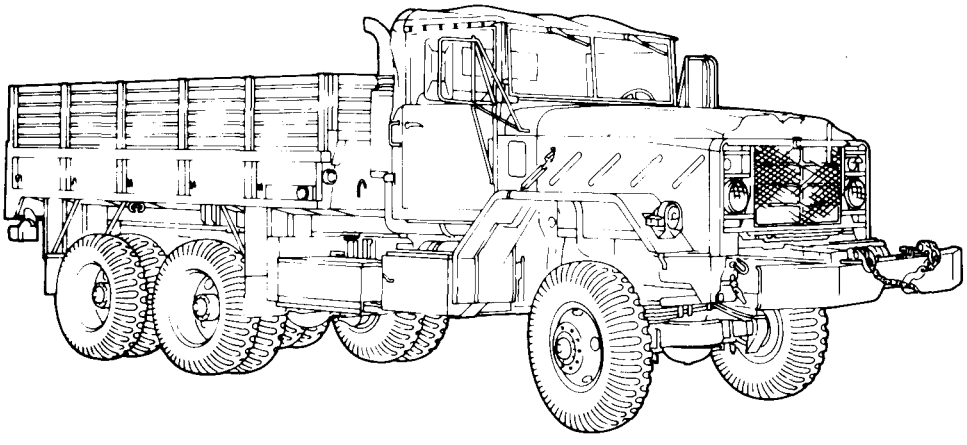
TECHNICAL MANUAL

DIRECT SUPPORT AND
GENERAL SUPPORT MAINTENANCE

TRUCK, 5-TON, 6X6, M939 AND M939A1 SERIES (DIESEL)



TRUCK, CARGO 5-TON, 6X6, DROPSIDE,
M923 (2320-01-050-2084), M923A1 (2320-01-206-4087),
M925 (2320-01-047-8769), M925A1 (2320-01-206-4088);
TRUCK, CARGO 5-TON, 6X6,
M924 (2320-01-047-8773), M924A1 (2320-01-205-2692),
M926 (2320-01-047-8772), M926A1 (2320-01-205-2693);
TRUCK, CARGO: 5 TON, 6X6, XLWB,
M927 (2320-01-047-8771), M927A1 (2320-01-206-4089),
M928 (2320-01-047-8770), M928A1 (2320-01-206-4090);
TRUCK, DUMP: 5-TON, 6X6,
M929 (2320-01-047-8756), M929A1 (2320-01-206-4079),
M930 (2320-01-047-8755), M930A1 (2320-01-206-4080);
TRUCK, TRACTOR 5-TON, 6X6,
M931 (2320-01-047-8753), M931Al (2320-01-206-4077),
M932 (2320-01 -047-8752), M932A1 (2320-01 -205-2684);
TRUCK, VAN, EXPANSIBLE: 5-TON, 6X6,
M934 (2320-01-047-8750), M934A1 (2320-01-205-2682),
M935 (2320-01-047-8751), M935A1 (2320-01-205-2683);
TRUCK, MEDIUM WRECKER: 5-TON, 6X6,
M936 (2320-01-047-8754), M936A1 (2320-01-206-4078)

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

JUNE 1986

CHANGE
NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *18 March 1991*

TECHNICAL MANUAL

VOLUME 2 OF 2
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE TRUCK, 5-TON, 6X6, M939, M39A1 AND M939A2 SERIES (DIESEL)

TRUCK, CARGO, DROPSIDE: 5-TON, 6X6
M923 (2320-01-050-2084), M923A1 (2320-01-206-4087), M923A2 (2320-01-230-0307),
M925 (2320-01-047-8769), M925A1 (2320-01-206-4088), M925A2 (2320-01-230-0308),
TRUCK, CARGO: 5-TON, 6X6,
M924 (2320-01-047-8773), M924A1 (2320-01-205-2692)
M926 (2320-01 -047-8772), M926A1 (2320-01 -205-2693)
TRUCK, CARGO, XLWB: 5-TON, 6X6,
M927 (2320-01-047-8771), M927A1 (2320-01-206-4089), M927A2 (2320-01-230-0309),
M928 (2320-01-047-8770), M928A1 (2320-01-206-4090), M928A2 (2320-01-230-0310),
TRUCK, DUMP, 5-TON, 6X6
M929 (2320-01-047-8756), M929A1 (2320-01-206-4079), M929A2 (2320-01-230-0305),
M930 (2320-01-047-8755), M930A1 (2320-01-206-4080), M930A2 (2320-01-230-0306),
TRUCK, TRACTOR: 5-TON, 6X6
M931 (2320-01-047-8753), M931A1 (2320-01-206-4077), M931A2 (2320-01-230-0302),
M932 (2320-01-047-8752), M932A1 (2320-01-205-2684), M932A2 (2320-01-230-0303),
TRUCK, VAN, EXPANSIBLE: 5-TON, 6X6,
M934 (2320-01-047-8750), M934A1 (2320-01-205-2682), M934A2 (2320-01-230-0300),
M935 (2320-01-047-8751), M935A1 (2320-01-205-2683), M935A2 (2320-01-230-0301),
TRUCK, MEDIUM WRECKER: 5-TON, 6X6,
M936 (2320-01-047-8754), M936A1 (2320-01-206-4078), M936A2 (2320-01-230-0304),

TM 9-2320-272-34-2, dated 10 June 1986, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page.

REMOVE PAGES	INSERT PAGES	REMOVE PAGES	INSERT PAGES
iii and iv	iii and iv	18-61 and 18-62	18-61 and 18-62
8-15 and 8-16	8-15 and 8-16	18-83 and 18-84	18-83 and 18-84
8-67 through 8-115	8-67 through 8-115	18-95 through 18-98	18-95 through 18-98
(8-116 Blank)	(8-116 Blank)	None	18.1 through 18.1-289
9-1 through 9-6	9-1 through 9-6		(18.1-290 Blank)
9-11 and 9-12	9-11 and 9-12	19-1 and 19-2	19-1 and 19-2
9-27 and 9-28	9-27 and 9-28	19-9 through 19-12	19-9 through 19-12
9-31 through 9-40	9-31 through 9-40	19-19 and 19-20	19-19 and 19-20
9-47 through 9-60	9-47 through 9-60	19-23 and 19-24	19-23 and 19-24

REMOVE PAGES	INSERT PAGES	REMOVE PAGES	INSERT PAGES
9-63 through 9-74	9-63 through 9-74	19-45 and 19-46	19-45 and 19-46
9-77 through 9-82	9-77 through 9-82	19-49 and 19-50	19-49 and 19-50
9-107 through 9-122	9-107 through 9-122	19–75 through 19-82	19-75 through 19-82
10-5 and 10-6	10-5 and 10-6	20-1 and 20-2	20-1 and 20-2
10-37 through 10-40	10-37 through 10-40	20-41 and 20-42	20-41 and 20-42
10-55 through 10–58	10-55 (10-56/10-57 Blank) and 10-58	20-57 (20-58 Blank)	20-57 (20-58 Blank)
		21-37 through 21-50	21-37 through 21-50.1
11-1 through 11-4	11-1 through 11-4		(21-50.2 Blank)
11-13 through 11-46	11-13 through 11-46	None	21-55 through 21-65
11-51 through 11-64	11-51 through 11-64		(21-66 Blank)
15-13 through 15-18	15-13 through 15-18	A-1 and A-2	A-1 and A-2
17-1 through 17-4	17-1 through 17-4	C-5 (C-6 Blank)	C-5 (C-6 Blank)
17-13 through 17-15	17-13 through 17-15	D-1 (D-2 Blank)	D-1 (D-2 Blank)
(17-16 Blank)	(17-16 Blank)	Index 1 through Index 16	Index 1 through Index 16
18-1 and 18-2	18-1 and 18–2		

3. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

PATRICIA P. HICKERSON
Colonel, United States Army
The Adjutant General

By Order of the Secretary of the Air Force;

MERRILL A. McPEAK
General, United States Air Force
Chief of Staff

Official;

CHARLES C. McDONALD
General, United States Air Force
Commander, Air Force Logistics Command

Distribution:

To be distributed in accordance with DA Form 12–38–E, Block 0388, Direct and General Support maintenance requirements for TM 9–2320–272–34–2.

TM 9-2320-272-34-2
TO 36A12-1C-452-2

CHANGE
NO. 1

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington D.C., *26 April 1990*

TECHNICAL MANUAL

VOLUME 2 OF 2

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE TRUCK, 5-TON, 6X6, M939, M939A1 AND M939A2 SERIES (DIESEL)

TRUCK, CARGO, DROPSIDE: 5-TON, 6X6,
M923 (2320-01-050-2084), M923A1 (2320-01-206-4087), M923A2 (2320-01-230-0307),
M925 (2320-01-047-8769), M925A1 (2320-01-206-4088); M925A2 (2320-01-230-0308),
TRUCK, CARGO: 5-TON, 6X6,
M924 (2320-01-047-8773), M924A1 (2320-01-205-2692),
M926 (2320-01-047-8772), M926A1 (2320-01-205-2693);
TRUCK, CARGO, XLWB: 5-TON, 6X6,
M927 (2320-01-047-8771), M927A1 (2320-01-206-4089), M927A2 (2320-01-230-0309),
M928 (2320-01-047-8770), M928A1 (2320-01-206-4090); M928A2 (2320-01-230-0310),
TRUCK, DUMP: 5-TON, 6X6,
M929 (2320-01-047-8756), M929A1 (2320-01-206-4079), M929A2 (2320-01-230-0305),
M930 (2320-01-047-8755), M930A1 (2320-01-206-4080); M930A2 (2320-01-230-0306),
TRUCK, TRACTOR: 5-TON, 6X6,
M931 (2320-01-047-8753), M931A1 (2320-01-206-4077), M931A2 (2320-01-230-0302),
M932 (2320-01-047-8752), M932A1 (2320-01-205-2684); M932A2 (2320-01-230-0303),
TRUCK, VAN, EXPANSIBLE: 5-TON, 6X6,
M934 (2320-01-047-8750), M934A1 (2320-01-205-2682), M934A2 (2320-01-230-0300),
M935 (2320-01-047-8751), M935A1 (2320-01-205-2683); M935A2 (2320-01-230-0301),
TRUCK, MEDIUM WRECKER: 5-TON, 6X6,
M936 (2320-01-047-8754), M936A1 (2320-01-206-4078) M936A2 (2320-01-230-0304),

TM 9-2320-272-34-2, 10 JUNE 1986, IS CHANGED AS FOLLOWS:

1. REMOVE OLD PAGES AND INSERT NEW PAGES AS INDICATED BELOW.
2. NEW OR CHANGED MATERIAL IS INDICATED BY A VERTICAL BAR IN THE MARGIN OF THE PAGE.

REMOVE PAGES	INSERT PAGES	REMOVE PAGES	INSERT PAGES
i and ii	i and ii	19-1 and 19-2	19-1 and 19-2
9-1 and 9-2	9-1 and 9-2	19-9 and 19-10	19-9 and 19-10
9-15 and 9-16	9-15 and 9-16	19-89 (19-90 blank)	19-89 (19-90 blank)
9-23 and 9-24	9-23 and 9-24	20-1 and 20-2	20-1 and 20-2
9-81 and 9-82	9-81 and 9-82	20-41 and 20-42	20-41 and 20-42
9-91 and 9-92	9-91 and 9-92	20-57 (20-58 blank)	20-57 (20-58 blank)
9-101 and 9-102	9-101 and 9-102	A-1 and A-2	A-1 and A-2
10-1 and 10-2	10-1 and 10-2		

3. FILE THIS CHANGE SHEET IN FRONT OF THE PUBLICATION FOR REFERENCE PURPOSES.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Offical:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

By Order of the Secretary of the Air Force:

LARRY D. WELCH
General, United States Air Force
Chief of Staff

CHARLES C. McDONALD
General, United States Air Force
Commander, Air Force Logistics Command

DISTRIBUTION:
To be distributed in accordance with DA Form 12-38 (Block No. 0388), Direct Support and General Support maintenance requirements for Truck, Diesel, 5-ton, 6x6, M939, and M939A1-series.

WARNING

EXHAUST GASES CAN KILL

1. DO NOT operate your vehicle engine in enclosed area.

2. DO NOT idle vehicle engine with cab windows closed.

3. DO NOT drive vehicle with inspection plates or cover plates removed.

4. BE ALERT at all times for exhaust odors.

5. BE ALERT for exhaust poisoning symptoms, they are:

- Headache
- Dizziness
- Sleepiness
- Loss of muscular control

6. If YOU SEE another person with exhaust poisoning symptoms:

- Remove person from area
- Expose to open air
- Keep person warm
- Do not permit person to move
- Administer artificial respiration, if necessary*

* For artificial respiration, refer to FM 21-11.

WARNING SUMMARY

- Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.
- Weight of vehicle must remain supported on jack stands at all times. Do not attempt to support weight of vehicle on hydraulic jack. Injury to personnel may result if jack fails.
- All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.
- Eyeshields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Compressed air source will not exceed 30 psi (207 kPa). When cleaning with compressed air, eyeshields must be worn. Failure to wear eyeshields may result in injury to personnel.
- Valve cover is under extreme tension. Do not remove all screws until limiting valve is positioned so vise will hold cover, or outer spring may fly out causing injury to personnel.
- Be careful when removing small retaining ring. Spring tension under “O” ring may release when retaining ring is removed, causing injury to personnel.

WARNING SUMMARY (Cont'd)

- Personnel must stand clear of vehicle when vehicle engine is running. Vehicle may suddenly move, causing injury to personnel.
- Adhesive material is flammable. Keep away from open flame, or injury to personnel may result.
- Use eyeshields when removing/installing door glass. Glass may shatter causing injury to personnel.
- Never work under dump body until safety braces are properly positioned. Injury to personnel may result if dump body suddenly lowers.
- Make sure dump control lever is in neutral and not moved. Injury to personnel may result if lift cylinder is operated when not secured.
- The elevating cylinder is heavy. Remove/install with the aid of assistant and a lifting device, or injury to personnel may result.
- Before hoisting outer boom away from/onto wrecker, make sure inner boom is properly fastened to outer boom, or injury to personnel may result.
- Inner boom must be supported at sheave to prevent tilting until hoist chain can be properly positioned around inner boom, or injury to personnel may result.
- Make sure all lines are fastened clear of the gondola to avoid snagging during removal or injury to personnel may result.
- Keep hydraulic oil reservoir away from open flame during inspection or repair. Failure to do this may result in injury to personnel.
- The front/rear winch is heavy. Use hoist during repair, or injury to personnel may result.

TECHNICAL MANUAL
NO. 9-2320-272-34-2

TECHNICAL ORDER
NO. 36A12-1C-452-2

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

Washington D. C., 26 April 1990

TECHNICAL MANUAL

VOLUME 2 OF 2

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE TRUCK, 5-TON, 6X6, M939, M939A1 AND M939A2 SERIES (DIESEL)

Model		NSN Without Winch	NSN With Winch
Truck, Cargo, Dropside	M923	2320-01-050-2084	
Truck, Cargo, Dropside	M923A1	2320-01-206-4087	
Truck, Cargo, Dropside	M923A2	2320-01-230-0307	
Truck, Cargo, Dropside	M925		2320-01-047-8769
Truck, Cargo, Dropside	M925A1		2320-01-206-4088
Truck, Cargo, Dropside	M925A2		2320-01-230-0308
Truck, Cargo	M924	2320-01-047-8773	
Truck, Cargo	M924A1	2320-01-205-2692	
Truck, Cargo	M926		2320-01-047-8772
Truck, Cargo	M926A1		2320-01-205-2693
Truck, Cargo, XLWB	M927	2320-01-047-8771	
Truck, Cargo, XLWB	M927A1	2320-01-206-4089	
Truck, Cargo, XLWB	M927A2	2320-01-230-0309	
Truck, Cargo, XLWB	M928		2320-01-247-8770
Truck, Cargo, XLWB	M928A1		2320-01-206-4090
Truck, Cargo, XLWB	M928A2		2320-01-230-0310
Truck, Dump	M929	2320-01-04708756	
Truck, Dump	M929A1	2320-01-206-4079	
Truck, Dump	M929A2	2320-01-230-0305	
Truck, Dump	M930		2320-01-047-8755
Truck, Dump	M930A1		2320-01-206-4080
Truck, Dump	M930A2		2320-01-230-0306
Truck, Tractor	M931	2320-01-047-8753	
Truck, Tractor	M931A1	2320-01-206-4077	
Truck, Tractor	M931A2	2320-01-230-0302	
Truck, Tractor	M932		2320-01-047-8752
Truck, Tractor	M932A1		2320-01-205-2684
Truck, Tractor	M932A2		2320-01-230-0303
Truck, Van, Expansible	M934	2320-01-047-8750	
Truck, Van, Expansible	M934A1	2320-01-205-2682	
Truck, Van, Expansible	M934A2	2320-01-230-0300	
Truck, Van, Expansible, W/HLG	M935	2320-01-047-8751	
Truck, Van, Expansible, W/HLG	M935A1	2320-01-205-2683	
Truck, Van, Expansible, W/HLG	M935A2	2320-01-230-0301	
Truck, Medium Wrecker	M936		2320-01-047-8754
Truck, Medium Wrecker	M936A1		2320-01-206-4078
Truck, Medium Wrecker	M936A2		2320-01-230-0304

This manual is published in two parts. TM 9-2320-272-34-1 contains chapters 1 through 7, and TM 9-2320-272-34-2 contains chapters 8 through 21, appendices A, B, C, D, and E.

This manual contains a table of contents and alphabetized index for chapters 8 through 21.

* This publication supersedes TM 9-2320-272-34-2 dated 8 October 1982 and all changes.

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
TRUCK, 5-TON, 6X6, M939, M939A1 AND M939A2 SERIES
(DIESEL)

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, Michigan 48397-5000. A reply will be furnished to you.

VOLUME 2 OF 2

CHAPTER 8
TRANSFER CASE MAINTENANCE

Section I. DESCRIPTION AND DATA

8-1. GENERAL

This section provides various operating functions of the transfer case and its components. Tabulated data for the transfer case is provided in table 8-1.

8-2. DESCRIPTION - TRANSFER CASE

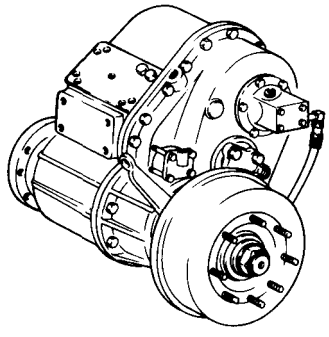
a. The transfer case is a gearbox located between the transmission and forward-rear axle. Its purpose is to transfer driving power from the transmission to the front axle as well as the rear axles. It also provides an extra gear reduction (low range operation, refer to TM 9-2320-272 -10). The drop box design enables the front axle propeller shaft to clear the underside of the engine.

b. The transfer case is equipped with an air-operated front-wheel drive shift cylinder, electrically-actuated interlock system and an air-actuated interlock cylinder.

1) The front-wheel drive automatically engages when the transfer case is shifted to low range.

2) The electrically-actuated interlock valve system is to prevent transfer case engagement when transmission is not in neutral. Electrical power supplied from transfer case switch energizes the interlock solenoid and dumps air pressure into the atmosphere. This releases pressure from the interlock air cylinder and the transfer case can be shifted.

c. The transfer case is equipped with an oil pump and speedometer drive gear.



TRANSFER CASE

Table 8-1. Transfer Case Tabulated Data

Make	Rockwell
Model	T-1138
Type	Two-speed with front-wheel drive
Ratios:	
Low speed	1.790 to 1
High speed	0.732 to 1
Speedometer output	2.050 to 1
Lubrication capacity	10 pints (4.73 liters)
Front axle declutch	Air operated
Oil pump	Constant running, self-priming reversible
Parking brake size	12 in. dia. x 3 in. width (304.8 x 76.2 mm)
Dry weight	550 pounds (249.7 kg)

TA 350412

Section II. TRANSFER CASE AND COMPONENTS MAINTENANCE

8-3. TRANSFER CASE MAINTENANCE TASK SUMMARY

8-4. TRANSFER CASE INTERLOCK VALVE REPLACEMENT

This task covers:

a. Removal b. Installation

INITIAL SETUP:

Applicable Models
All except M936

Test Equipment
None

Special Tools
None

Materials/Parts
Lockwasher
Two locknuts
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-10
TM 9-2320-272-20-2

Condition Description
Parking brake set.
Air reservoirs drained.
Dump spare tire carrier removed (M929 and M930 only).

Special Environmental Conditions
None

General Safety Instructions
Do not disconnect air lines before draining air reservoirs.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

WARNING

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

NOTE

Tag air lines and wires for installation.

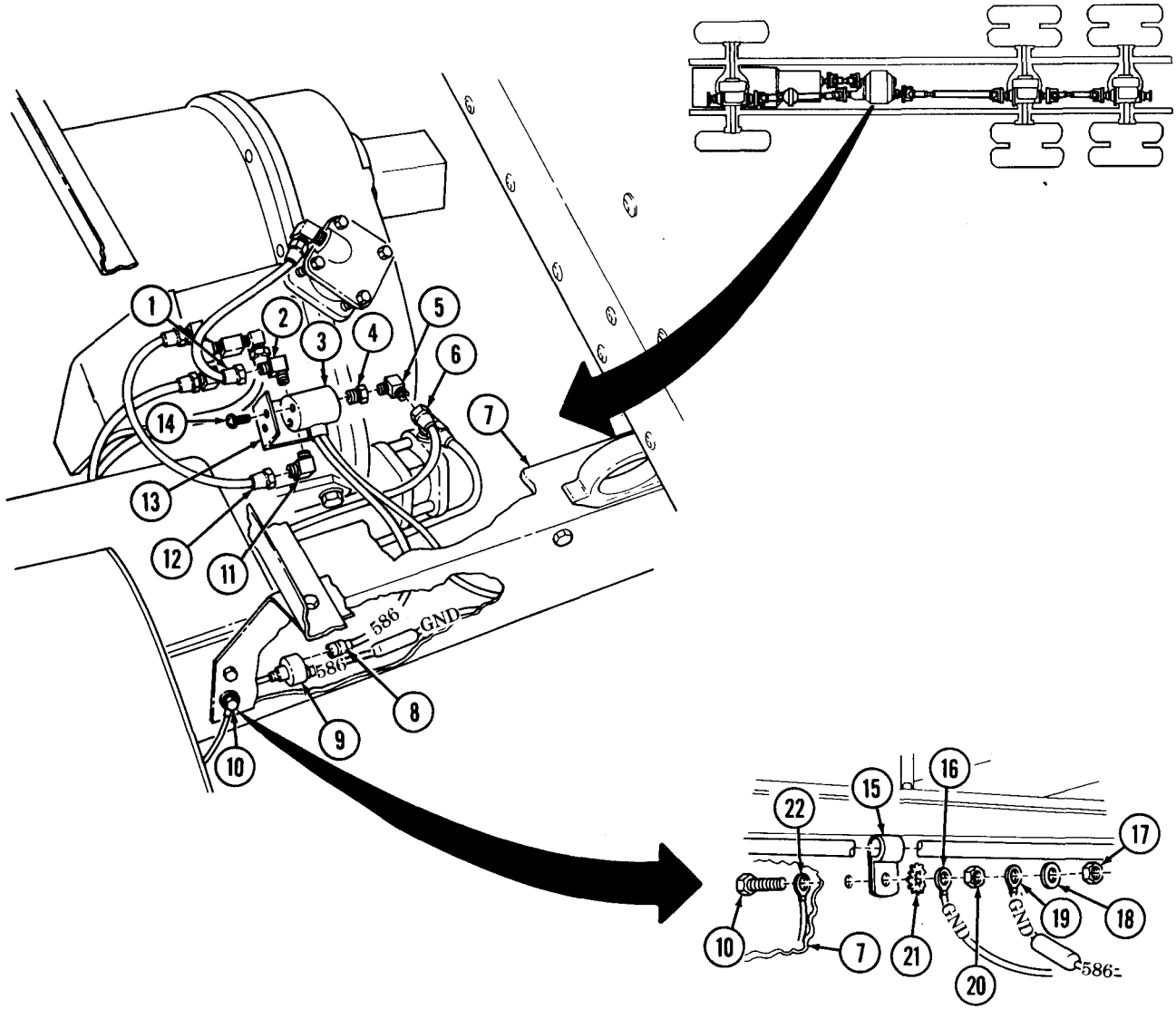
1.	Adapter elbow (5)	Interlock valve supply line (6)	Disconnect.	
2.	Adapter elbow (2)	Air cylinder supply line (1)	Disconnect.	
3.	Adapter elbow (11)	Vent line (12)	Disconnect.	
4.	Connector (9)	Wire (8)	Disconnect.	

NOTE

Assistant will help with step 5.

8-4. TRANSFER CASE INTERLOCK VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Frame (7)	Locknut (17), washer (18), diode ground wire (19), locknut (20), interlock valve ground wire (16), lockwasher (21), cable clamp (15), wire (22), and screw (10)	Remove.	Discard lockwasher (21) and two locknuts (17) and (20).
6.	Bracket (13)	Two screws (14) and interlock valve (3)	Remove.	
7.	Interlock valve (3)	Three adapter elbows (2), (5), (11), and adapter (4)	Remove.	



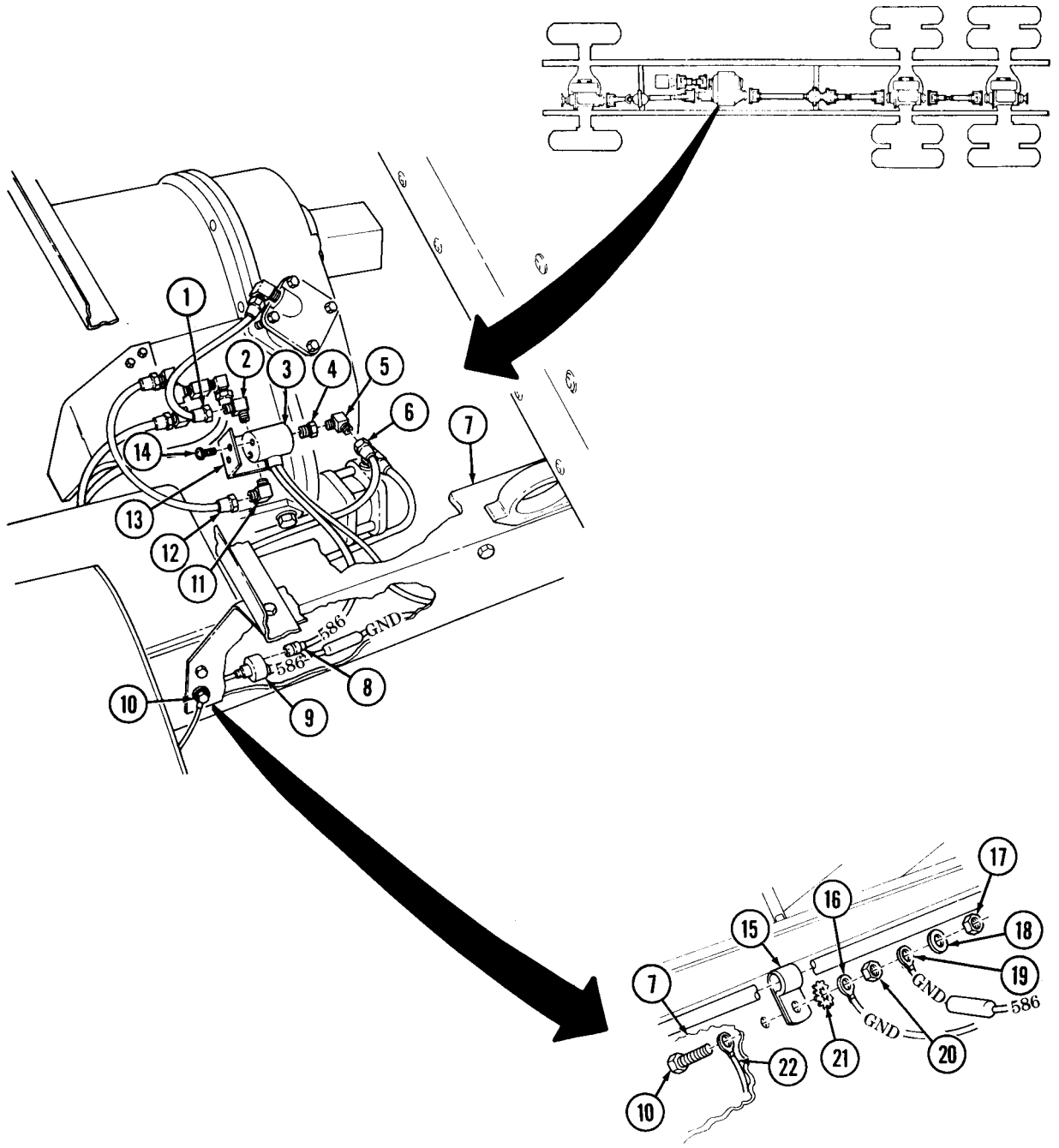
TA 350413

8-4. TRANSFER CASE INTERLOCK VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
		NOTE Clean all male pipe threads and wrap with sealing tape before installation.		
8.		Elbow (2), adapter (4), and two elbows (5) and (11)	Install on interlock valve (3).	
9.		Interlock valve (3)	Install on bracket (13) with two screws (14).	
		NOTE Assistant will help with step 10.		
10.		Interlock valve ground wire (16)	Install on frame (7) with screw (10), wire (22), cable clamp (15), new lockwasher (21), new locknut (20), diode ground wire (19), washer (18), and new locknut (17).	
11.		Wire (8)	Connect to connector (9).	
12.		Vent line (12)	Connect to elbow (11).	
13.		Air cylinder supply line (1)	Connect to elbow (2).	
14.		Interlock valve supply line (6)	Connect to elbow (5).	

8-4. TRANSFER CASE INTERLOCK VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Start engine (TM 9-2320-272-10) and allow air pressure to build to normal operating range. Check interlock valve for leaks. Road test vehicle.
- Install dump spare tire carrier (M929 and M930) (TM 9-2320-272-20-2).

TA 350414

8-5. TRANSFER CASE INTERLOCK VALVE (M936) REPLACEMENT

This task covers:

a. Removal b. Installation

INITIAL SETUP:

Applicable Models
M936

Equipment Condition Reference
TM 9-2320-272-10 Para. 8-19

Condition Description
Parking brake set.
Transfer case (M936) removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions.
None

Materials/Parts
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

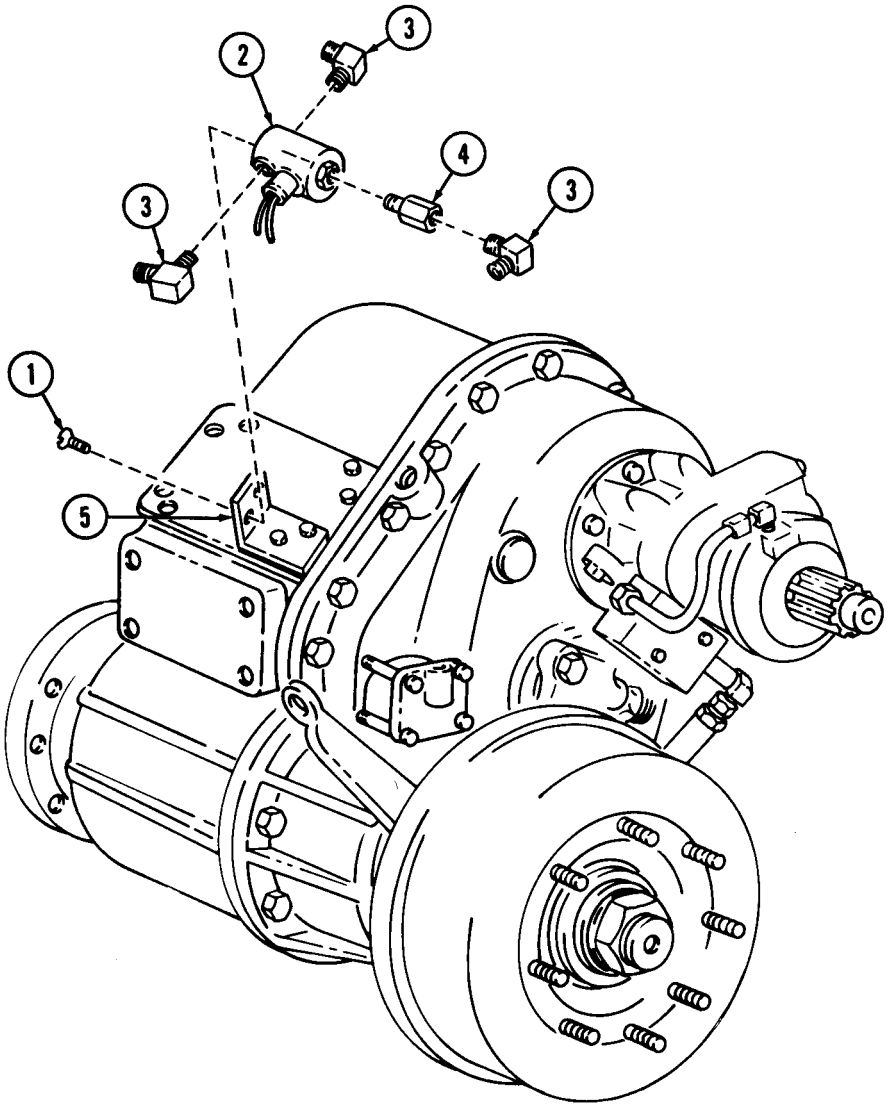
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Interlock valve bracket (5)	Two screws (1) and interlock valve (2)	Remove.	
2.	Interlock valve (2)	Three elbows (3) and adapter (4)	Remove.	
	b. Installation			
		NOTE Wrap all male pipe threads with sealing tape before installation.		
3.		Adapter (4) and three elbows (3)	Install on interlock valve (2).	
4.		Interlock valve (2)	Install on interlock valve bracket (5) with two screws (1).	

8-5. TRANSFER CASE INTERLOCK VALVE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install transfer case (M936) (para. 8-19).

8-6. TRANSFER CASE INTERLOCK AIR CYLINDER REPLACEMENT

This task covers:

a. Removal b. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Air resevoirs drained.
	Para. 8-19	Transfer case removed (M936 only).
	TM 9-2320-272-10	Spare tire removed (M923, M924, and M929 only)
	TM 9-2320-272-10	Dump body raised (M929 only).

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

Do not disconnect air lines before draining air reservoirs.

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

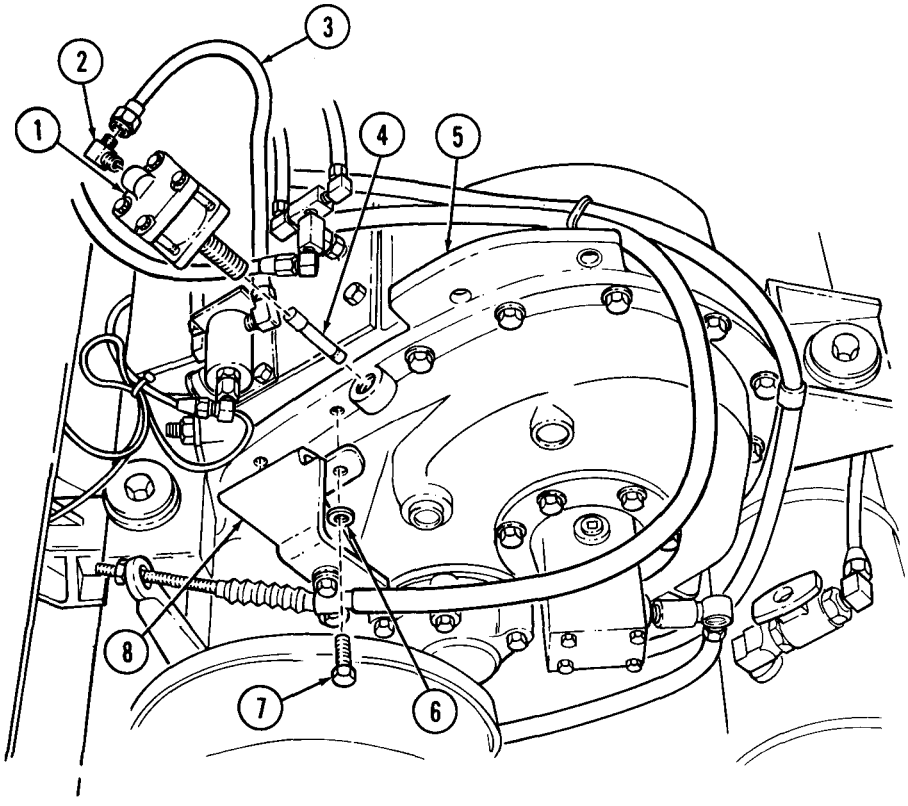
Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

a. Removal

1.	Elbow (2)	Interlock air cylinder supply line (3)	Disconnect.	
2.	Bracket (8)	Two screws (7) and washers (6)	Remove.	
3.		Bracket (8)	Remove.	
4.	Transfer case (5)	Air interlock cylinder (1) and pushrod (4)	Remove.	
5.	Air interlock cylinder (1)	Elbow (2)	Remove.	Replace if cracked or threads are stripped.

8-6. TRANSFER CASE INTERLOCK AIR CYLINDER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
		NOTE Wrap all male pipe threads with sealing tape before installation.		
6.		Elbow (2)	Install on interlock air cylinder (1).	
7.		Pushrod (4) and interlock air cylinder (1)	Install on transfer case (5).	
8.		Interlock air cylinder supply line (3)	Connect to elbow (2).	
9.		Bracket (8)	Install with two washers (6) and screws (7).	



END OF TASK!

FOLLOW-ON TASKS:
- Install transfer case (M936 only) (para. 8-19).
- Install spare tire (M923, M924, and M929 only) (TM 9-2320-272-10).
- Lower dump body (M929 only) (TM 9-2320-272-10).
- Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range. Check for air leaks. Road test vehicle.

8-7. TRANSFER CASE FRONT AXLE ENAGEMENT AIR CYLINDER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Air reservoirs drained.
	TM 9-2320-272-20-1	Transfer case to forward-rear axle propeller shaft removed (M936 only).

Test Equipment
None

Special Tools
None

Materials/Parts
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Special Environmental Conditions
None

General Safety Instructions
Do not disconnect air lines before draining air reservoirs.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

a. Removal

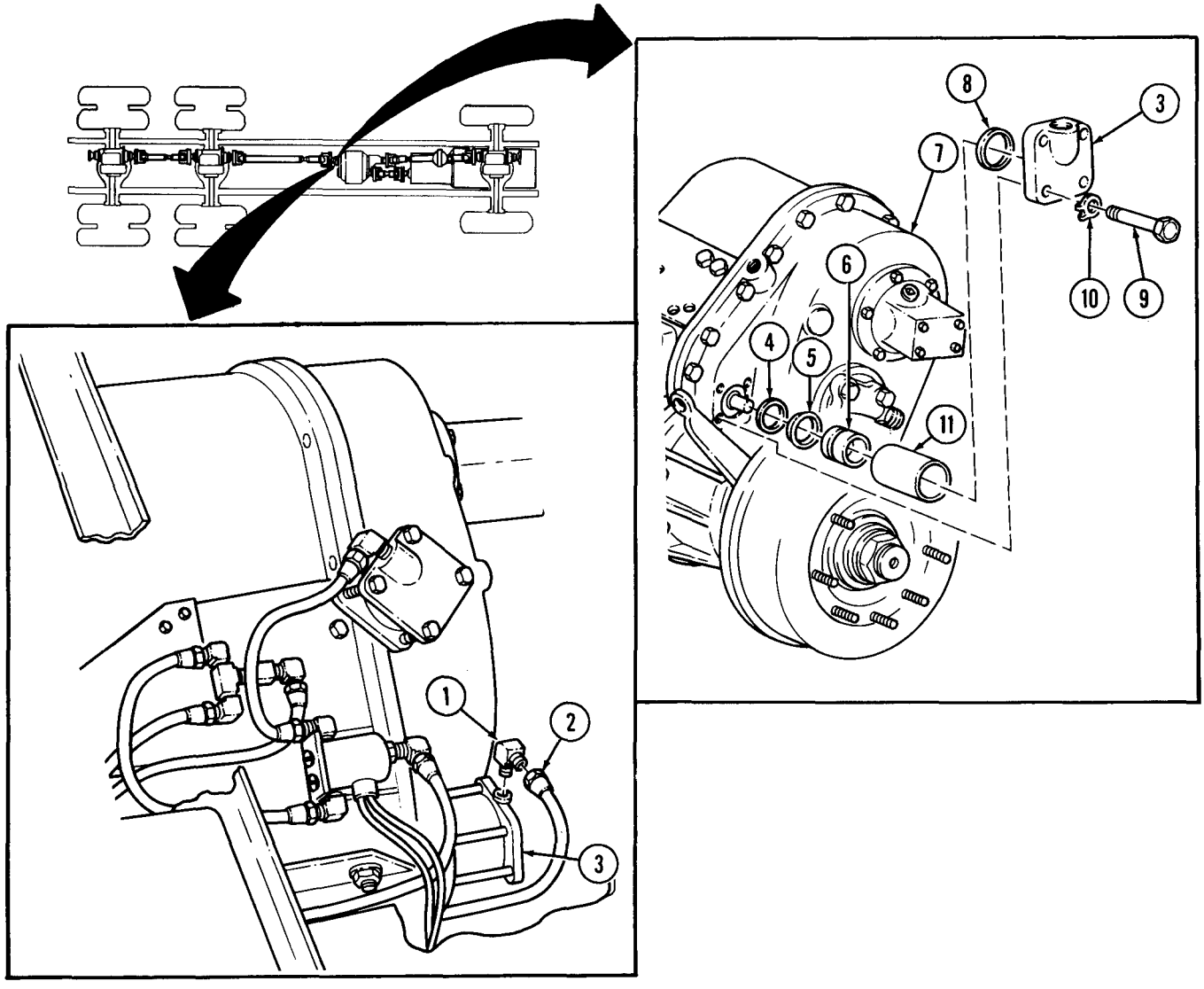
1.	Elbow (1)	Air supply line (2	Disconnect.	
2.	Air cylinder cover (3)	Elbow (1)	Remove.	
3.	Transfer case cover (7)	Four screws (9) and locking tabs (10), air cylinder cover (3), and brass washer (8)	Remove.	
4.		Air cylinder (11), plunger (6), seal (5), and brass washer (4)	Remove.	

b. Installation

5.		Brass washer (4), cylinder (11), seal (5), plunger (6), brass washer (8), and air cylinder cover (3)	Install on transfer case cover (7) with four locking tabs (10) and screws (9).	Tighten 6-10 lb-ft (8-14 N·m). Make sure locking tabs (10) are bent to prevent screws (9) from loosening.

8-7. TRANSFER CASE FRONT AXLE ENGAGEMENT AIR CYLINDER REPLACEMENT (Cont'd)

Step NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Clean all male pipe threads and wrap with sealing tape before installation.		
6.		Elbow (1)	Install on air cylinder cover (3).	
7.		Air supply line (2)	Connect to elbow (1).	



END OF TASK!

FOLLOW-ON TASK: Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range. Check front axle engagement air cylinder for leaks. Road test vehicle.

TA 350417

8-8. TRANSFER CASE FRONT AXLE ENGAGEMENT CONTROL VALVE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Air reservoirs drained.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two lockwashers
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Do not disconnect air lines before draining air reservoirs.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

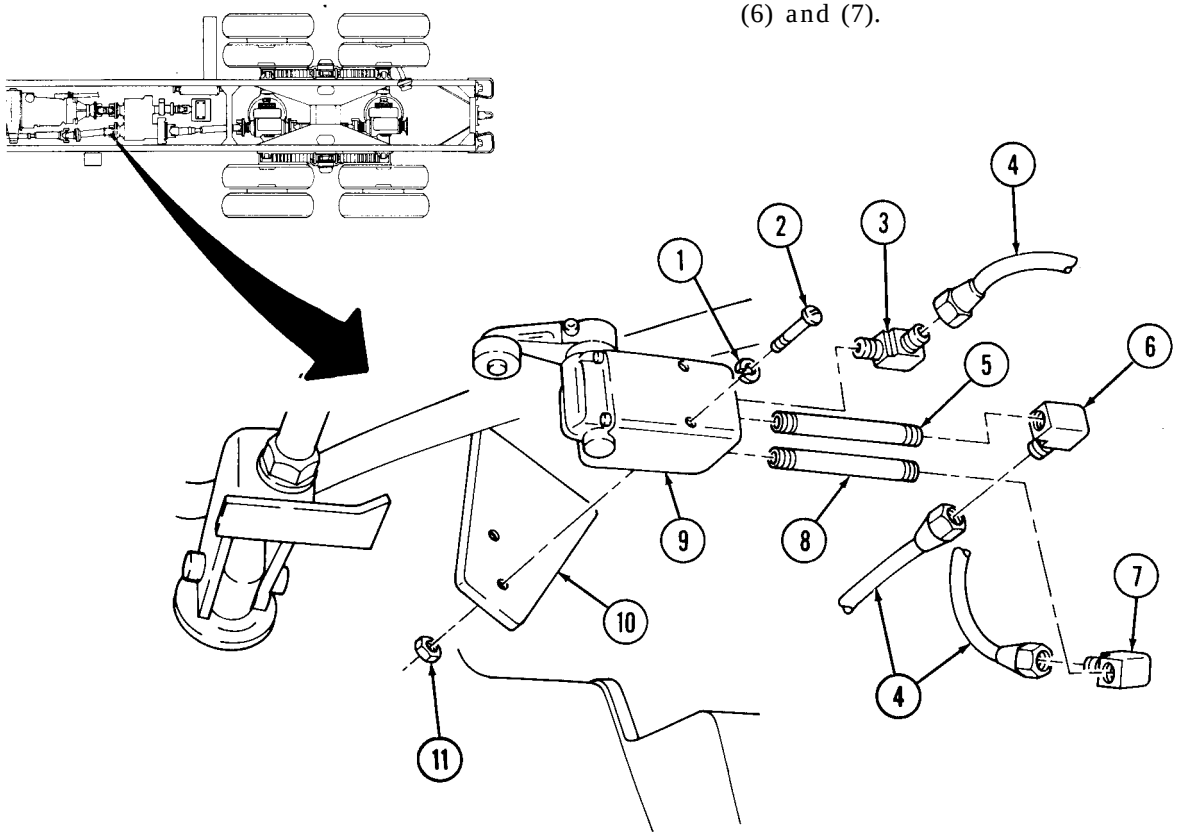
Do not disconnect air lines before draining air reservoirs. Small parts under pressure will shoot out with high velocity, causing injury to personnel.

a. Removal

1.	Adapter elbow (3) and elbows (6) and (7)	Three air lines (4)	Remove.	Tag for installation.
2.	Control valve (9)	Elbow (7) and pipe (8)	Remove.	Tag pipe (8) for installation.
3.		Elbow (6) and pipe (5)	Remove.	Tag pipe (5) for installation.
4.		Adapter elbow (3)	Remove.	
5.	Front transfer case bracket (10)	Two screws (2) and lockwashers (1), and control valve (9)	Remove.	Discard lockwashers (1).

8-8. TRANSFER CASE FRONT AXLE ENGAGEMENT CONTROL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
		NOTE Wrap all male pipe threads with sealing tape before installation.		
6.		Control valve (9)	Install on front transfer case bracket (10) with two screws (2) and new lockwashers (1).	
7.		Adapter elbow (3)	Install on control valve (9).	
8.		Pipe (5) and elbow (6)	Install on control valve (9).	
9.		Pipe (8) and elbow (7)	Install on control valve (9).	
10.		Three air lines (4)	Connect to adapter elbow (3) and elbows (6) and (7).	



END OF TASK!

FOLLOW-ON TASK: Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range. Check for air leaks and proper front axle engagement. Road test vehicle.

TA 350418

8-9. TRANSFER CASE SHIFT LEVER MAINTENANCE

This task covers:

a. Removal
b. Cleaning, Inspection, and Repair
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 Para. 8-14	Parking brake set. Transfer case switch removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins
Crocus cloth (Appendix C, Item 6)

Personnel Required
Wheeled vehicle repairman MOS 63W

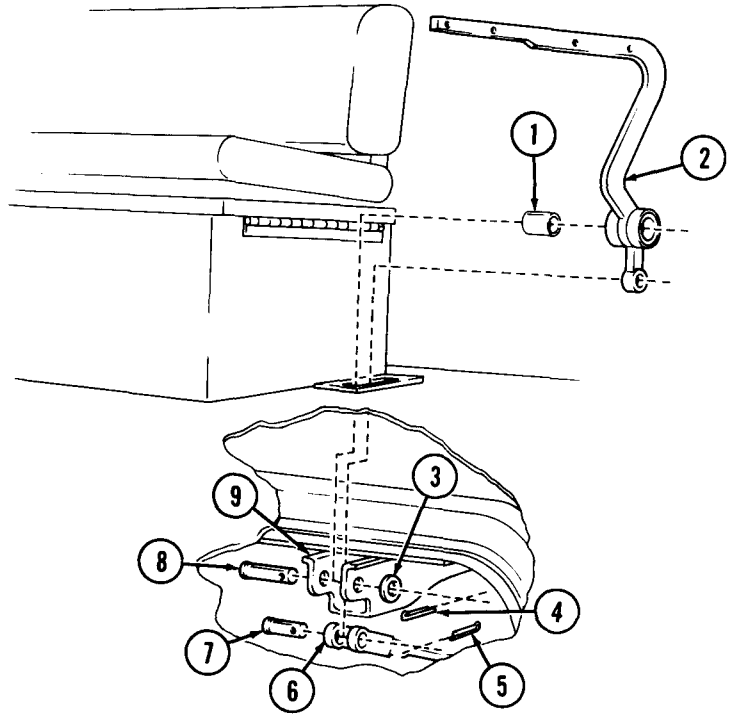
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Shift lever (2) to shift rod (6)	Cotter pin (5) and clevis pin (7)	Remove.	Discard cotter pin (5).
2.	Shift lever (2) to shift lever bracket (9)	Cotter pin (4), washer (3), pivot pin (8), and shift lever (2)	Remove.	Discard cotter pin (4).
		b. Cleaning, Inspection, and Repair		
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
3.		Shift lever (2)	a. Clean with drycleaning solvent.	
			b. Inspect for cracks or breaks.	Replace shift lever (2) if cracked or broken.
4.		Shift lever bushing (1)	a. Inspect for cracks, breaks, and pits.	Replace bushing (1) if cracked or broken. If pitted, remove with crocus cloth.

8-9. TRANSFER CASE SHIFT LEVER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Perform steps 4b and 5 if bushing (1) is to be replaced.		
			b. Remove from shift lever (2).	Use arbor press and mandrel.
5.		New shift lever bushing (1)	Install into shift lever (2).	Use arbor press and mandrel.
c. Installation				
6.		Shift lever (2)	a. Install on shift lever bracket (9) with pivot pin (8), washer (3), and new cotter pin (4). b. Install on shift rod (6) with clevis pin (7) and new cotter pin (5).	



END OF TASK!

FOLLOW-ON TASK: Install transfer case switch (para. 8-14).

TA 350419

8-10. TRANSFER CASE SHIFT LEVER SHIFT ROD MAINTENANCE

This task covers:

a. Removal
b. Adjustment
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins

Personnel Required
Wheeled vehicle repairman MOS 63W

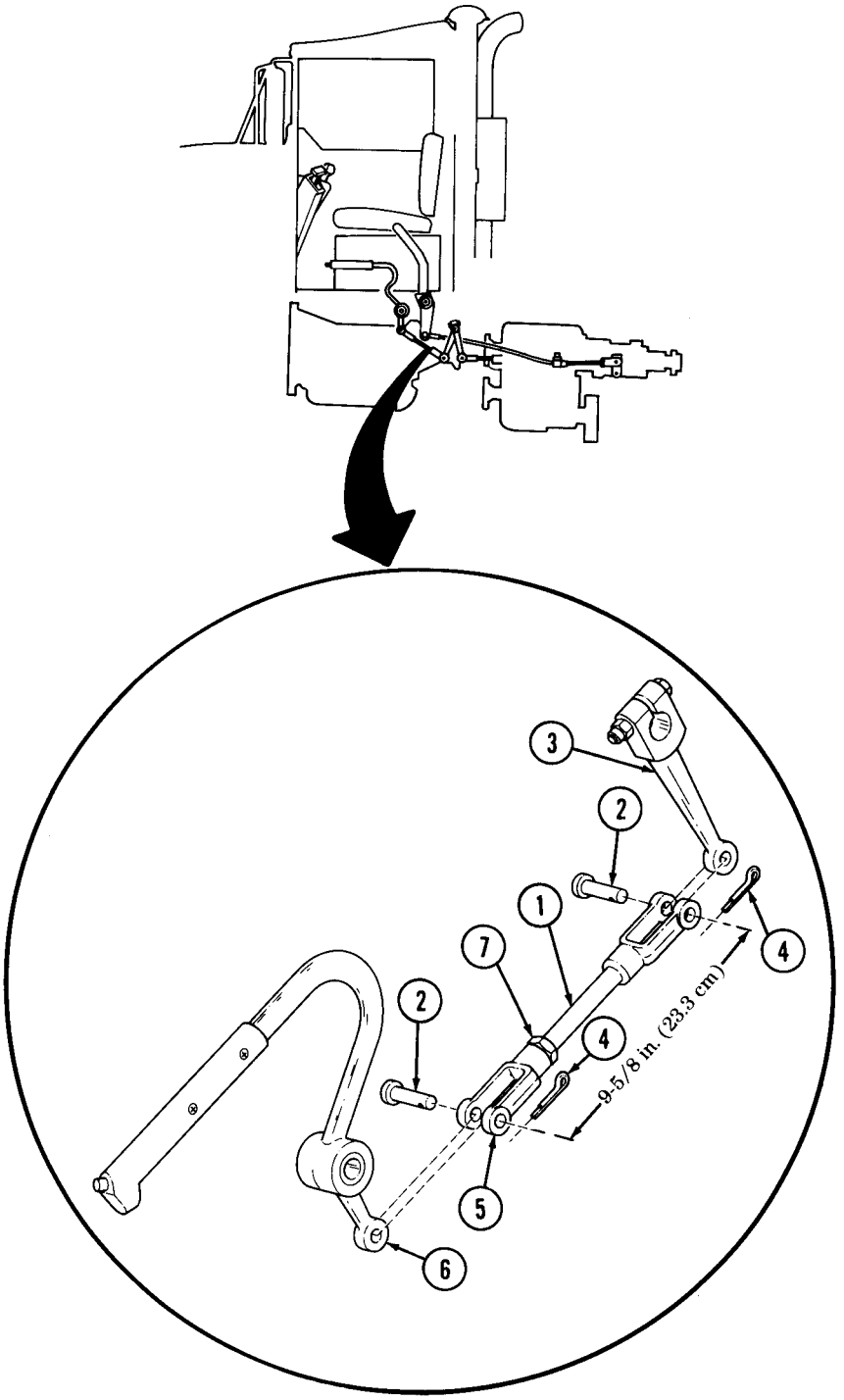
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Cross-shaft lever (3) and transfer case shift lever (6)	Two cotter pins (4) and clevis pins (2) and shift rod (1)	Remove.	Discard two cotter pins (4).
	b. Adjustment			
2.	Shift rod (1)	Jamnut (7)	Loosen.	
3.		Clevis (5)	Adjust until distance between centers of holes at either end of clevis (5) is 9-5/8 in. (23.3 cm).	
4.		Jamnut (7)	Install against clevis (5).	
	c. Installation			
5.		Shift rod (1)	Install on transfer case shift lever (6) and cross-shaft lever (3) with two clevis pins (2) and new cotter pins (4).	

8-10. TRANSFER CASE SHIFT LEVER SHIFT ROD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Check transfer case shift lever for proper operation (TM 9-2320-272- 10). Road test vehicle.

TA 350420

8-11. TRANSFER CASE CROSS-SHAFT REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins
Two woodruff keys

Personnel Required
Wheeled vehicle repairman MOS 63W

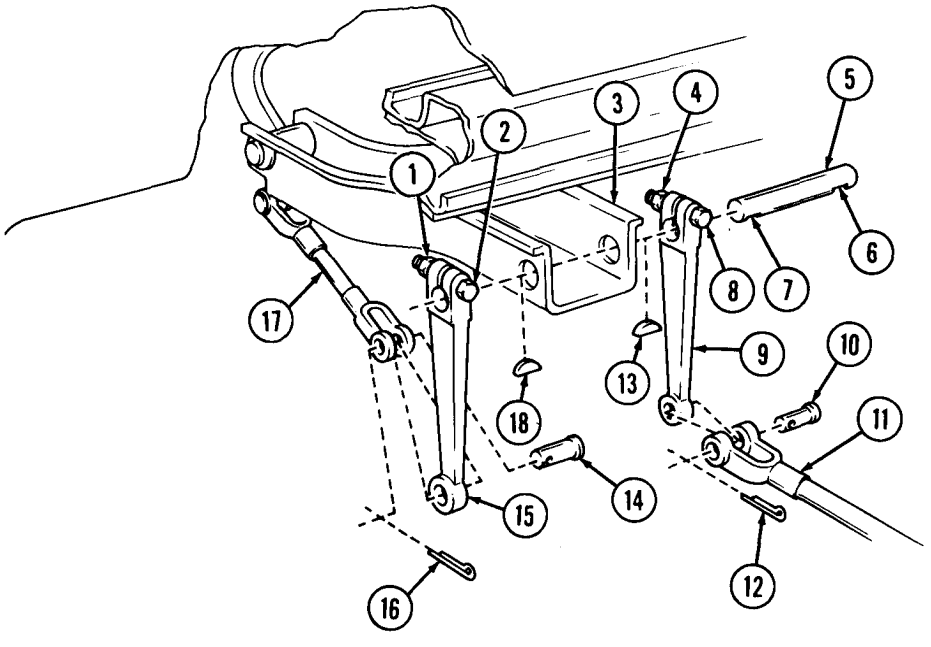
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Shift lever shift rod (17) to cross-shaft lever (15)	Cotter pin (16) and clevis pin (14)	Remove.	Discard cotter pin (16).
2.	Transfer case shift rod (11) to cross-shaft lever (9)	Cotter pin (12) and clevis pin (10)	Remove.	Discard cotter pin (12).
3.	Cross-shaft lever (15)	Locknut (1) and screw (2)	Loosen, and remove cross-shaft lever (15) from cross-shaft (5).	
4.	Cross-shaft (5)	Woodruff key (18)	Remove from slot (7).	Discard woodruff key (18).
5.	Cross-shaft lever (9)	Locknut (4) and screw (8)	Loosen, and remove cross-shaft lever (9) and cross-shaft (5) from cross-shaft bracket (3).	
6.	Cross-shaft (5)	Cross-shaft lever (9)	Remove.	
7.		Woodruff key (13)	Remove from slot (6).	Discard woodruff key (13).

8-11. TRANSFER CASE CROSS-SHAFT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
8.		Cross-shaft lever (9) and new woodruff key (13)	Install on cross-shaft (5) and in slot (6).	
9.		Cross-shaft (5)	Install on cross-shaft bracket (3).	
10.		New woodruff key (18)	Install in slot (7) on cross-shaft (5).	
11.		Cross-shaft lever (15)	Install on cross-shaft (5).	
12.		Screws (2) and (8) and locknuts (1) and (4)	Tighten.	
13.		Transfer case shift rod (11)	Install on cross-shaft lever (9) with clevis pin (10) and new cotter pin (12).	
14.		Shift lever shift rod (17)	Install on cross-shaft lever (15) with clevis pin (14) and new cotter pin (16).	



END OF TASK!

FOLLOW-ON TASK: Check transfer case shift lever for proper operation (TM 9-2320-272-10). Road test vehicle.

TA 350421

8-12. TRANSFER CASE SHIFT ROD MAINTENANCE

This task covers:

a. Removal
b. Cleaning, Inspection, and Repair
c. Adjustment
d. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins
Lockwasher

Personnel Required
Wheeled vehicle repairman MOS 63W

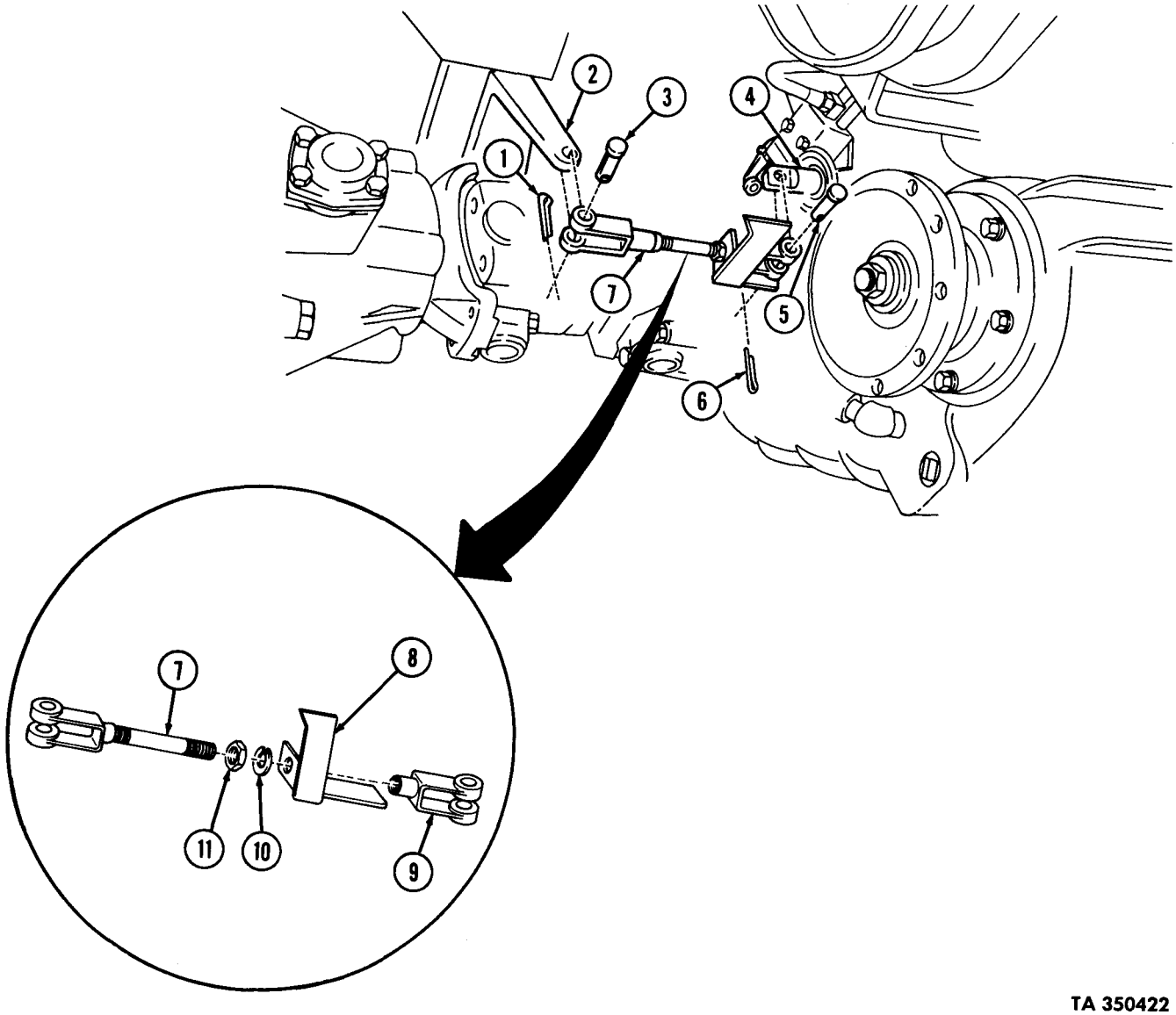
General Safety Instructions
Keep tire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Shift rod (7) to shift shaft (4)	Cotter pin (6) and clevis pin (5)	Remove, and disconnect shift rod (7).	Discard cotter pin (6).
2.	Shift rod (7) to cross-shaft lever (2)	Cotter pin (1) and clevis pin (3)	Remove, and disconnect shift rod (7).	Discard cotter pin (l).
		b. Cleaning, Inspection, and Repair		
			WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.	
3.		Shift rod (7)	a. Clean with drycleaning solvent.	
			b. Inspect for cracks, breaks, and bends.	Replace shift rod (7) if cracked, broken, or bent.
4.		Valve cam (8)	a. Inspect for cracks, breaks, and bends.	If cracked, broken, or bent, replace.

8-12. TRANSFER CASE SHIFT ROD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Perform steps 4b and 5 only if valve cam is to be replaced.	
			b. Unscrew clevis (9) and remove valve cam (8), lockwasher (11) from shift rod (7).	Place in soft-jawed vise. Discard lockwasher (10).
5.		New valve cam (8)	Install on shift rod (7) with jamnut (11), new lockwasher (10), and clevis (9).	



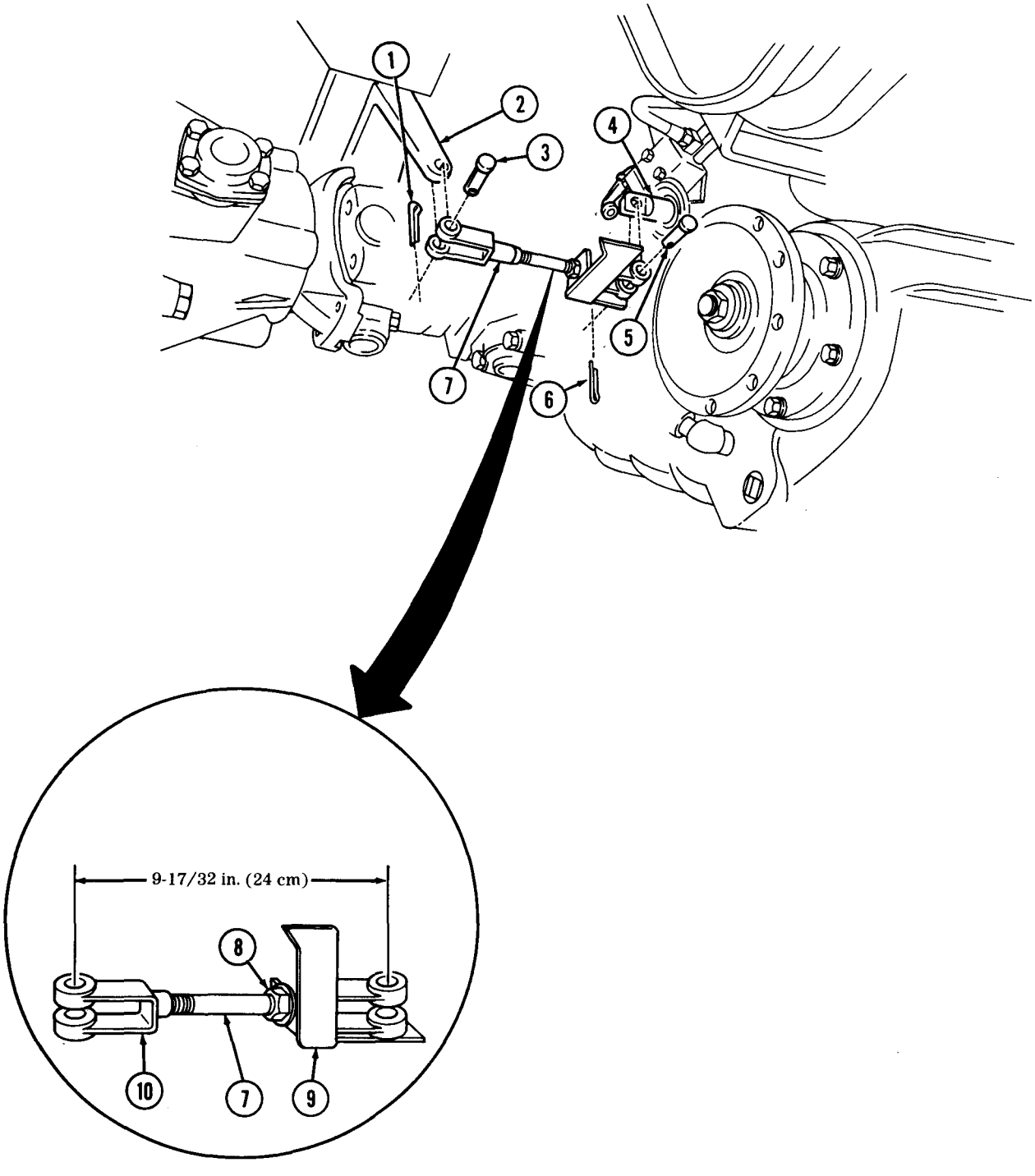
TA 350422

8-12. TRANSFER CASE SHIFT ROD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Adjustment				
6.	Valve cam (9)	Jamnut (8) on shift rod (7)	Loosen.	
7.		Clevis (10)	Adjust until distance between centers of both clevis holes is 9-17/32 in. (24 cm).	
8.		Jamnut (8)	Tighten.	Remove from soft-jawed vise.
d. Installation				
9.		Shift rod (7)	a. Install on cross-shaft lever (2) with clevis pin (3) and new cotter pin (1). b. Install on shift shaft (4) with clevis pin (5) and new cotter pin (6).	

8-12. TRANSFER CASE SHIFT ROD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Check transfer case shift lever for proper operation (TM 9-2320-272-10). Road test vehicle.

TA 350423

8-13. TRANSFER CASE SPEEDOMETER DRIVE GEAR AND DRIVEN SHAFT REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	LO 9-2320-272-12	Transfer case drained.
	TM 9-2320-272-20-2	Parking brakeshoes and dustcovers removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Woodruff key
Snapring
Gasket sealant (Appendix C, Item 13)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

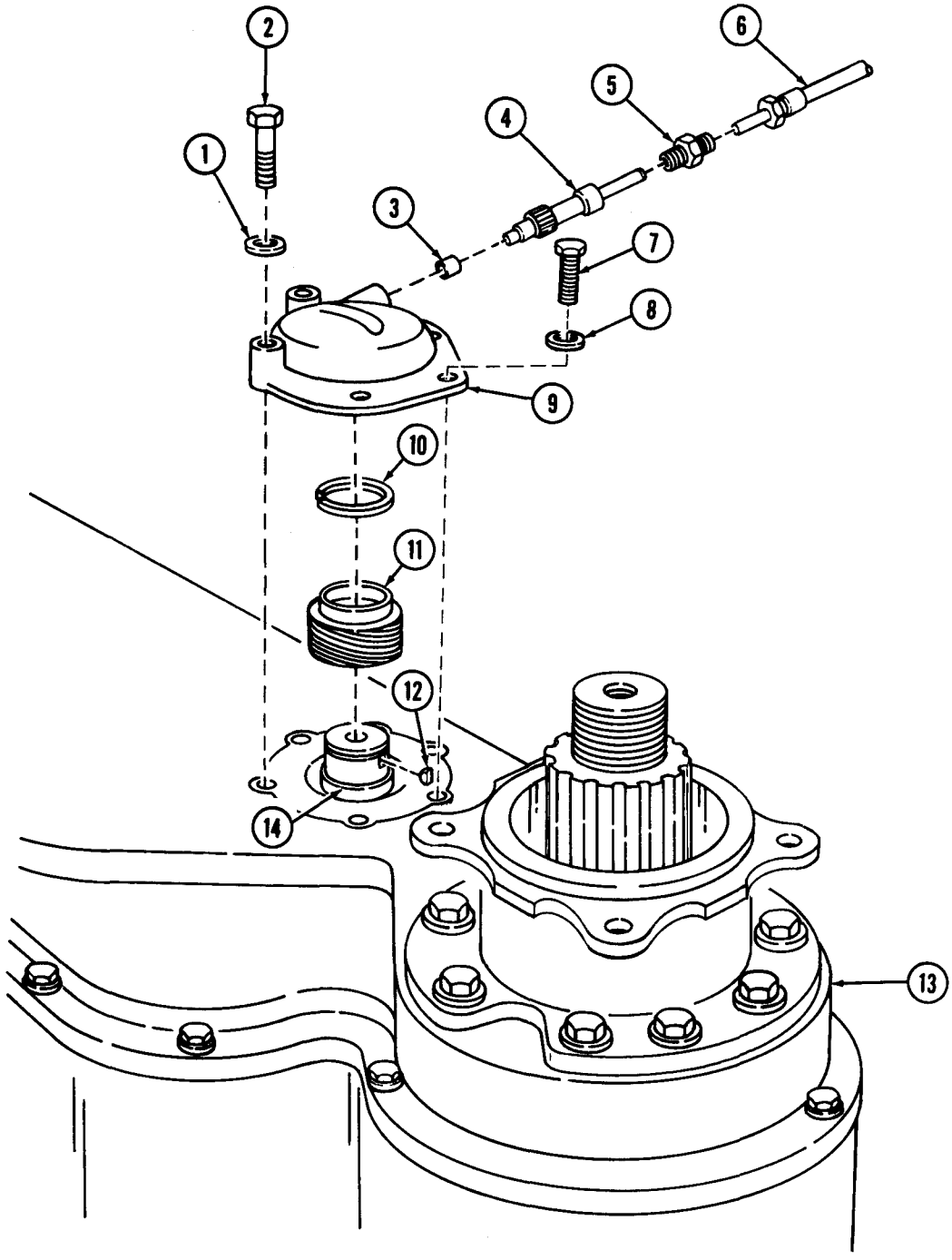
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Speedometer drive adapter (5)	Speedometer drive shaft (6)	Disconnect.	
2.	Transfer case (13)	Two screws (2) and washers (1), four screws (7) and washers (8), and speedometer drive gear cover (9)	Remove.	
3.	Speedometer drive gear cover (9)	Speedometer drive adapter (5)	a. Place in soft-jawed vise. b. Remove, and slide driven shaft (4) from cover (9). c. Remove from soft-jawed vise.	
4.		Sleeve bushing (3)	Remove.	
5.	Intermediate shaft (14)	Snapring (10) and speedometer drive gear (11)	Remove.	Discard snapring (10).

8-13. TRANSFER CASE SPEEDOMETER DRIVE GEAR AND DRIVEN SHAFT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Woodruff key (12)	Remove.	Discard woodruff key (12).



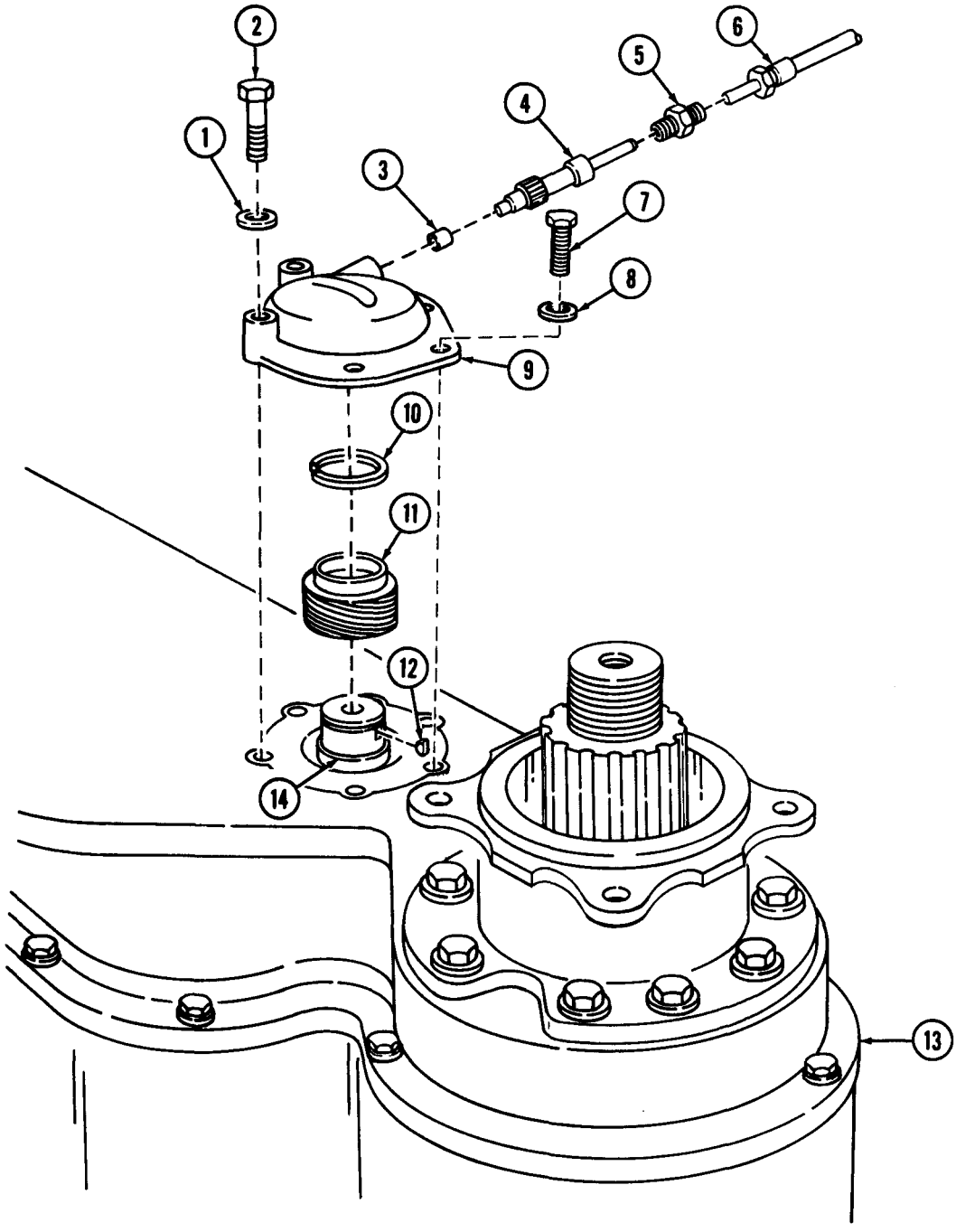
TA 350424

8-13. TRANSFER CASE SPEEDOMETER DRIVE GEAR AND DRIVEN SHAFT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Installation			
7.		New woodruff key (12)	Install on intermediate shaft (14).	
8.		Speedometer drive gear (11)	Install on intermediate shaft (14) with new snapring (10).	
9.		Sleeve bushing (3)	Install in speedometer gear cover (9).	
10.		Speedometer driven shaft (4)	Install in speedometer gear cover (9) with speedometer drive adapter (5).	
11.		Speedometer drive gear cover (9)	Install on transfer case (13) with two screws (2) and washers (l), and four screws (7) and washers (8).	Apply gasket sealant to cover (9).
12.		Speedometer drive shaft (6)	Connect to speedometer drive adapter (5).	

8-13. TRANSFER CASE SPEEDOMETER DRIVE GEAR AND DRIVEN SHAFT REPLACEMENT (Cont'd).

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install parking brakeshoes and dustcovers (TM 9-2320-272-20-2).
- Fill transfer case to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10). Check for oil leaks and road test vehicle.

TA 350425

8-14. TRANSFER CASE SWITCH REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Six lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

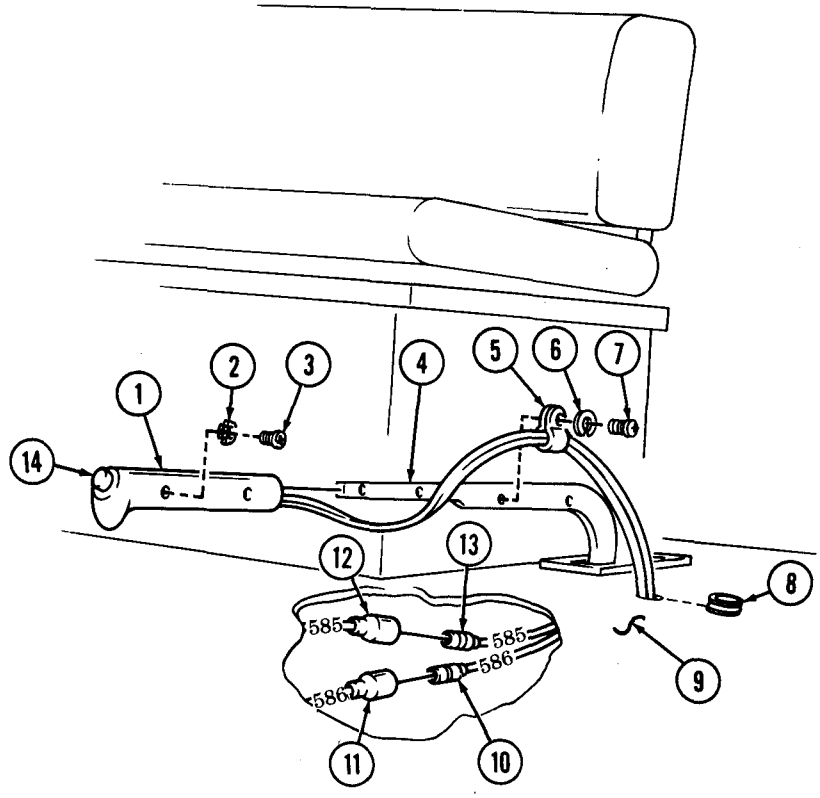
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Underside of cab floor (9)	Wire (13) and wire (10)	Disconnect from connectors (11) and (12).	**Tag** for installation.
2.		Wire (13) and wire (10)	Pull through grommet (8) on cab floor (9).	
3.	**Cab** floor (9)	Grommet (8)	Remove.	
4.	Transfer control shift lever (4)	Two screws (7), lockwashers (6) and clamps (5)	Remove.	Discard lockwashers (6).
5.	Switch (1)	Four screws (3) and lockwashers (2)	Remove.	Discard lockwashers (2).
6.	Transfer control shift lever (4)	Switch (1) with two wires (10) and (13), and pushbutton (14)	Remove.	
b. Installation				
7.		Switch (1) with two wires (10) and (13) and pushbutton (14)	Install on transfer control shift lever (4) with four new lock-washers (2) and screws (3).	

8-14. TRANSFER CASE SWITCH REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.		Two wires (10) and (13)	Install in two clamps (5) with two new lockwashers (6) and screws (7) on transfer control shift lever (4).	
9.		Grommet (8)	Install on cab floor (9).	
10.		Two wires (10) and (13)	a. Pull through grommet (8) and cab floor (9). b. Connect to connectors (11) and (12).	



END OF TASK!

FOLLOW-ON TASK: Road test vehicle and check for proper operation of transfer case control shift lever (TM 9-2320-272-10).

TA 350426

8-15. TRANSFER CASE CAPACITOR REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 TM 9-2320-272-20-1	Parking brake set. Transfer case to front axle propeller shaft removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272 -20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

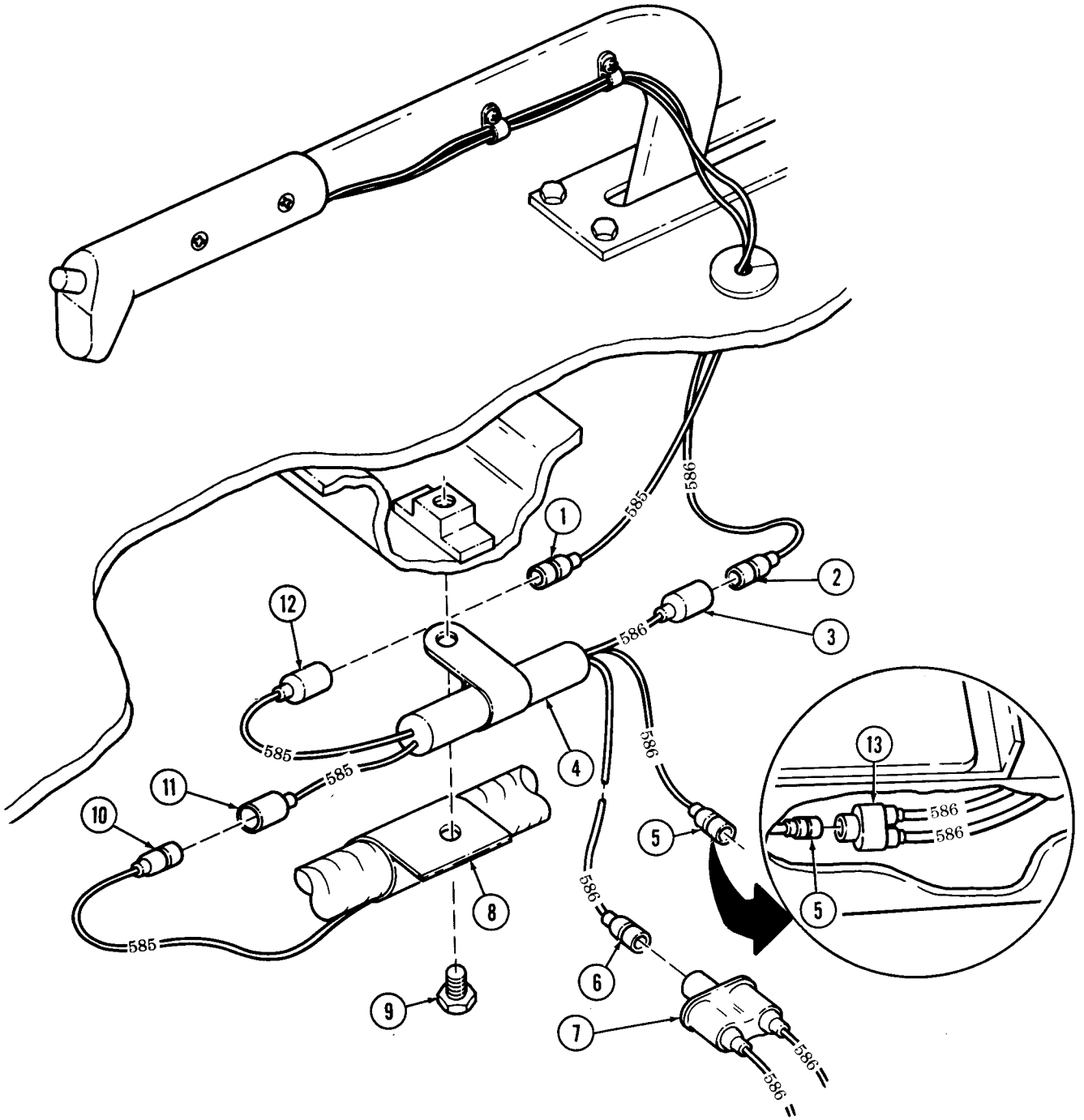
NOTE

Tag wires for installation.

1.	Transfer case capacitor (4)	Three wires (3), (5), and (6)	Disconnect one each from transfer case switch connector (2), transmission solenoid adapter (7), and interlock valve adapter (13).	
2.		Two wires (11) and (12)	Disconnect one each from transfer case switch connector (1) and front wiring harness connector (10).	
3.	Front wiring harness clamp (8)	Screw (9) and transfer case capacitor (4)	Remove.	

8-15. TRANSFER CASE CAPACITOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



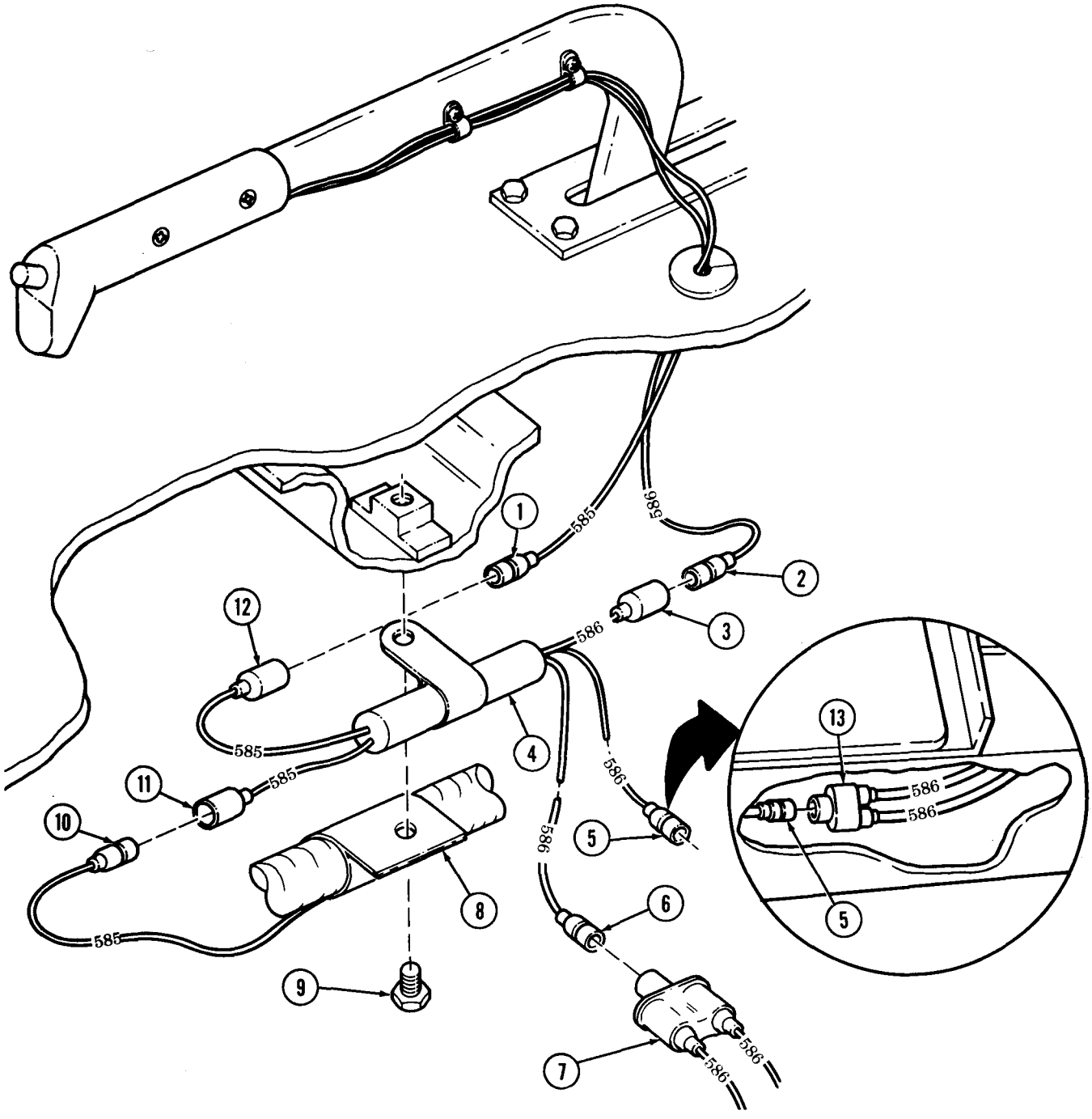
TA 350427

8-15. TRANSFER CASE CAPACITOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
4.		Transfer case capacitor (4)	Aline with front wiring harness clamp (8) and install with screw (9).	
5.		Two wires (11) and (12)	Connect to marked locations at front wiring harness connector (10) and transfer case switch connector (1).	
6.		Three wires (3), (5), and (6)	Connect to marked locations at interlock valve adapter (13), transmission solenoid adapter (7), and transfer case switch connector (2).	

8-15. TRANSFER CASE CAPACITOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS
- Install transfer case to front axle propeller shaft (TM 9-2320-272-20-1).
- Check transfer case shift lever for proper operation (TM 9-2320-272-10). Road test vehicle.

TA 350428

8-16. TRANSFER CASE TRANSORB DIODE REPLACEMENT

This task covers

a. Removal **b. Installation**

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Lockwasher
Two locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

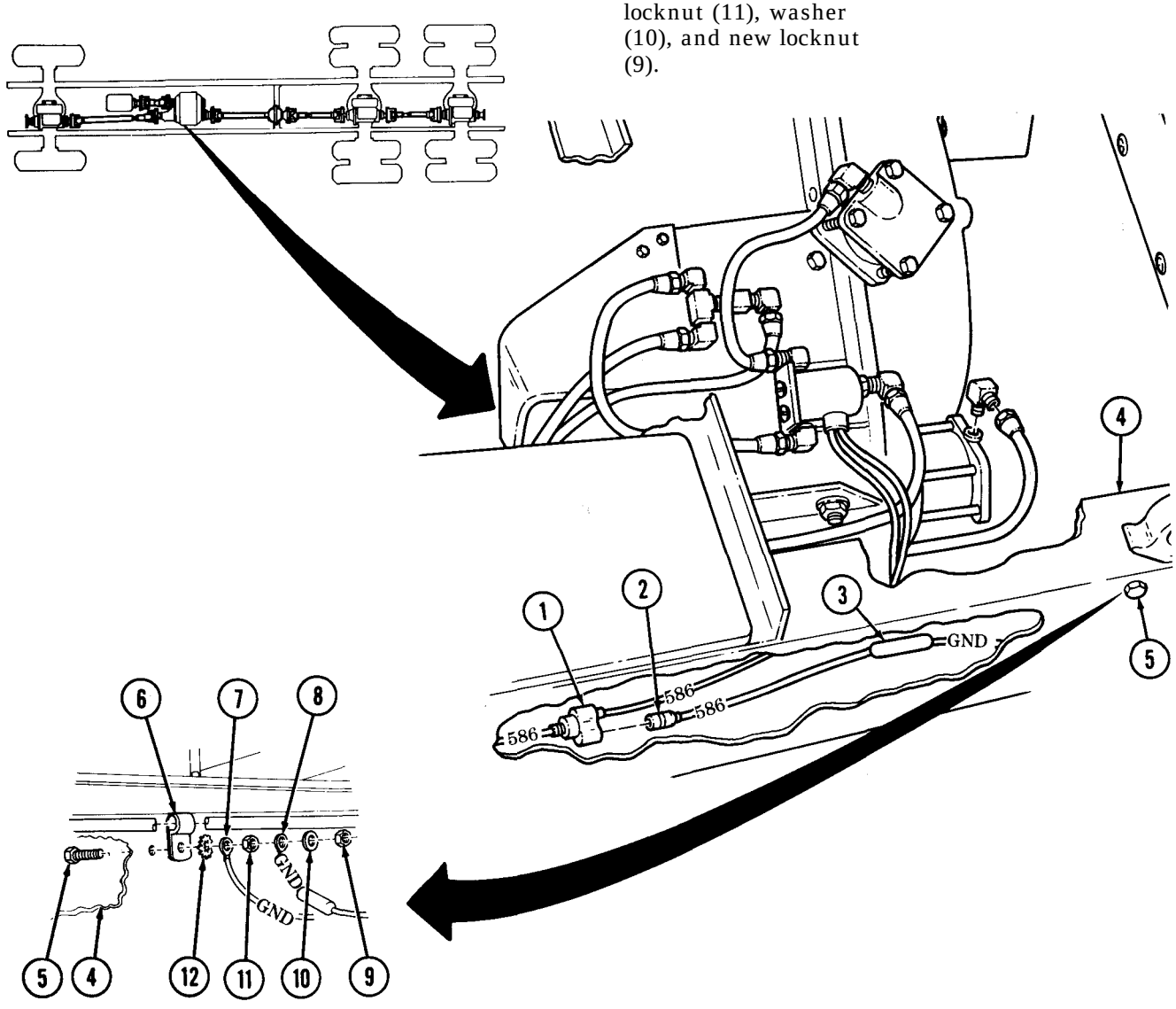
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Assistant will help with step 1.		
1.	Vehicle frame (4)	Locknut (9), washer (10), transorb diode ground wire (8), locknut (11), ground wire (7), lockwasher (12), cable clamp (6), and screw (5)	Remove.	Discard locknuts (9) and (11), and lockwasher (12).
2.	Front wiring harness connector (1)	Transorb diode wire (2)	Disconnect, and remove transorb diode (3).	
	b. Installation			
3.		Transorb diode wire (2)	Connect to front wiring harness connector (1).	

8-16. TRANSFER CASE TRANSORB DIODE REPLACEMENT (Cont'd)

LOCATION	ITEM	ACTION	REMARKS
	NOTE Assistant will help with step 4.		
4.	Transorb diode ground wire (8) and transorb diode (3)	Install on vehicle frame (4) with screw (5), cable clamp (6), new lockwasher (12), ground wire (7), new locknut (11), washer (10), and new locknut (9).	



END OF TASK!

FOLLOW-ON TASK: Check transfer case shift lever for proper operation (TM 9-2320-272-10). Road test vehicle.

TA 350429

8-17. TRANSFER CASE OIL PUMP REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All except M936	TM 9-2320-272-10 LO 9-2320-272-12	Parking brake set. Transfer case drained.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Gasket sealant (Appendix C, Item 13)
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

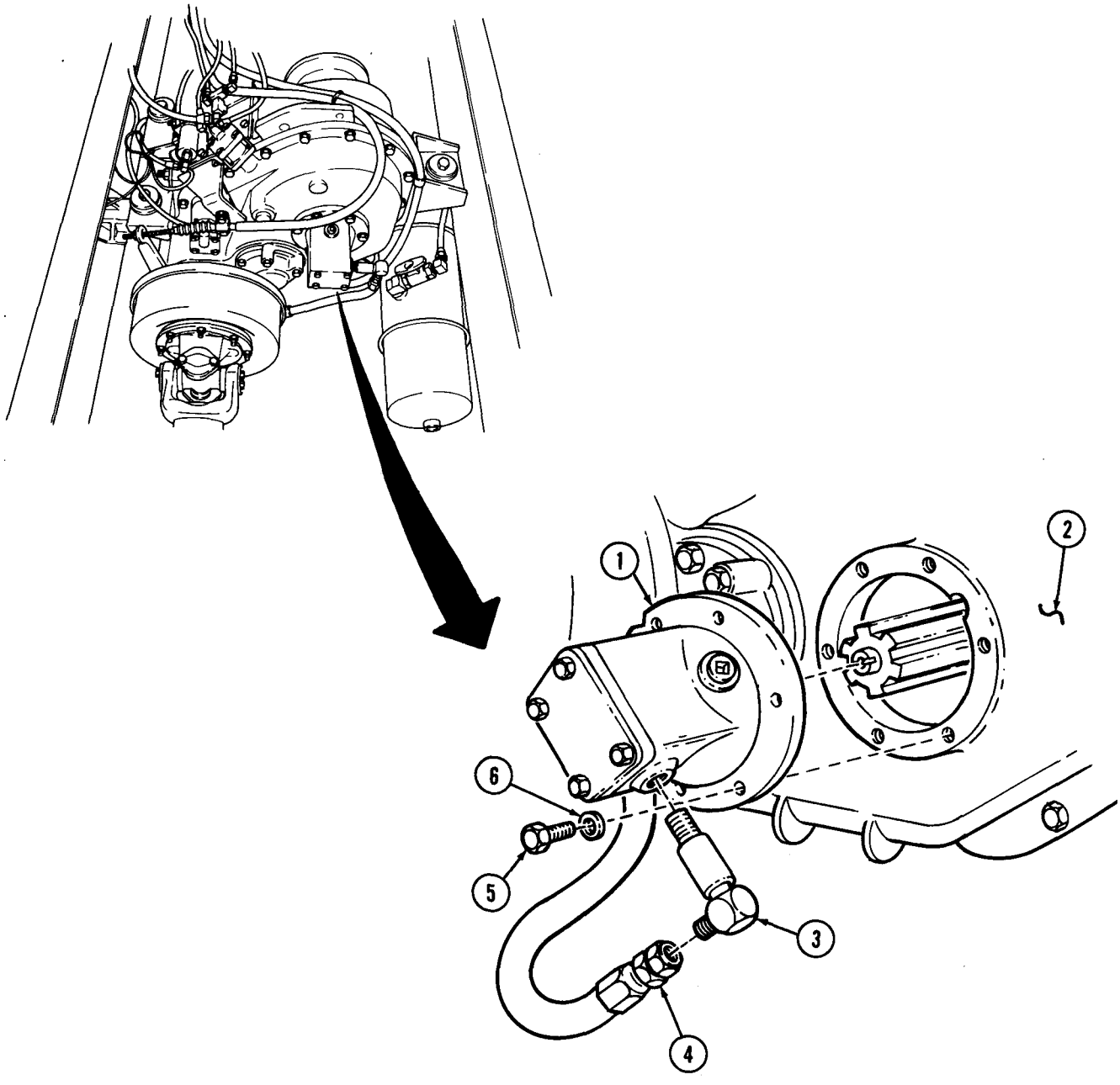
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Have drainage container ready to catch oil.		
	a. Removal			
1.	Elbow (3)	Hose (4)	Disconnect.	
2.	Oil pump (1)	Elbow (3)	Remove.	
3.	Transfer case (2)	Six screws (5), washers (6), and oil pump (1)	Remove.	Mark position of pump (1) for installation.
	b. Installation			
4.		Oil pump (1)	Install with six washers (6) and screws (5).	Apply gasket sealant to mating surfaces. Tighten 40-65 lb-ft (54-88 N·m).
5.		Elbow (3)	Install.	Wrap male pipe threads with sealing tape.
6.		Hose (4)	Connect.	

8-17. TRANSFER CASE OIL PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS • Fill transfer case to proper oil level (LO 9-2320-272-12).
• Road test vehicle (TM 9-2320-272-10) and check for leaks.

TA 350430

8-18. TRANSFER CASE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
All except M936	TM 9-2320-272-10	Parking brake set.
	LO 9-2320-272-12	Transfer case drained.
	TM 9-2320-272-20-2	Wet reservoir removed.
	TM 9-2320-272-20-1	Transfer case to forward-rear axle propeller shaft removed.
	TM 9-2320-272-10	Spare tire removed (M923, M925, M924, M926, M929, and M930).
	Para. 8-4	Transfer case interlock valve removed.
	Para. 8-8	Transfer case front axle engagement control valve removed.
	Para. 8-12	Transfer case shift rod removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Twenty-one locknuts
Four lockwashers
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

None

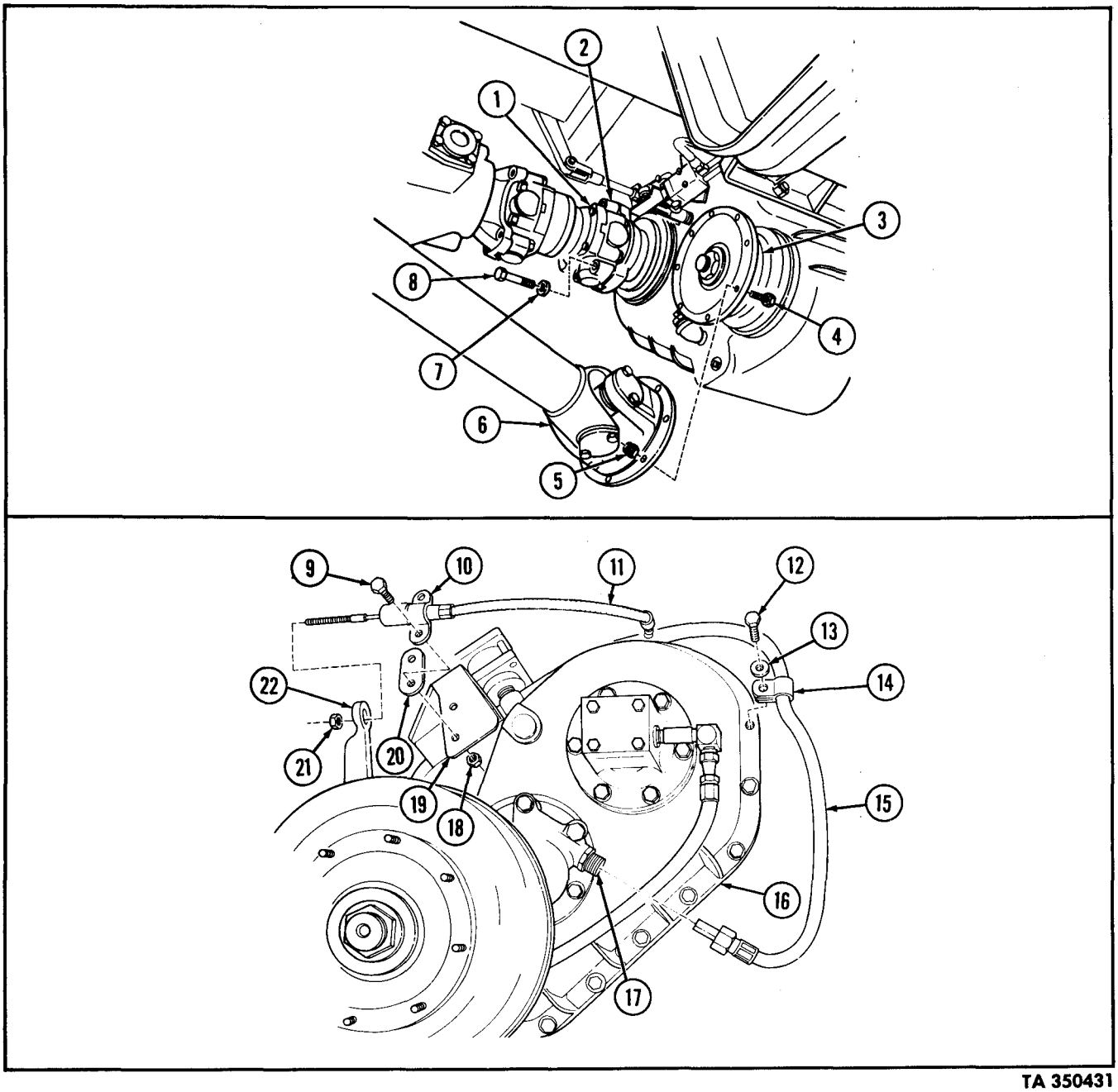
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Place transfer case lever in “HIGH”. This prevents propeller shaft from turning when loosening screws.		
1.	Transfer case input flange (2)	Four screws (8) and lockwashers (7)	Remove, and lower propeller shaft (1).	Discard lockwashers (7).
2.	Transfer case front output flange (3)	Eight screws (4) and locknuts (5)	Remove, and move propeller shaft (6) to one side.	Discard locknuts (5).
3.	Parking brake cable (11) to brakedrum lever (22)	Locknut (21)	Remove.	Discard locknut (21).

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Rear transfer case bracket (19)	Two locknuts (18), screws (9), clamp (10), and spacer (20)	Remove.	Discard locknuts (18).
5.	Speedometer drive shaft adapter (17)	Speedometer drive shaft (15)	Disconnect.	
6.	Transfer case cover (16)	Screw (12), washer (13), and clamp (14)	Remove.	



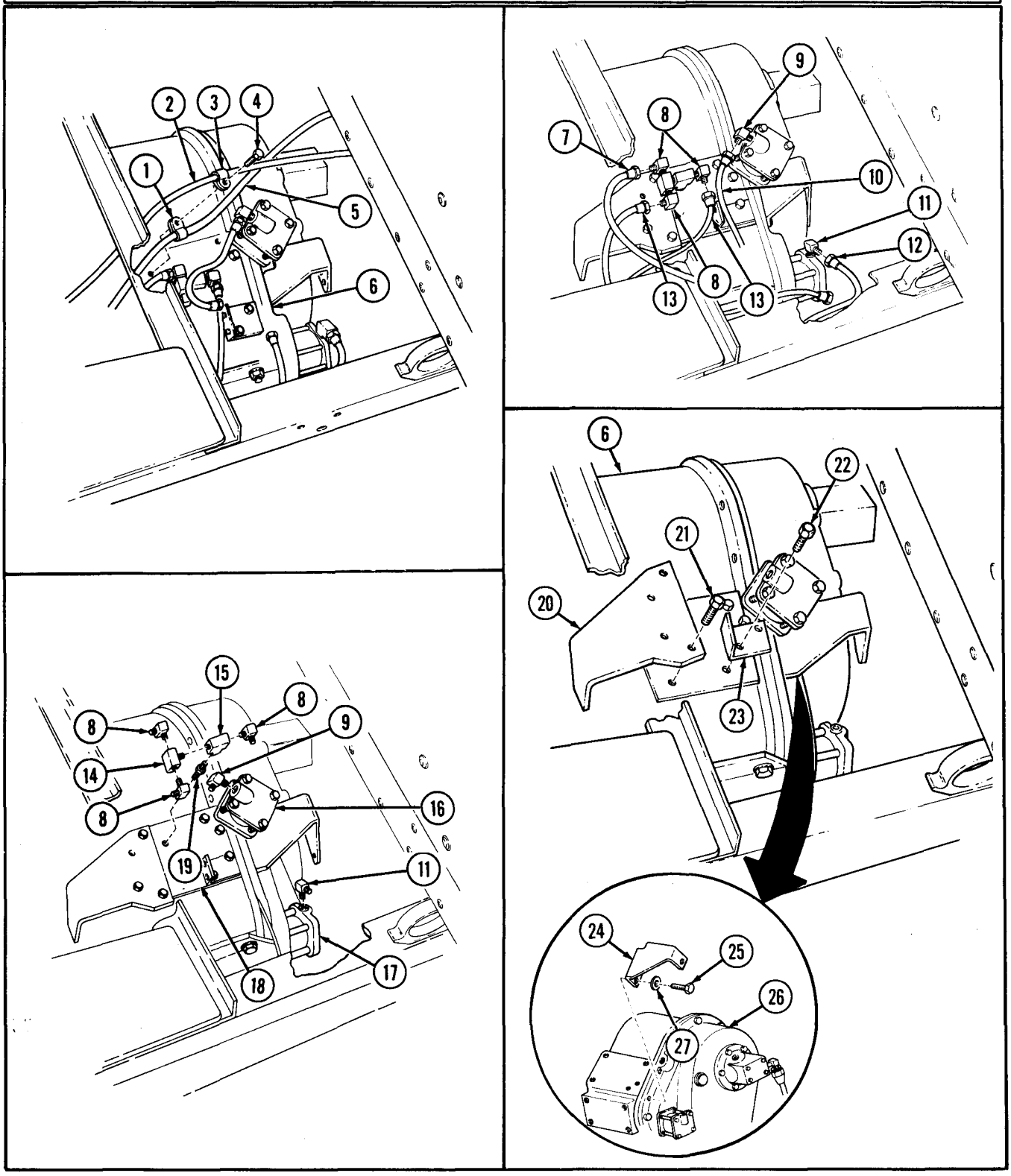
TA 350431

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Top of transfer case (6)	Screw (4), clamp (3), and clamp (1)	Remove, and move speedometer drive shaft (5) and parking brake cable (2) to one side.	
		NOTE Tag air lines for installation.		
8.	Two elbows (8)	Two vent lines (13)	Disconnect.	
9.	Elbow (8)	Interlock vent line (7)	Disconnect.	
10.	Air cylinder elbow (11)	Supply line (12)	Disconnect.	
11.	Interlock air cylinder elbow (9)	Supply line (10)	Disconnect.	
12.	Two vent tees (14) and (15)	Three elbows (8)	Remove.	
13.	Vent tee (15)	Vent tee (14)	Remove.	
14.	Inspection cover fitting (19)	Vent tee (15)	Remove.	
15.	Inspection cover (18)	Fitting (19)	Remove.	
16.	Air cylinder (17)	Elbow (11)	Remove.	
17.	Interlock air cylinder (16)	Elbow (9)	Remove.	
18.	Transfer case (6)	Two screws (22) and interlock valve bracket (23)	Remove.	
19.		Three screws (21) and front axle engagement control valve bracket (20)	Remove.	
20.	Transfer case cover (26)	Two screws (25), washers (27), and rear transfer case bracket (24)	Remove.	

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

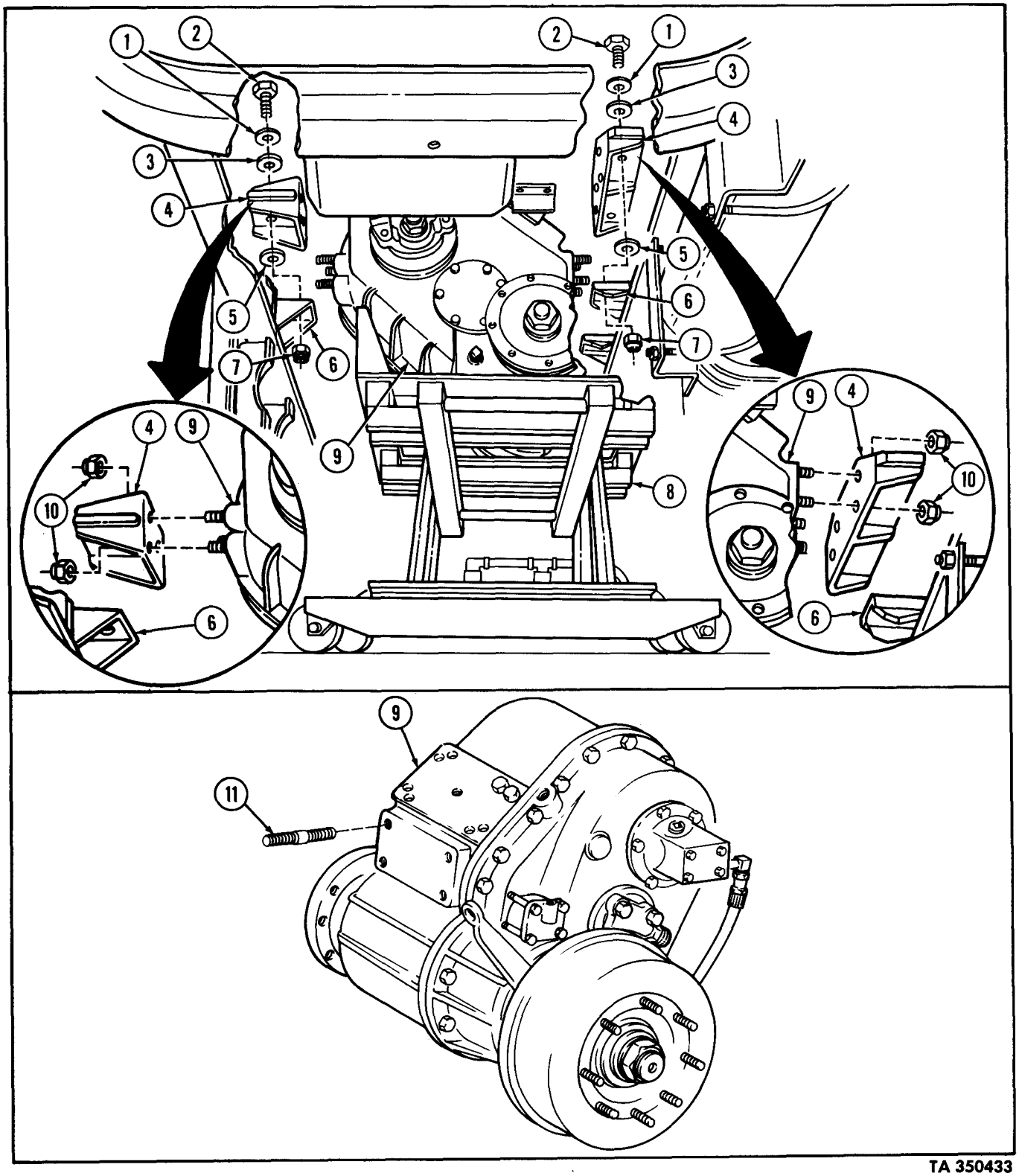


8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
21.		Hydraulic jack (8)	Position under transfer case (9).	
22.	Two transfer case mounting brackets (4) and frame (6)	Three locknuts (7), screws (2), insulators (3), and washers (1)	Remove.	Discard locknuts (7).
23.	Transfer case (9)	Hydraulic jack (8)	Raise, and remove three insulators (5).	Raise transfer case (9) high enough to allow removal of brackets (4).
24.		Seven locknuts (10) and two brackets (4)	Remove.	Discard locknuts (10).
25.		Hydraulic jack (8)	Lower, and remove transfer case (4) from underside of vehicle.	
26.	Hydraulic jack (8)	Transfer case (9)	Remove.	
27.	Transfer case (9)	Seven studs (11)	Remove.	

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



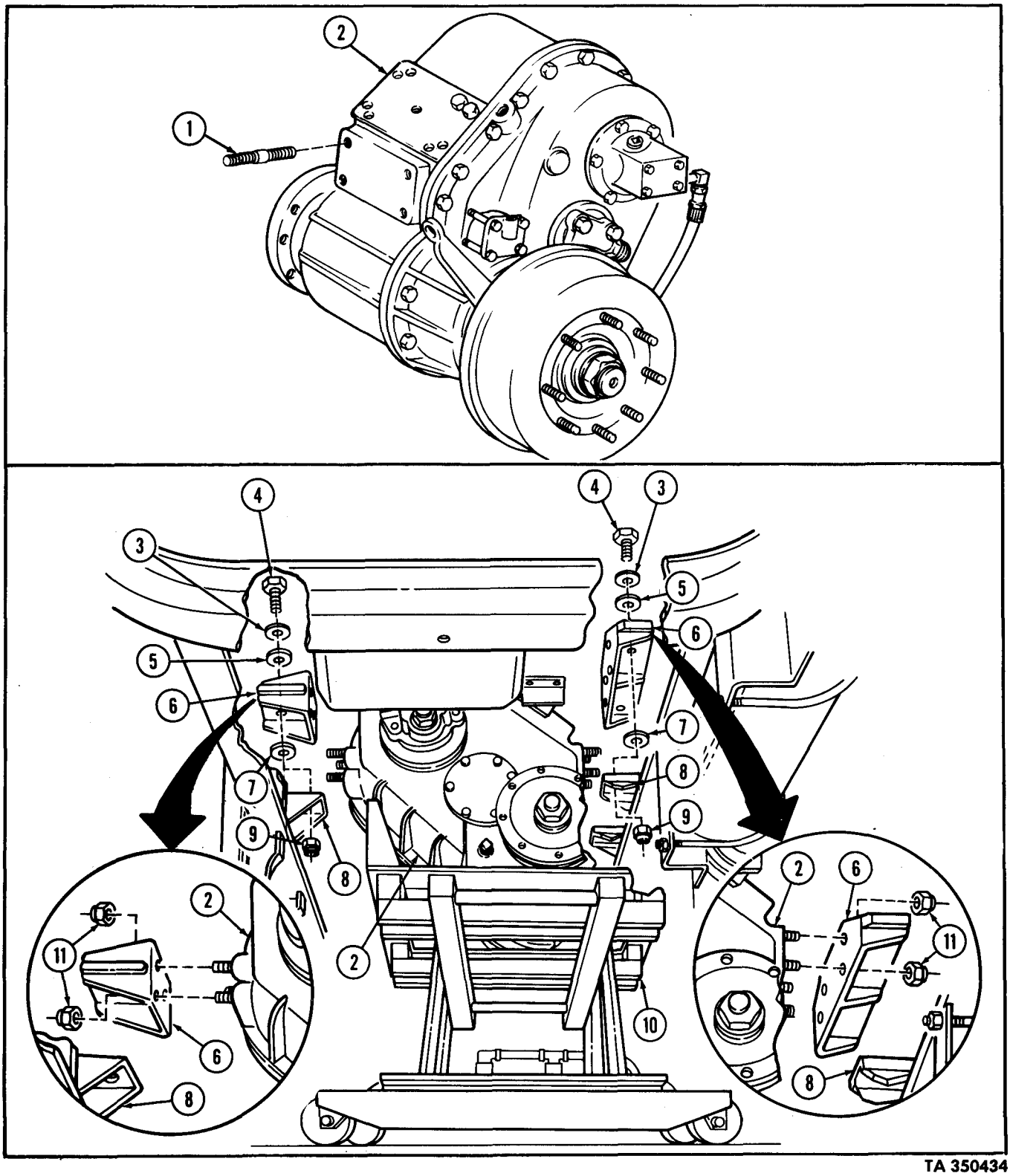
TA 350433

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		b. Installation		
28.		Seven studs (1)	Install on transfer case (2).	
29.		Transfer case (2)	a. Install on hydraulic jack (10) and position under vehicle.	
			b. Raise into position so two transfer case brackets (6) can be installed.	
30.		Two transfer case brackets (6)	Install on transfer case (2) with seven new locknuts (11).	Tighten 125-135 lb-ft (170-183 N·m).
31.		Three insulators (7)	Place between frame (8) and brackets (6).	
32.		Transfer case (2) and brackets (6)	a. Lower into position on three insulators (7).	
			b. Install on frame (8) with three insulators (5), washers (3), screws (4), and new locknuts (9).	Tighten 50-60 lb-ft (68-81 N·m).
33.		Hydraulic jack (10)	Remove from underside of vehicle.	

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



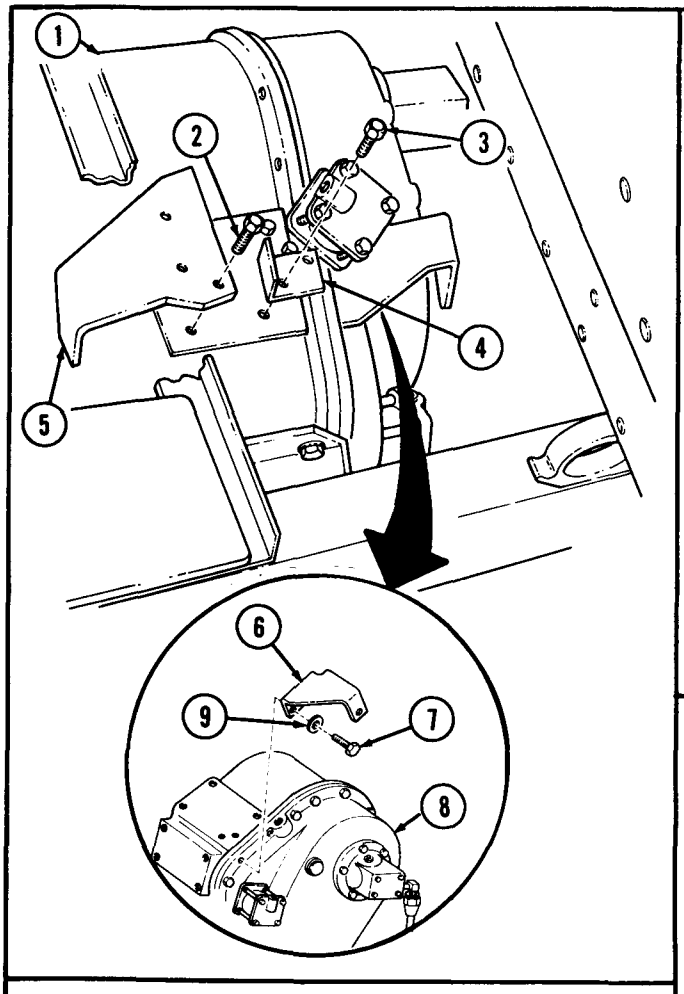
TA 350434

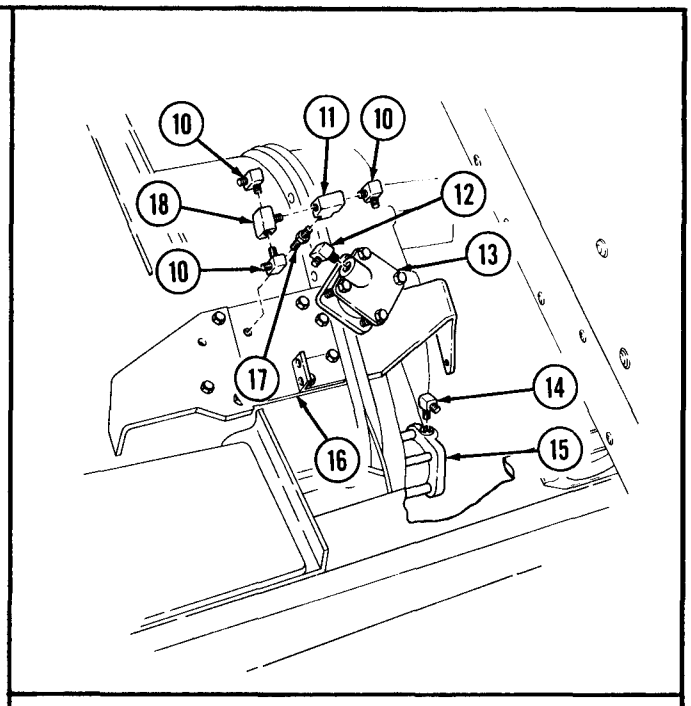
8-18. TRANSFER CASE REPLACEMENT (Cont'd)

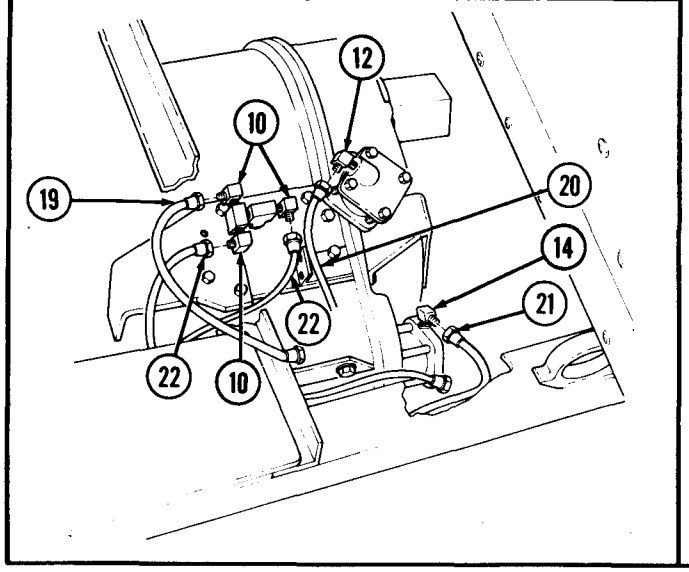
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
34.		Rear transfer case bracket (6)	Install on transfer case cover (8) with two washers (9) and screws (7).	Tighten 40-55 lb-ft (54-75 N·m).
35.		Front axle engagement control valve bracket (5)	Install on transfer case (1) with three screws (2).	Do not tighten.
36.		Interlock valve bracket (4)	Install on transfer case (1) with two screws (3).	Do not tighten.
		NOTE Wrap all male pipe threads with sealing tape before installation.		
37.		Elbow (12)	Install on interlock air cylinder (13).	
38.		Elbow (14)	Install on air cylinder (15).	
39.		Fitting (17)	Install on inspection cover (16).	
40.		Vent tee (11)	Install on inspection cover fitting (17).	
41.		Vent tee (18)	Install on vent tee (11).	
42.		Three elbows (10)	Install on two vent tees (11) and (18).	
43.		Supply line (20)	Connect to interlock air cylinder elbow (12).	
44.		Supply line (21)	Connect to air cylinder elbow (14).	
45.		Interlock vent line (19)	Connect to elbow (10).	
46.		Two vent lines (22)	Connect to two elbows (10).	
47.		Speedometer drive shaft (27) and parking brake cable (24)	Install on top of transfer case (1) with clamp (25), clamp (23), and screw (26).	Tighten screws (2), (3), (26), and (28), 30-40 lb-ft (41-54 N·m).

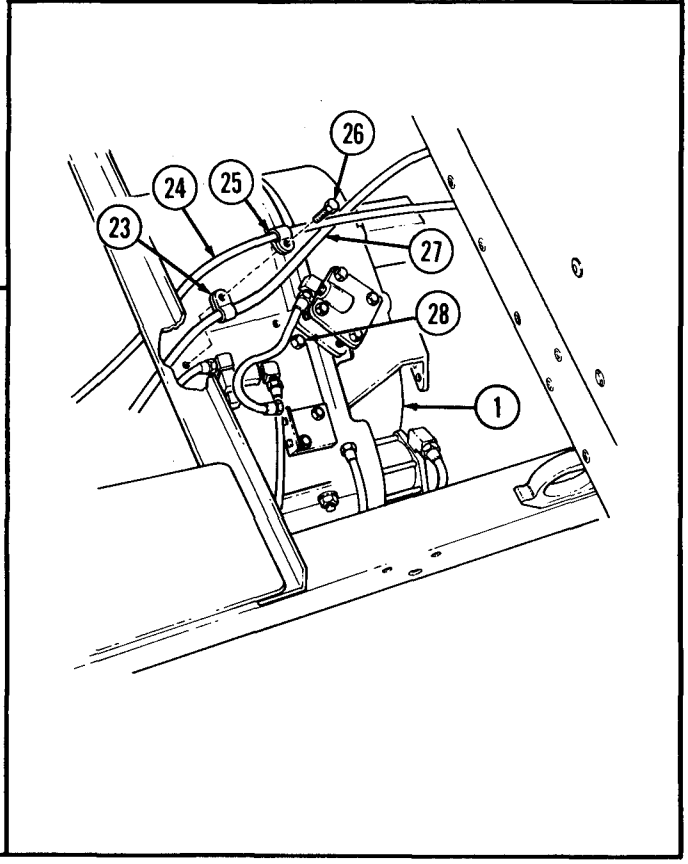
8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS









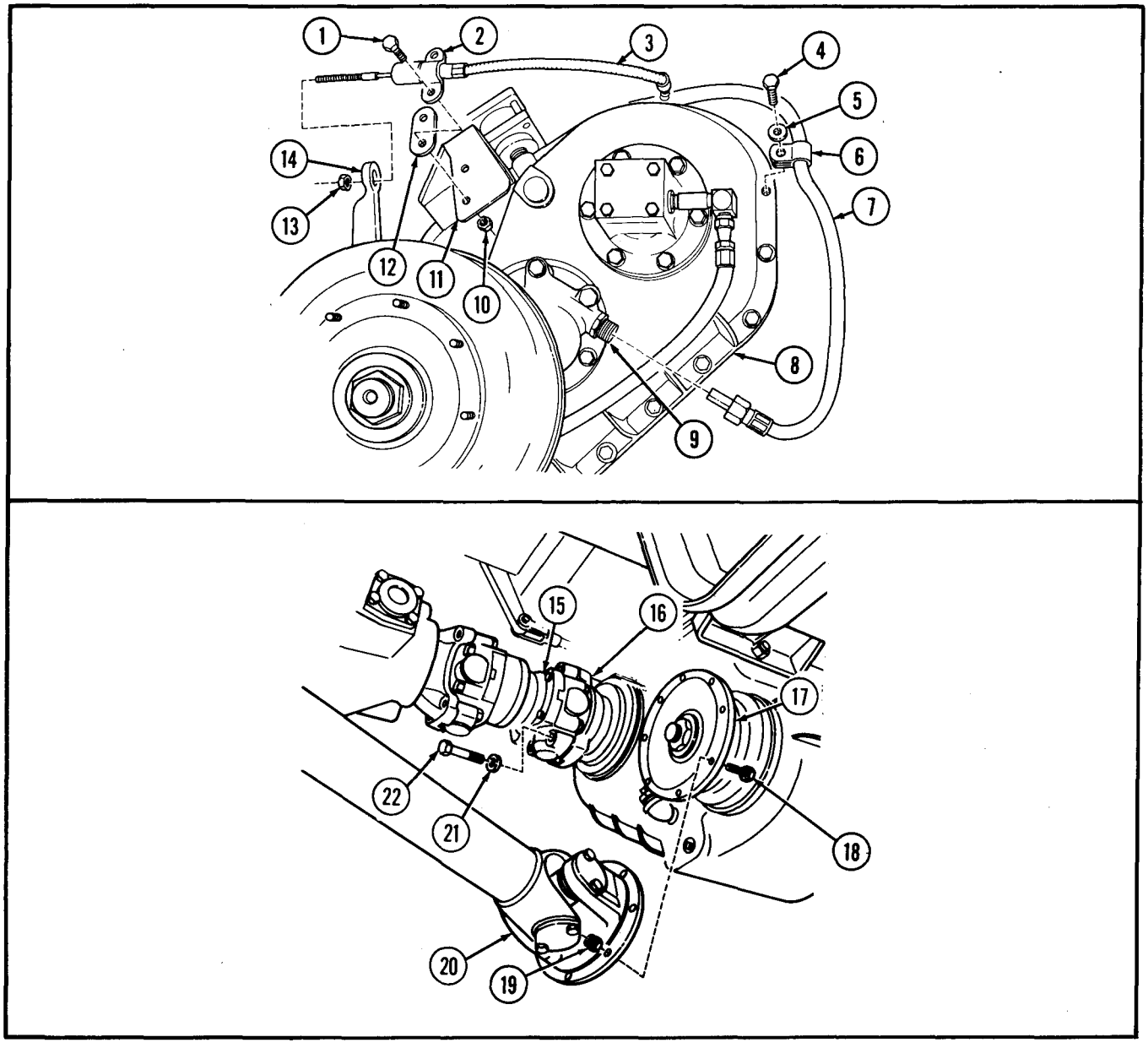
TA 350435

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
48.		Speedometer drive shaft (7)	a. Connect to speedometer drive shaft adapter (9).	
			b. Install on transfer case cover (8) with clamp (6), washer (5), and screw (4).	Tighten 40-55 lb-ft (54-75 N·m).
49.		Parking brake cable (3)	a. Install through brakedrum lever (14) with new locknut (13).	
			b. Install on rear transfer case bracket (11) with spacer (12), clamp (2), two screws (1), and new locknuts (10).	
50.		Propeller shaft (20)	Install on transfer front output flange (17) with eight screws (18) and new locknuts (19).	Tighten 32-40 lb-ft (43-54 N·m).
51.		Propeller shaft (15)	Install on transfer input flange (16) with four new lockwashers (21) and screws (22).	Tighten 32-40 lb-ft (43-54 N·m).

8-18. TRANSFER CASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS
- Install transfer case shift rod (para. 8-12).
- Install transfer case front axle engagement control valve (para. 8-8).
- Install transfer case interlock valve (para. 8-4).
- Check parking brake adjustment (TM 9-2320-272-20-2).
- Install transfer case to forward-rear axle propeller shaft (TM 9-2320-272-20-1).
- Install wet reservoir (TM 9-2320-272-20-2).
- Fill transfer case to proper oil level (LO 9-2320-272-12).
- Install spare tire if removed (TM 9-2320-272-10).

TA 350436

8-19. TRANSFER CASE (M936) REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	LO 9-2320-272-12	Transfer case drained.
	TM 9-2320-272-20-1	Transfer case to forward-rear axle propeller shaft removed.
	TM 9-2320-272-20-1	Transmission to transfer propeller shaft removed.
	Para. 8-8	Transfer case front axle engagement control valve removed.
	Para. 8-12	Transfer case shift rod removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Twenty-nine locknuts
Five lockwashers
Cotter pin
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

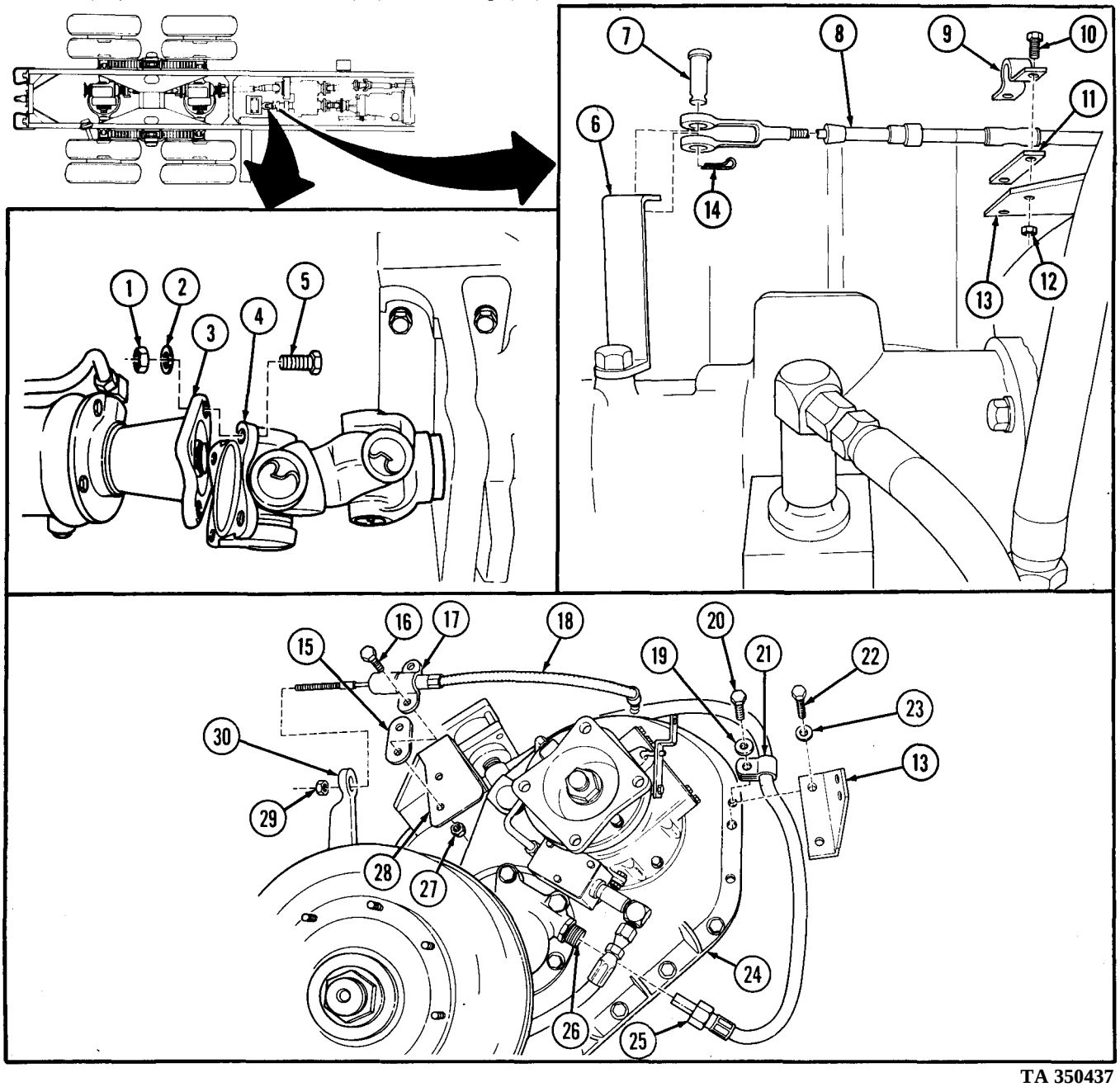
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272 -20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Flange (3)	Four screws (5), lockwashers (2), and nuts (1)	Remove, and slide propeller shaft (4) rearward.	Discard lockwashers (2).
2.	PTO select lever (6)	Cotter pin (14) and clevis pin (7)	Remove.	Discard cotter pin (14).
3.	PTO cable bracket (13) to PTO cable (8)	Two locknuts (12), screws (10), clamp (9), and spacer (11)	Remove.	Discard locknuts (12).
4.	Transfer case cover (24)	Two screws (22), washers (23), and PTO cable bracket (13)	Remove.	Tag cable bracket (13) for installation.
5.	Parking brake cable (18) to brakedrum lever (30)	Locknut (29)	Remove.	Discard locknut (29).

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Rear transfer case bracket (28)	Two locknuts (27), screws (16), clamp (17), and spacer (15)	Remove.	Discard locknuts (27).
7.	Speedometer drive shaft adapter (26)	Speedometer drive shaft (25)	Disconnect.	
8.	Transfer case cover (24)	Screw (20), washer (19), and clamp (21)	Remove.	



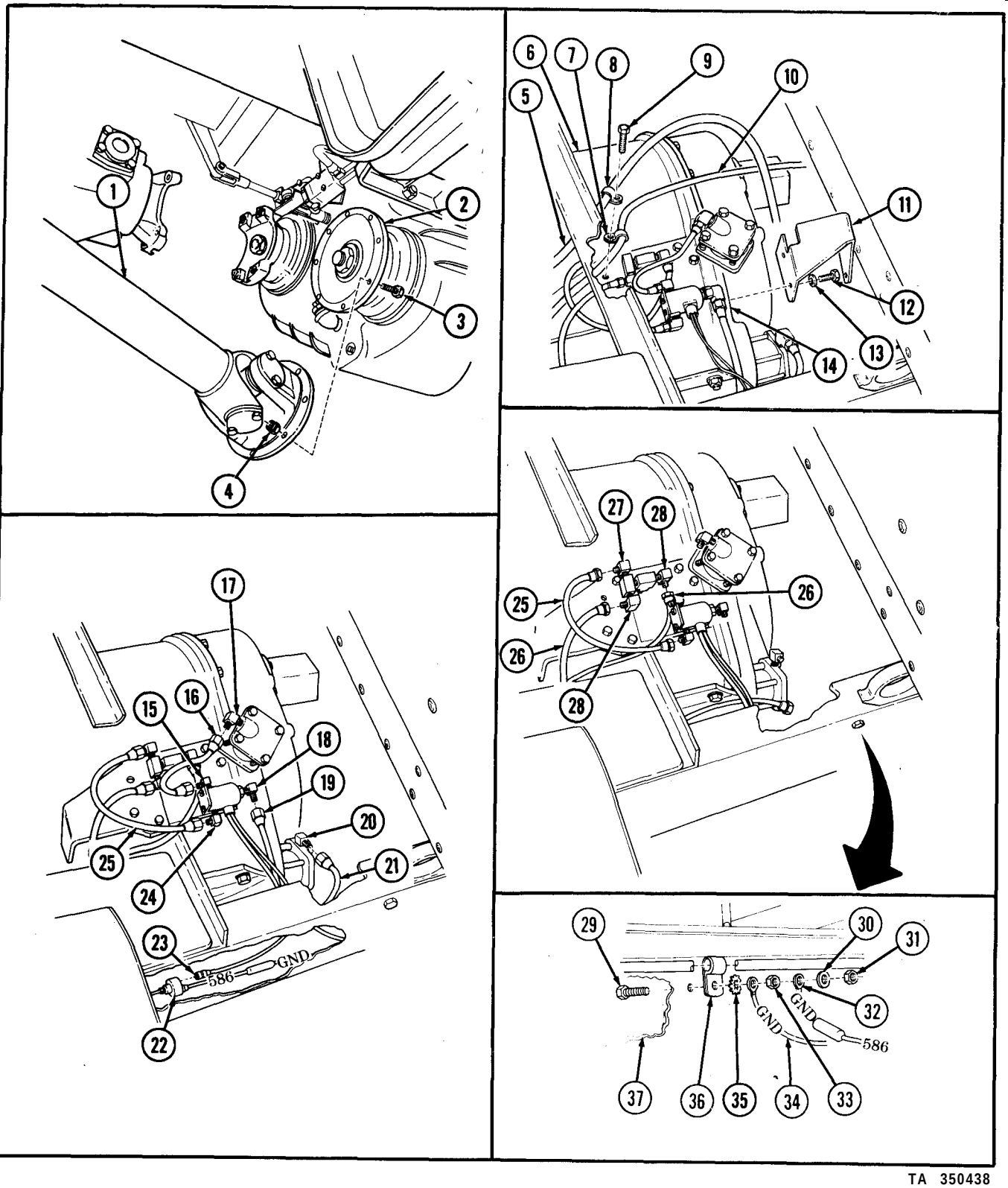
TA 350437

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
9.	Transfer front output flange (2)	Eight screws (3) and locknuts (4)	Remove and move propeller shaft (1) to one side.	Discard locknuts (4).
10.	Transfer case cover (14)	Two screws (12), washers (13), and rear transfer case bracket (11)	Remove.	Tag location of bracket (11) for installation.
11.	Top of transfer case (6)	Screw (9), clamp (8), and clamp (7)	Remove, and move speedometer drive shaft (10) and parking brake cable (5) to one side.	
		NOTE Tag air lines for installation.		
12.	Air cylinder elbow (20)	Supply line (21)	Disconnect.	
13.	Interlock air cylinder elbow (17) and interlock valve elbow (15)	Supply line (16)	Disconnect.	
14.	Interlock valve elbow (18)	Supply line (19)	Disconnect.	
15.	Interlock vent elbow (24)	Interlock vent line (25)	Disconnect.	
16.	Elbow (27)	Interlock vent line (25)	Disconnect.	
17.	Two elbows (28)	Two vent lines (26)	Disconnect.	
18.	Connector (22)	Wire (23)	Disconnect.	Tag wire (23) for installation.
19.	Frame (37)	Locknut (31), washer (30), diode ground wire (32), locknut (33), interlock valve ground wire (34), lockwasher (35), cable clamp (36), and screw (29)	Remove.	Discard two locknuts (31) and (33) and lockwasher (35).

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



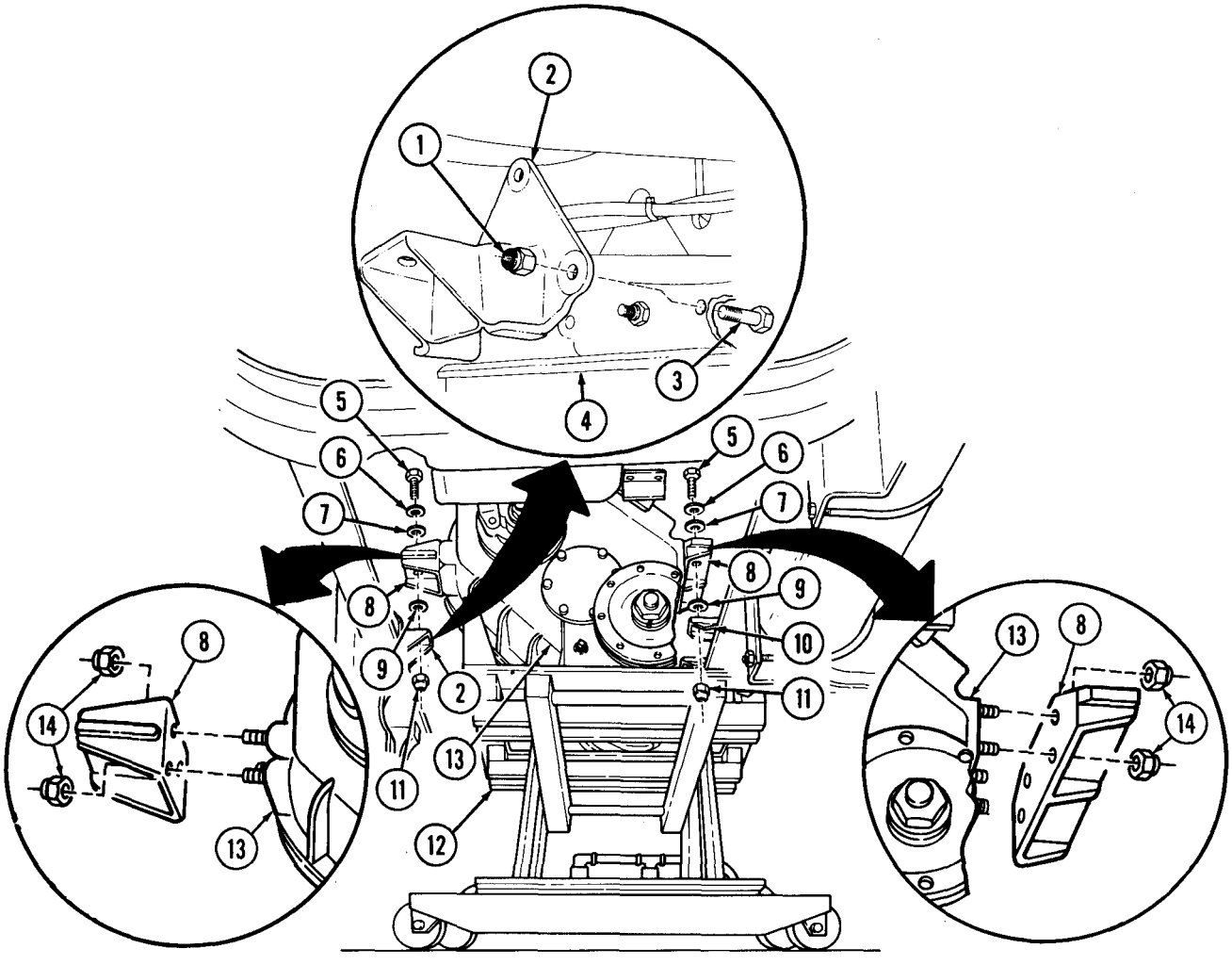
TA 350438

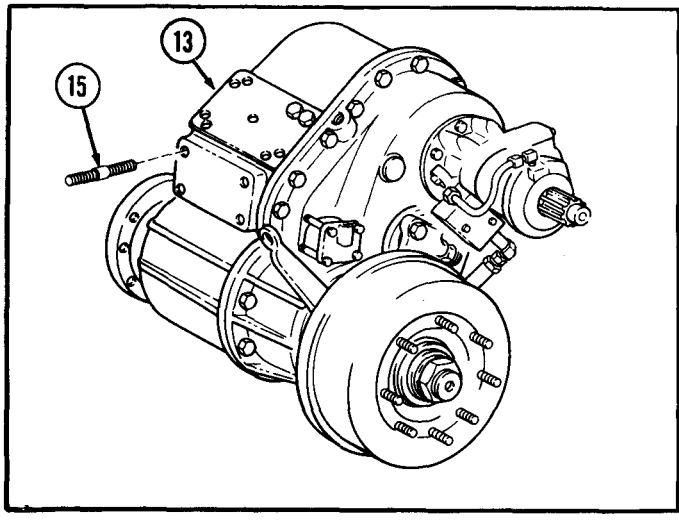
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

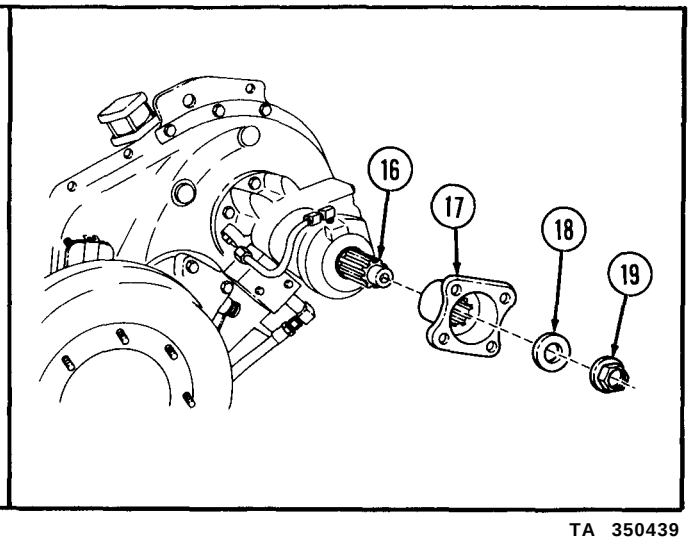
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.		Hydraulic jack (12)	Position under transfer case (13).	
21.	Two transfer case mounting brackets (8) to frame brackets (2) and (10)	Three locknuts (11), screws (5), insulators (7), and washers (6)	Remove.	Discard locknuts (11).
22.	Transfer case (13)	Hydraulic jack (12)	Raise, and remove three insulators (9).	Raise high enough to allow removal of right frame bracket (2).
23.	Frame (4)	Three screws (3), locknuts (1), and right frame bracket (2)	Remove.	Discard locknuts (1).
24.		Hydraulic jack (12) and transfer case (13)	a. Lower. b. Remove from underside of vehicle.	Make sure mounting brackets (8) clear frame bracket (10) and frame (4).
25.	Transfer case (13)	Seven locknuts (14) and two brackets (8)	Remove.	Discard locknuts (14).
26.		Seven studs (15)	Remove.	
27.	PTO shaft (16)	Locknut (19), washer (18), and flange (17)	Remove.	Discard locknut (19).
28.	Hydraulic jack (12)	Transfer case (13)	Remove.	Use lifting device.

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







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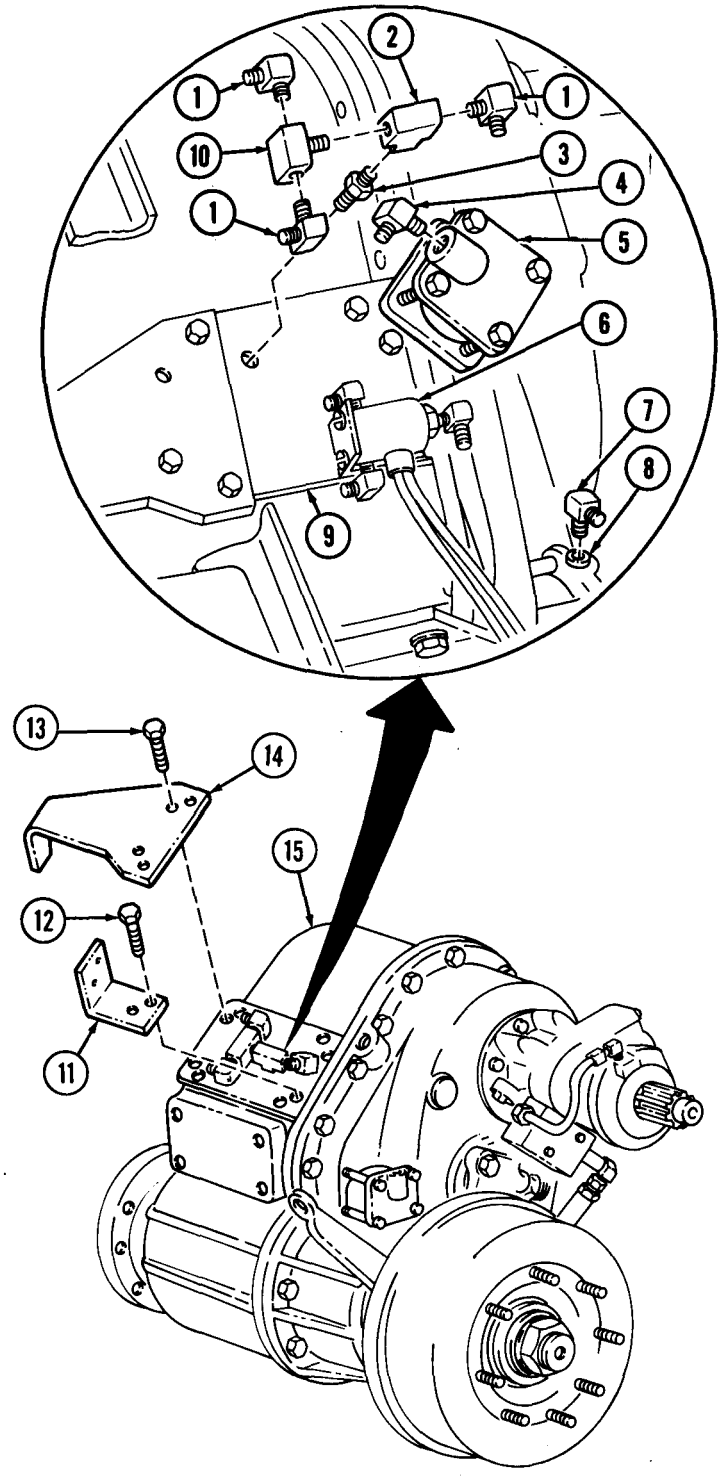
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
29.	Vent tees (2) and (10)	Three elbows (1)	Remove.	
30.	Vent tee (2)	Vent tee (10)	Remove.	
31.	Inspection cover fitting (3)	Vent tee (2)	Remove.	
32.	Inspection cover (9)	Fitting (3)	Remove.	
33.	Interlock air cylinder cover (5)	Elbow (4)	Remove.	
34.	Air cylinder cover (8)	Elbow (7)	Remove.	
35.	Transfer case (15)	Three screws (13) and front axle engagement control valve bracket (14)	Remove.	
36.	Interlock valve bracket (11)	Interlock valve (6)	Remove.	Refer to para. 8-5.
37.	Transfer case (15)	Two screws (12) and interlock valve bracket (11)	Remove.	

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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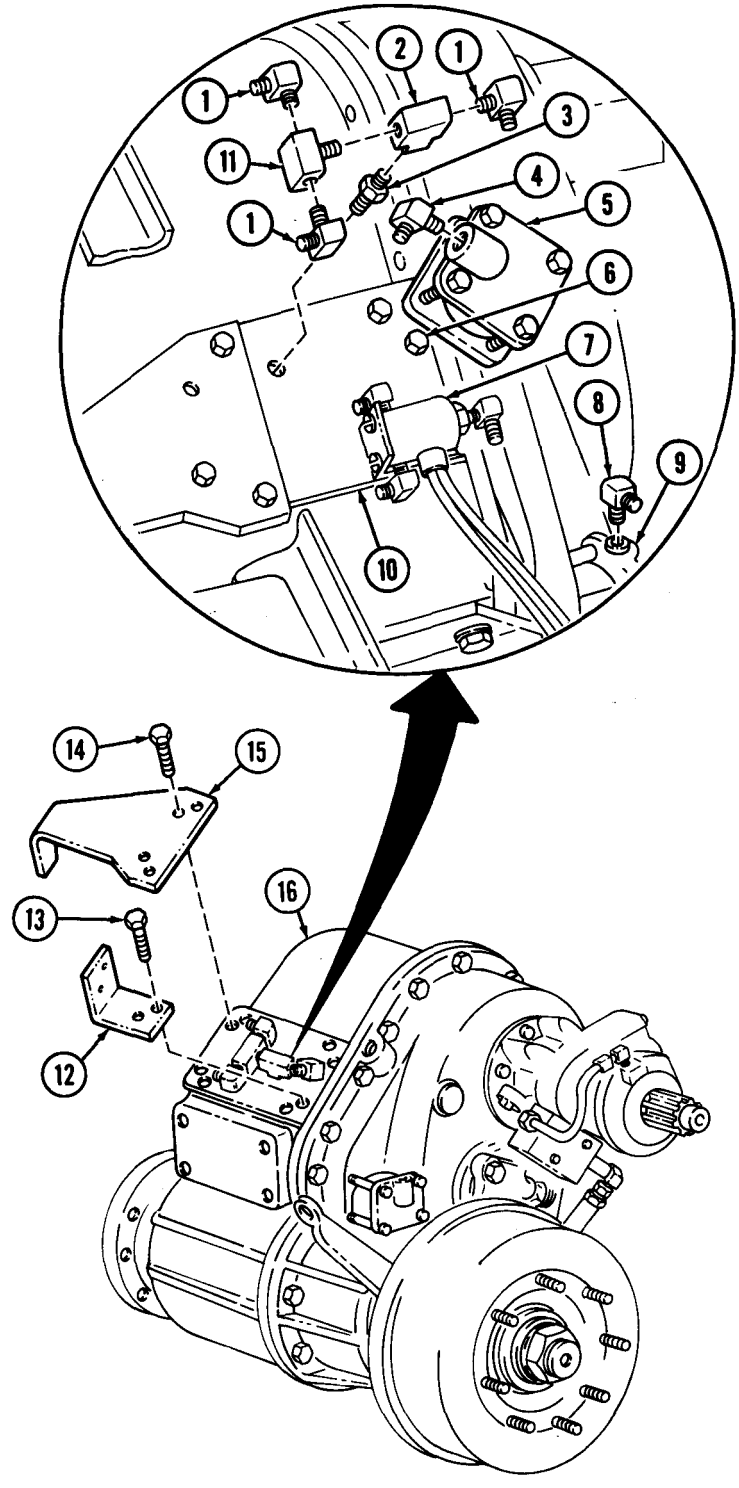
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
38.		Interlock valve bracket (12)	Install on transfer case (16) with two screws (13).	Do not tighten.
39.		Front axle engagement control valve bracket (15)	Install on transfer case (16) with three screws (14).	Tighten screws (6), (13), and (14) 30-40 lb-ft (41-54 N·m).
40.		Interlock valve (7)	Install.	Refer to para. 8-5.
		NOTE		
		Wrap all male pipe threads with sealing tape before installation.		
41.		Elbow (8)	Install on air cylinder cover (9).	
42.		Elbow (4)	Install on interlock air cylinder cover (5).	
43.		Fitting (3)	Install on inspection cover (10).	
44.		Vent tee (2)	Install on inspection cover fitting (3).	
45.		Vent tee (11)	Install on vent tee (2).	
46.		Three elbows (1)	Install on two vent tees (11) and (2).	

8-19. TRANSFER CASE [M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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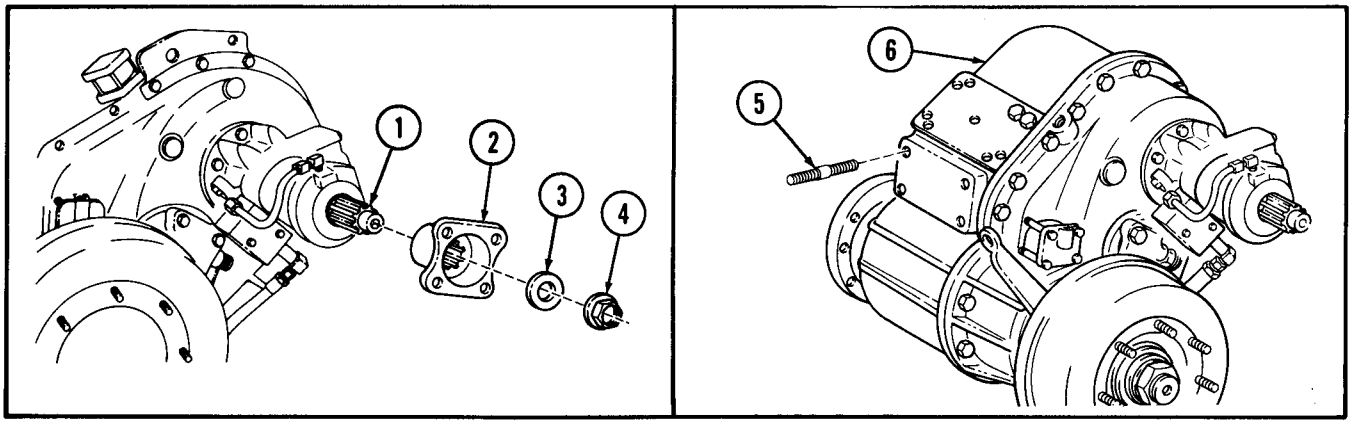
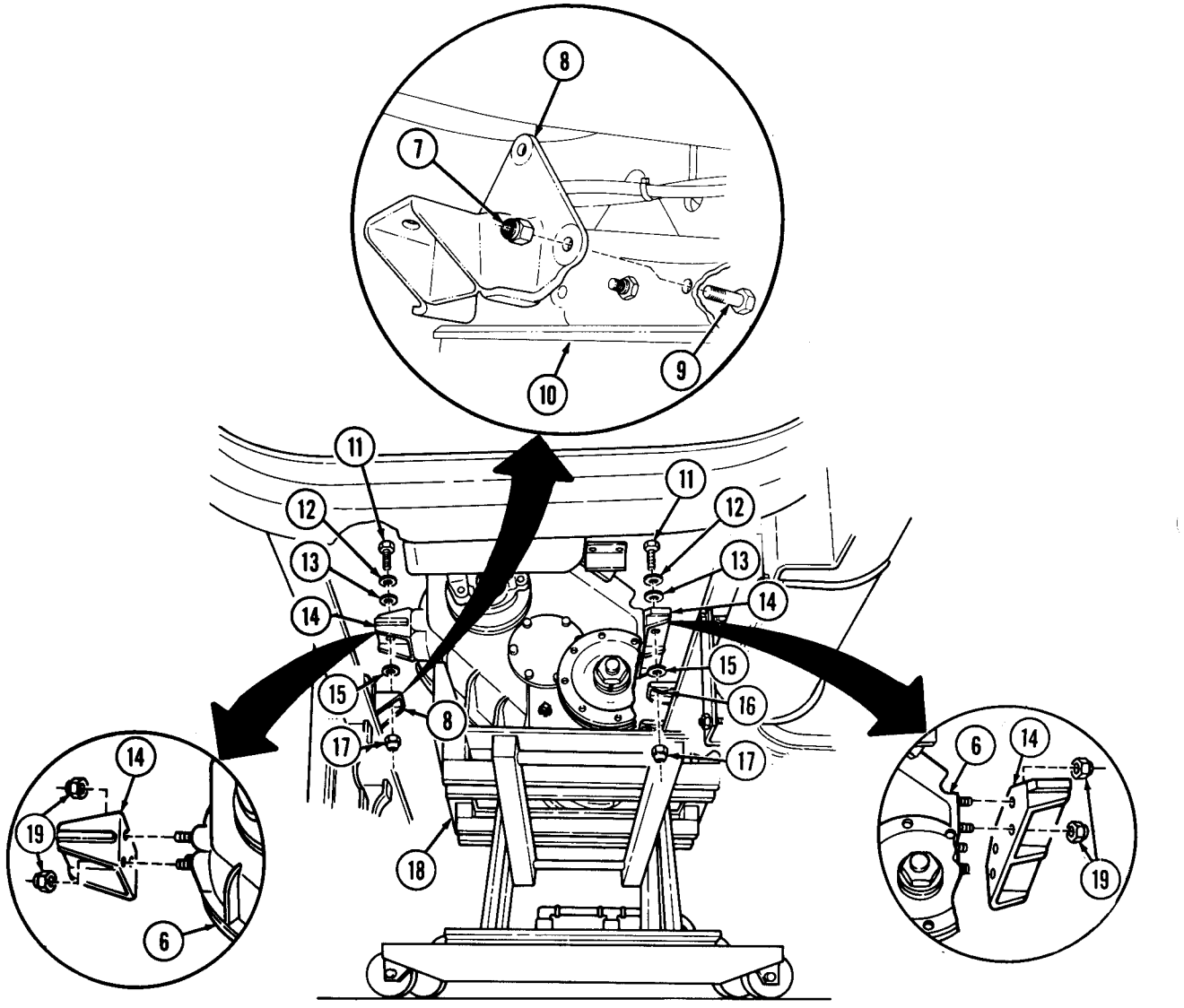
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
47.		Transfer case (6)	Install on hydraulic jack (18).	Use lifting device.
48.		Flange (2)	Install on PTO shaft (1) with washer (3) and new locknut (4).	
49.		Seven studs (5)	Install on transfer case (6).	
50.		Two transfer case mounting brackets (14)	Install on transfer case (6) with seven new locknuts (19).	Tighten 125-135 lb-ft (170-183 N·m).
51.		Transfer case (6)	a. Position under vehicle.	
			b. Raise into position so right frame bracket (8) can be installed.	
52.		Right frame bracket (8)	Install on frame (10) with three screws (9) and new locknuts (7).	Tighten 120 lb-ft (163 N·m).
53.		Three insulators (15)	Place between frame brackets (8) and (16), and transfer case mounting brackets (14).	
54.		Transfer case (6) and brackets (14)	a. Lower into position on three insulators (15).	
			b. Install on frame brackets (8) and (16) with three insulators (13), washers (12), screws (11), and new locknuts (17).	Tighten 50-60 lb-ft (68-81 N·m).
55.		Hydraulic jack (18)	Remove from underside of vehicle.	

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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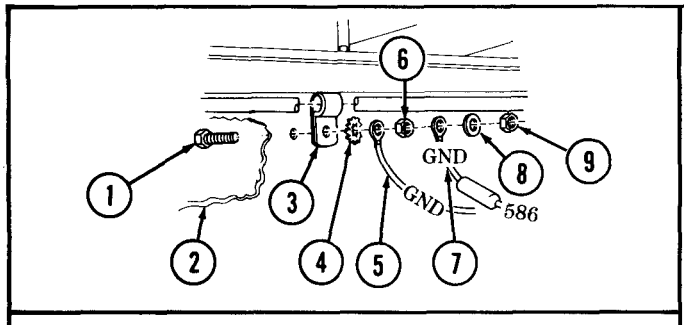
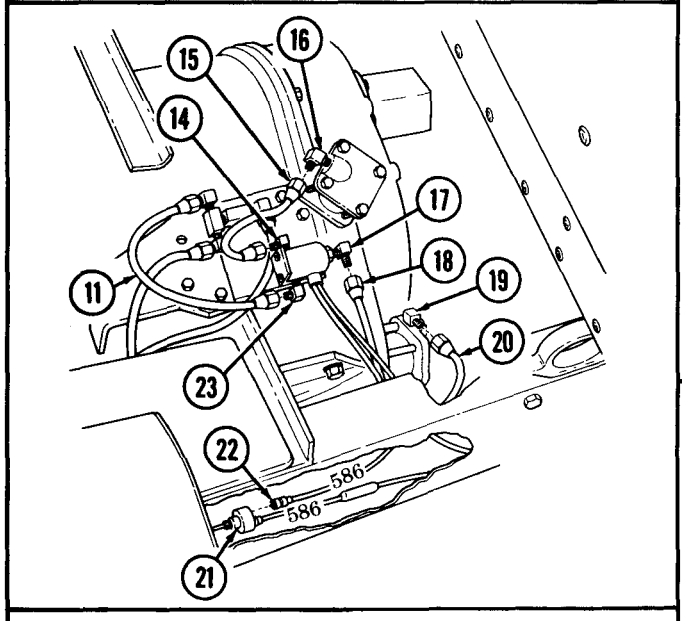
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

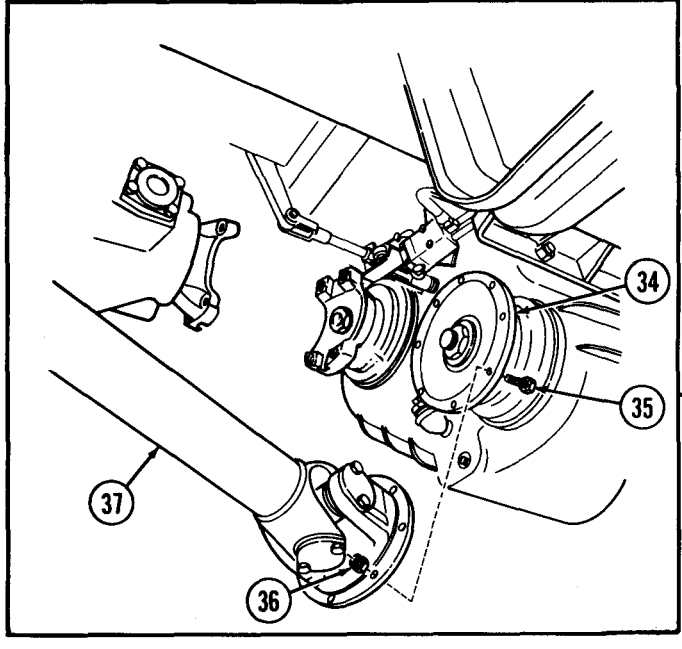
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
56.		Interlock valve ground wire (5)	Install to frame (2) with screw (1), cable clamp (3), new lockwasher (4), and new locknut (6).	
57.		Diode ground wire (7)	Install with washer (8) and new locknut (9).	
58.		Wire (22)	Connect to connector (21).	
59.		Two vent lines (10)	Connect to two elbows (13).	
60.		Interlock vent line (11)	a. Connect to elbow (12). b. Connect to interlock vent elbow (23).	
61.		Supply line (18)	Connect to interlock valve elbow (17).	
62.		Supply line (15)	Connect to interlock air cylinder elbow (16) and interlock valve elbow (14).	
63.		Supply line (20)	Connect to air cylinder elbow (19).	
64.		Speedometer drive shaft (28) and parking brake cable (33)	Install on top of transfer case (24) with clamp (25), clamp (26), and screw (27).	Tighten 30-40 lb-ft (41-54 N·m).
65.		Rear transfer case bracket (29)	Install on transfer case cover (32) with two washers (31) and screws (30).	Tighten 40-55 lb-ft (54-75 N·m).
66.		Propeller shaft (37)	Install on transfer output flange (34) with eight screws (35) and new locknuts (36).	Tighten 32-40 lb-ft (43-54 N·m).

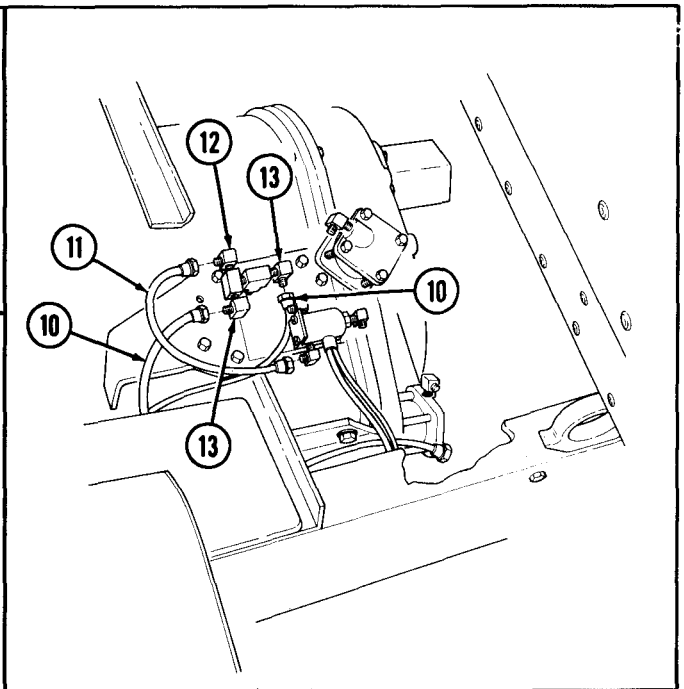
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

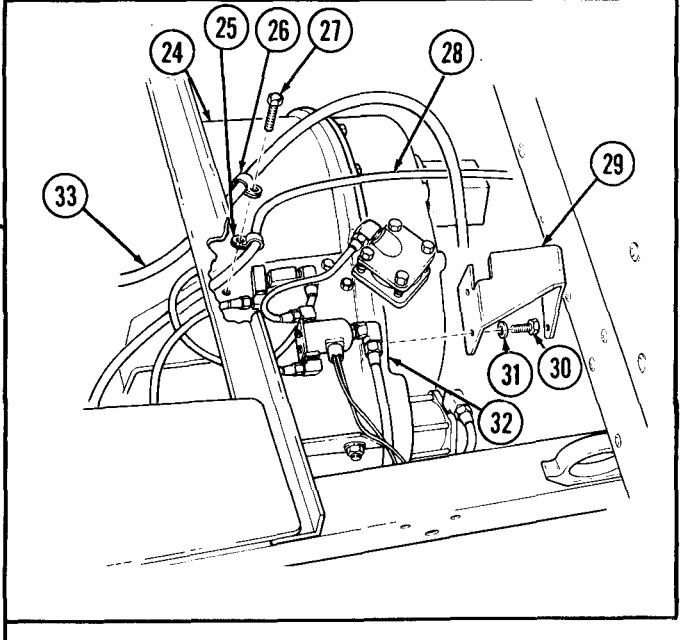
STEP NO.	LOCATION	ITEM	ACTION	REMARKS











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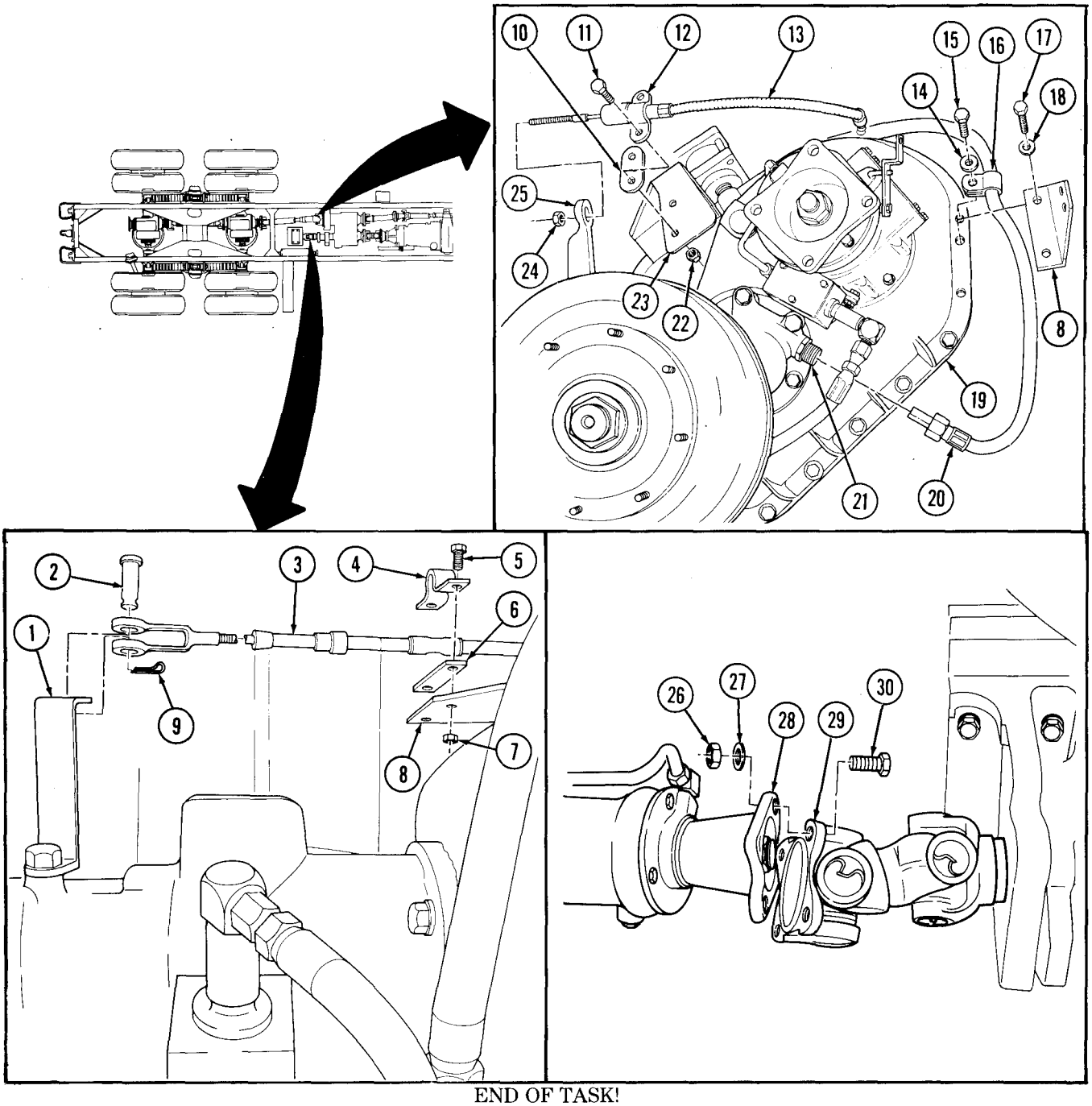
8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
67.		Speedometer drive shaft (20)	a. Connect to speedometer drive adapter (21).	
			b. Install on transfer case cover (19) with clamp (16), washer (14), and screw (15).	Tighten 40-55 lb-ft (54-75 N·m).
68.		Parking brake cable (13)	a. Install through brake drum lever (25) with new locknut (24).	
			b. Install on rear transfer case bracket (23) with spacer (10), clamp (12), two screws (11), and new locknuts (22).	
69.		PTO cable bracket (8)	Install on transfer case cover (19) with two washers (18) and screws (17).	Tighten 40-55 lb-ft (54-75 N·m).
70.		PTO cable (3)	a. Install on PTO cable bracket (8) with spacer (6), clamp (4), two screws (5), and new locknuts (7).	
			b. Install on PTO select lever (1) with clevis pin (2) and new cotter pin (9).	
71.		Propeller shaft (29)	Install on flange (28) with four screws (30), new lockwashers (27), and nuts (26).	

8-19. TRANSFER CASE (M936) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install transfer case shift rod (para. 8-12).
- Install transfer case front axle engagement control valve (para. 8-8).
- Check parking brake adjustment (TM 9-2320-272-20-2).
- Install transmission to transfer propeller shaft (TM 9-2320-272-20-1).
- Install transfer case to forward-rear axle propeller shaft (TM 9-2320-272-20-1).
- Fill transfer case to proper oil level (LO 9-23-0-272-12).

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8-20. TRANSFER CASE REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly and Adjustment

INITIAL SETUP

Applicable Models
All

Equipment Condition Reference
Para. 8-18

Condition Description
Transfer case removed.

Test Equipment
None

Special Tools
Crowfoot wrench GGG-C-1507
Two flange puller standoffs (Appendix D, Item 1)

Special Environmental Conditions
None

Materials/Parts
Shims
Five seals
Three locknuts
Four locking plates
Snapring
Woodruff key
Power takeoff gasket
Power takeoff seal
Adhesive sealant (Appendix C, Item 2)
GAA grease (Appendix C, Item 11)
Gasket sealant (Appendix C, Item 13)
GO 80/90 gear oil (Appendix C, Item 18)
Sealing compound (Appendix C, Item 26)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

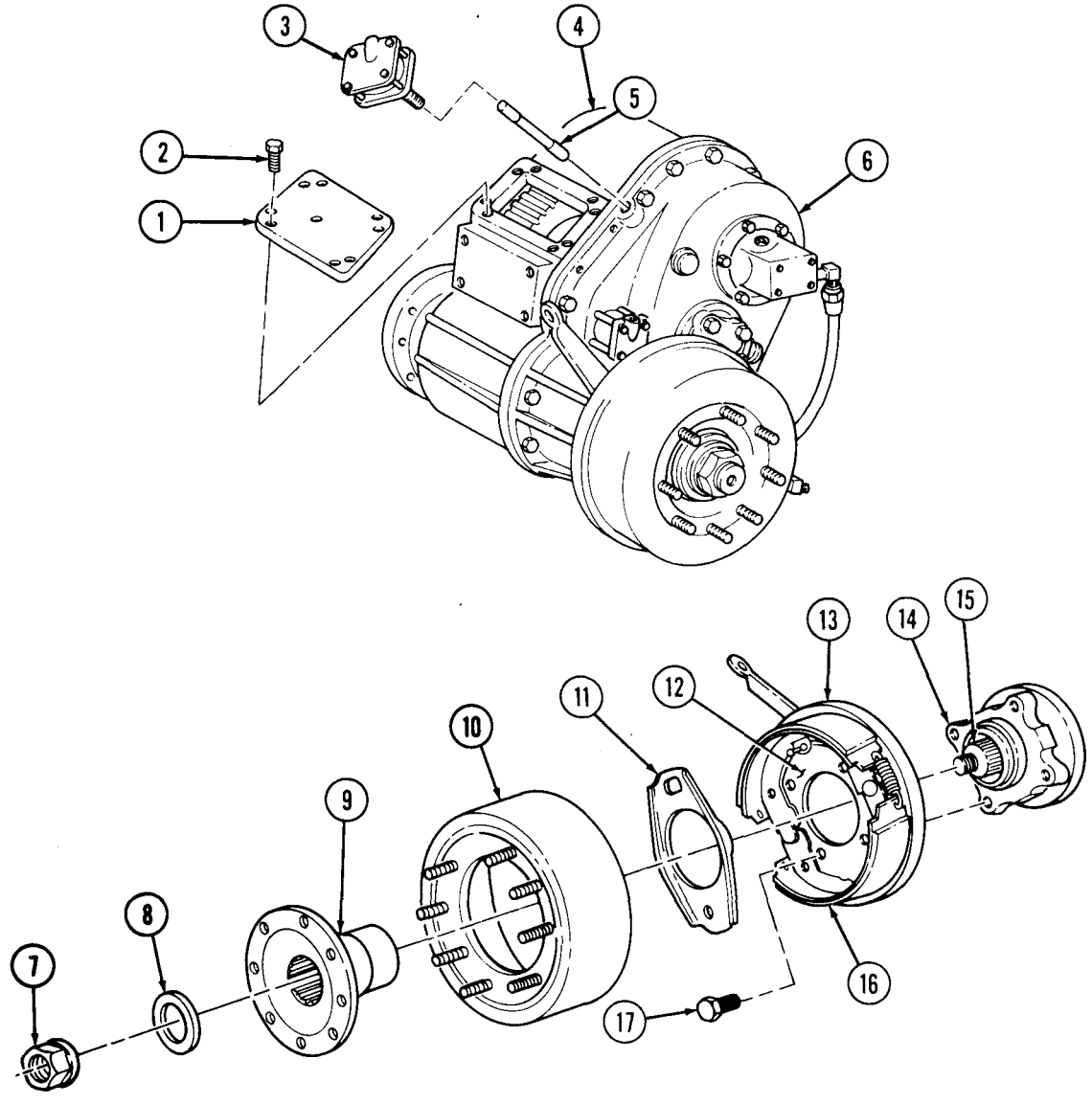
General Safety Instructions
- Keep fire extinguisher nearby when using drycleaning solvent.
- Support transfer case with wood blocks before performing disassembly.

Manual References
TM 9-214
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
		WARNING Transfer case is heavy. Use wood blocking to prevent transfer case from tipping over and causing injury to personnel.		
1.		Transfer case (4)	Clean exterior thoroughly.	Refer to para. 2-7.
2.	Transfer case cover (6)	Interlock air cylinder (3) and pushrod (5)	Remove.	Use crowfoot wrench.
3.	Transfer case housing (4)	Eight screws (2) and inspection plate (1)	Remove.	

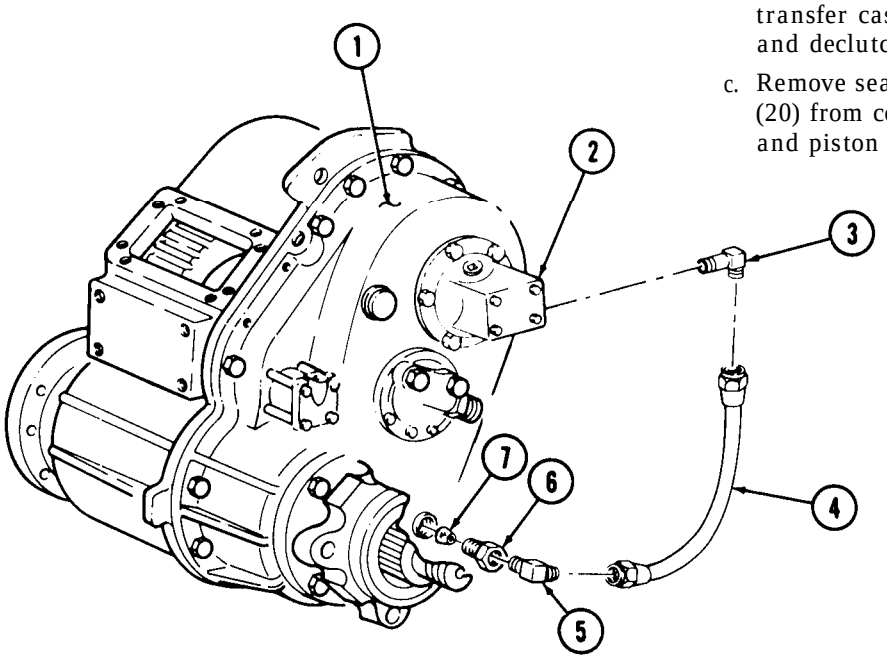
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Transfer case output shaft (15)	Locknut (7), washer (8), and transfer case output flange (9)	Remove.	Discard locknut (7). Tag flange (9) for installation.
5.		Parking brakedrum (10)	Remove.	
6.	Brakeshoe backing plate (12)	Actuating plate (11)	Remove.	
7.	Companion flange (14)	Four screws (17), dust-cover (13), and brakeshoe assembly (16)	Remove.	



8-20. TRANSFER CASE REPAIR (Cont'd)

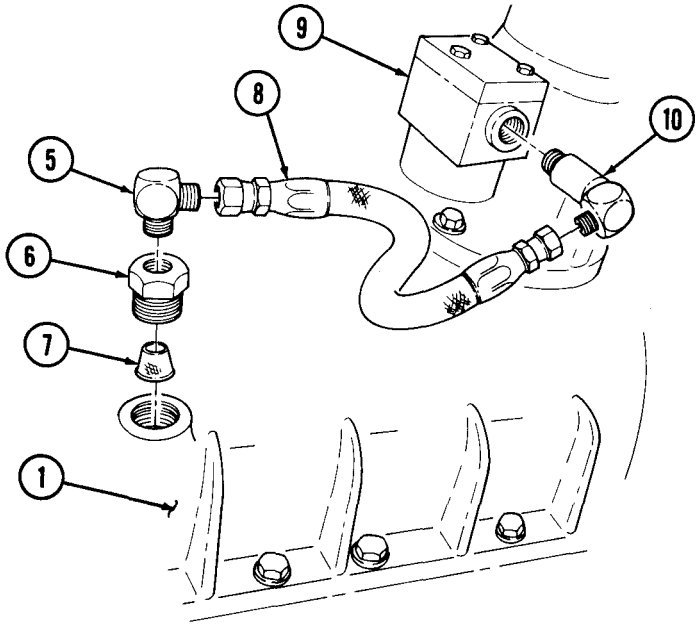
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Elbow (3) and elbow (5)	Oil line (4)	Remove.	
9.	Transfer case oil pump (2)	Elbow (3)	Remove.	
		NOTE Steps 10 and 11 are required only when vehicle is equipped with transfer power takeoff.		
10.	Elbows (5) and (10)	Oil line (8)	Remove.	
11.	Transfer power takeoff (9)	Elbow (10)	Remove.	
12.	Adapter fitting (6)	Elbow (5)	Remove.	
13.	Transfer case cover (1)	Adapter fitting (6) and filter screen (7)	Remove.	
13.1		Six screws (13), washers (12), and oil pump (11)	Remove.	Mark position of oil pump (11) for installation.
13.2		Front axle engagement air cylinder cover (14)	a. Bend tabs of four locking plates (15) away from screws (16).	
			b. Remove four screws (16), locking plates (15), cover (14), cylinder (18), piston (19), and gasket (21) from transfer case cover (1) and declutch shaft (22).	Discard locking plates (15) and gasket (21).
			c. Remove seals (17) and (20) from cover (14) and piston (19).	Discard seals (17) and (20).



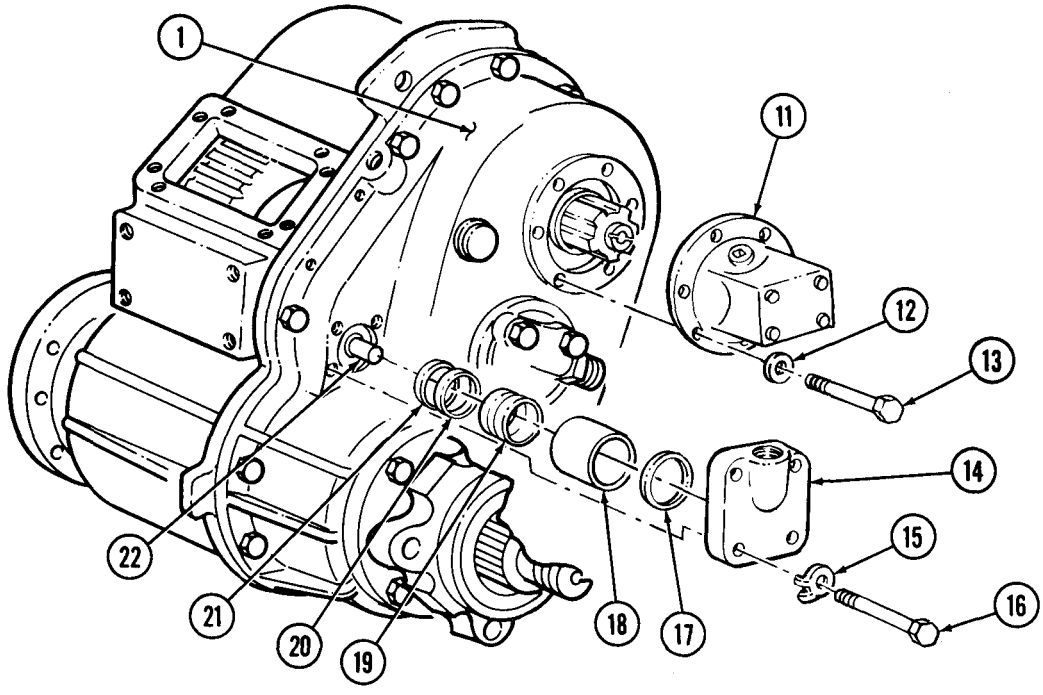
WITHOUT TRANSFER CASE PTO

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



WITH TRANSFER CASE PTO



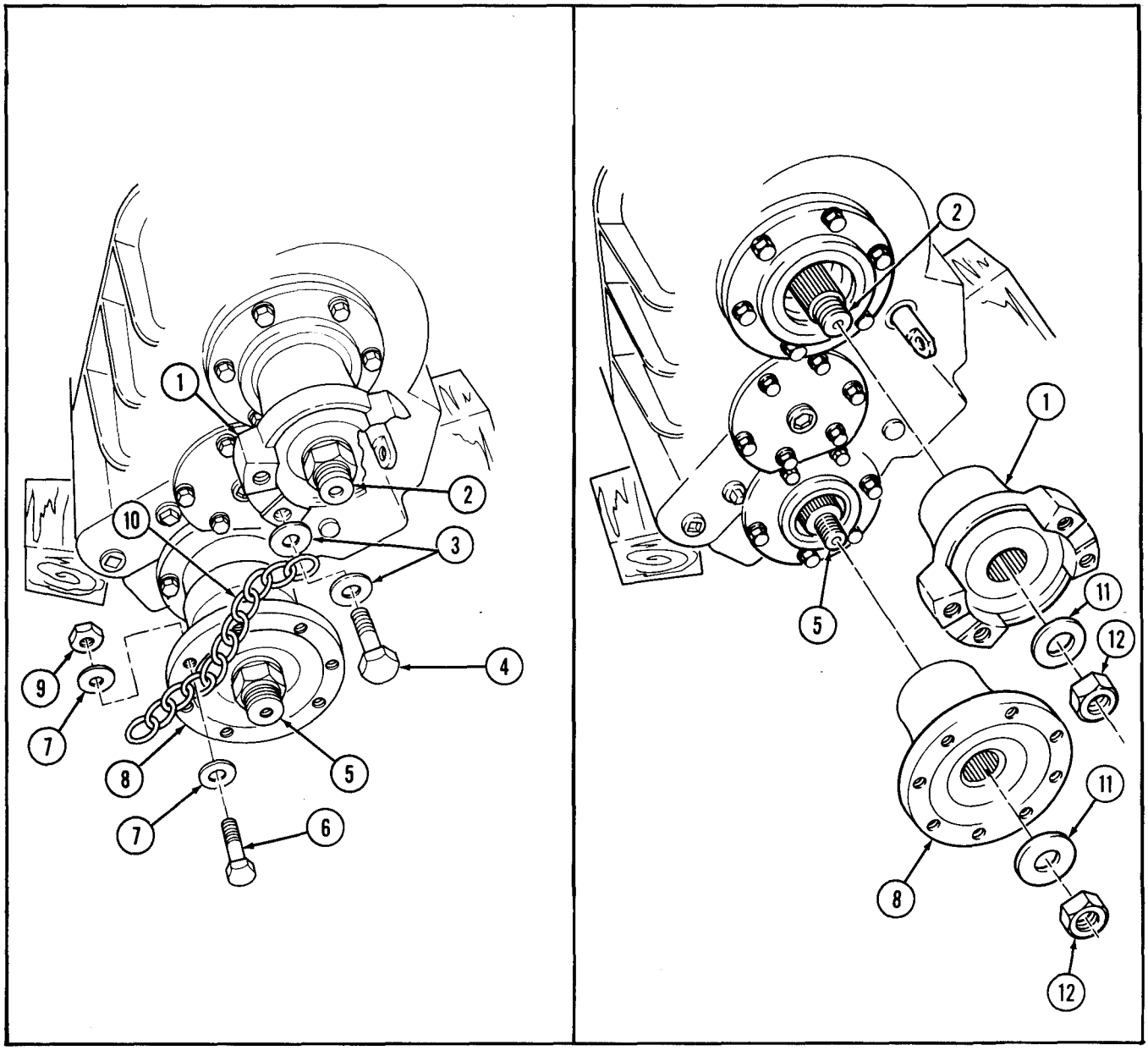
WITHOUT TRANSFER CASE PTO

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.		Chain (10)	a. Install on main flange (1) with two washers (3) and screw (4). b. Install on output flange (8) with screw (6), two washers (7), and nut (9).	
15.	Main flange (1) and output flange (8)	Two locknuts (12) and washers (11)	Remove.	Discard locknuts (12).
16.		Nut (9), two washers (7), screw (6), screw (4), two washers (3), and chain (10)	Remove.	
17.	Main input shaft (2)	Main flange (1)	Remove.	Use puller.
18.	Front output shaft (5)	Front output flange (8)	Remove.	Use puller. Tag for installation.

8-20. TRANSFER CASE REPAIR (Cent'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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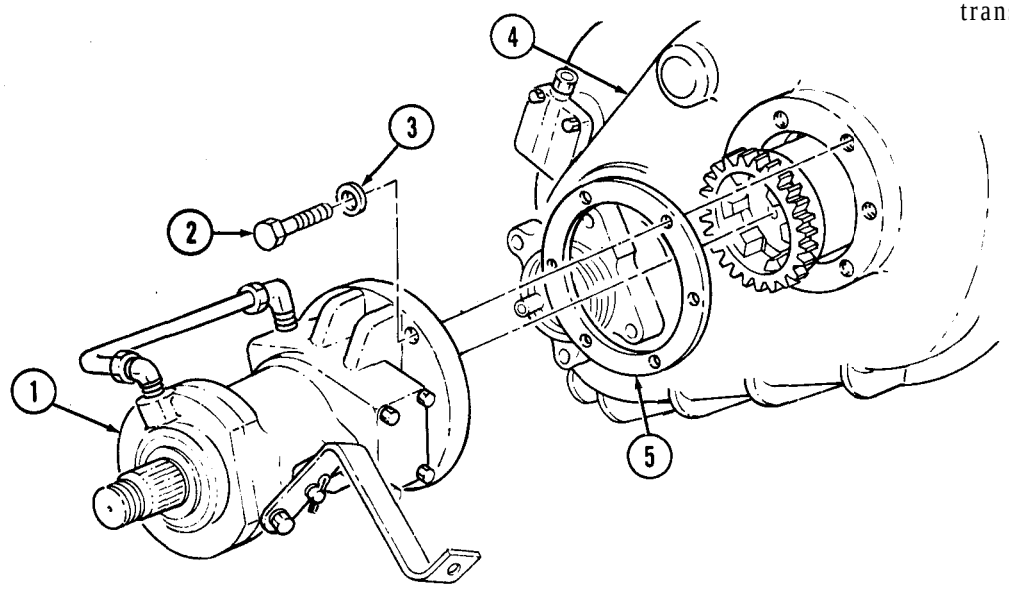
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Steps 19 and 20 are required only when vehicle is equipped with transfer power takeoff.		
19.	Transfer case cover (4)	Six screws (2), washers (3), transfer power takeoff (1), and gasket (5)	Remove.	Discard gasket (5).
20.	Main input shaft (7)	Setscrew (6), power takeoff drive gear (9), and seal (8)	Remove.	Discard seal (8).
22.		Setscrew (21), collar (23), and seal (19)	Remove.	Discard seal (19).
23.		Baffle (18)	Remove.	
24.	Transfer case cover (4)	Seven screws (27), washers (26), flange (12), and shim pack (13)	Remove.	
25.	Backing plate companion flange (12)	Dust shield (10) and flange seal (11)	Remove.	Discard seal (11).
26.	Transfer case cover (4)	Four screws (25), two screws (24), six washers (22), and gear cover (20)	Remove.	
27.	Transfer case housing (14)	Nineteen screws (16), washers (17), and transfer case cover (4)	Remove.	Use puller. Drive screw over intermediate shaft (15) and two long screws through puller into transfer case cover (14).



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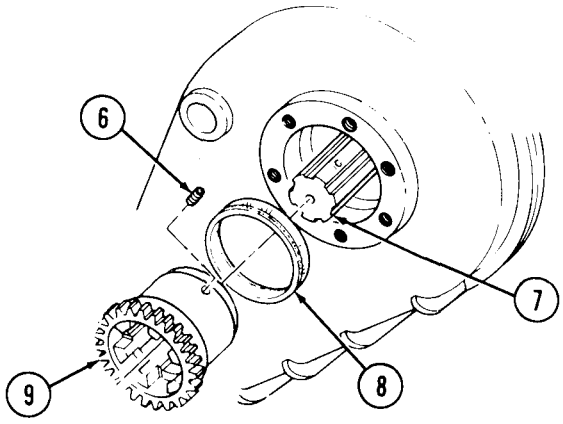
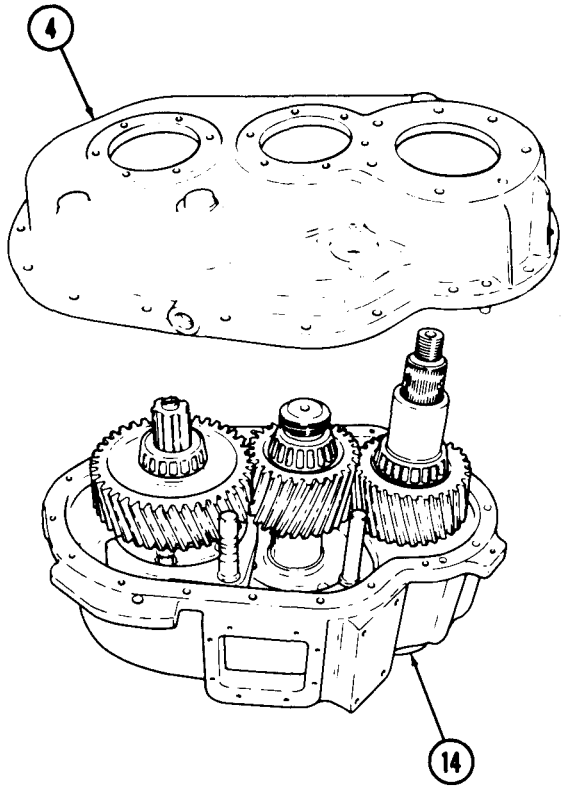
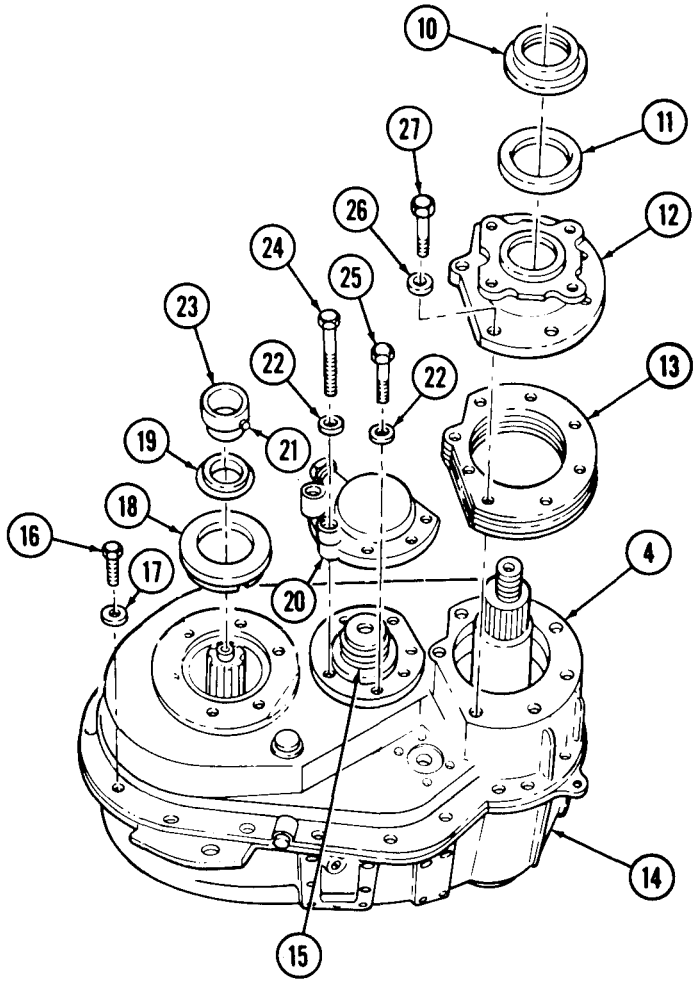
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

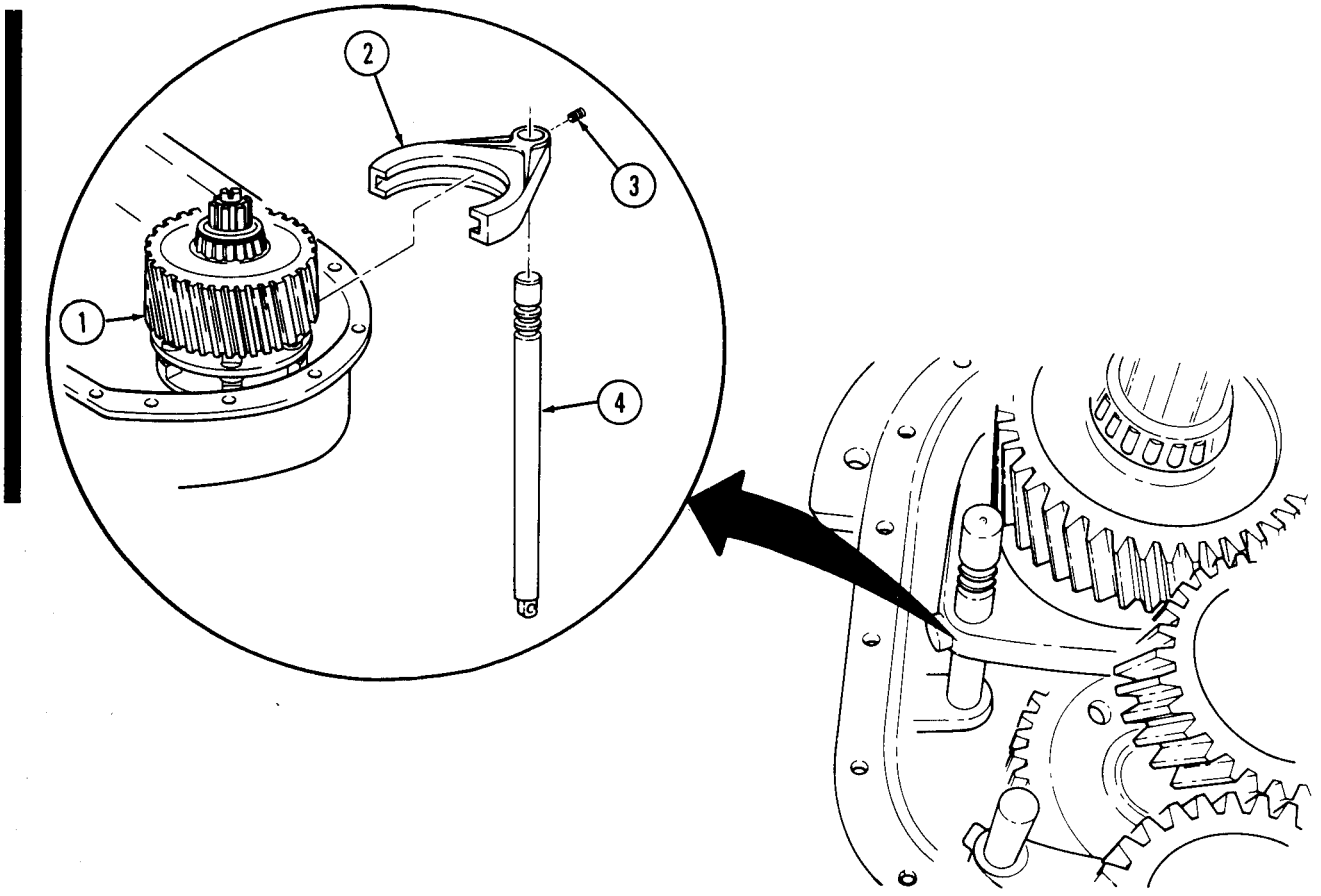






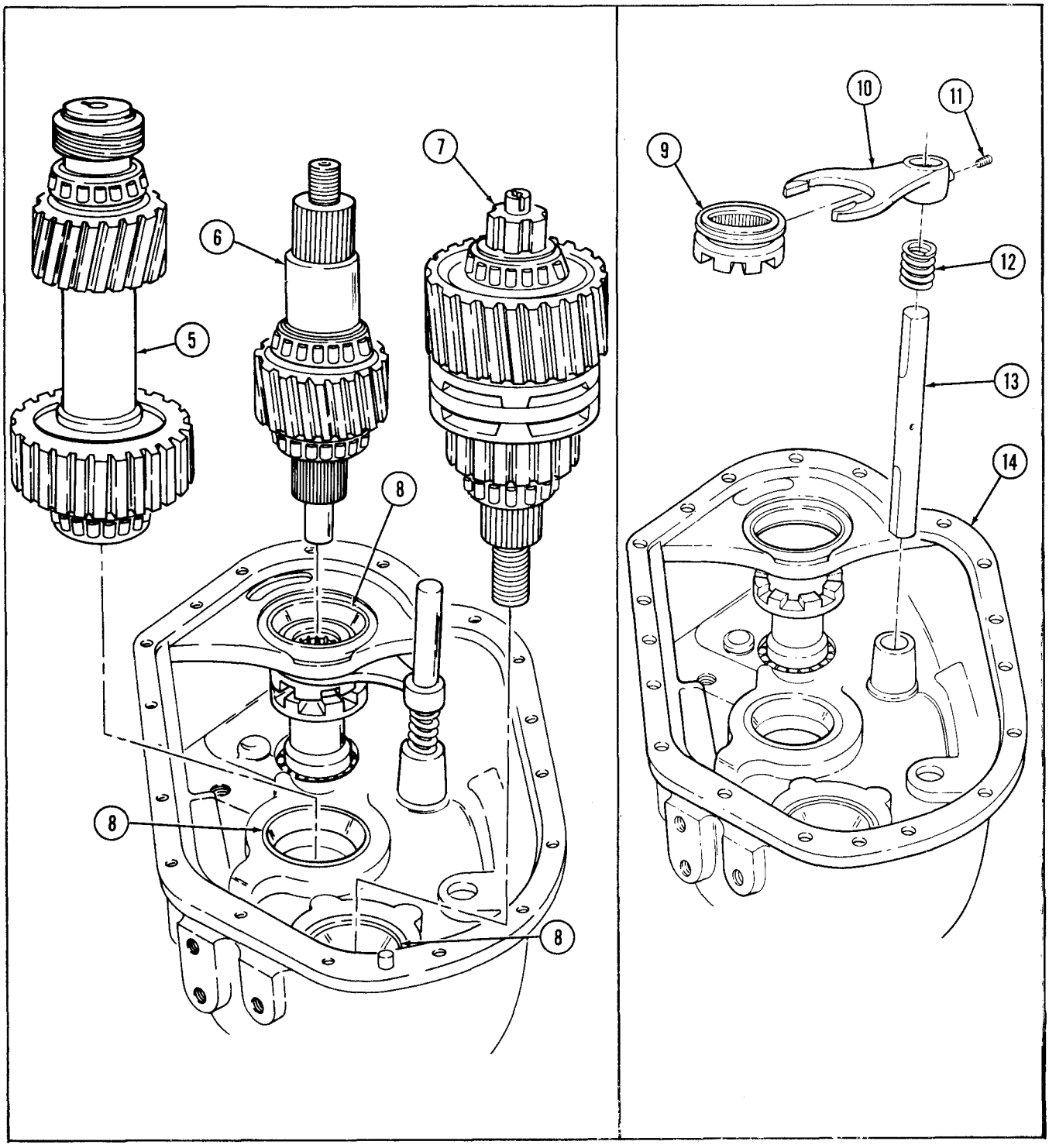
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
28.	Hi-lo shift fork (2)	Setscrew (3) and hi-lo shift shaft (4)	Remove.	
29.	Synchronizer gear(1)	Shift fork (2)	Remove.	
30.	Three bearing races (8)	Main input shaft assembly (7), rear output shaft assembly (6), and intermediate shaft assembly (5).	Remove.	
31.	Declutch fork(10)	Setscrew (11)	Remove.	
32.	Transfer case housing (14)	Declutch shaft (13), declutch fork (10), spring (12), and sliding clutch (9)	Remove.	Replace spring (12) if broken or distorted.



8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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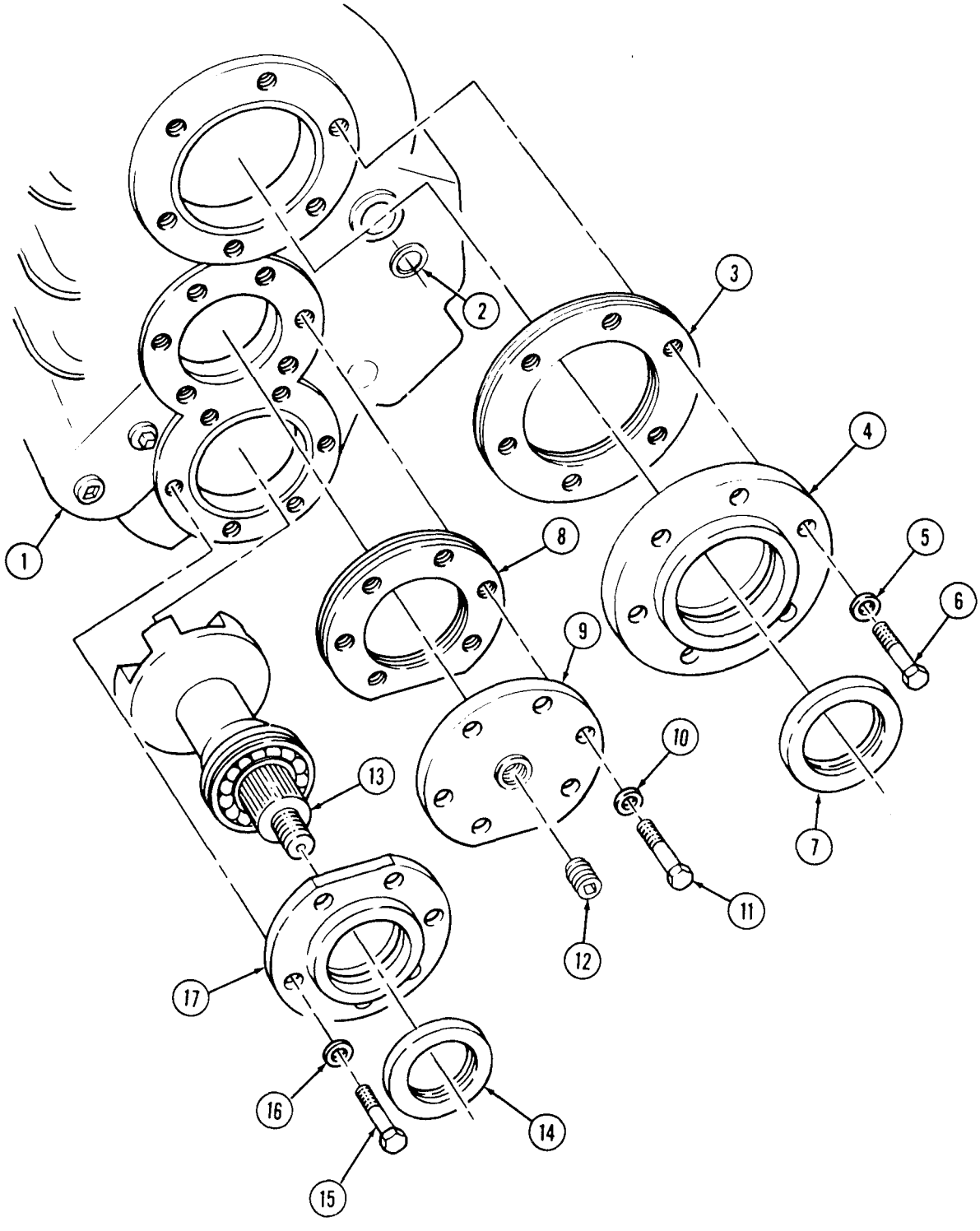
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
33.	Transfer case housing (1)	Hi-lo shift shaft seal (2)	Remove.	Discard seal (2).
34.		Six screws (6) and washers (5), main input shaft cover (4), and shim pack (3)	Remove.	Mark position for installation.
35.	Input shaft cover (4)	Input shaft seal (7)	Remove.	Discard seal (7).
36.	Intermediate shaft cover (9)	Plug (12)	Remove.	
37.	Transfer case housing (1)	Six screws (11) and washers (10), intermediate shaft cover (9) and shim pack (8)	Remove.	
38.		Six screws (15) and washers (16), and front output shaft cover (17)	Remove.	
39.	Front output shaft cover (17)	Output shaft seal (14)	Remove.	Discard seal (14).
40.	Transfer case housing (1)	Front output shaft (13)	Remove.	

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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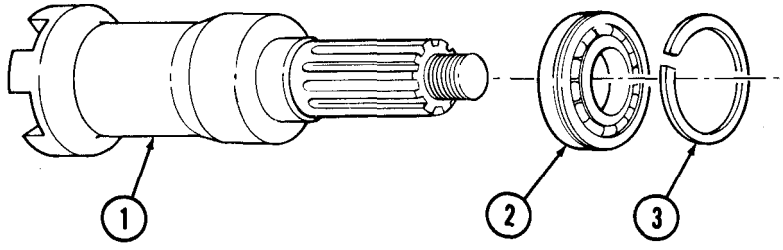
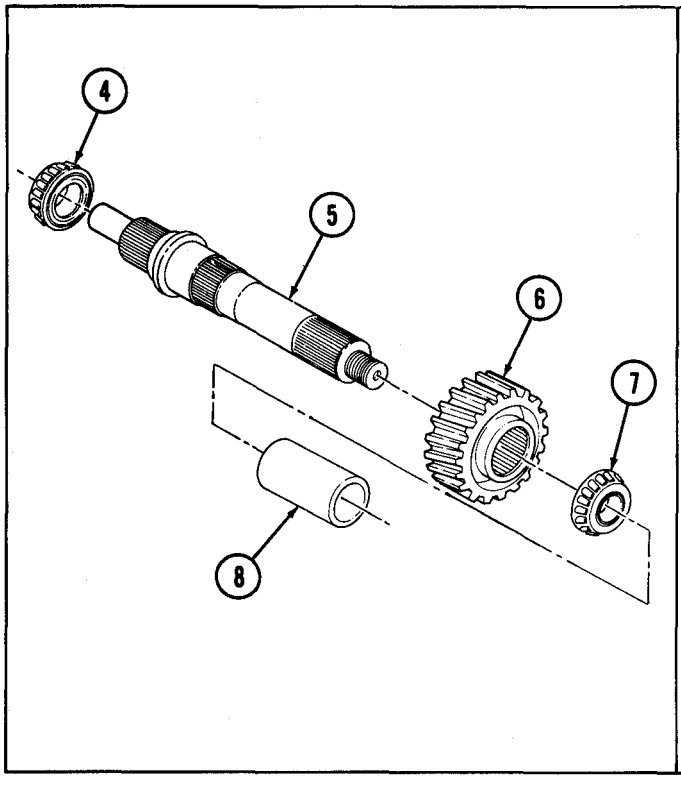
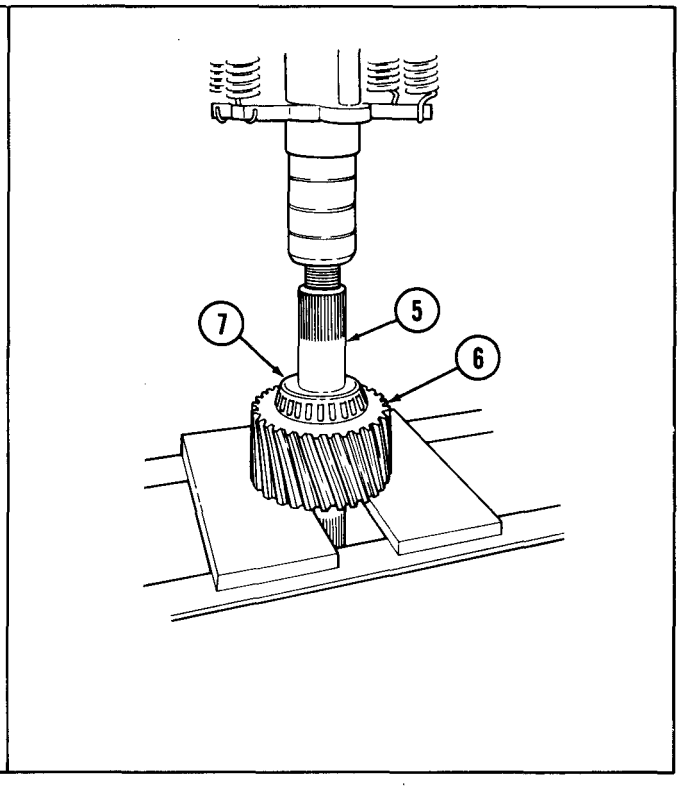
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
41.	Front output shaft (1)	Front output shaft roller bearing (2)	Remove.	Use flat axle type bearing puller. Tag bearing (2) for installation.
41.1	Bearing (2)	Snapring (3)	Remove.	Inspect snapring (3) for tightness. Replace if damaged.



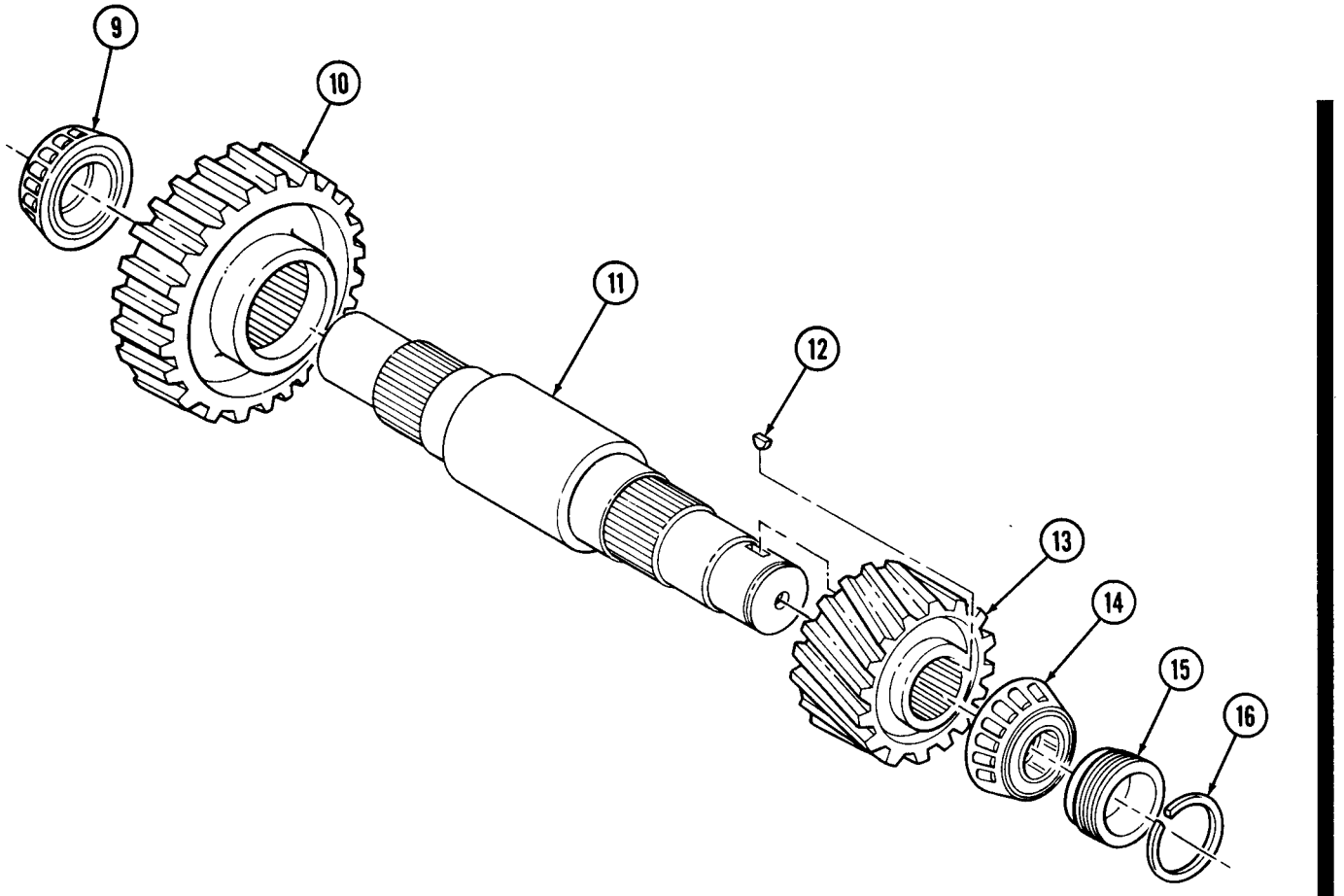
42.	Rear output shaft (5)	Spacer (8)	Remove.	
43.		Rear output shaft roller bearings (4) and (7), and gear (6)	Remove.	Use arbor press and mandrel. Tag gear (6) and bearings (4) and (7) for installation.





8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
44.	Intermediate shaft (11)	Snapring (16) and speedometer drive gear (15)	Remove.	Discard snapring (16).
45.		Woodruff key (12)	Remove.	Discard woodruff key (12).
46.		Intermediate roller bearing (14) and intermediate high-speed gear (13).	Remove.	Use arbor press and mandrel. Tag gear (13) and bearing (14) for installation.
47.		Intermediate roller bearing (9) and intermediate low-speed gear (10)	Remove.	Use arbor press and mandrel. Tag bearing (9) and gear (10) for installation.



8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
48.	Main input shaft (6)	Companion flange spacer (1)	Remove.	
49.		Main input shaft roller bearing (8), bearing spacer (9), and high-speed gear (10)	Remove.	Use arbor press and mandrel. Tag bearing (8) and spacer (9) for installation.
50.		High-speed gear spacer (11)	Remove.	Tag spacer (11) for installation.
51.		Synchronizer gear (12)	Remove.	
52.		Main input shaft roller bearing (2), bearing spacer (3), and low-speed gear (4)	Remove.	Use arbor press and mandrel. Tag bearing (2) and spacer (3) for installation.
53.		Low-speed gear spacer (5)	Remove.	Tag spacer (5) for installation.
	b. Cleaning and Inspection			

WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

54.	Main input shaft (6)	Two roll pins (7)	Inspect for breaks	Replace if broken.

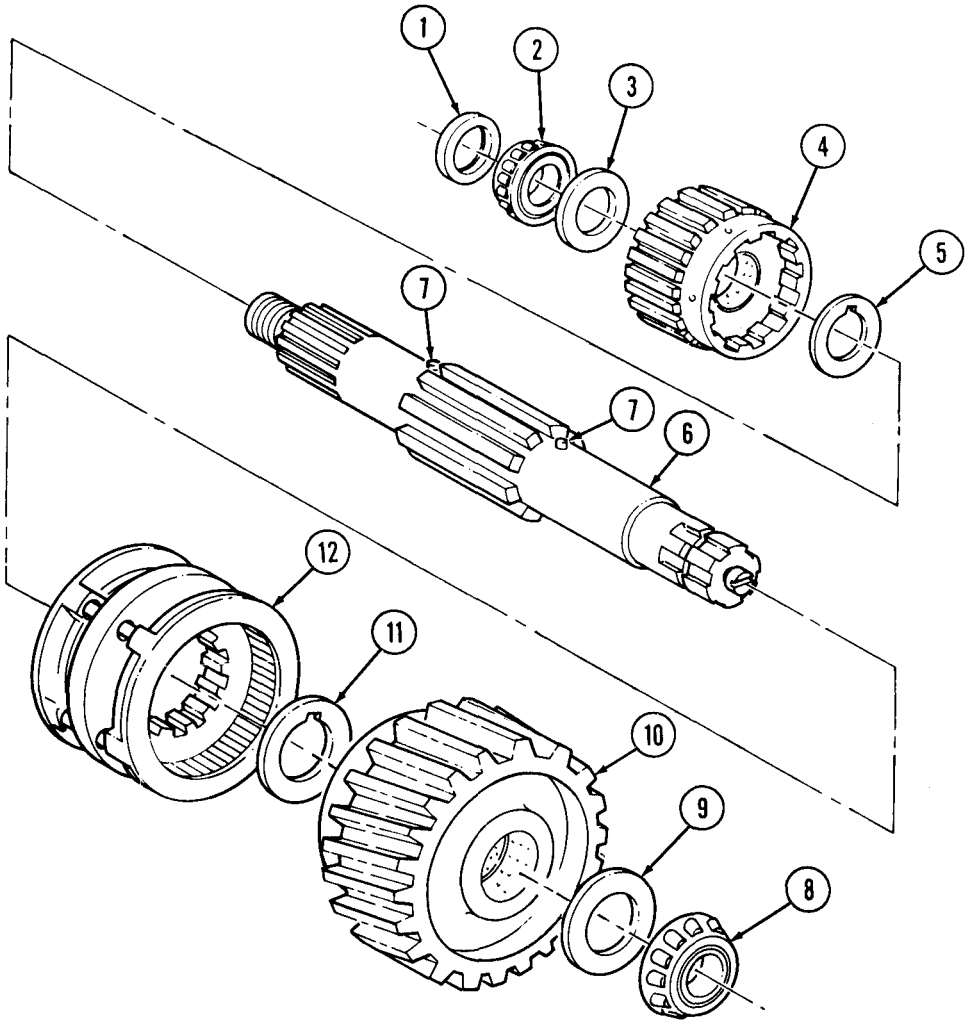
NOTE

Steps 55 and 56 are performed only if roll pins are to be replaced.

55.		Two roll pins (7)	Remove.	
56.		Two new roll pins (7)	Install in main input shaft (6).	
57.		All transfer case gears, shafts, spacers, washers, covers, and shims	a. Clean with drycleaning solvent.	
			b. Inspect for scores, breaks, cracks, chips, and pitting.	Replace if scored, broken, cracked, chipped, or pitted.

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

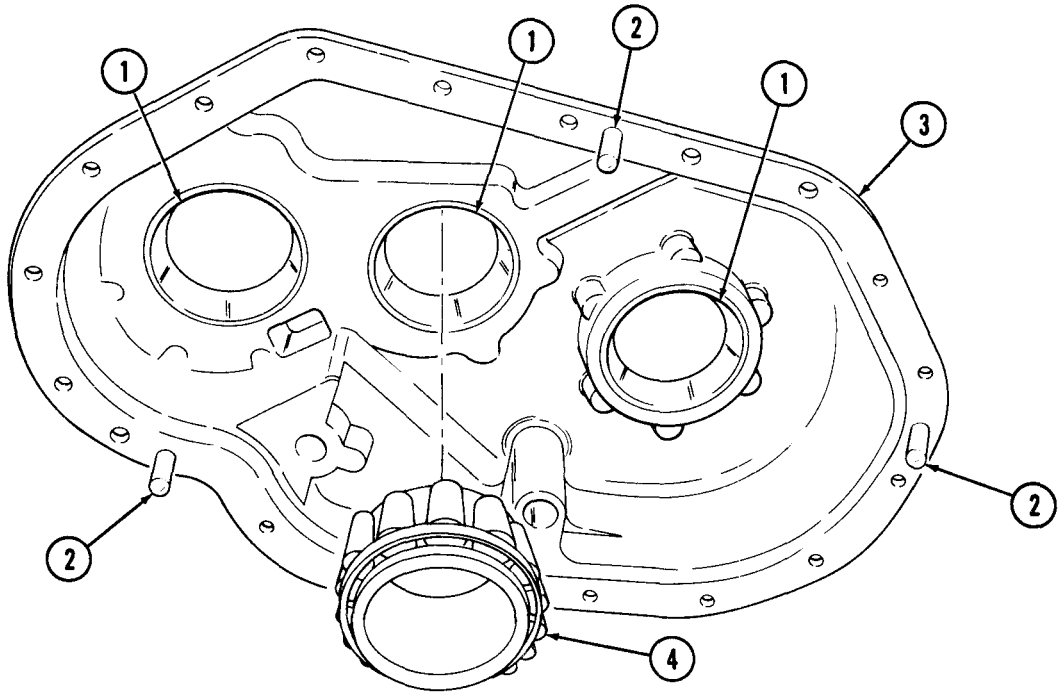


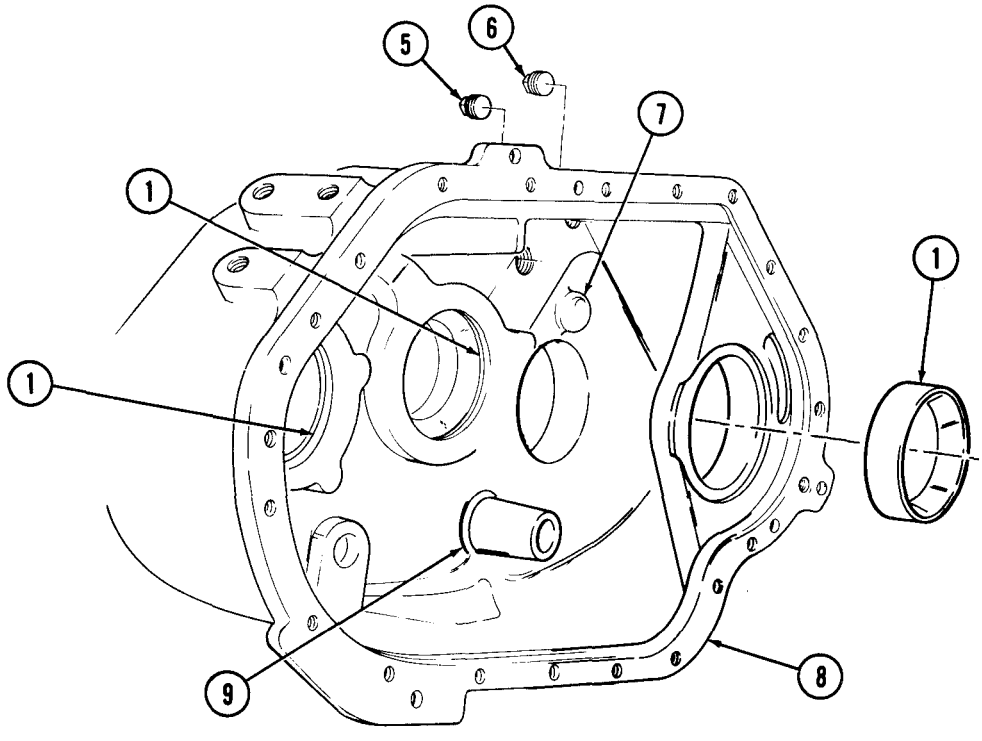
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.	
58.		Transfer case housing (8) and transfer case cover (3)	a. Clean with drycleaning solvent.	
			b. Clean mating surfaces.	
			c. Inspect for breaks, cracks, and stripped threads.	Replace if broken, cracked or threads are not repairable. Refer to para. 2-9.
58.1.		Filler (5) and drain (6) plugs.	a. Remove.	
			b. Inspect for stripped threads.	Replace if threads are stripped.
58.2.		Three dowel pins (2)	Inspect for bends and breaks.	Replace if bent or broken.
58.3.		Freeze plugs (7) and (9)	Inspect for looseness.	Replace if loose or missing.
59.		Bearing (4)	a. Clean with drycleaning solvent and allow to air dry.	
			b. Inspect.	Refer to TM 9-214. If damaged, replace bearing (4) and bearing race (1).
60.	Transfer case housing (8) and transfer case cover (3)	Bearing races (1)	a. Inspect.	Refer to TM 9-214.
			NOTE Perform steps 60b. and 61 only if bearings or bearing races are to be replaced.	
			b. Remove by tapping alternately on outer edge.	Tag bearing races (1) for installation.
61.		New bearing race (1)	Press into transfer case housing (8).	Use arbor press and mandrel.

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



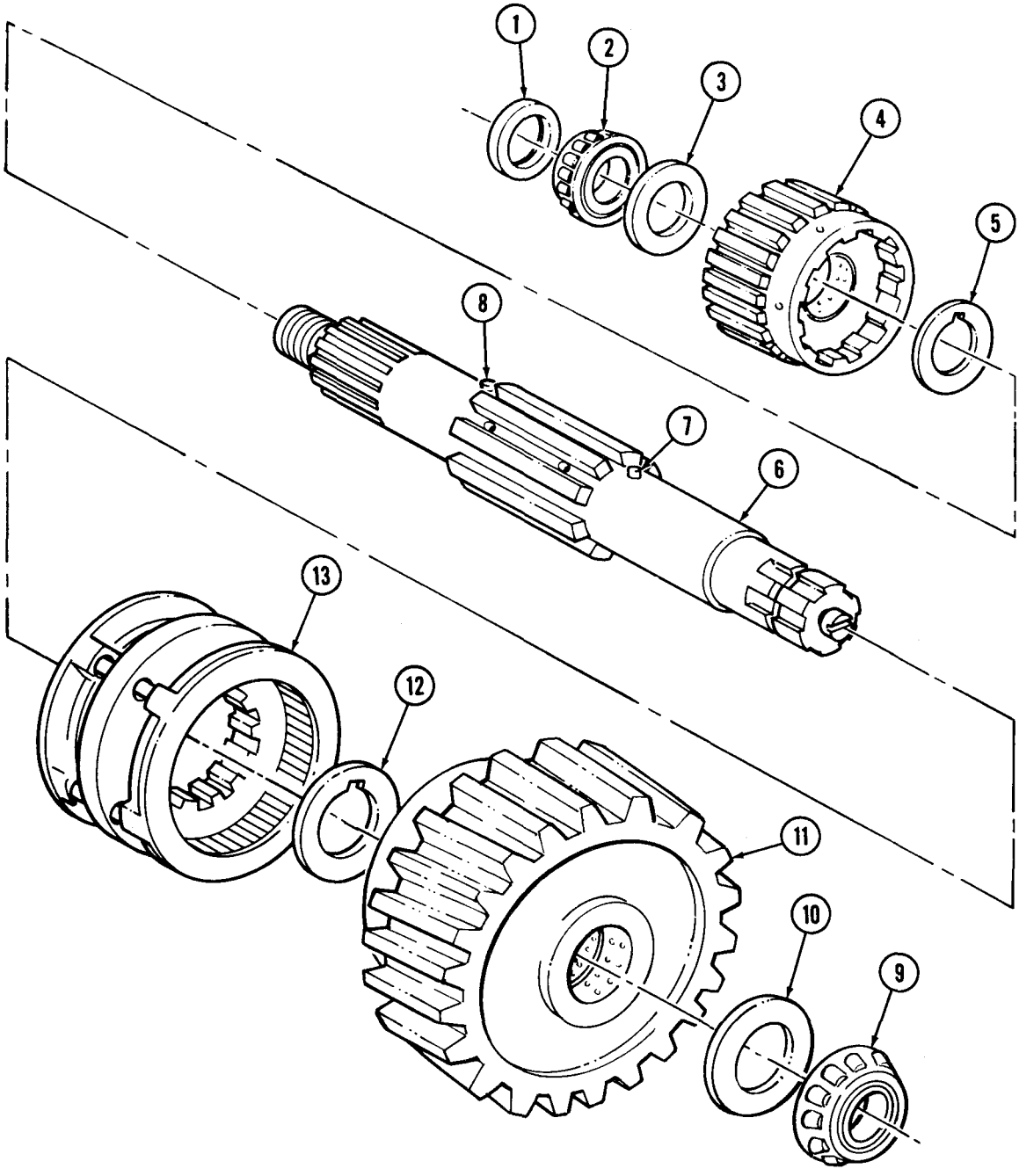


8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassembly and Adjustment			
		NOTE Coat all gears and bearing assemblies with gear oil during reassembly.		
62.		Low-speed gear spacer (5)	Install on main input shaft (6) and aline with dowel pin (8).	
63.		Low-speed gear (4) and bearing spacer (3)	Install on main input shaft (6).	Make sure bearing spacer (3) minimum thickness is 0.265 in. (6.73 mm).
64.		Main input shaft roller bearing (2)	Install on main input shaft (6).	Make sure gear spacer (5) is alined on dowel pin (8). Use arbor press and mandrel.
65.		Synchronizer gear (13)	Install on main input shaft (6).	
66.		High-speed gear spacer (12)	Install on main input shaft (6) and aline with dowel pin (7).	
67.		High-speed gear (11) and bearing spacer (10)	Install on main input shaft (6).	Make sure bearing spacer (10) minimum thickness is 0.143 in. (3.63 mm). Make sure gear spacer (12) is alined on dowel pin (7).
68.		Main input shaft roller bearing (9)	Install on main input shaft (6).	Use arbor press and mandrel.
69.		Companion flange spacer (1)	Install on main input shaft (6).	

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

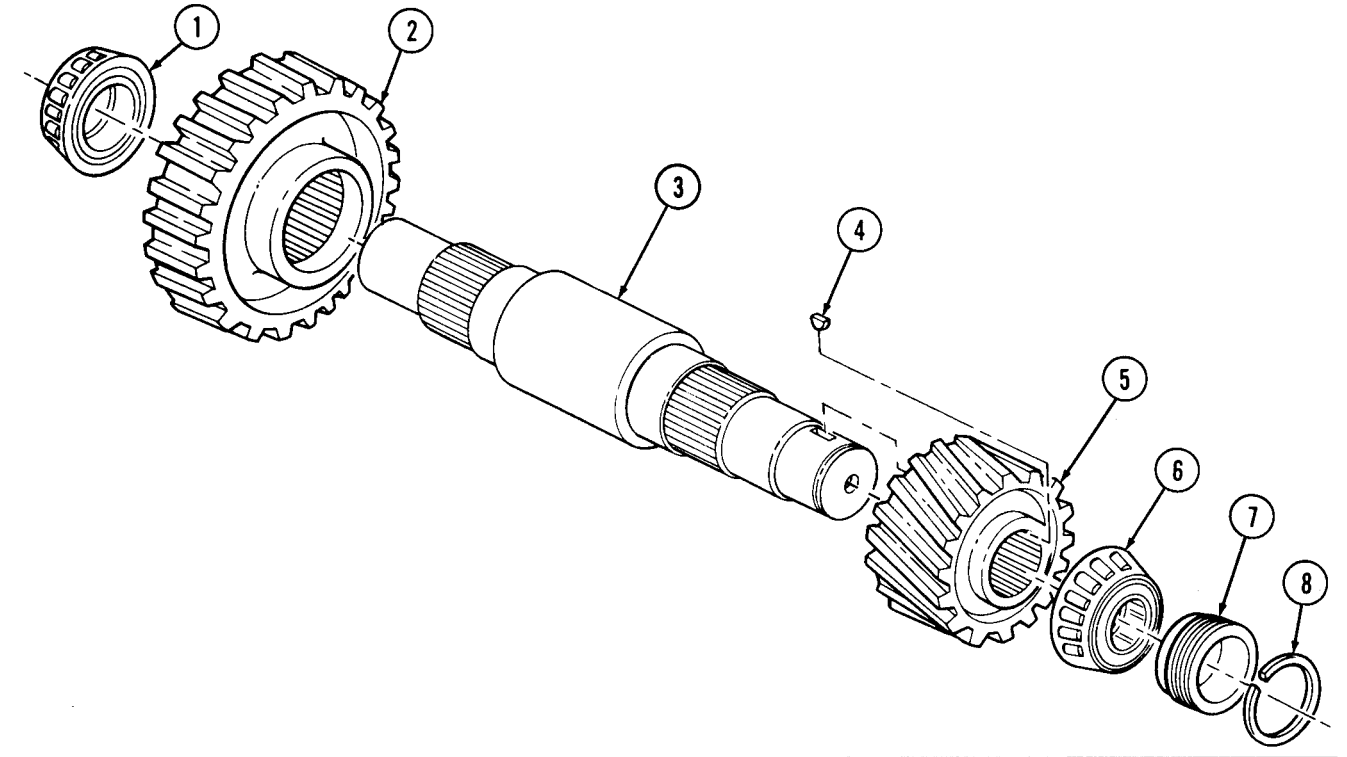


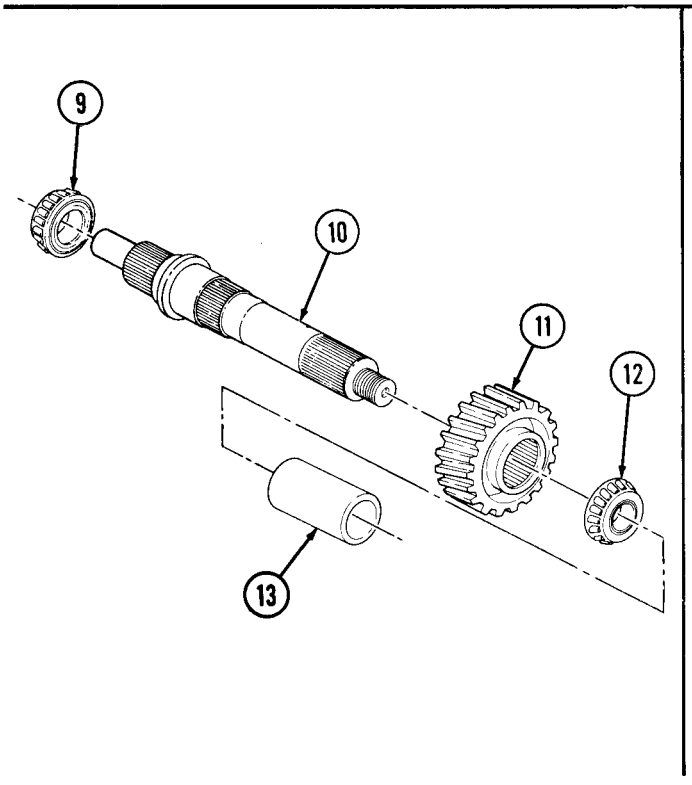
8-20. TRANSFER CASE REPAIR (Cont'd)

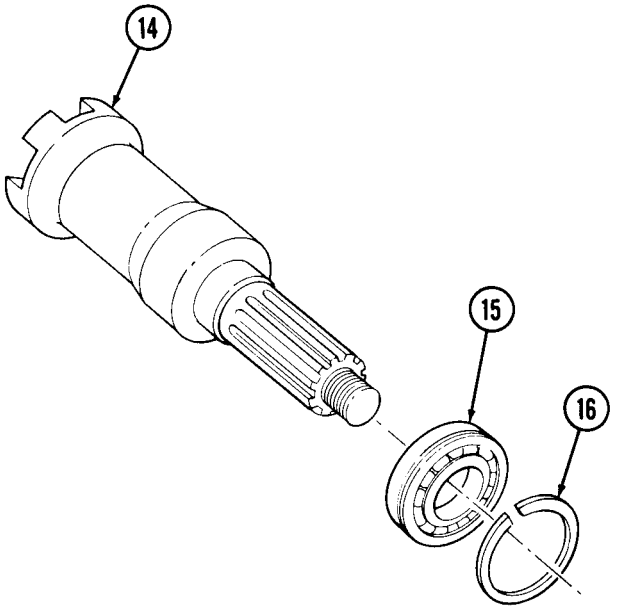
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
70.		Intermediate low-speed gear (2) and intermediate roller bearing (1)	Install on intermediate shaft (3).	Use arbor press and mandrel.
71.		Intermediate high-speed gear (5) and roller bearing (6)	Install on shaft (3).	Use arbor press and mandrel. Make sure high-speed gear (5) width is 3.875 in. (98.43 mm).
72.		New woodruff key (4)	Install on shaft (3).	
73.		Speedometer gear (7)	Install on intermediate shaft (3) over woodruff key (4) with new snapring (8).	
74.		Rear output shaft driven gear (11) and rear output shaft roller bearings (9) and (12)	Install on rear output shaft (10).	Use arbor press and mandrel. Make sure driven gear (11) width is 3.75 in. (95.25 mm).
75.		Rear output shaft spacer (13)	Install on shaft (10).	
76.		Front output shaft roller bearing (15)	Install on front output shaft (14).	Use arbor press and mandrel.
76.1.		New snapring (16)	Install on bearing (15)	Make sure snapring side of bearing race faces toward splined end of shaft (14).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





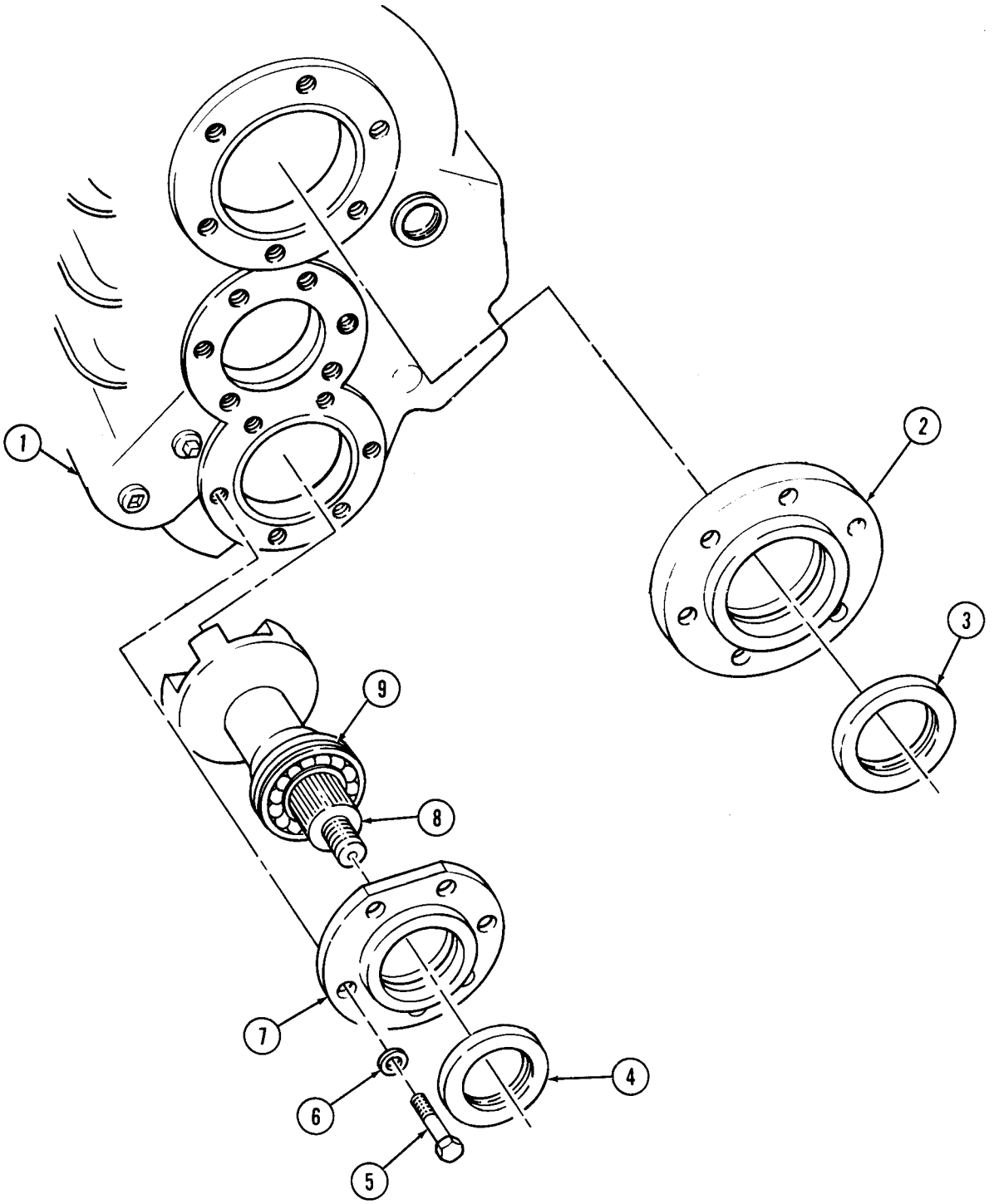


8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
77.		Front output shaft (8)	Install in transfer case until snapring (9) is flush with housing (1).	
		NOTE		
		Apply GAA grease to inside diameter of all seals.		
78.		New front output shaft seal (4)	Install in front output shaft cover (7).	
79.		Front output shaft cover (7) and transfer case housing (1)	Apply a thin coating of gasket sealant to mating surfaces.	
80.		Front output shaft cover (7)	Install on transfer case housing (1) with six washers (6) and screws (5).	Tighten 40-65 lb-ft (54-88 N·m).
81.		New input shaft seal (3)	Install in main input shaft cover (2).	

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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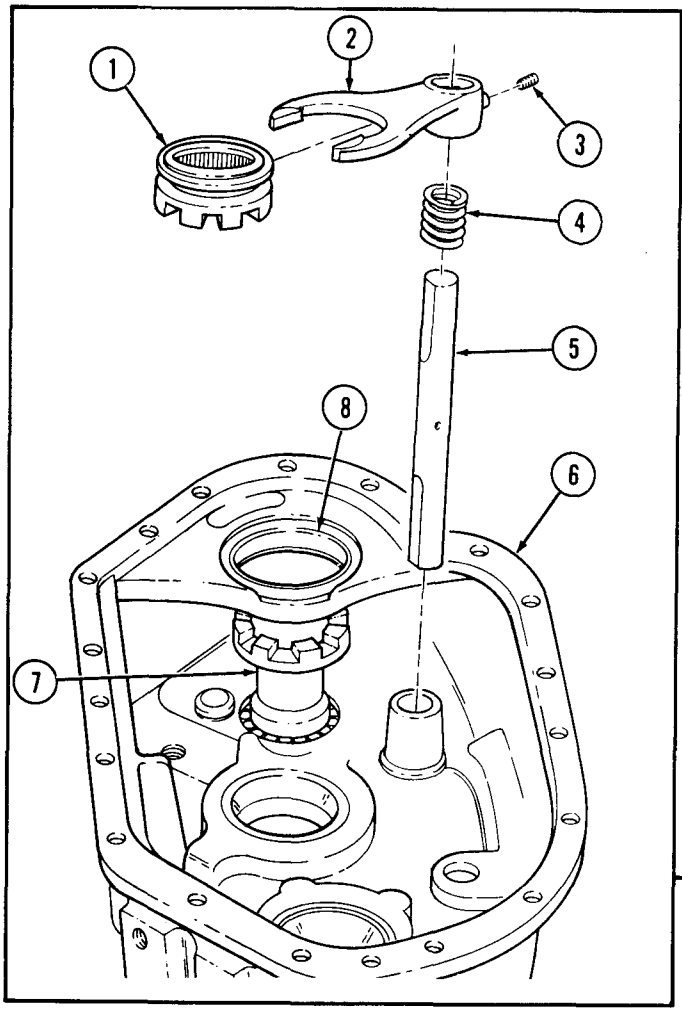
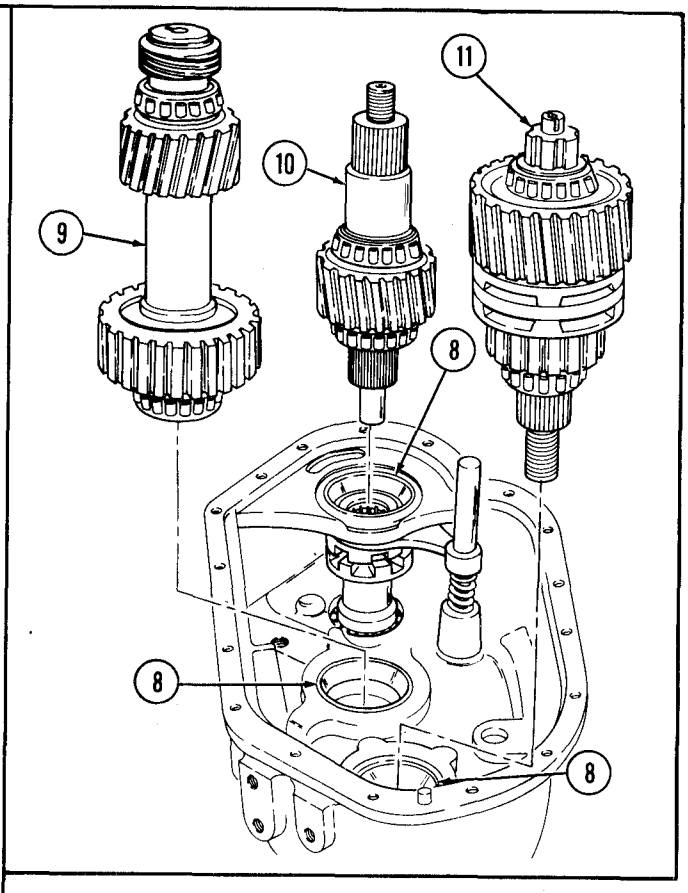
8-20. TRANSFER CASE REPAIR (Cont'd)

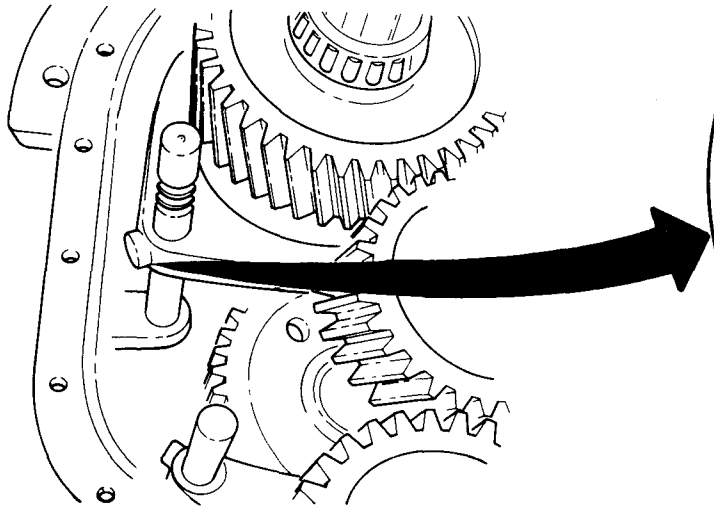
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
82.		Sliding clutch (1)	Install on front output shaft (7).	
83.		Declutch fork (2)	Install on sliding clutch (1).	
84.		Declutch spring (4)	Place under declutch fork (2).	
85.		Declutch shaft (5)	Install through fork (2), spring (4), and on transfer case housing (6).	
86.		Declutch fork (2)	Install on shaft (5) with setscrew (3) at setscrew hole.	Tighten setscrew (3) 20-35 lb-ft (27-47 N·m).
87.		Intermediate shaft assembly (9), rear output shaft assembly (10), and main input shaft assembly (11)	Install into three bearing races (8).	
88.		Hi-lo shift fork (12)	Install on synchronizer gear (15).	Make sure flat side of fork hub faces towards rear of transfer case housing (6).
89.		Hi-lo shift shaft (14)	Install into hi-lo shift fork (12) with setscrew (13) at setscrew hole.	Tighten setscrew (13) 50-85 lb-ft (68-115 N·m).

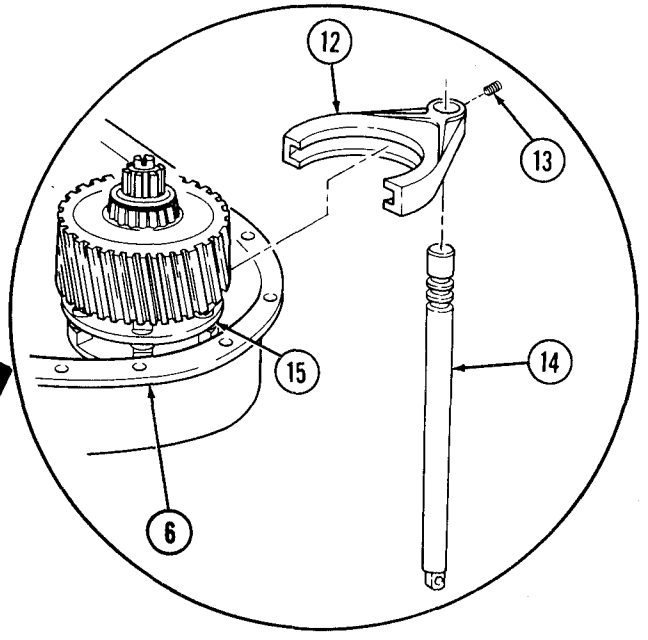
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







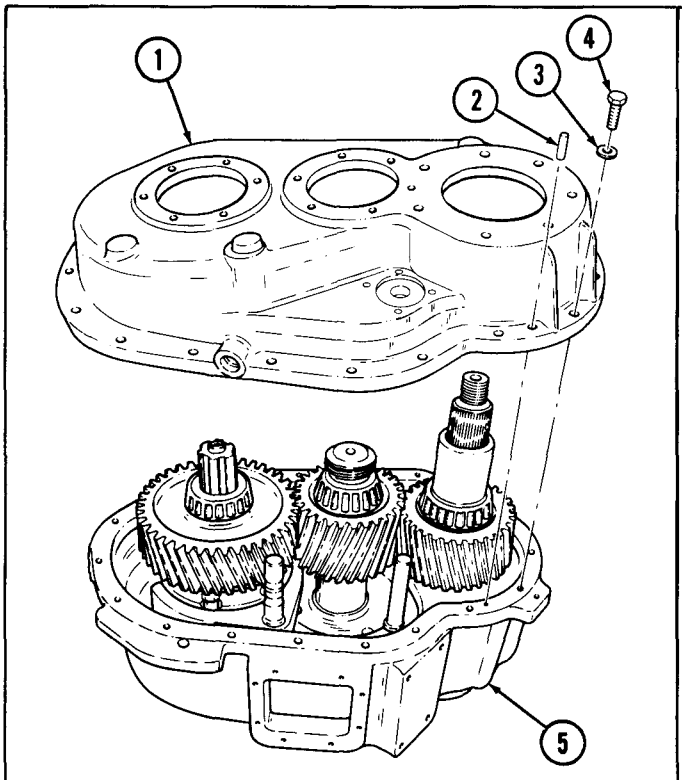


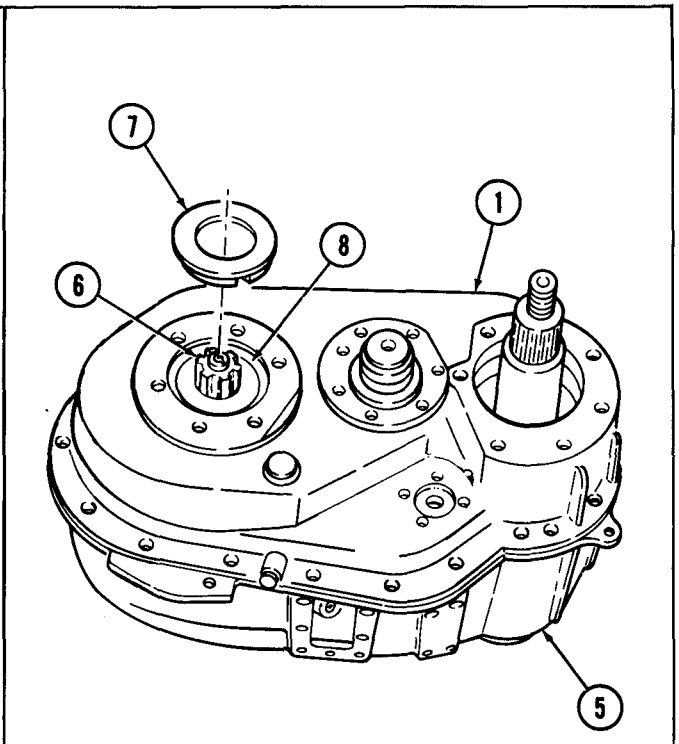
8-20. TRANSFER CASE REPAIR (Cont'd)

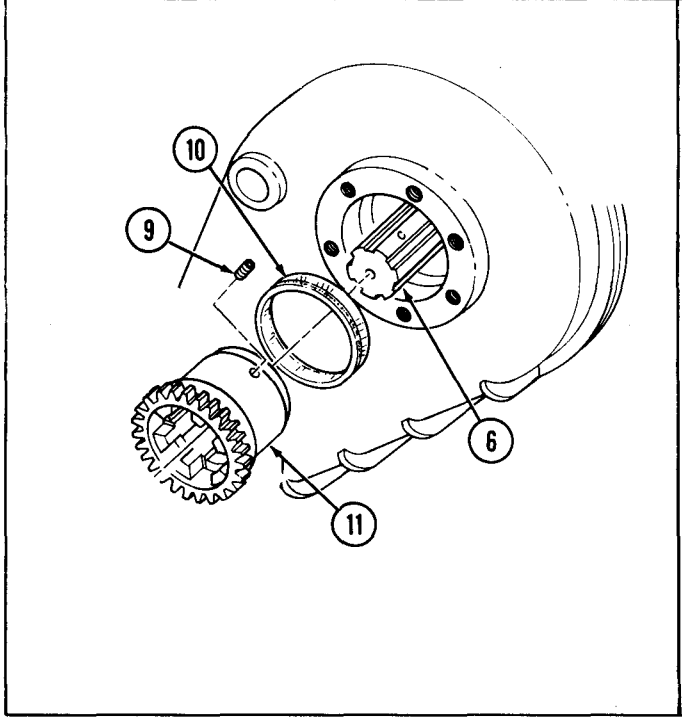
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
90.		Three dowel pins (2)	Install in transfer case cover (1).	
91.		Transfer case cover (1) and transfer case housing (5)	Apply light coating of gasket sealant to mating surfaces.	
92.		Transfer case cover (1)	Aline dowel pins (2) on transfer case housing (5) and install with nineteen washers (3) and screws (4).	Tighten 40-65 lb-ft (54-88 N·m).
93.		Bearing race (8)	Tap alternately around outer edge to seat against main input shaft (6) roller bearing.	
94.		Baffle (7)	Install on main input shaft (6).	
		NOTE		
		Steps 95 through 97 are required only when vehicle is equipped with transfer power takeoff.		
95.		Setscrew (9)	Apply adhesive sealant.	
96.		New seal (10) and power takeoff drive gear (11)	Install on main input shaft (6) with setscrew (9) at recess in shaft (6).	Tighten 12-16 lb-ft (16-22 N·m).
97.		New gasket (14) and transfer power takeoff (15)	Install on transfer case cover (1) with six washers (13) and screws (12).	Tighten 40-65 lb-ft (54-88 N·m).

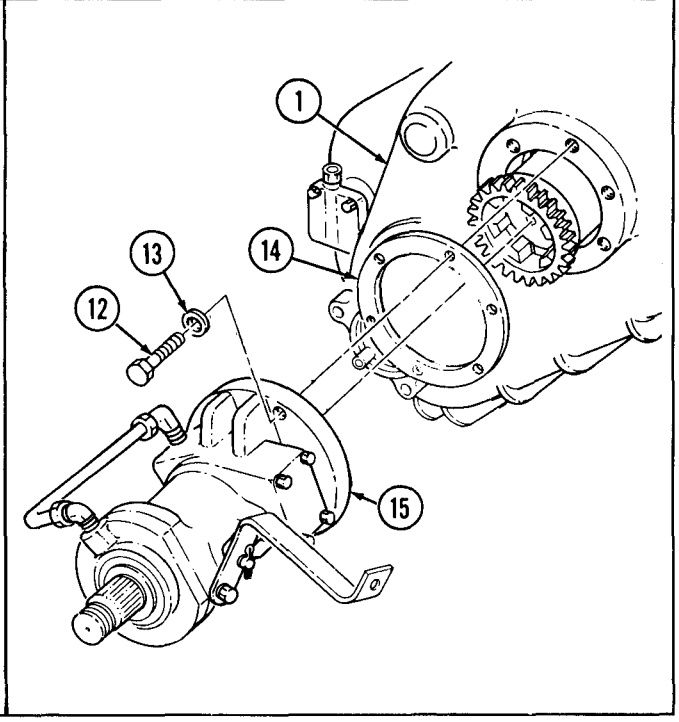
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







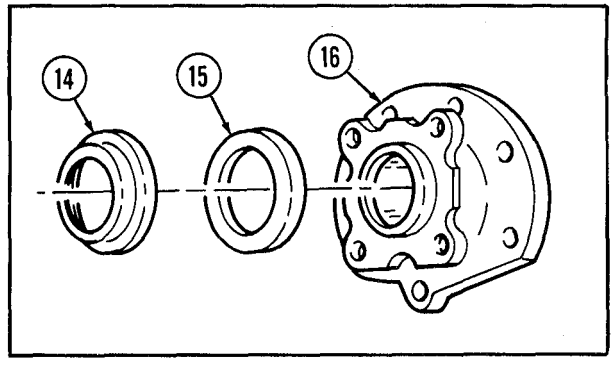


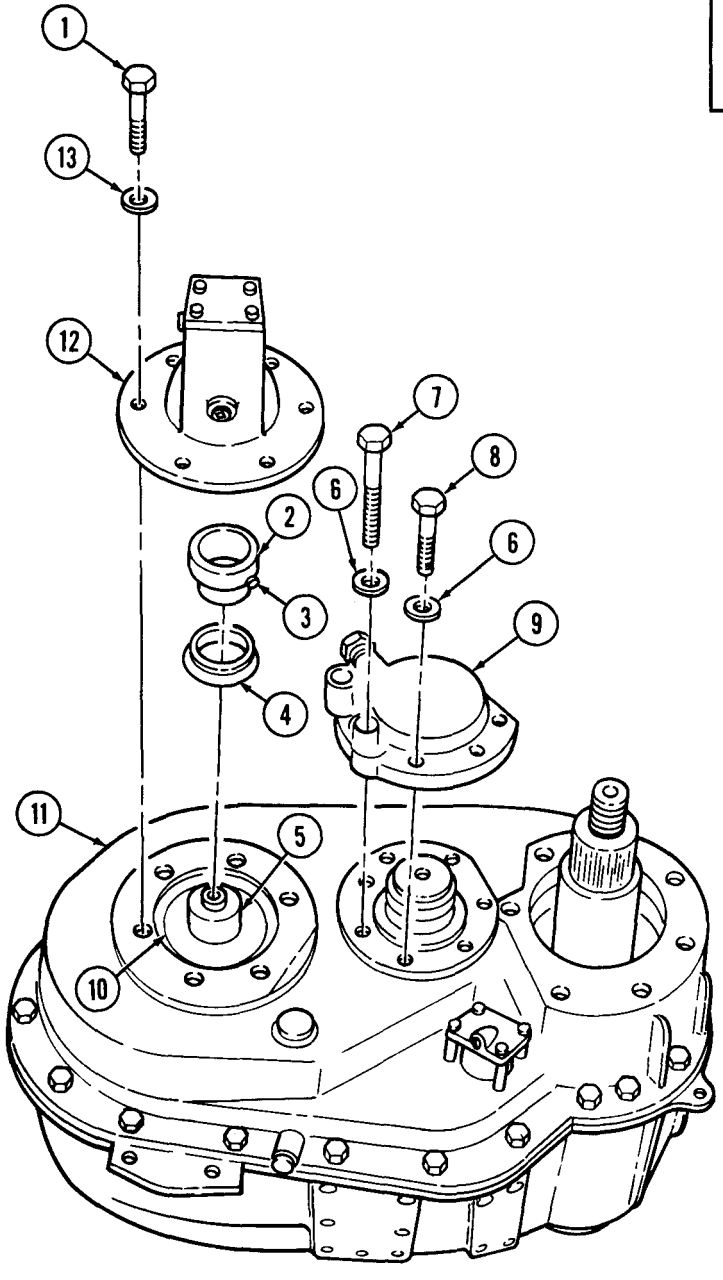
8-20. TRANSFER CASE REPAIR (Cont'd)

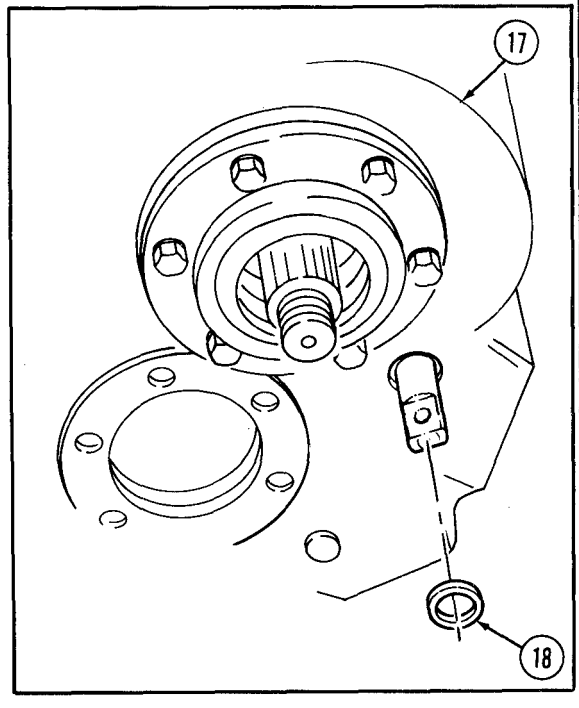
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
98.		Setscrew (3)	Apply adhesive sealant.	
99.		New seal (4)	Install on retaining collar (2) with large lip toward baffle (10).	
100.		Retaining collar (2)	Install on main input shaft (5) with setscrew (3) at recess in shaft (5).	Tighten 12-16 lb-ft (16-22 N·m).
101.		Oil pump (12) and transfer case cover (11)	Apply light coating of gasket sealant to mating surfaces.	
		NOTE Be sure to aline pump drive with slot on main input shaft.		
102.		Oil pump (12)	Install on transfer case cover (11) with six washers (13) and screws (1).	Tighten 40-65 lb-ft (54-88 N·m).
103.		Speedometer drive gear cover (9) and transfer case cover (11)	Apply light coating of gasket sealant to mating surfaces.	
104.		Speedometer drive gear cover (9)	Install on transfer case cover (11) with six washers (6), four screws (8), and two screws (7).	Tighten 40-65 lb-ft (54-88 N·m).
105.		New backing plate companion flange seal (15) and dust shield (14)	Install in backing plate companion flange (16).	
106.		New hi-lo shift shaft seal (18)	Apply gasket sealant to outer diameter and install in transfer case housing (17).	

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





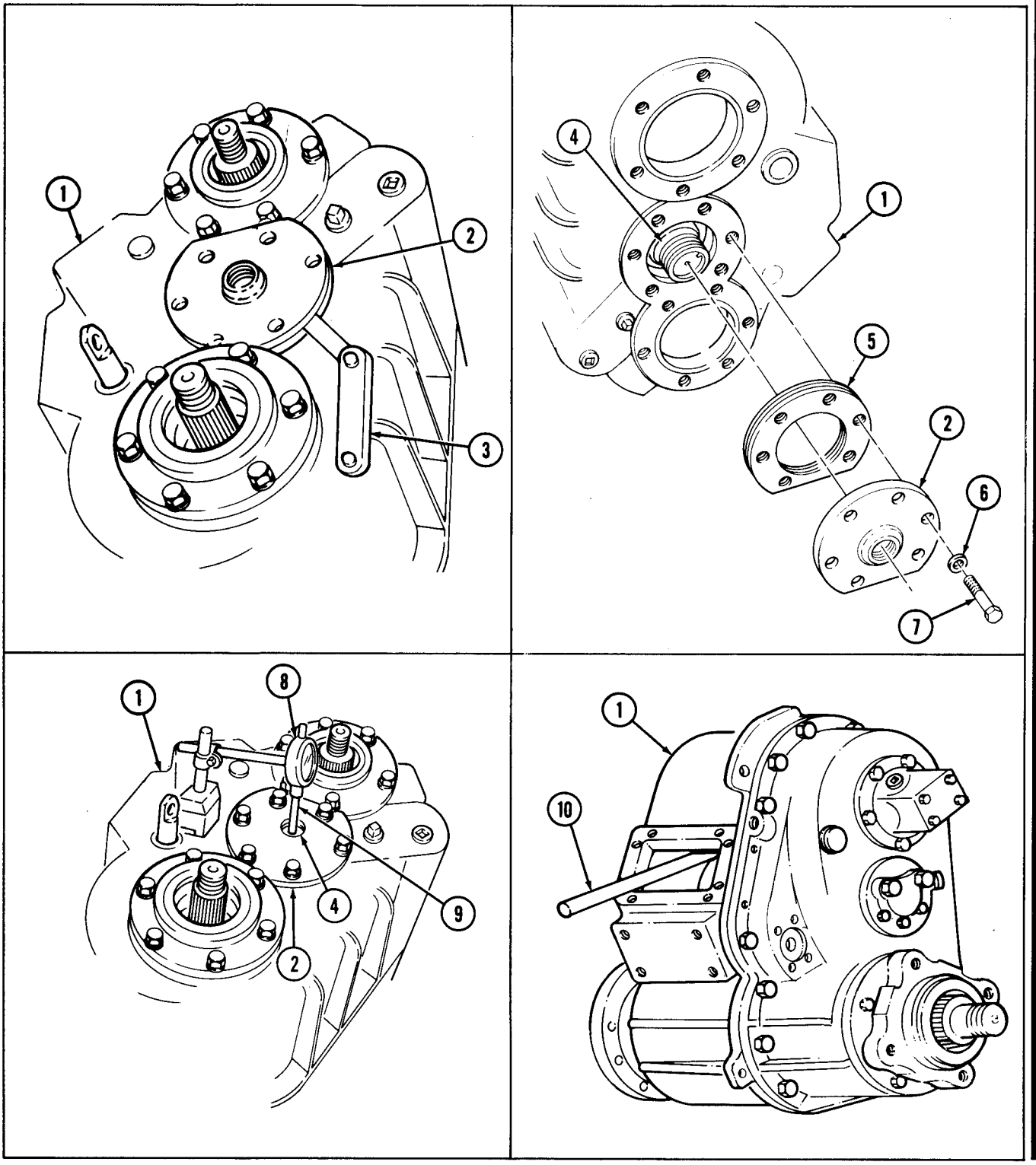


8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Step 107 establishes starting shim pack thickness.	
107.		Intermediate shaft cover (2)	a. Install on transfer case (1) and tap alternately around outer edge with soft-faced hammer.	
			b. Use feeler gage (3) and measure clearance between cover (2) and transfer case (1).	Record measurement.
108.	Transfer case (1)	Intermediate shaft cover (2)	Remove.	
			NOTE Use measurement obtained in step 107b. plus a 0.003 in. (0.076 mm) shim for starting shim pack thickness.	
109.		Starting shim pack (5) and intermediate shaft cover (2)	Install on transfer case (1) with six washers (6) and screws (7).	Do not apply sealer to mating surface. Tighten 40-65 lb-ft (54-88 N·m).
110.		Dial indicator (8)	Mount on transfer case (1) and position plunger tip (9) through hole in cover (2) on intermediate shaft (4).	
			NOTE Steps 111 through 114 are performed to make sure intermediate shaft will rotate freely without end play.	
111.		Intermediate shaft assembly (4)	Check end play as follows:	
			a. Use prybar (10) through inspection hole and force to rear of transfer case (1).	
			b. Set dial indicator (8) to zero.	
			c. Use prybar (10) through inspection hole and force to front of transfer case (1).	
			d. Record reading on dial indicator (8) and add 0.003-0.006 in. (0.076-0. 152 mm) to reading.	Use reading for number of shims (5) to be removed.

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

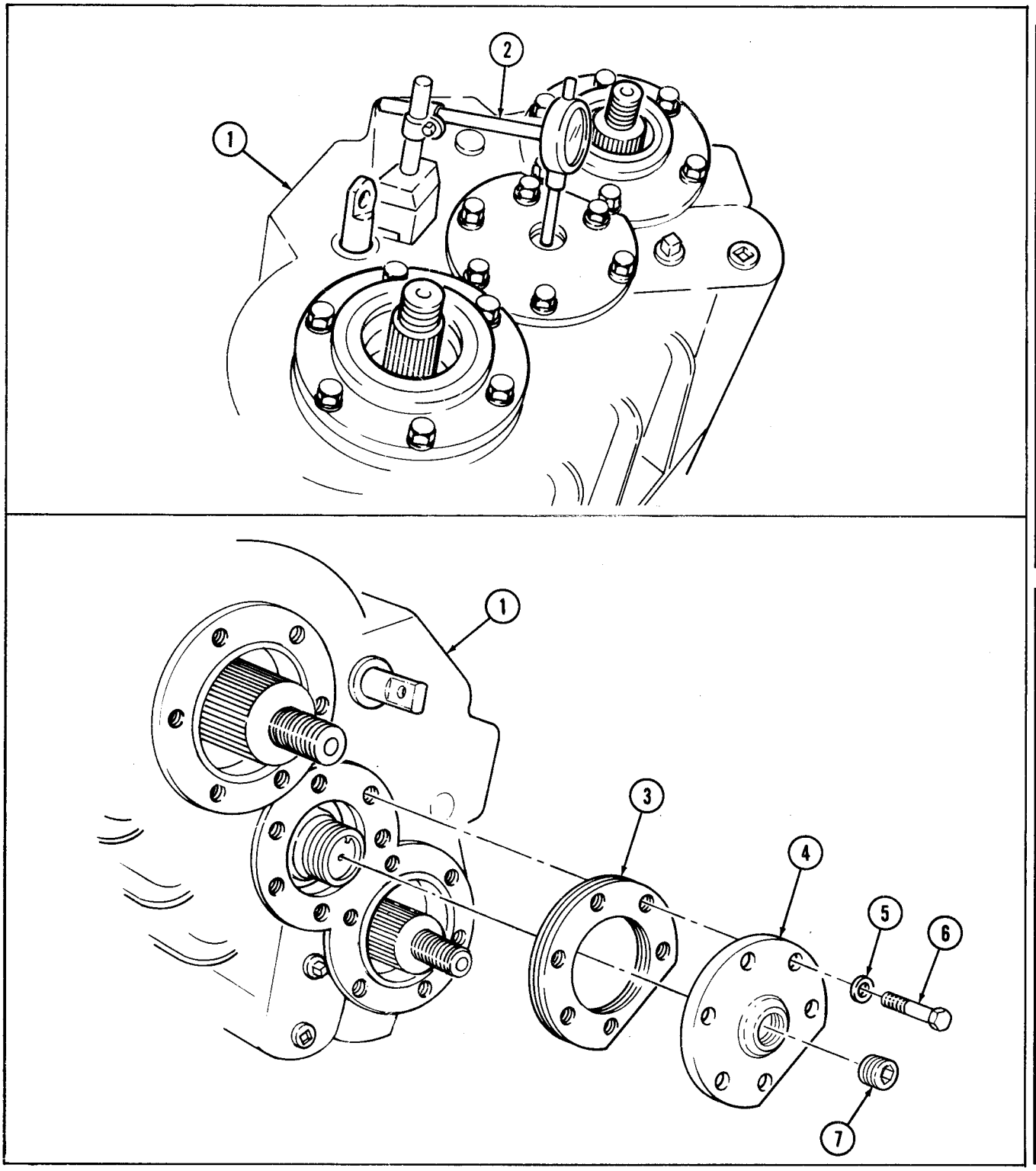


8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
112.	Transfer case (1)	Dial indicator (2)	Remove.	
113.		Six screws (6), washers (5), and intermediate shaft cover (4)	Remove.	
		NOTE Use reading obtained in step 111d. for number or thickness of shims to be removed for intermediate shaft adjustment.		
114.		Shims (3)	Remove amount recorded in step 111d.	
115.		Shim pack (3)	Remove.	
		CAUTION Do not use sealing compound on shims.		
116.		Transfer case (1) and intermediate shaft cover (4)	Apply a light coating of sealing compound to mating surfaces.	Do not coat shims (3) with sealing compound.
117.		Shim pack (3) and intermediate shaft cover (4)	Install on transfer case (1) with six washers (5) and screws (6).	Tighten 40-60 lb-ft (54-81 N·m).
118.		Plug (7)	Install on intermediate shaft cover (4).	Tighten 35-60 lb-ft (47-81 N·m).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

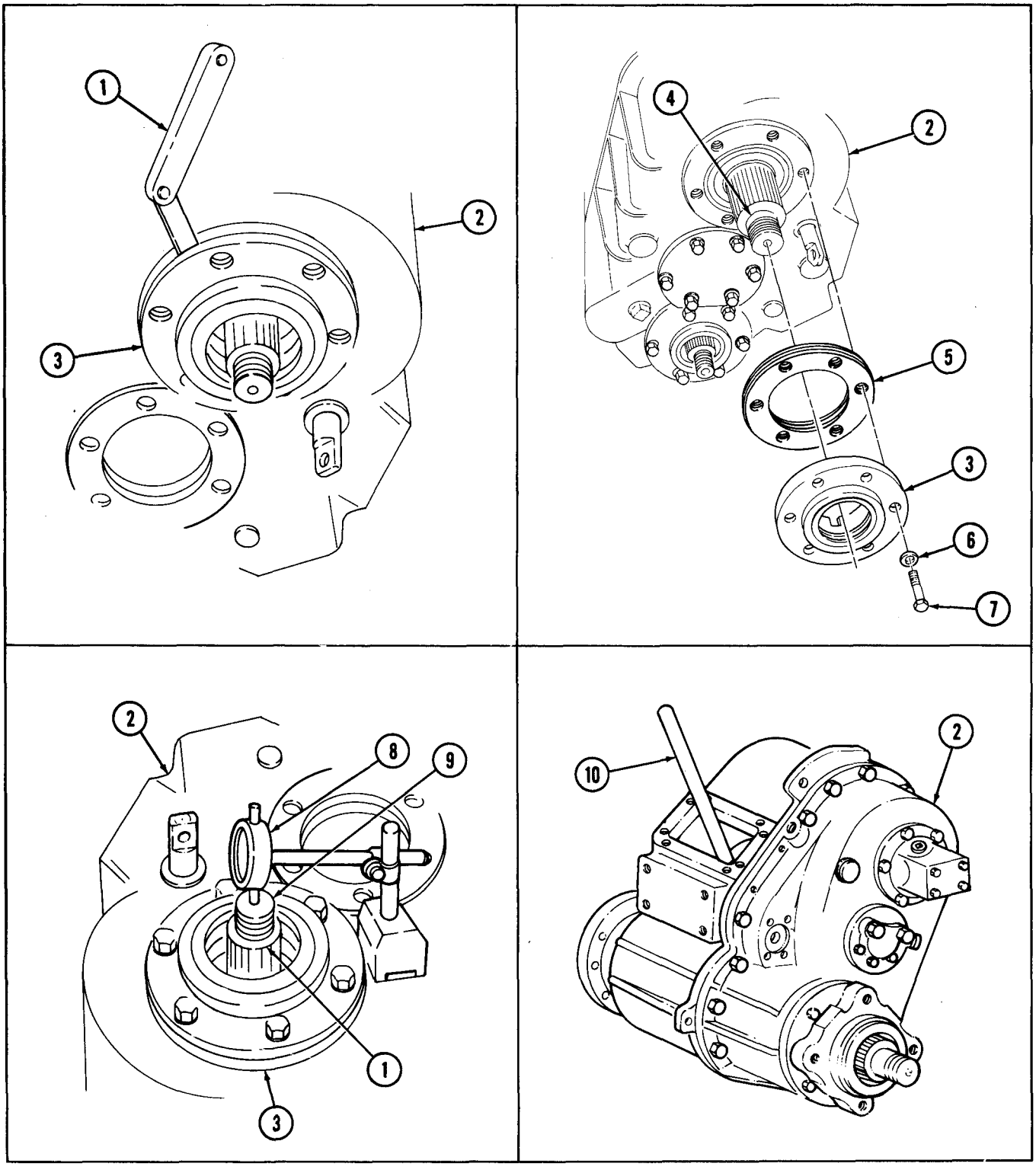


8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Step 119 establishes starting shim pack thickness.	
119.		Main input shaft cover (3)	a. Install on transfer case (2) and tap alternately around outer edge with soft-faced hammer.	
			b. Use feeler gage (1) and measure clearance between cover (3) and transfer case (2).	Record measurement.
120.	Transfer case (2)	Main input shaft cover (3)	Remove.	
			NOTE Use measurement obtained in step 119b. plus a 0.003 in. (0.076 mm) shim for starting shim pack thickness.	
121.		Starting shim pack (5) and main input shaft cover (3)	Install on transfer case (2) with six washers (6) and screws (7).	Do not apply sealing compound to mating surfaces. Tighten 40-65 lb-ft (54-88 N·m).
122.		Dial indicator (8)	Mount on transfer case (2) and position indicator plunger tip (9) on main input	
123.		Main input shaft assembly (4)	Check end play as follows: a. Use prybar (10) through inspection hole and force to rear of transfer case (2). b. Set dial indicator (8) to zero. c. Use prybar (10) through inspection hole and force to front of transfer case (2).	
			d. Record reading on dial indicator (8).	End play should be 0.0001-0.005 in. (0.00254-0.127 mm).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

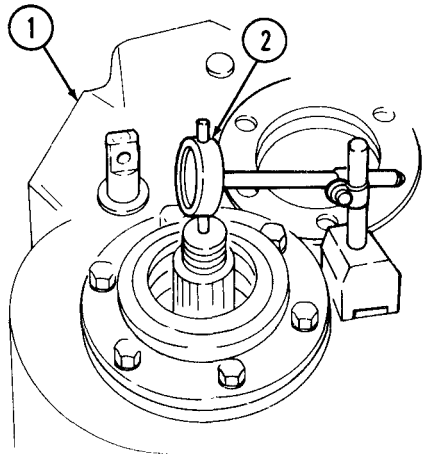


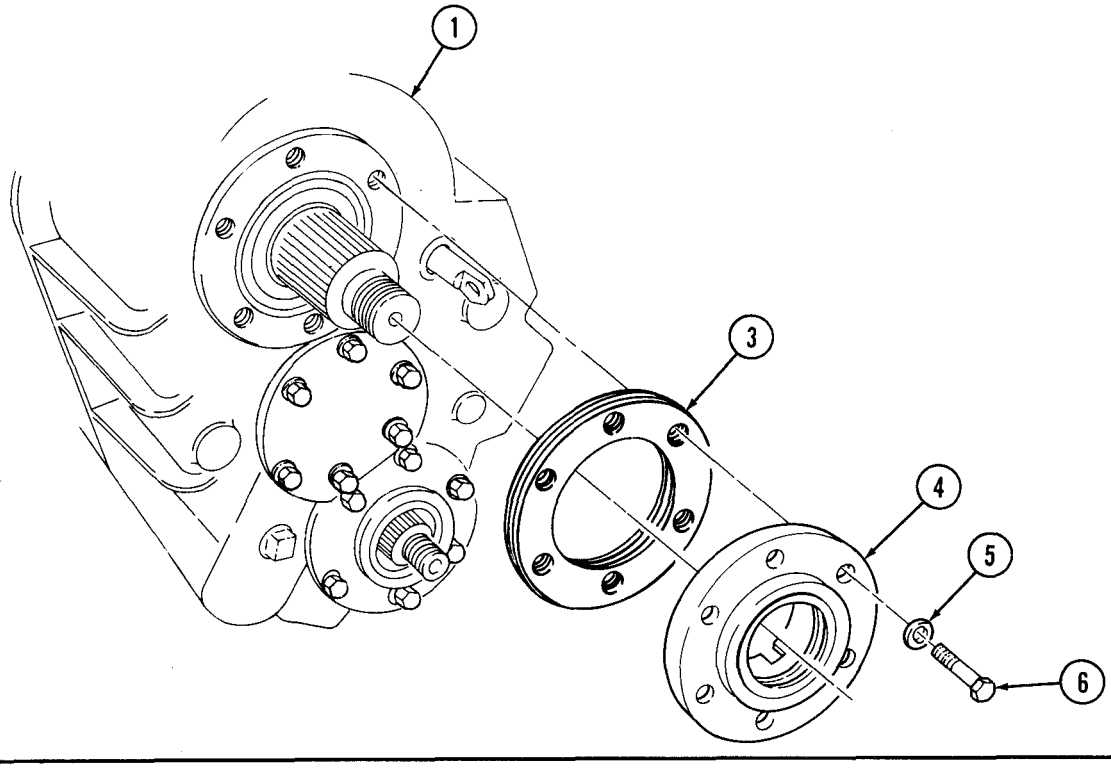
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
124.	Transfer case (1)	Dial indicator (2)	Remove.	
125.		Six screws (6), washers (5), and main input shaft cover (4)	Remove.	
		NOTE		
		Use reading obtained in step 123d for number or thickness of shims, to be removed or added, for main input shaft adjustment.		
126.		Shims (3)	Remove or add if necessary.	
127.		Shim pack (3)	Remove.	
		CAUTION		
		Do not use sealing compound on shims.		
128.		Transfer case (1) and main input shaft cover (4)	Apply a light coating of sealing compound to mating surfaces.	Do not coat shims (3) with sealing compound.
129.		Shim pack (3) and main input shaft cover (4)	Install on transfer case (1) with six washers (5) and screws (6).	Tighten 40-65 lb-ft (54-88 N·m).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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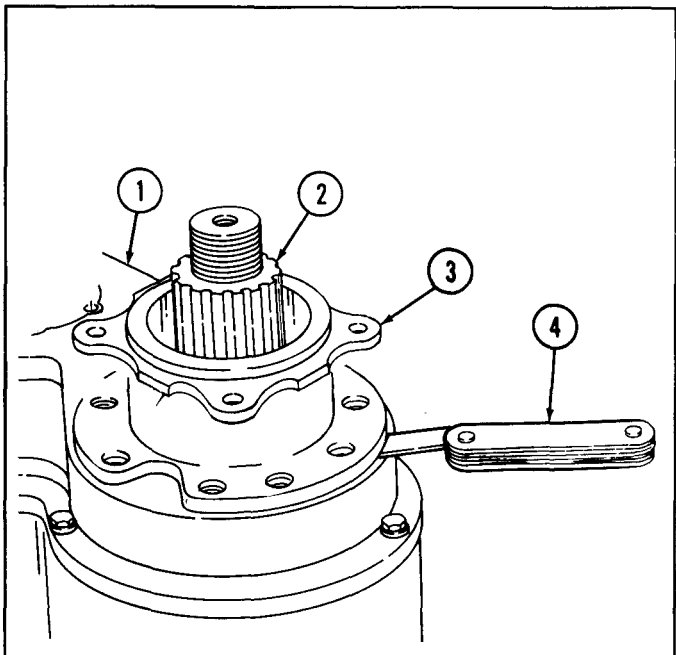
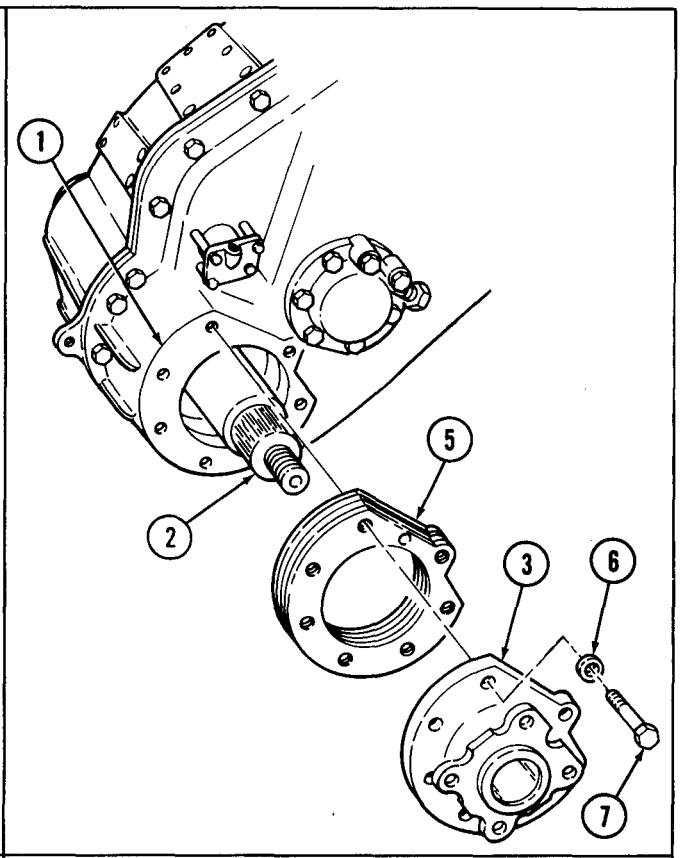
8-20. TRANSFER CASE REPAIR (Cont'd)

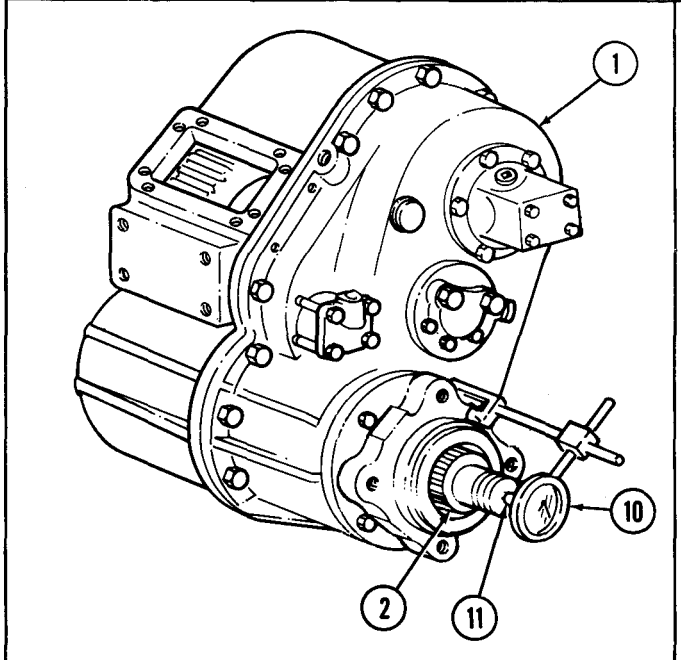
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Step 130 establishes starting shim pack thickness.	
130.		Backing plate companion flange (3)	a. Install on transfer case cover (1) and tap alternately around outer edge with soft-faced hammer.	
			b. Use feeler gage (4) and measure clearance between flange (3) and cover (1).	Record measurement.
131.	Transfer case cover (1)	Backing plate companion flange (3)	Remove.	
			NOTE Use measurement obtained in step 130b. plus a 0.003 in. (0.076 mm) shim for starting shim pack thickness.	
132.		Starting shim pack (5) and backing plate companion flange (3)	Install on transfer case cover (1) with seven washers (6) and screws (7).	Do not apply sealing compound to mating surfaces. Tighten 60-100 lb-ft (81-136 N·m).
133.		Dial indicator (10)	Mount on transfer case cover (1) and position indicator plunger tip (11) on rear output shaft (2).	
134.		Rear output shaft assembly (2)	Check end play as follows:	
			a. Use prybar (8) through inspection hole and force to front of transfer case (9).	
			b. Set dial indictor (10) to zero.	
			c. Use prybar (8) through inspection hole and force to rear of transfer case (9).	
			d. Record reading on dial indicator (10).	End play should be 0.0001-0.005 in. (0.00254-0.127 mm).

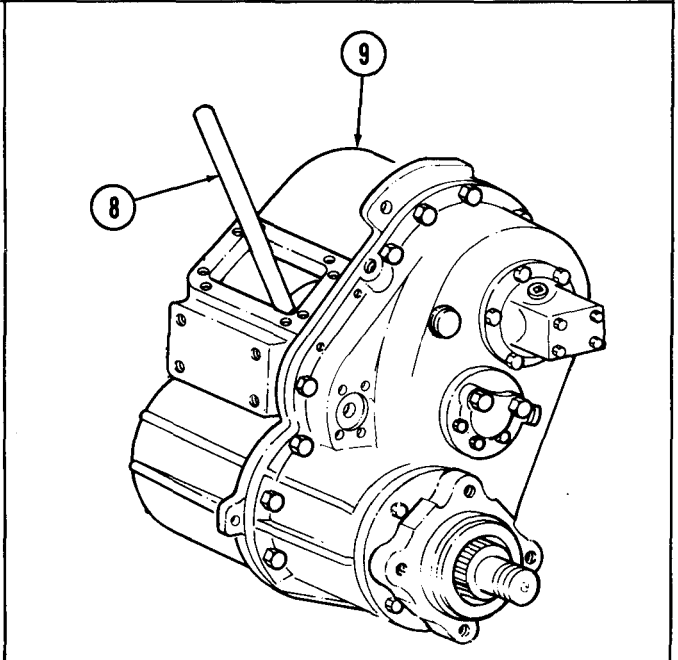
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







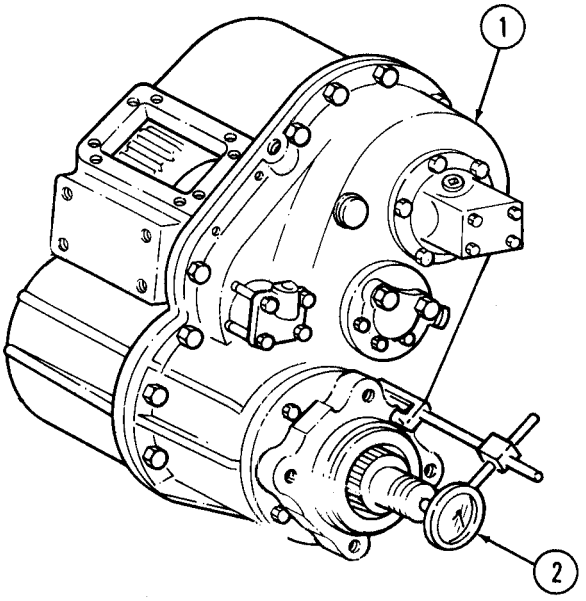


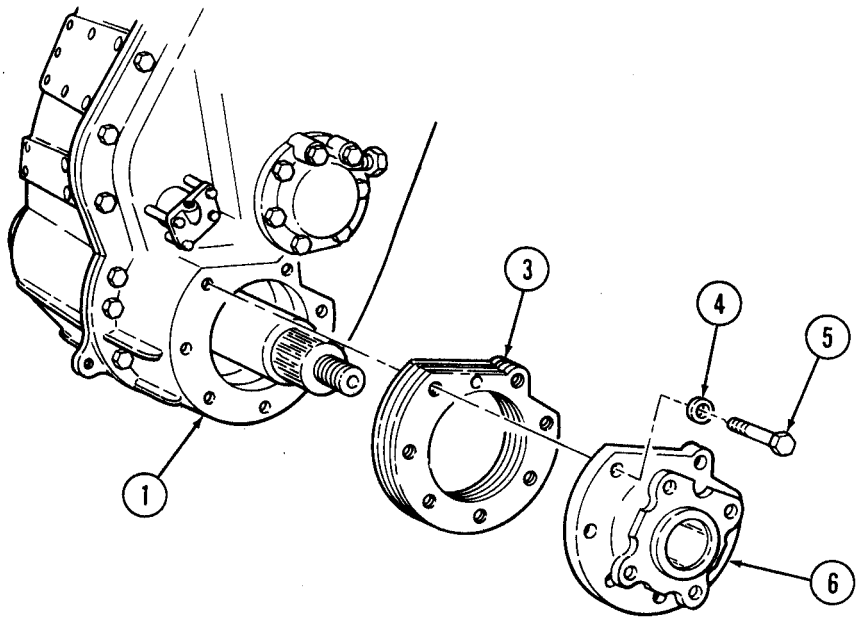
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
135.	Transfer case cover (1)	Dial indicator (2)	Remove.	
136.		Seven screws (5), washers (4), and backing plate companion flange (6)	Remove.	
		NOTE Use reading obtained in step 134d. for number or thickness of shims, to be removed or added for rear output shaft adjustment.		
137.		Shims (3)	Remove or add if necessary.	
138.		Shims (3)	Remove.	
		CAUTION Do not use sealing compound on shims.		
139.		Transfer case cover (1) and backing plate companion flange (6)	Apply light coating of sealing compound to mating surfaces.	Do not coat shims (3) with sealing compound.
140.		Shim pack (3) and backing plate companion flange (6)	Install on transfer case cover (1) with seven washers (4) and screws (5).	Tighten 110-145 lb-ft (149-197 N·m).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



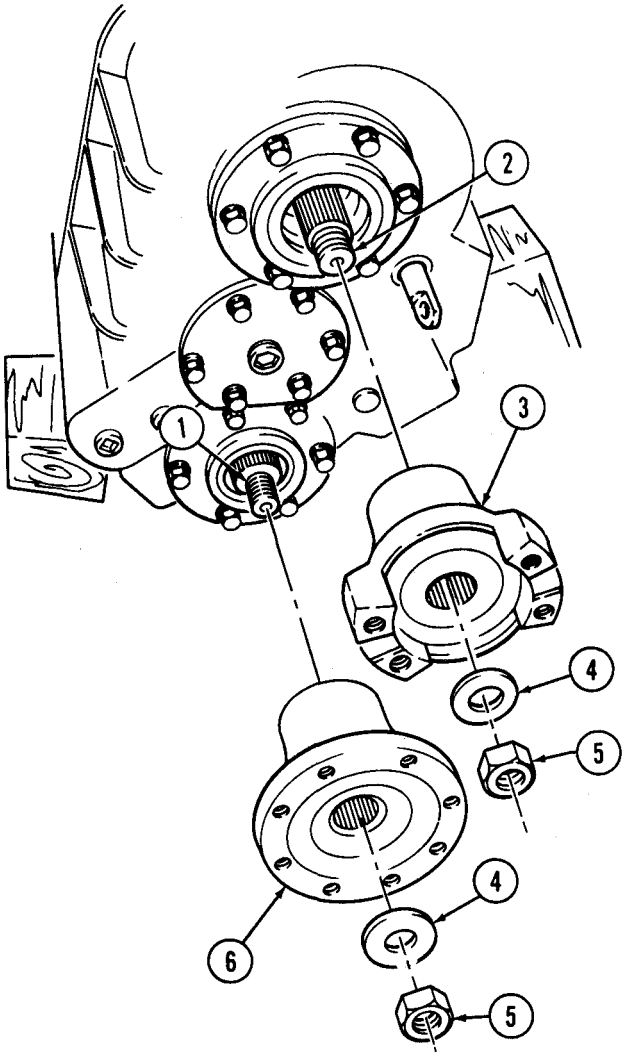


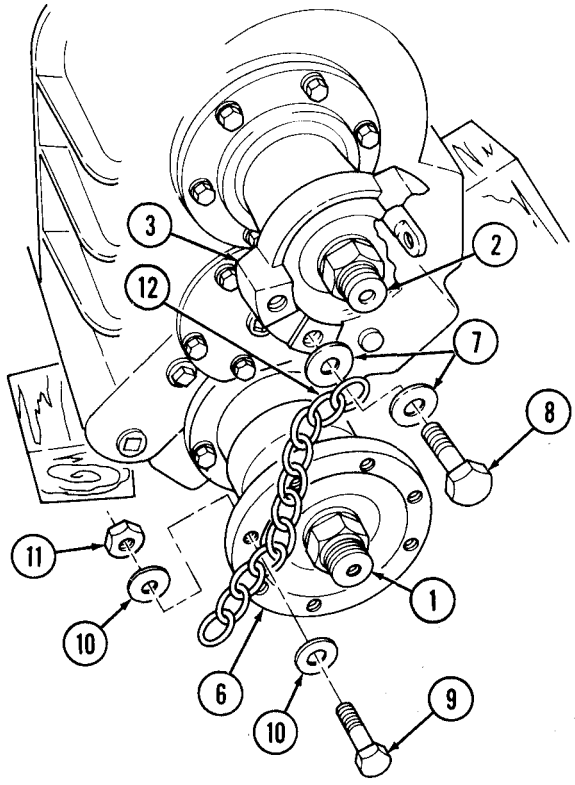
8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Apply GAA grease to inside diameter of all seals.		
140.1.		Two washers (4)	Apply thin coating of gasket sealant to mating surfaces.	
141.		Main input flange (3)	Install on main input shaft (2).	
142.		Front output flange (6)	Install on front output shaft (1).	
143.		Chain (12)	a. Install on main flange (3) with two washers (7) and screw (8). b. Install on output flange (6) with screw (9), two washers (10), and nut (11).	Install chain (12) to prevent flanges (3) and (6) from turning.
		NOTE Assistant will help with step 145.		
145.		Two washers (4) and new locknuts (5)	Install on main input shaft (2) and front output shaft (1).	Tighten 360-600 lb-ft (458-814 N·m).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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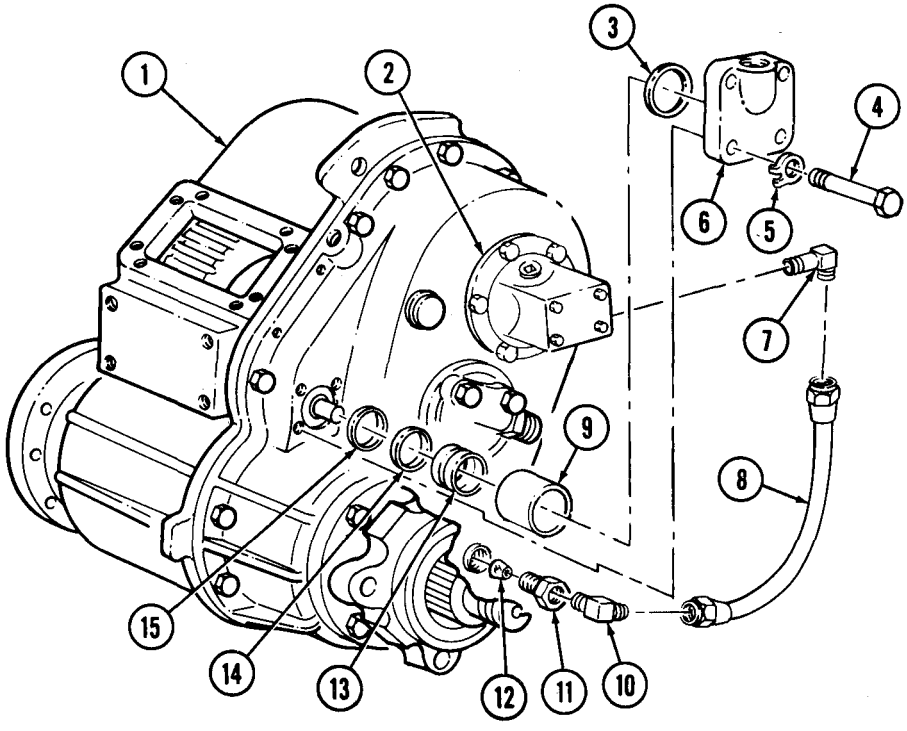
8-20. TRANSFER CASE REPAIR (Cont'd)

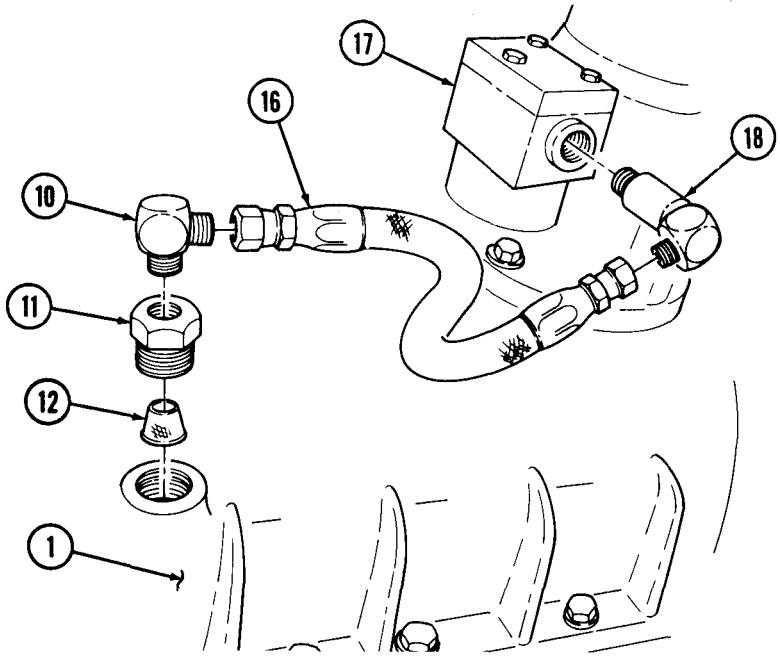
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
147.		Filter screen (12) and adapter fitting (11)	Install on transfer case cover (1).	
148.		Elbow (10)	Install on adapter fitting (11).	Tighten elbow (10) 15 lb-ft (20 N·m).
		NOTE Steps 149 and 150 are required only when vehicle is equipped with transfer power takeoff.		
149.		Elbow (18)	Install on transfer power takeoff (17).	Tighten elbow (18) 26 lb-ft (35 N·m).
150.		Oil line (16)	Connect to elbow (18) and elbow (10).	
151.		Elbow (7)	Install nipple end on oil pump (2).	Tighten elbow (7) 20 lb-ft (27 N·m).
152.		Oil line (8)	Connect to elbow (10) and elbow (7).	
152.1.		New seal (3)	Install in cover (6).	
152.2.		New seal (14)	Install on piston (13).	
152.3		New gasket (15), piston (13), air cylinder (9), and cover (6)	a. Install on transfer case cover (1) with four new locking plates (5) and screws (4). b. Bend tabs of locking plates (5) against screws (4).	Tighten screws (4) 6-10 lb-ft (8-13 N·m).

8-20. TRANSFER CASE REPAIR (Contd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



WITHOUT TRANSFER CASE PTO



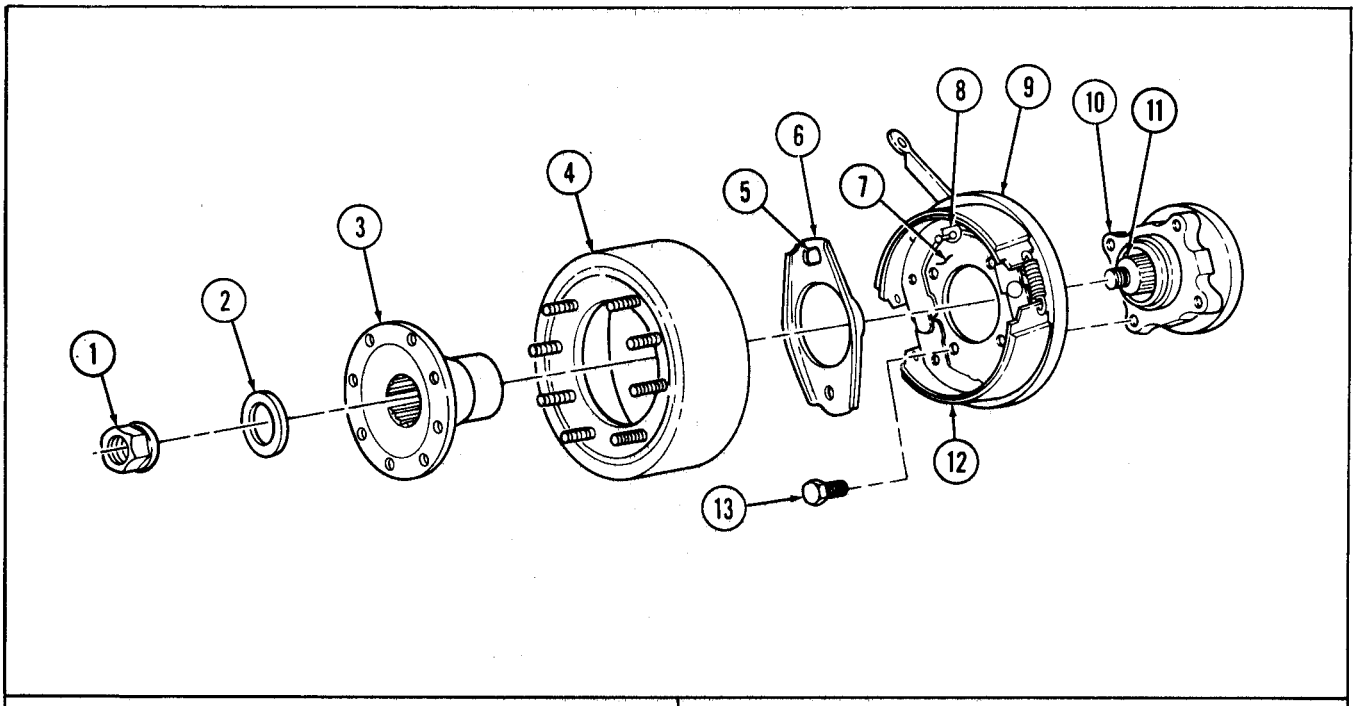
WITH TRANSFER CASE PTO

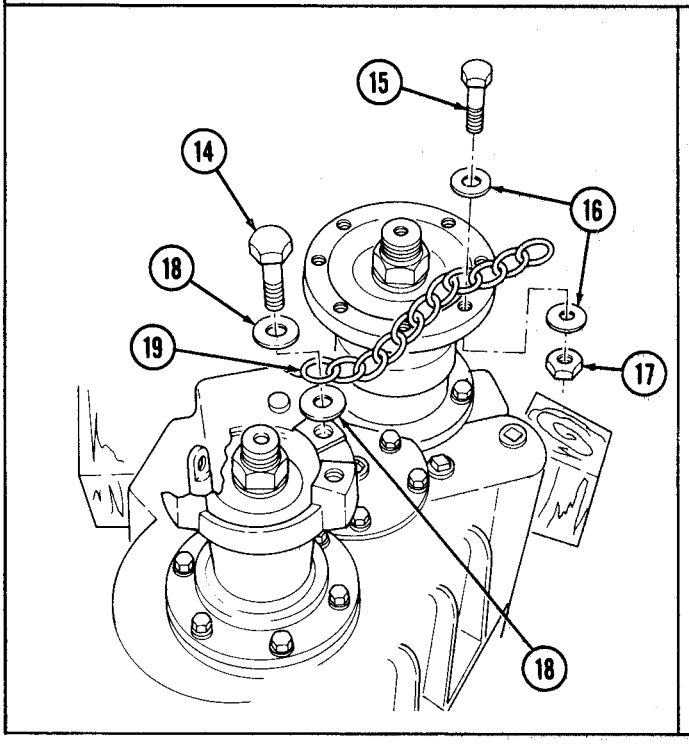
8-20. TRANSFER CASE REPAIR (Cont'd)

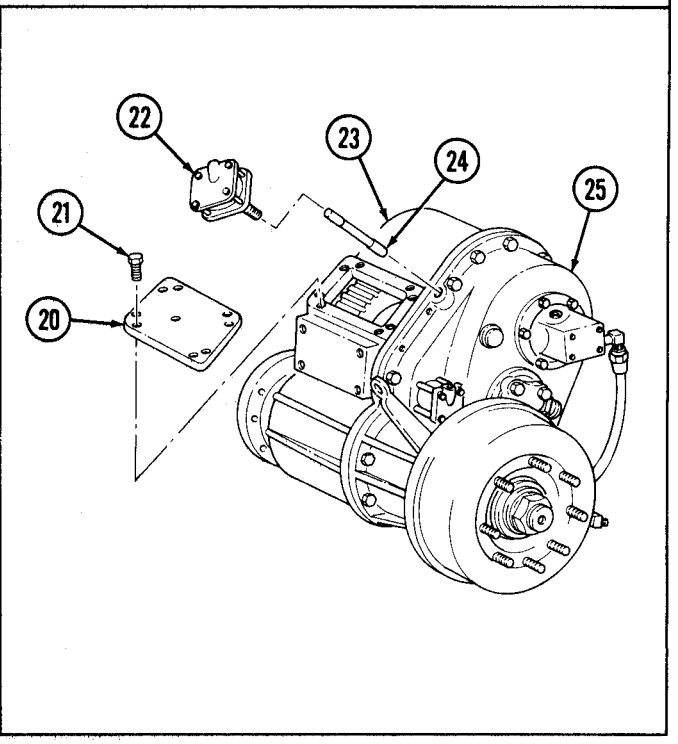
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
152.2.		Parking brake	Assemble.	Refer to TM 9-2320-272-20-2.
153.		Brakeshoe assembly (12) and dustcover (9)	Install on companion flange (10) with four screws (13).	Tighten 180-230 lb-ft (244-312 N·m).
154.		Actuating plate (6)	Install against backing plate (7) so retainer opening (5) fits over brake lever stud (8) of backing plate (7).	
		NOTE		
		Apply GAA grease to inside diameter of all seals.		
155.		Brakedrum (4) and transfer output flange (3)	Install on transfer case output shaft (11).	
		NOTE		
		Assistant will help with step 156.		
156.		Thrust washer (2)	Apply thin coating of gasket sealant and install with new locknut (1).	Tighten 450-600 lb-ft (610-814 N·m).
156.1.	Main flange (3) and output flange (6)	Nut (17), two washers (16), screw (15), screw (14), two washers (18), and chain (19)	Remove.	
157.		Inspection plate (20) and transfer case (23)	Apply thin coating of gasket sealant to mating surfaces.	
158.		Inspection plate (20)	Install on transfer case (23) with eight screws (21).	Do not tighten.
159.		Pushrod (24) and interlock air cylinder (22).	Install on transfer case cover (25).	Apply sealant on threads of interlock air cylinder (22). Use crowfoot wrench. Tighten 30-40 lb-ft (41-54 N·m).

8-20. TRANSFER CASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







END OF TASK!

FOLLOW-ON TASK: Install transfer case (para. 8-18).

CHAPTER 9
FRONT AND REAR AXLES MAINTENANCE

NOTE

Refer to TM 9-2320-358-24&P for unique M939A2 maintenance procedures.

Section I. DESCRIPTION AND DATA

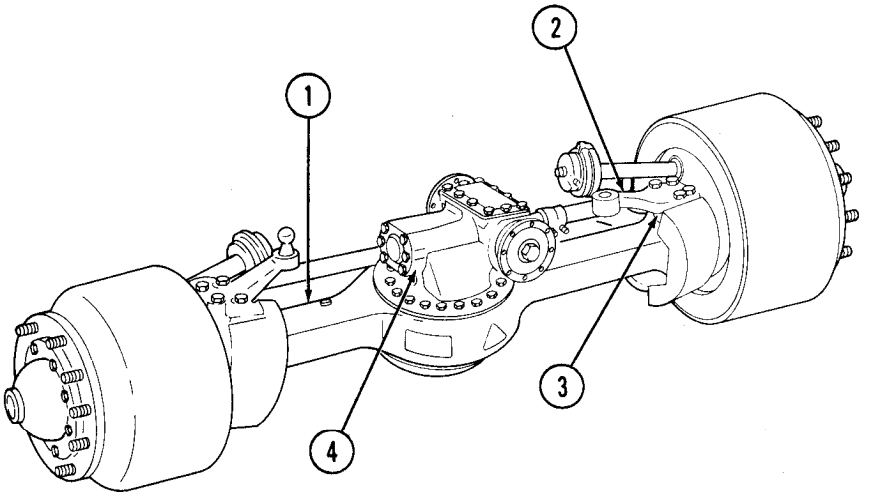
9-1. GENERAL

This section provides description and data for the front axle, the forward-rear axle, the rear-rear axle, and the carrier differentials. For axle tabulated data, see table 9-1.

9-2. DESCRIPTION-FRONT AND REAR AXLES

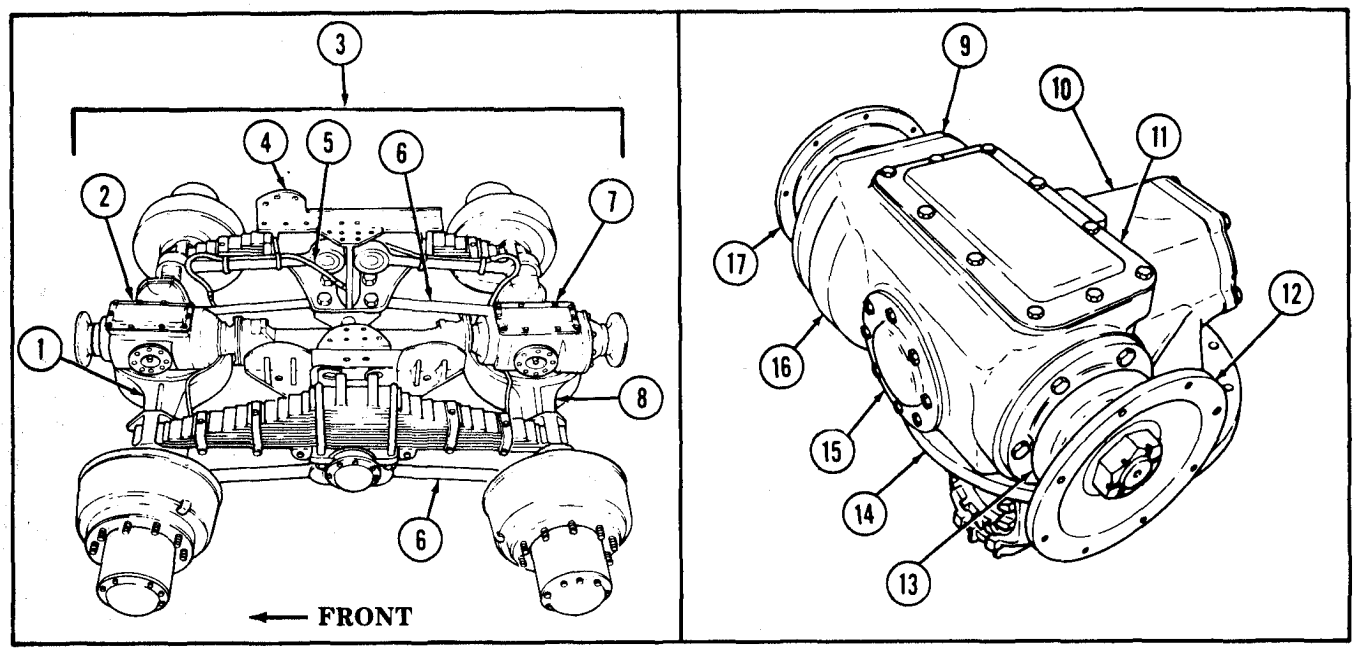
a. The front axle is a hypoid, double reduction, single speed unit installed to the underside of front springs. The differential transmits power from the transfer case to left and right axle shafts. Universal joints at the outer end of each shaft permit delivery of power to wheels under all conditions.

b. The two rear axles mounted in tandem, are hypoid, double reduction single speed units. The differentials transmit driving power from driving propeller shaft to the left and right axle shafts.



1. Front Axle Assembly
2. Steering Knuckle Arm
3. Steering Knuckle
4. Front Axle Carrier Differential

9-2. DESCRIPTION – FRONT AND REAR AXLES (Cont'd)



1. Forward-Rear Axle Assembly
2. Forward-Rear Axle Carrier Differential
3. Rear Axle Bogie Assembly
4. Bogie Support Bracket
5. Upper Torque Rod
6. Lower Torque Rod
7. Rear-Rear Carrier Differential
8. Rear-Rear Axle Assembly
9. Carrier Differential
10. Pinion Retaining Cover
11. Differential Top Cover
12. Differential Rear Companion Flange
13. Differential Rear Bearing Cover
14. Differential Mounting Flange
15. Differential Side Cover
16. Differential Pinion Retaining Cover
17. Differential Front Companion Flange

Table 9-1. Front and Rear Axle Tabulated Data

FRONT AXLE:

Make	Rockwell International
Model	FM1240-RFAX-1
Gear ratio	6.443:1
Load rating	17,000 lb (7727 kg)
Maximum speed	3,000 rpm

REAR AXLE:

Make	Rockwell International
Models	Rear-Rear M1240-RDAX-1 Forward-Rear M1240-RDAX-2
Gear ratio	6.443:1
Load rating	17,000 lb (7727 kg)
Maximum speed	3,000 rpm

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Section II. FRONT AXLE MAINTENANCE

9-3. FRONT AXLE MAINTENANCE TASK SUMMARY

9-4. SPINDLE BEARING SLEEVE AND OIL SEAL MAINTENANCE

This task covers:

a. Removal
b. Inspection
c. Installation

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
Spindle bearing sleeve remover 7950127
Spindle bearing sleeve replacer 7950129
Oil seal installer tool

Materials/Parts
Oil seals

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-20-1

Condition Description
Front axle shaft and universal joint removed.

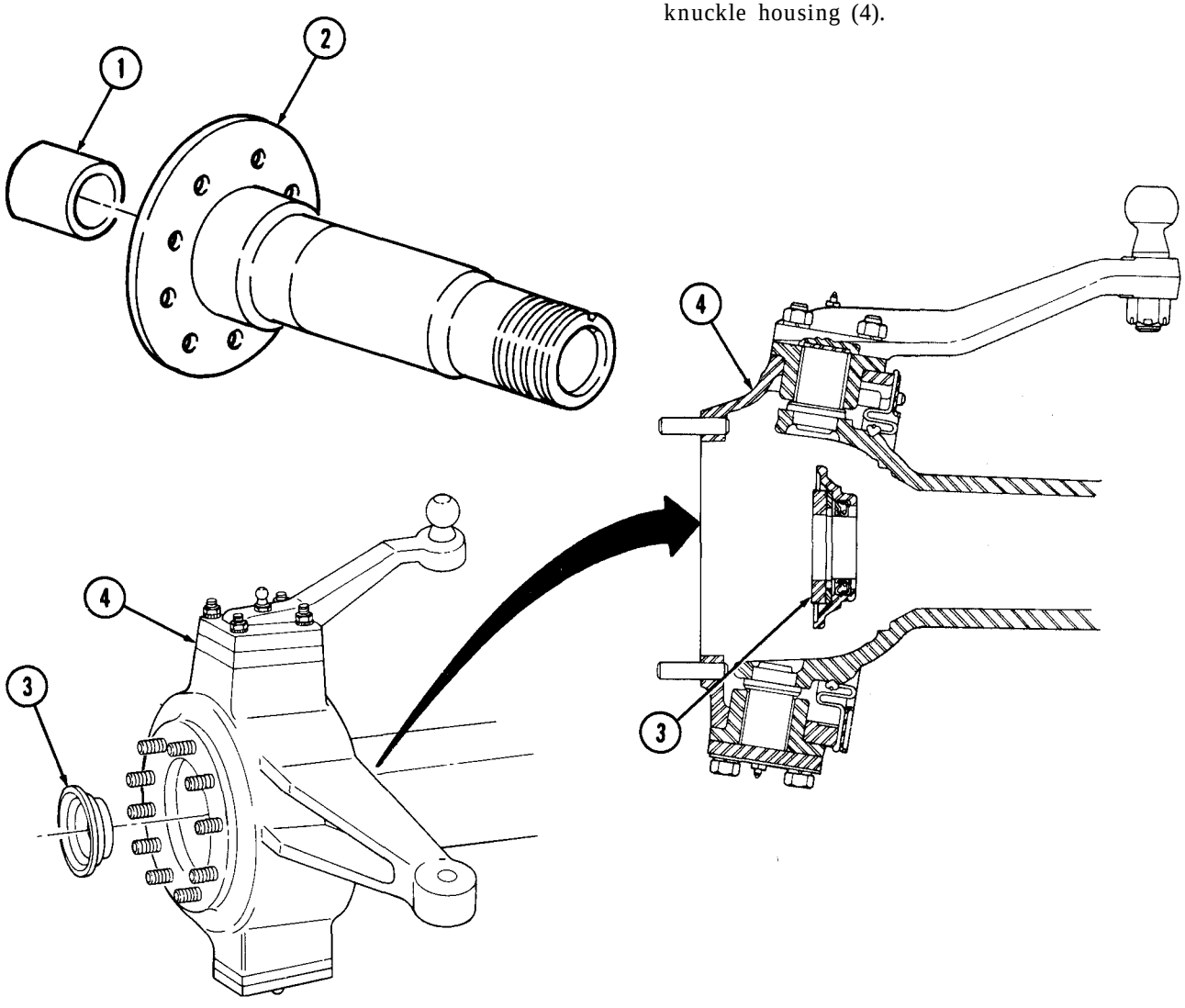
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Steering knuckle housing (4)	Oil seal (3)	Remove.	
	b. Inspection			
2.	Spindle (2)	Spindle bearing sleeve (1)	a. Inspect for nicks, cracks, and scoring.	If nicked, cracked or scored, replace bearing sleeve (1).
			b. Machine inside diameter.	Machine to 2.249 ± .002 in. (57.150 ± .051 mm).
			c. Measure inside diameter.	Inside diameter should be 2.249 ± .002 in. (57.150 ± .051 mm). Replace if inner diameter is more than 2.251 in. (57.18 mm).
		NOTE Steps 3 and 4 are performed only if spindle bearing sleeve is being replaced.		
3.	Spindle (2)	Spindle bearing sleeve (1)	Remove.	Use spindle bearing sleeve remover.
4.		New spindle bearing sleeve (1)	Install in spindle (2).	Use spindle bearing sleeve replacer.

9-4. SPINDLE BEARING SLEEVE AND OIL SEAL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.		New spindle bearing sleeve (1)	Install in spindle (2).	Use spindle bearing sleeve replacer.
c. Installation				
6.		Oil seal (3)	Install in steering knuckle housing (4).	



END OF TASK!

FOLLOW-ON TASK: Install front axle shaft and universal joint (TM 9-2320-272-20-1).

9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE

This task covers:

a. Removal
b. Cleaning and Inspection
c. Installation
d. End Play Test

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-1	Front axle shaft removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Lockwire
Three cotter pins
Four lockwashers
GAA grease (Appendix C, Item 11)
Sealing compound (Appendix C, Item 13)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

Keep fire extinguisher nearby when drycleaning solvent is used.

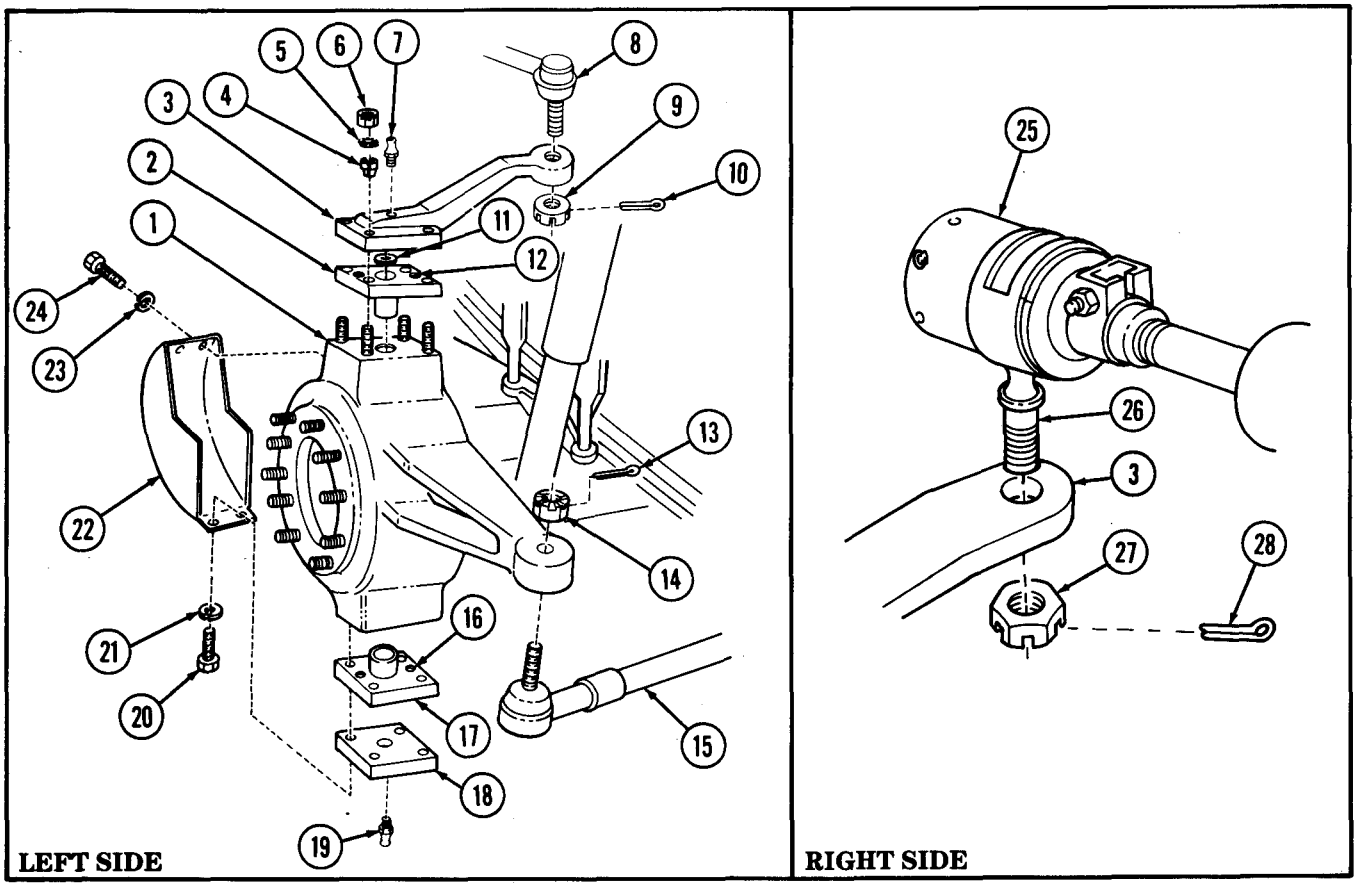
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Perform step 1 for left steering knuckle only.		
1.	Steering knuckle arm (3)	Cotter pin (10), slotted nut (9) and drag link (8)	Remove.	Discard cotter pin (10).
		NOTE Perform steps 2 and 3 for right steering knuckle only.		
2.		Cotter pin (28) and slotted nut (27)	Remove.	Discard cotter pin (28).
3.		Socket assembly (25) and ball stud (26)	Remove together.	
4.	Steering knuckle (1)	Cotter pin (13), slotted nut (14) and tie rod (15)	Remove.	Discard cotter pin (13).

9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.		Grease fitting (7) and four nuts (6), lock-washers (5), bushings (4), and steering knuckle arm (3)	Remove.	Discard lockwashers (5).
6.	Steering knuckle (1)	Spacer (11) and upper sleeve assembly (2)	Remove.	Using two pull bolt holes (12) to remove.
7.	Seal guard (22)	Two screws (24) and washers (23)	Remove.	
8.	Steering knuckle (1)	Grease fitting (19), and four screws (20), washers (21), lower plate (18), and seal guard (22)	Remove.	
9.		Lower sleeve assembly (17)	Remove.	Using two pull bolt holes (16) on lower sleeve assembly (17) to remove.



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9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.	Steering knuckle (4)	Lockwire (3) and twelve screws (1)	Remove.	Discard lockwire (3).
11.		Dust seal plate (2)	Pull clear.	Do not remove.
12.		Dust and moisture seal (7)	Pull clear of steering knuckle (4).	Do not remove.
13.	Axle kingpins (6) and (8)	Steering knuckle (4)	Remove.	

b. Cleaning and Inspection

WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

14.		Steering knuckle (4) and lower plate (14), upper sleeve (12) and lower sleeve (13)	a. Clean with dry-cleaning solvent.	
			b. Inspect for cracks.	If cracked or scored replace.
			c. Check inside of bearing sleeves (12) and (13) for bearing wear.	If inside surfaces are worn more than 1.505 in. (38 mm) replace inside bearing sleeves (12) and (13).
15.	Steering knuckle (4)	Studs (5) and studs (9)	Inspect for stripped threads.	If stripped replace.

NOTE

Do not perform step 16 unless new studs are to be installed.

16.		New studs (5) and new studs (9)	Install in steering knuckle (4).	
17.		Stop bolt (10) and jam-nut (11)	a. Inspect for bends.	

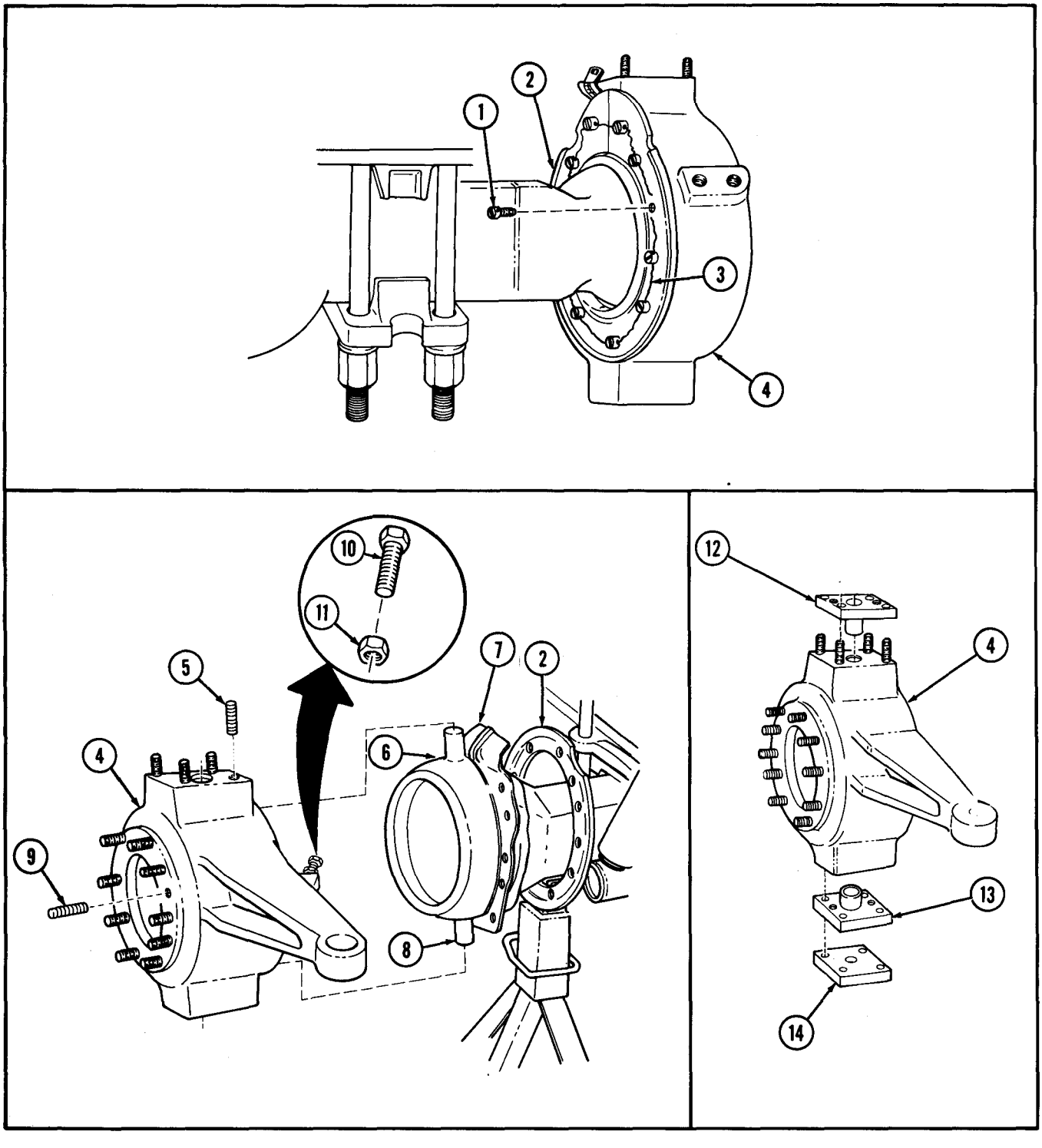
NOTE

Do not perform steps 17b and 18 unless new stop bolt is to be installed.

			b. Break weld and remove.	Discard.
18.		New stop bolt (10) and new jamnut (11)	Install on steering knuckle (4).	Do not weld.

9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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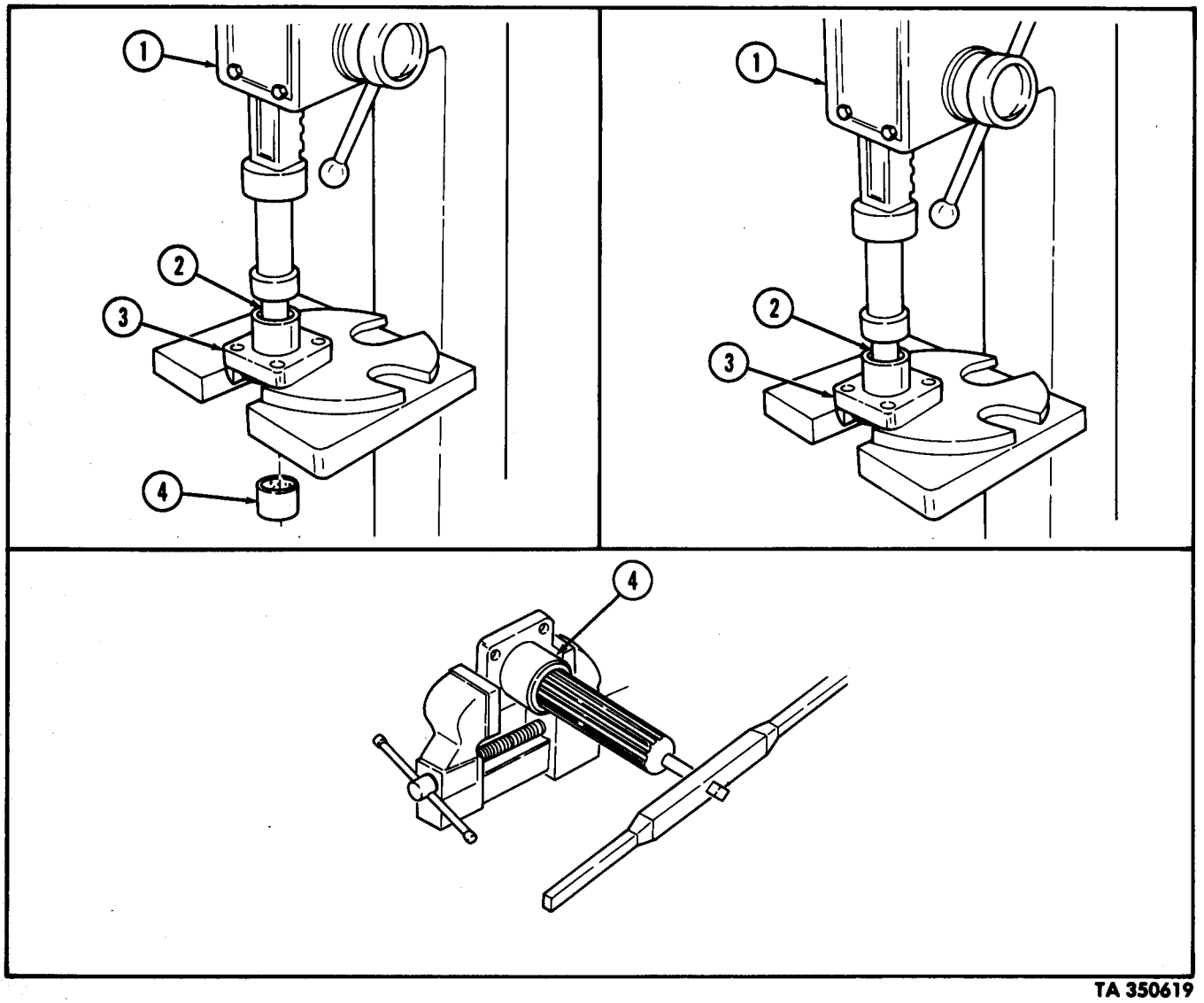
9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Steps 19 through 21 are performed only when bearing sleeve must be replaced. • Steps are the same for upper and lower sleeve assemblies.		
19.		Sleeve (3)	Place in arbor press (1) with mandrel (2) and press out bearing sleeve (4).	
20.		New bearing sleeve (4)	Press into sleeve assembly (3).	Use arbor press (1) and mandrel (2).
21.		Bearing sleeve (4)	Machine inside diameter.	Machine to 1.500 in. (3.81 cm.).



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9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

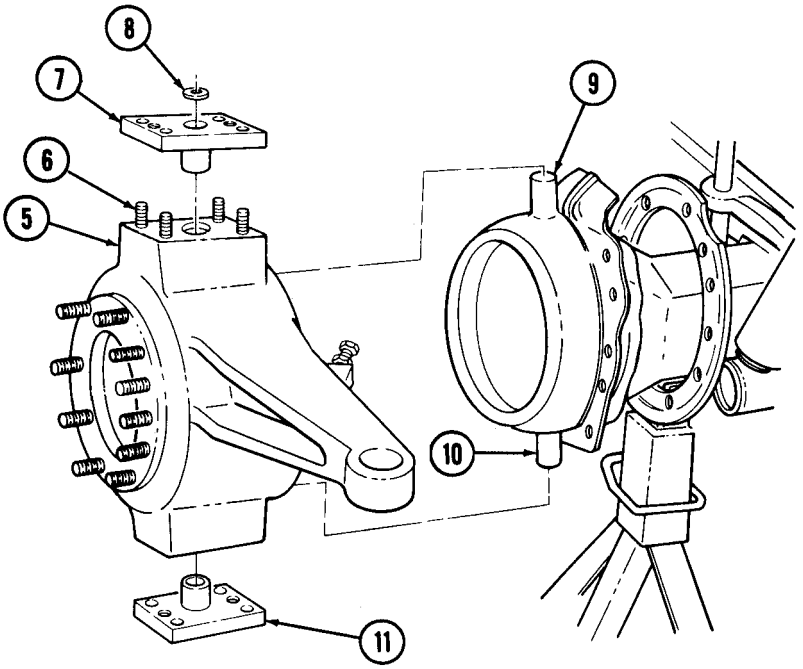
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

c. Installation

NOTE

The following steps are the same for left and right steering knuckles.

22.		Steering knuckle (5)	Position on kingpins (9) and (10) with steering arm studs (6) facing upward.
23.		Upper sleeve assembly (7)	Lubricate and aline with upper kingpin (9) and steering arm studs (6). Coat mounting flange and bottom of steering knuckle (5) with sealing compound.
24.		Spacer (8)	Position on upper sleeve assembly.
25.		Lower sleeve assembly (11)	Lubricate and position to steering knuckle (5) until seated on lower kingpin (10). Coat mounting flange with sealing compound.



9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
26.		Steering knuckle arm (3)	a. Install on steering arm studs (2) with four bushings (4), washers (5), and nuts (6).	Coat studs (2) with sealing compound and tighten nuts (6) 155-170 lb-ft (210-231 N·m).
			b. Install grease fitting (7) .	
27.		Dust and moisture seal (17) and dust seal plate (16)	With plate (16) over seal (17), install on steering knuckle (1) with twelve screws (19) and new lockwire (18).	
28.		Lower plate (8) and lower end of seal guard (13)	a. Coat with sealing compound and position over lower sleeve assembly (10) with "Wheel End" stamping out and down.	Make sure seal guard (13) is installed to two front mounting holes.
			b. Install on steering knuckle (1) with four washers (12) and screws (11).	Tighten screws (11) 105-135 lb-ft (142-183 N·m).
			c. Install grease fitting (9).	
29.		Upper end of seal guard (13)	Install on steering knuckle (1) with two washers (14) and screws (15).	Tighten screws (15) 105-135 lb-ft (142-183 N·m).
30.		Tie rod (25)	Install on steering knuckle (1) with slotted nut (24) and new cotter pin (23).	Tighten nut (24) 140-180 lb-ft (190-244 N·m).

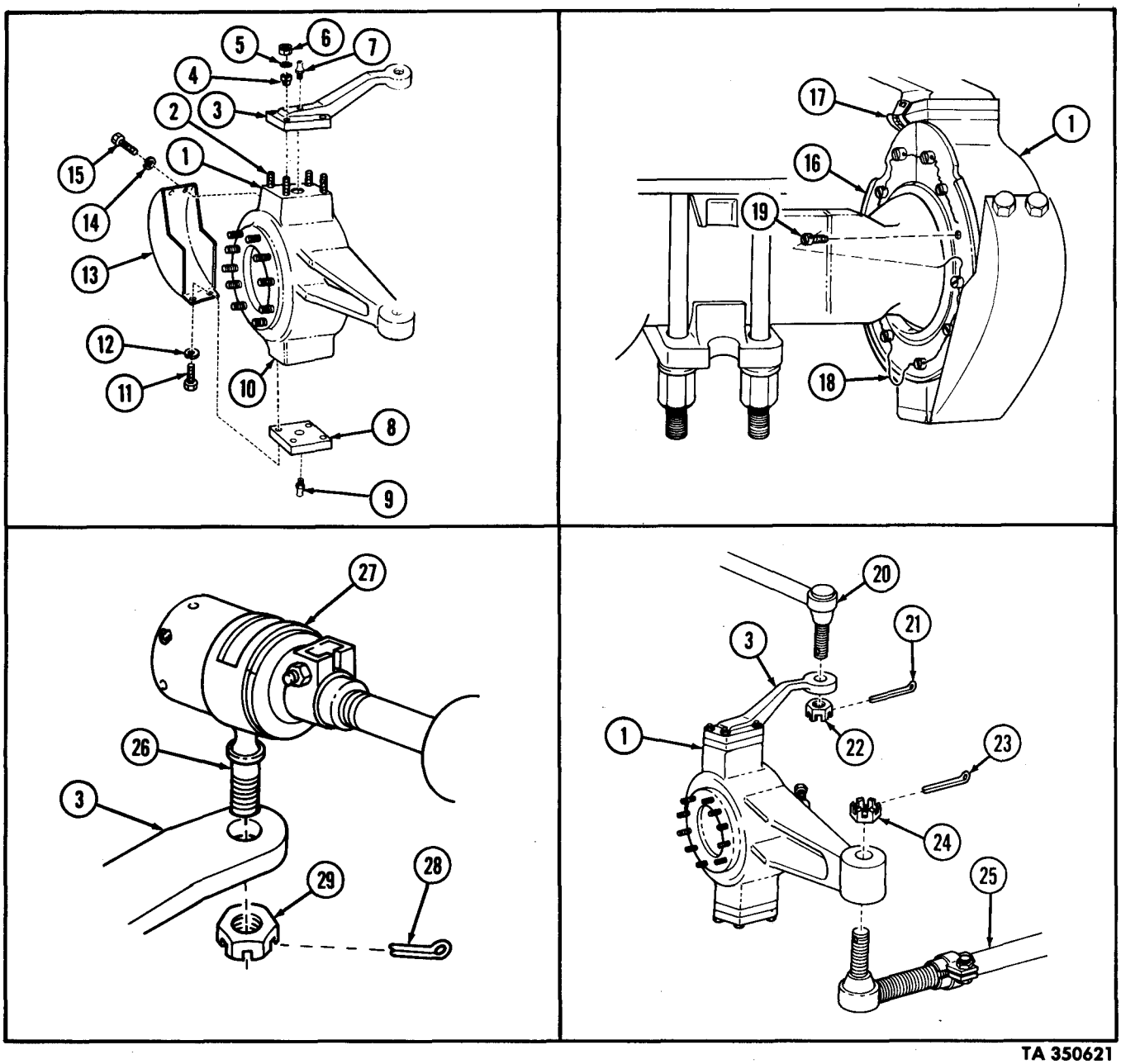
NOTE

- Perform step 31 for left steering knuckle arm only.
- Assistant will help with step 31.

31.		Drag link (20)	Position to steering knuckle arm (3) and install with slotted nut (22) and new cotter pin (21).	Tighten nut (22) 140-180 lb-ft (190-244 N·m).

9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Perform step 32 for right steering knuckle arm only.		
32.		Socket assembly (27), ball stud (26), nut (29), and new cotter pin (28)	Install on steering knuckle arm (3).	Tighten nut (29) 140-180 lb-ft (190-244 N·m).



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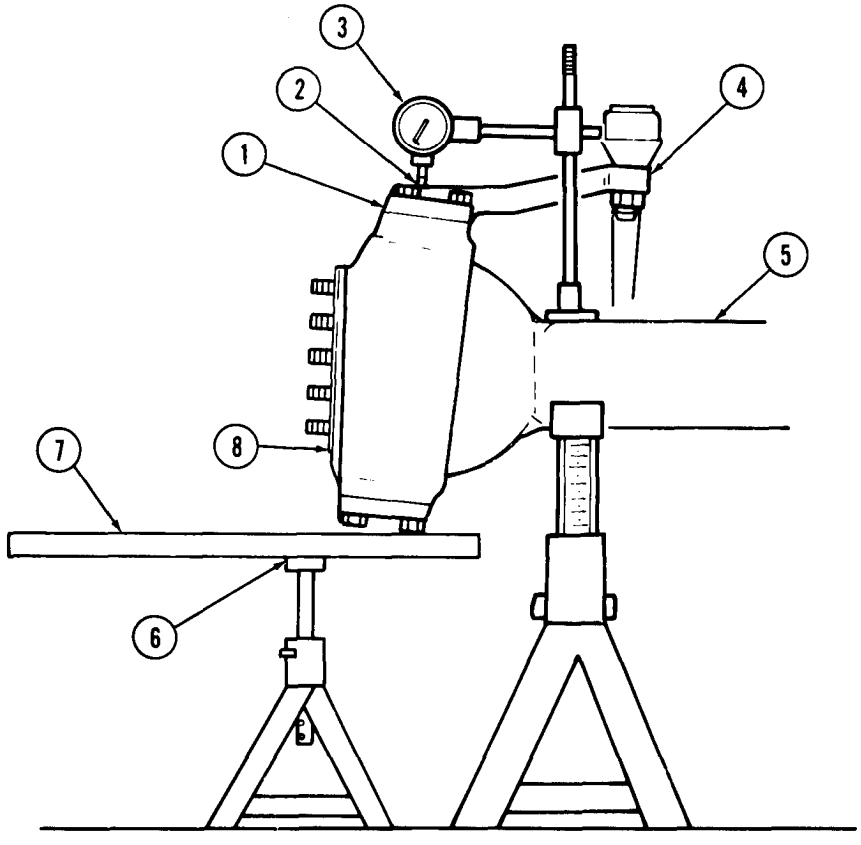
9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. End Play Test				
33.		Dial indicator (3) with magnetic stand	a. Position on front axle housing (5) next to steering arm (4) as shown.	
			b. Adjust until measuring point (2) touches center of steering arm mounting plate (1).	Note position of pointer in dial indicator (3).
34.		Lever (7) and fulcrum (6)	Position beneath steering knuckle.	A support stand may be used as fulcrum (6).
35.		Steering knuckle (8)	Pry upward with lever (7) and fulcrum (6) while observing movement of dial indicator (3) pointer.	If pointer indicates 0.004-0.014 (0.1-**0.3** mm) knuckle end play is within limits. If pointer indicates more than 0.14 (0.3 mm) install a thicker spacer. If pointer indicates less than 0.004 (0.1 mm) install a thinner spacer.
36.	Axle housing (5)	Dial indicator (3)	Remove.	
37.	Steering knuckle (8)	Lever (7) and fulcrum (6)	Remove.	

9-5. STEERING KNUCKLE ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install front axle shaft (TM 9-2320-272-20-1).
- Lubricate (LO 9-2320-272-12).
- Adjust steering knuckle turning angle (para. 9-18).
- Start engine (TM 9-2320-272-10) and road test vehicle.

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9-6. FRONT AXLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Rear wheels blocked.
	TM 9-2320-272-10	Air reservoirs drained.
	TM 9-2320-272-20-2	Front wheels removed.
	TM 9-2320-358-24&P	CTIS air lines removed from axle (M939A2)

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Ten locknuts
Two cotter pins
Eight lockwashers
Lubricating oil, OE/HDO 30 (Appendix C, Item 17)
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

- Do not attempt to support weight of vehicle on hydraulic jack.
- Do not disconnect air lines before draining air reservoirs.

Manual References

TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Weight of vehicle must remain supported on jack stands at all times. Do not attempt to support weight of vehicle on hydraulic jack. Injury to personnel may result if jack fails.

a. Removal

1.		Hydraulic jack (4) with axle fixture	Position under front axle differential housing (5) and raise vehicle.
2.		Two jack stands (3)	Fully extend jack stands (3) under springs (2) and ahead of left and right spring hangers (1).

9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.		Hydraulic jack (4) with axle fixture	Lower only enough for springs (2) to rest on jack stands (3).	Leave jack (4) in place to support front axle differential housing (5).

WARNING

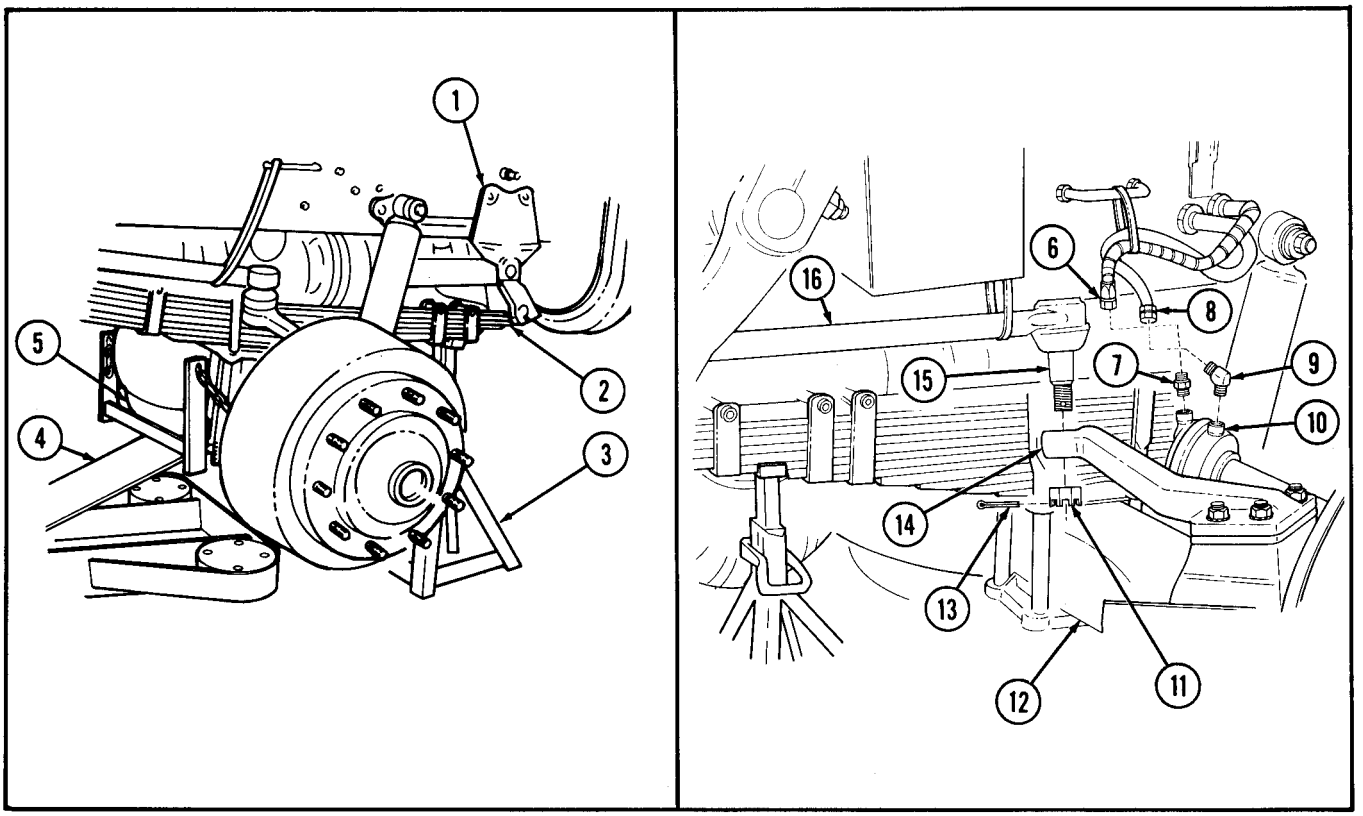
Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

4.	Left and right service brake chambers (10)	Two primary lines (6) and vent lines (8)	Disconnect.	Tag all air lines for installation and tie up and out of the way.
5.		Two adapter fittings (7) and adapter elbows (9)	Remove.	

NOTE

Steps 6 and 7 are for left side of vehicle.

6.	Drag link ball shaft (15)	Cotter pin (13) and slotted nut (11)	Remove.	Discard cotter pin (13).
7.	Steering knuckle arm (14)	Drag link ball shaft (15)	Remove.	Tie drag link (16) up and clear of axle (12).



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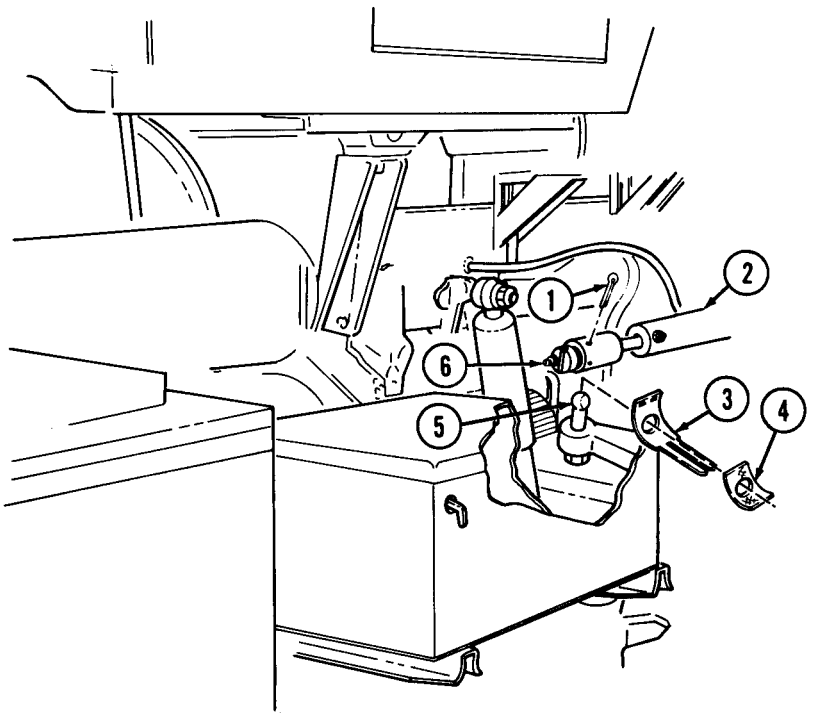
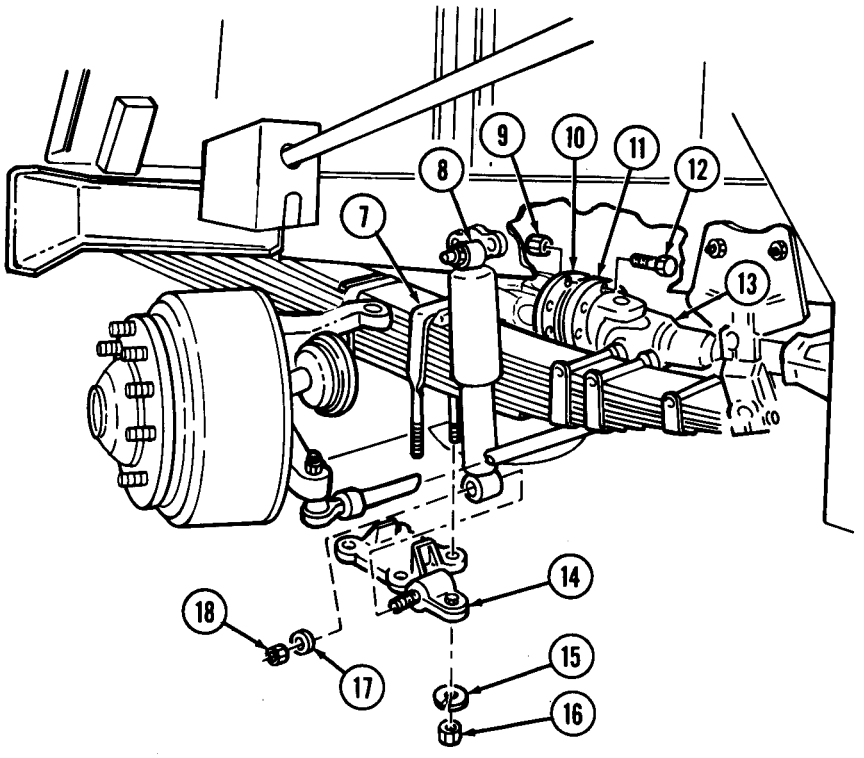
9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Steps 8 through 11 are for right side of vehicle.		
8.	Steering assist cylinder (2)	Cotter pin (1)	Remove and bend clip (3) back.	Discard cotter pin (1).
9.		Adjustable plug (6)	Loosen and tap steering assist cylinder (2) until disconnected from steering knuckle ball (5).	
10.	Steering knuckle ball (5)	Clip (3) and felt pad (4)	Remove.	
11.		Steering assist cylinder (2)	Tie clear of steering knuckle ball (5).	
12.	Left and right lower spring seat (14)	Two locknuts (18), washers (17), and shock absorbers (8)	Remove.	Discard locknuts (18).
13.	Differential flange (10)	Eight locknuts (9) and screws (12)	Remove and separate propeller shaft flange (11) from differential flange (10).	Discard locknuts (9).
14.		Front axle propeller shaft (13)	Tie clear of front axle assembly.	
15.	Two left and right spring U-bolts (7)	Eight nuts (16) and lockwashers (15) and two lower spring seats (14)	Remove.	Discard lockwashers (15).

9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Front axle (4)	**Lower hydraulic jack** (5) until front axle (4) is clear of spring U-bolts (6).	
17.	Front axle (4)	Left and right upper spring seat (1)	**Remove.**	
		NOTE Assistant will help with step 18.		
18.		Front axle (4)	Pull out from under front of vehicle with hydraulic jack (5).	

b. Installation

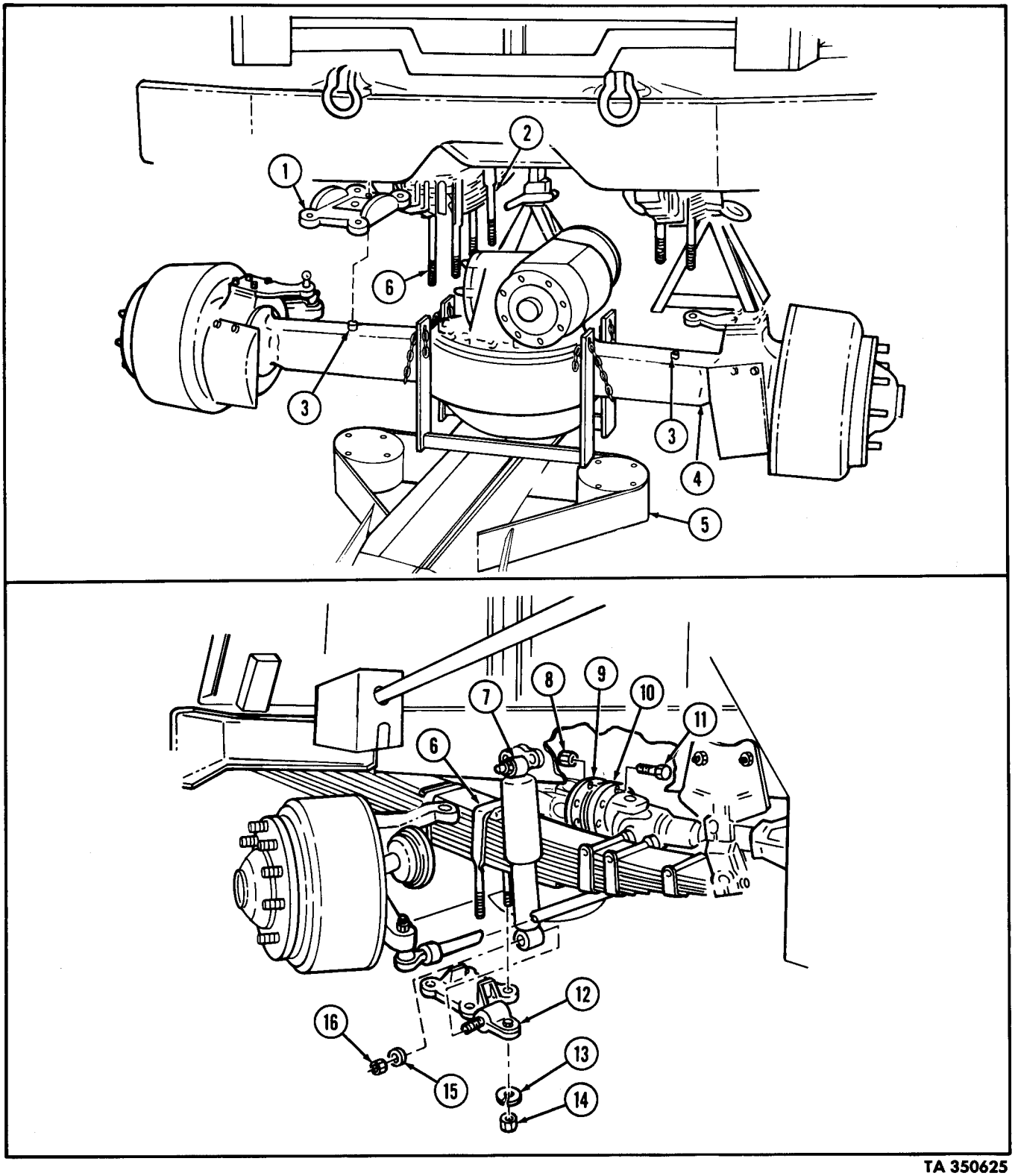
CAUTION

When positioning front axle, make sure spring U-bolts are properly alined so spring center bolt heads enter alinement holes in front axle spring seats. Axle anchor pins must aline to upper spring seat brackets or damage to equipment will result.

19.		Front axle (4)	Support with hydraulic jack (5) equipped with front axle fixture.	
20.		Left and right upper spring seat (1)	Place over left and right anchor pins (3) on front axle housing (4).	
		NOTE Assistant will help with step 21.		
21.		Front axle (4)	Raise with hydraulic jack (5) until spring U-bolts (6) are through upper springs seats (1) and springs (2) rest on upper spring seats (1).	
22.		Left and right lower spring seats (12)	Slide through four U-bolts (6) and install with eight new lock-washers (13) and nuts (14).	Tighten 350-400 lb-ft (475-542 N·m).
23.		Front propeller shaft flange (10)	Install on differential flange (9) with eight screws (11) and new locknuts (8).	Tighten 32-40 lb-ft (43-54 N·m).
24.		Left and right shock absorbers (7)	Install on lower spring seats (12) ,with two washers (15) and new locknuts (16).	

9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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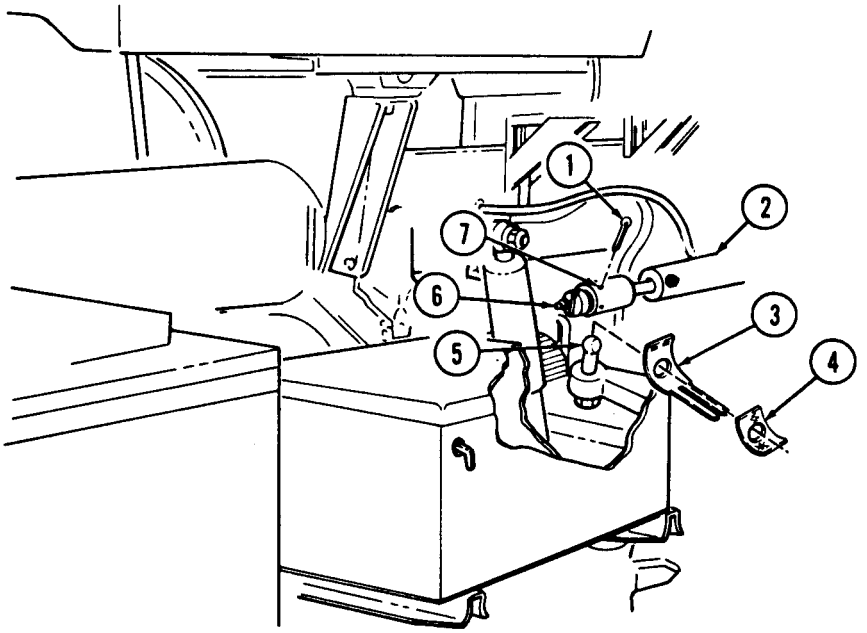
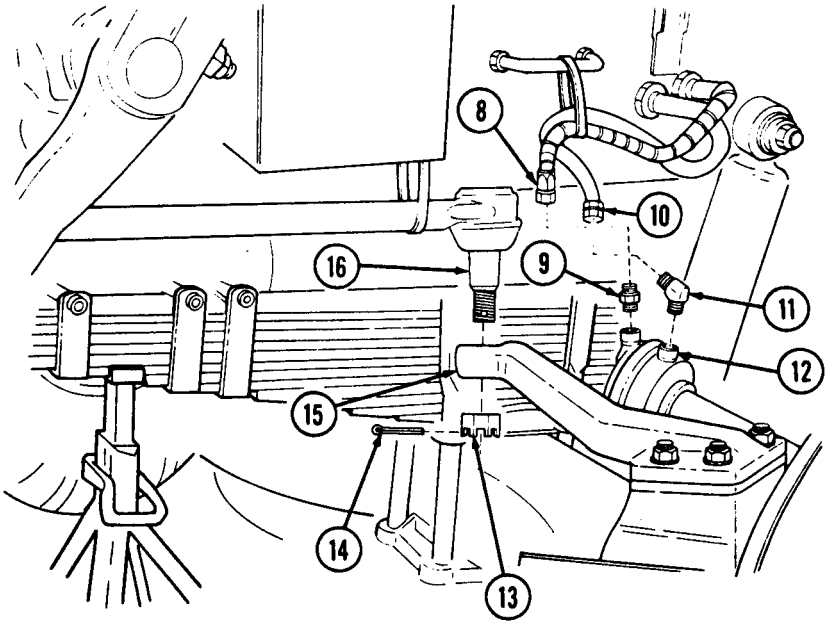
9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE		
		Steps 25 through 28 are for right side of vehicle.		
25.		Clip (3) and felt pad (4)	Place over steering knuckle ball (5).	Soak felt pad (4) with oil before installation.
26.		Steering assist cylinder (2)	a. Position on steering knuckle ball (5).	
			b. Tighten adjustable plug (6) and then back off until slots aline with holes in socket (7).	
27.		New cotter pin (1)	Install.	
28.		Clip (3)	Bend over felt pad (4) and socket (7).	
		NOTE		
		Steps 29 and 30 are for left side of vehicle.		
29.		Drag link ball shaft (16)	Install in steering knuckle arm (15) with slotted nut (13).	Tighten 140-180 lb-ft (190-244 N·m).
30.		New cotter pin (14)	Install.	
		NOTE		
		Clean all male pipe threads and wrap with sealing tape before installation.		
31.		Two adapter fittings (9) and adapter elbows (11)	Install on left and right service brake chambers (12).	
32.		Two primary lines (8)	Install to adapter fittings (9).	
33.		Two vent lines (10)	Install to adapter elbows (11).	

9-6. FRONT AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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END OF TASK!

FOLLOW-ON TASKS:
- For (M939A2) Install CTIS air lines (TM 9-2320-358-24&P).
- Install front wheels (TM 9-2320-272-20-2).
- Lubricate front axle (LO 9-2320-272-12).
- Check and adjust steering assist cylinder travel (TM 9-2320-272-20-2).
- Start engine (TM 9-2320-272-10) and allow air pressure to buildup to normal. Check for air leaks at brake chambers. Road test vehicle.

9-7. FRONT AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE

This task covers:

a. Removal
b. Cleaning and Inspection
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	LO 9-2320-272-12 Para. 9-6 TM 9-2320-272-20-1	Front axle differential drained. Front axle assembly removed. Front axle shafts removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Crocus cloth (Appendix C, Item 6)
Sealing compound (Appendix C, Item 13)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

- All personnel must stand clear during hoisting operations.
- Fire extinguisher will be kept nearby when using drycleaning solvent.
- Eyeshields must be worn when cleaning with a wire brush.

Manual References

TM 9-2320-272-20-1
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Carrier differential assembly (3) to axle housing (7)	Eighteen nuts (4) and washers (5)	Remove.	
2.		Lifting sling (2)	Attach to carrier differential assembly (3) and attach to lift hoist (1).	

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting or swinging load may cause injury to personnel.

CAUTION

When hoisting carrier differential assembly out of axle housing, use care not to damage mounting studs. Assistant will guide assembly out of housing.

3.		Carrier differential assembly (3)	Lift straight out of axle housing (7).	

9-7. FRONT AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd

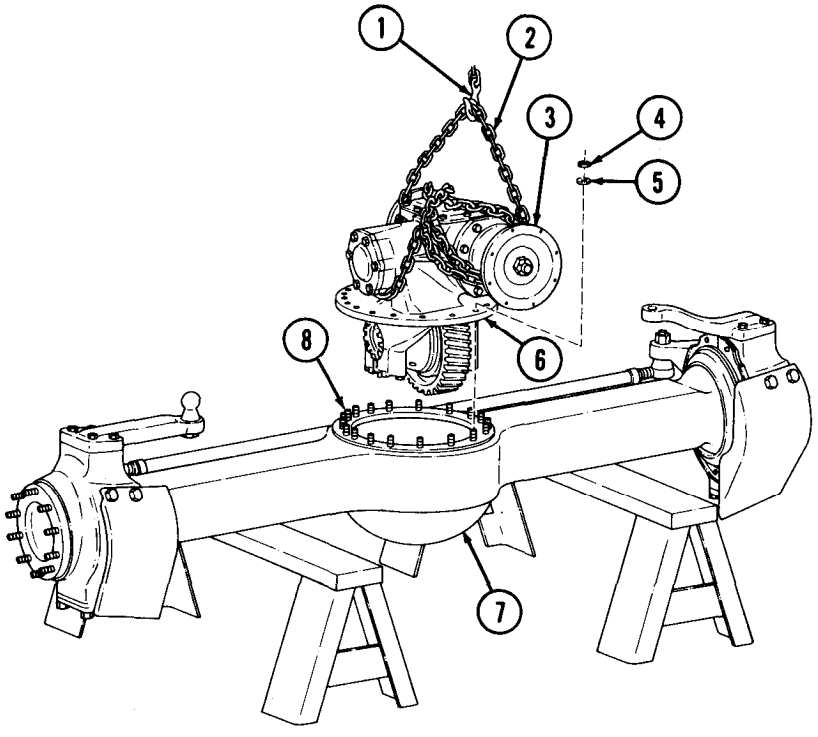
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Cleaning and Inspection

WARNING

- Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.
- Eyeshields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.

4.		Differential flange (6) and axle housing (7)	Clean sealing compound from mating surfaces.	Use wire brush and drycleaning solvent.
5.		Mounting studs (8)	Clean sealing compound from threads.	Use wire brush and drycleaning solvent.



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9-7. FRONT AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Differential flange (6) and axle housing (7) mating surfaces	Inspect for nicks, burrs, and cracks.	If nicked, cracked, or heavily burred, replace. If lightly burred, remove with crocus cloth.
7.		Mounting studs (8)	Inspect for bends and damaged threads.	If bent, or if threads are damaged, replace studs (8).

c. Installation

NOTE

Differential flange and axle housing mating surfaces must be absolutely clean before applying new sealing compound.

8.	Sealing compound	Apply generous but even amount around differential flange (6) and axle housing (7) mating surfaces, and around all axle housing mounting studs (8).	
9.	Lifting sling (2)	Attach to carrier assembly (3) and attach to lift hoist (1).	

WARNING

All personnel must stand clear during hoisting operation. A snapped cable, shifting or swinging load may cause injury to personnel.

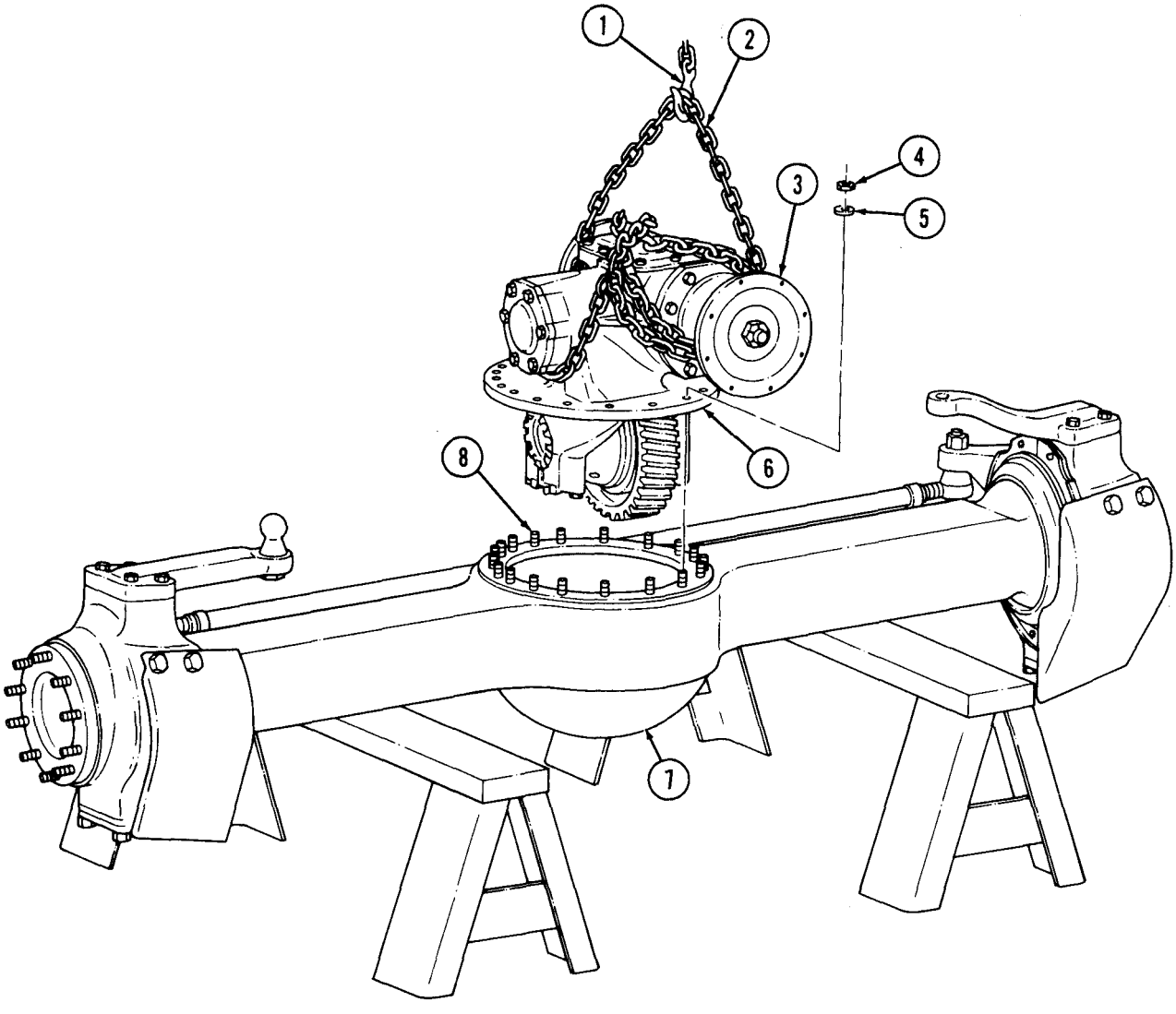
CAUTION

When hoisting carrier assembly onto axle housing, use care not to damage mounting studs. Assistant will guide assembly onto housing.

10.	Carrier assembly (3)	Lower onto axle housing (7), and install on mounting studs (8) with eighteen washers (5), and nuts (4).	Tighten nuts (4) 160-205 lb-ft (217-278 N·m).
11.	Lift hoist (1) and lifting sling (2)	Remove from carrier assembly (3).	

9-7. FRONT AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install front axle shafts (TM 9-2320-272-20-1).
- Install front axle assembly (para. 9-6).
- Fill differential with lubricant (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and road test vehicle.

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly and Adjustment

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
Two puller screws 8366689
Bearing remover/replacer 7950159

Materials/Parts
Gasket and shim kit
Spacer kit 5704278
Wear sleeve kit (99293)
Two cotter pins
Two oil seals
Safety wire MS51095-410
Twelve lockwashers
Crocus cloth (Appendix C, Item 6)
GAA grease (Appendix C, Item 11)
Lubricating oil, GO 80/90 (Appendix C, Item 18)
Prussian blue (Appendix C, Item 20)
Sealing compound (Appendix C, Item 24)
Sealing compound (Appendix C, Item 26)
18 in. twine string (Appendix C, Item 32)
White lead pigment (Appendix C, Item 34)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference	Condition Description
Para. 9-7	Differential and carrier removed (from front axle only).
Para. 9-12	Differential and carrier removed (from rear axle only).

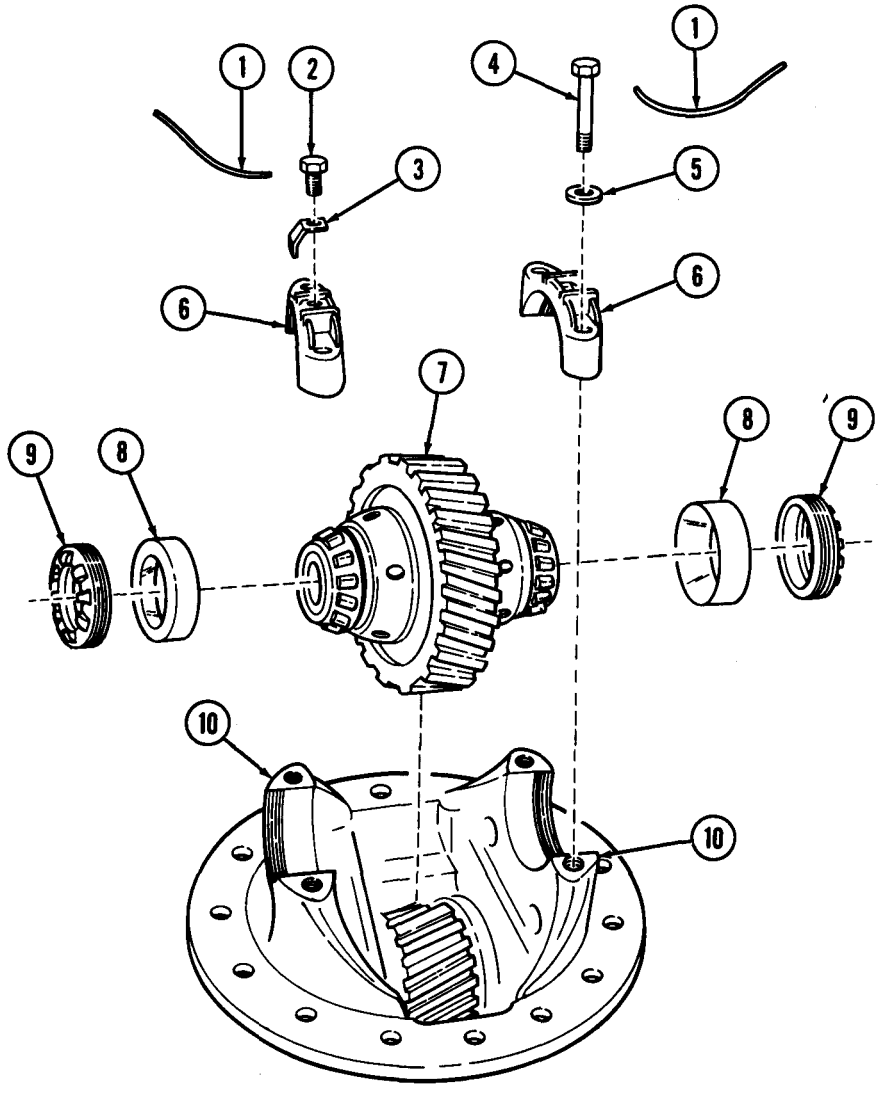
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Two screws (2) and four screws (4)	Two safety wires (1)	Remove.	Discard safety wires (1).
2.	Two bearing caps (6)	Two screws (2) and adjusting nut locks (3)	Remove.	

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		CAUTION Scribe bearing caps and saddles for installation. These items are machine matched and damage will result if they are intermixed.		
3.	Bearing saddles (10)	Four screws (4), washers (5), and two bearing caps (6)	Remove.	
4.		Two adjusting nuts (9)	Remove.	
5.	Differential carrier gear assembly (7)	Two bearing cups (8)	Remove.	Separate and tag for installation.
6.	Bearing saddles (10)	Differential carrier gear assembly (7)	Remove.	



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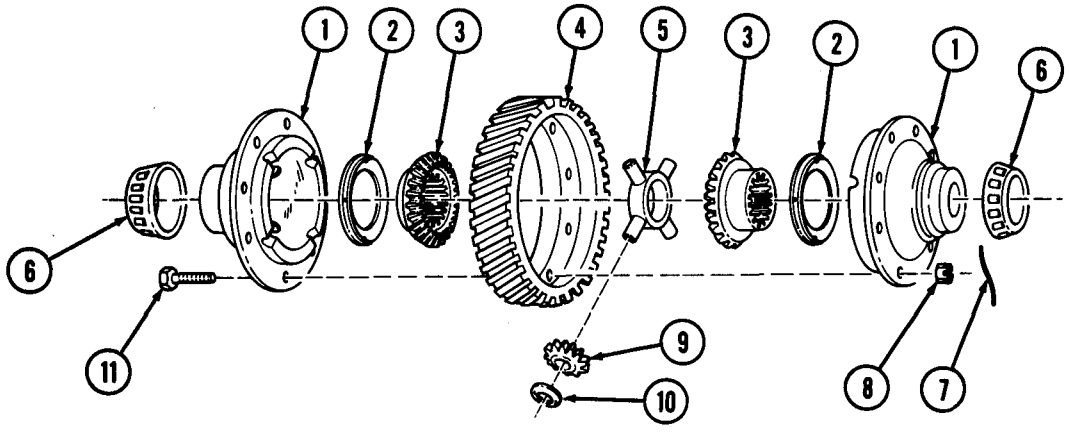
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Eight slotted nuts (8)	Safety wire (7)	Remove.	Discard safety wire (7).
8.	Differential gear housings (1) and helical drive gear (4)	Eight slotted nuts (8) and screws (11)	Remove.	
		CAUTION Two gear housings and helical drive gear must be scribed for installation. These items are machine matched and damage may result if they are intermixed.		
9.	Helical drive gear (4)	Two differential gear housings (1)	Remove.	Use hammer and brass drift.
10.	Two differential gear housings (1)	Two bearing cones (6)	Remove.	Use arbor press or bearing remover. Separate and tag for installation.
11.	Spider (5)	Two thrust washers (2) and side bevel gears (3), four thrust washers (10) and spider bevel gears (9)	Remove.	



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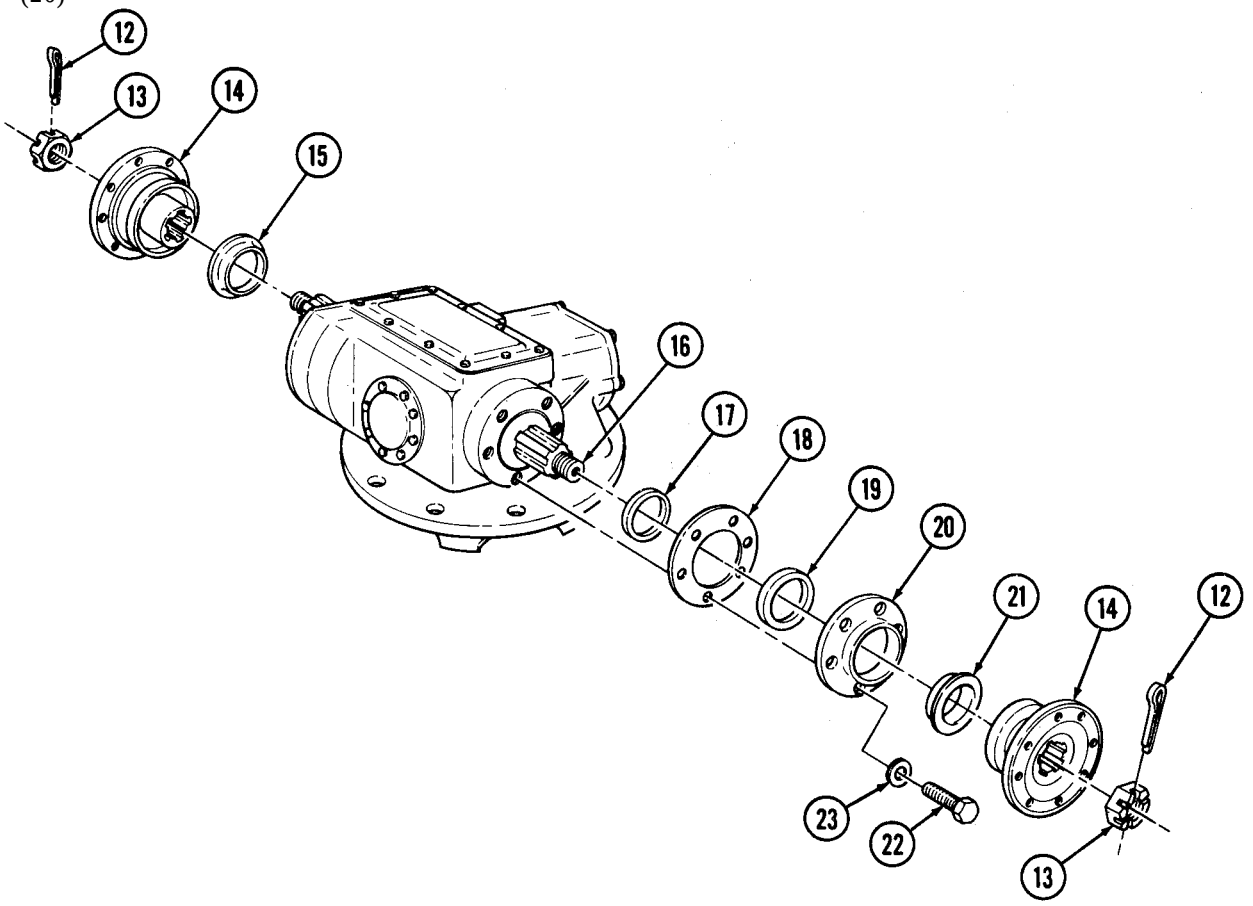
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
12.	Drive shaft assembly (16)	Two cotter pins (12) and nuts (13)	Remove.	Discard cotter pins (12).
13.		Two companion flanges (14)	Pull from drive shaft, (16) splines.	

NOTE

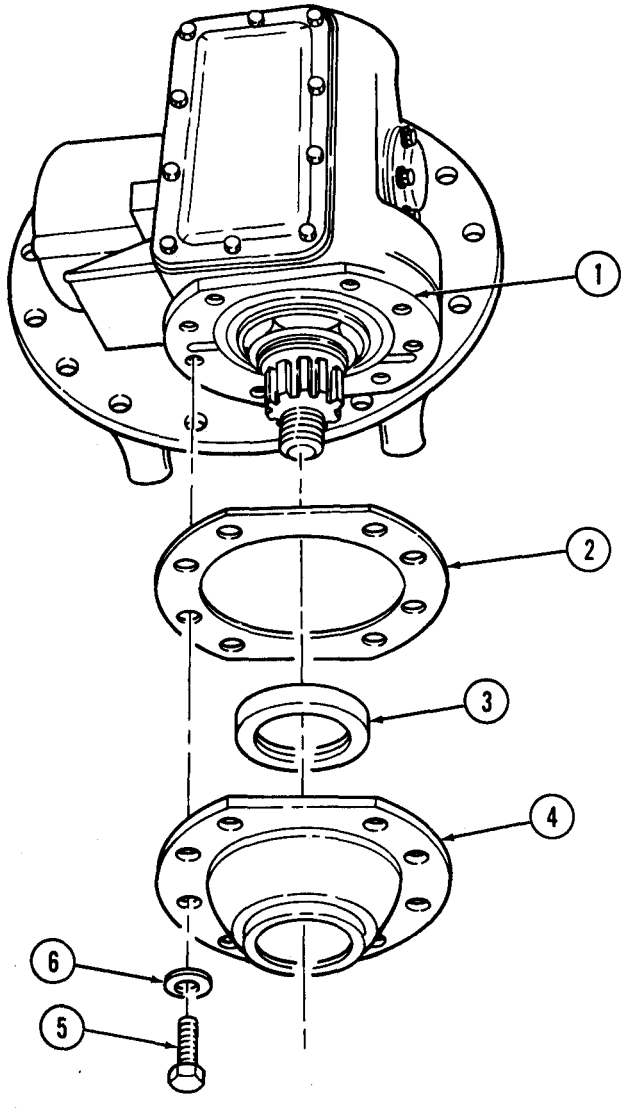
- Perform step 13.1 for companion flanges installed with wear sleeves.
- Remove wear sleeve only if inspection requires replacement.

13.1.	Companion flanges (14)	Two wear sleeves (21)	Remove.	Discard wear sleeves (21).
14.	Rear bearing cover (20)	Six screws (22) and lockwashers (23)	Remove.	Discard lockwashers (23).
15.	Drive shaft assembly (16)	Rear bearing cover (20), gasket (18), and thrust washer (17)	Remove.	Discard gasket (18). Clean gasket remains from mating surfaces.
16.	Rear bearing cover (20)	Oil seal (19)	Remove.	Discard oil seal (19).



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.	Front bearing cover (4)	Eight screws (5) and washers (6)	Remove.	
18.	Differential carrier housing (1)	Front bearing cover (4) and gasket (2)	Remove.	Discard gasket (2). Clean gasket remains from mating surfaces.
19.	Front bearing cover (4)	Oil seal (3)	Remove.	Discard oil seal (3).



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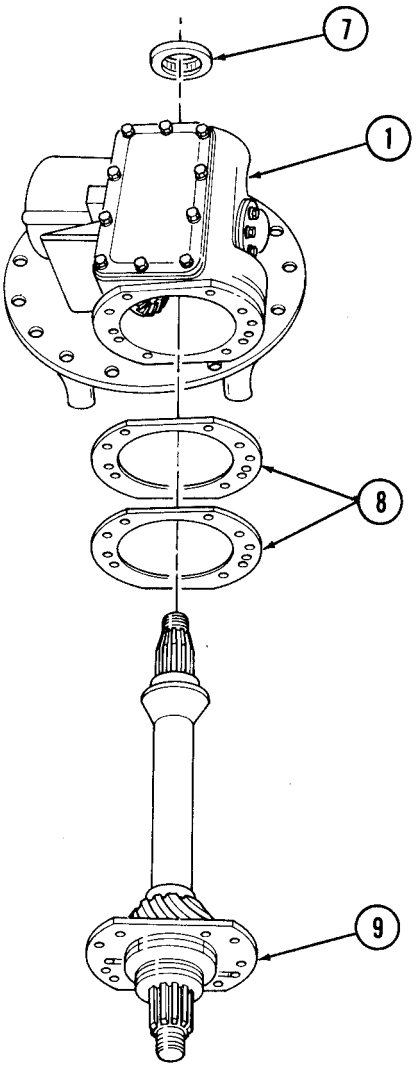
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

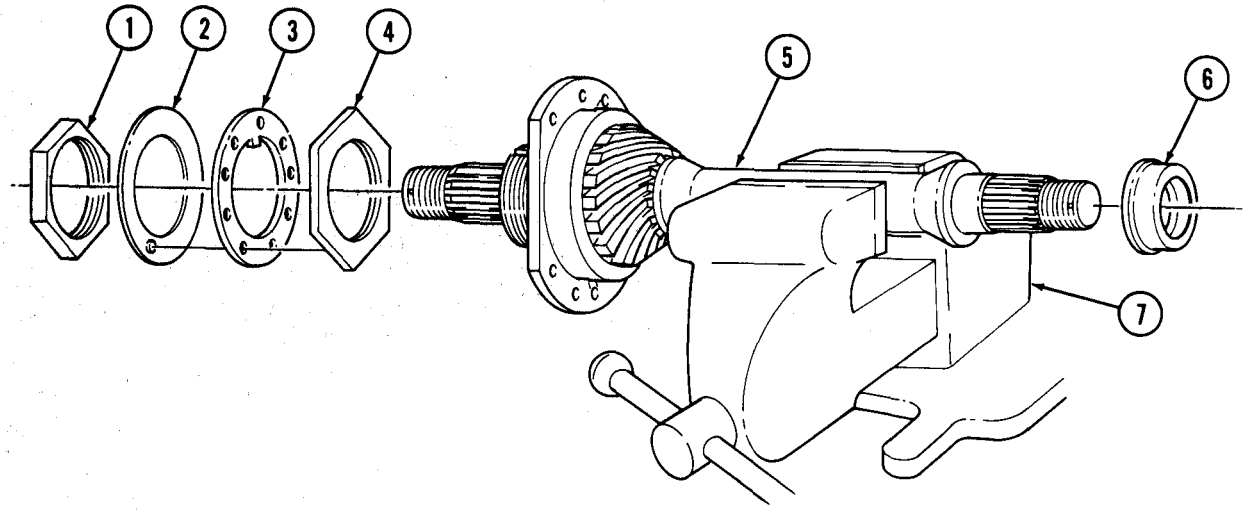
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.	Differential carrier housing (1)	Drive shaft assembly (9)	Remove.	
21.	Drive shaft assembly (9)	Shims (8)	Remove.	Discard shims (8). Count and record number of shims (8) used for installation.
22.	Differential carrier housing (1)	Bearing (7)	Remove.	



TA 350633

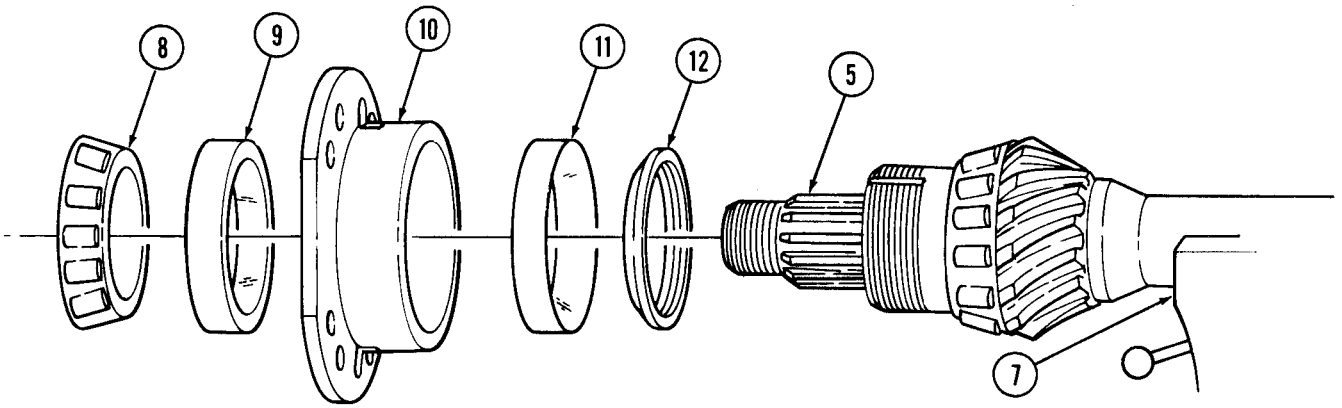
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
23.		Drive shaft (5)	Place in soft-jawed vise (7).	
24.	Drive shaft (5)	Rear bearing race (6)	Remove.	Use soft drift.
25.		Tab lockwasher (2)	Bend open locktab.	
26.		Outer nut (1)	Remove.	
27.		Tab lockwasher (2) and keywasher (3)	Remove.	Discard tab lockwasher (2).
28.		Inner nut (4)	Remove.	



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

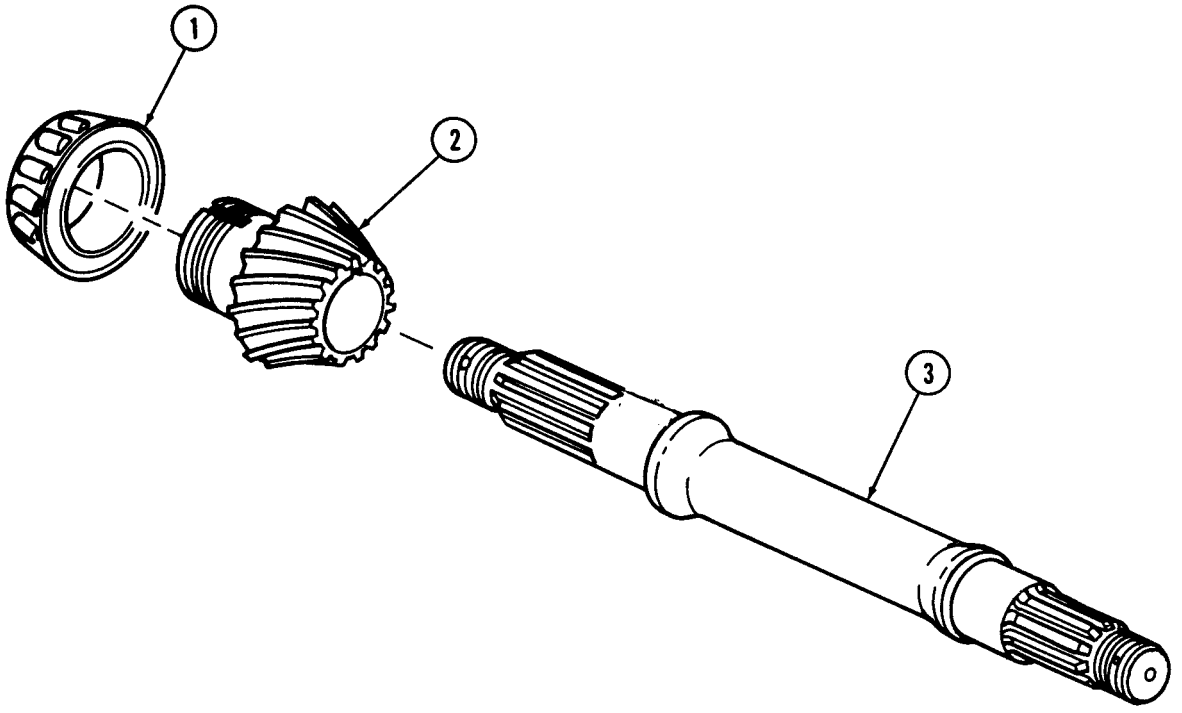
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
29.	Drive shaft assembly (5)	Outer bearing cone (8), retainer assembly (10), and collar (12)	Remove.	Tap lightly on retainer (10) to loosen bearing cone (8).
30.	Retainer assembly (10)	Outer bearing cup (9)	Remove.	
31.		Inner bearing cup (11)	Remove.	



TA 350635

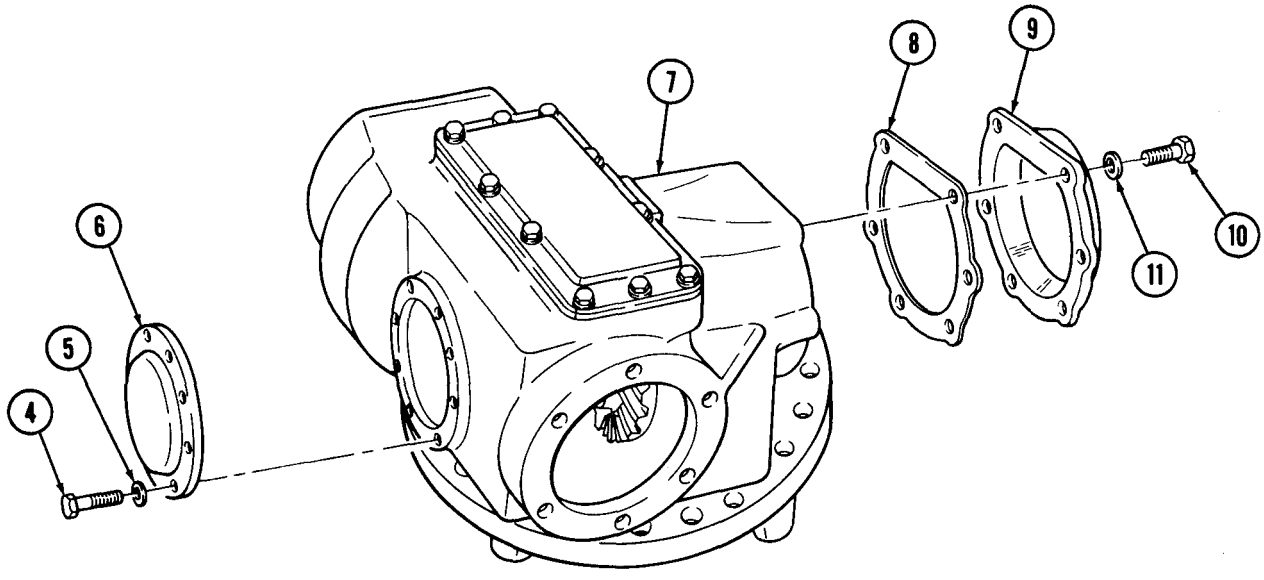
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
32.		Drive shaft (3)	Remove from vise.	
33.	Bevel pinion gear (2)	Drive shaft (3)	Remove.	Use arbor press.
35.	Bevel pinion gear (2)	Inner bearing cone (1)	Remove.	Use arbor press.



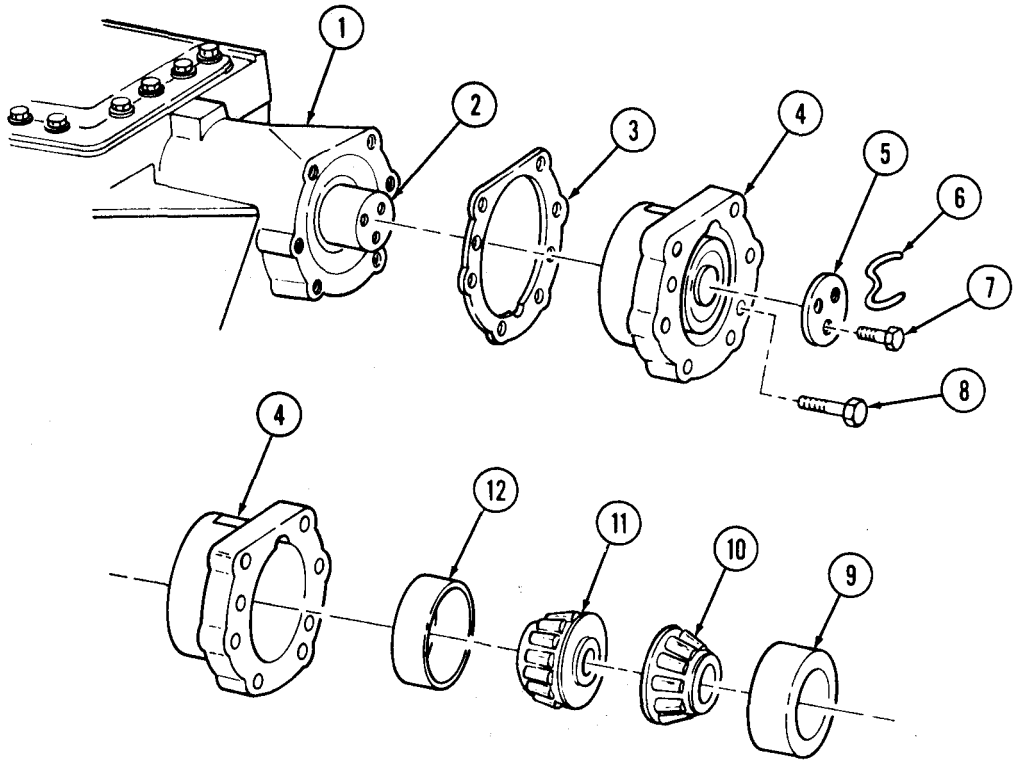
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
36.	Differential gear housing (7)	Eight screws (4), washers (5), and side cover (6)	Remove.	
37.		Six screws (10), lockwashers (11), bearing retaining plate (9), and shims (8)	Remove.	Record total shim thickness. Discard shims (8) and lockwashers (11).



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
38.	Helical gearshaft (2)	Safety wire (6), three screws (7), and retaining plate (5)	Remove.	Discard wire (6).
39.	Cap assembly (4)	Two puller screws (8)	a. Install in jacking holes in cap assembly (4). b. Tighten evenly until cap assembly (4) is free.	
40.	Differential carrier housing (1)	Cap assembly (4) and shims (3)	Remove.	Record total shim thickness for installation. Discard shims (3).
41.	Cap assembly (4)	Two puller screws (8)	Remove.	
42.		Inner bearing cup (12), bearing cone (11), outer bearing CUP (9), and bearing cone (10)	Remove.	Use arbor press.



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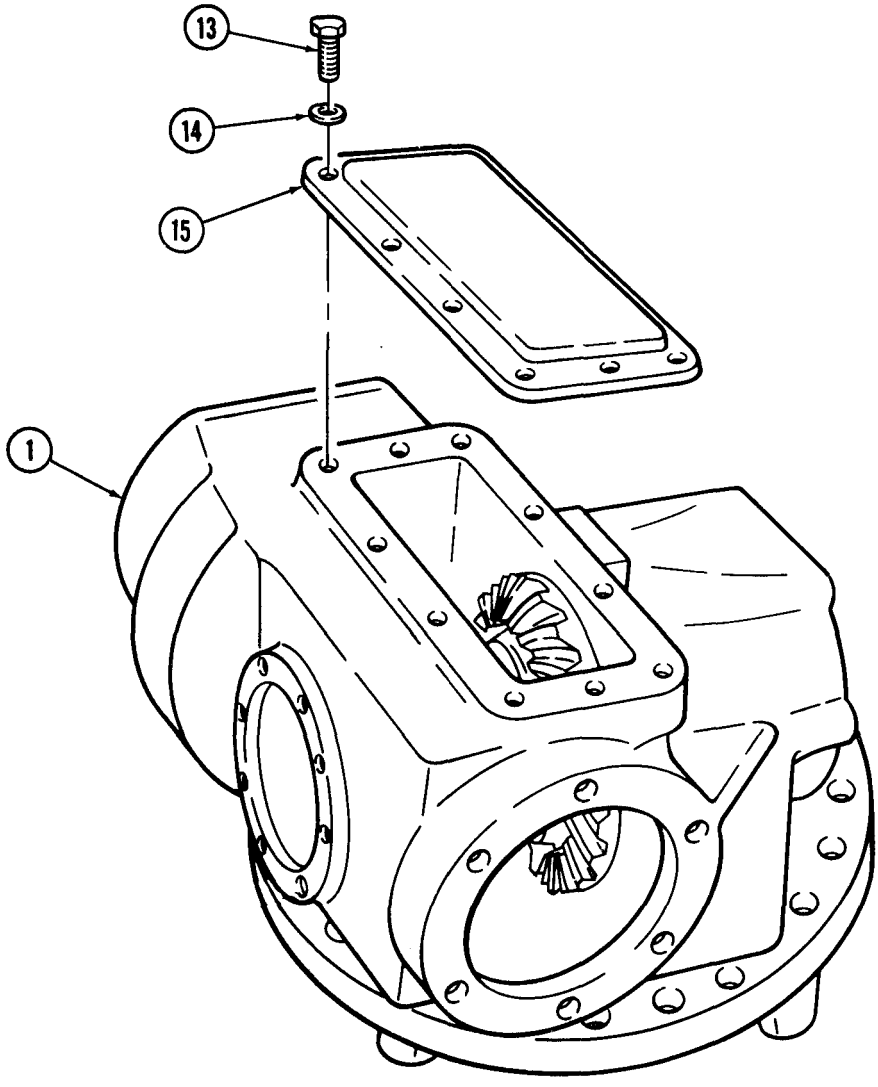
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
43.	Access cover (15)	Ten screws (13) and washers (14)	Remove.	
44.	Differential carrier housing (1)	Access cover (15)	Remove.	Clean sealant remains from mating surfaces.



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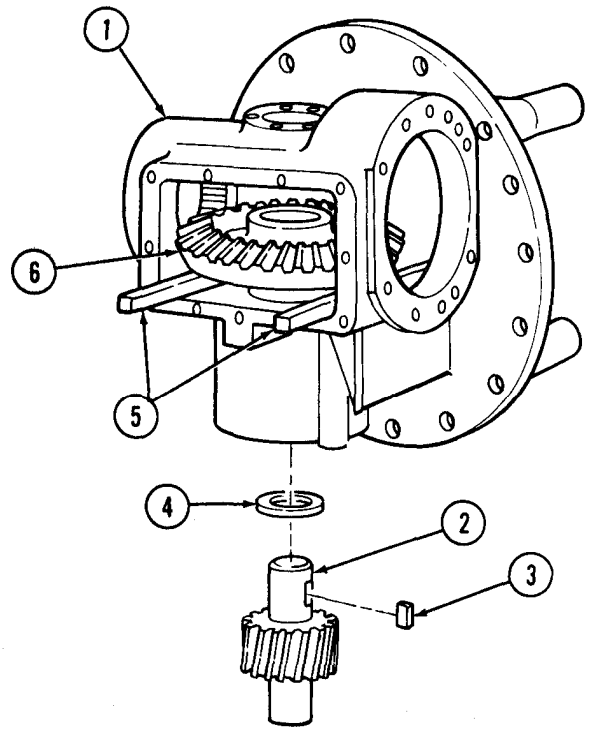
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
45.	Differential carrier housing (1)	Two soft-iron spacers (5)	Place between hypoid gear (6) and carrier housing (1).	
46.	Hypoid drive gear (6)	Helical gearshaft (2)	Remove.	Use arbor press. Use cylinder under shaft (2) to allow clearance from press.
47.	Helical gearshaft (2)	Key (3) and spacing washer (4)	Remove.	
48.	Differential carrier housing (1)	Two soft-iron spacers (5)	Remove.	
49.		Hypoid drive gear (6)	Remove.	



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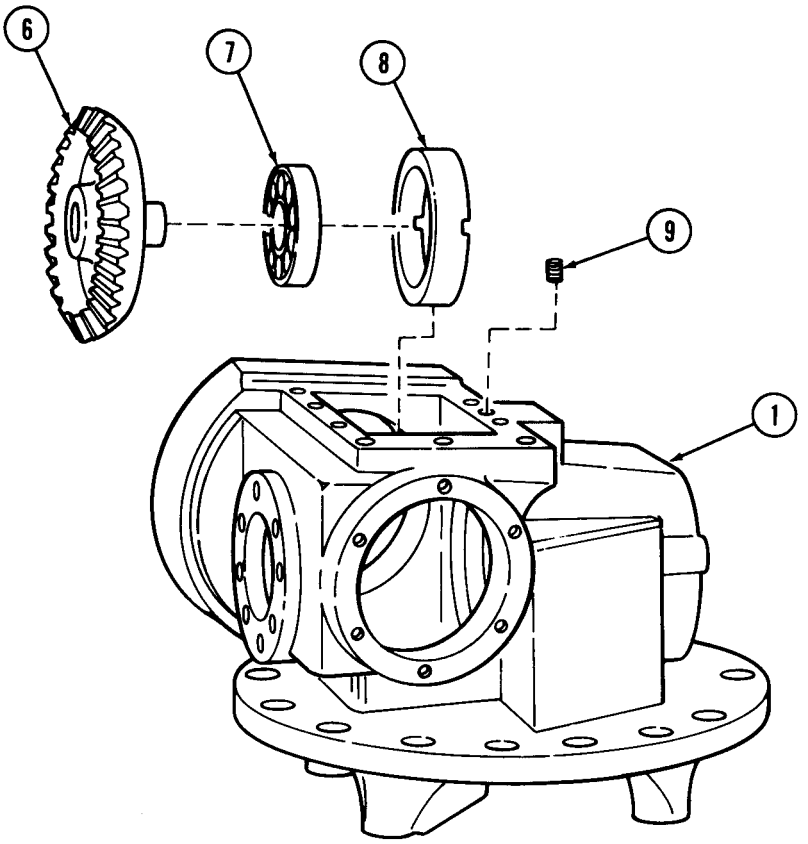
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
50.	Differential carrier housing (1)	Screw (9)	Remove.	
		CAUTION		
		Drive bearing sleeve out by tapping evenly. Scoring will occur if sleeve tilts in housing.		
51.		Bearing sleeve (8)	Remove.	
52.	Hypoid drive gear (6)	Roller bearing (7)	Remove.	Use arbor press.



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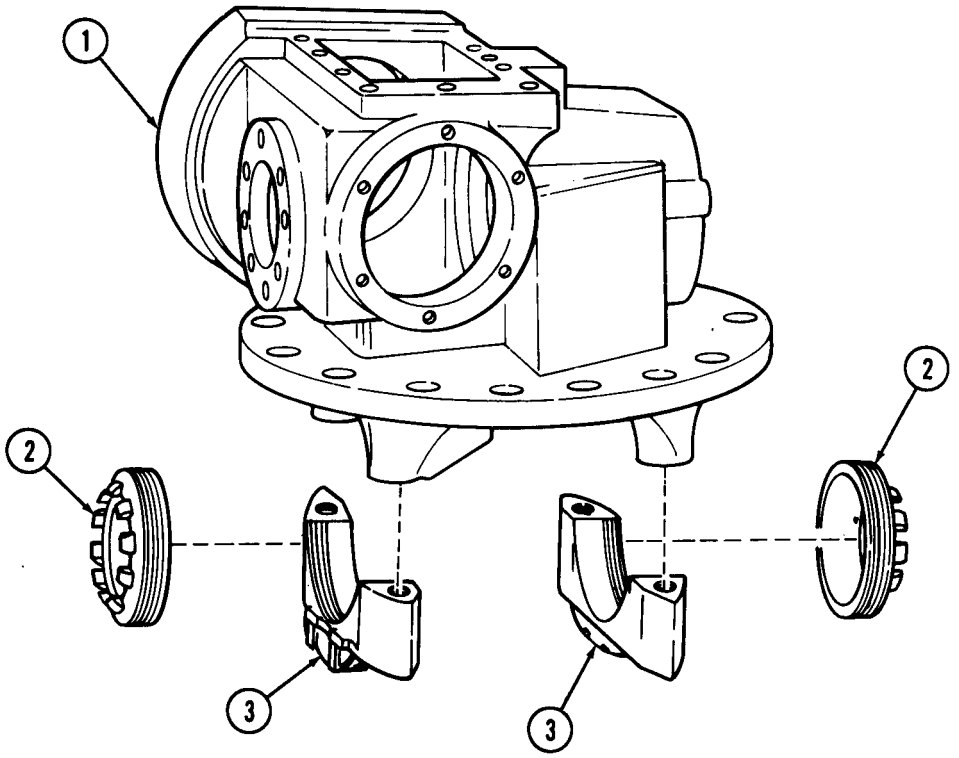
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		b. Cleaning, Inspection, and Repair		
53.		All differential carrier components	Clean.	Refer to para. 2-7.
		CAUTION		
		Differential carrier housing and caps are machine matched parts and cannot be intermixed.		
54.		Differential carrier housing (1) and two caps (3)	Check for cracks and distortion.	If cracked or distorted, replace.
55.		Differential carrier housing (1), two caps (3) and adjusting nuts (2)	Check for stripped and crossed threads.	If threads are stripped or crossthreaded, replace.
56.		Differential carrier housing (1) tapped holes	Check for stripped and crossed threads.	If threads are stripped or crossthreaded, retap.



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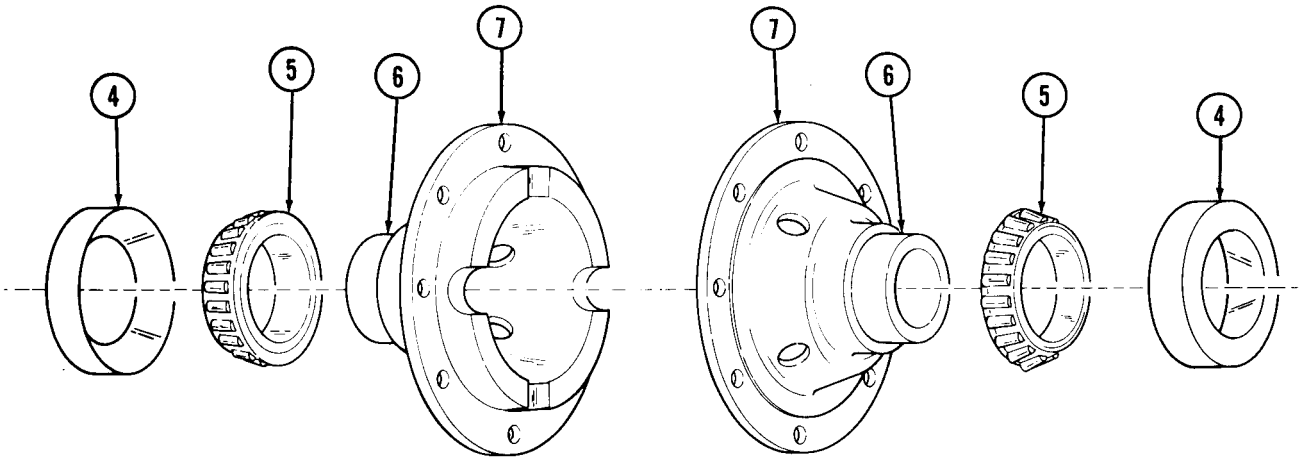
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
57.		Two bearing cups (4) and bearing cones (5)	Check for chips and distortion.	If chipped or distorted, replace.
58.		Two differential case halves (7)	Check for chips, burrs, cracks, scoring, pitting, and breaks.	If chipped, cracked, scored, pitted, or broken, replace. Remove burrs with honing stone.
59.		Two differential case halves (6) and bearings (5)	Measure outside and inside diameters.	If press fit measurement is less than 0.0015 in. or greater than 0.0035 in. (0.0381 to 0.0889 mm), replace.



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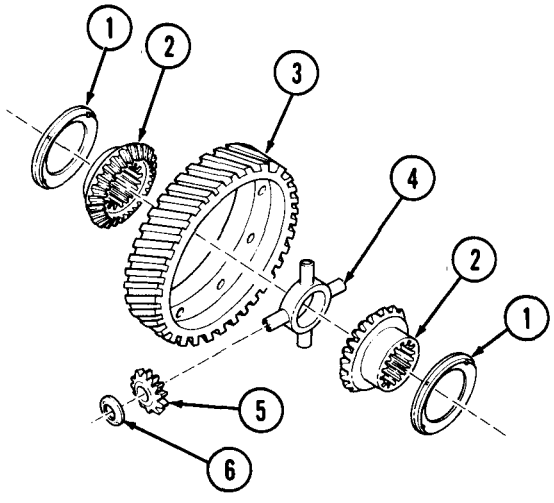
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

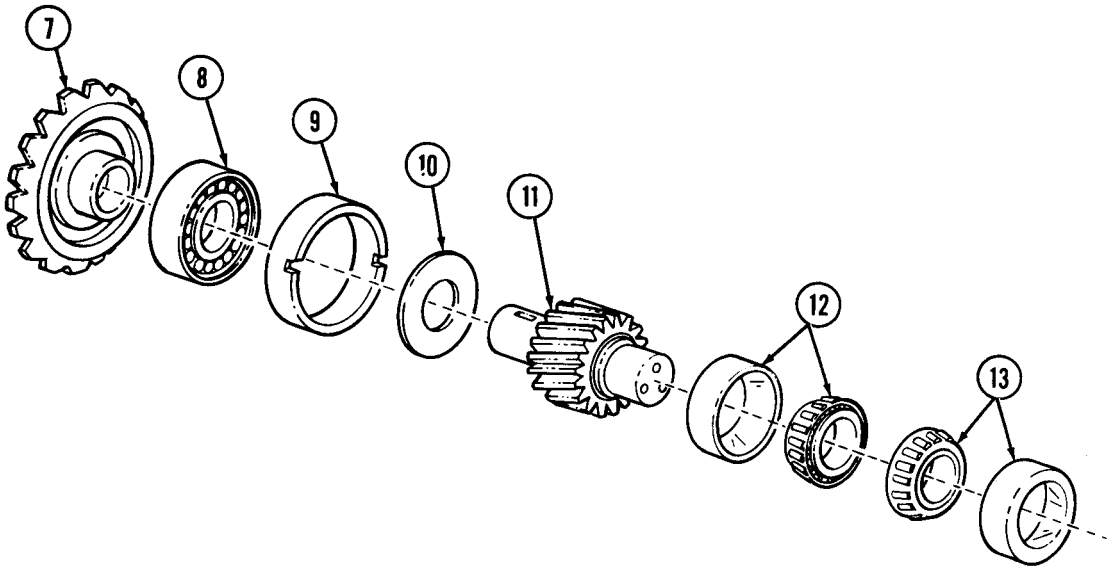
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE If one spider gear or side gear is damaged, replace all four spider gears and both side gears.		
60.		Helical drive gear (3), four spider bevel gears (5) and two side bevel gears (2)	Check for chips, burrs, cracks, scoring, pitting, and breaks.	If chipped, cracked, scored, pitted, or broken, replace. Remove burrs with honing stone.
61.		Spider (4)	Check for chips, cracks, scoring, and breaks.	If chipped, cracked, scored or broken, replace.
62.		Four thrust washers (6) and two thrust washers (1)	Check for scoring and uneven wear.	If scored or worn unevenly, replace.
63.		Spider (4)	Measure outside diameter.	If measurement is less than 1.122 in. or greater than 1.123 in. (28.4988 to 28.5242 mm), replace.
64.		Four spider bevel gears (5)	Measure inside diameter.	If measurement is less than 1.128 in. or greater than 1.130 in. (28.6512 to 28.702 mm), replace.
66.		Spider (4) and spider bevel gears (5)	Measure fit.	If clearance measurement is less than 0.005 in. or greater than 0.008 in. (0.127 to 0.2032 mm), replace.



TA 350644

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
66.		Bearing assemblies (12) and (13), and roller bearing (8)	Check for chips.	If chipped or distorted, replace.
67.		Hypoid drive gear (7) and helical gearshaft (11)	Check for chips, cracks, scoring, burrs, and broken teeth.	If chipped, cracked, scored, or teeth broken, replace. Remove burrs with honing stone.
68.		Sleeve (9) and thrust washer (10)	Check for cracks and scoring.	If cracked or scored, replace.



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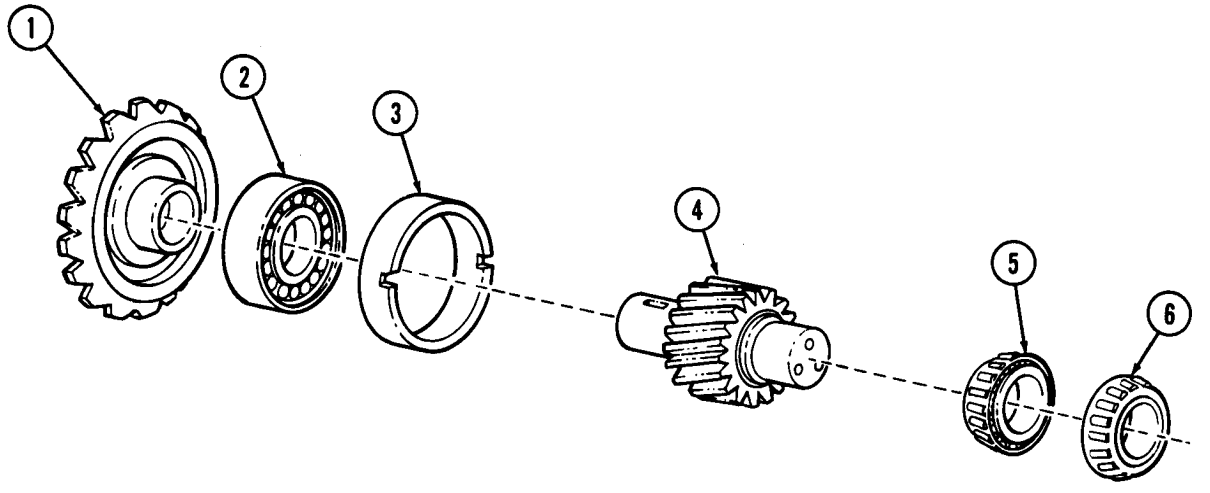
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
69.		Roller bearing (2) and hypoid drive gear (1)	Measure inner and outer diameters.	If press fit measurement is greater than 0.0060 in. (0.1524 mm), replace.
70,		Roller bearing (2) and bearing sleeve (3)	Measure outer and inner diameters.	If clearance fit measurement is less than 0.0032 in. or greater than 0.0058 in. (0.08128 to 0.14732 mm), replace.
71.		Bearing cones (5) and (6) and helical gearshaft (4)	Measure inner and outer diameters.	If press fit measurement is less than 0.0005 in. or greater than 0.0015 in. (0.0127 to 0.0381 mm), replace.



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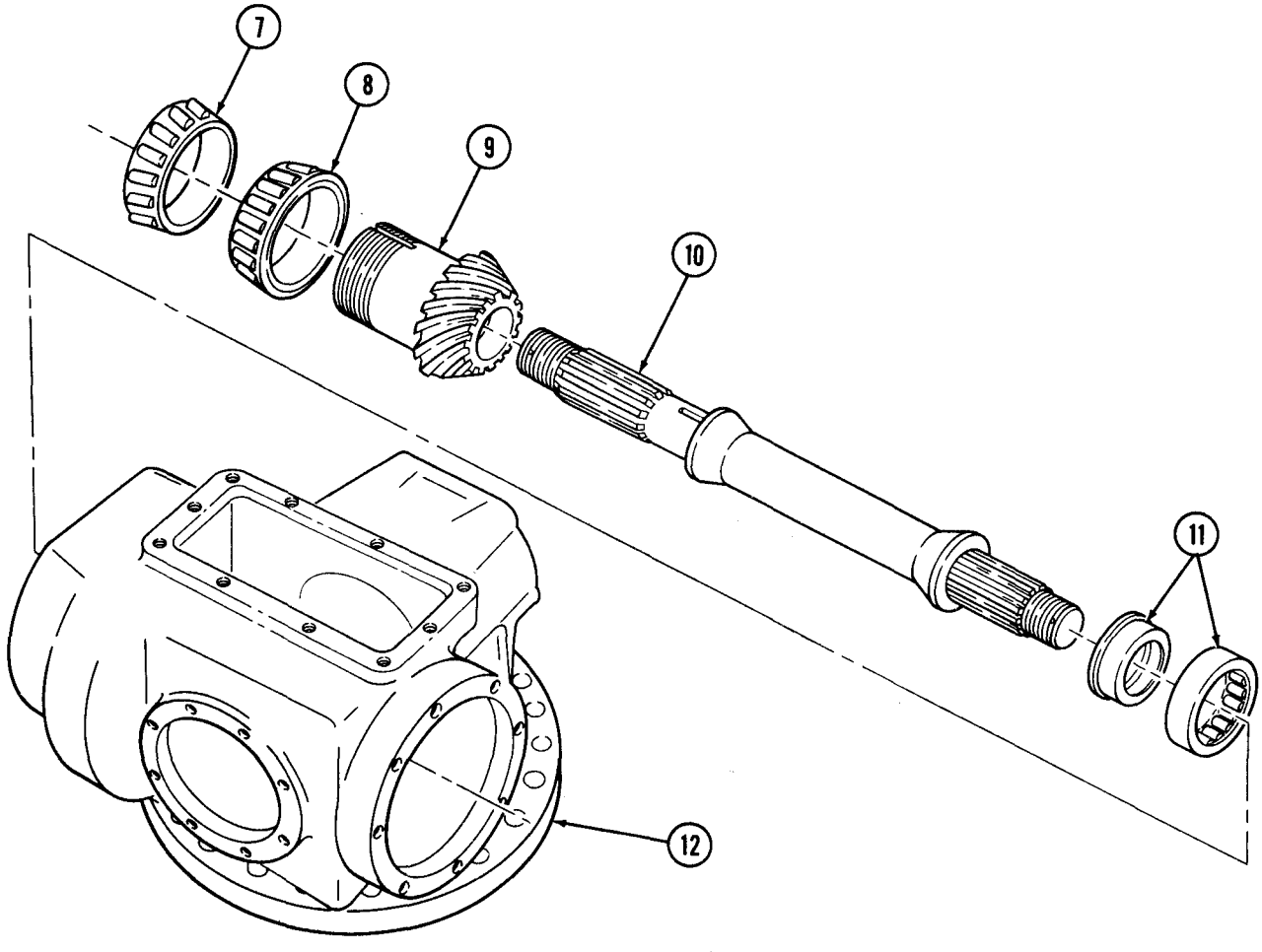
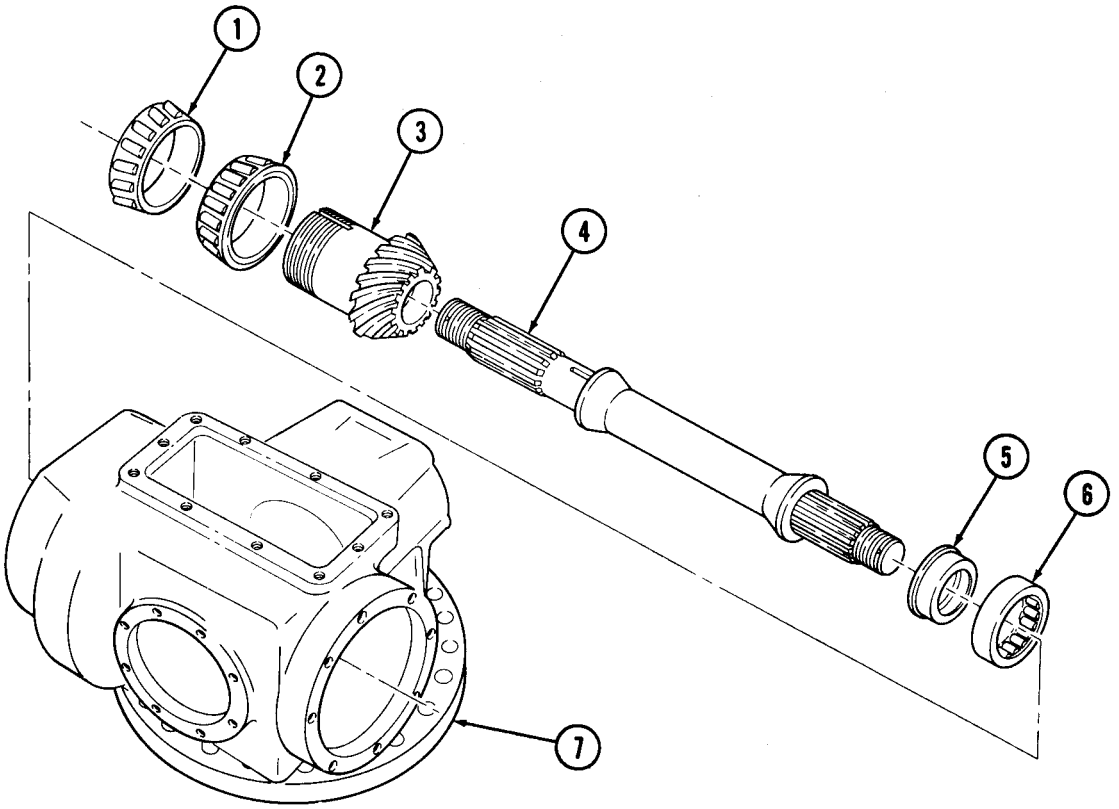
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
72.		Outer bearing assembly (7), inner bearing assembly (8), and rear bearing assembly (11)	Check for scoring, pitting, flaking, and cracks.	If scored, pitted, flaked, or cracked, replace.
73.		Bevel pinion gear (9), drive shaft (10), and differential carrier housing (12)	Check for chips, burrs, scoring, cracks, and breaks.	If chipped, scored, cracked, or broken, replace. Remove burrs with honing stone.



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
74.		Outer bearing cone (1) and bevel pinion gear (3)	Measure inner and outer diameters.	If press fit measurement is less than 0.0002 in. or greater than 0.0022 in. (0.0050 to 0.0558 mm), replace.
75.		Inner bearing cone (2) and bevel pinion gear (3)	Measure inner and outer diameters.	If press fit measurement is less than 0.001 in. or greater than 0.0025 in. (0.0254 to 0.0635 mm), replace.
76.		Rear bearing cone (5) and drive shaft (4)	Measure inner and outer diameters.	If press fit measurement is less than 0.0006 in. or greater than 0.0019 in. (0.0152 to 0.0482 mm), replace.
77.		Rear bearing cup (6) and differential carrier housing (7)	Measure inner and outer diameters.	If press fit measurement is less than 0.0005 in. or greater than 0.0007 in. (0.0127 to 0.0177 mm), replace.



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

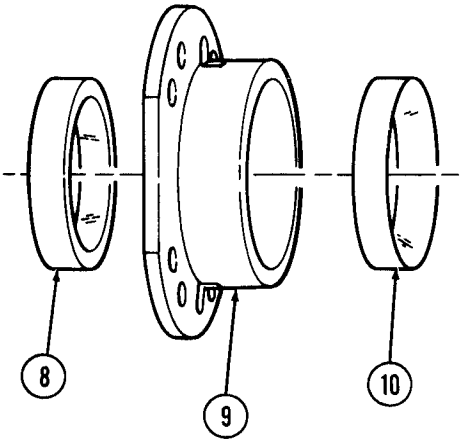
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

c. Reassembly and Adjustment

NOTE

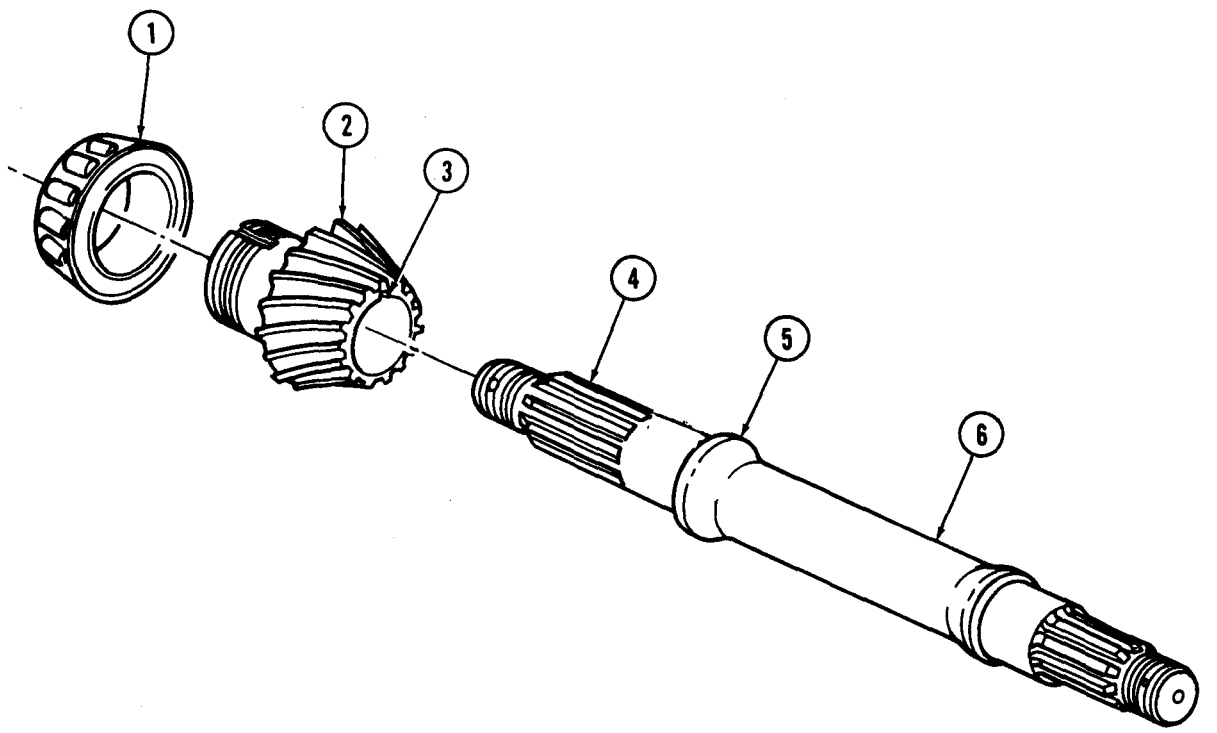
Coat all bearings and gears with lubricating oil during reassembly.

78.		Outer bearing cup (8) and inner bearing cup (10)	Press into retainer (9).	Use bearing remover/replacer. Thick side of cups must face toward inside of retainer (9).



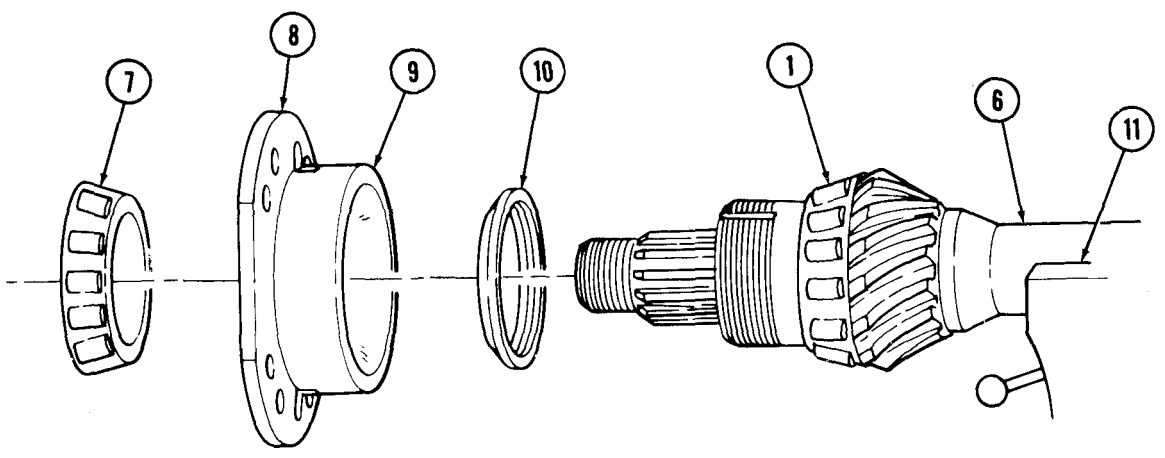
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cent'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
79.		Inner bearing cone (1)	Install on bevel pinion gear (2).	Wide end of cone (1) must face gear (2).
		NOTE White lead pigment is used as a high pressure lubricant.		
81.		Drive shaft (6)	Coat long splined end (4) with white lead pigment.	
82.		Bevel pinion gear (2)	a. Position on drive shaft (6) with key-way (3).	Aline splines in bevel pinion gear (2) with splines in long splined end (4).
			b. Press on shaft (6) until gear (2) is firmly seated against shoulder (5).	Use arbor press.



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
83.		Drive shaft (6)	Place in soft-jawed vise (11).	
		NOTE Collar is used to set preload on bevel pinion gear bearings. Make sure collar removed in disassembly is installed for preload test.		
84.		Collar (10)	Install on drive shaft (6).	
85.		Retainer assembly (9)	Install on drive shaft (6) and inner bearing cone (1).	Flange (8) must face outer end of shaft (6).
86.		Outer bearing cone (7)	Install on retainer (9).	



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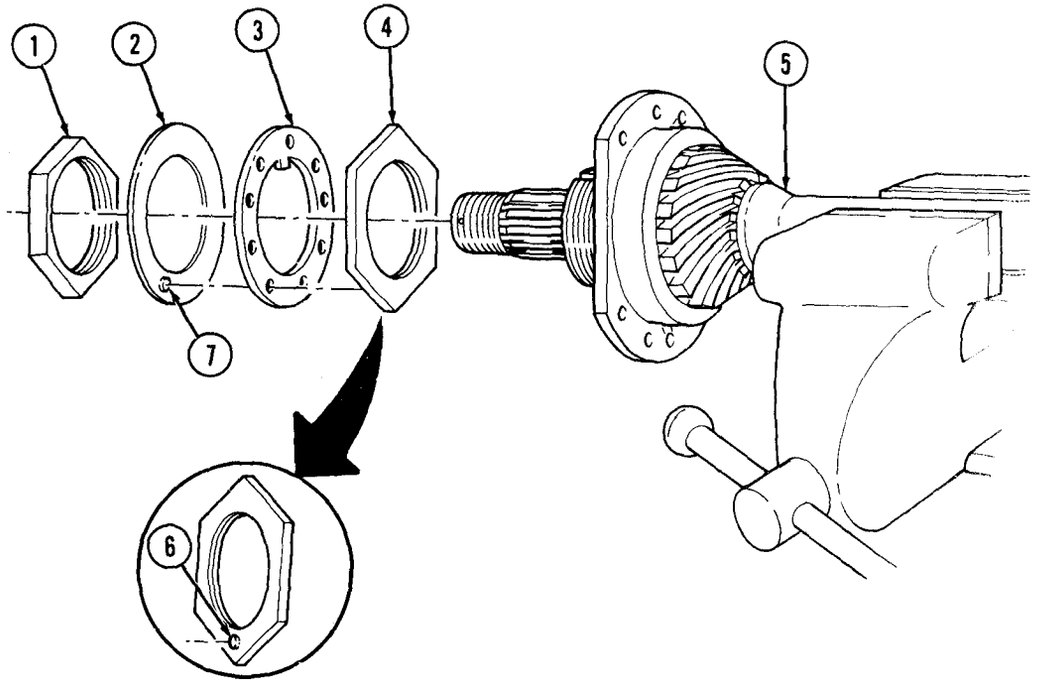
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
87.		Inner nut (4)	Install on drive shaft (5).	Make sure stud (6) is facing shaft (5) outer end. Tighten 800-1000 lb-ft (1085-1356 N·m).
88.		Key washer (3)	Install on drive shaft (5).	Make sure hole alines with inner nut stud (6).
89.		New lockwasher (2)	Install on drive shaft (5).	Make sure stud (7) alines with key washer (3) hole.
90.		Outer nut (1)	Install on drive shaft (5).	Tighten 1000-1200 lb-ft (1356-1627 N·m).

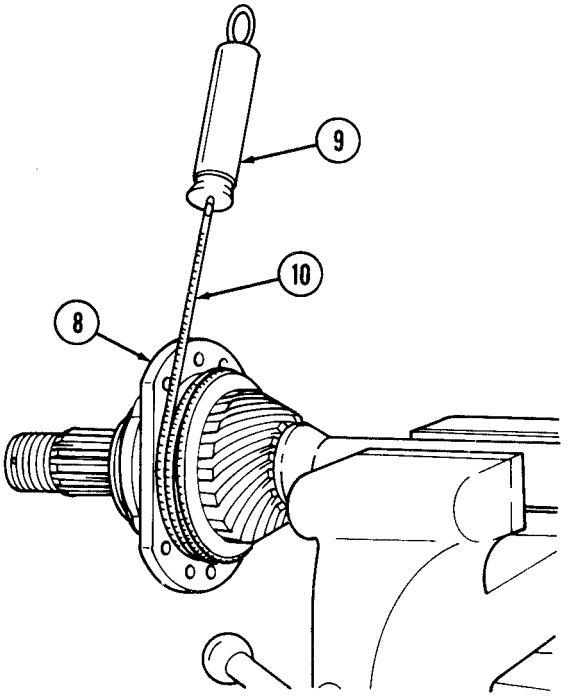


9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
91.		String (10)	a. Wrap around retainer assembly (8). b. Connect to bearing preload pound scale (9).	
92.		Preload pound scale (9)	Pull to check preload.	Original bearing preload must be 4 to 8 lb-ft (0.5 to 0.9 N·m). Pull on scale (9) must be 1.2 to 2.4 lbs (0.544 to 1.0896 kg). New bearing preload must be 12 to 18 lb-in. (1.4 to 2.0 N·m). Pull on scale (9) must be 3.6 to 5.5 lbs 1.634 to 2.497 kg).

NOTE

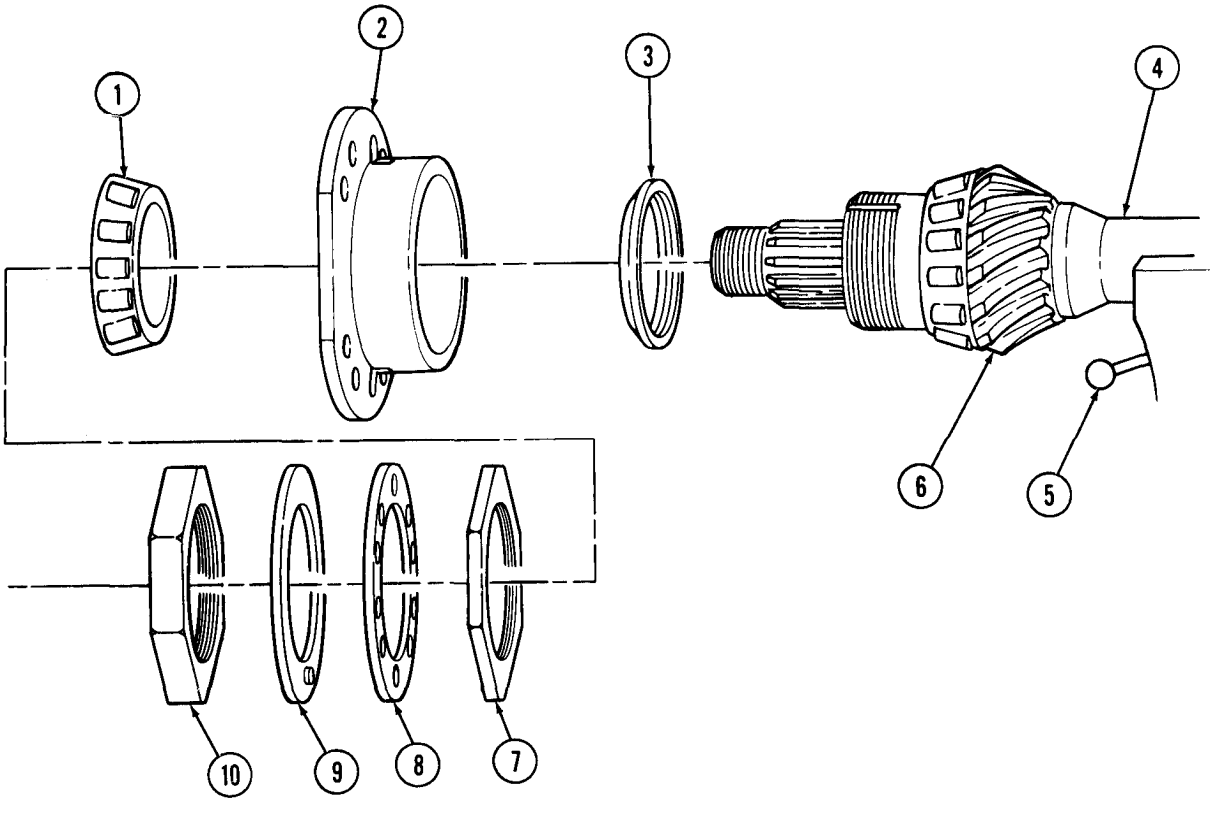
- If preload is not within given limits, perform steps 93 through 96.
- If preload is within given limits, go on to step 97.



TA 350653

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
93.	Drive shaft (4)	Outer nut (10) lockwasher (9), keywasher (8) and inner nut (7)	Remove.	
94.	Retainer (2)	Outer bearing cone (1)	Remove.	
95.	Drive shaft (4)	Retainer (2) and collar (3)	Remove.	
		NOTE Thickness of original collar can be reduced by rubbing with crocus cloth laid on flat surface.		
96.		Bevel pinion gear (6)	a. If preload exceeds given limits (refer to step 92), use thicker collar (3). b. If preload is less than given limits (refer to step 92), use thinner collar (3). c. Repeat steps 84 through 92 until preload is correct.	Select collar from bevel pinion gear spacer kit.



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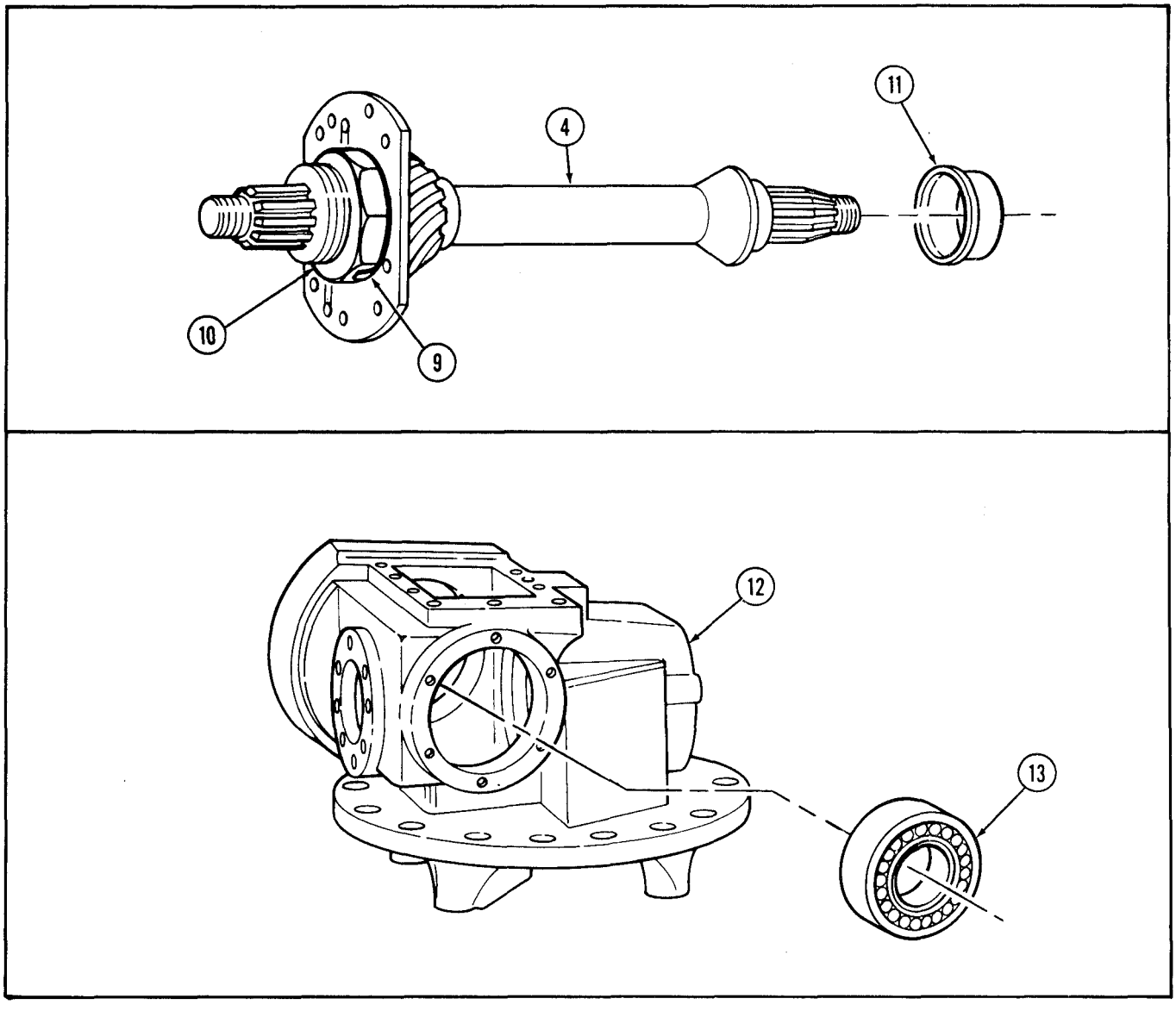
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

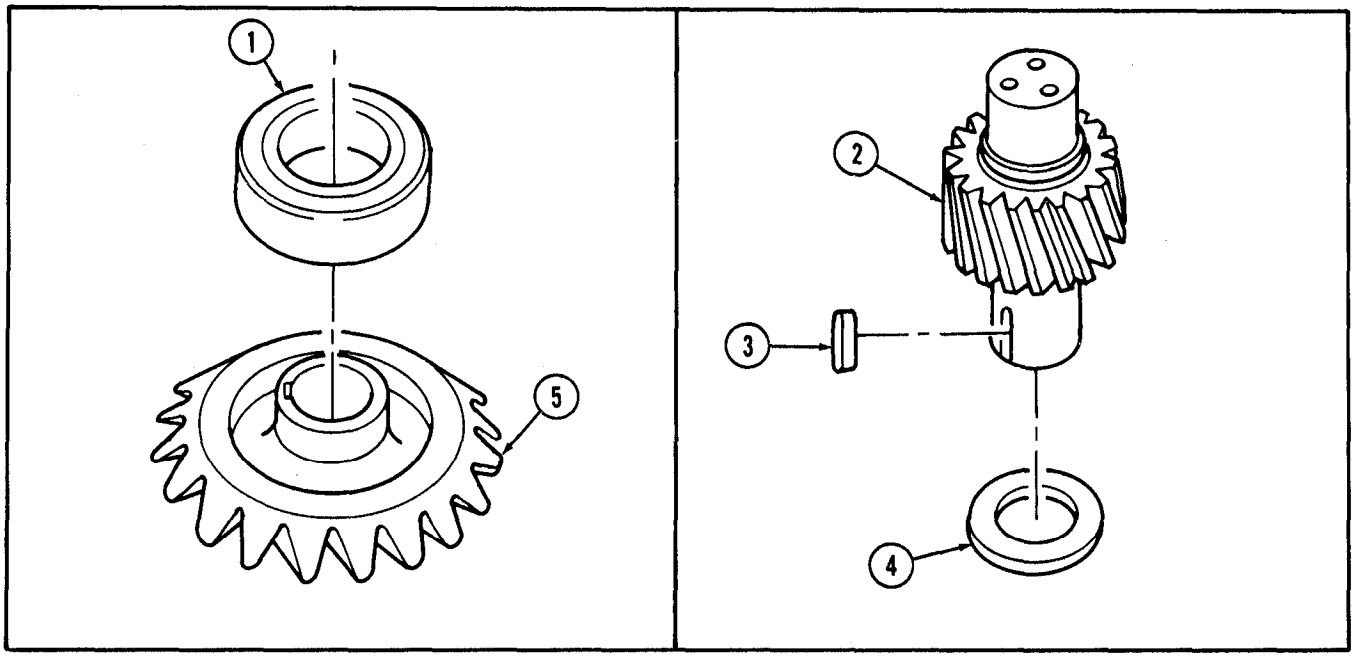
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
97.		Tab lockwasher (9)	Bend locktab over outer nut (10).	
98.		Bearing inner race (11)	Install on drive shaft (4).	
99.		Drive shaft (4)	Remove from vise (5).	
100.		Bearing (13)	Install in differential carrier housing (12).	Use arbor press.



TA 350655

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
101.		Bearing (1)	Install on bevel drive gear (5) hub.	
102.		Spacing washer (4)	Install on helical gearshaft (2).	
103.		Key (3)	Install in helical gearshaft (2).	
		NOTE White lead pigment is used as high pressure lubricant.		
104.		Helical gearshaft (2)	Coat keyed end with white lead pigment.	



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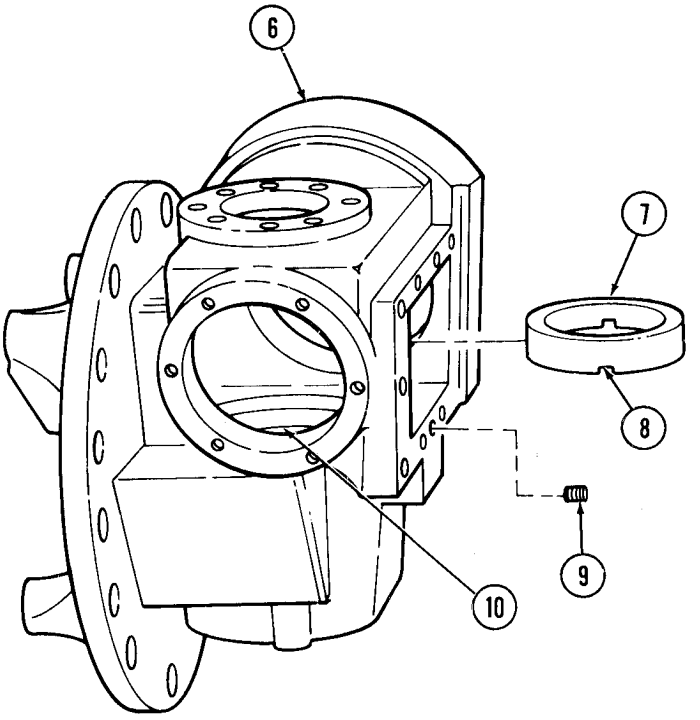
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
105.		Sleeve (7)	a. Place in differential carrier housing (6), with notches (8) toward shoulder of bore (10). b. Install in shoulder of bore (10).	
106.		Screw (9)	Install and tighten.	



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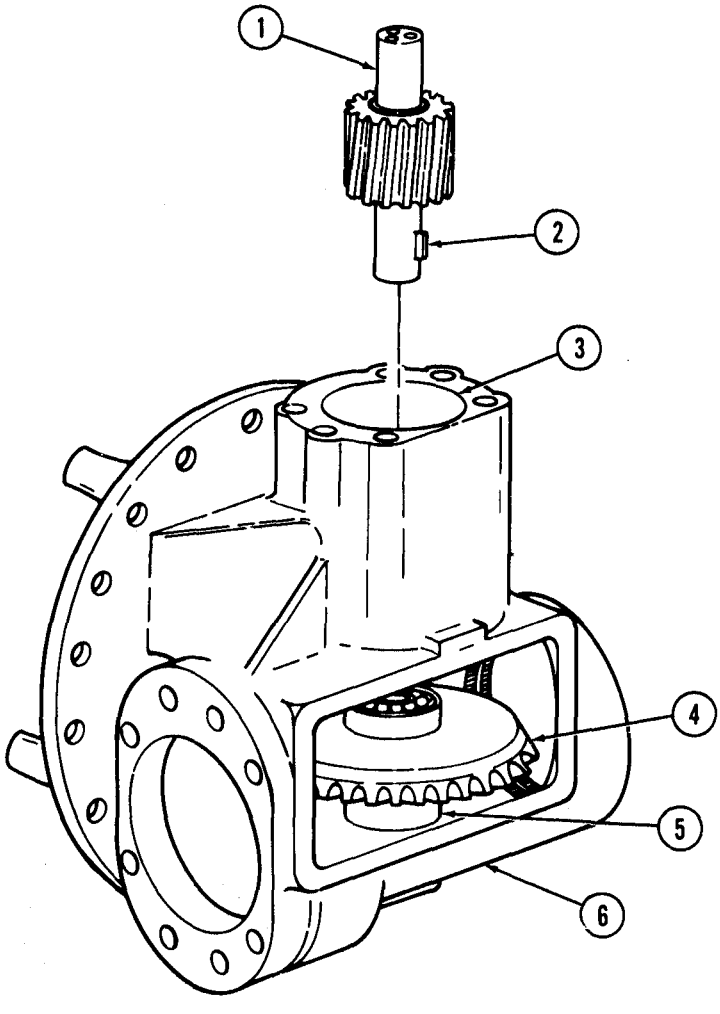
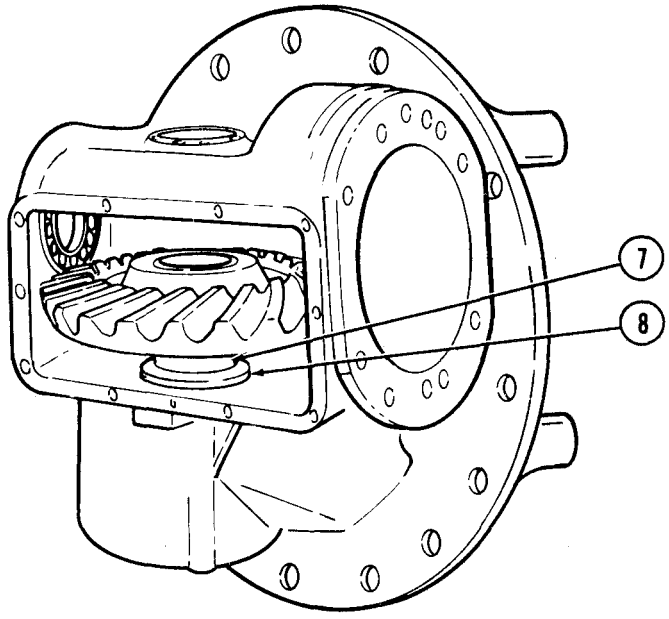
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
107.		Bevel drive gear (4)	Place in differential carrier housing (6).	Hub of gear (4) rests on arbor press adapter (5).
108.		Helical gearshaft (1)	a. Place through bore (3). b. Aline key (2) with drive gear (4) keyway. c. Install in bevel drive gear (4).	Use arbor press. Use stand off to hold gear (4) up from case.
109.		Adapter (5)	Remove.	
110.		Differential carrier housing (6)	Turn over with bore (3) on bottom side.	

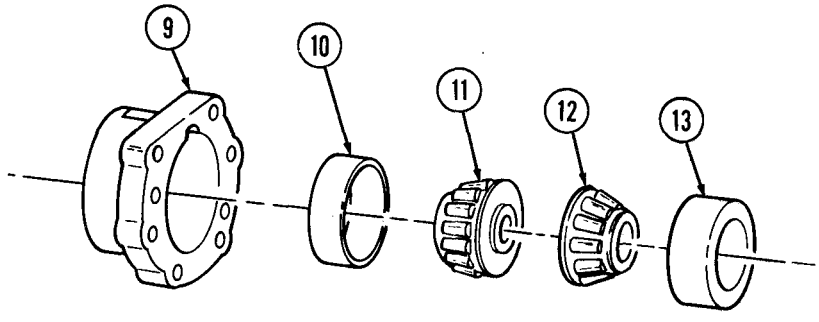


9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
111.		Bearing (7)	Install in sleeve (8).	



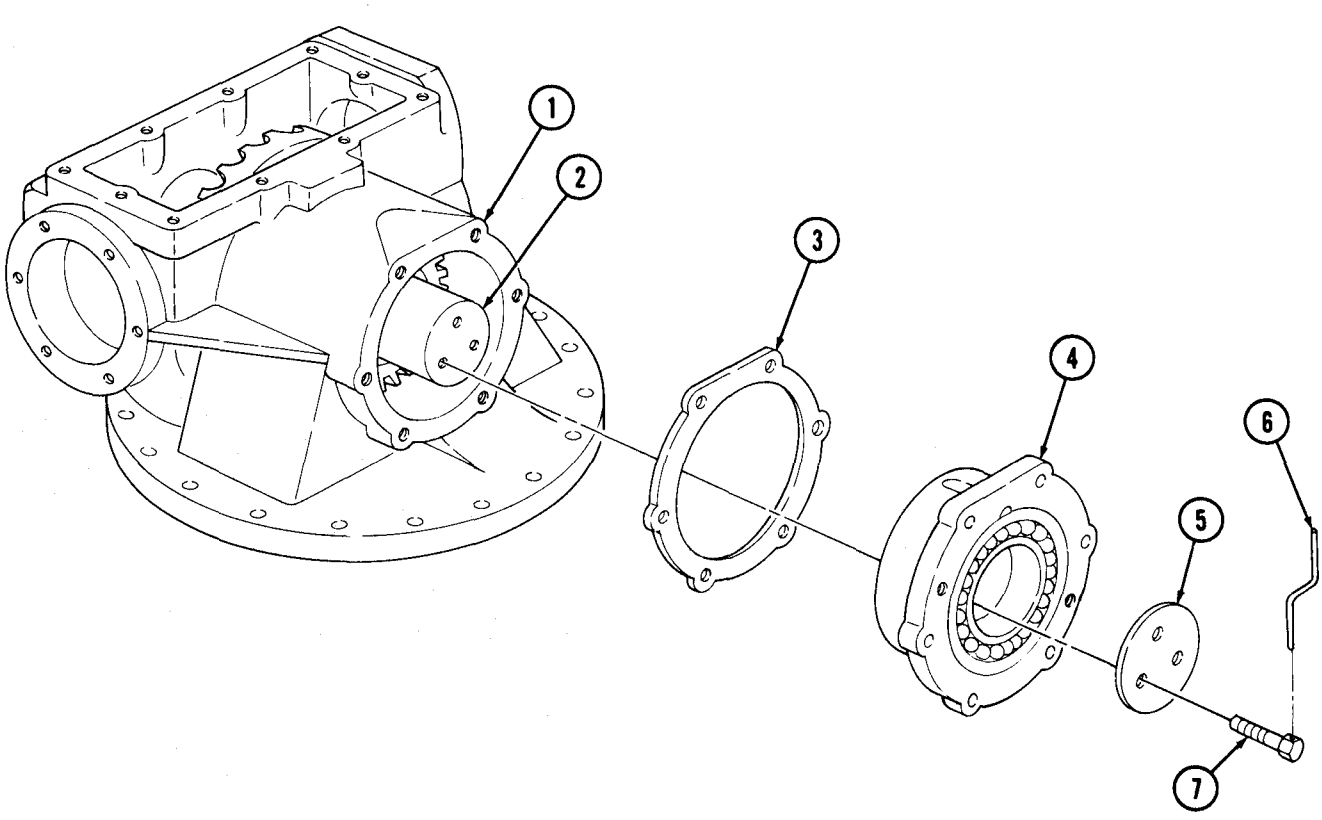
112.		Inner bearing cup (10)	Install in cap (9).	Thick side of cup (10) must face cap (9) bore outer side. Use bearing remover/ replacer.
113.		Inner bearing (11) and outer bearing (12)	Install in cap (9).	Wide ends must face each other.
114.		Outer bearing cup (13)	Install in cap (9).	Use bearing remover/ replacer.



TA 350659

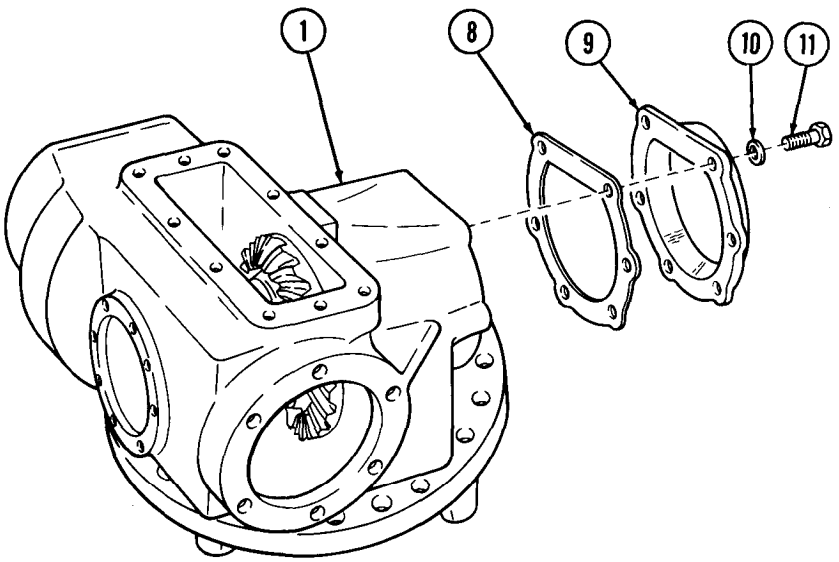
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
115.		New shims (3)	Place needed number on differential carrier housing (1) and aline holes.	Start with same number of shims (3) removed.
116.		Cap assembly (4)	a. Place over end of helical gearshaft (2) and aline holes.	Use alinement bolts.
			b. Press in place.	Use arbor press.
117.		Retaining plate (5)	Install with three screws (7).	Tighten 42-54 lb-ft (57-73 N·m).
118.		New safety wire (6)	Install on three screws (7).	



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
119.		New shims (8) and outer bearing cover (9)	Position on differential carrier housing (1) with holes alined.	Select same number shims (8) removed.
120.		Six new lockwashers (10) and screws (11)	Install.	Tighten 60-100 lb-ft (81-136 N·m).



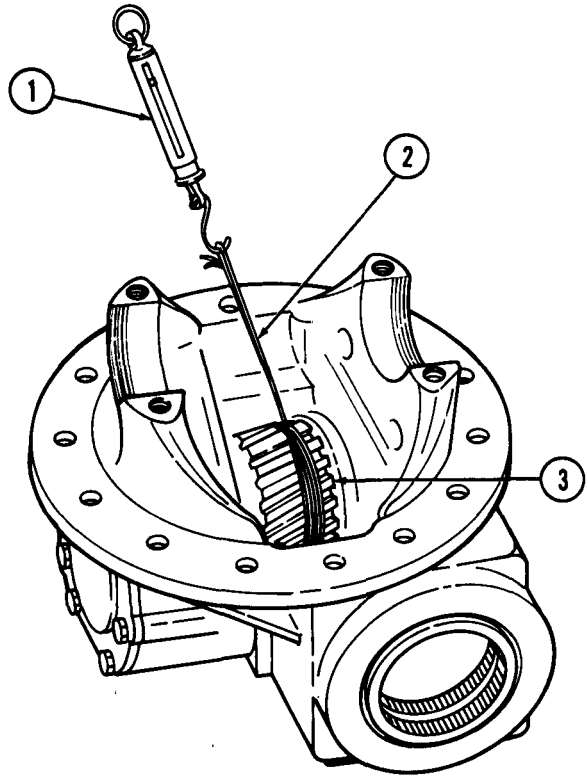
TA 350661

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
121.		String (2)	a. Wrap around helical gear shaft (3). b. Connect to bearing preload pound scale (l).	
122.		Preload pound scale (1)	Pull to check preload.	Original bearings must be preloaded at 4 to 8 lb-in. (0.5 to 0.9 N·m). Pull on scale (1) must be 1.5 to 3 lbs (0.681 to 1.362 kg). New bearing preload must be 12 to 18 lb-in. (1.4 to 2.0 N·m). Pull on scale (1) must be 4.5 to 6.7 pounds (2.04-3.041 kg).

NOTE

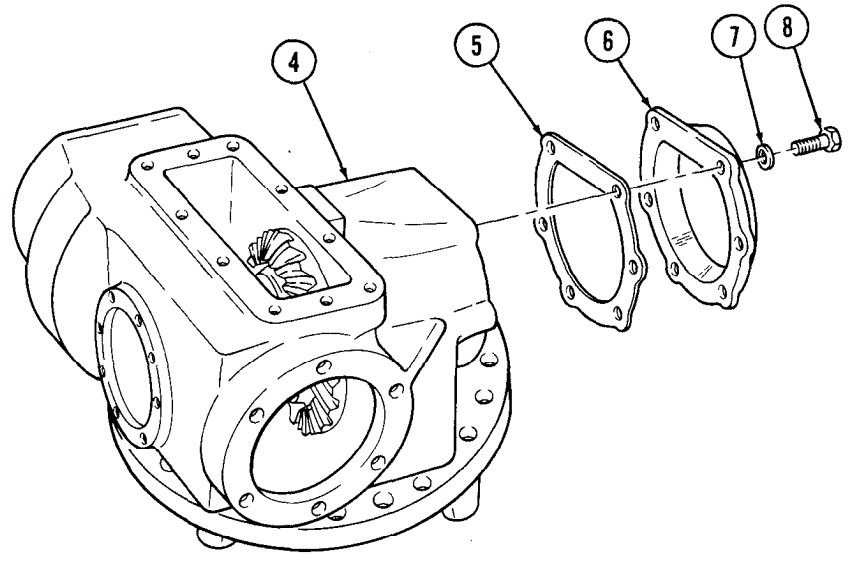
- If preload is not within given limits, do steps 123 through 126.
- If preload is within given limits, go on to step 127.



TA 350662

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

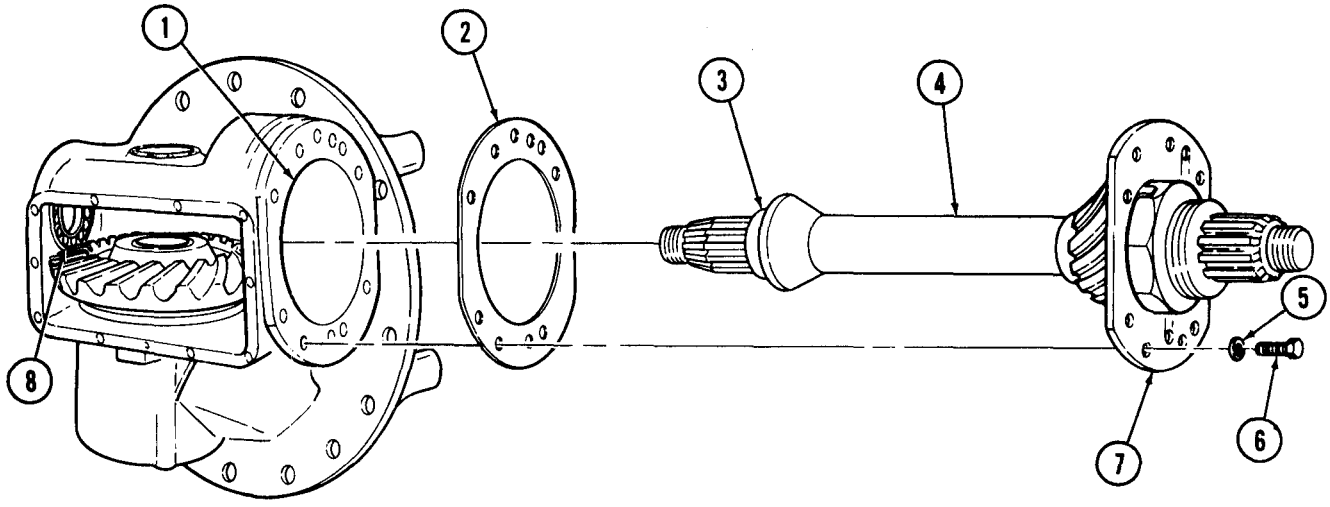
STEP No.	LOCATION	ITEM	ACTION	REMARKS
123.	Differential carrier housing (4)	Six screws (8) and lockwashers (7)	Remove.	
		CAUTION Do not jam any tool between bearing cap assembly and outer bearing cover. Shims will be damaged.		
124.		Outer bearing cover (6)	Remove.	Tap only on outer edge of cover (6).
125.		Shims (5)	a. If preload check was more than given limits, add shims (5) or use thicker shim.	Use gasket and shim kit.
			b. If preload check was less than given limits, reduce number of shims (5) or use thinner shim.	Use gasket and shim kit.
126.		Shims (5) and outer bearing cover (6)	a. Install with six lockwa.shers (7) and screws (8).	
			b. Repeat steps 121 and 122 until preload is correct.	



TA 350663

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
127.		Drive shaft assembly (4), retainer (7), and shims (2)	a. Insert in differential housing bore (1). b. Aline inner race (3) with bearing (8). c. Aline holes.	Start with same number of shims removed.
128.		Eight washers (5) and screws (6)	Install.	Tighten 93-120 lb-ft (126-163 N·m).



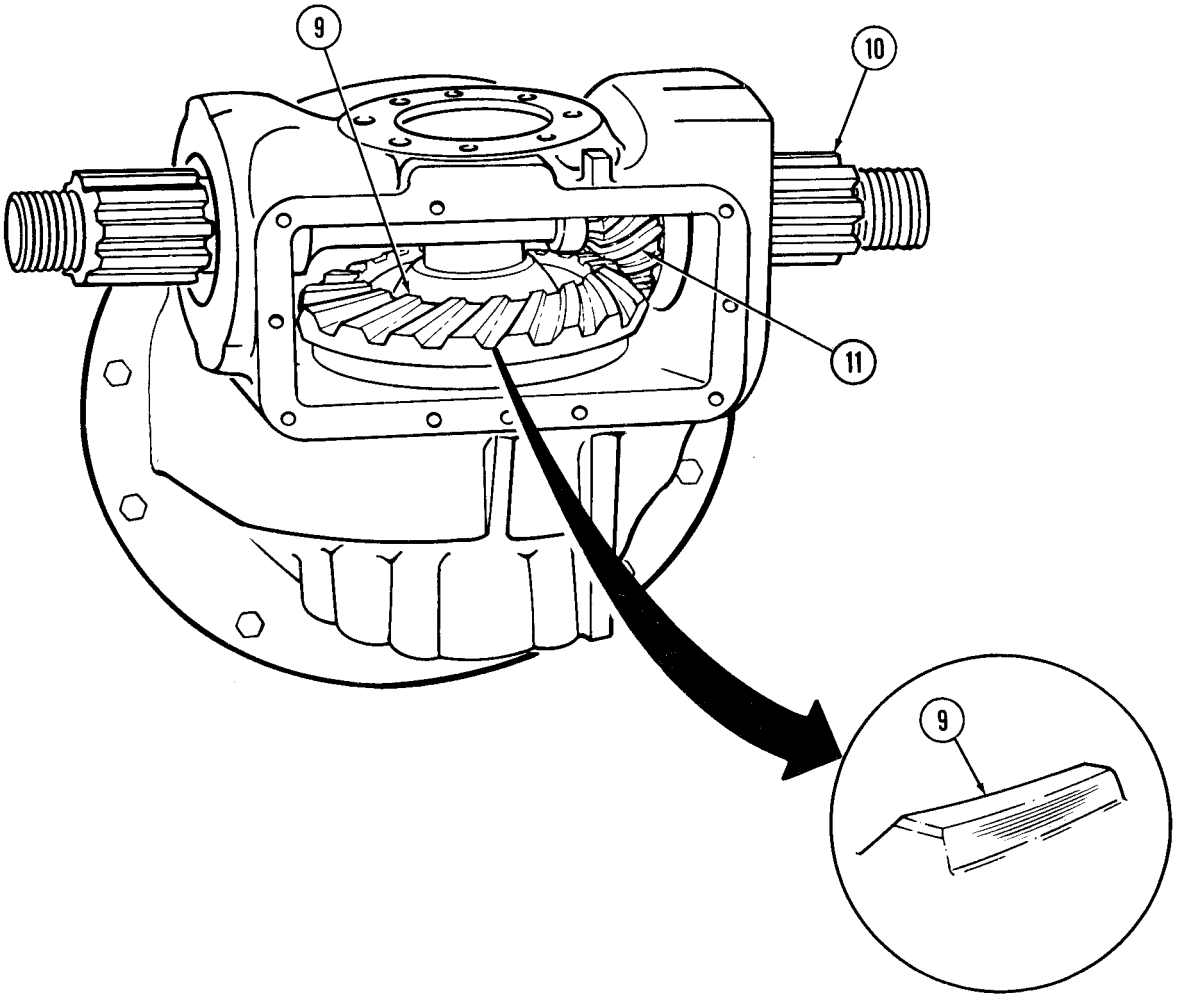
TA 350664

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
129.		Three bevel gear (11) teeth (9)	Coat with prussian blue.	
130.		Main shaft (10)	Turn and check pattern on drive gear teeth (9).	Pattern should be centered and cover two-thirds of gear teeth (9).

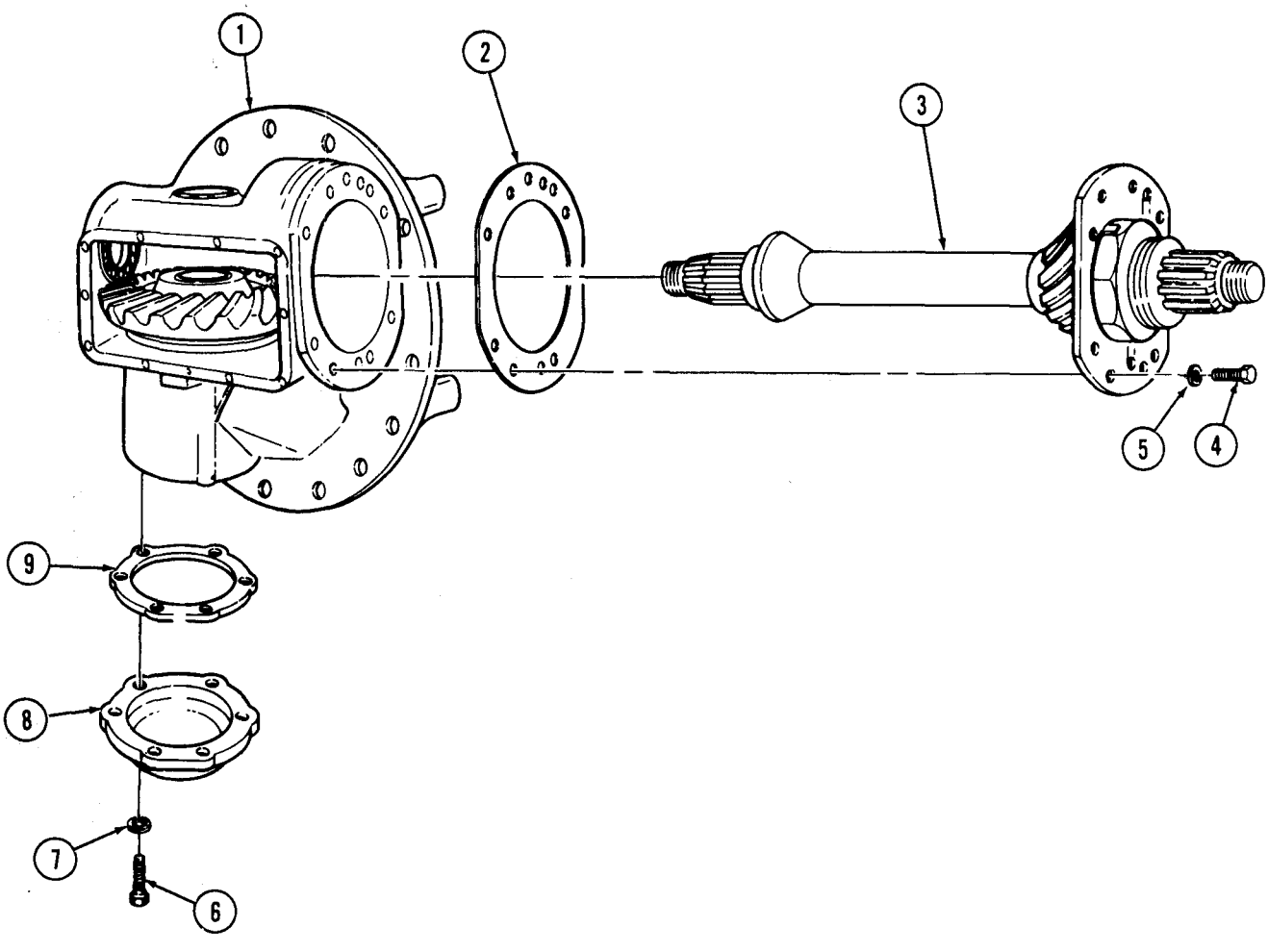
NOTE

- If pattern is not correct, do steps 131 through 147.
- If pattern is correct, go to step 148.



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

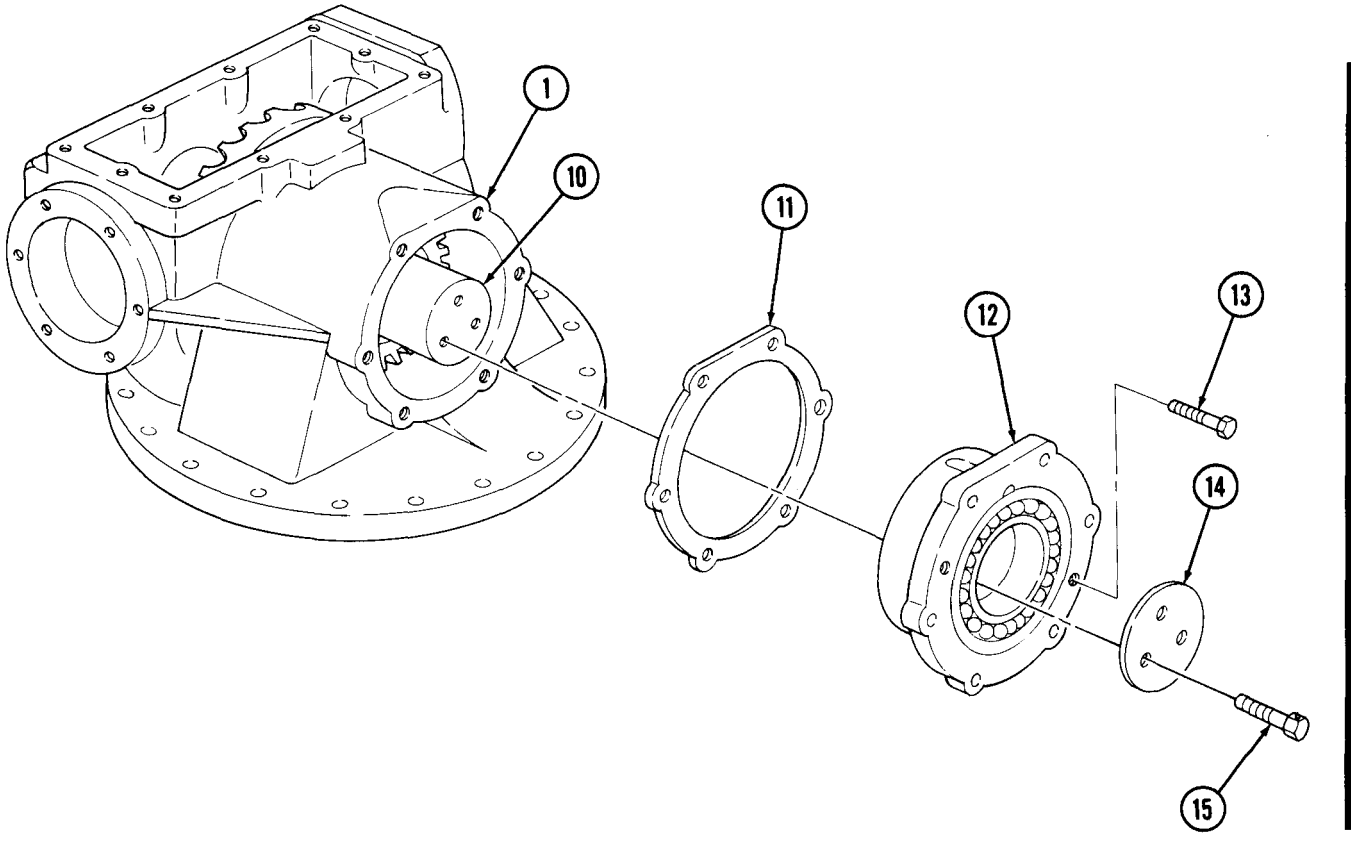
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
131.	Differential earner housing (1)	Eight screws (4) and washers (5)	Remove.	
		CAUTION Do not jam any tool between differential housing and bearing retainer shims when removing shaft assembly. Shims will be damaged.		
132.		Drive shaft assembly (3) and shims (2)	Remove.	
133.		Six screws (6) and washers (7)	Remove.	
134.		Cover (8) and shims (9)	Remove.	Tag shims (9) for installation.



TA 350666

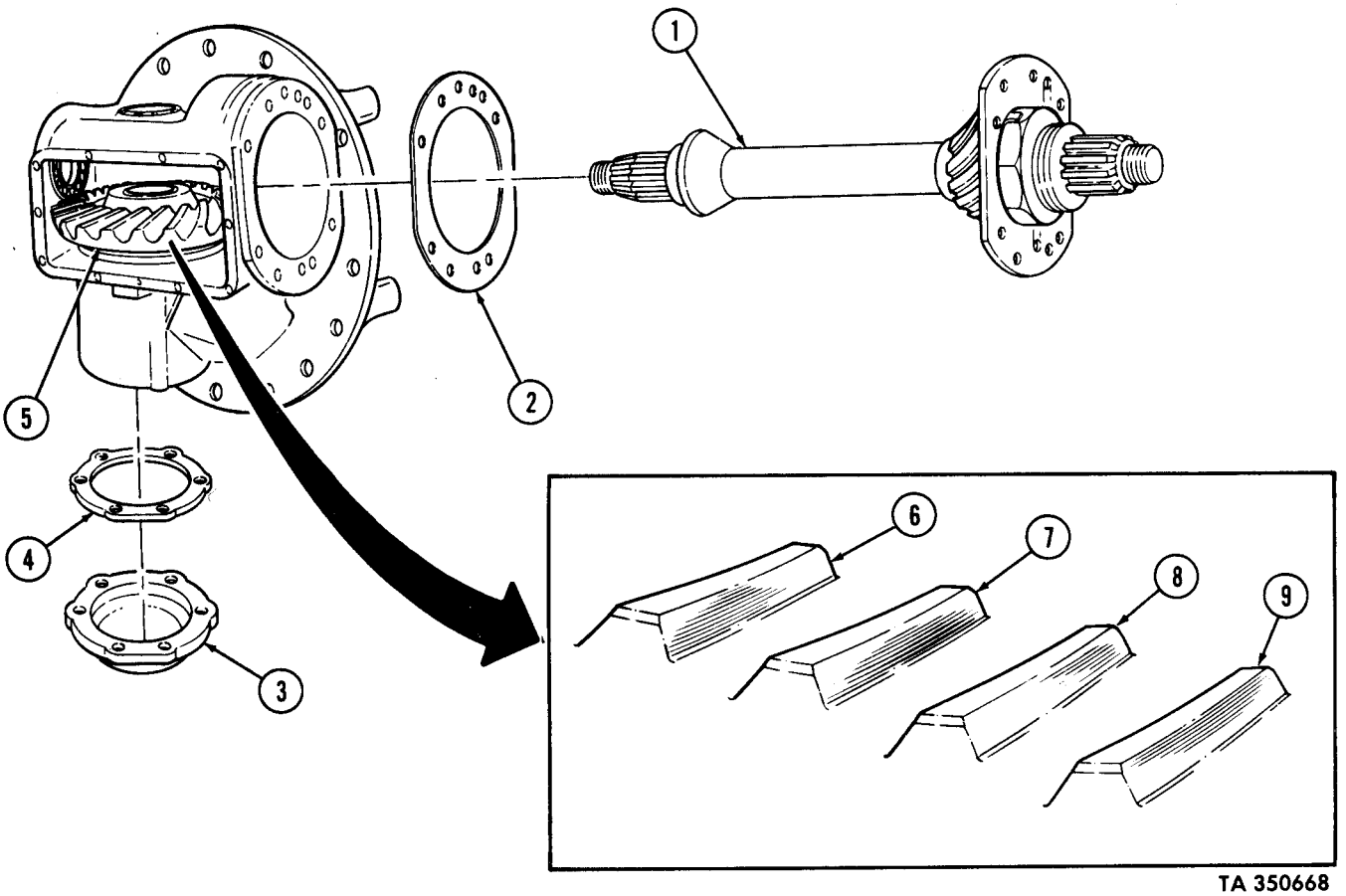
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
135.	Helical gearshaft (10)	Three screws (15) and retaining plate (14)	Remove.	
136.	Cap assembly (12)	Two puller screws (13)	a. Install in jacking holes. b. Tighten until cap assembly (12) is free of helical gearshaft (10).	
137.	Differential carrier housing (1)	Cap assembly (12) and shims (11)	Remove.	
138.	Cap assembly (12)	Two puller screws (13)	Remove.	



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

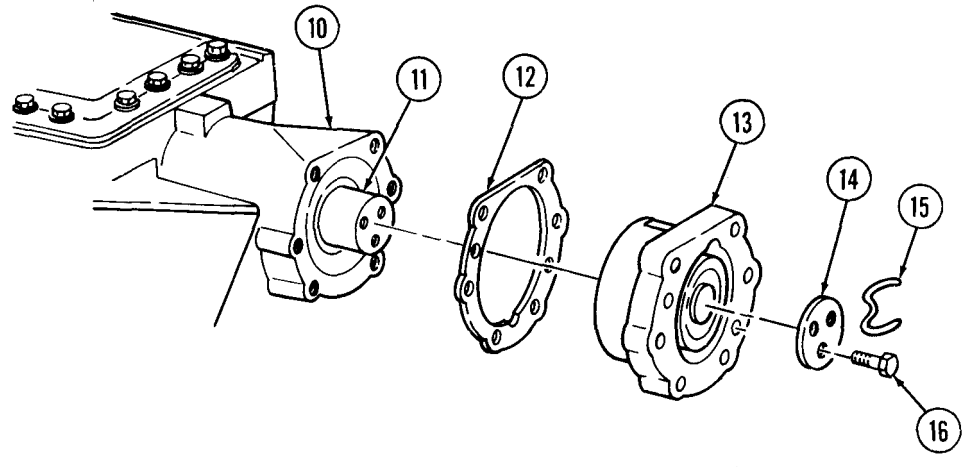
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
139.		Hypoid drive gear (5)	a. If tooth pattern, checked in step 130, looked like patterns 6 or 7, do step 140.	
			b. If tooth pattern looked like patterns 8 or 9, do step 141.	
140.		Driveshaft assembly (1) and cap assembly (3)	a. Remove one shim from shims (2) or use thinner shim.	Use gasket and shim kit.
			b. Add one shim to shims (4) or use thicker shim.	Use gasket and shim kit.
141.		Driveshaft assembly (1) and cap assembly (3)	a. Add one shim to shims (2) or use thicker shim.	Use gasket and shim kit
			b. Remove one shim from shims (4) or use thicker shim.	Use gasket and shim kit.



TA 350668

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

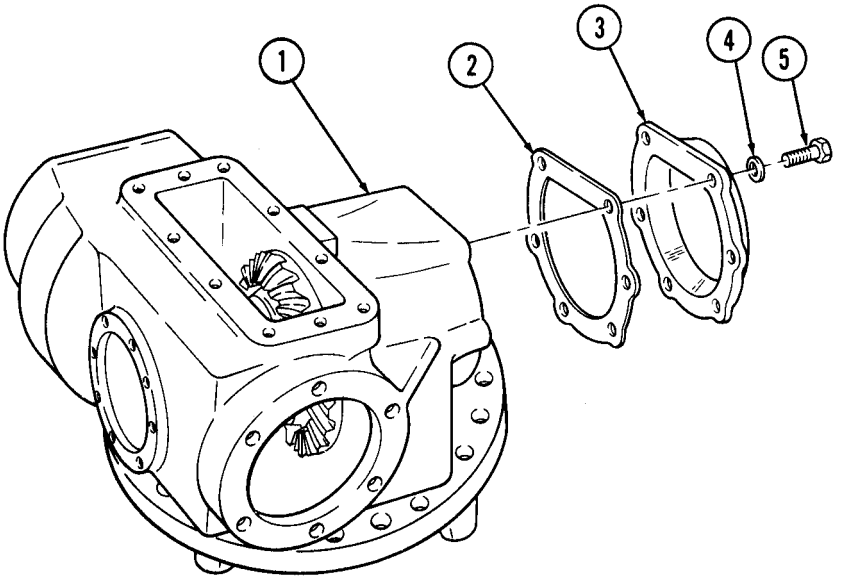
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
142.		Shims (12)	Place on differential carrier housing (10) and aline holes.	
143.		Cap assembly (13)	a. Place over end of helical gearshaft (11) and aline holes.	Use alinement bolts.
			b. Press in place.	Use arbor press.
143.1.		Bevel gear (5)	Turn and check bevel gear (5) backlash.	Backlash should be between 0.005 and 0.015 in. (0.1270 and 0.3810 mm).
144.		Retaining plate (14)	Install with three screws (16).	Tighten 42-54 lb-ft (57-73 N·m).
145.		Safety wire (15)	Install on three screws (16).	



TA 350669

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

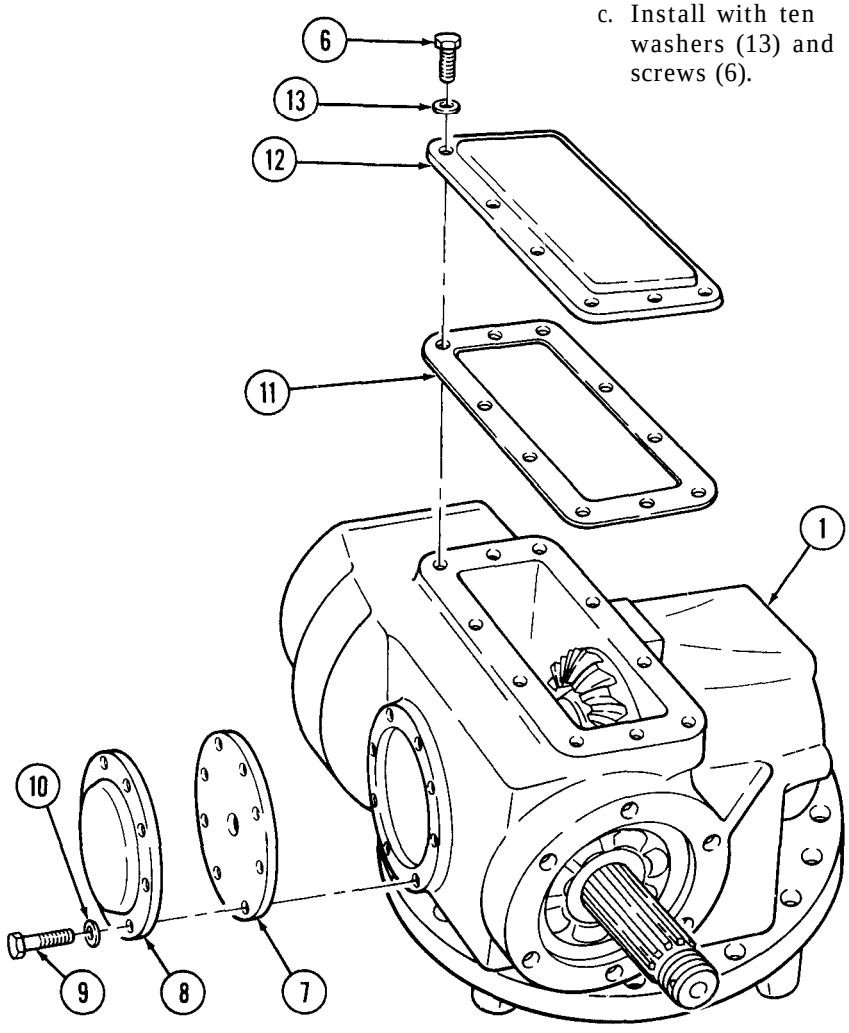
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
146.		Shims (2) and outer bearing cover (3)	Position on differential carrier housing (1) with holes alined.	
147.		Six lockwashers (4) and screws (5)	a. Install. b. Repeat steps 129 and 130 until pattern is correct.	Tighten 60-100 lb-ft (81-136 N·m).



TA 350670

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

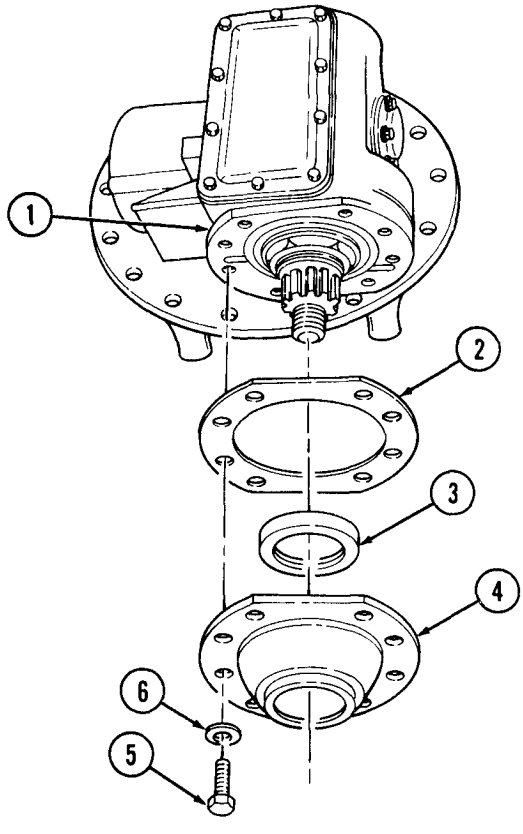
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
148.		New gasket (7)	a. Coat with light film of sealing compound. b. Place on differential carrier housing (1) and aline holes.	Use permatex no. 2.
149.		Side cover (8)	Install with eight washers (10) and screws (9).	Tighten 27-40 lb-ft (37-54 N·m).
151.		Access cover (12) and gasket (11)	a. Coat gasket (11) with light film of sealing compound. b. Position on differential carrier housing (1) and aline holes. c. Install with ten washers (13) and screws (6).	Use permatex no. 2. Tighten 27-40 lb-ft (37-54 N·m).



TA 350671

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

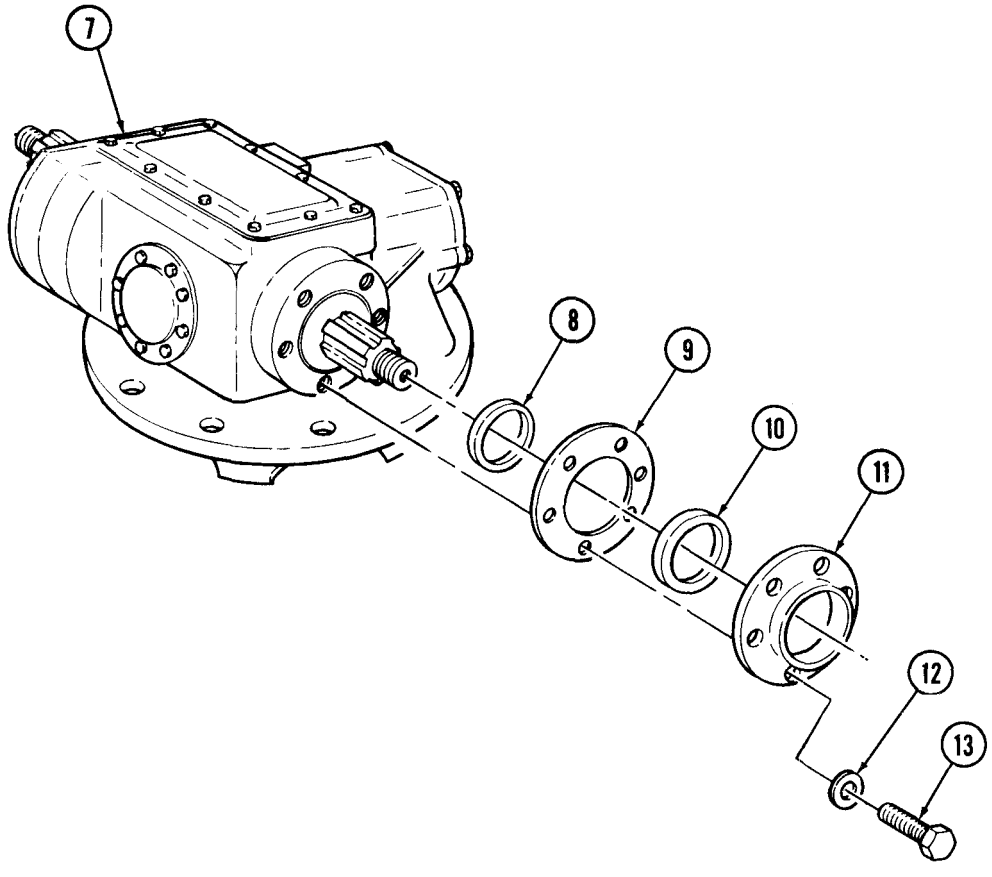
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
152.		New oil seal (3)	a. Lubricate inside diameter with GAA grease.	
			b. Coat outside diameter with sealing compound.	Use loctite RC/640.
			c. Press into front bearing cover (4).	
153.		New gasket (2)	a. Coat with light film of sealing compound.	Use permatex no. 2
			b. Place on bearing retainer (1) and aline holes.	
154.		Front bearing cover (4) with oil seal (3)	Install over gasket (2) with eight washers (6) and screws (5).	Tighten 93-120 lb-ft (126-163 N·m).



TA 350672

9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
155.		New oil seal (10)	a. Lubricate inside diameter with GAA grease.	
			b. Coat outside diameter with sealing compound.	Use loctite RC/640.
			c. Press into rear bearing cover (11).	
156.		New gasket (9)	a. Coat with light film of sealing compound.	Use permatex no. 2.
			b. Place on differential carrier housing (7) and aline holes.	
157.		Thrust washer (8) and rear bearing cover (11) with oil seal (10)	Install over gasket (9) with six new lock-washers (12) and screws (13).	Tighten 24-40 lb-ft (33-54 N·m).

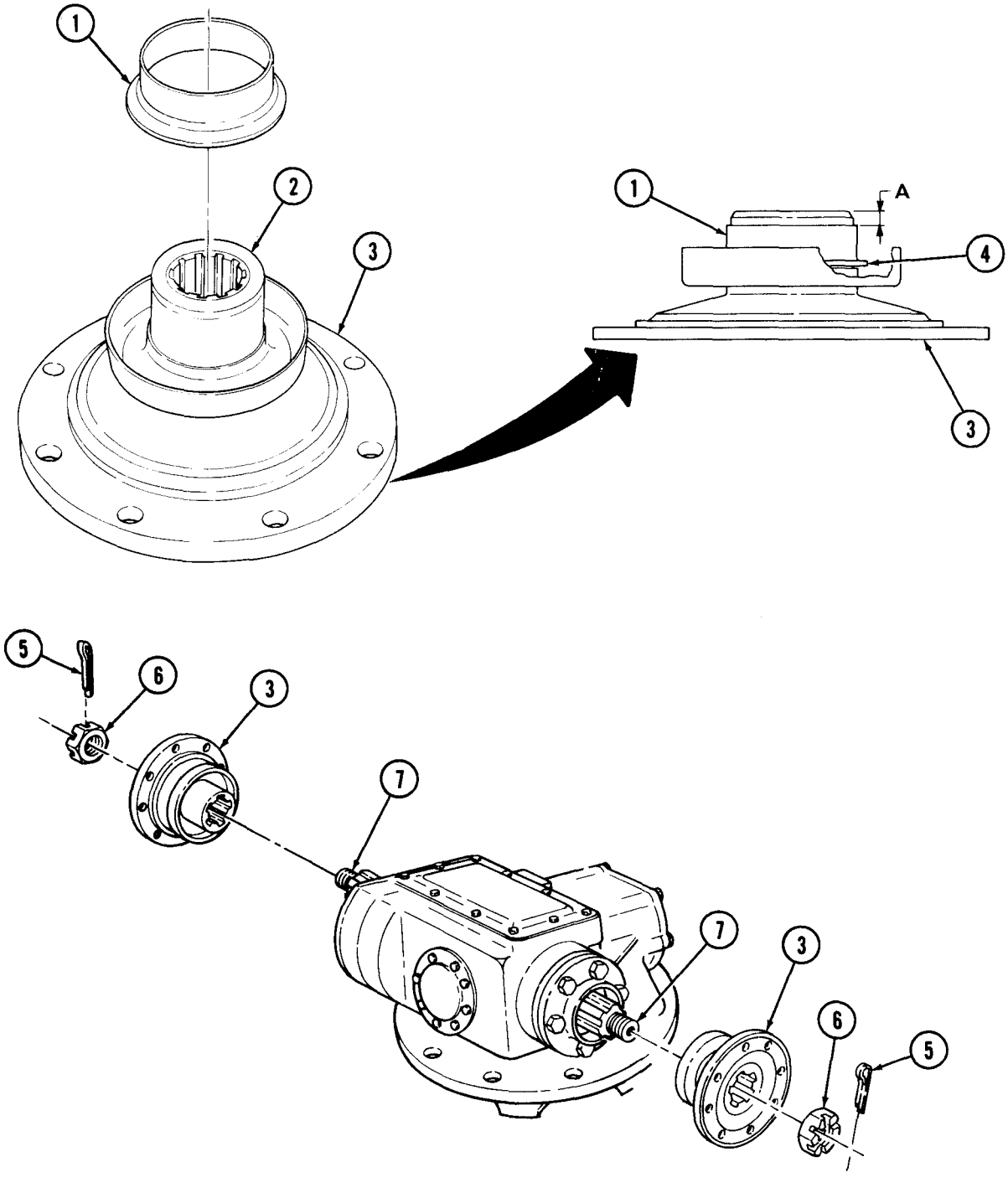


9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • All companion flanges must be installed with wear sleeve. • Perform step 157.1 for front differential carrier. • Perform step 157.2 for rear differential carrier.		
157.1.		New wear sleeve (1)	a. Install on companion flange (3) 0.25 in. (6.35 mm) (distance 'A') from shaft end (2). b. Remove flange (4) from wear sleeve (1) at precut line.	
157.2.		New wear sleeve (1)	Install on companion flange (3) 0.125 in. (3.175 mm) (distance 'A' from flange shaft end (2).	
		CAUTION Do not drive companion flanges on drive shaft assembly. Damage to bearings will result.		
158.		Two companion flanges (3)	Install on drive shafts (7) with two nuts (6).	Tighten 300-400 lb-ft (407-542 N·m).
159.		Two new cotter pins (5)	Install in drive shafts (7).	

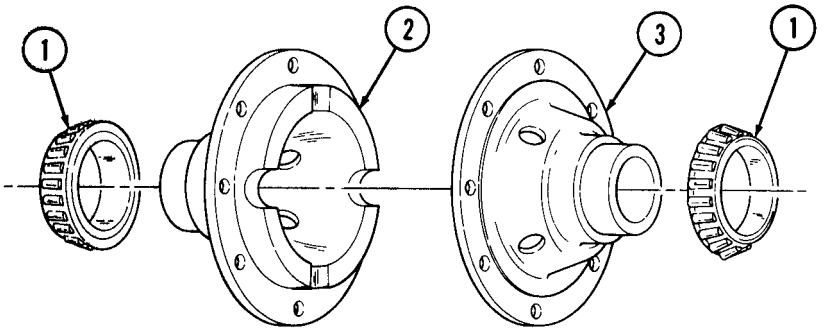
9-8. DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

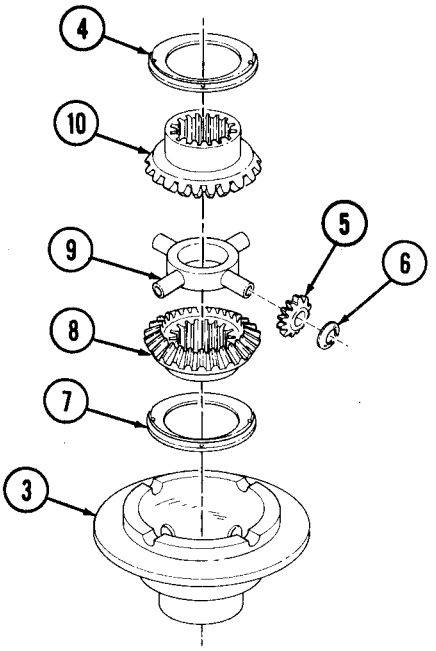


9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
160.		Two bearing cones (1)	Install on differential gear housings (2) and (3).	Use arbor press.
161.		Gear housings (2) and (3)	Lay on bench with flange side up.	

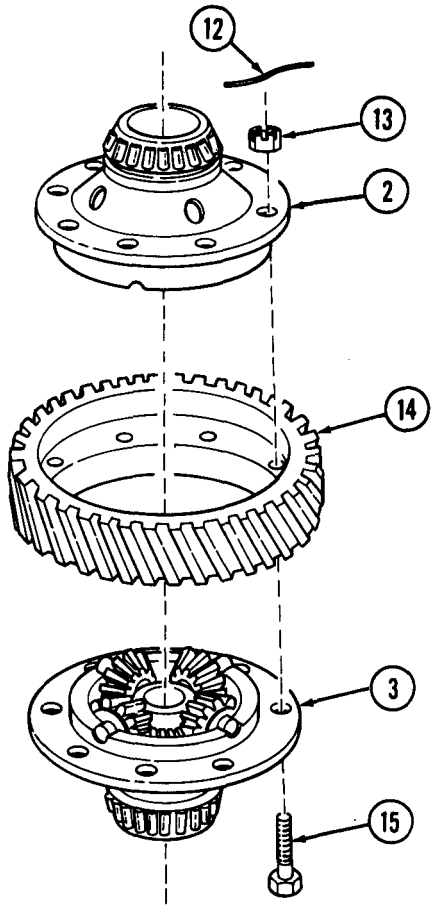


162.		Thrust washer (7) and side gear (8)	Place in gear housing (3).	
163.		Four spider gears (5) and thrust washers (6)	Install on spider (9), and place in gear housing (3).	
164.		Side gear (10) and thrust washer (4)	Place in gear housing (3).	Make sure all gear teeth are in mesh.



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
165.		Helical drive gear (14) and gear housings (2) and (3)	a. Place together as an assembly and aline holes.	Make sure marks, made during disassembly, on gear (14) and housings (2) and (3) aline.
			b. Install with eight screws (15) and nuts (13).	Tighten 130-170 lb-ft (176-231 N·m).
			c. Aline slots in nuts (13) with holes in screws (15).	Tighten nuts (13) as necessary to next slot only.
166.		New safety wire (12)	a. Install through holes in eight screws (15).	
			b. Twist wire (12) ends together until tight.	
			c. Cut excess wire (12) ends.	



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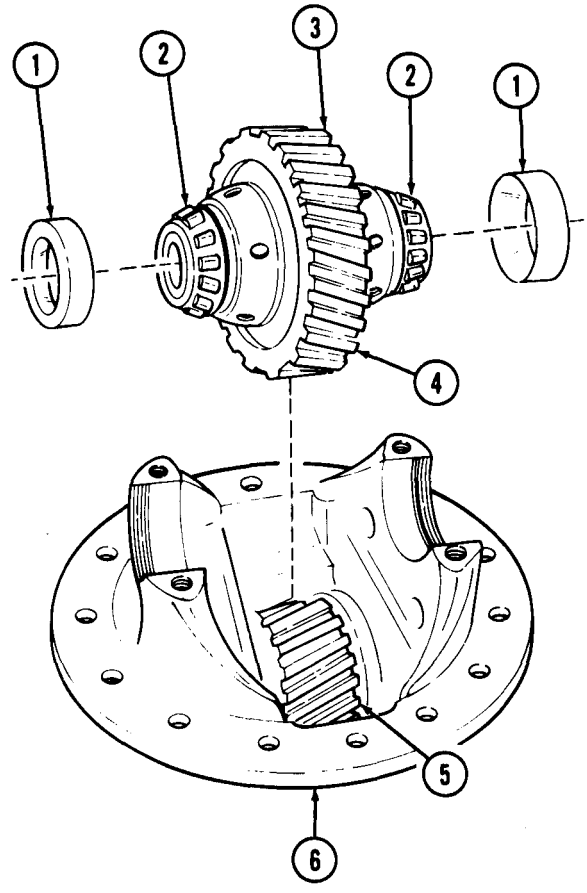
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
167.		Differential carrier gear assembly (3)	Place in differential carrier assembly (6).	Make sure drive gear teeth (4) mesh with pinion gear (5).
168.		Two bearing cups (1)	Install on two bearings (2).	Make sure cups (1) are seated in carrier assembly (6).



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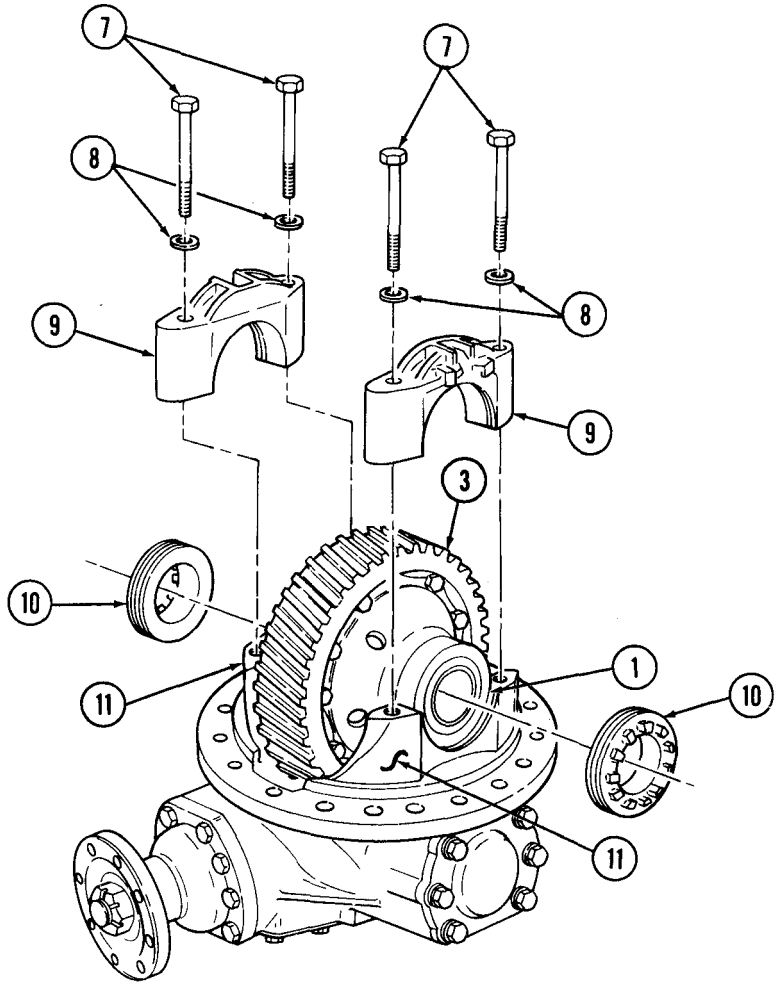
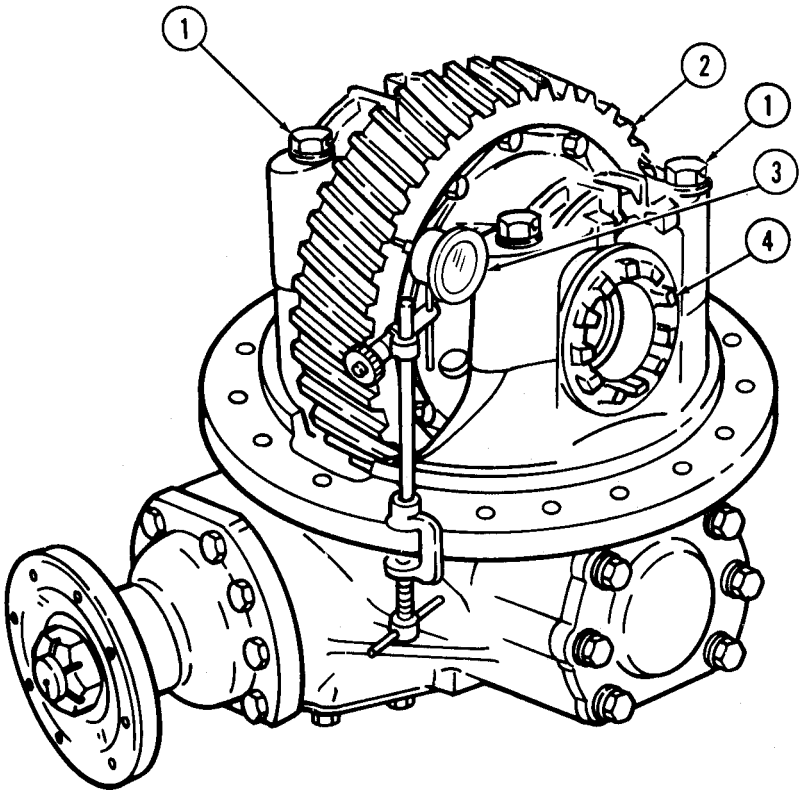
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
169.		Two caps (9)	Place on differential bearing saddle (11) and install with four screws (7) and washers (8).	Finger tighten four screws (7).
170.		Two adjusting nuts (10)	Partially install.	
171.		Four screws (7)	Tighten enough to firmly hold bearing cups (1) in place.	
172.		Two adjusting nuts (10)	Tighten alternately until touching races.	Keep helical gear (3) centered on helical pinion gear (5) pinion while alternately tightening adjusting nuts (10).



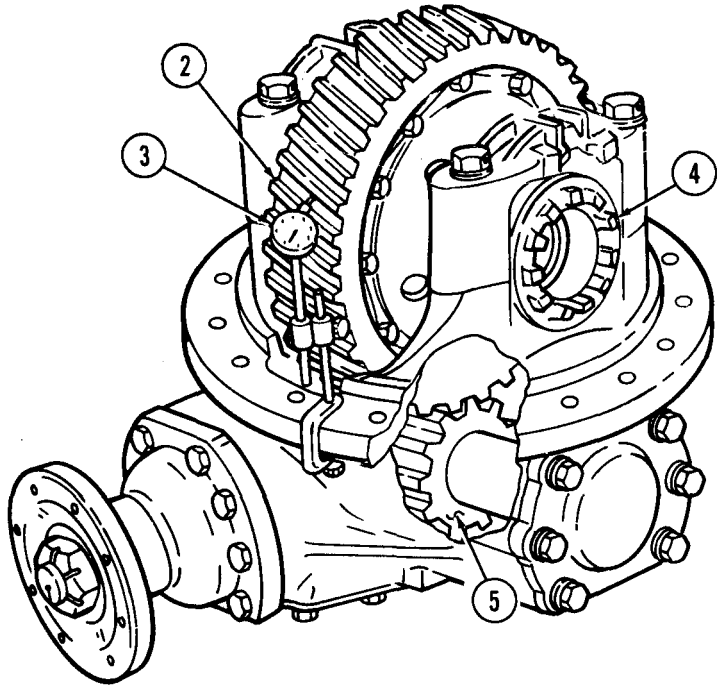
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
173.		Helical drive gear (2)	Turn to seat bearings.	Tighten four screws (1) 310-340 lb-ft (420-461 N·m).
174.		Dial indicator (3)	a. Place against side face of helical drive gear (2). b. Push and pull drive gear (2) and check reading.	
175.		Two adjusting nuts (4)	Tighten gradually while pushing and pulling drive gear (2).	Tighten until dial indicator (3) reading is 0.000 in.
176.		Helical drive gear (2)	Turn in one direction.	Check that runout is 0.008 in. (0.2032 mm) or less. Repeat steps 170 and 171 if more.



9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
177.		Dial indicator (3)	Place against helical drive gear (2) tooth.	
		NOTE Hold helical drive gear to prevent movement when measuring backlash.		
178.		Helical drive gear (2)	Rock back and forth and take reading.	Dial indicator reading should be between 0.009 and 0.020 in. (0.23 and 0.51 mm). If reading is not within 0.009 and 0.20 in. (0.23 and 0.51 mm), replace pinion (5) and helical drive gear (2).



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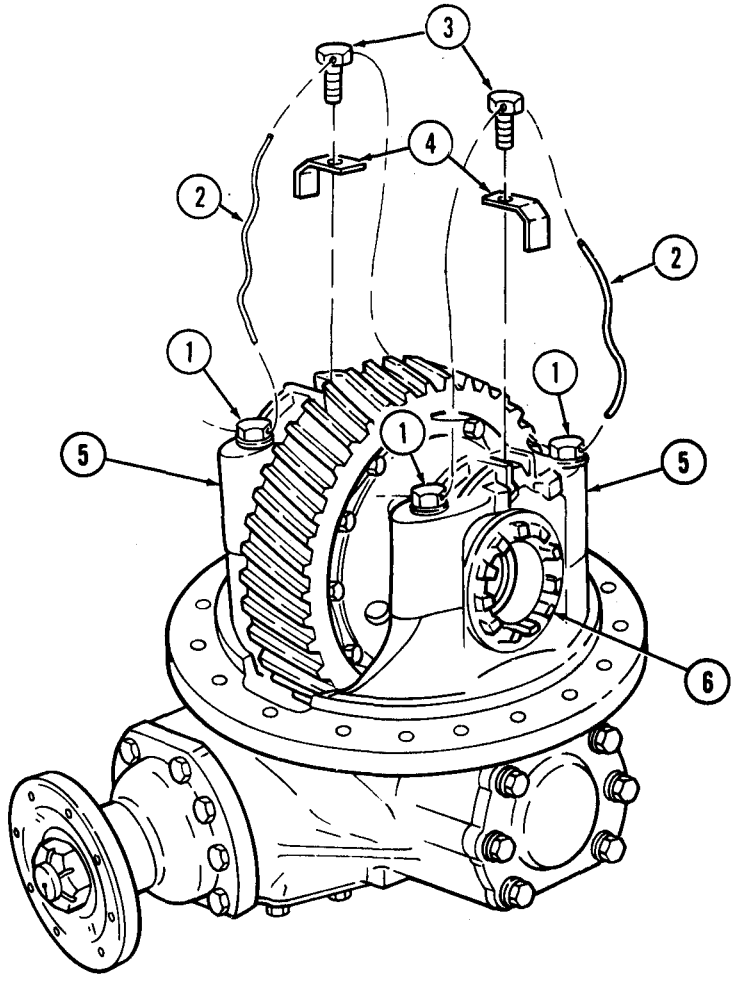
9-8. DIFFERENTIAL AND DIFFERENTIAL CARRIER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
179.		Two nuts (6)	Tighten nuts (6).	Tighten 15-35 lb-in. (1.3-4.0 N·m). Ensure notch of each nut (6) alines with top center of cap (5).
180.		Two adjusting nut locks (4)	Install with two screws (3).	Tighten 66-85 lb-ft (90-115 N·m).
181.		Safety wire (2)	Install on screws (1) and (3).	



END OF TASK!!

FOLLOW-ON TASKS: Install differential carrier assembly:
(para. 9-7, front axle only).
(para. 9-12, rear axle only).

TA 350680

Section III. REAR AXLE MAINTENANCE

9-9. REAR AXLE MAINTENANCE TASK SUMMARY

9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Eight locknuts
Twenty-two lockwashers
Lubricating oil OE/HDO 10 (Appendix C, Item 16)
Sealing tape (Appendix C, Item 30)

Personnel Required
Light-wheeled vehicle mechanic MOS 63W (3)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P
TM 9-2320-358-24&P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-358-24&P

Condition Description
Air reservoirs drained.
CTIS air lines removed from axle (M939A2).

Special Environmental Conditions
None

General Safety Instructions
- Do not attempt to support weight of vehicle on hydraulic jack.
- Do not disconnect air lines before draining air reservoirs.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Weight of vehicle must remain supported on jack stands at all times. Do not attempt to support weight of vehicle on hydraulic jack. Injury to personnel may result if jack fails.

a. Removal

1.		Hydraulic jack (14) with axle fixture	Position under rear-rear axle differential housing (15) and raise vehicle.	
2.		Four wheels (5)	Remove.	Refer to TM 9-2320-272-20-2.
3.		Four jack stands (11)	Position under spring seats (12) and rear-rear axle (4), and lower vehicle until spring seats (12) and axle (4) rests on stands (11).	

9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Front propeller shaft flange (2) to rear-rear companion flange (1)	Eight screws (3) and locknuts (13)	Remove.	Discard locknuts (13) and tie propeller shaft flange (2) up and out of the way.

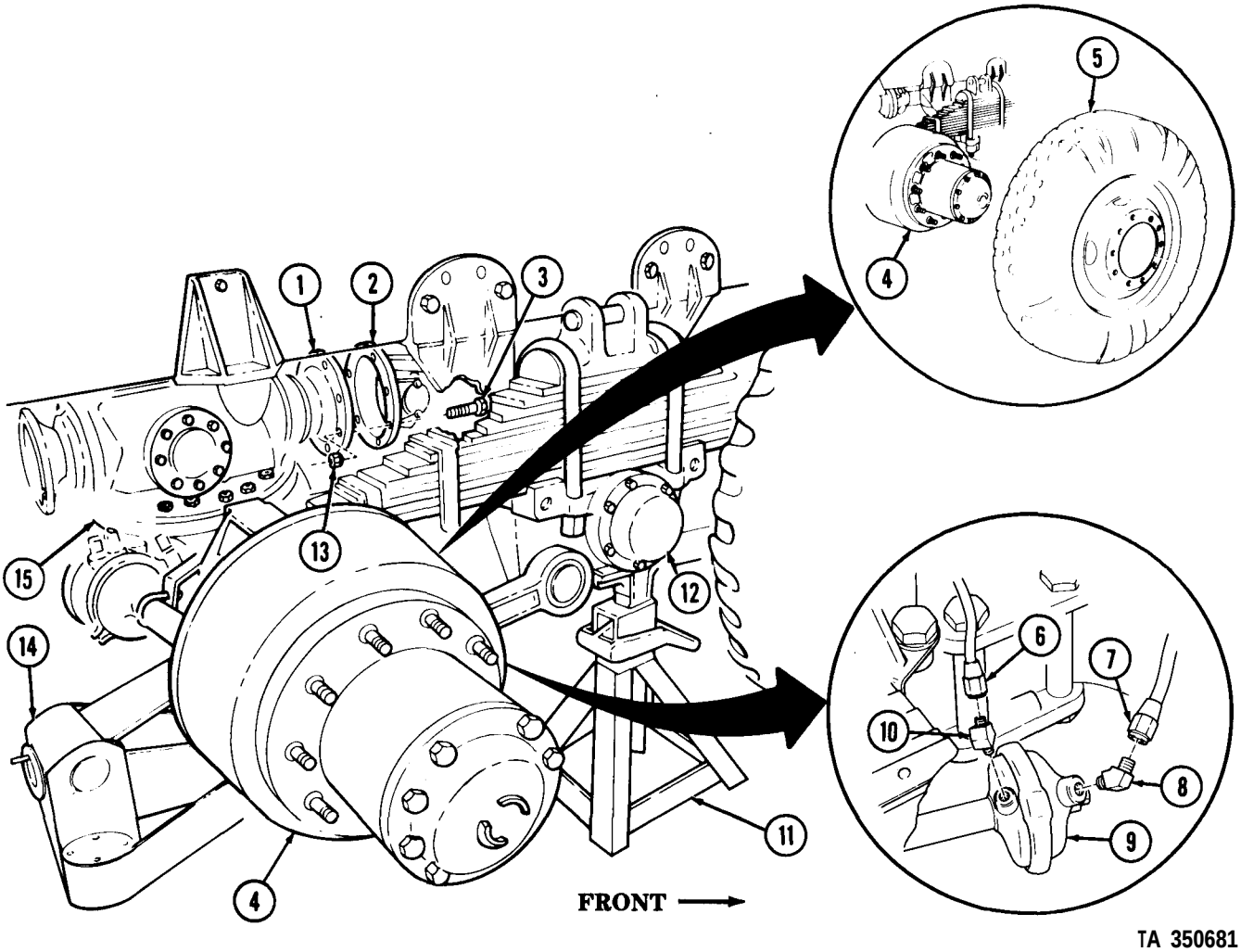
WARNING

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

NOTE

Tag all lines for installation.

5.	Right and left service brake chambers (9)	Two primary lines (7) and vent lines (6)	Disconnect.	
6.		Two adapter elbows (8) and elbows (10)	Remove.	



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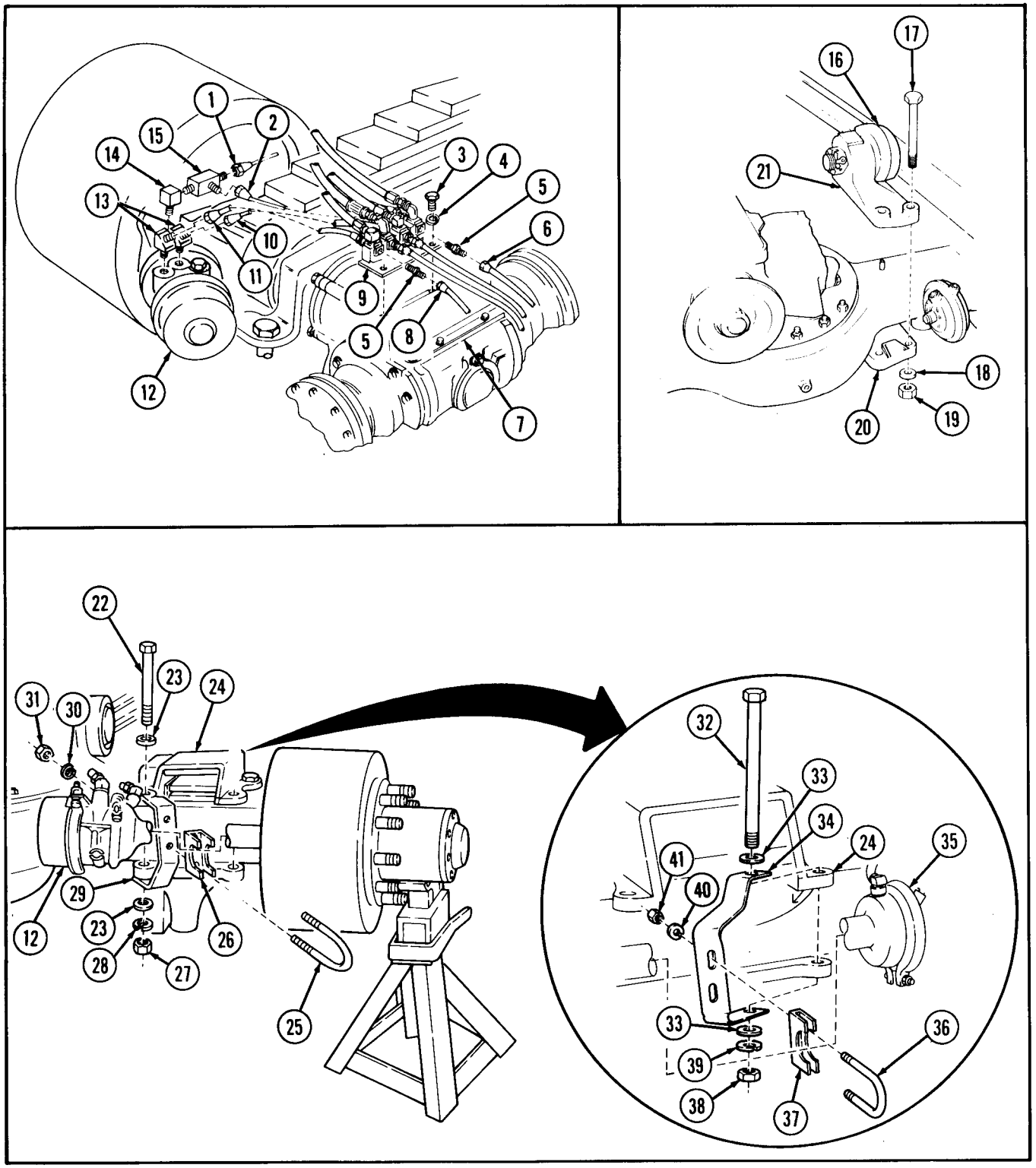
9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Right and left spring brakes (12)	Two vent lines (1), vent lines (2), secondary lines (11), and spring brake override lines (10)	Disconnect.	
8.		Four adapter elbows (13), two elbows (14) and tee fittings (15)	Remove.	
9.	Two adapter fittings (5)	Primary line (6) and secondary line (8)	Disconnect.	
10.	Mounting plate (9)	Two adapter fittings (5)	Remove.	Allows access to screws (3).
11.	Differential housing (7)	Two screws (3) and lockwashers (4), and mounting plate (9)	Remove.	Discard lockwashers (4).
12.	Right and left spring brakes (12)	Four nuts (31) and lockwashers (30), two U-bolts (25) and U-bolt brackets (26)	Remove.	Discard lockwashers (30). Soak nuts (31) in lubricating oil.
		NOTE Assistant will help with step 13.		
13.	Right and left upper spring brackets (24)	Two nuts (27) and lockwashers (28), four washers (23), two screws (22) and brake chamber brackets (29)	Remove.	Discard lockwashers (28).
14.	Right and left service brake chambers (35)	Four nuts (41) and lockwashers (40), two U-bolts (36), and U-bolt brackets (37)	Remove.	Discard lockwashers (40).
		NOTE Assistant will help with steps 15 through 18.		
16.	Upper torque rod bracket (21) to upper torque rod plate (20)	Four nuts (19), lockwashers (18), and screws (17)	Remove.	Discard lockwashers (18). Upper bracket (21) will remain attached to torque rod (16).
16.	Right and left upper spring brackets (24)	Two nuts (38) and lockwashers (39), four washers (33), two screws (32) and brake chamber brackets (34)	Remove.	Discard lockwashers (39).

9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.	Axle housing (4)	Four nuts (6) and lockwashers (5), two screws (2) and right and left upper spring brackets (1)	Remove.	Discard lockwashers (5).
18.	Right and left upper spring brackets (1)	Spring seat wear pads (3)	Remove.	If cracked or pitted, replace pad (3). Refer to TM 9-2320-272-20-1.
		NOTE Assistants will help with step 19.		
19.		Rear-rear axle (10)	a. Remove jackstands (9) that support axle (10). b. Pull axle (10) out from rear of vehicle with hydraulic jack (11) and place on two jack stands (9).	

b. Installation

WARNING

Weight of vehicle must remain supported on jack stands at all times. Do not attempt to support weight of vehicle on hydraulic jack. Injury to personnel may result if jack fails.

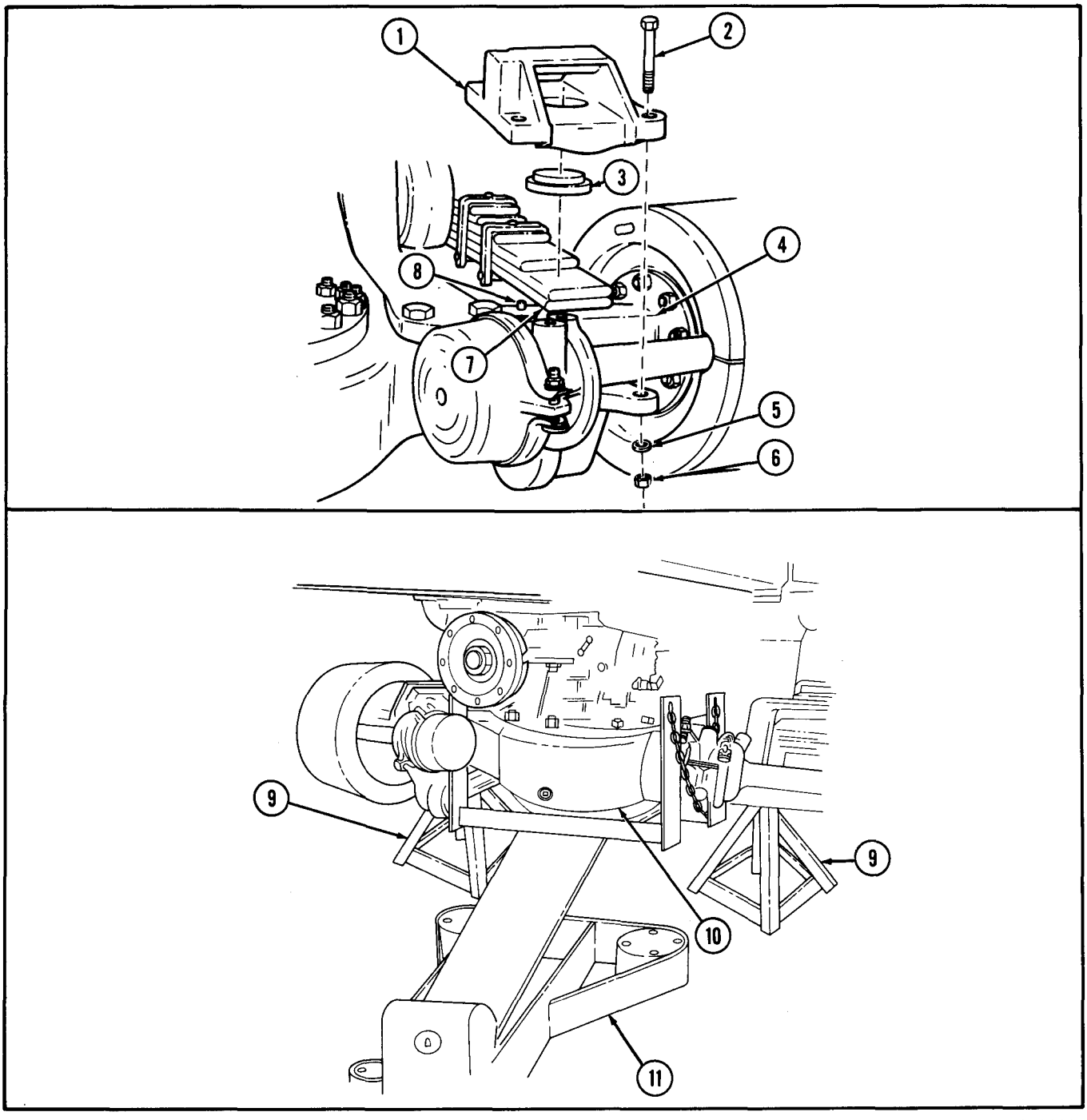
NOTE

Assistants will help with steps 20 through 25.

20.		Hydraulic jack (11) with axle fixture	a. Position under rear-rear axle (10). b. Raise axle (10) until jack stands (9) are clear and remove jack stands (9).
21.		Rear-rear axle (10)	Using hydraulic jack (11), position under springs (7).
22.		Left and right spring seat wear pads (3)	Install in left and right upper spring brackets (1).

9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
23.		Left and right upper spring brackets (1)	a. Slide onto leaf spring assemblies (7) and place on axle housing (4) over dowel pin (8).	



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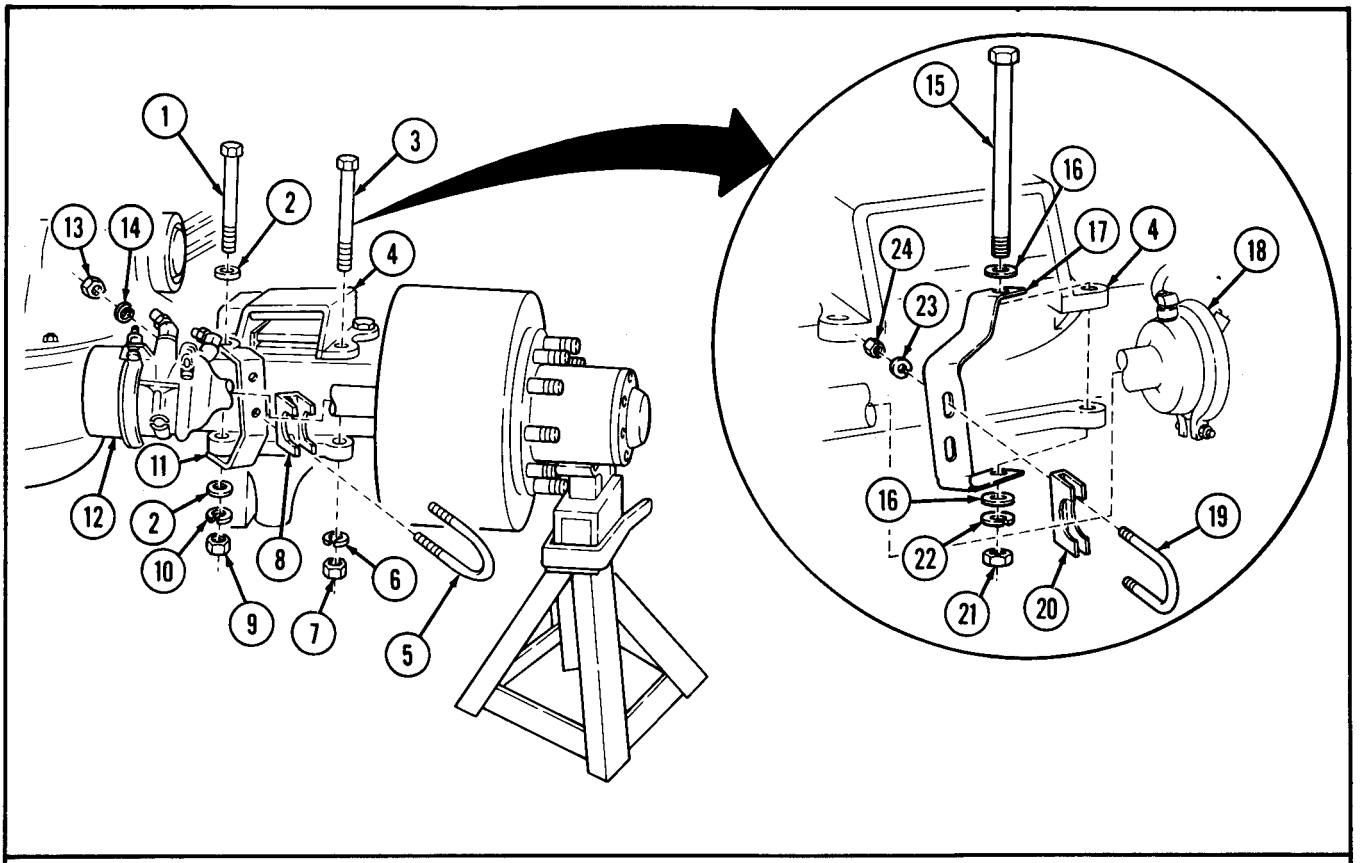
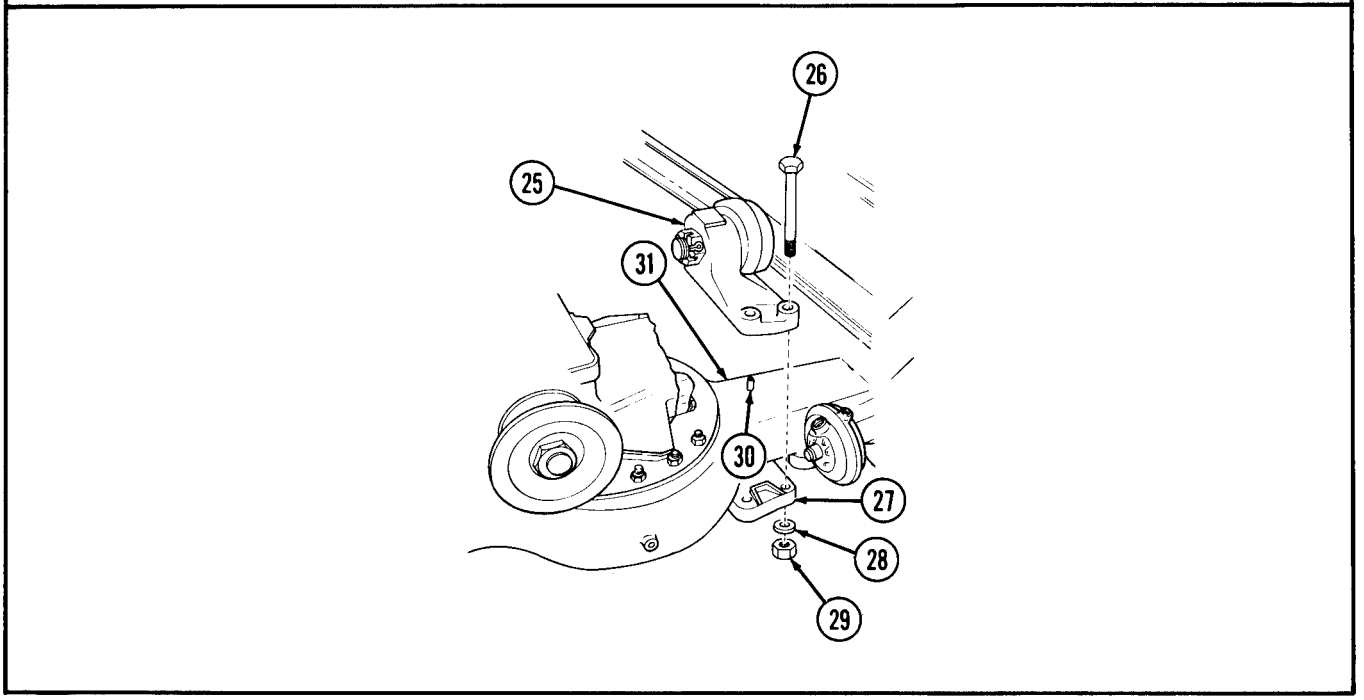
9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			b. Install each upper spring bracket (4) with two screws (3), new lockwashers (6), and nuts (7).	Finger tighten only.
24.		Left and right service brake chamber brackets (17)	Install each with screw (15), two washers (16), new lockwasher (22) and nut (21).	Finger tighten only.
25.		Upper torque rod bracket (25)	Install to upper torque rod plate (27) with four screws (26), new lockwashers (28), and nuts (29).	Dowel pin (30) positions torque rod bracket (25) on axle housing (31).
26.		Left and right U-bolt brackets (20)	Install each to service brake chamber (18) with U-bolt (19), two new lockwashers (23), and nuts (24).	
			NOTE Assistant will help with step 27.	
27.		Left and right spring brake brackets (11)	a. Install each with screw (1), two washers (2), new lockwasher (10), and nut (9).	
			b. Tighten two nuts (7), nut (21), and nut (9).	Tighten 350-375 lb-ft (475-509 N·m).
28.		Left and right U-bolt brackets (8)	a. Loosely assemble U-bolt brackets (8) to spring brake brackets (11) with U-bolt (5), and two lockwashers (14) and nuts (13).	
			b. Install brackets (8) to right and left spring brakes (12).	

9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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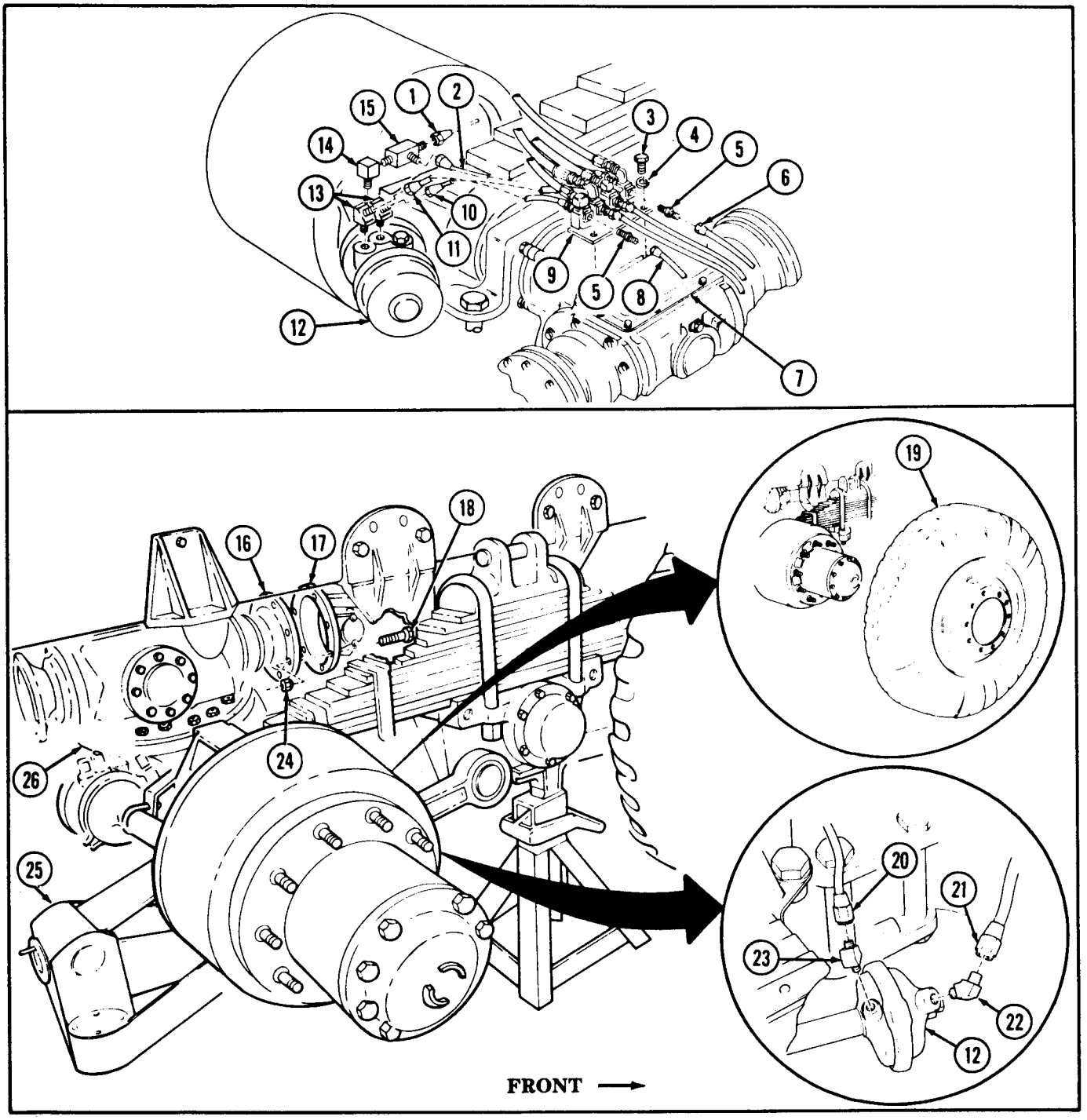
9-10. REAR-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
29.		Mounting plate (9)	Install to differential housing (7) with two new lockwashers (4) and screws (3).	
		NOTE		
		All male pipe threads must be wrapped with sealing tape before installation.		
30.		Two adapter fittings (5)	Install.	
31.		Primary line (6) and secondary line (8)	Connect to adapter elbows (13), elbow (14), and tee (15).	
32.		Two adapter elbows (13), elbow (14), and tee (15)	Install each to spring brake chambers (12).	
33.		Vent line (1), vent line (2), spring brake overide line (10) and secondary line (11)	Connect each to spring brake chambers (12).	
34.		Adapter elbow (22) and elbow (23)	Install each in left and right service brake chambers (12).	
35.		Primary line (21) and vent line (20)	Connect line (21) to adapter elbow (22), and line (20) to elbow (23) in left and right service brake chambers (12).	
		NOTE		
		Assistant will help with step 36.		
36.		Front propeller shaft flange (17)	Install to rear-rear companion flange (16) with eight screws (18) and new locknuts (24).	Tighten 32-40 lb-ft (43-54 N·m).
37.		Four wheels (19)	Install.	Refer to TM 9-2320-272-20-2.
38.		Hydraulic jack (25) with axle fixture	Remove from rear-rear axle assembly (26).	

9-10. REAR-REAR AXLE **ASSEMBLY REPLACEMENT (Cont'd)**

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- For (M939A2) Install CTIS air lines (TM 9-2320-358-24&P).
- Lubricate rear-rear axle (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range. Check for air leaks. Road test vehicle.

9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 TM 9-2320-272-20-2 TM 9-2320-358-24&P	Air reservoirs drained. Forward-rear wheels removed. CTIS airlines removed from axle (M939A2)

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Sixteen locknuts
Twenty-two lockwashers
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W (3)

General Safety Instructions

- Do not attempt to support weight of vehicle on hydraulic jack.
- Do not disconnect air lines before draining air reservoirs.

Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Weight of vehicles must remain supported on jack stands at all times. Do not attempt to support weight of vehicle on hydraulic jack. Injury to personnel may result if jack fails.

a. Removal

1.		Hydraulic jack (8) with axle fixture	Position under forward-rear axle differential housing (7) and raise vehicle.	
2.		Four jack stands (12)	Position under spring seats (13) and wheel hubs (9), and lower vehicle until resting on stands (12).	Leave jack (8) in place to support forward-rear axle and differential housing (7).
3.	Front companion flange (4) to propeller shaft flange (5)	Eight screws (6) and locknuts (10)	Remove.	Discard locknuts (10) and tie propeller shaft flange (6) up and out of the way.

9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Rear companion flange (3) to rear propeller shaft flange (2)	Eight screws (1) and locknuts (11)	Remove.	Discard locknuts (11) and tie propeller shaft flange (2) up and out of the way.

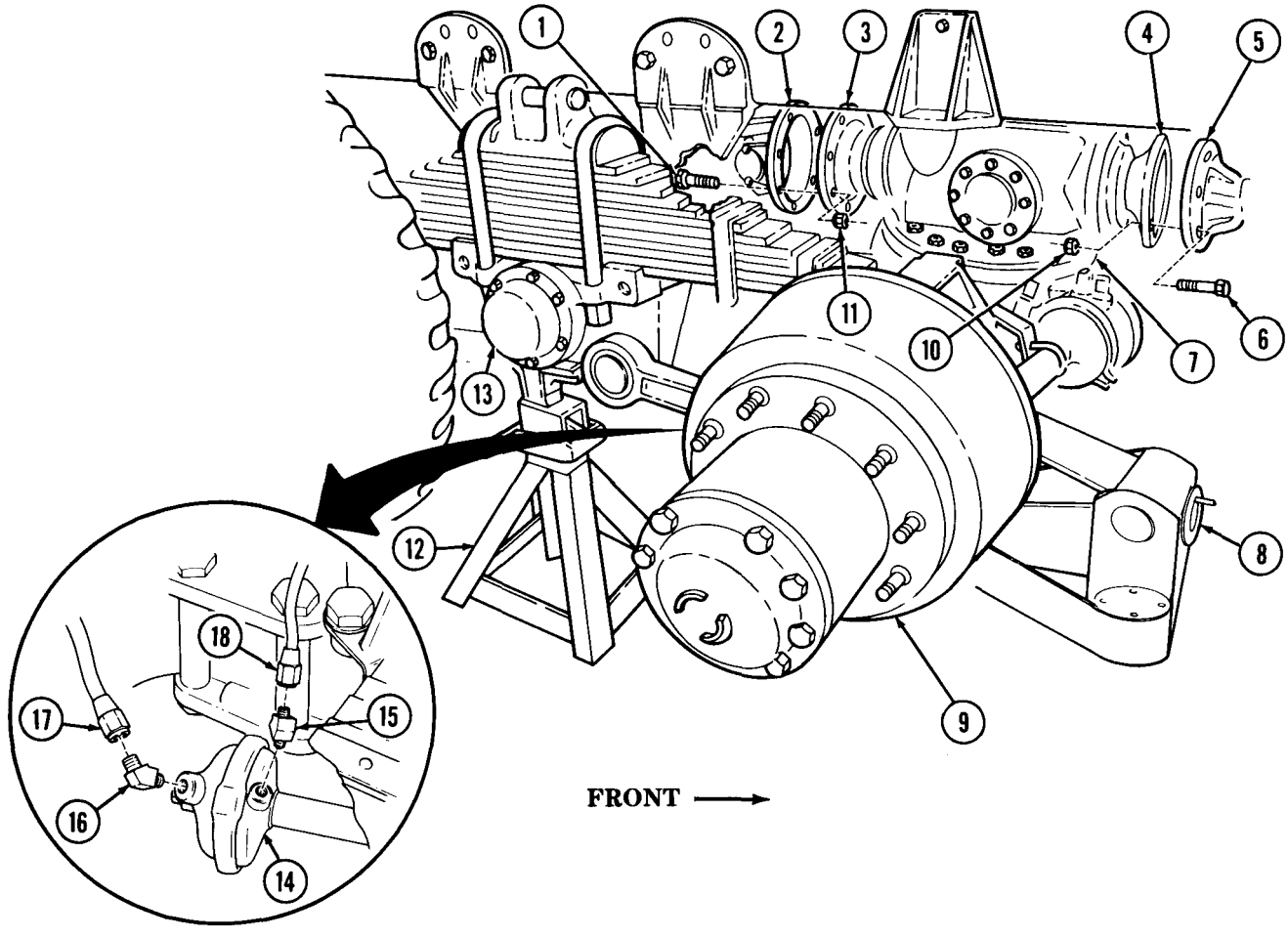
WARNING

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

NOTE

Tag all lines for installation.

5.	Right and left service brake chambers (14)	Two primary lines (17) and vent lines (18)	Disconnect.	
6.		Two adapter elbows (16) and elbows (15)	Remove.	



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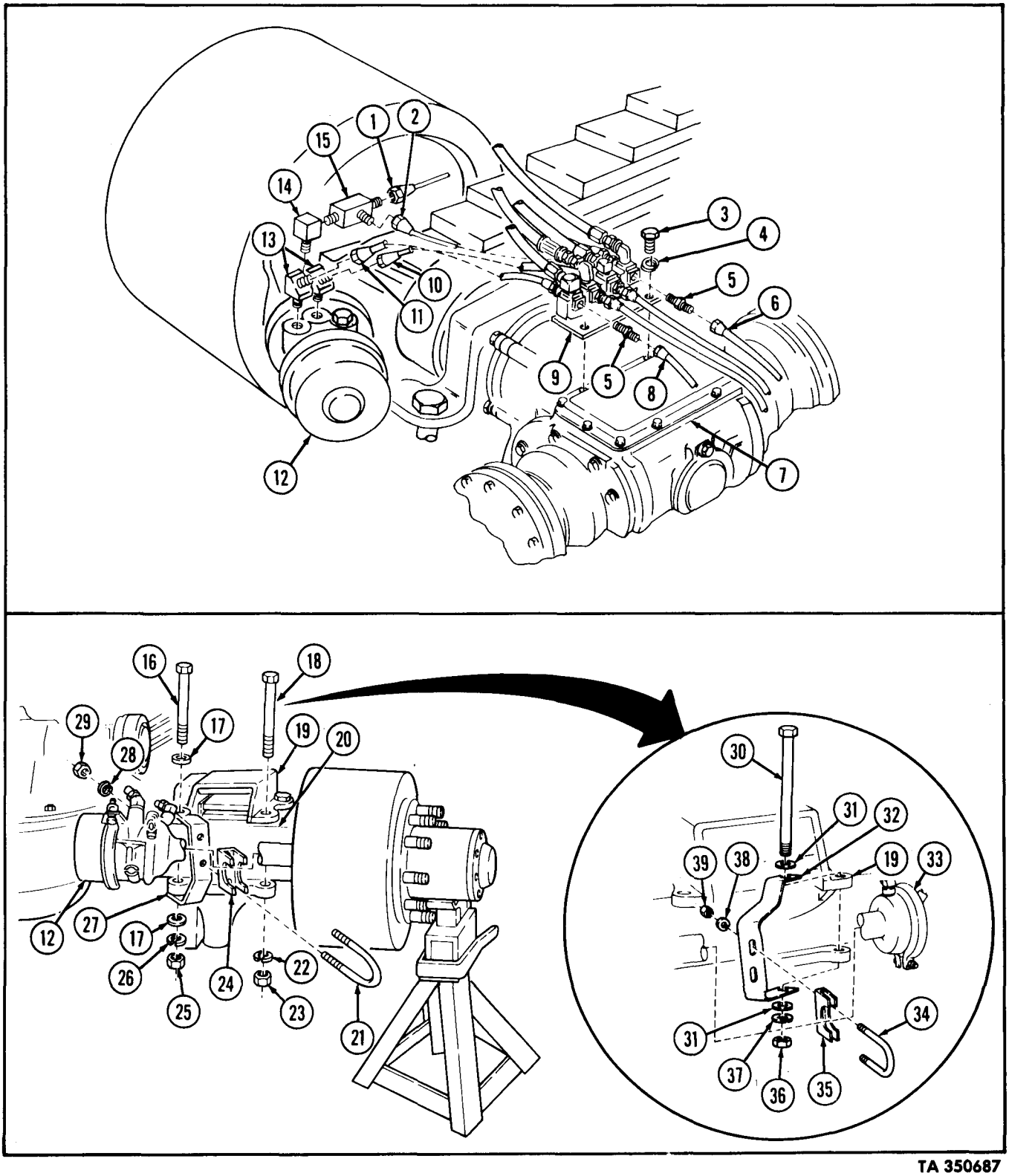
9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Right and left spring brakes (12)	Two vent lines (1), vent lines (2), secondary lines (11), and spring brake overide lines (10)	Disconnect.	
8.		Four adapter elbows (13), two elbows (14), and two tee fittings (15)	Remove.	
9.	Two adapter fittings (5)	Primary line (6) and secondary line (8)	Disconnect.	
10.	Mounting plate (9)	Two adapter fittings (5)	Remove.	Allows access to screws (3).
11.	Differential housing (7)	Two screws (3) and lockwashers (4), and mounting plate (9)	Remove.	Discard lockwashers (4).
12.	Right and left spring brakes (12)	Four nuts (29) and lockwashers (28), two U-bolts (21) and U-bolt brackets (24)	Remove.	Discard lockwashers (28).
		NOTE Assistant will help with step 13.		
13.	Right and left upper spring brackets (19)	Two nuts (25) and lock-washers (26), four washers (17), two screws (16) and brake chamber brackets (27)	Remove.	Discard lockwashers (26).
14.	Right and left service brake chambers (33)	Four nuts (39) and lockwashers (38), two U-bolts (34) and U-bolt brackets (35)	Remove.	Discard lockwashers (38).
		NOTE Assistant will help with steps 15 and 16.		
15.	Right and left upper spring brackets (19)	Two nuts (36) and lockwashers (37), four washers (31), two screws (30) and brake chamber brackets (32)	Remove.	Discard lockwashers (37).
16.	Axle housing (20)	Four nuts (23) and lockwashers (22), two screws (18) and right and left upper spring brackets (19)	Remove.	Discard lockwashers (22).

9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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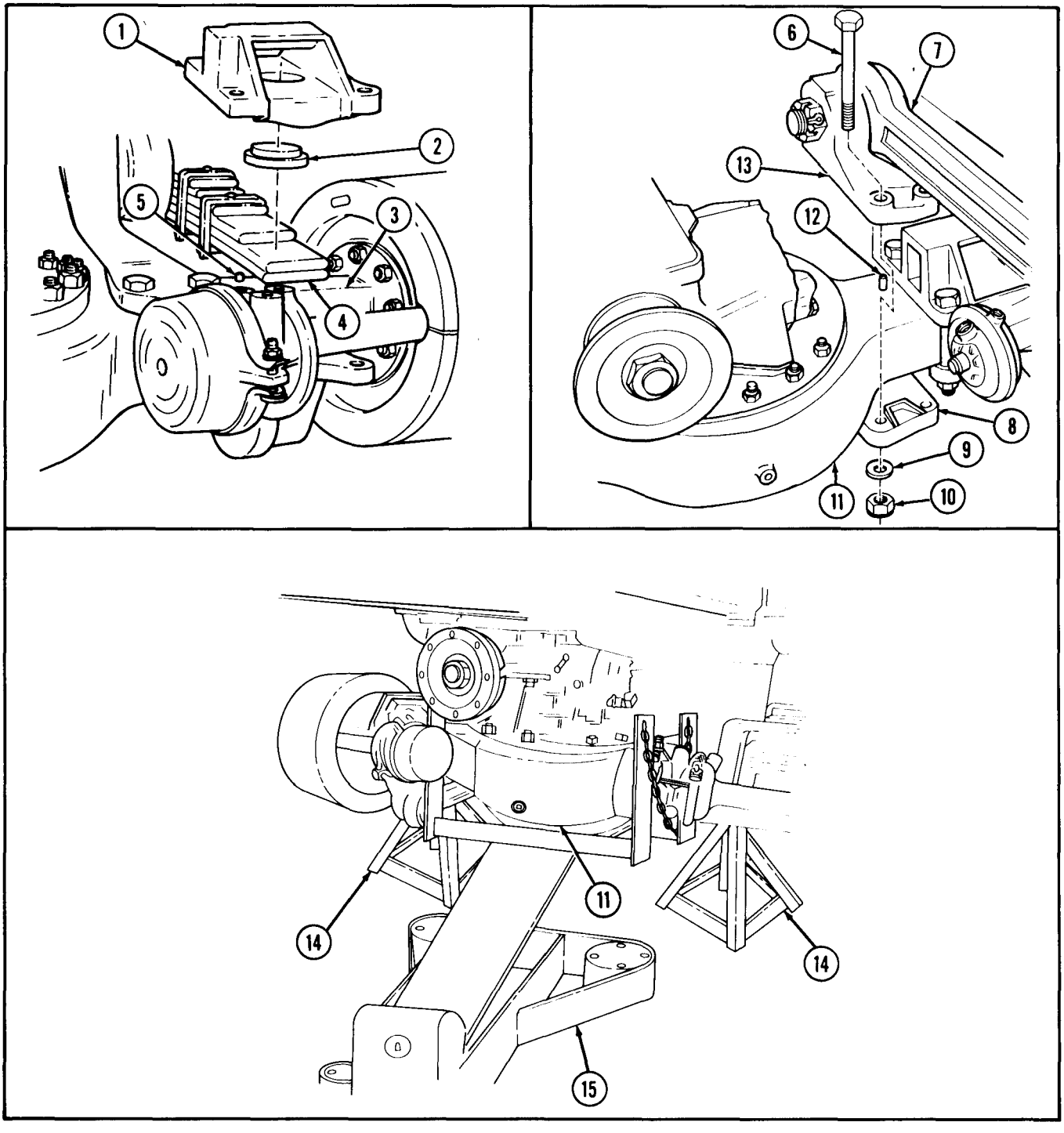
9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.	Right and left upper spring brackets (1)	Spring seat wear pads (2)	Remove.	If cracked or pitted, replace pad (2). Refer to TM 9-2320-272-20-1.
18.	Upper torque rod bracket (13) to upper torque rod plate (8)	Four nuts (10), lockwashers (9), and screws (6)	Remove.	Discard lockwashers (9). Upper bracket (13) will remain attached to torque rod (7).
		NOTE Assistants will help with step 19.		
19.		Forward-rear axle (11)	Pull axle (11) out from side of vehicle with hydraulic jack (15) and place on two jack stands (14).	
b. **Installation**				
		NOTE Assistants will help with step 20.		
20.		Hydraulic jack (15)	a. Position under forward-rear axle (11). b. Raise axle (11) until jack stands (14) are clear. c. Remove jack stands (14).	
21.		Forward-rear axle (11)	Using hydraulic jack (15), position under springs (4).	
22.		Upper torque rod bracket (13)	Install to upper torque rod plate (8) with four screws (6), new lockwashers (9), and nuts (10).	Dowel pin (12) positions torque rod bracket (13) on axle housing (3).
23.		Left and right spring seat wear pad (2)	Install in right and left upper spring bracket (1).	
24.		Left and right upper spring brackets (1)	Slide onto leaf spring assemblies (4) and install on axle housing (3) over dowel pin (5).	

9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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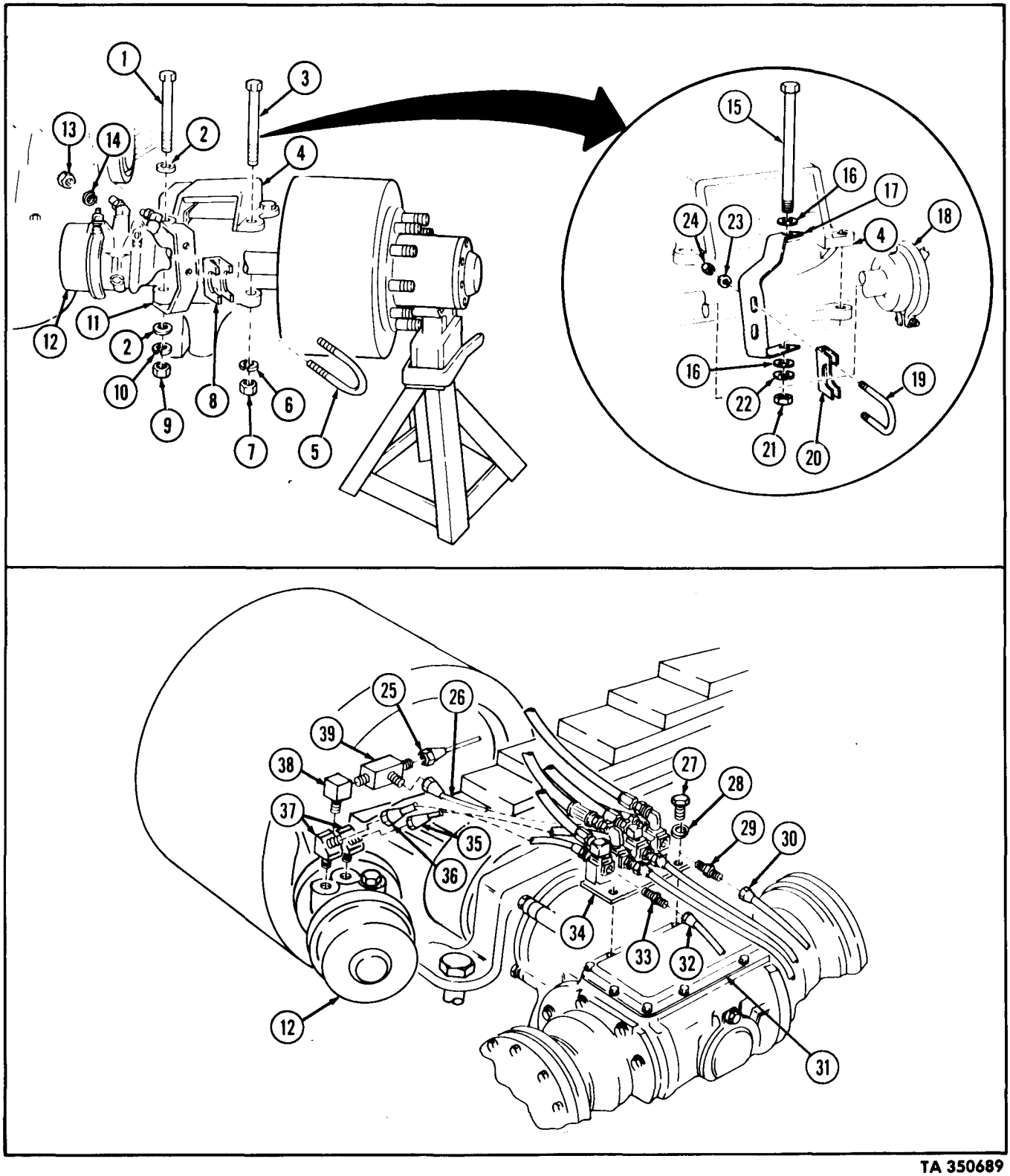
9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cent'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
25.		Left and right upper spring brackets (4)	Install each with two screws (3), new lockwashers (6), and nuts (7).	Finger tighten only.
26.		Left and right service brake chamber brackets (17)	Install each with screw (15), two washers (16), new lockwasher (22), and nut (21).	Finger tighten only.
27.		Left and right U-bolt brackets (20)	Install each to service brake chamber (18) with U-bolt (19), two new lockwashers (23), and nuts (24).	
		NOTE Assistant will help with step 28.		
28.		Left and right spring brake brackets (11)	a. Install each with screw (1), two washers (2), new lockwasher (10), and nut (9).	
			b. Tighten two nuts (7), nut (21), and nut (9).	Tighten 350-375 lb-ft (475-509 N·m).
29.		Left and right U-bolt brackets (8)	Install each to spring brake chamber (12) with U-bolt (5), two new lockwashers (14) and nuts (13).	
30.		Mounting plate (34)	Install to differential housing (31) with two new lockwashers (28) and screws (27).	
		NOTE Clean all male pipe threads and wrap with sealing tape before installation.		
31.		Two adapter fittings (29) and (33)	Install.	
32.		Primary line (30) and secondary line (32)	Connect.	
33.		Two adapter elbows (37), elbow (38), and tee (39)	Install each to spring brake chamber (12).	
34.		Vent line (25), vent line (26), spring brake override line (35) and secondary line (36)	Connect to adapter elbows (37), elbow (38), and tee (39).	

9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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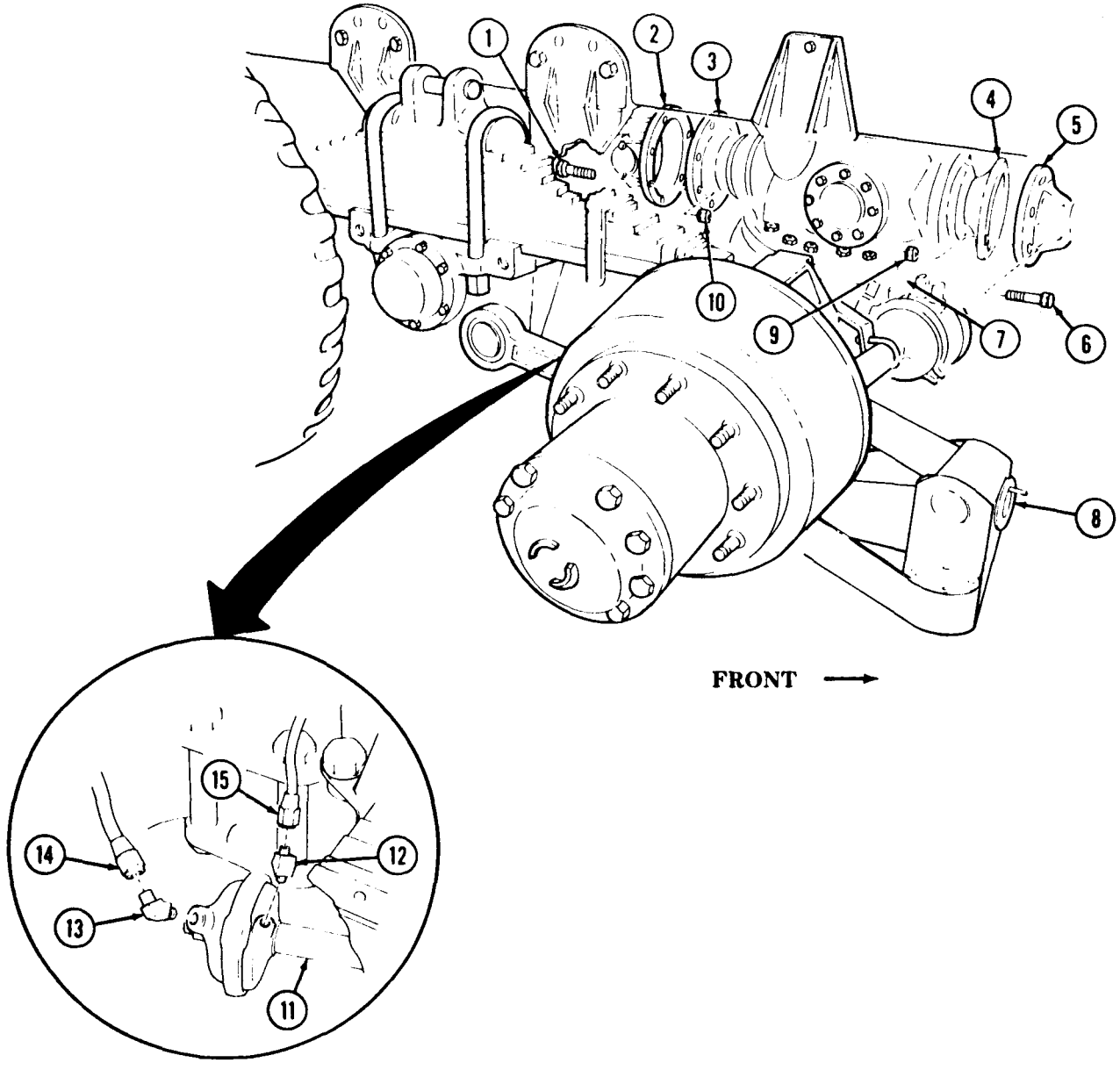
9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
35.		Adapter elbow (13) and elbow (12)	Install each in left and right service brake chamber (11).	
36.		Primary line (14) and vent line (15)	Install each in left and right service brake chamber (11).	
		NOTE Assistant will help with steps 37 and 38.		
37.		Rear propeller shaft flange (2)	Install to rear companion flange (3) with eight screws (1) and new locknuts (10).	
		Front propeller shaft flange (5)	Install to front companion flange (4) with eight screws (6) and new locknuts (9).	Tighten 32-40 lb-ft (43-54 N·m).
		Hydraulic jack (8) with axle fixture	Remove from forward-rear axle assembly (7).	

9-11. FORWARD-REAR AXLE ASSEMBLY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- For (M939A2) Install CTIS air lines (TM 9-2320-358-24&P).
- Install front-rear wheels (TM 9-2320-272-20-2).
- Lubricate front-rear axle (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range. Check for air leaks. Road test vehicle.

TA 350690

9-12. REAR AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE

This task covers:

a. Removal
b. Cleaning and Inspection
c. Installation

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
All	LO 9-2320-272-12	Axle differential drained.
	Para. 9-10	Rear-rear axle assembly removed (as required).
	Para. 9-11	Forward-rear axle assembly removed (as required).
	TM 9-2320-272-20-1	Rear-rear axle shafts removed (as required).
	TM 9-2320-272-20-1	Forward-rear axle shafts removed (as required).

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Crocus cloth (Appendix C, Item 6)
Sealing compound (Appendix C, Item 13)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

- All personnel must stand clear during hoisting operations.
- Fire extinguisher will be kept nearby when drycleaning solvent is used.
- Eyeshields must be worn when cleaning with a wire brush.

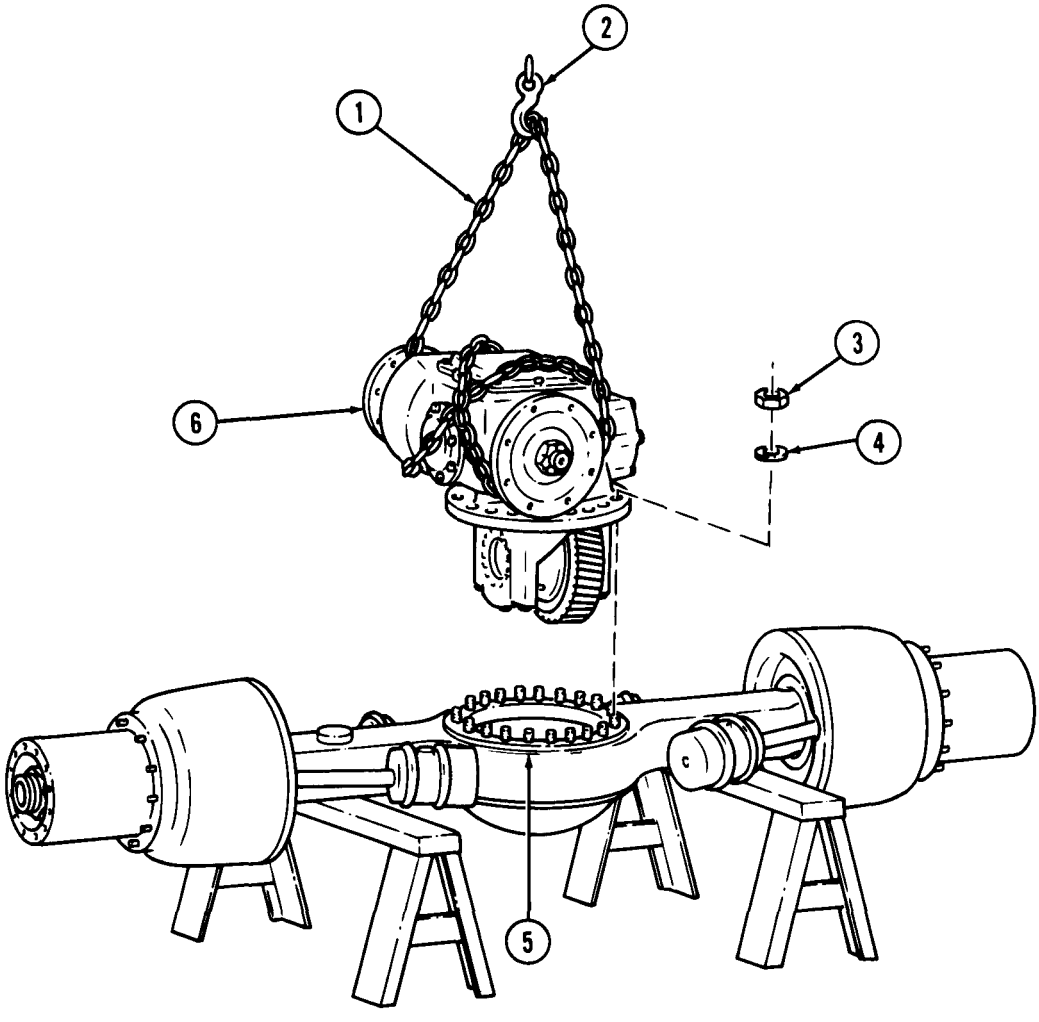
Manual References

TM 9-2320-272-20-1
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
		NOTE This procedure is the same for both the rear-rear and forward-rear carrier differentials. The rear-rear differential is covered here.		
1.		Lifting sling (1)	Attach to carrier assembly (6) and attach to lift hoist (2).	
2.	Rear-rear axle housing (5)	Eighteen nuts (3), and washers (4), and carrier assembly (6)	Remove.	

9-12. REAR AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350691

9-12. REAR AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cent'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting or swinging load may cause injury to personnel.

CAUTION

When hoisting carrier assembly out of axle housing, use care not to damage mounting studs. Assistant will guide assembly out of housing.

3.		Carrier assembly (1)	Lift straight out from axle housing (4).	

b. Cleaning and Inspection

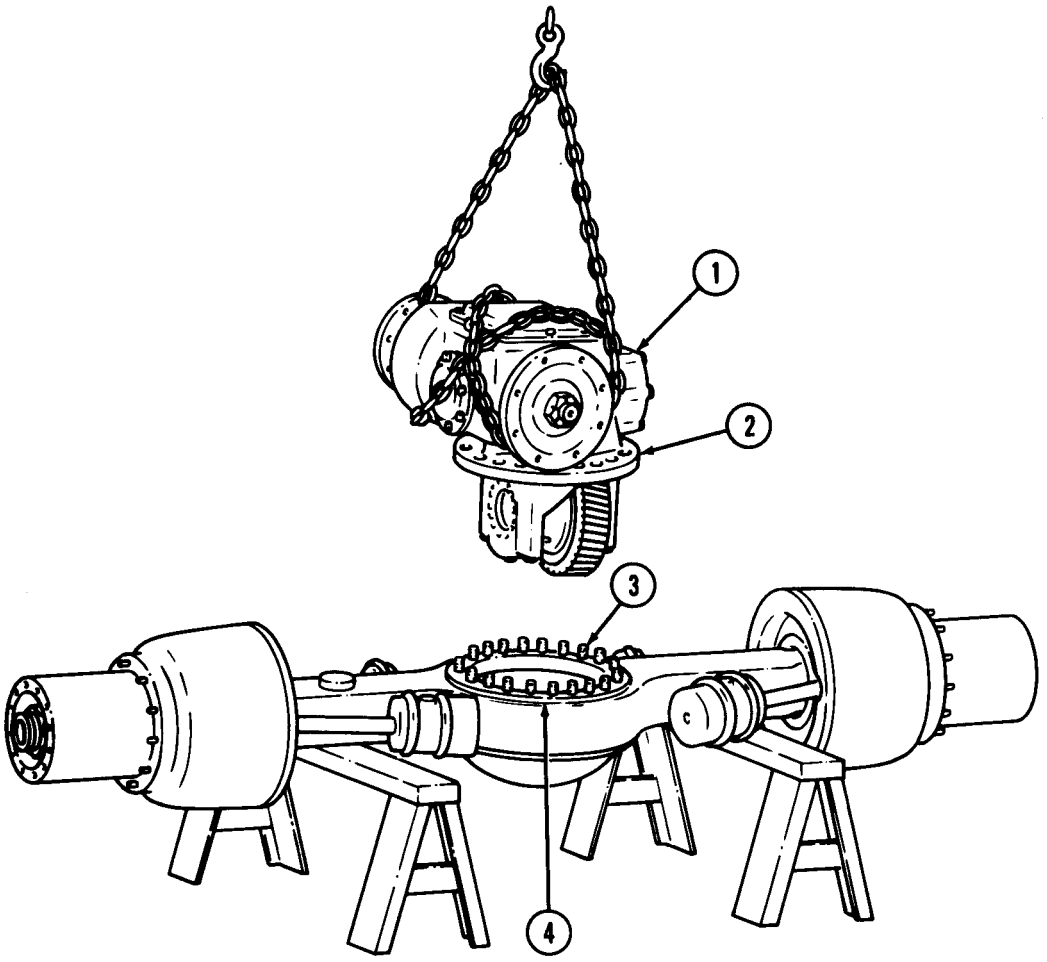
WARNING

- Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.
- Eyeshields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.

4.		Differential flange (2) and axle housing (4) mating surfaces	Remove sealing compound.	Use wire brush and drycleaning solvent.
5.		Mounting studs (3)	Remove sealing compound.	Use wire brush and drycleaning solvent.
6.		Differential flange (2) and axle housing (4) mating surfaces	Inspect for nicks, burrs, and cracks.	If nicked, cracked, or heavily burred, replace. If lightly burred, or nicked, remove with crocus cloth.
7.		Mounting studs (3)	Inspect for bends and damaged threads.	If bent, or if threads are damaged, replace studs (3).

9-12. REAR AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350692

9-12. REAR AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

c. Installation

NOTE

Differential flange and axle housing mating surfaces must be clean before applying sealing compound.

8.		Sealing compound	Apply generous, but even amount around differential flange (5) and axle housing (6) mating surfaces and around all axle housing mounting studs (7).
9.		Lifting sling (1)	Attach to carrier assembly (8) and attach to lift hoist (2).

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting or swinging load may cause injury to personnel.

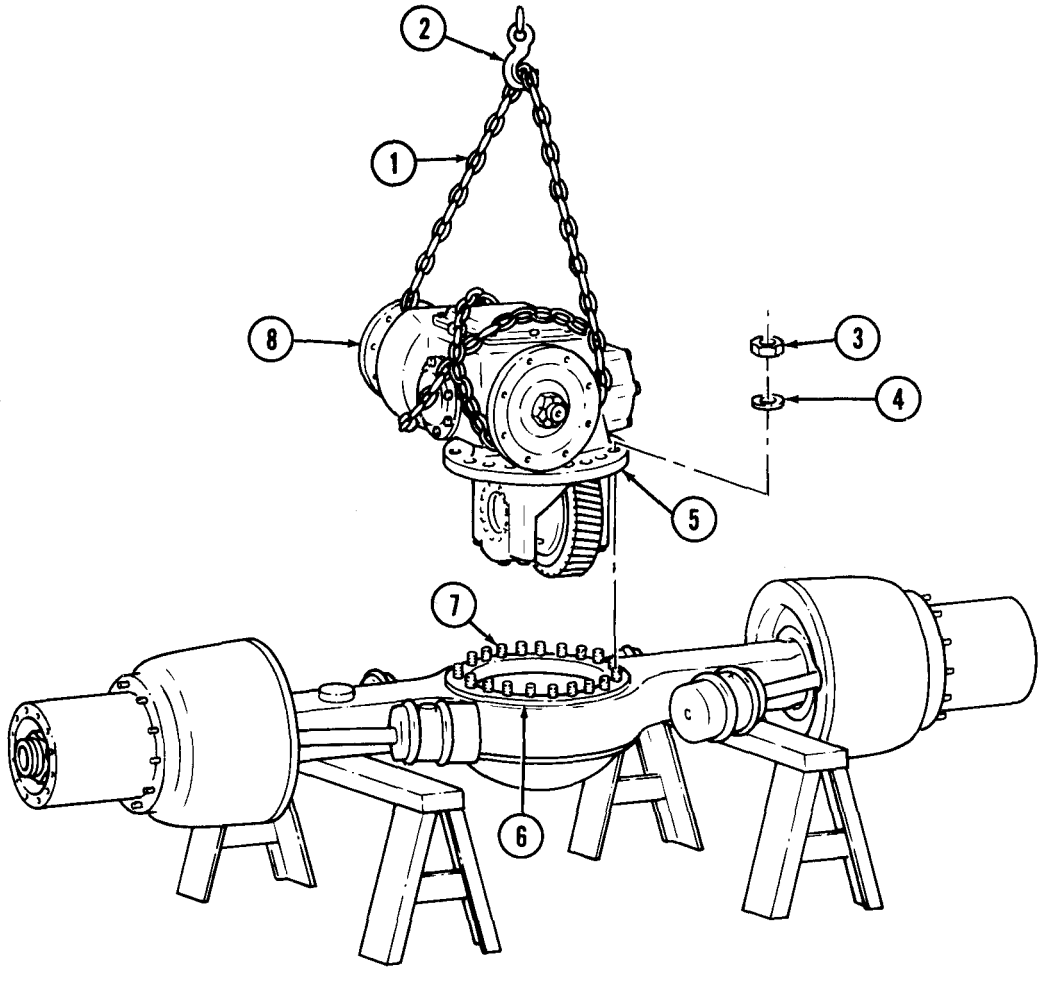
CAUTION

When hoisting carrier assembly onto axle housing, use care not to damage mounting studs. Assistant will guide assembly onto housing.

10.		Carrier assembly (8)	Lower into axle housing (6), and install to mounting studs (7) with eighteen washers (4) and nuts (3) and tighten.
11.		Lifting hoist (2) and lifting sling (1)	Detach from carrier assembly (8).

9-12. REAR AXLE CARRIER DIFFERENTIAL ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install rear-rear axle shafts if removed (TM 9-2320-272-20-1).
- Install rear-rear axle assembly if removed (para. 9-10).
- Install forward-rear axle assembly if removed (para. 9-11).
- Install forward-rear axle shafts if removed (TM 9-2320-272-20-1).
- Fill differential with lubricant (LO 9-2320-272-12).

TA 350693

9-13. UPPER AND LOWER TORQUE ROD REPAIR

This task covers:

a. Disassembly **b. Assembly**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Took
None

Materials/Parts
Two ball and bushings

Personnel Required
Light-wheeled vehicle mechanic MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-2

Condition Description
Parking brake set.
Upper/lower torque rods removed.

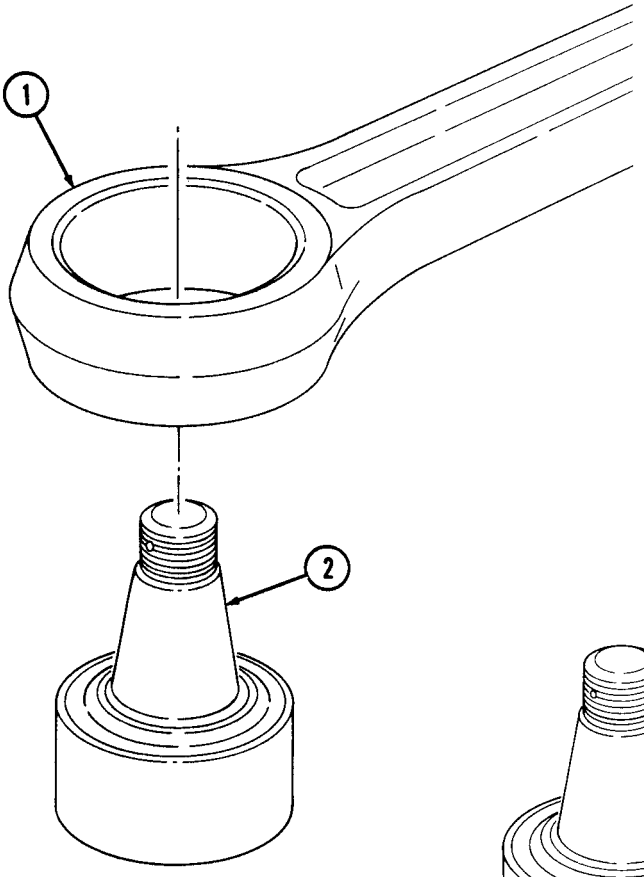
Special Environmental Conditions
None

General Safety Instructions
None

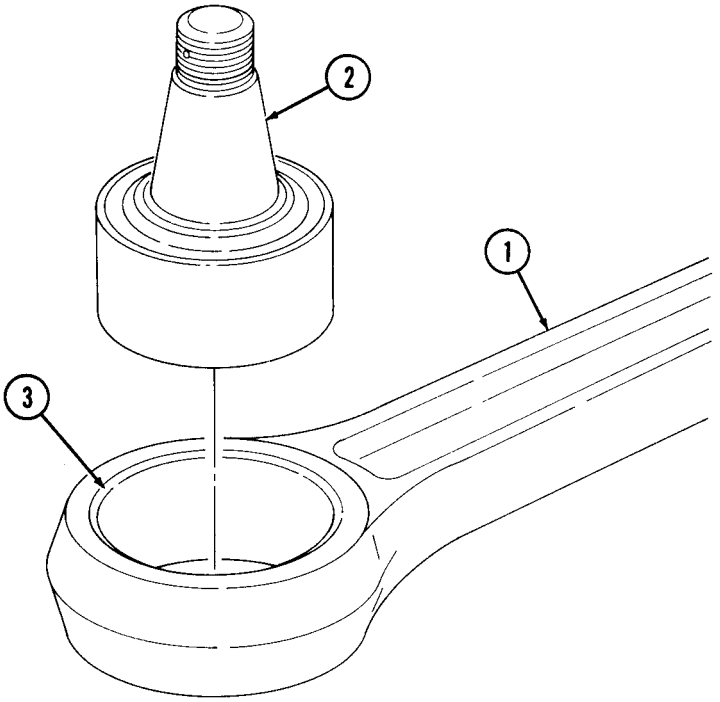
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
		NOTE When replacing ball and bushing, replace both. Step 1 covers one side.		
1.	Torque rod (1)	Ball and bushing (2)	Remove.	Use arbor press.
		b. Assembly		
		NOTE Ball and bushing must be pressed in on champer side (3) only.		
2.		Ball and bushing (2)	Press into torque rod (1). Use arbor press.	

9-13. UPPER AND LOWER TORQUE ROD REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



REMOVAL



INSTALLATION

END OF TASK!

FOLLOW-ON TASK: Upper/lower torque rod(s) installed (TM 9-2320-272-20-2)

9-14. FRONT DIFFERENTIAL OIL SEAL REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Wear sleeve kit
Oil seal
Cotter pin
Two gaskets
GAA grease (Appendix C, Item 11)
Sealing compound (Appendix C, Item 13)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-10
TM 9-2320-272-20-2

Condition Description
Parking brake set.
Rear wheels blocked.
Propeller shaft removed (as required).

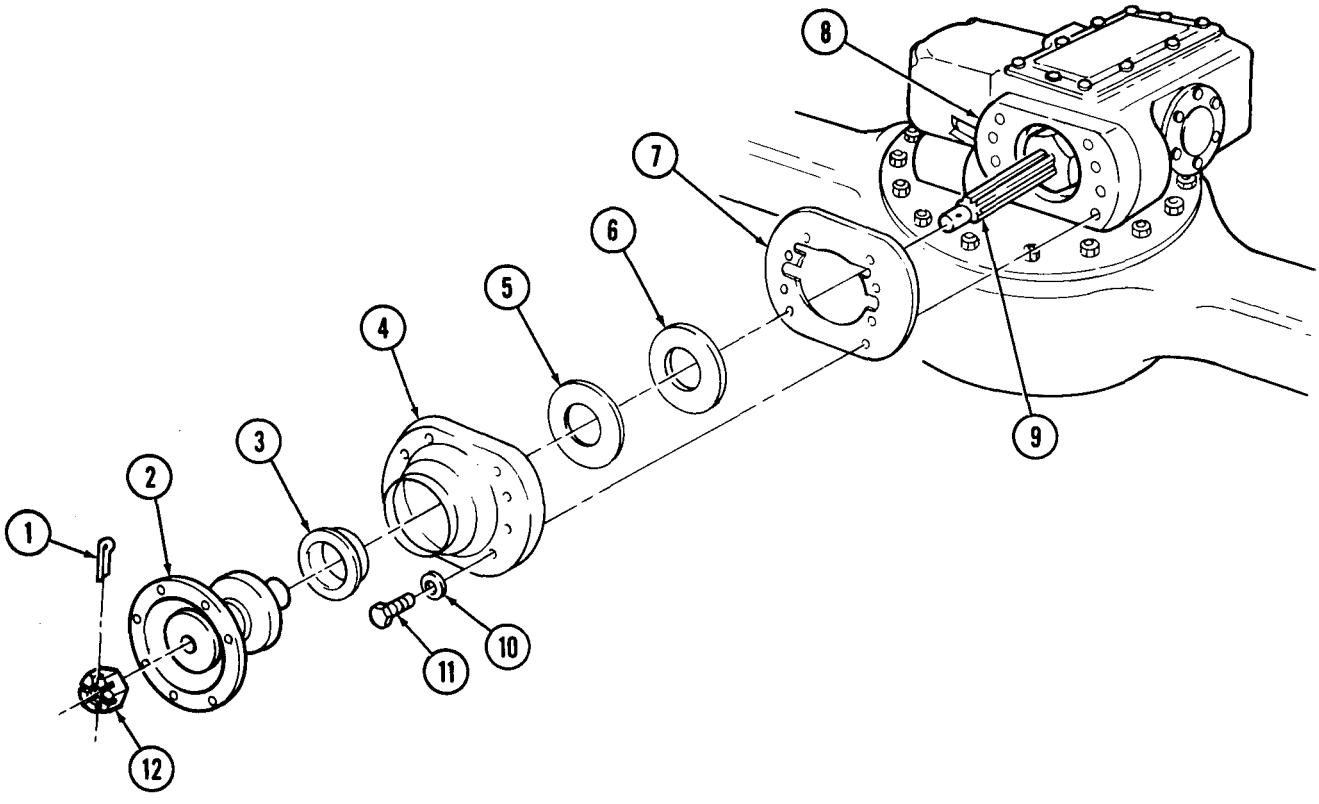
Special Environmental Conditions
None

General Safely Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
1.	Pinion drive shaft (9)	Cotter pin (1) and slotted nut (12)	Remove.	Discard cotter pin (1).
2.		Companion flange (2)	Pull from pinion drive shaft (9) splines.	
		NOTE • Perform step 2.1 if companion flange is installed with wear sleeve. • Remove wear sleeve only if inspection requires replacement.		
2.1.	Companion flange (2)	Wear sleeve (3)	Remove.	Discard wear sleeve (3).
		CAUTION Do not jam any tool between differential and pinion shaft retainer when removing front bearing cover. Shims will be damaged.		
3.		Eight screws (11), washers (10), and front bearing cover (4)	Remove.	Tap only on outer edge of front bearing cover (4).

9-14. FRONT DIFFERENTIAL OIL SEAL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Front bearing cover (4)	Differential oil seal (6) and front bearing cover gasket (5)	Remove.	Discard oil seal (6) and gasket (5). Clean gasket remains from mating surfaces.
5.	Pinion shaft retainer (8)	Pinion shaft retainer gasket (7)	Remove.	Discard gasket (7). Clean gasket remains from mating surfaces.

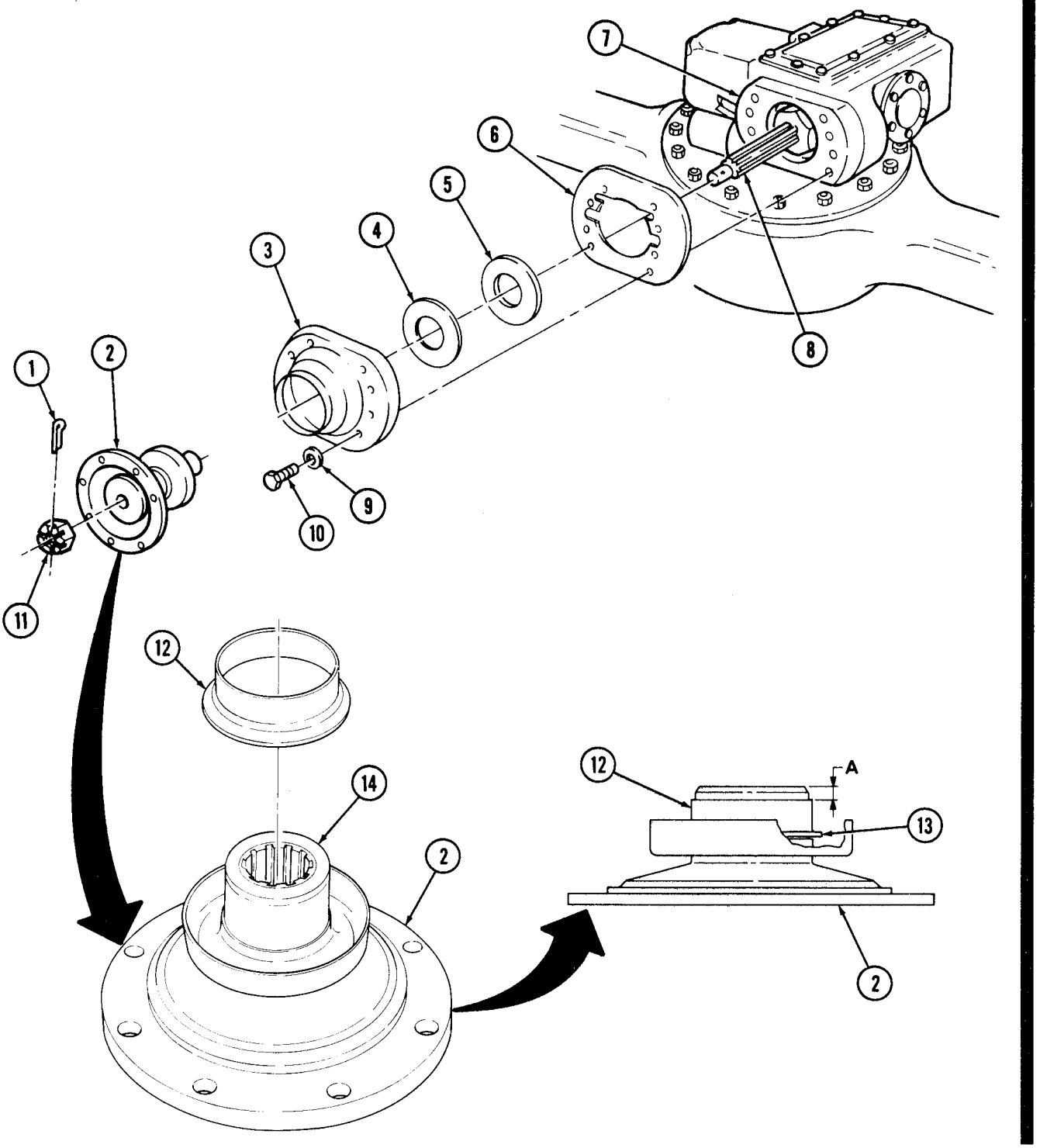


9-14. FRONT DIFFERENTIAL OIL SEAL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
6.		New pinion shaft retainer gasket (6)	Coat with sealing compound and place on pinion shaft retainer (7).	
7.		New front bearing cover gasket (4)	Place in small end of front bearing cover (3).	
8.		New differential oil seal (5)	a. Lubricate inside diameter of seal (5) with GAA grease. b. Coat outside diameter of seal (5) with sealing compound. c. Press into front bearing cover (3).	
9.		Front bearing cover (3) with gasket (4) and differential oil seal (5)	Install on pinion shaft retainer gasket (6) with eight washers (9) and screws (10).	Tighten 93-120 lb-ft (125-163 N·m).
		NOTE • Companion flange must be installed with wear sleeve. • Perform step 9.1 if wear sleeve was removed.		
9.1.		New wear sleeve (12)	a. Install on companion flange (2) 0.250 in. (6.35 mm) (distance 'A') from flange shaft end (14). b. Remove flange (13) of wear sleeve (12)at precut line.	
10.		Companion flange (2)	Install on pinion drive shaft (8) splines with slotted nut (11).	Tighten 300-400 lb-ft (407-542 N·m).
11.		New cotter pin (1)	Install in slotted nut (11) pinion drive	

9-14. FRONT DIFFERENTIAL OIL SEAL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



9-15. REAR DIFFERENTIAL OIL SEAL REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Wear sleeve kit
Cotter pin
Oil seal
Gasket
GAA grease (Appendix C, Item 11)
Sealing compound (Appendix C, Item 13)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Rear wheels blocked.
TM 9-2320-272-20-2	Propeller shaft removed (as required).

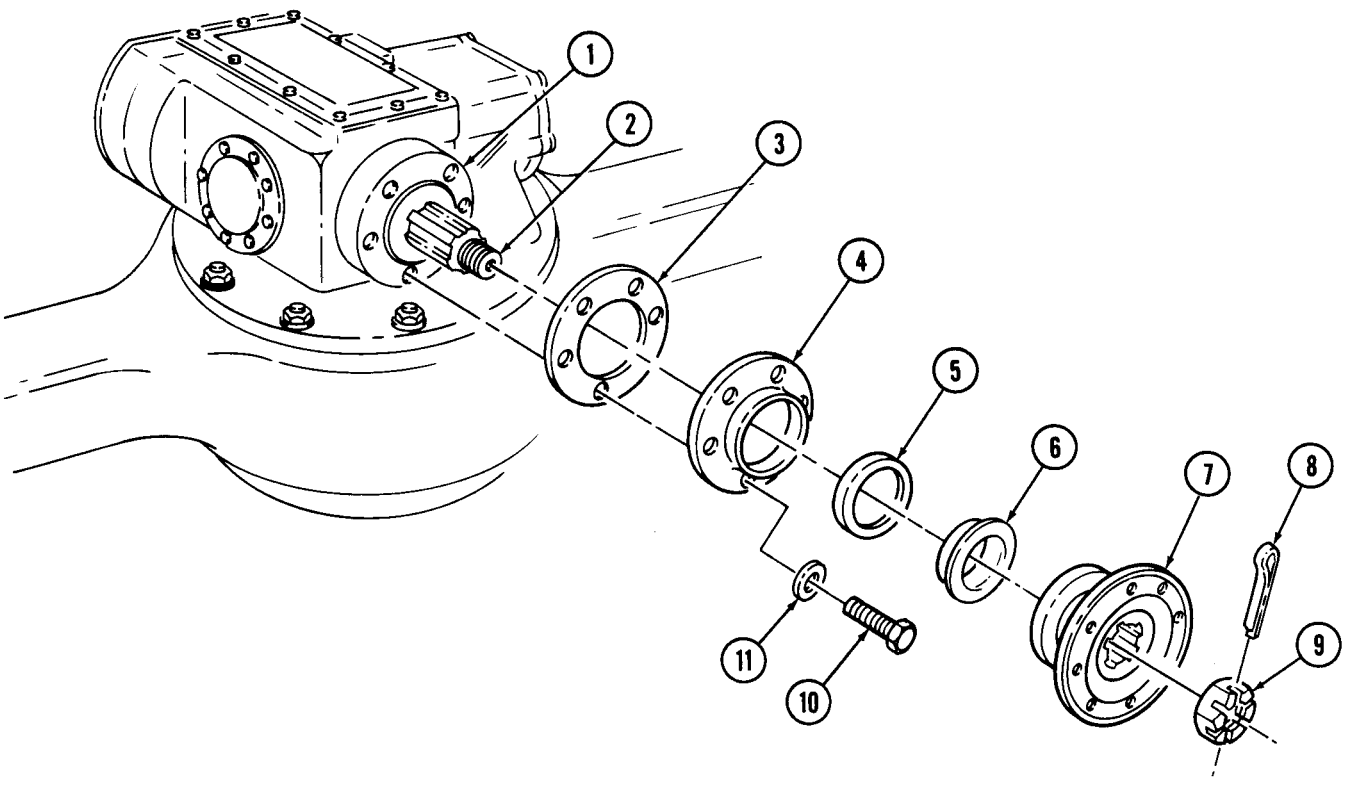
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Pinion drive shaft (2)	Cotter pin (8) and slotted nut (9)	Remove.	Discard cotter pin (8).
2.		Companion flange (7)	Pull from pinion drive shaft (2) splines.	
		NOTE • Peform step 2.1 if companion flange was installed with wear sleeve. • Remove wear sleeve only if inspection requires replacement.		
2.1.	Companion flange (7)	Wear sleeve (6)	Remove.	Discard wear sleeve (6).
3.		Six screws (10), washers (11), and rear cap (4)	Remove.	
4.	Rear cap (4)	Differential oil seal (5)	Remove.	Discard oil seal (5).
5.	Rear pinion shaft retainer (1)	Cap gasket (3)	Remove.	Discard gasket (3). Clean gasket remains from mating surfaces.

9-15. REAR DIFFERENTIAL OIL SEAL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

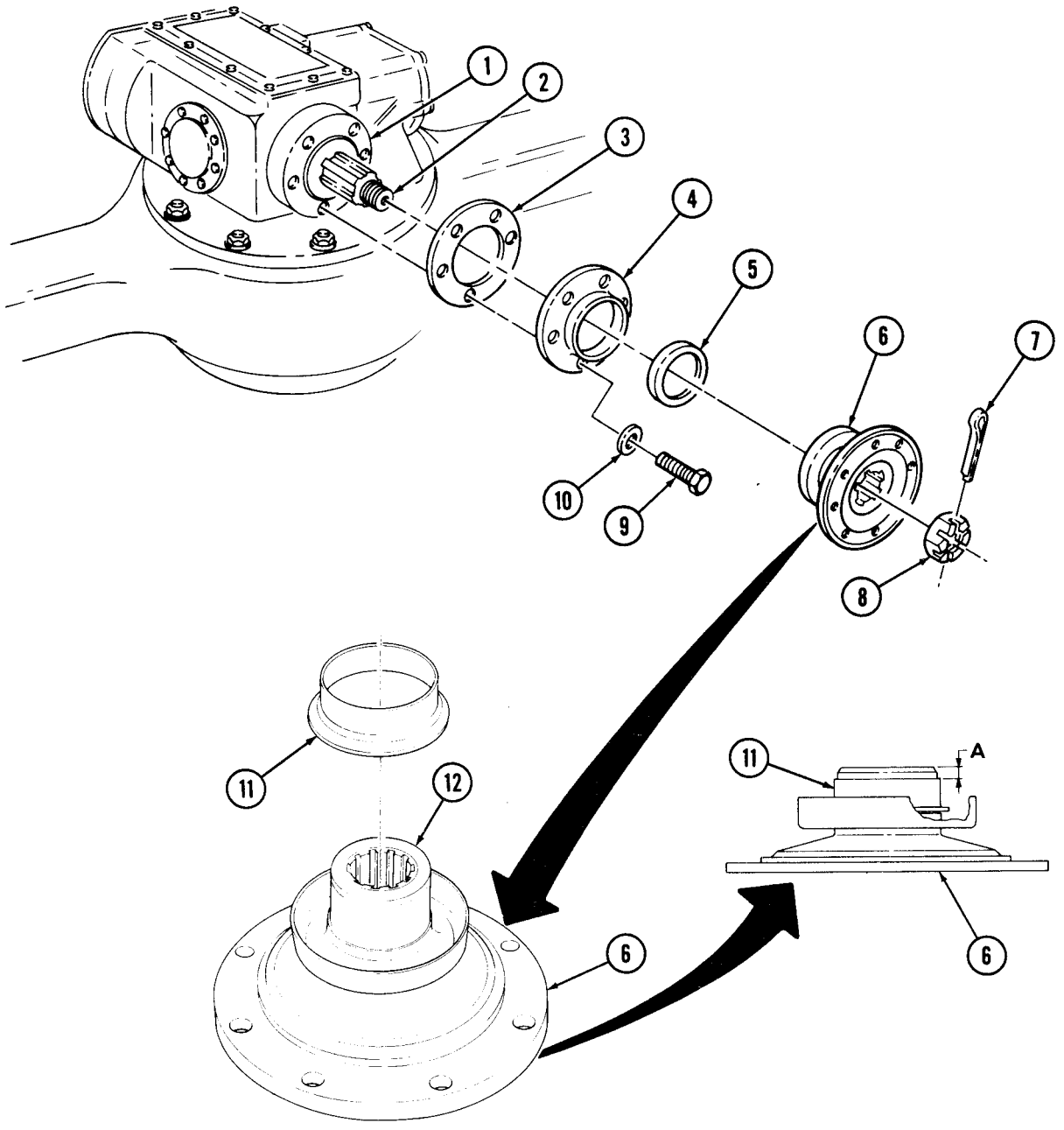


9-15. REAR DIFFERENTIAL OIL SEAL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
6.		New cap gasket (3)	Coat with sealing compound and install on rear pinion shaft retainer (1).	
7.		New differential oil seal (5)	a. Lubricate inside diameter of seal (5) with GAA grease. b. Coat outside diameter of seal (5) with sealing compound. c. Press into rear cap (4).	
8.		Rear cap (4) with oil seal (5)	Install on rear pinion shaft retainer (1) with six washers (10) and screws (9).	Tighten 93-120 lb-ft (126-163 N·m).
		NOTE • Companion flange must be installed with wear sleeve. • Perform step 8.1 if wear sleeve was removed.		
8.1.		New wear sleeve (11)	Install on companion flange (6) 0.125 in. (3.175 mm) (distance 'A') from flange shaft end (12).	
9.		Companion flange (6)	Install on pinion drive shaft (2) splines with slotted nut (8).	Tighten slotted nut (8) 300-400 lb-ft (407-542 N·m).
10.		New cotter pin (7)	Install through pinion drive shaft (2) and slotted nut (8).	

9-15. REAR DIFFERENTIAL OIL SEAL REPLACEMENT (Cont'd]

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install propeller shaft (TM 9-2320-272-20-2) if removed.
- Remove blocks from rear wheels (TM 9-2320-272-10).
- Start engine (TM 9-2320-272-10) and road test vehicle.
- Check rear differential oil seal for leaks (TM 9-2320-272-20-1).

9-16. CROSS TUBE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	Para. 9-10	Rear-rear axle removed (as required).
	Para. 9-11	Forward-rear axle removed (as required).
	Para. 9-13	Torque rods (four lower) removed.
	TM 9-2320-272-20-1	Rear springs removed.
	TM 9-2320-272-20-1	Spring seats removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Eight locknuts

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

Do not attempt to support weight of vehicle on a hydraulic jack.

Manual References

TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Weight of vehicle must remain supported on support stands at all times. Do not attempt to support weight of vehicle on a hydraulic jack. Injury to personnel may result if jack fails.

a. Removal

1.	Cross tube (3) to rear axle bogie support (1)	Eight locknuts (4) and screws (2)	Remove.	Discard locknuts (4).

NOTE

Assistant will help with step 2.

2.		Cross tube (3)	Remove.	

b. Installation

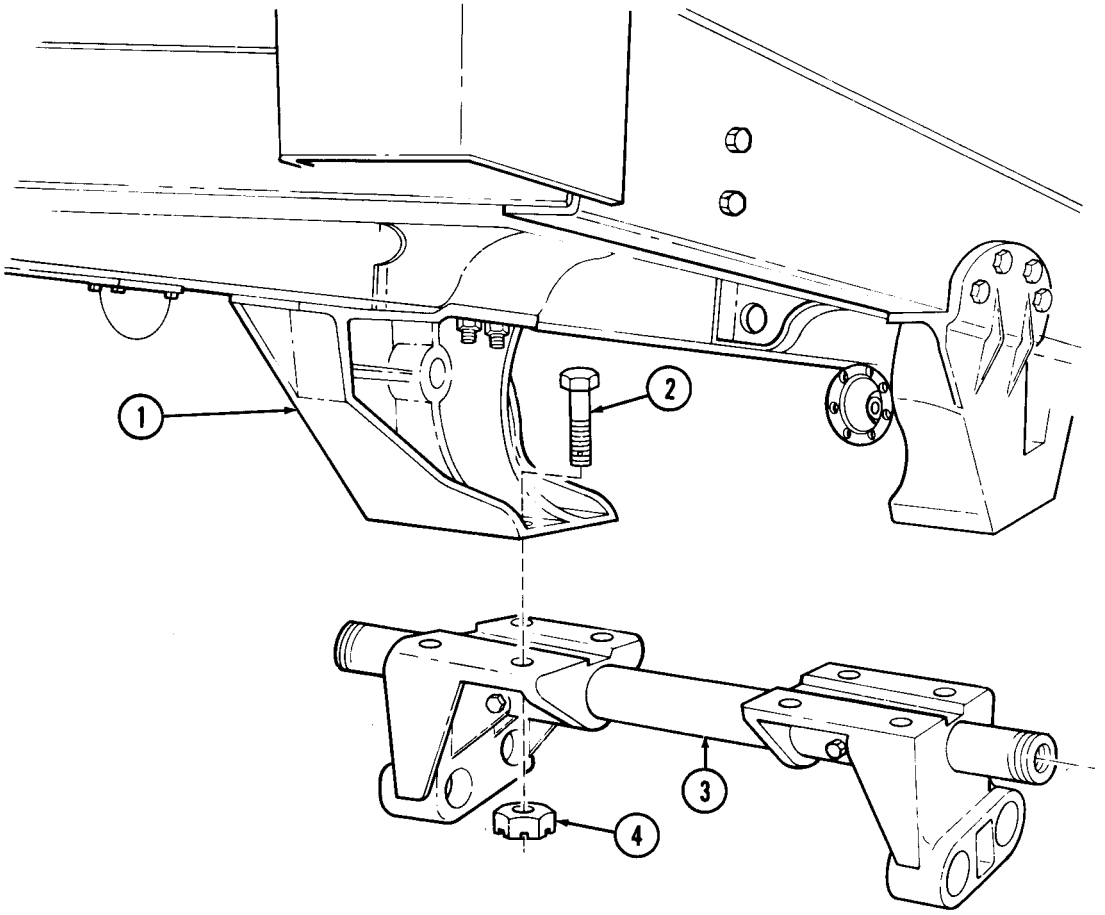
NOTE

Assistant will help with step 3.

3.		Cross tube (3)	Install on rear axle bogie support (1) with eight screws (2) and new locknuts (4).	Tighten new locknuts (4) 1200-1300 lb-ft (1627-1763 N·m).

9-16. CROSS TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install spring seats (TM 9-2320-272-20-1).
- Install rear springs (TM 9-2320-272-20-1).
- Install torque rods (para. 9-13).
- Install rear-rear axle (para. 9-10) if removed.
- Install forward-rear axle (para. 9-11) if removed.

TA 350702

Section IV. AXLE TESTS AND ADJUSTMENTS

9-17. AXLE TEST AND ADJUSTMENT TASK SUMMARY

9-18. STEERING STOP ADJUSTMENT

This task covers:

Turning Angle Adjustment

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Tires properly inflated.

Test Equipment

Camber and caster gage set

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two adjustment screws
Two nuts

Personnel Required

Wheeled vehicle repairman MOS 63W
Metal worker MOS 44B

General Safety Instructions

None

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

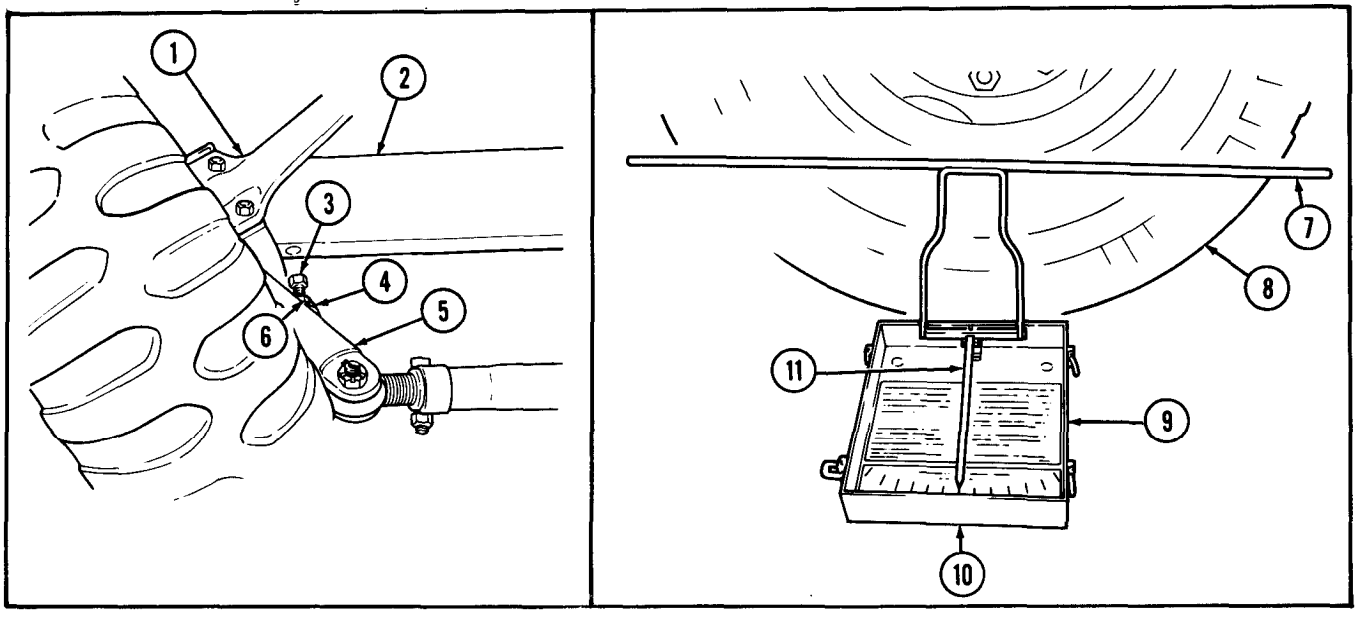
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		Turning Angle Adjustment		
1.		Left front wheel (8)	Position straight ahead.	
2.	Left front wheel (8)	Alinement device (9)	Position 3 in. (7.6 mm) from outer tire surface.	
3.		Turning radius gage (7)	Place against outer tire surface.	
4.		Pointer (11)	Center with wheel (8) aline with zero degree mark on base scale (10).	
5.		Left front wheel (8)	a. Turn outward to stop.	
			b. Read degrees of travel.	Correct travel is 28 degrees, if not correct, adjust.
		NOTE		
		Only perform steps 6 through 8 if adjustment is necessary.		
6.	Left steering knuckle (1)	Adjustment screw (3) and nut (6)	Break welds (4) and remove screw (3) and nut (6).	Discard screw (3) and nut (6).

9-18. STEERING STOP ADJUSTMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.		New adjustment screw (3) and nut (6)	a. Thread nut (6) all the way up on screw (3).	
			b. Thread into back of tie rod arm (5) as far as possible.	
			c. Turn screw (3) out until screw head contacts axle housing (2).	Screw (3) becomes turn angle stop.
			d. Hold screw (3) in position and turn nut (6) clockwise until it contacts the back of tie rod arm (5).	Nut (6) locks position of adjustment screw (3).
			e. Tighten nut (6) to 65-85 lb-ft (88-115 N·m).	
8.	Left steering knuckle (1)	Adjustment screw (3) and nut (6)	Tack weld nut (6) to screw (3) and to back of tie rod arm (5).	Screw (3) and nut (6) become fixed parts of left steering knuckle (1).

NOTE

Repeat steps 1 through 8 for right front wheel turning angle adjustment.



END OF TASK!

FOLLOW-ON TASK: Start engine (TM 9-2320-272-10) and road test vehicle.

TA 350703

9-19. AXLE LEAKAGE TEST

This task covers:

a. Test **b. Corrective Action**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Rear wheels blocked.

Test Equipment

Air pressure gage (0-160 psi)

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Pipe nipple
Tee connector
Quick disconnect coupling

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

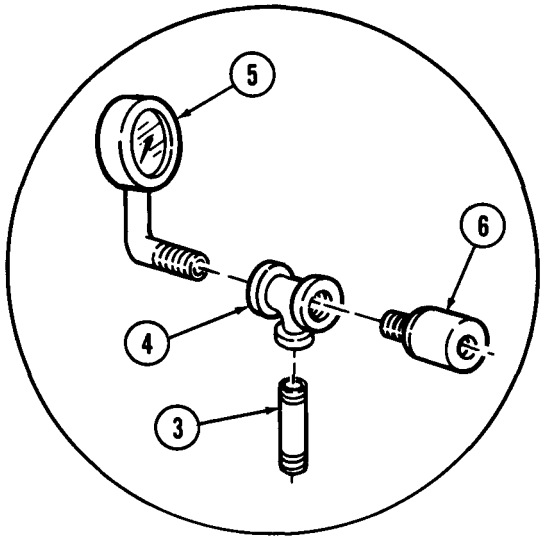
Manual References

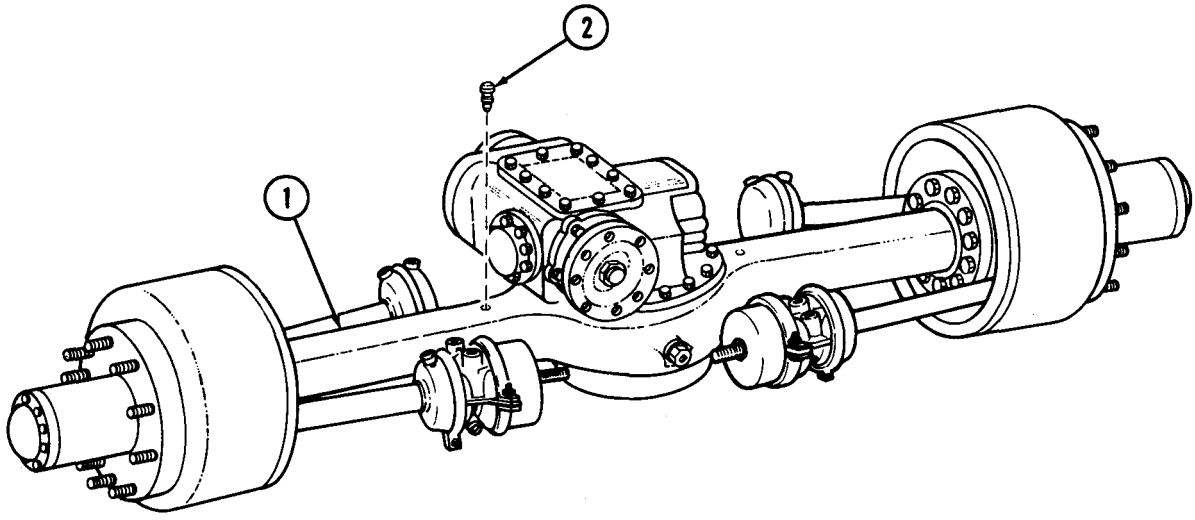
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Test				
1.	Axle housing (1)	Breather assembly (2)	Remove.	
2.		Pipe nipple (3) and tee connector (4)	Install in place of breather assembly (2).	
3.		Air pressure gage (5) and quick disconnect coupling (6)	Install each on tee connector (4) as shown.	

9-19. AXLE LEAKAGE TEST (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





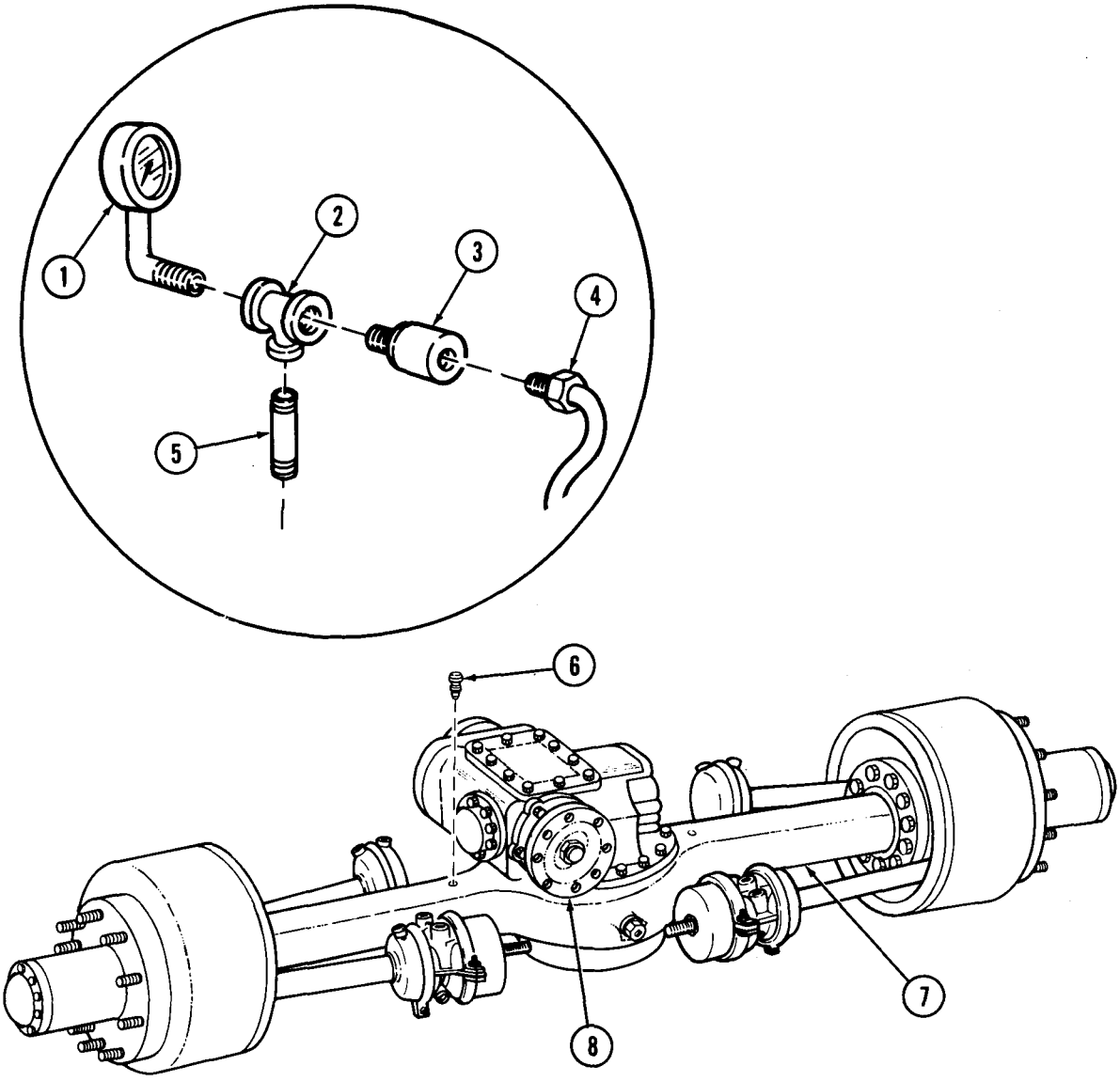
TA 350704

9-19. AXLE LEAKAGE TEST (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			CAUTION Do not allow air pressure to exceed 15 psi (103.4 kPa). Seals will be damaged if air pressure exceeds 15 psi (103.4 kPa).	
4.		Air supply hose (4)	a. Connect to quick disconnect coupling (3) and to air supply.	
			b. Turn on air.	Compressed air should now fill axle assembly.
5.		Air pressure gage (1)	a. Observe. Disconnect air supply hose (4) when pressure reaches 8 psi (55.2 kPa).	
			b. When disconnecting air supply hose (4), begin timing 45-second period.	
			c. After 45 seconds take reading of air pressure gage (1).	A faster than 5 psi (34.5 kPa) escape rate in 45 seconds indicates a leak. Correct per para. 9-19b.
b. Corrective Action				
6.	Axle housing (7)	Carrier differential (8)	a. Tighten all nuts and screws.	
			b. Apply soapsuds around carrier differential (8).	Air bubbles will indicate defective or missing sealing compound. To correct, see para. 9-7 (front axle) or para. 9-12 (rear axle.
			c .Shutoff air supply and bleed pressure from carrier differential (8).	
7.		Air pressure gage (1), air supply hose (4), quick disconnect coupling (3), tee connector (2), and pipe nipple (5)	Disconnect from axle housing (7) and remove.	
8.		Breather assembly (6)	Install in axle housing (7).	

9-19. AXLE LEAKAGE TEST (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

CHAPTER 10
COMPRESSED AIR AND BRAKE SYSTEMS MAINTENANCE

NOTE

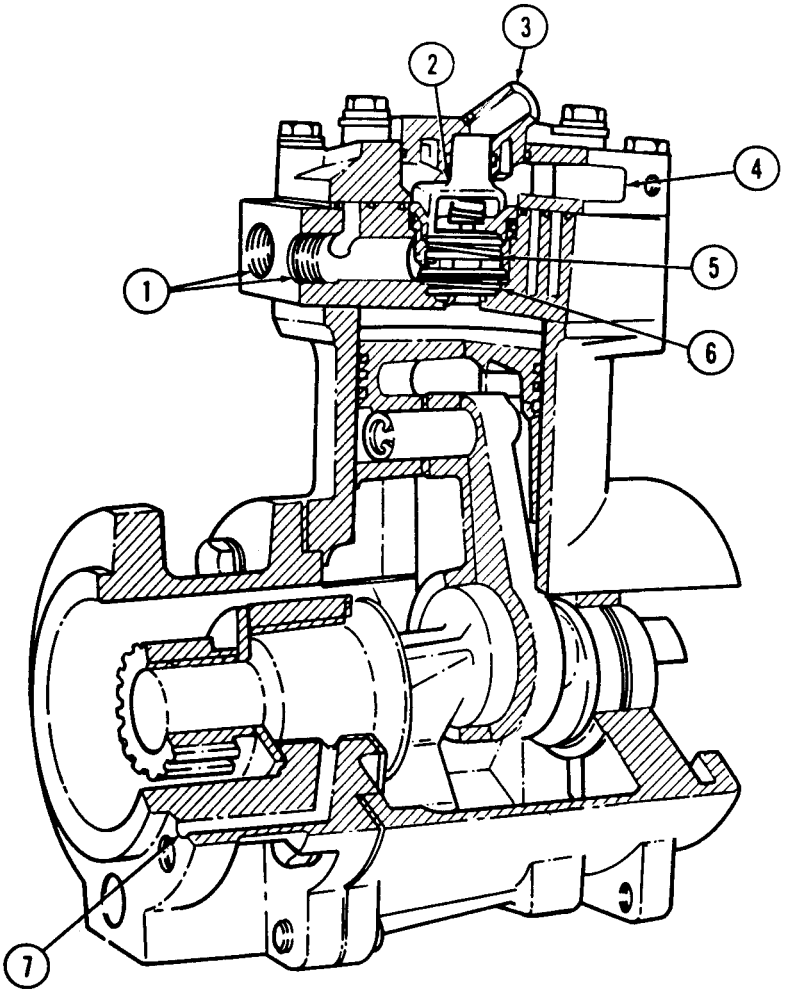
Refer to TM 9-2320-358-24&P for unique M939A2 maintenance procedures.

Section I. DESCRIPTION AND DATA

10-1. DESCRIPTION – AIR COMPRESSOR

a. The single cylinder air compressor is a standard accessory on the NHC-250 diesel engine.

b. The air compressor shown is driven from the accessory drive gear in the front gearcase. The air compressor is flange mounted to the accessory drive, which is mounted directly to the rear of the front gearcase. The air compressor is cooled and lubricated by the engine's cooling and lubrication systems.



AIR COMPRESSOR

1. Coolant Inlet and Outlet Ports
2. Unloader Valve
3. Air Governor Connection
4. Air Inlet
5. Intake Valve
6. Exhaust Valve
7. Lubrication Passage

TA 350567

10-1. DESCRIPTION - AIR COMPRESSOR (Cont'd)

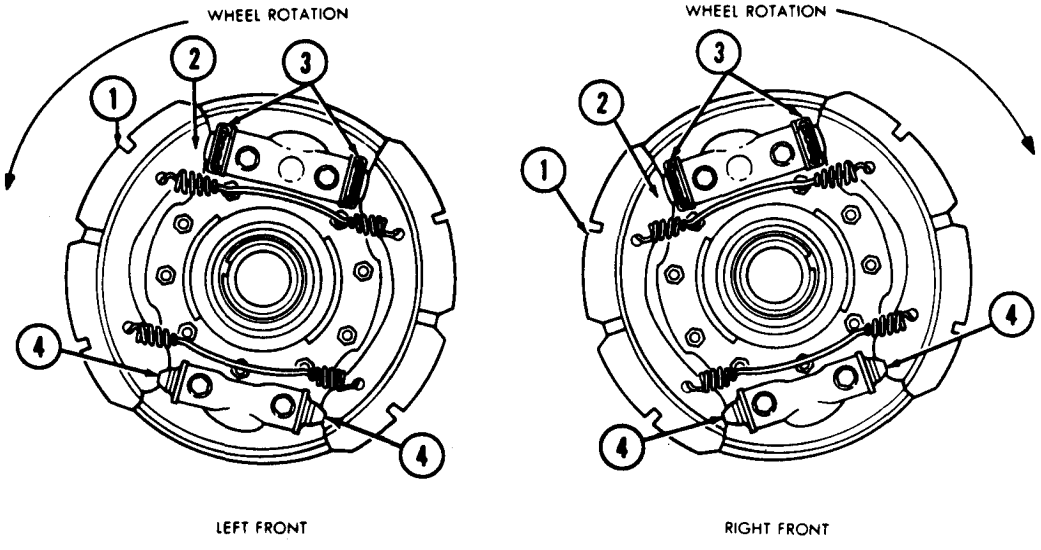
Table 10-1. Air Compressor Tabulated Data

Compressor Capacity @ 1250 rpm	13.2 CFM (6.23 l/sec)
Cylinders	1
Piston Displacement	18.05 cu. in. (296 ml)
Bore	3.63 in. (92.07 mm)
Stroke	1.75 in. (44.45 mm)
Speed	Engine speed
Coolant	Engine coolant
Lubrication	Engine oil
Water inlet tubing and outlet tubing outside diameter	0.50 in. (12.70 mm)
Air inlet tubing, inside diameter	0.88 in. (22.22 mm)
Air outlet tubing, inside diameter	0.50 in. (12.70 mm)
Height overall (approx)	12.25 in. (31.11 cm)
Width overall (approx)	5.75 in. (14.60 cm)
Length overall (approx)	9 in. (22.86 cm)
Weight overall (approx)	40 lb (18.14 kg)

10-2. DESCRIPTION - BRAKESHOES AND SYSTEM COMPONENTS

a. The shoe components are shown in installed position. Incorrect installation will prevent automatic adjusters from working. The long radius of the shoe web points to the star wheel of the adjustable plunger, and the arrow stamped on the shoe web points to the anchor plunger in the forward wheel rotation.

b. Refer to TM 9-2320-272-20-1 for complete description and data of the brake components.

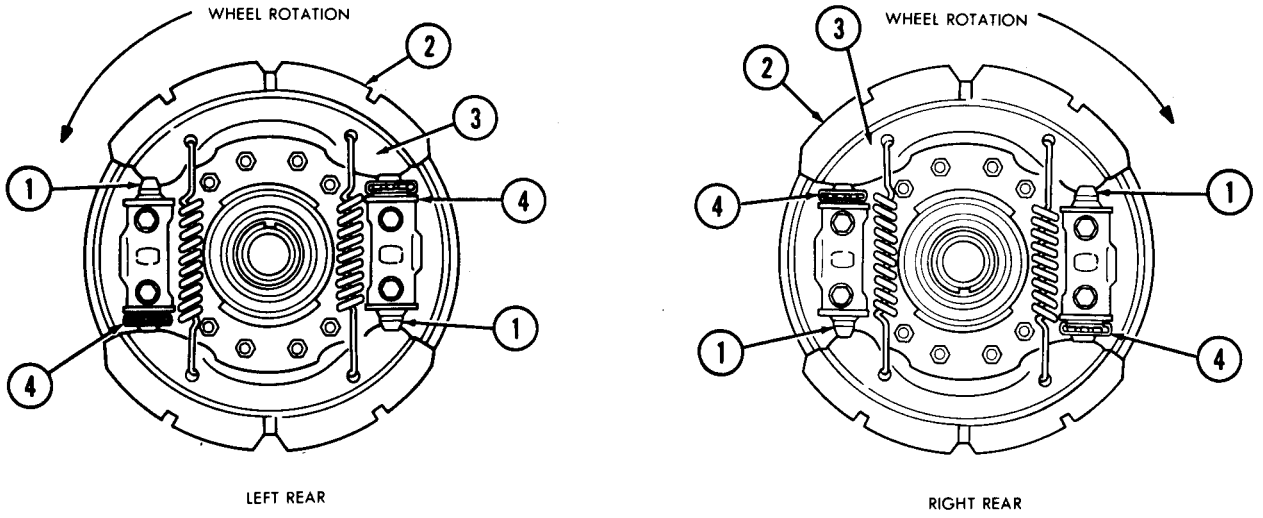


FRONT BRAKES

1. Shoe Lining
2. Shoe Web
3. Adjustable Plunger Star Wheel
4. Anchor Plunger

TA 350568

10-2. DESCRIPTION – BRAKESHOES AND SYSTEM COMPONENTS (Cont'd)



REAR BRAKES

1. Anchor Plunger
2. Shoe Lining
3. Shoe Web
4. Adjustable Plunger Star Wheel

Section II. COMPRESSED AIR AND BRAKE SYSTEMS COMPONENTS MAINTENANCE

10-3. AIR COMPRESSOR AND BRAKE SYSTEMS MAINTENANCE TASK SUMMARY

10-4. AIR COMPRESSOR MAINTENANCE

This task covers:

a. Disassembly
b. Cleaning
c. Inspection and repair
d. Assembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	Para. 10-5	Air compressor removed.

Test Equipment

Depth micrometer
Outside diameter micrometer
Inside diameter micrometer
Feeler gage
Cylinder bore dial gage
Spring tester
Dial indicator gage

Special Tools

Mounting plate 3375133

Special Environmental Conditions

None

Materials/Parts

Repair kit 3011472
Repair kit AR-73350
Twelve lockwashers
Anti-seize compound (Appendix C, Item 3)
Lubricating oil (Appendix C, Item 17)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

- Fire extinguisher will be kept nearby when drycleaning solvent is used.
- Eye protection must be worn when using compressed air.

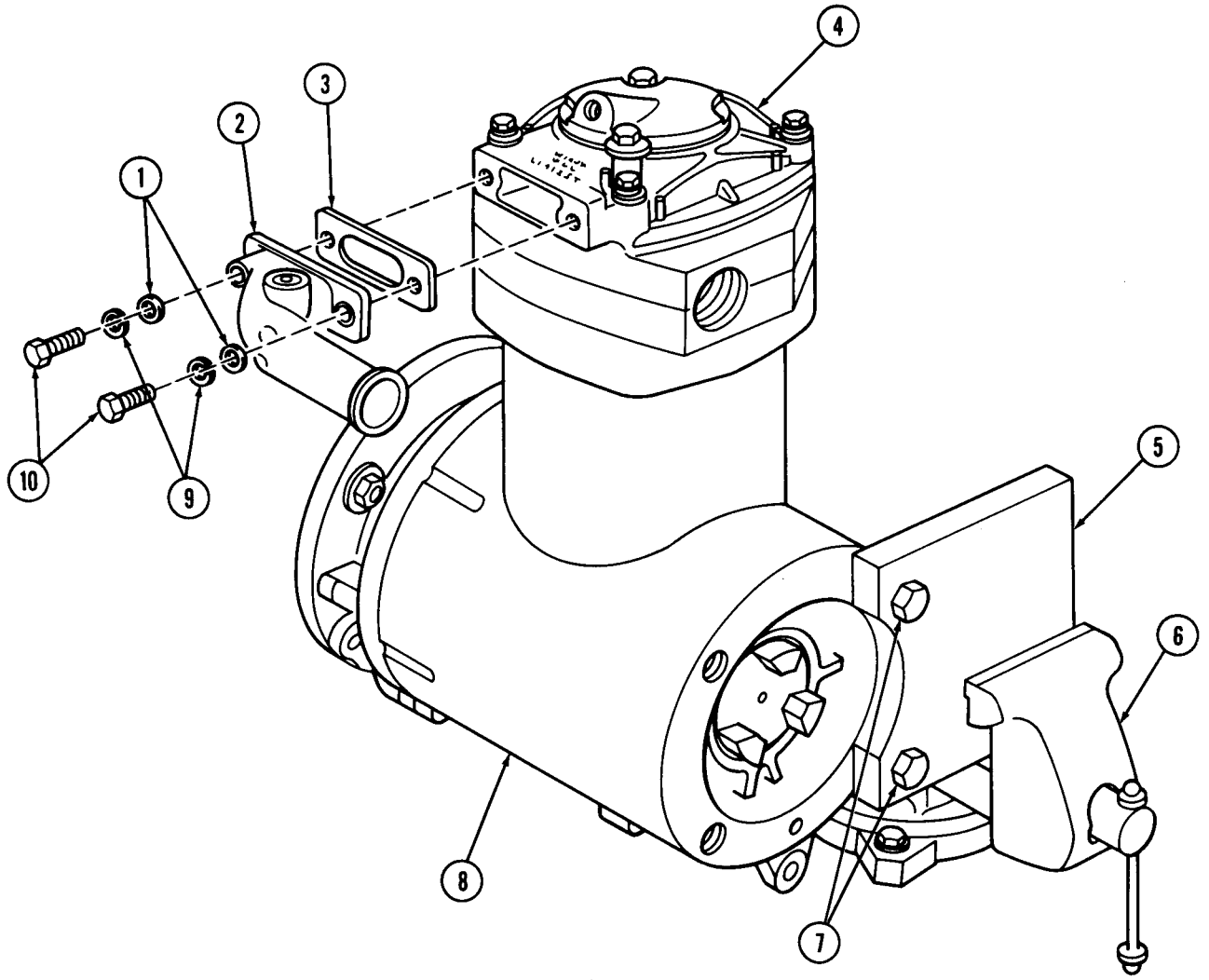
Manual References

TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Air compressor (8)	Mounting plate (5) and two screws (7)	Install.	
2.		Mounting plate (5) and air compressor (8)	Secure tightly in vise (6).	
3.	Cylinder head cover (4)	Two screws (10), lockwashers (9), washers (1), air inlet connection (2), and gasket (3)	Remove.	Discard lockwashers (9) and gasket (3).

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



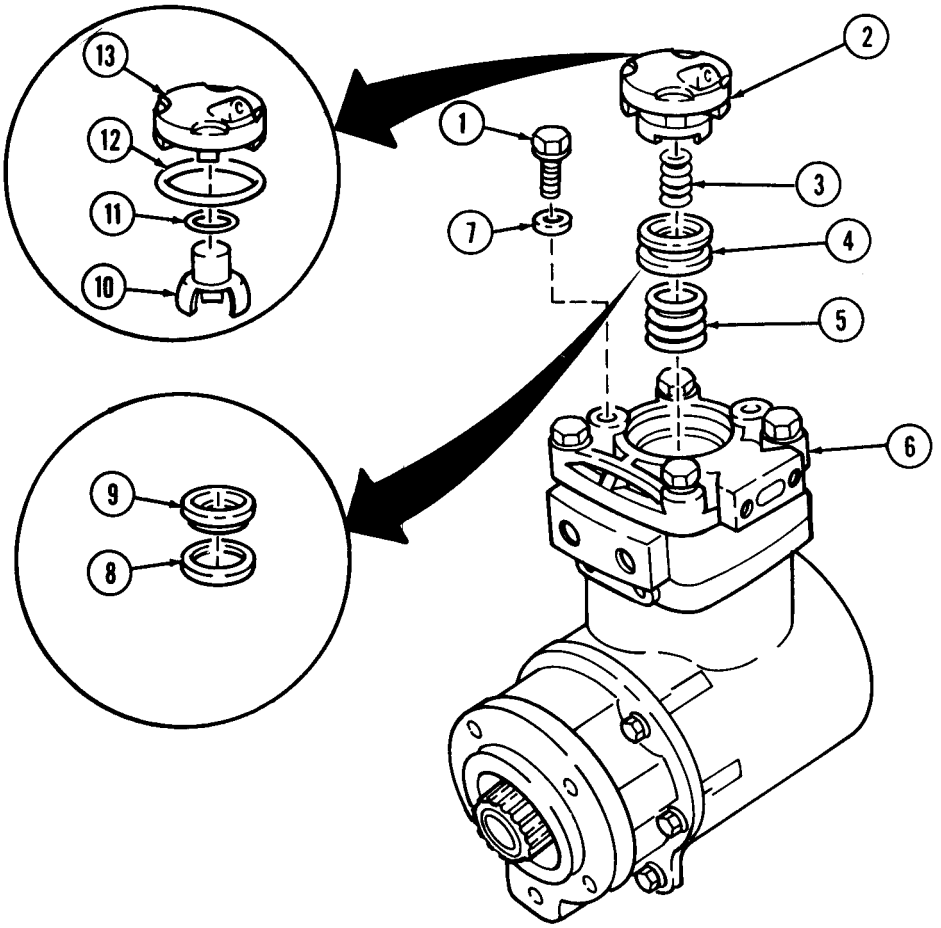
TA 350570

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Cylinder head cover (6)	Two screws (1), and washers (7), unloader valve assembly (2), unloader valve spring (3), intake valve assembly (4), and intake valve spring (5)	Remove.	
5.	Unloader valve assembly (2)	Unloader cap (10), "O" ring (12) and packing seal (11)	Remove from unloader valve body (13).	Discard "O" ring (12) and packing seal (11).
6.	Intake valve assembly (4)	Intake valve seat (9) and disk valve (8)	Separate.	

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



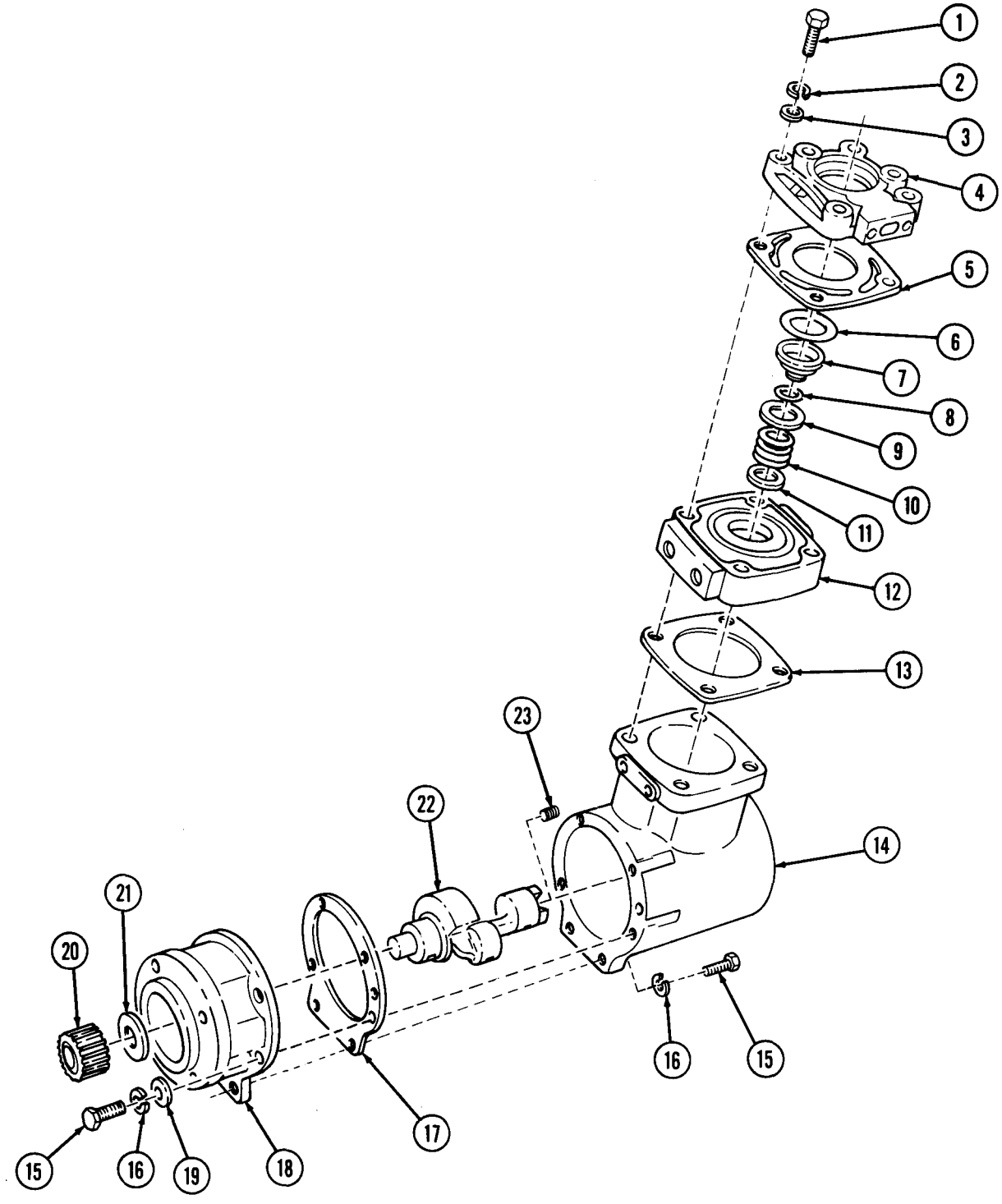
TA 350571

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Cylinder head (12)	Four screws (1), lockwashers (2), washers (3), cylinder head cover (4), and gasket (5)	Remove.	Discard lockwashers (2) and gasket (5).
8.	Crankcase (14)	Cylinder head (12) and gasket (13)	Remove.	Discard gasket (13).
9.	Cylinder head (12)	Exhaust valve seat (7)	Remove by pressing exhaust valve seat (7) from bottom side of cylinder head (12).	
10.	Exhaust valve seat (7)	"O" ring (6), packing seal (8), and exhaust valve (9)	Remove.	Discard "0" ring (6) and packing seal (8).
11.	Cylinder head (12)	Wear plate (11) and exhaust valve spring (10)	Remove.	
12.	Crankcase (14)	Six screws (15), lockwashers (16), and four washers (19)	Remove.	
		CAUTION Use care when removing crankshaft from connecting rod to avoid damage.		
13.		Front support (18), crankshaft (22), and gasket (17)	Remove as an assembly.	Rotate crankshaft (22) 90 degrees before or after top dead center of piston for ease of removal. Discard gasket (17).
14.	Crankshaft (22)	Pipe plug (23)	Remove.	
15.	Front support (18)	Drive coupling (20), thrust washer (21), and crankshaft (22)	Remove.	Use arbor press.

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



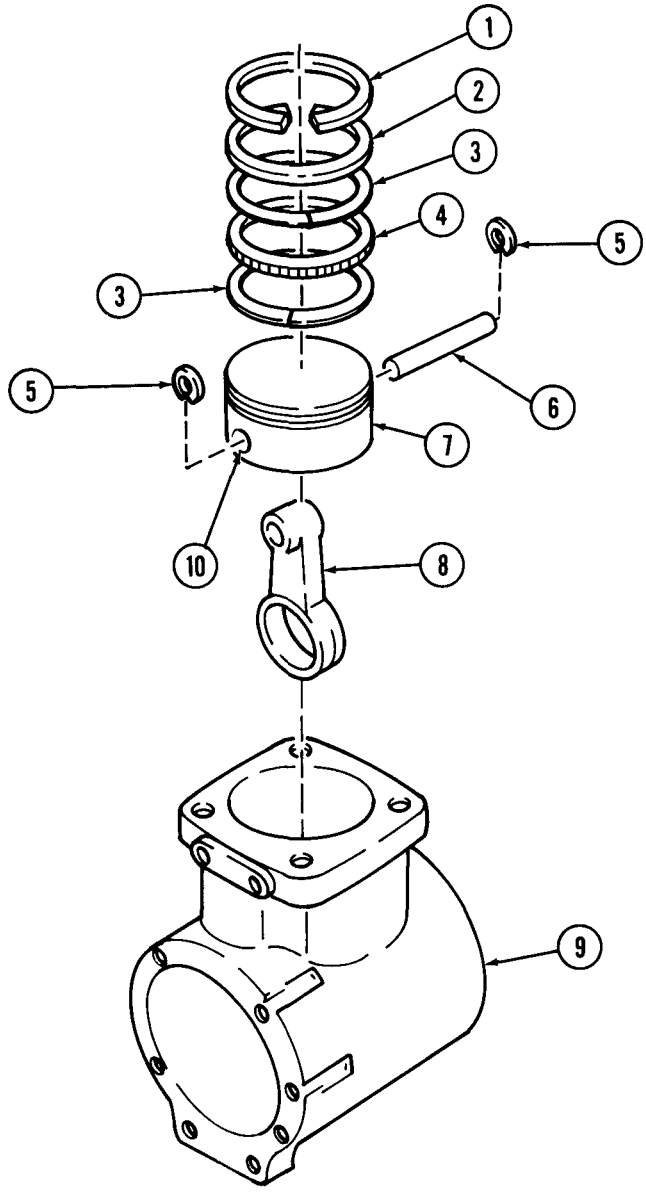
TA 350572

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.	Crankcase (9)	Piston (7) and connecting rod (8)	Remove through crankcase (9) cylinder.	
17.	Piston (7)	a. Top compression ring (1)	Remove.	Discard top compression ring (1).
		b. Intermediate compression ring (2)	Remove.	Discard intermediate compression ring (2).
		c. Oil ring expander (4) and two oil rings (3)	Remove.	Discard oil rings (3) and oil ring expander (4).
18.		Two retaining rings (5), piston pin (6), and connecting rod (8)	Remove.	If piston pin (6) cannot be removed from piston (7) by hand pressure, place piston (7) in hot water to expand piston pin bore (10) to allow removal. Driving pin (6) from piston (7) may damage piston (7).

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

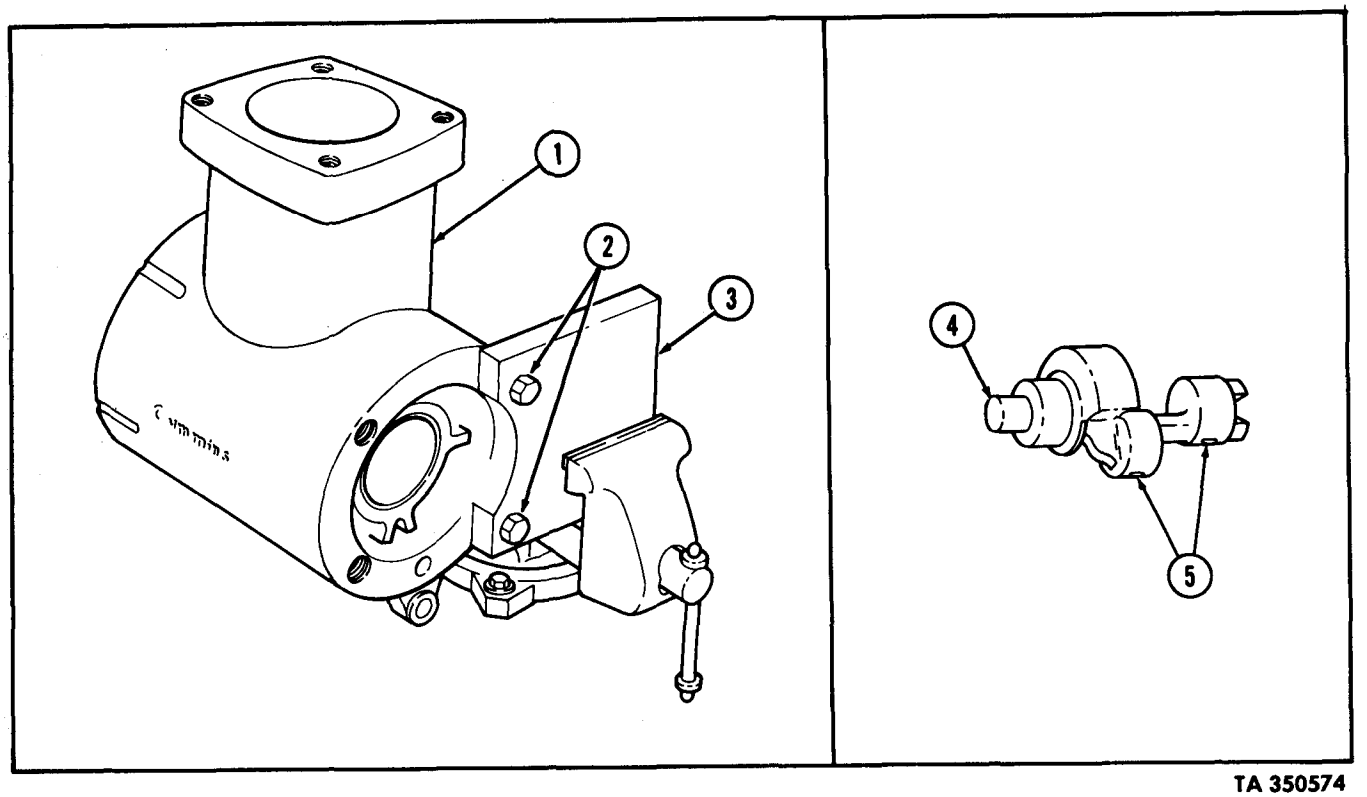
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350573

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

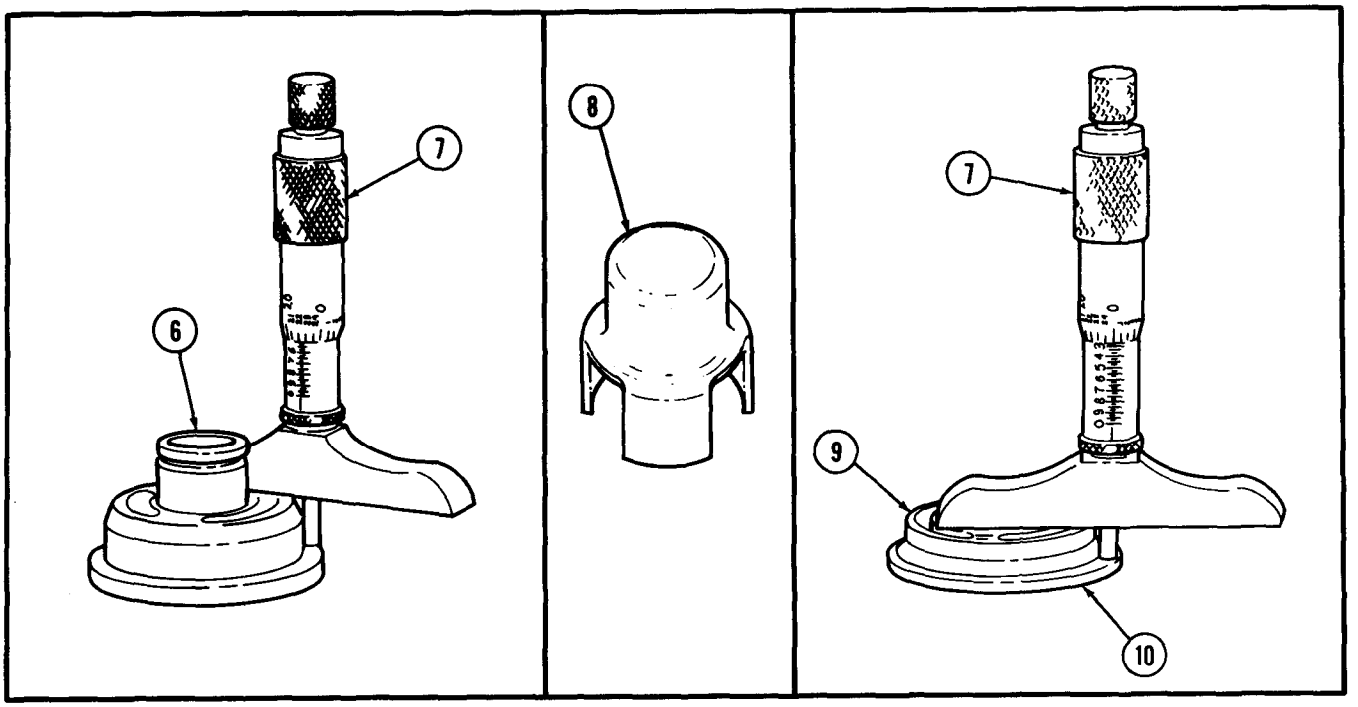
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Cleaning				
			WARNING • Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel. • Compressed air source will not exceed 30 psi (207 kPa). When cleaning with compressed air, eyeshields must be worn. Failure to wear eyeshields may result in injury to personnel.	
19.	Crankcase (1)	Mounting plate (3), and two screws (2)	Remove.	
20.		All metal parts	a. Immerse and clean in drycleaning solvent.	Clean gasket remains from all surfaces.
			b. Remove all carbon, rust and scale.	Make sure all mating surfaces are clean and smooth, without damage.
			c. Blow dry with compressed air.	Make sure that interior drilled oil passages (5) in crankshaft (4) are thoroughly cleaned.



TA 350574

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Inspection and Repair				
21.		Exhaust valve (6)	Measure seat height.	Use depth micrometer (7). If seat height is less than 0.485 in. (12.32 mm), replace.
22.		Intake valve (9)	a. Measure seat height.	If height is less than 0.270 in. (6.86 mm), replace.
			b. Measure intake valve surface (10).	Surface must be flat within 0.001 in. (0.03 mm) total micrometer reading. If not, replace.
23.		Unloader cap (8)	a. Check narrow part for scoring and excessive wear.	If scored or excessively worn, replace.
			b. Check seating surface for distortion, pitting, and wear.	If distorted, pitted, or worn, replace.



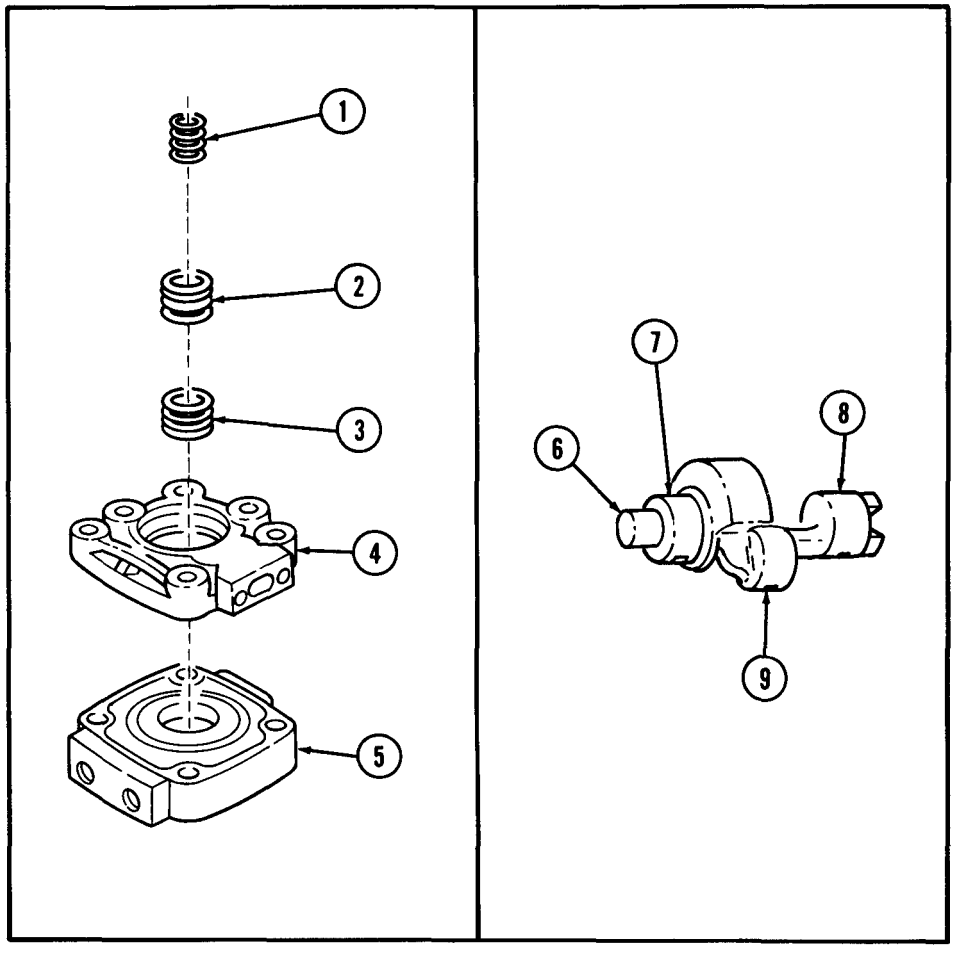
TA 350575

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION.	ITEM	ACTION	REMARKS
24.		Cylinder head (5) and cylinder head cover (4)	Check for cracks and breaks.	If cracked or broken, replace.
25.		Unloader valve spring (l), intake valve spring (2), and exhaust valve spring (3)	Measure spring characteristics.	Use spring tester and dial gage. If less than acceptable wear limits, replace. Wear limit for unloader valve spring (1) is 12.00 lb (5.4 kg). Wear limit for intake valve spring (2) is 0.55 lb (0.25 kg). Wear limit for exhaust valve spring (3) is 8.00 lb (3.63 kg).
26.		Crankshaft (6)	a. Check for scratches, scoring, and wear.	If scratched, scored, or worn, replace.
			b. Measure journals (7), (8), and (9).	Use outside diameter micrometer. If less than acceptable wear limits, replace. Wear limit for journal (7) is 1.871 in. (47.52 mm). Wear limit for journal (9) is 1.933 in. (49.10 mm). Wear limit for journal (8) is 1.871 in, (47.52 mm).

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

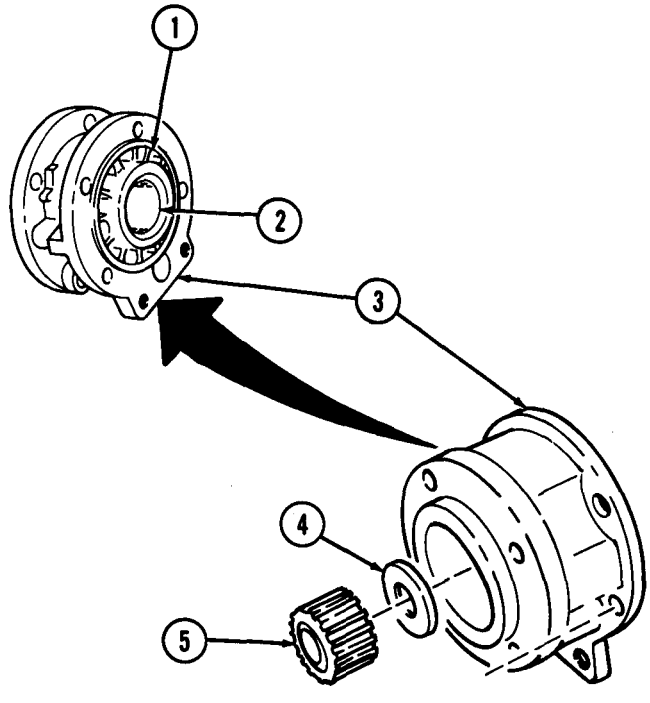
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350576

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

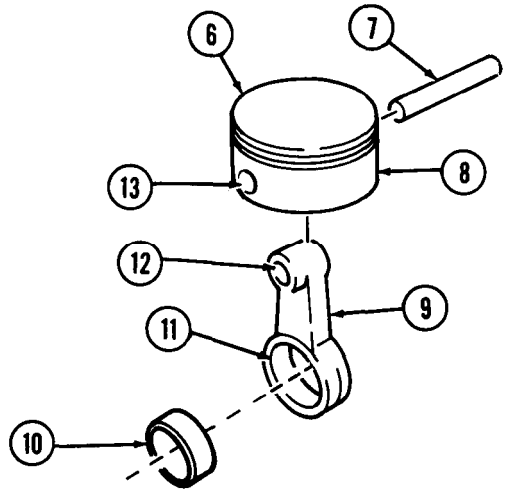
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
27.		Front support (3)	a. Check for scratches, scoring, and wear.	Replace if scratched, scored, or worn.
			b. Measure thrust flange (1).	Use outside diameter micrometer. Replace, if measurement is less than 1.287 in. (32.69 mm).
28.		Thrust bearing (4)	Measure thickness.	Replace, if measurement is less than 0.240 in. (6.10 mm).
29.		Support bearing (2)	a. Check for scoring and wear.	If scored or worn, replace.
			b. Measure inside diameter.	Use inside diameter micrometer. Replace if measurement is more than 1.887 in. (47.69 mm).
30.		Drive gear (5)	Inspect for wear, scoring, and damage.	If scored, excessively worn, or damaged, replace.



TA 350577

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
31.		Connecting rod bushing (10)	Check for scoring and damage.	If scored or damaged, replace connecting rod (9).
32.		Connecting rod (9)	a. Check for bend and twist.	If bend exceeds 0.002 in. (0.05 mm) or if twist exceeds 0.004 in. (0.10 mm), replace.
			b. Measure inner diameter of piston end (12) and crankshaft (11) end of connecting rod (9).	If piston end exceeds 0.689 in. (17.50 mm), replace. If crankshaft end exceeds 1.935 in. (49.15 mm), replace.
33.		Piston pin (7)	Measure outside diameter.	If measurement is less than 0.687 in. (17.45 mm), replace.
34.		Piston (6)	a. Make visual check for scoring, cracks, wear, and damage.	If scored, cracked, worn, or damaged, replace.
			b. Measure skirt (8) diameter.	If measurement is less than 3.617 in. (91.86 mm) at 70°F (21°C), replace.
			c. Measure pin bore (13) diameter.	If measurement is more than 0.689 in. (17.50 mm) at 70°F (21°C), replace.



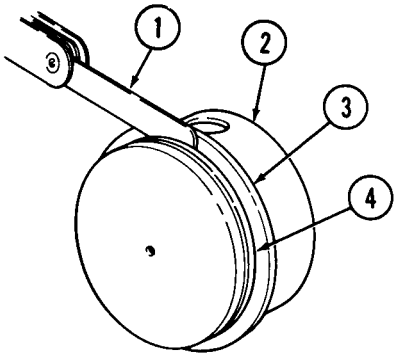
TA 350578

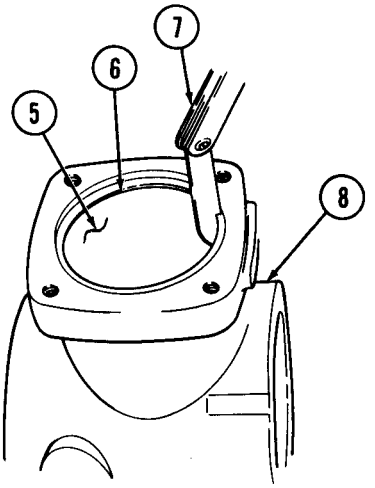
10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

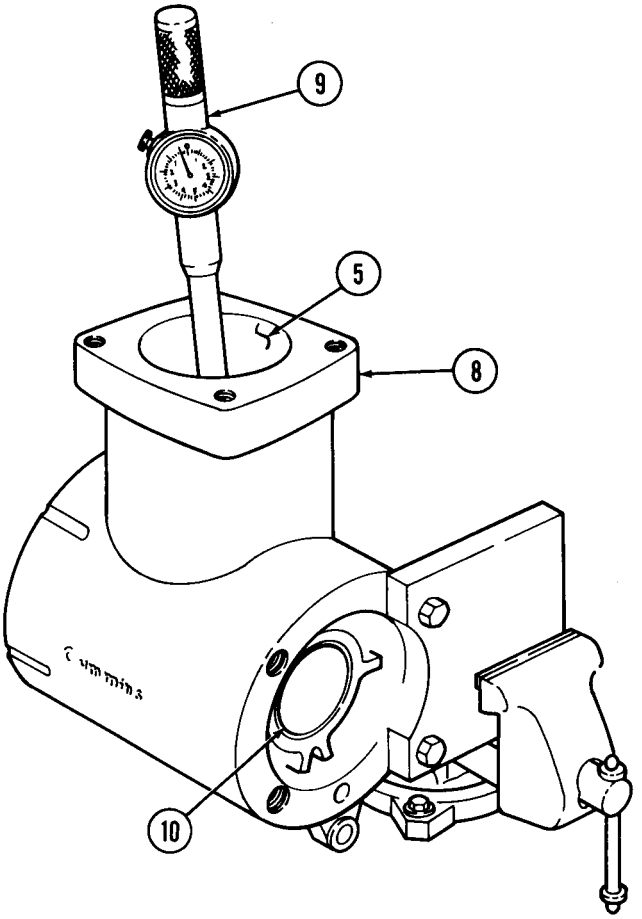
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
35.		Piston (2)	a. Install new ring (3) in groove (4).	
			b. Insert 0.004 in. (0.10 mm) feeler gage (1) between ring and groove.	
			c. Compress ring (3) into groove (4).	If ring (3) can be pressed below piston surface with feeler gage (1) in place, replace piston (2).
36.		Crankcase (8)	a. Seat piston ring (6) in unworn portion of bore (5).	
			b. Measure ring end gap with feeler gage (7).	Gap should be 0.010 to 0.020 in. (0.25 to 0.51 mm).
			c. Inspect bore (5) for scoring.	Hone bore as required to remove glaze.
			d. Check bore (5) for out-of roundness with a dial bore gage (9).	Maximum out-of-round is 0.002 in. (0.04 mm). If not within specifications, hone bore to receive 0.010, 0.020, or 0.030 in. (0.25, 0.51, or 0.76 mm) oversize piston and rings.
37.	Crankcase (8)	Crankshaft bushing (10)	Measure inner diameter.	Use inside diameter micrometer. If measurement exceeds 1.878 in. (47.70 mm), replace.

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







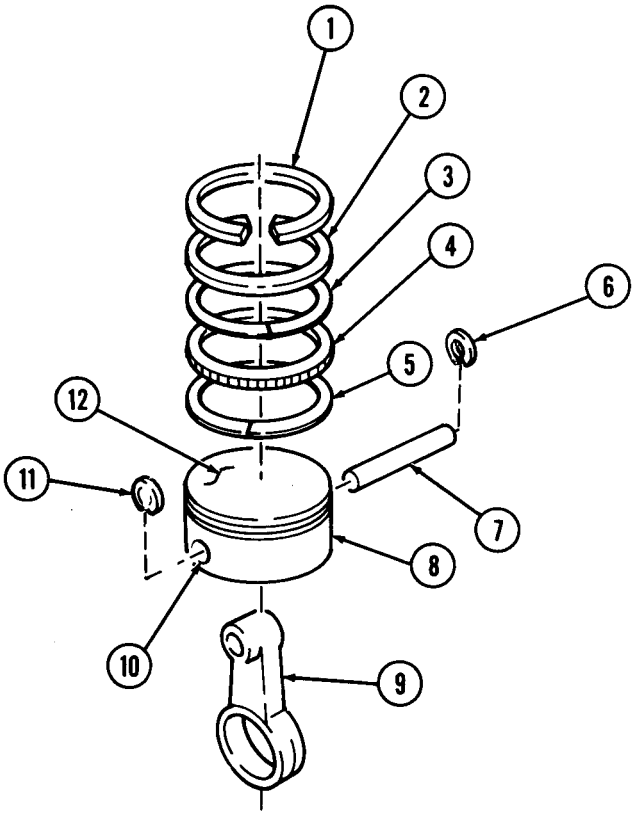
TA 350579

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
38.		Retaining ring (11)	Install in piston pin ring groove in piston pin bore (10).	
39.		Connecting rod (9)	Place piston end in piston (8).	
		CAUTION		
		Do not drive piston pin into bore. Damage to piston will result.		
40.		Piston pin (7)	Install through piston pin bore (10) and connecting rod (9) until seated against retaining ring (11).	
		NOTE		
		If pin cannot be installed by hand pressure, heat piston in hot water to expand pin bore.		
41.		Retaining ring (6)	Install in piston pin bore (10).	
42.		Oil ring (4) and two expander rings (3) and (5)	Install in bottom piston ring groove.	Expander rings (3) and (5) gaps and oil ring (4) gaps must be 180 degrees apart. Make sure ends of expander rings (3) and (5) do not overlap.

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
43.		Compression ring (1) and intermediate ring (2)	a. Install. b. Stagger gaps 180 degrees apart. c. Lubricate with clean lubricating oil.	Compression ring (1) is installed with word "top" toward crown of piston (12).



TA 350580

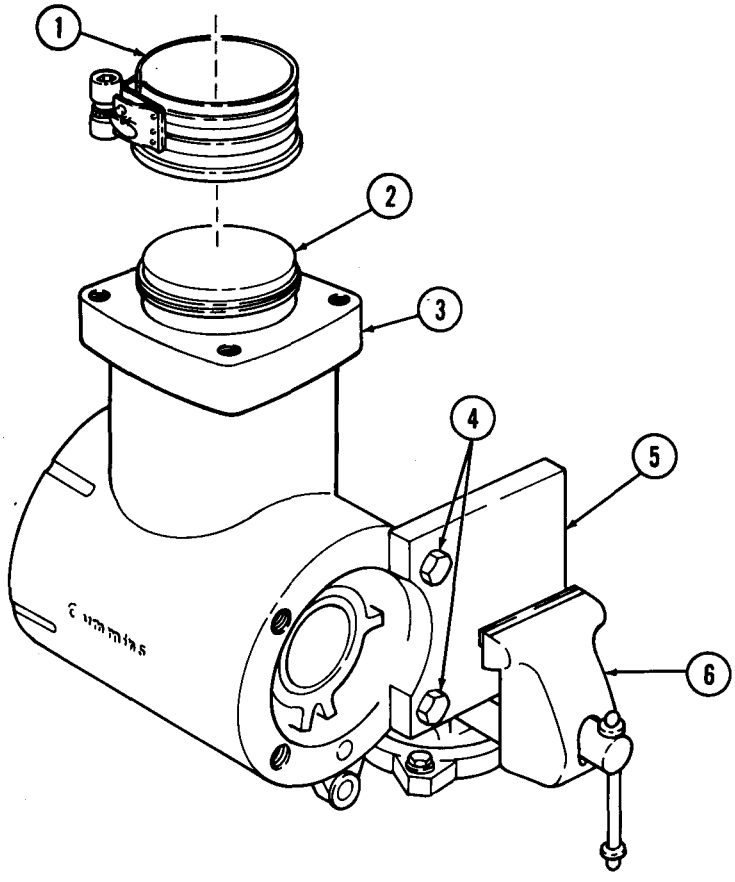
10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
44.		Air compressor crankcase (3)	Install on mounting plate (5) with two screws (4).	
45.		Mounting plate (5) and crankcase (3)	Install tightly in vise (6).	
46.		Ring compressor (1)	Install on piston and connecting rod assembly (2).	

CAUTION

Do not force piston into cylinder. This can crack rings and/or damage cylinder wall.

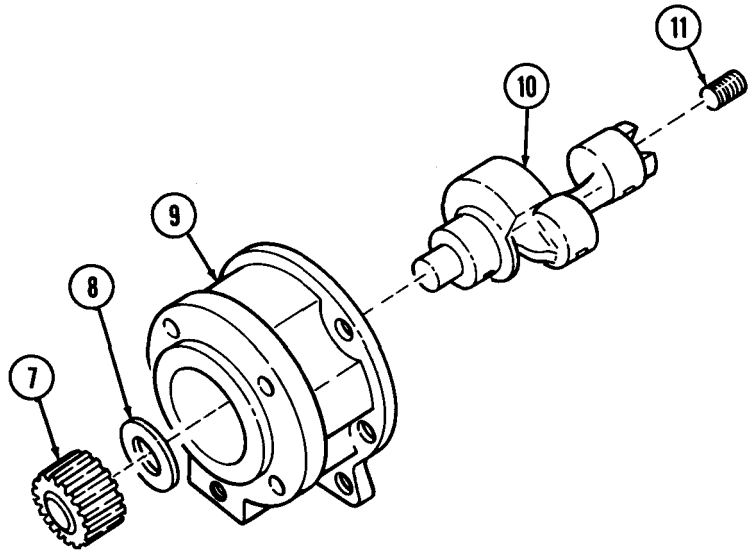
47.		Piston and rod assembly (2) and crankcase (3)	Lubricate with clean lubricating oil.	
48.		Piston and rod assembly (2)	Install in crankcase (3) cylinder bore.	



TA 350581

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

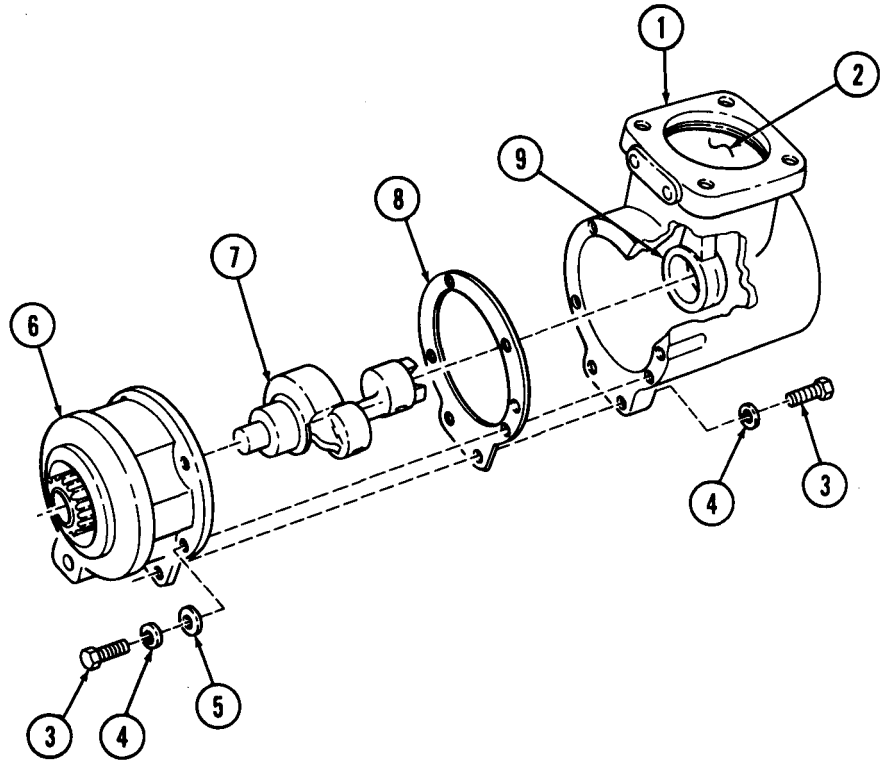
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
49.		Crankshaft (10)	Lubricate and install in crankshaft support (9).	
50.		Pipe plug (11)	Install in crankshaft (10).	
51.		Thrust bearing (8)	Install in support (9) on crankshaft (10) end.	Install with notches toward crankshaft (10).
52.		Drive gear (7)	Install on crankshaft (10).	Install with protruding end of gear (7) toward crankshaft (10). Use arbor press.



TA 350582

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

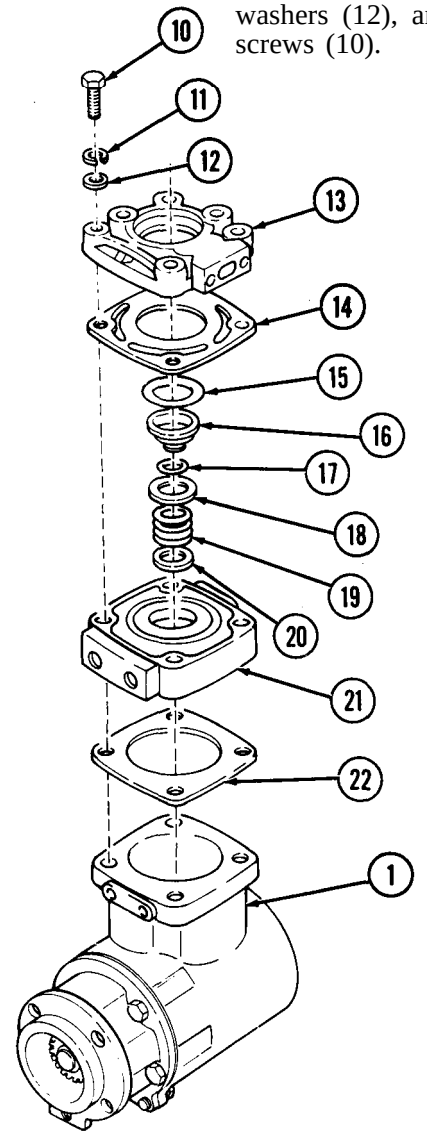
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
53.		Crankshaft (7), support assembly (6), and new gasket (8)	Install in crankcase (1) as follows:	
			a. Position piston (2) at 90 degrees before or after top dead center.	This will allow crankshaft (7) to be installed through connecting rod (9).
			b. Insert crankshaft (7) and support assembly (6) in crankcase (1) and connecting rod (9) journal.	
			c. Install on crankcase (1) with four washers (5) and six screws (3) and new lockwashers (4).	Tighten 30-35 lb-ft (41-48 N·m).



TA 350583

10-4. AIR COMPRESSOR MAINTENANCE [Cont'd)

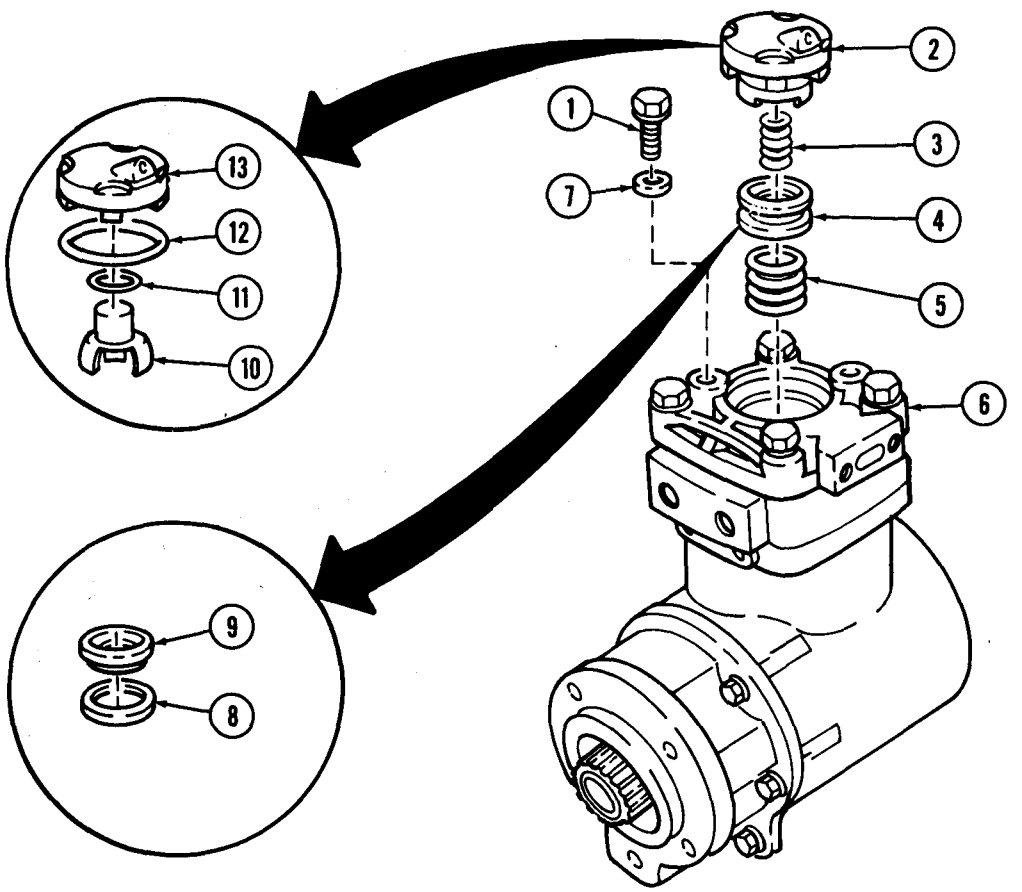
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
54.		Exhaust valve (18), new "O" ring (15), and packing seal (17)	Install on exhaust valve seat (16).	
55.		Wear plate (20), exhaust valve spring (19), and valve seat (16)	Install in cylinder head (21).	Use thumb pressure to press valve seat (16) into position in cylinder head (21).
56.		New gasket (22) and cylinder head (21)	Install on crankcase (l).	
57.		New gasket (14) and cylinder head cover (13)	Install on cylinder head (21) with four new lockwashers (11), washers (12), and screws (10).	



TA 350584

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

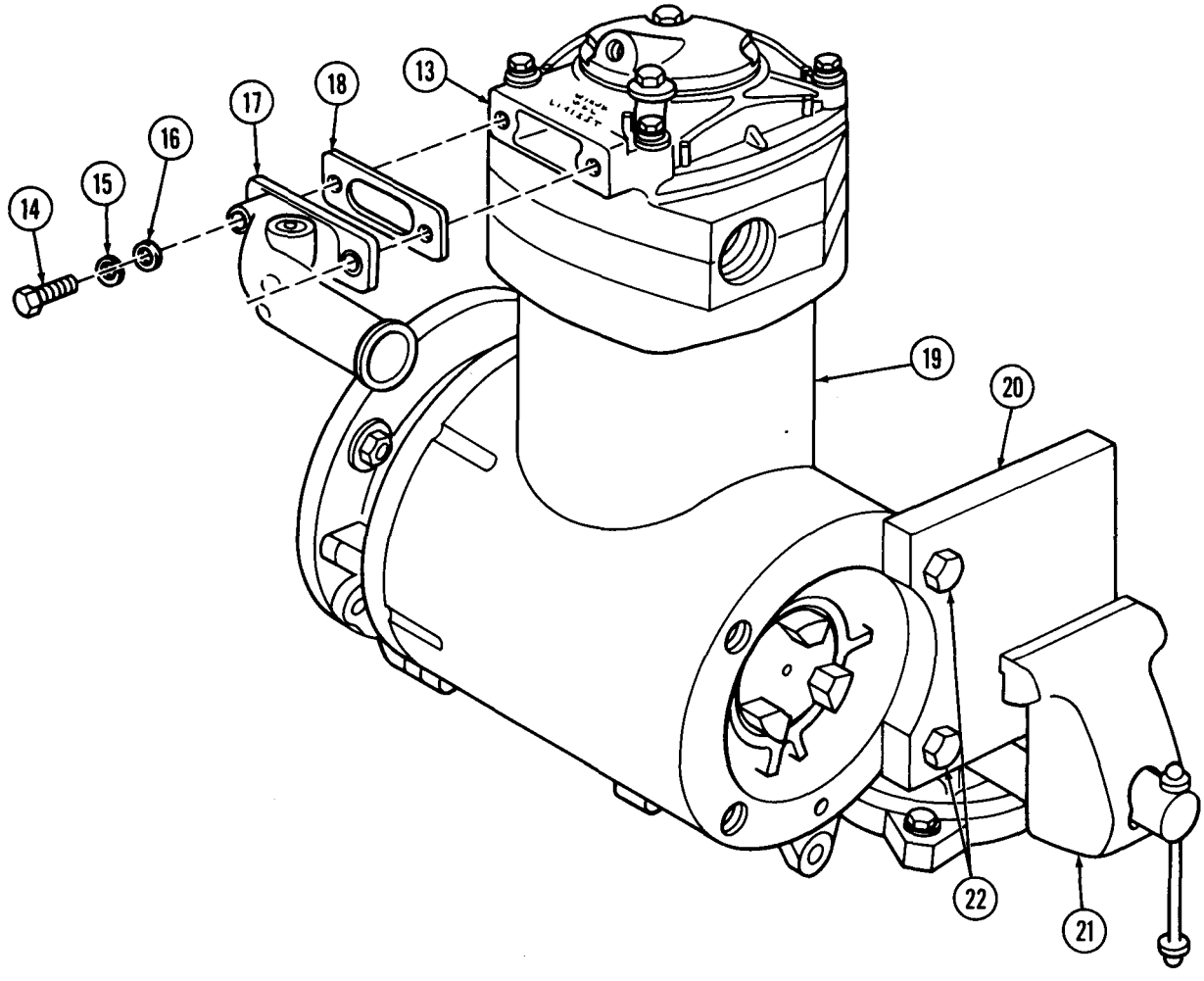
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
58.		New "O" ring (12), new packing seal (11), and unloader valve (10)	Install in unloader cap (13).	
59.		Intake valve (8)	Install on intake valve seat (9).	
60.		Intake valve seat assembly (4) and intake valve spring (5)	Install in cylinder head cover (6).	
61.		Unloader spring (3) and unloader cap assembly (2)	Install in cylinder head cover (6) with two screws (1) and washers (7).	



TA 350585

10-4. AIR COMPRESSOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
62.		New gasket (18) and air inlet connection (17)	Install on cylinder head cover (13) with two washers (16), new lockwashers (15), and screws (14).	
63.	Crankcase (19)	Mounting plate (20) and two screws (22)	Remove.	
64.	Vise (21)	Mounting plate (20)	Remove.	



END OF TASK!

FOLLOW-ON TASK: Install air compressor (para. 10-5).

10-5. AIR COMPRESSOR REPLACEMENT

This task covers:

a. Removal **b. Installation and Timing**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Air reservoirs drained.
	TM 9-2320-272-10 Para. 4-4	Left splash shield removed.
	Fuel pump removed.	
	TM 9-2320-272-20-2	Power steering pump removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Nine lockwashers
Housing support gasket
Four tube inserts
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

Do not disconnect air lines before draining air reservoirs.

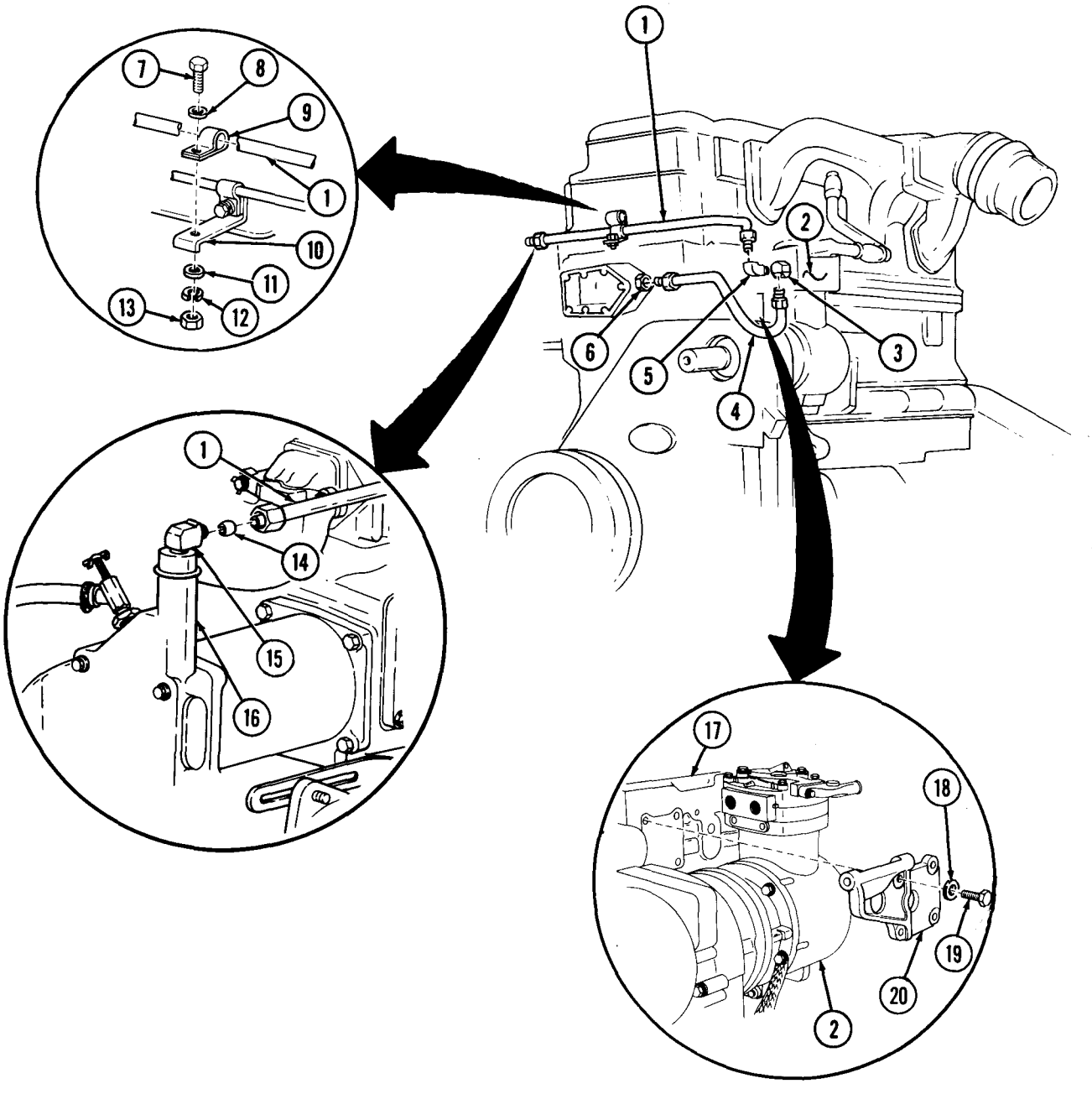
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		WARNING Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.		
1.	Air compressor (2) and engine oil cooler (16)	Coolant outlet line (1)	Disconnect from air compressor elbow (5) and engine oil cooler elbow (15).	
2.	Coolant outlet line support bracket (10)	Nut (13), lockwasher (12), washer (11), screw (7), washer (8), clamp (9) and coolant outlet line (1)	Remove.	Discard inserts (14) from ends of line (l). Discard lockwasher (12).
3.	Air compressor elbow (3) and water pump fitting (6)	Coolant inlet line (4)	Remove.	Discard inserts (14) from ends of line (4).

10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Engine block (17)	Four screws (19), washers (18) and power steering pump pivot bracket (20)	Remove.	



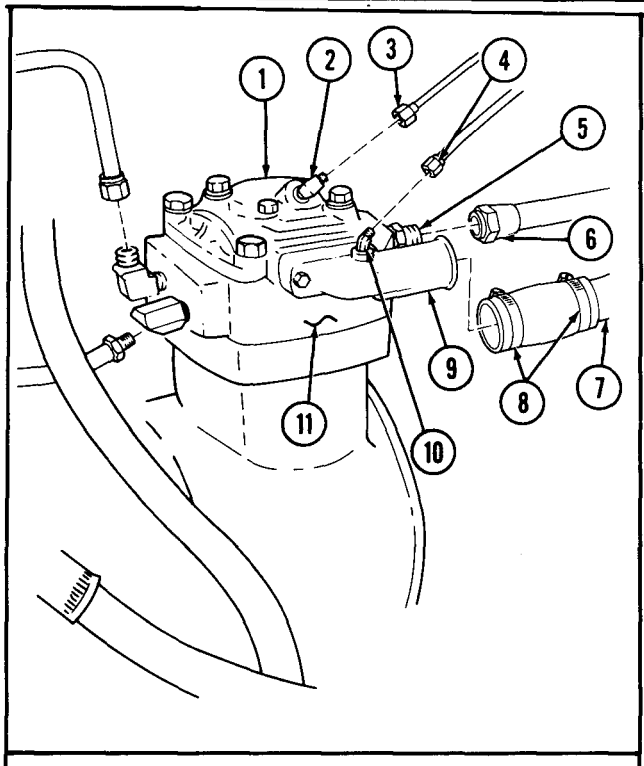
TA 350587

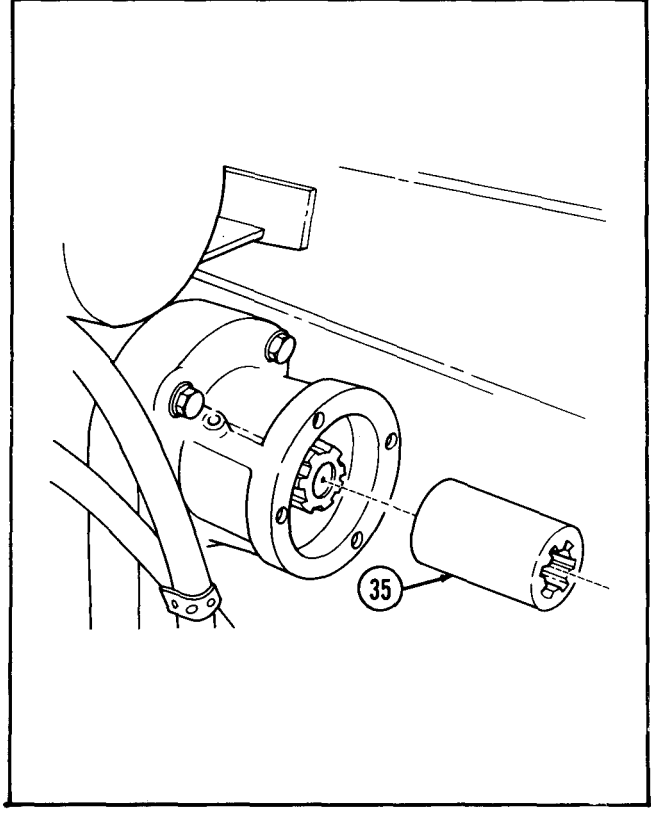
10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

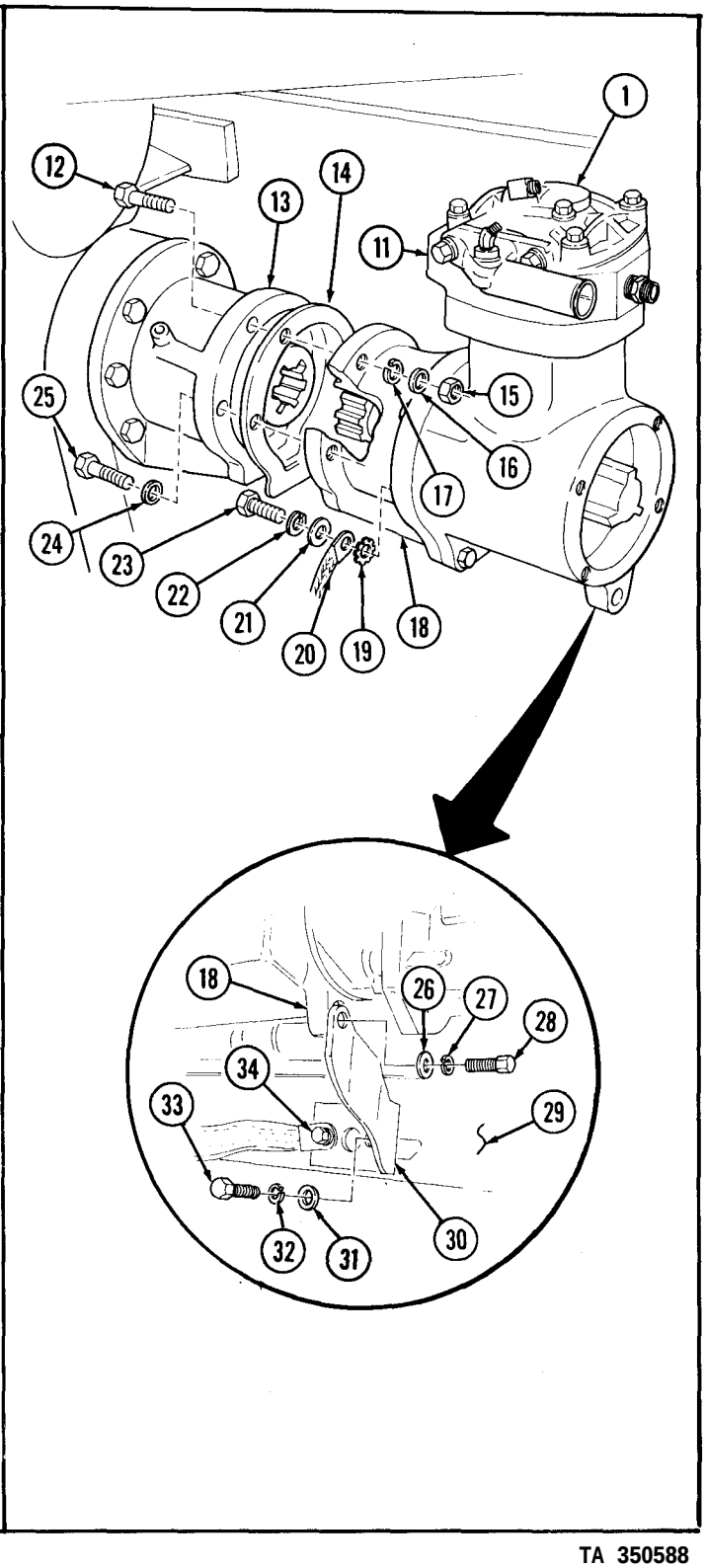
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Unloader valve body (1)	Air compressor to governor air line (3)	Disconnect from adapter elbow (2).	
6.	Compressor head (11)	Air compressor to alcohol evaporator air line (4)	Disconnect from adapter elbow (10).	
7.	Compressor inlet (9)	Air intake tube (7)	Loosen two clamps (8) and disconnect.	
8.	Compressor head (11)	Compressor to supply reservoir air line (6)	Disconnect from adapter (5).	
9.	Air compressor (18)	Screw (23), lockwasher (22), washer (21), ground cable (20), and lockwasher (19)	Remove.	Discard lockwashers (22) and (19).
10.	Air compressor (18) to accessory drive housing (13)	Two screws (25), lockwashers (24), two screws (12), lockwashers (17), washers (16), and nuts (15)	Remove.	Discard lockwashers (17) and (24).
11.	Air compressor (18) to bracket (30)	Screw (28), lockwasher (27), and washer (26)	Remove.	Discard lockwasher (27).
12.	Engine (29) to bracket (30)	Screw (33), washer (31), and lockwasher (32)	Remove.	Discard lockwasher (32).
13.		Screw (34)	Loosen and move bracket (30) down.	
14.		Air compressor (18)	Remove.	
15.		Gasket (14)	Remove.	Discard gasket (14). Clean gasket remains from mating surfaces.
16.		Coupling drive (35)	Remove.	

10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







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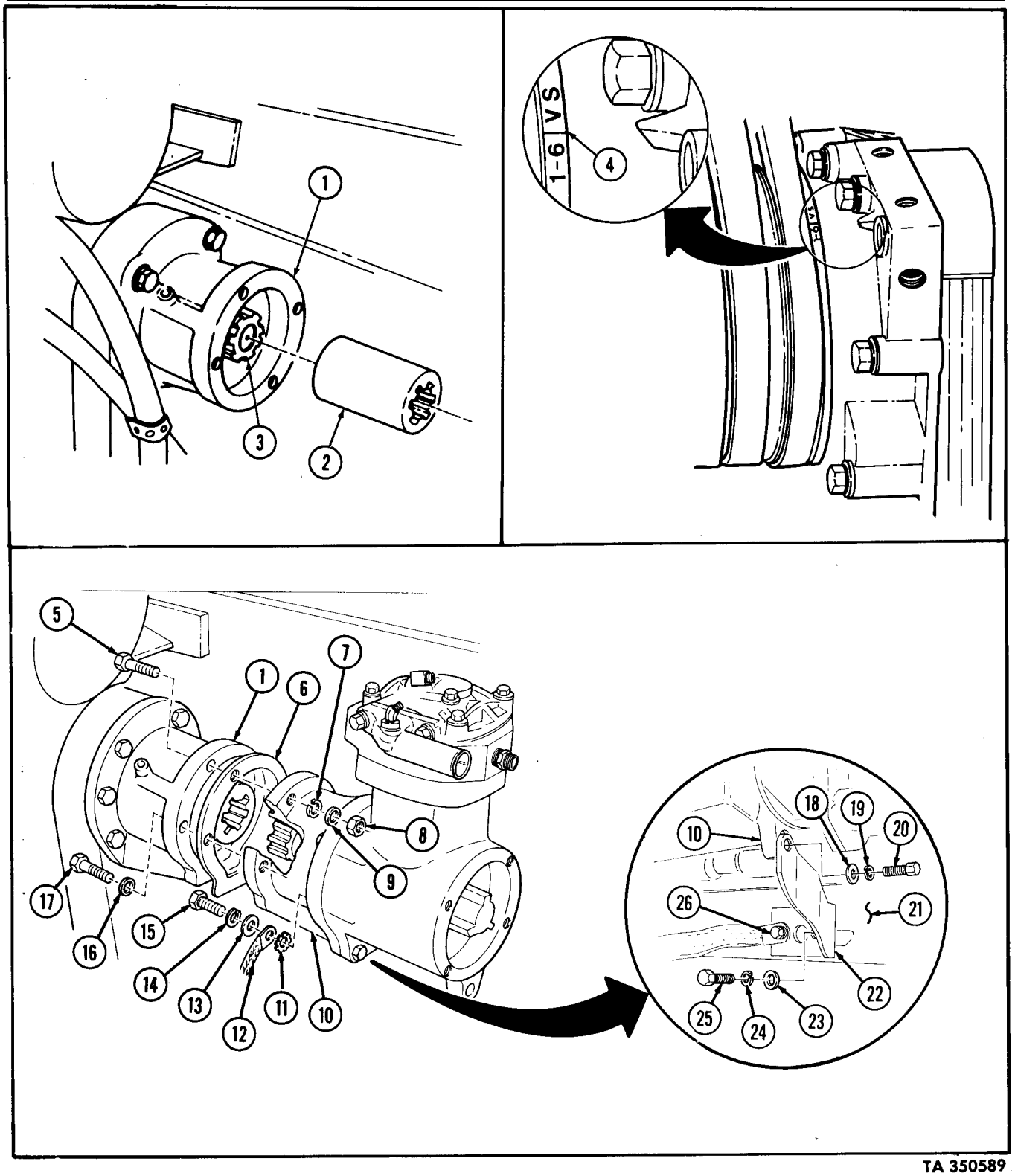
10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		b. Installation and Timing		
17.		Coupling drive (2)	Position in accessory drive housing (1) over accessory drive (3).	
			NOTE • If installing new compressor, use fittings from old compressor. Clean all male pipe threads and wrap with sealing tape before installation. • Make sure oil passage holes in new gasket are open, and aline with oil passages before installation.	
18.		New gasket (6)	Aline on accessory drive housing (1).	
19.		Air compressor (10)	a. Bar engine to "l-6" valve set position index mark (4). b. Set air compressor timing mark pointing between 9 and 10 o'clock looking at coupling end. c. Install on accessory drive housing (1) with two screws (17), new lockwashers (16), two screws (5), new lockwashers (7), washers (9) and nuts (8).	
20.		Ground cable (12)	Install on air compressor (10) with new lockwasher (11), washer (13), new lockwasher (14) and screw (15).	
21.		Bracket (22)	a. Install on air compressor (10) with screw (20), new lockwasher (19), and washer (18). b. Install on engine (21) with screw (25), new lockwasher (24), and washer (23). Tighten screw (26).	

10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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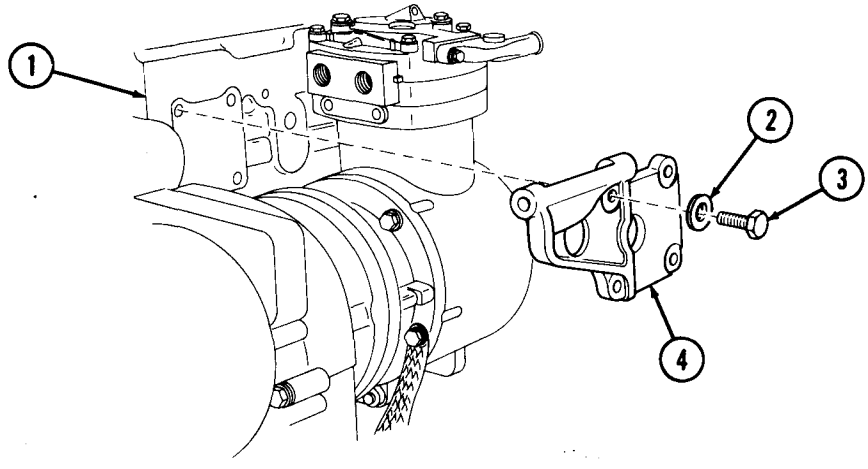
10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
22.		Coolant outlet line (5)	Connect to air compressor elbow (9), and oil cooler (13) elbow (12).	Use new inserts (11) on each end of line (5).
23.		Coolant outlet line (5)	Install on outlet line support bracket (17) with screw (14), washer (15), clamp (16), washer (18), new lockwasher (19), and nut (20).	
24.		Power steering pump pivot bracket (4)	Install on engine block (1) with four washers (2) and screws (3).	
25.		Coolant inlet line (8)	Connect to water pump fitting (10) and air compressor (6) elbow (7).	Use new inserts (11) on each end of line (8).
26.		Air intake tube (27)	Connect to compressor inlet air connection (29) with two clamps (28).	
27.		Air compressor to alcohol evaporator air line (24)	Install on head cover (31) adapter elbow (30).	
28.		Air compressor to governor air line (23)	Install on unloader valve body (21) adapter elbow (22).	
29.		Air compressor to supply reservoir air line (26)	Connect to compressor head adapter (25).	



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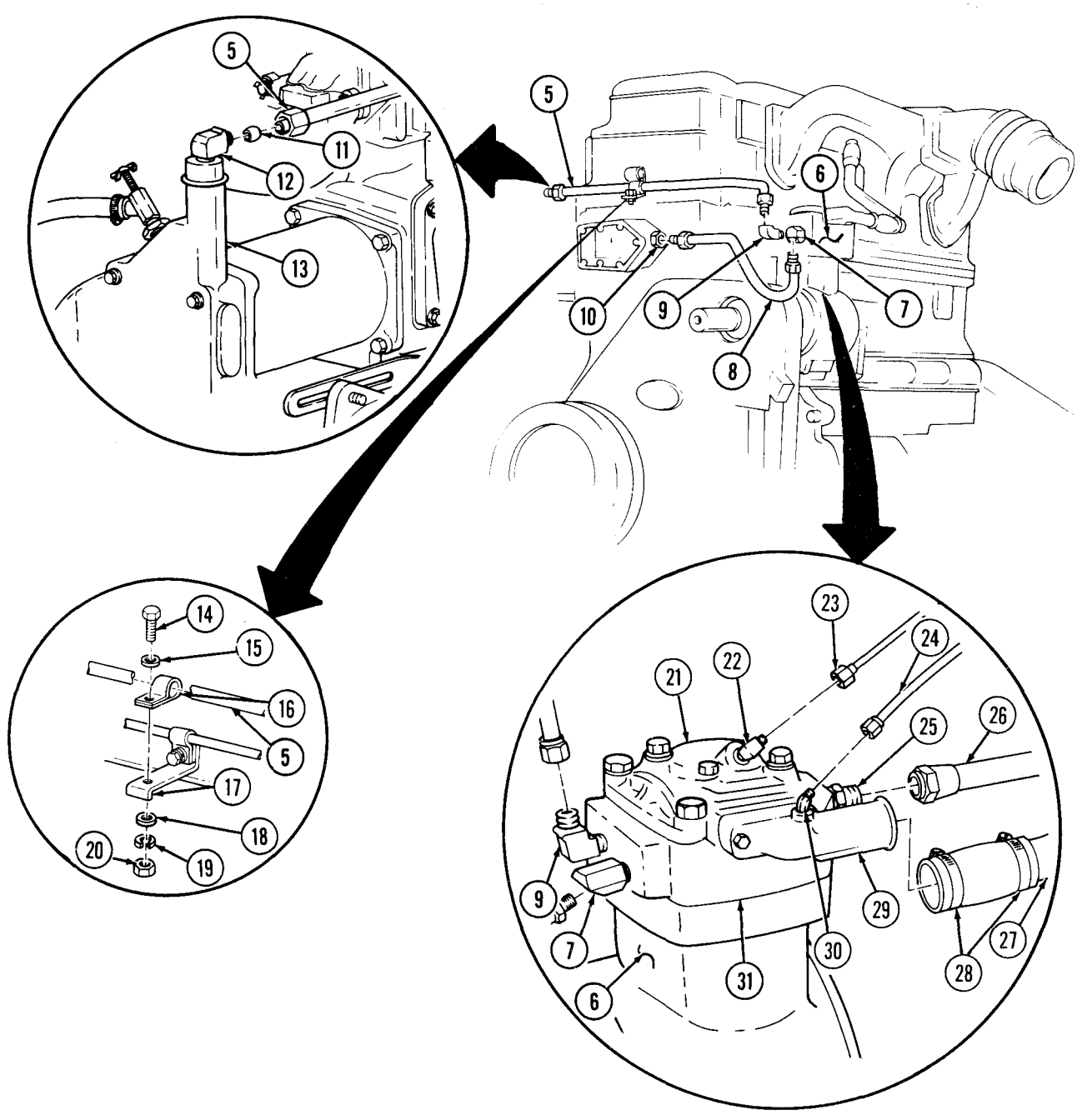
10-5. AIR COMPRESSOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install fuel pump (para. 4-4).
- Install power steering pump (TM 9-2320-272-20-2).
- Start engine (TM 9-2320-272-10) and check air compressor for leaks and proper operation.
- Install left splash shield (TM 9-2320-272-10).

TA 350591

10-6. FRONT BRAKE ACTUATOR REPAIR

This task covers:

a. Disassembly of Adjustable Actuator
b. Disassembly of Stationary Actuator
c. Cleaning and Inspection
d. Reassembly of Stationary Actuator
e. Reassembly of Adjustable Actuator

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Anchor plunger kit 1173 (left)
Anchor plunger kit 1174 (right)
Adjuster parts kit 1164
Lint-free cloth (Appendix C, Item 7)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition	Reference
Brake chambers removed.	TM 9-2320-272-20-2
Brakeshoes removed.	TM 9-2320-272-20-2
Front brake spider removed.	TM 9-2320-272-20-2

Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

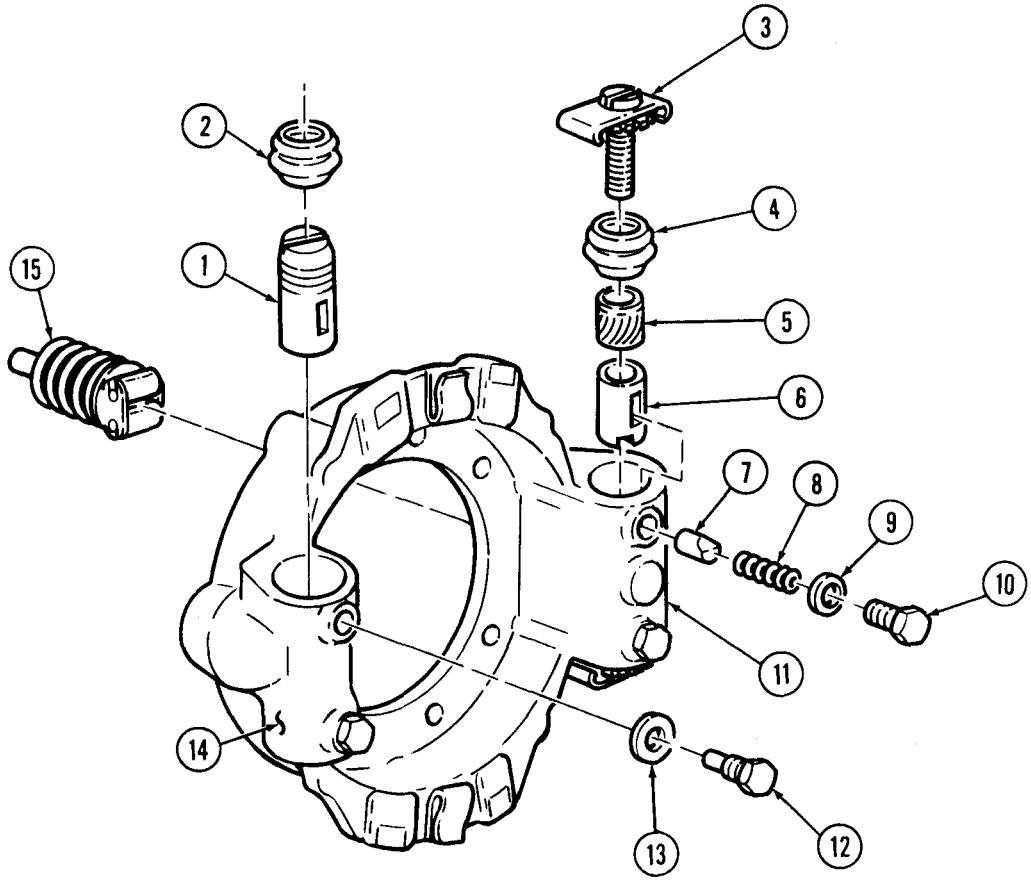
NOTE
Do not perform this procedure unless actuator repair kit is available.

a. Disassembly of Adjustable Actuator

1.	Back of adjusting plunger housing (11)	Wedge assembly (15)	Remove.	Discard wedge assembly (15).
2.	Adjusting plunger housing (11)	Two hollow screws (10), gaskets (9), springs (8), and adjusting pawls (7)	Remove.	Discard screws (10), gaskets (9), springs (8), and pawls (7).
3.		Two adjusting bolts (3)	Remove.	Discard bolts (3).
4.		Two plunger seals (4)	Remove.	Discard seals (4).
5.		Two adjusting sleeves (5) and adjusting plungers (6)	Remove.	Discard sleeves (5) and plungers (6).

10-6. FRONT BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. **Disassembly of Stationary Actuator**			
6.	Anchor plunger housing (14)	Two guide screws (12) and gaskets (13)	Remove.	Discard screws (12) and gaskets (13).
7.		Two anchor plungers (1) and seals (2)	Remove.	Discard plungers (1) and seals (2).



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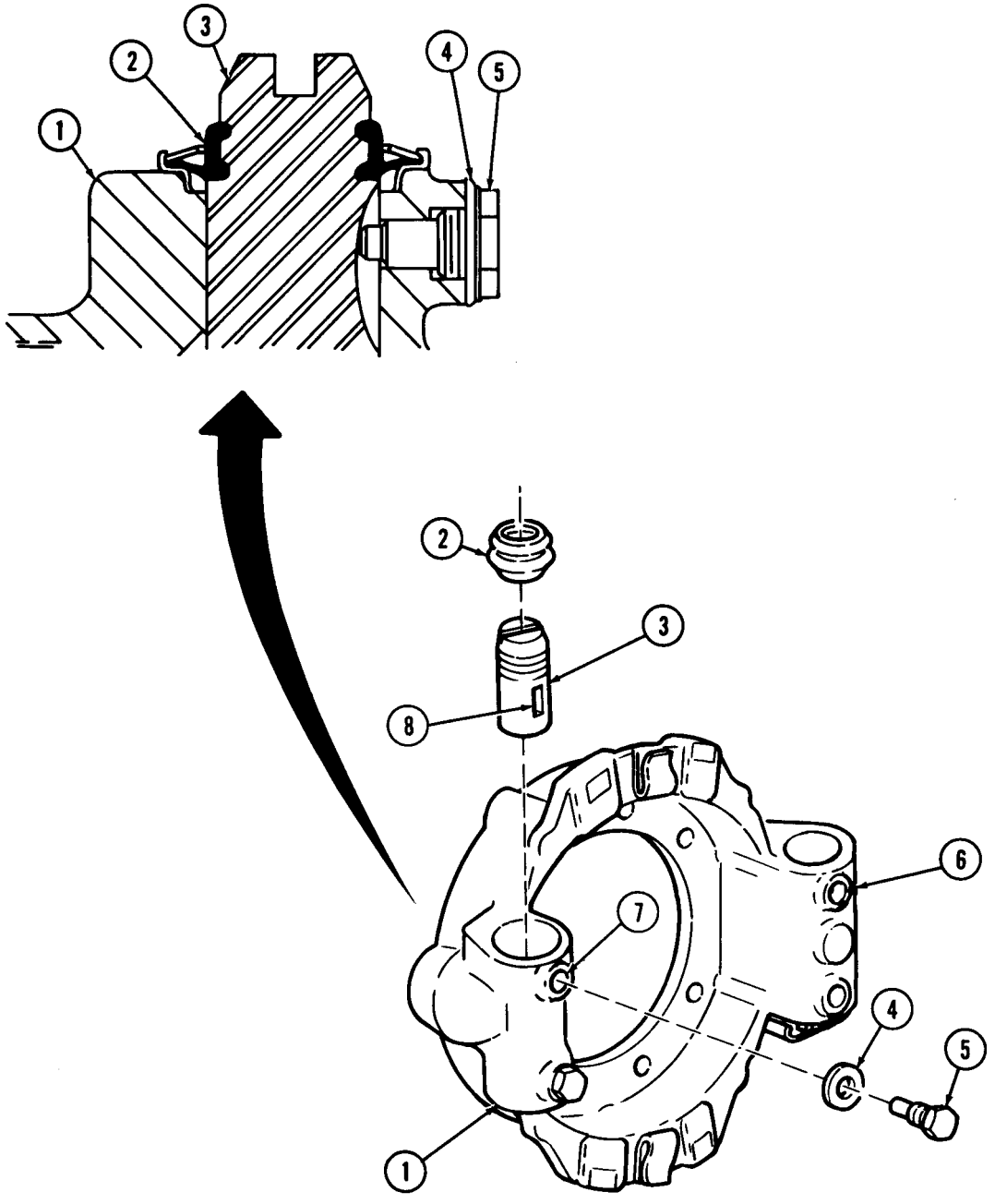
10-6. FRONT BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Cleaning and Inspection				
8.		Adjusting plunger housing (6) and anchor plunger housing (1)	Wipe clean with lint-free cloth and inspect for cracks, breaks, chips, and pitting.	Replace spider assembly if either housing (1) or (6) is cracked, broken, chipped, or pitted. (Refer to TM 9-2320 272-20-2).
d. Reassembly of Stationary Actuator				
			CAUTION	
			Keep all anchor plunger parts together. Intermixing right and left plunger parts will cause brake system damage.	
			NOTE	
			Coat all new metal parts, lips of seals, and plunger housing bores with a light film of grease included with new parts kit.	
9.		Two new anchor plungers (3)	Place piece of tape over slots in noses of anchor plungers (3) to protect lips of seals (2).	
10.		Two new seals (2)	Install into double grooves of anchor plungers (3).	
11.		Two new anchor plungers (3)	a. Position in anchor plunger housing (1) with guide grooves (8) and guide screw holes (7) alined.	Make sure correct "L" or "R" anchor plunger is installed in bore of anchor housing (1).
			b. Seat seals (2) in anchor plunger housing (1).	Use hammer and 1-3/4 in. wrench socket to seat.
12.		Two new gaskets (4) and guide screws (5)	Install in anchor plunger housing (1) and anchor plungers (3) grooves (8).	Tighten guide screws (5) 15-20 lb-ft (20-27 N·m).

10-6. FRONT BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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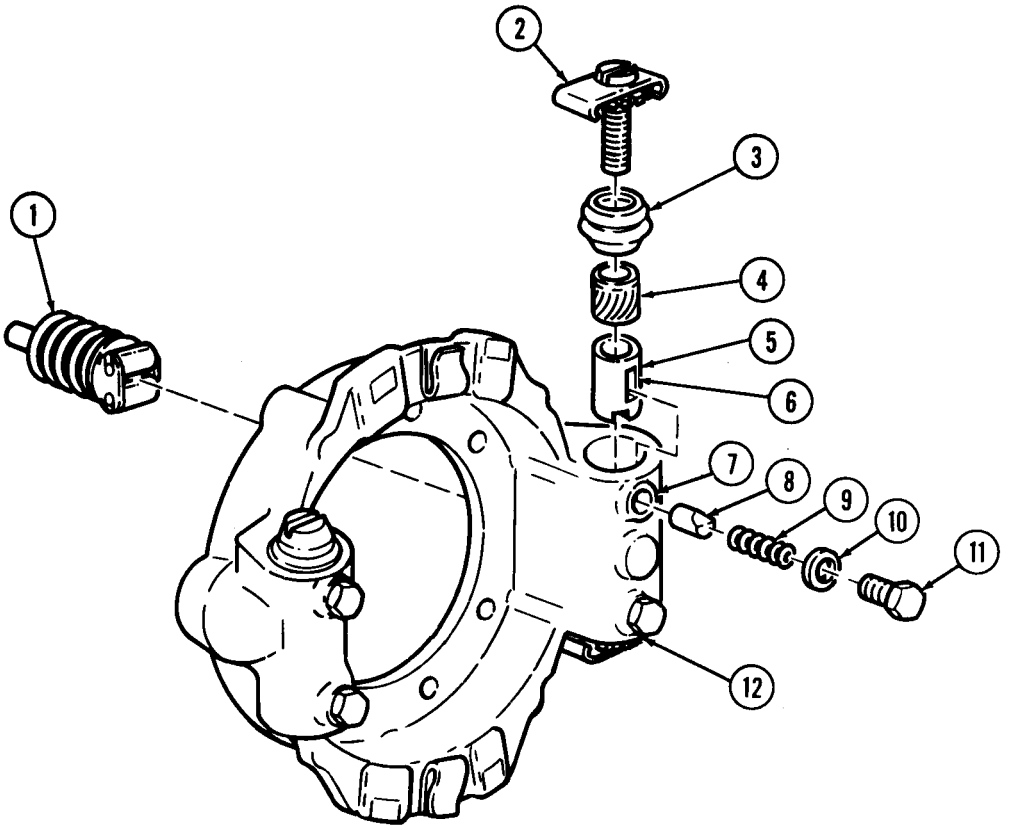
10-6. FRONT BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	e. Reassembly of Adjustable Actuator			
		NOTE Coat all parts with light film of GAA grease before reassembly.		
13.		Two new adjusting plungers (5)	Position in adjusting plunger housing (12) with guide groove (6) and adjusting pawl (7) hole alined.	
14.		Two new adjusting sleeves (4)	Position in each adjusting plunger (5).	
		NOTE Adjusting pawls have teeth and flats on one end and chamfered edge on the other end. When performing step 16, make sure adjusting pawl is positioned with chamfer toward sleeve to aline pawl and sleeve teeth.		
15.		Two new adjusting pawls (8) and new springs (9)	a. Position in adjusting plunger housing (12) with two new gaskets (10) and install two new hollow screws (11).	Tighten screws (11) 15-20 lb-ft (20-27 N·m).
			b. Use adjusting bolt (2) to rotate adjusting sleeve (4), and check for proper teeth meshing.	A clicking sound and a ratcheting feel will indicate proper meshing.
			c. Remove adjusting bolt (2) after sleeve (4) is installed.	
16.		Two new plunger seals (3)	Position inner lip over adjusting sleeve (4) and seat outer ring of seal (3) in adjusting plunger housing (12).	Use hammer and 1-3/4 in. wrench socket to seat.
		CAUTION Do not bottom adjusting bolt against seal. Seal will be damaged.		
17.		Two new adjusting bolts (2)	Install in adjusting sleeve (4).	Tighten until bolt heads are showing just above seal (3). This prevents seal (3) damage during installation.

10-6. FRONT BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.		New wedge assembly (1)	a. Install in back of adjusting plunger housing (12). b. Check operation of wedge assembly (1) and adjusting plungers (5).	



END OF TASK!

FOLLOW-ON TASKS: • Install brake spider (TM 9-2320-272-20-2).
• Install brakeshoes (TM 9-2320-272-20-2).
• Install brake chambers (TM 9-2320-272-20-2).

TA 350594

10-7. REAR BRAKE ACTUATOR REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Brake chambers removed.
	TM 9-2320-272-20-2	Brakeshoes removed.
	TM 9-2320-272-20-2	Rear brake spider removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Actuator repair kit 1105
Lint-free cloth (Appendix C, Item 7)
GAA grease (Appendix C, Item 11)
Tape (Appendix C, Item 31)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

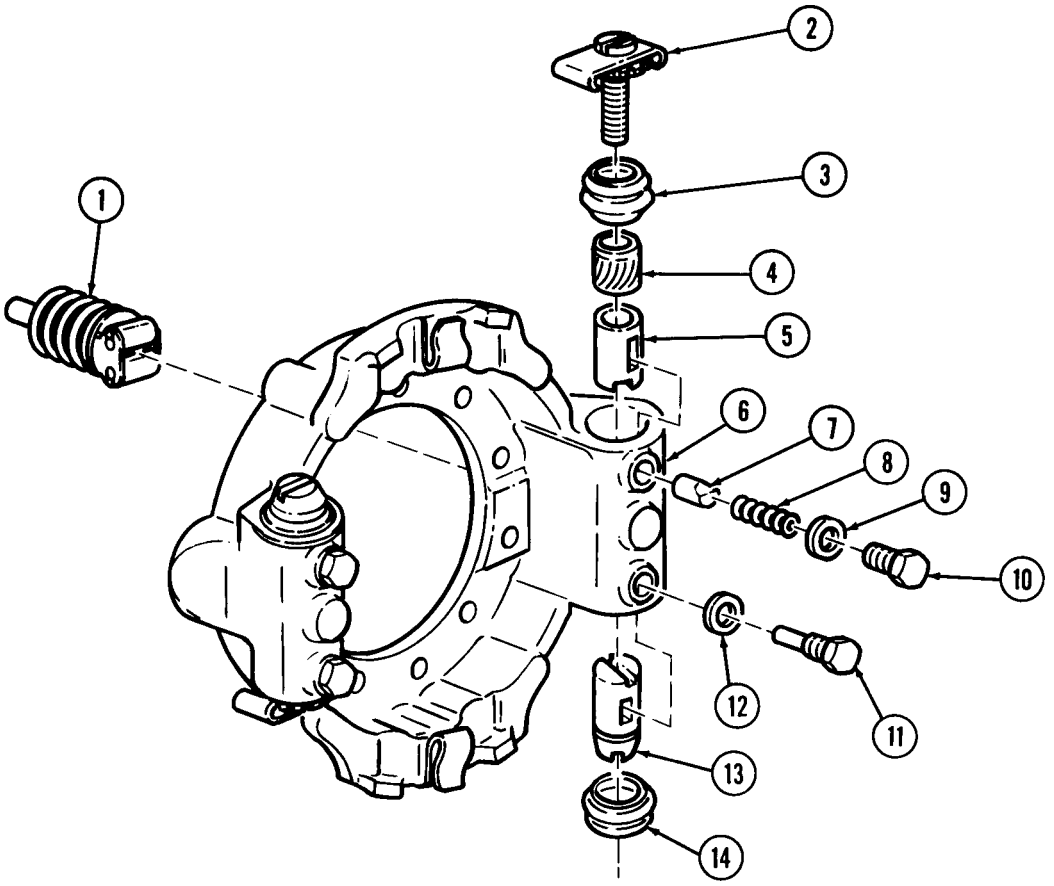
NOTE
Do not perform this procedure unless actuator repair kit is available.

a. Disassembly

1.	Back of plunger housing (6)	Wedge assembly (1)	Remove.	Discard wedge assembly (1).
2.	Plunger housing (6)	Guide screw (11) and gasket (12)	Remove.	Discard screw (11) and gasket (12).
3.		Hollow screw (10) gasket (9), spring (8), and adjusting pawl (7)	Remove.	Discard screw (10), gasket (9), spring (8), and pawl (7).
4.		Anchor plunger (13) and seal (14)	Remove.	Discard plunger (13) and seal (14).
5.		Adjusting bolt (2)	Remove.	Discard bolt (2).

10-7. REAR BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Adjusting plunger seal (3)	Remove.	Discard seal (3).
7.		Adjusting sleeve (4) and adjusting plunger (5)	Remove.	Discard sleeve (4) and adjusting plunger (5).



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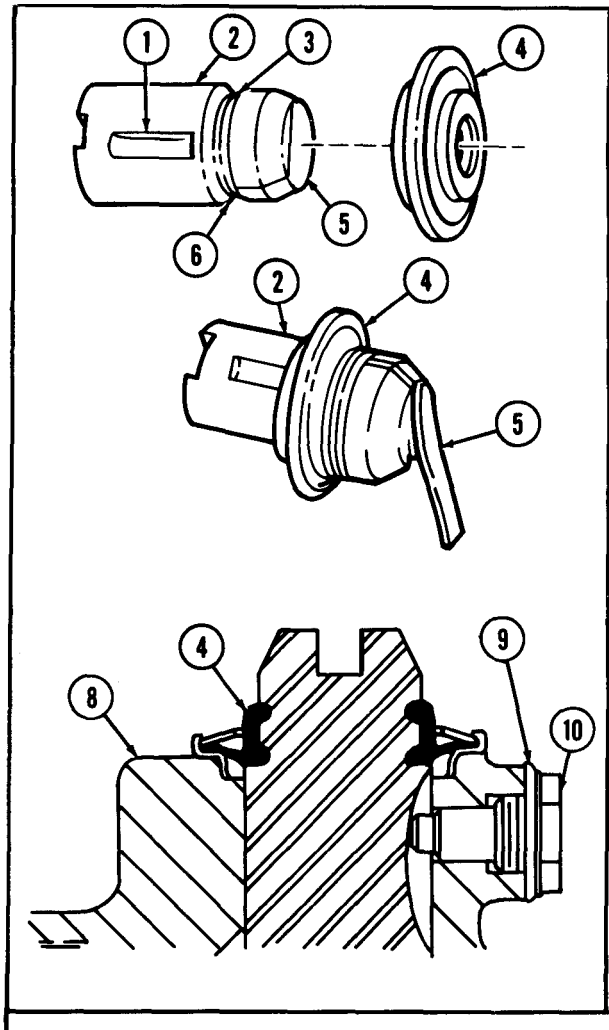
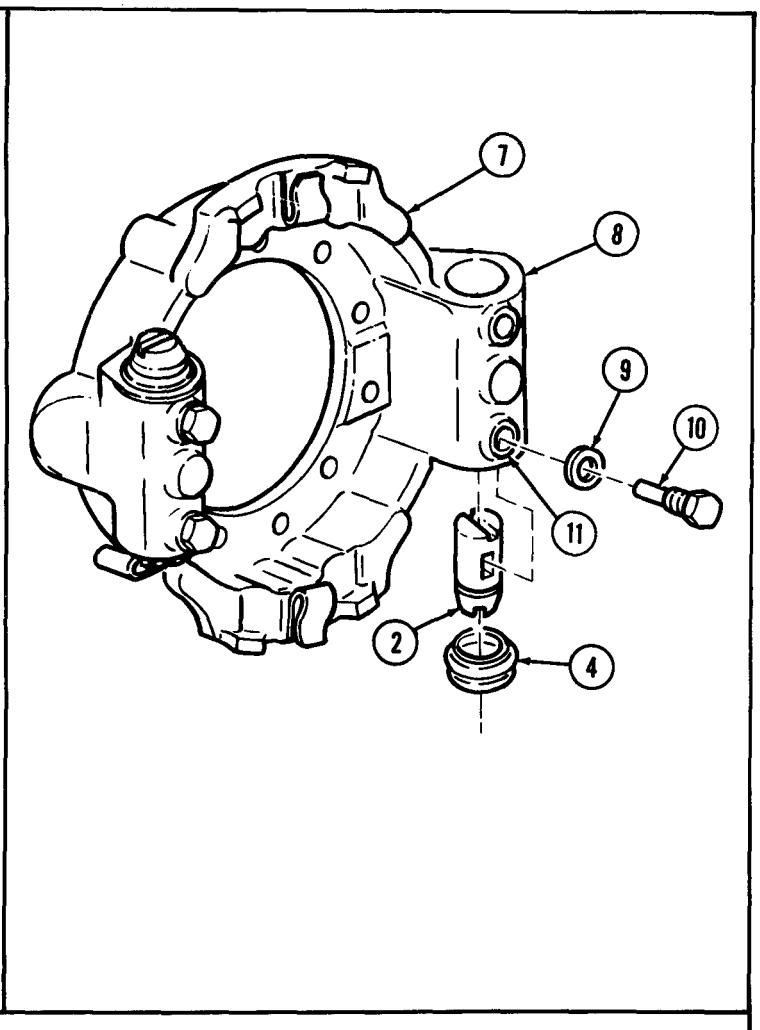
10-7. REAR BRAKE ACTUATOR REPAIR (Cont'd)

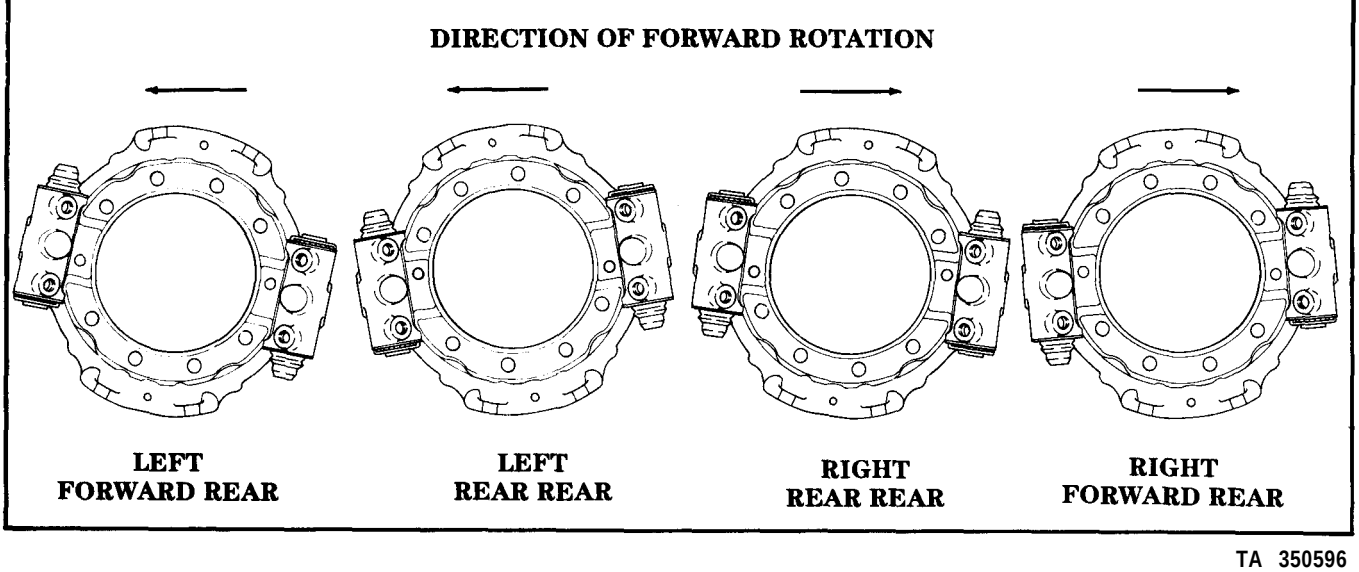
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning and Inspection			
8.		Plunger housing (8)	Wipe clean with lint-free cloth and inspect for cracks, breaks, chips, and pitting.	Replace spider assembly (7) if housing (8) is cracked, broken, chipped, or pitted. (Refer to TM 9-2320-272-20-2.)
	c. Reassembly			
		NOTE Coat all metal parts, lips of seals and plunger housing bores with a light film of GAA grease before reassembly.		
9.		New anchor plunger seal (4) and new anchor plunger (2)	Install as follows: a. Place tape (5) over brakeshoe web slot on new plunger (2). b. Slide new seal (4) on plunger (2) until inner seal lip is in second plunger groove (6) and outer seal lip is in first plunger groove (3).	Tape (5) will protect seal (4).
		CAUTION Anchor plungers and adjusting plungers are located vertically, opposite one another. Incorrect location will prevent automatic adjuster from working.		
			c. Remove tape (5), and position plunger (2) and seal (4) in plunger housing (8), and tap seal (4) down until seated.	Use hammer and 1-3/4 in. wrench socket to seat.
			d. Aline plunger guide groove (1), with guide screw hole (11), install new gasket (9), and install with new guide screw (10).	Tighten screw (10) 15-20 lb-ft (20-27 N·m).

10-7. REAR BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







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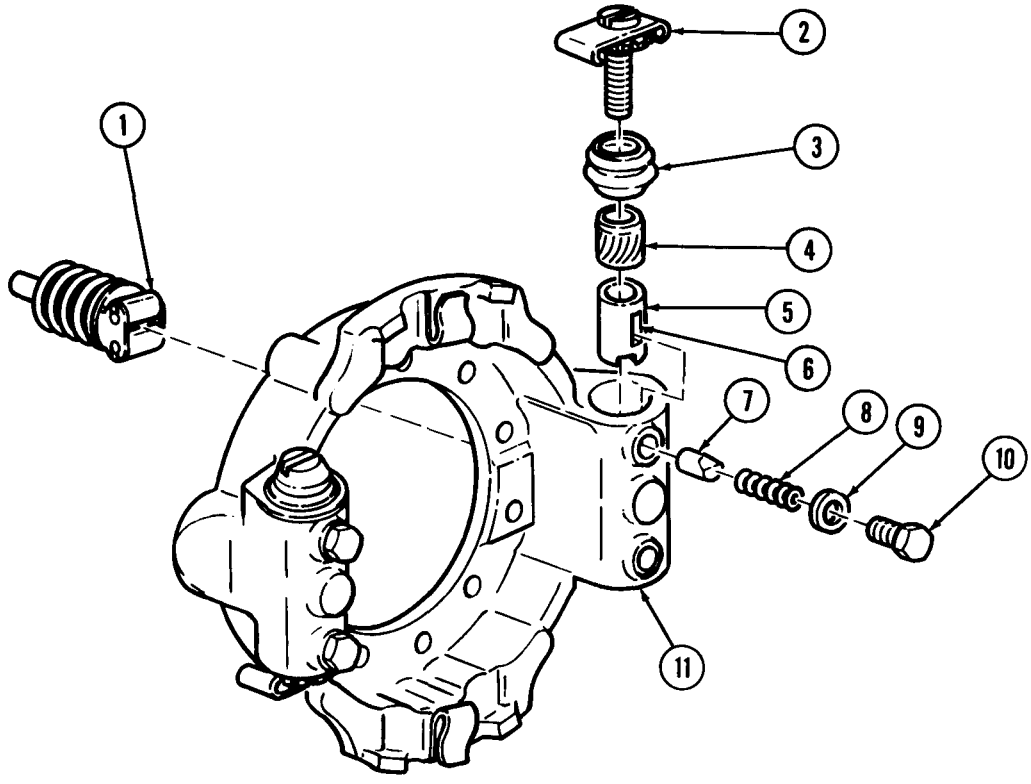
10-7. REAR BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.		New adjusting plunger (5)	Position in plunger housing (11) with guide groove (6) and adjusting pawl (7) hole alined.	
11.		New adjusting sleeve (4)	Position in adjusting plunger (5).	
		NOTE Adjusting pawl has teeth and flats on one end and chamfered edge on the other end. When performing step 12, make sure adjusting pawl is positioned with chamfer toward sleeve to aline pawl and sleeve teeth.		
12.		New adjusting pawl (7) and new spring (8)	a. Position in adjusting plunger housing (11), install new gasket (9) and secure with new hollow screw (10).	Tighten screw (10) 15-20 lb-ft (20-27 N·m).
			b. Use adjusting bolt (2) to rotate adjusting sleeve (4), and check for proper teeth meshing.	A clicking sound and a ratcheting feel will indicate proper meshing.
			c. Remove adjusting bolt (2) after sleeve (4) is installed.	
13.		New plunger seal (3)	Position inner lip in adjusting plunger housing (11) and tap down until seated.	Use hammer and 1-3/4 in. wrench socket to seat.
		CAUTION Do not bottom adjusting bolt against seal. Seal will be damaged.		
14.		New adjusting bolt (2)	Install in adjusting sleeve (4).	Tighten bolt (2) until bolt head shows just above seal (3). This will prevent damaging the seal during installation.
15.		New wedge assembly (1)	a. Install in adjusting plunger housing (11).	
			b. Check operation of wedge (1) and both plungers.	

10-7. REAR BRAKE ACTUATOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install brake spider (TM 9-2320-272-20-2).
• Install brakeshoes (TM 9-2320-272-20-2).
• Install brake chambers (TM 9-2320-272-20-2).

10-8. BRAKE PEDAL (TREADLE) VALVE REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Brake pedal removed.
	TM 9-2320-272-20-2	Brake pedal (treadle) valve removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Valve repair kit 289353
"0" ring
Three lockwashers
Pedal mounting plate gasket
Lint-free cloth (Appendix C, Item 7)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Spring tension under valve retainer could cause flying parts.

Manual References
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE
Do not perform this procedure unless valve kit is available.

a. Disassembly

1.	Valve body (1)	Three screws (9) and lockwashers (10)	Remove.	Discard lockwashers (10).
2.		Pedal mounting plate (3) and gasket (2)	Remove.	Discard gasket (2). Clean gasket remains from mating surfaces.
3.	Pedal mounting plate (3)	Plunger (8) and "O" ring (7)	Remove.	Discard "O" ring (7).
4.		Breather valve (6)	Remove.	
5.		Pedal stop (5)	Loosen locknut (4) and remove.	
6.	Pedal valve body (1)	Lower static piston assembly (12)	Remove by grasping locknut (11) and pulling piston assembly (12) straight out.	Discard lower static piston assembly (12).

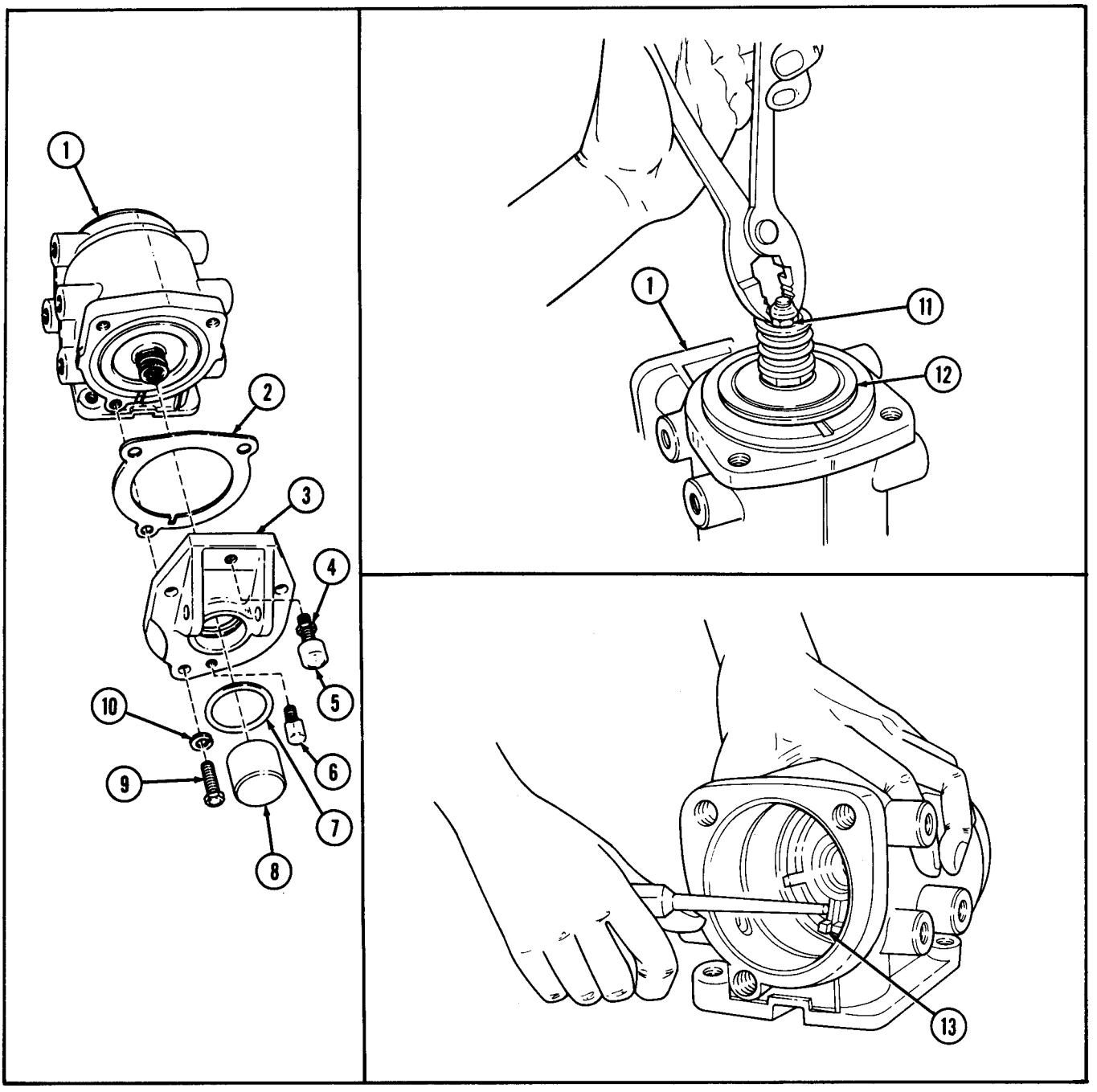
10-8. BRAKE PEDAL (TREADLE) VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

When performing step 7 be careful not to damage pedal valve body.

7.		Upper static piston assembly (13)	Loosen by rotating and remove.



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10-8. BRAKE PEDAL (TREADLE) VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Upper static piston assembly (1)	Large "O" ring (6) and small "O" ring (5)	Remove.	Discard "O" rings (6) and (5).
9.	Upper exhaust valve assembly (4) to upper static piston assembly (1)	Large retaining ring (3)	Remove and pull exhaust valve assembly (4) out.	

WARNING

Be careful when performing step 10. Spring tension under "O" ring retainer will release when small retainer ring is removed. Flying parts may cause injury to personnel.

10.	Upper exhaust valve assembly (4)	Small retaining ring (7), washer (8), external "O" ring (9), internal "O" ring (10), "O" ring retainer (11), spring (12), valve retainer (13), and exhaust valve (14)	Remove.	Discard exhaust valve (14), external "O" ring (9), and internal "O" ring (10).

b. Cleaning and Inspection

11.		Upper static piston assembly (1) and pedal valve body (2)	Wipe clean with lint-free cloth and inspect for cracks, breaks, chips, and pitting.	Replace treadle valve if any item is cracked, broken, chipped, or pitted.

c. Reassembly

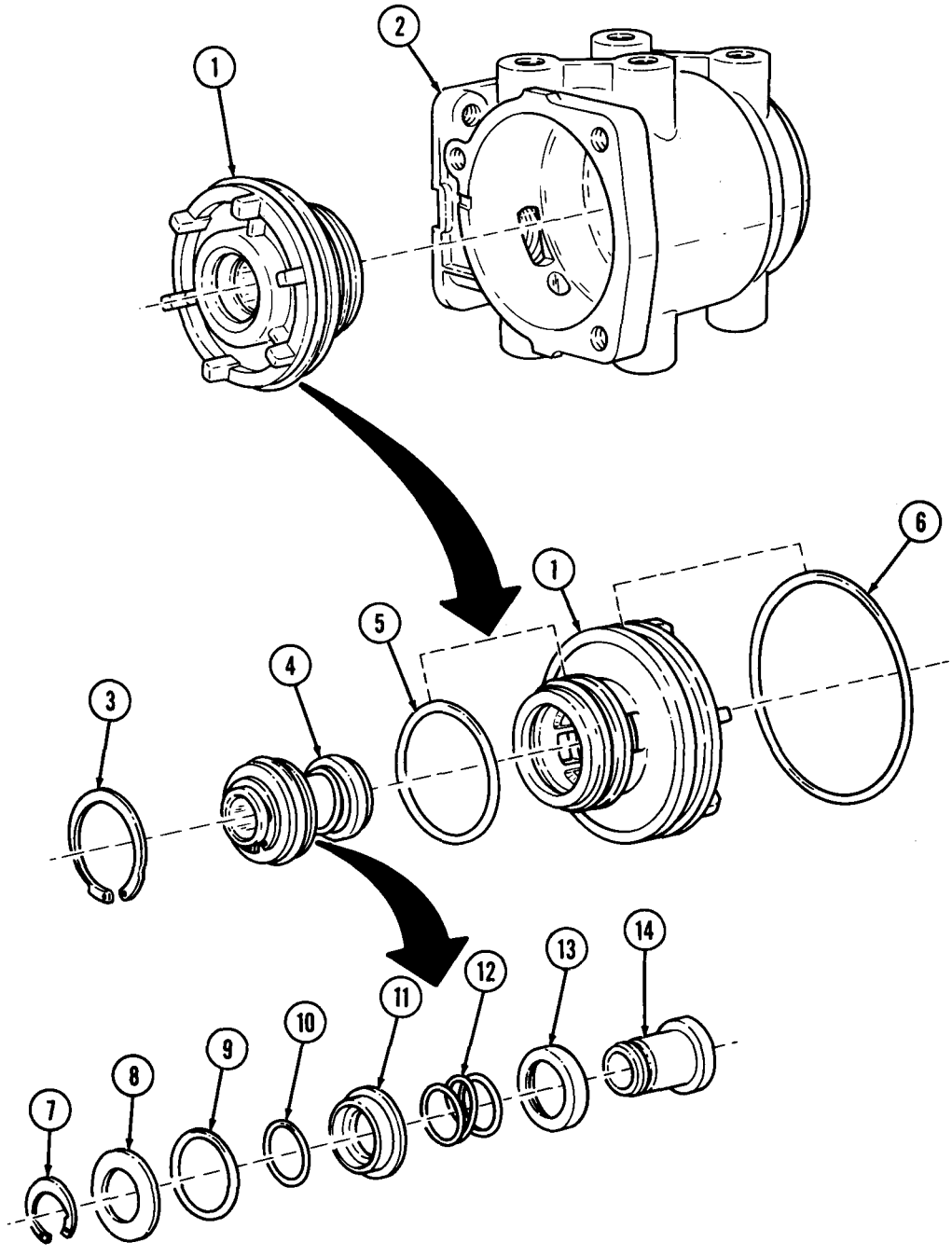
NOTE

Lubricate all parts except rubber spring with grease supplied with valve repair kit before reassembly.

12.		New exterior "O" ring (9) and new interior "O" ring (10)	Install on "O" ring retainer (11).	
13.		Valve retainer (13), spring (12), and "O" ring retainer (11)	Install on new exhaust valve (14) with washer (8), and retaining ring (7).	
14.		Upper exhaust valve assembly (4)	Install in upper static piston (1) with large retaining ring (3).	
15.		New large and small "O" rings (6) and (5)	Install.	

10-8. BRAKE PEDAL (TREADLE) VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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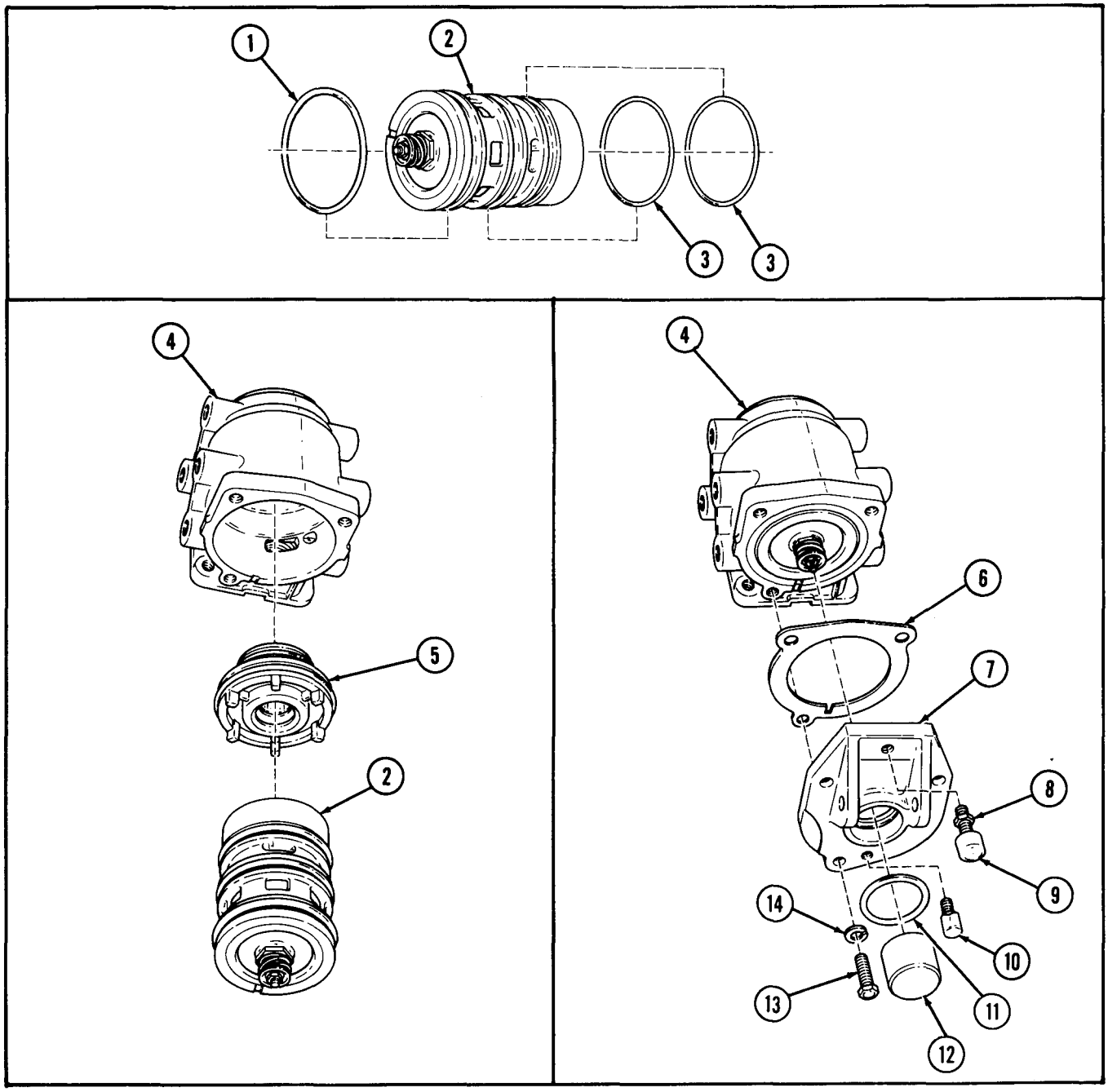
10-8. BRAKE PEDAL (TREADLE) VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Upper static piston assembly (5)	Position in pedal valve body (4) until seated.	Use thumb pressure to seat.
17.		New lower "O" ring (1) and two new upper "O" rings (3)	Install on new lower static piston assembly (2).	
18.		New lower static piston assembly (2)	Position in pedal valve body (4) until seated.	Use thumb pressure to seat.
19.		Pedal stop (9)	Install in pedal mounting plate (7).	Do not set locking nut (8).
20.		Breather valve (10)	Install.	
21.		New "O" ring (11) and plunger (12)	Install in pedal mounting plate (7).	Use hand pressure to seat plunger.
		NOTE		
		Discard retainer plate supplied with valve repair kit.		
22.		New gasket (6) and pedal mounting plate (7)	Install with three new lockwashers (14) and screws (13).	

10-8. BRAKE PEDAL (TREADLE) VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install brake pedal (treadle) valve (TM 9-2320-272-20-2).
- Install brake pedal (TM 9-2320-272-20-2).
- Start engine (TM 9-2320-272-10) and check brake pedal (treadle) valve for proper operation.

10-9. SPRING BRAKE DASH CONTROL VALVE REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-20-2

Condition Description
Spring brake dash control valve removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two lockwashers
Locknut
"O" ring
Sealing ring
Lint-free cloth (Appendix C, Item 7)

General Safety Instructions
None

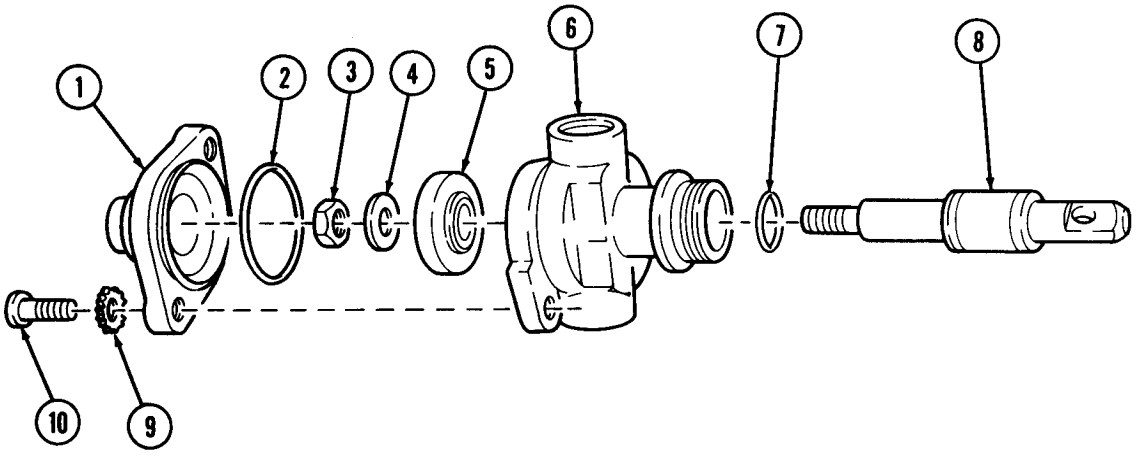
Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Valve cover (1)	Two screws (10) and lockwashers (9)	Remove and separate valve cover (1) from valve body (6).	Discard lockwashers (9).
2.		Valve cover sealing ring (2)	Remove.	Discard sealing ring (2).
3.	Plunger shaft (8)	Locknut (3), washer (4), and exhaust valve (5)	Remove.	Discard locknut (3).
4.	Valve body (6)	Plunger shaft (8)	Remove.	
5.	Plunger shaft (8)	"O" ring (7)	Remove.	Discard "O" ring (7).
	b. Cleaning and Inspection			
6.		Valve body (6), valve cover (1), and plunger shaft (8)	Wipe clean with lint-free cloth and inspect for cracks, chips, breaks and pitting.	Replace control valve assembly if cracked, chipped, broken or pitted.

10-9. SPRING BRAKE DASH CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
7.		New "O" ring (7)	Install on plunger shaft (8).	
8.		Plunger shaft (8)	Install in valve body (6).	
9.		Exhaust valve (5)	Install on plunger shaft (8) with washer (4) and new locknut (3).	Tighten locknut (3) until valve (5) is seated on plunger shaft (8).
10.		New valve cover sealing ring (2)	Install on valve body (6).	
11.		Valve cover (1)	Install on valve body (6) with two screws (10) and new lock-washers (9).	Tighten until cover (1) and valve body (6) are seated.



END OF TASK!

FOLLOW-ON TASKS: • Install spring brake dash control valve (TM 9-2320-272-20-2).
• Start engine (TM 9-2320-272-10) and check spring brake dash control valve for proper operation.

TA 350601

10-10. RELAY VALVE REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Relay valve removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Valve repair kit 287370
Eight lockwashers
Lint-free cloth (Appendix C, Item 7)
Lubricating oil OE/HDO 10 (Appendix C, Item 16)
Sealing tape (Appendix C, Item 30)

General Safety Instructions
None

Personnel Required
Fuel and electrical systems repairer MOS 63G

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

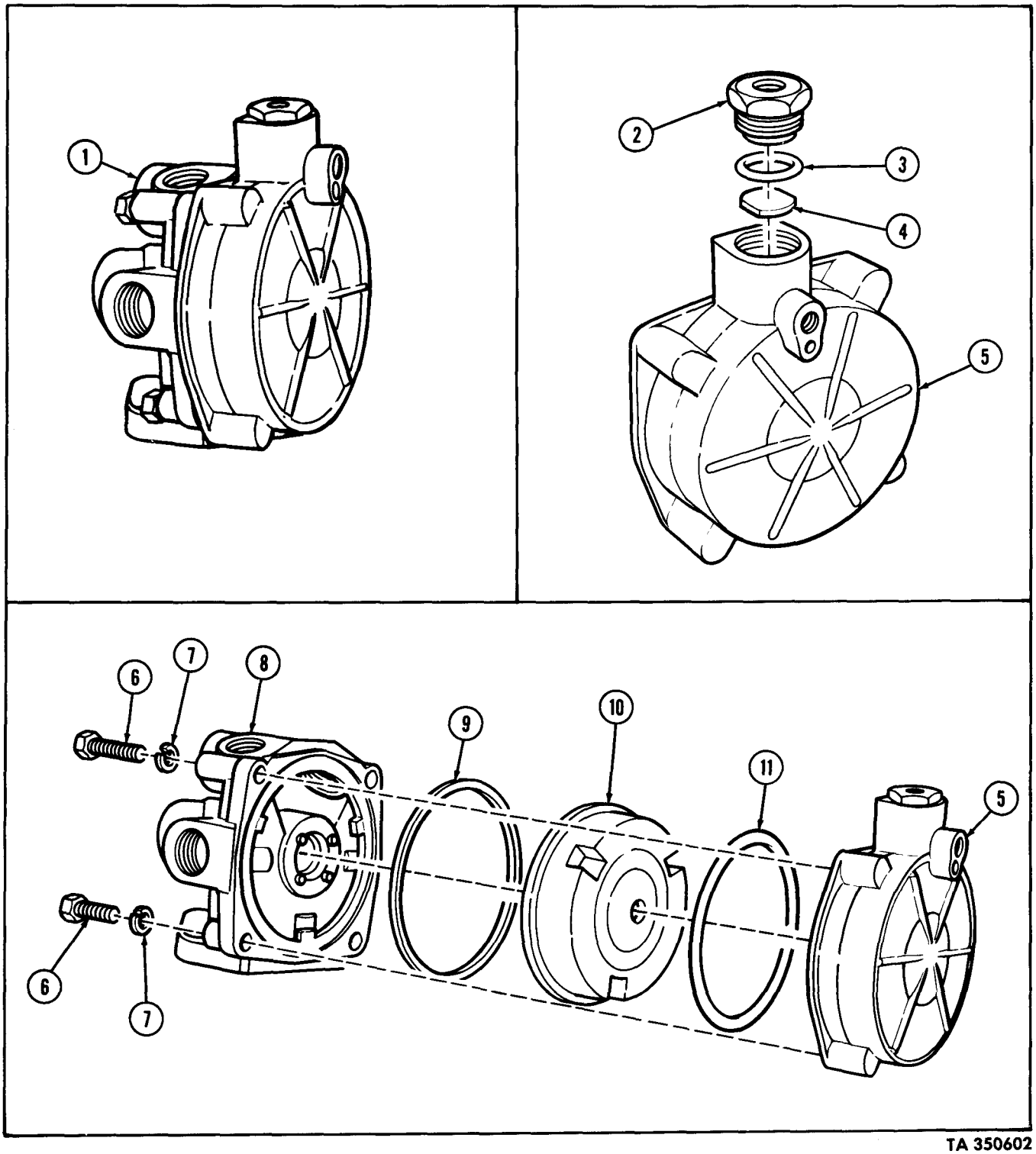
NOTE
Do not perform this procedure unless valve repair kit is available.

a. Disassembly

1.		Relay valve assembly (1)	Scribe alinement mark on valve cover (5) and valve body (8).	Mark is used for reassembly.
2.	Valve body (8)	Four screws (6), lockwashers (7) and valve cover (5)	Remove.	Discard lockwashers (7).
3.		Sealing ring (9)	Remove.	Discard sealing ring (9).
4.	Valve cover (5)	Relay piston (10) and "O" ring (11)	Remove.	Discard "O" ring (11).
5.		Capnut (2), "O" ring (3), and quick-release diaphragm (4)	Remove from valve cover (5).	Discard "O" ring (3) and diaphragm (4).

10-10. RELAY VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



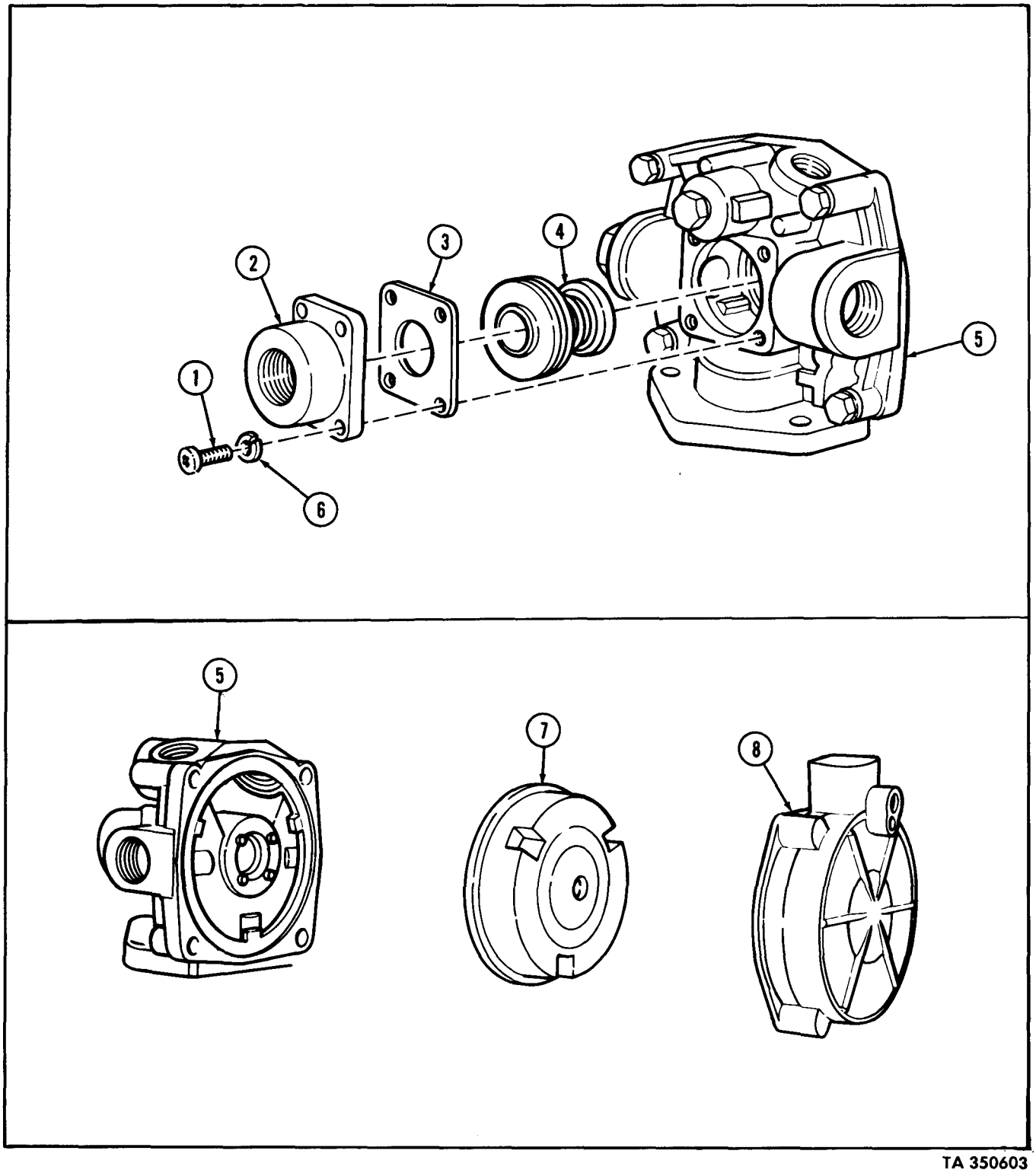
TA 350602

10-10. RELAY VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Body exhaust cover (2) and valve body (5)	Scribe alinement mark on exhaust cover (2) and valve body (5).	Mark is used for reassembly.
7.	Valve body (5)	Four screws (1) and lockwashers (6), cover (2) and gasket (3)	Remove.	Discard gasket (3) and lockwashers (6).
8.		Exhaust valve assembly (4)	Remove.	Discard.
	b. Cleaning and Inspection			
9.		Valve cover (8), valve body (5), relay piston (7), and body exhaust cover (2)	Wipe clean with lint-free cloth and inspect for cracks, breaks, chips, and pitting.	Replace relay valve if any item is cracked, broken, chipped, or pitted.
		NOTE If relay valve is being replaced, use adapter elbows from old relay valve. Clean all male-pipe threads and wrap with sealing tape.		
	c. Reassembly			
10.		Exhaust valve assembly (4)	Install in valve body (5) until seated.	Use thumb pressure to seat.
11.		Body exhaust cover (2) and new gasket (3)	Install with four screws (1) and new lockwashers (6).	Tighten screws (1) 2-3 lb-ft (3-4 N·m). Aline scribe marks.

10-10. RELAY VALVE REPAIR (Cont'd)

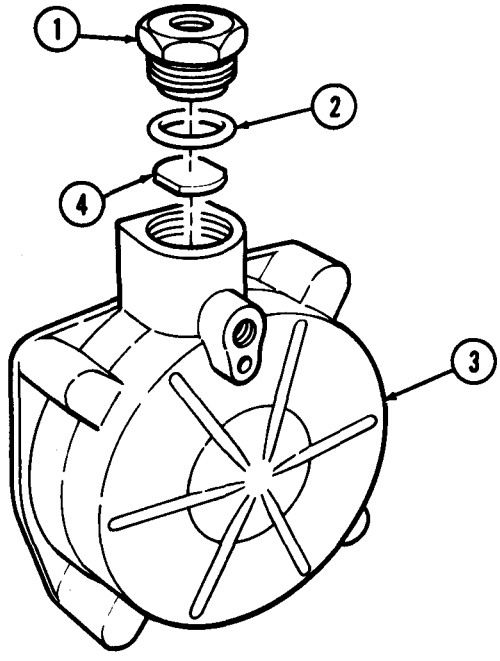
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350603

10-10. RELAY VALVE REPAIR (Cont'd)

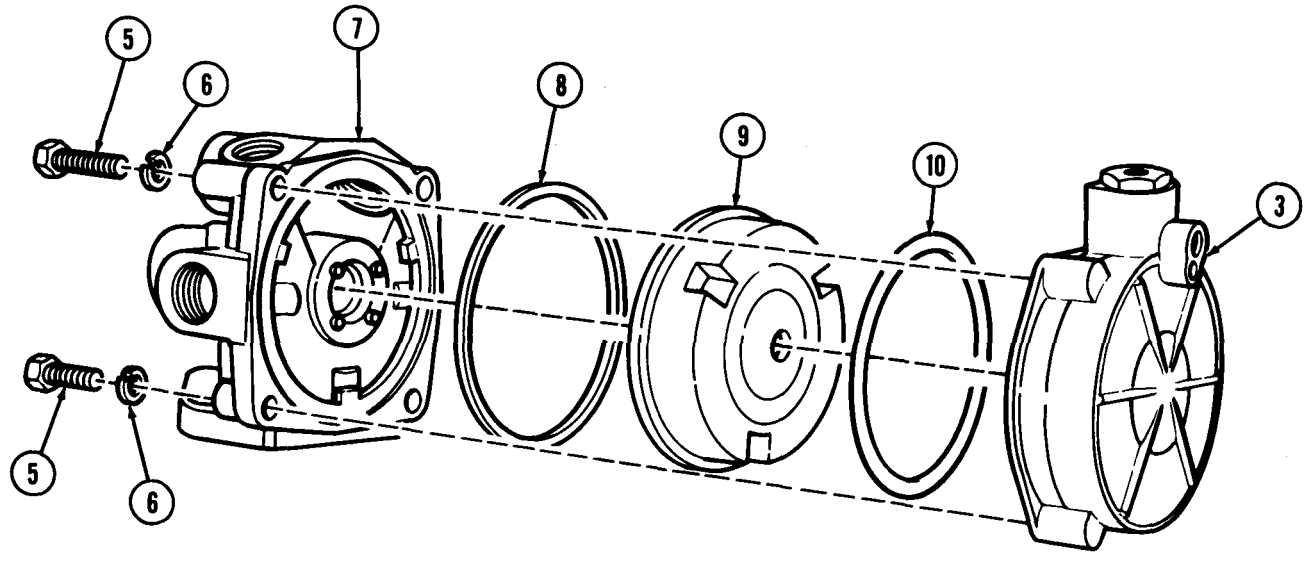
STEP NO.	LOCATION	ITEM	ACTION	
12.		New capnut "O" ring (2)	Install on capnut (1).	Lubricate "O" ring (2).
13.		New quick-release diaphragm (4)	Install in valve cover (3) with capnut (1).	Tighten capnut (1) 12 lb-ft (16 N·m).
14.		New relay piston "O" ring (10)	Install on relay piston (9).	Lubricate "O" ring (10).
15.		Relay piston (9)	Install in valve cover (3) until seated.	Use thumb pressure to seat.
16.		New sealing ring (8)	Install on valve body (7).	Lubricate sealing ring (8).
17.		Valve cover (3)	Position on valve body (7) with alinement marks alined and install with four new lockwashers (6) and screws (5).	Tighten 12 lb-ft (16 N·m).



TA 350604

10-10. RELAY VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install relay valve (TM 9-2320-272-20-2).
• Start engine (TM 9-2320-272-10) and check relay valve for air leaks.

TA 350605

10-11. LIMITING VALVE REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Limiting valve removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None.

Materials/Parts
Limiting valve repair kit 289500
Four lockwashers
"O" ring
Lint-free cloth (Appendix C, Item 7)

Personnel Required
Fuel and electrical systems repairer MOS 63G

General Safety Instructions
Do not remove valve cover until valve is installed in vise.

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Do not perform this procedure unless valve repair kit and "O" ring are available.

a. Disassembly

1.		Valve cover (9) and valve body (7)	Scribe alinement mark on cover (9) and body (7).	Mark is used for reassembly.
2.	Limiting valve (2)	Valve cover (9)	Remove as follows:	
			a. Place in soft-jawed vise (1) with cover (9) positioned to side.	Do not overtighten vise (1).

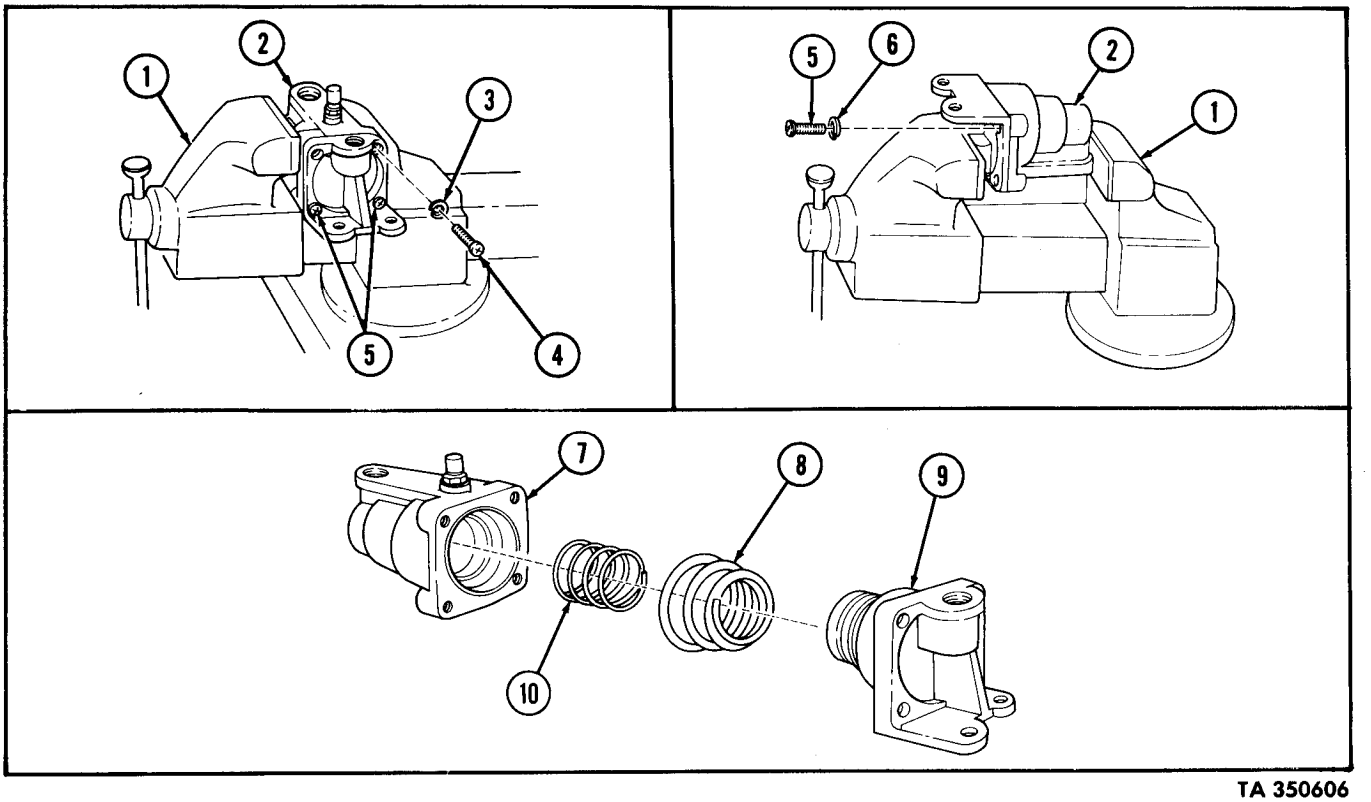
10-11. LIMITING VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Valve cover is under extreme tension. Do not remove all screws until limiting valve is positioned so vise will hold cover, or outer spring may fly out, causing injury to personnel.

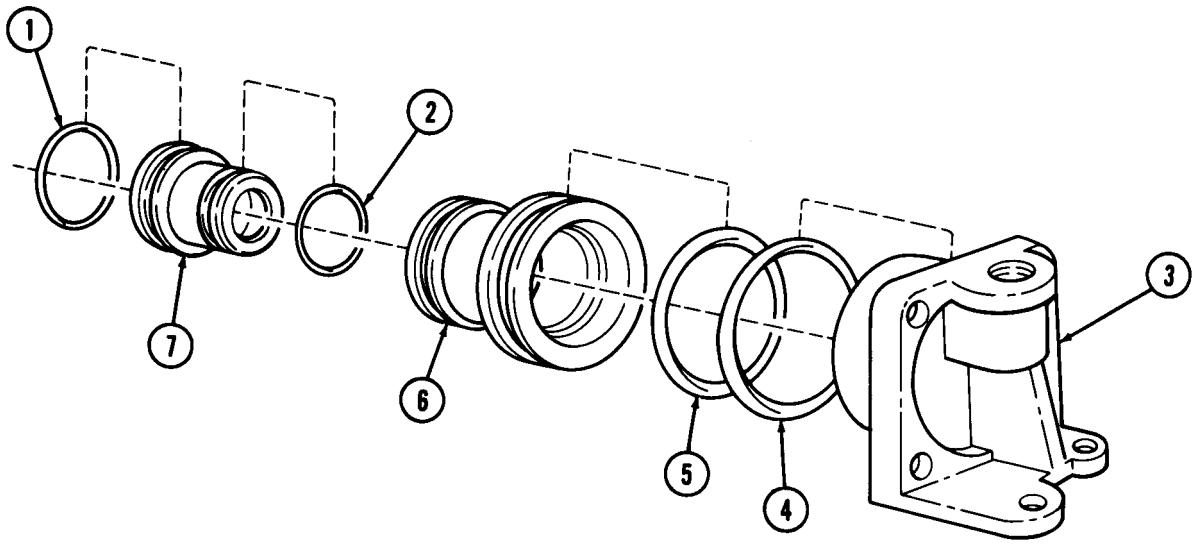
		b. Loosen and remove two screws (4) and lockwashers (3).	Discard lockwashers (3).
		c. Change position in vise (1) until cover (9) is secured.	Do not overtighten vise (1).
		a. Remove remainig two screws (5) and lockwashers (6).	Discard lockwashers (6).
		e. Hold hand over cover (9), and slowly loosen vise (1) until spring (8) tension is relieved.	
		f. Remove cover (9), outer piston spring (8), and spring (10) from valve body (7).	



TA 350606

10-11. LIMITING VALVE REPAIR (Cont'd)

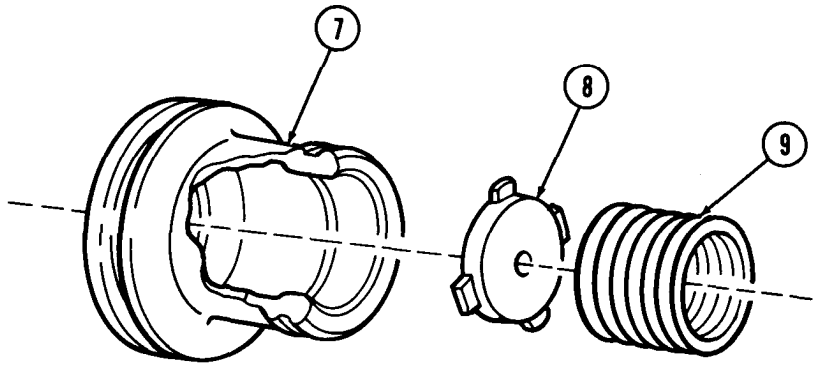
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Valve cover (3)	Outer piston (6) and inner piston (7)	Remove and separate pistons (6) and (7).	
4.		"O" ring (4)	Remove from valve cover (3).	Discard "O" ring (4).
5.	Outer piston (6)	"O" ring (5)	Remove.	Discard "O" ring (5).
6.	Inner piston (7)	Small "O" ring (2) and large "O" ring (1)	Remove.	Discard "O" rings (2) and (1).
7.		Exhaust valve spring (9) and exhaust valve (8)	Remove from inner piston (7).	Discard valve spring (9).
8.	Valve body (10)	Exhaust port breather (11)	Remove.	Discard breather (11).
b. Cleaning and Inspection				
9.		Valve body (10), inner piston (7), outer piston (6), and valve cover (3)	Wipe clean with lint-free cloth and inspect for cracks, breaks, chips, and pitting.	Replace limiting valve if cracked, broken, chipped, or pitted.
10.		Exhaust valve (8)	Wipe clean, and inspect for cracks or breaks.	Replace limiting valve if cracked or broken.

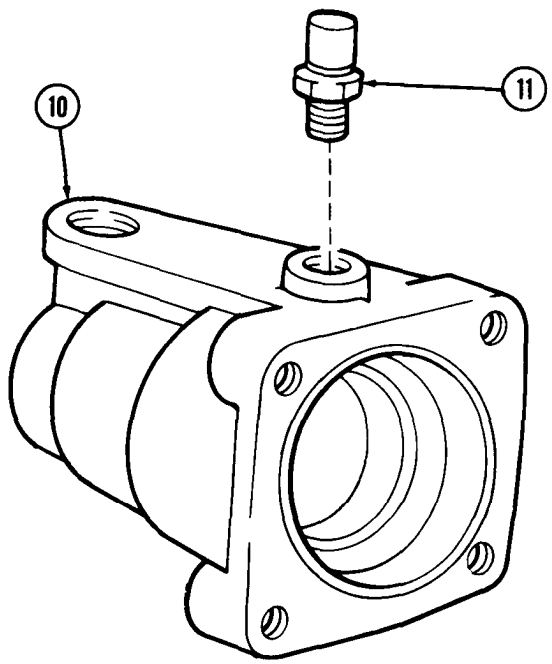


TA 350607

10-11. LIMITING VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

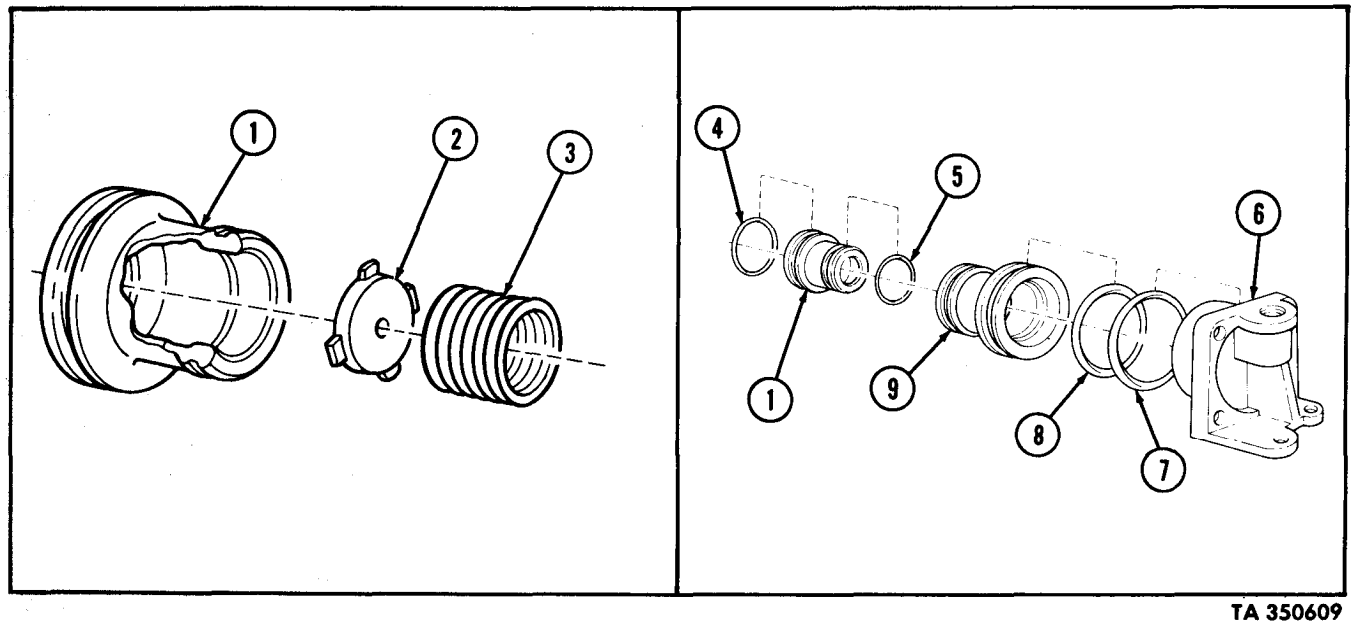




TA 350608

10-11. LIMITING VALVE REPAIR (Cont'd)

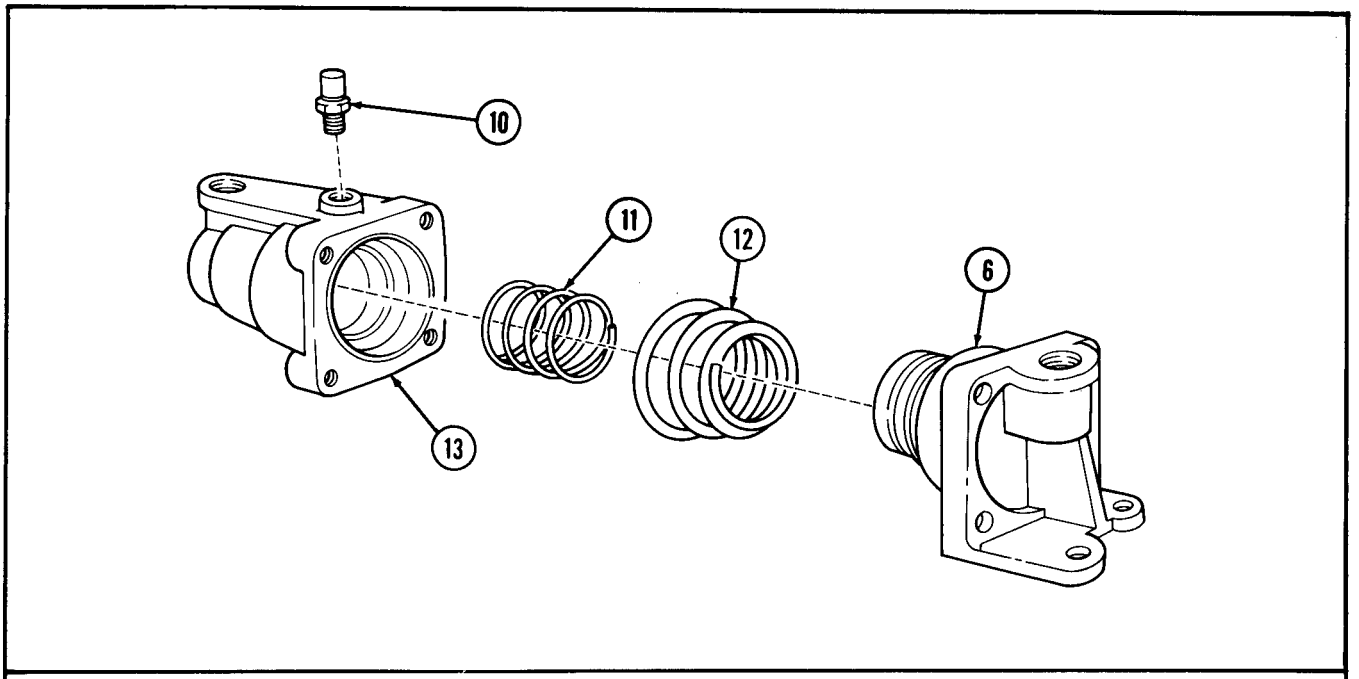
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
11.		Exhaust valve (2) and new valve spring (3)	Position in inner piston (1) until top of spring (3) seats.	Use finger to press spring (3) down.
12.		New large "O" ring (4) and new small "O" ring (5)	Install on inner piston (1).	Lubricate "O" rings (4) and (5) with lubricant provided in kit.
13.		Inner piston (1)	Place in outer piston (9).	
14.		New outer piston "O" ring (8)	Install on outer piston (9).	Lubricate "O" ring (8) with lubricant provided in kit.
15.		New valve cover "O" ring (7)	Install on valve cover (6).	Lubricate "O" ring (7) with lubricant provided in kit.
16.		Outer piston (9)	Position in valve cover (6) until seated.	Use thumb pressure to seat.
17.		New exhaust port breather (10)	Install in valve body (13).	
18.		New outer piston spring (12) and spring (11)	Position in valve body (13).	
19.		Valve cover (6)	Aline scribe marks and secure to valve body (13) with four new lock-washers (15) and screws (16).	Use soft-jawed vise (14) to hold valve body (13), and tighten screws (16) 4-6 lb-ft (5-8 N·m).

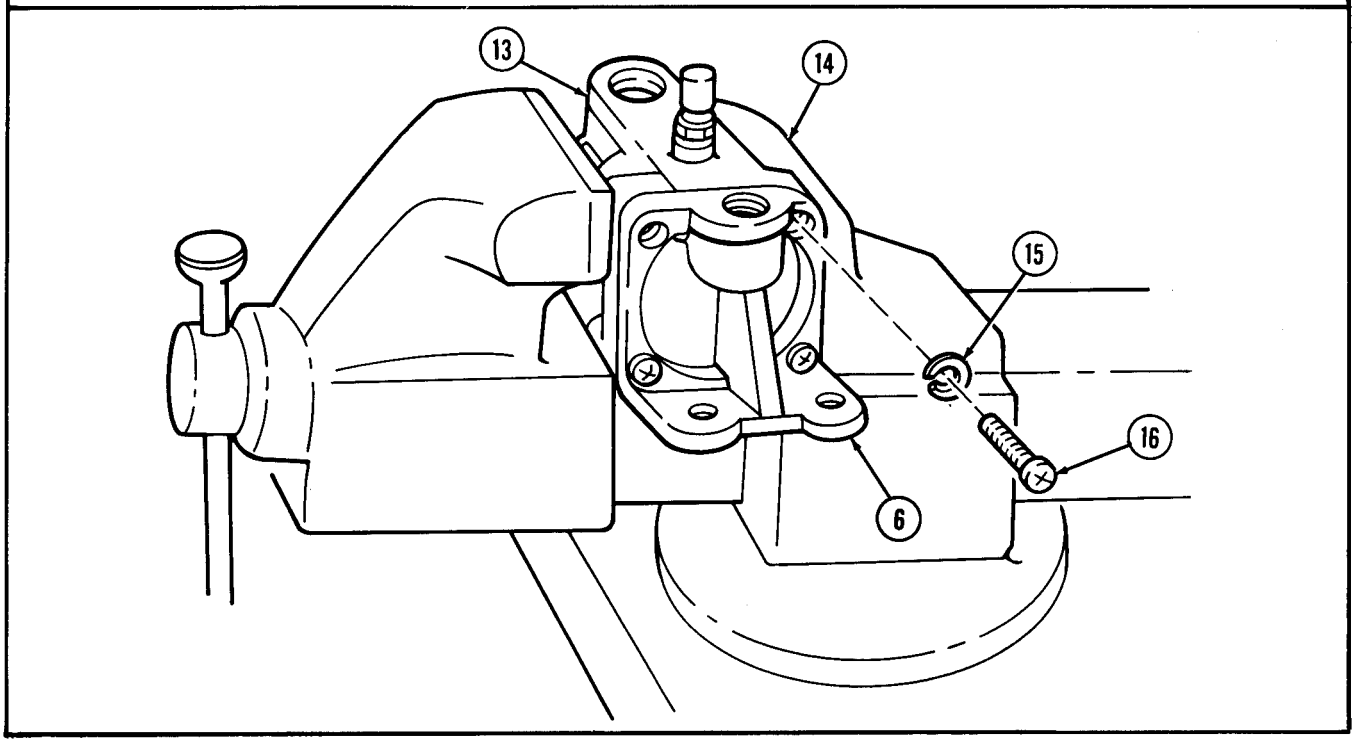


TA 350609

10-11. LIMITING VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





END OF TASK!

FOLLOW-ON TASKS:
- Install limiting valve (TM 9-2320-272-20-2).
- Start engine (TM 9-2320-272-10) and check limiting valve for air leaks.

TA 350610

10-12. TRANSFER CASE FRONT AXLE ENGAGEMENT CONTROL VALVE REPLACEMENT

The procedure for replacement of the transfer case front axle engagement control valve can be found in paragraph 8-8.

10-13. SERVICE BRAKE BRAKEDRUM MAINTENANCE

The procedure for removing and inspecting the brakedrum can be found in TM 9-2320-272-20-2. If necessary, turn brakedrum on a precision turning machine to a maximum of 15.12 in. (38.40 cm).

CHAPTER 11
POWER STEERING SYSTEM MAINTENANCE

Section I. DESCRIPTION AND DATA

11-1. DESCRIPTION - POWER STEERING GEAR

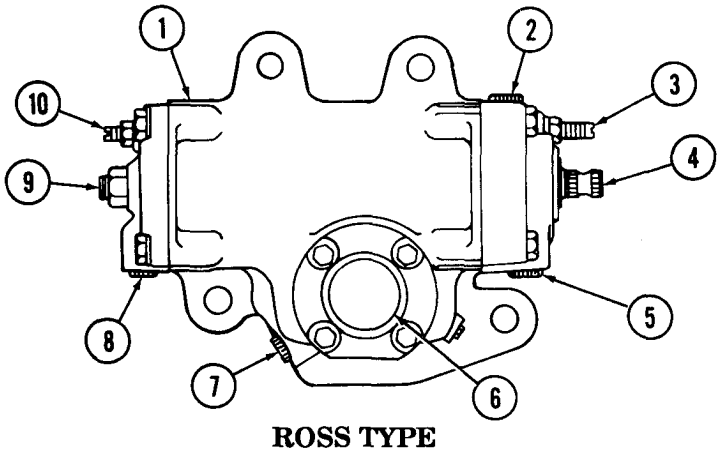
a. The M939 vehicles use one of two different models of integral power steering gears. Oil flow from the same engine driven pump supplies oil pressure for both models of steering gears. Both models direct and control oil flow and pressure to the same power assist cylinder mounted on the right side of the vehicle. The two steering gears use different pitman arms. Both types of steering gears will work manually in event of oil pressure failure.

1. ROSS TYPE STEERING GEAR. This is a recirculating ball type steering gear with a rotary valve as the control element. It has both worm gear and sector shaft adjustments in addition to two adjustable poppet valves.

2. SHEPPARD TYPE STEERING GEAR. This is a shuttle valve and piston type steering gear with adjustable plungers controlling power assisted steering angles. There are no other external mechanical adjustments.

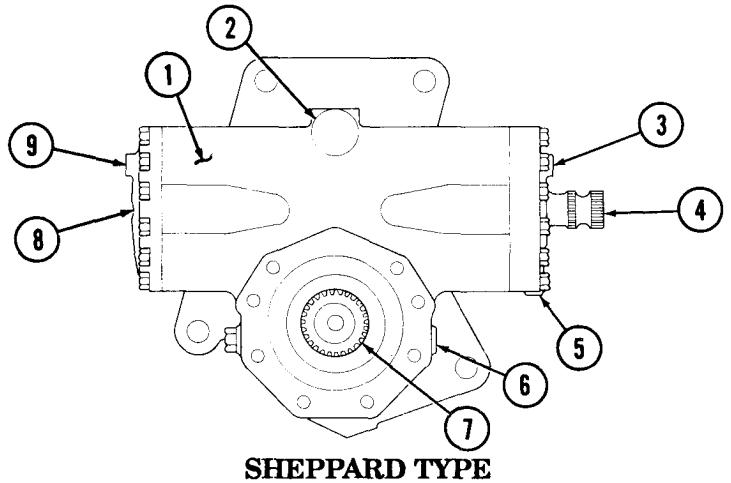
b. For additional description and data on the power steering system, refer to TM 9-2320-272-20-2.

c. The power steering gear is shown below. For additional steering gear data, see table 11-1.



ROSS TYPE

1. Power steering gear assembly
2. Hydraulic pressure inlet
3. Poppet valve adjustment
4. Input shaft
5. Hydraulic oil return
6. Sector shaft
7. Assist cylinder port
8. Assist cylinder port
9. Worm gear adjustment
10. Poppet valve adjustment



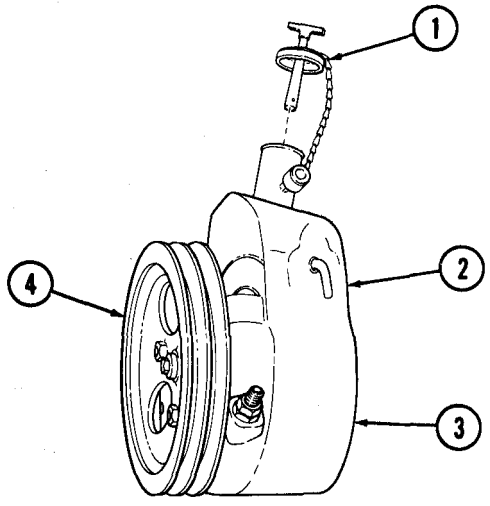
SHEPPARD TYPE

1. Power steering gear assembly
2. Hydraulic pressure inlet
3. Pressure relief plunger
4. Input shaft
5. Assist cylinder port
6. Hydraulic oil return
7. Sector shaft
8. Assist cylinder port
9. Pressure relief plunger

11-2. DESCRIPTION - POWER STEERING PUMP AND RESERVOIR

a. The power steering pump and reservoir are incorporated into a single assembly which is engine driven on all M939 series vehicles.

b. The power steering pump and reservoir are shown below. For additional data, see table 11-1.



1. Reservoir cap
2. Power steering pump reservoir
3. Power steering pump
4. Power steering pump pulley

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Table 11-1. Power Steering System Data

1. POWER STEERING GEAR

Make	TRW/Ross Gear
Model	HFB 64
Type	Integral
Location	Frame - left front

2. POWER STEERING GEAR

Make	Sheppard
Model	292SAF61
Location	Integral
	Frame - left front

3. POWER STEERING PUMP RESERVOIR

Make	Eaton
Model	B
Location	Hydraulic
Location	Engine - left side

Section II. GENERAL MAINTENANCE INSTRUCTIONS

11-3. GENERAL

Match the trouble symptom against the troubleshooting chart (Chapter 2, table 2-1) and follow the suggested checking sequence to prevent unnecessary repairs.

11-4. PRELIMINARY MAINTENANCE CHECKLIST

The following checks must be made before gear disassembly:

1. Check steering linkage and components for wear before performing hydraulic tests and adjustments.
2. Check tire pressures. Ensure pressures are correct and equal all around. Refer to TM 9-2320-272-10.
3. Check slip joint on steering column. Ensure it is free and lubricated. A tight slip joint can cause steering problems.
4. Check oil reservoir for proper oil level. Refer to LO 9-2320-272-12.
5. Check oil pump drivebelts for tightness, wear, or slippage. Refer to TM 9-2320-272-20-2.
6. If problems cannot be determined during the preliminary check, you will have to test the hydraulic system.

11-5. MAINTENANCE PRECAUTIONS

1. Always use a puller. Never use a torch or hammer to remove steering arms.
2. Do not weld any broken steering components. Replace defective or broken parts.
3. Do not cold straighten, hot straighten, or bend any steering system part.
4. Excessive heat will develop if power steering is held in extreme right or left turns longer than a few seconds. This heat will damage seals and/or pump.
5. Prevent dirt or foreign matter from entering hydraulic system. Always clean around filler caps, hose, and fitting connections before removing.

Section III. POWER STEERING SYSTEM MAINTENANCE

11-6. POWER STEERING MAINTENANCE TASK SUMMARY

11-7. UPPER STEERING COLUMN REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Steering wheel removed.
	TM 9-2320-272-20-1	Horn wire disconnected.
	TM 9-2320-272-20-1	Turn signal indicator switch removed.
	TM 9-2320-272-20-2	Trailer airbrake hand control valve removed.
	TM 9-2320-272-20-1	Horn contact brush removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two locknuts
LockWasher

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

None

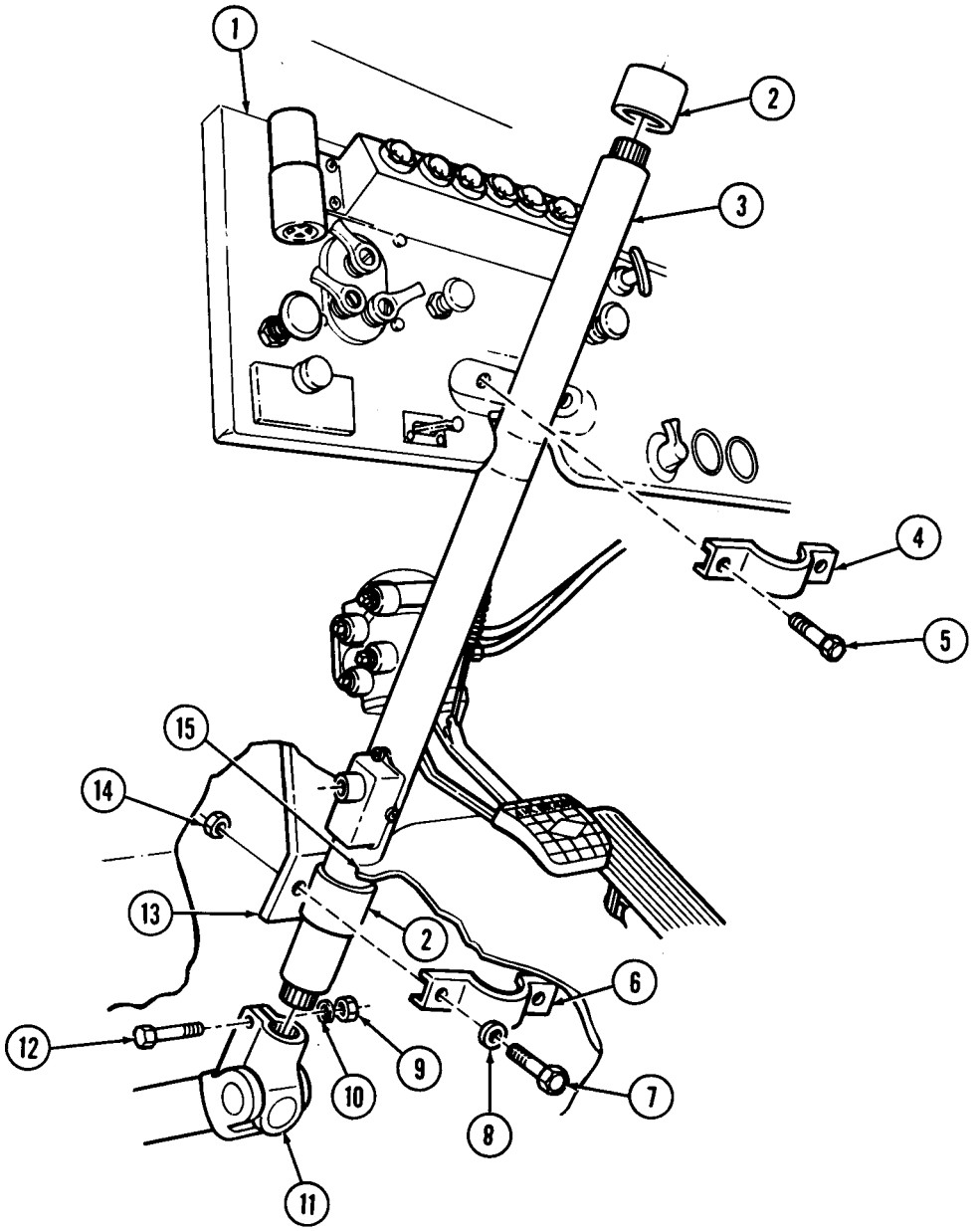
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Upper steering column universal joint (11)	Nut (9), lockwasher (10), and screw (12)	Remove.	Discard lockwasher (10).
2.	Upper steering column (3) and firewall (13)	Two locknuts (14), washers (8), and screws (7), and lower mounting clamp (6)	Remove.	Discard locknuts (14).
3.	Upper steering column (3) and instrument panel (1)	Two screws (5) and upper support clamp (4)	Remove.	Mark upper support clamp (4) location on steering column (3) for installation.

11-7. UPPER STEERING COLUMN REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.		Upper steering column (3)	Remove from steering column universal joint (11) and lift out through floorboard (15).	
5.	Upper steering column (3)	Two clamp bushings (2)	Slide off and remove.	



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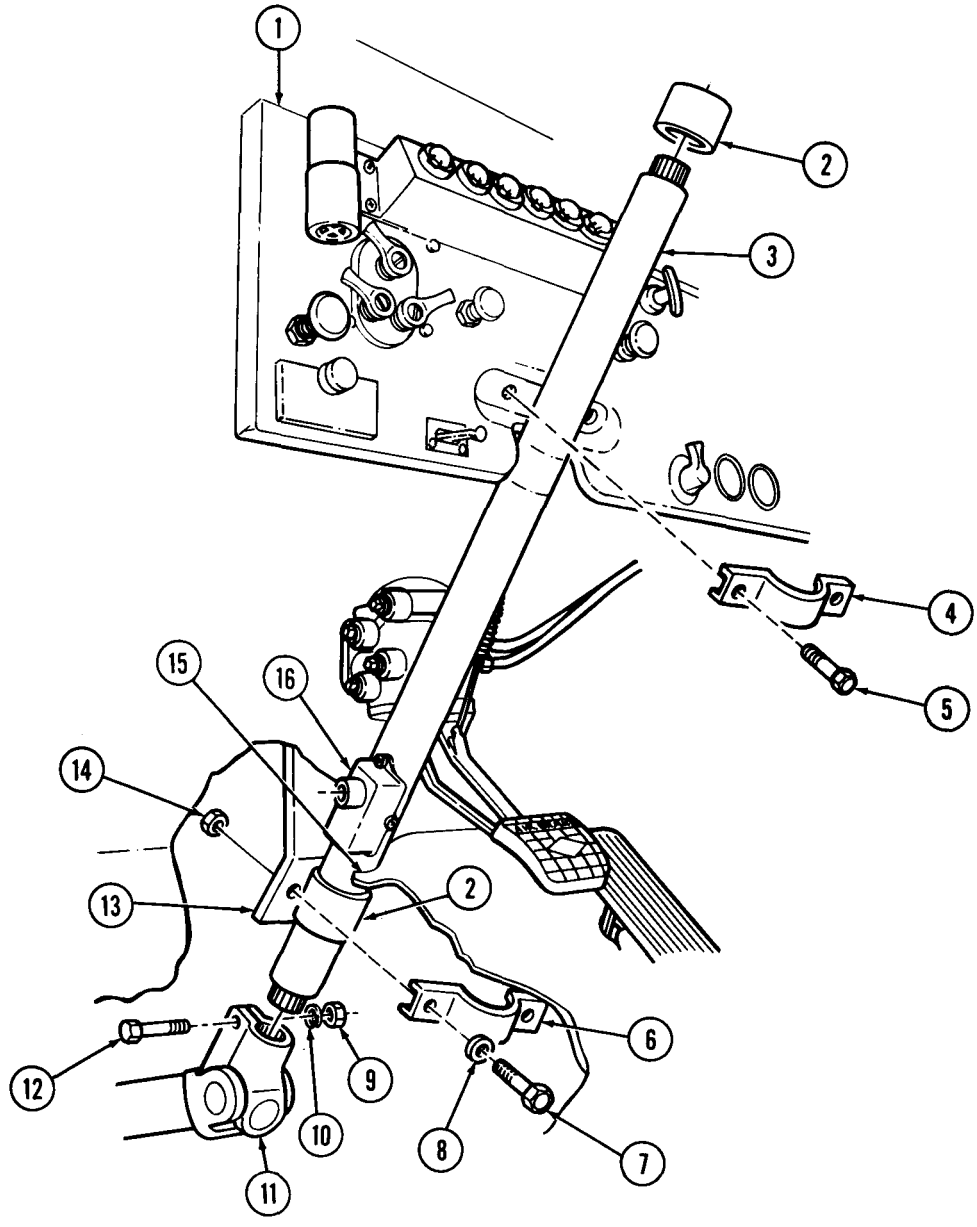
11-7. UPPER STEERING COLUMN REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Assistant will help with installation.	
	b. Installation			
6.		Two clamp bushings (2)	Install on upper steering column (3).	
7.		Upper steering column (3)	a. Lower through hole in floorboard (15) and insert splined end into universal joint (11).	Position horn contact brush (16) next to firewall (13).
			b. Install into universal joint (11) with screw (12), new lockwasher (10), and nut (9).	Do not tighten nut (9).
			c. Install to instrument panel (1) with upper support clamp (4) and two screws (5).	If old steering column (3) is being installed, make sure clamp (4) is positioned over clamp bushings (2) at marked locations. If new steering column (3) is being installed use marking on old column (3) to determine clamp (4) position.
			d. Install to firewall (13) with clamp (6), two screws (7), washers (8), and new locknuts (14).	
8.		Nut (9)	Tighten 28-34 lb-ft (38-46 N·m).	

11-7. UPPER STEERING COLUMN REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install trailer airbrake hand control valve (TM 9-2320-272-20-2).
- Install turn signal indicator switch (TM 9-2320-272-20-1).
- Connect horn wire (TM 9-2320-272-20-1).
- Install horn contact brush (TM 9-2320-272-20-1).
- Install steering wheel (TM 9-2320-272-20-2).
- Start engine (TM 9-2320-272-10) and road test vehicle.

TA 350789

11-8. LOWER STEERING COLUMN MAINTENANCE

This task covers

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Reassembly
e. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 TM 9-2320-272-20-2	Left splash shield removed. Steering gear stone shield removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Felt seal
Retainer
Two lockwashers
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO 30 (Appendix C, Item 17)

Personnel Required
Wheeled vehicle repairman MOS 63W

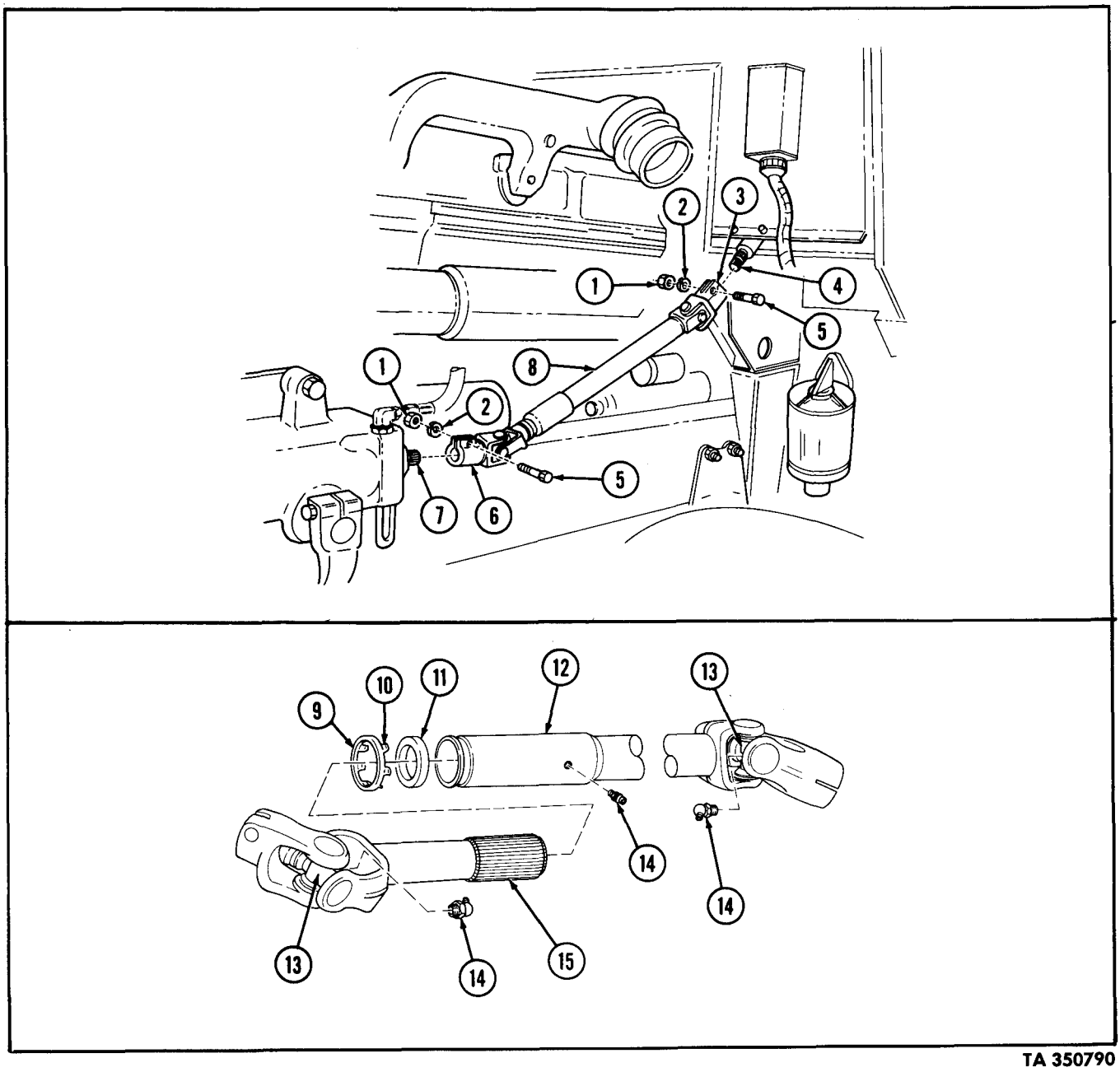
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Before removing lower steering column, make sure steering wheel spokes form a "Y" and front wheels are straight ahead for proper steering wheel alinement.		
1.	Lower steering column ends (3) and (6)	Two nuts (1), lockwashers (2), and screws (5)	Remove.	Discard lockwashers (2).
2.	Steering gear input shaft (7) and upper steering column shaft (4)	Lower steering column (8)	Remove.	
	b. Disassembly			
3.	Lower steering column upper section (12)	Retainer (9) and felt seal (11)	Bend tabs (10) and slide back on lower section (15) of lower steering column end (3).	

11-8. LOWER STEERING COLUMN MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.		Lower steering column lower section (15)	Scribe alinement marks and remove.	
5.	Lower steering column lower section (15)	Felt seal (11) and retainer (9)	Remove.	Discard seal (11) and retainer (9).
6.	Lower steering column upper section (12) and two universal joints (13)	Three grease fittings (14)	Remove.	



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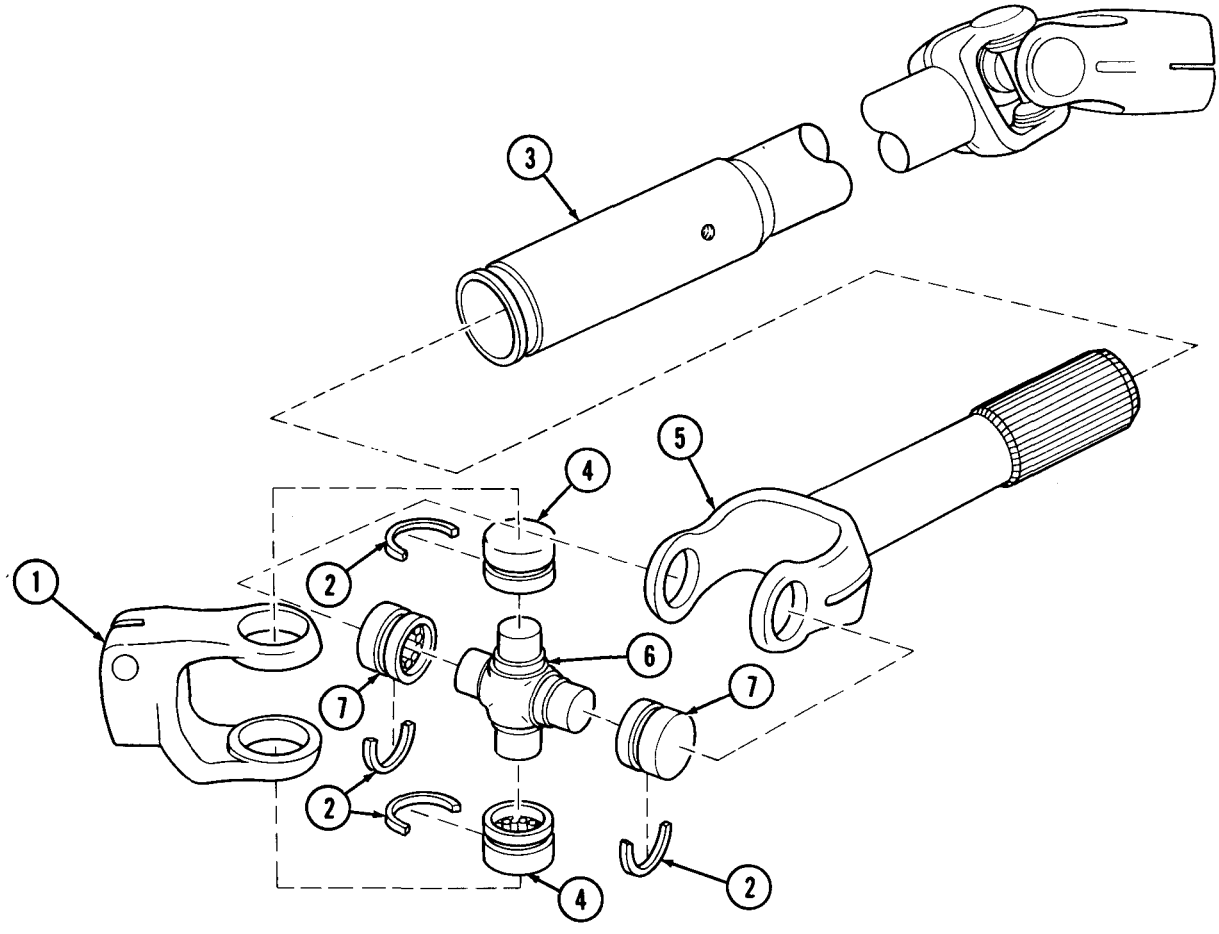
11-8. LOWER STEERING COLUMN MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Procedures to disassemble both universal joints are the same. Steps 7 through 9 cover the lower universal joint.		
7.	Four universal joint bearing caps (4) and (7)	Four snaprings (2)	Remove.	
8.	Universal joint (6)	Two universal joint bearing caps (4) and lower steering column end (1)	Remove.	
9.	Lower steering column lower section (5)	Two universal joint bearing caps (7) and universal joint (6)	Remove.	
	c. Cleaning and Inspection			
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
10.		Lower steering column sections (3) and (5)	a. Clean with drycleaning solvent.	
			b. Inspect for cracks and burrs on splines.	Repair small nicks or burrs on splines with fine file or crocus cloth. Replace if cracked or minor repairs cannot be made.
11.		Bearing caps (4) and (7)	a. Clean with drycleaning solvent.	
			b. Inspect.	Refer to TM 9-214. If damaged, replace universal joint (6).
12.		Universal joint (6)	a. Clean with drycleaning solvent.	
			b. Inspect for rough or uneven bearing surfaces.	Replace if bearing surfaces are rough or uneven.

11-8. LOWER STEERING COLUMN MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	d. Reassembly			
		NOTE Procedures to reassemble both universal joints are the same. Steps 13 through 15 cover the lower universal joint.		
13.		Universal joint (6)	Install on lower section (5) of lower steering column with two universal joint bearing caps (7).	Make sure bearing caps (7) are positioned so snaprings (2) can be installed.
14.		Lower steering column end (1)	Install on universal joint (6) with two universal joint bearing caps (4).	Make sure bearing caps (4) are positioned so snaprings (2) can be installed.
15.		Four snaprings (2)	Install on four universal joint bearing caps (4) and (7).	



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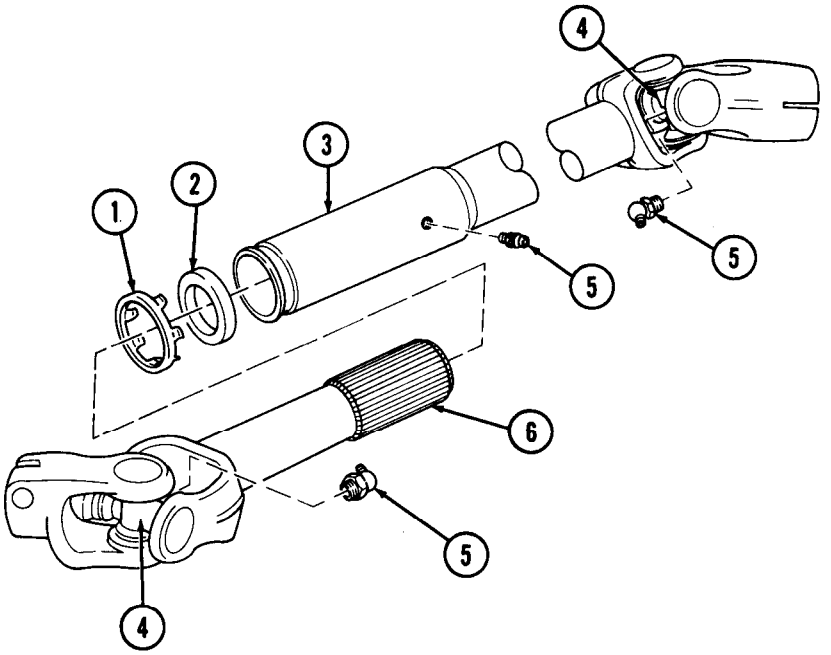
11-8. LOWER STEERING COLUMN MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Three grease fittings (5)	Install on two universal joints (4) and lower steering column upper section (3).	
17.		New felt seal (2) and new retainer (1)	Install on lower steering column lower section (6).	Soak felt seal (2) with lubricating oil prior to installation.
18.		Lower steering column lower section (6)	Aline scribe marks and install in lower steering column upper section (3) with felt seal (2) and retainer (1).	Apply GAA grease to splines.

e. Installation

Before installing lower steering column make sure steering wheel spokes form a "Y" and front wheels are straight ahead for proper steering wheel alinement.

19.		Lower steering column (14)	Install on upper steering column shaft (10) and steering gear input shaft (13).	Make sure screw (11) holes aline with grooves in shafts (10) and (13).
20.		Lower steering column ends (9) and (12)	Install with two screws (11), new lockwashers (8) and nuts (7).	Tighten 28-34 lb-ft (38-46 N·m).



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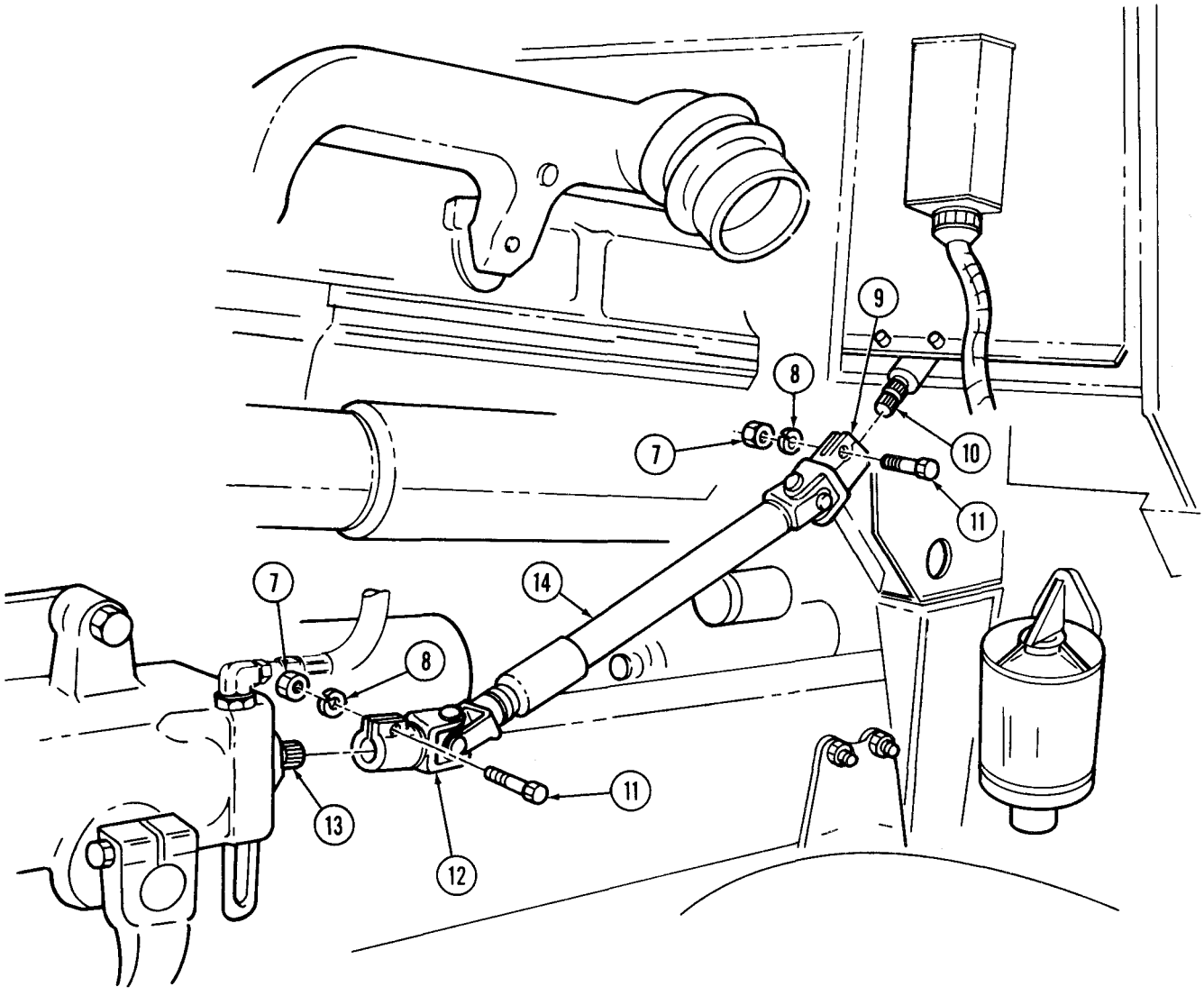
11-8. LOWER STEERING COLUMN MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION



END OF TASK!

FOLLOW-ON TASKS:
- Lubricate lower steering column (LO 9-2320-272-12).
- Install steering gear stone shield (TM 9-2320-272-20-2).
- Install left splash shield (TM 9-2320-272-10).
- Start engine (TM 9-2320-272-10) and road test vehicle.

TA 350793

11-9. STEERING GEAR (ROSS) AND MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Four "O" rings
Five locknuts
Lockwasher
Protective cap-plugs (Appendix C, Item 5)
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Left splash shield removed.
TM 9-2320-272-20-2	Steering gear stone shield removed.
TM 9-2320-272-20-2	Drag link removed.

Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Failure to do so may result in power steering gear damage.

NOTE

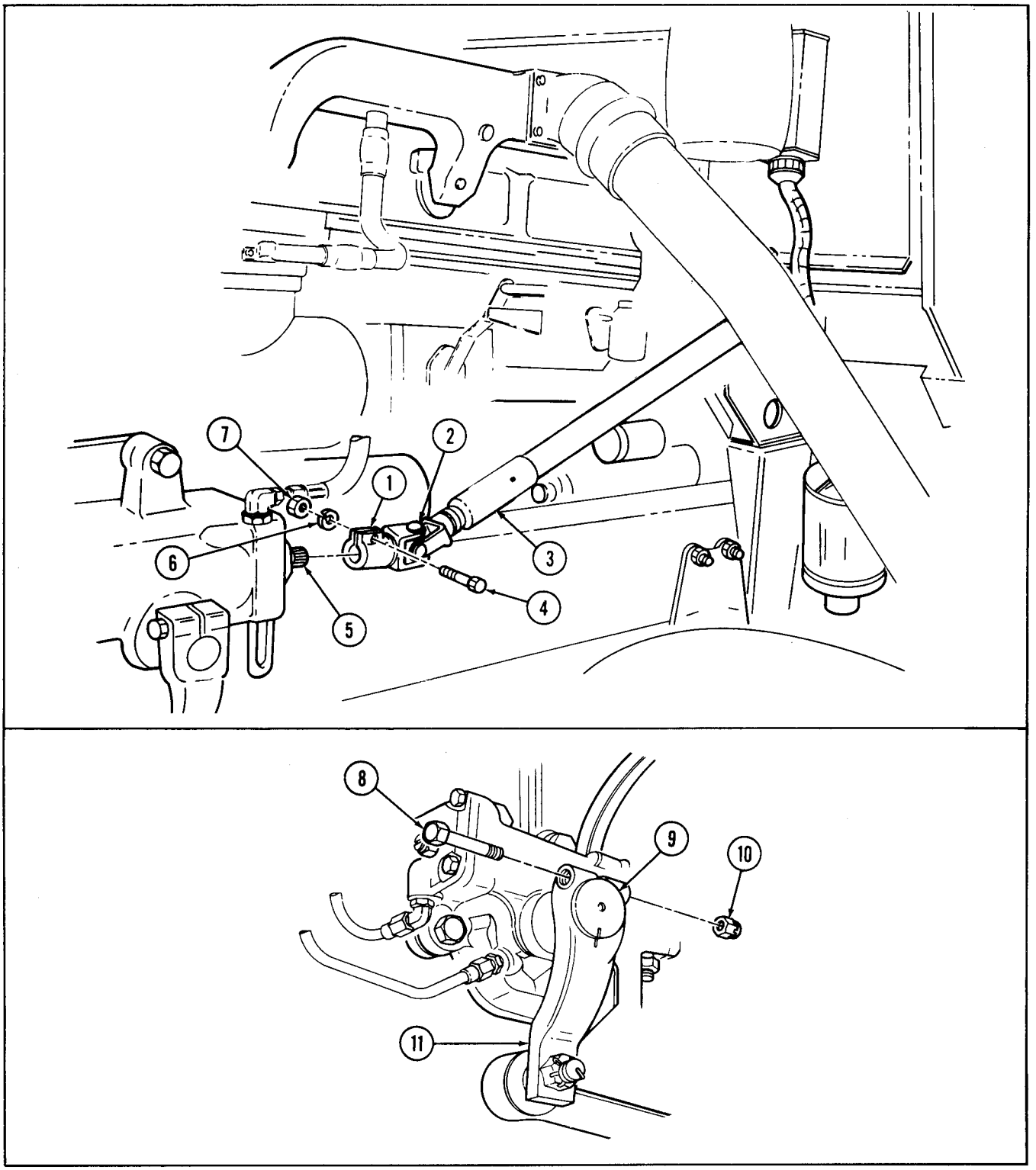
- Identify type of power steering gear. Removal and installation is different for the two steering gears. Refer to section I for identification.
- Ensure front wheels are straight ahead.

a. Removal

1.	Lower steering column universal joint (2) and steering gear input shaft (5)	Nut (7), lockwasher (6), and screw (4)	Remove.	Discard lockwasher (6).
2.		Lower steering column (3)	Open slot (1) in U-joint (2) and remove steering gear input shaft (5).	
3.	Pitman arm (11)	Locknut (10) and screw (8)	Remove.	Discard locknut (10).
4.	Steering gear sector shaft (9)	Pitman arm (11)	Use chisel to spread slot and remove.	Punch an alinement mark on pitman arm (11) and sector shaft (9).

11-9. STEERING GEAR (ROSS) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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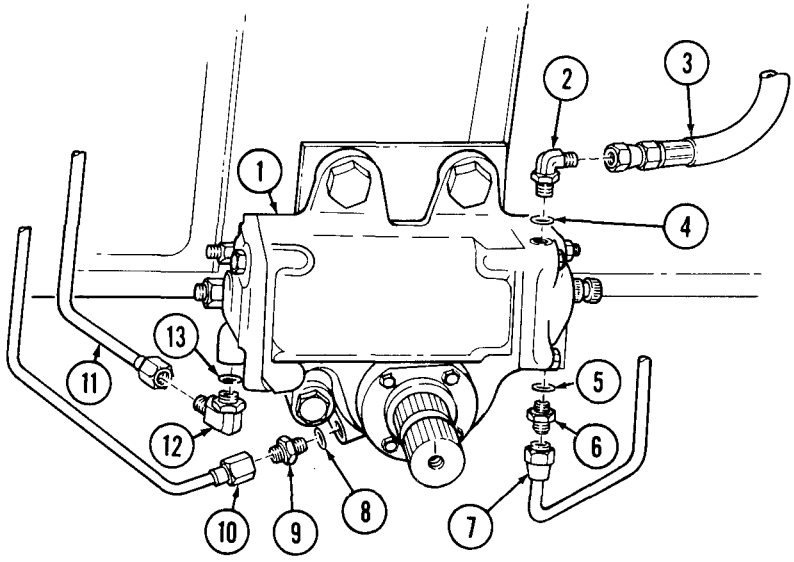
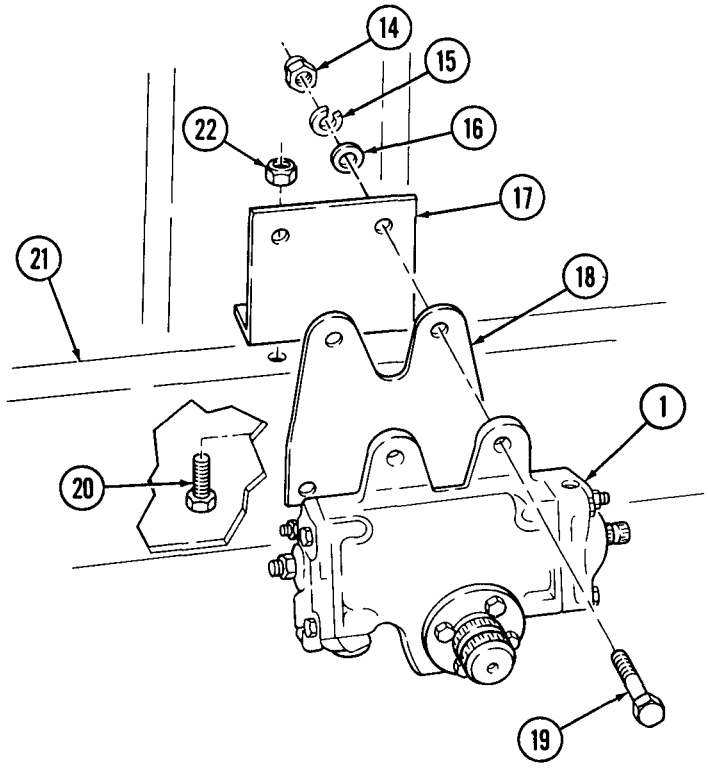
11-9. STEERING GEAR (ROSS) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Have container ready to catch oil from disconnected lines.		
5.	Adapter elbow (2) and adapter (6)	Oil pressure line (3) and return line (7)	Disconnect.	Tag lines for installation.
6.	Adapter (9) and adapter elbow (12)	Assist cylinder pressure lines (10) and (11)	Disconnect.	Tag lines for installation.
7.	Steering gear housing (1)	Adapter elbows (2) and (12), adapters (6) and (9), and "O" rings (4), (5), (8), and (13)	Remove.	Tag adapter elbows (2) and (12) and adapters (6) and (9) for installation. Discard "O" rings (4), (5), (8), and (13).
		NOTE Assistant will help with step 8.		
8.	Left frame rail (21)	Four nuts (14), lockwashers (15), washers (16), screws (19), steering gear housing (1), and mounting plate (18)	Remove.	Discard lockwashers (15).
9.		Four locknuts (22), screws (20), and bracket (17)	Remove.	Discard locknuts (22).
	b. Installation			
		NOTE Assistant will help with steps 10 through 11.		
10.		Mounting bracket (17)	Install with four screws (20) and new locknuts (22).	Do not tighten locknuts (22).
11.		Mounting plate (18) and steering gear housing (1)	Install on left frame rail (21) with four screws (19), washers (16), new lockwashers (15), and nuts (14).	Tighten nuts (14) 260-280 lb-ft (353-380 N·m).
11.1.		Locknuts (22)	Tighten.	Tighten locknuts (22) 60-70 lb-ft (81-95 N·m).
		NOTE Male pipe threads must be wrapped with antiseize tape before installation.		
12.		Adapter elbows (2) and (12) and adapters (6) and (9)	Install using new "O" rings (13), (8), (5), and (4).	
13.		Assist cylinder pressure lines (11) and (10)	Connect to steering gear housing adapter elbow (12) and adapter (9).	
14.		Oil return lines (7) and oil pressure line (3)	Connect to steering gear housing adapter (6) and adapter elbow (2).	

11-9. STEERING GEAR (ROSS) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





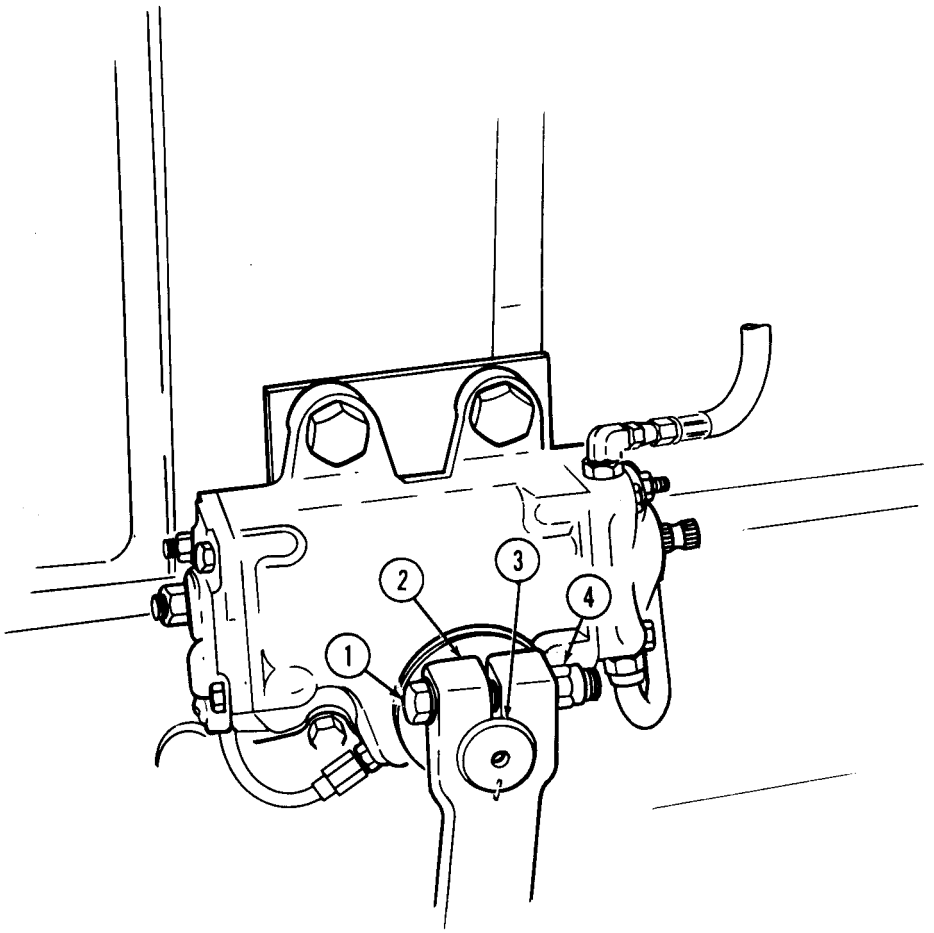
11-9. STEERING GEAR (ROSS) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.		Pitman arm (2)	Install on steering gear sector shaft (3) with screw (1) and new locknut (4).	Make sure alinement marks are in line with each other. Tighten 330-370 lb-ft (447-502 N·m).

NOTE

Before installing lower steering column, make sure steering wheel spokes form a "Y". Assistant will steady steering wheel.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Lower steering column universal joint (7)	a. Position to steering gear input shaft (9).	Make sure screw (8) holes aline with groove in shaft (9).
			b. Install on input shaft (9) with screw (8), new lockwasher (6), and nut (5).	Tighten 28-34 lb-ft (38-46 N·m).



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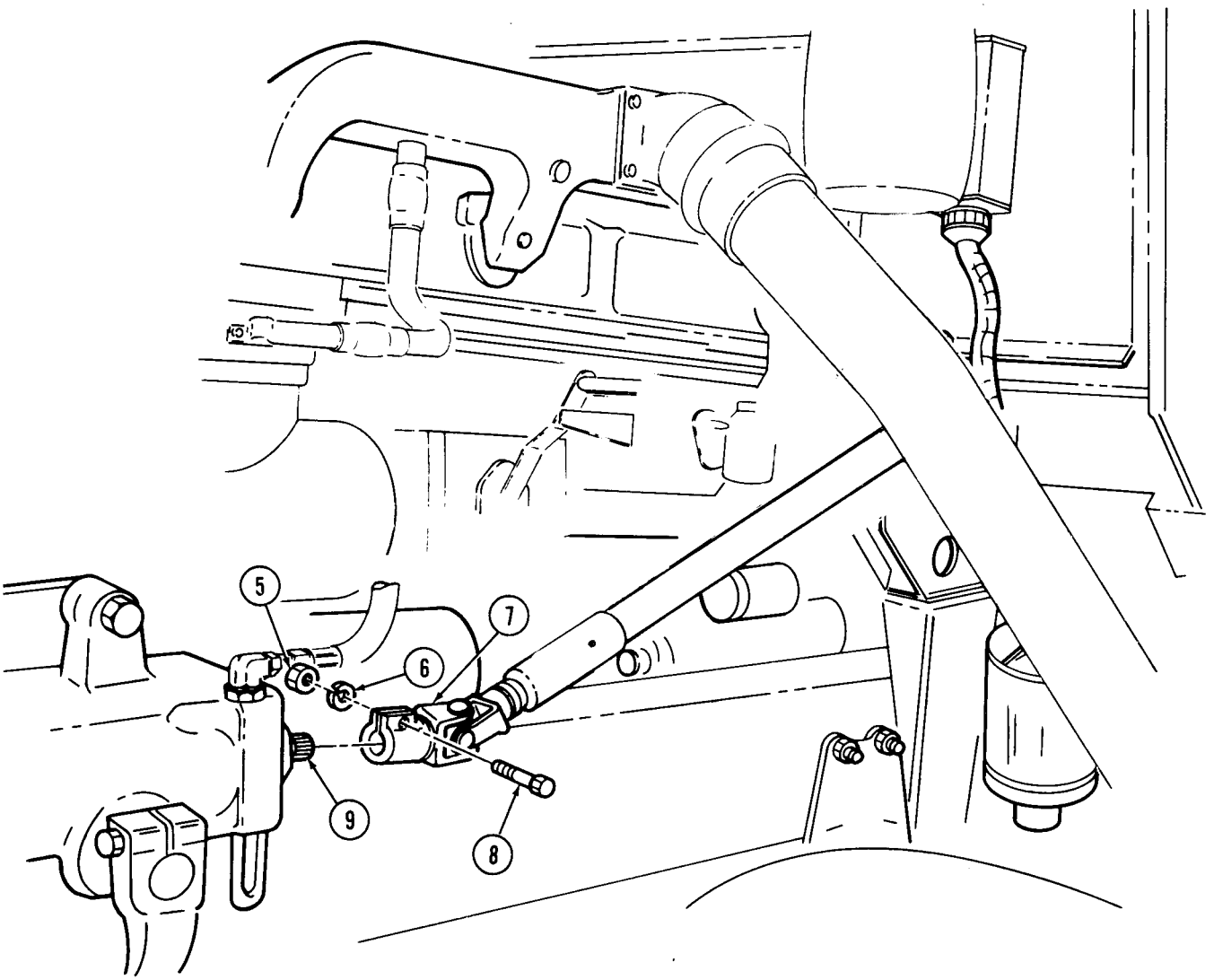
11-9. STEERING GEAR (ROSS) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install steering gear stone shield (TM 9-2320-272-20-2).
- Install left splash shield (TM 9-2320-272-10).
- Install drag link (TM 9-2320-272-20-2).
- Fill steering gear to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and road test vehicle.

TA 350797

11-9.1. STEERING GEAR (SHEPPARD) AND MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Four "O" rings
Four locknuts
Five lockwashers
Protective cap-plugs (Appendix C, Item 5)
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272 -20-2
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Left splash shield removed.
TM 9-2320-272-20-2	Steering gear stone shield removed.
TM 9-2320-272-20-2	Drag link disconnected.

Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	

NOTE

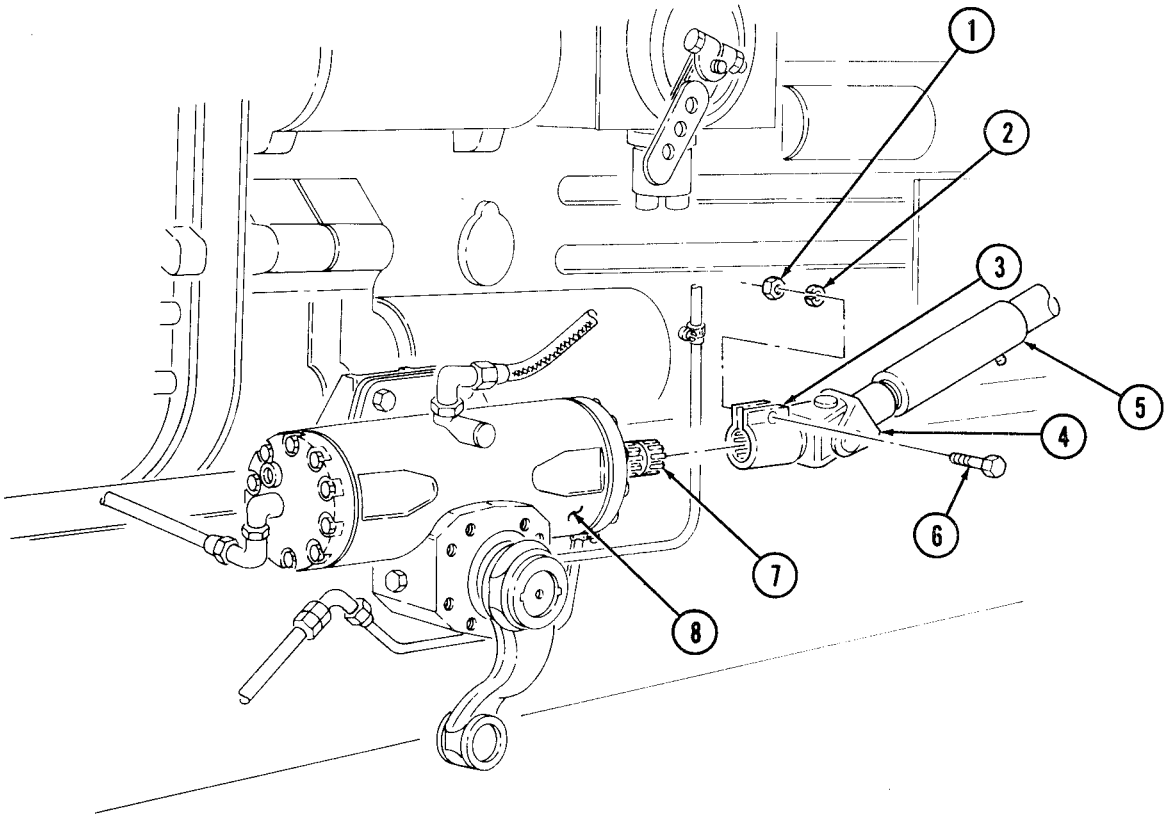
- Identify type of power steering gear. Removal and installation is different for the two steering gears. Refer to Section I for identification.
- Ensure front wheels are straight ahead.

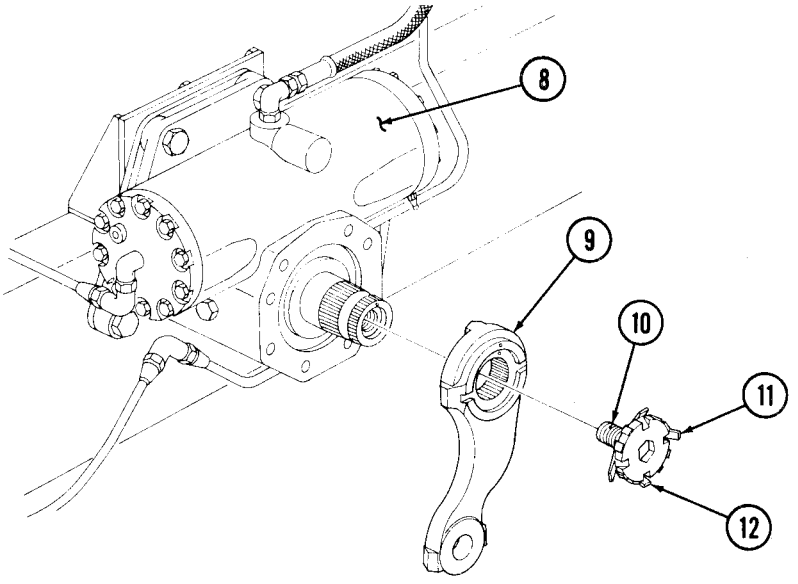
a. Removal

1. Lower steering column universal joint (4) and steering gear input shaft (7)	Nut (1), lockwasher (2), and screw (6)	Remove.	Discard lockwasher (2).
2.	Lower steering column (5)	Open slot (3) in universal joint (4) and remove from steering gear input shaft (7).	
3. Steering gear (8) and pitman arm (9)	Retainer (10)	a. Bend two long tabs (11) out of notches in pitman arm (9). b. Bend two short tabs (12) out of notches in retainer (10). c. Remove retainer (10).	
4. Steering gear (8)	Pitman arm (9) .	Remove.	Use puller.

11-9.1. STEERING GEAR (SHEPPARD) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





11-9.1. STEERING GEAR (SHEPPARD) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Failure to do so may result in steering system damage.

NOTE

- Have container ready to catch oil from disconnected lines.
- Tag all hydraulic lines for installation.

5.	Adapter elbow (3) and adapter (8)	Oil pressure line (4) and return line (9)	Disconnect.	
6.	Adapter elbow (15) and elbow (13)	Assist cylinder pressure lines (14) and (16)	Disconnect.	
7.	Steering gear (6)	Adapter elbow (3) and adapter (8)	Remove.	
8.	Adapter elbow (3) and adapter (8)	"O" rings (5) and (7)	Remove.	Discard "O" rings (5) and (7).

NOTE

Perform steps 9 through 11 if old steering gear is to be reused.

9.	Front of steering gear (6)	Elbow (1) and adapter elbow (15)	Remove.	
10.	Bottom rear of steering gear (6)	Elbow (13), line (12), and adapter (11)	Remove.	
11.	Elbow (1) and adapter (11)	"O" rings (2) and (10)	Remove.	Discard "O" rings (2) and (10).

NOTE

Assistant will help with step 12.

12.	Left frame rail (25)	Four nuts (19), lockwashers (18), washers (17), screws (23), steering gear housing (6), and mounting plate (22)	Remove.	Discard lockwashers (18).
13.		Four locknuts (20), screws (24), and bracket (21)	Remove.	Discard locknuts (20).

b. Installation

NOTE

Sheppard steering gear uses longer mounting screws.

14.		Mounting bracket (21)	Install on left frame rail (25) with four screws (24) and new locknuts (20).	Do not tighten locknuts (20).

11-9.1. STEERING GEAR (SHEPPARD) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.		Mounting plate (22) and steering gear housing (6)	Install on left frame rail (25) and mounting bracket (21) with four screws (23), washers (17), new lockwashers (18), and nuts (19).	Tighten nuts (19) 260-280 lb-ft (353-380 N·m).
16.		Locknuts (20)	Tighten.	Tighten locknuts (20) 60-70 lb-ft (81-95 N·m).

NOTE

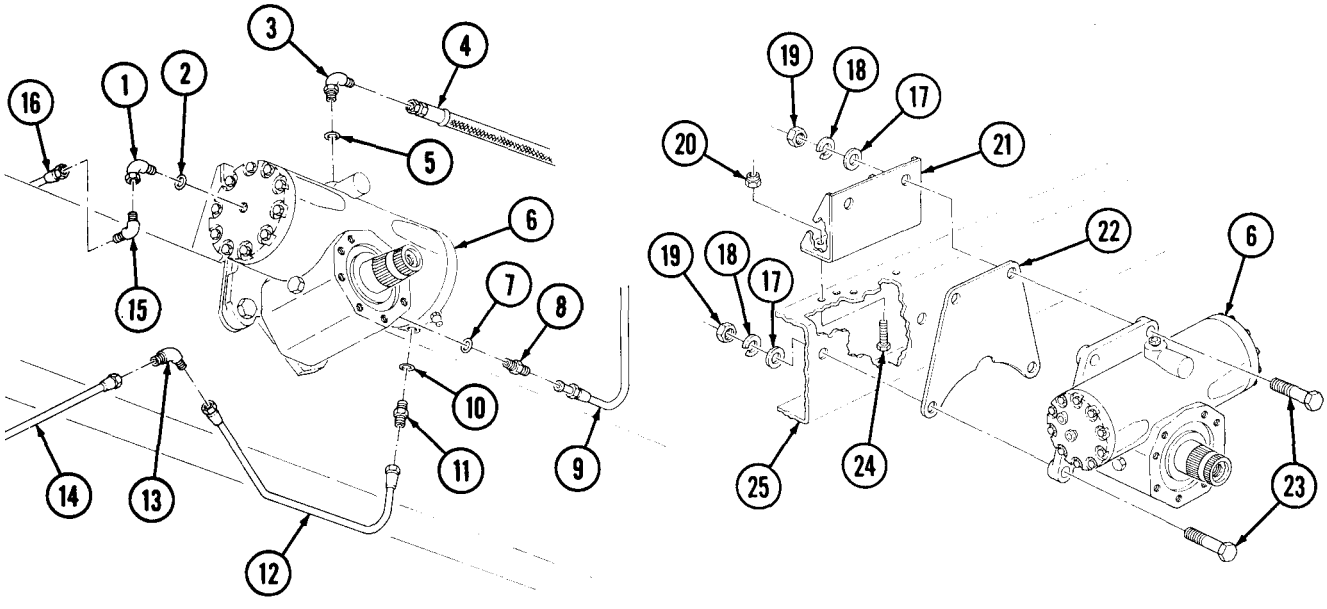
Perform steps 17 through 19 if old steering gear is to be installed.

17.		New "O" rings (2) and (10)	Install on elbow (1) and adapter (11).	
18.		Elbow (1) and adapter elbow (15)	Install on housing (6).	
19.		Adapter (11), line (12), and elbow (13)	Install on housing (6).	
20.		New "O" rings (5) and (7)	Install on adapter elbow (3) and adapter (8).	
21.		Adapter elbow (3) and adapter (8)	Install on housing (6).	

NOTE

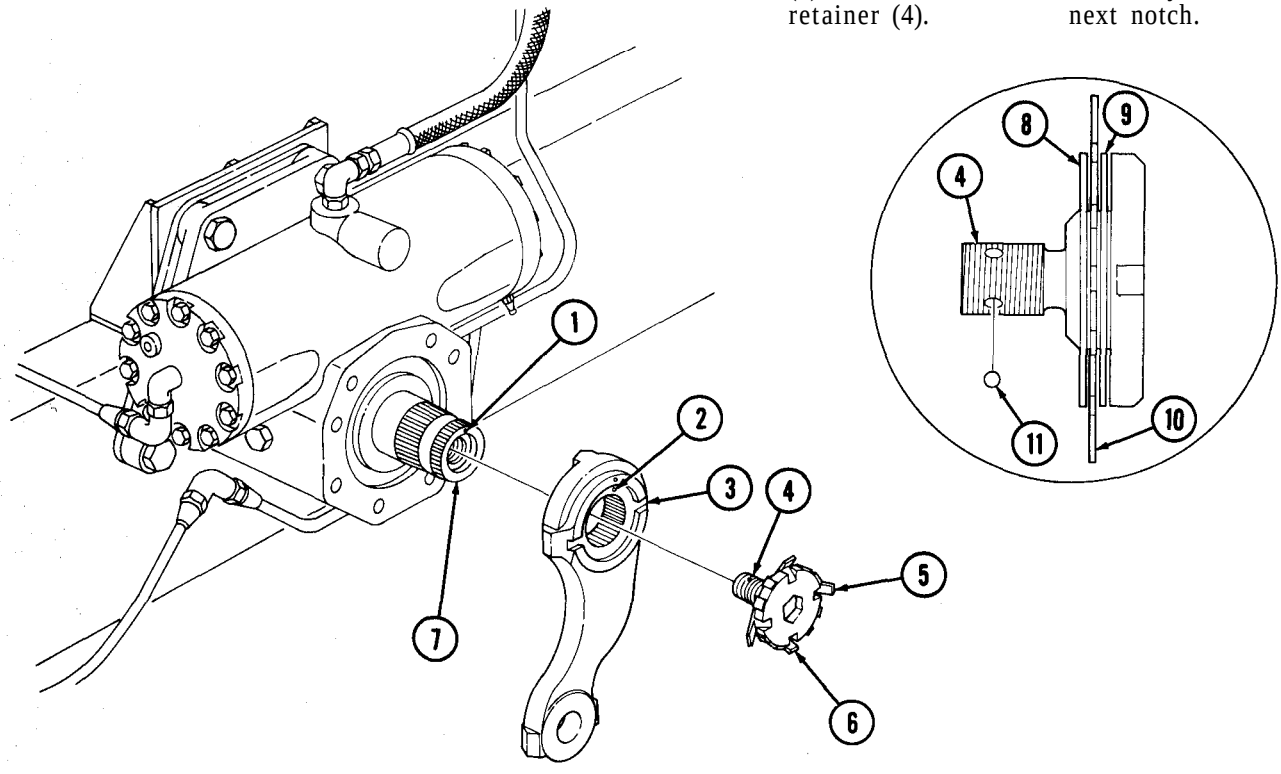
Male pipe threads must be wrapped with sealing tape before installation.

22.		Assist cylinder pressure lines (14) and (16)	Connect to elbow (13) and adapter elbow (15).	
23.		Oil return line (9) and oil pressure line (4)	Connect to adapter (8) and adapter elbow (3).	



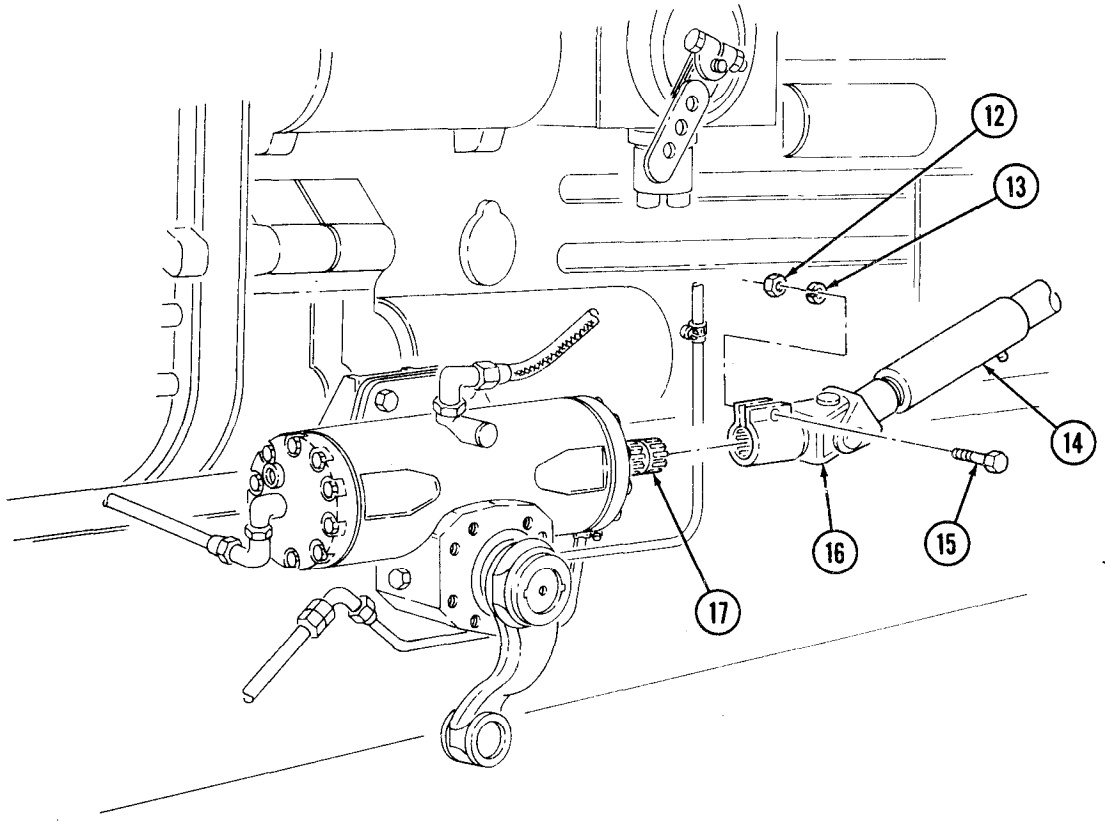
11-9.1. STEERING GEAR (SHEPPARD) AND MOUNTING BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Perform steps 24 and 25 if a new retainer assembly is installed.	
24.		Friction washer (9), tab lockwasher (10), and friction washer (8)	Press into slot on retainer (4).	
25.		Three nylon balls (11)	Press into indentations on retainer (4).	
26.		Pitman arm (3)	a. Aline timing marks (1) and (2).	
			b. Position pitman arm (3) on output shaft (7).	
			c. Screw retainer (4) into output shaft (7) until friction washer (8) drag is felt.	
			d. Aline long tabs (5) to notches of pitman arm (3) and bend tabs (5) into notches.	Back retainer (4) out one-half turn if necessary.
			e. Tighten retainer (4) 225 lb-ft (305 N·m).	
			f. Bend two short tabs (6) into notches on retainer (4).	Tighten retainer (4), if necessary, to aline next notch.



11-9.1. STEERING GEAR (SHEPPARD) AND MOUNTING BRACKET REPLACEMENT Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Before installing lower steering column, make sure steering wheel spokes form a "Y". • Assistant will steady steering wheel.		
27.		Lower steering column (14) and universal joint (16)	a. Position to steering gear input shaft (17).	Make sure screw (15) holes aline with groove in shaft (17).
			b. Install on input shaft (17) with screw (15), new lockwasher (13), and nut (12).	Tighten nut (12) 28-34 lb-ft (38-46 N·m).



END OF TASK!

FOLLOW-ON TASKS:
- Install steering gear stone shield (TM 9-2320-272-20-2).
- Install left splash shield (TM 9-2320-272-10).
- Install drag link (TM 9-2320-272-20-2).
- Fill steering gear to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and road test vehicle.

11-10. STEERING GEAR (ROSS) REPAIR

This task covers:

a. Disassembly
b. Cleaning, inspection, and Repair
c. Reassembly
d. Final Adjustments

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All with Ross type steering gear	Para. 11-9 LO 9-2320-272-12	Steering gear removed. Steering gear drained.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Seven “O” rings
Two 2-piece seals
Two plastic backup washers
Gasket
Two seals
Three seal rings
Two lock tabs
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO 10 (Appendix C, Item 16)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

- Keep tire extinguisher nearby when using drycleaning solvent.
- Compressed air source will not exceed 30 psi (207 kPa).
- Eyeshields must be worn when cleaning with compressed air.

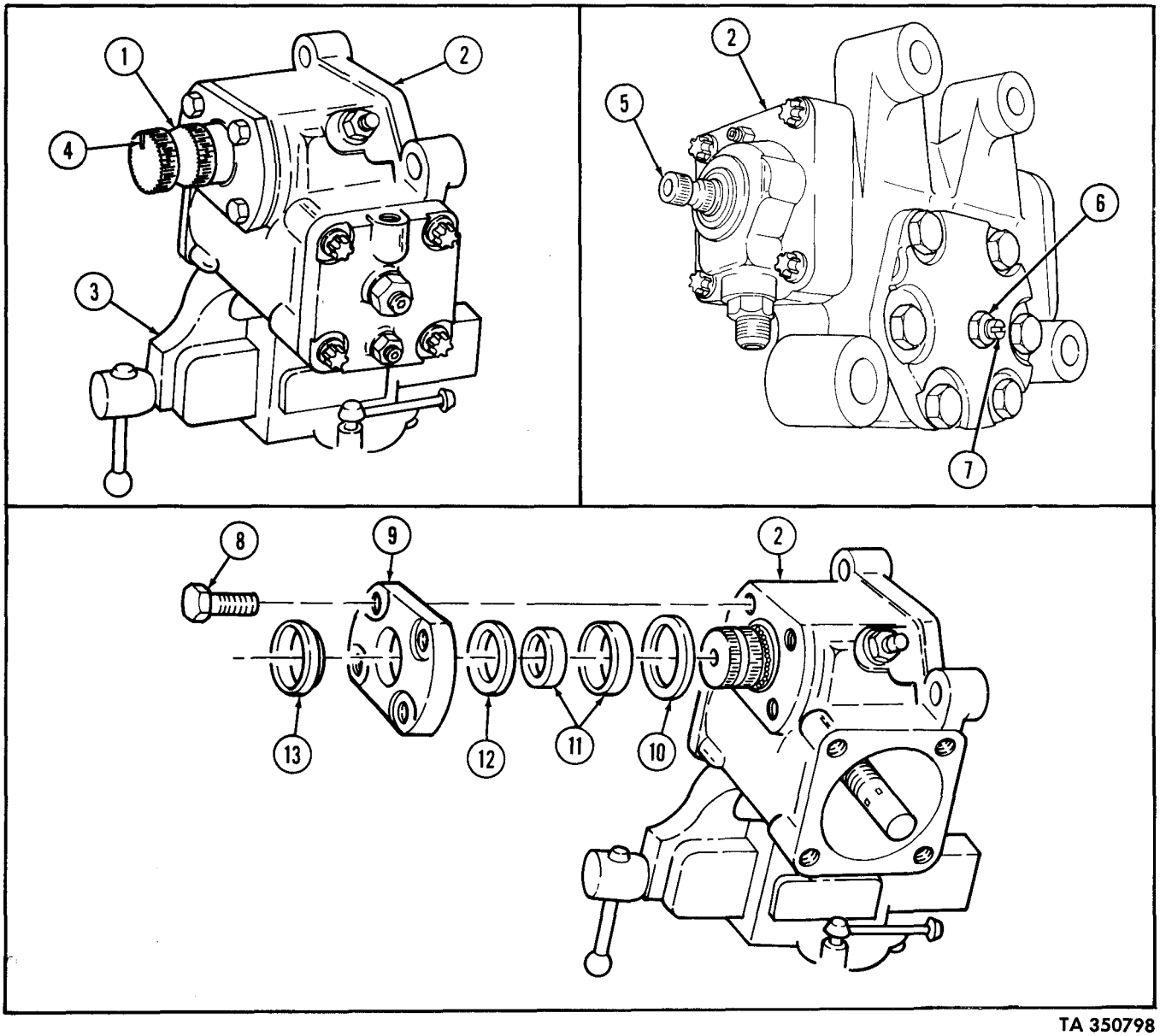
Manual References

TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.		Steering gear (2)	Position in vise (3) so sector shaft (1) is positioned horizontally.	
2.		Serrated end of sector shaft (1)	Remove all paint or corrosion and position alinement mark (4) in vertical direction.	Vertical positioning of sector shaft (1) is obtained by turning worm shaft (5).

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Sector shaft adjusting screw (7)	Jamnut (6)	Loosen.	
4.	Trunnion cover (9)	Outer seal (13)	Remove.	Discard seal (13).
5.	Trunnion cover (9) and gear housing (2)	Four screws (8)	Remove, and separate trunnion cover (9) from gear housing (2).	
6.	Trunnion cover (9)	"O" ring (12), two-piece seal (11), and backup washer (10)	Remove.	Discard "O" ring (12), two-piece seal (11), and backup washer (10).



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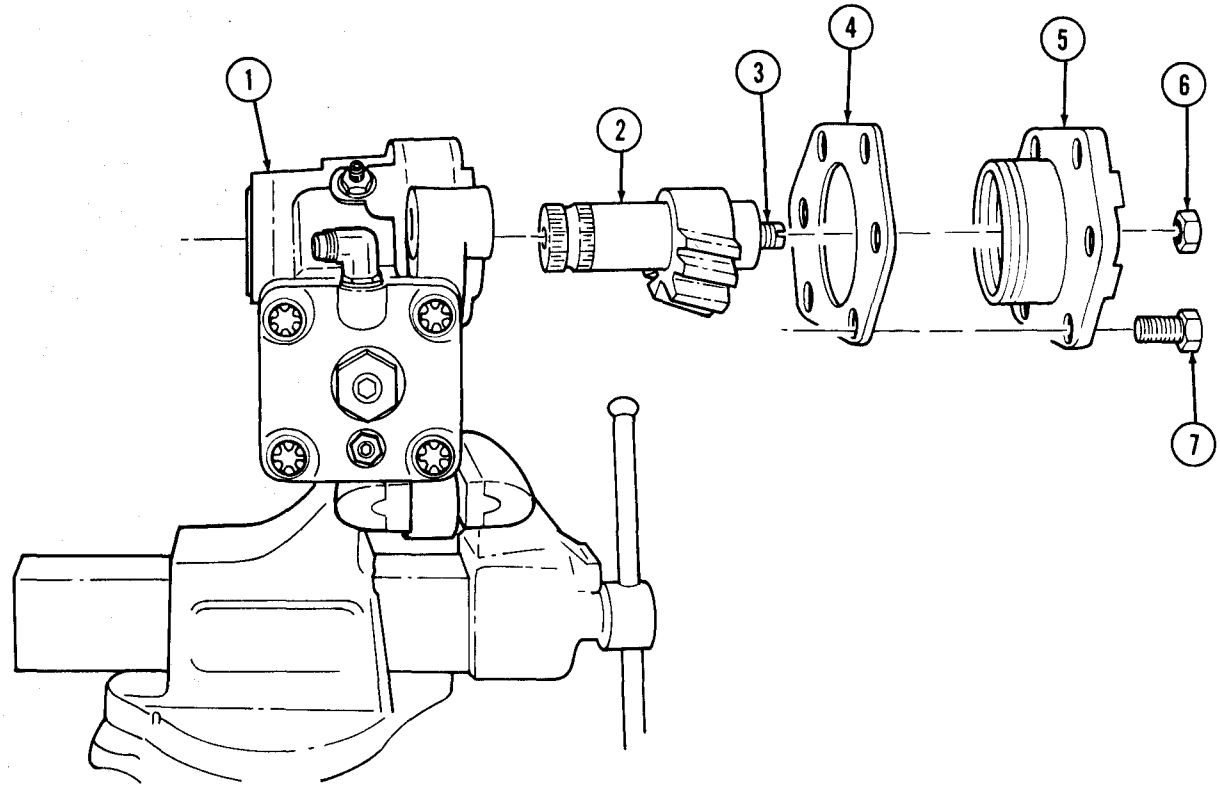
11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

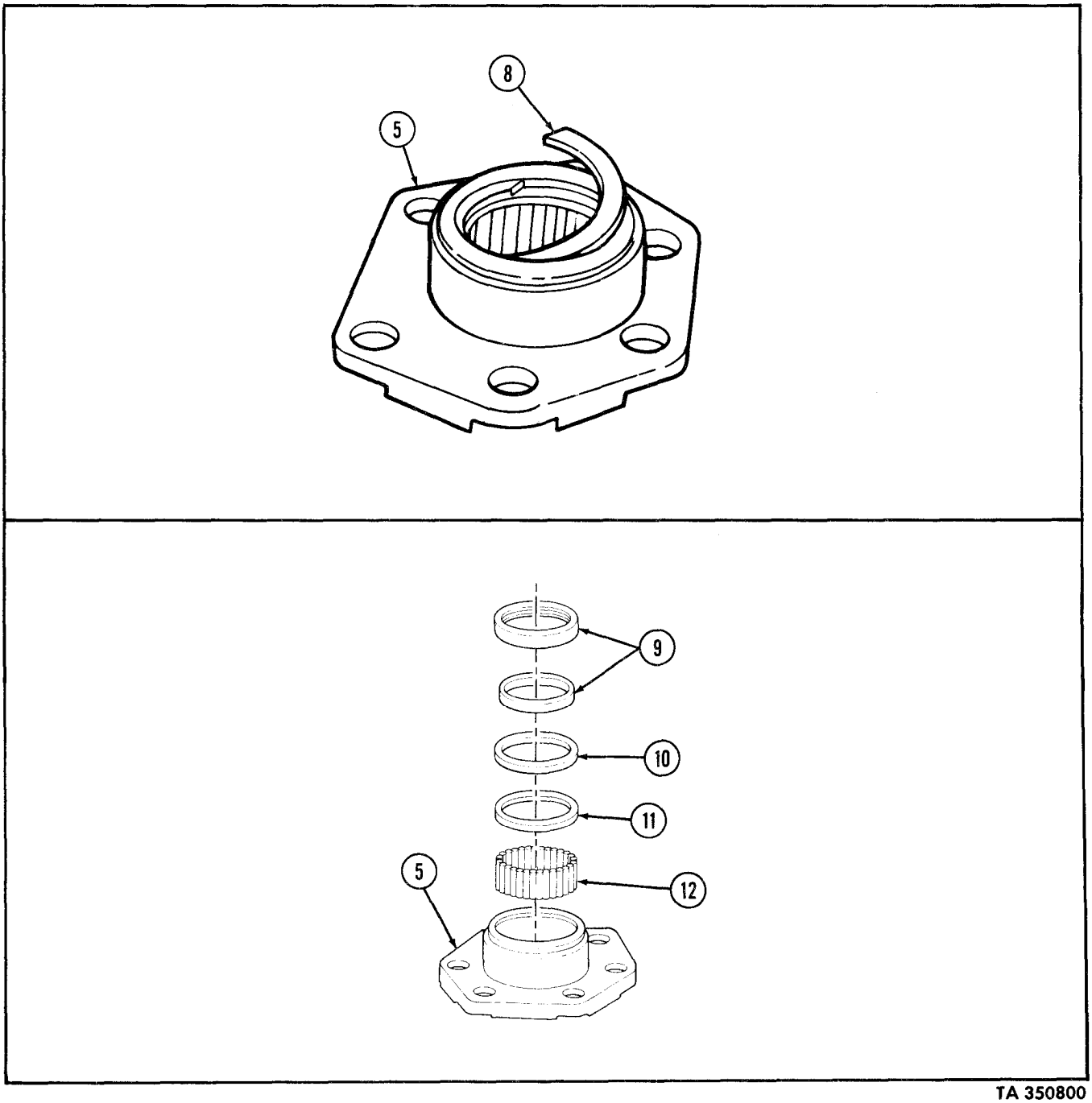
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Steering gear side cover (5) and steering gear housing (1)	Six screws (7)	Remove.	
8.		Side cover (5), sector shaft (2), and gasket (4)	Remove.	Discard gasket (4).
9.	Steering gear side cover (5)	Jamnut (6) and sector shaft adjusting screw (3)	a. Remove jamnut (6).	
			b. Turn sector shaft adjusting screw (3) clockwise until sector shaft (2) separates from side cover (5).	Sector shaft adjusting screw (3) is part of sector shaft (2).



TA 350799

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

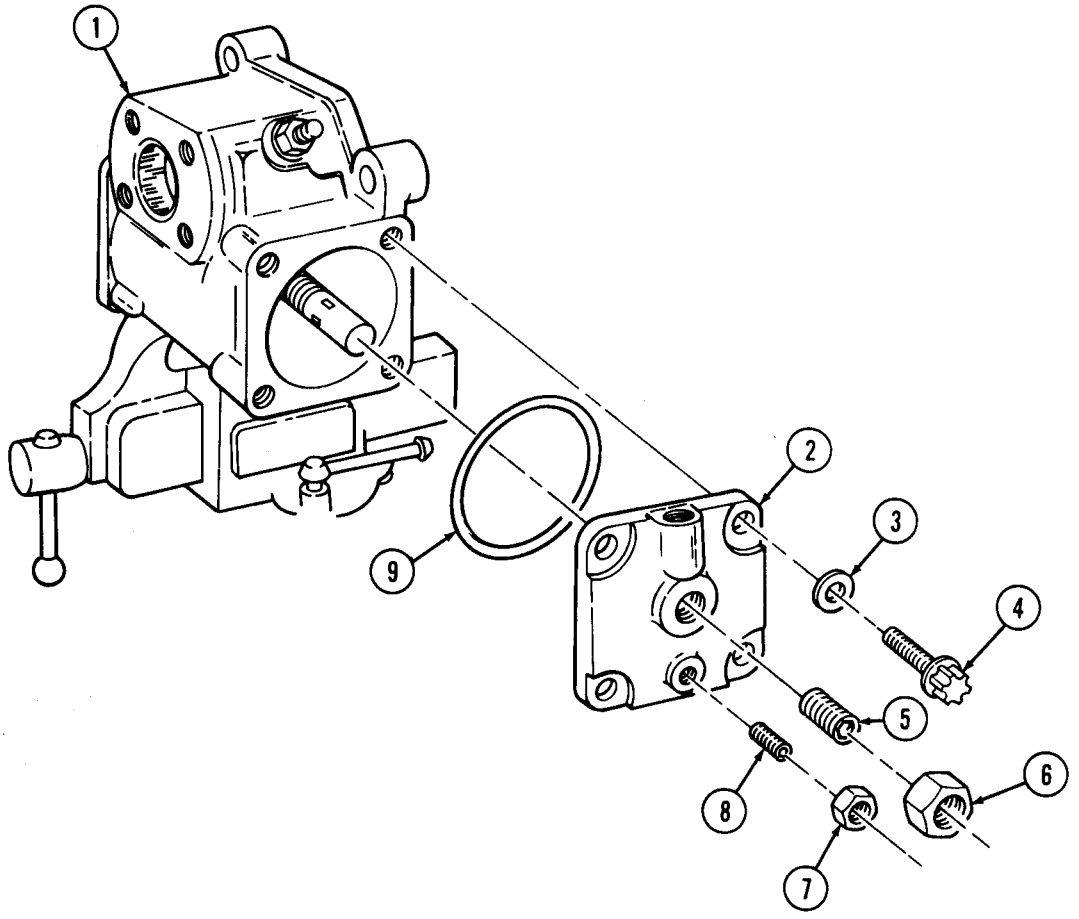
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.	Side cover (5)	Seal retainer (8), two-piece seal (9), plastic backup washer (10), steel backup washer (11), and forty-four bearing rollers (12)	Remove.	Discard two-piece seal (9) and backup washer (10).



TA 350800

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

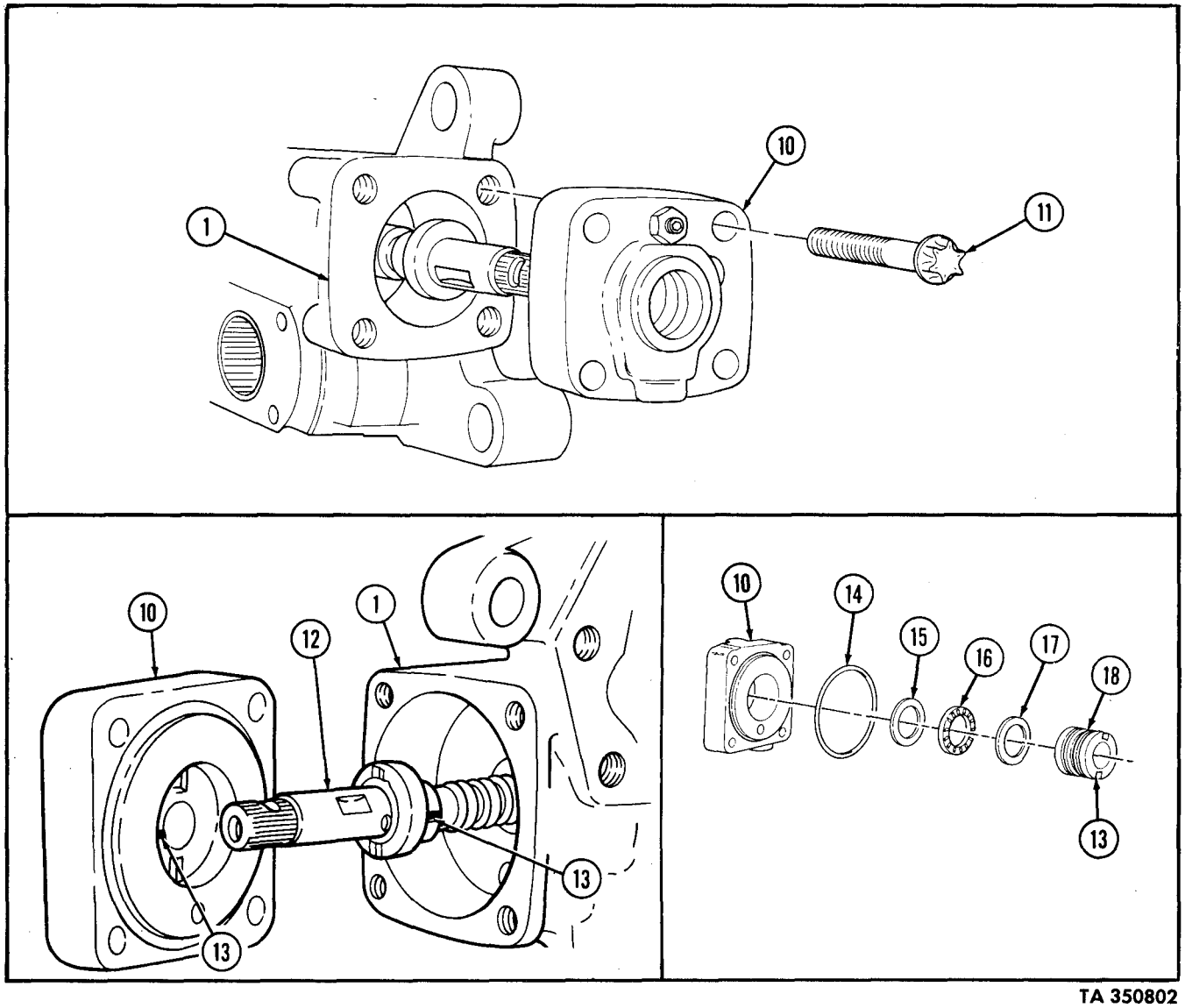
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.	End cover (2)	Jamnut (6) and worm-shaft adjusting screw (5)	Remove.	
12.		Jamnut (7) and poppet adjusting screw (8)	Remove.	
13.	End cover (2) and gear housing (1)	Four screws (4) and washers (3)	Remove.	
14.	Gear housing (1)	End cover (2) and "O" ring (9)	Remove.	Discard "O" ring (9).



TA 350801

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

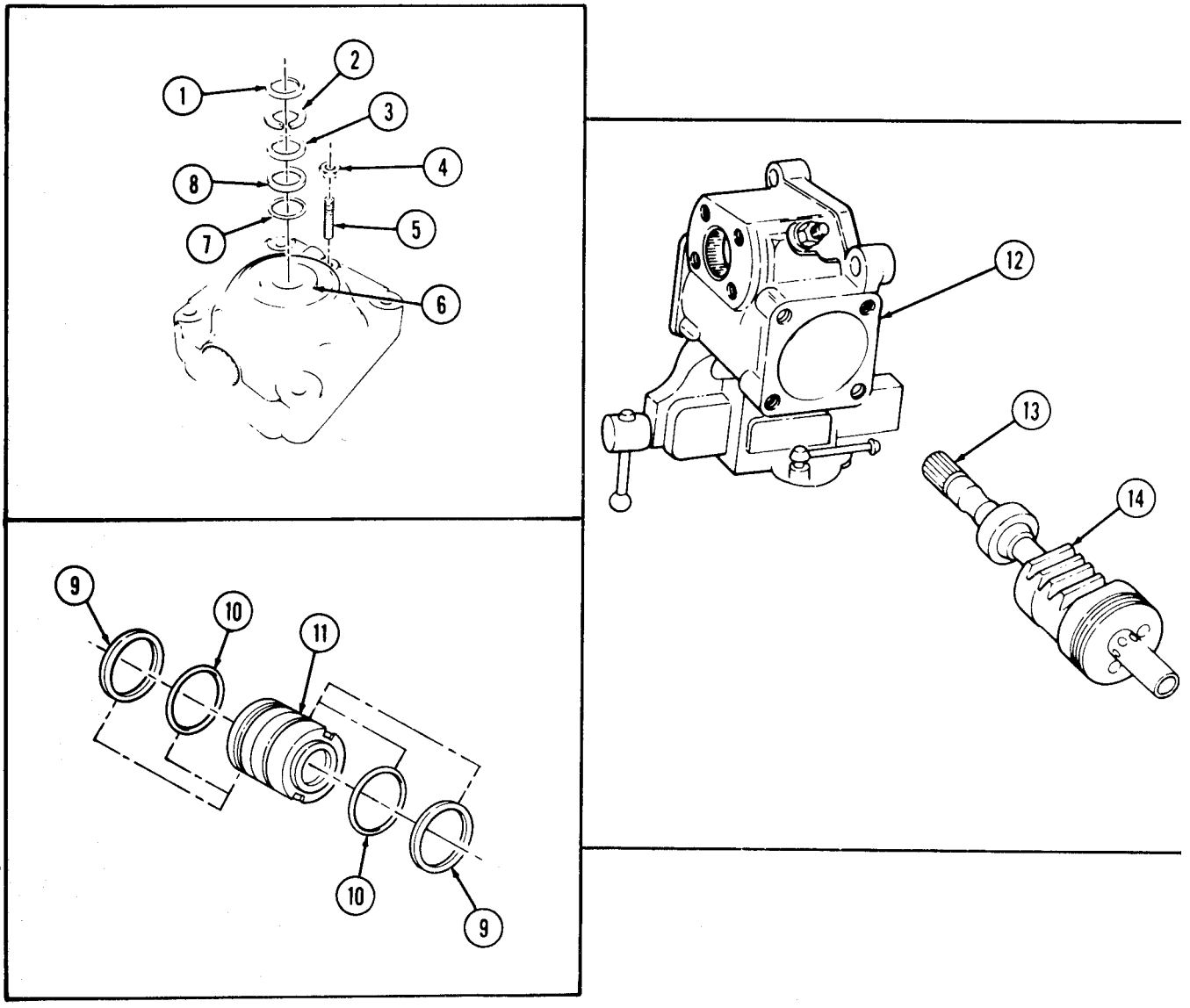
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.	Valve housing (10) and gear housing (1)	Four screws (11)	Remove.	
		CAUTION		
		Alinement marks (13) are located on valve sleeve (18) and wormshaft (12) so that they can be reassembled in their original position. Failure to aline marks may cause damage to steering gear.		
16.	Gear housing (1)	Valve housing (10)	Remove.	
17.	Mating side of valve housing (10)	Valve sleeve (18), inner thrust washer (17), thrust bearing (16), outer thrust washer (15), and "O" ring (14)	Remove.	Discard "O" ring (14).



TA 350802

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

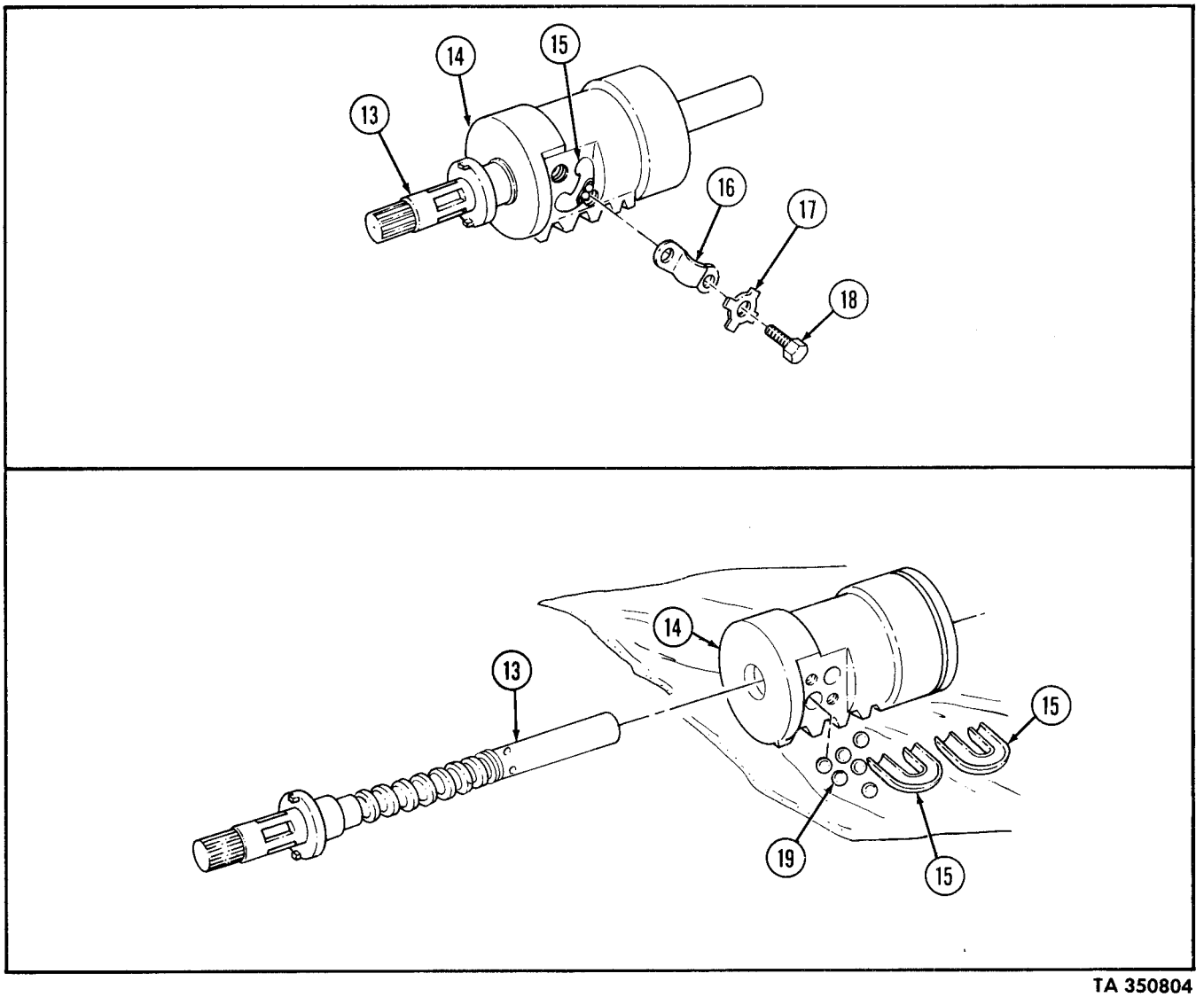
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.	Outside of valve housing (6) bore	Seal (1), retaining ring (2), steel backup washer (3), seal cup (8), and "O" ring (7)	Remove.	Discard "0" ring (7) and seal (1).
19.	Valve housing (6)	Jamnut (4) and poppet adjusting screw (5)	Remove.	
20.	Valve sleeve (11)	Two seal rings (9) and two "O" rings (10)	Remove.	Discard "0" rings (10) and seal rings (9).
21.	Gear housing (12)	Rack piston (14) and wormshaft (13)	Remove from end cover side of gear housing (12).	



TA 350803

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

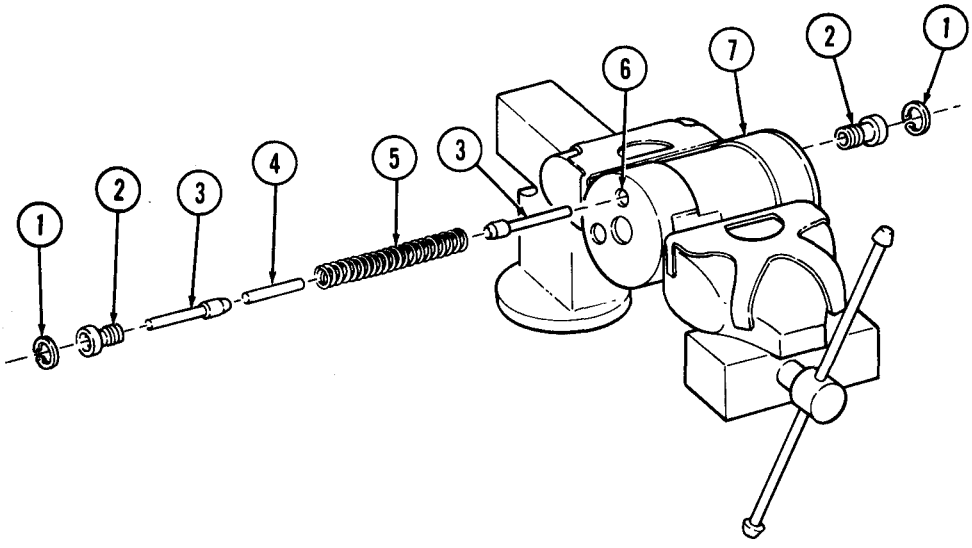
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
22.	Rack piston (14)	Ball bearing return guide retaining clip (16)	Bend two locktabs (17) down and remove two screws (18).	Discard locktabs (17).
23.		Two ball bearing return guides (15)	Remove.	
24.		Twenty-seven ball bearings (19)	Turn rack piston (14) over so ball bearings (19) can roll out as wormshaft (13) is rotated in each direction.	
25.		Wormshaft (13)	Remove.	



TA 350804

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

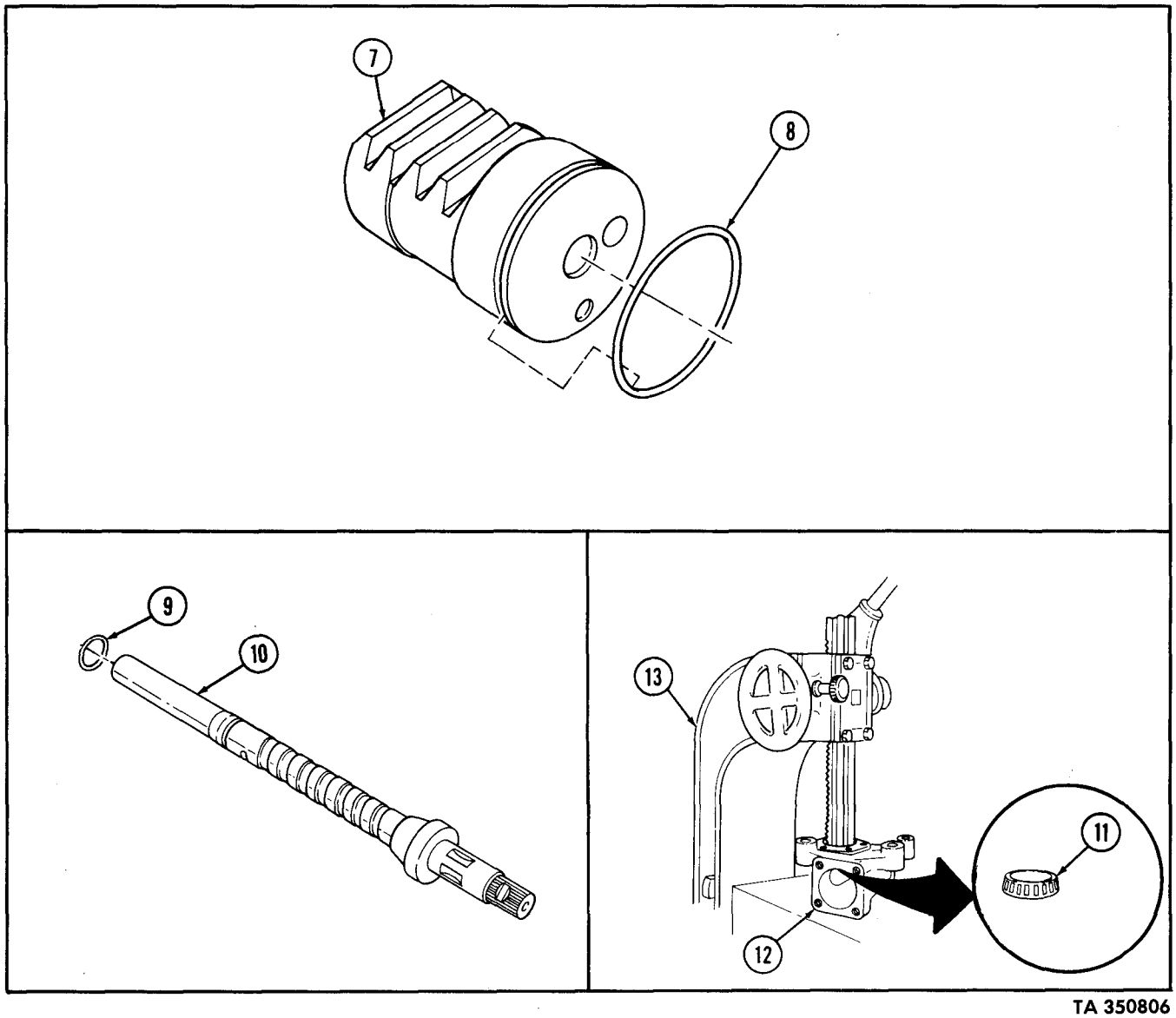
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
26.		Rack piston (7)	Position in soft-jawed vise.	
27.	Rack piston poppet bore (6)	Two poppet seat snap-rings (1)	Remove one from each end of bore (6).	
28.		Two poppet seats (2)	Push poppets (3) inward until poppet seats (2) can be removed.	Poppet spring (5) and spring rod (4) will come out of rack piston (7) when first poppet seat (2) is removed.
29.		Two poppets (3), spring (5), and spring rod (4)	Remove from poppet bore (6).	



TA 350805

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
30.	Rack piston (7)	"O" ring (8)	Remove.	Discard "O" ring (8).
31.	Wormshaft (10)	Seal ring (9)	Remove.	Discard seal ring (9).
		NOTE		
		Step 32 is performed only if sector shaft roller bearing requires replacement.		
32.	Gear housing (12)	Roller bearing (11)	Press bearing (11) out.	Use arbor press and mandrel (13). Discard bearing (11).



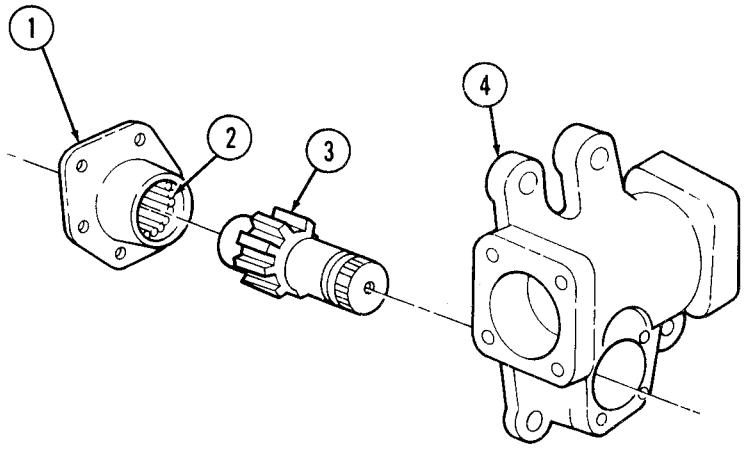
TA 350806

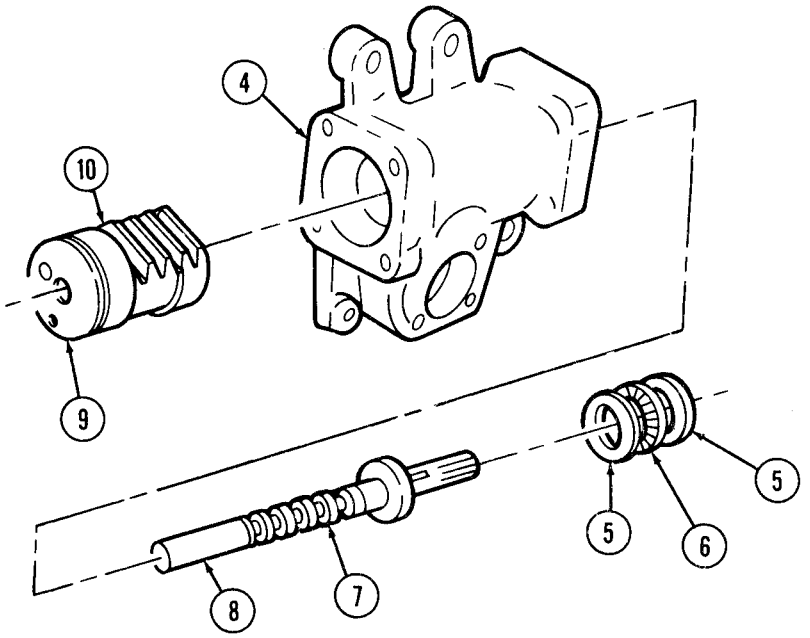
11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			
			WARNING	
			• Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel. • Compressed air source will not exceed 30 psi (207 kPA). When cleaning with compressed air, eyeshields must be worn. Failure to wear eyeshields may result in injury to personnel.	
33.		All steering gear components	Clean with solvent and dry with compressed air.	Refer to para. 2-7.
			NOTE	
			Light polished areas of steering gear components indicate normal wear.	
34.		Sector shaft (3) and side cover (1)	Inspect bearing areas and tooth surfaces for pitting.	Replace if pitted.
35.		Bearing rollers (2) in side cover (1)	Inspect for pitting and scoring.	Replace side cover (1) if roller bearings (2) are pitted or scored.
36.		Valve housing thrust bearing (6) and two thrust washers (5)	Inspect for pitting and scoring.	Replace if pitted or scored.
37.		Rack piston (9)	Inspect for broken or missing teeth (10).	Replace if teeth are broken or missing.
38.		Wormshaft (8)	a. Inspect for dents and chipping.	Replace if dented or chipped.
			b. Inspect worm groove (7) for chipping.	Replace if chipped.
39.		Gear housing (4)	Inspect for cracks, scored bore, or damage.	Replace if cracked, bore is scored, or damaged.

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

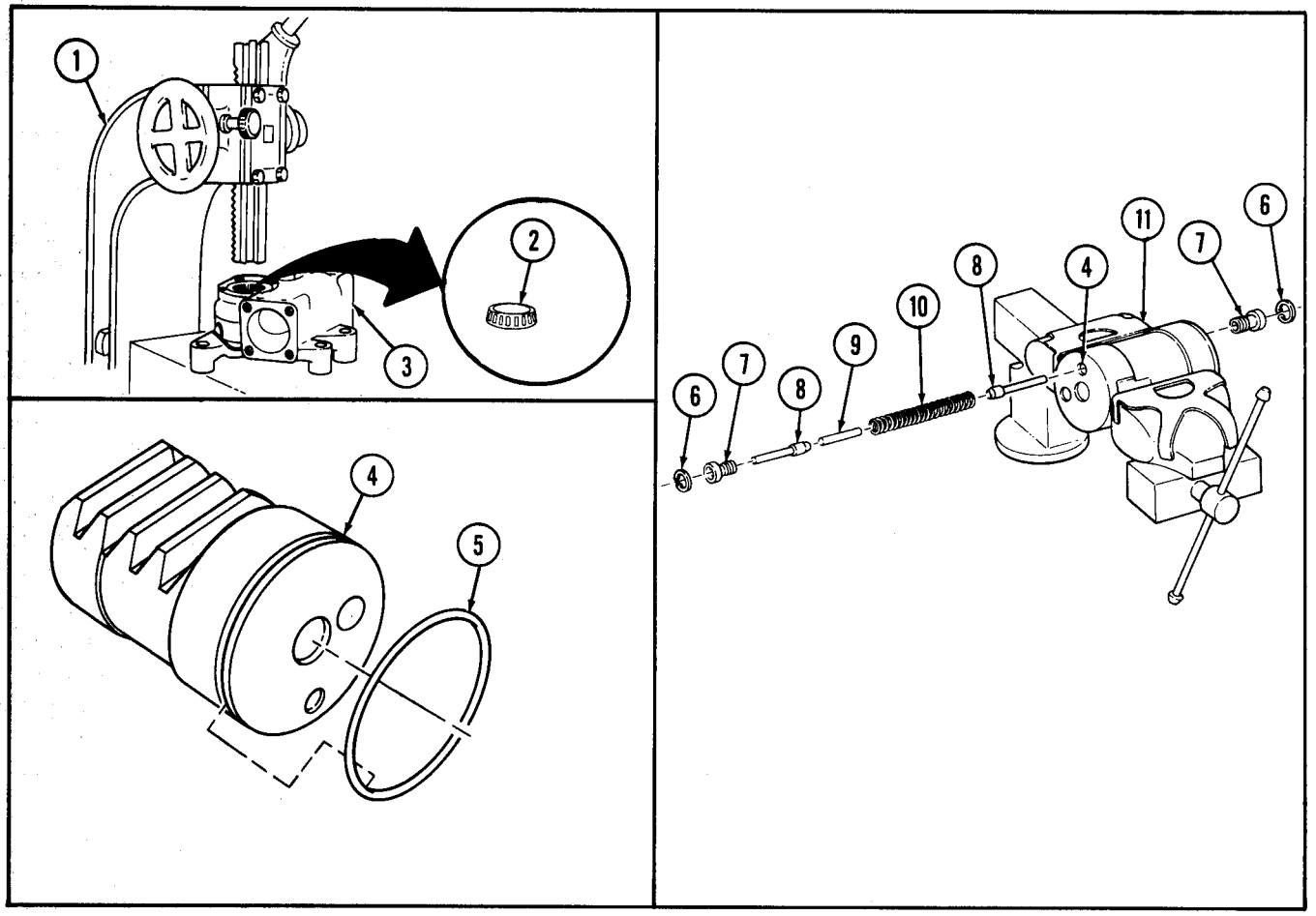




TA 350807

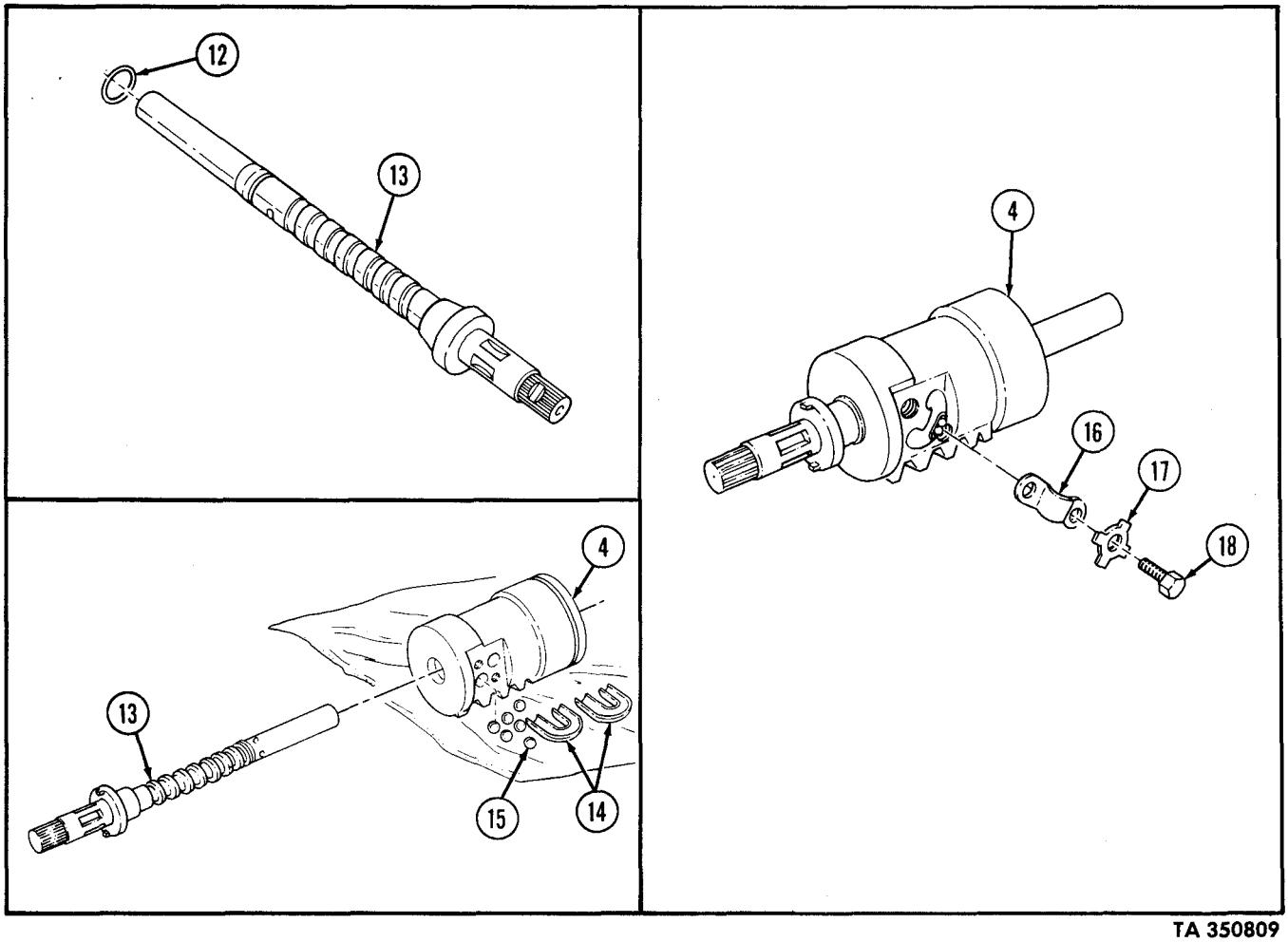
11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassembly			
		NOTE • Coat all steering gear parts with clean lubricating oil before reassembly. • Step 40 is performed only if new roller bearing is installed.		
40.		New roller bearing (2)	Press into gear housing (3).	Use arbor press and mandrel (1).
41.		New "O" ring (5)	Install on rack piston (4).	
42.		Rack piston (4)	Position in soft-jawed vise (11).	
43.		Two poppets (8), spring (10), and spring rod (9).	Position into rack piston (4) bore.	
44.		Two poppet seats (7)	Install with two snap-rings (6).	Tighten seats (7) 20-25 lb-ft (27-34 N·m).



TA 350808

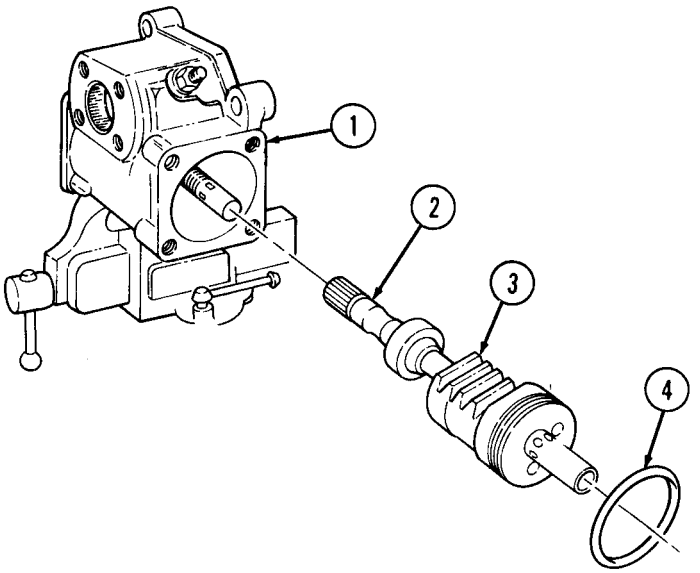
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
45.		New wormshaft "0" ring (12)	Install onto wormshaft (13).	
46.		Wormshaft (13)	Lightly coat with GAA grease and position into rack piston (4) bore.	Insert end opposite "O" ring (12) first.
47.		Two ball bearing return guides (14)	Position into rack piston (4).	
48.		Twenty-seven ball bearings (15)	Drop through holes in ball bearing return guides (14) as wormshaft (13) is rotated in each direction.	Make sure ball bearing return guides (14) stay in place when installing ball bearings (15).
49.		Two ball bearing return guides (14)	Install on rack piston (4) with retaining clip (16), two new locktabs (17), and screws (18).	Tighten screws (18) 13-17 lb-ft (18-23 N·m). Bend locktabs (17) against head of screws (18).



TA 350809

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

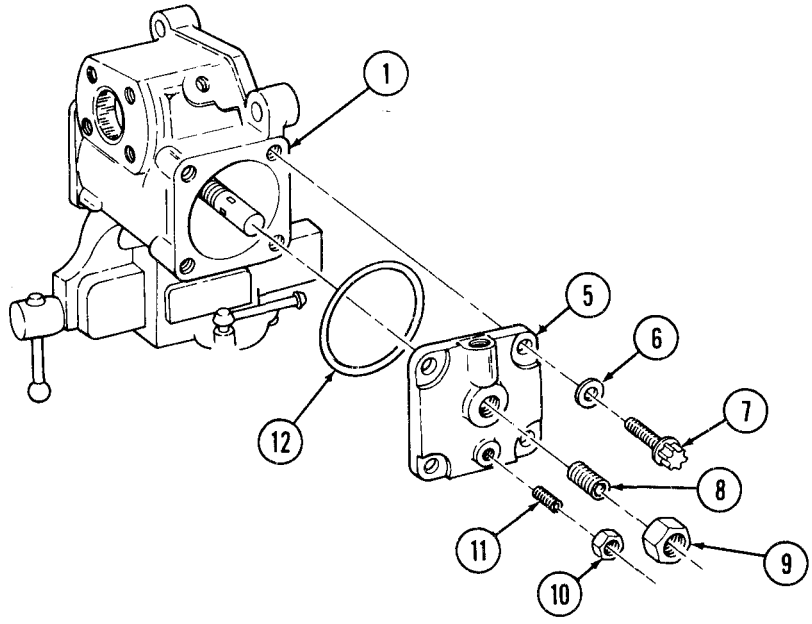
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
50.		New "O" ring (4)	Coat with clean GAA grease and install on rack piston (3).	
51.		Rack piston (3) and wormshaft (2)	Install through end cover side of gear housing (1).	
52.		Wormshaft adjusting screw (8) and jamnut (9)	Install in end cover (5) a few turns.	Final adjustment to be made later.
53.		Poppet adjusting screw (11) and jamnut (10)	Install in end cover (5) a few turns.	Final adjustment will be made later.
54.		End cover (5) and new "O" ring (12)	Install on housing (1) with four washers (6) and screws (7).	Tighten screws (7) 105-115 lb-ft (142-156 N·m).



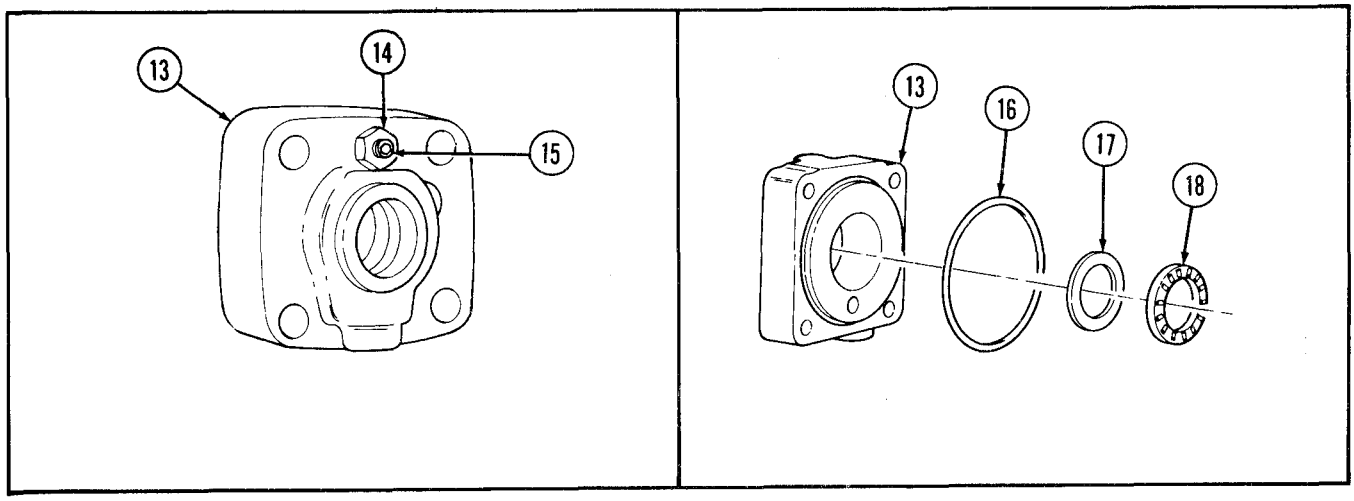
TA 350810

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



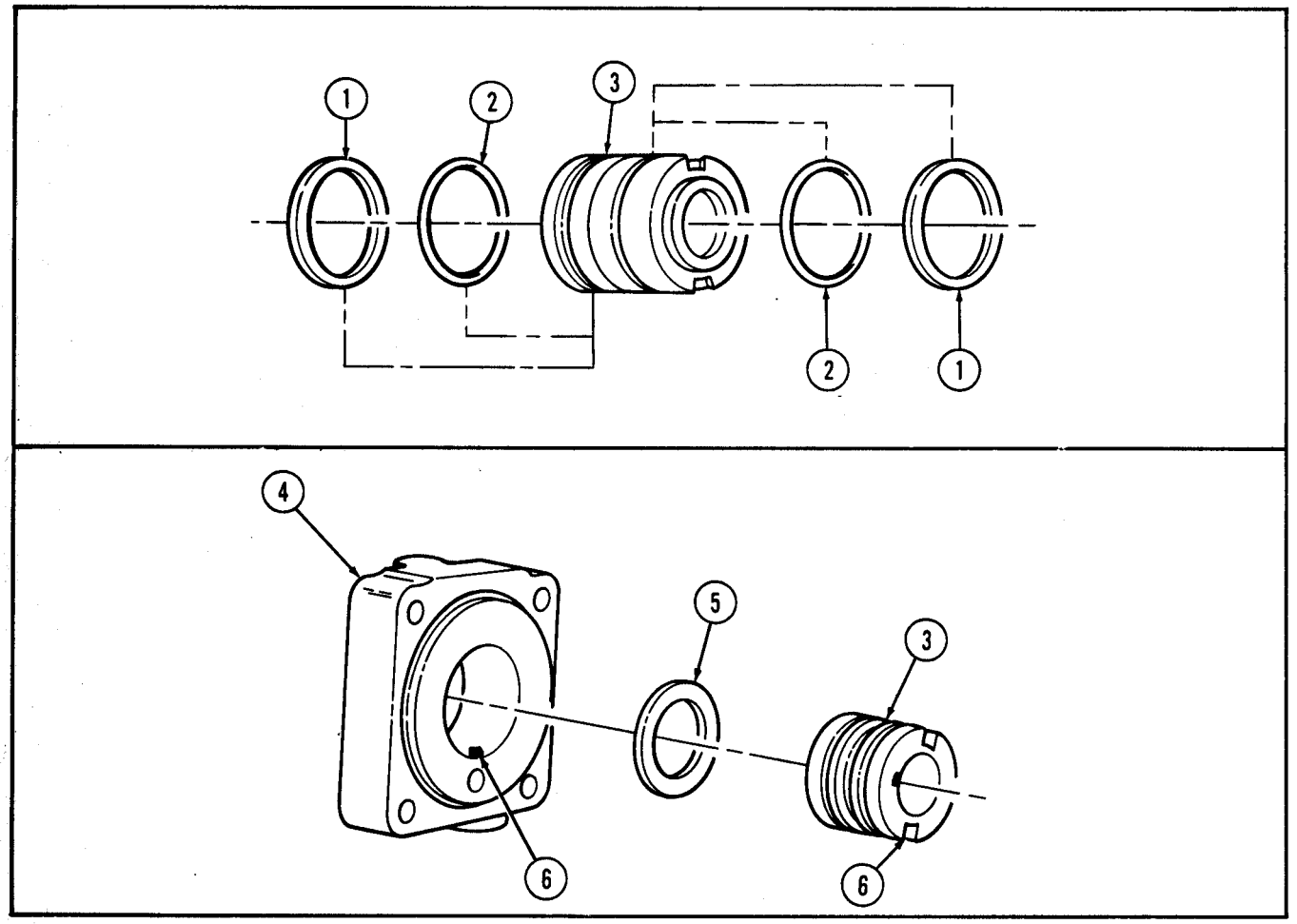
55.	Valve housing (13)	Poppet adjusting screw (15)	a. Install in valve housing (13) a few turns. b. Install jamnut (14) on adjusting screw (15).	Final adjustment will be made later.
56.		New valve housing "O" ring (16)	Place in groove on valve housing (13).	Lubricate "O" ring (16) with GAA grease to hold in place.
57.		Thrust washer (17) and thrust bearing (18)	Install in valve housing (13) bore.	



TA 350811

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
58.		Two new "O" rings (2) and new seal rings (1)	Install on valve sleeve (3).	
59.		Valve sleeve (3)	a. Coat end with GAA grease and install thrust washer (5).	Grease will hold thrust washer (5) in place.
			b. Install thrust washer (5) end down into valve housing (4).	When valve sleeve (3) is down in place in valve housing (4), it should measure approximately .40 in. (10 mm) from face of valve housing (4) to face of valve sleeve (3).
			c. Position valve sleeve (3) in valve housing (4) so that alinement marks (6) aline.	



TA 350812

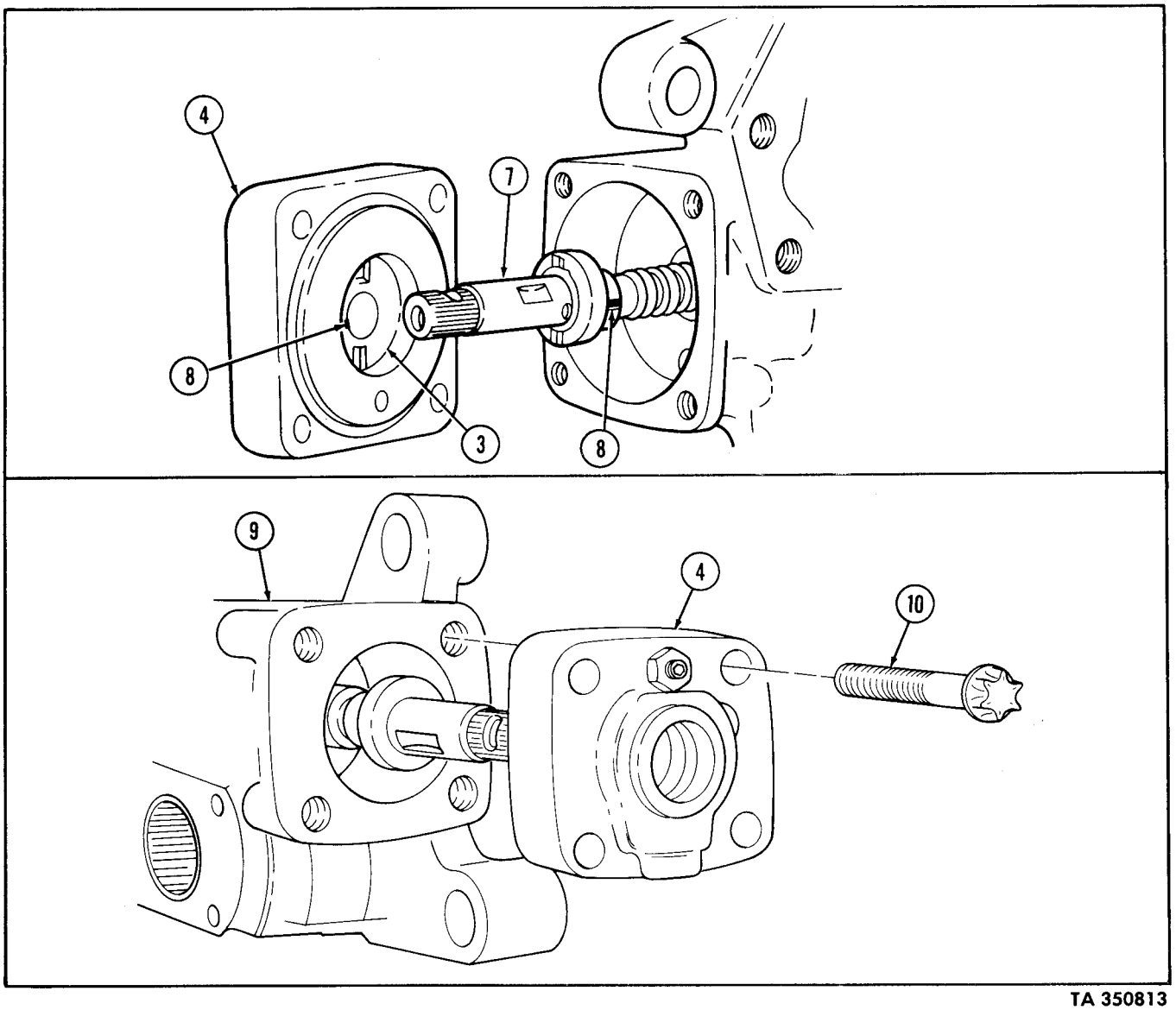
11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

Alinement marks are located on valve sleeve, wormshaft, and valve housing so that they can be reassembled in their original position. Failure to aline marks may cause damage to steering gear.

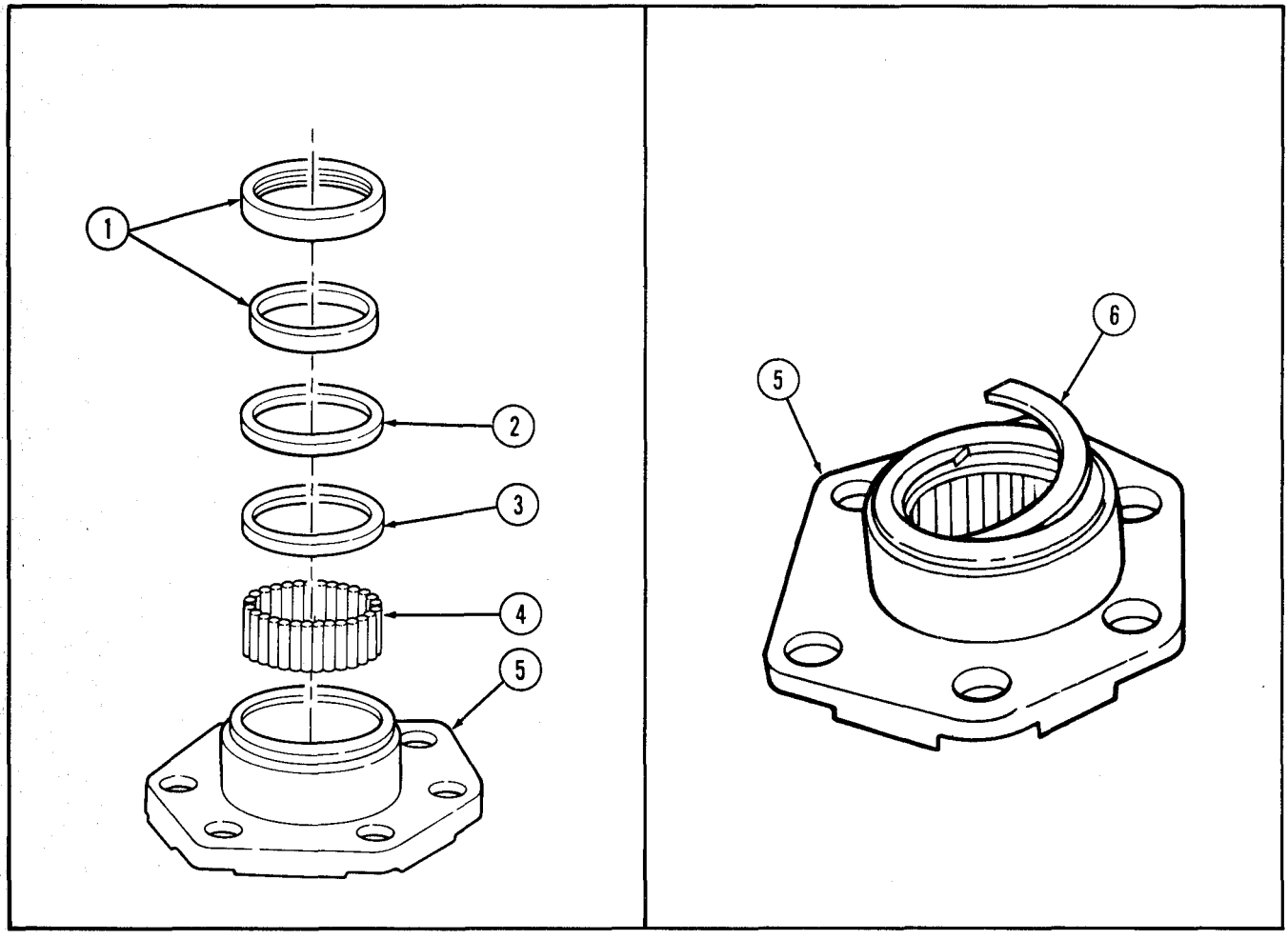
60.		Valve housing (4)	Position on wormshaft (7).	
61.		Wormshaft (7)	Rotate until alinement marks (8) aline.	Use a 12 pt. box end wrench at an angle on wormshaft (7).
62.		Valve housing (4)	Install on gear housing (9) with four screws (10).	Tighten screws (10) 105-115 lb-ft (142-156 N·m).



TA 350813

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

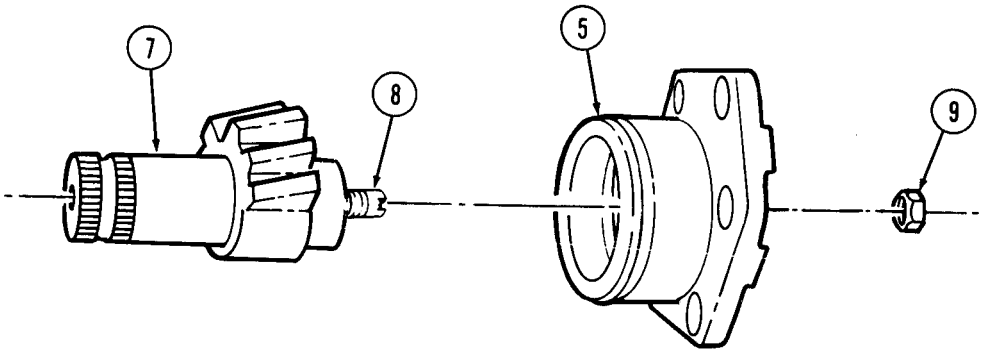
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
63.		Bearing rollers (4)	a. Apply a generous amount of GAA grease to bearing race inside of side cover (5). b. Install in side cover (5).	
64.		Steel backup washer (3), new plastic backup washer (2), and new two-piece seal (1)	Install in gear side cover (5) with seal retaining ring (6).	



TA 350814

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

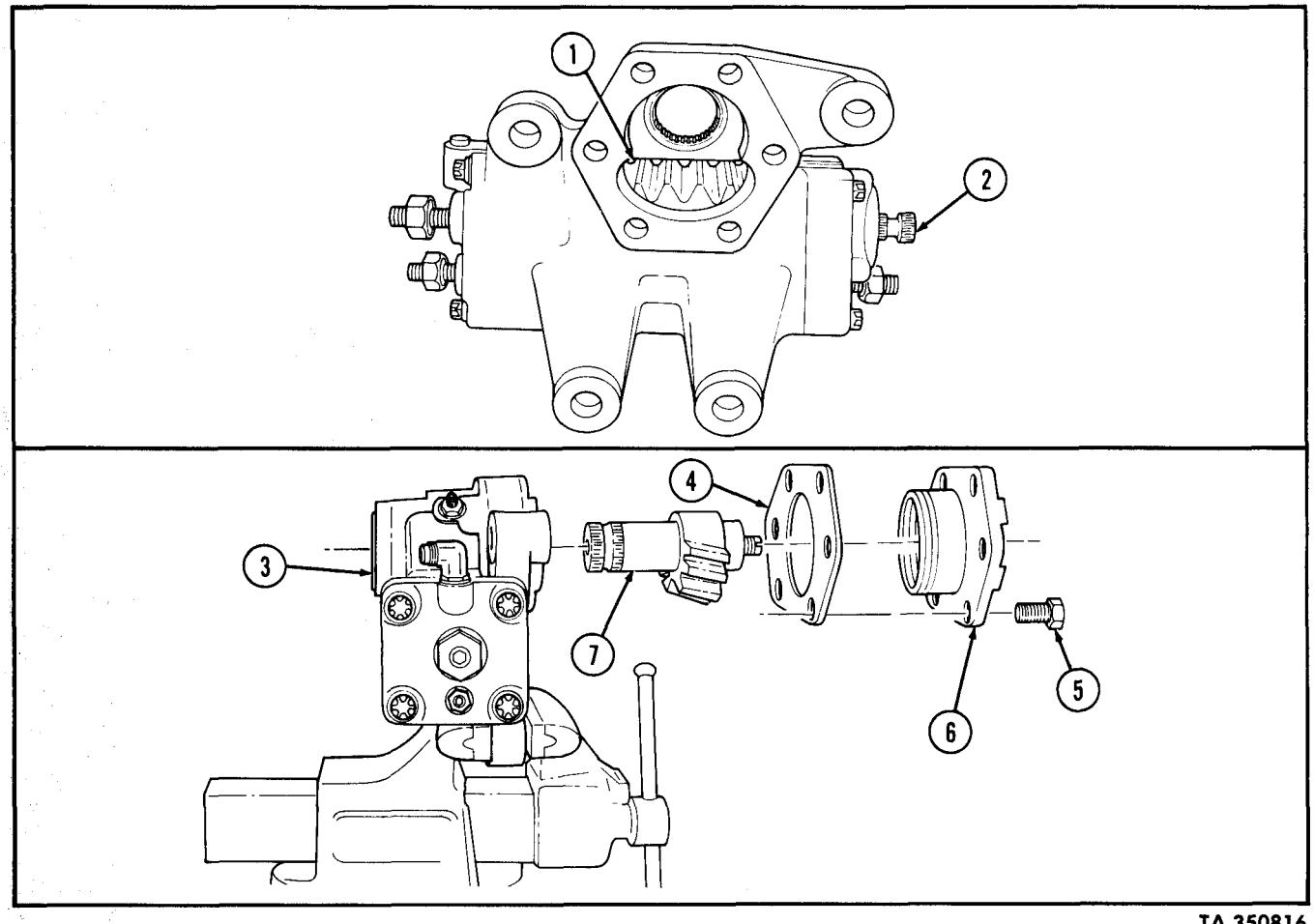
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
65.		Sector shaft (7)	a. Apply clean GAA grease to short bearing end. b. Screw sector shaft adjusting screw (8) in side cover (5) counterclockwise until bottomed. c. Loosen adjusting screw (8) one turn clockwise so side cover (5) rotates freely on sector shaft (7).	
66.		Jamnut (9)	Thread a few turns onto adjusting screw (8).	Final adjustment will be made later.



TA 350815

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

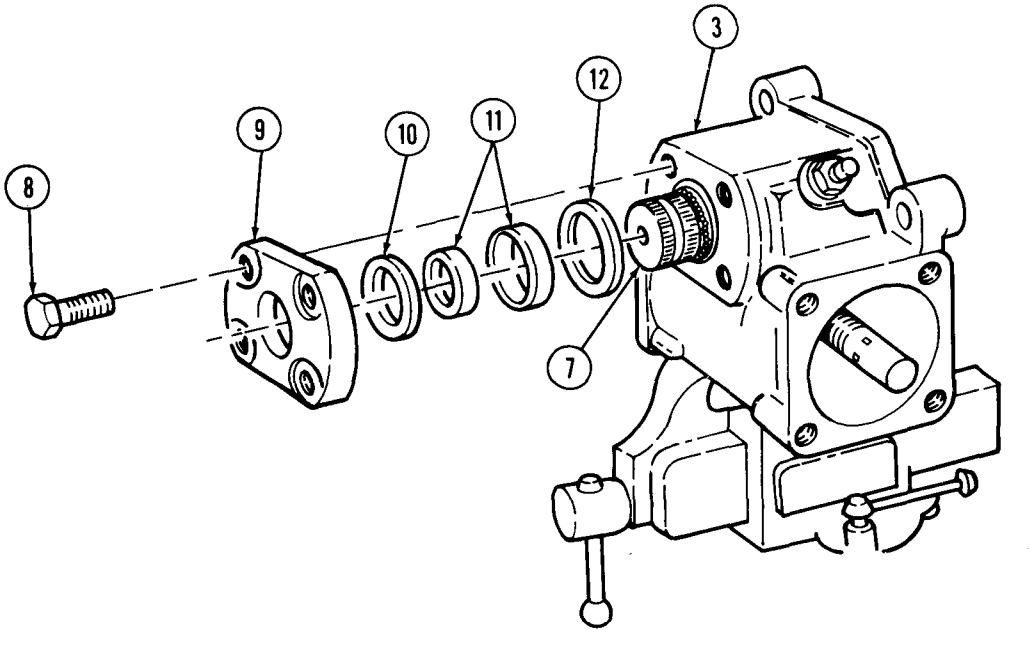
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
67.		Wormshaft (2)	Rotate until rack piston (1) is at center of steering gear travel.	
		CAUTION		
		When installing sector shaft care must be taken not to pinch new side cover gasket.		
68.		Side cover (6) with sector shaft (7) and new gasket (4)	a. Aline center tooth of sector shaft (7) with third notch from seal ring end of rack piston (1) and position in gear housing (3).	
			b. Install side cover (6) to gear housing (3) with six screws(5).	Using a criss-cross pattern, first tighten screws to 150 lb-ft (203 N·m) followed by 220-240 lb-ft (298-325 N·m).



TA 350816

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

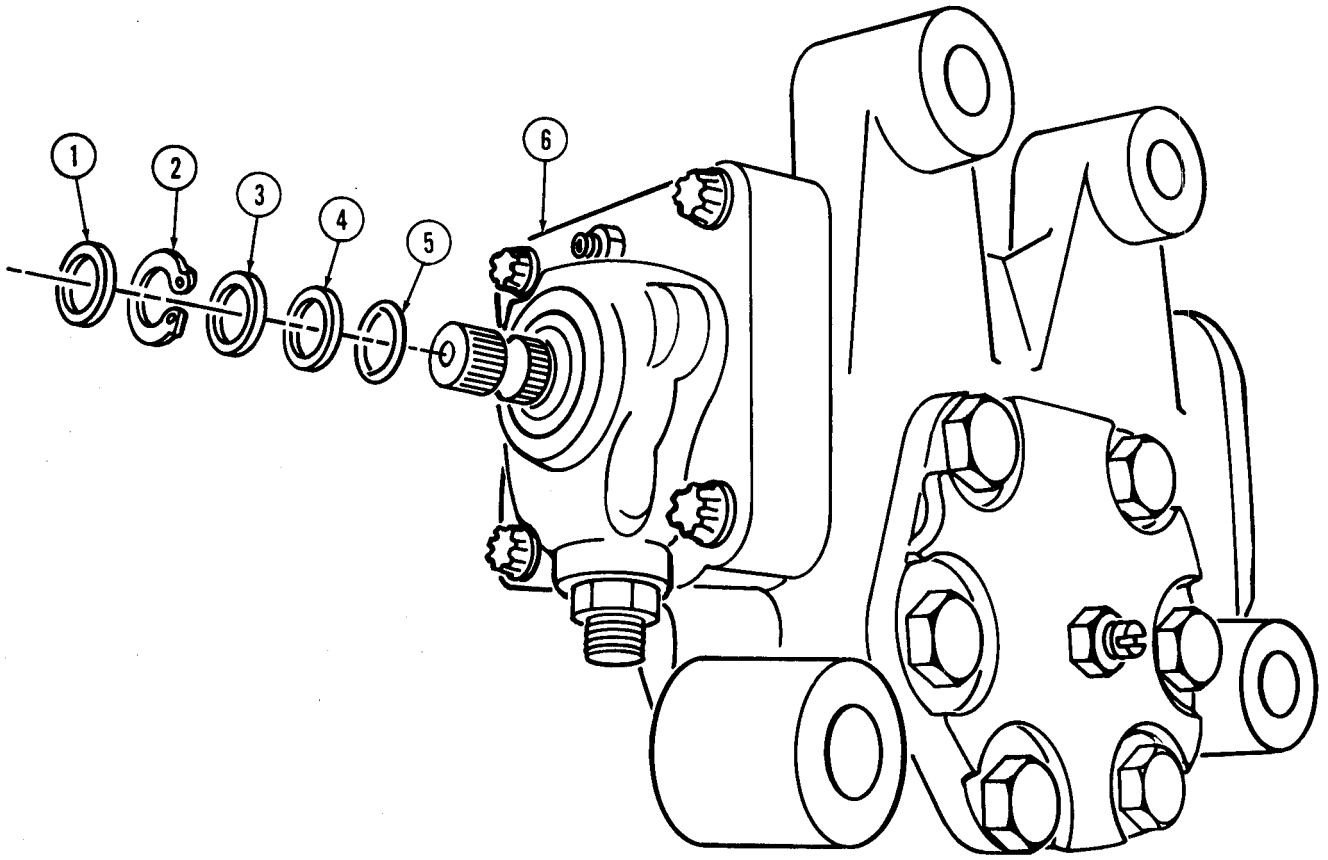
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		CAUTION The words OIL SIDE must be visible once the two-piece seal is assembled in the trunnion cover. Otherwise, the seal will not function, which could result in a loss of power steering assist.		
69.		Backup washer (12), new two-piece seal (11), and new inner seal (10)	Install in trunnion cover (9).	
70.		Trunnion cover (9)	Slide over serrated end of sector shaft (7) and install on gear housing (3) with four screws (8).	Make sure OIL SIDE of two-piece seal (11) faces housing (3). Tighten screws (8) 15-22 lb-ft (20-30 N·m).



TA 350817

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

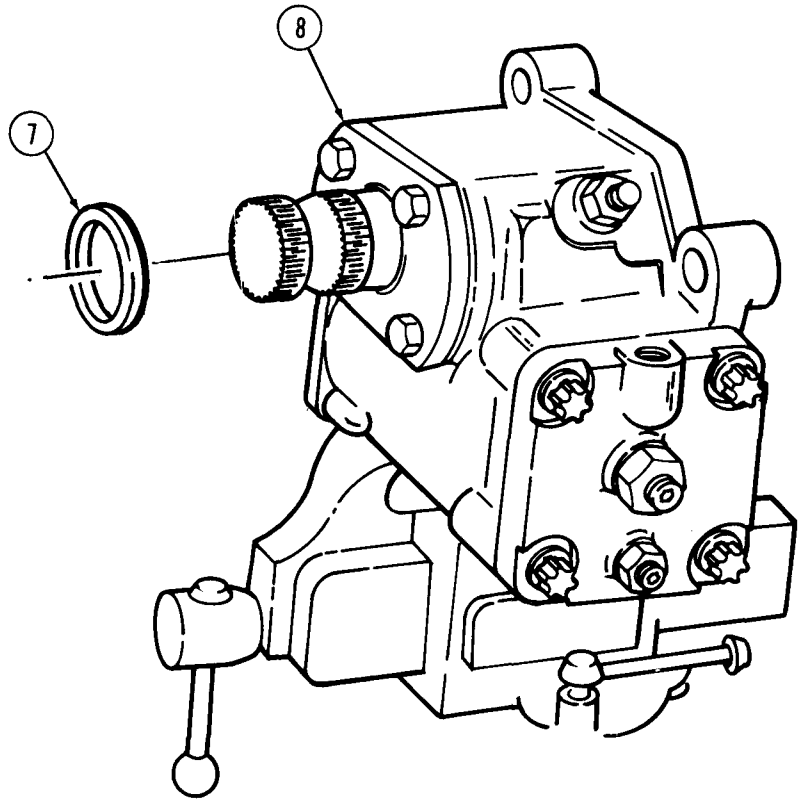
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
71.		New "O" ring (5)	Install into groove of seal cup (4).	
72.		Seal cup (4) and steel backup washer (3)	Insert into valve housing (6) and install retaining ring (2).	Use seal driver.
73.		New seal (1)	Insert into valve housing (6) and install retaining ring (2).	Use seal driver.



TA 350818

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
74.		New outer seal (7)	Install in trunnion cover (8).	Tap in place with seal driver and hammer.



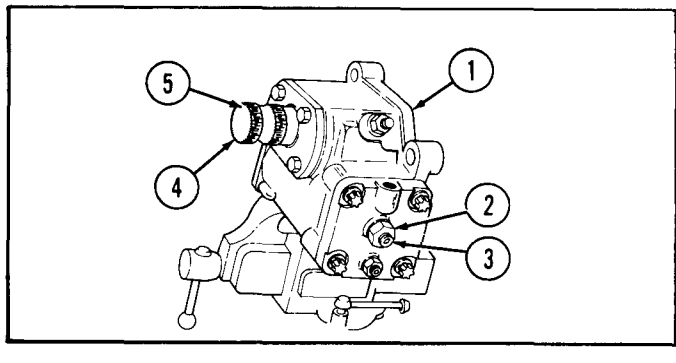
TA 350819

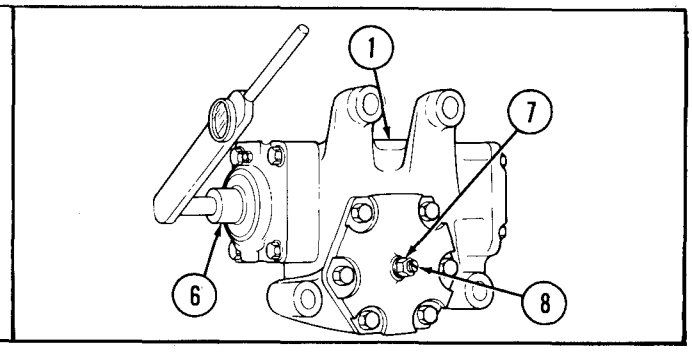
11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Final Adjustments				
75.	Steering gear(1)	Wormshaft (6)	Adjust travel as follows:	
			a. Position sector shaft alinement mark (5) in vertical direction.	Vertical positioning of sector shaft (4) is center of steering gear travel.
			b. Screw in wormshaft adjusting screw (3) until seated against wormshaft (6).	
			c. Tighten adjusting screw (3) 5-10 lb-ft (7-14 N·m).	
			d. Back adjusting screw (3) out one turn.	
76.		Sector shaft adjusting screw (8)	Adjust as follows:	
			a. Position torque wrench and a 12 pt socket on wormshaft (6).	Use socket on an angle.
			b. While moving wormshaft (6) 1/4 turn each side of center, tighten sector shaft adjusting screw (8) until torque reaches 25-30 lb-in. (2.8-3.4 N·m).	
			c. Back out sector shaft adjusting screw (8) one turn and note torque required to rotate wormshaft (6) 1/4 turn each side of center of wormshaft (6).	Record torque required on a separate sheet of paper.
			d. Move sector shaft adjusting screw (8) in to provide a rise of 2-6 lb-in. (0.2-0.7 N·m) at a point 45° each side of center of wormshaft (6).	

11-10. STEERING GEAR (ROSS) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			e. Tighten sector shaft adjusting screw jamnut (7) 45-50 lb-ft (61-68 N·m).	Torque required to rotate wormshaft (6) must not exceed 20 lb-in. (2.3 N·m) at any point in steering gear travel after jamnut (7) has been tightened. If torque exceeds 20 lb-in. (2.3 N·m), repeat step 76.
77.		Wormshaft adjusting screw (3)	Adjust as follows:	
			a. Position torque wrench and a 12 point socket on wormshaft (6).	Position socket at an angle.
			b. While moving wormshaft (6) 45° each side of center, tighten wormshaft adjusting screw (3) until torque reaches 10-15 lb-in. (1.1-1.7 N·m) higher than torque reached in step 76.	
			c. Tighten jamnut (2) 70-80 lb-ft (95-108 N·m).	
78.		Wormshaft (6)	Rotate 90° each side of center and note torque required to rotate wormshaft (6).	If torque required exceeds 35 lb-in. (4 N·m), repeat step 77





END OF TASK!

FOLLOW-ON TASKS: • Install steering gear (para. 11-9).
• Fill to proper oil level (LO 9-2320-272-12).
• Final poppet valve adjustments (para. 11-13).

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11-10.1. STEERING GEAR (SHEPPARD) REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Assembly

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
High-pressure seal kit P/N 2370461
Twenty-eight lockwashers
Three backup rings
Eight "O" rings
Seal
Oil seal
Three nylon balls
Three lockpins
Roll pin
Retainer
Slipper seal
Two check balls
Screen
Four reversing springs
Lubricating oil OE/HDO 10 (Appendix C, Item 16)
GAA grease (Appendix C, Item 11)
Crocus cloth (Appendix C, Item 6)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-34P
LO 9-2320-272-12
TM 9-214

Equipment Condition Reference	Condition Description
Para. 11-9.1 LO 9-2320-272-12	Steering gear removed. Steering gear drained.

Special Environmental Conditions
None

General Safety Instructions
- Keep fire extinguisher nearby when using drycleaning solvent.
- Compressed air source will not exceed 30 psi (207 kPa).
- Eyeshields must be worn when cleaning with compressed air.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

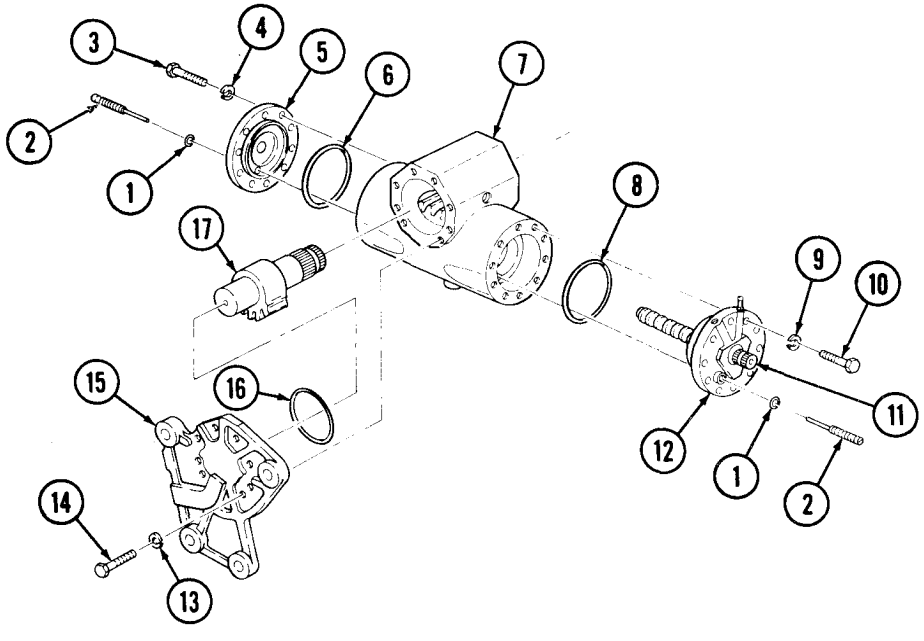
Use a clean, protected work surface for steering gear disassembly, repair, and assembly.

a. Disassembly

1. Cylinder head (5) and bearing cap (12)	Two relief valve plungers (2)	Remove.	Remove one on each end of housing (7).
2. Two relief valve plungers (2)	Two "O" rings (1)	Remove.	Discard "O" rings (1).
3. Output shaft cover (15) and housing (7)	Eight screws (14) and lockwashers (13)	Remove.	Discard lockwashers (13).

11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.		Output shaft and gear (17)	Clean exposed shaft, except splines.	Use crocus cloth to remove rust and scale to protect bearing in housing (7).
		NOTE Mark output shaft cover and housing for installation.		
5.	Housing (7)	Output shaft cover (15)	Remove.	Tap on end of output shaft (17) with soft-nosed hammer to loosen.
6.	Output shaft cover (15)	"O" ring (16)	Remove.	Discard "O" ring (16).
7.	Housing (7)	Output shaft and gear (17)	Remove.	
		NOTE Mark bearing cap, housing, and cylinder head for installation.		
8.		Ten screws (3), lockwashers (4), and cylinder head (5)	Remove.	Discard lockwashers (4).
9.	Cylinder head (5)	"O" ring (6)	Remove.	Discard "O" ring (6).
10.	Housing (7)	Ten screws (10), lockwashers (9), and bearing cap (12)	Remove.	Support bearing cap (12) and turn input shaft (11). Discard lockwashers (9).
11.	Bearing cap (12)	"O" ring (8)	Remove.	Discard "O" ring (8).

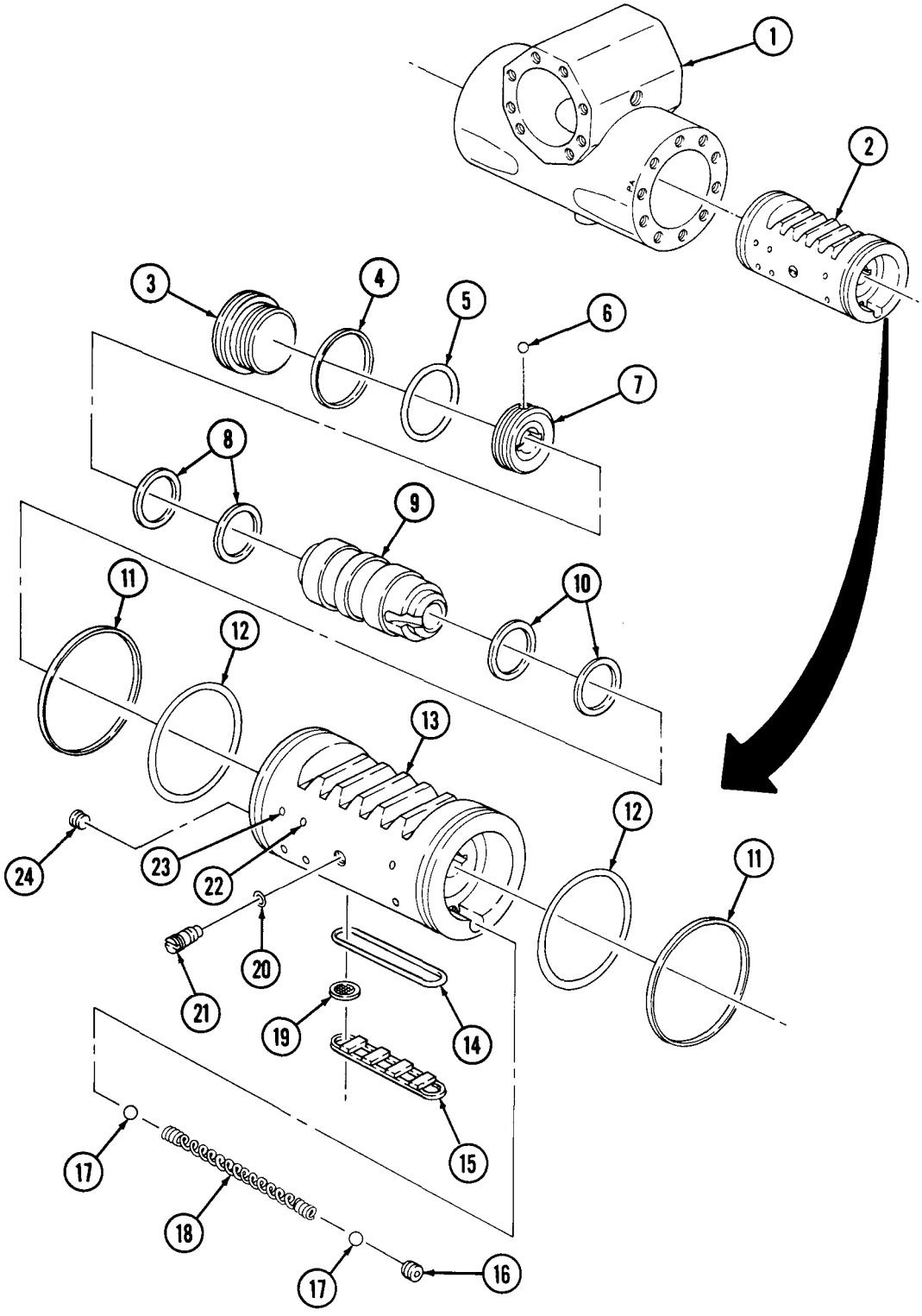


11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
12.	Steering gear housing (1)	Piston and valve assembly (2)	Remove.	Support piston (2) during removal.
13.	Side of piston (13)	Slipper seal (15), "O"-ring (14), and screen (19)	Remove.	Discard slipper seal (15), "O" ring (14), and screen (19).
14.		Two backup rings (11) and "O" rings (12)	Remove.	Discard backup rings (11) and "O" rings (12).
15.	Piston (13)	Lockpin (23)	Drill out.	Use 5/64 in. (2.0 mm) drill. Discard lockpin (23) remains.
16.		Piston plug (3)	Remove.	Use spanner type tool.
17.	Piston plug (3)	Backup ring (4) and "O" ring (5)	Remove.	Discard backup ring (4) and "O" ring (5).
		NOTE Mark adjusting nut and piston for installation.		
18.	Piston (13)	Lockpin (22)	Drill out.	Use 5/64 in. (2.0 mm) drill. Discard lockpin (22) remains.
19.		Adjusting nut (7)	Remove.	Nylon ball inserts (6) are not removed.
20.		Two reversing springs (8) and valve (9)	Remove from piston (13).	Discard reversing springs (8).
21.	Side of piston (13)	Valve positioning pin (21)	Remove.	
22.	Valve positioning pin (21)	"O" ring (20)	Remove.	Discard "O" ring (20).
		CAUTION Do not disturb adjusting nut in bottom of piston after removing reversing springs. Centering ability of valve will be lost.		
23.	Piston (13)	Two reversing springs (10)	Remove from piston (13).	Discard reversing springs (10).
24.		Valve seat (16), check ball (17), spring (18), check ball (17), and valve seat (24)	Remove.	Discard check balls (17).

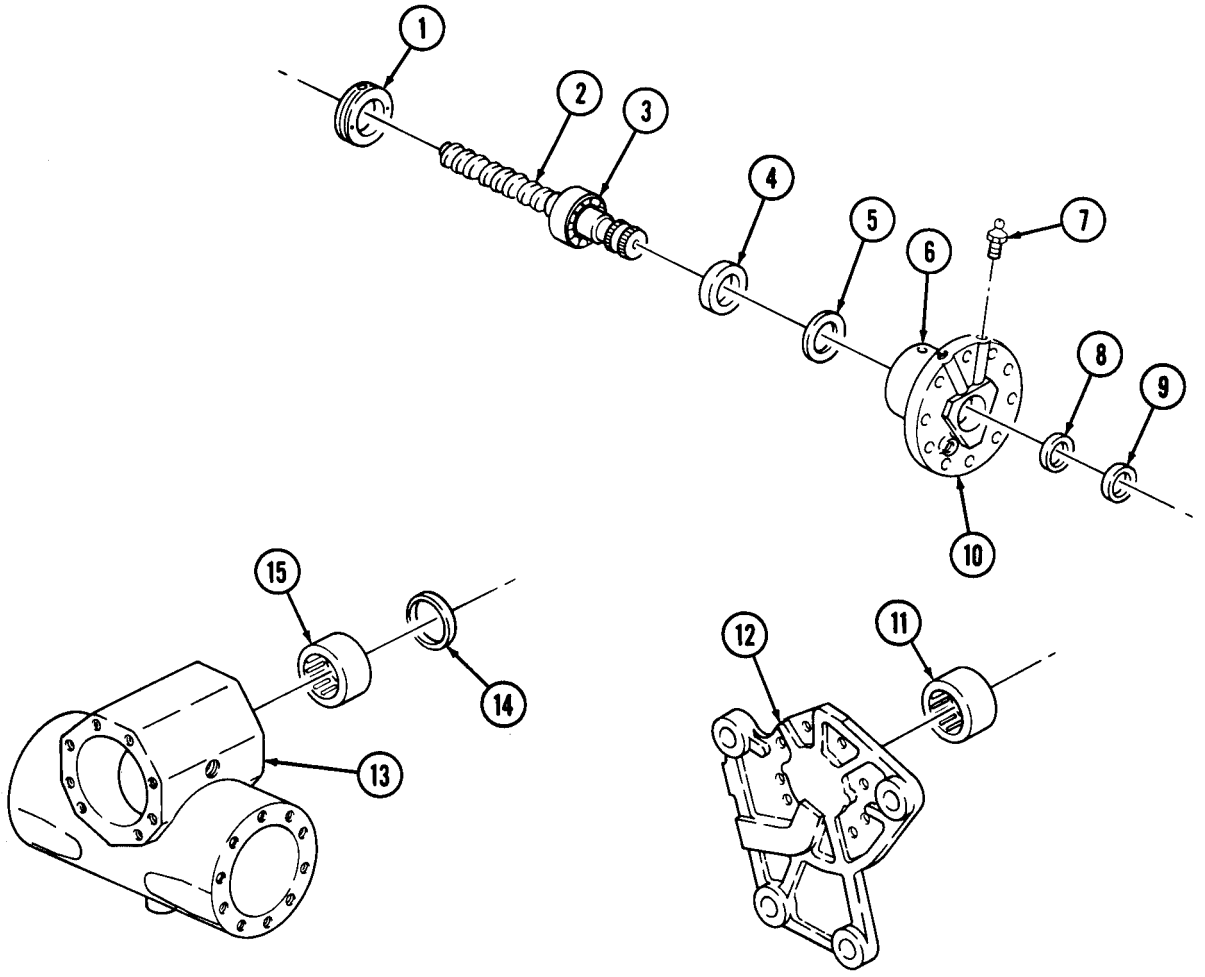
11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
25.	Housing (13)	Oil seal (14)	Remove.	Discard oil seal (14).
26.		Bearing (15)	Remove.	Use bearing puller.
27.	Bearing cap (10)	Lockpin (6)	Drill out.	Use 5/64 in. (2.0 mm) drill. Discard lockpin (6) remains.
28.		Bearing retainer (1)	Remove.	Use spanner type tool.
29.		Input shaft (2) and bearing (3)	Press out of bearing cap (10).	Press splined end through bearing cap (10).
30.		Seals (8) and (9), washer (5), and high pressure seal (4)	Remove.	Press out from outside toward inside. Discard seals (8), (9), and (4). Save washer (5).
31.		Grease fitting (7)	Remove.	
32.	Output shaft cover (12)	Bearing (11)	Remove.	Use bearing puller.



11-10.1. STEERING GEAR (SHEPPARD) REPAIR [Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			

WARNING

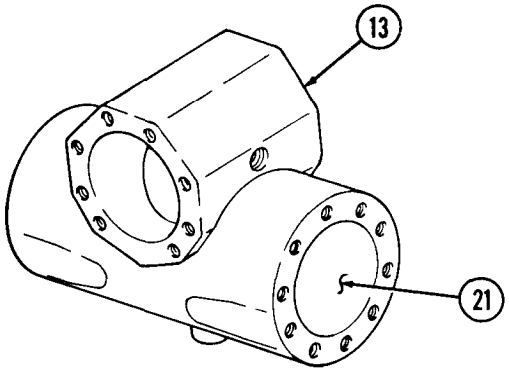
- Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do so may result in injury to personnel.
- Compressed air source will not exceed 30 psi (207 kPa). When cleaning with compressed air, eyeshields must be worn. Failure to wear eyeshields may result in injury to personnel.

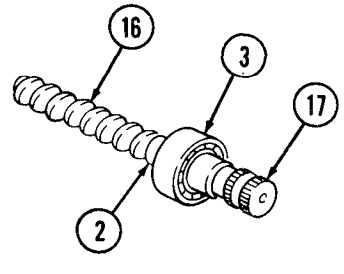
33.		All steering gear components	Clean with solvent and dry with compressed air.	Refer to para. 2-7.

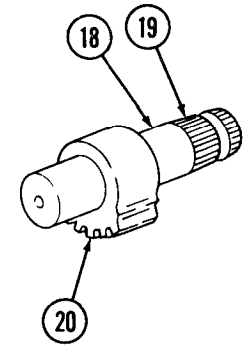
NOTE

- Light polished areas of steering gear components indicate normal wear.
- Blue discoloration indicates overheating. Inspect carefully. Replace all blue parts.

34.		Housing (13)	Inspect for cracks, nicks, and pitted and scored bore (21).	Replace if pitted or more than minor scoring.
35.		Input shaft (2) and bearing (3)	a. Inspect for rough bearing (3) movement and discoloration.	
			b. Inspect for cracks, breaks, chipped threads (16), and damaged splines (17).	Replace as one assembly if damage is other than minor nicks and burrs.
36.		Output shaft (18)	Inspect for cracks, breaks. and damaged splines (19), gear (20), and threads.	Replace if damaged.







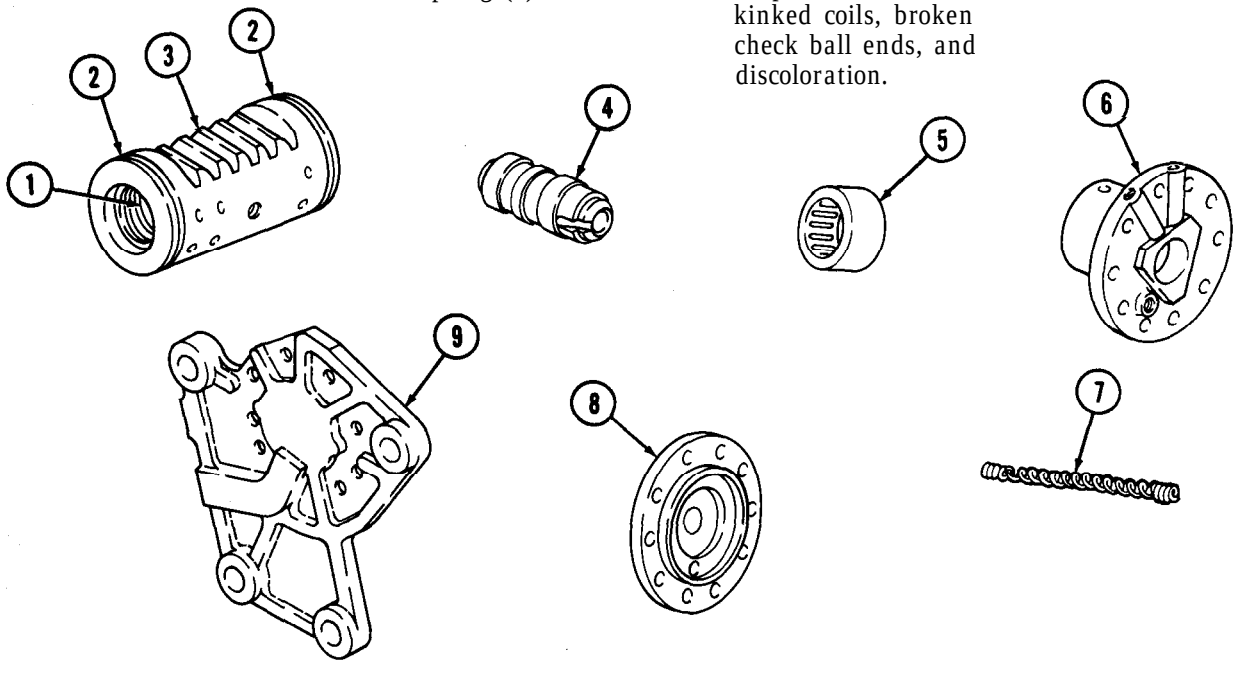
11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
37.		Piston (3)	a. Inspect for cracks, breaks, chipped seal grooves (2), and damaged threads.	Replace if damaged.

CAUTION

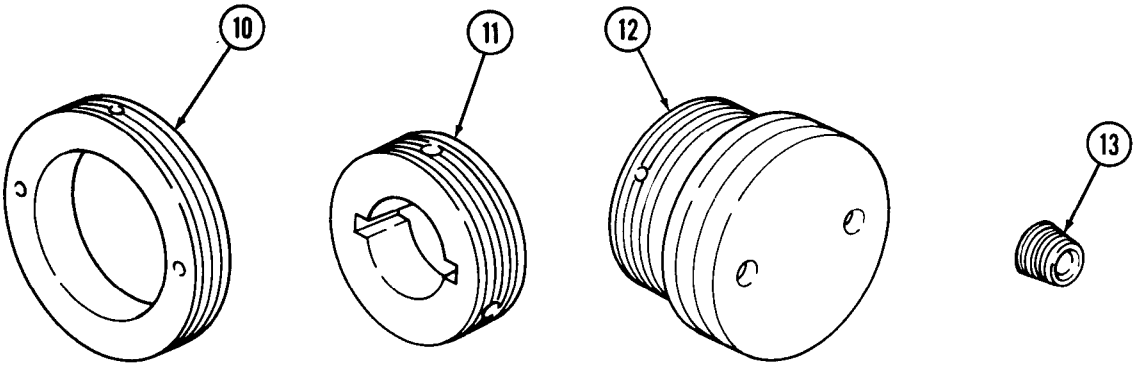
Do not disturb adjusting nut remaining in piston. Centering ability of valve will be lost.

			b. Inspect valve bore (1) for pitting and scoring.	Replace if pitted or damage is more than minor scoring.
			c. Inspect oil passages for blockages.	Clean with compressed air or soft wire if blocked.
38.		Valve (4)	Inspect for cracks, breaks, burrs, chipped lands, and chipped or damaged thread.	Replace if lands are broken or chipped or thread is damaged.
39.		Two bearings (5)	Inspect.	Refer to TM 9-214. Replace if damaged. Inspect bore if bearing is rejected.
40.		Cylinder head (8), bearing cap (6), output shaft cover (9)	Inspect for cracks, breaks, and damaged threads.	Replace if damage is more than minor nicks and burrs.
41.		Spring (7)	Inspect for bent or kinked coils, broken check ball ends, and discoloration.	Replace if damaged.



11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
42.		Bearing retainer (10)	a. Remove lockpin remains.	Discard lockpin remains (refer to step 27).
			b. Inspect for cracks and damaged threads,	Replace if cracked or threads are damaged.
43.		Adjusting nut (11)	a. Remove lockpin remains.	Discard lockpin remains (refer to step 18).
			b. Inspect for cracks and damaged threads.	Replace if cracked or threads are damaged.
44.		Piston plug (12)	a. Inspect for cracks, chipped or broken "O" ring lips, and damaged threads or spanner holes.	Replace if damaged.
			b. Remove lockpin remains.	Discard lockpin remains (refer to step 15).
45.		Check valve seats (13)	Inspect for nicks and burrs on seat surface and damaged slots or threads.	Remove minor nicks and burrs or replace if otherwise damaged.



46.		All parts (except as noted)	a. Remove minor nicks, burrs, and scoring with soft stone or crocus cloth.	
			b. Replace all cracked, broken, or discolored parts.	
			c. Chipped seal or "O"-ring grooves require part replacement.	
			d. No repair to housing piston bore can be made. Replace housing.	Refer to step 34.

11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Coat all seals and "O" rings with GAA grease before assembly.		
	b. Assembly			
47.		Bearing (1)	Press into bore of housing (4).	Seat bearing (1) flush with inner surface of housing (4).
48.		New oil seal (2)	Install in groove (3) of housing (4).	
49.		Bearing (6)	Install in output shaft cover (5).	Seat bearing (6) on shoulder in bore.
50.		Valve (23) and two new reversing springs (14)	a. Place springs (14) on long nose (13) of valve (23). b. Hold piston (19) with large opening down. c. Aline slot (22) in valve (23) with positioning pin hole (16) in piston (19) and insert valve (23) vertically up into piston (19) until reversing springs (14) contact internal adjusting nut (15). d. Turn piston (19) over.	
51.		New "O" ring (17)	Install on positioning pin (18).	
52.		Positioning pin (18)	a. Install in piston (19) with nose of positioning pin (18) in slot (22) of valve (23). b. Adjust positioning pin (18) until there is no radial free play, but valve (23) can move in bore of piston (19).	Only move valve (23) a small distance when checking end free play. Do not allow reversing springs (14) to come off nose of valve (23).
53.		Two new reversing springs (24)	Place over short nose of valve (23).	
		NOTE Perform step 54 only if new adjusting nut is to be installed.		
54.		Three new nylon balls (10)	Press into recesses (11) of adjusting nut (12).	

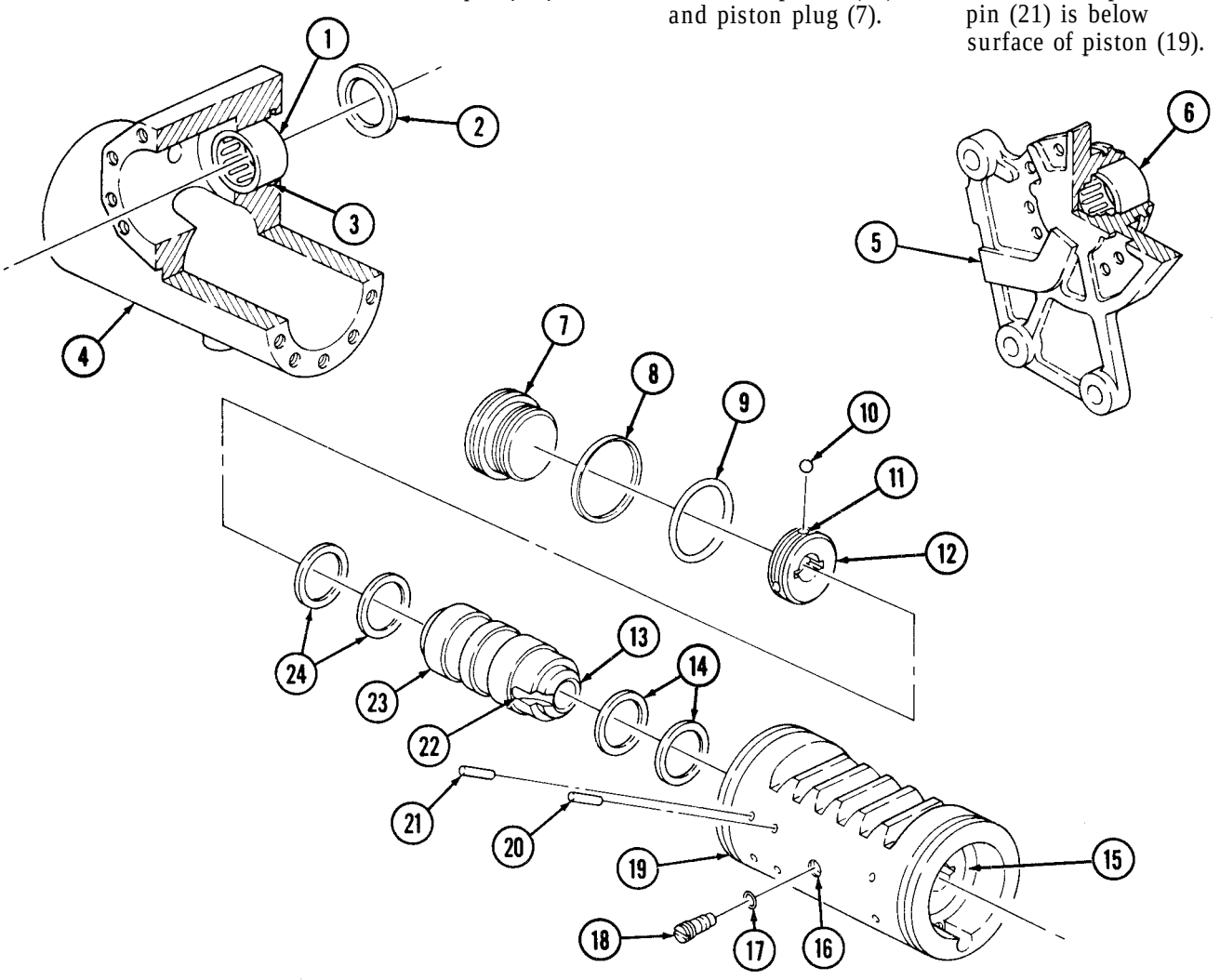
11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
55.		Adjusting nut (12)	Install shoulder side down in piston (19) to recorded position.	Refer to step 18. Valve (23) should have no end play.
56.		New lockpin (20)	Install in piston (19) and adjusting nut (12).	Make sure tip of lockpin (20) is below surface of piston (19).

NOTE

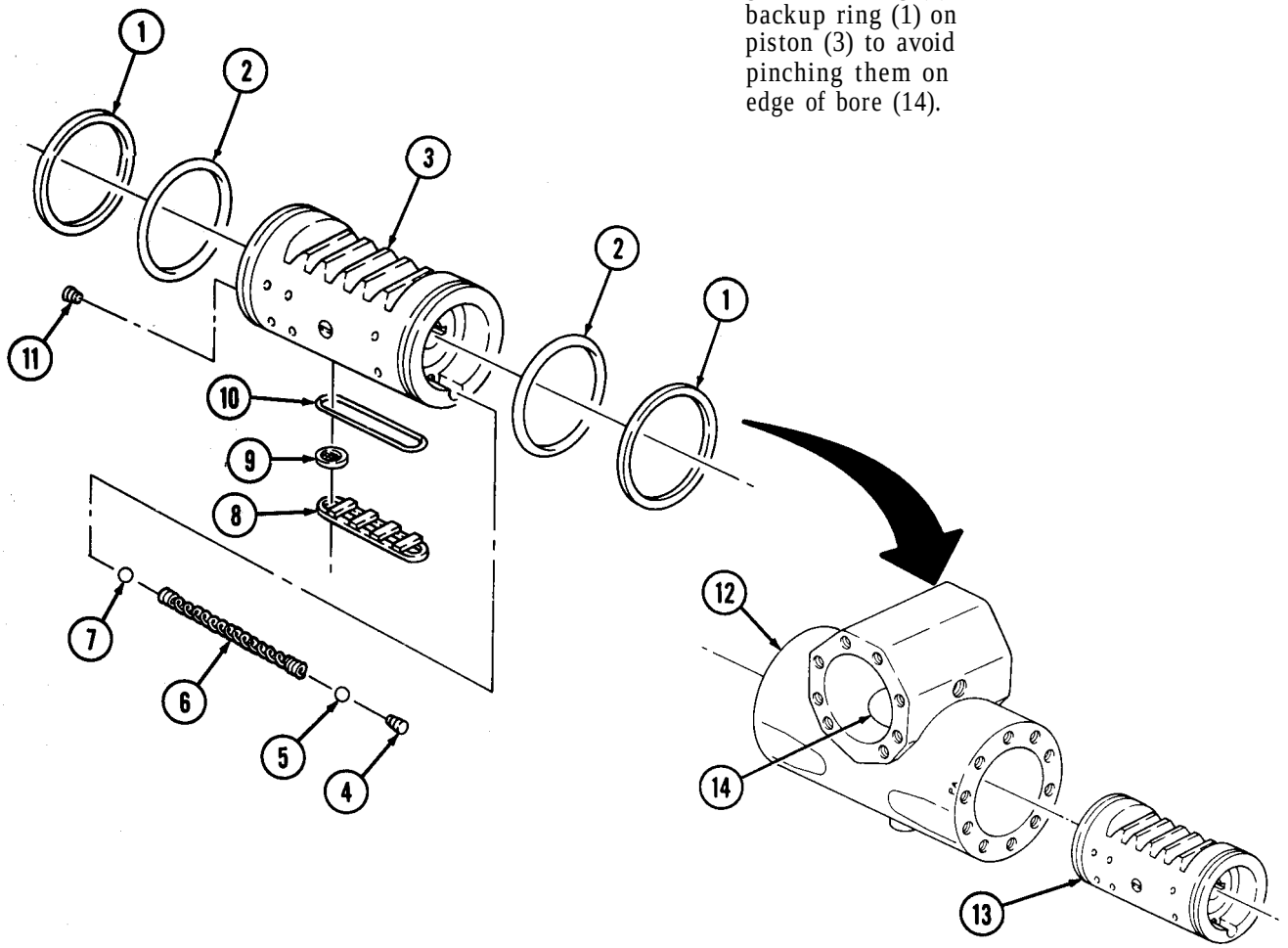
If old hole in piston and adjusting nut or plug do not line up, go to adjacent pin hole in piston and drill into adjusting nut or plug. Install new lockpin as in step 56.

57.		New "O" ring (9) and new backup ring (8)	Install on piston plug (7).	
58.		Piston plug (7)	Install in piston (19).	Use spanner type tool.
59.		New lockpin (21)	Install in piston (19) and piston plug (7).	Make sure tip of lockpin (21) is below surface of piston (19).



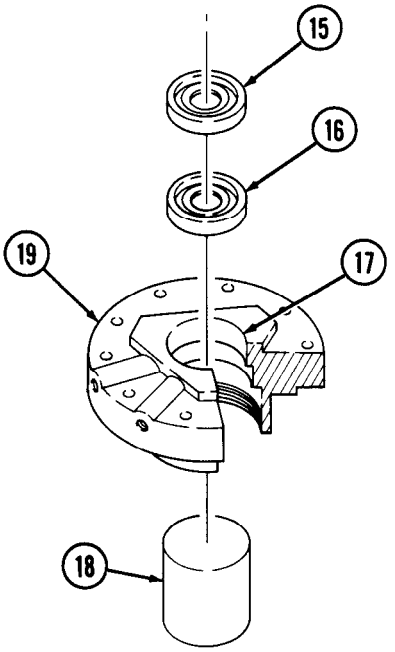
11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

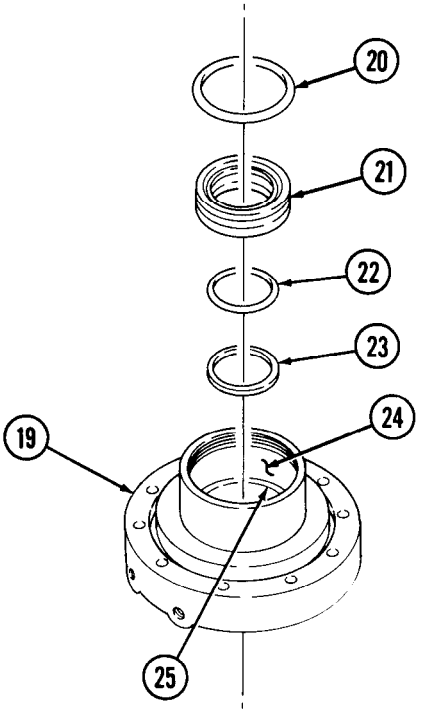
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
60.		Valve seat (11)	Install in piston (3).	
61.		New check ball (7), spring (6), new check ball (5), and valve seat (4)	Install in piston (3).	
62.		Two new "O" rings (2) and new backup rings (1)	Install on piston (3).	
63.		New screen (9), new slipper seal (8), and new "O" ring (10)	Install on piston (3).	
64.		Piston assembly (13)	a. Install in housing (12).	Start from end of housing (12) marked "PA".
			b. As inner end of piston (3) comes to rear of output shaft bore (14), guide "O" ring (2) and backup ring (1) on piston (3) to avoid pinching them on edge of bore (14).	



11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

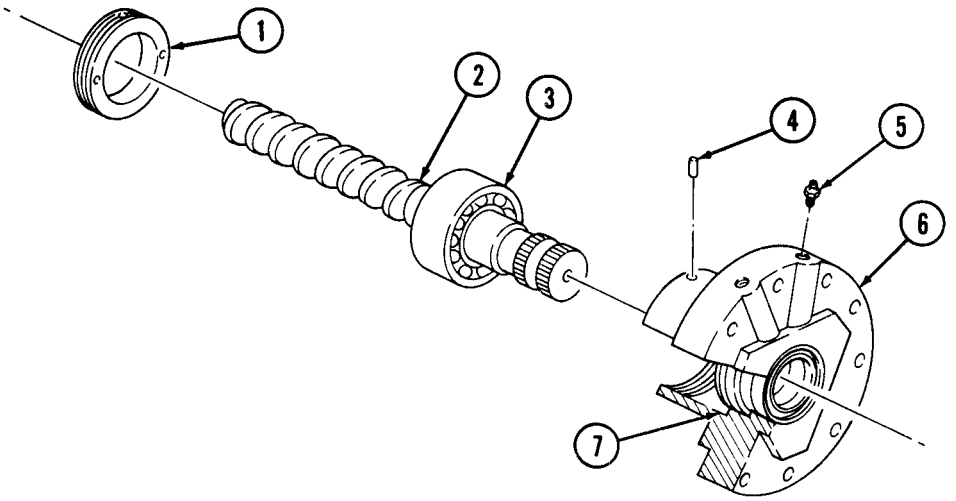
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
65.		Mandrel (18)	Place on firm bed so mandrel (18) is seated on shoulder (25) of bearing cap (19).	
66.		New seal (16)	Press into bore (17) of bearing cap (19).	Seat against mandrel (18) with lip of seal (16) up.
67.		New seal (15)	Press into bore (17) of bearing cap (19).	Seat against seal (16) with lip of seal up.
68.		Bearing cap (19) and new high-pressure seal (23)	a. Turn bearing cap (19) over, remove mandrel (18), and place bearing cap (19) on press bed with large end down.	If installing new type seal (23), discard washer saved from disassembly.
			b. Press high-pressure seal (23) into bore (24) and seat against shoulder (25).	Washer side of high-pressure seal (23) must be down.
69.		New "O" rings (20) and (22) and new high-pressure seal	Position on retainer (21).	
70.		Retainer (21)	Install in bearing cap (19).	Seat against high-pressure seal (23).





11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Coat splines of input shaft with GAA grease to protect seals during assembly.		
71.		Input shaft (2) and bearing (3)	Press into bearing cap (6).	Seat bearing (3) on shoulder (7) of bearing cap (6).
72.		Bearing retainer (1)	Install in bearing cap (6) hub.	
73.		Bearing cap (6) hub and retainer (1)	Aline lockpin (4) holes.	
74.		New lockpin (4)	Install in bearing cap (6) and retainer (1).	Tip of lockpin (4) must be below surface of hub of bearing cap (6).
75.		Grease fitting (5)	Install in bearing cap (6).	



76.		New "O" ring (13)	Install on cylinder head (12).	
77.		Cylinder head (12)	Aline marks and install on housing (14) with ten new lockwashers (11) and screws (10).	Tighten screws (10) 20-30 lb-ft (27-41 N·m).
78.		New "O" ring (8)	Install on plunger (9).	
79.		Plunger (8)	Install in cylinder head (12).	
80.		New "O" ring (16)	Install on bearing cap (6).	
81.		Bearing cap (6)	Turn input shaft (2), as necessary, into piston (15) and, alining marks, install on housing (14) with ten new lockwashers (17) and screws (18).	Tighten screws (18) 20-30 lb-ft (27-41 N·m).

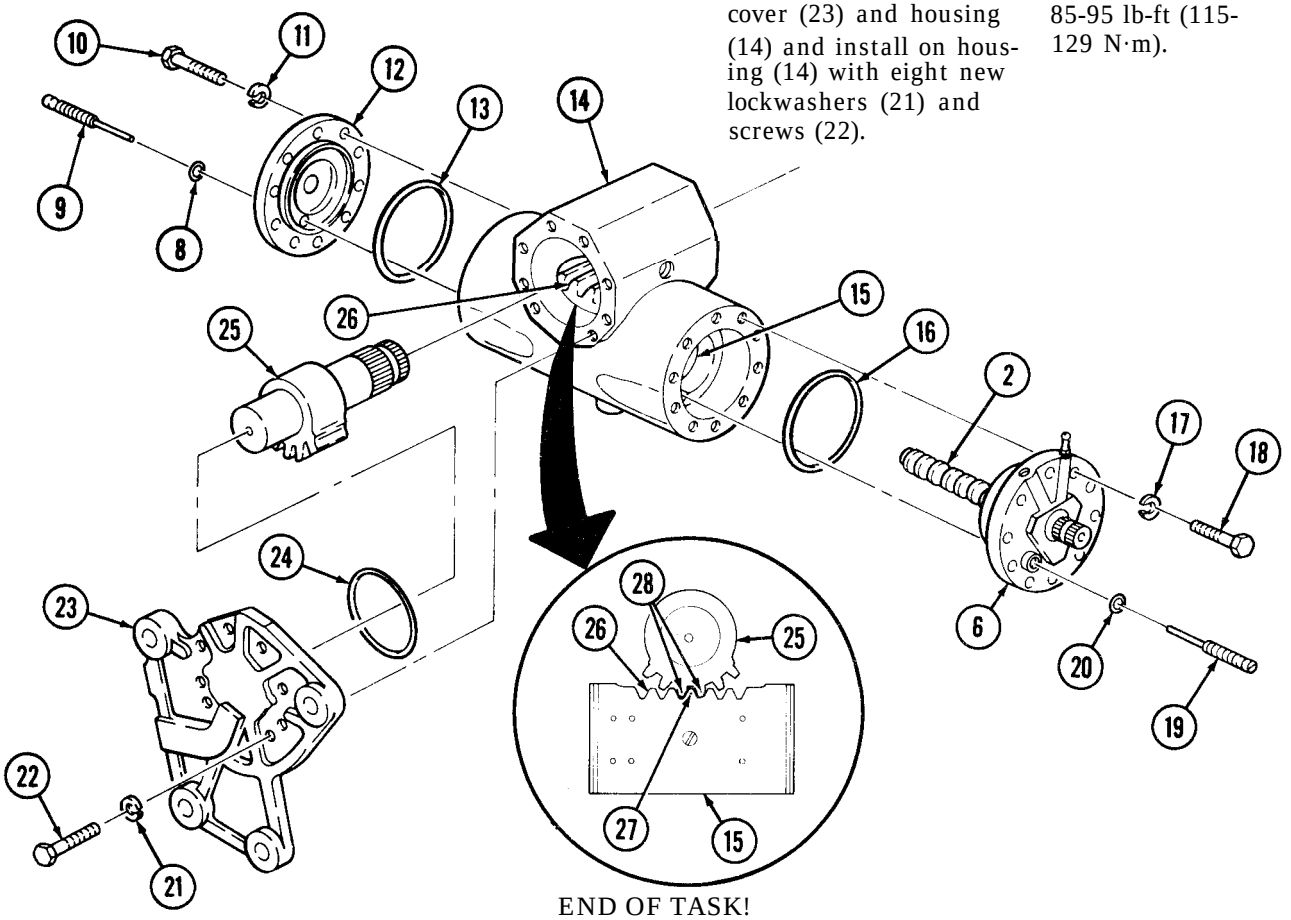
11-10.1. STEERING GEAR (SHEPPARD) REPAIR (Cont'd]

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
82.		New "O" ring (20)	Install on plunger (19).	
83.		Plunger (19)	Install in bearing cap (6).	

CAUTION

Wrap splines on output shaft with paper or tape. Grease paper or tape. Seal could be damaged during assembly.

84.		Output shaft and gear (25)	Aline two timing marks (28) on sector shaft and gear (25) and mark (27) on rack gear (26) of piston (15), and install in housing (14).	
85.		New "O" ring (24)	Install on shaft cover (23).	
86.		Shaft cover (23)	Aline marks on shaft cover (23) and housing (14) and install on housing (14) with eight new lockwashers (21) and screws (22).	Tighten screws (22) 85-95 lb-ft (115-129 N·m).



END OF TASK!

FOLLOW-ON TASKS:
- Install steering gear (para. 11-9.1).
- Fill to proper oil level (LO 9-2320-272-12).
- Bleed air from power steering system (TM 9-2320-272-20-2).
- Perform final plunger adjustments (para. 11-13).

11-11. POWER STEERING ASSIST CYLINDER REPAIR

This task covers:

a. Disassemble
b. Cleaning, Inspection, and Repair
c. Reassemble

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Power steering assist cylinder removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Power steering assist cylinder kit
Lubricating oil OE/HDO 10 (Appendix C, Item 16)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

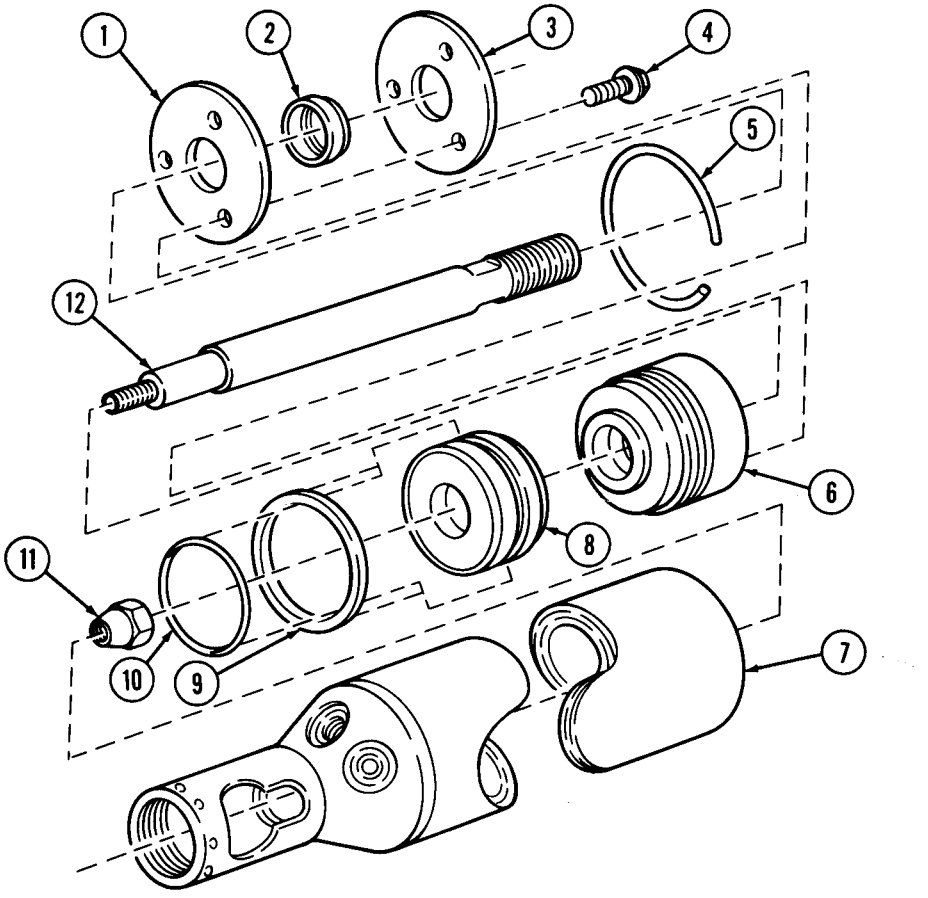
Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

a. Disassembly

1.		Power steering assist cylinder (7)	Thoroughly clean exterior with drycleaning solvent.	Refer to para. 2-7.
2.	Steering assist cylinder (7)	Piston rod (12)	Hold ports downward and push in and out to remove oil from cylinder (7).	Have oil drainage container ready to catch oil.

11-11. POWER STEERING ASSIST CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.		Steering assist cylinder (7)	Clamp in vise.	
4.	Top of steering assist cylinder (7)	Three screw-assembled washers (4), end plate retainer (3), seal (2), and end plate (1)	Remove.	
5.		Backup ring (5)	Remove from top of cylinder (7).	Push cylinder gland (6) in to remove backup ring (5).
6.		Cylinder gland (6), piston (8), and piston rod (12)	Remove as an assembly from assist cylinder (7).	
7.	Piston rod (12)	Locknut (11)	Remove.	
8.		Piston (8)		Turn piston (8) counterclockwise to remove.
9.		Cylinder gland (6)	Remove.	
10.	Piston (8)	Seal (10) and packing ring (9)	Remove.	Discard seal (10) and packing ring (9).



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11-11. POWER STEERING ASSIST CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.	Cylinder gland (2)	Snapring (13), piston rod seal retaining ring (12), piston rod oil seal (11), piston rod seal retaining ring (10), retaining ring (9), gland backup ring (8), and gland "O" ring (7)	Remove.	Discard piston rod seal (11), gland backup ring (8), and gland "O" ring (7).
12.		Cylinder gland to steering assist cylinder "O" ring (15), and backup ring (14)	Remove from cylinder gland (2).	Discard "O" ring (15) and backup ring (14).
13.	Steering assist cylinder (3)	Two ball sockets (5) and spring (4)	Remove.	

b. Cleaning, Inspection, and Repair

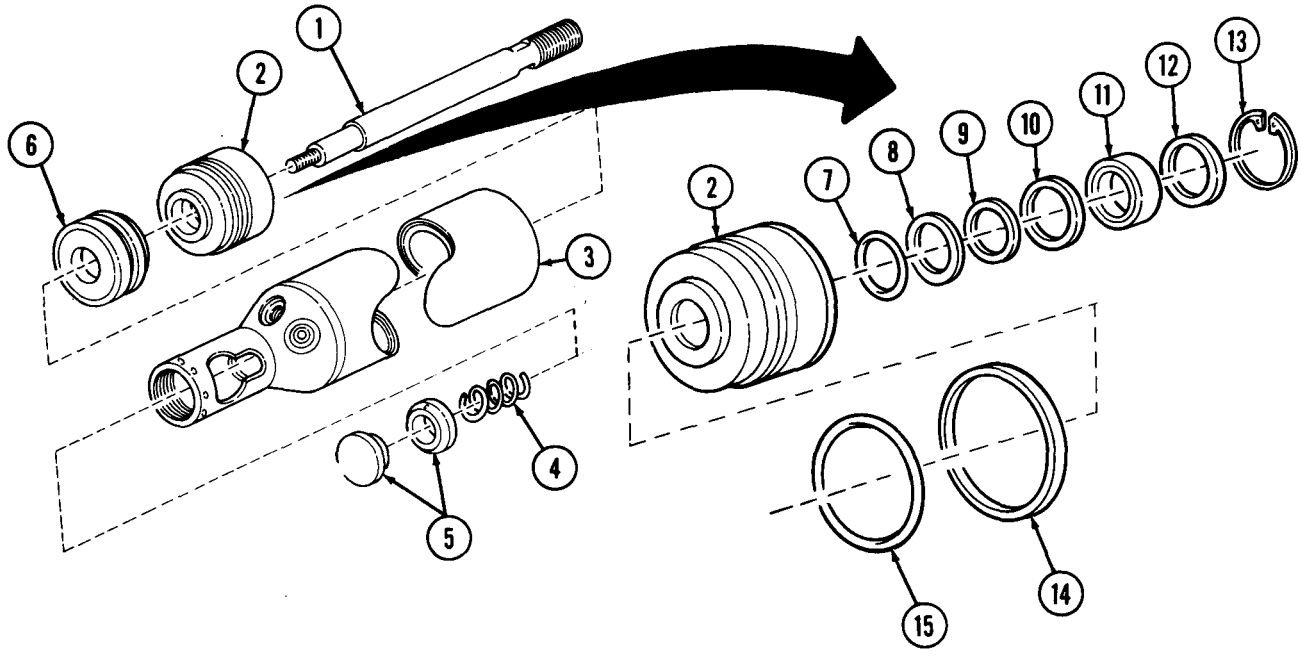
WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

14.		Steering cylinder (3) and related parts	Clean with drycleaning solvent and let air dry.	
15.		Steering assist cylinder (3), piston rod (1), piston (6), and cylinder gland (2)	Inspect for scoring, cracks, nicks, or breaks.	Replace power steering assist cylinder (3) if any of the parts are scored, cracked, nicked, or broken.
16.		Two ball sockets (5) and spring (4)	Inspect for breaks and cracks.	Replace ball sockets (5) and spring (4) if broken or cracked.

11-11. POWER STEERING ASSIST CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

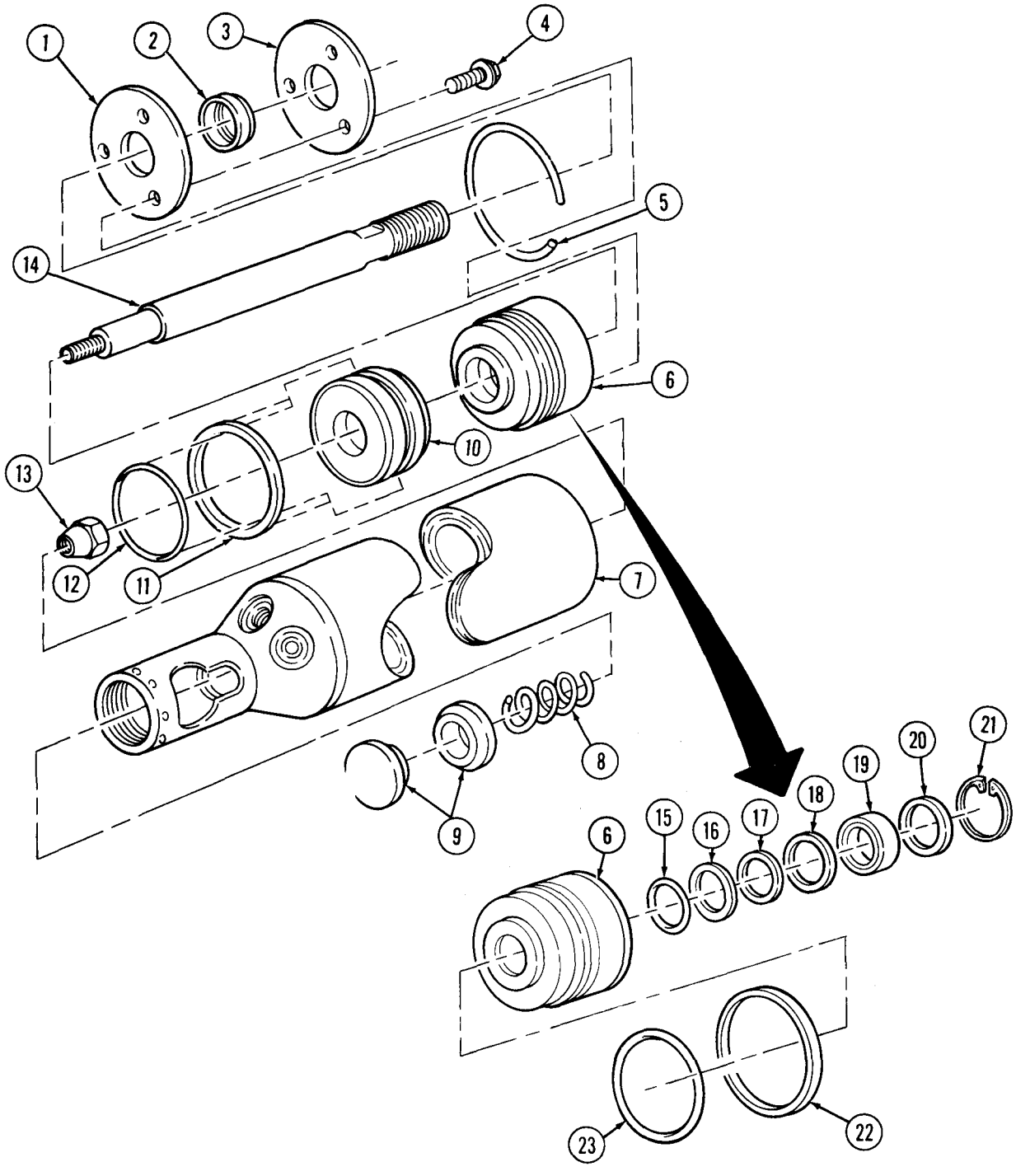


11-11. POWER STEERING ASSIST CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassembly			
		NOTE Coat all power steering assist cylinder components with clean lubricating oil before reassembly.		
17.		Spring (8) and two ball sockets (9)	Install into steering assist cylinder (7).	
18.		New backup ring (22) and new cylinder gland to steering assist cylinder "O" ring (23)	Install on cylinder gland (6).	
19.		New gland "O" ring (15), new gland backup ring (16), retaining rings (17) and (18), new piston rod seal (19), and retaining ring (20)	Install into cylinder gland (6) with snap-ring (21).	
20.		New packing ring (11) and new seal (12)	Install on piston (10).	
21.		Piston (10)	Install on piston rod (14) with nut (13).	Tighten nut (13).
22.		Piston (10) and piston rod (14)	Install into steering assist cylinder (7).	
23.		Cylinder gland (6)	Slide over piston rod (14) and into steering assist cylinder (7)	Use care not to damage seals when passing over threads on piston rod (14).
24.		Backup ring (5)	Install into top of steering assist cylinder (7).	Be sure backup ring (5) is seated in groove.
25.		End plate (1), new plate seal (2), and end plate seal retainer (3)	Install on cylinder gland (6) with three screw-assembled washers (4).	

11-11. POWER STEERING ASSIST CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install power steering assist cylinder (TM 9-2320-272-20-2).
• Lubricate power assist cylinder (LO 9-2320-272-12).

TA 350823

11-12. POWER STEERING PUMP TEST EQUIPMENT SETUP

This task covers:

a. Installation **b. Removal**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Left splash shield removed.
	TM 9-2320-272-20-2	Steering gear stone shield removed.

Test Equipment

Pressure gage kit 7010267
Load (shutoff) valve
Flow meter
Thermometer

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

None

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

Manual References

TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

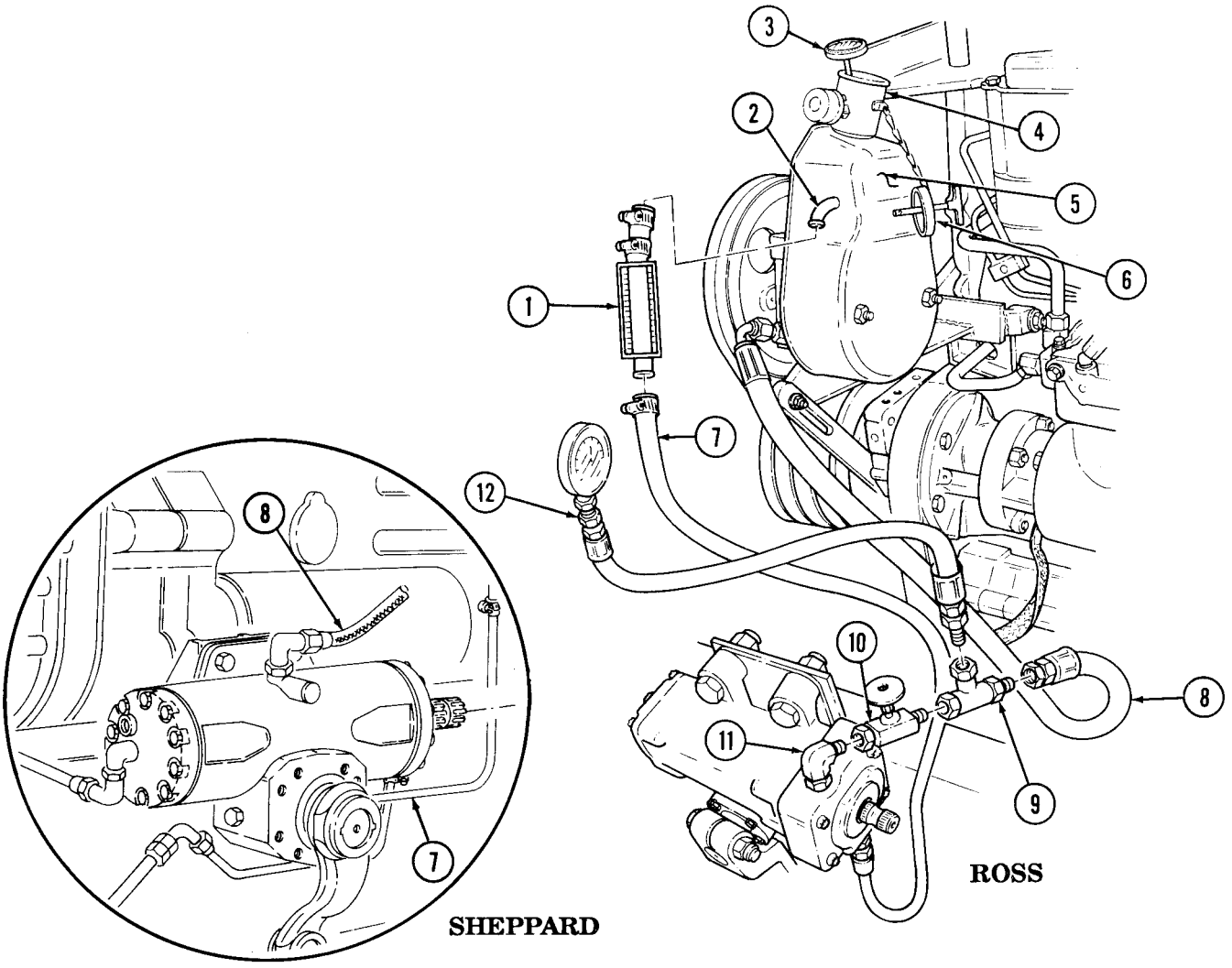
Test equipment setup is the same for Ross and Sheppard type steering gears. This procedure covers Ross type steering gear.

a. Installation

1.	Steering gear inlet adapter elbow (11)	Hydraulic pressure line (8)	Disconnect.	Have drainage container ready to catch oil.
2.		Load shutoff valve (10)	Connect to steering gear inlet adapter elbow (11).	
3.		Tee adapter (9)	Connect to load shutoff valve (10).	
4.		Pressure gage (12)	Connect to tee adapter (9).	

11-12. POWER STEERING PUMP TEST EQUIPMENT SETUP (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.		Hydraulic pressure line (8)	Connect to tee adapter (9).	
6.	Steering pump reservoir return line tube (2)	Hydraulic return line (7)	Disconnect.	Have drainage container ready to catch oil.
7.		Flow meter (1)	Connect to return line tube (2).	
8.		Hydraulic return line (7)	Connect to flow meter (1).	
9.	Steering pump reservoir (5)	Filler neck cover (6)	Remove.	
10.		Thermometer (3)	Install in pump reservoir filler neck (4).	



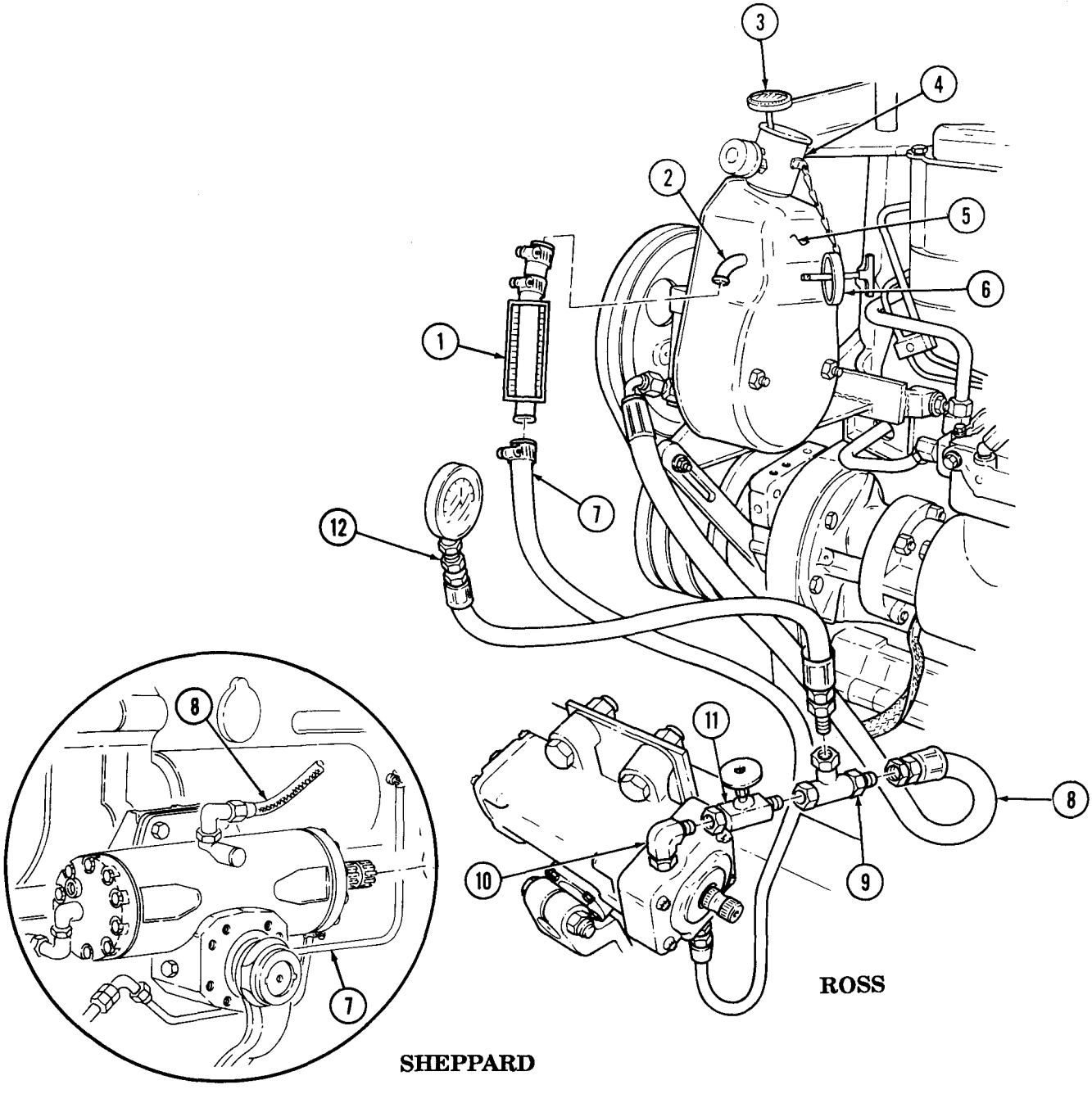
TA 350824

11-12. POWER STEERING PUMP TEST EQUIPMENT SETUP (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Removal				
11.	Steering pump reservoir filler neck (4)	Thermometer (3)	Remove.	
12.		Filler neck cover (6)	Install on pump reservoir filler neck (4).	
13.	Flow meter (1)	Hydraulic return line (7)	Disconnect.	Have drainage container ready to catch oil.
14.	Steering pump reservoir return line tube (2)	Flow meter (1)	Disconnect.	
15.		Hydraulic return line (7)	Connect to pump reservoir return line tube (2).	
16.	Tee adapter (9)	Hydraulic pressure line (8)	Disconnect.	Have drainage container ready to catch oil.
17.		Pressure gage (12)	Disconnect from tee adapter (9).	
18.	Load shutoff valve (11)	Tee adapter (9)	Disconnect.	
19.	Steering gear inlet adapter elbow (10)	Load shutoff valve (11)	Disconnect.	
20.		Hydraulic pressure line (8)	Connect to steering gear inlet adapter elbow (10).	

11-12. POWER STEERING PUMP TEST EQUIPMENT SETUP (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install steering gear stone shield (TM 9-2320-272-20-2).
- Install left splash shield (TM 9-2320-272-10).
- Fill power steering reservoir to proper oil level (LO 9-2320-272-12).

TA 350825

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

This task covers:

a. Steering Pump Pressure Test
b. Steering Pump Flow Test
c. Steering Gear Internal Leakage Test
d. Poppet Adjustment

INITIAL SETUP

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-10 Para. 11-12

LO 9-2320-272-12

Condition Description
Parking brake set.
Power steering test equipment installed.
Power steering reservoir filled to proper oil level.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Steel spacer

General Safety Instructions
Personnel must be clear of vehicle when vehicle engine is running.

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Personnel must be clear of vehicle when vehicle engine is running. Vehicle could suddenly move and cause injury to personnel and/or equipment.

NOTE

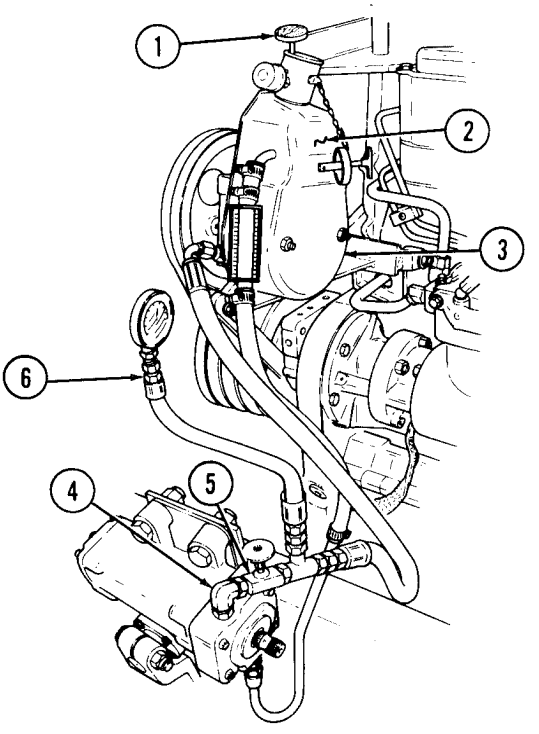
Do not begin this procedure before performing all preliminary maintenance checks. Refer to paragraph 11-4.

a. Steering Pump Pressure Test

1.		Engine	Start and warm up to operating temperature.	Refer to TM 9-2320-272-10.
				Let engine run through duration of test.

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		CAUTION		
		At no time allow power steering oil temperature to exceed 180°F (82°C). Run all tests at the prescribed temperature range of 125°-135°F (52°-57°C).		
2.	Steering gear inlet adapter elbow (4)	Load shutoff valve (5)	Partially close valve (5) until pressure gage (6) reads 1000 psi (6895 kPa).	
3.	Power steering pump reservoir (2)	Thermometer (1)	Observe temperature reading.	Temperature must be between 125°F (52°C) and 135°F (57°C).
		CAUTION		
		Do not keep the load valve closed for longer than 5 seconds to avoid damaging pump. Closing the load valve causes the pump to operate at relief pressure and the power steering oil temperature to increase rapidly.		
4.	Steering gear inlet adapter elbow (4)	Load shutoff valve (5)	a. Open.	
			b. Close and observe pressure gage (6) reading.	If gage (6) reads below 1360-1400 psi (9377-9929 kPa), repair or replace pump (3).
			c. Open.	



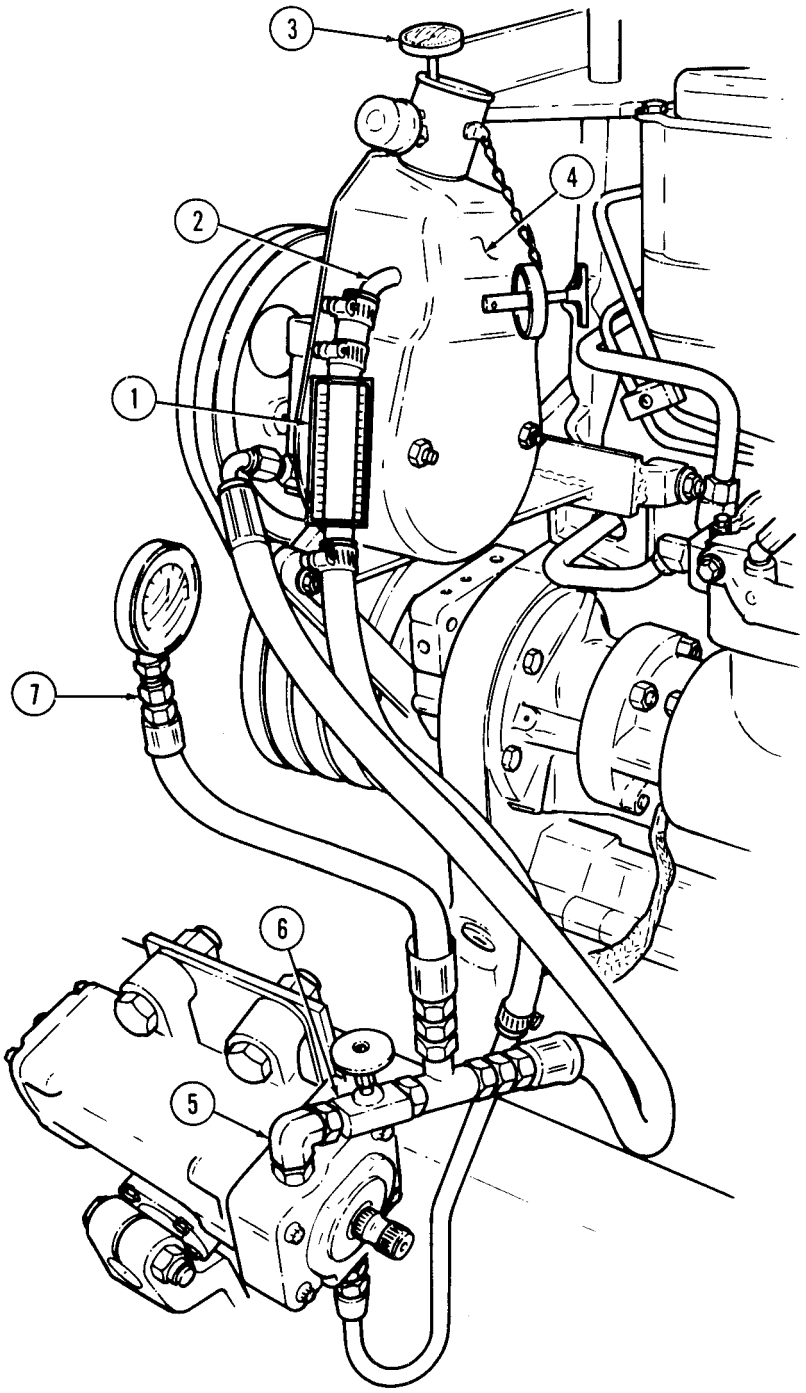
TA 350826

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Steering Pump Flow Test				
5.	Power steering pump reservoir (4)	Thermometer (3)	With engine idling, observe temperature reading.	Temperature must be 125°-135°F (52°-57°C).
6.	Power steering pump reservoir return line tube (2)	Flow meter (1)	Observe flow rate.	Flow rate should be 5.5-6.5 gallons per minute (20.8 -24.6 liters per minute).
		CAUTION Do not keep the load valve closed for longer than 5 seconds to avoid damaging pump. Closing the load valve causes the pump to operate at relief pressure and the power steering oil temperature to increase rapidly.		
7.	Steering gear inlet adapter elbow (5)	Load shutoff valve (6)	a. Close and observe pressure gage (7) and flow meter (1) readings.	Pressure should be 1360-1440 psi (9377-9929 kPa). Flow rate should be zero.
			b. Immediately open load valve (6) and observe flow meter (1) reading.	Flow rate should return to original reading of 5.5-6.5 gallons per minute (20.8-24.6 liters per minute). If not, replace pump (4).
8.		Engine	Run at 1200 rpm.	
9.	Steering gear inlet adapter elbow (5)	Load shutoff valve (6)	Fully close and observe pressure gage (7) and flow meter (1) readings.	Observe readings until steering pump (4) relief pressure is reached at 1360-1440 psi (9377-9939 kPa). Flow rate should be zero.
10.		Load shutoff valve (6)	Immediately open.	Flow rate should return to original reading of 5.5-6.5 gallons per minute (20.8-24.6 liters per minute).

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



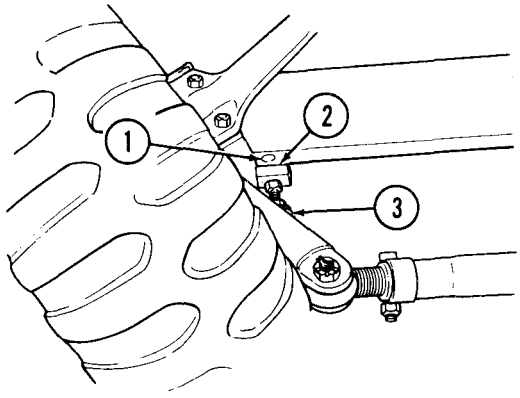
TA 350827

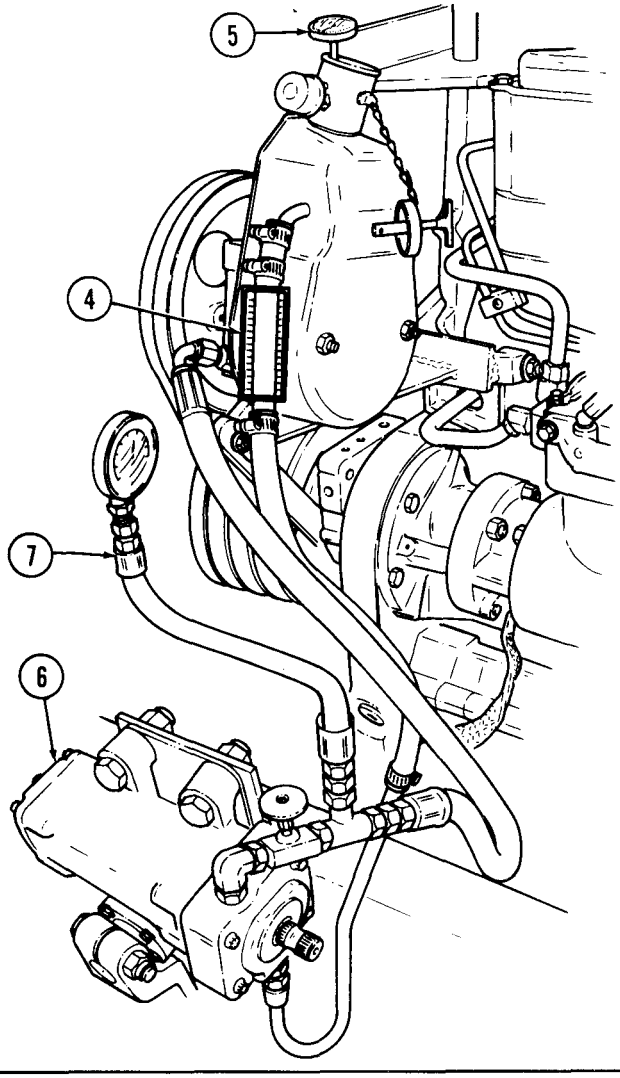
11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

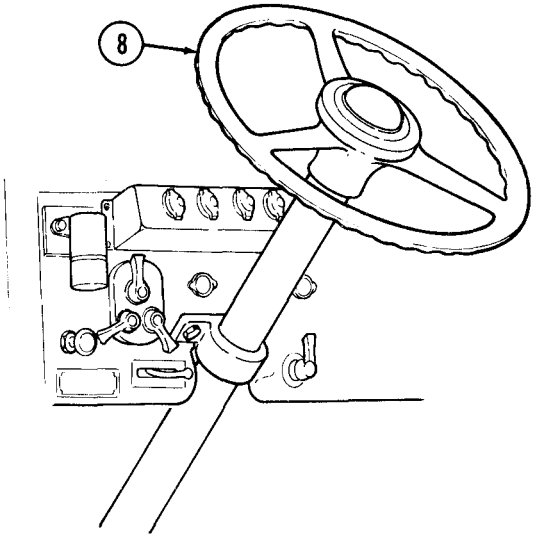
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Steering Gear Internal Leakage Test			
		CAUTION		
		Damage could result to steering gear if the steering gear does not allow wheels to reach axle stops. Poppets must be adjusted or steering gear will not bleed itself internally.		
11.		Thermometer (5)	Observe temperature reading.	Temperature must be 125°-135°F (52°-57°C).
12.	Axle stop (3)	Steel spacer (2)	Position between axle (1) and axle stop (3).	To prevent operation of poppets.
		CAUTION		
		Do not hold steering wheel in full turn position for more than 5-10 seconds. Pump damage could result.		
		NOTE		
		Assistant will rotate steering wheel.		
13.		Steering wheel (8)	Turn until axle stop (3) bottoms on spacer block (2).	
14.		Pressure gage (7) and flow meter (4)	Observe readings.	Pressure should be 1360-1440 psi (9377-9929 kPa). Flow rate 0-1 gallon per minute (0-4 liters per minute). If greater than 1 gallon per minute (4 liters per minute), repair steering gear (6).
		NOTE		
		Repeat steps 11 through 14 with wheels turned in opposite direction.		

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







TA 350828

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

d. Poppet Adjustment

CAUTION

Do not hold steering wheel in full turn position for more than 5-10 seconds. Pump damage could result.

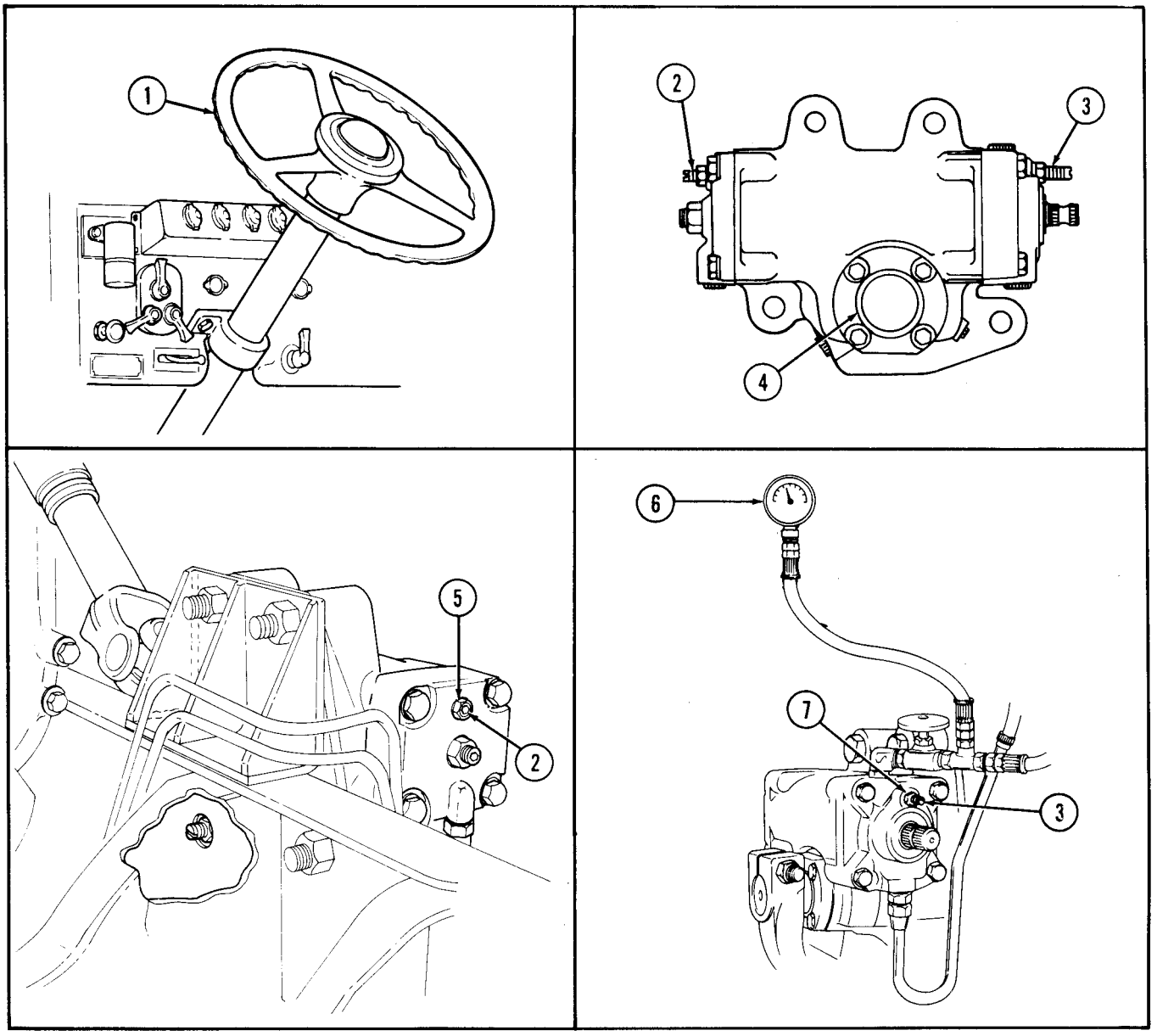
NOTE

Assistant will rotate steering wheel.

15.		Steering wheel (1)	Rotate full travel to the left direction.
16.		Sector shaft (4)	Observe sector shaft (4) rotate clockwise.
17.		Jamnut (7)	Loosen.
18.		Poppet adjusting screw (3)	a. Screw out until pressure gage (6) reaches maximum pressure. b. Screw in until pressure gage (6) shows a 200-400 psi (1379-2758 kPa) drop in pressure.
19.		Jamnut (7)	Tighten 12-18 lb-ft (16-24 N·m).
20.		Steering wheel (1)	Rotate full travel to the right direction.
21.		Sector shaft (4)	Observe sector shaft (4) rotate counter-clockwise.
22.		Jamnut (5)	Loosen.
23.		Poppet adjusting screw (2)	a. Screw out until pressure gage (6) reaches maximum pressure. b. Screw in until pressure gage (6) shows a 200-400 psi (1379-2758 kPa) drop in pressure.
24.		Jamnut (5)	Tighten 12-18 lb-ft (16-24 N·m).

11-13. POWER STEERING TESTS AND ADJUSTMENTS (ROSS)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
25.		Steering wheel (1)	With engine running, rotate steering wheel (1) from full left to full right several times.	This should remove all air from steering system.



END OF TASK!

FOLLOW-ON TASKS:
- Remove test equipment (para. 11-12).
- Fill power steering reservoir to proper oil level (LO 9-2320-272-12).
- Check steering gear mechanical adjustments (para. 11-14).
- Start engine (TM 9-2320-272-10) and road test vehicle.

TA 350829

11-13.1 .POWER STEERING TESTS AND ADJUSTMENTS (SHEPPARD)

This task covers:

a. Steering Pump Pressure Test
b. Steering Pump Flow Test
c. Steering Gear Internal Leakage Test
d. Plunger Adjustment

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Took
None

Materials/Parts
Steel spacer

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference
TM 9-2320-272-10 Para. 11-12
LO 9-2320-272-12

Condition Description
Parking brake set.
Power steering test equipment installed.
Power steering reservoir filled to proper oil level.

Special Environmental Conditions
None

General Safely Instructions
Personnel must be clear of vehicle when vehicle engine is running.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Personnel must be clear of vehicle when vehicle engine is running. Vehicle could suddenly move and cause injury to personnel and/or equipment.

NOTE

Do not begin this procedure before performing all preliminary maintenance checks. Refer to paragraph 11-4.

a. Steering Pump Pressure Test

1. Refer to para. 11-13, sub task a.

b. Steering Pump Flow Test

2. Refer to para. 11-13, sub task b.

11-13.1. POWER STEERING TESTS AND ADJUSTMENTS (SHEPPARD) (Cont'd)

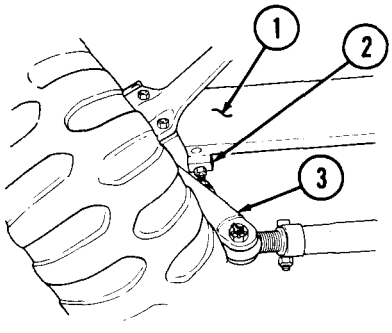
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

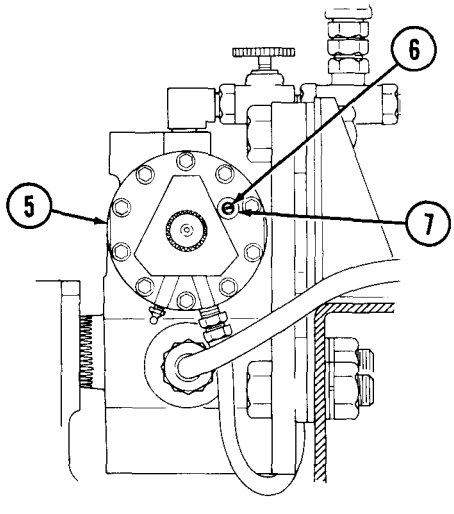
c. Steering Gear Internal Leakage Test

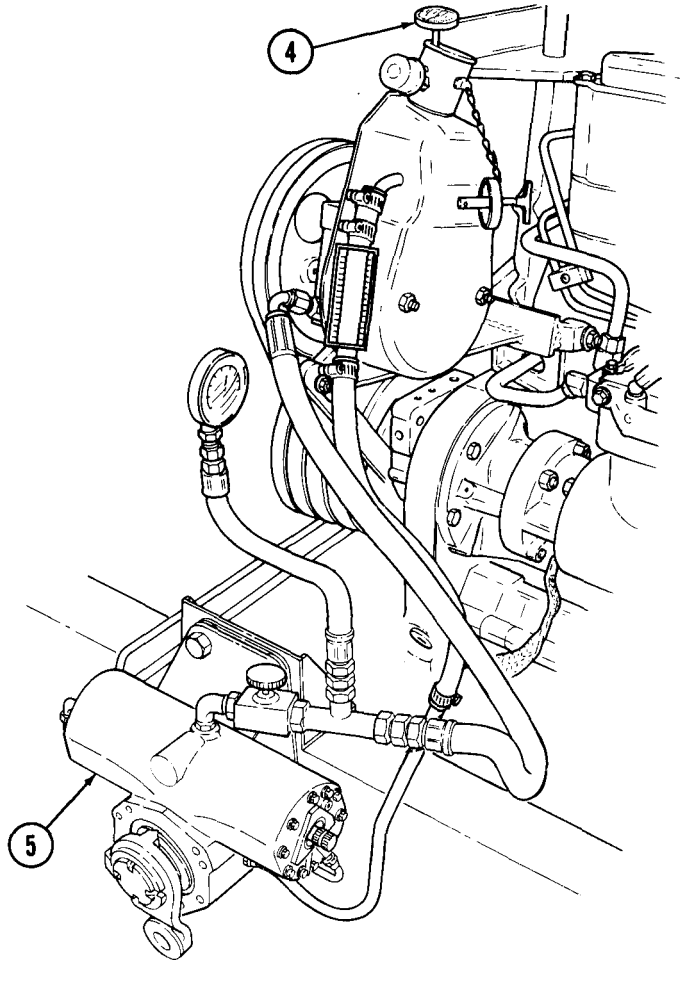
CAUTION

Damage could result to steering gear if the steering gear does not allow wheels to reach axle stops. Poppets must be adjusted or steering gear will not bleed itself internally.

3.	Thermometer (4)	Observe temperature reading.	Temperature must be 125°-135°F (52°-57°C).
4. Ends of steering gear (5)	Two plungers (6)	Turn out to just below surface of boss (7).	Do not turn out past edge of boss (7).
5. Axle stop (3)	Steel spacer (2)	Position between axle (1) and axle stop (3).	Spacers (2) must be 0.125-0.187 in. (3.2-4.8 mm) thick.







11-13.1. POWER STEERING TESTS AND ADJUSTMENTS (SHEPPARD) (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

Do not hold steering wheel in full turn position for more than 5-10 seconds. Pump damage could result.

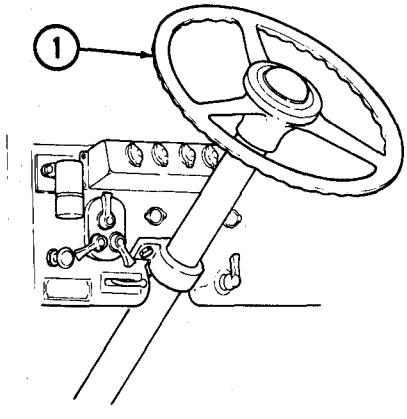
NOTE

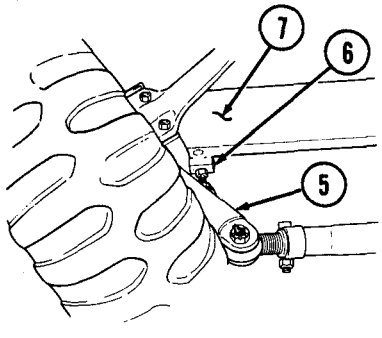
Assistant will rotate steering wheel.

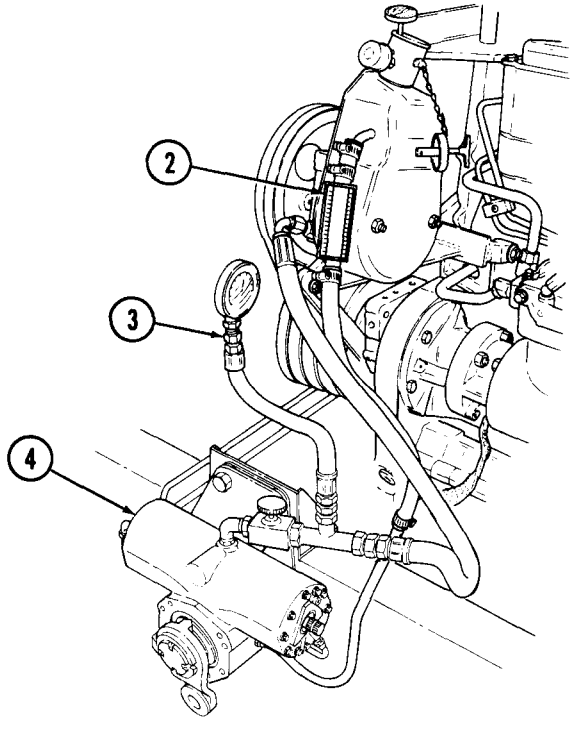
6.		Steering wheel (1)	Turn until axle stop (5) bottoms on spacer block (6).	
7.		Pressure gage (3) and flow meter (2)	Observe readings.	Pressure should be 1360-1440 psi (9377-9929 kPa). Flow rate 0-1 gallon per minute (0-4 liters per minute). If greater than 1 gallon per minute (4 liters per minute), repair steering gear (4).

NOTE

Repeat steps 5 through 7 with wheels turned in opposite direction.







11-13.1. POWER STEERING TESTS AND ADJUSTMENTS (SHEPPARD) (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

d. Plunger Adjustment

CAUTION

Do not hold steering wheel in full turn position for more than 5-10 seconds. Pump damage could result.

NOTE

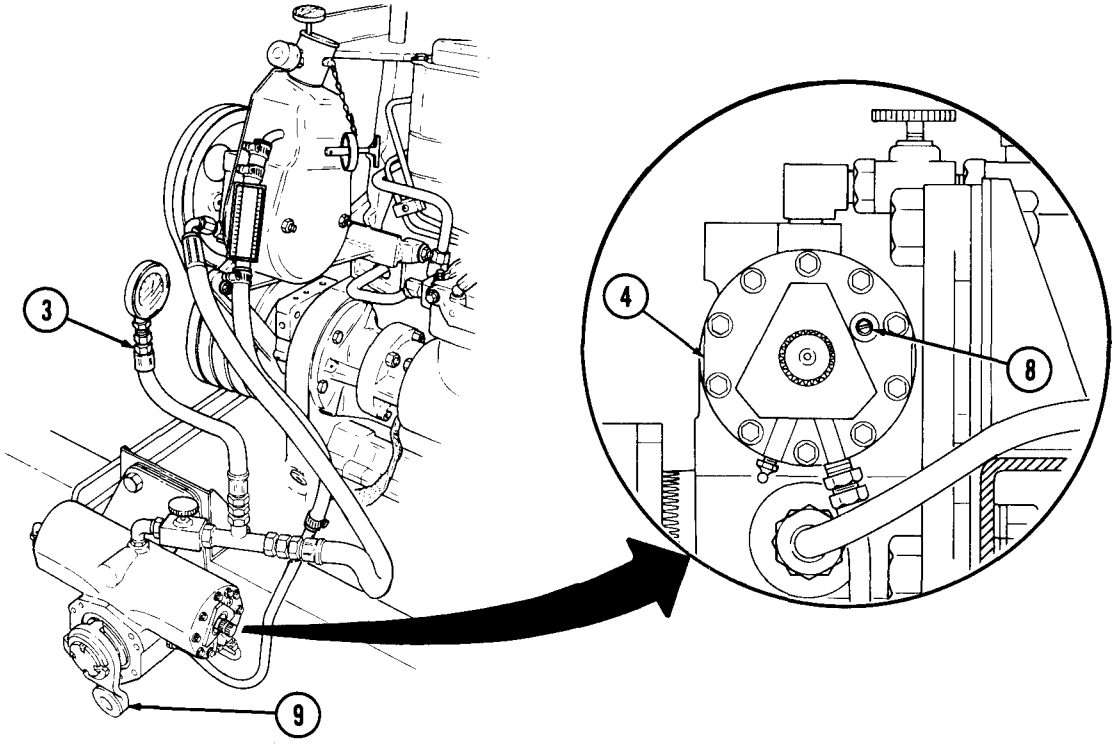
Assistant will rotate steering wheel.

8.		Steering wheel (1)	Rotate full travel to the left direction.	Spacer blocks (6) must be in place between axle (7) and axle stop (5).
9.		Pitman arm (9)	Observe that pitman arm (9) rotates clockwise.	

NOTE

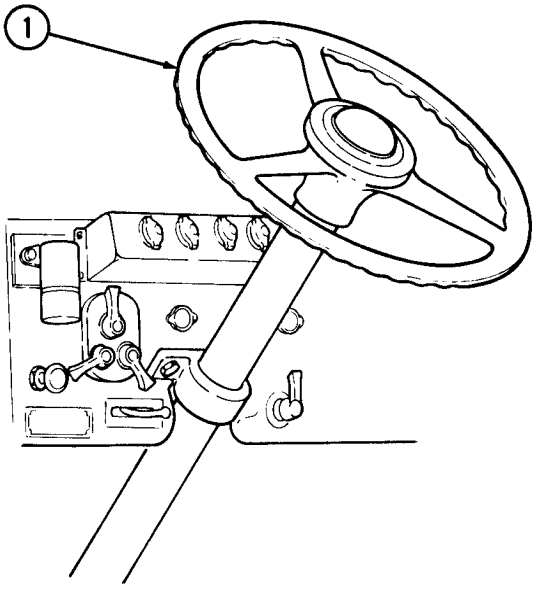
Turning plungers "in" decreases power assisted turning angle.
Turning plungers "out" increases power assisted turning angle.

10.		Rear plunger (8)	Turn clockwise until high pressure hiss is heard.	Pressure gage (3) must show 200-400 psi (1379-2758 kPa) drop in pressure.



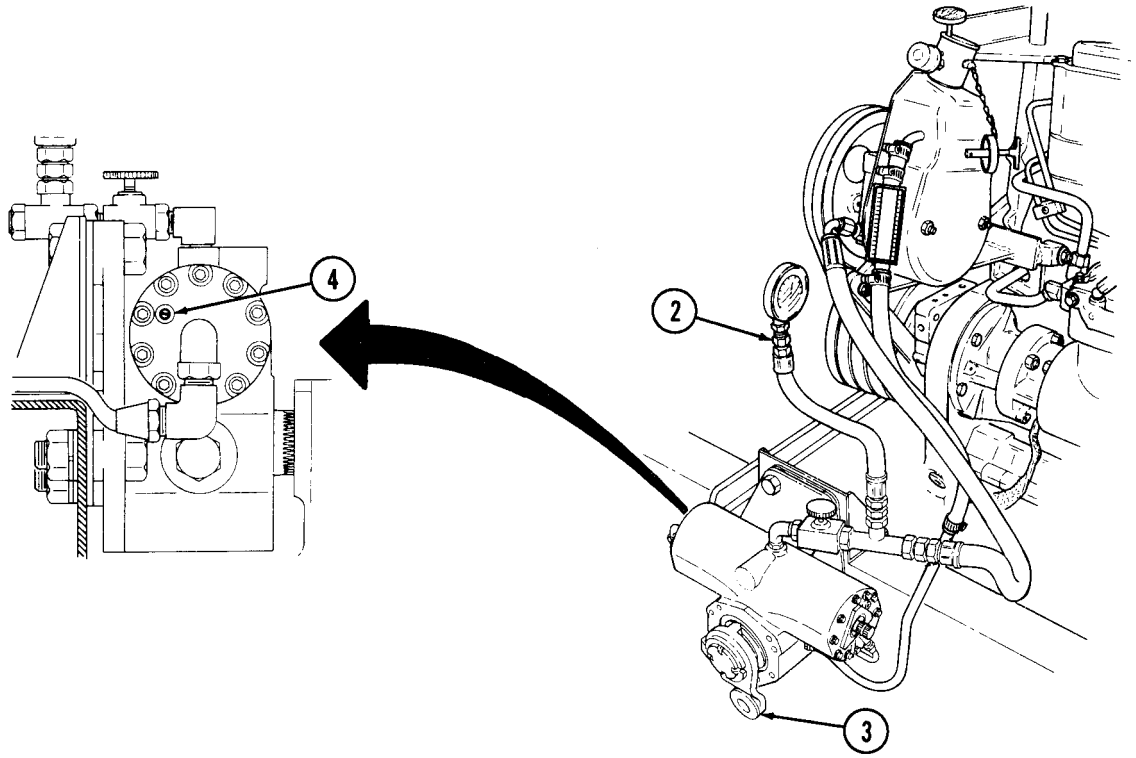
11-13.1. POWER STEERING TESTS AND ADJUSTMENTS (SHEPPARD) (Cont'd)

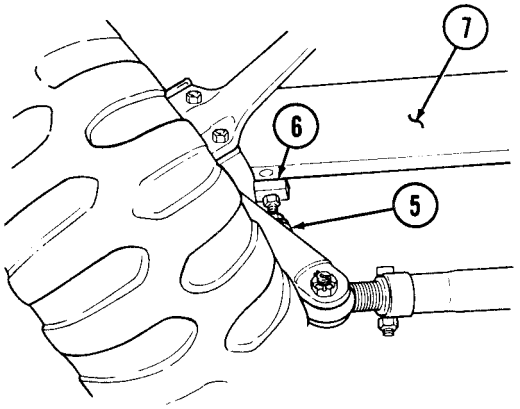
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			CAUTION Do not hold steering wheel in full turn position for more than 5-10 seconds. Pump damage could result.	
			NOTE Assistant will rotate steering wheel.	
11.		Steering wheel (1)	Rotate full travel to the right direction.	Spacer blocks (6) must be in place between axle (7) and axle stop (5).
12.		Pitman arm (3)	Observe that pitman arm (3) rotates counter-clockwise.	
			NOTE Turning plungers "in" decreases power assisted turning angle. Turning plungers "out" increases power assisted turning angle.	
13.		Front plunger (4)	Turn counterclockwise until high pressure hiss is heard.	Pressure gage (2) must show 200-400 psi (1379-2758 kPa) drop in pressure.



11-13.1. POWER STEERING TESTS AND ADJUSTMENTS (SHEPPARD) (Contd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





END OF TASK!

FOLLOW-ON TASKS:
- Remove test equipment (para. 11-12).
- Fill power steering reservoir to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and road test vehicle.

11-14. POWER STEERING GEAR ADJUSTMENT (ON VEHICLE)

This task covers:

a. Sector Shaft Adjustment **b. Wormshaft Adjustment**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Left splash shield removed.
	TM 9-2320-272-20-2	Drag link removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

None

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

None

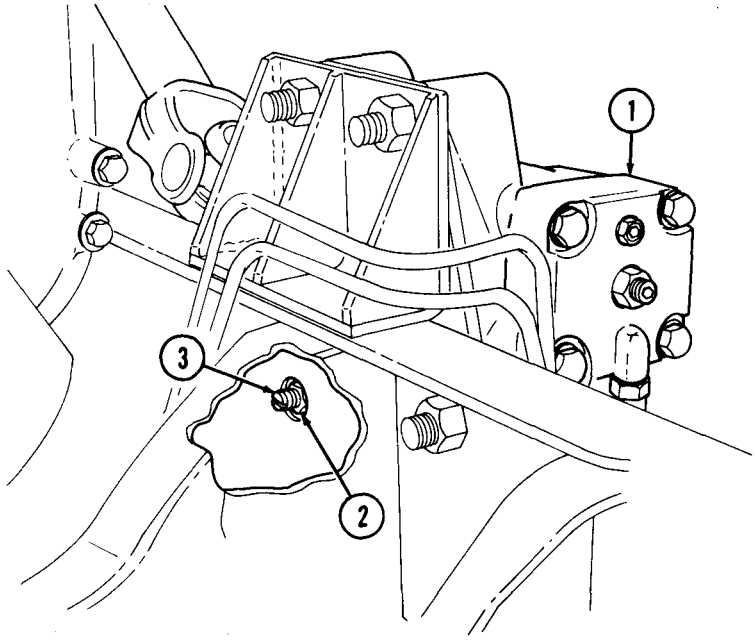
Manual References

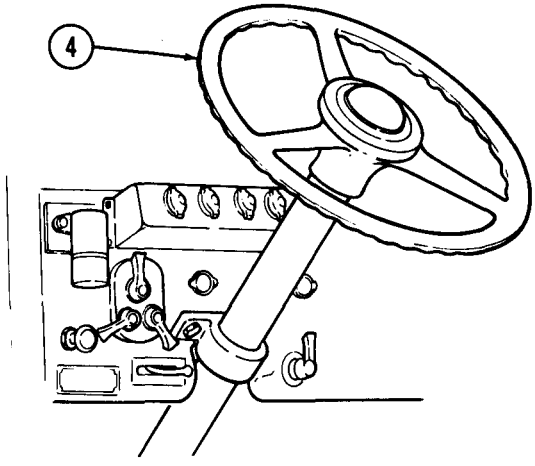
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Sector Shaft Adjustment		
			NOTE Assistant will rotate steering wheel.	
1.		Steering wheel (4)	a. Rotate full travel in both directions and note halfway (midway) point. b. Position to halfway point.	
2.	Right side of steering gear (1)	Jamnut (2)	Loosen.	
3.		Sector shaft adjusting screw (3)	a. Adjust. b. Turn sector shaft adjusting screw (3) counterclockwise one turn.	Tighten sector shaft adjusting screw (3) 10 lb-ft (14 N·m).

11-14. POWER STEERING GEAR ADJUSTMENT (ON VEHICLE) (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.		Jamnut (2)	Tighten.	Tighten jamnut (2) 40-45 lb-ft (54-61 N·m).
5.		Steering wheel (4)	Rotate lightly in both direction and check for pulsations.	If pulsations are felt repeat steps 1 through 5.

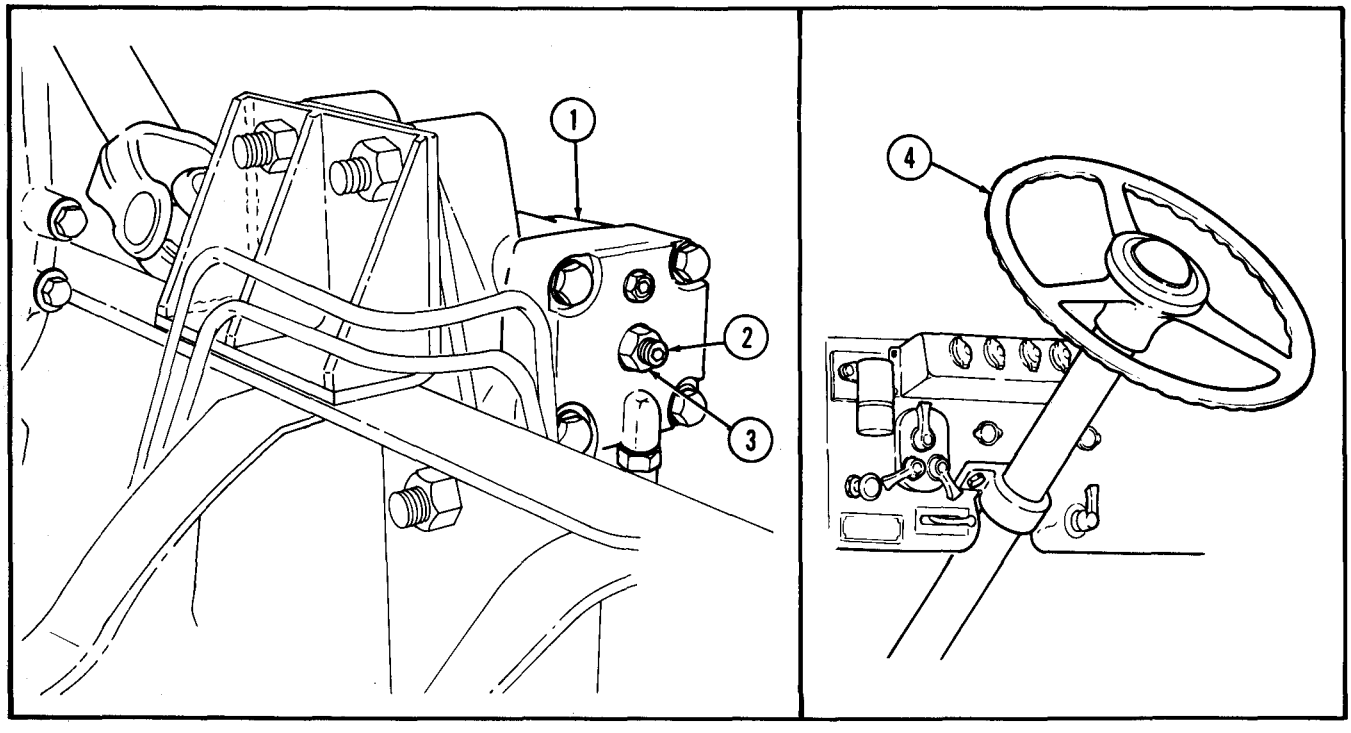




TA 350830

11-14. POWER STEERING GEAR ADJUSTMENT (ON VEHICLE) (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Wormshaft Adjustment				
6.	Front of steering gear (1)	Jamnut (3)	Loosen, and turn worm-adjusting screw (2) counterclockwise one full turn.	
7.		Worm adjusting screw (2)	a. Tighten.	Tighten wormshaft adjusting screw (2) 5-6 lb-ft (7-8 N·m).
			b. Hold in place and tighten jamnut (3) to steering gear (1).	Tighten jamnut (3) 70-80 lb-ft (95-109 N·m).
		NOTE Assistant will rotate steering wheel.		
8.		Steering wheel (4)	Rotate lightly in both directions and check for pulsations.	If pulsations are felt repeat steps 6 through 8.



END OF TASK!

FOLLOW-ON TASKS: • Install drag link (TM 9-2320-272-20-2).
• Install left splash shield (TM 9-2320-272-10).
• Start engine (TM 9-2320-272-10) and road test vehicle.

TA 350831

CHAPTER 12
FRAME MAINTENANCE

Section I. DESCRIPTION AND DATA

12-1. DESCRIPTION AND DATA

The M939 series vehicles use a heavily reinforced ladder-type frame on both the 167 inch and 179 inch wheel base trucks. All supporting brackets and crossmembers are either bolted or riveted to the U-channel shaped frame rails. The front bumper is bolted directly to the top and bottom flanges attached to the frame rails. Rear bumperettes are bolted to the flat sides of the frame rails and to the flat face of the rear crossmember.

Section II. FRAME MAINTENANCE

12-2. GENERAL

Refer to technical bulletin (TB 9-2300-247-40) for maintenance and repairs on frames used on the M939 series vehicles. Refer to TM 9-2320-272-34P for authorized replacement parts used in frame repair.

Section III. REPAIR AND REPLACEMENT STANDARDS

12-3. REPAIR AND REPLACEMENT STANDARDS

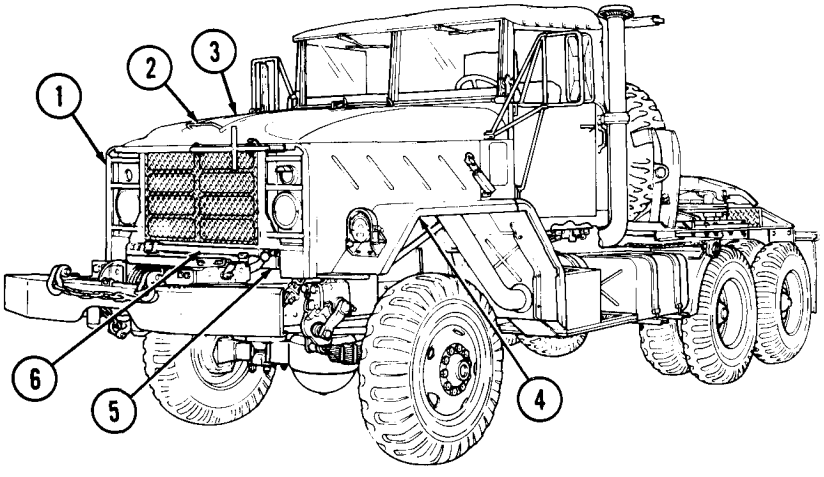
Repair and replacement standards are not covered in this manual for the M939 series vehicle frame. Refer to TB 9-2300-247-40, Tactical Wheeled Vehicles: “Repair of Frames”. Use the 5-ton truck repair section.

CHAPTER 13
FRONT SHEET METAL MAINTENANCE

Section I. DESCRIPTION

13-1. DESCRIPTION

a. The hood and forward part of the front fenders tilt forward to provide access to the engine compartment. The hood is secured in the open position by a retaining safety latch engaging the bumper, and in the closed position by a tensioned latch on each side of the cab. The headlamps, blackout lamps, hood handle safety latch, and forward part of the front fenders are mounted on the hood.



1. Radiator brush guard
2. Hood grab handle
3. Hood
4. Front fenders
5. Hood crossmember
6. Torsion bar

Section II. FRONT SHEET METAL MAINTENANCE

13-2. FRONT SHEET METAL MAINTENANCE TASK SUMMARY

TA 350365

13-3. HOOD CROSSMEMBER BRACKET MAINTENANCE

This task covers:

a. Removal
b. Cleaning and Inspection
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Hood assembly removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Insulator
Locknut
Two lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

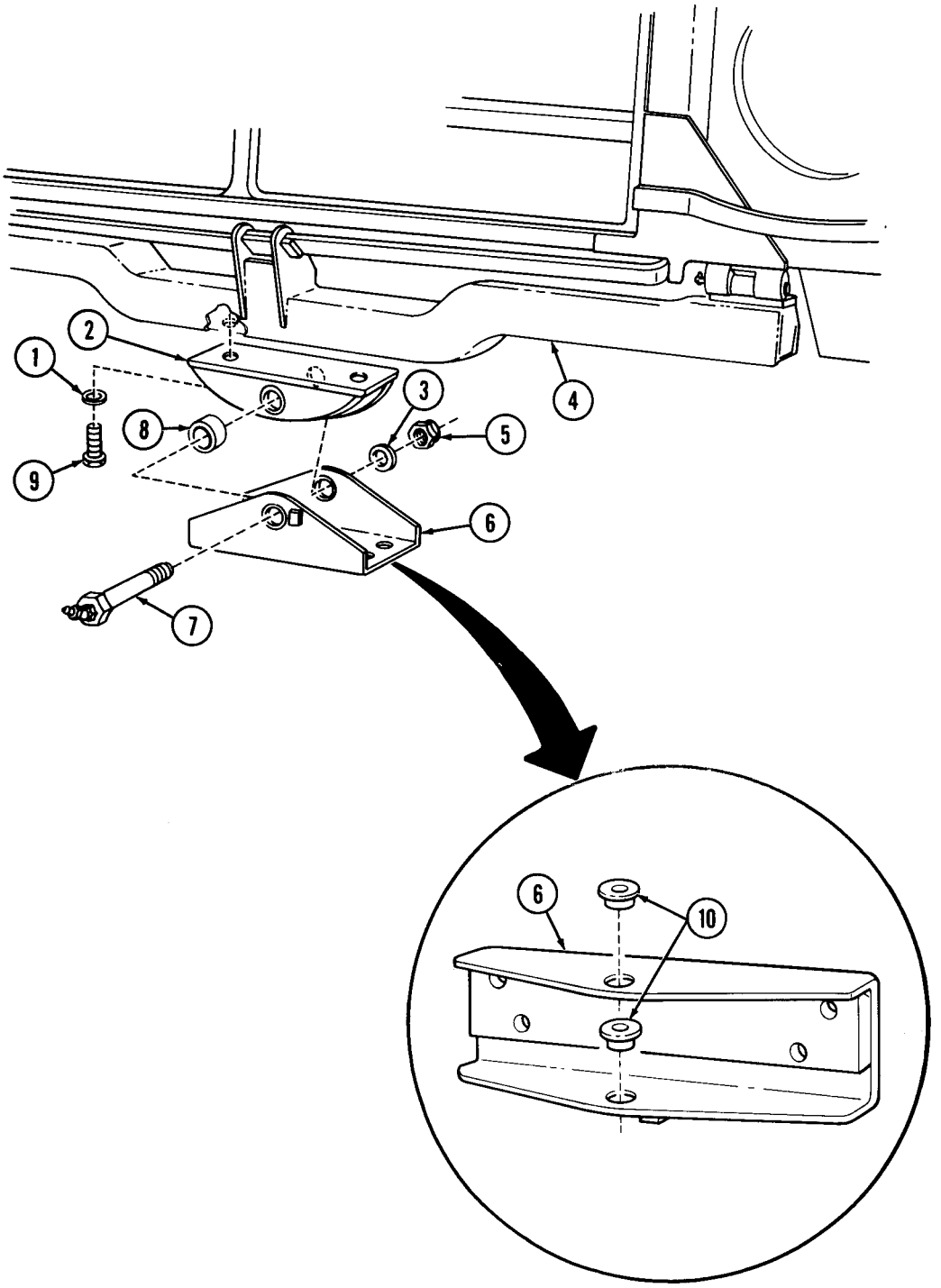
General Safety Instructions
None

Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Hood crossmember (4)	Two screws (9) and lockwashers (1), and trunnion bracket (2)	Remove.	Discard lockwashers (1).
2.	Lower half trunnion bracket (6) and through bolt (7)	Locknut (5) and washer (3)	Remove.	Discard locknut (5).
3.		Through bolt (7) and insulator (8)	Remove.	Use soft-faced hammer to remove bolt (7). Discard insulator (8).
	b. Cleaning and Inspection			
		NOTE: Trunnion bracket bushings are cleaned, inspected, and replaced in the same way. Steps 4 and 5 cover the lower half trunnion bracket bushings only.		
4.	Lower half trunnion bracket (6)	Two bushings (10)	a. Wipe clean and inspect for cracks, breaks, or chips.	If cracked, broken, or chipped, replace bushings (10).

13-3. HOOD CROSSMEMBER BRACKET MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



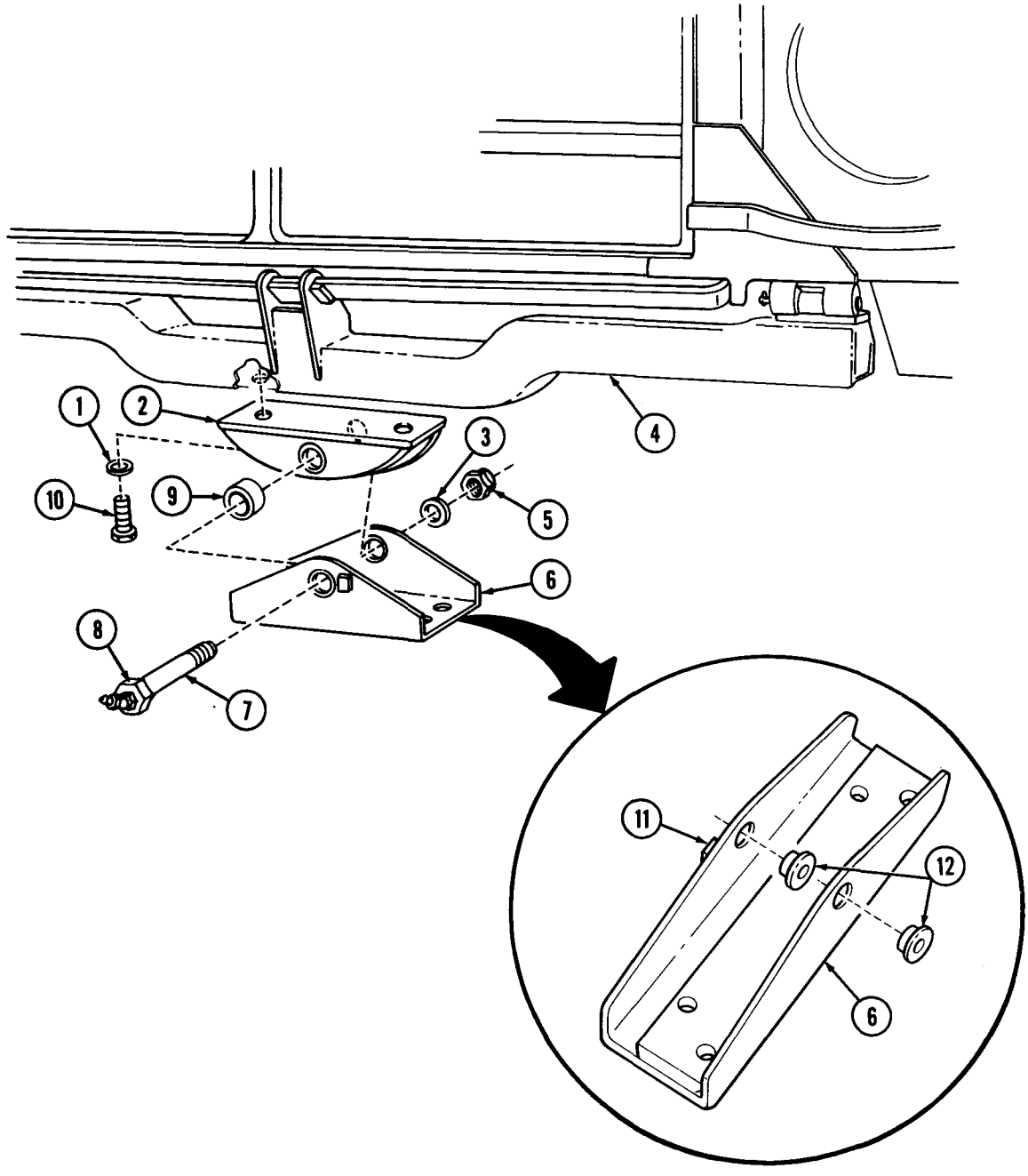
TA 350366

13-3. HOOD CROSSMEMBER BRACKET MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Steps 4b and 5 are performed only if bushings are to be replaced.	
			b. Drive out of lower half trunnion bracket (6).	Use steel drift and hammer.
5.		Two new bushings (12)	Drive in lower half trunnion bracket (6) until seated.	One bushing (12) is installed from inside bracket (6) on side with stop (11). The other bushing (12) is installed from outside of bracket (6).
	c. Installation			
6.		New insulator (9)	Position between front side of trunnion bracket (2) and lower half trunnion bracket (6).	
7.		Through bolt (7)	Install through brackets (6) and (2) with washer (3) and new locknut (5).	Make sure slot (8) on through bolt (7) is pointing upward to ensure proper position of lubricating port hole. Tighten locknut (5) 96 lb-ft (130 N·m).
8.		Trunnion bracket (2)	Install on hood crossmember (4) with two screws (10) and new lockwashers (1).	

13-3. HOOD CROSSMEMBER BRACKET MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS • Lubricate through bolt (LO 9-2320-272-12).
• Install hood assembly (TM 9-2320-272-20-2).

TA 350367

13-4. HOOD HINGES REPLACEMENT

This task covers:

a. **Removal** **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Cotter pin

Personnel Required
Wheeled vehicle repairman MOS 63W

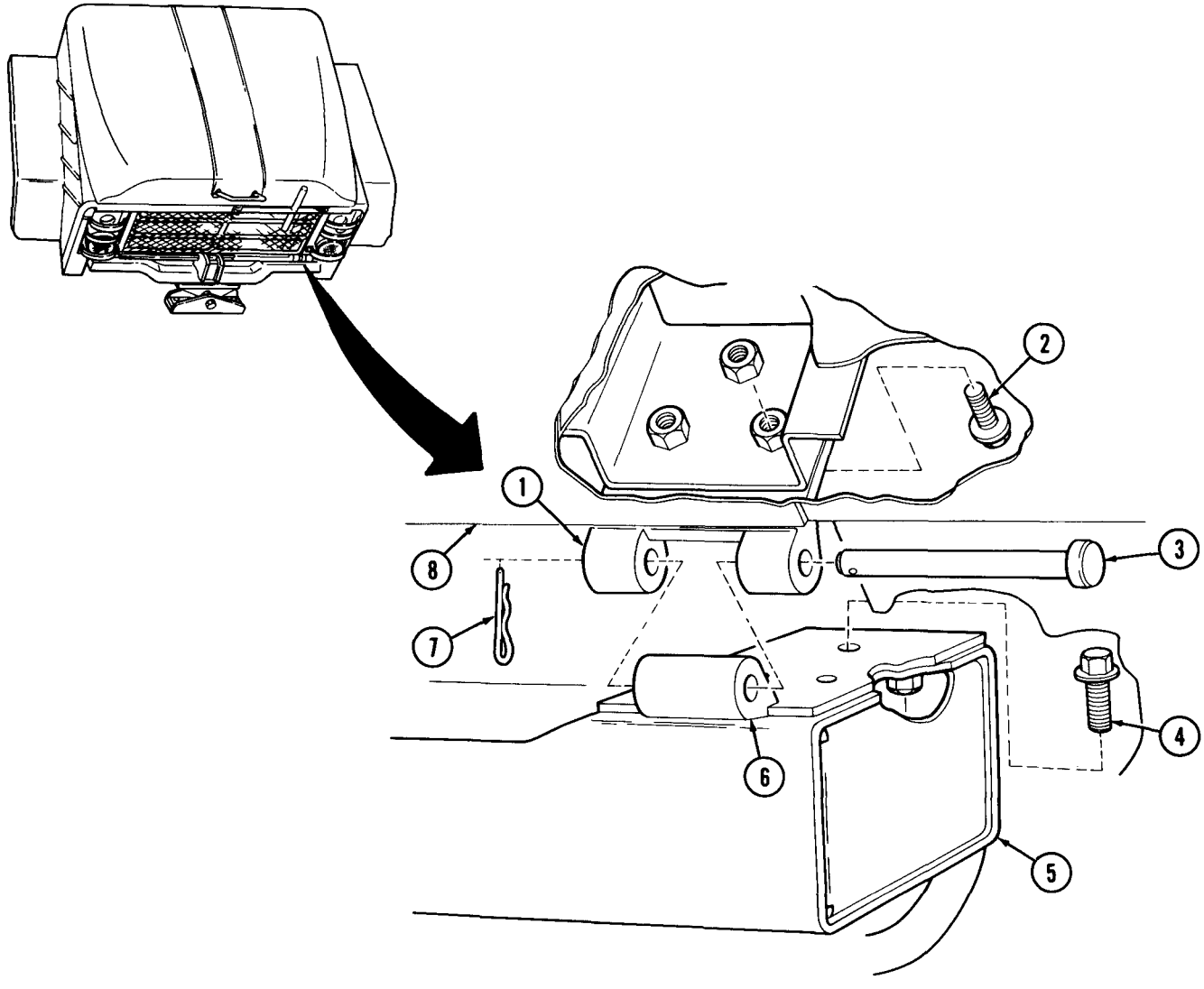
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Both hood hinges are removed in the same way. This procedure covers replacement of left hinge only.		
	a. Removal			
1.	Hinge pin (3)	Cotter pin (7)	Remove.	Discard cotter pin (7).
		NOTE Make sure hood and crossmember are supported when hinge pins are removed.		
2.	Hood (8) to crossmember (5)	Hinge pin (3)	Tap out of upper hinge half (1) and lower hinge half (6).	
3.	Hood (8)	Three screw-assembled lockwashers (2) and upper hinge half (1)	Remove.	
4.	Crossmember (5)	Three screw-assembled lockwashers (4) and lower hinge half (6)	Remove.	
	b. Installation			
5.		Lower hinge half (6)	Install on crossmember (5) with three screw-assembled lockwashers (4).	

13-4. HOOD HINGES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Upper hinge half (1)	Install on hood (8) with three screw-assembled lockwashers (2).	
7.		Hood (8)	Position on cross-member (5) with hinge halves (1) and (6) alined and install with hinge pin (3) and new cotter pin (7).	



END OF TASK!

13-5. TORSION BARS AND CROSSMEMBER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Hood assembly removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two cotter pins
Four locknuts
GAA grease (Appendix C, Item 11)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

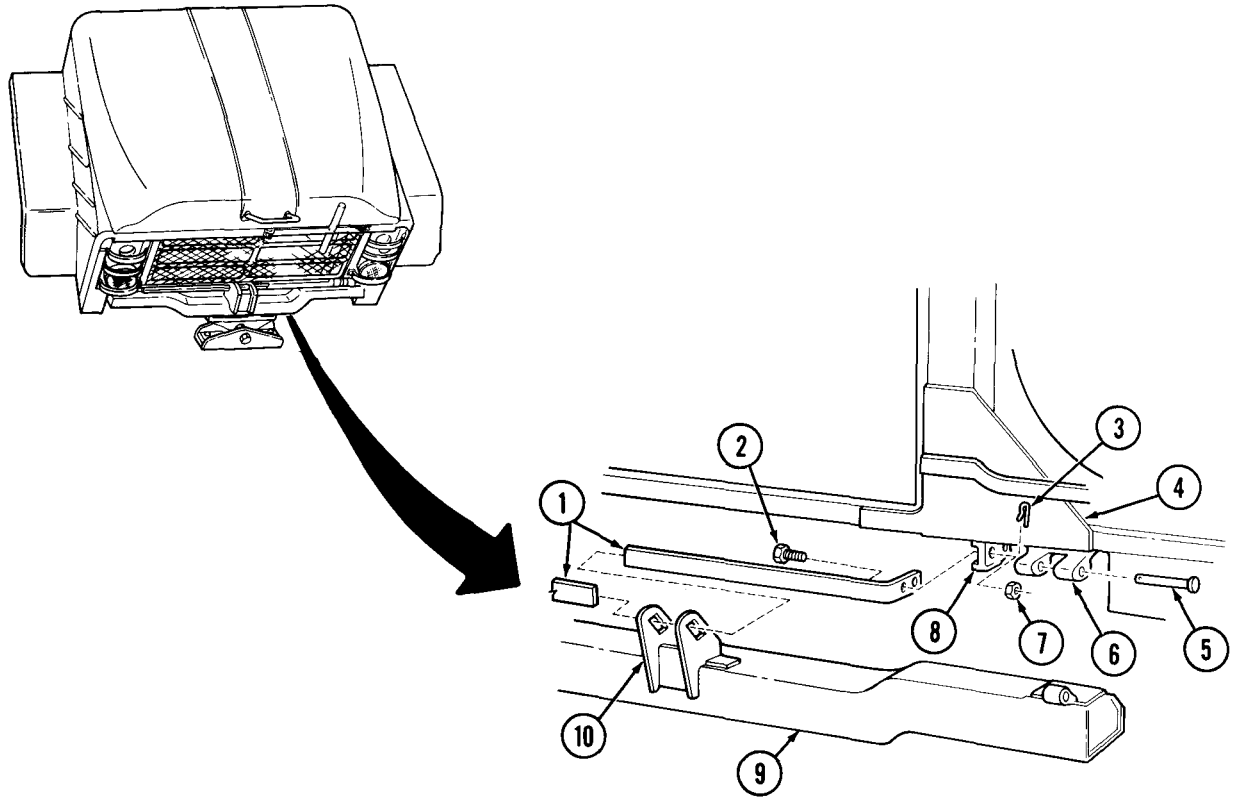
Manual References

TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Two hinge pins (5)	Two cotter pins (3)	Remove.	Discard cotter pins (3).
2.	Two torsion bars (1) to mounting brackets (8) and (10)	Two screws (2) and locknuts (7)	Remove from each torsion bar (1).	Brackets (8) and (10) are welded in place. Discard locknuts (7).
3.	Hood (4)	Two hinge pins (5), and bracket (9)	Remove.	
4.	Mounting brackets (8) and (10)	Two torsion bars (1)	Remove.	
	b. Installation			
5.		Two torsion bars (1)	a. Position in mounting brackets (8) and (10). b. Install on mounting brackets (8) with two screws (2) and new locknuts (7).	

13-5. TORSION BARS AND CROSSMEMBER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Bracket (9)	a. Position to hood (4) and aline hinges (6).	Coat hinges with GAA grease.
			b. Install with two hinge pins (5) and new cotter pins (3).	Coat pins with GAA grease.



END OF TASK!

FOLLOW-ON TASK: Install hood assembly (TM 9-2320-272-20-2).

TA 350369

13-6. FRONT FENDERS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 TM 9-2320-272-20-1	Parking brake set. Front light assembly removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

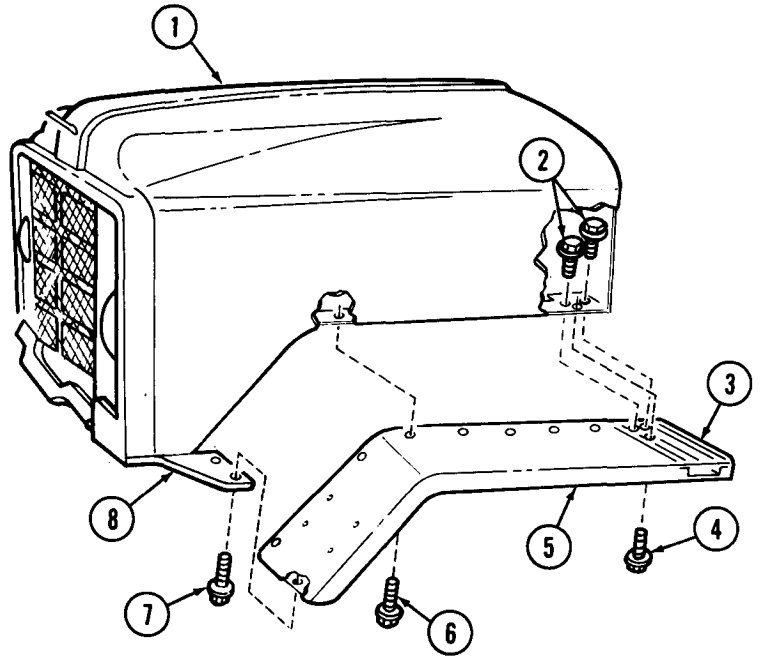
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Fender reinforcement (3) to hood (1)	Two screw-assembled washers (2)	Remove.	Remove from hood (1) side.
2.		Screw-assembled washer (4)	Remove.	Remove through hole in fender reinforcement (3).
3.	Fender (5) to brush guard (8)	Two screw-assembled washers (7)	Remove.	
4.	Hood (1)	Eight screw-assembled washers (6), and fender (5)	Remove.	
		b. Installation		
5.		Fender (5)	a. Place on brush guard (8) and hood (1). b. Install with thirteen screw-assembled washers (2), (4), (6), and (7).	

13-6. FRONT FENDERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install front light assembly (TM 9-2320-272-20-1).

13-7. RADIATOR BRUSH GUARD MAINTENANCE

This task covers

a. Removal
b. Inspection and Repair
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Hood assembly removed.
	TM 9-2320-272-20-1	Blackout drive lamp beam units removed.
	TM 9-2320-272-20-1	Service headlamp assemblies removed.
	Para. 13-5	Torsion bars and crossmember removed.
	TM 9-2320-272-20-2	Radiator baffles, seals, and plates removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W

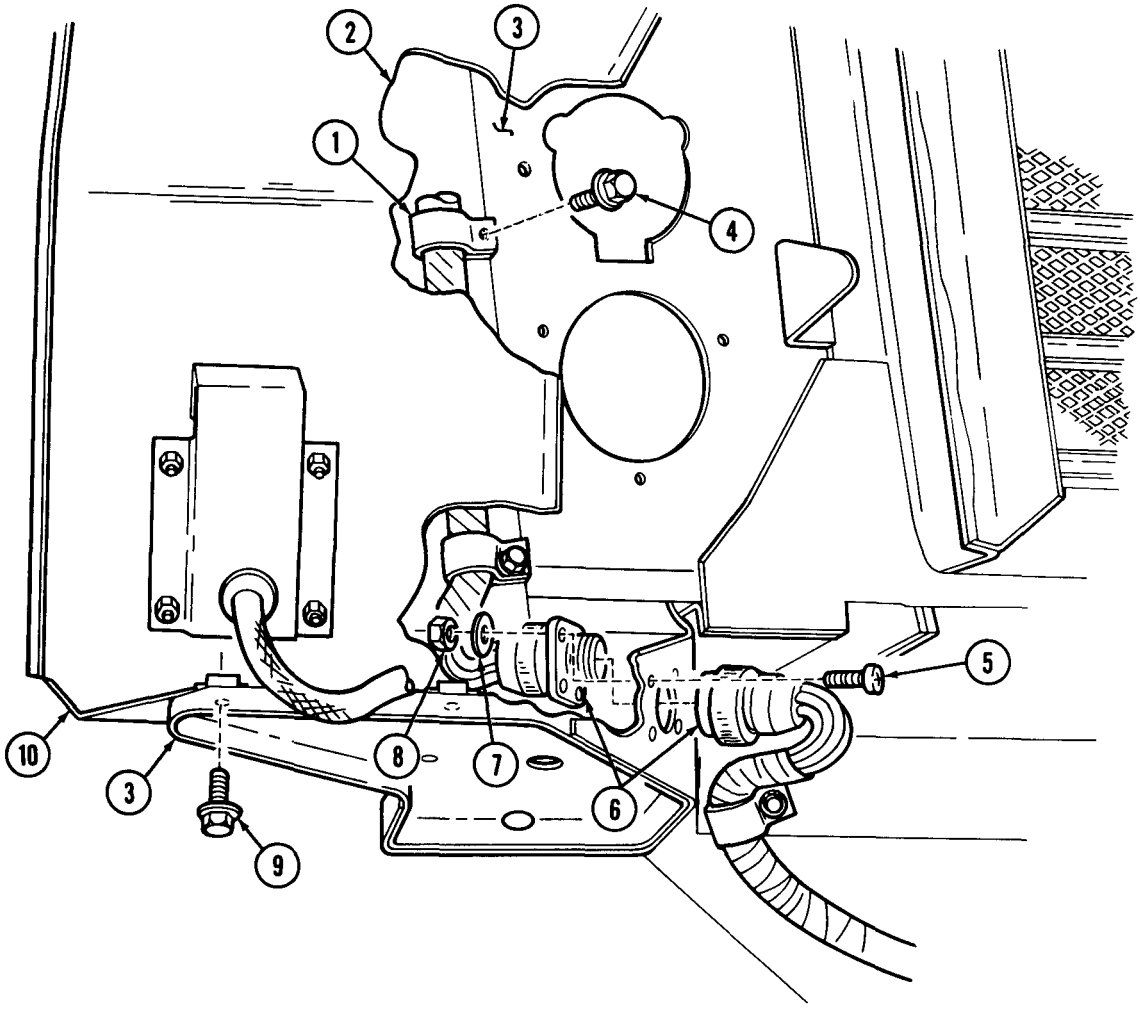
General Safety Instructions
None

Manual References
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P
TM 9-237

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Left fender (10) to brush guard (3)	Three screw-assembled washers (9)	Remove.	
2.	Wiring harness quick disconnect (6) to brush guard (3)	Four screws (5), washers (7), and locknuts (8)	Remove.	Discard locknuts (8).
		NOTE Wiring harness clamps are installed with the same screw-assembled washers as used in installing brush guard. When performing steps 3 and 7, note location of clamps for installation.		
3.	Hood (2) to brush guard (3)	Twelve screw-assembled washers (4) and harness clamps (1)	Remove.	Six removed from right engine side of hood (2) and six from left.

13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

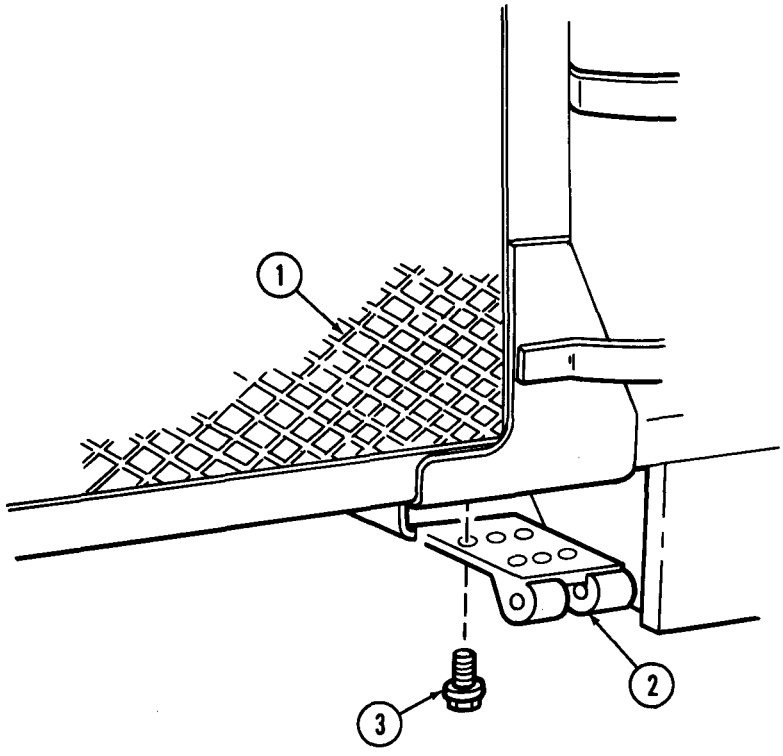
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350371

13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

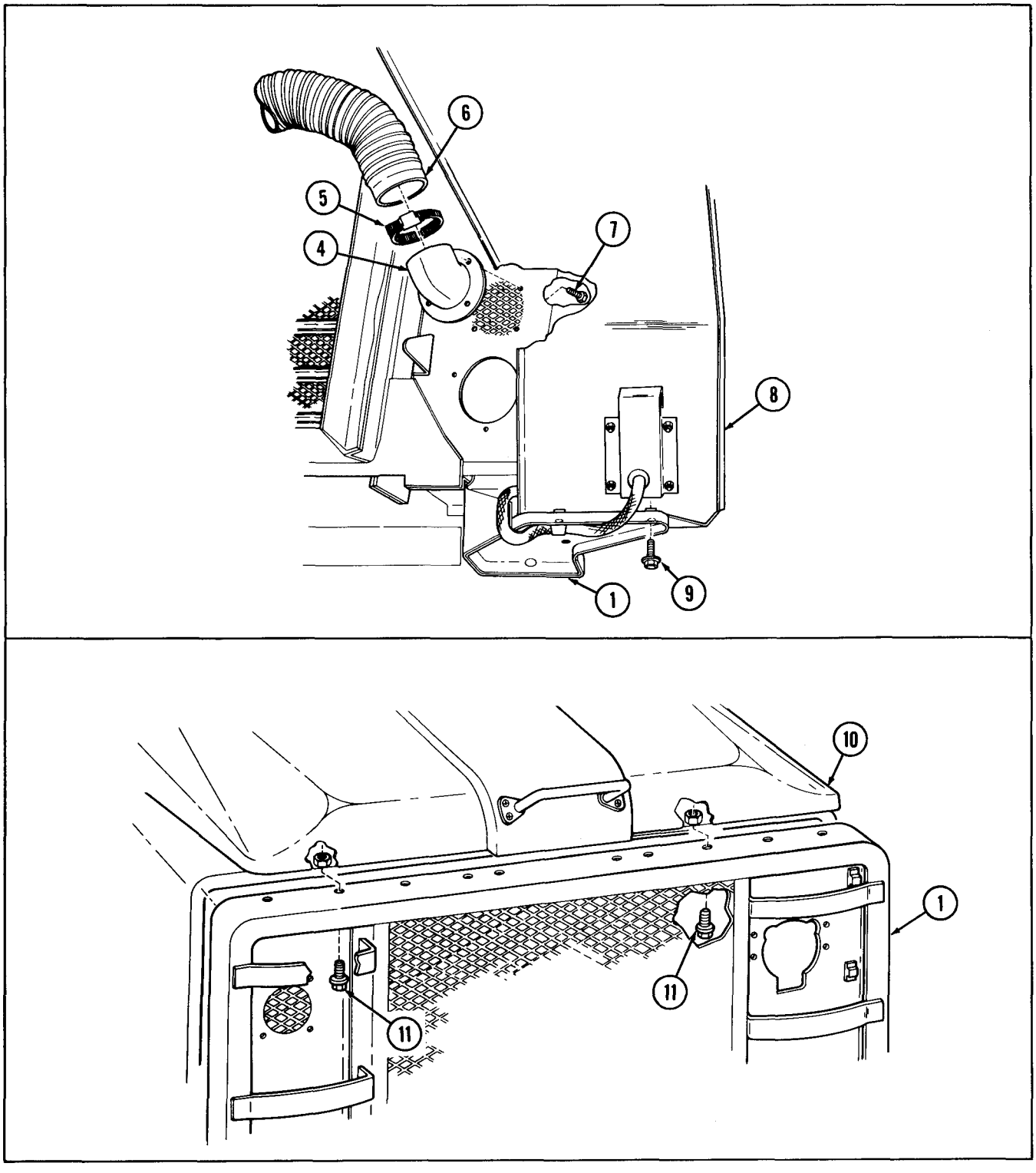
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Two upper hinge halves (2) to brush guard (1)	Six screw-assembled washers (3)	Remove three from each hinge half (2).	
5.	Right fender (8) to brush guard (1)	Three screw-assembled washers (9)	Remove.	
6.	Brush guard (1)	Four self-tapping screws (7), air duct clamp (5), air duct (6), and air inlet elbow (4)	Remove.	
7.	Brush guard (1) to hood (10)	Ten screw-assembled washers (11), and brush guard (1)	Remove.	Screws (11) are removed from top of brush guard (1). Six from engine side and four from outside of brush guard (1).
b. Inspection and Repair				
8.		Brush guard (1)	Inspect for cracks and breaks.	If cracked or broken, refer to TM 9-237 for repair instructions.



TA 350372

13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

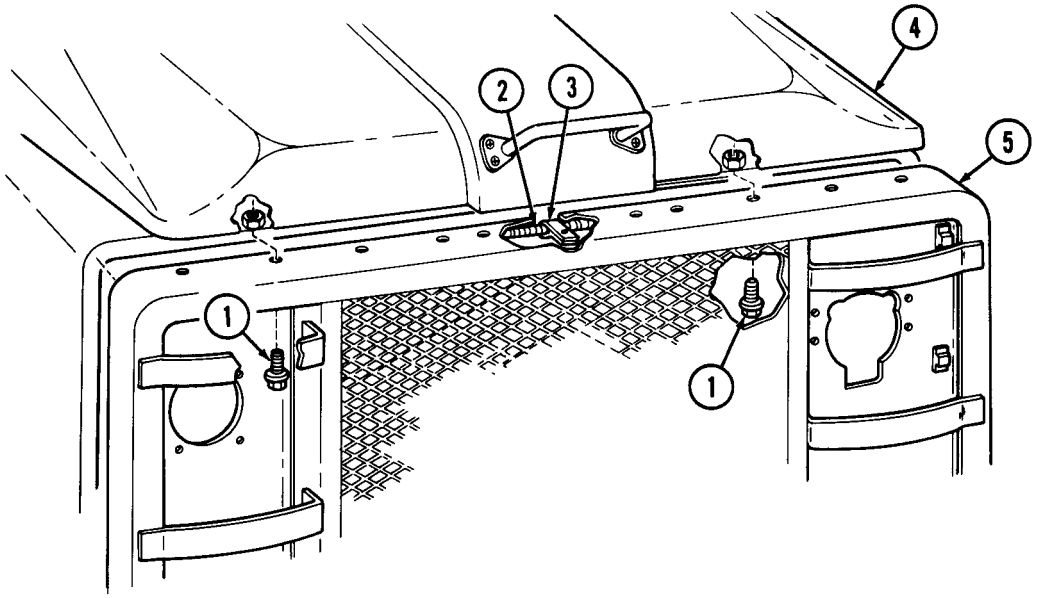
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350373

13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
9.		Brush guard (5) and wiring harness (2)	a. Position to hood (4) and aline harness clamps (3).	Clamps (3) are positioned as noted when removed.
			b. Install on hood (4) with ten screw-assembled washers (1).	Screws (1) are installed from top of brush guard (5). Six screws on engine side and four screws on the outside of brush guard (5).
10.		Fresh air inlet elbow (8)	Install on brush guard (5) with four self-tapping screws (9).	
11.		Air duct (7)	Install on inlet elbow (8) with duct clamp (6).	
12.		Three screw-assembled washers (11)	Install in right fender (10).	



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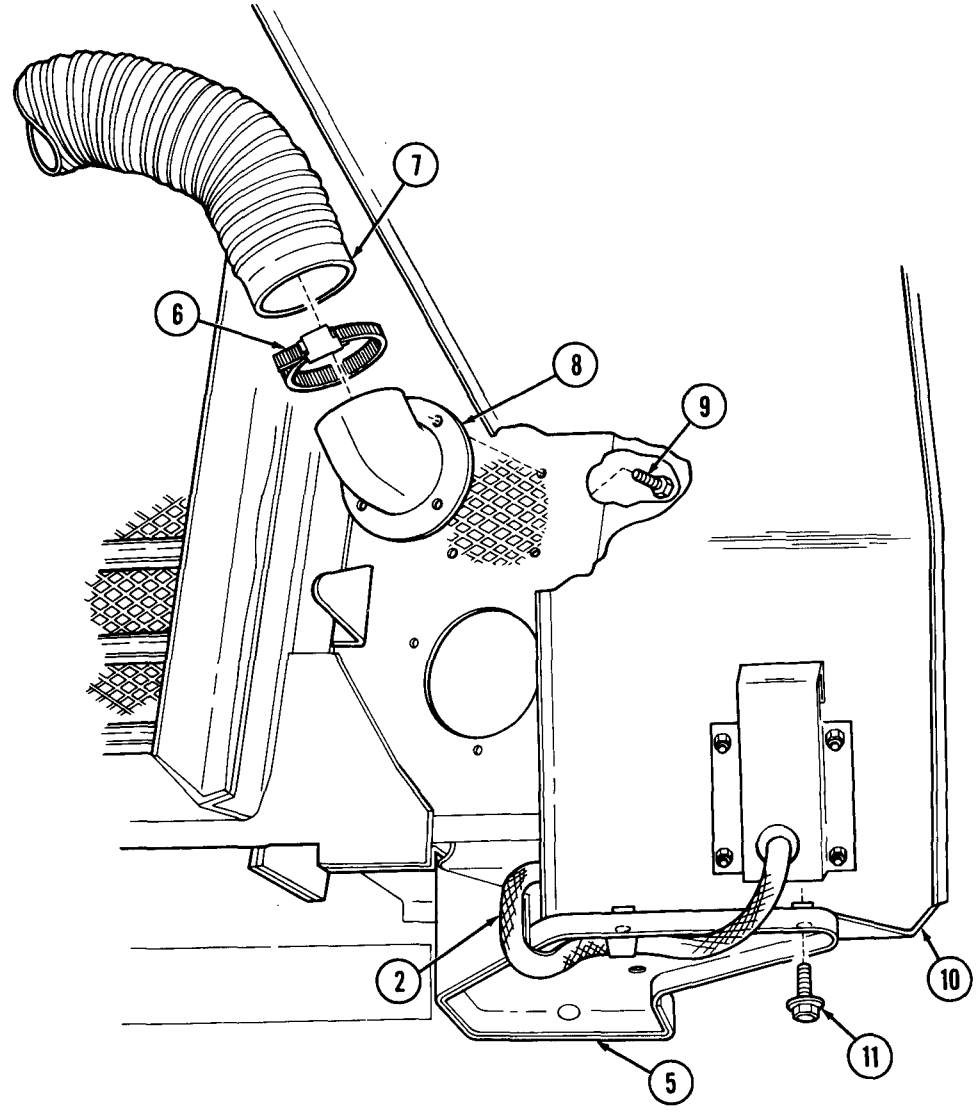
13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

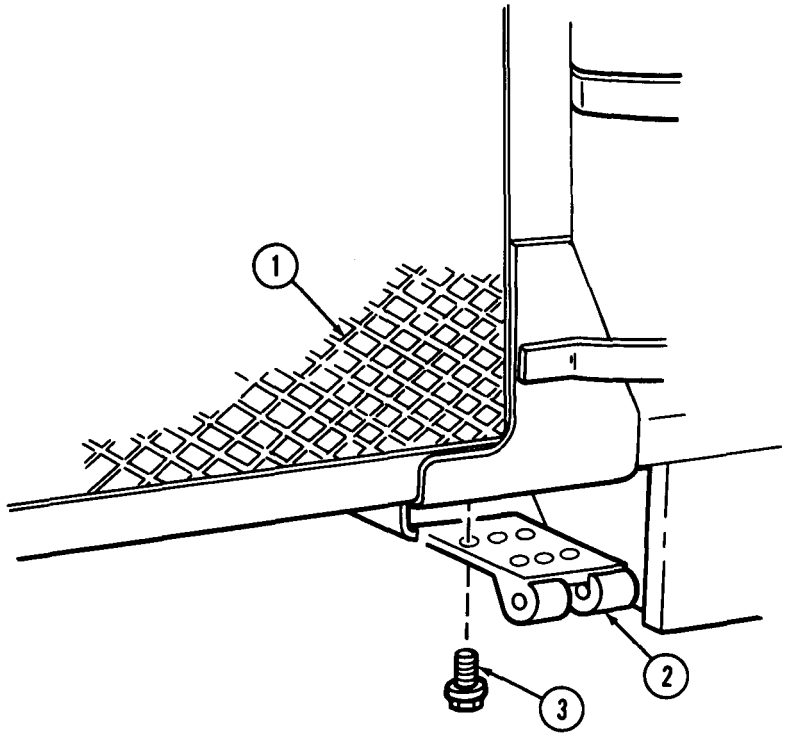
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350375

13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
13.		Two upper hinge halves (2)	Install on brush guard (1) with six screw-assembled washers (3).	Three screws (3) in each hinge half (2).
14.		Hood (13) and wiring harness (11)	Aline harness clamps (12) on hood (13) and install on left and right sides of brush guard (1) with twelve screw-assembled washers (4).	Six screws (4) on each side are installed from engine side of hood (13).
15.		Wiring harness quick disconnect (6)	Install on brush guard (1) with four screws (5), washers (7), and new locknuts (8).	
16.		Three screw-assembled washers (9)	Install in left fender (10).	



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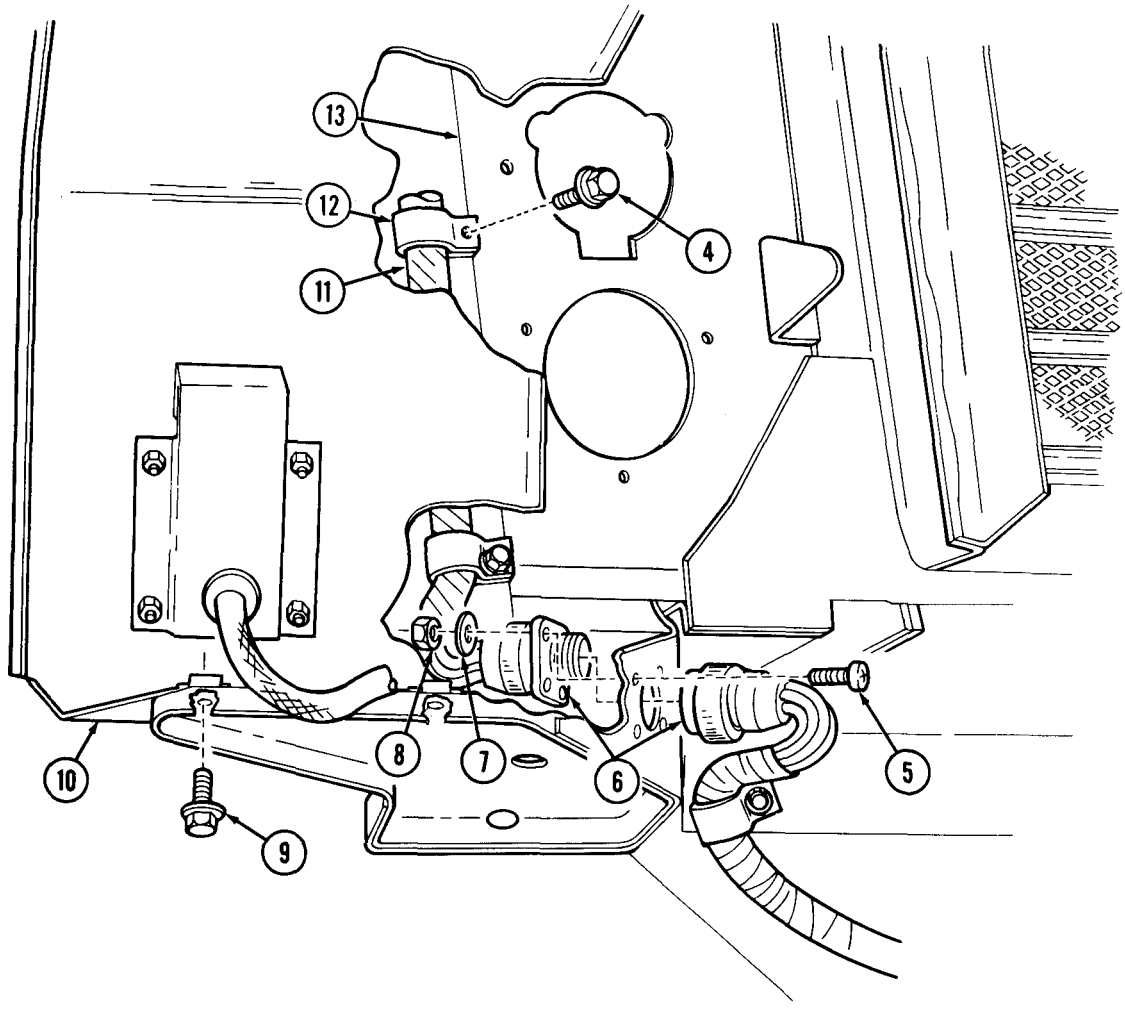
13-7. RADIATOR BRUSH GUARD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install radiator baffles, seals, and plates (TM 9-2320-272-20-2).
- Install torsion bars and crossmember (para. 13-5).
- Install headlight units (TM 9-2320-272-20-1).
- Install blackout lights (TM 9-2320-272-20-1).
- Install hood assembly (TM 9-2320-272-20-2).

TA 350377

CHAPTER 14
CAB MAINTENANCE

Section I. DESCRIPTION AND DATA

14-1. DESCRIPTION – VEHICLE CAB

The M939 series vehicle has a 3-member crew cab with canvas top. A hardtop kit is available for cold weather operation. Hardtop kit information is found in TM 9-2320-272-20-2.

Section II. CAB AND CAB COMPONENTS MAINTENANCE

14-2. CAB AND CAB COMPONENTS MAINTENANCE TASK SUMMARY

14-3. CAB DOOR GLASS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-2

Condition Description
Parking brake set.
Cab door glass assembly removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Regulator channel filler
Regulator channel seal
Frame filler/frame seal

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Eyeshields required when installing and removing cab door glass.

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Use eyeshields when removing and installing door glass. Glass could shatter causing injury to personnel.

a. Removal

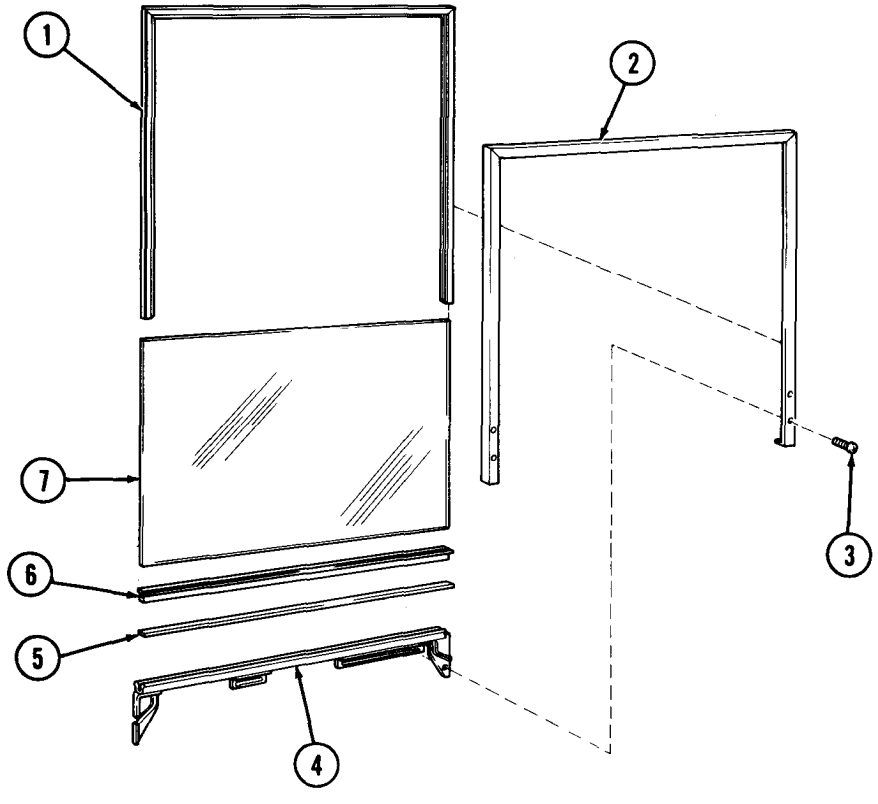
1.	Regulator channel (4) to frame (2)	Four screws (3)	Remove.	
2.		Regulator channel (4), regulator channel filler (5), and regulator channel seal (6)	Remove from frame (2).	Discard filler (5) and seal (6).
3.		Glass (7)	Slide out of frame (2).	
4.		Frame seal (1)	Remove from frame (2).	Discard seal (1).

b. Installation

5.		New frame seal (1)	Place on top and both sides of glass (7).	
6.		Glass (7)	Place in frame (2).	

14-3. CAB DOOR GLASS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.		New regulator channel seal (6)	Place on bottom of glass (7).	
8.		New regulator channel filler (5)	Place in regulator channel (4).	
9.		Regulator channel (4)	Position on glass (7) and install on frame (2) with four screws (3).	



END OF TASK!

FOLLOW-ON TASK: Install cab door glass assembly (TM 9-2320-272-20-2).

14-4. CAB WINDSHIELD GLASS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 TM 9-2320-272-20-2	Parking brake set. Windshield removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Frame filler strip
Crosspiece filler strip
Eight lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Eyeshields required when installing and removing windshield glass.

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

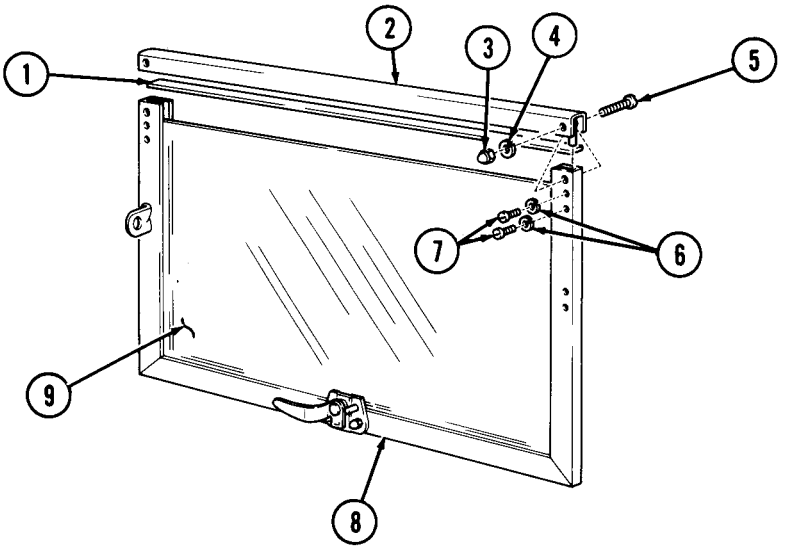
Use eyeshields when removing and installing windshield. Glass could shatter causing injury to personnel.

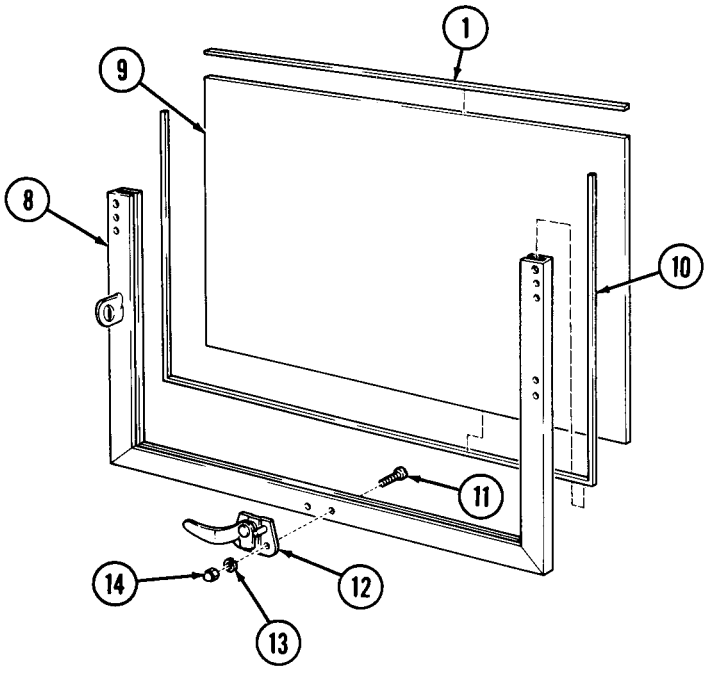
a. Removal

1.	Crosspiece (2) to windshield frame (8)	Two screws (5), lockwashers (4) and capnuts (3)	Remove.	Discard lockwashers (4).
2.	Windshield frame (8)	Crosspiece (2)	Remove.	
3.	Crosspiece (2)	Filler crosspiece strip (1)	Remove.	Discard filler strip (1).
4.	Windshield frame (8)	Four screws (7) and lockwashers (6)	Remove.	Discard lockwashers (6).
5.		Two screws (11), lockwashers (13), and capnuts (14), and locking latch (12)	Remove.	Discard lockwashers (13).
6.	Windshield frame (8)	Windshield glass (9) and frame filler strip (10)	Remove.	Discard filler strip (10).

14-4. CAB WINDSHIELD GLASS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





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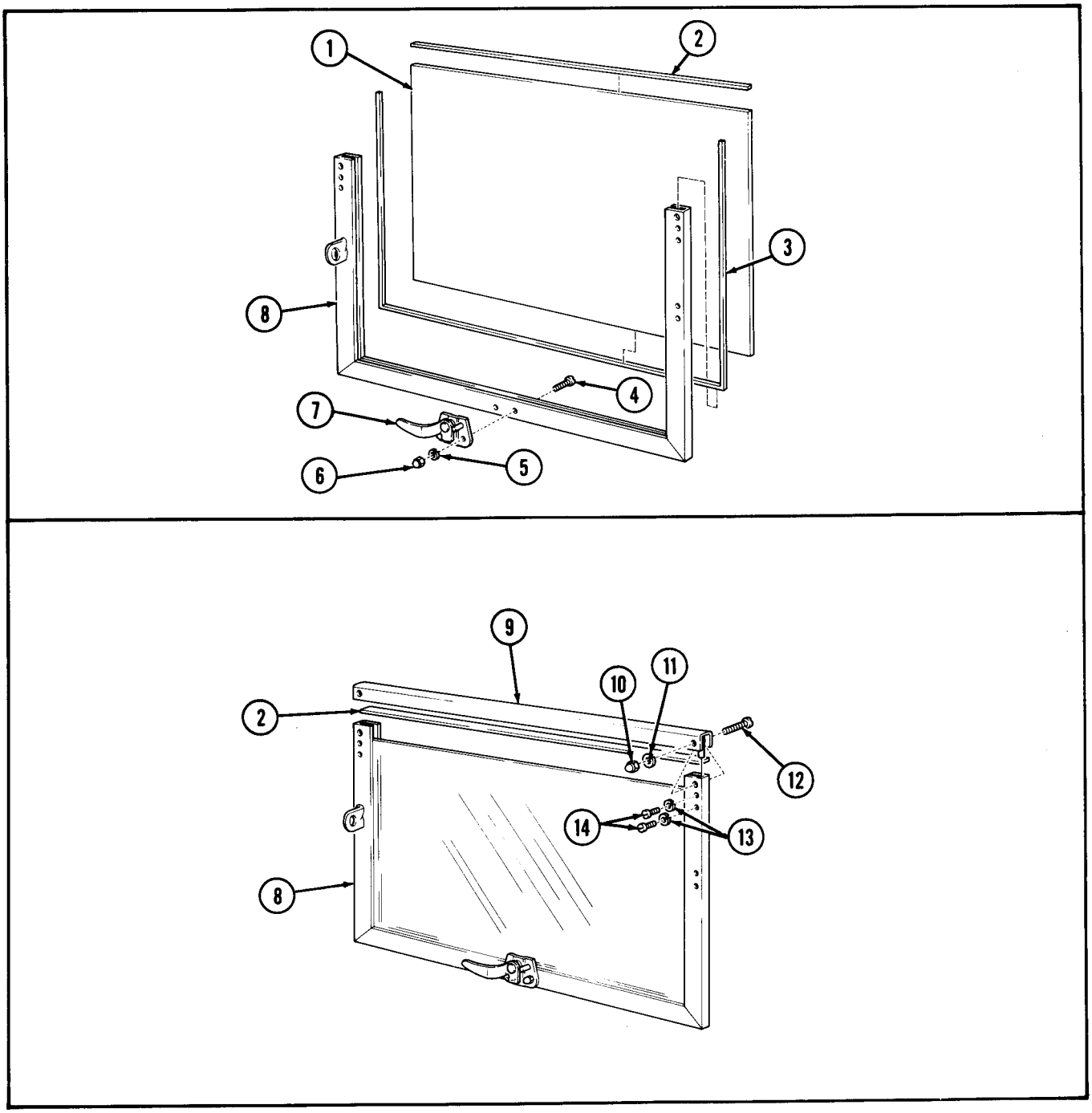
14-4. CAB WINDSHIELD GLASS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
7.		New frame filler strip (3)	Position around new windshield glass (1).	
8.		Windshield glass (1)	Place in windshield frame (8) and tap gently into position.	
9.		New crosspiece filler strip (2)	Position over windshield glass (1).	
10.		Crosspiece (9)	Place on windshield glass (1) and gently tap until screw holes are alined with windshield frame (8).	
		CAUTION		
		Do not overtighten crosspiece or windshield frame screws. Glass could be damaged.		
11.		Crosspiece (9) and windshield frame (8)	Install with two screws (12), new lockwashers (11), and capnuts (10).	
12.		Windshield frame (8) and glass (1)	Install with four screws (14) and new lockwashers (13).	
13.		Locking latch (7)	Position on windshield frame (8) and install with two screws (4), new lockwashers (5) and capnuts (6).	
14.		Crosspiece filler strip (2) and frame tiller strip (3)	Trim even with windshield frame (8) and crosspiece (9) edges.	

14-4. CAB WINDSHIELD GLASS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install windshield (TM 9-2320-272-20-2).

14-5. RETRACTABLE WINDOW GLASS AND VAN DOOR WINDOW GLASS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M934, M935	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-20-2	Retractable window removed.
	TM 9-2320-272-20-2	Van rear door and side door window removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

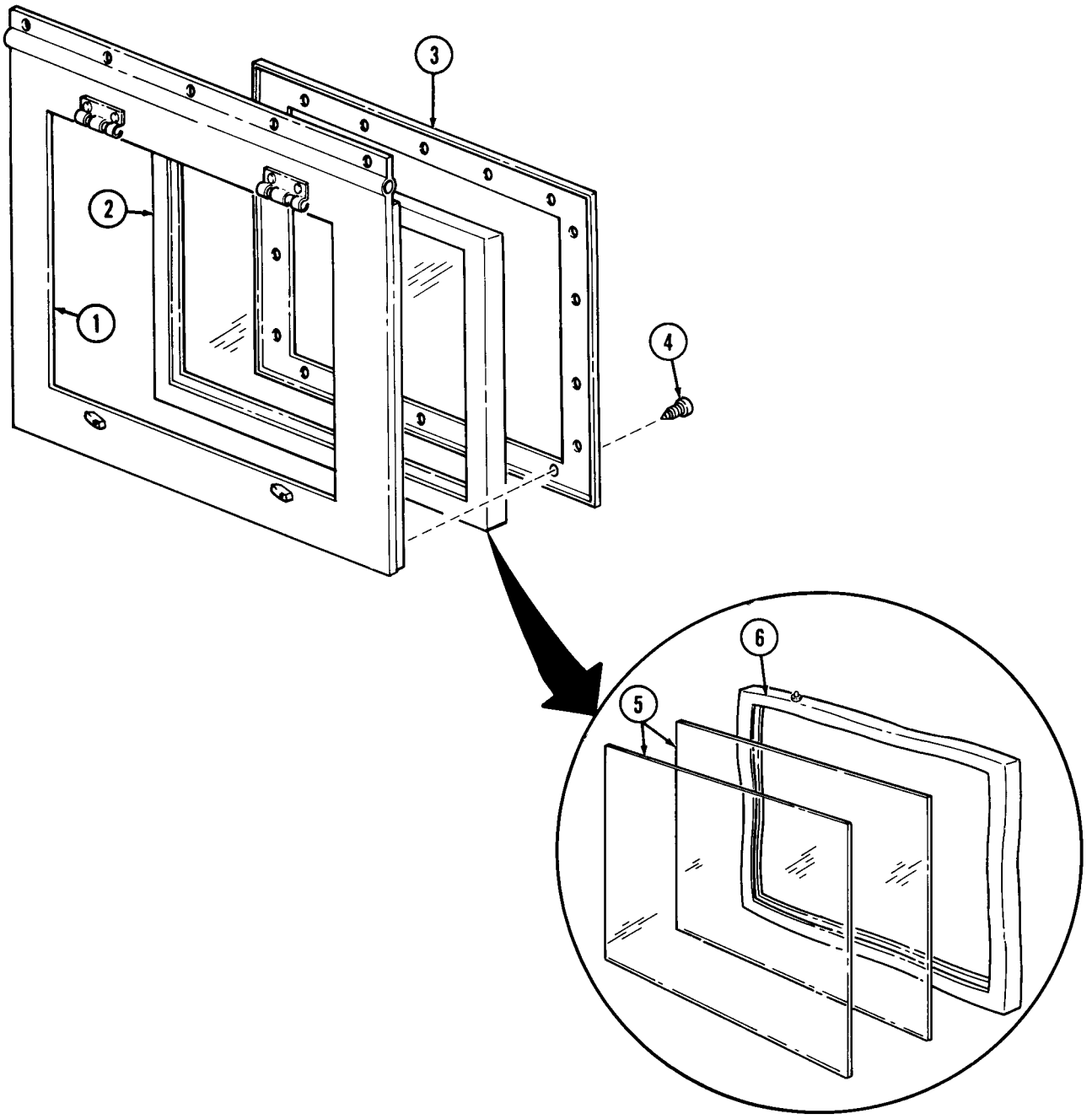
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Window frame (1)	Eighteen screws (4) and glass retainer (3)	Remove.	
2.		Glass unit (2)	Press out of window frame (1).	
3.	Two glass panes (5)	Glass seal (6)	Remove.	
		b. Installation		
4.		Glass seal (6)	Install on two glass panes (5).	
5.		Glass unit (2)	Press into window frame (1).	Plastic vent is placed at top of frame (1).
6.		Glass retainer (3)	Install with eighteen screws (4).	Bracket is placed at bottom of frame (1).

14-5. RETRACTABLE WINDOW GLASS AND VAN DOOR WINDOW GLASS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install retractable window (TM 9-2320-272-20-2).
• Install van rear door and side door window (TM 9-2320-272-20-2).

TA 350381

14-6. ENGINE ACCESS COVER (IN CAB) REPLACEMENT

This task covers

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 Para. 14-8	Parking brake set. Transmission control console and winch control tower removed.
	TM 9-2320-272-20-1	Instrument cluster removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Adhesive (Appendix C, Item 1)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

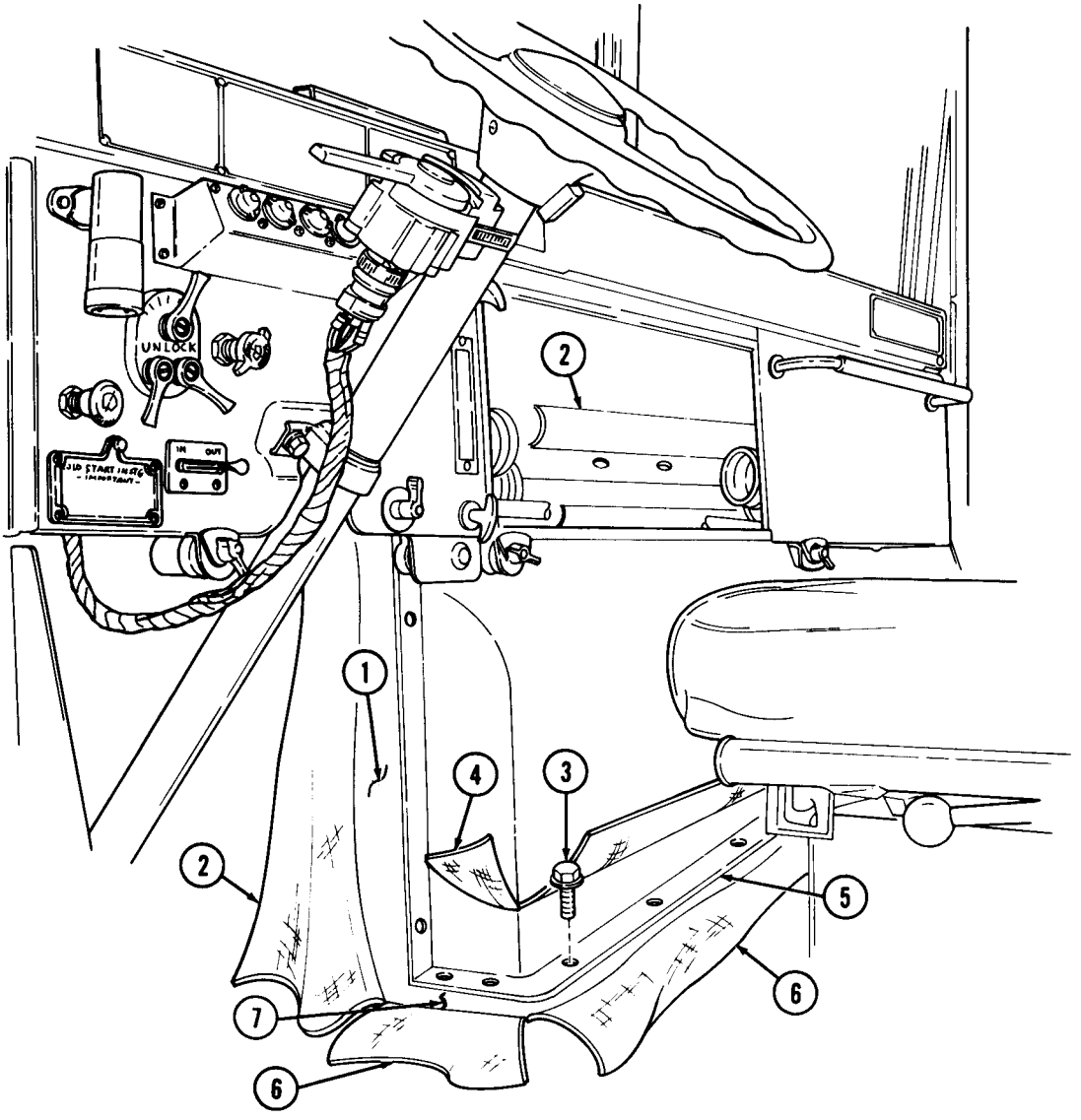
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Access cover (5) to firewall (1) and cab floor (7)	Cab floor insulation (6), firewall insulation (2), and access cover insulation (4)	Pull back until screw-assembled washers (3) are exposed.	
2.		Sixteen screw-assembled washers (3)	Remove.	
3.		Access cover (5)	Remove.	
		b. Installation		
4.		Access cover (5)	Install with sixteen screw-assembled washers (3).	
5.		Cab floor insulation (6), access cover insulation (4), and firewall insulation (2)	Apply adhesive to back side before installation.	
6.		Cab floor insulation (6)	Push back in place to cab floor (7).	
7.		Access cover insulation (4)	Push back in place to access cover (5).	

14-6. ENGINE ACCESS COVER (IN CAB) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.		Firewall insulation (2)	Push back in place to firewall (1).	



END OF TASK!

FOLLOW-ON TASKS: • Install transmission control console and winch control tower (para. 14-8).
• Install instrument cluster (TM 9-2320-272-20-1).

TA 350382

14-7. WINCH CONTROL LEVER AND POWER TAKEOFF CONTROL LEVER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M925, M926, M928, M930, M932, M936	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins

Personnel Required
Wheeled vehicle repairman MOS 63W

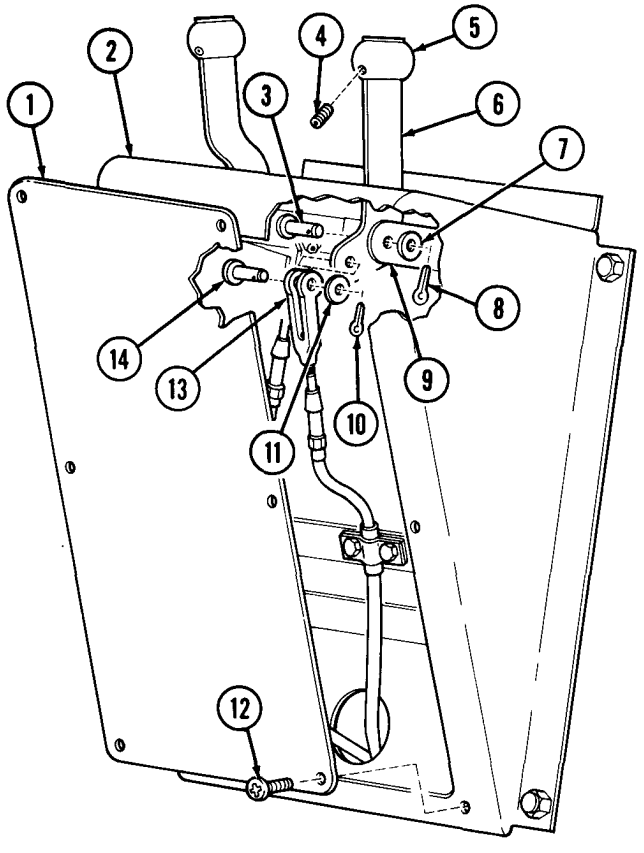
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Control tower (2)	Six screws (12) and front access cover (1)	Remove.	
2.	Control lever (6)	Cotter pin (10) washer (11), clevis pin (14), and cable clevis (13)	Remove.	Discard cotter pin (10).
		NOTE Power takeoff lever pin has two washers. The winch lever has only one washer.		
3.	Control tower (2)	Cotter pin (8), washer (7), lever pin (3) and control lever (6)	Remove.	Discard cotter pin (8).
4.	Control lever (6)	Two setscrews (4) and knob (5)	Remove.	
		b. Installation		
5.		Knob (5)	Install on control lever (6) with two setscrews (4).	

14-7. WINCH CONTROL LEVER AND POWER TAKEOFF CONTROL LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Control lever (6)	Position to lever bracket (9) and install with lever pin (3), washer (7), and new cotter pin (8).	
7.		Cable clevis (13)	Connect to control lever (6) and install with clevis pin (14), washer (11), and new cotter pin (10).	
8.		Front access cover (1)	Install on control tower (2) with six screws (12).	



END OF TASK!

FOLLOW-ON TASKS:
- Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range.
- Check winch control lever and power takeoff control lever for proper operation (TM 9-2320-272-10).

TA 350383

14-8. TRANSMISSION CONTROL CONSOLE AND WINCH CONTROL TOWER MAINTENANCE

This task covers

a. Removal
b. Inspection and Repair
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 Para. 7-3	Parking brake set. Transmission selector lever assembly removed.
	Para. 14-7	Winch and power takeoff (PTO) control levers removed (M925, M926, M928, M930, M932, and M936 only).

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
TM 9-237

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

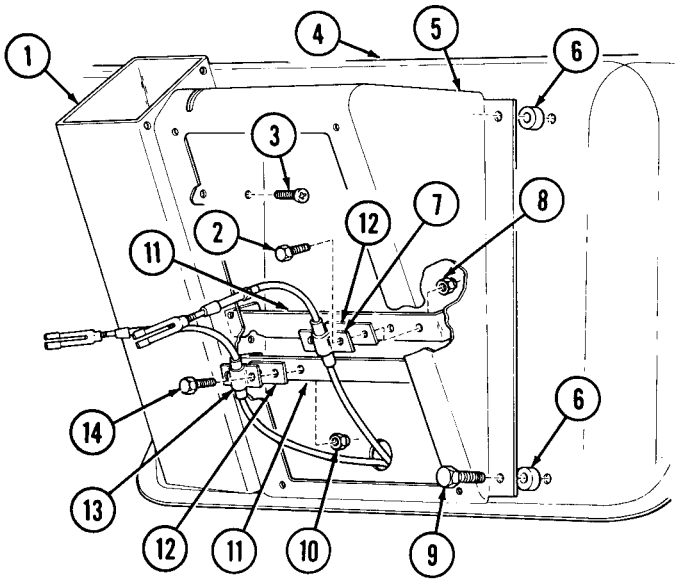
Steps 1 through 4 apply only to models equipped with a winch.

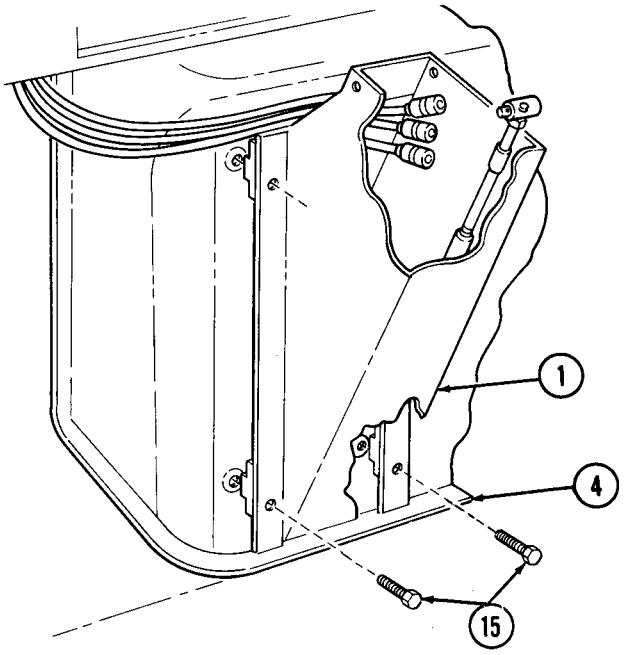
a. Removal

1.	Control cable brackets (11)	Two screws (2), two screws (14), two shims (12), two locknuts (8), two locknuts (10), and cable clamps (7) and (13)	Remove.	Discard locknuts (8) and (10).
2.	Control tower (5) to control console (1)	Three screws (3)	Remove.	
3.	Cover assembly (4)	Two screws (9), spacers (6), and control tower (5)	Remove.	
4.		Two screws (15) and control console (1)	Remove.	

14-8. TRANSMISSION CONTROL CONSOLE AND WINCH CONTROL TOWER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Step 5 applies to models not equipped with control tower.		
5.		Four screws (15) and control console (1)	Remove.	





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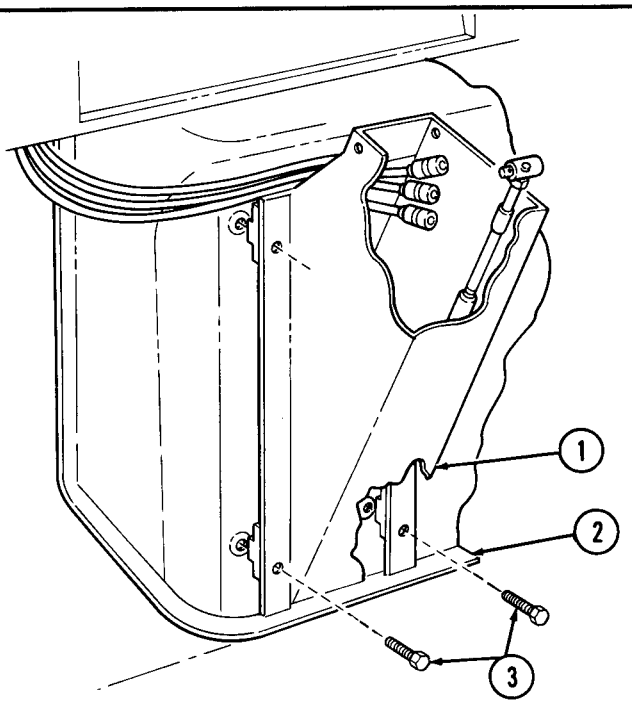
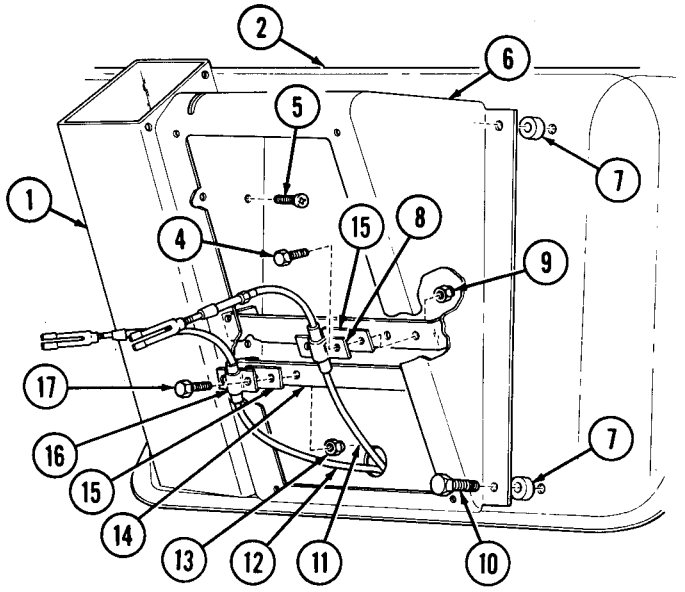
14-8. TRANSMISSION CONTROL CONSOLE AND WINCH CONTROL TOWER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Inspection and Repair				
6.		Control console (1) and control tower (6)	Refer to TM 9-237 for repair.	
c. Installation				
7.		Control console (1)	a. Install left side on cover assembly (2) with two screws (3).	
		NOTE Steps 7b and 7c apply to models not equipped with control tower. Steps 8 and 9 apply to models equipped with control tower.		
			b. Install right side on cover assembly (2) with two screws (3).	
			c. Proceed to follow-on tasks.	
8.		Control tower (6)	a. Install on cover assembly (2) with two spacers (7) and screws (10).	
			b. Install on control console (1) with three screws (5).	
9.		PTO control cable (12) and winch control cable (11)	Install on control cable brackets (14) with PTO cable clamp (16), winch cable clamp (8), two screws (4), two screws (17), two shims (15), two new locknuts (9), and two new locknuts (13).	

14-8. TRANSMISSION CONTROL CONSOLE AND WINCH CONTROL TOWER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





END OF TASK!

FOLLOW-ON TASKS:
- Install winch and power takeoff (PTO) levers (M925, M926, M928, M930, M932, and M936 only) (para. 14-7).
- Install transmission selector lever assembly (para. 7-3).

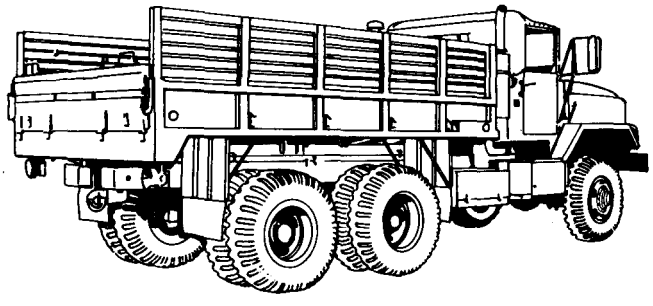
TA 350385

CHAPTER 15
CARGO BODY (M923, M924, M925, M926, M927, AND M928) MAINTENANCE

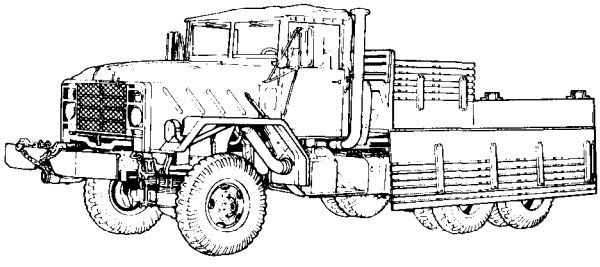
Section I. DESCRIPTION AND DATA

15-1. DESCRIPTION – CARGO BODIES

The M939 series vehicles include six cargo body models. The M924, M926, M927, and M928 models have welded fixed-sides bodies. The M923 and M925 models have bodies with removable dropsides. Additional data for each model can be found in table 15-1.

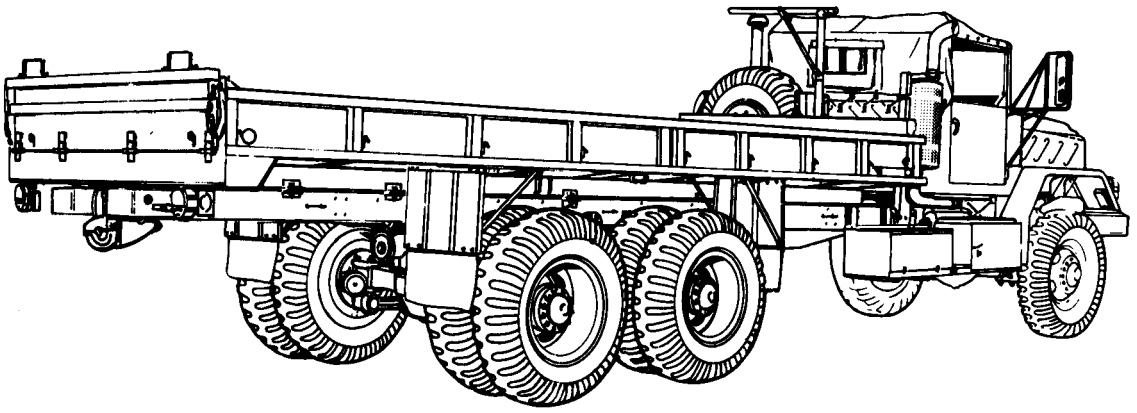


M924 AND M926
CARGO BODIES (FIXED-SIDE)



M923 AND M925
CARGO BODIES (DROPSIDE)

15-1. DESCRIPTION – CARGO BODIES (Cont'd)



M927 AND M928
CARGO BODIES (EXTRA-LONG WHEELBASE)

Table 15-1. Cargo Bodies Dimensions and Weights

1. M924 and M926 CARGO BODY	
Dimensions	168.25 x 96 in. (427.35 x 243.84 cm)
Weight	2050 lb (931 kg)
2. M923 and M925 CARGO BODY	
Dimensions	168.25 x 96 in. (427.35 x 243.84 cm)
Weight	2150 lb (976 kg)
3. M927 and M928 CARGO BODY	
Dimensions	244 x 96 in. (619.76 x 243.84 cm)
Weight	3000 lb (1362 kg)

TA 350387

Section II. CARGO BODY COMPONENTS MAINTENANCE

15-2. CARGO BODY MAINTENANCE TASK SUMMARY

15-3. CARGO BODY ASSEMBLY MAINTENANCE

This task covers

a. Removal
b. Cleaning
c. Inspection and Repair
d. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M923, M924, M925 M926, M927, M928	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Wheels chocked.
	TM 9-2320-272-10	Cargo compartment canvas cover, front and side racks removed.
	TM 9-2320-272-20-2	Cargo body cover bows removed.
	TM 9-2320-272-20-2	Wheel splash guards and brackets removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two 3/4-inch utility chains with hook ends
Eight locknuts
Wood (Appendix C, Item 33)

Personnel Required
Wheeled vehicle repairman MOS 63W (3)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-237
TM 9-247
TM 43-0139
TM 9-2320-272-34P

General Safety Instructions
- All personnel must stand clear during hoisting operations.
- Fire extinguisher will be kept nearby when drycleaning solvent is used.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Two front upper holddown brackets (1) to lower holddown brackets (2)	Four outer support springs (4), inner support springs (5), screws (3), washers (6), and locknuts (7)	Remove.	Discard locknuts (7).
		NOTE Extra-long wheelbase models (M927 and M928) utilize six intermediate holddown brackets, twelve screws, and twelve nuts.		
2.	Four intermediate upper holddown brackets (8) to lower holddown brackets (9)	Four screws (10) and locknuts (11)	Remove.	Discard locknuts (11).

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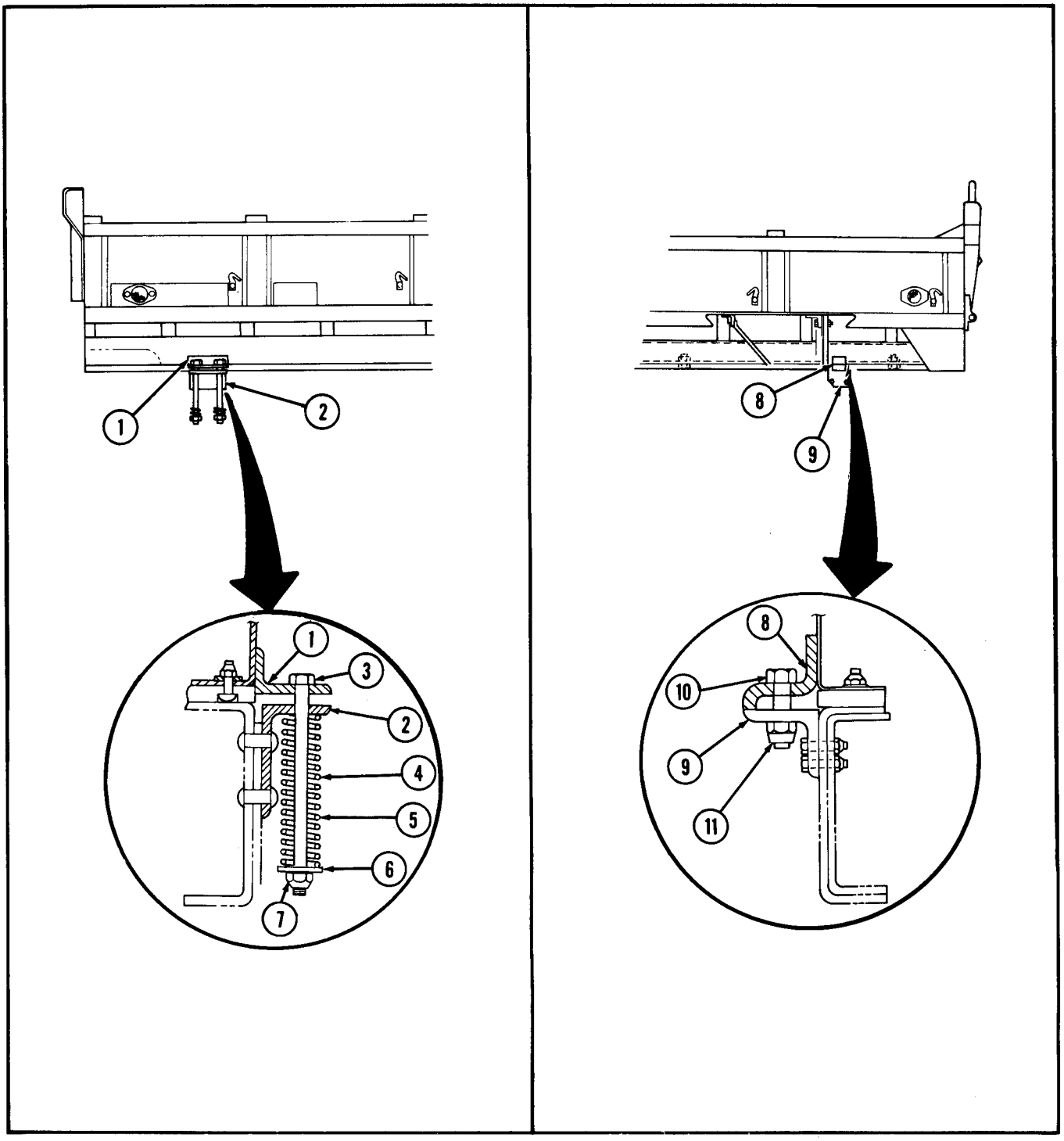
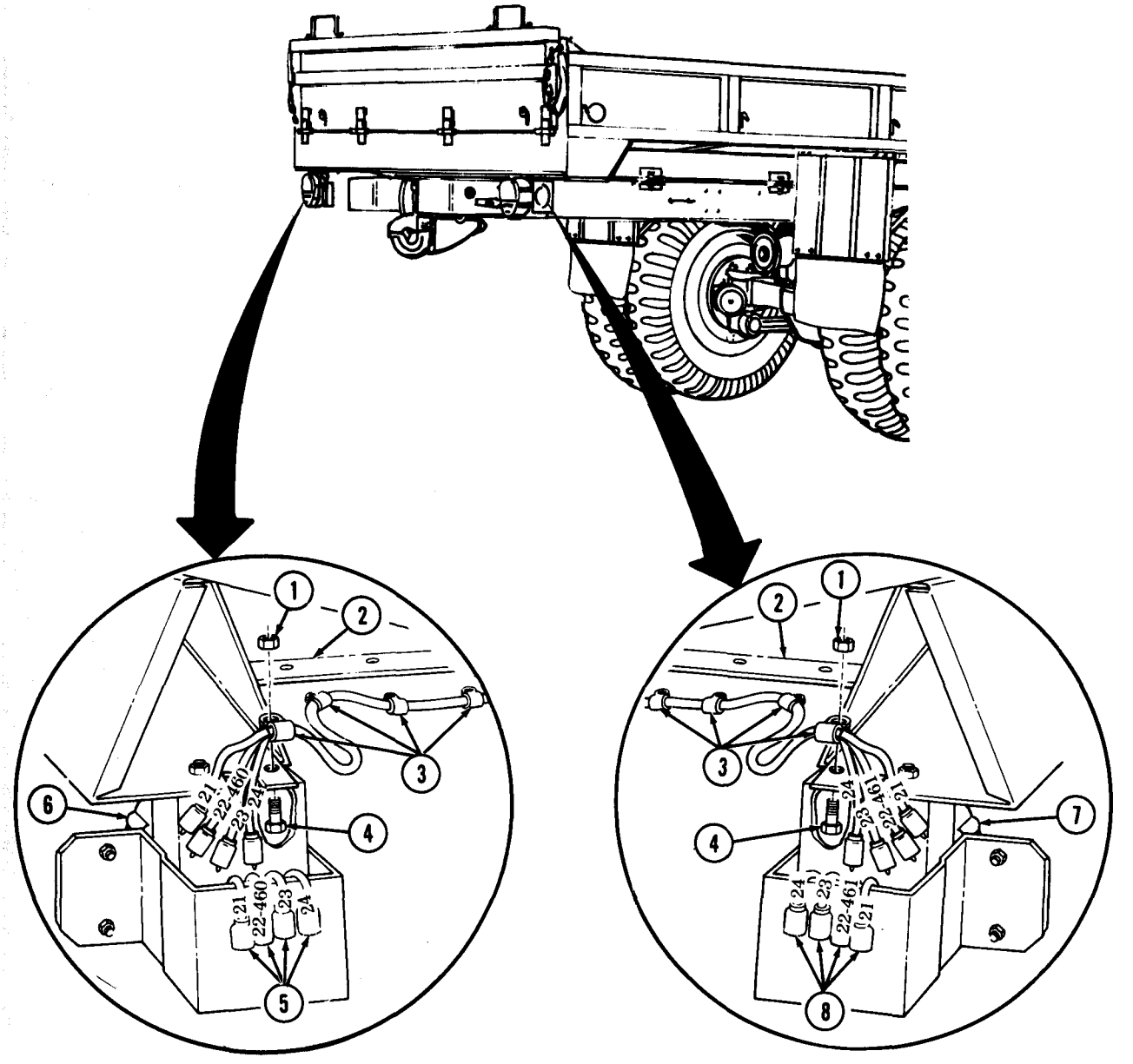
15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

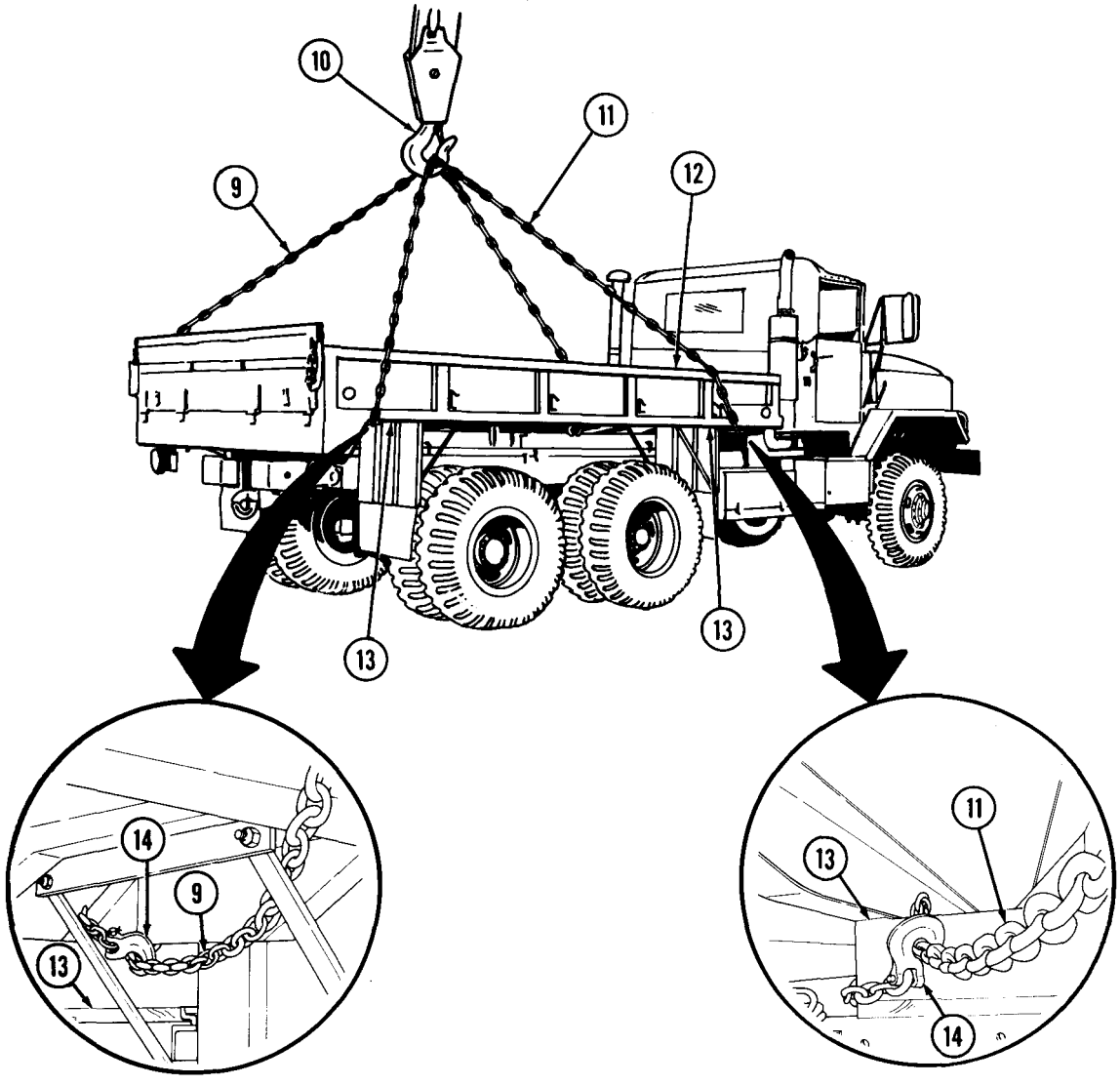
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Left rear composite light (6)	Four wires (5)	Disconnect.	Tag wires for installation.
4.	Right rear composite light (7)	Four wires (8)	Disconnect.	Tag wires for installation.
5.	Cargo body (2)	Eight nuts (1), screws (4), and wire-clamps (3)	Remove.	



TA 350391

15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Two utility chains (9) and (11)	Connect to cargo body (12) as follows: a. Wrap chains (9) and (11) around sub-frame beam (13) and fasten hooks (14) over chains (9) and (11). b. Hook center of chains (9) and (11) in hoisting cable hook (10).	Use wrecker or other hoisting device to hoist cargo body (12).



TA 350392

15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			WARNING	
			All personnel must stand clear during hoisting operations. A snapped cable, or shifting or swinging load may cause injury to personnel.	
7.		Two guide lines (8) and (9)	Connect guide line (9) to front lashing hook (10) and guide line (8) to rear lashing hook (6).	Mechanic will handle one guide line and direct hoisting operation. Assistant will handle other guide line. Second assistant will operate lifting device.
8.		Cargo body (4)	Lift clear of frame (5) and place on four shop stands (7).	
9.		Hoisting cable hook (2)	Disconnect from utility chains (1) and (3).	
b. Cleaning				
			WARNING	
			Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.	
10.		Cargo body (4)	Clean with steam or wire brush and approved cleaning solvent.	Refer to TM 9-247.

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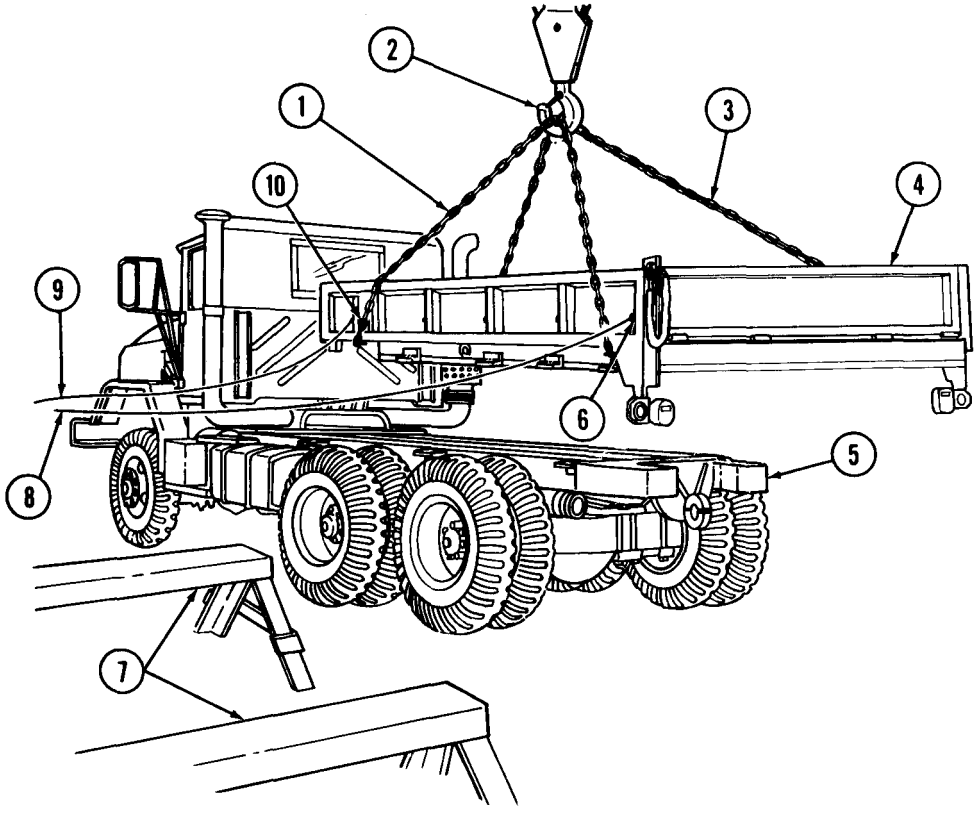
15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Inspection and Repair				
11.		Cargo body (4)	a. Inspect for dents, cracks, breaks, and rust.	
			b. Weld or straighten as necessary.	Refer to TM 9-237.
			c. Clean and paint as necessary.	Refer to TM 43-0139.
d. Installation				
12.		Hoisting cable hook (2)	Attach to center of both utility chains (1) and (3).	Check position and security of hooks (refer to step 6).

WARNING

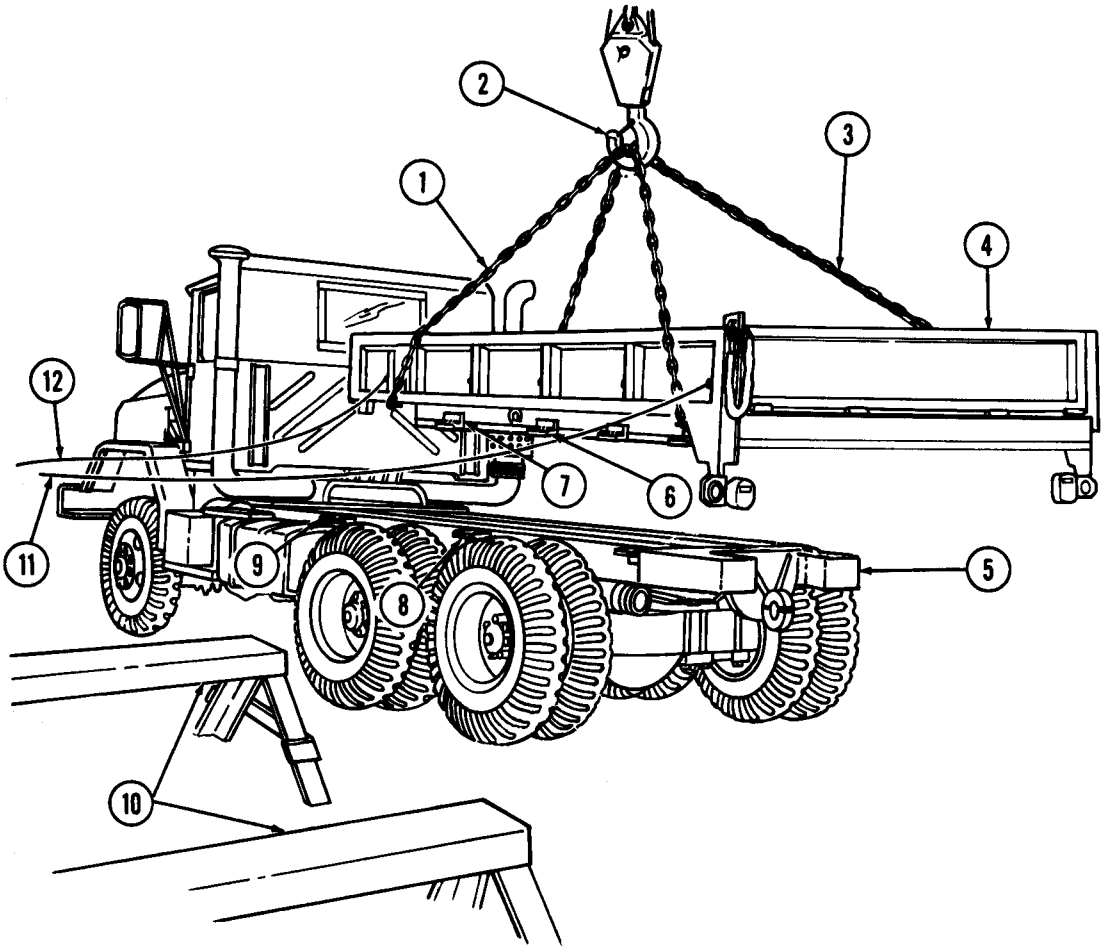
All personnel must stand clear during hoisting operations. A snapped cable, or shifting or swinging load may cause injury to personnel.



TA 350394

15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

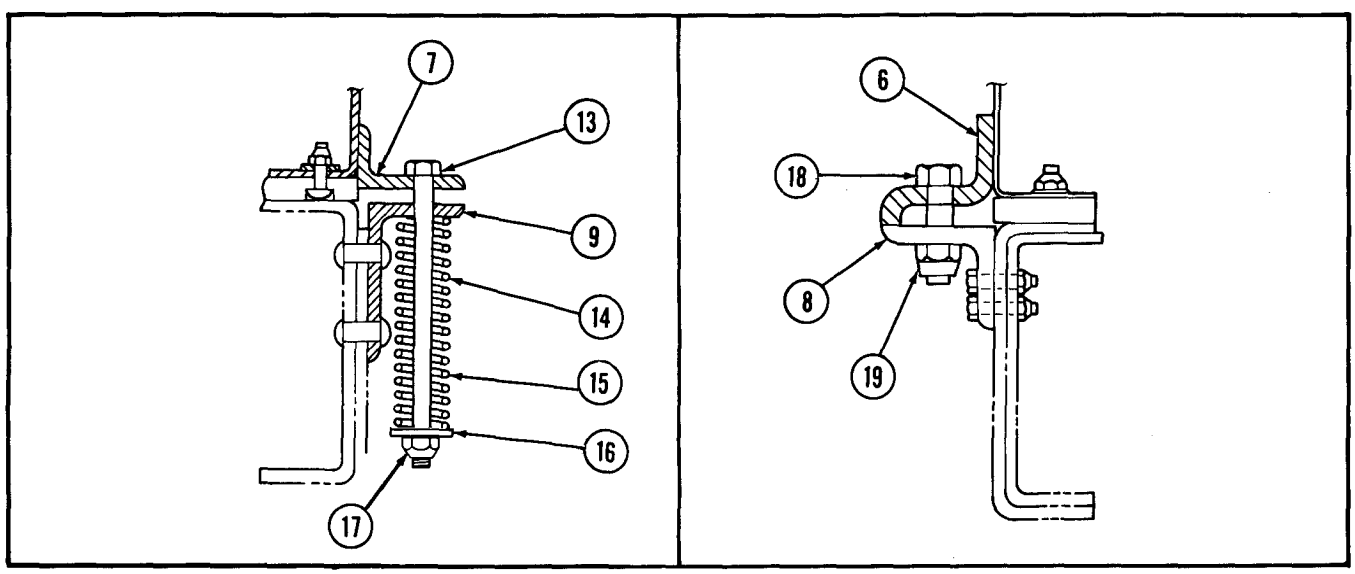
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Mechanic will handle one guide line and direct hoisting operations. Assistant will handle the other guide line. Second assitant will operate hoisting equipment.		
13.		Cargo body (4)	Place on frame (5) as follows: a. Hoist clear of shop stands (10). b. Lower on frame (5) with holddown brackets (6), (7), (8), and (9) alined.	Use drift pins and tanker bar for alinement.



TA 350395

15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

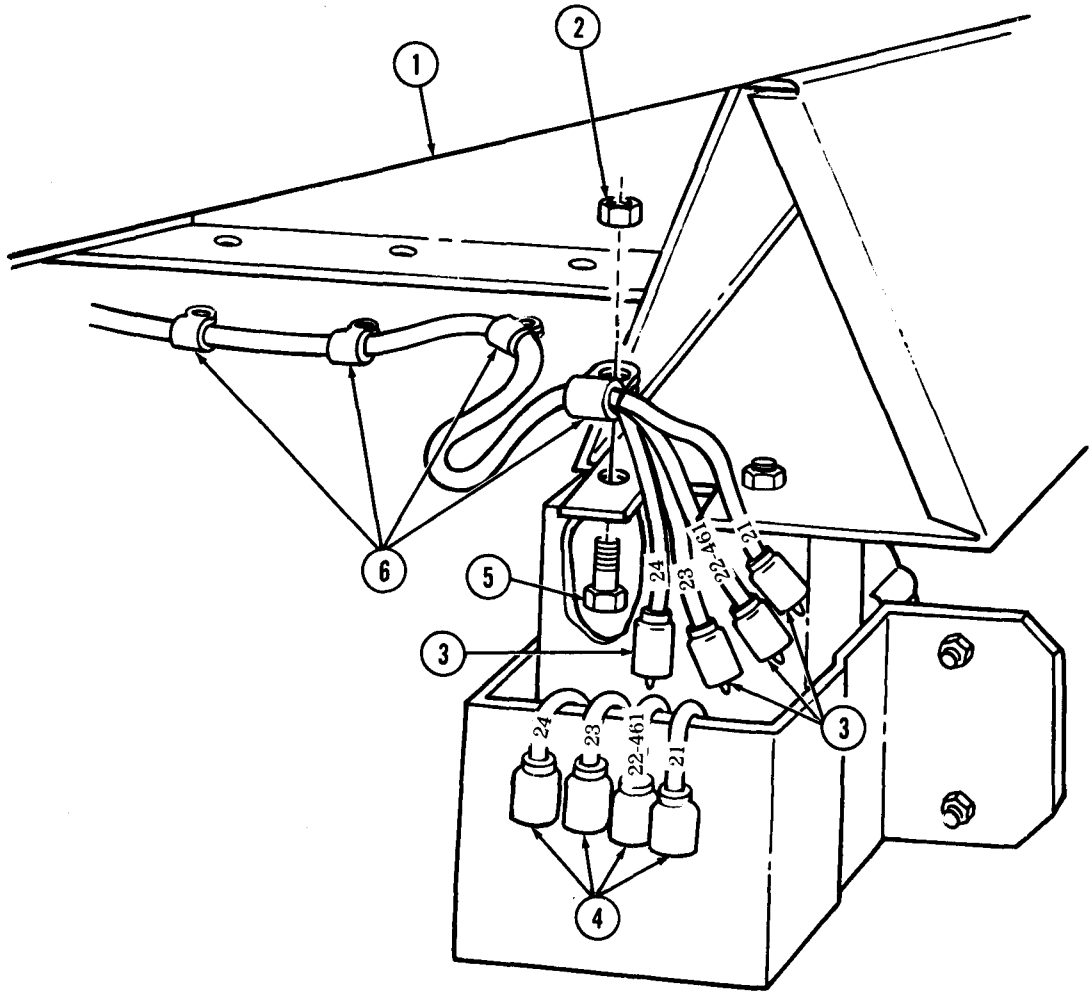
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.		Four outer support springs (14)	a. Place over four inner support springs (15).	
			b. Position under four lower holddown brackets (9) and install with four washers (16), new locknuts (17), and screws (13).	Tighten until spring length is 6.75 in. ± 0.06 in. (171.45 mm ± 1.5 mm).
		NOTE Extra-long wheelbase models (M927 and M928) utilize six intermediate holddown brackets, twelve screws and twelve washers.		
15.		Four screws (18)	Place through four intermediate upper holddown brackets (6) and lower holddown brackets (8) and install with four new locknuts (19).	Tighten 40-50 lb-ft (54-68 N·m).
16.		Two utility chains (1) and (3)	Remove from hoisting cable hook (2) and cargo body (4).	
17.		Two guide lines (11) and (12)	Remove.	



TA 350396

15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.		Four composite light wires (3)	Connect to right rear composite light connectors (4).	
19.		Four composite light wires (7)	Connect to left rear composite light connectors (8).	
20.		Eight wire clamps (6)	Connect to cargo body (1) and install with eight screws (5) and nuts (2).	

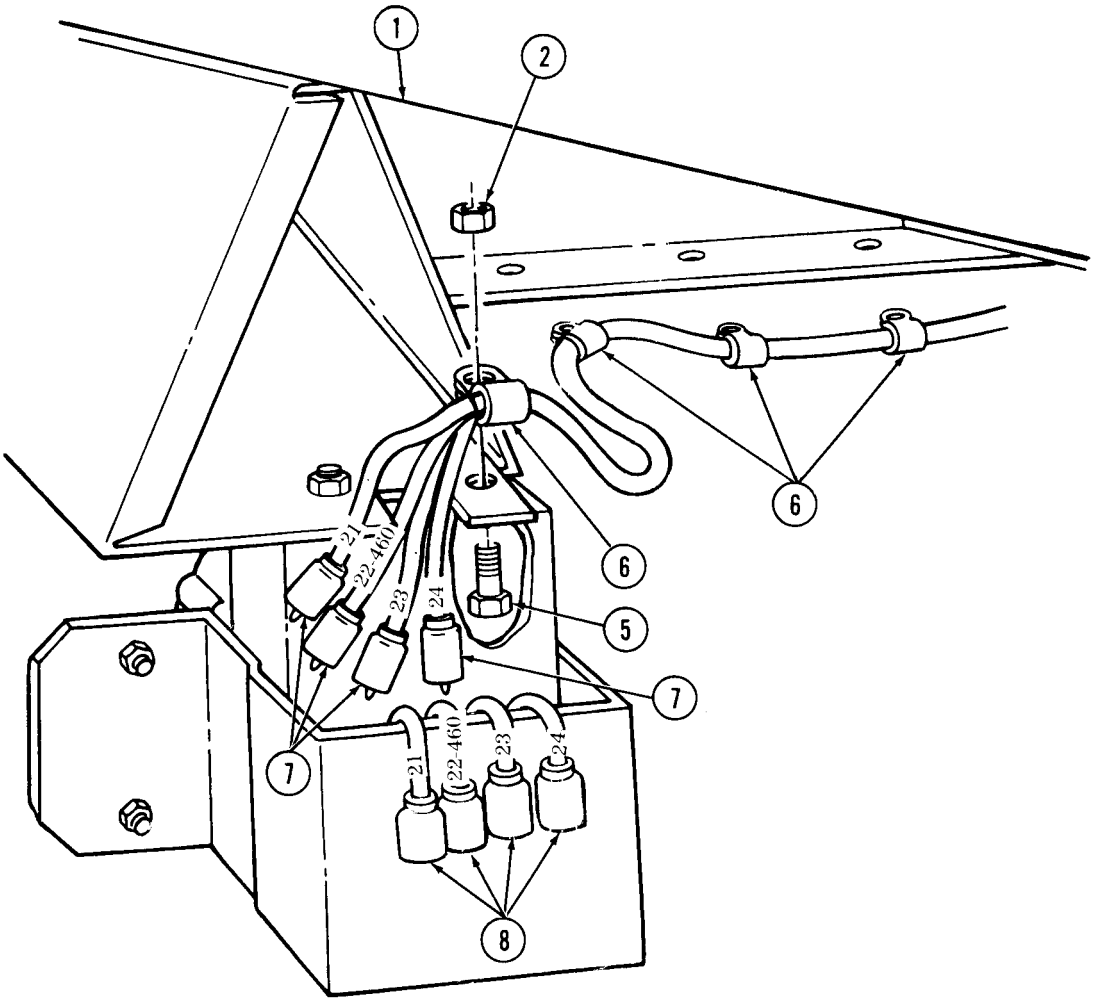


RIGHT

TA 350397

15-3. CARGO BODY ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



LEFT

END OF TASK!

FOLLOW-ON TASKS:
- Install wheel splash guards and brackets (TM 9-2320-272-20-2).
- Install cargo body cover bows (TM 9-2320-272-20-2).
- Install front and side racks and cargo compartment canvas cover (TM 9-2320-272-10).

TA 350398

15-4. CARGO BODY FRAME RAIL SILL MAINTENANCE

This task covers:

a. Removal
b. Inspection
c. Fabrication
d. Installation

INITIAL SETUP:

Applicable Models
M923, M924, M925, M926, M927, M928

Equipment Condition Reference
Para. 15-3

Condition Description
Cargo body assembly removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Ports
Ten lockwashers
Green 383 coating (Appendix C, Item 8)
Wood (Appendix C, Item 33)
Wood preservative (Appendix C, Item 35)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 43-0139
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

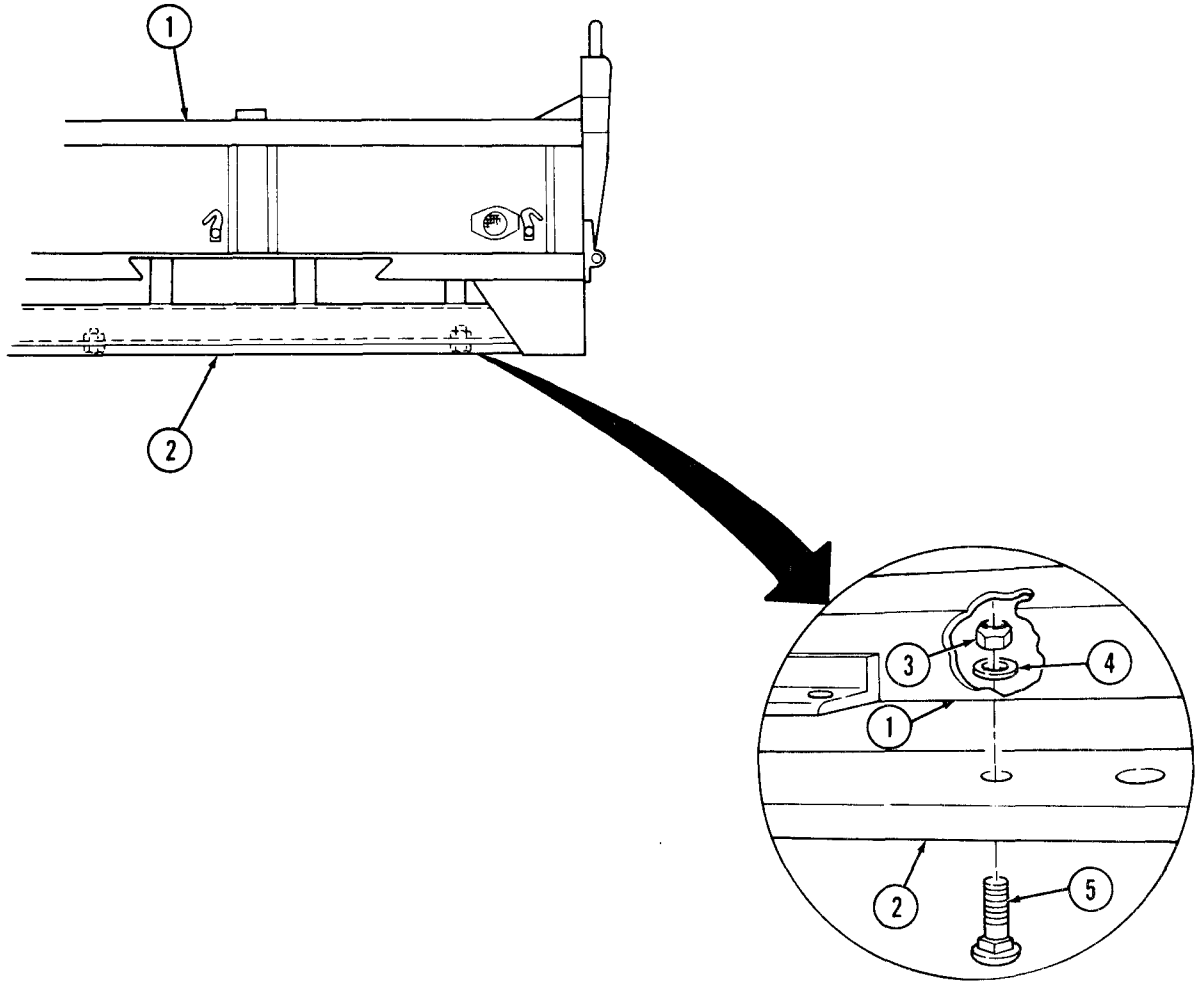
Extra-long wheelbase models (M927 and M928) utilize twenty bolts, lockwashers, and nuts to attach frame rail sills to cargo body.

a. Removal

1. Cargo body (1)	Ten nuts (3), lockwashers (4), and bolts (5), and frame rail sill (2)	Remove.	Discard lockwashers (4). Clean frame rail sill area.

15-4. CARGO BODY FRAME RAIL SILL MAINTENANCE (Cont'd]

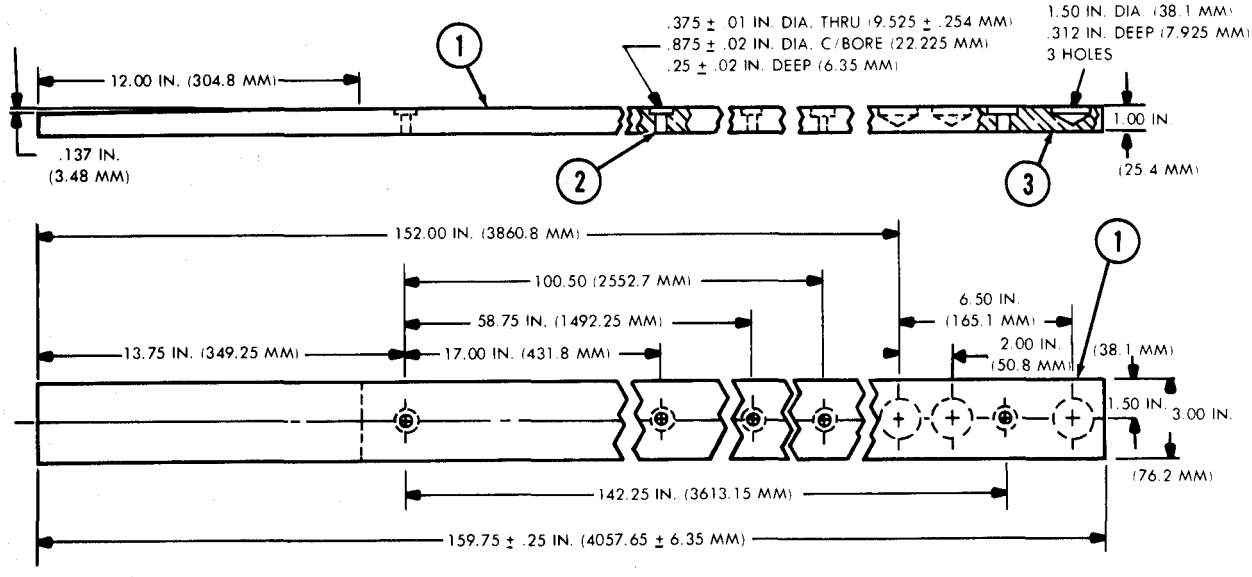
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Inspection				
2.		Frame rail sill (2)	Inspect for rot, deterioration, cracks, or breaks.	If defects are found, fabricate replacements (para. 15-4.c.).



15-4. CARGO BODY FRAME RAIL SILL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Fabrication			
		NOTE Step 3 applies to all except extra-long wheelbase (M927 and M928) cargo bodies.		
3.		Frame rail sill (1)	a. Cut to dimensions and drill five counterbore bolt holes (2) and three frame rest holes (3) as shown.	
			b. Seal and paint.	Refer to TM 43-0139.

M923, M924, M925, AND M926 CARGO MODELS

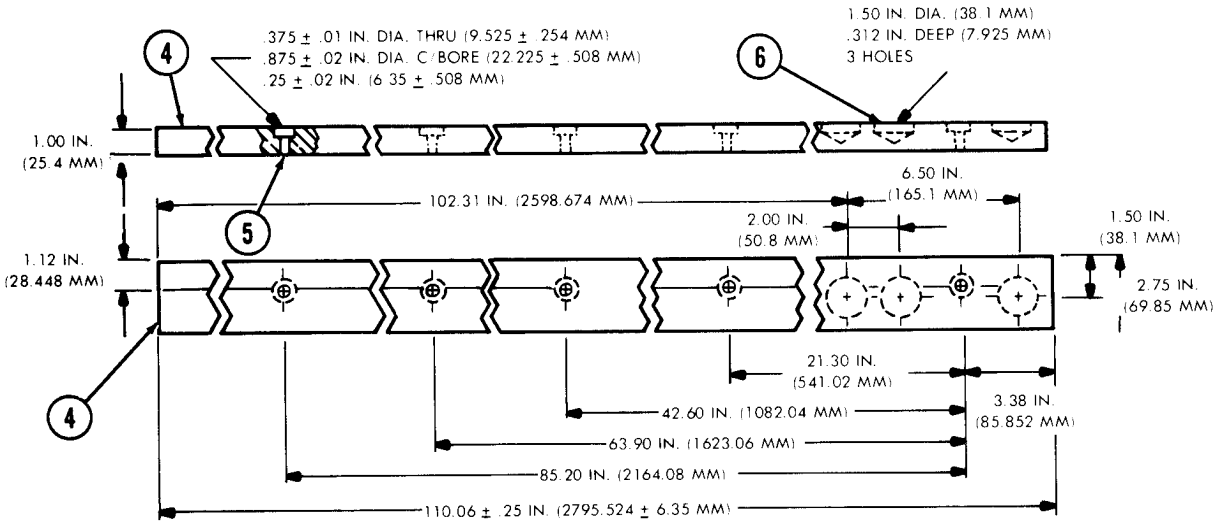


TA 350400

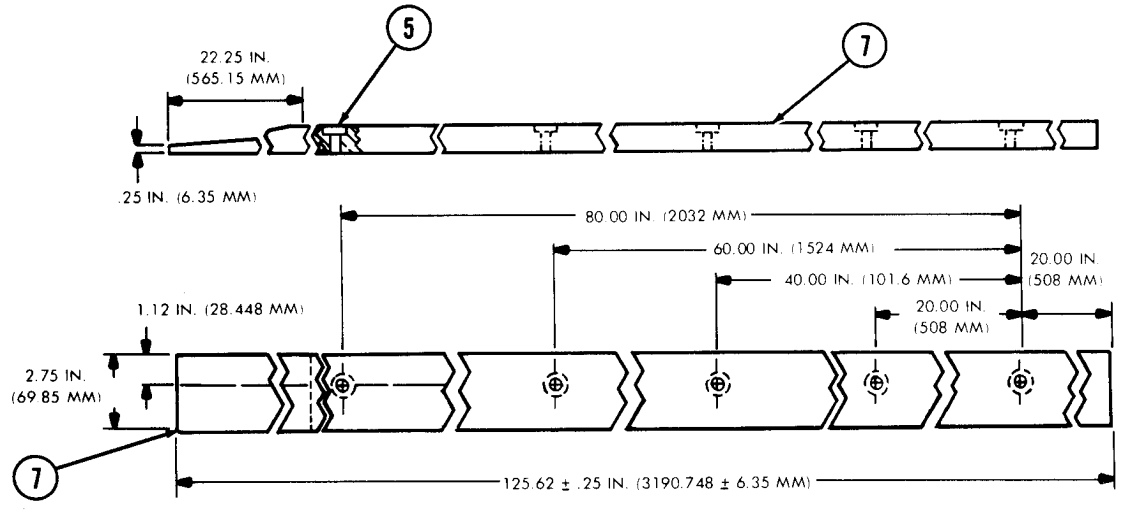
15-4. CARGO BODY FRAME RAIL SILL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Step 4 applies to extra-long wheelbase (M927 and M928) cargo bodies.	
4.		Front frame rail sill (4) and rear sill (7)	a. Cut to dimensions and drill ten counterbore bolt holes (5) and three frame rest holes (6) as shown.	
			b. Seal and paint.	Refer to TM 43-0139.

M927 AND M928 FRONT SECTION



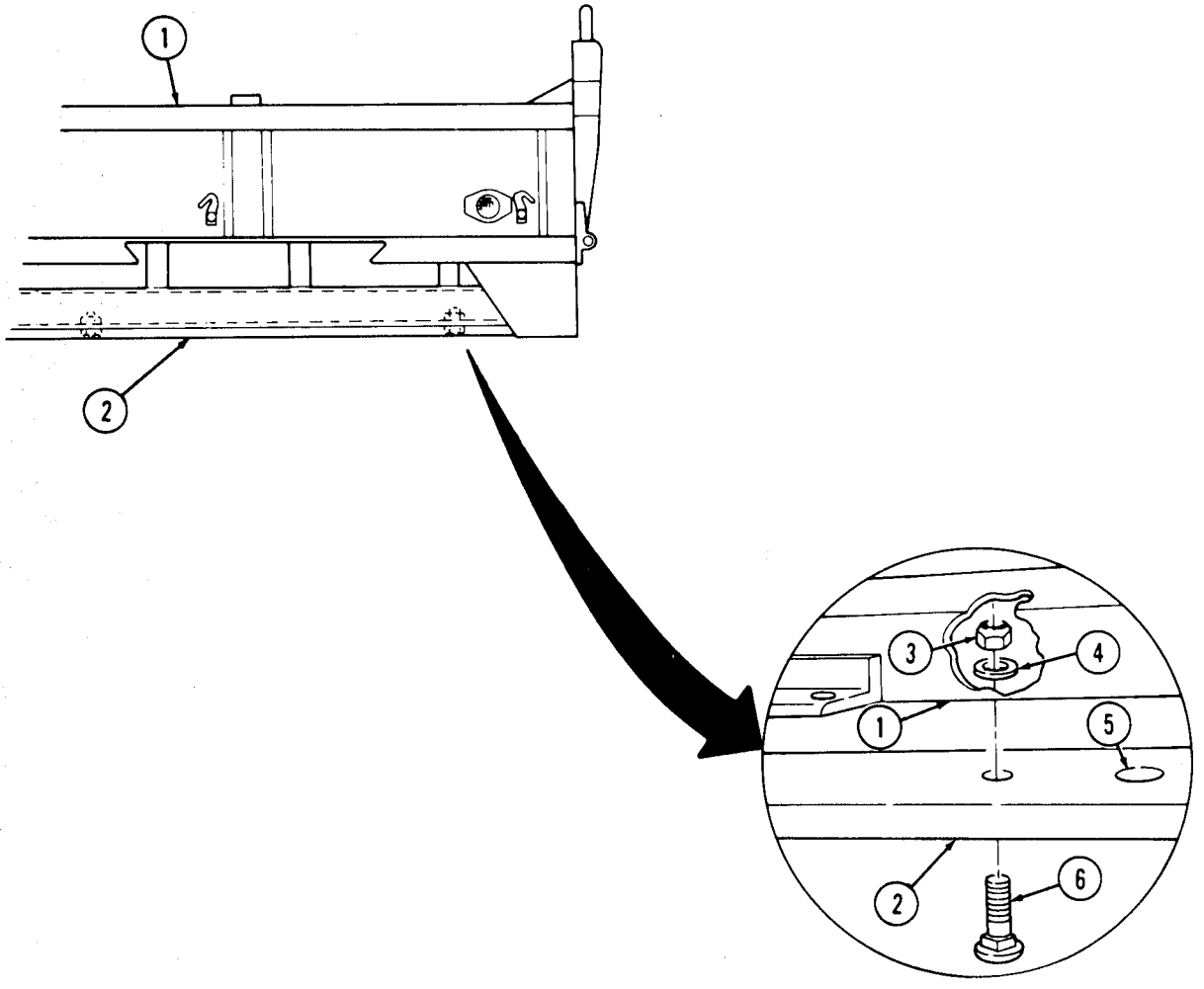
M927 AND M928 REAR SECTION



TA 350401

15-4. CARGO BODY FRAME RAIL SILL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Installation				
		NOTE Extra-long wheelbase models (M927 and M928) utilize twenty bolts, lockwashers, and nuts to attach rail sills to cargo body.		
5.		Frame rail sill (2)	a. Position on cargo body (1) with frame rest holes (5) down.	
			Install with ten bolts (6), new lockwashers (4), and nuts (3).	Make sure head of bolt (6) rests in sill of counterbore. Tighten 100-110 lb-in. (11-12 N·m).



END OF TASK!

FOLLOW-ON TASK: Install cargo body assembly (para. 15-3).

CHAPTER 16
DUMP BODY (M929 AND M930) MAINTENANCE

Section I. DESCRIPTION AND DATA

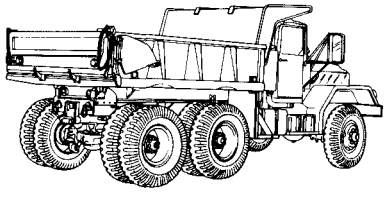
16-1. GENERAL

Dump body welding instructions are not covered in this chapter. Refer to TM 9-237, Welding Theory and Application. Additional general information can be found in TM 9-2320-272-10.

16-2. DESCRIPTION-DUMP BODY

a. The M939 series vehicles include two dump body models. The M930 model is equipped with a front winch and the M929 is not. Both models have the dump body and hoist assembly consisting of dump body bed, subframe, hydraulic pump, control valve, control linkage, and hydraulic hoist cylinders mounted on the rear of the chassis.

b. The hoist is controlled by a hand lever located in the vehicle cab, left of operator's seat. Power to operate the hoist is provided by the vehicle engine through a transmission power takeoff which drives a hydraulic pump.



M929 AND M930 DUMP BODY

Table 16-1. Dump Body Tabulated Data

Dimensions	125 in. long x 82 in. wide x 23 in. high (317.5 cm x 208.3 cm x 56.3 cm)
Payload	5 cubic yards (3.835 cu. m.)
Weight	2880 lbs (1307.53 kgs)

Section II. DUMP BODY MAINTENANCE

16-3. DUMP BODY MAINTENANCE TASK SUMMARY

TA 350832

16-4. DUMP BODY MAINTENANCE

This task covers:

a. Removal
b. Inspection and Repair
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Wheels chocked.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Sixteen locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W (3)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
TM 43-0139
LO 9-2320-272-12

General Safety Instructions
- Position safety braces before working under raised dump body.
- Do not operate dump controls when dump body is removed.
- All personnel must stand clear during hoisting operations.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

WARNING

Never work under dump body until safety braces are properly positioned. Injury to personnel may result if dump body suddenly lowers.

1.		Dump body (1)	a. Place in raised position. b. Place safety braces (6) in proper position.	Refer to TM 9-2320-272-10.

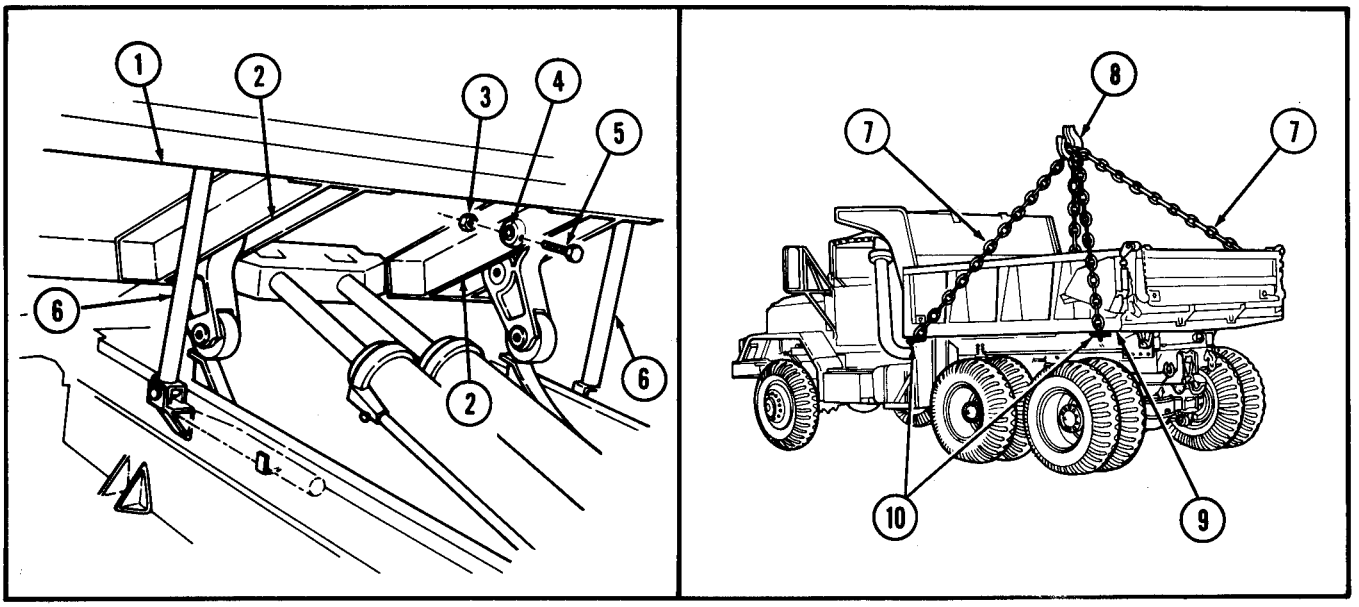
NOTE

Step 2 applies to both left and right thrust plates.

2.	Thrust plate pin (4) to thrust plate (2)	Screw (5) and locknut (3)	Remove.	Discard locknut (3).

16-4. DUMP BODY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.		Dump body (1)	Remove safety brace (6) and place in lowest position.	Refer to TM 9-2320-272-10.
4.		Two utility chains (7)	a. Attach utility chain hooks (10) around subframe beam (9) and install chains (7) over hoist hook (8).	
			b. Raise until slack is removed from chains (7).	Use wrecker or other hoisting device.



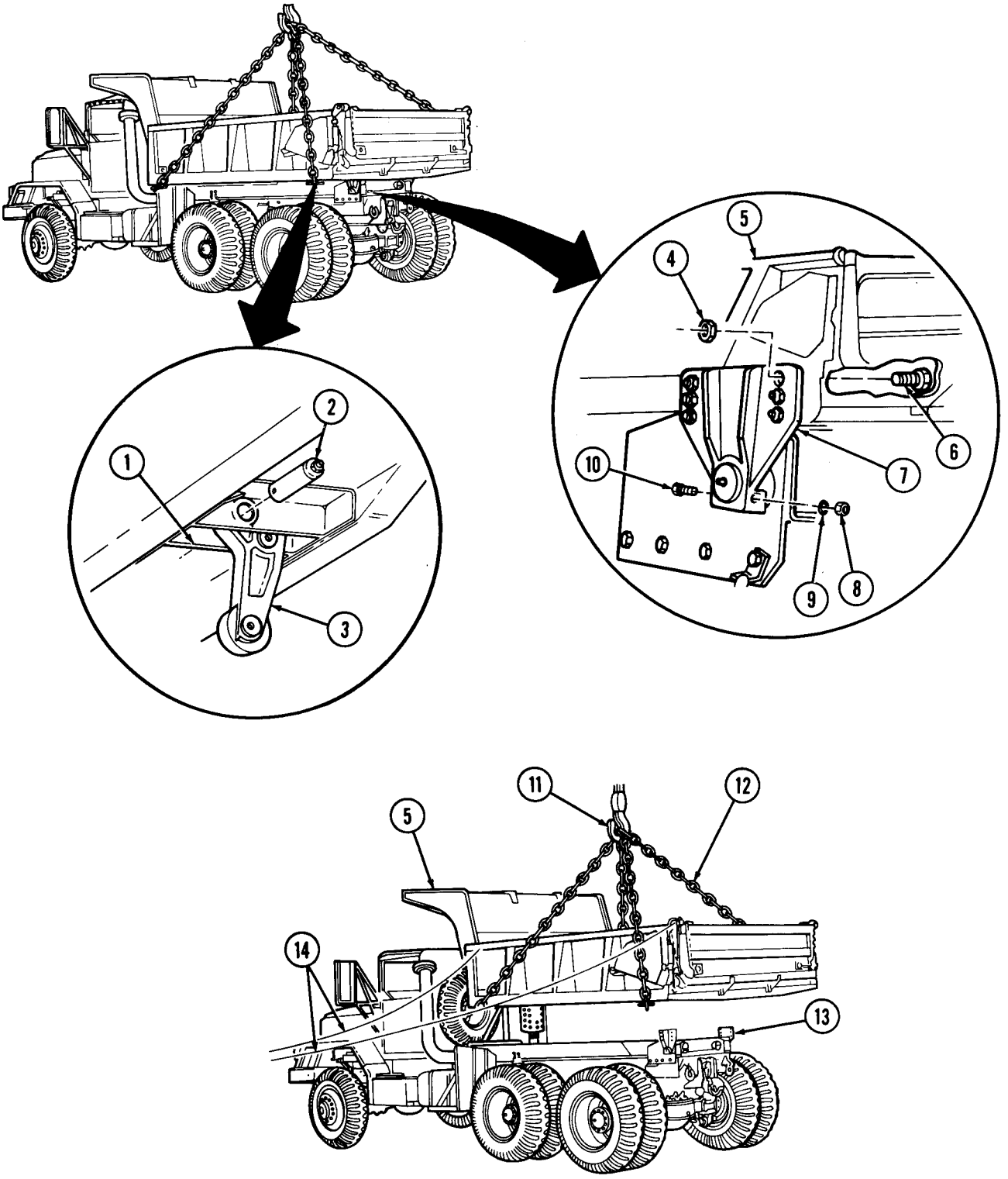
TA 350833

16-4. DUMP BODY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		WARNING		
		Make sure dump control lever is in neutral and not moved. Injury to personnel may result if lift cylinder is operated when not secured.		
		NOTE		
		Steps 5 through 8 apply to both left and right sides.		
5.	Thrust plate (1) to roller arm (3)	Thrust plate pin (2)	Remove.	
6.	Hinge bracket (7)	Six locknuts (4)	Remove.	Discard locknuts (4).
7.		Locknut (8), washer (9), and screw (10)	Remove.	Discard locknut (8).
8.		Hinge bracket (7)	Remove.	
9.		Two guide lines (14)	Connect to front and rear of dump body (5).	Mechanic will handle one guide line (14) and direct hoisting operation. One assistant will handle other guide line (14). Another assistant will operate lifting device.
		WARNING		
		All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.		
10.		Dump body (5)	Lift clear of subframe (13) and place on shop stands.	
11.		Six screws (6)	Remove.	
12.		Hoist hook (11) and utility chains (12)	Remove.	
b. Inspection and Repair				
13.		Dump body (5)	a. Inspect for breaks, dents, cracks, and rust.	If breaks, dents, cracks, or rusted through areas are found, repair (refer to TM 9-237).
			b. Clean and paint as necessary.	Refer to TM 43-0139.

16-4. DUMP BODY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



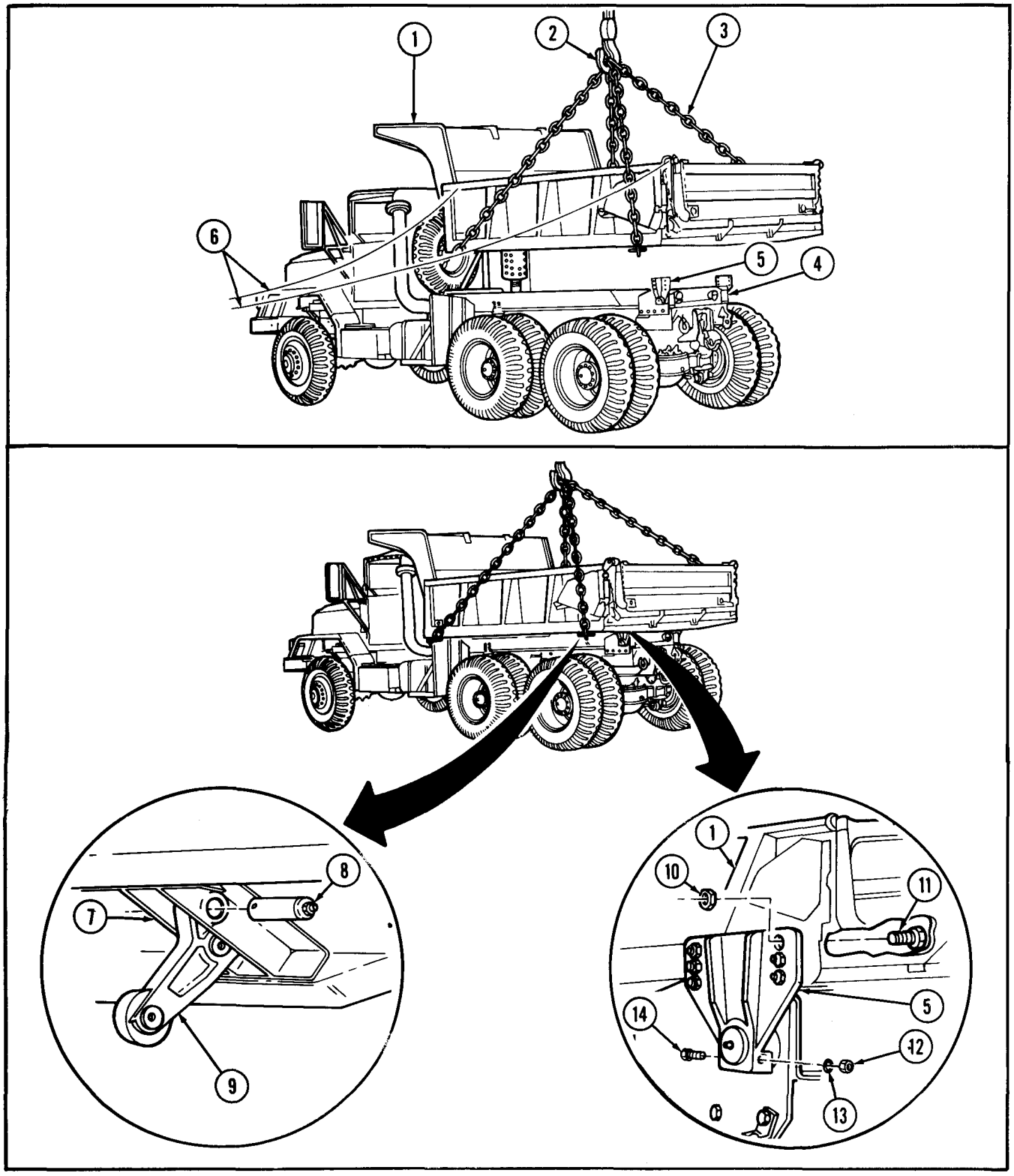
TA 350834

16-4. DUMP BODY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
14.		Utility chains (3) and hoist hook (2)	Attach to dump body (1).	Check position and security of chain hook ends (see step 4).
15.		Six screws (11)	Install on left and right side of dump body (1).	
		WARNING All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.		
16.		Dump body (1)	a. Hoist clear of shop stands.	
			b. Place on subframe (4).	Mechanic will handle one guide line (6) and direct hoisting operation. One assistant will handle the other guide line (6). Another assistant will operate lifting device.
17.		Two brackets (5)	Install on screws (11) with twelve new locknuts (10).	Tighten 240 lb-ft (325 N·m).
18.		Two screws (14), washers (13), and new locknuts (12)	Install on brackets (5).	Tighten 35 lb-ft (48 N·m).
19.		Two thrust plate pins (8)	Aline roller arms (9) to thrust plates (7) and install pins (8).	
20.		Two guide lines (6)	Remove.	

16-4. DUMP BODY MAINTENANCE (Cont'd)

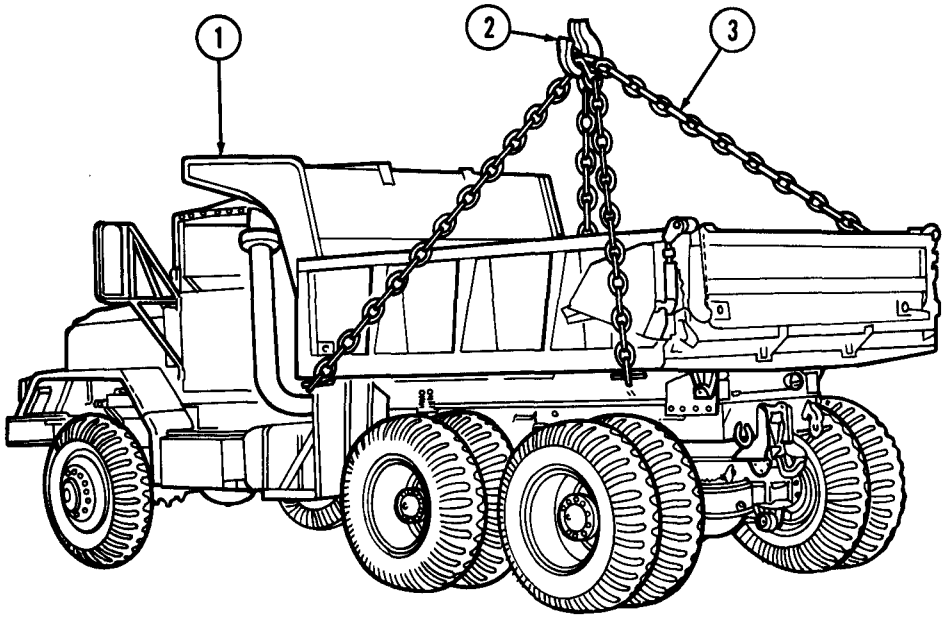
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350835

16-4. DUMP BODY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
21.		Two utility chains (3)	Remove from hoisting cable hook (2) and dump body (1).	



WARNING

Never work under dump body until safety braces are properly positioned. Injury to personnel may result if dump body suddenly lowers.

22.		Dump body (1)	a. Place in raised position. b. Place safety braces (4) in proper position.	Refer to TM 9-2320-272-10.

NOTE

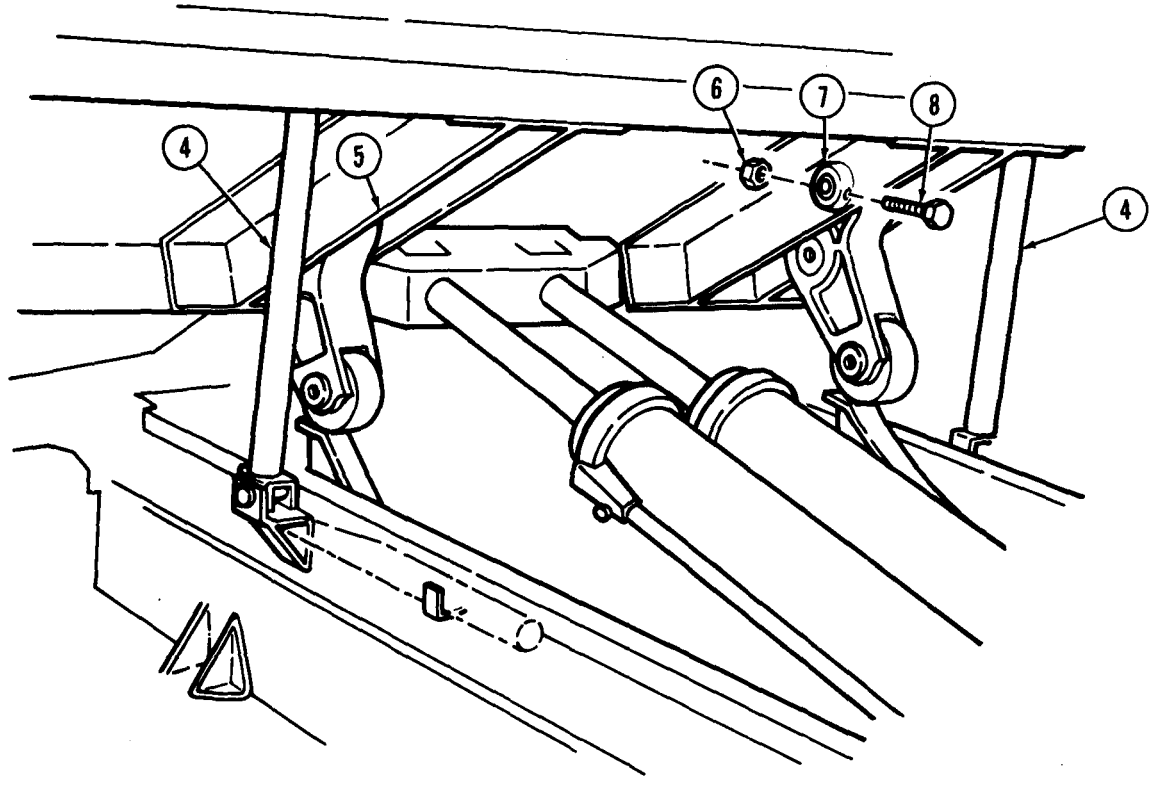
Step 23 applies to both left and right sides.

23.		Thrust plate pin (7)	Install on each thrust plate (5) with screw (8) and new locknut (6).	Tighten 35 lb-ft (48 N·m).

TA 350836

16-4. DUMP BODY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Lubricate dump body (LO 9-2320-272-12).

16-5. DUMP ROLLER ARM MAINTENANCE

This task covers

a. Removal
b. Disassembly
c. Inspection and Repair
d. Reassembly
e. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	Para. 16-4	Dump body removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
GAA grease (Appendix C, Item 11)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Do not operate dump controls when dump body is removed.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Make sure dump control lever is in neutral and not moved. Injury to personnel may result if lift cylinder is operated when not secured.

NOTE

This procedure applies to both left and right roller arms.

a. Removal

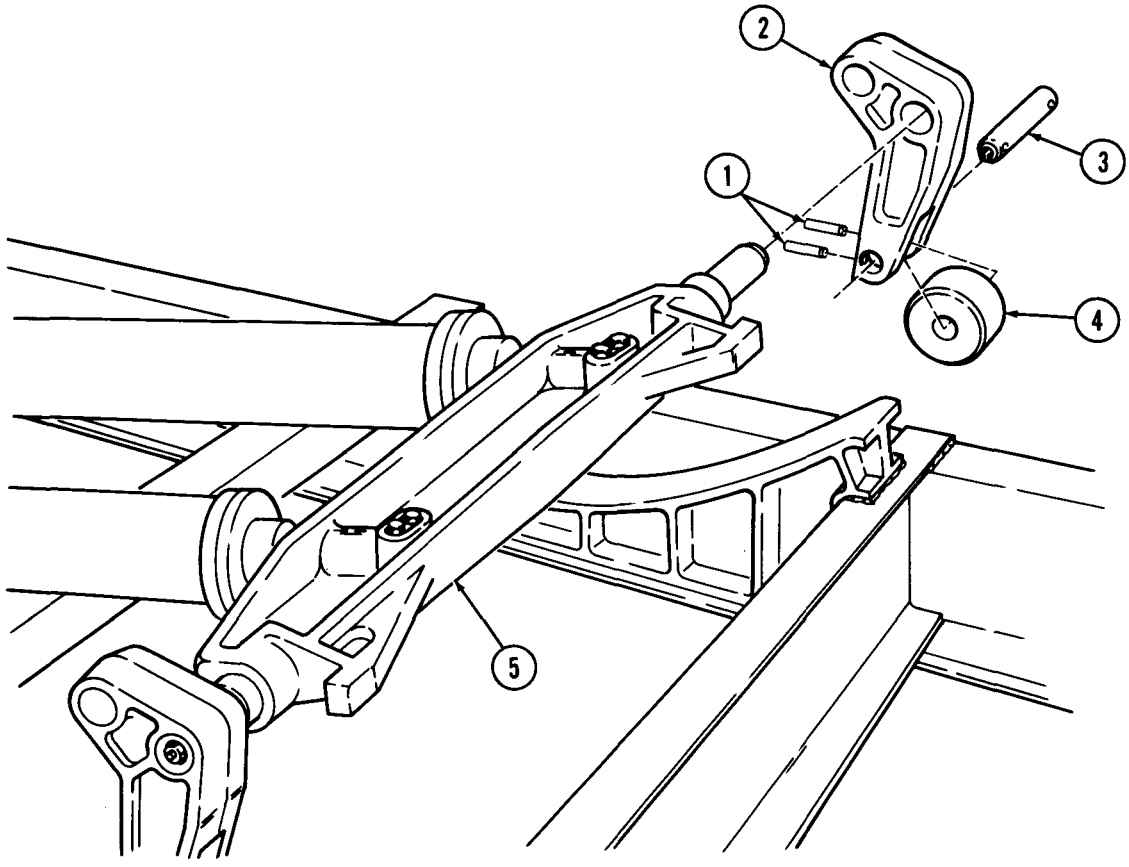
1.	Hoist cylinder cross-head (5)	Roller arm (2)	Remove.	Use soft-faced hammer to tap if necessary.

b. Disassembly

2.	Roller pin (3) to roller arm (2)	Two pins (1)	Remove.	Use punch and hammer.
3.		Roller pin (3)	Drive out of roller arm (2) and roller (4).	Use brass drift and hammer.
4.	Roller arm (2)	Roller (4)	Remove.	

16-5. DUMP ROLLER ARM MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

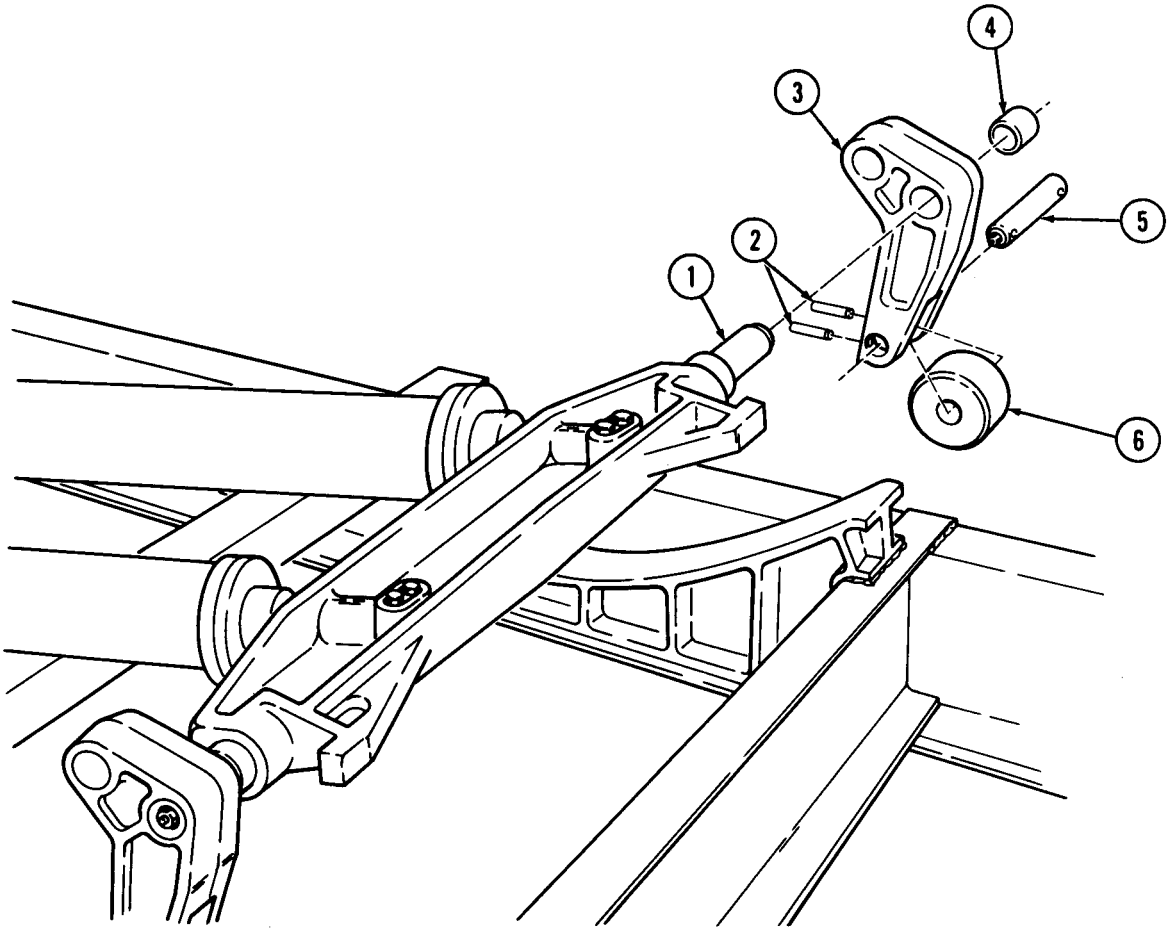


16-5. DUMP ROLLER ARM MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Inspection and Repair				
5.		Roller (6) and roller pin (5)	Inspect for cracks and deep grooves.	Replace if cracked, or deeply grooved.
6.		Roller arm (3)	Inspect for breaks and cracks.	Replace if broken or cracked.
7.	Roller arm (3)	Two bushings (4)	a. Inspect for breaks, cracks, and out-of-round condition.	Replace if broken, cracked or out-of-round.
		NOTE		
		Steps 7b and 8 are performed only if bushings are to be replaced.		
			b. Drive bushings (4) out of roller arm (3).	Use brass drift and hammer.
8.		Two new bushings (4)	Drive one in from each side until flush with roller arm (3).	Use wood block and hammer.
d. Reassembly				
9.		Roller (6)	a. Position in roller arm (3).	
			b. Coat roller pin (5) with light film GAA grease and position through roller arm (3) and roller (6).	Use soft-faced hammer to tap pins in place.
			c. Install with two pins (2).	
e. Installation				
10.		Roller arm (3)	Install on hoist cylinder crosshead shaft (1).	

16-5. DUMP ROLLER ARM MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install dump body (para. 16-4).
• Lubricate roller arms (LO 9-2320-272-12).

16-6. DUMP HOIST CYLINDER MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Reassembly
e. Installation

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	Para. 16-4 Para. 16-5	Dump body removed. Dump roller arms removed.

Test Equipment

Spring tester

Special Tools

Ring compressor

Special Environmental Conditions

None

Materials/Parts

Twenty-two lockwashers
Pre-form packing
Cylinder head "O" ring
Two cotter pins
Protective cap-plugs (Appendix C, Item 5)
Lint-free cloth (Appendix C, Item 7)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

Do not operate dump controls when dump body is removed.

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

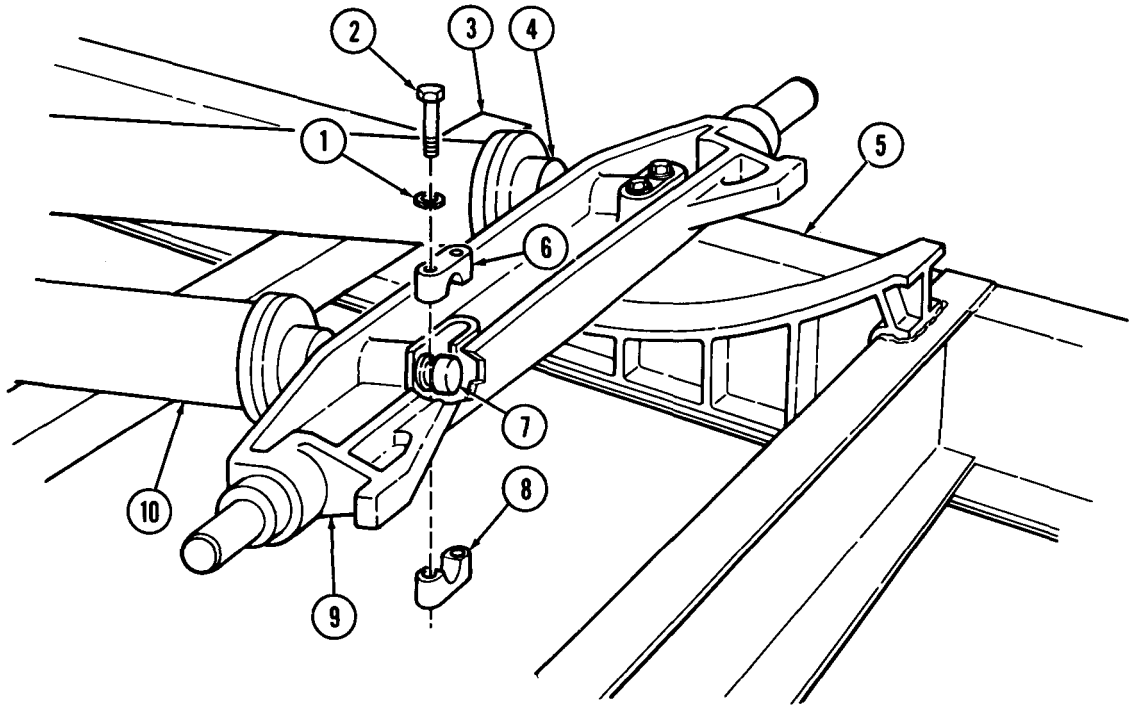
Make sure dump control is in neutral and not moved. Injury to personnel may result if lift cylinder is operated when not secured.

a. Removal

1.	Subframe (5)	Two hoist cylinders (4) and (10)	Raise and place wood support (3) between subframe (5) and cylinders (4) and (10).	A 4x4 block of wood is recommended.
2.	Two piston rods (7)	Four screws (2) and lockwashers (1), two upper crosshead retainers (6), lower crosshead retainers (8), and crosshead (9)	Remove.	Discard lockwashers (1).

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

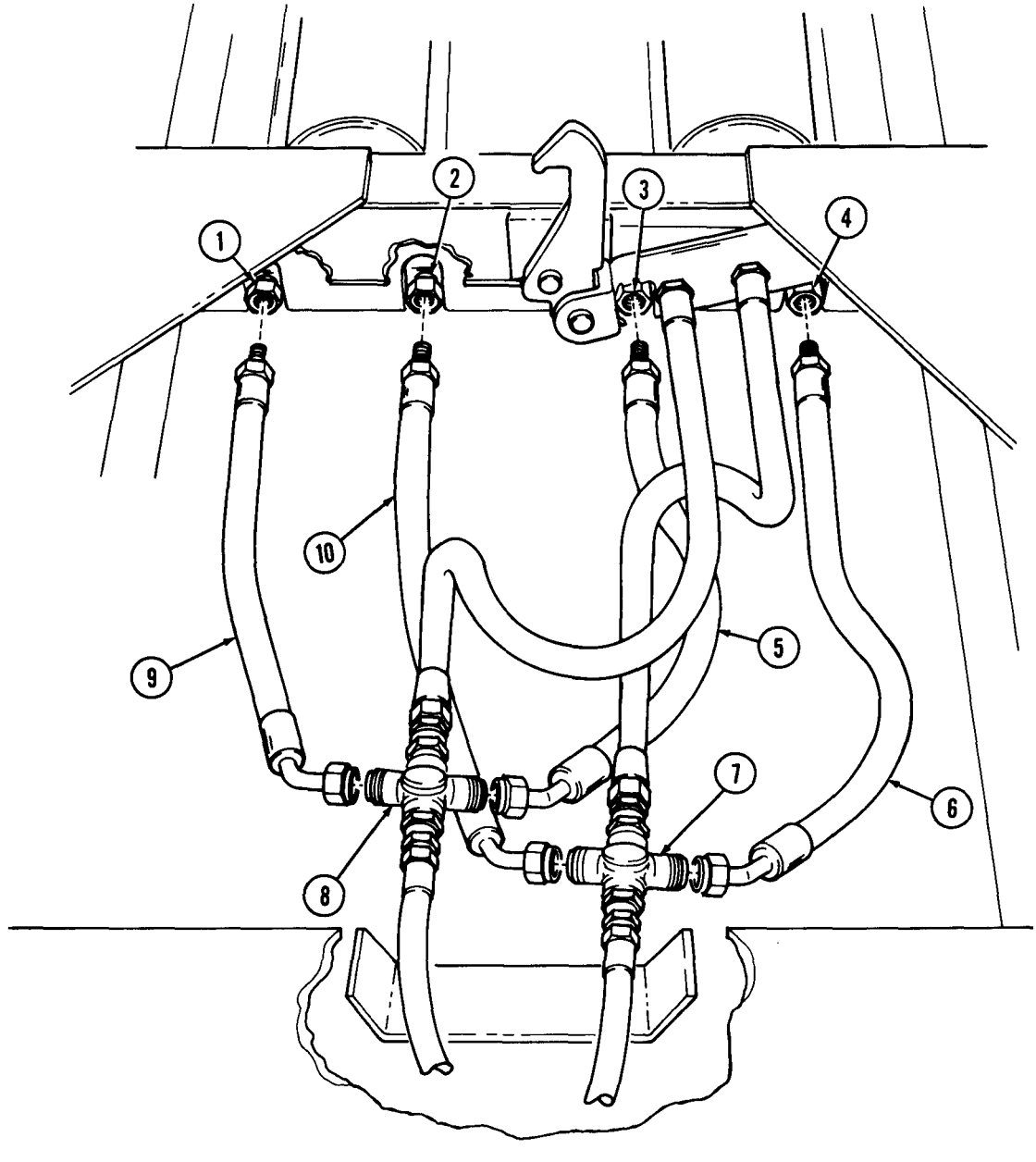


16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		CAUTION Plug all hydraulic lines or openings to prevent dirt from entering and damaging components.		
		NOTE • Cross fitting to hoist cylinder hoses must be disconnected from the cross fittings first. Then hoses can be removed from hoist cylinders. • Have drainage containers ready to catch oil.		
3.	Right cross fitting (8)	Two hydraulic hoses (9) and (5)	Disconnect.	Tag for installation.
4.	Left cross fitting (7)	Two hydraulic hoses (10) and (6)	Disconnect.	Tag for installation.
5.	Right and left cylinder ports A (1) and (3)	Two hydraulic hoses (9) and (5)	Disconnect.	Tag for installation.
6.	Right and left cylinder ports B (2) and (4)	Two hydraulic hoses (10) and (6)	Disconnect.	Tag for installation.

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350841

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Subframe (6)	Eight screws (3) and lockwashers (4), four bearing caps (2), and two hoist cylinders (5) and (1)	Remove.	Discard lockwashers (4).

b. Disassembly

NOTE

Both hoist cylinders are disassembled and assembled in the same way. Steps 8 through 37 apply only to the left hoist cylinder.

8.	Cylinder base (7)	Two square-head screws (18)	Remove and slide hinge pin (19) out of cylinder base (7).	
9.	Gland (12) to cylinder head (14)	Three screws (11)	Remove.	
10.		Gland (12)	Tap free of cylinder head (14) and slide off piston rod (16).	Use soft-faced hammer.
11.	Cylinder head (14) to hoist cylinder housing (8)	Ten screws (10) and lockwashers (9)	Remove.	Discard lockwashers (9).
12.		Cylinder head (14)	Tap free of cylinder (8) and slide off piston rod (16).	Use soft-faced hammer.
13.	Cylinder head (14)	Packing (13) and "O" ring (15)	Remove.	Discard packing (13) and "O" ring (15).

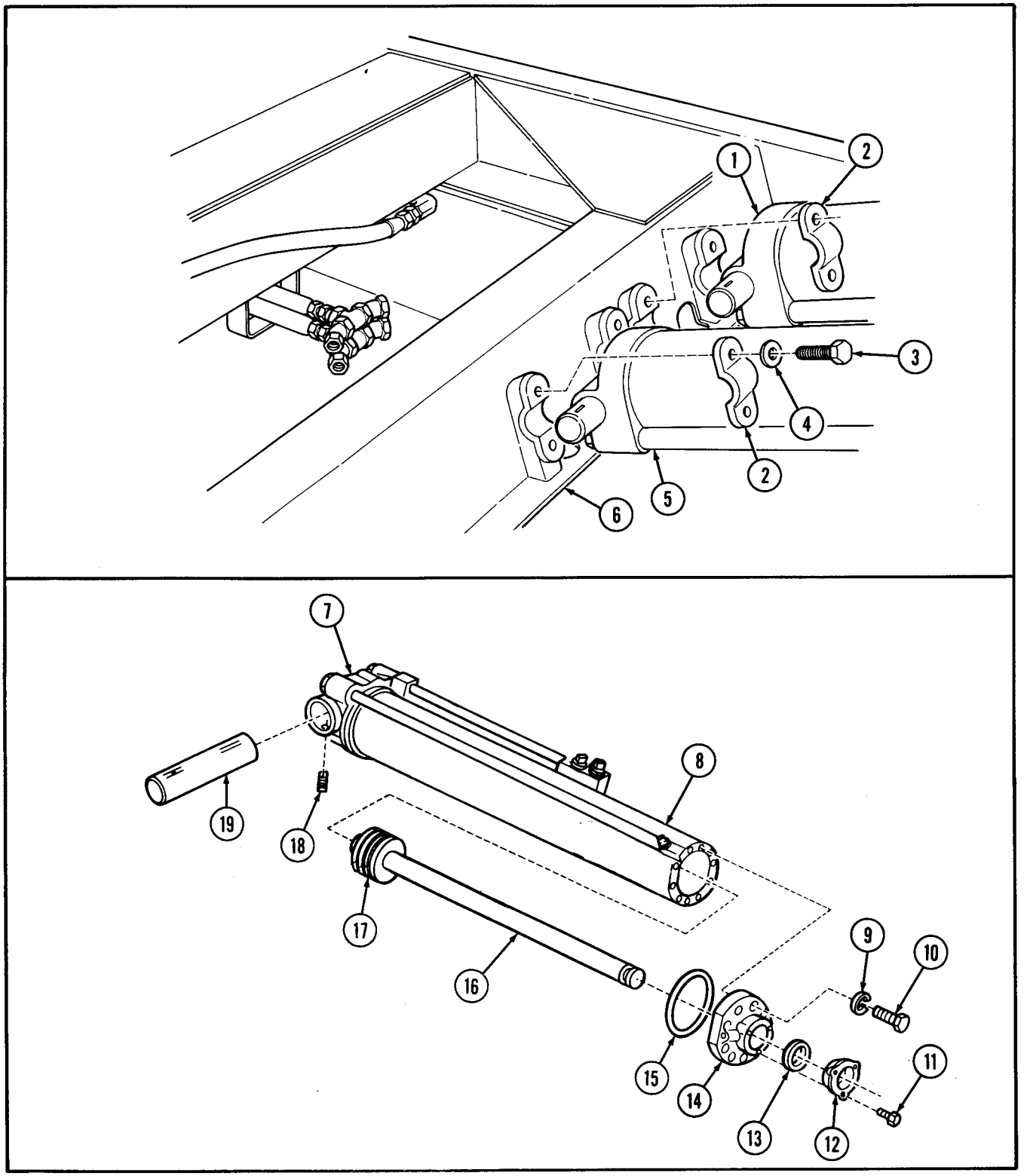
NOTE

Use care when performing step 14 to prevent damage to cylinder bore or piston.

14.	Hoist cylinder housing (8)	Piston rod (16) and piston (17)	Pull straight out to remove.	

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350842

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.	Piston rod (8) to piston (9)	Cotter pin (11) and slotted nut (12)	Remove.	Discard cotter pin (11).
16.		Piston (9)	Slide off piston rod (8).	
17.	Piston (9)	Three piston rings (10)	Remove from piston grooves (13).	
18.	Hoist cylinder housing (7)	Three bypass plugs (6), springs (5), and check balls (4)	Remove.	Tag for installation.
19.	Cylinder base (3)	Orifice plug cover (1) and orifice plug (2)	Remove.	

c. **Cleaning and Inspection**

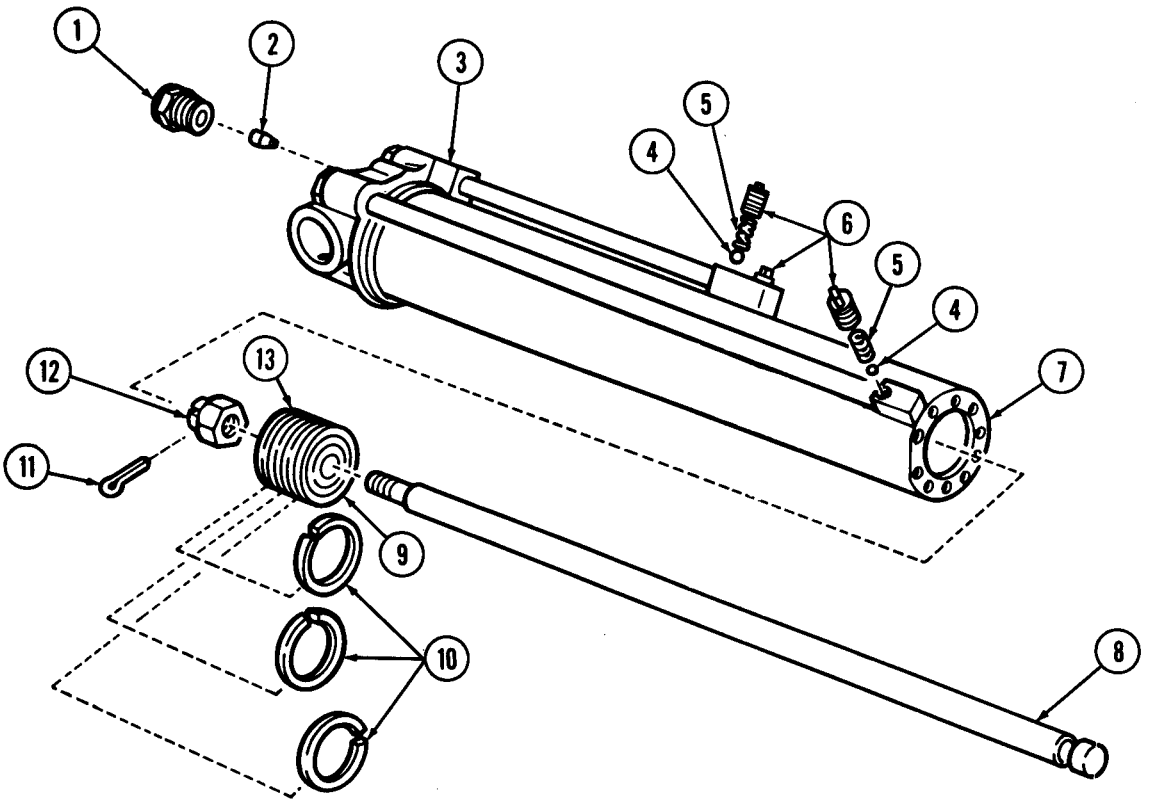
NOTE

Use clean lint-free cloth to wipe parts clean. After parts are cleaned and inspected, coat them with a light film of clean hydraulic oil.

20.		Check balls (4)	Wipe clean and inspect for scratches, chips, and seat wear marks.	If scratched, chipped, or marked, replace.
21.		Piston (9)	a. Wipe clean and inspect for cracks and breaks.	If cracked or broken, replace.
			b. Measure O.D. with micrometer.	If O.D. is less than 5.236 in. (132.994 mm), replace.
22.		Piston rod (8)	a. Wipe clean and inspect for scratches, chips, and scoring.	If scratched, chipped, or scored, replace.
			b. Measure O.D. with micrometer.	If O.D. is less than 1.994 in. (50.647 mm), replace.

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		Head (5) and gland (6)	a. Wipe clean and inspect for cracks and breaks.	If cracked or broken, replace.
			b. Measure I.D. of both with micrometer.	If less or more than 2.010 in. (51.044 mm), replace.
24.		Three bypass springs **(1)**	a. Measure free length.	If less or more than 1-1/4 in. (31.75 mm), replace.
			b. With spring tester, compress to 15/16 in. (23.81 2 mm) length.	If torque reading is not 10 lb-ft (14 N.m), replace.
		Three piston rings (9)	Inspect for breaks.	If any ring (9) is broken, replace all three.
		Orifice plug (2) and hoist cylinder walls (4)	Wipe clean and inspect for scratches and chips.	If scratched or chipped, replace.
		Three piston rings (9)	Install on piston grooves.	
		Piston (10)	Slide on piston rod (8) until seated and install with slotted nut (12) and new cotter pin (11).	

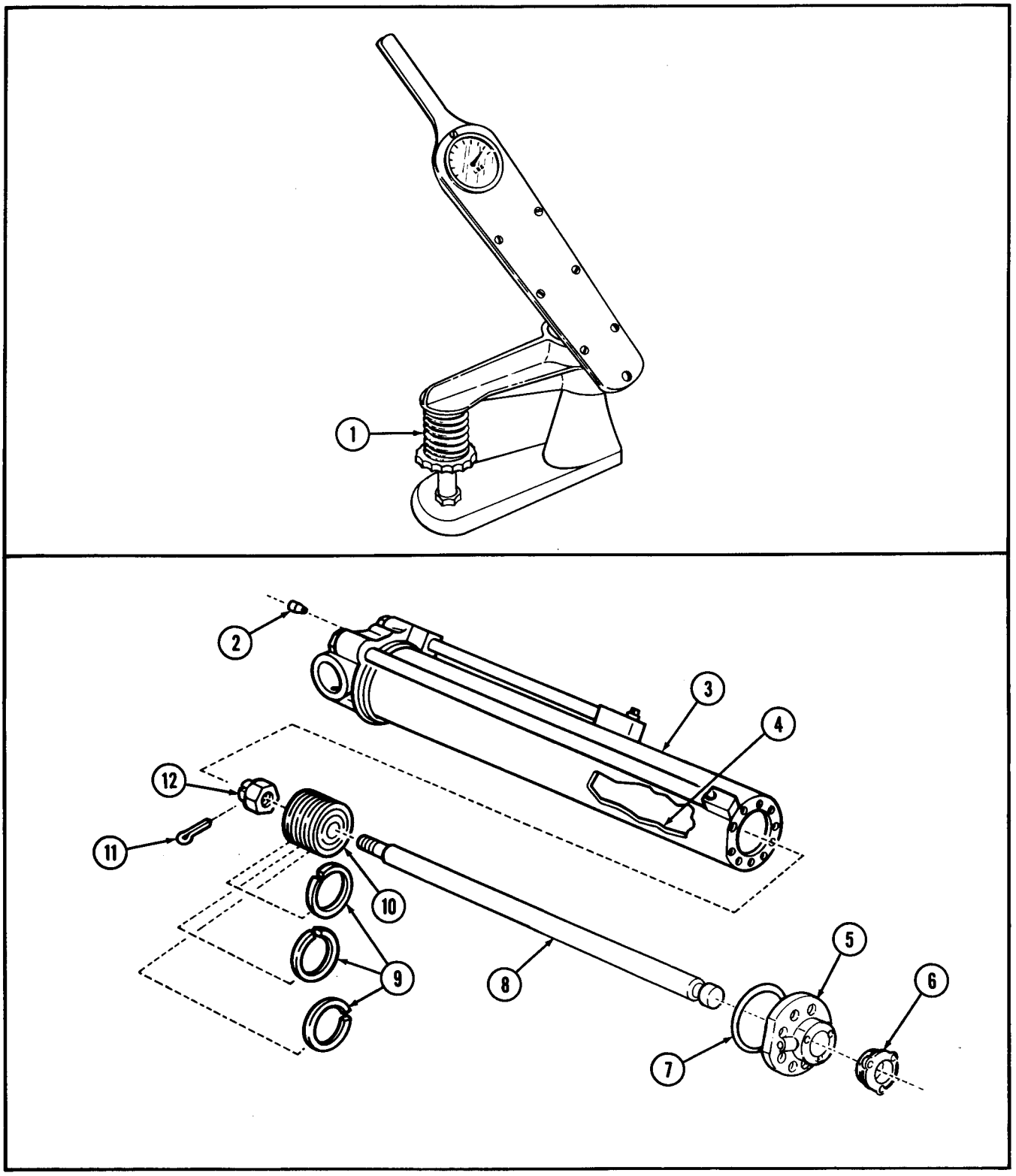
NOTE

Use care when performing step 29 to prevent damage to cylinder bore or piston.

	Piston (10) and piston rod (8)	Slide in cylinder housing (3).	Use ring compressor.
	New "O" ring (7)	Install on cylinder head (5).	

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



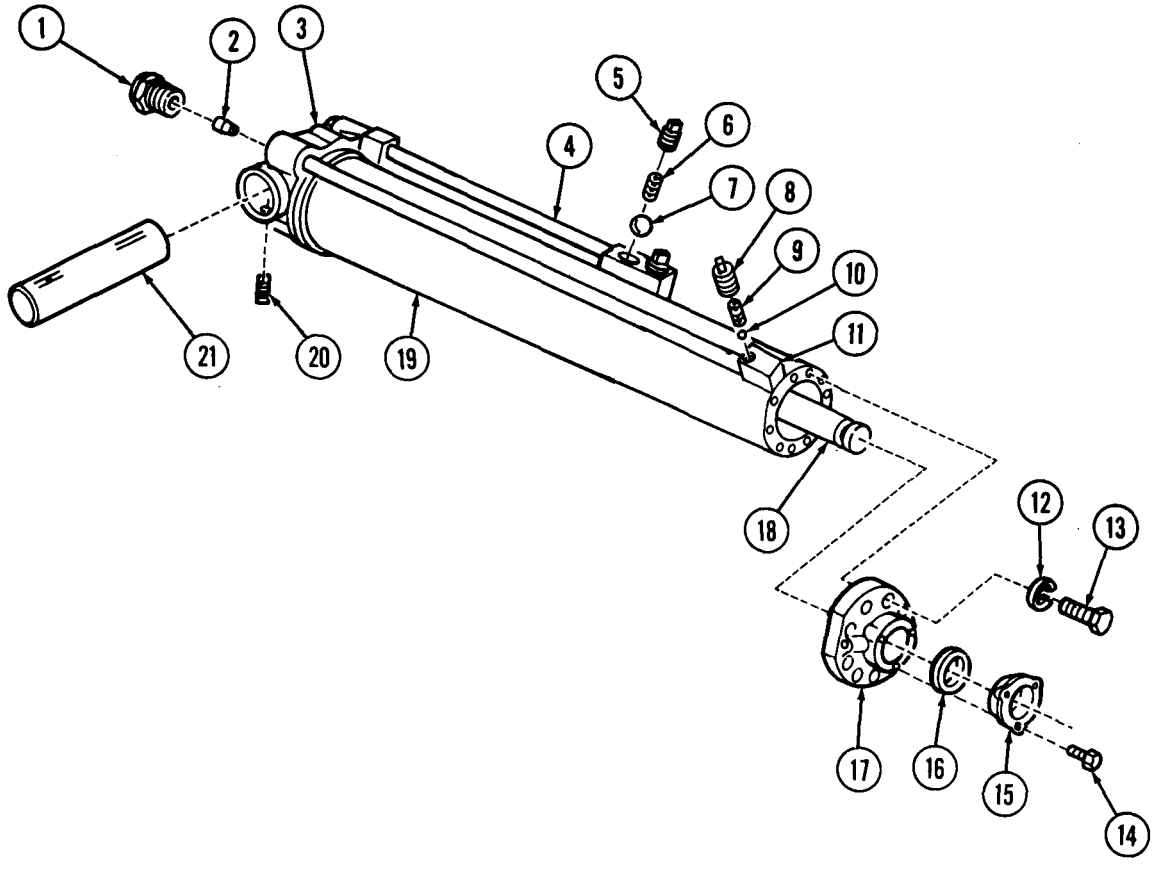
TA 350844

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
31.		Cylinder head (17)	a. Slide over piston rod (18) and position on cylinder housing (19).	
			b. Install with ten new lockwashers (12) and screws (13).	Tighten 8-10 lb-ft (11-14 N·m).
32.		New packing (16)	Install around piston rod (18) in cylinder head (17).	Use fingers to position.
33.		Gland (15)	a. Slide over piston rod (18) until seated against packing (16).	
			b. Install on cylinder head (17) with three screws (14).	
34.		Orifice plug (2) and orifice plug cover (1)	Install in cylinder base (3).	
35.		Two bypass check balls (7), springs (6), and plugs (5)	Install in short bypass tube connector block (4).	Connector block (4) is midway of cylinder (19).
36.		One bypass check ball (10), spring (9), and plug (8)	Install in long bypass tube connector block (11).	Connector block (11) is at head (17) end of cylinder (19).
37.		Hinge pin (21)	a. Position in cylinder base (3) until alined with screw (20) holes.	
			b. Install two square-head screws (20).	

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

e. Installation

NOTE

Installation steps 38 through 42 apply to both hoist cylinders.

38.		Hoist cylinders (6) and (1)	a. Position on sub-frame (7) with by-pass tubes (5) facing down. b. Install each with two bearing caps (2), and four new lockwashers (4) and screws (3).

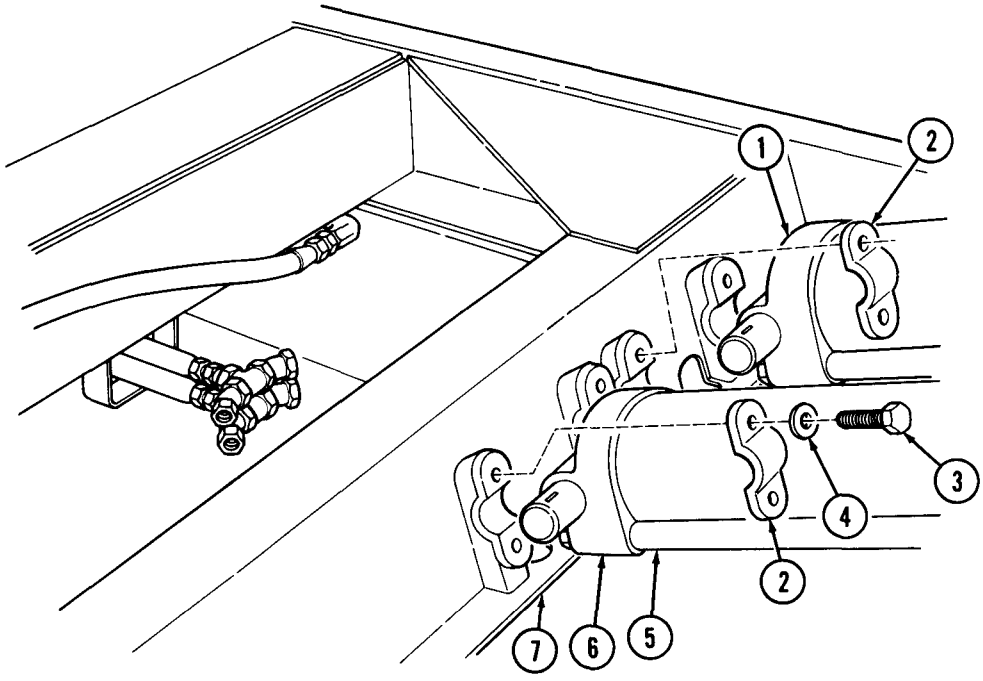
NOTE

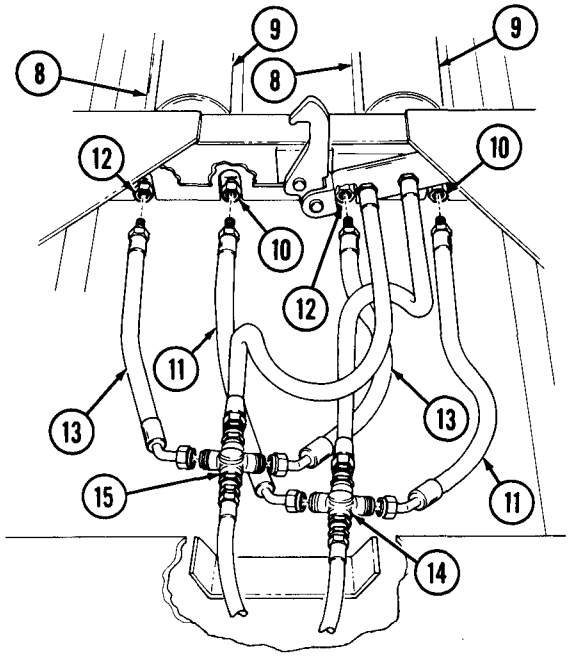
To properly identify hose connection points, the cylinder port (10), with bypass tube (9) extending to midway of the cylinder, will be identified as port B. The cylinder port (12), with bypass tube (8) extending full length of the cylinder, will be identified as port A.

39.		Two hydraulic hoses (13)	Connect to left cylinder port A (12), right cylinder port A (12), and right cross fitting (15).
40.		Two hydraulic hoses (11)	Connect to left cylinder port B (10), right cylinder port B (10), and left cross fitting (14).

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

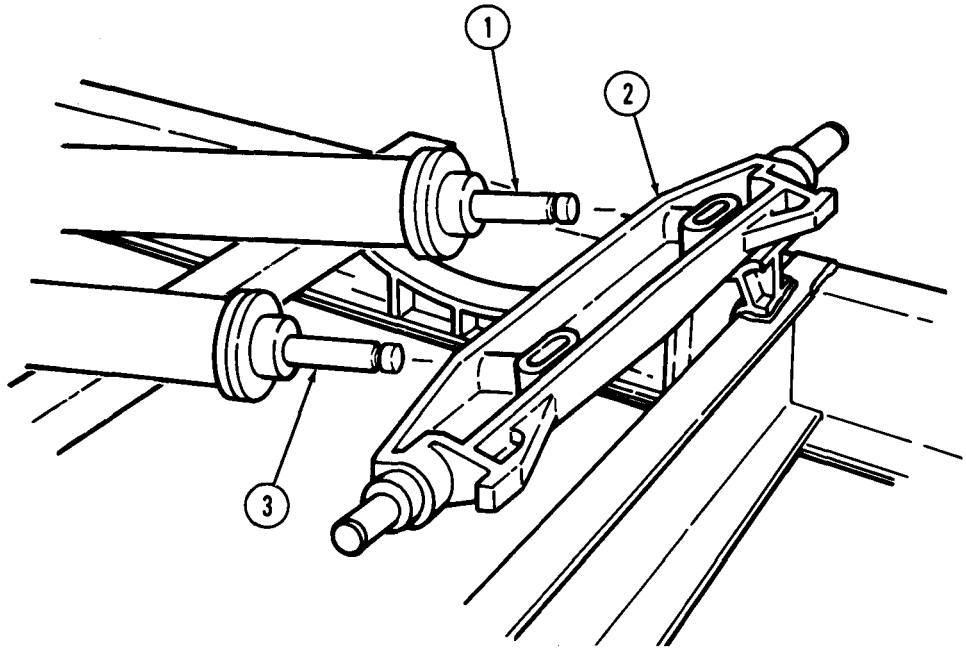




TA 350846

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

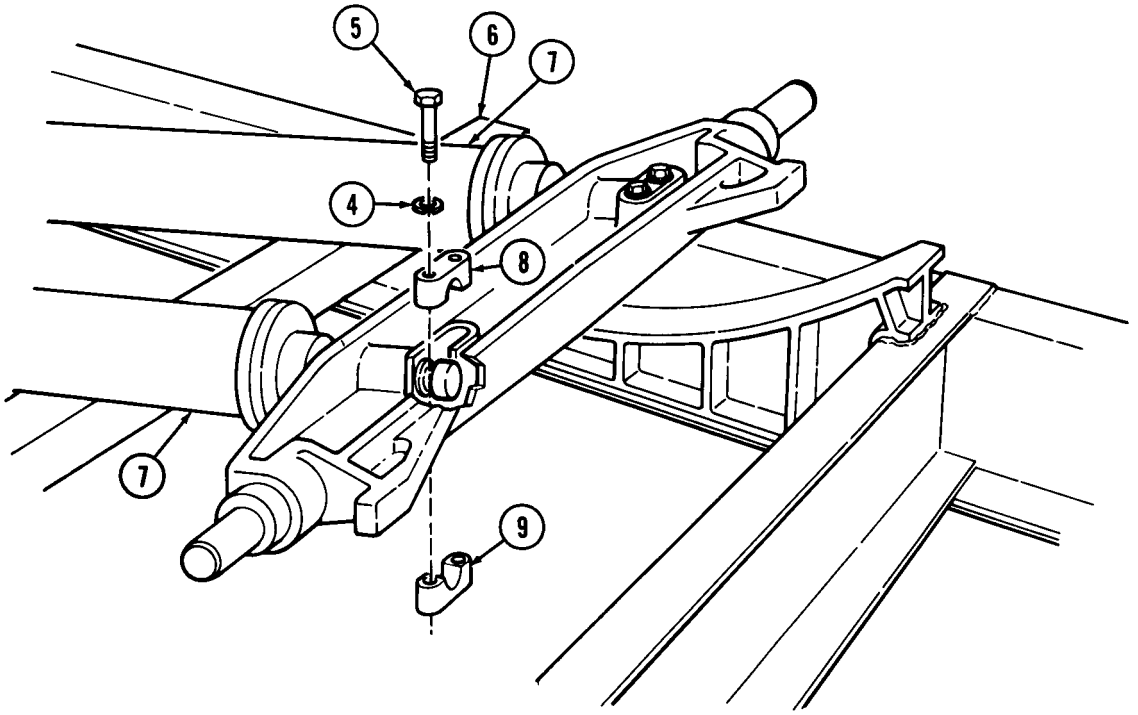
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
41.		Crosshead (2)	Position on piston rods (1) and (3) and install with two upper crosshead retainers (8), two lower crosshead retainers (9), four new lockwashers (4), and screws (5).	
42.		Two hoist cylinders (7)	Raise and remove wood support (6).	



TA 350847

16-6. DUMP HOIST CYLINDER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install dump roller arms (para. 16-5).
- Install dump body (para. 16-4).
- Fill hydraulic reservoir to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and operate dump through full range. Check for leaks and proper operation.

TA 350848

16-7. DUMP SAFETY LOCK AND CYLINDER REPLACEMENT

This task covers:

a. **Removal** **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10 Para. 16-4	Parking brake set. Dump body removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Three cotter pins
Six locknuts
Protective cap-plugs (Appendix C, Item 5)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Do not operate dump controls when dump body is removed.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Make sure dump control is in neutral and not moved. Injury to personnel may result if lift cylinder is operated when not secured.

CAUTION

Plug all hydraulic lines or openings to prevent dirt from entering and damaging components.

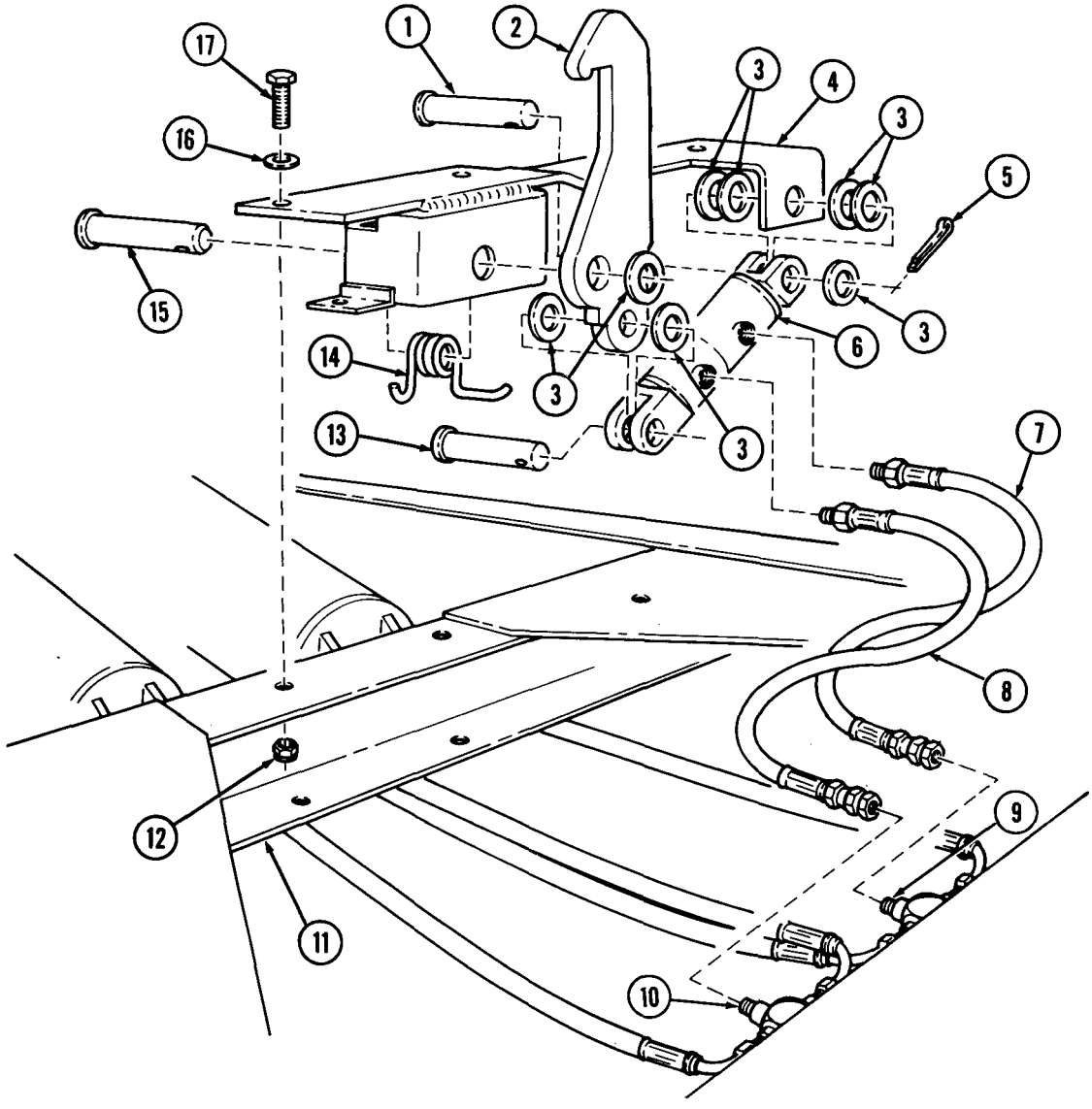
NOTE

Have drainage container ready to catch oil.

1.	Right cross fitting (10)	Hydraulic hose (8)	Disconnect.	Tag for installation.
2.	Left cross fitting (9)	Hydraulic hose (7)	Disconnect.	Tag for installation.
3.	Safety lock cylinder (6)	Two hydraulic hoses (7) and (8)	Disconnect.	Tag for installation.
4.	Pin (15)	Cotter pin (5) and washer (3)	Remove.	Discard cotter pin (5).
5.		Pin (15)	Release spring (14) tension and remove.	

16-7. DUMP SAFETY LOCK AND CYLINDER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Safety hook (2)	Cotter pin (5), pin (13), and two spacer washers (3)	Remove.	Discard cotter pin (5).
7.		Safety hook (2)	Remove.	
8.	Safety lock cylinder bracket (4)	Cotter pin (5), pin (1), and five spacer washers (3)	Remove.	Discard cotter pin (5).
9.		Safety lock cylinder (6)	Remove.	
10.	Frame rail (11)	Six screws (17), washers (16), locknuts (12), and safety lock cylinder bracket (4)	Remove.	Discard locknuts (12).



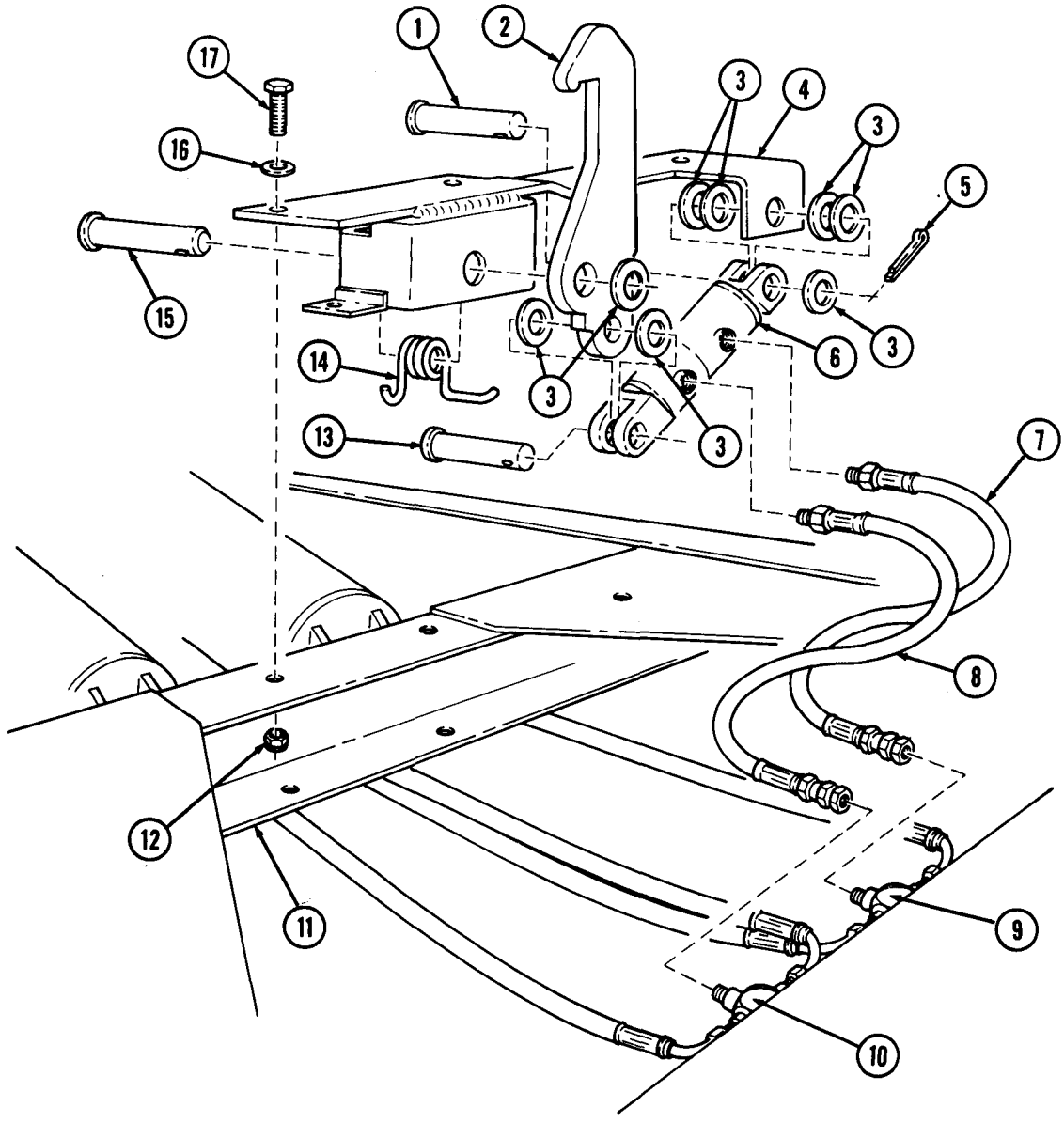
TA 350849

16-7. DUMP SAFETY LOCK AND CYLINDER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
11.		Cylinder bracket (4)	Install on frame rail (11) with six washers (16), screws (17), and new locknuts (12).	
12.		Safety lock cylinder (6)	Install on cylinder bracket (4) with five spacer washers (3), pin (1), and new cotter pin (5).	
13.		Safety hook (2)	a. Install on cylinder bracket (4) with pin (15), washer (3), new cotter pin (5), and spring (14). b. Install on safety lock cylinder (6) with two spacer washers (3), pin (13), and new cotter pin (5).	
14.		Two hydraulic hoses (7) and (8)	Connect to safety lock cylinder (6).	
15.		Hydraulic hose (7)	Connect to left cross fitting (9).	
16.		Hydraulic hose (8)	Connect to right cross fitting (10).	

16-7. DUMP SAFETY LOCK AND CYLINDER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install dump body (para. 16-4).
• Fill hydraulic reservoir to proper oil level (LO 9-2320-272-12).

TA 350850

16-8. DUMP CAB PROTECTOR SHIELD MAINTENANCE

This task covers:

a. Removal
b. Inspection and Repair
c. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Wheels chocked.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Nineteen locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions
All personnel must stand clear during hoisting operations.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
TM 9-237
TM 43-0139

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.		Two eyebolts (9)	Install each into upper rear hole (8) of cab protector (5) with washer (7) and nut (6).	
2.		Two utility chains (3)	a. Attach utility chain hooks (2) to eyebolts (9) and opposite ends of cab protector front support channel (1).	
			b. Attach utility chains (3) to hoist hook (4).	
			c. Raise until slack is removed from chains (3).	Use wrecker or hoisting device. Mechanic will direct operation while assistant operates hoist.

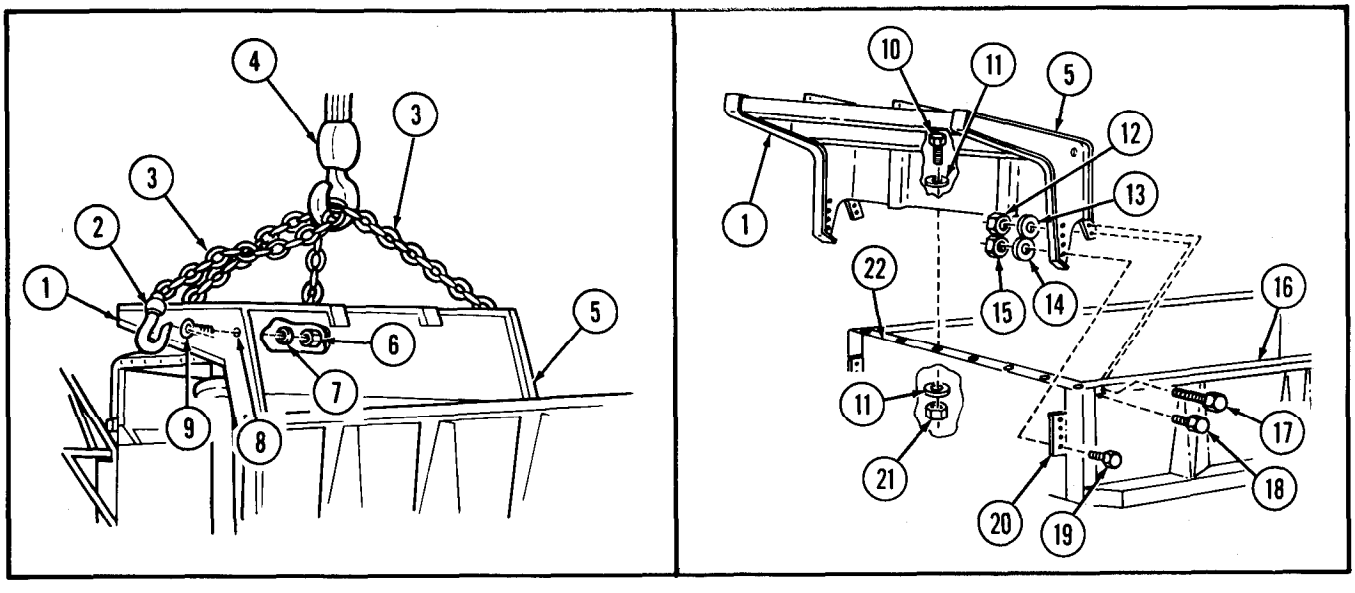
16-8. DUMP CAB PROTECTOR SHIELD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Cab protector (5) to front dump body channel (22)	Seven screws (10), fourteen washers (11), and seven locknuts (21)	Remove.	Discard locknuts (21).
4.	Left and right side cab protector (5) to dump body extension bracket (20)	Eight screws (19), washers (14), and locknuts (15)	Remove.	Discard locknuts (15).

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

5.	Cab protector (5) to dump body side support channel (16)	Four locknuts (12), washers (13), and two screws (17) and (18)	Remove and lift cab protector (5) clear of dump body.	Discard locknuts (12).
6.		Cab protector (5)	Place on four shop stands and remove utility chains (3).	



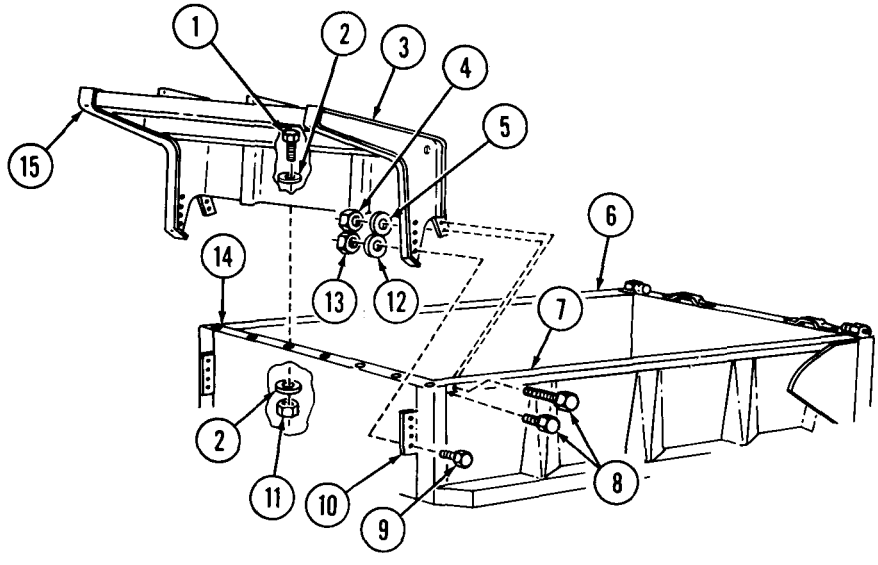
TA 350851

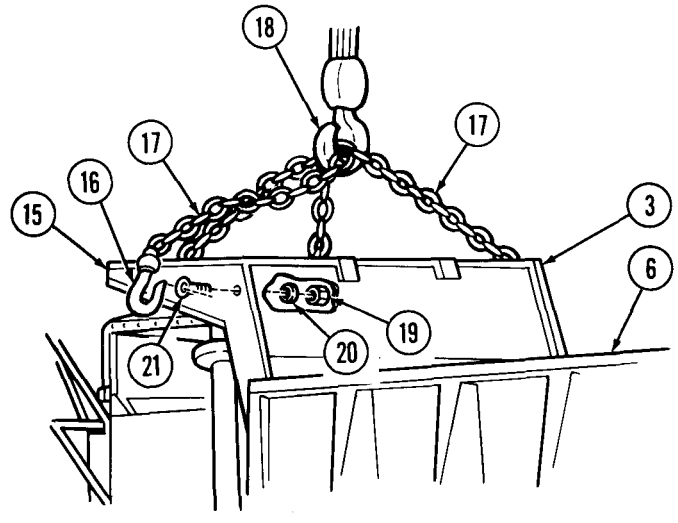
16-8. DUMP CAB PROTECTOR SHIELD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Inspection and Repair				
7.		Cab protector (3)	a. Inspect for breaks, dents, and rust.	If breaks, dents, cracks, or rusted-through areas are found, repair (refer to TM 9-237).
			b. Clean and paint as necessary.	Refer to TM 43-0139.
c. Installation				
8.		Hoist hook (18)	Attach to center of both utility chains (17).	If chains (17) have not been positioned, see step 1.
			WARNING All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.	
9.		Cab protector (3)	Place on dump body (6) as follows:	
			a. Hoist clear of four shop stands and aline mounting holes in dump body (6).	Use drift pins to aline.
			b. Install on left and right side dump body extension bracket (10) with eight screws (9), washers (12), and new locknuts (13).	
			c. Install on left and right dump body side support channel (7) with four screws (8), washers (5), and new locknuts (4).	
			d. Install on dump body front channel (14) with seven screws (1), fourteen washers (2), and seven new locknuts (11).	One washer (2) under screw (1) head and one washer (2) under locknut (11).

16-8. DUMP CAB PROTECTOR SHIELD MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.		Two utility chains (17) and hooks (16)	Remove from hoist hook (18), cab protector front channel (15), and eyebolts (21).	
11.		Nut (19) and washer (20)	Remove from each eyebolt (21) and remove eyebolts (21).	





END OF TASK!

TA 350852

16-9. DUMP SAFETY BRACE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Dump body in lowered position.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Lockwasher

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Both left and right safety braces are removed in the same way. This procedure applies to left brace only.

a. Removal

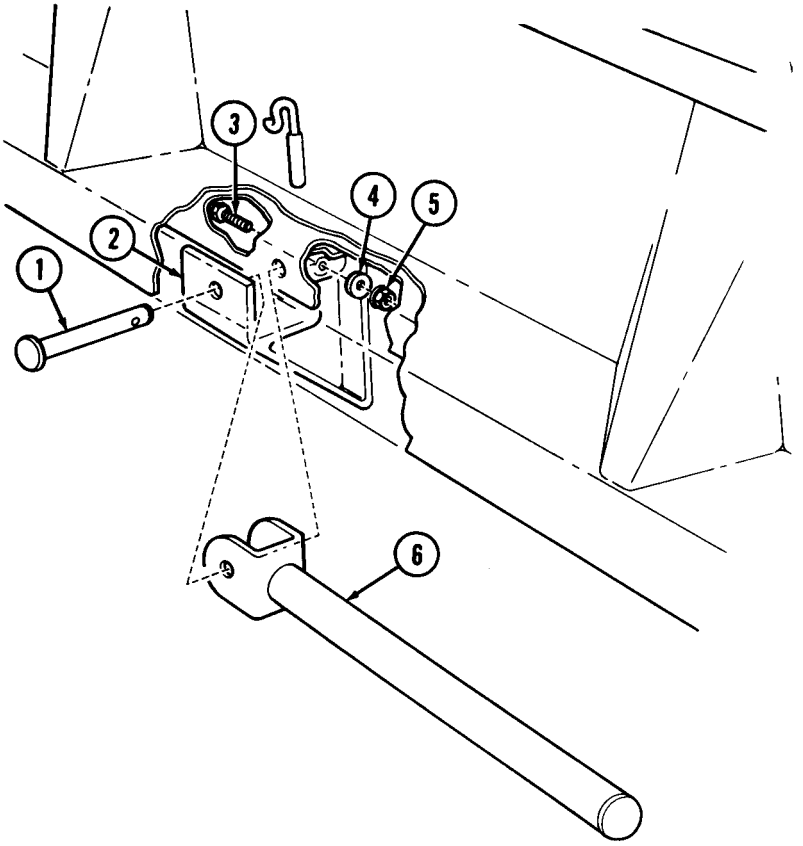
1.	Safety brace hinge pin (1) to bracket (2)	Screw (3), lockwasher (4), and nut (5)	Remove.	Discard lockwasher (4).
2.		Hinge pin (1)	Remove from bracket (2).	Use chisel and hammer.
3.		Safety brace (6)	Remove.	

b. Installation

4.		Safety brace (6)	Position in bracket (2) with hinge pin (1) hole alined.	
5.		Hinge pin (1)	Position in bracket (2) through safety brace (6) and install with screw (3), new lockwasher (4) and nut (5).	

16-9. DUMP SAFETY BRACE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

16-10. DUMP BODY HYDRAULIC HOSE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Dump body in lowered position.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

Position safety braces before working under raised dump body.

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Never work under dump body until safety braces are properly positioned. Injury to personnel may result if dump suddenly lowers.

NOTE

All hydraulic hoses are removed the same way. This procedure covers dump hoist cylinder and safety lock cylinder hoses only.

a. Removal

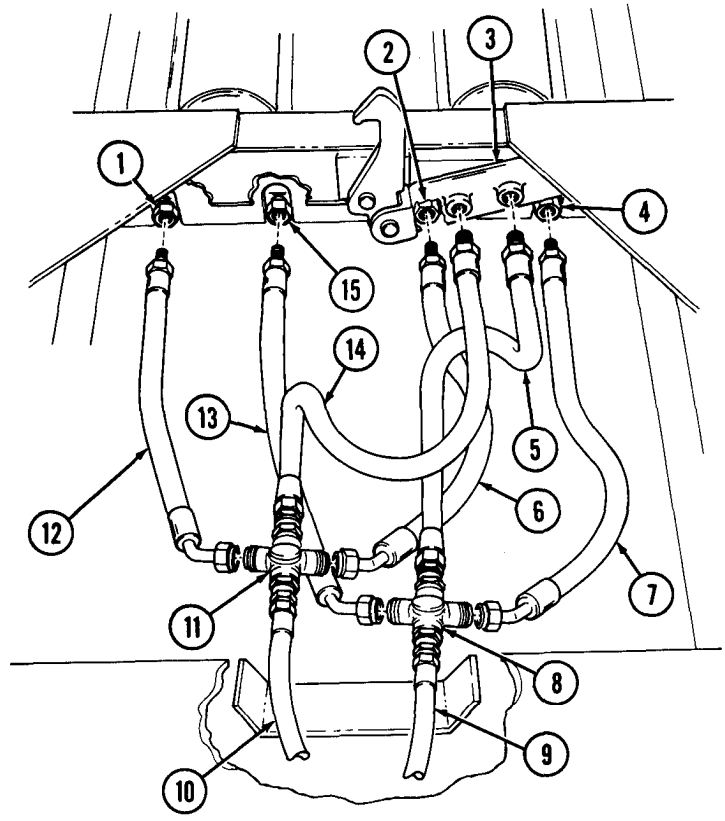
1.		Dump body	Raise and fasten in up position with safety braces and place control lever in neutral.	Refer to TM 9-2320-272-10. To prevent excessive loss of hydraulic oil, do not move control lever out of neutral position with hydraulic-hose removed.

CAUTION

Plug all hydraulic lines or openings to prevent dirt from entering and damaging components.

16-10. DUMP BODY HYDRAULIC HOSE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Cross fitting to hoist cylinder hoses must be disconnected from the cross fittings first. Then hoses can be removed from hoist cylinders. • Have drainage container ready to catch oil. • Drain hoses before plugging. • Tag hoses for installation.		
2.	Right cross fitting (11)	Four hydraulic hoses (6), (10), (12), and (14)	Disconnect.	
3.	Left cross fitting (8)	Four hydraulic hoses (5), (7), (9), and (13)	Disconnect.	
4.	Right and left cylinder, port A (1) and (2)	Two hydraulic hoses (6) and (12)	Disconnect.	
5.	Right and left cylinder, port B (4) and (15)	Two hydraulic hoses (7) and (13)	Disconnect.	
6.	Safety lock cylinder (3)	Two hydraulic hoses (5) and (14)	Disconnect.	



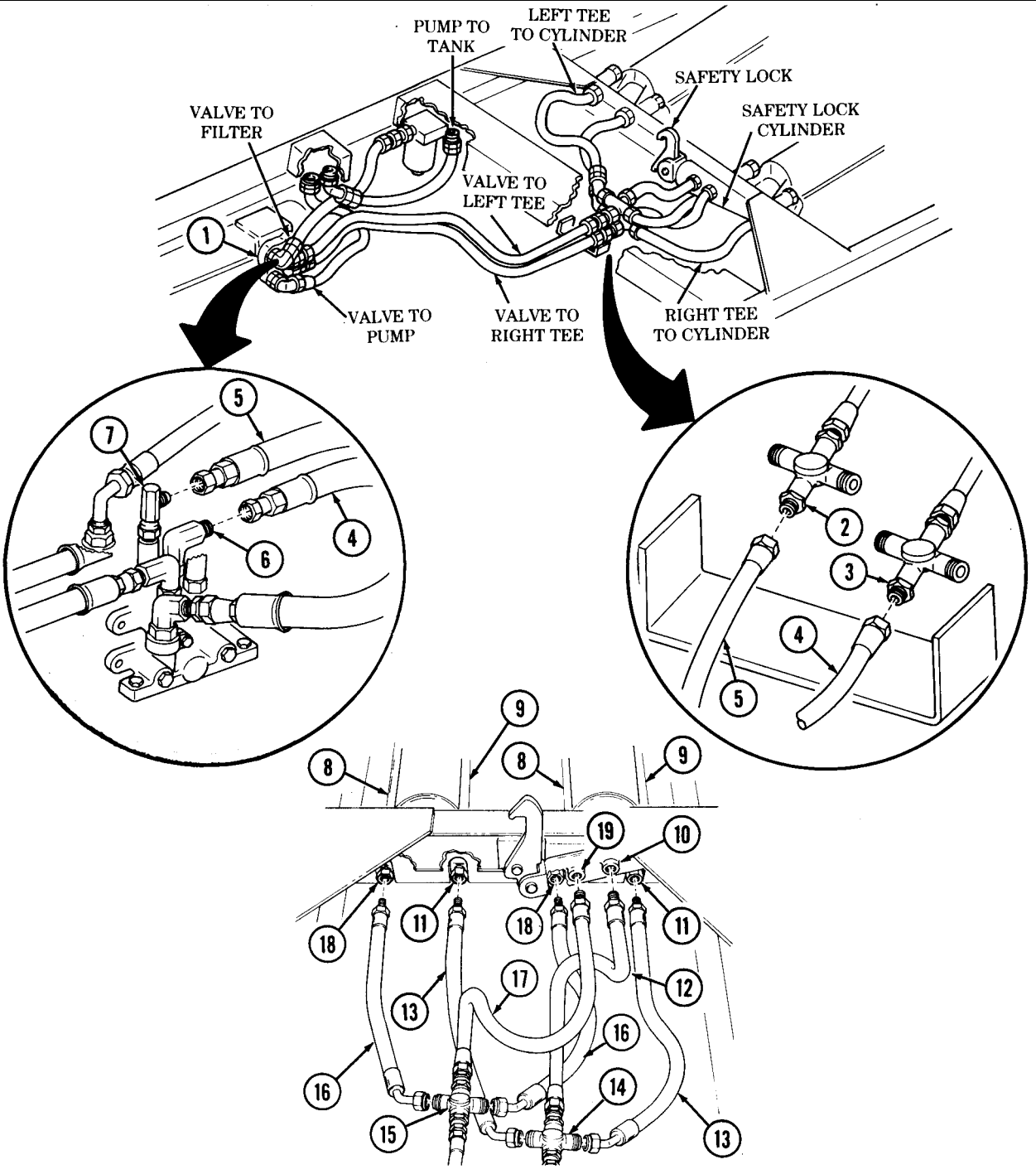
TA 350854

16-10. DUMP BODY HYDRAULIC HOSE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Control valve (1) fittings (6) and (7)	Two hoses (4) and (5)	Disconnect.	
	b. Installation			
		NOTE Make certain plugs are removed from all fittings before installation. Make certain no particles of plugging become trapped in dump body hydraulic system during installation of hoses and tubing.		
8.		Two hoses (4) and (5)	a. Connect to fittings (6) and (7) of control valve (1). b. Connect to cross fittings (3) and (2).	
		NOTE To properly identify hose connection points, the cylinder port (18), with bypass tube (8) extending the full length of the cylinder, will be identified as port A. The cylinder port (11) with bypass tube (9) extending midway of the cylinder, will be identified as port B.		
9.		Two hydraulic hoses (16)	Connect to left cylinder, port A (18) and right cylinder, port A (18) and right cross fitting (15).	
10.		Two hydraulic hoses (13)	Connect to left cylinder, port B (11), and right cylinder, port B (11) and left cross fitting (14).	
11.		Left cross fitting to safety lock cylinder hose (12)	a. Connect to left safety lock cylinder port (10). b. Connect to left cross fitting (14).	
12.		Right cross fitting to safety lock cylinder hose (17)	a. Connect to right safety lock cylinder port (19). b. Connect to right cross fitting (15).	
13.		Dump body	Remove safety braces and place in lowest position.	Refer to TM 9-2320-272-10.

16-10. DUMP BODY HYDRAULIC HOSE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Fill hydraulic reservoir to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and operate dump through full range. Check for leaks and proper operation.

TA 350855

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT

This task covers:

a. Removal **b. Installation and Adjustment**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Fourteen locknuts
Two cotter pins
Tiedown strap (Appendix C, Item 22)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

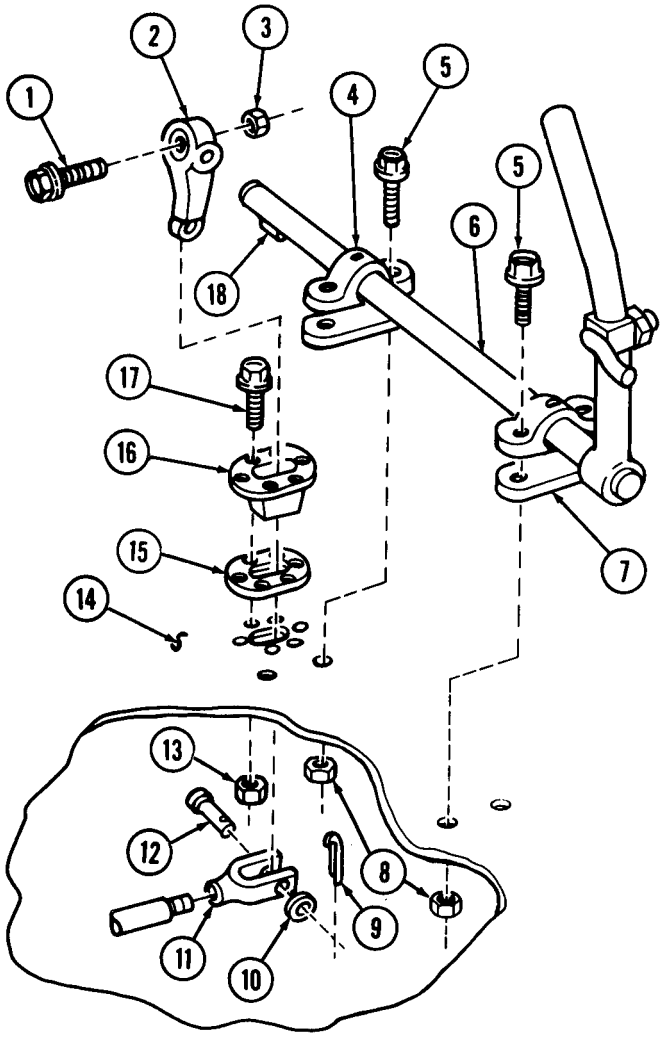
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Cable clevis (11) to shift lever arm (2)	Cotter pin (9), washer (10), and clevis pin (12)	Remove.	Cable clevis (11) is under cab floor (14). Discard cotter pin (9).
2.	Two lever brackets (4) and shims (7) to cab floor (14)	Four screws (5), locknuts (8), and shift lever (6)	Remove.	Discard locknuts (8) located under cab floor (14).
3.	Shift lever rod (6)	Woodruff key (18)	Remove.	
4.	Cab floor (14)	Screw (1), locknut (3), and shift lever arm (2)	Remove.	Discard locknut (3).
5.	Shift lever rod (6)	Two lever brackets (4)	Remove.	
6.	Cab floor (14)	Six screws (17) and locknuts (13) and seal (16) and retainer ring (15)	Remove.	Discard locknuts (13).

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350856

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Dump valve cable (20)	Cable clevis (10) and jamnut (9)	Loosen and remove.	
8.	Cable conduit (13) to rear cab floor left bracket (7)	Two screws (11), clamp (12), shim (8), and two locknuts (14)	Remove.	Bracket (7) is located under cab floor (18). Discard locknuts (14).
9.	Cable conduit (13) to front cab floor right bracket (15)	Screw (17), locknut (6), and clamp (16)	Remove.	Bracket (15) is located under cab floor (18). Discard locknut (6).
10.	Cable conduit (13)	Tiedown strap (19)	Remove.	Discard strap (19).
11.	Cable clevis (1) to control valve (5)	Cotter pin (4), washer (3), and clevis pin (2)	Remove.	Discard cotter pin (4).
12.	Dump valve cable (20) valve end	Cable clevis (1) and jamnut (26)	Loosen and remove.	
13.	Cable conduit (13) to lower bracket (23)	Jamnut (25) and washer (24)	Remove from control valve (5) side only.	It is not necessary to remove other washer (22) and jamnut (21).
14.		Cable conduit (13)	Pull through lower bracket (23) and underside of cab floor (18).	Tag for installation.

b. Installation and Adjustment

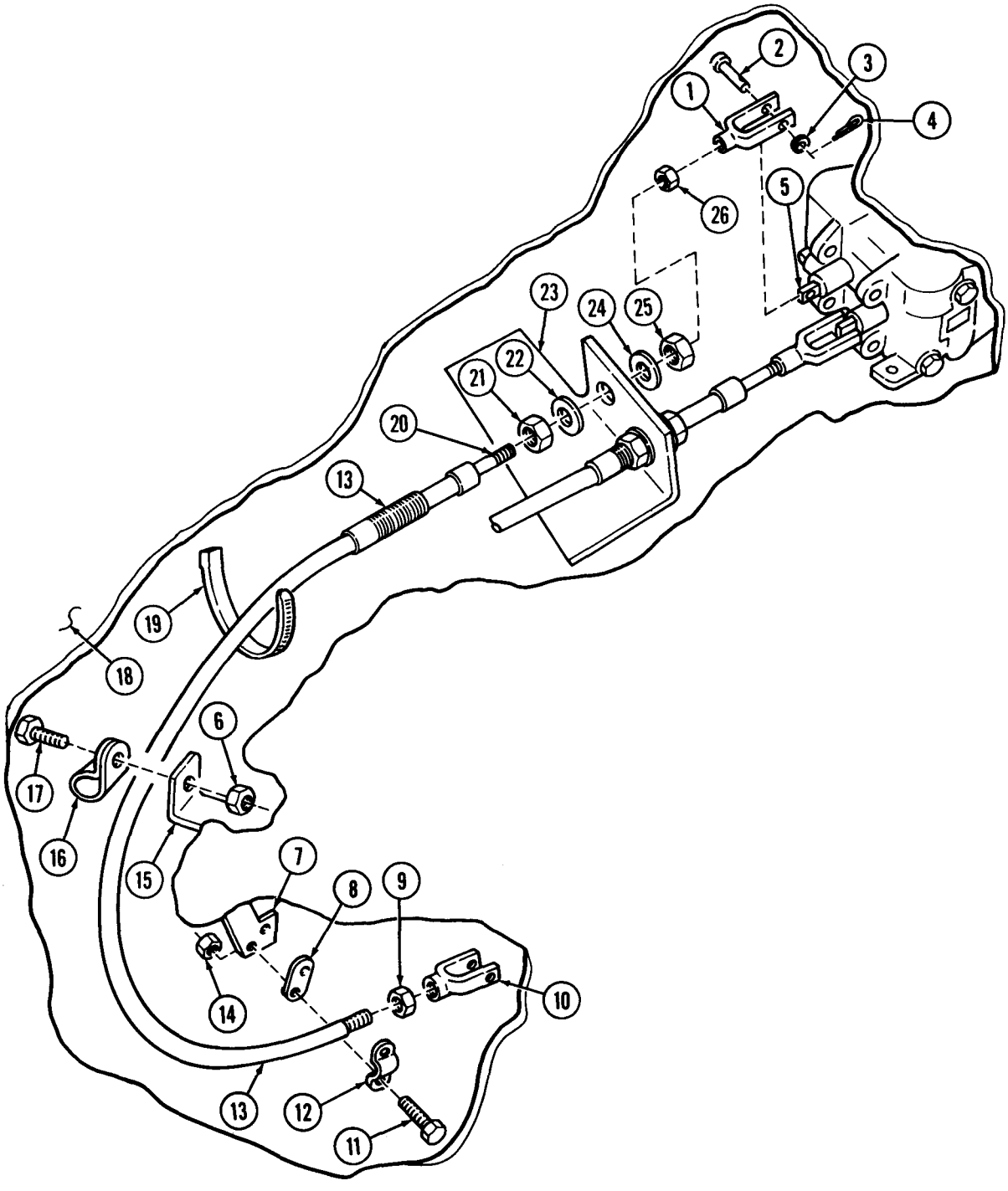
NOTE

If new cable is being installed use hardware from old cable.

15.		Cable conduit (13)	a. Install jamnut (21) and washer (22) on valve cable (20), if removed. b. Place valve cable (20) end through lower bracket (23) and install with washer (24) and jamnut (25).
16.		Cable clevis (1)	Screw on valve end of valve cable (20) four turns.

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



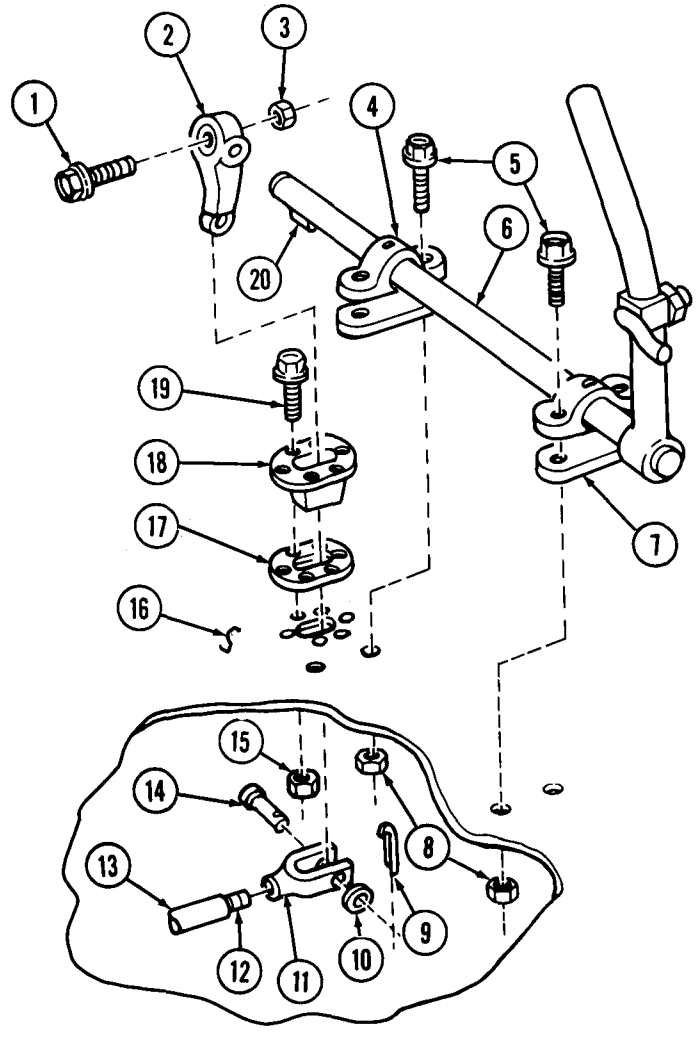
TA 350857

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.		Cable conduit (13)	Route under cab floor (16).	
18.		Cable clevis (11)	Screw on cable shift lever arm end (12) four turns.	
19.		Seal (18) and retainer ring (17)	Install on cab floor (16) with six screws (19) and new locknuts (15).	
20.		Two lever brackets (4)	Slide on lever rod (6).	
21.		Woodruff key (20)	a. Position on rod (6) and slide arm (2) over. b. Install with screw (1) and new locknut (3).	
22.		Shift lever rod (6)	Position to cab floor (16) and install with two brackets (4), shims (7), four screws (5), and new locknuts (8).	
23.		Cable clevis (11)	Install on lever arm (2) with clevis pin (14), washer (10), and new cotter pin (9).	

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



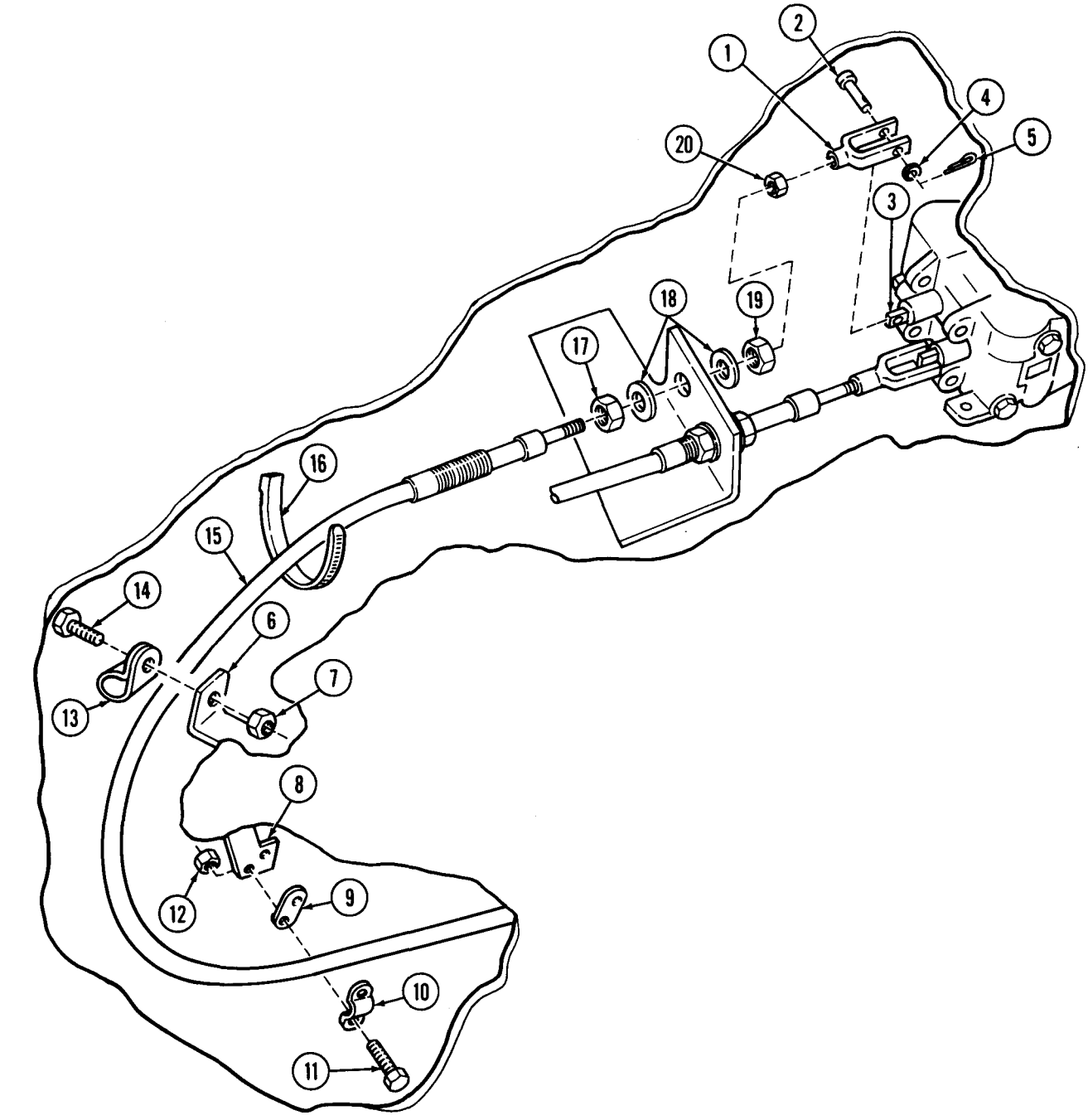
TA 350858

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
24.		Cable conduit (15)	a. Install on rear cab bracket (8) with shim (9), clamp (10), two screws (11), and new locknuts (12).	
			b. Install on front cab floor bracket (6) with clamp (13), screw (14), and new locknut (7).	
25.		Shift lever	Place in down position.	Refer to TM 9-2320-272-10.
26.		Valve shaft (3)	Manually pull out until seated.	Valve shaft (3) will stop when seated.
		NOTE Cable throw length can be adjusted with jamnuts.		
27.		Cable clevis (1)	a. Aline clevis pin (2) hole with hole in valve shaft (3).	Use jamnuts (17) and (19) and two washers (18) for alinement.
			b. Unscrew clevis (1) one turn and install on valve shaft (3) with clevis pin (2), washer (4), and new cotter pin (5).	Tighten jamnut (20).
28.		Tiedown strap (16)	Install.	

16-11. DUMP VALVE CABLE AND SHIFT LEVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Lubricate shift lever (LO 9-2320-272-12).
• Test dump valve cable operation (TM 9-2320-272-10).

TA 350859

16-12. DUMP SUBFRAME REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M929, M930	TM 9-2320-272-10 LO 9-2320-272-12 Para. 16-4	Parking brake set. Hydraulic oil reservoir drained. Dump body removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Eight locknuts
Four cotter pins
Protective cap-plugs (Appendix C, Item 5)

Personnel Required
Wheeled vehicle repairman MOS 63W (3)

General Safety Instructions
All personnel must stand clear during hoisting operations.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

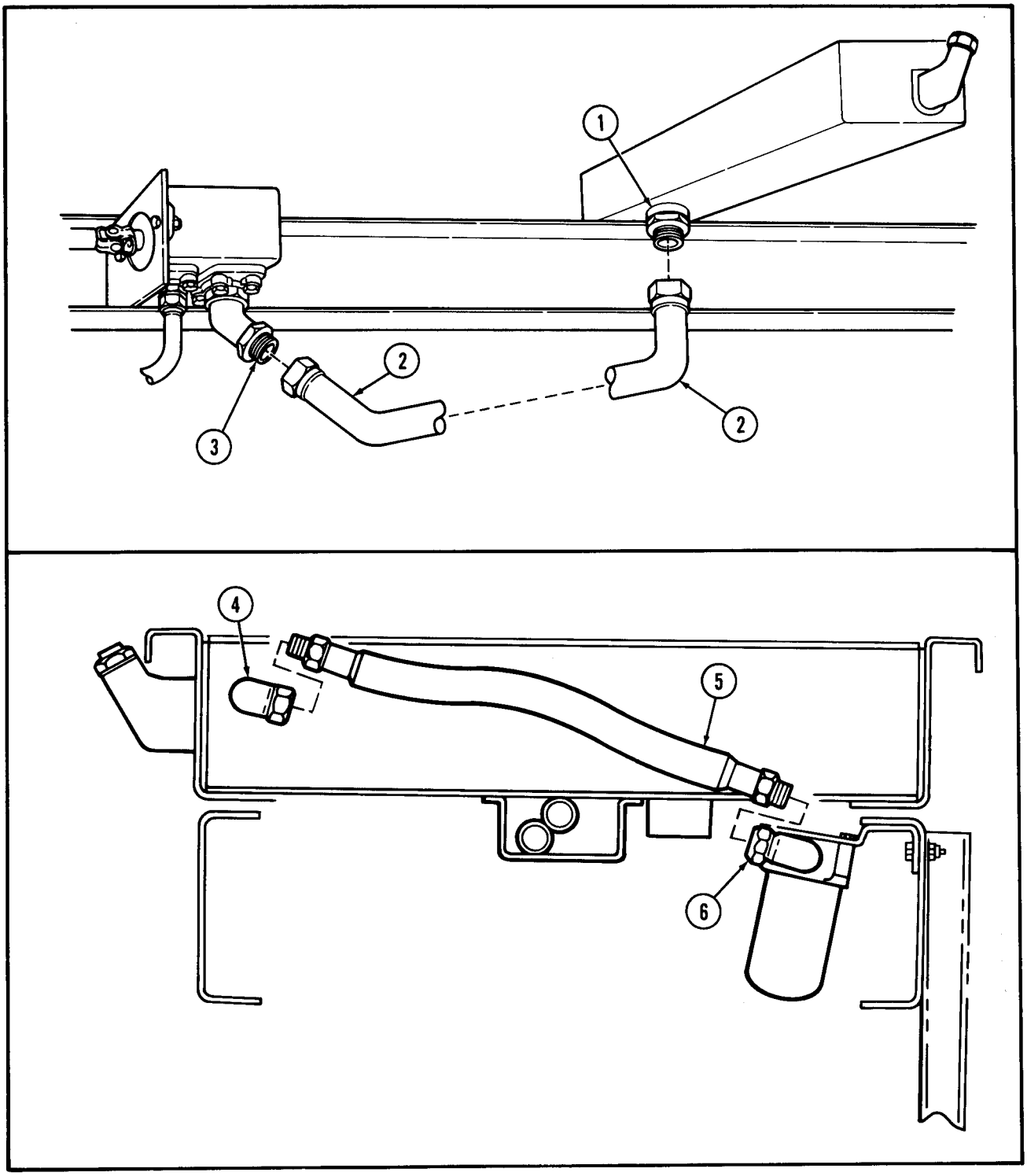
Plug all hydraulic lines or openings to prevent dirt form entering and damaging components.

a. Removal

1.	Pump to reservoir hydraulic tube (2)	Disconnect from pump adapter (3) and reservoir adapter (1).	Have container ready to catch oil.
2.	Filter to reservoir hydraulic hose (5)	Disconnect from reservoir elbow (4) and filter adapter (6).	Have container ready to catch oil.

16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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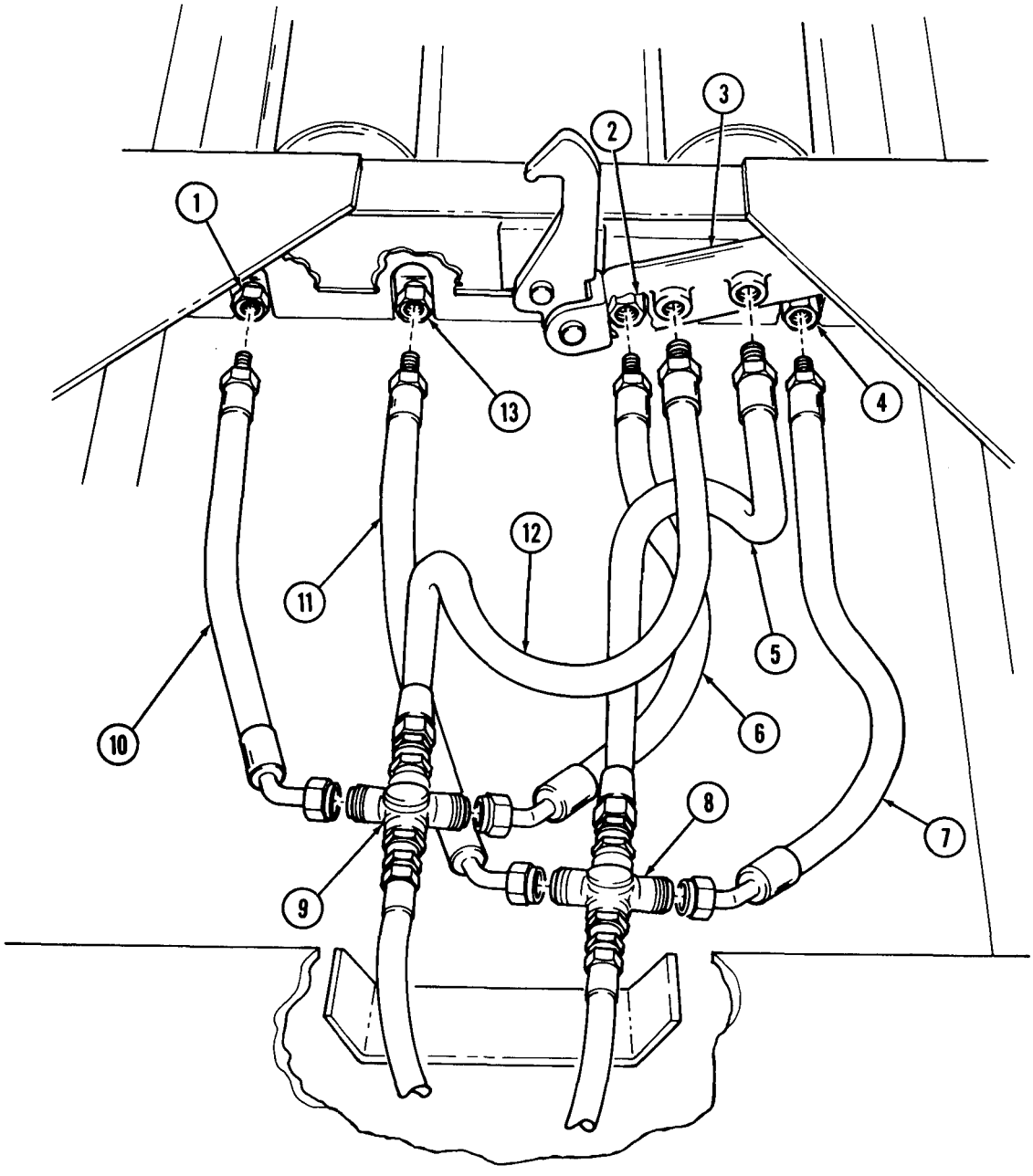
16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Cross fitting to hoist cylinder hoses must be disconnected from the cross fittings first. Then hoses can be removed from hoist cylinders. • Have container ready to catch oil.		
3.	Right cross fitting (9)	Three hydraulic hoses (6), (10), and (12)	Disconnect.	Tag for installation.
4.	Left cross fitting (8)	Three hydraulic hoses (5), (7), and (11)	Disconnect.	Tag for installation.
5.	Right and left cylinder port A (1) and (2)	Two hydraulic hoses (6) and (10)	Disconnect.	Tag for installation.
6.	Right and left cylinder port B (4) and (13)	Two hydraulic hoses (7) and (11)	Disconnect.	Tag for installation.
7.	Safety lock cylinder (3)	Two hydraulic hoses (5) and (12)	Disconnect.	Tag for installation.

16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

	LOCATION	ITEM	ACTION	REMARKS
8.	Two rear holddown brackets (13) to frame (16)	Eight screws (15) and locknuts (14)	Remove.	Discard locknuts (14).
9.		Two utility chains (11)	a. Attach hook ends to opposite side of frame channels (12).	
			b. Attach utility chains (11) to hoist hook (lo).	
			c. Raise until slack is removed from chains (11).	Use wrecker or hoisting device.
10.	Two front holddown brackets (5) to frame (16)	Two cotter pins (8), slotted nuts (7), washers (6), springs (3), screws (l), upper keepers (2), and lower keepers (4)	Remove from each bracket (5).	Discard cotter pins (8).
11.		Two guide lines (18)	Connect to front and rear of subframe (9).	Mechanic will handle one guide line (18) and direct hoisting operation. One assistant will handle other guide line (18), Another assistant will operate hoisting device.

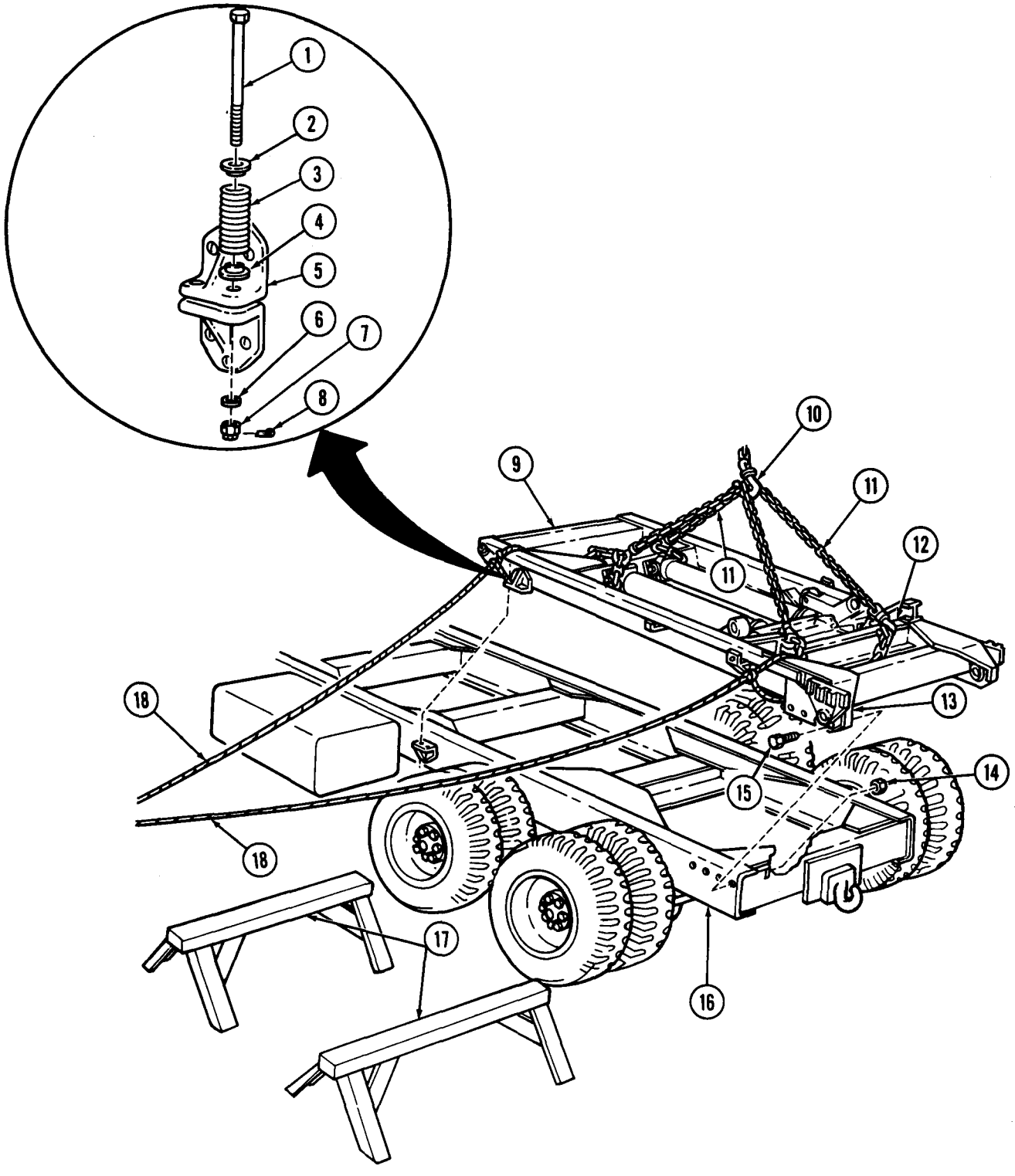
WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

12.		Subframe (9)	Lift clear of frame (16) and place on two shop stands (17).
13.		Hoist hook (10)	Disconnect from utility chains (11),

16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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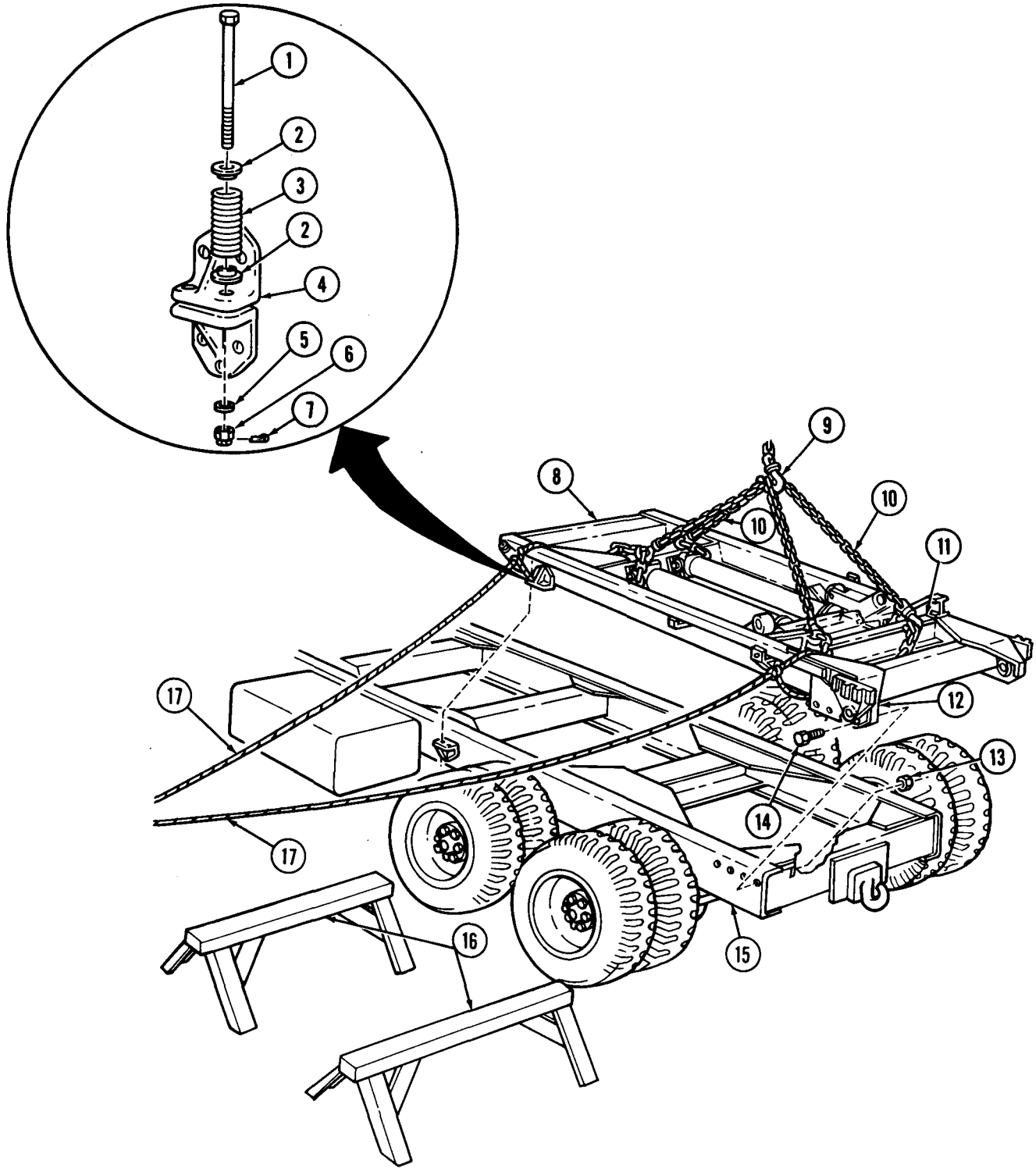
16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
14.		Hoist hook (9)	Attach to center of both utility chains (10).	Check position and security of chain hook ends (11) (see step 9).
		WARNING All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.		
15.		Subframe (8)	Place on frame (15) as follows: a. Hoist clear of shop stands (16). b. Lower on frame (15) with brackets (4) and (12) alined.	Mechanic will handle one guide line (17) and direct hoisting operation. Assistant will handle other guide line (17). Another assistant will operate lifting device.
16.		Two rear holddown brackets (12)	Install on frame (15) with four screws (14) and new locknuts (13) in each one.	
17.		Two utility chains (10)	Remove from hoist hook (9) and subframe (8).	
18.		Two front holddown brackets (4)	Install on frame (15) with two springs (3), four keepers (2), two screws (1), washers (5), slotted nuts (6), and new cotter pins (7) in each one.	

16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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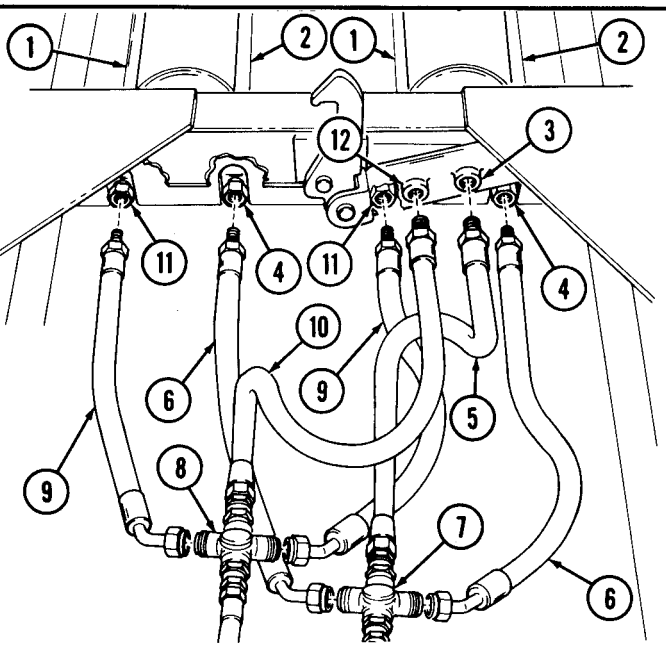
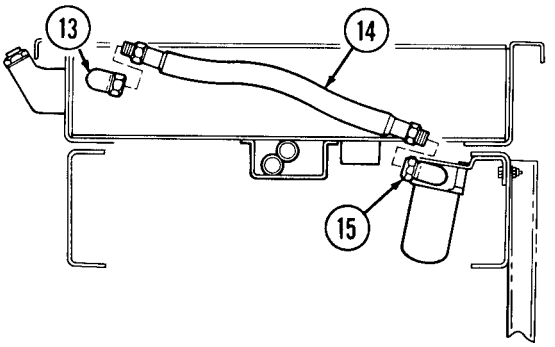
16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

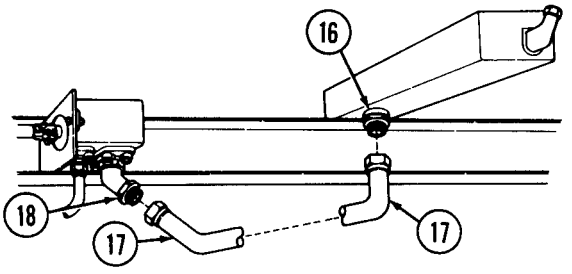
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE To properly identify hose connection points, the cylinder port (11), with bypass tube (1) extending the full length of the cylinder, will be identified as port A. The cylinder port (4), with bypass tube (2) extending midway of the cylinder, will be identified as port B.		
19.		Two hydraulic hoses (9)	Connect to left cylinder, port A (11) and right cylinder, port A (11) and right cross fitting (8).	
20.		Two hydraulic hoses (6)	Connect to left cylinder, port B (4) and right cylinder, port B (4) and left cross fitting (7).	
21.		Left cross fitting to safety lock cylinder hose (5)	a. Connect to left safety lock cylinder port (3). b. Connect to left cross fitting (7).	
22.		Right cross fitting to safety lock cylinder hose (10)	a. Connect to right safety lock cylinder port (12). b. Connect to right cross fitting (8).	
23.		Filter to reservoir hydraulic hose (14)	Connect to reservoir elbow (13) and filter adapter (15).	
24.		Pump to reservoir hydraulic tube (17)	Connect to pump adapter (18) and reservoir adapter (16).	

16-12. DUMP SUBFRAME REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







END OF TASK!

FOLLOW-ON TASKS:
- Install dump body (para. 16-4).
- Fill hydraulic reservoir to proper oil level (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10) and operate dump through full range. Check for leaks and proper operation.

TA 350864

16-13. DUMP HYDRAULIC PUMP REPLACEMENT

The procedure for replacement of the dump hydraulic pump can be found in paragraph 19-8.

16-14. DUMP CONTROL VALVE REPLACEMENT

The procedure for replacement of the dump control valve can be found in paragraph 19-10.

CHAPTER 17
FIFTH WHEEL MAINTENANCE

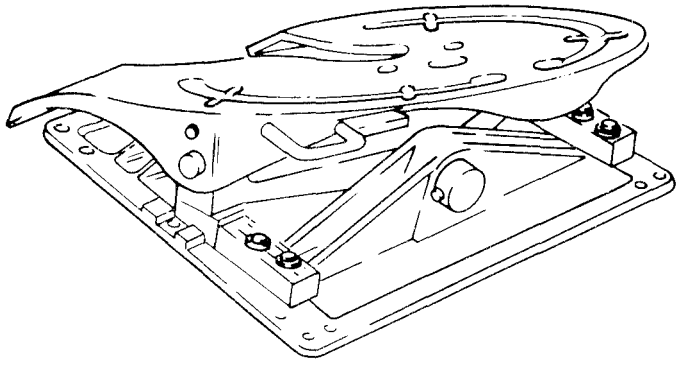
Section I. DESCRIPTION AND DATA

17-1. DESCRIPTION – FIFTH WHEEL

The fifth wheel serves as the coupling and support for the semitrailer. The semitrailer to tractor coupling operation can be found in TM 9-2320-272-10. Additional data for the fifth wheel can be found in table 17-1

Table 17-1. Fifth Wheel Tabulated Data

FIFTH WHEEL	
Make	Dayton-Walther
Type	Walking Beam
Series	Twenty



FIFTH WHEEL

Section II. FIFTH WHEEL MAINTENANCE

17-2. FIFTH WHEEL MAINTENANCE TASK SUMMARY

17-3. FIFTH WHEEL MAINTENANCE

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M931, M932	TM 9-2320-272-20-2	Fifth wheel removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Fifth wheel rebuild service kit 50-023044
Two 5/8-11 UNC, 3 in. (7.6 cm) long bolts
Three lockwashers
Two bushings

General safety Instructions
- All personnel must stand clear during hoisting operations.
- Keep fire extinguisher nearby when using drycleaning solvent.

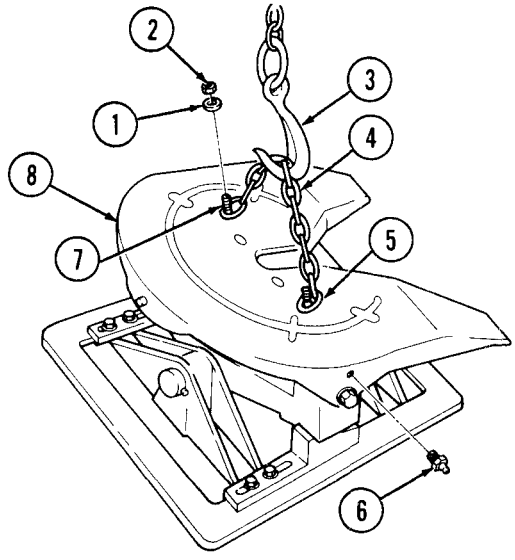
Personnel Required
Wheeled vehicle repairman MOS 63W (2)

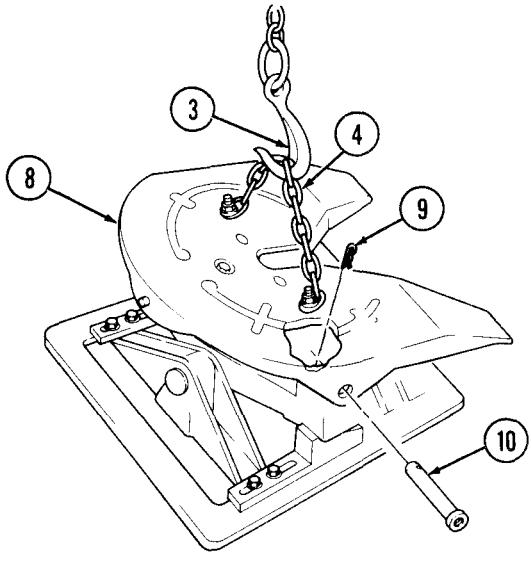
Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Disassembly				
1.	Fifth wheel housing (8)	Two grease fittings (6)	Remove.	
		NOTE Assistant will help with steps 2 through 6.		
2.		Utility chain (4)	a. Install link ends (5) to holes in housing (8) with two screws (7), four washers (1), and two nuts (2).	Make sure one washer (1) is between housing (8) and head of screw (7) and other washer (1) is between chain link (5) and nut (2).
			b. Attach to lifting device.	
3.		Hoist hook (3)	Raise until all slack is removed from utility chain (4).	
4.	Two fifth wheel bushing pins (10)	Two hairpin clips (9)	Remove.	

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

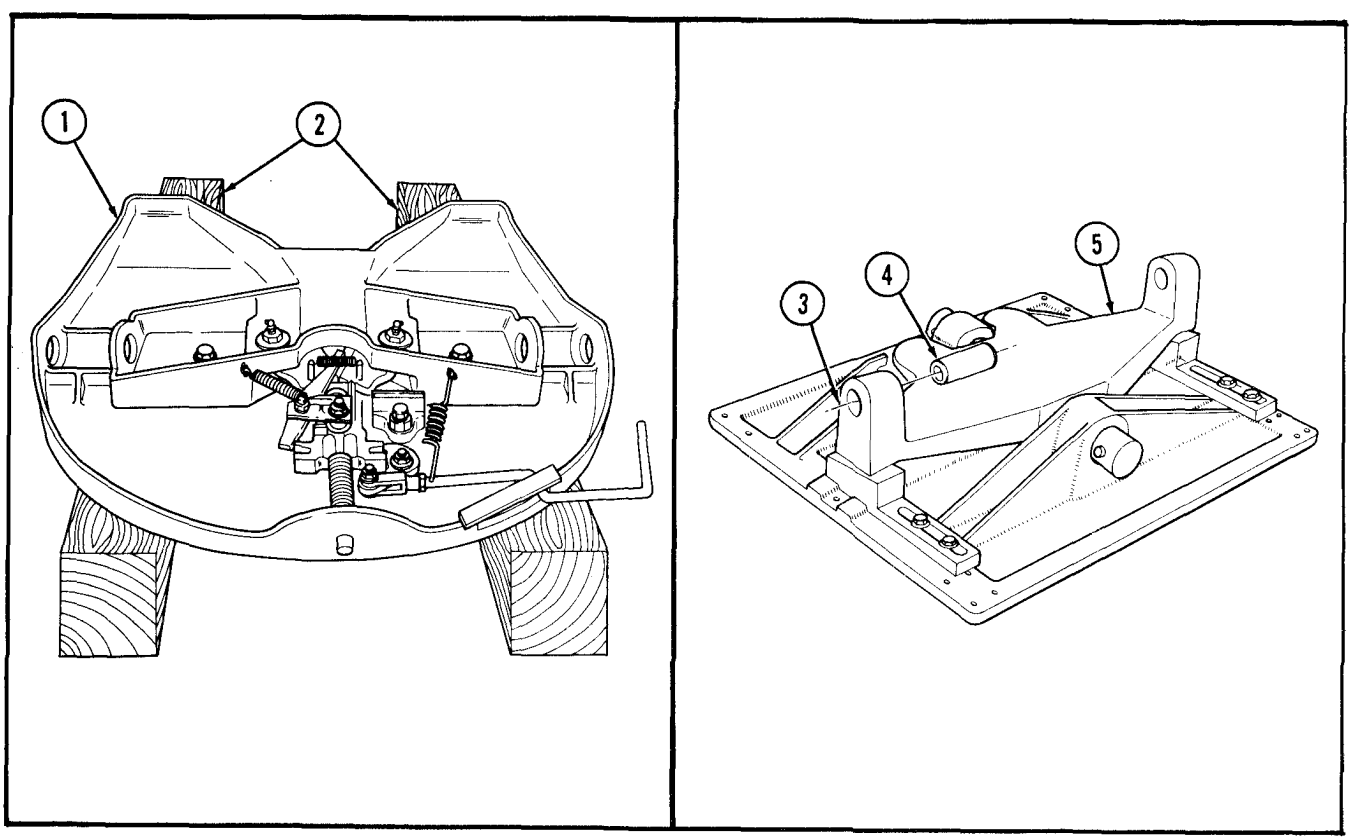
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Fifth wheel housing (8)	Two fifth wheel bushing pins (10)	Remove.	Pull outward from fifth wheel housing (8) using 5/8-11 bolts and a portable hydraulic jack unit.





17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

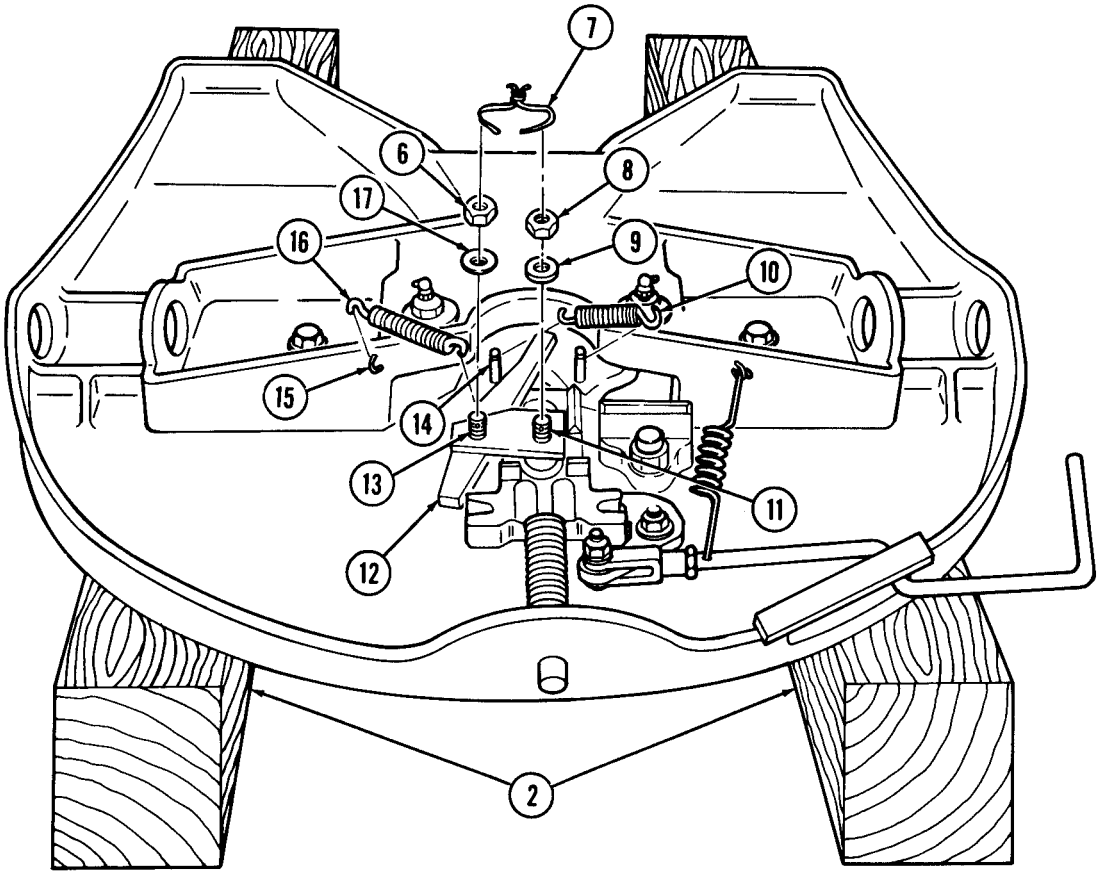
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			WARNING All personnel must stand clear during hoisting operations. A shifting or swinging load may cause injury to personnel.	
6.		Fifth wheel housing (1)	a. Raise clear of walking beam (5). b. Lower and place load-bearing side on two wood blocks (2) approximately 7 in. (17.7 cm) off floor.	
7.		Utility chain	Remove.	
8.	Two walking beam posts (3)	Two rubber bushings (4)	Remove.	Discard bushings (4).



TA 350405

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
9.	Two coupler jaw spring pins (14)	Jaw spring (10)	Remove.	Discard jaw spring (10).
10.	Lock latch (12) to housing eyelet (15)	Lock latch spring (16)	Remove.	
11.	Lock latch stud (13) and plunger bolt (11)	Lockwire (7)	Cut and remove.	Discard lockwire (7).
12.	Lock latch stud (13)	Locknut (6) and washer (17)	Remove.	Discard locknut (6).
13.	Plunger bolt (11)	Locknut (8) and washer (9)	Remove.	Discard locknut (8).



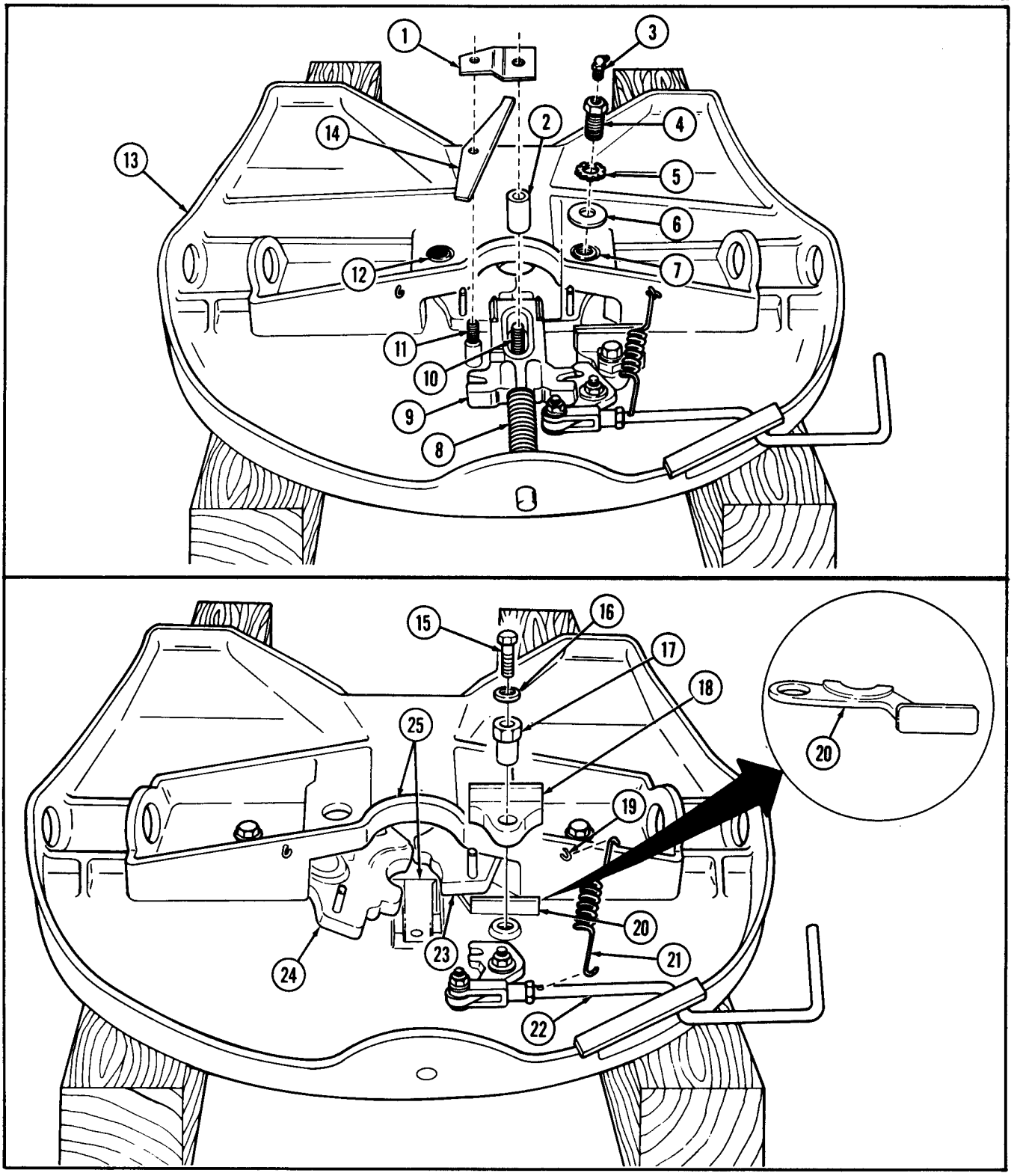
TA 350406

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.	Lock latch stud (11) and plunger bolt (10)	Plunger retaining bracket (1)	Remove.	
15.	Plunger bolt (10)	Spacing sleeve (2)	Remove.	Discard sleeve (2).
16.	Lock latch stud (11)	Lock latch (14)	Remove.	Discard lock latch (14).
17.	Fifth wheel housing (13)	Plunger bolt (10)	Remove.	Discard plunger bolt (10).
18.		Plunger (9)	a. Slide into coupler jaws (24) and (23). b. Pry upward and out to remove.	
19.		Plunger spring (8)	Remove.	Discard plunger (9) and spring (8).
20.	Left and right coupler jaw pivot pins (12) and (7)	Grease fitting (3), fitting adapter (4), lockwasher (5), and washer (6)	Remove from each pin (12) and (7).	Discard lockwashers (5).
21.	Fifth wheel housing (13)	Left and right coupler jaw pivot pins (12) and (7), right coupler jaw (23), and left coupler jaw (24)	Remove.	Discard pins (12) and (7). Discard coupler jaws (23) and (24).
22.	Compression bushing (18) to fifth wheel housing (13)	Slack adjuster bolt (15), lockwasher (16), slack adjuster (17), and compression bushing (18)	Remove.	Discard lockwasher (16).
23.	Coupler jaw housing (25)	Compression arm (20)	Remove.	Discard compression arm (20).
24.	Handle assembly (22) to housing eyelet (19)	Handle spring (21)	Remove.	

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
25.	Fifth wheel housing (1)	Locknut (3), washer (4), spacer (5), pinion gear (6), and handle assembly (7)	Remove.	Discard locknut (3) and spacer (5).
26.	Handle assembly (7)	Locknut (2), washer (9), bolt (8), and pinion gear (6)	Remove.	Discard locknut (2), bolt (8), and pinion gear (6).

b. Cleaning and Inspection

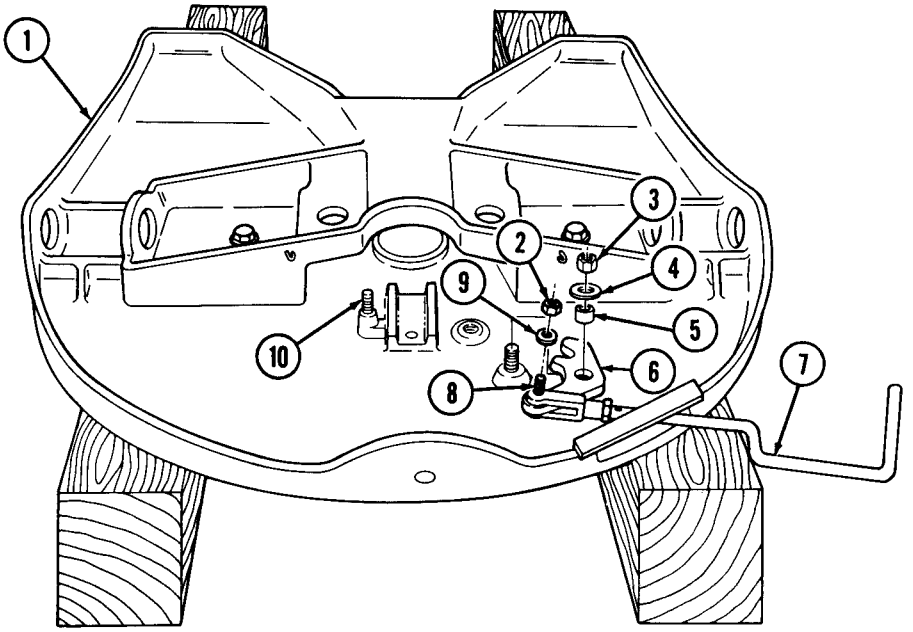
WARNING

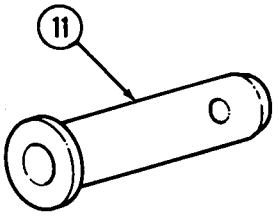
Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

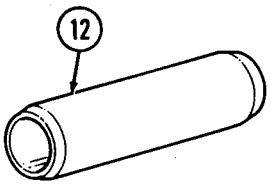
27.		Fifth wheel housing (1)	a. Clean with drycleaning solvent.	
			b. Inspect for cracks and breaks.	If cracked or broken, replace fifth wheel housing (1).
28.	Fifth wheel housing (1)	Lock latch stud (10)	Inspect for wear, breaks, cracks, and damaged threads.	Replace if worn, broken, cracked, or threads are damaged.
29.		Two mounting bracket pins (11)	Wipe clean and inspect for wear, chips, and damaged ends.	Replace if worn, chipped, or if ends are damaged.
30.		Two rubber bushings (12)	Wipe clean and inspect for wear and cracks.	Replace if worn or cracked.
31.		Fifth wheel base assembly (13)	a. Clean with drycleaning solvent.	
			b. Inspect for cracks and breaks.	If cracked or broken, replace fifth wheel base assembly (13).

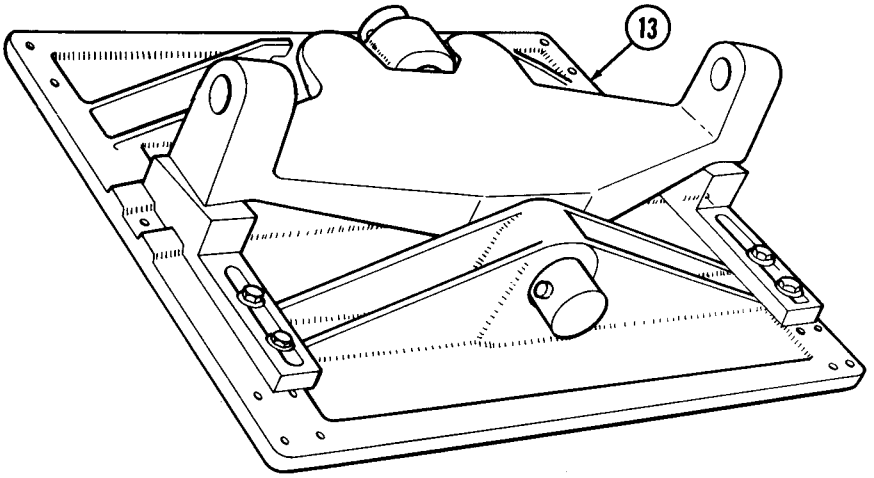
17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS









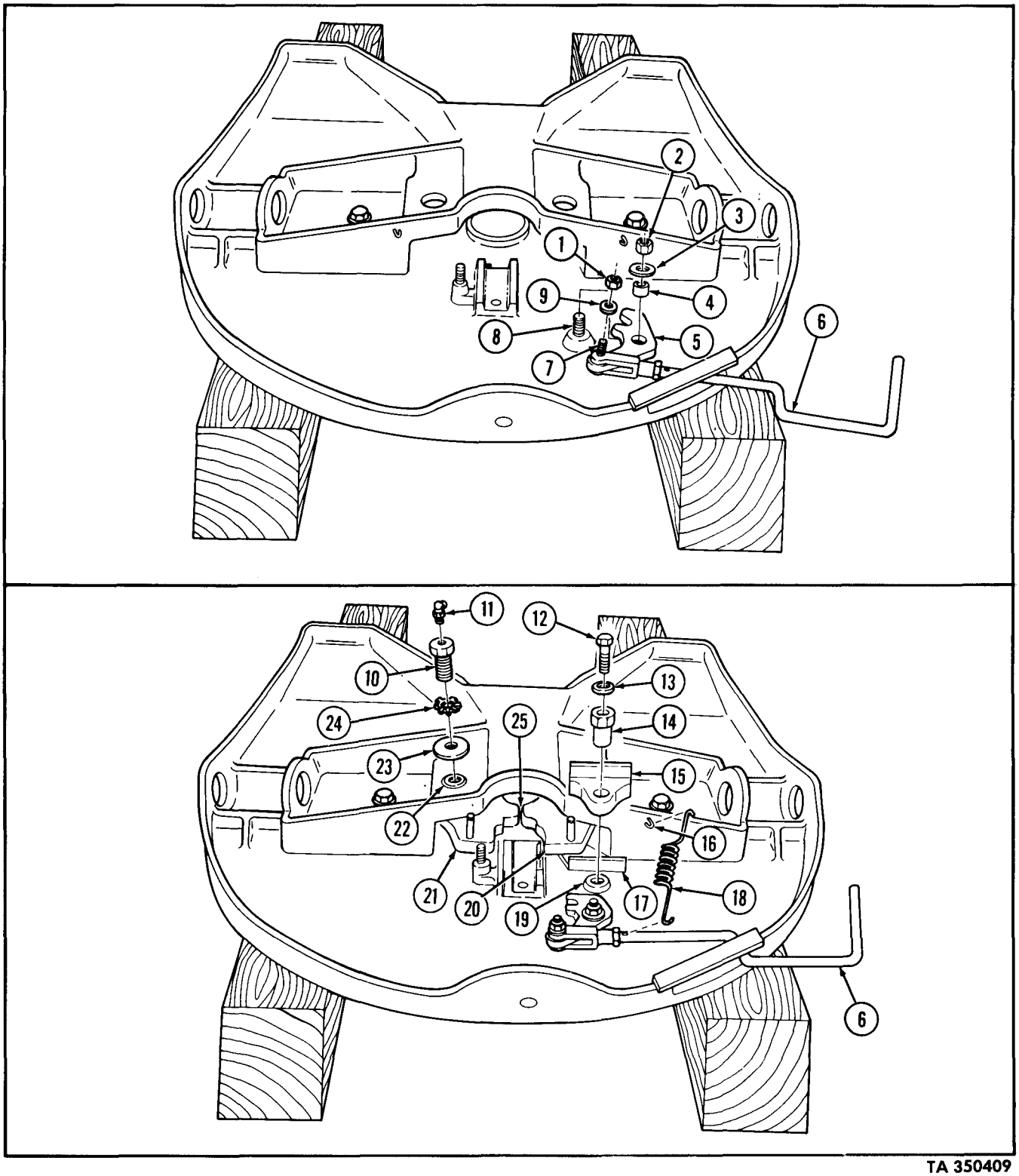
TA 350408

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
32.		New pinion gear (5)	a. Install on handle assembly (6) with new bolt (7), washer (9), and new locknut (1).	
			b. Install on fifth wheel housing bolt (8) with new spacer (4), washer (3), and new locknut (2).	Spacer (4) must be installed first.
33.		Handle spring (18)	Install on handle assembly (6) and housing eyelet (16).	
34.		New compression arm (17)	Place through coupler jaw housing opening (25) so hole in compression arm (17) is alined with left coupler jaw (21) pivot pin hole.	
35.		Slack adjuster (14)	Install in compression bushing (15).	
36.		Compression bushing (15)	Install on housing (19) with new lockwasher (13) and bolt (12).	Make sure rubber pad and flat on compression arm (17) are alined.
37.		New right coupler jaw (20)	a. Slide through coupler jaw housing opening (25) and position over jaw pivot pin hole.	
			b. Install with new jaw pivot pin (22).	
38.		New left coupler jaw (21)	a. Slide through jaw housing opening (25) until alined with holes in compression arm (17) and housing (19).	
			b. Install with new jaw pivot pin (22).	
39.		Washer (23), new lockwasher (24), fitting adapter (10), and grease fitting (11)	Install on each jaw pivot pin (22).	

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



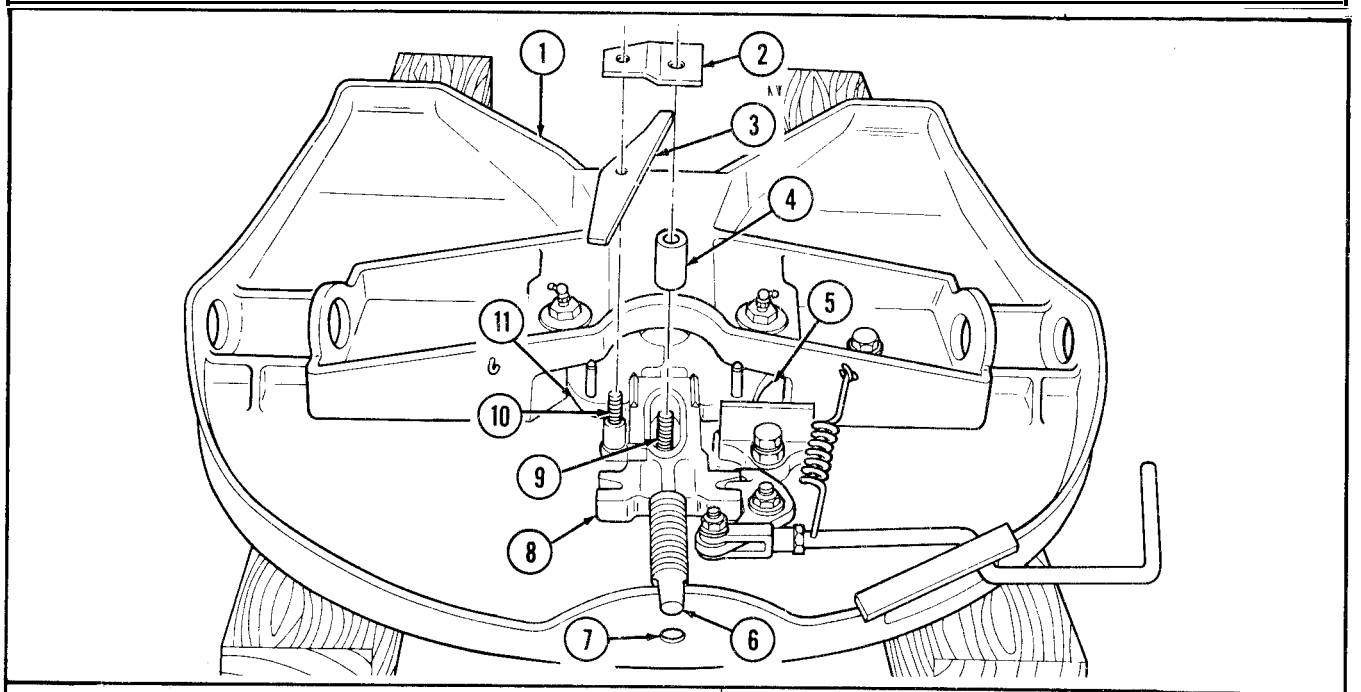
TA 350409

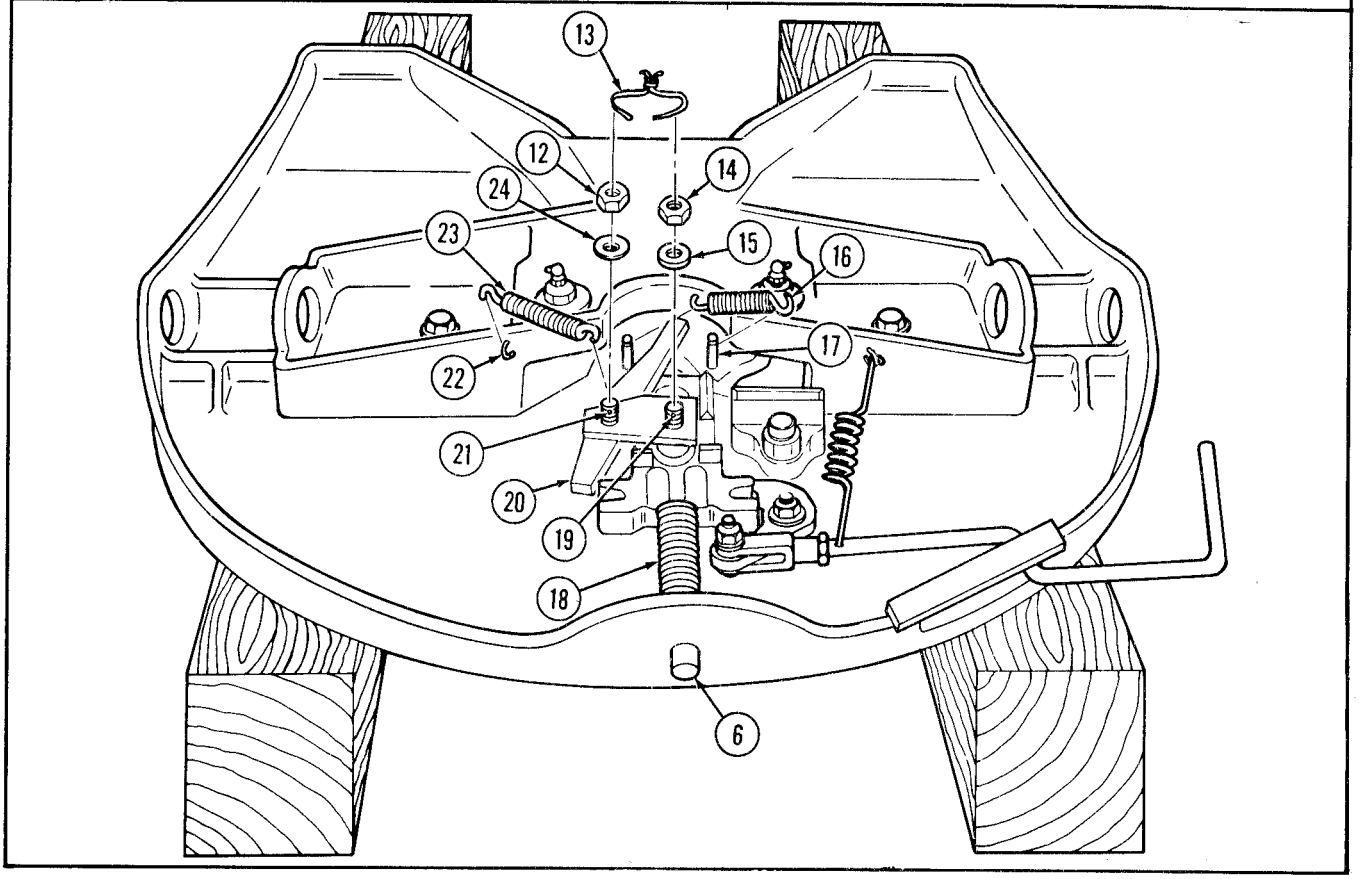
17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
40.		Left and right coupler jaws (11) and (5)	Place in closed position.	
41.		New plunger bolt (9)	Place through top side of fifth wheel housing (1).	
42.		New plunger spring (18)	Slide onto plunger shaft (6).	
43.		New plunger (8)	Insert shaft (6) into guide hole (7) and force plunger (8) down between coupler jaws (11) and (5).	
44.		New lock latch (3)	Position on lock latch stud (10).	
45.		New spacing sleeve (4)	Position on plunger bolt (9).	
46.		Plunger retaining bracket (2)	a. Install on plunger bolt (9) with washer (15) and new locknut (14).	
			b. Tighten until locknut (14) clears lockwire hole (19).	Do not overtighten locknut (14).
			c. Install on lock latch stud (10) with washer (24) and new locknut (12).	
			d. Tighten until locknut (12) clears lockwire hole (21).	Do not overtighten locknut (12).
47.		New lockwire (13)	Thread through holes in lock latch stud (10) and plunger bolt (9) and twist ends tight.	
48.		Lock latch spring (23)	Attach one end to lock latch (20) and other end to housing eyelet (22).	
49.		Coupler jaws (11) and (5)	Place in open position.	
50.		New jaw spring (16)	Attach to each coupler jaw spring pin (17).	

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





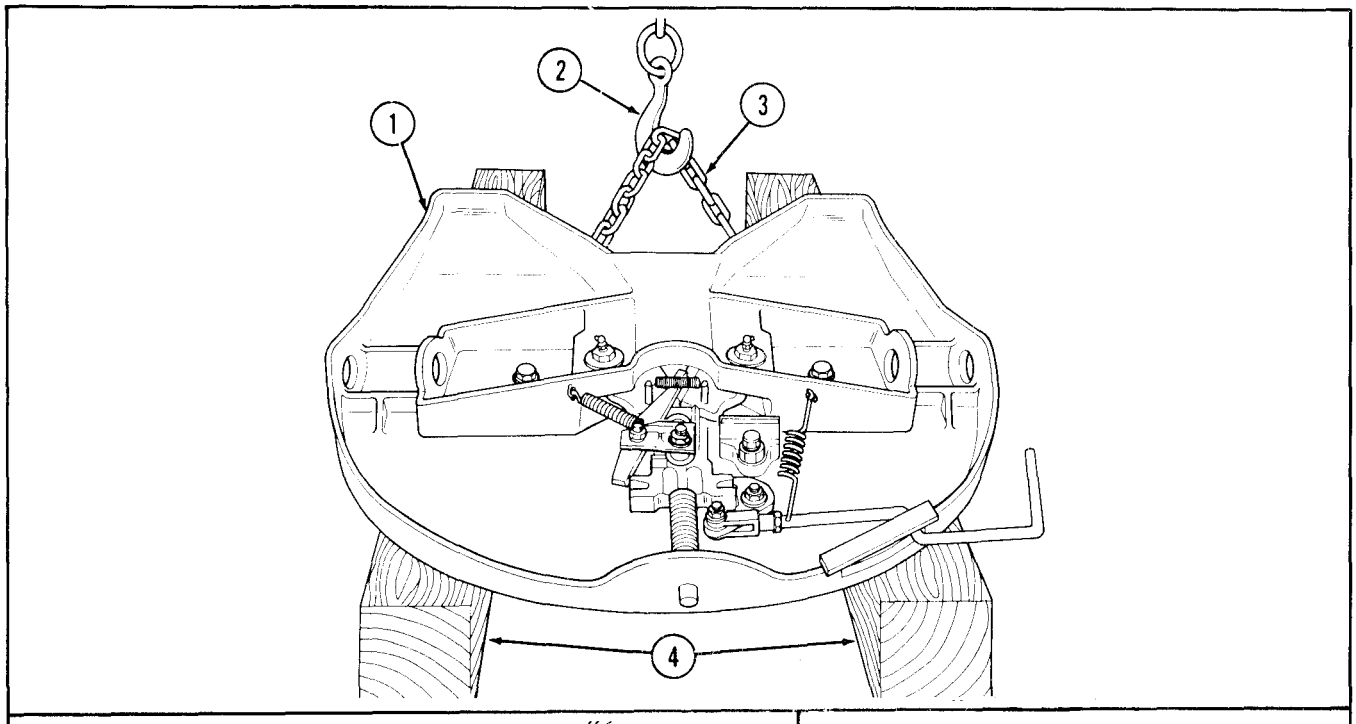
TA 350410

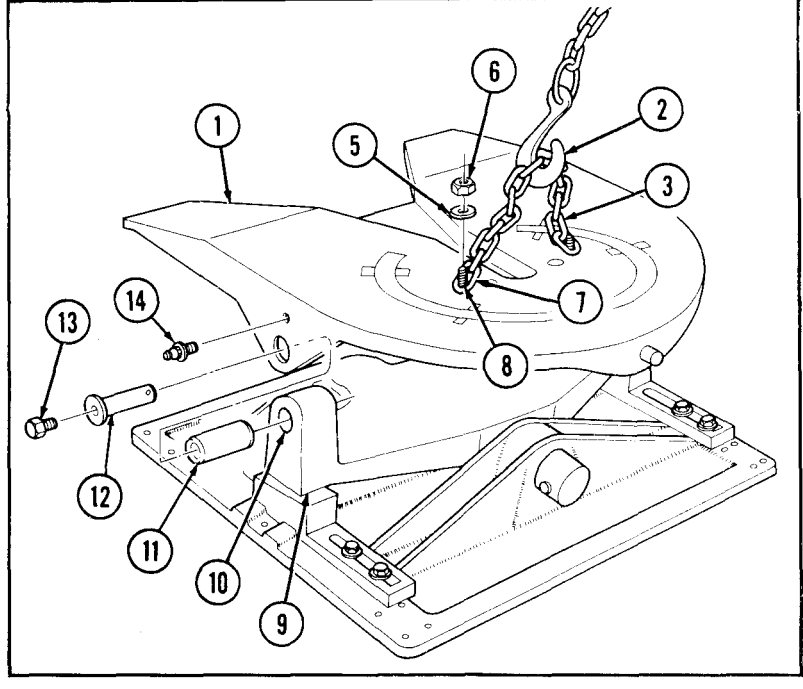
17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

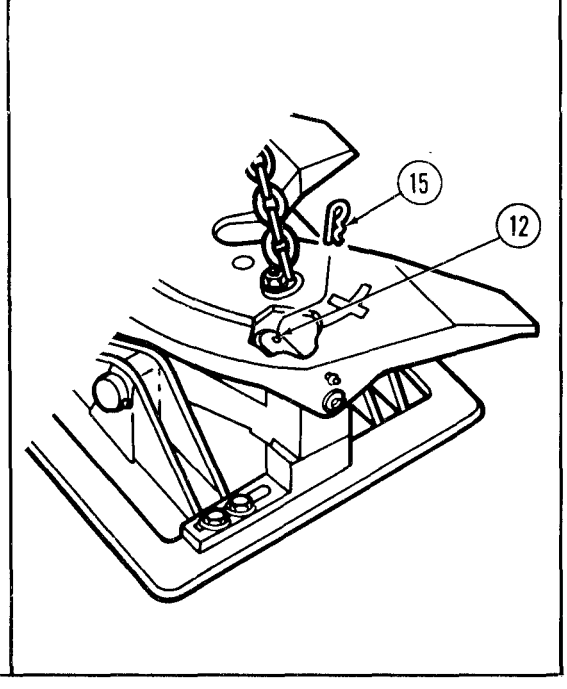
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
51.		Two rubber bushings (11)	Place through each walking beam post hole (10).	
		NOTE Assistant will help with steps 52 through 56.		
52.		Hoist hook (2)	Attach to utility chain (3).	
		WARNING All personnel must stand clear during hoisting operations. A shifting or swinging load may cause injury to personnel.		
53.		Fifth wheel housing (1)	Lift clear of wood blocks (4). Allow housing (1) to turn over and position on walking beam post (9).	Load bearing side will be up.
54.		Two fifth wheel bushing pins (12)	Install.	Use portable hydraulic jack unit to press into place.
55.		Two hairpin clips (15)	Install one in each bushing pin (12).	
56.		Hoist hook (2)	Disconnect from utility chain (3).	
57.	Utility chain links (7) to fifth wheel housing (1)	Two screws (8), four washers (5), and two nuts (6)	Remove.	
58.		Two grease fittings (14)	Install in fifth wheel housing (1).	
59.	Two bushing pins (12)	Two bolts (13)	Remove.	

17-3. FIFTH WHEEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







END OF TASK!

FOLLOW-ON TASKS: • Lubricate fifth wheel (LO 9-2320-272-12).
• Install fifth wheel (TM 9-2320-272-20-2).

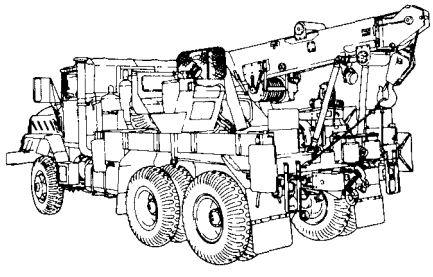
CHAPTER 18
WRECKER BODY (M936) MAINTENANCE
Section I. DESCRIPTION AND DATA

18-1. DESCRIPTION – WRECKER BODY

a. The M936 is the wrecker body model in the M939 series. The vehicle body consists of a hydraulic crane, and front and rear winch. The hydraulic system is powered by the vehicle engine. An extendable boom can rotate 360° and can be raised to approximately 45° elevation.

b. Each of the crane's operating functions is dependent on hydraulic pressure supplied by the crane hydraulic pump. Functions are regulated by a control valve consisting of four two-way hydraulic valves. Each valve controls one of the crane's operating functions. These include raising or lowering the boom, swinging the boom left or right, extending or retracting the boom, and winding or unwinding the hoist cable.

c. Tabulated data for the wrecker crane can be found in TM 9-2320-272-10.



M936 WRECKER BODY

Section II. WRECKER BODY COMPONENTS REPLACEMENT

18-2. WRECKER BODY COMPONENTS REPLACEMENT TASK SUMMARY

TA 350706

18-2. WRECKER BODY COMPONENTS REPLACEMENT TASK SUMMARY (Cont'd)

18-3. FUEL CAN BRACKET REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two lockwashers
Eleven locknuts

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

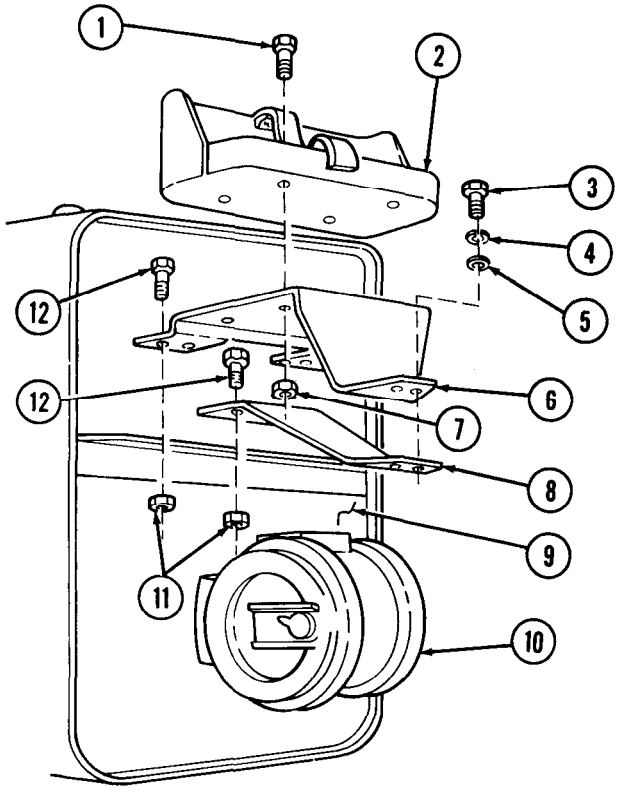
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Upper bracket (6)	Four screws (1), locknuts (7), and fuel can holder (2)	Remove.	Discard locknuts (7).
2.	Bracket (8) to hydraulic oil filter (10)	Two screws (3), washers (5), and lockwashers (4)	Remove.	Discard lockwashers (4).
3.	Bracket (6) to hydraulic oil reservoir (9)	Seven screws (12) and locknuts (11)	Remove.	Discard locknuts (11).

18-3. FUEL CAN BRACKET REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.		Upper bracket (6) and lower bracket (8)	Remove.	
b. Installation				
5.		Lower bracket (8) and upper bracket (6)	a. Position to oil filter (10). b. Install with two screws (3), new lockwashers (4), and washers (5). c. Install on hydraulic oil reservoir (9) with seven screws (12) and new locknuts (11).	
6.		Fuel can holder (2)	Install with four new locknuts (7) and screws (1).	



END OF TASK!

TA 350707

18-4. HYDRAULIC OIL FILTER HOUSING REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 LO 9-2320-272-12 Para. 18-3	Parking brake set. Hydraulic oil reservoir drained. Fuel can bracket removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four lockwashers
Filter gasket
Protective cap-plugs (Appendix C, Item 5)
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage.

a. Removal

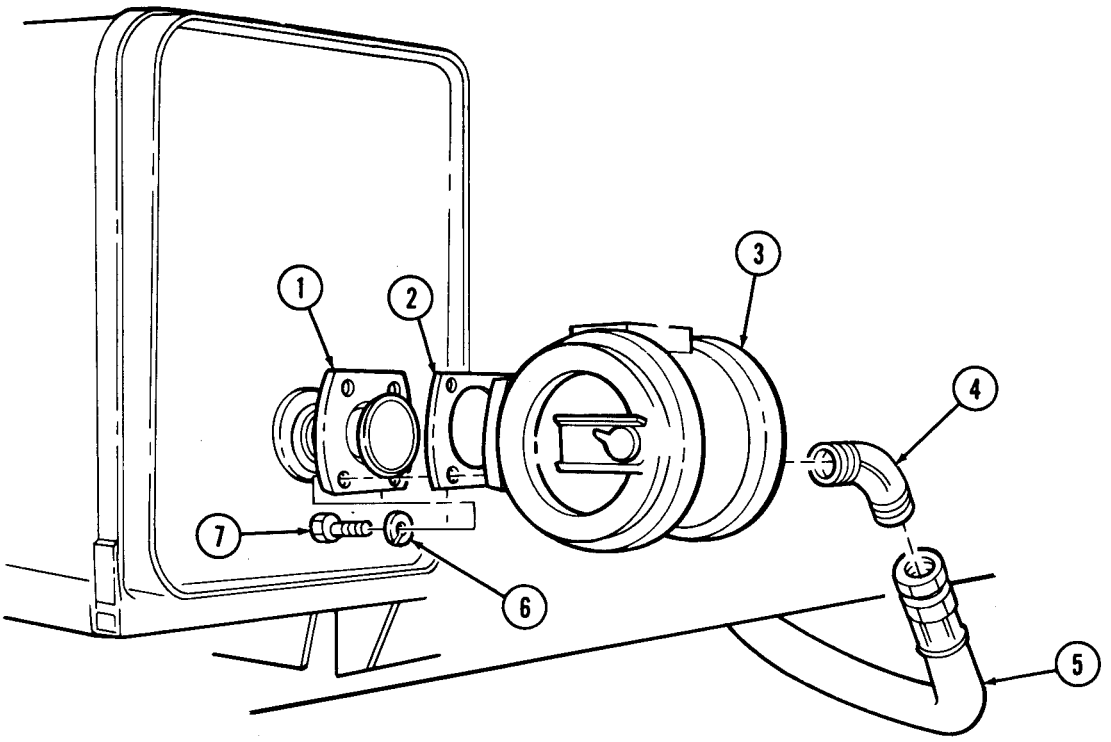
NOTE

Have drainage container ready to catch oil.

1.	Front of hydraulic oil filter housing (3)	Flex hose (5)	Disconnect from filter elbow (4).	
2.		Hydraulic oil filter elbow (4)	Remove from filter housing (3).	
3.	Filter housing (3) to mounting flange (1)	Four screws (7) and lockwashers (6)	Remove.	Discard lockwashers (6).
4.		Filter housing (3) and gasket (2)	Remove.	Discard gasket (2). Clean gasket remains from mating surfaces.

18-4. HYDRAULIC OIL FILTER HOUSING REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
5.		New gasket (2) and filter housing (3)	Install on mounting flange (1) with four new lockwashers (6) and screws (7).	
6.		Filter elbow (4)	Wrap with sealing tape and install to hydraulic oil filter housing (3).	
7.		Flex hose (5)	Install on hydraulic oil filter elbow (4).	



END OF TASK!

FOLLOW-ON TASKS:
- Install fuel can bracket (para. 18-3).
- Fill hydraulic oil reservoir to proper oil level (LO 9-2320-272-12).
- Check hydraulic oil filter for proper operation (TM 9-2320-272-10).

TA 350708

18-5. HYDRAULIC OIL RESERVOIR REPLACEMENT

This task covers:

a. Removal b. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	Para. 18-3	Fuel can bracket removed.
	Para. 18-4	Hydraulic oil filter housing removed.
	TM 9-2320-272-20-1	Floodlight assembly removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two locknuts
Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

None

Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage.

a. Removal

NOTE

Have drainage container ready to catch oil.

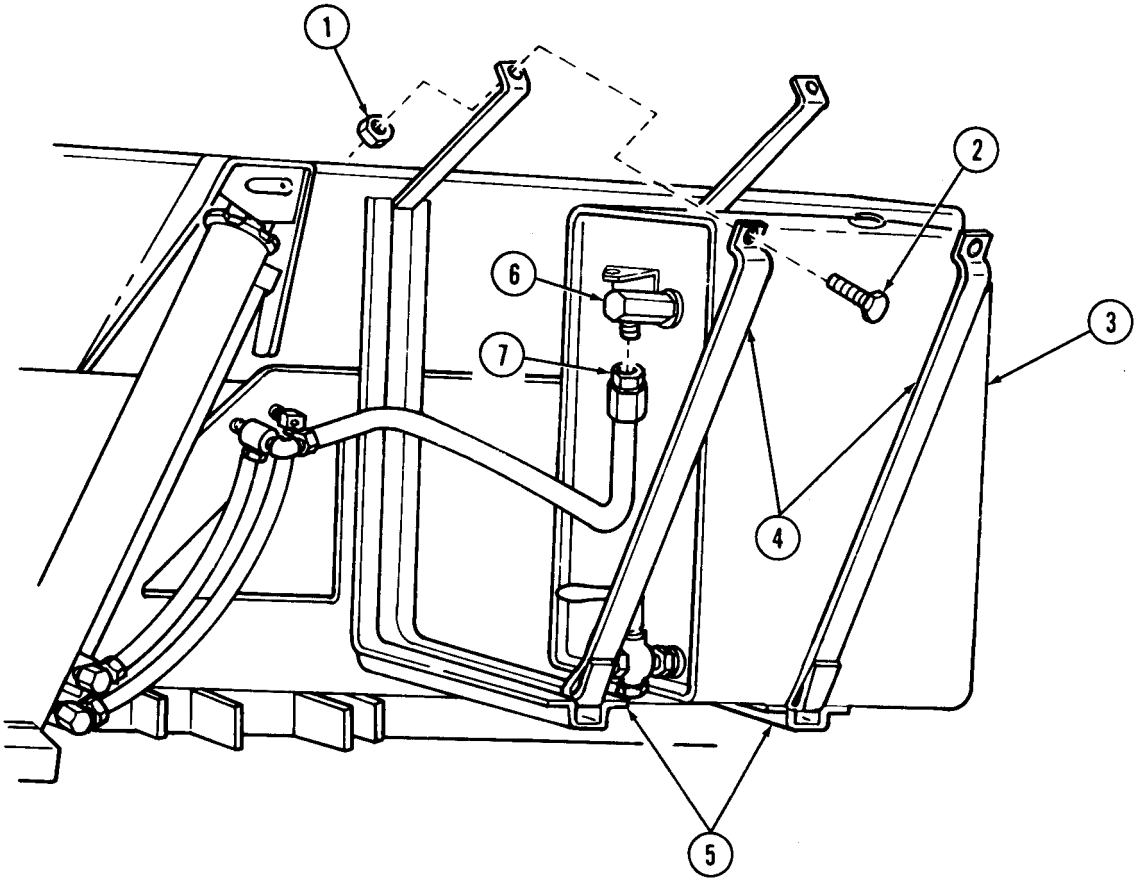
1.	Rear of hydraulic oil reservoir (3)	Hydraulic oil return hose (7)	Disconnect from reservoir adapter elbow (6).	
2.	Two reservoir retaining straps (4)	Two screws (2) and locknuts (1)	Remove, and separate retaining straps (4) from hydraulic oil reservoir (3).	Discard locknuts (1).
3.	Two reservoir brackets (5)	Hydraulic oil reservoir (3)	Remove.	

b. Installation

4.		Hydraulic oil reservoir (3)	Position on two reservoir brackets (5).	

18-5. HYDRAULIC OIL RESERVOIR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.		Two retaining straps (4)	Position around reservoir (3) and install with two screws (2) and new locknuts (1).	
6.		Hydraulic oil return hose (7)	Install on reservoir adapter elbow (6) at rear of reservoir (3).	



END OF TASK!

FOLLOW-ON TASKS:
- Install floodlight assembly (TM 9-2320-272-20-1).
- Install hydraulic oil filter housing (para. 18-4).
- Install fuel can bracket (para. 18-3).
- Start engine (TM 9-2320-272-10), operate boom, and check for leaks.

TA 350709

18-6. HYDRAULIC OIL RESERVOIR BRACKETS AND STRAPS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 Para. 18-5	Parking brake set. Hydraulic oil reservoir removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Four locknuts
Eight lockwashers

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Both hydraulic oil reservoir brackets are removed and installed the same way.

a. Removal

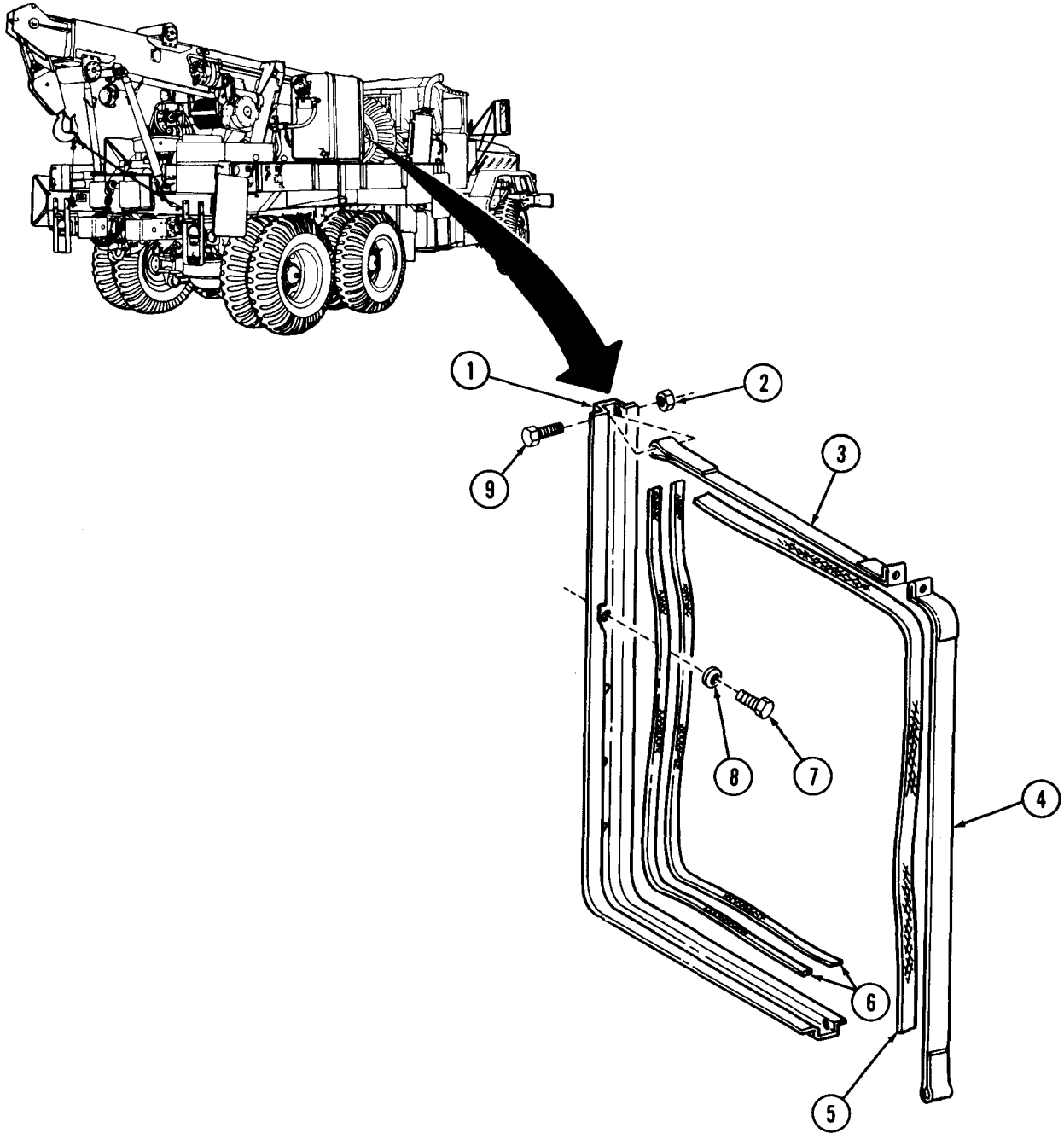
1.	Oil reservoir bracket (1)	Two screws (9), locknuts (2), straps (3) and (4), and insulator strip (5)	Remove.	Discard locknuts (2).
2.		Two bracket insulator strips (6)	Remove.	
3.		Four screws (7) and lockwashers (8), and bracket (1)	Remove.	Discard lockwashers (8).

b. Installation

4.		Bracket (1)	Install with four new lockwashers (8) and screws (7).	
5.		Two bracket strips (6)	Install on brackets (1).	
6.		Straps (3) and (4)	Install with two screws (9) and new locknuts (2).	

18-6. HYDRAULIC OIL RESERVOIR BRACKETS AND STRAPS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.		Insulator strip (5)	Place under straps (3) and (4) when installing on oil reservoir tank.	



END OF TASK!

FOLLOW-ON TASK: Install hydraulic oil reservoir (para. 18-5).

TA 350710

18-7. HYDRAULIC HOIST WINCH MOTOR AND LINES REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Four lockwashers
Gasket
Four locknuts
Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

None

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage.

a. Removal

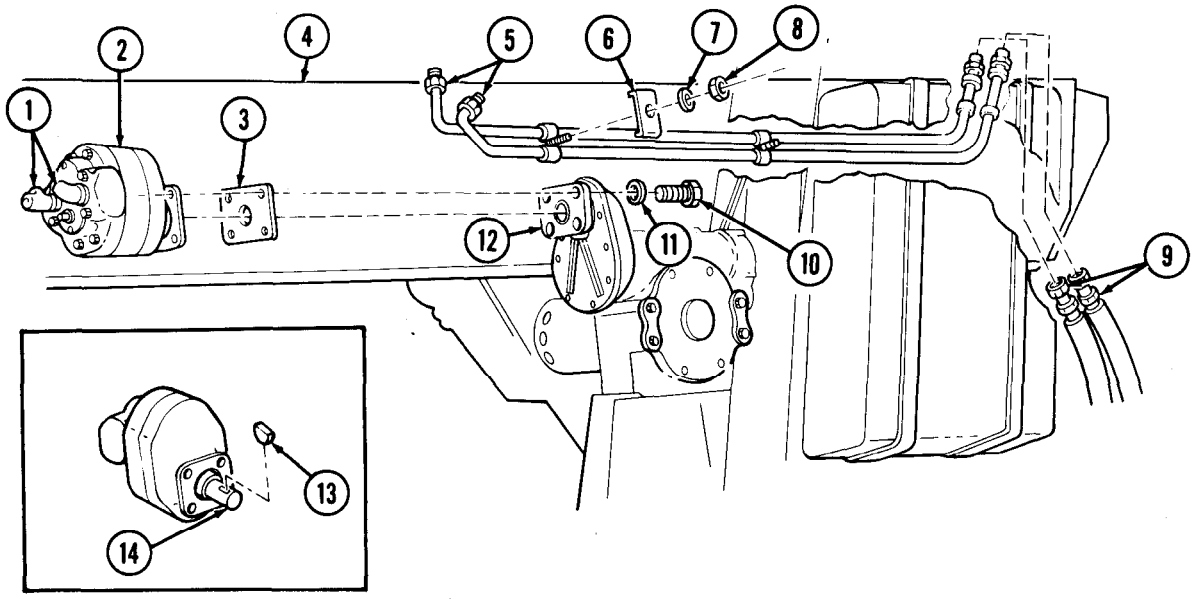
NOTE

Have drainage container ready to catch oil.

1.	Hoist motor elbows (1)	Two steel hydraulic lines (5)	Disconnect.	Tag for installation.
2.	Two steel hydraulic lines (5)	Two hydraulic flex hoses (9)	Disconnect.	Tag for installation.
3.		Four locknuts (8), washers (7), and clamps (6)	Remove.	Discard locknuts (8).
4.		Two steel hydraulic lines (5)	Turn until clear of hoist motor (2).	Permits removal of hoist motor (2).
5.	Winch gearbox adapter (12)	Four screws (10) and lockwashers (11), hoist motor (2), and gasket (3)	Remove.	Discard lockwashers (11). Discard gasket (3). Clean gasket remains from mating surfaces.

18-7. HYDRAULIC HOIST WINCH MOTOR AND LINES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Gear shaft (14)	Woodruff key (13)	Remove.	
b. Installation				
7.		Woodruff key (13)	Position in slot on gear shaft (14).	
8.		Hoist motor (2) and new gasket (3)	Install on winch gearbox adapter (12) with four new lockwashers (11) and screws (10).	Tighten 60-70 lb-ft (81-95 N·m).
9.		Two steel hydraulic lines (5)	a. Connect to hoist motor elbows (1) at marked locations. b. Install on boom (4) with four clamps (6), washers (7), and new locknuts (8). c. Install on two hydraulic flex hoses (9).	
10.		Two hydraulic flex hoses (9)	Connect to two steel hydraulic lines (5).	



END OF TASK!

FOLLOW-ON TASKS • Fill hydraulic oil reservoir to proper oil level (LO 9-2320-272-12).
• Check hoist winch motor for proper operation (TM 9-2320-272-10).

TA 350711

18-8. HOIST LEVEL WIND REPLACEMENT

This task covers:

a. Removal
b. Disassembly
c. Reassembly
d. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Eight locknuts
Two cotter pins

Personnel Required
Wheeled vehicle repairman MOS 63W

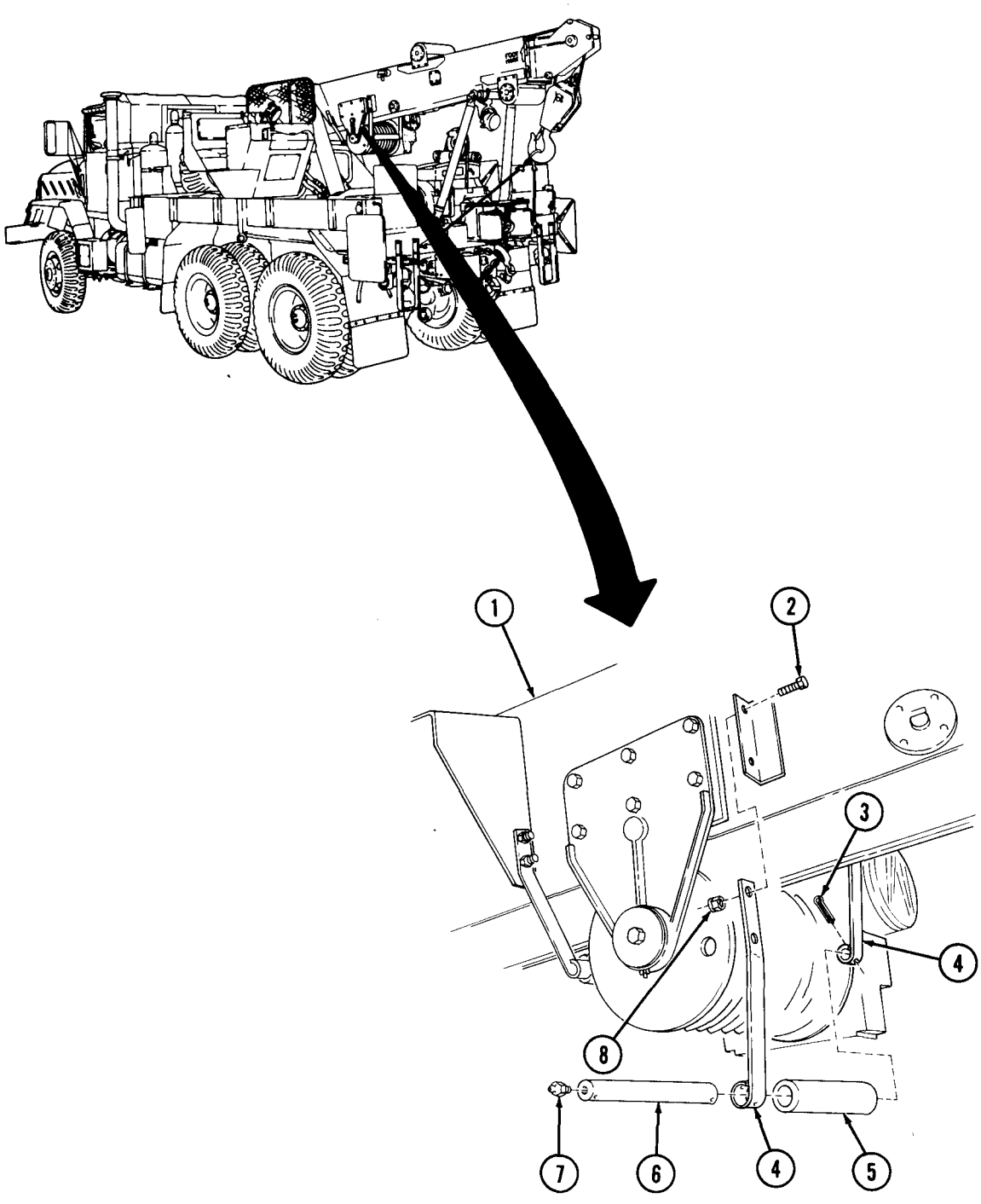
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Front and rear roller braces are removed the same way.		
1.	Boom (1)	Four screws (2) and locknuts (8)	Remove.	Discard locknuts (8).
2.		Two front roller braces (4)	Remove.	
		b. Disassembly		
		NOTE Front and rear level wind rollers are disassembled the same way.		
3.		Cotter pin (3)	Remove.	Discard cotter pin (3).
4.		Grease fitting (7)	Remove.	
5.		Level wind roller (5)	Remove.	
6.		Shaft (6)	Remove.	

18-8. HOIST LEVEL WIND REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



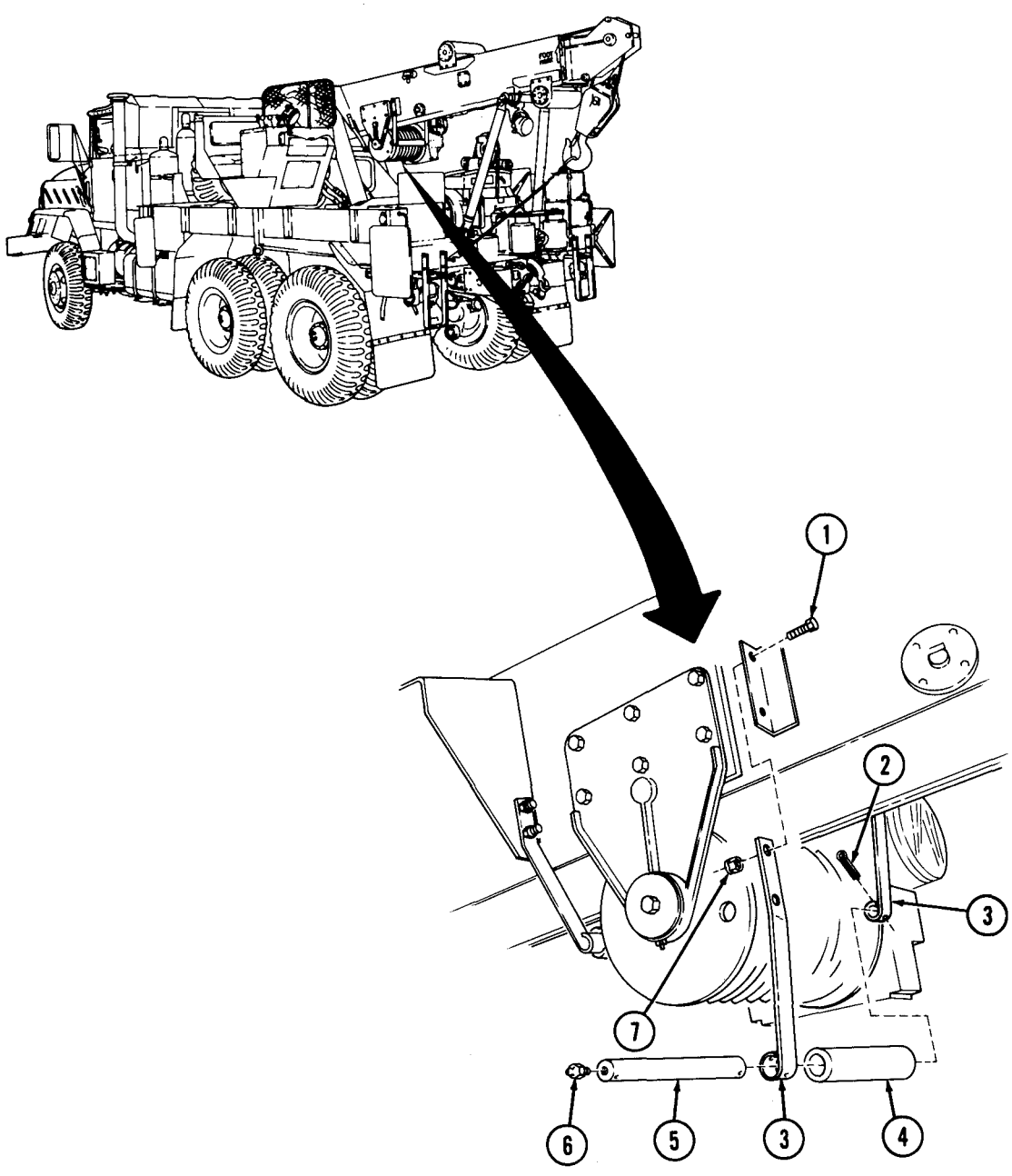
TA 350712

18-8. HOIST LEVEL WIND REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassembly			
		NOTE		
		Front and rear level wind rollers are assembled the same way.		
7.		Shaft (5)	Install into level wind roller (4).	
8.		Grease fitting (6)	Install on shaft (5).	
9.		Level wind roller (4)	Install into roller brace (3).	
10.		New cotter pin (2)	Install.	
	d. Installation			
		NOTE		
		Front and rear roller braces are installed the same way.		
11.		Two roller braces (3)	Install with four screws (1) and new locknuts (7).	

18-8. HOIST LEVEL WIND REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

TA 350713

18-9. HOIST WINCH REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M936

Test Equipment
None

Special Tools
None

Materials/Parts
Twelve lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference / Condition Description

TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-2	Boom floodlight wire removed.
TM 9-2320-272-20-2	Hoist winch cable removed.
Para. 18-7	Hydraulic hoist winch motor and lines removed.
Para. 18-8	Hoist level wind removed.

Special Environmental Conditions
None

General Safety Instructions
All personnel must stand clear during hoisting operations.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

a. Removal

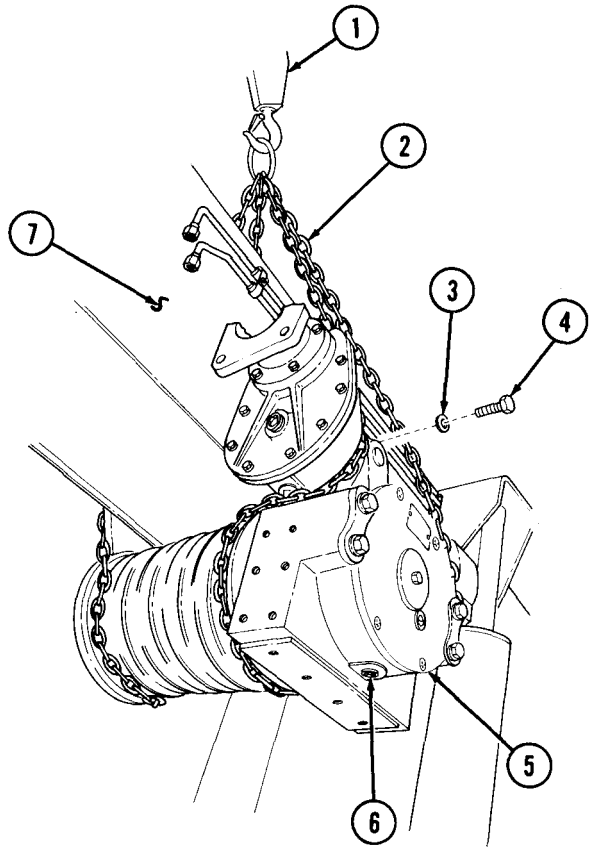
NOTE

Have drainage container ready to catch oil.

1.	Bottom of hoist winch (5)	Drainplug (6)	a. Remove, and drain oil from hoist winch (5). b. Install in hoist winch (5).	
2.		Utility chain (2)	Attach to hoist winch (5).	
3.		Hoist hook (1)	Attach to utility chain (2) and raise until slack is removed from chain (2).	

18-9. HOIST WINCH REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Assistant will help with step 4.		
4.	Boom (7)	Twelve screws (4) and lockwashers (3), and hoist winch (5)	Remove, and lower hoist winch (5) to wrecker bed.	Discard lockwashers (3).
5.	Wrecker bed	Hoist winch (5)	Attach utility chain (2) to hoist hook (1), and remove.	
6.		Utility chain (2)	Remove.	



TA 350714

18-9. HOIST WINCH REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Installation

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

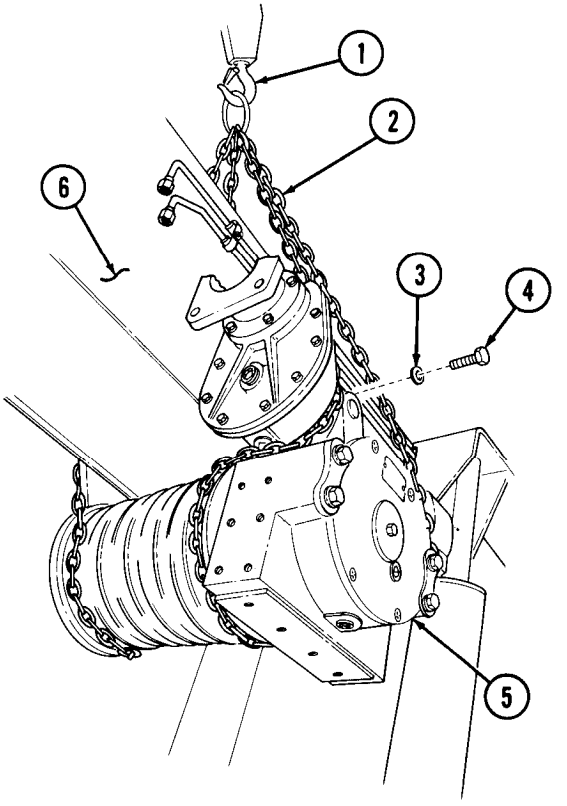
NOTE

Assistant will help with steps 7, 8, and 9.

7.		Utility chain (2)	Attach to hoist winch (5).
8.		Hoist hook (1)	Attach to utility chain (2).
9.		Hoist winch (5)	a. Hoist into position and aline with holes in boom (6). b. Install with twelve new lockwashers (3) and screws (4).
10.		Hoist hook (1) and utility chain (2)	Remove.

18-9. HOIST WINCH REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install hoist level wind (para. 18-8).
- Install hydraulic hoist winch motor and lines (para. 18-7).
- Install hoist winch cable (TM 9-2320-272-20-2).
- Install boom floodlight wire (TM 9-2320-272-20-2).
- Fill hoist winch to proper oil level (LO 9-2320-272-12).

TA 350715

18-10. BOOM ELEVATING CYLINDER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Boom lowered.
	LO 9-2320-272-12	Hydraulic oil reservoir drained.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Lockwasher
Cotter pin
Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

General Safety Instructions

- All personnel must stand clear during hoisting operations.
- Elevating cylinder is heavy. Use caution when removing or installing elevating cylinder.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage.

NOTE

Both left and right elevating cylinders are removed and installed in the same way. Only the right elevating cylinder is covered in this procedure.

a. Removal

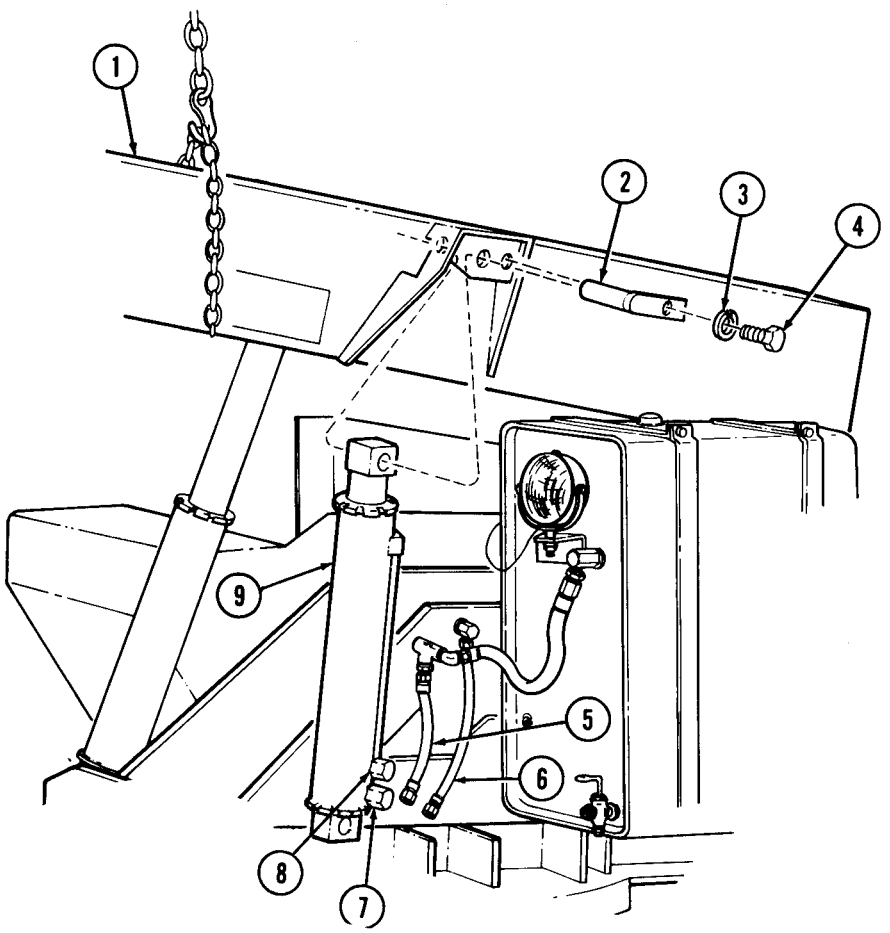
NOTE

Have drainage container ready to catch oil.

1.	Bottom of elevating cylinder (9)	Cylinder oil supply line (6) and return line (5)	Disconnect from snubber valve (7) and cylinder adapter fitting (8).	Tag for installation.

18-10. BOOM ELEVATING CYLINDER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		WARNING		
		All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.		
2.	Top of elevating cylinder (9)	Wrecker boom (1)	Raise with lifting device until boom weight is fully supported and upper retaining pin (2) is free.	
3.	Elevating cylinder (9) to boom (1)	Screw (4), lockwasher (3), and upper retaining pin (2)	Remove.	Discard lockwasher (3).



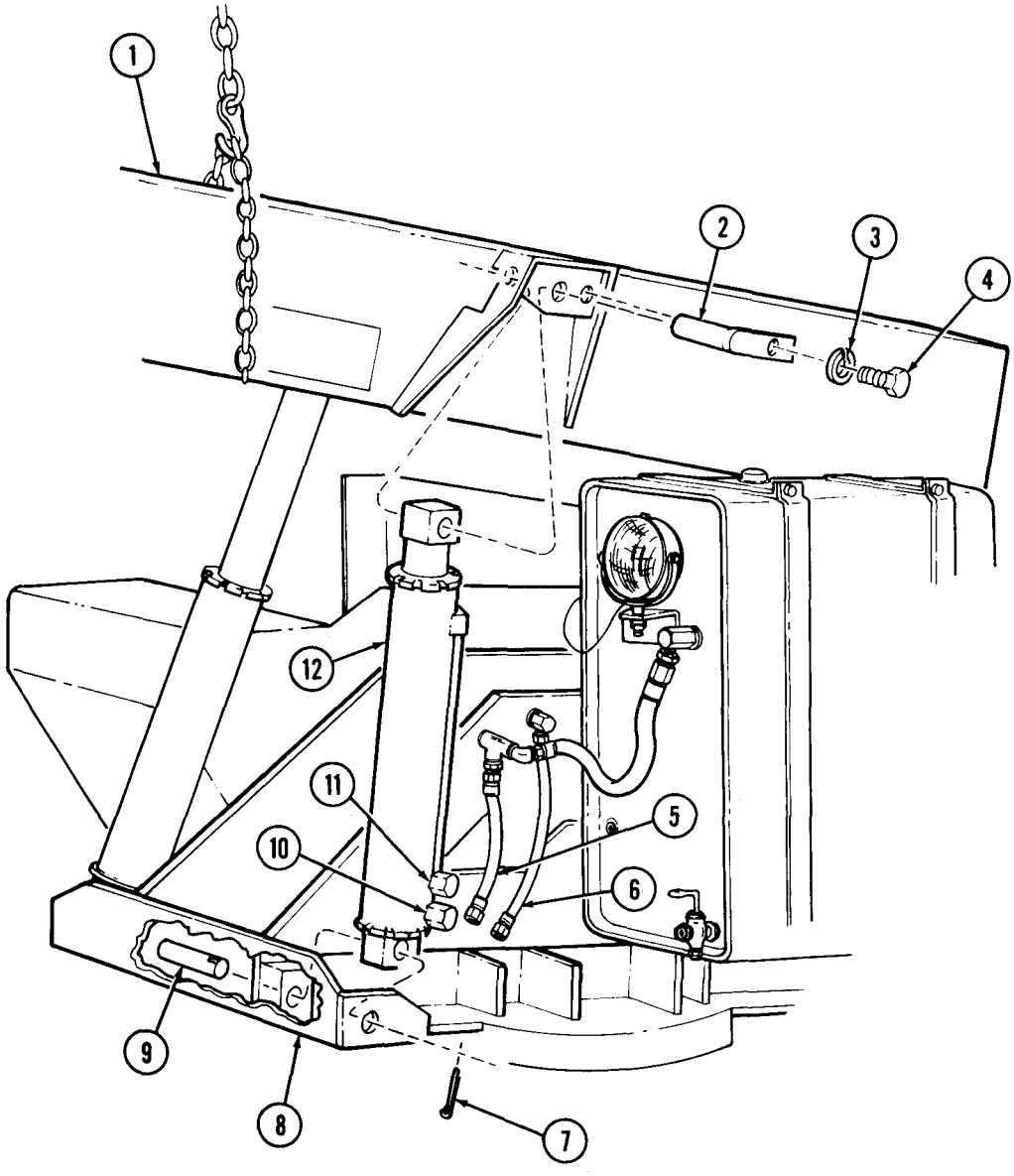
TA 350716

18-10. BOOM ELEVATING CYLINDER REPLACEMENT (Cont'd) 1

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			WARNING	
			The elevating cylinder is heavy. Remove with the aid of assistant and a lifting device, or injury to personnel may result.	
4.	Turntable (8)	Cotter pin (7), lower retaining pin (9), and elevating cylinder (12)	Remove.	Discard cotter pin (7).
5.		Wrecker boom (1)	Raise with lifting device and install braces.	Refer to TM 9-2320-272-10.
	b. Installation			
			WARNING	
			• The elevating cylinder is heavy. Do not attempt to install this component without the aid of assistant and a lifting device, or injury to personnel may result. • All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.	
6.		Wrecker boom (1)	Raise, and remove shipper braces.	Refer to TM 9-2320-272-10.
7.		Elevating cylinder (12)	a. Install on turntable (8) with lower retaining pin (9) and new cotter pin (7).	
			b. Install on boom (1) with upper retaining pin (2), new lockwasher (3), and screw (4).	Tighten screw (4) 44-61 lb-ft (60-83 N·m).
8.		Cylinder oil supply line (6)	Install on snubber valve (10).	
9.		Cylinder oil return line (5)	Install on cylinder adapter fitting (11).	
10.		Wrecker boom (1)	Remove lifting device.	

18-10. BOOM ELEVATING CYLINDER REPLACEMENT (Cont'd)

LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Fill hydraulic oil reservoir to proper oil level (LO 9-2320-272-12).
- Operate crane through full range (TM 9-2320-272-10) and check for leaks at lines and cylinders.

TA 350717

18-11. BOOM ELEVATING CYLINDER PACKING REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Boom lowered.

Test Equipment

None

Special Tools

Spanner wrench 8747917

Special Environmental Conditions

None

Materials/Parts

Packing
GAA grease (Appendix C, Item 11)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

All personnel must stand clear during hoisting operations.

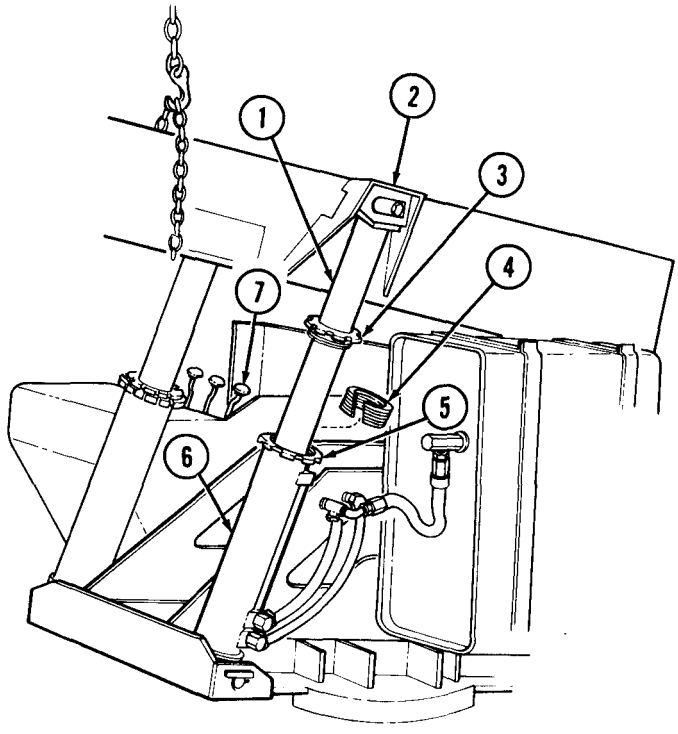
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			WARNING All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.	
			a. Removal	
1.		Wrecker boom (2)	a. Place boom cylinder lever (7) in UP position. b. Raise with lifting device and install shipper braces.	Refer to TM 9-2320-272-10.
2.		Boom cylinder control lever (7)	Place in LOWER position to release pressure from elevating cylinder (6).	
3.	Elevating cylinder (6)	Packing nut (3)	Loosen and slide up on piston rod (1) to expose packing (4).	Use spanner wrench.

18-11. BOOM ELEVATING CYLINDER PACKING REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		CAUTION Use care not to scratch piston rod surface when removing packing.		
4.	Elevating cylinder (6)	Packing (4)	Slide up piston rod (1) and remove.	Discard packing (4).
	b. Installation			
5.		New packing (4)	a. Coat with GAA grease. b. Position around piston rod (1) and slide down into cylinder head (5), and install with packing nut (3).	
6.		Wrecker boom (2)	Remove lifting device.	



END OF TASK!

FOLLOW-ON TASK: Operate crane through full range (TM 9-2320-272-10) and check for leaks at cylinder.

TA 350718

18-12. BOOM REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M936

Test Equipment
None

Special Tools
None

Materials/Parts
Locknut
Two lockwashers
Protective cap-plugs (Appendix C, Item 5)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition

Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-2	Boom floodlight wire removed.
LO 9-2320-272-12	Hydraulic oil reservoir drained.
Para. 18-9	Hoist winch removed.

Special Environmental Conditions
None

General Safety Instructions
- All personnel must stand clear during hoisting operations.
- Make sure inner boom is secured to outer boom before hoisting.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

a. Removal

CAUTION

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage.

NOTE

Have drainage container ready to catch oil.

1.	Two boom adapter elbows (4)	Extension cylinder extension hose (6) and retracting hose (5)	Disconnect.	Tag for installation.
2.		Inner boom (1)	Install to outer boom (3) with utility chain (18).	Prevents inner boom (1) from moving.
3.		Two utility chains (2)	Attach to outer boom (3).	
4.		Outer boom (3)	Raise with lifting device until boom (3) weight is fully supported and upper retaining pins (17) are free.	

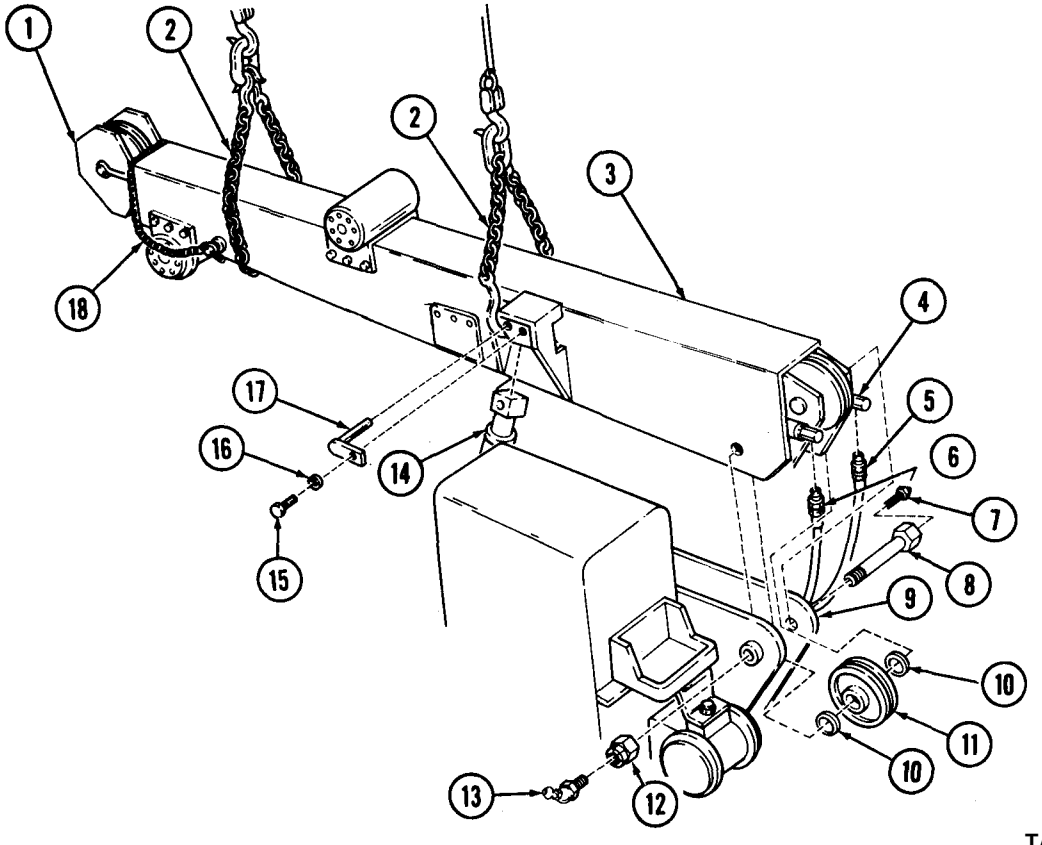
18-12. BOOM REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Two elevating cylinders (14) to outer boom (3)	Two screws (15) lockwashers (16) and retaining pins (17)	Remove.	Discard lockwashers (16).

WARNING

Before hoisting outer boom away from wrecker, make sure inner boom is properly secured to outer boom as outlined in step 2 to prevent injury to personnel.

6.	Pivot pin (8)	Grease fittings (7) and (13)	Remove.	
7.	Turntable (9)	Locknut (12), pivot pin (8), two bearing sleeves (10) and crane sheave (11)	Remove.	Discard locknut (12).
8.		Outer boom (3)	With utility chains (2) installed on lifting device, remove and place on jack stands.	
9.	Outer boom (3)	Two utility chains (2) and utility chain (18)	Remove.	



TA 350719

18-12. BOOM REPLACEMENT (Cont'd)

b. Installation

WARNING

Before hoisting outer boom to wrecker, make sure inner boom is secured to outer boom as outlined in step 10 to prevent injury to personnel.

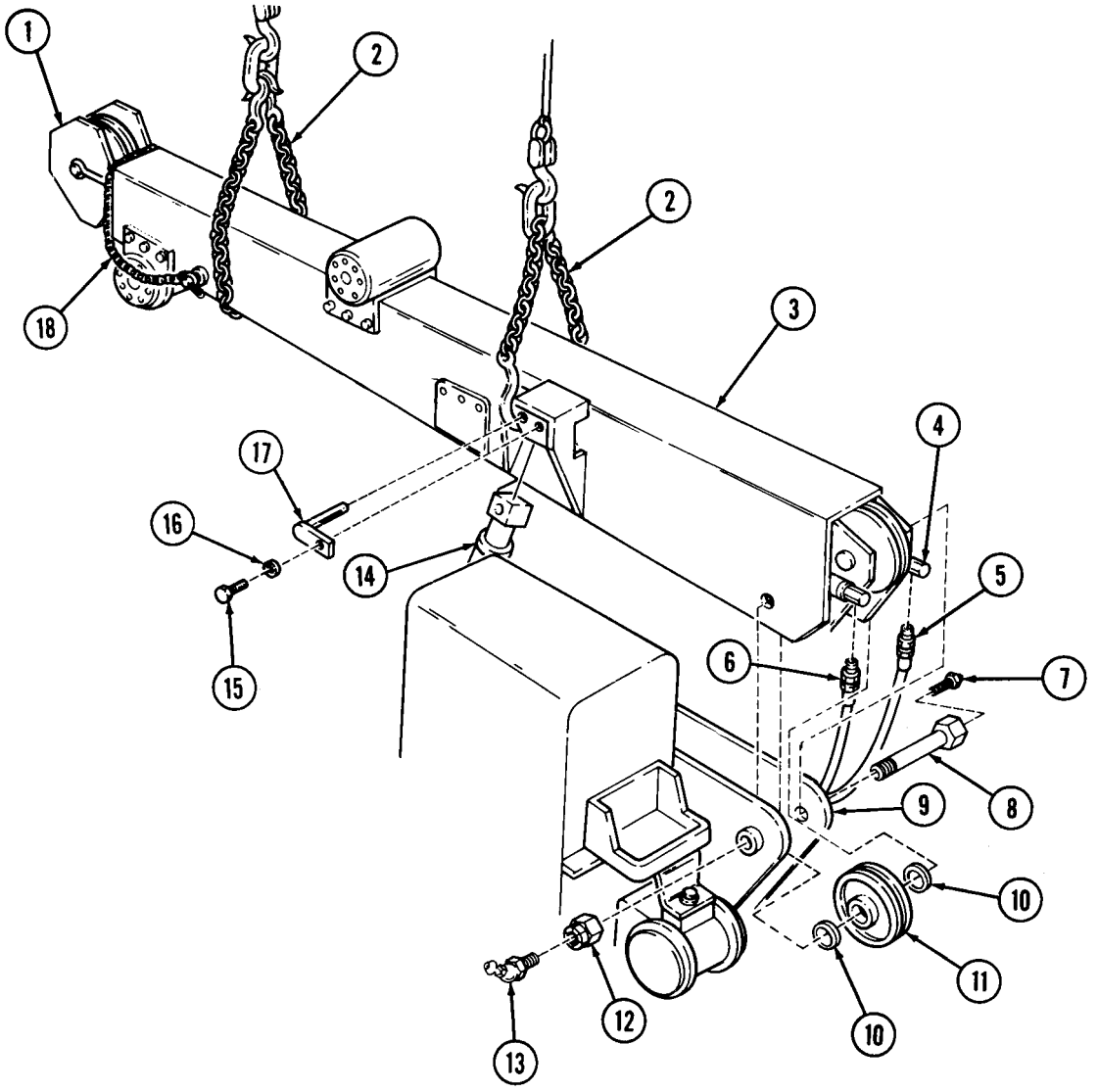
NOTE

If installing new boom assembly, use hardware from old boom.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.		Inner boom (1)	Install on outer boom (3) with utility chain (18).	Prevents inner boom (1) from moving.
11.		Two utility chains (2)	Attach to outer boom (3).	
12.		Outer boom (3)	Hoist and position on turntable (9).	
13.		Crane sheave (11) and two bearing sleeves (10)	Aline with holes in outer boom (3) and turntable (9).	
14.		Outer boom (3)	a. Install on turntable (9) with pivot pin (8), new locknut (12), and grease fittings (7) and (13).	Tighten 800-1000 lb-ft (1085-1356 N·m).
			b. Install two elevating cylinders (14) with two retaining pins (17), new lockwashers (16), and screws (15).	Tighten 44-61 lb-ft (60-83 N·m).
15.		Extension cylinder extension hose (6) and retracting hose (5)	Connect to two boom adapter elbows (4).	
16.		Two utility chains (2) and utility chain (18)	Remove.	

18-12. BOOM REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install boom floodlamp lead (TM 9-2320-272-20-1).
- Fill hydraulic oil reservoir to proper oil level (LO 9-2320-272-12).
- Lubricate boom (LO 9-2320-272-12).
- Install hoist winch (para. 18-9).
- Operate boom through full range (TM 9-2320-272-10) and check for proper operation.

TA 350720

18-13. INNER BOOM REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 Para. 18-12	Parking brake set. Boom removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Eight lockwashers
Cotter pin

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions
- All personnel must stand clear during hoisting operations.
- Inner boom must be properly supported.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

NOTE

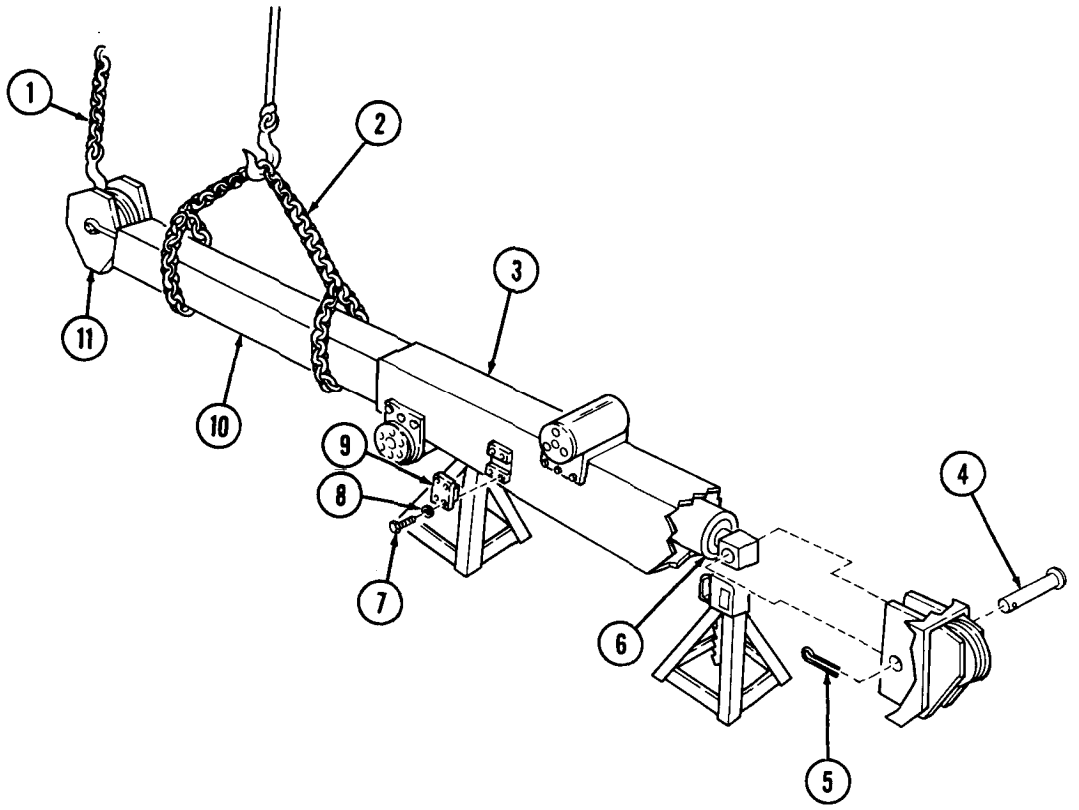
Extension cylinder will be removed and installed with the inner boom during this procedure.

a. Removal

1.	Extension cylinder (6) to front of outer boom (3)	Cotter pin (5) and straight-head pin (4)	Remove.	Discard cotter pin (5).
2.	Outer boom (3)	Eight screws (7) and lockwashers (8), and two boom stops (9)	Remove.	Discard lockwashers (8).

18-13. INNER BOOM REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			WARNING Inner boom must be supported at sheave to prevent tilting until hoist chain can be properly positioned around inner boom, or injury to personnel may result.	
3.		Hoist hook (1)	Attach to boom sheave (11).	Keeps inner boom (10) from tilting during removal.
4.		Inner boom (10)	a. Slowly pull out of outer boom (3) until utility chain (2) can be installed. b. Remove hoist hook (1) from sheave (11) and hoist inner boom (10) away from outer boom (3) with lifting device. c. Place on jack stands.	



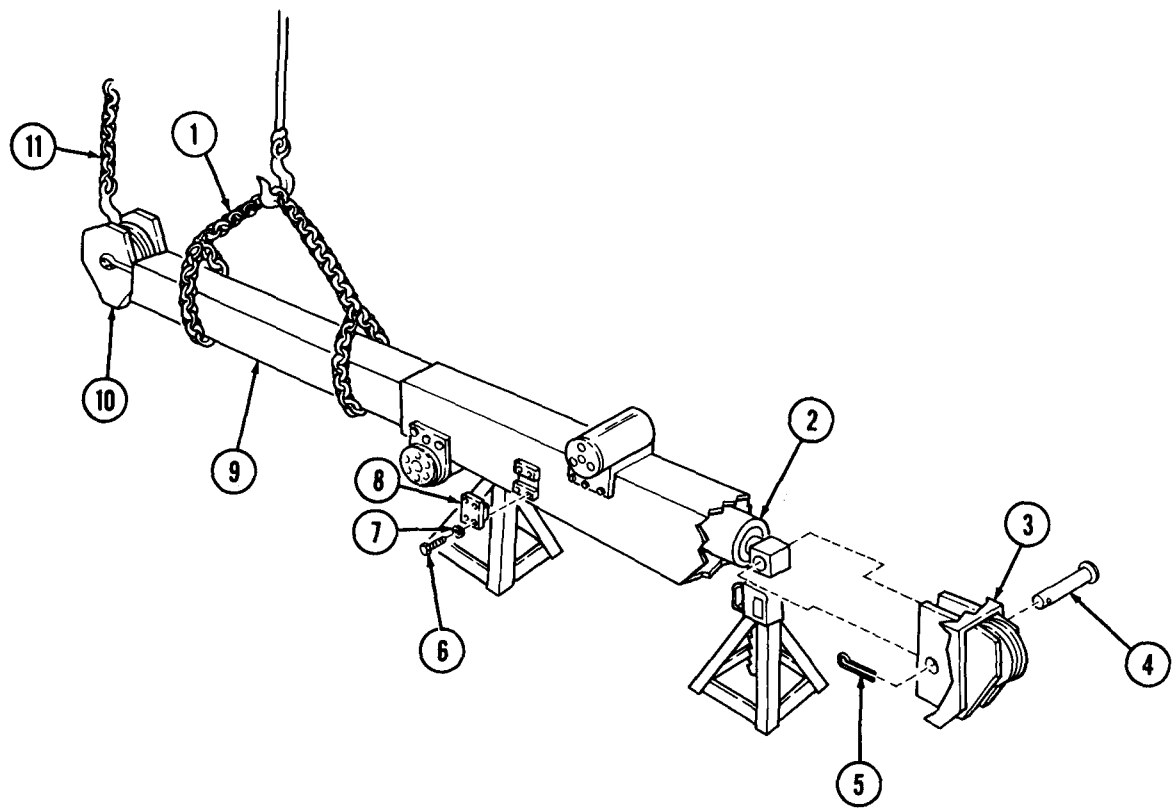
TA 350721

18-13. INNER BOOM REPLACEMENT (Cont'd) 1

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Installation			
		WARNING		
		Inner boom must be supported at sheave to prevent tilting until hoist chain can be properly positioned around inner boom, or injury to personnel may result.		
5.		Utility chain (1)	Attach around inner boom (9) as shown.	
6.		Inner boom (9)	Hoist into outer boom (3) as far as chain (1) placement will permit.	
7.		Hoist hook (11)	Attach to inner boom sheave (10) and remove chain (1).	Prevents inner boom (9) from tilting during installation.
8.		Inner boom (9)	Slide into outer boom (3) until extension cylinder (2) alines to holes in front of outer boom (3).	
9.		Extension cylinder (2)	Install on outer boom (3) with straight-head pin (4) and new cotter pin (5).	
10.		Hoist hook (11)	Remove from inner boom sheave (10).	
11.		Two boom stops (8)	Install on outer boom (3) with eight new lock-washers (7) and screws (6).	

18-13. INNER BOOM REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Check boom roller lateral and vertical adjustment (para. 18-30).
• Install boom (para. 18-12).

TA 350722

18-14. EXTENSION CYLINDER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 Para. 18-13	Parking brake set. Inner boom removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Cotter pin

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions
All personnel must stand clear during hoisting operations.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

a. Removal

1.	Extension cylinder (3) to inner boom (4)	Cotter pin (5)	Remove, and drive out retaining pin (6) from inner boom (4) and cylinder (3).	Discard cotter pin (5).
2.		Utility chains (1)	Attach around extension cylinder (3) and install on lifting device (2).	
3.		Extension cylinder (3)	a. Slowly pull out of inner boom (4) until chains (1) can be positioned. b. Place on shop horses or jack stands.	
4.		Utility chains (1) and lifting device (2)	Remove.	

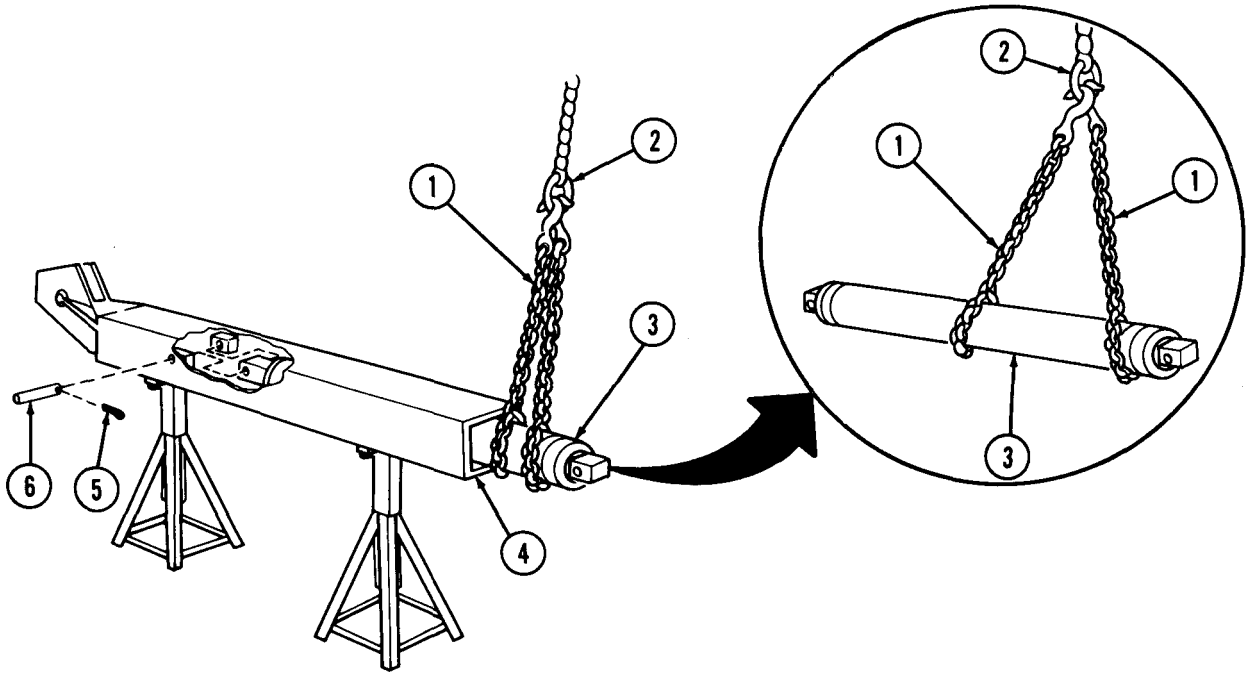
18-14. EXTENSION CYLINDER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
5.		Utility chains (1)	Attach around extension cylinder (3) and install on lifting device (2).	

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

6.		Extension cylinder (3)	a. Hoist to and install in inner boom (4). b. Install retaining pin (6) and new cotter pin (5). c. Remove chains (1).	



END OF TASK!

FOLLOW-ON TASK: Install inner boom (para. 18-13).

18-15. BOOM ROLLER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 Para. 18-13	Parking brake set. Inner boom removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Six lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

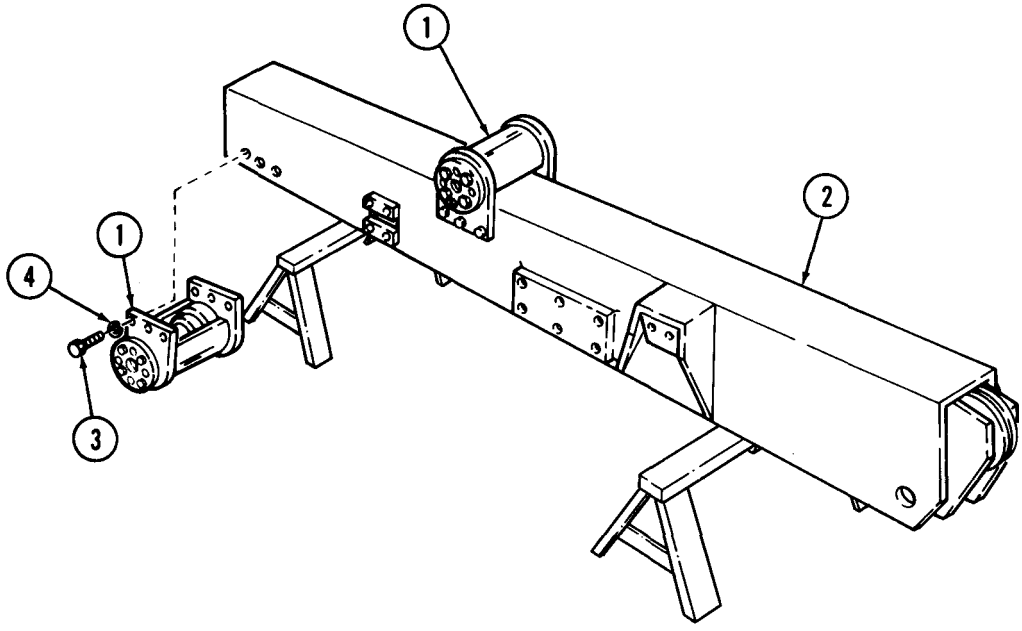
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Both boom rollers are removed in the same way with boom on or off the vehicle. This procedure applies to the bottom boom roller with inner boom removed.		
1.	Outer boom (2)	Six screws (3) and lockwashers (4), and roller (1)	Remove.	Discard lockwashers (4).
		b. Installation		
2.		Boom roller (1)	Install on outer boom (2) with six new lockwashers (4) and screws (3).	

18-15. BOOM ROLLER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install inner boom (para. 18-13).
• Check boom roller lateral and vertical adjustment (para. 18-30).

TA 350724

18-16. ELECTRICAL SWIVEL REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	Boom raised.
	TM 9-2320-272-10	Shipper braces installed.
	TM 9-2320-272-20-1	Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Six lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

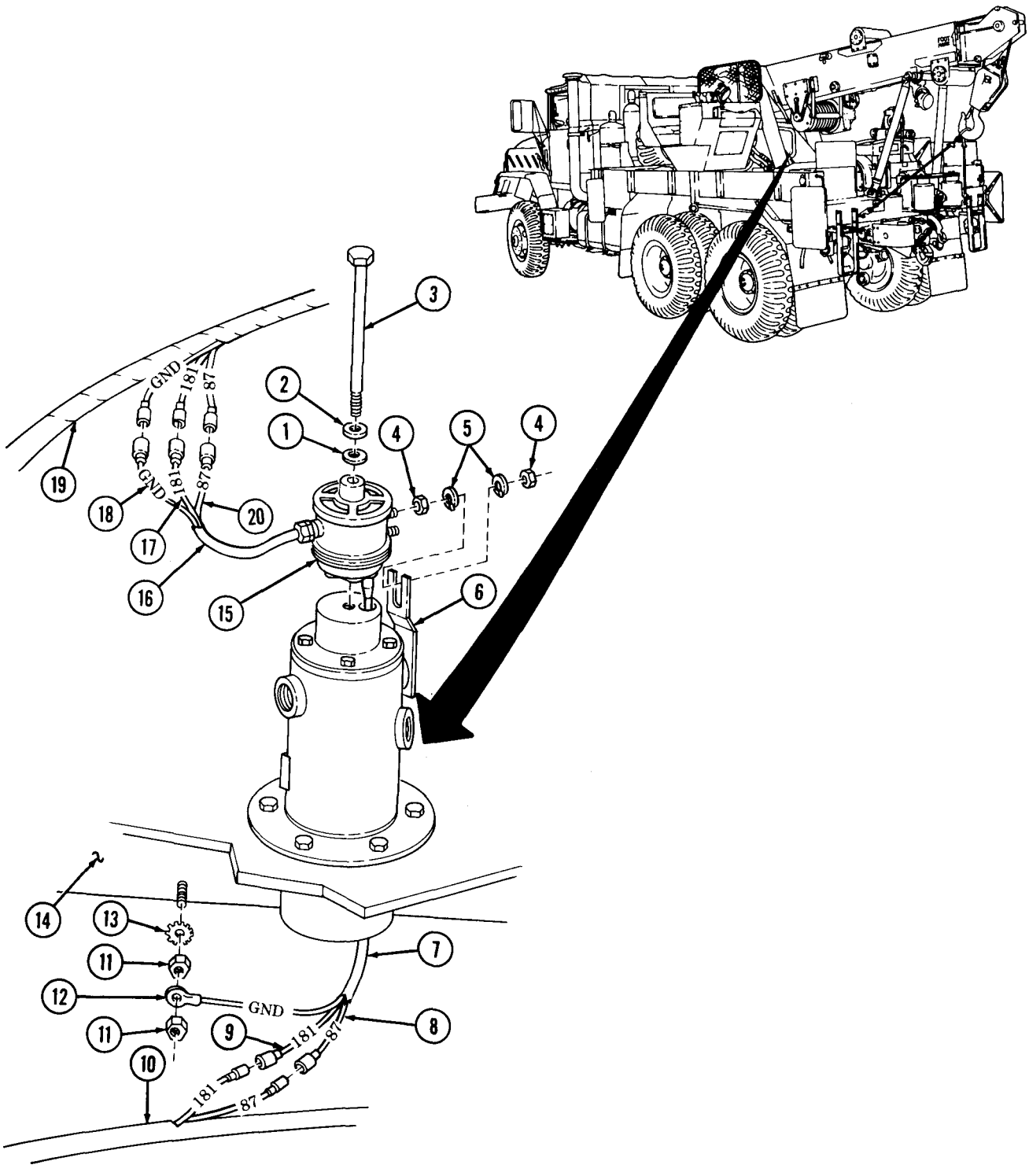
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Electrical swivel harness (7) to crane wiring harness (10)	Wires (8) and (9)	Disconnect.	Tag for installation. Disconnection is made from underside of vehicle.
2.	Frame (14)	Two nuts (11), ground wire (12), and lockwasher (13)	Remove.	Tag for installation. Removal is made from underside of vehicle. Discard lockwasher (13).
3.	Electrical swivel harness (16) to floodlight harness (19)	Wires (17) and (20), and ground wire (18)	Disconnect.	Tag for installation.
4.	Hydraulic swivel bracket (6)	Four nuts (4) and lockwashers (5)	Remove.	Discard lockwashers (5).
5.	Electrical swivel (15)	Screw (3), lockwasher (2), and washer (1)	Remove.	Discard lockwasher (2).
6.		Electrical swivel (15)	Remove.	

18-16. ELECTRICAL SWIVEL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



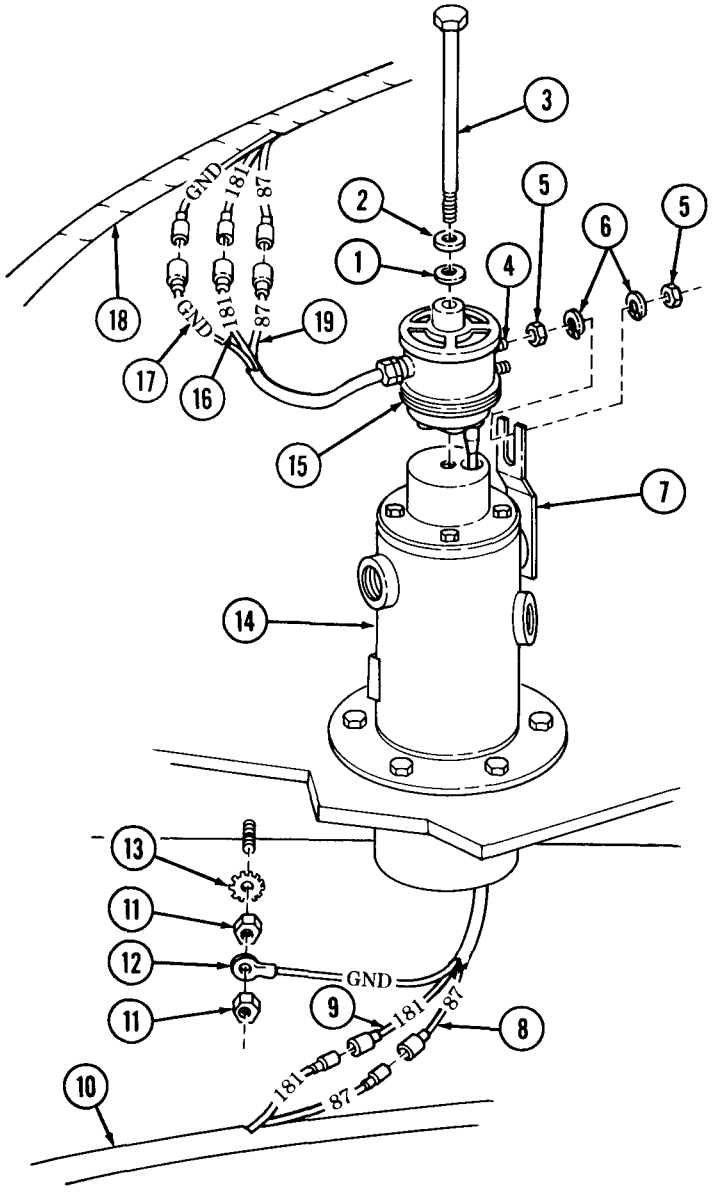
TA 350725

18-16. ELECTRICAL SWIVEL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.		Electrical swivel studs (4)	Install two new lockwashers (6) and nuts (5).	Install loosely.
8.		Electrical swivel (15)	a. Install on hydraulic swivel (14) with screw (3) new lockwasher (2), and washer (1). b. Install on hydraulic swivel bracket (7) with four new lockwashers (6) and nuts (5).	
9.		Wires (16), (17), and (19)	Connect to floodlight harness (18).	
10.		Wires (8) and (9)	Connect to crane wiring harness (10).	Connection is made at underside of vehicle.
11.		Ground wire (12)	Install with new lockwasher (13) and two nuts (11).	Connection is made at underside of vehicle.

18-16. ELECTRICAL SWIVEL REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Connect battery ground cables (TM 9-2320-272-20-1).
- Remove shipper braces (TM 9-2320-272-10).
- Lower boom (TM 9-2320-272-10).

TA 350726

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	Para. 18-12	Boom removed.
	Para. 18-16	Electrical swivel removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Six lockwashers
Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

All personnel must stand clear during hoisting operations.

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

a. Removal

CAUTION

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage.

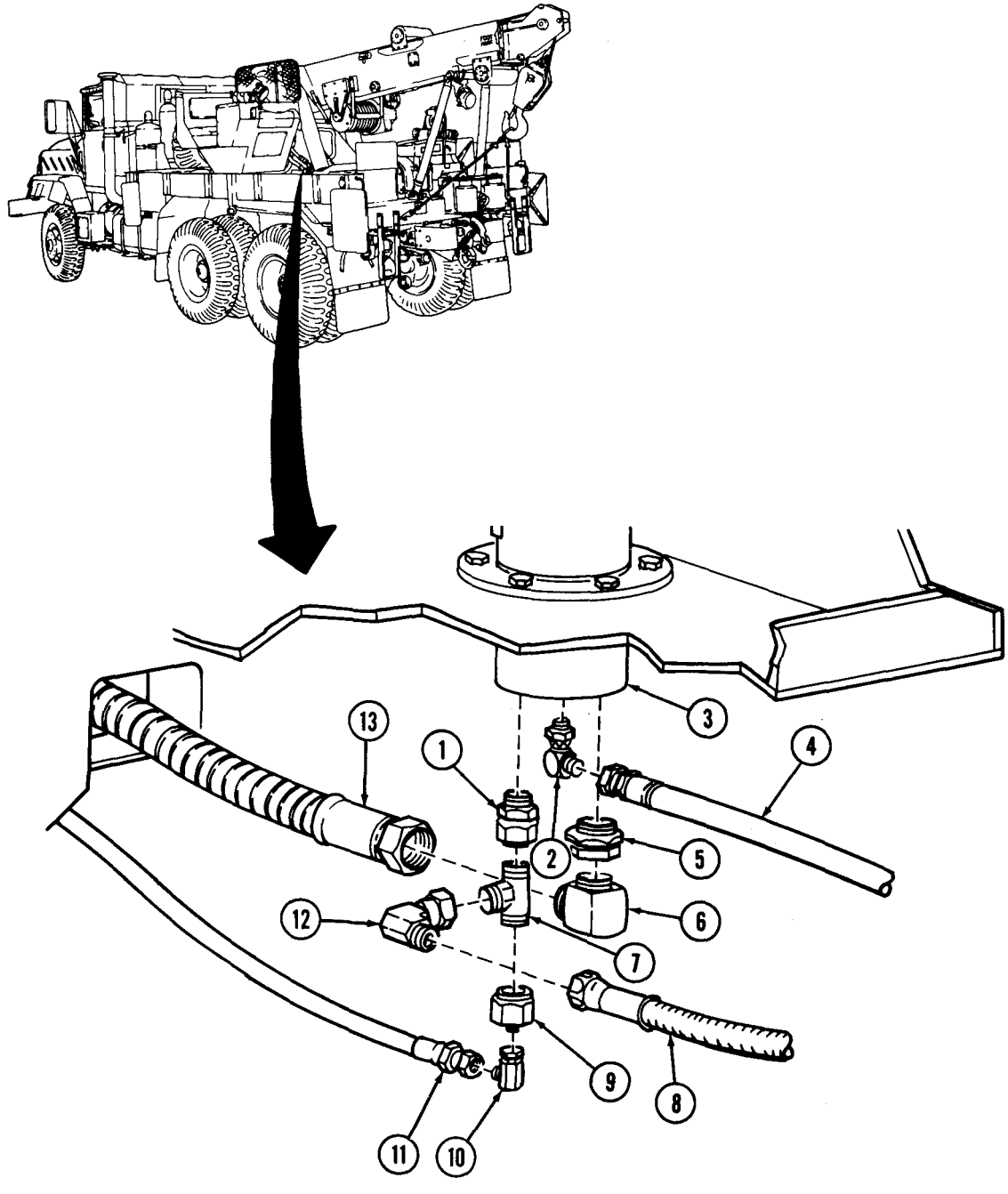
NOTE

- Have drainage container ready to catch oil.
- Tag all hydraulic lines and fittings for installation.

1.	Lower end of hydraulic swivel valve (3)	Hydraulic lines (4), (8), (11), and (13)	Disconnect.
2.		Adapter fittings (2), (6), (10), and (12).	Remove.
3.		Adapter fittings (5), (9), (7), and (1)	Remove.

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

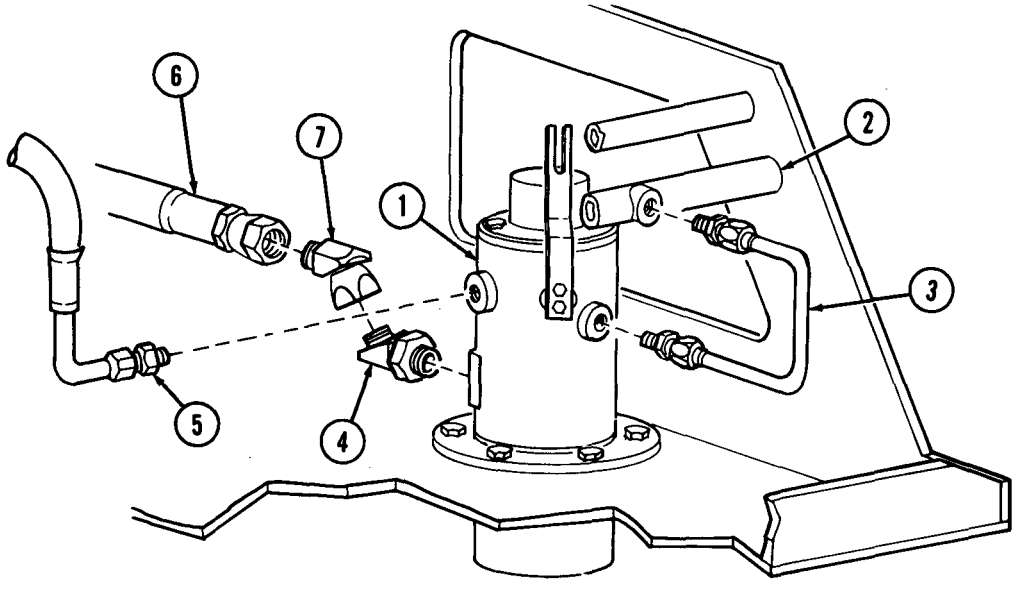
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350727

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Hydraulic swivel valve (1)	Hydraulic lines (5) and (6)	Disconnect.	
5.	Elevating cylinder tee (2) and swivel valve (1)	Hydraulic tube (3)	Disconnect.	
6.	Hydraulic swivel valve (1)	Adapter fittings (4) and (7)	Remove.	



7.		Six screws (10) and lockwashers (11)	Remove.	Discard lockwashers (11).
8.		Utility chain (8)	Install on hydraulic swivel valve (1).	

NOTE

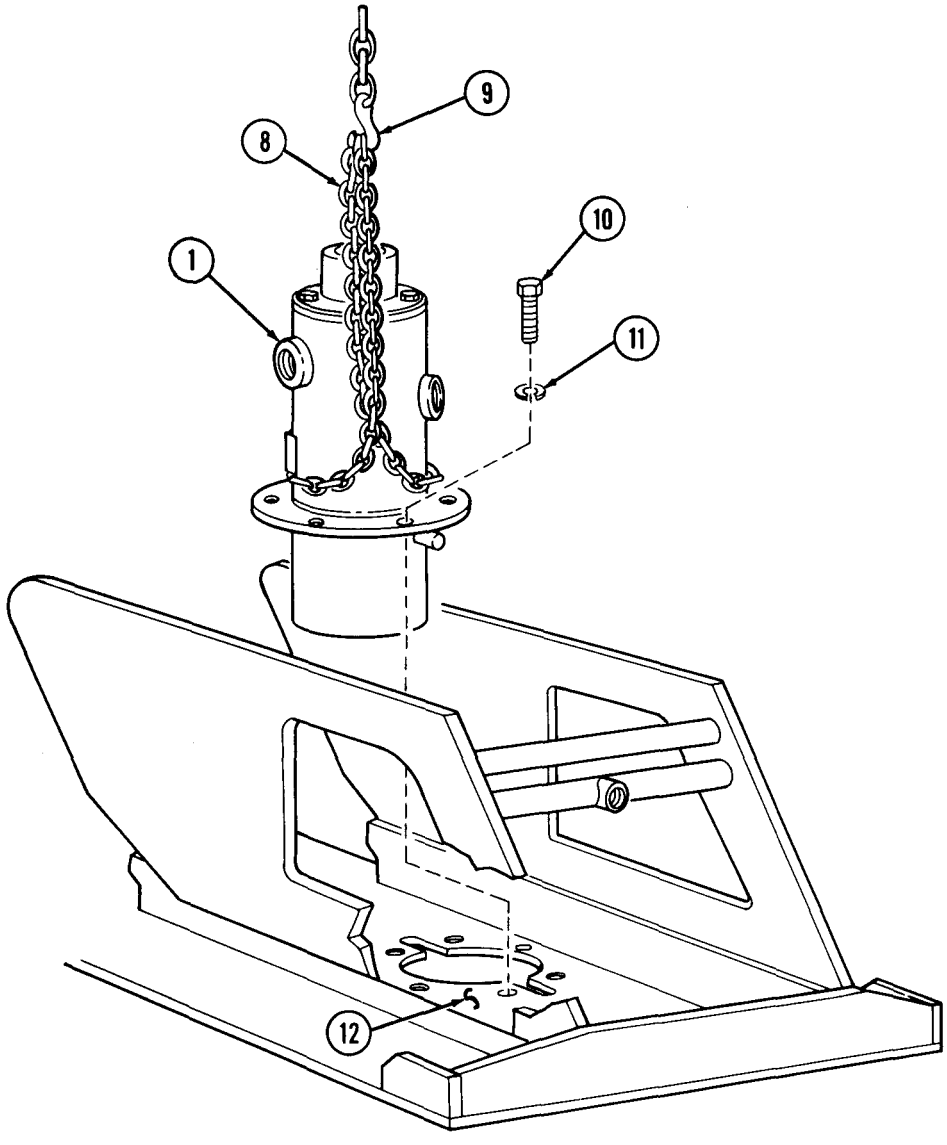
Assistant will help with step 9.

9.		Hoist hook (9)	Attach to chain (8) and lift valve (1) from turntable (12).	

TA 349712

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.		Utility chain (8) and lifting device.	Remove.	



TA 350728

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
11.		Utility chain (2) and hoist hook (3)	Install to hydraulic swivel valve (1).	

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

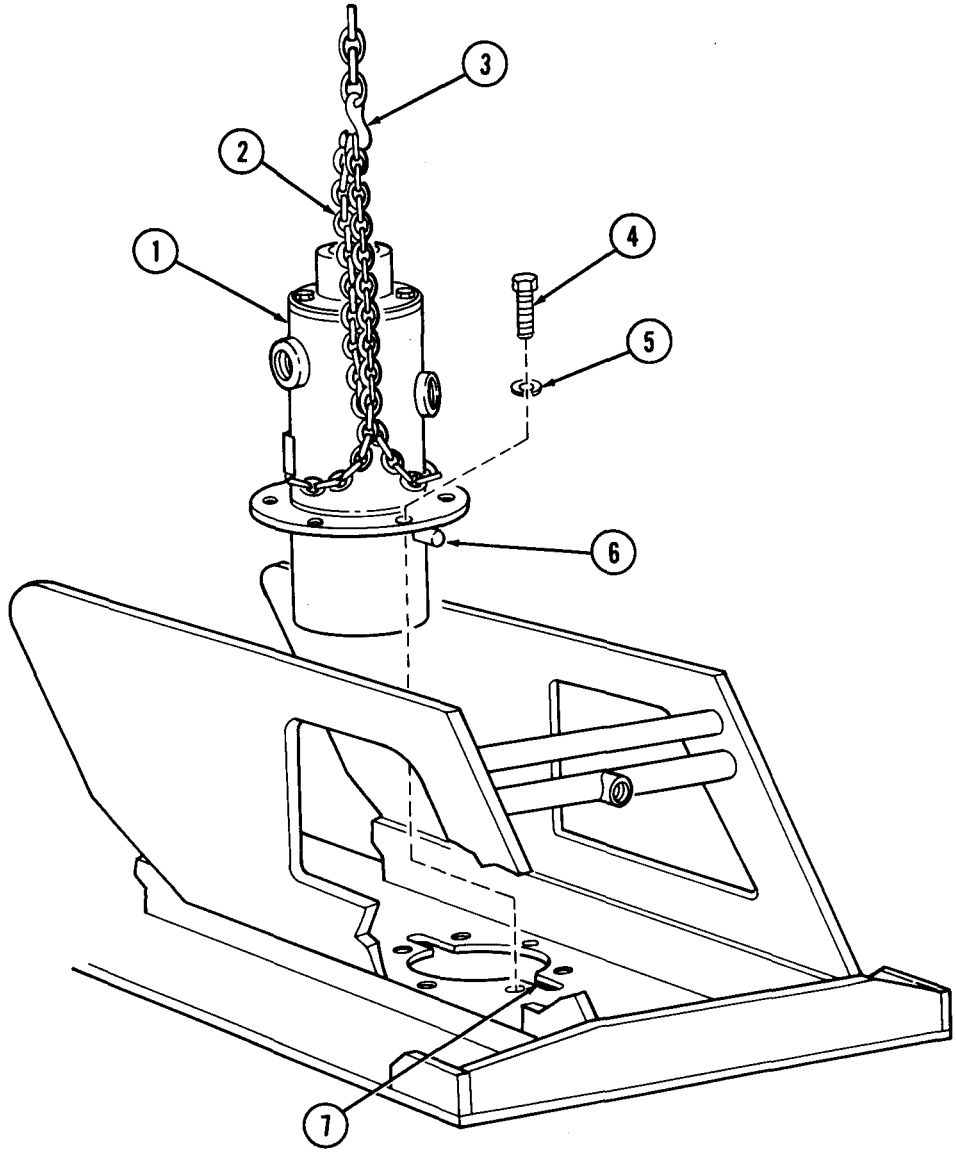
NOTE

Assistant will help with step 12.

12.		Swivel valve (1)	Aline valve guide pins (6) with slots in turntable (7) and install with six new lockwashers (5) and screws (4).	Tighten 44-61 lb-ft (60-83 N·m).
13.		Hoist hook (3) and utility chain (2)	Remove.	

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



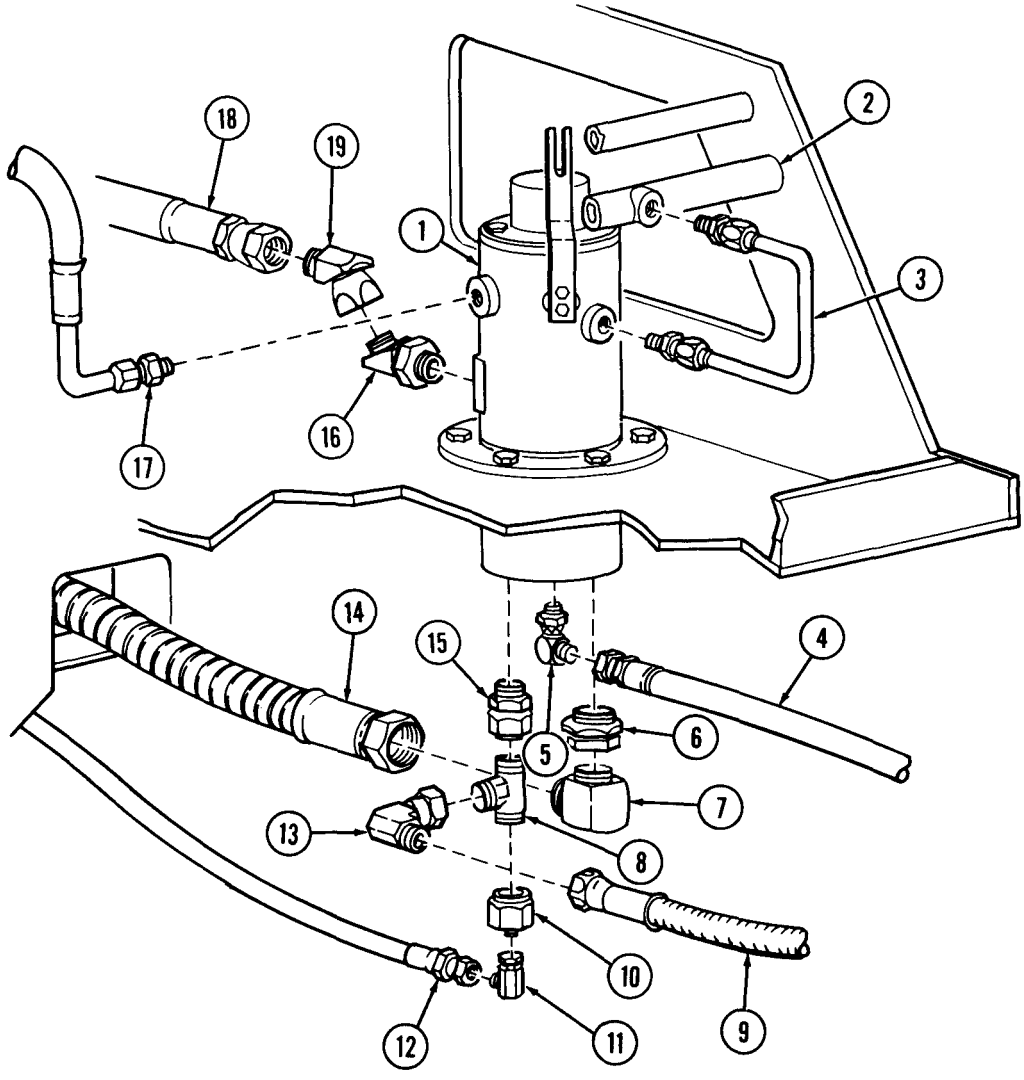
TA 350729

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.		Adapter fittings (16) and (19)	Install adapter fitting (16) on swivel valve (1) and adapter fitting (19) onto adapter fitting (16).	
15.		Hydraulic tube (3)	Connect to swivel valve (1) and elevating cylinder tee (2).	
16.		Hydraulic lines (17) and (18)	Connect.	
17.		Adapter fittings (5), (6), (15), and (8)	Install.	
18.		Adapter fittings (7), (10), (11), and (13)	Install.	
19.		Hydraulic lines (4), (9), (12), and (14)	Connect.	

18-17. HYDRAULIC SWIVEL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install electrical swivel (para. 18-16).
• Install boom (para. 18-12) and check for leaks.

TA 350730

18-18. CRANE HYDRAULIC SWINGER MOTOR REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Four lockwashers
Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

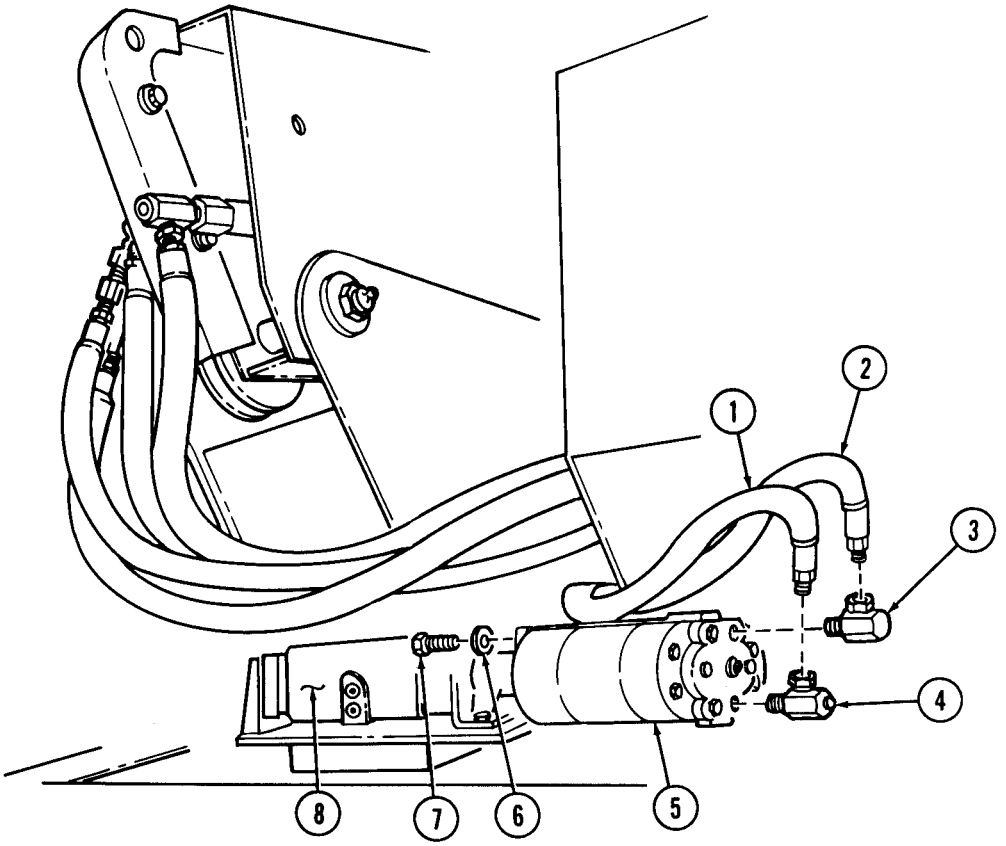
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		CAUTION When disconnecting hydraulic lines, plug all openings to prevent dirt from entering and causing internal parts damage.		
		NOTE Have drainage container ready to catch oil.		
1.	Swinger motor adapter elbows (3) and (4)	Two hydraulic flex lines (1) and (2)	Disconnect.	Tag for installation.
2.	Swinger motor (5) to gearcase (8)	Four screws (7) and lockwashers (6)	Remove.	Discard lockwashers (6).
3.		Swinger motor (5)	Remove.	
4.	Swinger motor (5)	Two adapter elbows (3) and (4)	Remove.	Tag for installation.
	b. Installation			
5.		Two adapter elbows (4) and (3)	Install on swinger motor (5).	
6.		Swinger motor (5)	Install on gearcase (8) with four new lockwashers (6) and screws (7).	Tighten 44-61 lb-ft (60-83 N·m).
7.		Two hydraulic flex lines (2) and (1)	Connect.	

18-18. CRANE HYDRAULIC SWINGER MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Fill hydraulic oil reservoir to proper oil level (LO 9-2320-272-12).
• Operate swing control lever to check swinger motor for proper operation (TM 9-2320-272-10).

TA 350731

18-19. CRANE SWINGER GEARCASE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M936

Equipment Condition Reference
TM 9-2320-272-10 Para. 18-18

Condition Description
Parking brake set.
Crane hydraulic swinger motor removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Six lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

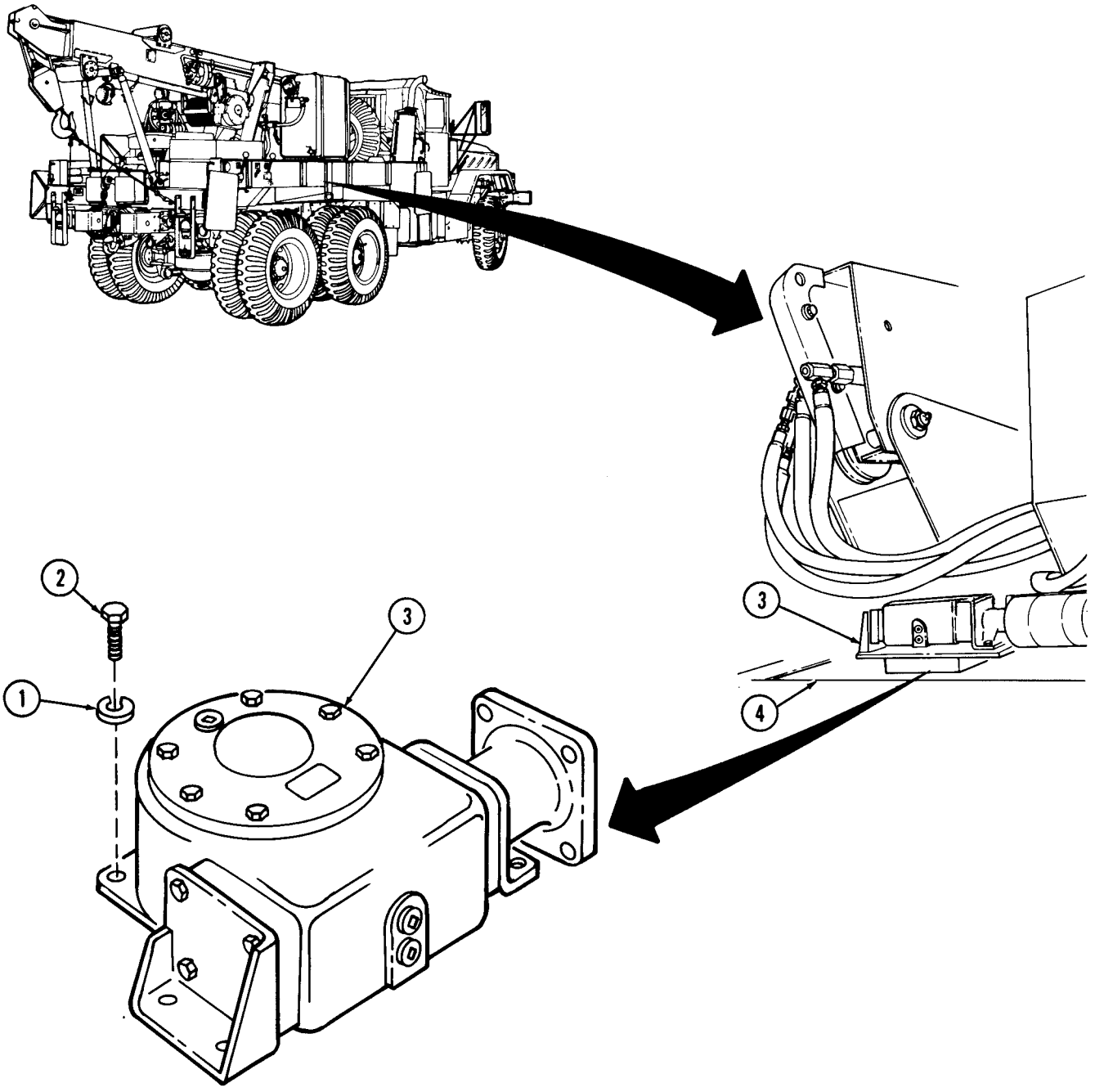
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Crane swinger gearcase (3)	Six screws (2) and lockwashers (1)	Remove.	Discard lockwashers (1).
2.	Turntable (4)	Gearcase (3)	Remove.	
	b. Installation			
3.		Gearcase (3)	Install with six new lockwashers (1) and screws (2).	

18-19. CRANE SWINGER GEARCASE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install crane hydraulic swinger motor (para. 18-18).

TA 350732

18-20. CRANE CONTROL VALVE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 LO 9-2320-272-12	Parking brake set. Hydraulic oil reservoir drained.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four locknuts
Protective cap-plugs (Appendix C, Item 5)

Personnel Required
Wheeled vehicle repairman MOS 63W

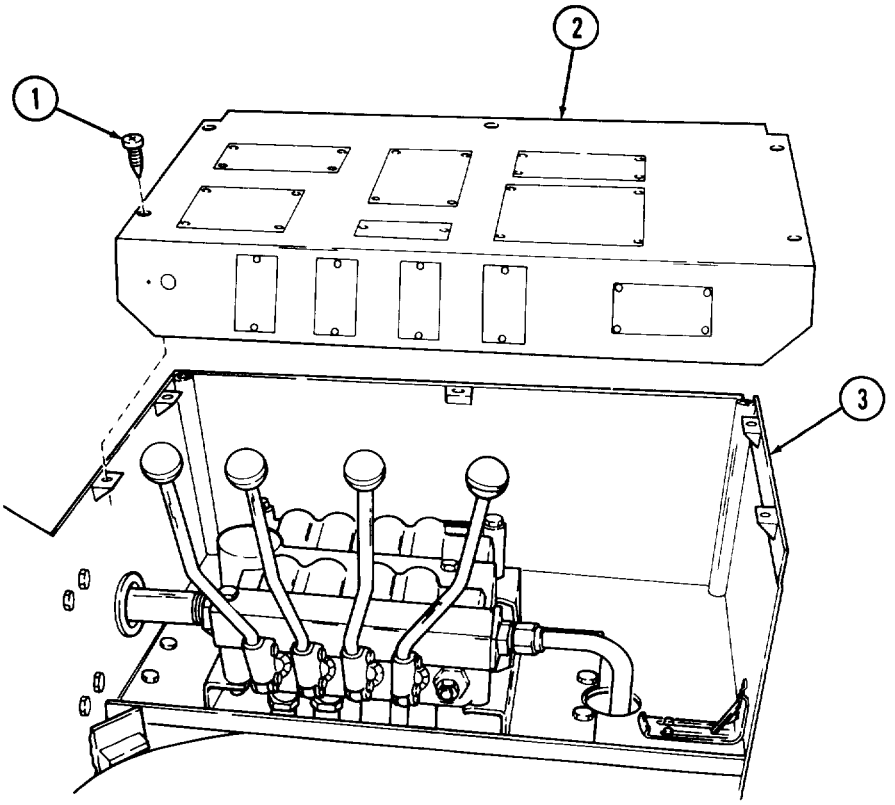
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
1.	Gondola (3)	Five screws (1) and control valve cover (2)	Remove.	

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350733

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

CAUTION

When disconnecting hydraulic lines, plug all openings to prevent dirt from entering and causing internal parts damage.

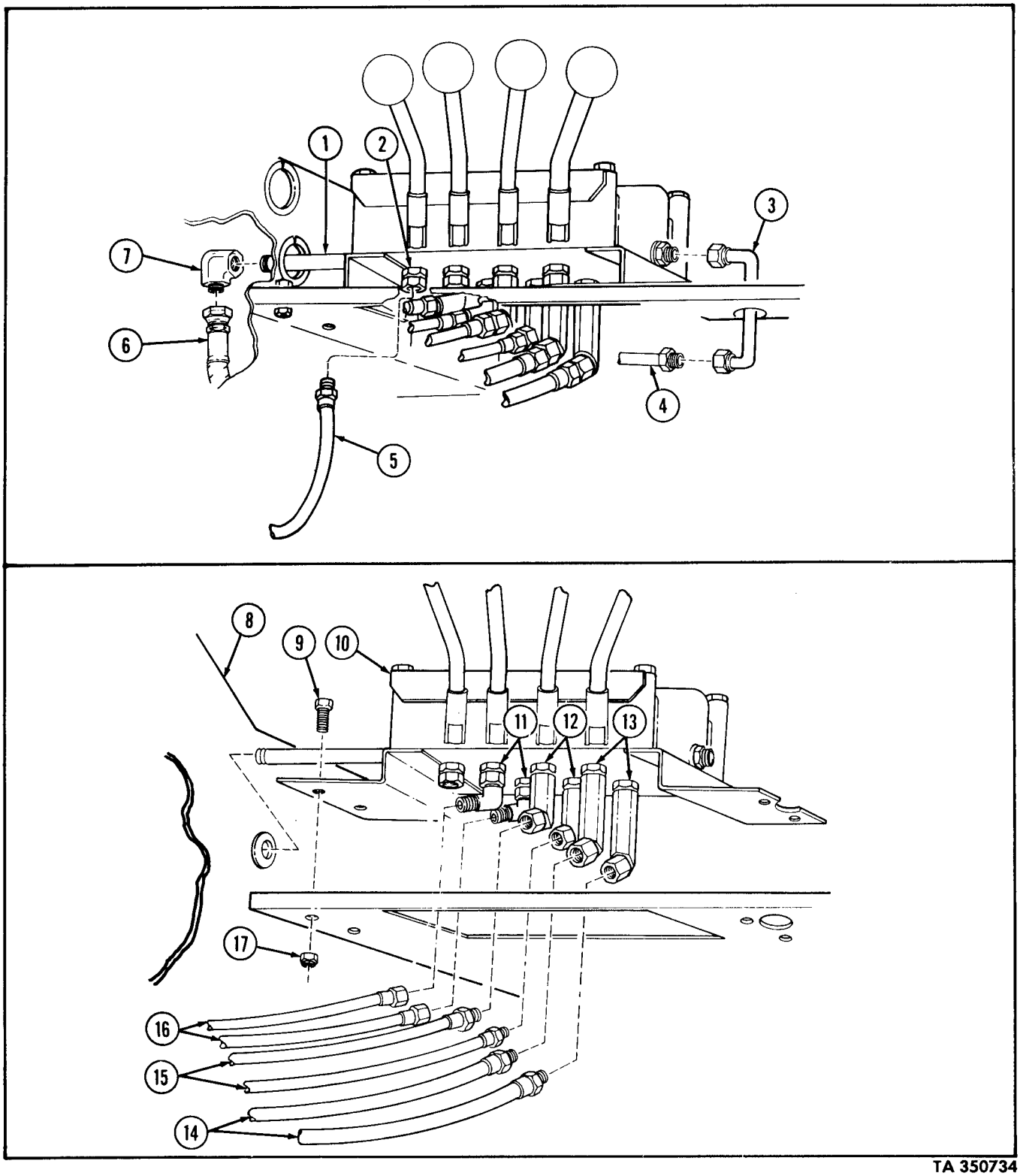
NOTE

- Have drainage container ready to catch oil.
- Tag hydraulic lines for installation.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
2.	Control valve elbow (7)	Hydraulic oil reservoir crossover tube (6)	Disconnect.	
3.	Control valve adapter (1)	Control valve elbow (7)	Remove.	
4.	Two control valve adapter fittings (13)	Two hydraulic swinger motor flex lines (14)	Disconnect.	
5.	Two control valve adapter fittings (12)	Two hydraulic crowd cylinder flex lines (15)	Disconnect.	
6.	Two control valve adapter fittings (11)	Two hydraulic hoist motor flex lines (16)	Disconnect.	
7.	Control valve adapter fitting (2)	Hydraulic elevating cylinder crossover tube (5)	Disconnect.	
8.	Hydraulic swivel valve flex line (4)	Control valve tube (3)	Remove.	
9.	Gondola (8)	Four screws (9) and locknuts (17), and control valve (10)	Remove.	Discard locknuts (17).

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



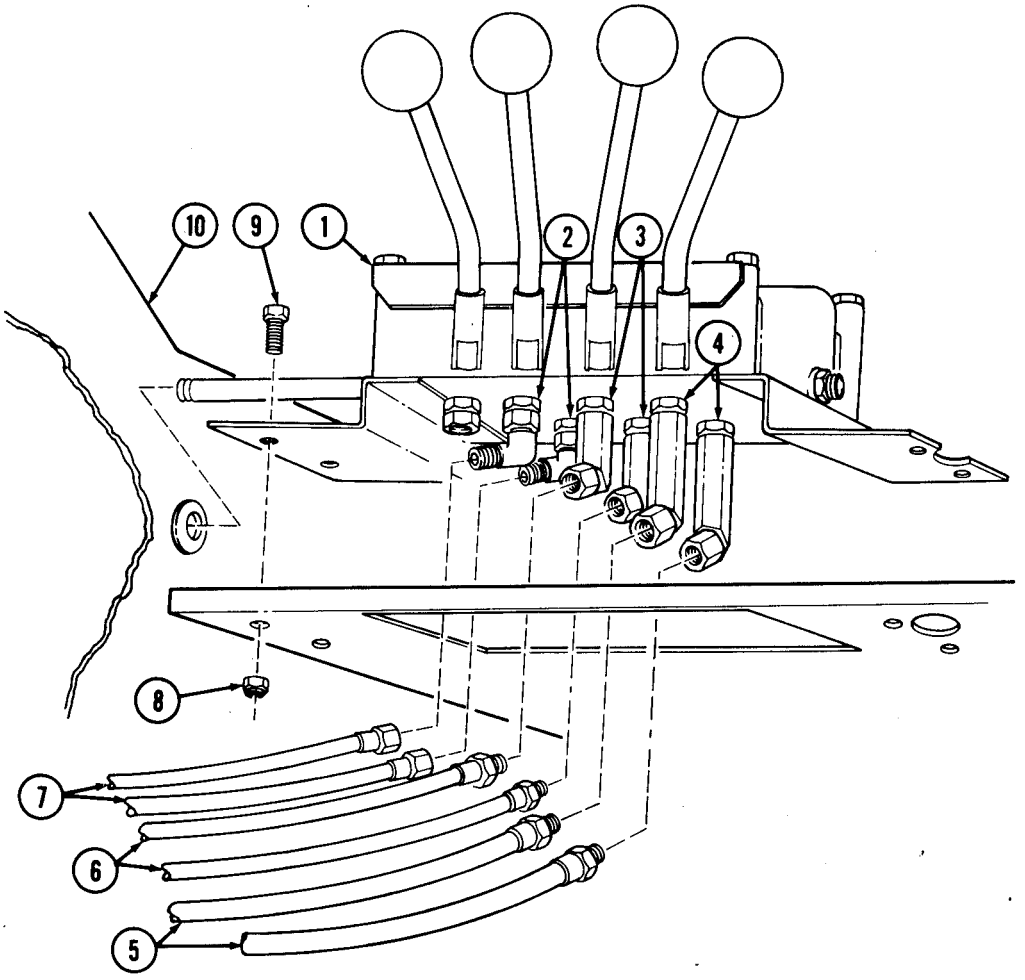
TA 350734

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Installation			
			NOTE • If new crane control valve is being installed, fittings from old crane control valve may be used. Two side control plates and base may be used. Fittings must be cleaned and inspected for cracks and stripped threads. • During installation, make sure all hydraulic lines are connected at their marked locations.	
10.		Control valve (1)	Install on gondola (10) with four screws (9) and new locknuts (8).	Tighten 44-61 lb-ft (60-83 N·m).
11.		Two hydraulic swinger motor flex lines (5)	Install on two control valve adapter fittings (4).	
12.		Two hydraulic crowd cylinder flex lines (6)	Install on two control valve adapter fittings (3).	
13.		Two hydraulic hoist motor flex lines (7)	Install on two control valve adapter fittings (2).	

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

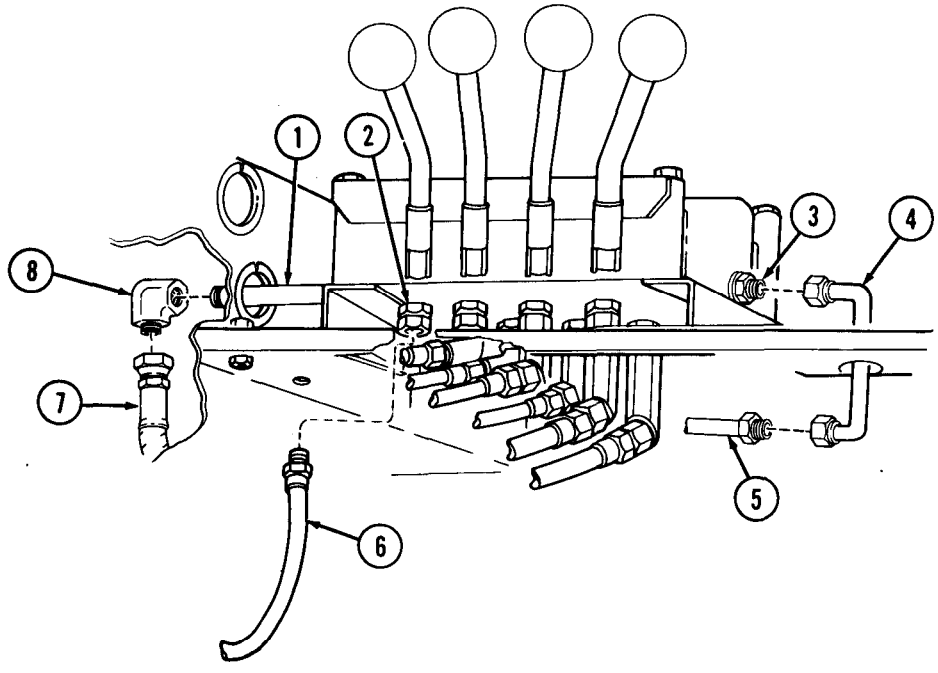
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350735

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

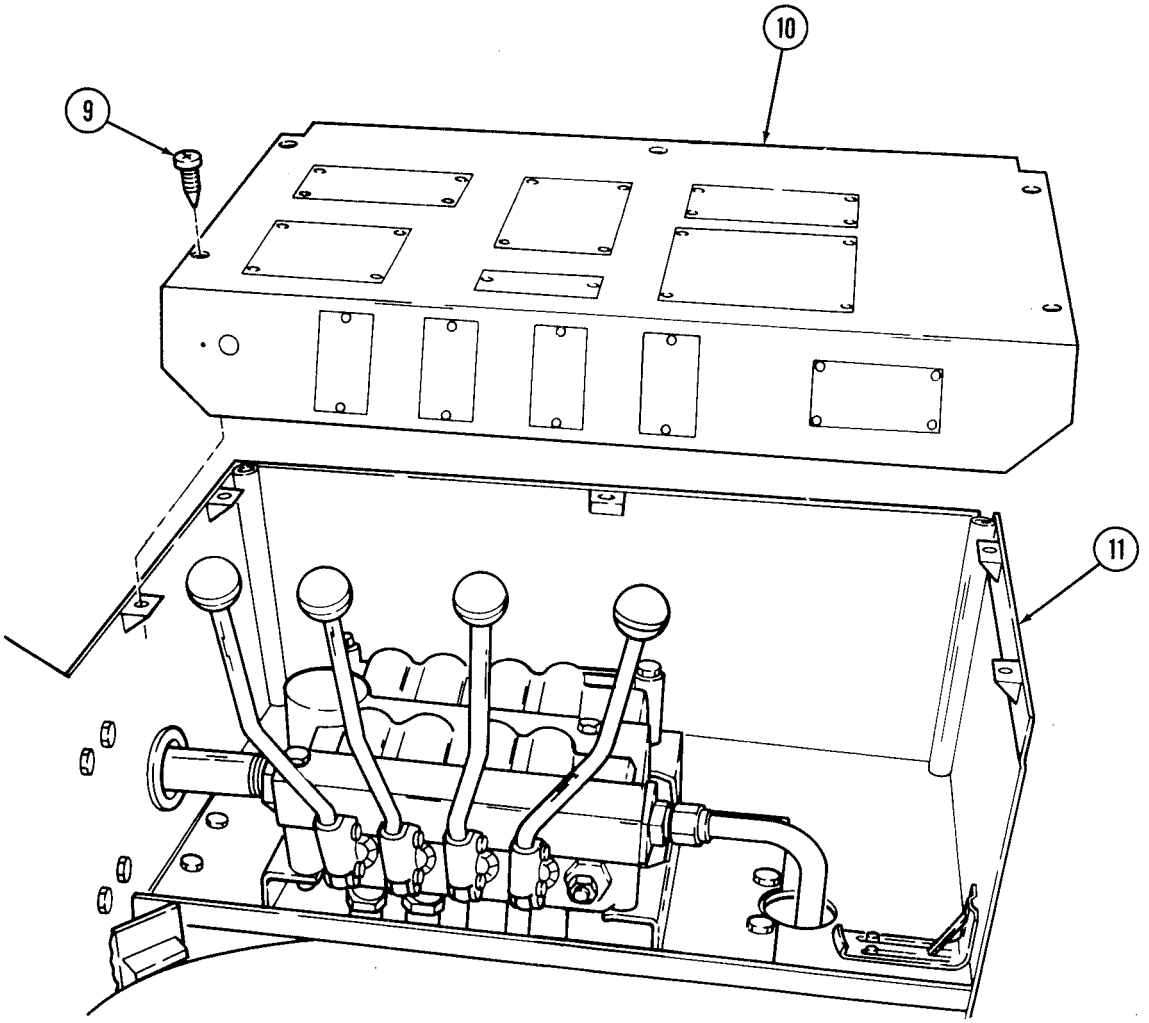
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.		Control valve tube (4)	Install on hydraulic swivel valve flex line (5) and hydraulic control valve adapter (3).	
15.		Hydraulic elevating cylinder crossover tube (6)	Install on control valve adapter (2).	
16.		Control valve elbow (8)	Install on hydraulic control valve adapter (1).	
17.		Hydraulic oil reservoir crossover tube (7)	Install on control valve elbow (8).	



TA 350736

18-20. CRANE CONTROL VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.		Control valve cover (10)	Install on gondola (11) with five screws (9).	



END OF TASK!

FOLLOW-ON TASKS: • Fill hydraulic oil reservoir to proper oil level (LO 9-2320-272-12).
• Check pressure relief valve adjustment (TM 9-2320-272-20-2).

TA 350737

18-20.1. REGULATOR FLOW VALVE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Cap and plug set (Appendix C, Item 5)
Pipe sealant (Appendix C, Item 36)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

CAUTION

When disconnecting hydraulic lines, plug all openings to prevent dirt from entering and causing internal parts damage.

NOTE

Have drainage container ready to catch oil.

1.	Adapter elbow (3)	Hydraulic hose (2)	Disconnect.	
2.	Extension cylinder (1)	Adapter elbow (3), regulator valve (4), and nipple (5)	Remove.	

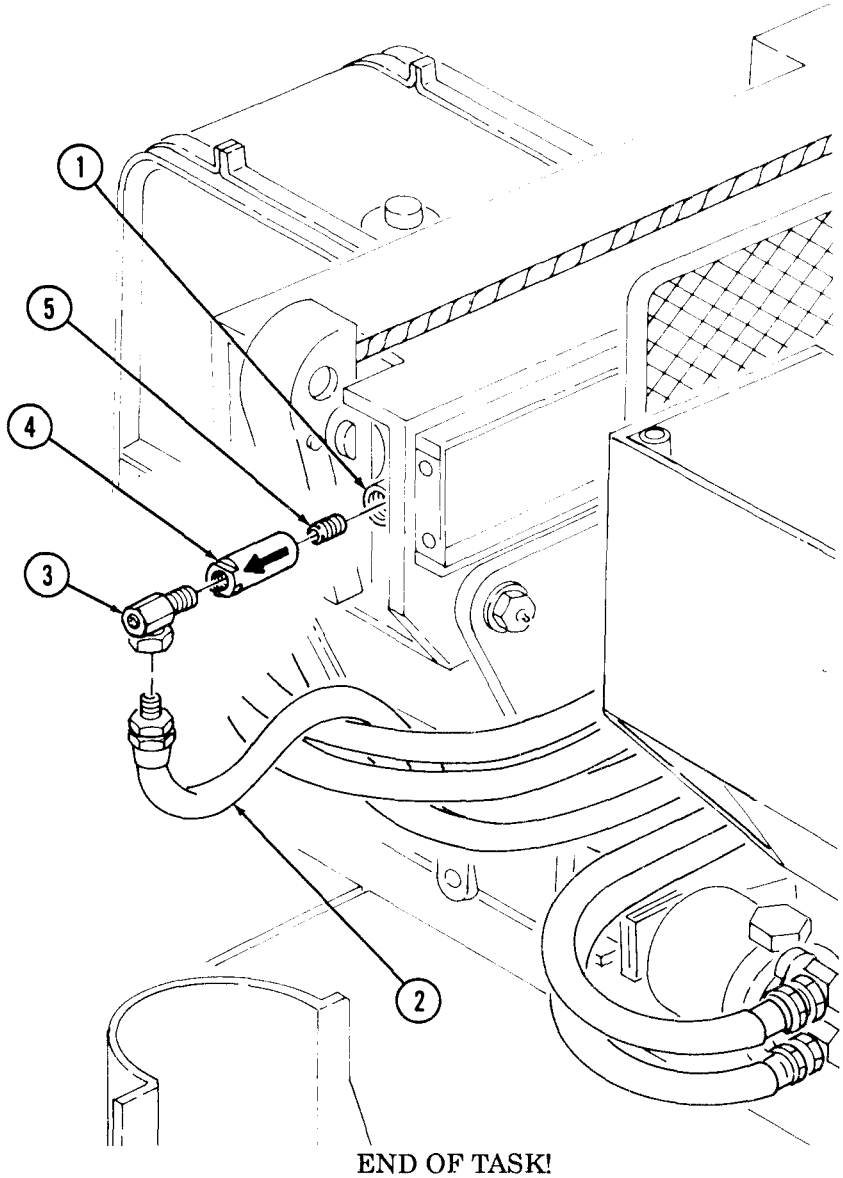
b. Installation

CAUTION

Arrow marked on regulator flow valve must point away from extension cylinder. Failure to do so may cause damage to equipment.

18-20.1. REGULATOR FLOW VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Apply pipe sealant to all male threads before installation.		
3.		Nipple (5), regulator valve (4), and adapter elbow (3)	Install on extension cylinder (1).	Ensure arrow of regulator valve (4) points away from extension cylinder (1).
4.		Hydraulic hose (2)	Connect to adapter elbow (3).	



END OF TASK!

FOLLOW-ON TASK: Fill hydraulic oil reservoir to proper level (LO 9-2320-272-12).

18-21. GONDOLA REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 Para. 18-20 TM 9-2320-272-20-1	Parking brake set. Crane control valve removed. Floodlight assembly removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Fifteen locknuts

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

All personnel must stand clear during hoisting operations.

Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

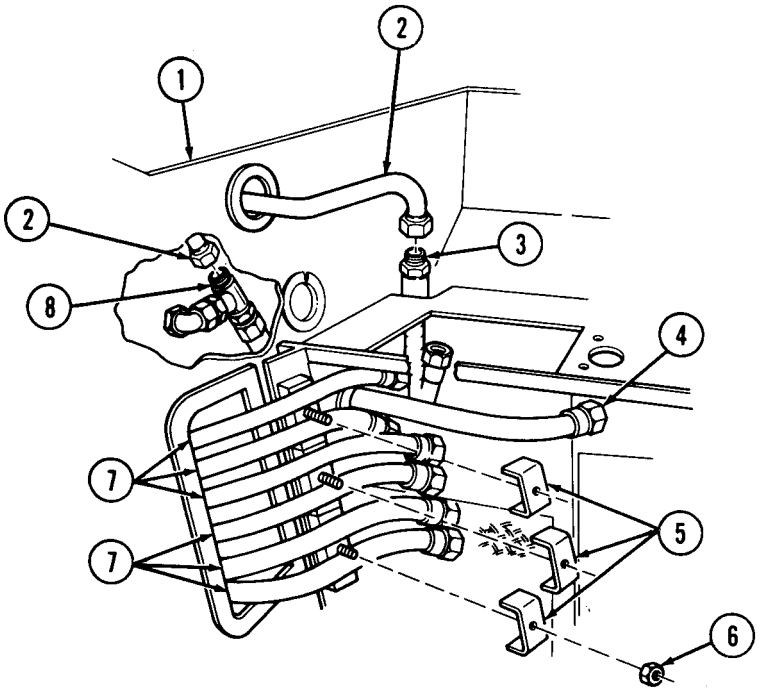
WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

1.	Elevating cylinder crossover tee (8) and control valve flex line (3)	Hydraulic tube (2)	Remove.	
2.	Gondola (1)	Three locknuts (6) and clamps (5), and six hydraulic flex lines (7)	Remove.	Discard locknuts (6). Tag lines (7) for installation.
3.		Hydraulic swivel valve flex line (4)	Remove from gondola (1).	

18-21. GONDOLA REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18-21. GONDOLA REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Gondola (9)	Gondola guard (2)	Remove.	
5.		Three screws (6) and clips (7)	Remove.	
6.		Two utility chains (10)	Attach to gondola (9).	
7.		Hoist hook (1)	Attach to chains (10) and raise until slack is removed.	

CAUTION

Make sure all hydraulic lines and wires are fastened clear of gondola to avoid snagging during removal.

NOTE

Assistant will help with step 8.

8.	Turntable sideplate (3)	Twelve locknuts (4) and screws (5)	Remove, and hoist gondola (9) away from sideplate (3).	Discard locknuts (4).
9.	Gondola (9)	Hoist hook (1) and two utility chains (10)	Remove.	

b. Installation

10.		Two utility chains (10)	Attach to gondola (9).	
11.		Hoist hook (1)	Attach to two utility chains (10).	

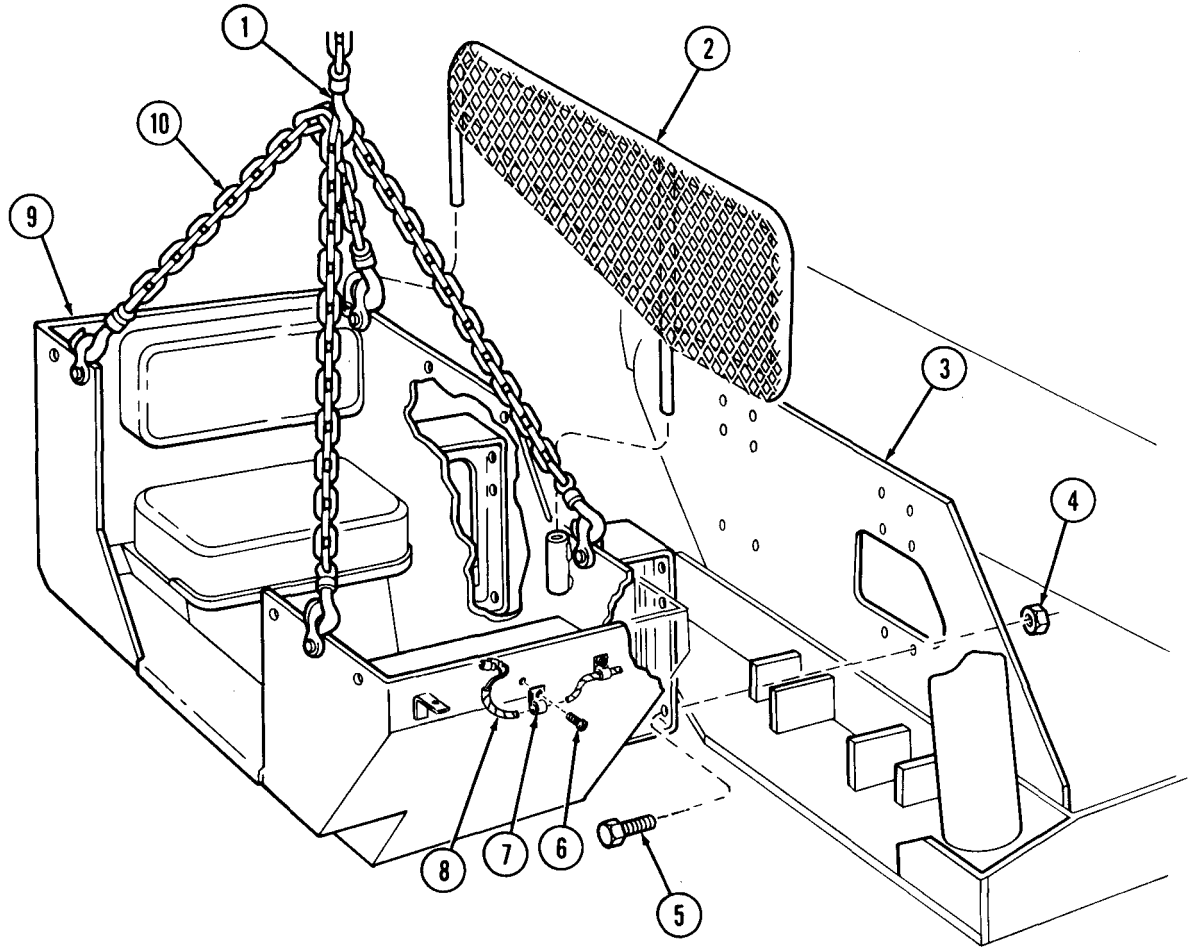
NOTE

- Assistant will help with step 12.
- When positioning gondola, guide all hydraulic lines through opening.

12.		Gondola (9)	Hoist to turntable sideplate (3) and install with twelve screws (5) and new locknuts (4).	Tighten 44-61 lb-ft (60-83 N·m).
13.		Two utility chains (10) and hoist hook (1)	Remove from gondola (9).	
14.		Two wires (8)	Install with three clips (7) and screws (6).	
15.		Gondola guard (2)	Install.	

18-21. GONDOLA REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



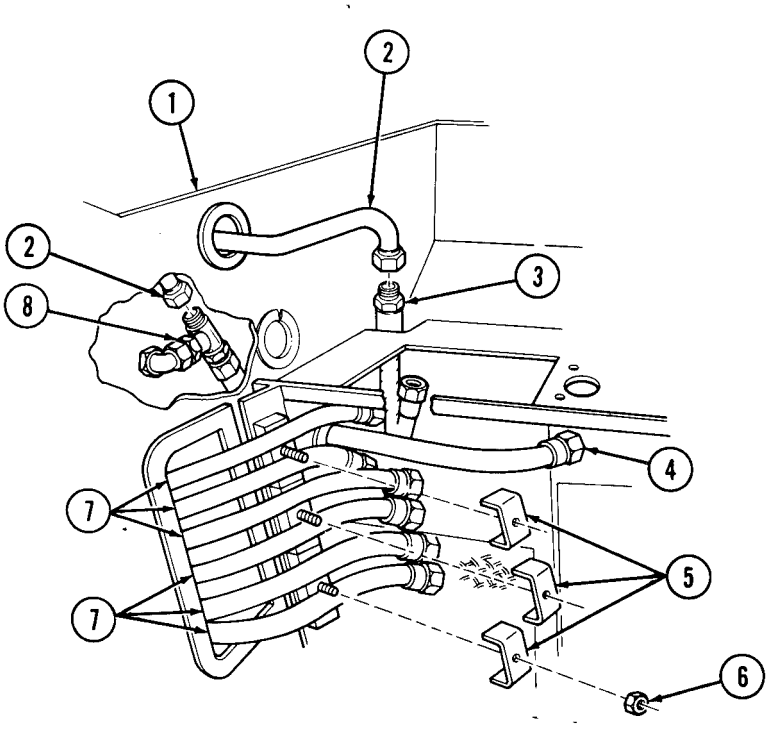
TA 350739

18-21. GONDOLA REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Hydraulic swivel valve flex line (4)	Guide through gondola (1).	
17.		Six hydraulic flex lines (7)	Install on gondola (1) with three clamps (5) and new locknuts (6).	
18.		Hydraulic tube (2)	Install on elevating cylinder crossover tee (8) and control valve flex line (3).	

18-21. GONDOLA REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install crane control valve (para. 18-20).
• Install floodlight assembly (TM 9-2320-272-20-1).

TA 350740

18-22. TURNTABLE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.
	Para. 18-5	Hydraulic oil reservoir removed.
	Para. 18-10	Boom elevating cylinders removed.
	Para. 18-17	Hydraulic swivel valve removed.
	Para. 18-19	Crane swinger gearcase removed.
	Para. 18-21	Gondola removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Eighteen locknuts

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

All personnel must stand clear during hoisting operations.

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

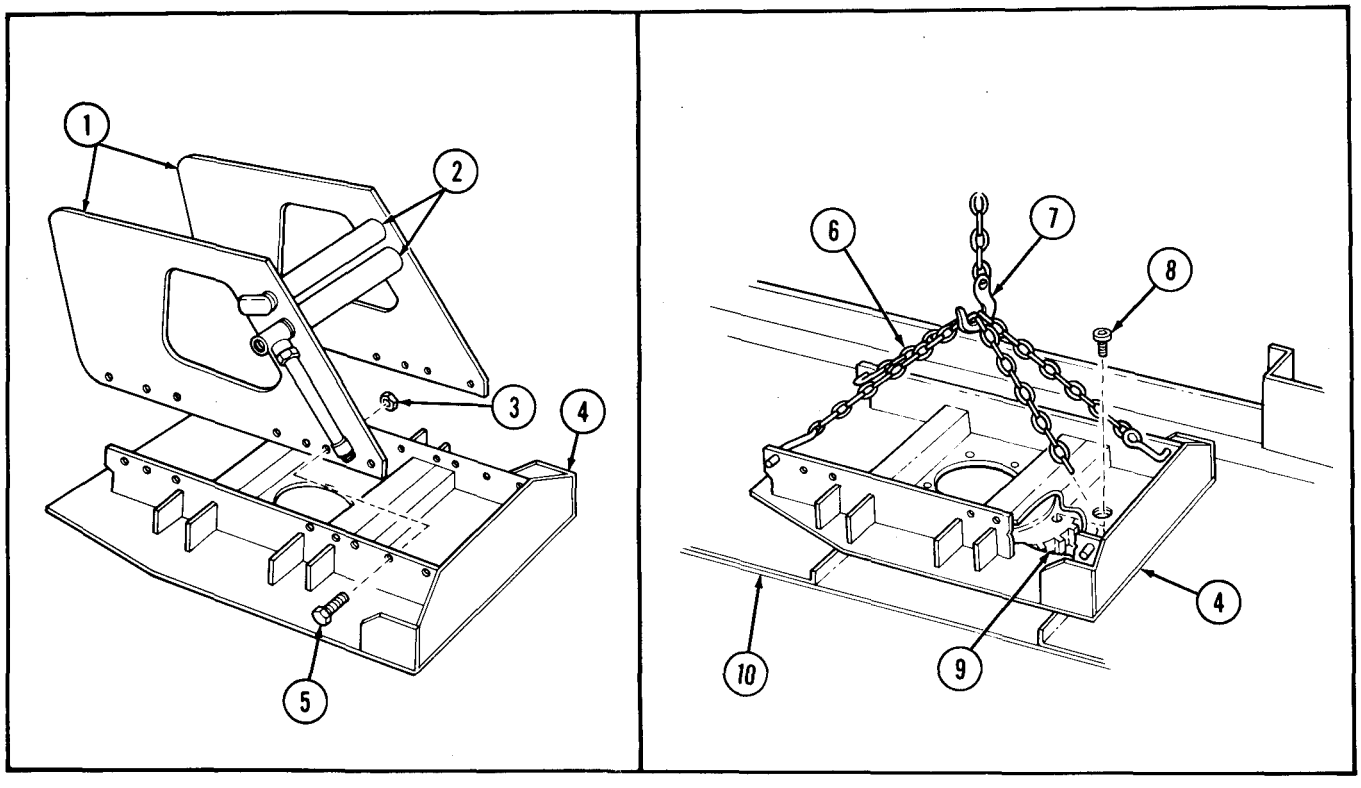
All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

a. Removal

1.	Turntable base plate (4)	Eighteen screws (5) and locknuts (3), two turntable sideplates (1), and crossover tubes (2)	Remove.	Discard locknuts (3).
2.	Turntable gear bearing (9) to crane body (10)	Eighteen screws (8)	Remove.	Turntable must be rotated so access hole exposes each screw (8).

18-22. TURNTABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Assistant will help with steps 3 and 4.		
3.		Two utility chains (6)	Attach to turntable (4).	
4.		Hoist hook (7)	Attach to chains (6) and hoist turntable base plate (4) away from crane body (10).	
5.	Turntable base date (4)	Two utility chains (6) and hoist hook (7)	Remove.	



TA 350741

18-22. TURNTABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Installation			

WARNING

All personnel must stand clear during hoisting operations. A snapped cable, shifting, or swinging load may cause injury to personnel.

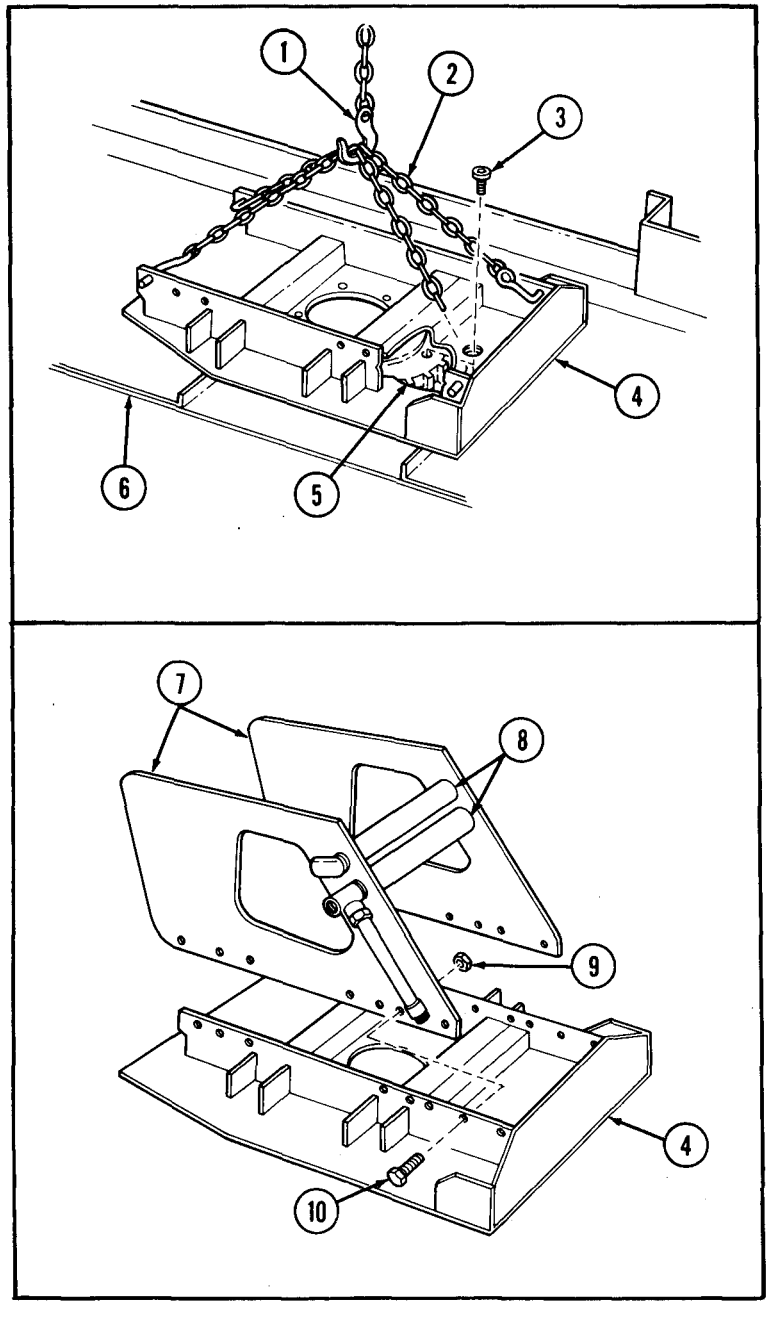
NOTE

Assistant will help with steps 6 and 7.

6.		Two utility chains (2)	Attach to turntable (4).	
7.		Hoist hook (1)	Attach to chains (2) and hoist turntable (4) onto crane body (6).	
8.		Two utility chains (2) and hoist hook (1)	Remove from turntable (4).	
9.		Turntable gear bearing (5)	Rotate to expose each screw hole in turntable (4) and install on crane body (6) with eighteen screws (3).	Tighten 170-200 lb-ft (231-271 N·m).
10.		Turntable sideplates (7) and crossover tubes (8)	Install on turntable (4) base with eighteen screws (10) and new locknuts (9).	Tighten 170-200 lb-ft (231-271 N·m).

18-22. TURNTABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install gondola (para. 18-21).
- Install crane swinger gearcase (para. 18-19).
- Install hydraulic swivel valve (para. 18-17).
- Install boom elevating cylinders (para. 18-10).
- Install hydraulic oil reservoir (para. 18-5).

TA 350742

18-23. FRONT WINCH HYDRAULIC PUMP REPLACEMENT

The procedure for replacement of the front winch hydraulic pump can be found in paragraph 19-8.

18-24. FRONT WINCH CONTROL VALVE REPLACEMENT

The procedure for replacement of the front winch control valve can be found in paragraph 19-10.

Section III. WRECKER BODY COMPONENTS REPAIR

18-25. WRECKER BODY COMPONENTS REPAIR TASK SUMMARY

18-26. HYDRAULIC OIL RESERVOIR REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-5	Hydraulic oil reservoir removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

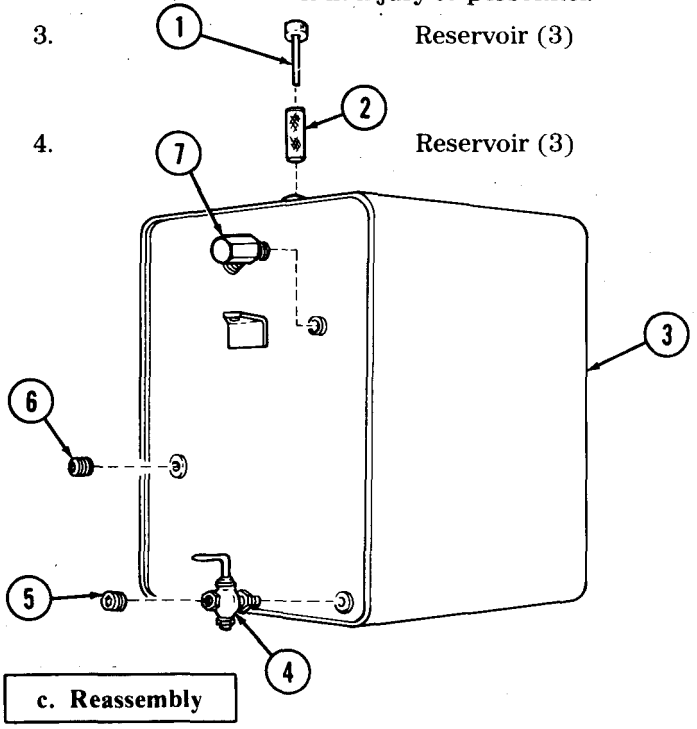
Materials/Parts
Eleven locknuts
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-34P
TM 9-237

18-26. HYDRAULIC OIL RESERVOIR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Disassembly				
1.	Top of oil reservoir (3)	Oil gage (1) and filter screen (2)	Remove.	
2.	Oil reservoir (3)	Elbow (7), draincock (4), pipe plug (5), and pipe plug (6)	Remove.	
b. Cleaning, Inspection, and Repair				
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
3.		Reservoir (3)	a. Steam clean exterior. b. Flush interior with drycleaning solvent.	
4.		Reservoir (3)	Inspect for leaks and repair as follows: a. Plug all openings except filter inlet. b. Insert air hose in inlet hole and cover opening around hose. c. Coat exterior of reservoir (3) with soapy water. d. Apply 6 psi (41 kPa) air pressure for a minimum of two minutes and check for bubbles.	Repair defective reservoir (3) if any leaks are found (refer to TM 9-237). Replace reservoir (3) if leaks cannot be repaired.
c. Reassembly				
5.		Two pipe plugs (5) and (6)	Install on reservoir (3).	
6.		Elbow (7)	Wrap threads with sealing tape and install.	
7.		Draincock (4)	Wrap threads with sealing tape and install.	
8.		Filter screen (2) and oil gage (1)	Install.	

END OF TASK!

FOLLOW-ON TASK: Install hydraulic oil reservoir (para. 18-5).

TA 350743

18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models
M936

Test Equipment
None

Special Tools
None

Materials/Parts
Four snaprings
Four oil seal adapters
Four inner "O" rings
Four outer "O" rings
Eight lockwashers
Crocus cloth (Appendix C, Item 6)
Lint-free cloth (Appendix C, Item 7)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
Para. 18-7	Hydraulic hoist winch motor removed
	or
Para. 18-18	Crane hydraulic swinger motor removed.

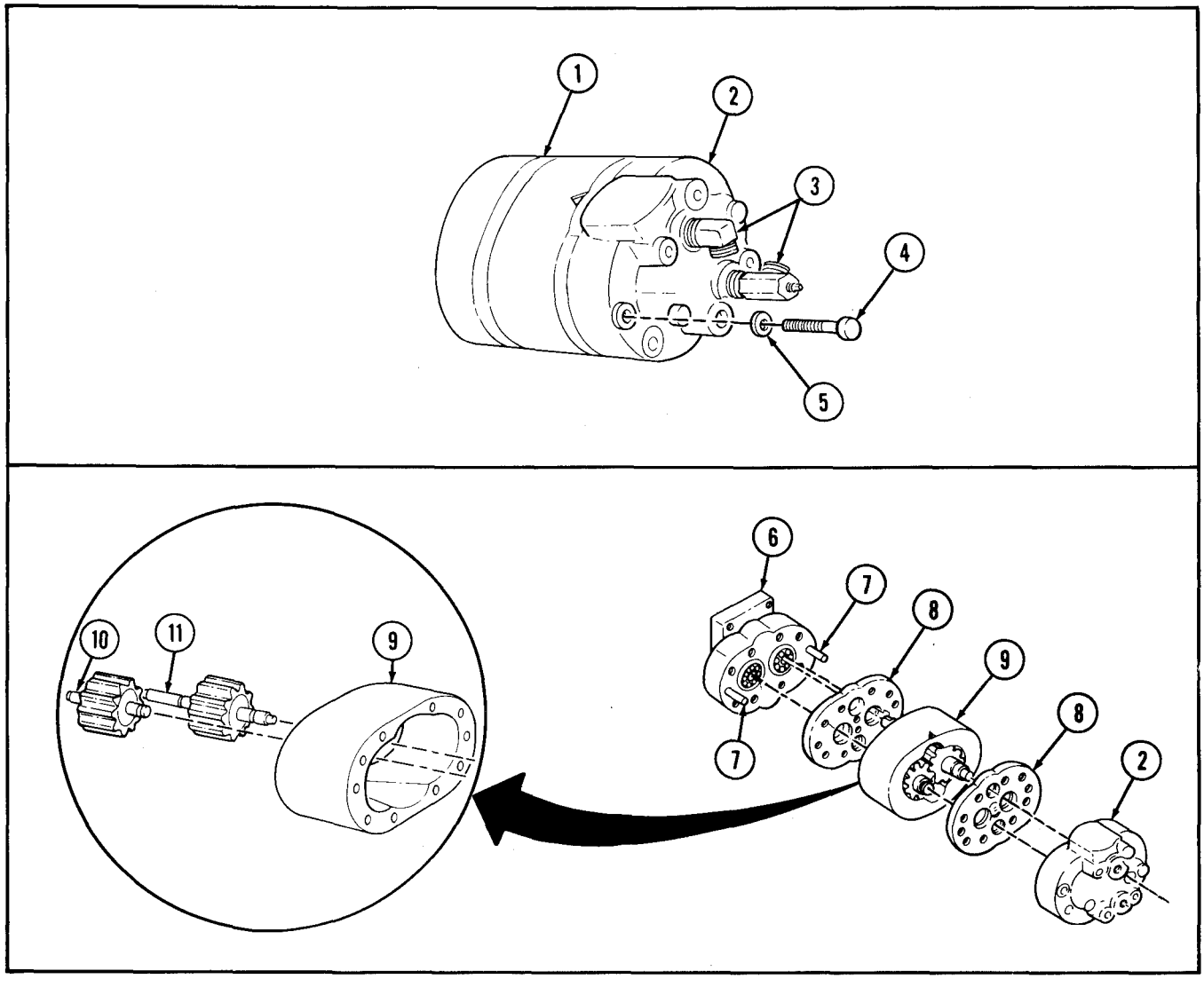
Special Environmental Conditions
None

General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Repair procedures for the hoist winch motor and the swinger motor are identical. This procedure will cover the hoist winch motor only. • The following instructions apply to repairable type motors only.		
	a. Disassembly			
1.	Hoist motor (1)	Two adapter fittings (3)	Remove.	
2.		Front cover (6) and rear cover (2)	Scribe alinement marks between front cover (6) and pump body (9), and between rear cover (2) and pump body (9).	
3.	Front cover (6) and rear cover (2) to motor body (9)	Eight screws (4) and lockwashers (5)	Remove.	Discard lockwashers (5). Covers (6) and (2) are now held to motor body (9) by two dowel pins (7).

18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

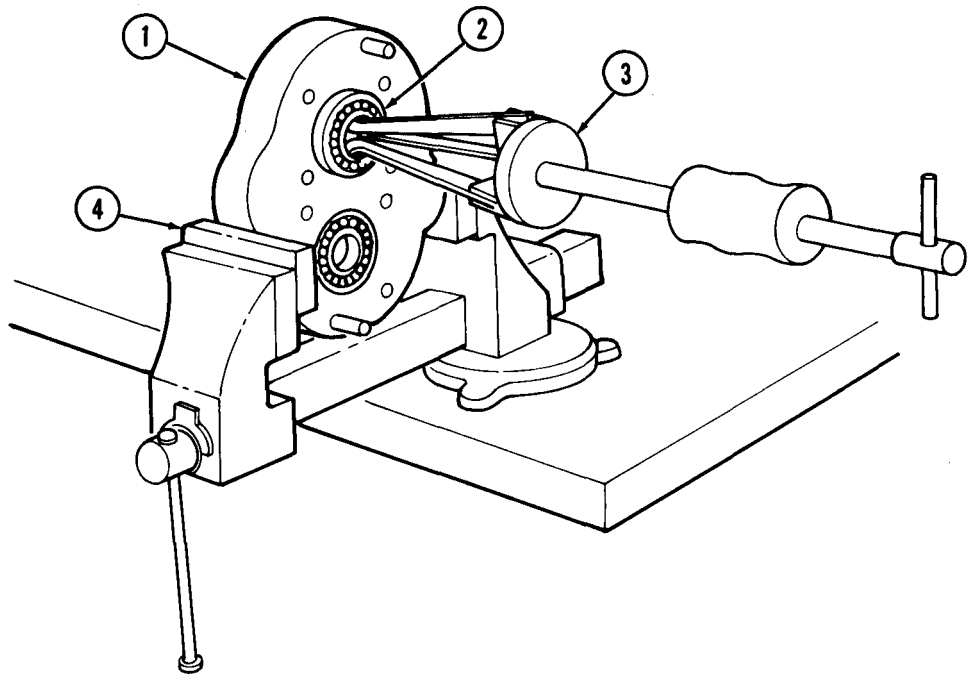
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		CAUTION All metal wear plates are easily damaged. Use care not to damage when removing front cover and rear cover.		
4.		Front cover (6) and rear cover (2)	Gently tap inner edges of each, and remove from motor body (9).	Use soft-faced hammer and alternately tap cover edges.
5.		Front and rear wear plates (8)	Gently tap inner edges of each, and remove from motor body (9).	Use soft-faced hammer.
6.		Drive gear shaft (11) and driven gear shaft (10)	Remove from motor body (9).	



TA 350744

18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.		Front cover (5) or rear cover (1)	Position in soft-jawed vise (4).	
		NOTE		
		Bearings are removed from front cover and rear cover in the same way. This procedure covers rear cover bearing removal only.		
8.	Front cover (5) or rear cover (1)	Two roller bearings (2)	Remove.	Use mechanical puller (3).
9.		Two oil seal adapters (7), outer "O" rings (8), and inner "O" rings (9)	Remove.	Discard all items removed in this step. It is not necessary to remove dowel pins (6) unless inspection requires replacement.
10.	Drive gear shaft (12) and driven gear shaft (13)	Four snaprings (10), and spacers (11)	Remove.	Discard snaprings (10).



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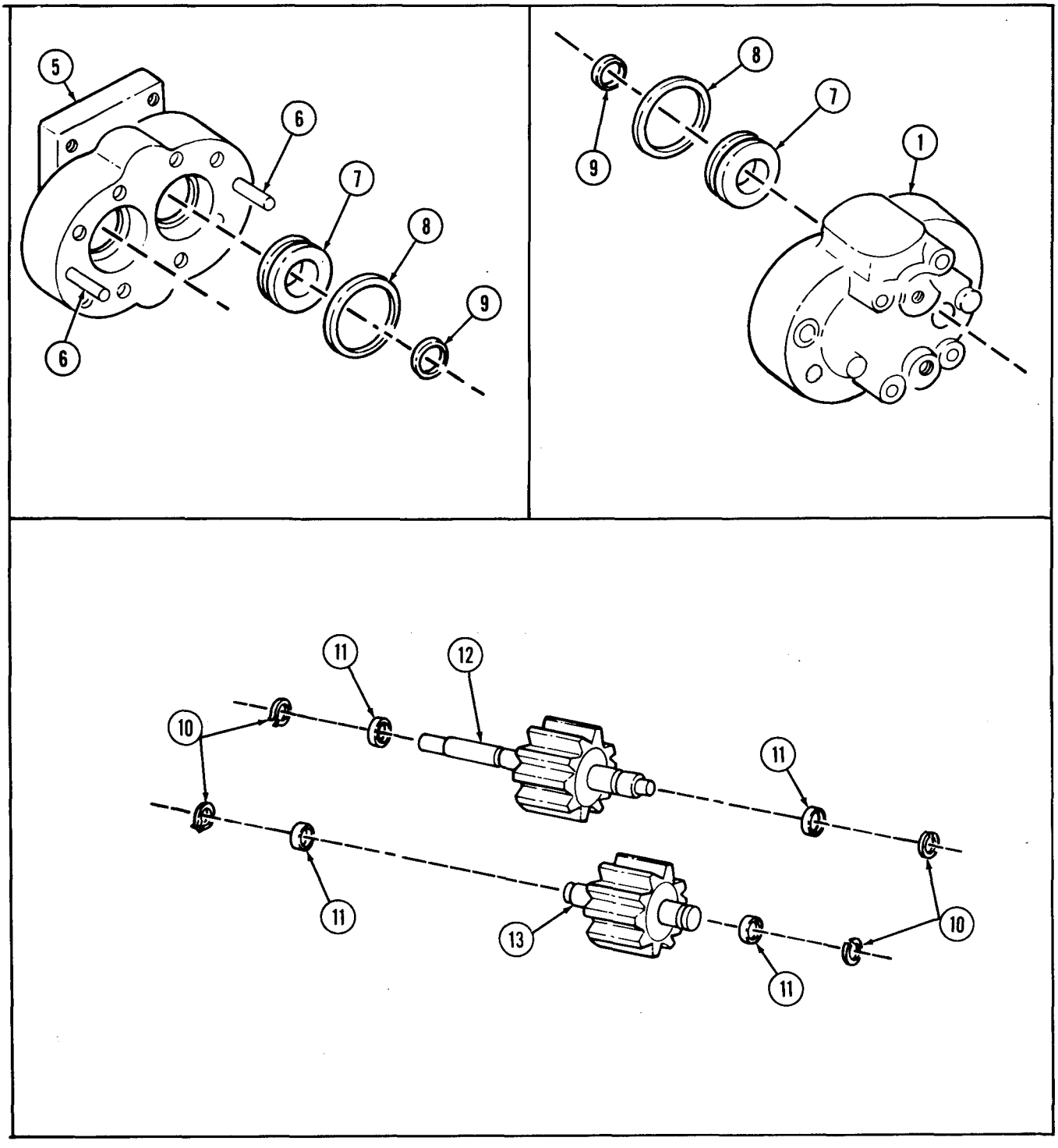
18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350746

18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

b. Cleaning, Inspection, and Repair

WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

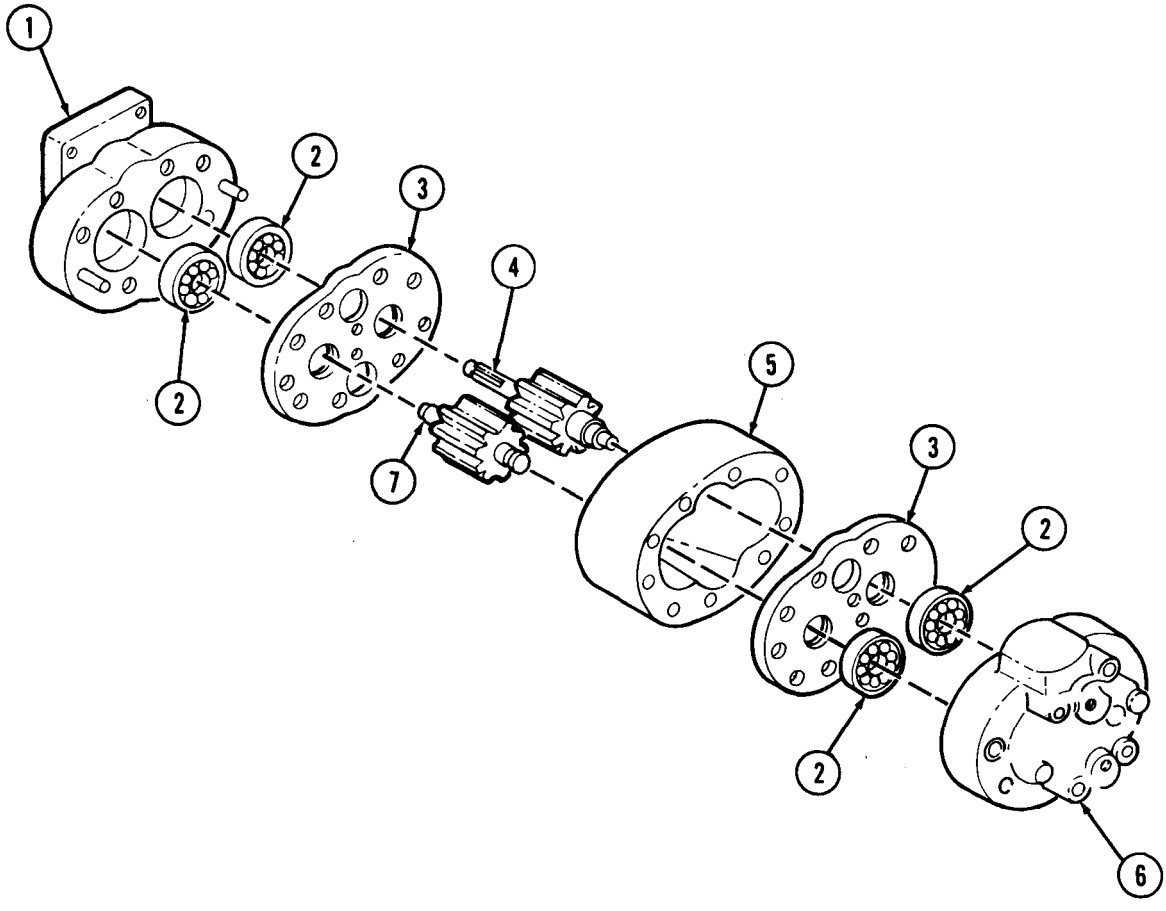
CAUTION

Do not spin-dry bearings with compressed air.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.		Four bearings (2), drive gear shaft (4), driven gear shaft (7), front cover (1), rear cover (6), and motor body (5)	a. Clean with dry-cleaning solvent. b. Dry thoroughly with lint-free cloth.	
12.		Motor body (5), front cover (1), and rear cover (6)	Inspect for cracks, pitting, and scoring.	Replace if cracked, pitted, or scored.
13.		Drive gear shaft (4) and driven gear shaft (7)	Inspect for cracks, nicks, or burrs.	Replace if cracked. Remove nicks and burrs with crocus cloth. If repairs cannot be made, replace.
14.		Wear plates (3)	Inspect for nicks, burrs, dents, or distortion.	Replace if nicked, burred, dented, or distorted.
15.		Four bearings (2)	Inspect for scoring, pitting, or rough edges around race.	Replace if pitted, scored, or rough edges are evident.

18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

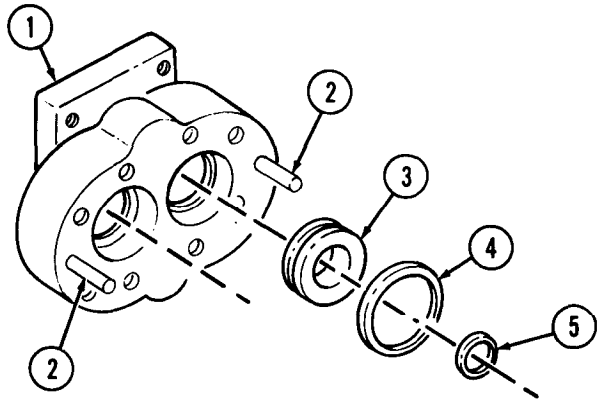
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350747

18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
16.		Two new oil seal adapters (3), new inner "O" rings (5), and new outer "O" rings (4)	Install in each cover (1) and (6).	
17.		Two roller bearings (8)	Install in each cover (1) and (6).	Use arbor press (7).
18.		Dowel pins (2)	Install in cover (1).	Only if removed.
19.		Four spacers (13)	Install on gear shafts (14) and (16) with four new snaprings (15).	
20.		Gear shafts (14) and (16)	Position in body (10) so they mesh.	
		NOTE		
		To properly assemble wear plates (9), bronze sides should face each other.		
21.		Two wear plates (9)	Position one on body dowel pins (2) and one on motor body (10).	
22.		Covers (1) and (6)	a. Position with alinement marks directly opposite one another.	
			b. Install with eight new lockwashers (12) and screws (11).	Tighten 125 lb-ft (170 N·m).



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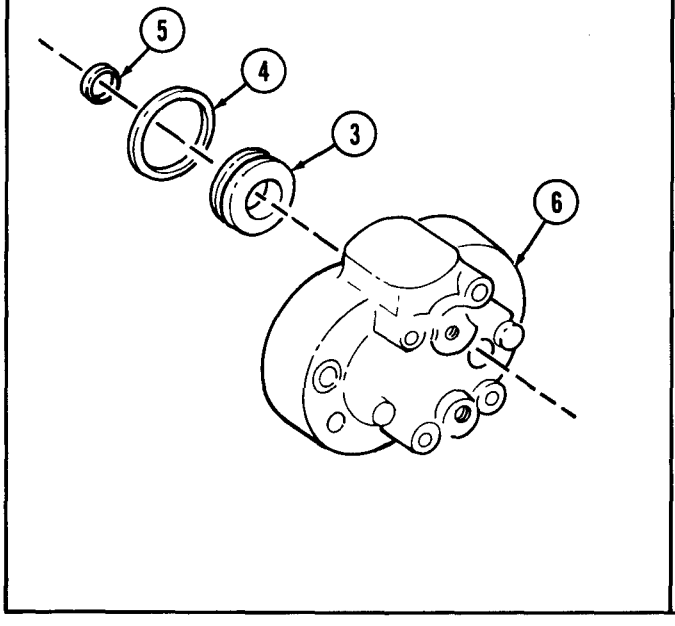
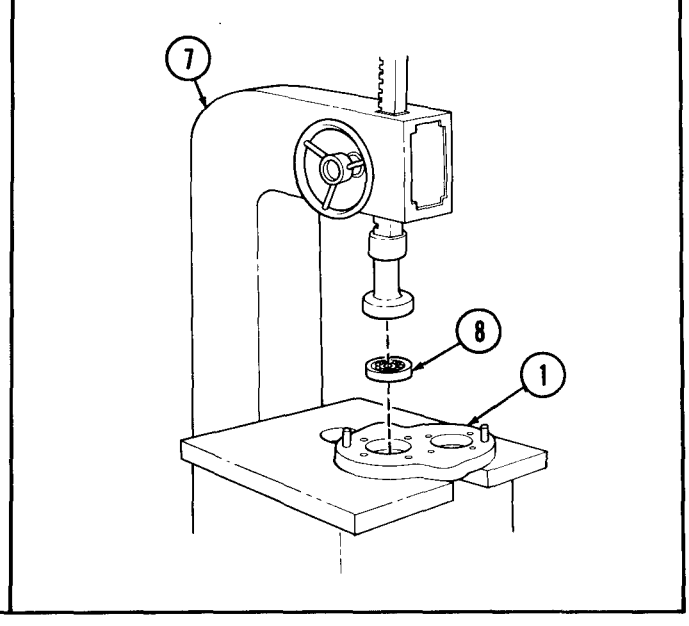
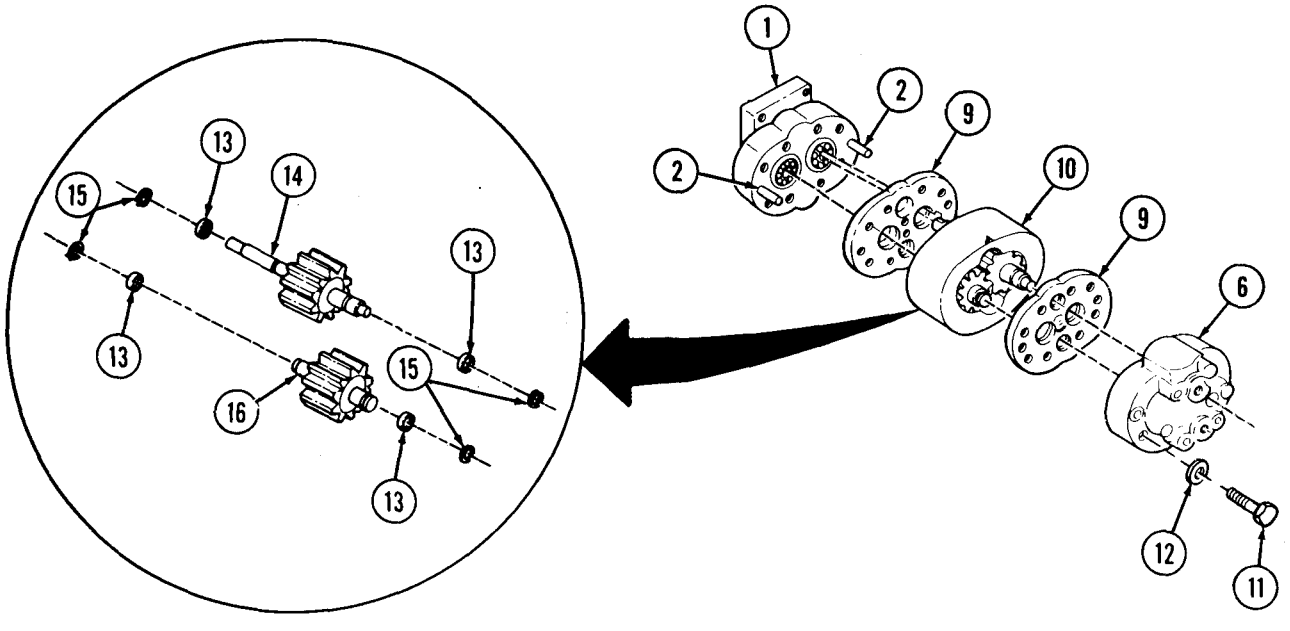
18-27. HYDRAULIC HOIST WINCH MOTOR OR SWINGER MOTOR REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







END OF TASK!

FOLLOW-ON TASKS: Install hydraulic hoist winch (para. 18-7)
or
Install crane hydraulic swinger motor (para. 18-18).

TA 350749

18-28. HOIST WINCH REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-9	Hoist winch removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Thirty-six lockwashers
Four hoist winch seals
Four bushings
Six gaskets
Snapring
Expansion plug
"O" ring
Three woodruff keys
Four keys
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

Keep fire extinguisher nearby when using drycleaning solvent.

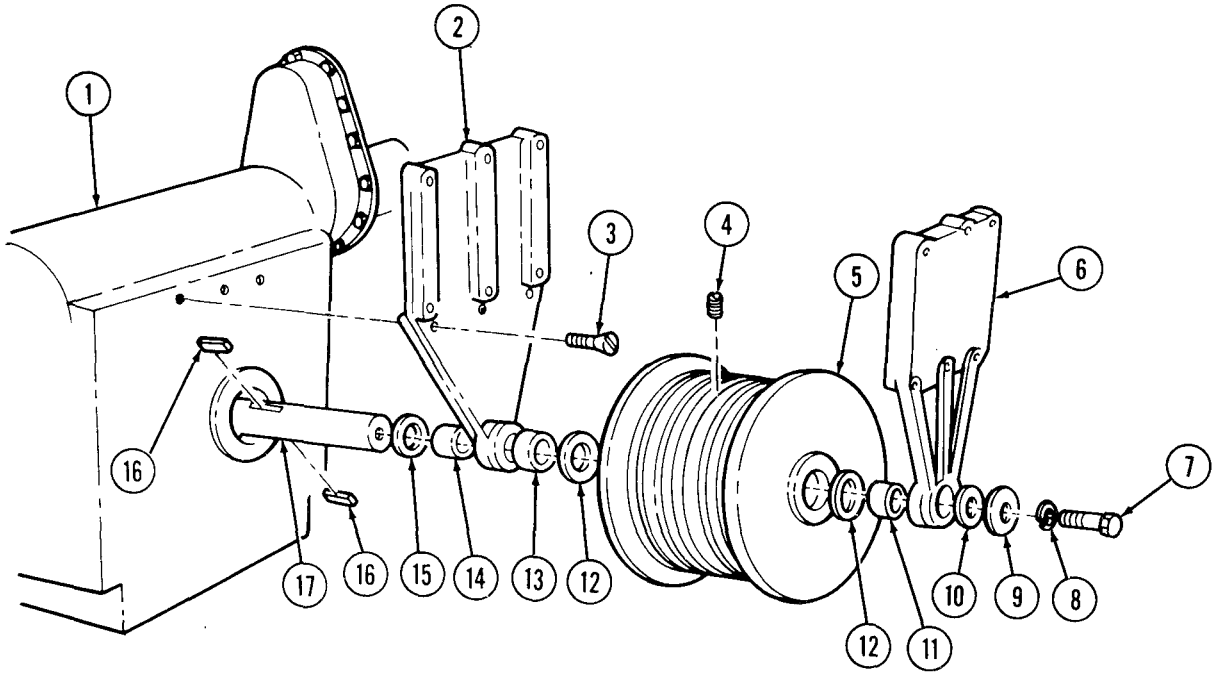
Manual References

TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
		a. Disassembly		
1.		Hoist winch (1)	Thoroughly clean exterior with drycleaning solvent.	
2.	Output side of drum shaft (17)	Screw (7), lockwasher (8), retaining washer (9), shim (10), support plate (6), drum (5), two thrust washers (12), and two keys (16)	Remove.	Discard lockwasher (8) and keys (16).

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Support plate (6)	Bushing (11)	Remove.	Use arbor press and mandrel. Discard bushing (11).
4.	Hoist drum (5)	Cable setscrew (4)	Remove.	
5.	Drum shaft (17)	Screw (3) and drum support (2)	Remove.	
6.	Gearcase housing (1)	Bushing (14) and seal (15)	Remove.	Use arbor press and mandrel. Discard bushing (14) and seal (15).
7.	Drum support (2)	Bushing (13)	Remove.	Use arbor press and mandrel. Discard bushing (13).



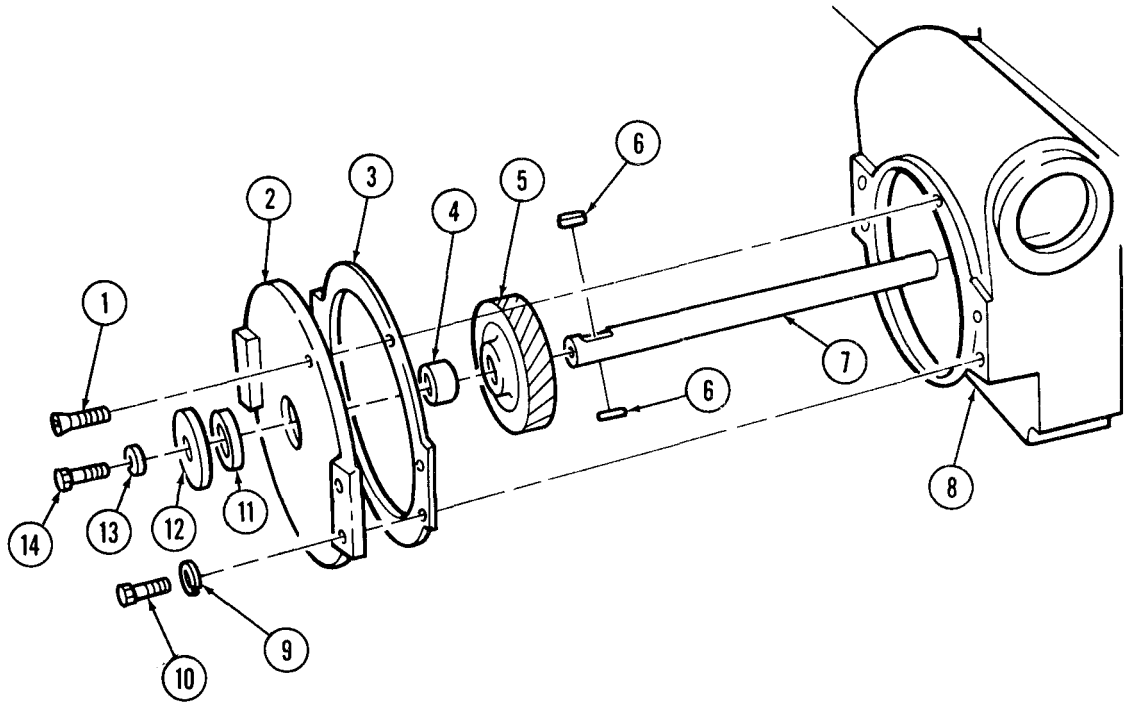
TA 350750

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Input side of drum shaft (7)	Screw (14), lockwasher (13), and retaining washer (12)	Remove.	Discard lockwasher (13).
9.	Gearcase (8)	Four screws (10), six screws (1), four lockwashers (9), gearbox cover (2), and gasket (3)	Remove.	Discard lockwashers (9) and gasket (3). Clean gasket remains from mating surfaces.
10.	Gearcase cover (2)	Seal (11) and bushing (4)	Remove.	Discard seal (11) and bushing (14).
11.	Gearcase housing (8)	Drum shaft (7) and hoist worm gear (5)	Remove as one assembly.	
12.	Drum shaft (7)	Hoist worm gear (5) and two keys (6)	Remove.	Discard keys (6).

NOTE

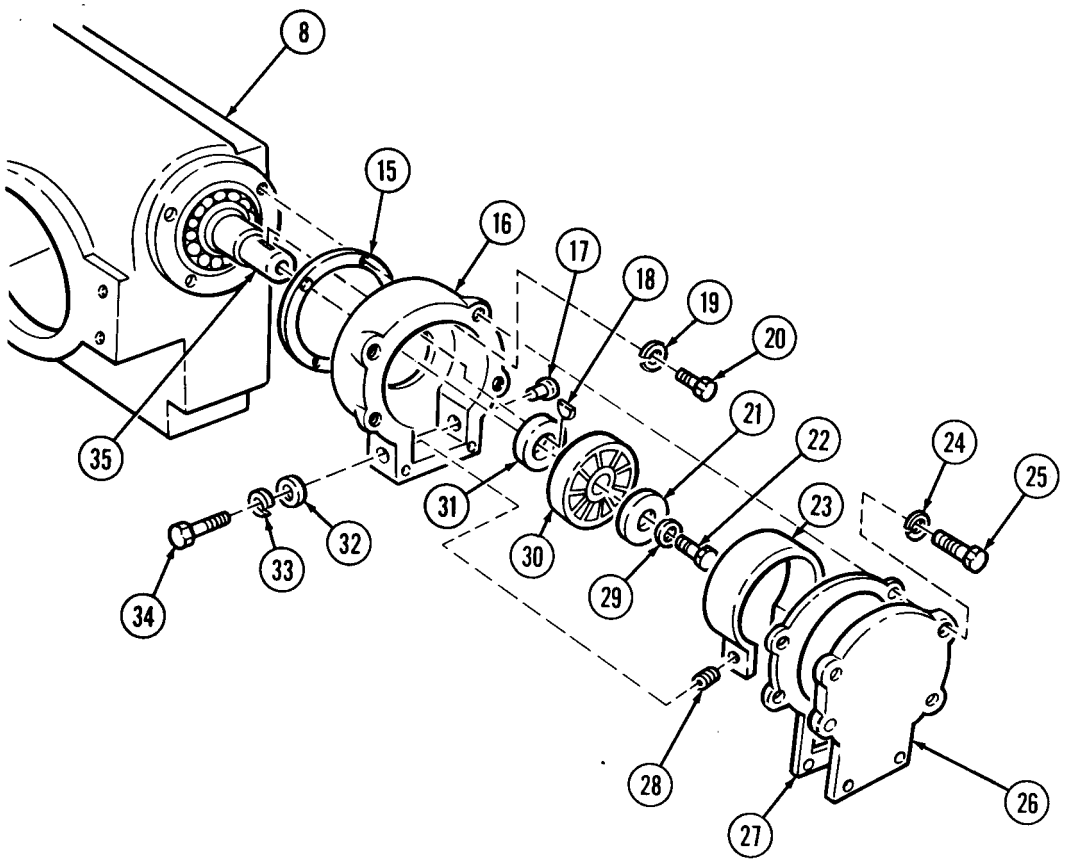
Scribe alinement marks on brake housing and gearcase for proper installation during reassembly.



TA 350751

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
13.	Brake housing (16)	Six screws (25) and lockwashers (24), housing cover (26), and gasket (27)	Remove.	Discard lockwashers (24) and gasket (27).
14.		Screw (34), lockwasher (33), "O" ring (32), spring (28), and brake band (23)	Remove.	Discard lockwasher (33) and "O" ring (32).
15.	Hoist wormshaft (35)	Screw (22), lockwasher (29), washer (21), brakedrum (30) and woodruff key (18)	Remove.	Discard lockwasher (29). Use puller for brake-drum (30) and discard woodruff key (18).
16.	Gearcase (8)	Four screws (20) and lockwashers (19), brake housing (16), and gasket (15)	Remove.	Discard lockwashers (19) and gasket (15). Clean gasket remains from mating surfaces.
17.	Brake housing (16)	Expansion plug (17) and seal (31)	Remove.	Discard seal (31) and expansion plug (17).



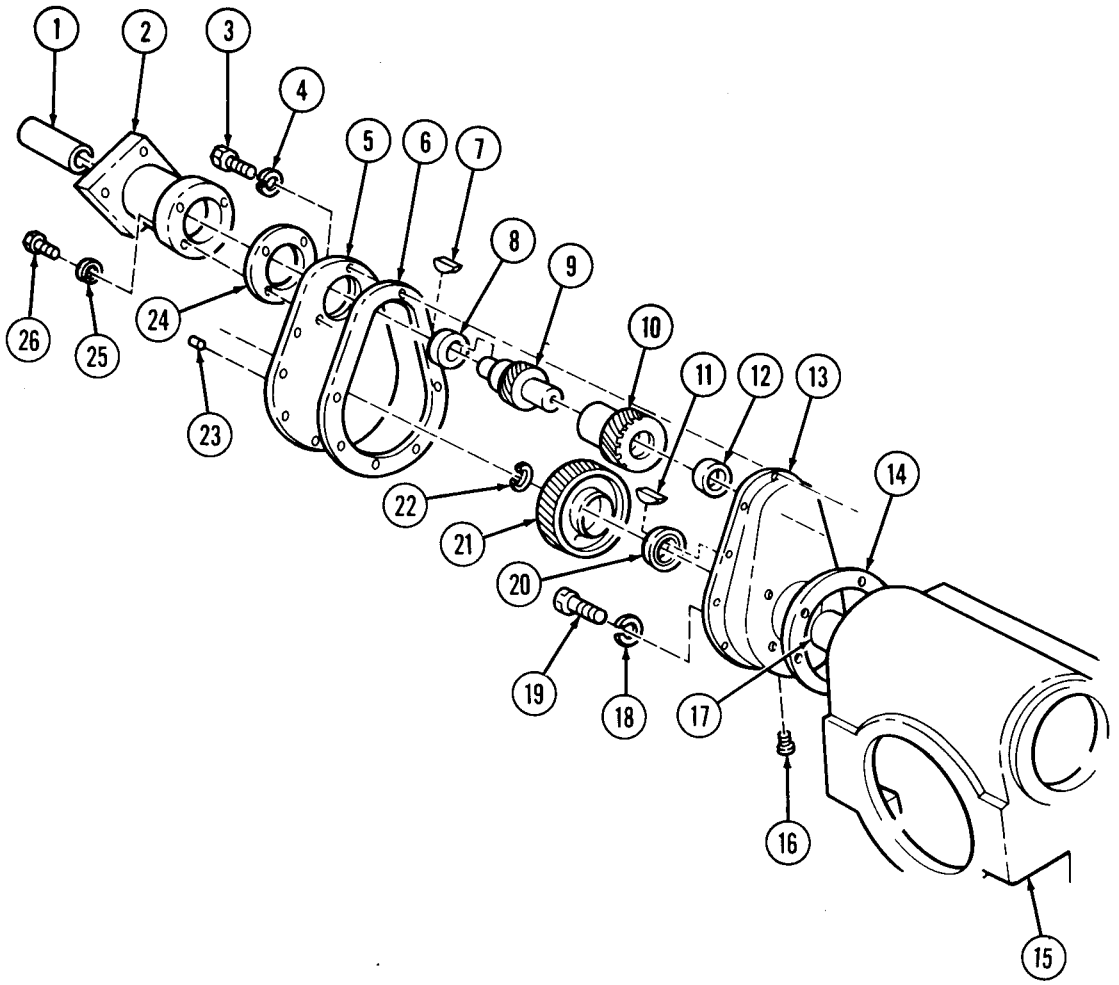
TA 350752

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.	Input shaft (9)	Coupler (1)	Remove.	
19.	Input shaft cover (5)	Four screws (26) and lockwashers (25), hoist motor adapter (2), and gasket (24)	Remove.	Discard lockwashers (25) and gasket (24). Clean gasket remains from mating surfaces.
20.	Input shaft (9)	Woodruff key (7)	Remove.	Discard woodruff key (7).
		NOTE Do not remove two input shaft cover dowel pins unless inspection requires cover replacement.		
21.	Input shaft gearcase (13)	Ten screws (3) and lockwashers (4), input shaft cover (5), and gasket (6)	Remove.	Discard lockwashers (4) and gasket (6). Clean gasket remains from mating surfaces.
22.	Input shaft cover (5)	Plug (23) and bearing (8)	Remove.	Use arbor press and mandrel.
23.	Input shaft gearcase (13)	Input shaft (9), input gear (10), and bearing (12)	Remove.	Use puller.
24.	Hoist wormshaft (17)	Snapring (22) drive gear (21), and woodruff key (11)	Remove.	Discard snapring (22). Use puller. Discard woodruff key (11).
25.	Gearcase housing (15)	Four screws (19) and lockwashers (18), gearcase (13), and gasket (14)	Remove.	Discard lockwashers (18) and gasket (14). Clean gasket remains from mating surfaces. Discard seal (20).
26.	Input shaft gearcase (13)	Plug (16) and seal (20)	Remove.	

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
27.	Gearcase housing (6)	Two wormshaft bearings (2) and wormshaft (1)	a. Press wormshaft (1) ends to remove bearings (2). b. Remove wormshaft (1).	Use arbor press and mandrel.
28.		Gearcase breather (3), two filler plugs (4), and magnetic pipe plug (5)	Remove.	

b. Cleaning, Inspection, and Repair

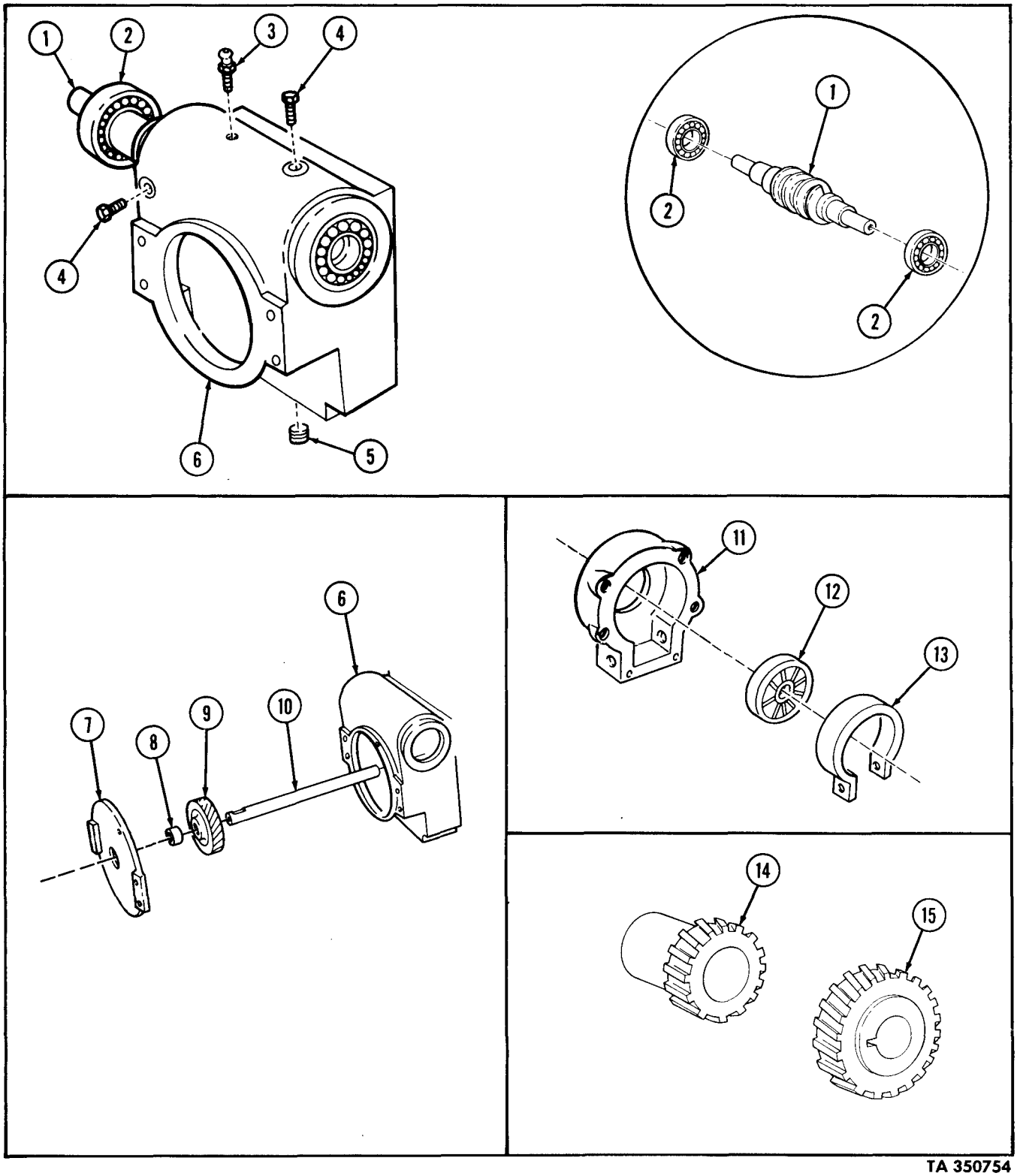
WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

29.		All hoist winch parts	Clean with drycleaning solvent.	Refer to para. 2-7.
30.		Magnetic pipe plug (5)	Inspect for metal filings and chips.	If metal filings are found, gear wear is indicated. If metal chips are found, damaged gears are indicated.
31.		Drum shaft gear (9), wormshaft (1), drum shaft (10), input gear (14), and drive gear (15)	Inspect for breaks, chipped teeth, cracks, and burrs.	If broken, chipped, or cracked, replace. If burred, remove burrs with crocus cloth.
32.		Wormshaft bearings (2) and bushing (8)	Inspect for cracks, pits, or out-of-round condition.	If cracked, pitted, or out-of-round, replace.
33.		Gearcase cover (7), gearcase housing (6), breather (3), two plugs (4), and automatic brake housing (11)	Inspect for breaks, cracks, warping, or stripped threads.	If broken, cracked, warped, or if stripped threads are evident, replace.
34.		Brakedrum (12) and brake band (13)	Inspect for scoring or oil-soaked condition.	If brake band (13) is worn to rivets, or oil-soaked, replace. If drum (12) is scored, replace.

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



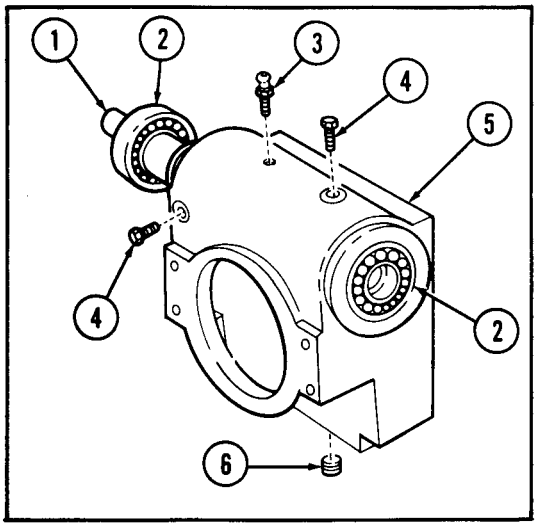
TA 350754

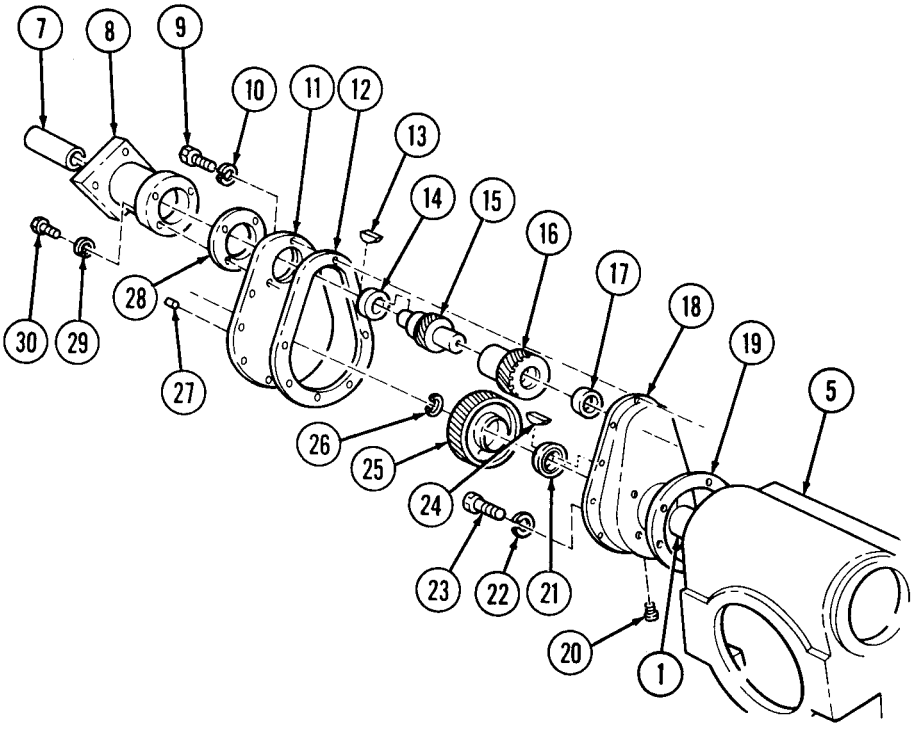
18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassembly			
		NOTE Make sure alinement marks made during disassembly realine during assembly.		
35.		Wormshaft (1) and two bearings (2)	Install in gearcase housing (5).	Install bearings (2) with arbor press and mandrel.
36.		Two filler plugs (4), gearcase breather (3), and magnetic pipe plug (6)	Install into gearcase housing (5).	Wrap sealing tape around filler plugs (4) and breather (3) before installation.
37.		Plug (20) and new seal (21)	Install in input shaft gearcase (18).	Wrap sealing tape around plug (20) before installation.
38.		New input shaft gear-case gasket (19) and gearcase (18)	Install on gearcase housing (5) with four new lockwashers (22) and screws (23).	
39.		New woodruff key (24)	Place in keyway on hoist wormshaft (1).	
40.		Drive gear (25)	Place over hoist worm-shaft (1) and secure with new snapring (26).	
41.		Input shaft bearing (17)	Press in input shaft gearcase (18).	Use arbor press and mandrel.
42.		Input shaft gear (16)	Slide over input shaft (15).	
43.		Input shaft bearing (14)	Press into input shaft cover (11).	Use arbor press and mandrel.
44.		Input shaft (15) and gear (16)	Install in input shaft gearcase (18) until in-put shaft (15) bottoms against bearing (17).	
45.		New input shaft gear-case gasket (12) and cover (11)	Install on input shaft gearcase (18) with ten screws (9) and new lockwashers (10).	
46.		Plug (27)	Install in input shaft cover (11).	Wrap sealing tape around plug (27) before installation.
47.		New woodruff key (13)	Install in keyway in input shaft (15).	

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
48.		New gasket (28) and hoist motor adapter (8)	Install on input shaft gearcase cover (11) with four new lockwashers (29) and screws (30).	
49.		Coupler (7)	Slide over input shaft (15).	





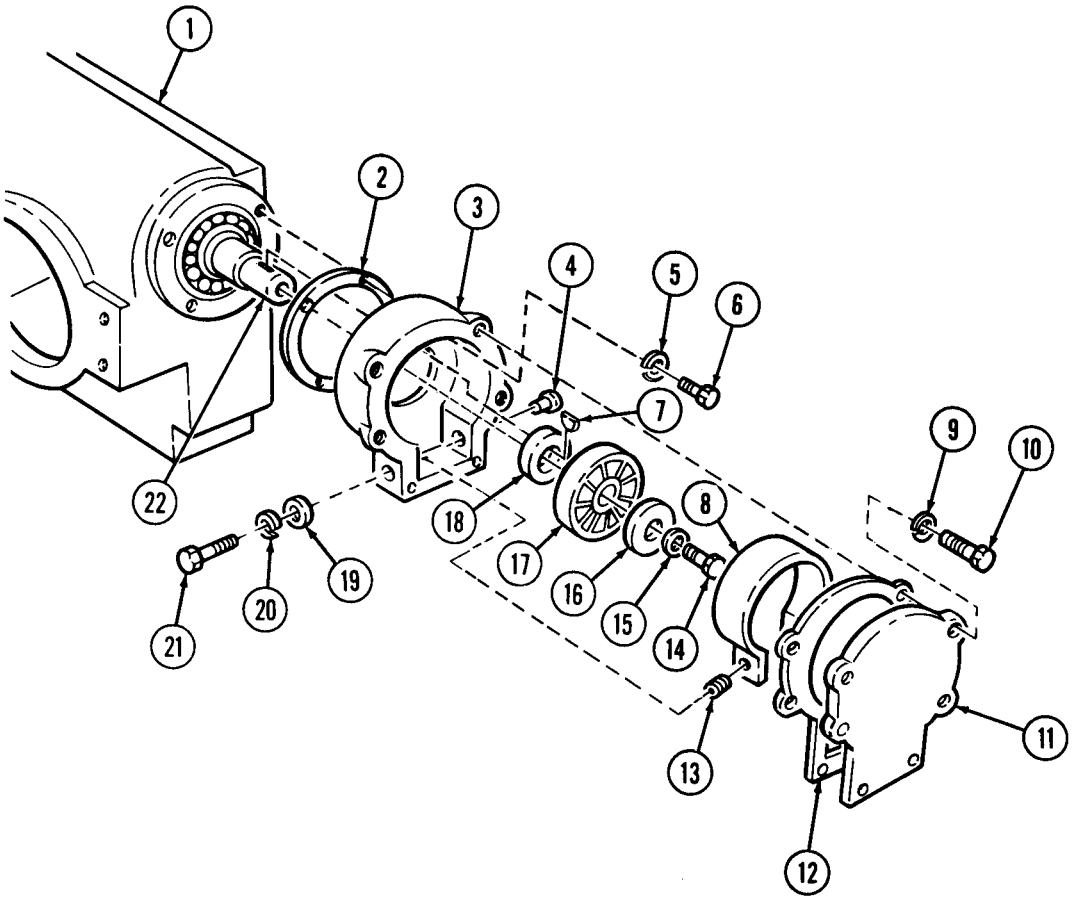
TA 350755

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
50.		New gasket (2) and automatic brake housing (3)	Install on gearcase housing (1) with four new lockwashers (5) and screws (6).	
51.		New seal (18) and brakedrum (17)	Install on hoist wormshaft (22) with new woodruff key (7), retaining washer (16), new lockwasher (15), and screw (14).	
52.		Brake band (8)	Install as follows: a. Position around brakedrum (17) with spring (13) between brake band (8) and automatic brake housing (3). b. Install on brake housing (3) with new "O" ring (19), new lockwasher (20), and screw (21).	
53.		New gasket (12) and automatic brake cover (11)	Install on brake housing (3) with six new lockwashers (9) and screws (10).	
54.		New expansion plug (4)	Install in brake housing (3).	

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



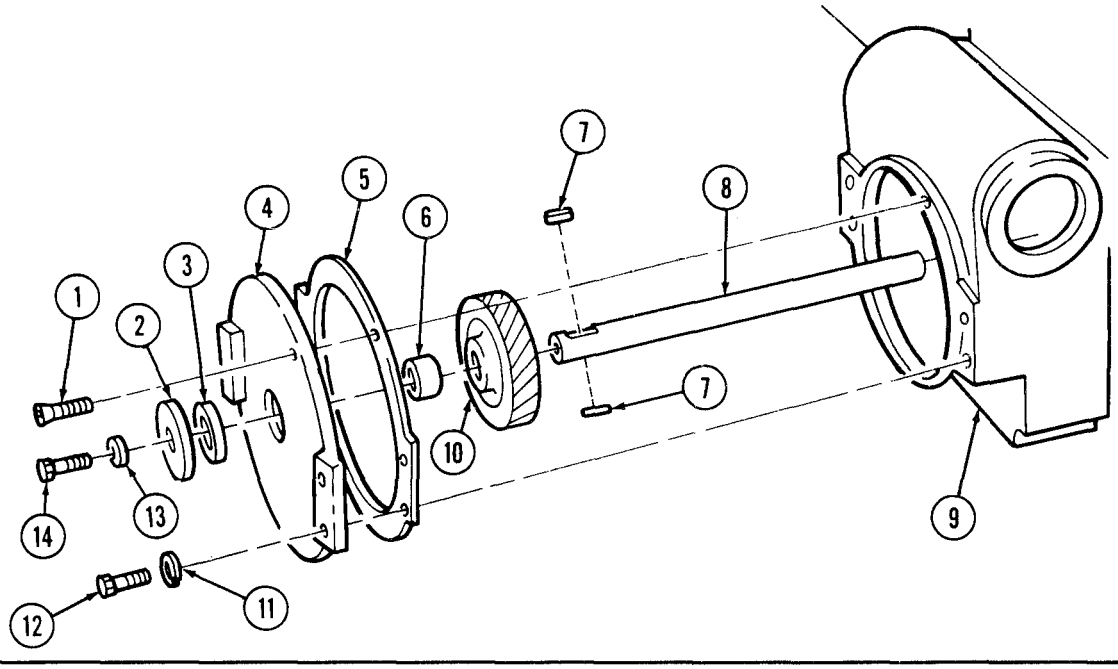
TA 350756

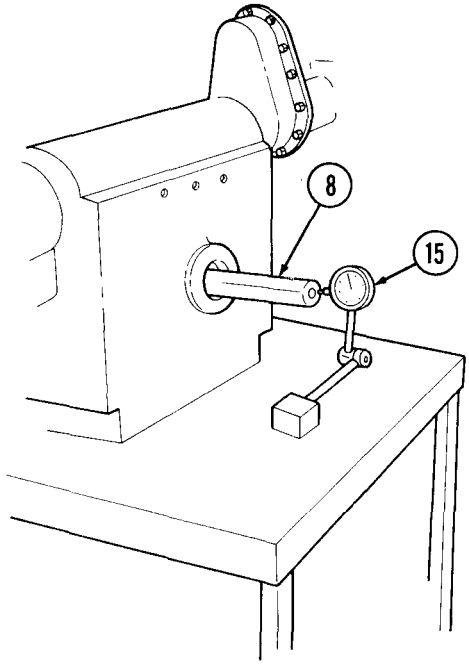
18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
55.		New gearcase housing cover bushing (6) and new seal (3)	Install in gearcase housing cover (4).	Make sure seal (3) is flush with outside edge of cover (4).
56.		Two new keys (7) and hoist worm gear (10)	Install on drum shaft (8).	Make sure gear (10) centers over new keys (7).
57.		Hoist worm gear (10) and drum shaft (8)	Install in gearcase housing (9).	
58.		New gearcase housing cover gasket (5) and cover (4)	Place over drum shaft (8) and install on gearcase housing (9) with four new lockwashers (11), six screws (1), and four screws (12).	
59.		Retaining washer (2)	Install on drum shaft (8) with new lockwasher (13) and screw (14).	
		NOTE Before completing assembly of hoist winch, the worm gear end play must be checked and adjusted. End play will be checked at the drum shaft and adjusted by adding gaskets to gearcase cover.		
60.		Drum shaft (8)	a. Place dial indicator (15) against shaft (8) as shown.	
			b. Pull drum shaft (8) in and out several times until reading on dial indicator (15) is consistent.	If end day is less than 0.005 in. (0.125 mm), add cover gaskets (5) until end play reads greater than 0.005 in. (0.125 mm) but less than 0.015 in. (0.37 mm).

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





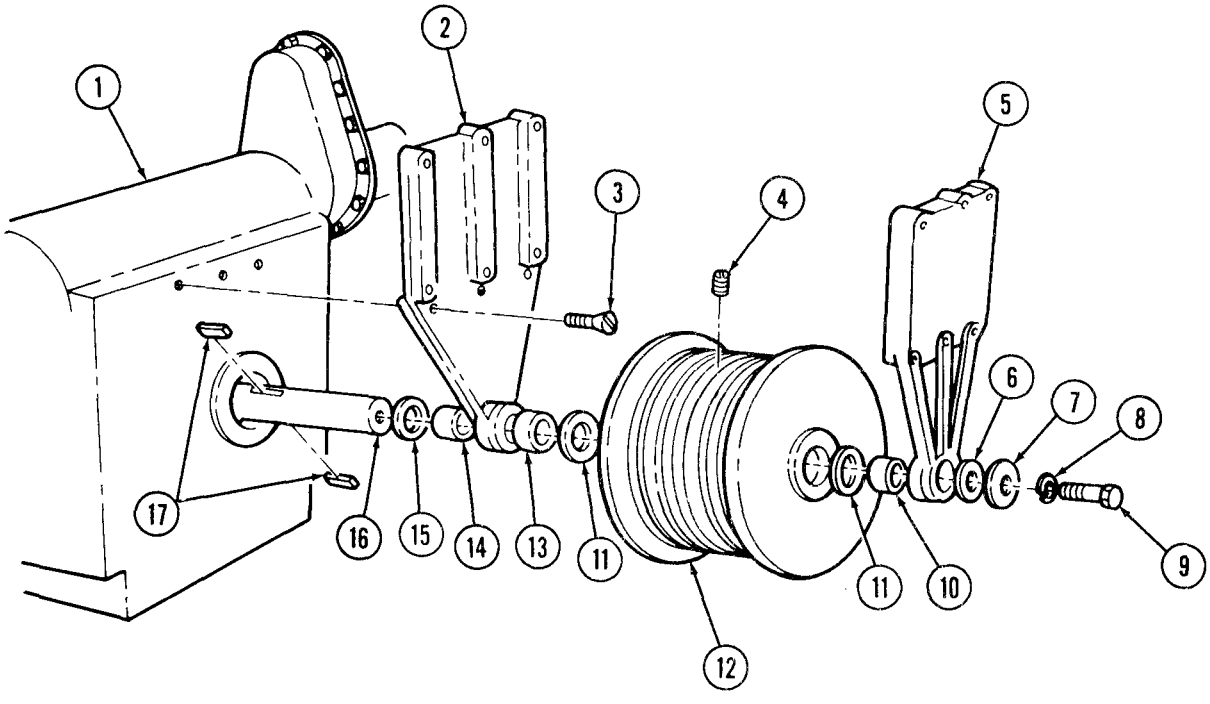
TA 350757

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
61.		New bushing (14) and new seal (15)	Press in gearcase housing (1).	Make sure seal (15) is flush with outside of housing (1). Use arbor press and mandrel.
62.		New drum support bushing (13)	Install in drum support (2).	Use arbor press.
63.		Drum support (2)	Slide over drum shaft (16) and install on case housing (1) with screw (3).	
64.		New support plate bushing (10)	Install in support plate (5).	Use arbor press.
65.		Two thrust washers (11), drum (12), and support plate (5)	Position on drum shaft (16) and install with two new keys (17), shim (6), retaining washer (7), new lock-washer (8), and screw (9).	Make sure drum (12) seats over keys (17).
65.1.		Cable setscrew (4)	Install in drum (12).	
66.		Drum shaft (16)	Check end play by inserting feeler gage between retaining washer (7) and shim (6) and take reading.	If reading is less than 0.015 in. (0.381 mm), add an appropriate number of shims (6) until at least 0.015 in. (0.381 mm) is obtained.

18-28. HOIST WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install hoist winch (para. 18-9).
• Check automatic brake adjustment (TM 9-2320-272-20-2).

18-29. BOOM ELEVATING CYLINDER REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models

M936

Test Equipment

None

Special Tools

Bushing installer 3005319
Handle 7010321

Materials/Parts

Two seals
"O" ring
Lockwire
Wiper strip
Packing
Crocus cloth (Appendix C, Item 6)
Lint-free cloth (Appendix C, Item 7)

Personnel Required

Wheeled vehicle repairman MOS 63W

Manual References

TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference

Para. 18-10

Condition Description

Boom elevating cylinder removed.

Special Environmental Conditions

None

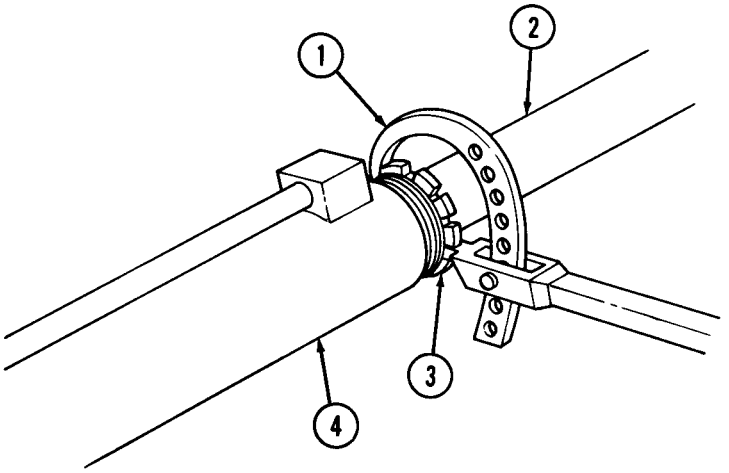
General Safety Instructions

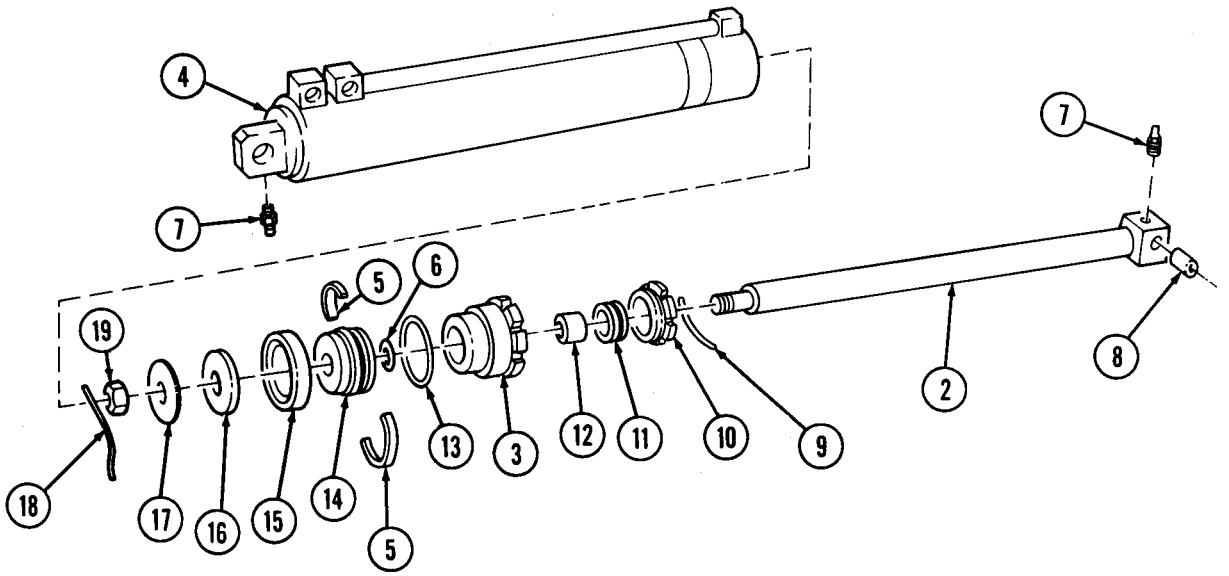
Keep fire extinguisher nearby **when** using drycleaning solvent.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Elevating cylinder body (4)	Cylinder head (3) and piston rod (2)	Remove.	Use spanner wrench (1) to remove cylinder head (3).
2.	Piston rod (2)	Lockwire (18), nut (19), washer (17), retainer (16), piston seal (15), piston (14), piston-to-piston rod seal (6), cylinder head (3), and wiper strip (9)	Remove.	Discard lockwire (18). Discard piston seal (15) and piston-to-piston rod seal (6). Discard wiper strip (9).
3.	Cylinder head (3)	Packing nut (10), packing (11), bushing (12), and "O" ring (13)	Remove.	Discard "O" ring (13) and packing (11).
4.	Piston (14)	Two half rings (5)	Remove.	
5.	Piston rod (2)	Sleeve (8)	Remove.	
6.	Cylinder body (4) and piston rod (2)	Two lubrication fittings (7)	Remove.	

18-29. BOOM ELEVATING CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





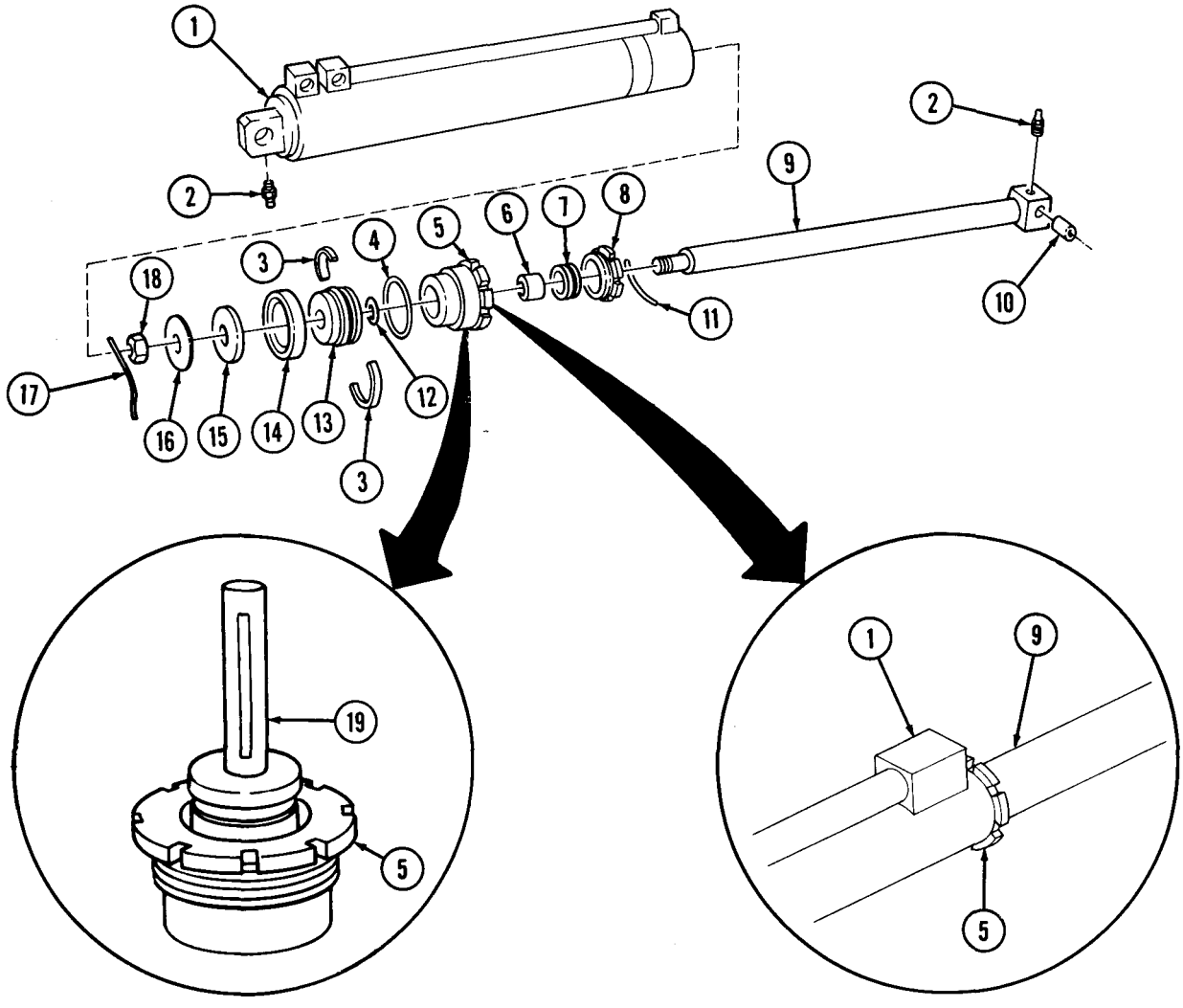
TA 350759

18-29. BOOM ELEVATING CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			
		WARNING		
		Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
7.		All parts of elevating cylinder	Clean with drycleaning solvent, and dry with lint-free cloth.	
8.		Piston rod (9)	Inspect for burrs, scoring, scratches, and stripped threads.	Remove minor scratches and burrs with crocus cloth. If piston rod (9) is scored, scratched, or if stripped threads are evident, replace.
9.		Piston (13) and cylinder body (1)	Inspect for scoring.	If piston (13) is scored, replace. If cylinder body (1) is scored, replace elevating cylinder.
	c. Reassembly			
10.		Two lubrication fittings (2)	Install in cylinder body (1) and piston rod (9).	
11.		Sleeve (10)	Install in piston rod (9).	
12.		Two half rings (3)	Install on piston (13).	
13.		Piston rod bushing (6)	Install in cylinder head (5).	Use bushing installer and handle (19).
14.		New "O" ring (4), new packing (7), packing nut (8), and new wiper strip (11)	Install on cylinder head (5).	
15.		Cylinder head (5)	Install on piston rod (9).	Use care not to damage wiper strip (11) when passing over threads on piston rod (9).
16.		New piston-to-piston rod seal (12), piston (13), new piston seal (14), retainer (15), and washer (16)	Install on piston rod (9).	

18-29. BOOM ELEVATING CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.		Piston rod nut (18)	Install on piston rod (9) and secure nut (18) with new lockwire (17).	
18.		Piston rod (9)	Slide into cylinder body (1) and install cylinder head (5) to cylinder body (1).	Use spanner wrench to tighten cylinder head (5).



END OF TASK!

FOLLOW-ON TASKS:
- Install boom elevating cylinder (para. 18-10).
- Lubricate elevating cylinder (LO 9-2320-272-12).

TA 350760

18-30. BOOM REPAIR AND ADJUSTMENT

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly
d. Vertical Adjustment

INITIAL SETUP:

Applicable Models
M936

Test Equipment
None

Special Tools
None

Materials/Parts
Two cotter pins
Two locknuts
Twenty-four lockwashers
GM grease (Appendix C, Item 11)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-34P
TM 9-237

Equipment Condition Reference	Condition Description
Para. 18-9	Hoist winch removed.
Para. 18-13	Inner boom removed.
Para. 18-14	Extension cylinder removed.
Para. 18-15	Boom rollers removed.

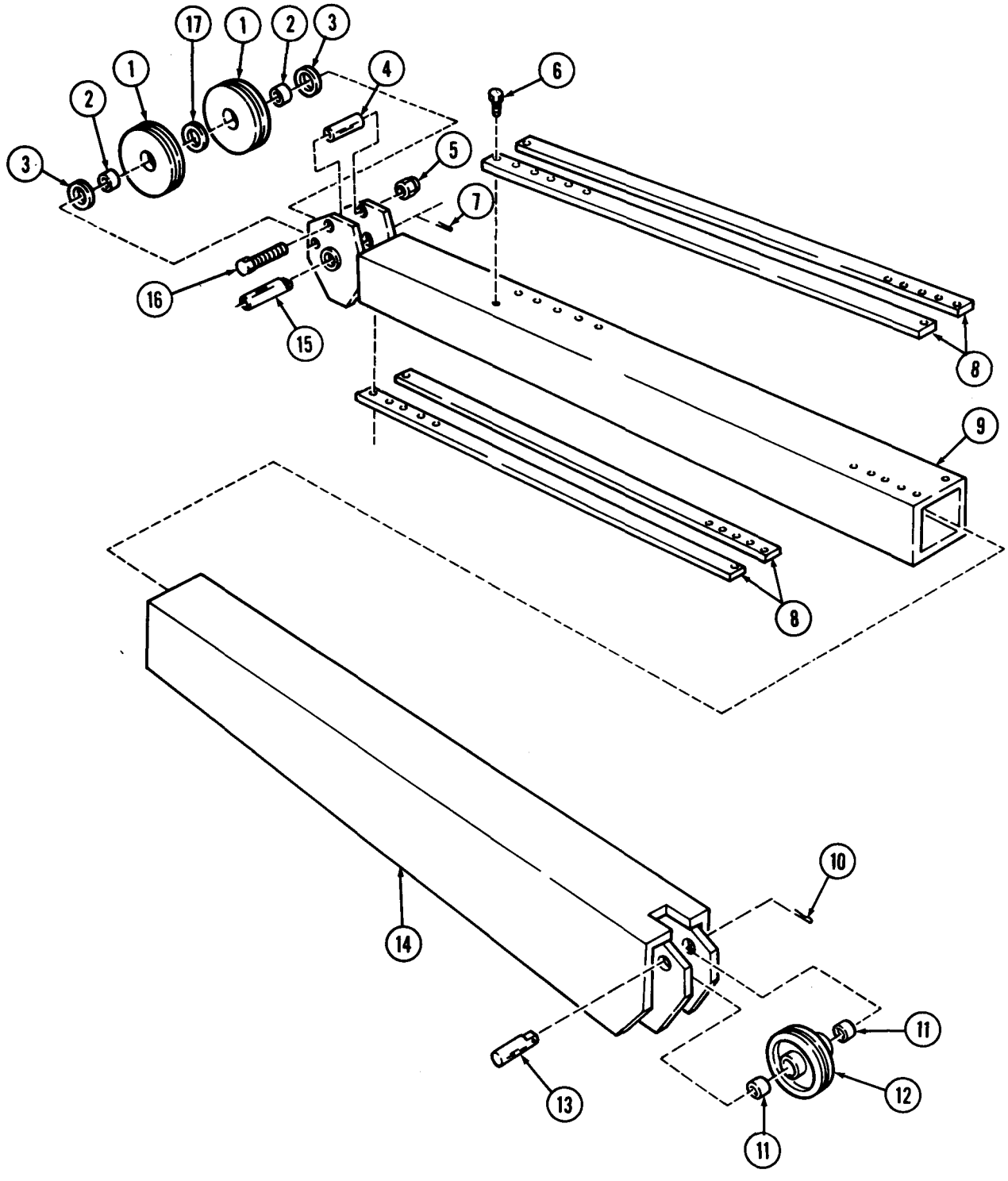
Special Environmental Conditions
None

General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Outer boom (14)	Cotter pin (10), crane sheave pin (13), and crane sheave (12)	Remove.	Discard cotter pin (10).
2.	Crane sheave (12)	Two bearings (11)	Remove.	Use arbor press and mandrel.
3.	Inner boom (9)	Two screws (16), locknuts (5), and spacers (4)	Remove.	Discard locknuts (5).
4.		Cotter pin (7), cable sheave pin (15), and two cable sheaves (1)	Remove.	Discard cotter pin (7).
5.	Two cable sheaves (1)	Two sheave bushings (2), thrust washers (3), and spacer (17)	Remove.	Use arbor press and mandrel.
6.	Four boom tracks (8) to inner boom (9)	One hundred and four screws (6) and four tracks (8)	Remove from inner boom (9).	

18-30. BOOM REPAIR AND ADJUSTMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



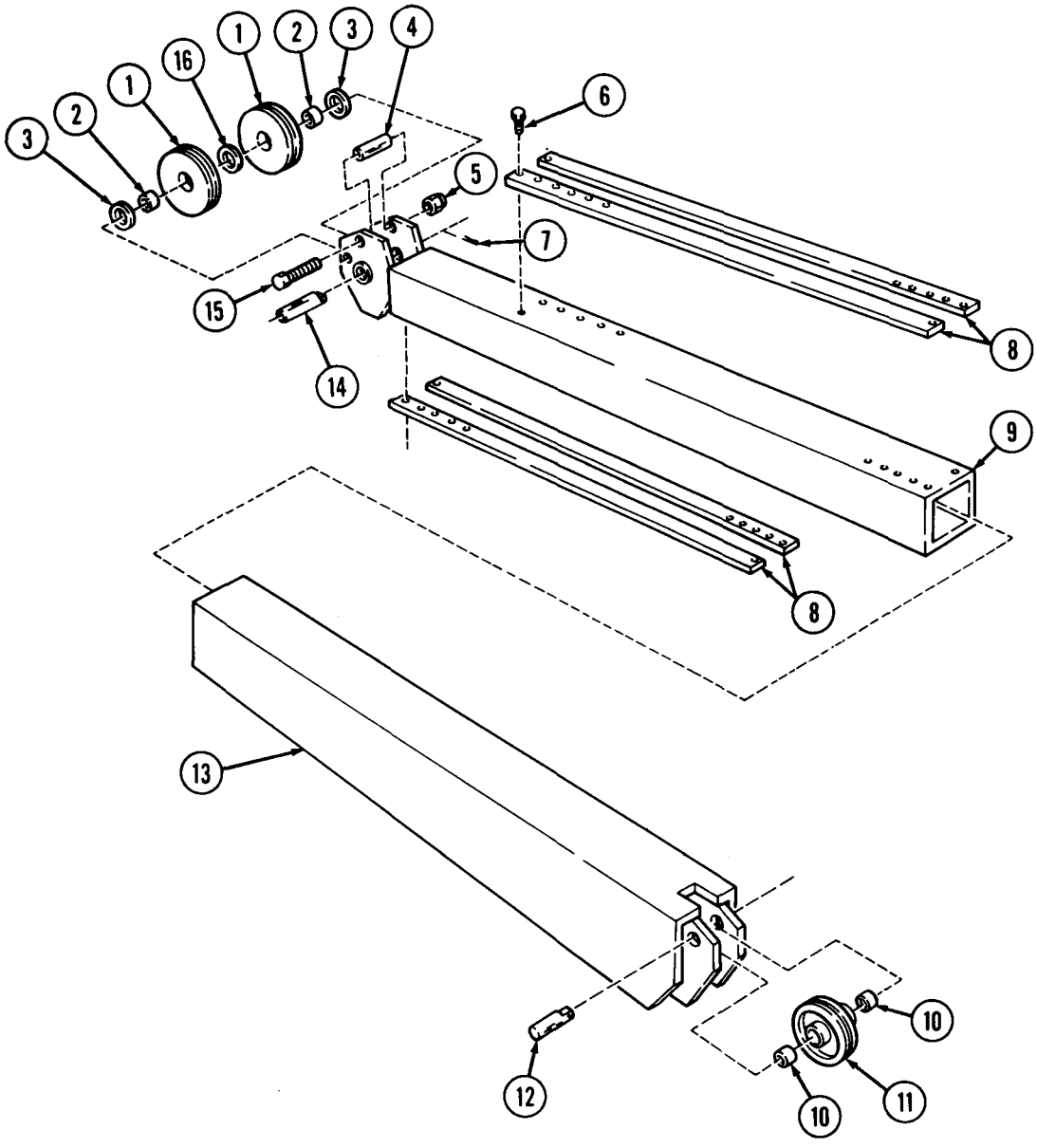
TA 350761

18-30. BOOM REPAIR AND ADJUSTMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
7.		All boom components	Clean with drycleaning solvent.	
8.		Inner boom (9) and outer boom (13)	Inspect for cracked or broken welds and bends.	If welds are cracked or broken, refer to TM 9-237. If inner boom (9) or outer boom (13) is bent, replace.
9.		Four boom tracks (8)	Inspect for cracks, breaks, and bends.	If tracks (8) are cracked, broken, or bent, replace.
10.		Crane sheave pin (12) and cable sheave pin (14)	Inspect for breaks and out-of-round condition.	If pins (12) and (14) are broken, or out-of-round, replace.
11.		Two cable sheaves (1), cable sheave bushings (2), crane sheave (11), and crane sheave bearings (10)	Inspect for breaks and out-of-round condition.	If broken or out-of-round, replace.
	c. Reassembly			
12.		Four boom tracks (8)	Install to inner boom (9) with one hundred and four screws (6) and coat with GAA grease.	
13.		Two cable sheave bushings (2)	Install into two cable sheaves (1).	Use arbor press and mandrel.
14.		Two cable sheave thrust washers (3) and spacer (16)	Aline with holes in inner boom (9) and install with cable sheave pin (14) and new cotter pin (7).	
15.		Two spacers (4)	Position to inner boom (9) and install with two screws (15) and new locknuts (5).	

18-30. BOOM REPAIR AND ADJUSTMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



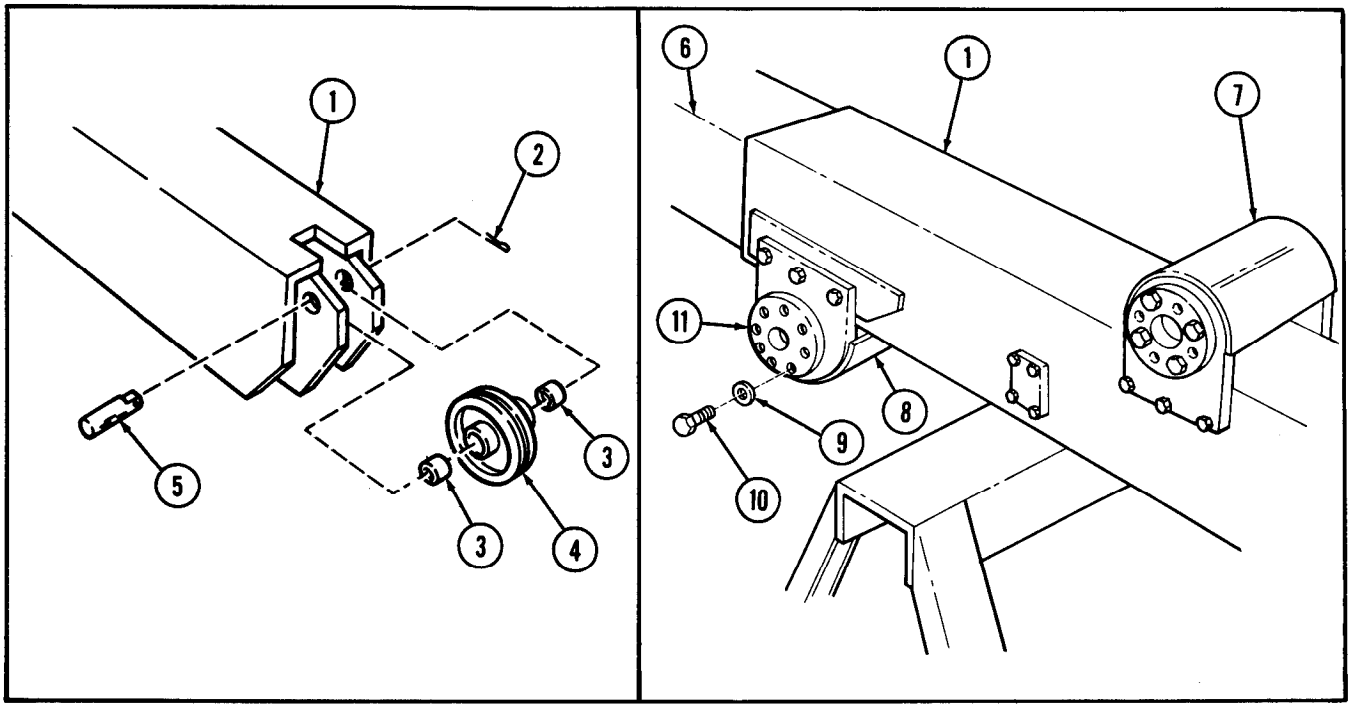
TA 350762

18-30. BOOM REPAIR AND ADJUSTMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Two crane sheave bearings (3)	Install into crane sheave (4).	Use arbor press and mandrel.
17.		Crane sheave (4)	Aline with holes in outer boom (1) and install with crane sheave pin (5) and new cotter pin (2).	
18.		Boom rollers	Install.	Refer to para. 18-15.
19.		Extension cylinder	Install.	Refer to para. 18-14.
20.		Inner boom	Install.	Refer to para. 18-13.
21.		Hoist winch	Install.	Refer to para. 18-9.
	d. Vertical Adjustment			
		NOTE Vertical adjustment can be performed with boom assembly either installed or removed from wrecker body.		
22.	Four mounting caps (11) to lower boom roller assembly (8) and upper boom roller assembly (7)	Sixteen screws (10) and lockwashers (9)	Remove.	Discard lockwashers (9).
23.	Lower boom roller assembly (8)	Two mounting caps (11)	a. Turn so top edge of inner boom (6) and top edge of outer boom (1) are approximately parallel. b. Install mounting caps (11) on lower boom roller assembly (8) with eight new lockwashers (9) and screws (10).	
24.	Upper boom roller assembly (7)	Two mounting caps (11)	a. Turn until roller assembly (7) strikes inner boom (6), then turn back to next screw hole. b. Install two mounting caps (11) to upper boom roller assembly (7) with eight new lockwashers (9) and screws (10).	

18-30. BOOM REPAIR AND ADJUSTMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
25.		Inner boom (6)	Manually extend and retract to verify that lower edge clears outer boom (1).	
		NOTE Only perform steps 26 and 27 if inner boom catches on upper boom roller assembly after adjustment is checked.		
26.	Two mounting caps (11) to upper roller assembly (7)	Eight screws (10) and lockwashers (9)	Remove and turn mounting cap (11) one additional screw hole.	Discard lockwashers (9).
27.		Two mounting caps (11)	Install on upper roller (7) with eight new lockwashers (9) and screws (10).	



END OF TASK!

T'A 350763

18-31. EXTENSION CYLINDER REPAIR

This task covers:

a. Disassemble
b. Cleaning, Inspection, and Repair
c. Reassemble

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-14	Extension cylinder removed.

Test Equipment
None

Special Tools
Bushing installer 3005319
Handle 7010321

Special Environmental Conditions
None

Materials/Parts
Wiper strip
Lockwire
"O" ring
Packing
Crocus cloth (Appendix C, Item 6)
Lint-free cloth (Appendix C, Item 7)

Personnel Required
Wheeled vehicle repairman MOS 63W

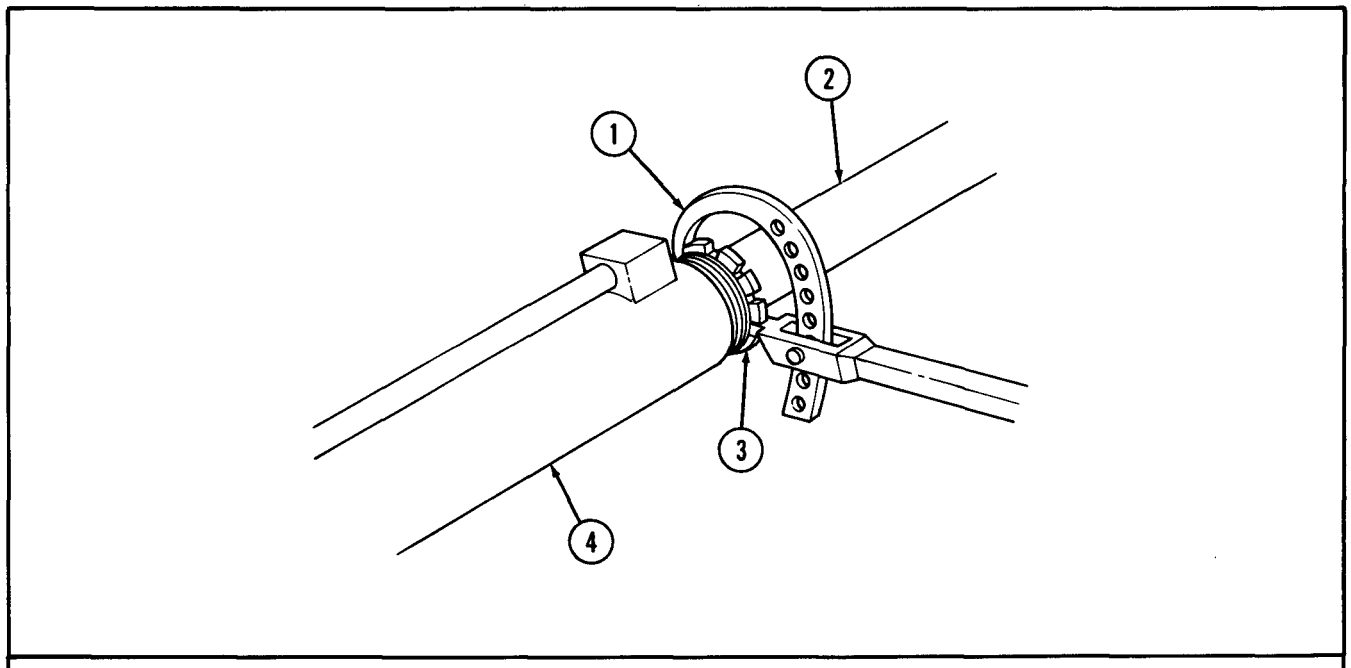
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

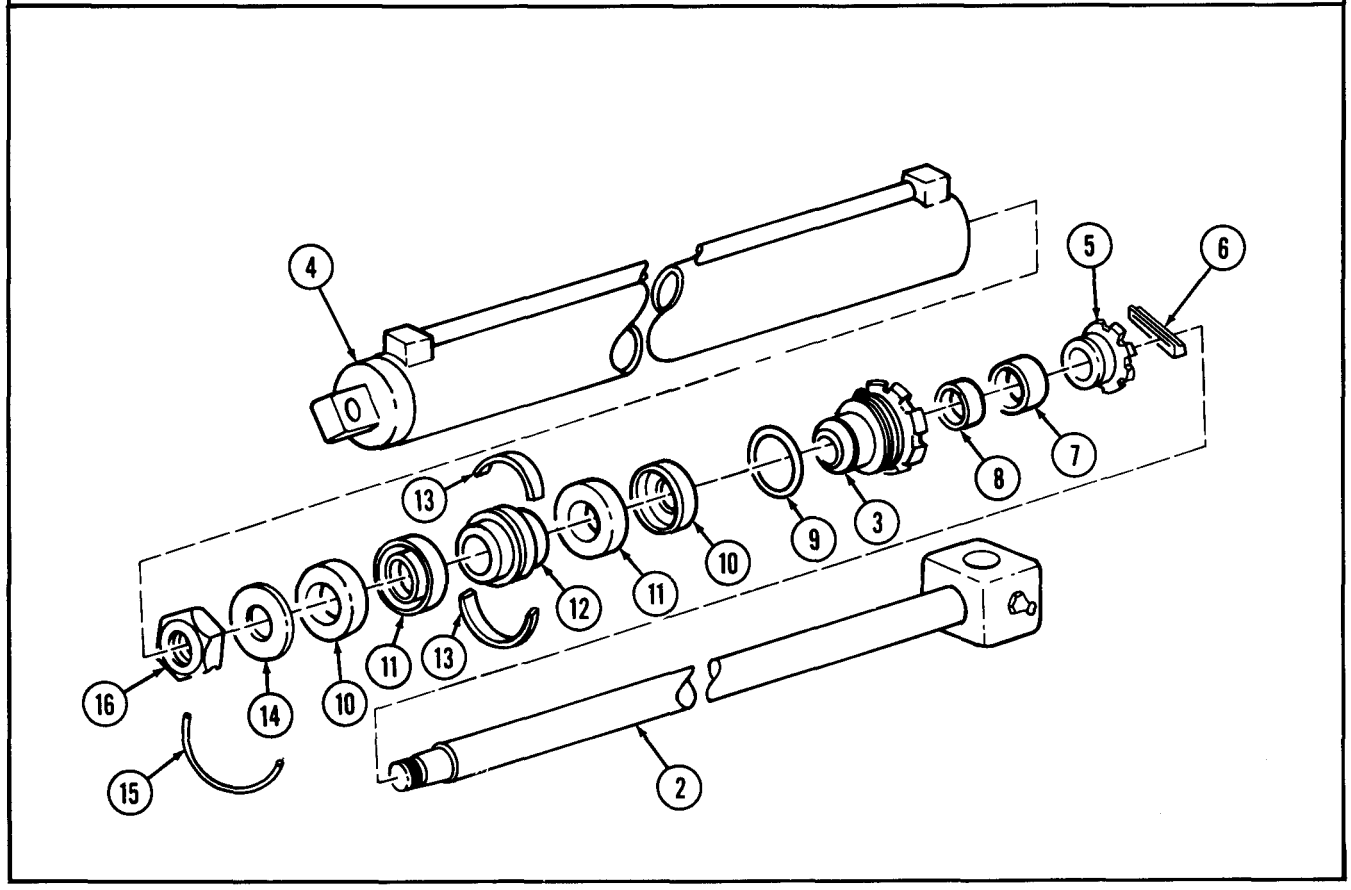
Manual References
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Extension cylinder body (4)	Cylinder head (3) and piston rod (2)	Remove.	Use spanner wrench (1) to remove cylinder head (3).
2.	Piston rod nut (16) to piston rod (2)	Lockwire (15) and nut (16)	Remove.	Discard lockwire (15).
3.	Piston rod (2)	Washer (14), U-cup retainers (10), U-cups (11), piston (12), cylinder head (3), and wiper strip (6)	Remove.	Discard wiper strip (6)
4.	Cylinder head (3)	Packing nut (5), packing (7), "O" ring (9), and piston rod bushing (8)	Remove.	Discard "O" ring (9) and packing (7).
5.	Piston (12)	Two half rings (13)	Remove.	

18-31. EXTENSION CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





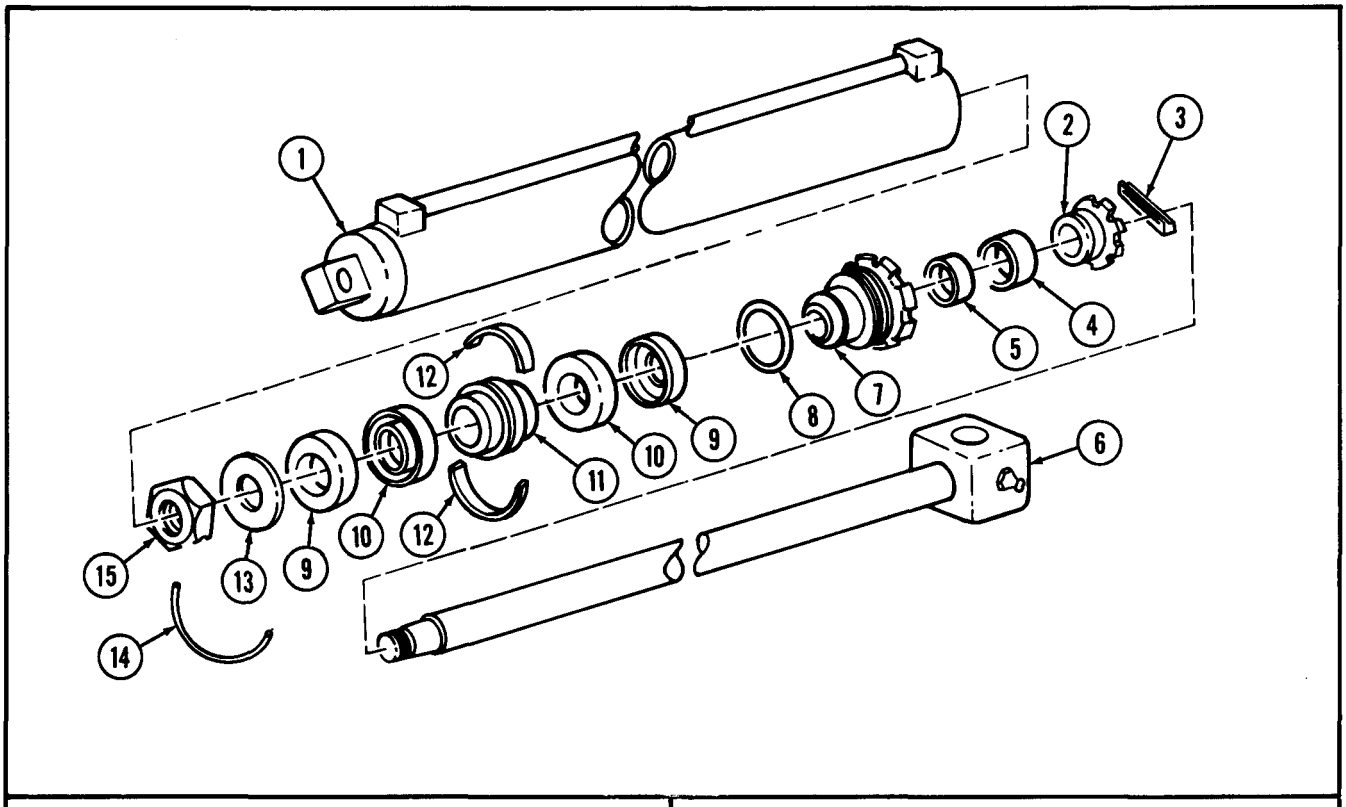
TA 350764

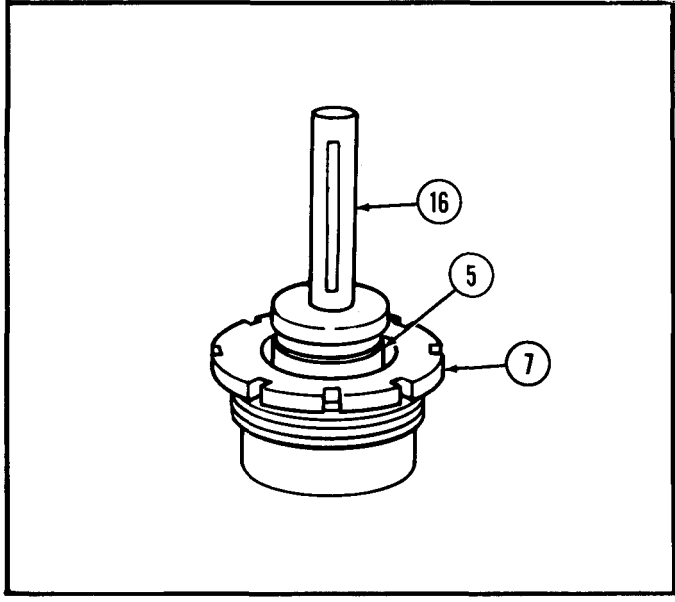
18-31. EXTENSION CYLINDER REPAIR (Cont'd)

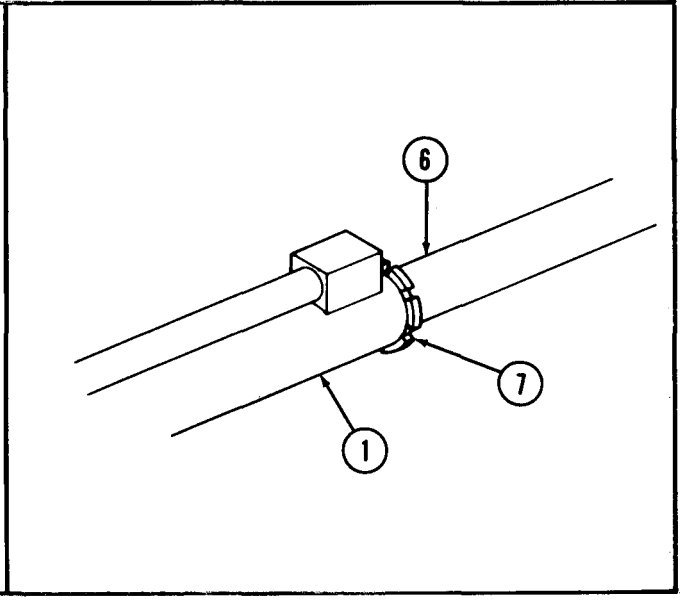
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			
		WARNING		
		Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
6.		All extension cylinder components	Clean with drycleaning solvent, and dry with lint-free cloth.	Refer to para. 2-7.
7.		Piston rod (6)	Inspect for burrs, scoring, scratches, and stripped threads.	Remove minor scratches and burrs with crocus cloth. If piston rod (6) is scored, or if stripped threads are evident, replace.
8.		Piston (11) and cylinder body (1)	Inspect for scoring.	If piston (11) is scored, replace. If cylinder body (1) is scored, replace.
	c. Reassembly			
9.		Two half rings (12)	Install on piston (11).	
10.		Piston rod bushing (5)	Install in cylinder head (7).	Use bushing installer and handle (16).
11.		New "O" ring (8), new packing (4), packing nut (2), and new wiper strip (3)	Install on cylinder head (7).	
12.		Cylinder head (7)	Install on piston rod (6).	Use care not to damage wiper strip (3) when passing over threads on piston rod (6).
13.		Two U-cup retainers (9), U-cups (10), piston (11) and washer (13)	Install on piston rod (6).	
14.		Piston rod nut (15) and new lockwire (14)	Secure to piston rod (6).	
15.		Piston rod (6)	Slide into cylinder body (1) and install cylinder head (7) on cylinder body (1).	Use spanner wrench to tighten cylinder head (7).

18-31. EXTENSION CYLINDER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







END OF TASK!

FOLLOW-ON TASKS: • Lubricate extension cylinder (LO 9-2320-272-12).
• Install extension cylinder (para. 18-14).

TA 350765

18-32. BOOM ROLLER REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-15	Boom roller removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Eight lockwashers
Two woodruff keys

Personnel Required
Wheeled vehicle repairman MOS 63W

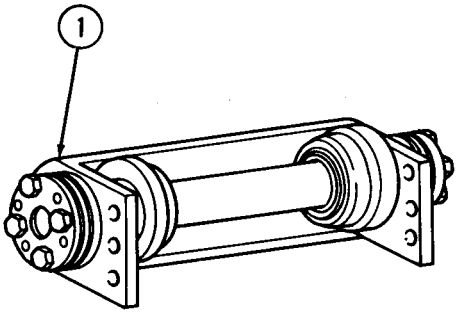
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

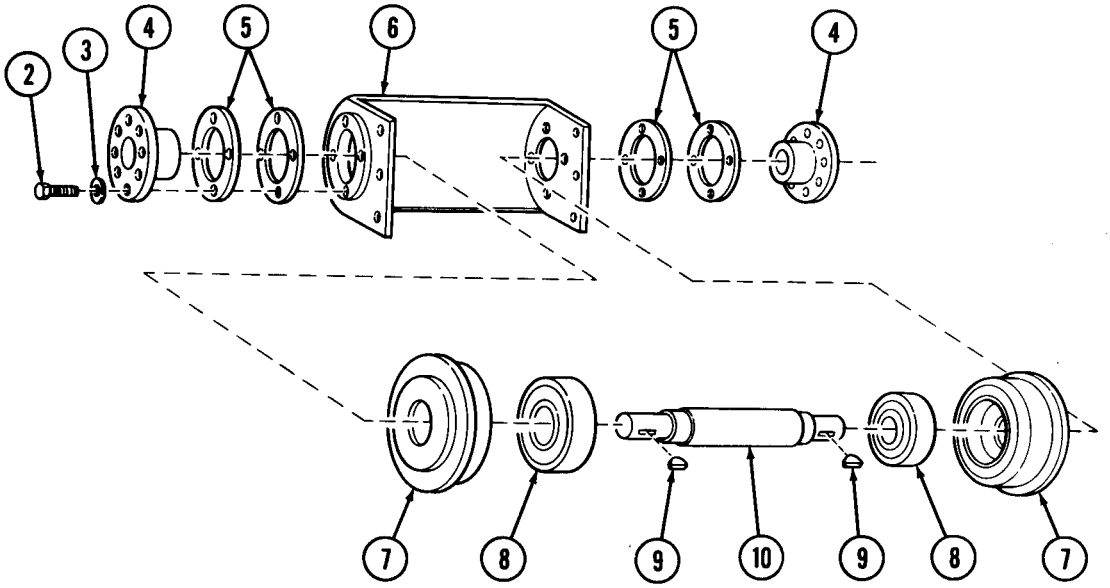
Manual References
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
1.		Boom roller (1)	Thoroughly clean exterior with drycleaning solvent.	
2.	Left and right mounting caps (4) to boom roller frame (6)	Eight screws (2) and lockwashers (3), left and right mounting caps (4), and four shims (5)	Remove.	Discard lockwashers (3).
3,	Frame (6)	Two rollers (7) and roller shaft (10)	Remove.	
4.	Roller shaft (10)	Two rollers (7)	Remove.	
5.	Rollers (7)	Two roller bearings (8)	Remove.	Use arbor press and mandrel.
6.	Roller shaft (10)	Two woodruff keys (9)	Remove.	Discard woodruff keys (9).

18-32. BOOM ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





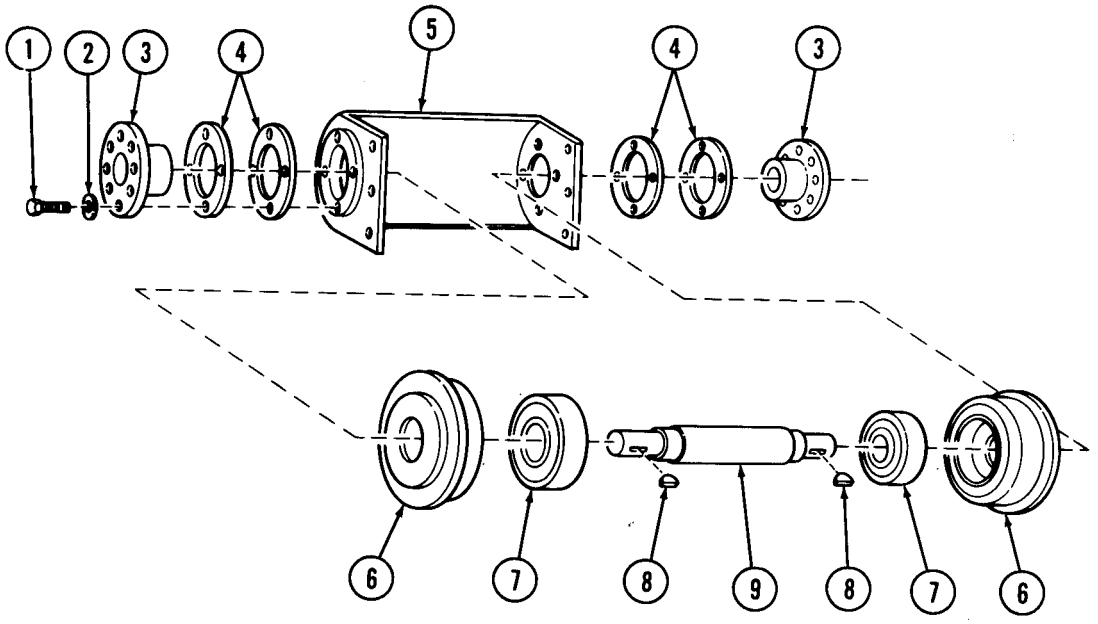
TA 350766

18-32. BOOM ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
7.		All boom roller parts	Clean with drycleaning solvent.	Refer to para. 2-7.
8.		Roller bearings (7) and rollers (6)	Inspect for pitting and scoring.	If pitted or scored, replace bearings (7) or rollers (6).
9.		Boom roller frame (5) and mounting caps (3)	Inspect for cracks or damaged threads.	If cracked, or threads are damaged, replace frame (5) or mounting caps (3).
10.		Roller shaft (9)	Inspect for scoring and breaks.	If roller shaft (9) is broken or scored, replace.
	c. Reassembly			
11.		Roller bearings (7)	Install in rollers (6).	Use arbor press and mandrel.
12.		Two new woodruff keys (8)	Install on roller shaft (9).	
13.		Rollers (6) and bearings (7)	Install on roller shaft (9).	
14.		Roller shaft (9) and rollers (6)	Install in boom roller frame (5).	
15.		Four shims (4), and left and right mounting caps (3)	a. Position to frame (5) and measure clearance between mounting caps (3) and rollers (6).	
			b. Clearance should be .062-.125 in. (1.6-3.2 mm).	If clearance is more than .062-.125 in. (1.6-3.2 mm) remove shims (4). If clearance is less than .062-.125 in. (1.6-3.2 mm) add shims (4).
			c. Install on frame (5) with eight new lock-washers (2) and screws (l).	

18-32. BOOM ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install boom roller (para. 18-15).

TA 350767

18-33. CRANE SWINGER GEARCASE REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-19	Crane swinger gearcase removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Three gearcase gaskets
Gearcase seal
Fifteen lockwashers
Five woodruff keys

Personnel Required
Wheeled vehicle repairman MOS 63W

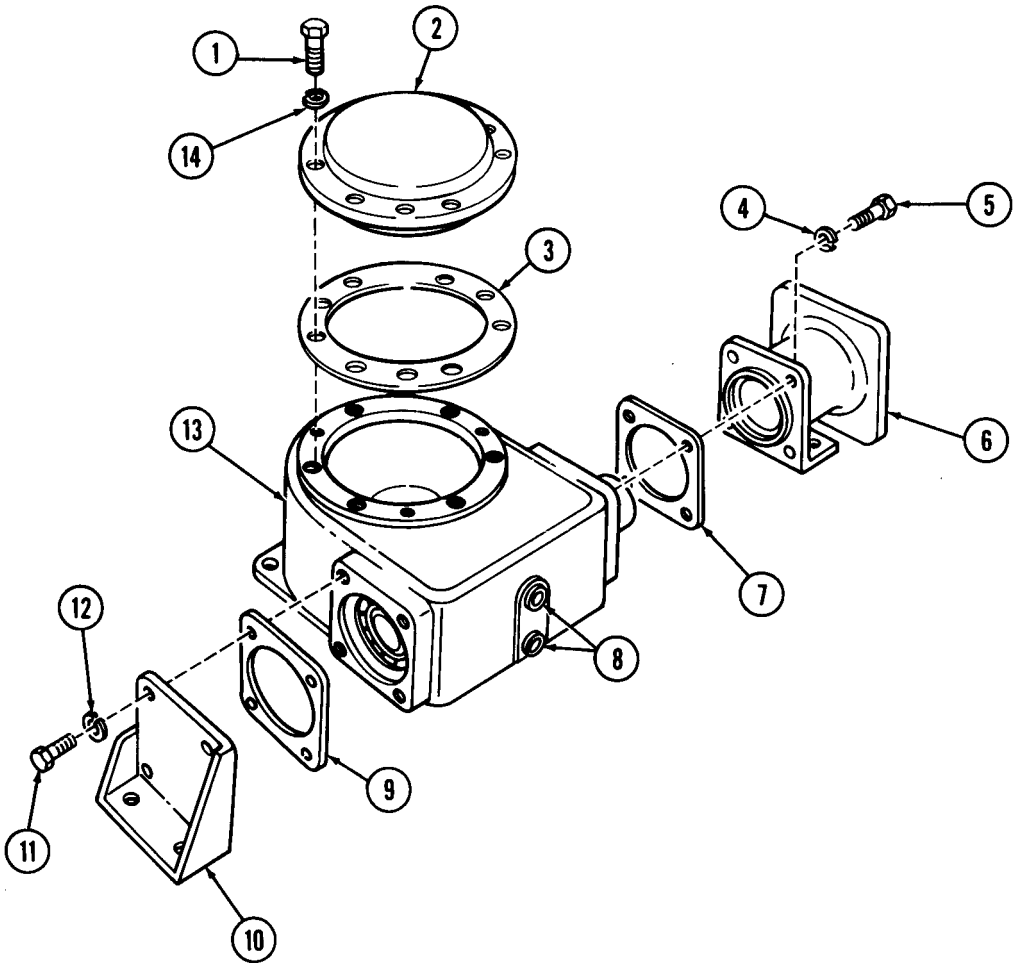
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
1.		Crane swinger gearcase (13)	Thoroughly clean exterior with drycleaning solvent.	Refer to para. 2-7.
2.	Crane swinger gearcase (13)	Two drainplugs (8)	Remove, and drain lubricant from gearcase (13).	Have drainage container ready to catch oil. Reinstall drainplugs (8) after lubricant is completely drained.
3.	Shaft bearing cap (10) to gearcase (13)	Four screws (11), lockwashers (12), shaft bearing cap (10), and gasket (9)	Remove.	Discard lockwashers (12) and gasket (9). Clean gasket remains from mating surfaces.

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Gearcase (13)	Four screws (5) and lockwashers (4), gearcase motor mounting cap (6), and gasket (7)	Remove.	Discard lockwashers (4) and gasket (7). Clean gasket remains from mating surfaces.
5.		Six screws (1) and lockwashers (14), cover (2), and gasket (3)	Remove.	Discard lockwashers (14) and gasket (3). Clean gasket remains from mating surfaces.



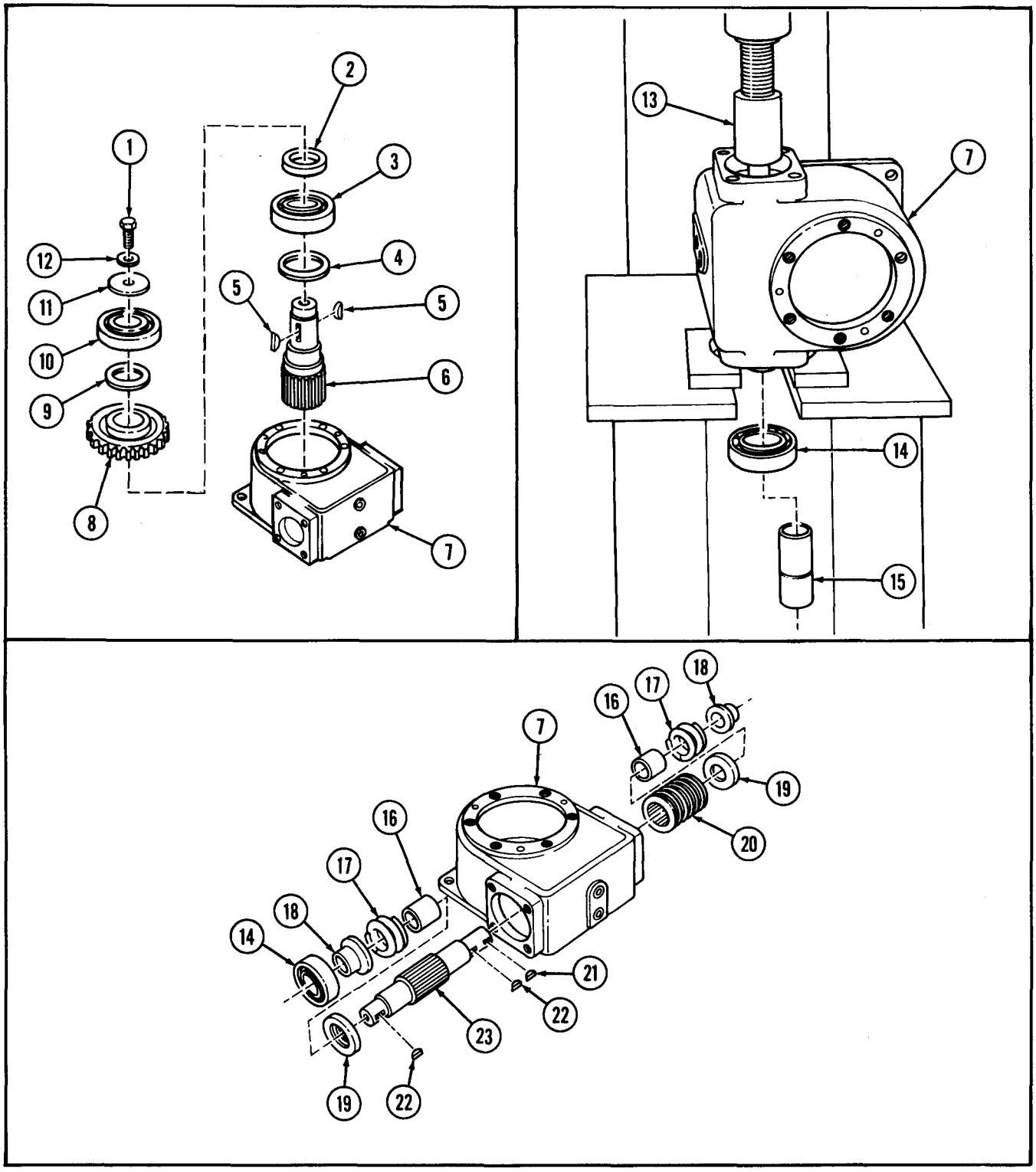
TA 350768

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Gearcase (7)	Gear shaft assembly (6)	Remove.	Use arbor press and mandrel (13).
7.	Gear shaft assembly (6)	Screw (1), lockwasher (12), and retaining washer (11)	Remove.	Discard lockwasher (12).
8.		Upper bearing (10), thrust washer (9), gear (8), gear washer (2), lower bearing (3), seal (4), and two woodruff keys (5)	Remove.	Use puller for bearing (10) and gear (8), and discard woodruff keys (5). Discard seal (4).
9.	Shoulder shaft (23)	Coupling (15) and woodruff key (21)	Remove.	Use arbor press and mandrel (13) and discard woodruff key (21).
10.		Gearcase (7)	a. Press shoulder shaft (23) down until bearing (14) is removed. b. Turn gearcase (7) over and press bearing (14) and shoulder shaft (23) assembly from gearcase (7).	Use arbor press and mandrel (13).
11.	Shoulder shaft (23)	Two bushings (18), springs (17), spacers (16), washers (19), and woodruff keys (22)	Remove.	Discard woodruff keys (22).
12.	Shoulder shaft (23)	Worm gear (20)	Remove.	

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



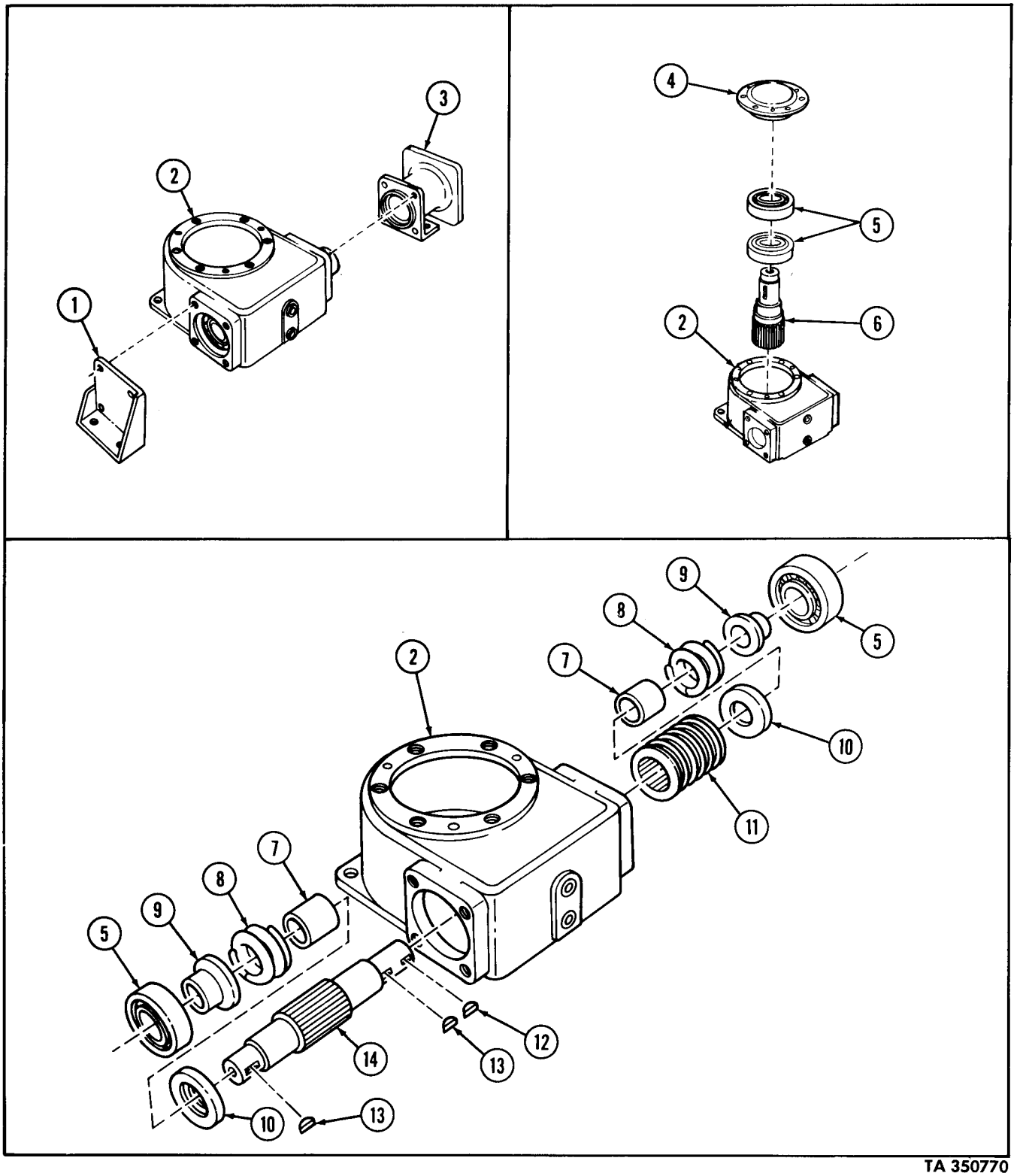
TA 350769

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning, Inspection, and Repair			
			WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.	
			CAUTION Do not spin-dry bearings with compressed air.	
13.		All gearcase (2) components	Clean with drycleaning solvent.	
14.	Four bearings (5)	Inspect for scoring, pitting, and breaks	Replace bearings (5) if scored, pitted, or broken.	
15.		Gearcase (2), gearcase motor mounting cap (3), shaft bearing cap (1), and gearcase cover (4)	Inspect for cracks and breaks.	Replace gearcase (2), caps (1) and (3), and gearcase cover (4) if cracked or broken.
16.		Shoulder shaft (14), worm gear (11), and gearshaft (6)	Inspect for cracks, breaks, chips, and out-of-round condition.	Replace shoulder shaft (14), worm gear (11), and gearshaft (6) if broken, cracked, chipped, or out-of-round.
	c. Reassembly			
17.		Two new woodruff keys (13), washers (10), spacers (7), springs (8), and bushing (9)	Install on shoulder shaft (14).	
18.		Worm gear (11)	Install on shoulder shaft (14).	
19.		Shoulder shaft bearings (5)	a. Install on shoulder shaft (14) and press shoulder shaft (14) into gearcase (2) until bearing (5) is flush with end of gearcase (2).	Use arbor press and mandrel.
			b. Turn gearcase (2) over and press second shoulder shaft bearing (5) into gearcase (2).	Use arbor press and mandrel. Make sure bearing (5) is flush with gearcase (2).
20.		New woodruff key (12)	Install on shoulder shaft (14).	

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



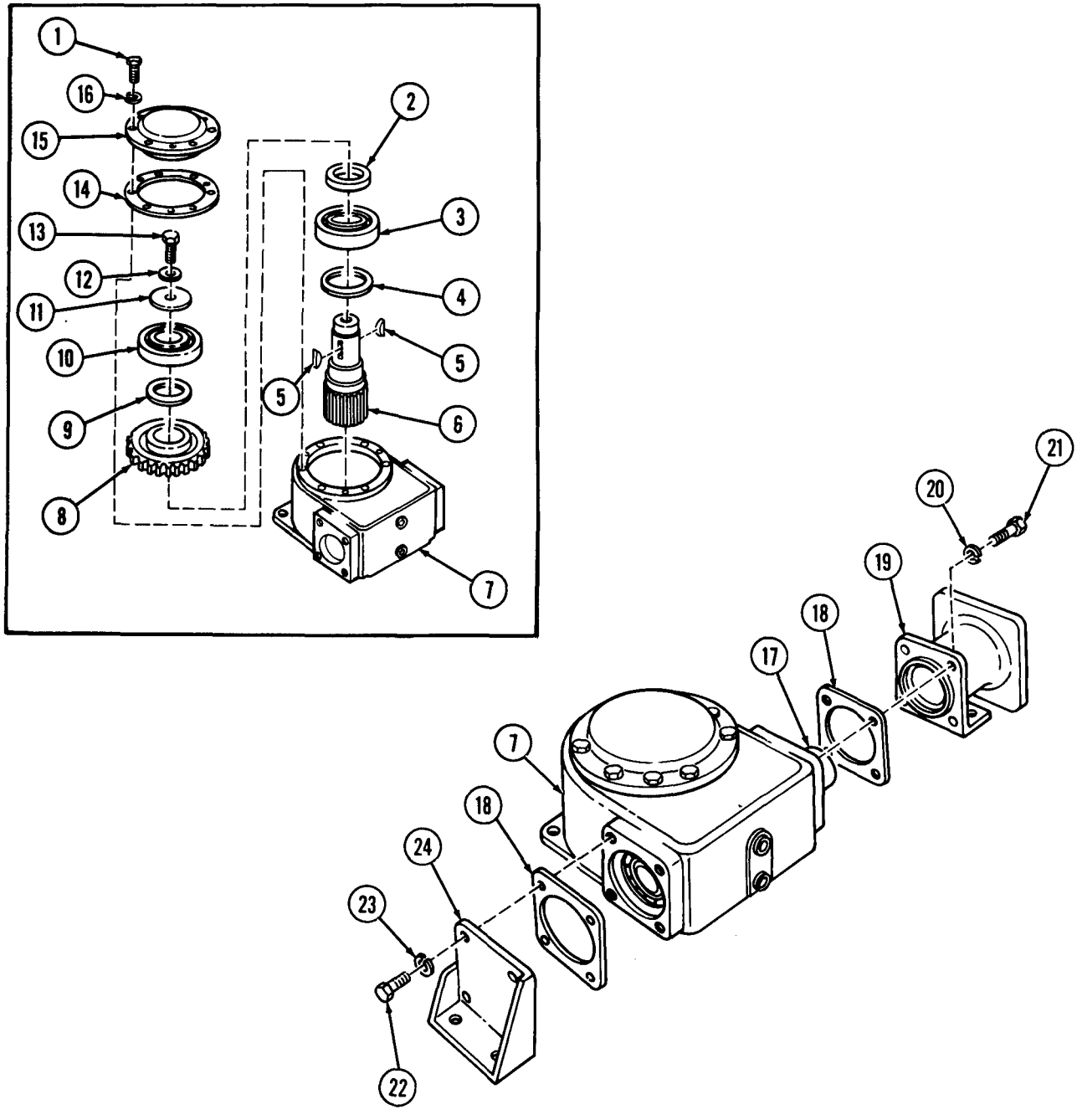
TA 350770

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
21.		New seal (4)	Install on gear shaft (6).	
22.		Bearing (3)	Press onto gear shaft (6).	Use arbor press and mandrel.
23.		Lower thrust washer (2), two new woodruff keys (5), and gear (8)	Install and press gear (8) onto gear shaft (6) over woodruff keys (5).	Use arbor press and mandrel.
24.		Upper thrust washer (9) and bearing (10)	Install washer (9) and press bearing (10) onto gear shaft (6).	Use arbor press and mandrel.
25.		Retaining washer (11), new lockwasher (12), and screw (13)	Install on gear shaft (6).	Tighten screw (13) 44-61 lb-ft (60-83 N·m).
26.		New gasket (14) and gearcase cover (15)	Install on gearcase (7) with six new lock-washers (16) and screws (1).	Tighten screws (1) 44-61 lb-ft (60-83 N·m).
27.		New gasket (18) and shaft bearing cap (24)	Install on gearcase (7) with four new lock-washers (23) and screws (22).	Tighten screws (22) 44-61 lb-ft (60-83 N·m).
28.		Coupling (17)	Install in gearcase (7).	
29.		New gasket (18) and mounting cap (19)	Install on gearcase (7) with four new lock-washers (20) and screws (21).	Tighten screws (21) 44-61 lb-ft (60-83 N·m).

18-33. CRANE SWINGER GEARCASE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Fill gearcase with lubricant (LO 9-2320-272-12).
• Install crane swinger gearcase (para. 18-19).

18-34. GONDOLA REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-21	Gondola removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Six lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

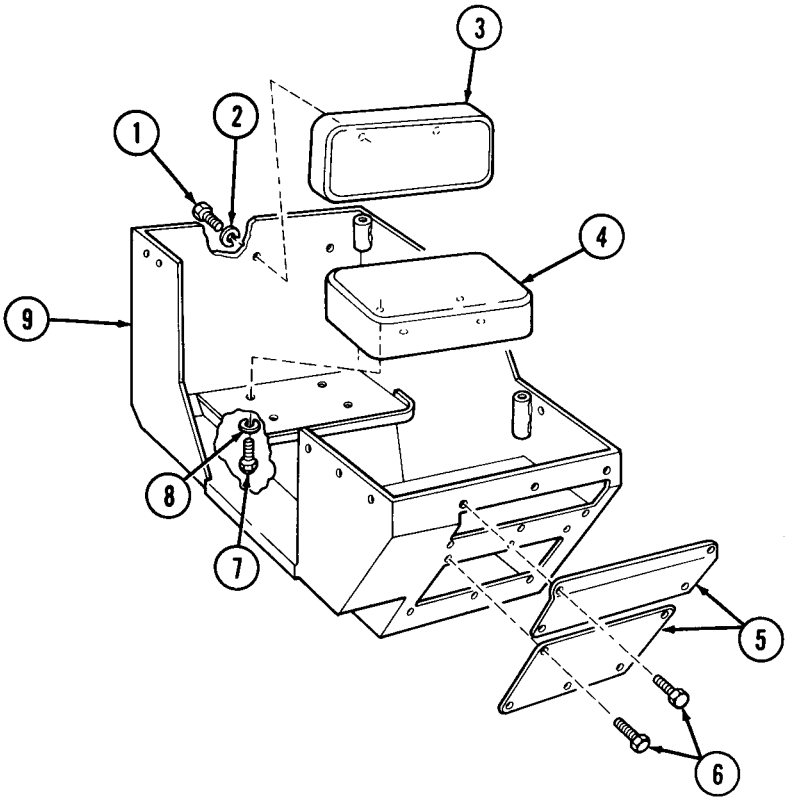
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-34P
TM 9-237

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
1.	Gondola (9)	Twelve screws (6) and two access plates (5)	Remove.	
2.		Two screws (1) and lockwashers (2), and seat backrest (3)	Remove.	Discard lockwashers (2).
3.		Four screws (7) and lockwashers (8), and seat cushion (4)	Remove.	Discard lockwashers (8).
		b. Cleaning, Inspection, and Repair		
		WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
4.		Gondola (9)	a. Clean with drycleaning solvent.	Refer to para. 2-7.
			b. Inspect for breaks and cracked welds.	If broken or cracked, refer to TM 9-237.

18-34. GONDOLA REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.		Seat backrest (3) and seat cushion (4)	Inspect for tears or broken springs.	If torn, or if broken springs are evident, replace.
c. Reassembly				
6.		Seat cushion (4)	Install on gondola (9) with four new lockwashers (8) and screws (7).	
7.		Seat backrest (3)	Install on gondola (9) with two new lockwashers (2) and screws (1).	
8.		Two access plates (5)	Install on gondola (9) with twelve screws (6).	



END OF TASK!

FOLLOW-ON TASK: Install gondola (para. 18-21).

18-35. TURNTABLE REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-22	Turntable removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-34P
LO 9-2320-272-12
TM 9-237

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
1.	Turntable gear and bearing assembly (1) to base plate (3)	Eighteen screws (2) and gear and bearing (1)	Remove from underside of base plate (3).	
		b. Cleaning, Inspection, and Repair		

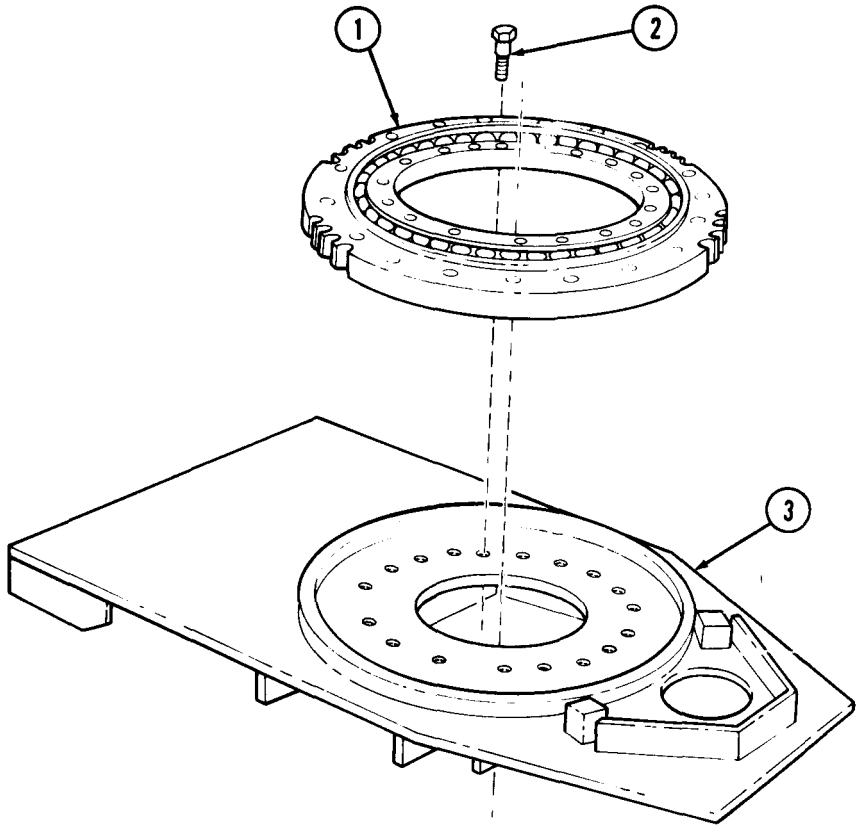
WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

2.	Turntable base plate (3) and gear and bearing (1)	Clean with drycleaning solvent.	Refer to para. 2-7.
3.	Turntable base plate (3)	Inspect for cracks and breaks.	If cracked or broken, refer to TM 9-237.
4.	Turntable gear and bearing assembly (1)	Inspect for cracks, pits, scores, and broken teeth.	If gear and bearing (1) are cracked, pitted, scored, or broken teeth are evident, replace.

18-35. TURNTABLE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
5.		Turntable gear and bearing assembly (1)	Install on underside of turntable base plate (3) with eighteen screws (2).	Tighten screws (2) 170-200 lb-ft (231-271 N·m).



END OF TASK!

FOLLOW-ON TASKS:
- Lubricate gear bearing (LO 9-2320-272-12).
- Install turntable (para. 18-22).

TA 350773

18-36. CRANE CONTROL VALVE REPAIR

This task covers:

a. Disassembly
b. Cleaning, Inspection, and Repair
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	Para. 18-20	Crane control valve removed.

Test Equipment

None

Special Tools

Seal retainer remover and replacer Y-56205

Special Environmental Conditions

None

Materials/Parts

Relief valve kit 5704274
Load check valve kit 5704273
Eight snaprings
Connector "O" ring
Four lockwashers
Lint-free cloth (Appendix C, Item 7)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

Keep fire extinguisher nearby when using drycleaning solvent.

Manual References

TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Do not perform this procedure unless relief valve kit and load check valve kit are available.

a. Disassembly

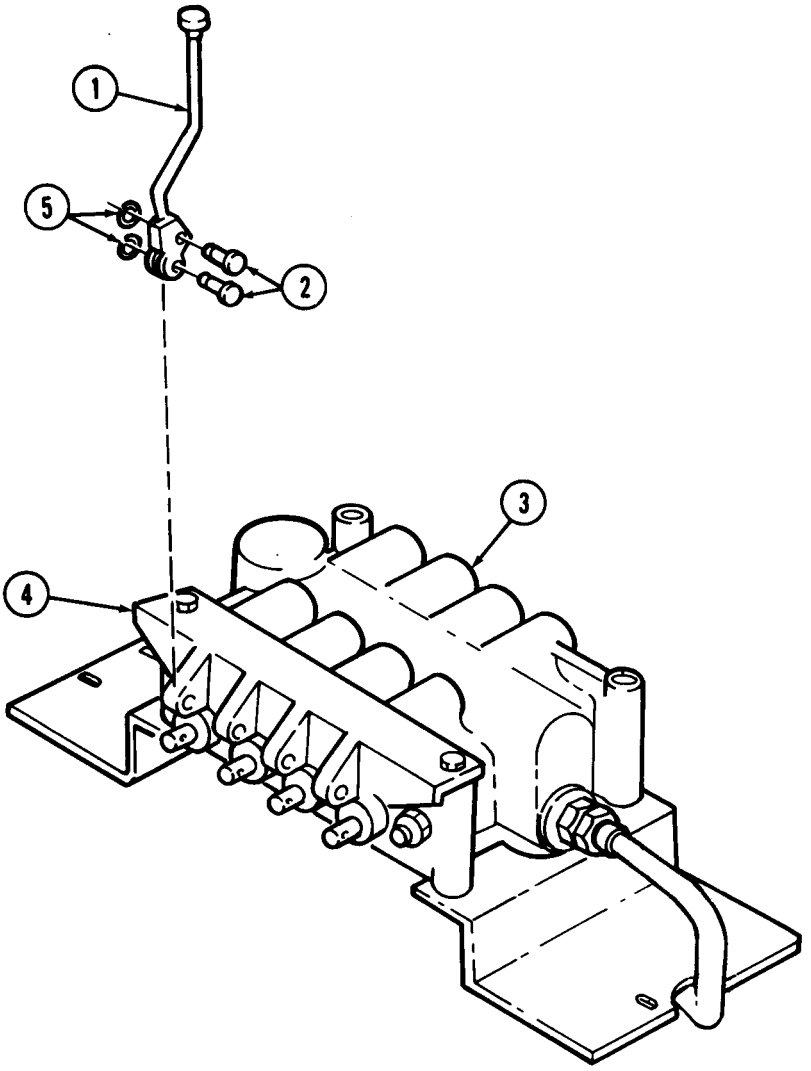
WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

1.		Crane control valve (3)	Thoroughly clean exterior with drycleaning solvent.	Refer to para. 2-7.
2.	Base (4) and control valve (3)	Eight pins (2) and snaprings (5), and four handles (1)	Remove.	Discard snaprings (5).

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350774

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Control valve (3)	Four screws (1), nuts (13), and lockwashers (14), two control brackets (15) and (7), and base (2)	Remove.	Discard lockwashers (14).
4.	Nipple (18) to control valve (3)	Nipple adapter (17) and "O" ring (16)	a. Remove from control valve (3). b. Remove nipple (18) from nipple adapter (17).	Discard "O" ring (16).
5.	Control valve (3)	Tube (6), connector (5), and "O" ring (4)	Remove.	Mark position and angle of tube (6). Discard "O" ring (4).
6.		Two elbows (10), three adapters (11), and two "O" rings (12)	Remove.	Discard two "O" rings (12) and mark position and angle of elbows (10).
7.		Four elbows (9) and "O" rings (8)	Remove.	Discard four "O" rings (8) and mark position and angle of elbows (9).

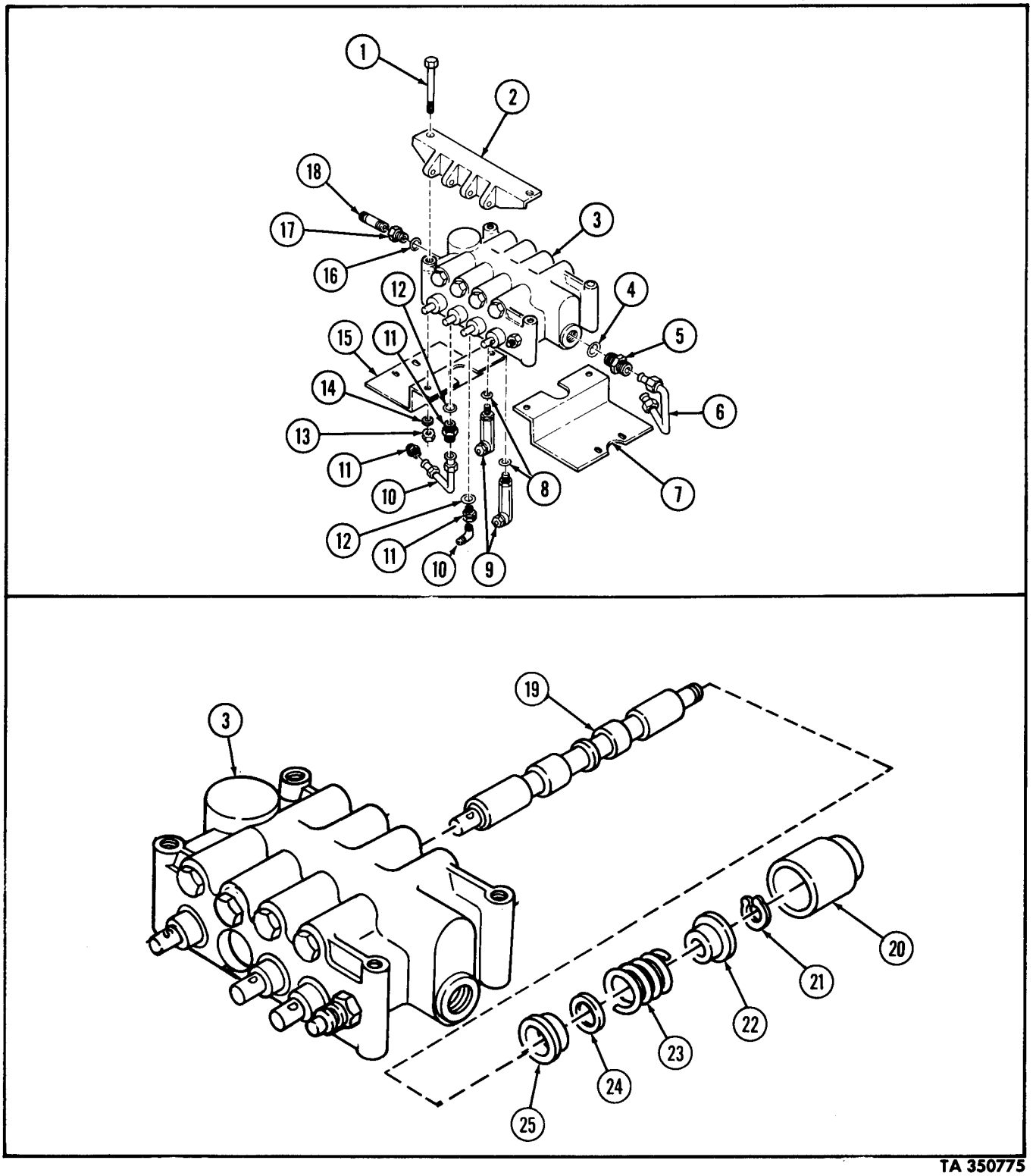
NOTE

All spring-centered spool valves in the control valve are removed and disassembled in the same way. Three spool valves are stamped with a "D" (double action) on the shank of the spool valve. The fourth is stamped with an "S" (single action) and is located next to the oil outlet port in the control valve. Steps 8 through 11 will cover a double-action valve only.

8.	Control valve (3)	Spool valve cap (20) and spool valve (19)	Remove.	
9.		Spool valve (19)	Clamp in soft-jawed vise.	
10.	Spool valve (19)	Snapring (21), outer spacer (22), spring (23), travel limit washers (24), and inner spacer (25)	Remove.	Use improvised compression tool to compress spring (23).

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



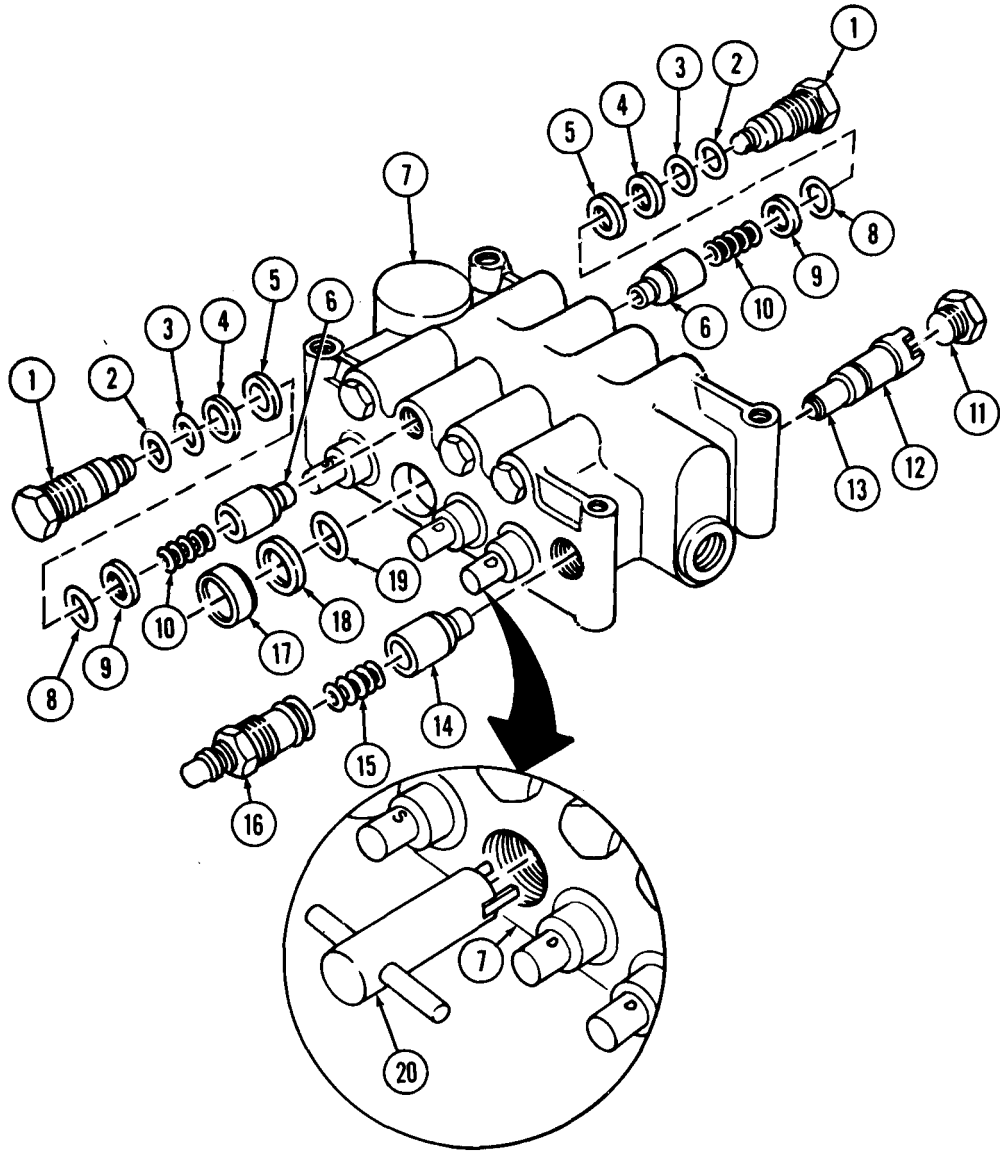
TA 350775

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.	Control valve (7)	Retainer (17), seal (18), and "O" ring (19)	Remove.	Use seal retainer remover and replacer (20). Discard seal (18) and "O" ring (19).
		NOTE All check valves in the control valve are removed and reassembled the same way. Check valves located adjacent to valve spools marked with a "D" (double action) are identical. The check valve located by the valve spool marked "S" (single action) contains only one spring and poppet. All other components are the same as the "D" type spools. Steps 12 and 13 cover a check valve adjacent to a "D" type spool.		
12.	Control valve (7)	Two check valve caps (1), springs (10), and poppets (6)	Remove.	
		NOTE Do not remove check seat sleeve from control valve. Check valve parts should be identified so they maybe returned to their original position during reassembly.		
13.	Two check valve caps (1)	Backup ring (9), "O" ring (8), backup ring (5), backup ring (4), "O" ring (3), and "O" ring (2)	Remove from each.	Discard all items removed.
14.	Control valve (7)	Relief valve (16)	Remove.	Discard relief valve (16).
15.		Seat retainer plug (11), drain sleeve (13), and seat retainer (12)	Remove.	Discard seat retainer (12).
16.		Poppet spring (15) and poppet assembly (14)	Remove.	Discard poppet assembly (14) and spring (15).

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



T'A 350776

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Cleaning, Inspection, and Repair

WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

17.		All control valve components	Clean with drycleaning solvent and dry with lint-free cloth.	Refer to para. 2-7.
18.		Spool valve (11) and control valve (6)	Inspect for grooves, scratches, cracks, and breaks.	If grooved, scratched, cracked, or broken, replace crane control valve (6).

c. Reassembly

NOTE

Drain sleeve should go into control valve far enough to leave two or three full threads exposed. Installing seat retainer plug at this point sets the seat retainer to the proper depth.

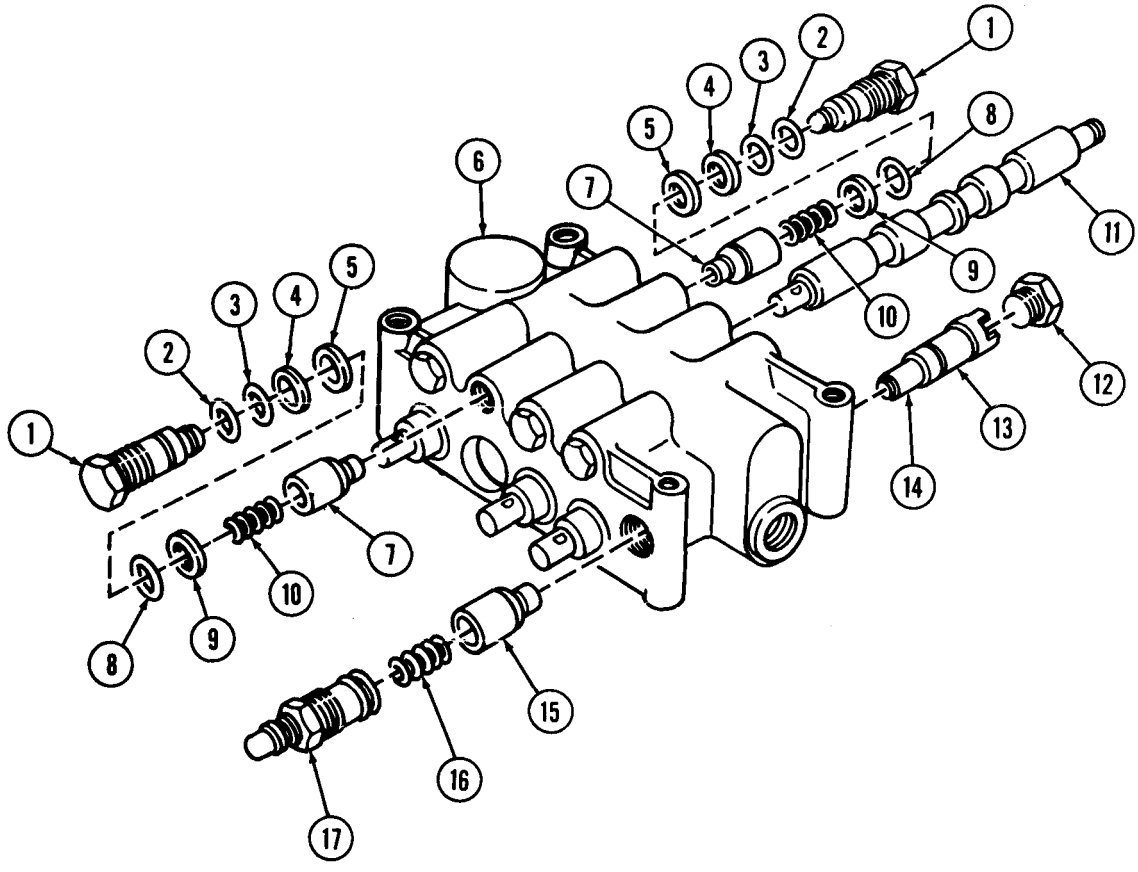
19.		New seat retainer (13) and drain sleeve (14)	Install in control valve (6).	
20.		Seat retainer plug (12)	Install in control valve (6).	
21.		New poppet assembly (15) and poppet spring (16)	Install in control valve (6) so poppet assembly (15) points toward seat retainer (13).	
22.		New relief valve (17)	Install on control valve (6).	
23.		New "O" ring (2) new "O" ring (3), new back-up ring (4), new back-up ring (5), new "O" ring (8), and new back-up ring (9)	Install on each check valve cap (1).	
24.		Two poppets (7), springs (10), and check valve caps (1)	Install into control valve (6).	

NOTE

The remaining check valve caps are reassembled in the same way.

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

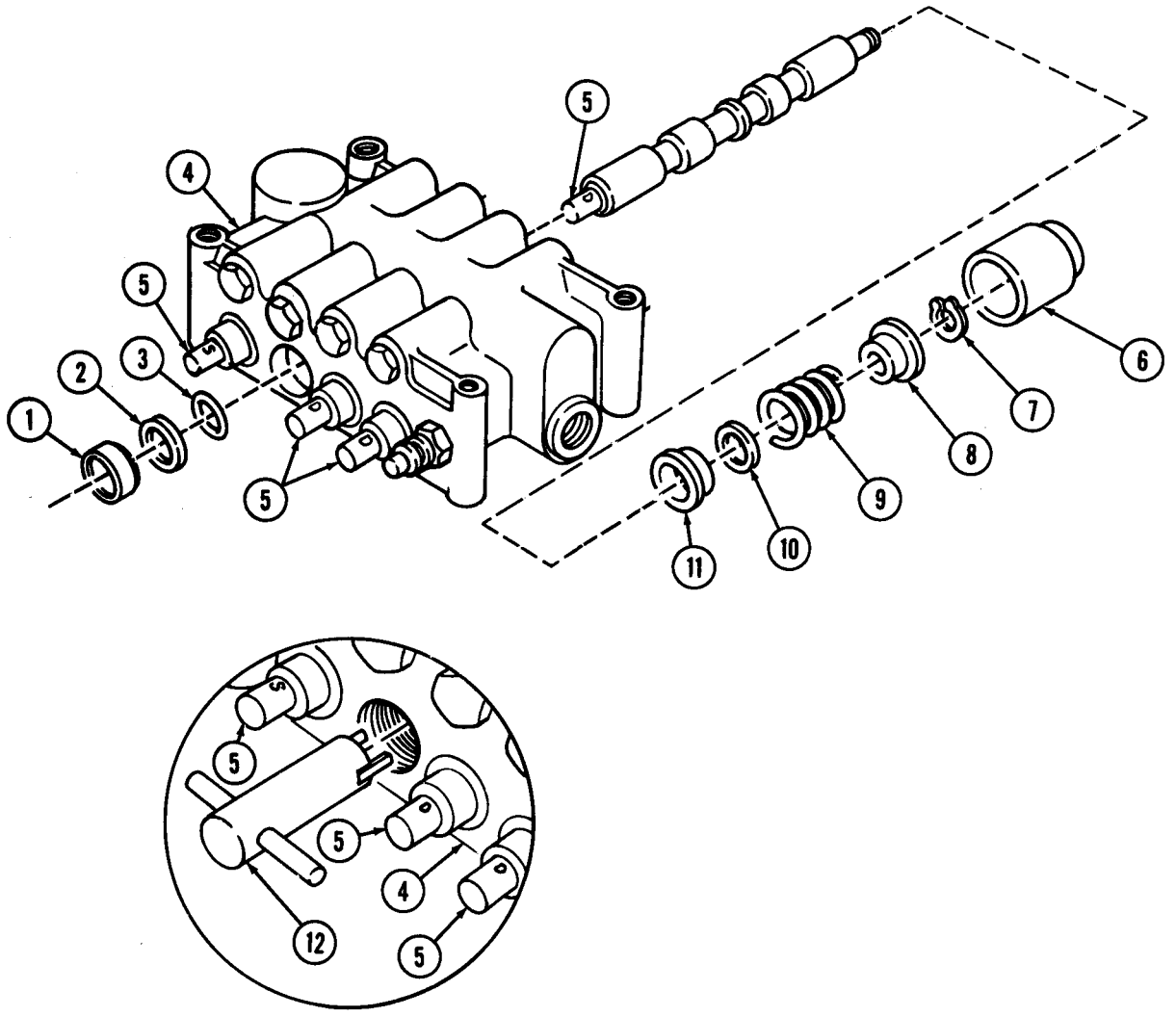
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350777

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
25.		Spool valve (5)	Clamp in soft-jawed vise.	
26.		Inner spacer (11), travel limit washer (10), spring (9), and outer spacer (8)	Using improvised compression tool, compress spring (9) and install on spool valve (5) with new snapring (7).	
27.		Spool valve (5) and spool valve cap (6)	Install in control valve (4).	
28.		New "O" ring (3) retainer (1), and new seal (2)	Install on control valve (4).	Use seal retainer remover and replacer (12).



TA 350778

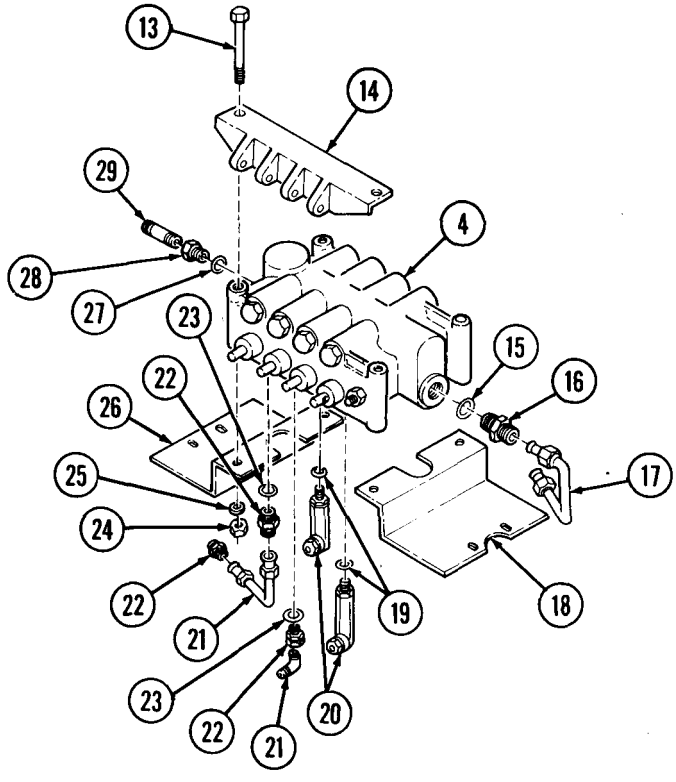
18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

The three remaining spool valves are reassembled into the control valve in the same way.

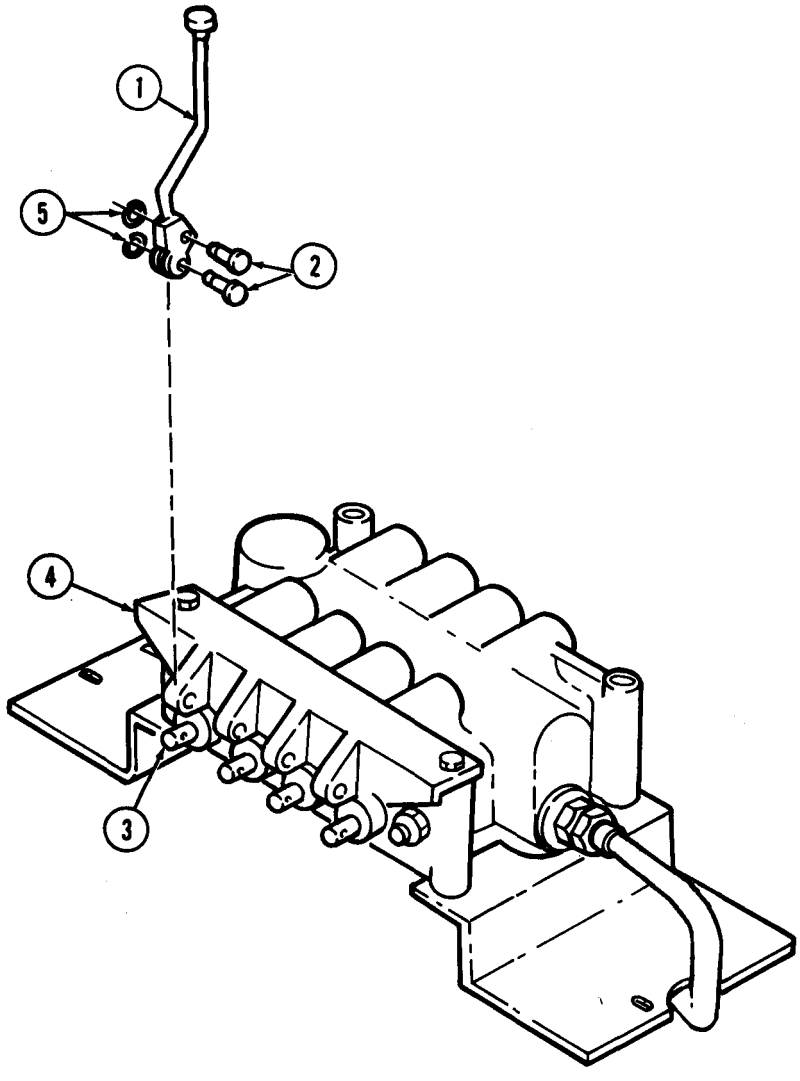
29.		Four new "O" rings (19) and elbows (20)	Install on control valve (4) in their marked location and angle.
30.		Two new "O" rings (23), three adapters (22), and two elbows (21)	Install on control valve (4) in their marked location and angle.
31.		New "O" ring (15), connector (16), and tube (17)	Install on control valve (4) in its marked location and angle.
32.		Nipple adapter (28)	Install on nipple (29).
33.		New "O" ring (27) and nipple adapter (28)	Install on control valve (4).
34.		Right control bracket (18), left control bracket (26) and base (14)	Install on control valve (4) with four screws (13), new lockwashers (25), and nuts (24).



TA 350779

18-36. CRANE CONTROL VALVE REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
35.		Four operating handles (1)	a. Aline with holes in base (4) and control valve spools (3). b. Install with eight pins (2) and new snaprings (5).	



END OF TASK!

FOLLOW-ON TASK: Install crane control valve (para. 18-20).

TA 350780

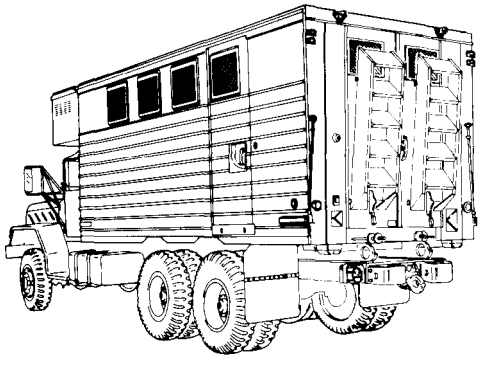
CHAPTER 18.1
VAN BODY (M934, M934A1 , M935, M935A1) MAINTENANCE

Section I. DESCRIPTION AND DATA

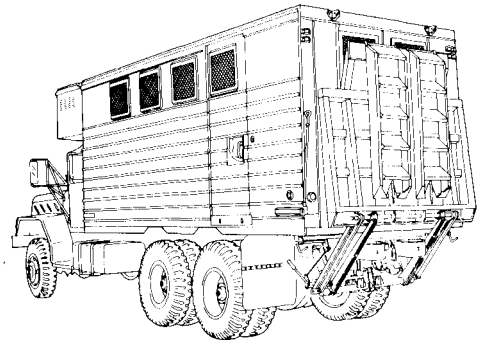
18.1-1. DESCRIPTION - VAN BODY

a. The M934, M934A1, M935, M935A1 are the expansible van body models in the M939 series vehicles. The only difference between these models is that the M935 and M935A1 expansible vans have a hydraulic liftgate.

b. Tabulated data on the M934, M934A1, M935, and M935A1 expansible vans can be found in TM 9-2320-272-10.



M934 AND M934A1 VAN BODIES



M935 AND M935A1 VAN BODIES (WITH LIFTGATE)

Section II. VAN BODY COMPONENTS MAINTENANCE

18.1-2. VAN BODY COMPONENTS MAINTENANCE TASK SUMMARY

18.1-2. VAN BODY COMPONENTS MAINTENANCE TASK SUMMARY (Cont'd)

18.1-3. VAN BODY REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Twenty-two locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W (3)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Ladders removed.

Special Environmental Conditions
None

General Safety Instructions
All personnel must stand clear during lifting operations.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

- M934, M935, M934A1, and M935A1 van bodies are replaced the same way. This procedure covers the M934 and M934A1 vehicles.
- Van body mounting hardware is removed and installed the same way on left and right sides of vehicle. Left side of vehicle is shown.
- One assistant will help with entire procedure.

18.1-3. VAN BODY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Van body (2) and frame brackets (9)	Four locknuts (20), screws (16), washers (17), springs (18), and springs (19)	Remove.	Discard locknuts (20).
2.		Eight locknuts (7) and screws (14)	Remove.	Discard locknuts (7).
3.	Van body (2)	Ten locknuts (5) and bevel washers (6)	Remove.	Discard locknuts (5).
4.	Lifting device (1) and front lifting brackets (21)	Chain (22)	Attach.	
5.	Lifting device (1) and rear lifting brackets (4)	Chain (3)	Attach.	

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

NOTE

Second assistant will help with steps 6 and 7.

6.	Frame (13)	Van body (2)	Raise clear of frame (13).	Release parking brake and remove vehicle once van body (2) has cleared frame (13).
7.		Van body (2)	Lower onto four jackstands.	Position four jackstands evenly under van body (2).
8.	Frame brackets (9)	Four blocks (8)	Remove.	

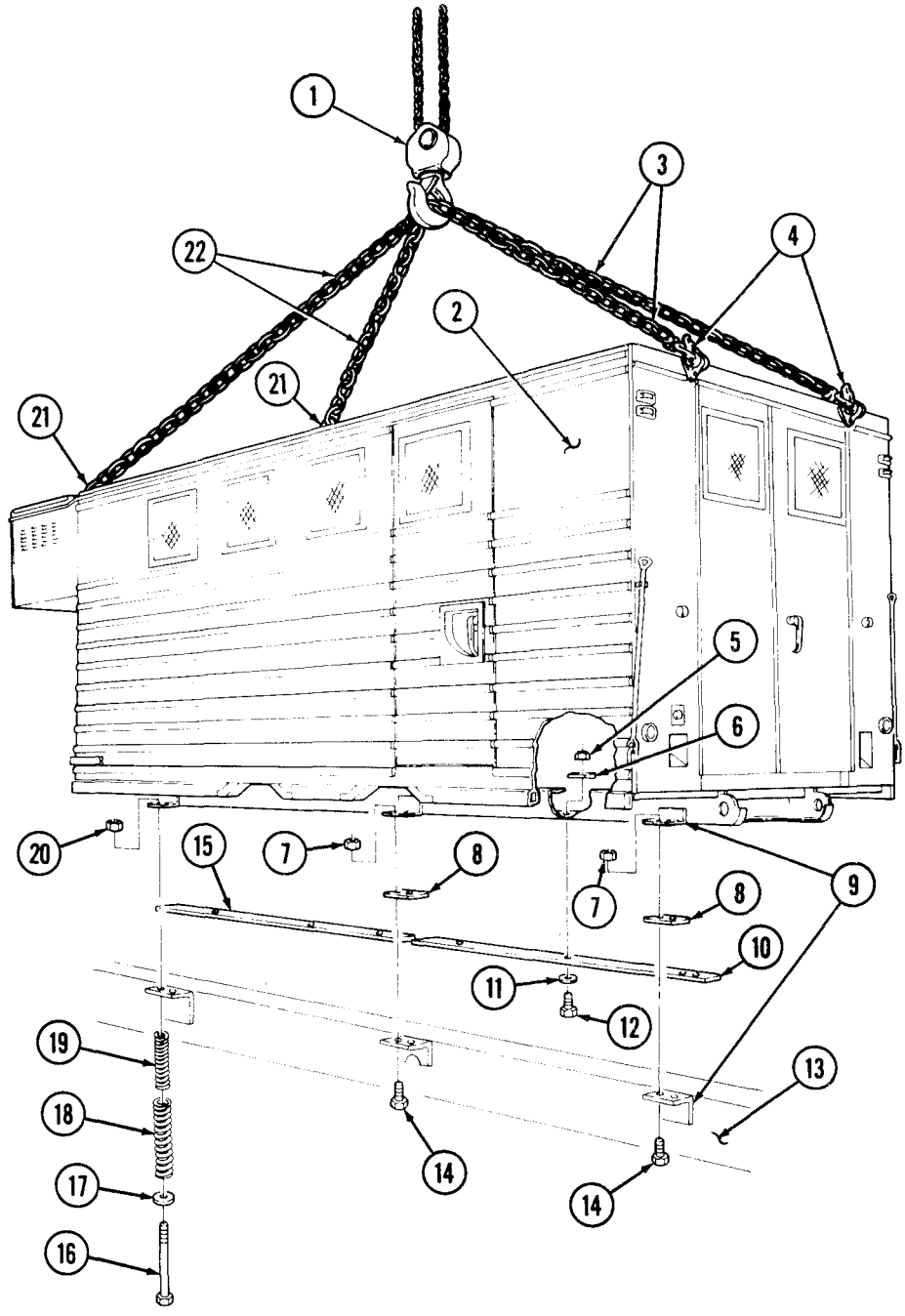
NOTE

Sills and hardware will be in position for removal after van body has been removed.

9.	Frame (13)	Ten screws (12), washers (11), two sills (10), and two sills (15)	Remove.	
10.	Front lifting brackets (21), rear lifting brackets (4), and lifting device (1)	Chains (3) and (22)	Remove.	

18.1-3. VAN BODY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-3. VAN BODY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
11.		Two sills (10) and (15)	Install on van body (2) with ten washers (11), screws (12), bevel washers (6), and new locknuts (5).	
12.		Four blocks (8)	Position on frame brackets (9).	
13.		Chain (3)	Attach to lifting device (1) and rear lifting brackets (4).	
14.		Chain (22)	Attach to lifting device (1) and front lifting brackets (21).	

WARNING

All personnel must stand clear during hoisting operations. A swinging or shifting load may cause injury to personnel.

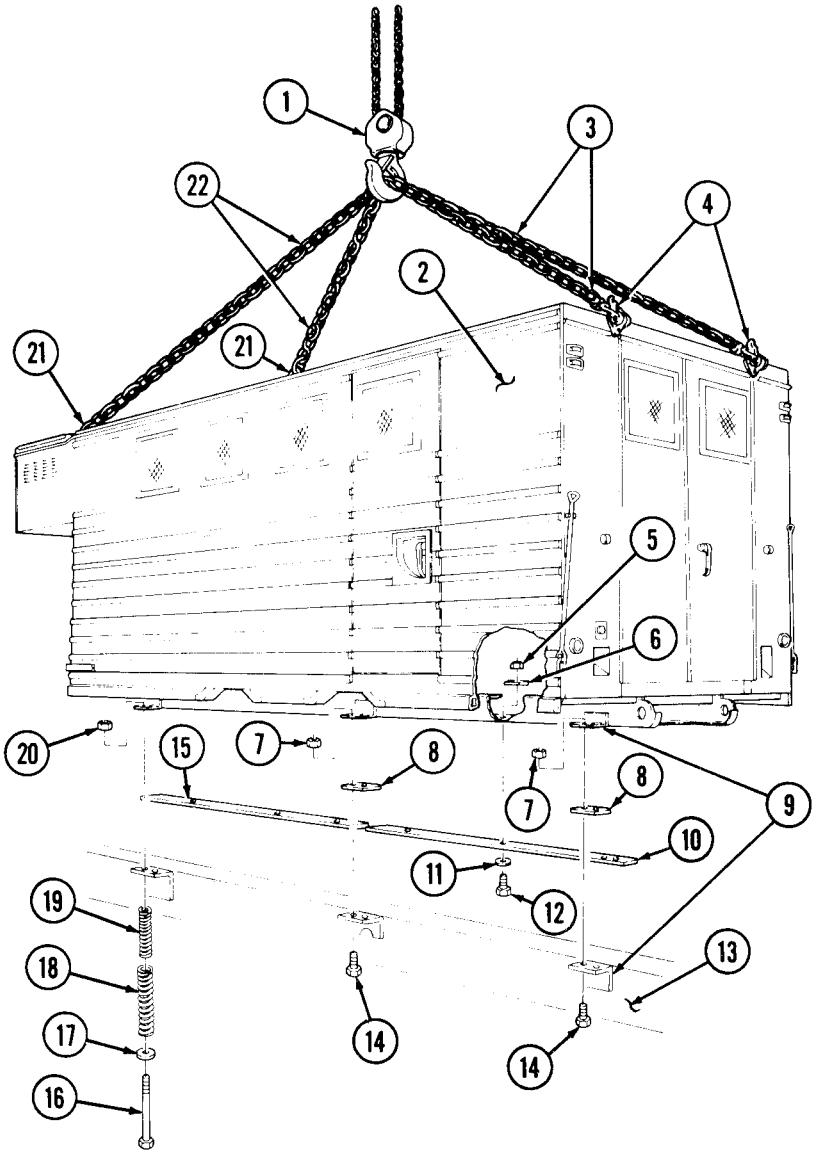
NOTE

Second assistant will help with steps 15 and 17.

15.		Van body (2)	a. Raise evenly from four jackstands. b. Remove jackstands.	
16.		Vehicle	Position under raised van body (2) and set parking brake.	
17.		Van body (2)	Lower slowly onto vehicle and frame (13).	Aline holes of frame brackets (9) and van body (2).
18.		Van body (2)	Install on frame brackets (9) with eight screws (14) and new locknuts (7).	Tighten screws (14) and locknuts (7) to 160-200 lbs-ft (217-271 N·m.)
19.		Van body (2)	Install on frame brackets (9) with four screws (16), washers (17), springs (18), springs (19) and new locknuts (20).	Tighten screws (16) and locknuts (20) until spring length is 6.75 in plus or minus 0.06 in (171.45 mm plus or minus 1.5 mm).

18.1-3. VAN BODY REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.		Chains (3) and (22)	Remove from front lifting brackets (21), rear lifting brackets (4), and lifting device (1).	



END OF TASK!

FOLLOW-ON TASK: Install ladders (TM 9-2320-272-10).

18.1-4. RETRACTABLE BEAM DRIVE SHAFT AND LOCK MAINTENANCE

This task covers:

a. **Removal**
b. Cleaning, Inpection, and Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materials/Parts
Locknut
Five keys
GAA grease (Appendix C, Item 11)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

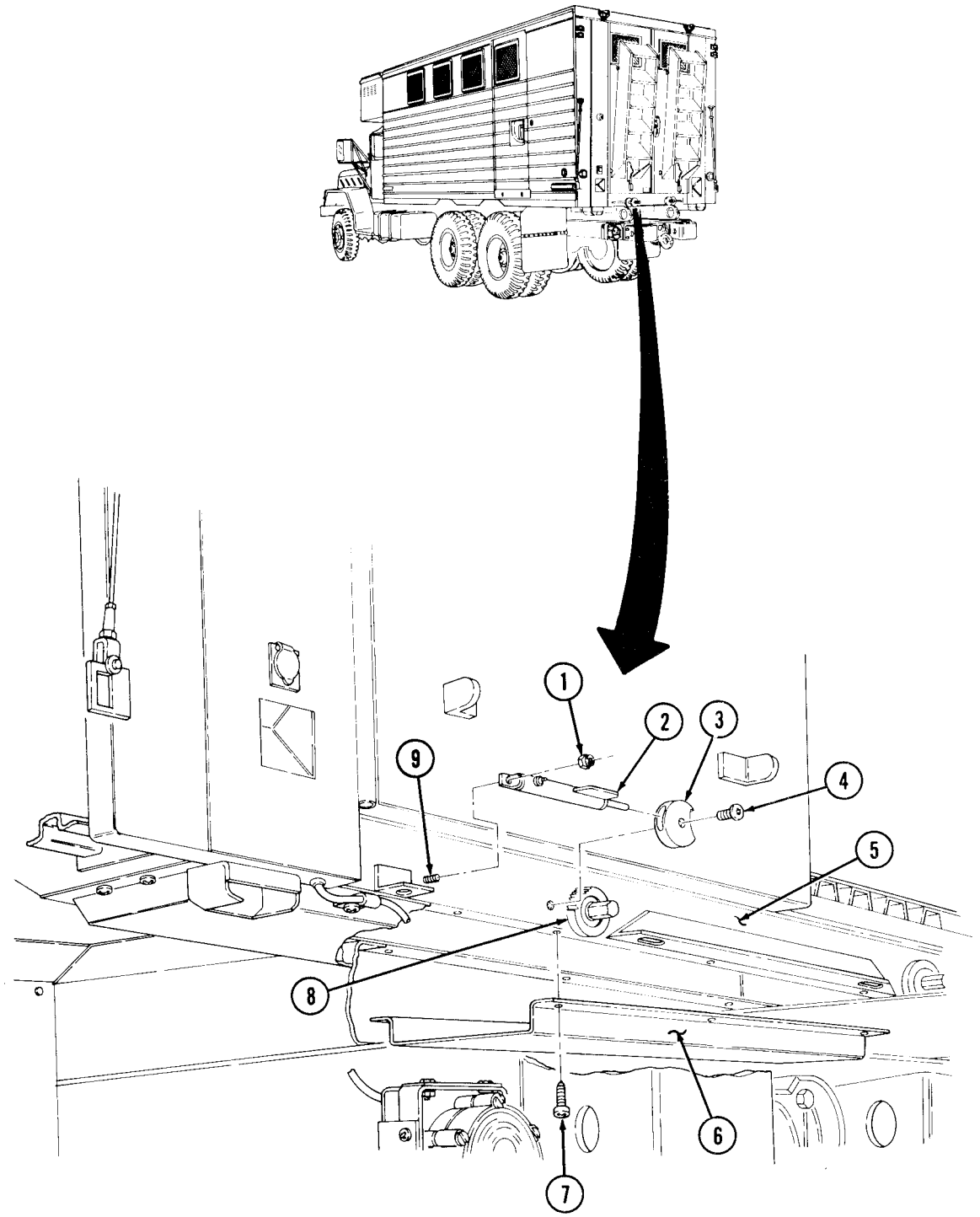
NOTE

- Left and right retractable beam drive shafts and locks are removed and installed the same way. This procedure covers the left retractable drive shaft and lock.
- Retractable beam drive shafts and locks are replaced the same way on M934, M934A1, M935, and M935A1 vehicles. M934A1 is shown.

1. Underframe stud (9)	Locknut (1) and lock (2)	Remove.	Discard locknut (1).
2. Underframe (5) at pawl (3)	Screw (4)	Remove.	
3. Underframe (5) at ratchet (8)	Pawl (3) and lock (2)	Remove.	
4. Underframe (5)	Thirty screws (7) and five covers (6)	Remove.	

18.1-4. RETRACTABLE BEAM DRIVE SHAFT AND LOCK MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-4. RETRACTABLE BEAM DRIVE SHAFT AND LOCK MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Four bushings **(13)**	Setscrews (14)	Loosen.	
6.		Ratchet shaft (7)	Remove all nicks, burrs, and corrosion.	

CAUTION

Do not bend or strain shaft during removal. Doing so may result in damage to equipment.

NOTE

- Lubricate ratchet shaft for removal.
- Assistant under van body will catch shaft components during removal in step 7.

7.	Underframe (6)	Ratchet shaft (7), five spacers (8), sprocket assemblies (9), spacers (10), nine bushings (11), and four bushings (13).	Slowly pull shaft (7) and remove.	

b. Cleaning, Inspection, and Repair

8.		All parts	Clean.	Refer to para. 2-7.
9.	Five sprockets (5)	Five keys (4) and bushings (3)	Remove.	Discard keys (4).
10.		Bushings (3), (11), and (13)	Inspect for wear.	Refer to para. 2-8. Replace if damaged.
11.		Ratchet shaft (7)	Inpsect for burrs, nicks, and corrosion.	Repair with file or emery cloth if damaged.
12.		Lock (1)	Test spring action of lock plunger (2).	Replace lock (1) if spring action is weak.
13.		Five new keys (4) and bushings (3)	Install in five sprockets (5).	

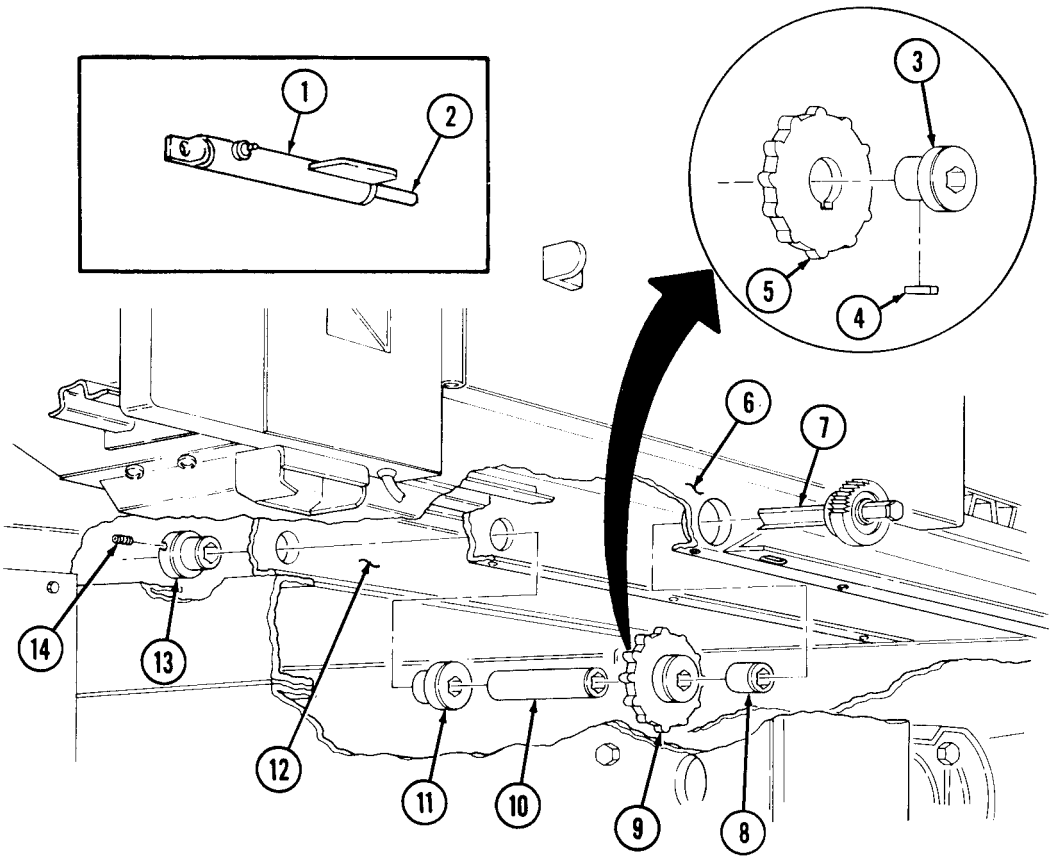
c. Installation

CAUTION

Do not bend or strain shaft during installation. Doing so may result in damage to equipment.

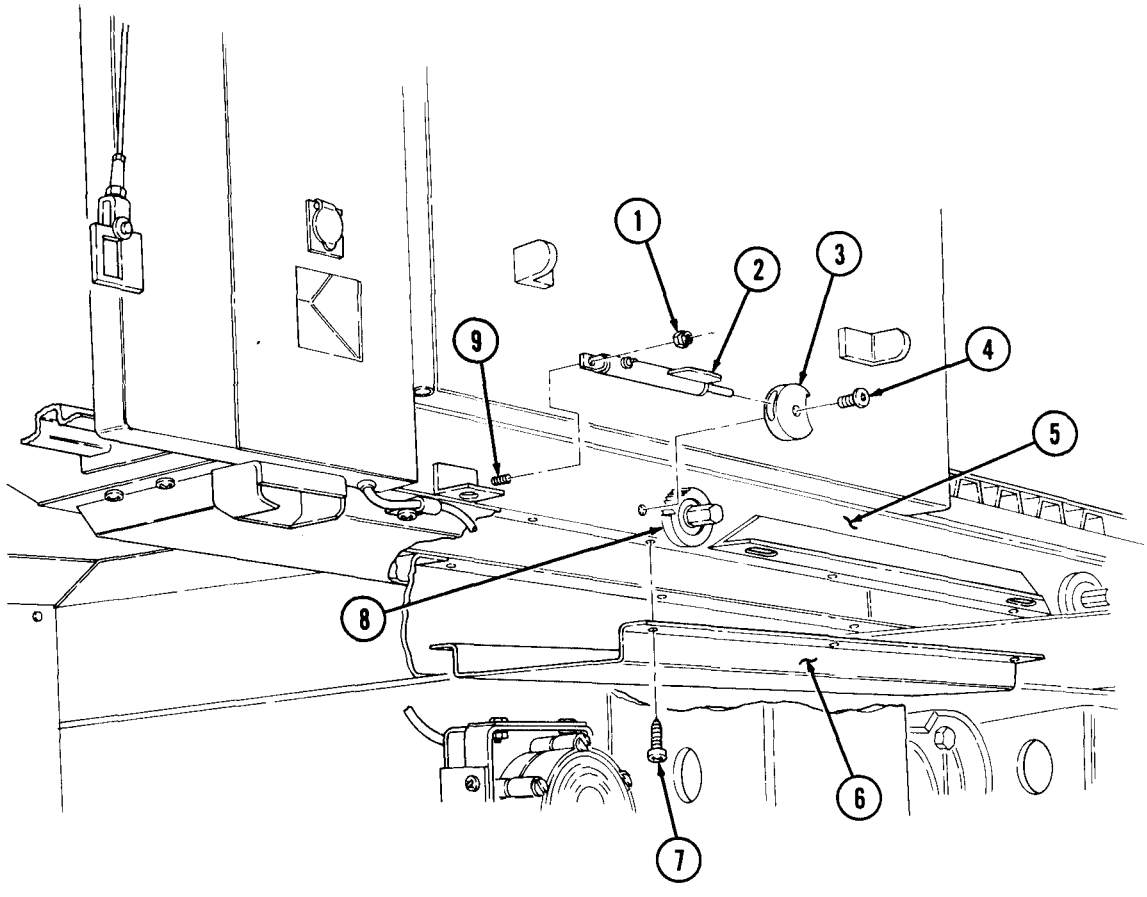
18.1-4. RETRACTABLE BEAM DRIVE SHAFT AND LOCK MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE • Bevel forward end of ratchet shaft for installation. • Coat two feet of forward end of ratchet shaft with GAA grease for installation. • Assistant under van body will install shaft components during shaft installation in step 14.	
14.		Ratchet shaft (7), four bushings (13), nine bushings (11), five spacers (10), sprocket assemblies (9), and spacers (8)	Slowly insert ratchet shaft (7) into underframe (6) and install.	
15.		Four setscrews (14)	Install in four bushings (13) in underframe channels (12).	
16.		Ratchet shaft (7)	Lubricate with GAA grease.	Refer to LO 9-2320-272-12.



18.1-4. RETRACTABLE BEAM DRIVE SHAFT AND LOCK MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.		Five covers (6)	Install on underframe (5) with thirty screws (7).	
18.		Pawl (3)	Install on ratchet (8) and underframe (5) with screw (4).	
19.		Lock (2)	Install on pawl (3).	
20.		Lock (2)	Install on underframe stud (9) with new locknut (1).	



END OF TASK!

18.1-5. RETRACTABLE BEAM REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Two locknuts
Three seals

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
TM 9-237

Equipment Condition	Reference
Parking brake set.	TM 9-2320-272-10
Van body sides fully expanded and secured.	TM 9-2320-272-10
Retractable beam rollers removed.	Para. 18.1-6
Retractable beam drive shaft and lock removed.	Para. 18.1-4

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

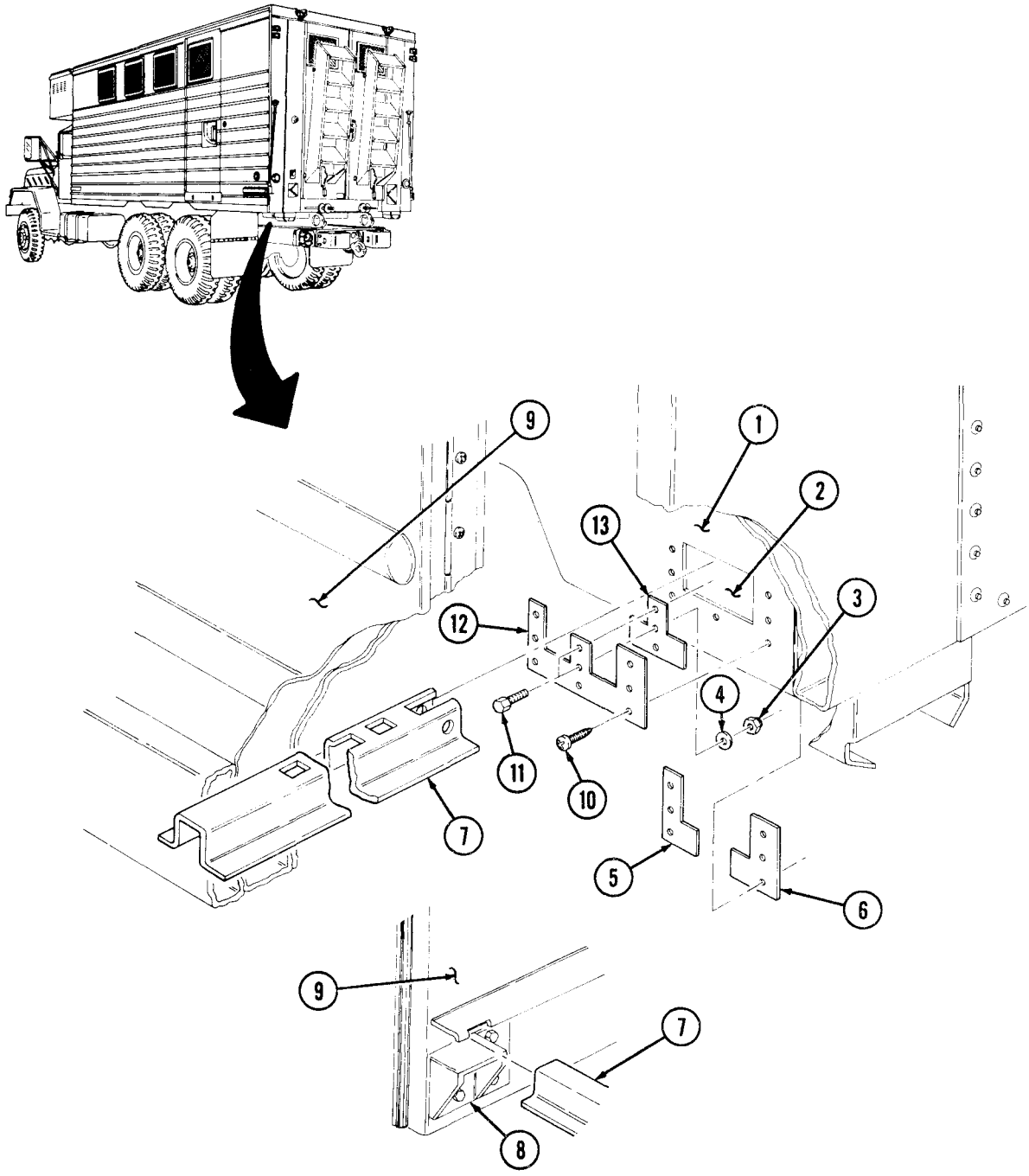
- All ten retractable beams are removed and installed the same way. This procedure covers the left-rear retractable beam.
- Retractable beams are replaced the same way on M934, M934A1, M935, and M935A1 vehicles. M934A1 vehicle is shown.

18.1-5. RETRACTABLE BEAM REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Side panel (9) at side panel support (8)	Retractable beam (7)	Break welds between side panel (9) and side panel support (8) and remove.	Refer to TM 9-237.
		CAUTION		
		Remove retractable beam slowly from underframe. Failure to do so may result in damage to equipment.		
2.	Underframe (1) at channel (2)	Retractable beam (7)	Slide under side panel (9) and remove.	
3.	Underframe (1)	Two locknuts (3), washers (4), screws (11), seven screws (10), retainer (12), and seals (13), (5), and (6).	Remove.	Discard locknuts (3) and seals (13), (5) and (6).
	b. Installation			
4.		New seals (6), (5), and (13) and retainer (12)	Install on underframe (1) with seven screws (10), two screws (11), washers (4), and new locknuts (3).	
		CAUTION		
		Install retractable beam slowly into underframe. Failure to do so may result in damage to equipment.		
5.		Retractable beam (7)	Slide under side panel (9) and install in underframe (1) at channel (2).	
6.		Retractable beam (7)	Install by welding beam (7) to side panel (9) and side panel support (8).	Refer to TM 9-237.

18.1-5. RETRACTABLE BEAM REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install retractable beam drive shaft and lock (para. 18. 1-4).
- Install retractable beam rollers (para. 18.1-6).
- Retract van body sides (TM 9-2320-272-10).

18.1-6. RETRACTABLE BEAM ROLLERS REPLACEMENT

This task covers:

a. Support Roller Removal
b. Support Roller Installation
c. End Roller Removal
d. End Roller Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Four cotter pins

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-10

Condition Description
Parking brake set.
Van body sides fully expanded and secured.

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE
The left-rear cover mentioned in tasks a. and b. has seven screws. All other roller covers have eight screws.

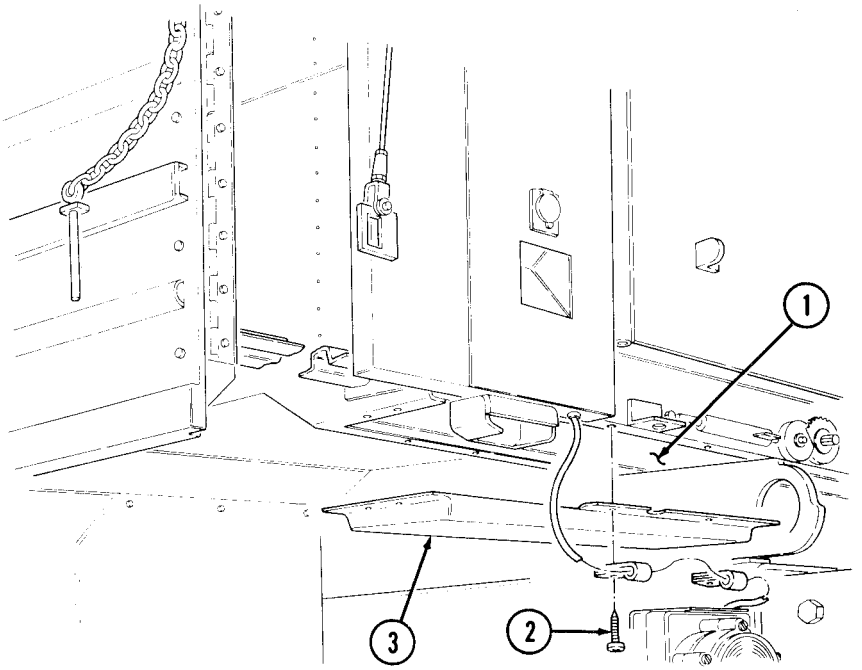
a. Support Roller Removal

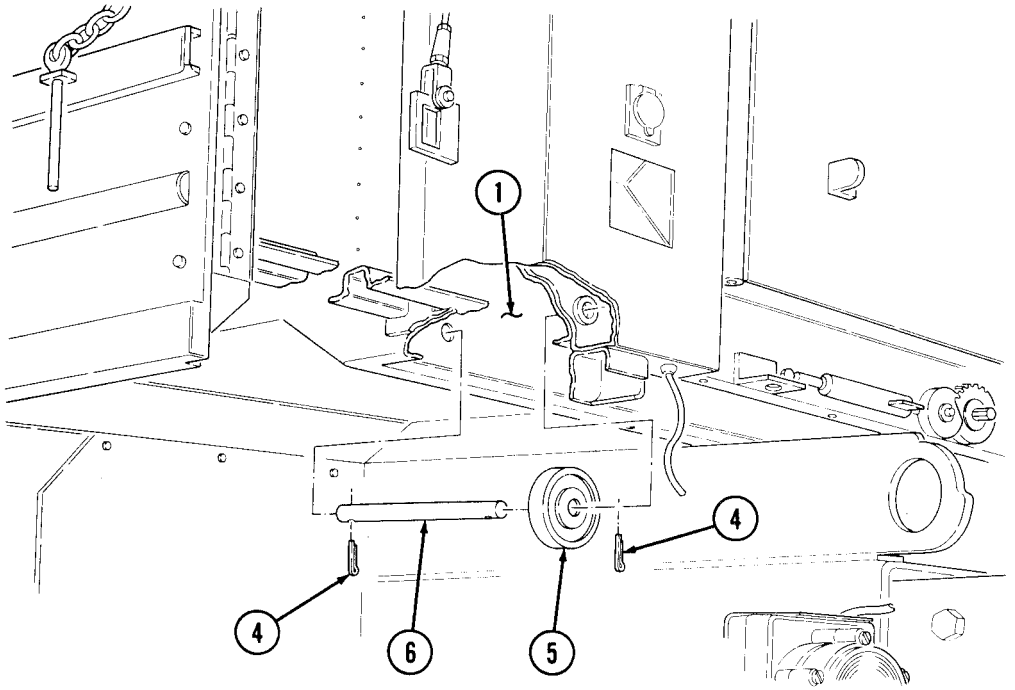
NOTE
All ten support rollers are removed the same way. This procedure covers the left-rear support roller.

1.	Underframe (1)	Seven screws (2) and cover (3)	Remove.	
2.	Support roller shaft (6)	Two cotter pins (4)	Remove.	Discard cotter pins (4).
3.	Under frame (1)	Support roller shaft (6) and support roller (5)	Remove.	

18.1-6. RETRACEABLE BEAM ROLLERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



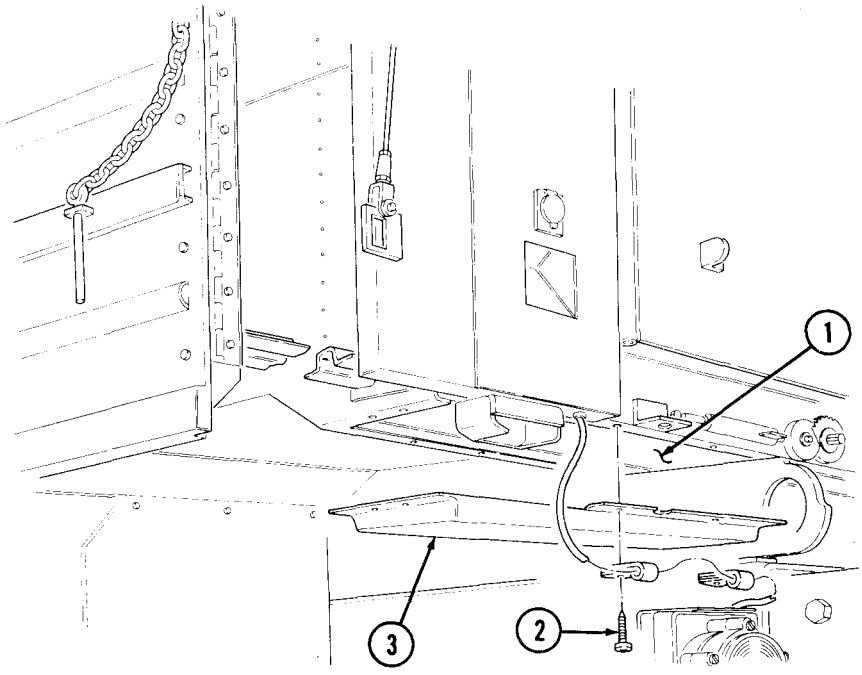


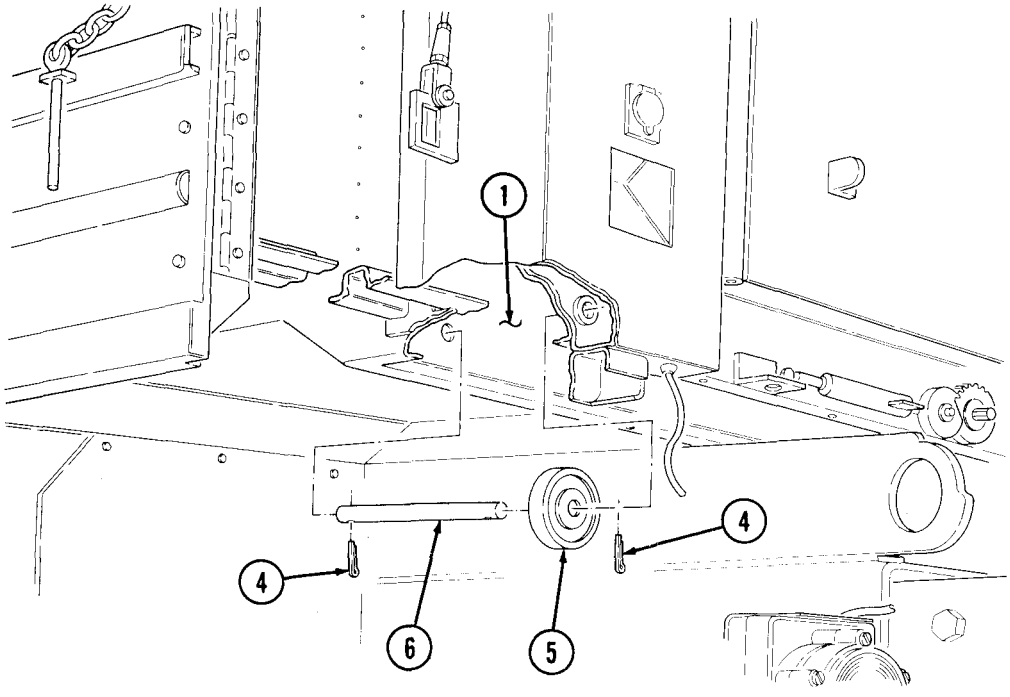
18.1-6. RETRACTABLE BEAM ROLLERS REPLACEMENT (Cont'd]

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Support Roller Installation			
		NOTE All ten support rollers are installed the same way. This procedure covers the left-rear support roller.		
4.		Support roller (5)	Install on underframe (1) with support roller	
5.		Two new cotter pins (4)	Install in support roller shaft (6).	
6.		Cover (3)	Install on underframe (1) with seven screws (2).	

18.1-6. RETRACTABLE BEAM ROLLERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



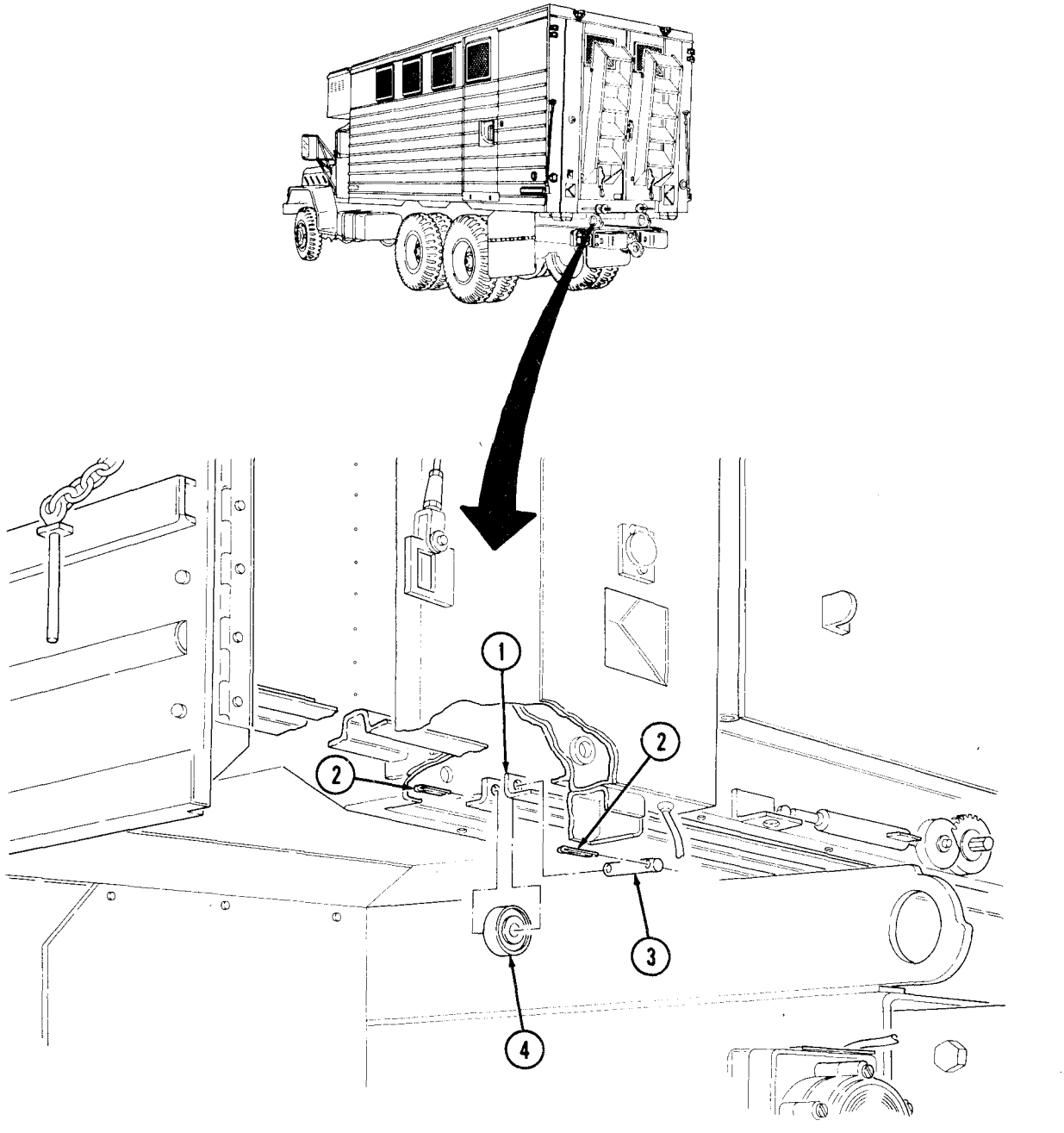


18.1-6 RETRACTABLE BEAM ROLLERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		c. End Roller Removal		
		NOTE All ten end rollers are removed the same way. This procedure covers the left-rear end roller.		
7.		Support roller	Remove.	Refer to task a.
8.	End roller shaft (3)	Two cotter pins (2)	Remove.	Discard cotter pins (2).
9.	Underframe (1)	End roller shaft (3) and end roller (4)	Remove.	
		d. End Roller Installation		
		NOTE All ten end rollers are installed the same way. This procedure covers the left-rear end roller.		
10.		End roller (4)	Install on underframe (1) with end roller shaft (3).	
11.		Two new cotter pins (2)	Install in end roller shaft (3).	
12.		Support roller	Install.	Refer to task b.

18.1-6. RETRACTABLE BEAM ROLLERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Retract van body sides (TM 9-2320-272-10).

18.1-7. REAR DOORS MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Three cotter pins
Two locknuts
Six lockwashers
Gasket
Ten rivets
Weatherseal
Two seals
Sealing compound (Appendix C, Item 37)
Adhesive (Appendix C, Item 1)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
TB 43-0213

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Ladders removed. (M934, M934A1)
TM 9-2320-272-10	Liftgate lowered (M935, M935A1).
TM 9-2320-272-20-2	Rear door window removed.

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Left and right rear doors are removed the same way. This procedure covers the left rear door.		
1.	Van body (2) at door check (1)	Cotter pin (6) and retaining pin (3)	Remove.	Discard cotter pin (6).
2.	Van body (2)	Fifteen screws (4) and door (5)	Remove.	

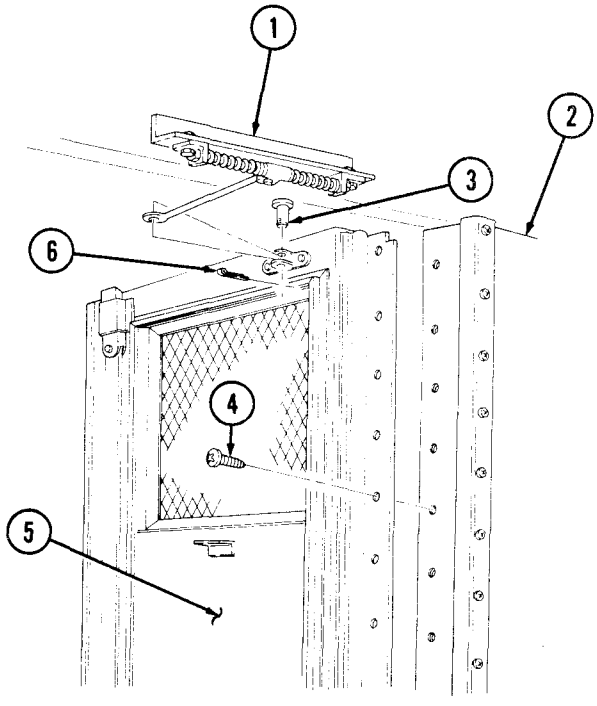
18.1-7. REAR DOORS MAINTENANCE (Cont'd)

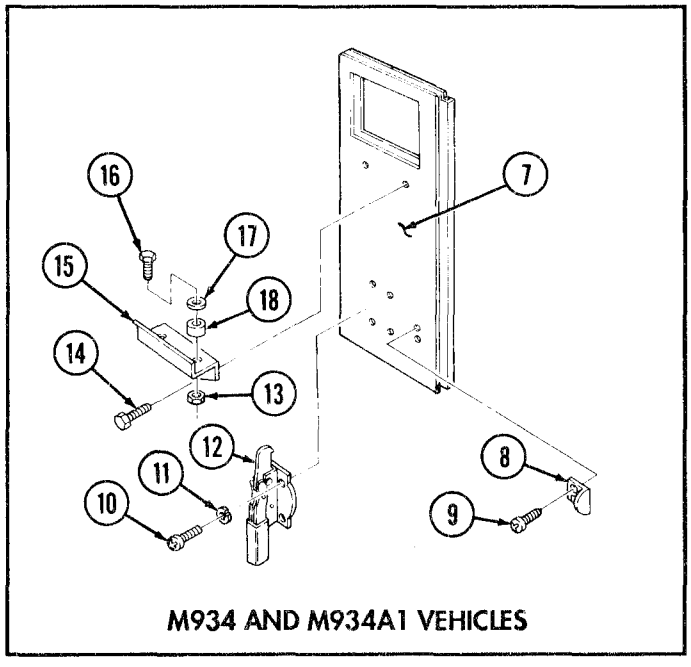
STEP NO.	LOCATION	ITEM	ACTION	
	b. Disassembly			

NOTE

- Left and right rear doors are disassembled the same way except. where indicated. Left door is shown.
- Steps 3 through 5 apply to M934 and M934A1 vehicles.

3.	Outer panel (7)	Two screws (9) and angle brackets (8)	Remove.	
4.		Four screws (10), lock-washers (11), and clamp (12)	Remove.	Discard lockwashers (11)
5.		Four screws (14), two screws (16), washers (17), bushings (18), locknuts (13), and rack (15)	Remove.	Discard locknuts (13).





M934 AND M934A1 VEHICLES

18.1-7. REAR DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Door frame (14)	Seven rivets (23) and seal (22)	Remove.	Discard rivets (23).
		NOTE Step 7 applies to left rear door.		
7.	Inner panel (26)	Four screws (15), clip (16), six screws (17), and bracket (19)	Remove.	
		NOTE Step 8 applies to right rear door.		
8.	Outer panel (24)	Three rivets (35), handle (34), and gasket (33)	Remove.	Discard gasket (33) and rivets (35).
9.	Center case (18) and two bolt and case assemblies (4)	Two cotter pins (10), screws (6), lockwashers (7), and rods (8)	Remove.	Discard cotter pins (10) and lockwashers (7).
10.	Center case (18)	Pins (12) and (13) and handle (11)	Remove.	
11.	Inner panel (26)	Four screws (9) and center case (18)	Remove.	
12.		Eight screws (5), two bolt and case assemblies (4), and spacer plates (3)	Remove.	
13.	Door frame (14)	Sixteen screws (31), retainer (30), seal (29), hinge (28), and seal (27)	Remove.	Discard seals (27) and (29).
14.	Inner panel (26)	Moldings (l), (2), and (32)	Break adhesive seal and remove.	
		NOTE Steps 15 and 16 apply to left rear door.		
15.	Door frame (14)	Weatherseal (25)	Break adhesive seal and remove.	Discard weatherseal (25).
16.		Thirty-five screws (20) and molding (21)	Remove.	

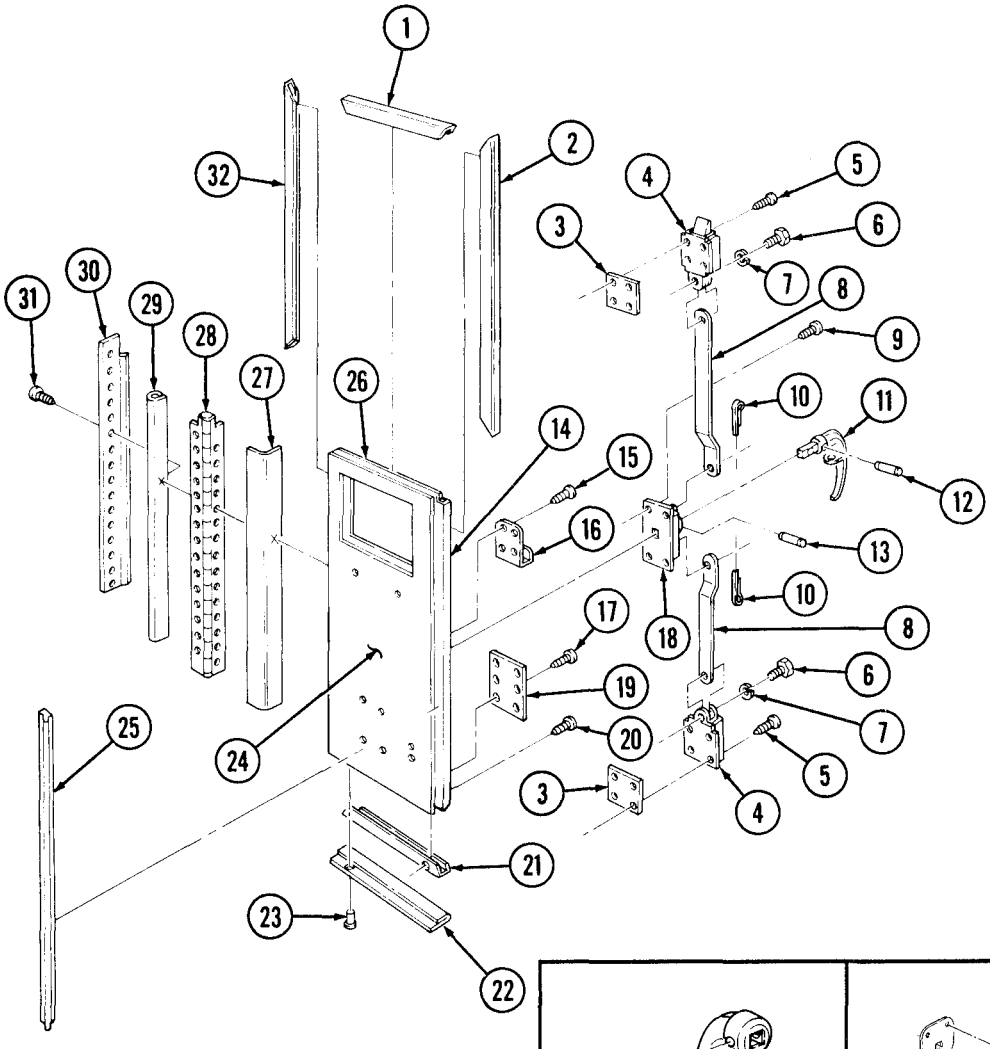
18.1-7. REAR DOORS MAINTENANCE (Cont'd)

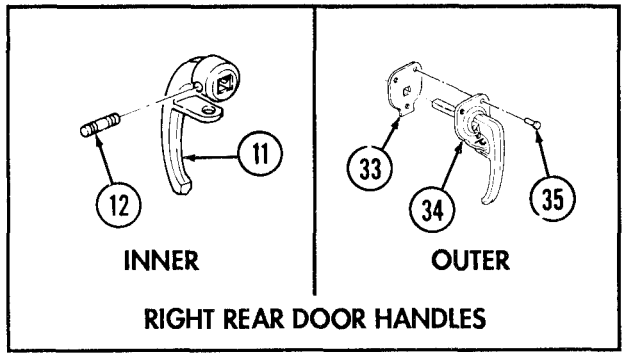
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Step 17 applies to right rear door.

17.		Thirty-four screws (20) and molding (21)	Remove.



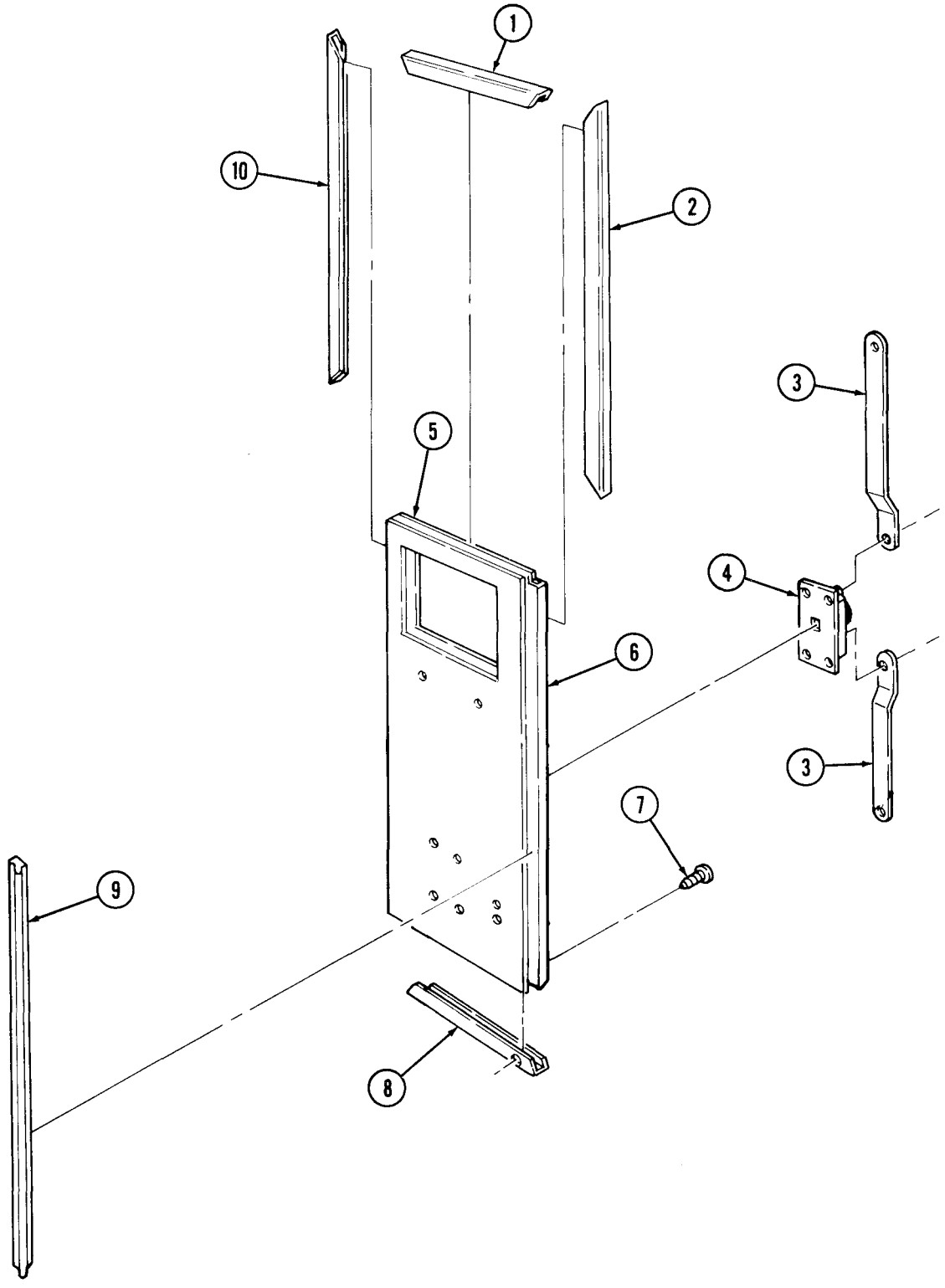


18.1-7. REAR DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Cleaning and Inspection			
18.		All parts	Clean.	Refer to para. 2-7.
19.		Center case (4)	Inspect all movable parts for proper operation.	Replace if damaged.
20.		Rods (3)	Inspect for breaks and bends.	Replace if damaged.
21.		Moldings (1), (2), (8), and (10)	Inspect for cracks and bends.	Replace if damaged.
	d. Assembly			
22.		All inside surfaces and boxed-in areas	Rustproof.	Refer to TB 43-0213.
	NOTE • Apply sealing compound between exterior joints. • Apply adhesive to rubber and metal surfaces for installation. • Step 23 applies to right rear door.			
23.		Molding (8)	Install on door frame (6) with thirty-four screws (7).	
	NOTE Steps 24 and 25 apply to left rear door.			
24.		Molding (8)	Install on door frame (6) with thirty-five screws (7).	
25.		New weatherseal (9)	Install on door flame (6) with adhesive.	
26.		Moldings (1), (2), and (10)	Install on inner panel (5) with adhesive.	

18.1-7. REAR DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

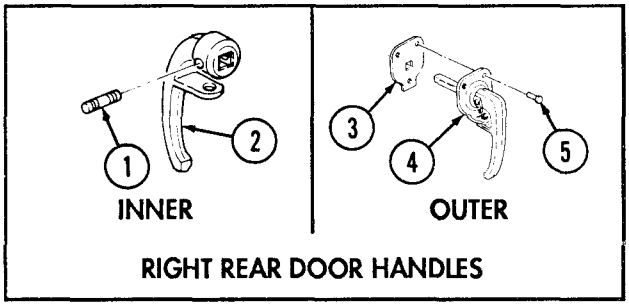


18.1-7. REAR DOORS MAINTENANCE (Cont'd)

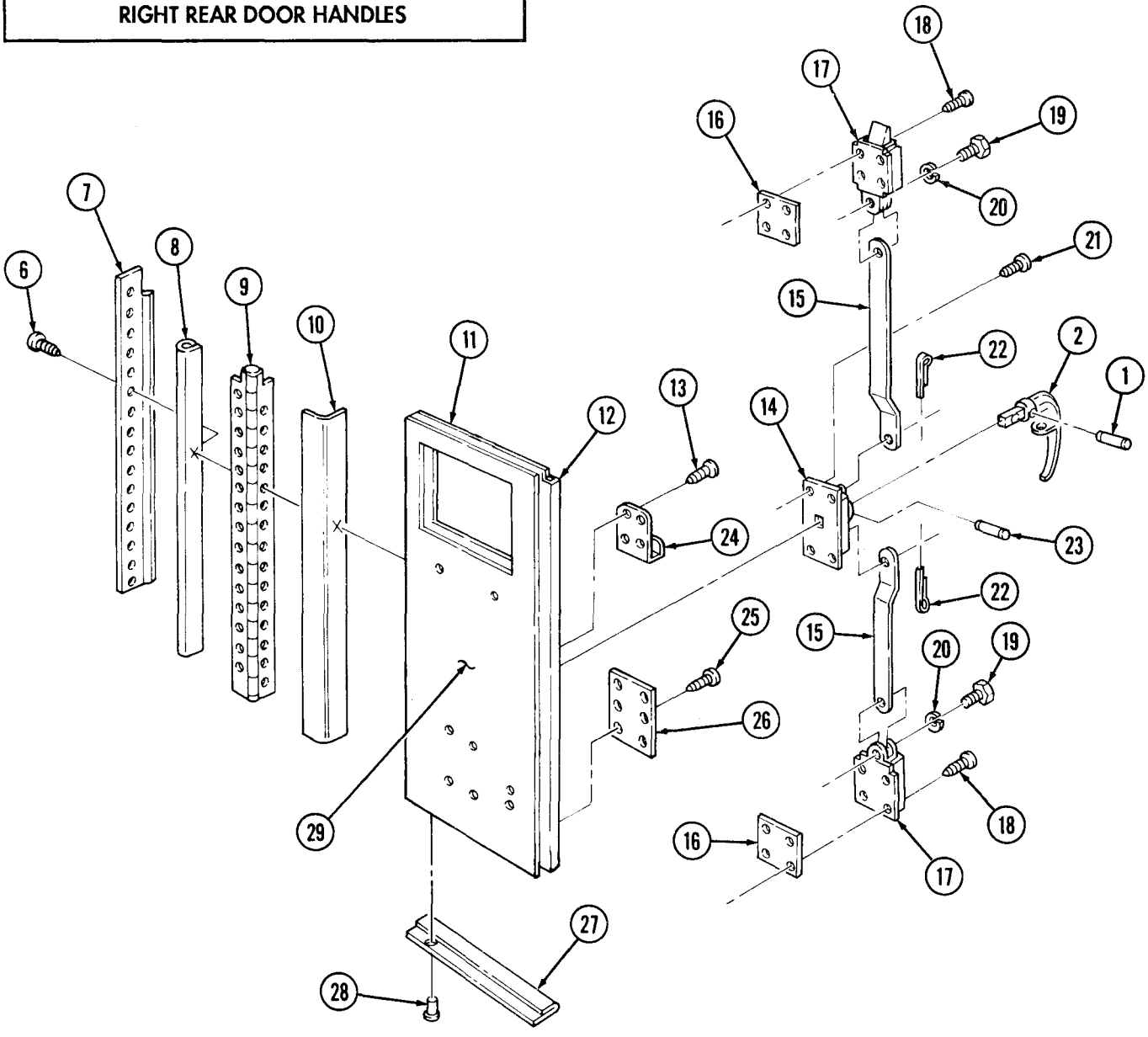
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
27.		New seal (10), hinge (9), new seal (8), and retainer (7)	Install on door frame (12) with sixteen screws (6).	
28.		Two spacer plates (16) and bolt and case assemblies (17)	Install on inner panel (11) with eight screws (18).	
29.		Center case (14)	Install on inner panel (11) with four screws (21).	
30.		Handle (2)	Install on center case (14) with pins (1) and (23).	
31.		Two rods (15)	Install on center case (14) and two bolt and case assemblies (17) with two new cotter pins (22), screws (19), and new lockwashers (20).	
		NOTE Step 32 applies to right rear door.		
32.		New gasket (3) and handle (4)	Install on outer panel (29) with three new rivets (5).	
		NOTE Step 33 applies to left rear door.		
33.		Clip (24) and bracket (26)	Install on inner panel (11) with four screws (13) and six screws (25).	
34.		Seal (27)	Install on door frame (12) with seven new rivets (28).	

18.1-7. REAR DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



RIGHT REAR DOOR HANDLES

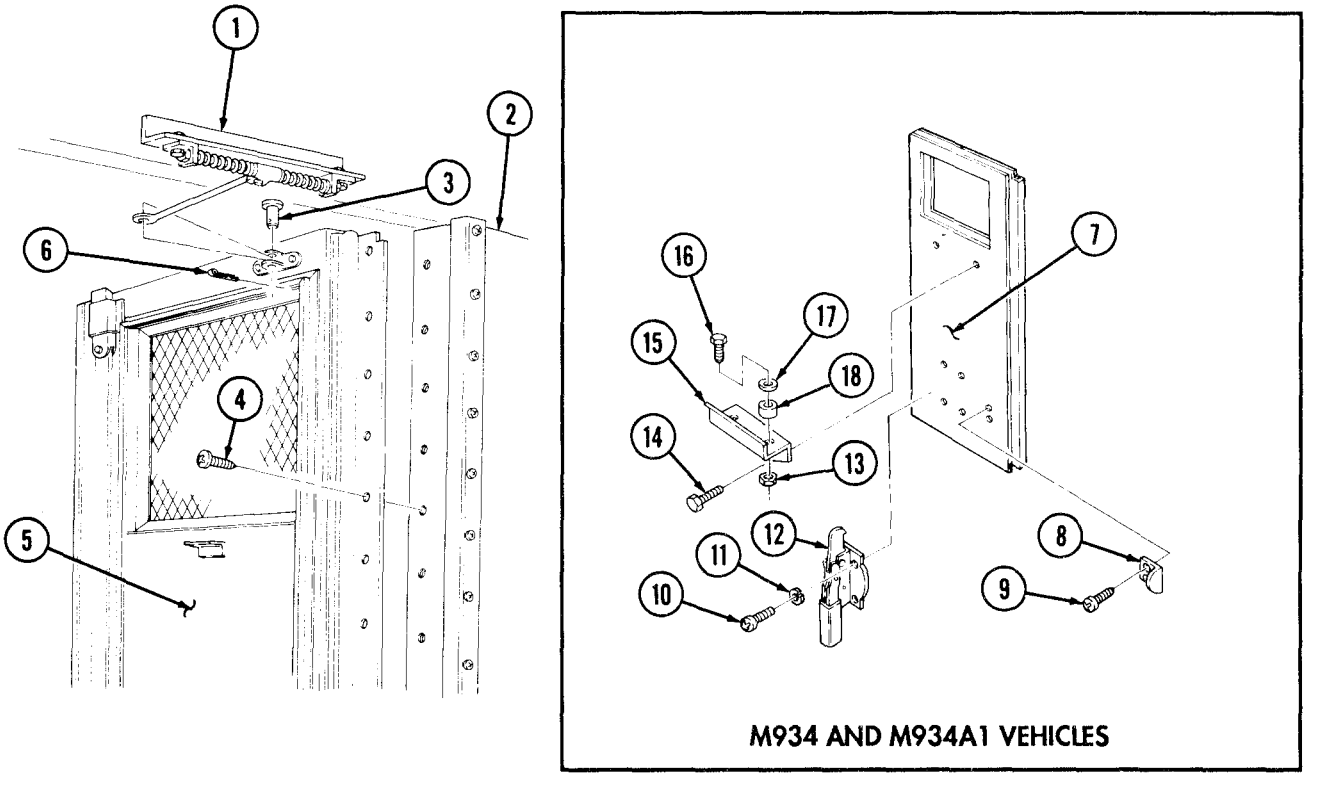


18.1-7. REAR DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Steps 35 through 37 apply to M934 and M934A1 vehicles.		
35.		Rack (15)	Install on outer panel (7) with four screws (14), two screws (16), washers (17), bushings (18), and new locknuts (13).	
36.		Clamp (12)	Install on outer panel (7) with four screws (10) and new lockwashers (11).	
37.		Two angle brackets (8)	Install on outer panel (7) with two screws (9).	
		e. Installation		
		NOTE • Left and right rear doors are installed the same way. This procedure covers the left rear door. • Mine holes of door hinge with holes in van body for installation. • Assistant will help with step 38.		
38.		Door (5)	Install on van body (2) with fifteen screws (4).	
39.		Door (5)	Install on door check (1) with retaining pin (3) and new cotter pin (6).	

18.1-7. REAR DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



M934 AND M934A1 VEHICLES

END OF TASK!

FOLLOW-ON TASKS:
- Install rear door window (TM 9-2320-272-20-2).
- Install ladders (M934, M934A1) (TM 9-2320-272-10).
- Raise liftgate (M935, M935A1) (TM 9-2320-272-10).

18.1-8. SIDE DOORS MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Three cotter pins
Four lockwashers
Nineteen rivets
Gasket
Two seals
Adhesive (Appendix C, Item 1)
Sealing compound (Appendix C, Item 37)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
TB 43-0213

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Van body sides fully expanded and secured.
TM 9-2320-272-20-2	Side door window removed.

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE
Left and right side doors are maintained the same way on M934, M935, M934A1, and M935A1 vehicles. This procedure covers the left side door on a M934A1 vehicle.

a. Removal

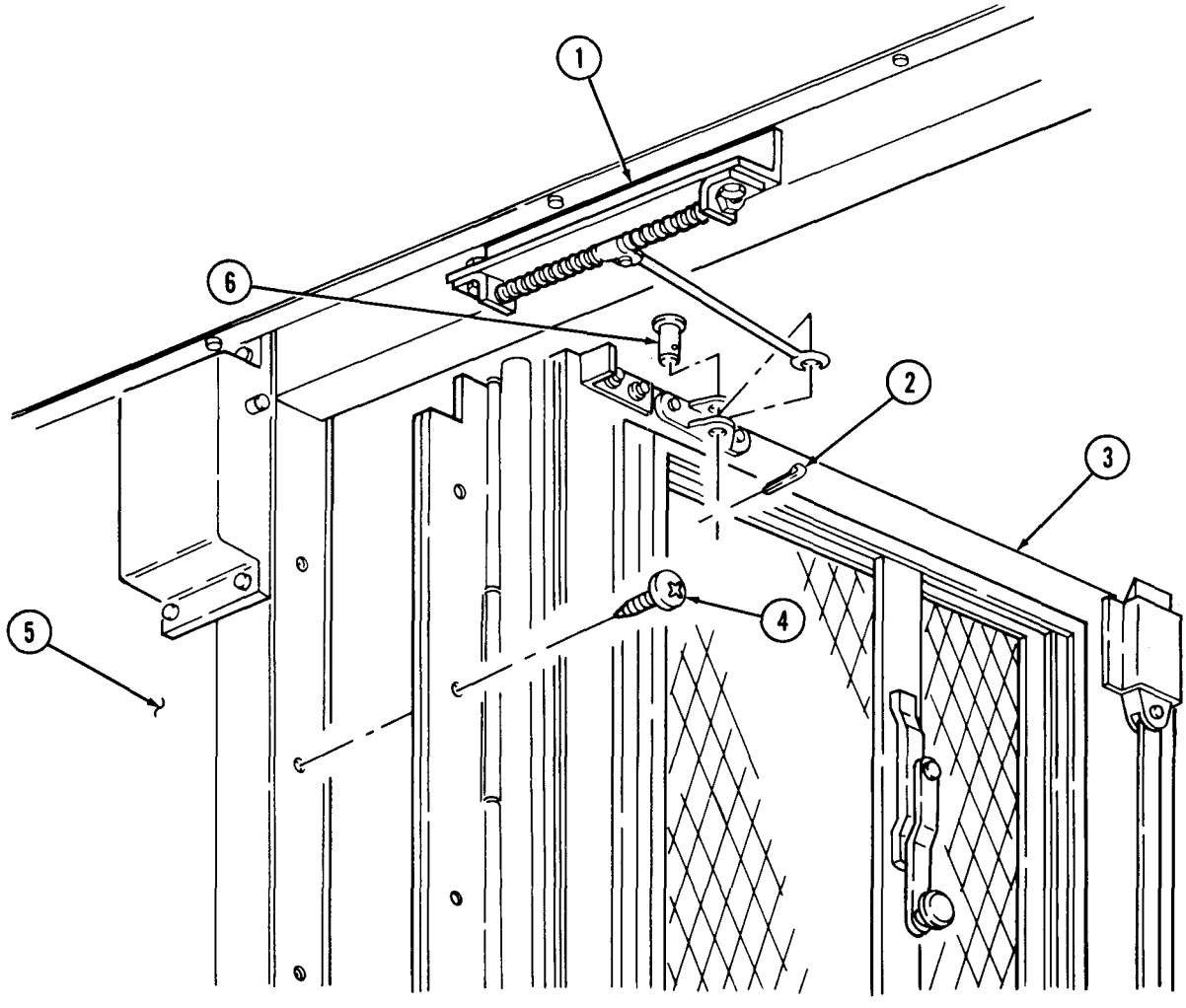
1.	Door check (1)	Cotter pin (2) and retaining pin (6)	Remove.	Discard cotter pin (2).

NOTE
Assistant will help with step 2.

2.	Side panel (5)	Fifteen screws (4) and door (3)	Remove.	

18.1-8. SIDE DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

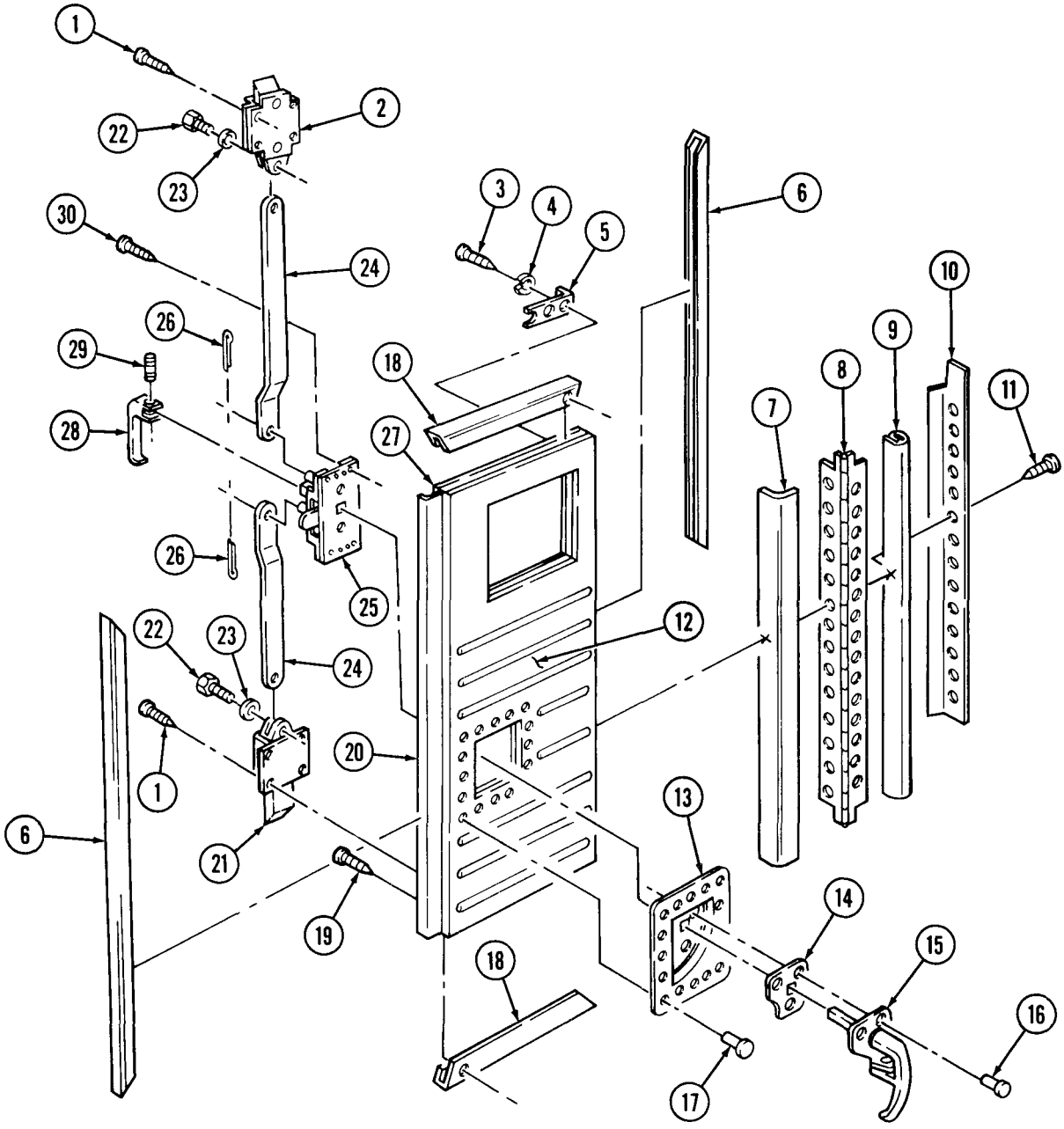


18.1-8. SIDE DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Disassembly			
3.	Pocket (13) at outer panel (12)	Three rivets (16), handle (15), and gasket (14)	Remove.	Discard rivets (16) and gasket (14).
4.	Outer panel (12)	Sixteen rivets (17) and pocket (13)	Remove.	Discard rivets (17).
5.	Center case (25) and bolt and case assemblies (2) and (21)	Two cotter pins (26), screws (22), lockwashers (23), and rods (24)	Remove.	Discard cotter pins (26) and lockwashers (23).
6.	Center case (25)	Pin (29) and handle (28)	Remove.	
7.	Inner panel (27)	Four screws (30) and center case (25)	Remove.	
8.		Eight screws (1) and bolt and case assemblies (2) and (21)	Remove.	
9.	Door frame (20)	Fourteen screws (11), molding (10), seal (9), hinge (8), and seal (7)	Remove.	Discard seals (7) and (9).
10.	Inner panel (27)	Two moldings (6)	Break adhesive seal and remove.	
11.		Two screws (19), screws (3), lockwashers (4), strike (5), and two moldings (18).	Remove.	Discard lockwashers (4).
	c. Cleaning and Inspection			
12.		All parts	Clean.	Refer to para. 2-7.
13.		Center case (25) and bolt and case assemblies (2) and (21)	Inspect all movable parts for proper operation.	Replace if damaged.
14.		Rods (24)	Inspect for breaks and bends.	Replace if damaged.
15.		Moldings (6) and (18) and pocket (13)	Inspect for cracks and bends.	Replace if damaged.
16.		Outer panel (12), door frame (20), and inner panel (27)	Inspect for damage.	Replace entire door assembly if any part of assembly is damaged.

18.1-8. SIDE DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

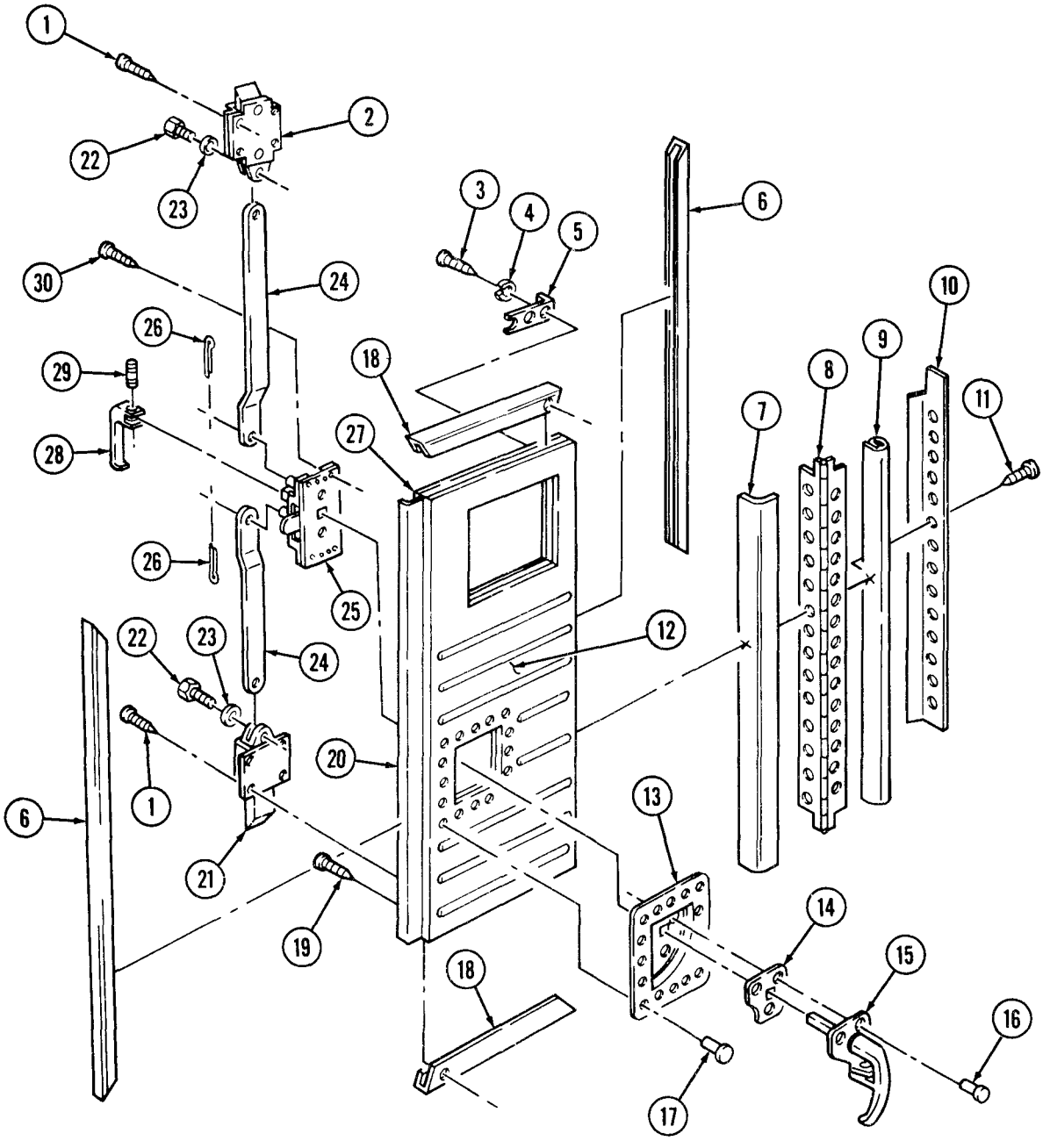


18.1-8. SIDE DOORS MAINTENANCE (Cont'd]

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Assembly				
17.		All inside surfaces and boxed-in areas.	Rustproof.	Refer to TB 43-0213.
		NOTE Apply sealing compound to exterior joints for installation.		
18.		Two moldings (18)	Install on inner panel (27) with two screws (19), screws (3), new lockwashers (4), and strike (5).	
19.		Two moldings (6)	Install on inner panel (27) with adhesive.	
20.		New seal (7), hinge (8), new seal (9), and molding (10)	Install on door frame (20) with fourteen screws (11).	
21.		Bolt and case assemblies (2) and (21)	Install on inner panel (27) with eight screws (1).	
22.		Center case (25)	Install on inner panel (27) with four screws (30).	
23.		Two rods (24)	Install on center case (25) and bolt and case assemblies (2) and (21) with two new cotter pins (26), new lockwashers (23), and screws (22).	
24.		Pocket (13)	Install on outer panel (12) with sixteen new rivets (17).	
25.		New gasket (14) and handle (15)	Install on outer panel (12) and pocket (13) with three new rivets (16).	
26.		Handle (28)	Install on center case (25) and handle (15) with pin (29).	

18.1-8. SIDE DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



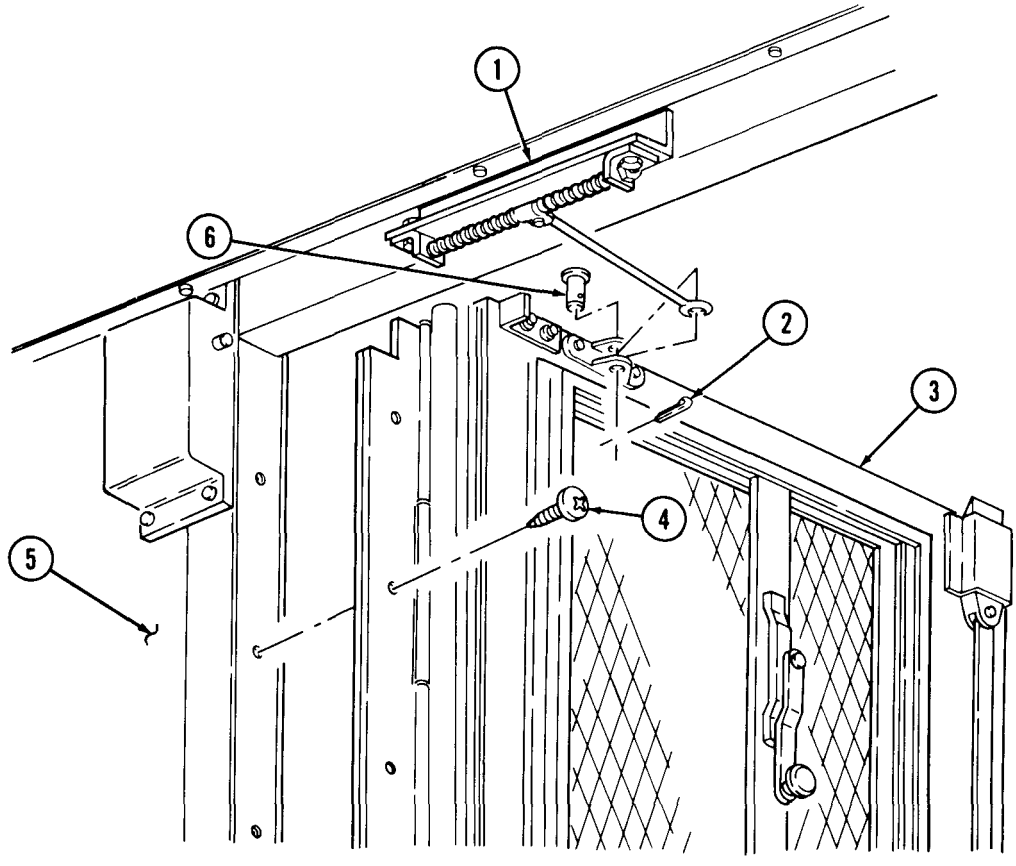
18.1-8. SIDE DOORS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

e. Installation

NOTE
Assistant will help with step 27.

27.		Door (3)	Install on side panel (5) with fifteen screws (4).
28.		Door (3)	Install on door check (1) with retaining pin (6) and new cotter pin (2).



END OF TASK!

FOLLOW-ON TASKS: • Install side door window (TM 9-2320-272-20-2).
• Retract van body sides (TM 9-2320-272-10).

18.1-9. UNDERFRAME PARTS REPLACEMENT

This task covers:

a. Underframe Parts Removal **b. Underframe Parts Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materials/Parts
Eight lockwashers
Two seals
Thirty-two rivets
Sealing compound (Appendix C, Item 37)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manuel References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

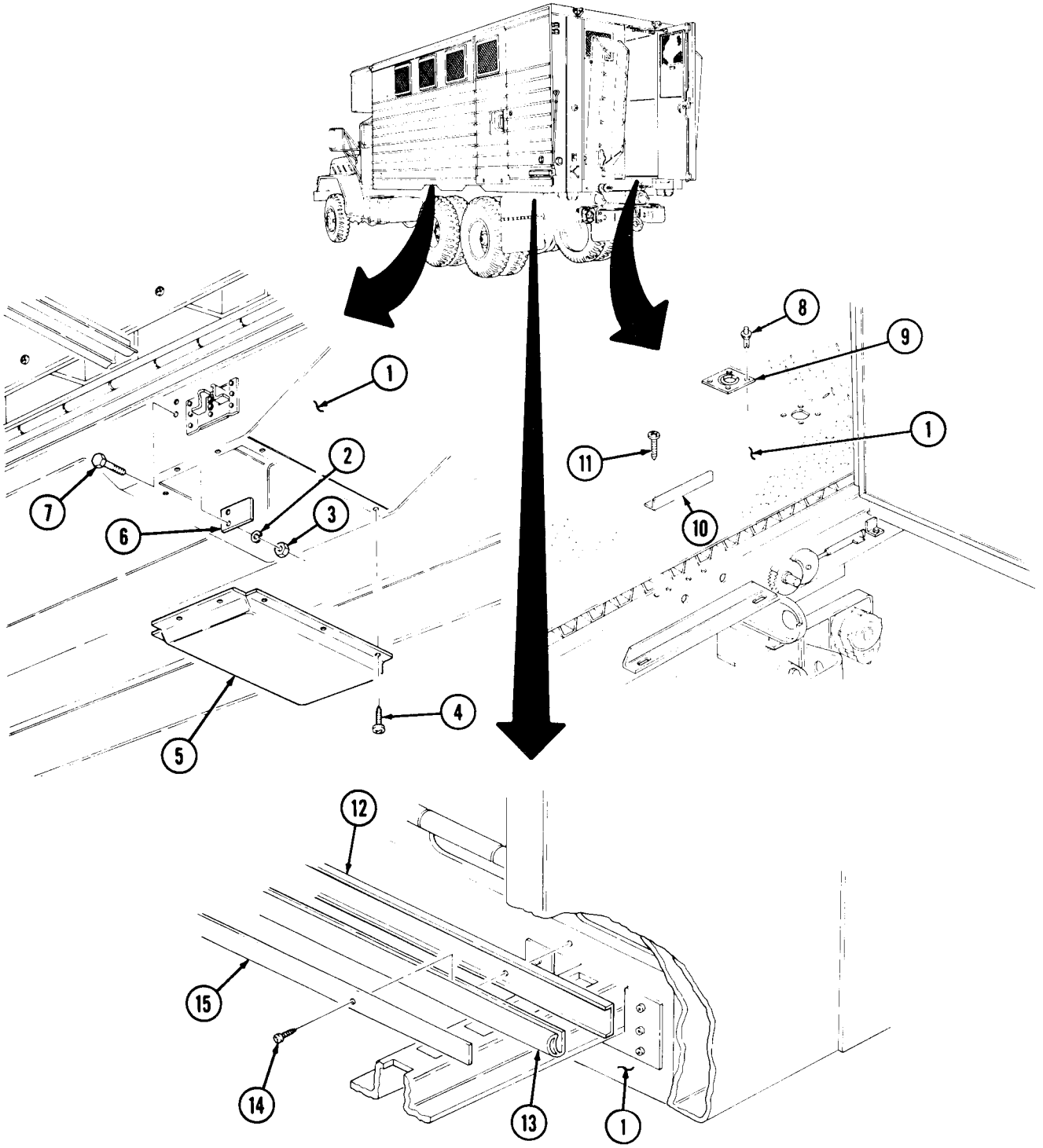
Underframe parts are removed and installed the same way on M934, M935, M934A1, and M935A1 vehicles. This procedure covers parts replacement on a M934A1 vehicle.

18.1-9. UNDERFRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Underframe Parts Removal			
		NOTE Assistant will help with step 1.		
1.	Underframe (1)	One hundred thirty-eight screws (14), two retainers (15), channels (12), and seals (13)	Remove.	Discard seals (13).
2.		Thirty-two screws (4) and four covers (5)	Remove.	
3.		Eight screws (7), nuts (3), lockwashers (2), and four plates (6)	Remove.	Discard lockwashers (2).
4.		Thirty-two rivets (8) and eight tiedowns (9)	Remove.	Discard rivets (8).
5.		Four screws (11) and angle bracket (10)	Remove.	
	b. Underframe Parts Installation			
6.		Angle bracket (10)	Install on underframe (1) with four screws (11).	
7.		Eight tiedowns (9)	Install on underframe (1) with thirty-two new rivets (8).	
8.		Four plates (6)	Install on underframe (1) with eight screws (7), new lockwashers (2), and nuts (3).	
9.		Four covers (5)	Install on underframe (1) with thirty-two screws (4).	
		NOTE Apply sealing compound to exterior joints for installation.		
10.		Two retainers (15), channels (12), and new seals (13)	Install on underframe (1) with one hundred thirty-eight screws (14).	

18.1-9. UNDERFRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

18.1-10. HINGED FLOOR MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Teals
None

Materials/Parts
Fifty-six rivets
Five seals
Adhesive tape (Appendix C, Item 39)
sealing compound (Appendix C, Item 37)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
TM 9-237

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Van body sides fully expanded and secured.
TM 9-2320-272-10	Hinged end panel opened.
TM 9-2320-272-20-2	Counterbalance removed.

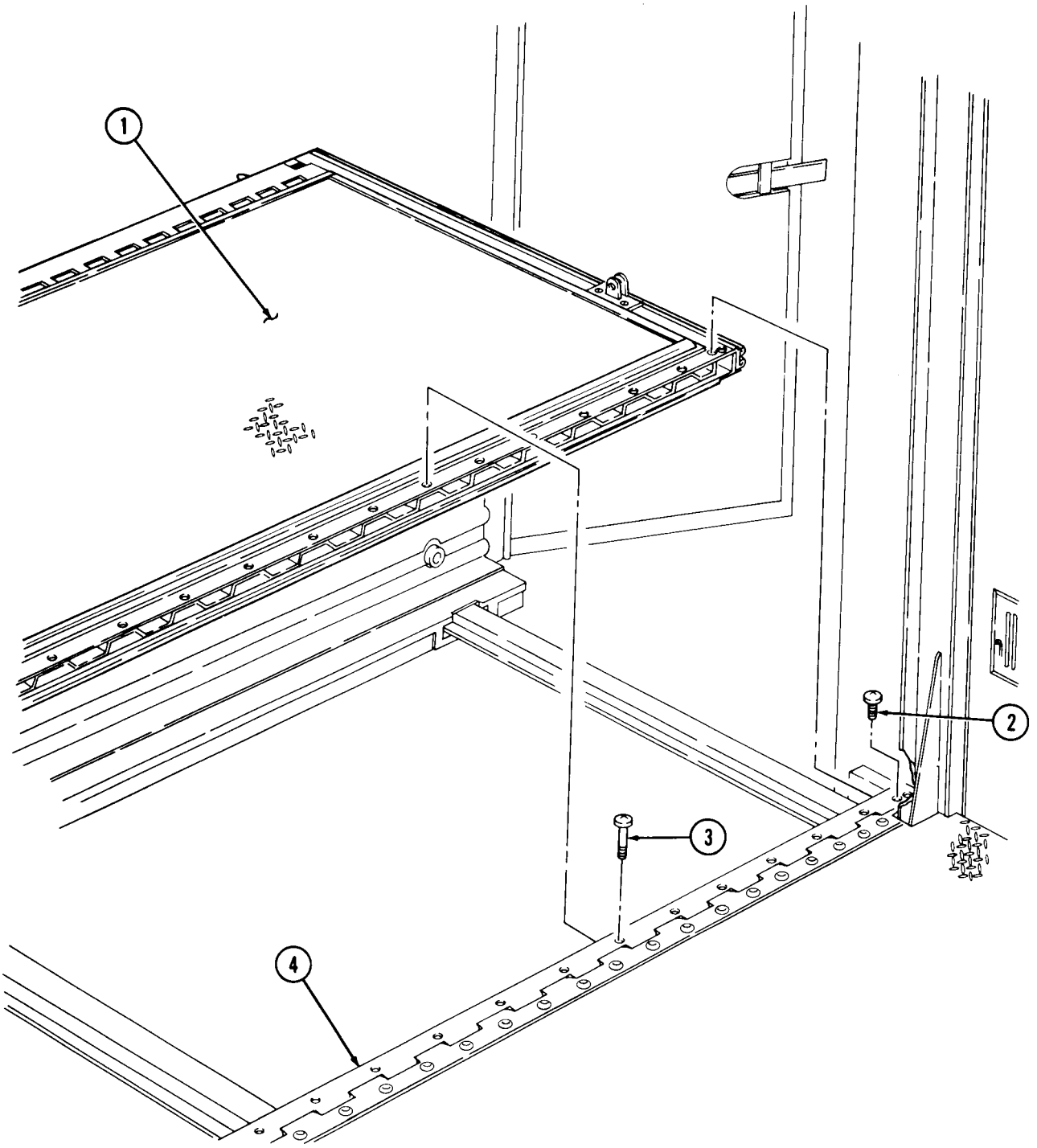
Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE • Left and right hinged floors are removed the same way. This procedure covers the left hinged floor. • Assistant will help with step 1.		
1.	Hinge (4)	Fifty-five screws (3), four screws (2), and hinged floor (1)	Remove.	

18.1-10. HINGED FLOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

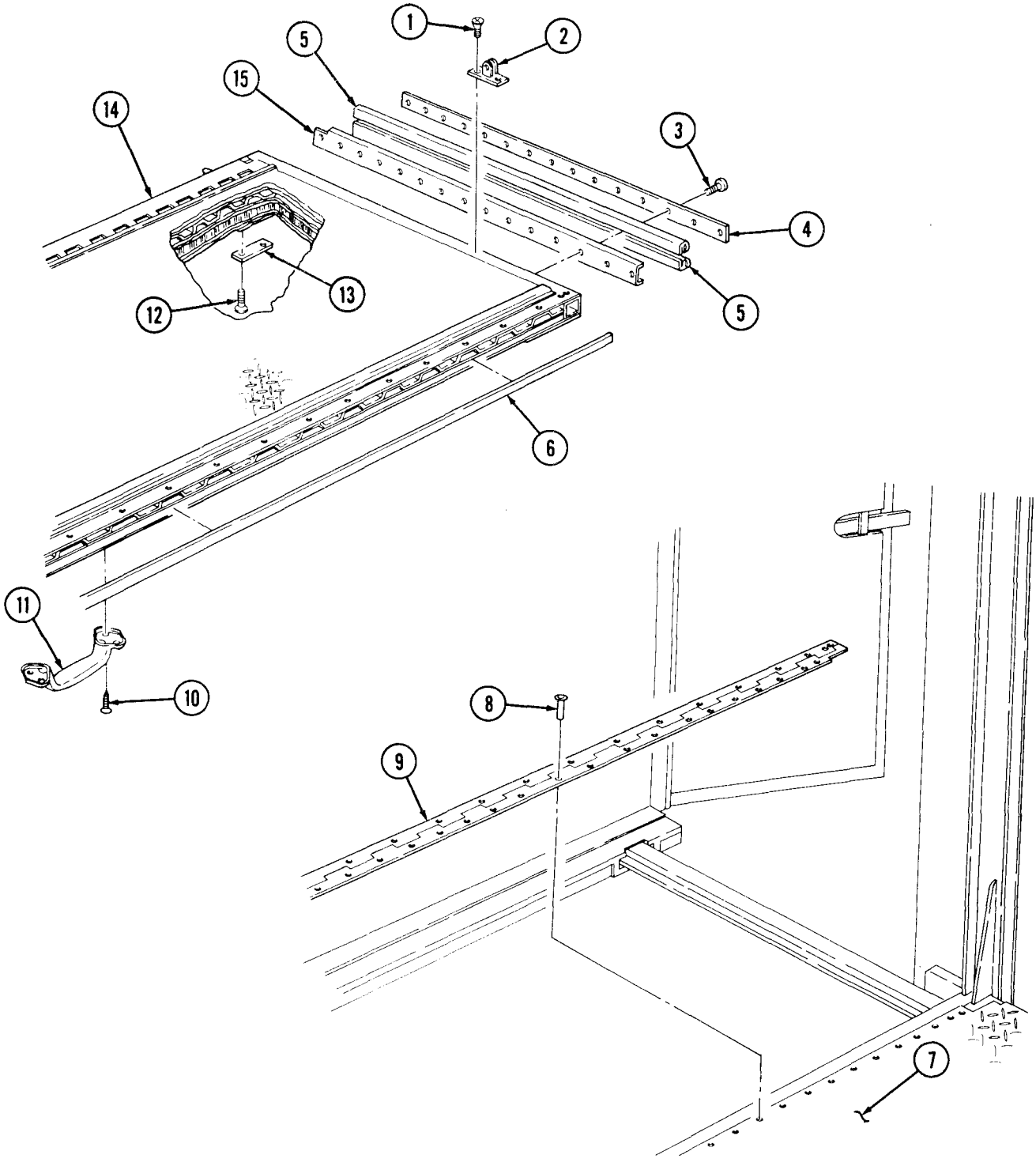


18.1-10. HINGED FLOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Disassembly			
		NOTE Left and right hinged floors are disassembled the same way. This procedure covers the left hinged floor.		
2.	Hinged floor (14)	Four screws (1) and two pivots (2)	Remove.	
3.		Thirty screws (3), two retainers (4), four seals (5), and two channels (15)	Remove.	Discard seals (5).
4.		Ten screws (12) and five pads (13)	Remove.	
5.		Four screws (10) and handle (11)	Remove.	
6.		Seal (6)	Remove.	Discard seal (6).
		NOTE Perform step 7 only if hinge is to be replaced. See task c.		
7.	Underframe (7)	Fifty-six rivets (8) and hinge (9)	Remove.	Discard rivets (8).
	c. Cleaning and Inspection			
8.		All parts	Clean.	Refer to para. 2-7.
9.		Hinged floor (14)	Inspect for cracked, broken, and torn floor plates	Replace if damaged. Refer to TM 9-237.
10.		Retainers (4) and channels (15)	Inspect for bends and breaks.	Replace if bent or broken.
11.		Hinge (9)	Inspect for breaks, cracks, and smooth operation.	Replace if damaged.

18.1-10. HINGED FLOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

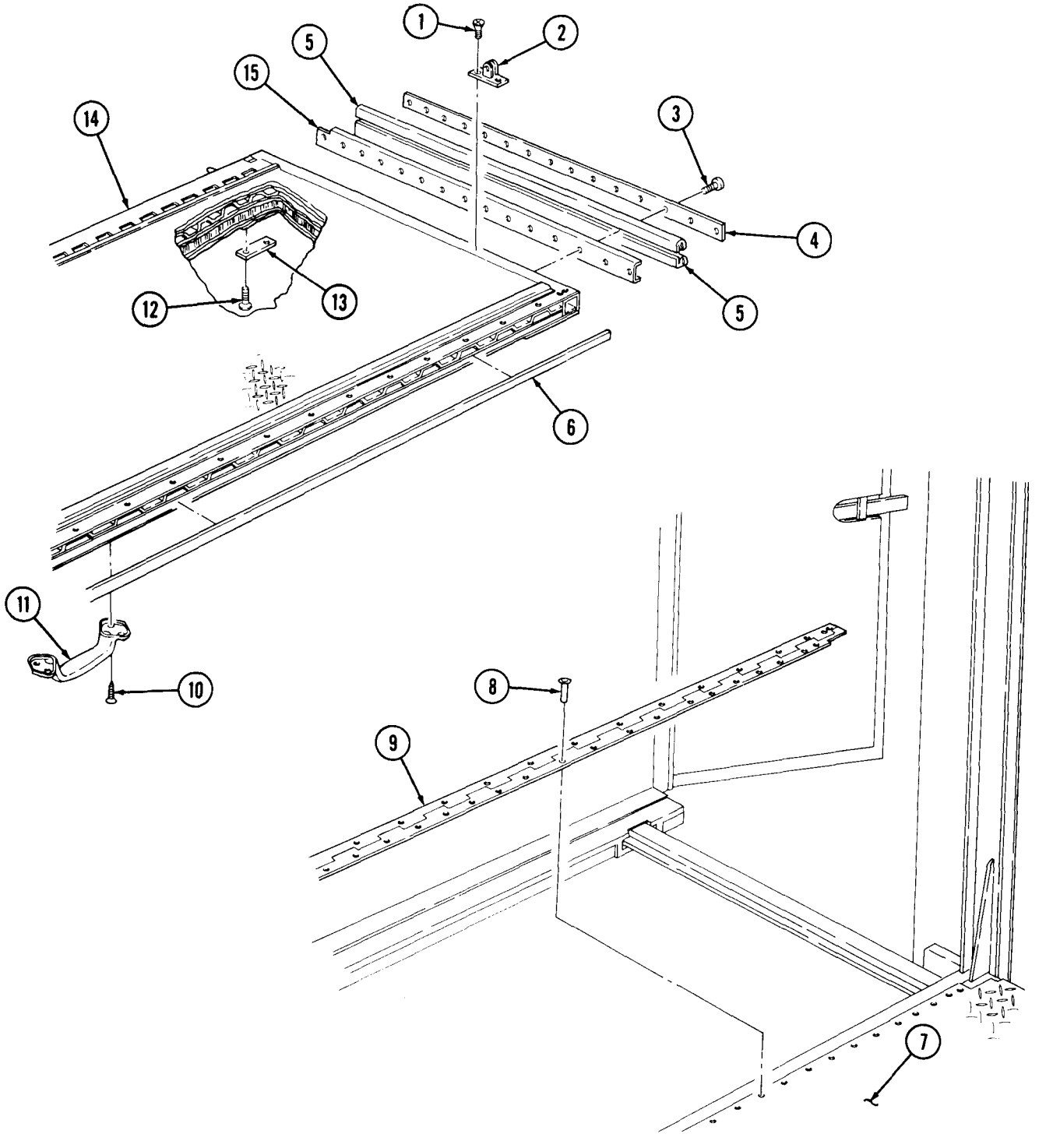


18.1-10. HINGED FLOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	d. Assembly			
		NOTE • Left and right hinged floors are assembled the same way. This procedure covers the left hinged floor. • Seal exterior joints with sealing compound for installation. • Insulate exterior joints and areas of metal-to-metal contact with adhesive tape. • Perform step 12 only if hinge is to be replaced.		
12.		Hinge (9)	Install on underframe (7) with fifty-six new rivets (8).	
13.		New seal (6)	Install on hinged floor (14).	
14.		Handle (11)	Install on hinged floor (14) with four screws (10).	
15.		Five pads (13)	Install on hinged floor (14) with ten screws (12).	
16.		Two channels (15), four new seals (5), and two retainers (4)	Install on hinged floor (14) with thirty screws (3).	
17.		Two pivots (2)	Install on hinged floor (14) with four screws (1).	

18.1-10. HINGED FLOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-10. HINGED FLOOR MAINTENANCE (Cont'd)

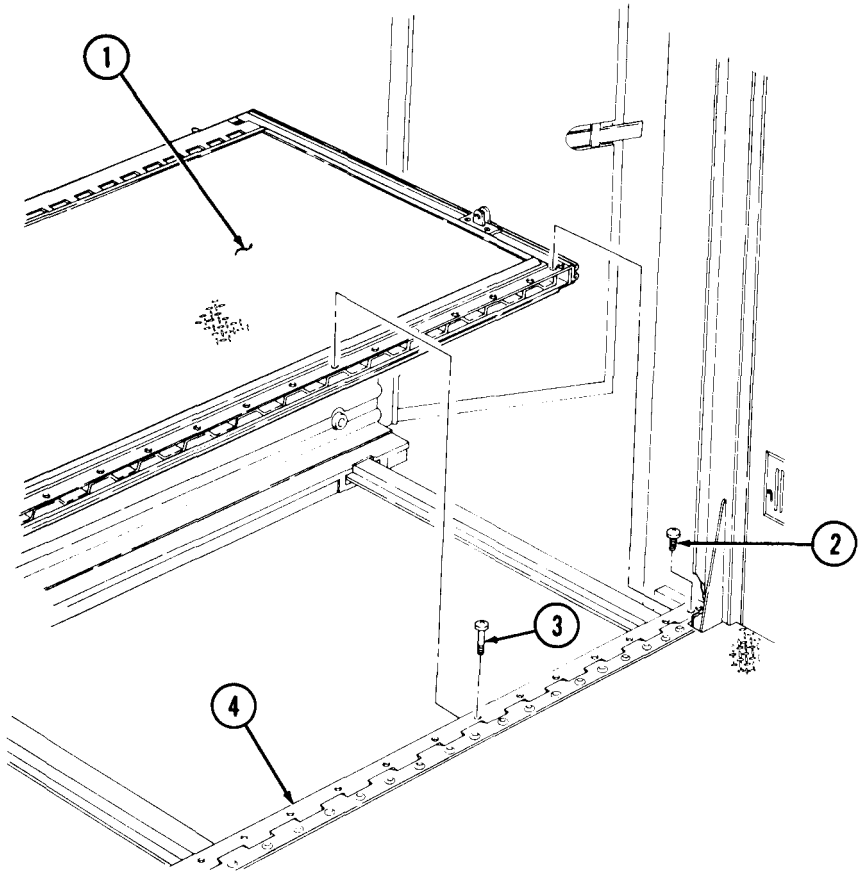
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

e. Installation

NOTE

- Left and right hinged floors are installed the same way. This procedure covers the left hinged floor.
- Assistant will help with step 18.

18.		Hinged floor (1)	Install on hinge (4) with fifty-five screws (3) and four screws (2).	



END OF TASK!

FOLLOW-ON TASKS:
- Install counterbalance (TM 9-2320-272-20-2).
- Close hinged end panel (TM 9-2320-272-10).
- Retract van body sides (TM 9-2320-272-10).

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Assembly

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Channel seal
Four hundred sixty-one rivets
Nine seals
Adhesive (Appendix C, Item 1)
Sealing Compound (Appendix C, Item 37)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Van body sides fully expanded and secured.
TM 9-2320-272-20-2	Retractable window removed.
TM 9-2320-272-20-2	Side panel front lock removed.
TM 9-2320-272-20-2	Side panel rear lock removed.
Para. 18.1-8	Side door removed.

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Disassembly

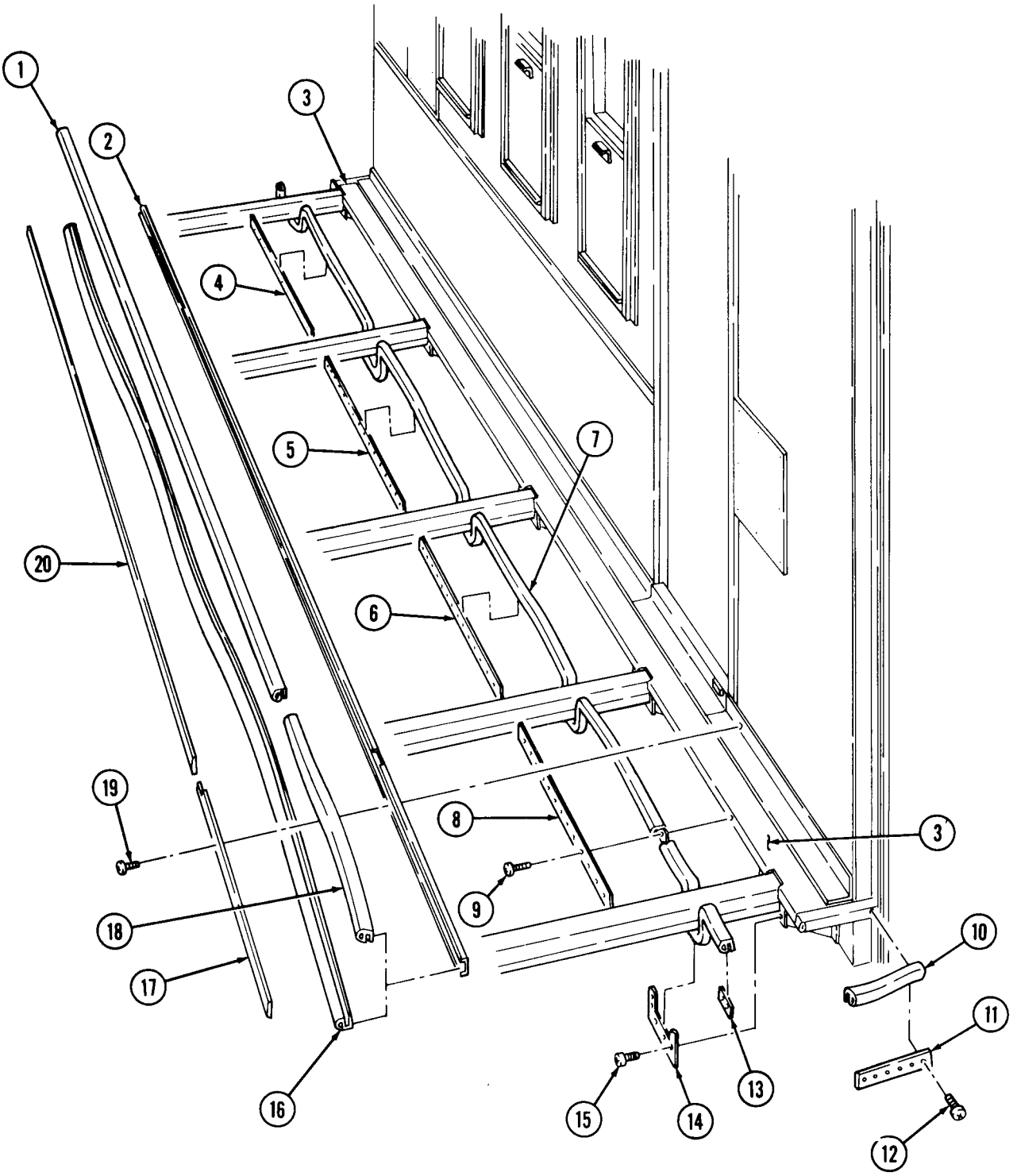
NOTE
Left and right exterior side panels are disassembled the same way.
This procedure covers the right exterior side panel.

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Side panel frame (3)	Sixty-nine screws (19), retainer (17), and retainer (20)	Remove.	
2.		Seals (1), (16), and (18), and channel (2)	Remove.	Discard seals (1), (16), and (18).
3.	Seal (7) at side panel frame (3)	Thirty screws (15) and five retainers (14)	Remove.	
4.	Side panel frame (3)	Sixty-two screws (9), retainers (4), (5), (6), and (8), two retainers (13), and seal (7)	Remove.	Discard seal (7).
5.		Six screws (12), two retainers (11), and seals (10)	Remove.	Discard seals (10).

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

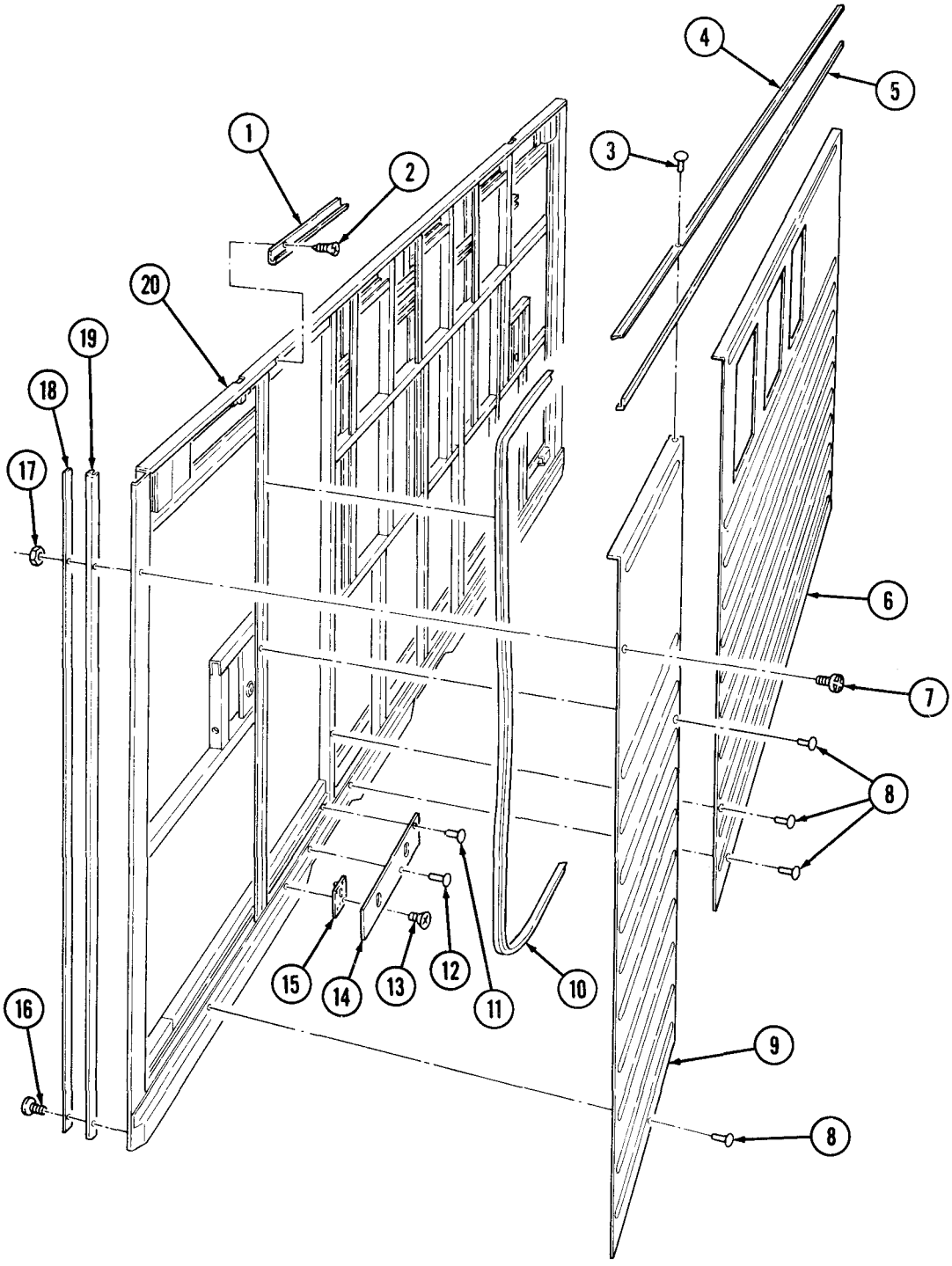


18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Skins (6) and (9) at side panel frame (20)	One hundred eighty-nine rivets (3), angle bracket (4), and seal (5)	Remove.	Discard rivets (3) and seal (5).
7.	Side panel frame (20)	Eighty-two screws (7), nuts (17), four screws (16), two retainers (18), and seals (19)	Remove.	Discard seals (19).
8.	Doorway of side panel frame (20)	Channel seal (10)	Remove.	Discard channel seal (10).
9.		Nine screws (2) and molding (1)	Remove.	
		NOTE • Perform steps 10 through 12 only if skin is to be replaced. See task b. • Assistant will help with steps 10 through 12.		
10.	Side panel frame (20)	Two hundred forty-eight rivets (8) and skins (6) and (9)	Remove.	Discard rivets (8).
11.		Eight rivets (11), sixteen rivets (12), and lower skin (14)	Remove.	Discard rivets (11) and (12).
12.		Eight screws (13) and two ladder hangers (15)	Remove.	

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

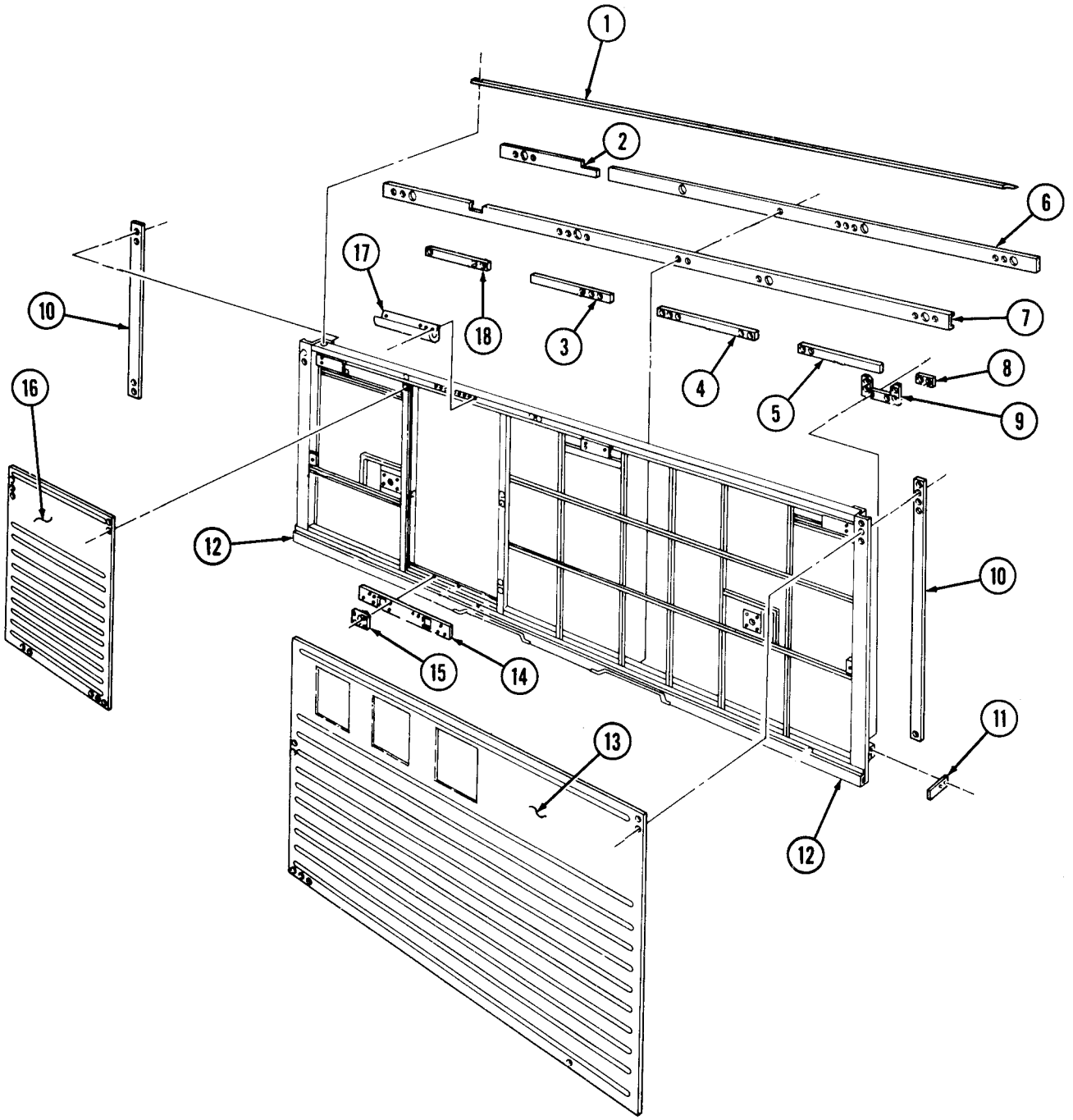


18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning and Inspection			
13.		All parts	Clean.	Refer to para. 2-7.
14.		Five retainers (9), retainers (3), (4), and (5), and (18), and two retainers (8)	Inspect for cracks and bends.	Replace if cracked or bent.
15.		Angle bracket (1), retainers (2) and (6), and channel (7)	Inspect for rust, corrosion, and breaks.	Replace if damaged.
16.		Two retainers (10) and (11)	Inspect for bends and breaks.	Replace if bent or broken.
17.		Molding (17) and two ladder hangers (15)	Inspect for cracks and warpage.	Replace if cracked or warped.
18.		Skins (13) and (16) and lower skin (14)	Inspect for tears and punctures.	Replace if damaged.
19.		Side panel frame (12)	Inspect for cracks, breaks, and warpage.	Replace entire side panel assembly if damaged.

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

c. Assembly

NOTE

- Left and right exterior side panels are assembled the same way. This procedure covers the right exterior side panel.
- Perform step 20 through 22 only if skin is to be replaced. See task b.
- Assistant will help with steps 20 through 22.

20.		Two ladder hangers (15)	Install on side panel frame (20) with eight screws (13).
21.		Lower skin (14)	Install on side panel frame (20) with eight new rivets (11) and sixteen new rivets (12).
22.		Skins (6) and (9)	Install on side panel frame (20) with two hundred forty-eight new rivets (8).

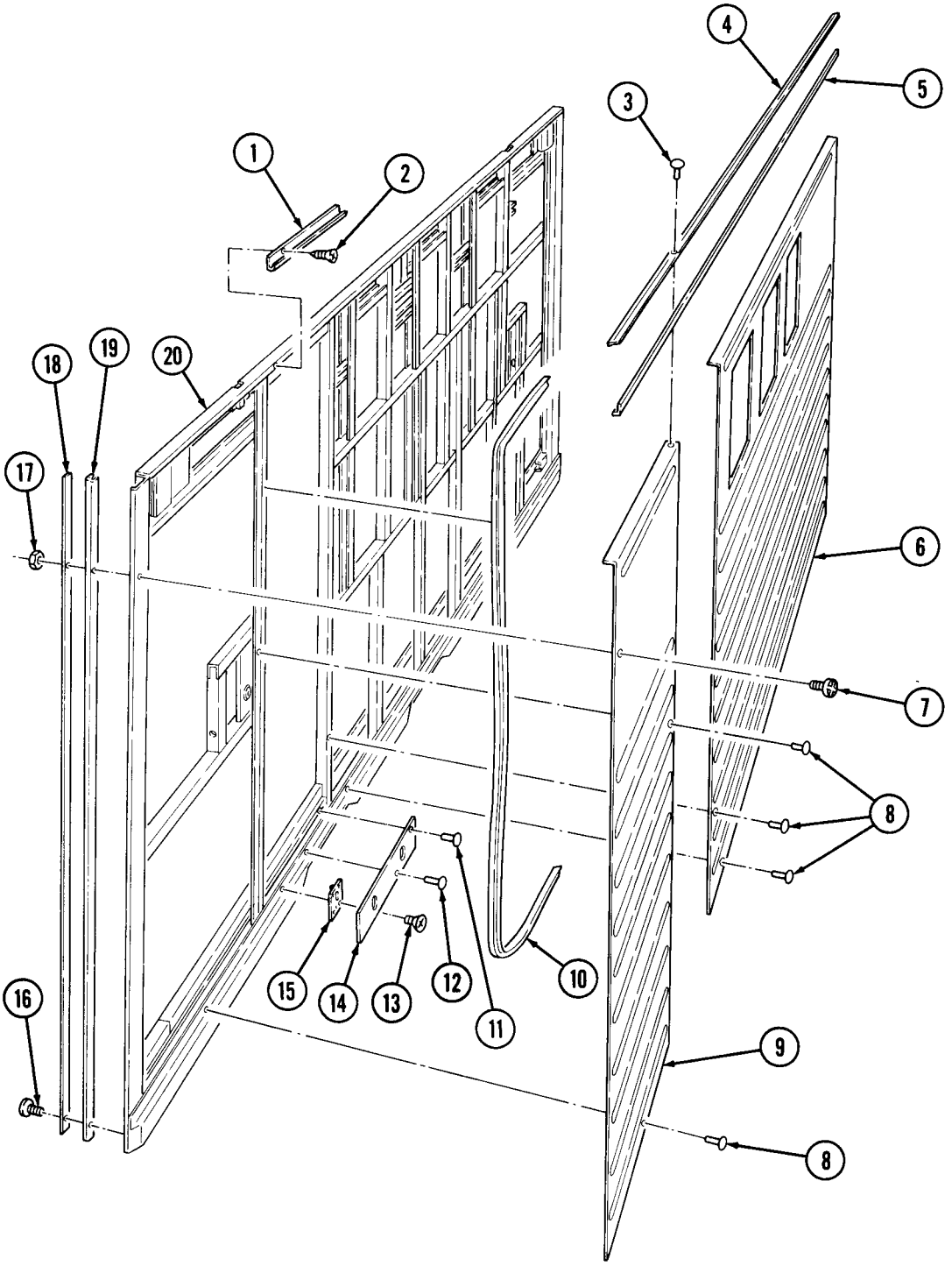
NOTE

- Apply sealing compound to exterior joints for installation.
- Apply adhesive to rubber and metal surfaces for installation.

23.		Molding (1)	Install on doorway of side panel frame (20) with nine screws (2).
24.		New channel seal (10)	Install on doorway of side panel frame (20).
25.		Two new seals (19) and retainers (18)	Install on side panel frame (20) with eighty-two screws (7), nuts (17), and four screws (16).
26.		New seal (5) and angle bracket (4)	Install on skins (6) and (9) and side panel frame (20) with eighty-nine new rivets (3).

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

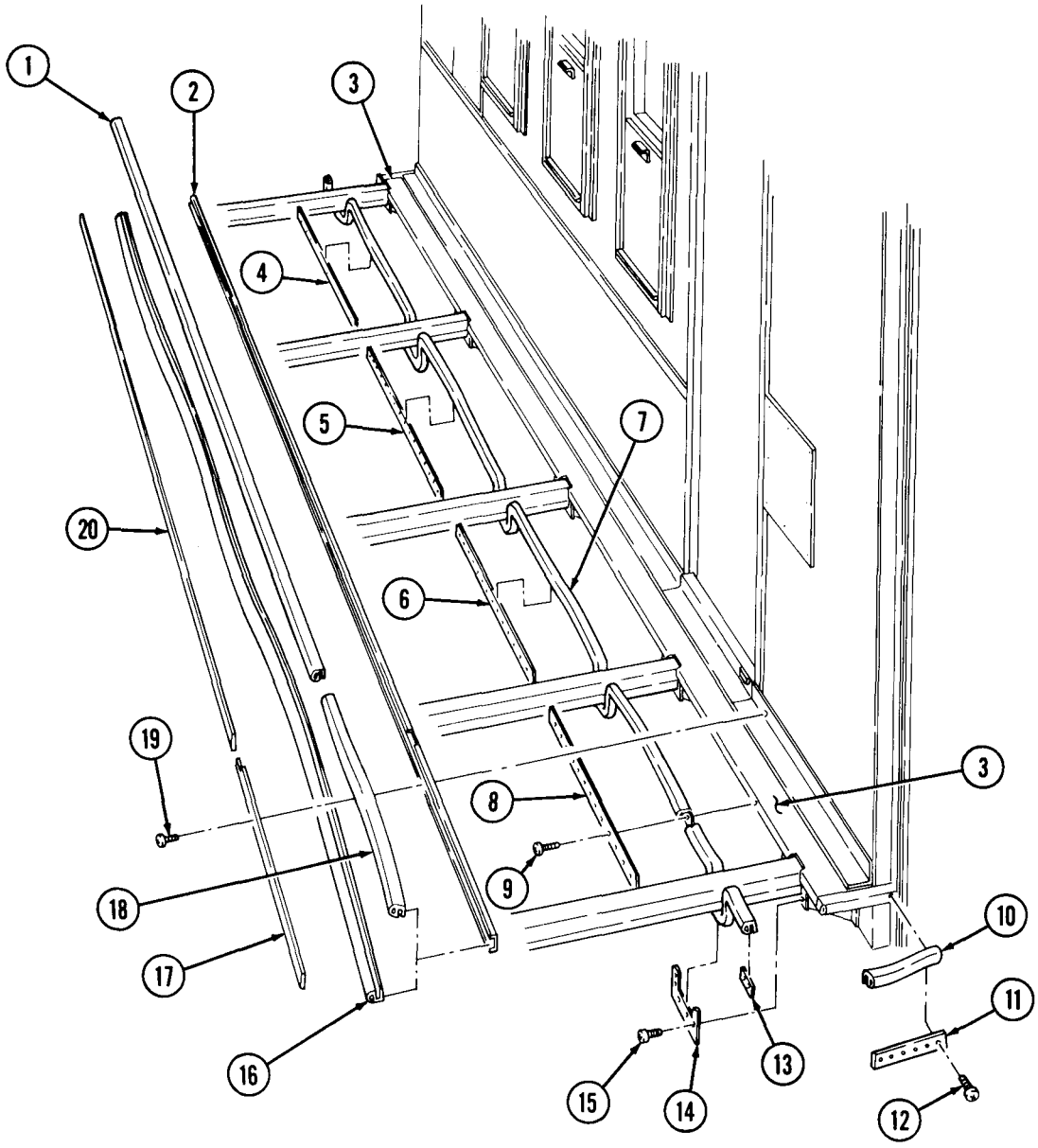


18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
27.		Two new seals (10) and retainers (11)	Install on side panel frame (3) with six screws (12).	
28.		New seal (7), two retainers (13), and retainers (4), (5), (6), and (8)	Install on side panel frame (3) with sixty-two screws (9).	
29.		Five retainers (14)	Install on side panel frame (3) and seal (7) with thirty screws (15).	
30.		New seals (1), (16), and (18), channel (2), retainer (20), and retainer (17)	Install on side panel frame (3) with sixty-nine screws (19).	

18.1-11. EXTERIOR SIDE PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install side panel rear lock (TM 9-2320-272-20-2).
- Install side panel front lock (TM 9-2320-272-20-2).
- Install retractable window (TM 9-2320-272-20-2).
- Retract van body sides (TM 9-2320-272-10).
- Install side door (para. 18.1-8).

18.1-12. REAR WALL INTERIOR PANELS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Sealing compound (Appendix C, Item 37)

Personnel Required
Wheeled vehicle repairman
MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Rear doors opened.
TM 9-2320-272-10	Van body sides fully expanded and secured.
Para. 18.1-42	Electrical load center removed (left side).
Para. 18.1-44	Electrical junction box removed (left side).
Para. 18.1-45	Converter outlet box removed (left side).
TM 9-2320-272-20-2	Inside telephone jack post removed (right side).
TM 9-2320-272-20-2	Blackout light switch removed (right side).
TM 9-2320-272-20-2	Fire extinguisher bracket removed (right side).
Para. 18.1-48	Heater thermostat removed (right side).

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Rear wall exterior panels are not serviceable and if damaged are replaced as a unit with rear wall assembly.

a. Removal

1.	Left panel (2) and header (3)	Thirteen screws (4) and molding (1)	Remove.
2.	Right panel (7) and header (6)	Thirteen screws (10) and molding (8)	Remove.

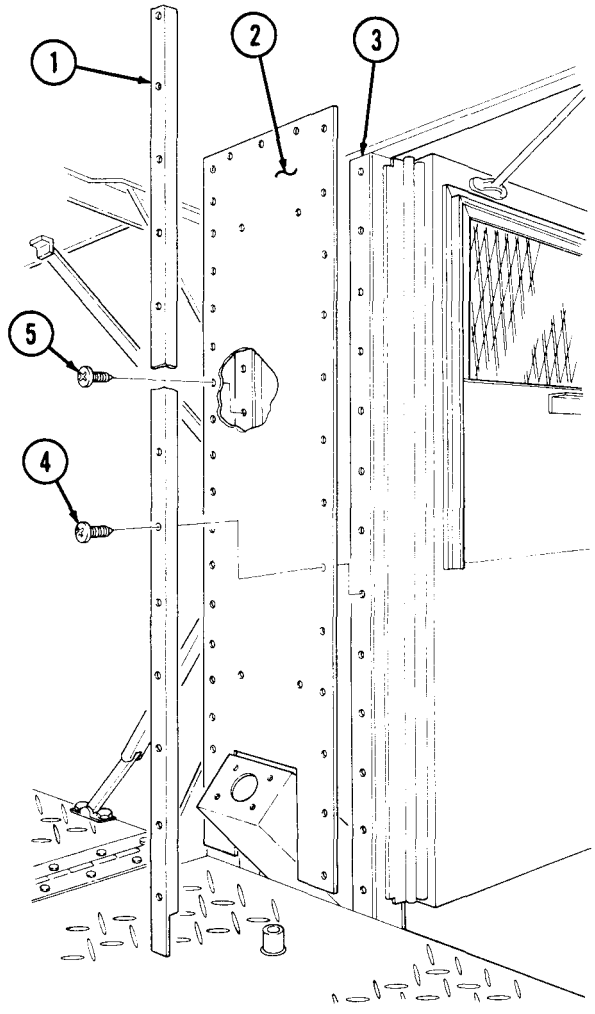
NOTE

Assistant will help with steps 3 and 4.

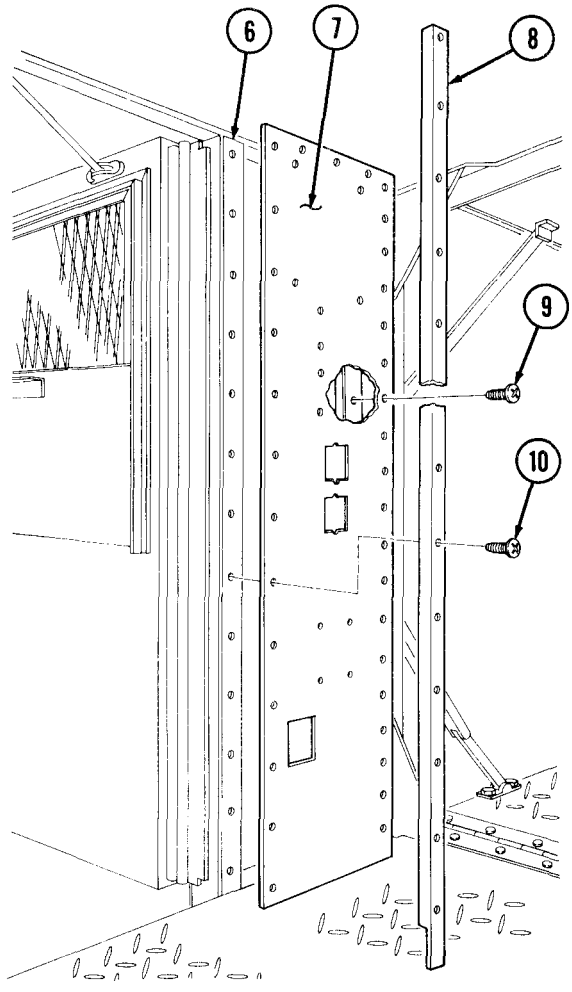
3.	Header (3)	Twenty-two screws (5) and left panel (2)	Remove.
4.	Header (6)	Twenty-two screws (9) and right panel (7)	Remove.

18.1-12. REAR WALL INTERIOR PANELS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



LEFT PANEL



RIGHT PANEL

18.1-12. REAR WALL INTERIOR PANELS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Skin (2) and underframe (1)	Eight screws (4) and two corner gussets (3)	Remove.	

b. Installation

NOTE

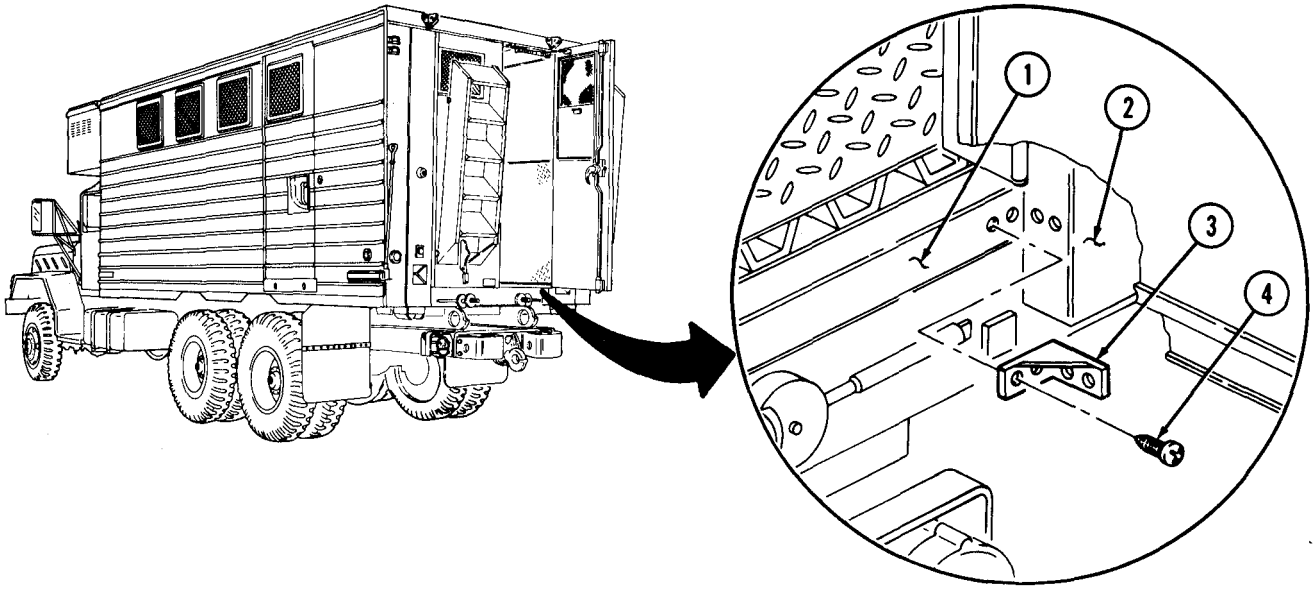
Apply sealing compound to exterior joints for installation.

6.		Two corner gussets (3)	Install on skin (2) and underframe (1) with eight screws (4).

NOTE

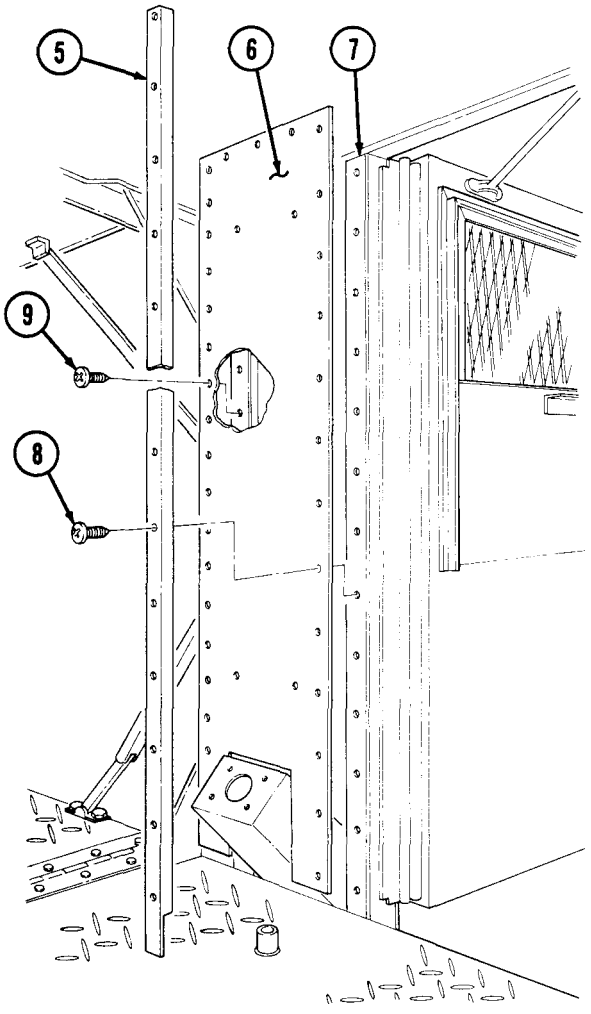
Assistant will help with steps 7 and 8.

7.		Right panel (11)	Install on header (10) with twenty-two screws (13).
8.		Left panel (6)	Install on header (7) with twenty-two screws (9).
9.		Molding (12)	Install on right panel (11) and heater (10) with thirteen screws (14).
10.		Molding (5)	Install on left panel (6) and header (7) with thirteen screws (8).

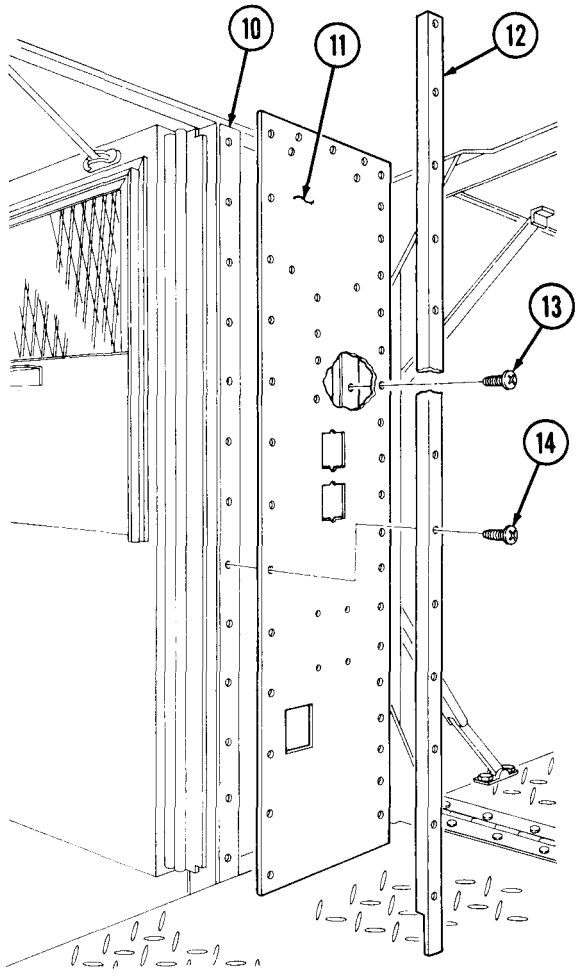


18.1-12. REAR WALL INTERIOR PANELS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



LEFT PANEL



RIGHT PANEL

END OF TASK!

FOLLOW-ON TASKS:
- Install heater thermostat (right side) (para. 18.1-48).
- Install fire extinguisher bracket (right side) (TM 9-2320-272-20-2).
- Install blackout light switch (right side) (TM 9-2320-272-20-2).
- Install inside telephone jack post (right side) (TM 9-2320-272-20-2).
- Install converter outlet box (left side) (para. 18.1-45).
- Install electrical junction box (left side) (para. 18.1-44).
- Install electrical load center (left side) (para. 18.1-42).
- Retract van body sides (TM 9-2320-272-10).
- Close rear doors (TM 9-2320-272-10).

18.1-13. HINGED END PANEL MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

TM 9-2320-272-10

Van body sides fully expanded and secured.

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materiels/Parts
Three seals
Thirty rivets
Sealing compound (Appendix C, Item 37)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

NOTE
All hinged end panels are removed the same way. This procedure covers the right rear hinged end panel.

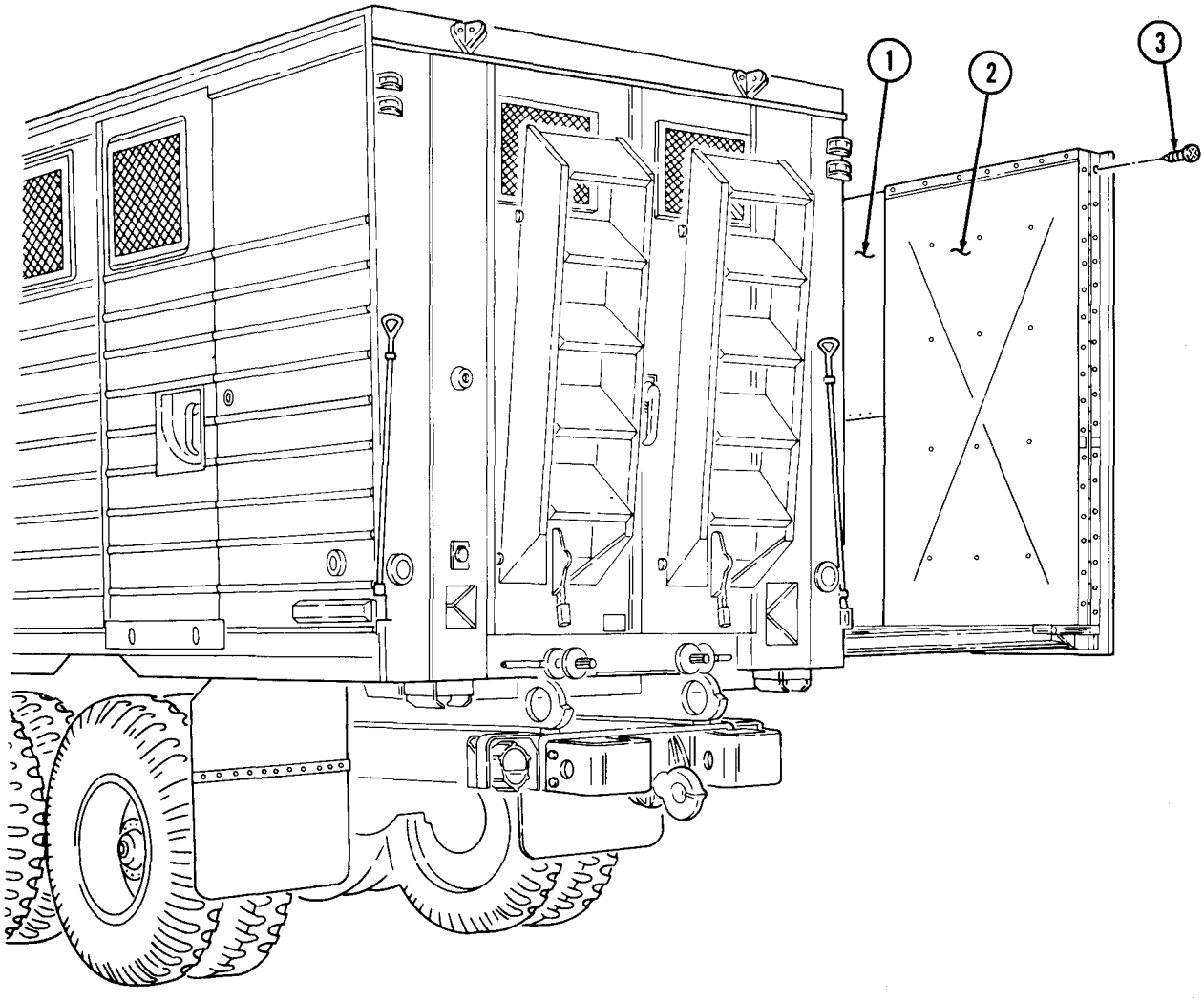
1.	Hinged end panel (2) and side panel (1)	Sixteen screws (3)	Remove.

NOTE
Assistant will help with step 2.

2.	Side panel (1)	Hinged end panel (2)	Remove.

18.1-13. HINGED END PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

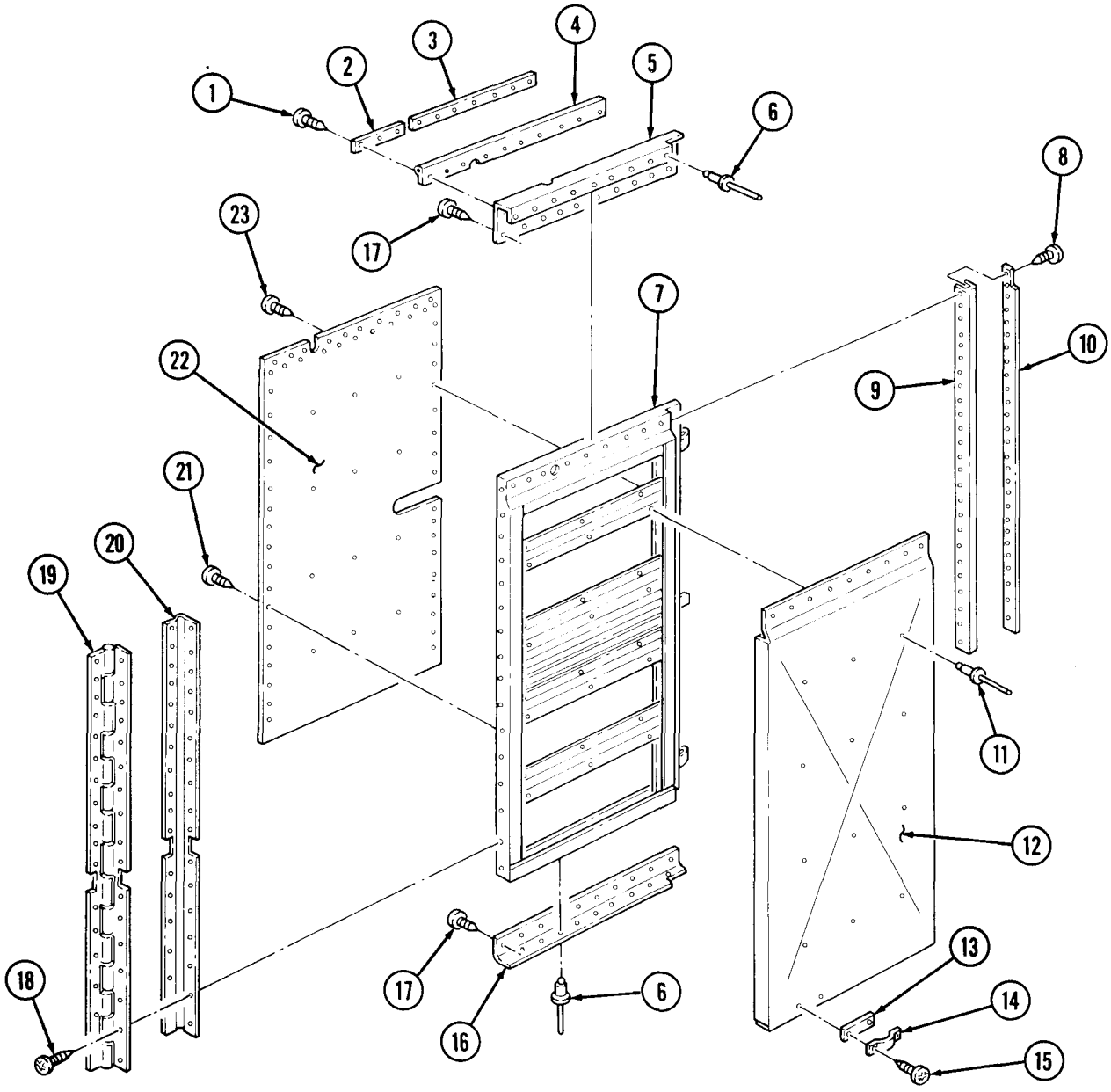


18.1-13. HINGED END PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Disassembly			
		NOTE All hinged end panels are disassembled the same way. This procedure covers the right rear hinged end panel.		
3.	Panel frame (7) and outer skin (12)	Sixteen screws (18), hinge (19), and seal (20)	Remove.	Discard seal (20).
4.		Twenty-seven screws (8), retainer (10), and seal (9)	Remove.	Discard seal (9).
5.	Channel (5)	Ten screws (1), retainers (2) and (3), and seal (4)	Remove.	Discard seal (4).
6.	Outer skin (12), panel frame (7), and inner skin (22)	Eighteen rivets (6), twenty screws (17), and channels (5) and (16)	Remove.	Discard rivets (6).
7.	Outer skin (12)	Two screws (15), strap (14), and spacer plate (13)	Remove.	
		NOTE • Perform steps 8 and 9 only if skins are to be replaced. See task c. • Assistant will help with steps 8 and 9.		
8.	Panel frame (7)	Twelve rivets (11) and outer skin (12)	Remove.	Discard rivets (11).
9.		Thirty screws (23), eighteen screws (21), and inner skin (22)	Remove.	
	c. Cleaning and Inspection			
10.		All parts	Clean.	Refer to para. 2-7.
11.		Channels (5) and (16)	Inspect for cracks and breaks.	Replace if cracked or broken.
12.		Retainers (2), (3), and (10), spacer place (13), and strap (14)	Inspect for bends and breaks.	Replace if bent or broken.
13.		Hinge (19)	Inspect for cracks, breaks, corrosion, and proper operation.	Replace entire hinged end panel if damaged.

18.1-13. HINGED END PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.		Inner skin (22) and outer skin (12)	Inspect for tears and punctures.	Replace if torn or punctured.
15.		Panel frame (7)	Inspect for cracks, breaks, and warpage.	Replace entire hinged end panel assembly if damaged.



18.1-13. HINGED END PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Assembly				

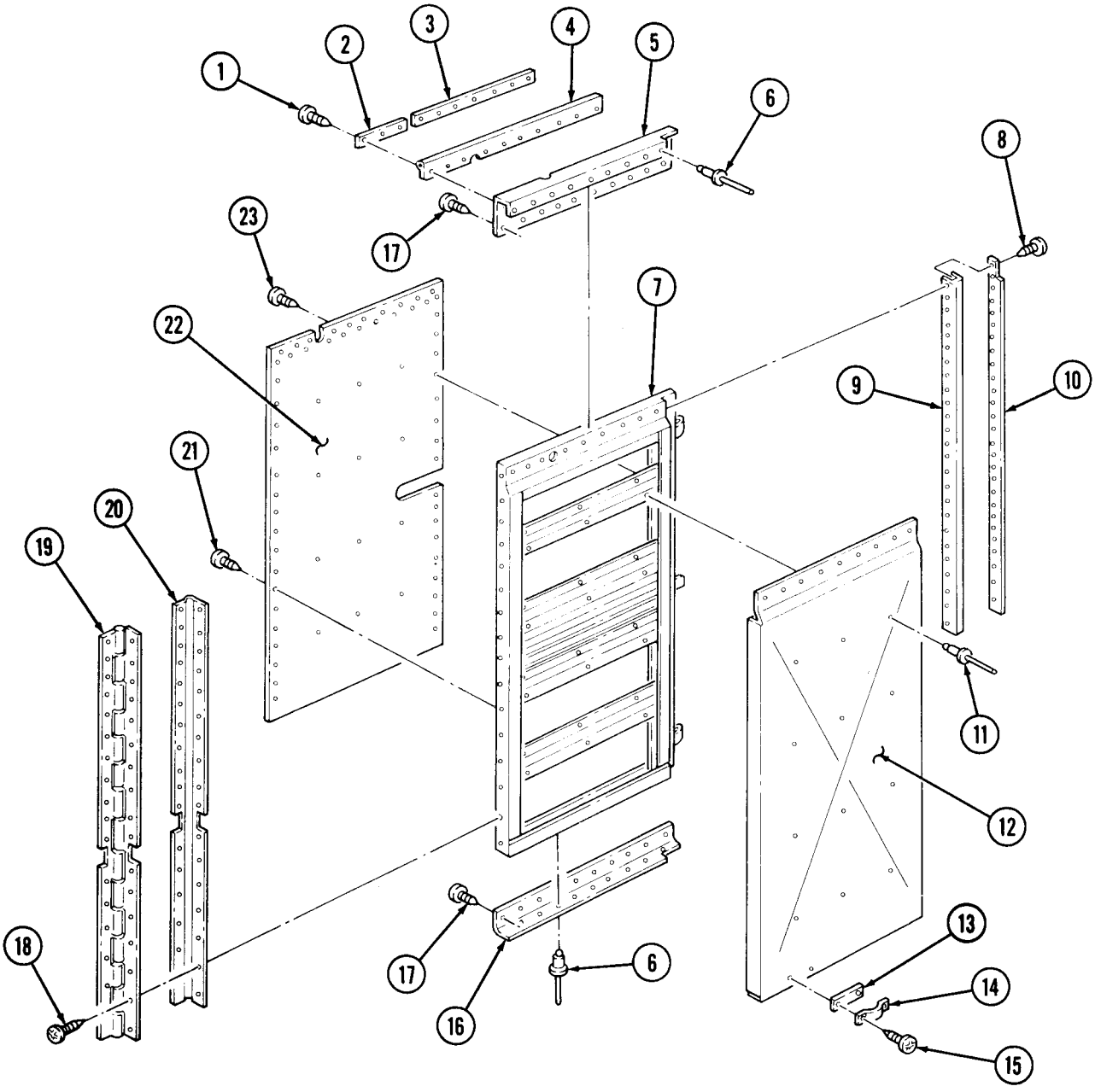
NOTE

- All hinged end panels are assembled the same way. This procedure covers the right rear hinged end panel.
- Seal all exterior joints with sealing compound.
- Perform steps 16 and 17 only if skins are to be replaced.
- Assistant will help with steps 16 and 17.

16.		Inner skin (22)	Install on panel frame (7) with thirty screws (23) and eighteen screws (21).
17.		Outer skin (12)	Install on panel frame (7) with twelve new rivets (11).
18.		Spacer plate (13) and strap (14)	Install on outer skin (12) with two screws (15).
19.		Channels (5) and (16)	Install on outer skin (12), panel frame (7), and inner skin (22) with eighteen new rivets (6) and twenty screws (17).
20.		New seal (4) and retainers (2) and (3)	Install on channel (5) with ten screws (1).
21.		New seal (9) and retainer (10)	Install on outer skin (12) and panel frame (7) with twenty-seven screws (8).
22.		New seal (20) and hinge (19)	Install on outer skin (12) and panel frame (7) with sixteen screws (18).

18.1-13. HINGED END PANEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-13. HINGED END PANEL MAINTENANCE (Cont'd)

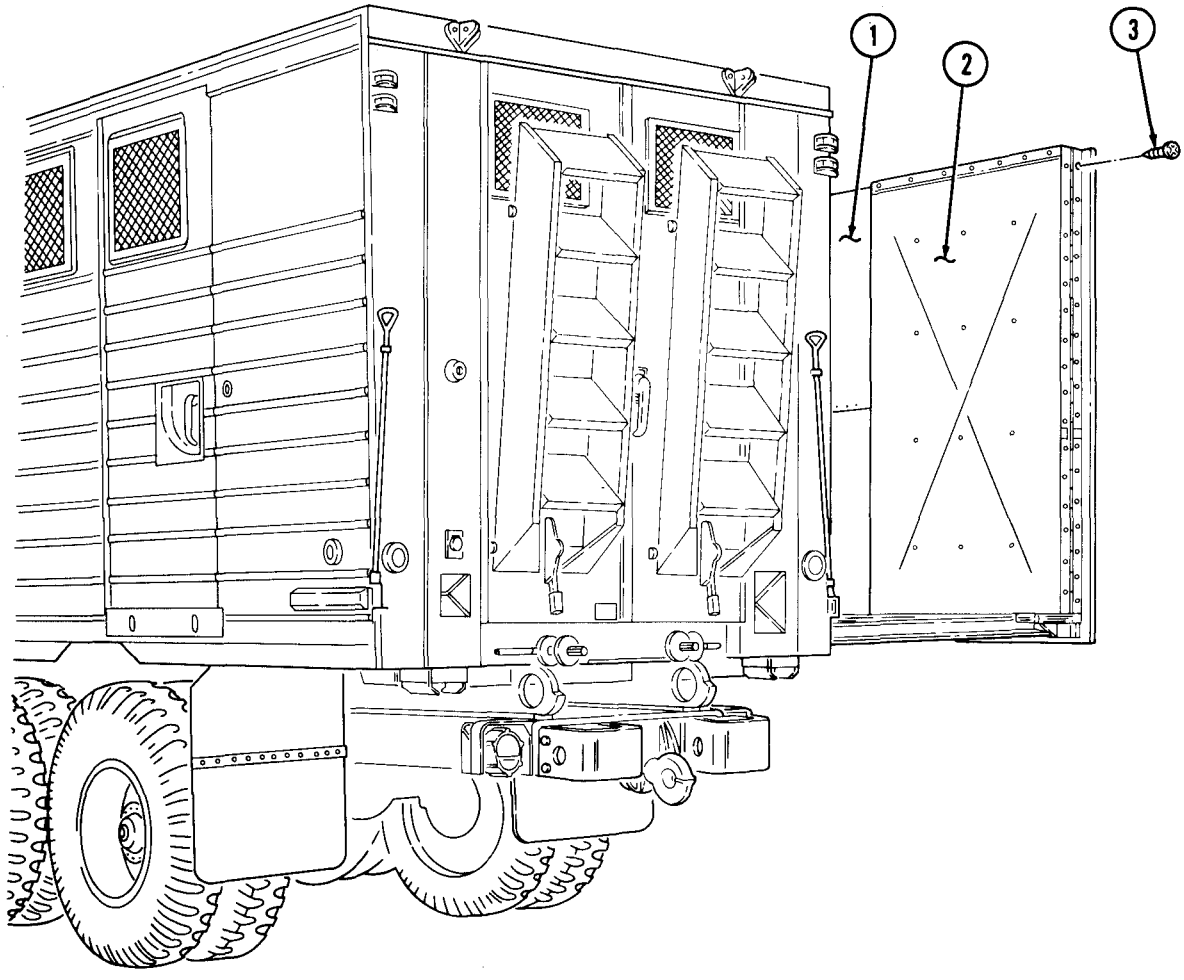
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

e. Installation

NOTE

All hinged end panels are installed the same way. This procedure covers the right rear hinged end panel.

23.		Hinged end panel (2)	Install on side panel (1) with sixteen screws (3).



END OF TASK!

FOLLOW-ON TASK: Retract van body sides (TM 9-2320-272-10).

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Two cotter pins
Gasket
Three grommets
Insulation
Six lockwashers
Two O-rings
Four rubber bumpers
Primer (Appendix C, Item 38)
Sealing compound (Appendix C, Item 37)
Adhesive (Appendix C, Item 1)

Personnel Required
Wheeled vehicle repairman MOS 63W (3)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Van body sides fully expanded and secured.
Para. 18.1-13	Hinged end panels removed.
Para. 18.1-10	Hinged floor removed.
Para. 18.1-16	Hinged roof removed.
Para. 18.1-8	Side doors removed.

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

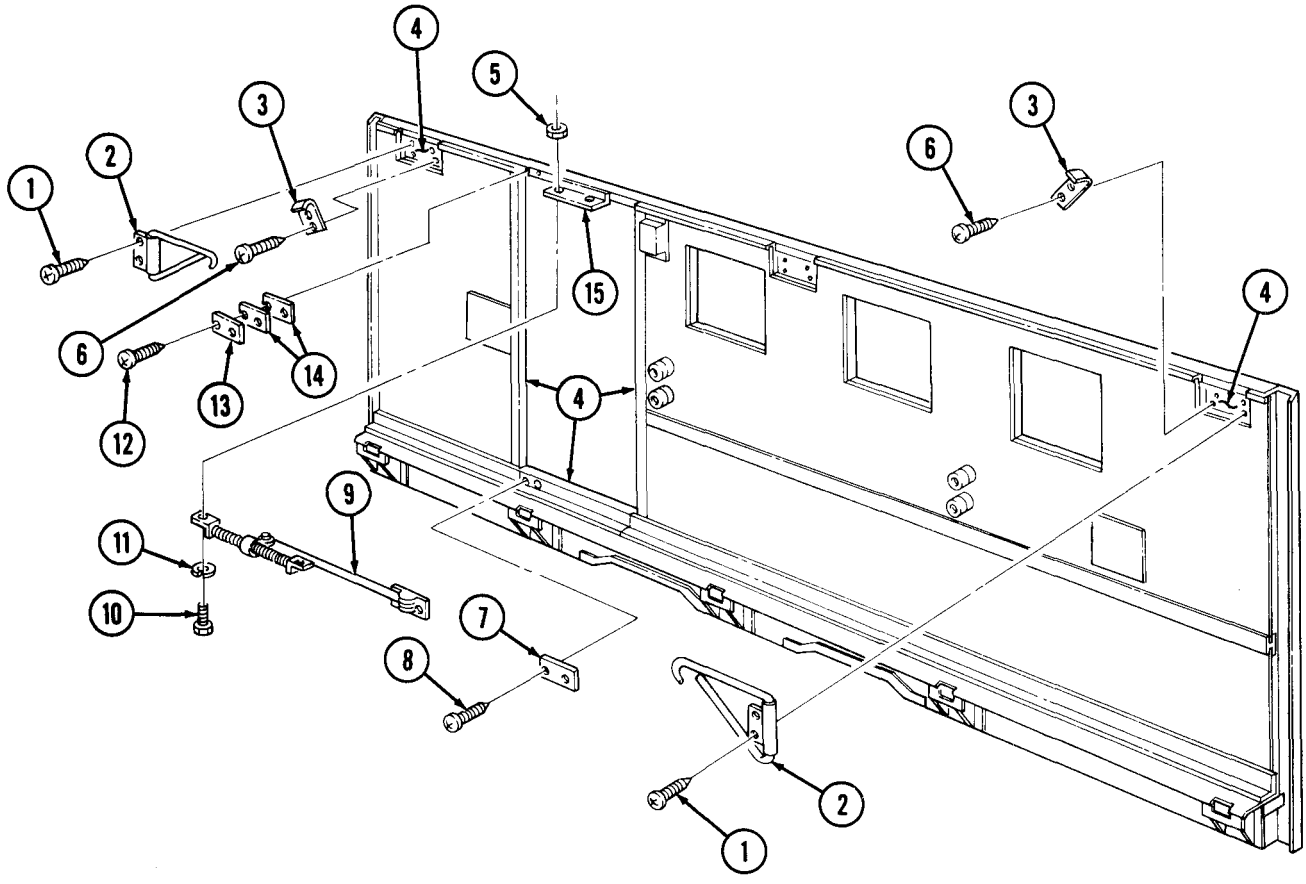
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Left and right interior side panels are removed the same way. This procedure covers the right side.		
1.	Side panel frame (4)	Six screws (1) and three hooks (2)	Remove.	
2.		Six screws (6) and three clips (3)	Remove.	
3.		Two screws (8) and striker (7)	Remove.	
4.	Door angle (15)	Two screws (10), lockwashers (11), nuts (5), and door check assembly (9)	Remove.	Discard lockwashers (11).
5.	Side panel frame (4)	Two screws (12), striker (13), and two spacer plates (14)	Remove.	

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

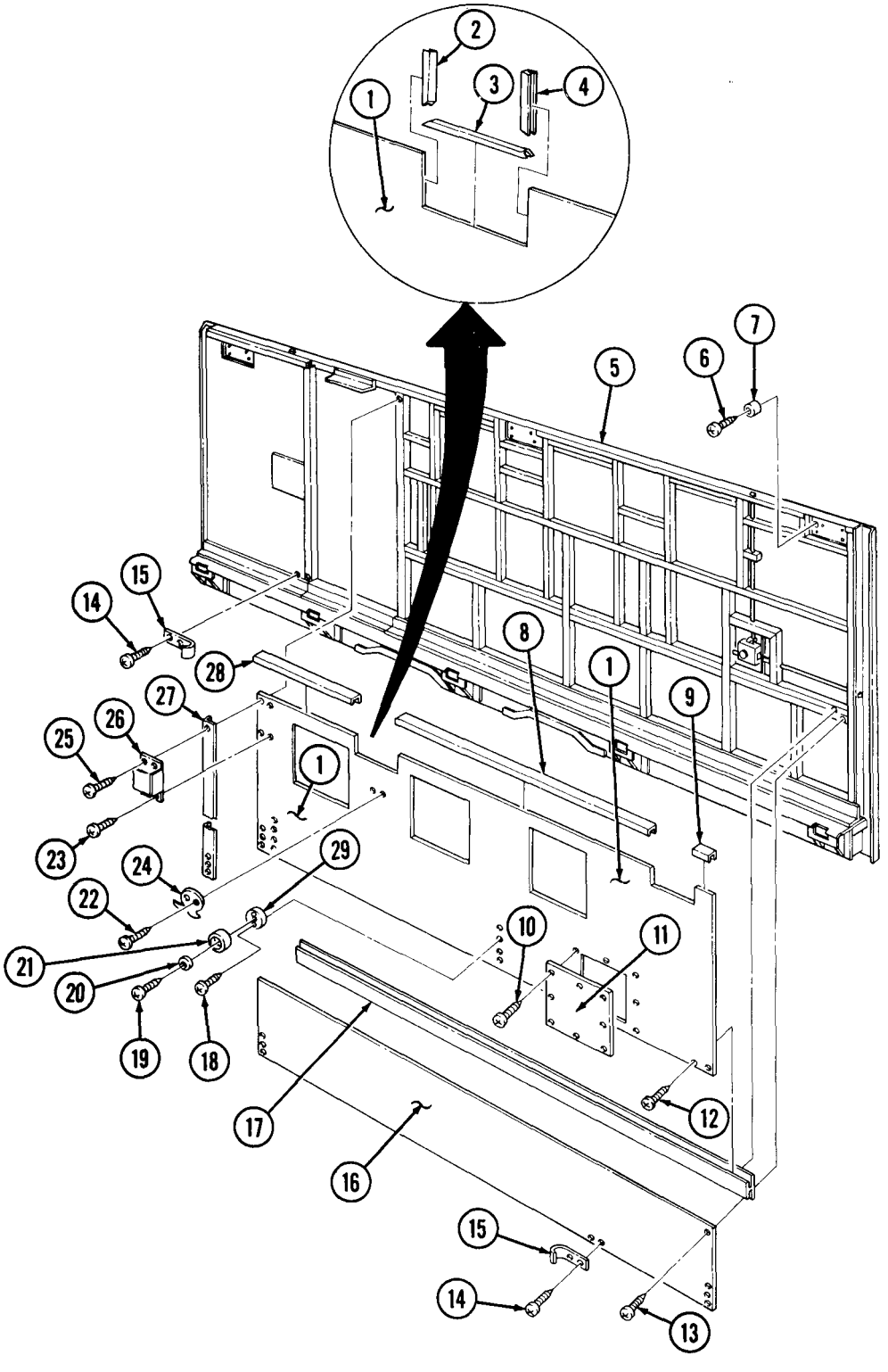


18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Side panel frame (5)	Two screws (6) and grommets (7)	Remove.	Discard grommets (7).
7.	Panel (16)	Four screws (14) and two clips (15)	Remove.	
8.	Panel (1)	Four screws (19), washers (20), and rubber bumpers (21)	Remove.	Discard rubber bumpers (21).
9.		Eight screws (18) and four wood spacers (29)	Remove.	
10.		Eight screws (22) and four hangers (24)	Remove.	
11.		Two screws (23), two screws (25), and junction box (26)	Remove.	
12.		Eight screws (10) and plate (11)	Remove.	
13.		Eleven screws (25) and molding (27)	Remove.	
		NOTE Assistants will help with steps 14 and 15.		
14.	Side panel frame (5)	Thirty-three screws (13) and panel (16)	Remove.	
15.		Fifty-eight screws (12), molding (17), and panel (1)	Remove.	
16.	Panel (1)	Moldings (28), (8), and (9)	Remove.	
17.		Two moldings (2), two moldings (3), and two moldings (4)	Remove.	

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

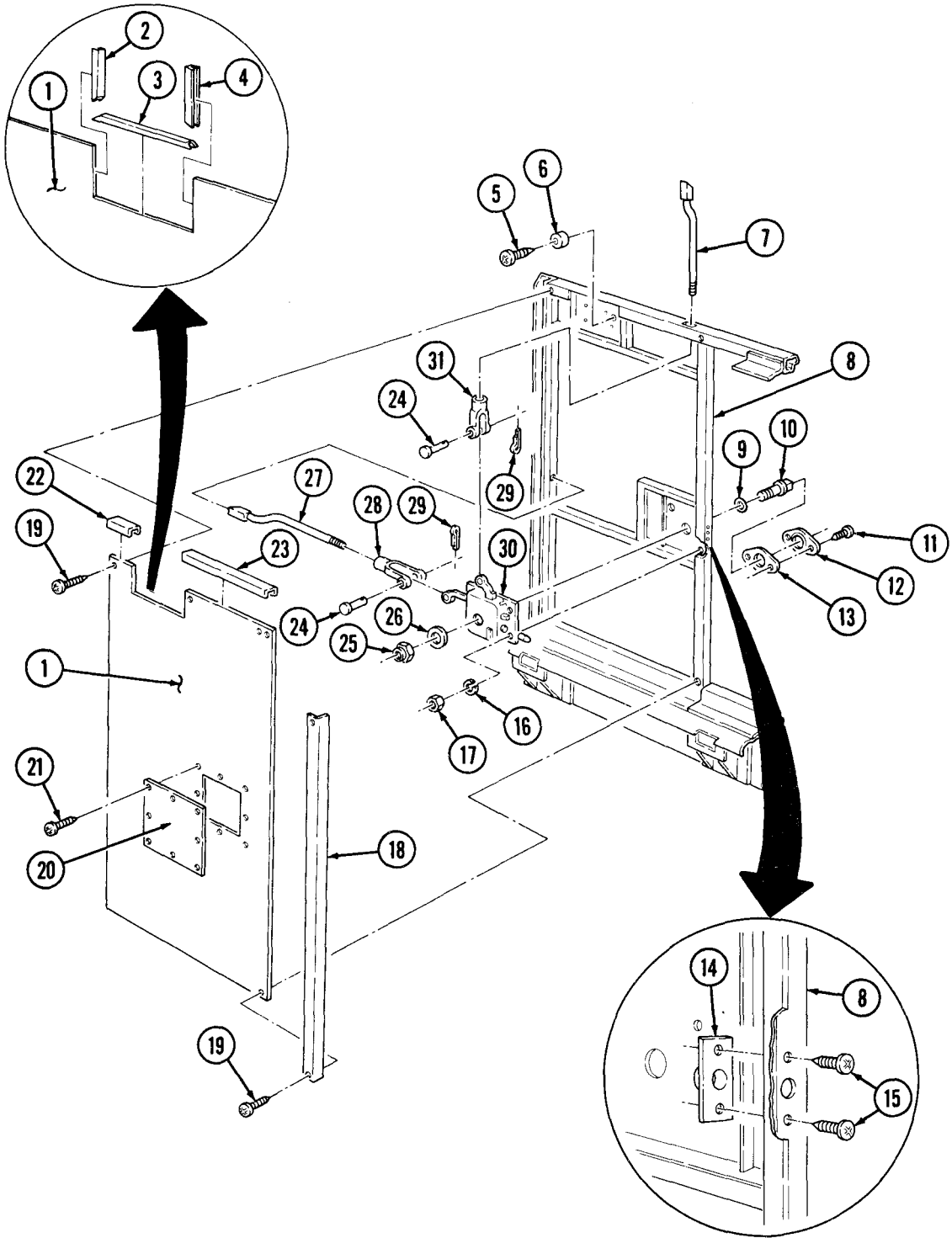


18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.	Panel (1)	Eight screws (21) and plate (20)	Remove.	
		NOTE Assistant will help with step 19.		
19.	Side panel frame (8)	Thirty-three screws (19), moldings (2), (3), (4), (18), (22), and (23), and panel (1)	Remove.	
20.	Shank (10) and latch (30)	Nut (25) and washer (26)	Remove.	
21.	Latch (30)	Two screws (11), plate (12), gasket (13), shank (10), and O-ring (9)	Remove.	Discard O-ring (9) and gasket (13)
22.		Two cotter pins (29), pins (24), clevis (28), and clevis (31)	Remove.	Discard cotter pins (29).
23.	Side panel frame (8)	Four nuts (17), lockwashers (16), and latch (30)	Remove.	Discard lockwashers (16).
24.		Two screws (15) and retainer (14)	Remove.	
25.	Flush bolt (7)	Clevis (31)	Remove.	
26.	Horizontal bar (27)	Clevis (28)	Remove.	
27.	Side panel frame (8)	Horizontal bar (27) and flush bolt (7)	Remove.	
28.			Repeat steps 18 through 27 for removal of front latch assembly.	
29.		Screw (5) and grommet (6)	Remove.	Discard grommet (6).

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

b. Installation

NOTE

- Left and right interior side panel latches are installed the same way. This procedure covers the right side.
- Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer.
- Seal between exterior joints with sealing compound.
- Apply adhesive to rubber and metal surfaces.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
30.		New grommet (6)	Install on side panel frame (8) with screw (5).	
31.		Horizontal bar (27) and flush bolt (7)	Position in side panel frame (8).	
32.		Clevis (28)	Install on horizontal bar (27).	
33.		Clevis (31)	Install on flush bolt (7).	
34.		Retainer (14)	Install on side panel frame (8) with two screws (15).	
35.		Latch (30)	Install on side panel frame (8) with four new lockwashers (16) and nuts (17).	
36.		Clevises (28) and (31)	Install on latch (30) with two pins (24) and new cotter pins (29).	
37.		New O-ring (9), shank (10), new gasket (13), and plate (12)	Install on latch (30) with two screws (11).	
38.		Nut (25) and washer (26)	Install on shank (10) and latch (30).	
39.			Repeat steps 30 through 38 for installation of front latch assembly.	

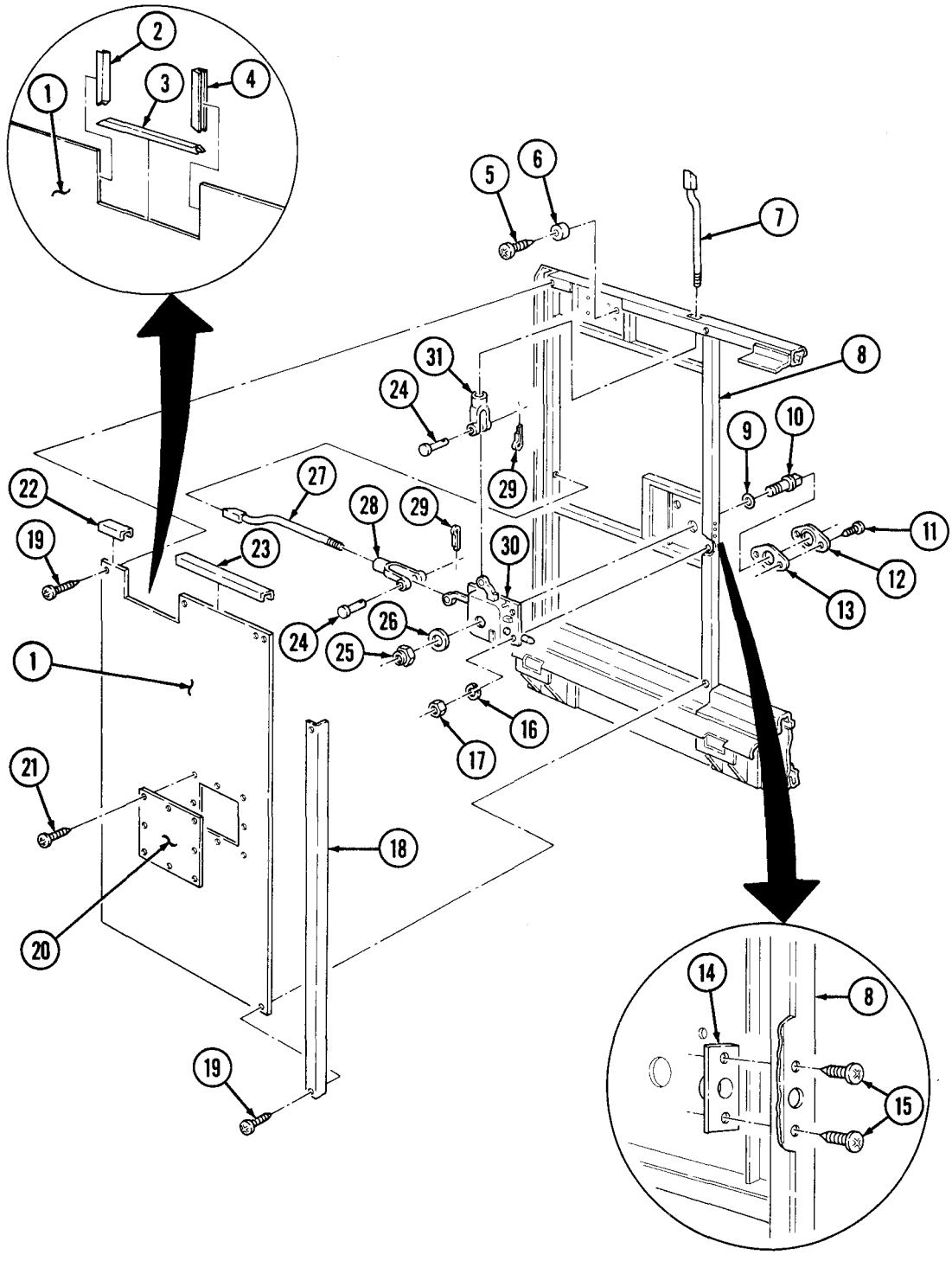
NOTE

- Insulate entire structure with fibrous glass felt insulation.
- Assistant will help with step 40.

40.		Panel (1) and moldings (2), (3), (4), (18), (22), and (23)	Install on side panel frame (8) with thirty-three screws (19).	
41.		Plate (20)	Install on panel (1) with eight screws (21).	

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

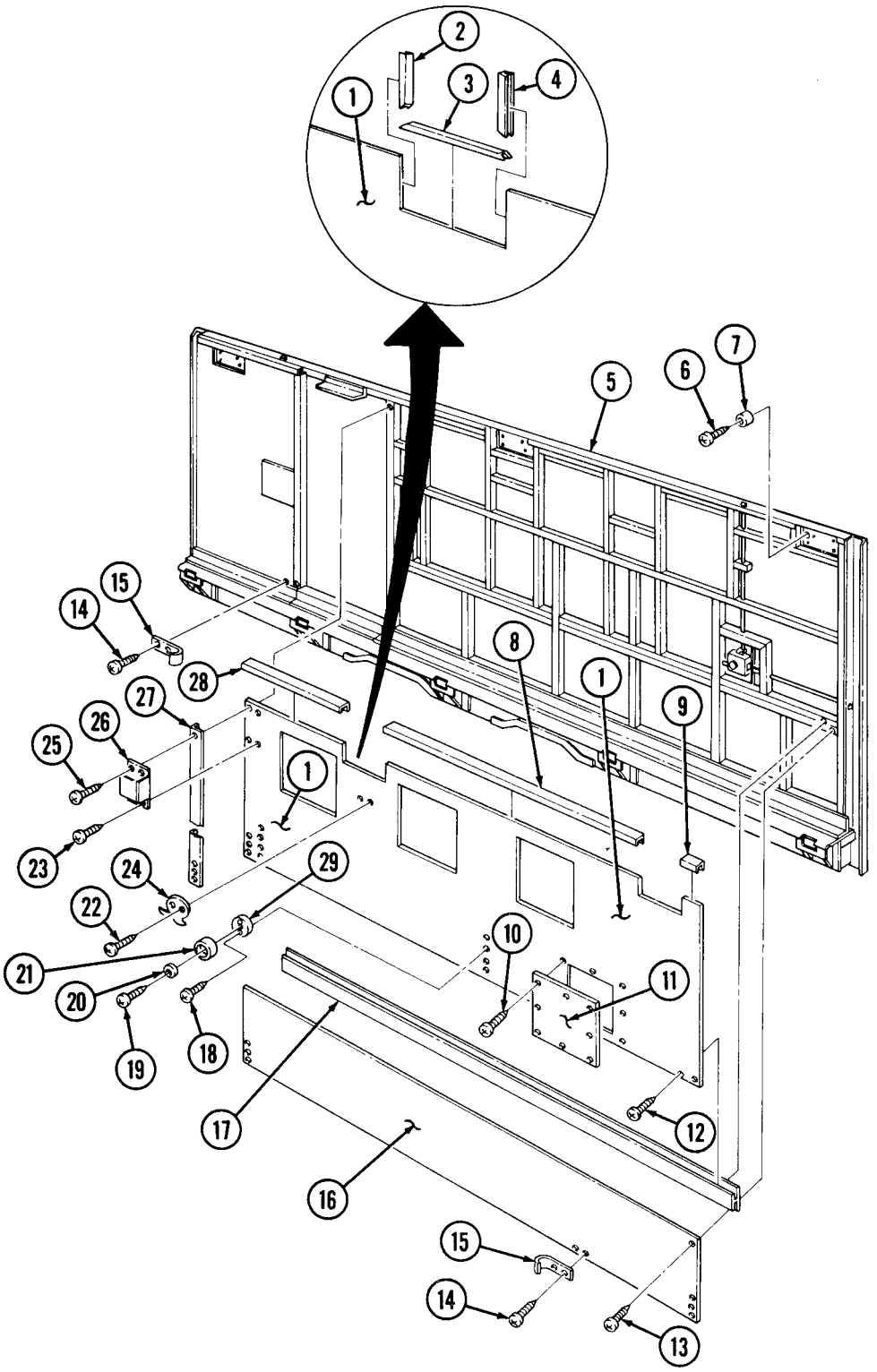


18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
42.		Two moldings (2), two moldings (3), and two moldings (4)	Install on panel (1).	
43.		Moldings (8), (9), and (28)	Install on panel (1).	
		NOTE • Assistants will help with steps 44 and 45. • Insulate entire structure with fibrous glass felt insulation.		
44.		Panel (1) and molding (17)	Install on side panel frame (5) with fifty-eight screws (12).	
45.		Panel (16)	Install on side panel frame (5) with thirty-three screws (13).	
46.		Molding (27)	Install on panels (1) and (16) with eleven screws (25).	
47.		Plate (11)	Install on panel (1) with eight screws (10).	
48.		Junction box (26)	Install on panel (1) with two screws (23) and screws (25).	
49.		Four hangers (24)	Install on panel (1) with eight screws (22).	
50.		Four wood spacers (29)	Install on panel (1) with eight screws (18).	
51.		Four new rubber bumpers (21)	Install on panel (1) with four screws (19) and washers (20).	
52.		Two clips (15)	Install on panel (16) with four screws (14).	
53.		Two new grommets (7)	Install on side panel frame (5) with two screws (6).	

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

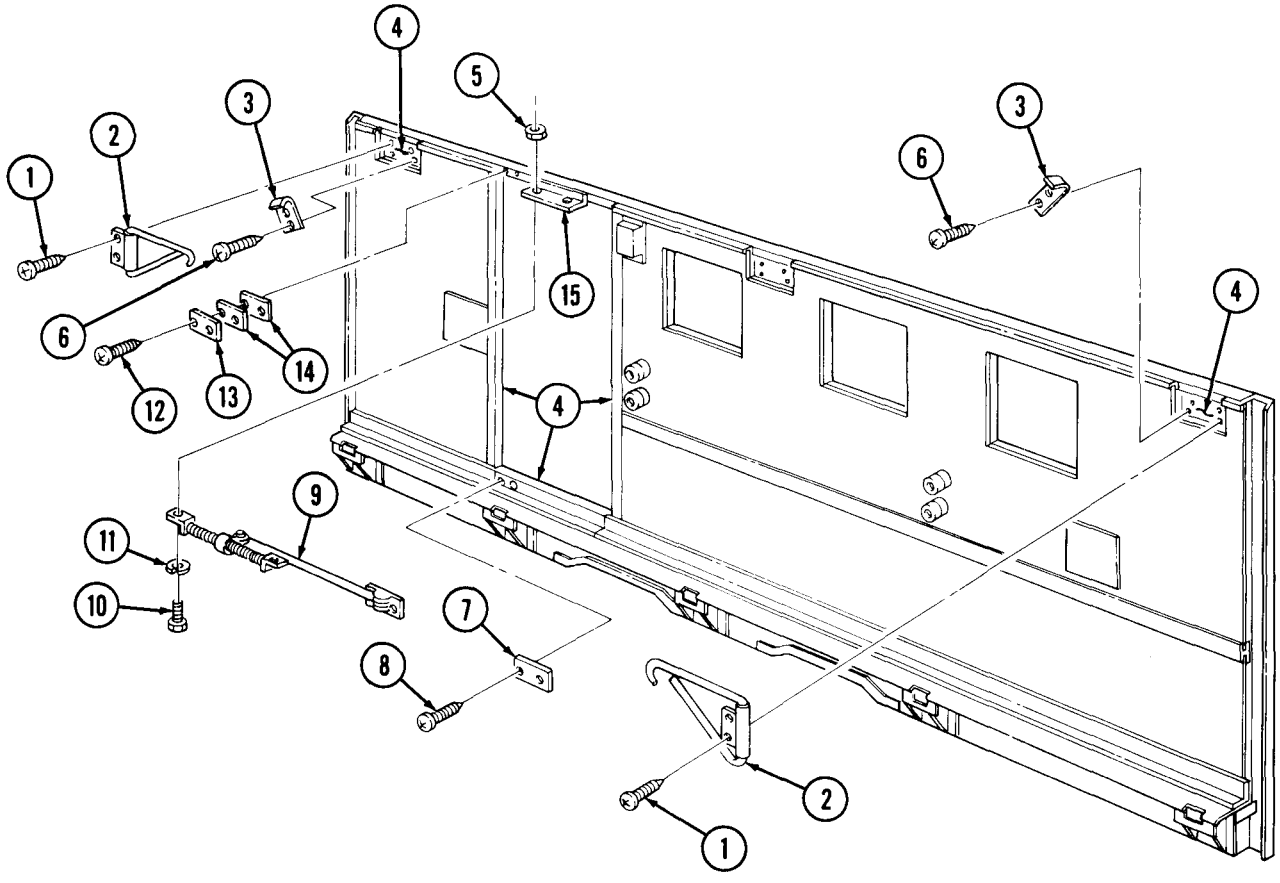


18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
54.		Striker (13) and two spacer plates (14)	Install on side panel frame (4) with two screws (12).	
55.		Door check assembly (9)	Install on door angle (15) with two screws (10), new lockwashers (11), and nuts (5).	
56.		Striker (7)	Install on side panel frame (4) with two screws (8).	
57.		Three clips (3)	Install on side panel frame (4) with six screws (6).	
58.		Three hooks (2)	Install on side panel frame (4) with six screws (1).	

18.1-14. INTERIOR SIDE PANELS AND LATCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install side doors (para. 18.1-8).
- Install hinged roof (para. 18.1-16).
- Install hinged floor (para. 18.1-10).
- Install hinged end panels (para. 18.1-13).
- Retract van body sides (TM 9-2320-272-10).

18.1-15. CEILING AND FRAME MAINTENANCE

This task covers:

a. Removal
b. Cleaning and Inspection
c. Installation

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Insulation
Six lockwashers
Six-hundred twenty-three rivets
Two seals
Adhesive (Appendix C, Item 1)
Primer (Appendix C, Item 38)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Van body sides fully expanded and secured.
Para. 18.1-20	Ceiling air ducts removed.
Para. 18.1-18	Ceiling filler and side panels removed.
Para. 18.1-19	Ceiling rear cover removed.
Para. 18.1-21	Ceiling transition removed.
Para. 18.1-7	Rear doors removed.

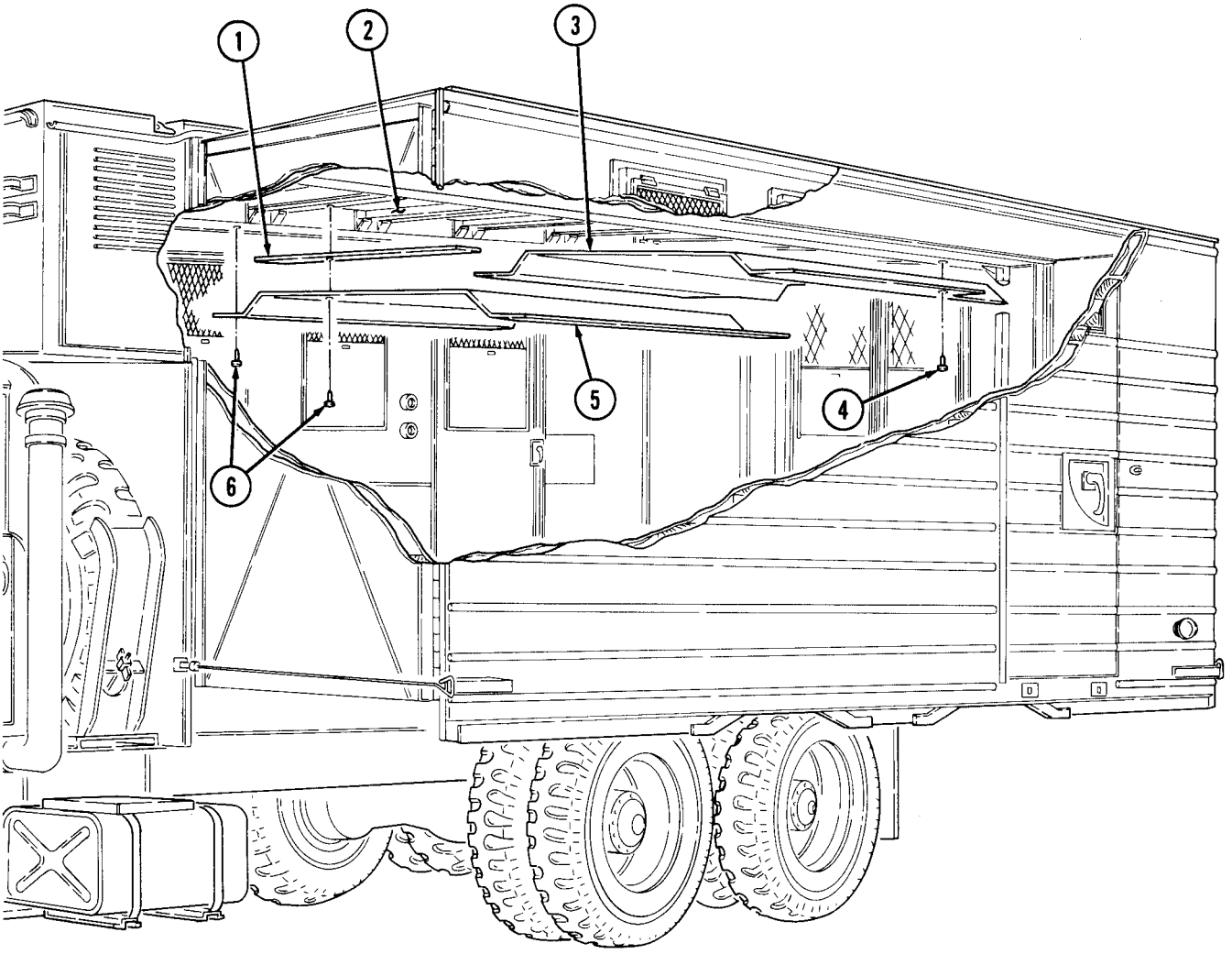
Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Assistant will help with steps 1 through 4.		
1.	Roof frame (2)	Ninety-three rivets (4), ceiling panel (3), and two liner strips (1)	Remove.	Discard rivets (4).
2.		One-hundred two rivets (6), ceiling panel (5), and two liner strips (1)	Remove.	Discard rivets (6).

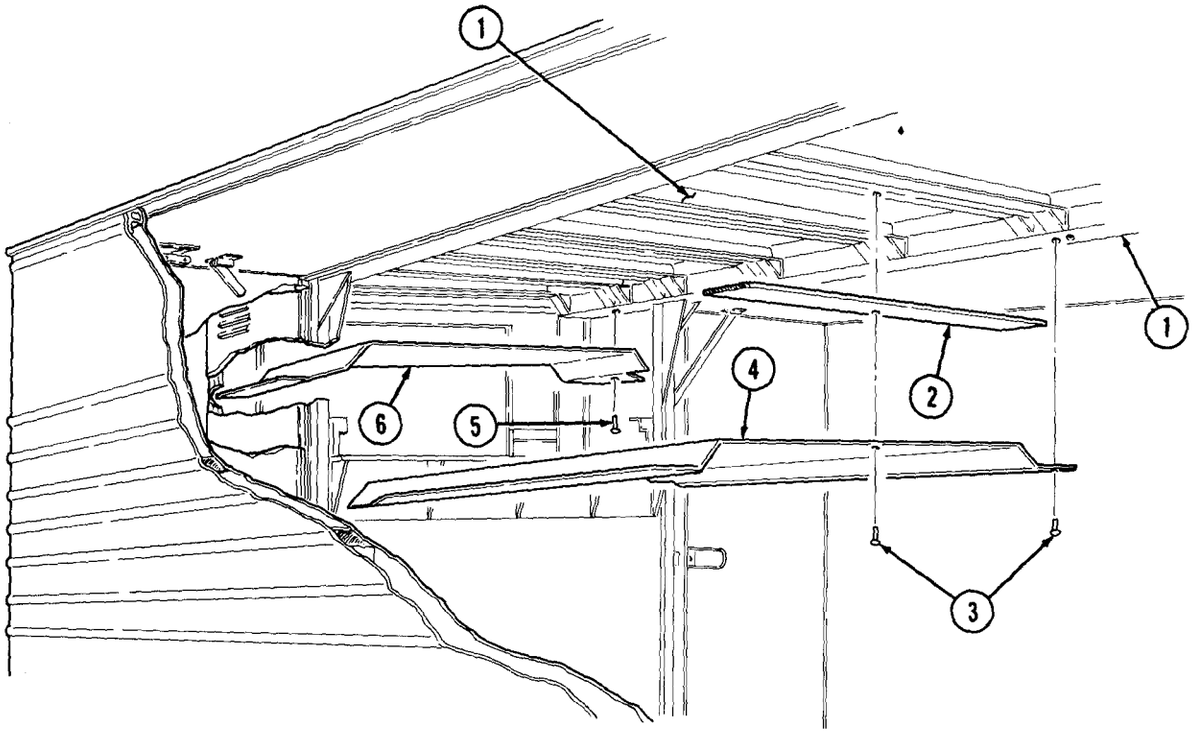
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



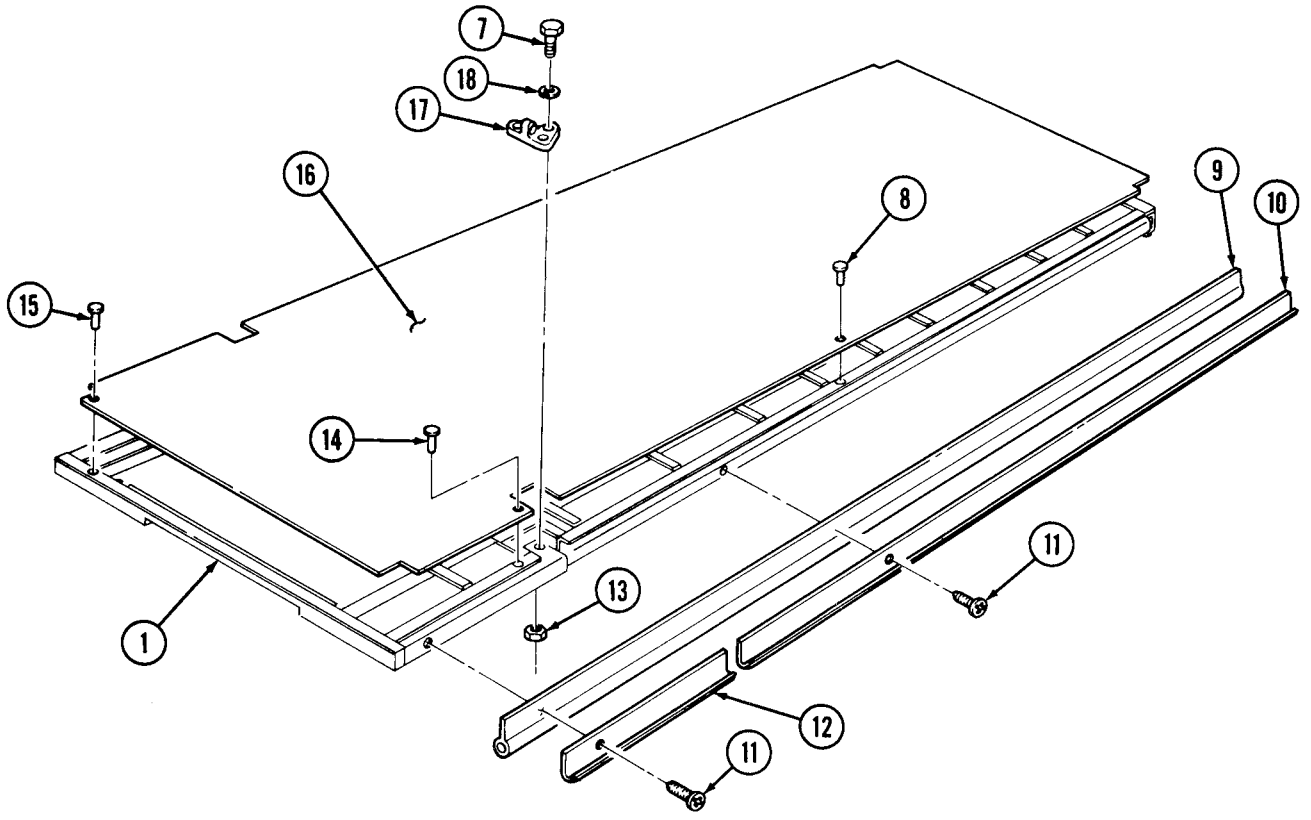
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Roof frame (1)	Ninety-two rivets (3), ceiling panel (4), and two liner strips (2)	Remove.	Discard rivets (3).
4.		Seventy-six rivets (5), ceiling panel (6), and three liner strips (2)	Remove.	Discard rivets (5).



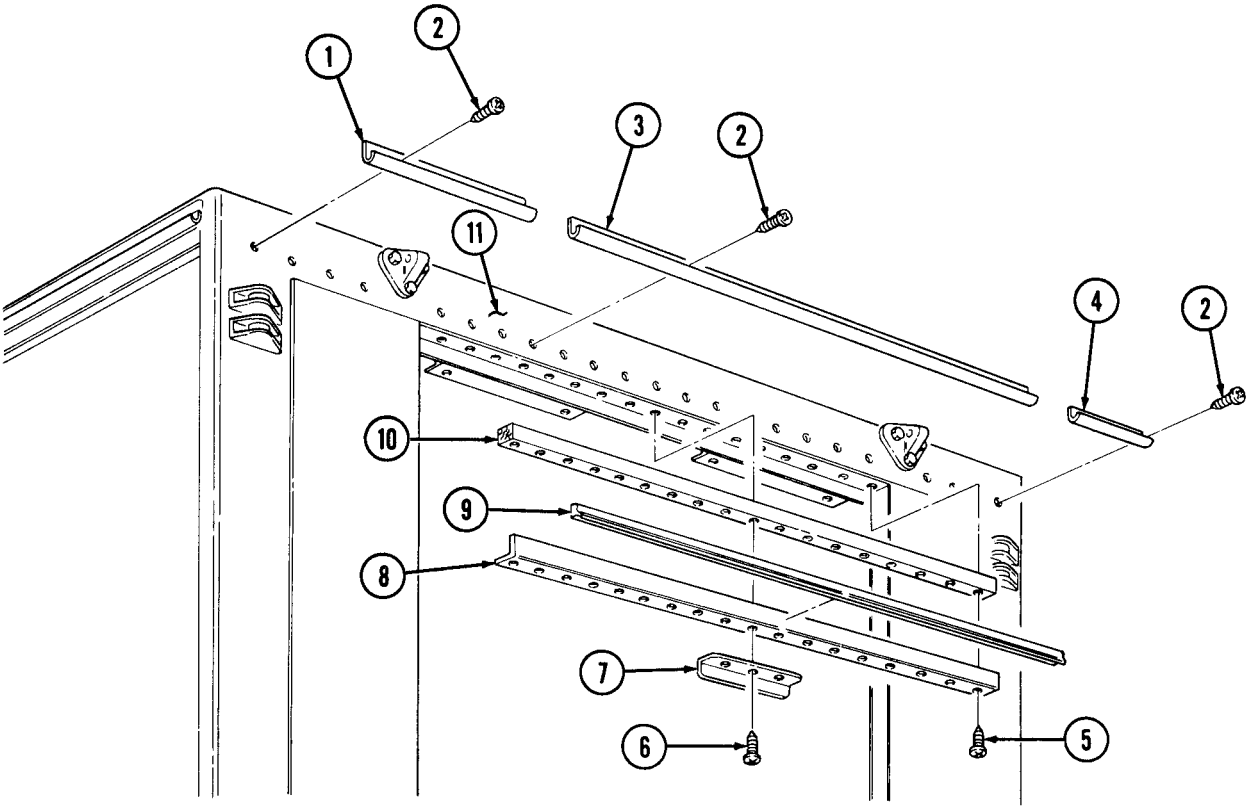
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Left and right side moldings are removed the same way. This procedure covers the right side.		
5.		Fifty-nine screws (11), seal (9), molding (10), and molding (12)	Remove.	Discard seal (9).
6.		Six screws (7), lockwashers (18), nuts (13), and two lifting brackets (17)	Remove.	Discard lockwashers (18).
		NOTE • Perform steps 7 and 8 only if roof is damaged and is to be removed. See task b. • Assistant will help with steps 7 and 8.		
7.	Roof panel (16) and roof frame (1)	One-hundred twenty-six rivets (15), eighteen rivets (14), and one-hundred sixteen rivets (8)	Remove.	Discard rivets (8), (14), and (15).
8.	Roof frame (1)	Roof panel (16)	Remove.	Lift and place on supports.



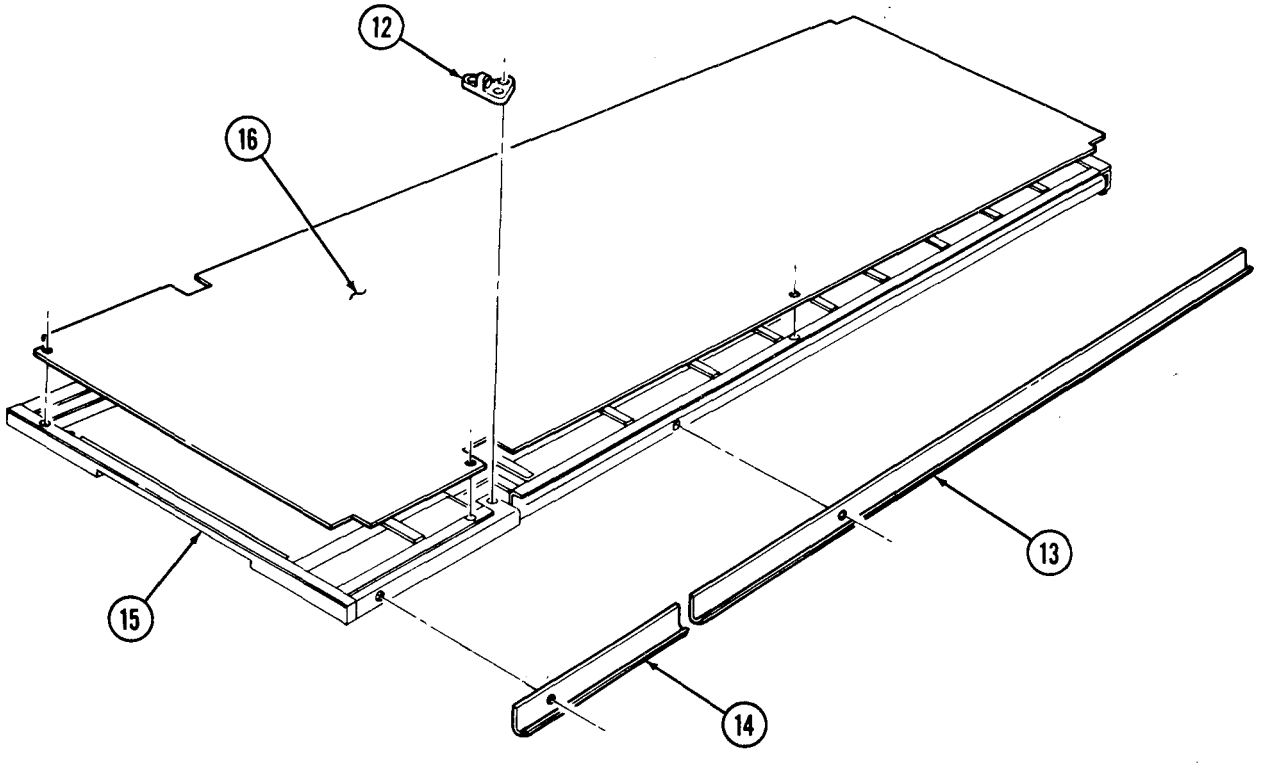
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
9.	Van body (11)	Twenty-three screws (2) and moldings (1), (3), and (4)	Remove.	
10.	Retainer (8)	Three screws (6) and angle bracket (7)	Remove.	
11.	Van body (11)	Fifteen screws (5), seal (9), retainer (8), and woodblock (10)	Remove.	Discard seal (9).
	b. Cleaning and Inspection			
12.		All parts	Clean.	Refer to para. 2-7.
13.		Moldings (1), (3), and (4)	Inspect for bends and breaks.	Replace if bent or broken.
14.		Angle bracket (7) and retainer (8)	Inspect for cracks and breaks.	Replace if cracked or broken.
15.		Woodblock (10)	Inspect for breaks.	Replace if broken.



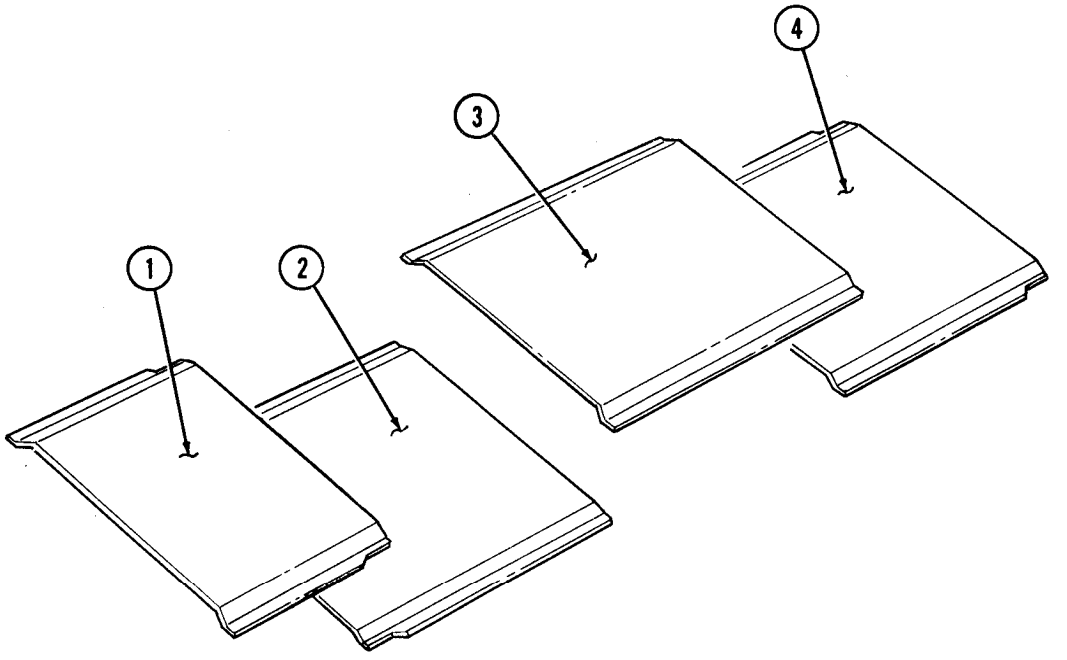
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.		Moldings (13) and (14)	Inspect for bends, breaks, and warpage.	Replace if bent, broken, or warped.
17.		Lifting bracket (12)	Inspect for breaks and cracks.	Replace if broken or cracked.
18.		Roof panel (16)	Inspect for tears and punctures.	Replace if torn or punctured.
19.		Roof frame (15)	Inspect for breaks, warpage, and broken bows.	Replace entire roof assembly if damaged.



18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.		Ceiling panels (1), (2), (3), and (4)	Inspect for cracks and punctures.	Replace if cracked or punctured.



c. Installation

NOTE

- Apply adhesive for installation.
- Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer.

21.	Wood block (13), new seal (12), and retainer (11)	Install on van body (14) with fifteen screws (8).	Leave three center holes of retainer open for angle bracket (10) installation.
22.	Angle bracket (10)	Install on retainer (11) with three screws (9).	
23.	Moldings (6), (7), and (15)	Install on van body (14) with twenty-five screws (5).	

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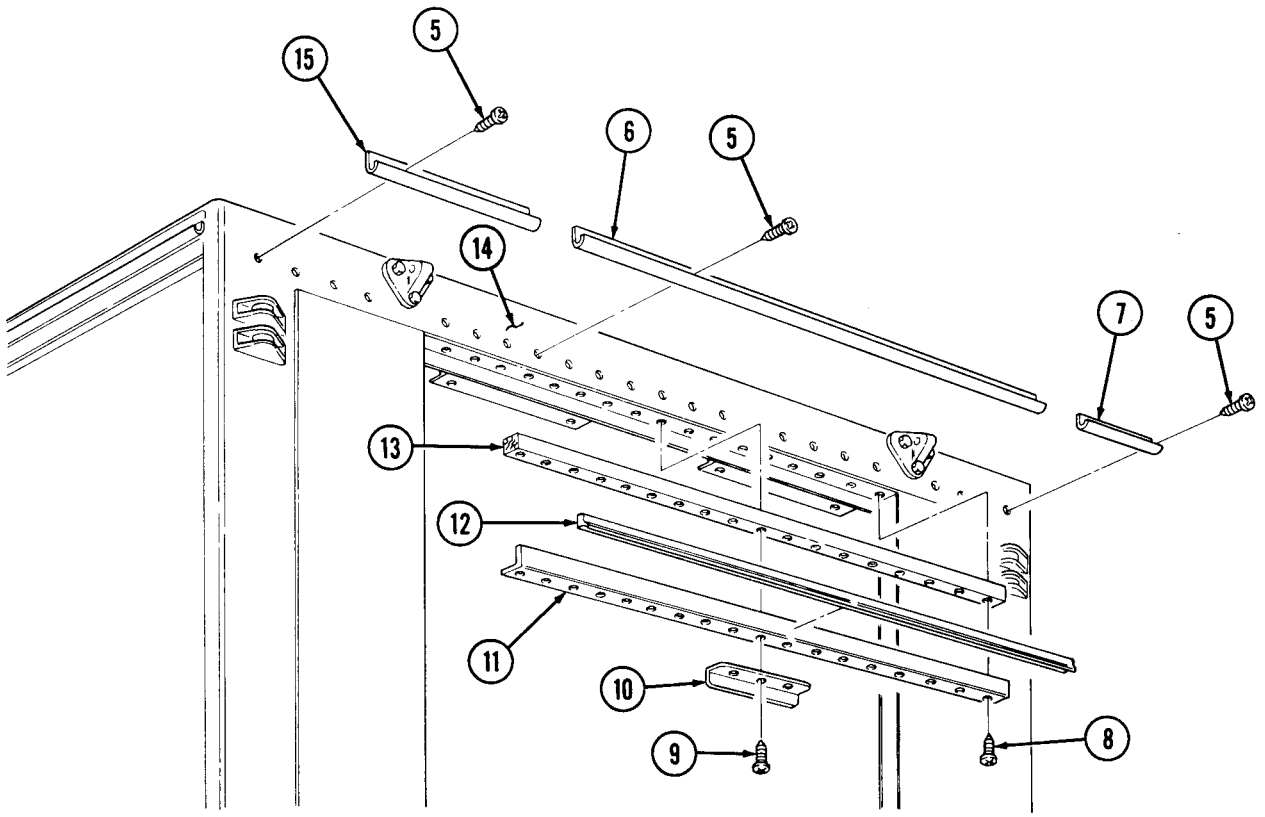
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

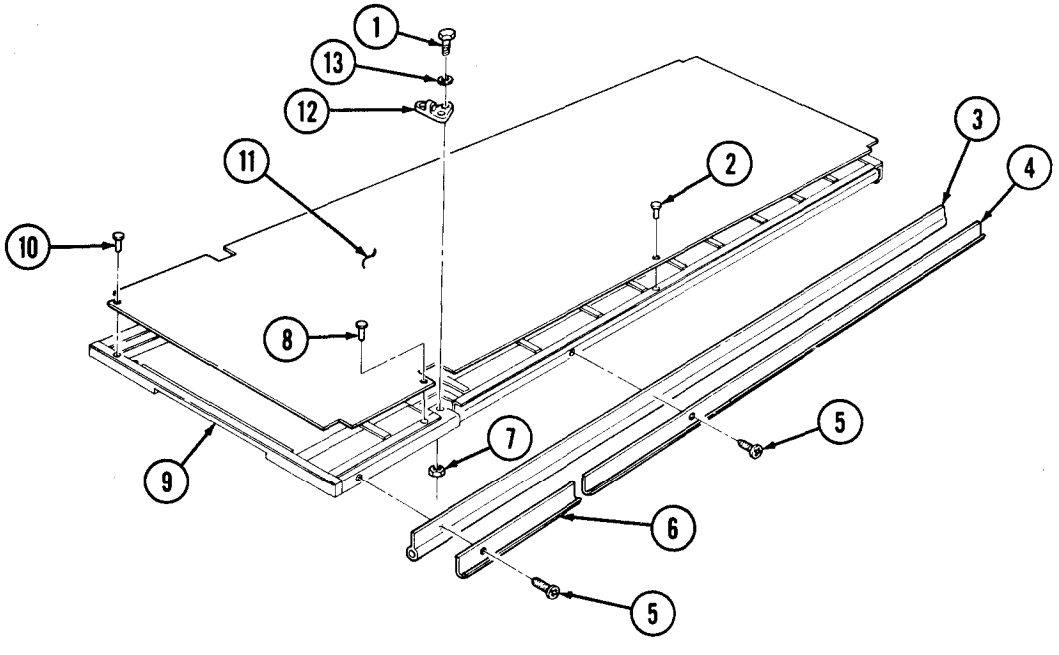
- Perform step 24 only if roof panel is to be installed. See task b.
- Insulate entire structure with fibrous glass felt insulation.
- Assistant will help step 24.

24.		Roof panel (11)	a. Lift from supports and position on roof frame (9). b. Install on roof frame (9) with one-hundred sixteen new rivets (2), eighteen new rivets (8), and one-hundred twenty-six new rivets (10).
25.		Two lifting brackets (12)	Install on roof frame (9) with six screws (1), new lockwashers (13), and nuts (7).

NOTE

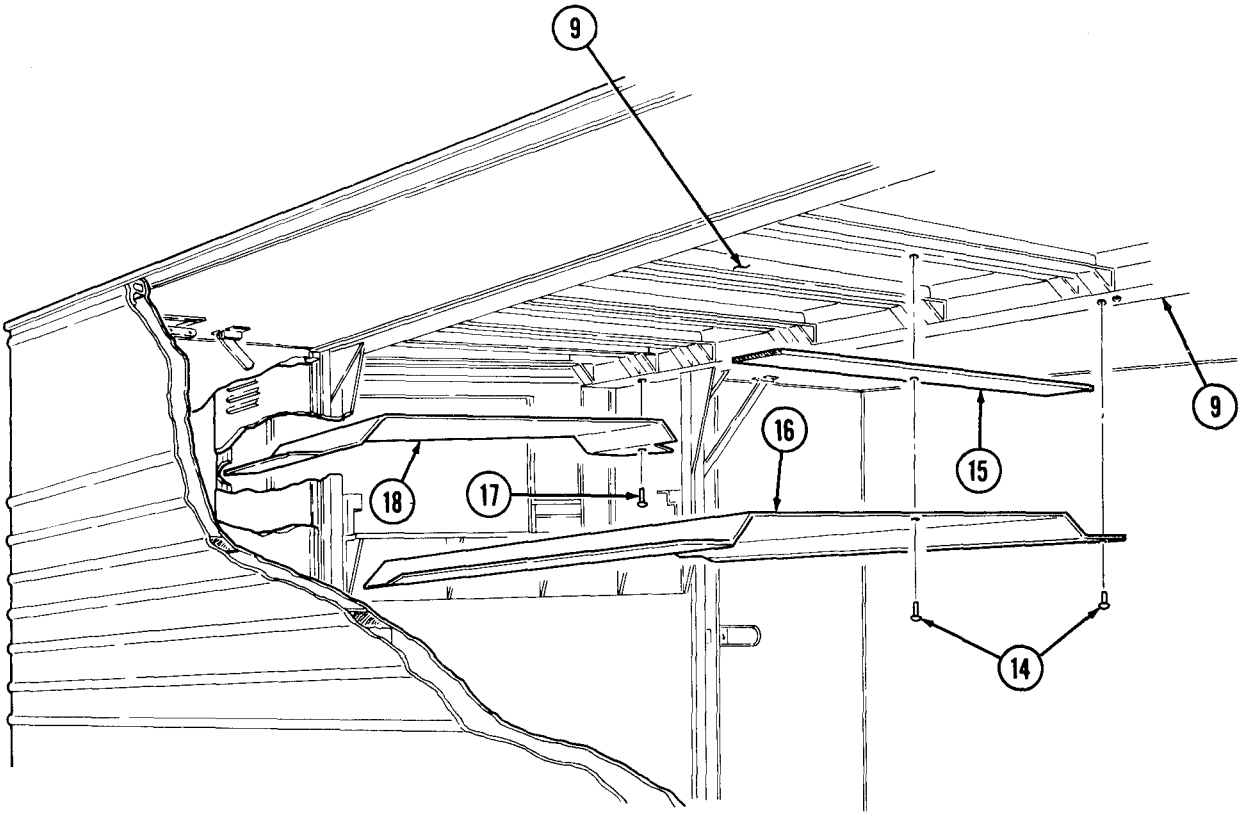
Left and right side moldings are installed the same way. This procedure covers the right side.

26.		Molding (4), molding (6), and new seal (3)	Install on roof frame (9) with fifty-nine screws (5).



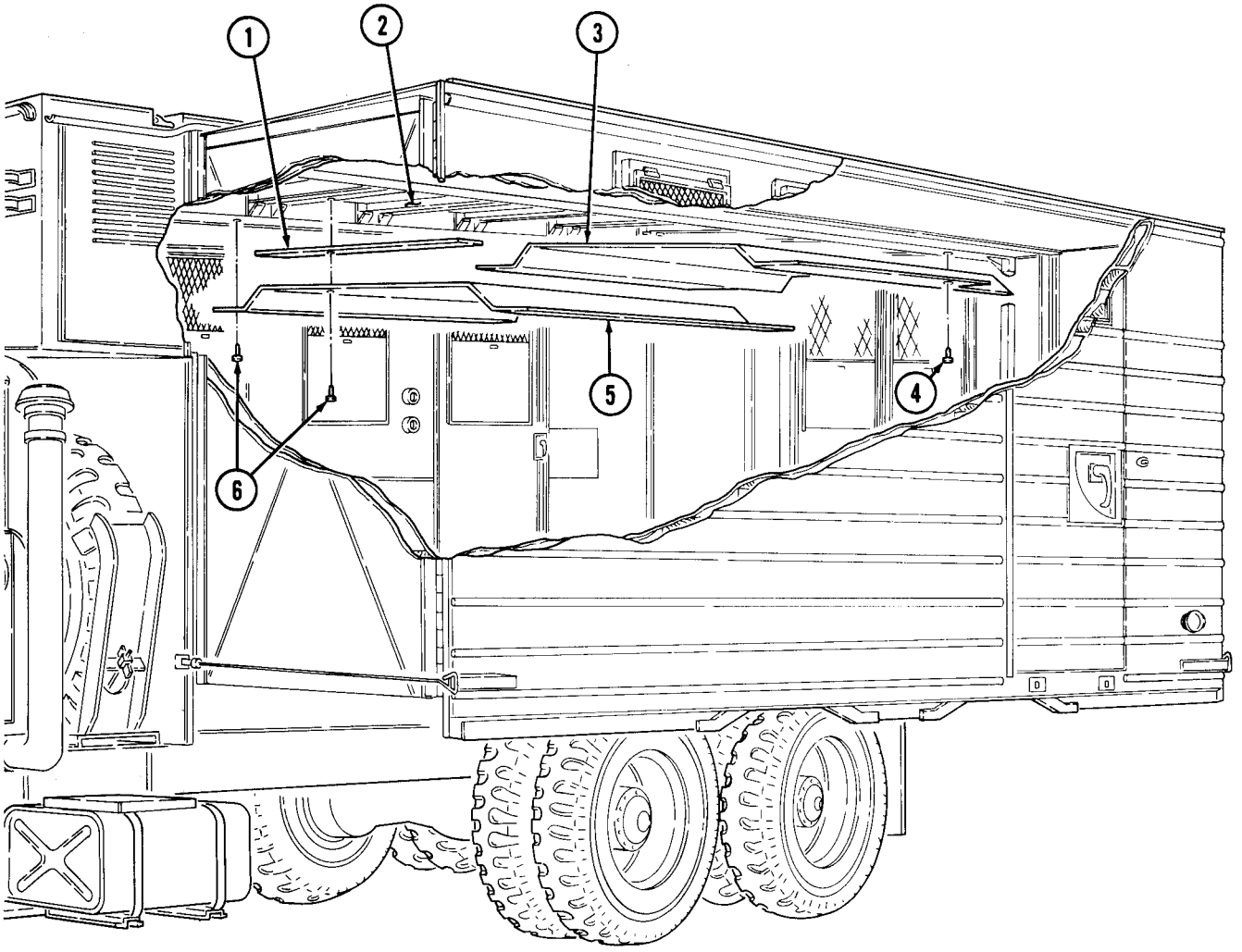
18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Assistant will help with steps 27 through 30.		
27.		Ceiling panel (18) and three liner strips (15)	Install on roof frame (9) with seventy-six new rivets (17).	
28.		Ceiling panel (16) and two liner strips (15)	Install on roof frame (9) with ninety-two new rivets (14).	



18.1-15. CEILING AND FRAME MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
29.		Ceiling panel (5) and two liner strips (1)	Install on roof frame (2) with one-hundred two new rivets (6).	
30.		Ceiling panel (3) and two liner strips (1)	Install on roof frame (2) with ninety-three new rivets (4).	



END OF TASK!

FOLLOW-ON TASKS:
- Install rear doors (para. 18.1-7).
- Install ceiling transition (para. 18.1-21).
- Install ceiling rear cover (para. 18.1-19).
- Install ceiling filler and side panels (para. 18.1-18).
- Install ceiling air ducts (para. 18.1-20).
- Retract van body sides (TM 9-2320-272-10).

18.1-16. HINGED ROOF MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Three cotter pins
Two cushion pads
Gasket
Five grommets
Insulation
O-ring
Two-hundred thirty-three rivets
Five seals
Primer (Appendix C, Item 38)
Sealing compound (Appendix C, Item 37)
Adhesive (Appendix C, Item 1)

Personnel Required
Wheeled vehicle mechanic MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition	Reference
Parking brake set.	TM 9-2320-272-10
Van body sides fully expanded and secured.	TM 9-2320-272-10
Hinged roof-operated blackout circuit plungers removed.	TM 9-2320-272-20-2
Ceiling rear cover removed.	Para. 18.1-19
Ceiling filler and side panels removed.	Para. 18.1-18

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
All personnel must stand clear during lifting operations.

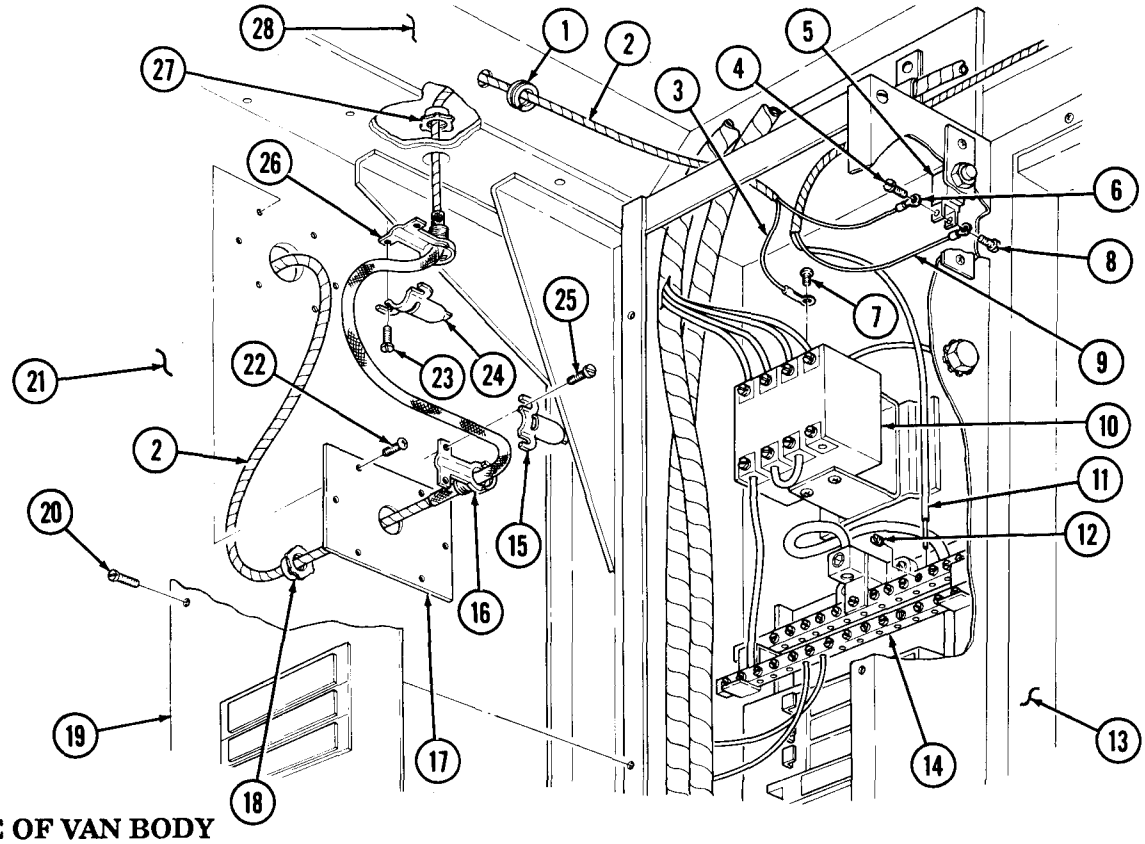
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
			NOTE • Left and right hinged roofs are removed the same way. This procedure covers right side except where indicated. • Tag leads for installation.	
1.	Load center (13)	Six screws (20) and cover (19)	Remove.	
			NOTE Step 2 applies to left side blackout harness.	
2.	Neutral bus bar (14) and rear door blackout switch (5)	Setscrew (12) and screw (8)	Remove, and disconnect cables (9) and (11).	
			NOTE Step 3 applies to right side blackout harness.	
3.	Relay (10) and rear door blackout switch (5)	Screws (4) and (7)	Remove, and disconnect cables (3) and (6).	
4.	Panel (21)	Six screws (22) and cover (17)	Remove.	
5.	Harness (2) and cover (17)	Nut (18) and connector (16)	Remove.	Mark position of connector (16) for installation.
6.		Two screws (25) and connector (15)	Remove.	Mark position of connector (15) for installation.
7.	Harness (2) and ceiling truss (28)	Nut (27) and connector (26)	Remove.	Mark position of connector (26) for installation.
8.		Two screws (23) and connector (24)	Remove.	Mark position of connector (24) for installation.
9.		Grommet (1)	Remove.	Discard grommet (1).
			NOTE Step 10 applies to left side blackout harness.	
10.	Load center (13)	Harness (2)	Pull through hole in ceiling truss (28) and rear header (29) and remove.	
			NOTE Step 11 applies to right side blackout harness.	
11.		Harness (2)	Pull through hole in ceiling truss (28) and remove.	

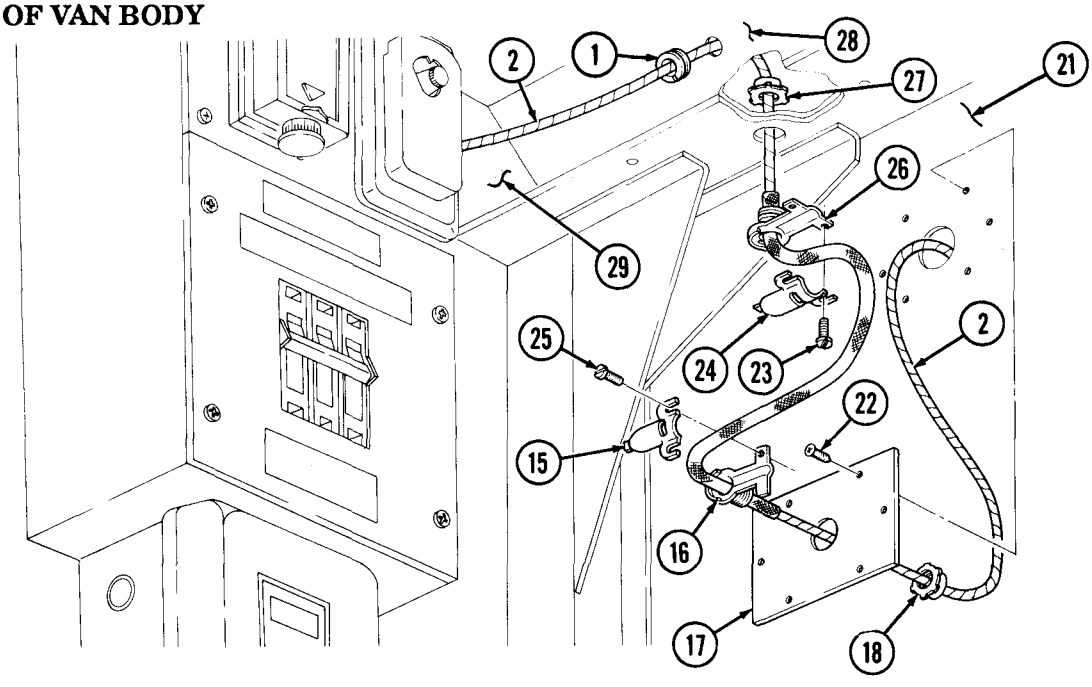
18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



RIGHT SIDE OF VAN BODY

LEFT SIDE OF VAN BODY



18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
12.	Lifting device (1) and hinged roof (3)	Two chains (2)	Attach.	Remove slack from chains (2).
13.	Hinged roof (3)	Four screws (5), two angle brackets (4), and holding rods (6).	Remove.	

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

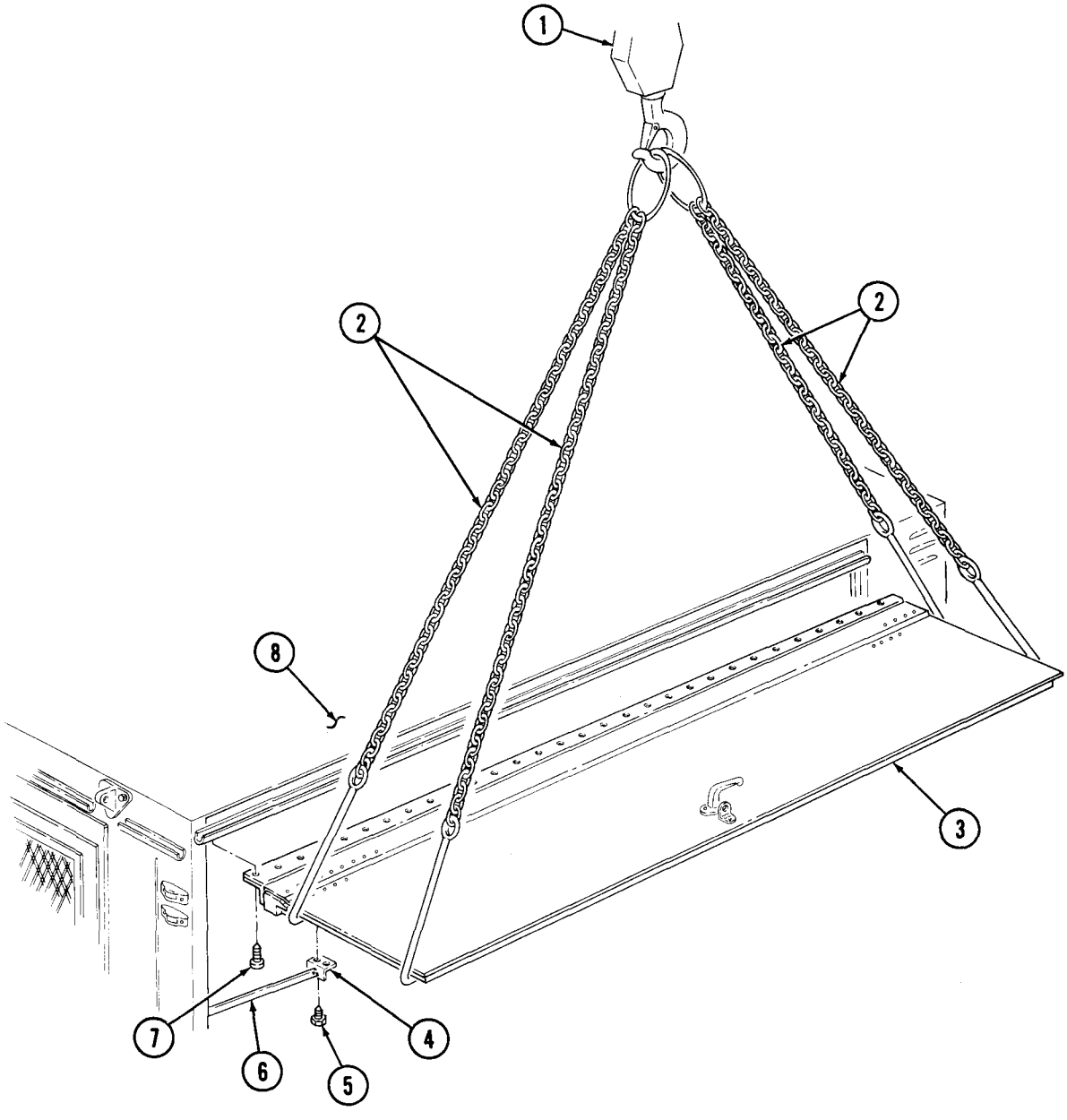
NOTE

Assistant will help with step 14.

14.	Van body (8) and hinged roof (3)	Sixty-nine screws (7)	a. Remove. b. Lift hinged roof (3) and position on supports.	
15.	Lifting device (1) and hinged roof (3)	Chains (2)	Remove.	

18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

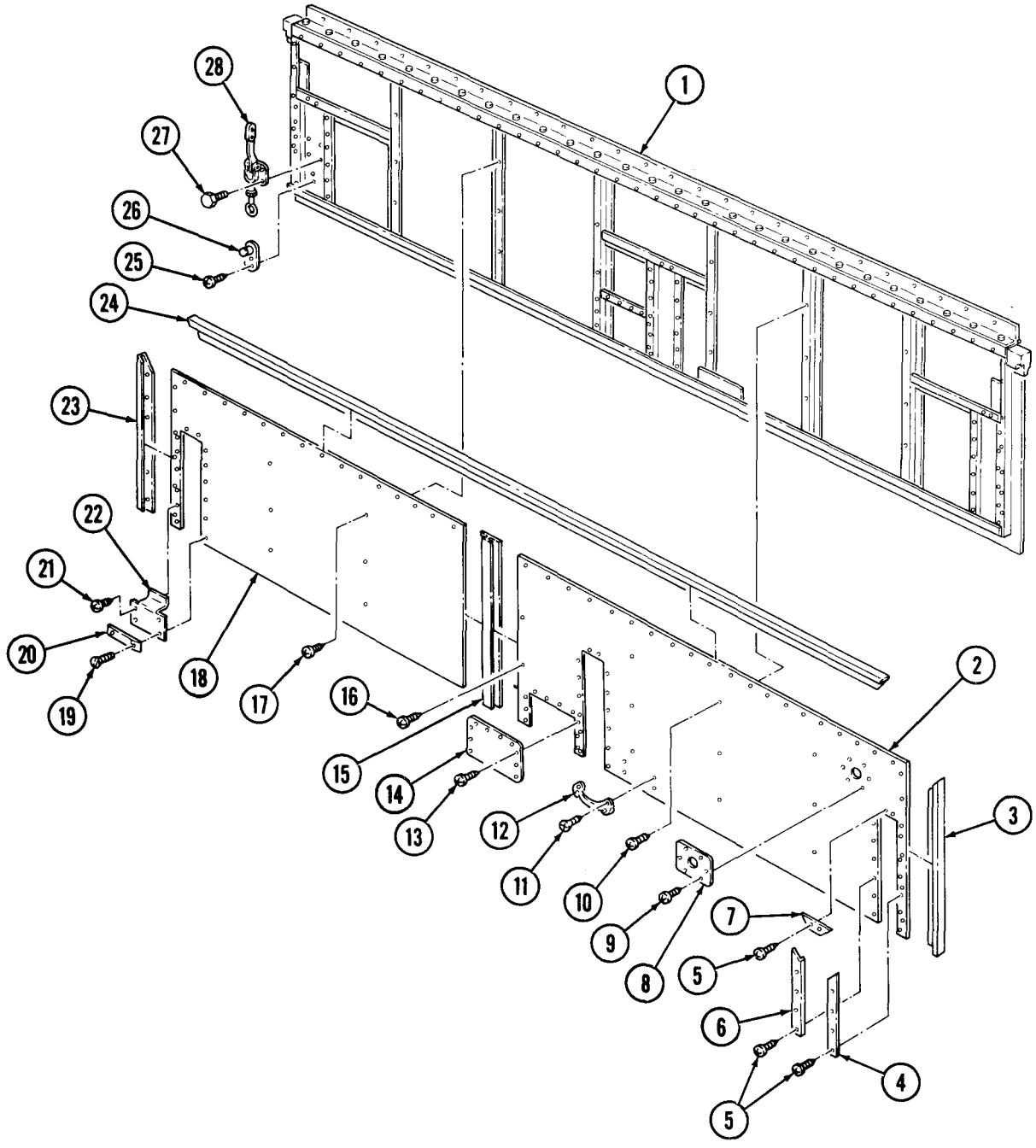


18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Disassembly			
		NOTE Left and right hinged roofs are disassembled the same way. This procedure covers the right side.		
16.	Hinged roof frame (1)	Twelve screws (27) and three clamps (28)	Remove.	
17.		Six screws (25) and three holder assemblies (26)	Remove.	
18.	Panels (2) and (18)	Thirty screws (5), three moldings (4), (6), and (7)	Remove.	
19.	Panel (2)	Four screws (11) and handle (12)	Remove.	
20.		Ten screws (13) and cover (14)	Remove.	
21.		Six screws (9) and plate (8)	Remove.	
22.	Panels (2) and (18)	Six screws (19) and three bars (20)	Remove.	
23.		Six screws (21) and three fillers (22)	Remove.	
24.		Two screws (16) and molding (15)	Remove.	
25.		Moldings (3), (23), and (24)	Remove.	
		NOTE Assistant will help with steps 26 and 27.		
26.	Hinged roof frame (1)	Fifty-five screws (10) and panel (2)	Remove.	
27.		Forty-one screws (17) and panel (18)	Remove.	

18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
28.	Hinged roof frame (11)	Sixty-eight screws (26), hinge (14), and seal (13)	Remove.	Discard seal (13).
29.		Twenty-four rivets (29), retainer (30), and seal (28)	Remove.	Discard seal (28) and. rivets (24).
30.		Cushion pads (12) and (27)	Remove.	Discard cushion pads (12) and (27).
31.		Fifly-two rivets (32), retainer (34), and seal (35)	Remove.	Discard rivets (32) and seal (35).
32.		Seals (31) and (33)	Remove.	Discard seals (31) and (33).
33.	Angle bracket (37)	Padlock and chain (2) and chain hook (1)	Remove.	
34.	Skin (7)	Three screws (38) and angle bracket (37)	Remove.	
35.	Handle (3) at shoulder bolt	Cotter pin (24), nut (23), and washer (22)	Remove.	Discard cotter pin (24).
36.	Skin (7)	Two screws (4), plate (5), handle (3), gasket (6), and O-ring (36)	Remove.	Discard O-ring (36) and gasket (6).
37.	Latch (17)	Two cotter pins (19) and pins (16)	Remove.	Discard cotter pins (19).
38.	Hinged roof frame (11)	Four nuts (21), washers (20), and latch (17)	Remove.	
39.	Bars (15) and (25)	Two clevises (18)	Remove.	
40.	Hinged roof frame (11)	Bars (15) and (25)	Remove.	
41.		Four screws (9) and grommets (10)	Remove.	Discard grommets (lo).

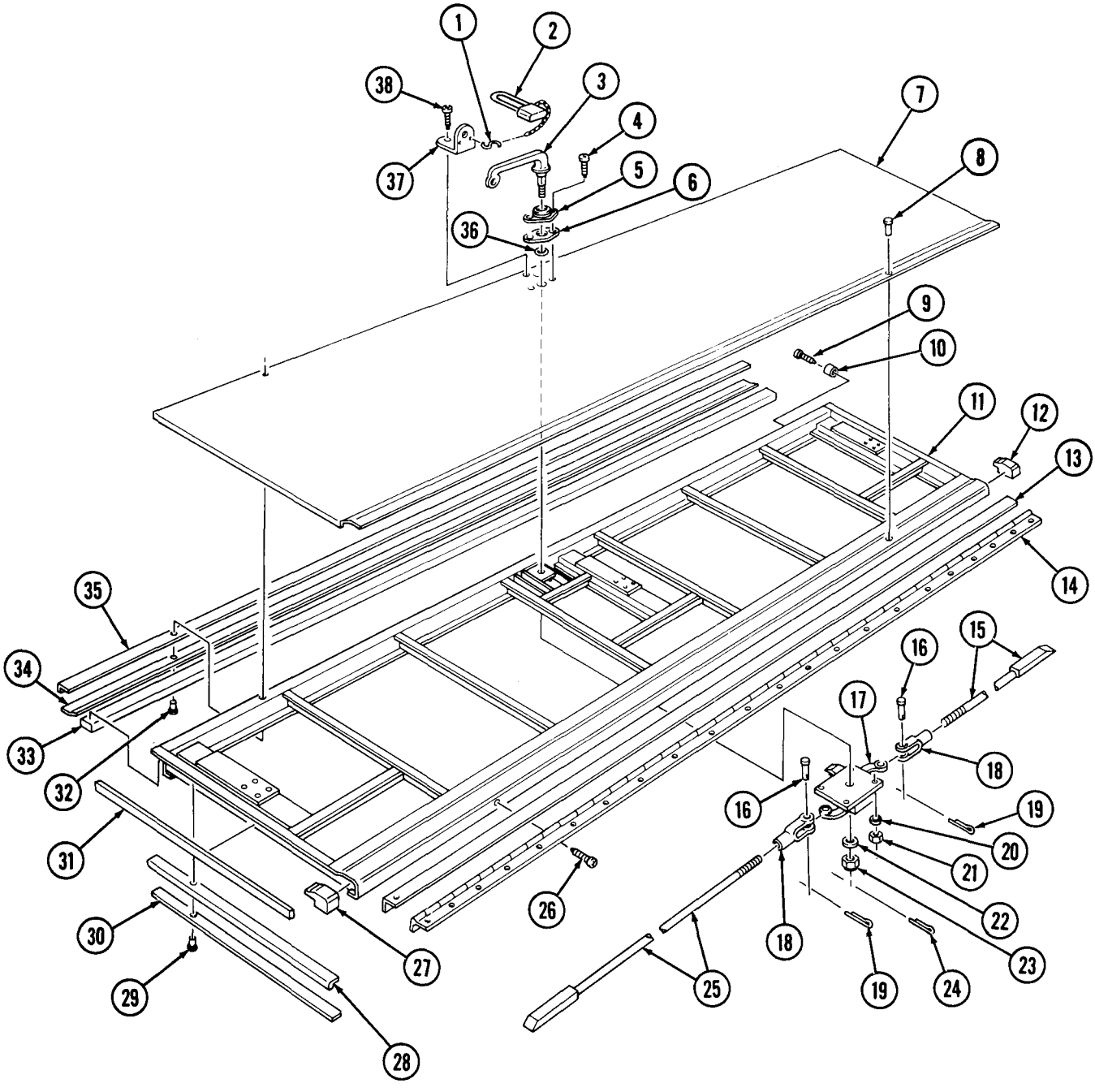
NOTE

- Perform step 42 only if skin is to be removed. See task c.
- Assistant will help with step 42.

42.		One-hundred fifty-seven rivets (8) and skin (7)	Remove.	Discard rivets (8).

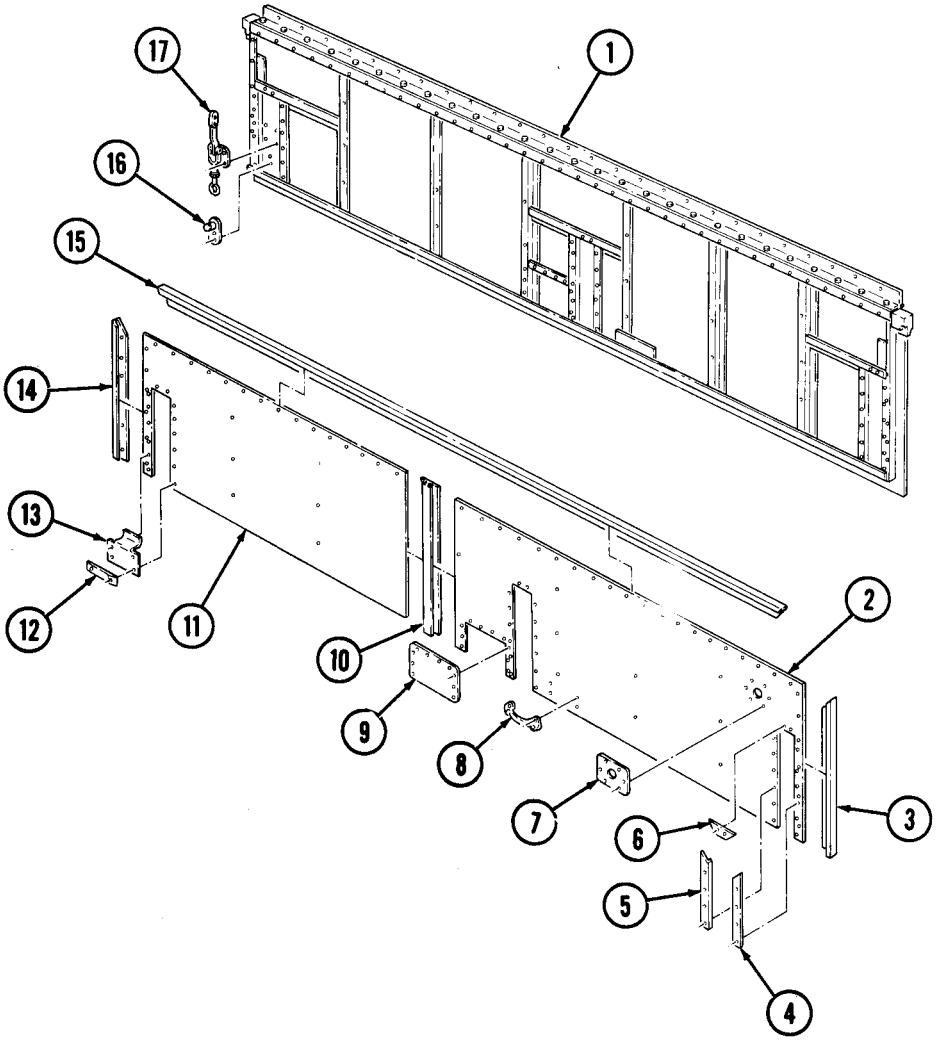
18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



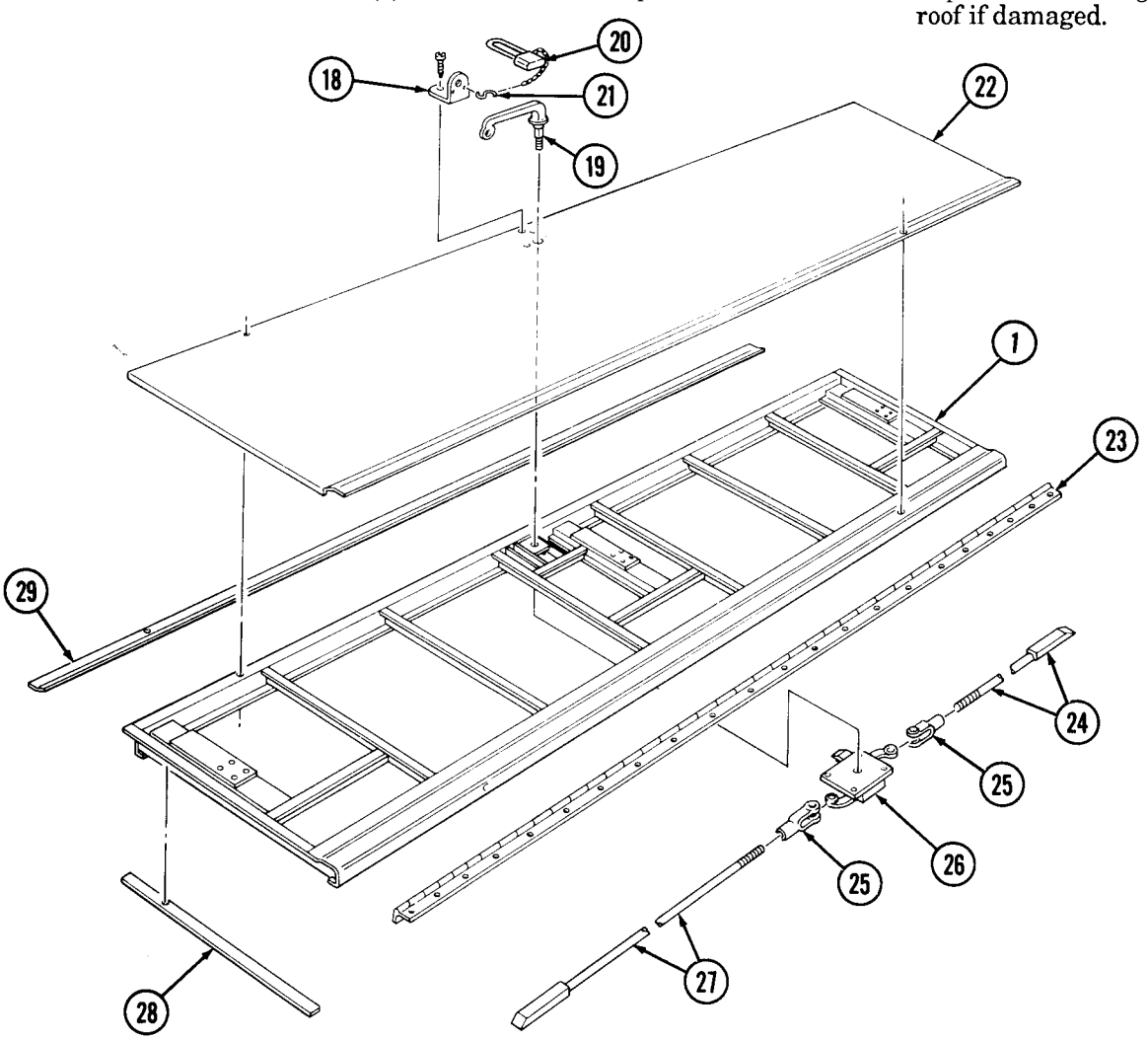
18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Cleaning and Inspection				
43.		All parts	Clean.	Refer to para. 2-7.
44.		Panels (2) and (11)	Inspect for cracks and breaks.	Replace if cracked or broken.
45.		Moldings (3), (4), (5), (6), (10), (14), and (15)	Inspect for warpage and breaks.	Replace if warped or broken.
46.		Plate (7), handle (8), cover (9), three bars (12), and fillers (13)	Inspect for bends and breaks.	Replace if bent or broken.
47.		Three clamps (17) and holder assemblies (16)	Inspect for breaks and proper operation.	Replace if damaged.



18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
48.		Hinge (23)	Inspect for breaks and proper operation.	Replace if damaged.
49.		Retainers (28) and (29)	Inspect for cracks and breaks.	Replace if cracked or broken.
50.		Angle bracket (18), padlock and chain (20), chain hook (21), and handle (19)	Inspect for breaks.	Replace if broken.
51.		Bars (24) and (27), and two clevises (25)	Inspect for bends and breaks.	Replace if bent or broken.
52.		Latch (26)	Inspect for proper operation.	Replace if damaged.
53.		Skin (22)	Inspect for tears and punctures.	Replace if torn or punctured.
54.		Frame (1)	Inspect for breaks.	Replace entire hinged roof if damaged.

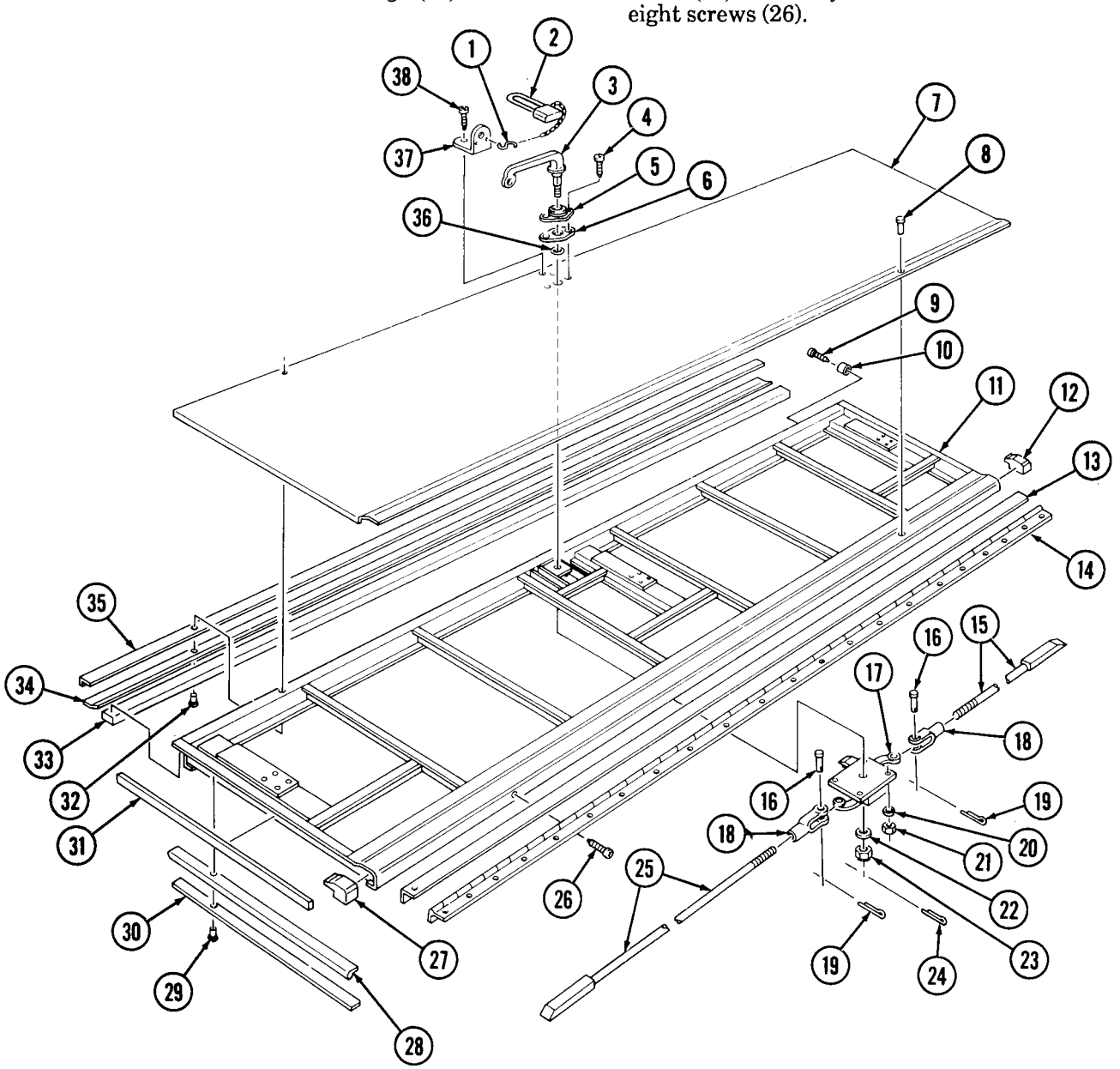


18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Left and right hinged roofs are assembled the same way. This procedure covers the right side. • Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer. • Seal between exterior joints with sealing compound. • Apply adhesive to both rubber and metal surfaces. • Perform step 55 only if skin is to be installed. See task c. • Assistant will help with step 55.		
55.		Skin (7)	Install on hinged roof frame (11) with one-hundred fifty-seven new rivets (8).	
56.		Four new grommets (10)	Install on hinged roof frame (11) with four screws (9).	
57.		Two clevises (18)	Install on bars (15) and (25) and position in slots of hinged roof frame (11).	
58.		Latch (17)	Install on hinged roof frame (11) with four washers (20) and nuts (21).	
59.		Two clevises (18)	Install on latch (17) with two pins (16) and new cotter pins (19).	
60.		New O-ring (36), new gasket (6), plate (5), and handle (3)	Install on skin (7) with two screws (4).	
61.		Handle (3)	Install on latch (17) with washer (22), nut (23), and new cotter pin (24).	
62.		Angle bracket (37)	Install on skin (7) with three screws (38).	
63.		Chain hook (1) and padlock and chain (2)	Install on angle bracket (37).	
64.		New seals (31) and (33)	Install on hinged roof frame (11).	
65.		New seal (35) and retainer (34)	Install on hinged roof frame (11) with fifty-two new rivets (32).	
66.		New cushion pads (12) and (27)	Install on hinged roof frame (11).	

18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
67.		New seal (28) and retainer (30)	Install on hinged roof frame (11) with twenty-four new rivets (29).	
68.		New seal (13) and hinge (14)	Install on hinged roof frame (11) with sixty-eight screws (26).	

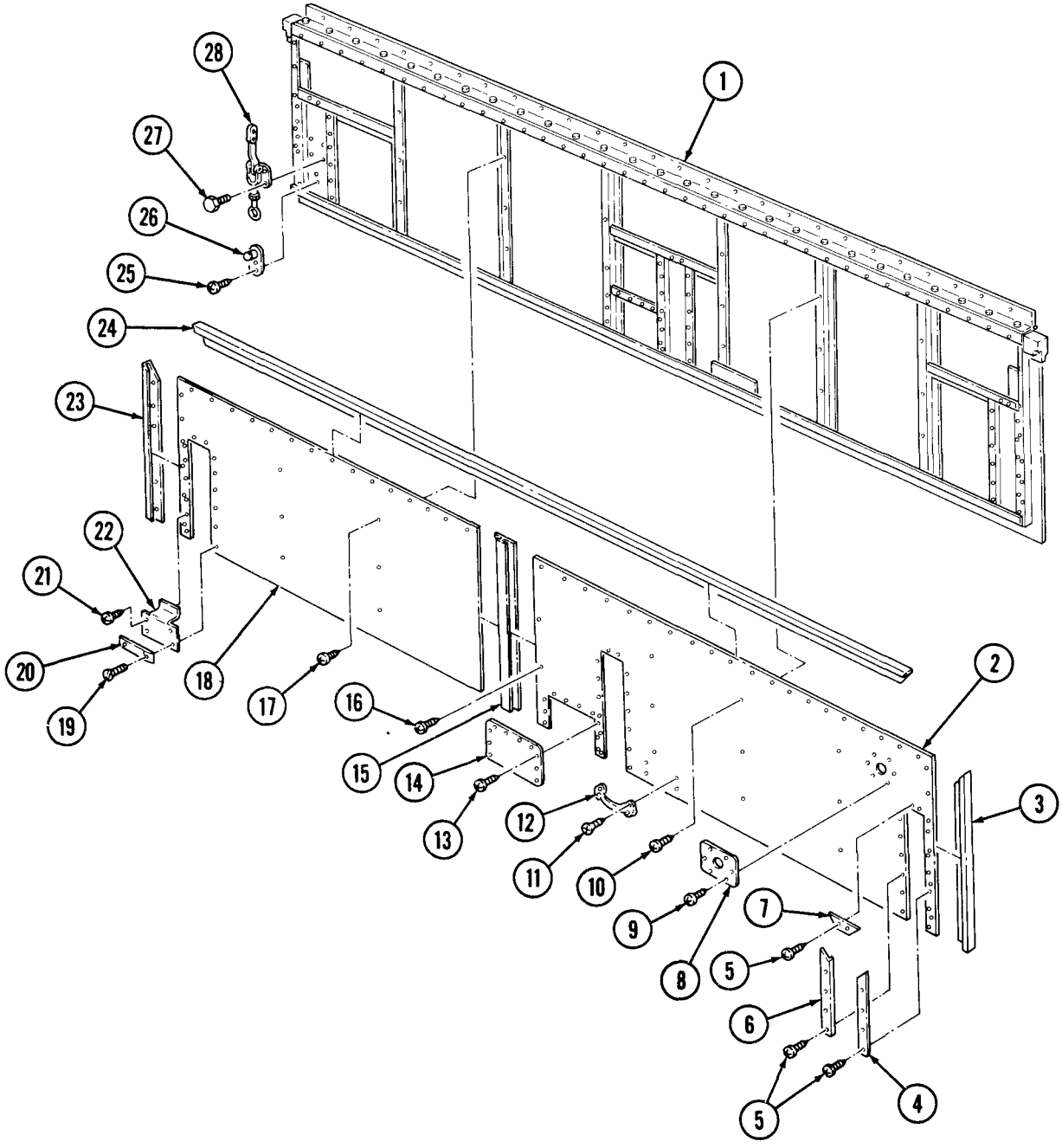


18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Insulate entire structure with fibrous glass felt insulation. • Assistant will help with steps 69 and 70.		
69.		Panel (18)	Install on hinged roof frame (1) with forty-one screws (17).	
70.		Panel (2)	Install on hinged roof frame (1) with fifty-five screws (10).	
71.		Molding (15)	Install on panels (2) and (18) with two screws (16).	
72.		Moldings (3), (23), and (24)	Install on panels (2) and (18).	
73.		Three fillers (22)	Install on panels (2) and (18) with six screws (21).	
74.		Three bars (20)	Install on fillers (22) with six screws (19).	
75.		Plate (8)	Install on panel (2) with six screws (9).	
76.		Cover (14)	Install on panel (2) with ten screws (13).	
77.		Handle (12)	Install on panel (2) with four screws (11).	
78.		Three moldings (4), (6), and (7)	Install on panels (2) and (18) with thirty screws (5).	
79.		Three holder assemblies (26)	Install on hinged roof frame (1) with six screws (25).	
80.		Three clamps (28)	Install on hinged roof frame (1) with twelve screws (27).	

18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

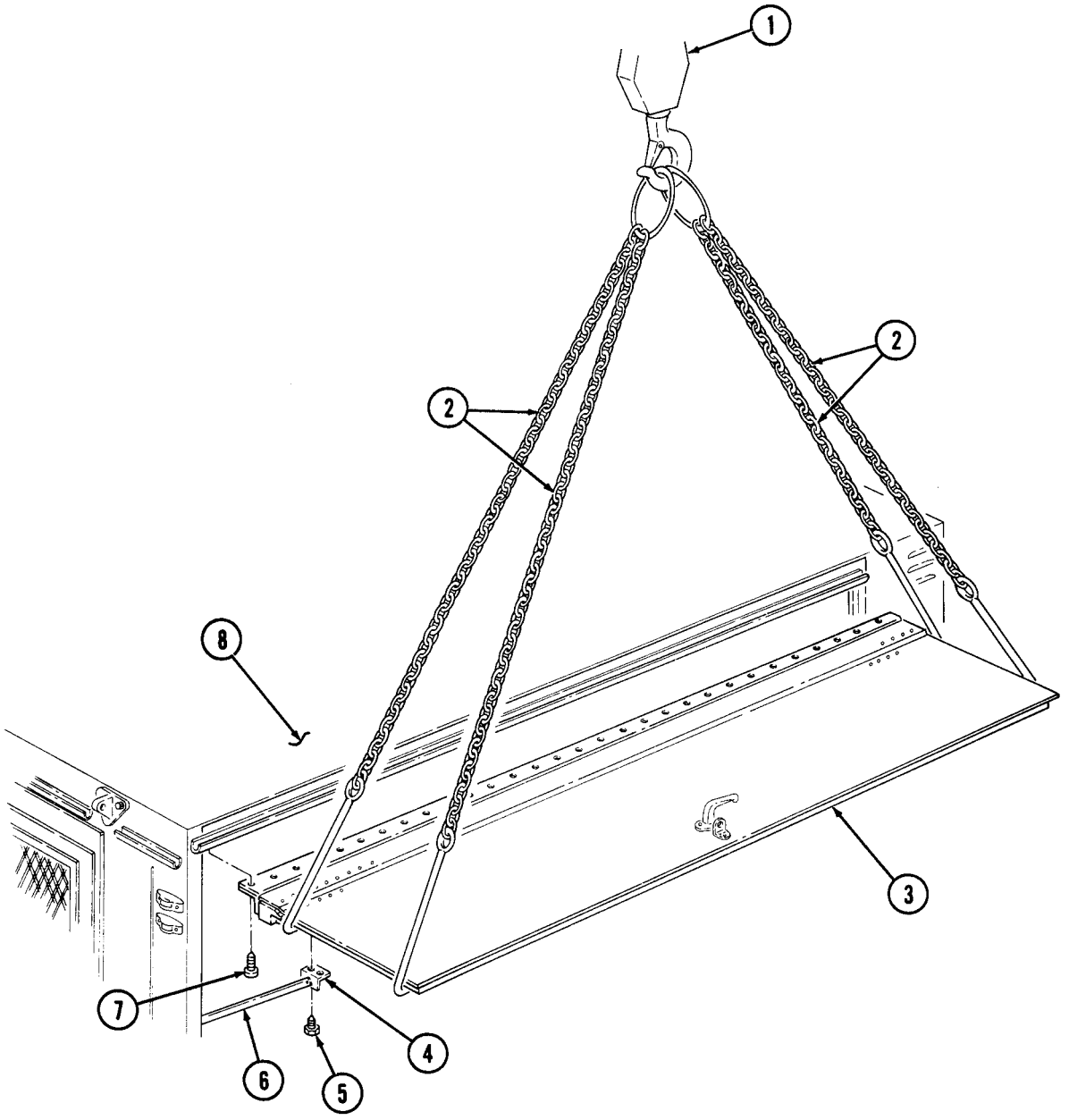


18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	e. Installation			
			NOTE Left and right hinged roofs are installed the same way. This procedure covers the right side except where indicated.	
81.		Two chains (2)	Attach to lifting device (1) and hinged roof (3).	
			WARNING All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.	
			NOTE Assistant will help with step 82.	
82.		Hinged roof (3)	a. Lift from supports Install on van body (8) with sixty-nine screws (7). c. Install on two holding rods (6) and angle bracket (4) with four screws (5).	
83.		Chains (2)	Remove from lifting device (1) and hinged roof (3).	
			NOTE Hinged roof-operated blackout circuit plungers must be installed before side blackout harnesses are installed in load center.	
84.		Hinged roof-operated blackout circuit plungers	Install.	Refer to TM 9-2320-272-20-2.

18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

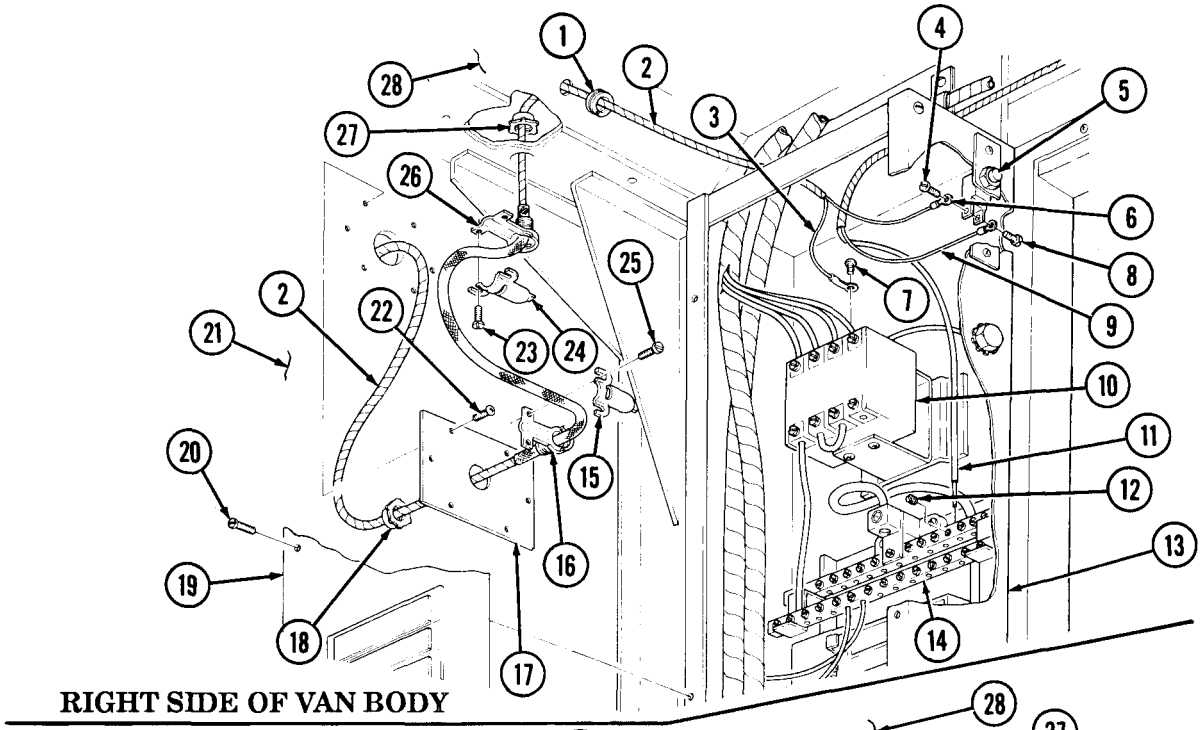


18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
85.		Connector (16)	Install on cover (17) with nut (18).	
86.		Harness (2)	Remove slack and slide through hole in cover (17) and connector (16).	
87.		Cover (17)	Install on panel (21) with six screws (22).	
88.		Connector (15)	Install on connector (16) and cover (17) with two screws (25).	
89.		New grommet (1)	Install in hole in ceiling truss (28).	
90.		Connector (26)	Slide onto harness (2).	
91.		Harness (2)	a. Insert through hole in ceiling truss (28) and guide to rear header (29).	Perform for left side blackout harness only.
			b. Insert through hole in ceiling truss (28)	Perform for right side blackout harness only.
			c. Install nut (27) on harness (2).	
			d. Guide to load center (13) and remove slack.	
92.		Connector (26)	Install on harness (2) and ceiling truss (28) with nut (27).	
93.		Connector (24)	Install on harness (2) and connector (26) with two screws (23).	
			NOTE	
			Step 94 applies to right side blackout harness.	
94.		Cables (3) and (6)	a. Connect to rear door blackout switch (5) with screw (4).	
			b. Connect to relay (10) with screw (7).	
			NOTE	
			Step 95 applies to left side blackout harness.	
95.		Cables (9) and (11)	a. Connect to rear door blackout switch (5) with screw (8).	
			b. Connect to neutral bus bar (14) with setscrew (12).	
96.		Cover	Install on load center (13) with six screws (20).	

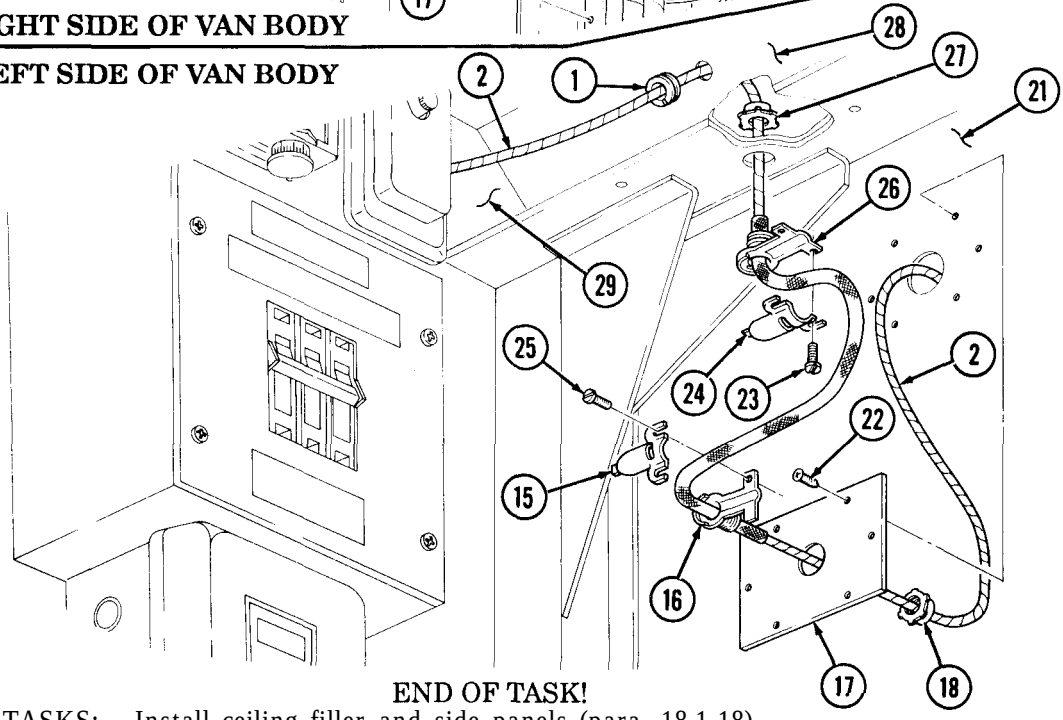
18.1-16. HINGED ROOF MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



RIGHT SIDE OF VAN BODY

LEFT SIDE OF VAN BODY



END OF TASK!

FOLLOW-ON TASKS:
- Install ceiling filler and side panels (para. 18.1-18).
- Install ceiling rear cover (para. 18.1-19).
- Install hinged roof-operated blackout circuit plungers (TM 9-2320-272-20-2).
- Retract van body sides (TM 9-2320-272-10).

18.1-17. FRONT WALL REGISTERS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M934, M935, M934A1, M935A1	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE
All four front wall registers are removed and installed the same way. This procedure covers one register.

a. Removal

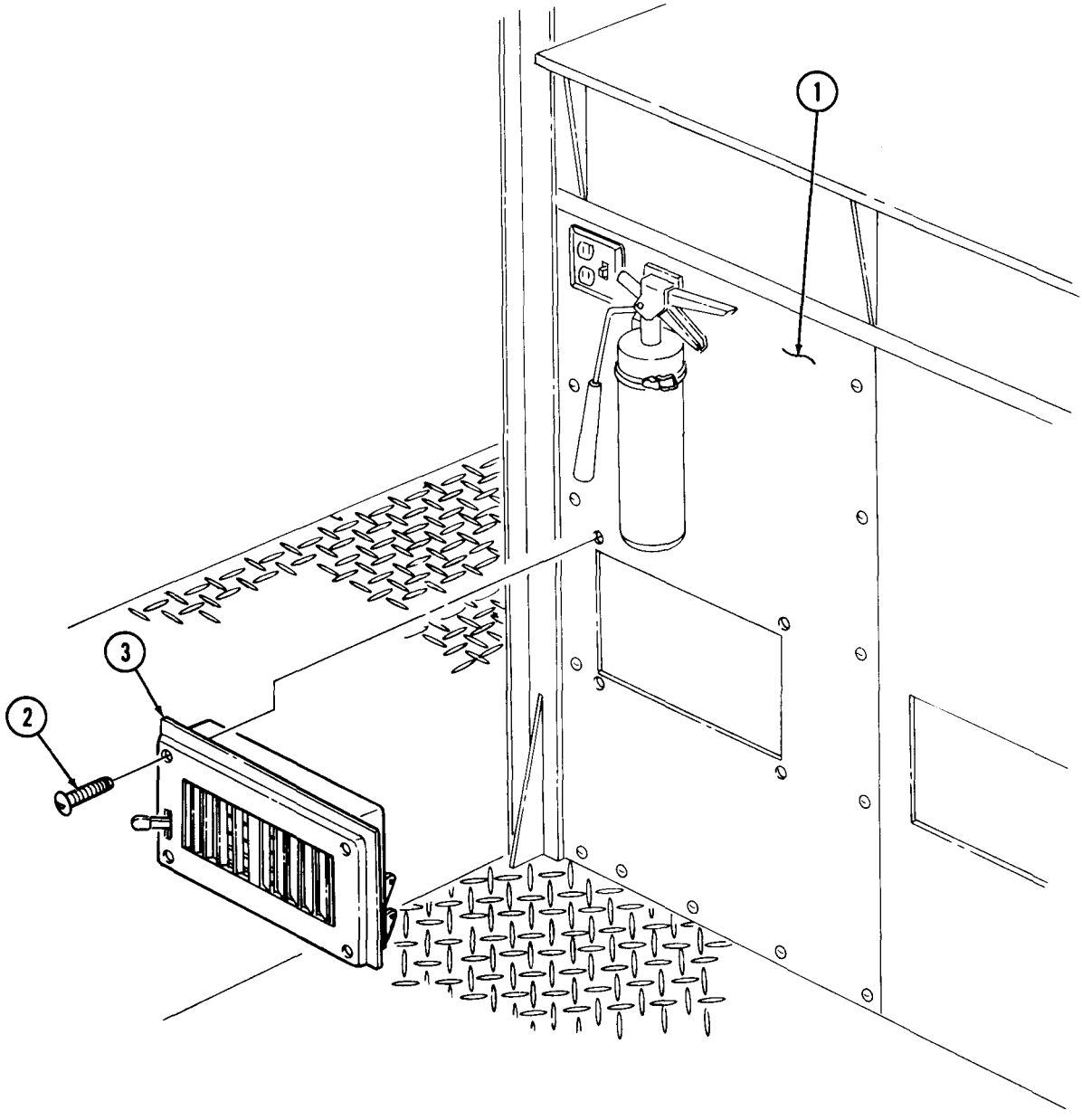
1.	Front wall (1)	Four screws (2) and register (3)	Remove.

b. Installation

2.		Register (3)	Install on front wall (1) with four screws (2).

18.1-17. FRONT WALL REGISTERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-18. CEILING FILLER AND SIDE PANELS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Insulation
Adhesive (Appendix C, Item 1)
Primer (Appendix C, Item 38)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition	Reference
Parking brake set	TM 9-2320-272-10
Inside telephone jacks (ceiling) removed.	TM 9-2320-272-20-2
Blackout light switches and receptacles removed.	TM 9-2320-272-20-2
Ceiling deflectors and registers removed.	Para. 18.1-22
Blackout and emergency light fixtures removed.	Para. 18.1-49
Fluorescent light fixtures removed.	Para. 18.1-51
Rear splice plate removed.	Para. 18.1-23

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

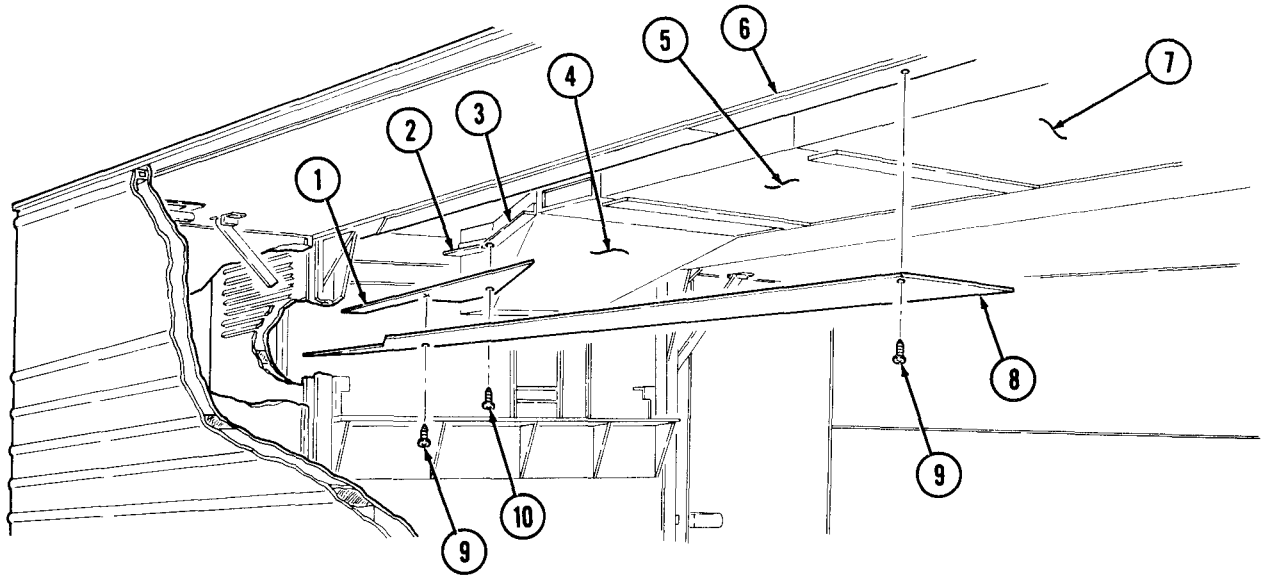
- Left and right ceiling filler and side panels are removed and installed the same way. This procedure covers the left side.
- Assistant will help with entire procedure.

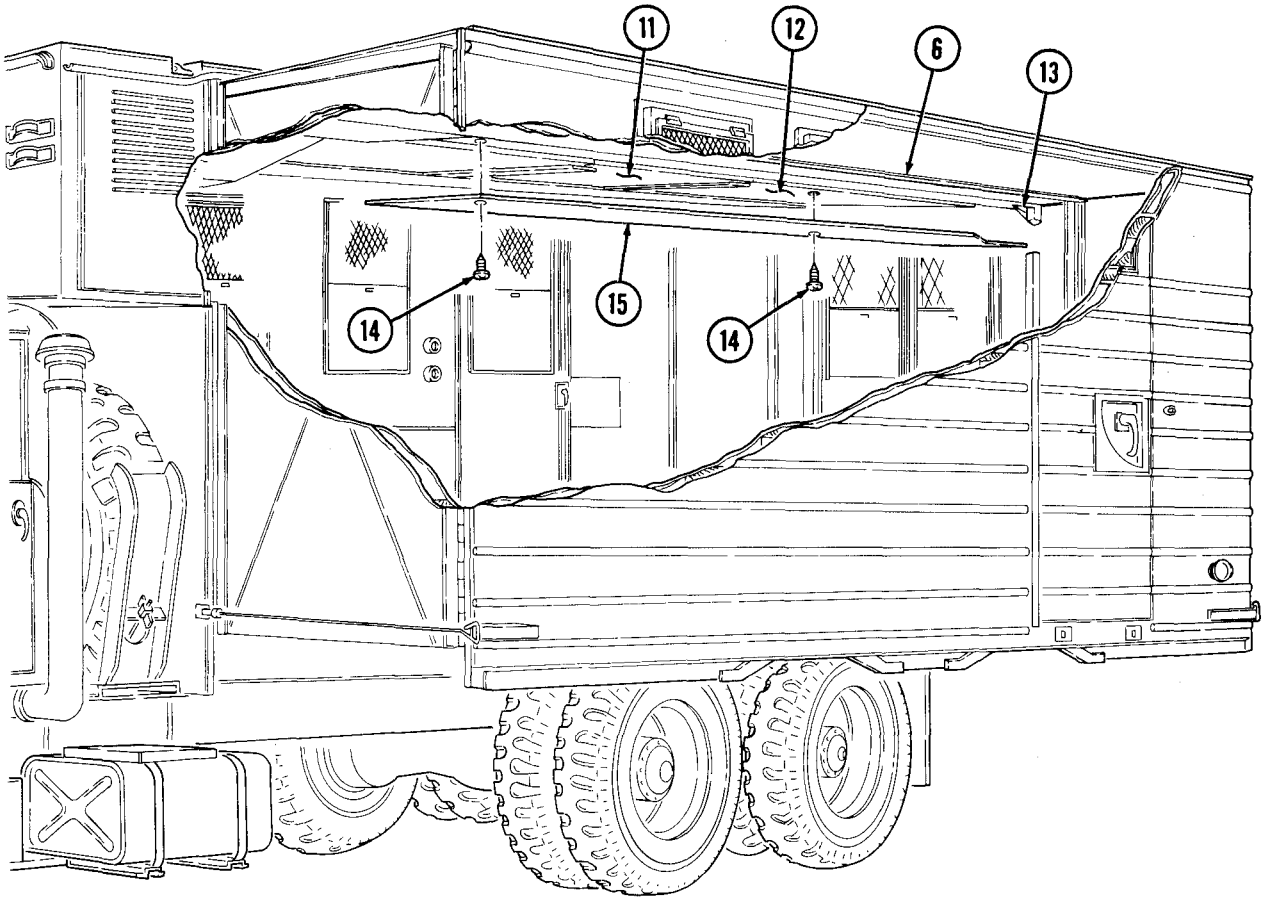
a. Removal

1.	Lintel (6), air ducts (5) and (7), and filler panel (1)	Thirty screws (9) and side panel (8)	Remove.	
2.	Filler angles (2) and (3) at transition (4)	Seven screws (10) and filler panel (1)	Remove.	
3.	Lintel (6), rear header (13), and air ducts (11) and (12)	Forty-four screws (14) and side panel (15)	Remove.	

18.1-18. CEILING FILLER AND SIDE PANELS REPLACEMENT (Cont'd]

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



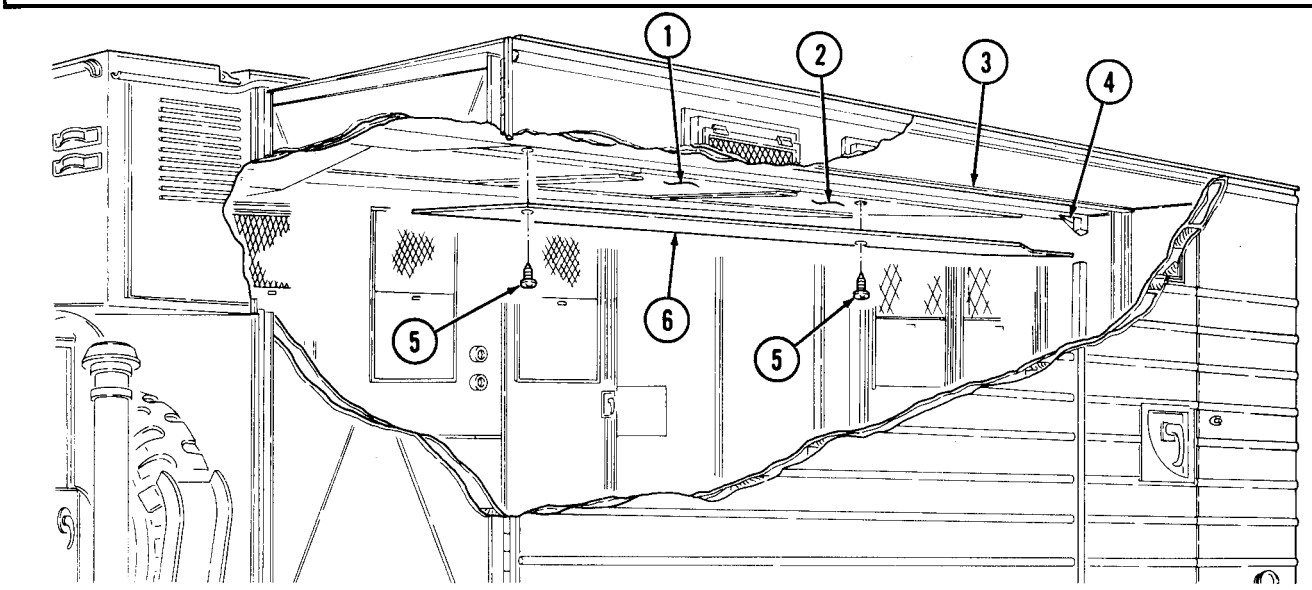


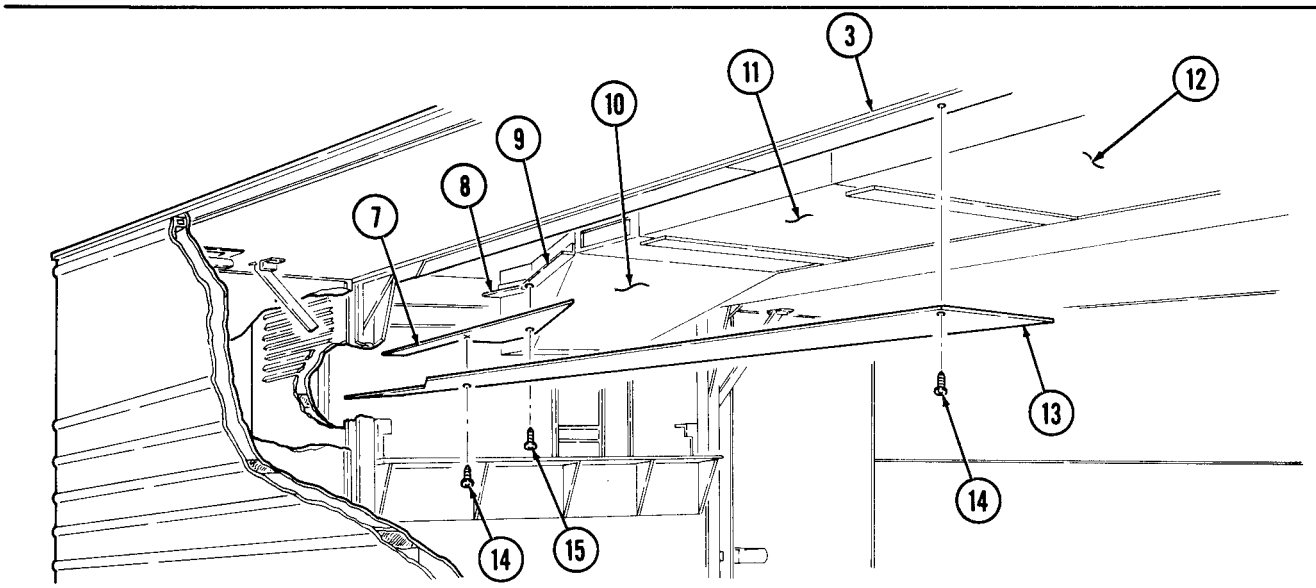
18.1-18. CEILING FILLER AND SIDE PANELS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
		NOTE • Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer. • Apply adhesive to both rubber and metal surfaces. • Insulate entire structure with fibrous glass felt insulation.		
4.		Side panel (6)	Install on lintel (3), rear header (4), and air ducts (1) and (2) with forty-four screws (5).	
5.		Filler panel (7)	Install on filler angles (8) and (9) and transition (10) with seven screws (15).	
6.		Side panel (13)	Install on lintel (3), air ducts (11) and (12) and filler panel (7) with thirty screws (14).	

18.1-18. CEILING FILLER AND SIDE PANELS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





END OF TASK!

FOLLOW-ON TASKS:
- Install rear splice plate (para. 18. 1-23).
- Install fluorescent light fixtures (para. 18.1-51).
- Install blackout and emergency light fixtures (para. 18.1-49).
- Install blackout light switches and receptacles (TM 9-2320-272-20-2).
- Install ceiling deflectors and registers (para. 18.1-22).
- Install inside telephone jacks (ceiling) (TM 9-2320-272-20-2).

18.1-19. CEILING REAR COVER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Equipment Condition Reference
TM 9-2320-272-10
Para. 18.1-23

Condition Description
Parking brake set
Rear splice plate removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materials/Parts
Insulation
Adhesive (Appendix C, Item 1)
Primer (Appendix C, Item 38)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE
Assistant will help with entire procedure.

a. Removal

1.	Rear header (2) and air duct (1)	Eight screws (4), thirteen screws (5), and rear cover (3)	Remove.

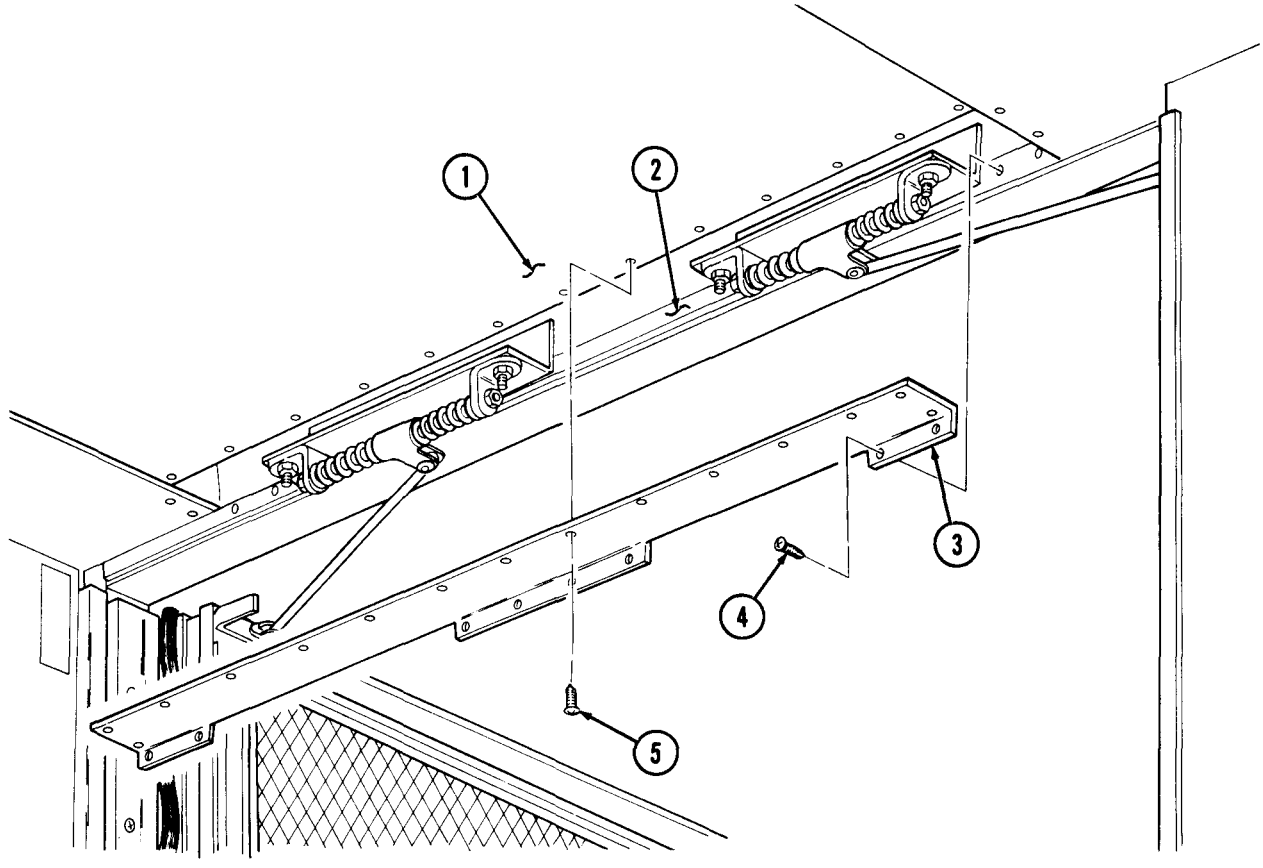
b. Installation

NOTE
- Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer.
- Apply adhesive to metal surfaces.
- Insulate entire structure with fibrous glass felt insulation.

2.		Rear cover (3)	a. Install on rear header (2) with eight screws (4). b. Install on air duct (1) with thirteen screws (5).

18.1-19. CEILING REAR COVER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install rear splice plate (para. 18.1-23).

18.1-20. CEILING AIR DUCTS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Primer (Appendix C, Item 38)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition	Reference
Parking brake set.	TM 9-2320-272-10
Van sides fully expanded and secured.	TM 9-2320-272-10
Ceiling rear cover removed.	Para. 18.1-19
Ceiling filler and side panels removed.	Para. 18.1-18

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

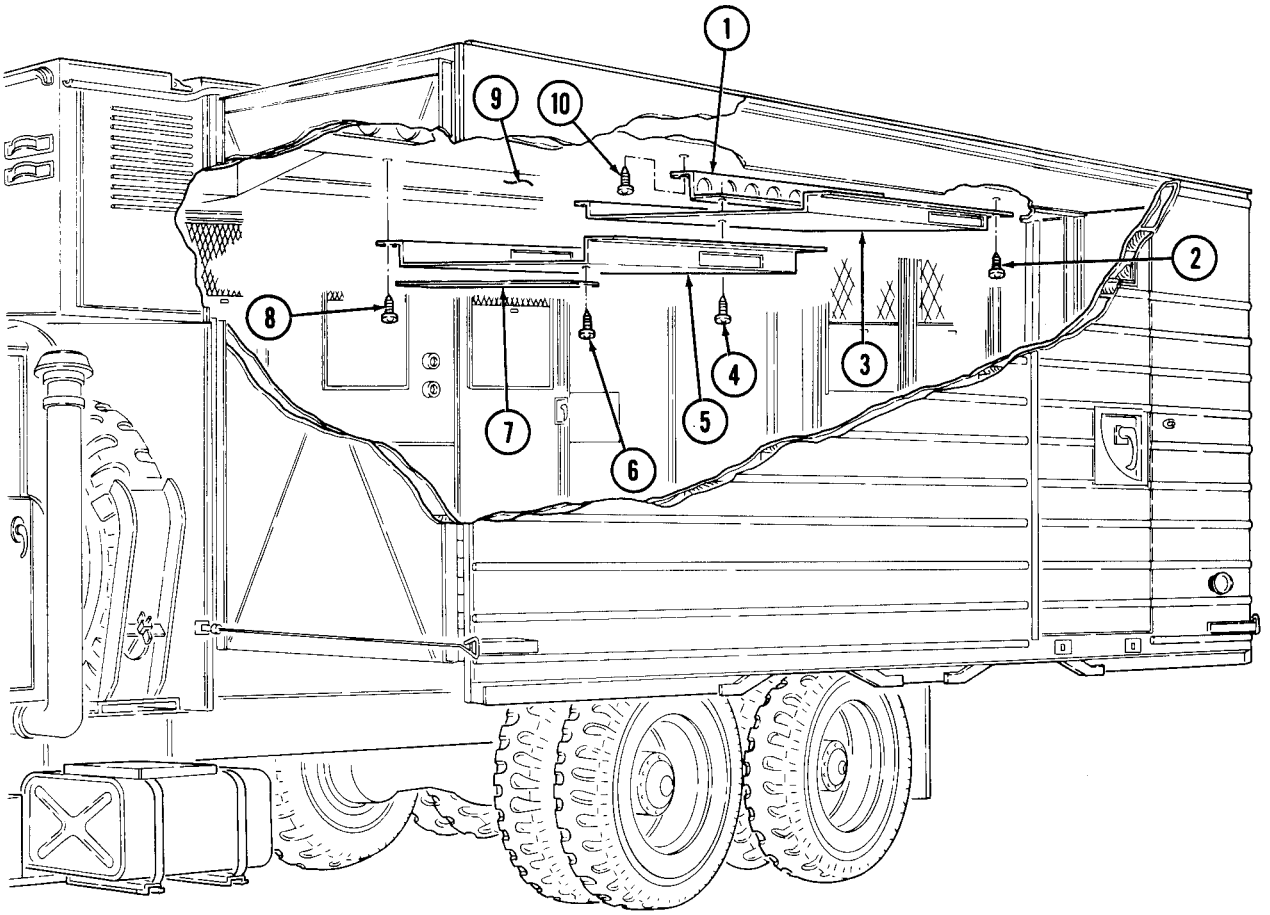
NOTE
Assistant will help with entire procedure.

a. Removal

1.	Air ducts (3) and (5)	Fifty-two screws (6) and two enclosures (7)	Remove.	
2.	Air ducts (3) and (5) and support (1)	Fourteen screws (4)	Remove.	
3.	Ceiling (9)	Forty-two screws (2) and air duct (3)	Remove.	
4.		Eighteen screws (8) and air duct (5)	Remove.	
5.		Nine screws (10) and support (1)	Remove.	

18.1-20. CEILING AIR DUCTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-20. CEILING AIR DUCTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Air ducts (8) and (12)	Fifty-two screws (11) and two enclosures (10)	Remove.	
7.	Air duct (8) and support (3)	Four screws (7)	Remove.	
8.	Air ducts (8) and (12) and support (1)	Six screws (9)	Remove.	
9.	Ceiling (4)	Twenty-six screws (6) and air ducts (8) and (12)	Remove.	
10.		Ten screws (5) and support (3)	Remove.	
11.		Seven screws (2) and support (1)	Remove.	

b. Installation

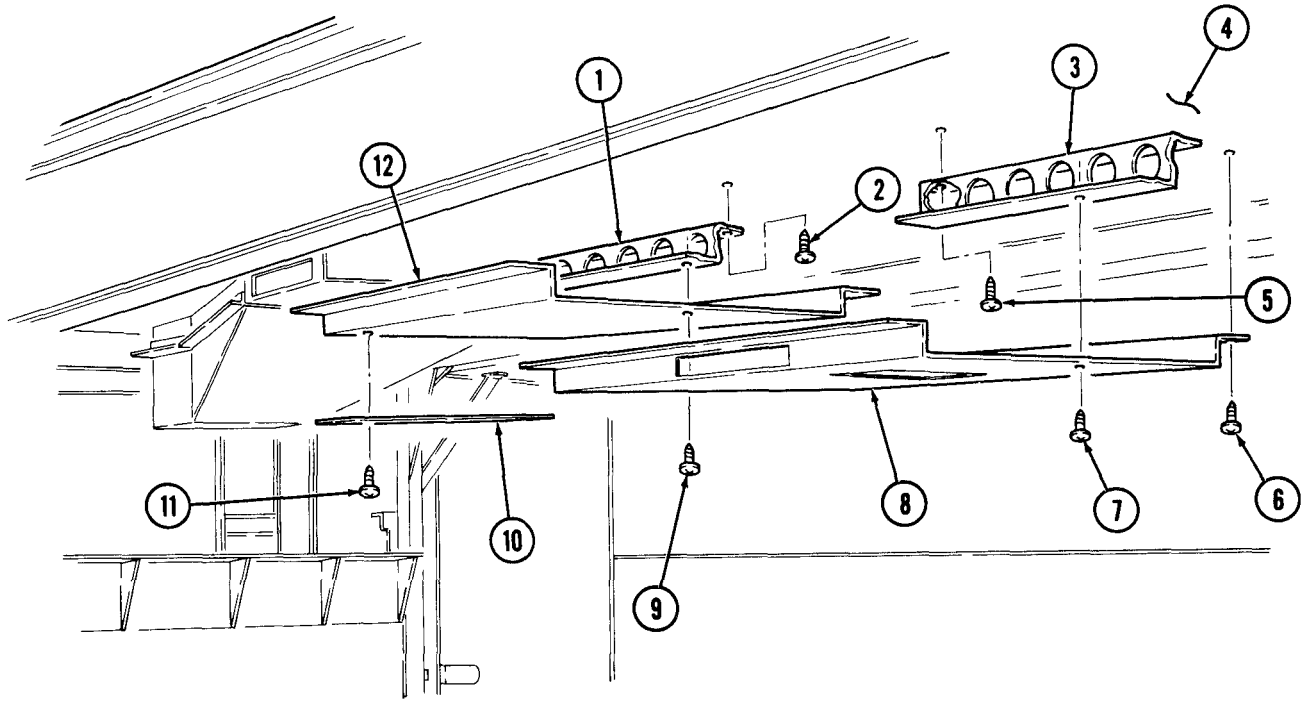
NOTE

Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer.

12.		Support (1)	Install on ceiling (4) with seven screws (2).	Position support (1) over center of roof frame bow.
13.		Support (3)	Install on ceiling (4) with ten screws (5).	Position support (3) over center of roof frame bow.
14.		Air ducts (8) and (12)	Install on ceiling (4) with twenty-six screws (6).	
15.		Air duct (12)	Install on support (1) with six screws (9).	
16.		Air duct (8)	Install on support (3) with four screws (7).	
17.		Two enclosures (10)	Install on air ducts (8) and (12) with fifty-two screws (11).	

18.1-20. CEILING AIR DUCTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

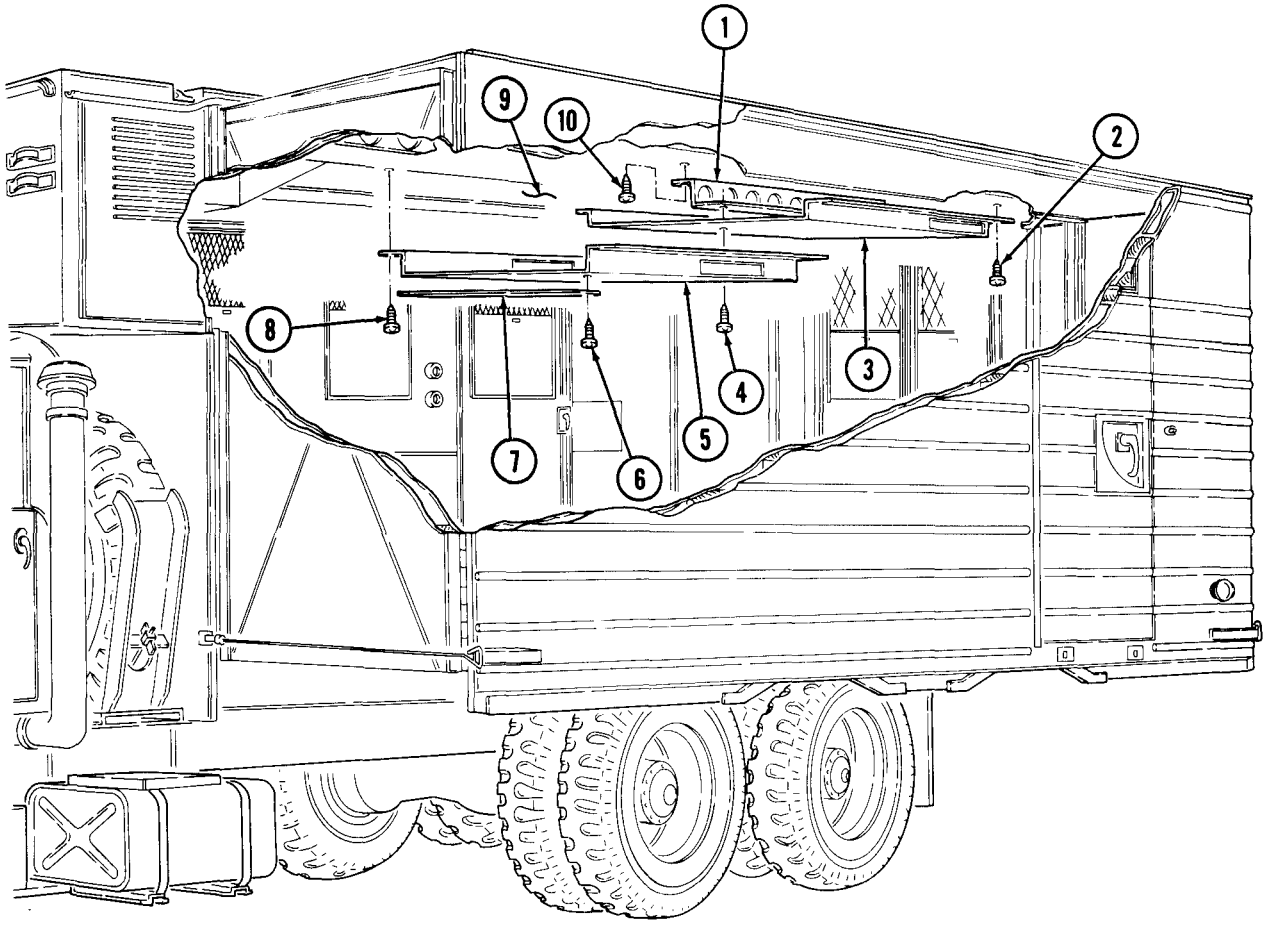


18.1-20. CEILING AIR DUCTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.		Support (1)	Install on ceiling (9) with nine screws (10).	Position support (1) over bow of roof frame.
19.		Air duct (5)	Install on ceiling (9) with eighteen screws (8).	
20.		Air duct (3)	Install on ceiling (9) with forty-two screws (2).	
21.		Air duct (3)	Install on support (1) with fourteen screws (4).	
22.		Two enclosures (7)	Install on air ducts (3) and (5) with fifty-two screws (6).	

18.1-20. CEILING AIR DUCTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install ceiling filler and side panels (para. 18.1-18).
- Install ceiling rear cover (para. 18.1-19).
- Retract van body sides (TM 9-2320-272-10).

18.1-21. CEILING TRANSITION MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Insulation
Twenty-four rivets
Four seals
Adhesive (Appendix C, Item 1)

Personnel Required
Wheeled vehicle repairman MOS 63W (4)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition	Reference
Parking brake set.	TM 9-2320-272-10
Van sides fully expanded and secured.	TM 9-2320-272-10
Ceiling filler and side panels removed.	Para. 18.1-18
Ceiling air ducts removed.	Para. 18.1-20

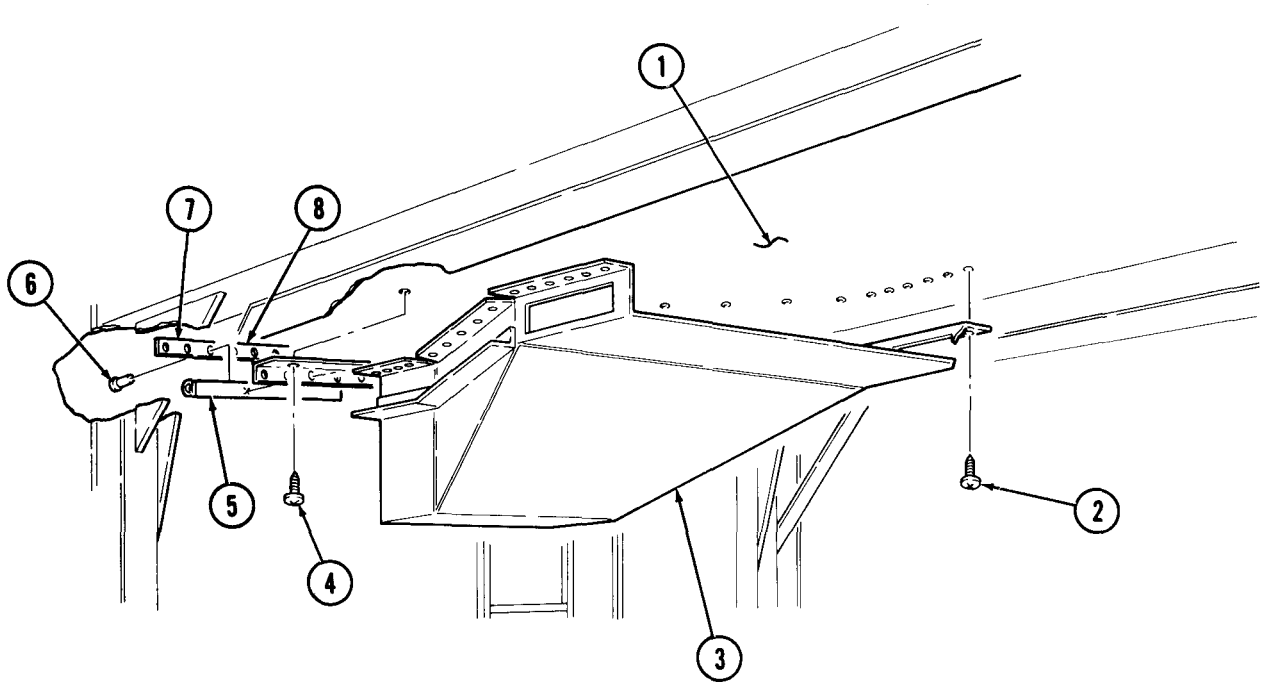
Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Support (8) at ceiling (1)	Seven screws (4)	Remove.	
		NOTE Assistants will help with step 2.		
2.	Ceiling (1)	Thirty screws (2) and transition (3)	Remove.	
	b. Disassembly			
3.	Transition (3)	Seven rivets (6), retainer (7), seal (5), and support (8)	Remove.	Discard rivets (6) and seal (5).

18.1-21. CEILING TRANSITION MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

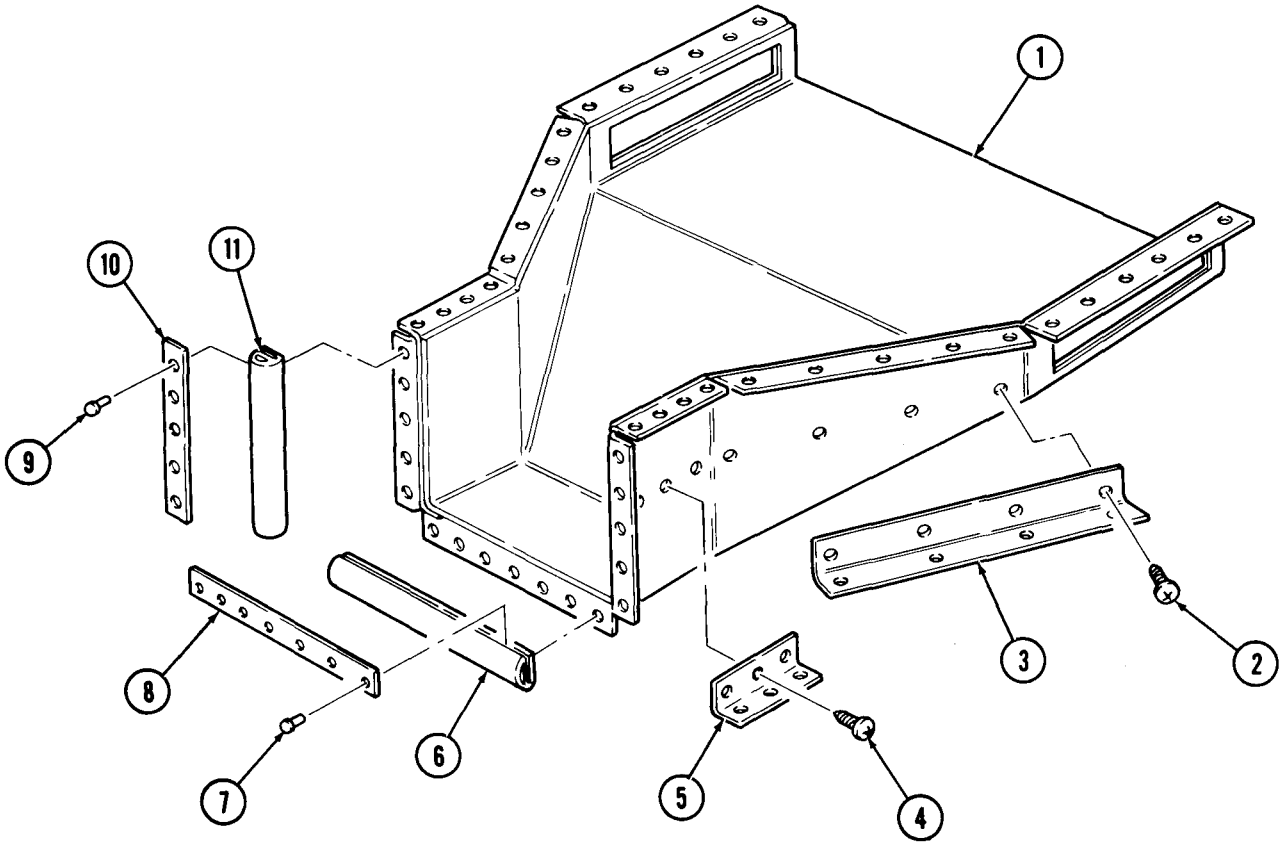


18.1-21. CEILING TRANSITION MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Transition (1)	Ten rivets (9), two retainers (10), and seals (11)	Remove.	Discard seals (11) and rivets (9).
5.		Seven rivets (7), retainer (8), and seal (6)	Remove.	Discard seal (6) and rivets (7).
		NOTE Left and right filler panels are removed the same way. This procedure covers the left side.		
6.		Four screws (2) and filler angle (3)	Remove.	
7.		Three screws (4) and filler angle (5)	Remove.	
	c. Assembly			
		NOTE Left and right filler panels are removed the same way. This procedure covers the left side.		
8.		Filler angle (5)	Install on transition (1) with three screws (4).	Angle to be in line with lower surface of air ducts.
9.		Filler angle (3)	Install on transition (1) with four screws (2).	Angle to be in line with lower surface of air ducts.
		NOTE Apply adhesive to both rubber and metal surfaces.		
10.		New seal (6) and retainer (8)	Install on transition (1) with seven new rivets (7).	
11.		Two new seals (11) and retainers (10)	Install on transition (1) with ten new rivets (9).	

18.1-21. CEILING TRANSITION MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-21. CEILING TRANSITION MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
12.		Support (8), new seal (5), and retainer (7)	Install on transition (3) with seven new rivets (6).	Aline support (8) with flanges on transition (3).

d. Installation

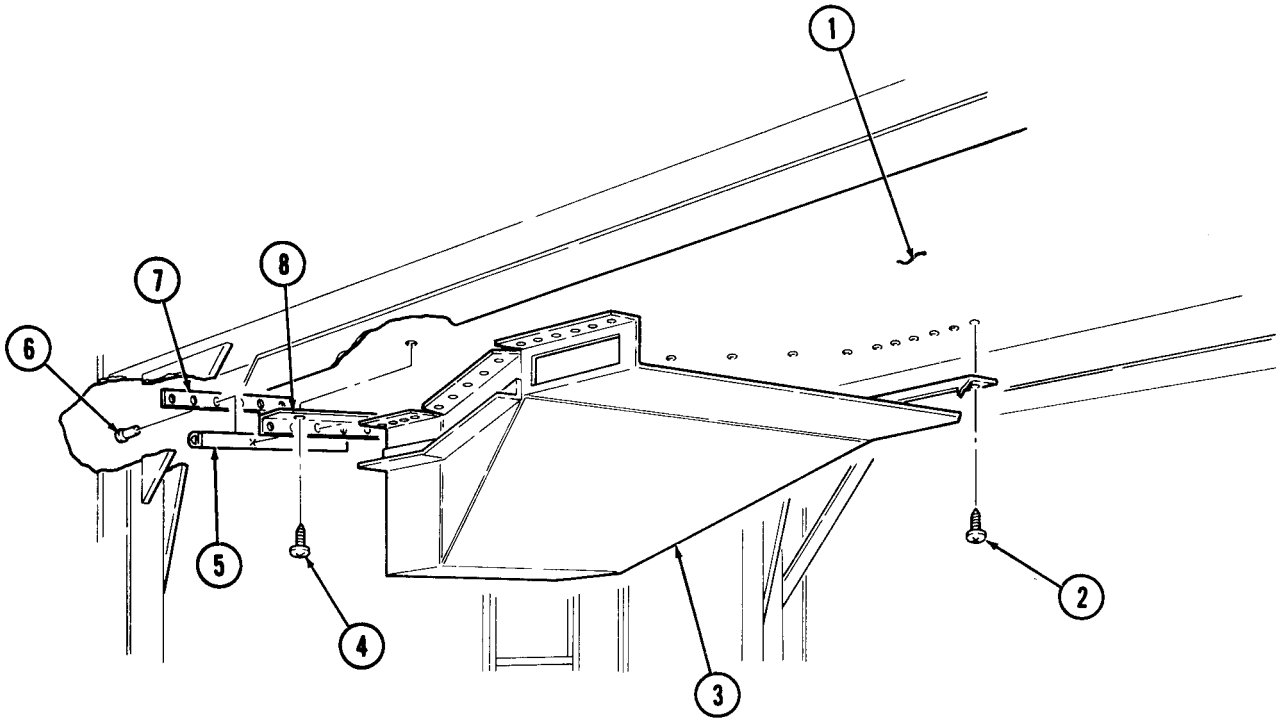
NOTE

- Insulate inside of transition with duct lining insulation.
- Assistants will help with steps 13 and 14.

13.		Transition (3)	Install on ceiling (1) with thirty screws (2).
14.		Support (8)	Install on ceiling (1) with seven screws (4).

18.1-21. CEILING TRANSITION MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW ON-TASKS:
- Install ceiling air ducts (para. 18.1-20).
- Install ceiling filler and side panels (para. 18.1-18).
- Retract van body sides (TM 9-2320-272-10).

18.1-22. CEILING DEFLECTORS AND REGISTERS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M934, M935, M934A1, M935A1	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

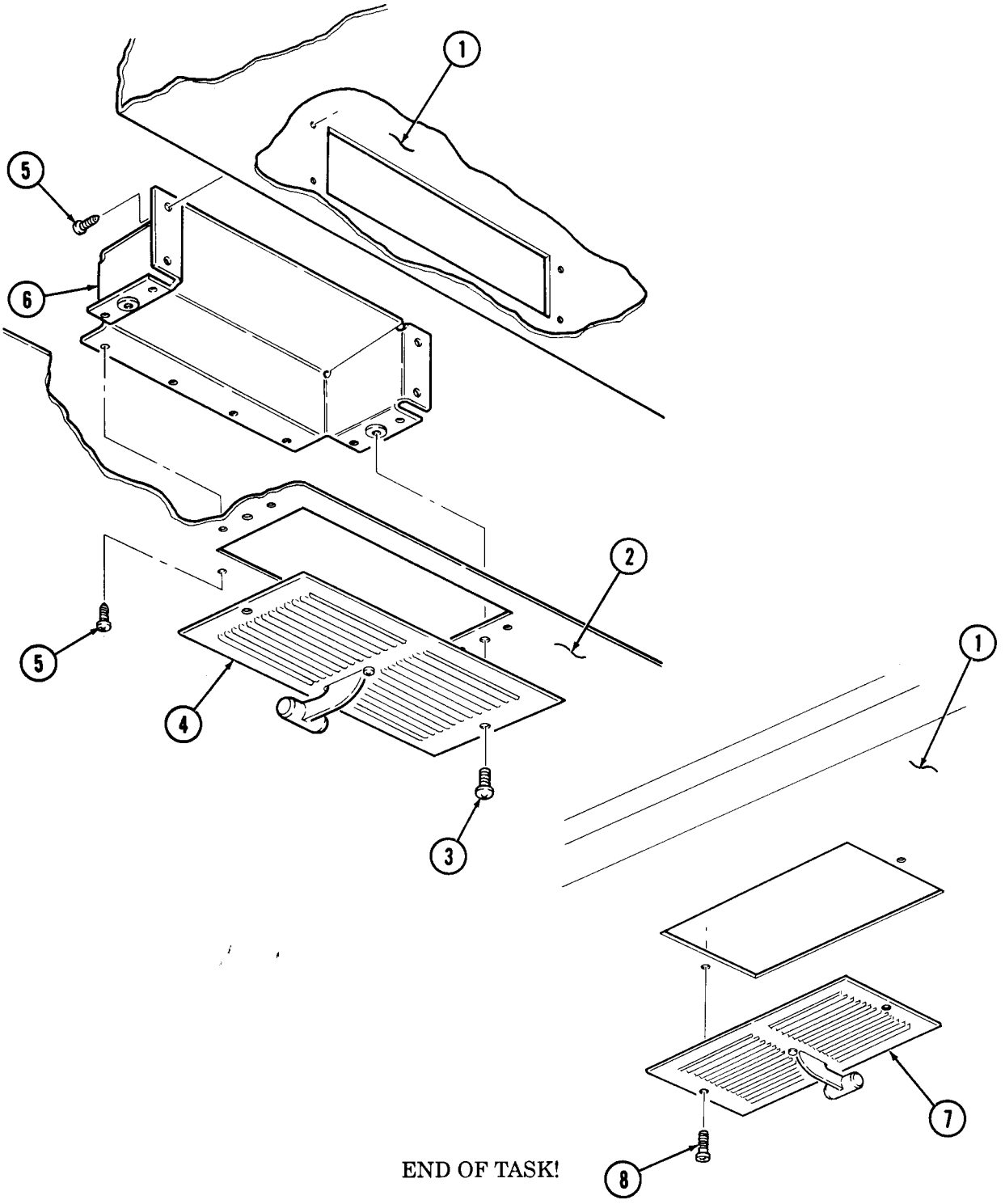
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Ceiling side panels (2) and eight deflectors (6)	Sixteen screws (3) and eight registers (4)	Remove.	
2.	Air ducts (1) and ceiling side panel (2)	Ninety-six screws (5) and eight deflectors (6)	Remove.	
3.	Air ducts (1)	Four screws (8) and two registers (7)	Remove.	
		b. Installation		
4.		Two registers (7)	Install on air ducts (1) with four screws (8).	
5.		Eight deflectors (6)	Install on air ducts (1) and ceiling side panel (2) with ninety-six screws (5).	
6.		Eight registers (4)	Install on ceiling side panel (2) and eight deflectors (6) with sixteen screws (3).	

18.1-22. CEILING DEFLECTORS AND REGISTERS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

18.1-23. REAR SPLICE PLATE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M934, M935, M934A1, M935A1	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
Vehicle must be on a level surface.

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

Left and right rear splice plates are removed and installed the same way. This procedure covers the right side.

a. Removal

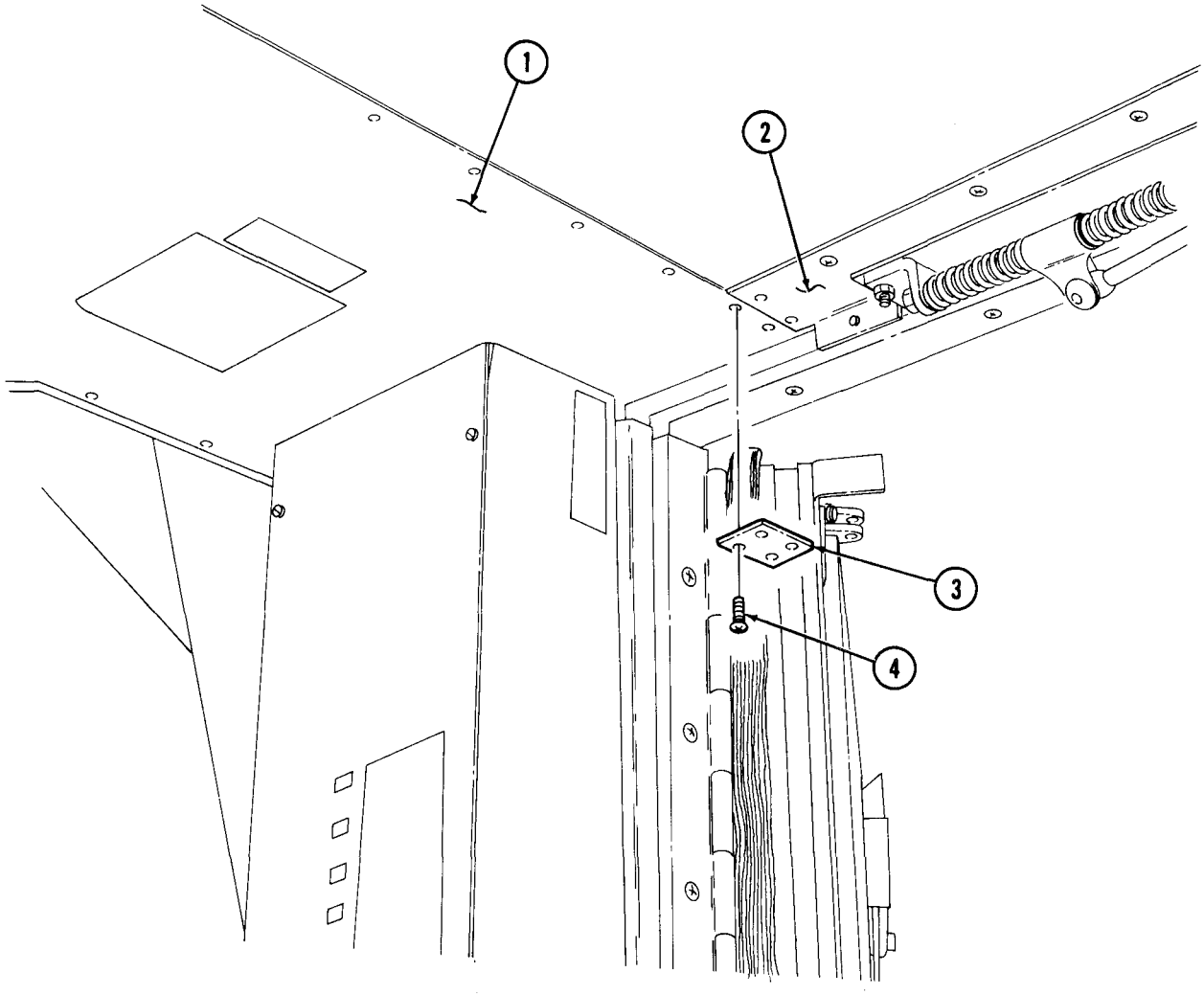
1.	Side panel (1) and rear cover (2)	Four screws (4) and splice plate (3)	Remove.

b. Installation

2.		Splice plate (3)	Install on side panel (1) and rear cover (2) with four screws (4).

18.1-23. REAR SPLICE PLATE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

18.1-24. BONNET FRAME PARTS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Insulation
Two speed nuts
Three-hundred fifty-one rivets
Adhesive (Appendix C, Item 1)
Primer (Appendix C, Item 38)
Sealing compound (Appendix C, Item 37)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-2	Bonnet control rod removed.
TM 9-2320-272-20-2	Van heater removed.
Para. 21-31	Air conditioner (if equipped) removed.
Para. 18.1-25	Bonnet access door removed.
Para. 18.1-26	Bonnet door removed.

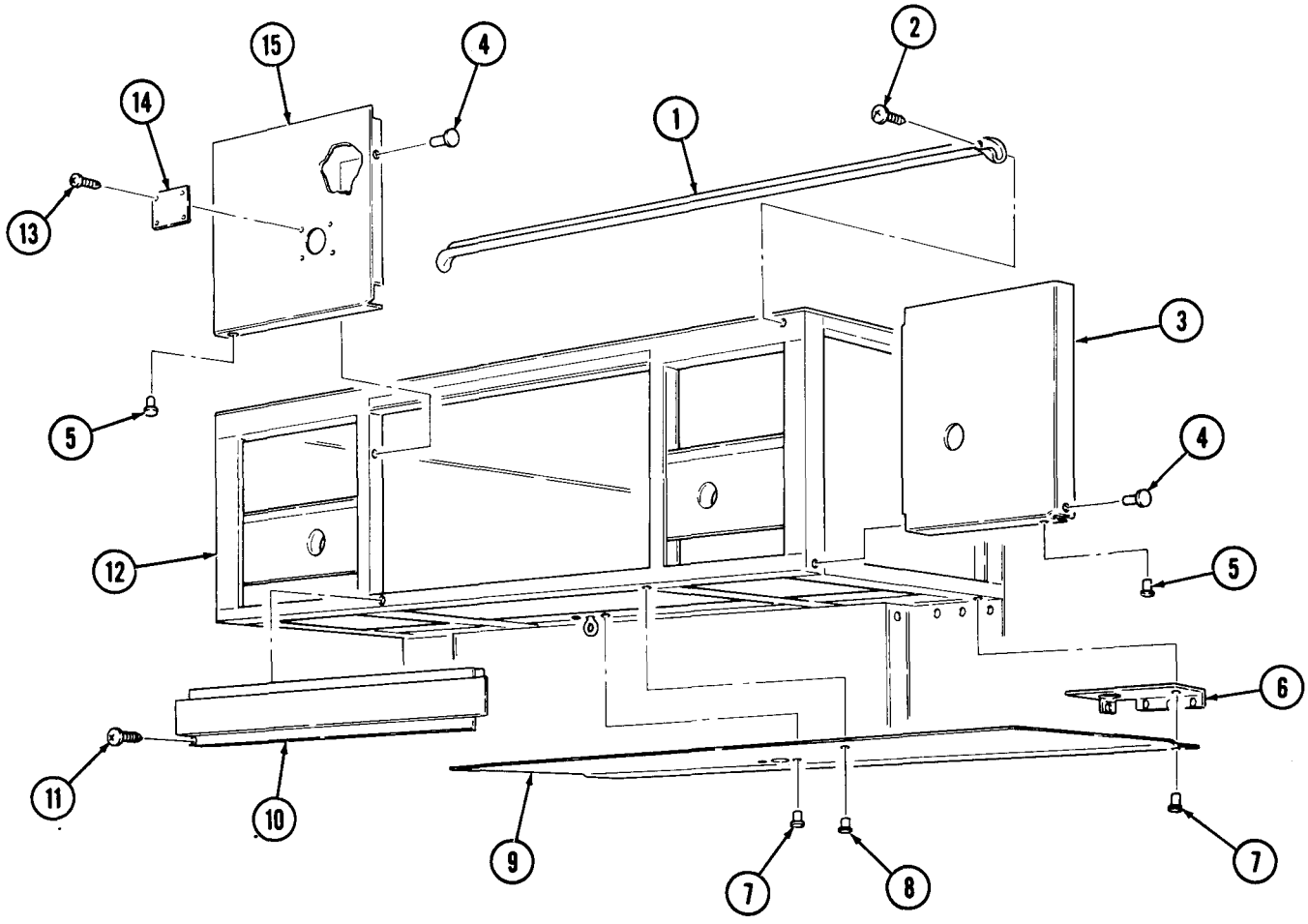
Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Bonnet frame (12)	Twenty-seven screws (2) and drip molding (1)	Remove.	
2.		Seventeen screws (11) and door panel (10)	Remove.	
3.	Outer panel (15) and bonnet frame (12)	Four screws (13) and plate (14)	Remove.	
4.	Bonnet frame (12) and bonnet lower panel (9)	Thirty-eight rivets (4), twenty-four rivets (5), and outer panels (3) and (15)	Remove.	Discard rivets (4) and (5).
		NOTE • Left and right fillers are removed the same way. The left filler is shown. • Assistant will help with step 5.		
5.	Bonnet frame (12)	Sixty-four rivets (7), thirty-one rivets (8), bonnet lower panel (9), and two fillers (6)	Remove.	Discard rivets (7) and (8).

18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

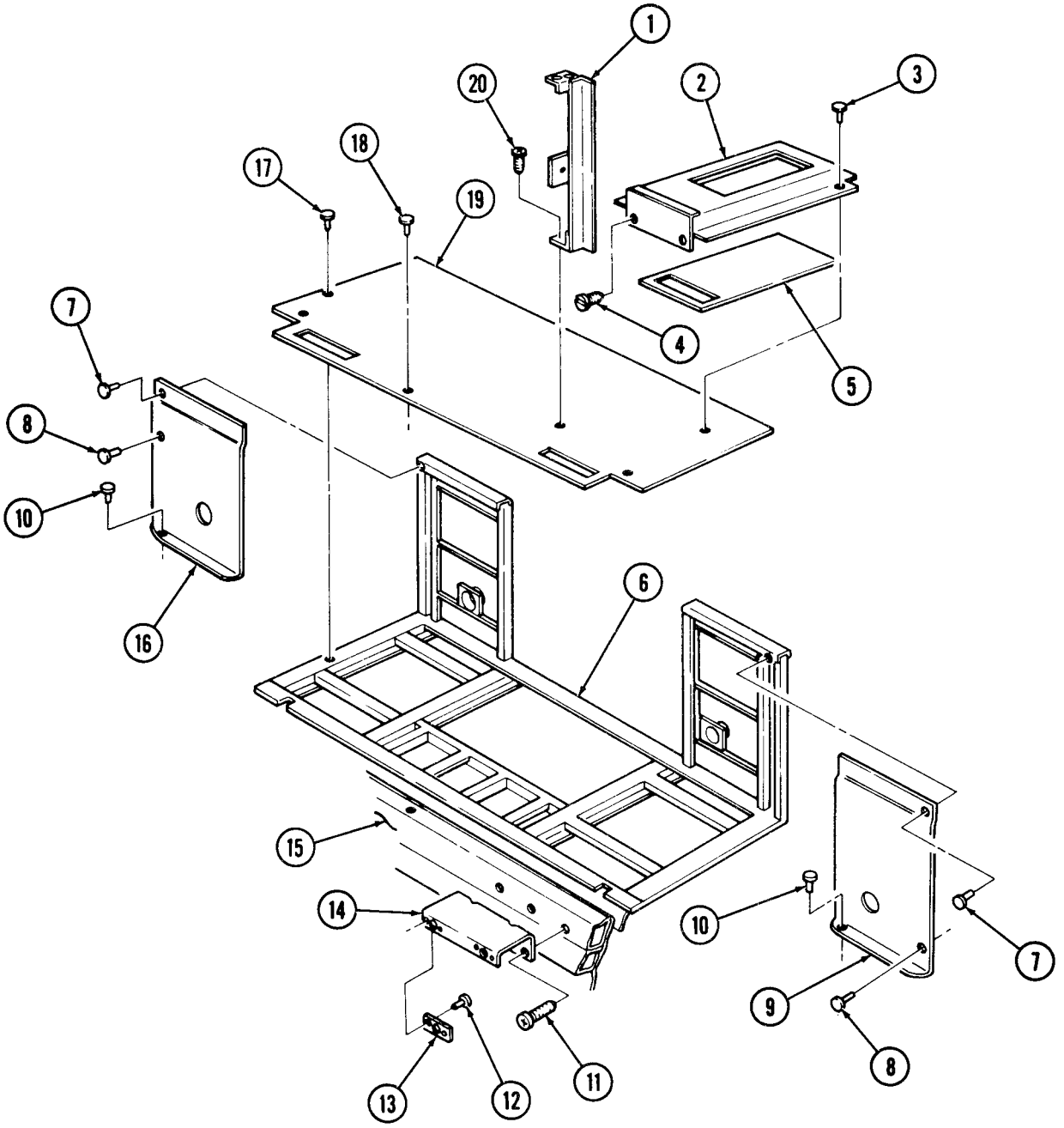


18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Left and right heater duct assemblies are removed the same way. This procedure covers the right side.		
6.	Support (14) and heater duct (2)	Two fasteners (4)	Remove.	
7.	support (14)	Four rivets (12) and two speed nuts (13)	Remove.	Discard rivets (12) and speed nuts (13).
8.	Front wall (15)	Three screws (11) and support (14)	Remove.	
9.	Bonnet floor (19)	Thirty-six rivets (3), heater duct (2), and insulation (5)	Remove.	Discard rivets (3) and insulation (5).
10.	Bonnet frame (6) and bonnet floor (19)	Sixteen rivets (7), twenty-four rivets (8), thirty-six rivets (10), inner panel (9), and inner panel (16)	Remove.	Discard rivets (7), (8), and (10).
11.	Bonnet floor (19)	Three screws (20) and post (1)	Remove.	
		NOTE Assistant will help with step 12.		
12.	Bonnet frame (6) and front wall (15)	Forty-three rivets (17), thirty-five rivets (18), and bonnet floor (19)	Remove.	Discard rivets (17) and (18).

18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Installation

NOTE

- Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer.
- Seal between exterior joints with sealing compound.
- Insulate all enclosed structure with fibrous glass felt insulation.
- Assistant will help with step 13.

13.		Bonnet floor (19)	Install on bonnet frame (6) and front wall (15) with forty-three new rivets (17), and thirty-five new rivets (18).
14.		Post (1)	Install on bonnet floor (19) with three screws (20).
15.		Inner panels (9) and (16)	Install on bonnet frame (6) and bonnet floor (19) with thirty-six new rivets (10), twenty-four new rivets (8), and sixteen new rivets (7).

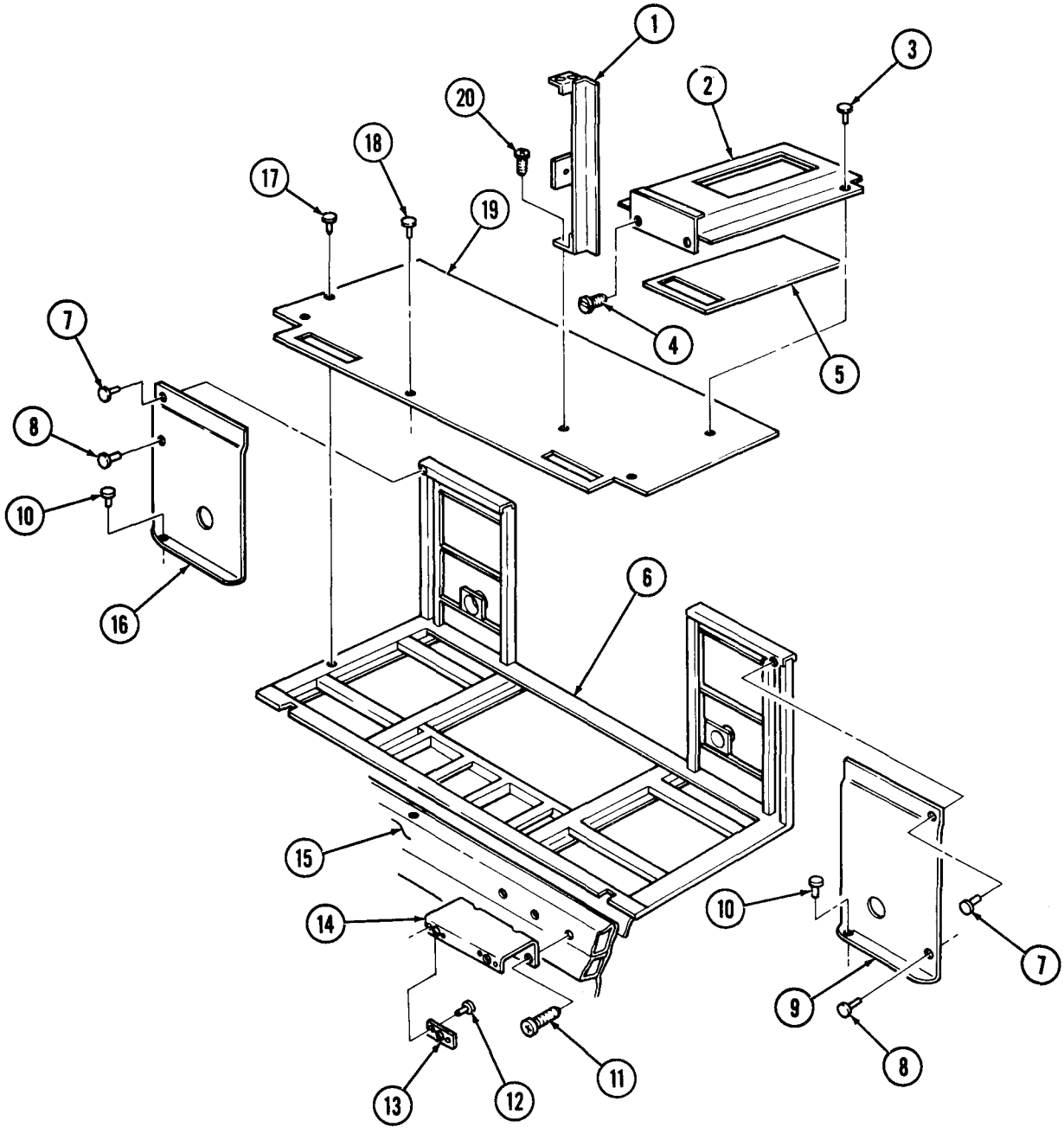
NOTE

Left and right heater duct assemblies are installed the same way. This procedure covers the right side.

16.		New insulation (5) and heater duct (2)	Install on bonnet floor (19) with thirty-six new rivets (3).
17.		Support (14)	Install on front wall (15) with three screws (11).
18.		Two new speed nuts (13)	Install on support (14) with four new rivets (12).
19.		Heater duct (2)	Install on support (14) with two fasteners (4).

18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

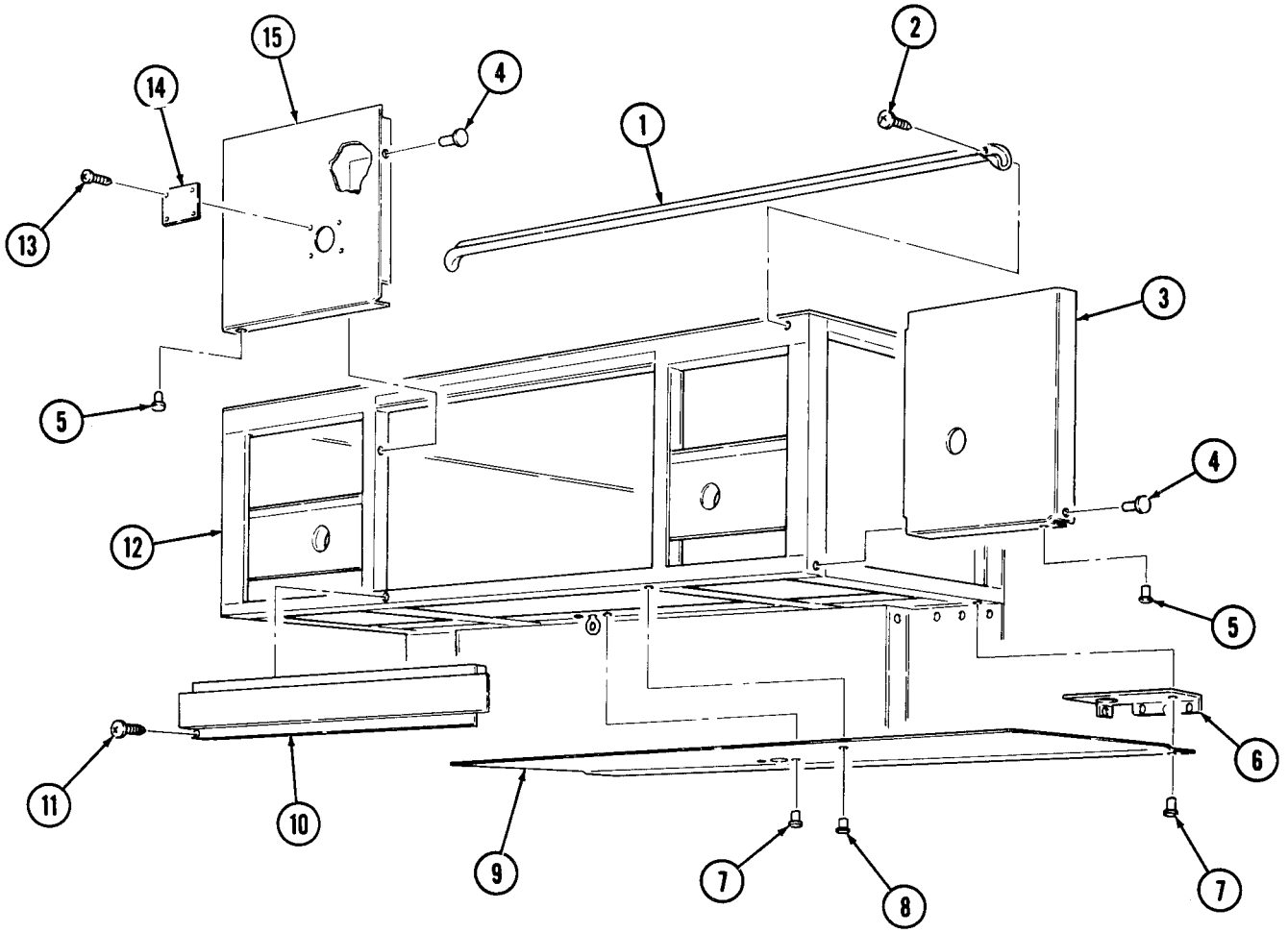


18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE • Left and right fillers are installed the same way. The left filler is shown. • Assistant will help with step 20.		
20.		Two fillers (6) and bonnet lower panel (9)	Install on bonnet frame (12) with sixty-four new rivets (7) and thirty-one new rivets (8).	
21.		Outer panels (3) and (15)	Install on bonnet frame (12) and bonnet lower panel (9) with twenty-four new rivets (5) and thirty-eight new rivets (4).	
22.		Plate (14)	Install on outer panel (15) and bonnet frame (12) with four screws (13).	
23.		Door panel (10)	Install on bonnet frame (12) with seventeen screws (11).	
24.		Drip molding (1)	Install on bonnet frame (12) with twenty-seven screws (2).	

18.1-24. BONNET FRAME PARTS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install bonnet door (para. 18.1-26).
- Install bonnet access door (para. 18.1-25).
- Install van heater (TM 9-2320-272-20-2).
- Install air conditioner (if equipped) (para. 21-31).
- Install bonnet control rod (TM 9-2320-272-20-2).

18.1-25. BONNET ACCESS DOOR MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M935, M934A1, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-2

Condition Description
Parking brake set.
Bonnet control rod removed.

Test Equipment
None

Special Tools
None

Materials/Parts
Insulation
Sixty-six rivets
Two seals
Primer (Appendix C, Item 38)
Sealing compound (Appendix C, Item 37)

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

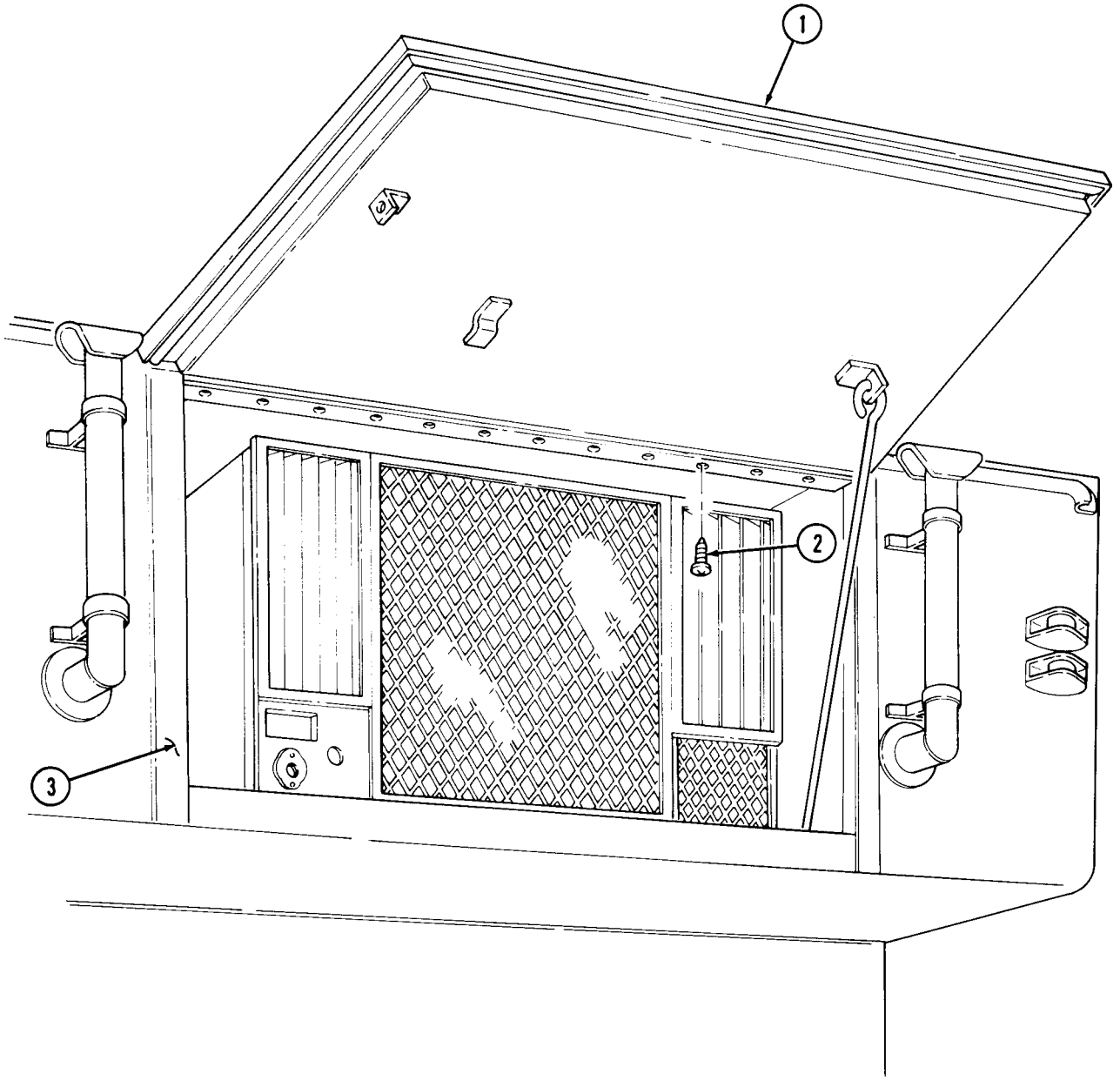
Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Assistant will help with step 1.		
1.	Bonnet frame (3)	Twelve screws (2) and access door assembly (1)	Remove.	Lift and position on supports.

18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

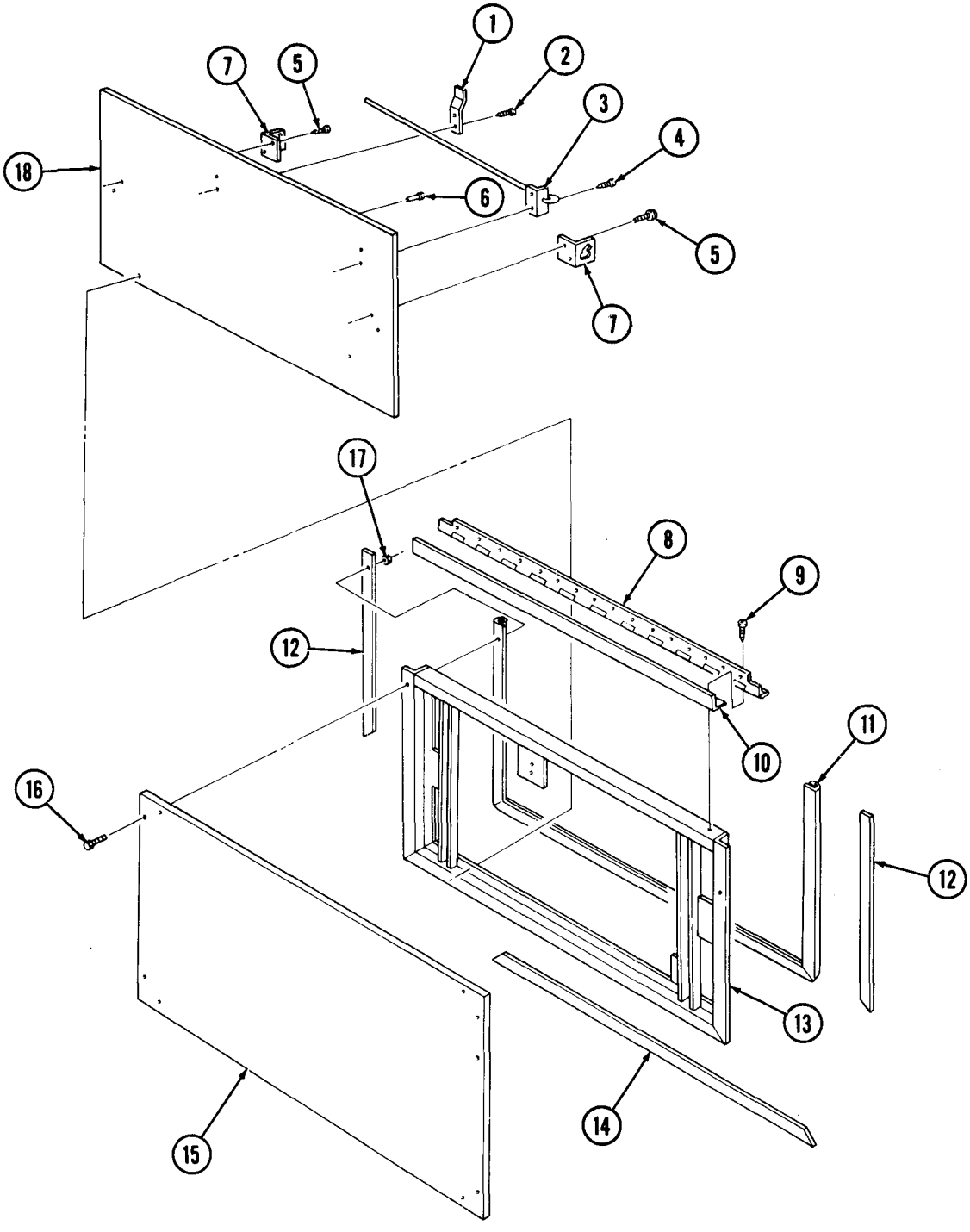


18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Disassembly				
2.	Door frame (13)	Twelve screws (9), hinge (8), and seal (10)	Remove.	Discard seal (10).
3.	Inner panel (18)	Two screws (5) and angle bracket (7)	Remove.	Angle bracket (7) can be located on either side of inner panel (18).
4.		Two screws (4) and rod assembly (3)	Remove.	
5.		Two screws (2) and holder bracket (1)	Remove.	
		NOTE Assistant will help with step 6.		
6.	Door frame (13)	Thirty-three screws (16), nuts (17), outer panel (15), two retainers (12), retainer (14), and seal (11)	Remove.	Discard seal (11).
		NOTE Perform step 7 if inner panel is to be removed. See task c.		
7.		Sixty-six rivets (6) and inner panel (18)	Remove.	Discard rivets (6).
c. Cleaning and Inspection				
8.		All parts	Clean.	Refer to para. 2-7.
9.		Hinge (8)	Inspect for breaks and proper operation.	Replace if damaged.
10.		Retainers (12) and (14)	Inspect for bends and breaks.	Replace if bent or broken.
11.		Angle bracket (7), holder bracket (1), and rod assembly (3)	Inspect for cracks and breaks.	Replace if cracked or broken.
12.		Outer panel (15)	Inspect for tears and punctures.	Replace if torn or punctured.
13.		Inner panel (18)	Inspect for tears and punctures.	Replace if torn or punctured.
14.		Door frame (13)	Inspect for bend, cracks, and breaks.	Replace if bent, cracked, or broken.

18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Assembly				

NOTE

- Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer.
- Seal between exterior joints with sealing compound.
- Insulate all enclosed structure with fibrous glass felt insulation.
- Perform step 15 only if inner panel is to be installed. See task c.
- Assistant will help with steps 15 and 16.

15.		Inner panel (18)	Install on door frame (13) with sixty-six new rivets (6).
16.		New seal (11), retainer (14), two retainers (12), and outer panel (15)	Install on door frame (13) with thirty-three screws (16) and nuts (17).
17.		Holder bracket (1)	Install on inner panel (18) with two screws (2).
18.		Rod assembly (3)	Install on inner panel (18) with two screws (4).

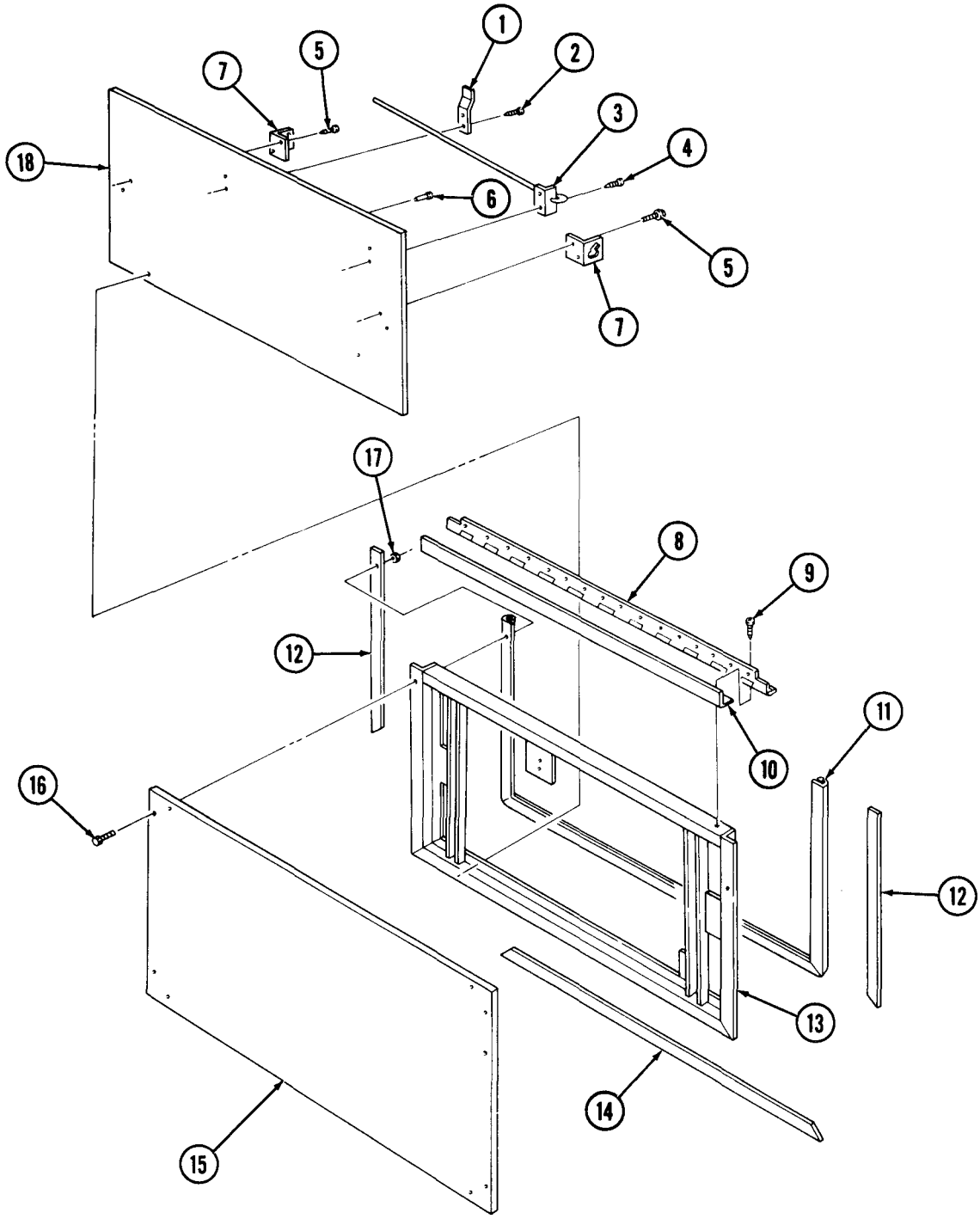
NOTE

Angle bracket can be installed on either side of door.

19.		Angle bracket (7)	Install on inner panel (18) with two screws (5).
20.		New seal (10) and hinge (8)	Install on doorframe (13) with twelve screws (9).

18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

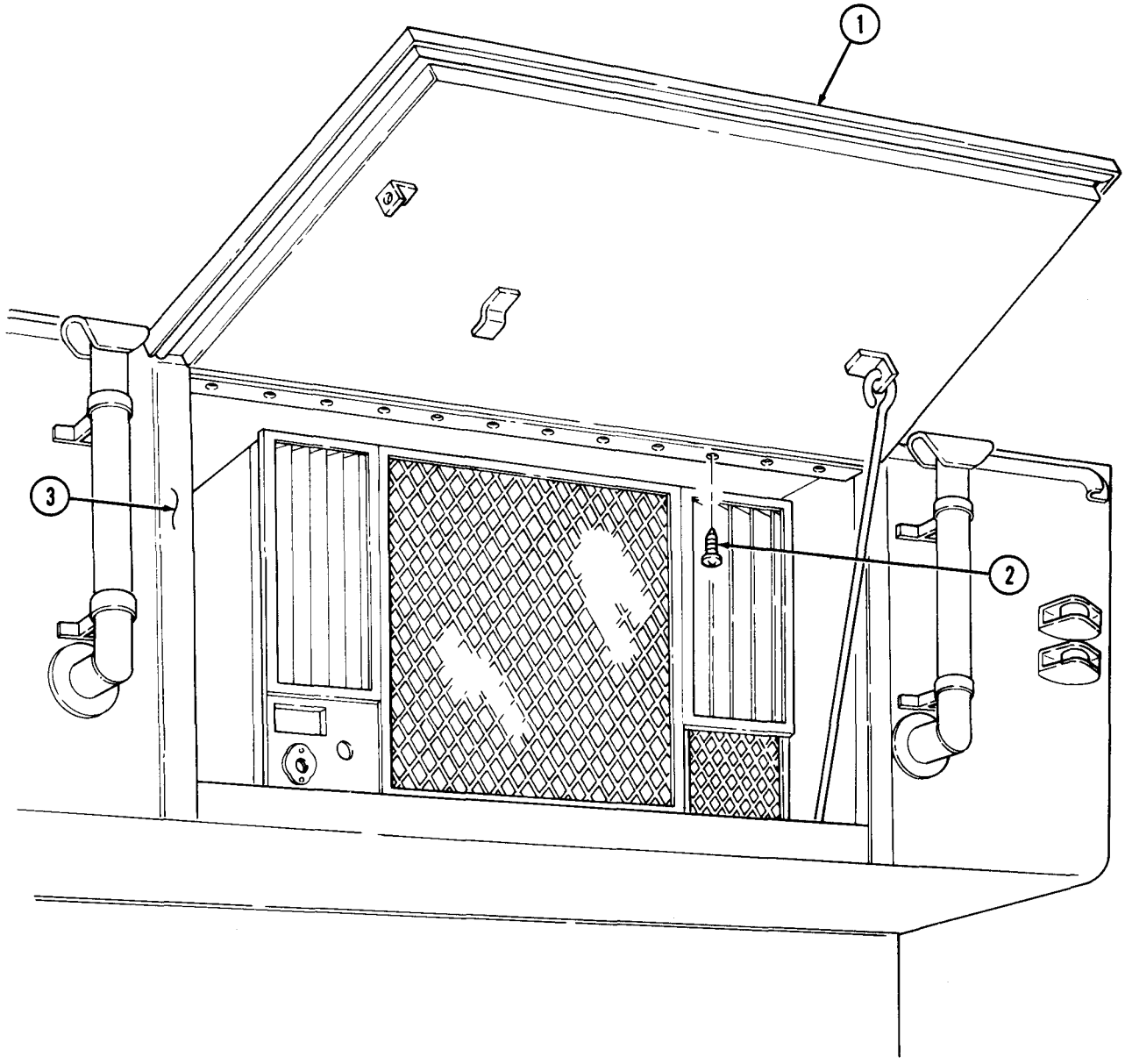


18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
e. Installation				
		NOTE Assistant will help with step 21.		
21.		Access door assembly (1)	Install on bonnet frame **(3)** with twelve screws (2).	

18.1-25. BONNET ACCESS DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install bonnet control rod (TM 9-2320-272-20-2).

18.1-26. BONNET DOOR MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M934, M935, M934A1, M935A1	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Materials/Parts
Four channel seals
Insulation
One-hundred twenty-four rivets
Three seals
Cork (Appendix C, Item 40)
Primer (Appendix C, Item 38)
Sealing compound (Appendix C, Item 37)

Special Environmental Conditions
Vehicle must be on a level surface.

General Safety Instructions
None

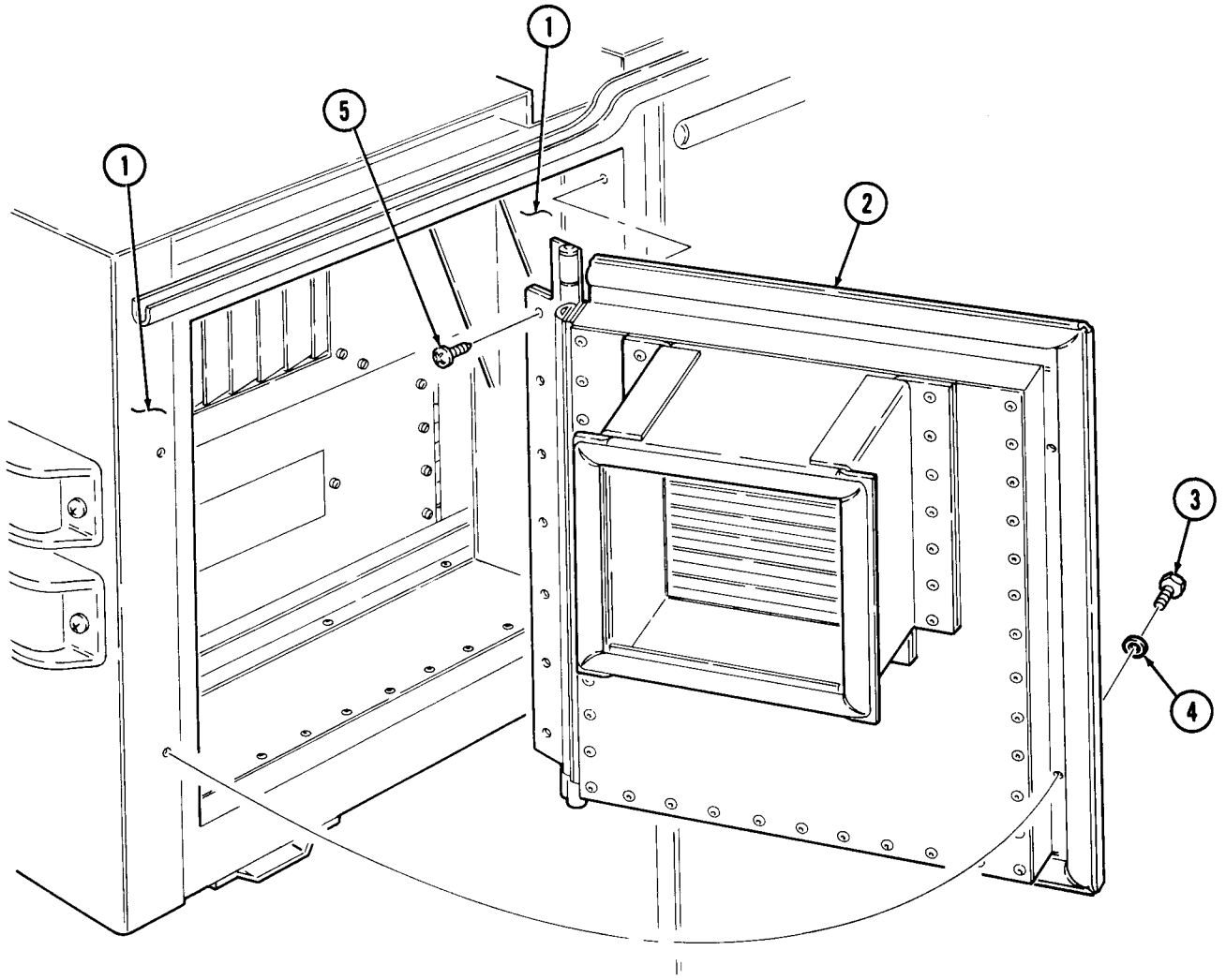
Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Left and right bonnet doors are removed the same way. This procedure covers the left side.		
1.	Bonnet door (2) and bonnet (1)	Two screws (3) and washers (4)	Remove.	
		NOTE Assistant will help with step 2.		
2.	Bonnet (1)	Seven screws (5) and bonnet door (2)	Remove.	Position squarely on four jackstands with outer panel facing upwards.

18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

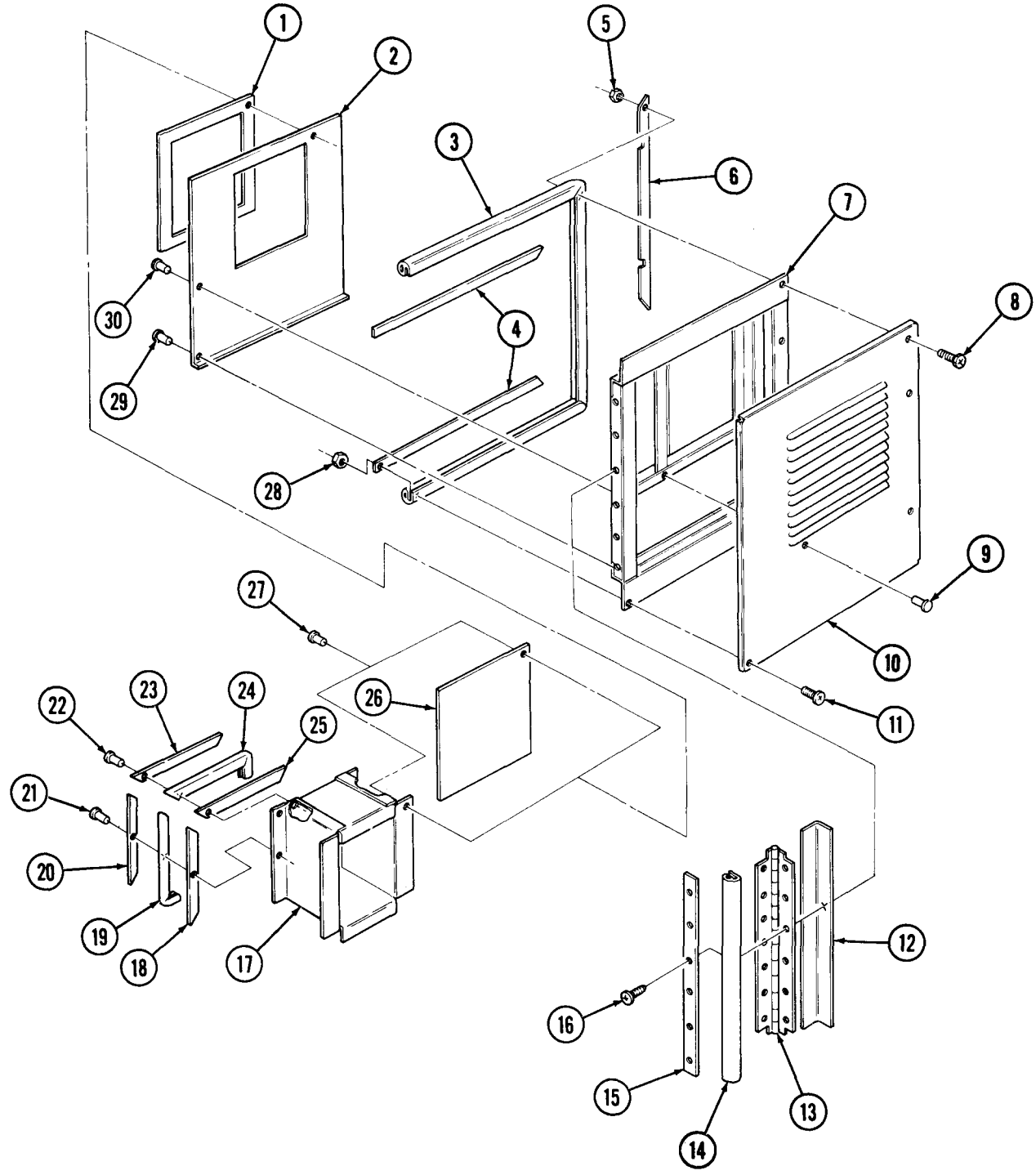


18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Disassembly			
		NOTE Left and right bonnet doors are disassembled the same way. This procedure covers the left side.		
3.	Frame (7)	Six screws (16), seal (14), spacer plate (15), hinge (13), and seal (12)	Remove.	Discard seals (12) and (14).
4.	Outer panel (10), frame (7), and seal (3)	Eighteen screws (11), nuts (28), and two retainers (4)	Remove.	
		NOTE Assistant will help with step 5.		
5.	Frame (7)	Seventeen rivets (9) and outer panel (10)	Remove.	Discard rivets (9).
6.	Inner panel (2)	Twenty-four rivets (27), intake assembly (17), and preformed cork (1)	Remove.	Discard rivets (27) and cork (1)
7.	Intake assembly (17)	Fourteen rivets (21), two channels (18), channels (20) and channel seals (19)	Remove.	Discard rivets (21) and channel seals (19).
8.		Ten rivets (22), two channels (23), channels (25), and channel seals (24)	Remove.	Discard rivets (22) and channel seals (24).
		NOTE Perform step 9 only if intake assembly is not present on inner panel.		
9.		Twentv-four rivets (27), intake panel (26), and preformed cork (1)	Remove.	Discard rivets (27) and cork (1).
10.	Frame (7)	Seven screws (8), nuts (5), retainer (6), and seal (3).	Remove.	Discard seal (3).
		NOTE Assistant will help with step 11.		
11.		Thirty-three rivets (29), two rivets (30), and inner panel (2)	Remove.	Discard rivets (29) and (30).

18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

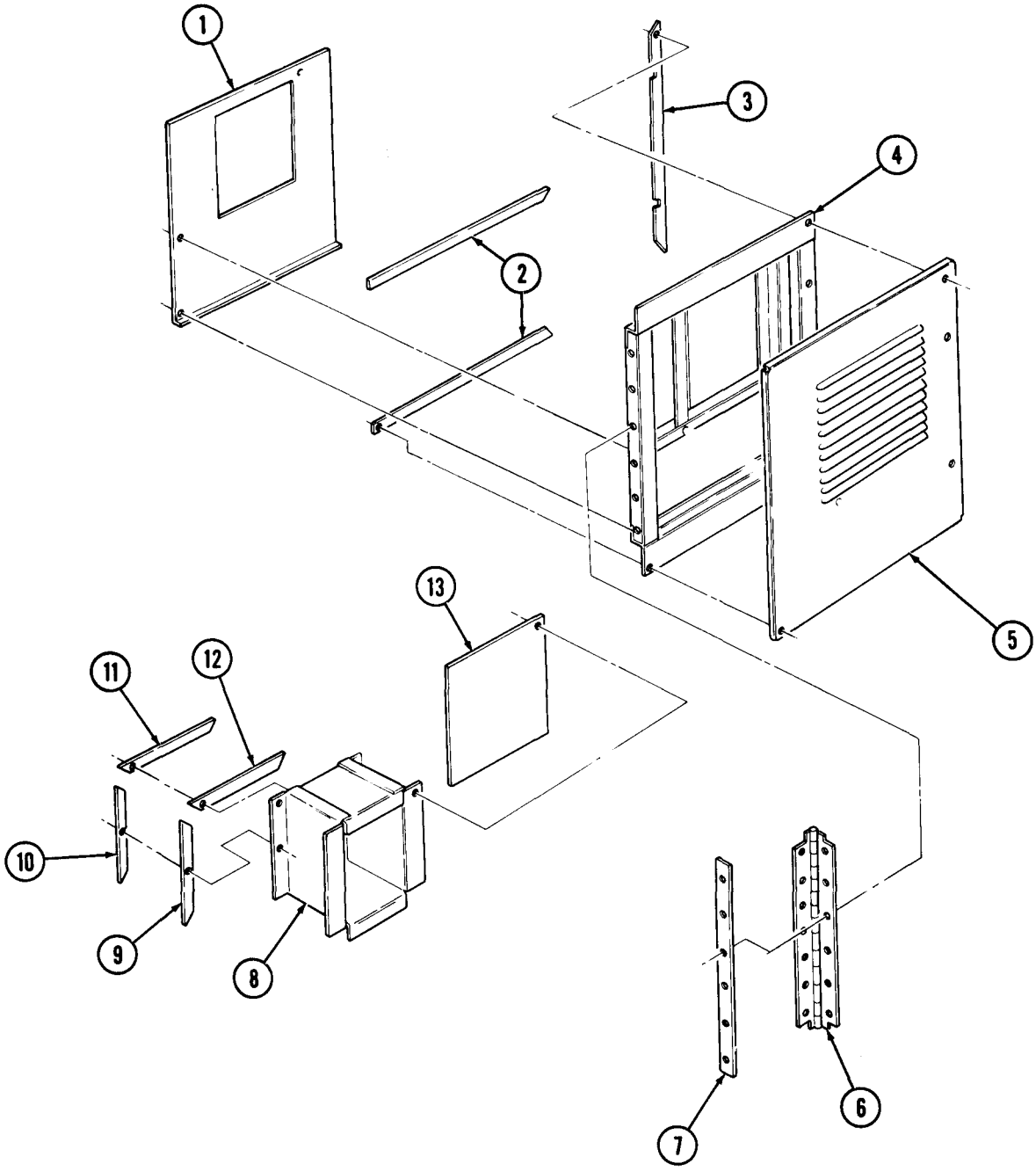


18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Cleaning and Inspection			
12.		All parts	Clean.	Refer to para. 2-7.
13.		Hinge (6)	Inspect for breaks, corrosion, and proper operation.	Replace if damaged.
14.		Retainers (2) and (3) and spacer plate (7)	Inspect for bends and breaks.	Replace if bent or broken.
15.		Outer panel (1) and inner panel (5)	Inspect for tears, cracks, and punctures.	Replace if torn, cracked or punctured.
16.		Intake assembly (8)	Inspect for cracks and bends.	Replace if cracked or bent.
17.		Intake panel (13)	Inspect for bends and breaks.	Replace if bent or broken.
18.		Channels (9), (10), (11), and (12)	Inspect for bends and breaks.	Replace if bent or broken.
19.		Frame (4)	Inspect for bends, breaks, cracks, and warpage.	Replace entire bonnet door assembly if damaged.

18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

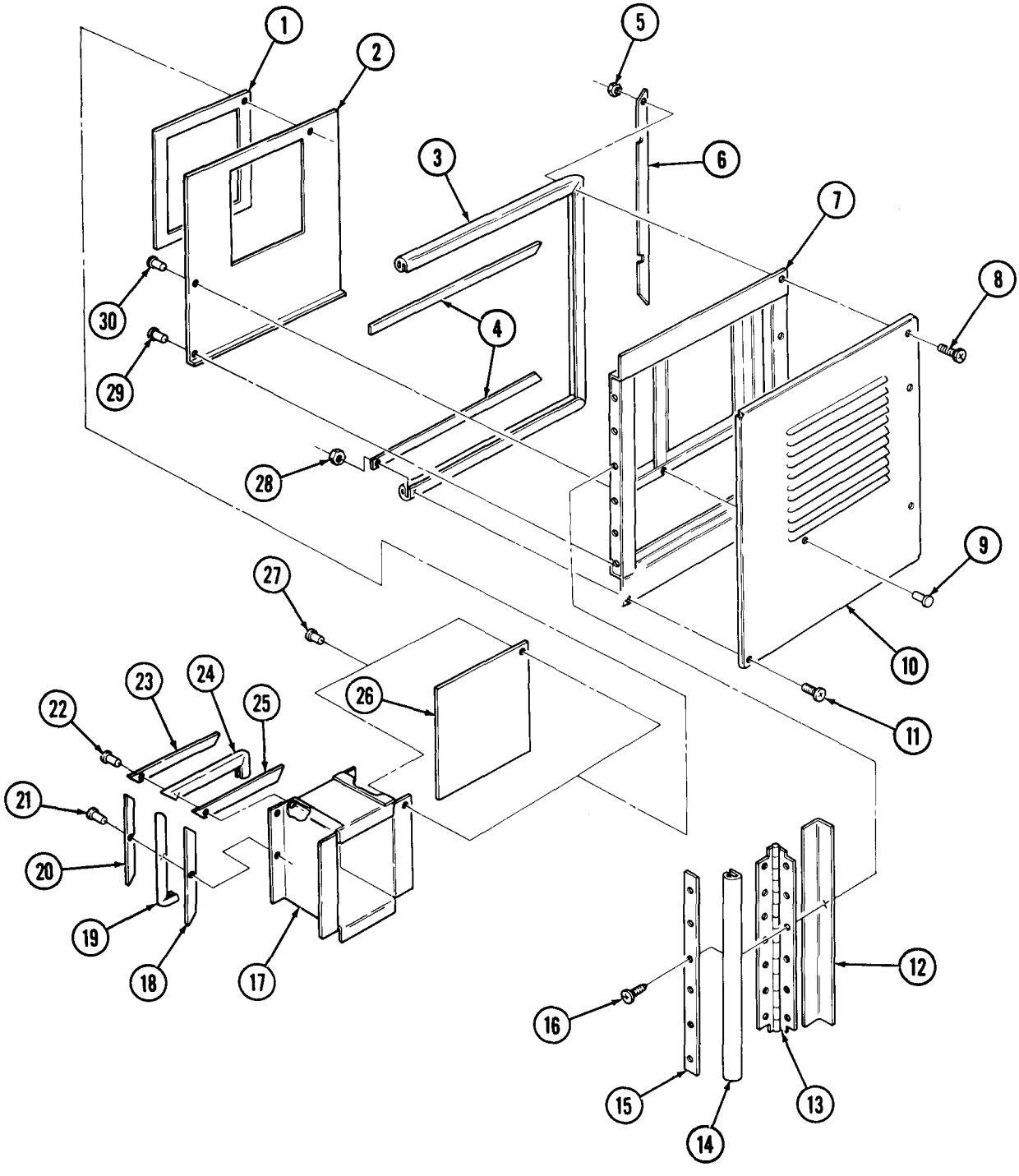


18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	d. Assembly			
		NOTE • Left and right bonnet doors are assembled the same way. This procedure covers the left door. • Insulate areas of dissimilar metal-to-metal contact with zinc chromate primer. • Seal between exterior joints with sealing compound. • Insulate all enclosed structure with fibrous glass felt insulation. • Assistant will help with step 20.		
20.		Inner panel (2)	Install on frame (7) with thirty-three new rivets (29) and two new rivets (30).	
21.		New seal (3) and retainer (6)	Install on frame (7) with seven screws (8) and nuts (5).	
		NOTE Perform step 22 only if intake assembly is not present on inner panel.		
22.		New preformed cork (1) and intake panel (26)	Install on inner panel (2) with twenty-four new rivets (27).	
23.		Two new channel seals (24), channels (23), and channels (25)	Install on intake assembly (17) with ten new rivets (22).	
24.		Two new channel seals (19), channels (18), and channels (20)	Install on intake assembly (17) with fourteen new rivets (21).	
		NOTE Assistant will help with steps 25 and 26.		
25.		New preformed cork (1) and intake assembly (17)	Install on inner panel (2) with twenty-four new rivets (27).	
26.		Outer panel (10)	Install on frame (7) with seventeen new rivets (9).	
27.		Two retainers (4)	Install in seal (3) with eighteen screws (11) and nuts (28).	
28.		New seal (12), hinge (13), spacer plate (15), and new seal (14)	Install on frame (7) with six screws (16).	Hinge must be flush with top of door.

18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-26. BONNET DOOR MAINTENANCE (Cont'd)

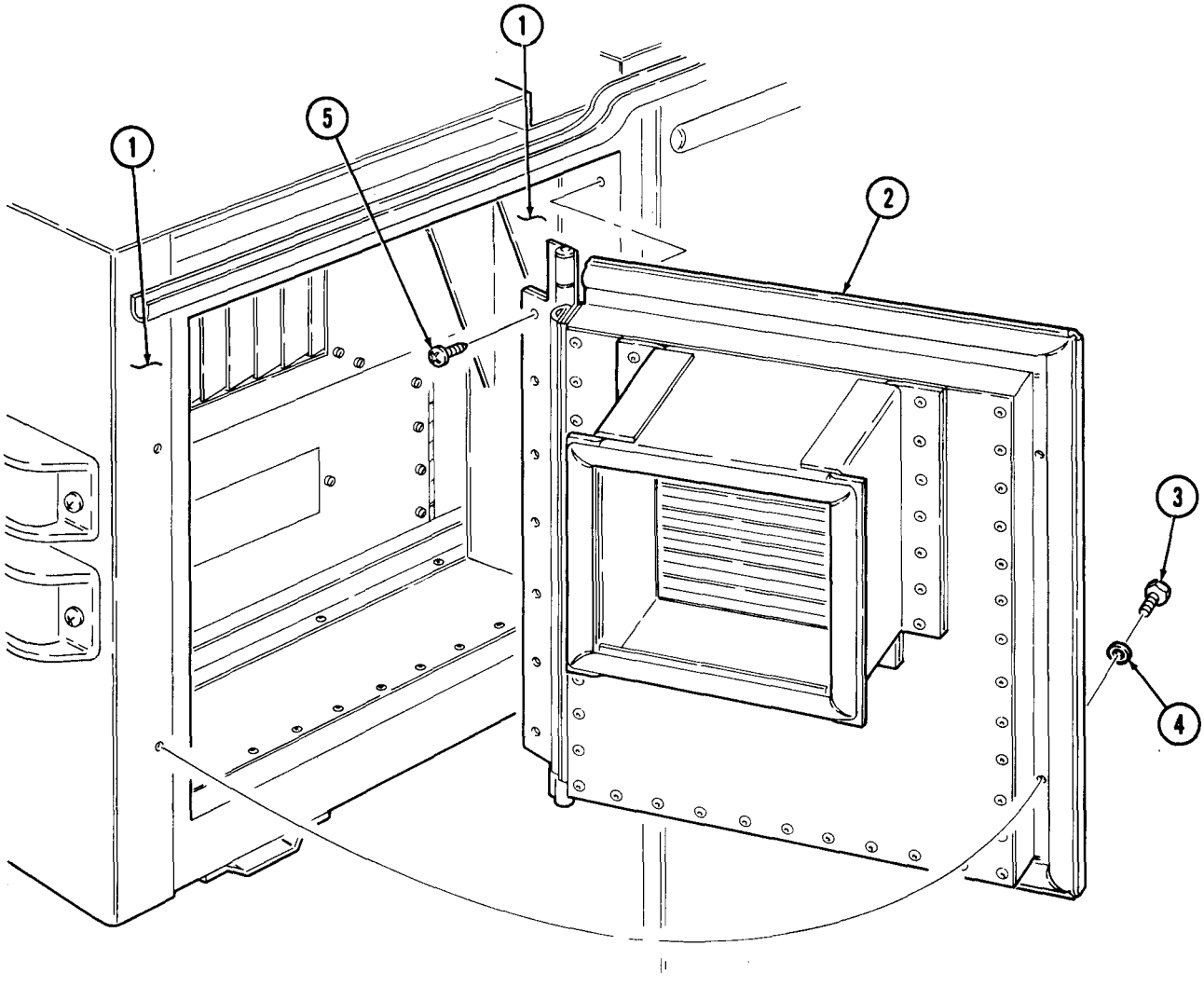
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

e. Installation

NOTE

- Left and right bonnet doors are installed the same way. This procedure covers the left door.
- Assistant will help with step 24.

Bonnet door (2)	Install on bonnet (1) with seven screws (5), two screws (3), and washers (4).



END OF TASK!

Section III. VAN BODY ELECTRICAL COMPONENTS REPLACEMENT

18.1-27. VAN BODY ELECTRICAL COMPONENTS TASK SUMMARY

18.1-28. MAIN WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled Vehicle Repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-1	Battery ground cables disconnected.
TM 9-2320-272-20-2	Fluorescent light tubes removed.
TM 9-2320-272-20-2	Emergency lamp and blackout light removed.
TM 9-2320-272-20-2	Blackout light switch and 110-volt receptacle removed.

Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

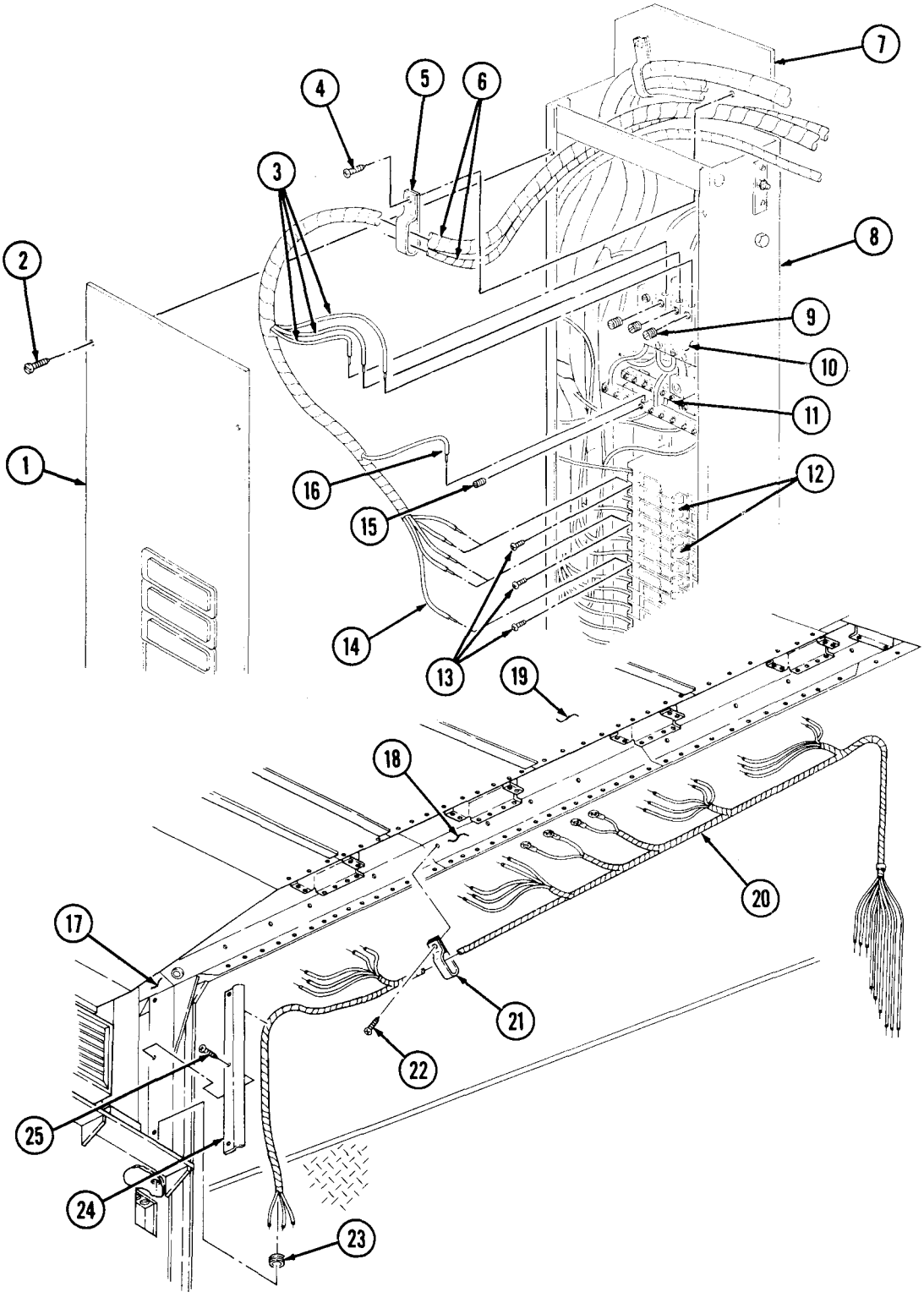
- The left and right main wiring harnesses are replaced the same way. This procedure covers the right main wiring harness.
- Tag wires for installation.

a. Removal

1.	Load center (8)	Six screws (2) and cover (1)	Remove.
2.	Relay (10)	Three setscrews (9) and wires (3)	Remove.
3.	Neutral bus (11)	Setscrew (15) and wire (16)	Remove.
4.	20 amp circuit breaker (12)	Three screws (13) and five wires (14)	Remove.
5.	Plate (7) and wiring harnesses (6)	Screw (4) and clamp (5)	Remove.
6.	Van ceiling (18) and wiring harness (20)	Twelve screws (22) and clamps (21)	Remove.
7.	Van side panel (17)	Grommet (23)	Remove.
8.		Three screws (25) and wire clip (24)	Remove.
9.	Van body (19)	Main wiring harness (20)	Remove.

18.1-28. MAIN WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-28. MAIN WIRING HARNESS MAINTENANCE (Cont'd)

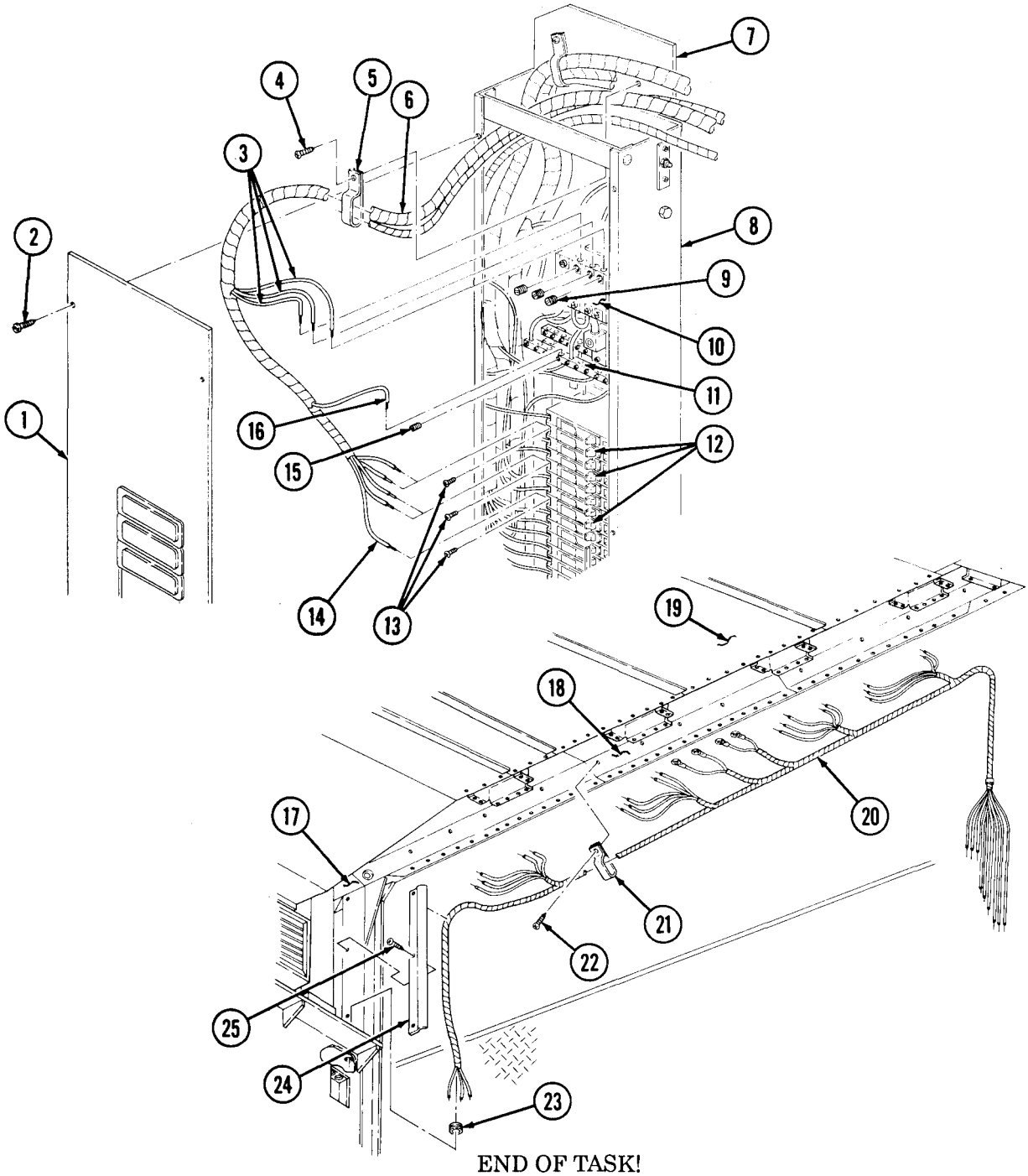
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

For van wiring harness repair, refer to TM 9-2320-272-20-1.

10.	Main wiring harness (20)	Position on van body (19).
11.	Wire clip (24)	Install on side panel (17) with three screws (25).
12.	Grommet (23)	Install on side panel (17).
13.	Twelve clamps (21)	Install on main harness (20) and van ceiling (18) with twelve screws (22).
14.	Clamp (5)	Install on harnesses (6) and plate (7) with screw (4).
15.	Five wires (14)	Install on 20 amp circuit breaker (12) with three screws (13).
16.	Wire (16)	Install on neutral bus (11) with setscrew (15).
17.	Three wires (3)	Install on relay (10) with three setscrews (9).
18.	Cover (1)	Install on load center (8) with six screws (2).

18.1-28. MAIN WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install blackout light switch and 110-volt receptacle (TM 9-2320-272-20-2).
- Install emergency lamp and blackout light (TM 9-2320-272-20-2).
- Install fluorescent light tubes (TM 9-2320-272-20-2).
- Connect battery ground cables (TM 9-2320-272-20-1).

18.1-29. VAN AIR CONDITIONER WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Two lockwashers

Personnel Required
Wheeled Vehicle Repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1
Para. 18.1-18

Condition Description
Parking brake set.
Battery ground cables disconnected.
Ceiling filler and side panels removed.

Special Environmental Conditions
None

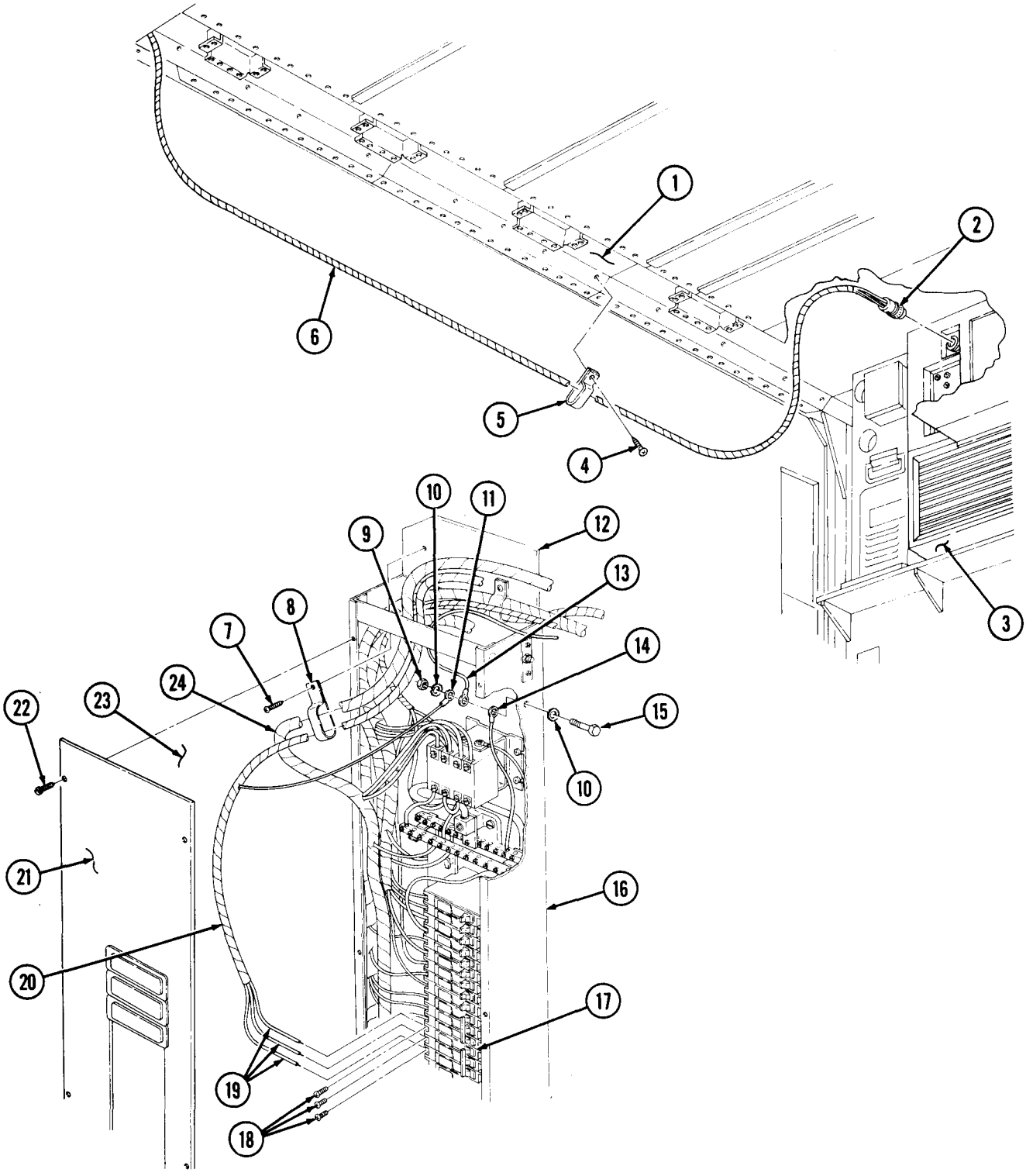
General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Tag cables for installation.		
	a. Removal			
1.	Wiring harness (6) and van ceiling (1)	Twelve screws (4) and clamps (5)	Remove.	
2.	Air conditioner (3)	Plug (2)	Disconnect.	
3.	Load center (16)	Six screws (22) and cover (21)	Remove.	
4.	Wiring harnesses (20) and (24) and plate (12)	Screw (7) and clamp (8)	Remove.	
5.	Load center (16)	Nut (9), screw (15), two lockwashers (10), cable assembly (14), ground cable (13), and wiring harness cable (11)	Remove.	Discard lockwashers (10).
6.	30 amp circuit breaker (17)	Three screws (18) and wiring harness cables (19)	Remove.	
7.	Van body (23)	Wiring harness (20)	Remove.	
	b. Repair			

For van wiring harness repair, refer to TM 9-2320-272-20-1.

18.1-29. VAN AIR CONDITIONER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

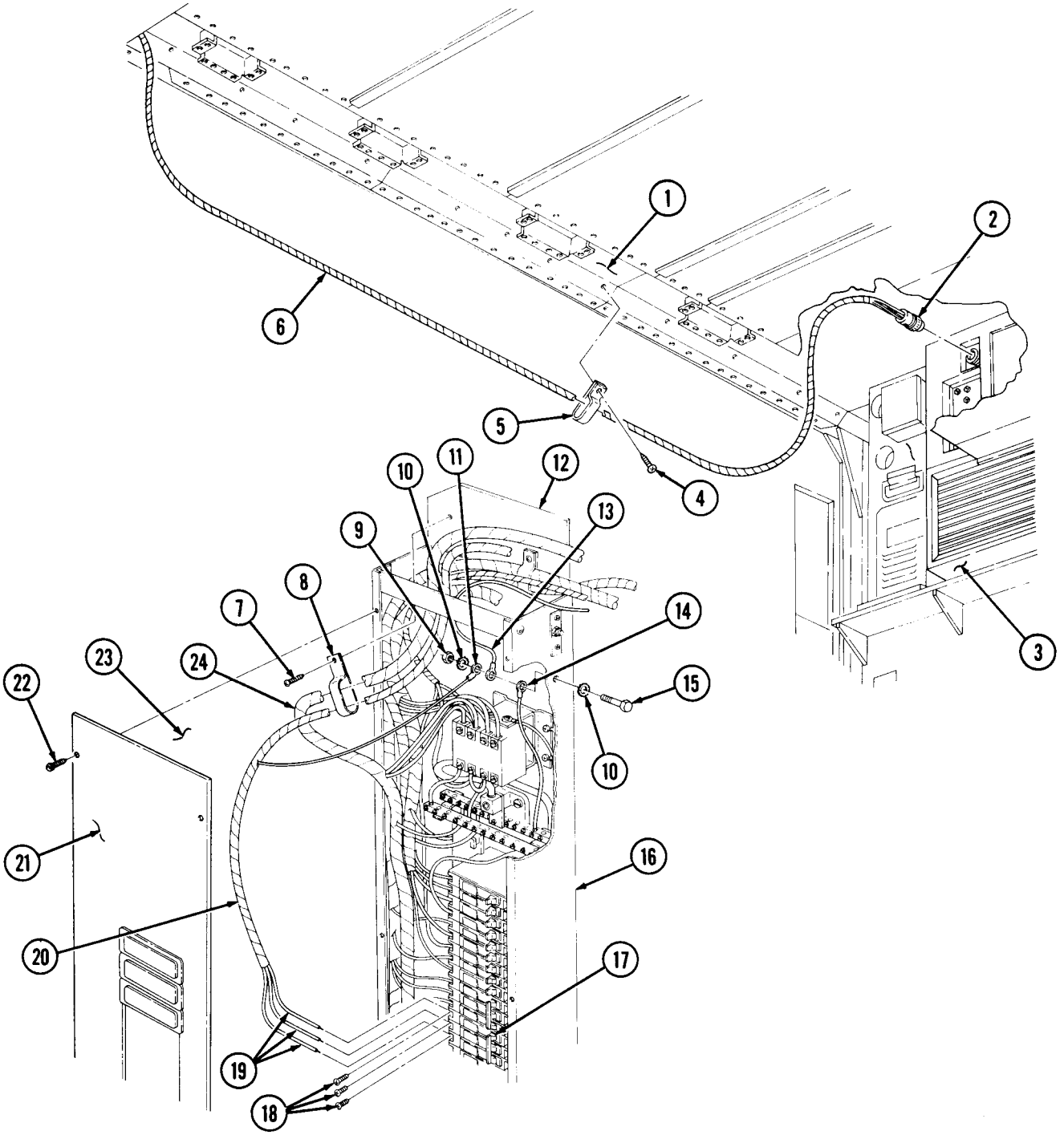


18.1-29. VAN AIR CONDITIONER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
8.		Wiring harness (20)	Position on van body (23).	
9.		Three wiring harness cables (19)	Install on 30 amp circuit breaker (17) with three screws (18).	
10.		Wiring harness cable (11), ground cable (13), and cable assembly (14)	Install on load center (16) with screw (15), two new lockwashers (10), and nut (9).	
11.		Clamp (8)	Install on wiring harnesses (24) and (20), and plate (12) with screw (7).	
12.		Cover (21)	Install on load center (16) with six screws (22).	
13.		Plug (2)	Connect to air conditioner (3).	
14.		Twelve clamps (5)	Install on wiring harness (6) and van ceiling (1) with twelve screws (4).	

18.1-29. VAN AIR CONDITIONER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install ceiling filler and side panels (para. 18.1-18).
- Connect battery ground cable (TM 9-2320-272-20-1).

18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-1 Para. 18.1-18	Battery ground cables disconnected.
	Ceiling filler and side panels removed.

Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

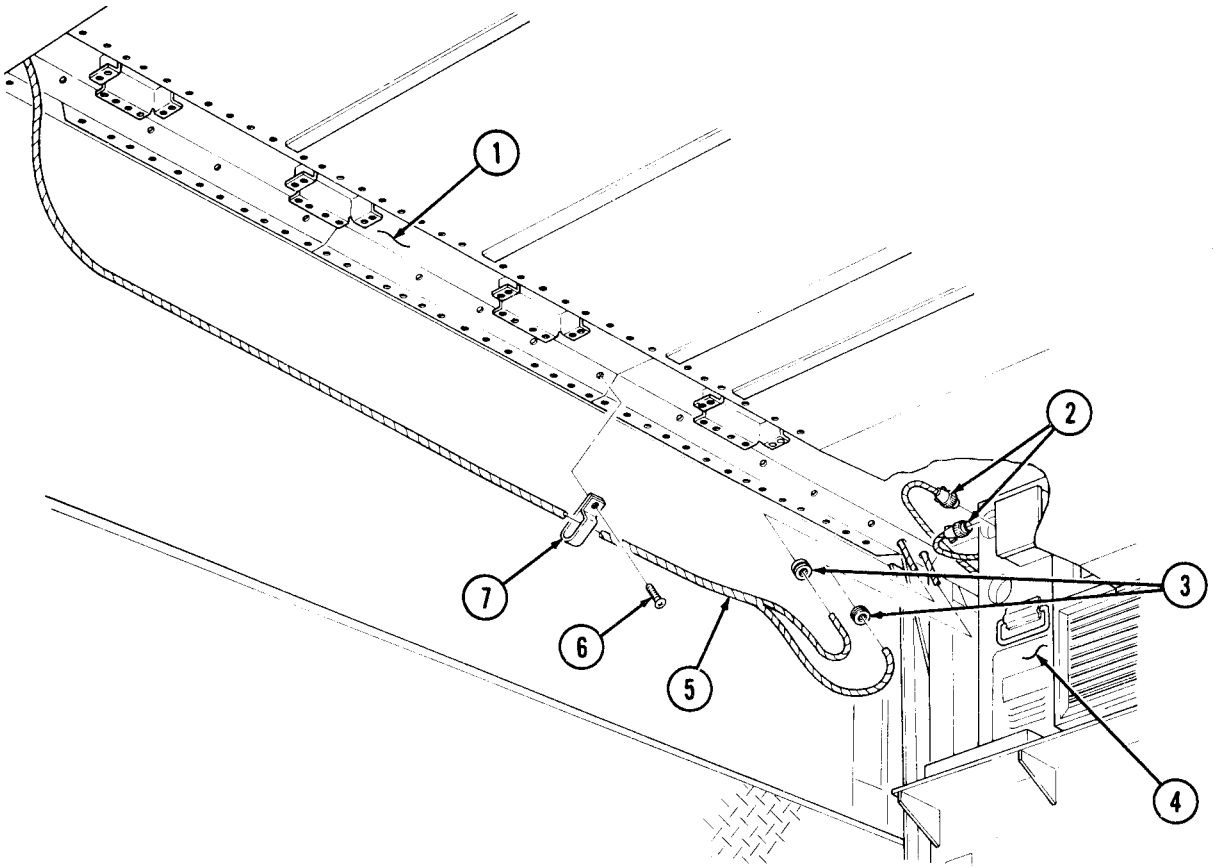
NOTE
Tag wires for installation.

a. Removal

1.	Van ceiling (1) and wiring harness (5)	Twelve screws (6) and clamps (7)	Remove.
2.		Two grommets (3)	Remove.
3.	Heater (4)	Two plugs (2)	Disconnect.

18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

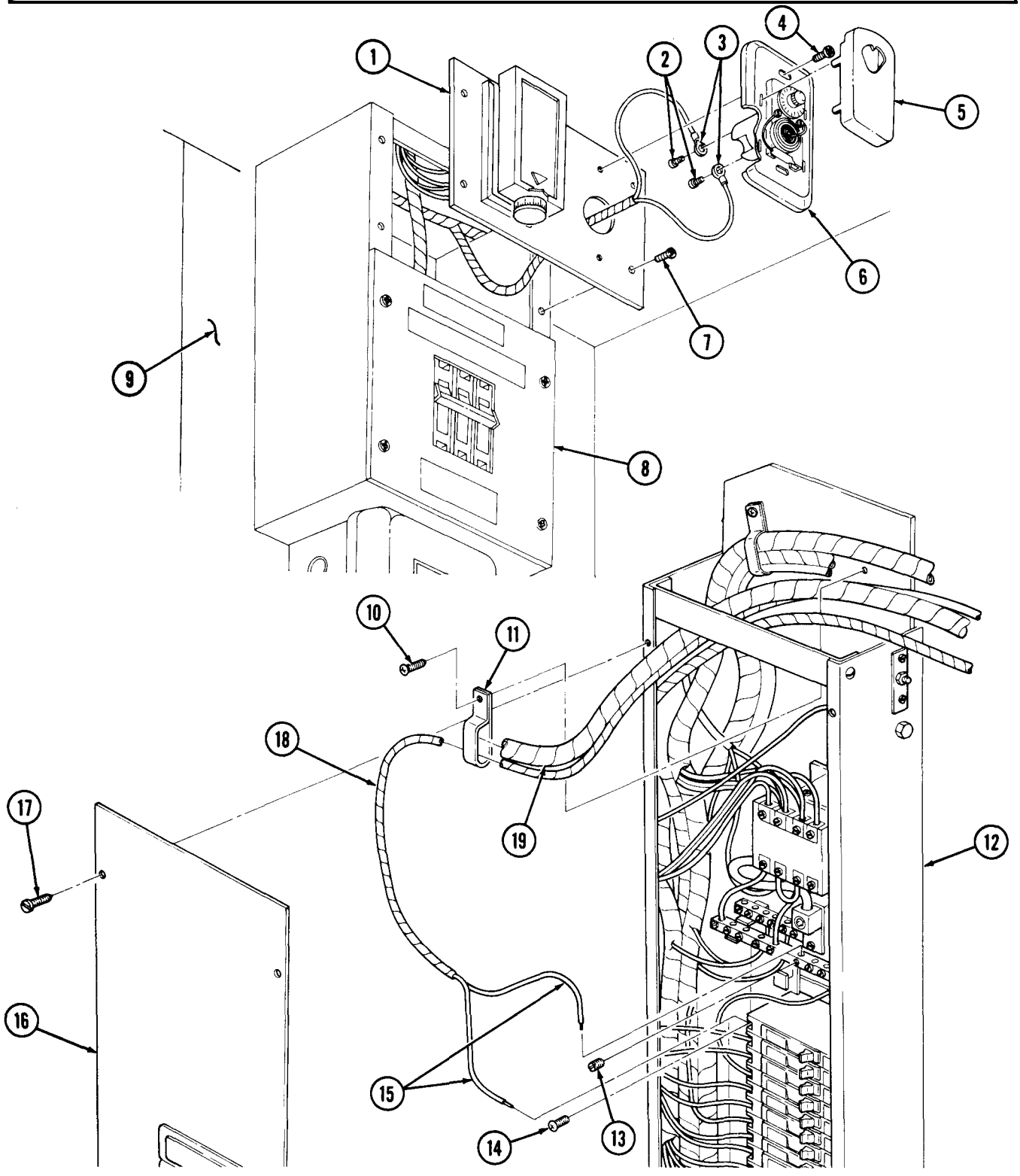
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.	Thermostat (6)	Thermostat cover (5)	Remove.	
5.	Control center box (8)	Four screws (4) and thermostat (6)	Remove.	
6.		Two screws (2) and wires (3)	Remove.	
7.		Four screws (7) and upper cover (1)	Remove.	
8.	Load center (12)	Six screws (17) and cover (16)	Remove.	
9.	Wiring harnesses (18) and (19)	Screw (10) and clamp (11)	Remove.	
10.	Load center (12)	Setscrew (13), screw (14), and two wires (15)	Remove.	
11.	Van body (9)	Wiring harness (18)	Remove.	

b. Repair

For van wiring harness repair, refer to TM 9-2320-272-20-1.

18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

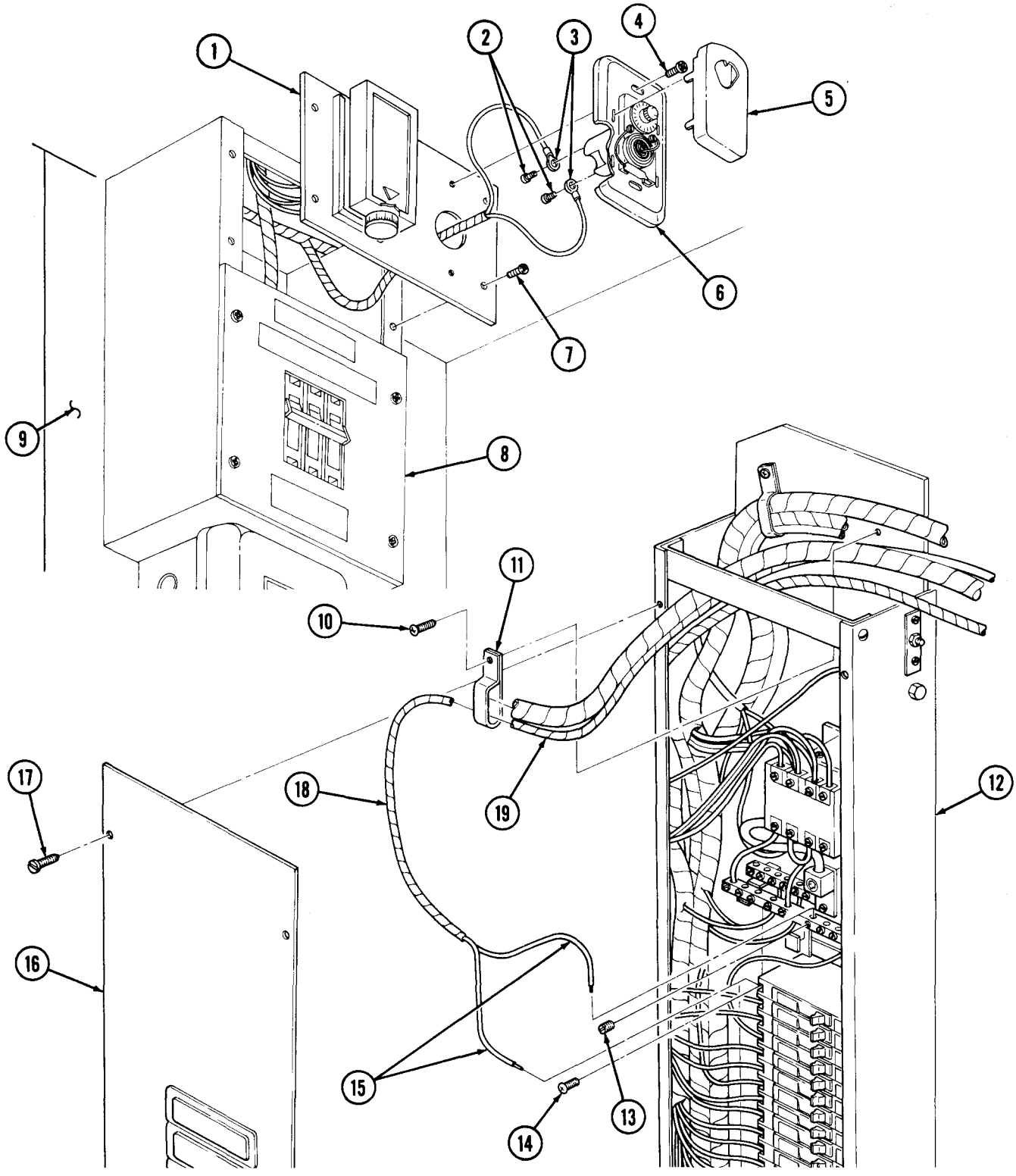


18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Installation			
12.		Wiring harness (18)	Position on van body (9).	
13.		Two wires (15)	Install on load center (12) with screw (14) and setscrew (13).	
14.		Clamp (11)	Place on wiring harnesses (18) and (19) and install on load center (12) with screw (10).	
15.		Cover (16)	Install on load center (12) with six screws (17).	
16.		Upper cover (1)	Install on center control box (8) with four screws (7).	
17.		Wires (3)	Install on thermostat (6) with two screws (2).	
18.		Thermostat (6)	Install on upper cover (1) with two screws (4).	
19.		Thermostat cover (5)	Install on thermostat (6).	

18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

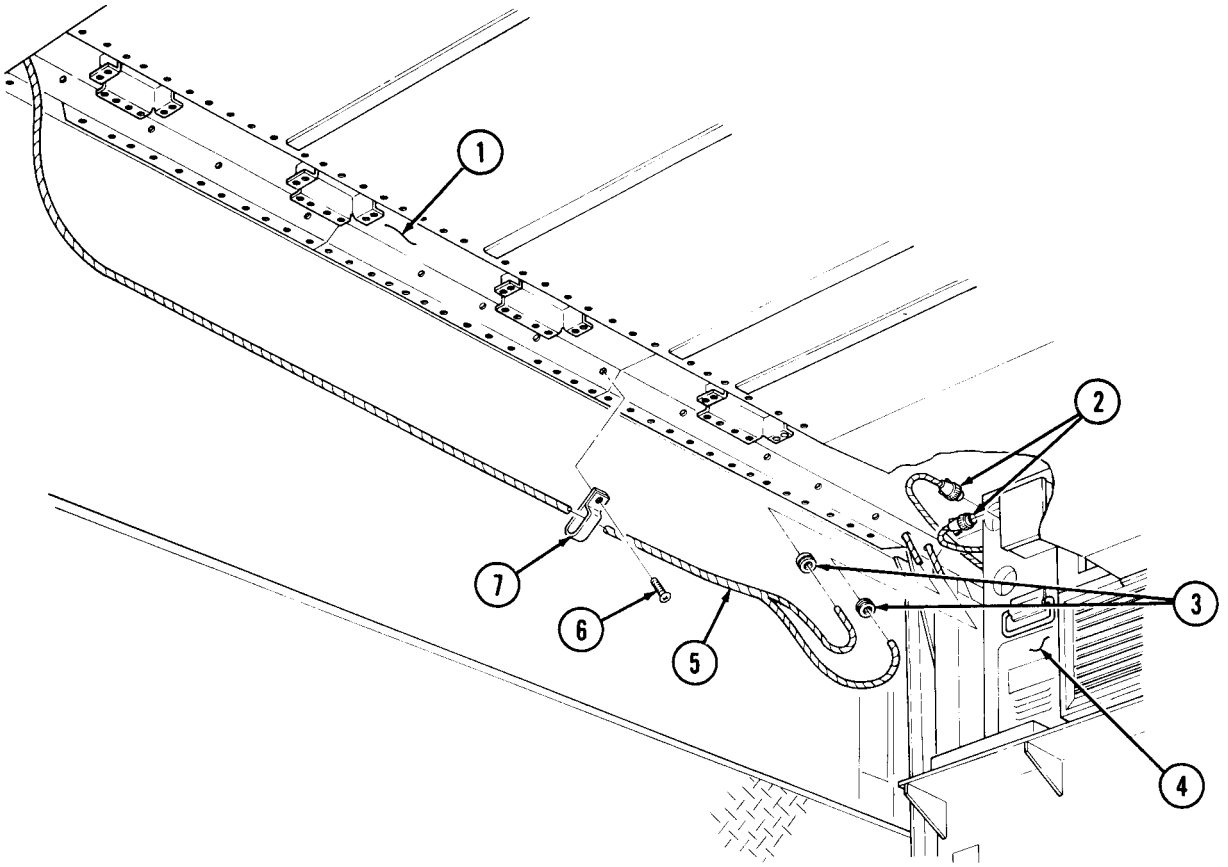


18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.		Two plugs (2)	Connect to heater (4).	
21.		Two grommets (3)	Install on wiring harness (5) and van ceiling (1).	
22.		Twelve clamps (7)	Install on wiring harness (5) and van ceiling (1) with twelve screws (6).	

18.1-30. VAN HEATER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install ceiling filler and side panels (para. 18.1-18).
• Connect battery ground cables (TM 9-2320-272-20-1).

18.1-31. HEATER FUEL PUMP WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

Test Equipment
None

Special Tool
None

Special Environmental Conditions
None

Materials/Parts
None

General Safety Instructions
None

Personnel Required
Wheeled Vehicle Repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

NOTE
- Perform steps 1 and 2 for M934 and M935 vehicles.
- Tag wires for installation.

1.	Fuel pump wiring harness (3)	Screw (1) and clamp (5)	Remove.
2.	Fuel pump connector plug (2)	Wiring harness (3)	Disconnect.

NOTE
Perform step 3 for M934A1 and M935A1 vehicles.

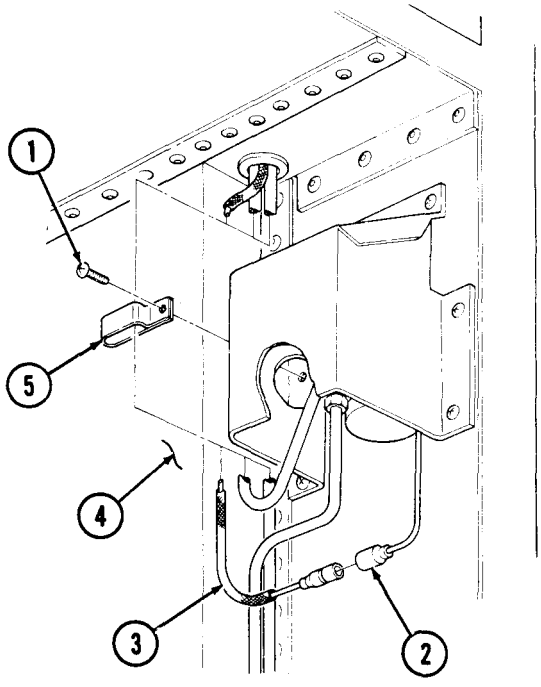
3.	Fuel pump connector plug (2)	Wiring harness (3)	Disconnect.
4.	Heater (6)	Wiring harness (3)	Disconnect.
5.	Van body (4)	Wiring harness (3)	Remove.

b. Repair

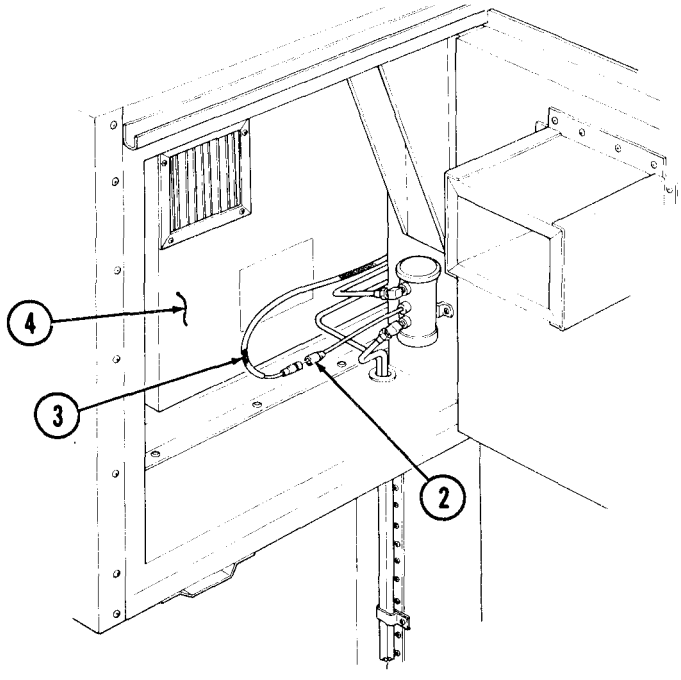
For van wiring harness repair, refer to TM 9-2320-272-20-1.

18.1-31. HEATER FUEL PUMP WIRING HARNESS MAINTENANCE (Cont'd)

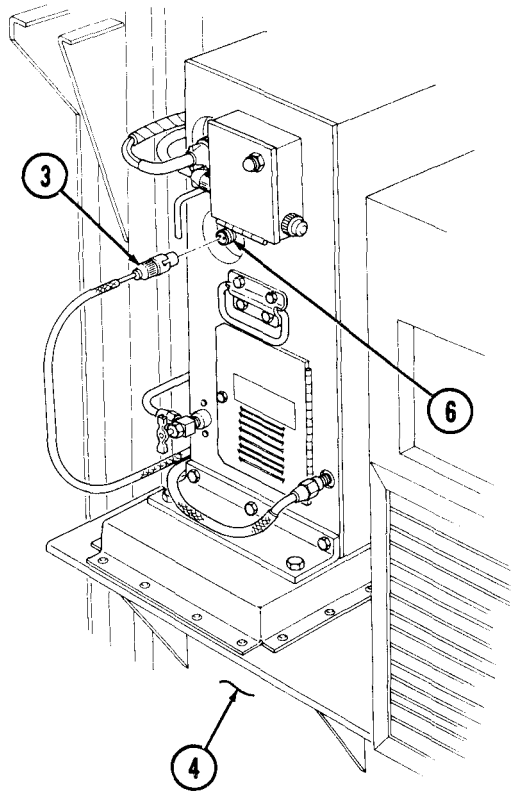
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



M934 AND M935



M934A1 AND M935A1

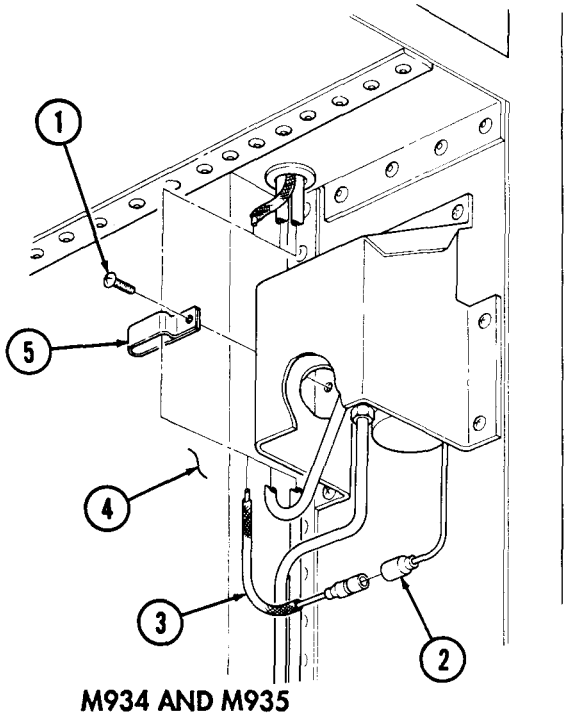


18.1-31. HEATER FUEL PUMP WIRING HARNESS MAINTENANCE (Cont'd)

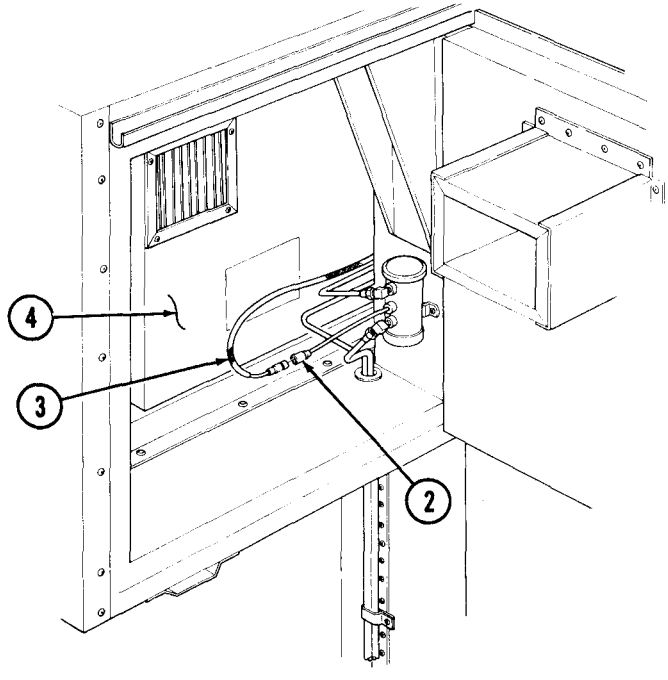
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
6.		Wiring harness (3)	Position on van body (4).	
7.		Wiring harness (3)	Connect to heater (6).	
		NOTE Perform step 8 for M934A1 and M935A1 vehicles.		
8.		Wiring harness (3)	Connect to fuel pump connector plug (2).	
		NOTE Perform steps 9 and 10 for M934 and M935 vehicles.		
9.		Wiring harness (3)	Connect to fuel pump connector plug (2).	
10.		Clamp (5)	Install on wiring harness (3) with screw (1).	

18.1-31. HEATER FUEL PUMP WIRING HARNESS MAINTENANCE (Cont'd)

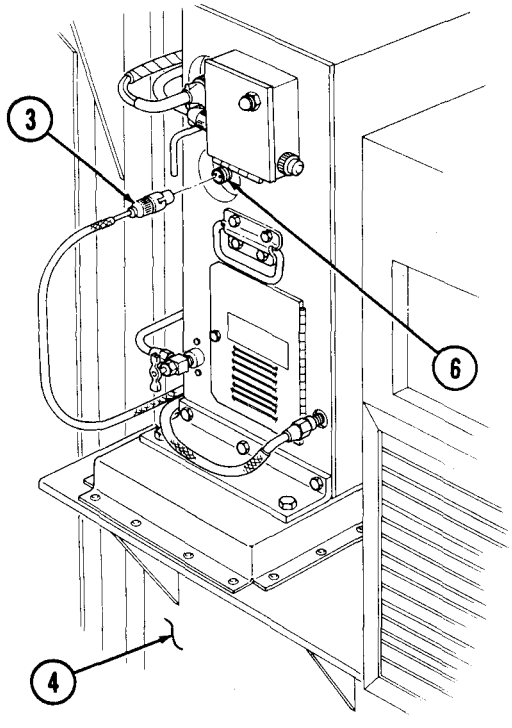
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



M934 AND M935



M934A1 AND M935A1



END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-32. ELECTRICAL HEATER (10kW) WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Three insulated wires splicers

Personnel Required
Wheeled Vehicle Repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

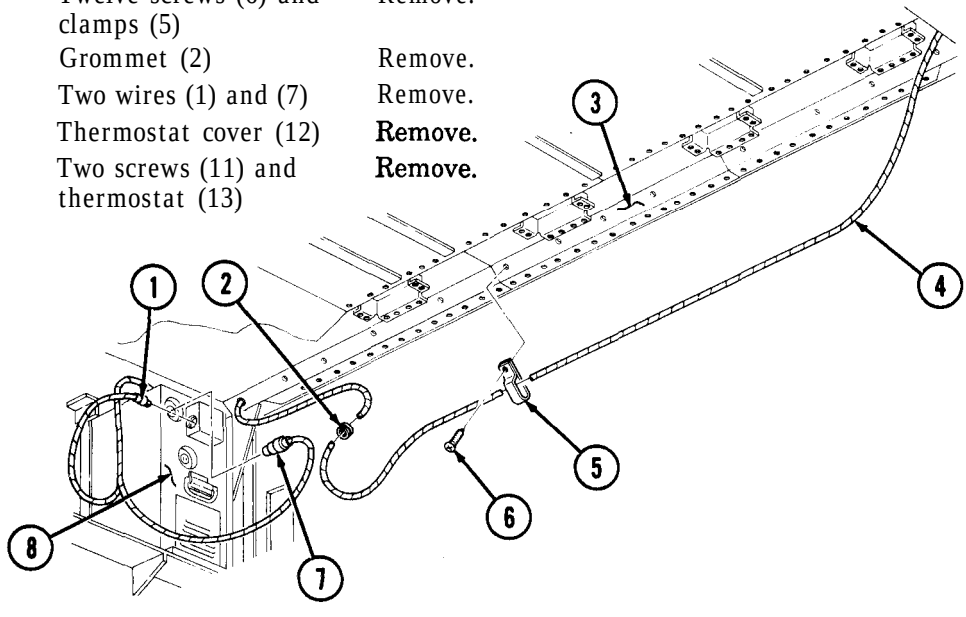
Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1
Para. 18.1-18

Condition Description
Parking brake set.
Battery ground cables disconnected.
Ceiling fillers and side panels removed.

Special Environmental Conditions
None

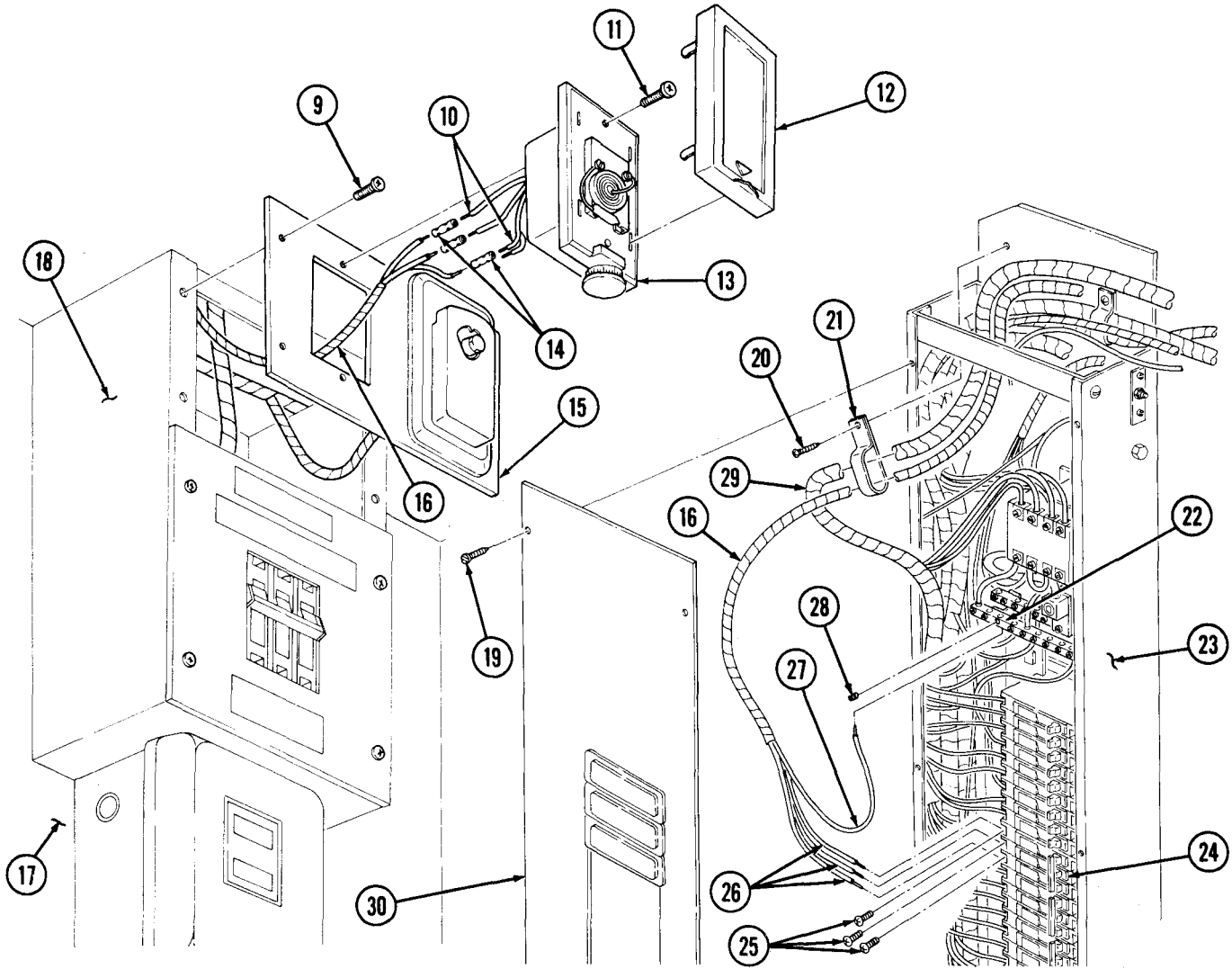
General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Tag wires for installation.		
1.	Van ceiling (3) and wiring harness (4)	Twelve screws (6) and clamps (5)	Remove.	
2.		Grommet (2)	Remove.	
3.	Heater (8)	Two wires (1) and (7)	Remove.	
4.	Thermostat (13)	Thermostat cover (12)	Remove.	
5.	Upper cover (15)	Two screws (11) and thermostat (13)	Remove.	



18.1-32. ELECTRICAL HEATER (10kW) WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Wiring harness (1.6) and thermostat leads (10)	Three insulated wire splicers (14)	Remove.	Discard insulated wire splicers (14).
7.	Control center box (18)	Four screws (9) and upper cover (15)	Remove.	
8.	Load center (23)	Six screws (19) and cover (30)	Remove.	
9.		Screw (20), clamp (21) and wiring harnesses (16) and (29)	Remove.	
10.	Neutral bus (22)	Screw (28) and wire (27)	Remove.	
11.	Three 20 amp circuit breakers (24)	Screws (25) and cables (26)	Remove	
12.	Van body (17)	Wiring harness (16)	Remove.	



18.1-32. ELECTRICAL HEATER (10kW) WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Repair

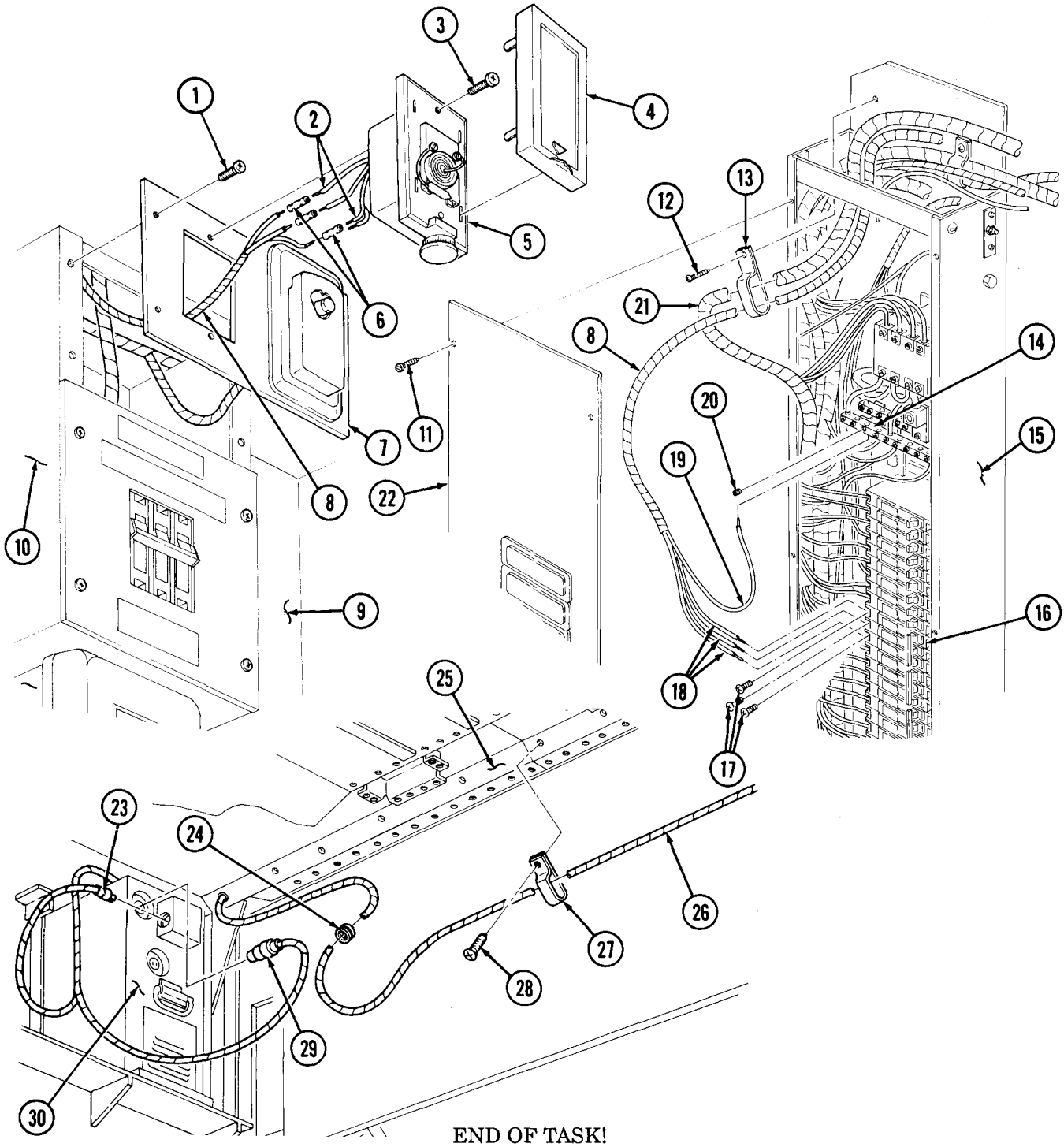
For van wiring harness repair, refer to TM 9-2320-272-20-1.

c. Installation

13.		Wiring harness (8)	Position on van body (9).
14.		Three wires (18)	Install on three 20 amp circuit breakers (16) with three screws (17).
15.		Wire (19)	Install on neutral bus (14) with screw (20).
16.		Clamp (13)	Install on wiring harnesses (8) and (21) and load center (15) with screw (12).
17.		Cover (22)	Install on load center (15) with six screws (11).
18.		Upper cover (7)	Install on control center box (10) with four screws (1).
19.		Thermostat leads (2)	Connect to wiring harness (8) with three new insulated wire splicers (6).
20.		Thermostat (5)	Install on upper cover (7) with two screws (3).
21.		Thermostat cover (4)	Install on thermostat (5).
22.		Two cables (23) and (29)	Install on heater (30).
23.		Grommet (24)	Install on wiring harness (26) and van ceiling (25).
24.		Twelve clamps (27)	Install on wiring harness (26) and van ceiling (25) with twelve screws (28).

18.1-32. ELECTRICAL HEATER (10kW) WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install ceiling filler and side panels (para. 18.1-18).
• Connect battery ground cables (TM 9-2320-272-20-1).

18.1-33. BLACKOUT BYPASS WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

General Safety Instructions
None

Personnel Required
Wheeled Vehicle Repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

NOTE
Tag wires for installation.

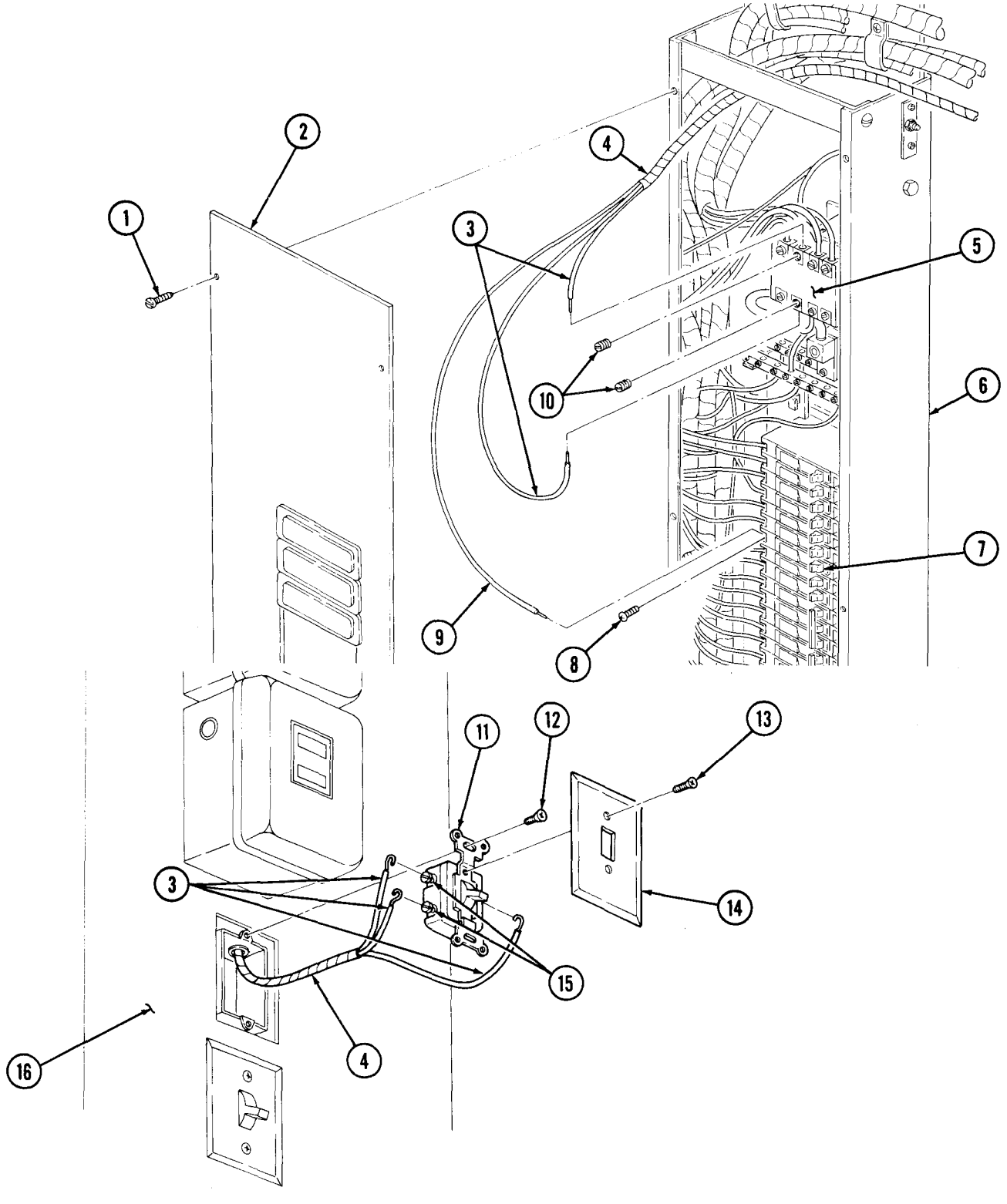
1.	Load center (6)	Six screws (1) and cover (2)	Remove.
2.	3-pole circuit breaker (5)	Two setscrews (10) and wires (3)	Remove.
3.	30 amp circuit breaker (7)	Screw (8) and wire (9)	Remove.
4.	Switch (11)	Two screws (13) and cover (14)	Remove.
5.	Van body (16)	Two screws (12) and switch (11)	Remove.
6.	Switch (11)	Three screws (15)	Loosen and remove wires (3).
7.	Van body (16)	Wiring harness (4)	Remove.

b. Repair

For van wiring harness repair, refer to TM 9-2320-272-20-1.

18.1-33. BLACKOUT BYPASS WIRING HARNESS MAINTENANCE (Cont'd)

STEP No.	LOCATION	ITEM	ACTION	REMARKS

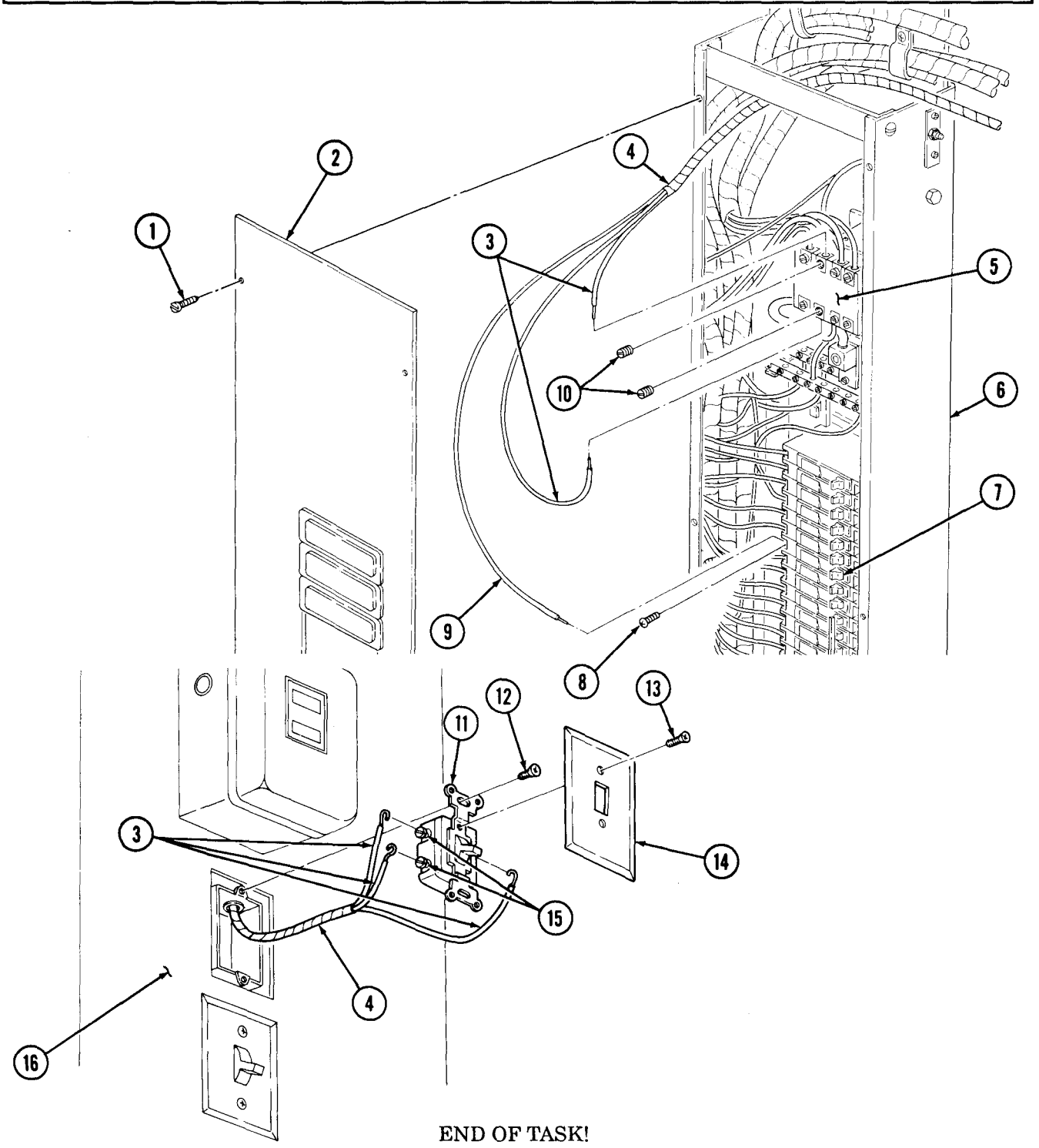


18.1-33. BLACKOUT BYPASS WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
8.		Wiring harness (4)	Position on van body (16).	
9.		Three wires (3)	Install on switch (11) with three screws (15).	
10.		Switch (11)	Install on van body (16) with two screws (12).	
11.		Cover (14)	Install on switch (11) with two screws (13).	
12.		Wire (9)	Install on 30 amp circuit breaker (7) with screw (8).	
13.		Two wires (3)	Install on 3-pole circuit breaker (5) with two setscrews (10).	
14.		Cover (2)	Install on load center (6) with six screws (1).	

18.1-33. BLACKOUT BYPASS WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-34. RIGHT AND LEFT SIDE BLACKOUT HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Van body sides fully expanded and secured.
TM 9-2320-272-20-2	Hinged roof-operated blackout circuit plungers removed.

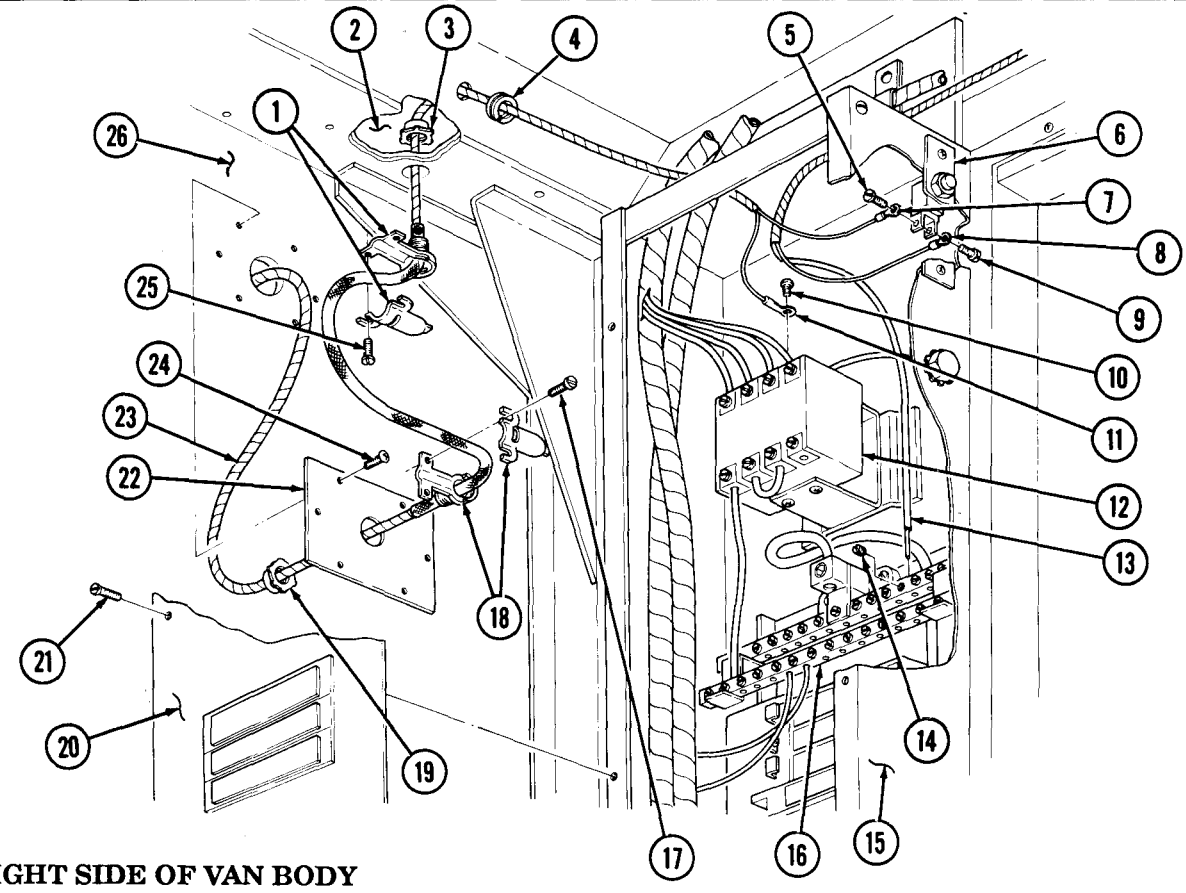
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Tag wires for installation.		
1.	Load center (15)	Six screws (21) and cover (20)	Remove.	
2.	Neutral bus (16)	Screw (14) and wire (13)	Remove.	
3.	Relay (12)	Screw (10) and wire (11)	Remove.	
4.	Rear door blackout switch (6)	Screws (5) and (9), and wires (7) and (8)	Remove.	
		NOTE Perform steps 5 through 8 for left and right side of van body.		
5.	Van body (26)	Six screws (24) and cover (22)	Remove.	
6.	Van body (26)	Grommet (4)	Remove.	
7.	Harness (23) and cover (22)	Nut (19), two screws (17) and two halves of connector (18)	Remove.	
8.	Harness (23) and ceiling truss (2)	Nut (3), two screws (25) and two halves of connector (1)	Remove.	
9.	Load center (15)	Harness (23)	Pull through hole in ceiling truss.	

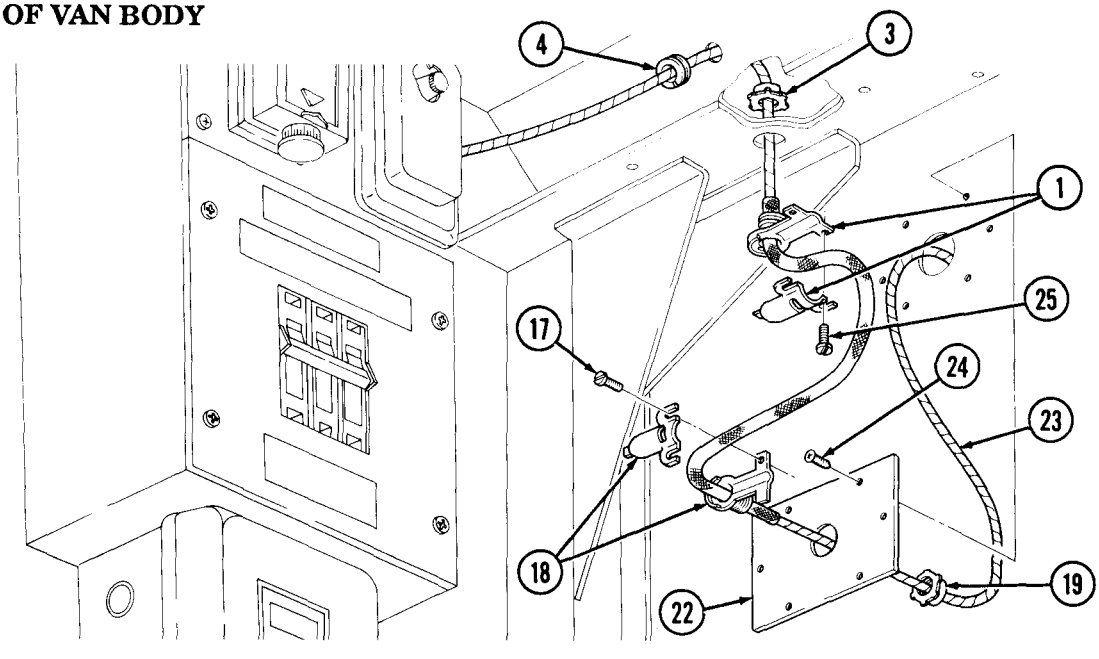
18.1-34. RIGHT AND LEFT SIDE BLACKOUT HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



RIGHT SIDE OF VAN BODY

LEFT SIDE OF VAN BODY

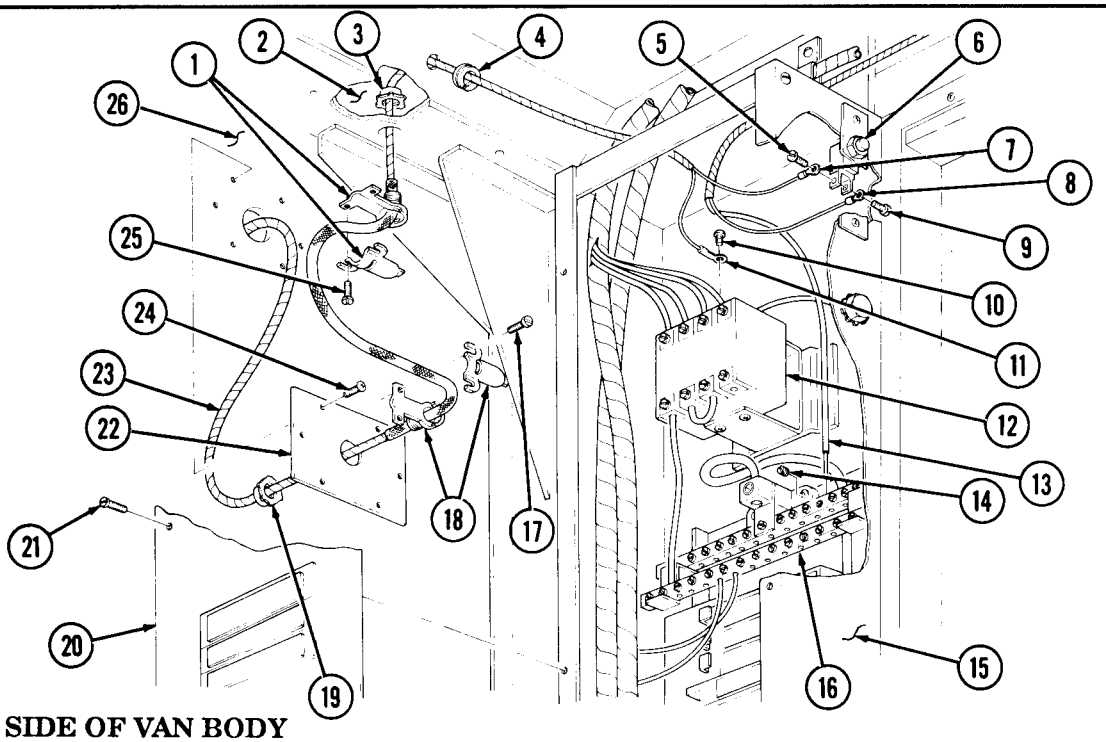


18.1-34. RIGHT AND LEFT SIDE BLACKOUT HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Repair				
		NOTE For van wiring harness repair, refer to TM 9-2320-272-20-1.		
c. Installation				
10.		Harness (23)	Push in through hole in ceiling truss (2) and position on load center (15).	
		NOTE Perform steps 11 through 14 for left and right side of van body.		
11.		Two halves of connector (1)	Install on harness (23) and ceiling truss (2) with nut (3) and two screws (25).	
12.		Cover (22)	Install on van body (26) with six screws (24).	
13.		Two halves of connector (18)	Install on harness (23) and cover (22) with nut (19) and two screws (17).	
14.		Grommet (4)	Install on van body (26).	
15.		Wires (7) and (8)	Install on rear door blackout switch (6) with screws (5) and (9).	
16.		Wire (11)	Install on relay (12) with screw (10).	
17.		Wire (13)	Install on neutral bus (16) with screw (14).	
18.		Cover (20)	Install on load center (15) with six screws (21).	

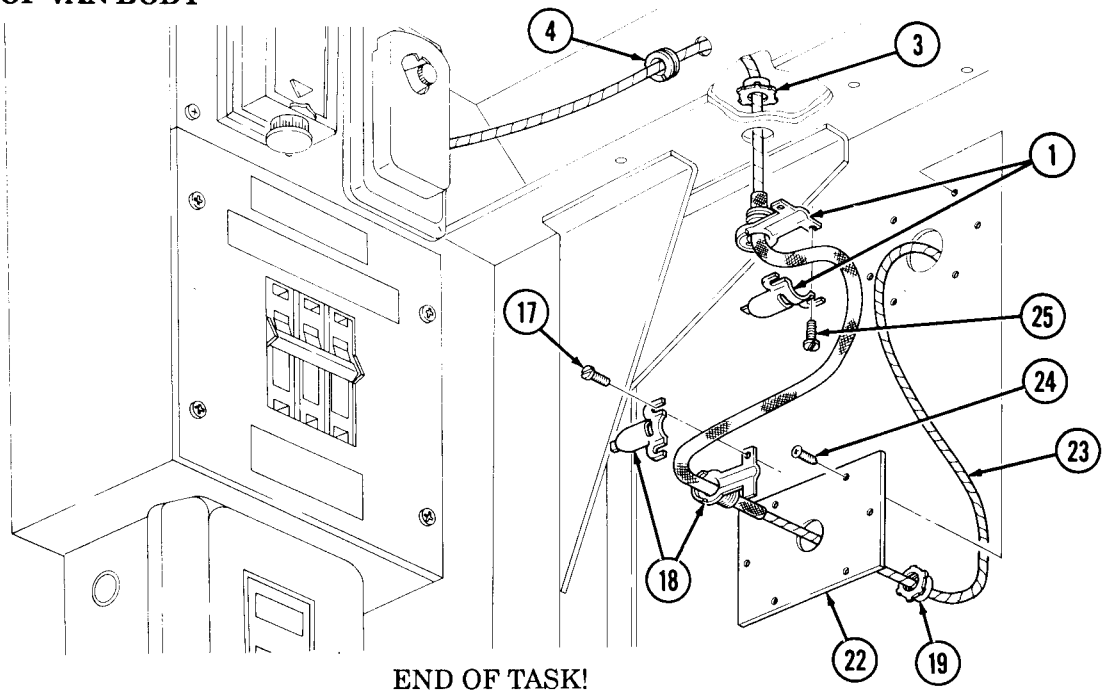
18.1-34. RIGHT AND LEFT SIDE BLACKOUT HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



RIGHT SIDE OF VAN BODY

LEFT SIDE OF VAN BODY



END OF TASK!

FOLLOW-ON TASKS: • Install hinged roof-operated blackout circuit plungers (TM 9-2320-272-20-2).
• Retract van body sides (TM 9-2320-272-10).

18.1-35. CIRCUIT BREAKER HARNESS AND CIRCUIT BREAKER MAINTENANCE

This task covers:

a. Circuit Breaker Harness Removal
b. Circuit Breaker Removal
c. Repair
d. Circuit Breaker Installation
e. Circuit Breaker Harness Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two locknuts
Lockwasher

General Safety Instructions
None

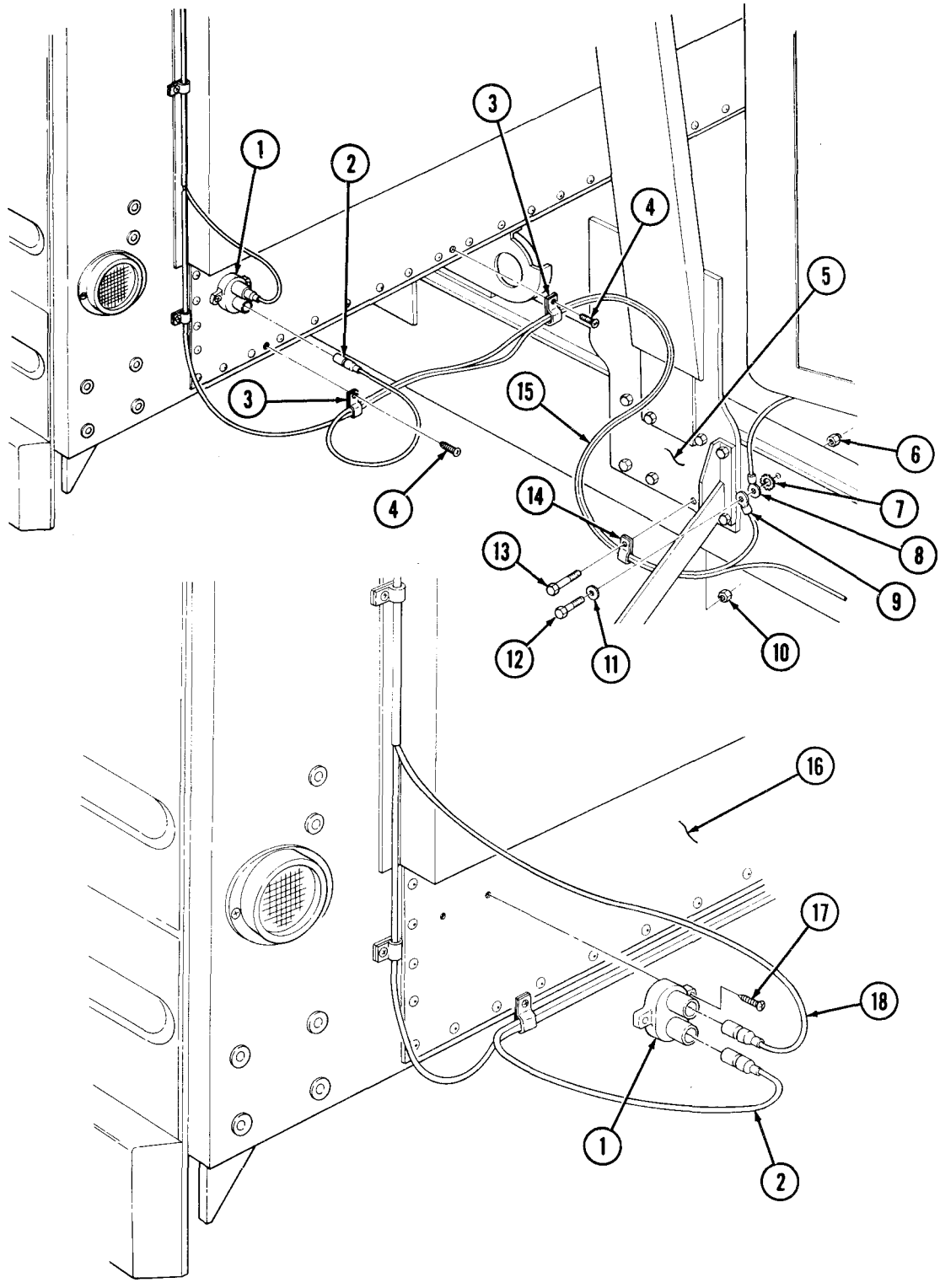
Personnel Required
Wheeled Vehicle Repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Circuit Breaker Harness Removal		
		NOTE Tag wires for installation.		
1.	Circuit breaker (1)	Wire (2)	Disconnect.	
2.	Wiring harness (15) and van body (16)	Two screws (4) and clamps (3)	Remove.	
3.	Spare tire carrier mounting bracket (5)	Locknut (10), screw (13), and clamp (14)	Remove.	Discard locknut (10).
4.		Locknut (6), screw (12), washer (11), wires (8) and (9), and lockwasher (7)	Remove.	Discard locknut (6) and lockwasher (7).
5.	Van body (16)	Wiring harness (15)	Remove.	
6.	Circuit breaker (1)	Emergency lamp wiring harness (18).	Disconnect.	
		b. Circuit Breaker Removal		
7.	Van body (16)	**Two** screws **(17)** and and circuit breaker (1)	Remove.	

18.1-35. CIRCUIT BREAKER HARNESS AND CIRCUIT BREAKER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

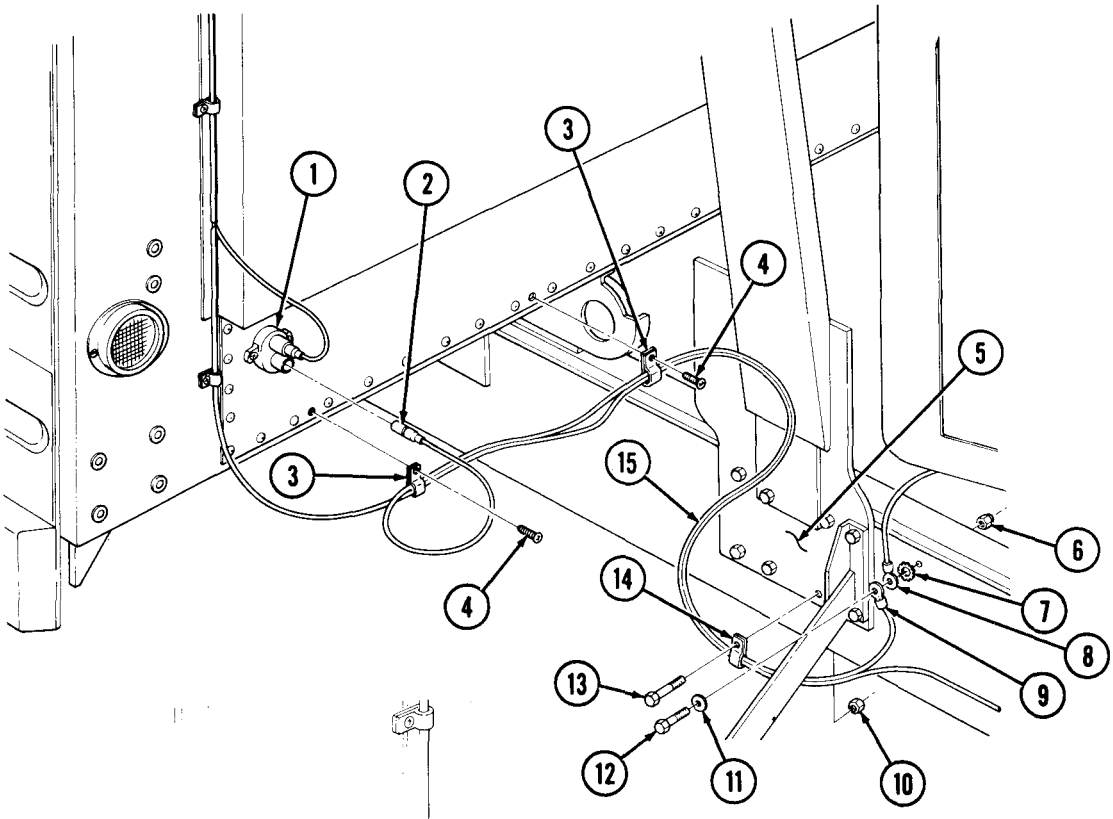


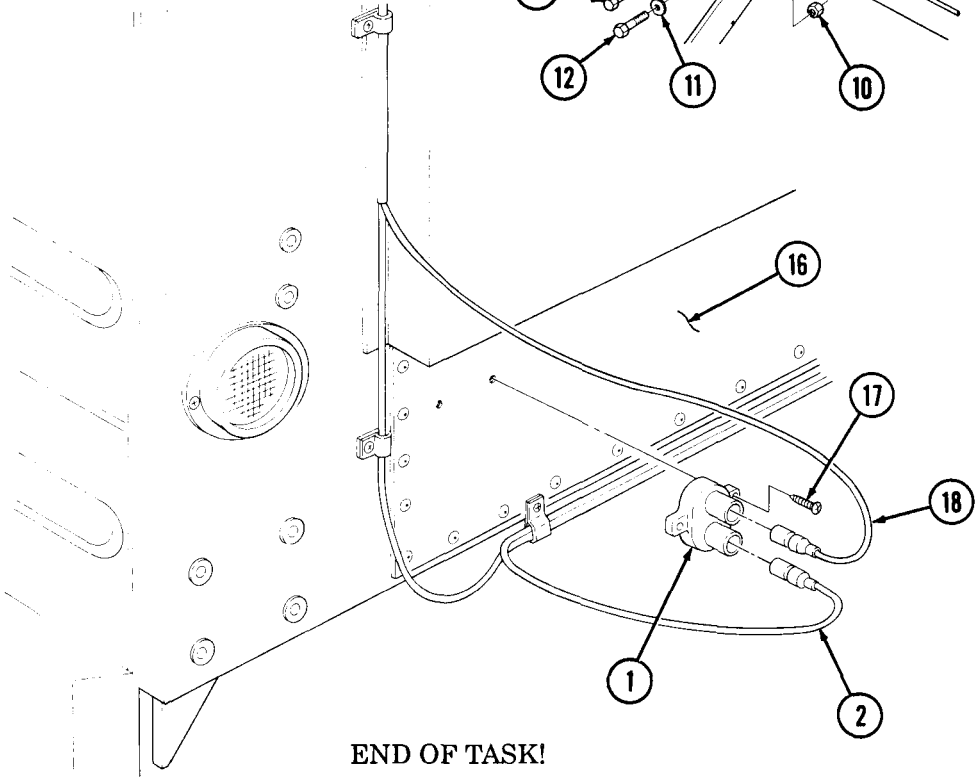
18.1-35. CIRCUIT BREAKER HARNESS AND CIRCUIT BREAKER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Repair			
	For van wiring harness repair, refer to TM 9-2320-272-20-1.			
	d. Circuit Breaker Installation			
8.		Circuit breaker (1)	Install on van body (16) with two screws (17).	
	e. Circuit Breaker Harness Installation			
9.		Emergency lamp wiring harness (18)	Install on circuit breaker (1).	
10.		Wires (9) and (8)	Install on spare tire mounting bracket (5) with screw (12), washer (11), new lockwasher (7), and new locknut (6).	
11.		Clamp (14) and wiring harness (15)	Install on spare tire carrier mounting bracket (5) with screw (13), and new locknut (10).	
12.		Two clamps (3)	Install on wiring harness (2) and van body (16) with two screws (4).	
13.		Wire (2)	Connect to circuit breaker (1).	

18.1-35. CIRCUIT BREAKER HARNESS AND CIRCUIT BREAKER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-36. EMERGENCY LAMP WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Took
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1
Para. 18.1-18

Condition Description
Parking brake set.
Battery ground cables disconnected.
Ceiling filler and side panels removed.

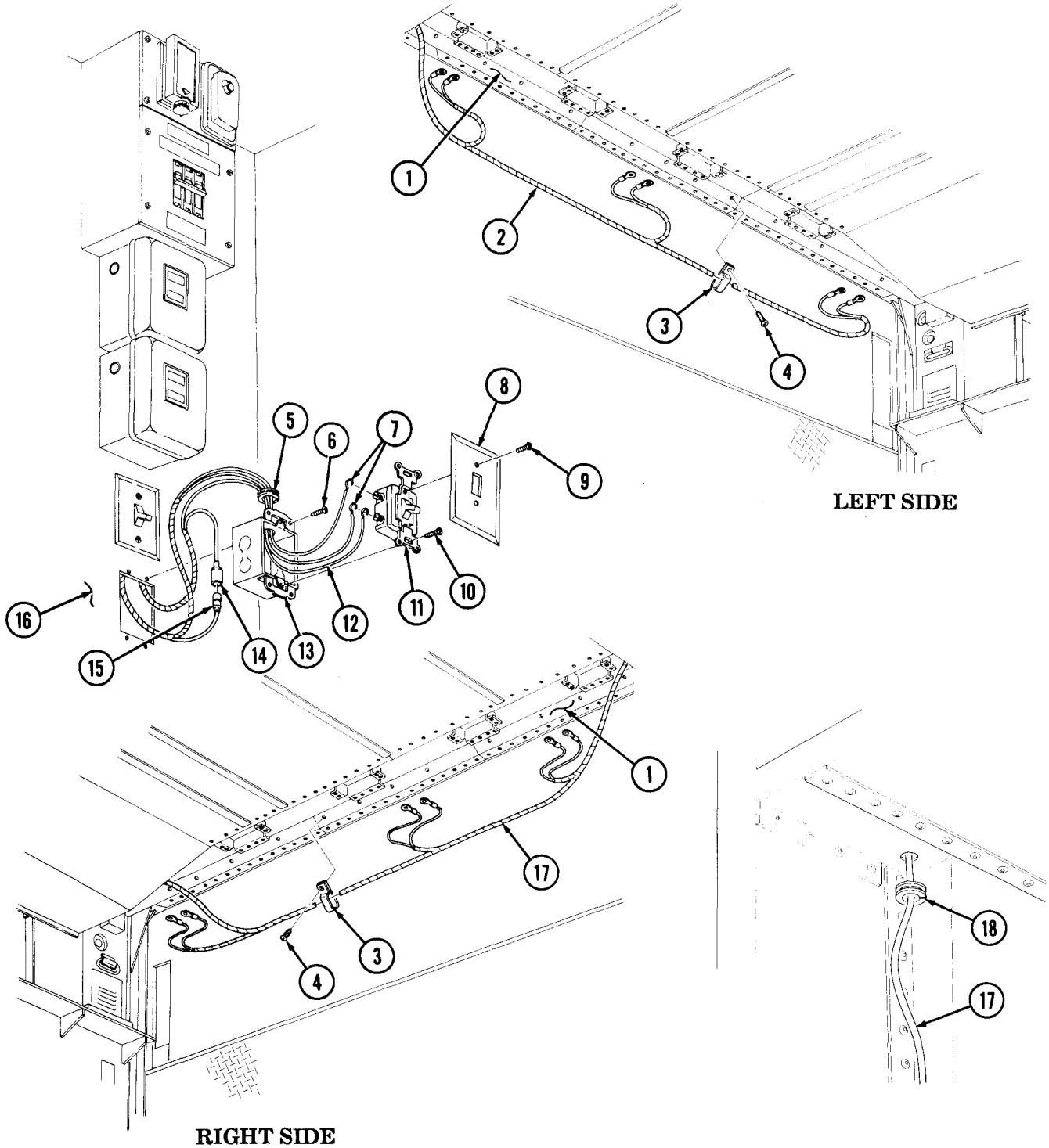
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Tag wires for installation.		
1.	Van ceiling (1) and wiring harness (2)	Twelve screws (4) and clamps (3)	Remove.	
2.	Switch (11)	Two screws (9) and cover (8)	Remove.	
3.	Switch box (13)	Two screws (10) and switch (11)	Remove.	
4.	Switch (11)	Two wires (7) and wire (12)	Disconnect.	
5.	Van wall (16)	Four screws (6) and box (13)	Remove.	
6.	Switch box (13)	Grommet (5)	Remove.	
7.	Emergency lamp wiring harness lead (15)	Emergency lamp wiring harness lead (14)	Disconnect.	
8.	Van ceiling (1)	Twelve screws (4) and clamps (3)	Remove from wiring harness (17).	
9.		Grommet (18) and wiring harness (17)	Remove.	

18.1-36. EMERGENCY LAMP WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



LEFT SIDE

RIGHT SIDE

18.1-36. EMERGENCY LAMP WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.	Circuit breaker (1)	Lead (2)	**Disconnect.**	
11.	Wiring harness (3) and van body (11)	Two screws (5) and clamps (4)	Remove.	
12.		Two screws (10) and clamps (6).	Remove	
13.	Spare tire carrier bracket (7)	Screw (9), clamp (8), and wiring harness (3)	Remove.	
14.	Positive battery terminal (13)	Nut (12) and wire (14)	Remove.	
15.	Van body (11)	Lead (2)	Remove.	

b. Repair

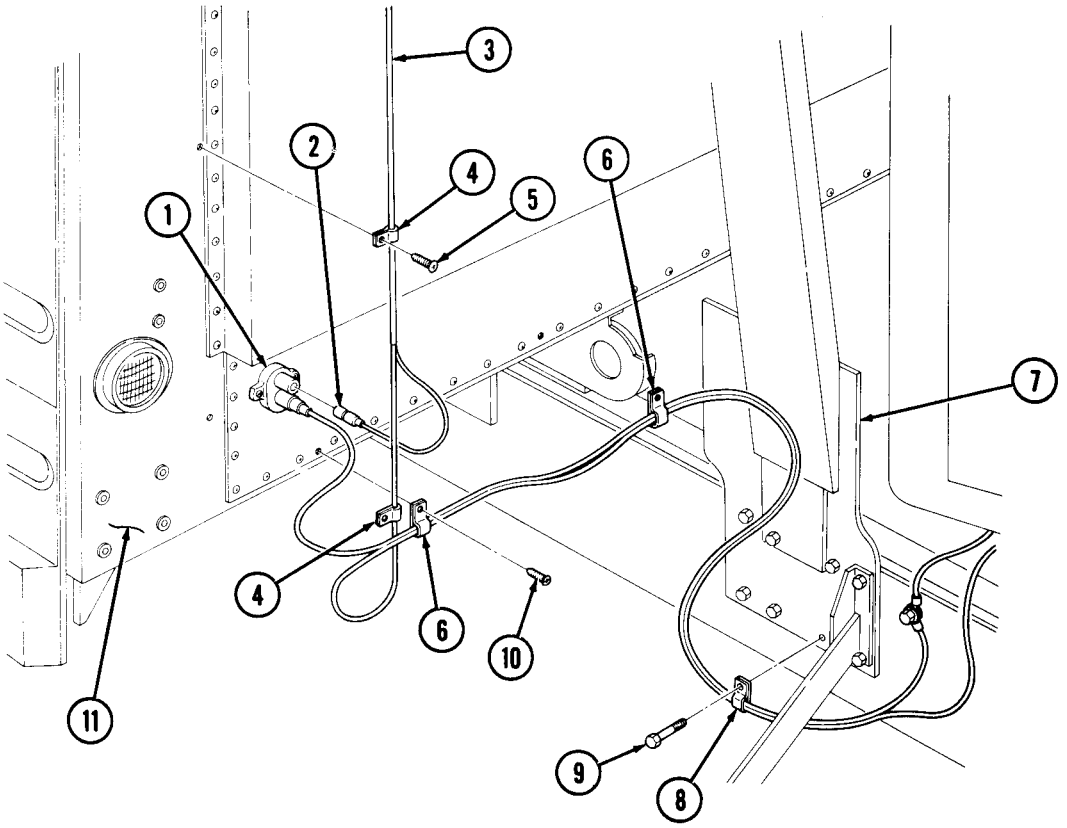
For van wiring harness repair, refer to TM 9-2320-272-20-1.

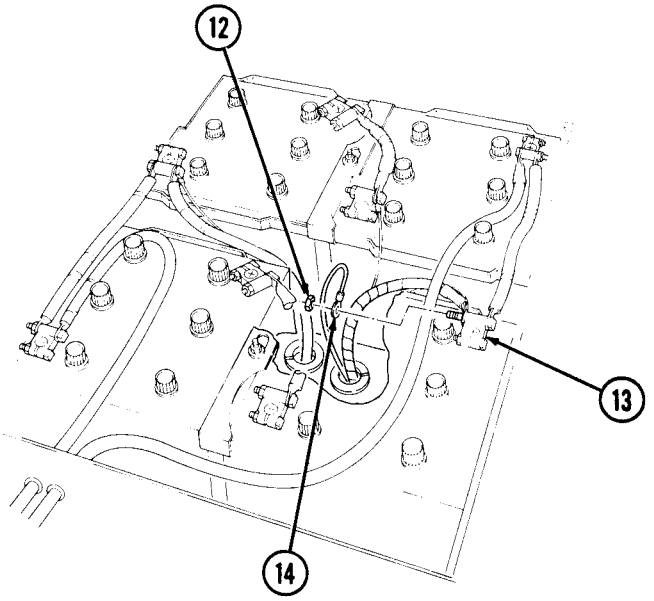
c. Installation

16.		Wire (14)	Install on positive battery terminal (13) with nut (12).
17.		Wiring harness (3)	Install on spare tire carrier bracket (7) with clamp (8) and screw (9).
18.		Two clamps (6)	Install on wiring harness (3) and van body (11) with two screws (10).
19.		Two clamps (4)	Install on wiring harness (3) and van body (11) with two screws (5).
20.		Lead (2)	Connect to circuit breaker (1).

18.1-36. EMERGENCY LAMP WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



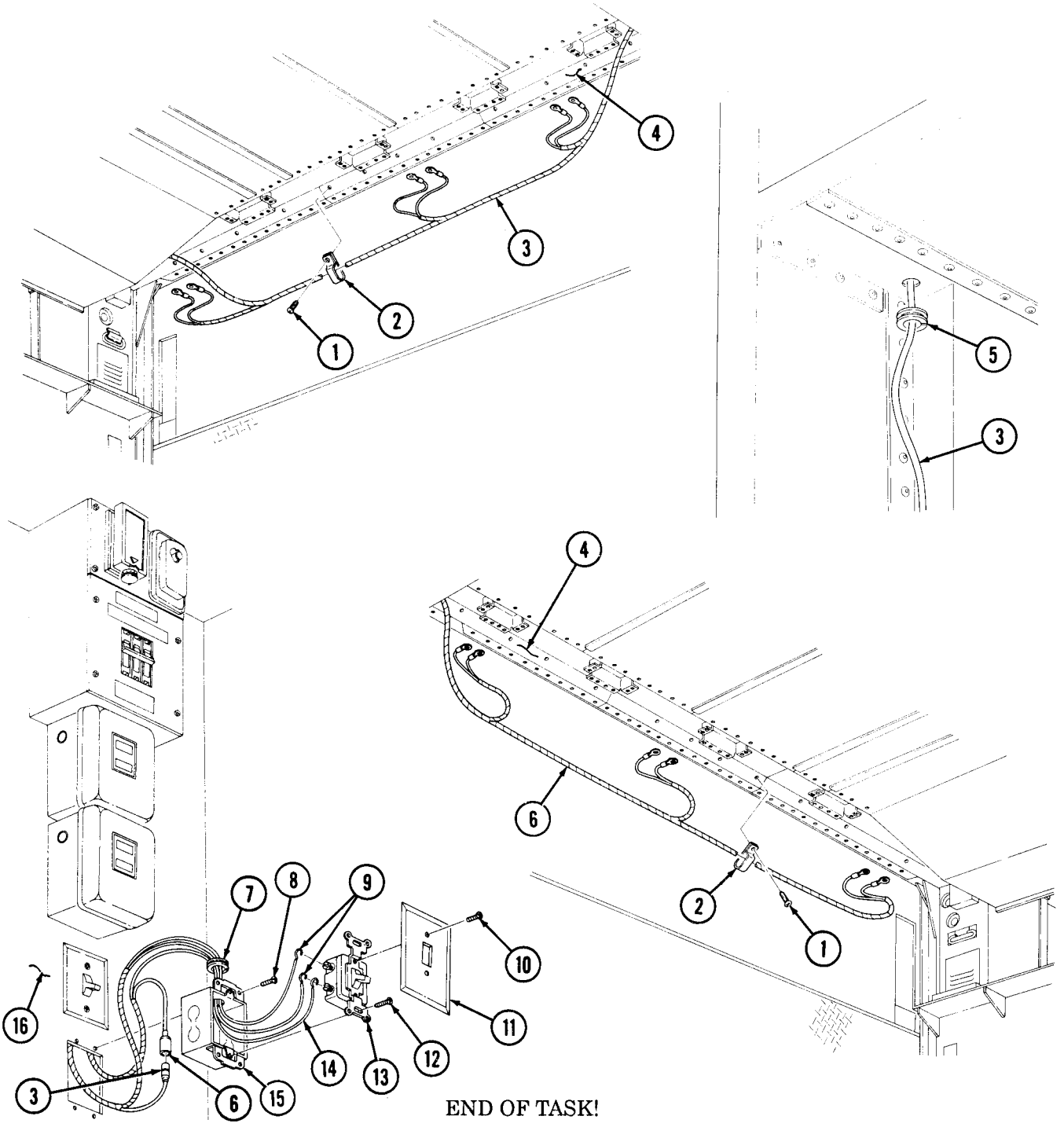


18.1-36. EMERGENCY LAMP WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
21.		Grommet (5)	Install on van ceiling (4) and wiring harness (3).	
22.		Twelve clamps (2)	Install on van ceiling (4) and wiring harness (3) with twelve screws (1).	
23.		Emergency lamp wiring harness (6)	Connect to emergency lamp wiring harness (3).	
24.		Grommet (7)	Install on switch box (15).	
25.		Two cables (9) and cable (14)	Install on switch (13).	
26.		Switch box (15)	Install on van wall (16) with four screws (8).	
27.		Switch (13)	Install on switch box (15) with two screws (12).	
28.		Cover (11)	Install on switch (13) with two screws (10).	
29.		Emergency lamp wiring harness (6)	Install on van ceiling (4) with twelve clamps (2) and screws (1).	

18.1-36. EMERGENCY LAMP WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install ceiling filler and side panels (para. 18.1-18).
• Connect battery ground cables (TM 9-2320-272-20-1).

18.1-37. BLACKOUT AND CLEARANCE LIGHTS WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Main power switch off.
TM 9-2320-272-20-2	Clearance and blackout marker lights removed.
Para. 18.1-12	Rear wall interior panels removed.
Para. 18.1-18	Ceiling filler and side panels removed.
Para. 18.1-20	Ceiling air ducts removed.

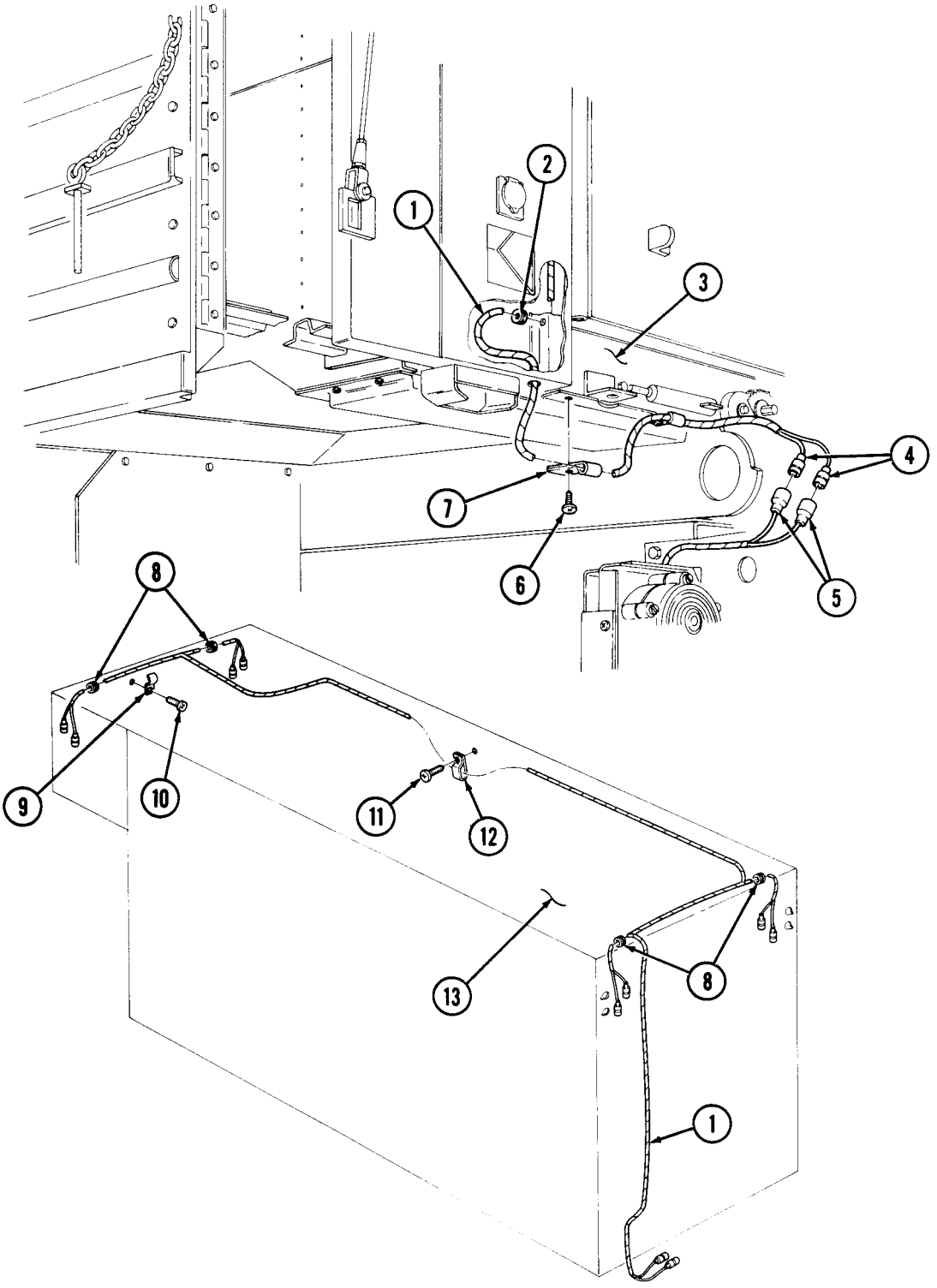
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Tag wires for installation.		
1.	Van body (3) and wiring harness (1)	Grommet (2)	Remove.	
2.		Two screws (6) and clamps (7)	Remove.	
3.	Rear wiring harness connectors (5)	Wiring harness connectors (4)	Disconnect.	
4.	Van ceiling (13) and wiring harness (1)	Twelve screws (11) and clamps (12)	Remove.	
5.		Five screws (10) and clamps (9)	Remove.	
6.		Four grommets (8)	Remove.	
7.	Van body (3)	Wiring harness (1)	Remove.	

18.1-37. BLACKOUT AND CLEARANCE LIGHTS WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-37. BLACKOUT AND CLEARANCE LIGHTS WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Repair

NOTE

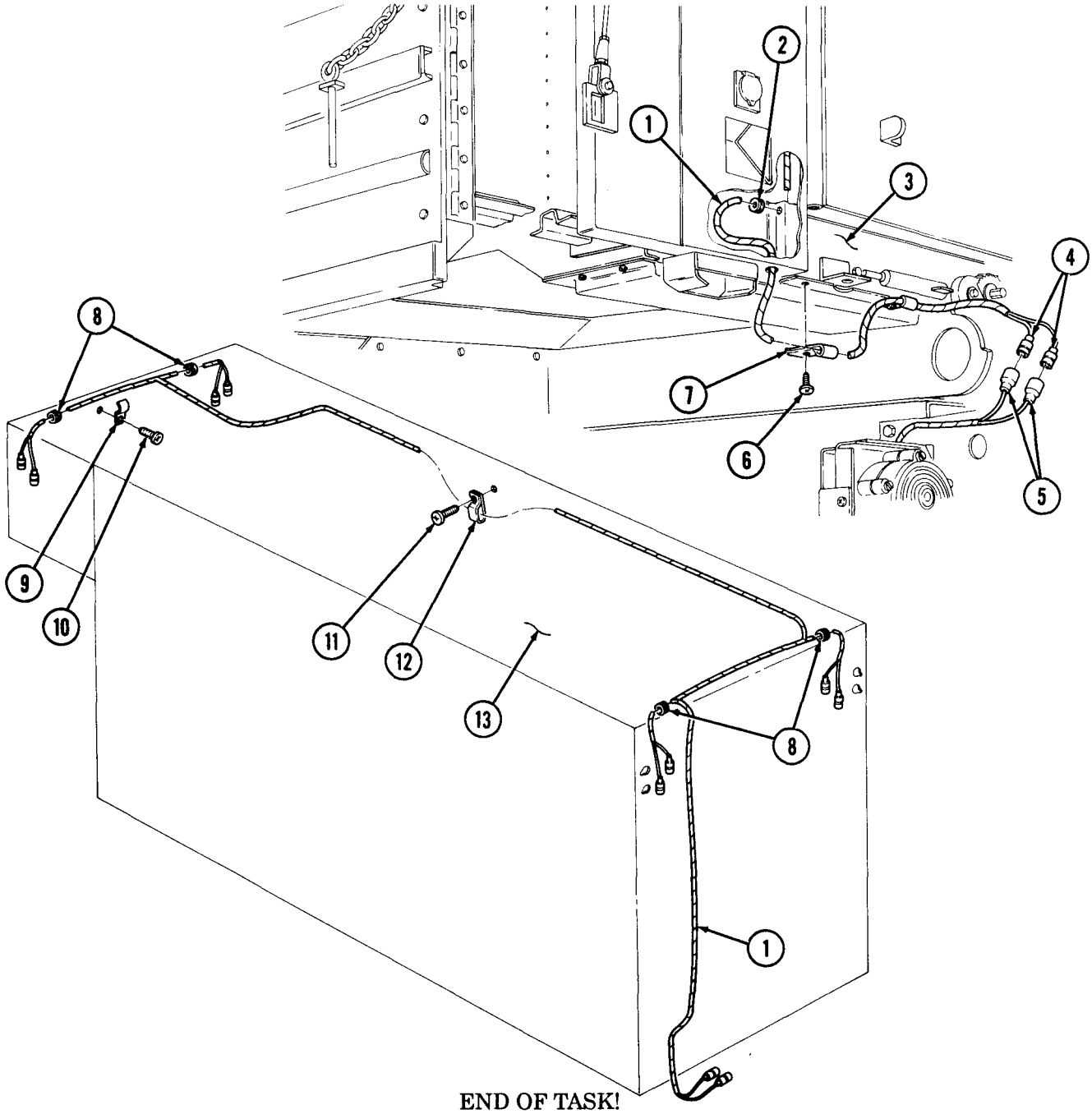
For van wiring harness repair, refer to TM 9-2320-272-20-1.

c. Installation

8.		Wiring harness (1)	Position on van body (3).
9.		Four grommets (8)	Install on van ceiling (13) and wiring harness (1).
10.		Five clamps (9)	Install on van ceiling (13) and wiring harness (1) with five screws (10).
11.		Twelve clamps (12)	Install on van ceiling (13) and wiring harness (1) with twelve screws (11).
12.		Wiring harness connectors (4)	Connect to rear wiring harness connectors (5).
13.		Two clamps (7)	Install on wiring harness (1) and van body (3) with two screws (6).
14.		Grommet (2)	Install on wiring harness (1) and van body (3).

18.1-37. BLACKOUT AND CLEARANCE LIGHTS WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install ceiling air ducts (para. 18.1-20).
- Install ceiling filler and side panels (para. 18.1-18).
- Install rear wall interior panels (para. 18.1-12).
- Install clearance and blackout marker lights (TM 9-2320-272-20-2).
- Main power switch on (TM 9-2320-272-10).

18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Sealing compound (Appendix C, Item 26)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1
Para. 18.1-18

Condition Description
Parking brake set.
Battery ground cables removed.
Ceiling filler and side panels removed.

Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

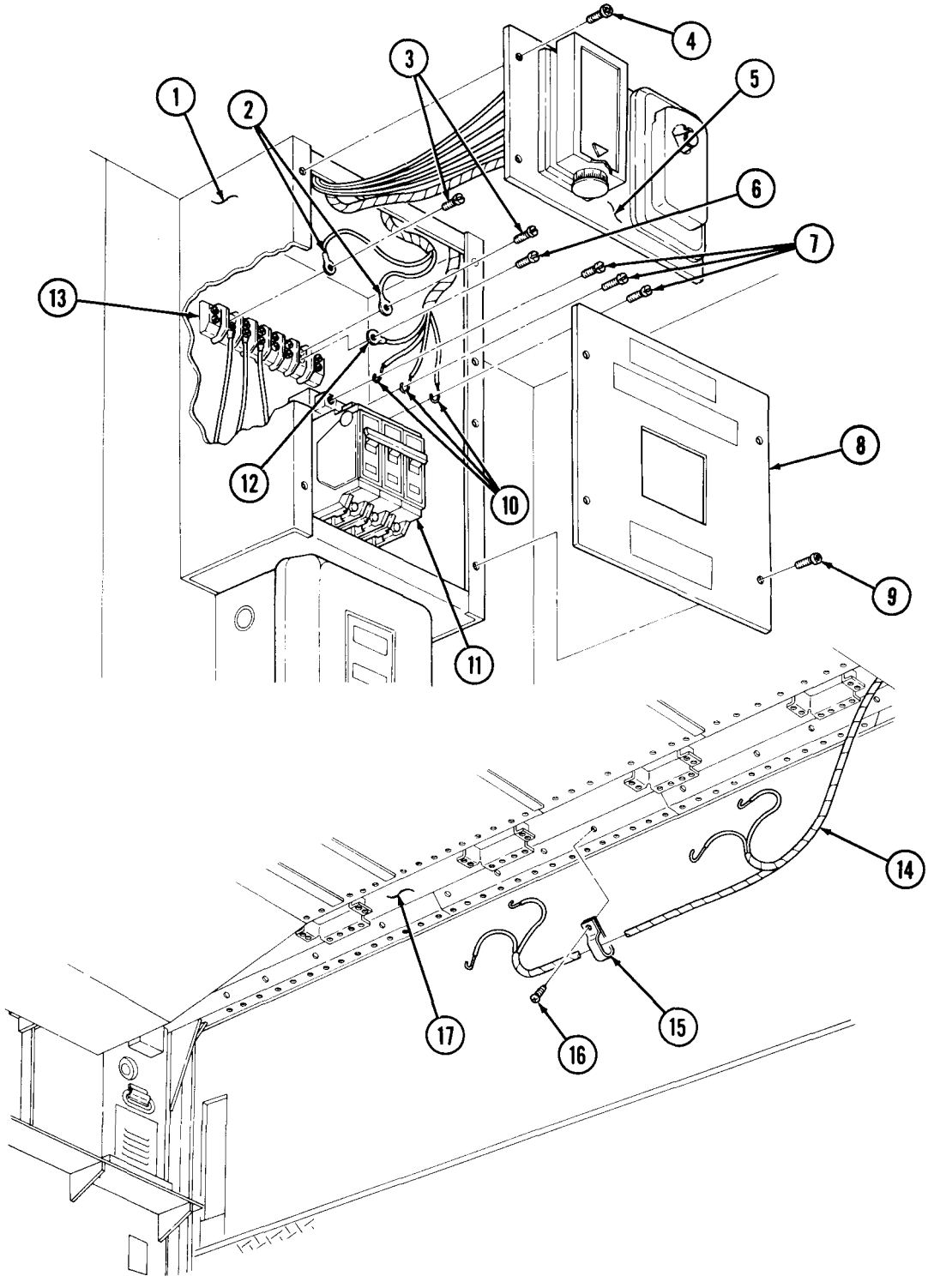
a. Removal

NOTE
Tag wires for installation.

1.	Control center (1)	Four screws (4) and upper cover (5)	Remove.
2.		Four screws (9) and lower cover (8)	Remove.
3.	Terminal (13)	Two screws (3) and wires (2)	Remove.
4.		Screw (6) and wire (12)	Remove.
5.	Circuit breaker (11)	Three screws (7) and wires (10)	Remove.
6.	Branched 400 Hz receptacle harness (14) and van ceiling (17)	Six screws (16) and clamps (15)	Remove.

18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Connectors (1) and (2)	Connectors (5) and (6)	Disconnect.	
8.	Electrical connector box (8)	Eight screws (3) and electrical connector box cover (4)	Remove.	
9.	Connector (2)	Four wires (7)	Disconnect.	
10.	Load center (13)	Six screws (16) and cover (9)	Remove.	
11.	Two harnesses (12) and load center (13)	Screw (10) and clamp (11)	Remove.	
12.	Coupling (14)	Wiring harness (15)	Pull and remove from load center (13) and electrical connector box (8).	

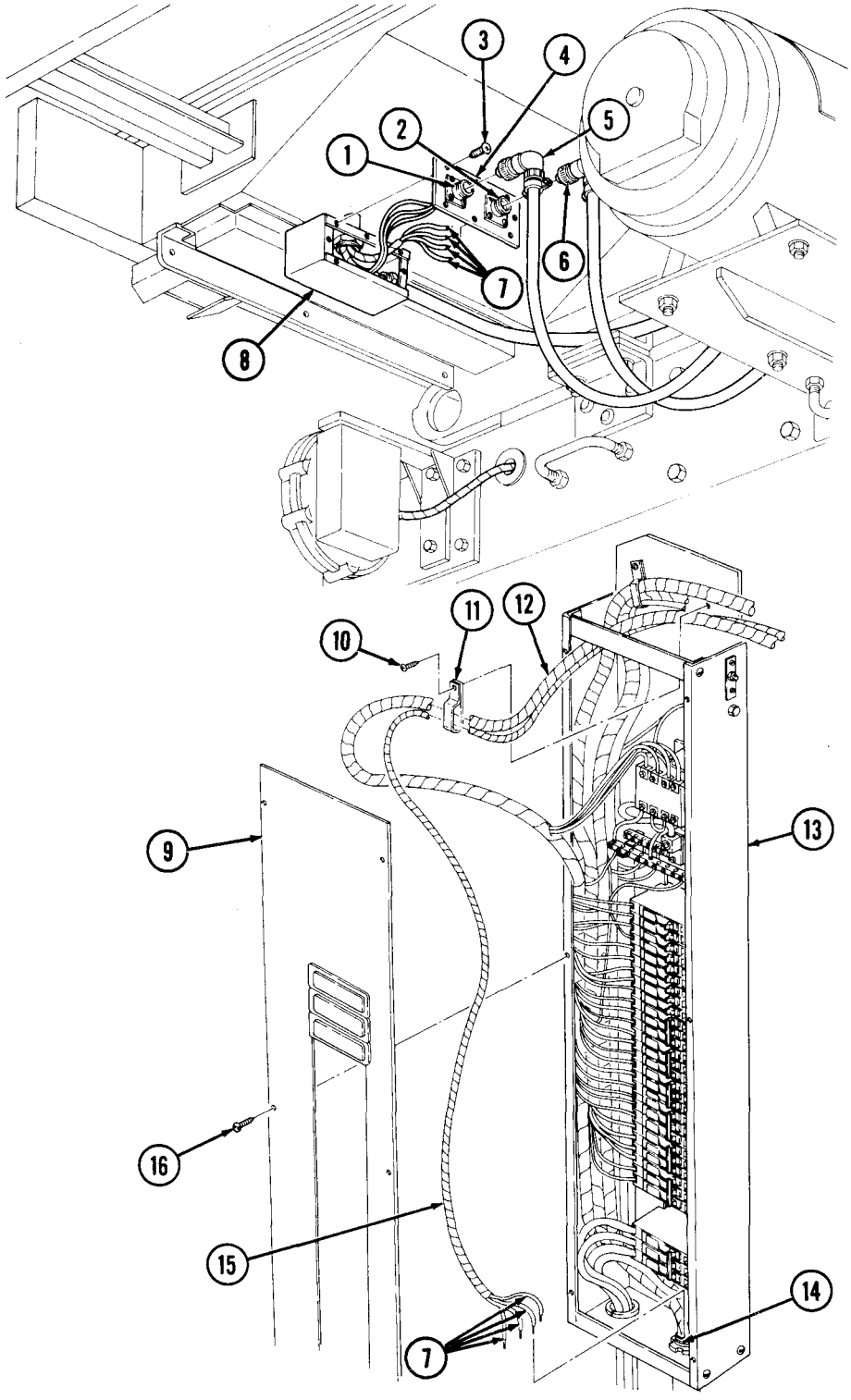
b. Repair

NOTE

For van wiring harness repair, refer to TM 9-2320-272-20-1.

18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

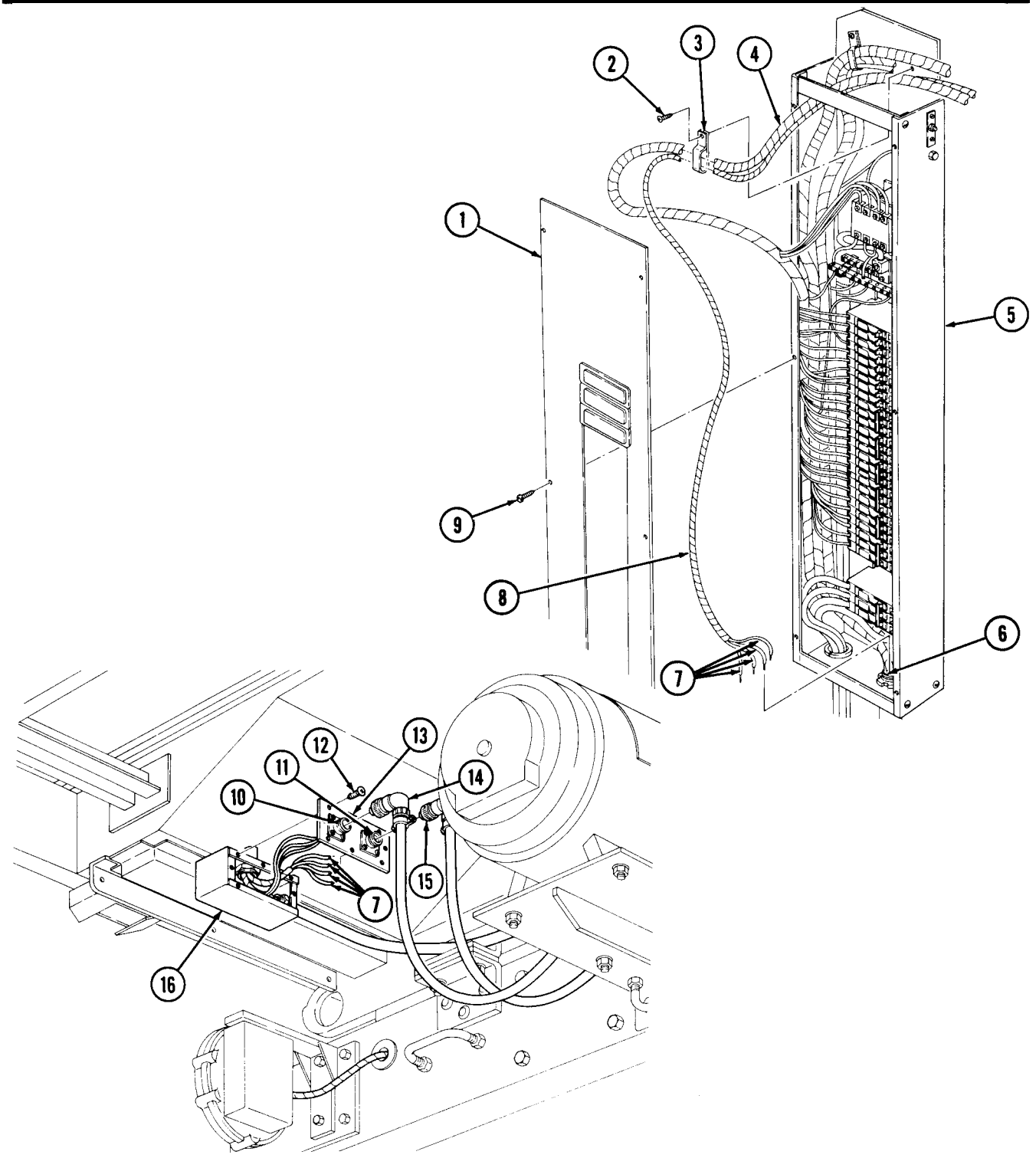


18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
13.		Wiring harness (8)	Push through coupling (6), electrical connector box (16), and load center (5).	
14.		Four wires (7)	Connect to connector (11).	
15.		Clamp (3)	Install on two harnesses (4) and load center (5) with screw (2).	
16.		Cover (1)	Install on load center (5) with six screws (9).	
		NOTE Apply sealing compound in step 17.		
17.		Electrical connector box cover (13)	Install on electrical connector box (16) with eight screws (12).	
18.		Cables (14) and (15)	Connect to connectors (10) and (11).	

18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

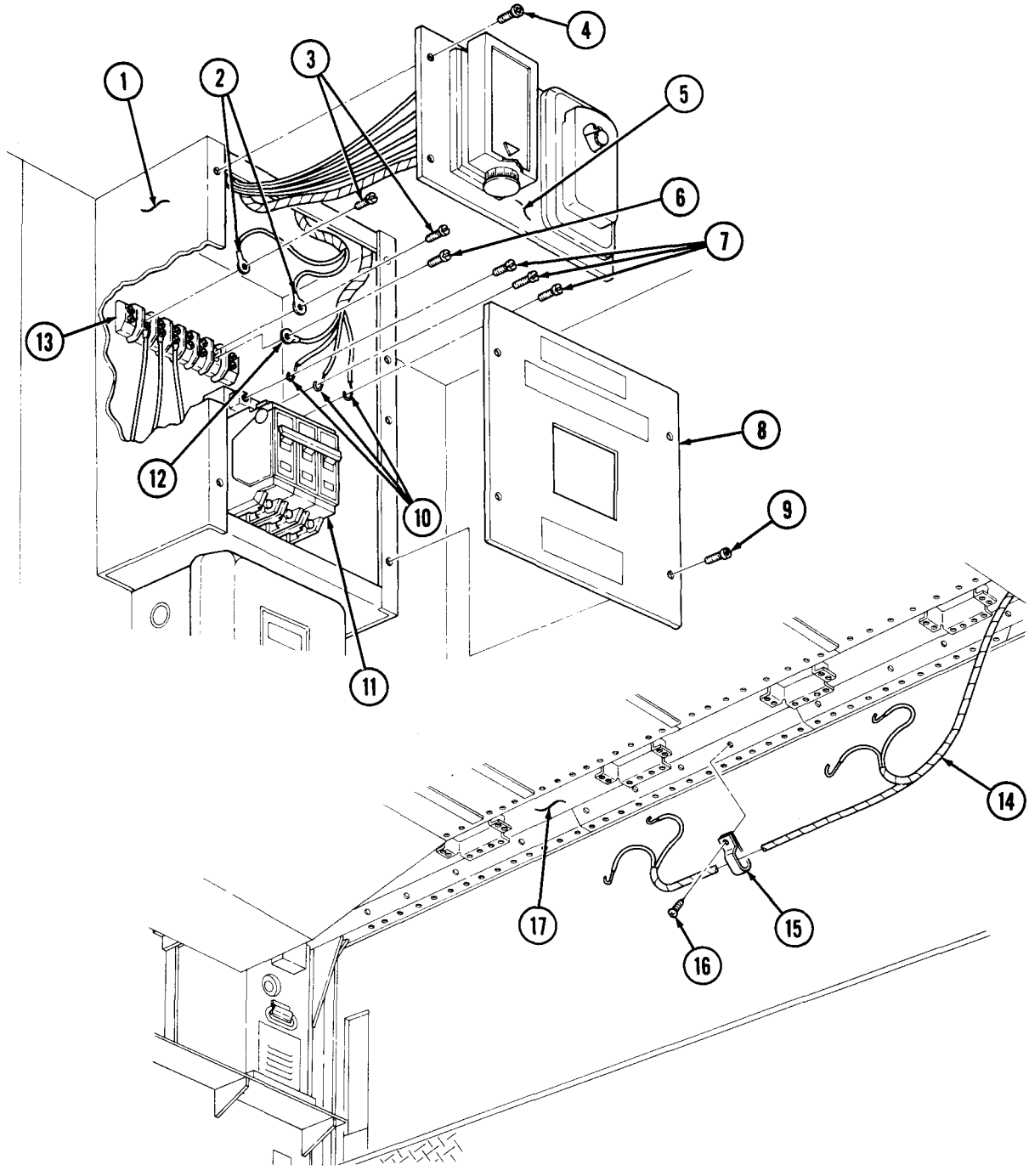


18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
19.		Three wires (10)	Install on circuit breaker (11) with three screws (7).	
20.		Wire (12)	Install on terminal (13) with screw (6).	
21.		Two wires (2)	Install on terminal (13) with two screws (3).	
22.		Lower cover (8)	Install on control center box (1) with four screws (9).	
23.		Upper cover (5)	Install on control center box (1) with four screws (4).	
24.		Six clamps (15)	Install on branched 400 Hz receptacle harness (14) and van ceiling (17) with six screws (16).	

18.1-38. 400 Hz SUPPLY AND BRANCHED 400 Hz RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install ceiling filler and side panels (para. 18.1-18).
• Install battery ground cables (TM 9-2320-272-20-1).

18.1-39. TELEPHONE POST WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-2
Para. 18.1-18

Condition Description
Parking brake set.
Inside telephone jack posts removed.
Ceiling filler and side panels removed.

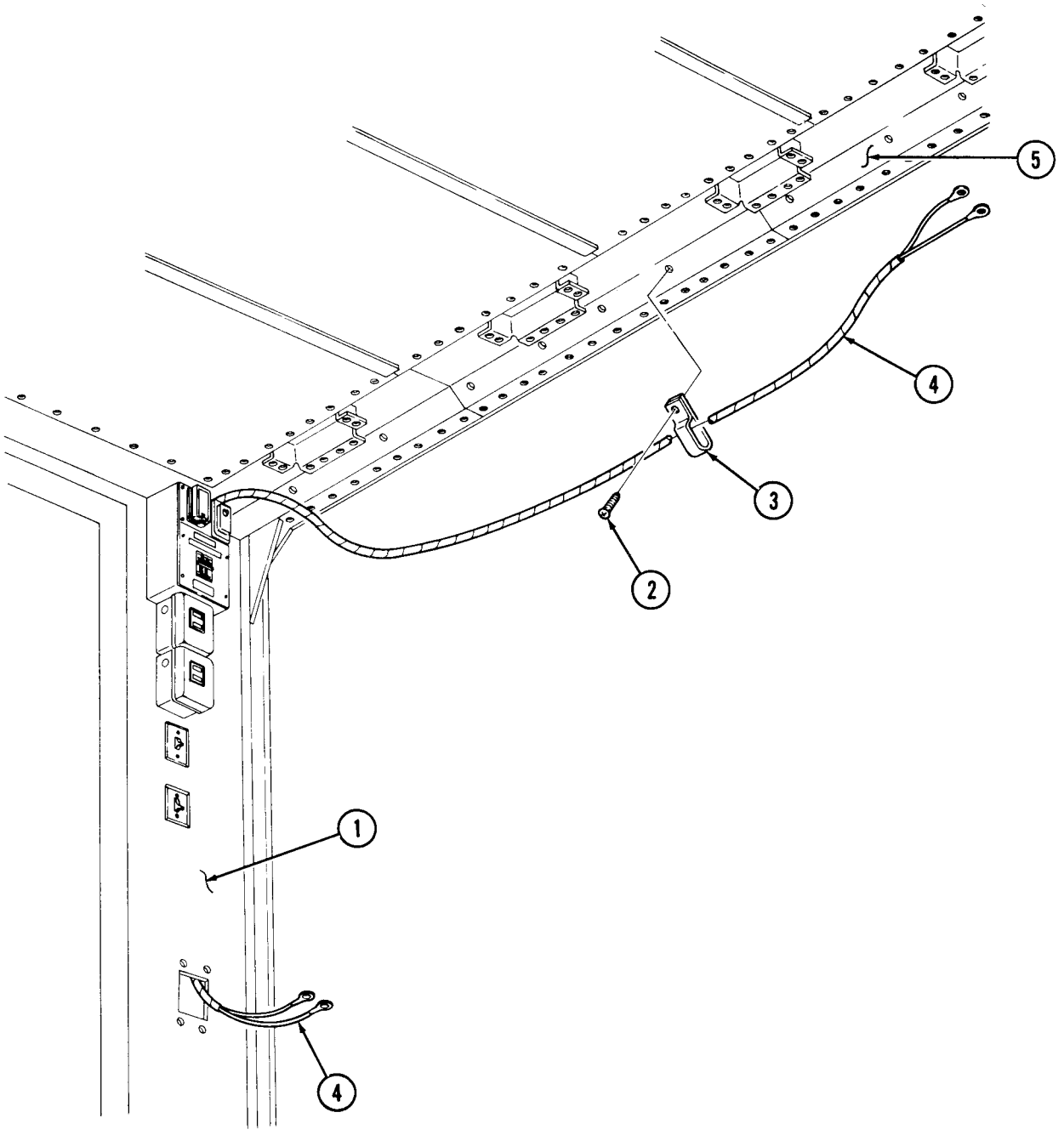
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Tag wires for installation.		
1.	Wiring harness (4) and van ceiling (5)	Six screws (2) and clamps (3)	Remove.	
2.	Van body (1)	Wiring harness (4)	Remove.	
	b. Repair			
		NOTE For van wiring harness repair, refer to TM 9-2320-272-20-1.		
	c. Installation			
3.		Six clamps (3)	Install on wiring harness (4) and van ceiling (5) with six screws (2).	

18.1-39. TELEPHONE POST WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install ceiling filler and side panels (para. 18.1-18).
• Install inside telephone jack posts (TM 9-2320-272-20-2).

18.1-40. ENTRANCE RECEPTACLE 220V 3-PHASE WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Four locknuts
Safety wire (Appendix C, Item 36)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	External power source removed.
TM 9-2320-272-20-1	Battery ground cables disconnected.

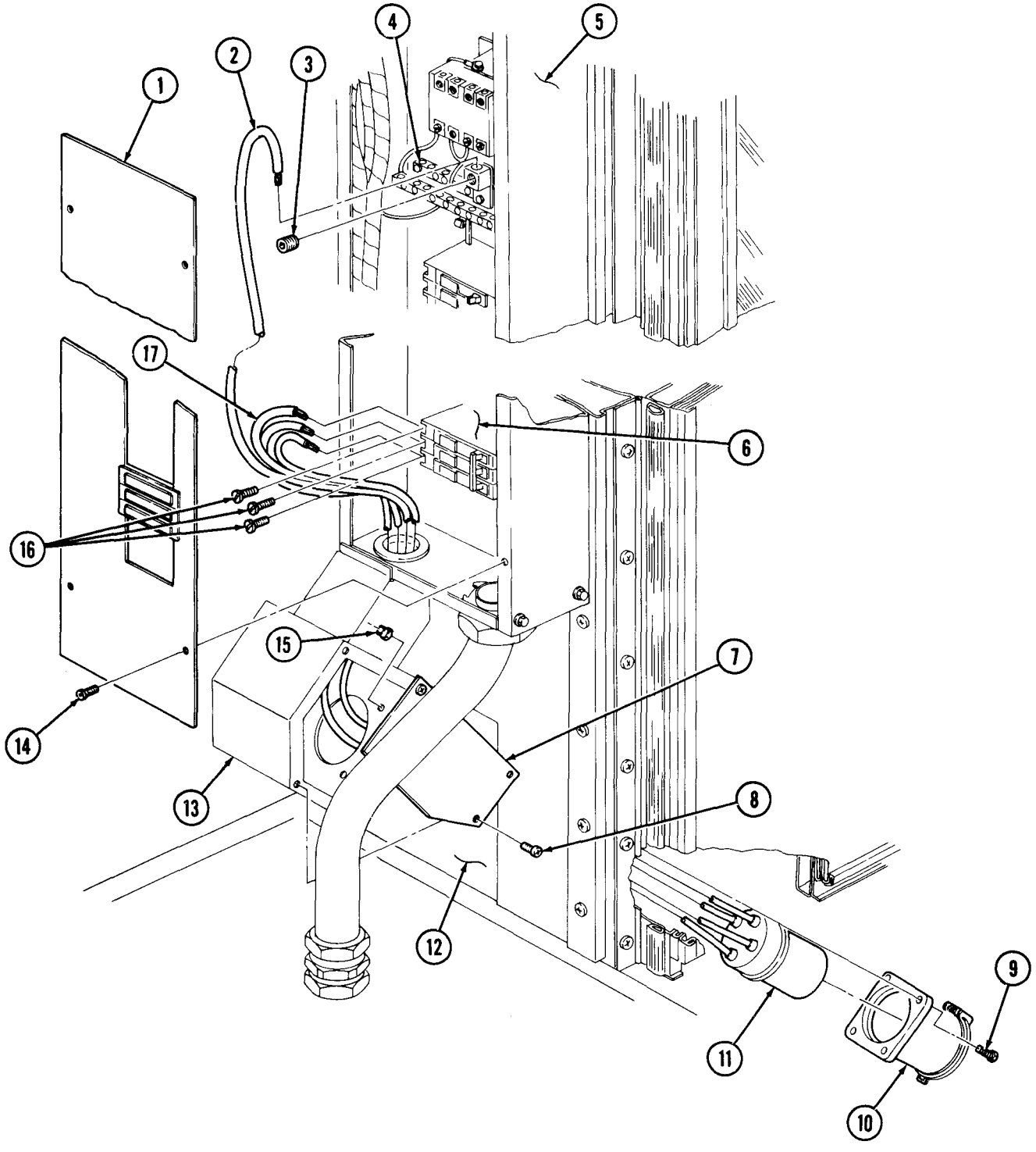
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Tag wires for installation.		
1.	Load center box (5)	Six screws (14) and cover (1)	Remove.	
2.	Circuit breakers (6)	Three screws (16) and wires (17)	Remove.	
3.	Neutral bus bar (4)	Setscrew (3) and wire (2)	Remove.	
4.	Electrical box (13)	Three screws (8) and plate (7)	Remove.	
5.	Van body (12)	Four screws (9), locknuts (15), and receptacle (10)	Remove.	Discard locknuts (15).
6.	Receptacle (10)	Connector (11)	Disconnect.	
		NOTE Safety wire will be used to route wires through van body.		
7.	Van body (12)	Wires (2) and (17)	Remove from electrical box (13) and load center (5).	

18.1-40. ENTRANCE RECEPTACLE 220V 3-PHASE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

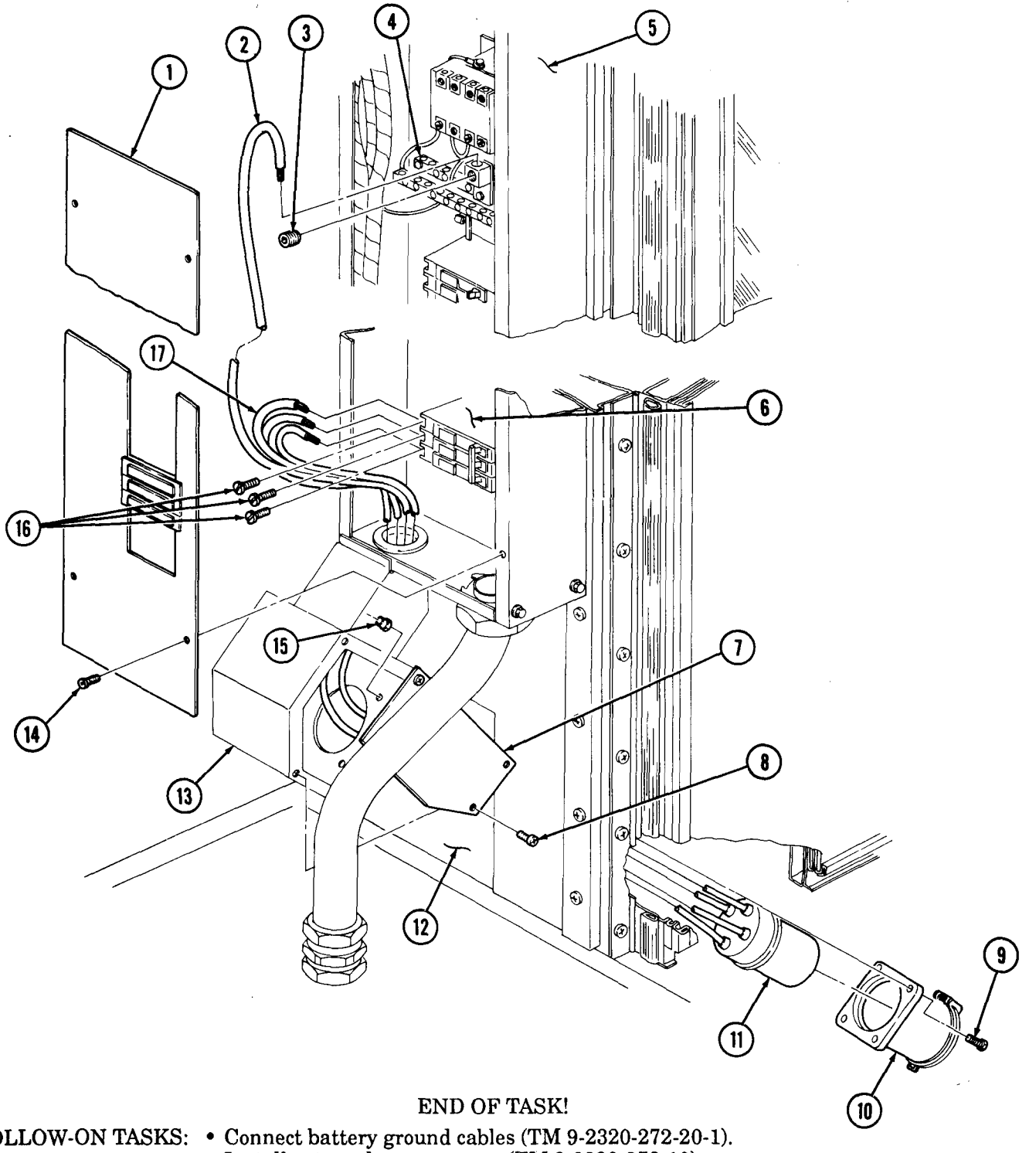


18.1-40. ENTRANCE RECEPTACLE 220V 3-PHASE HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Repair				
		NOTE For van wiring harness repair, refer to TM 9-2320-272-20.		
c. Installation				
8.		Wires (2) and (17)	Feed through electrical box (13) into load center (5).	
9.		Receptacle (10)	Place over connector (11) and install on van body (12) with four screws (9) and new locknuts (15).	
10.		Plate (7)	Install on electrical box (13) with three screws (8).	
11.		Wire (2)	Install on neutral bus bar (4) with setscrew (3).	
12.		Three wires (17)	Install on circuit breakers (6) with three screws (16).	
13.		Cover (1)	Install on load center box (5) with six screws (14).	

18.1-40. ENTRANCE RECEPTACLE 220V 3-PHASE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Connect battery ground cables (TM 9-2320-272-20-1).
- Install external power source (TM 9-2320-272-10).

18.1-41. FLEXIBLE CONVERTER WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Gasket
Lockwasher

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE
Tag wires for installation.

a. Removal

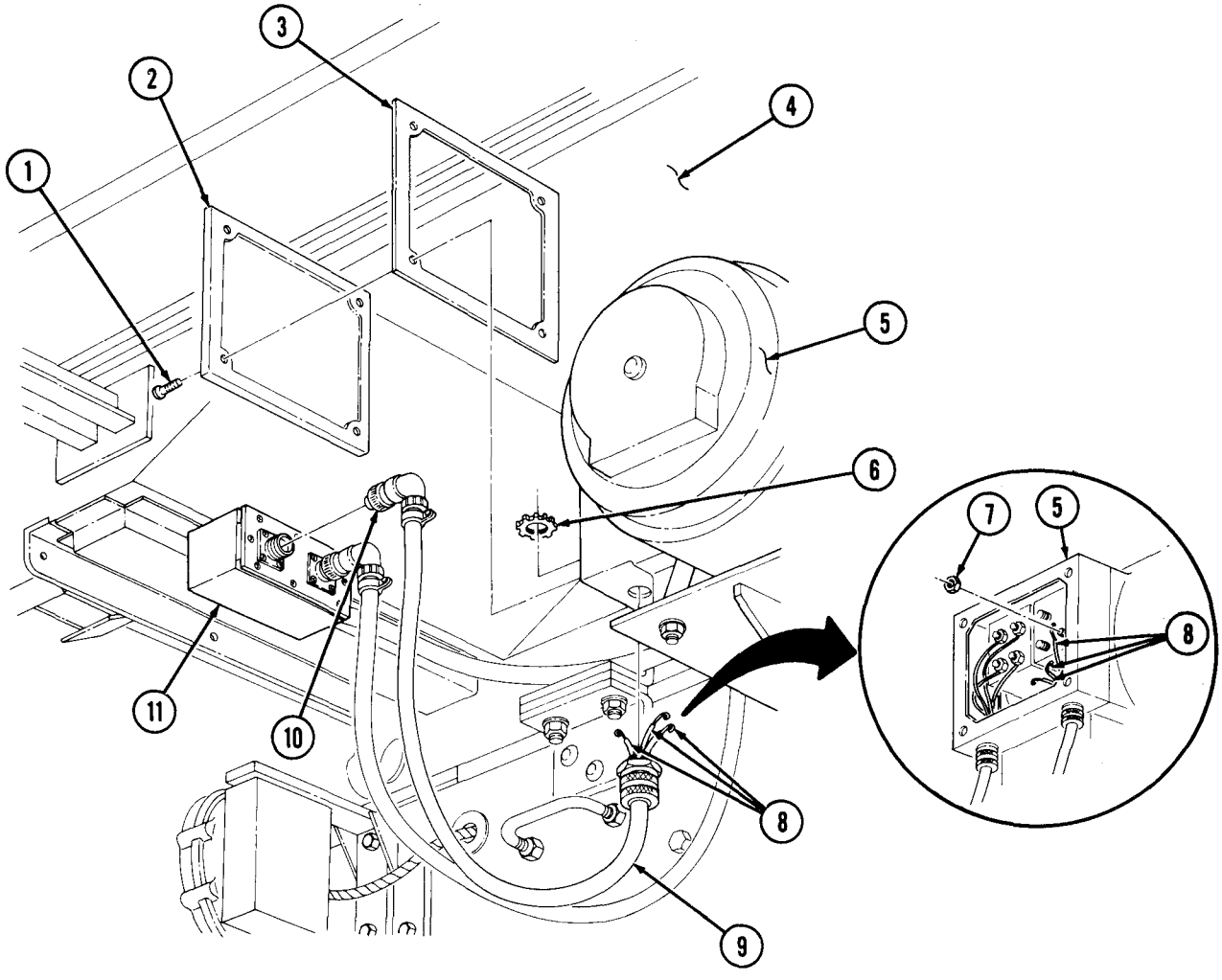
1. Junction box (11)	Connector (10)	Disconnect.	
2. Converter (5)	Four screws (1), cover (2), and gasket (3)	Remove.	Discard gasket (3).
3.	Three nuts (7), wires (8), and lockwasher (6)	Remove.	Discard lockwasher (6).
4. Van body (4)	Wiring harness (9)	Remove.	

b. Repair

NOTE
For van wiring harness repair, refer to TM 9-2320-272-20-1.

18.1-41. FLEXIBLE CONVERTER WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Installation				
5.		Wiring harness (9)	Position on van body (4).	
6.		Three wires (8)	Install on converter (5) with three nuts (7) and new lockwasher (6).	
7.		Cover (2)	Install on converter (5) with new gasket (3) and four screws (1).	
8.		Connector (10)	Connect to junction box (11).	



END OF TASK!

18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Three lockwashers
Gasket
Sealing compound (Appendix C, Item 26)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P
TM 9-237

Equipment Condition	Reference	Condition Description
	TM 9-2320-272-10	Parking brake set.
	TM 9-2320-272-10	External power source disconnected.
	TM 9-2320-272-20-1	Battery ground cables disconnected.

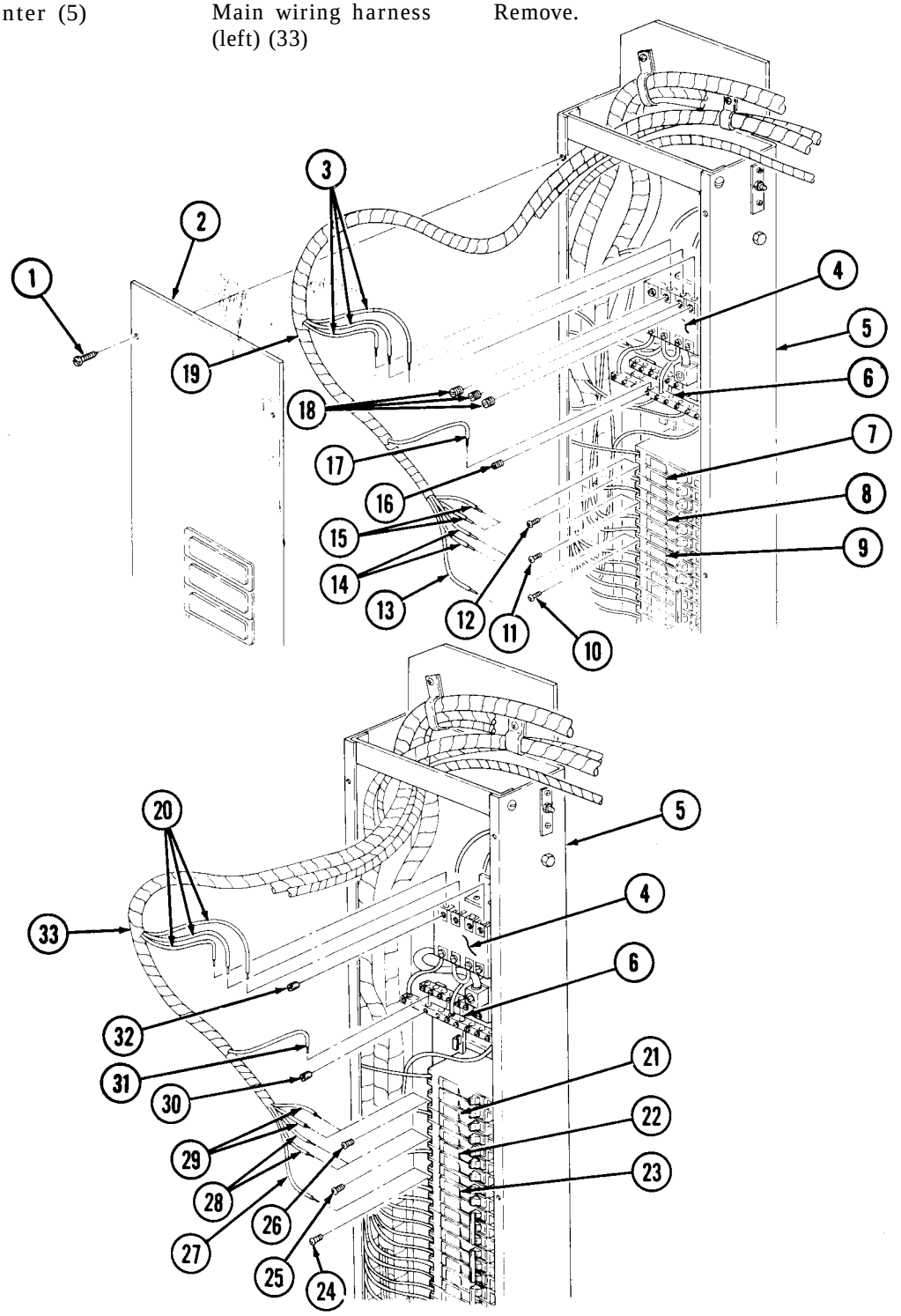
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Tag wires for installation.	
1.	Load center (5)	Six screws (1) and cover (2)	Remove.	
2.	Relay (4)	Three screws (18) and wires (3)	Remove.	
3.	Neutral bus (6)	Screw (16) and wire (17)	Remove.	
4.	Circuit breakers (7) and (8)	Screws (12) and (11) and two wires (15) and (14)	Remove.	
5.	Circuit breaker (9)	Screw (10) and wire (13)	Remove.	
6.	Load center (5)	Main wiring harness (right) (19)	Remove.	
7.	Relay (4)	Three screws (32) and wires (20)	Remove.	
8.	Neutral bus (6)	Screw (30) and wire (31)	Remove.	
9.	Circuit breaker (21)	Screw (26) and wires (29)	Remove.	
10.	Circuit breaker (22)	Screw (25) and wires (28)	Remove.	

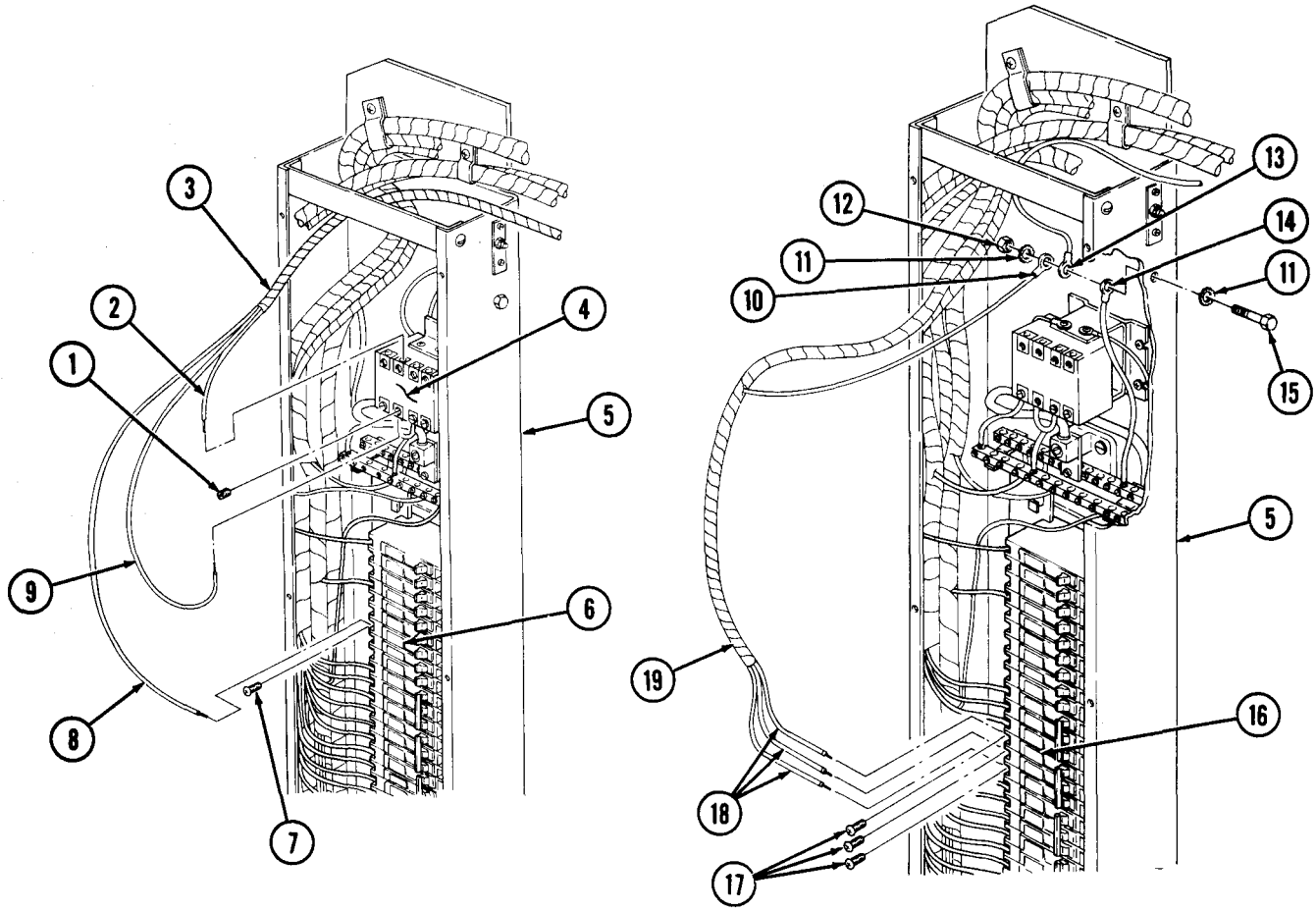
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.	Circuit breaker (23)	Screw (24) and wire (27)	Remove.	
12.	Load center (5)	Main wiring harness (left) (33)	Remove.	



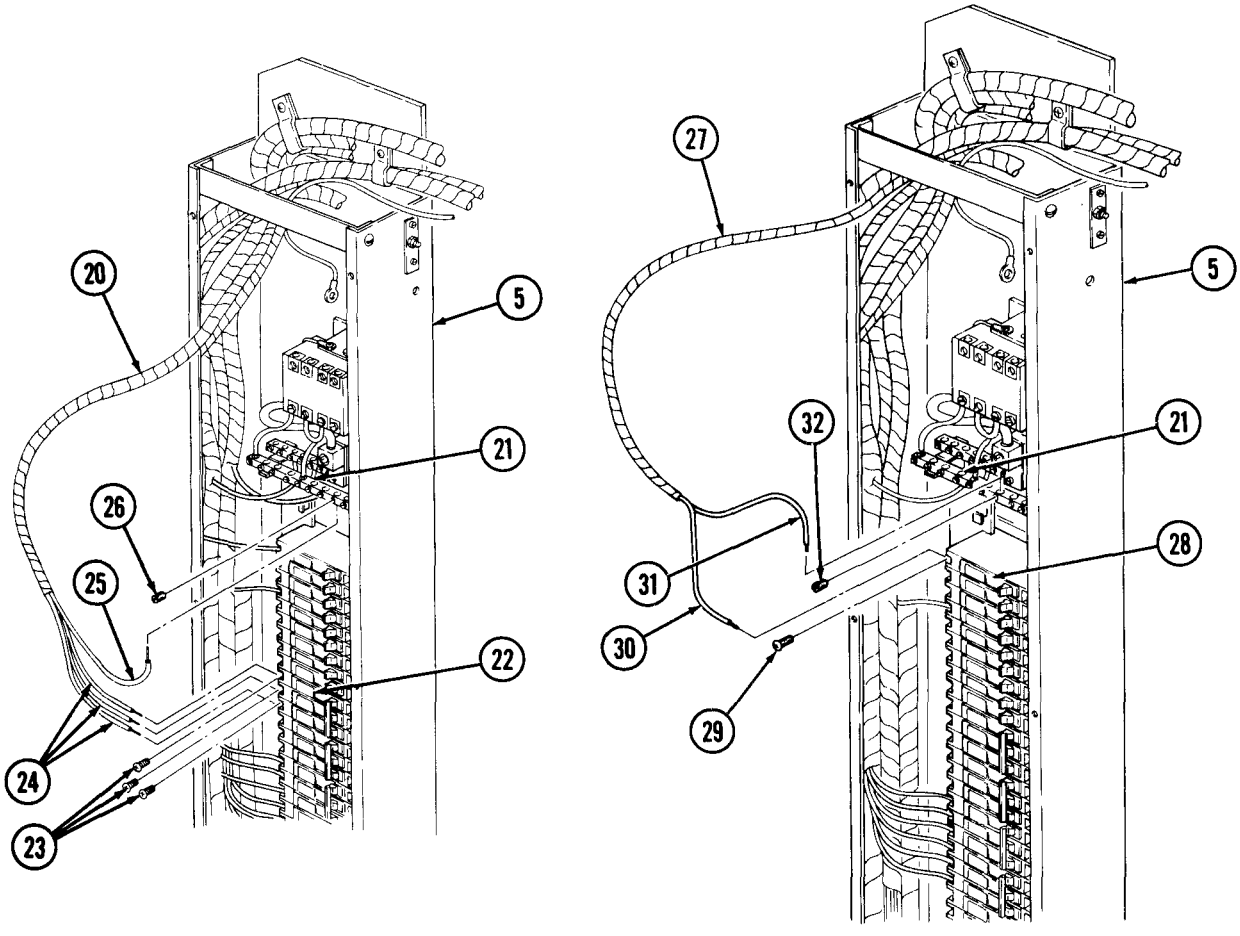
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
13.	Relay (4)	Screw (1) and wires (2) and (9)	Remove.	
14.	Circuit breaker (6)	Screw (7) and wire (8)	Remove.	
15.	Load center (5)	Blackout by-pass wiring harness (3)	Remove.	
16.		Nut (12), screw (15), two washers (11), cable assembly (14), ground cable (13), and cable (10)	Remove.	
17.	Three circuit breakers (16)	Three screws (17) and wires (18)	Remove.	
18.	Load center (5)	Air conditioner wiring harness (19)	Remove.	



18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
19.	Neutral bus (21)	Screw (26) and wire (25)	Remove.	
20.	Three circuit breakers (22)	Three screws (23) and wires (24)	Remove.	
21.	Load center (5)	10kW electric heater wiring harness (20)	Remove.	
22.	Neutral bus (21)	Screw (32) and wire (31)	Remove.	
23.	Circuit breaker (28)	Screw (29) and wire (30)	Remove.	
24.	Load center (5)	Electric heater wiring harness (27)	Remove.	

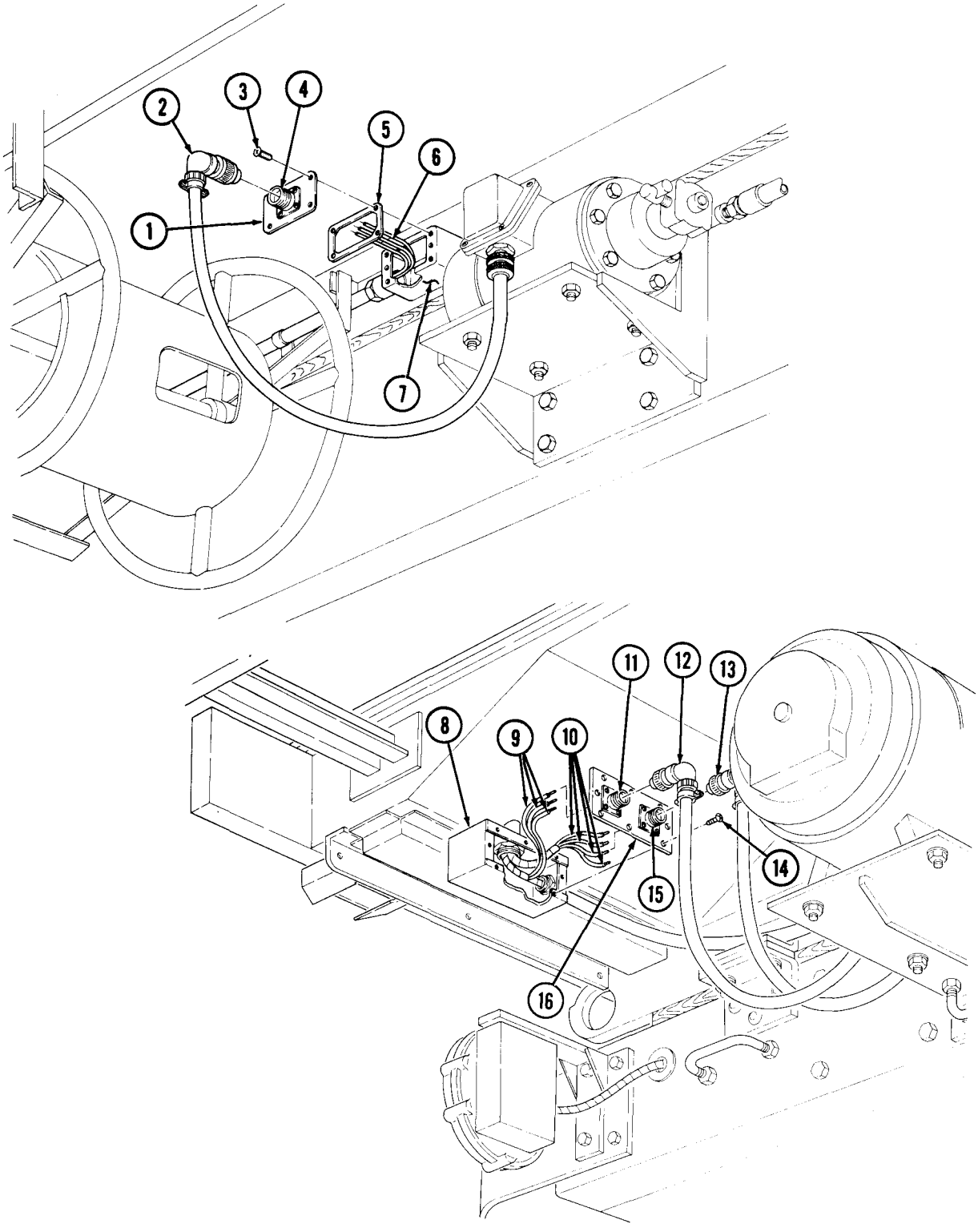


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Steps 25 through 27 are applicable to M935 and M935A1 vehicles only.		
25.	Connector (4)	Auxiliary pump connector (2)	Disconnect.	
26.	Outlet box (7)	Four screws (3), cover (1), and gasket (5)	Remove.	Discard gasket (5).
27.	Connector (4)	Auxiliary pump wiring harness leads (6)	Disconnect.	Refer to TM 9-237.
28.	Connectors (11) and (15)	Cables (12) and (13)	Disconnect.	
29.	Junction box (8)	Eight screws (14) and cover (16)	Remove.	
30.	Connectors (11) and (15)	Wires (9) and (10)	Remove.	Refer to TM 9-237.

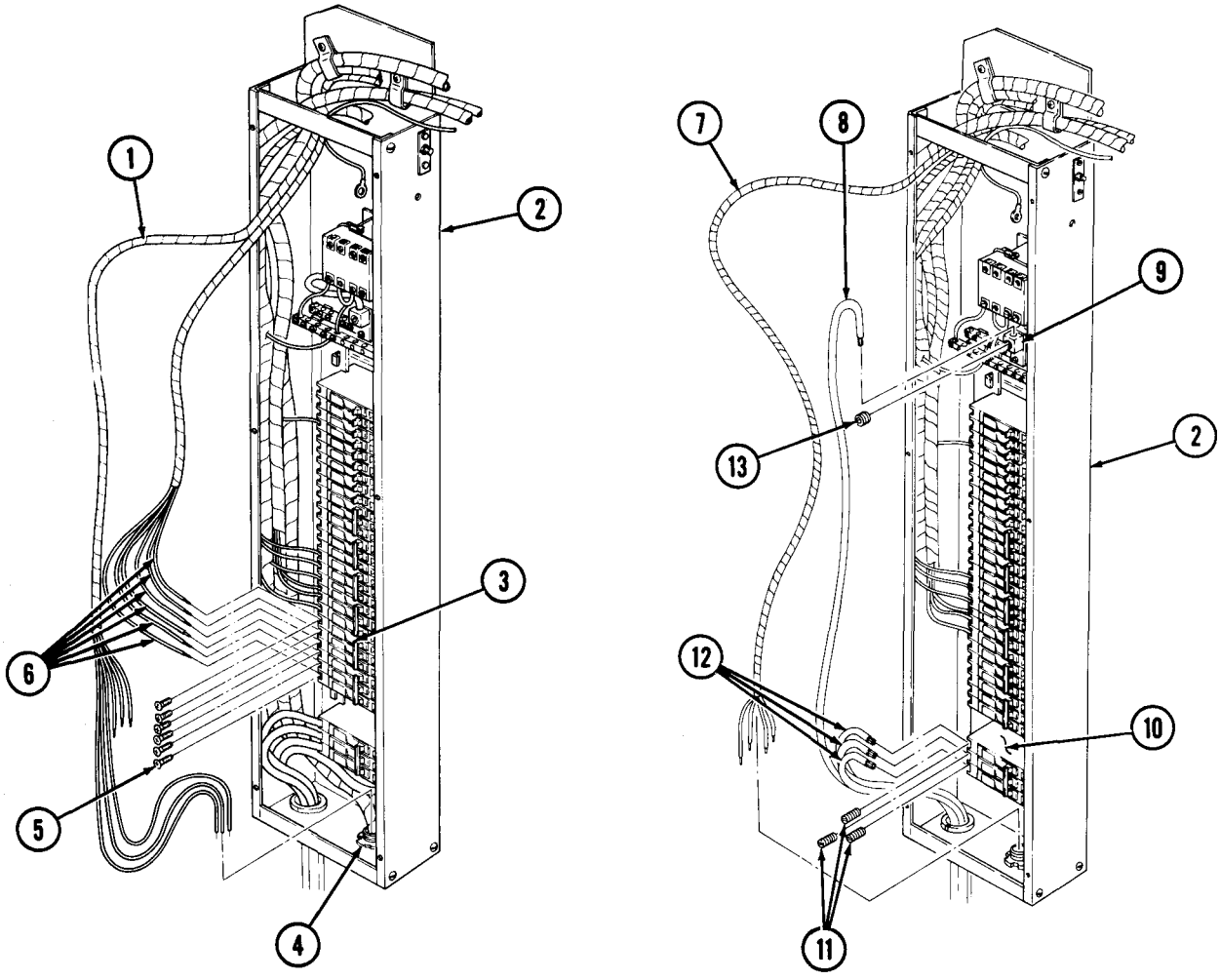
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



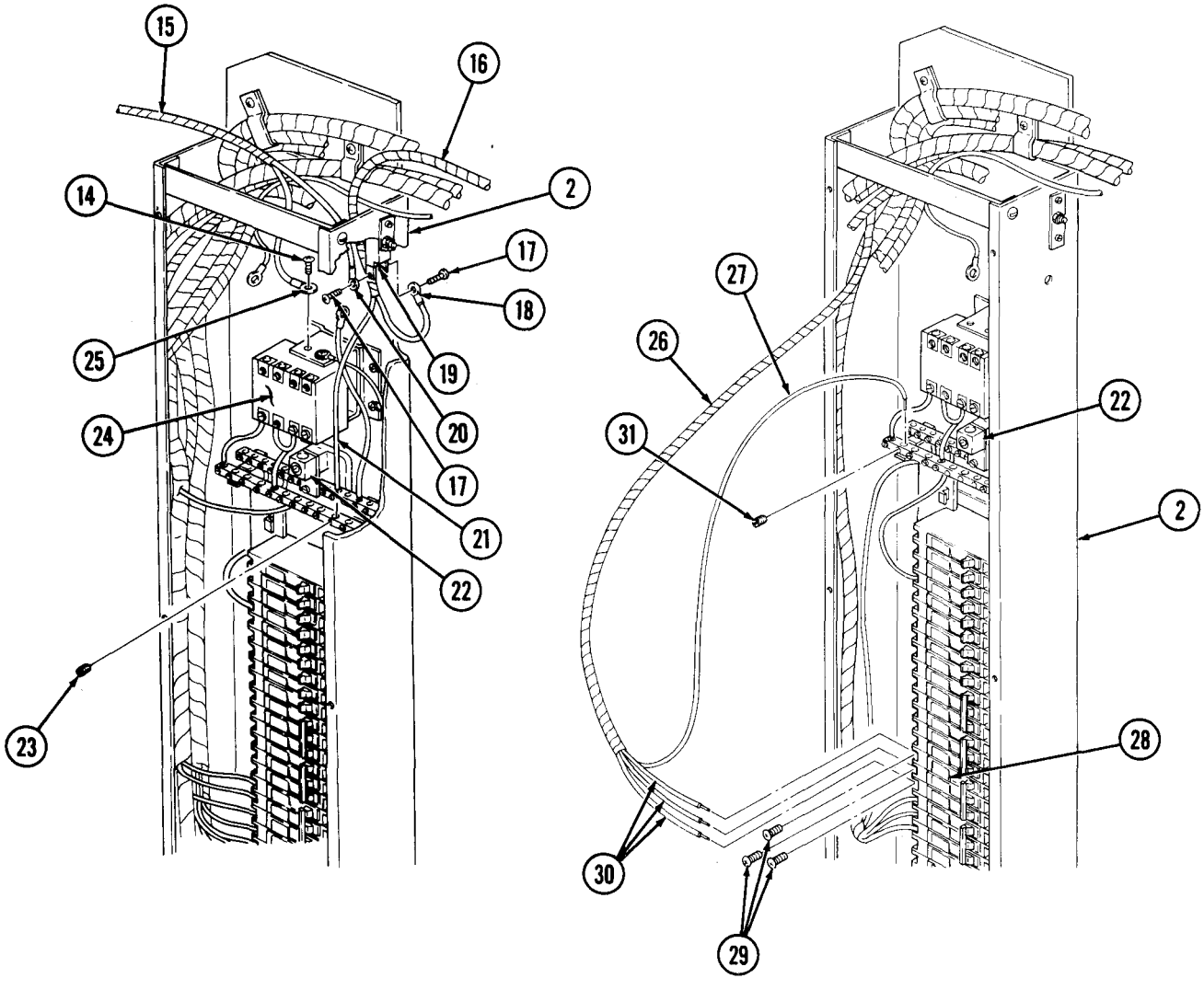
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
31.	Six circuit breakers (3)	Six screws (5) and wires (6)	Remove.	
32.	Load center (2) and coupling (4)	Converter and auxiliary pump wiring harness (1)	Remove.	
33.	Neutral bus (9)	Screw (13) and wire (8)	Remove.	
34.	Three circuit breakers (10)	Three screws (11) and wires (12)	Remove.	
35.	Load center (2)	Wire (7) and entrance receptacle wiring harness (8)	Remove.	



18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
36.	Relay (24)	Screw (15) and wire (25)	Remove.	
37.	Switch (19)	Two screws (17) and wires (18) and (20)	Remove.	
38.	Neutral bus (22)	Screw (23) and wire (21)	Remove.	
39.	Load center (2)	Right and left blackout harnesses (15) and (16)	Remove.	
40.	Neutral bus (22)	Screw (31) and wire (27)	Remove.	
41.	Three circuit breakers (28)	Three screws (29) and wires (30)	Remove.	
42.	Load center (2)	3 phase receptacle (right) wiring harness (26)	Remove.	

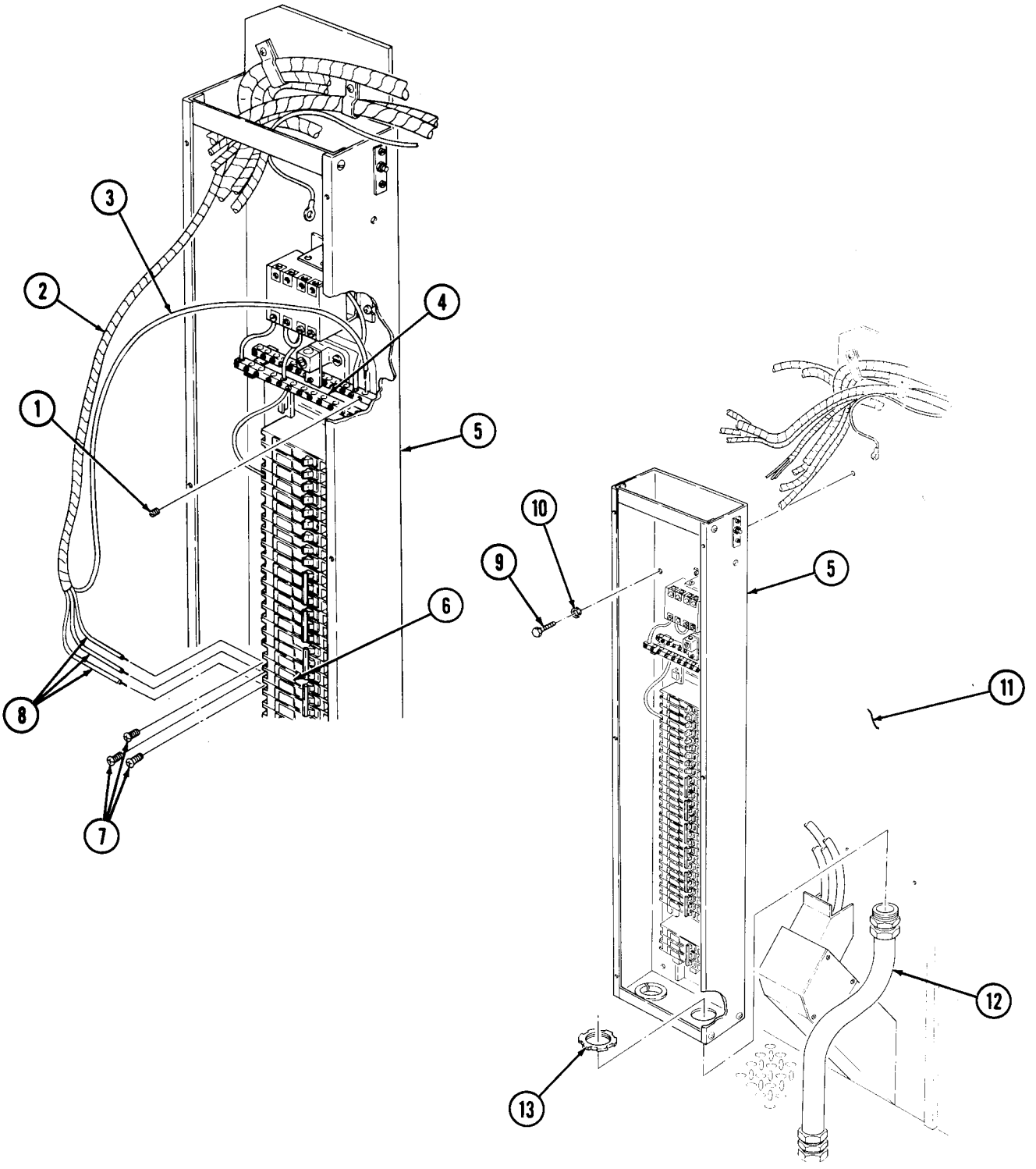


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
43.	Neutral bus (4)	Screw (1) and wire (3)	Remove.	
44.	Three circuit breakers (6)	Three screws (7) and wires (8)	Remove.	
45.	Load center (5)	3 phase receptacle (left) wiring harness (2)	Remove.	
46.		Four screws (9) and washers (10)	Remove.	
47.	Conduit (12)	Special nut (13)	Remove.	
48.	Van body (11)	Load center box (5)	Remove.	

18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

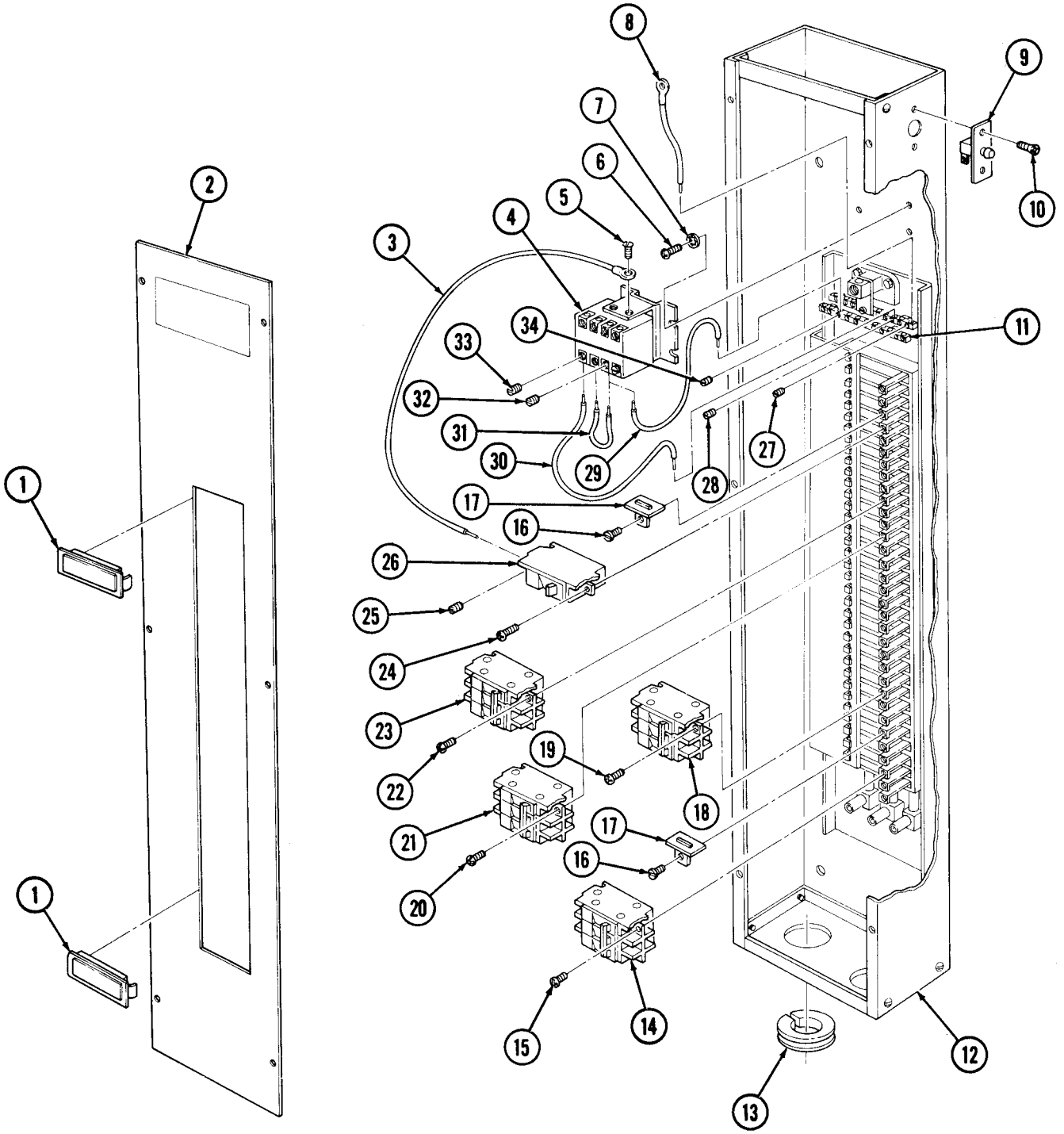


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Disassembly				
49.	Load center cover (2)	Six plates (1)	Remove.	
50.	Relay (4)	Two screws (32), jumper wire (31), and ground B cable (29)	Remove.	
51.	Relay (4) and neutral bus (11)	Screws (33) and (28) and ground N cable (30)	Remove.	
52.	Neutral bus (11)	Screw (34) and ground B cable (29)	Remove.	
53.	20 amp circuit breaker (26) and relay (4)	Screws (25) and (5) and relay cable (3)	Remove.	
54.	Load center box (12)	Three screws (6), lockwashers (7), and relay (4)	Remove.	Discard lockwashers (7).
55.	Neutral bus (11)	Screw (27) and cable (8)	Remove.	
56.	Load center (12)	Six screws (16) and insulators (17)	Remove.	
57.		Nine screws (24) and 20 amp circuit breakers (26)	Remove.	
58.		Three screws (22) and 30 amp circuit breaker (23)	Remove.	
59.		Three screws (20) and 40 amp circuit breaker (21)	Remove.	
60.		Twelve screws (19) and four 20 amp circuit breakers (18)	Remove.	
61.		Three screws (15) and 100 amp circuit breaker (14)	Remove.	
62.		Grommet (13)	Remove.	
63.		Two screws (10) and blackout door switch (9)	Remove.	

18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

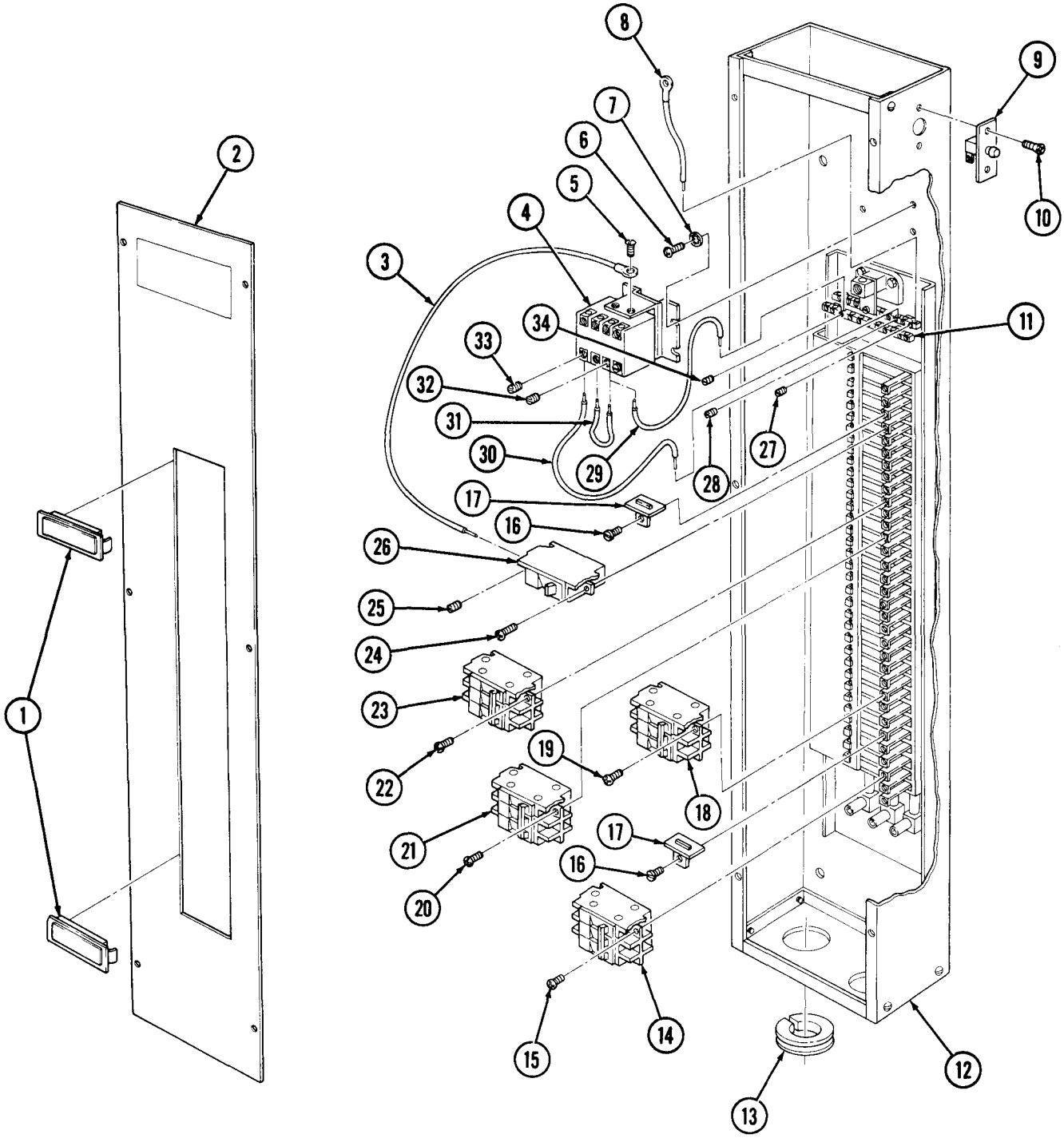


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Assembly				
64.		100 amp circuit breaker (14)	Install on load center (12) with three screws (15).	
65.		Four 20 amp circuit breakers (18)	Install on load center (12) with twelve screws (19).	
66.		40 amp circuit breaker (21)	Install on load center (12) with three screws (20).	
67.		30 amp circuit breaker (23)	Install on load center (12) with three screws (22).	
68.		Nine 20 amp circuit breakers (26)	Install on load center (12) with nine screws (24).	
69.		Six insulators (17)	Install on load center (12) with six screws (16).	
70.		Relay (4)	Install on load center (12) with three screws (6) and new lockwashers (7).	
71.		Cable (8)	Install on neutral bus (11) with screw (27).	
72.		Relay cable (3)	Install on 20 amp circuit breaker (26) and relay (4) with two screws (25) and (5).	
73.		Ground B cable (29)	Install on neutral bus (11) with screw (34).	
74.		Ground N cable (30)	Install on relay (4) and neutral bus (11) with two screws (33) and (28).	
75.		Jumper wire (31) and ground B cable (29)	Install on relay (4) with two screws (32).	
76.		Six plates (1)	Install on load center cover (2).	
77.		Blackout door switch (9)	Install on load center (12) with two screws (10).	
78.		Grommet (13)	Install on load center (12).	

18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

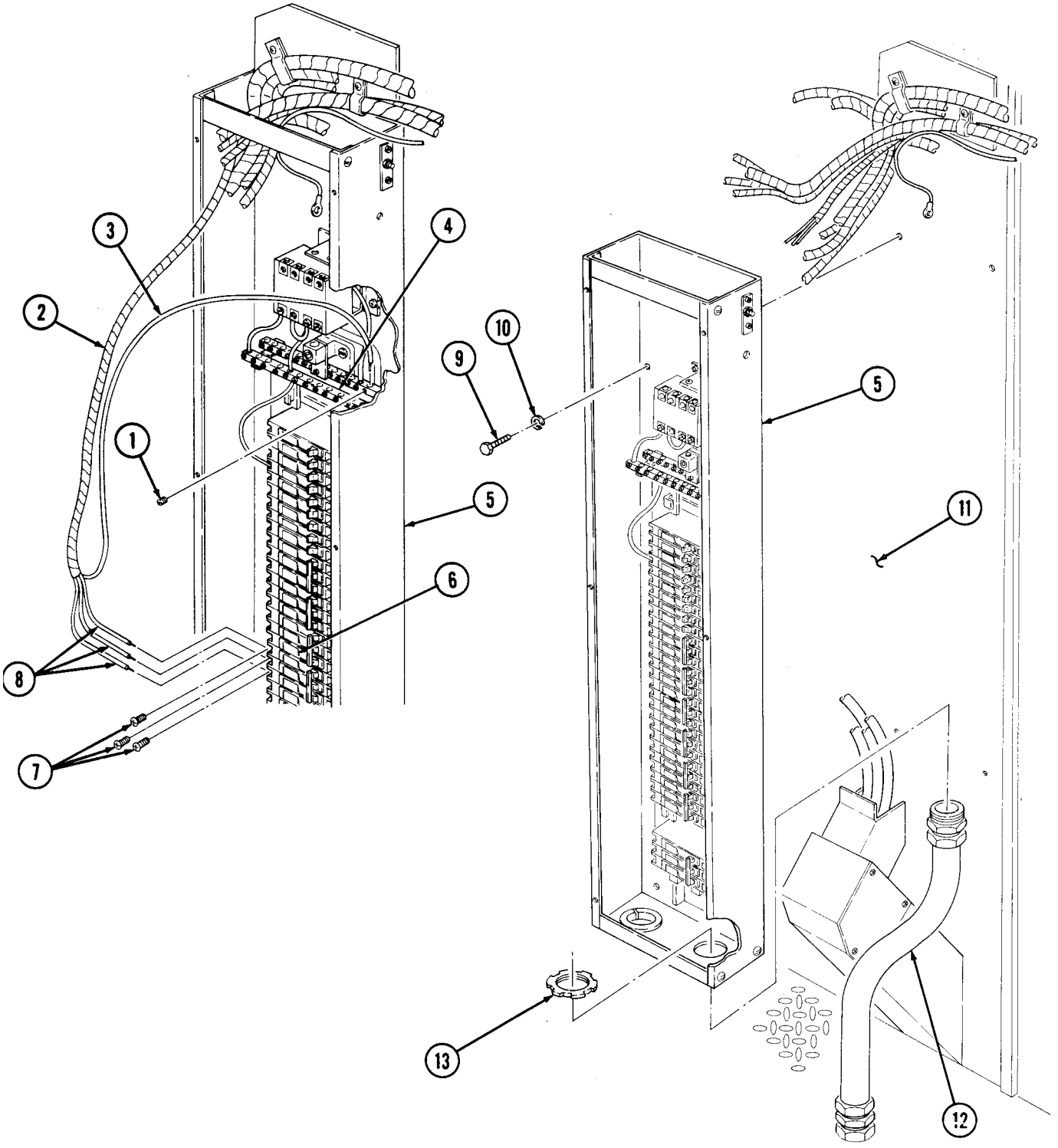


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Installation				
79.		Load center box (5)	Install on van body (11) with four screws (9) and washers (10)	
80.		Special nut (13)	Install on conduit (12).	
81.		Three wires (8) and 3-phase receptacle (left) wiring harness (2)	Install on circuit breaker (6) with three screws (7).	
82.		Wire (3)	Install on neutral bus (4) with screw (1).	

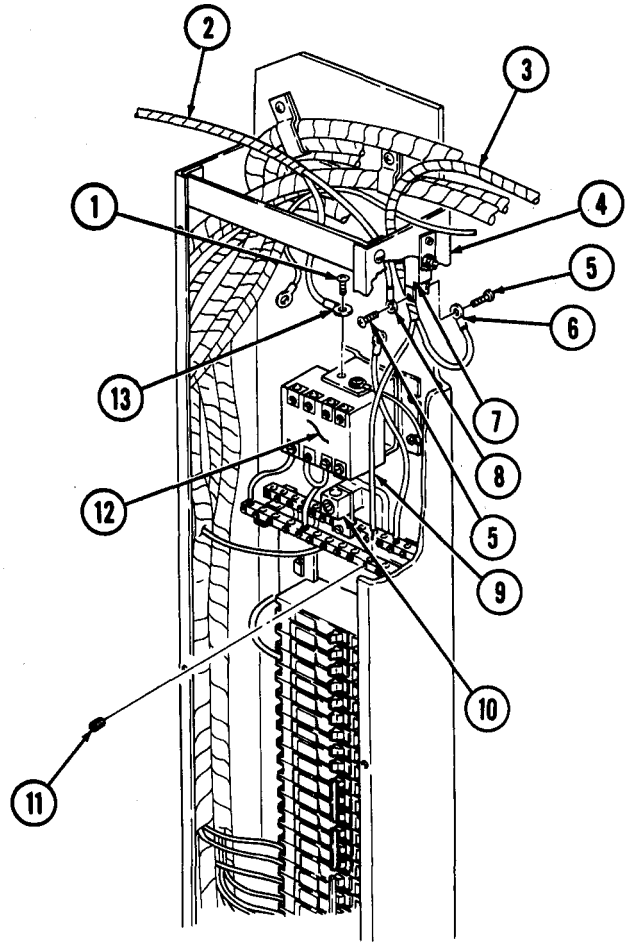
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

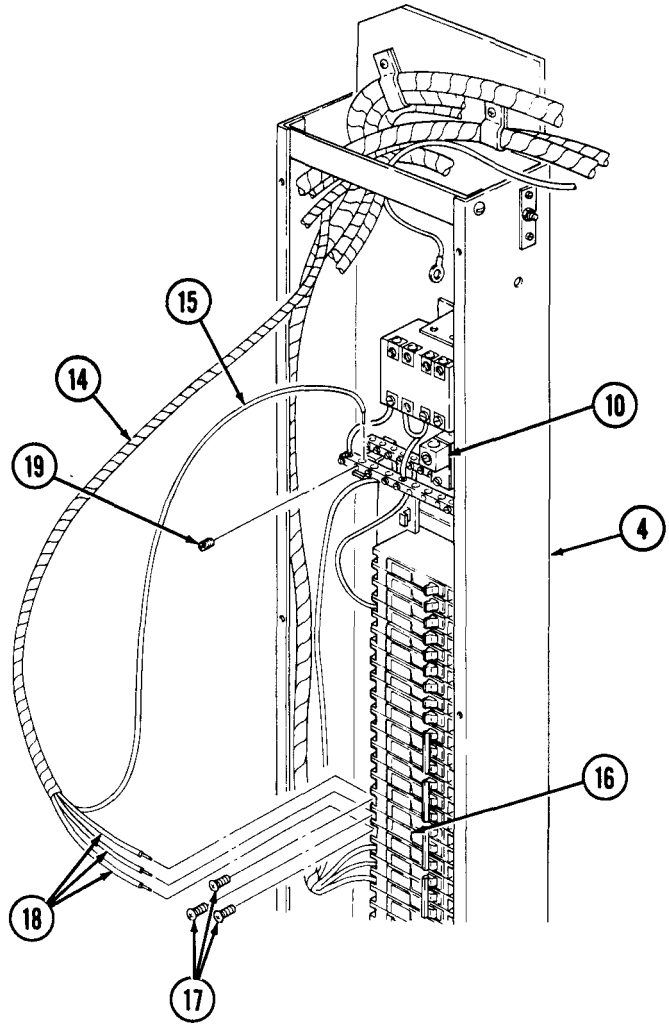
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

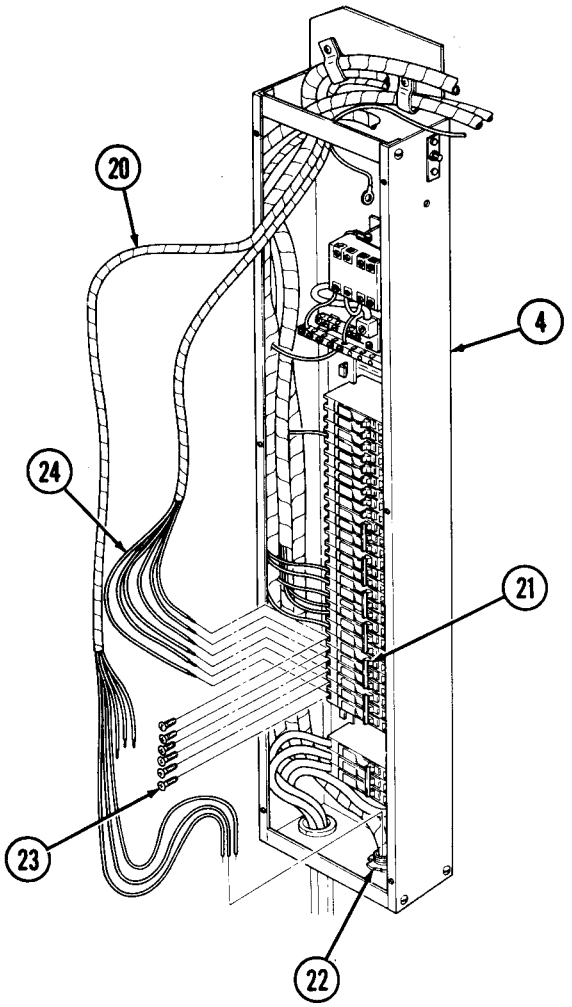
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
83.		Three wires (18) and 3-phase receptacle (right) wiring harness (14)	Install on circuit breakers (16) with three screws (17).	
84.		Wire (15)	Install on neutral bus (10) with screw (19).	
85.		Wire (9) and right and left blackout harnesses (2) and (3)	Install on neutral bus (10) in load center (4) with screw (11).	
86.		Two wires (6) and (8)	Install on switch (7) with two screws (5).	
87.		Wire (13)	Install on relay (12) with screw (1).	

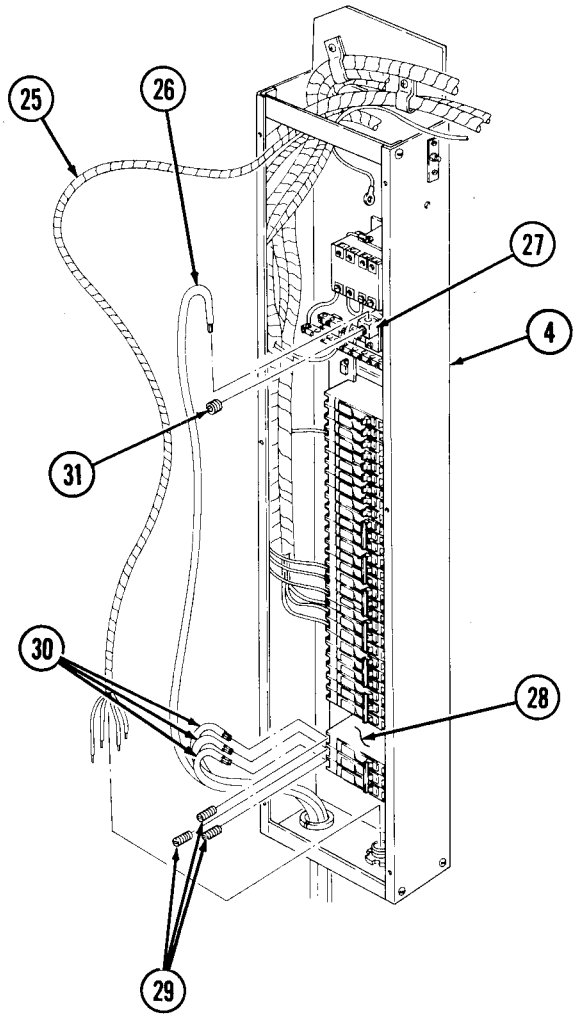




18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
88.		Three wires (30) and 400Hz branched wiring harness(25)	Install on circuit breakers (28) in load center (4) with three screws (29).	
89.		Wire (26)	Install on neutral bus (27) with screw (31).	
90.		Six wires (24) and converter and auxiliary pump wiring harness (20)	Install on circuit breaker (21) in load center (4) with six screws (23). Insert through coupling (22).	



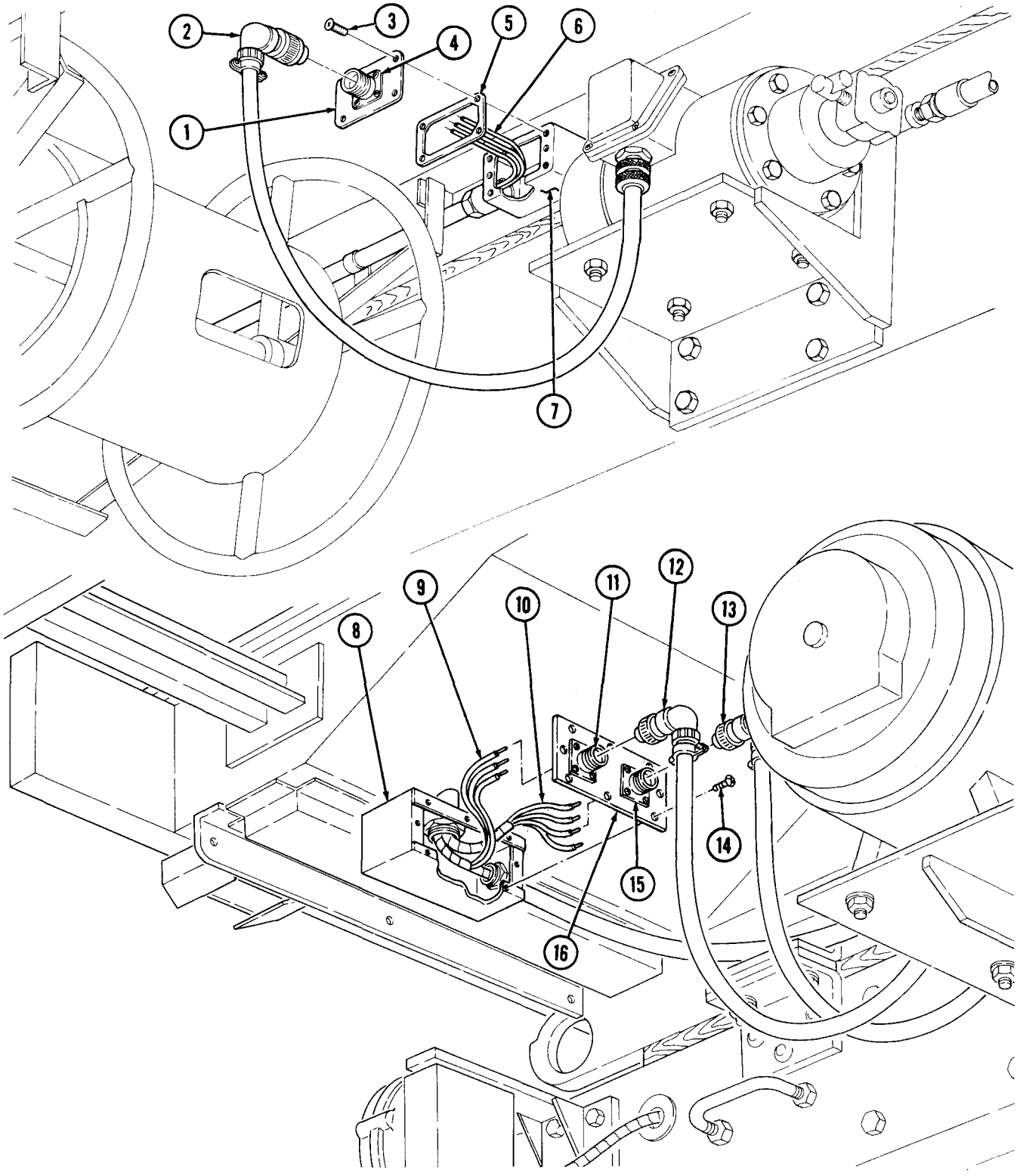


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
91.		Wires (9) and (10)	Install on connectors (11) and (15).	Refer to TM 9-237.
		NOTE Apply sealing compound before performing step 92.		
92.		Cover (16)	Install on junction box (8) with eight screws (14).	
93.		Cables (12) and (13)	Install on connectors (11) and (15).	
		NOTE Perform steps 94 through 96 for M935 and M935A1 vehicles.		
94.		Auxiliary pump wiring harness (6)	Connect to connector (4).	Refer to TM 9-237.
95.		Cover (1)	Install on outlet box (7) with new gasket (5) and four screws (3).	
96.		Auxiliary pump cable (2)	Connect to connector (4).	

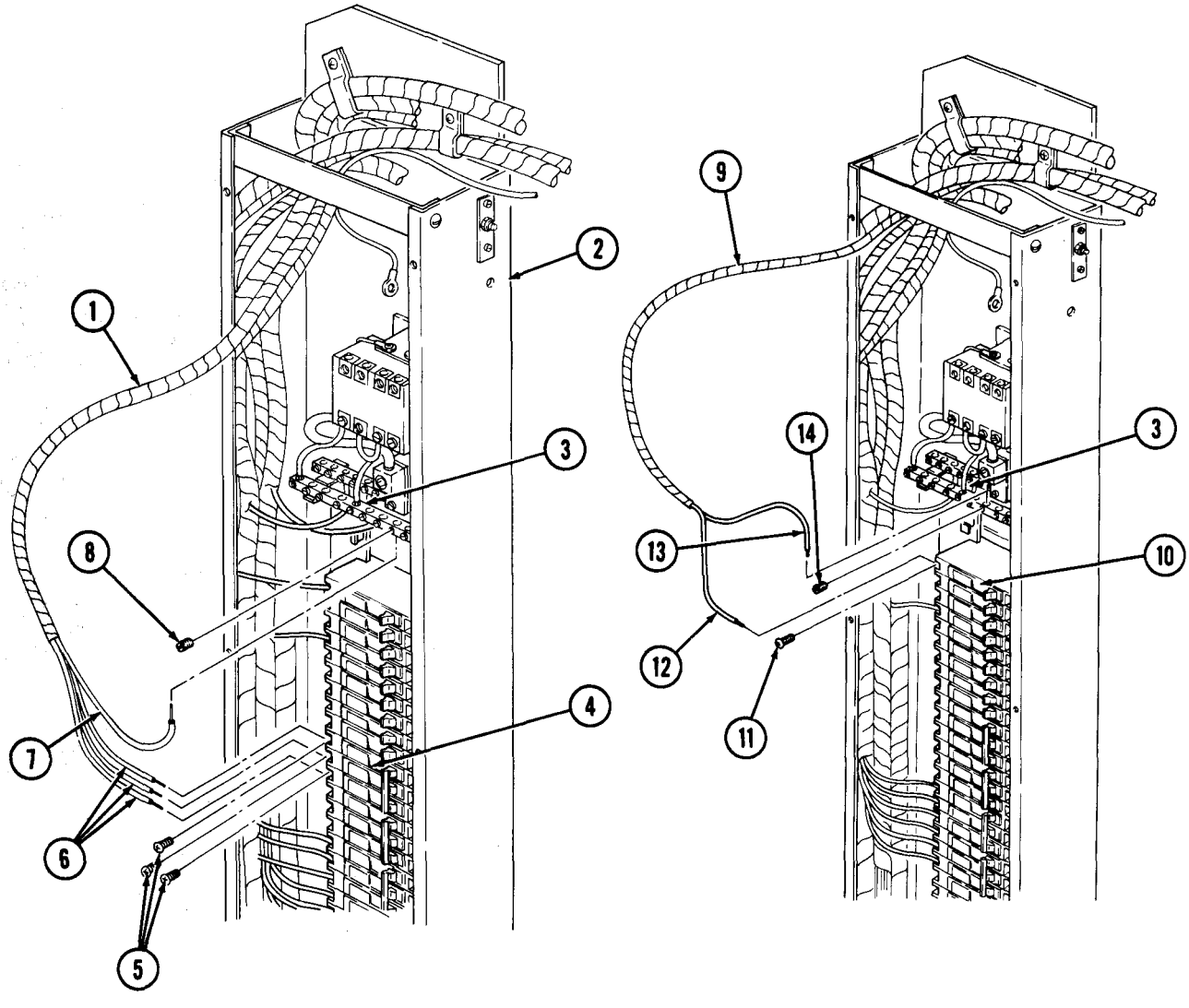
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



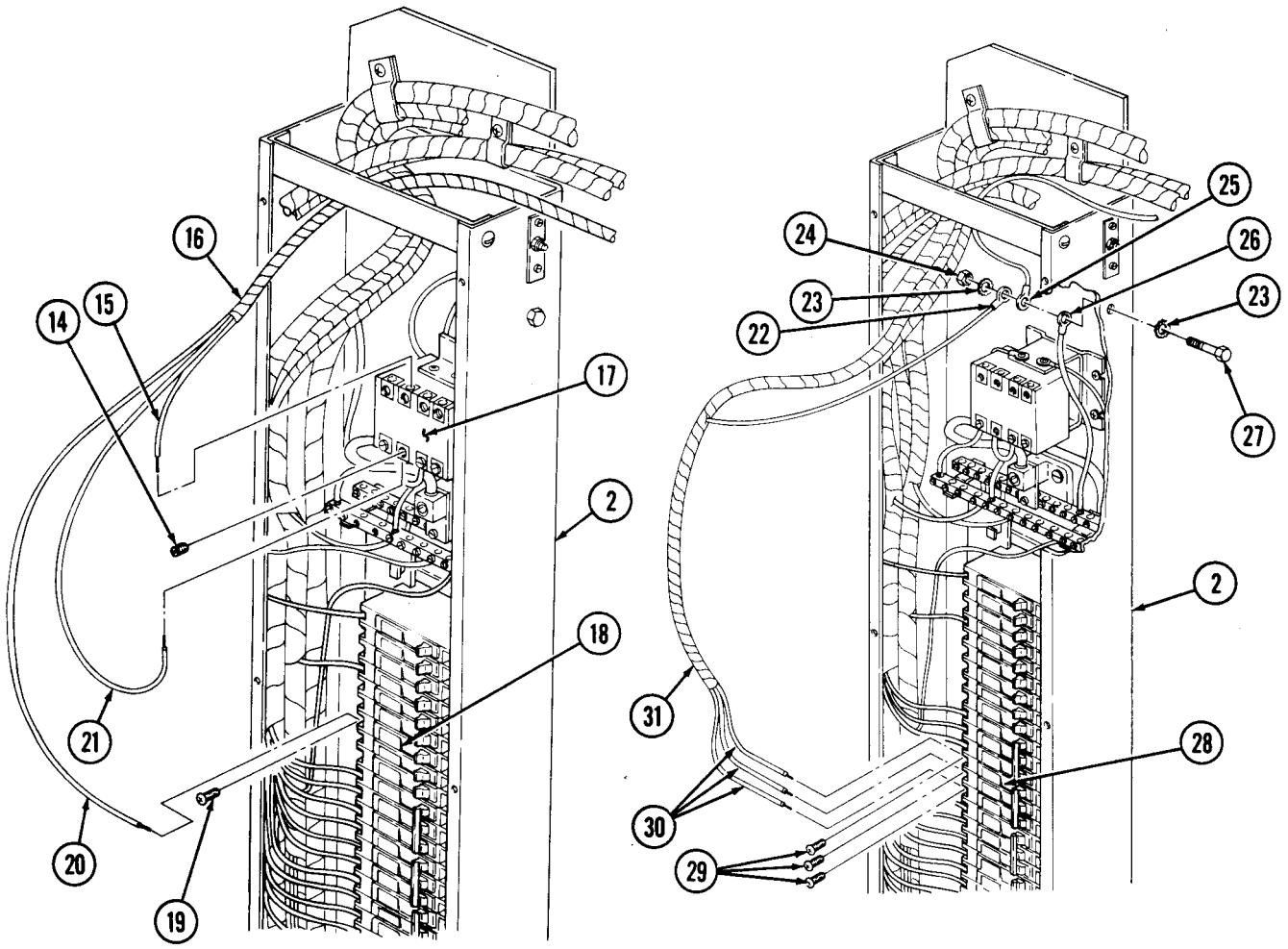
18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
97.		Wires (12) and (13) and electric heater wiring harness (9)	Install on circuit breaker (10) in load center (2) and neutral bus (3) with screws (11) and (14).	
98.		Wire (7), three wires (6), and 10kW electrical heater wiring harness(1)	Install on neutral bus (3) and circuit breakers (4) with screw (8) and three screws (5).	



18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
99.		Three wires (30) and air conditioner wiring harness (31)	Install on circuit breaker (28) in load center (2) with three screws (29).	
100.		Cable assembly (26) ground cable (25) and cable (22)	Install on load center (2) with nut (24), screw (27), and two washers (23).	
101.		Wires (15), (21), and (20), and blackout by-pass wiring harness (16)	Install on relay (17) and circuit breaker (18) with screws (14) and (19).	

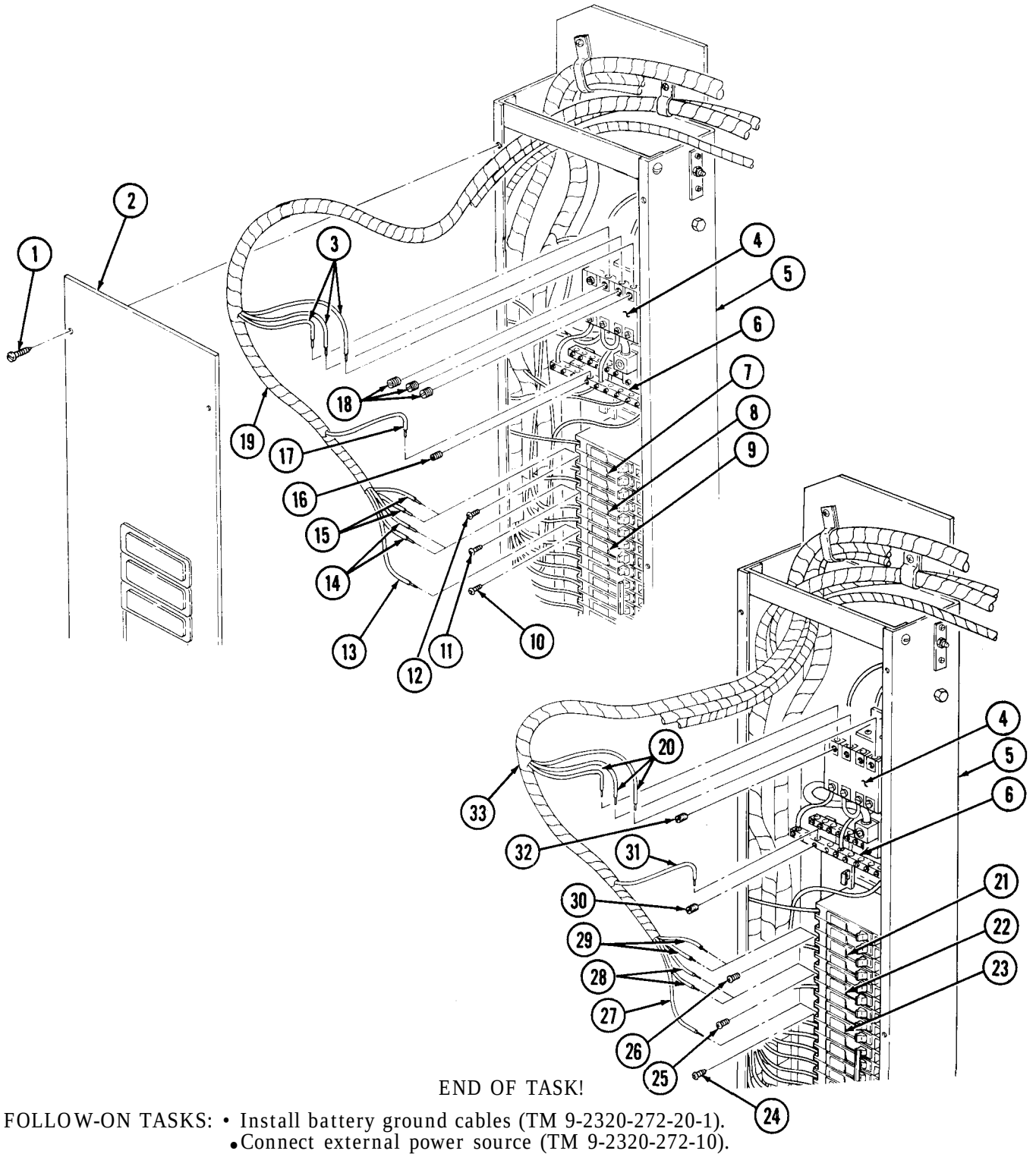


18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
102.		Main wiring harness (left) (33)	Position on load center (5).	
103.		Wire (27)	Install on circuit breaker (23) with screw (24).	
104.		Wires (28)	Install on circuit breaker (22) with screw (25).	
105.		Wires (29)	Install on circuit breaker (21) with screw (26).	
106.		Wire (31)	Install on neutral bus (6) with screw (30).	
107.		Three wires (20)	Install on relay (4) with three screws (32).	
108.		Two wires (15) and (14), wire (13), and main wiring harness (right) (19)	Install on three circuit breakers (7), (8), and (9) with three screws (12), (11) and (10).	
109.		Wire (17)	Install on neutral bus (6) with screw (16).	
110.		Three wires (3)	Install on relay (4) with three screws (18).	
111.		Load center box cover (2)	Install on load center box (5) with six screws (1).	

18.1-42. ELECTRICAL LOAD CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install battery ground cables (TM 9-2320-272-20-1).
• Connect external power source (TM 9-2320-272-10).

18.1-43. ELECTRICAL BOX MAINTENANCE

This task covers:

a. Disassembly
b. Inspection
c. Assembly
d. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1
Para. 18.1-40

Condition Description
Parking brake set.
Battery ground cables disconnected.
Entrance receptacle 220V 3-phase harness removed.

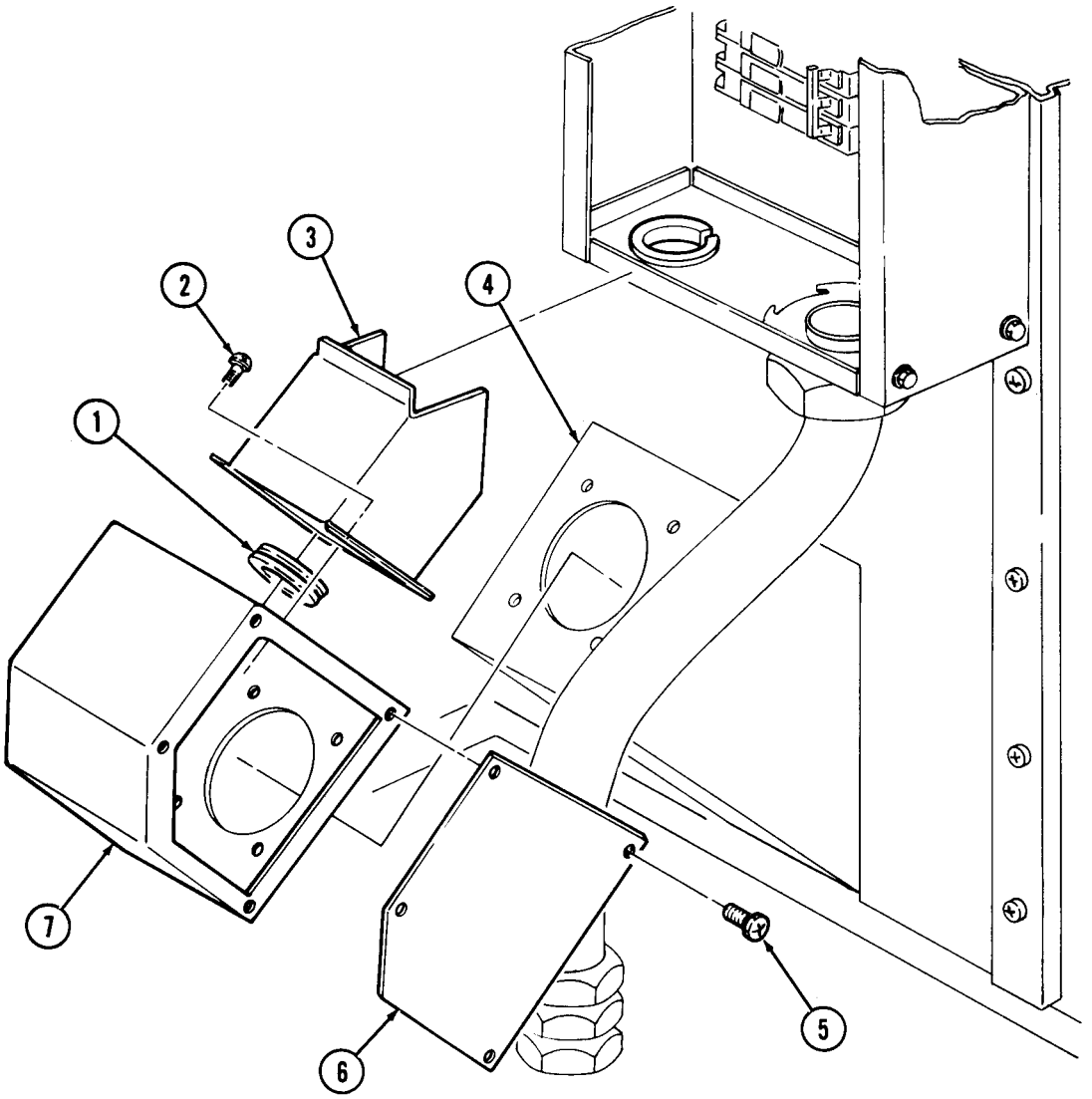
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Disassembly		
1.	Electrical box (7)	Six screws (2) and bracket (3)	Remove.	
2.		Grommet (1)	Remove.	
3.		Screw (5) and plate (6)	Remove.	
		b. Inspection		
4.			Inspect all parts for damage. Replace all damaged parts.	
		c. Assembly		
5.		Plate (6)	Install on electrical box (7) with screw (5).	
6.		Bracket (3)	Install on electrical box (7) with six screws (2).	

18.1-43. ELECTRICAL BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Installation				
7.		Electrical box (7)	Position on van body end panel (4).	
8.		Grommet (1)	Install on electrical box (7).	



END OF TASK!

FOLLOW-ON TASKS: • Install entrance receptacle 220V 3-phase harness (para. 18.1-40).
• Connect battery ground cables (TM 9-2320-272-20-1).

18.1-44. ELECTRICAL JUNCTION BOX REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Eight locknuts
Gasket
Sealing compound (Appendix C, Item 26)

General Safety Instructions
None

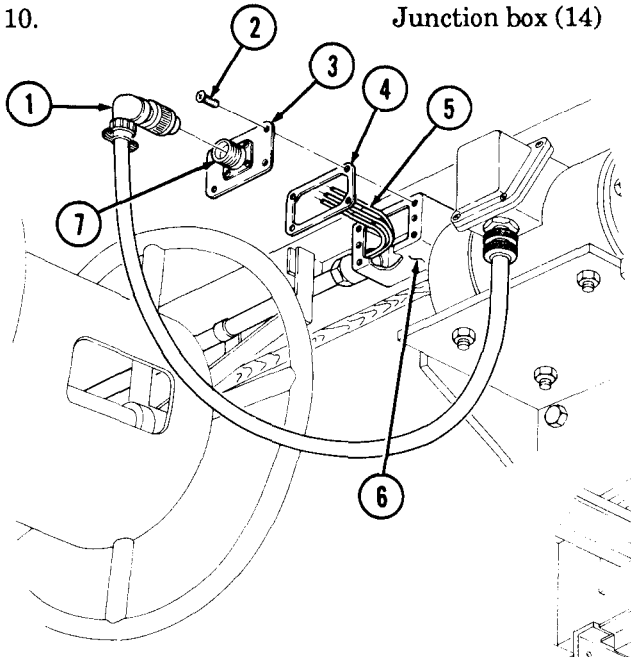
Personnel Required
Wheeled vehicle repairman MOS 63W

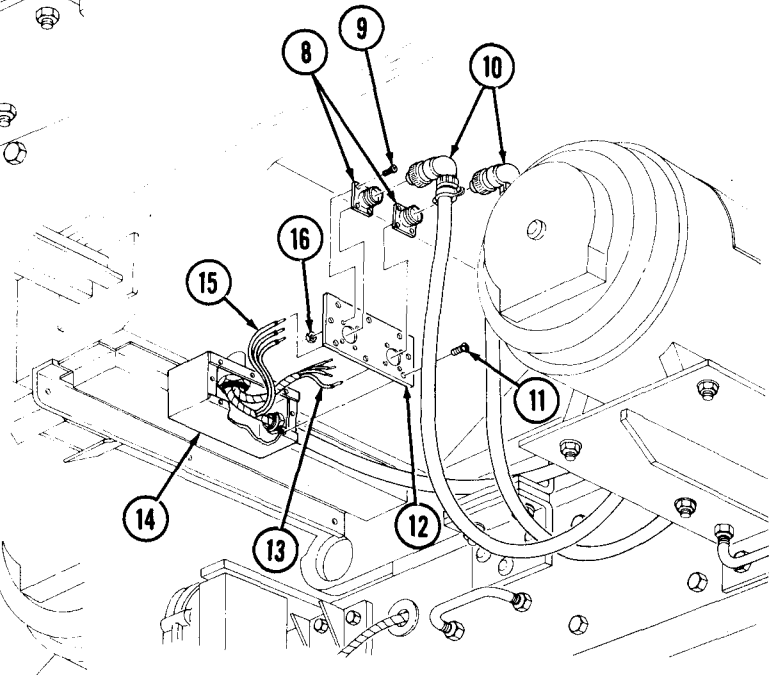
Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34
TM 9-237

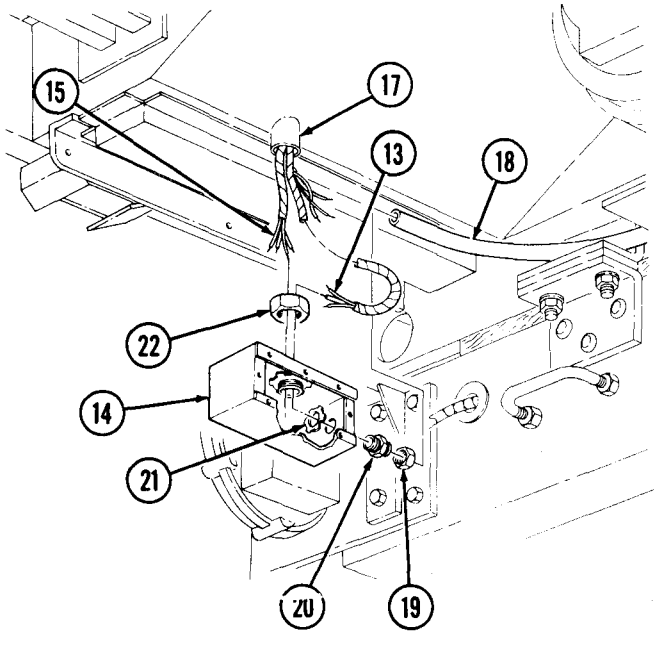
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Outlet box (6)	Cable (1)	Disconnect.	
2.		Four screws (2)	Remove and separate cover (3) from outlet box (6).	
		NOTE Tag wires for installation.		
3.	Cover (3)	Harness leads (5)	Remove from connector (7).	Refer to TM 9-237.
4.	Outlet box (6)	Cover (3) and gasket (4)	Remove.	Discard gasket (4).
5.	Junction box (14)	Cables (10)	Remove.	
6.		Eight screws (11) and cover (12)	Remove.	
		NOTE Tag wires for installation.		
7.	Cover (12)	Harness leads (13) and (15)	Remove from connectors (8).	Refer to TM 9-237.
8.		Eight locknuts (16), screws (9), and two connectors (8)	Remove.	Discard locknuts (16).

18.1-44. ELECTRICAL JUNCTION BOX REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
9.	Junction box (14)	Special nut (21), nut (22), adapter (20), and nut (19)	Loosen and remove.	
10.		Junction box (14)	Remove from conduits (17) and (18) and slide off wires (13) and (15).	





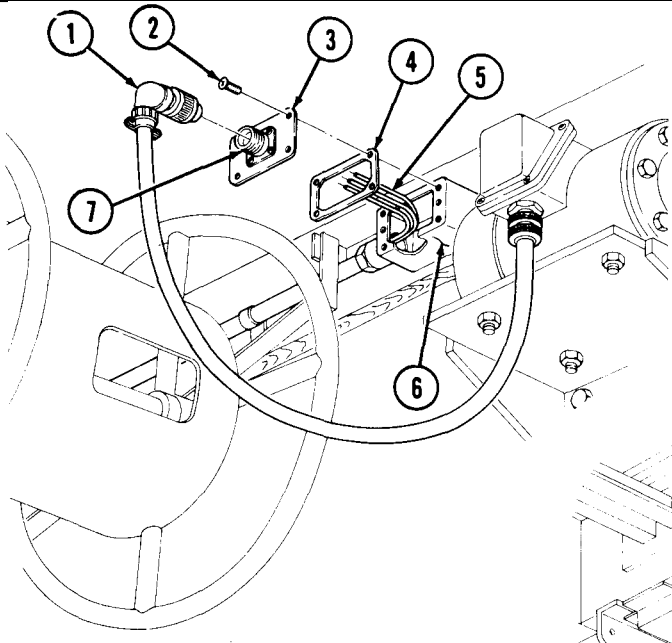


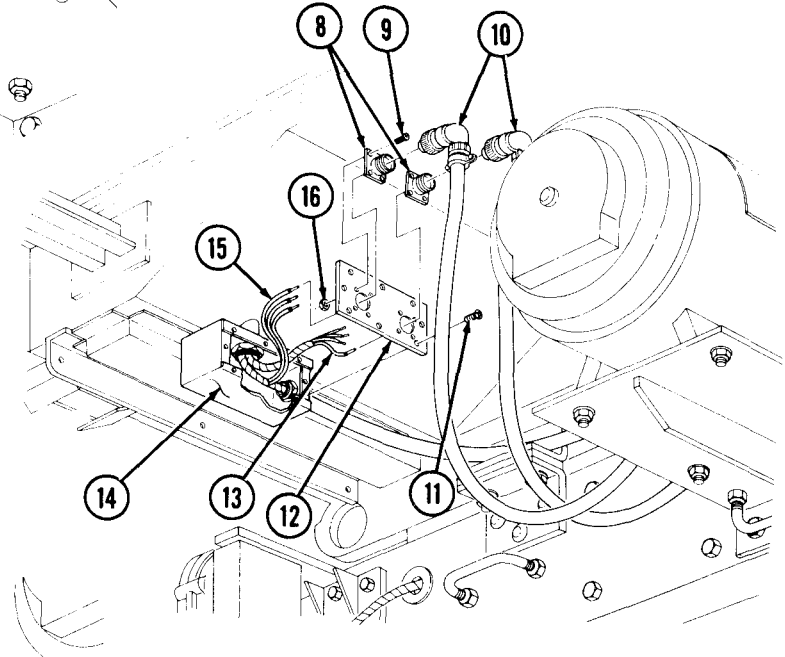
18.1-44. ELECTRICAL JUNCTION BOX REPLACEMENT (Cont'd)

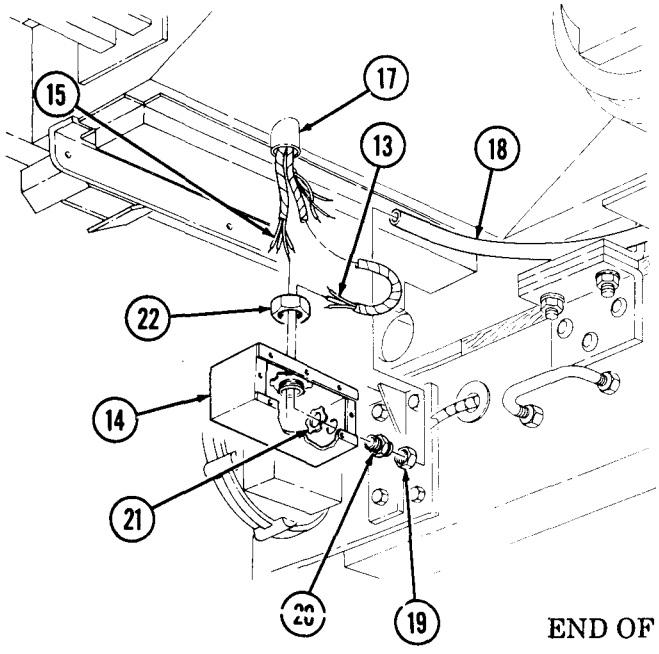
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
11.		Junction box (14)	a. Place nut (20) on conduit (17). b. Feed wires (13) and (15) through holes injunction box (14). c. Position junction box (14) on conduits (17) and (18).	
12.		Nut (20)	Install on junction box (14).	
13.		Junction box (14)	Feed conduit (18) through nut (19), adapter (20), junction box (14) and special nut (21).	
14.		Special nut (21)	Install on junction box (14).	
15.		Two connectors (8)	Install on cover (12) with eight screws (9) and new locknuts (16).	
16.		Wires (13) and (15)	Connect to connectors (8).	Refer to TM 9-237.
17.		Cover (12)	Coat edges with sealing compound and install on junction box (14) with eight screws (11).	
18.		Cables (10)	Install on connectors (8).	
19.		Cover (3)	Position on outlet box (6) with new gasket (4).	
20.		Harness leads (5)	Connect to connector (7) on cover (3).	Refer to TM 9-237.
21.		Cover (3)	Install on outlet box (6) with four screws (2).	
22.		Cable (1)	Install on outlet box (6).	

18.1-44. ELECTRICAL JUNCTION BOX REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS







END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-45. 400 Hz CONVERTER OUTLET BOX REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four locknuts
Gasket

General Safety Instructions
None

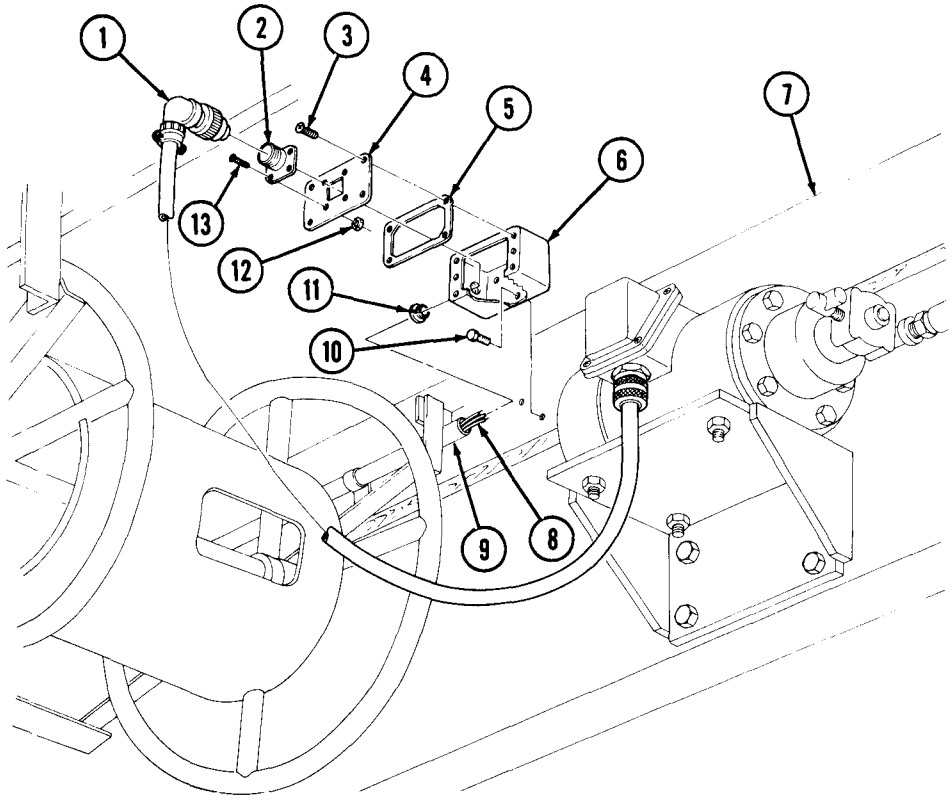
Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P
TM 9-237

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Outlet box (6)	Cable (1)	Disconnect.	
2.		Four screws (3), cover (4), and gasket (5)	Remove.	Discard gasket (5).
		NOTE Tag wires for installation.		
3.	Cover (4)	Wires (8)	Disconnect from connector (2).	Refer to TM 9-237.
4.		Four locknuts (12), screws (13), and connector (2)	Remove.	Discard locknuts (12).
5.	Outlet box (6)	Nut (11)	Loosen and slide back on conduit (9).	
6.	Van body (7)	Two screws (10) and outlet box (6)	Remove.	
	b. Installation			
7.		Outlet box (6)	Slide onto end of conduit (9) and install on van body (7) with two screws (10).	

18.1-45. 400 Hz CONVERTER OUTLET BOX REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.		Conduit (9)	Secure to outlet box (6) with nut (11).	
9.		Connector (2)	Install on cover (4) with four screws (13) and new locknuts (12).	
10.		New gasket (5) and wires (8)	Slide new gasket (5) over wires (8) and connect wires (8) to connector (2).	Refer to TM 9-237.
11.		Cover (4) and new gasket (5)	Aline on outlet box (6) and install with four screws (3).	
12.		Cable (1)	Connect to connector (2) on outlet box (6).	



END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-46. 400 Hz CONVERTER HARNESS CONDUIT REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-1	Battery ground cables removed.
Para. 18.1-45	400 Hz converter outlet box removed.
Para. 18.1-44	Electrical junction box removed.

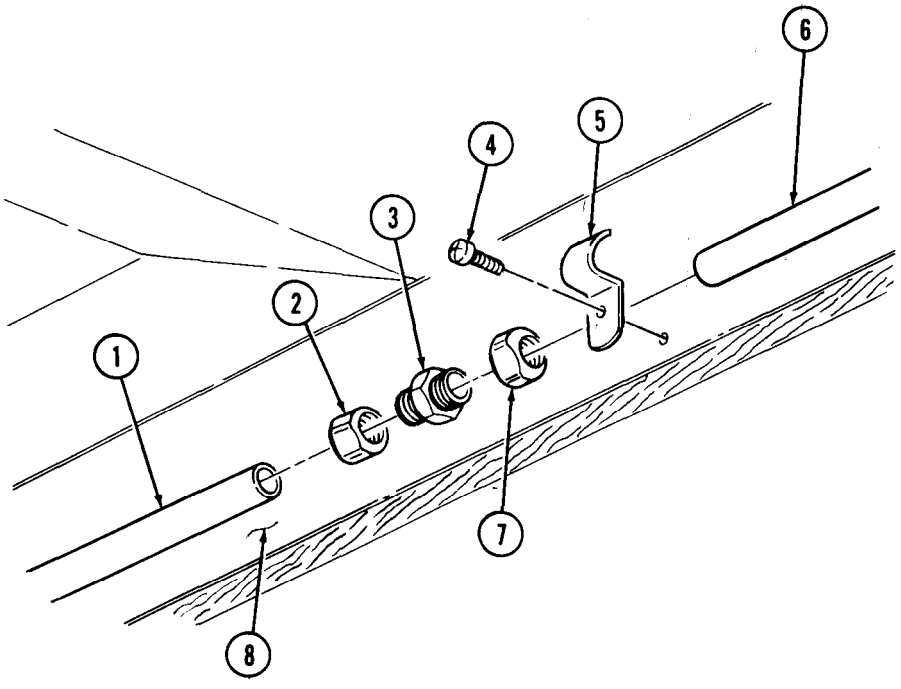
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Conduits (1) and (6)	Six screws (4) and clamps (5)	Remove.	
2.	Coupling (3)	Nuts (2) and (7)	Remove.	
3.	Conduits (1) and (6)	Coupling (3)	Remove.	
4.	Van body (8)	Conduits (1) and (6)	Remove.	
	b. Installation			
5.		Coupling (3)	Install on conduits (1) and (6).	
6.		Conduits (1) and (6)	Install on van body (8) with six screws (4) and clamps (5).	
7.		Nuts (2) and (7)	Install on coupling (3).	

18.1-46. 400 Hz CONVERTER HARNESS CONDUIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Connect battery ground cables (TM 9-2320-272-20-1).
• Install 400 Hz converter outlet box (para. 18.1-45).
• Install electrical junction box (para. 18.1-44).

18.1-47. CONTROL CENTER BOX MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Four lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10 Para. 18.1-48	Parking brake set. Heater thermostat and 10kW heater thermostat removed.
Para. 18.1-50	AC manual starter switches removed.

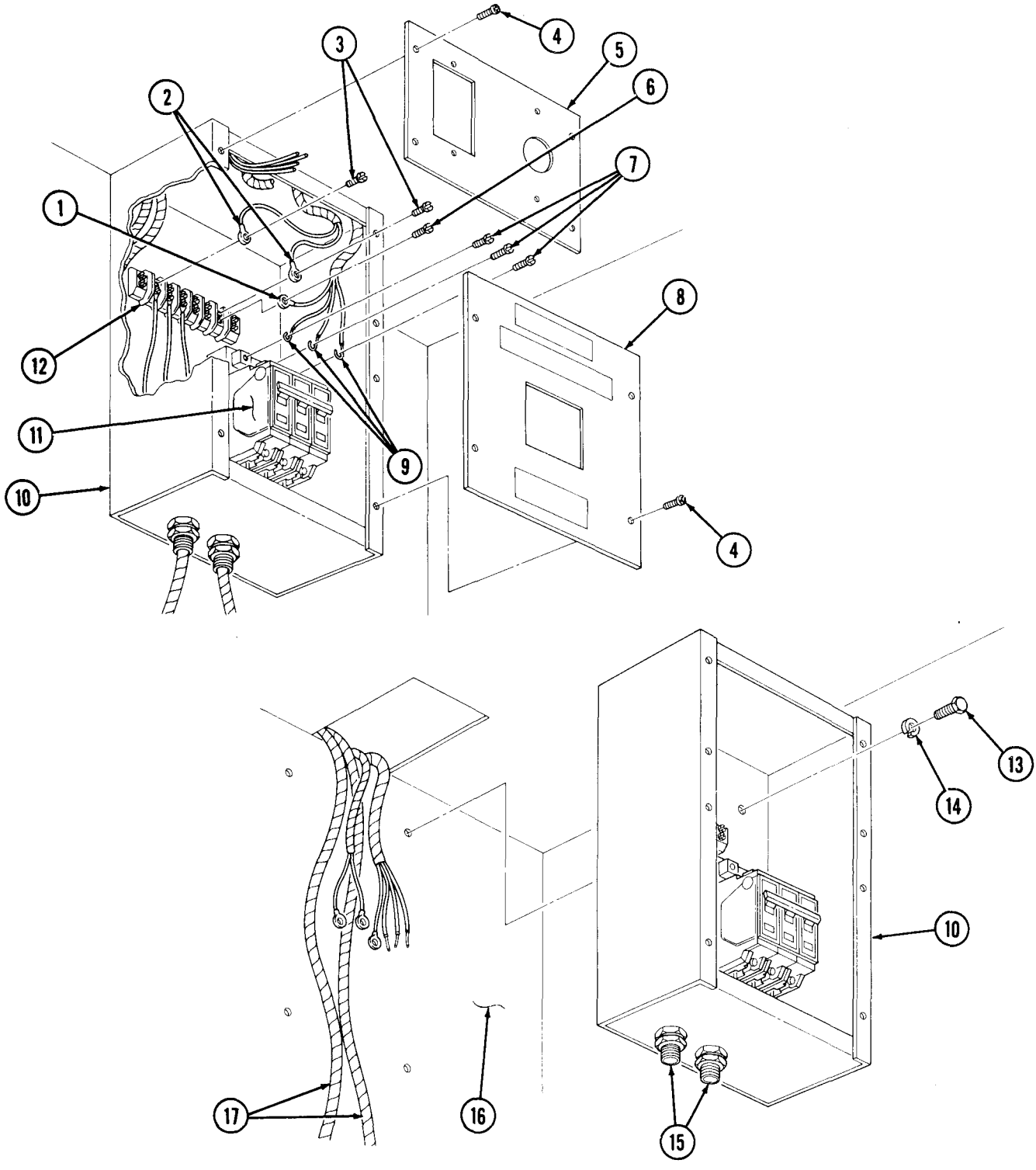
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Tag wires for installation.		
1.	Control center box (10)	Eight screws (4) and covers (5) and (8)	Remove.	
2.	Terminal board **(12)**	Two screws **(3)** and wires (2)	Remove.	
3.		Screw (6) and wire (1)	Remove.	
4.	Circuit breaker (11)	Three screws (7) and wires (9)	Remove.	
5.	Control center box (10)	Two wiring harnesses (17)	Pull through nipples (15).	
6.	Control center box (10) at van body (16)	Four screws (13), lockwashers (14), **and** control center box (10)	Remove.	Discard lockwashers (14).

18.1-47. CONTROL CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

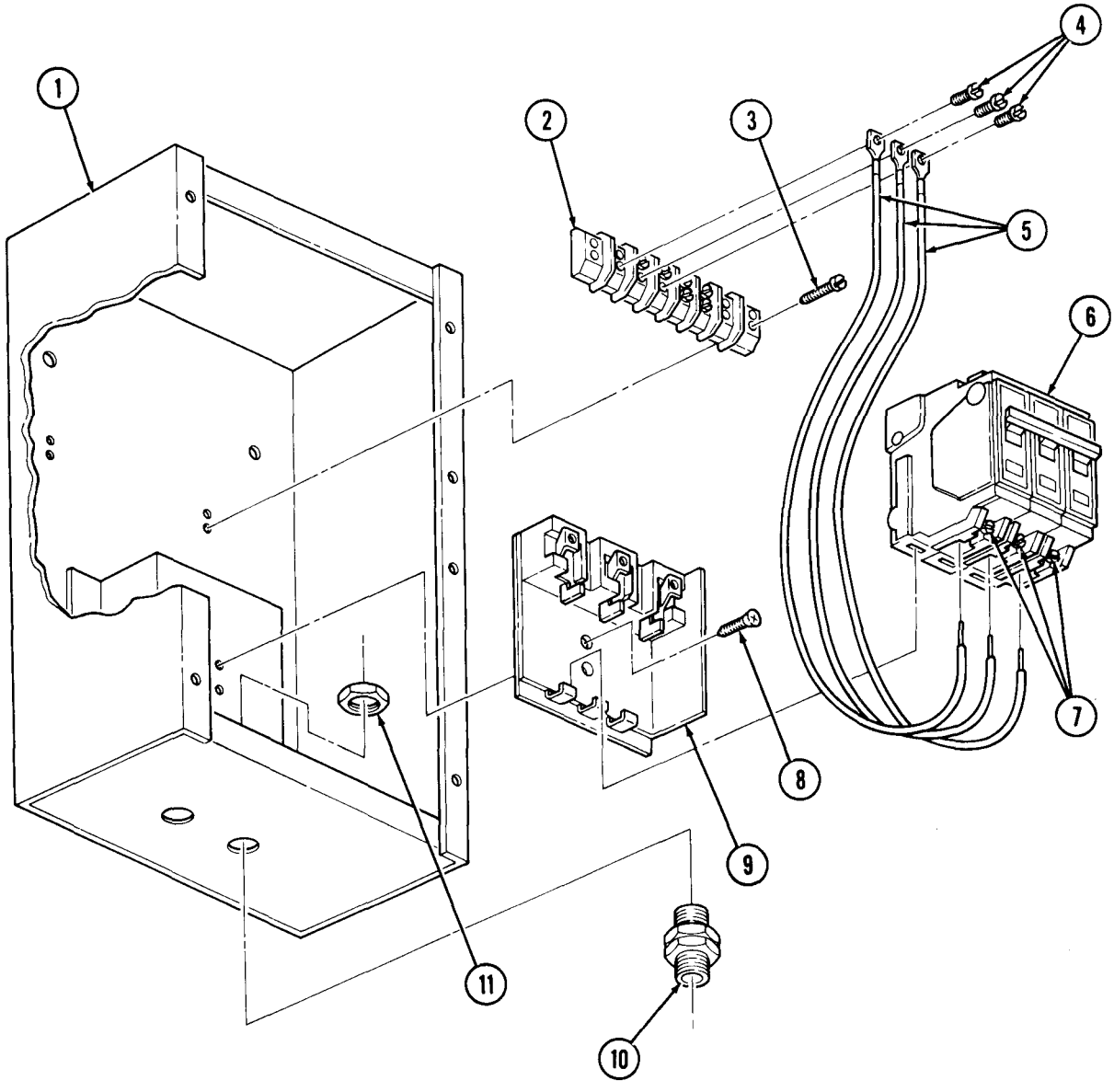


18.1-47. CONTROL CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Disassembly			
7.	Terminal board (2)	Three screws (4) and jumper cables (5)	Remove.	
8.	Circuit breaker (6)	Three screws (7) and jumper cables (5)	Loosen screws and remove.	
9.	Circuit breaker mounting base (9)	Circuit breaker (6)	Remove.	
10.	Control center box (1)	Two screws (8) and circuit breaker mounting base (9)	Remove.	
11.		Four screws (3) and terminal board (2)	Remove.	
12.		Two nuts (11) and nipples (10)	Remove.	
	c. Assembly			
13.		Two nipples (10)	Install on control center box (1) with two nuts (11).	
14.		Circuit breaker mounting base (9)	Install on control center box (1) with two screws (8).	
15.		Termninal board (2)	Install on control center box (1) with four screws (3).	
16.		Circuit breaker (6)	Install on circuit breaker mounting base (9).	
17.		Three jumper cables (5)	Install on terminal board (2) with three screws (4).	
18.		Three jumper cables (5)	Install on circuit breaker (6) and tighten three screws (7).	

18.1-47. CONTROL CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

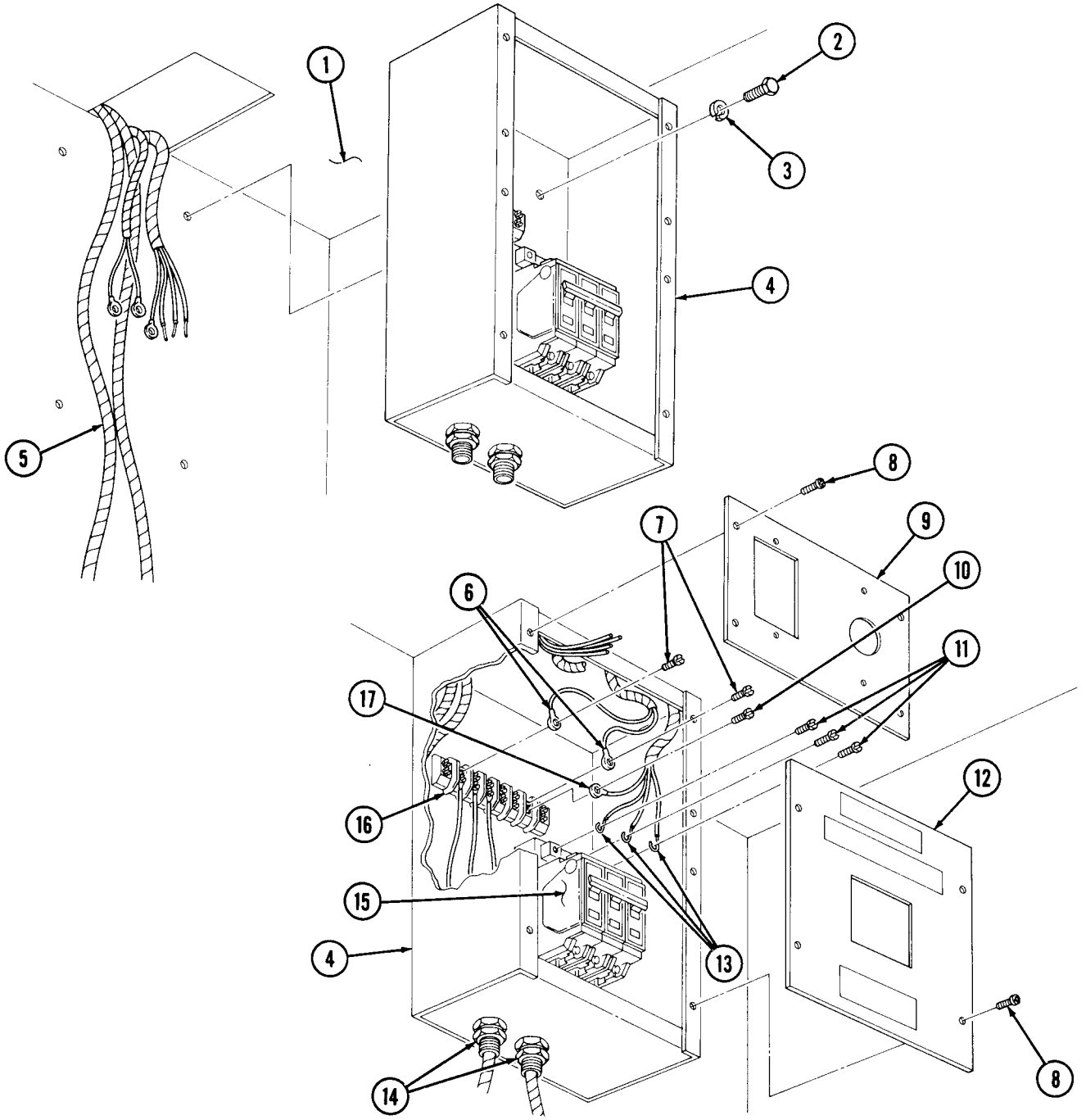


18.1-47. CONTROL CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Installation				
19.		Control center box (4)	Install on van body (1) with four new lock-washers (3) and screws (2).	
20.		Wiring harness (5)	Push through nipples (14) in control center box (4).	
21.		Three wires (13)	Install on circuit breaker (15) with three screws (11).	
22.		Wire (17)	Install on terminal board (16) with screw (10).	
23.		Two wires (6)	Install on terminal board (16) with two screws (7).	
24.		Covers (9) and (12)	Install on control center box (4) with eight screws (8).	

18.1-47. CONTROL CENTER BOX MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install AC manual starter switches (para. 18.1-50).
• Install heater thermostat and 10kW heater thermostat (para. 18.1-48).

18.1-48. HEATER THERMOSTAT AND 10kW HEATER THERMOSTAT REPLACEMENT

This task covers:

a. Heater Thermostat Removal
b. 10kW Heater Thermostat Removal
c. 10kW Heater Thermostat Installation
d. Heater Thermostat Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Three insulated wire splices

General Safety Instructions
None

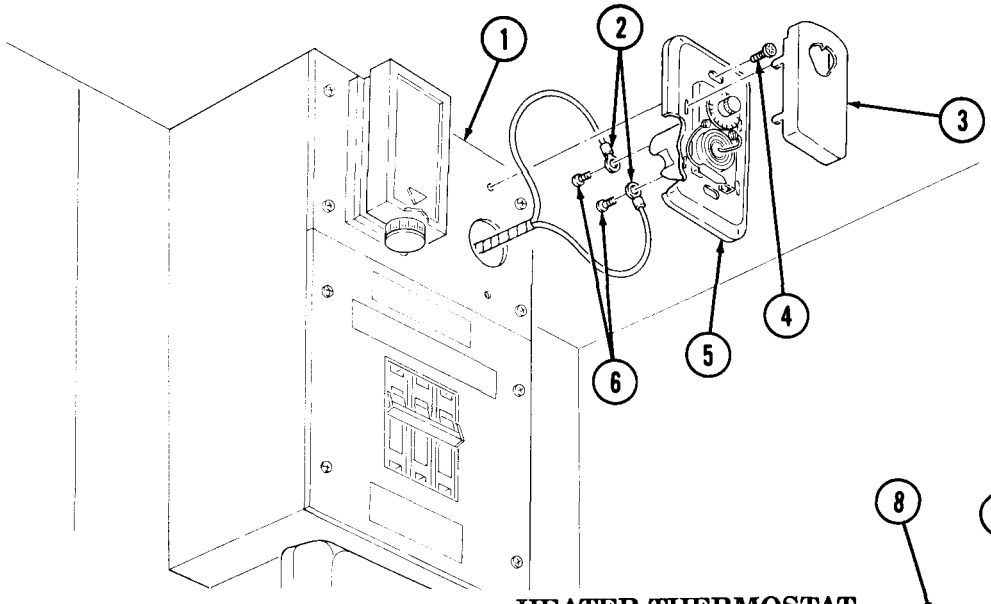
Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

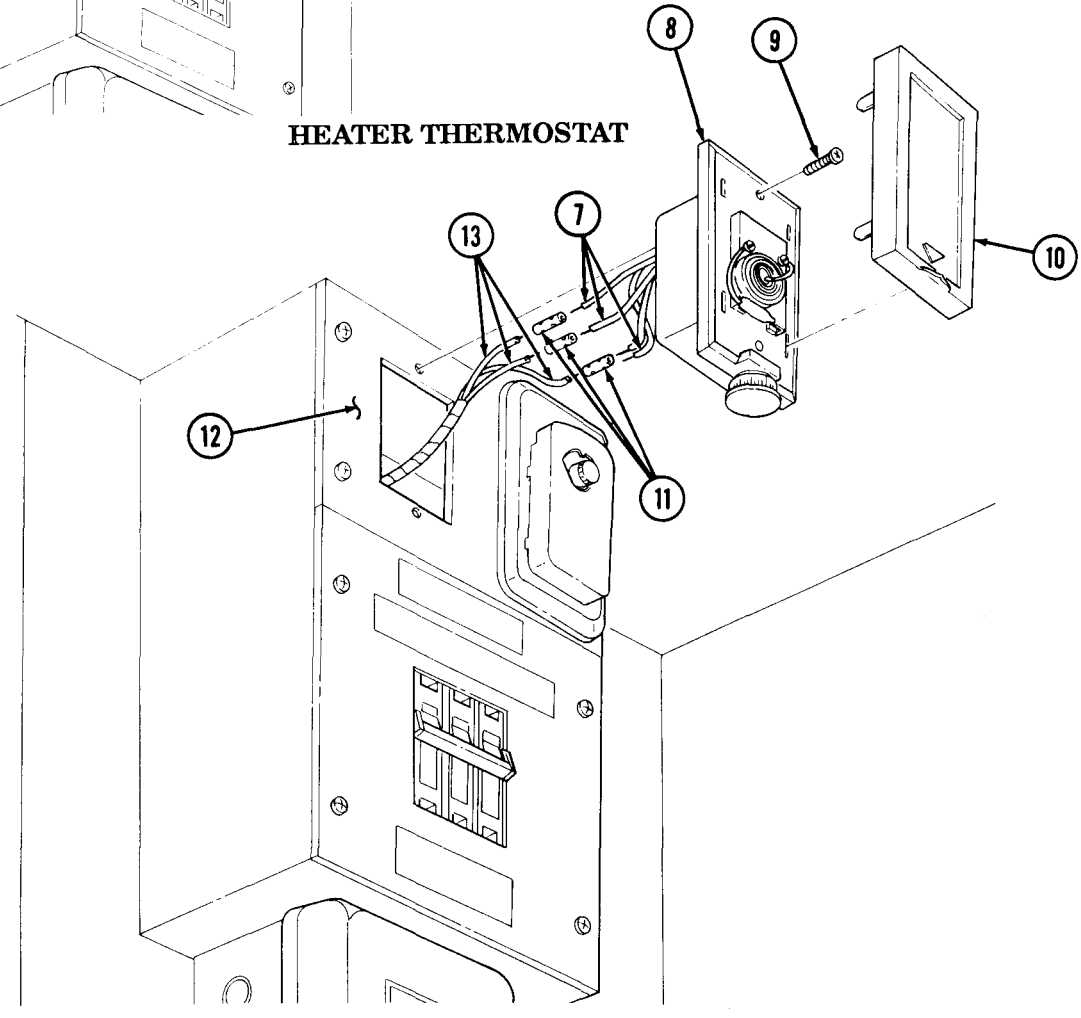
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Heater Thermostat Removal		
		NOTE Tag wires for installation.		
1.	Thermostat (5)	Cover (3)	Remove.	
2.	Control center box cover (1)	Two screws (4) and thermostat (5)	Remove.	
3.	Thermostat (5)	Two screws (6) and wires (2)	Remove.	
4.	Control center box cover (1)	Thermostat (5)	Remove.	
		b. 10kW Heater Thermostat Removal		
5.	Thermostat (8)	Cover (10)	Remove.	
6.	Control center box cover (12)	Two screws (9) and thermostat (8)	Remove.	
7.	Three insulated wire splices (11)	Three wires (7) and (13)	Disconnect.	Discard insulated wire splices (11).
8.	Control center box cover (12)	Thermostat (8)	Remove.	

18.1-48. HEATER THERMOSTAT AND 10kW HEATER THERMOSTAT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



HEATER THERMOSTAT



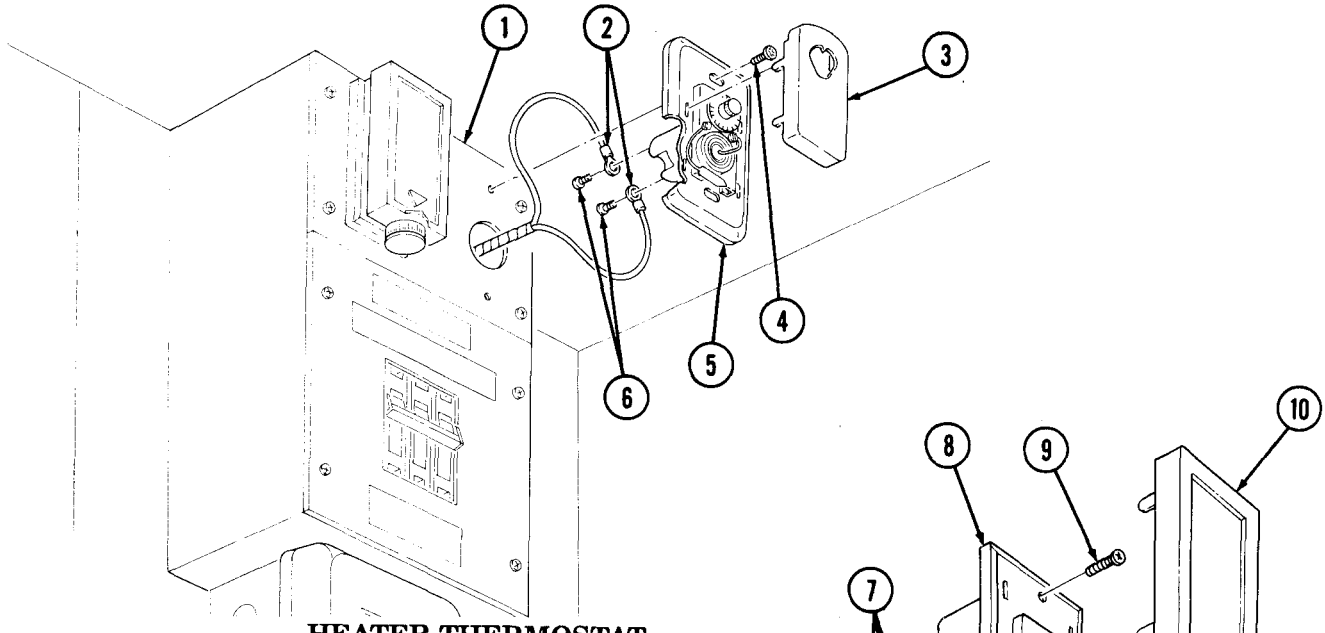
10 kW HEATER THERMOSTAT

18.1-48. HEATER THERMOSTAT AND 10kW HEATER THERMOSTAT REPLACEMENT (Cont'd)

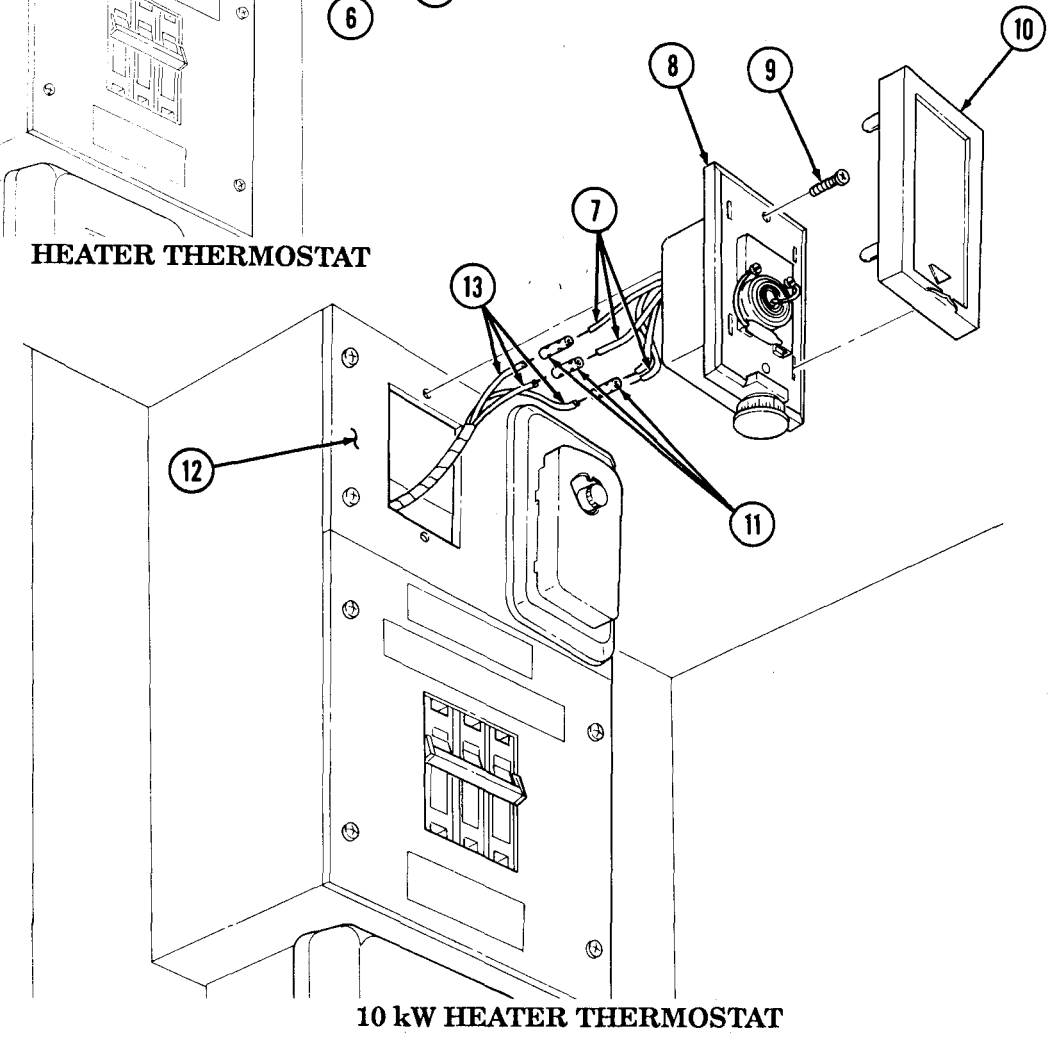
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		c. 10kW Heater Thermostat Installation		
9.		Three wires (7) and (13)	Connect with three new insulated wire splices (11).	One splice has two wires.
10.		Thermostat (8)	Position on control center box cover (12) and install with two screws (9).	
11.		Cover (10)	Install on thermostat (8).	
		d. Heater Thermostat Installation		
12.		**Two** wires (2)	Install on thermostat (5) with two screws (6).	
13.		Thermostat (5)	Position on control center box cover (1) and install with two screws (4).	
14.		Cover (3)	Install on thermostat (5).	

18.1-48. HEATER THERMOSTAT AND 10kW HEATER THERMOSTAT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



HEATER THERMOSTAT



10 kW HEATER THERMOSTAT

END OF TASK!

FOLLOW-ON TASK: Install battery ground cables (TM 9-2320-272-20-1).

18.1-49. BLACKOUT AND EMERGENCY LIGHT FIXTURES REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition	Reference
Parking brake set.	TM 9-2320-272-10
Emergency and blackout lamps removed.	TM 9-2320-272-20-2
Battery ground cables disconnected.	TM 9-2320-272-20-1

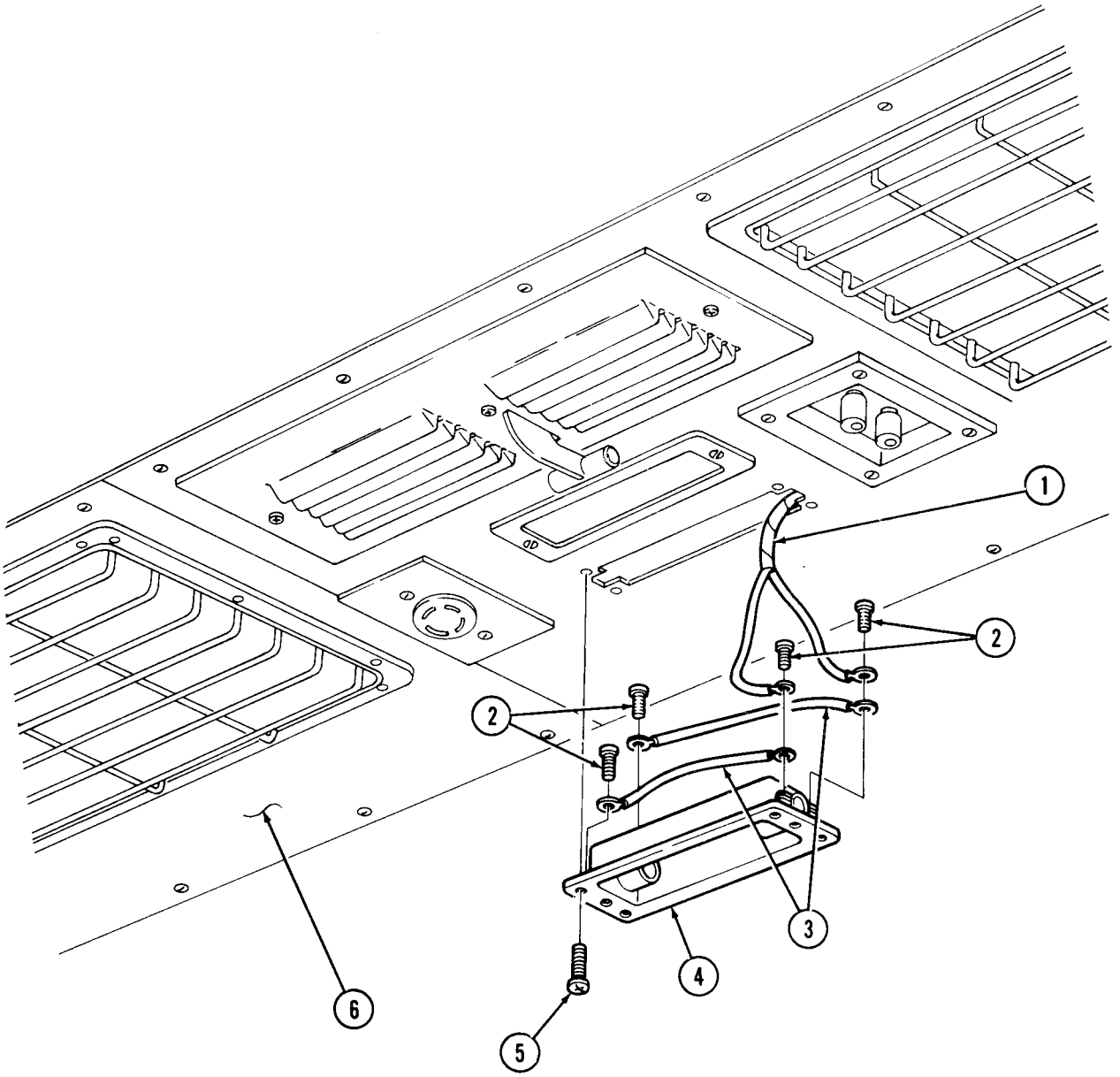
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Tag wires for installation.		
1.	Van ceiling (6)	Four screws (5) and housing (4)	Remove.	
2.	Housing (4)	Four screws (2), two jumper cables (3), and wiring harness (1)	Remove.	
		b. Installation		
3.		Two jumper cables (3) and wiring harness (1)	Install on housing (4) with four screws (2).	
4.		Housing (4)	Install on van ceiling (6) with four screws (5).	

18.1-49. BLACKOUT AND EMERGENCY LIGHT FIXTURES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install emergency and blackout lamps (TM 9-2320-272-20-2).
• Connect battery ground cables (TM 9-2320-272-20-1).

18.1-50. AC MANUAL STARTER SWITCHES REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Twelve insulated wire splices

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

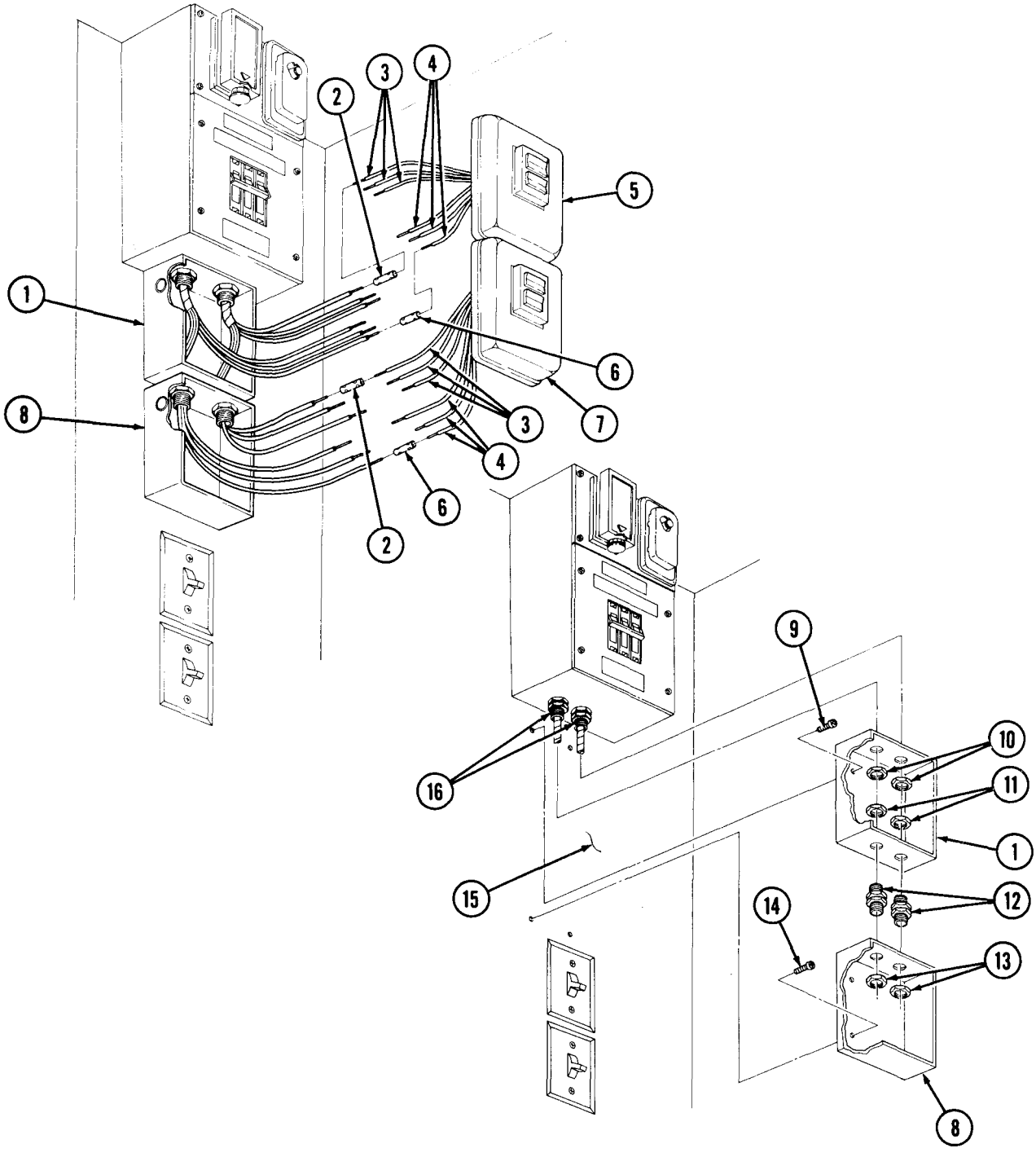
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Tag wires for installation.		
1.	AC manual starter switch boxes (1) and (8)	Covers (5) and (7)	Remove.	
2.	Six insulated wire splices (2)	Six wires (3)	Disconnect.	Discard insulated wire splices (2).
3.	Six insulated wire splices (6)	Six wires (4)	Disconnect.	Discard insulated wire splices (6).
4.	Two connectors (16)	Two nuts (10)	Remove.	
5.	Two connectors (12)	Two nuts (11)	Remove.	
6.		Two nuts (13)	Remove.	
7.	Van body (15)	Four screws (9) and manual starter switch box (1)	Remove.	
8.		Four screws (14), manual starter switch box (8) and two connectors (12).	Remove.	

18.1-50. AC MANUAL STARTER SWITCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

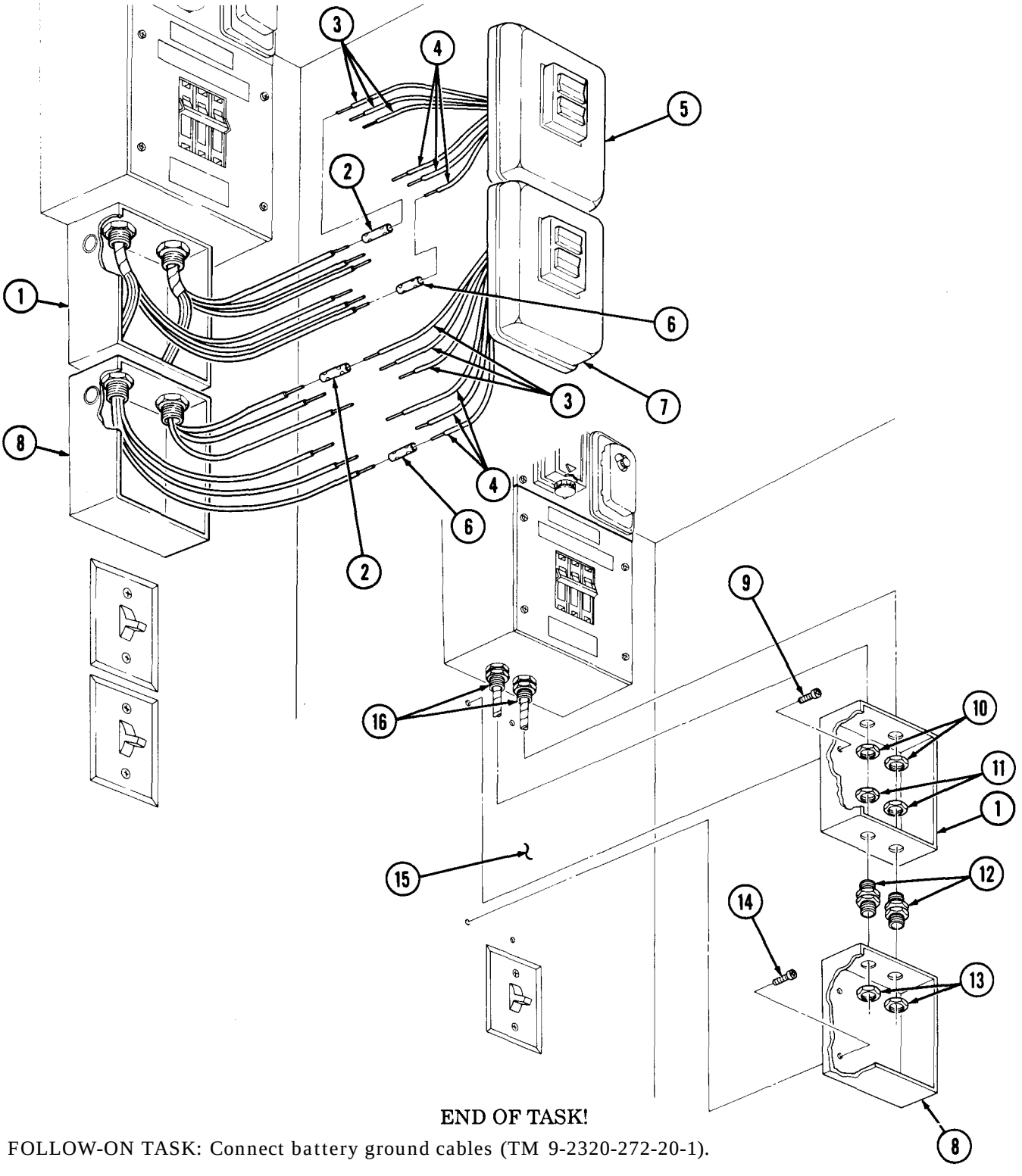


18.1-50. AC MANUAL STARTER SWITCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
9.		Manual starter switch box (1)	Install on van body (15) with four screws (9).	
10.		Manual starter switch box (8)	Install on van body (15) with four screws (14).	
11.		Two nuts (10)	Install on two connectors (16).	
12.		Two connectors (12)	Install on two manual starter switch boxes (1) and (8).	
13.		Two nuts (11)	Install on two connectors (12).	
14.		Two nuts (13)	Install on two connectors (12).	
15.		Six cables (3)	Connect to six new insulated wire splicers (2).	
16.		Six cables (4)	Connect to six new insulated wire splicers (6).	
17.		Covers (5) and (7)	Install on manual starter switch boxes (1) and (8).	

18.1-50. AC MANUAL STARTER SWITCHES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-51. FLUORESCENT LIGHT FIXTURES MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Two insulated wire splices
Lockwasher

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-2

Condition Description
Parking brake set.
Fluorescent light tubes removed.

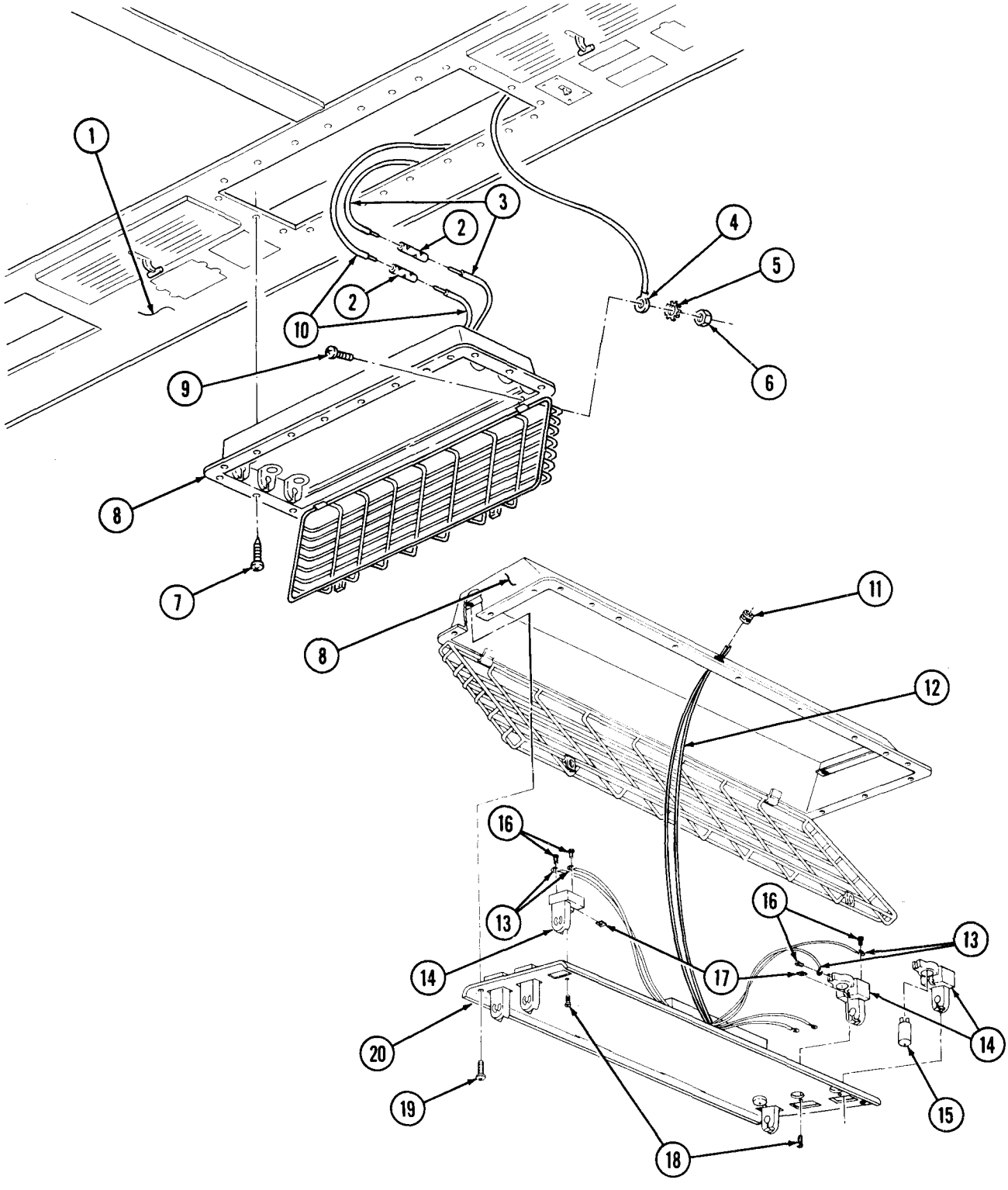
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE All eight fluorescent light fixtures are removed and installed the same way. This procedure covers one flourescent light fixture.		
1.	Van ceiling (1)	Twenty screws (7) and light fixture body (8)	Remove.	
2.	Light fixture body (8)	Screw (9), nut (6), lockwasher (5), and wire (4)	Remove.	Discard lockwasher (5).
3.		Two wires (3) and (10) and insulated wire splices (2)	Disconnect.	Discard insulated wire splices (2).
		b. Disassembly		
4.	Light fixture body (8)	Four screws (19) and light fixture (20)	Remove.	
5.	Light fixture (20)	Six screws (18), nuts (17), and sockets (14)	Remove.	
6.	Six sockets (14)	Twelve screws (16) and wires (13)	Remove.	
7.		Six starters (15)	Remove.	
8.	Harness (12)	Grommet (11)	Remove.	
9.	Light fixture (20)	Harness (12)	Remove.	

18.1-51. FLUORESCENT LIGHT FIXTURES MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

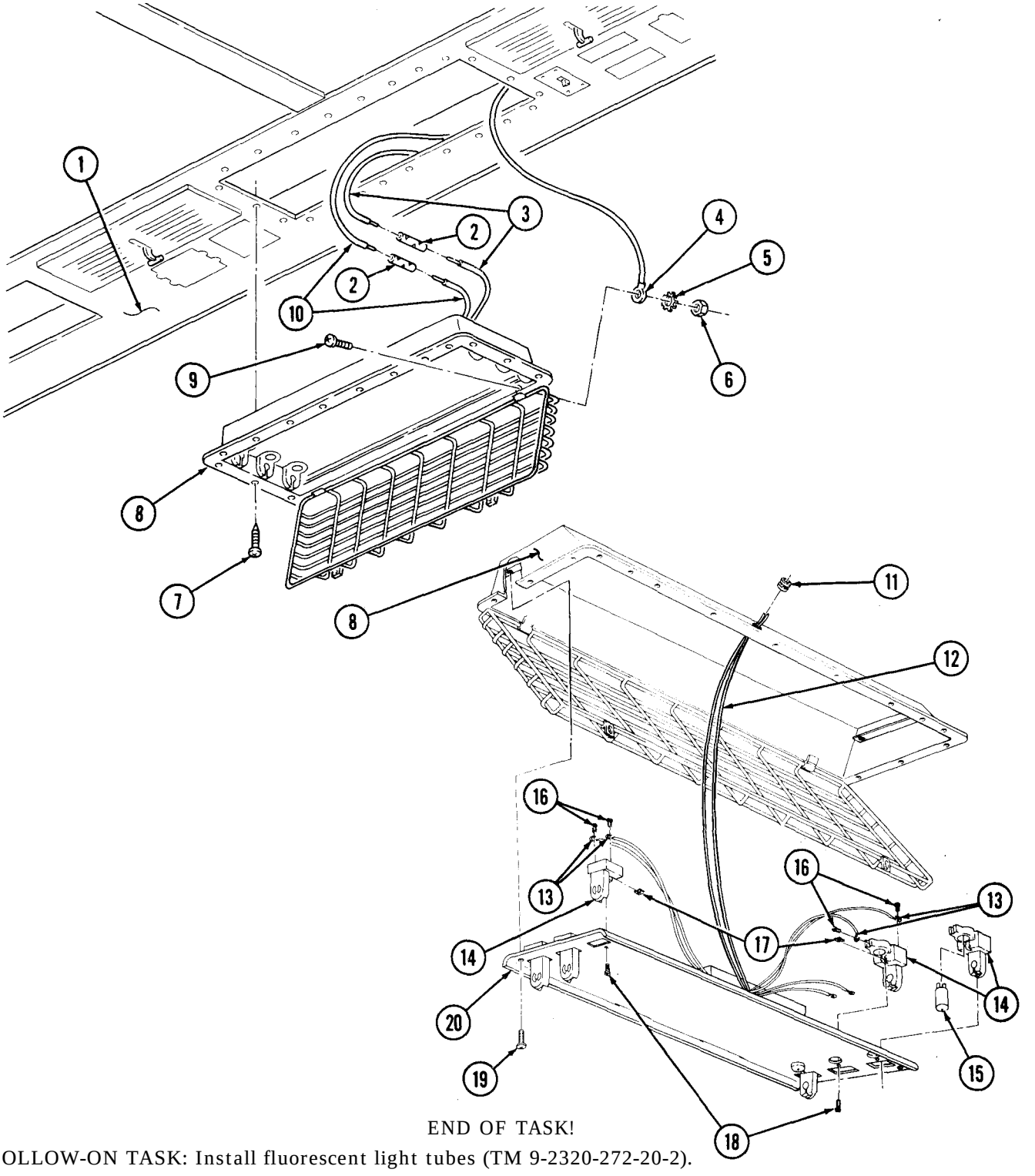


18.1-51. FLUORESCENT LIGHT FIXTURES MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Inspection			
10.	Six sockets (14)	Six starters (15)	Inspect for burns or damage.	Replace if burnt or damaged.
	d. Assembly			
11.		Six starters (15)	Install on six sockets (14).	
12.		Twelve wires (13)	Install on six sockets (14) with twelve screws (16).	
13.		Six sockets (14)	Install on light fixture (20) with six nuts (17) and screws (18).	
14.		Grommet (11)	Install on harness (12).	
15.		Light fixture (20)	Install on light fixture body (8) with four screws (19).	
	e. Installation			
16.		Wire (4)	Install on light fixture body (8) with nut (6), new lockwasher (5), and screw (9).	
17.		Two wires (3) and (10)	Connect with two new insulated wire splices (2).	
18.		Light fixture body (8)	Install on van ceiling (1) with twenty screws (7).	

18.1-51. FLUORESCENT LIGHT FIXTURES MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install fluorescent light tubes (TM 9-2320-272-20-2).

18.1-52. 400 Hz CONVERTER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10
TM 9-2320-272-20-1

Condition Description
Parking brake set.
Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four locknuts
Gasket

General Safety Instructions
None

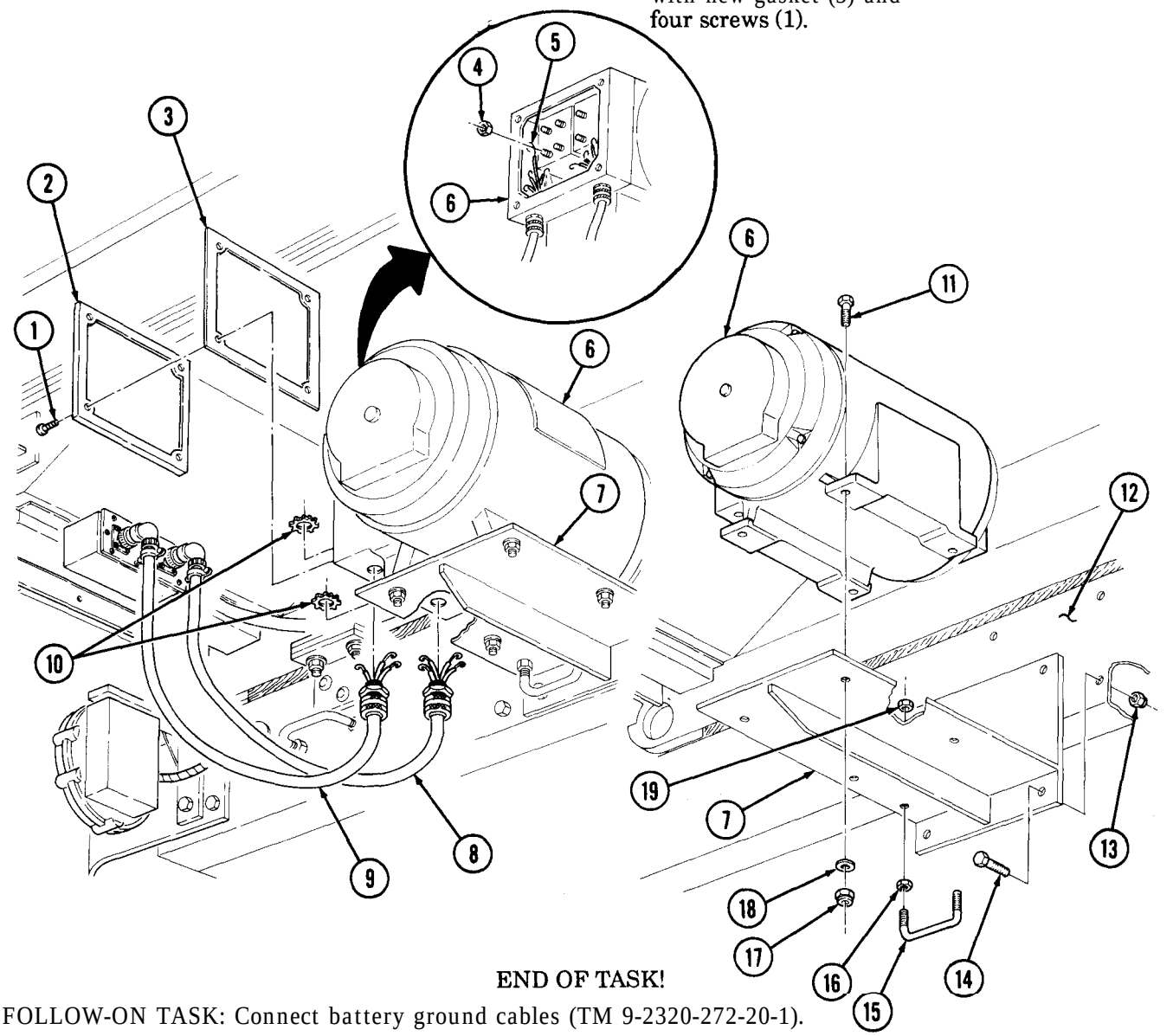
Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
1.	Converter (6)	Four screws (1), cover (2), and gasket (3)	Remove.	Discard gasket (3).
2.		Seven nuts (4) and wires (5)	Remove.	
3.		Two locknuts (10) and wiring harnesses (8) and (9)	Remove.	Discard locknuts (10).
4.	Support bracket (7)	Four nuts (17), washers (18), and screws (11)	Remove.	
5.		Converter (6)	Remove.	
6.		Two locknuts (19), U-bolt (15), and two nuts (16)	Remove.	Discard locknuts (19).
7.	Van body (12)	Four nuts (13), screws (14), and support bracket (7)	Remove.	
b. Installation				
8.		Support bracket (7)	Install on van body (12) with four nuts (13) and screws (14).	
9.		U-bolt (15)	Install on support bracket (7) with two nuts (16) and new locknuts (19).	

18.1-52. 400 Hz CONVERTER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
10.		Converter (6)	Install on support bracket (7) with four screws (11), washers (18), and nuts (17).	
11.		Two wiring harnesses (9) and (8)	Install on converter (6) with two new locknuts (10).	
12.		Seven wires (5)	Install on converter (6) with seven nuts (4).	
13.		Cover (2)	Install on converter (6) with new gasket (3) and four screws (1).	



END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

18.1-53. 3-PHASE RECEPTACLE WIRING HARNESS MAINTENANCE

This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-1	Battery ground cables disconnected.
Para. 18.1-18	Ceiling filler and side panels removed.

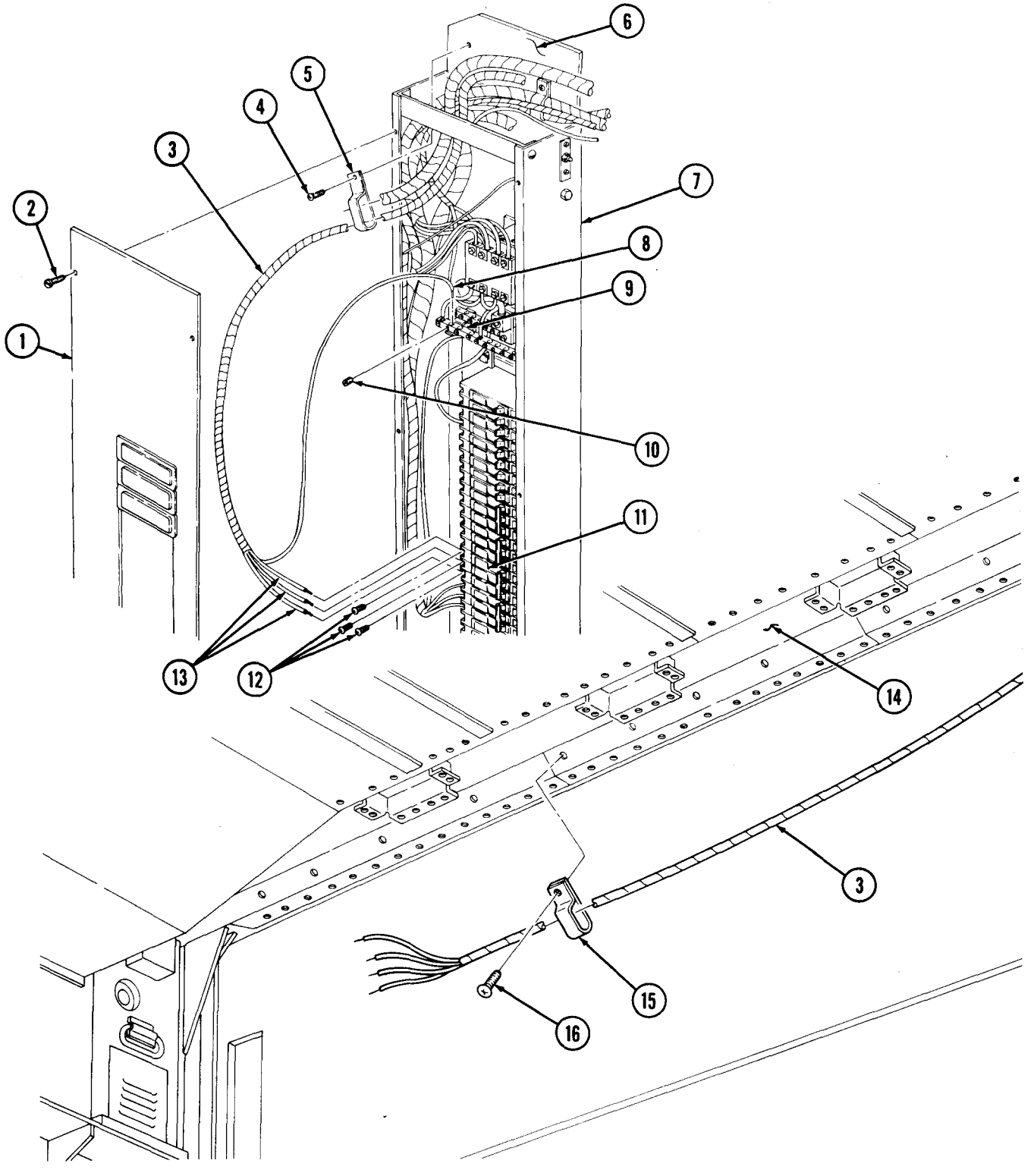
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
		NOTE Tag wires for installation.		
1.	Load center (7)	Six screws (2) and cover (1)	Remove.	
2.	Wiring harness (3) and van body (6)	Screw (4) and clamp (5)	Remove.	
3.	Neutral bus (9)	Screw (10) and wire (8)	Remove.	
4.	Circuit breakers (11)	Three screws (12) and wires (13)	Remove.	
5.	Van ceiling (14) and wiring harness (3)	Twelve screws (16) and clamps (15)	Remove.	
6.	Van body (6)	Wiring harness (3)	Remove.	

18.1-53. 3-PHASE RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



18.1-53. 3-PHASE RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

b. Repair

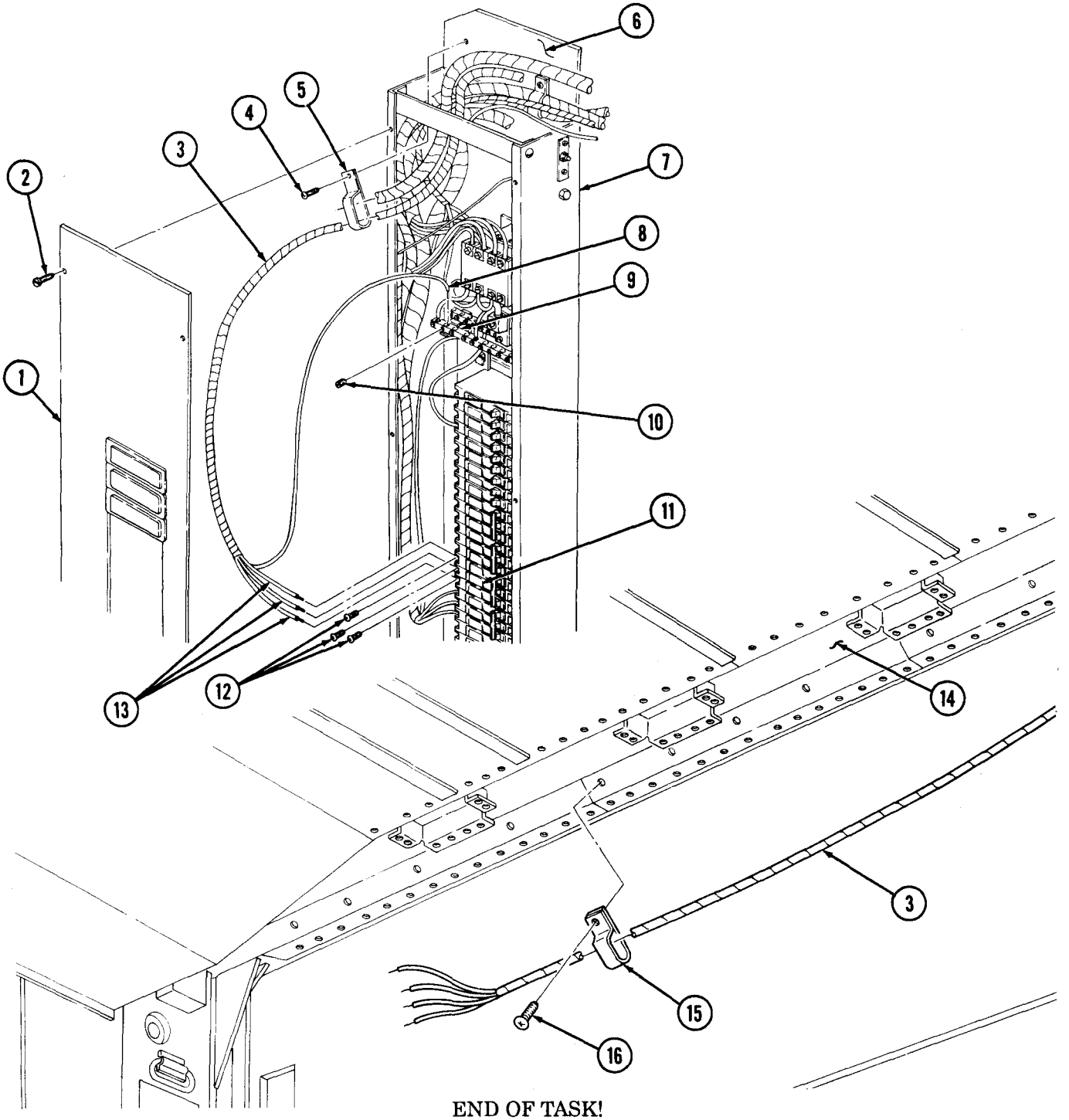
NOTE
For van wiring harness repair, refer to TM 9-2320-272-20-1.

c. Installation

7.		Wiring harness (3)	Position on van body (6).
8.		Twelve clamps (15)	Install on wiring harness (3) and van ceiling (14) with twelve screws (16).
9.		Three wires (13)	Install on circuit breakers (11) with three screws (12).
10.		Wire (8)	Install on neutral bus (9) with screw (10).
11.		Clamp (5)	Install on wiring harness (3) and van body (6) with screw (4).
12.		Cover (1)	Install on load center (7) with six screws (2).

18.1-53. 3-PHASE RECEPTACLE WIRING HARNESS MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install ceiling filler and side panels (para. 18.1-18).
• Connect battery ground cables (TM 9-2320-272-20-1).

18.1-54. ELECTRICAL LOAD CENTER CONDUIT REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M934, M934A1, M935, M935A1

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Gasket
Locknut
Sealing compound (Appendix C, Item 26)

General Safety Instructions
None

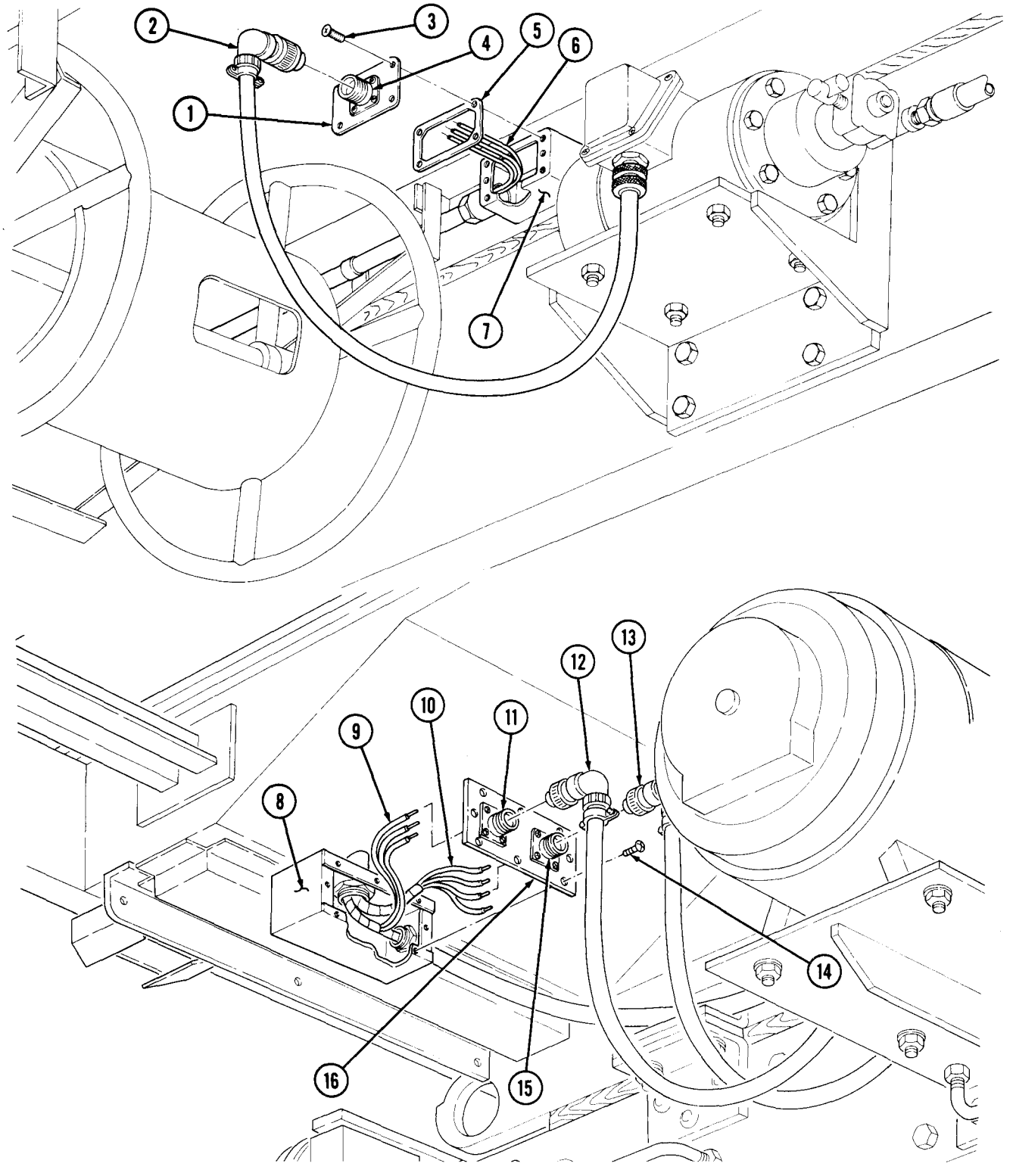
Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
TM 9-237

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Connector (4)	Auxiliary pump cable (2)	Disconnect.	
2.	Outlet box (7)	Four screws (3), cover (1), and gasket (5)	Remove.	Discard gasket (5).
3.	Connector (4)	Auxiliary pump wiring harness (6)	Disconnect.	Refer to TM 9-237.
4.	Connectors (11) and (15)	Cables (12) and (13)	Remove.	
5.	Junction box (8)	Eight screws (14) and cover (16)	Remove.	
6.	Connectors (11) and (15)	Wires (9) and (10)	Disconnect.	Refer to TM 9-237.

18.1-54. ELECTRICAL LOAD CENTER CONDUIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

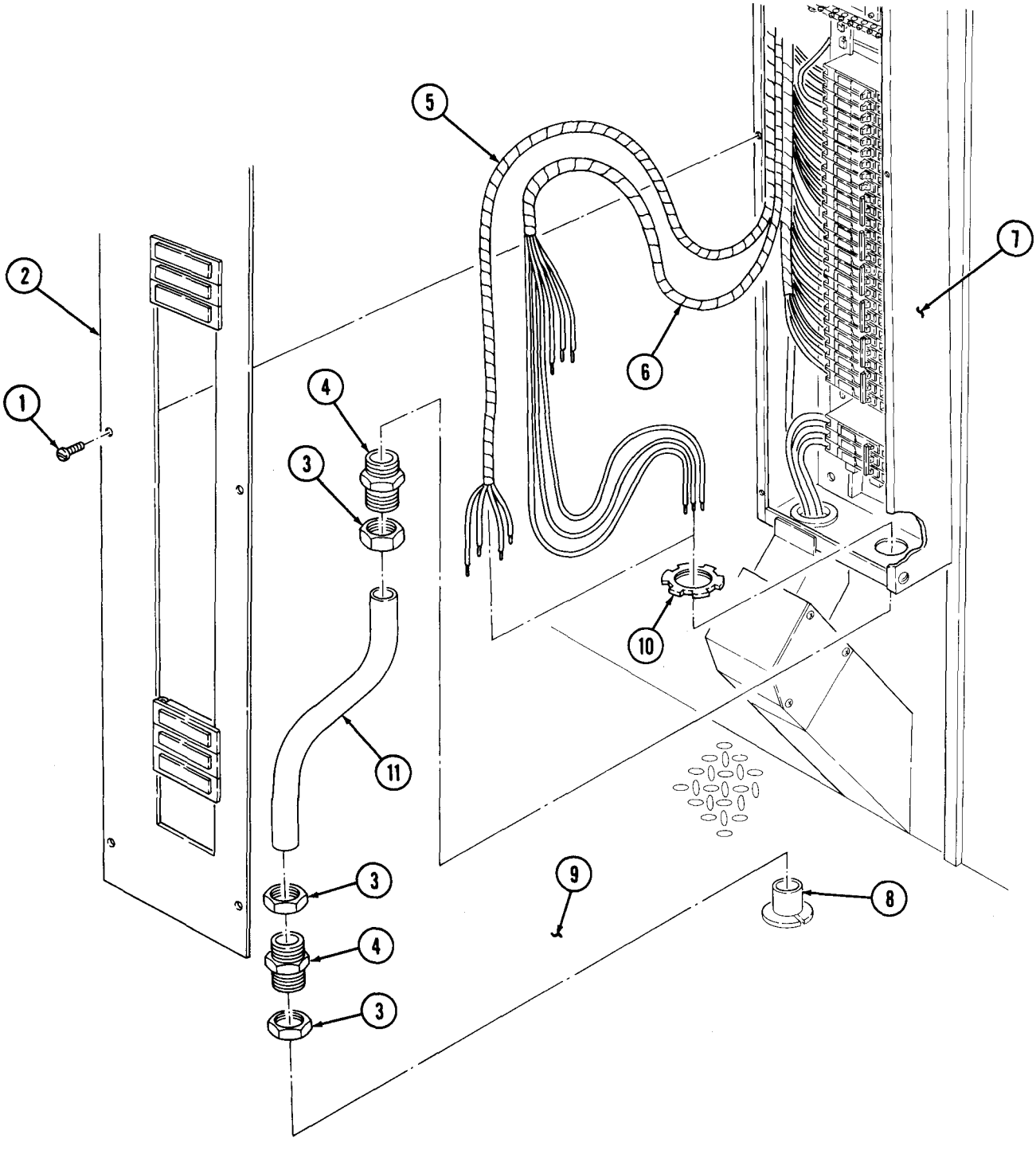


18.1-54. ELECTRICAL LOAD CENTER CONDUIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Load center (7)	Six screws (1) and cover (2)	Remove.	
8.		Wiring harnesses (5) and (6)	Pull out of conduit (11).	
9.	Load center (7) and conduit (11)	Locknut (10), nipple (4), and nut (3)	Remove.	Discard locknut (10).
		NOTE Assistant will help with step 10.		
10.	Conduit (8)	Two nuts (3) and nipple (4)	Remove.	
11.	Van body (9)	Conduit (11)	Remove.	
	b. Installation			
12.		Conduit (11)	Position on van body (9).	
13.		Nipple (4)	Install on conduit (8) with two nuts (3).	
14.		Nipple (4)	Install on load center (7) and conduit (11) with nut (3) and new locknut (10).	
15.		Wiring harnesses (5) and (6)	Push through load center (7) and conduit (11).	
16.		Cover (2)	Install on load center (7) with six screws (1).	

18.1-54. ELECTRICAL LOAD CENTER CONDUIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

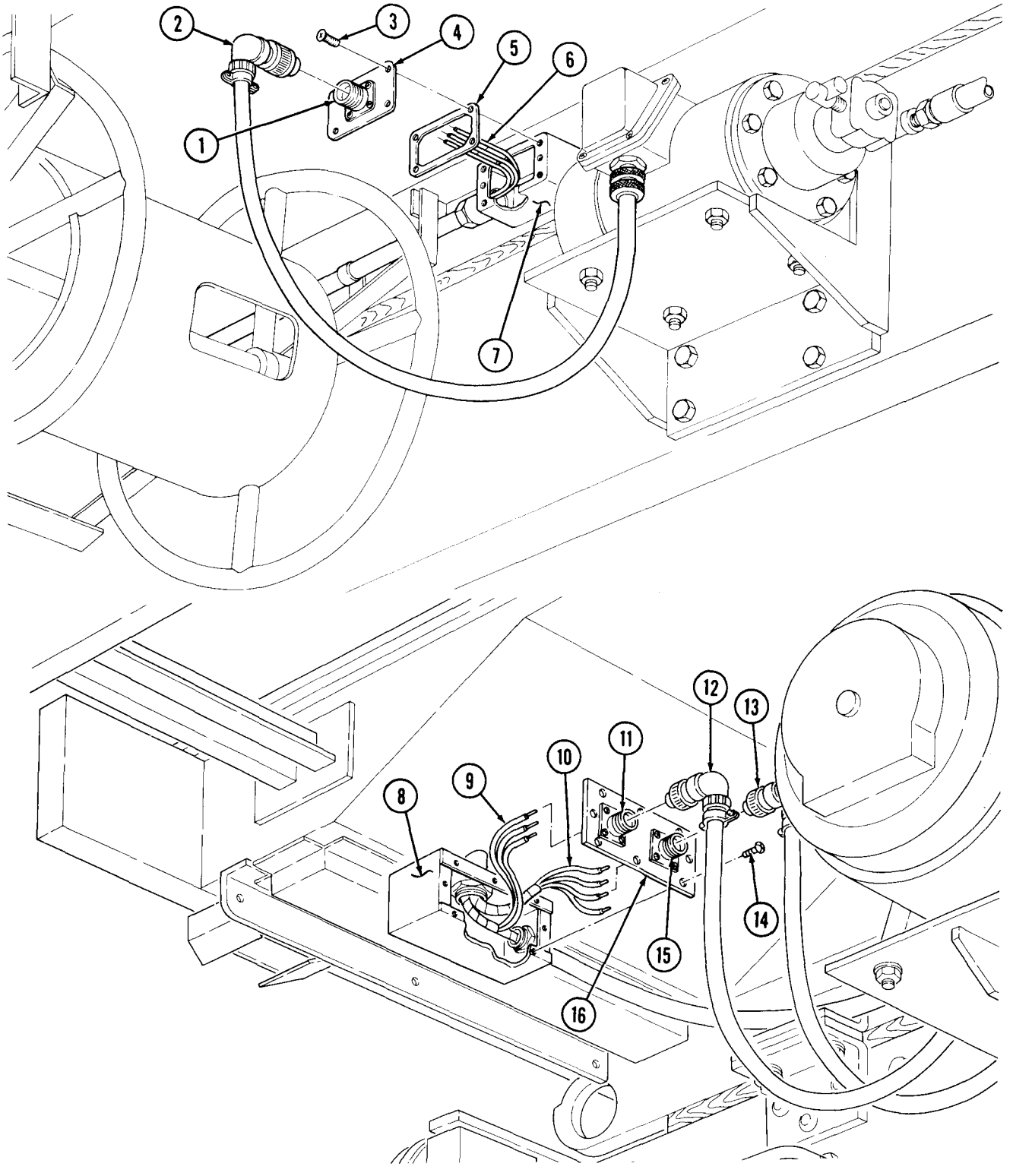


18.1-54. ELECTRICAL LOAD CENTER CONDUIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.		Wires (9) and (10)	Install on connectors (11) and (15).	Refer to TM 9-237.
		NOTE Apply sealing compound before performing step 18.		
18.		Cover (16)	Install on junction box (8) with eight screws (14).	
19.		Cables (12) and (13)	Install on connectors (11) and (15).	
20.		Auxiliary pump wiring harness (6)	Connect to connector (4).	Refer to TM 9-237.
21.		Cover (1)	Install on outlet box (7) with new gasket (5) and four screws (3).	
22.		Auxiliary pump cable (2)	Connect to connector (4).	

18.1-54. ELECTRICAL LOAD CENTER CONDUIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



CHAPTER 19
WINCH MAINTENANCE

NOTE

Refer to TM 9-2320-358-24&P for unique M939A2 maintenance procedures.

Section I. DESCRIPTION AND DATA

19-1. DESCRIPTION — FRONT WINCH

a. The front winch assembly is mounted on extensions bolted to the left and right frame side rails. The front winch is a worm gear, jaw clutch, horizontal drum type with an internal automatic brake and a drum drag brake.

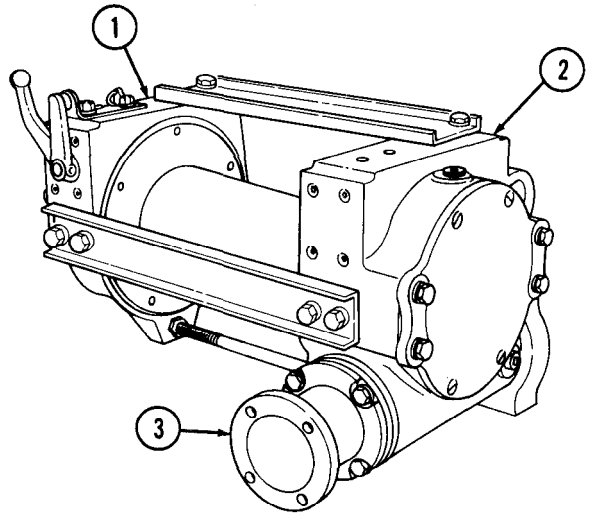
b. The automatic brake, which is attached to the front end of the drive (worm gear) shaft, sustains winch load whenever delivery of power to winch is interrupted.

c. The internally-mounted drag brake is in constant contact with the left end of winch drum. It prevents the drum from spinning when unwinding cable.

d. The M936 winch is equipped with a level winding device bolted to the top of the end frame (left end of winch) and the gear case (right end of winch). When winding cable, tension of cable on sheave causes sheave frame to travel on its wheels from side to side on the trolley track and wind the cable in tight, even coils and layers on the drum.

e. The M936 winch is also equipped with a manually-operated cable tensioner mounted on the front of the winch. The cable tensioner places tension or drag on the cable when being wound on the drum without a load.

f. Power for the front winch is supplied by the vehicle's engine through a transmission power takeoff (PTO) which drives a hydraulic pump. Hydraulic pressure drives a hydraulic motor mounted on the rear of the winch.



FRONT WINCH

1. End frame
2. Gearcase
3. Hydraulic motor adapter

TA 350865

19-2. DESCRIPTION – REAR WINCH

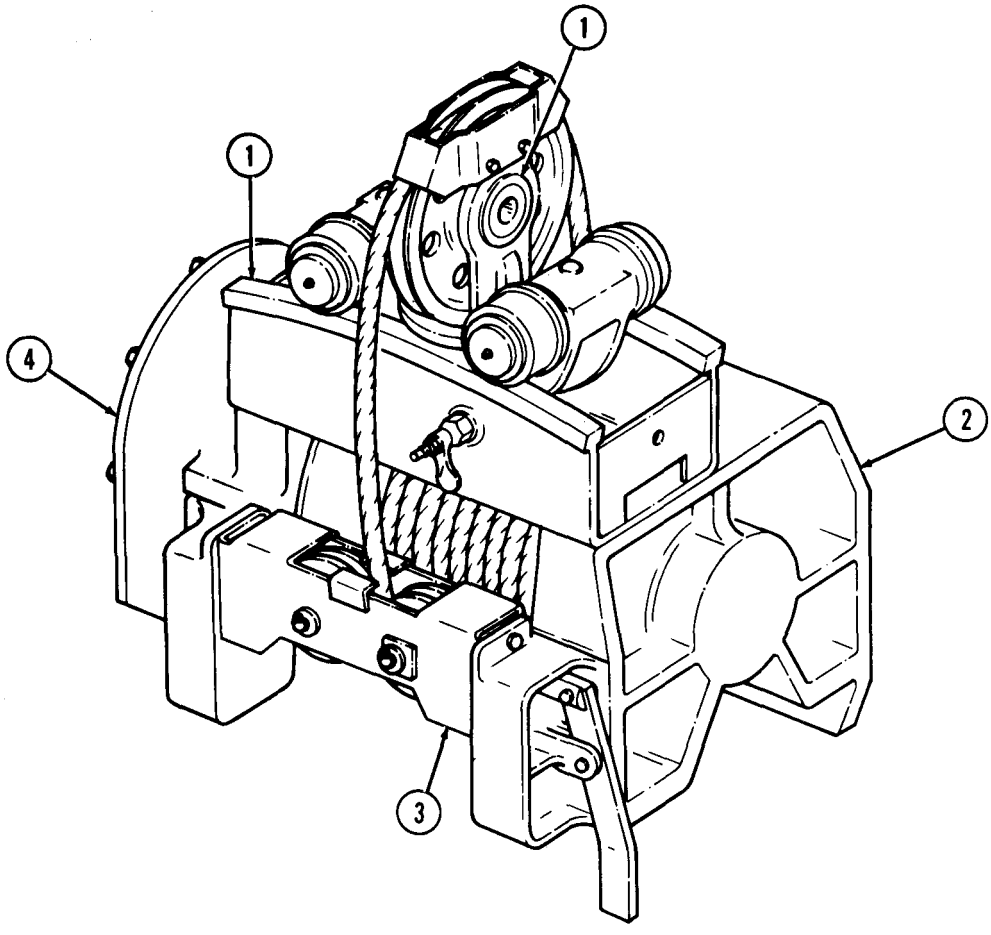
a. The rear winch assembly is mounted on the M936 wrecker body at the rear of the crane. The rear winch is a worm geared, horizontal drum type with an internal automatic brake.

b. The automatic brake, which is attached to the rear end of the drive (worm gear) shaft, sustains winch load whenever delivery of power to winch is interrupted.

c. All rear winches are equipped with a level wind that winds cable in tight, even layers.

d. The rear winch is equipped with a manually-controlled, pneumatically-operated cable tensioner. The cable tensioner places tension, or drag on the cable when being wound on the drum without a load.

e. Power for the rear winch is supplied from the crane hydraulic system. Hydraulic pressure drives a hydraulic motor mounted on the front of the winch.



REAR WINCH

1. Level wind
2. End frame
3. Cable tensioner
4. Gearcase

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Table 19-1. Winch Tabulated Data.

1. FRONT WINCH

Model (M925, M926, M928, M930, M932)	DA 615
Model (M936)	DAS 615
Capacity	20,000 lb (9091 kg)
Cable Size	5/8 in. (15.875 mm)
Drive	Hydraulic Motor
Location	Front of Vehicle

2. REAR WINCH

Model (M936)	ESA 716K
Capacity	45,000 lb (20,454 kg)
Cable Size	3/4 in. (19.05 mm)
Drive	Hydraulic Motor
Location	Rear of Vehicle

Section II. FRONT WINCH COMPONENTS MAINTENANCE

19-3. FRONT WINCH MAINTENANCE TASK SUMMARY

19-4. FRONT WINCH REPAIR

This task covers:

a. Disassembly into Subassemblies
b. Disassembly of Subassemblies
c. Cleaning, Inspection, and Repair
d. Reassembly of Subassemblies
e. Reassembly of Winch

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M925, M926, M928, M930, M932, M936	TM 9-2320-272-20-2	Winch removed from vehicle.
	TM 9-2320-272-20-2	Left and right winch mounting plates removed.
	LO 9-2320-272-12	Winch drained.
	Para. 19-7	Winch roller removed.
	Para. 19-5	Winch cable tensioner removed.
	Para. 19-6	Front winch level wind removed (if equipped).

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Cotter pin
Two keys
Two woodruff keys
Four seals
Five gaskets
Twenty-one lockwashers
GAA grease (Appendix C, Item 11)
Wiping rag (Appendix C, Item 23)
Sealing compound (Appendix C, Item 26)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

The front winch is a heavy component. Use hoist during repair to prevent injury to personnel.

Manual References

TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

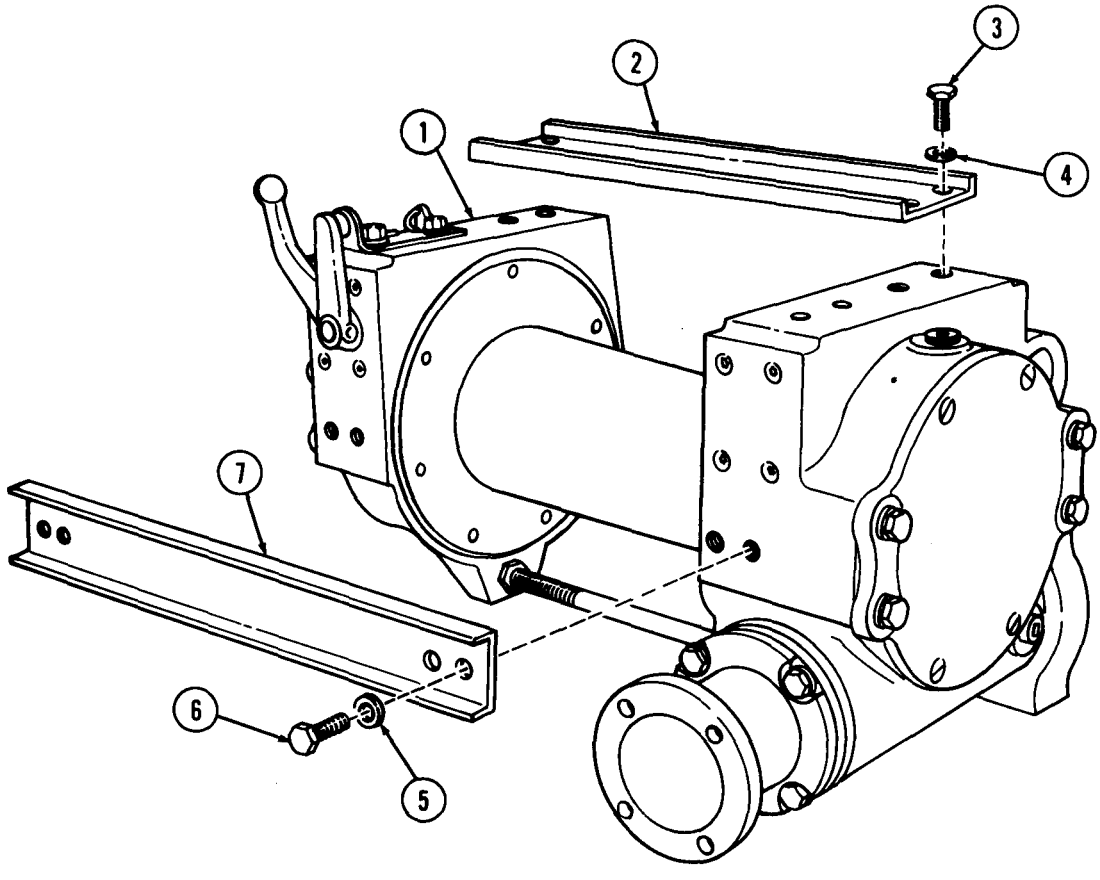
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

The M925, M926, M928, M930, and M932 vehicles' front winch weight is 353 lbs (160 kg). The M936 front winch weight is 472 lbs (214 kg). Use hoist during repair to prevent injury to personnel.

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Disassembly into Subassemblies				
1.	Winch (1)	Four screws (3) and lockwashers (4), and top channel (2)	Remove.	Discard lockwashers (4).
2.		Four screws (6) and lockwashers (5), and rear channel (7)	Remove.	Discard lockwashers (5).



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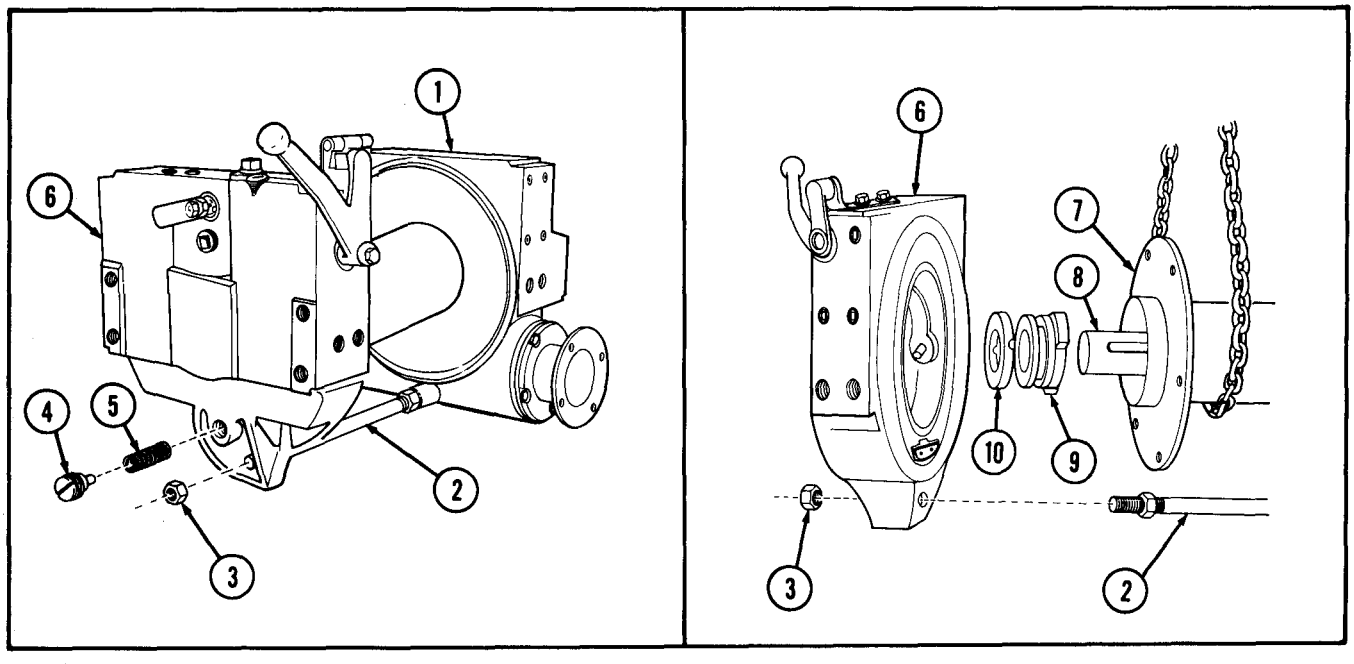
19-4. FRONT WINCH REPAIR (Cont'd)

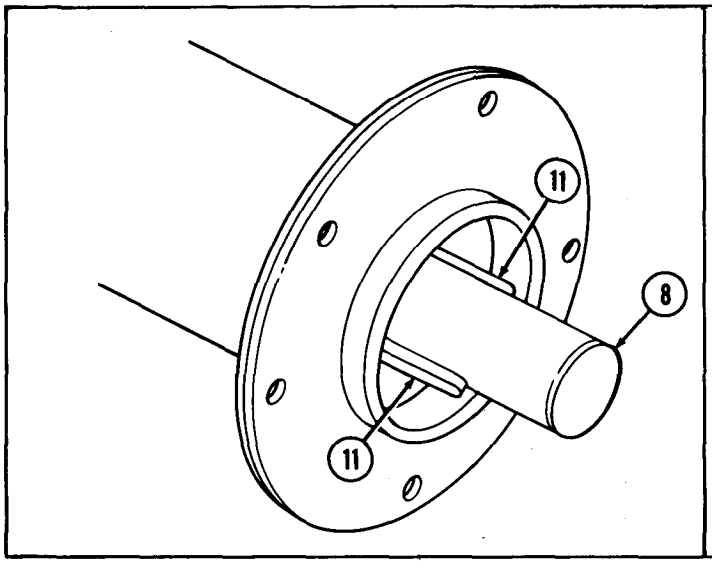
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	End frame (6)	Drag brake adjusting screw (4) and spring (5)	Remove.	
4.	Tie rod (2)	Nut (3)	Remove.	
		NOTE Support drum with overhead hoist and chain.		
5.		End frame (6)	Separate from drum (7) and shaft (8).	
6.	Drum shaft (8)	Thrust washer (10) and clutch (9)	Remove.	
7.	Gearcase (1)	Tie rod (2)	Remove.	

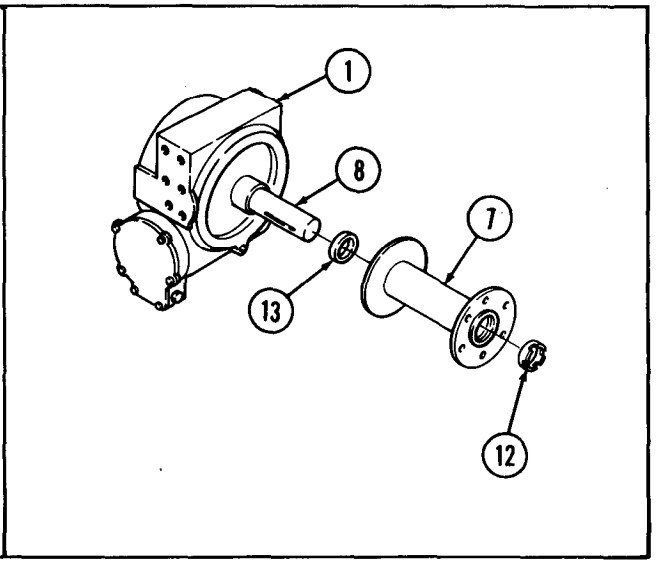


TA 350868

19-4. FRONT WINCH REPAIR (Cont'd)

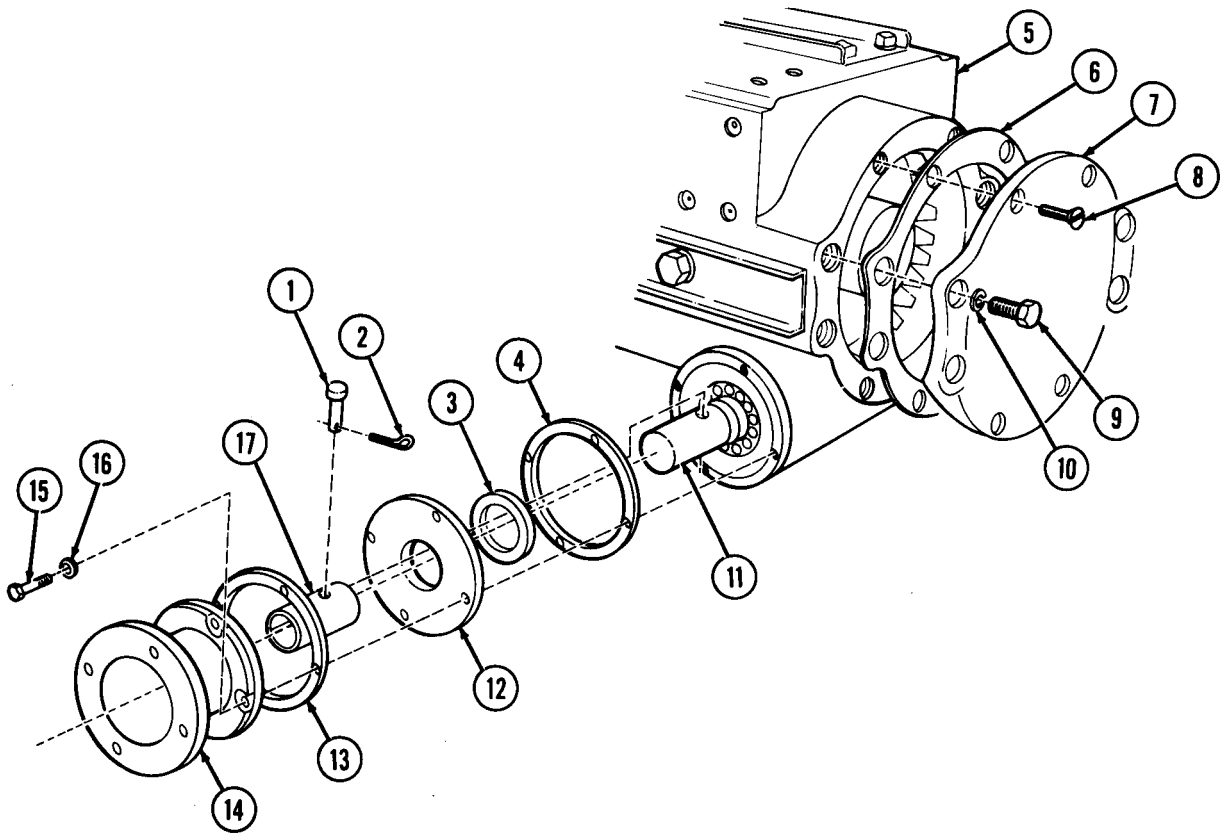
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Drum shaft (8)	Two keys (11)	Remove.	Discard keys (11).
9.		Thrust ring (12), drum (7), and seal (13)	Remove.	Discard seal (13).





19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Disassembly of Subassemblies				
10.	Gearcase (5)	Four screws (8), screws (9), and lockwashers (10), end cover (7), and gasket (6)	Remove.	Discard gasket (6) and lockwashers (10). Clean gasket remains from mating surfaces.
11.		Four bolts (15) and lockwashers (16), and adapter (14)	Remove.	Discard lockwashers (16).
12.	Winch motor adapter (14)	Adapter gasket (13)	Remove.	Discard gasket (13). Clean gasket remains from mating surfaces.
13.	Worm gear shaft (11)	Cotter pin (2), pin (1) and coupling (17)	Remove.	Discard cotter pin (2).
14.		Seal retainer (12) and gasket (4)	Remove.	Discard gasket (4). Clean gasket remains from mating surfaces.
15.		Seal (3)	Remove.	Discard seal (3).



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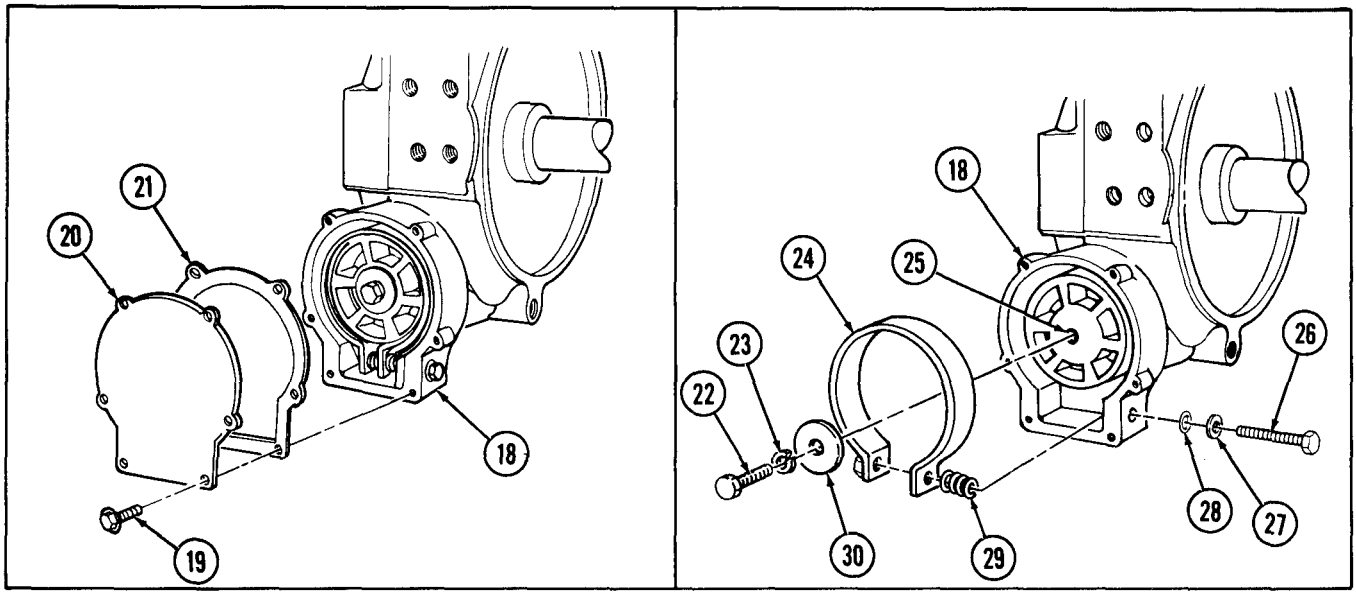
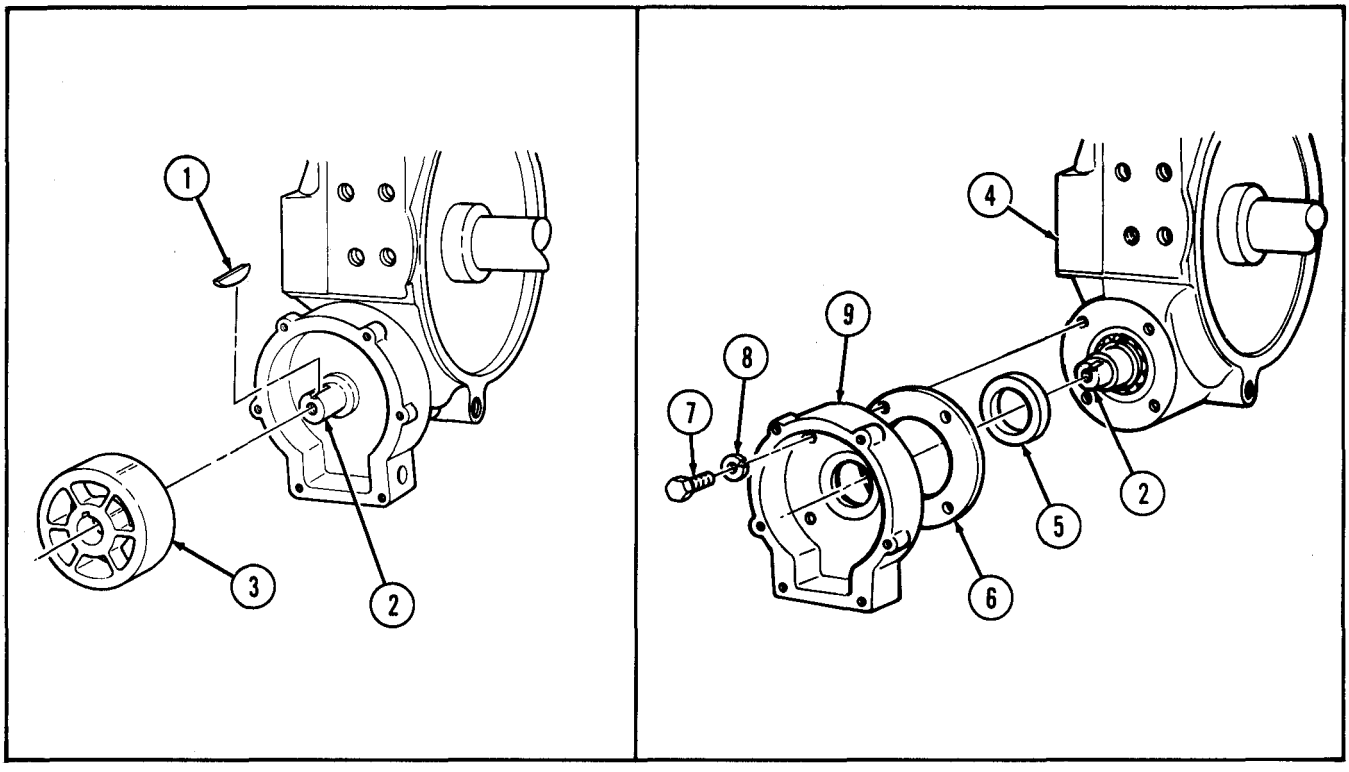
19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
16.	Automatic brake housing (18)	Six screw-assembled washers (19), automatic brake cover (20), and gasket (21)	Remove.	Discard gasket (21). Clean gasket remains from mating surfaces.
17.		Adjusting screw (26), washer (27), and "O" ring (28)	Remove.	Discard "O" ring (28).
18.		Spring (29) and brake band (24)	Remove.	
19.	Automatic brakedrum (25)	Screw (22), lockwasher (23), and washer (30)	Remove.	Discard lockwasher (23).



19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.	Worm gear shaft (2)	Brake drum (3) and woodruff key (1)	Remove.	Use puller. Discard woodruff key (1).
		NOTE Make sure gearcase and brake housing are marked for reassembly.		
21.	Gearcase (4)	Four screws (7) and lockwashers (8), and brake housing (9)	Remove.	Discard lockwashers (8).
22.		Brake housing gasket (6)	Remove.	Discard gasket (6). Clean gasket remains from mating surfaces.
23.		Brake housing seal (5)	Remove.	Discard seal (5).



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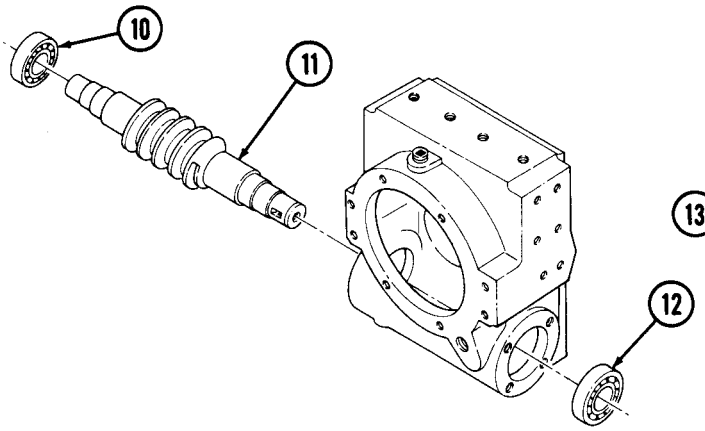
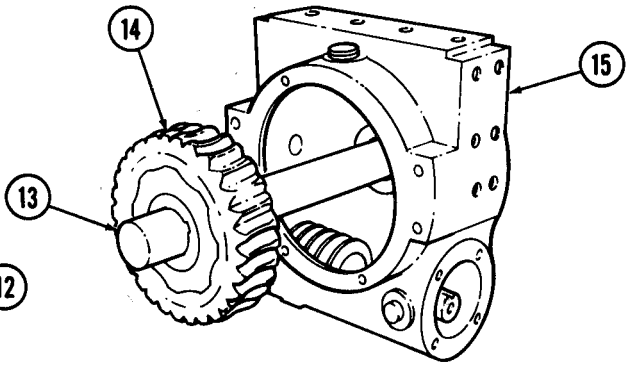
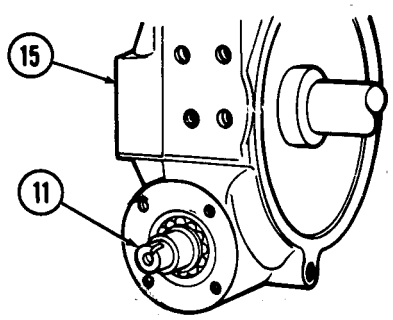
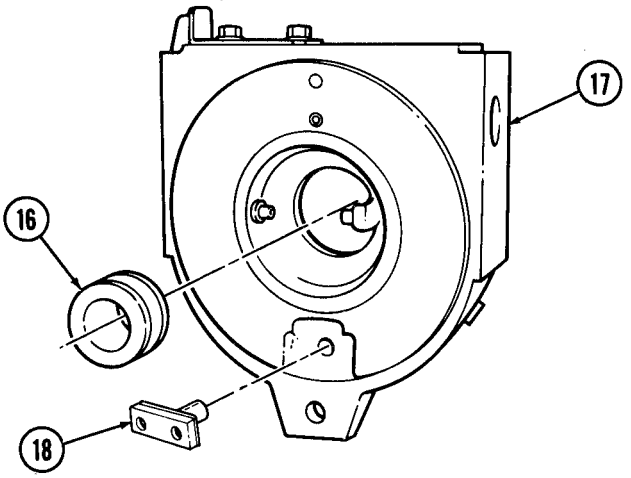
19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Make sure a rag is placed in bottom of gearcase under worm gear during removal.		
24.	Gearcase (15)	Worm gear shaft (11)	a. Tap with hammer at brake end and allow worm gear shaft (11) to drop to bottom of gearcase (15).	Use soft-faced hammer.
			b. Press bearing (10) from wormgear shaft (11).	Use arbor press.
25.		Drum shaft (13) and worm gear (14)	Remove.	
25.1.		Worm gear shaft (11)	Remove.	
25.2.	Worm gear shaft (11)	Front bearing (12)	Remove.	
26.	End frame (17)	Drag brake (18)	Remove.	
27.		Bearing sleeve (16)	Remove.	



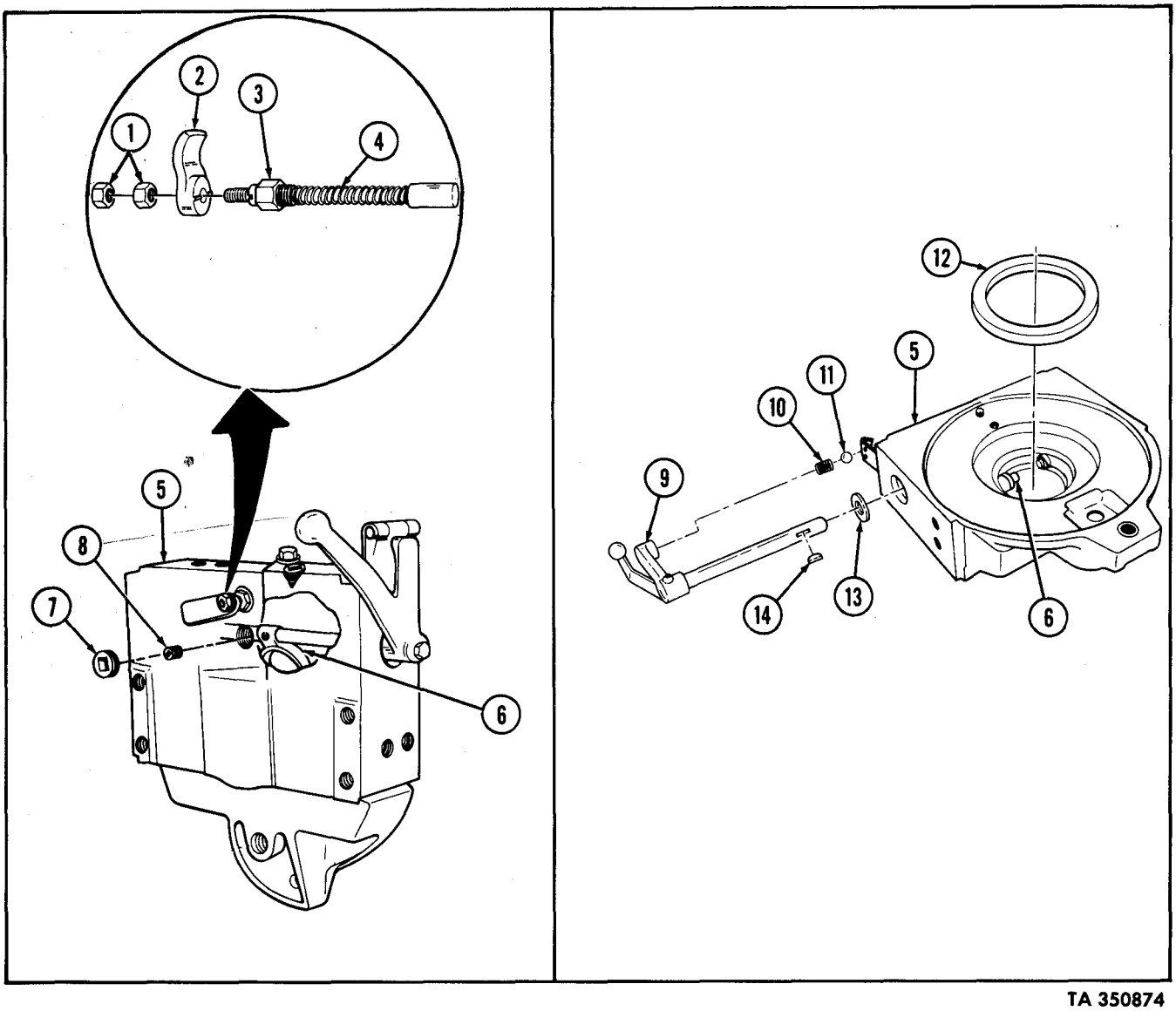






19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
29.	End frame (5)	Pipe plug (7)	Remove.	
30.	Shifter fork (6)	Setscrew (8)	Remove.	
31.	End frame (5)	Two nuts (1), poppet latch (2), nut (3), and poppet assembly (4)	Remove.	
32.	Shifter shaft (9)	Woodruff key (14)	Remove.	Discard woodruff key (14).
33.	End frame (5)	Shifter shaft (9)	Remove.	Ball (11) and spring (10) will fall out during removal.
34.		Oil seals (13) and (12)	Remove.	Discard oil seals (13) and (12).



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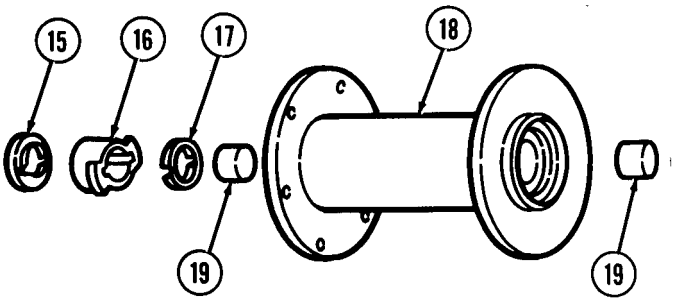
19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Cleaning, Inspection, and Repair			
35.		Thrust ring (15)	Wipe clean, and inspect for cracks and wear.	Measure thickness with micrometer. Discard if cracked, or if measurement is less than 0.049 in. (12.5 mm).
36.		Clutch (16)	Wipe clean, and inspect for cracks or chips where clutch (16) engages drum (18).	Replace if cracked or chipped.
37.		Thrust ring (17)	Wipe clean, and inspect for cracks and wear.	Measure thickness with micrometer. Discard if cracked, or if measurement is less than 0.486 in. (12.3 mm).
38.		Drum (18)	Inspect for breaks, cracks, and elongated bolt holes.	Replace if broken, cracked, or if holes are elongated. Drum (18) holes elongated less than 0.063 in. (1.59 mm) deep are accept able.
39.		Two bushings (19)	a. Wipe clean and measure for wear.	Measure with micrometer, and replace if inner diameter exceeds 2.136 in. (54.25 mm).

NOTE

Steps 39b and 40 are performed only if bushings are to be replaced.

b. Remove from drum (18).



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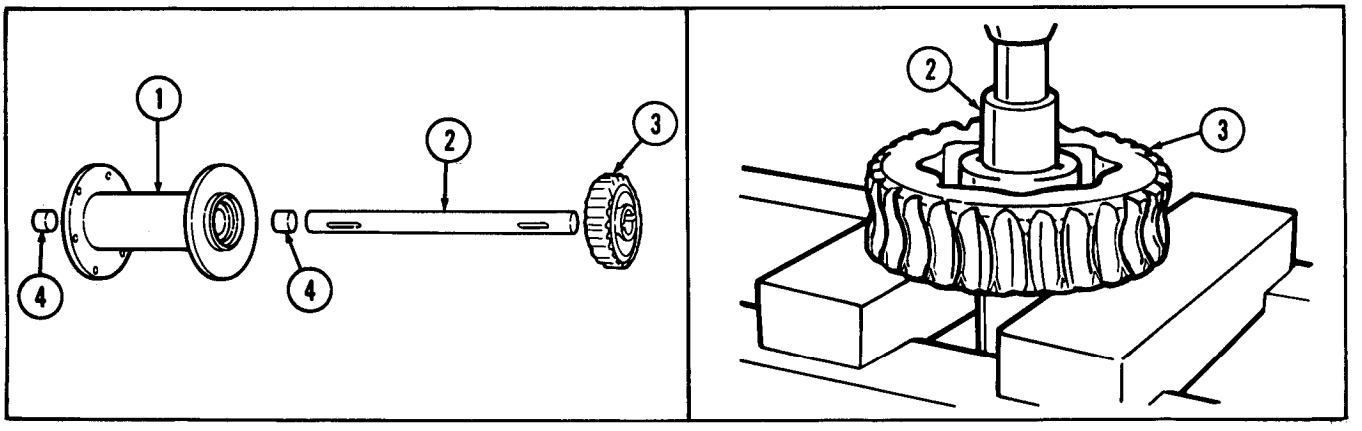
19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
40.		Two new bushings (4)	Install in drum (1).	
41.		Drum shaft (2)	Wipe clean, and measure all five bearing surfaces.	Measure with micrometer and replace if outer diameter is less than 2.123 in. (53.92 mm) at any bearing surface.
42.		Drum shaft gear (3)	a. Wipe clean, and inspect for broken, chipped, or scored teeth.	Replace if teeth are broken, chipped, or scored.
			NOTE Steps 42b and 43 are performed only when shaft gear or drum shaft are to be replaced.	
			b. Place in arbor press with mandrel, and press shaft (2) out of gear (3).	
			NOTE Remove drum shaft gear keys only if they are damaged. Discard keys and install new keys.	
43.		New drum shaft gear (3) and drum shaft (2)	Place in arbor press and press shaft (2) into gear (3).	Shaft (2) is pressed through gear until keys are centered in gear (3).



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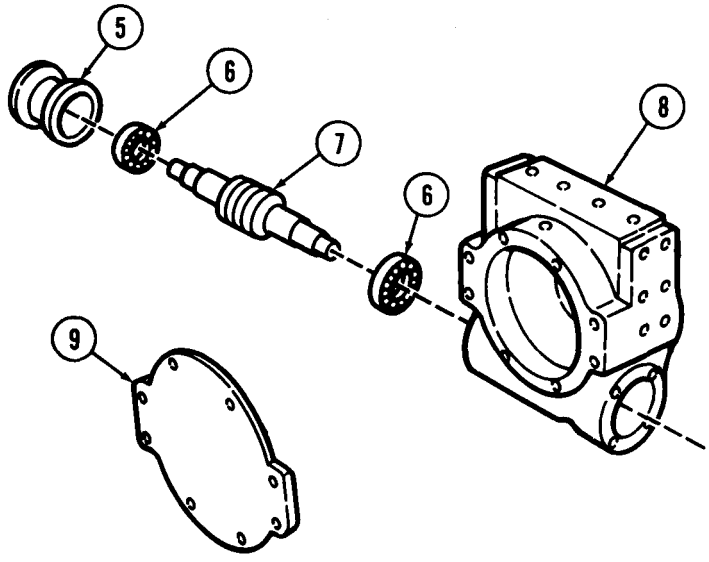
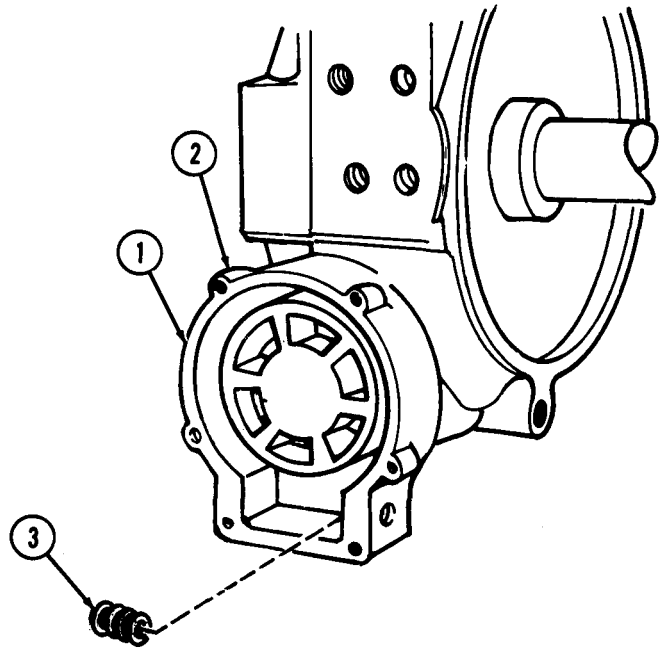
19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
44.		Winch motor adapter (5)	Wipe clean, and inspect for breaks and cracks.	Replace if broken or cracked.
45.		Worm gear shaft (7) and worm gear bearings (6)	Wipe clean, and inspect for rough or chipped ball bearings and races.	Replace if ball bearings or races are rough or chipped.
46.		Gearcase (8)	Inspect for breaks and cracks.	Replace if broken or cracked.
47.		Gearcase cover (9)	Inspect for breaks and cracks.	Replace if broken or cracked.



19-4. FRONT WINCH REPAIR (Cont'd)

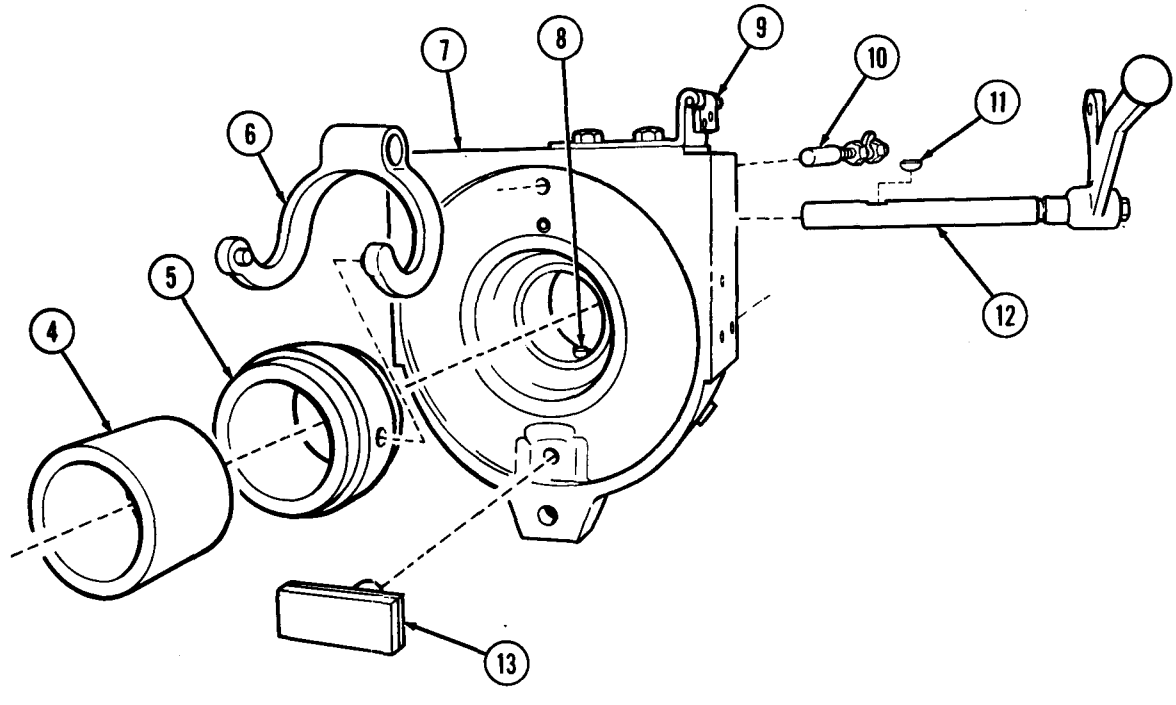
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
48.		Automatic brake housing (2)	Inspect for cracks.	Replace if cracked.
49.		Brakedrum (1)	Inspect for cracks and grooves.	Replace if cracked or grooved.
50.		Spring (3)	a. Inspect for cracked and collapsed coils.	Discard if coils are cracked or collapsed.
			b. Measure free length.	Discard if free length is less than 1.5 in. (38 mm).
			c. Test spring (3) with spring tester and torque wrench.	Discard if test reading is not 52 lb-ft (71 N·m) when compressed to 1 in. (25.4 mm).



TA 350878

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
51.		End frame sleeve pin (8)	Inspect for wear, and make sure pin (8) extends far enough to hold end frame sleeve (5) away from end frame (7).	Replace pin (8) if it does not extend far enough to hold end frame sleeve (5) away from end frame (7).
52.		End frame (7)	Inspect for breaks and cracks.	Replace if broken or cracked.
53.		Poppet spring assembly (10)	Inspect for cracks and bends.	Replace if cracked or bent.
54.		Hinge (9)	Inspect for breaks.	Replace if broken.
55.		Clutch shifter shaft (12) and woodruff key (11)	Wipe clean, and inspect for bends and scoring on seal surface.	Replace if bent or scored.
56.		Clutch fork (6)	Inspect for bends and cracks.	Replace if bent or cracked.
57.		End frame sleeve (5)	Wipe clean, and inspect for cracks.	Replace if cracked.
58.		Bushing (4)	Wipe clean, and measure for wear.	Measure with micrometer, and replace if inner diameter exceeds 2.136 in. (54 mm).
59.		Drag brake (13)	Inspect for breaks and cracks.	Replace if broken or cracked.



TA 350879

19-4. FRONT WINCH REPAIR (Cont'd)

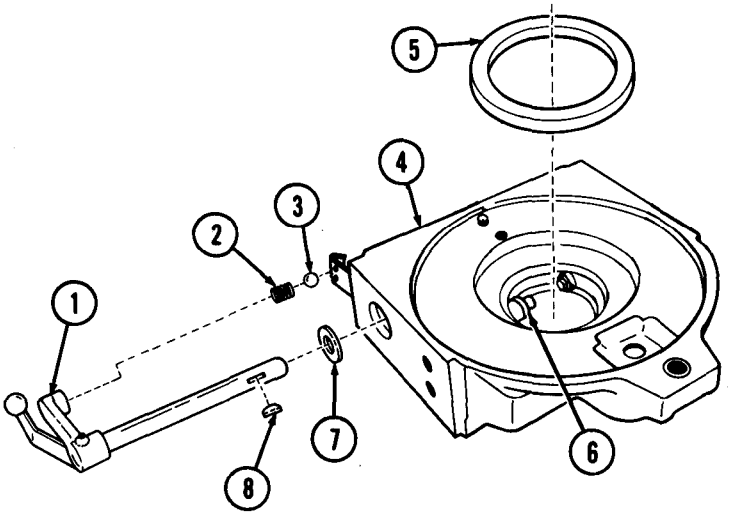
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

d. Reassembly of Subassemblies

NOTE

Coat outside diameter of seals with sealing compound before reassembly.

60.		New oil seals (5) and (7)	Install in end frame (4).
61.		Clutch shifter shaft (1)	a. Insert through seal (7) and then install new woodruff key (8). b. Position through shifter fork (6) and into end frame (4).
62.		Shifter lever ball (3) and spring (2)	Install in end frame (4).



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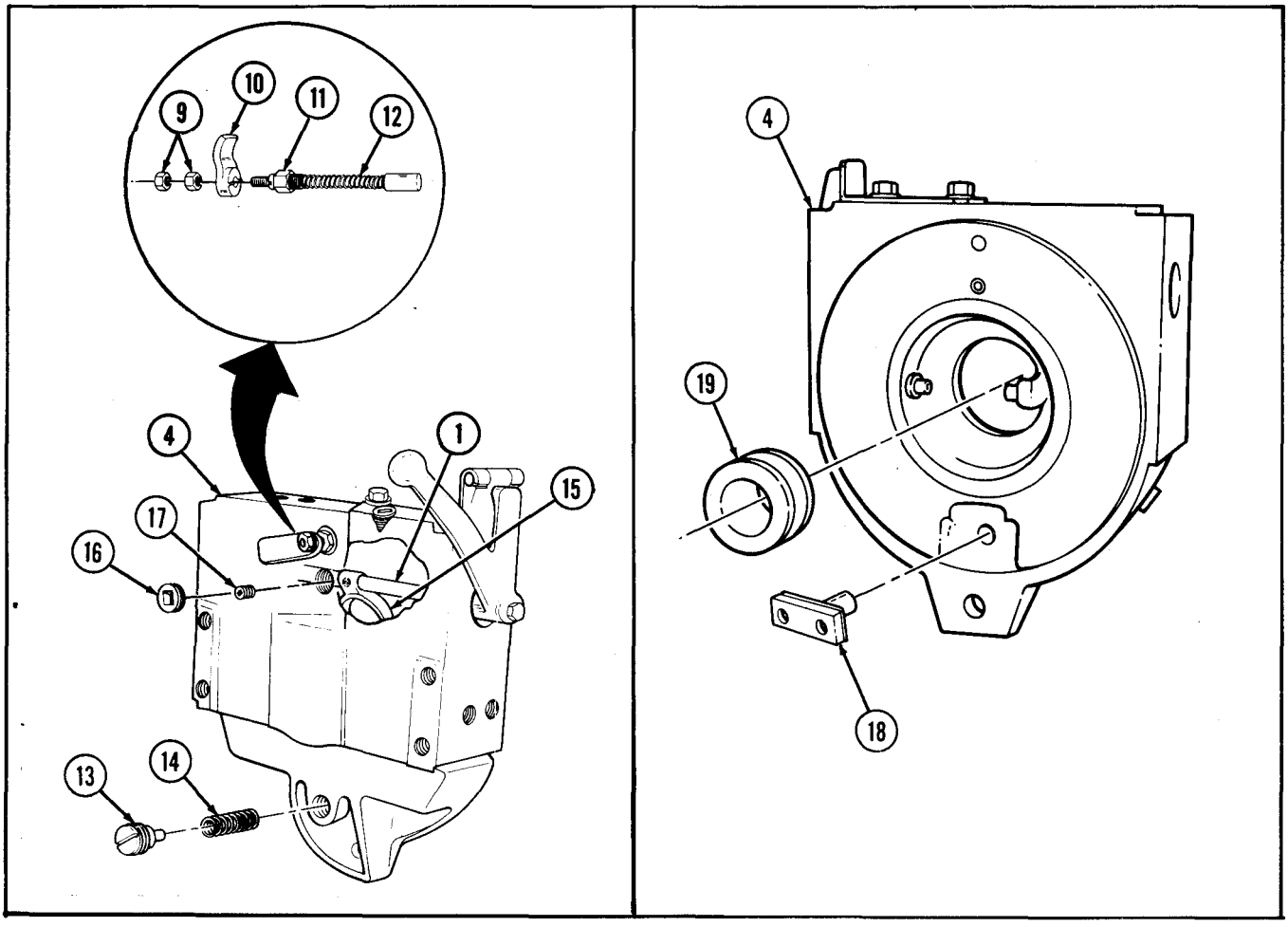
19-4. FRONT WINCH REPAIR (Cont'd)

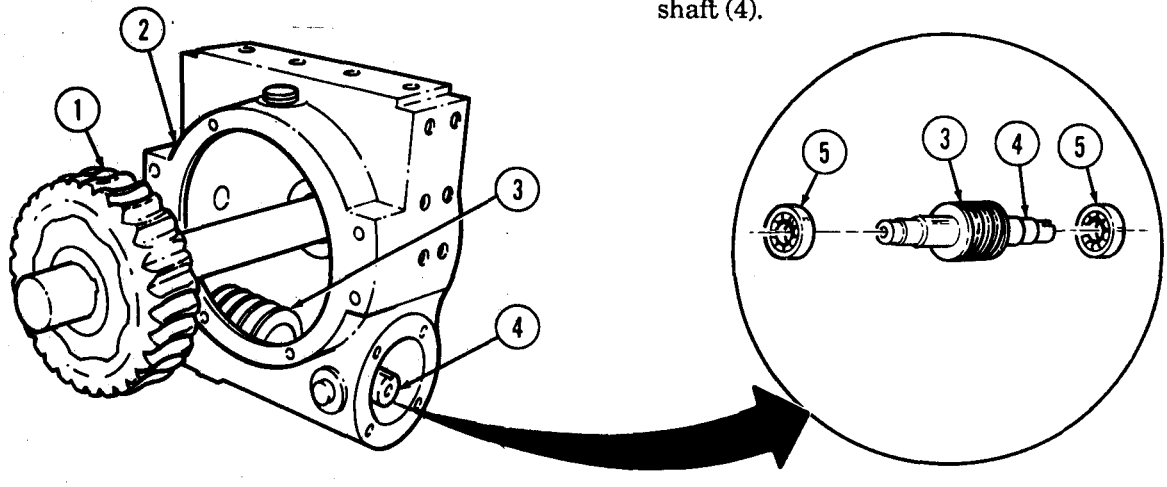
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
63.		Setscrew (17) and shifter fork (15)	Install on shifter shaft (1).	Tighten setscrew (17).
64.		Pipe plug (16)	Install on end frame (4).	
65.		Poppet assembly (12)	Install with nut (11), latch (10), and two nuts (9).	Coat threads of nut (11) with sealing compound.
66.		Bearing sleeve (19)	Install in end frame (4).	
67.		Drag brake (18) and spring (14)	a. Install with adjusting screw (13).	
			b. Tighten adjusting screw (13) all the way.	Adjustment is made after winch is installed on vehicle. Refer to TM 9-2320-272-20-2.



TA 350881

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
68.		Bearing (5)	Install on worm gear shaft (4).	Use arbor press. Either bearing could be installed first.
69.		Worm gear shaft (4) and bearing (5)	Position in bottom of gearcase (2).	Do not install.
		NOTE Keyway end of worm gear shaft must extend from the marked side of gearcase.		
70.		Drum shaft and gear (1)	Install in gearcase (2).	
71.		Worm gear shaft (4) and bearings (5)	Install in gearcase (2).	Tap shaft (4) with soft-faced hammer until bearings (5) are flush with gearcase (2) and worm gear (3) meshes.
71.1.		Bearing (5)	Install on worm gear shaft (4).	Use arbor press.

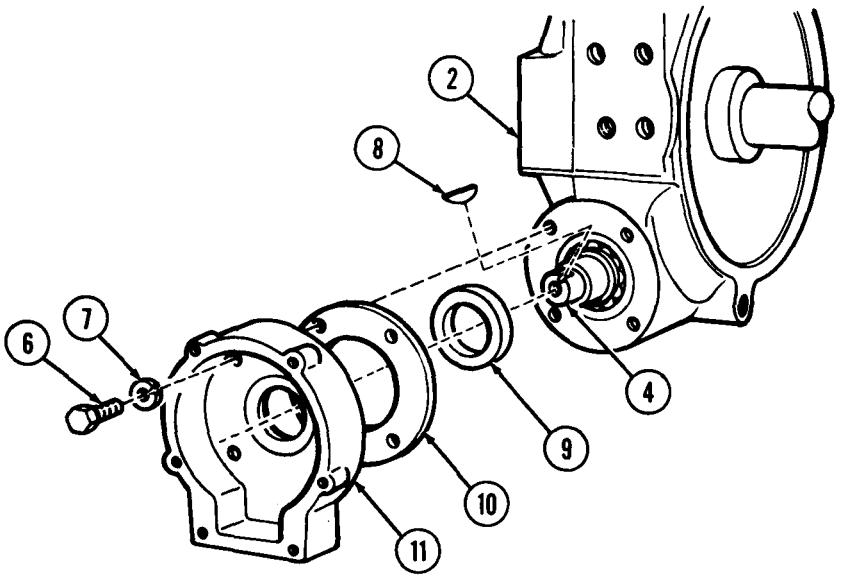


72.		New brake housing seal (9)	Coat outside diameter with sealing compound and install in gearcase (2).	
73.		New gasket (10)	Coat with light film of grease and position on gearcase (2).	Use GAA grease to aid installation.
		NOTE Match alinement marks.		
74.		Brake housing (11)	Install with four new lockwashers (7) and screws (6).	
75.		Key (8)	Position on worm gear shaft (4).	

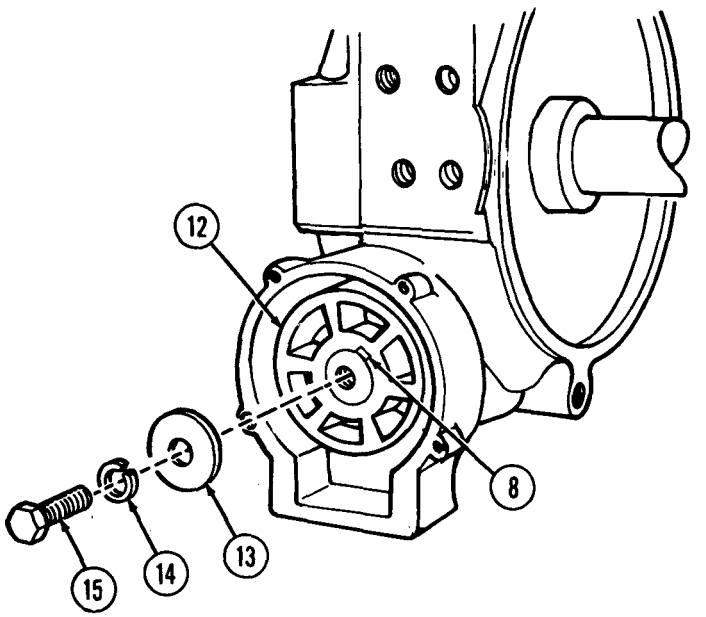
TA 350882

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



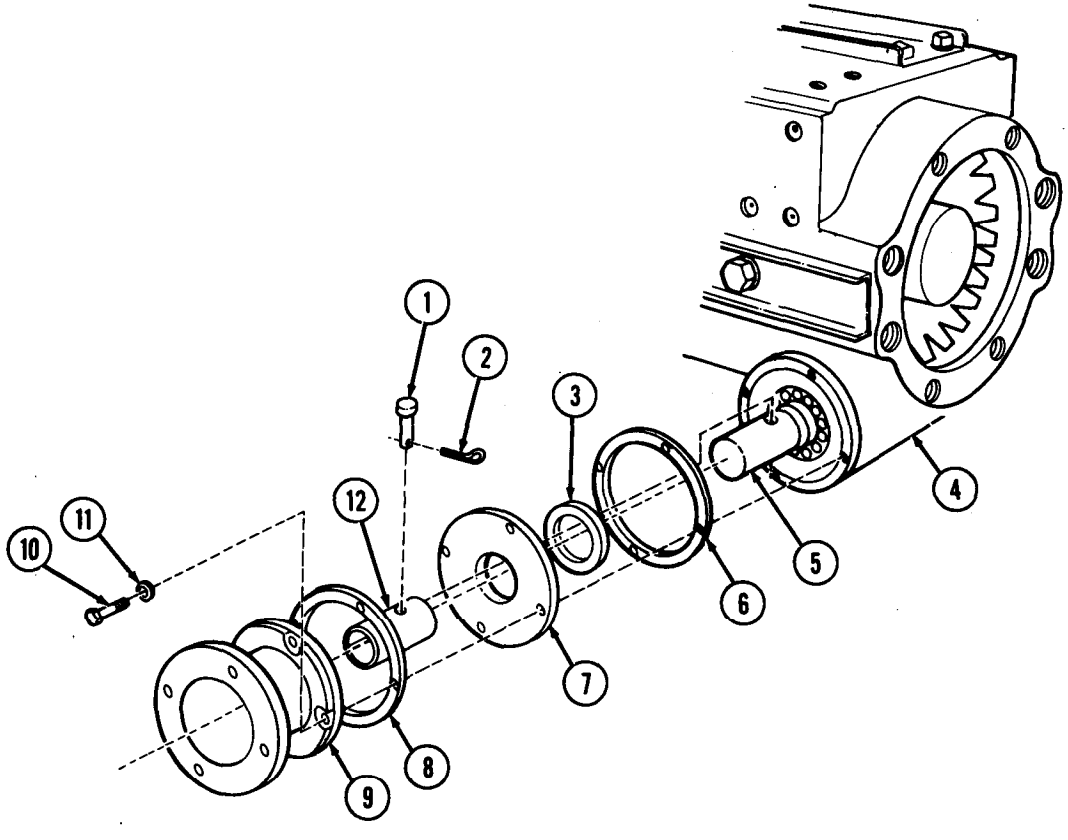
76. Brakedrum (12) — Aline with key (8) and install with washer (13), new lockwasher (14), and screw (15).



TA 350883

19-4. FRONT WINCH REPAIR (Cont'd)

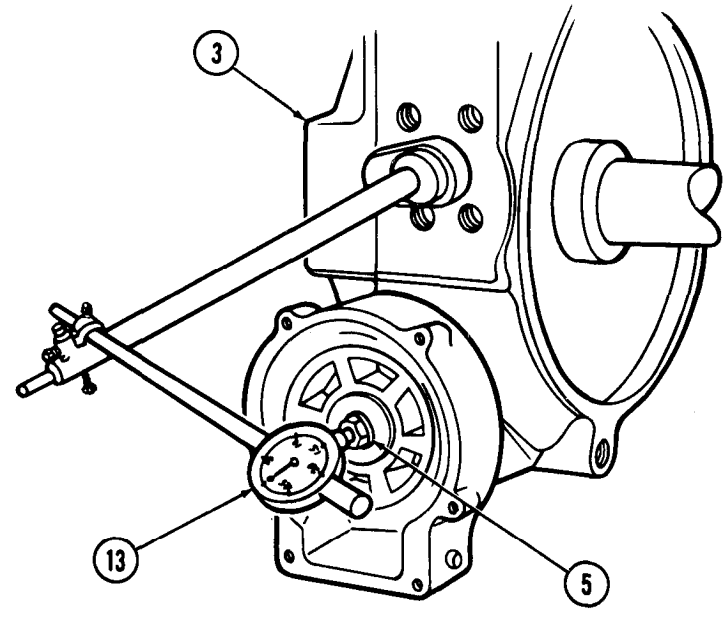
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
77.		New gasket (6)	Coat with light film of grease and position on gearcase (4).	Use GAA grease to aid installation. Number of gaskets will vary with step 83.
78.		New seal (3)	Coat outside diameter with sealing compound and install on worm gear shaft (5).	
79.		Seal retainer (7)	Position over worm gear shaft (5).	
80.		Coupling (12)	Aline holes and install with pin (1) and new cotter pin (2).	
81.		New gasket (8)	Coat with light film of grease and position on retainer (7).	Use GAA grease to aid installation.
82.		Adapter (9)	Aline all screw holes and install with four new lockwashers (11) and screws (10).	



TA 350884

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
83.		Dial indicator (13)	a. Install on gearcase (3) and measure end play of worm gear shaft (5).	Use washer or place scrap steel to bolt for extension. If end play is less than 0.005 in. (0.127 mm), add gaskets (12) until end play reads greater than 0.005 in. (0.127 mm) but less than 0.015 in. (0.37 mm).
			b. Remove dial indicator (13) when proper adjustment has been obtained.	

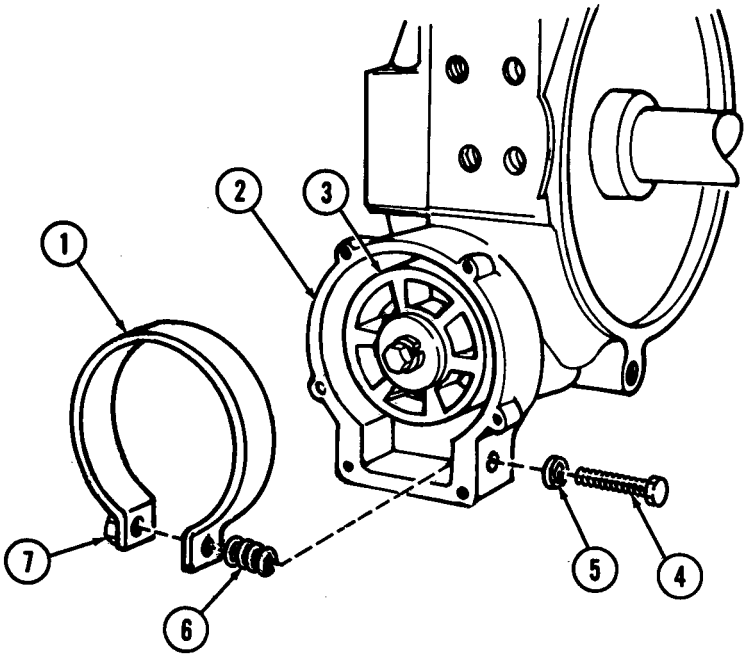


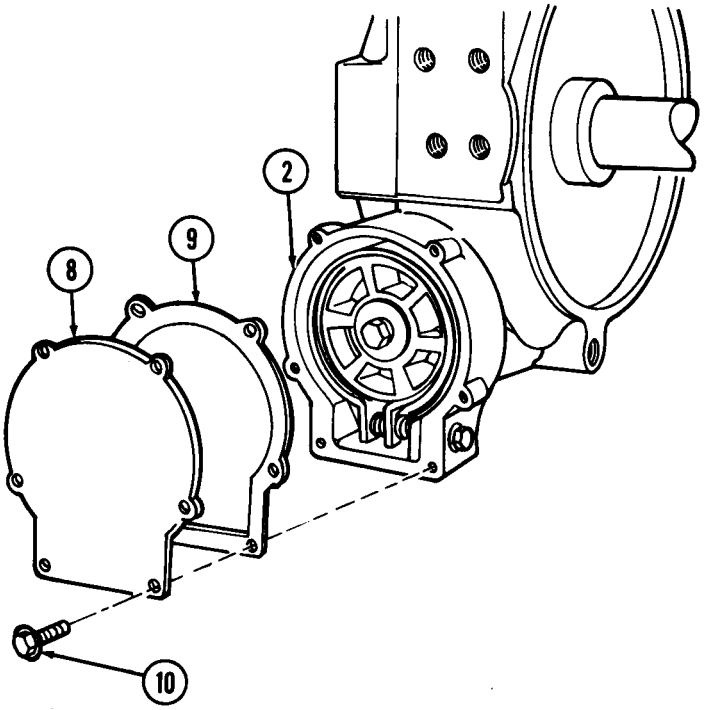
19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
84.		Brake band (1)	Install around automatic brakedrum (3).	Position cage nut (7) to the left.
85.		Spring (6)	Install between housing (2) and brake band (1).	
86.		Screw (4) and washer (5)	a. Install through housing (2), spring (6), and one end of brake band (1). b. Screw into caged nut (7) until spring (6) is compressed 1.125 to 1.187 in. (28 to 30 mm) in length.	
87.		New gasket (9)	Coat with light film of grease and position on housing (2).	Use GAA grease to aid assembly.
88.		Cover (8)	Position over gasket (9) and install with six screw-assembled washers (10).	

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

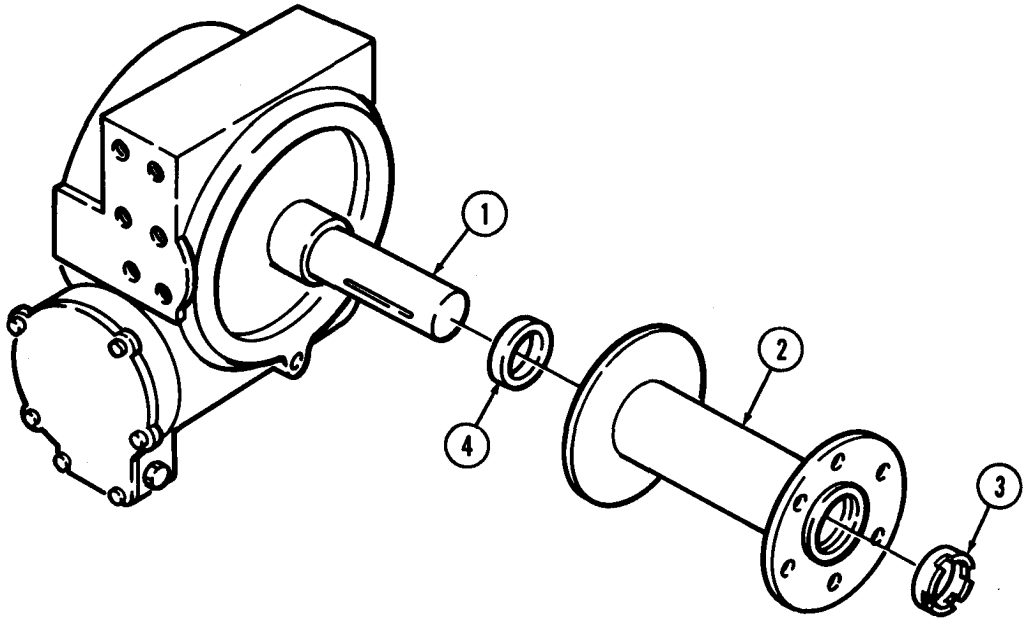




TA 350886

19-4. FRONT WINCH REPAIR (Cont'd)

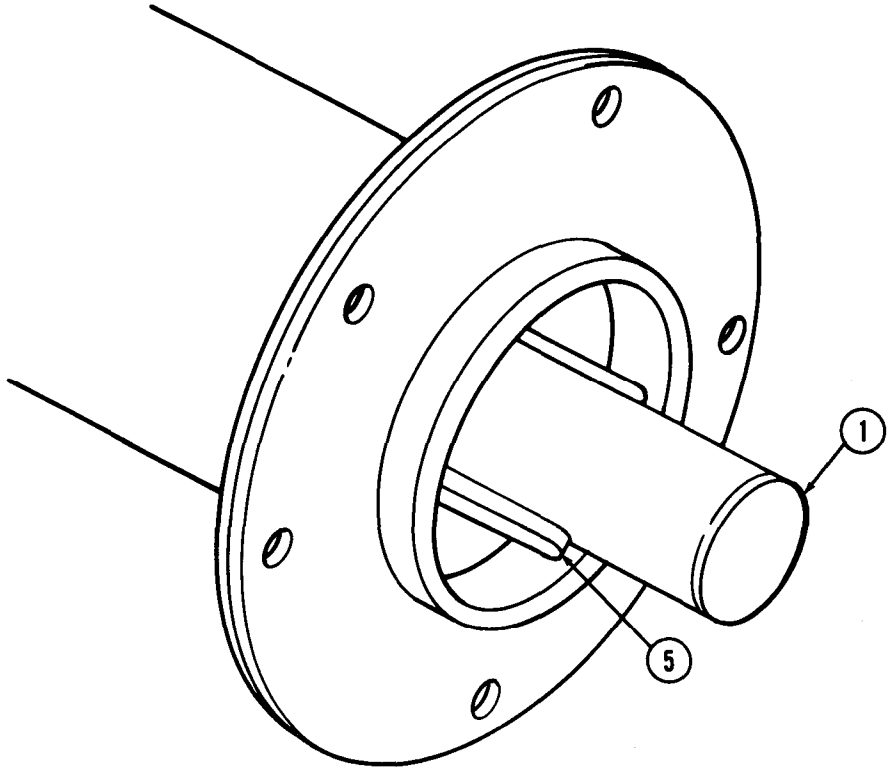
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
89.		New oil seal (4)	Coat outer diameter of seal (4) with sealing compound and install in drum (2).	
90.		Drum (2)	Install on drum shaft (1).	
		NOTE		
		Support drum with overhead hoist and chain.		
91.		Thrust washer (3)	Install on drum shaft (1).	Make sure flat side is against drum.



TA 350887

19-4. FRONT WINCH REPAIR (Cont'd)

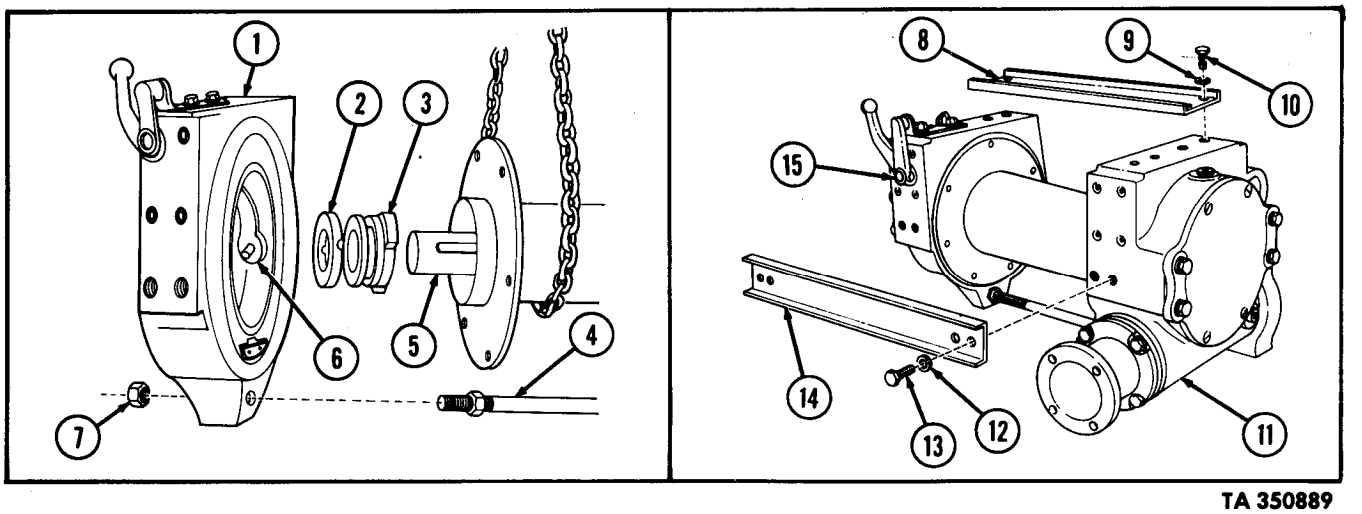
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
92.		Two new keys (5)	a. Aline with thrust washer (3).	Inside ends of keys (5) fit into thrust washer (3).
			b. Install keys (5).	Tap lightly with mallet to seat keys (5) fully.



TA 350888

19-4. FRONT WINCH REPAIR (Cont'd)

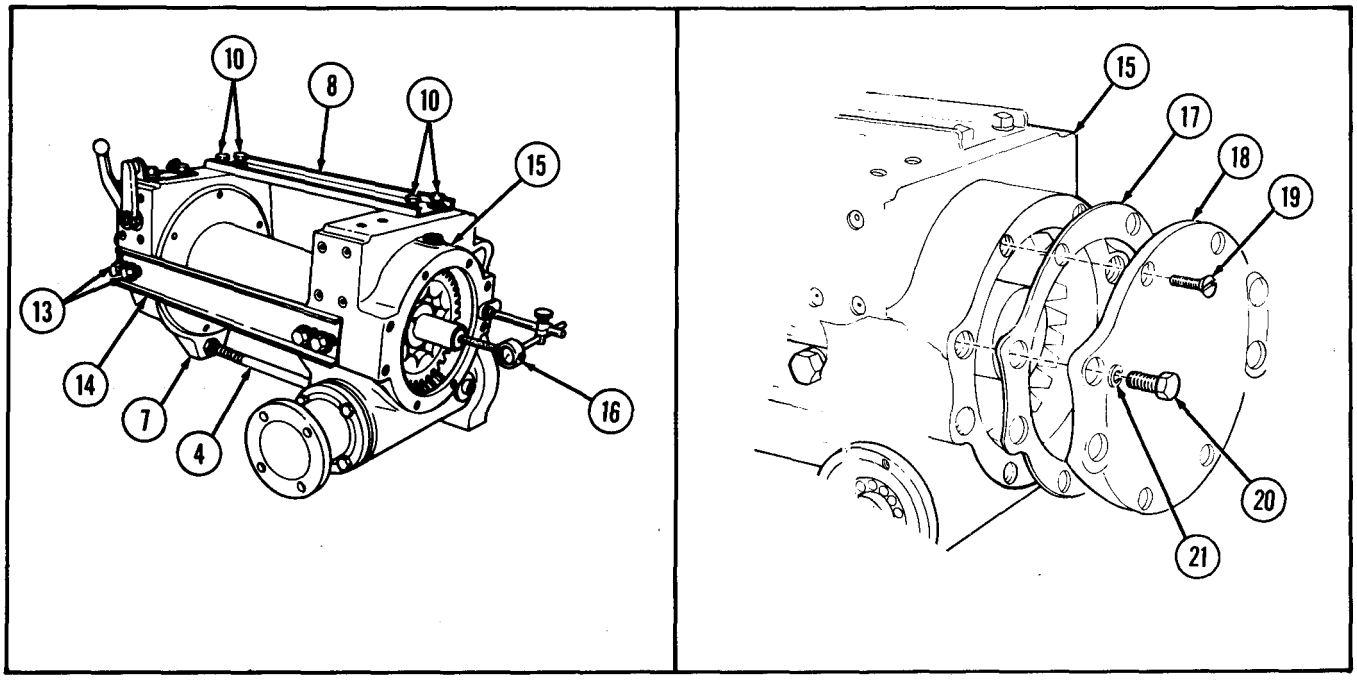
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
e. Reassembly of Winch				
93.		Clutch (3) and thrust washer (2)	Install on drum shaft (5).	Make sure clutch (3), engages the drum.
94.		Tie rod (4)	Screw into gearcase (11) as far as it will go.	
95.		End frame (1)	Install on drum shaft (5), and tie rod (4) with tie rod nut (7).	Make sure clutch shifter fork (6) engages sliding clutch (3). Do not tighten nut (7) until end play adjustment is made (steps 98 and 99).
96.		Rear channel (14)	Position on winch (15), and install with four screws (13) and new lockwashers (12).	Do not tighten.
97.		Top channel (8)	Position on winch (15) and install with four screws (10) and new lockwashers (9).	Do not tighten.
98.		Dial indicator (16)	a. Mount on gearcase (15), and measure end play of drum shaft.	
			b. Adjust end play to 0.005-0.015 in. (0.127-0.381 mm).	Adjustment is made with nuts on tie rod (4).
99.		Tie rod nuts (7) and screws (10) and (13)	Tighten tie rod nuts (7) and screws (10) and (13) after proper end play is obtained.	



TA 350889

19-4. FRONT WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
100.		New gasket (17)	Coat both sides with sealing compound and position on gearcase (15).	
101.		Cover (18)	Position on gearcase (15), and install with four screws (19), screws (20), and lockwashers (21).	



END OF TASK!

FOLLOW-ON TASKS:
- Install front winch level wind, if removed (para. 19-6).
- Install winch cable tensioner (para. 19-5).
- Install winch roller (para. 19-7).
- Install left and right winch mounting plates (TM 9-2320-272-20-2).
- Install front winch (TM 9-2320-272-20-2).
- Fill winch with lubricant (LO 9-2320-272-12).

TA 350890

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Reassembly
e. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-20-2	Winch cable removed.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Eight lockwashers
Four felt washers
GAA grease (Appendix C, Item 11)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

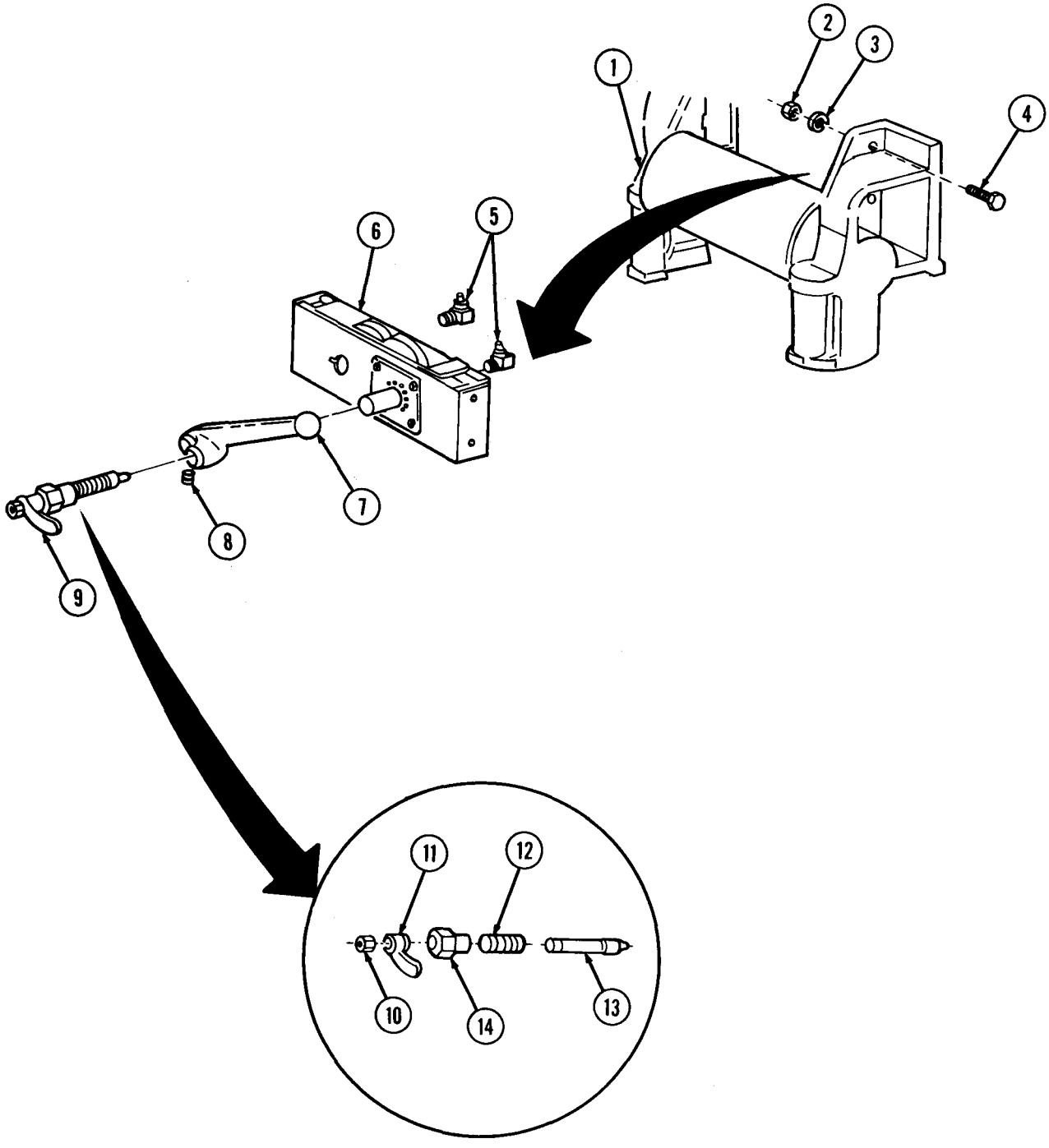
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Roller assembly (1)	Four screws (4), nuts (2), and lockwashers (3), and cable tensioner (6)	Remove.	Discard lockwashers (3).
		b. Disassembly		
2.	Cable tensioner (6)	Two grease fittings (5)	Remove.	
3.		Setscrew (8), lever (7), and poppet assembly (9)	Remove.	
4.	Poppet assembly (9)	Latch nut (10) and winch poppet nut (14)	Remove.	
5.		Latch (11), spring (12) and poppet (13)	Remove.	

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

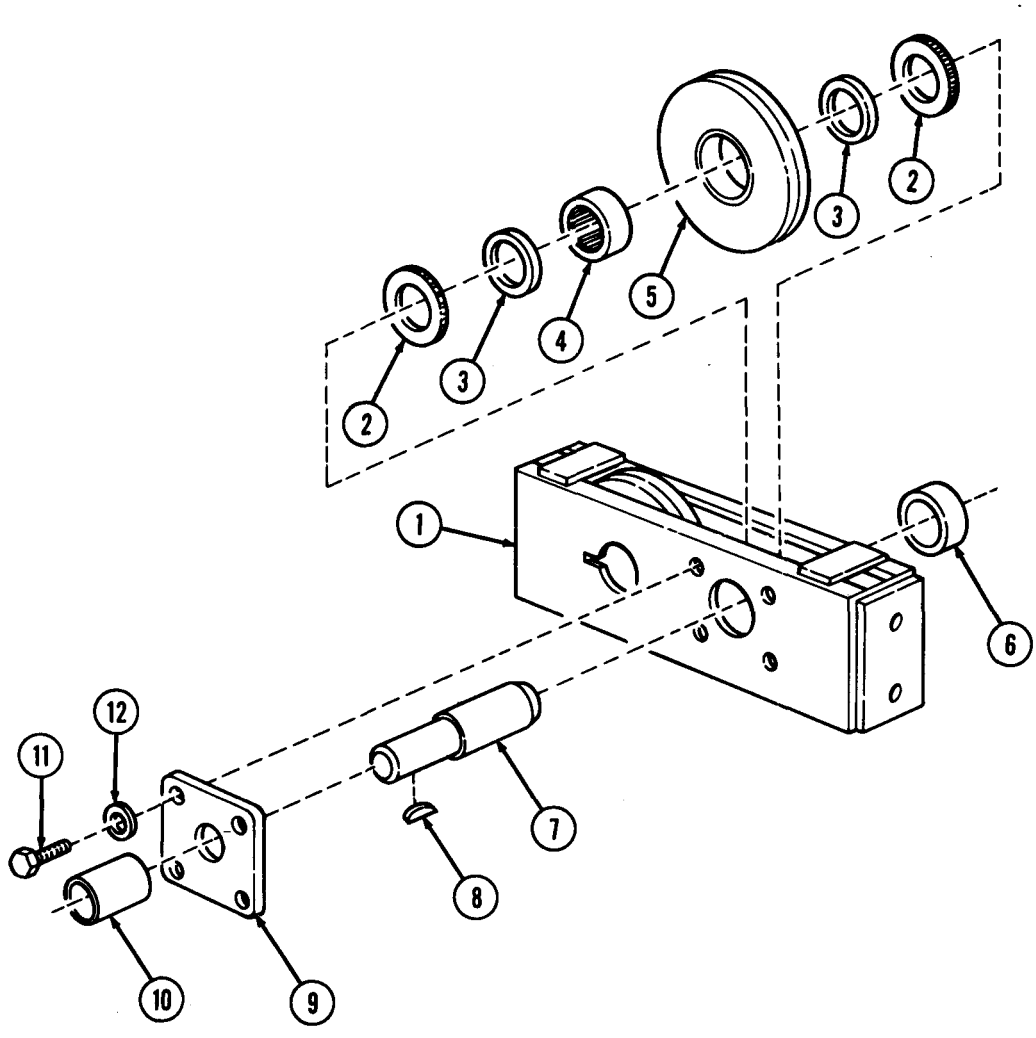
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350891

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

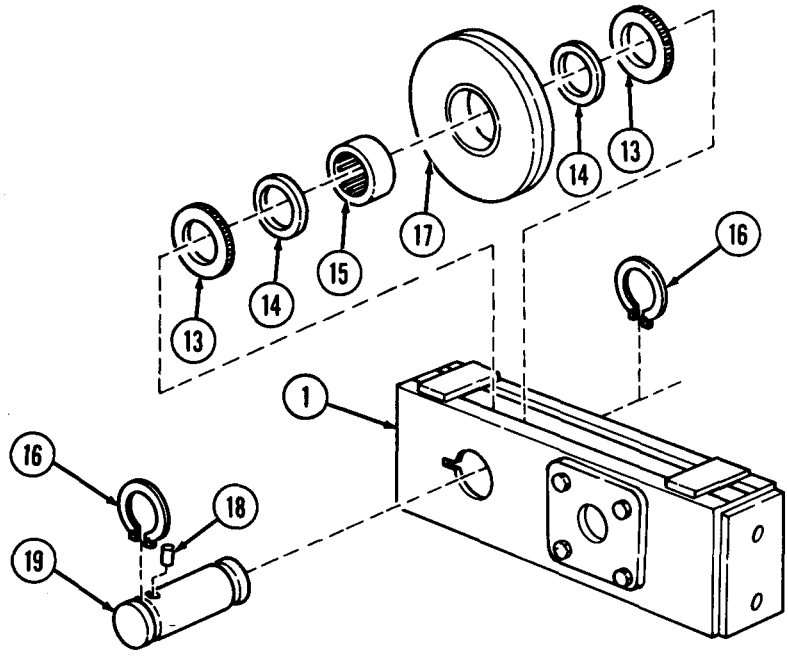
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Frame (1)	Four screws (11), and lockwashers (12) and block assembly (9)	Remove.	Discard lockwashers (12).
7.		Shaft (7)	Remove.	
8.	Shaft (7)	Bushing (6), key (8) and bushing (10)	Remove.	Tag for installation.
9.	Frame (1)	Sheave (5), two felt washers (3), and thrust washers (2)	Remove.	Discard felt washers (3).
10.	Sheave (5)	Bearing (4)	Remove.	



TA 350892

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

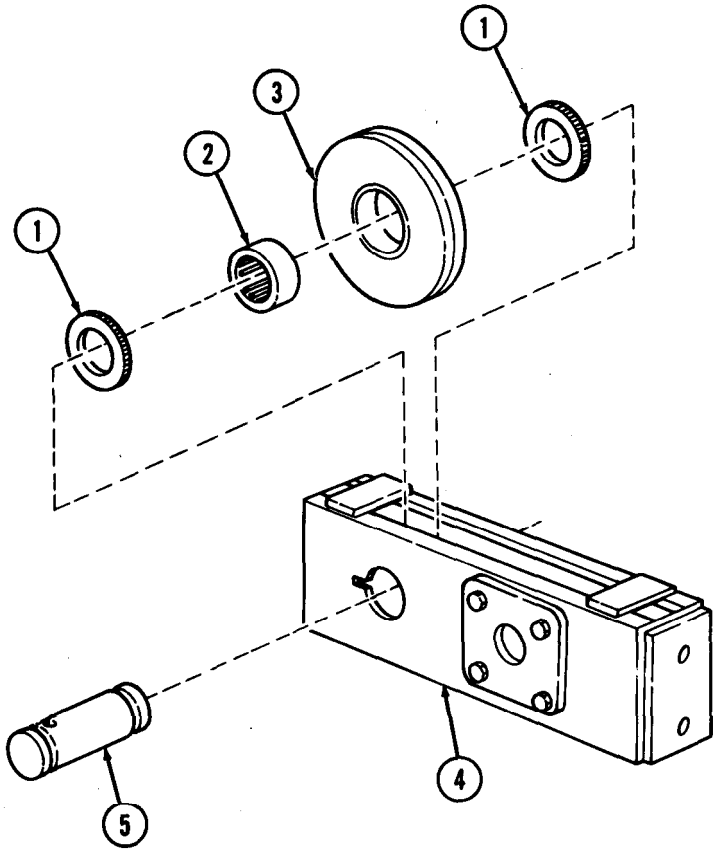
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.	Pin (19)	Two snaprings (16)	Remove.	
12.	Frame (1)	Pin (18) and pin (19)	Remove.	
13.		Sheave (17), two felt washers (14), and thrust washers (13)	Remove.	Discard felt washers (14).
14.	Sheave (17)	Bearing (15)	Remove.	



TA 350893

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

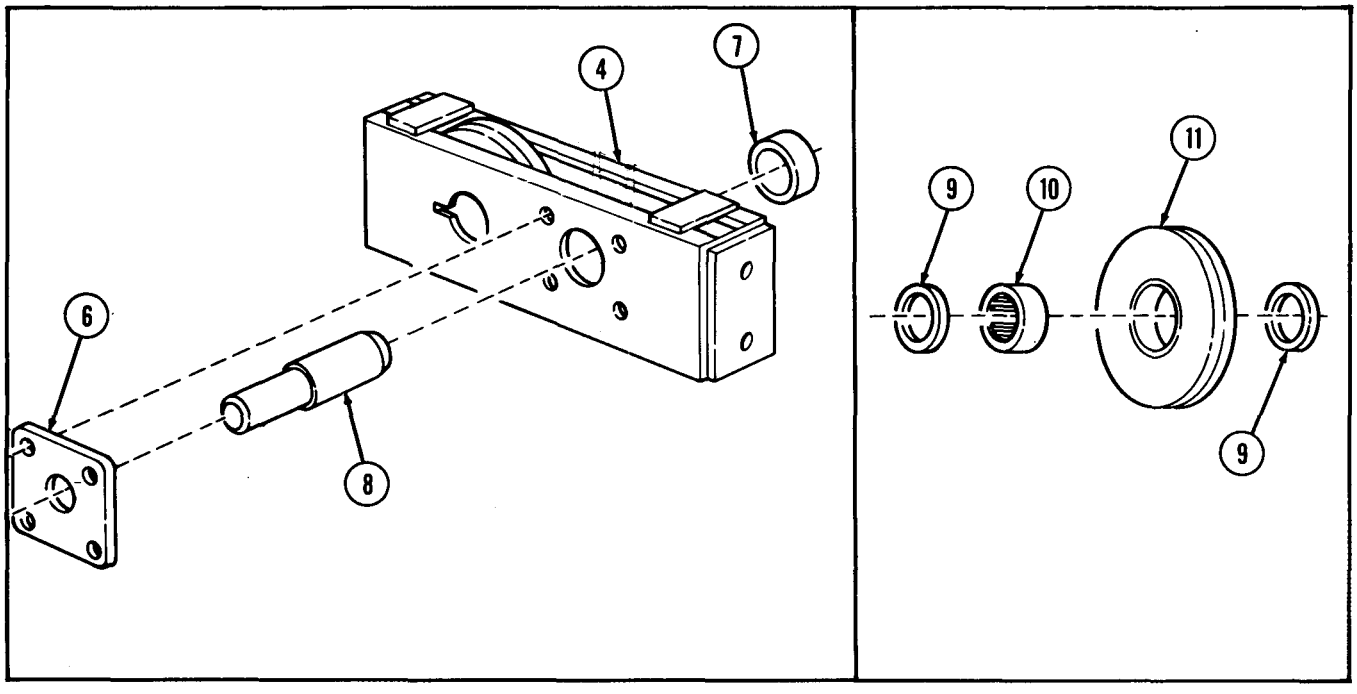
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Cleaning and Inspection				
15.		Frame (4)	Inspect for breaks and cracks.	Replace if broken or cracked.
16.		Tensioner sheave pin (5)	Wipe clean, and inspect for pits, scoring, and wear.	Replace if scored, pitted, or if outside diameter is less than 0.9995 in. (25.39 mm).
17.		Sheave (3)	Wipe clean, and inspect for breaks and cracks.	Replace if broken or cracked.
18.		Bearing (2)	Wipe clean, and inspect for cracks, chips, and broken cage.	Replace if cracked, chipped, broken, or if inner diameter exceeds 1.000 in. (25.4 mm).
19.		Two thrust washers (1)	Wipe clean, and inspect for cracks, chips, and wear.	Replace if cracked, chipped or if thickness is less than 0.0615 in. (1.56 mm).



TA 350894

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

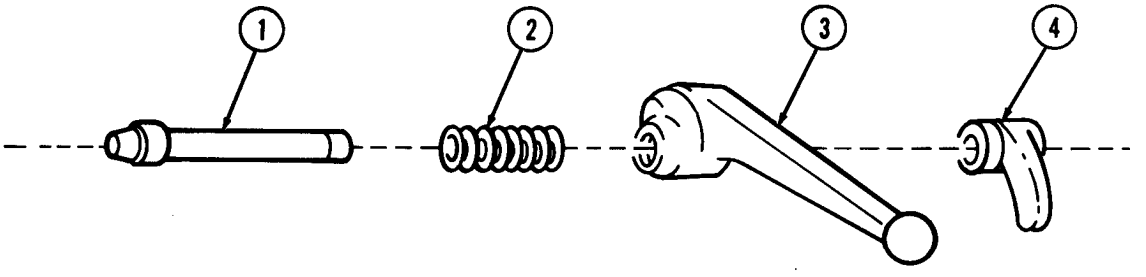
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.		Block (6)	Wipe clean, and inspect for cracks and elongated screw holes.	Replace if cracked or holes elongated.
21.		Shaft (8)	a. Wipe clean, and inspect for cracks.	Replace if cracked.
			b. Measure cam outer diameter.	Replace if cam outer diameter is less than 0.748 in. (18.99 mm).
			c. Measure outer diameter of bearing surface.	Replace if outer diameter is less than 0.748 in. (18.99 mm).
22.		Sheave (11)	Wipe clean, and inspect for cracks and wear.	Replace if cracked, or broken.
23.		Two thrust washers (9)	Wipe clean, and inspect for cracks and wear.	Replace if cracked, or if thickness is less than 0.062 in. (1.56 mm).
24.		Bearing (10)	Wipe clean, and inspect for cracks, chips, and broken cage.	Replace if cracked, chipped, broken, or if inner diameter exceeds 1.000 in. (25.4 mm).
25.		Two bushings (7)	Wipe clean, and inspect for cracks, chips, and wear.	Replace if cracked, chipped, or if inner diameter exceeds 0.754 in. (19.15 mm).



TA 350895

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

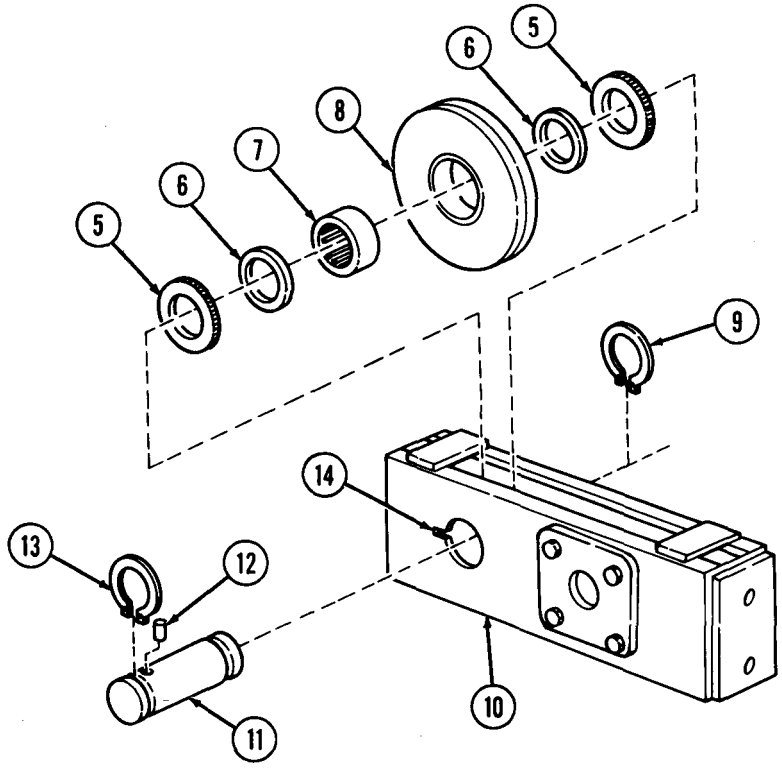
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
26.		Latch (4) and lever (3)	Wipe clean, and inspect for breaks and cracks.	Replace if broken or cracked.
27.		Poppet (1)	Wipe clean, and inspect for bends and breaks.	Replace if bent or broken.
28.		Spring (2)	Wipe clean, and inspect for broken and collapsed coils.	Replace if coils are broken or collapsed.



TA 350896

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE Make sure all bearings are packed with GAA grease before installation.	
		d. Reassembly		
29.		Bearing (7)	Install in sheave (8).	Use arbor press.
30.		Pin (12)	Drive into tensioner sheave pin (11) until seated.	Use hammer.
31.		Snapring (13)	Install on tensioner sheave pin (11).	
32.		Two new felt washers (6)	Position felt side against each end of bearing (7).	
33.		Sheave (8) and two thrust washers (5)	a. Position sheave (8) in frame (10) with thrust washer (5) on each side.	
			b. Secure with tensioner sheave pin (11) and snapring (9).	Pin (12) must engage slot (14) in frame (10). Grease fitting hole of pin (11) must face to rear of frame (10).



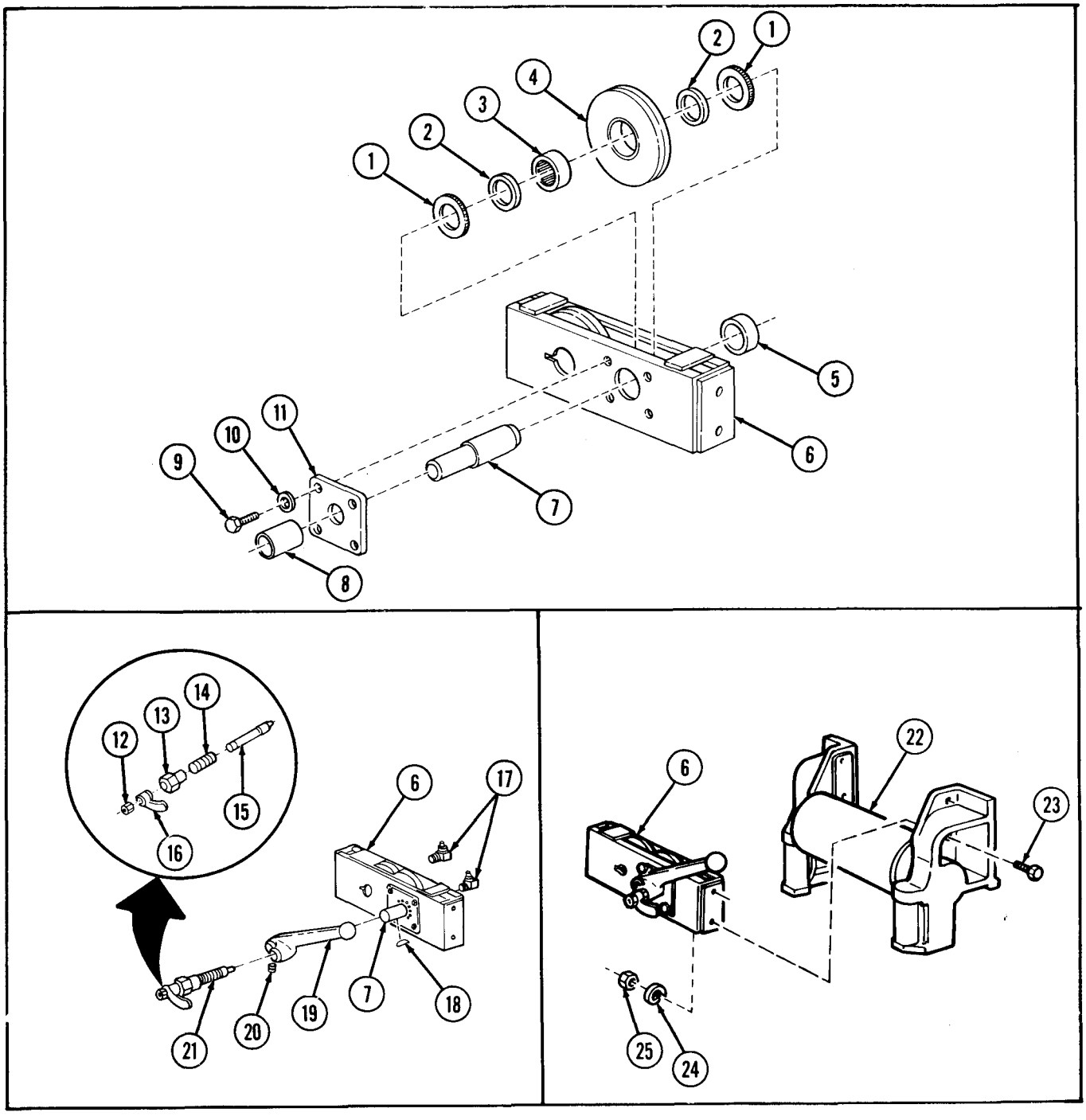
TA 350897

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
34.		Two bushings (8) and (5)	Install in cable tensioner frame (6).	Use arbor press.
35.		Bearing (3)	Install in sheave (4).	Use arbor press.
36.		Two new felt washers (2)	Position felt side of washers (2) against each end of bearing (3).	
37.		Sheave (4) and two thrust washers (1)	Position in cable tensioner frame (6), and secure with shaft (7).	
38.		Block (11)	Install on cable tensioner frame (6) over shaft (7) with four bolts (9) and new lockwashers (10).	
39.		Lever (19)	Position over key (18) on shaft (7), and install with setscrew (20).	
40.		Spring (14)	Position on poppet (15), and place in poppet nut (13).	
41.		Latch (16)	Position on poppet (15), and install with latchnut (12).	
42.		Poppet assembly (21)	Position in lever (19) and install with poppet nut (13).	
43.		Two grease fitting adapters (17)	Install in cable tensioner frame (6).	
e. Installation				
44.		Cable tensioner (6)	Install on roller assembly (22) with four screws (23), new lockwashers (24), and nuts (25).	

19-5. FRONT WINCH CABLE TENSIONER MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install winch cable (TM 9-2320-272-20-2).
• Lubricate tensioner assembly (LO 9-2320-272-12).

TA 350898

19-6. FRONT WINCH LEVEL WIND MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning, Inspection, and Repair
d. Reassembly
e. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Thirteen lockwashers
Five felt washers
Cotter pin
Two locknuts
Felt seal
Bushing
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO-30 (Appendix C, Item 17)

Personnel Required
Wheeled vehicle repairman MOS 63W

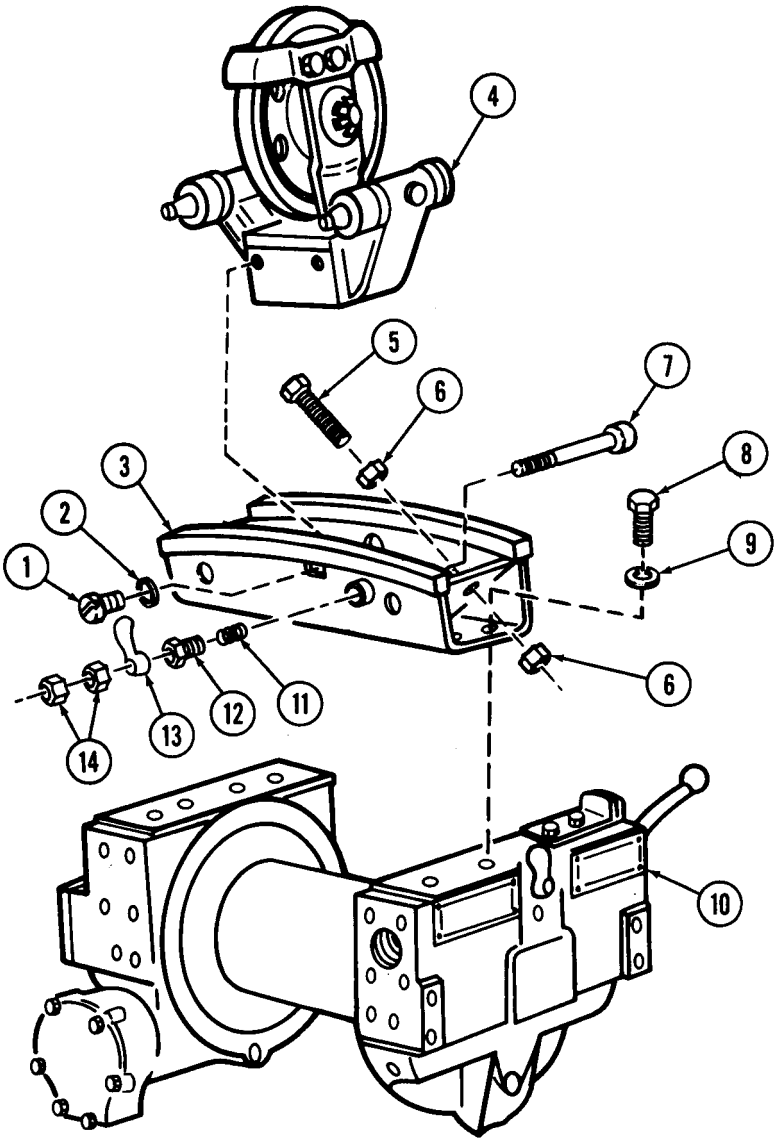
General Safety Instructions
None

Manual References
LO 9-2320-272-12
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Track (3)	Four screws (8) and lockwashers (9)	Remove.	Discard lockwashers (9).
2.	Winch (10)	Track (3) and level wind (4)	Remove.	
	b. Disassembly			
		NOTE Rectangular holes are provided for removing screws. Slide the level wind backwards and forwards until screws are visible.		
3.	Track (3)	Four screws (1) and lockwashers (2), and level wind (4)	Remove.	Discard lockwashers (2).

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

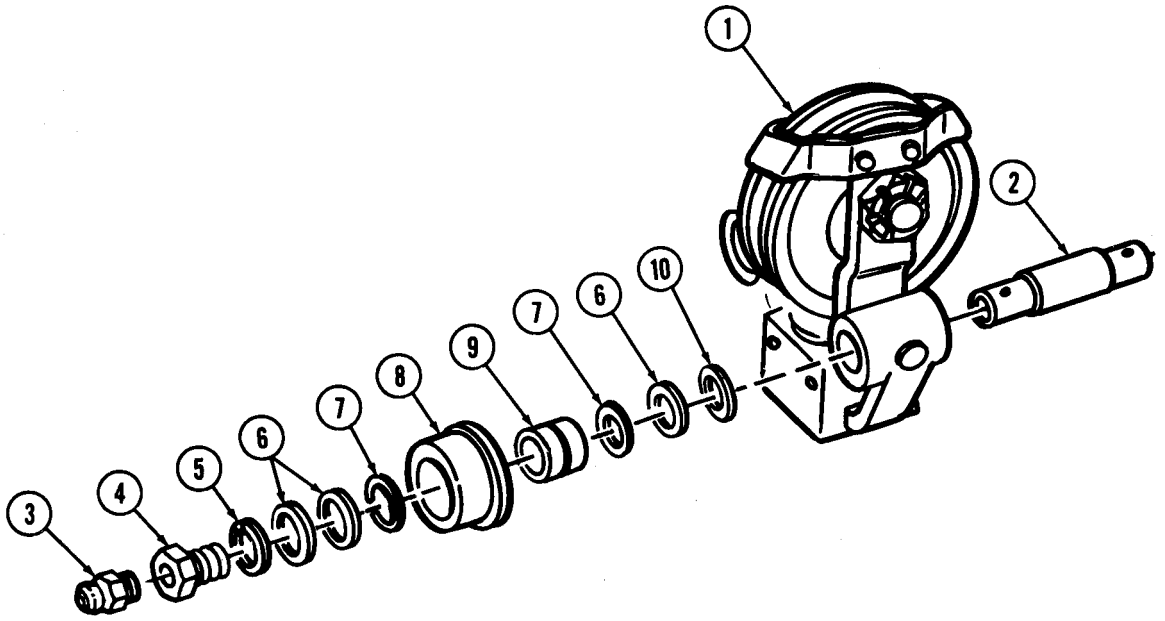
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
4.		Two nuts (14), drum lock latch (13), nut (12), spring (11), and poppet (7)	Remove.	
5.	Track (3)	Outer nut (6), bolt (5), and inner nut (6)	Remove.	



TA 350899

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

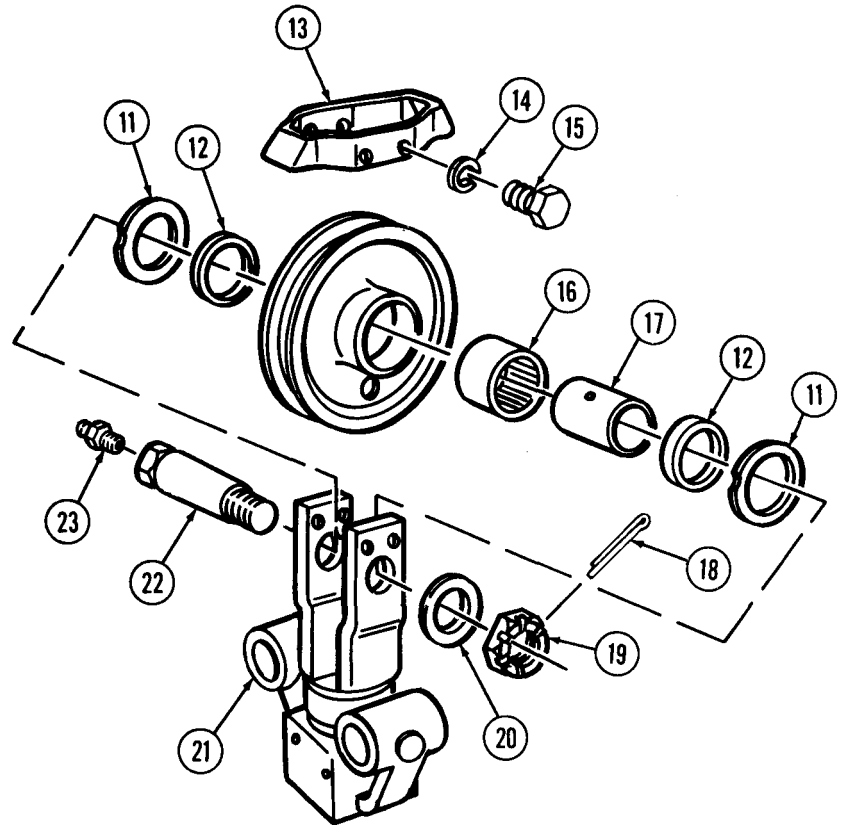
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Both sets of winch trolley wheels are removed the same.		
6.	Axle (2)	Grease fitting (3)	Remove.	
7.		Bolt (4), and lockwasher (5)	Remove.	Discard lockwasher (5).
8.		Three flat washers (6), wheel (8), two felt washers (7), and thrust washer (10)	Remove.	Discard felt washers (7).
9.	Level wind (1)	Axle (2)	Remove.	Use arbor press.
10.	Wheel (8)	Bearing (9)	Remove.	Use arbor press.



TA 350900

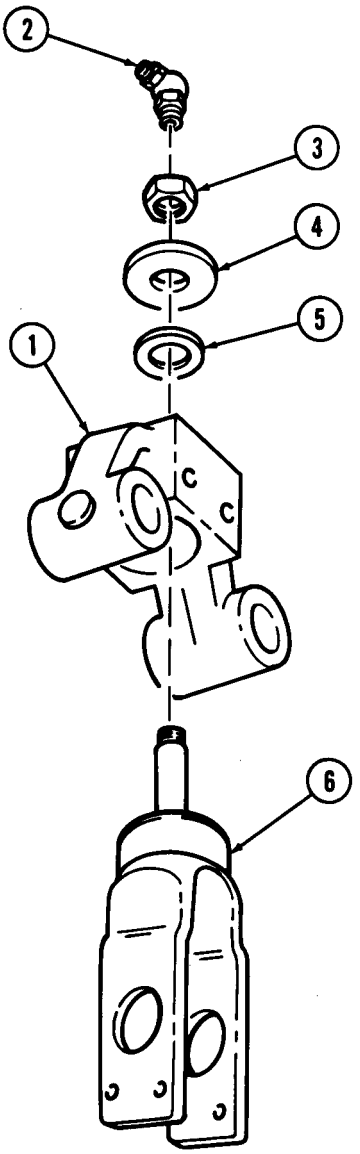
19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
11.	Frame (21)	Four bolts (15) and lockwashers (14), and sheave guard (13)	Remove.	Discard lockwashers (14).
12.	Bolt (22)	Grease fitting (23), cotter pin (18), slotted nut (19), and washer (20)	Remove.	Discard cotter pin (18).
13.	Frame (21)	Bolt (22) and sheave (24)	Remove.	Thrust washers (11) will fall out.
14.	Sheave (24)	Two felt washers (12), sleeve (17), and bearing (16)	Remove.	Discard felt washers (12).



19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

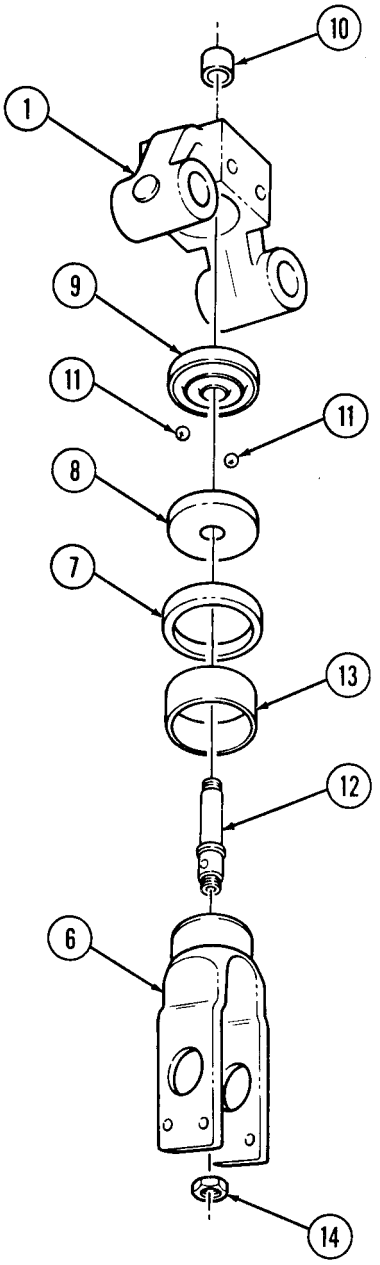
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.	Frame (1)	Grease fitting (2), locknut (3), washer (4), and felt washer (5)	Remove.	Discard locknut (3) and felt washer (5).
16.		Swivel (6)	Remove.	Use arbor press.



TA 350902

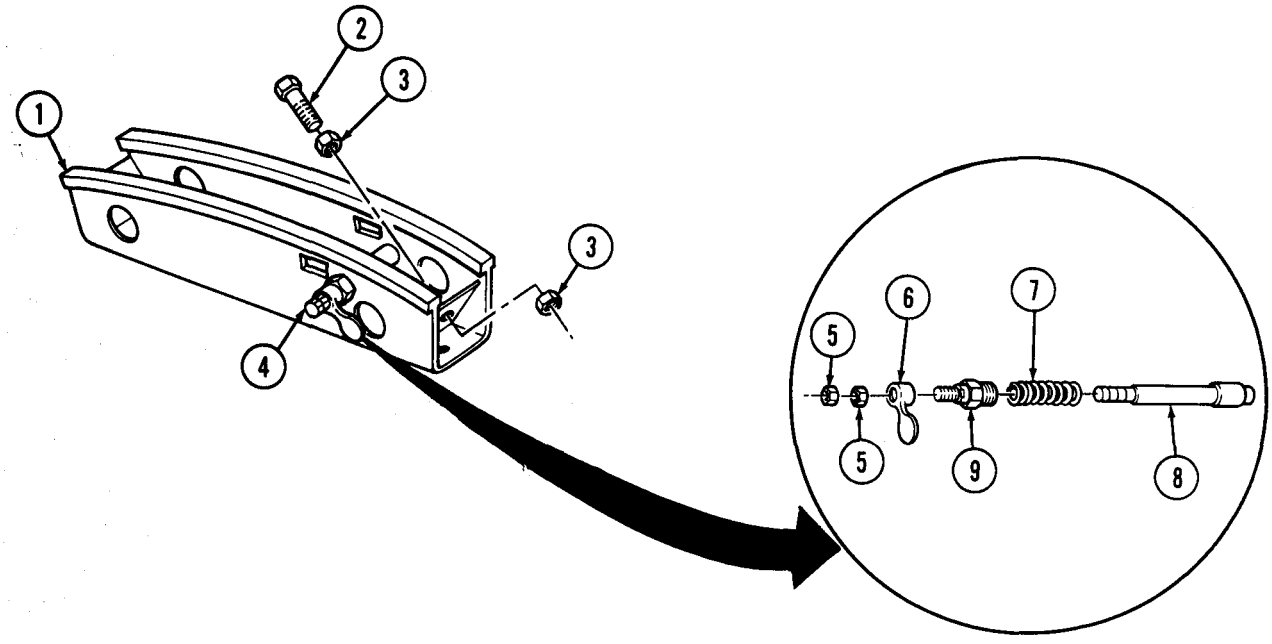
19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
17.	Frame (1)	Bushing (13), felt seal (7), inner race (8), twenty-six ball bearings (11), and outer race (9)	Remove.	Use arbor press. Discard felt seal (7) and bushing (13).
17.1.		Bearing (10)	Remove.	Use arbor press.
18.	Swivel (6)	Locknut (14) and extension (12)	Remove.	Use arbor press. Discard locknut (14).



19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

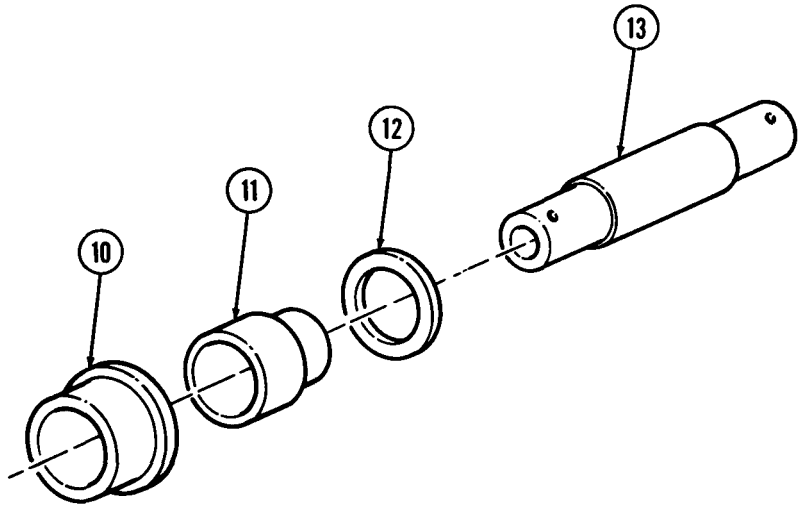
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Cleaning, Inspection, and Repair			
19.		Track (1)	Wipe clean, and inspect for cracks and chipped or nicked wheel surface.	Discard if cracked. Use file to smooth wheel surface if chipped or nicked.
20.		Drum lock assembly (4)	a. Wipe poppet (8) clean, and inspect for cracks, bends, and damaged threads.	Discard if cracked, bent, or threads are damaged.
			b. Wipe spring (7) clean and inspect for broken or collapsed coils.	Discard if coils are broken or collapsed.
			c. Wipe nut (9) clean and inspect for damaged threads.	Discard if threads are damaged.
			d. Wipe latch (6) clean and inspect for cracks.	Discard if cracked.
			e. Wipe nuts (5) clean and inspect for damaged threads.	Discard if threads are damaged.
21.		Stop bolt (2) and nuts (3)	Wipe clean and inspect for bends and cracks, or damaged threads.	Discard if bent or cracked, or threads are damaged.



TA 350904

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

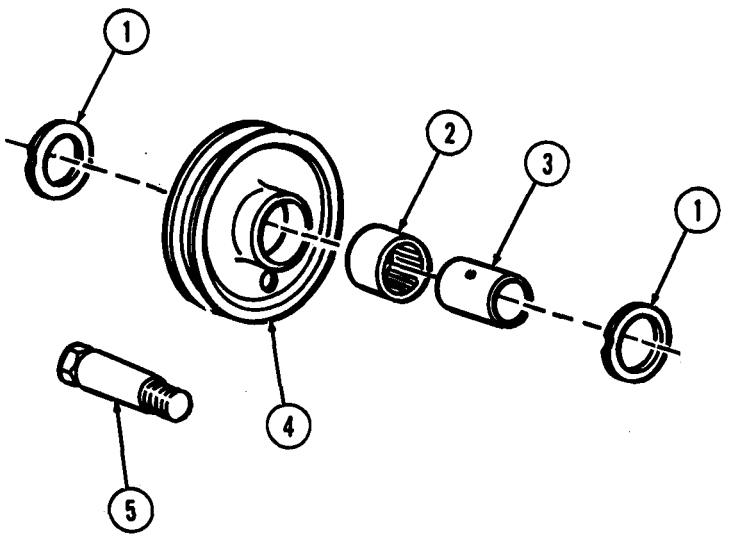
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
22.		Wheel (10)	Wipe clean, and inspect for cracks and damaged roller surface.	Discard if cracked, or roller surface is damaged.
23.		Bearing (11)	Inspect for chips, cracks, and damaged cage.	Discard if chipped, or cage is damaged.
24.		Thrust washer (12)	Wipe clean, and inspect for cracks and wear. Measure thickness.	Discard if thickness is less than 0.058 in. (1.47 mm).
25.		Axle (13)	Wipe clean, and inspect for cracks and scoring.	Discard if cracked or scored.



TA 350905

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

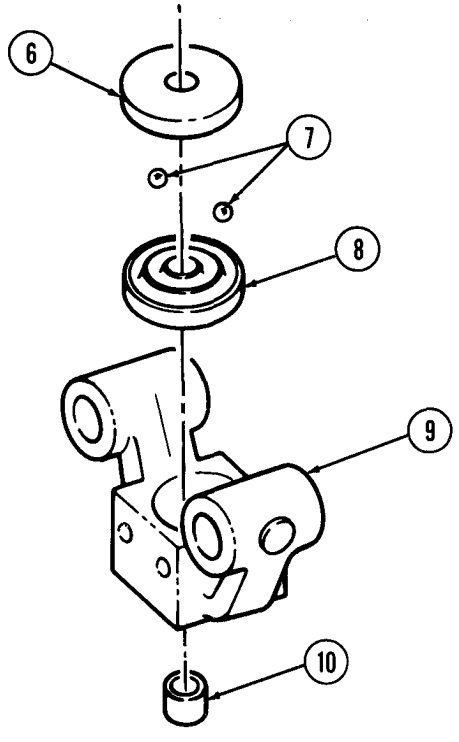
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
26.		Bolt (5)	Wipe clean, and inspect for cracks, scoring, and damaged threads.	Discard if cracked, scored, or if threads are damaged.
27.		Two thrust washers (1)	Wipe clean, and inspect for cracks and wear. Measure thickness.	Discard if cracked or thickness is less than 0.058 in. (1.47 mm).
28.		Sheave (4)	Wipe clean, and inspect for cracks.	Discard if cracked.
29.		Sleeve (3)	Wipe clean, and inspect for cracks and scoring.	Discard if cracked or scored.
30.		Bearing (2)	Inspect for chips, cracks, and damaged cage.	Discard if chipped, cracked, or cage is damaged.



TA 350906

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
31.		Bearing (10)	Inspect for chips, cracks, and damaged cage,	Discard if chipped, cracked, or cage is damaged.
32.		Inner and outer race (6) and (8)	Wipe clean, and inspect for pits, chips, and cracks.	Discard if pitted, chipped, or cracked.
33.		Twenty-six balls (7)	Inspect for cracks, chips, and out-of-round condition.	Discard if cracked, chipped, or out-of-round.
34.		Frame (9)	Wipe clean, and inspect for cracks and damaged threads.	Discard if cracked or threads are damaged.



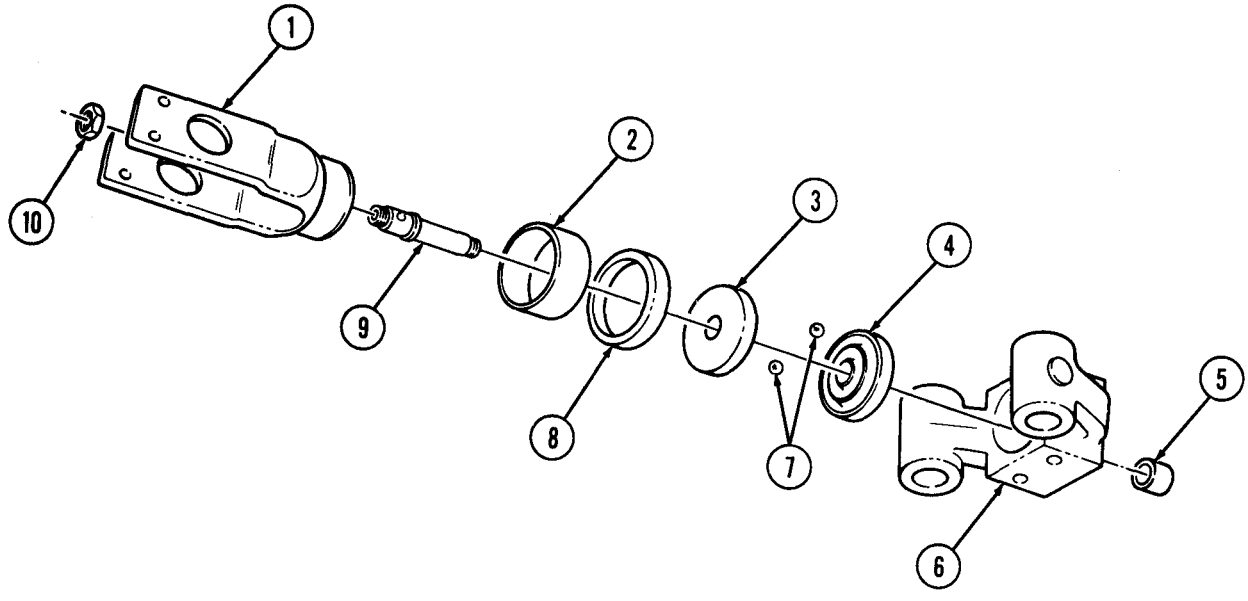
19-6. FRONT WINCH LEVEL MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	d. Reassembly			

NOTE

- Make sure all felt seals are soaked in oil before installation.
- Make sure all bearings are packed with GAA grease before installation.

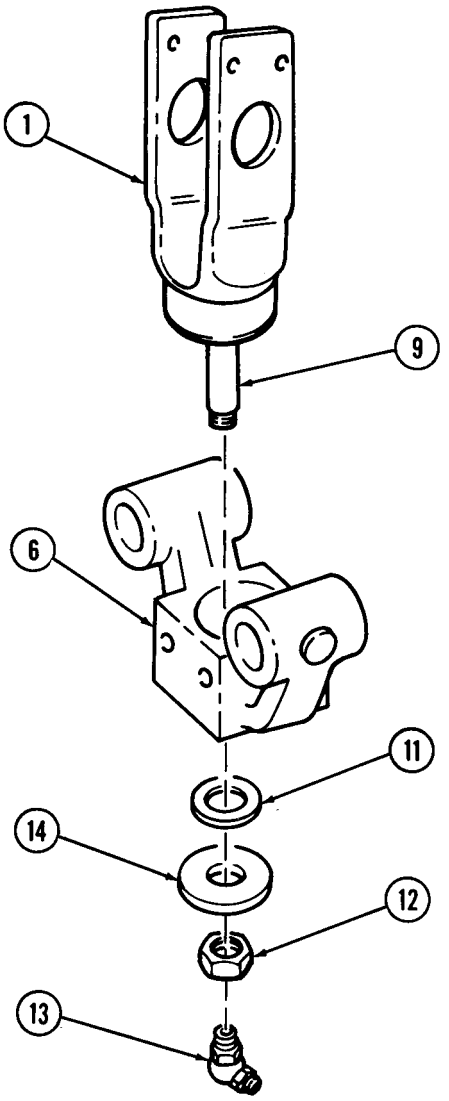
35.	Extension (9) and new locknut (10)	Install into swivel (1).	Use arbor press.
36.	Outer race (4)	Install into frame (6).	Use arbor press.
37.	Twenty-six ball bearings (7)	Install into outer race (4).	
38.	Inner race (3)	Install over ball bearings (7).	Use arbor press.
39.	New felt seal (8)	Install over inner race (3).	
40.	New bushing (2)	Install in frame (6).	Use arbor press.
41.	Bearing (5)	Install into frame (6).	



TA 350908

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

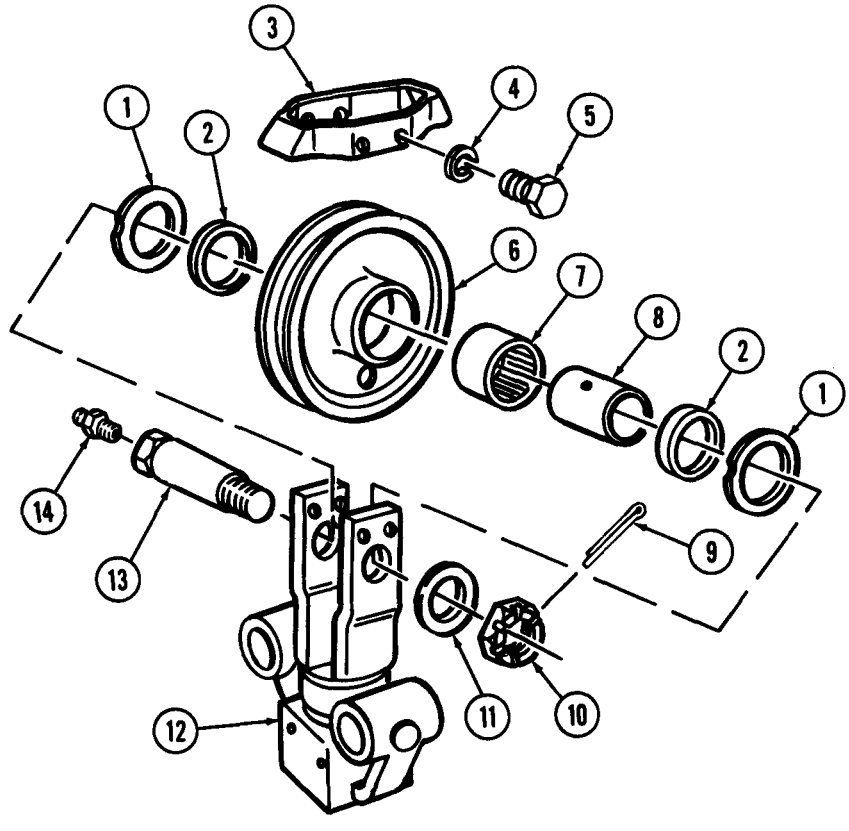
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
42.		Swivel (1) with extension (9) installed	Install into frame (6).	Use arbor press.
43.		Frame (6) with swivel (1) extension (9) installed	Install new felt washer (11), washer (14), new locknut (12), and grease fitting (13).	



TA 350909

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

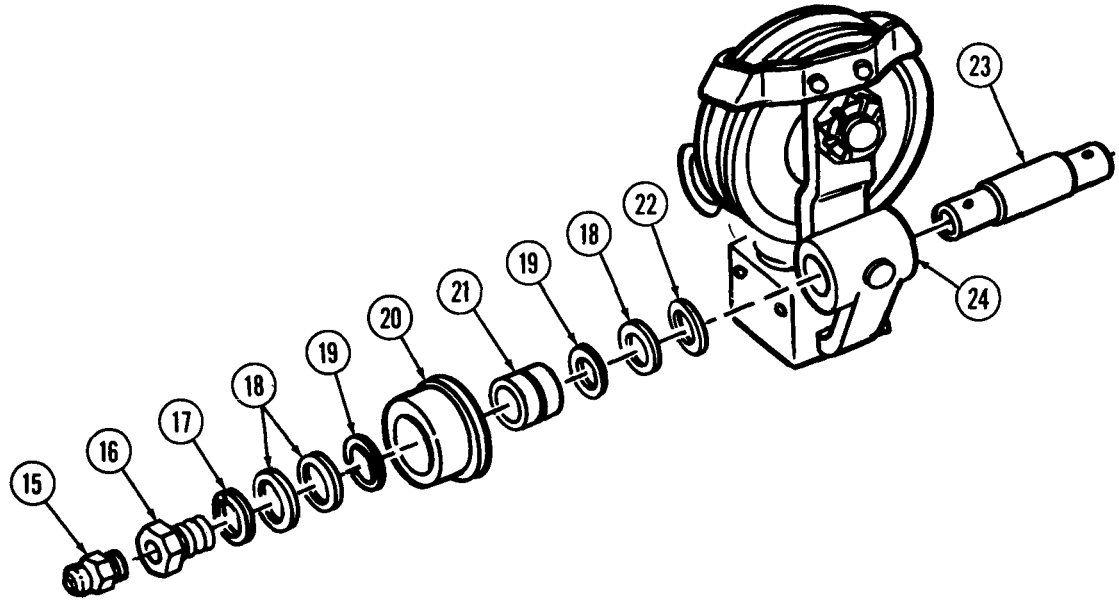
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
44.		Bearing (7), sleeve (8), and two new felt washers (2)	Install in sheave (6).	
45.		Sheave (6)	Position in frame (12).	
46.		Two thrust washers (1)	Install one on each side of sheave (6).	
47.		Bolt (13)	Insert through frame (12) and sheave (6), and install with washer (11) and slotted nut (10).	Tighten nut (10) so cotter pin holes on nut (10) and bolt (13), are alined.
48.		New cotter pin (9)	Insert through hole in nut (10) and bolt (13).	Bend ends of cotter pin (9) around nut (10).
49.		Grease fitting (14)	Install in bolt (13).	
50.		Sheave guard (3)	Position over sheave (6), and install on frame (12) with four bolts (5) and new lockwashers (4).	



TA 350910

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Both sets of winch trolley wheels are installed the same.		
51.		Axle (23)	Install in frame (24).	
52.		Thrust washer (22)	Install on axle (23).	
53.		Bearing (21)	Position in wheel (20).	
54.		Wheel (20), with bearing (21), and two new felt washers (19)	Install on axle (23) with bolt (16), three washers (18), and new lockwasher (17).	Bolt (16), with hole drilled for grease fitting (15), goes toward front of winch.
55.		Grease fitting (15)	Install in bolt (16).	



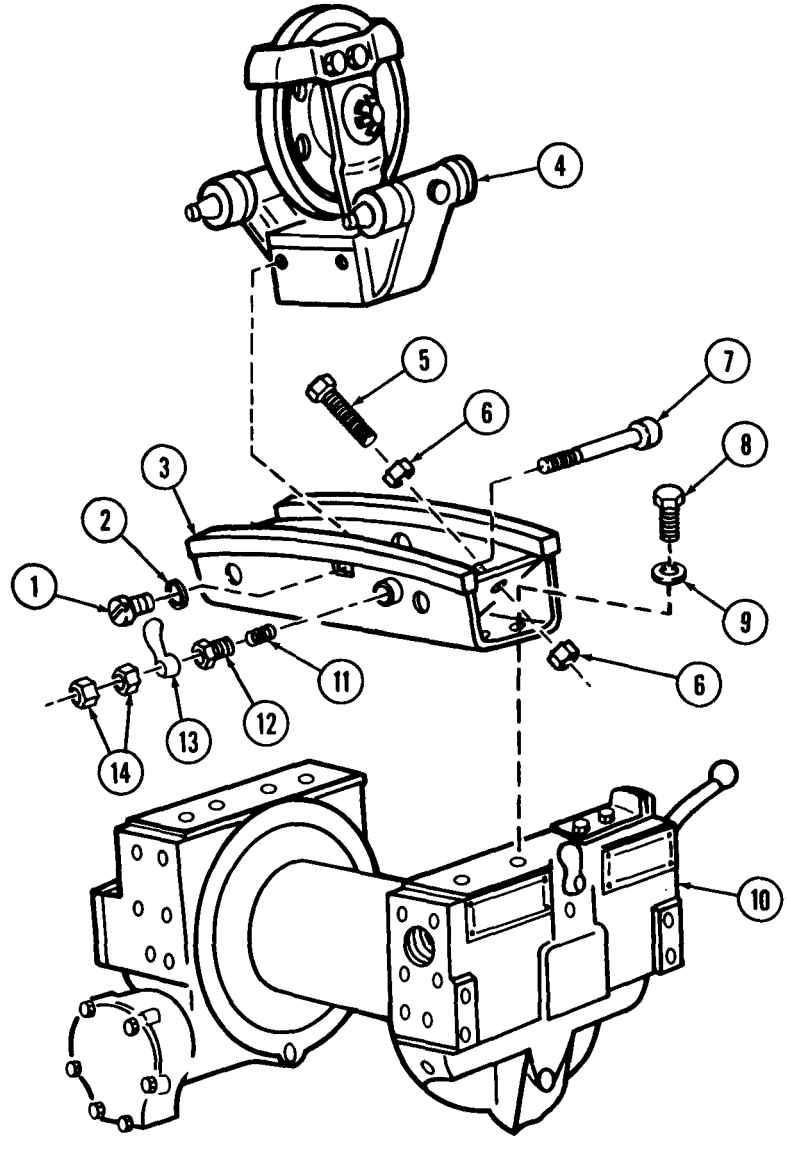
TA 350911

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
56.		Spring (11)	Position on poppet (7) shaft and install with nut (12).	
57.		Poppet (7)	Install in track (3).	
58.		Latch (13)	Position on poppet (7) shaft and install with two nuts (14).	
59.		Level wind assembly (4)	Position on track (3), and install with four screws (1) and new lockwashers (2).	
60.		Track (3)	Install stop bolt (5) with two nuts (6).	Level wind (4) must get final adjustment when winch is mounted on vehicle.
e. Installation				
61.		Level wind assembly (4) and track (3)	Install on winch (10) with four screws (8) and new lock-washers (9).	

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Lubricate level wind assembly (LO 9-2320-272-12).

TA 350912

19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. Cleaning, Inspection, and Repair
d. Reassembly
e. Installation

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-2	Front winch removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Sixteen lockwashers
Two felt washers
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO 30 (Appendix C, Item 17)

Personnel Required
Wheeled vehicle repairman MOS 63W

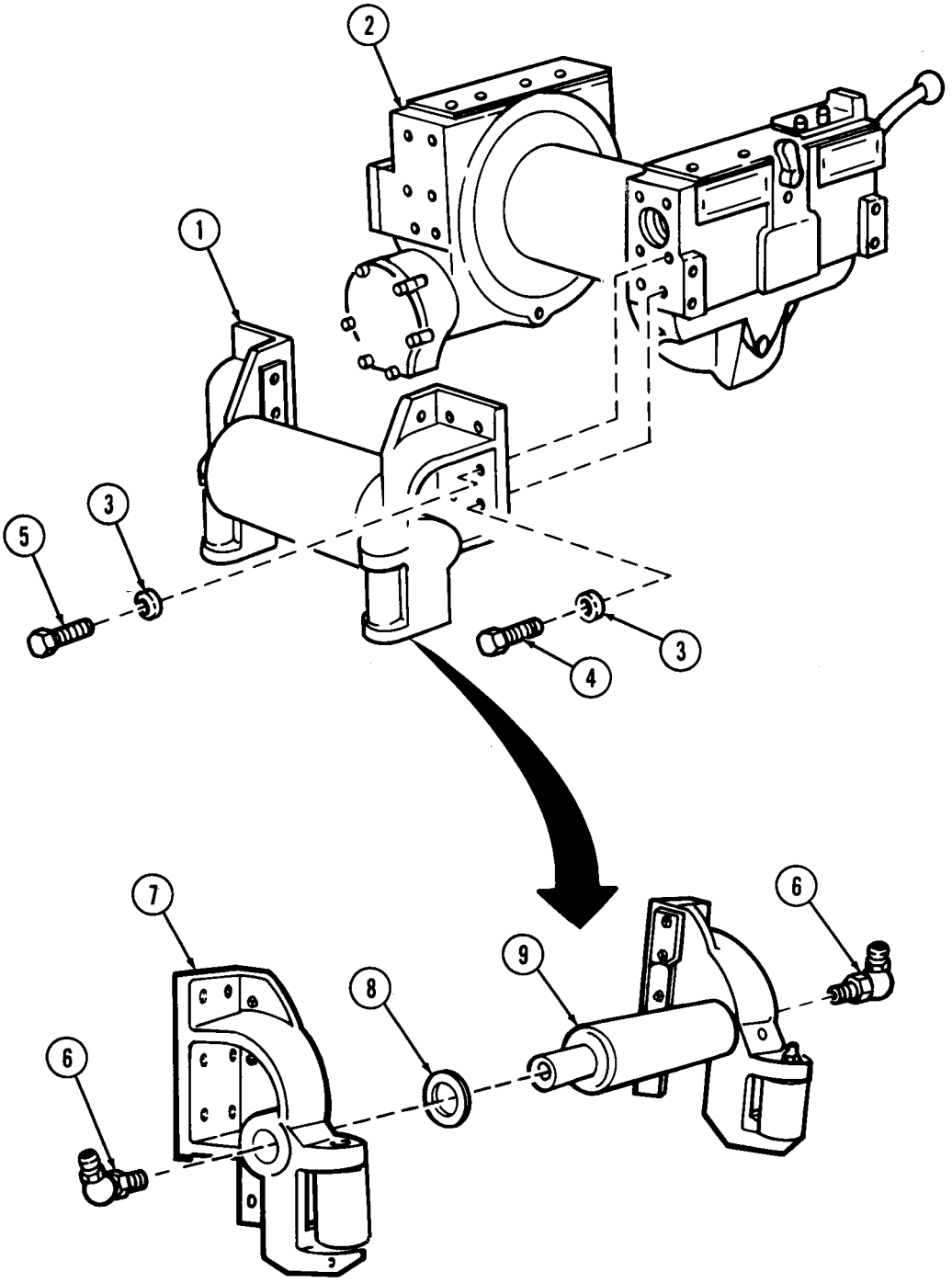
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Winch roller assembly (1)	Eight screws (5) and lockwashers (3)	Remove.	Discard lockwashers (3).
2.		Four screws (4) and lockwashers (3)	Remove.	Discard lockwashers (3).
3.	Winch (2)	Winch roller assembly (1)	Remove.	
		b. Disassembly		
4.	Roller shaft (9)	Two grease fittings (6), right roller bracket (7), and thrust washer (8)	Remove.	

19-6. FRONT WINCH LEVEL WIND MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



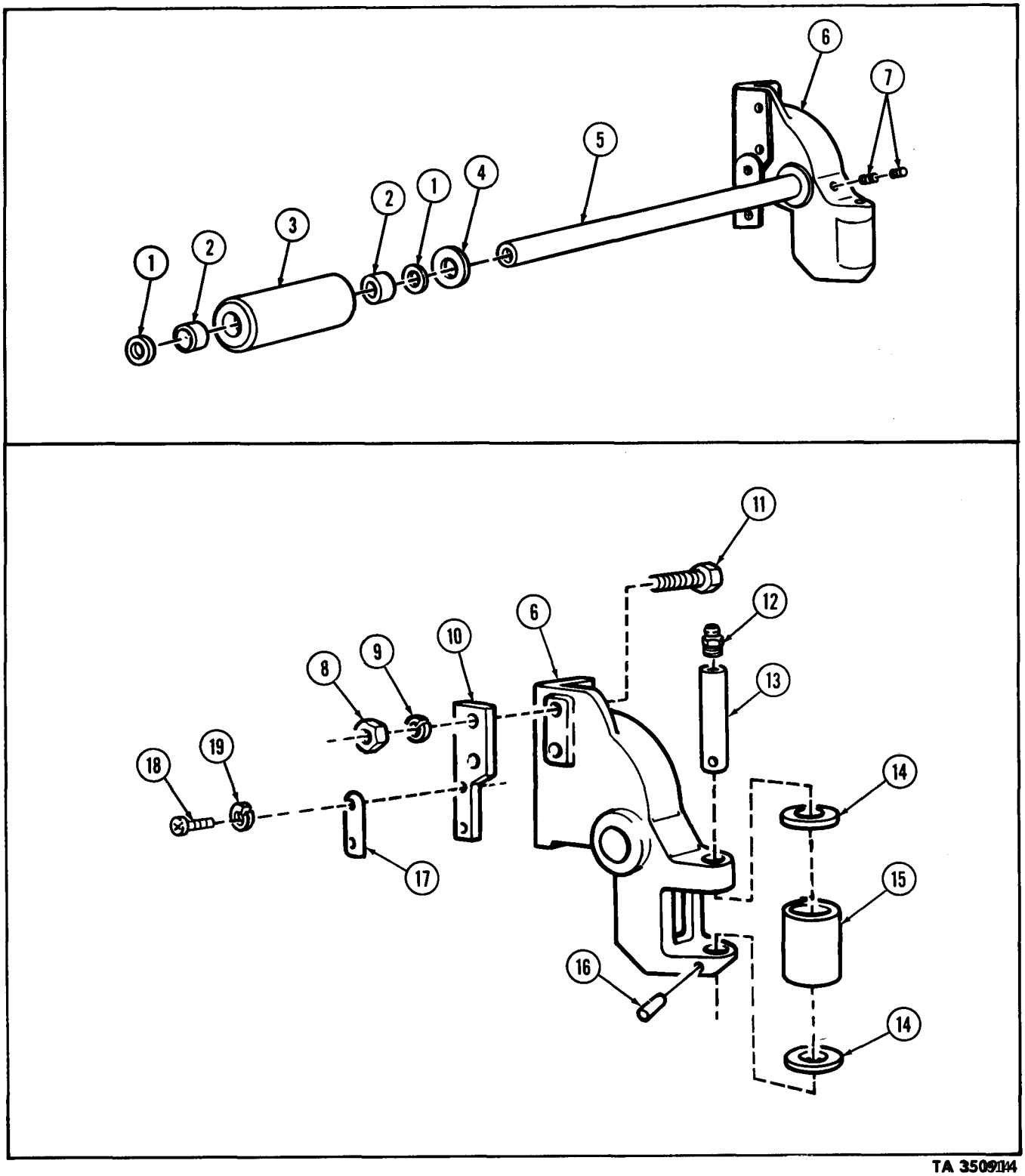
TA 350913

19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Roller shaft (5)	Roller (3)	Remove.	
6.	Roller (3)	Two felt washers (1) and bearings (2)	Remove.	Discard felt washers (1).
7.	Roller shaft (5)	Thrust washer (4)	Remove.	
8.	Left roller bracket (6)	Two setscrews (7)	Remove.	Both setscrews (7) are located in the same hole.
9.		Shaft (5)	Remove.	
		NOTE Both side rollers are disassembled the same.		
10.	Side roller shaft (13)	Grease fitting (12)	Remove.	
11.	Roller bracket (6)	Pin (16)	Remove.	
12.		Two thrust washers (14) and roller (15)	Remove.	
13.	Large side bracket (10)	Two screws (18) and lockwashers (19), and small side bracket (17)	Remove.	Discard lockwashers (19).
14.	Roller bracket (6)	Two bolts (11), nuts (8), and lockwashers (9), and large side bracket (10)	Remove.	Discard lockwashers (9).

19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 350914

19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

c. Cleaning, Inspection, and Repair

WARNING

Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.		All items in steps 19 through 23.	Clean with SD type 2 cleaning solvent (para. 2-7).	Clean each item before inspecting.
16.		Side roller shaft (4)	a. Inspect for cracks.	Discard if cracked.
			b. Measure outer diameter with a micrometer at bushing contact area.	Discard if outer diameter is less than 0.994 in. (25.25 mm).
17.		Bushings (6)	a. Inspect for scoring.	Discard if scored.
			b. Measure inner diameter with a micrometer.	Discard if inner diameter is more than 1.010 in. (25.65 mm).

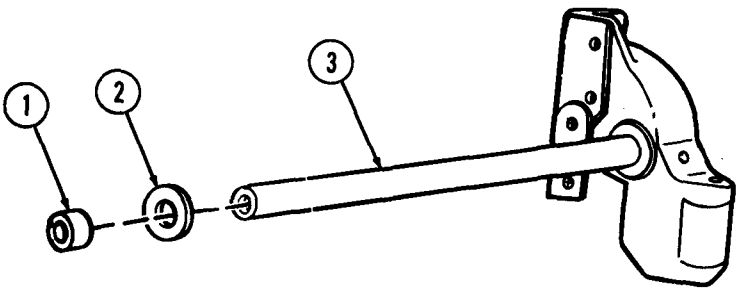
NOTE

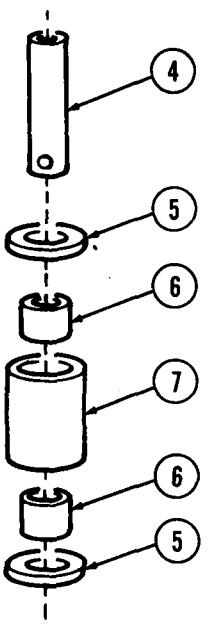
Steps 18 and 19 are performed only if bushings are to be replaced.

18.		Two bushings (6)	Remove.	Use arbor press and mandrel.
19.		Two new bushings (6)	Install in roller (7).	
20.		Thrust washers (5)	a. Inspect for cracks.	Discard if cracked.
			b. Measure thickness with a micrometer.	Discard if less than 0.040 in. (1.02 mm).
21.		Roller shaft (3)	a. Inspect for cracks and scoring.	Discard if cracked or scored.
			b. Measure outer diameter with a micrometer where bearing (1) races contact shaft (3).	Discard if outer diameter is less than 1.495 in. (37.97 mm). There are two bearings, one at each end of shaft (3).
22.		Thrust washers (2)	a. Inspect for chips, cracks, and scoring.	Discard if chipped, cracked, or scored.
			b. Measure thickness with a micrometer.	Discard if less than 0.051 in. (1.30 mm) thick.
23.		Two bearings (1)	Inspect for chips, pitting, cracks, and damaged cage.	Discard if chipped, pitted, cracked, or cage is damaged.

19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





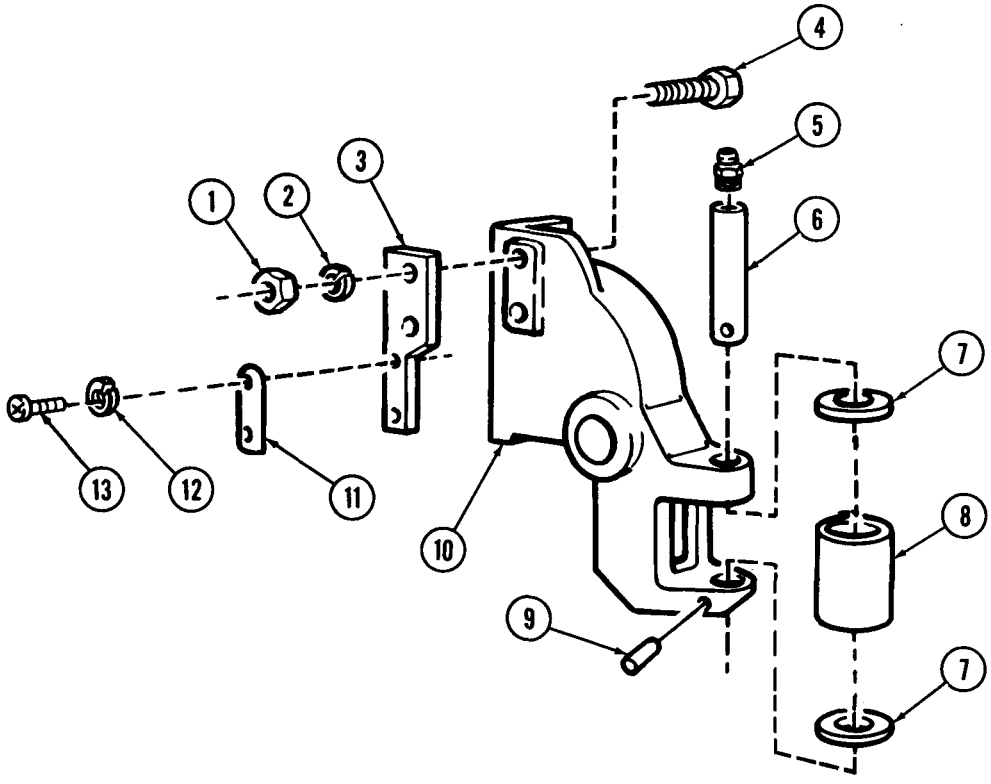
TA 350915

19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
d. Reassembly				
24.		Large side bracket (3)	Position to roller bracket (10), and install with two bolts (4), nuts (1), and new lockwashers (2).	
25.		Small side bracket (11)	Position to large bracket (3), and install with two screws (13) and new lockwashers (12).	
26.		Two thrust washers (7)	Position one on each end of roller (8).	
27.		Roller (8) and two thrust washers (7)	Install in roller bracket (10).	
28.		Shaft (6)	Install in roller bracket (10) through roller (8).	Aline pin holes at bottom.
29.		Pin (9)	Install through roller bracket (10) and shaft (6).	
30.		Grease fitting (5)	Install in shaft (6).	

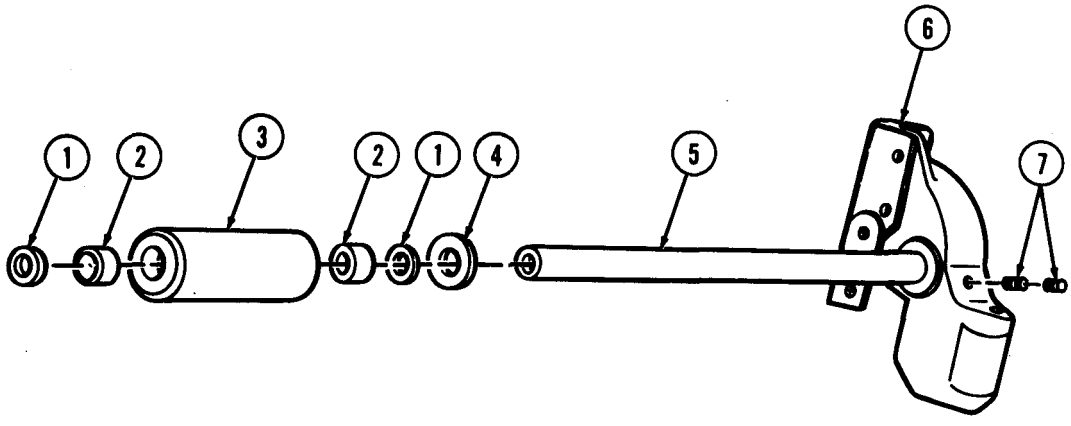
19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
31.		Roller shaft (5)	Install in roller bracket (6).	Aline setscrew hole.
32.		Two setscrews (7)	Install in roller bracket (6), and tighten.	
33.		Thrust washer (4)	Install on shaft (5).	
34.		Two bearings (2)	Coat with GAA grease and install in roller (3).	
35.		New felt washer (1)	Soak in oil, and install on roller (3) on bracket (6) end.	Place steel side against bearing (2).
36.		Roller (3)	Install on shaft (5).	
37.		New felt washer (1)	Soak in oil and install on roller (3) right end.	Place steel side against bearing (2).
38.		Thrust washer (9) and right roller bracket (8)	Install on shaft (5).	
39.		Two grease fittings (10)	Install in shaft (5).	
e. Installation				
40.		Winch roller assembly (11)	Install on winch (12) with eight screws (15), four screws (14), and twelve new lock-washers (13).	



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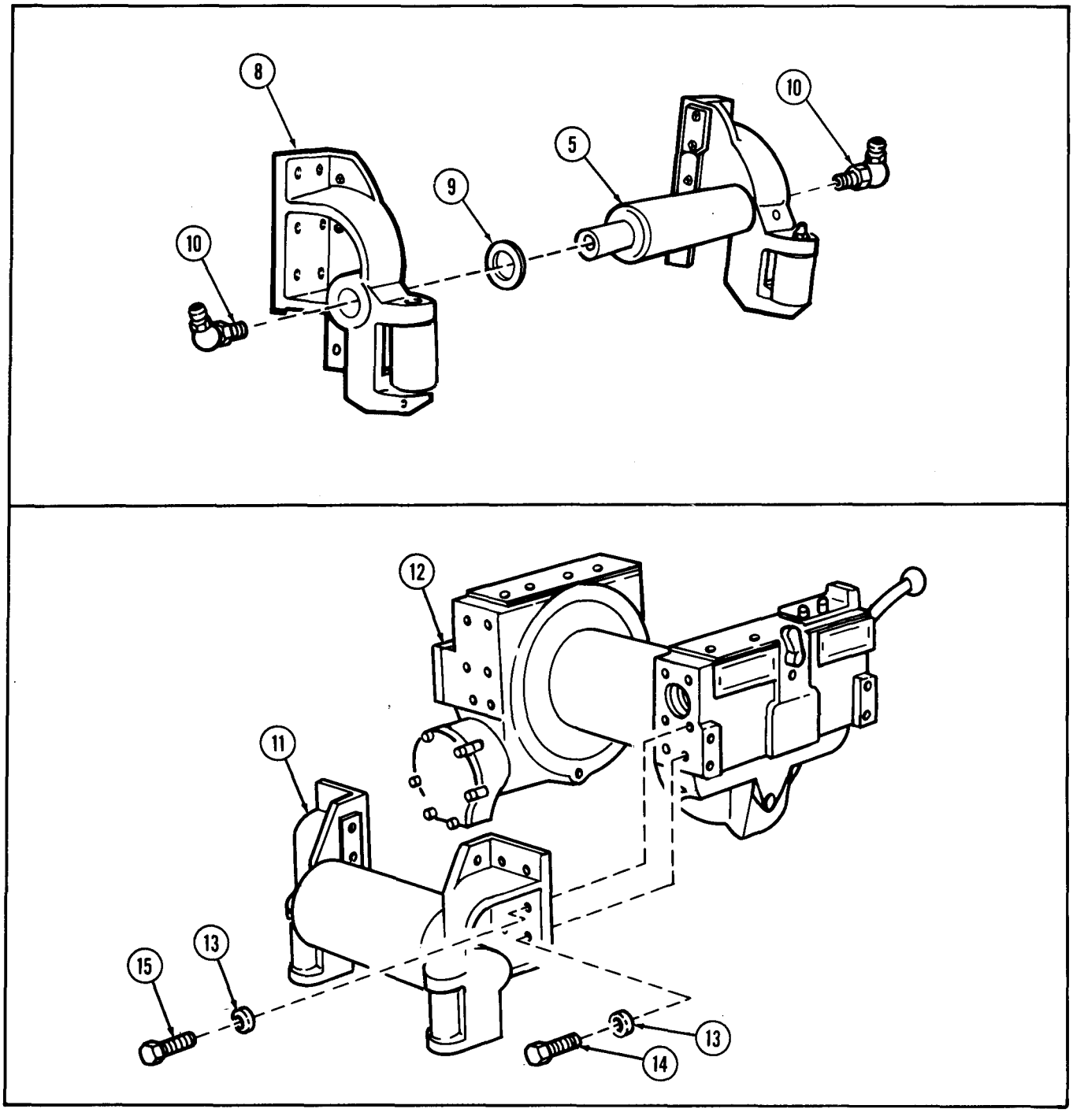
19-7. FRONT WINCH ROLLER ASSEMBLY MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Lubricate roller assembly (LO 9-2320-272-12).
• Install front winch (TM 9-2320-272-20).

TA 350918

19-8. FRONT WINCH HYDRAULIC PUMP REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M925, M926, M928, M929, M930, M932, M936	LO 9-2320-272-12	Hydraulic reservoir drained.

Test Equipment

None

Special Toots

None

Special Environmental Conditions

None

Materials/Parts

Two "O" rings
Eight lockwashers
Two locknuts

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

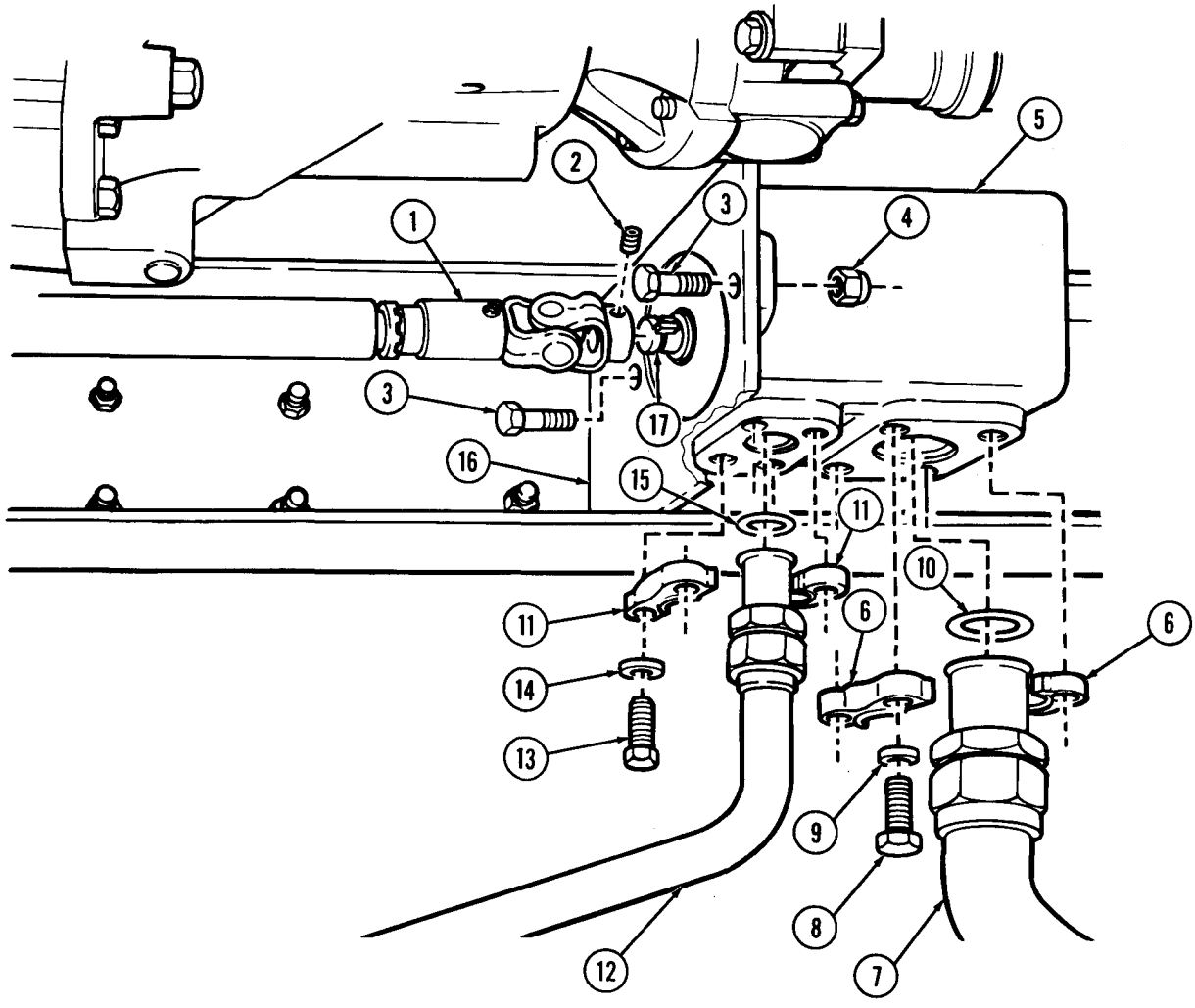
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Pump shaft (17)	Setscrew (2) and drive shaft (1)	Remove.	
2.	Tube (7)	Four screws (8), four lockwashers (9), two pipe flange swivels (6), and "O" ring (10)	Remove.	Discard lockwashers (9) and "O" ring (10).
3.	Tube (12)	Four screws (13), lockwashers (14), two pipe flange swivels (11), and "O" ring (15)	Remove.	Discard "O" ring (15) and lockwashers (14).
4.	Pump bracket (16)	Two bolts (3), and locknuts (4), and hydraulic pump (5)	Remove.	Discard locknuts (4).

19-8. FRONT WINCH HYDRAULIC PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



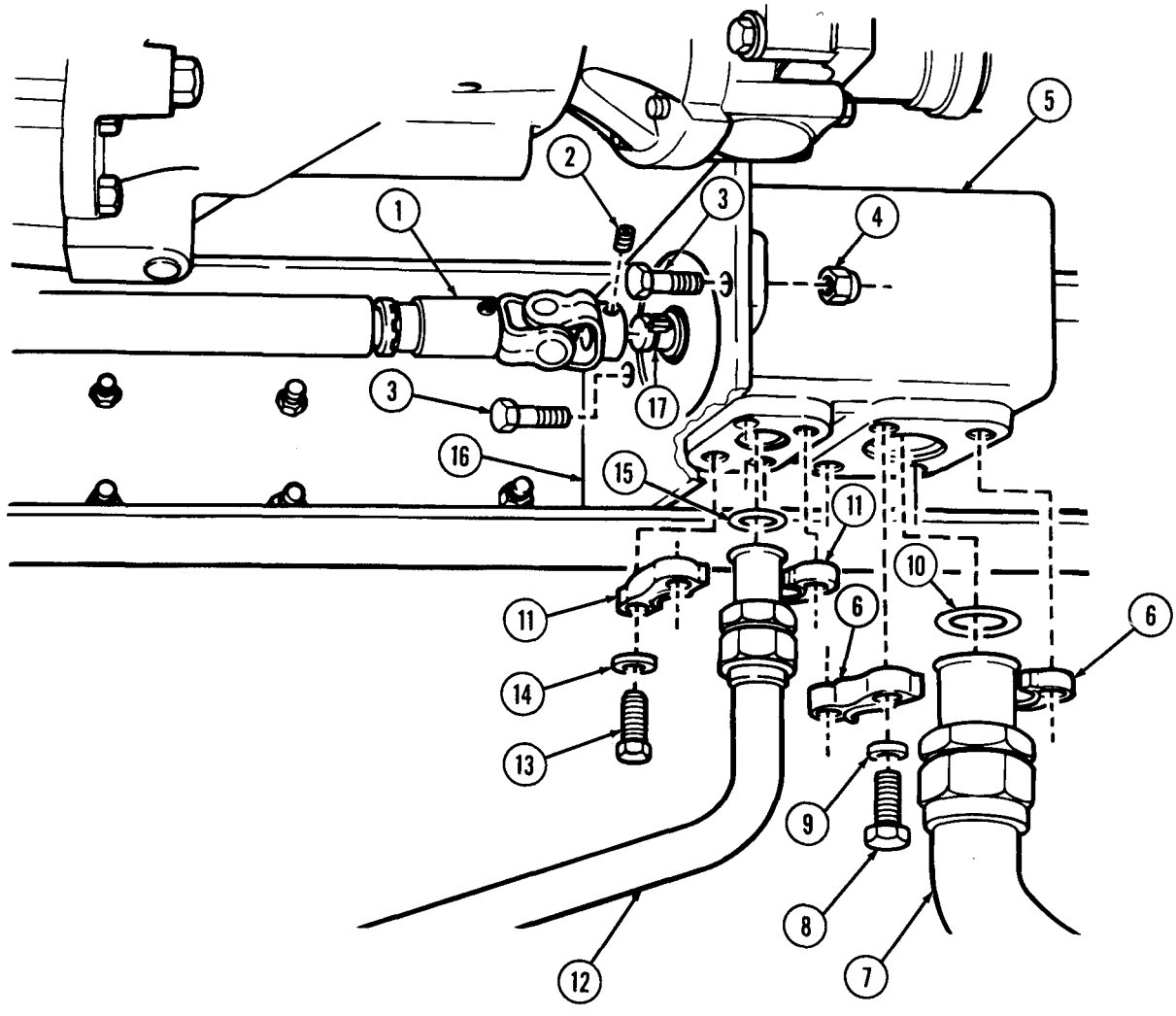
TA 350919

19-8. FRONT WINCH HYDRAULIC PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
5.		Pump (5)	Position to bracket (16) and install with two bolts (3) and new locknuts (4).	
6.		Tube (7)	Position to pump (5) and install with new "O" ring (10), two pipe flange swivels (6), four new lockwashers (9), and screws (8).	
7.		Tube (12)	Position to pump (5), and install with new "O" ring (15), two pipe flange swivels (11), four new lockwashers (14), and screws (13).	
8.		Driveshaft (1)	Connect to pump shaft (17).	Make sure key is positioned in keyway.
9.		Setscrew (2)	Install in drive shaft (1) and tighten.	

19-8. FRONT WINCH HYDRAULIC PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Fill hydraulic reservoir (LO 9-2320-272-12).
• Operate winch system and check for leaks (TM 9-2320-272-10).

19-9. FRONT WINCH CONTROL VALVE CABLE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M925, M926, M928, M930, M932, M936	TM 9-2320-272-10	Parking brake set.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Three cotter pins
Tiedown straps (Appendix C, Item 22)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

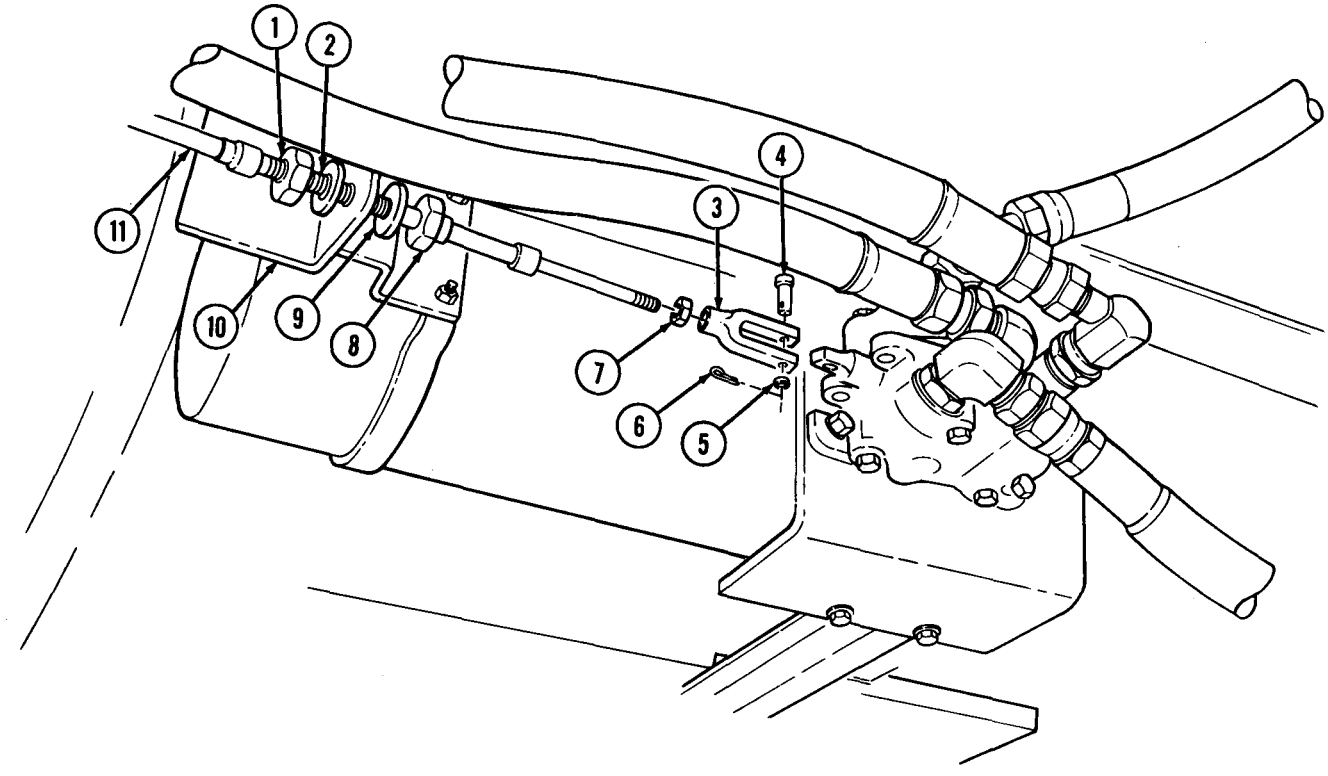
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Remove tiedown straps as required.		
1.	Clevis (3)	Clevis pin (4), washer (5), and cotter pin (6)	Remove.	Discard cotter pin (6).
2.	Cable (11)	Clevis (3) and nut (7)	Remove.	
3.	Bracket (10)	Nut (8), washer (9), and cable (11)	Remove.	
4.	Cable (11)	Washer (2) and nut (1)	Remove.	

19-9. FRONT WINCH CONTROL VALVE CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



19-9. FRONT WINCH CONTROL VALVE CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Shift panel (8)	Six screws (16) and shift panel cover (17)	Remove.	
6.	Cable clevis (3)	Clevis pin (1), cotter pin (4), and washer (2)	Remove.	Discard cotter pin (4).
7.	Lever (7)	Cable clevis (3)	Disconnect.	
8.	Shift panel (8)	Cotter pin (9), washer (5), pin (6), and lever (7)	Remove.	Discard cotter pin (9).
9.		Two screws (15), nuts (10), clamp (14), shim (13), and cable (12)	Remove.	

NOTE

Grommet may remain on cable during removal. Transfer grommet to new cable.

b. Installation

NOTE

Install tiedown straps as required.

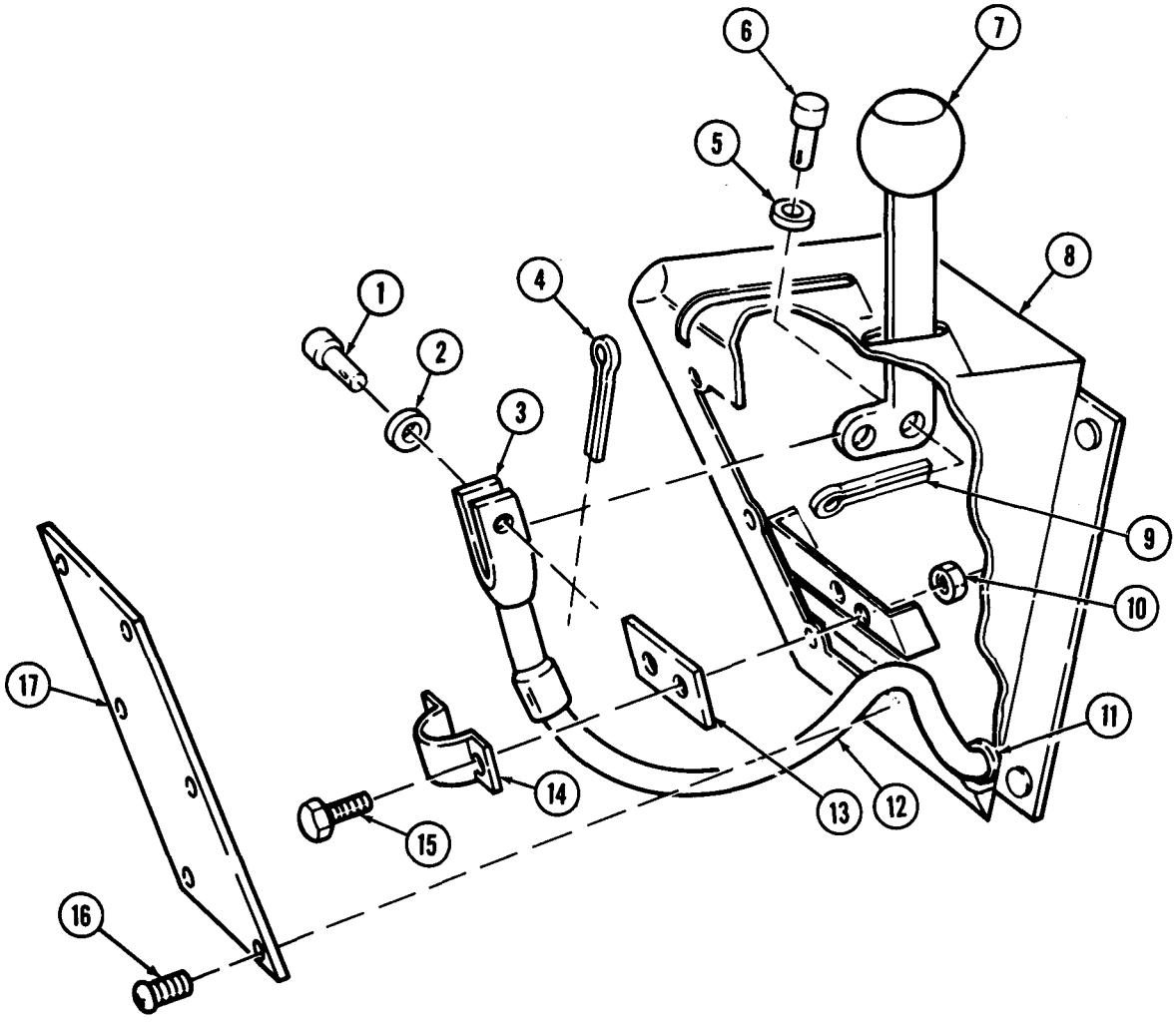
10.		Lever (7)	Install in shift panel (8) with pin (6), washer (5), and new cotter pin (9).	Bend ends of cotter pin (9).
11.		Cable (12)	Position on lever (7).	Make sure grommet (11) is positioned in firewall.
12.		Cable clevis (3)	Connect to lever (7) with clevis pin (1), washer (2), and new cotter pin (4).	Bend ends of cotter pin (4).
13.		Clamp (14)	Position on cable (12) and install on shift panel (8) with two screws (15), shim (13) and two nuts (10).	
14.		Shift panel cover (17)	Install on shift panel (8) with six screws (16).	

NOTE

Place lever (7) in neutral position.

19-9. FRONT WINCH CONTROL VALVE CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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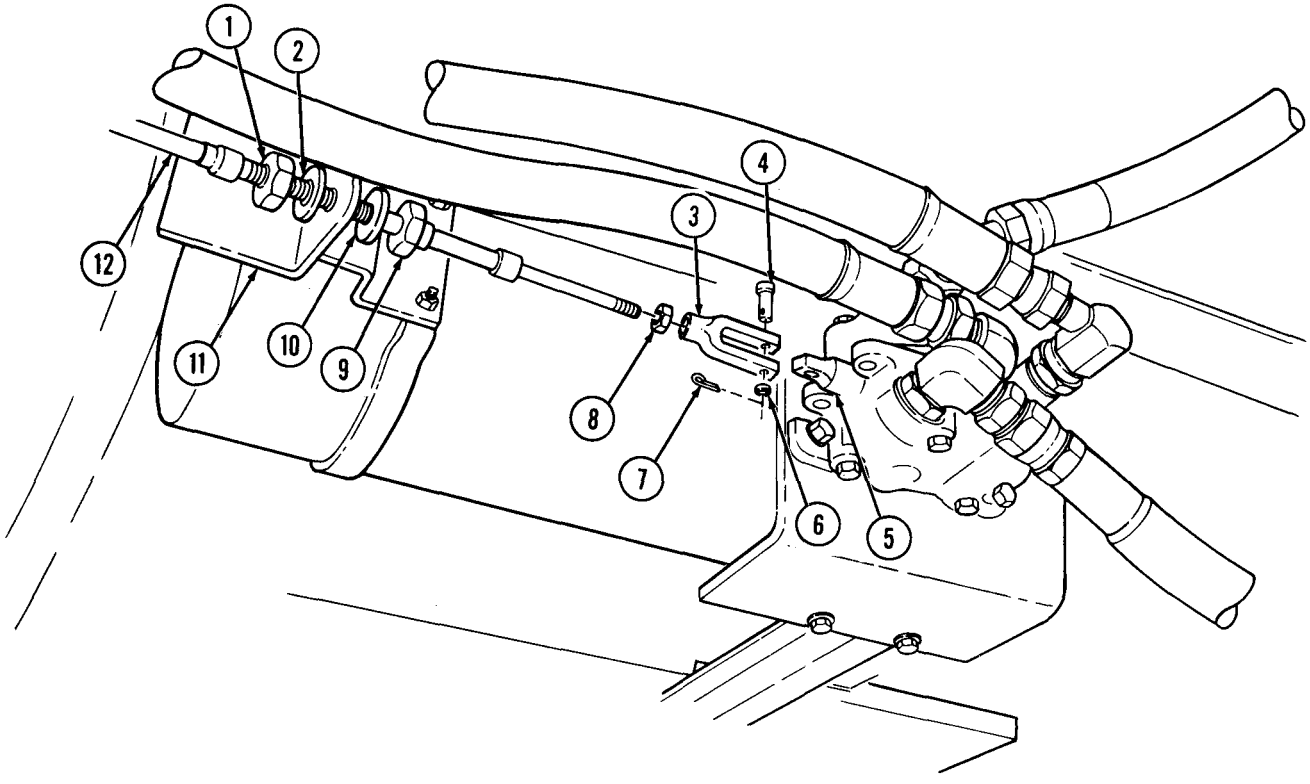
19-9. FRONT WINCH CONTROL VALVE CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.		Nut (1) and washer (2)	Install on cable (12) and position cable (12) through bracket (11).	Do not tighten nut (1).
16.		Washer (10), nuts (9) and (8), and clevis (3)	Install on cable (12).	
17.		Clevis (3)	Position to valve (5) and adjust until pin (4) can be installed.	
18.		Clevis pin (4), washer (6), and new cotter pin (7)	Install.	Bend ends of cotter pin (7).
19.		Nuts (8), (9), and (1)	Tighten.	

19-9. FRONT WINCH CONTROL VALVE CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Start engine (TM 9-2320-272-10). Check winch control valve cable for proper operation.

TA 350923

19-10. FRONT WINCH CONTROL VALVE MAINTENANCE

This task covers:

a. Removal
b. Disassembly
c. C1eaning and Inspection
d. Assembly
e. Installation

INITIAL SETUP:

Applicable Models
M925, M926, M928, M930, M932, M936

Equipment Condition Reference
TM 9-2320-272-10
LO 9-2320-272-12

Condition Description
Parking brake set.
Hydraulic oil reservoir drained.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins
Seven locknuts
Control valve parts kit 923080
Protective cap-plugs (Appendix C, Item 5)

General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

CAUTION

Plug hydraulic hoses to prevent dirt from entering.

NOTE

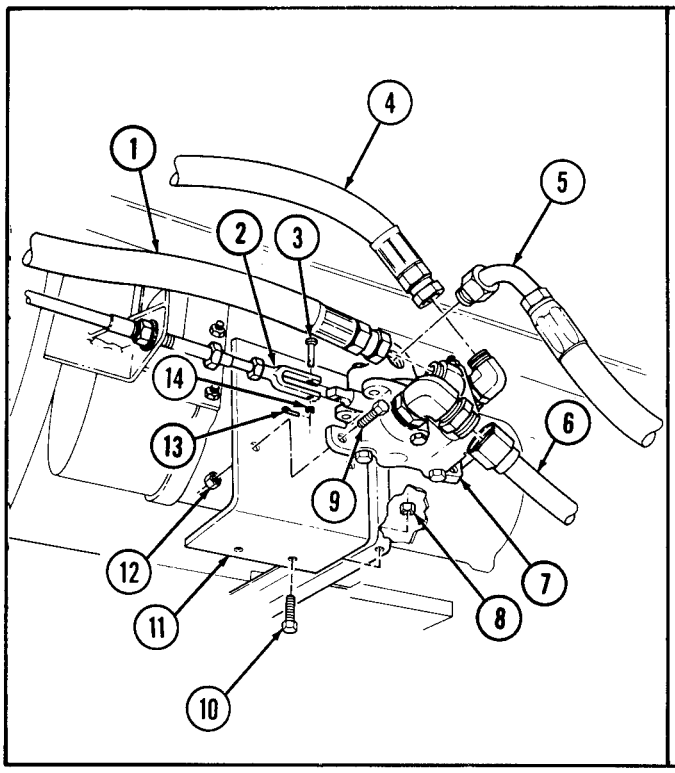
- The front winch control valve and dump body control valve are replaced the same way. This procedure covers the front winch control valve.
- All hoses and fittings must be tagged for installation.
- All models have four hoses except M930 which has six.

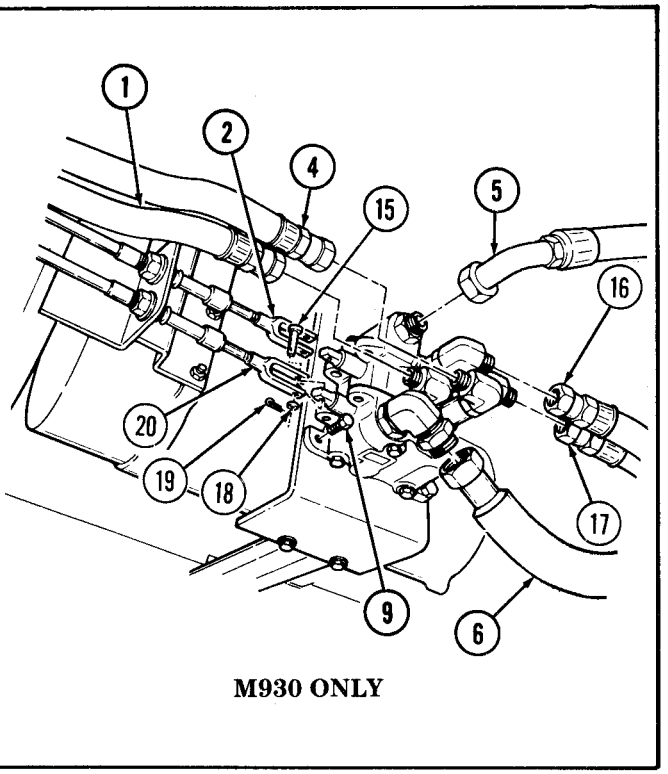
a. Removal

1.	Control valve (7)	Hoses (1), (4), (5), and (6)	Disconnect.	Tag for installation.

19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE		
		Step 2 is for M930 only.		
2.		Hoses (16) and (17)	Disconnect.	Tag for installation.
3.	Cable clevis (2)	Clevis pin (3), cotter pin (13), and washer (14)	Remove.	Discard cotter pin (13).
		NOTE		
		Step 4 is for M930 only.		
4.	Cable clevis (20)	Clevis pin (15), cotter pin (19), and washer (18)	Remove.	Discard cotter pin (19).
5.	Bracket (11)	Four bolts (10) and locknuts (8)	Remove.	Discard locknuts (8).
6.	Control valve (7)	Three bolts (9) and locknuts (12)	Remove.	Discard locknuts (12).

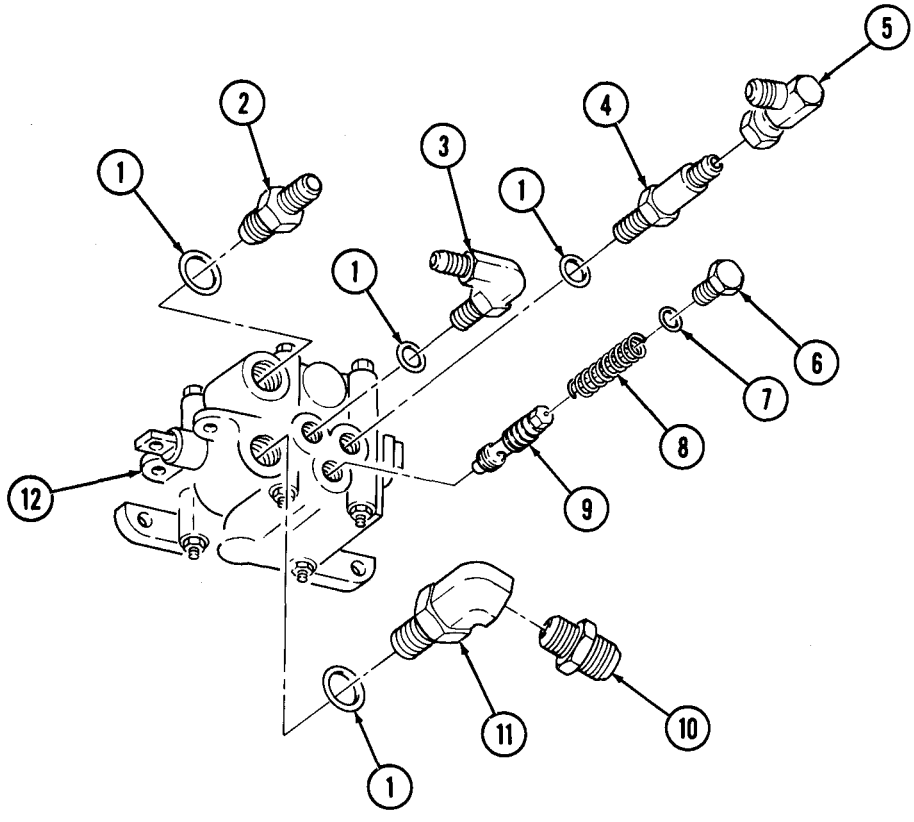




M930 ONLY

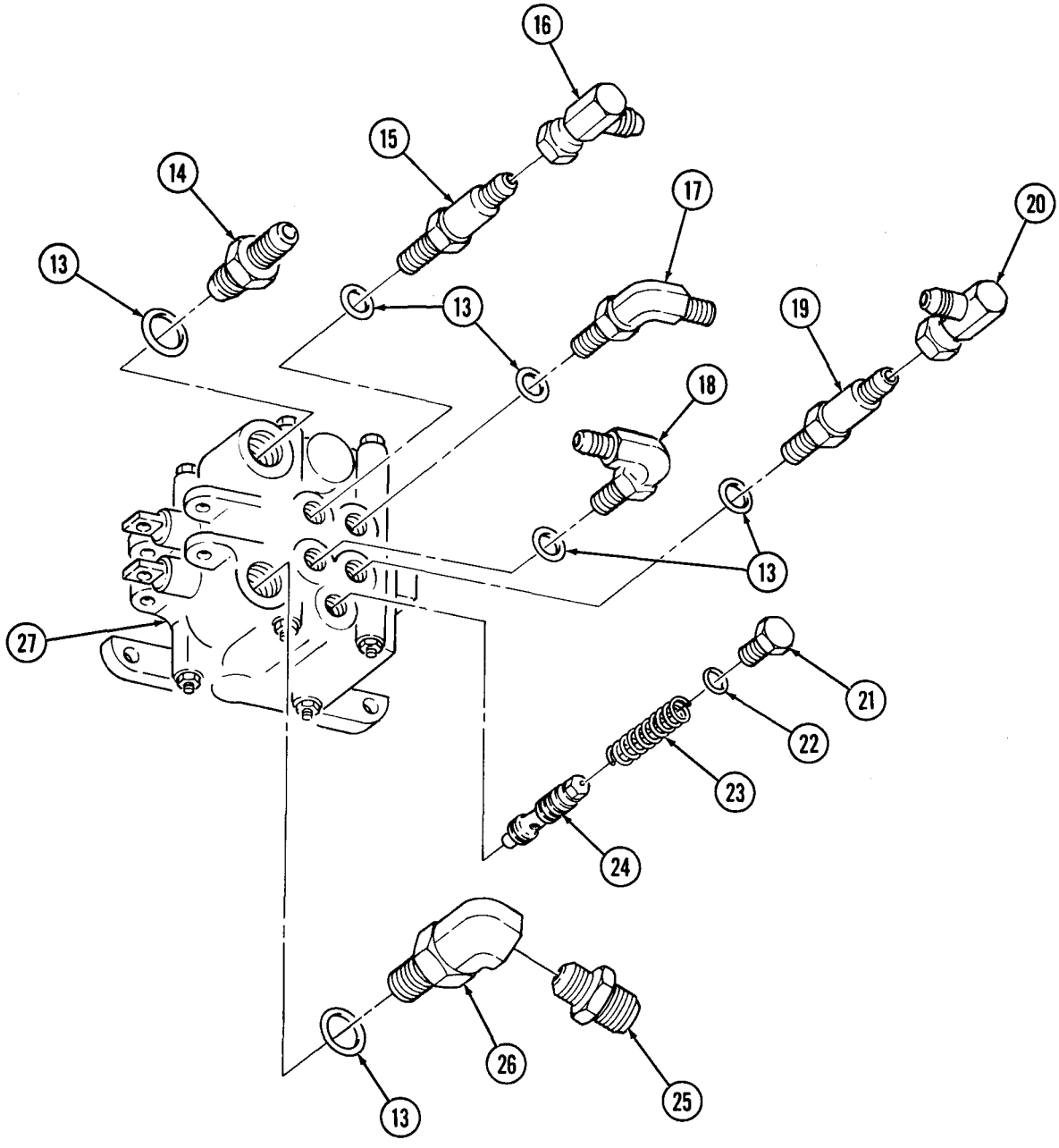
19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Fittings (4) and (11)	Elbow (5) and adapter (10)	Remove.	
8.	Control valve (12)	Fittings (2), (3), (4), and (11) and four captive "O" rings (1)	Remove.	Tag fittings for installation. Discard "O" rings (1).
9.		Plug (6), spring (8), and relief valve (9)	Remove.	
10.	Plug (6)	"O" ring (7)	Remove.	Discard "O" ring (7).
		NOTE Steps 11 through 14 are for M930 only.		
11.	Fittings (15), (19), and (26)	Elbows (16) and (20) and adapter (25)	Remove.	
12.	Control valve (27)	Fittings (14), (15), (17), (18), (19), and (26) and six captive "O" rings (13)	Remove.	Tag fittings for installation. Discard "O" rings (13).
13.		Plug (21), spring (23), and relief valve (24)	Remove.	
14.	Plug (21)	"O" ring (22)	Remove.	Discard "O" ring (22).



19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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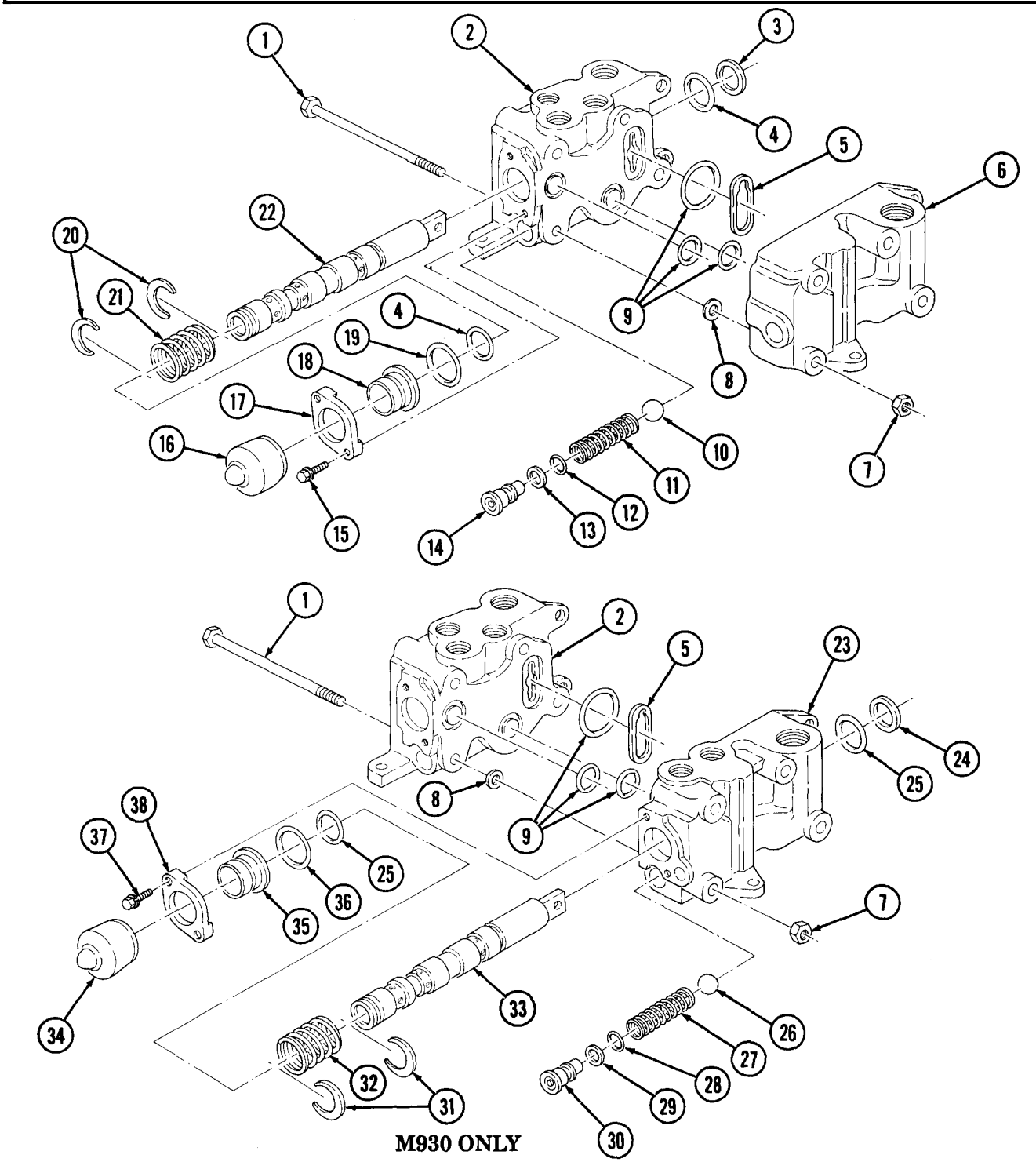
19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Disassembly				
15.	Inlet housing (2) and outlet housing (6)	Four nuts (7) and screws (1)	Remove.	
16.	Inlet housing (2)	Four shims (8), three "O" rings (9), and retainer (5)	Remove.	Discard shims (8), "O" rings (9), and retainer (5).
17.		Two screw-assembled lockwashers (15) and retainer (17)	Remove.	Discard screw-assembled lockwashers (15).
18.	Retainer (17)	Dust boot (16) and sleeve (18)	Remove.	
19.	Sleeve (18)	"O" ring (19)	Remove.	Discard "O" ring (19).
20.	Inlet housing (2)	Valve spool (22)	Remove.	
21.	Valve spool (22)	Two "O" rings (4)	Remove.	Discard "O" rings (4).
		NOTE		
		Perform step 22 only if spring or retainers require replacement.		
22.		Two retainers (20) and spring (21)	Remove.	
23.	Inlet housing (2)	Gasket (3)	Remove.	Discard gasket (3).
24.		Plug (14), spring (11), and ball (10)	Remove.	
25.	Plug (14)	"O" ring (12) and gasket (13)	Remove.	Discard "O" ring (12) and gasket (13).
		NOTE		
		Steps 26 through 32 are for M930 only.		
26.	Outlet housing (23)	Two screw-assembled lockwashers (37) and retainer (38)	Remove.	Discard screw-assembled lockwashers (37).
27.	Retainer (38)	Dust boot (34) and sleeve (35)	Remove.	
28.	Sleeve (35)	"O" ring (36)	Remove.	Discard "O" ring (36).
29.	Outlet housing (23)	Valve spool (33)	Remove.	
30.	Valve spool (33)	Two "O" rings (25)	Remove.	Discard "O" rings (25).
		NOTE		
		Perform step 31 only if spring or retainers require replacement.		
31.		Two retainers (31) and spring (32)	Remove.	
32.	Outlet housing (23)	Gasket (24)	Remove.	Discard gasket (24),
33.		Plug (30), spring (27), and ball (26)	Remove.	
34.	Plug (30)	"O" ring (28) and gasket (29)	Remove.	Discard "O" ring (28) and gasket (29).

19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

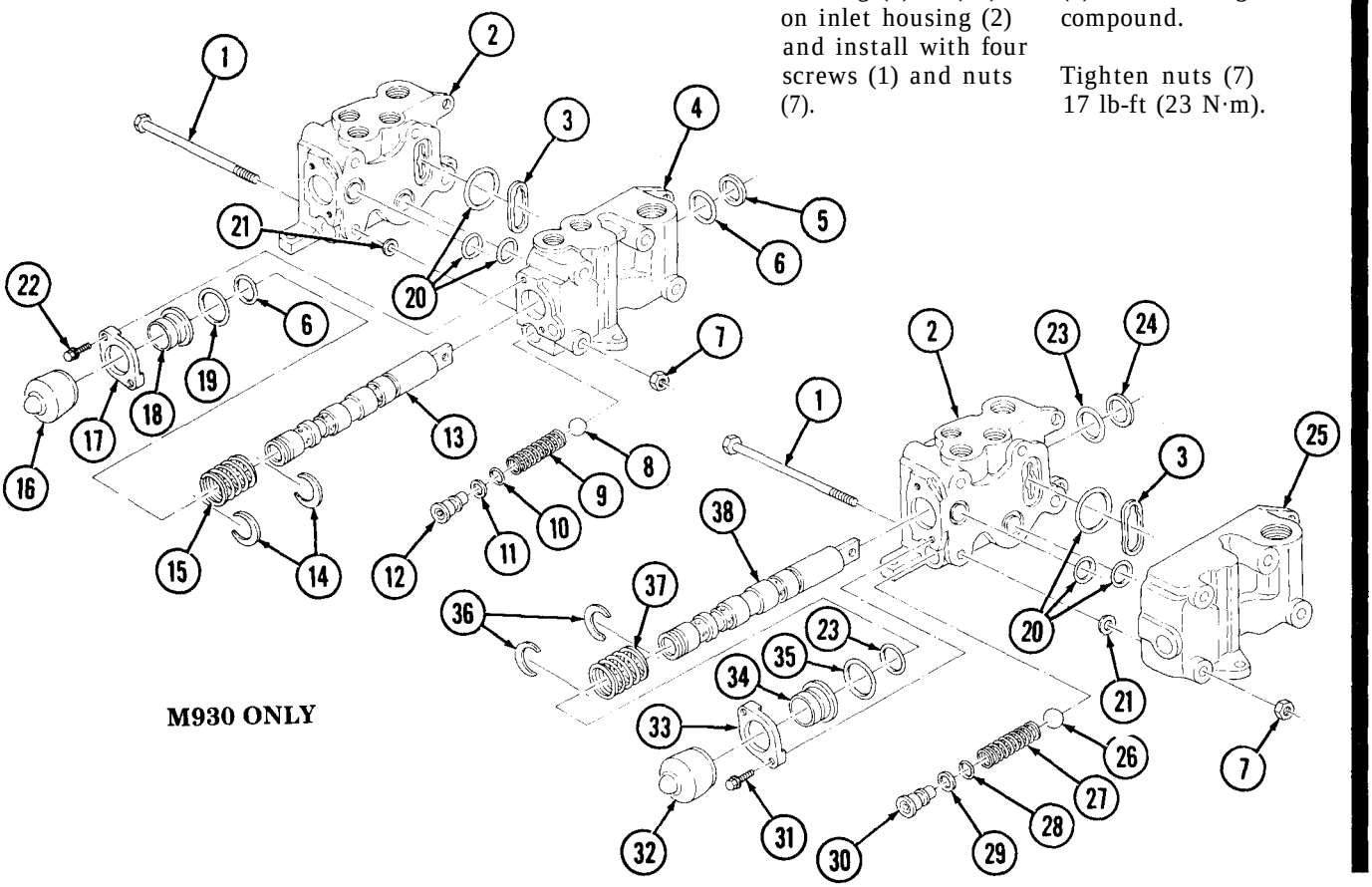


19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Contd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Cleaning and Inspection				
35.			Clean all control valve parts (para. 2-9).	
36.		Valve spools (13) and (38)	Inspect for burrs, scoring, and damage.	Remove burrs and scoring with a polishing stone or crocus cloth. Replace if excessively burred, scored, or damaged.
37.		Outlet housings (4) and (25) and inlet housing (2)	Inspect for burrs, scoring, and damage.	Remove burrs and scoring with a polishing stone or crocus cloth. Replace if excessively burred, scored, or damaged.
d. Assembly				
		NOTE • Steps 38 through 46 are for M930 only. • Perform step 38 only if springs or retainers were removed.		
38.		Two retainers (14) and spring (15)	Install on valve spool (13).	
39.		Two new "O" rings (6)	Install in grooves of valve spool (13).	
40.		New gasket (5)	Install in bore of outlet housing (4).	
41.		Valve spool (13)	Install in bore of outlet housing (4).	
42.		New "O" ring (19)	Install in sleeve (18).	
43.		Dust boot (16) and sleeve (18)	Install on retainer (17).	
44.		Retainer (17)	Install on outer housing (4) with two new screw. assembled lockwashers (22).	
45.		New "O" ring (11) and new gasket (10)	Install on plug (12).	
46.		Ball (8), spring (9), and plug (12)	Install in outlet housing (4).	
		NOTE Perform step 47 only if spring or retainers were removed.		
47.		Two retainers (36) and spring (37)	Install on valve spool (38).	
48.		Two new "O" rings (23)	Install in grooves of valve spool (38).	
49.		New gasket (24)	Install in bore of inlet housing (2).	

19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
50.		Valve spool (38)	Install in bore of inlet housing (2).	
51.		New "O" ring (35)	Install in sleeve (34).	
52.		Dust boot (32) and sleeve (34)	Install on retainer (33).	
53.		Retainer (33)	Install on inlet housing (2) with two new screw-assembled lockwashers (31).	
54.		New "O" ring (29) and new gasket (28)	Install on plug (30).	
55.		Ball (26), spring (27), and plug (30)	Install in inlet housing (2).	
56.		New retainer (3) and three new "O" rings (20)	Install in grooves of inlet housing (2).	
57.		Inlet housing (2) and outlet housing (4) or (25)	a. Position four new shims (21) on inlet housing (2).	
			b. Carefully place outlet housing (4) or (25) on inlet housing (2) and install with four screws (1) and nuts (7).	Coat threads of screws (1) with sealing compound. Tighten nuts (7) 17 lb-ft (23 N·m).



19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

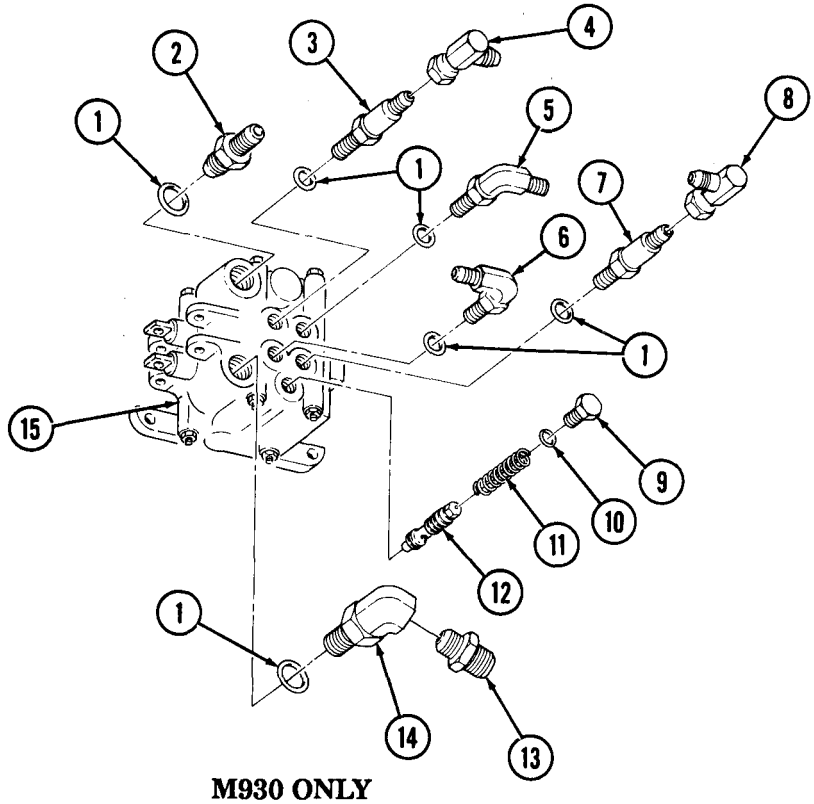
STEP NO.	LOCATION	ITEM	ACTION	REMARKS

e. Installation

NOTE

Steps 58 through 61 are for M930 only.

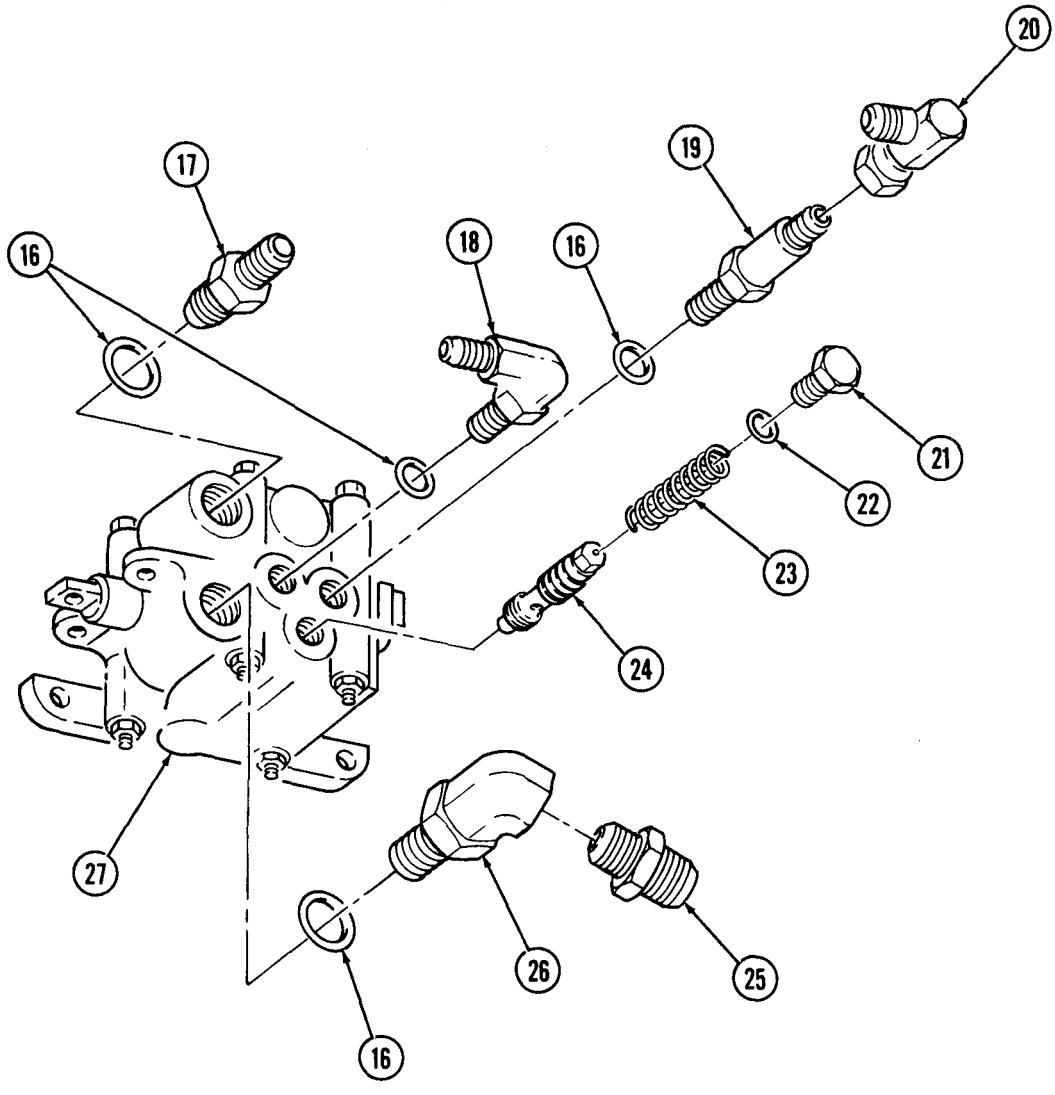
58.		New "O" ring (10)	Install on plug (9).
59.		Relief valve (12), spring (11), and plug (9)	Install on control valve
60.		Fittings (2), (3), (5), (6), (7), and (14) and six new captive "O" rings (1)	Install on control valve (15).
61.		Two elbows (4) and (8) and adapter (13)	Install on fittings (3), (7), and (14).
62.		New "O" ring (22)	Install on plug (21).
63.		Relief valve (24), spring (23), and plug (21)	Install on control valve (27).
64.		Fittings (17), (18), (19), (26) and four new captive "O" rings (16)	Install on control valve (27).
65.		Elbow (20) and adapter (25)	Install on fittings (19) and (26).



M930 ONLY

19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

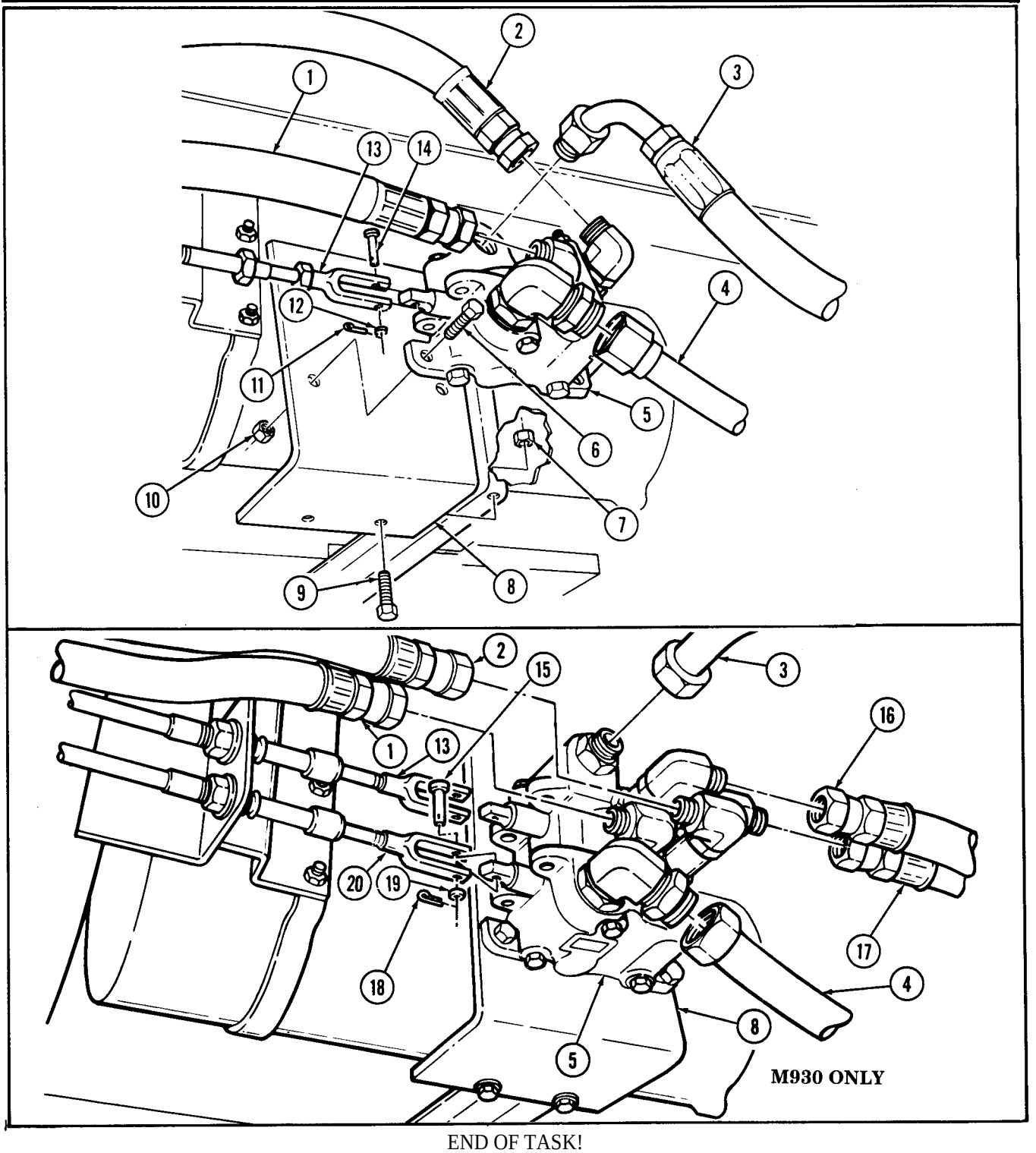


19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
66.		Control valve (5)	Position to bracket (8) and install with three bolts (6) and new locknuts (10).	
67.		Bracket (8)	Install with four bolts (9) and new locknuts (7).	
68.		Hoses (1), (2), (3), and (4)	Connect to control valve (5).	
		NOTE Step 69 is for M930 only.		
69.		Hoses (16) and (17)	Connect to control valve (5).	
70.		Cable clevis (13)	Install on control valve (5) with clevis pin (14), washer (12), and new cotter pin (11).	
		NOTE Step 71 is for M930 only.		
71.		Cable clevis (20)	Install on control valve (5) with clevis pin (15), washer (19), and new cotter pin (18).	

19-10. FRONT WINCH CONTROL VALVE MAINTENANCE (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Fill hydraulic oil reservoir (LO 9-2320-272-12).

19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M925, M926, M928 M929, M930, M932, M936	TM 9-2320-272-10 LO 9-2320-272-12	Parking brake set. Hydraulic oil reservoir drained.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two locknuts
Protective cap-plugs (Appendix C, Item 5)
Six tiedown straps (Appendix C, Item 22)
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

a. Removal

CAUTION

Plug all openings to prevent dirt from entering and damaging components.

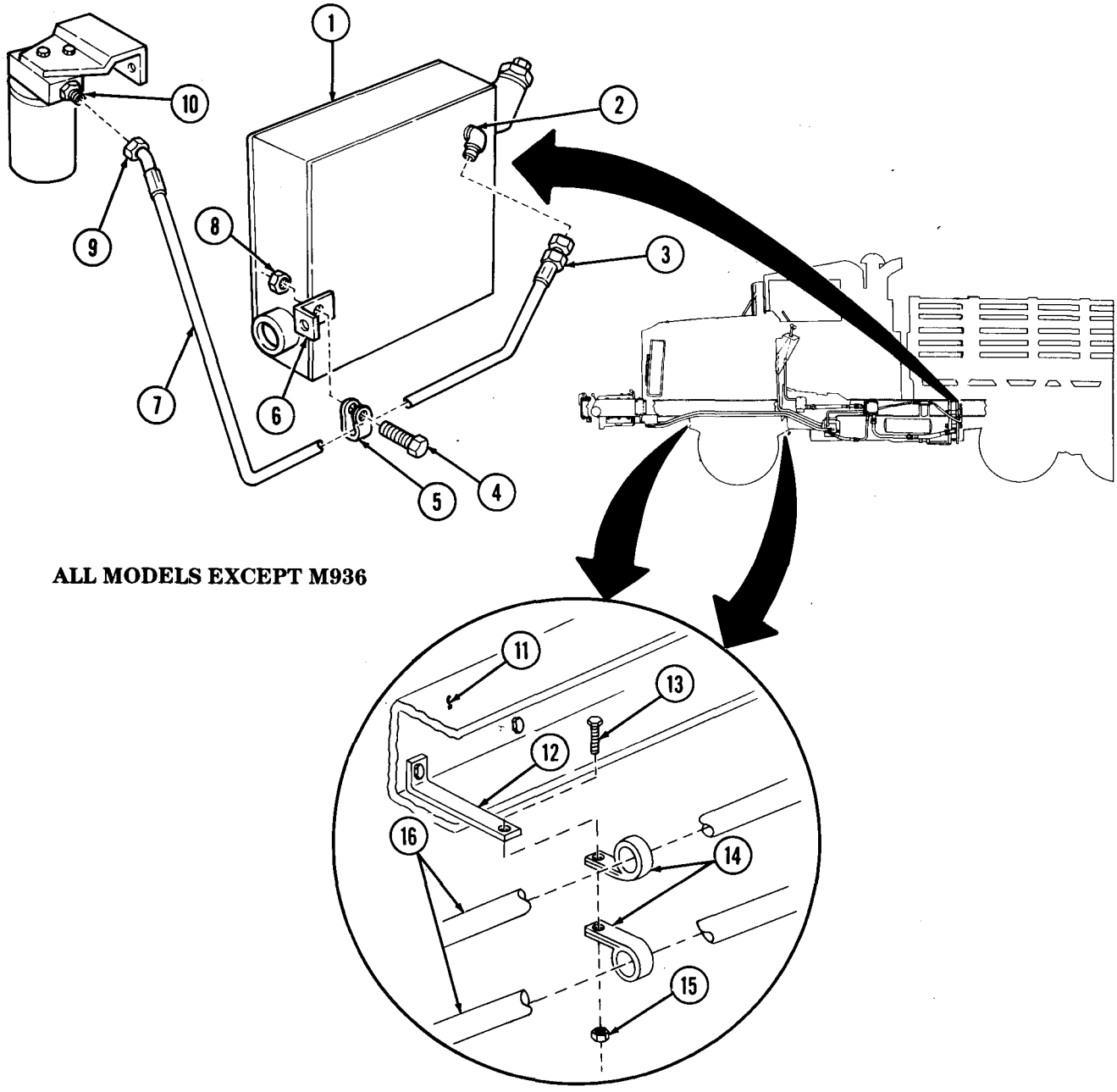
NOTE

- Remove and discard tiedown straps holding hoses to vehicle.
- Have drainage container ready to catch oil.
- Perform steps 1 through 4 for all vehicles except M936.

1.	Filter adapter (10)	Hose nut (9)	Disconnect.	Hold filter adapter (10) to prevent turning.
2.	Hydraulic reservoir (1)	Nut (8), screw (4), and clamp (5)	Remove from mounting bracket (6).	

19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
3.	Reservoir elbow (2)	Hose nut (3)	Disconnect.	
4.		Hose (7)	Remove.	
5.	Right frame rail (11) and two hydraulic hoses (16)	Two pairs of hose clamps (14), two screws (13), and locknuts (15)	Remove.	Discard locknuts (15). Clamp brackets (12) remain attached to frame rail (11).



ALL MODELS EXCEPT M936

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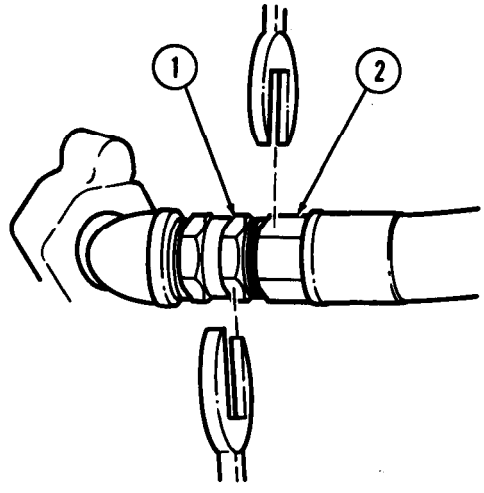
19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Tag hoses for installation.		
6.		Four hoses (3) and two tubes (4) and (5)	a. Position wrench over hose end (2). b. Loosen swivel flare nut (1). c. Disconnect hoses at each end. d. Remove hoses (3).	Hold hose end (2) firmly in place.



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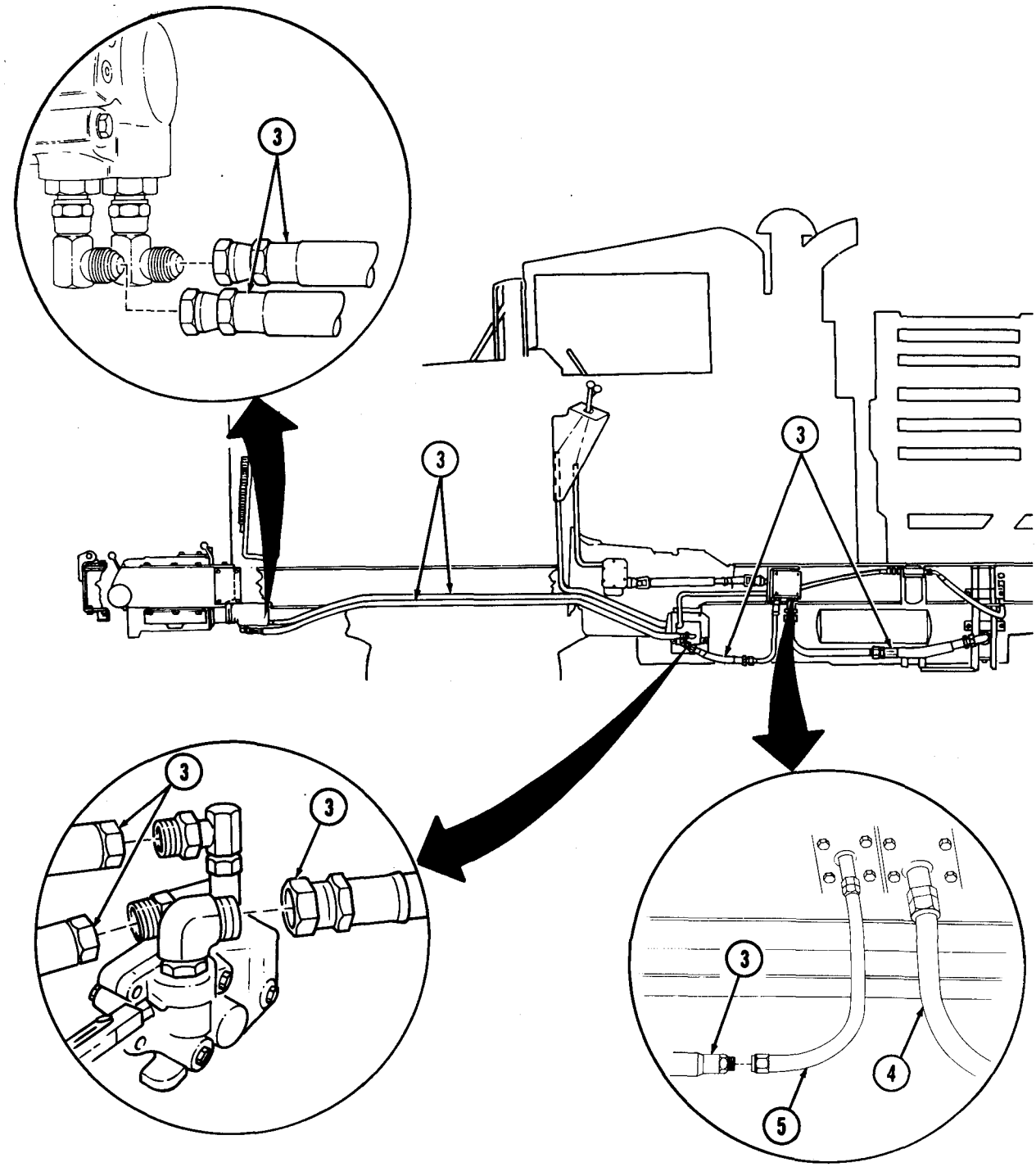
19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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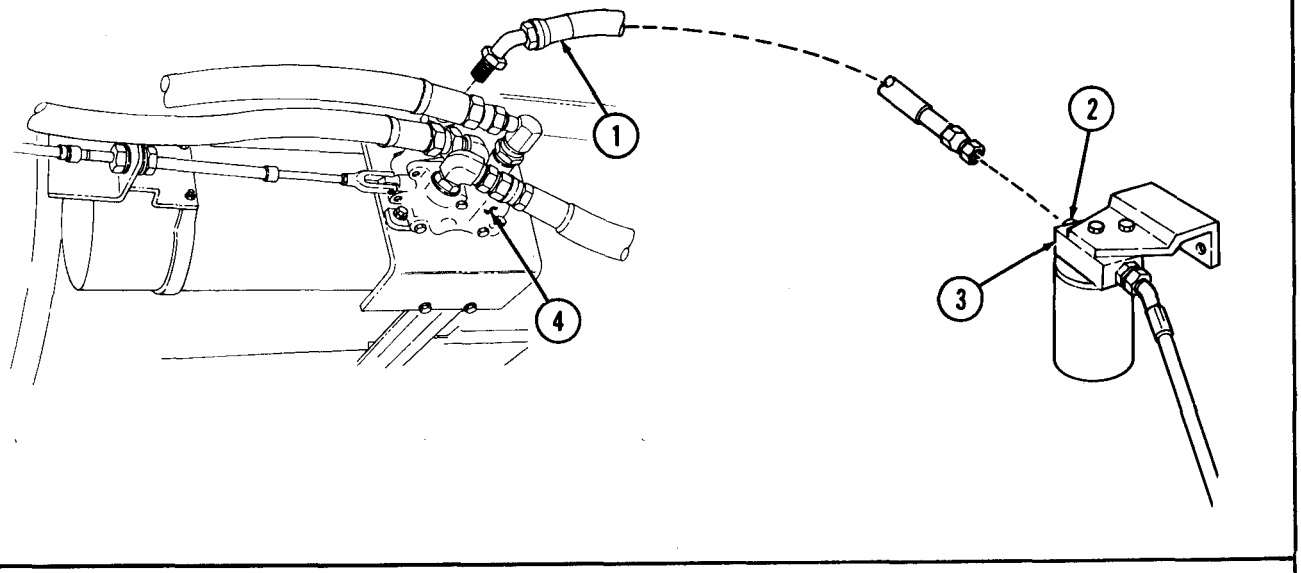
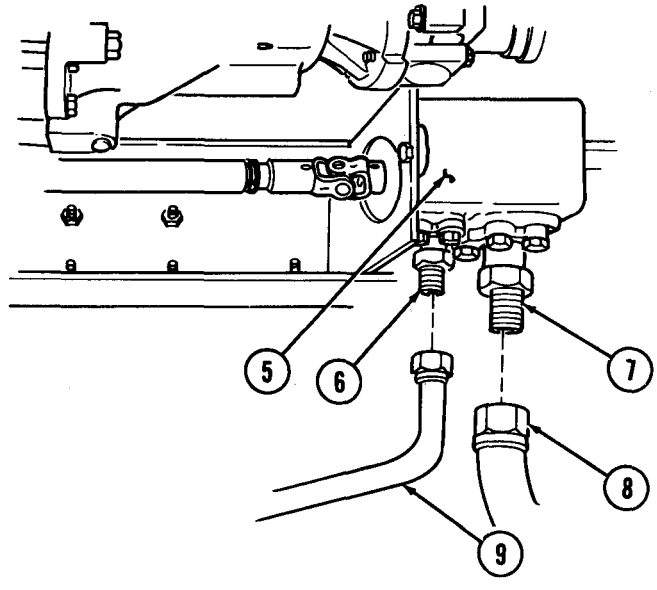
19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Perform steps 7 and 8 for all vehicles except M936.		
7.	Filter (3)	Hose (1)	Disconnect from adapter (2).	Use wrench to prevent adapter (2) from turning.
8.	Control valve (4)	Hose (1)	Remove.	
9.	Hydraulic pump (5)	Two tubes (8) and (9)	Remove from adapters (6) and (7).	
b. Installation				
10.		Two tubes (8) and (9)	Connect to adapters (6) and (7).	
		NOTE • Perform step 11 for all vehicles except M936. • Wrap all male pipe threads with sealing tape.		
11.		Hose (1)	a. Connect to control valve (4). b. Connect to adapter (2).	

19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

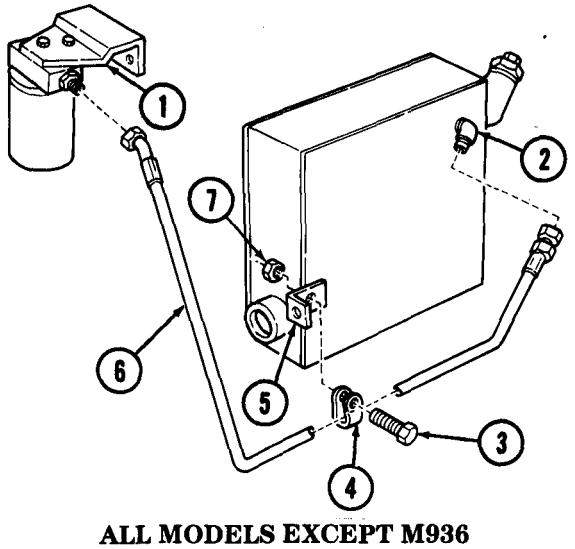




TA 350931

19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE		
		Perform steps 12 through 14 for all vehicles except M936.		
12.		Hydraulic hose (6)	a. Connect to elbow (2). b. Connect to adapter (1).	
13.		Clamp (4)	a. Position on hose (6) and mounting bracket (5). b. Install with screw (3) and nut (7).	
14.		Hose (16)	Connect to elbow (15) and tube (17).	Use care to avoid bending tube (17).
15.		Hose (19)	Connect to tube (18) and control valve elbow (20).	Use care to avoid bending tube (18).
16.		Two hose ends (22)	Connect to two control valve elbows (21).	
17.		Two hose ends (9)	Connect to two elbows (8).	
18.		Two pairs of clamps (12)	a. Install on hoses (14). b. Install on two brackets (10) with two screws (11) and new locknuts (13).	
19.		Six tiedown straps	Install as necessary to two hoses (14).	

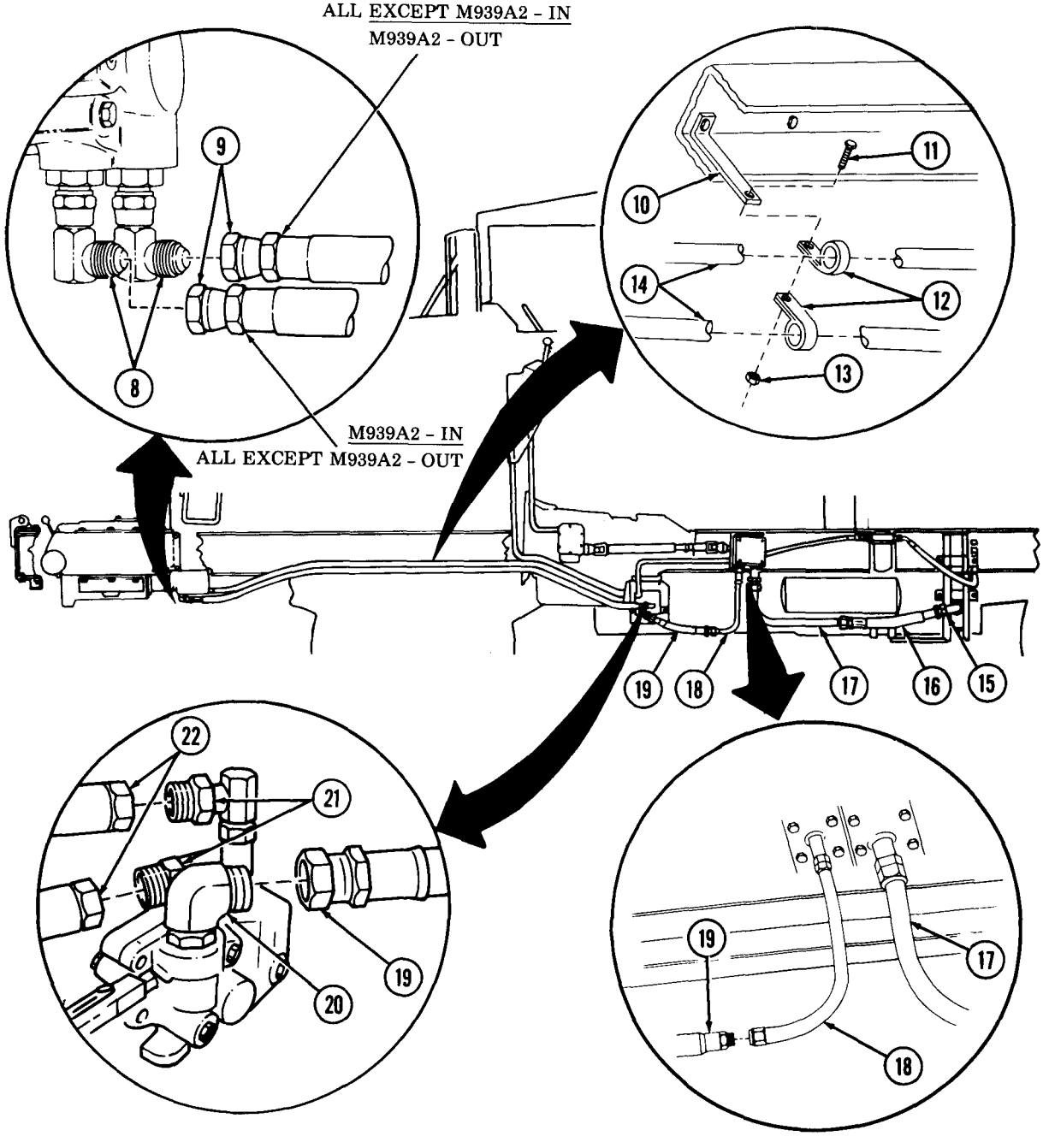


ALL MODELS EXCEPT M936

TA 350932

19-11. FRONT WINCH HYDRAULIC HOSE AND TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Fill hydraulic oil reservoir (LO 9-2320-272-12).
- Start engine (TM 9-2320-272-10). Operate winch and check for leaks and proper operation.

TA 350933

Section III. REAR WINCH COMPONENTS MAINTENANCE

19-12. REAR WINCH MAINTENANCE TASK SUMMARY

19-13. REAR WINCH REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-20-2 Para. 19-18	Rear winch removed from vehicle. Rear winch level wind removed.

Test Equipment
Spring tester

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four cotter pins
Twenty-nine lockwashers
Four gaskets
Four seals
Two bushings
Two woodruff keys
"O" ring
Brake band
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO 30 (Appendix C, Item 17)
Rags (Appendix C, Item 23)
Sealing compound (Appendix C, Item 26)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

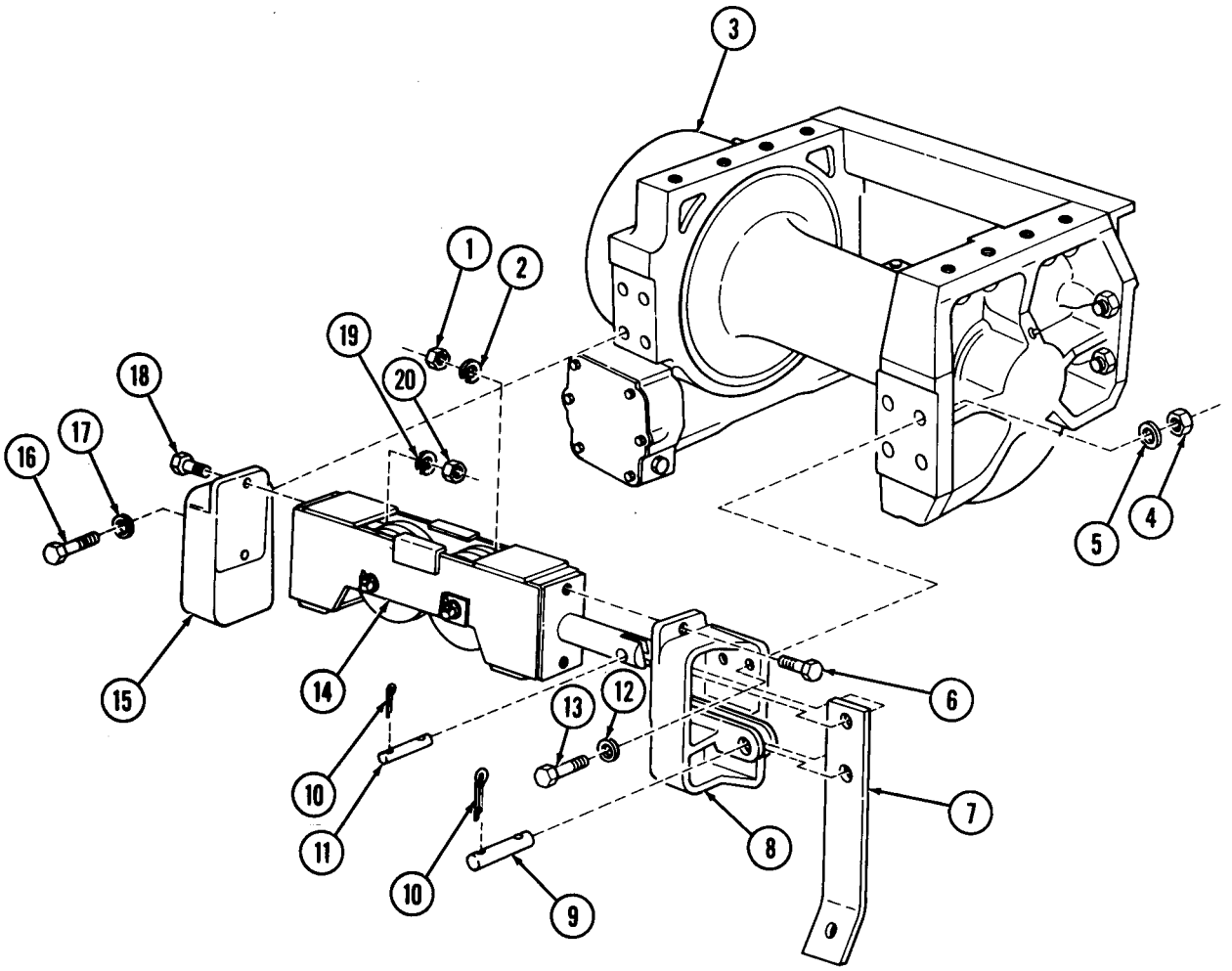
General Safety Instructions
The rear winch is a heavy component. Use hoists during repair to prevent injury.

Manual References
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Bracket (8)	Four cotter pins (10), pin (9), pin (11), and lever (7)	Remove.	Discard cotter pins (10).
2.	Bracket (15)	Four bolts (16) and lockwashers (17)	Remove.	Discard lockwashers (17).
3.	Tensioner frame (14)	Two screws (18), nuts (20), and lockwashers (19), and bracket (15)	Remove.	Discard lockwashers (19).
4.	Bracket (8)	Two screws (6), lockwashers (2), and nuts (1), and tensioner frame (14)	Remove.	Discard lockwashers (2).

19-13. REAR WINCH REPAIR (Cont'd)

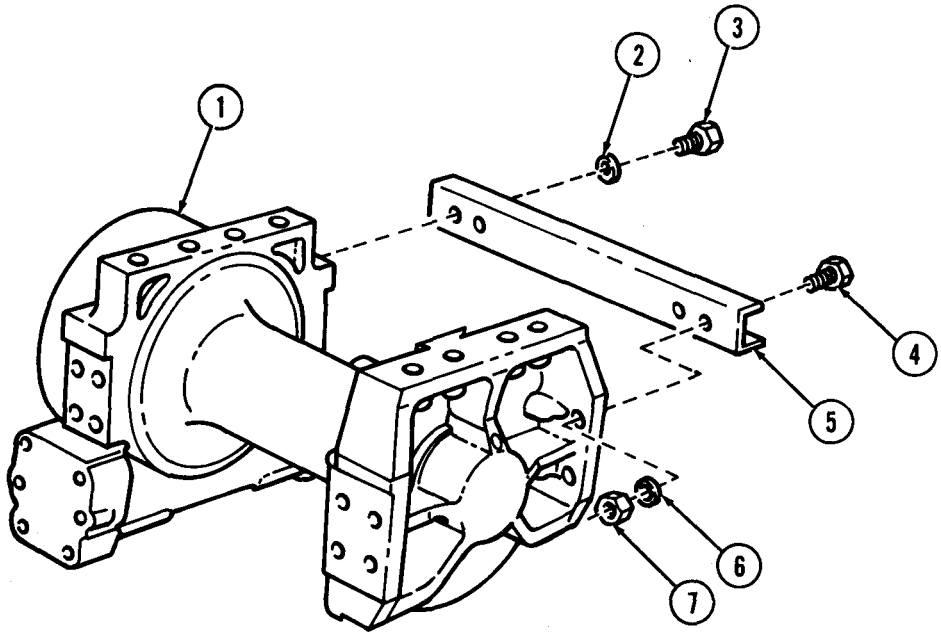
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Rear winch (3)	Four screws (13), two nuts (4) and lockwashers (5), four washers (12), and bracket (8)	Remove.	Discard lockwashers (5).



TA 350934

19-13. REAR WINCH REPAIR (Cont'd)

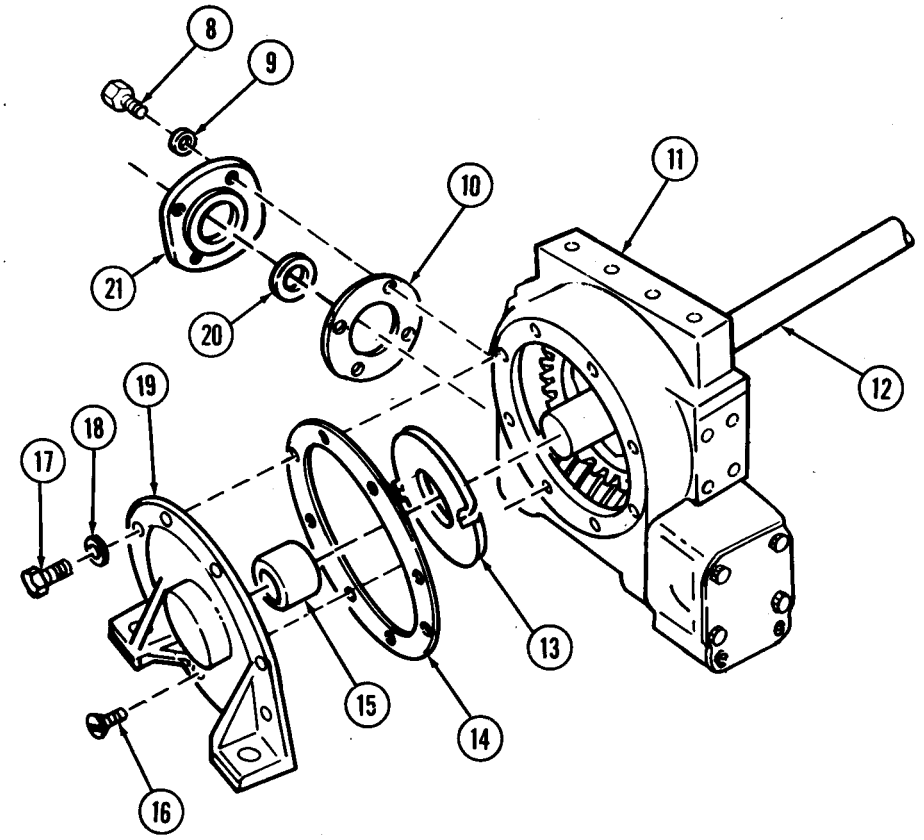
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Rear winch (1)	Three screws (3) and lockwashers (2)	Remove.	Discard lockwashers (2).
7.		Screw (4), nut (7), lockwasher (6), and front channel (5)	Remove.	Discard lockwasher (6).



TA 350935

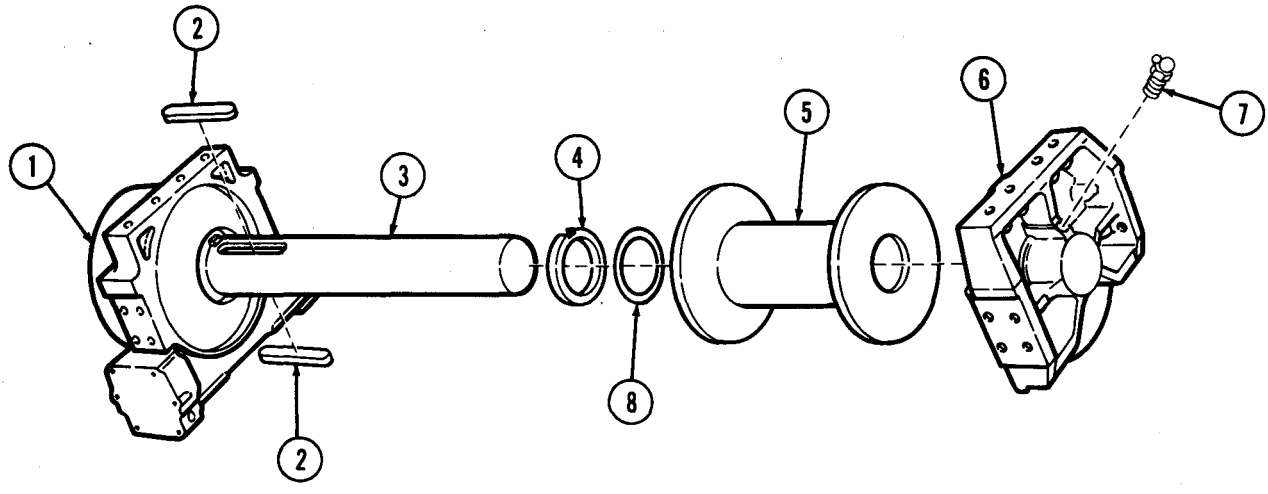
19-13. REAR WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Assistant will help with step 8.		
8.	Gearcase (11)	Two screws (16), six bolts (17) and lockwashers (18), end cover (19), and gasket (14)	Remove.	Discard lockwashers (18) and gasket (14).
9.	Drum shaft (12)	Thrust washer (13)	Remove.	
10.	Gearcase (11)	Four screws (8) and lockwashers (9), input shaft bearing cap (21), and gasket (10)	Remove.	Discard gasket (10) and lockwashers (9).
11.	Bearing cap (21)	Seal (20)	Remove.	Discard seal (20).
12.	End cover (19)	Bushing (15)	Remove.	Discard bushing (15) if inner diameter is more than 3.150 in. (80.01 mm).



19-13. REAR WINCH REPAIR (Cont'd)

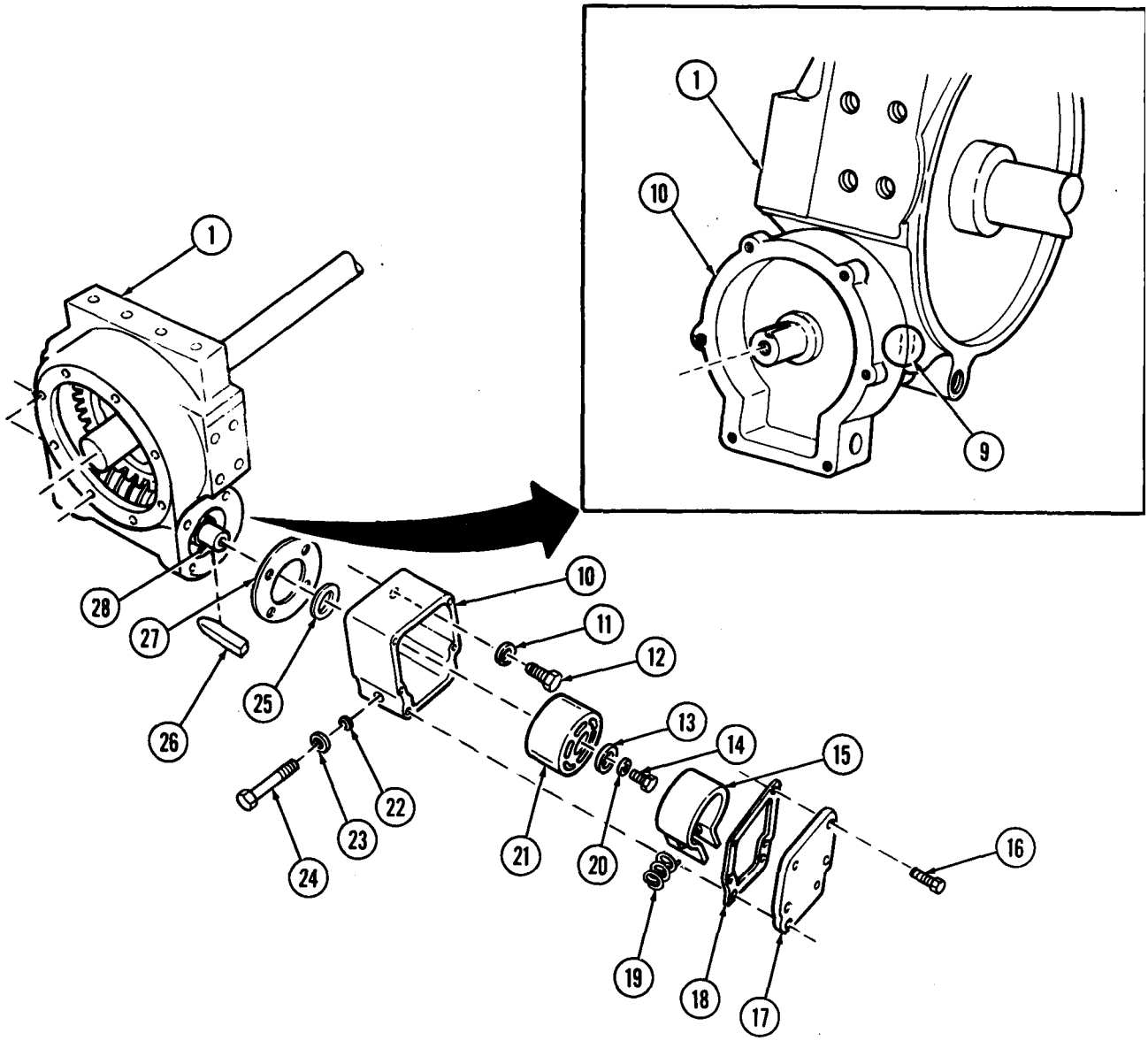
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Support drum with overhead hoist.		
13.	Gearcase assembly (1)	End frame (6)	Remove.	
14.	Drum shaft (3)	Drum (5), seal (8), thrust washer (4), two keys (2), and grease fitting (7)	Remove.	Discard seal (8) and two keys (2).
15.	Automatic brake housing (10)	Six screw-assembled washers (16), housing cover (17), and gasket (18)	Remove.	Discard gasket (18). Clean gasket remains from mating surfaces.
16.		Adjusting screw (24), "O" ring (22), and washer (23)	Remove.	Discard "O" ring (22).
17.		Brake band (15) and spring (19)	Remove.	Discard brake band (15).
		NOTE Assistant will help with step 18.		
18.		Screw (14), lockwasher, (20), washer (13), and brakedrum (21)	Remove.	Discard lockwasher (20). Use puller to remove brakedrum (21).
19.	Gearcase (1)	Brake housing (10)	Scribe alinement marks (9) between gearcase (1) and housing (10).	Mark (9) is used for reassembly.



TA 350937

19-13. REAR WINCH REPAIR (Cont'd)

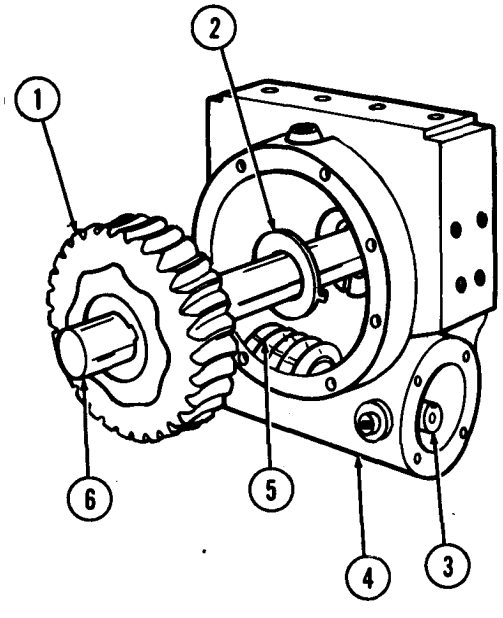
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
20.		Four screws (12) and lockwashers (11), brake housing (10), and gasket (27)	Remove.	Discard lockwashers (11) and gasket (27). Clean gasket remains from mating surfaces.
21.	Brake housing (10)	Seal (25)	Remove.	Discard seal (25).
22.	Worm gear shaft (28)	Key (26)	Remove.	



TA 350938

19-13. REAR WINCH REPAIR (Cont'd)

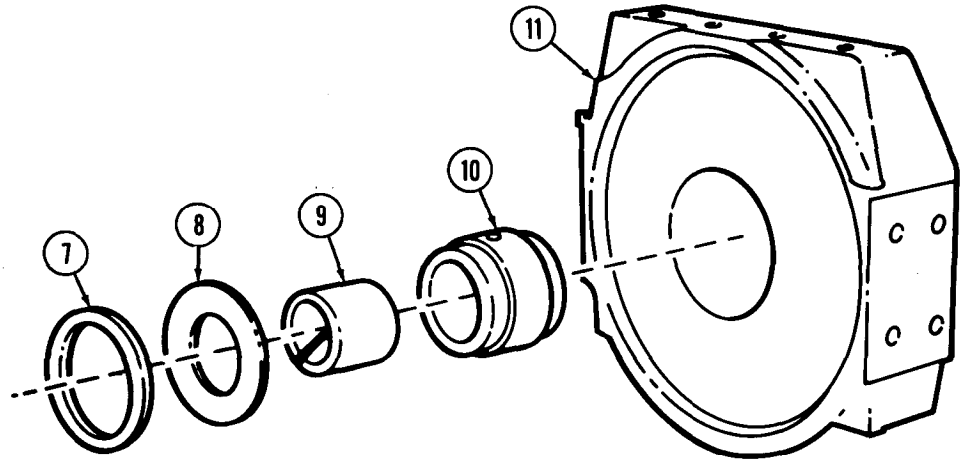
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Make sure a rag is placed in bottom of gearcase under worm gear to protect worm gear during removal.		
23.	Gearcase (4)	Worm gear shaft (3)	Tap with hammer at brake end. Allow worm gear (5) to drop to bottom of gearcase (4).	
24.		Drum shaft (6) and gear (1)	Remove.	
25.		Worm gear shaft (3) and thrust washer (2)	Remove.	



TA 350939

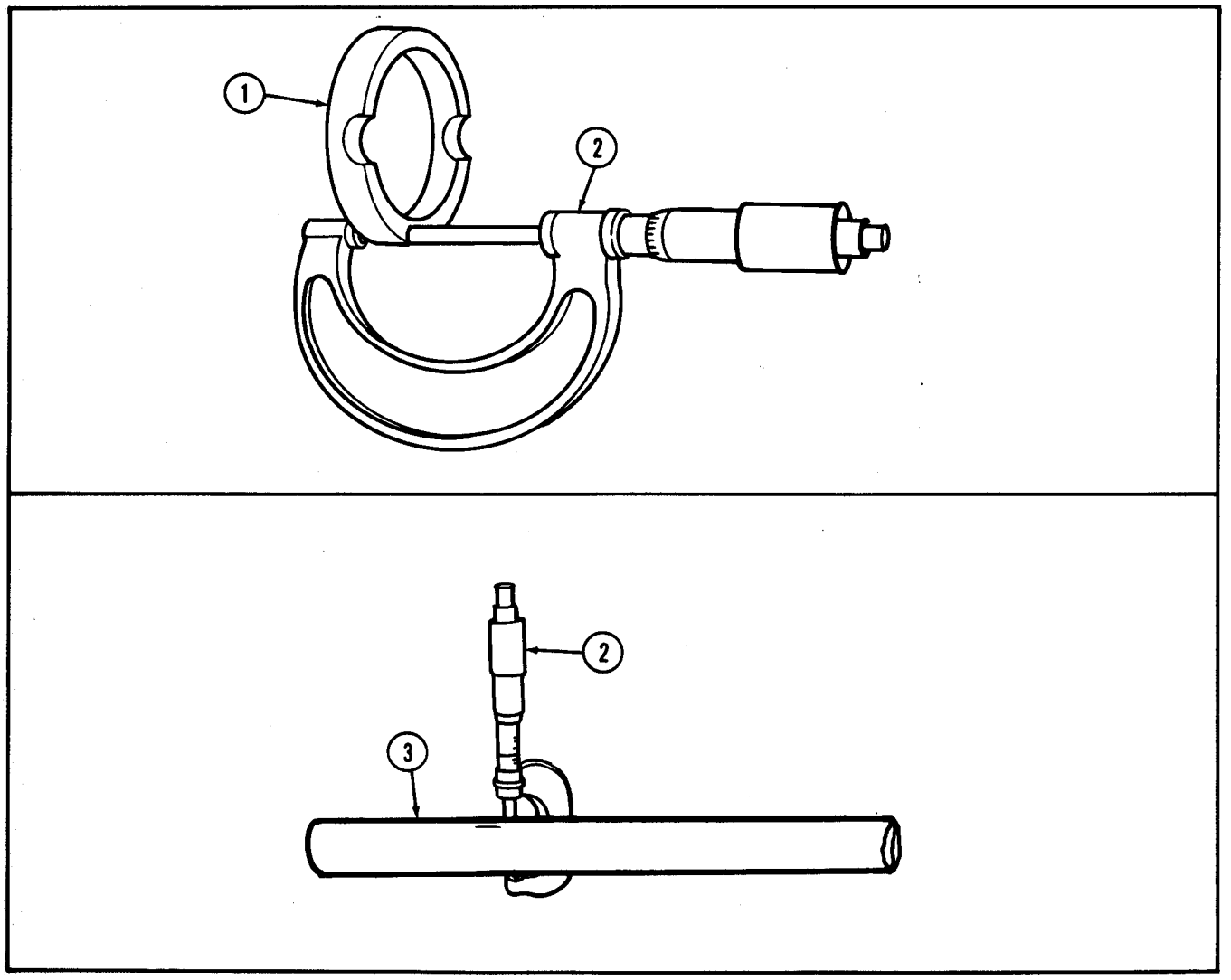
19-13. REAR WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
26.	End frame (11)	Seal (7), thrust washer (8), and sleeve (10)	Remove.	Discard seal (7).
27.	Sleeve (10)	Bushing (9)	Remove.	Discard bushing (9).



19-13. REAR WINCH REPAIR (Cont'd)

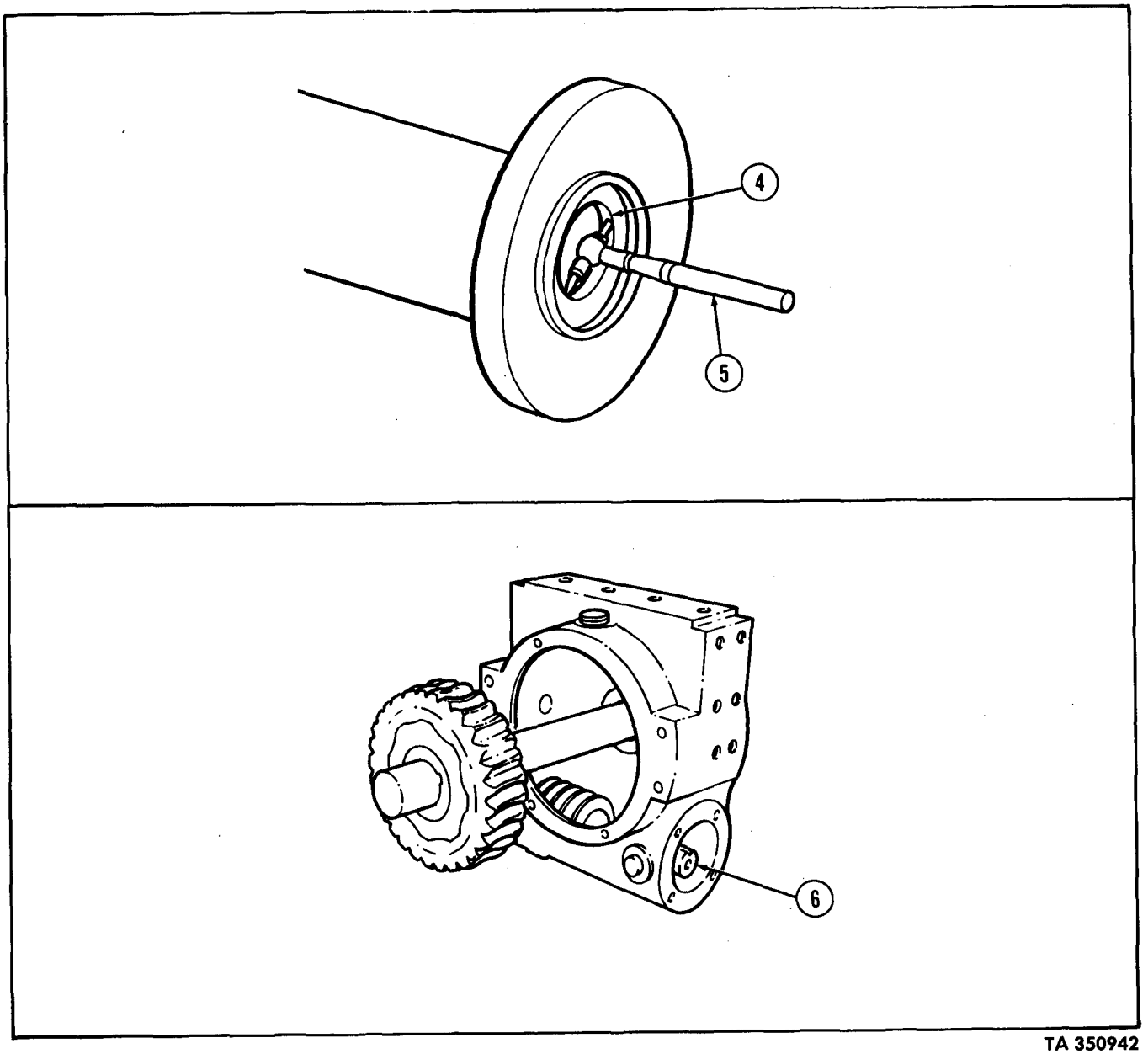
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		b. Cleaning and Inspection		
28.		All thrust washers (1)	a. Clean and inspect for cracks.	If cracked, replace.
			b. Measure with a micrometer (2).	Discard if thickness measures less than 0.059 in. (1.50 mm).
29.		Drum shaft (3)	a. Clean and inspect for cracks, chips, and straightness.	Discard if cracked, chipped, or bent.
			b. Measure all bearing surfaces with a micrometer (2).	Discard if diameter is less than 2.995 in. (76.07 mm).



TA 350941

19-13. REAR WINCH REPAIR (Cont'd)

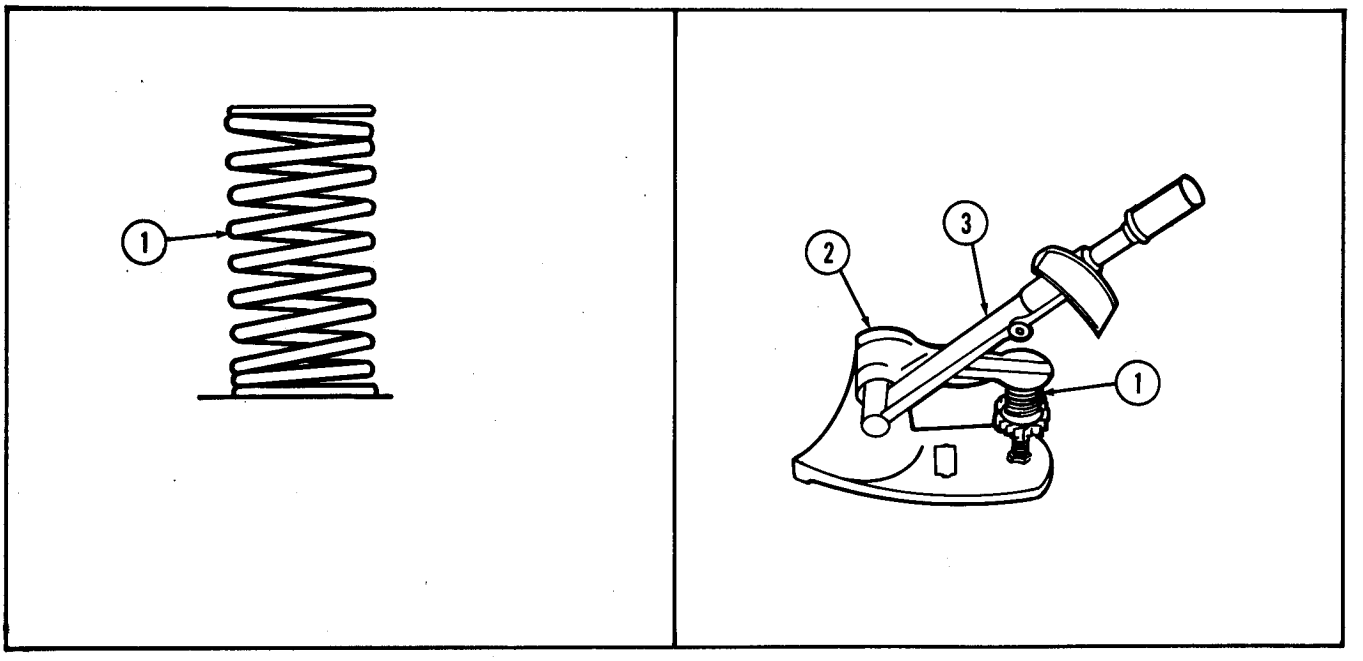
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
30.		Three bushings (4); one in end frame, two in gearcase	a. Clean and inspect for cracks, chips, and scoring.	Discard if cracked, chipped, or scored.
			b. Measure inner diameter with a telescoping gage (5).	Discard if inner diameter is more than 3.010 in. (76.45 mm).
31.		Worm shaft (6)	Clean and inspect for cracks, chips, scoring, or damaged bearings.	Discard if cracked, chipped, scored, or bearings damaged.



TA 350942

19-13. REAR WINCH REPAIR (Cont'd)

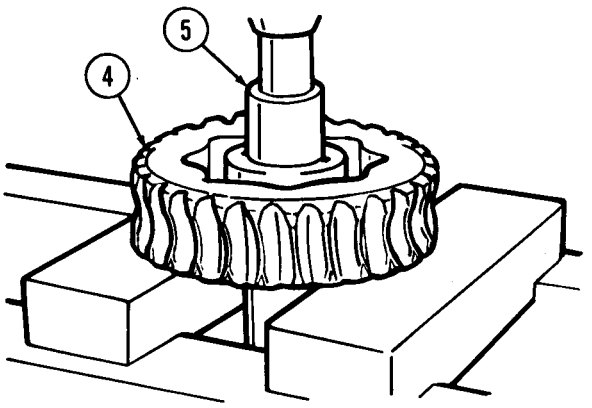
STEP NO.	LOCATION	ITEM	ACTION	
32.		Spring (1)	a. Clean and inspect for distortion, or cracked or collapsed coils.	Discard if distorted, cracked, or collapsed.
			b. Measure free length.	Discard if free length is not 2.750 in. (69.85 mm).
			c. Test spring (1) with tester (2) and torque wrench (3). When compressed to 2 in. (50.8 mm), torque wrench (3) should read 97 lb-ft (131.5 N·m).	Discard if test reading is different.
33.		All housings, covers, and cases.	Clean and inspect for cracks, broken parts, or damaged threads.	Discard if cracked, broken, or threads are damaged.



TA 350943

19-13. REAR WINCH REPAIR (Cont'd)

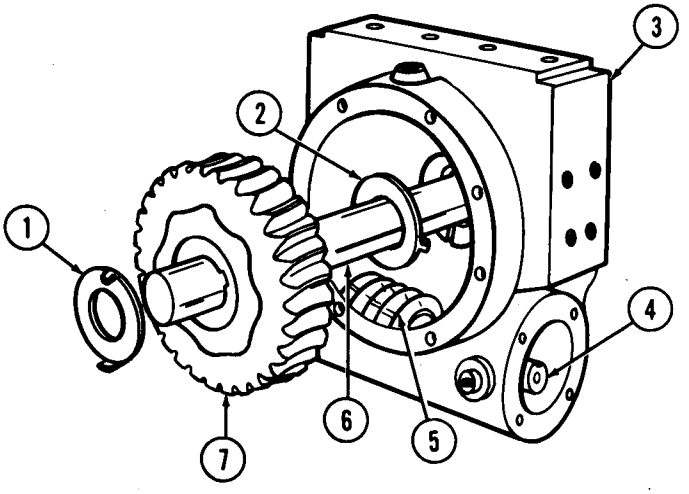
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
34.		Drum shaft gear (4)	Clean and inspect for broken, chipped, or scored teeth.	Discard if teeth are broken, chipped, or scored.
		NOTE		
		If drum shaft gear does not require replacement, go to step 37.		
35.		Drum shaft (5)	Press shaft (5) out of gear (4).	Use arbor press and mandrel.
		NOTE		
		Do not remove drum shaft keys if they are not damaged. If removed, install new keys.		
36.		New drum-shaft gear (4) or new shaft (5)	Press shaft (5) into gear (4).	Press shaft (5) through gear (4) until keys are centered in gear (4). Use arbor press and mandrel.



TA 350944

19-13. REAR WINCH REPAIR (Cont'd)

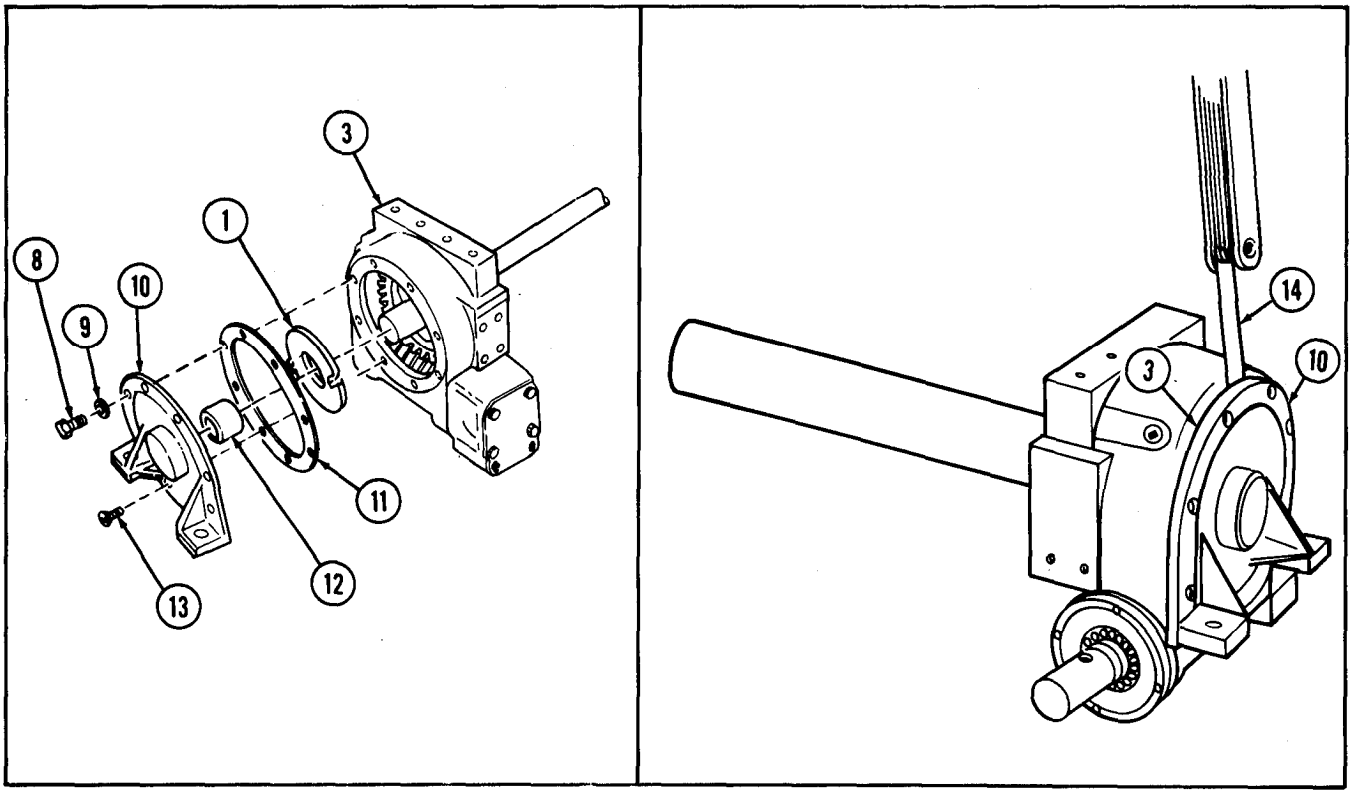
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassembly			
		NOTE		
		Apply light film of oil to all parts during assembly. Do not lubricate brake band or drum.		
37.		Worm gear shaft (4) and gear (5)	Position in gearcase (3) and allow to rest on the bottom of gearcase (3).	
		NOTE		
		Keyway end of worm gear shaft must extend from the side of gearcase marked in step 19.		
38.		Thrust washer (2)	Coat with GAA grease and install over drum shaft (6).	Make sure locking tab is toward gearcase bushing.
39.		Drum shaft (6) and gear (7)	a. Install part way into bushing.	
			b. Position thrust washer (2) against gearcase (3).	Make sure locking tab engages slot in gearcase (3).
			c. Install drum shaft (6) and gear (7).	
40.		Worm gear (5) and shaft (4)	Install.	Position worm gear shaft (4) in case (3), making sure worm gear (5) engages drum shaft gear (7).
41.		Thrust washer (1)	Install over shaft (6) and coat with GAA grease.	Make sure locking tab is toward end cover (10).
42.		Bushing (12)	Install in end cover (10).	



TA 350945

19-13. REAR WINCH REPAIR (Cont'd)

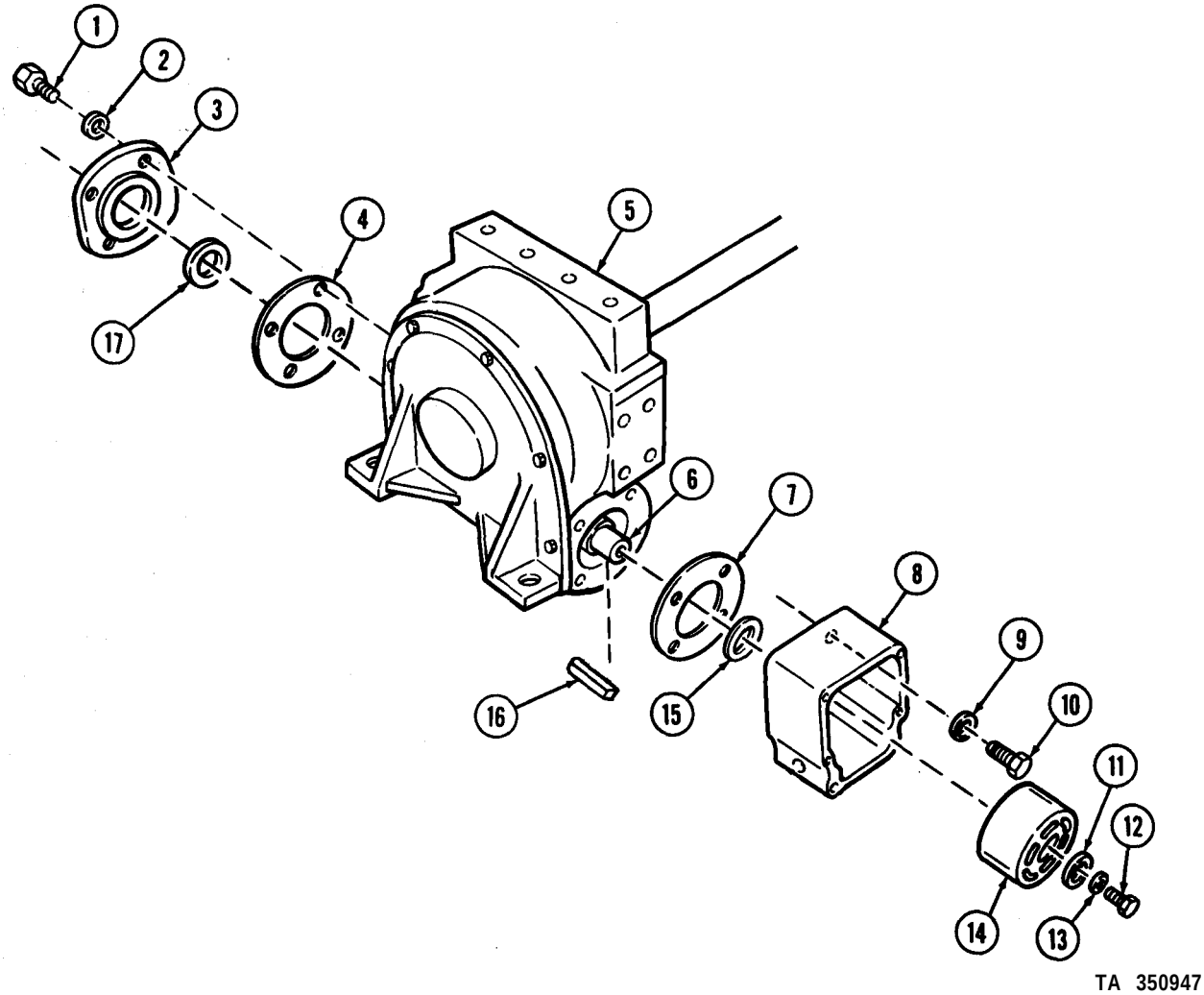
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
43.		End cover (10)	a. Position on shaft (6) with locking tab on thrust washer (1) alined with slot in cover (10).	Do not install gasket (11).
			b. Measure clearance between gearcase (3) and cover (10) with feeler gage (14).	If zero clearance, install gasket (11) and cover (10) and proceed to step 43c. If a measurement is obtained, add one to four gaskets (11). Thickness of gaskets (11) must be measurement obtained plus 0.005-0.015 in. (0.13-0.38 mm).
			c. With proper clearante obtained, install cover (10) with new gaskets (11) to gearcase (3) with two screws (13), six bolts (8), and new lockwashers (9).	Coat gaskets (11) with sealing compound.



TA 350946

19-13. REAR WINCH REPAIR (Cont'd)

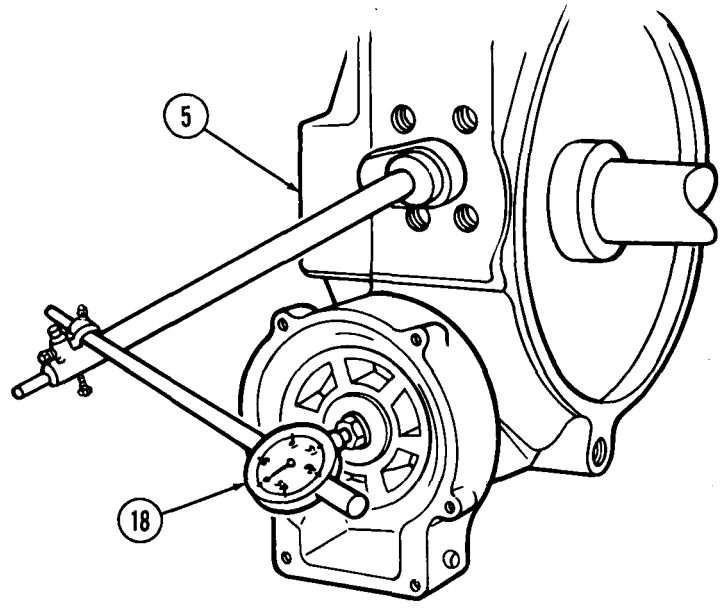
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
44.		New seal (15)	Install in brake housing (8).	
45.		Brake housing (8) and new gasket (7)	Position on gearcase (5) and install with four bolts (10) and new lockwashers (9).	
46.		New seal (17)	Install in input shaft bearing cap (3).	
47.		Input shaft bearing cap (3) and new gasket (4)	Position on gearcase (5) and install with four screws (1) and new lockwashers (2).	
48.		Key (16)	Install on shaft (6).	
49.		Brakedrum (11)	Position on shaft (6) and install with washer (14), bolt (12), and new lockwasher (13).	Make sure key slot in drum (11) engages key (16).



TA 350947

19-13. REAR WINCH REPAIR (Cont'd)

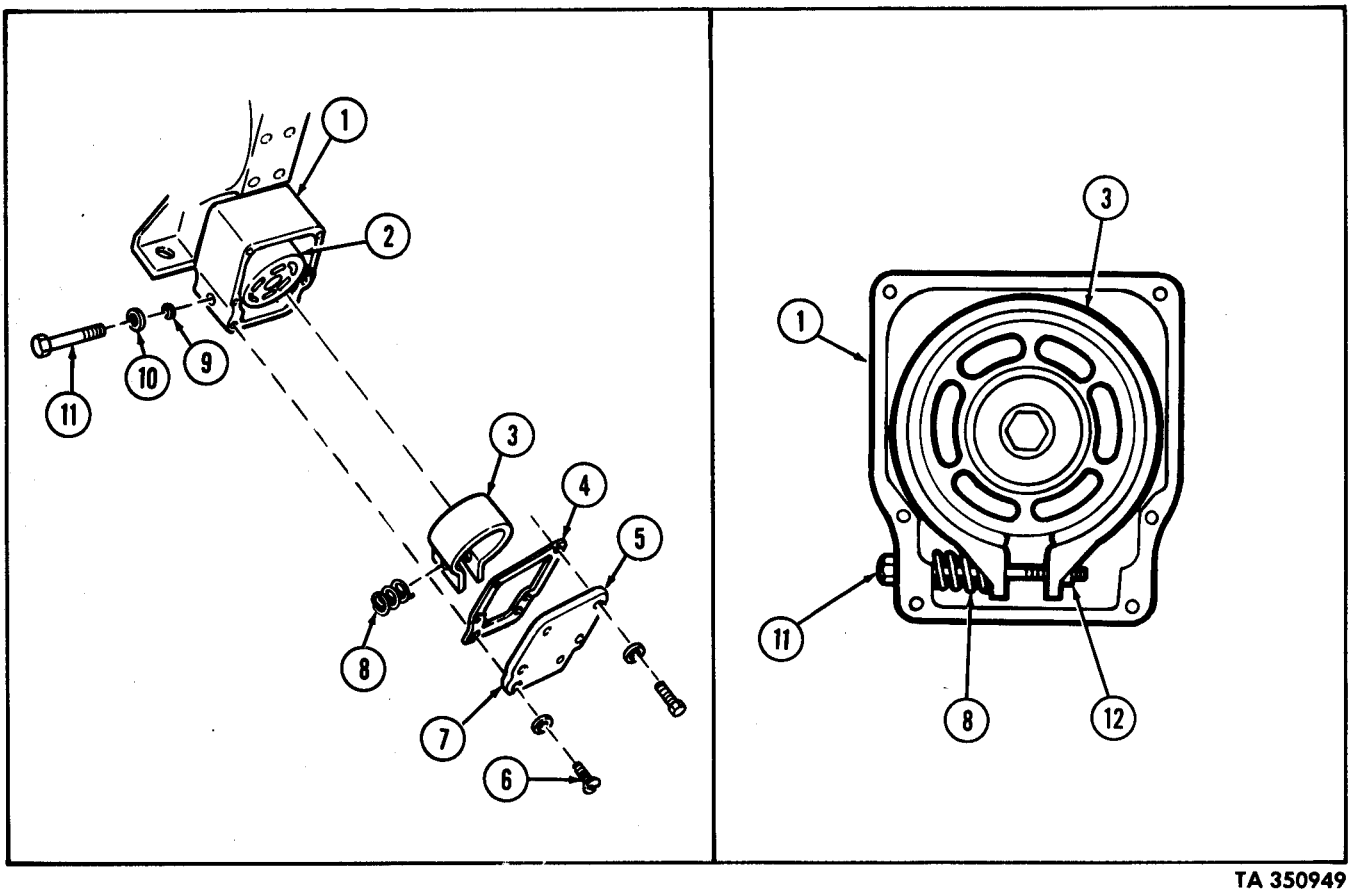
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
50.		Dial indicator (18)	a. Install on gearcase (5) and measure end play of worm gear shaft (6). b. Remove after proper adjustment is obtained.	If end play measures less than 0.005 in. (0.13 mm), add additional new gaskets (4) until proper end play is obtained.



TA 350948

19-13. REAR WINCH REPAIR (Cont'd)

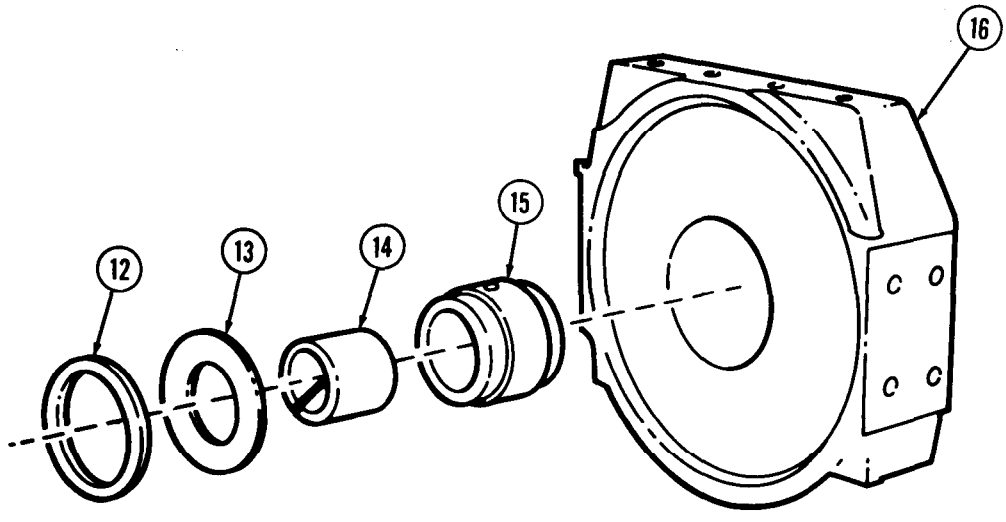
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
51.		New brake band (3)	Position around drum (2).	Caged nut (12) goes to the right.
52.		Spring (8)	Position between housing (1) and brake band (3).	
53.		Flat washer (10) and new "O" ring (9)	Install on bolt (11).	
54.		Bolt (11)	Install through housing (1), spring (8), and caged nut (12) on brake band (3).	Tighten until spring (8) measurement is 2.125-2.187 in. (51-52.5 mm).
55.		New gasket (4)	Position on housing (1).	
56.		Cover (7)	Position over gasket (4) and install on housing (1) using two screw-assembled washers (5) and four screw-assembled washers (6).	Screw-assembled washers (5) are installed in top holes and screw-assembled washers (6) in bottom holes of housing (1).



TA 350949

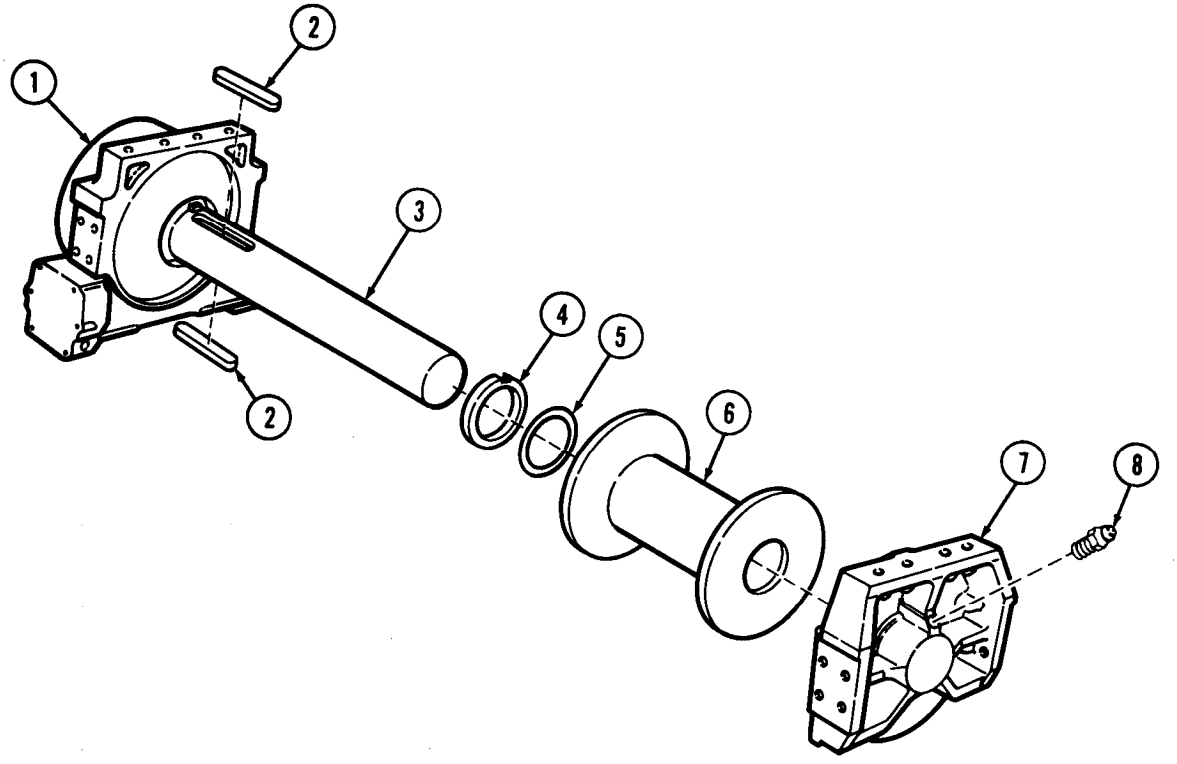
19-13. REAR WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
57.		Sleeve (15) and bushing (14)	Install in end frame (16).	Make sure slot in sleeve (15) slides over pin in end frame (16).
58.		Thrust washer (13)	Install in end frame (16).	Make sure locktab engages slot in end frame (16).
59.		New seal (12)	Install in end frame (16).	



19-13. REAR WINCH REPAIR (Cont'd)

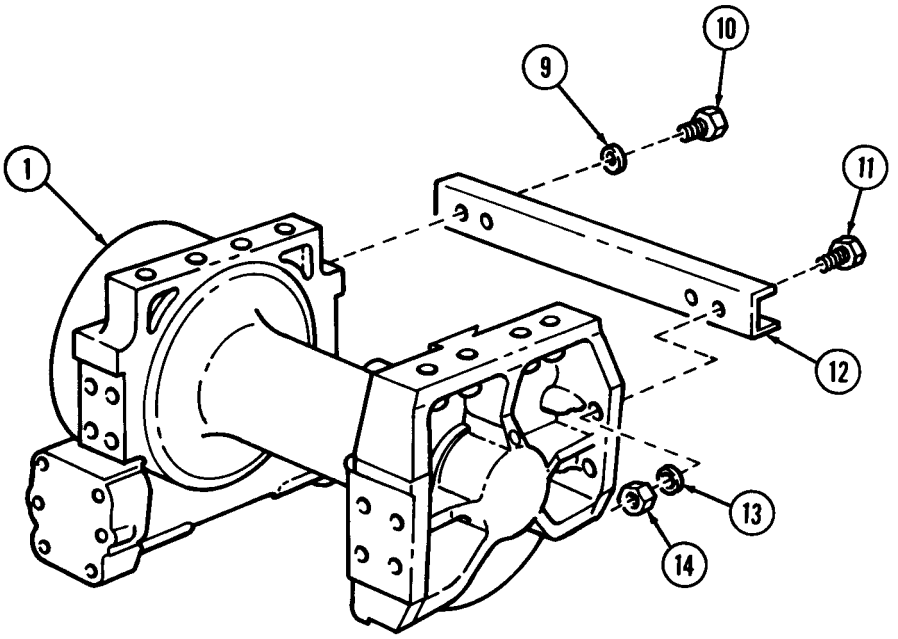
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
60.		New seal (5)	Install in drum (6).	
61.		Thrust washer (4)	a. Coat with GAA grease.	
			b. Install on shaft (3) and position against gearcase (1).	Make sure locktab engages slot in gearcase (1).
62.		Two new keys (2)	Install in shaft (3).	Tap lightly with hammer.
63.		Drum (6)	Aline keyways and drive on shaft (3) until seated.	
64.		Grease fitting (8)	Install on end frame (7).	
65.		End frame (7)	Install on shaft (3).	



TA 350951

19-13. REAR WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
66.		Front channel (12)	a. Install on gearcase (1) with screw (11), new lockwasher (13), and nut (14). b. Install three screws (10) and new lockwashers (9).	

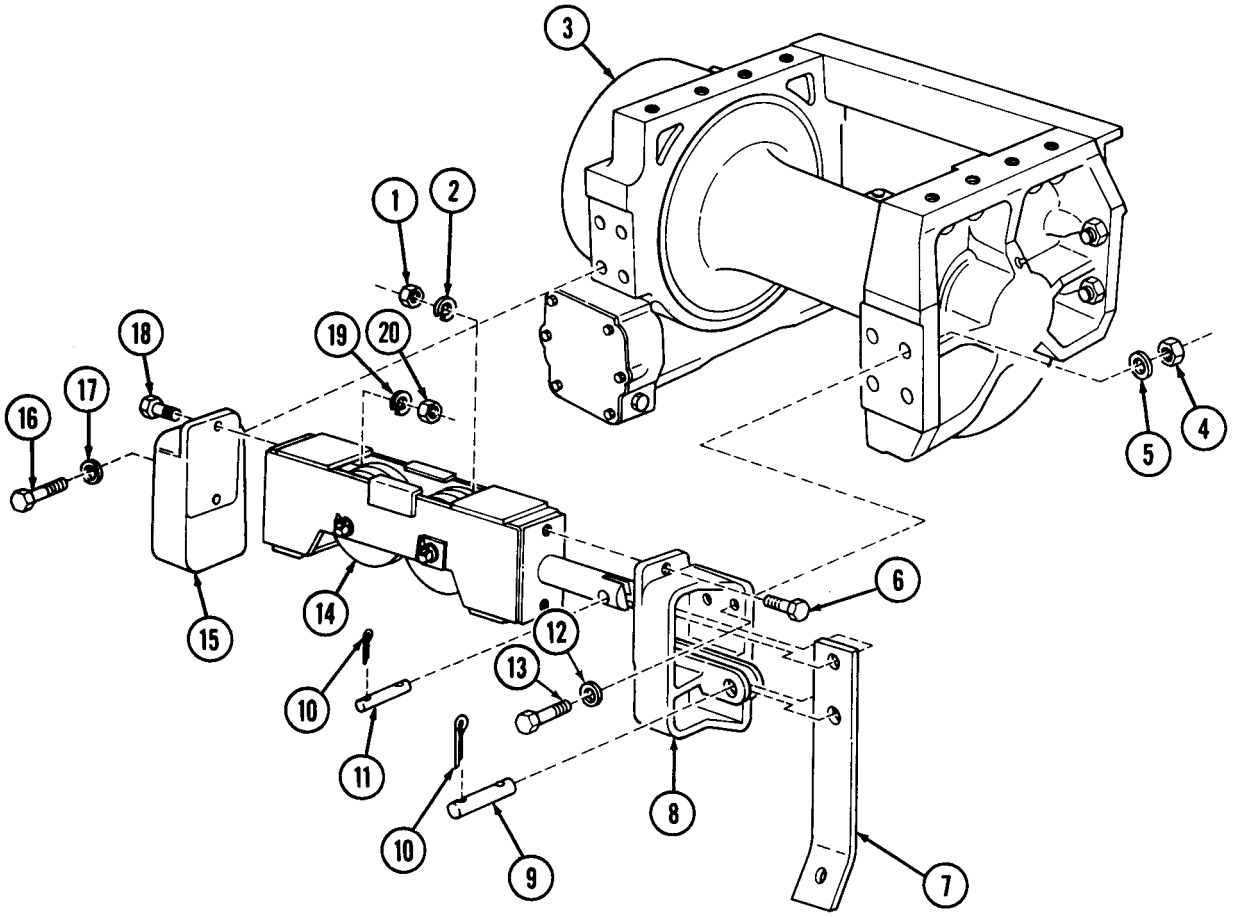


19-13. REAR WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
67.		Bracket (8)	Install on rear winch (3) with four screws (13) and washers (12), and two new lock-washers (5) and nuts (4).	
68.		Tensioner frame (14)	Install on bracket (8) with two screws (6), new lockwashers (2), and nuts (1).	
69.		Bracket (15)	a. Install on tensioner frame (14), with two screws (18), new lockwashers (19), and nuts (20). b. Install on rear winch (3) with four screws (16) and new lock-washers (17).	
70.		Lever (7)	Install with pin (11), pin (9), and four new cotter pins (10).	

19-13. REAR WINCH REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install rear winch level wind (para. 19-18).
• Install rear winch (TM 9-2320-272-20-2).

TA 350953

19-14. REAR WINCH CABLE TENSIONER REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-20-2	Rear winch cable removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Ten lockwashers
Six cotter pins
Four felt washers
GAA grease (Appendix C, Item 11)

Personnel Required
Wheeled vehicle repairman MOS 63W

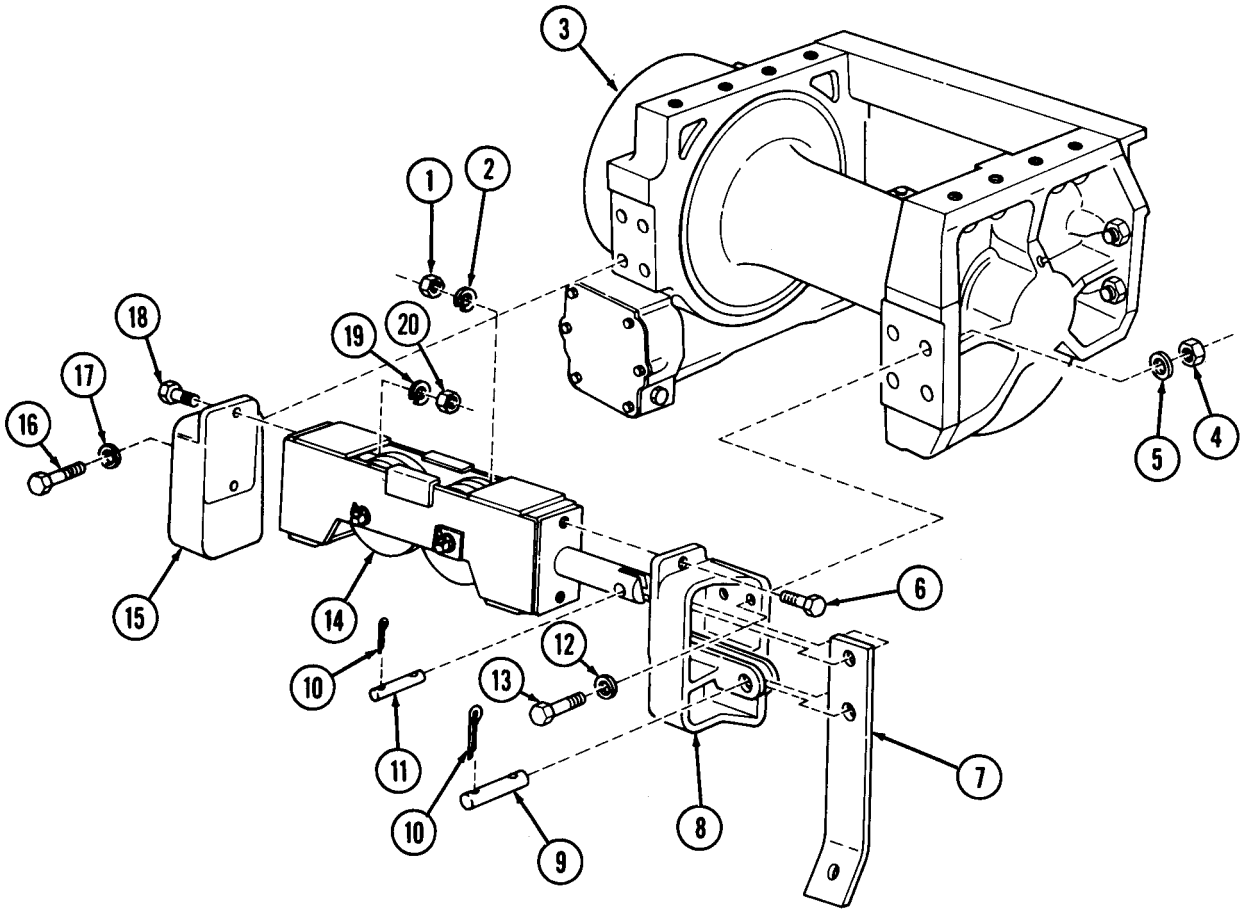
General Safety Instructions
None

Manual References
TM 9-2320-272-20-2
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Bracket (8)	Four cotter pins (10), pin (9), pin (11), and lever (7)	Remove.	Discard cotter pins (10).
2.	Bracket (15)	Four bolts (16) and lockwashers (17)	Remove.	Discard lockwashers (17).
3.	Tensioner frame (14)	Two screws (18), nuts (20), lockwashers (19), and bracket (15)	Remove.	Discard lockwashers (19).
4.	Bracket (8)	Two screws (6), lockwashers (2), and nuts (1), and tensioner frame (14)	Remove.	Discard lockwashers (2).
5.	Rear winch (3)	Four bolts (13), two nuts (4) and lockwashers (5), four washers (12), and bracket (8)	Remove.	Discard lockwashers (5).

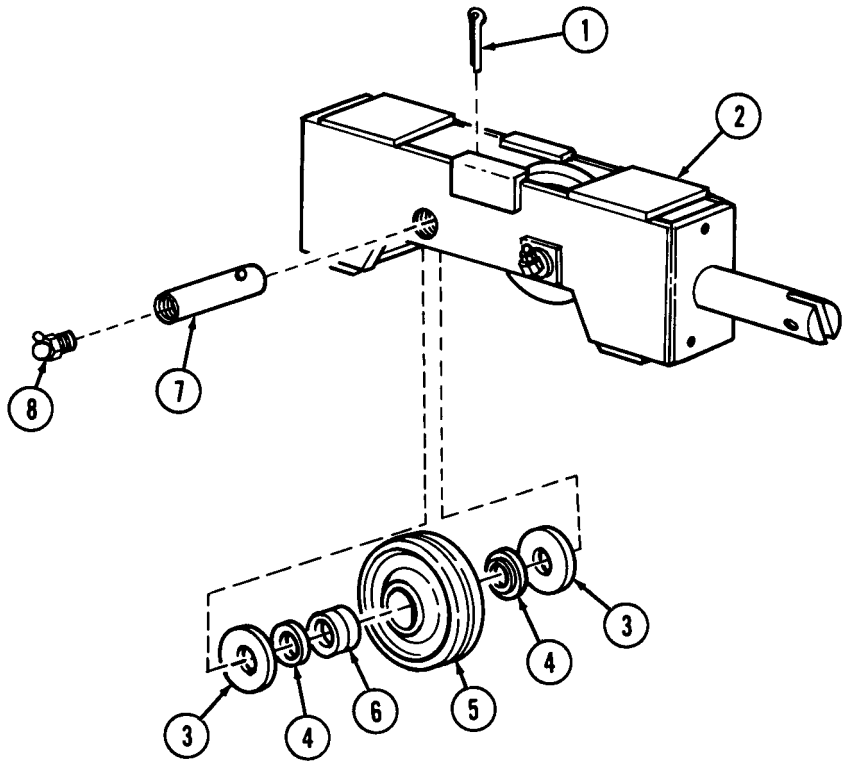
19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

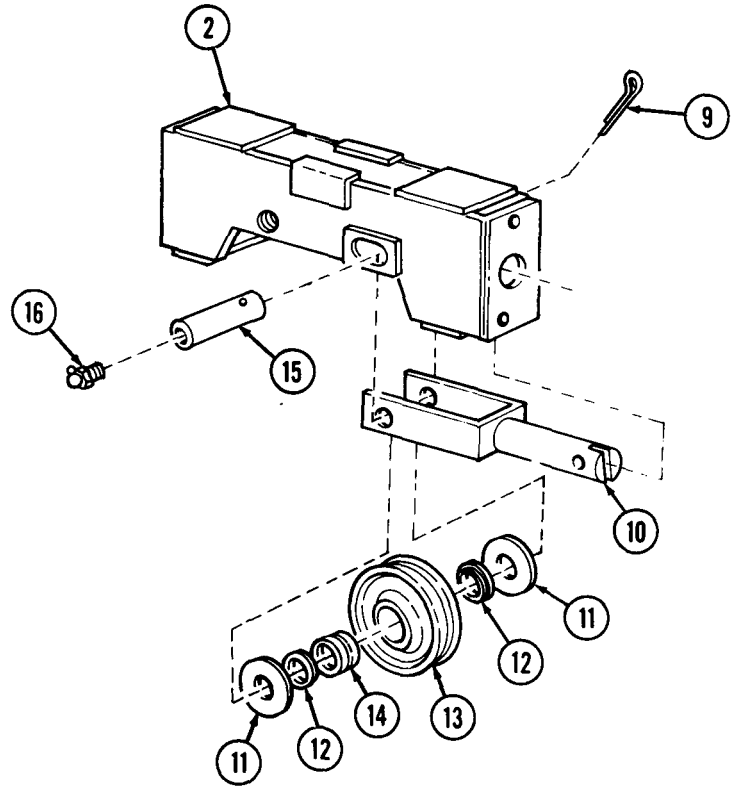
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Tensioner frame (2)	Cotter pin (1), pin (7), and grease fitting (8)	Remove.	Discard cotter pin (1).
7.		Sheave (5), two thrust washers (3), and two felt washers (4)	Remove.	Discard felt washers (4).
8.	Sheave (5)	Bearing (6)	Remove.	
9.	Tensioner frame (2)	Cotter pin (9), pin (15), and grease fitting (16)	Remove.	Discard cotter pin (9).
10.	Sheave frame (10)	Sheave (13), two thrust washers (11), and two felt washers (12)	Remove.	Discard felt washers (12).
11.	Sheave (13)	Bearing (14)	Remove.	
12.	Tensioner frame (2)	Sheave frame (10)	Remove.	



TA 350955

19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

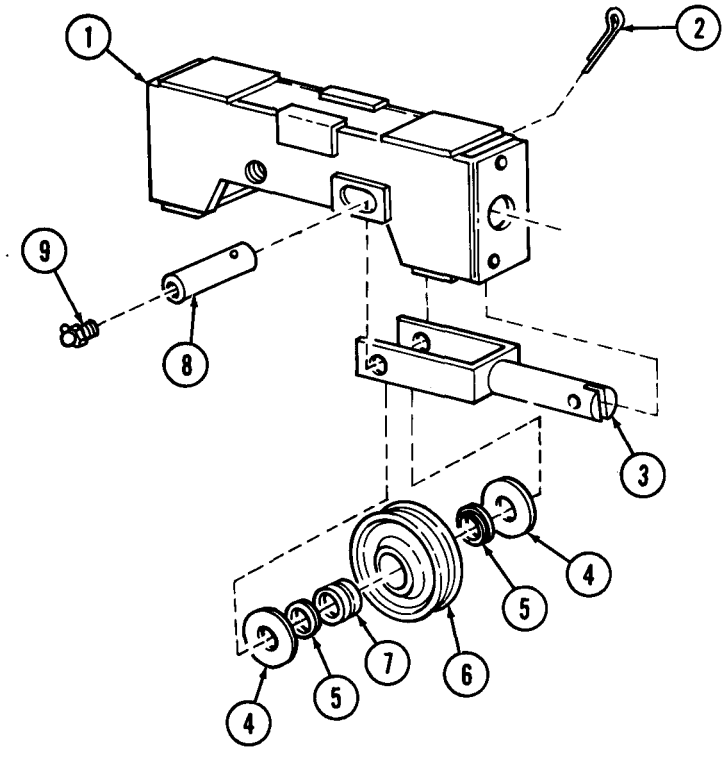
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning and Inspection			
		NOTE Parts for both sheaves are inspected the same way.		
13.		Thrust washers (11)	Clean and inspect for cracks or wear.	Measure with a micrometer and discard if thickness is less than 0.055 in. (1.40 mm), or if cracked.
14.		Bearing (14)	Clean and inspect for chips, cracks, scoring, or damaged cage.	Discard if chipped, cracked, scored, or cage is damaged.
15.		Pin (15)	Clean and inspect for cracks or wear.	Measure with a micrometer, and discard if outer diameter is less than 1.245 in. (31.63 mm), or if cracked.



TA 350956

19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

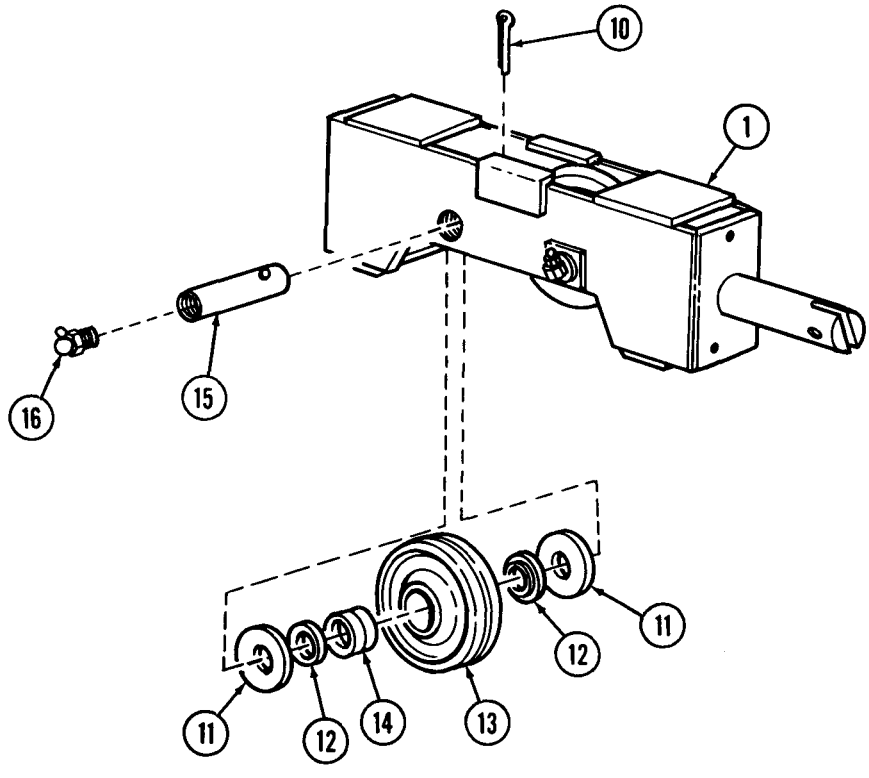
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
16.		Sheave frame (3)	Position in tensioner frame (1).	
17.		Bearing (7)	Coat with GAA grease, and install in sheave (6).	
18.		Two new felt washers (5)	Install one on each side of bearing (7).	Place steel sides of felt washers (5) next to bearing (7).
19.		Sheave (6) and two thrust washers (4)	Position in sheave frame (3).	
20.		Grease fitting (9), pin (8), and new cotter pin (2).	Install.	



TA 350957

19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
21.		Bearing (14)	Coat with GAA grease and install in sheave (13).	
22.		Sheave (13), two thrust washers (11), and new felt washers (12)	Install in tensioner frame (1).	Place steel sides of felt washers (12) next to bearing (14).
23.		Grease fitting (16), pin (15), and new cotter pin (10)	Install.	

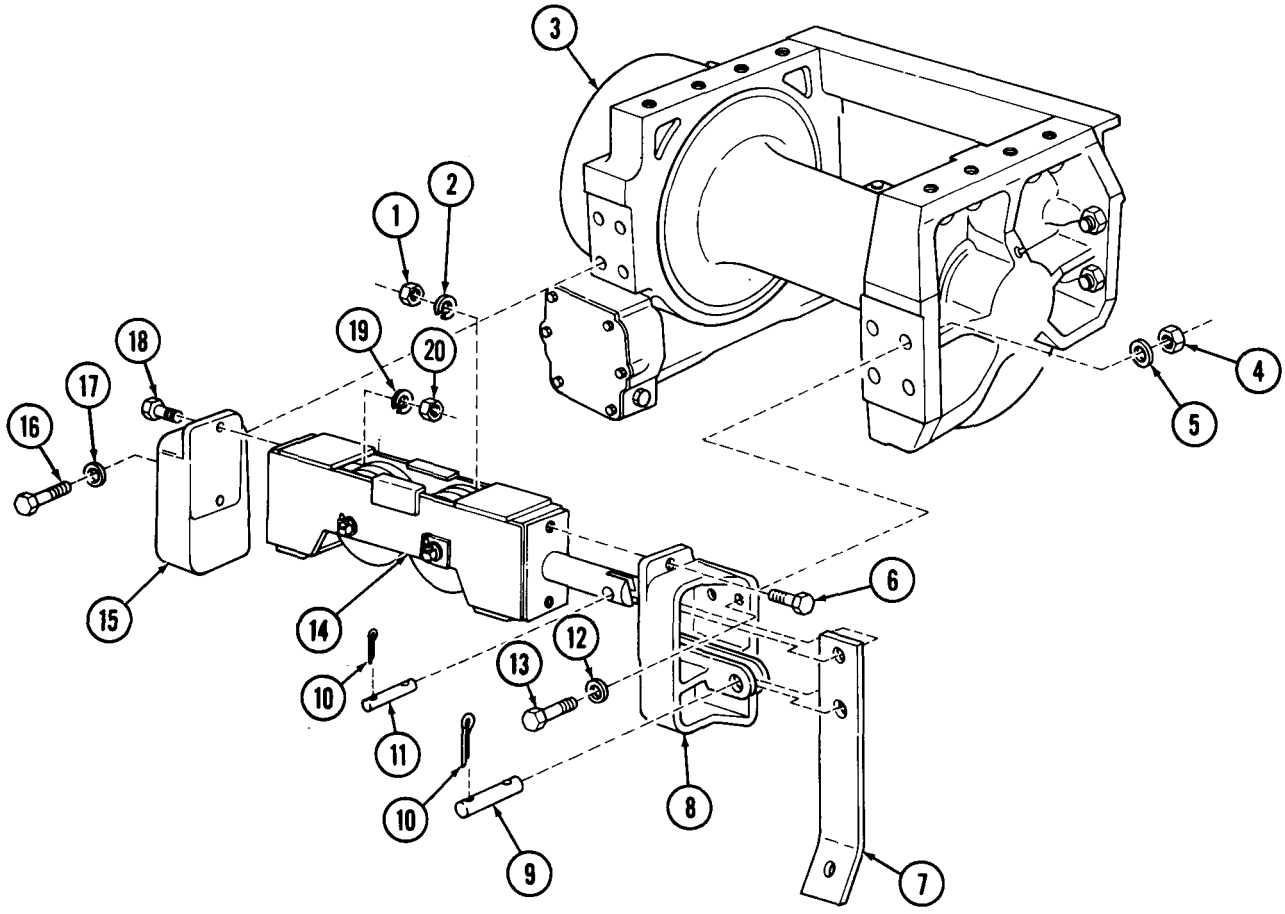


19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
24.		Bracket (8)	Install on rear winch (3) with four bolts (13) and washers (12), and two new lockwashers (5) and nuts (4).	
25.		Tensioner frame (14)	Install on bracket (8) with two screws (6), new lockwashers (2), and nuts (1).	
26.		Bracket (15)	a. Install on tensioner frame (14), with two screws (18), new lockwashers (19), and nuts (20). b. Install on rear winch (3) with four bolts (16) and new lockwashers (17).	
27.		Lever (7)	Install with pin (11), pin (9), and four new cotter pins (10).	

19-14. REAR WINCH CABLE TENSIONER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Lubricate rear winch tensioner (LO 9-2320-272-12).
- Install rear winch cable (TM 9-2320-272-20-2).

19-15. REAR WINCH SIDE ROLLER REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Four lockwashers
Two felt washers
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO 30 (Appendix C, Item 17)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

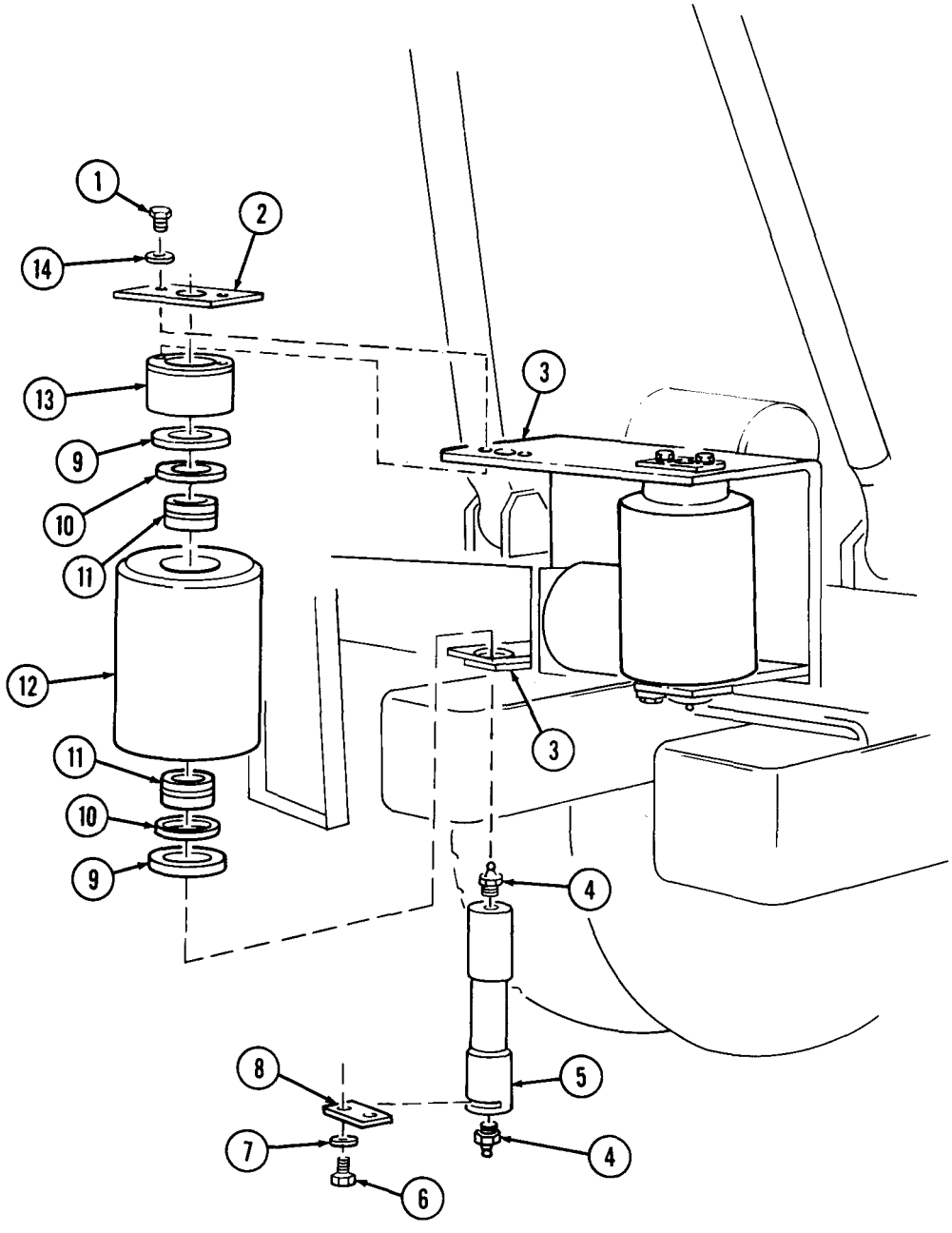
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12
TM 9-214

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Repair procedures for both side rollers are the same.		
	a. Disassembly			
1.	Bracket (3)	Two screws (6) and lockwashers (7), and lockplate (8)	Remove.	Discard lockwashers (7).
		NOTE Assistant will help with steps 2 and 3.		
2.		Shaft (5)	Remove.	
3.		Roller (12), two thrust washers (9) and felt washers (10)	Remove.	Discard felt washers (10).
4.	Roller (12)	Two bearings (11)	Remove.	
5.	Bracket (3)	Two screws (1) and lockwashers (14), plate (2), and spacer (13)	Remove.	Discard lockwashers (14).
6.	Shaft (5)	Two grease fittings (4)	Remove.	

19-15. REAR WINCH SIDE ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

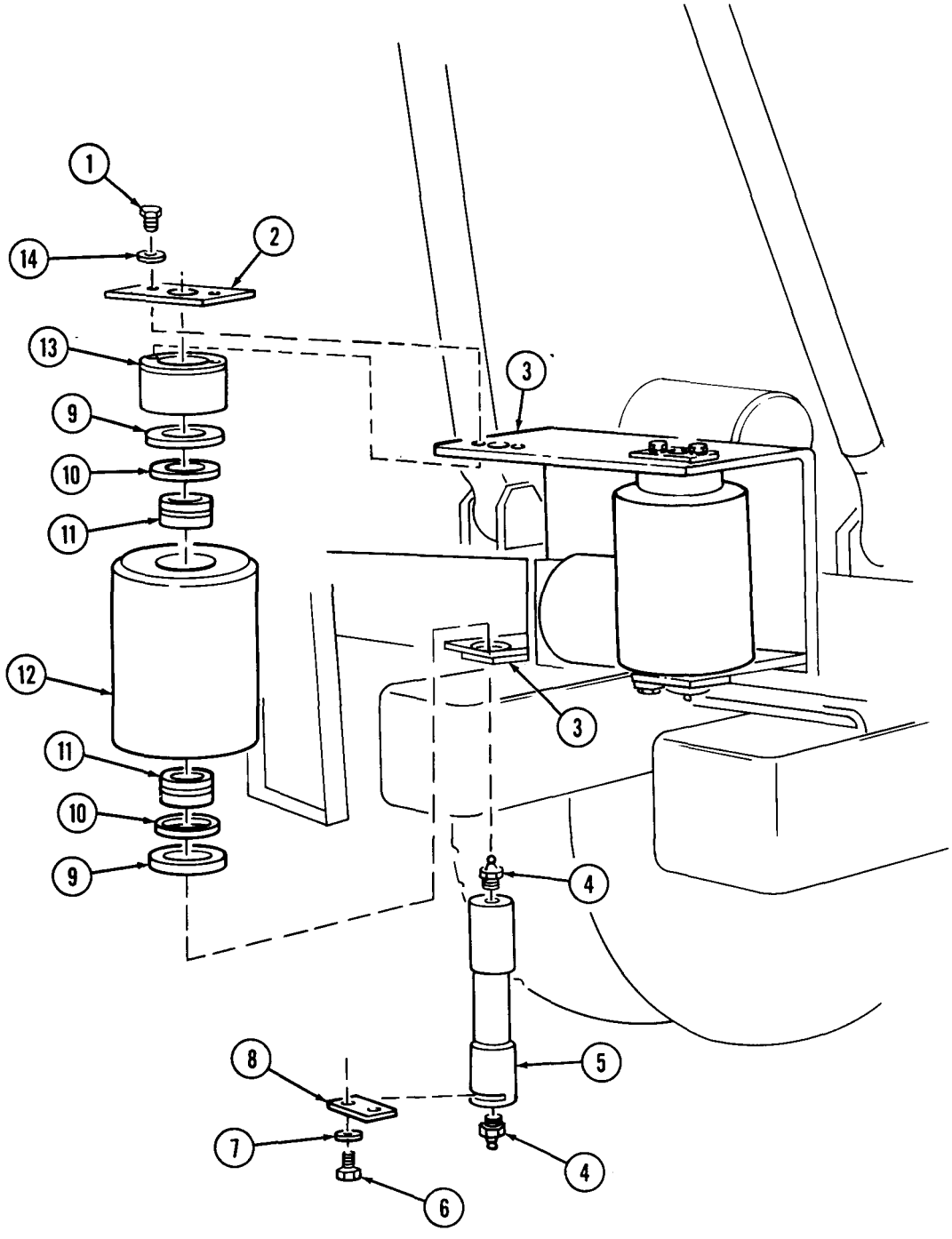


19-15. REAR WINCH SIDE ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning and Inspection			
		WARNING		
	Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.			
7.		All roller (12) and shaft (5) components	Clean in drycleaning solvent and allow to air dry.	
8.		Shaft (5)	a. Inspect for cracks.	If cracked, replace.
			b. Measure bearing surfaces.	If outer diameter is less than 2.245 in. (57.02 mm), replace.
9,		Two thrust washers (9)	Inspect for cracks and measure thickness.	If cracked, replace.
				If thickness is less than 0.055 in. (1.40 mm), replace.
10.		Bearings (11)	Inspect.	Refer to TM 9-214. If damaged, replace.
	c. Reassembly			
11.		Two grease fittings (4)	Install one in each end of shaft (5).	
12.		Spacer (13)	Install on bracket (3) with plate (2), two new lockwashers (14) and screws (1).	
13.		Two bearings (11)	Pack with GAA grease and install in roller (12).	Refer to TM 9-214.
14.		Two thrust washers (9) and new felt washers (10)	Position one of each on each end of roller (12).	Soak new felt washers (10) in lubricating oil prior to installation.
		NOTE		
		Assistant will help with steps 15 and 16.		
15.		Roller (12), bearings (11), felt washers (10), and thrust washers (9)	Slide into bracket (3).	
16.		Shaft (5)	Install through bracket (3) and roller (12).	Make sure locking slot is at bottom.
17.		Lockplate (8)	Aline with shaft (5) and install with two new lockwashers (7) and screws (6).	

19-15. REAR WINCH SIDE ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Lubricate roller assembly (LO 9-2320-272-12).

TA 350961

19-16. REAR WINCH TOP AND BOTTOM ROLLER REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 Para. 19-15	Parking brake set. Left side roller removed (for bottom roller repair only).

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two lockwashers
Two felt washers
GAA grease (Appendix C, Item 11)
Lubricating oil OE/HDO 30 (Appendix C, Item 17)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12
TM 9-214

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

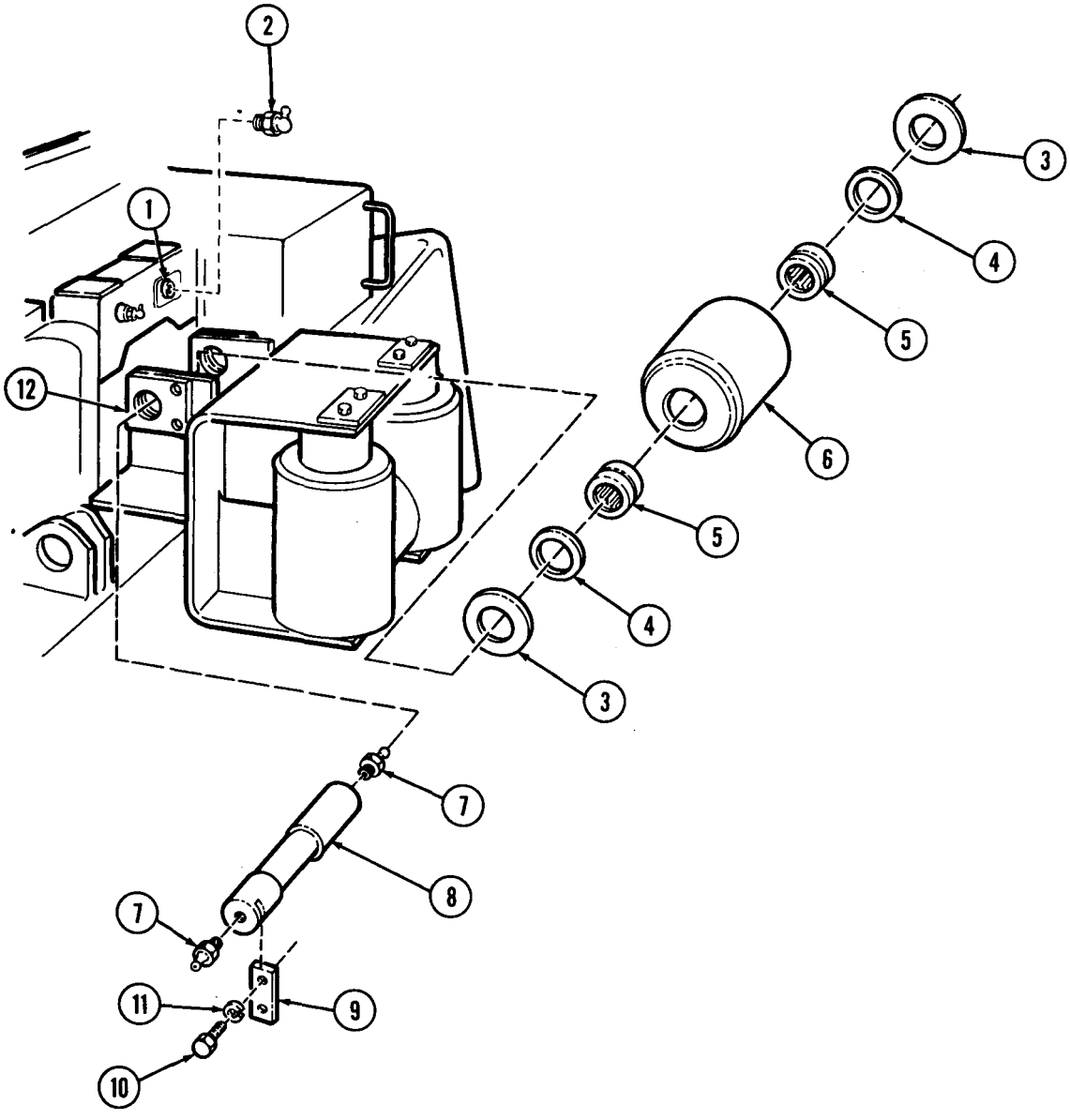
Repair procedures for top and bottom rollers are the same.

a. Disassembly

1.	Shaft (8)	Two grease fittings (7)	Remove.	
2.	Bracket (12)	Two screws (10) and lockwashers (11), and lockplate (9)	Remove.	Discard lockwashers (11).
3.	Roller (6)	Shaft (8)	Remove.	Thrust washers (3) may fall out.
4.	Tensioner sheave shaft (1)	Two grease fittings (2)	Remove.	

19-16. REAR WINCH TOP AND BOTTOM ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Assistant will help with step 5.		
5.	Bracket (12)	Roller (6) and two thrust washers (3)	Remove.	
6.	Roller (6)	Two felt washers (4) and bearings (5)	Remove.	Discard felt washers (4).



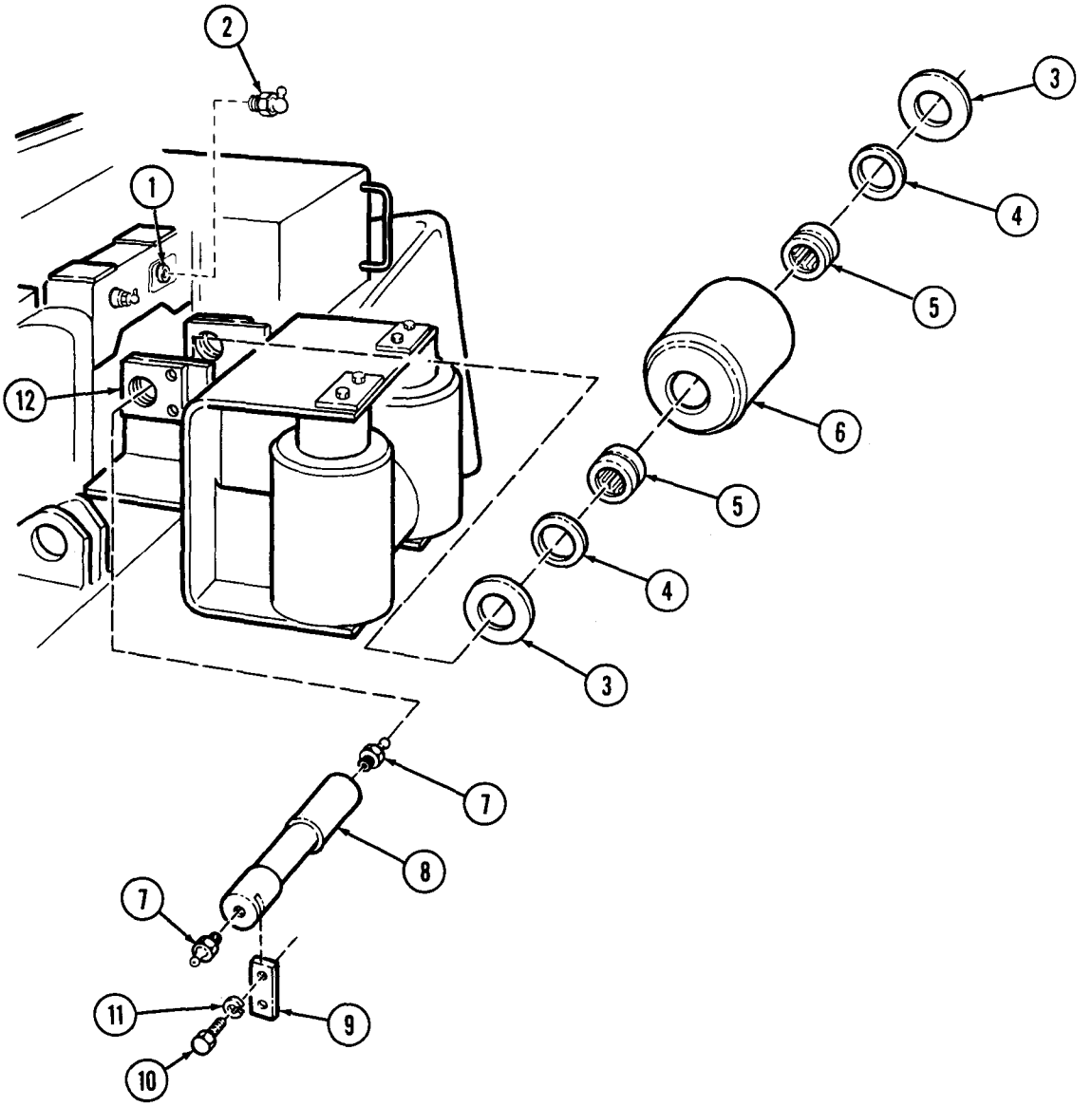
TA 350962

19-16. REAR WINCH TOP AND BOTTOM ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Cleaning and Inspection				
		WARNING		
		Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.		
7.		All roller (6) and shaft (8) components	Clean in drycleaning solvent and allow to air dry.	
8.		Shaft (8)	a. Inspect for cracks.	If cracked, replace.
			b. Measure bearing surfaces.	If outer diameter is less than 2.245 in. (57.02 mm), replace.
9.		Thrust washers (3)	a. Inspect for cracks.	If cracked, replace.
			b. Measure thickness.	If thickness is less than 0.055 in. (1.397 mm), replace.
10.		Bearings (5)	Inspect.	Refer to TM 9-214. If damaged, replace.
c. Reassembly				
11.		Two bearings (5)	Pack with GAA grease and install in roller (6).	Refer to TM 9-214.
12.		Two new felt washers (4) and thrust washers (3)	Position on each end of roller (6).	Soak new felt washers (4) in lubricating oil prior to installation.
		NOTE		
		Assistant will help with steps 13 and 14.		
13.		Roller (6), bearings (5), felt washers (4), and thrust washers (3)	Slide into bracket (12).	
14.		Shaft (8)	Install through bracket (12) and roller (6).	
15.		Lockplate (9)	Aline with shaft (8) and install with two new lockwashers (11) and screws (10).	
16.		Two grease fittings (7)	Install in each end of shaft (8).	
17.		Two grease fittings (2)	Install into tensioner sheave shaft (1).	

19-16. REAR WINCH TOP AND BOTTOM ROLLER REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Lubricate roller assembly (LO 9-2320-272-12).
• Install bottom roller if removed (para. 19-15).

TA 350963

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M936	TM 9-2320-272-10 LO 9-2320-272-12	Parking brake set. Hydraulic oil drained.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Cotter pin
Four "O" rings
Four locknuts
Fourteen lockwashers
Adhesive sealant (Appendix C, Item 3)
Sealing tape (Appendix C, Item 30)

Personnel Required

Wheeled vehicle repairman MOS 63W (2)

General Safety Instructions

None

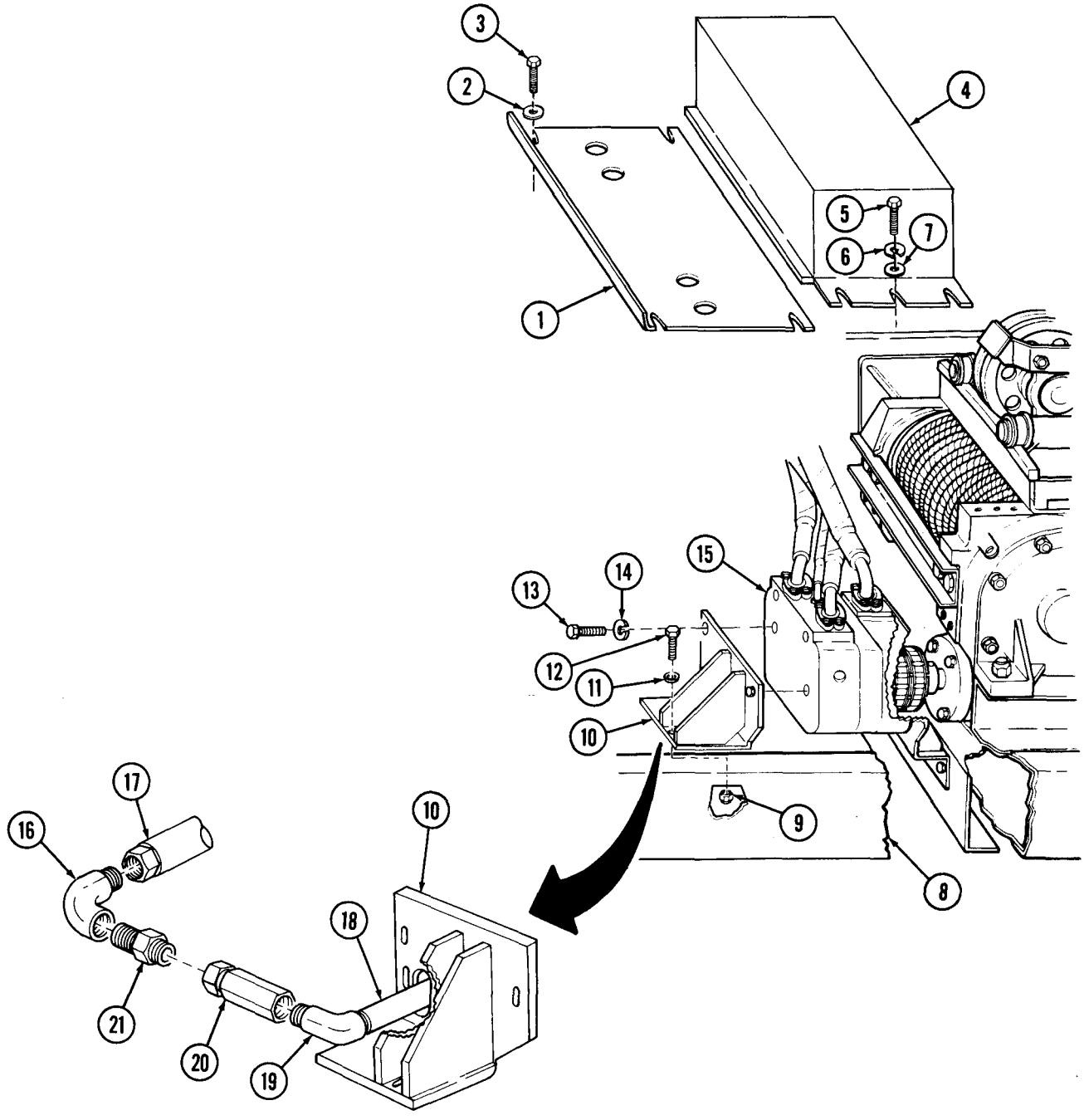
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
1.	Frame (8)	Five screws (5), washers (7), lockwashers (6), and cover (4)	Remove.	Discard lockwashers (6).
2.		Four screws (3) and washers (2) and floor plate (1)	Remove.	
3.	Front bracket (10) to frame (8)	Two screws (12), washers (11), and locknuts (9)	Remove.	Discard locknuts (9).
		NOTE Have drainage container ready to catch oil.		
4.	Elbow (16)	Hose connector (17)	Disconnect.	
5.	Elbow (19)	Elbow (16), adapter (21), and valve (20)	Remove.	Tag adapter (21) and valve (20) for installation.
6.	Pipe nipple (18)	Elbow (19)	Rotate upward.	To allow removal of front bracket (10).

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Winch motor (15)	Three screws (13) and lockwashers (14), and front bracket (10)	Remove.	Discard lockwashers (14).



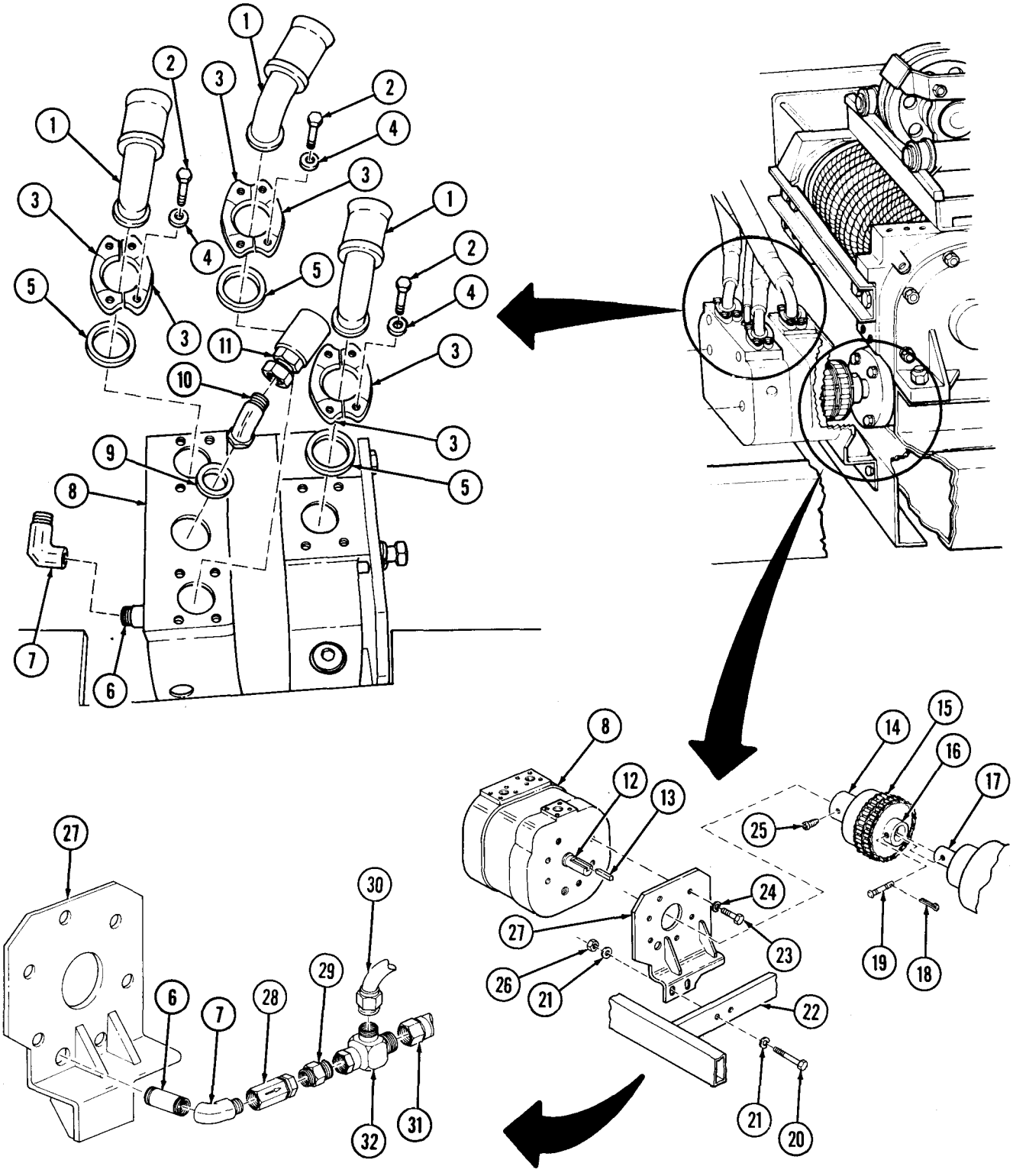
TA 350964

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Winch motor (8)	Elbow (7) and pipe nipple (6)	Remove.	
9.		Twelve screws (2) and washers (4), and six clamps (3)	Remove.	
10.		Three hydraulic hoses (1) and "O" rings (5)	Remove.	Discard "O" rings (5). Tag hoses (1) for installation.
11.	Elbow (10) on winch motor (8)	Hydraulic hose (11)	Disconnect.	
12.	Winch motor (8)	Elbow (10) and "O" ring (9)	Remove.	Discard "O" ring (9).
13.	Tee (32)	Two hose connectors (30) and (31)	Disconnect.	Tag hoses (30) and (31) for installation.
14.	Coupling front hub (14)	Setscrew (25)	Loosen.	Loosen setscrew (25) until flush with coupling front hub (14).
15.	Pipe nipple (6)	Tee (32), adapter (29), valve (28), and elbow (7)	Remove.	Tag valve (28) for installation.
16.	Frame crossmember (22) to rear bracket (27)	Two screws (20), four washers (21), and two locknuts (26)	Remove.	Discard locknuts (26).
		NOTE Assistant will help with step 17.		
17.	Frame crossmember (22)	Winch motor (8) and rear bracket (27)	Remove.	
18.	Winch motor shaft (12)	Key (13)	Remove.	
19.		Six screws (23) and lockwashers (24), and rear bracket (27)	Remove.	Discard lockwashers (24).
20.		Pipe nipple (6)	Remove.	Tag pipe nipple (6) for installation.
21.	Coupling rear hub (16)	Cotter pin (18) and shear pin (19)	Remove.	Discard cotter pin (18).
22.	Winch drive shaft (17)	Coupling (15)	Remove.	

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



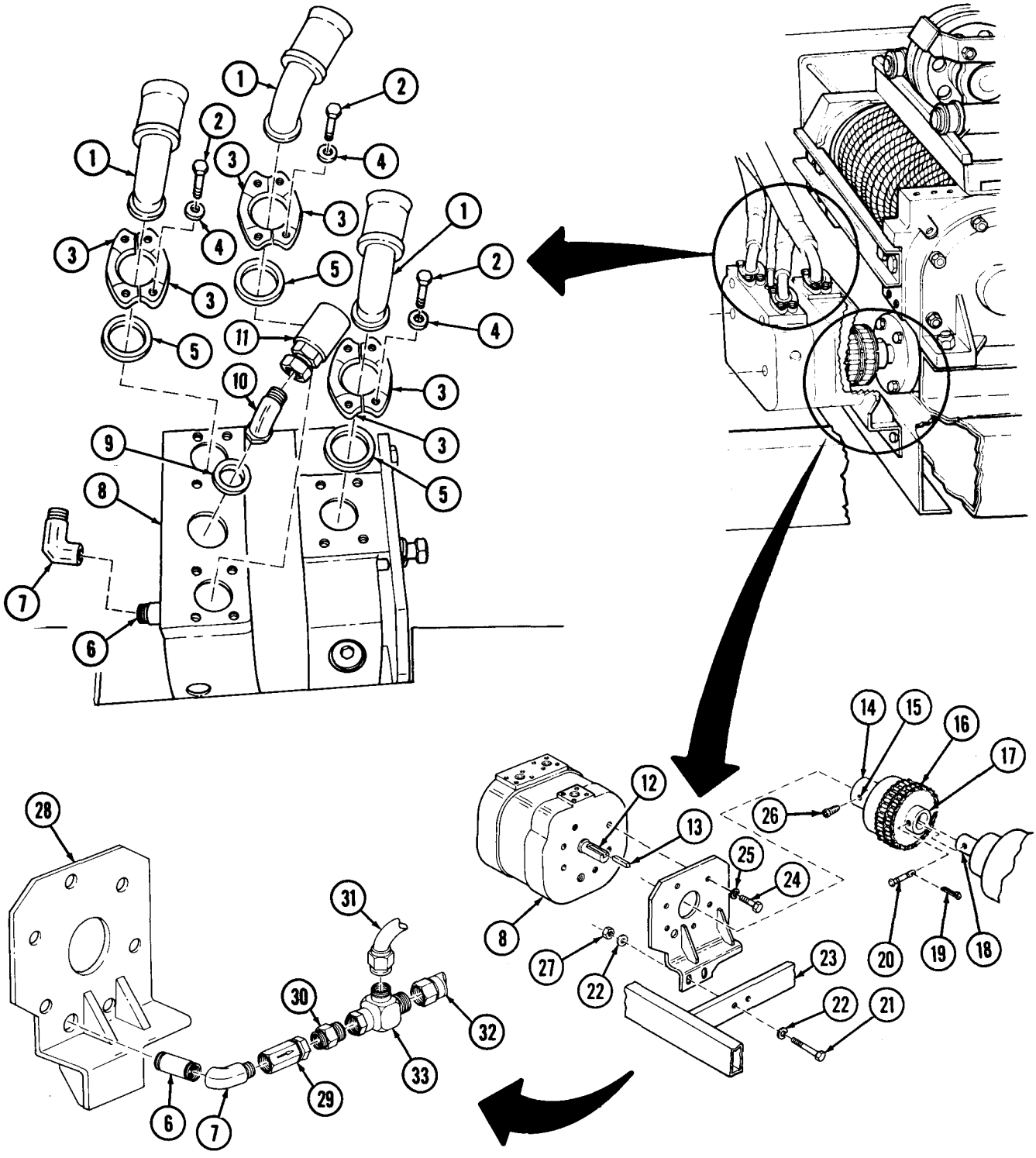
TA 350965

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
23.		Coupling (16)	Install on winch drive shaft (18) with shear pin (20) and new cotter pin (19).	Aline holes in rear coupling hub (17) and drive shaft (18).
			NOTE	
	All male pipe threads will be wrapped with sealing tape before installation.			
24.		Rear bracket (28)	Install on winch motor (8) with six screws (24) and new lock washers (25).	Tighten 60-70 lb-ft (81-95 N·m).
			NOTE	
			Assistant will help with step 25.	
25.		Winch motor (8) and key (13)	Install on coupling (16) with key (13) in slot of winch drive shaft (12).	Make sure key (13) is visible through set-screw hole (15).
26.		Rear bracket (28)	Install on frame cross-member (23) with two screws (21), four washers (22), and two new locknuts (27).	Tighten 60-70 lb-ft (81-95 N·m).
27.		Pipe nipple (6), elbow (7), valve (29), adapter (30), and tee (33)	Install on winch motor (8).	
28.		Two hose connectors (31) and (32)	Connect to tee (33).	
29.		Setscrew (26)	Install on coupling front hub (14).	Apply adhesive sealant to threads of setscrew (26) before installing.
30.		Elbow (10)	Install on winch motor (8) with new "O" ring (9).	
31.		Hydraulic hose (11)	Connect to elbow (10).	
32.		Three hydraulic hoses (1)	Connect to winch motor (8) with twelve screws (2) and washers (4), six clamps (3), and three new "O" rings (5).	

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



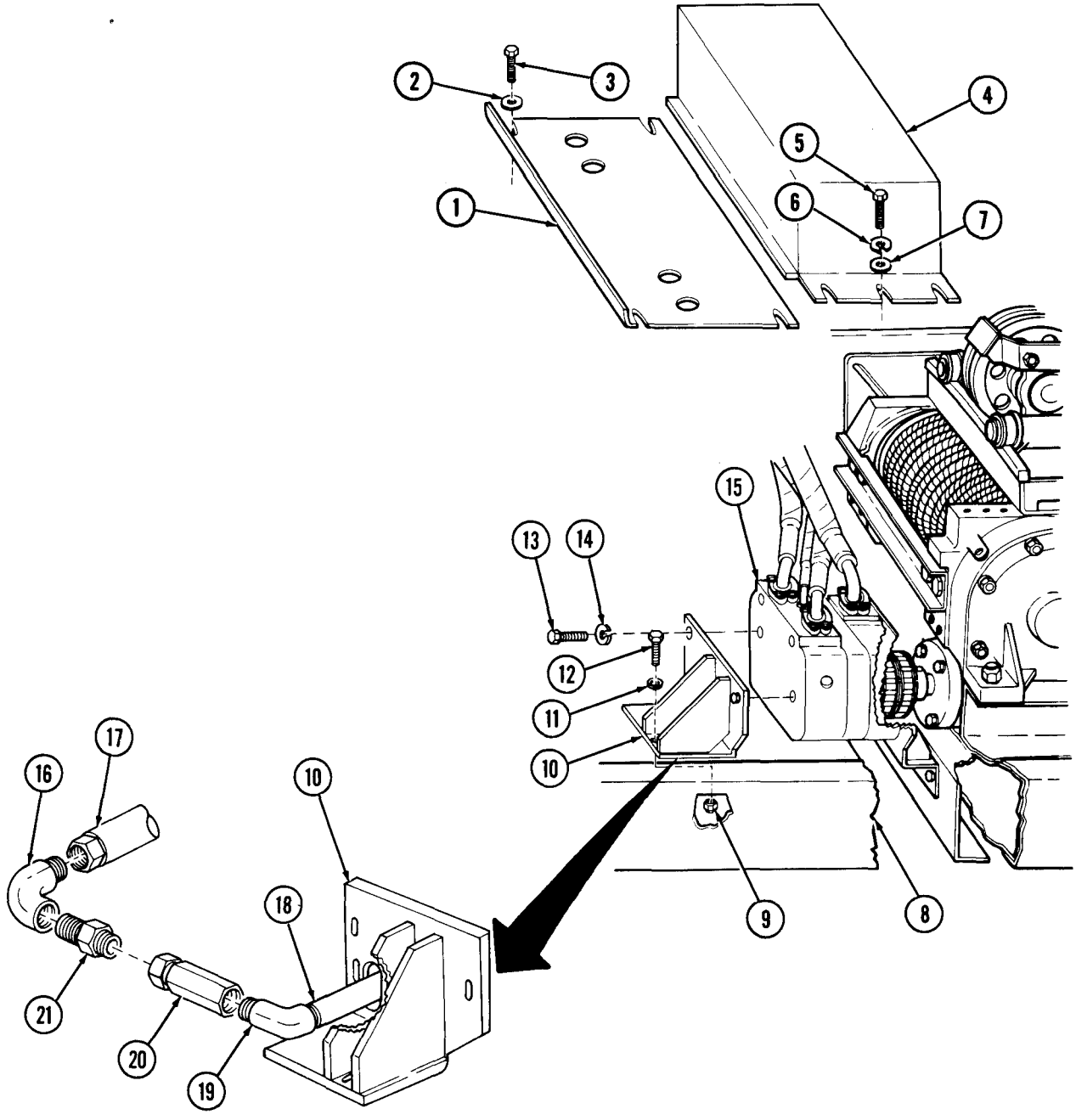
TA 350966

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
33.		Pipe nipple (18) and elbow (19)	Install on winch motor (15).	Position elbow (19) facing upward for ease in installing bracket (10).
		Front bracket (10)	Install to winch motor (15) with three screws (13) and new lockwashers (14).	Tighten 60-70 lb-ft (81-95 N·m). Return elbow (19) to original position.
		Valve (20), adapter (21), and elbow (16)	Install on elbow (19).	
		Hose connector (17)	Connect to elbow (16).	
		Front bracket (10)	Install to frame (8) with two screws (12), washers (11), and new locknuts (9).	Tighten 60-70 lb-ft (81-95 N·m).
		Floor plate (1)	Install with four screws (3) and washers (2).	Tighten 60-70 lb-ft (81-95 N·m).
		Cover (4)	Install with five screws (5), new lockwashers (6), and washers (7).	Tighten 60-70 lb-ft (81-95 N·m).

19-17. REAR WINCH HYDRAULIC MOTOR REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Fill hydraulic oil reservoir to proper level (LO 9-2320-272-12).
- Check rear winch hydraulic motor for proper operation (TM 9-2320-272-10).

TA 350967

19-18. REAR WINCH LEVEL WIND MAINTENANCE

Maintenance procedures for rear winch level wind and front winch level wind are the same. Refer to paragraph 19-6.

Section IV. REPAIR AND REPLACEMENT STANDARDS

19-19. REPAIR AND REPLACEMENT STANDARDS

a. This section provides repair and replacement standards for front winch, rear winch, and winch components. Repair and replacement standards included give minimum, maximum, and key clearance of new or repaired parts. An asterisk (*) in the "wear limits" column indicates a part should be replaced when worn beyond dimensions given in "size and fit of new parts" column.

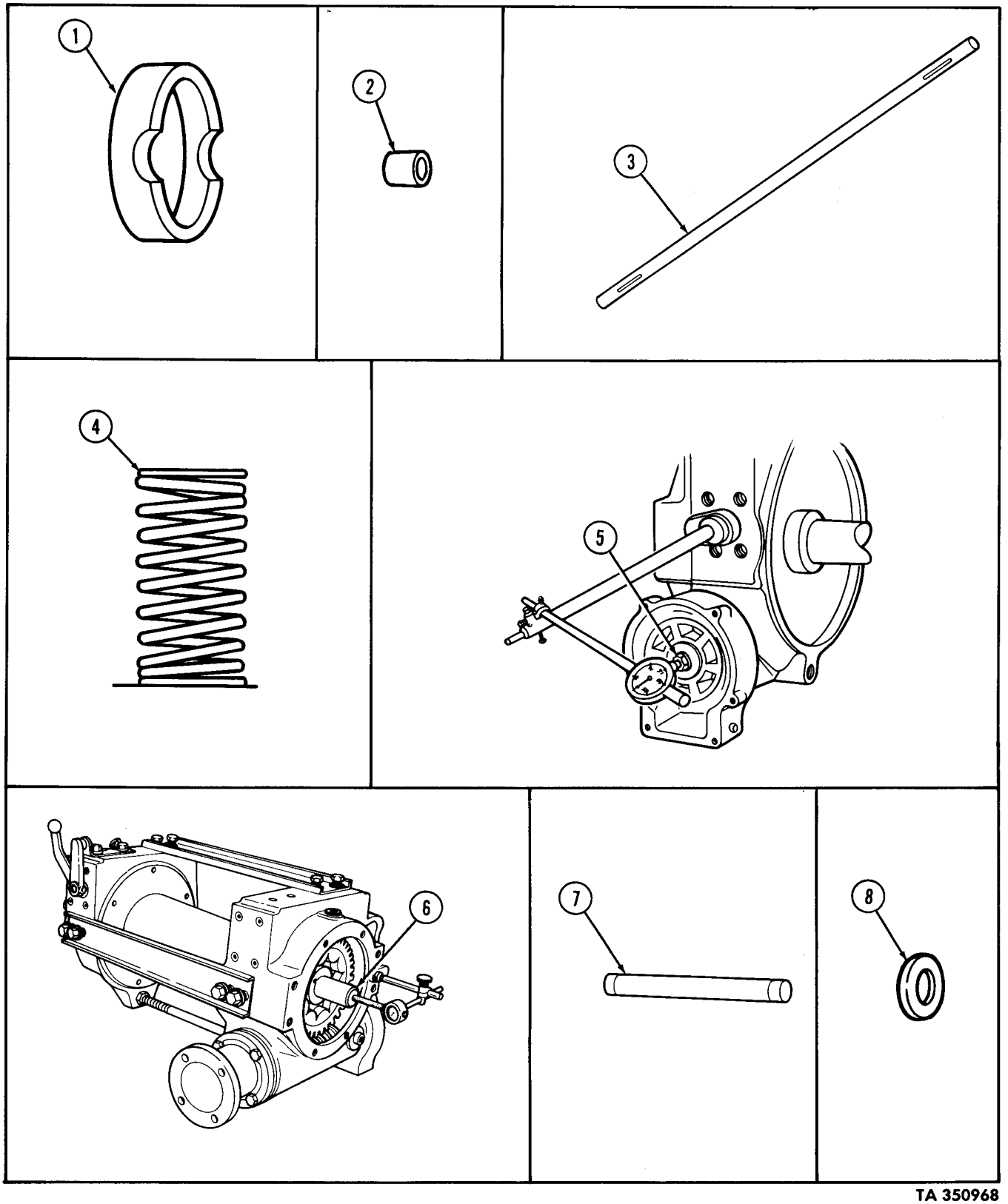
b. Components covered by repair and replacement standards listed in table 19-2 are illustrated. To find the component and its tolerance requirements, match the reference number identifying the component to the same reference number listed to the extreme left in table 19-2.

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components

REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
	FRONT WINCH		
1	Thrust ring thickness	0.492-0.508 in. (12.396-12.903 mm)	0.486 in. (12.344 mm)
2	Drum shaft bearing inside diameter	2.127-2.130 in. (54.02-54.10 mm)	2.136 in. (54.254 mm)
3	Drum shaft outside diameter	2.123-2.125 in. (53.924-53.975 mm)	2.121 in. (53.873 mm)
4	Automatic brake spring free length	1.5 in. (38.1 mm)	*
4	Load to compress brake spring to 1 in. (25.4 mm)	52 lb-ft (71 N·m)	*
5	Worm shaft end play	0.005-0.015 in. (0.127-0.381 mm)	*
6	Drum shaft end play	0.005-0.015 in. (0.127-0.381 mm)	*
	FRONT WINCH TENSIONER		
7	Tensioner roller pin outside diameter	0.9995-1.0000 in. (25.387-25.400 mm)	0.997 in. (25.323 mm)
8	Tensioner thrust washer thickness	0.633-0.635 in. (16.078-16.129 mm)	0.630 in. (16.002 mm)

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

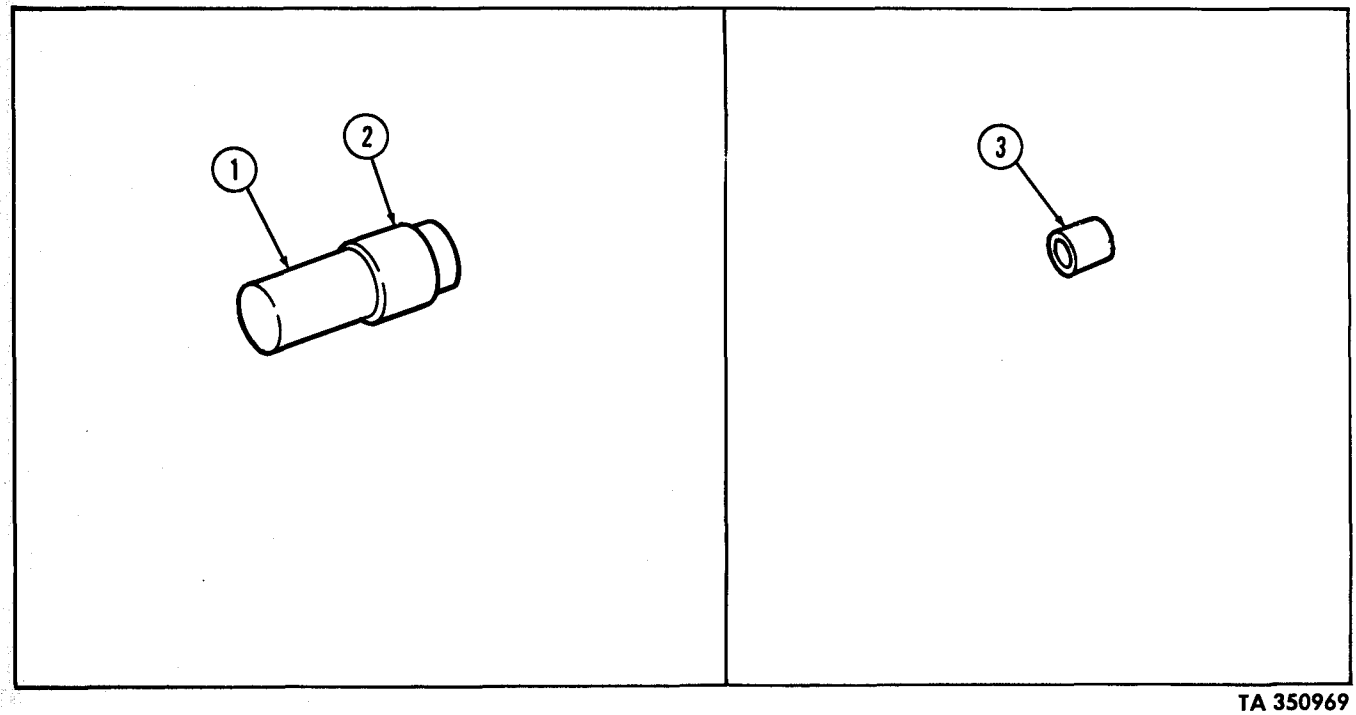
REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
1			
2			
3			
4			
5			
6			
7			
8			



TA 350968

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

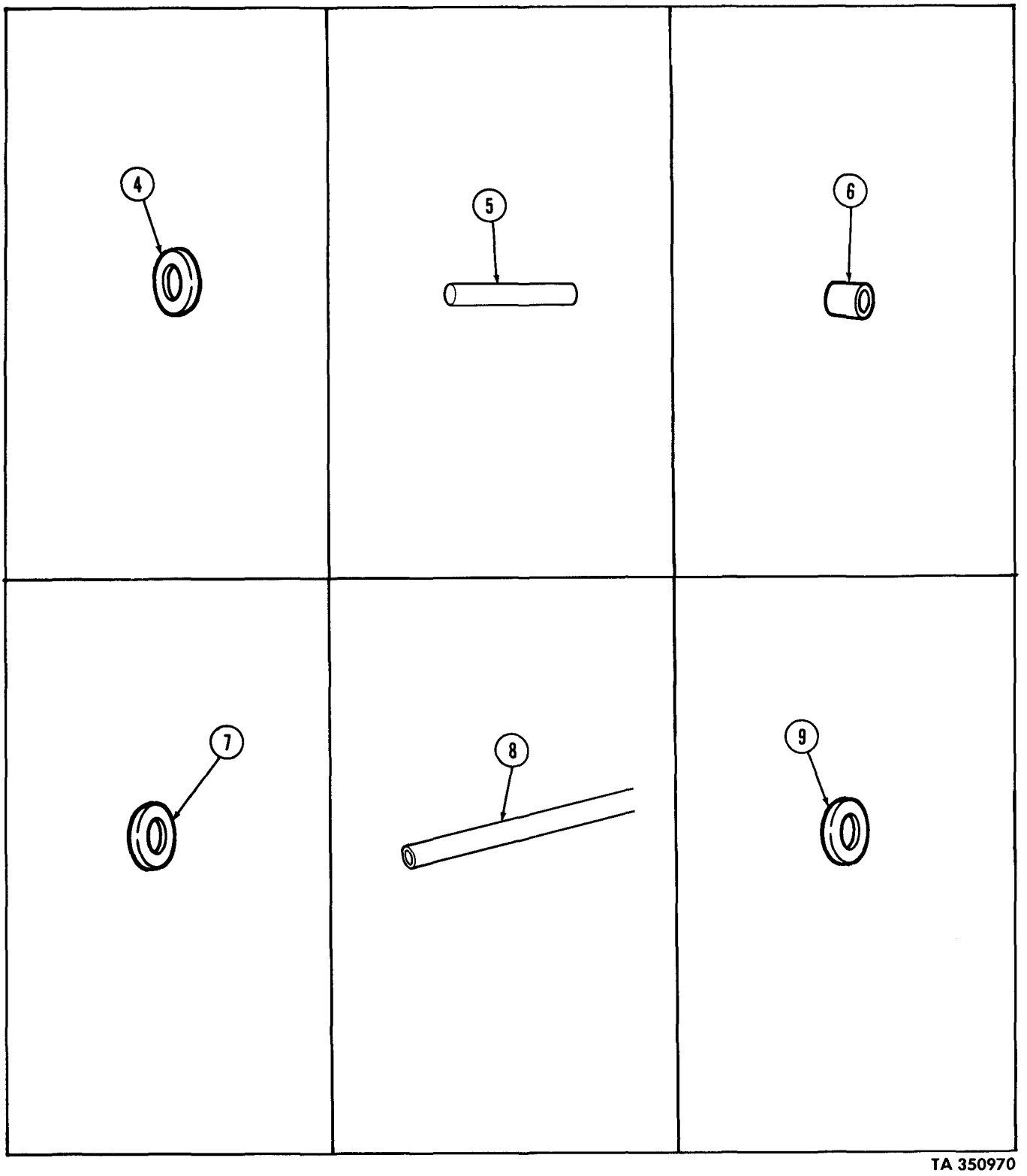
REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
	FRONT WINCH		
1	Tensioner roller shaft cam bearing surface outside diameter	0.748-0.750 in. (18.999-19.050 mm)	0.745 in. (18.923 mm)
2	Tensioner roller shaft cam outside diameter	0.995-1.0000 in. (25.273-25.400 mm)	0.994 in. (25.247 mm)
3	Tensioner roller shaft bushing inside diameter	0.751-0.754 in. (19.075-19.151 mm)	0.758 in. (19.253 mm)
	FRONT WINCH LEVEL WIND		
4	Level wind thrust washer thickness	0.0615-0.0635 in. (1.562-1.612 mm)	0.058 in. (1.473 mm)
	FRONT WINCH ROLLER		
5	Side roller pin outside diameter	0.995-1.000 in. (25.273-25.400 mm)	0.994 in. (25.247 mm)
6	Side roller bushing inside diameter	1.001-1.004 in. (25.425-25.501 mm)	1.008 in. (25.600 mm)
7	Side roller thrust washer thickness	0.059-0.060 in. (1.498-1.524 mm)	0.049 in. (1.244 mm)
8	Roller shaft outside diameter	1.4995-1.5000 in. (38.087-38.100 mm)	1.495 in. 37.973 mm)
9	Roller shaft thrust washer thickness	0.0615-0.0655 in. (1.562-1.663 mm)	0.051 in. (1.295 mm)



TA 350969

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS



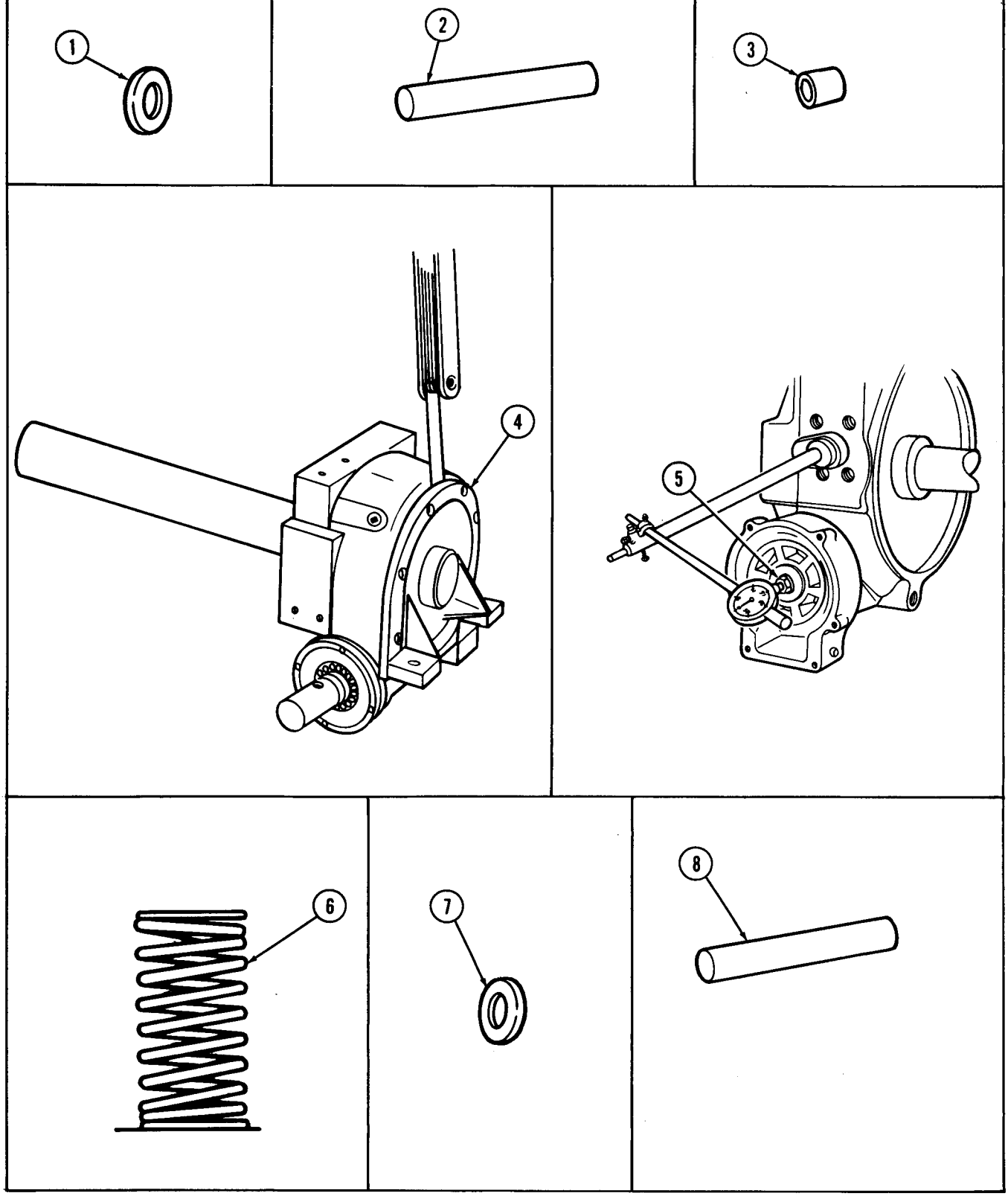
TA 350970

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
	REAR WINCH		
1	Thrust washer thickness	0.0615-0.0655 in. (1.562-1.663 mm)	0.059 in. (1.498 mm)
2	Drum shaft outside diameter	2.998-3.000 in. (76.149-76.200 mm)	2.995 in. (76.073 mm)
3	Drum shaft bushing inside diameter	3.005-3.007 in. (76.327-76.377 mm)	2.995 in. (76.454 mm)
4	Drum shaft end play	0.005-0.015 in. (0.127-0.381 mm)	*
5	Worm shaft end play	0.005-0.015 in. (0.127-0.381 mm)	*
6	Automatic brake spring free length	2.750 in. (69.850 mm)	*
6	Load to compress spring to 2 in. (50.8 mm)	97 lb-ft (132 N·m)	*
	REAR WINCH TENSIONER		
7	Tensioner thrust washer thickness	0.0615-0.0655 in. (1.562-1.663 mm)	0.055 in. (1.397 mm)
8	Tensioner roller pin outside diameter	1.2495-1.2500 in. (31.737-31.750 mm)	1.245 in. (31.623 mm)

Table 19-.2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
1			
2			
3			
4			
5			
6			
7			
8			

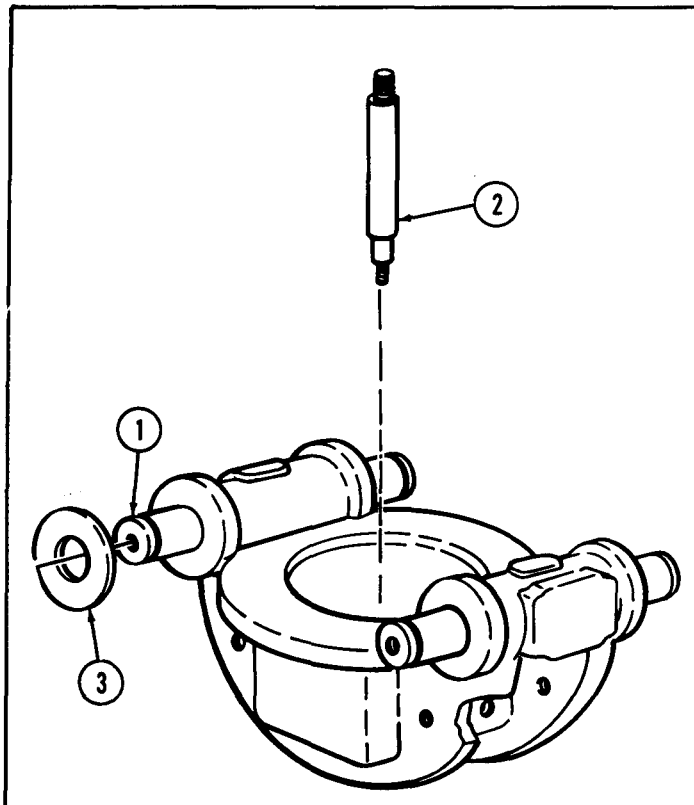
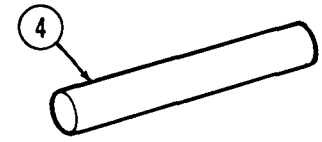
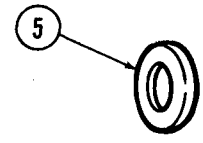
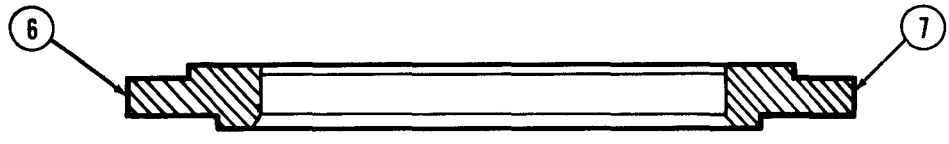
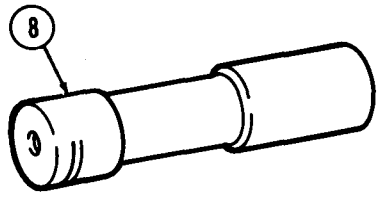
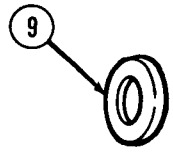


TA 350971

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
	REAR WINCH LEVEL WIND		
1	Level wind axle outside diameter	1.995-2.000 in. (50.673-50.800 mm)	1.995 in. (50.673 mm)
2	Level wind shaft outside diameter	0.8745-0.8750 in. (22.212-22.225 mm)	0.870 in. (22.098 mm)
3	Level wind thrust washer thickness	0.0615-0.0655 in. (1.562-1.663 mm)	0.057 in. (1.448 mm)
4	Level wind sheave pin outside diameter	2.7490-2.7496 in. (69.824-69.839 mm)	2.744 in. (69.697 mm)
5	Thrust washer thickness	0.0615-0.0655 in. (1.562-1.663 mm)	0.055 in. (1.397 mm)
6	Sheave spacer thickness	0.087-0.090 in. (2.209-2.286 mm)	0.093 in. (2.362 mm)
7	Sheave spacer thickness	0.178-0.182 in. (4.521-4.622 mm)	0.174 in. (4.419 mm)
	REAR WINCH TOP, BOTTOM, AND SIDE ROLLERS		
8	Side, top, and bottom roller shaft outside diameter	2.2495-2.2500 in. (57.137-57.150 mm)	2.245 in. (57.023 mm)
9	Side, top, and bottom roller thrust washer thickness	0.0615-0.655 in. (1.562-1.663 mm)	0.055 in. (1.397 mm)

Table 19-2. Repair and Replacement Standards for Front Winch, Rear Winch, and Winch Components (Cont'd)

REF. NO.	POINTS OF MEASUREMENT	SIZE AND FIT OF NEW PARTS	WEAR LIMITS
			
			
			
			

TA 350972

CHAPTER 20
POWER TAKEOFF MAINTENANCE

NOTE

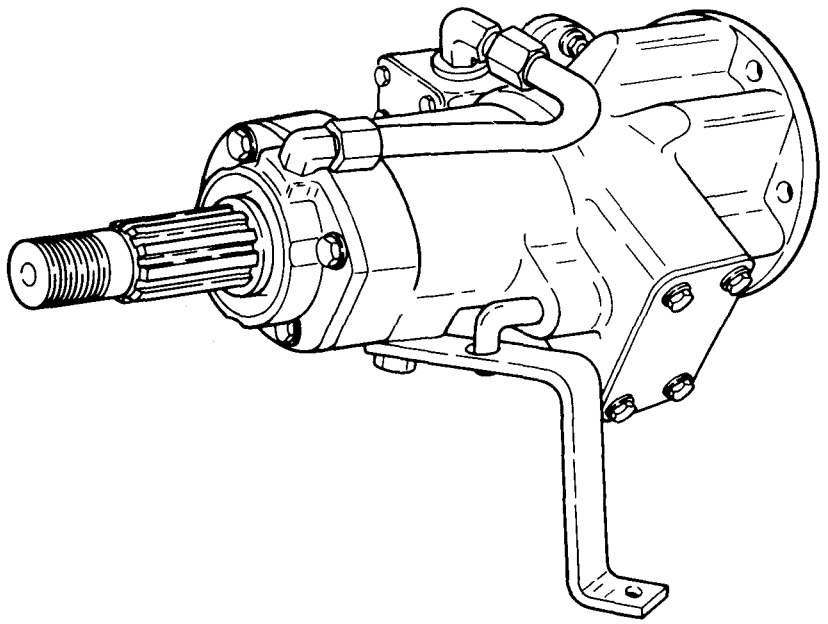
Refer to TM 9-2320-358-24&P for unique M939A2 maintenance procedures.

Section I. DESCRIPTION AND DATA

20-1. DESCRIPTION – TRANSFER CASE POWER TAKEOFF

a. The M936 wrecker with crane and M935 van with hydraulic liftgate have a power takeoff mounted on the rear of the transfer case. This power takeoff provides power to drive a hydraulic pump. It is pressure lubricated by an oil pump which also provides lubrication to the transfer case.

b. The power takeoff is a one-speed unit with output speed controlled and varied with engine rpm. Operator controls for the power takeoff are located in the cab.

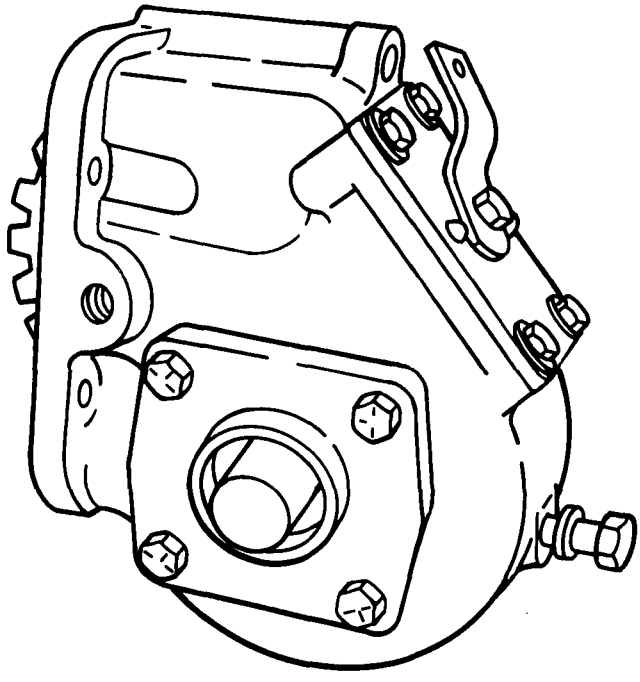


TRANSFER CASE POWER TAKEOFF

20-2. DESCRIPTION – TRANSMISSION POWER TAKEOFF

a. The transmission power takeoff is mounted on the right side of the transmission. This power takeoff provides power to drive a hydraulic pump which furnishes hydraulic pressure to operate the front winch and dump body.

b. The power takeoff, pressure lubricated by transmission oil, is a one-speed unit with output speed controlled and varied by engine rpm. Operator controls for the power takeoff are located in the cab.



TRANSMISSION POWER TAKEOFF

1. TRANSFER CASE POWER TAKEOFF

Make	Rockwell
Model	4-34165
Type	Single Speed
Location	Rear of Transfer Case

2. TRANSMISSION POWER TAKEOFF

Make	Dana
Model	A 22LL-C3-G
Type	Single Speed
Location	Right Side of Transmission

TA 350998

Section II. TRANSFER CASE POWER TAKEOFF AND CONTROLS MAINTENANCE

20-3. TRANSFER CASE POWER TAKEOFF MAINTENANCE TASK SUMMARY

20-4. TRANSFER CASE PTO CONTROL CABLE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M935 and M936	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Five locknuts
Cotter pin
Tiedown straps (Appendix C, Item 22)

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

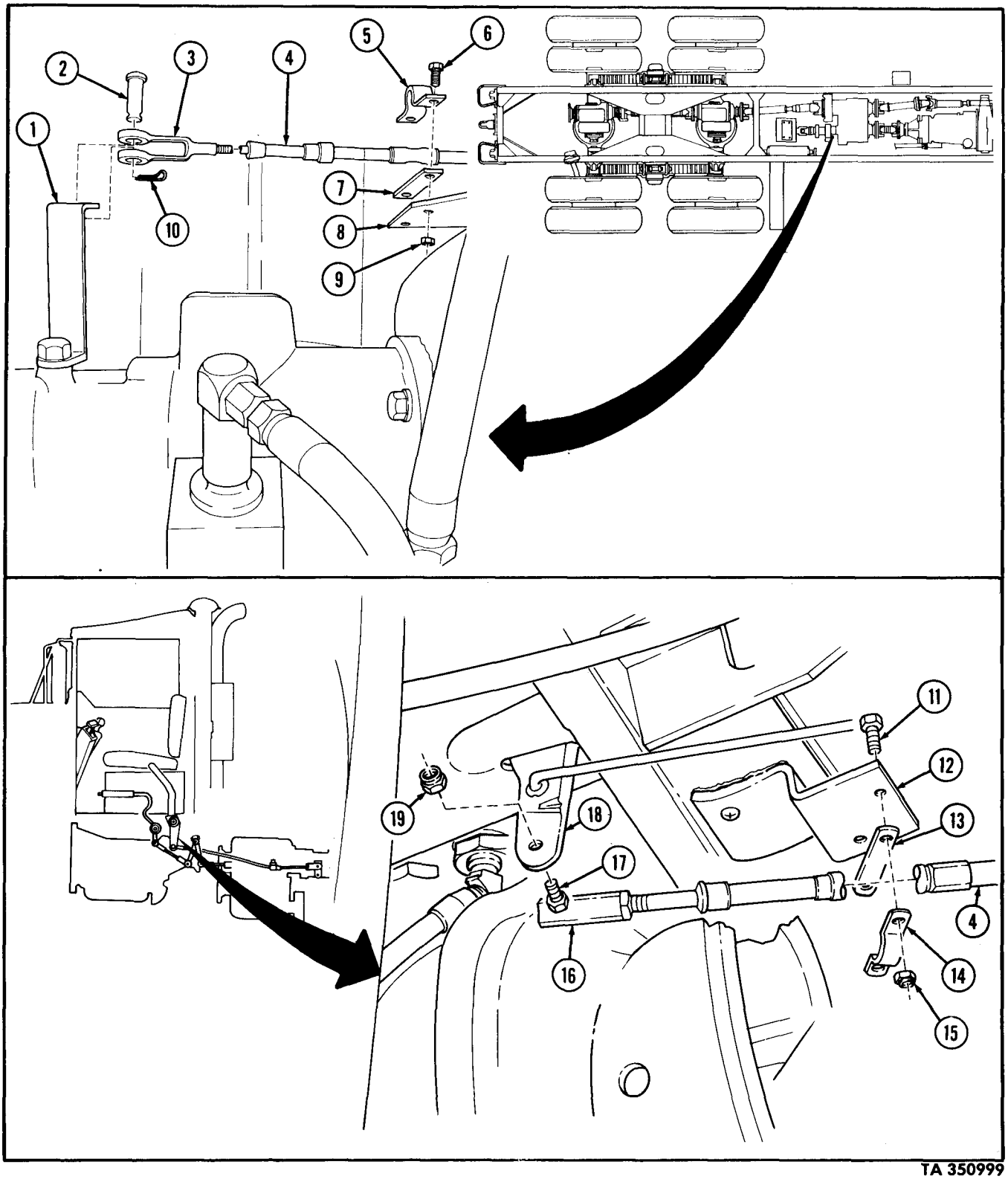
NOTE
Cut tiedown straps as required.

a. Removal

1.	Transfer case PTO select lever (1)	Cotter pin (10), clevis pin (2), and transfer PTO cable clevis (3)	Remove.	Discard cotter pin (10).
2.	PTO cable bracket (8)	Two screws (6) and locknuts (9), clamp (5) and shim (7)	Remove.	Discard locknuts (9).
3.	PTO cable (4)	Clevis (3)	Remove.	
4.	Front PTO cable bracket (12)	Two screws (11) and locknuts (15), clamp (14) and shim (13)	Remove.	Discard locknuts (15).
5.	Cross-shaft lever (18)	Locknut (19) and PTO cable swivel bolt (17)	Remove.	Discard locknut (19).
6.	PTO cable (4)	Swivel bolt (17) cable end (16)	Remove.	

20-4. TRANSFER CASE PTO CONTROL CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



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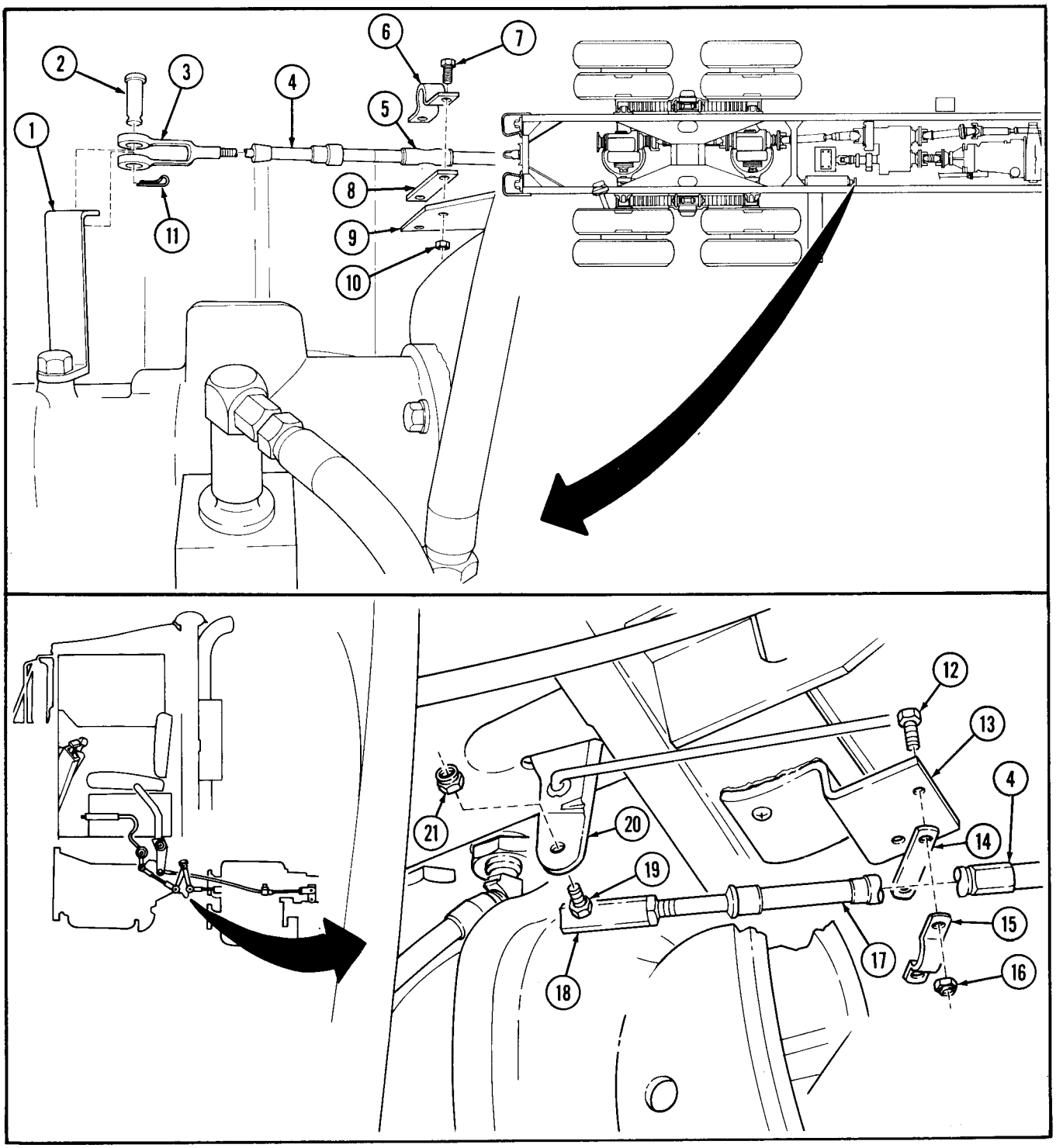
20-4. TRANSFER CASE PTO CONTROL CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
		NOTE Install tiedown straps as required.		
7.		Clevis (3)	Install on transfer case PTO cable (4) a few turns.	Adjustment will be made later.
8.		Transfer case PTO cable (4) (clevis end)	Install on PTO cable bracket (9) with clamp (6), shim (8), two screws (7), and new locknuts (10).	Make sure shim (8) is between PTO cable bracket (9) and PTO cable collar (5).
9.		Swivel bolt (19) cable end (18)	Install on front of PTO cable (4).	
10.		Transfer case PTO cable (4) (swivel bolt end)	Install on front PTO cable bracket (13) with clamp (15), shim (14), two screws (12), and new locknuts (16).	Make sure shim (14) is between PTO cable collar (17) and PTO cable bracket (13).
11.		Transfer case PTO cable swivel bolt (19)	Install on cross-shaft lever (20) with new locknut (21).	
		NOTE The transfer case PTO cable can be adjusted at two points. Adjustments can be made at the transfer case select lever cable clevis or at the transfer case PTO select lever cable collar.		
12.		Transfer case PTO cable clevis (3)	a. Adjust forward until alined with transfer PTO select lever (1). b. Install on PTO select lever (1) with pin (2) and new cotter pin (11).	If necessary, reposition transfer PTO cable (4) at PTO cable collar (17).

20-4. TRANSFER CASE PTO CONTROL CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Check transfer case PTO for proper operation (TM 9-2320-272-10).

TA 351000

20-5. TRANSFER CASE PTO CROSS-SHAFT (CONTROL LEVER) REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M935 and M936	TM 9-2320-272-10 TM 9-2320-272-20-2	Parking brake set. Driver's seat removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Fifteen locknuts
Cotter pin
GAA grease (Appendix C, Item 11)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

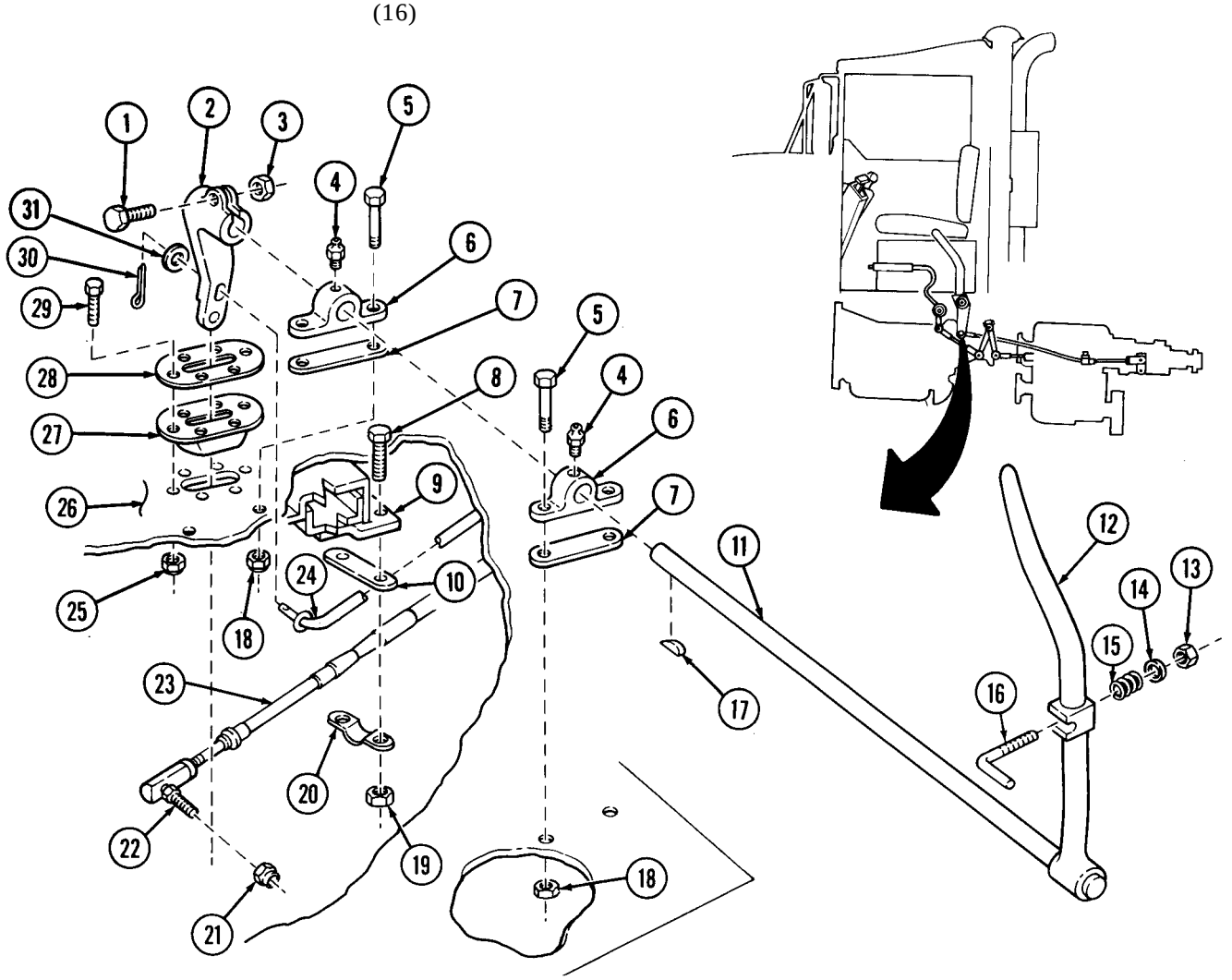
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
1.	Cross-shaft lever (2)	Transfer case PTO cable swivel bolt (22) and locknut (21)	Remove.	Discard locknut (21).
2.	Transfer case PTO cable bracket (9)	Two screws (8) and locknuts (19), shim (10), clamp (20), and transfer case PTO cable (23)	Remove.	Discard locknuts (19).
		NOTE Assistant will help with step 3.		
3.	Cab floor (26)	Four screws (5) and locknuts (18), and two shims (7), and cross-shaft retaining clamps (6)	Remove.	Discard locknuts (18).
4.	Two cross-shaft retaining clamps (6)	Two grease fittings (4)	Remove.	
		NOTE Perform step 5 on M936 wrecker only.		
5.	Cross-shaft lever (2)	Cotter pin (30), washer (31), and brake lock control valve rod (24)	Remove.	Discard cotter pin (30).
6.		Screw (1) and locknut (3)	Remove.	Discard locknut (3).

20-5. TRANSFER CASE PTO CROSS-SHAFT (CONTROL LEVER) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Assistant will help with step 7.		
7.	Cab floor (26)	Six screws (29) and locknuts (25), rubber seal (27), ring seal (28), and cross-shaft lever (2)	Remove.	Lift cross-shaft lever (2) from cab floor (26). Discard locknuts (25).
8.	Cross-shaft (11)	Woodruff key (17)	Remove.	
9.		Two cross-shaft retaining clamps (6)	Remove.	
10.	PTO lever (12)	Locknut (13), washer (14), helical spring (15), and PTO lever pin (16)	Remove.	Discard locknut (13).



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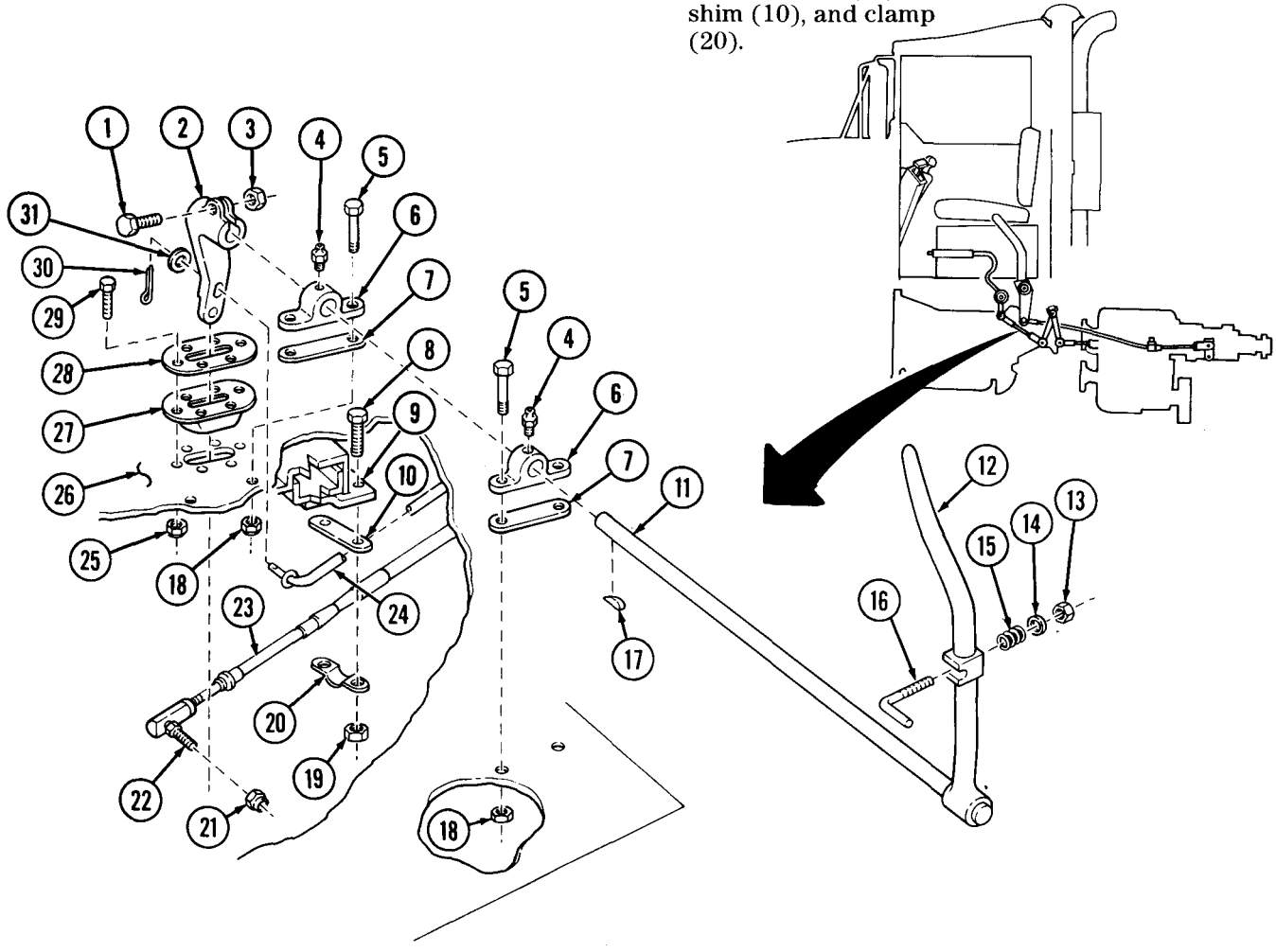
20-5. TRANSFER CASE PTO CROSS-SHAFT (CONTROL LEVER) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
11.		PTO lever (12)	Install with new locknut (13), washer (14), helical spring (15), and PTO lever pin (16).	
12.		Two cross-shaft retaining clamps (6) and cross-shaft lever (2)	Install on cross-shaft (11).	
13.		Two grease fittings (4)	Install in retaining clamps (6).	
14.		Woodruff key (17)	Install in cross-shaft (11).	Small amount of grease on rounded edge of woodruff key (17) will hold it in place on cross-shaft (11).
15.		Cross-shaft (11)	a. Guide into cross-shaft lever (2) and install screw (1) and new locknut (3) in cross-shaft lever (2). b. Lower to cab floor (26) so cross-shaft lever (2) and cross-shaft retaining clamps (6) are in position for installation.	
		NOTE Assistant will help with steps 16 and 17.		
16.		Cross-shaft lever (2)	Install to cab floor (26) with, six screws (29), rubber seal (27), ring seal (28), and six new locknuts (25).	
17.		Cross-shaft retaining clamps (6)	Install to cab floor (26) with four screws (5) and new locknuts (18), and two shims (7).	Make sure shims (7) are between cab floor (26) and clamps (6).
		N O T E Perform step 18 on M936 wrecker only.		

20-5. TRANSFER CASE PTO CROSS-SHAFT (CONTROL LEVER) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.		Brake lock control valve rod (24)	Guide into upper hole of cross-shaft lever (2) and install with washer (31) and new cotter pin (30).	
19.		PTO cable swivel bolt (22)	Guide into lower hole of cross-shaft lever (2) and install with new locknut (21).	
20.		Transfer case PTO cable (23)	Install on transfer case PTO cable bracket (9) with screws (8) and new locknuts (19), shim (10), and clamp (20).	



END OF TASK!

FOLLOW-ON TASKS: • Install driver's seat (TM 9-2320-272-20-2).
• Check transfer case PTO for proper operation (TM 9-2320-272-10).

20-6. TRANSFER CASE POWER TAKEOFF (PTO) REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M935 and M936

Equipment Condition Reference
TM 9-2320-272-20-2

Condition Description
Transfer case PTO to hydraulic pump propeller shaft removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
PTO to transfer case gasket
Oil seal
Cotter pin
Adhesive sealant (Appendix C, Item 2)
Protective cap-plugs (Appendix C, Item 5)
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

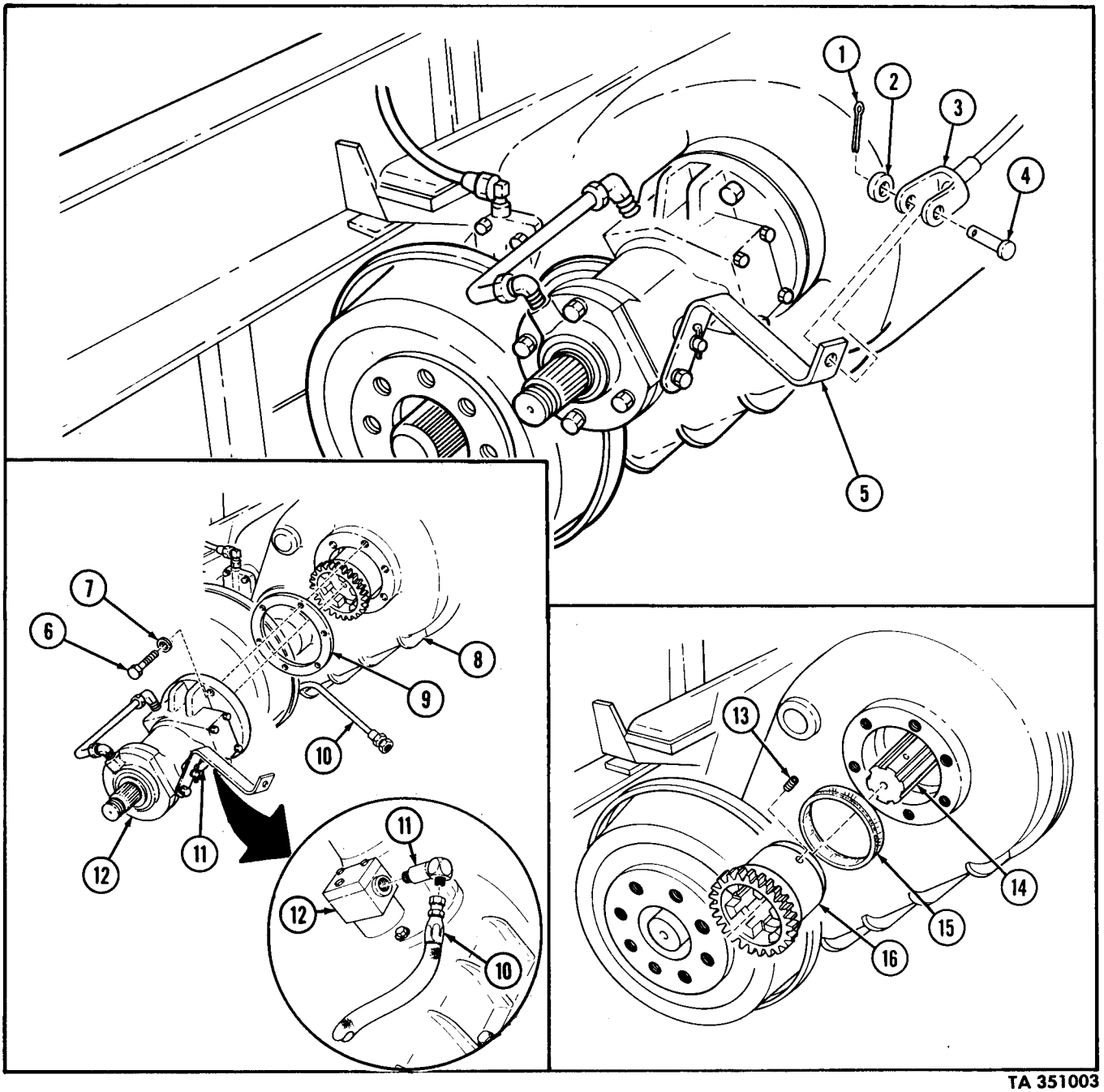
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-2
TM 9-2320-272-34P
LO 9-2320-272-12

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	PTO select lever (5)	Cotter pin (1), washer (2), clevis pin (4), and clevis (3)	Remove.	Discard cotter pin (1).
		NOTE Have drainage container ready to catch oil.		
2.	Adapter (11)	Transfer case oil return line (10)	Disconnect from adapter (11).	Plug opening of oil return line (10).
3.	Power takeoff (12)	Adapter (11)	Remove.	Plug opening of power takeoff (12).
4.	Transfer case (8)	Six screws (6) and washers (7)	Remove.	
5.		Power takeoff (12)	Remove.	
6.		Gasket (9)	Remove.	Discard gasket (9). Clean gasket remains from mating surfaces.

20-6. TRANSFER CASE POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	PTO oil pump drive gear assembly (16)	Set screw (13)	Remove.	
8.	Transfer case main input shaft (14)	PTO oil pump drive gear assembly (16)	Slide off main input shaft (14).	
9.	PTO oil pump drive gear assembly (16)	Oil seal (15)	Remove.	Discard oil seal (15).



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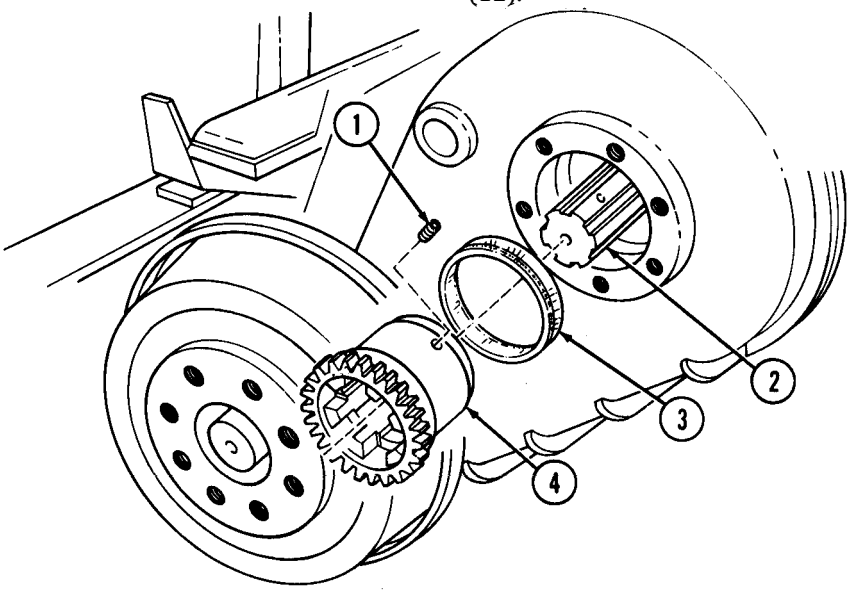
20-6. TRANSFER CASE POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

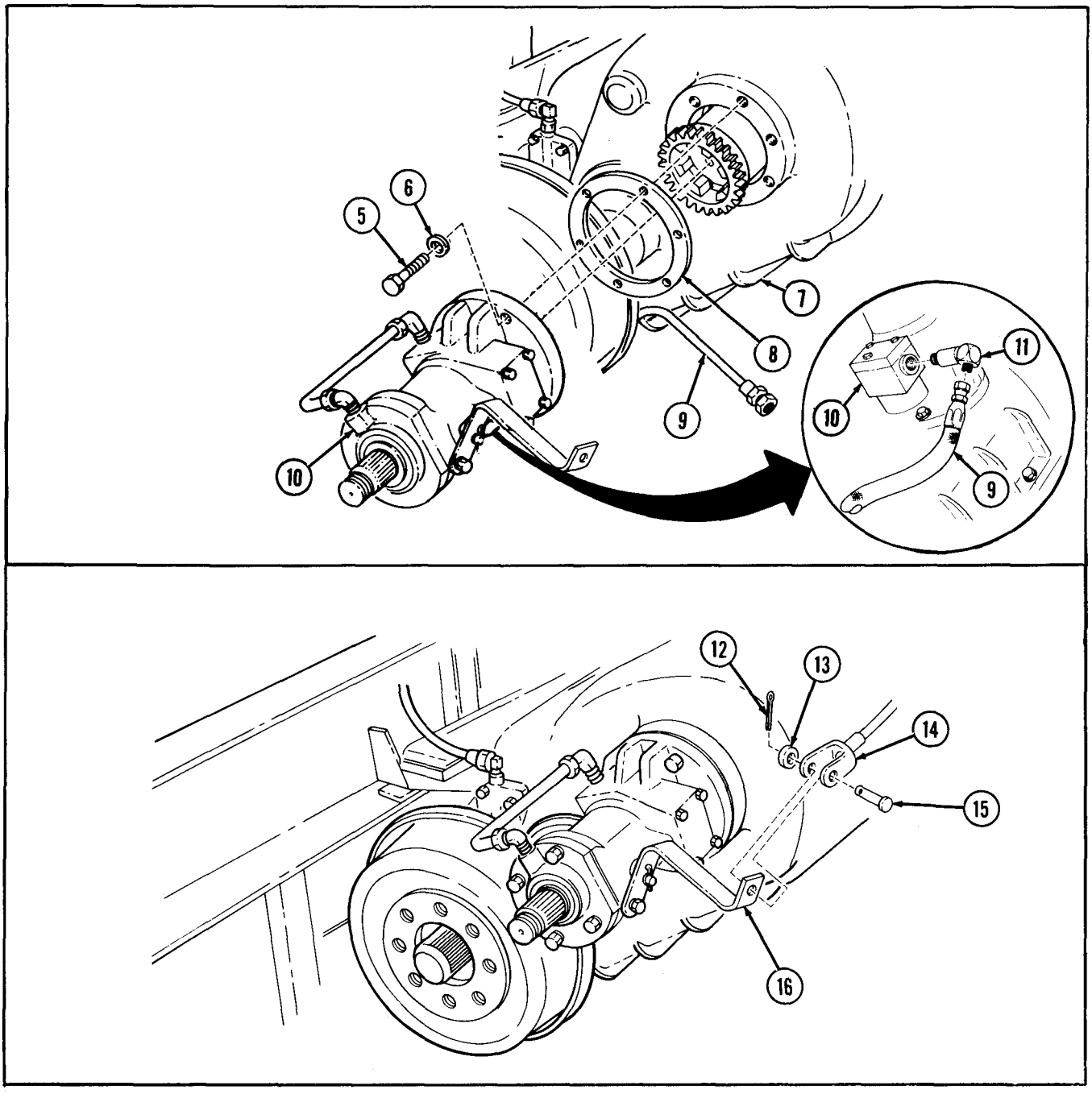
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
10.		New oil seal (3)	Install on PTO oil pump drive gear assembly (4).	
11.		PTO oil pump drive gear assembly (4)	Install on transfer case main input shaft (2).	Aline setscrew (1) hole in gear assembly (4) with recess in main input shaft (2).
12.		Setscrew (1)	Install in PTO oil pump drive gear assembly (4).	Apply adhesive sealant to threads of setscrew (1). Tighten 84-108 lb-in. (10-12 N·m).
13.		New gasket (8) and power takeoff (10)	Install on transfer case (7) with six screws (5) and washers (6).	Tighten screws (5) 40-65 lb-ft (54-88 N·m).
		NOTE Male pipe threads must be wrapped with sealing tape before installation.		
14.		Adapter (11)	Install on power take-off (10).	
15.		Transfer case oil return line (9)	Connect to adapter (11).	
16.		PTO clevis (14)	Install on PTO select lever (16) with clevis pin (15), washer (13), and new cotter pin (12).	



TA 351004

20-6. TRANSFER CASE POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Adjust transfer case PTO cable (para. 20-4).
- Install transfer case PTO to hydraulic pump propeller shaft (TM 9-2320-272-20-2).
- Fill transfer case to proper oil level (LO 9-2320-272-12).
- Check transfer case PTO for proper operation (TM 9-2320-272-10).

TA 351005

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M935 and M936	Para. 20-6	Transfer case PTO removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Adapter plug gasket
Shifter shaft "O" ring
Bearing cap/oil seal
Two locknuts
Eight lockwashers
Cotter pin
Two snaprings
Woodruff key
Oil seal sleeve
Lint-free cloth (Appendix C, Item 7)

Personnel Required
Wheeled vehicle repairman MOS 63W

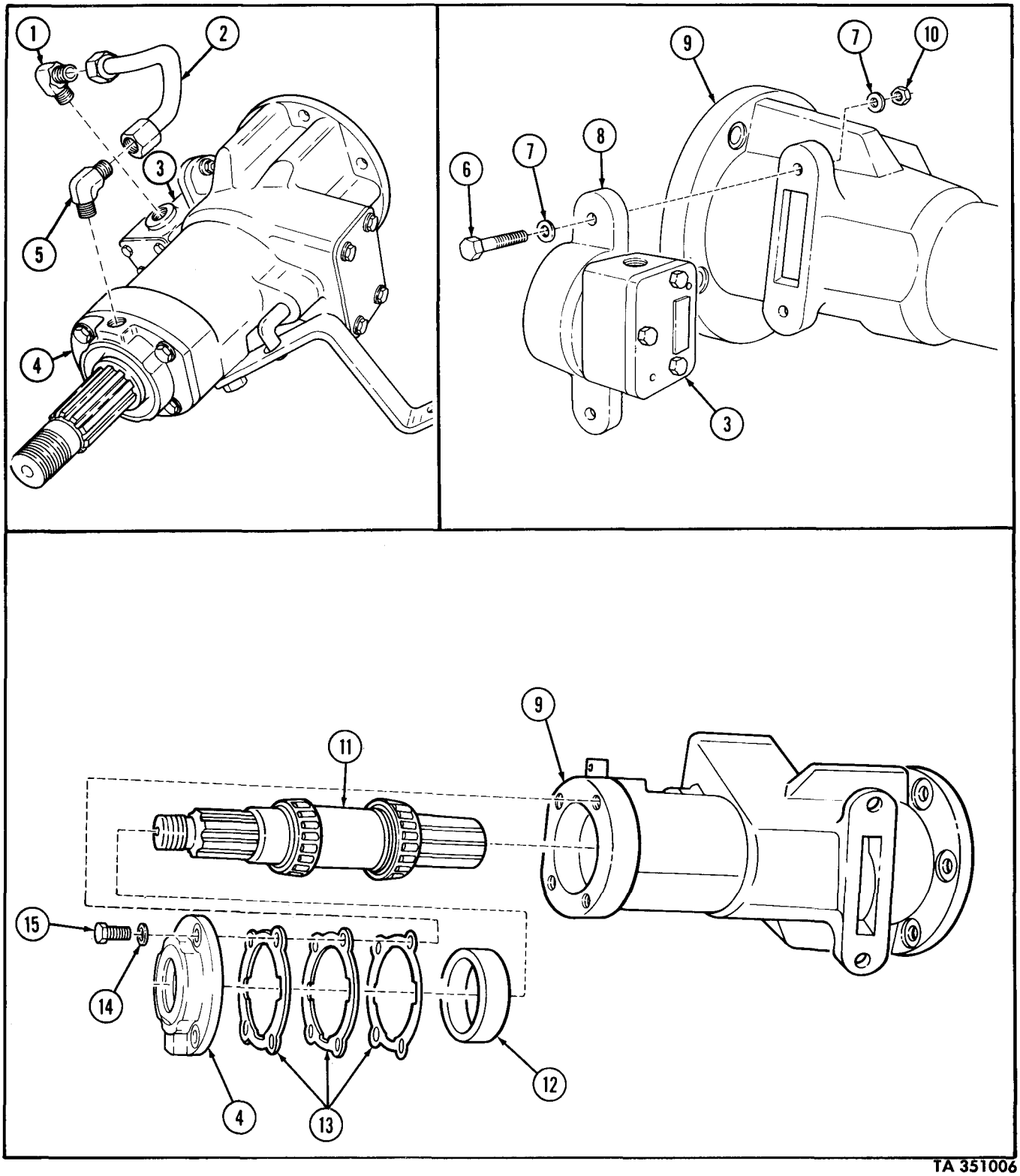
General Safety Instructions
Keep fire extinguisher nearby when using drycleaning solvent.

Manual References
TM 9-2320-272-34P
TM 9-214

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	Oil pump housing (3) and bearing cap (4)	Oil line (2)	Remove from adapter elbows (1) and (5).	
2.		Adapter elbows (1) and (5)	Remove.	
3.	Oil pump adapter (8) and PTO housing (9)	Two locknuts (10), four washers (7), and two screws (6)	Remove from PTO housing (9).	Discard locknuts (10).
4.	Bearing cap (4) and PTO housing (9)	Four screws (15) and lockwashers (14)	Remove.	Discard lockwashers (14).
5.		Bearing cap (4), shims (13), outer bearing race (12), and PTO shaft (11)	Remove from PTO housing (9).	Tag shims (13) for installation.

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

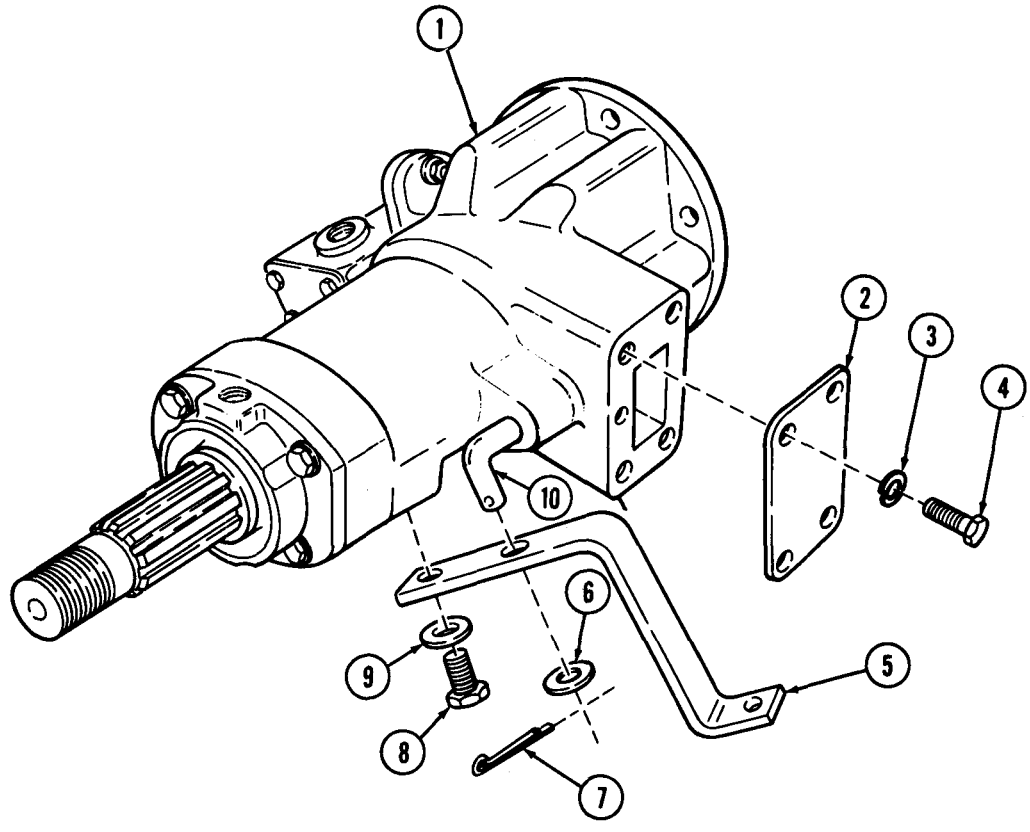
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 351006

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

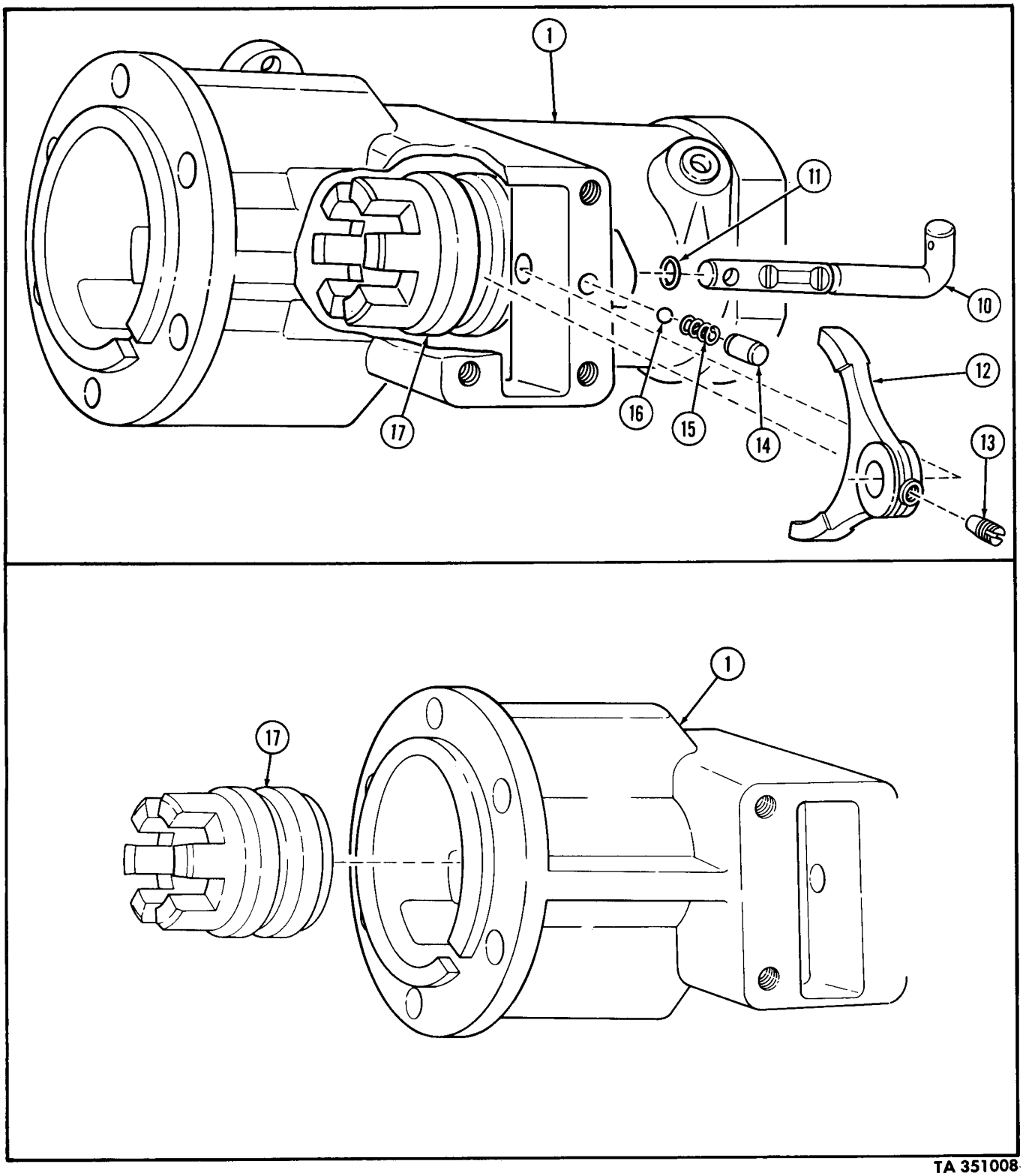
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	PTO shift lever (5) and shifter shaft (10)	Cotter pin (7) and washer (6)	Remove.	Discard cotter pin (7).
7.	PTO shift lever (5) and PTO housing (1)	Screw (8) and washer (9)	Remove.	
8.	PTO housing (1)	Four screws (4) and lockwashers (3) and plate (2)	Remove.	Discard lockwashers (3).
9.		Dowel (14), spring (15) and detent ball (16)	Tilt PTO housing (1) until items fall out.	
10.	Shifter fork (12)	Setscrew (13)	Remove.	
11.		Shifter shaft (10)	Remove.	
12.	Shifter shaft (10)	"O" ring (11)	Remove.	Discard "O" ring (11).
13.	PTO housing (1)	Shifter fork (12)	Remove.	Mark position of shifter fork (12) for installation.
14.		Clutch collar (17)	Tilt PTO housing (1) until item falls out	



TA 351007

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

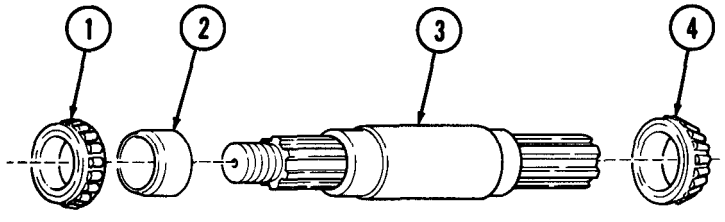
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 351008

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

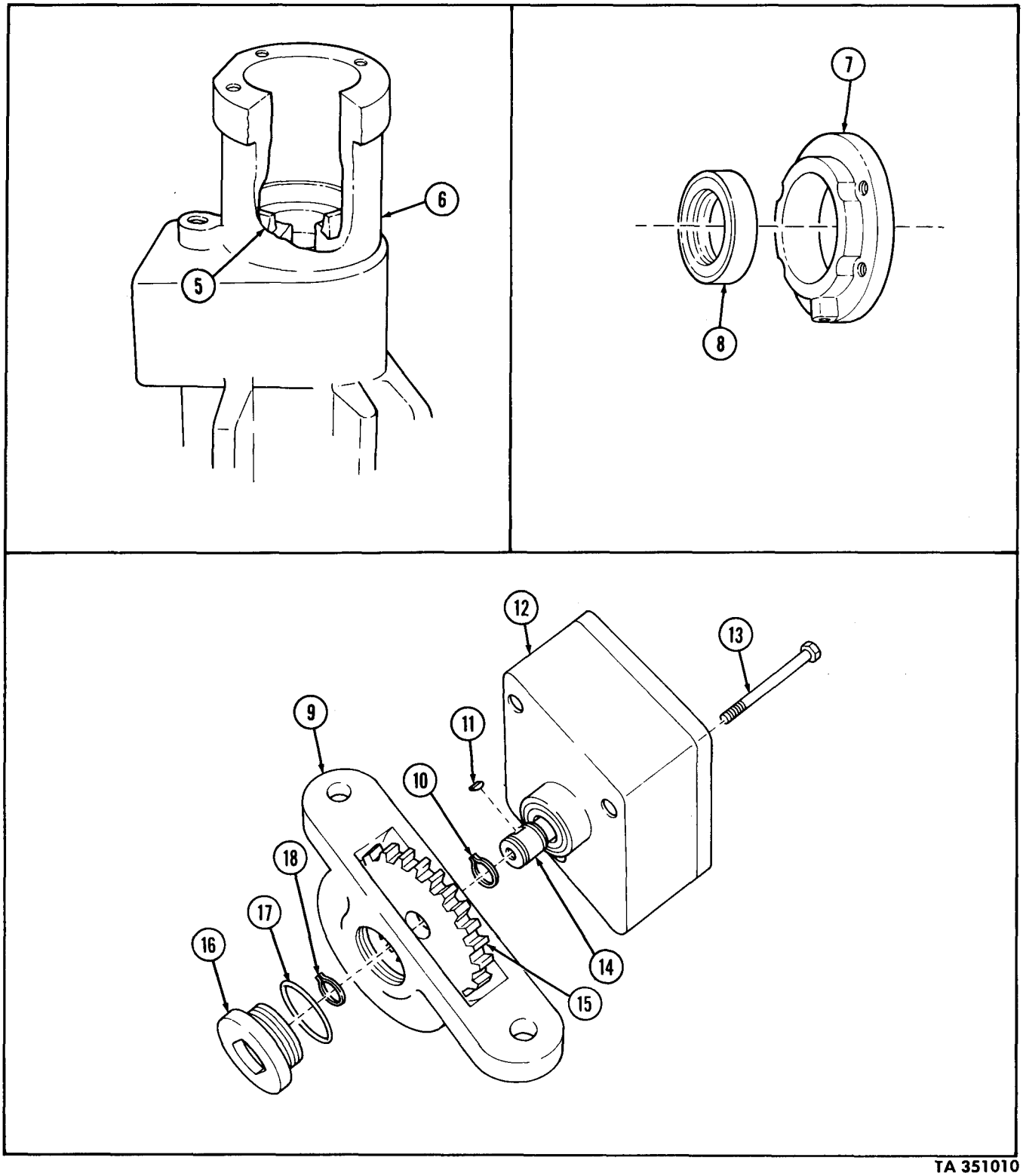
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.	PTO housing (6)	Inner bearing race (5)	Remove.	
16.	Oil pump adapter (9)	Access plug (16) and gasket (17)	Remove.	Discard gasket (17).
17.	Pump shaft (14)	Outer snapring (18)	Remove.	Discard snapring (18).
18.	Oil pump (12)	Three screws (13), oil pump adapter (9), and drive gear (15)	Remove.	
19.	Oil pump shaft (14)	Inner snapring (10) and woodruff key (11)	Remove.	Discard snapring (10) and woodruff key (11).
20.	PTO shaft (3)	Outer and inner output shaft bearings (1) and (4)	Remove.	Use arbor press and mandrel.
21.		Oil seal sleeve (2)	Remove.	Discard oil seal sleeve (2).
22.	Bearing cap (7)	PTO oil seal (8)	Remove.	Discard PTO oil seal (8).



TA 351009

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



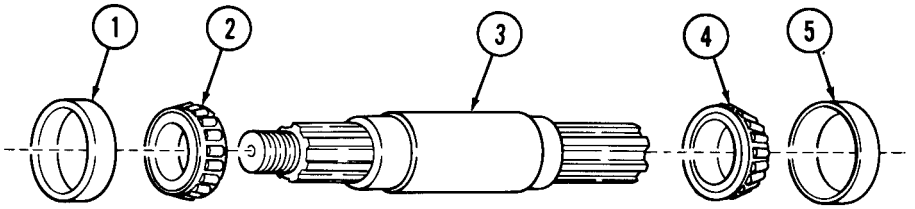
TA 351010

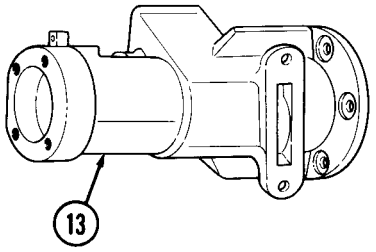
20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

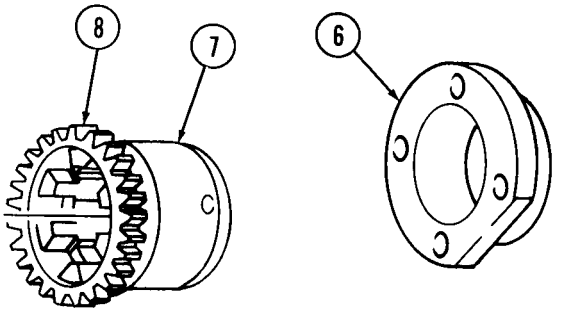
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Cleaning and Inspection			
			WARNING Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.	
			NOTE Cleaning and inspection instructions include PTO oil pump drive gear and collar assembly removed from transfer case input shaft in paragraph 20-6.	
23.		All transfer case PTO components	a. Clean with drycleaning solvent. b. Dry with lint-free cloth.	
24.		PTO shaft (3)	Inspect for pitting, galling, and scoring.	Replace if pitted, galled, or scored.
25.		PTO housing (13)	Inspect for cracks, or pitting in bores and on machined surfaces.	Replace transfer case power takeoff if housing (13) is cracked or pitted in bores or on machined surfaces.
26.		Inner (4) and outer (2) shaft bearings and two bearing races (1) and (5)	Inspect for cracking, pitting, scoring, and discoloration.	Discard if any matched bearing (2) and (4) or races (1) or (5) are pitted, cracked, scored, or discolored and replace all four. Refer to TM 9-214.
27.		PTO oil pump drive gear (8) and collar (7)	Inspect for cracks, pitting, scoring, or missing teeth.	Replace if cracked, pitted, scored, or teeth are missing.
28.		Oil pump adapter drive gear (11)	Inspect for chipped, cracked, or missing teeth.	Replace if chipped, cracked, or teeth are missing.
29.		Oil pump adapter (12)	Inspect for cracks.	Replace if cracked.
30.		Oil pump (9) and shaft (10)	Inspect for cracks and scoring.	Replace if cracked or scored.
31.		Bearing cap (6)	Inspect for cracks.	Replace if cracked.

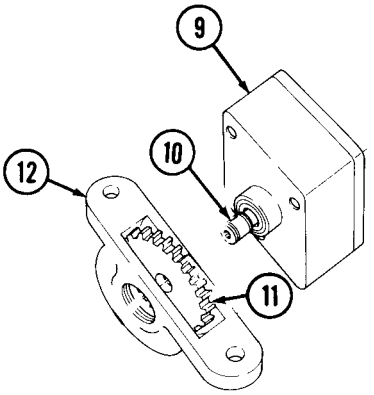
20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





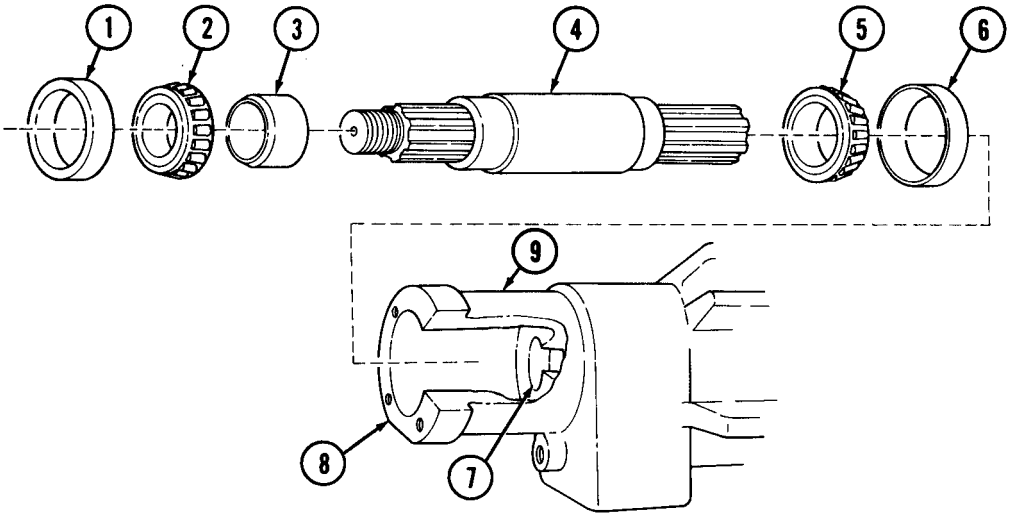




TA 351011

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

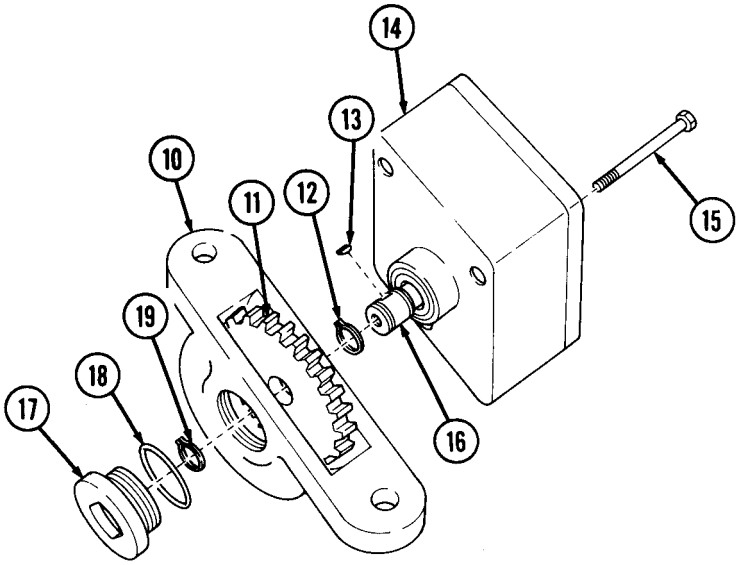
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
c. Reassembly				
32.		New snapring (12) and new woodruff key (13)	Install on oil pump shaft (16).	
33.		Oil pump adapter (10)	Position against oil pump (14), aline oil pump gear (11) on oil pump shaft (16), and install three screws (15).	Tighten screws (15) 9-11 lb-ft (12-15 N·m).
34.		New snapring (19)	Install on oil pump shaft (16).	
35.		New adapter plug gasket (18) and adapter plug (17)	Install on oil pump adapter (10).	Tighten adapter plug (17) 80 lb-ft (108 N·m).
36.		Inner bearing (5), and outer bearing (2), and new oil seal sleeve (3)	Install on PTO shaft (4).	Use arbor press and mandrel. Refer to TM 9-214.
37.		Inner bearing race (6)	Position over inner bearing (5) on PTO shaft (4).	
38.		PTO shaft (4)	Position into PTO housing (9) through bearing cap end (8) of PTO housing (9).	Make sure inner bearing race (6) seats squarely in PTO housing (9) bore on shoulder (7).
39.		Outer bearing race (1)	Position into PTO housing (9).	Make sure outer bearing race (1) seats squarely in PTO housing (9) bore.



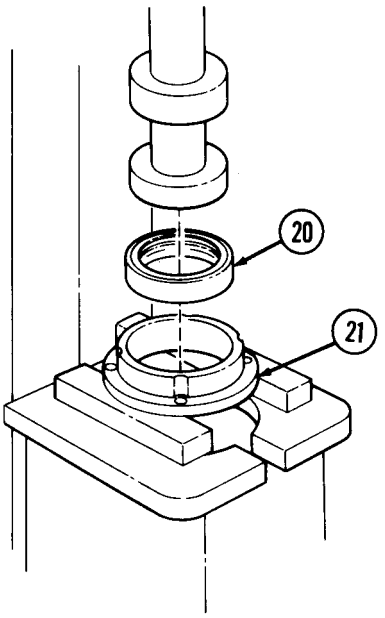
TA 351012

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



40.		New oil seal (20)	Install in bearing cap (21).	"OUTSIDE" stamping must be up. Use arbor press and mandrel.



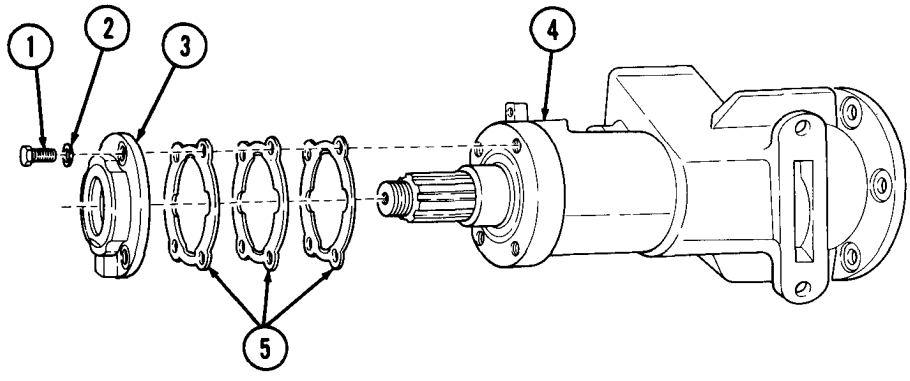
TA 351013

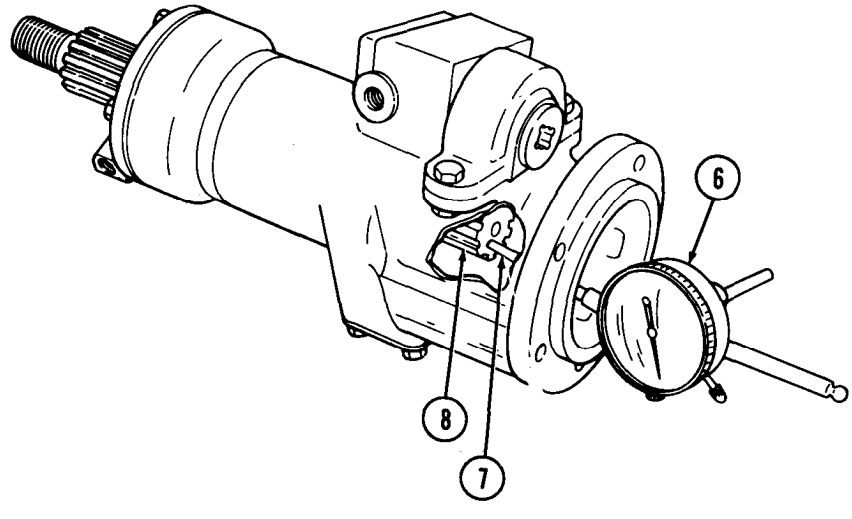
20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
			NOTE	
			Step 41 establishes starting shim pack thickness.	
41.		Bearing cap (3)	a. Install on transfer case PTO (4) and tap alternately around outer edge with soft faced hammer.	
			b. Use feeler gage and measure clearance between cap (3) and PTO (4).	Record measurement.
42.	Transfer case PTO (4)	Bearing cap (3)	Remove.	
			NOTE	
			Use measurement obtained in step 4 lb plus a .003 in. (.0762 mm) shim for starting shim pack thickness.	
43.		Starting shim pack (5) and bearing cap (3)	Install on transfer case PTO (4) with four washers (2) and screws (1).	Do not apply sealer to mating surfaces. Tighten 18-24 lb-ft (24-32 N·m).
44.		Dial indicator (6)	Position dial indicator plunger (7) against shaft (8).	
45.		Transfer PTO shaft (8)	Check end play as follows:	
			a. Force shaft (8) to rear of transfer case PTO (4).	
			b. Set dial indicator (6) to zero.	
			c. Force shaft (8) to front of transfer case PTO (4).	
			d. Record reading shown on dial indicator (6).	End play should be .0001 -.005 in. (.00254-0.127 mm).

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS





TA 351014

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
46.	Transfer case PTO (4)	Four screws (1) and washers (2) and bearing cap (3)	Remove.	

NOTE

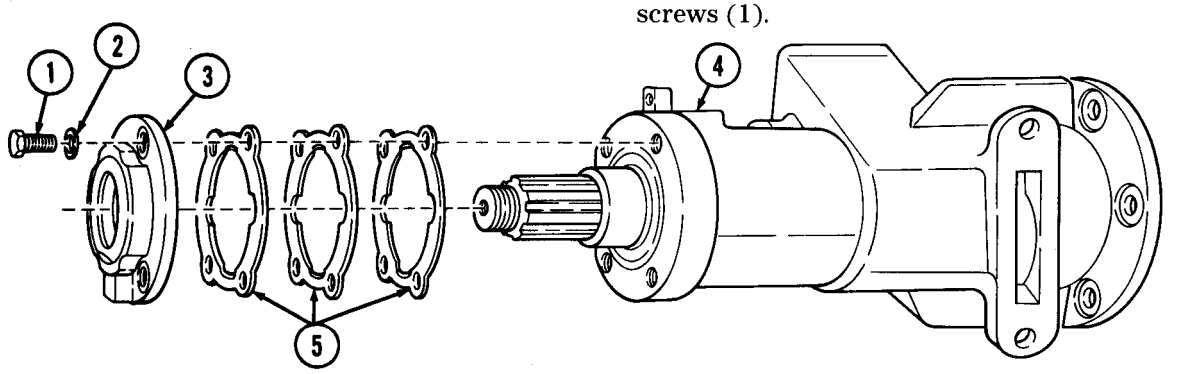
Use reading obtained in step 45d for number or thickness of shims, to be removed or added, for transfer case PTO shaft adjustment.

47.		Shims (5)	Remove or add if necessary.	
48.		Shim pack (5)	Remove.	

NOTE

Do not apply sealer to shims.

49.		Transfer case PTO (4) and bearing cap (3)	Apply a light coating of sealer to mating surfaces.	Do not coat shims (5) with sealer.
50.		Shim pack (5) and bearing cap (3)	Install on transfer case PTO (4) with four new lockwashers (2) and screws (1).	Tighten 18-24 lb-ft (24-32 N·m).



CAUTION

Clutch collar and shifter must be properly installed to ensure proper PTO operation. Make sure clutch collar internal splines face away from PTO mounting flange and thick edge of shifter fork faces shifter shaft.

51.		Clutch collar (18)	Position splined end (23) over PTO shaft.	
52.		Shifter fork (11)	Position finger ends (10) of fork (11) in center groove (17) of clutch collar (18).	
53.		New "O" ring (7)	Install on shifter shaft (9).	
54.		Shifter shaft (9)	Place through PTO housing bore (16) and fork (11) and install with setscrew (12) into hole (8).	Tighten setscrew (12) 7-9 lb-ft (10-12 N·m).

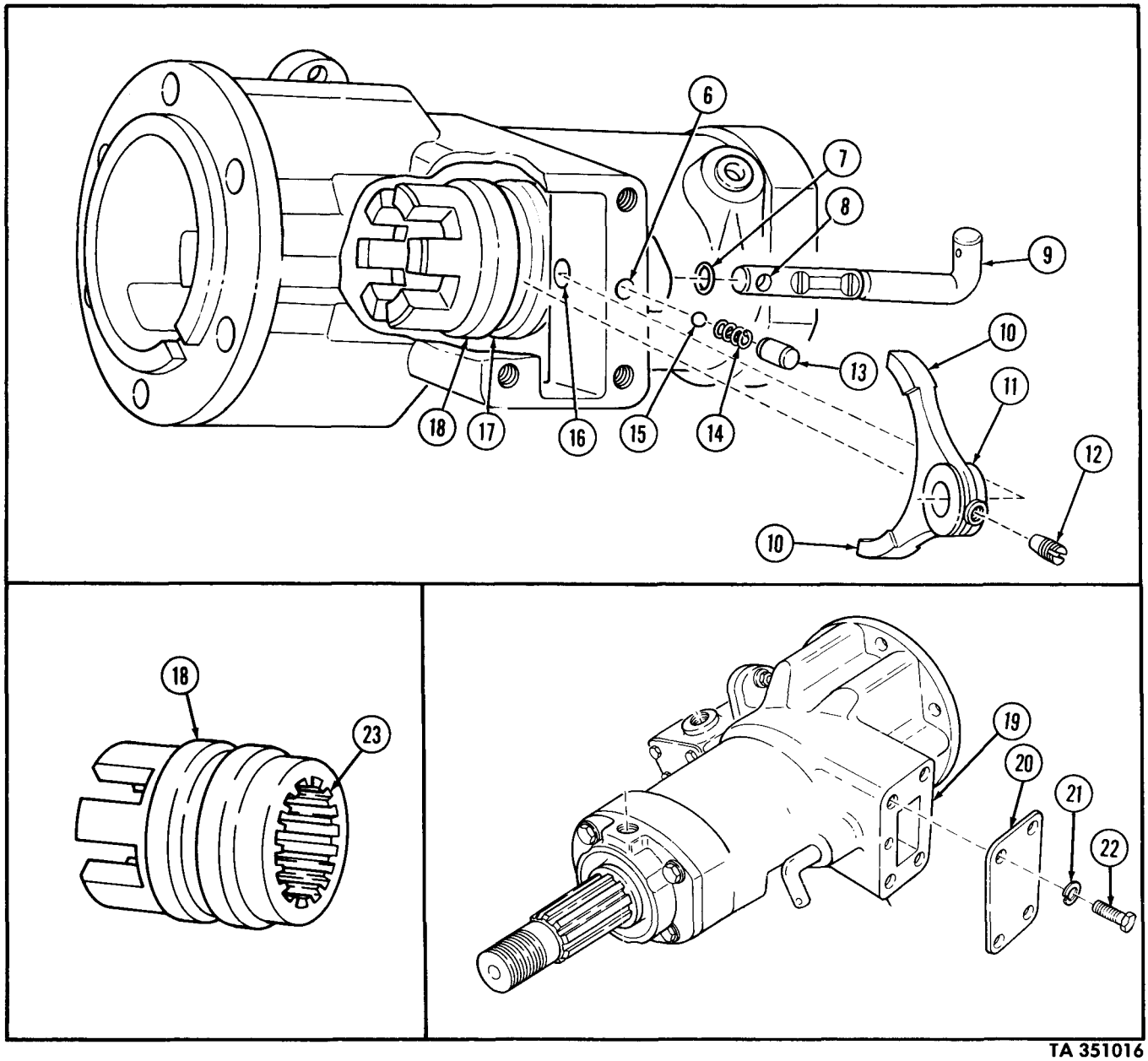
TA 351015

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (COnt'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
55.		Detent ball (15), spring (14), and dowel (13)	Place into PTO housing bore (6).	
56.		Cover plate (20)	Install on PTO housing (19) with four new lockwashers (21) and screws (22).	Tighten screws (22) 18-24 lb-ft (24-32 N·m).

NOTE

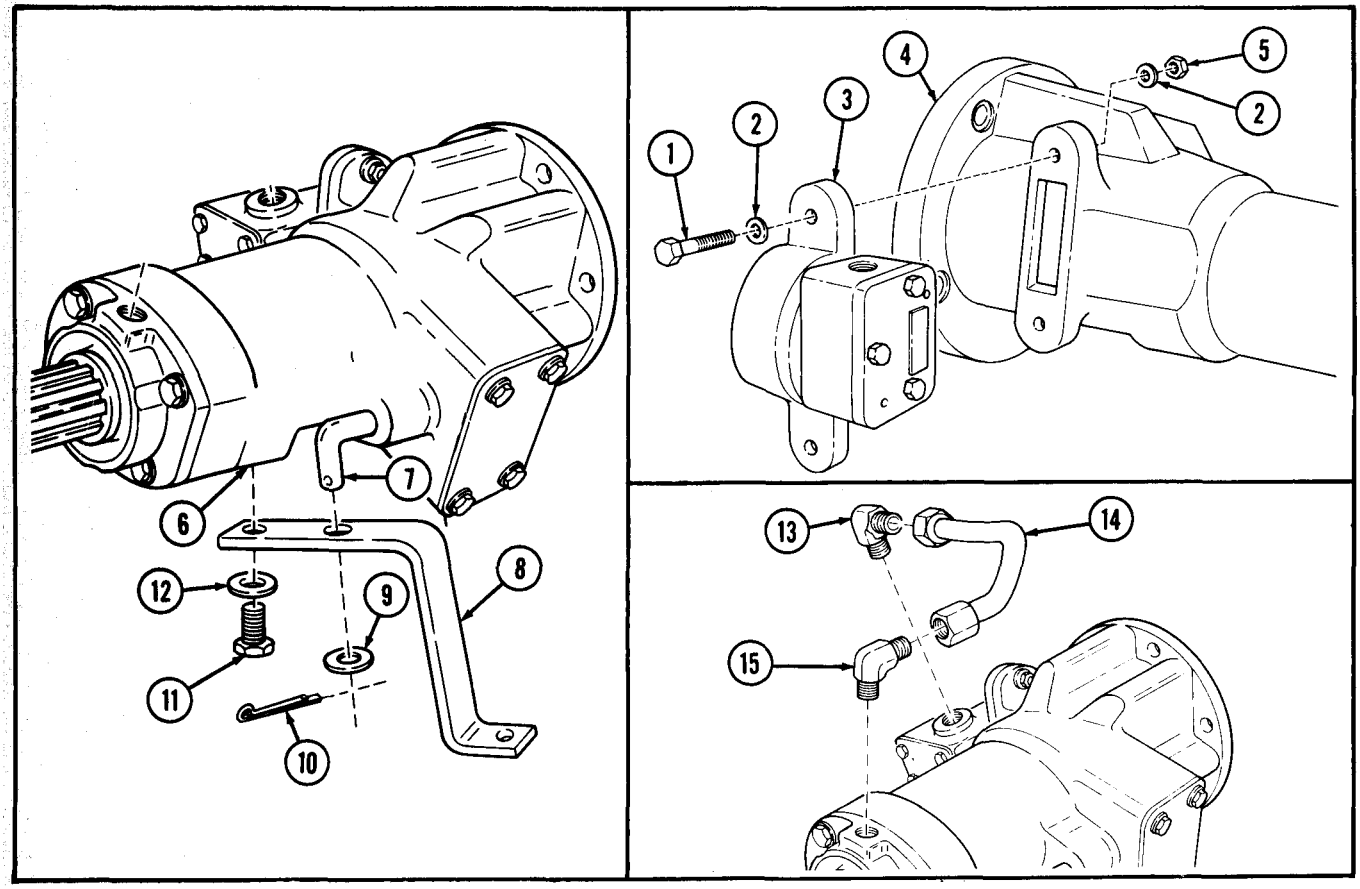
At this point, check operation of PTO shifter shaft. Shifter shaft must be able to be moved into two positions.



TA 351016

20-7. TRANSFER CASE POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
57.		PTO shift lever (8)	a. Install on shifter shaft (7) with washer (9) and new cotter pin (10). b. Install on PTO housing end (6) with washer (12) and screw (11).	
58.		Oil pump adapter (3)	Install on PTO housing (4) with four washers (2), two screws (1), and two new locknuts (5).	Tighten 15-20 lb-ft (20-27 N·m).
59.		Adapter elbows (14) and (15)	Install.	
60.		Oil line (13)	Connect to PTO adapter elbows (14) and (15).	



END OF TASK!

FOLLOW-ON TASK: Install transfer case PTO (para. 20-6).

TA 351017

Section III. TRANSMISSION POWER TAKEOFF AND CONTROLS MAINTENANCE

20-8. TRANSMISSION POWER TAKEOFF MAINTENANCE TASK SUMMARY

20-9. TRANSMISSION POWER TAKEOFF (PTO) CONTROL CABLE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
M925, M926, M928, M929, M930, M932, M936	TM 9-2320-272-10	Parking brake set.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two cotter pins
Two locknuts

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

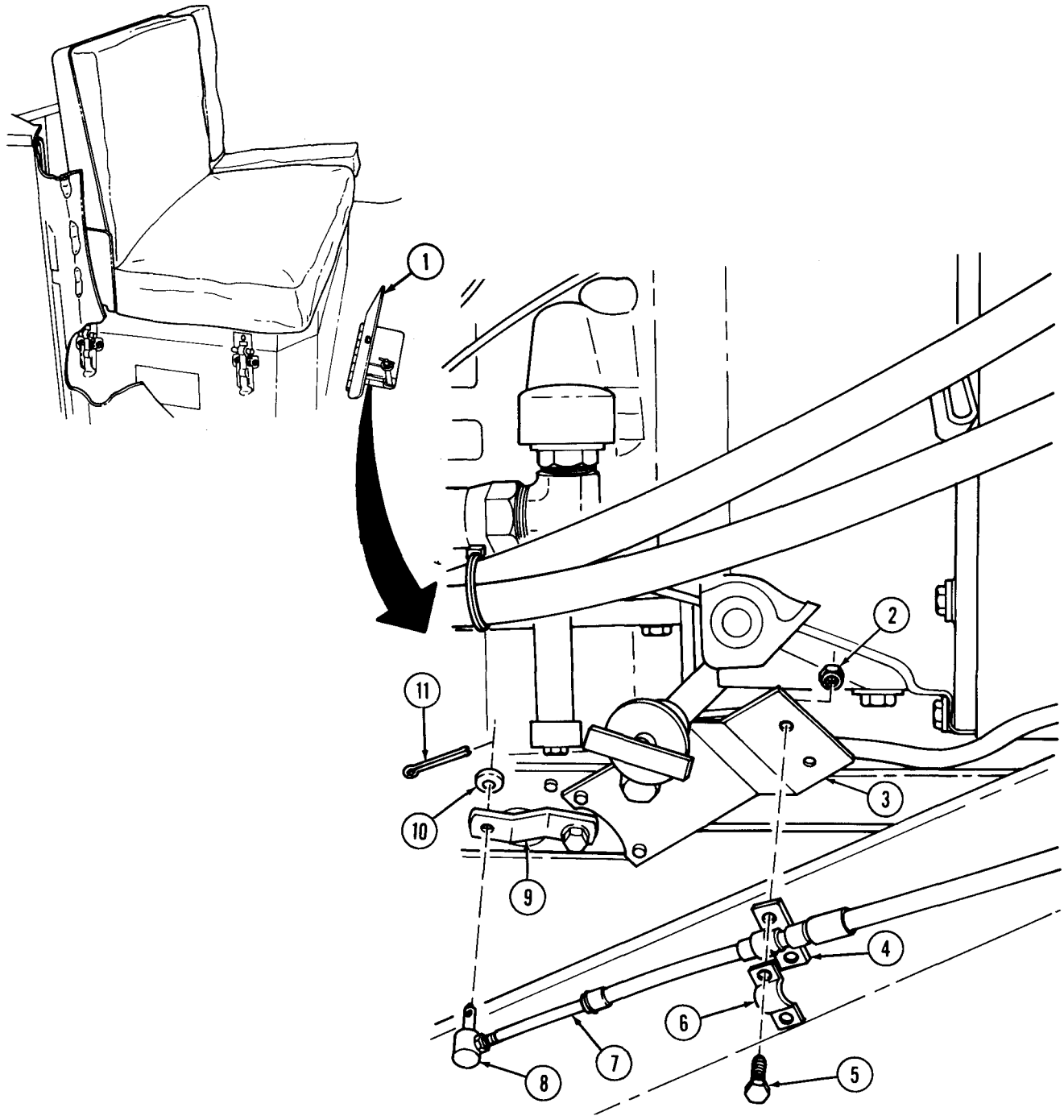
Manual References

TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Inside cab	Transmission dipstick access door (1)	Open.	Refer to TM 9-2320-272-10.
2.	PTO cable bracket (3)	Two screws (5) and locknuts (2), clamp (6), and spacer (4)	Remove.	
3.	PTO cable pin (8)	Cotter pin (11) and washer (10)	Remove and lift PTO cable pin (8) free of select lever (9).	Discard cotter pin (11).
4.	PTO cable (7)	PTO cable pin (8)	Remove.	Tag end of PTO cable (7) for installation.

20-9. TRANSMISSION POWER TAKEOFF (PTO) CONTROL CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



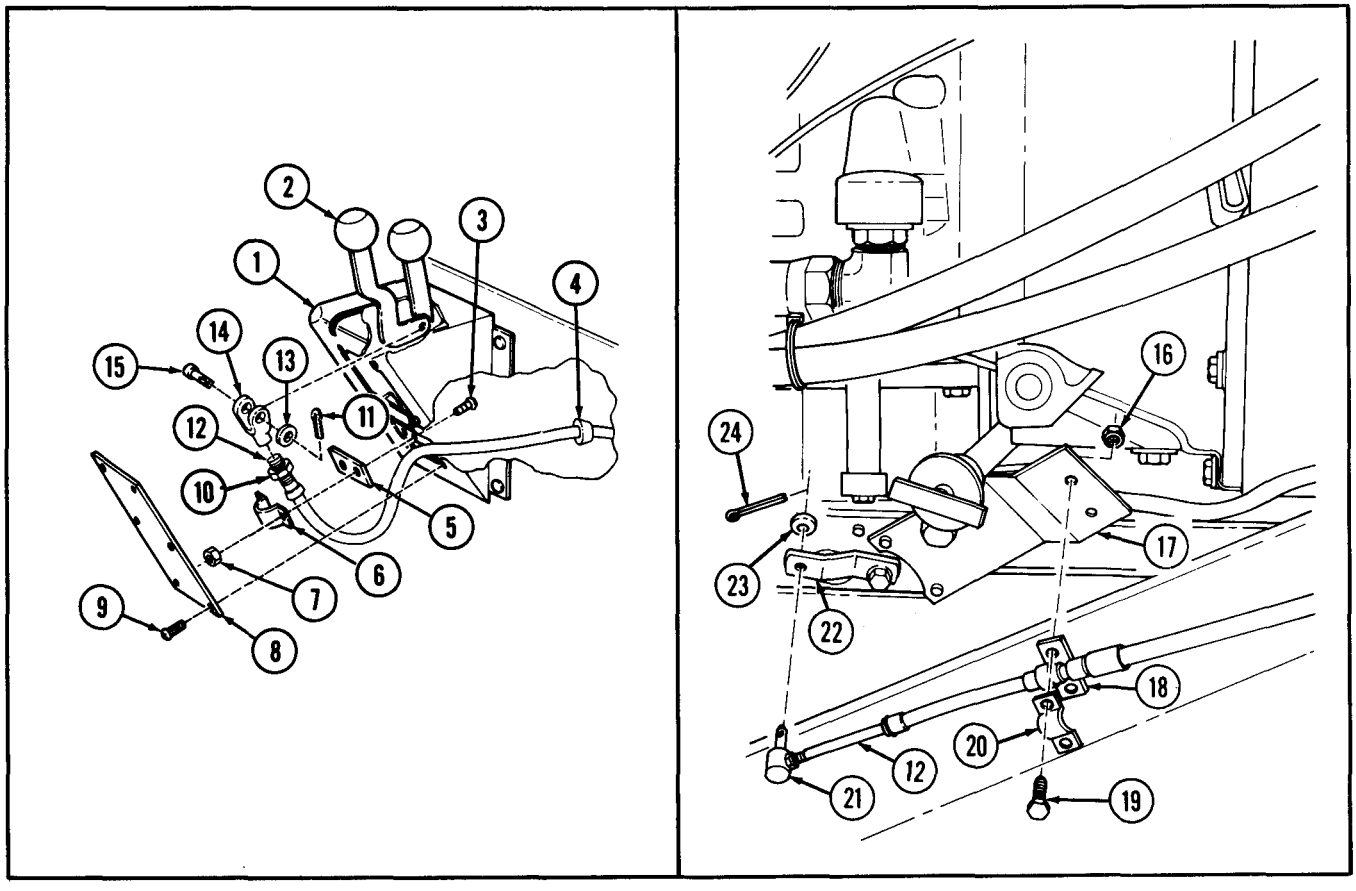
TA 351018

20-9. TRANSMISSION POWER TAKEOFF (PTO) CONTROL CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	PTO control panel (1)	Six screws (9) and access cover (8)	Remove.	
6.		Two locknuts (7) and screws (3), clamp (6), and spacer (5)	Remove.	Discard locknuts (7).
7.	PTO control lever (2)	Cotter pin (11), washer (13), and clevis pin (15)	Remove.	Discard cotter pin (11). Pull end of control cable (12) clear of panel.
8.	PTO control cable (12)	Nut (10)	Loosen and remove cable clevis (14).	
9.	PTO control panel (1)	PTO control cable (12)	Pull through grommet (4) and into cab.	Tag end of PTO cable (12) for installation.
b. Installation				
10.		PTO control cable (12)	Feed transmission select lever end of cable through rear of control panel (1) and into grommet (4).	
11.		PTO cable clevis (14)	a. Attach to PTO control panel end of cable (12) with nut (10). b. Install to PTO control lever (2) with clevis pin (15), washer (13), and new cotter pin (11).	
12.		PTO control cable (12)	Install to PTO control panel (1) with two screws (3), spacer (5), clamp (6), and two new locknuts (7).	
13.		PTO control panel access cover (8)	Install to PTO control panel (1) with six screws (9).	
14.		PTO control cable (12)	a. Pull down to PTO from engine compartment. b. Install PTO cable pin (21) on end of PTO control cable (12).	

20-9. TRANSMISSION POWER TAKEOFF (PTO) CONTROL CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
15.		PTO cable pin (21)	Connect to PTO select lever (22) with washer (23) and new cotter pin (24).	
16.		PTO control cable (12)	Attach to PTO cable bracket (17) with retainer strap (20), spacer plate (18), and two screws (19), and nuts (16).	



END OF TASK!

FOLLOW-ON TASK: Start engine and check power takeoff (PTO) for proper operation (TM 9-2320-272-10).

TA 351019

20-10. TRANSMISSION POWER TAKEOFF (PTO) REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
M925, M926, M928, M929, M930, M932, M936

Test Equipment
None

Special Tools
None

Materials/Parts
Seven lockwashers
Cotter pin
Locknut
Gasket
Protective cap-plugs (Appendix C, Item 5)
Lubricating oil OE/HDO 10 (Appendix C, Item 16)
Sealing tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W (2)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P
LO 9-2320-272-12

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-20-2	Transmission PTO to hydraulic pump propeller shaft removed.
TM 9-2320-272-20-1	Transmission oil dipstick tube removed.

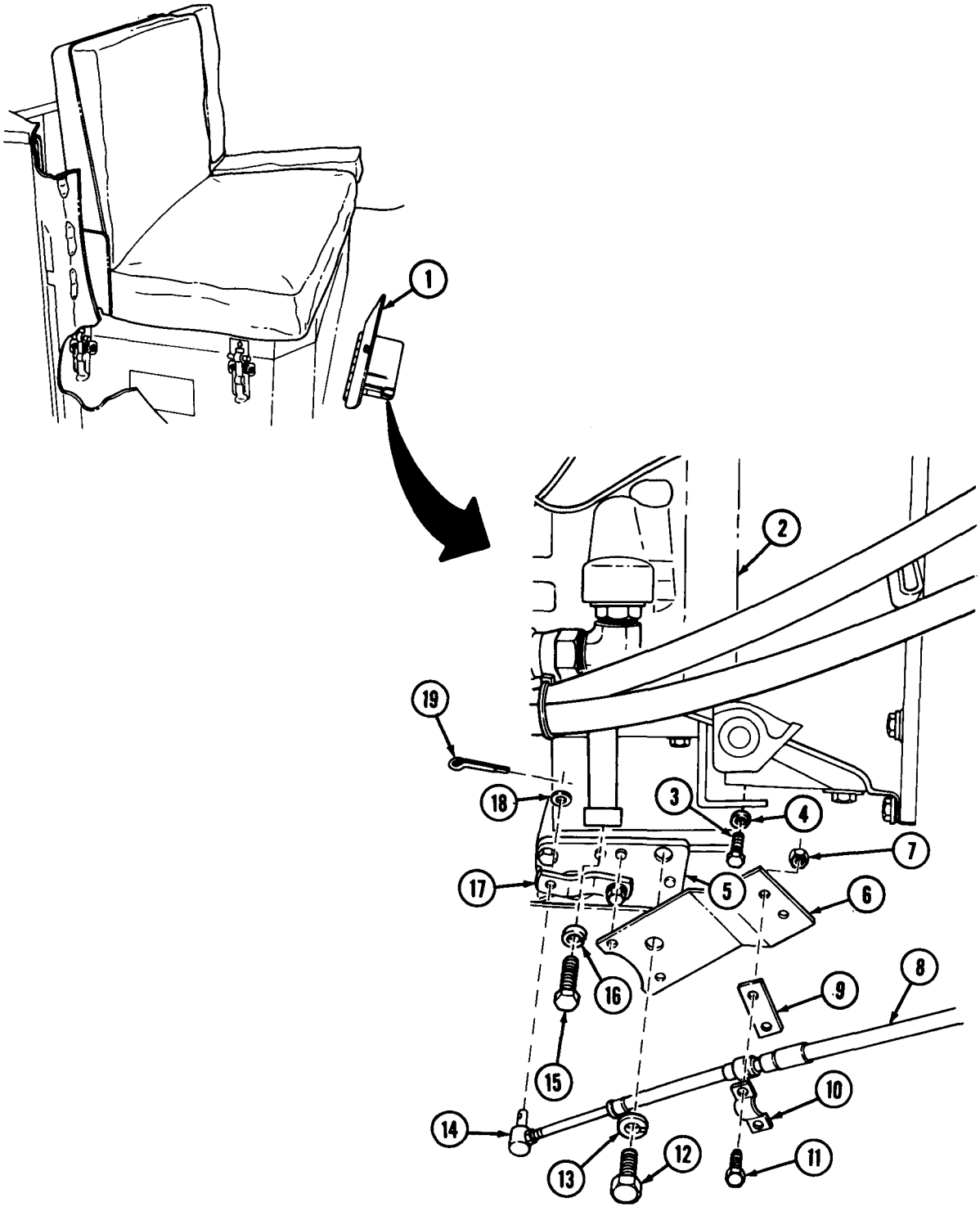
Special Environmental Conditions
None

General Safety Instructions
None

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Inside cab	Transmission dipstick access door (1)	Open.	Refer to TM 9-2320-272-10.
2.	PTO cable bracket (7)	Two nuts (4) and screws (11), clamp (10), and spacer (9)	Remove.	
3.	PTO cable pin (14)	Cotter pin (19) and washer (18)	Remove and lift PTO cable pin (14) from select lever (17).	Discard cotter pin (19). Tie PTO cable (8) clear of work area.
4.	PTO (5)	Cable bracket (6) screw (12), and lockwasher (13)	Remove.	Discard lockwasher (13).
5.	PTO (5) and transmission (2)	Screw (15), lockwasher (16), and two screws (3), and lockwashers (4)	Remove.	Discard lockwashers (16) and (4).

20-10. TRANSMISSION POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 351020

20-10. TRANSMISSION POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	PTO oil hose adapter (7)	Oil hose (8)	Disconnect and position clear of work area.	Plug end of hose (8).
7.	PTO (2) and transmission (1)	Two nuts (5) and lockwashers (6)	Remove.	Discard lockwashers (6).
		Screw (3) and lockwasher (4)	Remove.	
9.	Right frame rail (13) and bracket (11)	Screw (10) and locknut (12)	Remove.	Discard locknut (12).
10.		PTO (2) and gasket (9)	Remove from transmission (1).	Discard gasket (9). Clean gasket remains from mating surfaces.
11.	PTO (2)	PTO oil hose adapter (7)	Remove.	Plug orifice of PTO (2).

b. Installation

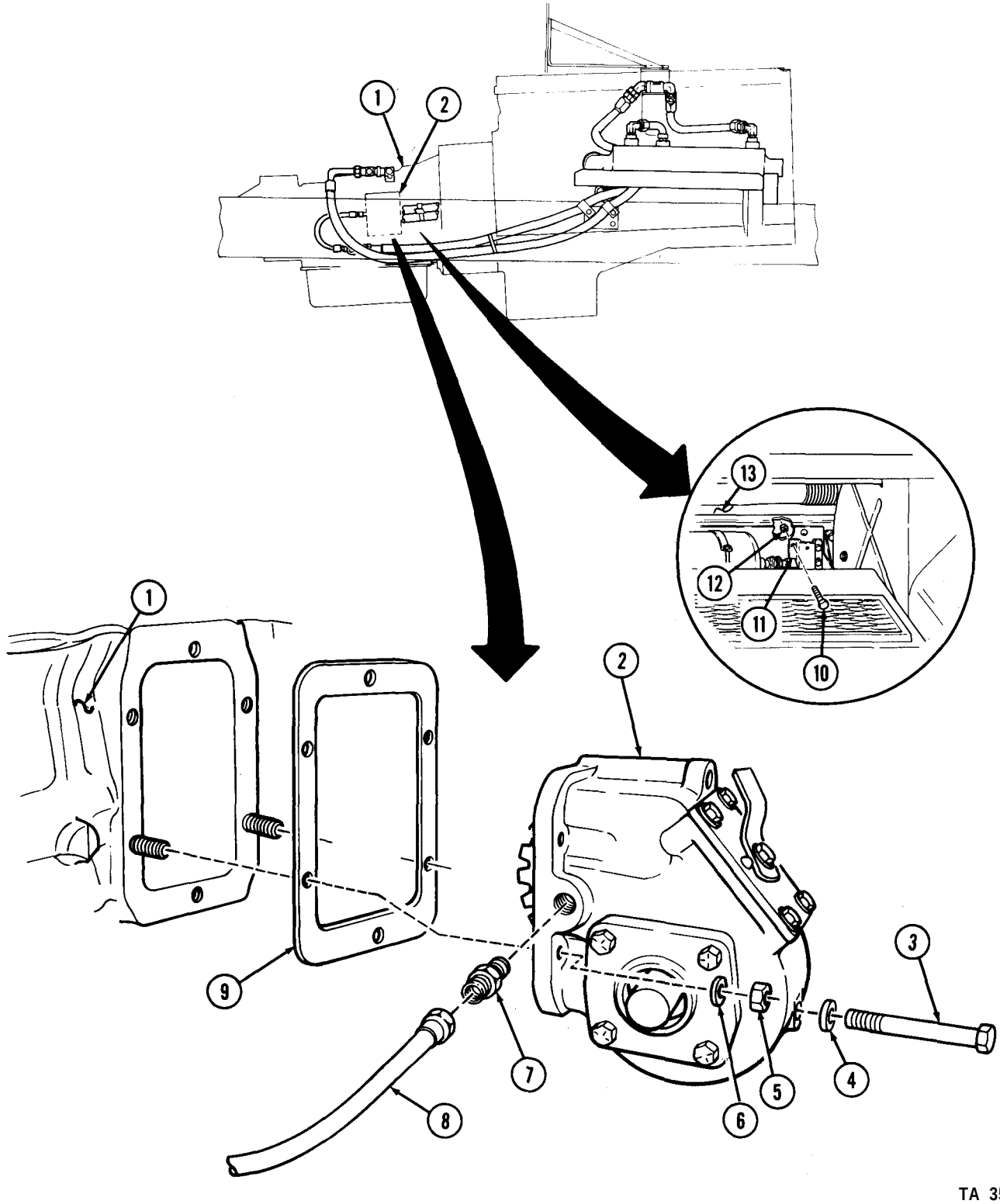
NOTE

Male pipe threads must be wrapped with sealing tape before installation.

12.	PTO oil hose adapter (7)	Install on PTO (2).	Remove plug from PTO (2) if present.
13.	Screw (3) and lockwasher (4)	Position in PTO (2).	
14.	New gasket (9) and PTO (2)	Install on transmission (1) with two new lockwashers (6) and nuts (5).	
15.	Screw (3)	Tighten.	
16.	PTO oil hose (8)	Connect to adapter (7).	Remove plug from oil hose (8).
17.	Screw (10) and new locknut (12)	Install on frame rail (13) and bracket (11).	

20-10. TRANSMISSION POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



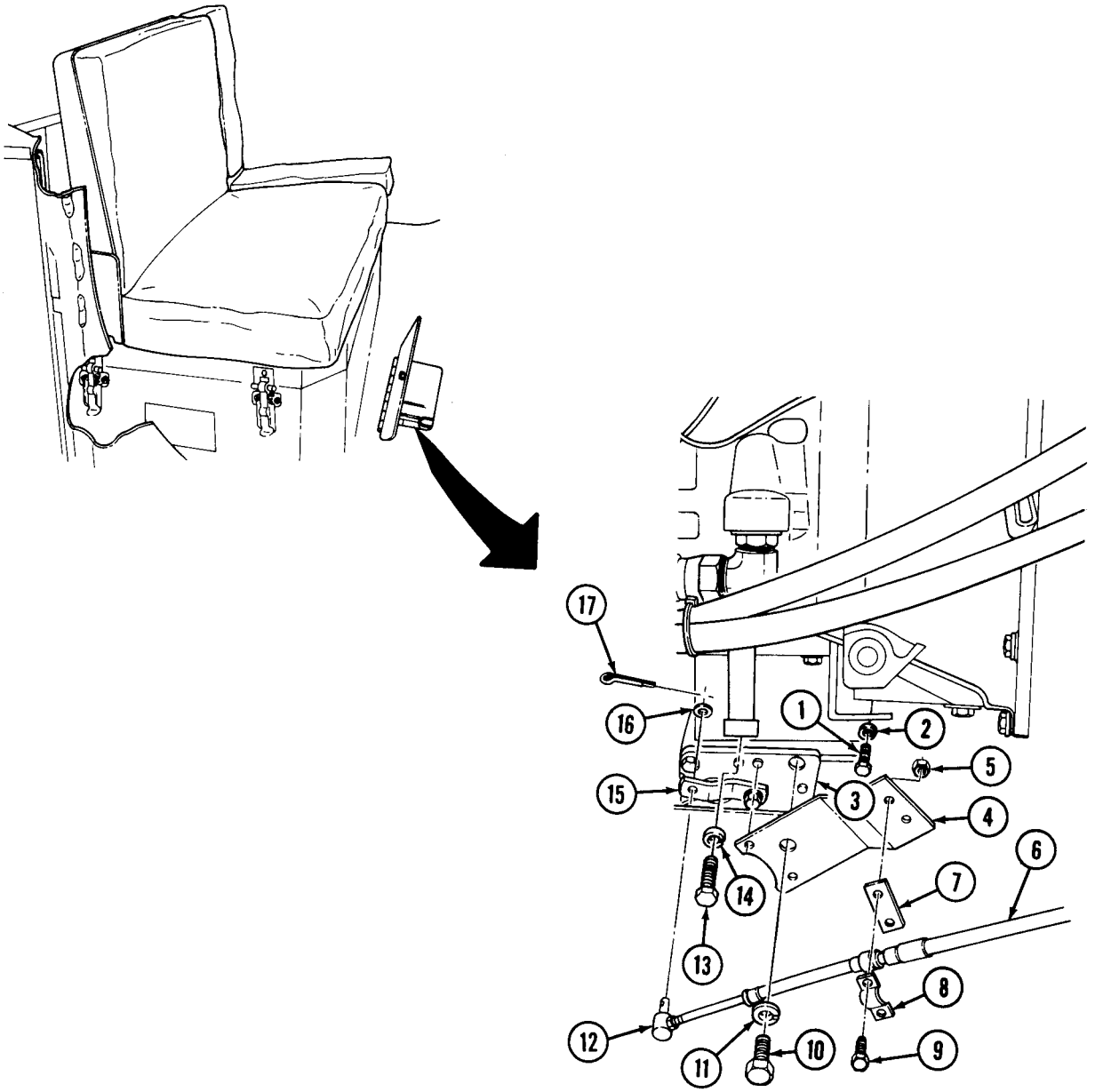
TA 351021

20-10. TRANSMISSION POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
18.		Two new lockwashers (2), screws (1), and new lockwasher (14), and screw (13)	Install.	
19.		PTO cable bracket (4)	Install to PTO (3) with new lockwasher (11) and screw (10).	
20.		PTO cable (6) and PTO cable pin (12)	Install to PTO select lever (15) with washer (16) and new cotter pin (17).	
21.		Clamp (8) and spacer (7)	Install to PTO cable bracket (4) with two screws (9) and nuts (5).	

20-10. TRANSMISSION POWER TAKEOFF (PTO) REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Install transmission PTO to hydraulic pump propeller shaft (TM 9-2320-272-20-2).
- Install transmission dipstick tube (TM 9-2320-272-20-1).
- Fill transmission to proper oil level (LO 9-2320-272-12).
- Start engine, check for leaks, and proper operation of PTO (TM 9-2320-272-10).

TA 351022

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP:

Applicable Models
M925, M926, M928, M929, M930, M932, M936, M939A2

Test Equipment
None

Special Tools
None

Materials/Parts
Two shift cover gaskets
Two output bearing cap gaskets
Two input bearing cap gaskets
Two thrust washers
Output shaft oil seal
Snapring
"O" ring
Lockwasher
Woodruff key
Oil soluble grease (Appendix C, Item 19)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-34P

Equipment Condition Reference

	Condition Description
Para. 20-10	Transmission power takeoff removed.
TM 9-2320-358-24&P	Transmission power takeoff removed (M939A2).

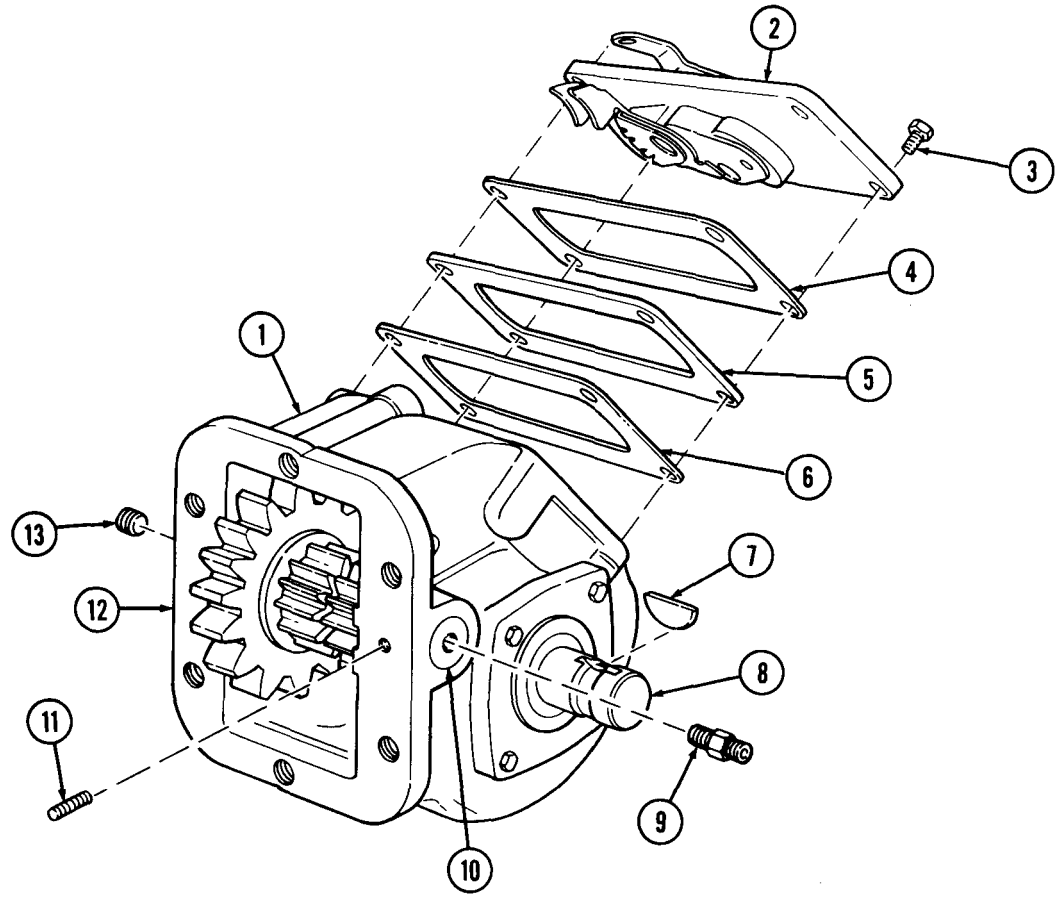
Special Environmental Conditions
None

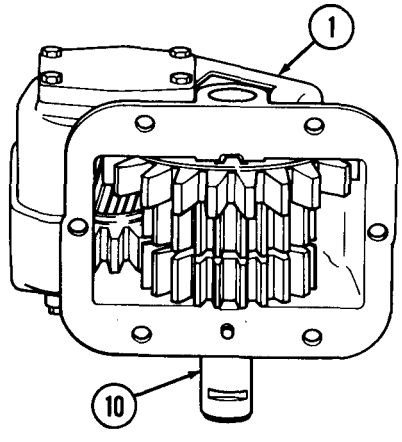
General Safety Instructions
- Keep fire extinguisher nearby when using drycleaning solvent.
- Compressed air source will not exceed 30 psi (207 kPa).
- Eyeshields must be worn when cleaning with compressed air.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Disassembly			
1.	PTO output drive shaft (8)	Woodruff key (7)	Remove.	Discard woodruff key (7).
2.	Shifter cover (2) and PTO housing (1)	Four screws (3)	Remove.	
3.		Shifter cover (2), two gaskets (4) and (6), and spacer (5)	Remove.	Discard gaskets (4) and (6).
4.	PTO mating flange (12)	Setscrew (11) and pipe plug (13)	Remove.	
5.		Idler pin (10)	Press completely through PTO housing (1).	Use arbor press. Remove lube adapter (9), if present.

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

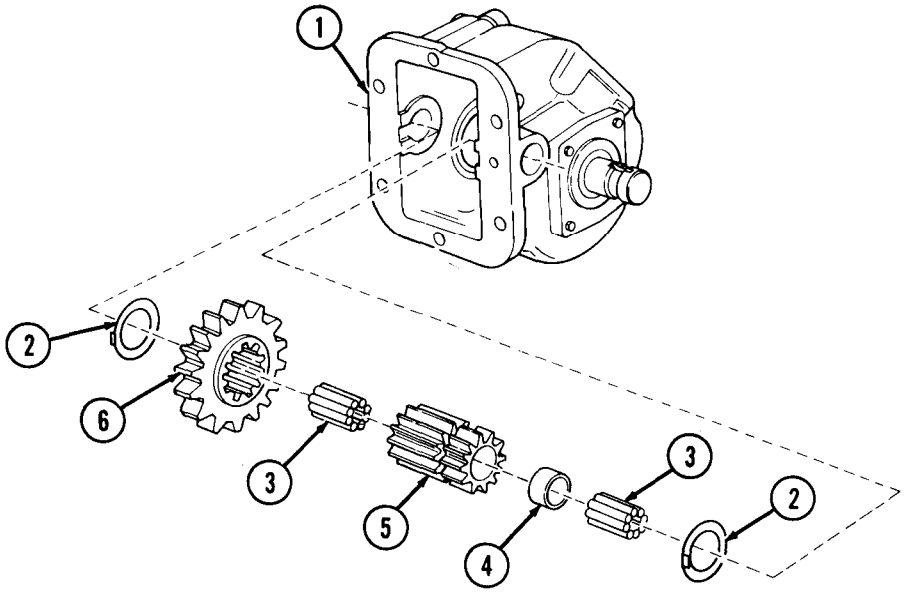




TA 351023

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	PTO housing (1)	Input gear (6), drive gear (5) and two thrust washers (2)	Remove.	Discard thrust washers (2).
7.	Drive gear (5)	Input gear (6)	Slide off drive gear (5).	
8.		Thirty-eight needle bearings (3)	Remove nineteen needle bearings (3) from each end of drive gear (5).	
9.		Spacer (4)	Remove.	



NOTE

. Before removing input bearing cap from PTO housing, mark cap and housing to ensure proper power takeoff reassembly.

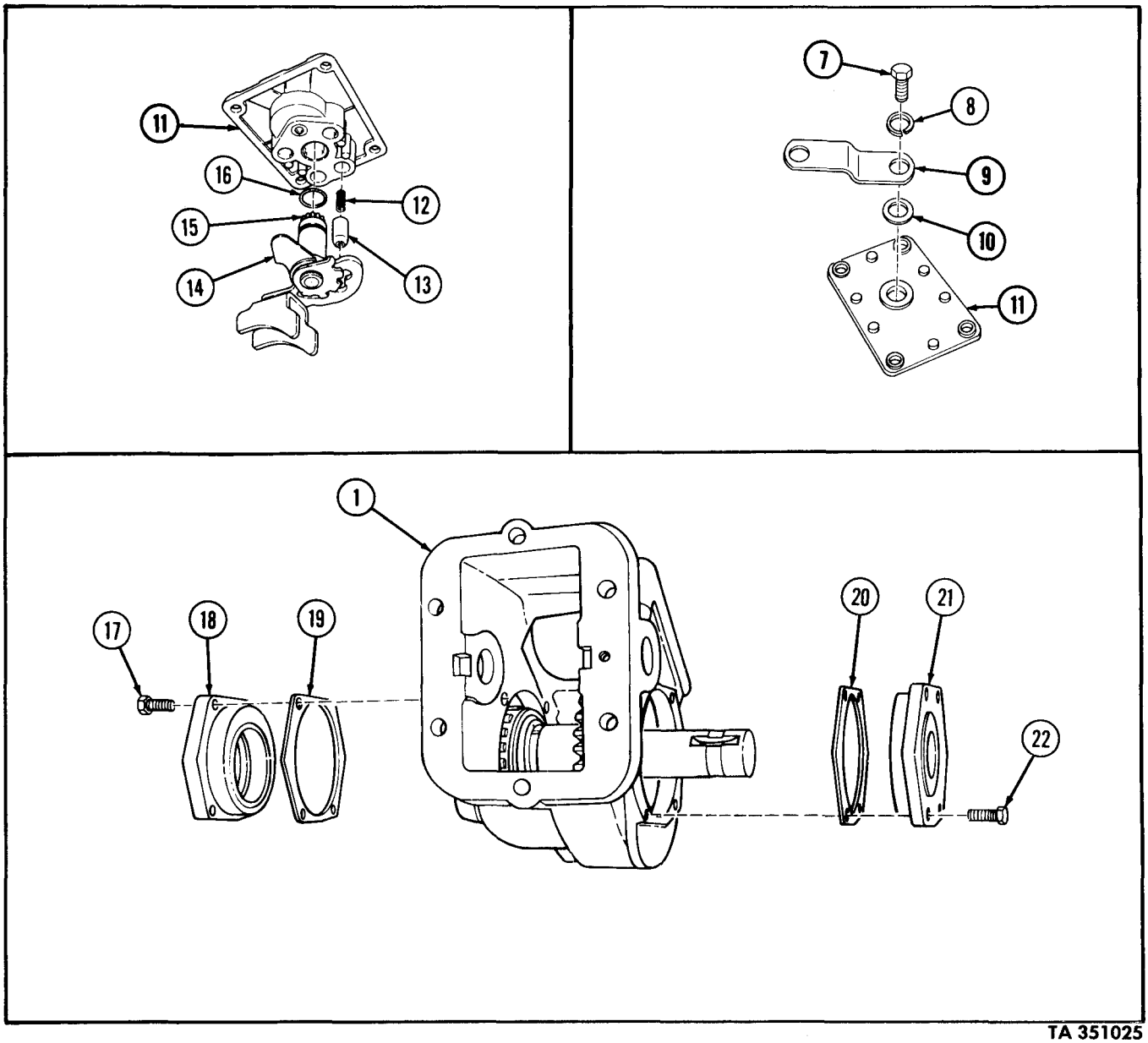
• Exact number of gaskets found when removing bearing caps may vary.

10.	Output bearing cap (21) and PTO housing (1)	Four screws (22)	Remove.	
11.		Output bearing cap (21) and gasket (20)	Remove.	Discard gasket (20).
12.	Input bearing cap (18) and PTO housing (1)	Four screws (17)	Remove.	
13.		Input bearing cap (18) and gasket (19)	Remove.	Discard gasket (19).

TA 351024

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

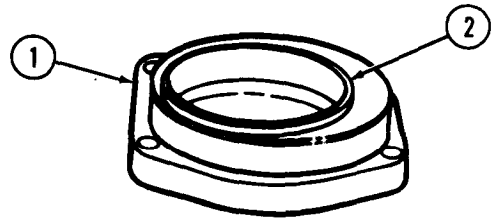
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
14.	Shifter cover (11)	Screw (7), lockwasher (8), lever (9), and washer (10), and gear controller (14)	Remove.	Discard lockwasher (8). Scribe lever (9), shaft (15), and shifter cover (11) for installation.
15.		Poppet (13) and spring (12)	Remove.	Scribe hole containing poppet (13) and spring (12) for installation.
16.	Gear controller (14)	"O" ring (16)	Remove.	Discard "O" ring (16).



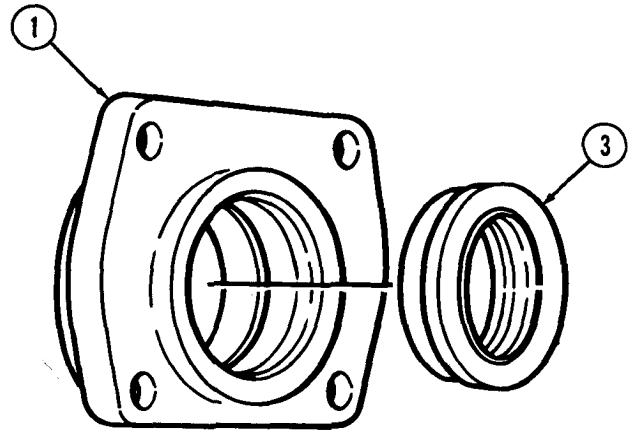
TA 351025

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Disassembly of output and input bearing caps is the same.		
17.	Bearing cap (1)	Bearing cup (2)	Remove.	



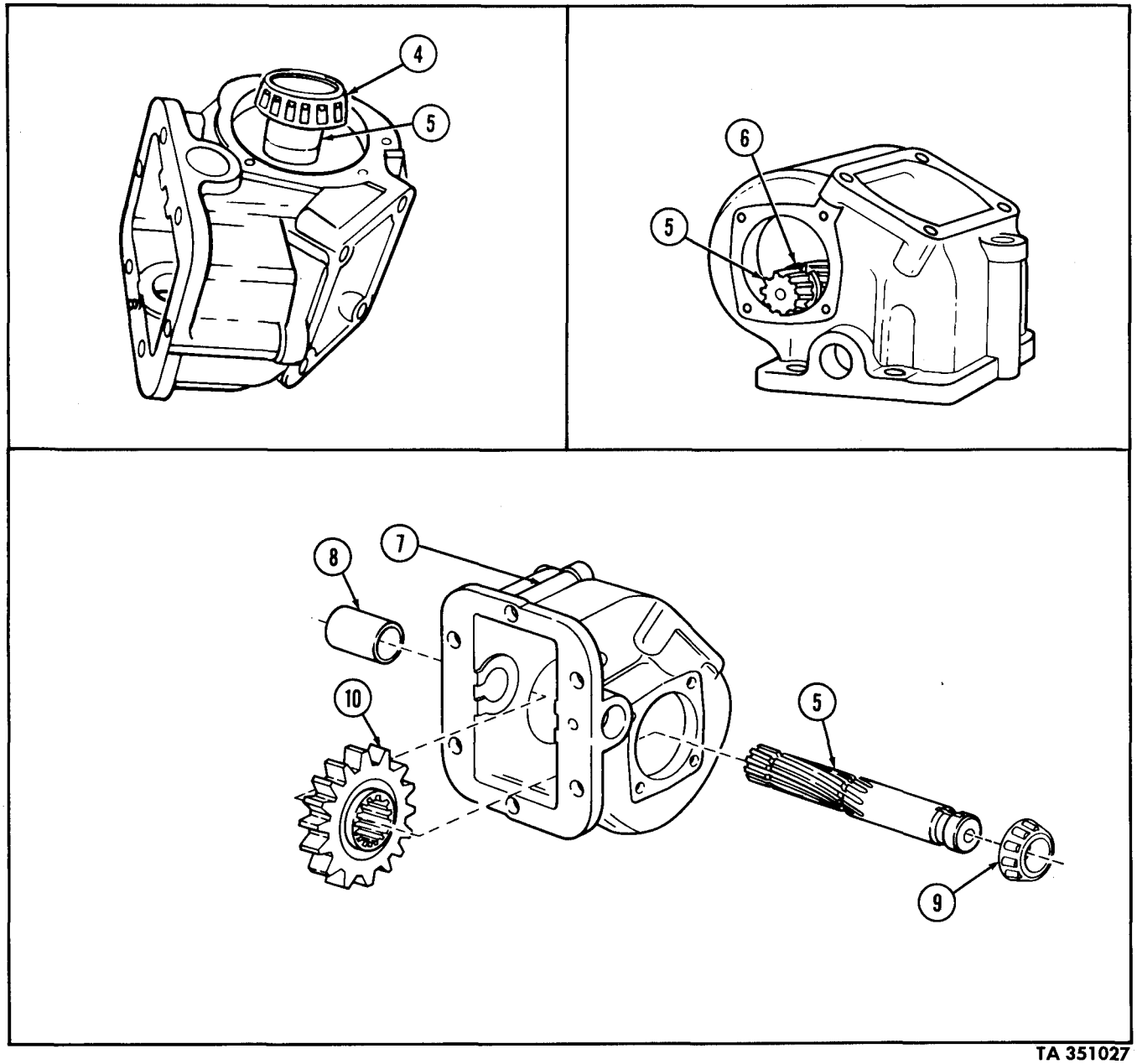
		NOTE Step 18 is performed only on the output bearing cap.		
18.	Bearing cap (1)	Output shaft oil seal (3)	Remove.	Discard seal (3).



TA 351026

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
19.	Output shaft (5)	Input bearing (4)	Remove.	Tag for installation.
20.		Snapring (6)	Remove.	Discard snapring (6).
21.	PTO housing (7)	Output shaft (5)	Remove.	Spacer (8) and output gear (10) will slide off shaft (5) when removed.
22.	Output shaft (5)	Output bearing (9)	Remove.	Tag for installation.



TA 351027

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

b. Cleaning and Inspection

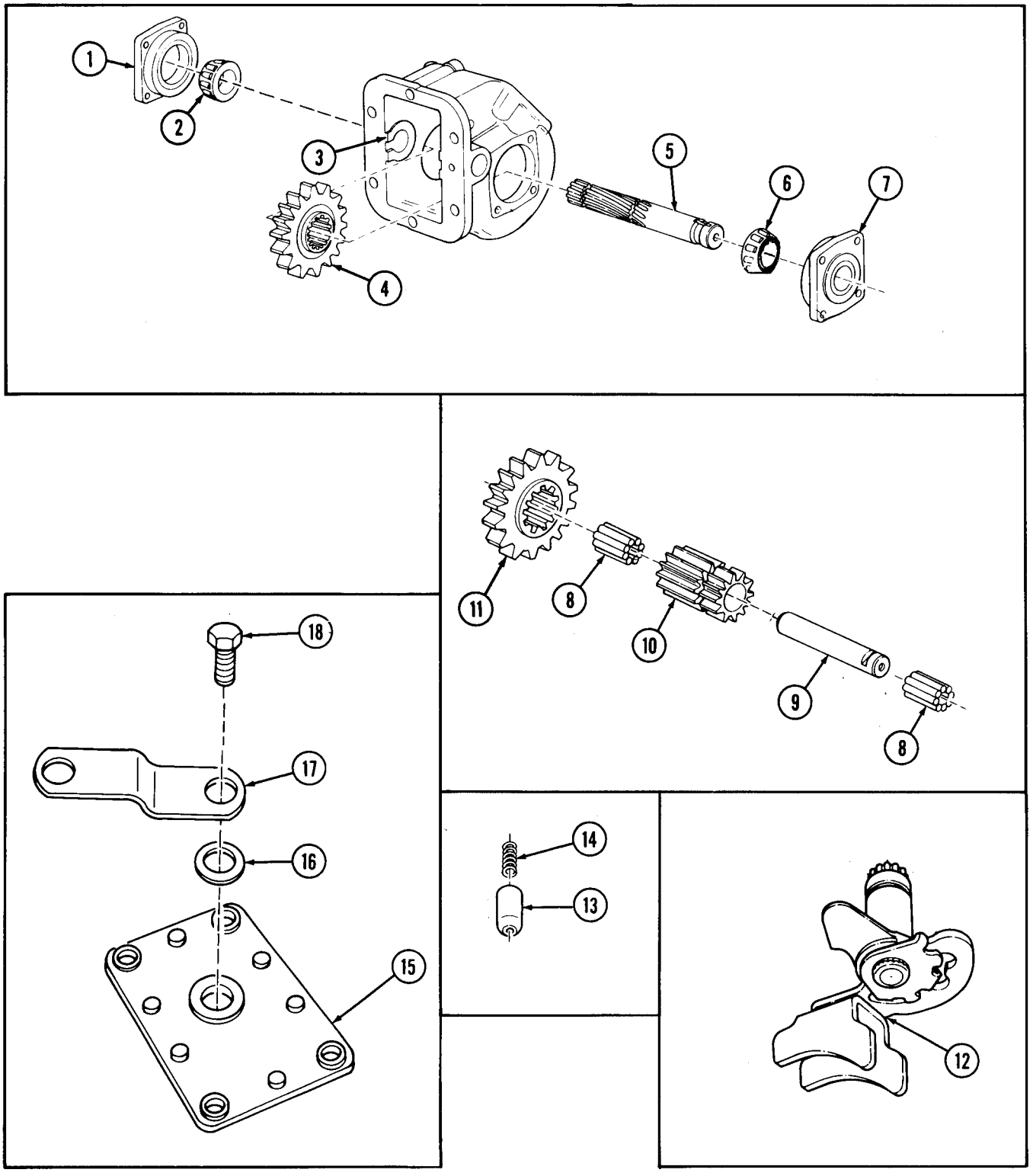
WARNING

- Drycleaning solvent is flammable and will not be used near open flame. Use only in well-ventilated places. Failure to do this may result in injury to personnel.
- Compressed air source will not exceed 30 psi (207 kPa). When cleaning with compressed air, eyeshields must be worn. Failure to wear eyeshields may result in injury to personnel.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
23.		Idler pin (9), input gear (11), drive gear (10), output gear (4), and output shaft (5)	a. Clean with dry cleaning solvent.	Refer to paragraph 2-7.
			b. Inspect for breaks, cracks, chips, pitting, and wear.	Replace if broken, cracked, chipped, pitted, or worn.
24.		Thirty-eight needle bearings (8) input bearing (2), and output bearing (6)	a. Clean with dry-cleaning solvent.	Refer to paragraph 2-7. Do not dry bearings (2) and (6) with compressed air.
			b. Inspect for pits, scores, cracks, and chips.	Replace if pitted, scored, cracked, or chipped.
25.		PTO housing (3)	a. Clean with dry-cleaning solvent.	Refer to paragraph 2-7.
			b. Clean gasket remains from mating surfaces.	
			c. Inspect for cracks and chips.	Replace if cracked or chipped.
26.		Screw (18), lever (17), washer (16), shifter cover (15), spring (14), poppet (13), gear controller (12), and bearing caps (1) and (7)	a. Clean with dry-cleaning solvent.	Refer to paragraph 2-7.
			b. Clean gasket remains from mating surfaces.	Replace if pitted, broken, cracked, chipped, or worn.
			c. Inspect for pits, breaks, cracks, chips, and wear.	

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

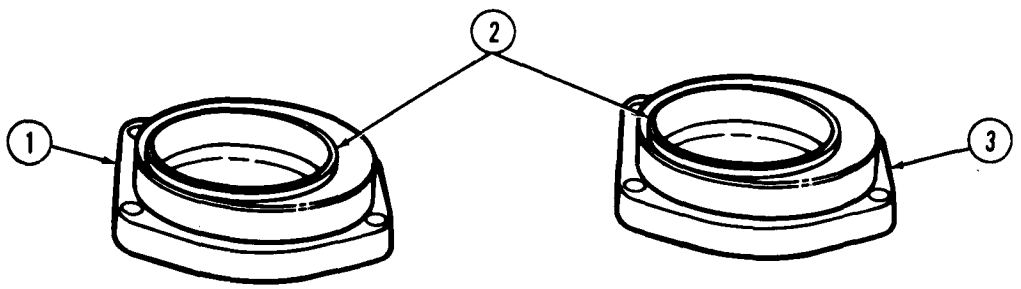
STEP NO.	LOCATION	ITEM	ACTION	REMARKS



TA 351028

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	c. Reassemble			
		NOTE Lubricate all power takeoff components with oil during reassembly.		
27.		Two bearing cups (2)	Install one into output bearing cap (3) and one into input bearing cap (1) using wood block and hammer.	

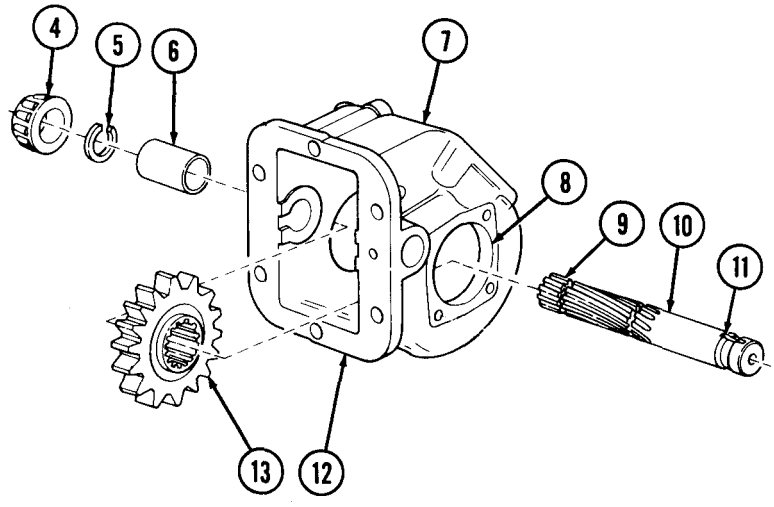


28.		PTO housing (7)	Place on workbench with PTO to transmission flange (12) facing you.	Mark on output bearing cap side (8) must be to your right.
29.		Output gear (13)	Place in right side of PTO housing (7).	Flat edge of output gear (13) must face output shaft keyway (11).
30.		Output shaft (10)	Place through right (output) side (8) of PTO housing (7) and output gear (13).	

TA 349713

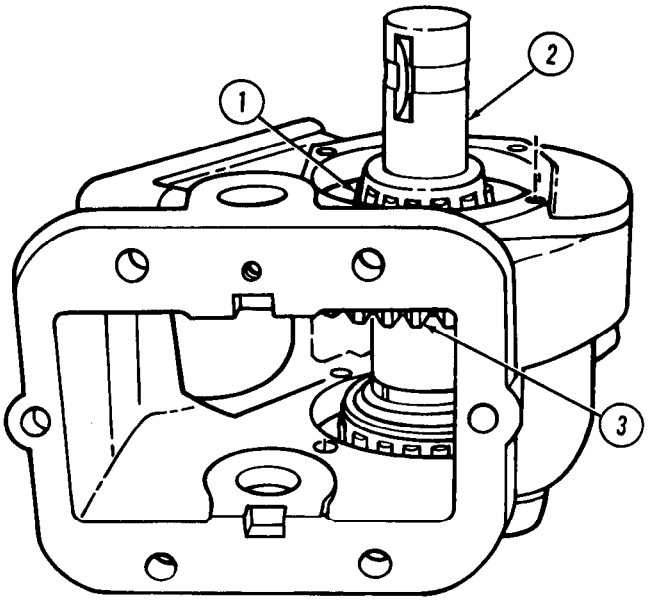
20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
31.		Spacer (6) and new snapring (5)	Slide over input side of output shaft (10).	Snapring must seat in groove (9).
32.		Input bearing (4)	Install to input side of output shaft (10) until bottomed at snapring (5).	Use arbor press.



20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
33.		Output bearing (1)	Install on output side of output shaft (2) until seated on output gear (3).	Use arbor press.



NOTE

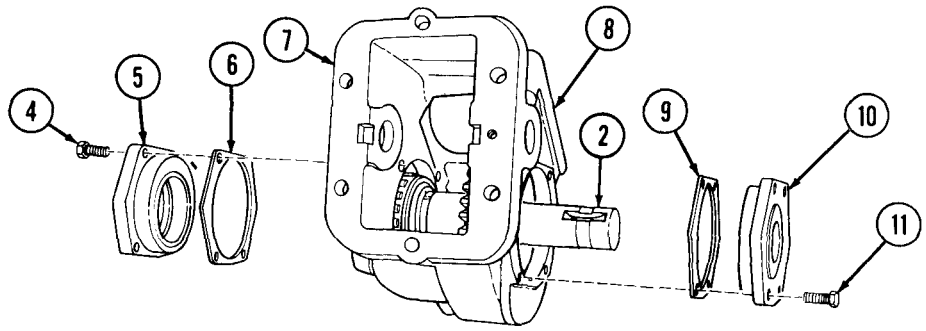
For correct bearing cap installation, make sure arrow on input bearing cap points toward shifter cover opening. Once positioned, the output bearing cap can be correctly installed.

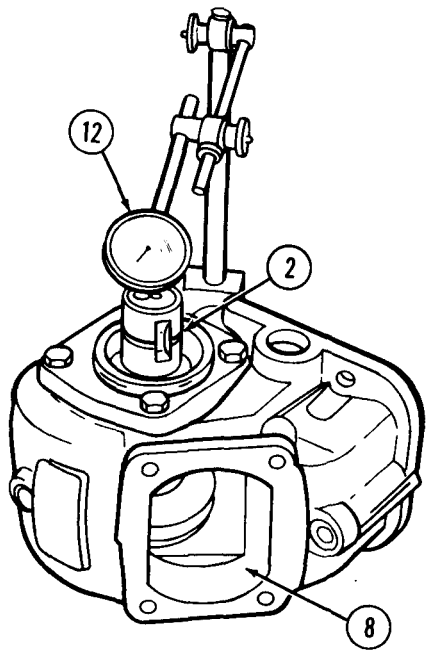
34.		New gasket(s) (6) and input bearing cap (5)	Install on unmarked side of PTO housing (7) with four screws (4).	Tighten 8-10 lb-ft (11-14 N·m).
35.		New gasket(s) (9) and output bearing cap (10)	Install on marked side of PTO housing with four screws (11).	Tighten 8-10 lb-ft (11-14 N·m).

TA 351030

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
36.		Output shaft (2)	a. Check end play with dial indicator (12).	Shaft (2) should turn freely and end play must not exceed .006 in. (0.152 mm).
			b. Adjust end play by using pry bar through hole (8) and force shaft (2) up and down.	Add gaskets (9) to increase end play. Remove gaskets (9) to decrease end play.

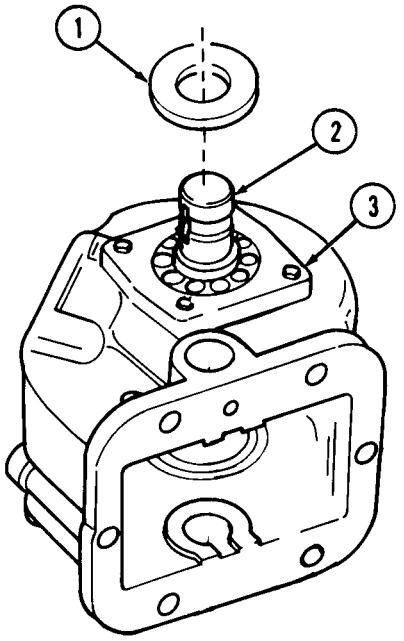




TA 351031

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
37.		New output shaft oil seal (1)	Install to output shaft (2) until flush with outside edge of output bearing cap (3).	

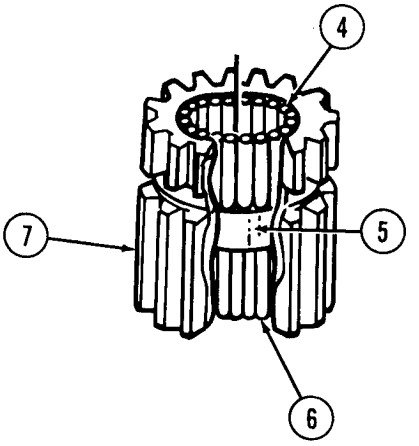


38.		Drive gear (7)	a. Coat inside with oil soluble grease.	
			b. Set flat on work bench.	
39.		Thirty-eight needle bearings (4) and (6)	a. Insert first nineteen bearings (6) in drive gear (7).	Use oil soluble grease to hold bearings (6) in place.
			b. Position spacer (5) in drive gear (7) next to bearings (6).	
			c. Insert second nineteen bearings (4) in drive gear (7) until bottomed against spacer (5).	Use oil soluble grease to hold bearings (4) in place.

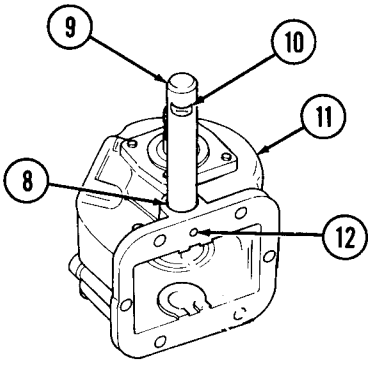
TA 351032

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



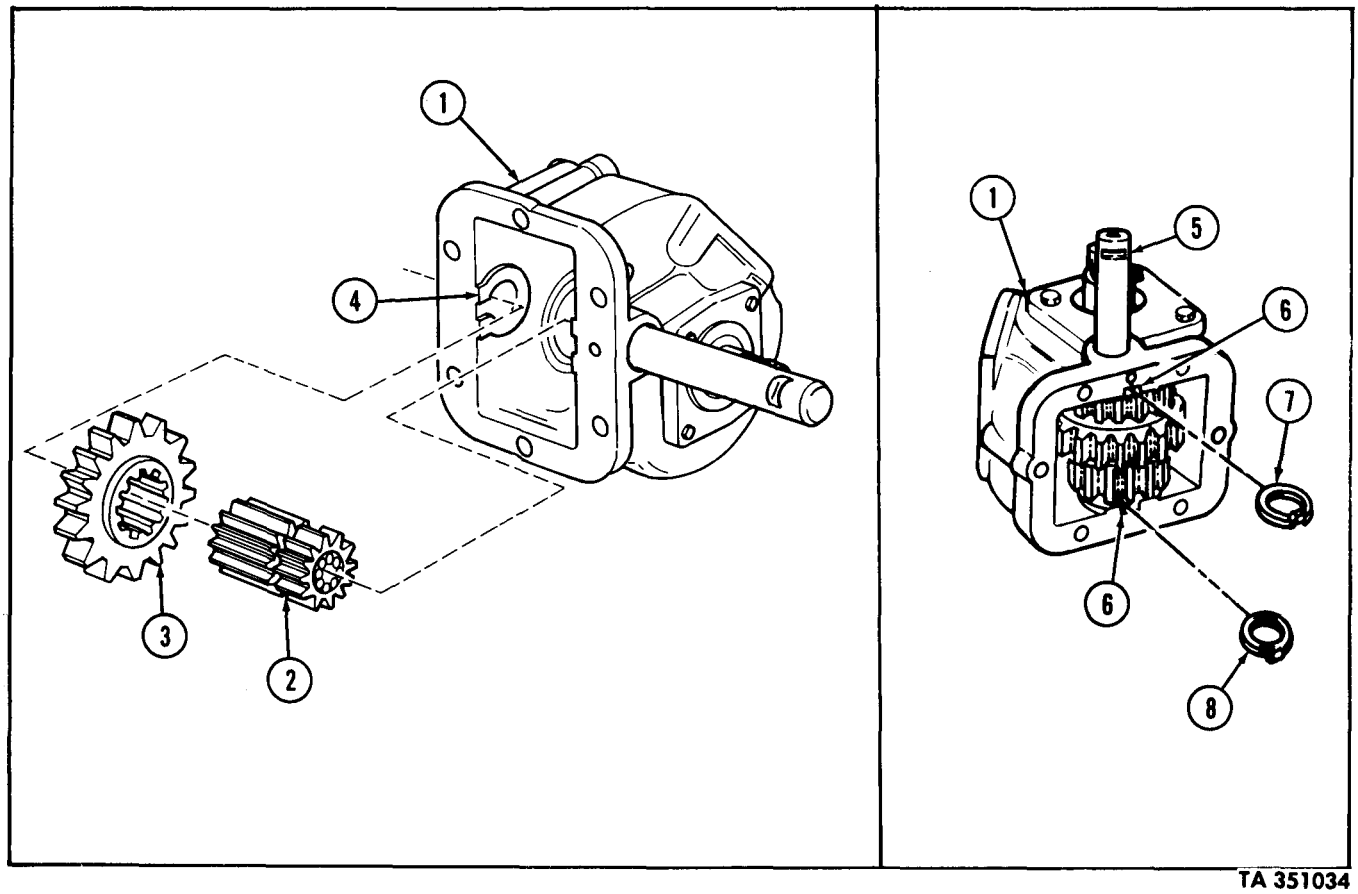
40.		Idler pin (9)	Press through idler pin hole (8) from output bearing cap side of housing (11) until flush with inside wall of housing (11).	Use arbor press. Make sure idler pin slot (10) will aline with screw hole (12) when idler pin (9) is pressed through housing (11) during installation.



TA 351033

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

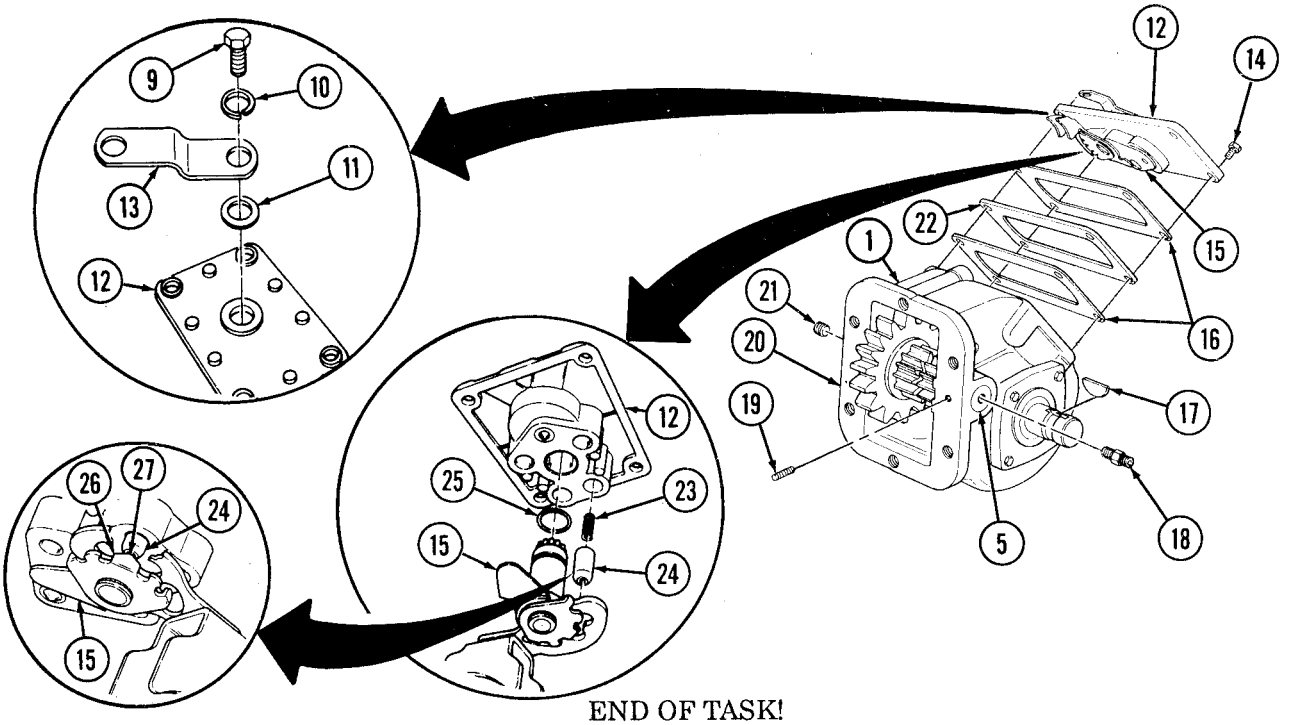
STEP NO.	LOCATION	ITEM	ACTION	REMARKS
41.		Input gear (3)	With large flange side first, slide onto long side of drive gear (2).	
42.		Drive gear (2)	Position in PTO housing (1) with short part of gear (2) meshing with output gear.	
43.		New thrust washer (7)	Place between input gear (3) and idler pin hole (4) so tab (8) sits in housing slot (6).	Use oil soluble grease to hold in place.
44.		New thrust washer (7)	Place between drive gear (2) and idler pin hole (4) so tab (8) sits in housing slot (6).	Use oil soluble grease to hold in place.
45.		Idler pin (5)	Press completely through PTO housing (1) until both ends of idler pin (5) are flush with housing (1).	Use arbor press.



TA 351034

20-11. TRANSMISSION POWER TAKEOFF (PTO) REPAIR (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
46.		Lube adapter (18)	Install in idler pin (5).	
47.		Plug (21)	Install in idler pin (5).	
48.		Screw (19)	Install in PTO to transmission flange (20).	Make sure screw (19) is alined with groove in idler pin (5).
49.		New "O" ring (25)	Install on shaft of gear controller (15)	
50.		Spring (23) and poppet (24)	Install in hole scribed for installation in shifter cover (12).	
51.		Gear controller (15)	Install on shifter cover (12) using screw (9), new lockwasher (10), lever (13), and washer (11).	Aline lever (13) to scribe marks. Ensure that point (26) of controller (15) engages dimple (27) in poppet (24).
52.		Two new gaskets (16), spacer (22), and shifter cover (12)	Install on PTO housing (1) using four screws (14).	Tighten screws (14) to 8-10 lb-ft (11-14 N·m). Ensure that gear controller (15) engages input gear.
53.		New woodruff key (17)	Install.	



END OF TASK!

FOLLOW-ON TASKS: • Install transmission power takeoff (PTO) (Para. 20-10).
• For M939A2 vehicles, install power takeoff (PTO) (TM 9-2320-358-24&P.

TA 351035

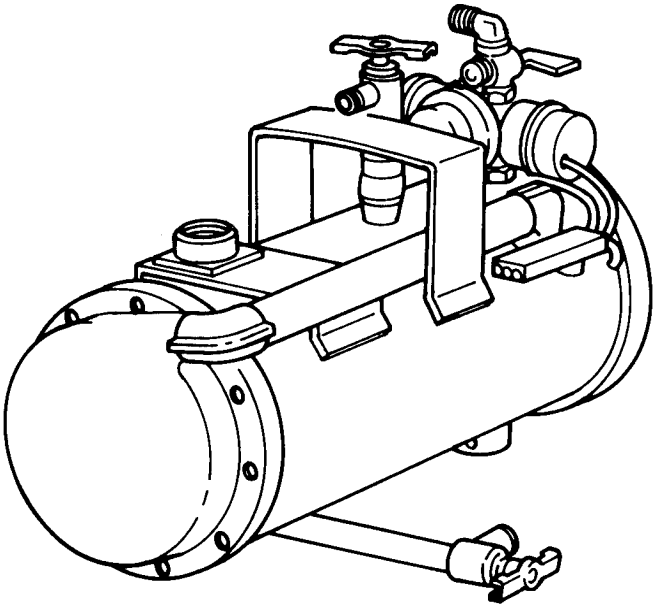
CHAPTER 21
SPECIAL PURPOSE KITS

Section I. ENGINE COOLANT HEATER KIT REPLACEMENT

21-1. DESCRIPTION

a. Installation instructions for the engine coolant heater kit can be found on drawing 12256431. The engine coolant heater kit cannot be installed unless the personnel fuel burning heater kit is also installed. Both heaters operate off the same electric fuel pump.

b. The engine coolant heater kit is designed to preheat coolant of diesel engines in preparation for starting at low temperatures. The preheated coolant is routed to warm in-cab batteries. In addition to heating coolant, heater's exhaust gases are used to heat engine oil by exhausting gases into an oil pan shroud. Control of heater operations are conducted from cab by use of a dash mounted control box.



ENGINE COOLANT HEATER

TA 350973

21-2. TABULATED DATA

Table 21-1. Engine Coolant Heater Tabulated Data

	STANDARD	METRIC
Heat output:		
High heat	15,000 BTU/hr	
Low heat	8,000 BTU/hr	
Fuel	No. 2 diesel	
Fuel pressure (at fuel inlet)	3 to 15 psi	20.6-103.4 kPa
Fuel consumption (nominal):		
High heat	0.026 ± .005 lb/min	0.01 ± .002 kg
Low heat	0.011 ± .003 lb/min	0.005 ± .001 kg
Operating temperature range	-65 to ± 100°F	-54°C to +38°C
Overheat switch setting	245°F	118°C
Cycling switch setting	190°F	88°C
Electrical requirements:		
Nominal	24 VDC	
Range	20-28.5	
Current consumption:		
Starting above 30°F (-1°C)	12 amps	
Starting below 30°F (-1°C)	15 amps	
Running above 30°F (-1°C)	1.5 amps	
Running below 30°F (-1°C)	3.5 amps	
Heater dimensions:		
Length	15.31 in.	38.8 cm
Height	10.00 in.	25.4 cm
Width	6.18 in.	15.7 cm
Weight	15.0 lbs	6.8 kg

21-3. ENGINE COOLANT HEATER KIT COMPONENT REPLACEMENT TASK SUMMARY

21-4. ENGINE COOLANT HEATER CONTROL BOX REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-1	Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

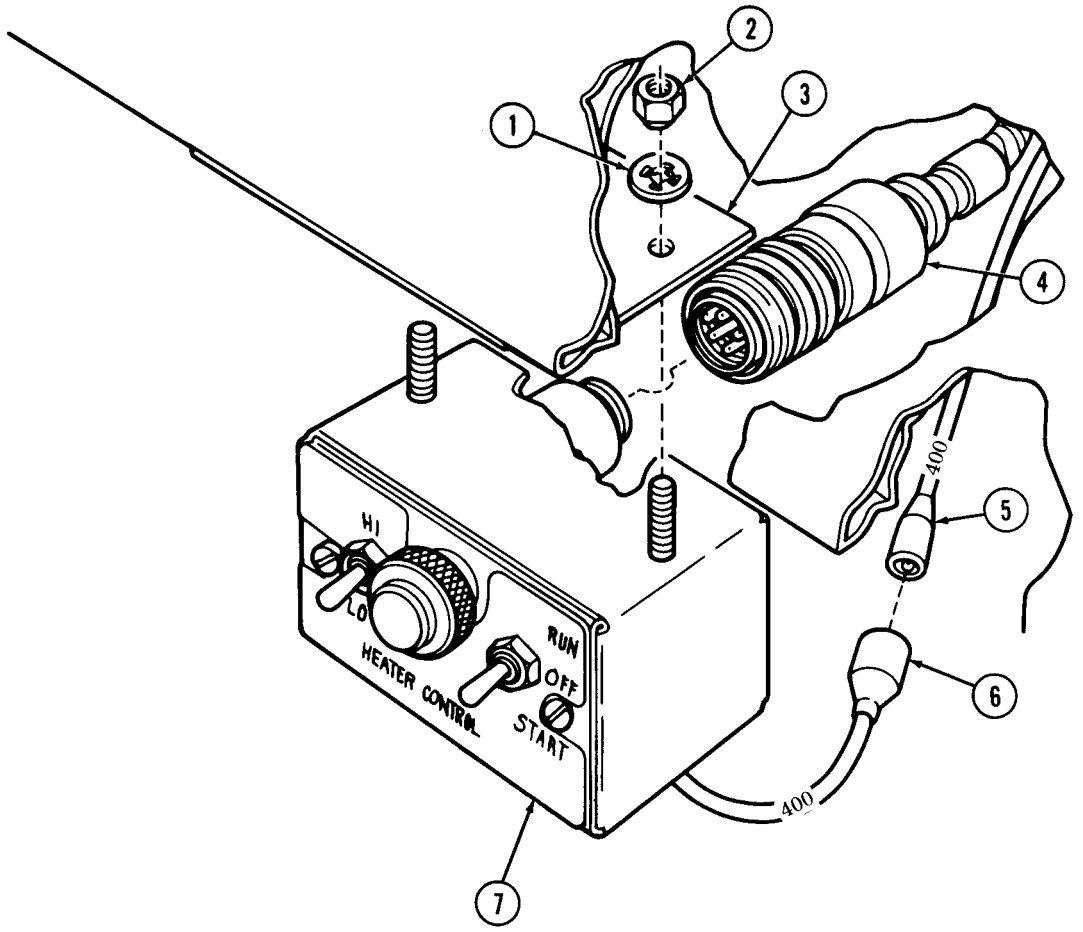
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Coolant heater control box (7)	Coolant heater harness (4)	Disconnect.	
2.		Connector (5)	Disconnect from control box wire (6).	
3.	Control mounting bracket (3)	Two nuts (2) and lockwashers (1), and coolant heater control box (7)	Remove.	Discard lockwashers (1).
		b. Installation		
4.		Coolant heater control box (7)	Install on control mounting bracket (3) with two new lockwashers (1) and nuts (2).	
5.		Connector (5)	Connect to control box wire (6).	
6.		Coolant heater harness (4)	Connect to control box (7).	

21-4. ENGINE COOLANT HEATER CONTROL BOX REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Connect battery ground cables (TM 9-2320-272-20-1).
• Check engine coolant heater for proper operation (TM 9-2320-272-10).

TA 350974

21-5. ENGINE COOLANT HEATER PUMP REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Hood raised and secured.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

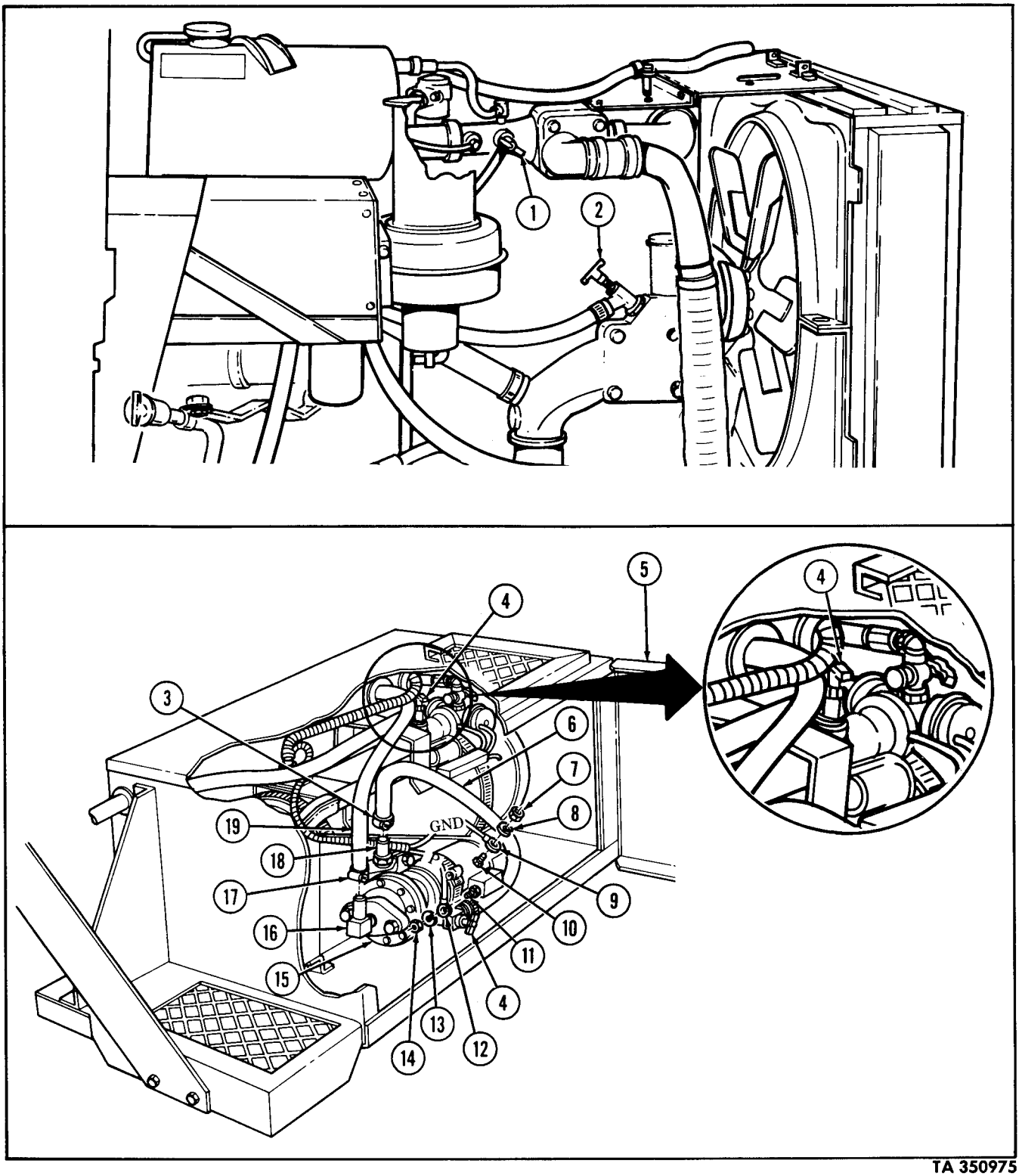
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.		Water manifold drain-cock (1) and engine oil cooler draincock (2)	Close.	
2.		Toolbox door (5)	Open.	
3.		Two engine coolant heater draincocks (4)	Close.	
4.	Heater pump elbow (16)	Manifold inlet hose (19) and clamp (17)	Remove.	
5.	Heater pump adapter (18)	Pump outlet hose (6) and clamp (3)	Remove.	
6.	Front of heater pump (15)	Nut (7) and lockwasher (8)	Remove from terminal stud (10) and disconnect ground wire (9).	Discard lockwasher (8).
7.	Right side of heater pump (15)	Nut (14) and lockwasher (13)	Remove from terminal stud (11) and discon-nect wire (12).	Discard lockwasher (13).

21-5. ENGINE COOLANT HEATER PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



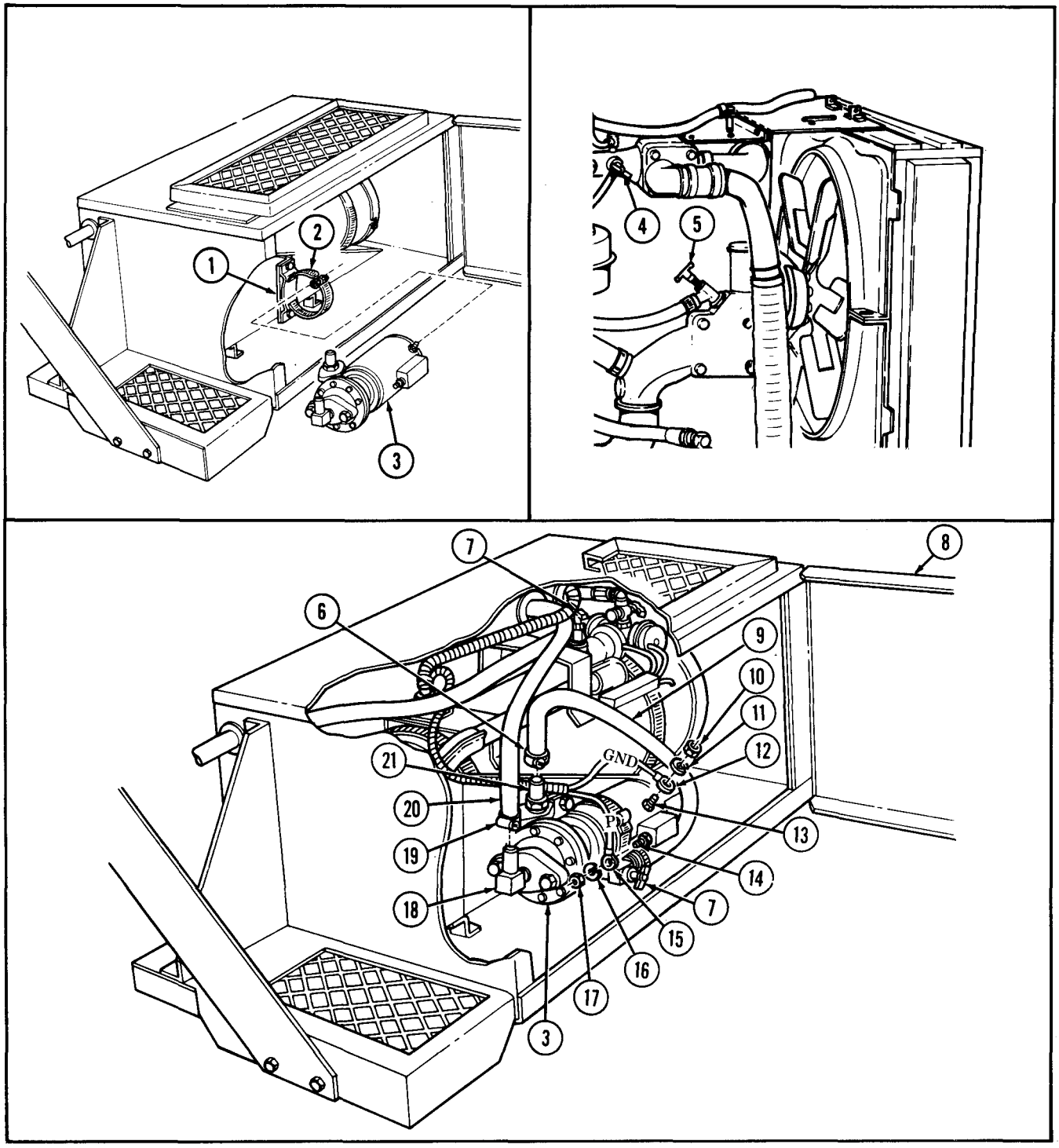
TA 350975

21-5. ENGINE COOLANT HEATER PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Pump bracket (1)	Clamp (2) and heater pump (3)	Remove.	
b. Installation				
9.		Heater pump (3)	Install against pump bracket (1) with clamp (2).	
10.		Ground wire (12)	Install on terminal stud (13) with new lockwasher (11) and nut (10).	
11.		Wire (15)	Install on terminal stud (14) with new lockwasher (16) and nut (17).	
12.		Pump outlet hose (9)	Install on heater pump adapter (21) with hose clamp (6).	
13.		Manifold inlet hose (20)	Install on heater pump elbow (18) with hose clamp (19).	
14.		Two engine coolant heater draincocks (7)	Open.	
15.		Water manifold draincock (4) and engine oil cooler draincock (5)	Open.	
16.		Toolbox door (8)	Close.	

21-5. ENGINE COOLANT HEATER PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Check engine coolant heater for proper operation (TM 9-2320-272-10).

TA 350976

21-6. ENGINE COOLANT HEATER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	Para. 21-5	Engine coolant heater pump removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Cotter pin
Four locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W

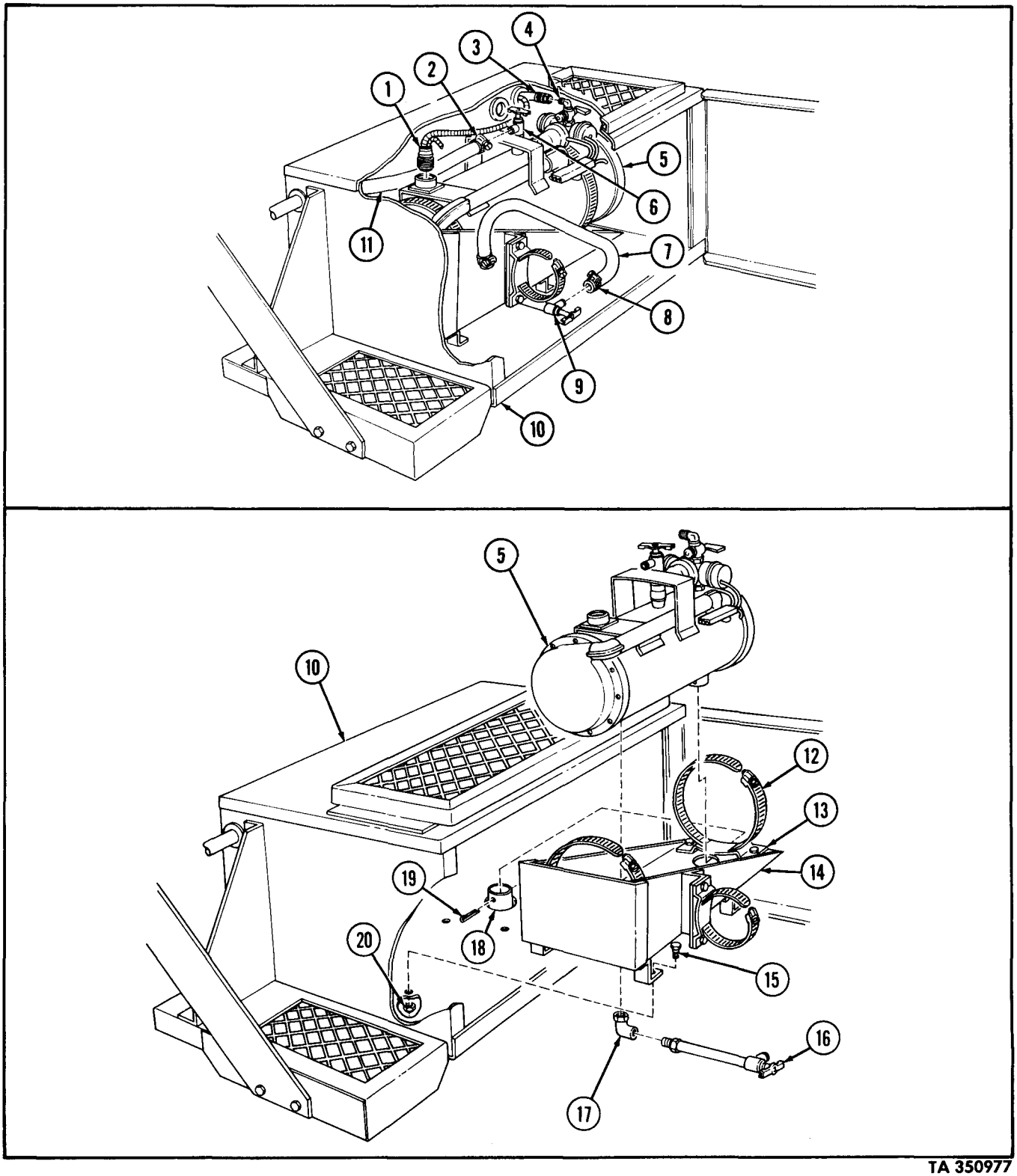
General Safety Instructions
None

Manual References
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Engine coolant heater (5)	Engine coolant heater harness (1)	Disconnect.	
2.		Cotter pin (19) and exhaust tube (18)	Remove.	Discard cotter pin (19).
3.	Engine coolant heater fuel pump draincock tee (4)	Fuel line (3)	Disconnect.	
4.	Engine coolant drain-cock (6)	Hose clamp (2) and hose (11)	Remove.	
5.	Toolbox (10)	Four screws (15) and locknuts (20), bracket (14), and engine coolant heater (5)	Remove.	Discard locknuts (20).
6.	Engine coolant heater (5) to two saddle brackets (13)	Two clamps (12)		
7.	Engine coolant draincock (9)	Hose clamp (8) and hose (7)	Remove.	
8.	Elbow (17)	Draincock pipe (16)	Remove.	
9.		Elbow (17) and engine coolant heater (5)	Remove.	

21-6. ENGINE COOLANT HEATER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



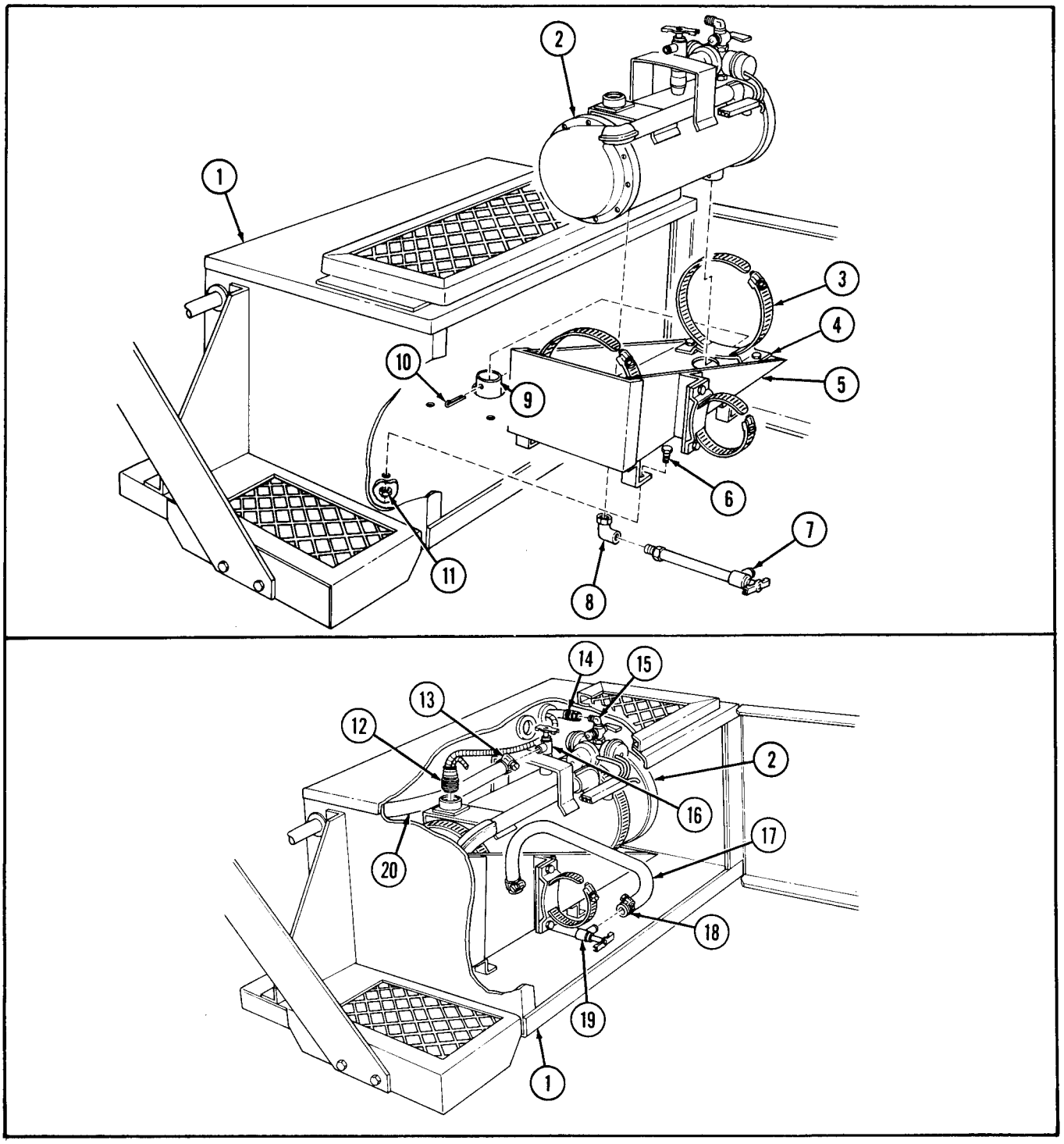
TA 350977

21-6. ENGINE COOLANT HEATER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
10.		Engine coolant heater (2)	Install on saddle brackets (4) with two clamps (3).	
11.		Elbow (8)	Install on engine coolant heater (2).	
12.		Draincock pipe (7)	Install on elbow (8).	
13.		Coolant heater bracket (5)	Install on toolbox (1) with four screws (6) and new locknuts (11).	
14.		Coolant outlet hose (20)	Install on draincock (16) with hose clamp (13).	
15.		Fuel line (14)	Install on engine coolant heater fuel pump draincock tee (15).	
16.		Exhaust tube (9)	Install on engine coolant heater (2) with new cotter pin (10).	
17.		Engine coolant heater harness (12)	Connect to engine coolant heater (2).	
18.		Pump outlet hose (17)	Install on draincock (19) with hose clamp (18).	

21-6. ENGINE COOLANT HEATER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install engine coolant heater pump (para. 21-5).

TA 350978

21-7. ENGINE COOLANT HEATER HARNESS REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-1	Battery ground cables disconnected.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two lockwashers
Locknut
Tiedown strap (Appendix C, Item 22)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

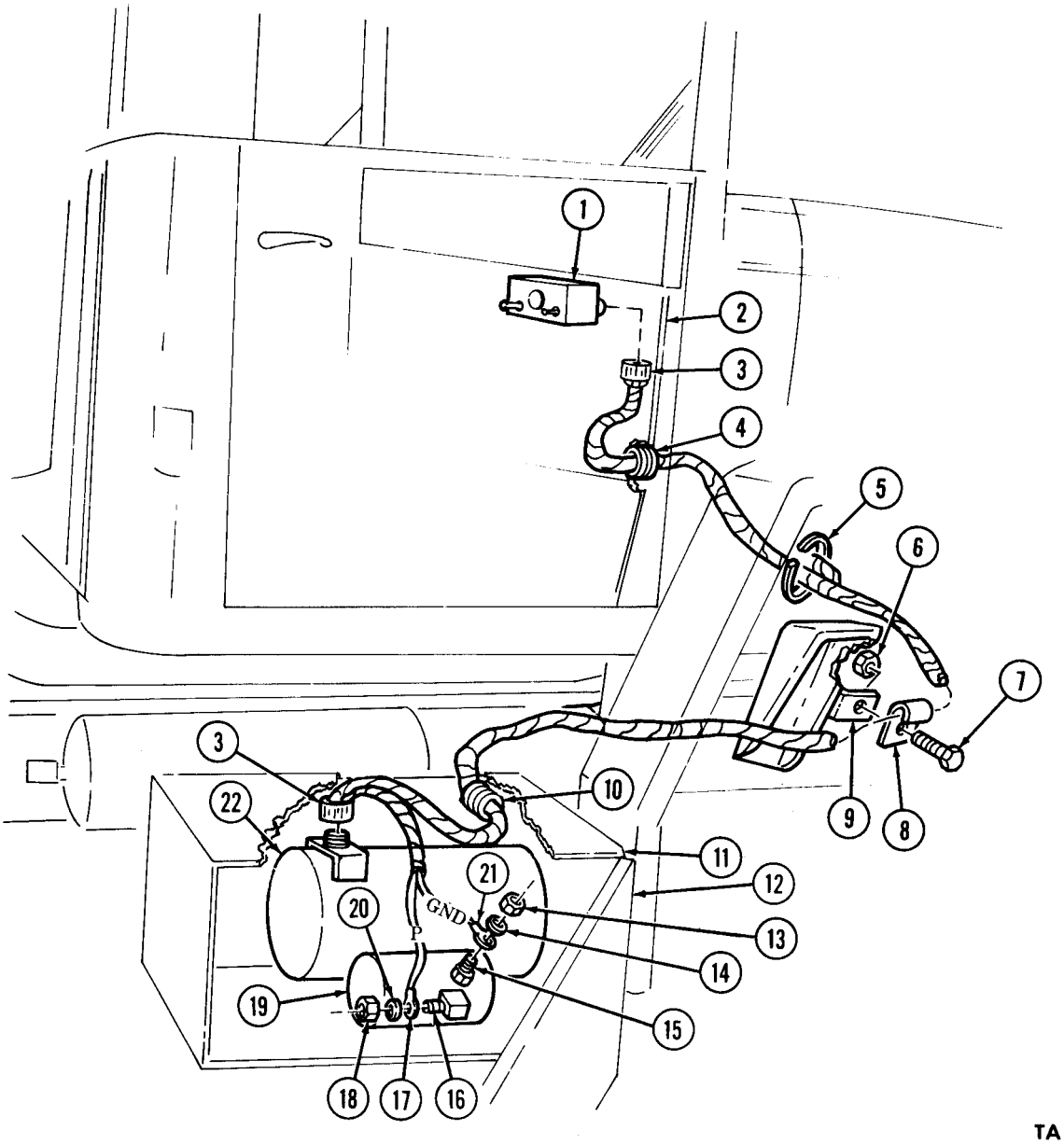
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.		Toolbox door (12)	Open.	
2.	Engine coolant heater (22)	Engine coolant heater harness (3)	Disconnect.	
3.	Front of heater pump (19)	Nut (13) and lockwasher (14)	Remove from terminal stud (15) and disconnect ground wire (21).	Discard lockwasher (14).
4.	Right side of heater pump (19)	Nut (18) and lockwasher (20)	Remove from terminal stud (16) and disconnect wire (17).	Discard lockwasher (20).
5.	Engine coolant heater harness (3) and bracket (9)	Screw (7), locknut (6), and clamp (8)	Remove.	Discard locknut (6).
6.	Engine coolant heater harness (3)	Tiedown strap (5)	Remove.	Discard tiedown strap (5).

21-7. ENGINE COOLANT HEATER HARNESS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
7.	Control box (1)	Engine coolant heater harness (3)	Disconnect, and slide through grommet (4) in firewall (2) and grommet (10) in toolbox (11) to remove.	



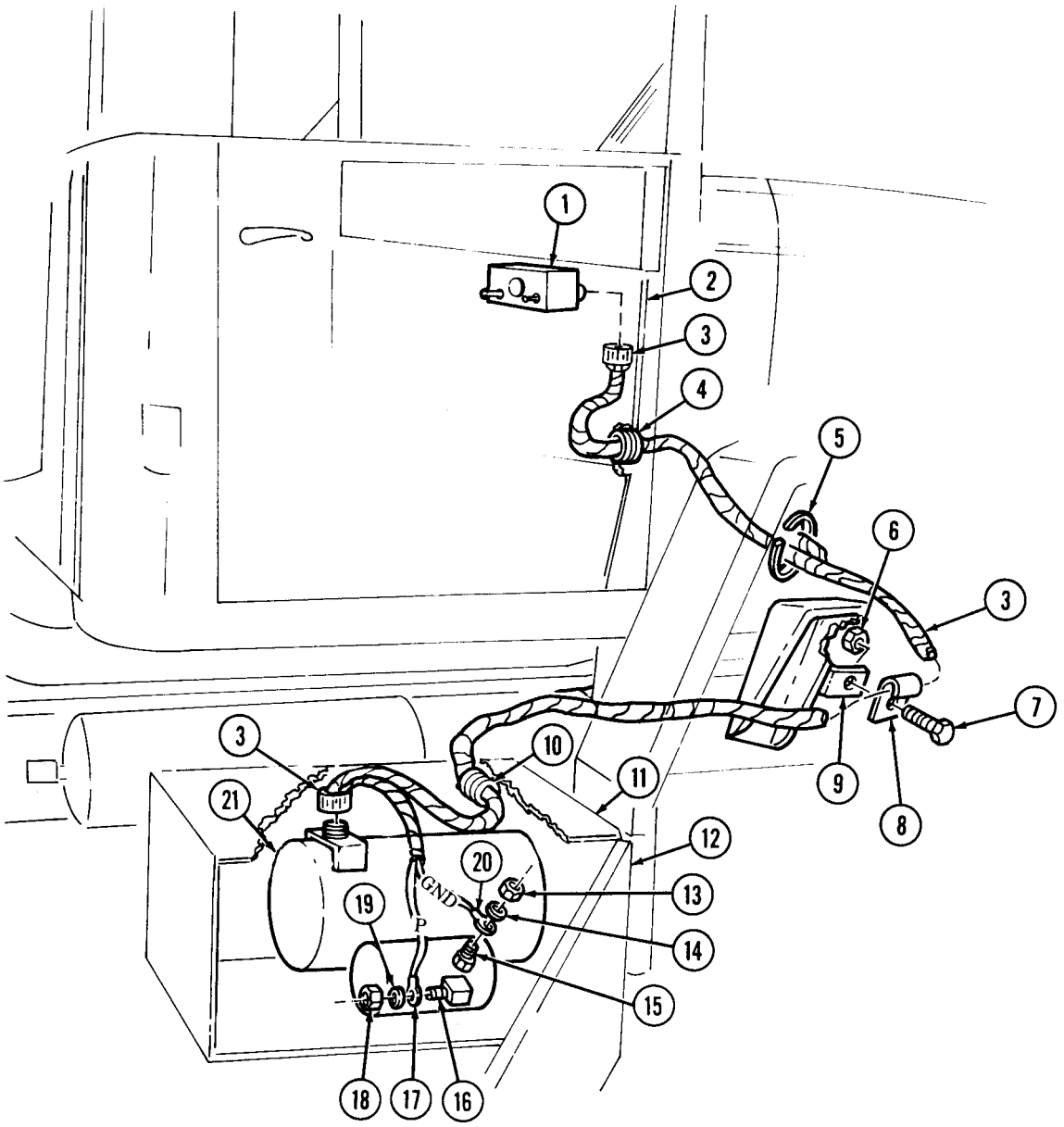
TA 350979

21-7. ENGINE COOLANT HEATER HARNESS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
8.		Engine coolant heater harness (3)	a. Slide through grommet (4) in firewall (2) and through grommet (10) in toolbox (11). b. Connect to heater control box (1). c. Install with new tie-down strap (5). d. Install on bracket (9) with clamp (8), screw (7), and new locknut (6). e. Connect to engine coolant heater (21).	
9.		Wire (17)	Install on terminal stud (16) with new lockwasher (19) and nut (18).	
10.		Ground wire (20)	Install on terminal stud (15) with nut (13) and new lockwasher (14).	
11.		Toolbox door (12)	Close.	

21-7. ENGINE COOLANT HEATER HARNESS REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS:
- Connect battery ground cables (TM 9-2320-272-20-1).
- Check engine coolant heater for proper operation (TM 9-2320-272-10).

TA 350980

21-8. OIL PAN SHROUD AND EXHAUST TUBE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Three cotter pins
Four lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

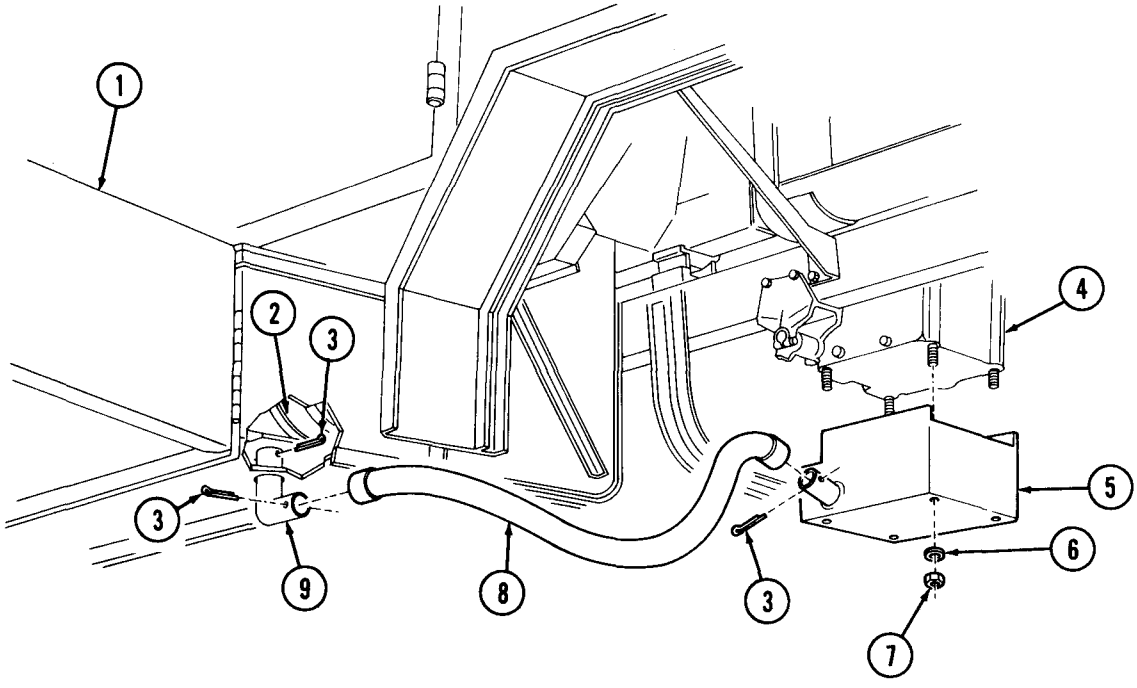
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.		Toolbox door (1)	Open.	
2.	Engine coolant heater (2) and oil pan shroud (5)	Three cotter pins (3), exhaust tube (8), and elbow (9)	Remove.	Discard cotter pins (3). Exhaust tube (8) and elbow (9) can be separated.
3.	Oil pan (4)	Four nuts (7), lockwashers (6), and oil pan shroud (5)	Remove.	Discard lockwashers (6).
	b. installation			
4.		Oil pan shroud (5)	Install on oil pan (4) with four nuts (7) and new lockwashers (6).	
5.		Exhaust tube (8) and elbow (9)	Install on engine coolant heater (2) and oil pan shroud (5) with three new cotter pins (3).	Bend both sides of cotter pins (3).
6.		Toolbox door (1)	Close.	

21-8. OIL PAN SHROUD AND EXHAUST TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

TA 350981

21-9. ENGINE COOLANT BATTERY HEATER PAD REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272 -20-1	Batteries removed.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

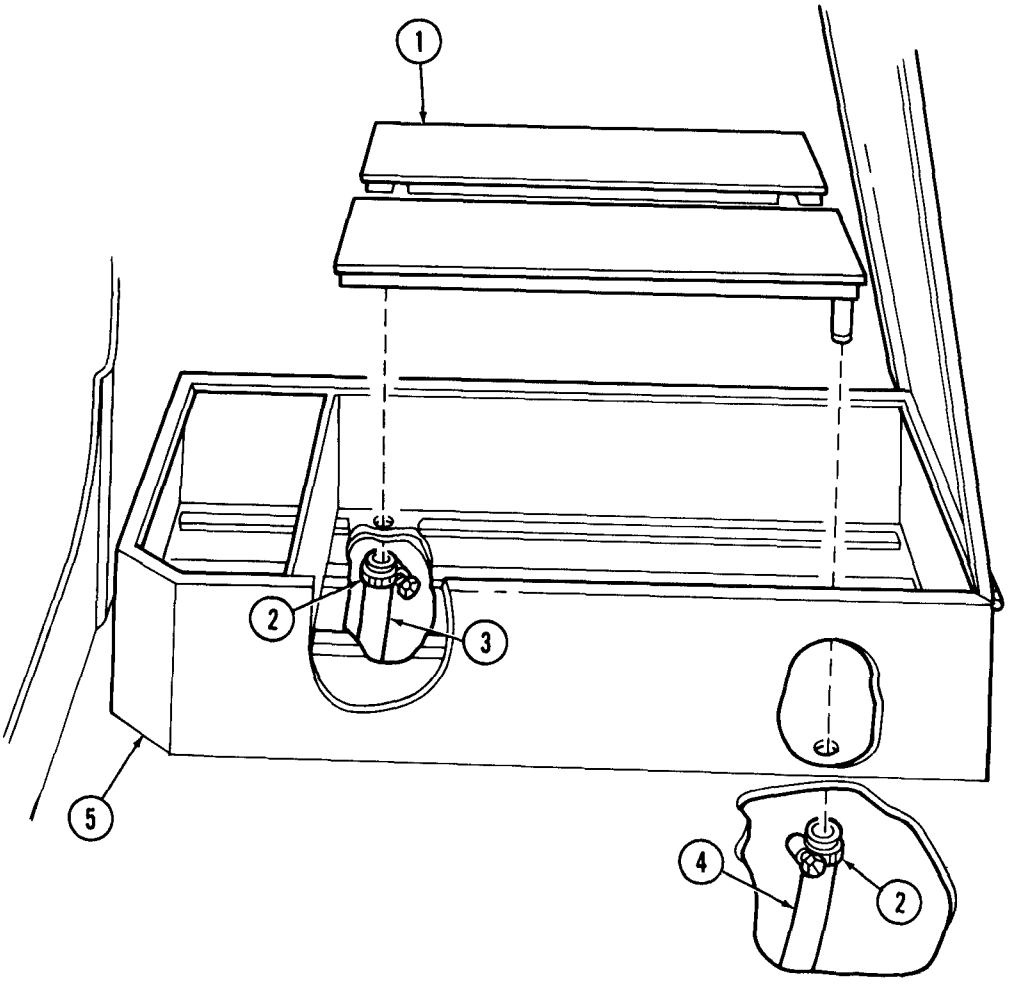
General Safety Instructions
None

Manual References
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Engine coolant heater pad (1)	Two hose clamps (2), inlet hose (3), and outlet hose (4)	Remove.	
2.	Battery box (5)	Engine coolant heater pad (1)	Remove.	
	b. Installation			
3.		Engine coolant heater pad (1)	Install in battery box (5).	
4.		Inlet hose (3) and outlet hose (4)	Install on engine coolant heater pad (1) with two hose clamps (2).	

21-9. ENGINE COOLANT BATTERY HEATER PAD REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Install batteries (TM 9-2320-272-20-1).

21-10. ENGINE COOLANT HEATER ELECTRIC FUEL PUMP REPLACEMENT

The engine coolant heater and the personnel fuel burning heater operate off of the same electric fuel pump. The removal and installation procedures for the personnel fuel burning heater electric fuel pump can be found in paragraph 21-16.

Section II. PERSONNEL FUEL BURNING HEATER KIT REPLACEMENT

21-11. DESCRIPTION

a. The personnel fuel burning heater kit -55°F (-48°C) is designed to heat cab and defrost windshield of vehicle. The fuel burning personnel heater utilizes two independent air systems: one for combustion, and one for ventilation.

b. Installation instructions for the personnel fuel burning heater kit can be found on drawing 12256195. This section will cover description, data and replacement instructions of kit components only. To find a specific replacement procedure, refer to the task summary in paragraph 21-13.

c. The combustion air system, in conjunction with fuel from vehicle fuel system, supplies flame for heat which is transmitted into ventilation air system by means of a heat exchanger. Once heated air is in ventilation system, its intensity is controlled by a cable actuated baffle. Heated air, which is allowed to pass by the baffle, is routed into the diverter assembly. The diverter allows heated air to be channeled directly into cab or through defroster vents by means of a second cable actuated baffle. Both cable actuated baffle assemblies have their control knobs mounted to the instrument panel. In addition to baffle controls, an electrical control box is mounted to the instrument panel which starts heater and regulates HI and LO heat operations.

21-12. TABULATED DATA

Table 21-2. Personnel Fuel Burning Heater Kit Replacement

	STANDARD	METRIC
Heat output: (ventilation air):		
Rated output	30,000 BTU/hr	
High heat	27,000 BTU/hr	
Low heat	15,000 BTU/hr	
Fuel	No. 2 diesel	
Fuel pressure (at valve inlet)	3 to 15 psi	20.6-103.4 kPa
Fuel consumption (nominal):		
High heat	0.049 lb/min	0.022 kg
Low heat	0.031 lb/rein	0.014 kg
Operating temperature range	-55°F ± 5°F to 70°F ± 5°F	-48°C ± -15°C to 21°C ± -15°C
Overheat switch setting	325°F to 475°F	163°C to 249°C
Electrical requirements:		
Nominal	24 VDC	
Range	19-30	
Current consumption:		
Starting above 30°F (-1°C)	12 amps	
Starting below 30ºF (-1°C)	14 amps	
Running above 30°F (-1°C)	8 amps	
Running below 30°F (-1°C)	10 amps	
Heater dimensions:		
Length	17.25 in.	43.8 cm
Height	10.42 in.	26.5 cm
Width	6.33 in.	16.1 cm
Weight	less than 21 lbs	less than 9.45 kg

21-13. PERSONNEL FUEL BURNING HEATER KIT COMPONENT REPLACEMENT TASK SUMMARY

21-14. PERSONNEL FUEL BURNING HEATER CONTROL BOX REPLACEMENT

This task covers:

a. Removal b. Installation

INITIAL SETUP:

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-20-1

Condition Description
Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W

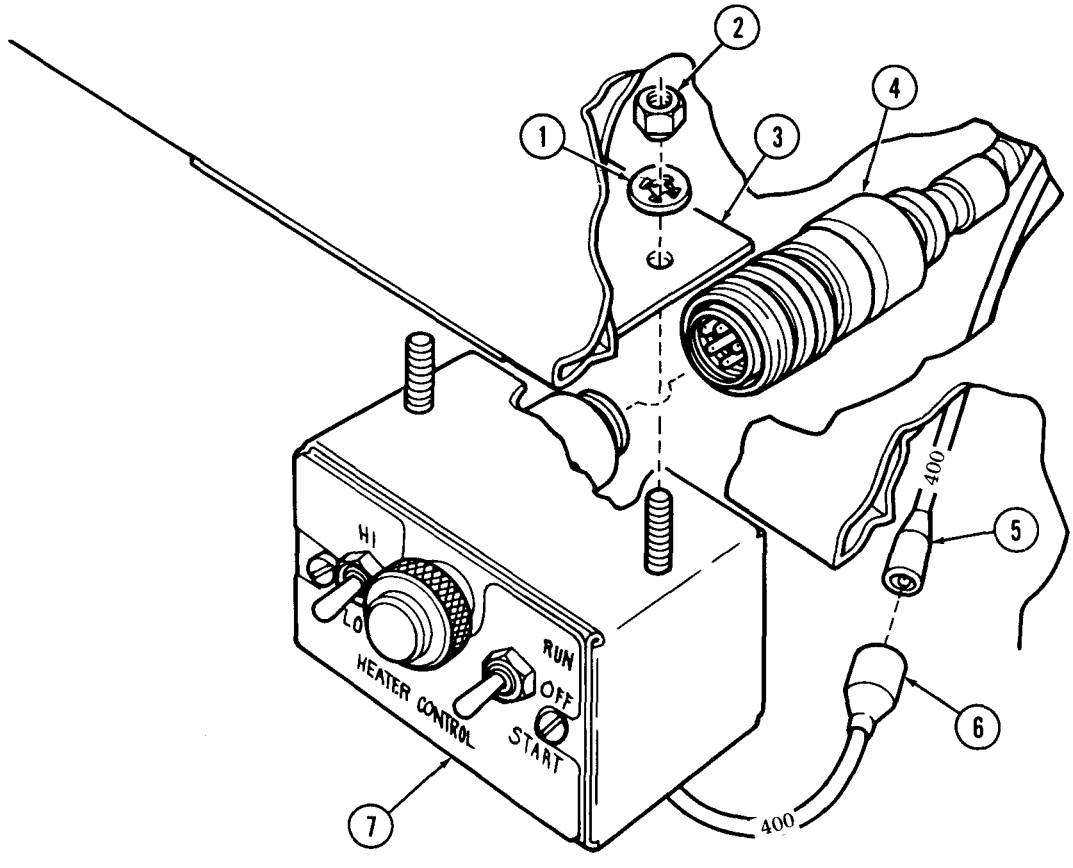
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Fuel burning heater control box (7)	Fuel burning heater harness (4)	Disconnect.	
2.		Connector (5)	Disconnect from control box wire (6).	
3.	Control mounting bracket (3)	Two nuts (2) and lockwashers (1)	Remove.	Discard lockwashers (1).
4.		Fuel burning heater control box (7)	Remove.	
	b. Installation			
5.		Fuel burning heater control box (7)	Install on control mounting bracket (3) with two new lockwashers (1) and nuts (2).	
6.		Connector (5)	Connect to control box wire (6).	
7.		Fuel burning heater harness (4)	Connect to fuel burning heater control box (7).	

21-14. PERSONNEL FUEL BURNING HEATER CONTROL BOX REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Connect battery ground cables (TM 9-2320-272-20-1).
• Check personnel fuel burning heater for proper operation (TM 9-2320-272-10).

TA 350983

21-15. PERSONNEL FUEL BURNING HEATER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Hood raised and secured.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Cotter pin

Personnel Required
Wheeled vehicle repairman MOS 63W

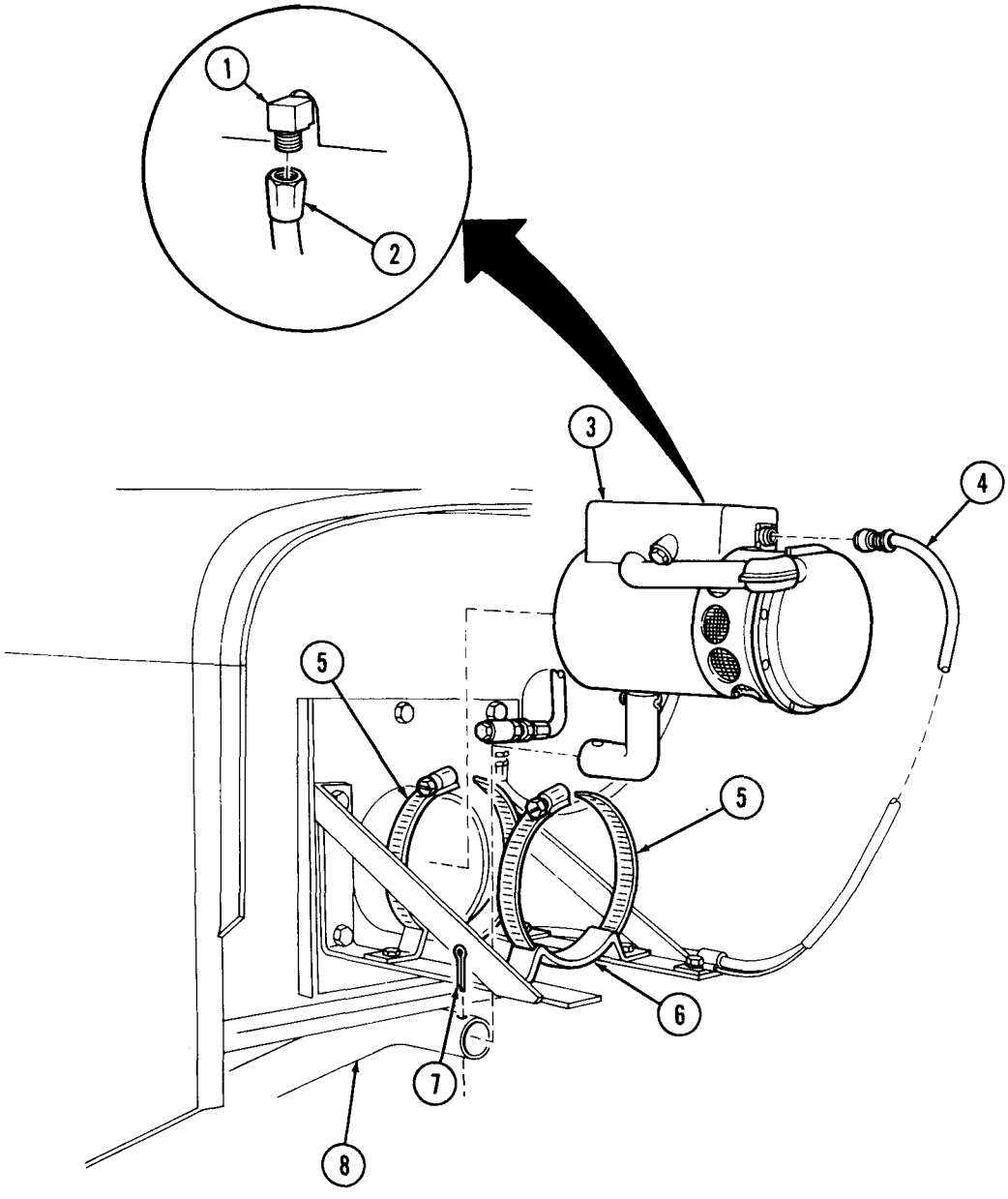
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Fuel burning heater (3)	Heater harness (4)	Disconnect.	
2.	Left side of heater (3)	Fuel line (2)	Disconnect from heater elbow (1).	
3.	Exhaust tube (8) to heater (3)	Cotter pin (7)	Remove.	Discard cotter pin (7).
4.	Heater bracket (6)	Two clamps (5)	Loosen, and slide fuel burning heater (3) out of clamps (5).	
		b. Installation		
5.		Fuel burning heater (3)	Install on heater bracket (6) with two clamps (5).	
6.		Exhaust tube (8)	Install on fuel burning heater (3) with new cotter pin (7).	
7.		Fuel line (2)	Connect to heater elbow (1).	
8.		Heater harness (4)	Connect to fuel burning heater (3).	

21-15. PERSONNEL FUEL BURNING HEATER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Check personnel fuel burning heater for proper operation (TM 9-2320-272-10).

TA 350984

21-16. PERSONNEL FUEL BURNING HEATER ELECTRIC FUEL PUMP REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-1	Battery ground cables disconnected.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Two locknuts
Protective cap-plugs (Appendix C, Item 5)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

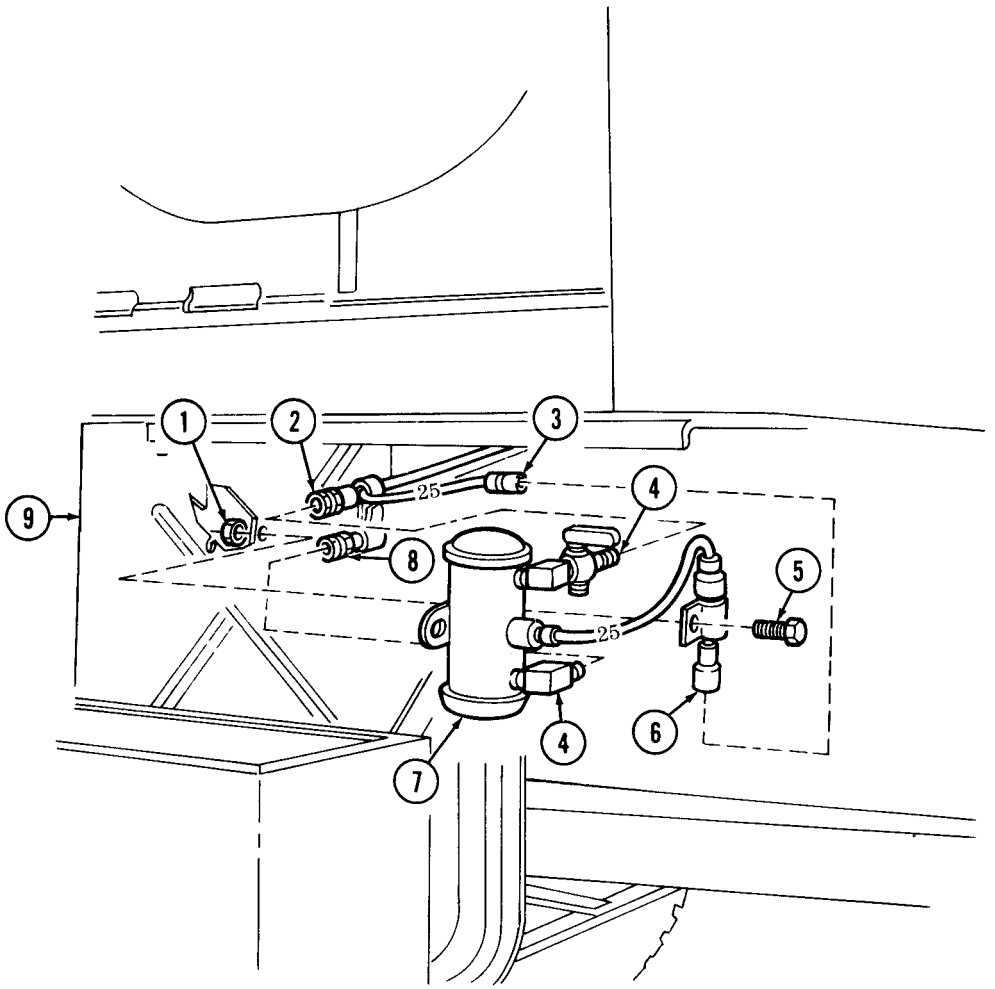
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Electric fuel pump wire Connector (3) (6)		Disconnect.	
		CAUTION: When disconnecting lines and hoses from pump, immediately plug all open ports. Failure to do this can cause damage to pump.		
2.	Electric fuel pump (7)	Fuel inlet line (8) and outlet line (2)	Disconnect from adapter fittings (4).	Tag for installation. Plug fuel lines and fuel pump ports.
3.	Left-hand splash panel (9)	Two screws (5) and locknuts (1), and electric fuel pump (7)	Remove.	Discard locknuts (1).
		b. installation		
4.		Electric fuel pump (7)	Install on left-hand splash panel (9) with two screws (5) and new locknuts (1).	
5.		Fuel outlet line (2) and inlet line (8)	Install on adapter fittings (4).	

21-16. PERSONNEL FUEL BURNING HEATER ELECTRIC FUEL PUMP REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.		Connector (3)	Connect to electric fuel pump wire (6).	



END OF TASK!

FOLLOW-ON TASKS:
- Connect battery ground cables (TM 9-2320-272-20-1).
- Check personnel fuel burning heater electric fuel pump for proper operation (TM 9-2320-272-10).

TA 350985

21-17. PERSONNEL FUEL BURNING HEATER HARNESS AND CABLE 76 REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10 TM 9-2320-272-20-1	Hood raised and secured. Battery ground cables disconnected.

Test Equipment

None

Special Tools

None

Special Environmental Conditions

None

Materials/Parts

Lockwasher
Locknut
Six tiedown straps (Appendix C, Item 22)

Personnel Required

Wheeled vehicle repairman MOS 63W

General Safety Instructions

None

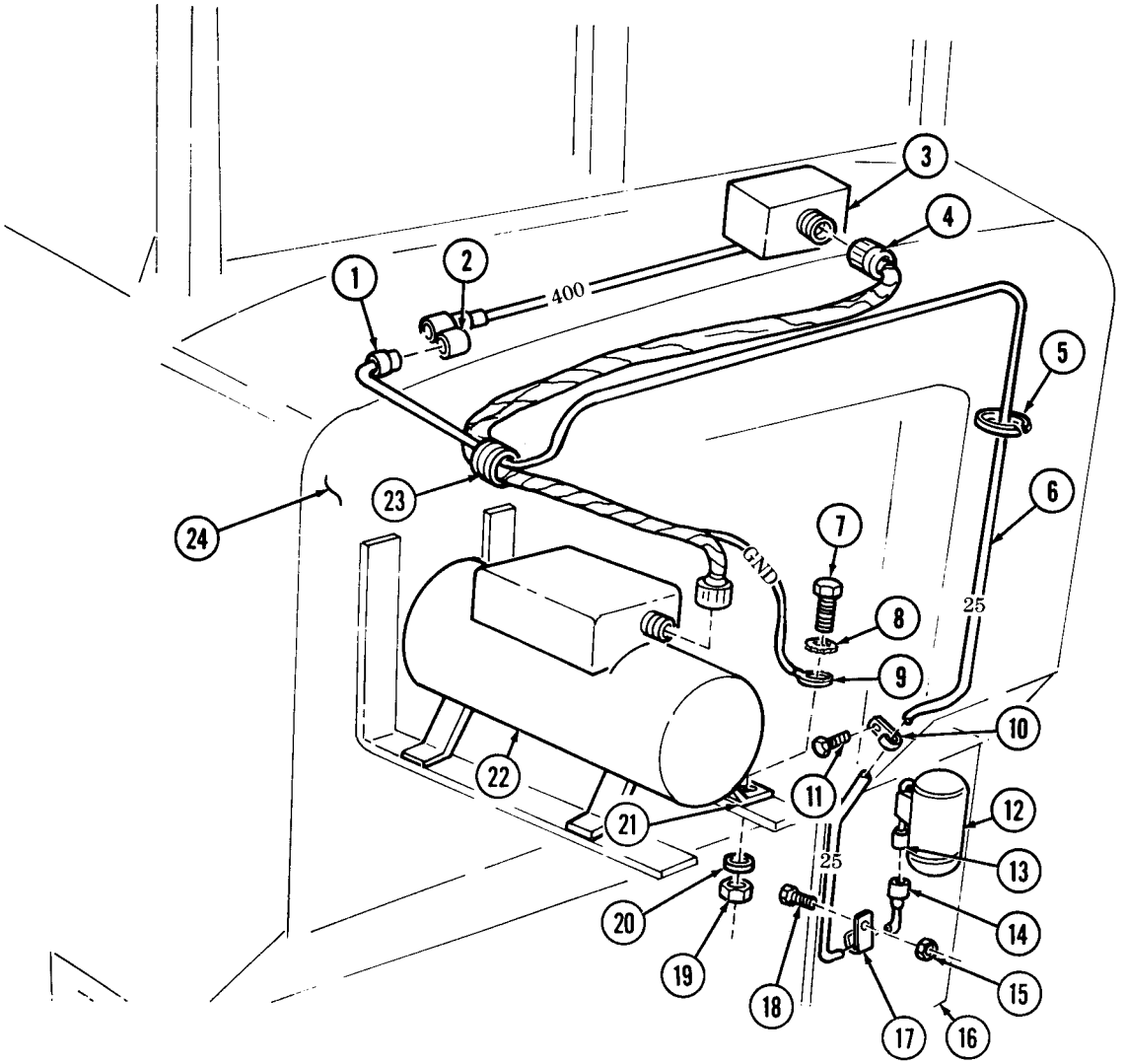
Manual References

TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	a. Removal			
1.	Fuel burning heater (22)	Heater harness (4)	Disconnect.	
2.	Right underside of dash	Connector (1)	Disconnect from heater control box connector (2).	
3.	Heater control box (3)	Heater harness (4)	Disconnect.	
4.	Electric fuel pump (12)	Connector (14)	Disconnect from wire connector (13).	
5.	Heater bracket (21)	Screw (7), nut (19), washer (20), and lockwasher (8)	Remove, and disconnect heater ground wire (9).	Discard lockwasher (8).
6.	Wire (6)	Six tiedown straps (5)	Remove.	Discard straps (5).
7.	Firewall (24)	Screw (11) and clamp (10)	Remove.	

21-17. PERSONNEL FUEL BURNING HEATER HARNESS AND CABLE 76 REPLACEMENT (Cent'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
8.	Splash panel (16)	Screw (18), locknut (15) and clamp (17)	Remove.	Discard locknut (15).
9.		Wire (6) and heater harness (4)	Remove through grommet (23) in firewall (24).	



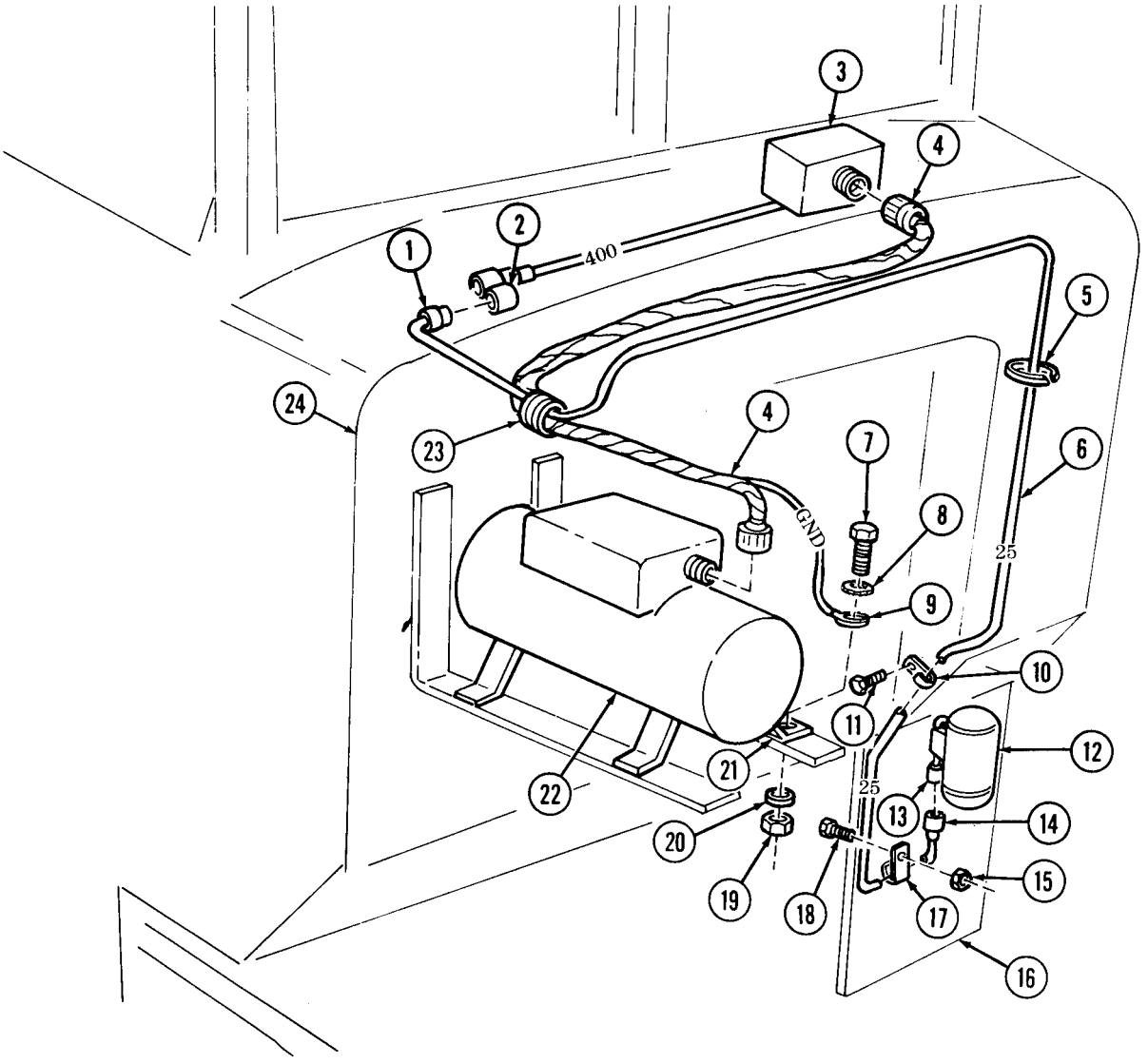
TA 350986

21-17. PERSONNEL FUEL BURNING HEATER HARNESS AND CABLE 76 REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
10.		Wire (6) and heater harness (4)	Install through grommet (23) in firewall (24).	
11.		Heater harness (4)	Connect to heater control box (3).	
12.		Connector (1)	Connect to heater control box connector (2).	Connection is made under right side of dash.
13.		Connector (14)	Connect to wire connector (13) on electric fuel pump (12).	
14.		Heater harness (4)	a. Connect to fuel burning heater (22).	
			b. Install ground wire (9) to heater bracket (21) with screw (7), new lockwasher (8), washer (20), and nut (19).	Make sure ground wire (9) is installed between lockwasher (8) and bracket (21).
15.		Wire (6)	a. Install with six new tiedown straps (5).	
			b. Install to firewall (24) with screw (11) and clamp (10).	
			c. Install to splash shield (16) with screw (18), new locknut (15) and clamp (17).	

21-17. PERSONNEL FUEL BURNING HEATER HARNESS AND CABLE 76 REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Connect battery ground cables (TM 9-2320-272-20-1).
• Check personnel fuel burning heater for proper operation (TM 9-2320-272-10).

TA 350987

21-18. PERSONNEL FUEL BURNING HEATER EXHAUST TUBE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
Two cotter pins
Two locknuts

Personnel Required
Wheeled vehicle repairman MOS 63W

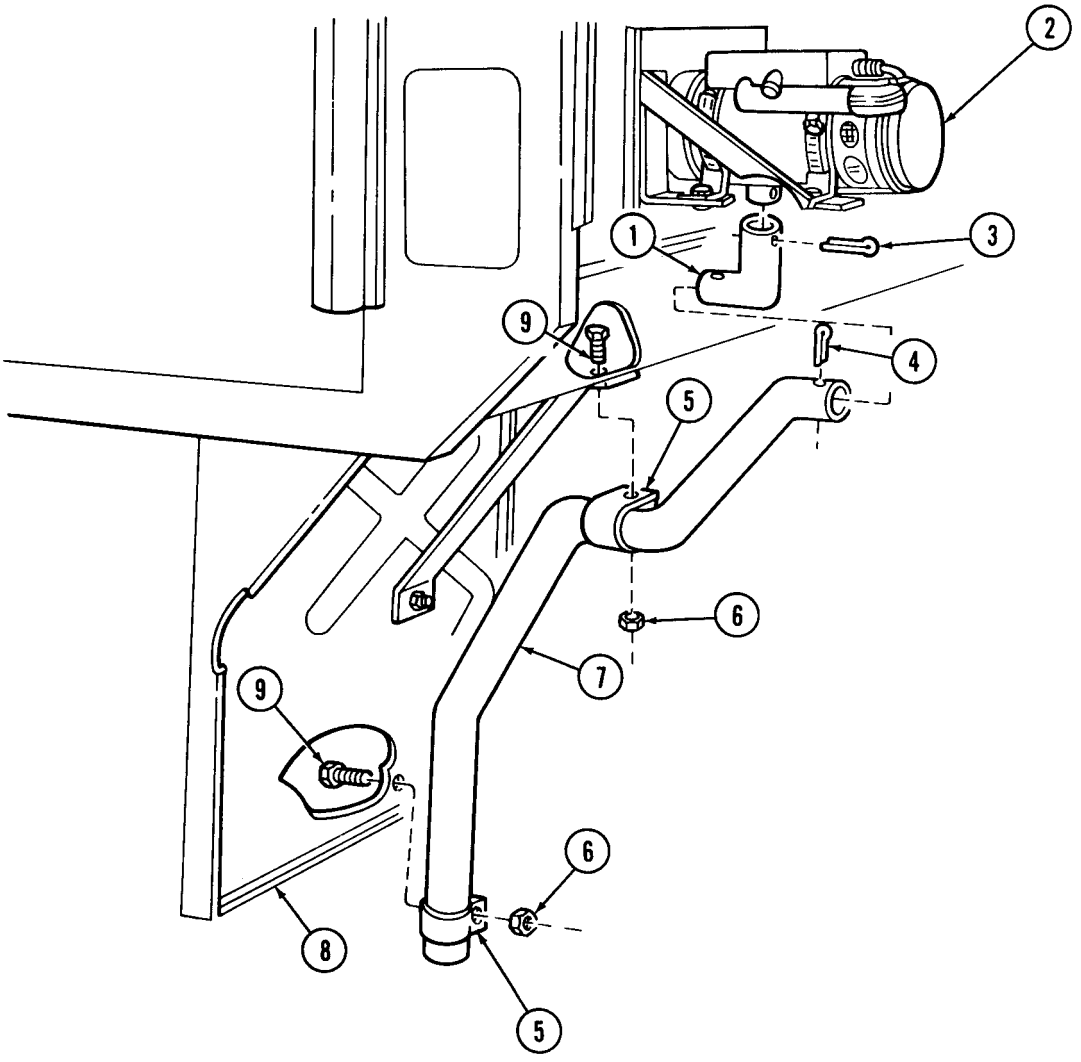
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
1.	Exhaust elbow (1) and fuel burning heater (2)	Cotter pin (3)	Remove.	Discard cotter pin (3).
2.	Exhaust elbow (1) and exhaust tube (7)	Cotter pin (4)	Remove.	Discard cotter pin (4).
3.	Fuel burning heater (2) and splash panel (8)	Two screws (9), locknuts (6), and clamps (5), tube (7), and exhaust elbow (1)	Remove.	Discard locknuts (6).
		b. Installation		
4.		Exhaust elbow (1)	Install on heater (2) with new cotter pin (3).	
5.		Exhaust tube (7)	a. Install on exhaust elbow (1) with new cotter pin (4). b. Install on splash panel (8) with two clamps (5), screws (9), and new locknuts (6).	

21-18. PERSONNEL FUEL BURNING HEATER EXHAUST TUBE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

TA 350988

21-19. PERSONNEL FUEL BURNING HEATER CIRCUIT BREAKER REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-20-1	Battery ground cables disconnected.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

General Safety Instructions
None

Manual References
TM 9-2320-272-20-1
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

NOTE

All circuit breakers on the M939 series vehicles are removed and installed the same way. This procedure covers the personnel fuel burning heater circuit breaker only.

a. Removal

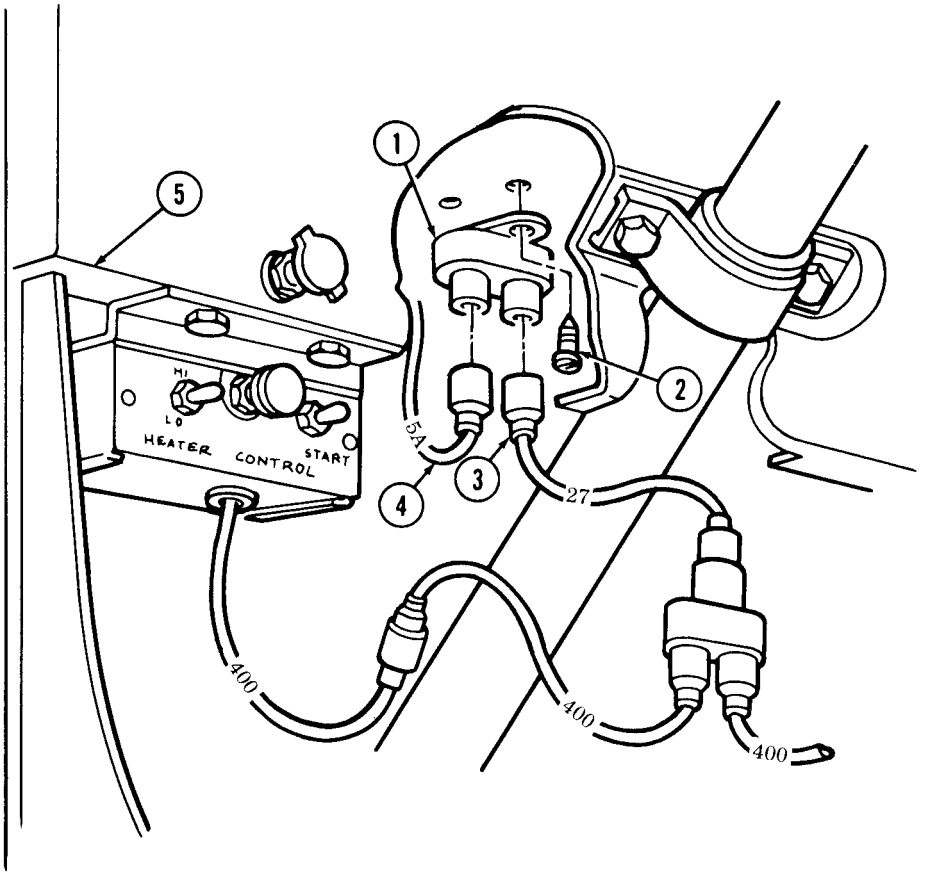
1.	Left underside of dash (5)	Connector (3) and connector (4)	Disconnect from heater circuit breaker (1).	
2.		Two screws (2) and heater circuit breaker (1)	Remove.	

b. Installation

3.		Heater circuit breaker (1)	Install on left underside of dash (5) with two screws (2).	
4.		Connector (4) and connector (3)	Connect to heater circuit breaker (1).	Connection is made under left side of dash (5).

21-19. PERSONNEL FUEL BURNING HEATER CIRCUIT BREAKER REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Connect battery ground cables (TM 9-2320-272-20-1).

Section III. DEEPWATER FORDING KIT

21-20. DESCRIPTION

a. The deepwater fording kit provides component air venting and engine pressurization when crossing water no greater than 6-1/2 ft (1.98 m) in depth. The power steering pump and engine crankcase are pressurized. Venting of other drive train components is accomplished through the air intake system. pressurization of components is provided by compressed air system at horn. The compressed air is then regulated and directed to the various components by means of pressure and shutoff valves which are controlled from within the cab.

b. Installation instructions for the deepwater fording kit can be found on drawing 12302688. This section will cover description and replacement instructions of kit components only. To find a specific replacement procedure, refer to the task summary in paragraph 21-21.

21-21. DEEPWATER FORDING KIT COMPONENT REPLACEMENT TASK SUMMARY

21-22. DEEPWATER FORDING HAND CONTROL AND CABLE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Equipment Condition Reference
TM 9-2320-272-10

Condition Description
Hood raised and secured.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Ports
Four locknuts
Lockwasher

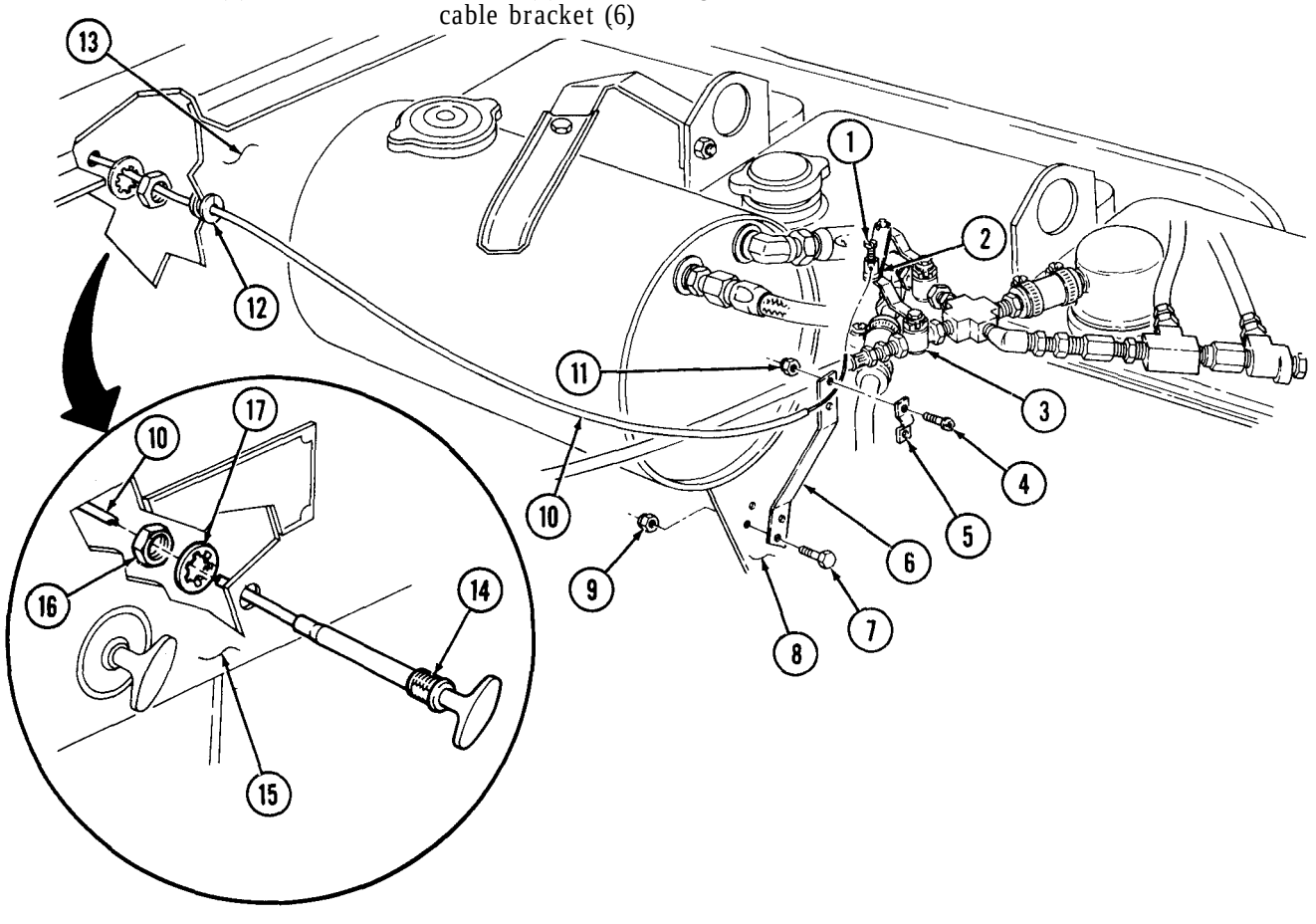
General Safety Instructions
None

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

21-22. DEEPWATER FORDING HAND CONTROL AND CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Removal				
1.	Pressurization valve (3) and control cable (10)	Screw (1)	Loosen and remove control cable (10) from nut (2).	
2.	Fording cable bracket (6)	Two locknuts (11), screws (4), clamp (5), and control cable (10)	Remove.	Discard locknuts (11).
3.	Hand control (14) and control cable (10)	Nut (16) and lockwasher (17)	a. Remove and slide down control cable (10).	
			b. Pull hand control (14) and control cable (10) from instrument panel (15) and grommet (12) in firewall (13).	Discard lockwasher (17).
4.	Surge tank mounting bracket (8)	Two locknuts (9), screws (7), and fording cable bracket (6)	Remove.	Discard locknuts (9).

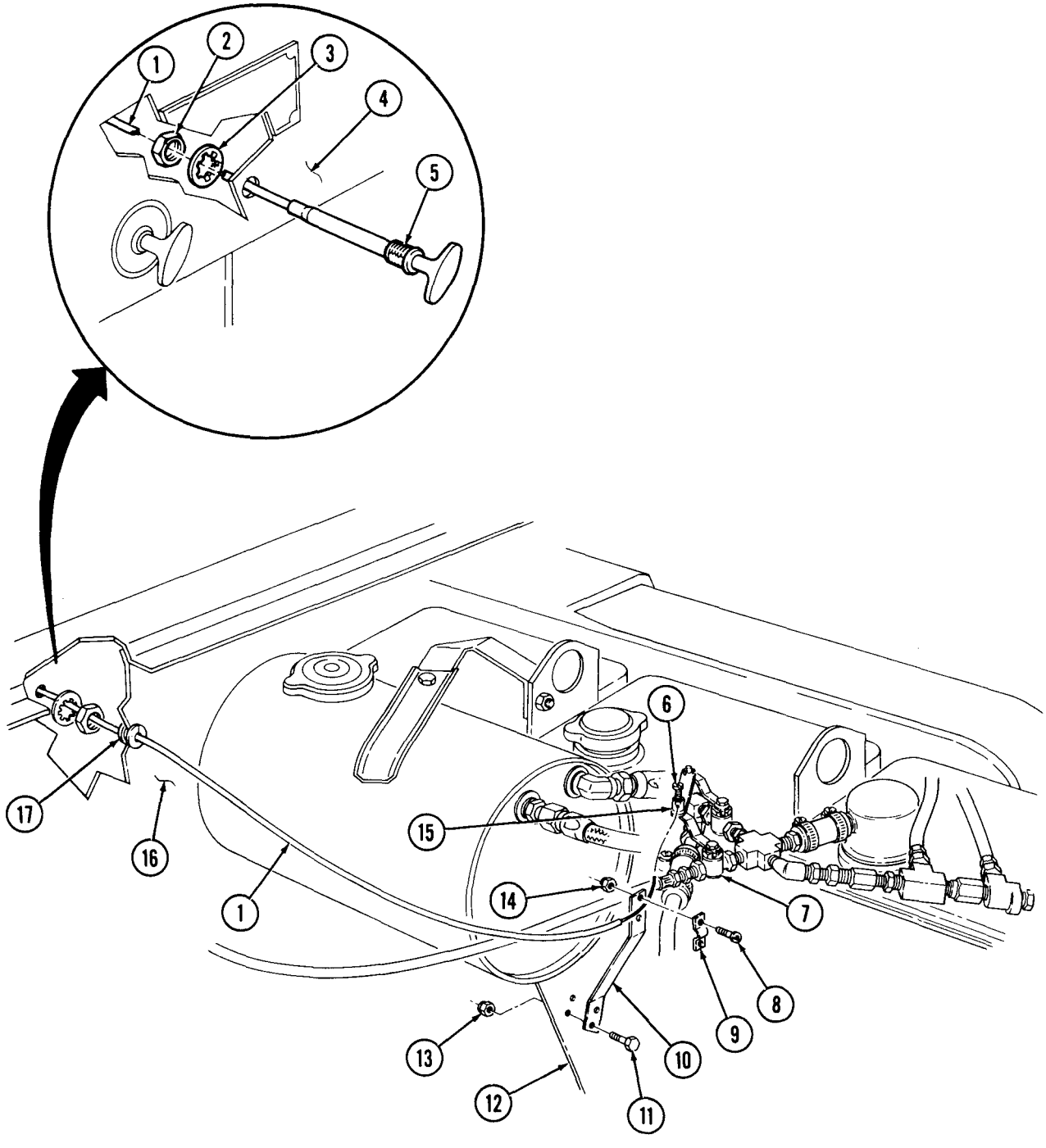


21-22. DEEPWATER FORDING HAND CONTROL AND CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
5.		Fording cable bracket (10)	Install on surge tank mounting bracket (12) with two screws (11) and new locknuts (13).	
6.		Control cable (1)	Insert through hole in instrument panel (4), new lockwasher (3), nut (2), and grommet (17) on firewall (16).	
7.		Hand control (5)	Install on instrument panel (4) with new lockwasher (3) and nut (2).	
8.		Control cable (1)	a. Slide through nut (15) on pressurization valve (7) and tighten screw (6). b. Install on fording cable bracket (10) with clamp (9), two screws (8), and new locknuts (14).	

21-22. DEEPWATER FORDING HAND CONTROL AND CABLE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

21-23. DEEPWATER FORDING PRESSURIZATION VALVE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Took
None

Materials/Parts
Three locknuts
Lockwasher
Antiseize tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition	Reference
Hood raised and secured.	TM 9-2320-272-10
Air reservoirs drained.	TM 9-2320-272-10

Special Environmental Conditions
None

General Safety Instructions
Do not disconnect air lines before draining air reservoirs.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity causing injury to personnel.

a. Removal

1.	Fording cable bracket (24)	Two locknuts (25), screws (18), and clamp (19)	Remove.	Discard locknuts (25).
2.	Control cable (26) to pressurization valve (22)	Screw (29)	Loosen and remove control cable (26) from nut (28).	
3.	Pressurization valve adapter (21)	Supply hose (20)	Disconnect.	

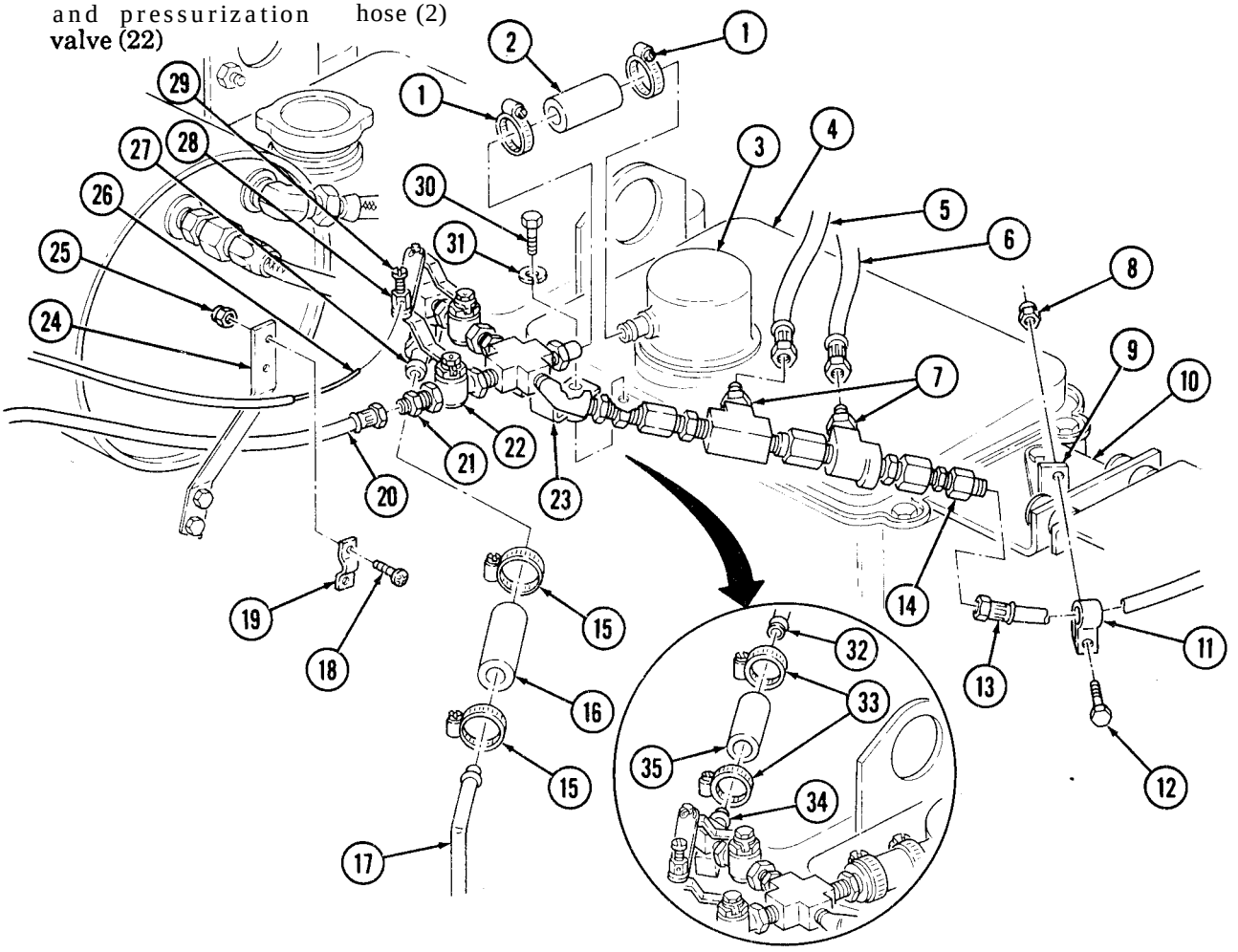
NOTE

Perform step 4 for vehicles equipped with positive crankcase ventilation system.

4.	Pressurization valve elbow (34)	Two clamps (33), hose (35), and crankcase vent tube (32)	Remove.	
5.	Pressurization valve elbow (27)	Two clamps (15), hose (16), and crankcase breather tube (17)	Remove.	

21-23. DEEPWATER FORDING PRESSURIZATION VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Pressurization valve connectors (7)	Pressurization hose (6) and vent hose (5)	Disconnect.	Tag for installation.
7.	Bracket (9) on radiator support bracket (10)	Locknut (8), screw (12), clamp (11), and power steering pump hose (13)	Remove.	Discard locknut (8).
8.	Pressurization valve connector (14)	Power steering pump hose (13)	Disconnect.	
9.	Pressurization valve bracket (23) and rocker lever cover (4)	Screw (30) and lock-washer (31)	Remove.	Discard lockwasher (31).
10.	Crankcase breather (3) and pressurization valve (22)	Two clamps (1) and hose (2)	Remove.	



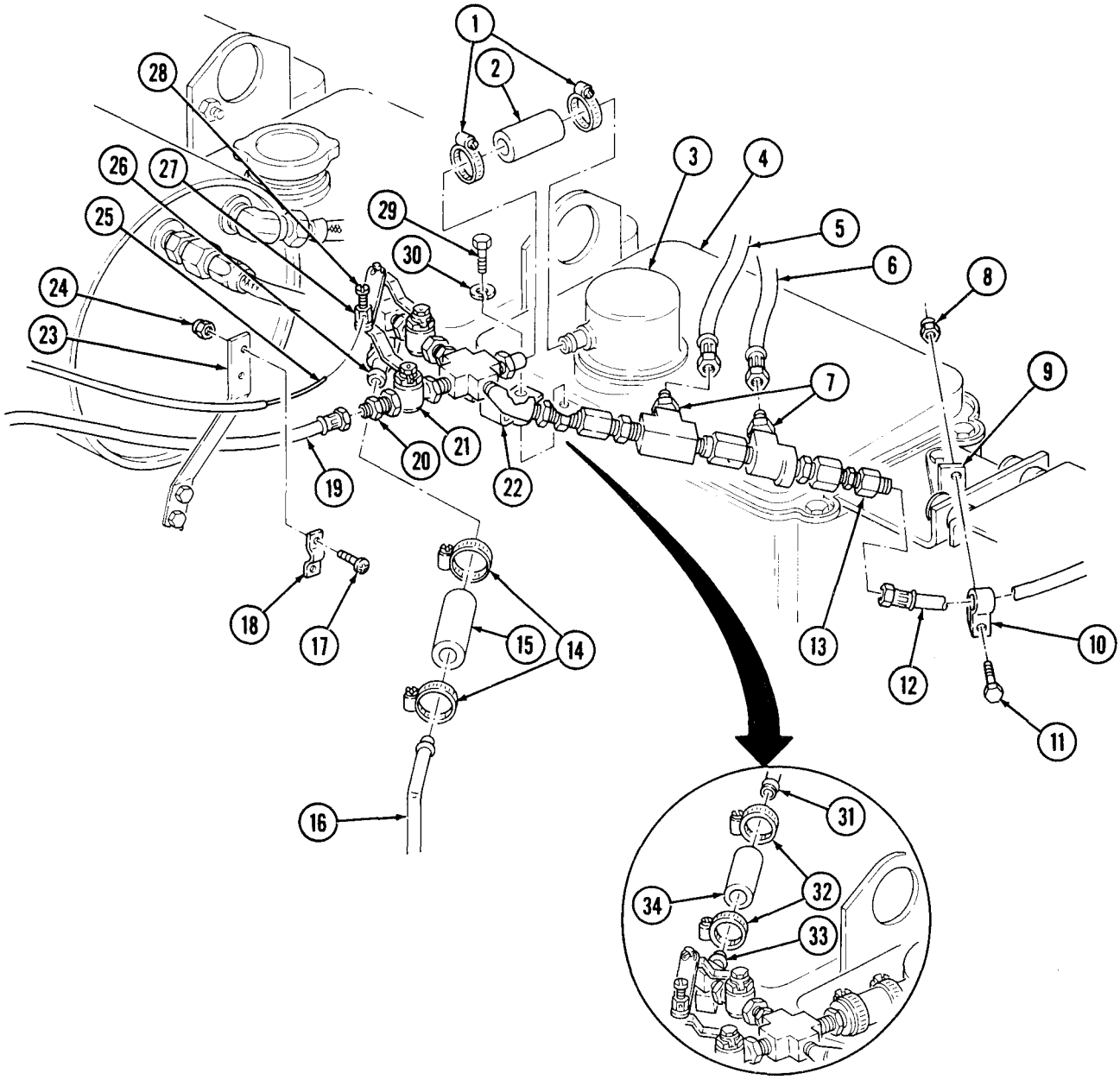
WITH POSITIVE CRANKCASE VENTILATION SYSTEM

21-23. DEEPWATER FORDING PRESSURIZATION VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
	b. Installation			
			NOTE All male threads must be wrapped with antiseize tape before installation.	
11.		Pressurization valve (21)	Connect to crankcase breather (3) with hose (2) and two clamps (1).	
12.		Pressurization valve bracket (22)	Install on rocker lever cover (4) with new lockwasher (30) and screw (29).	
13.		Power steering pump hose (12)	a. Connect to pressurization valve connector (13). b. Install on bracket (9) with clamp (10), screw (11), and new locknut (8).	
14.		Pressurization hose (6) and vent hose (5)	Connect to pressurization valve connectors (7).	
15.		Crankcase breather tube (16)	Install on pressurization valve elbow (26) with hose (15) and two clamps (14).	
			NOTE Perform step 16 for vehicles equipped with positive crankcase ventilation.	
16.		Crankcase vent tube (31)	Install on pressurization valve elbow (33) with hose (34) and two clamps (32).	
17.		Supply hose (19)	Connect to pressurization valve adapter (20).	
18.		Control cable (25)	a. Insert through nut (27) on pressurization valve (21) and tighten screw (28). b. Install on fording cable bracket (23) with clamp (18), two screws (17), and locknuts (24).	

21-23. DEEPWATER FORDING PRESSURIZATION VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



WITH CLEAN AIR SYSTEM

END OF TASK!

FOLLOW-ON TASK: Start engine (TM 9-2320-272-10) and allow air pressure to buildup to normal operating range. Check for air leaks. Road test vehicle.

21-24. DEEPWATER FORDING AIR PRESSURE HOSES REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Locknut
Five tiedown straps (Appendix C, Item 21)
Antiseize tape (Appendix C, Item 30).

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Hood raised and secured.
TM 9-2320-272-10	Air reservoirs drained.

Special Environmental Conditions
None

General Safety Instructions
Do not disconnect air lines before draining air reservoirs.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

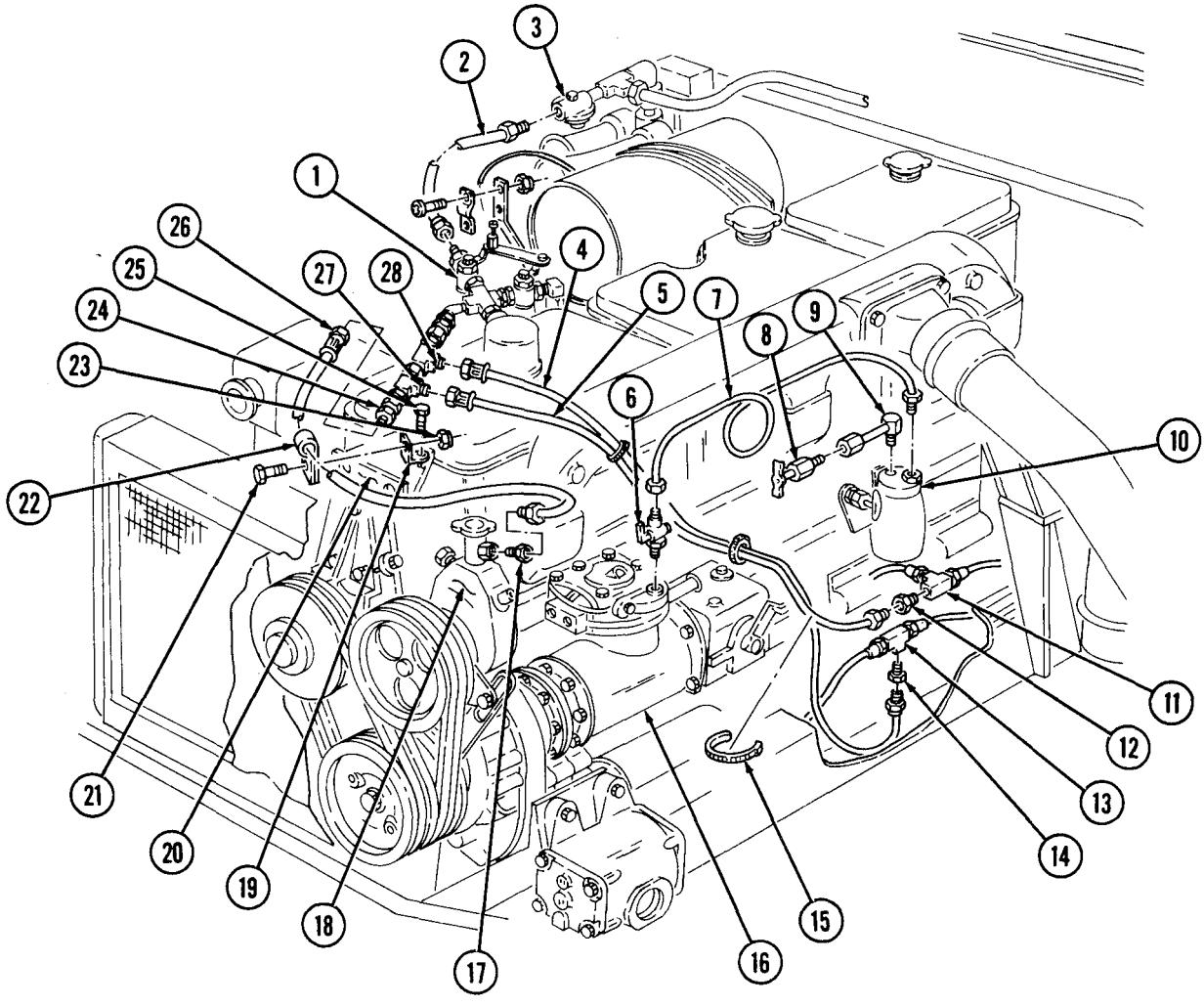
Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity causing injury to personnel.

a. Removal

1.	Pressurization valve (3) and pressurization valve adapter (1)	Supply hose (2)	Disconnect.	
2.	Bracket (19)	Locknut (23), screw (21), clamp (22), and power steering pump hose (26)	Remove.	Discard locknut (23).
3.	Pressurization valve connector (24) and adapter (17)	Power steering pump hose (26)	Disconnect.	
4.	Pressure hose (4) and vent hose (5)	Five tiedown straps (15)	Remove.	Discard tiedown straps (15).
5.	Pressurization valve connector (28) and tee (13)	Pressure hose (4) and bushing (14)	Remove.	

21-24. DEEPWATER FORDING AIR PRESSURE HOSES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
6.	Pressurization valve connector (27) and tee (11)	Vent hose (5) and bushing (12)	Remove.	
7.	Shutoff valve (6) and alcohol evaporator (10)	Air line (7)	Disconnect.	
8.	Alcohol evaporator (10)	Drain valve (8) and elbow (9)	Remove.	
9.	Power steering pump (18)	Adapter (17)	Remove.	
10.	Air compressor (16)	Shutoff valve (6)	Remove.	
11.	Radiator support bracket (20)	Screw (25) and bracket (19)	Remove.	

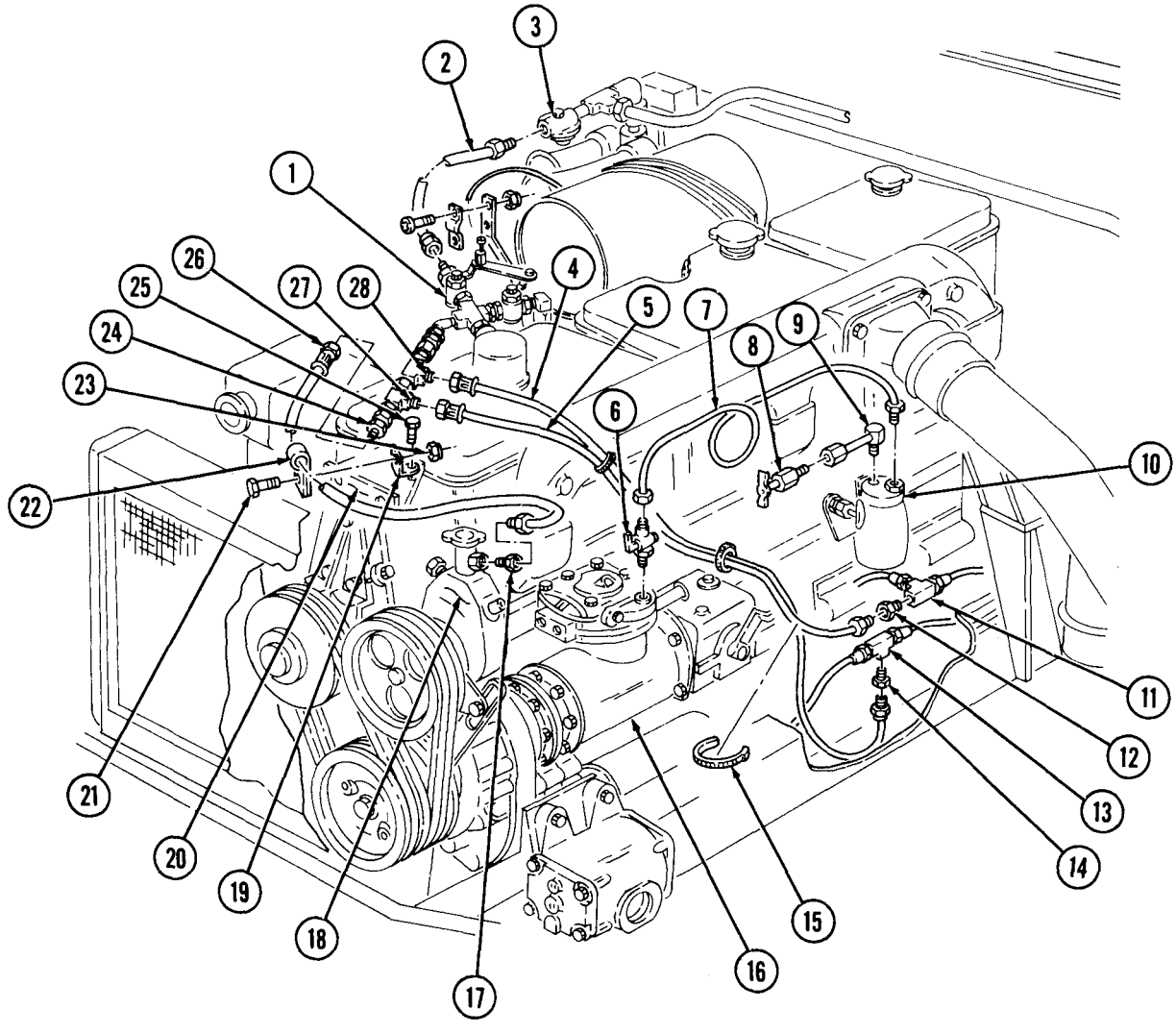


21-24. DEEPWATER FORDING AIR PRESSURE HOSES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		b. Installation		
		NOTE Wrap all male pipe threads with antiseize tape before installation.		
12.		Bracket (19)	Install on radiator support bracket (20) with screw (25).	
13.		Shutoff valve (6)	Install on air compressor (16).	
14.		Elbow (9) and drain valve (8)	Install on alcohol evaporator (10).	
15.		Air line (7)	Connect to shutoff valve (6) and alcohol evaporator (10).	
16.		Vent hose (5) and bushing (12)	a. Install bushing (12) on tee (11). b. Connect vent hose (5) on bushing (12) and pressurization valve connector (27).	
17.		Pressure hose (4) and bushing (14)	a. Install bushing (14) on tee (13). b. Connect pressure hose (4) on bushing (14) and pressurization valve connection (28).	
18.		Five new tiedown straps (15)	Install on pressure hose (4) and vent hose (5).	
19.		Power steering pump hose (26) and adapter (17)	a. Install adapter (17) on power steering pump (18). b. Connect power steering pump hose (26) on adapter (17) and pressurization valve connector (24). c. Install power steering pump hose (26) on bracket (20) with clamp (22), screw (21), and new locknut (23).	
20.		Supply hose (2)	Install on pressurization valve adapter (1) and regulator valve (3).	

21-24. DEEPWATER FORDING AIR PRESSURE HOSES REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASK: Start engine (TM 9-2320-272-10) and allow air pressure to build up to normal operating range. Check for air leaks. Road test vehicle.

21-24.1 DEEPWATER FORDING REGULATOR VALVE REPLACEMENT

This task covers:

a. Removal **b. Installation**

INITIAL SETUP:

Applicable Models
All

Test Equipment
None

Special Tools
None

Materials/Parts
Antiseize tape (Appendix C, Item 30)

Personnel Required
Wheeled vehicle repairman MOS 63W

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

Equipment Condition	Reference
Hood raised and secured.	TM 9-2320-272-10
Air reservoirs drained.	TM 9-2320-272-10

Special Environmental Conditions
None

General Safety Instructions
Do not disconnect air lines before draining air reservoirs.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

WARNING

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity causing injury to personnel.

a. Removal

1.	Regulator valve (6)	Supply hose (7)	Disconnect.
2.	Tee (2)	Air line (4) and adapter (3)	Remove.
3.	Air horn solenoid (8)	Regulator valve (6), nipple (5), tee (2), elbow (1), and reducer (9)	Remove.

b. Installation

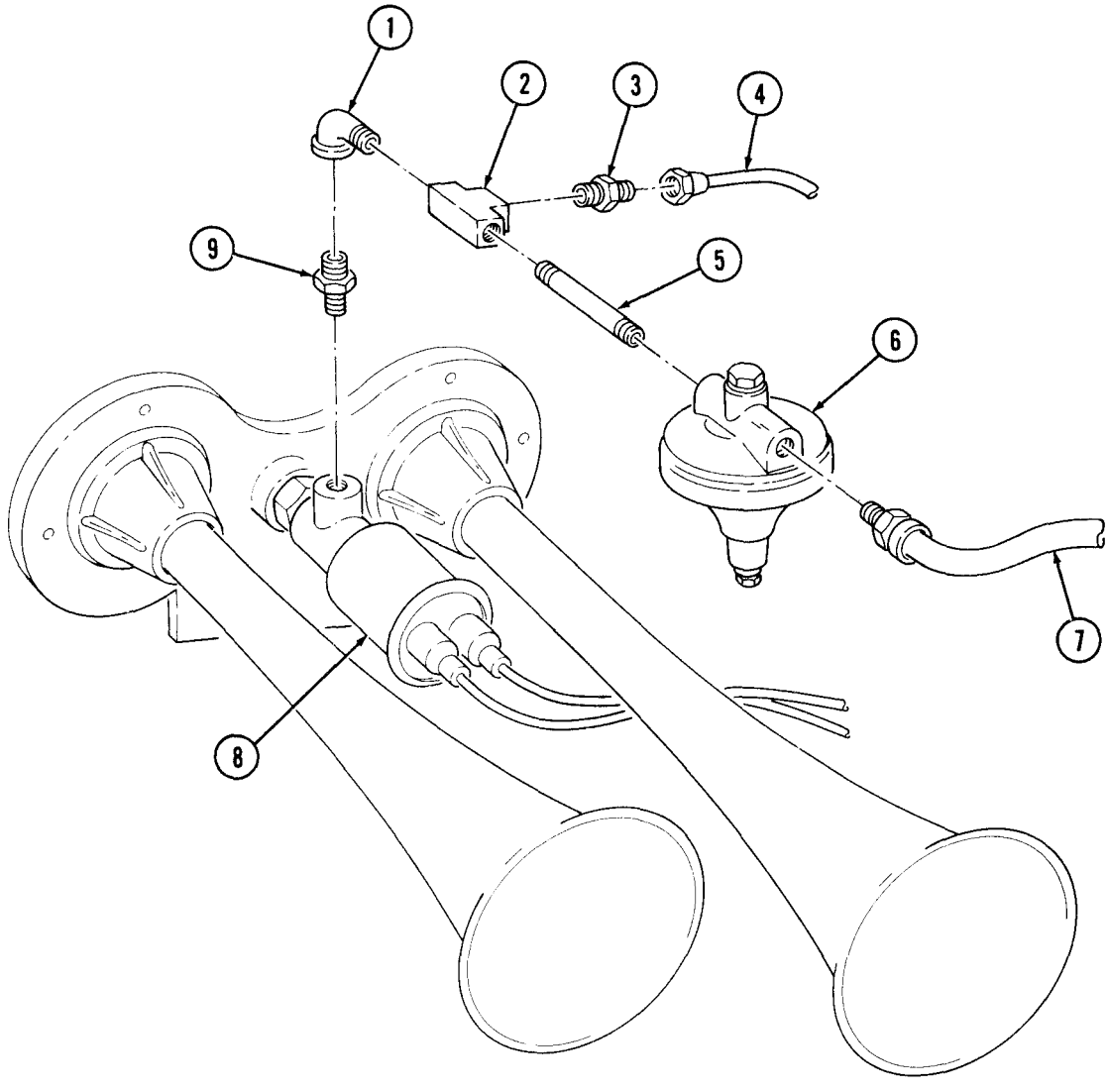
NOTE

Wrap all male pipe threads with antiseize tape before installation.

4.		Reducer (9), elbow (1), tee (2), nipple (5), and regulator valve (6)	Install on air horn solenoid (8).
5.		Air line (4) and adapter (3)	Install on tee (2).
6.		Supply line (7)	Install on regulator valve (6).

21-24.1 DEEPWATER FORDING REGULATOR VALVE REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

Section IV. HAND AIRBRAKE KIT

21-25. DESCRIPTION

a. The hand airbrake kit is designed for use when braking force is required at wheels of a towed vehicle and not at wheels of towing vehicle. The kit consists of valve assembly with hand control, bulkhead union, double-check valve, and tubing with appropriate fittings and clamps. Compressed air to power hand airbrake system is drawn from air supply valve mounted on the side of firewall.

b. For removal and installation instructions for hand airbrake kit, refer to drawing 12256300. This kit is used on all M939 series vehicles.

Section V. RADIATOR AND HOOD COVER KIT

21-26. DESCRIPTION

a. The radiator and hood cover kit consists of hood panel loops, radiator and hood cover assembly, hood panel screws, and a drilling instruction drawing. No component of this kit is removed and replaced as a separate unit. The kit is the unit.

b. For further instruction on the removal and installation of the radiator and hood cover kit, refer to drawing 12256609. This kit is used on all M939 series vehicles.

21-27. RADIATOR AND HOOD COVER KIT REPLACEMENT TASK SUMMARY

21-28. RADIATOR AND HOOD COVER KIT REPLACEMENT

This task covers:

a. Installation **b. Removal**

INITIAL SETUP:

Applicable Models	Equipment Condition Reference	Condition Description
All	TM 9-2320-272-10	Parking brake set.

Test Equipment
None

Special Tools
None

Special Environmental Conditions
None

Materials/Parts
None

Personnel Required
Wheeled vehicle repairman MOS 63W

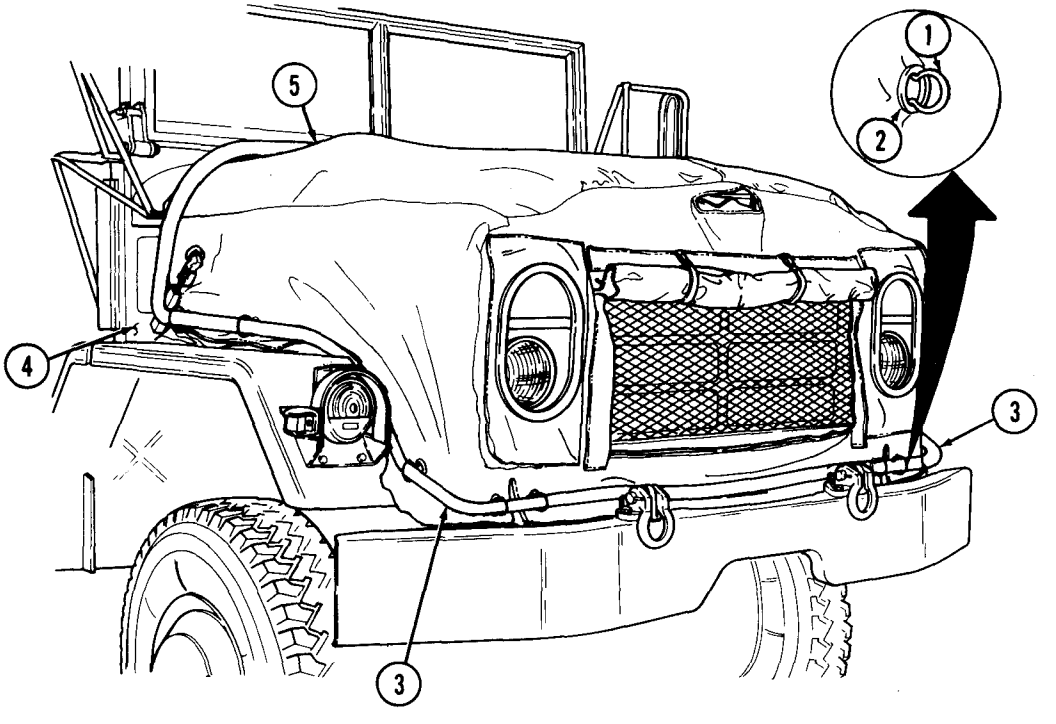
General Safety Instructions
None

Manual References
TM 9-2320-272-10
TM 9-2320-272-34P

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
a. Installation				
1.		Radiator and hood cover (5)	a. Place over hood (4) and insert tiedown loops (1) through grommets (2). b. Install by threading tiedown strap (3) through each tiedown loop (1) and tying strap ends together.	Refer to drilling instruction drawing for installation of tiedown loops.
b. Removal				
		NOTE Once installed, it is not necessary to remove tiedown loops.		
2.		Tiedown strap (3)	Untie ends and pull from eighteen tiedown loops (1).	
3.		Radiator and hood cover (5)	Remove from hood (4).	

21-28. RADIATOR AND HOOD COVER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

TA 350996

Section IV. AIR CONDITIONER KIT

21-29. DESCRIPTION

The air conditioner is used primarily in van type enclosures. The unit provides filtered, cooled or heated air to maintain the service conditions necessaryor the efficient operation of electronic equipment in the vans. The air conditioner also provides for the comfort of operating personnel housed within the van.

21-30. TABULATED DATA

Table 21-3. Air Conditioner Tabulated Data.

	STANDARD	METRIC
1. DIMENSIONS AND WEIGHT		
Length	38-1/16 in.	0.96 m
Width	35-3/16 in.	0.89 m
Height	27-1/8 in.	0.68 m
Weight	434lbs	196.86 kg
Max power requirement	13.5kw	
2. SPECIFICATIONS		
Capacity	36,000 BTU/HR	
Volts	208	
Hertz	50/60	
Phase	3	

21-31. AIR CONDITIONER KIT REPLACEMENT

THIS TASK COVERS:

a. Removal **b. Installation**

INITIAL SETUP

Applicable Models
M934, M934A1, M935, M935A1

Test Equipment
None

Special Tools
None

Materials/Parts
Cotter pin
Twenty-nine lockwashers

Personnel Required
Wheeled vehicle repairman MOS 63W (3)

Manual References
TM 9-2320-272-10
TM 9-2320-272-20-1
TM 9-2320-272-20-2
TM 9-2320-272-34P

Equipment Condition Reference	Condition Description
TM 9-2320-272-10	Parking brake set.
TM 9-2320-272-10	Cab paulin and bows removed.
TM 9-2320-272-10	Windshield lowered.
TM 9-2320-272-10	Companion seat lowered.
TM 9-2320-272-10	External power source disconnected.
TM 9-2320-272-20-1	Ground cable disconnected.
TM 9-2320-272-20-2	Air conditioner drain tube removed.
Para. 18.1-26	Bonnet door removed.

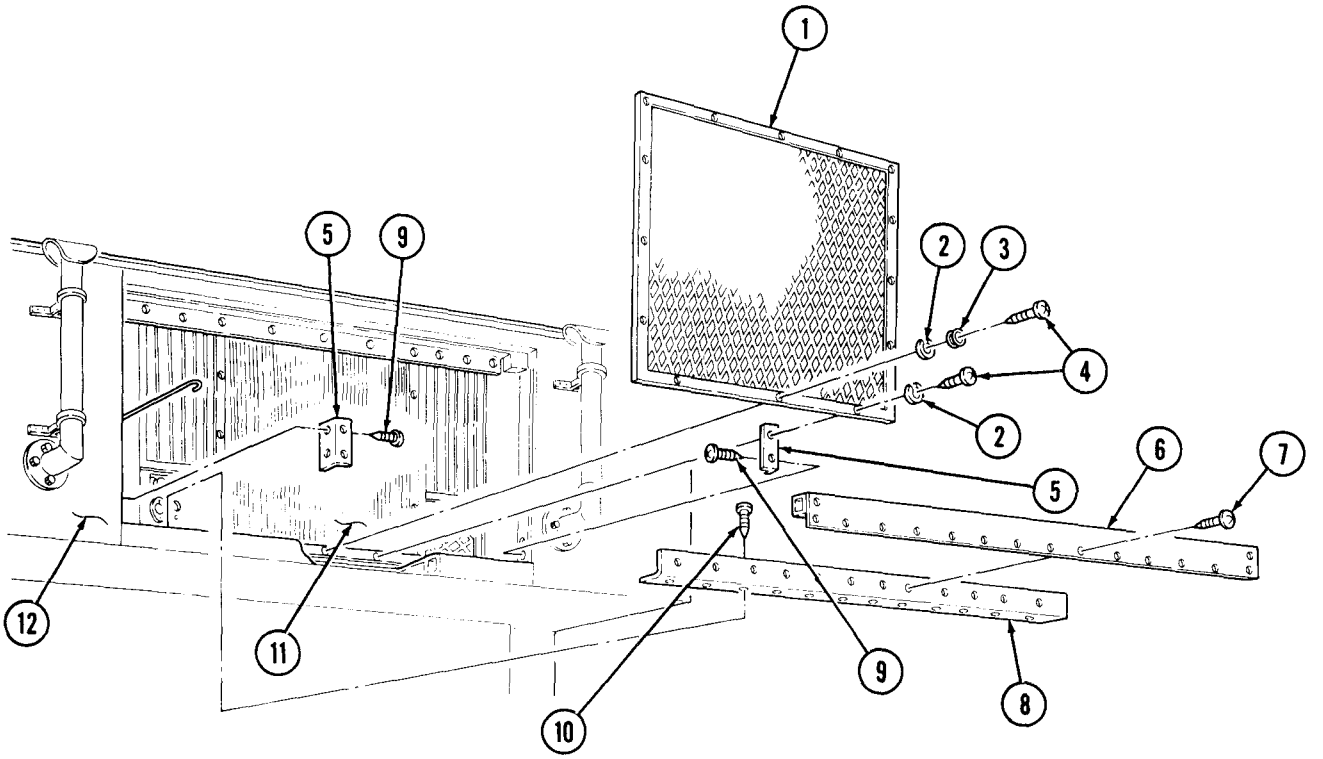
Special Environmental Conditions
None

General Safety Instructions
All personnel must stand clear during lifting operations.

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		a. Removal		
		NOTE Screw quantity for steps 1, 2, and 4 may differ from vehicle to vehicle. Record quantity removed for installation.		
1.	Lower panel mounting angle (8) and two mounting angles (5)	Sixteen screws (7) and lower angle bracket (6)	Remove.	
2.	Bonnet (12)	Twelve screws (10) and lower panel mounting angle (8)	Remove.	
3.		Four screws (9) and two mounting angles (5)	Remove.	
4.	Air conditioner (11)	Fourteen screws (4), lockwashers (2), snap (3), and condenser guard (1)	Remove.	Discard lockwashers (2).

21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
5.	Bonnet (8) and air conditioner (7)	Sixteen screws (1) and top enclosure (2)	Remove.	
6.		Seven screws (6) and bottom enclosure (5)	Remove.	
7.	Left enclosure (13)	Four screws (16), plate (15), and bellows (14)	Remove.	
8.	Swing arm (11)	Cotter pin (12) and door rod (10)	Remove.	Discard cotter pin (12).
9.	Bonnet (8) and air conditioner (7)	Ten screws (9) and left enclosure (13)	Remove.	
10.		Ten screws (3) and right enclosure (4)	Remove.	
11.	Air conditioner (7)	Power cable (21)	Disconnect.	
12.		Screw (23), lockwasher (24), washer (25), ground cable (26), and lockwasher (22)	Remove.	Discard lockwashers (24) and (22).
13.	Mounting plate (18) and bonnet floor (32)	Nut (30), lockwasher (29), washer (28), screw (20), ground cable (26), and lockwasher (27)	Remove.	Discard lockwashers (29) and (27).
14.		Five nuts (31), lockwashers (33), washers (34), and screws (19)	Remove.	Discard lockwashers (33).
15.	Mounting plate (35) and bonnet floor (32)	Six screws (17) and lockwashers (36)	Remove.	Discard lockwashers (36).

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

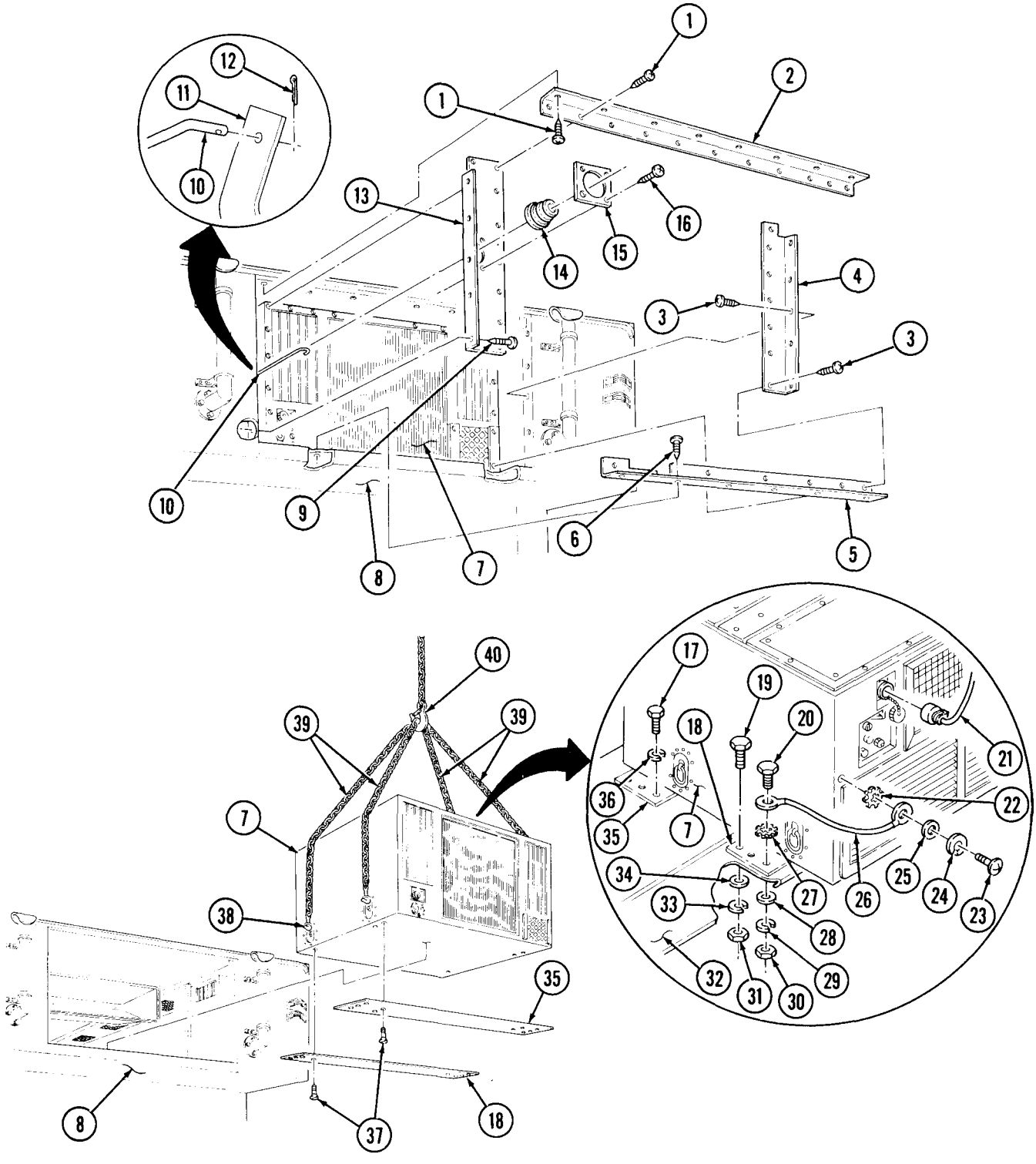
NOTE

Two assistants will help with step 16.

16.	Lifting device (40) and four lifting brackets (38)	Chain (39)	Attach.	
17.	Bonnet (8)	Air conditioner (7)	Remove.	Position air conditioner (7) for access to bottom of unit.
18.	Air conditioner (7)	Six screws (37) and mounting plates (35) and (18)	Remove.	

21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
b. Installation				
19.		Mounting plates (20) and (2)	Install on air conditioner (19) with six screws (24).	

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

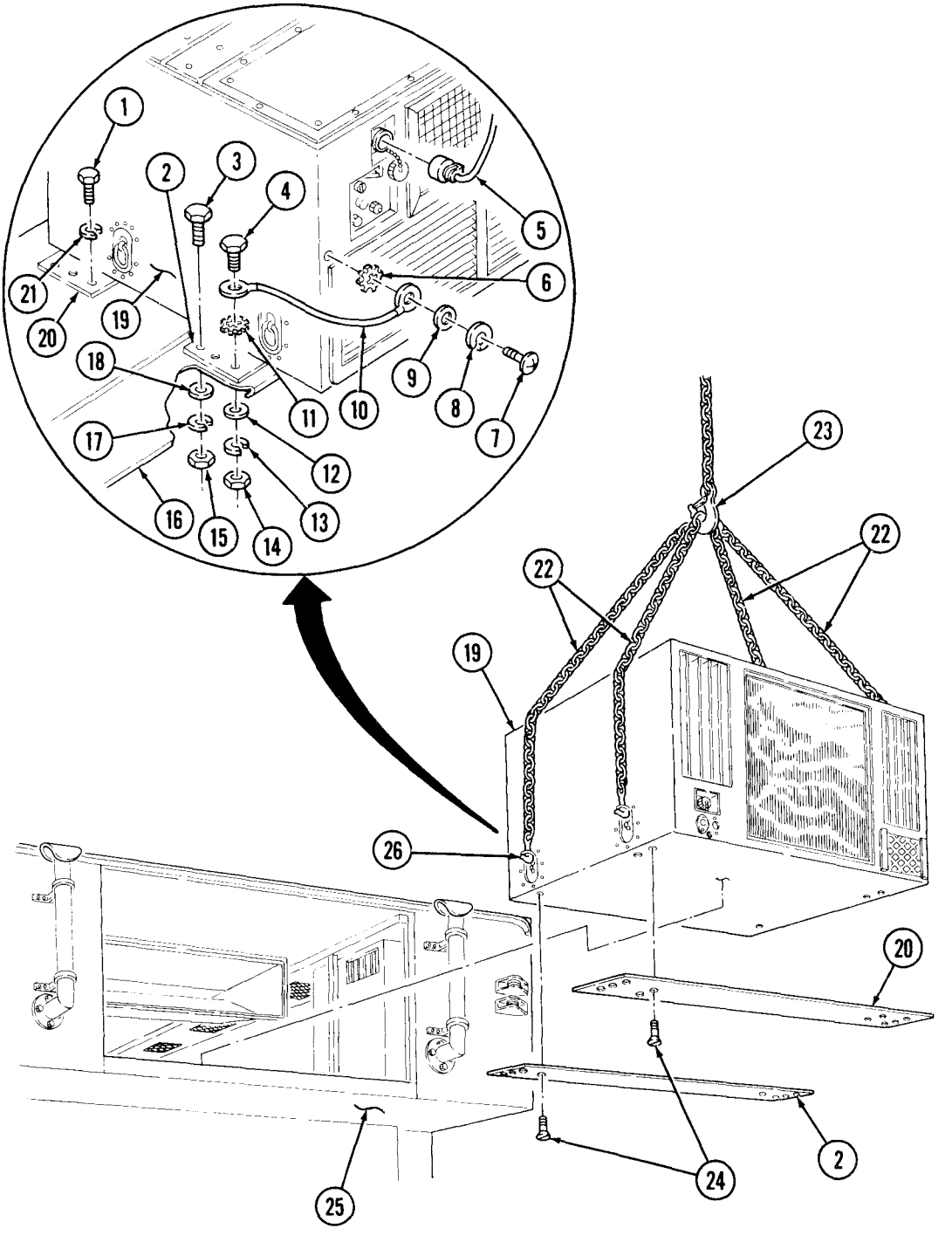
NOTE

Two assistants will help with step 20.

20.		Chain (22)	Attach to lifting device (23) and four lifting brackets (26).
21.		Air conditioner (19)	Position in bonnet (25).
22.		Mounting plate (20)	Install on bonnet floor (16) with six new lockwashers (21) and screws (1).
23.		Ground cable (10)	a. Install on mounting plate (2) and bonnet floor (16) with new lockwasher (11), screw (4), washer (12), new lockwasher (13), and nut (14). b. Install on air conditioner (19) with new lockwasher (6), washer (9), new lockwasher (8), and screw (7).
24.		Mounting plate (2)	Install on bonnet floor (16) with five screws (3), washers (18), new lockwashers (17), and nuts (15).
25.		Power cable (5)	Connect to air conditioner (19).
26.		Air conditioner (19)	Remove lifting device (23) and chain (22).

21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

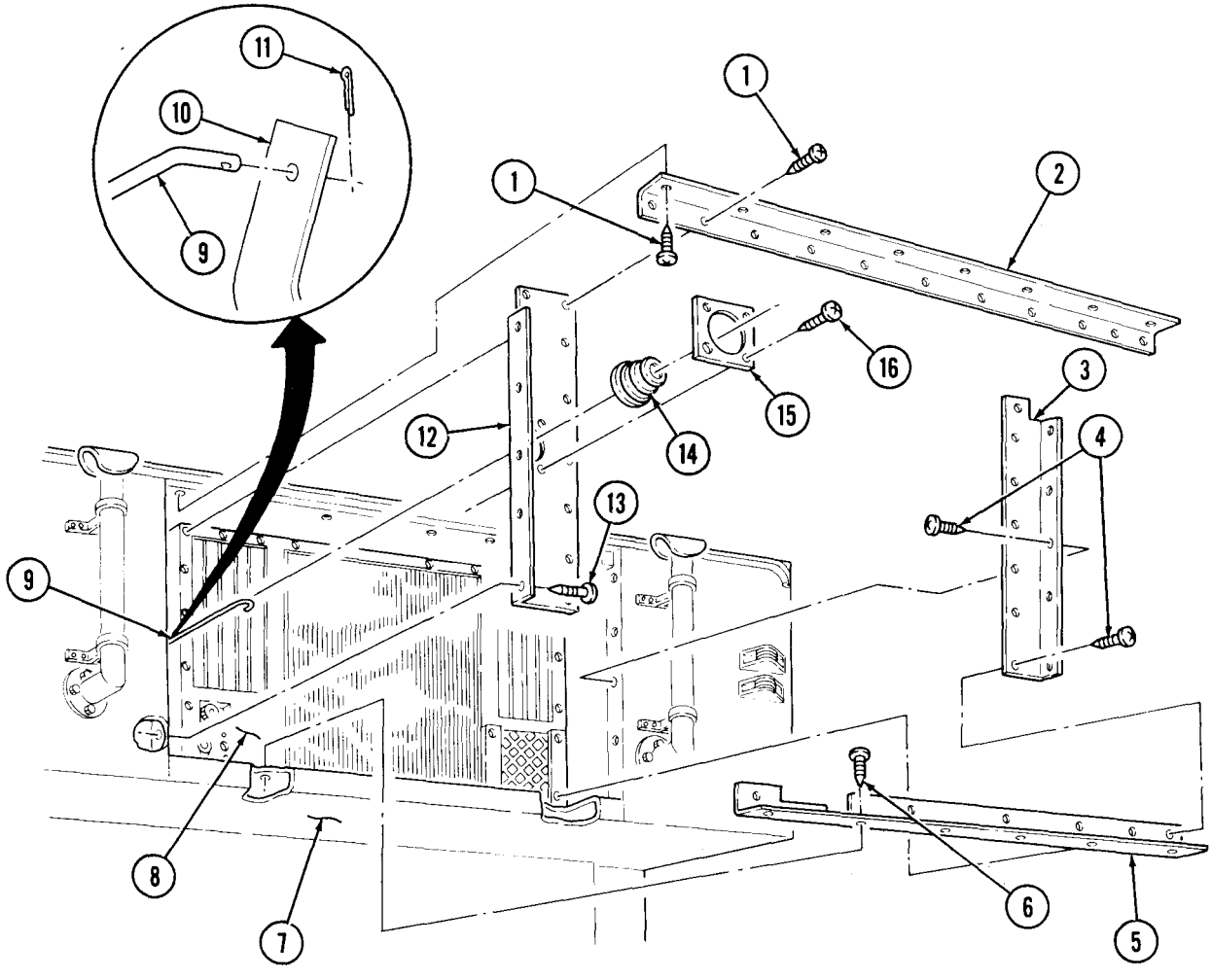


21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
27.		Right enclosure (3)	Install on bonnet (7) and air conditioner (8) with ten screws (4).	
28.		Bellows (14)	Install on left enclosure (12) with plate (15) and four screws (16).	
29.		Door rod (9)	Install on swing arm (10) with new cotter pin (11).	
30.		Left enclosure (12)	Install on bonnet (7) and air conditioner (8) with ten screws (13).	Ensure door rod (9) is positioned through bellows (14).
31.		Bottom enclosure (5)	Install on bonnet (7) and air conditioner (8) with seven screws (6).	
32.		Top enclosure (2)	Install on bonnet (7) and air conditioner (1) with sixteen screws	

21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS

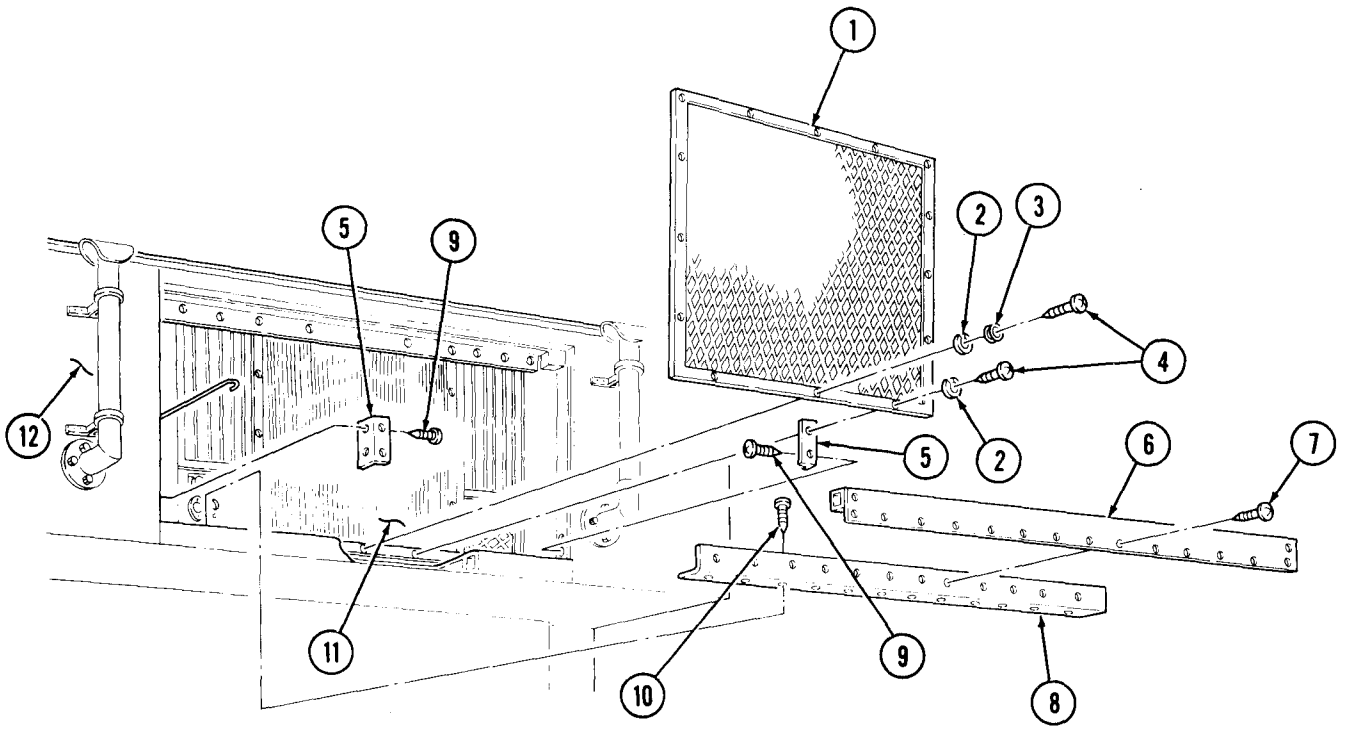


21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS
		NOTE Screw quantity for steps 31, 33, and 34 may differ from vehicle to vehicle. Install screws as recorded.		
31.		Condenser guard (1)	Install on air conditioner (11) with fourteen new lockwashers (2), snap (3), and fourteen screws (4).	
32.		Two mounting angles (5)	Install on bonnet (12) with four screws (9).	
33.		Lower panel mounting angle (8)	Install on bonnet (12) and two mounting angles (5) with twelve screws (10).	
34.		Lower angle bracket (6)	Install on bonnet (12) and two mounting angles (5) with sixteen screws (7).	

21-31. AIR CONDITIONER KIT REPLACEMENT (Cont'd)

STEP NO.	LOCATION	ITEM	ACTION	REMARKS



END OF TASK!

FOLLOW-ON TASKS: • Install bonnet door (para. 18.1-26).
- Install air conditioner drain tube (TM 9-2320-272-20-2).
- Connect ground cable (TM 9-2320-272-20-1).
- Connect external power source (TM 9-2320-272-10).
- Raise companion seat (TM 9-2320-272-10).
- Raise windshield (TM 9-2320-272-10).
- Install cab paulin and bows (TM 9-2320-272-10).

APPENDIX A
REFERENCES

A-1. INDEXES

The following indexes should be consulted frequently for latest changes to, or revisions of, references given in this appendix and for new publications or instructions relating to material covered in this manual.

a. Military Publications:

Consolidated Index of Army Publications and Blank Forms . . . . . DA PAM 310-1
Index of Army Equipment Modification Work Orders . . . . . DA PAM 310-10
Equipment Improvement Report and Maintenance Digest . . . . . TB 43-0001-39

b. General References:

Authorized Abbreviations and Brevity Codes . . . . . AR 310-50
Dictionary of United States Army Terms AR310-25
Military Symbols . . . . . FM 21-30
How to Prepare and Conduct Military Training . . . . . FM 21-6

A-2. SUPPLY CATALOGS

The following Department of the Army Supply Catalogs pertain to this manual:

Shop Equipment, Automotive Maintenance and Repair, Organizational: Common No. 2. (NSN 4910-00-754-0650) . . . . . SC 4910-95-CL-A72
Shop Equipment, Automotive Maintenance and Repair, Organizational: Common No. 1. (NSN 4910-00-754-0654) . . . . . SC 4910-95-CL-A74
Tool Set, Vehicle, Full Tracked, Organizational: Supplemental No. 2. (NSN 4940-00-754-0743) . . . . . SC 4940-95-CL-A08

A-3. FORMS

Refer to DA Pam 310-1 for index of blank forms. Refer to DA Pam 738-750 for pertinent maintenance forms and explanation on use.

DA Form 2028. Recommended Changes to Publications
DA Form 2401. Organizational Control Record for Equipment
DA Form 2402. Exchange Tag
DA Form 2404. Equipment Inspection and Maintenance Worksheet
DA Form 2405. Maintenance Request Register
DA Form 2406. Materiel Condition Status Report
DA Form 2407. Maintenance Request
DA Form 2407-1. Maintenance Request - Continuation Sheet
DA Form 2408. Equipment Log Assembly (Records)
DA Form 2408-9. Equipment Control Record
DA Form 2408-10. Equipment Component Register
DA Form 2409. Equipment Maintenance Log - (Consolidated)
DA Form 348. Equipment Operator's Qualification Record (Except Aircraft)
DA Form 285. U.S. Army Accident Investigation Report
DD Form 314. Preventive Maintenance Schedule and Record
DD Form 518. Accident - Identification Card
DD Form 1397. Processing and Reprocessing Record for Shipment, Storage, and Issue of Vehicles
Standard Form 46. U.S. Government Motor Vehicle Operator's Identification Card
Standard Form 91. Operator Report on Motor Vehicle Accidents
Standard Form 368. Quality Deficiency Report

A-4. OTHER PUBLICATIONS

The following publications contain information pertinent to major items, materiel, and associated equipment:

a. Vehicle

Direct and General Support Repair Parts and Special Tools Lists . . . . . TM 9-2320-272-34P
Lubrication Order-Truck, 5-Ton, 6x6, M939 Series . . . . . LO 9-2320-272-12
Organizational, Direct Support and General Support Maintenance Including Repair Parts and Special Tools List, Truck, 5-Ton, 6X6, M939A2 Series . . . . . TM 9-2320-358-24&P
Operator's Manual-Truck, 5-Ton, 6x6, M939 Series . . . . . TM 9-2320-272-10
Organizational Maintenance Manual, Truck, 5-Ton, 6x6, M939 Series . . . . . TM 9-2320-272-20-1
Organizational Maintenance Manual, Truck, 5-Ton, 6x6, M939 Series . . . . . TM 9-2320-272-20-2
Organizational Maintenance Repair Parts-Truck, 5-Ton, 6x6, M939 Series . . . . . TM 9-2320-272-20P
Transportability Guidance . . . . . TM 55-2320-260-15-1

b. Camouflage

Camouflage, Field Manufacturing Techniques . . . . . TM 5-200
Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Materials Handling Equipment . . . . . TB 43-0209

c. Decontamination

Chemical, Biological, and Radiological (CBR) Decontamination . . . . . TM 3-220
Chemical, Biological, Radiological, and Nuclear Defense . . . . . FM 21-40
Decontamination Apparatus, Portable, DS2 . . . . . TM 3-4230-204-12&P

d. General

Accident Reporting and Records . . . . . AR 385-40
Administrative Storage of Equipment . . . . . TM 740-90-1
Basic Cold Weather Manual . . . . . FM 31-70
Command Maintenance Management Inspections . . . . . AR 750-8
Cooling Systems, Tactical Vehicles . . . . . TM 750-254
Deep Water Fording of Ordnance Materiel . . . . . TM 9-238
Destruction of Tank-Automotive Equipment to Prevent Enemy Use . . . . . TM 750-244-6
Direct Support and General Support Maintenance Manual . . . . . TM 9-2920-243-30
Direct Support, General Support, and Depot Maintenance Manual . . . . . TM 9-2920-242-35
Direct Support, General Support, and Depot Maintenance Manual . . . . . TM 9-2920-248-35
First Aid for Soldiers . . . . . FM 21-11
Functional Grouping Codes . . . . . TB 750-93-1
General Repair for Clothing and Textiles . . . . . FM 10-267
Manual for the Wheeled Vehicle Driver . . . . . FM 21-305
Northern Operations . . . . . FM 31-71
Operation and Maintenance of Army Materiel in Extreme Cold Weather (0°F to -65°F) . . . . . FM 9-207
Operator, Organizational, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools List) . . . . . TM 9-4910-387-14&P
Operator's Manual:
Grinding Machine, Valve Face, Bench Mounting . . . . . TM 9-4910-484-10
Painting Instructions for Field Use . . . . . TM 43-0139
Petroleum Handling Equipment and Operations . . . . . FM 10-69
Prevention of Motor Vehicle Accidents . . . . . AR 385-55
Principles of Automotive Vehicles . . . . . TM 9-8000
Warranty Procedures for Cummins Engine and Allison Transmission . . . . . TB 9-2300-295-15/21

A-4. OTHER PUBLICATIONS (Cont'd)

e. Maintenance and Repair

Combat Vehicles and Tactical Support Vehicles:

Metal Body Repair ..... FM 43-2
Tactical Wheeled Vehicles: Repair of Frames ..... TB 9-2300-247-40

General Supply:

Care, Maintenance, and Repair of Pneumatic Tires, Inner Tubes, and Radial Tires ..... TM 9-2610-200-20
Chemical Agent Alarm Maintenance ..... TM 3-6665-225-12
Decontaminating Apparatus Maintenance ..... TM 3-4230-204-12&P
Description, Use, Bonding Techniques, and Properties of Adhesives ..... TB ORD 1032
Generator Assembly ..... TM 9-2920-225-34
Inspection and Classification of Tires ..... TM 9-2610-201-14
Inspection, Care, and Maintenance of Antifriction Bearings ..... TM 9-214
Lead-Acid Storage Battery Maintenance ..... TM 9-6140-200-14
Load-Testing Vehicles Used to Handle Missiles and Rockets ..... TB 9-352
Mandatory Brake Hose Inspection and Replacement ..... TB 9-2300-405-14
Materials Used for Cleaning, Preserving, Abrading, and Cementing ..... TM 9-247
Operator's Manual: Welding Theory and Application ..... TM 9-237
Safety Inspection and Testing of Lifting Devices ..... TB 43-0142
Simplified Test Equipment for Internal Combustion Engines ..... TM 9-4910-571-12&P
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems ..... TB 750-651
Winterization Kits for Army Tank-Automotive Materiel ..... SB 9-16

f. Shipment and Limited Storage

Administrative Storage of Equipment ..... TM 740-90-1
Color and Marking of Army Materiel ..... TB 43-0209
General Packing Instructions ..... TM 746-10
Marking for Shipment and Storage MIL-STD-129
Methods of Preservation MIL-P-116
Packaging of Materiel ..... AR 700-15
Preparation for Shipment and Storage of Basic Issue Items MIL-B-12841
Preservation, Packaging, and Packing of Military Supplies and Equipment ..... TM 38-230-1 and TM 38-230-2
Preservation, Packaging, and Packing of Materiels, Supplies, and Equipment Used by the Army ..... SB 38-100
Rail Car Loading Procedures ..... TM 55-601
Security of Tactical Wheeled Vehicles ..... TB 9-2300-422-20
Shipment and Limited Storage MIL-V-62038
Softwood Lumber MM-L-751
Standards for Oversea Shipment and Domestic Issue of Combat, Tactical, and Special Purpose Vehicles ..... TB 9-2300-281-35
The Army Maintenance Management System (TAMMS) ..... DA PAM 738-750

APPENDIX B

REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

Repair parts, special tools, and equipment for direct support and general support maintenance are listed in TM 9-2320-272-34P, which is the authority for requesting replacements.

APPENDIX C
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. SCOPE

This appendix lists expendable/durable supplies and materials you will need to maintain M939 series vehicles.

C-2. EXPLANATION OF COLUMNS

a. Item Number. This number is assigned to each entry in the listing and is referenced in applicable tasks under the heading of "Materials/Parts".

b. Level. This column identifies the lowest level of maintenance that requires the listed item. Codes used in this column are:

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance

c. National Stock Number. This is the national stock number assigned to the item. Use it to request or requisition that item.

d. Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item listing indicates the Federal Supply Code of Manufacturer (FSCM) in parentheses followed by the part number.

e. Federal Supply Code for Manufacturer (FSCM).

Code	Manufacturer
05972	Loctite Corp.
19207	U.S. Army Tank-Automotive Command
58536	Federal Commercial Item Description Promulgated by General Services Administration.
72932	Gulf Oil Corp.
77247	Permatex Co., Inc
78500	Rockwell Int. Corp.
79819	M.S. Ginn Co.
80244	General Services Administration
81348	Federal Specifications
81349	Military Standards
81755	General Dynamics Corp.
96906	Military Standards
97403	U.S. Army Mobility Research and Development Center
98308	Bray Oil Co., Inc.

f. Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by an abbreviation; EA (each), OZ (ounce), GAL. (gallon). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
1	O	8040-00-262-9005	ADHESIVE: synthetic rubber, MMM-A-1617, type II, 1 gallon can (79819) 1357	GAL.
2	F	8030-01-135-0685	ADHESIVE SEALANT: anaerobic threadlock, medium strength, MIL-S-461 type II, grade N, Loctite 242, 50 ml (05972) 24231	ML
3	F	8030-00-251-3980	ANTISEIZE COMPOUND: temperature resistant lubricant, MIL-A-907, Loctite anti-seize, 2000°F, 1 lb can with brush top (05972) 76764	LB
4	F	6850-00-974-3738	CALIBRATING FLUID: gulf 45A, 55 gallon drum (72932) 45A	GAL.
5	O	5340-00-450-5718	CAP AND PLUG SET: (19207) 10935405	SET
6	F	5350-00-221-0872	CLOTH: abrasive (crocus), 9 in. x 11 in. sheets, 50 sheets/package (58536) A-A-1206 type I	PG
7	O	7920-00-044-9281	CLOTH: cleaning, lint-free, general purpose, white, 10 lb box (81349) MIL-C-85043	LB
8	O	8010-01-160-6741	COATING: aliphatic, polyurethane, chemical agent resistant, green 383, MIL-C-46168C, type II, 1 gallon can (19207) 5584154	GAL.
9	F	9150-00-265-9406	CUTTING FLUID: 1 gallon can (81348) C-O-376	GAL.
10	O	7930-00-282-9699	DETERGENT: nonsudsing, general purpose, liquid, 1 gallon (80244) MIL-D-16791 type I	GAL.
11	O	9150-00-190-0905	GAA GREASE: automotive and artillery, (MIL-G- 6-1/2 lb can (98308) BRAYCO TE610	LB

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
12	F	8040-00-664-4134	GASKET COMPOUND: shellac, heavy-bodied, hard setting, liquid sealant, 2 ounce bottle with applicator (77247) 5J	OZ
13	O	5330-01-052-5759	GASKET SEALANT: silicone rubber, general purpose, MIL-A-46106, type I, Silastic 732 RTV (black), 5 ounce tube (78500) 1199-T-3842	OZ
14	F	5350-00-271-5966	LAPPING AND GRINDING COMPOUND: valve-grinding compound, grease-mixed, grit 120 coarse, 1 lb can (58536) A-A-1203 type I	LB
15	F	5350-00-193-1341	LAPPING AND GRINDING COMPOUND: valve-grinding compound, grease-mixed, grit 220 fine, 1 lb can (58536) A-A-1203 type I	LB
16	C	9150-00-189-6727	OIL: lubricating, internal combustion engine, tactical service, OE/HDO 10, 1 quart can (81349) MIL-L-2104	QT
17	C	9150-00-186-6681	OIL: lubricating, internal combustion engine, tactical service, OE/HDO 30, 1 quart can (81349) MIL-L-2104	QT
18	C	9150-01-035-5392	OIL: lubricating, gear, GO 80/90, 1 quart can (81349) MIL-L-2105	QT
19	F	9150-00-250-0933	PETROLATUM: technical, oil- soluble grease (Vaseline) 7-1/2 lb can (81348) VV-P-236	LB
20	F	8010-00-247-4334	PIGMENT: iron, blue, oil base (substitute for prussian blue), 1/2 pint can (81348) TT-P-381	PT
21	O	5975-00-111-3208	PLASTIC STRAP: tiedown, self-locking, type I, class 1, 5 inches long (96906) MS3367-5-9	EA

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
22	0	5975-00-570-9598	PLASTIC STRAP: tiedown, self-locking, type I, class 1, 10 inches long (96906) MS3367-7-9	EA
23	0	7920-00-205-1711	RAG: wiping, unbleached cotton and cotton-synthetic, mixed colors, 50 lb bale (58536) A-A-531	LB
24	F	8030-00-111-6404	SEALING COMPOUND: anaerobic, retaining, MIL-R-46082, type II, Loctite RC/640, 50 ml (05972) 64031	ML
25	F	8030-00-247-2525	SEALING COMPOUND: hardening, MIL-S-45180, type 1, Permatex no. 1, 11 ounce tube (77247) FORMAGASKET 1	OZ
26	0	8030-00-252-3391	SEALING COMPOUND: nonhardening, MIL-S-45180, type II, Permatex no. 2, 11 ounce tube (77247) FORMAGASKET 2	OZ
27	F	8030-00-656-1426	SEALING COMPOUND: nonhardening, MIL-S-45180, type III, Permatex no. 3, 1 pint can (77247) FORMAGASKET 3	PT
28	F	8030-00-503-0316	SEALING COMPOUND: nonhardening, Permatex no. 51H (pipe joint compound), 4 ounce can (77247) 51H	OZ
29	0	3439-00-224-3567	SOLDER: rosin core, 60/40, 0.094 in. dia., 5 lb spool (81348) QQ-S-571	LB
30	0	8030-00-889-3535	TAPE: antiseizing, white, MIL-T-27730, 260 in. long x 1/2 in. wide x 0.0035 in. thick, spool in snap-on shell (81755) P5025-2R	EA
31	F	7510-00-290-2023	TAPE: masking, 60 yards/roll, 1/2 inch wide, manila in color, A-A-883 type II (81348) PPP-T-42	EA
32	0	4020-00-291-5901	TWINE: cotton (string) 375 yds, 16 ply (81348) T-T-871 type 1	EA

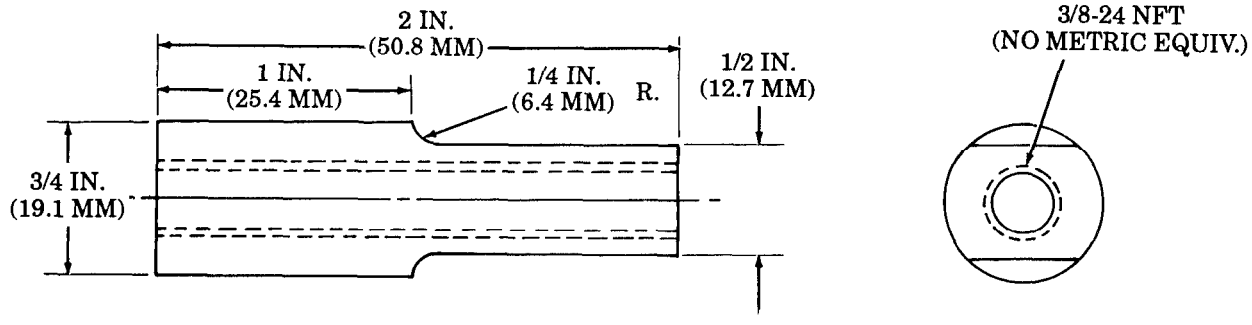
Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
33	F	5510-00-270-6031	WOOD: laminated, decking, red or white oak, MIL-W-39 treated with preservative TT-W-572, 228 in. x 11.5 in. x 1.12 in. (97403) 12319E0079	EA
34	F	8010-00-239-5736	WHITE LEAD: basic carbonate, paste in oil, 1 lb can (96906) MS35599-1 type B	LB
35	F	8030-00-222-0503	WOOD PRESERVATIVE: 1 gallon can (81349) MIL-S-13518	GAL.
36	F	9505-00-198-9125	WIRE: non-electric, iron, 1 lb roll (80244) 22-W-1642-125-36	LB
37	F	8030-00-682-6745	SEALING COMPOUND: Type I (81349) MIL-C-18255	SE
38	F	0010-00-145-8312	PRIMER: zinc chromate (81348) Spec TT-P-1757	PT
39	F	0040-00-142-9193	TAPE: adhesive (81349) Spec MIL-A-46050	BX
40	F	5330-00-069-3321	CORK: Type IB, Class 2 (81348) Spec HH-C-576	EA

APPENDIX D

ILLUSTRATED LIST OF MANUFACTURED ITEMS

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct and general support maintenance levels.



NOTES:

1. Fabricate from mild tool steel bar NSN 9510-00-043-1493.
2. Make and finish per diagram above.
3. All dimensions ± 0.030 in. (0.76 mm).

Figure 1. Flange Puller Standoff

APPENDIX E

TORQUE LIMITS

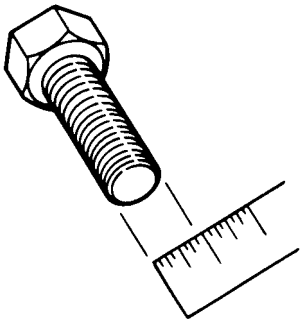
E-1. GENERAL

This section provides general torque limits for screws used on the M939 series vehicles. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal bracket then tighten it one more turn.

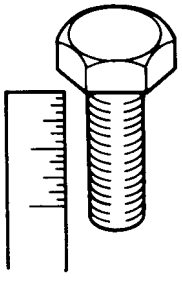
E-2. TORQUE LIMITS

Table F-1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table F-2 lists wet torque limits. Wet torque limits are used on screws that have high pressure lubricants applied to the threads.

E-3. HOW TO USE TORQUE TABLE



a. Measure the diameter of the screw you are installing.



b. Count the number of threads per inch.

c. Under the heading SIZE, look down the left hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).

d. In the second column under SIZE, find the number of threads per inch that matches the number of threads you counted in step b.

CAPSCREW HEAD MARKINGS

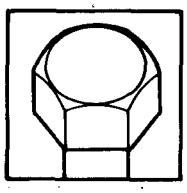
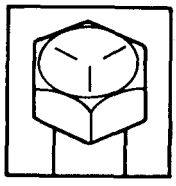
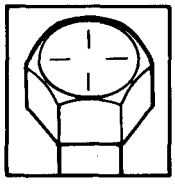
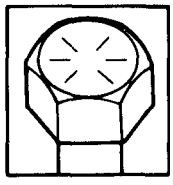
Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).

e. To find the grade screw you are installing, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the torque table.

f. Look down the column under the picture you found in step e. until you find the torque limit (in lb-ft or N·m) for the diameter and threads per inch of the screw you are installing.

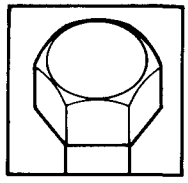
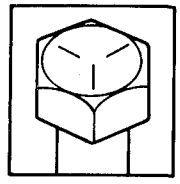
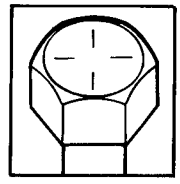
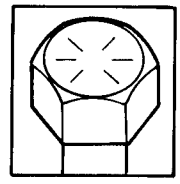
TA 350781

Table E-1. Torque limits for Dry Fasteners

CAPSCREW HEAD MARKINGS										
SIZE			TORQUE							
			SAE GRADE NO. 1 or 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
1/4	20	6.35	5	6.78	8	10.85	10	13.56	12	16.27
1/4	28	6.35	6	8.14	10	13.56	–	–	14	18.98
5/16	18	7.94	11	14.92	17	23.05	19	25.76	24	32.52
5/16	24	7.94	13	17.63	19	25.76	–	—	27	36.61
3/8	16	9.53	18	24.41	31	42.04	34	46.10	44	59.66
3/8	24	9.53	20	27.12	35	47.46	—	—	49	66.44
7/16	14	11.11	28	37.97	49	66.44	55	74.58	70	94.92
7/16	20	-	30	40.68	55	74.58	–	–	78	105.77
1/2	13	12.70	39	52.88	75	101.70	85	115.26	105	142.38
1/2	20	-	41	55.60	85	115.26	–	-	120	162.78
9/16	12	14.29	51	69.16	110	149.16	120	162.72	155	210.18
9/16	18	-	55	74.58	120	162.72	—	–	170	230.52
5/8	11	15.88	63	85.43	150	203.40	167	226.45	210	284.76
5/8	18	-	95	128.82	170	230.52	–	–	240	325.44
3/4	10	19.05	105	142.38	270	366.12	280	379.68	375	508.50
3/4	16	-	115	155.94	295	400.02	–	—	420	596.52
7/8	9	22.23	160	216.96	395	535.62	440	596.64	605	820.38
7/8	14	-	175	237.30	435	589.86	–	—	675	915.30
1	8	25.40	235	318.66	590	800.04	660	894.96	910	1233.96
1	14	-	250	339.00	660	894.96	–	–	990	1342.44
1-1/8	-	25.58	–	–	800-880	1084.8 - 1193.3	–	–	1280-1440	1735.7 - 1952.8
1-1/4	-	31.75	–	–	–	–	–	–	1820-2000	2467.9 - 2712.0
1-3/8	–	34.93	–	–	1460-1680	1979.8 - 2278.1	–	–	2380-2720	3227.3 - 3688.3
1-1/2	–	38.10	–	–	1940-2200	2630.6 - 2983.2	–	–	3160-3560	4285.0 - 4827.4

TA 350782

Table E-2. Torque Limits for Wet Fasteners

CAPSCREW HEAD MARKINGS										
SIZE			TORQUE							
			SAE GRADE NO. 1 or 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
1/4	20	6.35	4.9	6.10	7.2	9.76	9.0	12.20	10.8	14.64
1/4	28	6.35	5.4	7.33	9.0	12.20	–	-	12.6	17.08
5/16	18	7.94	9.9	13.34	15.3	22.54	17.1	23.18	21.6	29.27
5/16	24	7.94	11.7	15.87	17.1	23.18	-	-	24.3	32.95
3/8	16	9.53	16.2	21.97	27.9	37.84	30.6	41.49	39.6	53.69
3/8	24	9.53	18.0	24.41	31.5	42.71	–	-	44.1	59.80
7/16	14	11.11	25.2	34.17	44.1	59.80	49.5	67.12	63.0	85.42
7/16	20	-	27.0	36.61	49.5	67.12	-	–	70.2	95.19
1/2	13	12.70	35.1	47.59	67.5	91.53	76.5	103.73	94.5	128.14
1/2	20	-	36.9	50.04	76.5	103.73	–	–	108.0	146.50
9/16	12	14.29	45.9	62.24	99.0	134.24	108.0	146.45	139.5	189.16
9/16	18	-	49.5	67.12	108.0	146.45	–	-	153.0	207.47
5/8	11	15.88	56.7	76.89	135.0	183.06	150.3	203.80	189.0	256.28
5/8	18	-	85.5	115.94	153.0	207.47	–	–	216.0	296.90
3/4	10	19.05	94.5	128.14	243.0	329.51	252.0	341.71	337.5	457.65
3/4	16	-	103.5	140.35	265.5	360.02	–	-	378.0	536.87
7/8	9	22.23	144.0	195.26	355.5	482.06	396.0	536.98	544.5	738.34
7/8	14	-	157.5	213.57	391.5	530.87	-	-	607.5	823.77
1	8	25.40	211.5	286.79	531.0	720.04	594.0	805.46	819.0	1110.56
1	14	-	225.0	305.10	594.0	805.46	-	–	891.0	1208.20
1-1/8	–	25.58	–	–	720.0-792.0	976.32-1073.97	–	–	1152.0-1296.0	1562.13-1757.52
1-1/4	-	31.75	–	–	–	-	–	–	-	2221.11-2440.80
1-3/8	-	34.93	–	–	1314.0-1512.0	1781.82-2050.29	-	-	2142.0-2448.0	2904.57-3319.47
1-1/2	-	38.10	–	-	1746.0-1980.0	2367.54-2684.88	-	-	2844.0-3204.0	3856.5 -4344.66

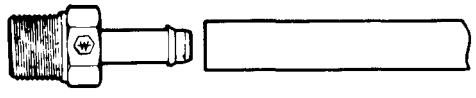
TA 350783

APPENDIX E (Cont'd)

Tubing Application Tightening Assembly Instructions

Slide tubing over barbed insert until bottomed on fitting.

MINI-BARB



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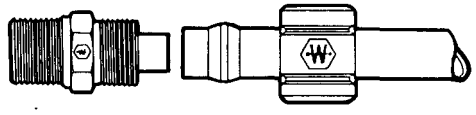
1. Slide nut and then sleeve on tubing.
2. Slide I.D. of tubing onto fitting insert until it bottoms.
3. Assemble nut to fitting body.
4. Tighten assembly finger tight to cover body threads.

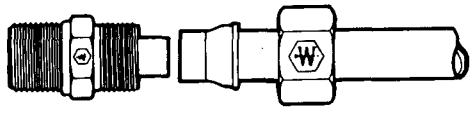
KNURL-ON



---

1. Slide nut and then sleeve on tubing.
2. Slide I.D. of tubing onto fitting insert until it bottoms.
3. Assemble nut to fitting body.
4. Tighten nut finger tight. From that point, tighten with a wrench two complete turns.

SELF-ALINE-PTF



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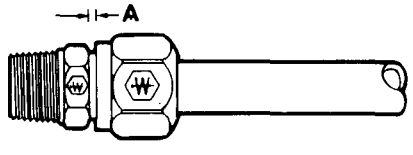
1. Cut tubing to desired length. Make sure that the ends are cut reasonably square.
2. Slide tubing into the preassembled fitting and push until tube bottoms.
3. Tighten nut as indicated in chart. Another check on proper assembly is dimension "A" when nut is fully tightened.

DISASSEMBLY - Remove nut and pull tubing out of fitting body. Insert will remain in tubing.

REASSEMBLY - Push tubing and insert into fitting body until it bottoms. Thread nut onto fitting body and tighten as in step 3.

NYLON TUBING
FOR AIR BRAKE



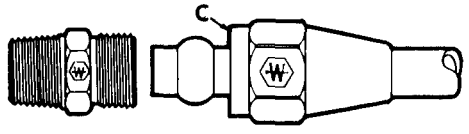
TUBE O.D.	TIGHTEN NUT TO:	A
1/4	85 - 115 lb-in (10 - 13 N·m)	.085/.105
3/8	12 - 17 lb-ft (16 - 23 N·m)	.125/.145
1/2	25 - 33 lb-ft (34 - 45 N·m)	.100/.120
5/8	26 - 35 lb-ft (35 - 47 N·m)	.115/.135
3/4	38 - 50 lb-ft (52 - 68 N·m)	.180/.200

TA 350784

APPENDIX E (Cont'd)

1. Slide nut and then sleeve on tubing. Threaded end of nut (C) must face out.
2. Insert tubing into fitting. Be sure tubing is bottomed on fitting shoulder.
3. Thread nut onto fitting body until it is hand tight.
4. From that point, tighten with a wrench the number of turns indicated right.

COPPER TUBING
FOR AIR BRAKE



TUBE SIZE	ADDITIONAL NUMBER OF TURNS FROM HAND TIGHT
1/4, 3/8	1-3/4
1/2, 5/8, 3/4	3-1/4

INDEX

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18-78	18-27, Item, B-12		
19-8	19-4, Action B-13		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Reads: Motor body (5), front Cover (1), and front Cover (6)

Should read: Motor body (5), front Cover (1), and rear Cover (6)

Reads: Disconnect.

Should read: Remove.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBERS
Your Name, Rank, and Phone

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches
1 Kilometer = 1,000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
1 Kilogram = 1,000 Grams = 2.2 Lb
1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

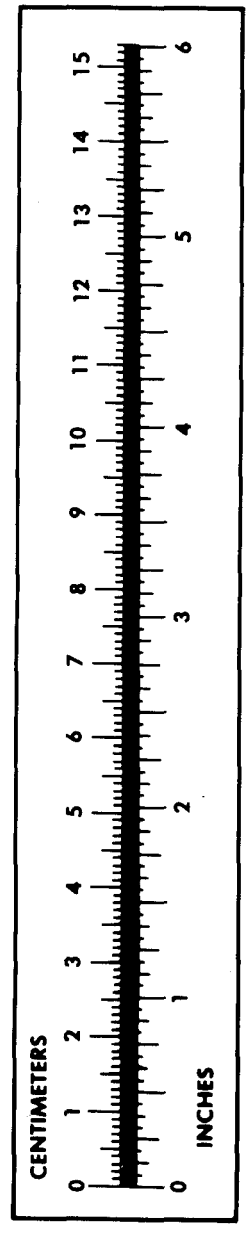
TEMPERATURE

5/9 (°F -32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Cesius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32 = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Kilopascals	6.895
Miles Per Gallon	Kilometers Per Liter	0.425
Miles Per Hour	Kilometers Per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621



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