

TM 9-2355-106-23-3

MAINTENANCE MANUAL

VOLUME 3 OF 3

COMMERCIAL OFF-THE-SHELF (COTS)

for

INTERNATIONAL

MINE RESISTANT VEHICLE

CATEGORY I

2355-01-553-4634

CATEGORY II

2355-01-553-4636

Manufactured by

International Military and Government, L.L.C.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve procedures, please let us know. Mail comments directly to: PM-MRAP, AMSTA-LC-GMM, 6501 E. 11 Mile Road, Warren, MI 48397-5000.

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TM 9-2355-106-23-3
TABLE OF CONTENTS

Chapter 4 MAINTENANCE INSTRUCTIONS - Continued

4-7	Transfer Case	649
4-7.1	Transfer Case Cooling Hose Replacement	649
4-7.2	Transfer Case Drain/Fill Procedure	652
4-7.3	Transfer Case Breather Replacement	655
4-7.4	Prop Shaft Replacement.....	657
4-7.5	Transfer Case Oil Cooler Replacement.....	660
4-7.6	Transfer Case Assembly Replacement	663
4-7.7	Transfer Case Shift Sensor and Air Lines Replacement	667
4-8	Axles	669
4-8.1	Wheel Hub Replacement.....	669
4-8.2	Rear Axle Outer Hub Drain/Fill Procedure	677
4-8.3	Hub Seal Replacement.....	679
4-8.4	Front Differential Assembly Replacement	683
4-8.5	Rear Differential Assembly Replacement.....	690
4-8.6	Axle-Differential Drain/Fill Procedure.....	696
4-8.7	Inner Hub Seal Replacement.....	698
4-8.8	Axle Alignment Procedure	702
4-8.9	Rear Axle Shaft Replacement and Bearing Adjustment.....	709
4-8.10	Front Axle Shaft and Universal Joint Assembly Replacement	716
4-8.11	Rear Drive Axle Gasket Replacement	722
4-8.12	Rear Axle Assembly Replacement	728
4-8.13	Front Axle Assembly Replacement.....	731
4-9	Brakes.....	739
4-9.1	Air Dryer Replacement	739
4-9.2	Air Dryer Filter Replacement	741
4-9.3	Air Governor Replacement	744
4-9.4	Air Governor Adjustment	747
4-9.5	Air Lines and Air Hose Replacement.....	750
4-9.6	Air Reservoir Replacement.....	752
4-9.7	ABS Sensor Replacement	754
4-9.8	Air Line Grommet Replacement	757
4-9.9	Brake Chamber Replacement	761
4-9.10	Brake Inspection and Adjustment.....	765
4-9.11	Service Brake Double Check Valve Replacement	768
4-9.12	ABS Modulator Valve Replacement	770
4-9.13	Brake Shoe Replacement.....	773
4-9.14	Brake Drum Replacement	777
4-9.15	ABS Control Module Re-Calibration, Testing, and Replacement.....	782
4-9.16	Brake S-Cam Shaft Service and Replacement	788
4-9.17	Hand Brake Control Valve Replacement.....	798
4-9.18	Brake Pedal Replacement.....	802
4-10	Wheels	805
4-10.1	Wheel/Tire Replacement	805
4-11	Steering.....	807
4-11.1	Tie Rod Replacement	807
4-11.2	Steering Bracket Replacement.....	812
4-11.3	Steering Shaft Replacement.....	816
4-11.4	Steering Arm Replacement.....	818
4-11.5	Pitman Arm Replacement.....	824
4-11.6	Spindle and Bearing Replacement	834
4-11.7	Steering Gear Replacement	843
4-11.8	Steering Column Replacement.....	846

TM 9-2355-106-23-3
TABLE OF CONTENTS

4-11.9	Steering Wheel and Clock Spring Replacement	853
4-11.10	Steering Drag Link Replacement.....	861
4-11.11	Power Steering Reservoir Replacement	864
4-11.12	Power Steering Tubing and Hose Replacement	868
4-11.13	Power Steering Reservoir Drain/Fill Procedure.....	871
4-11.14	Power Steering Filter and Filter Head Replacement	873
4-12	Frame.....	875
4-12.1	Pintle Hook Replacement	875
4-12.2	Tow Shackle Replacement.....	878
4-12.3	Winch Cable Replacement	881
4-12.4	Winch Replacement.....	885
4-12.5	Gladhands Replacement	888
4-12.6	Frame Support Bolts Replacement.....	890
4-13	Suspension	893
4-13.1	Shock Absorber Replacement	893
4-13.2	Leaf Spring Brackets Replacement	896
4-13.3	Leaf Spring Bushing Replacement	902
4-13.4	Bounce Stops (Front) Replacement	909
4-13.5	Rear Auxiliary Overload Spring Replacement	911
4-13.6	Upper and Lower King Pin (Bushings) Replacement	917
4-14	Cab and Body	925
4-14.1	Crew and Front Passenger Seat Replacement	925
4-14.2	Drivers Seat Replacement.....	928
4-14.3	Seat Cushion Replacement	932
4-14.4	Seat Belt Replacement	934
4-14.5	Stowage Box Replacement	937
4-14.6	Door Replacement.....	943
4-14.7	Door Mounted Mirror Replacement	949
4-14.8	Fender Mirror Replacement.....	951
4-14.9	Mirror Glass Replacement.....	954
4-14.10	Cab Door Exterior Handle Assembly Replacement.....	956
4-14.11	Cab Door Interior Handle Assembly Replacement.....	960
4-14.12	Cab Door Combat Lock Assembly Replacement	963
4-14.13	Weapon (Sliding) Hatch Replacement (Gunner's Hatch).....	968
4-14.14	Weapon (Sliding) Hatch Inner Lock Assembly Replacement.....	971
4-14.15	Cabin Emergency Hatch Replacement	976
4-14.16	Gun Port Replacement	980
4-14.17	Cabin Emergency Hatch Handle/Lock Assembly Replacement.....	983
4-14.18	Rear Door/Ramp Assembly Replacement.....	985
4-14.19	Bottom Ramp Step Replacement	988
4-14.20	Rear Door Lock Assembly Replacement.....	990
4-14.21	Rear Door Hydraulic Assist Replacement	994
4-14.22	Rear Door Hydraulic Reservoir Replacement	1001
4-14.23	Rear Door Hydraulic Pump Replacement	1004
4-14.24	Rear Door Hose Replacement.....	1008
4-14.25	Windshield and Body Window Replacement.....	1010
4-14.26	Cab Mount Replacement.....	1015
4-14.27	Hood/Fender Latch Replacement.....	1019
4-14.28	Hood Tilt Mount Removal and Replacement.....	1022
4-14.29	Hood Assembly Replacement	1024
4-14.30	Armor Grill Replacement	1031
4-14.31	Left Side Engine Armor Plate	1034
4-14.32	Right Side Armor Plate	1036
4-14.33	Body Panels Exterior Armor Plating Replacement.....	1038
4-14.34	Step Replacement	1042
4-14.35	Exterior Battery Box/Fuel Tank Armor Door Replacement.....	1044

TM 9-2355-106-23-3
TABLE OF CONTENTS

4-14.36	Belly Armor Replacement	1047
4-15	Other	1059
4-15.1	Windshield Wiper Motor Linkage and Transmission Assembly Replacement	1059
4-15.2	Windshield Wiper Arm and Blade Replacement.....	1062
4-15.3	Windshield Washer Reservoir and Pump Motor Replacement	1065
4-15.4	FSS Engine Compartment Sensor Replacement.....	1068
4-15.5	FSS Cab/Crew Compartment Sensor Replacement	1072
4-15.6	Fire Suppression System (FSS) - Fire Extinguisher, Dispersion Units, and Pipe Replacement	1075
4-15.7	Air Conditioner Compressor Replacement	1079
4-15.8	A/C Belt Replacement	1082
4-15.9	Air Conditioner Service/Recharge Procedure.....	1085
4-15.10	Air Conditioner Condenser Fan/Motor Replacement.....	1089
4-15.11	Air Conditioner Receiver/Dryer Replacement.....	1097
4-15.12	Air Conditioner Hose Replacement	1101
4-15.13	Air Conditioner Service Port/Schrader Valve Replacement	1105
4-15.14	Heater Replacement.....	1109
4-15.15	LSS Blower Motor Replacement.....	1115
4-15.16	HVAC/LSS Control (Air Conditioner Thermo Switch) Replacement.....	1118
4-15.17	Expansion Valve Replacement.....	1121
4-15.18	NBC/LSS Filter Replacement	1123
4-15.19	Overpressure System Replacement.....	1127
4-16	Weapon Station and Equipment.....	1130
4-16.1	Gunner's Platform/Stand Replacement	1130
4-16.2	Rifle Racks Replacement	1133
4-17	Preparation for Shipment.....	1135
Chapter 5	SUPPORTING INFORMATION	1138
5-1	General	1138
5-2	Maintenance Functions.....	1138
5-3	Explanation of Columns in Section II.....	1139
5-4	Explanation Of Columns in Tool and Test Equipment Requirements, Section III	1140
5-5	Explanation of Columns in Remarks, Section IV	1140
5-6	Expendable and Durable Items List.....	1161

Chapter 4 – MAINTENANCE INSTRUCTIONS

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7 Transfer Case

4-7.1 Transfer Case Cooling Hose Replacement

TRANSFER CASE COOLING HOSE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SETUP		
<p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Hose, flexible transfer case air to oil (2) Cable lock strap (2) Adapter (2)</p>	<p><u>Equipment Condition</u> Parking Brake Set Battery Disconnect Switch OFF Engine OFF Wheels chocked</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Remove wheel chocks Check and refill transfer case oil level as required</p>	



During normal vehicle operation the transfer case can become very hot. Allow transfer case to cool prior to servicing the hose. Failure to comply may result in serious injury to personnel.

When removing first hose fitting, break connection loose slowly and let any pressure release before removing connection. Failure to comply may result in serious injury.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove and discard cable lock straps from transfer case hoses.

NOTE

Note the orientation and routing of the two transfer case hoses. One hose goes to the upper oil cooler housing fitting. The other hose goes to the lower oil cooler housing fitting.

2. Remove and discard transfer case hose and adapters from the transfer case and the upper input on oil cooler fitting.
3. Remove and discard transfer case hose and adapters from the transfer case and the lower input on oil cooler fitting.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new transfer hose to transfer case.
2. Install other end of new transfer hose with adapter to upper fitting of oil cooler.
3. Install new transfer hose to transfer case.
4. Install other end of new transfer hose (1) with adapter to lower fitting of oil cooler.
5. Install new cable lock straps to secure hose and hose.



Assure that FSS hoses are secured to the transfer case cooling hoses. Failure to secure FSS hoses could result in damage to FSS system.

c) Follow-On Maintenance

1. Check transfer case oil level and refill as necessary using the transfer case drain/fill procedures.
2. Close all transfer drain cocks.
3. Remove wheel chocks.
4. Remove vehicle from jack stands.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7.2 Transfer Case Drain/Fill Procedure

TRANSFER CASE DRAIN/FILL		
This task covers:		
a) Drain	b) Fill	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> ½" Drive Torque Wrench (0-100 ft-lb)</p> <p><u>Material/Parts</u> Transfer Case Fluid</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p>	<p><u>Equipment Condition</u> Parking Brake Set Battery Disconnect Switch OFF Transmission in NEUTRAL (N) Engine OFF Wheels chocked</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Drain Pan Rags</p> <p><u>Follow-On Maintenance</u> Dispose of Used Oil</p>	



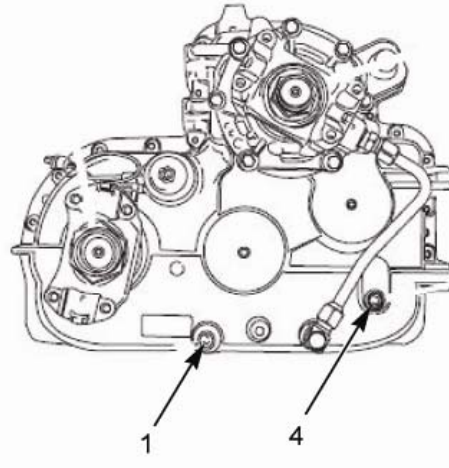
Avoid contact with the hot fluid or the sump when draining transmission fluid. Direct contact with the hot fluid or the sump may result in bodily damage.

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent from moving. Serious personal injury and damage to components can result.

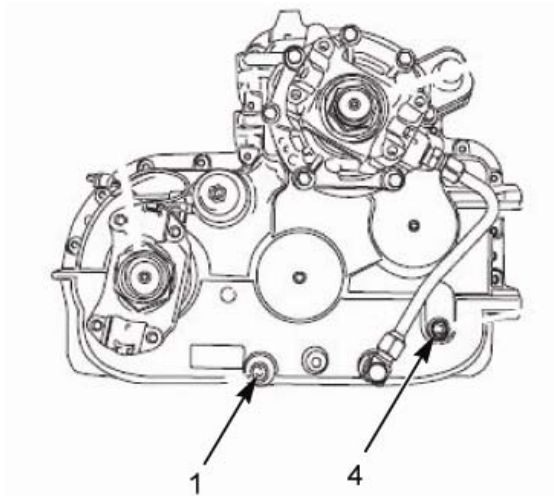
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Drain



1. Park the vehicle on a level surface. Place blocks under the wheels not being raised to keep the vehicle from moving.
2. Raise the vehicle so that the area to be serviced is off the ground.
3. Place a large container under the transfer case.
4. Remove the magnetic drain plug (1) from the bottom of the transfer case. Drain and discard the oil correctly. Clean the magnetic drain plug.

b) Fill



DO NOT use 80/90 Non-Synthetic or other improper fluid when filling the transfer case. Failure to comply could cause immediate damage to transfer case.

1. Install the magnetic drain plug (1) and tighten to 48-68 lb-ft (35-50 N•m).
2. Remove the fill plug (4) and fill the transfer case with 4.5 Quarts of SAE Grade 50W Synthetic oil.

Chapter 4 – MAINTENANCE INSTRUCTIONS

3. Tighten fill plug (4) to 48-68 lb-ft (35-50 N•m).

c) Follow-On Maintenance

1. Remove wheel chocks.
2. Dispose of used oil in accordance with local regulations.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7.3 Transfer Case Breather Replacement

TRANSFER CASE BREATHER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		
<u>Special Tools</u>		<u>Equipment Required</u>
None		Rags
<u>Personnel</u>		<u>Equipment Conditions</u>
One (1) Wheeled Vehicle Mechanic		Engine OFF
<u>Material Parts</u>		Battery Disconnect Switch OFF
Transfer case breather		Parking brake set
Loctite		Transmission set in NEUTRAL (N)
		Wheels chocked
		<u>Reference</u>
		Parts Manual
		<u>Follow-On Maintenance</u>
		Battery Disconnect Switch ON
		Check Oil level
		Start engine
		Verify operation of transfer case
		Shut engine OFF
		Battery Disconnect Switch OFF
		Remove wheel chocks

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles, work gloves, making sure vehicle has parking brake set, transmission and transfer case in neutral (N), wheels chocked. Transfer case and oil may be hot if vehicle has been driven, use extreme caution when opening drain valves and un-bolting bolts. Hot fluid and parts can burn through layers of skin quickly. Failure to comply may result in damage to equipment and or serious burns, injury or death to personnel.



1. With 7/16" wrench loosen breather (1) and remove slowly.
2. Wipe up and spills and discard breather (1).

b) Installation

1. Apply Loctite to threads of new breather (1).
2. When installing new breather, ensure that you do not crossthead threads. This will cause transfer case to leak.
3. Install new breather and tighten.

c) Follow-On Maintenance

1. Check transfer case oil level.
2. Battery Disconnect Switch ON.
3. Start vehicle.
4. Verify operation of transfer case.
5. Shut engine OFF.
6. Battery Disconnect Switch OFF.
7. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7.4 Prop Shaft Replacement

PROP SHAFT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) Prop Shaft (as needed)</p>	<p><u>Equipment Condition</u> Engine OFF Wheels chocked Battery Disconnect Switch OFF Belly Armor Removed (as required)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u></p> <p><u>Follow-On Maintenance</u> Test drive vehicle</p>	



To avoid property damage, personal injury, or death, park the vehicle on a flat level surface, set the parking brake, turn the engine off, and chock the wheels.

To avoid personal injury or death use a jack stand or equivalent support under the prop shaft during the removal and installation procedure.

System components become extremely hot during normal operation. Use extreme care when working around hot components. Failure to comply may result in injury to personnel.

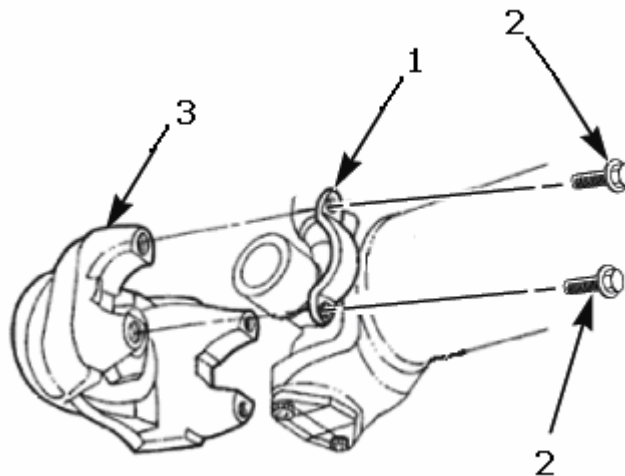
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

NOTE

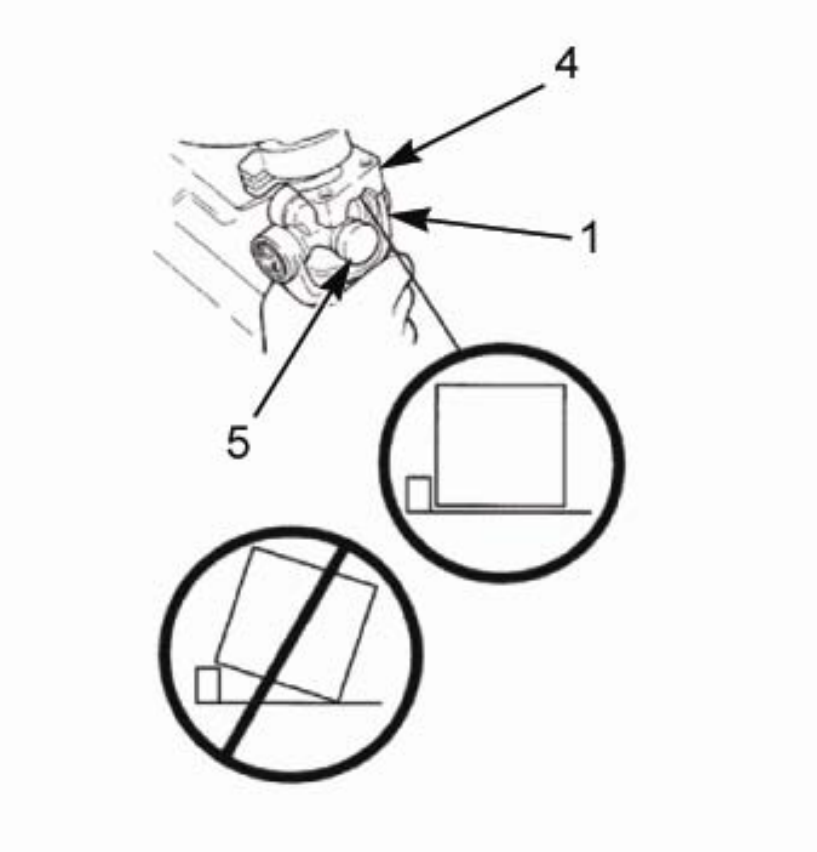
Belly Armor must be removed to replace transmission to transfer case prop shaft, and transfer case to front axle prop shaft.

1. Remove the two bearing straps (1) and the four mounting bolts (2) from the forward/rear output yokes (3).
2. Repeat step 2 for the other end of the prop shaft.
3. Remove the Prop Shaft from the vehicle.



Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install the new prop shaft, using bearing straps, following Steps 1 to 4 in reverse order.
2. Make sure the bearing caps (5) are seated correctly. Tighten the bearing strap mounting bolts:
 - a) 1710 U-Joint Series: 115 to 135 lb-ft (156 to 183 N•m).
 - b) SPL170 U-Joint Series: 100 to 120 lb-ft (136 to 163 N•m).

c) Follow-On Maintenance

1. Test drive vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7.5 Transfer Case Oil Cooler Replacement

TRANSFER CASE OIL COOLER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SETUP		
<p><u>Special Tools</u></p> <p>None</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u></p> <p>Oil Cooler (1)</p> <p>Mounting Nuts (4)</p> <p>Mounting Bolts (4)</p> <p>Cable Lock Strap (1)</p>	<p><u>Equipment Condition</u></p> <p>Transmission set in (N)</p> <p>Parking Brake set</p> <p>Battery Disconnect Switch OFF</p> <p>Engine OFF</p> <p>Wheels chocked</p> <p><u>Reference</u></p> <p>Parts Manual</p> <p><u>Equipment Required</u></p> <p>Rags</p> <p>Drip Pan</p> <p><u>Follow-On Maintenance</u></p> <p>Remove jack stand</p> <p>Remove wheel chocks</p> <p>Check and refill transfer case oil level as required</p>	



During normal vehicle operation the transfer case oil cooler can become very hot. Allow transfer case and oil cooler to cool prior to servicing the oil cooler. Failure to comply may result in serious injury to personnel.

When removing first hose fitting, break connection loose slowly and let any pressure release before removing connection. Failure to comply may result in serious injury.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



NOTE

Note the orientation and routing of the two transfer case hoses. One hose (2) goes to the upper oil cooler housing fitting (4). The other hose (1) goes to the lower oil cooler housing fitting (5).

1. Remove and discard cable lock strap (3).
2. Remove transfer case hose (2) from the upper input on oil cooler fitting.
3. Remove transfer case hose (1) from the lower input on oil cooler fitting.
4. Remove and discard bolts securing oil cooler-to-cooler bracket.
5. Remove and discard oil cooler.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

1. Install new transfer case oil cooler-to-cooler bracket, noting the orientation of the hose connections. Secure new oil cooler with new mounting nuts and bolts.
2. Install transfer hose to upper fitting of oil cooler.
3. Install transfer hose to lower fitting of oil cooler.
4. Torque fittings.
5. Install new cable lock strap to transfer hose.

c) Follow-On Maintenance

1. Check transfer case oil level and refill as necessary using the transfer case drain/fill procedures.
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7.6 Transfer Case Assembly Replacement

TRANSFER CASE ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Personnel</u> Two (2) Wheeled Vehicle Mechanics</p> <p><u>Material/Parts</u> Transfer Case (1)</p> <p><u>Reference</u> Parts Manual</p>		<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Battery Disconnect Switch OFF Engine OFF Wheels chocked Drain Air Tanks Disconnect cooler lines Belly Armor Removed Prop Shaft Removed</p> <p><u>Equipment Required</u> Transmission Jack Rags Drain Pan</p> <p><u>Follow-On Maintenance</u> Re-connect cooler lines Install Prop Shaft Install Belly Armor</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS



Avoid contact with the hot fluid or the sump when draining transmission fluid. Direct contact with the hot fluid or the sump may result in bodily damage.

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent moving. Serious personal injury and damage to components can result.

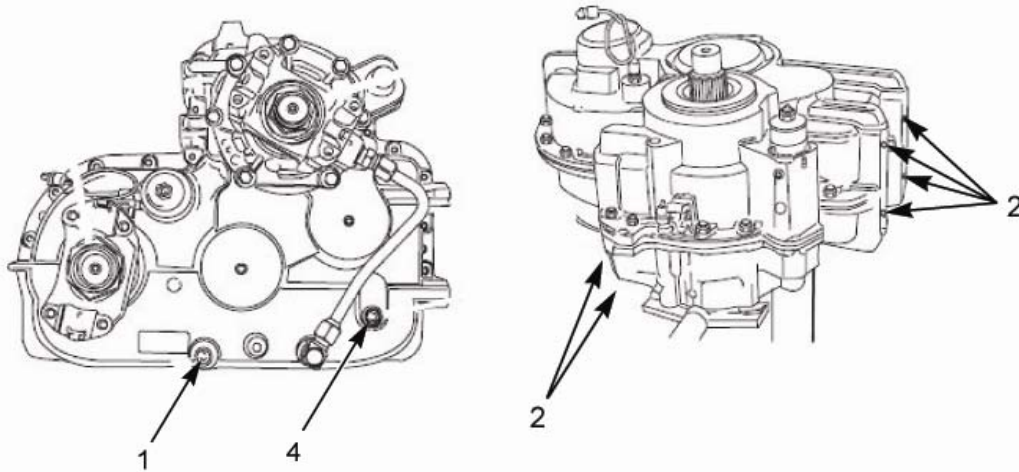
Support the transfer case with a lifting strap before mounting the transfer case into the repair stand. A transfer case that is not supported correctly can fall. Serious personal injury and damage to components can result.

NOTE

The transfer case weighs approximately 670 lb (304.2 kg) without the PTO.

Chapter 4 – MAINTENANCE INSTRUCTIONS

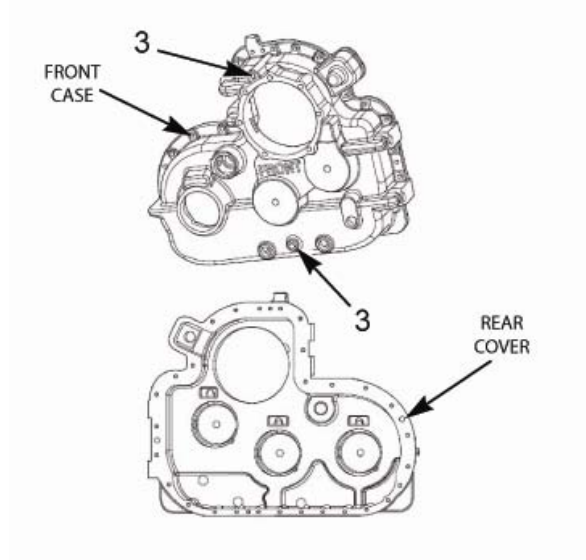
a) Removal



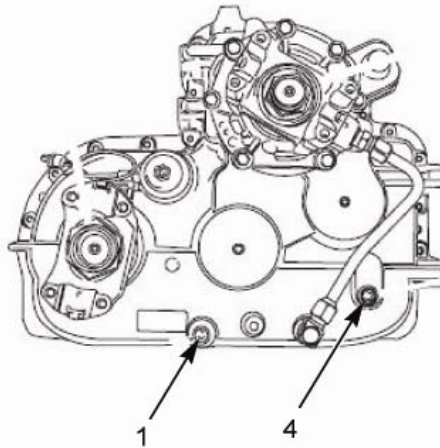
1. Park the vehicle on a level surface. Place chock blocks under the wheels.
2. Raise the vehicle so that the area to be serviced is off the ground.
3. Place a drain pan under the transfer case.
4. Remove the magnetic drain plug (1) from the bottom of the transfer case. Drain and discard the oil correctly. Clean the magnetic drain plug.
5. Disconnect the drivelines from the input and output yokes or flanges of the transfer case.
6. Disconnect the air lines at the shift cylinders of the transfer case.
7. Disconnect the oil cooler lines.
8. Disconnect the harness for the indicator switch wires.
9. Use a transmission jack to support the transfer case. Remove the mounting bolts that hold the transfer case to the vehicle.
10. Carefully remove the transfer case.
11. Install eye-bolts in the lifting holes (3) in either half of the transfer case housing. Lifting holes are located at the top and bottom of each half of the transfer case near the center.
12. Attach a suitable device to the eye-bolts to lift the transfer case.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Use a lifting device to move the transfer case from the repair stand to a hydraulic roller jack. If used, remove the temporary eye-bolts and angle iron brackets from the transfer case housing.
2. Move the transfer case into position under the vehicle with the hydraulic roller jack.
3. Install the transfer case into the vehicle with the mounting bolts and torque to 145 -175 ft-lb (197-237 N•m).
4. Connect the drivelines to the input and output yokes of the transfer case.
5. Connect any switch or speed sensor wiring.



6. Install the magnetic drain plug (1) and tighten to 48-68 lb-ft (35-50 N•m).
7. Remove the fill plug (4) and fill the transfer case with SAE Grade 50W Synthetic oil.
8. Tighten fill plug (4) to 48-68 lb-ft (35-50 N•m).

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-7.7 Transfer Case Shift Sensor and Air Lines Replacement

TRANSFER CASE SHIFT SENSOR AND AIR LINES REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) Indicator switch wire connector Two (2) air lines</p>		<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine OFF Wheels chocked Battery Disconnect Switch OFF Drain Air Tanks</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Test drive Vehicle</p>



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.

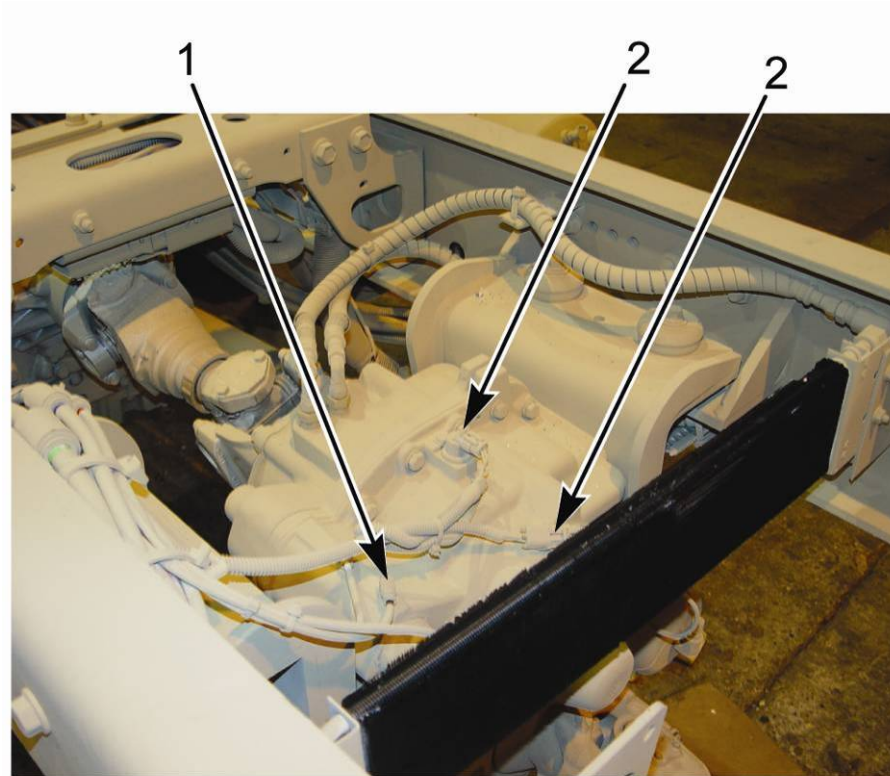
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Park the vehicle on a level surface. Place chock blocks under the wheels.

NOTE

Cab removed for clarity.



2. Disconnect the air lines (1) at the shift cylinders of the transfer Case. Note which air line is attached to high/low port opening for reassembly.
3. Disconnect the harness (2) for the indicator switch wires.
4. Remove Shift Sensor.

b) Installation

1. Install the Shift Sensor to the Transfer case.
2. Connect the harness (2) for the indicator switch wires.
3. Connect the air lines (1) at the shift cylinders of the Transfer Case.

NOTE

Reassemble as disassembled.

c) Follow-On Maintenance

1. Test drive vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8 Axles

4-8.1 Wheel Hub Replacement

WHEEL HUB REPLACEMENT	
This task covers:	
a) Removal	b) Installation
	c) Follow-On Maintenance
INITIAL SET UP	<u>Personnel</u>
	One (1) Wheeled Vehicle Mechanic
<u>Special Tools</u>	<u>Equipment Required</u>
Drive Flange Puller	Rated jack stand
Dial Indicator (with mount)	Suitable floor jack
Snap Ring Pliers (Internal)	
Torque Wrench (250-400 ft-lb)	
8 point, 4 7/8" , 3/4" Drive	<u>Reference</u>
Plastic Hammer	Parts Manual
<u>Material Parts</u>	<u>Follow-On Maintenance</u>
Silicone Gasket Material	Install brake drum
Wheel Hub (1)	Adjust brakes
Rags	Install wheel and tire assembly
	Lower vehicle and remove suitable lifting device
<u>Equipment Conditions</u>	Battery Disconnect Switch ON
Engine OFF	Start engine
Battery Disconnect Switch OFF	Re-charge air system
Parking brake set	Check and verify air gauges
Transmission set in NEUTRAL (N)	Check and verify brake operation
Wheels chocked	Remove wheel chocks
Retract brake lining to remove brake drum or drain air tanks and reservoirs if needed	Test drive vehicle
Wheel and tire assembly removed	Shut engine OFF
Brake drum removed	Battery Disconnect Switch OFF
	Parking brake set
	Transmission set in NEUTRAL (N)
	Wheels chocked

Chapter 4 – MAINTENANCE INSTRUCTIONS

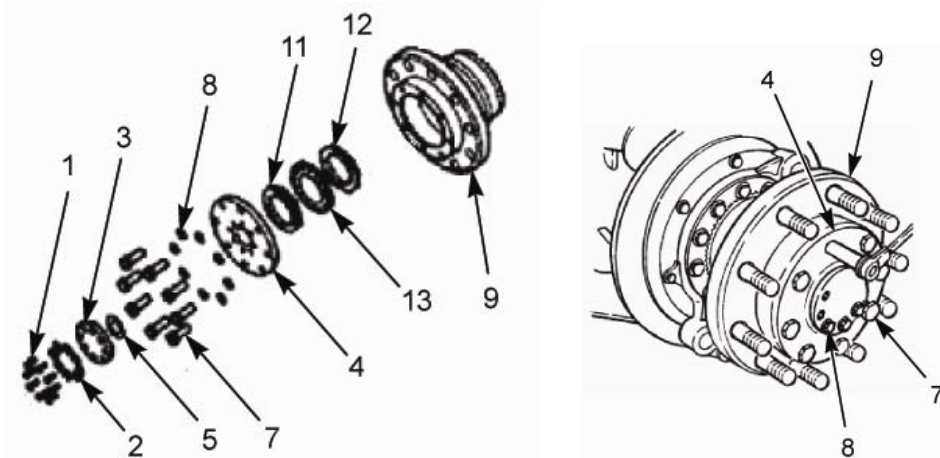
a) Removal



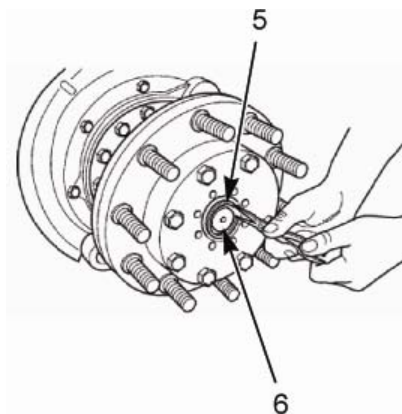
Make sure that before lifting vehicle off the ground that it is parked on a level surface and you have a suitable jack and rated jack stands for supporting vehicle axle. Set brake and chock wheels. Failure to comply may result in damage to equipment or serious injury or death to personnel.

A wheel and tire assembly is heavy. Request the assistance of another person to remove and install wheel and tire assembly. Failure to comply may result in serious injury or death to personnel.

Use appropriate safety goggles/glasses and respirator protection. Brake shoes may contact asbestos, which has been determined to be a cancer-causing agent. Never clean the brake surface with compressed air. Avoid inhaling any dust from any brake surface. Only use authorized brake cleaning fluid. Failure to comply may result in damage to equipment or in serious injury to personnel.

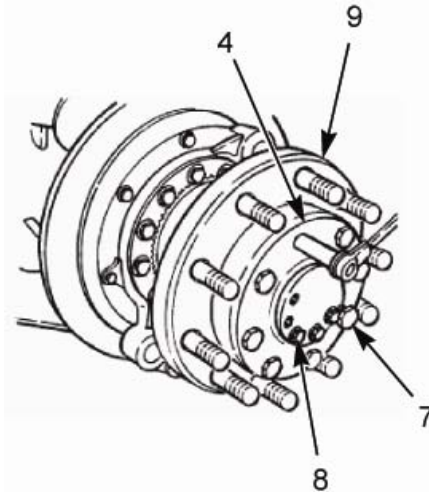


1. Remove the capscrews (1) and washers (2) that connect the hubcap (3) to the drive flange (4). Remove hubcap (3) and place aside for install later.



2. Remove the snap ring (5) from the axle shaft end (6).

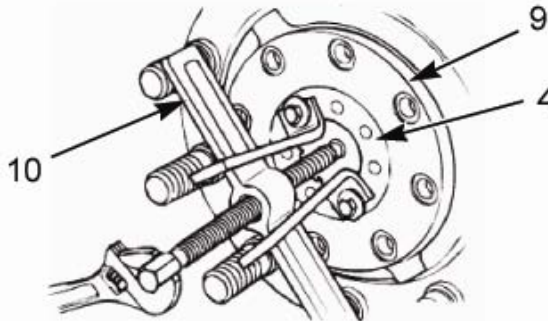
Chapter 4 – MAINTENANCE INSTRUCTIONS



3. Remove capscrews (7) and washers (8) connecting the drive flange (4) to the wheel hub (9).



DO NOT HIT steel parts with a steel hammer. DO NOT PRY off the parts with sharp tools. To loosen the drive flange from the hub, hit with a soft mallet. This will avoid parts to break. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

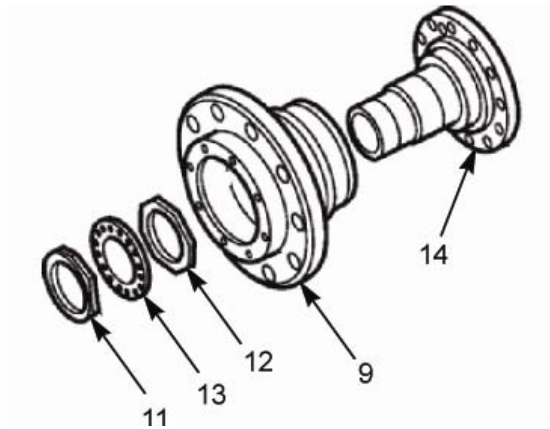


4. Remove drive flange (4) from hub (9). It may be necessary to use a puller (10) to remove drive flange (4).

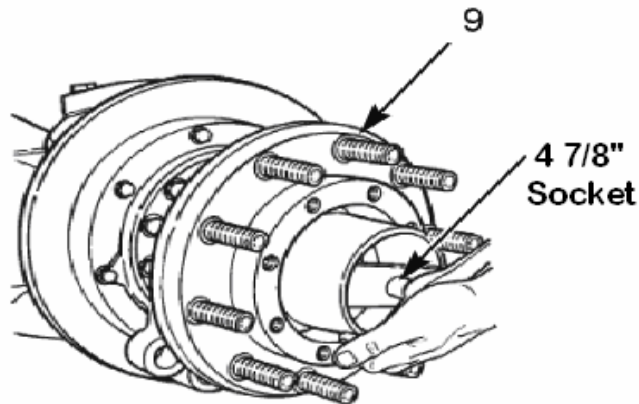


When removing adjusting nuts (11) and (12) with lock washer (13) from spindle (14), always make sure that the correct size socket wrench is used. NEVER tighten or loosen the adjusting nuts (11) and (12) by hitting them directly with a hammer or a drift or chisel placed against them with a hammer. This will damage the adjusting nuts (11) and (12) and prevent proper wheel bearing adjustment achievements. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS



5. Remove outer adjusting nut (11), lock washer (13), and inner adjusting nut (12) off spindle (14). Remember to use correct size socket wrench (4-7/8 inch) to remove adjusting nuts.



Use plastic or leather mallet for disassembly and assembly procedures. DO NOT HIT steel parts with a steel hammer, parts can break off. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

6. Remove hub (9) off spindle (14) by pulling straight off.
7. Discard removed hub per local regulation.

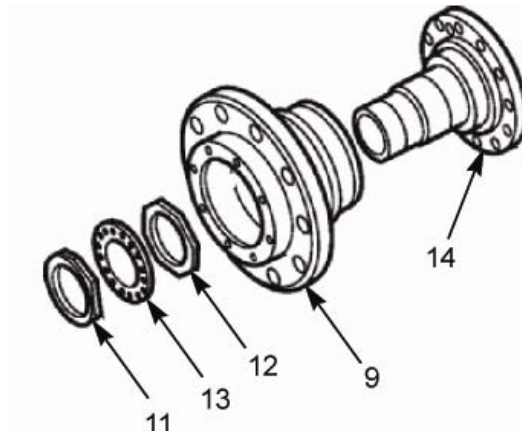
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

1. Apply thin layer of anti-corrosion compound to studs and nuts.



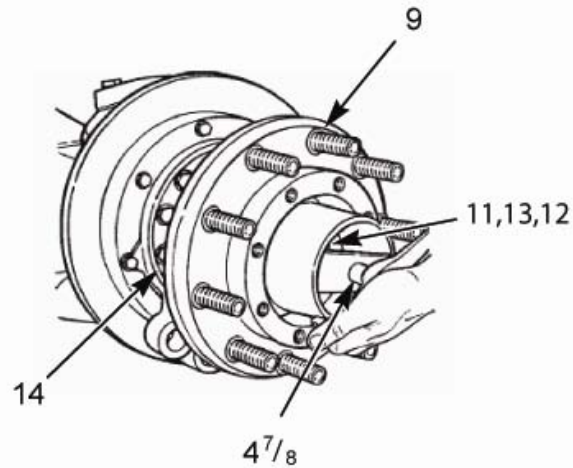
2. Install new hub assembly (9) onto spindle (14). Careful not to damage oil seal during installation. Press hub (9) until the inner bearing is flat against face of spindle (14).
3. Install inner wheel bearing nut (12), lock washer (13), and outer wheel bearing adjusting nut (11).



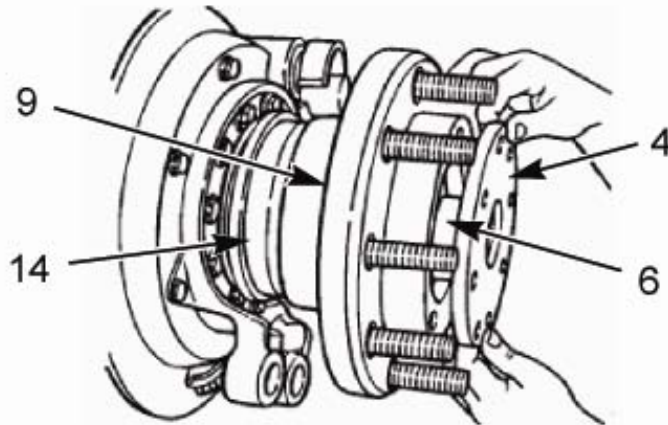
Always use a torque wrench to tighten the adjusting nuts to their correct adjusted torques. Always use the correct size socket wrench. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

NEVER tighten or loosen the adjusting nuts (11) and (12) by hitting them directly with a hammer or a drift or chisel placed against them with a hammer. This will damage the adjusting nuts (11) and (12) and prevent proper wheel bearing adjustment achievements. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

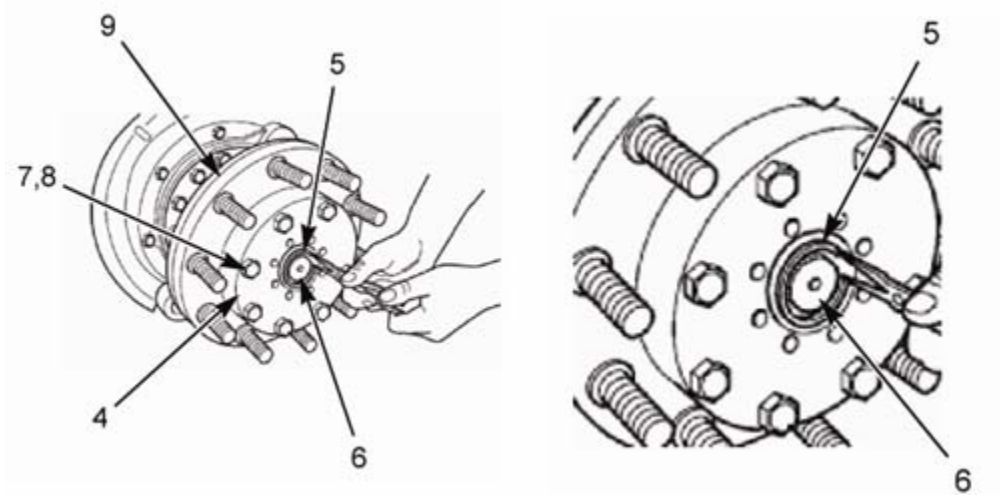


4. Tighten inner adjusting nut (12) to 100 ft-lb (136 N•m) torque while the hub (9) is being rotated eight revolutions (minimum) to be sure that all bearing and seal surfaces are seated properly. Back off one full turn and retighten adjusting nut (12) to 50 ft-lb (68 N•m).
5. Back off adjusting nut (12) 1/5 turn.
6. Install lock washer (13) and outer adjusting (jam) nut (11). Tighten adjusting nut (11) to 250-400 ft-lb (339-542 N•m). The resulting endplay must be within 0.001 to 0.010 inch (0.025 to 0.254 mm). Readjust if necessary to achieve proper endplay.
7. Apply a layer of silicone gasket material to the hub mounting surface (9) of the drive flange (4) ONLY.

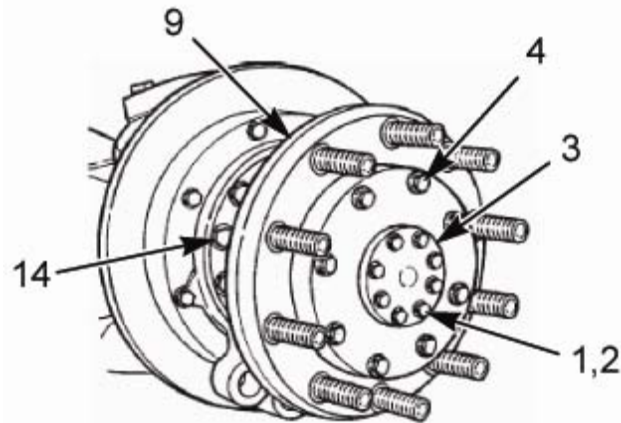


8. Apply wheel bearing grease to the inside splines of the drive flange (4) and the splines of the driveshaft (6).
9. Install drive flange (4) on hub (9) with washers (8) and capscrews (7). Tighten to 180-230 ft-lb (244-312 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS



10. Install snap ring (5) to end of axle shaft (6) making sure it is positioned in the groove at the axle shaft end.
11. Apply 0.125 inch continuous bead of silicone gasket material around mounting surface of either hubcap (3) or drive flange (4).



12. Install hubcap (3) with washers (2) and capscrews (1). Tighten to 35-50 ft-lb (47-68 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Install brake drum.
2. Adjust brakes and tighten drum to specification,
3. Install wheel and tire assembly and tighten to specification.
4. Raise vehicle and remove jack stand.
5. Lower vehicle and remove suitable lifting device.
6. Battery Disconnect Switch ON.
7. Start engine.
8. Re-charge air system, if needed.
9. Check and verify air gauge operation.
10. Check and verify brake operation.
11. Remove wheel chocks.
12. Test drive vehicle.
13. Shut engine OFF.
14. Battery Disconnect Switch OFF.
15. Parking brake set.
16. Transmission set in NEUTRAL (N).
17. Wheels chocked.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.2 Rear Axle Outer Hub Drain/Fill Procedure

REAR AXLE OUTER HUB DRAIN/FILL PROCEDURE		
This task covers:		
a) Drain	b) Fill	c) Follow-On Maintenance
INITIAL SETUP		<u>Equipment Condition</u> Transmission set in (N) Parking Brake Set Engine OFF Wheels chocked
<u>Special Tools</u> None		<u>Reference</u> Parts Manual
<u>Personnel</u> One (1) Wheeled Vehicle Mechanic		<u>Equipment Required</u> Safety stands (2 to 4) Catch lube container (1) Rags
<u>Material/Parts</u> Hub lubricant (1 qt)		<u>Follow-On Maintenance</u> Remove wheel chocks Check operation



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

NOTE

Rear hub has been redesigned. If replacement is needed, it must be replaced in pairs and the spacers discarded.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) **Drain**

1. Make sure the vehicle is on a level surface.
2. Place chocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.



4. To drain or remove some lube from the hub (1), loosen mounting nuts (2). Tap end of axle with brass drift to break the seal and let oil drain into suitable container.

b) **Fill**

NOTE

Prior to re-assembly, parts which are to be reused must be carefully inspected for signs of wear or damage. Replacement of such parts can prevent costly downtime at a future date.

1. If a small amount of lube was removed to check lube condition, replace same amount with new lube fluid. If totally drained, add one quart.
2. If hub assembly is removed from axle for any reason, after hub assembly is installed on the axle, add one quart of lube fluid to each hub assembly that was removed from the axle.
3. Check rear differential for proper lube fluid level. Add if necessary. Refer to Lubrication in the Master Service Manual for correct fluid type.

c) **Follow-On Maintenance**

1. Remove safety stands.
2. Remove wheel chocks.
3. Check operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.3 Hub Seal Replacement

HUB SEAL REPLACEMENT

This task covers:

a) Removal

b) Installation

c) Follow-On Maintenance

INITIAL SETUP

Equipment Condition

- Transmission set in (N)
- Parking Brake set
- Battery Disconnect OFF
- Engine OFF
- Wheels chocked
- Wheel removed
- Hub removed
- Drum assembly removed

Special Tools

- 3 to 5 pound hammer (1)
- Non-metallic scraper (1) if required
- Ball peen hammer

Reference

- Parts Manual

Personnel

- One (1) Wheeled Vehicle Mechanic

Equipment Required

- Wheel Dolly (1)

Material/Parts

- Seals (1)
- Fine Grit Emery Cloth (1)
- Loctite Gasket Eliminator (purple) (1)
- Bearing Lubricant

Follow-On Maintenance

- Install drum, hub & wheel
- Remove wheel chocks
- Check operation

Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

The outside of the unit should be carefully cleaned before starting the disassembly. If steam cleaning, ensure that breather and air fittings are covered to prevent water from entering assembly.

Provide a clean place to work. It is important that no dirt or foreign material enters the unit during repairs.

When disassembling the various assemblies, lay all parts on a clean bench in the same sequence as removed. This procedure will simplify reassembly and reduce the possibility of losing parts.

Carefully wash and re-lubricate all bearings as removed and protectively wrap until ready for use. Remove bearings with pullers designed for this purpose or in manner which will not damage those bearing that will be reused.

When necessary to apply a force to remove a part, use of a puller or press would be preferred. However, sometimes it may be necessary to use a soft hammer or bar.

a) Removal

The hub seals are removed by using a brass drift and hammer.

1. Position the drift through the outer opening of hub and against the inner bearing.
2. Tap bearing and seal out through the brake drum side of hub. Take care so that seal bore is not damaged.

NOTE

Never use a steel punch to remove inner bearing and seal. Possible damage to the bearing or seal bore may occur and the bearing and cup will have to be replaced.

Do not use a chisel to cut the ring since the chisel could damage the machined surface of the axle.

If outer seal assembly is still in the hub, then remove seal and inner bearing as described above.

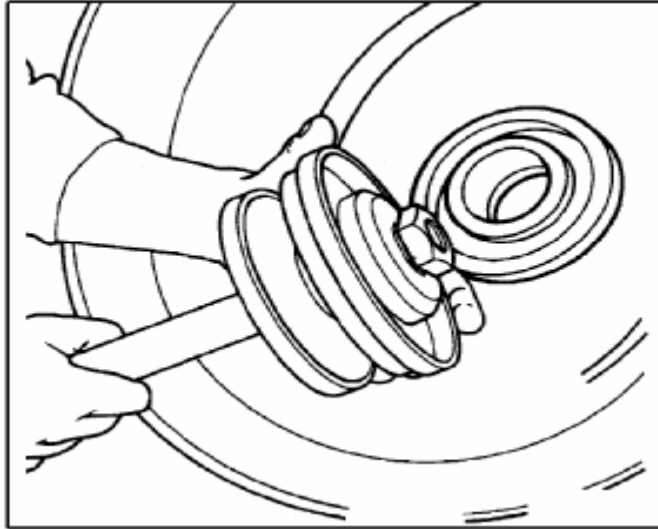
1. Remove inner bearing from spindle.
2. Use a small hammer to tap seal off the wear ring.
3. To remove the seal wear ring, use a ball peen hammer to tap in several places around the wear ring. This action will expand the wear ring, and then it can be removed from the axle spindle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

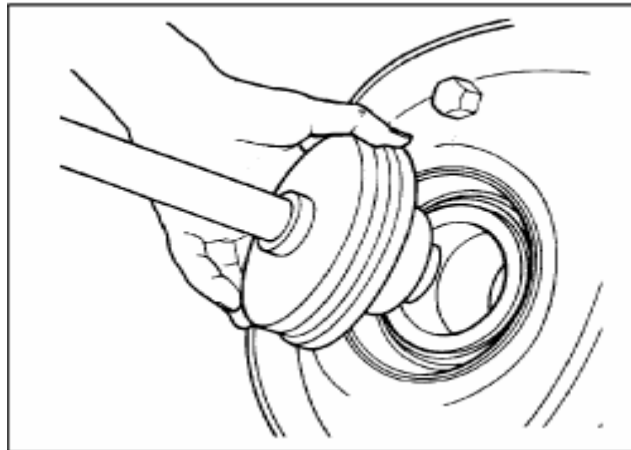
Hub Installed Unitized Seal

1. Install pre-lubed inner bearing in hub bore.
2. To install seal, place outer face of seal in the recess of the selected tool adapter.



Installation of Unitized Seal on to Tool Adapter

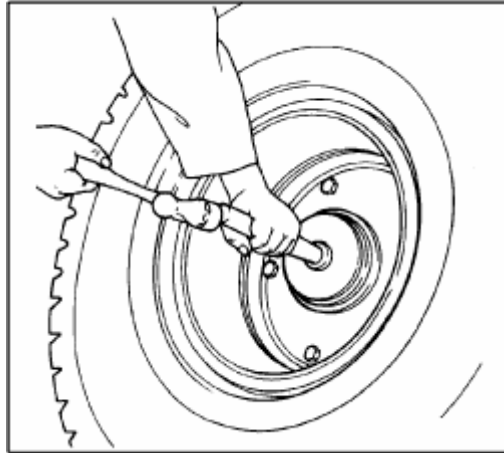
3. Install tool, centering into bore of inner bearing cone. Start seal into bore. Be sure seal is not cocked; tap tool handle lightly to start seal into hub bore. Check to see that seal is not cocked.



Installation of Unitized Seal into Hub

Chapter 4 – MAINTENANCE INSTRUCTIONS

4. Hold tool handle straight and firmly and strike tool handle until the sound of impact changes when seal is seated. Check seal to be sure it is uniformly seated but not crushed. Also check bearing for free movement.



Seating Seal in Hub Bore

IMPORTANT

Any time wheel is removed with a Unitized Seal, the seal should be replaced.

5. Install wheel, hub/drum assembly. Adjust wheel bearings. Refer to Wheel Bearing Adjustment.

c) Follow-On Maintenance

1. Install hub/drum assembly.
2. Install wheel.
3. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.4 Front Differential Assembly Replacement

FRONT DIFFERENTIAL ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Joint Repair	c) Installation
d) Follow-On Maintenance		
INITIAL SETUP		<u>Equipment Condition</u>
		Transmission set in (N)
		Parking Brake set
		Battery Disconnect OFF
		Engine OFF
		Wheels chocked
		Remove prop shaft
		Remove cross tube
		Tires Removed
		Hubs Removed
		Axles Removed
		<u>Reference</u>
		Parts Manual
		<u>Equipment Required</u>
		Jack
		Jack Stands
		<u>Follow-On Maintenance</u>
		Install Tires, hubs, and axles
		Install Prop Shaft
		Install Cross Tube
		Remove Wheel Chocks
		Check front end alignment
<u>Special Tools</u>		
Rotary Sanding Tool		
Torque Wrench		
Ball Joint Removal Tool		
4 7/8" Socket, 3/4 " Drive		
Tie Rod Removal Tool		
Putty Knife (as required)		
<u>Personnel</u>		
One (1) Wheeled Vehicle Mechanic		
<u>Material/Parts</u>		
Front Differential Assembly (1)		
Loctite 242		
Brake Cleaner		
Silicon RTV		
Loctite 5699		

Chapter 4 – MAINTENANCE INSTRUCTIONS



Place jack stands under the frame rails. Never work under or near a vehicle supported only by a jack or lifting device. Failure to properly support the vehicle and components may result in death or serious injury.

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below:

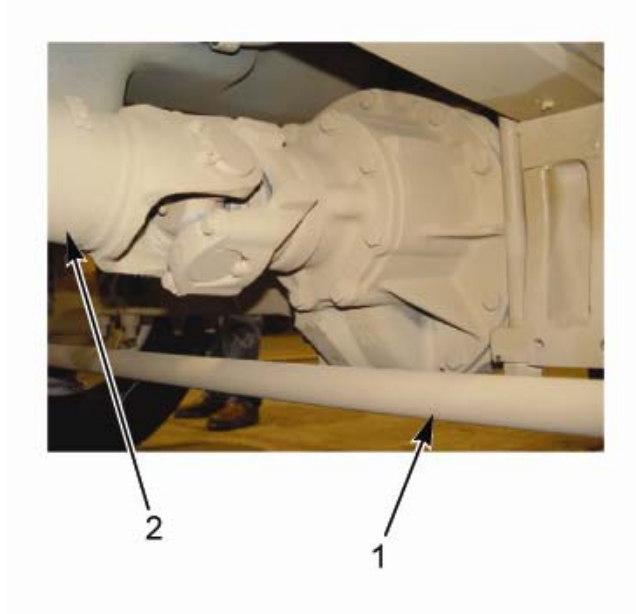
- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.
- Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

When you apply some silicone gasket materials, a small amount of acid vapor is present. To prevent serious personal injury, ensure that the work area is well-ventilated. Read the manufacturer's instructions before using a silicone gasket material, then carefully follow the instructions. If a silicone gasket material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

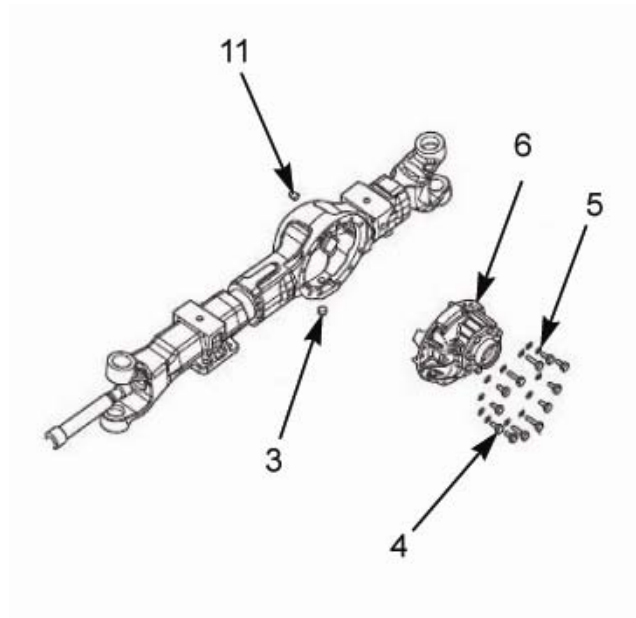
Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin. If Loctite® adhesive material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove steering tie rod (1).
2. Remove prop shaft (2).
3. Place a suitable container under the front differential.

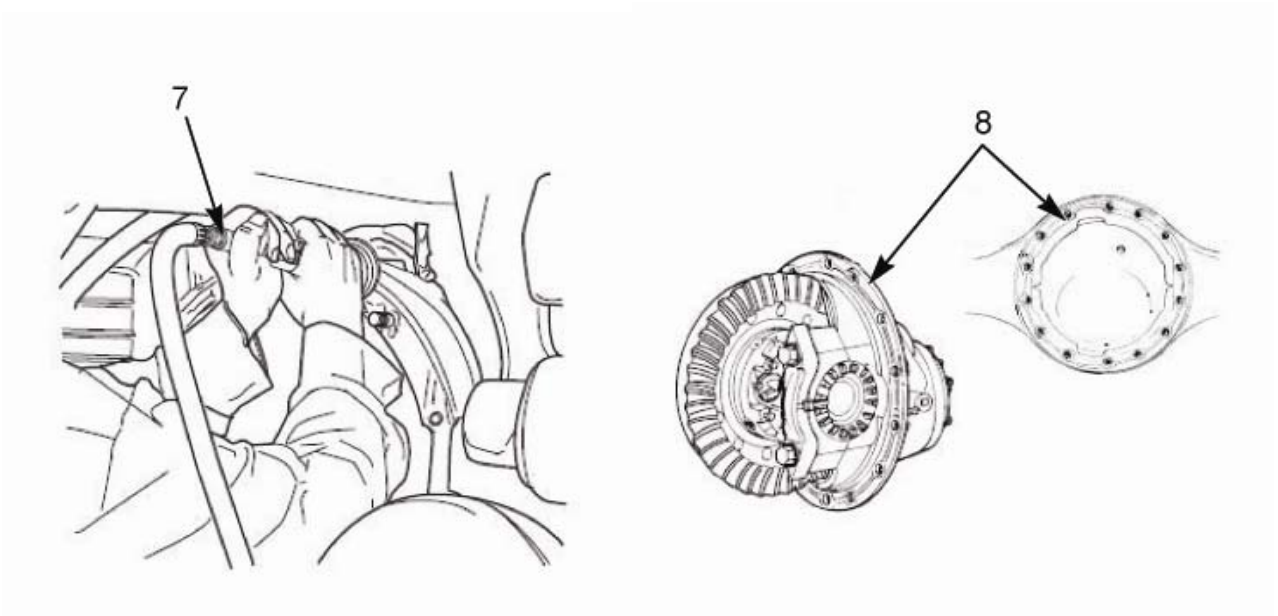


4. Remove the drain plug (3).
5. After oil is drained, install drain plug (3).
6. Remove suitable container and properly dispose of oil.
7. Place a roller jack under the front differential.
8. Remove fourteen differential bolts (4) and washers (5).
9. Remove old front differential (6) and discard.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Joint Repair

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Set the parking brake. Block the wheels to prevent the vehicle from moving.
3. Remove the carrier from the housing.
4. Remove all debris from inside the housing.



5. Use a rotary tool (7) with a scour pad, or putty knife, to clean all silicone residue from the housing and carrier faces. Surfaces must be clean, dry and free of contaminants. The surfaces must not be oily to the touch (8).
6. Remove metal filings from the magnets inside the housing.
7. Use solvent to clean the inside of the housing.
8. Loctite® ODC Free cleaner or brake cleaner to clean the housing and carrier faces.
9. Dry the housing and carrier faces.



New capscrew kits have blue Dri-Loc® STS threadlocker, an equivalent to Loctite® 242 threadlocker, applied to the bolts. Do not remove the blue Dri-Loc® STS threadlocker from the bolts. Damage to components can result.

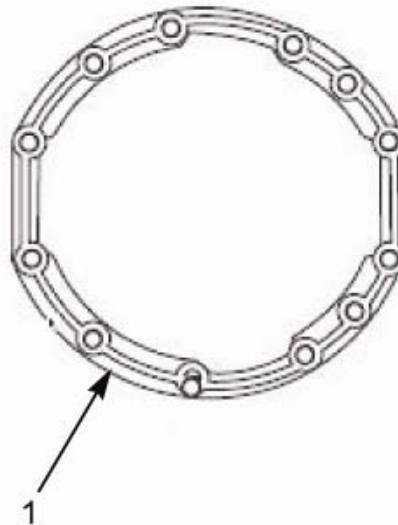
Chapter 4 – MAINTENANCE INSTRUCTIONS

10. If you reuse the carrier-to-housing bolts, use a rotary wire brush to remove any threadlocker material and clean the capscrew threads. Use a clean cloth to wipe the threads.
11. Use a ½” 13NC tap to clean the internal threads in the housing, if required.



Apply silicone gasket material in a continuous 0.25-in. (6 mm) bead. If you use more than this amount, gasket material can break off and plug lubrication passages. Damage to components can result.

12. Apply a 0.25-in. (6 mm) bead of Loctite® 5699 silicone gasket material to the housing face. Do not use ThreeBond® 1216E silicone products (1).

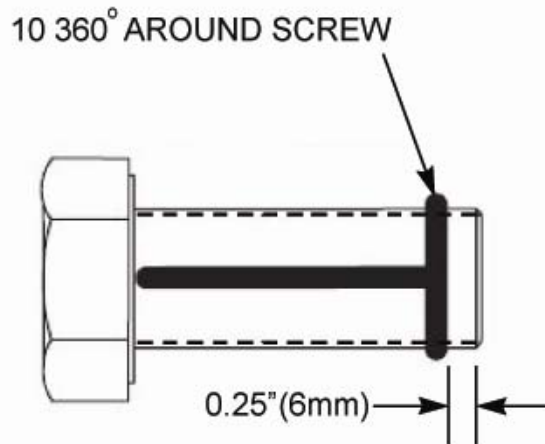


13. Install two long studs into the carrier to guide the carrier into the housing.
14. Immediately install the carrier into the housing to permit the silicone gasket material to compress evenly between the faces.



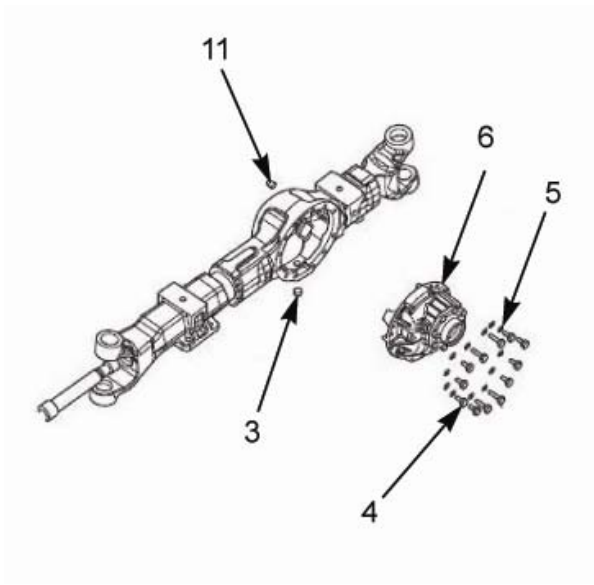
Apply Loctite® 242 threadlocker to reused capscrew threads only. Do not apply Loctite® 242 threadlocker to new bolts with the blue pre-applied threadlocker patch. Damage to components can occur.

Chapter 4 – MAINTENANCE INSTRUCTIONS



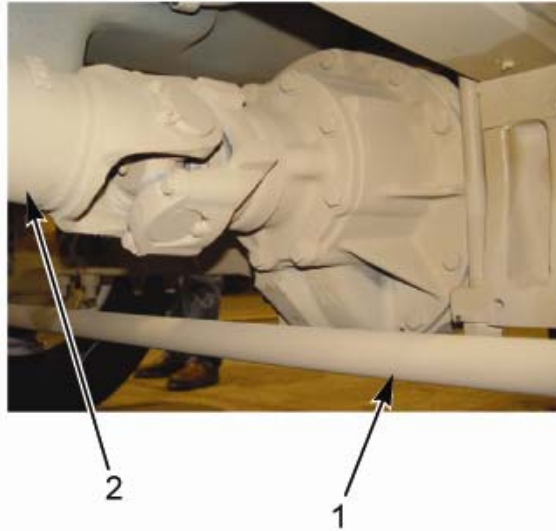
15. Apply a 0.125-in. (3 mm) bead of Loctite® 242 threadlocker around the reused capscrew threads approximately 0.25-in. (6 mm) from the end. Apply a 0.125-in. (3 mm) bead of Loctite® 242 threadlocker across the length of the threads. Do not apply Loctite® 242 threadlocker to new bolts with the blue pre-applied threadlocker patch (10).

c) Installation



1. Place the roller jack with the new front differential (6) and align the bolt holes.
2. Install two washers (5) and two differential bolts (4) but do not tighten bolts.
3. Install the remaining twelve washers (5) bolts (4) and tighten bolts as follows:
 - a) Tighten 1/2-inch bolts to 140 lb-ft (190 N•m).
 - b) Tighten 5/8-inch bolts to 225 lb-ft (306 N•m).
4. Wait a minimum of 60 minutes before filling the assembly with lubricant.
5. Remove roller jack.

Chapter 4 – MAINTENANCE INSTRUCTIONS



6. Install prop shaft (2).
 7. Install cross tube (1).
 8. Tighten the drain plug (3) to 36 lb-ft (48 N•m).
 9. Remove the fill plug (11) on front of the differential and fill with oil.
 10. Install the fill plug (11) and tighten to 36 lb-ft (48 N•m).
- d) Follow-On Maintenance**
1. Check front end alignment.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.5 Rear Differential Assembly Replacement

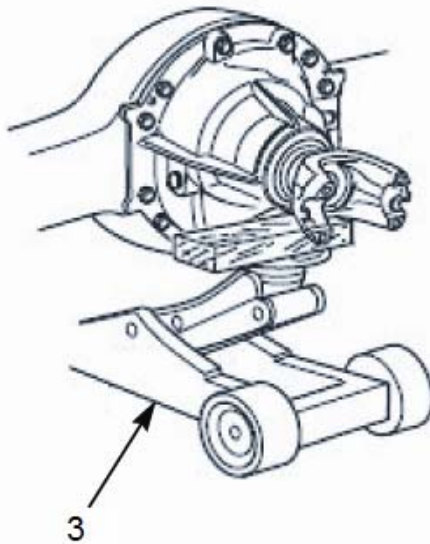
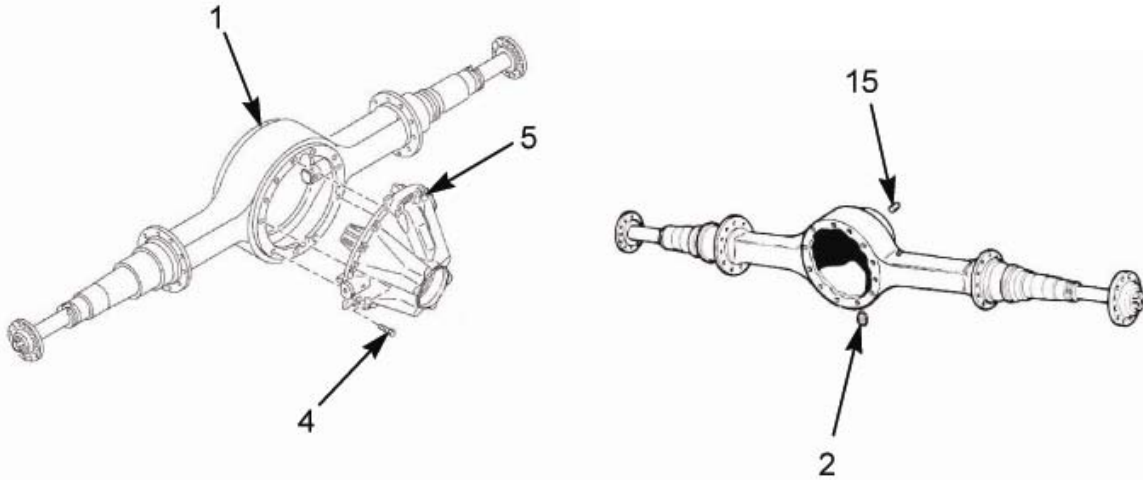
REAR DIFFERENTIAL ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Prepare the Parts	c) Prepare the Axle
d) Carrier-To-Housing Joint Sealing Procedure	e) Installation	f) Follow-On Maintenance
INITIAL SETUP <u>Special Tools</u> Floor Jack Leather Mallet Torque Wrench <u>Personnel</u> One (1) Wheeled Vehicle Mechanic <u>Material/Parts</u> Rear Differential Assembly (1) Silicone Gasket Compound Crocus Cloth Loctite RTV		<u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine OFF Battery Disconnect OFF Wheels chocked Remove the drive shaft <u>Reference</u> Parts Manual <u>Equipment Required</u> Drip Pan Rags/Pig Mats <u>Follow-On Maintenance</u> Install Drive Shaft



Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Place a suitable container under the housing axle (1) for the oil to drain.
2. Remove the oil drain plug (2).
3. After the oil is done draining, install the oil drain plug (2).
4. Place a suitable lifting device under the differential carrier to support the assembly (3).
5. Remove all fourteen carrier-to-housing capscrews (4) except the top two carrier-to-housing capscrews..
6. Loosen the top two carrier-to-housing capscrews and leave attached to the assembly. The capscrews will hold the carrier in the housing.

Chapter 4 – MAINTENANCE INSTRUCTIONS

7. Loosen the differential carrier in the axle housing. Use a leather mallet to hit the mounting flange of the carrier at several points (5).
8. After the carrier is loosened, remove the top two capscrews.



When you use a pry bar, be careful not to damage the carrier or housing flange. Damage to these surfaces will cause oil leaks.

9. Use a suitable lifting device to remove the carrier from the axle housing. Use a pry bar that has a round end to help remove the carrier from the housing.
10. Use a lifting tool to lift the old differential carrier (5) by the input yoke flange.

b) Prepare Parts

NOTE

Threads must be without damage and clean so that accurate adjustments and correct torque values can be applied to fasteners and parts.

1. Replace any fastener if the corners of the head are worn.
2. Replace the washers if damaged.
3. Replace the gaskets, oil seals or grease seals at the time of axle or carrier repair.
4. Clean the parts and apply new silicone gasket material where required when the axle or carrier is assembled.
5. Remove nicks, mars, and burrs from parts with machined or ground surfaces. Use a fine file, India stone, emery cloth or crocus cloth.
6. Clean and repair the threads of fasteners and holes. Use a die or tap of the correct size or a fine file.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Installation



When you apply some silicone gasket materials, a small amount of acid vapor is present. To prevent serious personal injury, ensure that the work area is well-ventilated. Read the manufacturer's instructions before using a silicone gasket material, then carefully follow the instructions. If a silicone gasket material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

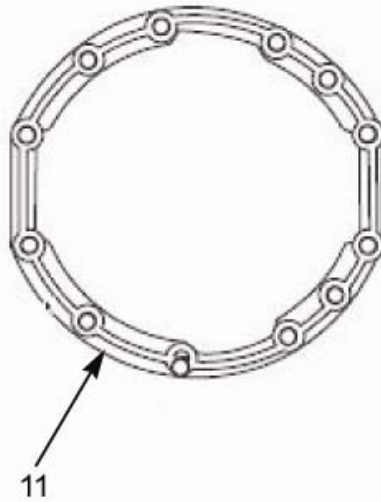
Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below:

- Wear safe eye protection
 - Wear clothing that protects your skin
 - Work in a well-ventilated area
 - Do not use gasoline, or solvents that contain gasoline. Gasoline can explode
1. Use a cleaning solvent and rags to clean the inside of the axle housing and the carrier mounting surface.
 2. Inspect the axle housing for damage. Repair or replace the axle housing.
 3. Check for loose studs, if equipped, in the mounting surface of the housing where the carrier fastens. Remove and clean the studs that are loose.
 4. Apply liquid adhesive to the threaded holes. Install the studs into the axle housing. Tighten the studs to 115-135 ft-lb torque.



Apply silicone gasket material in a continuous 0.25 in. (6 mm) bead. If you use more than this amount, gasket material can break off and plug lubrication passages. Damage to components can result.

Chapter 4 – MAINTENANCE INSTRUCTIONS

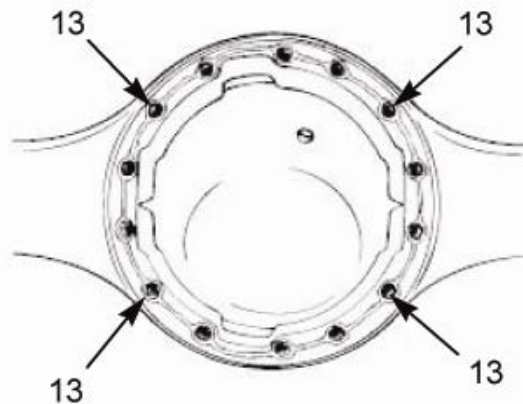


5. Apply a 0.25 in. (6 mm) continuous bead of silicone gasket material to the mounting surface of the housing where the carrier fastens (11).



Do not use a hammer or mallet to install the carriers. A hammer or mallet will damage the mounting flange of the carrier and cause oil leaks.

6. Use a hydraulic roller jack or a lifting tool to install the carrier into the axle housing.

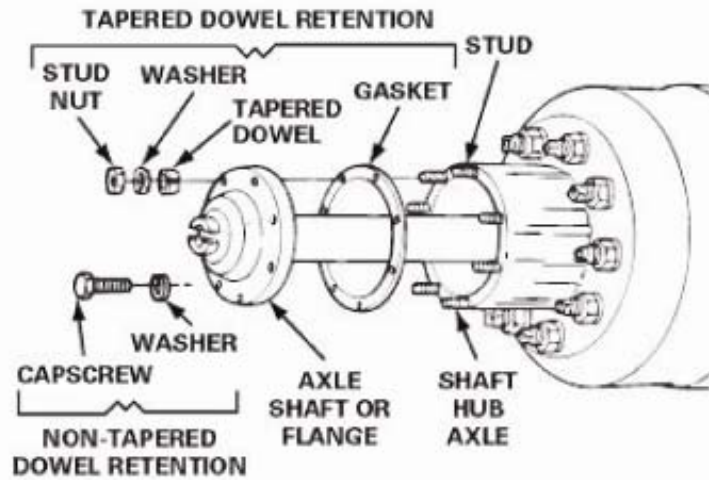


7. Install nuts and washers or capscrews and washers, if equipped, into the four corner locations around the carrier and axle housing. Hand-tighten the fasteners (13).
8. Carefully push the carrier into position. Tighten the four fasteners two or three turns each in a pattern opposite each other.

Chapter 4 – MAINTENANCE INSTRUCTIONS

9. Repeat Step 8 until the four fasteners are tightened to the correct torque value.
10. Install the other fasteners and washers that hold the carrier in the axle housing. Tighten fasteners to 50-75 lb-ft (68-102 N•m).
11. Connect the driveline universal joint to the pinion input yoke or flange on the carrier.

14



12. Install the gaskets and axle shafts into the axle housing and carrier. The gasket and flange of the axle shafts must fit flat against the wheel hub.
13. Tighten axle drain plug to 25 lb-ft (34 N•m).
14. Remove housing oil fill plug and fill with oil (14).
15. When done, tighten housing oil fill plug (14) to 36 lb-ft (48 N•m).

d) Follow-On Maintenance

1. Fill differential and Hub in accordance with Axle Differential Drain/Fill Procedure.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.6 Axle-Differential Drain/Fill Procedure

AXLE-DIFFERENTIAL DRAIN/FILL PROCEDURE	
This task covers:	
a) Remove	b) Drain
d) Fill	e) Follow-On Maintenance
c) Installation	
INITIAL SETUP	<u>Equipment Condition</u>
	Transmission in NEUTRAL (N)
	Parking Brake set
	Engine OFF
	Wheels chocked
	Battery Disconnect Switch OFF
<u>Special Tools</u>	<u>Reference</u>
Jack	Parts Manual
Jack Stand	
Torque Wrench	
<u>Material/Parts</u>	<u>Equipment Required</u>
Axle-Differential Lubricant Fluid	Drain Pan
Meritor GL-5, SAE 85W/140 Gear	Rags
Front axle drain plug	
Rear axle drain plug	
<u>Personnel</u>	<u>Follow-On Maintenance</u>
One (1) Wheeled Vehicle Mechanic	Remove wheel chocks
	Dispose of used fluid in accordance with local regulations
	Do 30 minute road test and then recheck fluid levels



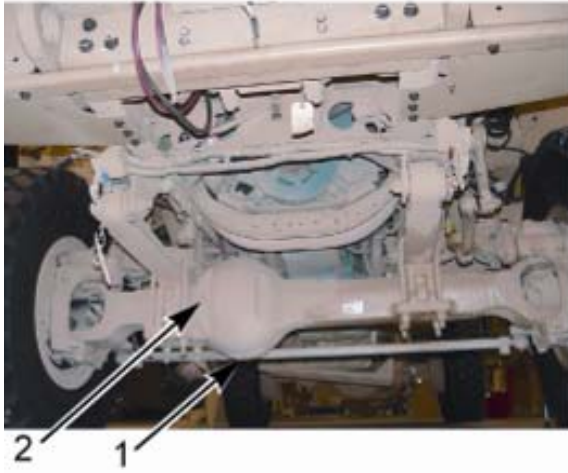
Avoid contact with the hot fluid or the sump when draining transmission fluid. Direct contact with the hot fluid or the sump may result in bodily damage.

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

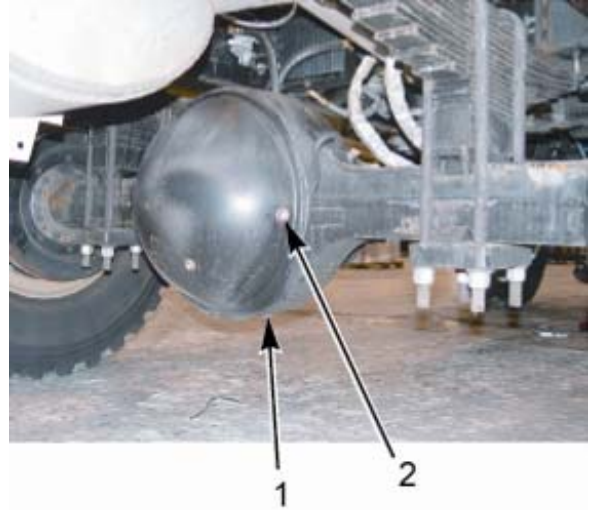
Park the vehicle on a level surface. Block the wheels to prevent from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Drain



Front Axle



Rear Axle

1. Park the vehicle on a level surface. Place blocks under the wheels not being raised to keep the vehicle from moving.
2. Raise the vehicle so that the area to be serviced is off the ground.
3. Place a large container under the axle differential.
4. Remove and discard the magnetic drain plug (1) from the bottom of the differential case. Drain and discard the fluid correctly. Clean the drain plug hole.

b) Fill

1. Install the new magnetic drain plug (1) and tighten to 48-68 lb-ft (35-50 N•m).
2. Remove the fill plug (2) and fill the axle differential case with Meritor GL-5, SAE 85W/140 Gear Oil axle differential lubricant fluid.
3. Jack up one side of vehicle until one end of the axle is 8-10" off the ground.
4. Fill the differential with oil until oil starts to come out of the fill plug hole in differential.
5. Lower the vehicle and repeat for the other side.
6. Fluid level should be ½" below the differential fill plug hole.
7. Install flange using RTV and torque bolts. Alternate tightening in crisscross pattern.
8. Tighten fill plug (2) to 48-68 lb-ft (35-50 N•m).

c) Follow-On

1. Remove wheel chocks.
2. Dispose of used fluid in accordance with local regulations.
3. Do 30 minute road test and then recheck fluid levels.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.7 Inner Hub Seal Replacement

INNER HUB SEAL REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Press or Brass Hammer or Drift Driver</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Hub Seal (1) Non-Hardening Sealing Compound (1)</p>		<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine OFF Battery Disconnect switch OFF Wheels chocked Wheel removed Brake drums removed Hub removed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Press Jack Jack stands</p> <p><u>Follow-On Maintenance</u> Install hub and brake drum Install wheel Remove wheel chocks Check operation</p>

NOTE

The outside of the unit should be carefully cleaned before starting the disassembly. If steam cleaning, ensure that breather and air fittings are covered to prevent water from entering assembly.

When necessary to apply a force to remove a part, use of a puller or press would be preferred. However, sometimes it may be necessary to use a soft hammer or bar.

Do not remove the seal unless it is to be replaced by a new seal assembly.

The suspension yoke must be off the axle housing before the seal assembly can be removed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



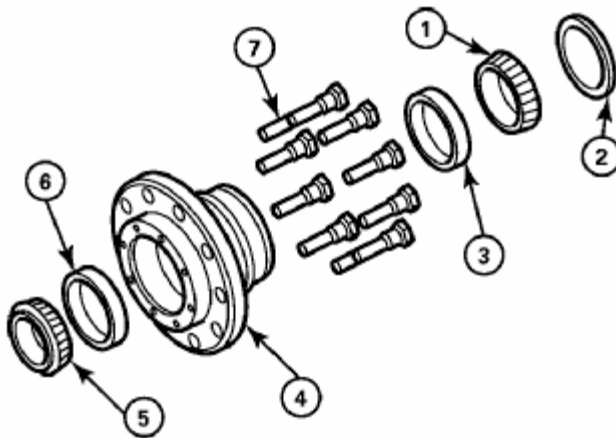
Observe all warnings and cautions concerning press operation to avoid serious personal injury and possible damage to components.

Do not hit the wheel studs with a steel hammer or remove the studs by twisting. Damage to the parts can occur and metal fragments can cause serious personal injury.

NOTE

If a press is not available, use a brass hammer or drift.

1. Remove brake drum.
2. Remove outer nut spindle, spindle nut, and inner nut spindle.
3. Remove outer bearing cone (5), and outer bearing cup (6).
4. Remove hub (4).
5. Remove inner bearing cup (3) and inner bearing cone (1).
6. Remove the oil seal (2) from the hub with a suitable tool. Discard the oil seal.



- | |
|------------------------|
| (1) INNER BEARING CONE |
| (2) INNER OIL SEAL |
| (3) INNER BEARING CUP |
| (4) HUB |
| (5) OUTER BEARING CONE |
| (6) OUTER BEARING CUP |
| (7) WHEEL STUDS |

Remove Inner Bearing Cone, and Inner and Outer Bearing Cups

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

NOTE

Prior to re-assembly, parts which are to be reused must be carefully inspected for signs of wear or damage. Replacement of such parts can prevent costly downtime at a future date.

All bearing surfaces, including ball bearing assemblies and roller bearing cups and cones, should be examined for pitting, wear, or overheating. Shafts may be nicked and marred, or may have damaged threads. Parts which show any signs of damage should be repaired or replaced.

1. Protect ABS tone ring when installing, (use wood, rag, or suitable item for protection). Ensure ABS tone ring is square and seated properly.

NOTE

Do not force or hit the seal after it has touched the bottom of the bore. The seal can be damaged.

2. Install a new inner oil seal (2). Apply a layer of non-hardening sealing compound to the outside of the seal and install the seal into its correct position against the bore.
3. On units equipped for ABS, install the ABS tone wheel on the hub with a brass drift.



Damage to the teeth on the ABS tone ring can create an error signal during testing and operation of the ABS system.



4. Install the oil sleeve on the spindle with a driver.
5. Install the hub assembly (4) onto the spindle. Be careful the oil seal is not damaged during installation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

6. Use procedure for Wheel/Hub Replacement to ensure bearing is seated correctly with proper end play.
 7. Install the outer bearing cone (6) on the spindle and push it into its cup inside the hub (4).
 8. Install the inner wheel bearing nut (3), wheel bearing lock washer (2) and outer wheel bearing adjusting nut (1).
- c) Follow-On Maintenance**
1. Install hub and brake drum.
 2. Install wheels.
 3. Remove wheel chocks.
 4. Check operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.8 Axle Alignment Procedure

AXLE ALIGNMENT PROCEDURE	
This task covers:	
a) Alignment	b) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> Trammel Bar and Slide Scale</p> <p><u>Personnel</u> Two (2) Wheeled Vehicle Mechanics</p> <p><u>Material Parts</u> Cotter Pin (2)</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Required</u> Suitable lifting device Suitable rated jack stands</p> <p><u>Equipment Conditions</u> Engine OFF Battery Disconnect Switch OFF Parking brake set Transmission in NEUTRAL (N) Wheels chocked</p> <p><u>Follow-On Maintenance</u> Battery Disconnect Switch ON Start engine Verify operation of steering system Remove wheel chocks Verify driving operation Shut engine OFF Set parking brake</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Alignment



Ensure that proper safety equipment is being used, protective eye wear and gloves. Failure to comply may result in serious injury or death to personnel.

Hydraulic jacks are intended only for lifting the vehicle and not for supporting the vehicle while performing maintenance. **DO NOT** get under vehicle after vehicle is raised, unless it is properly supported with blocks or jack stands. Failure to comply may result in injury or death to personnel.

Wheel and tire assembly is heavy. **DO NOT** attempt to lift or catch wheel and tire assembly without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Check front tires at regular intervals. Check front alignment only if the tires start to show incorrect wear or front suspension has been subjected to extremely heavy service or severe impact loads. Before checking and adjusting alignment, components such as wheel bearings, tie rod ends, drag links, shock absorbers and tire inflation should be inspected and corrected where necessary.

The toe-in adjustment is the most important alignment factor to check when attempting to extend tire life. **Toe-in should be set only by trained mechanics using calibrated equipment.** The setting should be re-checked after any correction to be sure it is correct.

Incorrect toe-in will result in rapid tire wear. Tire wear on radial tires due to excessive toe-in shows up initially as irregular wear; more so on the outside grooves than the inside grooves of the tire and more so on the right front than on the left front tire. Excessive toe-out will show a reversed effect: more wear on the inside than the outside grooves and more so on the left front than the right front tire.

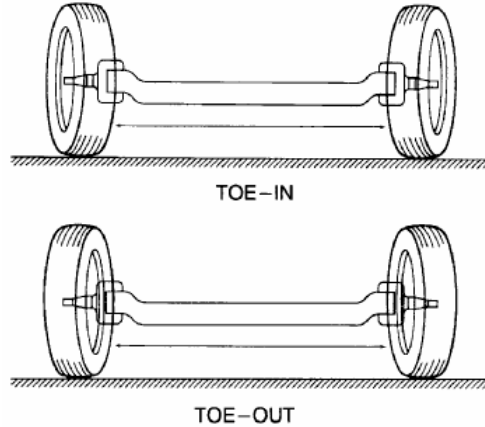
If front axle tire wear pattern has **heavy** wear on the outside of one tire tread and on the inside tread of its mate, the rear axle suspension alignment should be inspected.

Caster, camber and toe-in dimensions are for vehicles at no-load (no payload condition). If the frame is not level, the frame angle must be considered. This is especially important when making a caster check. The frame angle must be added to or subtracted from the caster angle to obtain a true caster reading.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Toe-In

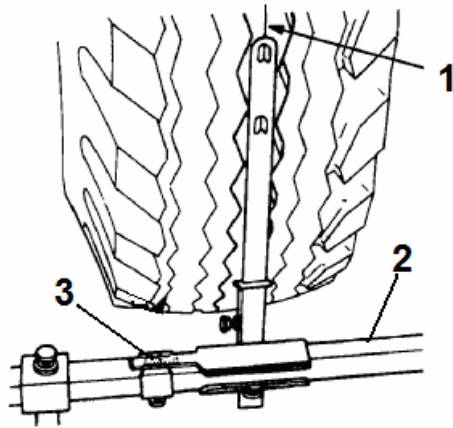
The toe-in is the amount in fractions of an inch (mm) that the front wheels are closer together at the front than at the back of the tire. Another reason for toe-in, and the most familiar, is that when the vehicle is being driven, the forces acting on the front wheels tend to make the wheels toe-out.

**Manual Toe-in Adjustment**

To obtain an accurate toe reading, two mechanics are required to ensure that the pointers are always placed or adjusted to be exactly in front of the line scribed on both front tires.

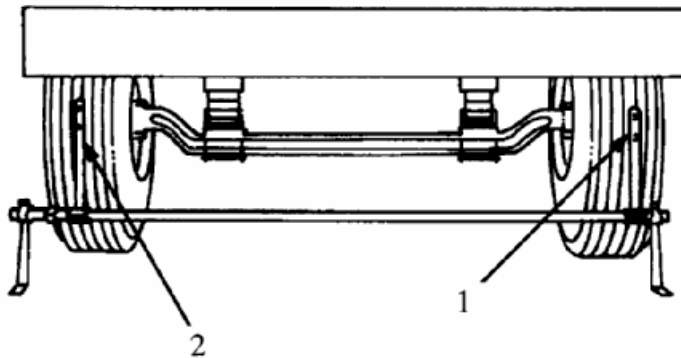
1. Turn front tires to the exact straight-forward position.
2. Ensure that vehicle is parked on a flat, level surface before proceeding.
3. Install wheel chocks to rear wheels.
4. With suitable lifting device, raise front axle of vehicle.
5. Wipe excess dirt and moisture from the center of both front tire treads all the way around (360°). Use chalk to mark the center area of both tires around the complete wheel.
6. Put a scribe or pointed instrument against the center of the whitened part of each tire and rotate the tire 360°. The scribe must be held in place so that a single straight line is marked all the way around the tires.
7. Put a full floating radius gauge plate under each wheel. Lower the vehicle and remove the lock pins from the radius gauge plates to allow the front wheels to return to the normal operating position. If full floating radius gauge plates are not available, lower the vehicle to the floor and roll it forward 12 to 15 feet (3.65 to 4.57 m) to neutralize the front suspension. Neutralizing the front suspension is extremely important if the vehicle has been jacked up to scribe the tires; otherwise, the front wheels will not return to normal operating position due to the tires gripping the floor surface when the vehicle is lowered.

Chapter 4 – MAINTENANCE INSTRUCTIONS



- | | |
|-----|-------------|
| (1) | Scribe Line |
| (2) | Trammel Bar |
| (3) | Slide Scale |

8. Set the sliding scale end (3) of a trammel bar (2) to zero (0) and lock scale into place.
9. Put trammel bar at the rear of the front tires so that the sliding scale that was set to zero in step 7 is centered against the scribed line (1) on one of the tires.
10. Adjust the pointer on the end of the trammel bar opposite the sliding scale so it lines up with the scribed line on the rear of the opposite front tire. Lock pointer in place on the trammel bar.



- | | |
|-----|--|
| (1) | Pointer End |
| (2) | Sliding Scale End Adjusted to Scribe Line to Indicate Actual Toe Setting |

11. Put trammel bar against the front of the tires so the pointer end (1) is against the scribed line on the front tire. Loosen and move the sliding scale pointer (2) on the opposite end of the trammel bar so it is against the scribe line on the opposite tire. Lock the scale in place.
12. Read the toe-in or toe-out on the sliding scale. If toe-in is correct, it will read 1/16 inch \pm 1/16 inch.

Chapter 4 – MAINTENANCE INSTRUCTIONS

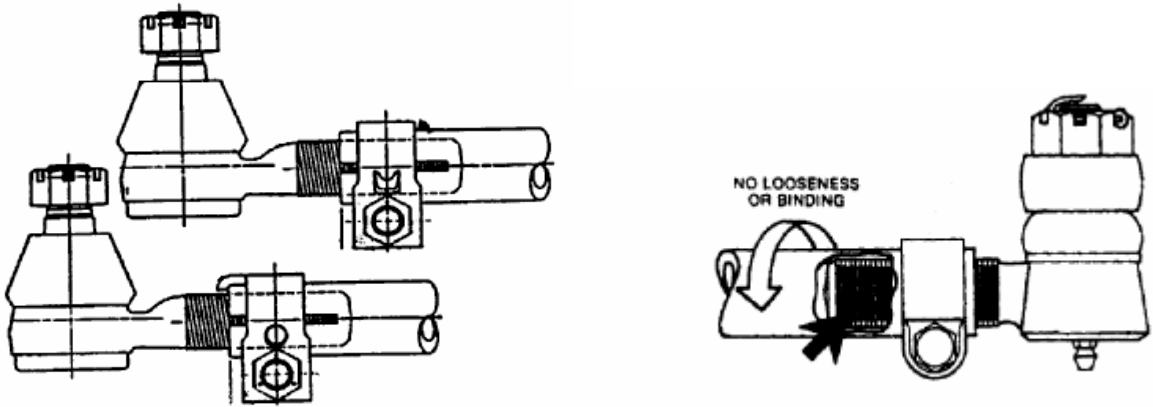
13. If toe-in adjustment is necessary, follow this procedure:



When the tie rod, drag link or power steering linkage ends are replaced, they must be threaded into the tie rod sufficiently so that when the clamp is applied, the clamping action will be directly over the threads on the ball joint end. Be sure that the end is in far enough (past clamp) to provide adequate clamping.



When repositioning the tie rod clamps, check bolt clearance between the bolt and axle I-Beam at the maximum turn position, right and left (turn). Interference may restrict proper steering linkage movement, and/or cause damage to clamp bolts.



- a. Loosen tie rod clamps that secure the tie rod ends in position in the tie rod.
- b. Set the sliding scale on the trammel bar to read 1/16 inch toe-in.
- c. Turn the tie rod to set the toe-in. After the toe-in is set, the sliding scale and the pointer should both be on the scribe line of the tire each is in front of.
- d. Turning the steering wheel in each direction to center the steering linkage (if the vehicle had power steering, start the engine before turning the wheel). Make sure that the front wheels are in a straight ahead position (stop engine), and recheck the toe-in setting. Make any necessary adjustments.
- e. Repeat steps until the toe-in reading is 1/16 inch \pm 1/16 inch.
- f. Position and tighten the tie rod clamp bolts to specification.
- g. Be sure that the tie rod ends are properly indexed or aligned (left tie rod end parallel to the right tie rod end). Proper indexing will eliminate restricted movement of the tie rod assembly. Restriction could cause premature failure of tie rod ends.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Alignment Specifications

Alignment Procedure Rules

When performing front wheel alignment procedures, observe the following rules.

1. Toe-in dimension may be measured from center of tread, or from inside of tire.
2. Tolerance Toe-in-Plus or Minus 1/16 inch (1.59 mm).

Toe-In For All Steer Axles

Acceptable Service Range – Unloaded:

- a. 0 to 1/8 inch
- b. 0 to .125 inch
- c. 0 to .180 degree

If Out Of Acceptable Service Range – Unloaded, Reset To:

- a. 1/32 to 3/32 inch
- b. .03 to .09 inch
- c. .05 to .13 degree

Chapter 4 – MAINTENANCE INSTRUCTIONS

Torque Chart						
Location	Size		Torque			
-	Diameter (Inches)	No. Threads	FT-LB	N•M		
-	-	-	Min.	Max.	Min.	Max.
Tie Rod End Nut and Drag Link End Nut (Note 1)	3/4	16	85	105	116	143
	7/8	14	120	160	163	218
Tie Rod Clamp Bolt	1/2	13	40	50	54	68
	5/8	11	45	65	61	88
Steering Arm Nut & Tie Rod Arm Nut (Note 1)	1-1/8	12	300	400	407	544
	1-1/4	12	775	1050	1054	1428
U-Bolt Nuts	3/4 Flg	16	260	300	192	222
	5/8 Hex	18	130	160	96	118
	7/8 Hex	14	260	300	192	222

NOTE: If cotter pin cannot be installed after minimum torque is attained, the nut must be advanced until cotter pin can be installed. Torque specified is for taper and threads which are clean and oil free. **DO NOT LOOSEN THE NUT TO INSTALL THE COTTER PIN.**

b) Follow-on Maintenance

1. Battery Disconnect Switch ON.
2. Start engine.
3. Verify operation of steering system.
4. Remove wheel chocks.
5. Verify driving operation.
6. Shut engine OFF.
7. Set parking brake.
8. Put transmission in NEUTRAL (N).

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.9 Rear Axle Shaft Replacement and Bearing Adjustment

REAR AXLE SHAFT REPLACEMENT AND BEARING ADJUSTMENT

This task covers:

a) Removal

b) Installation

c) Follow-On Maintenance

INITIAL SETUP

Special Tools

¾" Driven 4" Socket

Personnel

One (1) Wheeled Vehicle Mechanic

Material/Parts

Bearing Oil Lubricant (1)

Gaskets (2)

Equipment Condition

Transmission set in (N)

Parking Brake set

Engine OFF

Wheels chocked

Vehicle raised on safety stands

Remove rear wheels

Reference

Parts Manual

Equipment Required

Hub cover (2)

Safety stands (2)

Follow-On Maintenance

Install rear wheels

Remove safety stands and lower vehicle

Remove wheel chocks

Check operation

Chapter 4 – MAINTENANCE INSTRUCTIONS



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

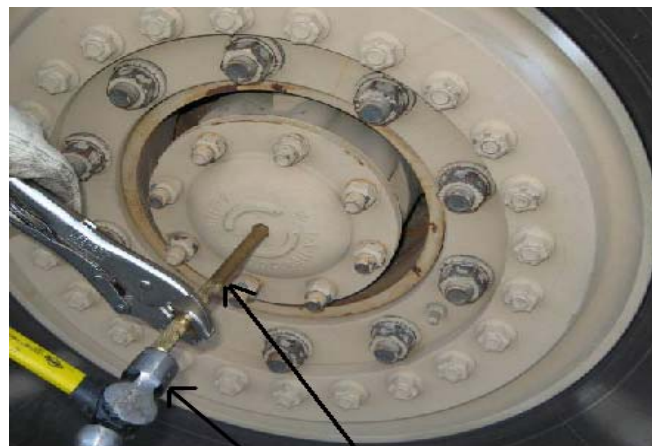
a) Removal

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Identify each axle shaft so that they can be installed in the same location after repair is completed.
5. Remove capscrew and washers or stud nuts and washers from flanges of both axle shafts.

NOTE

A 1- 1/2 inch diameter brass hammer can be used as a drift.

6. Hit the end of the drift with a large hammer (five to six pounds) and the axle shaft and tapered dowels will loosen.



Brass Drift

Hammer

Hit End of Drift with Large Hammer



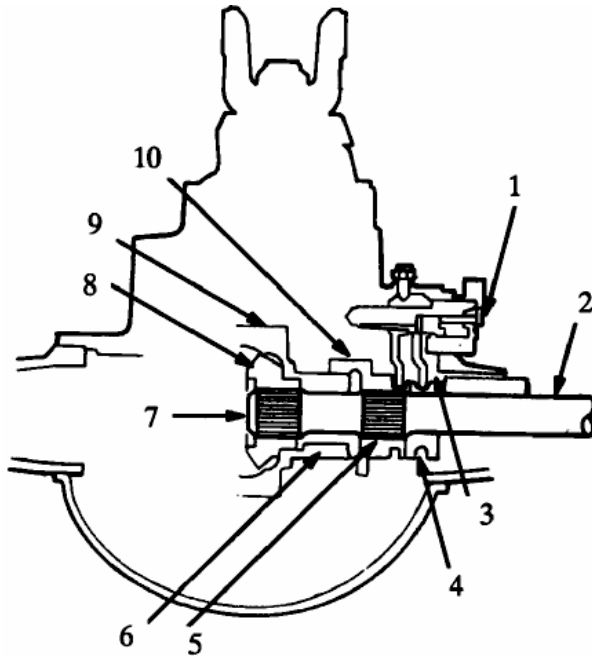
Do not use a chisel or wedge to loosen the axle shafts and dowels. The chisel or wedge can damage the hub, axle shafts and, if used, oil seals.

Chapter 4 – MAINTENANCE INSTRUCTIONS

7. Remove both axle shafts of drive axles.

NOTE

If the axle(s) are equipped with main differential lock, the right-hand axle shaft of single axles have two sets of splines. One set of splines is engaged with the side gear and one set is engaged with the shift collar. It may be necessary to rotate the shaft when pulling it through the shift collar.

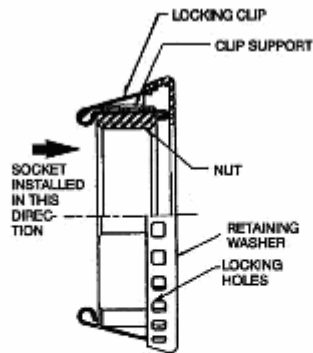


- | | |
|------|---|
| (1) | Actuator Assembly and Shift Fork |
| (2) | Axle Shaft |
| (3) | Interference Between Shift Collar and Housing |
| (4) | Shift Collar in Unlocked Position |
| (5) | Outer Splines Axle Shaft to Shift Collar |
| (6) | Shift Collar and Differential Case Splines |
| (7) | Inner Splines Axle Shaft to Side Gear |
| (8) | Side Gear |
| (9) | Differential (Plain) Case Half |
| (10) | Shift Collar in Locked Position |

NOTE

You may have to rotate shaft when pulling it through shift collar.

Chapter 4 – MAINTENANCE INSTRUCTIONS



{Right click on graphic to bring up an option list}

Figure 16. Axilok Unitized Self-Locking Wheel Bearing Adjusting Nut

International vehicles with 23,000 to 30,000 lb. single rear axles and 38,000 to 58,000 lb. tandem rear axles may have the Axilok unitized self-locking wheel bearing adjusting nut. The Axilok unitized self-locking nut enhances accurate, reliable wheel bearing adjustment. Its unitized design allows precise wheel bearing adjustment end play settings of .001 inch to .005 inch (.0254 to .127 mm) which provides for improved wheel seal and bearing life and meets the requirements of antilock brake systems. A 6 or 12 point 4 inch socket is required to depress the locking clips for the installation and removal of the Axilok wheel bearing adjusting nut.

IMPORTANT

Always use the correct socket. Do not use any other type of instrument to depress the locking clips such as pliers, channel locks, etc.



Never use an impact wrench to install or remove Axilok.

Before re-installing the Axilok, be certain the threads, locking tab, locking clips and retaining washer are free of defects and are in proper working condition.

Be certain the socket is not worn or damaged to the point it will not fully depress the locking clips or properly engage the hex nut feature. Always use a properly calibrated torque wrench when installing an Axilok.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Remove

1. Place the 4 inch socket over the hex portion of the nut to depress the locking clips (Figure 17).
2. Turn nut counterclockwise to remove. When removing the Axilok, it is required to manually keep the retaining washer moving toward the end of the spindle with nut as nut is removed (Figure 17).

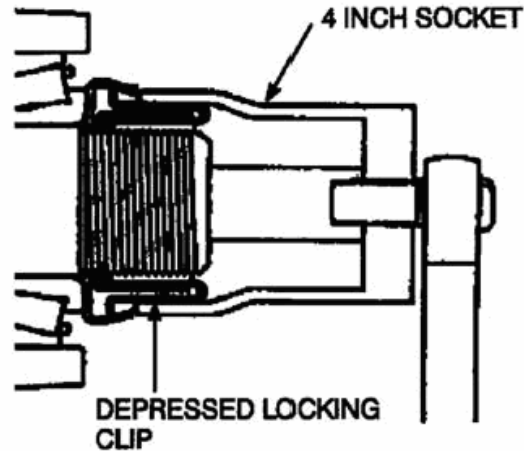


FIG 17

c) Install

1. Apply a few drops of light weight lubricating oil through one of the holes of the retaining washer. This will allow the nut and retaining washer to rotate freely during installation (Figure 18).
2. The nut and retaining washer of the Axilok are locked together with two locking clips. Place the 4 inch standard 6 or 12 point socket over the hex feature of the nut to depress the locking clips, thereby releasing locking clips and allowing the nut to rotate freely within the retaining washer (Figure 19).
3. Align the tab on the retaining washer with the keyway in the spindle. Thread the nut onto the spindle with the socket.
4. After spoke/disc wheel hub, bearings, and Axilok unitized self-locking nut are installed, rotate the assembly while tightening the self-locking nut to 200 ft-lb (271 N•m).
5. Back off Axilok unitized self locking nut to zero torque.
6. Rotate the spoke/disc hub assembly a minimum of one complete revolution while retightening the Axilok unitized self locking nut to 50 ft-lb (68 N•m).
7. Back off the Axilok unitized self-locking nut 1/8 turn.
8. Remove the socket from the Axilok allowing the spring clips to release and engage into the holes in the retaining washer. If the tabs of the locking clips do not line up with the retaining washer holes, rotate the Axilok counterclockwise until the locking clips engage into locking holes (Figure 16).
9. Install axle shaft. Refer to GROUP 14 - REAR AXLES in the CTS-5000 Master Service Manual for detailed information.

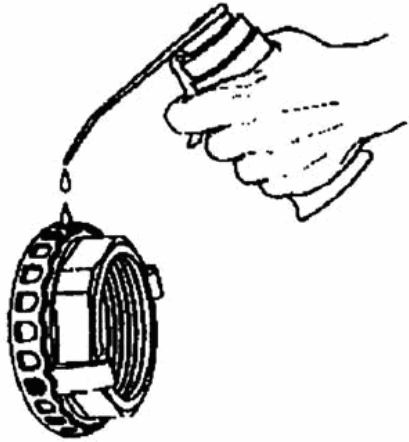
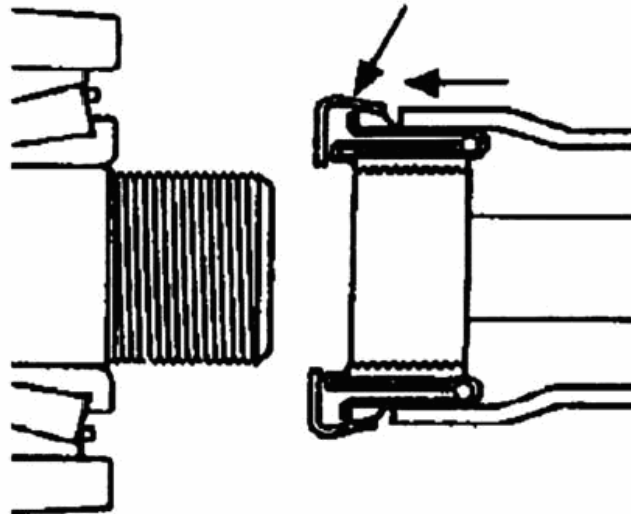


FIG 18



(Right click on graphic to bring up an option list)

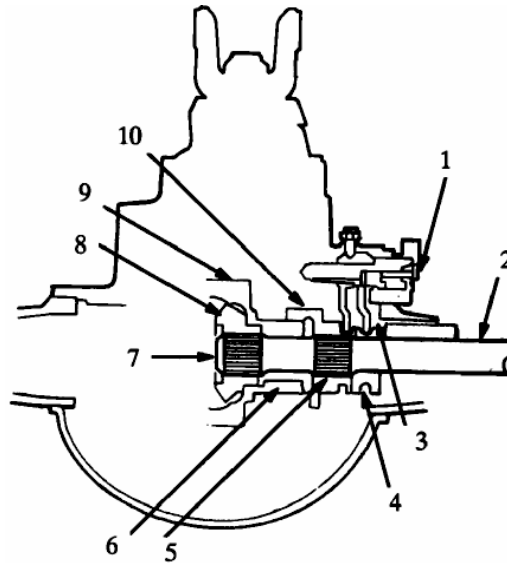
Figure 19. Release Locking Clips

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

NOTE

Prior to re-assembly, parts which are to be reused must be carefully inspected for signs of wear or damage. Replacement of such parts can prevent costly downtime at a future date.



10. Install the left axle shaft following the procedures described.
11. Check the lubricant level in the axles and hubs where the axle shafts were removed. Add lubricant if necessary.

c) Follow-On Maintenance

1. Install rear wheels.
2. Remove safety stands and lower vehicle.
3. Remove wheel chocks.
4. Check operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.10 Front Axle Shaft and Universal Joint Assembly Replacement

FRONT AXLE SHAFT AND UNIVERSAL JOINT ASSEMBLY REPLACEMENT

This task covers:

a) Removal

b) Installation

c) Follow-On Maintenance

INITIAL SETUP

Special Tools

4 7/8" socket

Torque Wrench

Mattox Handle

Driver, Inner Axle Seal

Driver, Spindle Inner Seal

Non-Marking Hammer

Personnel

One (1) Wheeled Vehicle
Mechanic

Material/Parts

Spindle Inner Seal

CV-U-Joint (as required)

Grease

Connector Lubricant

Brake Cleaner

Tie-Rod Remover (as required)

2 Lb Hammer (as required)

Equipment Condition

Transmission set in (N)

Parking Brake set

Engine OFF

Wheels chocked

Battery Disconnect Switch OFF

Tire and rim, brake assembly, spindle removed

Steering Knuckle removed (as required)

Reference

Parts Manual

Equipment Required

Jack and Jack Stand

Follow-On Maintenance

Test drive vehicle

Install Steering Knuckle

Install Spindle

Install Hub

Install Tire Assembly

Check Wheel Alignment



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

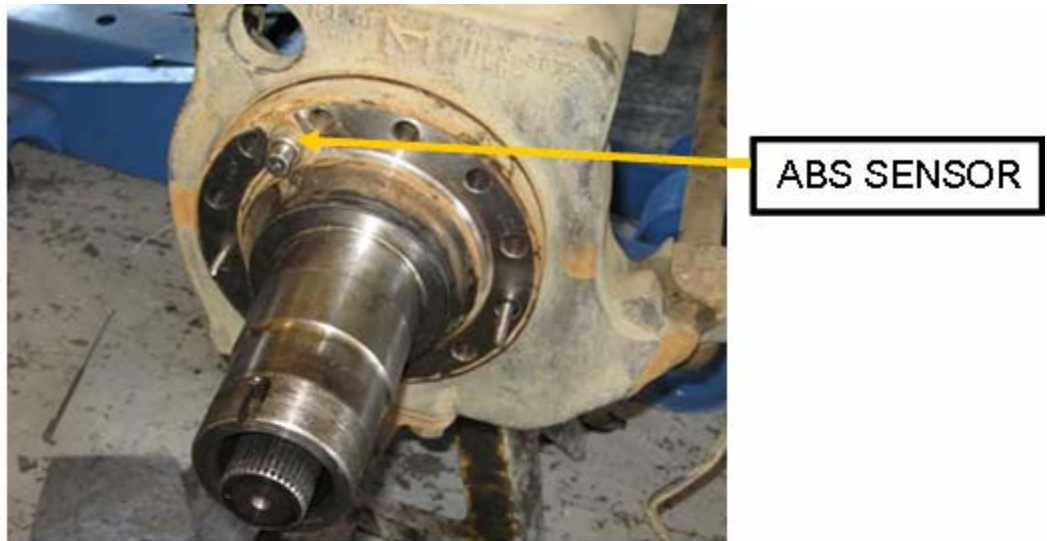
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Remove ABS Sensor and Wiring harness.

NOTE

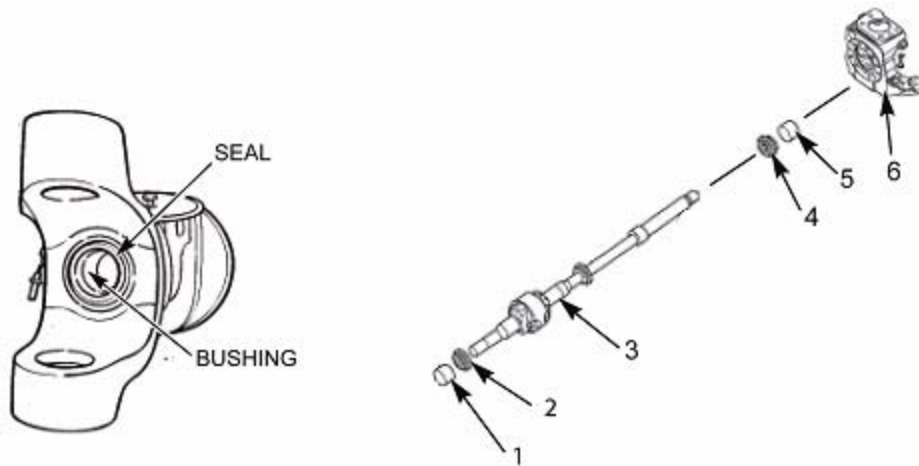
Have front wheels in the straight position before disassembly and assembly. Failure to do so can make the installation of the axle shaft difficult.



NOTE

Mark S Cam (top and bottom) before disassembly.

Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Remove the Grease Seal (1) and the Outer Axle Shaft Bushing (2) through the Steering Knuckle (6).
3. Remove the Axle Shaft from the Axle Housing.

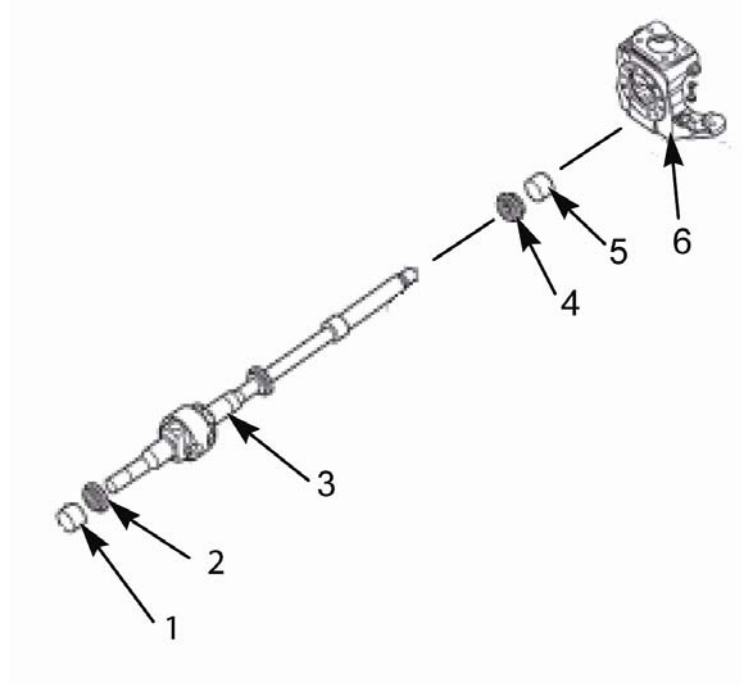
NOTE

Do not disassemble the universal joints, which will void the Meritor® warranty.

4. The cross assemblies are non-greaseable. Do not disassemble the cross assembly. If the cross assembly needs service, replace it with a new assembly. Remove the universal joint and axle shaft assembly (3) from the carrier housing by pulling the assembly STRAIGHT out of the carrier housing.
5. Remove the Oil Seal (4) and the Inner Axle Shaft Bushing (5) from the Front Axle Assembly, if required.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



NOTE

The following is done with the steering knuckle removed.

1. Install the Inner Axle Shaft Bushing.
2. Install Oil Seal, the oil Seal must be installed with the notch at the top. Use correct size sleeve or driver.
3. Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin.
4. Apply a layer of Loctite® 680 sealant on the outside diameter of the bushing.
5. Pack the Bushing with grease before assembly.



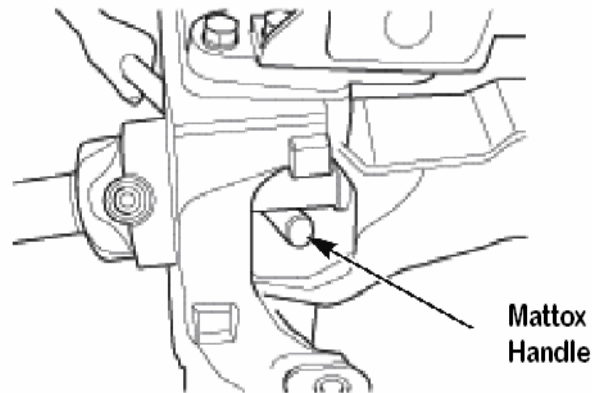
Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin. Apply a layer of Loctite® 680 sealant on the outside diameter of the bushing.

NOTE

Steps below are alternative procedures that can be performed with the steering knuckle still in place.

Chapter 4 – MAINTENANCE INSTRUCTIONS

1. It can be difficult to correctly support and align the inner shaft when installing the longer axle shaft and universal joint assembly through the steering knuckle. The following procedure has been developed to aid in the installation process.
2. Obtain a strong, smooth piece of wood, like an ax handle or sledge hammer handle.
3. Place one end of the piece of wood between the Steering Knuckle and the axle housing.

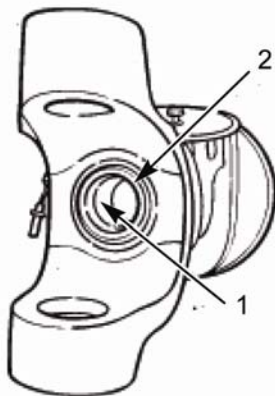


4. Install the inner axle shaft through the steering knuckle and into the axle housing. Use the piece of wood as a lever to support the axle shaft.



Be careful to avoid damaging the inner oil seal when installing the axle shaft.

5. Carefully align the inner shaft splines with the splines of the differential side gear.
6. Install the Axle Shaft assembly through the Steering Knuckle.



7. Install the Oil Seal (1) and the Inner Axle Shaft Bushing, the Oil Seal must be installed with the notch on top. Use correct size sleeve or driver (2) through the Steering Knuckle (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Test Drive Vehicle.
2. Install Steering Knuckle.
3. Install Spindle.
4. Install Hub.
5. Install Tire Assembly.
6. Check Wheel Alignment.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.11 Rear Drive Axle Gasket Replacement

REAR DRIVE AXLE GASKET REPLACEMENT	
This task covers:	
a) Removal	b) Installation
c) Follow-On Maintenance	
INITIAL SETUP	
<p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) Rear Drive Axle Gasket</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine OFF Wheels chocked Battery Disconnect Switch OFF Tire and rim removed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Install tire Assembly Test drive vehicle</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

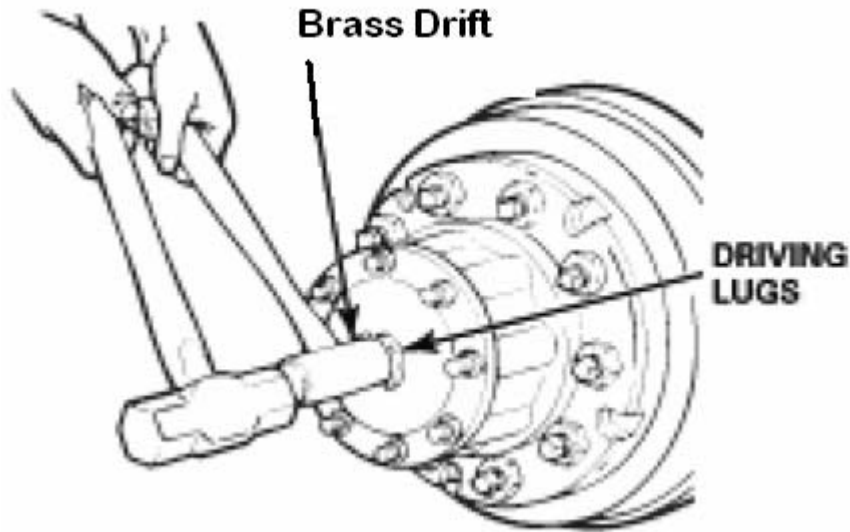
Chapter 4 – MAINTENANCE INSTRUCTIONS

Axle Shaft Removal Methods

Brass Drift Method



Do not strike the round driving lugs on the flange of an axle shaft. Pieces can break off and cause serious personal injury.

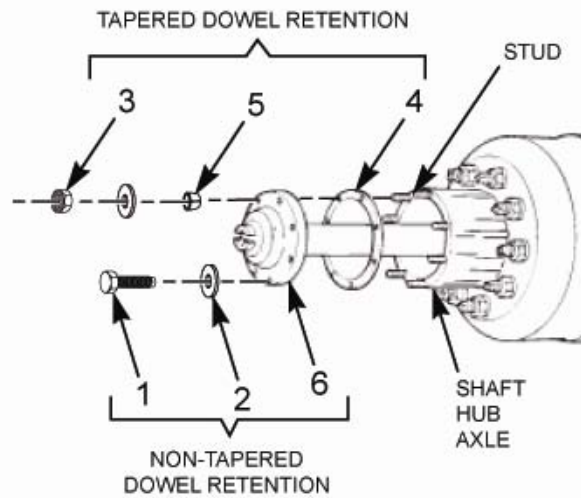


1. Hold a 1-1/2-inch diameter brass drift against the center of the axle shaft, inside the round driving lugs.
2. Strike the end of the drift with a large hammer, five to six pounds, and the axle shaft and tapered dowels will loosen.
3. Mark each axle shaft before it is removed from the axle assembly.
4. Remove the tapered dowels and separate the axle shafts from the main axle hub assembly.
5. Install a cover over the open end of each axle assembly hub where an axle shaft was removed.

NOTE

Mark each axle shaft before it is removed from the axle assembly.

Chapter 4 – MAINTENANCE INSTRUCTIONS



6. Remove the capscrews (1), washers (2), stud nuts (3), gaskets (4), tapered dowel (5), if equipped, from the flanges of both axle shafts (6).



Use a brass or leather mallet to loosen the drive flange from the hub during removal procedures. Do not use a sharp tool to pry the flange from the hub, which can damage mounting surfaces. Do not hit steel parts with a steel hammer. Pieces of a part can break off and cause serious personal injury and damage to components.

Use a torque wrench to tighten or loosen adjusting nuts. Do not use a hammer to directly hit adjusting nuts, or to hit a chisel or drift placed against them. Damaged adjusting nuts can prevent you from obtaining correct wheel bearing end play, which can affect vehicle operation and cause the wheels to separate from the vehicle. Serious personal injury and damage to components will result.

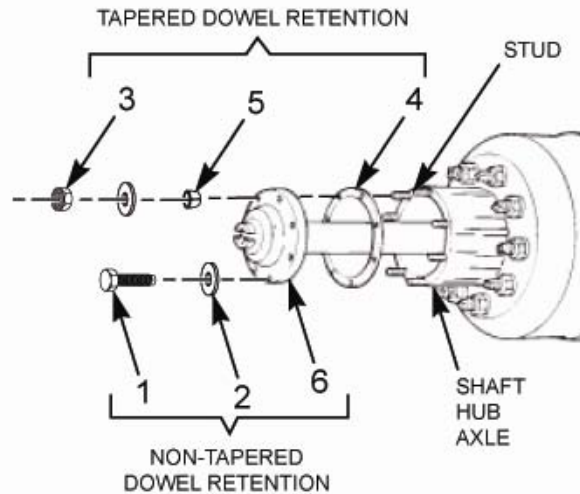
Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

Straight Holes, Nuts and Hardened Washers

1. Clean the mating surfaces of the axle shaft and the wheel hub.
2. If silicone gasket material is used, apply a 0.125-in. (3 mm) diameter bead of the gasket material around the mating surface of the hub and around the edge of each fastener hole.
3. Install the gasket (4) and the axle shaft (6) into the housing. The gasket and the flange of the axle shaft must fit flat against the wheel hub.



4. Install the Grade 8 nuts (3) and hardened washers (2) onto the stud. Lock washers are an acceptable alternative. Tighten the stud nuts (3) or capscrews (1) and washers (2) to the specified torque.

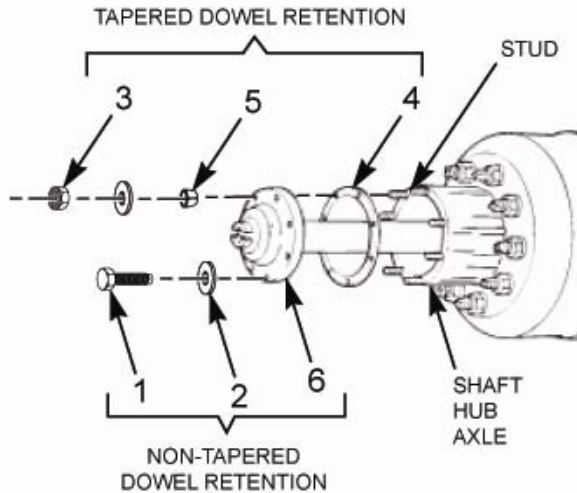
Shaft-to-Hub Torque Fastener Chart- Non-Tapered Dowel Applications

Fastener	Thread Size	Torque Value Grade 8 Nuts lb-ft (N•m)	
		Plain Nut	Locknut
Stud Nut, Axle Shaft	0.62-18	150-230 (244-312)	130-190 (203-258)
	0.75-16	310-400 (420-542)	270-350 (366-475)
Studs	ALL	Install the coarse thread end of the stud into the hub and tighten to the last thread.	

Chapter 4 – MAINTENANCE INSTRUCTIONS

Tapered Dowel, Hardened Washer and Hardened Nut

1. Clean the mating surfaces of the axle shaft and the wheel hub.
2. If silicone gasket material is used, apply a 0.125 in. (3 mm) diameter bead of the gasket material around the mating surface of the hub and around the edge of each fastener hole.
3. Install the gasket and the axle shaft into the housing. The gasket and the flange of the axle shaft must fit flat against the wheel hub.



4. Install solid tapered dowels (5) over each stud and into the flange of the axle shaft (6). Use a punch or a drift and hammer, if necessary.
5. Install the Grade 8 nuts (3) and hardened washers (2) onto the stud. Lock washers are an acceptable alternative. Tighten the stud nuts (3) to the specified torque.

Shaft-to-Hub Torque Fastener Chart- Tapered Dowel Applications

Fastener	Thread Size	Torque Value Grade 8 Nuts lb-ft (N•m)	
		Plain Nut	Locknut
Stud Nut, Axle Shaft	0.44-20	50-75 (81-102)	40-65 (67-88)
	0.50-20	75-115 (115-156)	65-100 (102-136)
	0.56-18	110-165 (176-224)	100-145 (149-197)
	0.62-18	150-230 (244-312)	130-190 (203-258)
Studs	ALL	Install the coarse thread end of the stud into the hub and tighten to the last thread.	

c) Follow-On Maintenance

1. Install tire assembly.
2. Test drive vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.12 Rear Axle Assembly Replacement

REAR AXLE ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Lock nuts (8) Hardened washers (8) Rags Loctite</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine OFF Wheels chocked Vehicle raised on jack stands Drive shaft disconnected Air lines removed and labeled</p>		<p><u>Equipment Condition- Continued</u> Hydraulic lines removed and labeled Electrical lines removed and labeled Remove wheels Remove brake assembly</p> <p><u>Equipment Required</u> Jack (1) Jack stands (4) Drain pan Identification Tags</p> <p><u>Follow-On Maintenance</u> Remove wheel chocks Install removed components and lines Check operation Vehicle raised on jack stands. Connect drive shaft. Install air lines removed and labeled. Install hydraulic lines removed and labeled. Install electrical lines removed and labeled. Install brake assembly. Install wheels Remove wheel chocks.</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

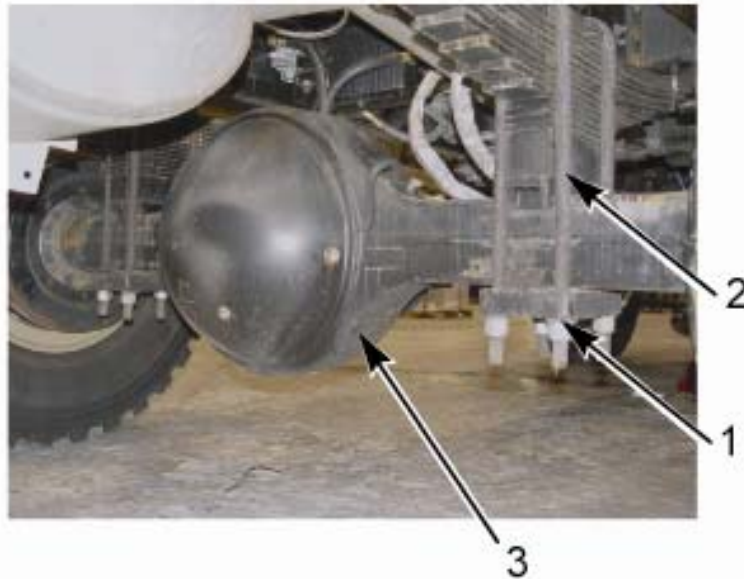


To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

a) Removal

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the rear axle housing to be serviced is off the ground. Support the vehicle with safety stands.
4. Place drain pan under rear axle housing and drain lubricant from rear axle housing if not already done.



NOTE

Tag and reinstall wedge spacer plates for proper location on assembly.

5. Ensure all lines and connections are labeled and removed.
6. Place jack under and support rear axle housing (3).
7. Remove eight (four each side) lock nuts and hardened washers (1) from spring U-bolts (2).
8. Lower axle housing using jack and place on carrier overhaul stand.
9. Install spring hardware removed on U-bolts with lock nuts for installation.

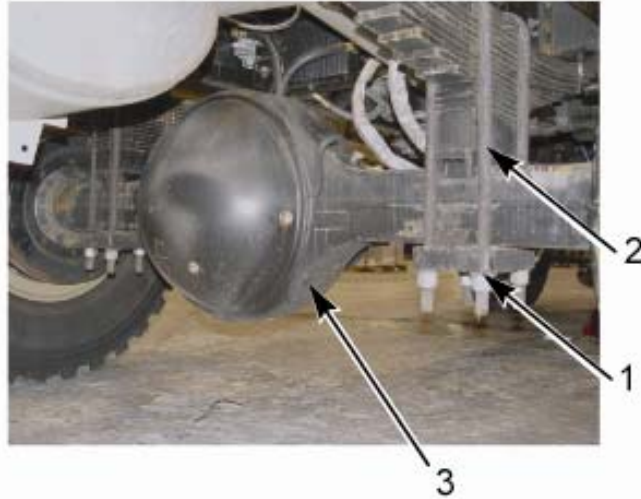
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

NOTE

Prior to re-assembly, parts which are to be reused must be carefully inspected for signs of wear or damage. Replacement of such parts can prevent costly downtime at a future date.

1. Use jack and raise axle housing into position on rear spring assemblies.
2. Remove and discard lock nuts and washers securing spring hardware.



3. Mount axle onto spring and brackets and secure with eight U-bolts (2) with new lock screws and washers (1). Torque to 260-300 ft-lb (352-407 N•m).
4. Reconnect labeled lines and connections removed.
5. Install drive shaft.
6. Refill axle housing with lubricant. Refer to lubrication charts.
7. Lower and remove jack.
8. Install brake assemblies.
9. Install wheels.

c) **Follow-On Maintenance**

1. Vehicle raised on jack stands.
2. Connect drive shaft.
3. Install air lines removed and labeled.
4. Install hydraulic lines removed and labeled.
5. Install electrical lines removed and labeled.
6. Install brake assembly.
7. Install wheels.
8. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-8.13 Front Axle Assembly Replacement

FRONT AXLE ASSEMBLY REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) Front Axle Assembly</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Condition</u> Engine OFF Wheels chocked Battery Disconnect Switch OFF Drain & disconnect air lines Disconnect ABS sensor Disconnect forward drive shaft</p> <p><u>Equipment Required</u> Jack Jack Stands Rags Drip Pan</p> <p><u>Follow-On Maintenance</u> Test drive vehicle Connect air lines Connect ABS sensor Connect forward drive shaft Remove wheel chocks Battery Disconnect Switch ON Front End Alignment Check fluid level</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Use a brass or leather mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off and cause serious personal injury.

Removing the Wheel from the Drum



Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. Park the vehicle on a level surface. Place blocks under the wheels not being serviced to prevent the vehicle from moving.
2. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
3. Retract the brake linings so that the drums will clear the linings.
4. If the steering universal joint is to be removed from the housing, remove the oil drain plug and drain the lubricant from the axle.
5. Remove the rim and tire.

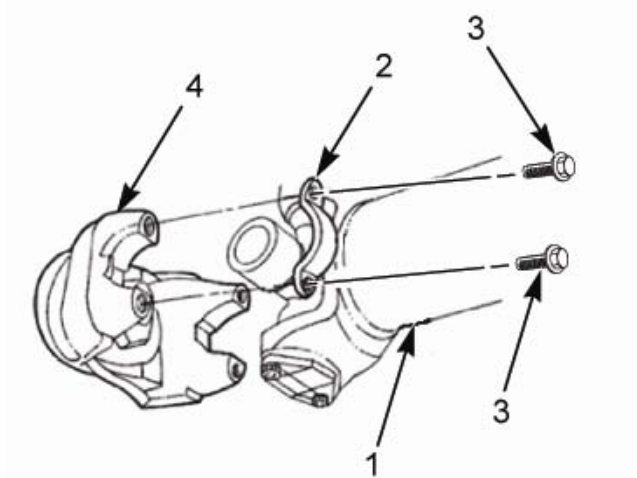
Service Procedure



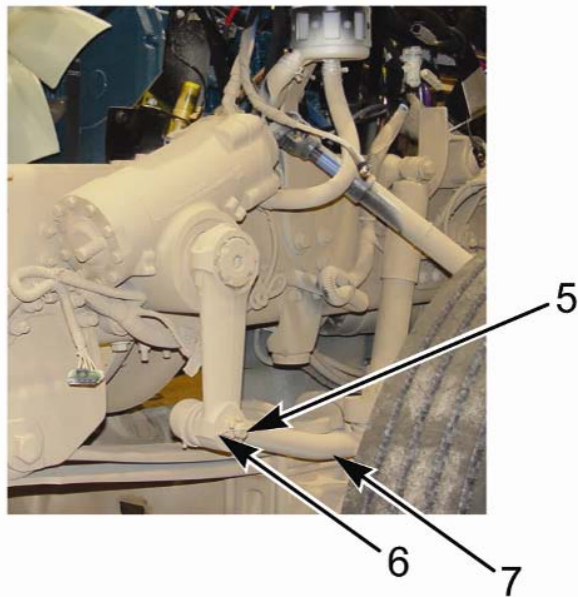
To avoid property damage, personal injury, or death, park the vehicle on a flat Level surface, set the parking brake, turn the engine off, and chock the wheels.

To avoid personal injury or death use a jack stand or equivalent support under the prop shaft during the removal and installation procedure.

Chapter 4 – MAINTENANCE INSTRUCTIONS

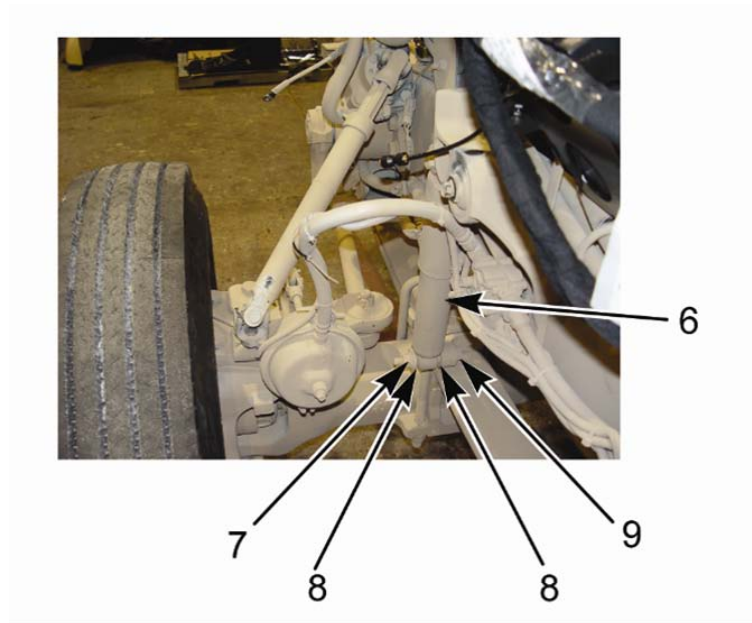


1. Raise the axle and support with jack stands. This will spread the distance between the axles and aid the removal of the prop shaft (1).
2. Remove the two bearing straps (2) and the four mounting bolts (3) from the forward yoke (4).
3. Disengage prop shaft.

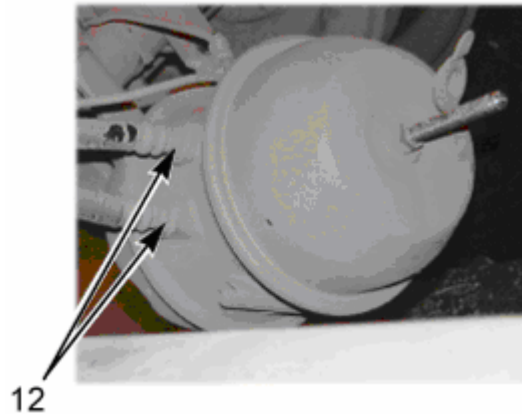


Chapter 4 – MAINTENANCE INSTRUCTIONS

4. Remove cotter pin (5) and remove the nut (6) from the steering drag link (7).

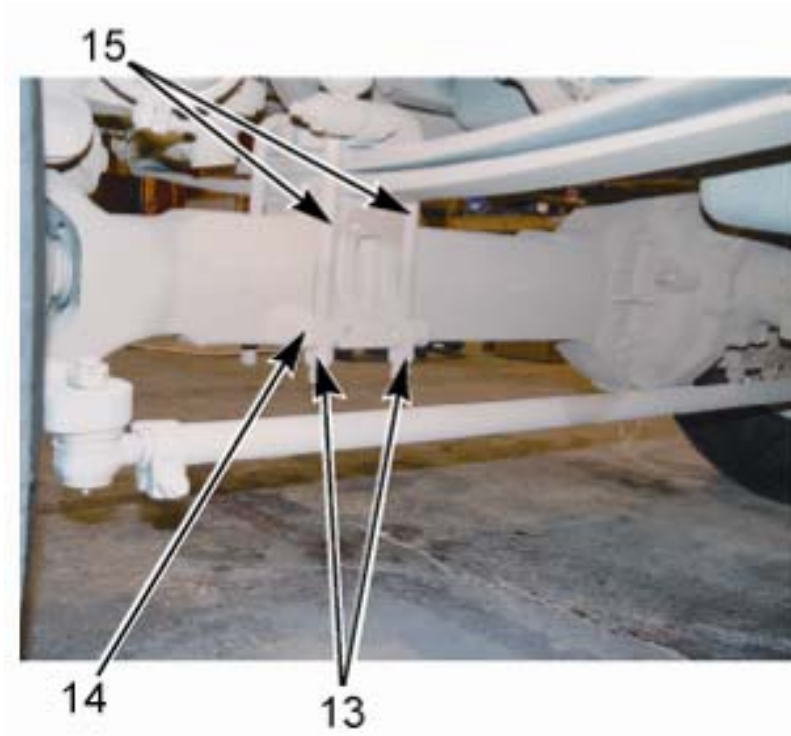


5. Disconnect two shock absorbers (6), driver, and passenger sides by removing two nuts (7), four washers (8), and two bolts (9).



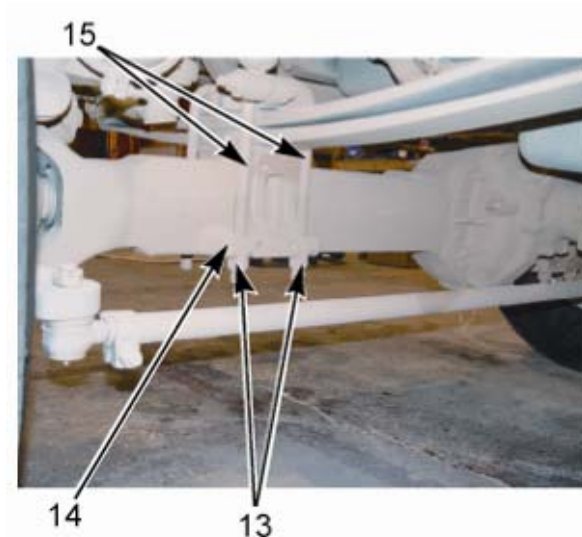
6. Drain the air tank.
7. Disconnect the air lines (12) at the brake chamber.
8. Remove the air brake chamber and bracket from the driver and passenger side.

Chapter 4 – MAINTENANCE INSTRUCTIONS



9. Remove four U-bolt nuts (13) from two axle brackets (15) with the leaf spring lower U-bolt plate (14).
10. Remove front axle assembly.

b) Installation

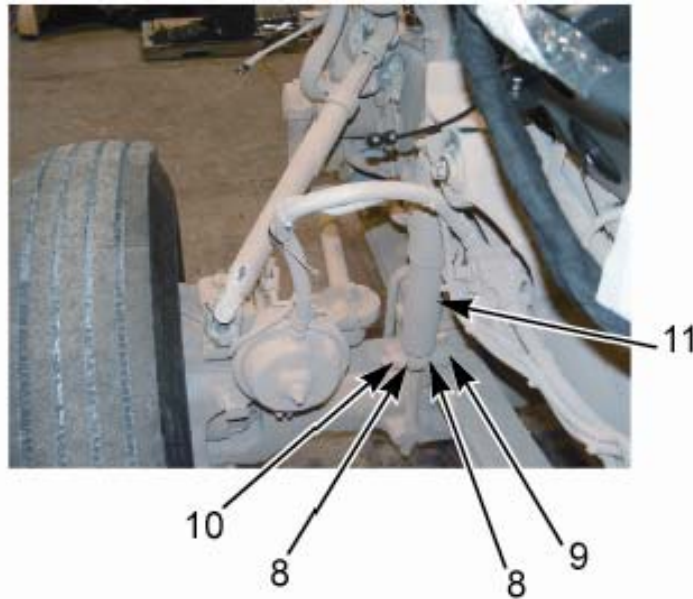


1. With new front axle in position install two leaf spring lower and upper plates (14)
2. Install two axle brackets (15).
3. Install four U-bolts (13) to axle brackets.

Chapter 4 – MAINTENANCE INSTRUCTIONS

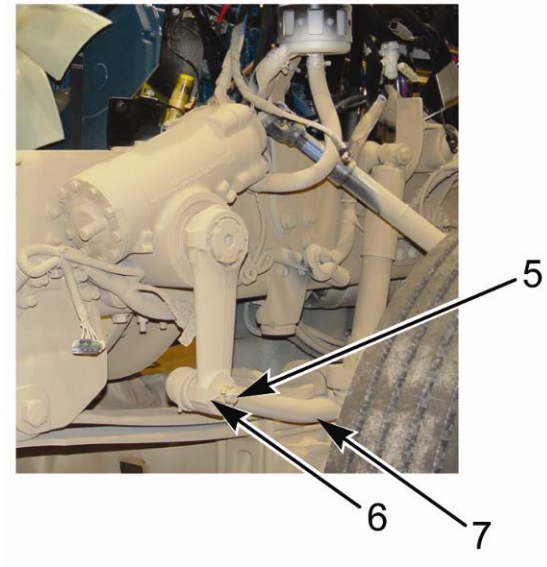


4. Install air brake chamber and bracket to axle housing.
5. Connect air lines (12) at the brake chambers.

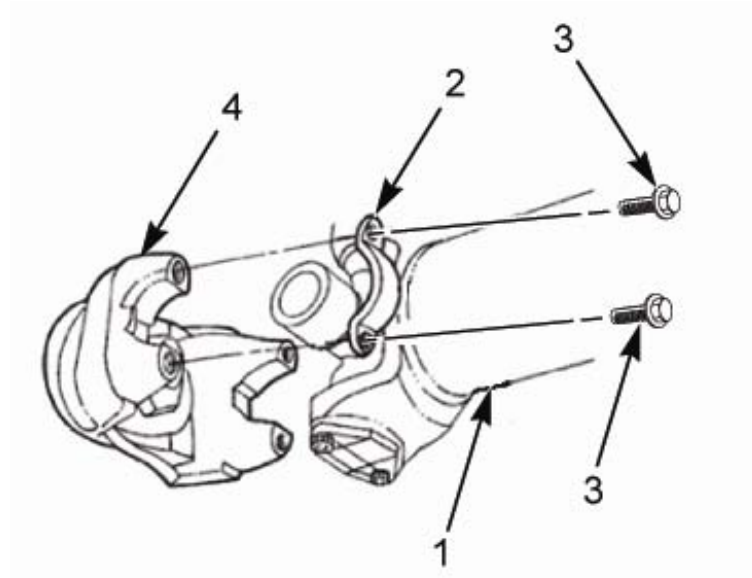


6. Install two shock absorbers (11), driver and passenger sides, by installing two nuts (10), four washers (8) and two bolts (9).

Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Reposition the steering drag link (7) in place, screw on nut (6); install cotter pin (5).



8. Reposition drive shaft into position (1) reposition the two bearing straps (2), and install four mounting bolts (3), to the forward yoke (4).
9. Install rims and tires.
10. Replace lubricant with new lubricant into axle housing.
11. Remove jack stands, lower vehicle, remove blocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Connect air lines.
2. Connect ABS sensor.
3. Connect forward drive shaft.
4. Remove wheel chocks.
5. Battery Disconnect Switch ON.
6. Align Front End.
7. Test drive vehicle.
8. Check Fluid Level.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9 Brakes

4-9.1 Air Dryer Replacement

AIR DRYER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SETUP		
<p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Air Dryer Mounting Nuts (4) Mounting Bolts (4)</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine shut OFF Wheels chocked Air reservoirs drained Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Thread Tape</p> <p><u>Follow-On Maintenance</u> Close drain cocks Start Engine Verify air pressure Remove wheel chocks</p>	



Whenever any component is serviced or removed from the air system, be sure to set the parking brake and chock the vehicle to prevent it from moving while the service is being performed. Failure to do so could result in personal injury and/or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

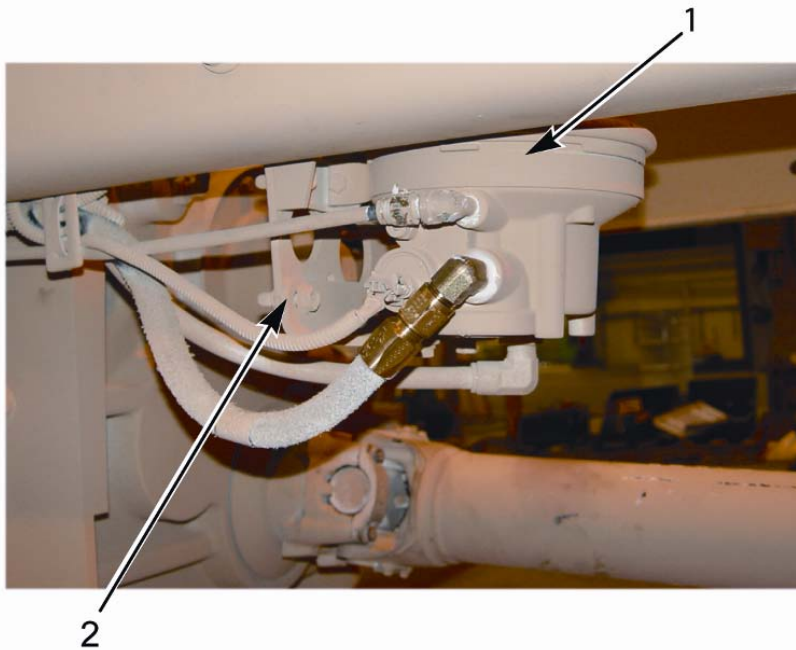
a) Removal

1. Park the vehicle on a level surface and prevent movement by setting the parking brakes and blocking the vehicle.



Drain off all air from the air system before removing brake system components. Failure to do so could result in personal injury and/or death.

2. Drain all reservoirs to 0 psi.



3. Clean the exterior of the dryer end cover (1).
4. Remove fittings and electrical connections from air dryer (1).
5. Remove and discard mounting nuts and bolts (2) that secure the air dryer to frame.
6. Remove and discard air dryer (1).

b) Installation

1. Mount new air dryer (1) to frame using new mounting nuts and bolts (2).
2. Install fittings to new air dryer, using thread tape.

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure and listen as the air dryer purges air with an audible escape of air.
3. Verify that the air system regains full air pressure and the air dryer purges air audibly.
4. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.2 Air Dryer Filter Replacement

AIR DRYER FILTER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Desiccant Filter (1) Mounting Strap (1) Capscrew, Nut, & Lockwasher (1)</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine shut OFF Battery Disconnect Switch OFF Wheels chocked Air reservoirs drained</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Close drain cocks Start engine Verify air pressure Remove wheel chocks</p>	



Whenever any component is serviced or removed from the air system, be sure to set the parking brake and/or block the vehicle to prevent it from moving while the service is being performed. Failure to do so could result in personal injury and/or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

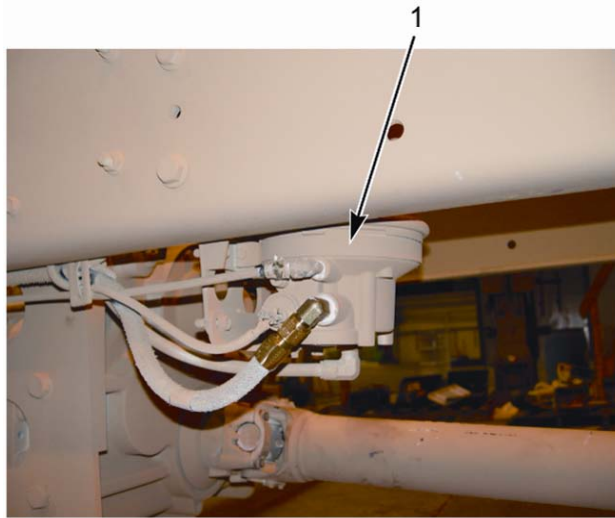
a) Removal

1. Park the vehicle on a level surface and prevent movement by setting the parking brakes and blocking the vehicle.

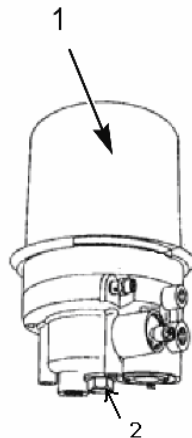


Drain off all air from the air system before removing brake system components. Failure to do so could result in personal injury and/or death.

2. Drain all reservoirs to 0 psi.



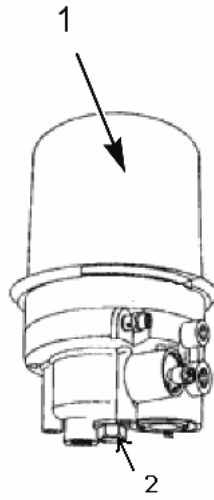
3. Clean the exterior of the dryer end cover (1).



4. Remove bolt (2) from Air Dryer.
5. Remove dryer end cover (1).
6. Remove and discard desiccant filter.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new filter into end cover base.
2. Install end cover (1) over new filter.
3. Install bolt in the Air Dryer.

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure and note that the air dryer purges air with an audible escape of air.
3. Verify that the air system regains full air pressure and the air dryer purges air audibly.
4. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.3 Air Governor Replacement

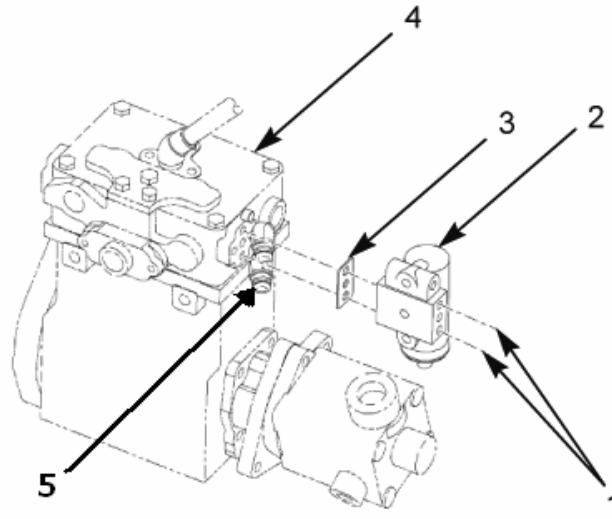
AIR GOVERNOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		
<p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Air Governor Gasket Thread Tape</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p>	<p><u>Equipment Conditions</u> Transmission set in (N) Parking Brake set Engine shut OFF Battery disconnect switch OFF Wheels chocked Left side FSS Removed Left side Armor Removed Air drained from Brake system Air canister removed</p> <p><u>Follow-On Maintenance</u> Install Air Canister Start engine and fill air tanks Test governor for leaks Shut off engine Install left side armor Install left FSS nozzle bracket Remove wheel chocks</p>	



Before working on the air system on the vehicle, make sure you have released the air pressure in the lines. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Drain air from brake system.
2. Disconnect reservoir air line (5).
3. Remove governor mounting bolts (1), governor (2), and gasket (3) from compressor (4).

b) Installation



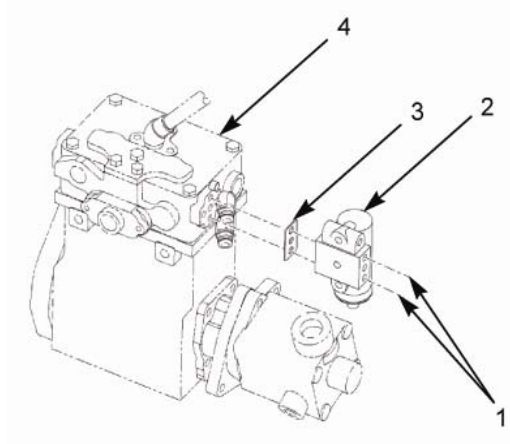
Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water.



When reinstalling air lines, use thread tape, and do not cross thread on installation. This will cause the system to leak and malfunction.

Chapter 4 – MAINTENANCE INSTRUCTIONS



1. Clean mounting area for new gasket (3) and governor (2) on compressor (4) side.
2. Install gasket (3) and governor (2) with mounting bolts (1) to compressor (4). Tighten to specification.
3. Connect air line to Air Compressor using thread tape.

c) Follow-On Maintenance

1. Install Air Canister.
2. Start engine and fill air tanks.
3. Test governor for leaks.
4. Shut off engine.
5. Install left armor.
6. Install left FSS nozzle bracket.
7. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.4 Air Governor Adjustment

AIR GOVERNOR ADJUSTMENT		
This task covers:		
a) Preparation	b) Adjustment	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u> Test gauges
<u>Special Tools</u> None		<u>Equipment Conditions</u> Wheels chocked Left side FSS nozzle bracket removed Left side armor removed Air Canister removed Transmission in NEUTRAL (N) Parking brake set Engine running
<u>Personnel</u> One (1) Wheeled Vehicle Mechanic		
<u>Material Parts</u> None		
<u>Reference</u> Parts Manual		<u>Follow-On Maintenance</u> Shut engine OFF Install air canister Install left side armor Install left side FSS

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Preparation



Use all safety pre-cautions before, during and after this procedure. Wear protective safety goggles/face shield, compressed air is very dangerous. During this procedure the vehicle's engine needs to be running, use extreme caution. Make sure that there is no one behind vehicle, under vehicle, or in vehicle while you are working on the engine. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.



Only test gauges known to be accurate are to be used for checking brake valve pressures, governor pressure settings and other tests. Failure to comply may result in damage to equipment.

1. Chock vehicle wheels before start.
2. Start the vehicle engine up to build air pressure in the air brake system.
3. Check the pressure registered by the dash gauge or test gauge at the time the governor cuts out, stopping the compression of air by the compressor. The cut-out pressure should be 125 psi.
4. Apply pressure to the brake pedal a couple times to reduce the air pressure and watch to see which pressure the governor cuts in the compressor. The cut-in pressure should be 100-105 psi.
5. If the pressure settings for the governor are inaccurate, or if they need to be adjusted, follow the procedure below.

Chapter 4 – MAINTENANCE INSTRUCTIONS

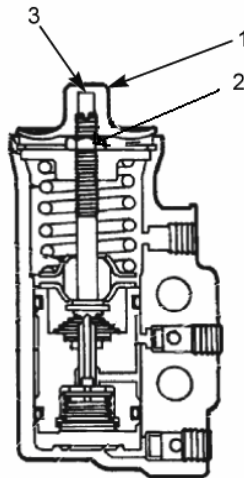
b) Adjustment



Use extreme caution when doing adjustments on the governor, vehicle is still running and there are moving parts. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

NOTE

Each ¼ turn on the adjusting screw of the governor will change the setting by approximately 4 psi. Any governor requiring more than a full turn adjustment in either direction should be cleaned and inspected.



1. To adjust governor, first unscrew the cover (1) at top of governor.
2. Loosen the adjusting screw lock nut (2).
3. Turn adjusting screw (3) counterclockwise to raise the pressure setting.
4. Turn adjusting screw (3) clockwise to lower the pressure setting.
5. After the adjustment is completed, the adjusting screw lock nut (2) should be tightened to lock in the adjustment.
6. Screw cover (1) securely onto governor.

c) Follow-On Maintenance

1. Shut engine OFF.
2. Install Air Canister.
3. Install left side armor.
4. Install left side FSS nozzle bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.5 Air Lines and Air Hose Replacement

AIR LINES AND AIR HOSE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Flexible tubing Fittings (2)</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine shut OFF Wheels chocked Air reservoirs drained Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Close all reservoir drain cocks Start the engine to build up system air pressure Check for leaks Verify that the air system regains full air pressure and the air dryer purges air audibly Remove wheel chocks</p>	



Whenever any component is serviced or removed from the air system, set the parking brake and chock the wheels to prevent it from moving while the service is being performed. Failure to do so could result in personal injury and/or death.

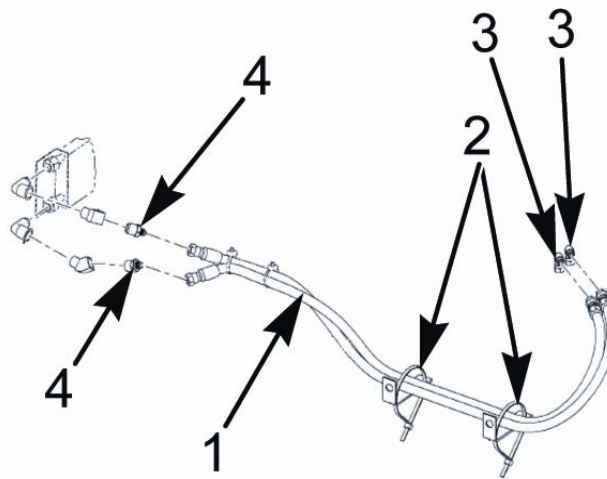
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Drain all air from the air system before removing air lines or hose. Failure to do so could result in personal injury and/or death.

1. Park the vehicle on a level surface and prevent movement by setting the parking brakes and blocking the vehicle.
2. Open drain valves on reservoir tank(s).
3. Drain all reservoirs to 0 psi.



4. Disconnect air line/hose (1) fittings (3) from each end. Note location of fittings.
5. Remove and discard any cable lock straps (2) securing the air line/hose.
6. Remove and discard air line/hose.

b) Installation

1. Route new air line/hose (1) replacing hoses removed.
2. Insert any adapters (4) or fittings (3) required.
3. Attach fittings to components.
4. Install any cable lock straps (2) or other tie downs removed.

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure.
3. Check for leaks.
4. Verify that the air system regains full air pressure and the air dryer purges air audibly.
5. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.6 Air Reservoir Replacement

AIR RESERVOIR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Air Reservoir Mounting Strap (4) Mounting Strap Nuts (8)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p>	<p><u>Equipment Condition</u> Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Wheels chocked Parking brake set Air reservoirs drained Belly armor removed Bottom compartment armor removed Batteries and box removed Battery box support removed</p> <p><u>Follow-On Maintenance</u> Close all reservoir drain cocks Start engine to build up air pressure Check for leaks Verify that air system regains full pressure and the air dryer purges air audibly. Install battery box frame and battery box Install battery support Install battery armor Install belly armor Remove wheel chocks.</p>	



Whenever any component is serviced or removed from the air system, be sure to set the parking brake and/or block the vehicle to prevent it from moving while the service is being performed. Failure to do so could result in personal injury and/or death.

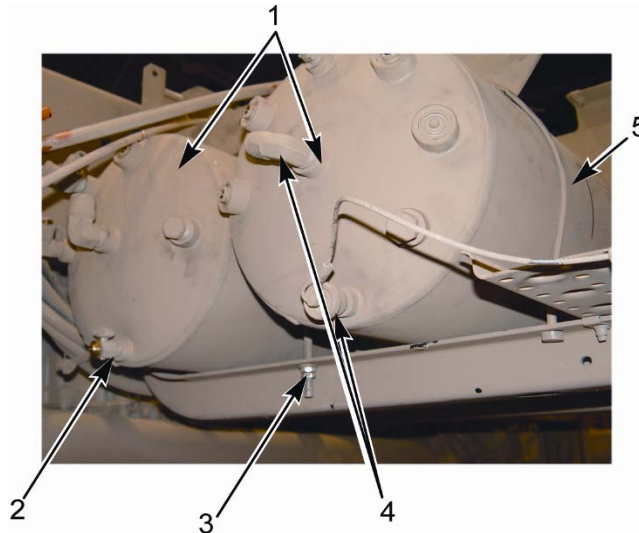
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Park the vehicle on a level surface and prevent movement by setting the parking brakes and blocking the vehicle.



Drain all air from the air system before removing brake system components. Failure to do so could result in personal injury and/or death.



2. Open drain valves (2) on reservoir tank(s) (1).
3. Drain all reservoirs to 0 psi.
4. Disconnect reservoir tank fittings (4). (Same on both Tanks)
5. Remove and discard nuts (3) and support straps (5).
6. Remove reservoir tank(s) (1).

b) Installation

1. Mount new air reservoir tank (1) to frame.
2. Secure with new support straps (5) and new mounting nuts (3).
3. Install fittings (4) to new reservoir air tank(s).

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure.
3. Check for leaks.
4. Verify that the air system regains full air pressure and the air dryer purges air audibly.
5. Install battery box frame and battery box.
6. Install battery support.
7. Install Battery armor.
8. Install belly armor.
9. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.7 ABS Sensor Replacement

ABS SENSOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Material/Parts</u> ABS Sensor</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Engine shut OFF Wheels chocked Battery Disconnect Switch OFF Tires removed Hub Removed Brake Drum removed</p> <p><u>Equipment Required</u> Floor Jack Jack Stand</p> <p><u>Follow-On Maintenance</u> Reinstall brakes Reinstall hub Reinstall brake drum Reinstall tires and wheels Remove jack stand and lower vehicle to ground Battery Disconnect Switch ON</p>	

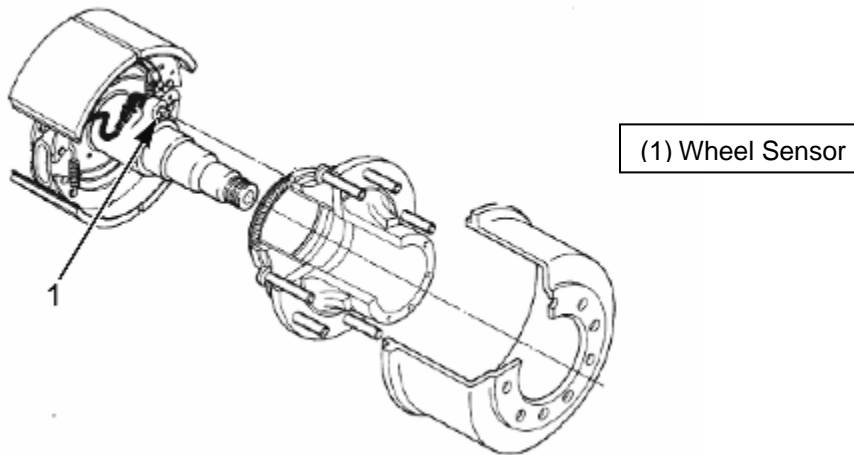
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Make sure that vehicle is parked on level surface and apply parking brakes.

Make sure you have safety goggles/glasses and respiratory. Brake shoes may contact asbestos, which has been determined to be a cancer causing agent. Never clean the brake surface with compressed air. Avoid inhaling any dust from any brake surface. Only use authorized brake cleaning fluid.



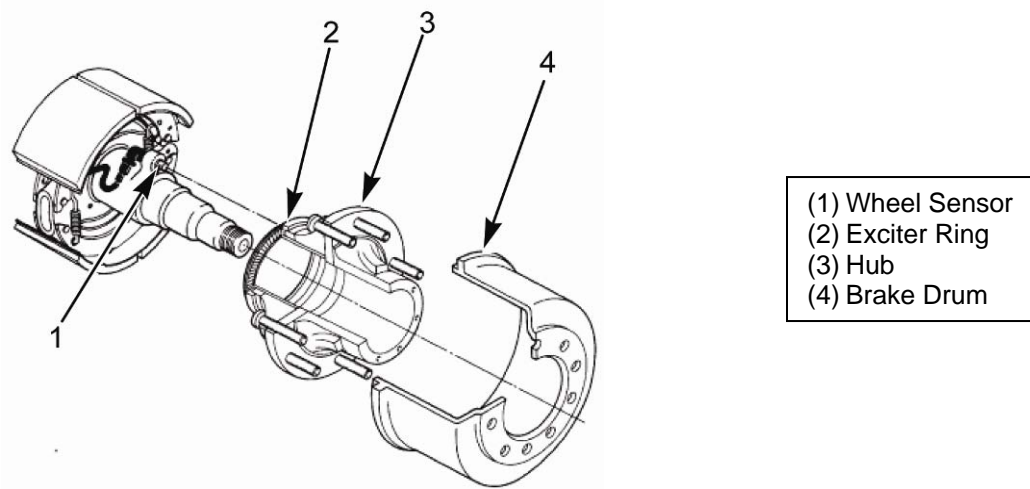
1. Clean ABS sensor area and brake shoe area with authorized brake cleaner.
2. Disconnect ABS sensor (1) connector.
3. Loosen bolt/screw and remove ABS sensor (1) from mounting location.
4. Clean area and contact for new sensor.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use NOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately.



1. Apply anti-corrosion compound to sensor (1) bolt/screw and mounting location.
2. Install sensor on wheel assembly and bolt/screw into place.
3. Apply connector lubricant to connector and connect.

c) Follow-On Maintenance

1. Reinstall brakes.
2. Reinstall Hub (3).
3. Reinstall Brake Drum (4).
4. Reinstall Tires and Wheels.
5. Remove Jack Stand and lower vehicle to ground.
6. Battery Disconnect Switch ON.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.8 Air Line Grommet Replacement

AIR LINE GROMMET REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Air Manifold (1)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p>	<p><u>Equipment Conditions</u> Engine shut OFF Drain air tanks and reservoirs Battery Disconnect Switch OFF Parking brake set Transmission set in NEUTRAL (N) Wheels chocked Engine hood raised and secured Remove air filter assembly (if needed) Remove air lines</p> <p><u>Follow-On Maintenance</u> Install air lines Install air filter (if removed) Battery Disconnect Switch ON Start engine Pressurize air system Verify air gauge operation Check for air leaks Verify brake operation Remove wheel chocks Test drive vehicle</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS



Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.

Engine components become extremely hot during normal operation. Always allow engine to cool completely prior to performing any task or procedures on it. Working in close quarters in engine compartment can be difficult moving around. Wear proper safety equipment; safety goggles, work gloves, long sleeves or shop coat. Failure to comply may result in serious burns, cuts, or injury or death to personnel.

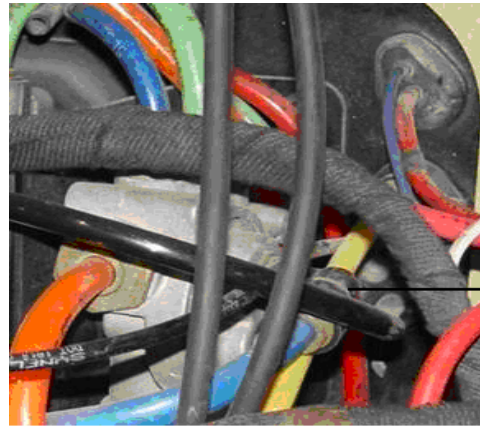
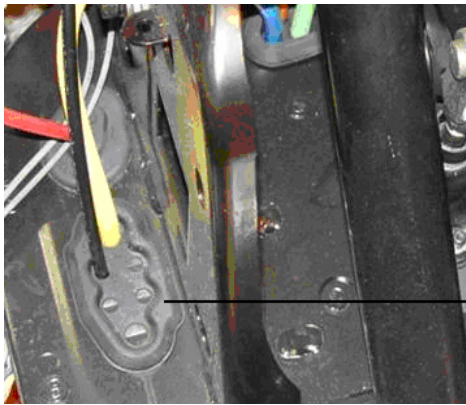
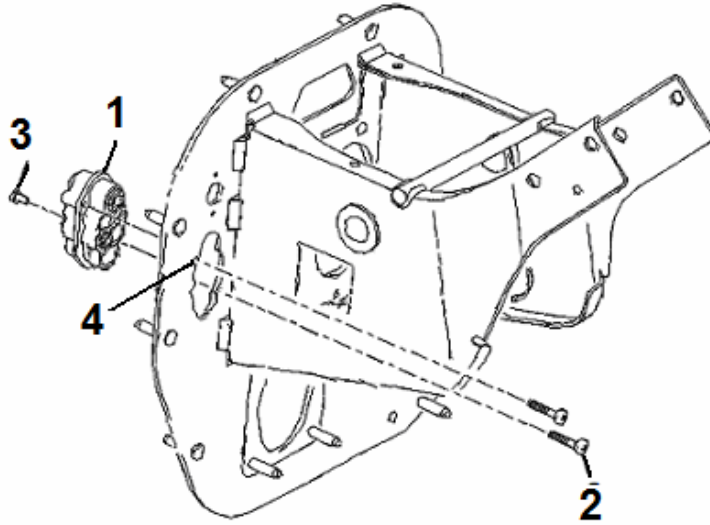
DO NOT operate vehicle with air pressure system loss, this is extremely dangerous. Vehicle has reduced or no braking capability and may not stop. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

DO NOT disconnect any air line or fitting until system pressure has been relieved. Air under pressure can penetrate the skin. Failure to comply may result in serious injury or death to personnel.

Protective eye goggles or face shield needs to be worn. Air drain valves are under pressure. DO NOT place face in front of air drain valves while draining air reservoirs. Open air drain valves slowly to prevent sudden blast of air. Failure to comply may result in serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. On the inside of vehicle cab, pull back the rubber covering (5) to expose the steering column mounting plate (4) screws (2).
2. Remove two mounting screws (2) holding air line grommet (1) to steering column plate bracket (4).
3. Push the air line grommet from inside of cab towards the engine compartment.
4. Pull air lines from air line grommet (1) and discard air line grommet (1).

b) Installation

1. Pull air lines (3) through new air line grommet (1).
2. Push air line grommet (1) into position from the engine compartment side through firewall steering column mounting plate (4).
3. Pull back rubber covering (5) and install two mounting screws (2) to hold air line grommet (1) into place in steering column mounting plate (4).
4. Tighten screws (2).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Install air lines.
2. Install air filter, if removed.
3. Battery Disconnect Switch ON.
4. Start engine.
5. Pressurize air system.
6. Verify air gauge operation.
7. Check for air leaks.
8. Verify brake operation.
9. Remove wheel chocks.
10. Test drive vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.9 Brake Chamber Replacement

BRAKE CHAMBER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Nut (2) Washer (2) Pin Slack Adjuster (1) Cotter Pin (1)</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Condition</u> Transmission set in (N) Battery Disconnect switch OFF Engine shut OFF Wheels chocked Parking brake set Air reservoirs drained</p> <p><u>Equipment Required</u> Jack Jack Stand</p> <p><u>Follow-On Maintenance</u> Close all reservoir drain cocks. Start engine to build up air pressure, confirm air reservoir purges air with an audible escape of air. Verify air system regains full air pressure. Verify automatic slack adjuster is operational. Remove wheel chocks.</p>	



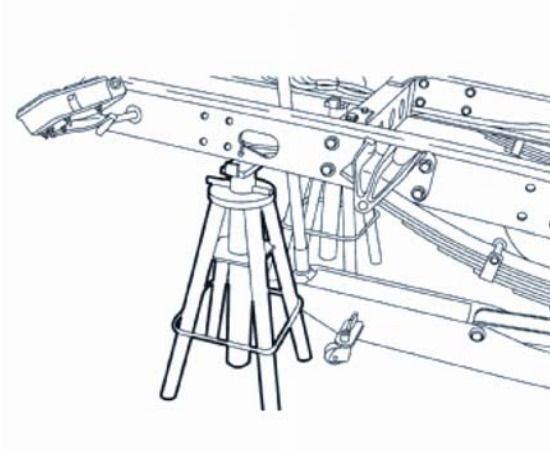
Whenever any component is serviced or removed from the air system, be sure to set the parking brake and/or block the vehicle to prevent it from moving while the service is being performed. Failure to do so could result in personal injury and/or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

Raise and support the vehicle using a suitable jack and rated jack stands that can support the weight of the vehicle.

a) **Removal**

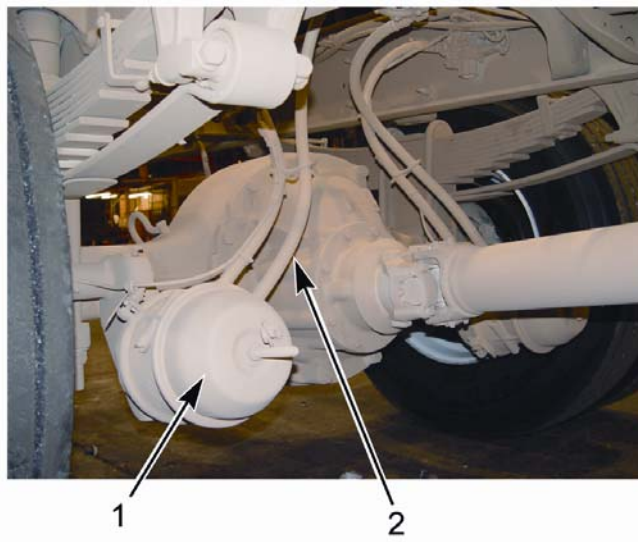


1. Using a suitable jack, raise, and support the front or rear of the vehicle with jack stands.
2. Remove the front or rear wheels.



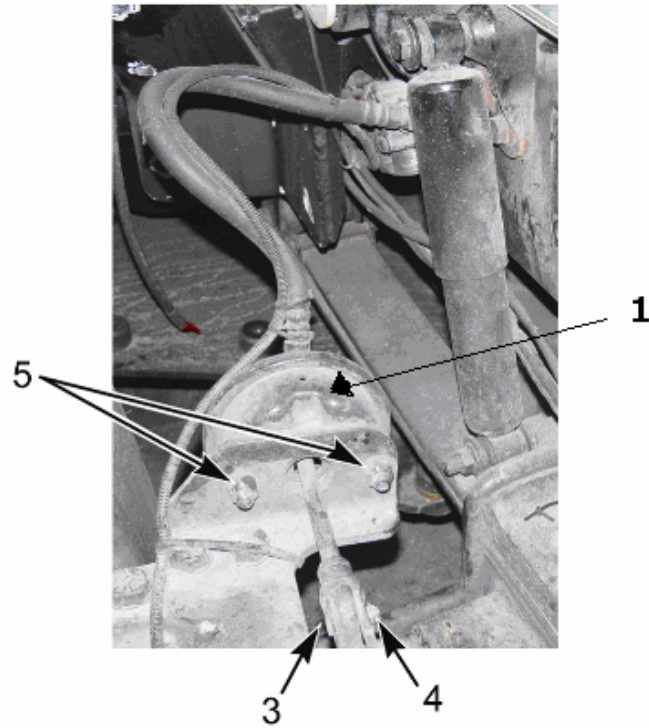
Drain all air from the air system before removing brake system components. Failure to do so could result in personal injury and/or death.

3. Drain all air reservoirs to 0 psi.



4. Remove the air hoses (2) from the brake chamber (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS



5. Remove and discard cotter pin (3) and slack adjuster pin (4) from slack adjuster.
6. Remove and discard the two nuts and washers (5) securing the brake chamber to the axle.

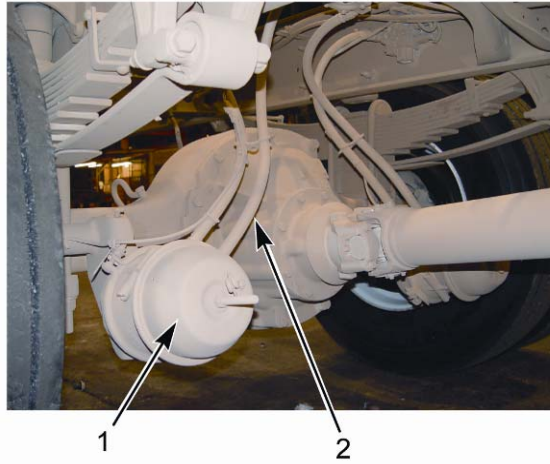
NOTE

Note the orientation of the brake chamber before removing.

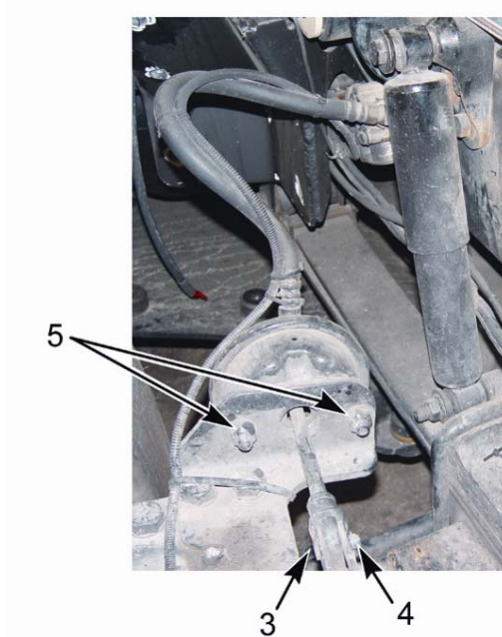
7. Remove the brake chamber (1) by pulling forward so the slack adjuster clears the axle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new brake chamber (1) noting orientation for mounting bolts and air hoses (2).



2. Install new washers and nuts (5) and torque to 100-115 ft-lb (136-156 Nm).
3. Insert slack adjuster into axle arm.
4. Insert pin (4) and secure with cotter pin (3).
5. Install the air hose (2) from the brake chamber (1).

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure and confirm that the air reservoir purges air with an audible escape of air.
3. Verify that the air system regains full air pressure.
4. Verify automatic slack adjuster is operational.
5. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.10 Brake Inspection and Adjustment

BRAKE INSPECTION AND ADJUSTMENT		
This task covers:		
a) Inspection	b) Adjustment	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> Two (2) Wheeled Vehicle Mechanics</p> <p><u>Material Parts</u> None</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Conditions</u> Transmission set in (N) Battery Disconnect switch OFF Engine shut OFF Wheels chocked Parking brake applied Remove wheel and tire assembly Brake drum removed</p> <p><u>Equipment Required</u> Floor Jack Jack Stand (suitable jack and rated jack stand that can support the weight of the vehicle)</p> <p><u>Follow-On Maintenance</u> Install brake drum Install wheel and tire assembly Remove jack stand Remove floor jack Check Brakes</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Inspection



Brake shoes and inside surface of brake drums may be coated with asbestos dust, wear required face shield and mask when performing this task. Breathing this dust may be harmful to your health. Do not use compressed air to clean brake drums. Use required brake cleaner spray to remove the dust residue from brake shoes and drums. Failure to comply may result in serious injury or death to personnel.

1. Clean dust and dirt from brake shoes and brake drum.
2. Inspect brake shoes for missing or damaged springs.

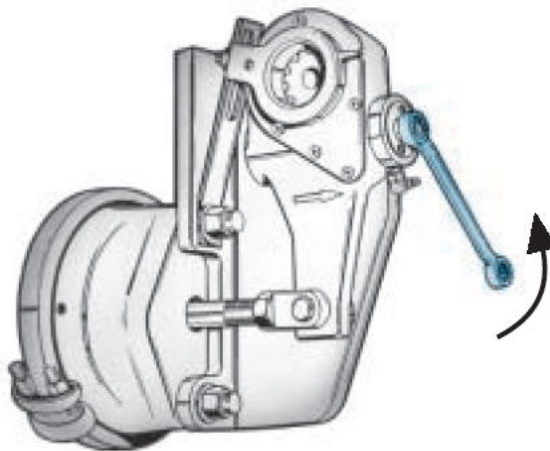


If there are any missing or damaged springs replace immediately. Replace brake shoes if there are any signs of overheating, if step on center wear tab of brake shoe lining is not visible, or if thickness on any part of brake shoe is ¼ inch (6mm) or less. Failure to comply may result in damage to equipment.

3. Inspect brake shoes for obvious groves, uneven wear, signs of overheating, discoloration, glaze, and thickness.
4. Install brake drum on hub housing and finger tighten to make adjustments.

b) Adjustment

1. Rotate the adjusting hex clockwise until the lining lightly contacts the drum.
2. Back off the adjuster by turning the adjusting hex counter-clockwise ½ of a turn.



Chapter 4 – MAINTENANCE INSTRUCTIONS

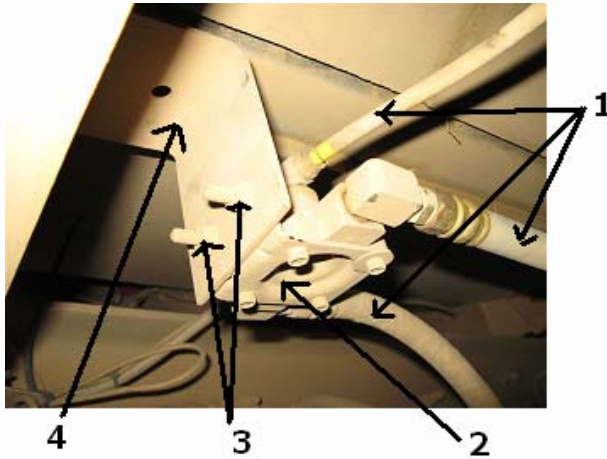
3. A minimum of 13 ft-lb is necessary to overcome the internal clutch. A ratcheting sound will be present.
4. DO NOT use an impact wrench or internal damage will occur.

c) Follow-On Maintenance

1. Install brake drums.
2. Install wheel and tire assembly.
3. Remove jack stand.
4. Remove floor jack.
5. Check brakes.

Chapter 4 – MAINTENANCE INSTRUCTIONS

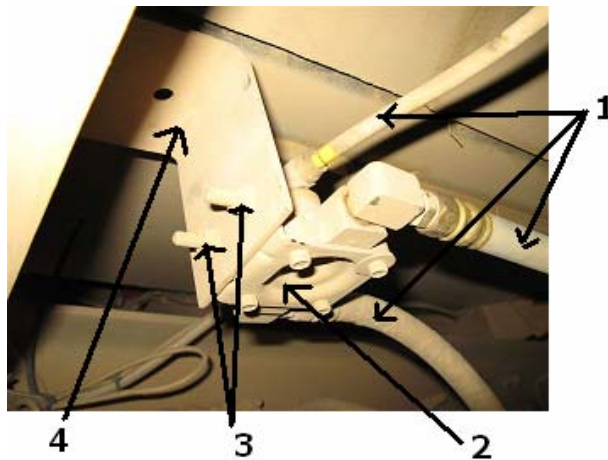
a) Removal



1. Tag and remove 3 ea air lines (1) from check valve (2).
2. Remove 2 bolts and nuts (3) located on valve mounting bracket (4).
3. Remove valve (2).

b) Installation

1. Install valve (2) onto mounting bracket (4), using 2 bolts and nuts (3).
2. Connect 3 each air lines (1) to Service Brake Valve (2).



c) Follow-On Maintenance

1. Start engine.
2. Check valve for leaks.

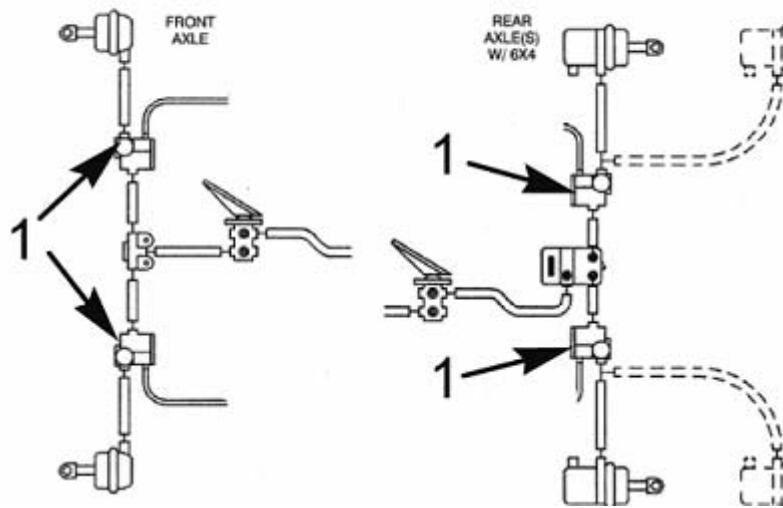
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Park the vehicle on a level surface and prevent movement by setting the parking brakes and chocking the wheels.



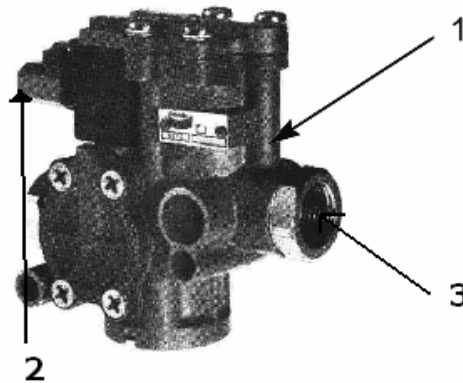
Before removing air lines or hoses drain all air from the air system. Failure to do so could result in personal injury and/or death.



2. Open drain valves on air reservoir tank(s).
3. Drain all air reservoirs to 0 psi.

NOTE

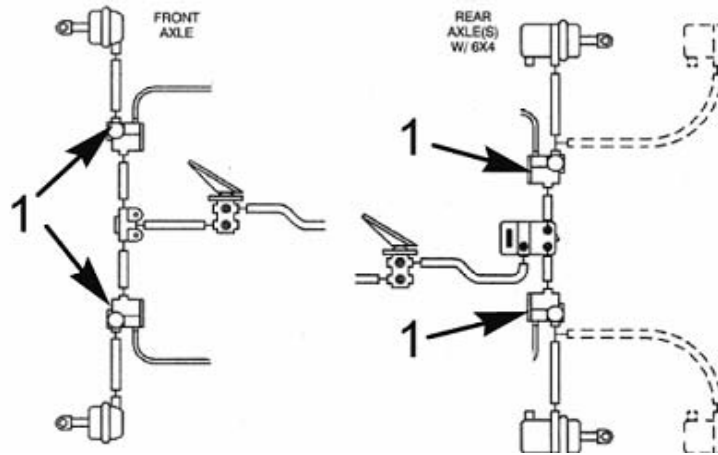
Identify and mark or label all air lines and their respective connections on the valve to facilitate ease of installation.



4. Disconnect both air lines (3) and electrical connections (2) from modulator valve (1).
5. Remove the modulator valve (1) from the vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

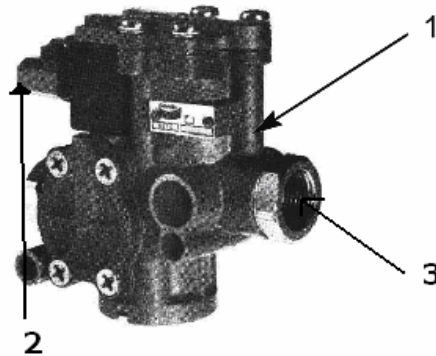
b) Installation



1. Install all air line fittings and plugs, making certain thread sealing material does not enter the valve (1).
2. Install the assembled modulator valve (1) on the vehicle.

NOTE

Refer to the labeled harnesses that were previously removed.



3. Reconnect both air lines (3) to the modulator valve (1) using the identification made during removal Step 4.
4. Reconnect the electrical connector (2) to the modulator valve (1).
5. After installing the valve, test all air fittings for excessive leakage. Tighten fittings as needed.

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure.
3. Check for leaks.
4. Verify that the air system regains full air pressure.
5. Check brakes for proper operation.
6. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.13 Brake Shoe Replacement

BRAKE SHOE REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crewmember</p> <p><u>Material Parts</u> Brake Shoes Spring Hardware Kit</p>	<p><u>Equipment Conditions</u> Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Wheels chocked Parking brake applied Wheel & tire assembly removed Rear 5 inch spacer removed Brake drum removed</p> <p><u>Equipment Required</u> Jack Stand Floor Jack (Suitable jack and rated jack stand that can support the weight of the vehicle.)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Install brake drum Install rear 5 inch spacer Install wheel & tire assembly Remove jack stand Remove floor jack</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS



Brake shoes and inside surface of brake drums may be coated with asbestos dust wear required face shield and mask when performing this task. Breathing this dust may be harmful to your health. Do not use compressed air to clean brake drums. Use required brake cleaner spray to remove the dust residue from brake shoes and drums. Failure to comply may result in serious injury or death to personnel.

If there are any missing or damaged springs replace immediately. Drums will have to be turned or replaced if there are any signs of overheating on the brake shoes. Failure to comply may result in damage to equipment.

Springs are under extreme tension and can act as projectiles when being removed. Ensure all personnel wear protective goggles. Failure to comply may result in serious injury or death to personnel.



When one brake shoe needs to be replaced, all brake shoes for that axle must be replaced. Failure to comply may result in damage to equipment.

NOTE

Two pair of shoes are required per axle, note position and anchor points prior to brake shoe removal to ensure proper installation, and all brake shoes are removed the same way.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Clean brake dust with required brake cleaner before removing parts. To ease in removal and installation.
2. Make sure there is no one standing directly behind you when you are removing springs and pins since these are under load.
3. Note the position of the springs and hardware holding the brake shoes into place to ease in installation.
4. Remove the springs (1) and support bars (2) from lower brake shoe.
5. Remove lower brake shoe.
6. Repeat steps 4 and 5 for upper brake shoe and remove shoe.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



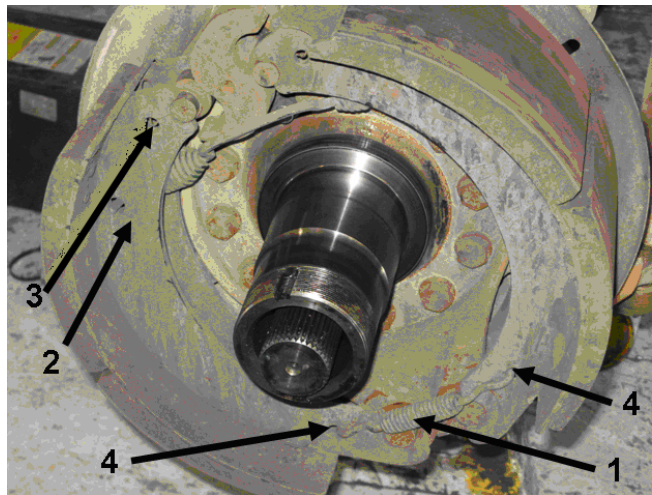
If there are any missing or damaged springs do not install new shoes until you replace them all with new spring hardware kit. Drums will have to be turned or replaced if there were any signs of overheating on the old brake shoes. Failure to comply may result in damage to equipment.

Springs are under extreme tension and can act as projectiles when being removed. Ensure all personnel wear protective goggles. Failure to comply may result in serious injury or death to personnel.

NOTE

Protruding ends of brake shoes fit in the slots of adjusting bolts. Only newer brake shoes are marked with ANCHOR at trailing edge.

Upper and lower brake shoes must fit on anchor pins (3).



1. Install brake return spring (1) on upper and lower brake shoes.
2. Position upper and lower brake shoes on wheel hub.
3. While an assistant is holding brake shoes the other is installing the tension return springs.
4. Make sure the springs are connected properly through the spring hole (4) to ensure brake shoe is positioned in adjusting screw and anchor plunger.

c) Follow-On Maintenance

1. Install brake drum.
2. Install rear 5 inch spacer.
3. Install wheel and tire assembly.
4. Remove jack stand.
5. Remove floor jack.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.14 Brake Drum Replacement

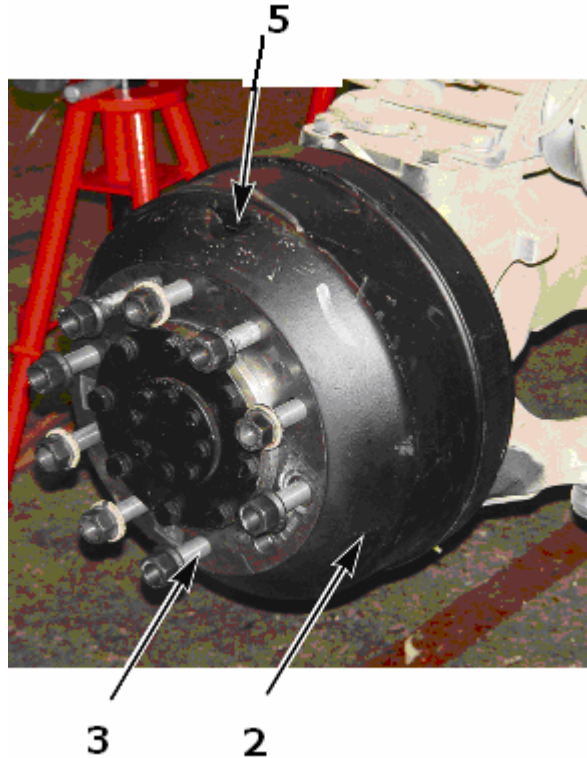
BRAKE DRUM REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Material/Parts</u> Front Brake Drum (1 per wheel) Lockring (1 per wheel) Rear Brake Drum (1 per wheel)</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Battery Disconnect Switch OFF Engine shut OFF Wheels chocked Tires removed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Floor Jack Jack Stand (suitable jack and rated jack stand that can support the weight of the vehicle)</p> <p><u>Follow-On Maintenance</u> Install tires and tighten to specification Remove jack stand and floor jack Check brake operation</p>	



Make sure you have safety goggles/glasses and respiratory. Brake shoes may contact asbestos, which has been determined to be a cancer causing agent. Never clean the brake surface with compressed air. Avoid inhaling any dust from any brake surface. Only use authorized brake cleaning fluid. Failure to comply may result in damage to equipment or in serious injury to personnel.

Make sure that vehicle is parked on level surface and apply parking brakes.

Chapter 4 – MAINTENANCE INSTRUCTIONS



1. Remove lockring (if equipped) from around stud (3) which helps keep drum in place and discard.
2. With a wiggle motion, remove drum (2) from front hub. If drum will not move insert pry tool from brake kit in slots (5) on drum to loosen. If still will not move use rubber mallet.

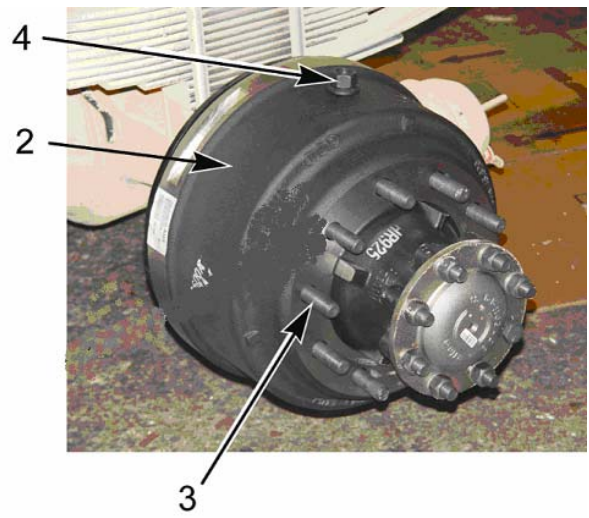
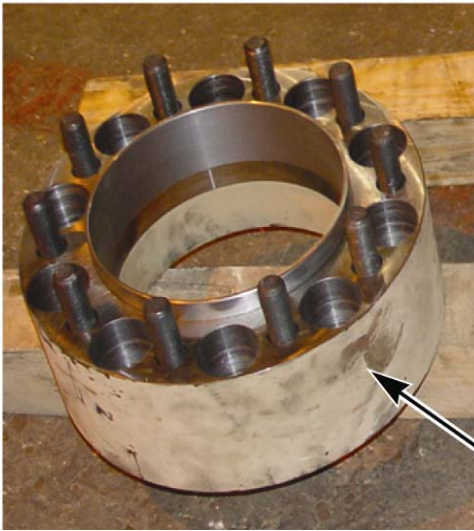
b) **Installation**

Rear



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use NIOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in easy; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately.

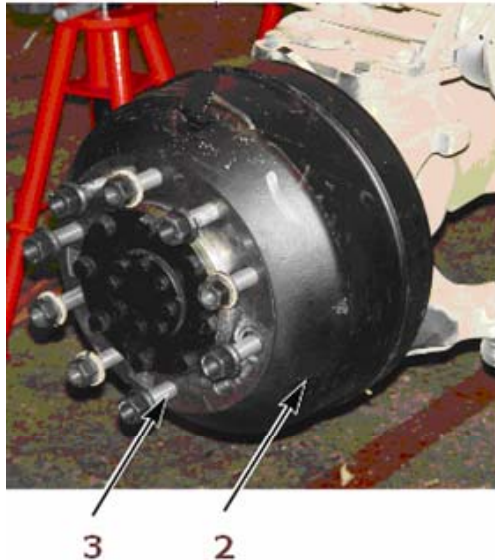
Chapter 4 – MAINTENANCE INSTRUCTIONS



1. Apply light coating of anti-corrosion compound to studs (3) and stud holes in drum face.
2. Install new drum (2) by aligning all ten holes with ten studs (3) and alignment bolt/screw (4) and evenly wiggle drum onto studs (3). Use rubber mallet if binds up.
3. Install a lockring if equipped on one stud to keep drum in place.
4. Install the 5 inch spacer (1) and tighten down with ten locknuts and torque to specification.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Front



1. Apply light coating of anti-corrosion compound to studs (3) and stud holes in drum face.
2. Install new drum (2) by aligning up all ten studs (1) with holes in drum and wiggle into place. Use rubber mallet if binding occurs.
3. Install a lockring on one of the studs to keep drum in place.

c) Follow-On Maintenance

1. Install tires and tighten to specification.
2. Remove jack stand and floor jack.
3. Check brake operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.15 ABS Control Module Re-Calibration, Testing, and Replacement

ABS CONTROL MODULE RE-CALIBRATION, TESTING, AND REPLACEMENT

This task covers:

- | | | |
|-------------------|--------------------------|-----------------|
| a) Test | b) Removal | c) Installation |
| d) Re-Calibration | e) Follow-On Maintenance | |

INITIAL SET UP

Special Tools

Hand-Held or PC-Based Diagnostic Tool/MSD/EST

Equipment Required

None

Personnel

One (1) Wheeled Vehicle Mechanic

Equipment Conditions

- Parking brake set
- Transmission set in NEUTRAL (N)
- Wheels chocked

Material Parts

ABS Control Module (1)

Reference

Parts Manual

Follow-On Maintenance

- Battery Disconnect Switch ON
- Ignition switch to the ON position
- Verify operation of ABS module
- Ignition switch to the OFF position
- Battery Disconnect Switch OFF
- Remove wheel chocks

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Test



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



NOTE

The ABS Controller contains self-testing diagnostics and will illuminate the appropriate indicator lamp on the IP cluster gauge display and will disengage part or all of the ABS functions.

The EC-60™ controller is designed to allow the technician to change the default system settings (chosen by the vehicle OEM) to provide additional or customized features. When replacing an ECU, be sure to use an equivalent Bendix replacement part number so that the standard default settings are provided.

1. If the IP cluster gauge lamp is illuminated there is a problem with the ABS system. Enter diagnostic (See Introduction to Troubleshooting) and perform test checking for DTC's.
2. After retrieving any DTC's, if receive a code for the ABS Control Module or ECU (1) check all of the following items:
 - a) Check for damaged or corroded connectors (2).
 - b) Check for damaged wiring.
 - c) Clear trouble codes.
 - d) Re-run diagnostic and see if codes come return.
 - e) If codes return after repairs have been made, replace the ABS Control Module or ECU.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Antilock Brake System Warning Light, Circuit and Cluster						
STEP	KEY	ACTION	TEST POINTS	SPEC.	YES - IN SPEC.	NO -OUT OF SPEC.
1.	Off	Disconnect connector (363) and measure resistance between light terminals.	(363), bulb connectors.	<1 ohm	Go to next step.	Replace bulb.
2.	Off	Disconnect relay R-23 (476). At relay (476) measure resistance to ground at circuit 94E.	(476), 94E to ground.	>100K ohm	Go to next step.	Locate short to ground in circuit 94E, then repair.
3.	Off	Use a test lead to jumper relay (476) circuit 94E to circuit 94-G. At connector. (363) measure resistance to ground at circuit 94E.	(363), 94E to ground.	<1 ohm	Go to next step.	Locate open or poor connection in circuit 94E, then repair.
4.	Off	At relay (476), measure resistance to ground at circuit 94-G.	(476), 94-G to ground.	<1 ohm	Go to next step.	Locate open or poor connection in circuit 94-G between (476) and G3 ground adaptor (456), then repair.
5.	Off	Disconnect connector (627), measure resistance to ground at pin E3, 16 gauge grey wire.	(627), pin E3, 16 gauge grey wire to ground.	>100K ohm	Go to next step.	Locate short to ground in circuit (627) pin E3, 16 gauge grey wire, connector (625), and circuit 94H.
6.	Off	Use a test lead to jumper relay (476) circuit 94H to ground. At connector (627) measure resistance to ground at circuit 94H.	(627), 94H to ground.	<1 ohm	Reconnect (625). Go to next step.	Locate open or poor connection in circuit 94H, connector (625), and circuit 16 gauge, grey wire, then repair.
7.	On	Measure voltage to ground at connector (363) circuit 94D.	(363), 94D to ground.	12±1.5 V	Reconnect connector. (363). Go to next step.	Locate cause of low or no voltage in circuit 94D to 10A fuse F10-B, then repair.
8.	On	Measure voltage to ground at relay (476) circuit 94B.	(476), 94B to ground.	12±1.5 V	Go to next step.	Locate open or poor connection in circuit 94B/94F to 10A fuse F10-A, then repair.
9.	Off	Remove relay R23 (476) and bench test, by measuring resistance from pin 30 to 87A.	Relay R23, pin 30 to 87A.	<1 ohm	Go to next step.	Replace defective relay.
10.	Off	Bench test relay R23 (476) by applying +12V to pin 86, ground to pin 85, and measuring resistance from pin 30 to 87.	Energized relay R23, pin 30 to 87.	<1 ohm	Relay and circuits test good. Replace ABS control module.	Replace defective relay.

3. If all wiring, connectors, relays, check ok replace the ABS Control Module or ECU.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Removal



Before removing ABS Control Module, turn OFF Battery Disconnect Switch and disconnect batteries. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

1. Battery Disconnect Switch OFF.
2. Batteries disconnected.
3. Remove any contamination around unit and electrical connections (3) before disconnecting.
4. Note the EC-60™ controller (1) assembly mounting position on the vehicle.

NOTE

ABS Controller is located on right side under dash 12V power distribution center.

5. Disconnect the electrical connectors from the EC-60™ controller.
6. Remove and retain the mounting bolts (2) that secure the EC-60™ controller (1) to the cab chassis.

c) Installation



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.



When replacing the EC-60™ controller, verify that the unit you are installing has the correct default settings. It is recommended to use only the correct replacement part number. Failure to do so could result in a loss of features.

1. Apply connector lubricant to electrical connectors (3).
2. Apply anticorrosion compound to mounting bolts (2).
3. Position and secure the EC-60™ controller (1) in the original mounting orientation using the mounting bolts (2) retained during removal.
4. Install mounting bolts (2) and tighten to firmly secure the ECU (1) into place. DO NOT over-tighten, this can cause damage to the controller (1).
5. Reconnect all electrical connections (3).
6. Connect batteries.
7. Battery Disconnect Switch ON.
8. Ignition switch to the ON position and verify operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

d) Re-Calibration

1. The ABS indicator lamp will display system configuration information when diagnostics is entered. The lamp will blink out configuration information codes using the following patterns chart below.
2. In this mode the ECU tells the technician, by means of a series of six blink codes, the type of ABS system that the ECU has been set up to expect. (Example, if the fourth blink code is a three, the technician knows that a 6S/5M sensor modulator configuration has been set.

SYSTEM CONFIGURATION CHECK

1st Number	System Power
1	12 Volts
2	24 Volts
2nd Number	Wheel Speed Sensors
4	4 Sensors
6	6 Sensors
3rd Number	Pressure Modulator Valves
4	4 Modulators
5	5 Modulators
6	6 Modulators
4th Number	ABS Configuration
1	4S/4M or 6S/6M
2	6S/4M
3	6S/5M
5th Number	Traction Control Configuration
2	No ATC
3	ATC Engine Control Only
4	ATC Brake Control Only
5	Full ATC (Engine Control & Brake Control)
6th Number	Retarder Configuration
1	No Retarder
2	J1939 Retarder
3	Retarder Relay
4	J1939 Retarder, Retarder Relay

3. The EC-60™ controller is designed to allow the technician to change the default system settings (chosen by the vehicle OEM) to provide additional or customized features. When replacing an ECU, be sure to use an equivalent Bendix replacement part number so that the standard default settings are provided.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Reconfiguring Standard ECU's

Vehicle reconfiguration is carried out by using the Reconfiguration ECU Mode.

Reconfiguration may be carried out by using the Blink Code Switch or by using a hand-held or PC-based diagnostic tool.

During the reconfiguration process, and independently from any reconfiguration being carried out by technician, standard ECU's automatically check the J1939 serial link and communicate with other vehicle modules. If the serial link shows that the vehicle has a retarder device present, the ECU will configure itself to communicate with the retarder device for improved ABS performance. Example, if ECU detects the presence of a retarder disable relay during a reconfiguration, it will configure itself to control the relay to disable the retarder device as needed.

Reconfiguring Premium ECU's

As with standard ECU's, the Premium EC-60™ controller also carries out, independently from any reconfiguration being carried out by the technician, an automatic check of the J1939 serial link and communicate with other vehicle modules. This includes checking for ATC and retarder disable relay operation. In addition, premium EC-60™ controllers will determine the number of wheel speed sensors and PMV's installed and configure itself accordingly.

e) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Ignition switch to the ON position.
3. Verify operation of the ABS module.
4. Ignition switch to the OFF position.
5. Battery Disconnect Switch OFF.
6. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.16 Brake S-Cam Shaft Service and Replacement

BRAKE S-CAM SHAFT SERVICE AND REPLACEMENT

This task covers:

- a) Removal
- b) Inspection
- c) Installation
- d) Follow-On Maintenance

INITIAL SET UP

Special Tools

Owatonna 630-7 piloted driver
 Feeler Gauge (obtain locally)
 Dial indicator (obtain locally)
 Torque Wrench

Personnel

One (1) Wheeled Vehicle Mechanic

Material Parts

S-Cam Shaft (1)
 Shoe Return Springs (1)
 Shoe Retainer Springs (2)
 S-Cam Shaft Grease Seals (2)
 S-Cam Shaft Bushings (2)
 Cotter Pin (1)
 Lockwashers (14)
 Snap Ring (1)
 Anti-Seize Compound

Reference

Parts Manual

Equipment Required

Suitable lifting device
 Suitable rated jack stands
 Rags
 Brake cleaner

Equipment Conditions

Battery Disconnect Switch OFF
 Transmission set in NEUTRAL (N)
 Wheels chocked
 Engine Shut OFF
 Remove wheel and tire assembly
 Remove 5 inch spacer (on rear axle only) (if needed)
 Remove wheel hub
 Drain air tanks, air dryers, purge reservoir
 Put vehicle on suitable rated jack stands

Follow-On Maintenance

Install wheel hub
 Install 5 inch spacer (rear only)
 Install wheel and tire assembly
 Raise vehicle to remove jack stand
 Lower vehicle to ground and remove lifting device
 Battery Disconnect Switch ON
 Start engine
 Pressurize air tanks
 Verify cluster gauge operation
 Verify brake operation
 Shut engine OFF
 Remove wheel chocks

Chapter 4 – MAINTENANCE INSTRUCTIONS

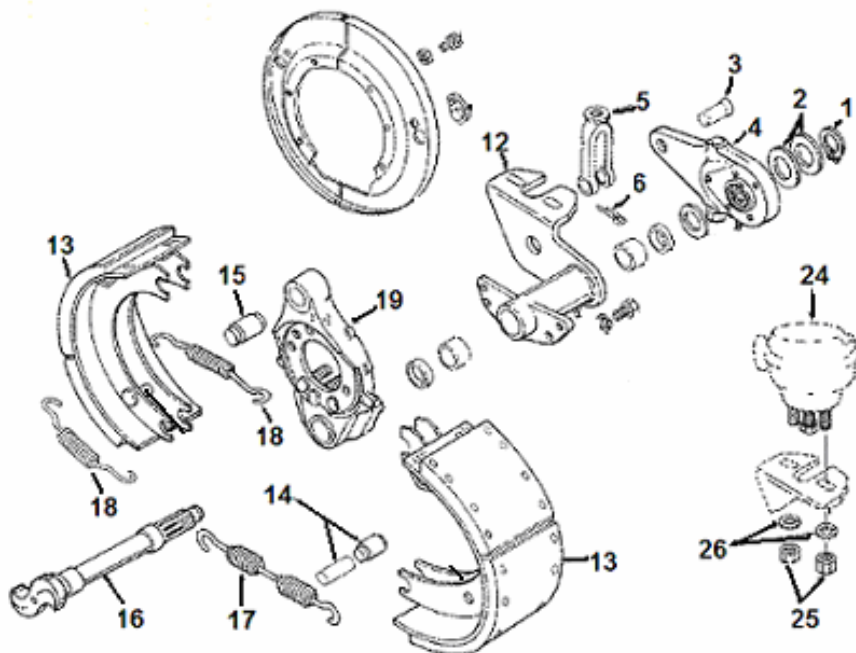
a) Removal



Always wear safety goggles and an approved respirator during all brake service procedures. Wear the respirator from removal of the wheels through assemble. Brake material dust may be potential health hazard. Handle ALL brake parts with care the brake dust covers all parts. Failure to comply may result in serious injury or death to personnel.

NEVER use compressed air or dry brushing to clean brake parts or assemblies, carefully clean parts in a well ventilated or open air area. During disassembly, carefully place all parts on the floor to avoid getting dust into the air. Use an industrial vacuum cleaner with a HEPA filter system to clean dust from the brake drums, backing plates and other brake parts. After using the vacuum, remove any remaining dust with a rag soaked in water and wrung until nearly dry. DO NOT use compressed air to clean your clothing after working on brakes, use vacuum with HEPA filter system. Failure to comply may result in serious injury or death to personnel.

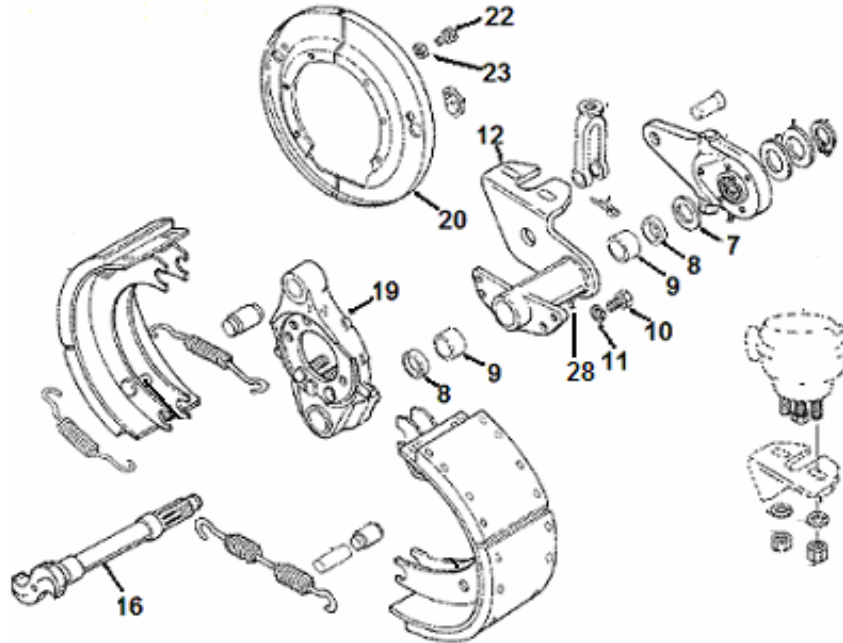
Never connect or disconnect air hoses containing pressure, it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted. Failure to comply may result in serious injury or death to personnel.



1. Insert a sturdy lever between one of the shoes (13) and the camshaft housing (12). Pry shoe (13) away from the cam roller (14) until pin and roller assembly can be removed. Repeat on opposite shoe. (If cam rollers or pins (14) show signs of wear, galling, pitting, cracks; discard and replace with new.)
2. Remove shoe return spring (17) and discard. Force shoes towards the S-cam (16) to relieve spring tension.
3. Remove shoes. Lift one of the shoes (13) off anchor pin (15) and lower both shoes to the floor.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4. Remove the two shoe retainer springs (18) and discard.
5. Remove the anchor pin (15) by sliding it out of the spider (19).
6. Remove the cotter pin (6) from the yoke (5) of the actuator (24). Remove yoke pin (3) so the slack arm (4) is free of the yoke (5). Remove the two nuts (25) and washers (26) that secure the actuator to the bracket (12) and remove the actuator (24).
7. Remove snap ring (1) and spacer washer (2) from splined end of camshaft (16). Remove slack adjuster (4) from camshaft (16). (A puller may be required.) Remove spacers (2) and the thick washer (7) from camshaft (16).



8. Remove camshaft (16) from actuator bracket and cam tube (12).
9. Mark and remove the dust shields (20) from the spider (16) by removing the six cap screws (22) and washers (23). (DO NOT remove this unless there is apparent damage.)
10. Remove actuator bracket and cam tube (12) from the spider (19) by removing the four cap screws (10) and lockwashers (11). Discard lockwashers.
11. Remove and discard the two camshaft grease seals (8). One at each end of the cam tube.
12. Remove and discard the two camshaft bushings (9) located in the same area as the seals. Use a tool of proper diameter and length to drive the bushings out from the backside.

NOTE

If the spider (19) is to be reused and there is damage to any of the three studs, they may be pressed out of the spider (19) and replaced with new studs.

13. To ensure proper assembly, note and mark the relationship of the spider (19) to the axle (driver or curb side) and the orientation on the axle flange. Remove the spider from the axle flange by removing the five bolts, nuts, and lockwashers from the three studs.

Chapter 4 – MAINTENANCE INSTRUCTIONS

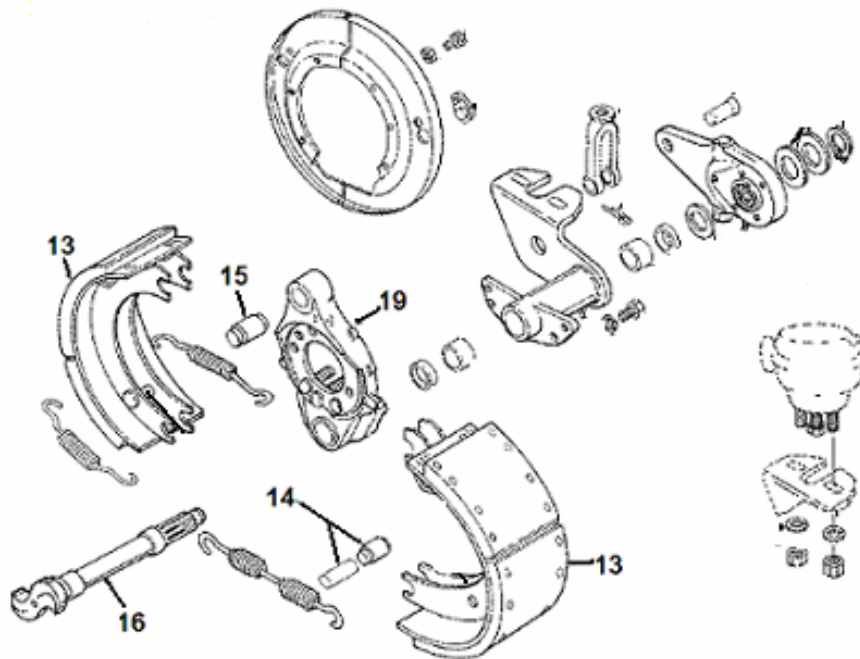
b) Inspection

Actuator Bracket and Cam Tube

1. Check assembly for bent actuator bracket (12) and broken or cracked cam tube welds.
2. Inspect camshaft bushing (9) (if not being replaced) for signs of wear. Bearing surfaced should be smooth and free of any pitting or fractures. Insert camshaft (16) and measure looseness at both ends with a dial indicator. If more than .020 in. movement is notes, replace bushings (9) and/or camshaft (16). If one bushing (9) is requiring replacement, replace both S-cam shaft bushings (9). This will avoid uneven wear on bushings (9) and S-cam shaft (16).

S-Cam Shaft

1. Inspect S-cam shaft (16) spline for cracks and excessive deformation. Replace as necessary.
2. Inspect the S-cam shaft bearing journals for wear or corrosion. If the shaft shows wear or roughness that is visible, or roughness that can be detected by feel, it must be replaced.
3. Inspect S-cam head for cracks, and its roller surfaces for flat spots, brinelling, or ridges. Note unusual wear patterns which may indicate an out of square condition. Replace if any of these conditions exist.



Spider

Inspect for cracks or broken surfaces on the spider (19) at the S-cam (16), anchor pin (15), and mounting bolt holes. Replace any spider (19) with visible damage. DO NOT attempt to weld or repair. Check fit of anchor pin (15) in torque spider (19). Radial clearance in excess of .010 in. indicates excessive wear. Replace anchor pin (15) and/or torque spider (19).

Chapter 4 – MAINTENANCE INSTRUCTIONS

Rollers and Pins

Inspect rollers and pins (14) for flat spots, galling, broken, or cracked surfaces. Replace as necessary.

Anchor Pin

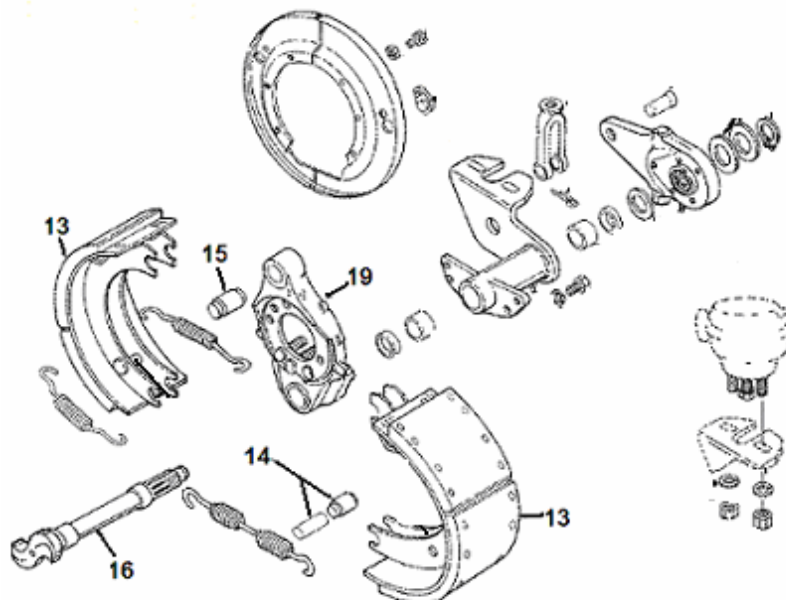
Inspect anchor pin (15) for worn, broken, or cracked surfaces. Replace as necessary.

Shoes and Lining

1. Check shoes (13) for bent shoe webs, cracks in shoe table welds or webs, and elongated rivet holes. Replace shoes if any of these conditions exist.
2. Measure the shoe (13) span by loosely installing the anchor pin (15) and cam roller (14) in the appropriate ends of the shoe web. If the distance from center of anchor pin (15) to center of cam roller (14) exceeds 11.78 in. replace shoe.
3. Check linings. Replace when any of the following conditions exist:
 - a) Lining thickness at thinnest point is ¼ in. or less.
 - b) Linings are cracked or worn in an unusual or odd pattern, i.e., lining wear tapered from side to side across shoe table. Unusual wear patterns can indicate damage to foundation brake parts.
 - c) Rivet holes are elongated in lining or shoes.
 - d) Lining is oil soaked.
 - e) Linings can be moved by hand, i.e., loose rivets.

Brake Drums

1. Inspect drums for cracks, heat checking, glazing, grooving severe out-of-round condition or bell mouthing (must not exceed .025 T.I.R.). Replace any cracked drums. Drums should be turned at reline to prevent hot spotting and will achieve quicker, more complete burnishing of the new lining.
2. Measure the drum I.D. to be sure the maximum limit allowed (stamped on drum) has not been exceeded, due to wear or machining.



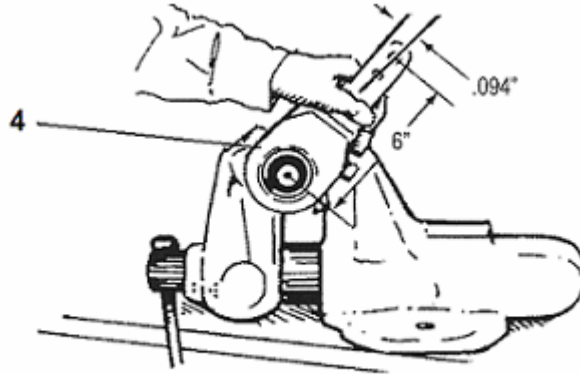
Chapter 4 – MAINTENANCE INSTRUCTIONS

Manual Slack Adjuster

NOTE

If any of the following conditions are found, replace the slack adjuster (4). DO NOT attempt to repair it.

1. Check for cracks in the body and arm of the slack adjuster.



CHECKING SLACK ADJUSTER BACKLASH

2. Check for spline wear. The amount of backlash in the slack adjuster (4) to S-cam shaft (16) should not be more than .094 in. measured 6 in. from centerline of the S-cam shaft.
3. Check ability to rotate the adjusting nut at least one complete revolution in each direction. Force required to rotate the adjusting nut should not exceed 15 lb-ft.

Actuators

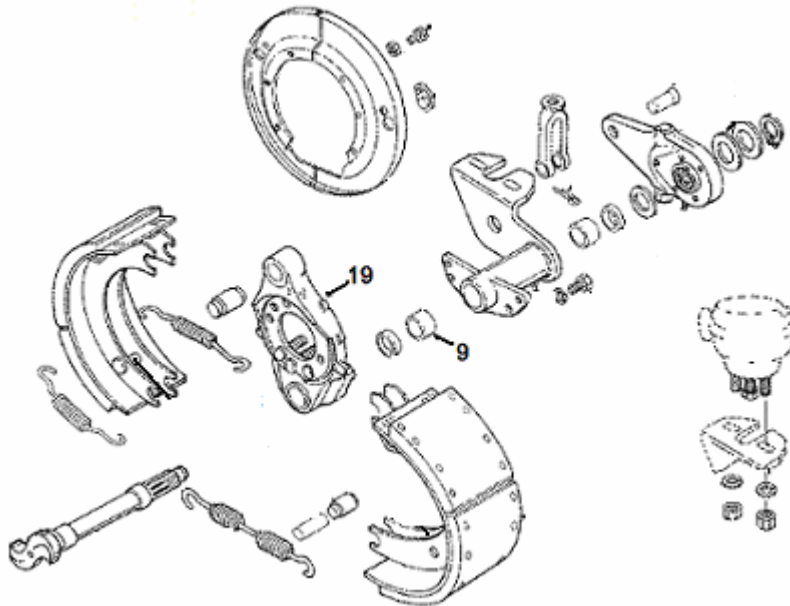
1. Check for cracked housing, loose mounting studs.
2. Check for damage to the push rod and push rod boot (if equipped).
3. Check for broken push rod return spring.
4. Check for excessive wear on yoke (5), yoke pin (3), and slack adjuster (4) yoke pin hole or bushing. There should not be more than .031 in. combined free play in all these components.

c) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

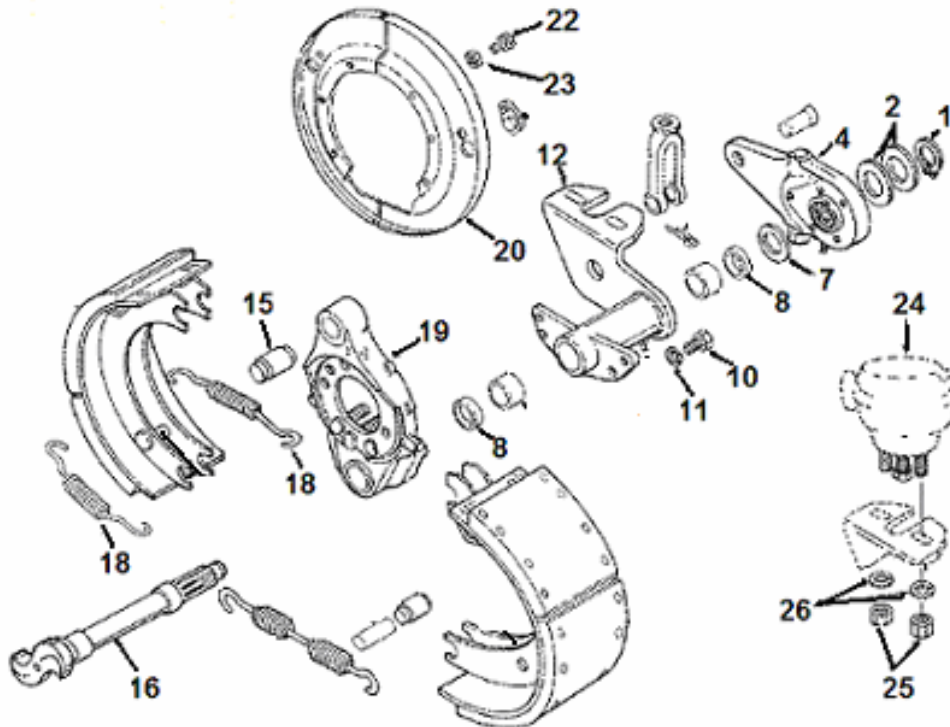
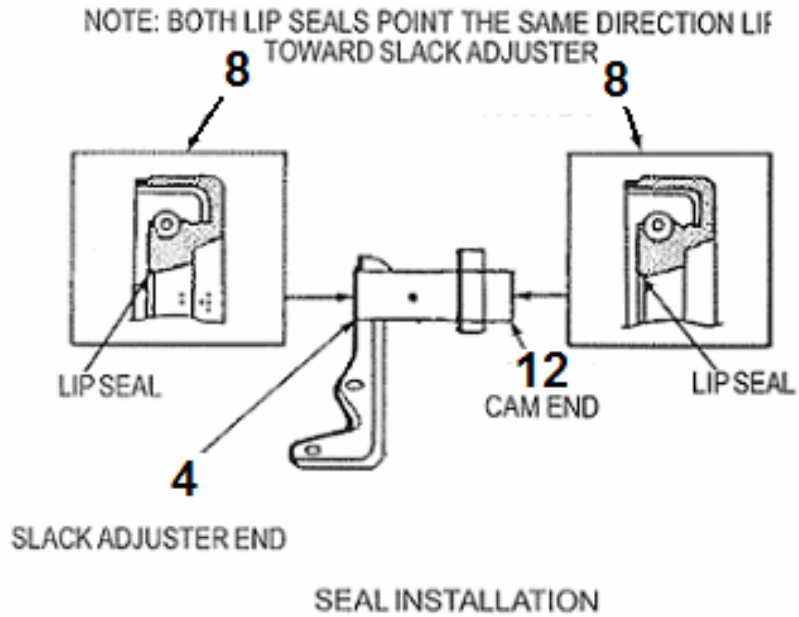


1. Apply anti-corrosion compound on nuts, bolts, and screws.
2. Install spider (19) onto axle flange using the five bolts, three studs, new lockwashers and nuts. Be certain that the spider is properly placed as noted or marked during removal/disassembly. Tighten mounting bolts to specification.
3. Install new S-cam shaft bushings (9). Drive into place using Owatonna 630-7 piloted driver or similar tool. Take care not to damage or distort the I.D. of the bushings.



The lip of the grease seals must be installed correctly to prevent any possible damage. The lip of the seal that is installed in the cam end must enter the opening first. The lip of the seal that is installed in the opposite end of the cam tube must enter last.

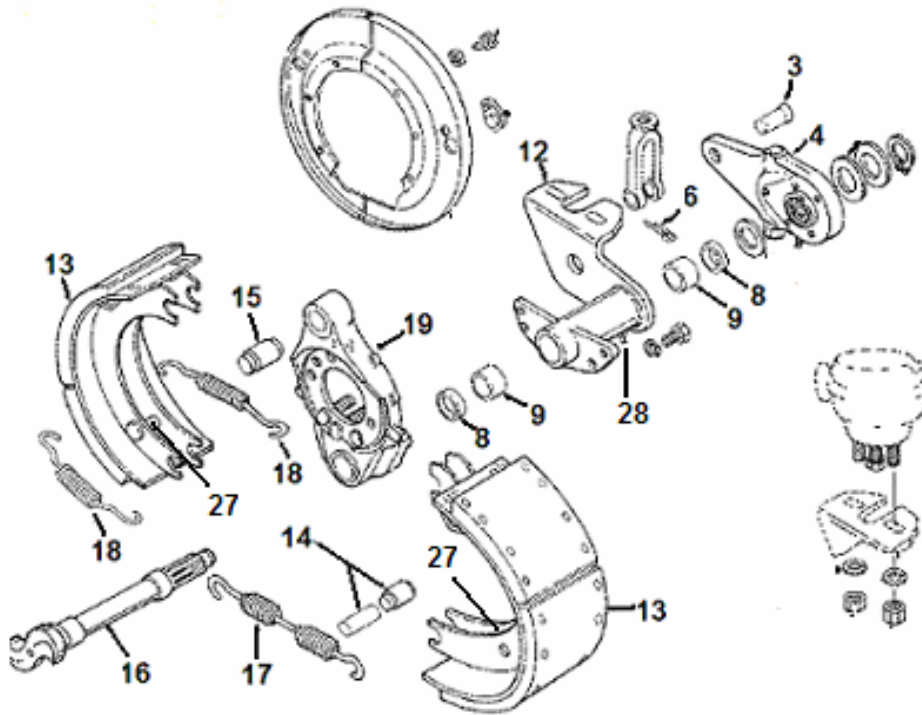
Chapter 4 – MAINTENANCE INSTRUCTIONS



4. Install new S-cam shaft grease seals (8) in the ends of the S-cam tube and chamber bracket (12). Drive seals into place using Owatonna 630-7 piloted driver or similar tool.
5. Install the actuator bracket and S-cam tube (12) onto the spider (19) using four cap screws (10) and new lockwashers (11). Torque to 70-80 lb-ft. Secure the actuator (24) to the bracket (12) using the two nuts (25) and washers (26).

Chapter 4 – MAINTENANCE INSTRUCTIONS

6. If it was removed, install dust shields (20) with six cap screws (22) and new lockwashers (23). Torque to 90-110 in-lb.
7. Coat S-cam shaft (16) journals with light film of chassis lube. DO NOT coat "S" cam head. Install the S-cam shaft (16) into the S-cam tube (12). DO NOT damage the grease seals (8).
8. Install the thick S-cam shaft flat washer (7), the slack adjuster (4), spacer washers (2), and new snap ring (1) in that order onto the splined end of the S-cam shaft (16). Adjust end-play of the S-cam shaft .005 in. and .045 in. by using washers (2) to fill the space. Make sure that the snap ring (1) is seated into the groove at the end of the splined S-cam shaft (16).
9. Install anchor pin (15) into spider (19). Center anchor pin (15) in spider (19) so it sticks out equally at both ends.
10. Install new brake shoe retaining springs (18). Engage hook ends of the two springs into each of the tabs of the two brake shoes.



11. Place the top shoe (13) onto the spider (19) by engaging the open slots on the end of the retaining springs (18) onto the anchor pin (15). Place the opposite end of the shoe (13) against the S-cam (16). Swing the opposite shoe (13), with springs (18) attached, back until slots in the shoe engage the anchor pin (15), then swing shoe toward the S-cam (16). Spring tension will hold the shoes in position.
12. Place hook of return spring (17) onto the return spring pin (27) on one shoe (13). Hold shoes against S-cam (16) and connect the other hook of the return spring (17) over to the other shoe return spring pin (27).
13. Insert a sturdy bar between end of one brake shoe (13) and spider housing (19) at the S-cam (16) end of the shoe. Pry down until brake shoe roller and pin (14) can be installed between the S-cam (16) and the slots in the end of the brake shoes (13). Repeat procedure for other shoe.

Chapter 4 – MAINTENANCE INSTRUCTIONS

14. Adjust the slack adjuster (4) until the yoke pin (3) can be installed through the proper hole in the arm. Install a new cotter pin (6) to retain. Make sure cam rollers (14) are in lowest position on the cam.
15. Lubricate the S-cam shaft bushings (9) by filling the S-cam shaft tube (12) with chassis lube through the Zerk fitting (28). Fill until grease is forced out in the area of the slack adjuster (4). Grease should not appear at the S-cam (16) head end. If it does, the new seal (8) was not installed properly or the old seal needs to be replaced.

d) Follow-On Maintenance

1. Install brake drum and tighten to specification.
2. Install 5 inch spacer and tighten to specification.
3. Install wheel and tire assembly and tighten to specification.
4. Raise vehicle to remove jack stand.
5. Lower vehicle to ground and remove lifting device.
6. Battery Disconnect Switch ON.
7. Start engine.
8. Pressurize air tanks and systems.
9. Verify cluster gauge operation.
10. Verify brake operation.
11. Shut engine OFF.
12. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.17 Hand Brake Control Valve Replacement

HAND BRAKE CONTROL VALVE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Hand Brake Control Valve Mounting Hardware Cable Lock Straps</p>		<p><u>Equipment Condition</u> Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Wheels chocked Air reservoirs drained Parking brake set</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Close drain cocks Start engine Check for leaks Verify air pressure Check brakes Remove wheel chocks</p>



Whenever any component is serviced or removed from the air system, set the parking brake and chock the vehicle wheels to prevent it from moving while the service is being performed. Failure to do so could result in personal injury and/or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Park the vehicle on a level surface and prevent movement by setting the parking brakes and chocking the vehicle wheels.



Drain all air from the air system before removing air lines or hose. Failure to do so could result in personal injury and/or death.

2. Open drain valves on reservoir tank(s).
3. Drain all reservoirs to 0 psi.

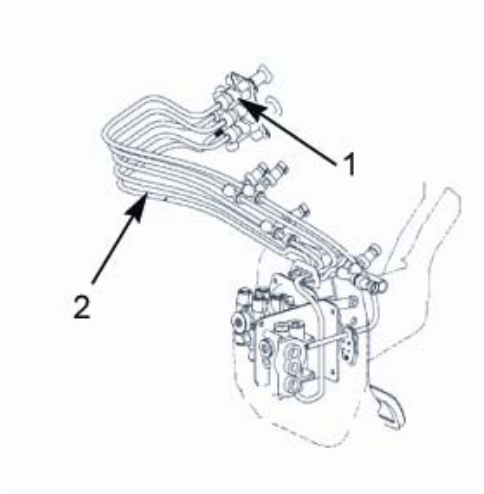


4. Remove knobs from hand brake control valve (1).

NOTE

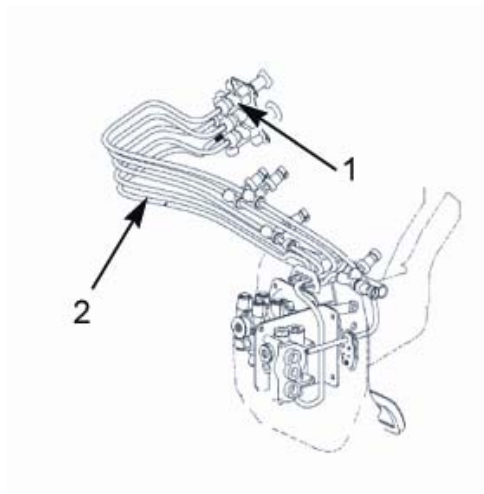
Label the harnesses when they are removed from the hand brake control valve (1). This information will be needed for the installation of the new hand brake control valve.

Chapter 4 – MAINTENANCE INSTRUCTIONS



5. Remove and discard any cable lock straps or other tie downs on harness (2).
6. Disconnect harnesses (2) from the hand brake control valve (1).
7. Remove and discard mounting hardware securing hand brake control valve (1) to firewall.
8. Remove and discard hand brake control valve.

b) Installation



1. Install the new hand brake control valve (1) using new mounting hardware.

NOTE

Refer to the labeled harnesses that were removed from the hand brake control valve.

2. Attach harnesses (2) to the appropriate hand brake control valve (1) fitting.
3. Install any cable lock straps or other tie downs removed from harness (2).

Chapter 4 – MAINTENANCE INSTRUCTIONS



5. Install knobs (1) to the front side of the hand brake control valve.

c) Follow-On Maintenance

1. Close all reservoir drain cocks.
2. Start the engine to build up system air pressure.
3. Check for leaks.
4. Verify that the air system regains full air pressure.
5. Check brakes for proper operation.
6. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-9.18 Brake Pedal Replacement

BRAKE PEDAL REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) Brake pedal</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p>		<p><u>Equipment Condition</u> Transmission in NEUTRAL (N) Parking brake set Engine shut OFF Battery Disconnect Switch OFF Wheels chocked Air reservoirs drained</p> <p><u>Follow-on Maintenance</u> Close reservoir tank air valves Battery Disconnect Switch ON Engine ON to build up system air pressure Check IP gauges for correct air pressure Parking brake OFF Remove wheel chocks Check brakes for proper operation Test drive vehicle Engine shut OFF Battery Disconnect Switch shut OFF Transmission in NEUTRAL (N) Parking brake SET Chock wheels</p>

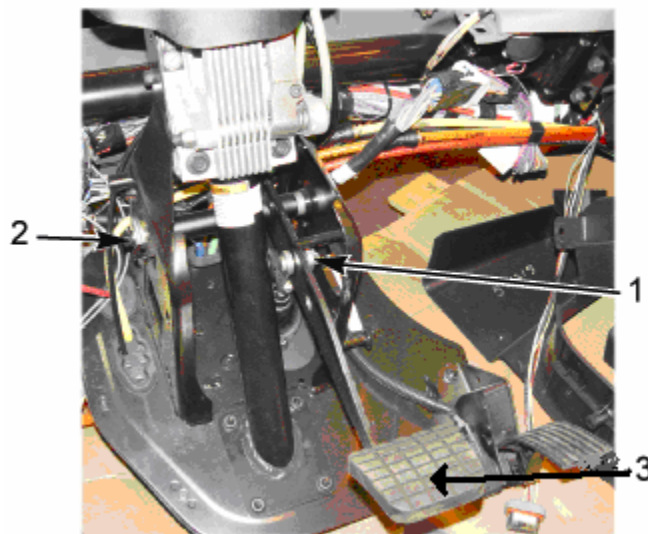
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

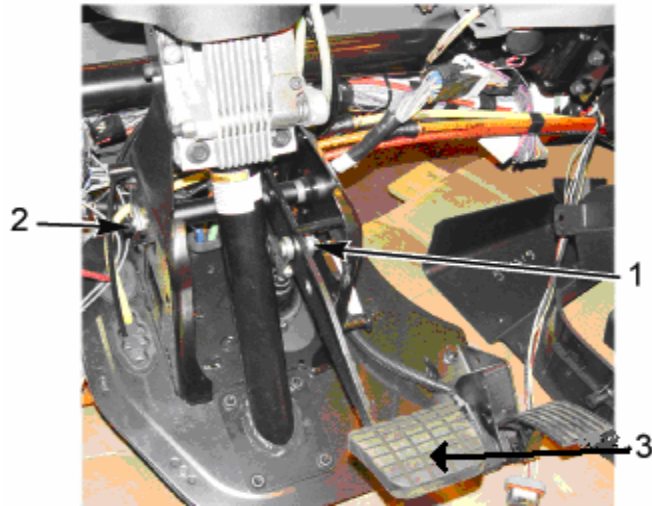
Drain all air from the air system before removing brake system components. Failure to do so could result in personal injury and/or death.



1. Remove bolts (1) and (2) from brake pedal (3).
2. Remove brake pedal (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new brake pedal (3).
2. Install bolts (2) and (1) tighten.
3. Check brake pedal for proper operation.

c) Follow-on Maintenance

1. Close reservoir tank air valves.
2. Battery Disconnect Switch ON.
3. Engine ON to build up system air pressure.
4. Check IP gauges for correct air pressure.
5. Parking brake OFF.
6. Remove wheel chocks.
7. Check brakes for proper operation.
8. Test drive vehicle.
9. Engine shut OFF.
10. Battery Disconnect Switch OFF.
11. Transmission in NEUTRAL (N).
12. Parking brake SET.
13. Chock wheels.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-10 Wheels

4-10.1 Wheel/Tire Replacement

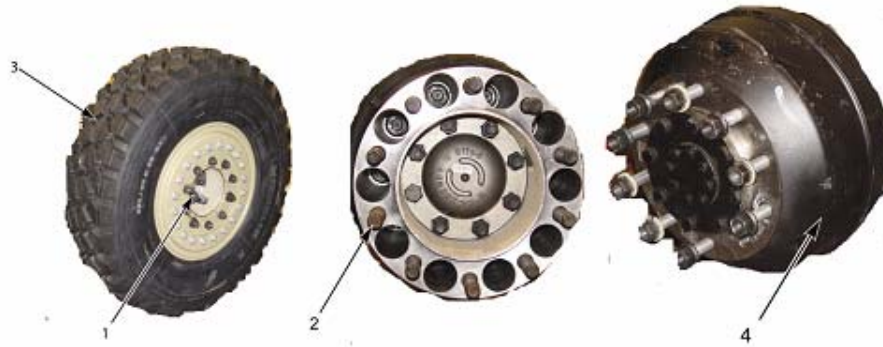
WHEEL/TIRE REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
INITIAL SETUP	<u>Equipment Condition</u>
<u>Special Tools</u>	Transmission set in (N)
None	Parking Brake set
<u>Material/Parts</u>	Battery Disconnect Switch OFF
Wheel/Tire Assembly	Engine shut OFF
	Wheels chocked
<u>Personnel</u>	<u>Equipment Required</u>
One (1) Wheeled Vehicle Mechanic	Floor Jack
One (1) Crewmember	Jack Stand
	(suitable jack and rated jack stand that can support the weight of the vehicle)
<u>Reference</u>	<u>Follow-On Maintenance</u>
Parts Manual	Remove jack stand and lower floor jack and remove



Do not attempt to lift Wheel and Tire Assemblies by yourself. These assemblies are heavy and bulky and should not be lifted alone. Have another person assist with changing of a wheel/tire assembly. Failure to comply may result in damage to equipment or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



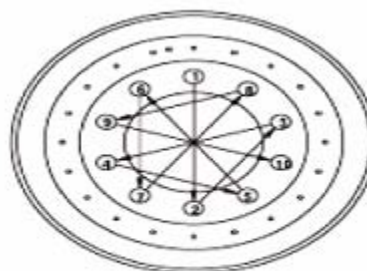
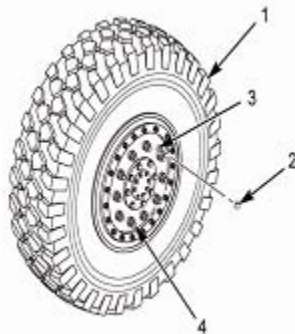
1. Loosen and remove ten lug nuts (1) from studs (2) for wheel/tire assembly (3).
2. With assistance and care remove wheel/tire assembly (3) from drum assemble (4) and set on ground.

b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use NOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

1. Apply anti-corrosion compound to studs (2) and lug nuts (1).
2. With assistance, lift new wheel/tire assembly (3) onto drum assemble (4).
3. Install lug nuts (1) and tighten in proper sequence and torque to 350-400 Ft-lb (474-542 N•m).



LUG NUTS

c) Follow-On Maintenance

1. Remove jack stand and lower floor jack and remove.

Chapter 4 – MAINTENANCE INSTRUCTIONS

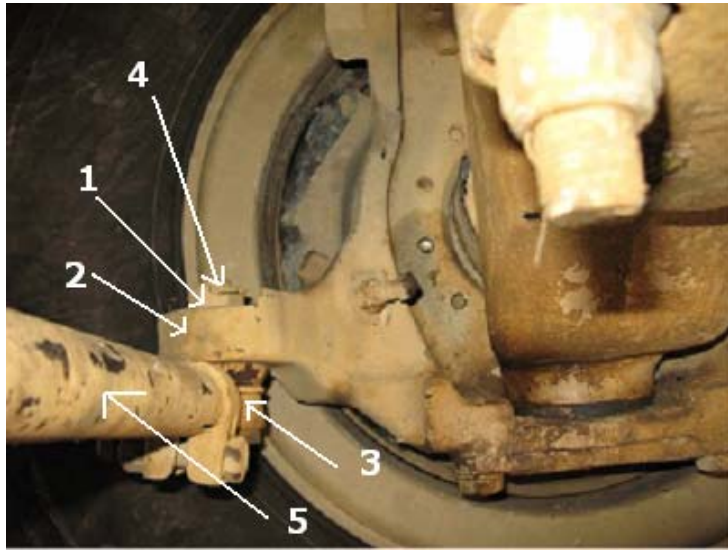
4-11 Steering

4-11.1 Tie Rod Replacement

TIE ROD REPLACEMENT	
This task covers:	
a) Removal	b) Installation
d) Follow-On Maintenance	c) Adjustment
INITIAL SETUP	<u>Equipment Condition</u>
	Transmission set in (N)
	Parking Brake set
	Battery Disconnect switch OFF
	Engine shut OFF
	Wheels chocked
<u>Special Tools</u>	
Tie Rod Separator	
<u>Material/Parts</u>	<u>Reference</u>
Cotter Pins	Parts Manual
New Tie Rods (if needed)	
	<u>Equipment Required</u>
	None
<u>Personnel</u>	<u>Follow-On Maintenance</u>
One (1) Wheeled Vehicle Mechanic	Remove wheel chocks
	Start engine

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove the cotter pin (4) and nut (1) that secures each tie rod end (3) to the steering knuckle (2).
2. Separate tie rod end (3) from the steering knuckle (2), using a tie rod separator tool.
3. Mark the position of each tie rod end (3) in the tie rod tube (5).
4. Remove the clamp bolts and nuts from the clamps on the tie rod tube (5).
5. Thread the tie rod ends (3) out of the tie rod tube (5).

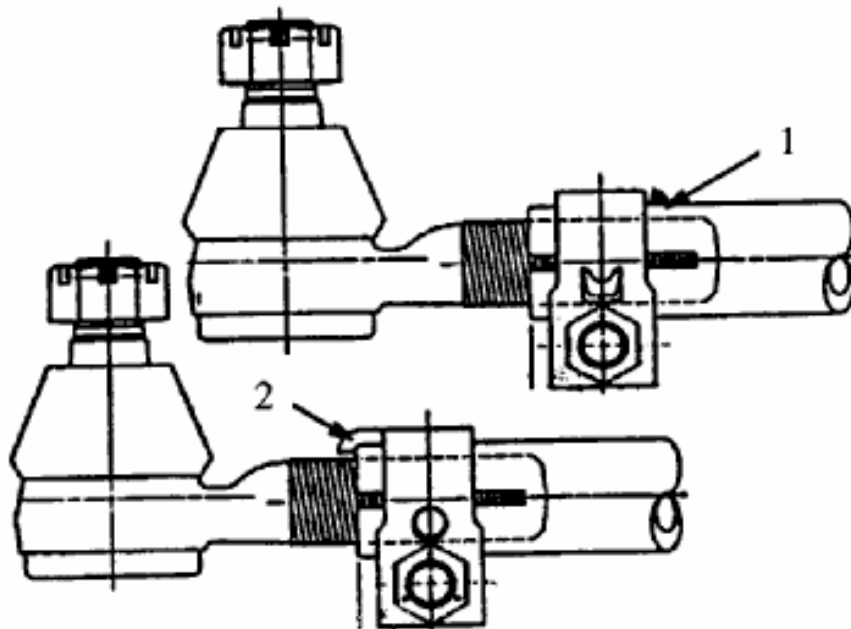
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



When tie rod, drag link, or power steering linkage ends are replaced, they must be threaded into the tie rod or the drag link sufficiently to allow positioning of the clamp over the threads if not welded on the ball joint end. Position the clamp bolt so it crosses the slot in the rod end.

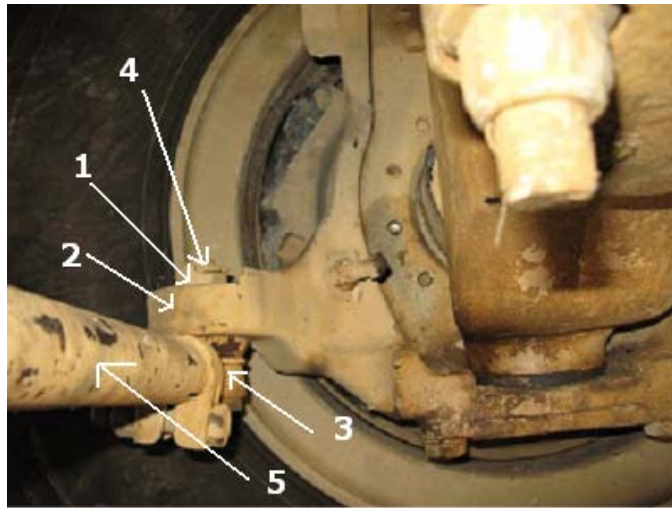
When repositioning the tie rod clamps, check bolt clearance between the bolt and the axle I-beam at the maximum turn position, right and left turn. Interference may restrict proper steering linkage movement, and/or cause damage to clamp bolts.



NOTE

Some tie rod clamps will be free to rotate around the tie rod, allowing setting of toe-in while avoiding contact of the axle. There are two ways mechanical stops will position the clamps. One style clamp is limited by a spot weld (1) on the tube. The second style clamp is limited by a tab (2) that will lock against the end of the tube. Both styles are shown. Note the type of tie rod clamp for your vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS



NOTE

The tie rod has right hand threads on one end and left hand threads on the other end. Make sure the tie rod ends are installed properly on the tie rod.

1. Thread the tie rod end (3) into the tie rod tube (5) far enough to completely cover the slots in the tube. There should be no binding or looseness in the tie rod threads as the tie rod end (3) is being threaded into the tie rod tube (5).
2. If removed tie rod ends (3) are re-used, install the tie rod ends (3) on the tie rod tube (5) to the position marked during removal. If new tie rod ends (3) are installed, thread the ends (3) equally on the tie rod (5) to the required length.
3. Install the nuts and the bolts in the clamps. Tighten finger-tight.
4. Assemble the tie rod end (3) into the steering knuckle (2). Install the tie rod stud nut (6). Tighten to 120-160 ft-lb (163-218 N•m).
5. Install the cotter pin (4). Tighten the nut (1) until the holes are aligned. DO NOT loosen the nut (1) to install the cotter pin (4).
6. Lubricate tie rod ends (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Adjustment



Illustration as viewed from right side of vehicle

1. Check and adjust the toe-in. After checking and adjusting the toe-in.
2. Be sure the tie rod ends are properly aligned in the steering arm (the left tie rod end is parallel to the right tie rod end). Proper alignment will eliminate restricted movement of the tie rod assembly. Tighten the tie rod clamp bolts.

d) Follow-On Maintenance

1. Remove wheel chocks.
2. Start engine.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.2 Steering Bracket Replacement

STEERING BRACKET REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
INITIAL SET UP	<u>Material Parts</u>
<u>Special Tools</u>	Steering Bracket (1)
None	Gasket Steering Bracket
	Gasket Steering Column (1)
	Anti-Corrosion Compound
<u>Personnel</u>	<u>Follow-On Maintenance</u>
One (1) Wheeled Vehicle Mechanic	Install steering column
<u>Reference</u>	Connect intermediate shaft
Parts Manual	Apply connector lubricant to connectors
	Connect electrical connectors
<u>Equipment Required</u>	Re-connect air lines in engine compartment for brake pedal
None	Battery Disconnect Switch ON
	Start engine
<u>Equipment Conditions</u>	Re-charge air system
Transmission set in NEUTRAL (N)	Test break system before test driving
Engine shut OFF	Remove wheel chocks
Battery Disconnect Switch OFF	Test drive vehicle
Parking brake set	Shut engine OFF
Chock wheel	Set parking brake
Air filter canister removed	
Disconnect Intermediate steering shaft in engine compartment	
Remove steering column	
Drain air system	
Disconnect air lines in engine compartment for brake pedal	

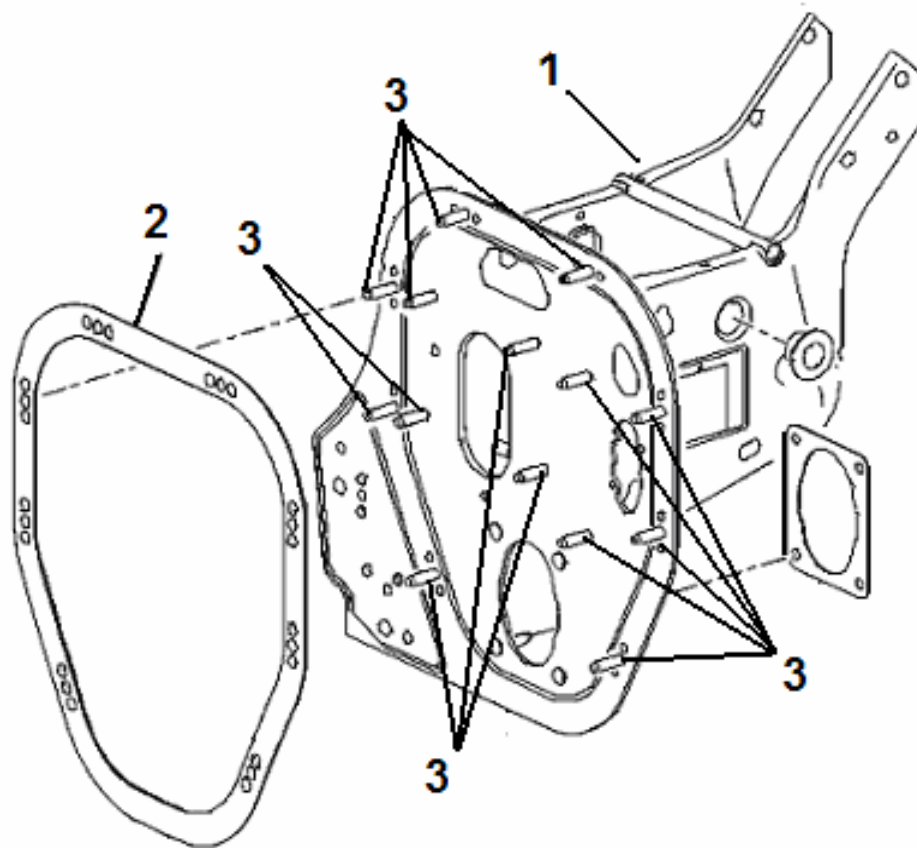
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Engine components become extremely hot during normal operation. Always allow engine to cool completely prior to performing any task or procedures on it. Working in close quarters in engine compartment can be difficult moving around. Wear proper safety equipment; safety goggles, work gloves, long sleeves or shop coat. Failure to comply may result in serious burns, cuts, or injury or death to personnel.



1. From engine compartment, label and mark all electrical connections that will need to be disconnected to gain access to firewall to remove mounting nuts (3) for steering bracket (1).
2. Disconnect all electrical connections.
3. Remove power distribution box, Bussmann, air cleaner and holding bracket assembly for easier access to firewall.
4. Remove eight nuts from studs of steering bracket assembly in engine compartment.
5. From the interior of the vehicle cab, lift up and pull the steering bracket assembly (1) toward the driver seat to separate it from the firewall. Remove from vehicle and discard.
6. Remove the gasket material (2) from the steering column mounting surface of the firewall.

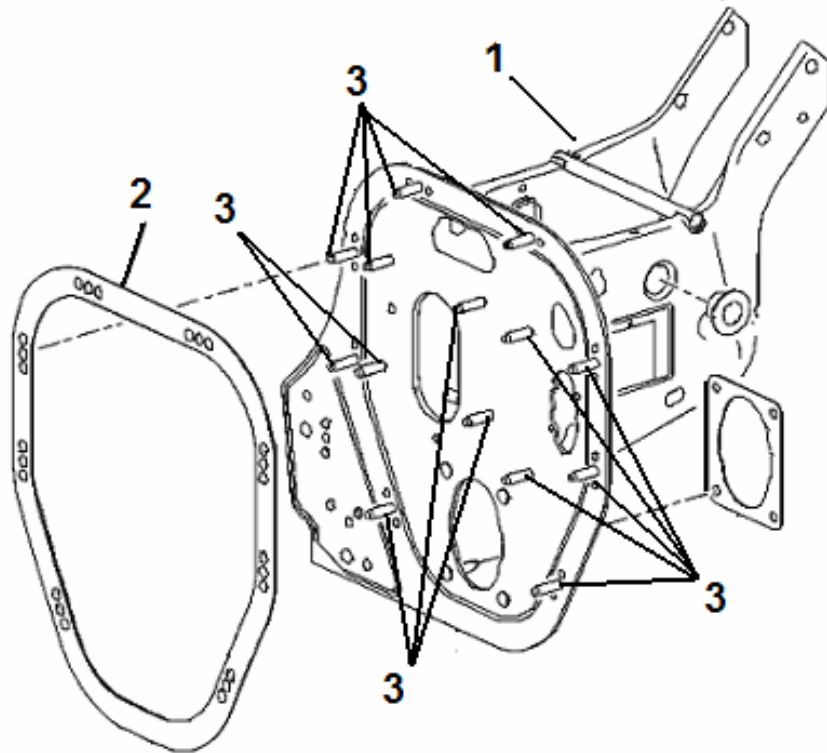
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.

Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



1. Make sure interior mounting surface at firewall is clean of old gasket (2).
2. Apply anti-corrosion compound to mounting nuts and studs on steering bracket assembly.
3. Position the new steering bracket plate gasket (2) on the studs of the new steering bracket assembly (1) and insert through mounting holes in firewall.
4. With an assistant in the engine compartment, loosely install a couple mounting nuts (3) on steering bracket assembly (1) studs through firewall.
5. Make any adjustments to gasket (2) or steering bracket (1) before install nuts (3) and tighten nuts.
6. Reinstall air cleaner and holding bracket assembly, Bussmann and power distribution box.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Install steering column.
2. Connect intermediate shaft.
3. Apply connector lubricant to electrical connectors.
4. Connect all electrical connectors.
5. Re-connect air lines in engine compartment for brake pedal.
6. Battery Disconnect Switch ON.
7. Start engine.
8. Re-charge air system.
9. Test brake system before test driving.
10. Remove wheel chocks.
11. Test drive vehicle.
12. Shut engine OFF.
13. Set parking brake.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.3 Steering Shaft Replacement

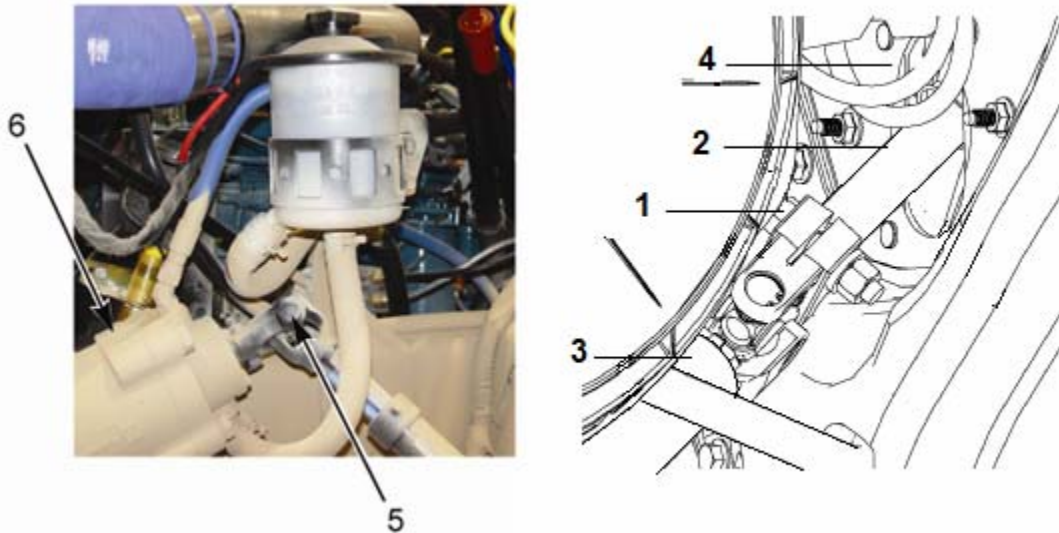
STEERING SHAFT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Steering Shaft Pinch Bolt (2) Nut (2)</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Required</u> None</p> <p><u>Equipment Conditions</u> Engine shut OFF Left side FSS nozzle bracket removed Left side armor removed Air filter canister removed Battery Disconnect Switch OFF Parking brake set Transmission set in NEUTRAL (N) Wheels chocked</p> <p><u>Follow-On Maintenance</u> Install air filter canister Battery Disconnect Switch ON Start engine Remove wheel chocks Test drive vehicle to check steering Shut engine OFF Set parking brake Install left side armor Install left side FSS</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles and work gloves. Working around engine components make sure that you allow the engine time to cool before working on it. Use caution when working under the hood of the vehicle in close quarters, there is little room to work around if engine is still on the hot side. Make sure that the vehicle hood is properly secure or propped so it will not fall on you while you are working. Failure to comply may result in vehicle equipment and or serious injury or death to personnel.



1. Remove upper pinch bolt (1) to steering column (2) and steering shaft (3) at firewall (4) and discard it.
2. Remove lower pinch bolt (5) to steering shaft (3) at steering gear end (6) and discard it.

b) Installation

1. Position new steering shaft (3) on steering gear end (6) and install new pinch bolt (1) and tighten to specification.
2. Position steering shaft (3) to steering column (2) at firewall (4) and install new pinch bolt (1) and tighten to specification.

c) Follow-On Maintenance

1. Install air filter canister.
2. Battery Disconnect Switch ON
3. Start engine.
4. Remove wheel chocks.
5. Test drive vehicle to check steering.
6. Shut engine OFF.
7. Set parking brake.
8. Install left side armor.
9. Install left side FSS nozzle bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.4 Steering Arm Replacement

STEERING ARM REPLACEMENT		
This task covers:		
<p>a) Removal</p> <p>d) Follow-On Maintenance</p>	<p>b) Inspection</p>	<p>c) Installation</p>
<p>INITIAL SET UP</p> <p><u>Special Tools</u></p> <p>None</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u></p> <p>Steering Arm</p> <p>Cotter Pin (2)</p> <p>Hex Nut (2)</p> <p><u>Equipment Required</u></p> <p>Suitable lifting device</p> <p>Suitable rated jack stands</p> <p><u>Reference</u></p> <p>Parts Manual</p>		<p><u>Equipment Conditions</u></p> <p>Engine shut OFF</p> <p>Battery disconnect switch OFF</p> <p>Wheels chocked</p> <p>Parking brake set</p> <p>Transmission in NEUTRAL (N)</p> <p>Remove wheel and tire assembly</p> <p>Drain air tanks and reservoirs</p> <p><u>Follow-On Maintenance</u></p> <p>Reinstall wheel and tire assembly</p> <p>Remove jack stand</p> <p>Remove suitable lifting device</p> <p>Battery Disconnect Switch ON</p> <p>Start engine</p> <p>Test steering turn wheel lock to lock</p> <p>Remove wheel chocks</p> <p>Test drive vehicle to verify operation</p> <p>Shut engine OFF</p> <p>Set parking brake</p> <p>Transmission set in NEUTRAL (N)</p> <p>Wheels chocked</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

These following instructions are for the driver's side which is attached to the steering gear. Follow all the same instructions for replacement of passenger side steering arm except for disconnecting drag link. The passenger side does not have a steering gear or drag link, so there will not be one attached.

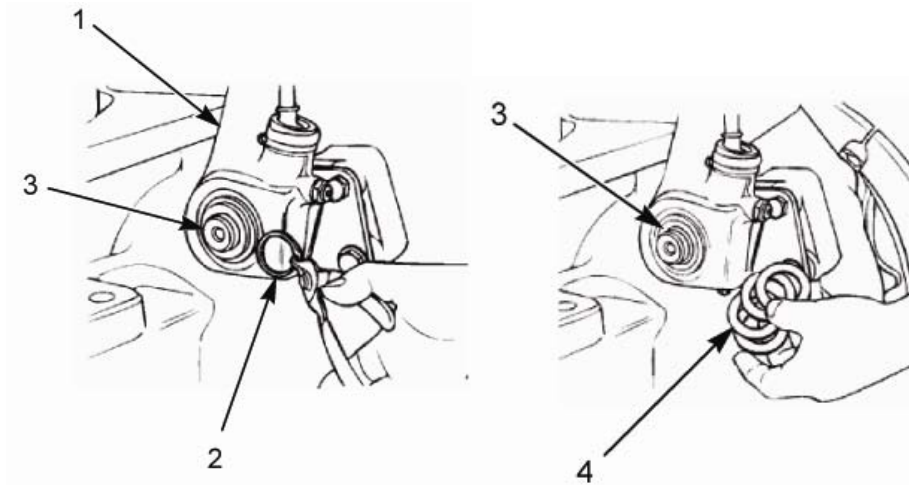


Wear safety goggles and work gloves while working on vehicle. Use assistance of other personnel when removing wheel and tire assembly, it is extremely heavy. Failure to comply may result in serious injury or death to personnel.

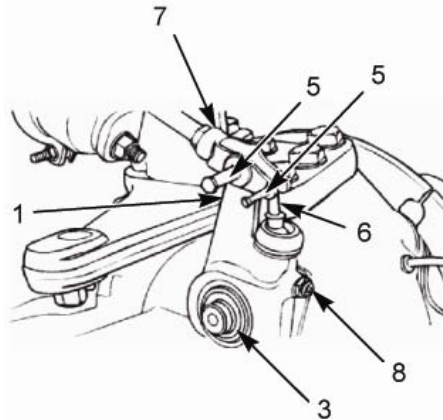
Never connect or disconnect air hoses containing pressure, it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted. Failure to comply may result in serious injury or death to personnel.

DO NOT use heat on components to facilitate removal of arms. This may weaken other connecting parts. Use lubricating spray and a breaker bar to break loose after letting soak for a few minutes. Remember to use the proper socket wrench as not to damage bolt heads. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

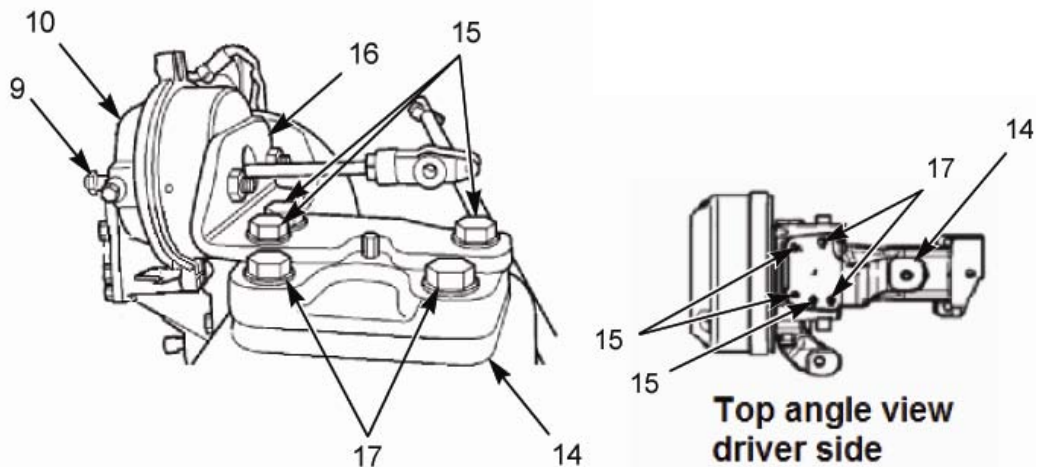
Chapter 4 – MAINTENANCE INSTRUCTIONS



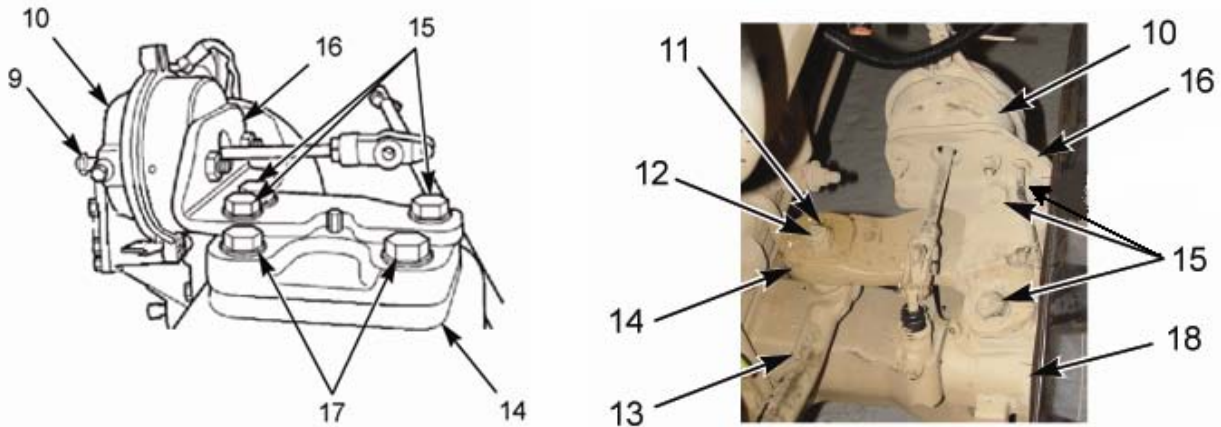
1. Remove the slack adjuster (1) retaining ring (2) at the adjuster end of the camshaft (3).
2. Remove slack adjuster shims (4) at adjuster end of the camshaft (3).



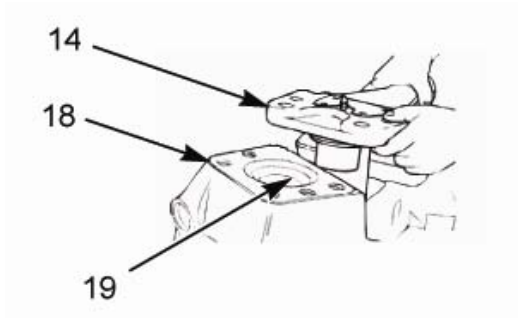
3. Remove the pins (5) that engage the push rod yoke (6) and the slack adjuster (1).
4. Adjust the slack forward by lifting on the pawl (7) and rotating the hex nut (8).
5. Remove the slack adjuster (1) and inner washer from the camshaft (3).
6. Disconnect the air lines (9) at the air brake chamber (10).



Chapter 4 – MAINTENANCE INSTRUCTIONS



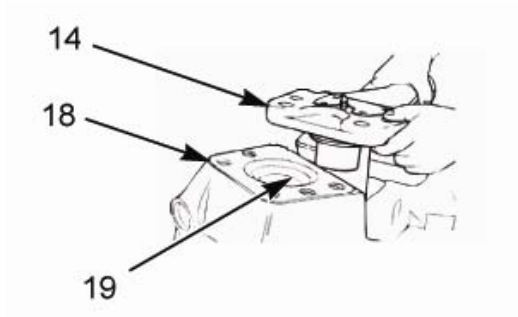
7. Remove cotter pin (11) and hex nut (12) from drag link (13) to steering arm (14) connection and disconnect pieces.
8. Loosen three mounting bolts (15) to air chamber mounting bracket (16) and remove.



9. Loosen two remaining mounting bolts (17) to steering arm (14) and remove steering arm from steering knuckle (18).
10. Discard defective steering arm (14) in accordance with regulations.

b) Inspection

1. Once steering arm (14) has been removed inspect the top steering knuckle cap (18) for any signs of wear or damage.



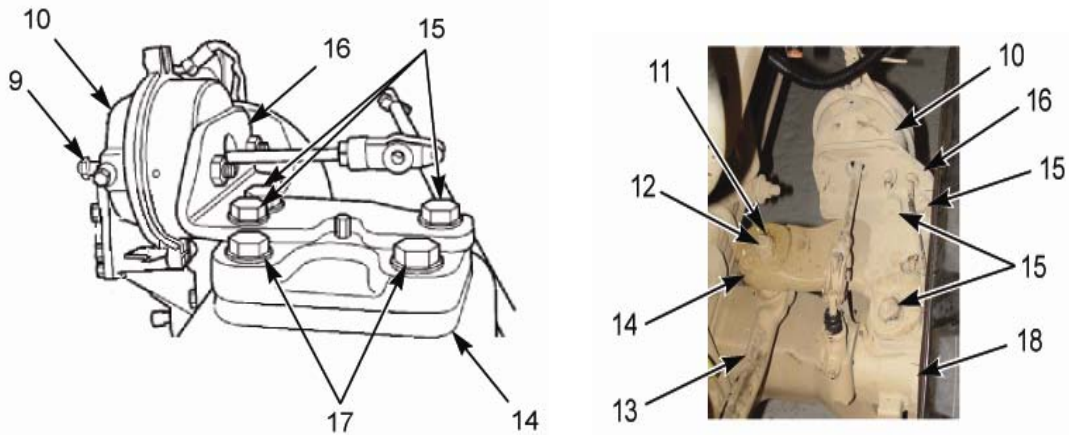
2. Any signs of damage; worn, pitted, cracked, rough, to the steering knuckle top cap (18) or bushings (19) replace knuckle or bushings.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately.



1. Apply anti-corrosion compound to drag link mounting.
2. Apply lock-tight to threads of mounting bolts to steering arm and air chamber bracket.
3. Install new steering arm (14) into the top of steering knuckle top (18).
4. Align bolt holes and install two mounting bolts (17) loosely.
5. Install mounting bracket (16) for air brake chamber (10) and insert the three mounting bolts (15).
6. Align all mounting bolts and tighten to 100-115 ft-lb (136-156 N•m).
7. Reconnect drag link (13) to steering arm end (14) with hex nut (12) and cotter pin (11). Tighten to 85-105 ft-lb (116-143 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

d) Follow-On Maintenance

1. Reinstall wheel and tire assembly.
2. Remove jack stand.
3. Remove suitable lifting device.
4. Battery Disconnect Switch ON.
5. Start engine.
6. Test steering turning steering wheel from lock to lock.
7. Remove wheel chocks.
8. Test drive vehicle to verify operation.
9. Shut engine OFF.
10. Set parking brake.
11. Transmission set in NEUTRAL (N).
12. Wheels chocked.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.5 Pitman Arm Replacement

PITMAN ARM REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> 3-Jaw Puller Anti-Sieze Compound</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Pitman Arm (1) Cotter Pin (1) Tab Lock Retainer Kit(1)</p> <p><u>Equipment Required</u> Suitable lifting device Suitable rated jack stands (2)</p>	<p><u>Reference</u> Parts Manual</p> <p><u>Equipment Conditions</u> Engine shut OFF Battery disconnect switch OFF Wheels chocked Parking brake set Transmission in NEUTRAL (N) Remove wheel and tire assembly</p> <p><u>Follow-On Maintenance</u> Reinstall wheel and tire assembly Remove jack stand Remove floor jack Battery Disconnect Switch ON Start engine Check steering Remove wheel chocks Test drive vehicle Shut engine OFF Battery Disconnect Switch OFF Parking brake set Wheels chocked</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

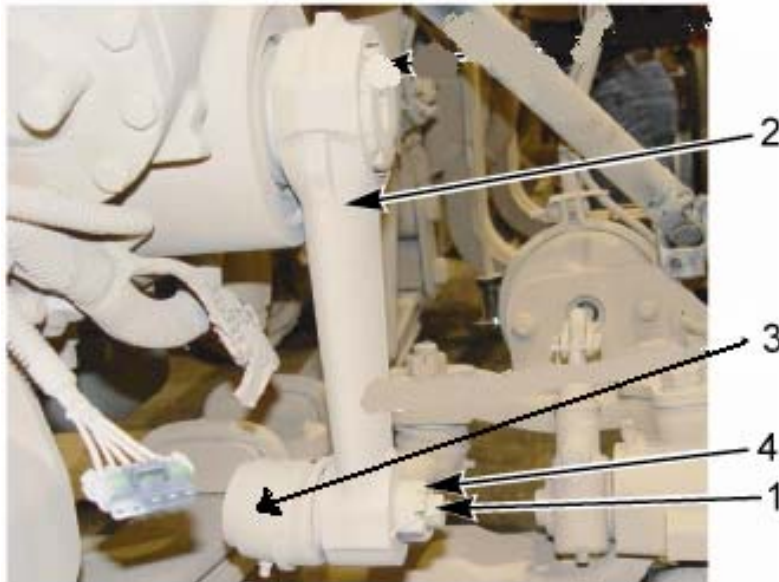
a) Removal



Use safety goggles and proper work gloves. Use assistance of other personnel when removing wheel and tire assembly. Failure to comply may result in serious injury or death to personnel.

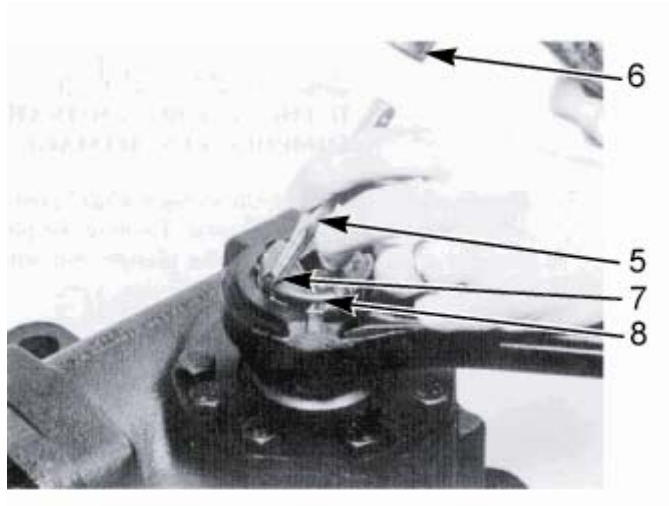
Use suitable jack and rated jack stand that can support the weight of the vehicle. Use safety goggles and proper work gloves. Use assistance of other personnel when removing wheel and tire assembly. Failure to comply may result in serious injury or death to personnel.

The pitman arm will be extremely tight. Do not pound on the pitman arm or apply any source of heat to the pitman arm or sector shaft. Never weld the pitman arm or the sector shaft. Failure to comply will result in damage to equipment and/or serious injury or death to personnel.



1. Remove cotter pin (1) from base of pitman arm (2) where it connects to drag link (3) and discard.
2. Remove castell nut (4).

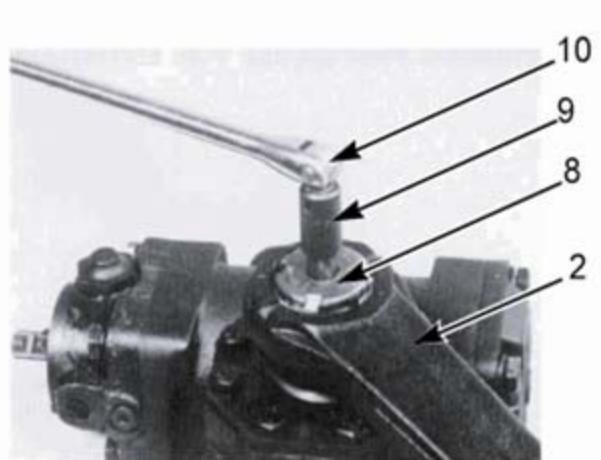
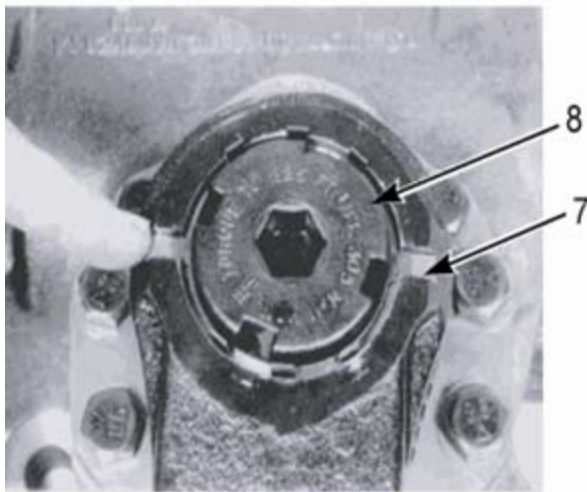
Chapter 4 – MAINTENANCE INSTRUCTIONS



3. Use the small punch (5) and ball peen hammer (6) to bend the two restraining tabs (7) out of the retainer (8) so the retainer can be removed.

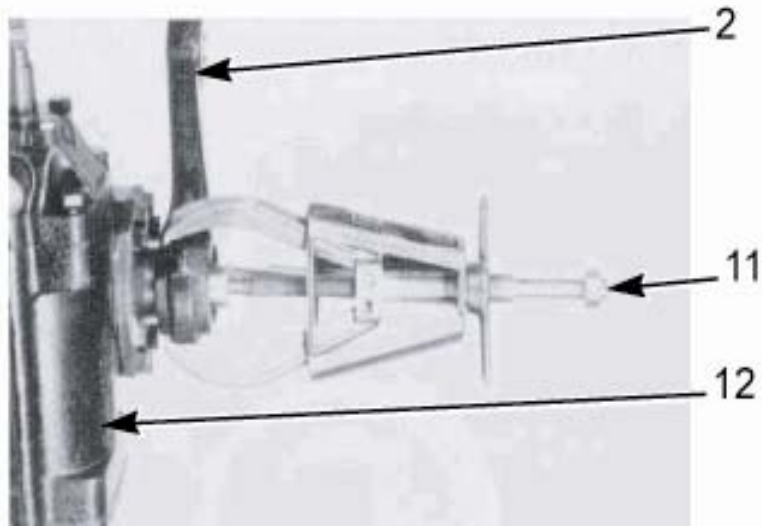
NOTE

Do not bend the tabs in the pitman arm slot.

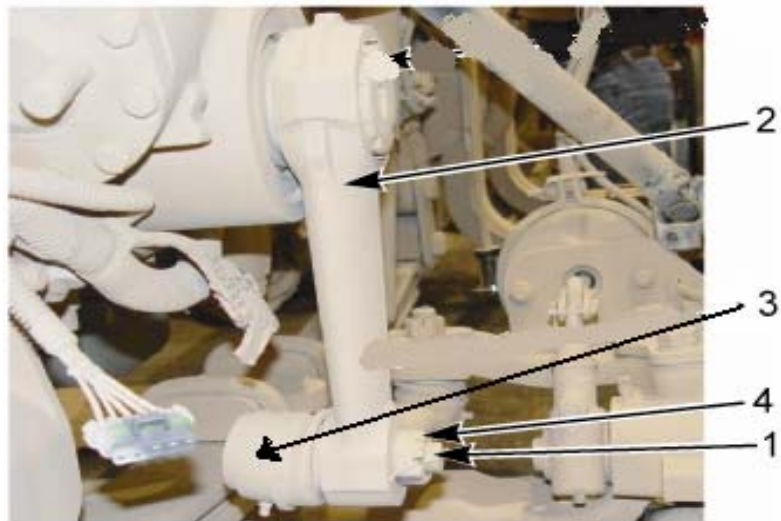


4. Use a 5/8 inch or 3/4 inch Allen head socket (9) and breaker bar (10) to remove the tab lock retainer (8).

Chapter 4 – MAINTENANCE INSTRUCTIONS



5. Attach a 3-Jaw puller (11) and remove the pitman arm (2) from the steering gear assembly (12). The pitman arm (2) will have three pads for the jaws of the puller (11) to go around.
6. Remove steering drag link (3) from lower part of pitman arm (2) by tapping it out without damaging it and remove pitman arm (2).
7. Check steering gear (12) recess for any signs of damage. If damage is present, replace steering gear.



Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



If the pitman arm is not applied to the proper specifications, the pitman arm could work loose and lose its attachment and cause an accident. If the pitman arm is found loose, replace the pitman arm and sector shaft. Failure to comply may result in equipment damage and serious injury or death to personnel.

The pitman arm should be installed after the steering gear is mounted on the vehicle so proper torque can be applied to the pitman arm. Lack of proper torque will cause the looseness of the pitman arm. Failure to comply will result in damage to equipment and/or serious injury or death to personnel.

Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately.

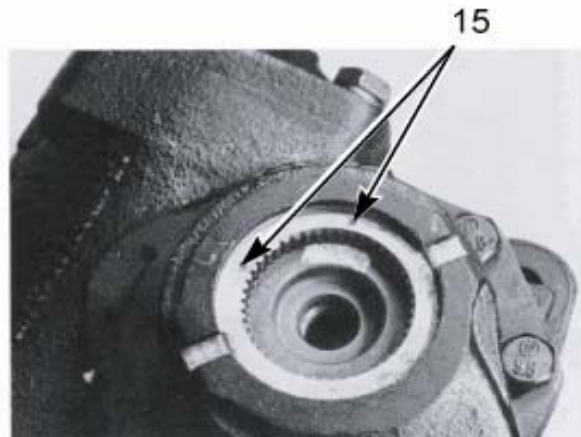
When installing new cotter pin if slot is not visible, continue to tighten nut until slot appears and insert cotter pin. Never loosen a nut to install a cotter pin. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Proper installation of the pitman is critical to the safe operation of the vehicle. Follow these procedures for the attachment. Correct torque values are very important! Use lubricant where indicated. Always use a new tab lock retainer. Failure to comply may result in damage to equipment and /or serious injury or death to personnel.



1. Check new pitman arm (2) for any signs of damage. If there is any damage replace it.

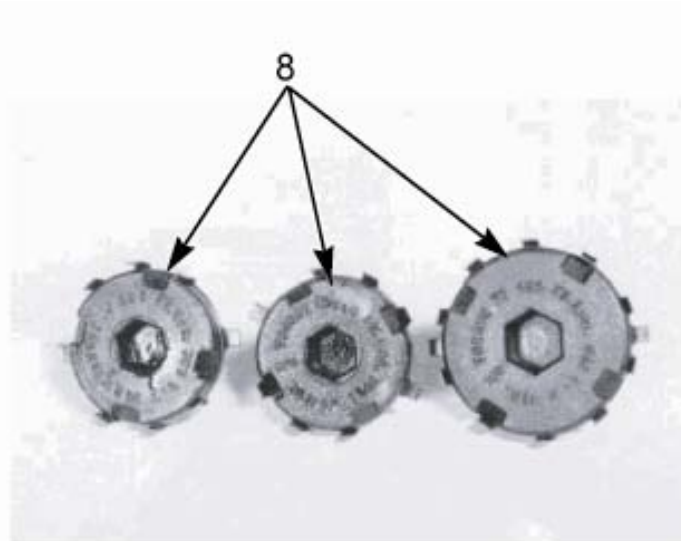
Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Install pitman arm (2) on the output shaft by aligning the timing marks of the pitman arm (2) with the timing mark of the output shaft (15).

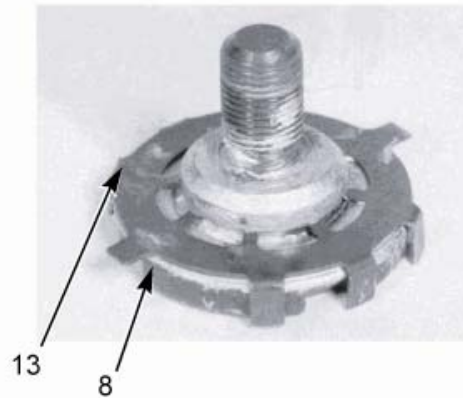
NOTE

Tab lock retainers (8) are supplied with three torque specifications: 225 lb-ft (305 N•m), 350 lb-ft (475 N•m), or 450 lb-ft (601 N•m). The torque value is stamped on the face of the retainer. Check the torque value stamped on your retainer to be sure your retainer is correct before installing!

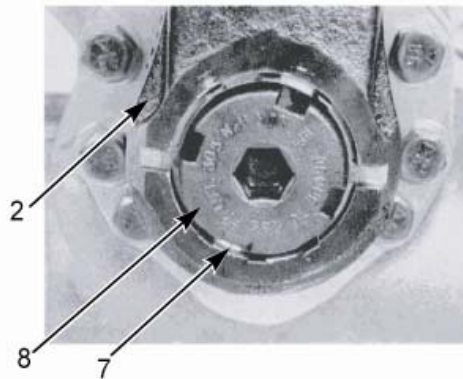


3. With the new retainer (8), read the instruction sheet supplied with the retainer kit carefully! Discard the parts that are not required for this procedure.

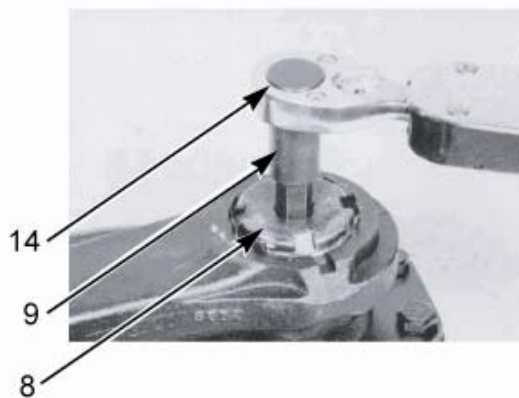
Chapter 4 – MAINTENANCE INSTRUCTIONS



4. Apply Anti-Seize compound in the threads of the sector shaft and retainer (8) and on both sides of the friction washer (13).



5. Install the retainer (8) into the output shaft by hand and align the tabs (7) of the retainer (8) with the notches of the pitman arm (2).



6. Use the 5/8 inch or 3/4 inch Allen head socket (9) and torque wrench (14) to install the retainer (8) in the output shaft by tightening the retainer to M-80; 225 lb-ft (305 N•m), M-90 and 100; 350 lb-ft (475 N•m), or M-110; 450 lb-ft (601 N•m).

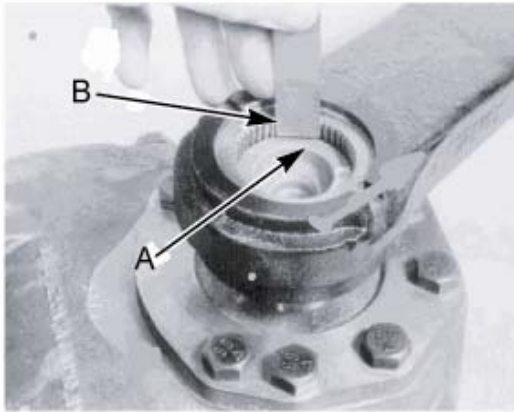
Chapter 4 – MAINTENANCE INSTRUCTIONS

IMPORTANT

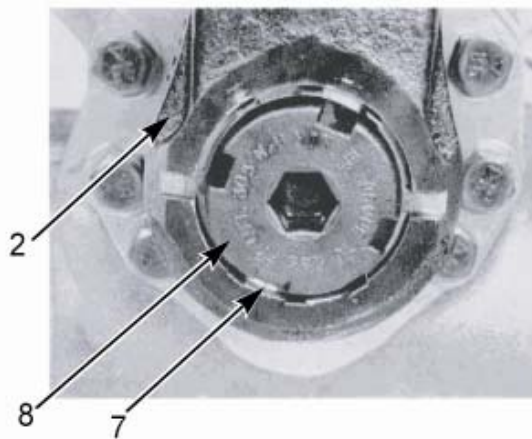
Steps 7, 8, and 9 are required only if you are replacing or reinstalling a pitman arm. If the pitman arm and sector shaft are both new, proceed to Step 10.



If the measurement does not meet the acceptable minimum or maximum tolerance, the pitman arm and sector shaft must be replaced. Failure to take the measurement or replace worn parts could result in pitman arm looseness which could lead to an accident, personal injury or death.

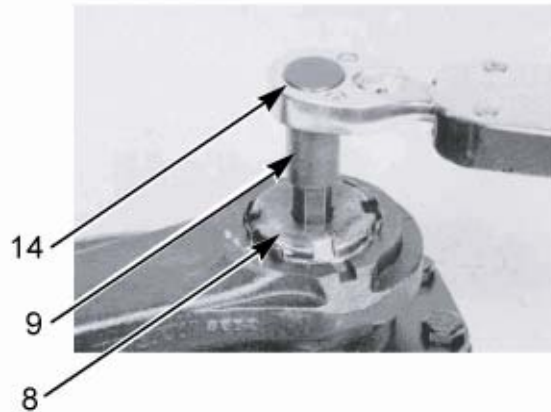


7. After tightening the retainer, loosen and remove the retainer from the output shaft. Measure the distance from the end of the output shaft (A) to the recessed area of the pitman arm (B). The acceptable dimension is: M-80 retainers: 3/32 to 5/32 inch (2.4 to 4 mm), M-90 and 100 retainers: 3/32 to 5/32 inch (2.4 to 4 mm), or M-110 retainers: 1/8 to 3/16 inch 3/2 to 4.8 mm).

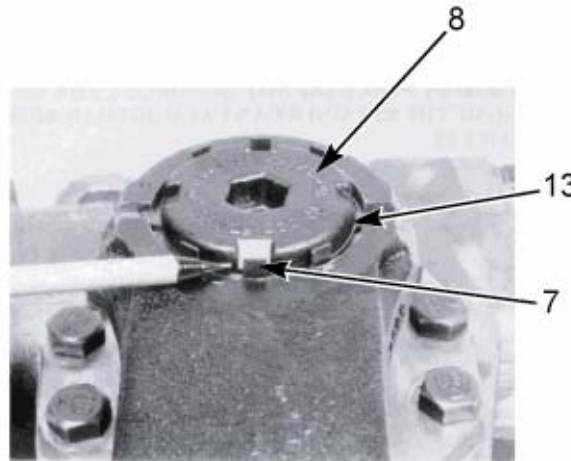


8. If the measurement is OK, or after replacing the sector shaft and pitman arm (2), install the retainer (8) into the output shaft hand tight. Make sure that the tabs (7) of the retainer align with the pitman arm (2).

Chapter 4 – MAINTENANCE INSTRUCTIONS



9. Use the 5/8 inch or 3/4 inch Allen head socket (9) and torque wrench (14) to install the retainer (8) in the output shaft by tightening the retainer to M-80; 225 lb-ft (305 N•m), M-90 and 100; 350 lb-ft (475 N•m), or M-110; 450 lb-ft (601 N•m).

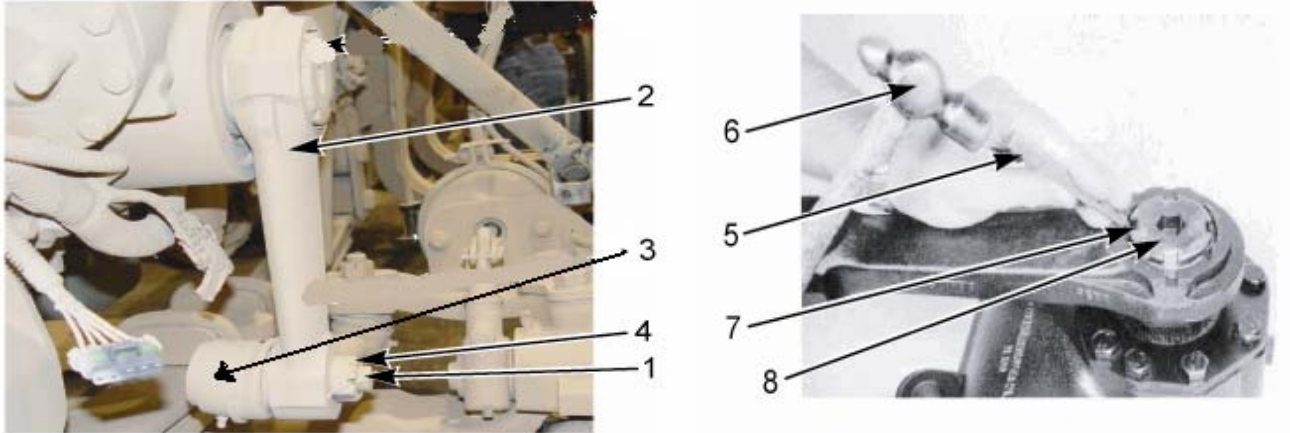


10. After the specified torque is reached, continue tightening until two of the retaining tabs (7) of tab washer (13) align with notches in the retainer (8).



If the tabs and notches do not line up, tighten beyond the specified torque value until two tabs align. Never back off the retainer to align the retaining tabs. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS



11. Use tapered punch (5) and ball peen hammer (6) to lock retaining tabs (7) into the retainer (8).
12. Install drag link (3) and tighten new nut (4) to specification. Stud size 3/4 inch - 85 to 105 lb-ft (116 to 143 N•m), Stud size 7/8 inch - 120 to 160 lb-ft (163 to 218 N•m).



DO NOT back off the nut to locate the cotter pin hole! Always advance tightening to locate cotter pin hole. Failure to install and lock the cotter pin in the ball stud could result in a hazardous vehicle operating condition. Failure to comply will result in equipment damage and or serious injury or death to personnel.

13. Install new cotter pin (1) into drag link (3) ball stud.

b) Follow-On Maintenance

1. Reinstall wheel and tire assembly.
2. Remove jack stand.
3. Remove floor jack.
4. Battery Disconnect Switch ON.
5. Start engine.
6. Check steering.
7. Remove wheel chocks.
8. Test drive vehicle.
9. Shut engine OFF.
10. Battery Disconnect Switch OFF.
11. Parking brake set.
12. Wheel chocks.

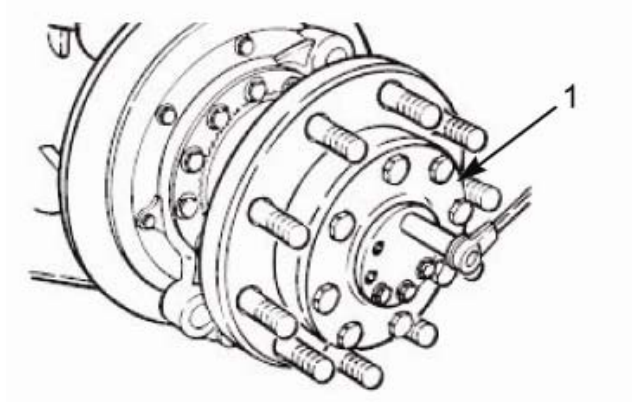
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.6 Spindle and Bearing Replacement

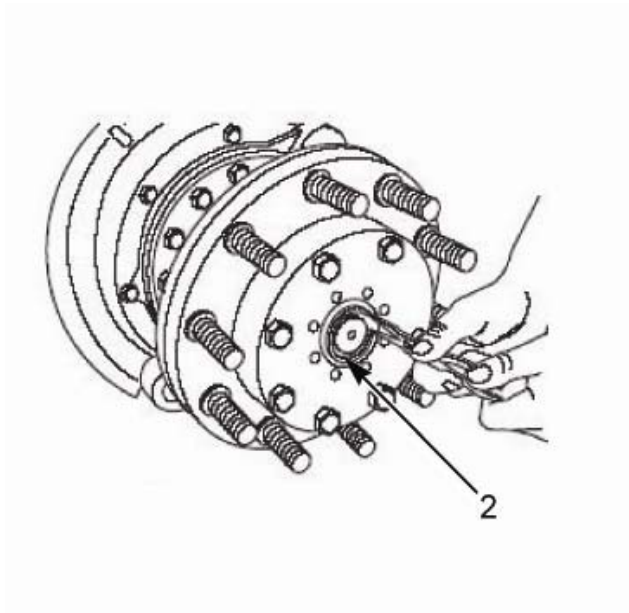
SPINDLE AND BEARING REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Dial Indicator Spindle Nut Wrench (4 7/8") Mechanical Puller</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Spindle (1) Outer Bearing Cup (1) Outer Bearing Cone (1) Inner Bearing Cone (1) Inner Bearing Cup (1) Grease Seal (1) Silicone Gasket Material</p>	<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Battery Disconnect Switch OFF Engine shut OFF Wheels chocked Remove wheel from drum</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> None</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

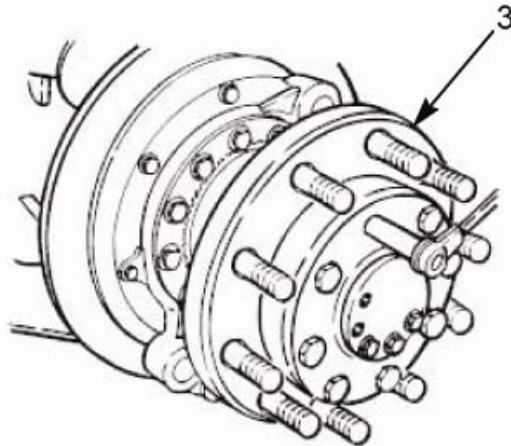


1. Remove the capscrews and washers that connect the hubcap to the drive flange. Remove the hubcap (1).



2. Remove the snap ring from the end of the axle shaft (2).

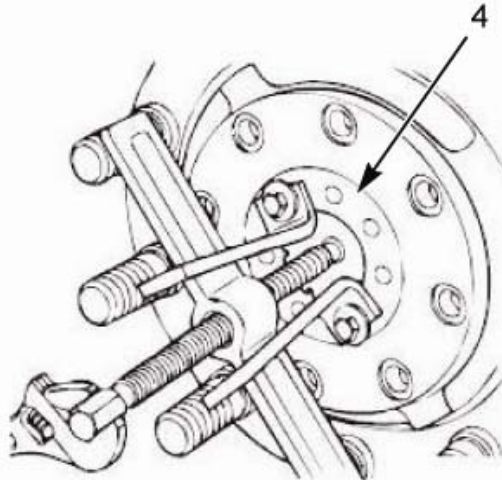
Chapter 4 – MAINTENANCE INSTRUCTIONS



3. Remove the capscrews and washers that connect the drive flange to the wheel hub (3).

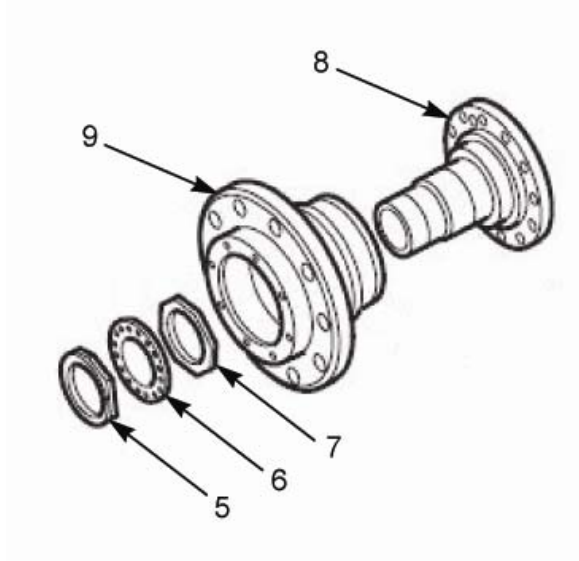


Use a brass or leather mallet to loosen the drive flange from the hub during removal procedures. Do not use a sharp tool to pry the flange from the hub, which can damage mounting surfaces. Do not hit steel parts with a steel hammer. Pieces of a part can break off and cause serious personal injury and damage to components.



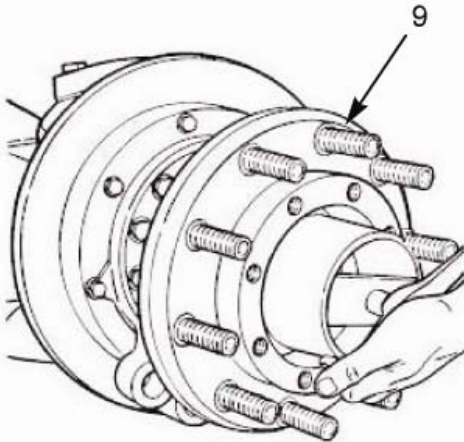
4. Remove the drive flange from the hub. If necessary, use puller to remove the drive flange (4).

Chapter 4 – MAINTENANCE INSTRUCTIONS



Use a torque wrench to tighten or loosen adjusting nuts. Do not use a hammer to directly hit adjusting nuts, or hit a chisel or drift placed against them. Damaged adjusting nuts can prevent you from obtaining correct wheel bearing end-play, which can affect vehicle operation and cause the wheel to separate from the vehicle and cause serious personal injury and damage to components.

5. Remove the outer adjusting nut (5), lock washer (6) and the inner adjusting nut (7) from the spindle (8). Use a 4-7/8 in. socket wrench to remove the adjusting nut (5).



6. Remove the hub (9) straight off the spindle (8). Prevent the outer bearing cone from falling when you remove the hub.

Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

If the hub is difficult to remove, tap it with a plastic or leather mallet to loosen it.

7. Remove the outer bearing cone (14) from the hub (9).

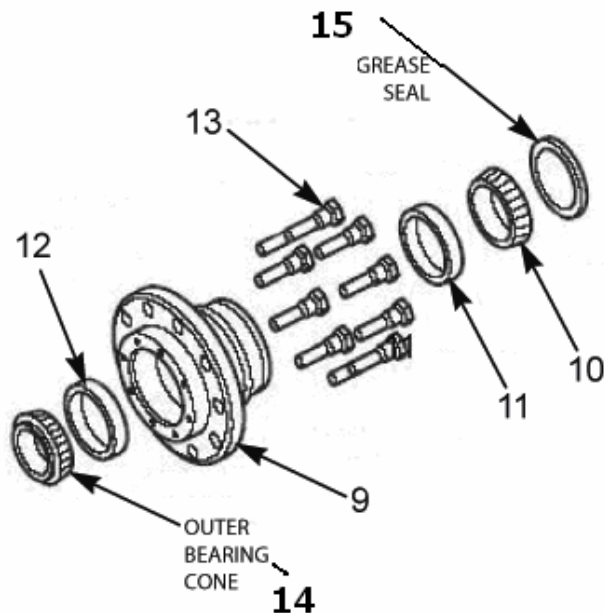


Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

NOTE

If a press is not available, use a brass hammer or drift.

8. If it is necessary to remove the wheel studs from the hub, place the hub into a press. Support the hub flange and press the studs (13) through the hub (12).



9. If necessary, remove the oil seal (15) from the hub with a suitable tool. Discard the oil seal.
10. If necessary, on units equipped for ABS, remove the ABS tooth wheel from the hub with a suitable puller.
11. Remove the inner bearing cone (10) from the hub (9).
12. Remove the inner bearing cup (11) and outer bearing cup (12) from the hub with a press and sleeve or a bearing puller.

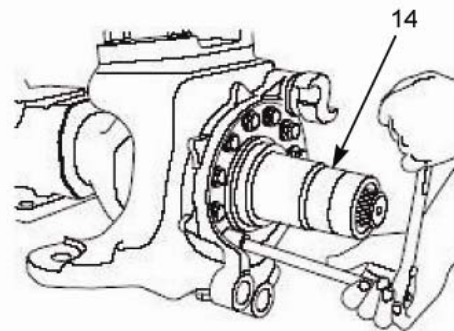
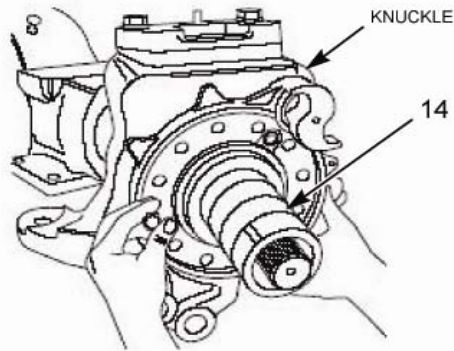
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

1. On units equipped for ABS, if the steel sleeve for holding the ABS sensor clip and ABS sensor has been disassembled, install the sleeve with a suitable driver.
2. Install the sleeve into the spindle until it is 15/16 in. (0.9375 in. or 23.8 mm) below the inner bearing shoulder 55 to 60 lb-ft (245 to 267 N•m).
3. Install the ABS sensor clip into the sleeve.
4. If removed, install a new camshaft bearing and grease seals into the knuckle.
5. Pack the spindle bushing with grease.
6. If disassembled, install the bushing and grease seal into the spindle.

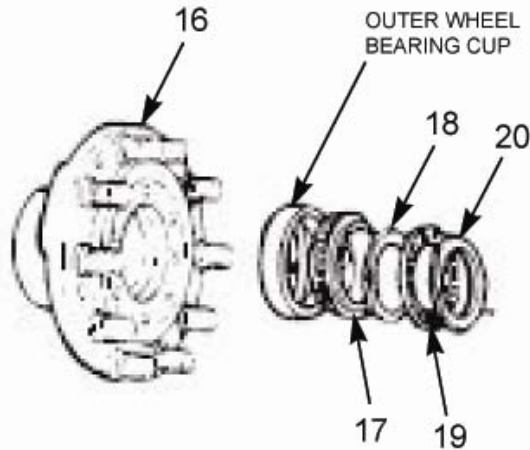


7. Install the spindle against the knuckle (14) the keyway slot for the wheel bearing adjusting nut system toward the TOP for ABS spindles.
8. Install the brake assembly onto the spindle. Fasten all parts to the knuckle with twelve capscrews and washers. Tighten to 180 to 230 lb-ft (244 to 312 N•m).
9. On units equipped for ABS, install the ABS cable into the knuckle. Install the ABS sensor into the ABS bushing in the spindle.
10. If removed, install the stop screw to the depth marked during removal.
11. If the wheel studs were removed from the hub, put the hub in a press with the drum side at the BOTTOM.
 - a) Align the grooves on the studs with the grooves in the stud holes in the hub.
 - b) Press the studs into position.
12. Use a press and sleeve to install the inner and outer bearing cups into the hub.

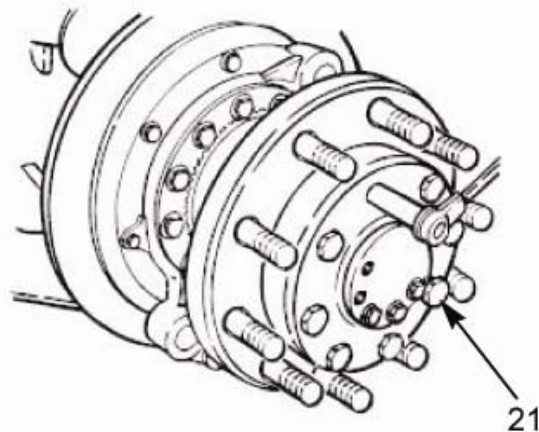
If a press is not available: Use a brass hammer.

Chapter 4 – MAINTENANCE INSTRUCTIONS

13. Fill the bearing cones and hub cavity with GAA grease until it is level with the inside diameter of the bearing cones.
14. Install the inner bearing cone into its cup inside the hub.
15. Install a new inner oil seal.
16. Install the seal into its correct position against the bore. Do not force or hit the seal after it has touched the bottom of the bore, which can damage the seal.
17. On units equipped for ABS, install the ABS tooth wheel onto the hub with a suitable driver.



18. Install the hub assembly (16) spindle. Be careful the oil seal is not damaged during installation. Press the hub until the inner bearing is flat against the face of the spindle.
19. Install the outer bearing cone (17) the spindle and push it into its cup inside the hub.
20. Install the inner wheel bearing nut (18) wheel bearing lock washer (19) and outer wheel bearing adjusting nut (20).



21. Use a torque wrench to tighten the adjusting nut (21) to 100 lb-ft (136 N•m).
22. Rotate the hub three full turns to ensure all the bearings and seal surfaces are in contact.

Chapter 4 – MAINTENANCE INSTRUCTIONS

23. Back off the adjusting nut 1/4 turn, 2-1/2 studs of the drum bolt circle. Do not rotate the hub assembly after backing off the adjusting nut.
24. Assemble the lock ring and jam nut. Tighten the jam nut to 250 to 400 lb-ft (339-542 N•m). If the lock ring does not line up with the adjusting nut, rotate the adjusting nut clockwise, tightening, to the closest lock ring hole. To make the smallest turn possible, flip the lock ring over if necessary.
25. Check the resulting end-play with a dial indicator and perform the following actions.

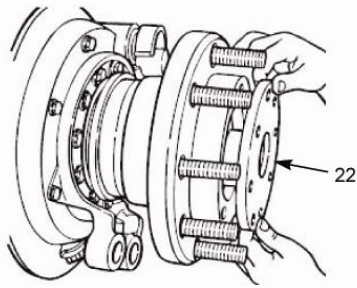
End-play (inch)	Action
0.000-0.002	No action required
>0.002-0.005	Remove the jam nut and lock ring. Tighten the adjusting nut 1/32 turn by flipping the lock ring over and turning the adjusting nut to align with the next hole.
>0.005-0.008	Remove the jam nut and lock ring. Tighten the adjusting nut 1/16 turn by turning the adjusting nut to align with the next hole. Do not flip the lock ring.
>0.008-0.011	Remove the jam nut and lock ring. Tighten the adjusting nut 3/32 turn by flipping the lock ring over and turning the adjusting nut to align with the second hole from the current position.
>0.011	Return to Step 1 and repeat the procedure.



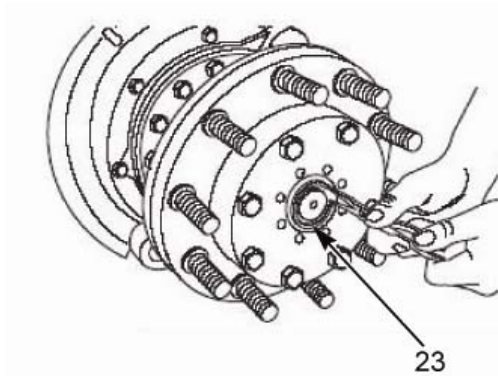
When you apply some silicone gasket materials, a small amount of acid vapor is present. To prevent serious personal injury, ensure that the work area is well-ventilated. Read the manufacturer's instructions before using a silicone gasket material, then carefully follow the instructions. If the silicone gasket material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

26. Apply a layer of silicone gasket material to the hub mounting surface of the drive flange only.
27. Apply GAA grease to the inside splines of the drive flange and the splines of the driveshaft.

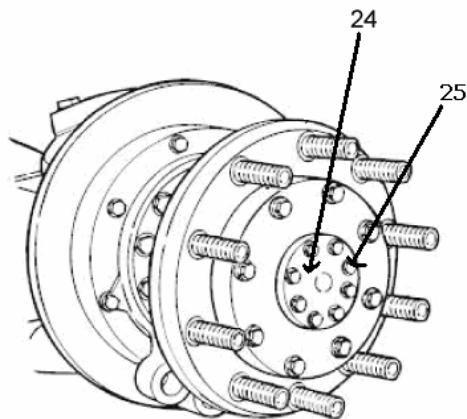
Chapter 4 – MAINTENANCE INSTRUCTIONS



28. Install the drive flange (22) onto the hub and fasten with washers and cap screws. Tighten the cap screws to 180 to 230 lb-ft (244 to 312 N•m).



29. Install the snap ring (23) onto the end of the axle shaft. Ensure the snap ring is positioned in the groove at the end of the axle shaft.
30. Apply a 0.125 in. continuous bead of silicone gasket material around either the mounting surface of the hubcap or the drive flange.



31. Install the hubcap (24) and tighten the cap screws (25) to 35-50 ft-lb (47-68 N•m).

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.7 Steering Gear Replacement

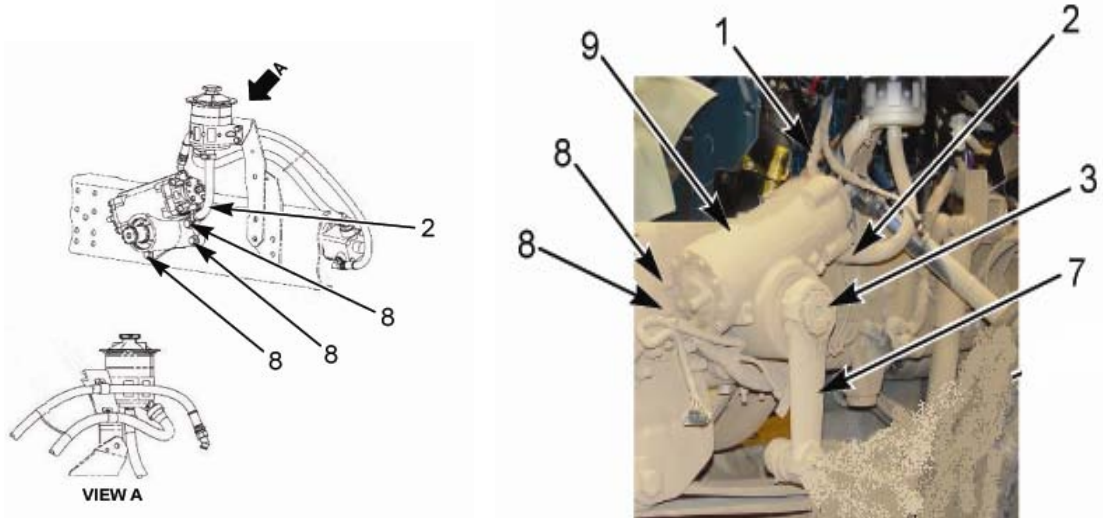
STEERING GEAR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>None</p> <p><u>Reference</u></p> <p>Parts Manual</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u></p> <p>Steering Gear (1)</p>	<p><u>Equipment Condition</u></p> <p>Engine shut OFF</p> <p>Wheels chocked</p> <p>Left side FSS nozzle bracket removed</p> <p>Left side armor removed</p> <p><u>Equipment Required</u></p> <p>Drain Pan</p> <p><u>Follow-On Maintenance</u></p> <p>Left side armor installed</p> <p>Left side FSS nozzle bracket installed</p> <p>Remove chocks</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

NOTE

To avoid breaking the shaft clock spring assembly, before performing the following procedure, ensure the steering wheel is centered with the wheels straight ahead.



1. Place a suitable container to drain the power steering fluid into.
2. Loosen the power steering hose elbow (1).
3. Loosen the reservoir hose connection (2).
4. Using an Allen wrench remove the steering arm nut (3).
5. Remove the steering arm (7) from steering gear (9).
6. Place a strap around the old steering gear and use a chain hoist to apply tension on the steering gear.

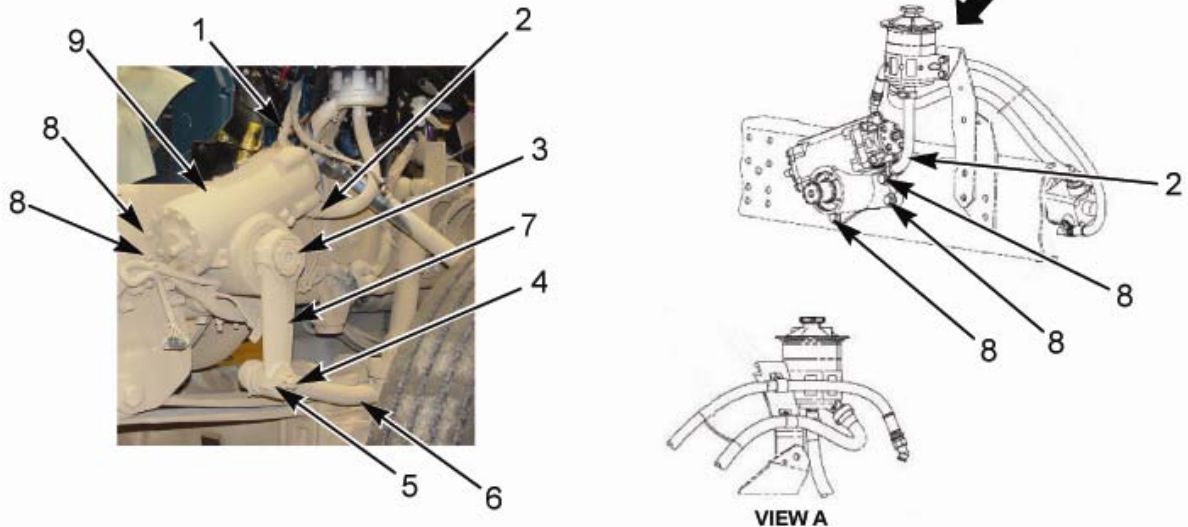


Steering gear is heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant, or a suitable lifting device. Failure to comply may result in serious injury or death of personnel.

7. Remove five steering gear mounting bolts (8). Two in the back of the steering gear and two in the front of the steering gear and one on the bottom.
8. Remove the old steering gear (9) and discard.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Place a strap around the new steering gear (9) and use a chain hoist to install the new steering gear in the vehicle.
2. Lower the new steering gear (9) into place and align the bolt holes.
3. Install five steering gear mounting bolts (8). Two in the back of the steering gear, two in the front of the steering gear, and one on the bottom.
4. Tighten down steering gear mounting bolts (8).
5. Remove strap and chain hoist.
6. Install the steering arm (7).
7. Using an Allen wrench install the steering arm nut (3).
8. Connect the reservoir hose connection (2) to the steering gear.
9. Connect the power steering hose at elbow (1) to the steering gear.
10. Remove suitable container.
11. Fill the steering gear with power steering fluid.
12. Check system for proper operation and leaks.

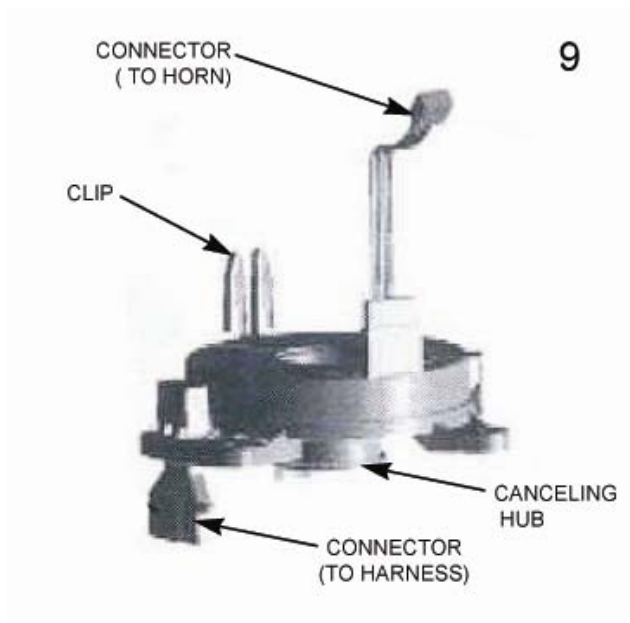
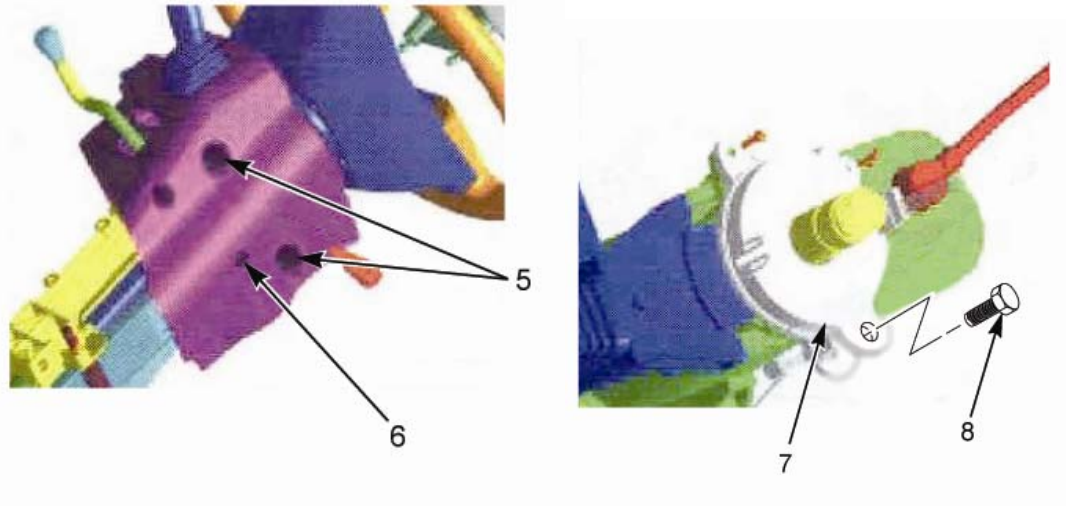
c) Follow-On Maintenance

1. Install left side armor.
2. Install left side FSS nozzle bracket.
3. Remove chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Remove the steering column covers by removing the two post screws (5) and one column screw (6) with a Torx wrench. Separate the bottom and top cover halves. A wiring harness is attached to the bottom cover half and will prevent the cover from being removed from the steering column area. Complete removal of this cover is necessary to facilitate the installation of this kit.



2. Disconnect the electrical connector on the bottom side of the clock spring (7) by prying the locking tab gently with a flat blade screwdriver. The locking tab is located on the steering column side of the housing (9).
3. Verify that the wheels are straight then tape the top cover of the clock spring to the bottom housing of the clock spring. Remove three screws (8) that secure the clock spring to the steering column assembly.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4. Remove the two turn signal screws (10) that secure the turn signal housing to the steering column.

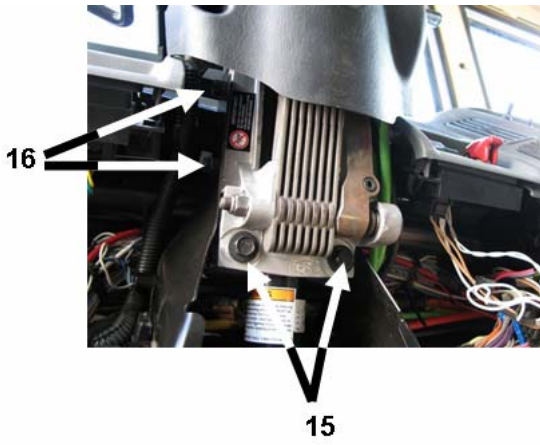


5. Disconnect the electrical connector (22) located on the back-side of the turn signal housing by gently squeezing the tab of the wiring harness connector while pulling it away from the turn signal.
6. If applicable, locate the TC-7 Trailer Control Brake Valve (11) on the steering column pedestal. Identify, mark and disconnect all of the air lines connected to the brake valve. All of the ports contain push to connect fittings. To disconnect push the fitting toward the valve with one hand and pull the air line out, away from the valve, with the other.
7. If applicable, remove the three TC-7 mounting screws (12) securing the valve to the steering column housing. Pull the TC-7 down, sliding it through the opening in the steering column housing. Removal of the handle is not necessary to remove the brake valve.



Chapter 4 – MAINTENANCE INSTRUCTIONS

8. Remove the two cross-cab beam screws (15) that secure the steering column to the cab beam.

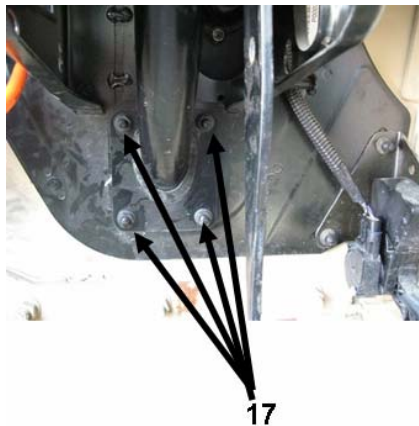


9. Remove and discard the four 5/16 inch Torx screws (16) that secure the top portion of the steering column to the steering column housing and the four 8mm flange nuts (17) that secure the bottom of the steering column to the firewall.
10. Lift up and pull toward driver's seat on the steering column to disengage the splined shaft of the steering column.
11. Remove the gasket material from the steering column mounting surface of the firewall.

b) Installation

Use all of the components contained in this kit.

1. Position the gasket on the four steering column mounting studs that are secured to the firewall.
2. Align the steering column with the opening in the firewall. Using extreme caution and align the steering column and splined shaft with the mating coupling.



3. Loosely install the four 8mm flange nuts (17) that secure the steering column to the firewall and the four 5/16 inch Torx screws (15) that secure the steering column to the support bracket.

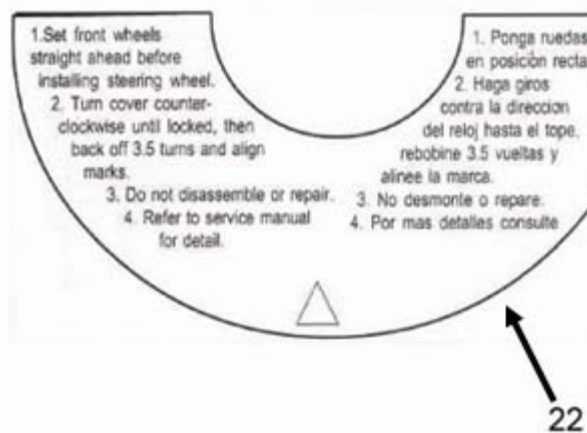
Chapter 4 – MAINTENANCE INSTRUCTIONS

4. Tighten the four 5/16 inch Torx screws (15) to 240 to 350 in-lb (67 to 97 N•m) and the 8mm flange nuts (17) to 200 to 240 in-lb (56 to 67 N•m).
5. The two cross-cab beam mounting screws (16) and tighten to 125 to 210 in-lb (35 to 59 N•m).
6. Install the TC-7 Brake Valve (11) using the three screws (12) removed during the disassembly, tighten to 30 to 40 in-lb (8 to 11 N•m). Reconnect the air lines. Push the fitting in, towards the valve and insert the air line. When the air line can't be inserted further, pull back on the fitting to secure.



Installing the Clock spring

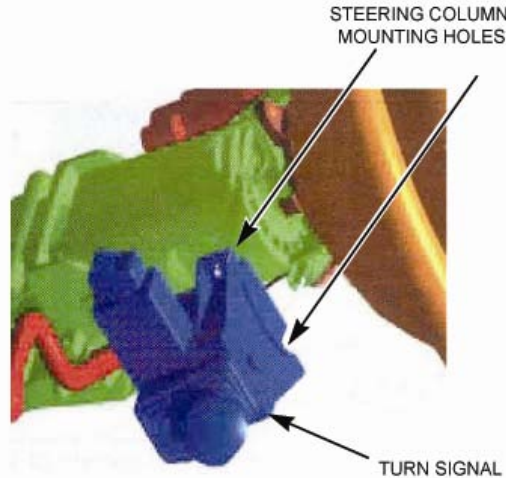
7. Inspect the clock spring verifying the tape that was installed in step 3 of the Disassembly is intact. If the tape is broken, the clock spring must be centered before it can be placed in service. Follow the instructions on the front surface of the clock spring for resetting the assembly.



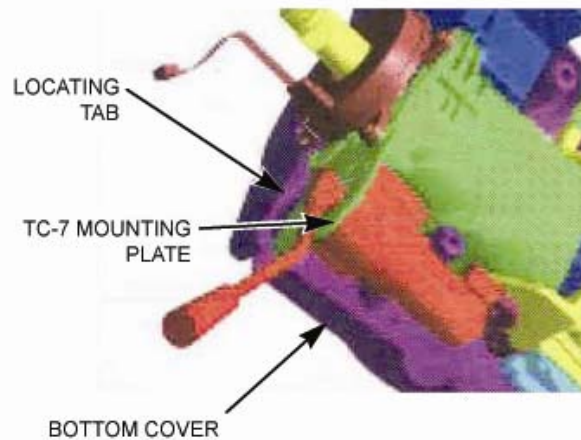
8. Align the three holes on the clock spring with the column mounting holes. The clock spring holes will align in one direction only. Using the three clock spring screws (8), secure the clock spring and torque the screws to 15 to 30 in-lb (4 to 8 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

9. Connect the clock spring electrical connector on the bottom of the housing to the wire harness. An audible "click" ensures the connector is secure.
10. Align the steering column mounting holes of the turn signal with the holes in the steering column housing. Ensure the positioning tab is centered in the steering column housing locating slot. Secure the turn signal screws and torque to 25 to 45 in-lb (7 to 13 N•m).



11. Connect the wire harness to the turn signal electrical connector on the bottom of the housing. An audible "click" ensures the connector is secured.
12. Reinstall the column cover halves, starting with the bottom cover. Secure the wire harness and clip to the cover before installation. Align the steering column screw hole of the bottom cover with the steering column hole. The locating tab inside the cover rests against the TC-7 Trailer Control mounting plate when properly positioned. Install the column screw and torque to 15 to 35 in-lb (4 to 10 N•m).
13. Align the top cover with the bottom cover and install the two post screws. Tighten the post screw to 15 to 30 in-lb (4 to 8 N•m).



Chapter 4 – MAINTENANCE INSTRUCTIONS

14. Reconnect the intermediate shaft to the steering column.
15. Align the steering wheel on the steering column shaft. Also, align the clock spring clip with the slot in the steering wheel. Exercise extreme caution to prevent misalignment and possible damage to the clock spring, shaft and steering wheel.
16. Replace the steering wheel nut (1) and torque to 660 to 720 in-lb (183 to 200 N•m).
17. Connect the clock spring wire harness to the steering wheel (horn) connector.
18. Install the front cover.
19. Reconnect the power source.

c) Testing the Vehicle

1. Activate the horn to verify the electrical connection to the horn is complete.
2. Turn on the turn signal then turn the steering wheel to verify that the system operates correctly as either a "non-canceling" or "canceling" switch.
3. If the horn and/or turn signals are not functioning properly verify that the power source is connected and that all electrical connections are properly seated.
4. Verify the vehicle wheels turn when the steering wheel is turned and that the steering wheel features such as tilt and telescoping, if applicable, are also functioning properly.

d) Follow-On Maintenance

1. Install steering wheel and clock spring.
2. Install steering wheel shaft to column.
3. Install air filter canister.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.9 Steering Wheel and Clock Spring Replacement

STEERING WHEEL AND CLOCK SPRING REPLACEMENT

This task covers:

a) Removal

b) Installation

c) Follow-On Maintenance

INITIAL SET UP

Special Tools

Steering Wheel Puller

Equipment Required

None

Personnel

One (1) Wheeled Vehicle Mechanic

Equipment Conditions

Engine shut OFF

Battery Disconnect Switch OFF

Parking brake set

Transmission set in NEUTRAL (N)

Wheels chocked

Material Parts

Steering Wheel (1)

Clock Spring (1)

Reference

Parts Manual

Follow-On Maintenance

Battery Disconnect Switch ON

Start engine

Verify operation of steering wheel

Verify operation of clock spring

Verify operation of switches

Remove wheel chocks

Test drive vehicle

Shut engine OFF

Battery Disconnect Switch OFF

Set parking brake

Chock wheels

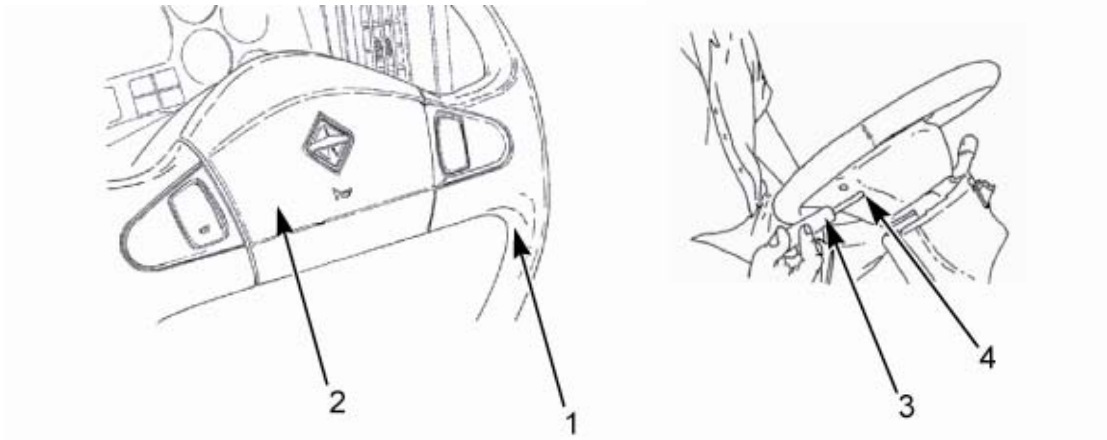
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

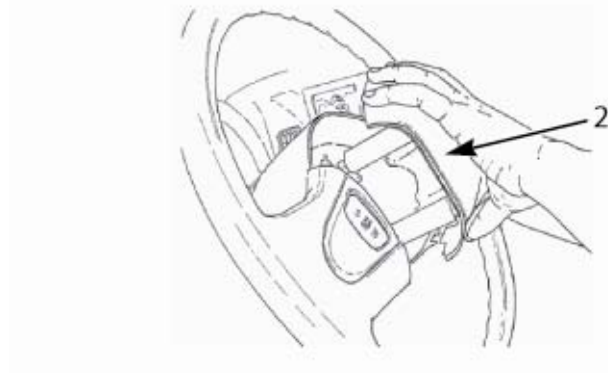


Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of each part. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Steering Wheel

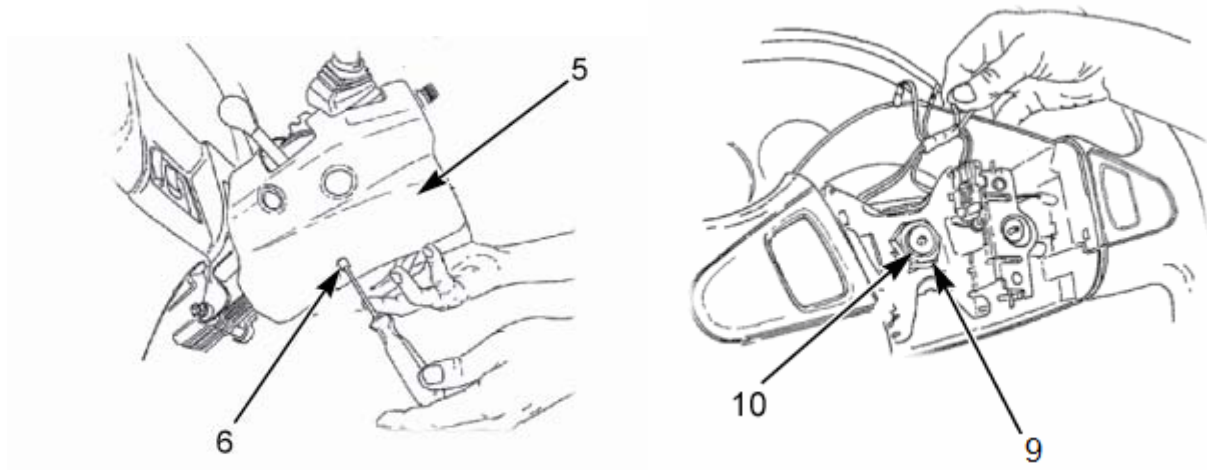


1. To remove front cover (2) from steering wheel (1), insert removal tool or Phillips head screwdriver (3) into the aperture (4) to release it.

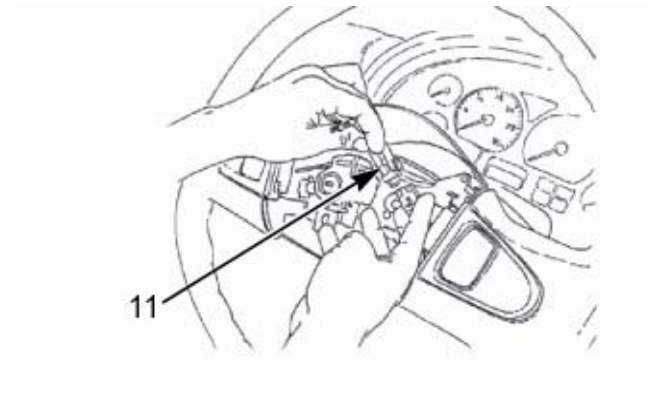


2. Remove front cover (2) by pulling up on it as you release it with the removal tool or Phillips screwdriver (3) and set aside for reinstallation later.

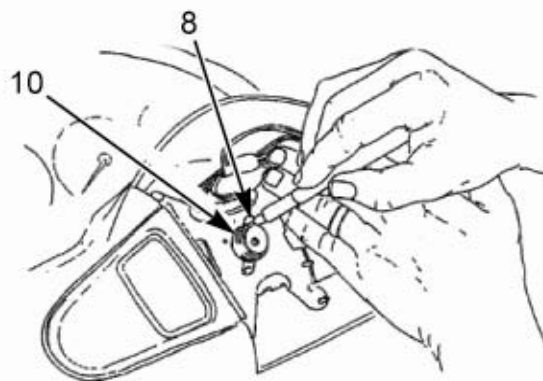
Chapter 4 – MAINTENANCE INSTRUCTIONS



3. Remove side cover (5) by removing retaining screws (6) and set screws and side cover aside to reinstall later.
4. Remove retaining nut (9) from the shaft spindle (10).

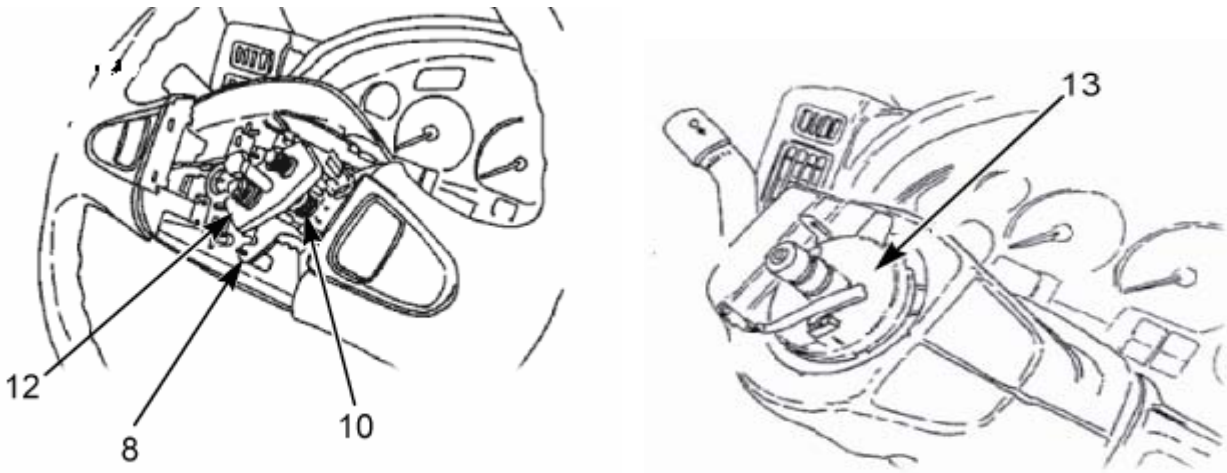


5. Disconnect steering wheel wiring harness (11).



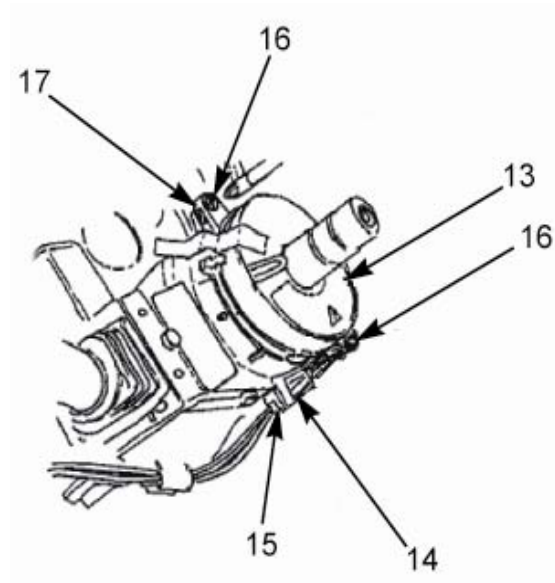
6. Before removing steering wheel mark location of the shaft spindle (10) to the plate base (8). This will assist in the proper alignment and re-assembly later.

Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Install a wheel puller (12) to plate base (8) and shaft spindle (10). Slowly remove steering wheel from shaft spindle (10).
8. Clock spring (13) is now revealed.
9. Discard steering wheel if removing because of damaged in accordance with regulations.

Clock Spring



1. Disconnect clock spring wire harness (14) from column harness (15).
2. Remove the two screws (16) from tabs (17) that hold clock spring (13) into place.
3. Remove clock spring (13) and discard according to local regulations.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

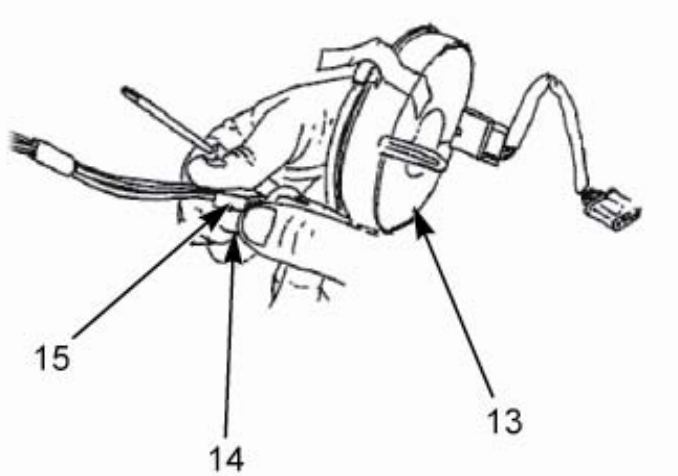


Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.

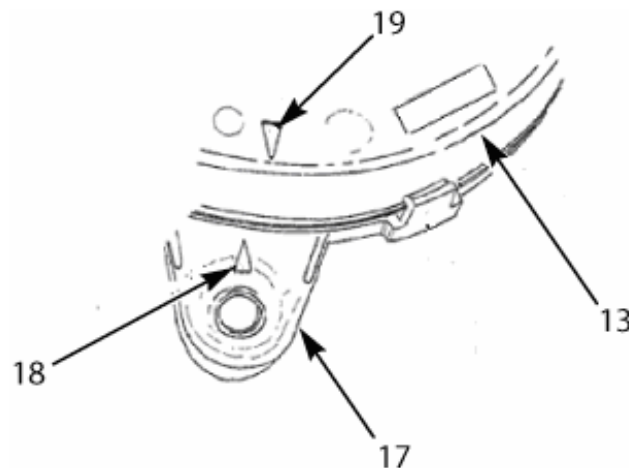
NOTE

Read and follow the directions for the clock spring installation very carefully. If clock spring is not properly installed the device will break. If the clock spring binds, it must be re-aligned or it will break in use. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

Clock Spring

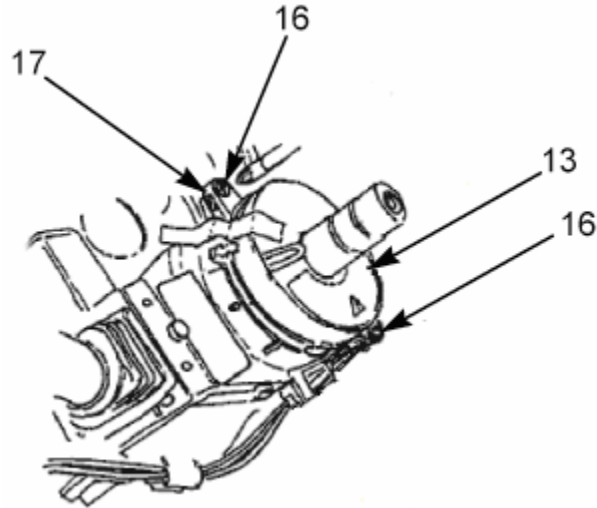


1. Apply connector lubricant to connector ends.
2. Connect the clock spring harness (14) to the dash harness (15).



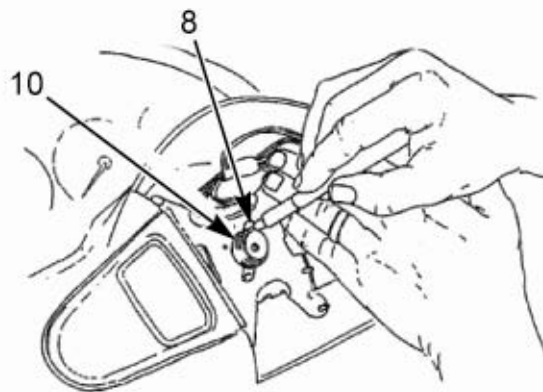
3. Install the clock spring (13) using alignment arrows (18) and (19) on the spring body (13) and on the tab (17).

Chapter 4 – MAINTENANCE INSTRUCTIONS



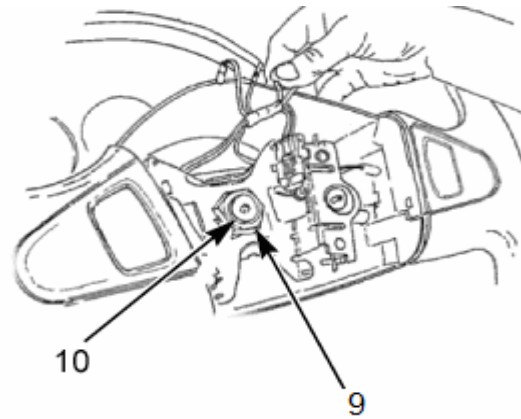
4. Install screws (16) and tighten to 15-30 in-lb. Do not over tighten, this will cause the clock spring to bind and break.
5. To assure that the clock spring is centered, do the following:
 - a. Turn the clock spring 3 ½ turns counter-clockwise.
 - b. Return the clock spring clockwise 3 ½ turns.
 - c. Turn the clock spring 3 ½ more turns clockwise.
 - d. Return the clock spring 3 ½ turns counter-clockwise to the center.
6. If no binding has occurred, the spring is now centered. If binding occurs, rotate the clock spring body appropriately and repeat steps a, b, c, and d until no binding occurs through 3 ½ turns from center in each direction. (Seven turns lock-to-lock).

Steering Wheel

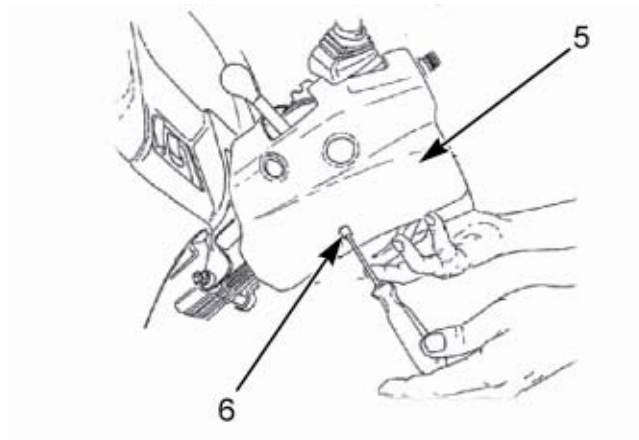


1. Install steering wheel (1) by lining up the marks made in removal to plate base (8) and shaft spindle (10) which will assure that the steering wheel (1) is centered properly on the shaft spindle (10).

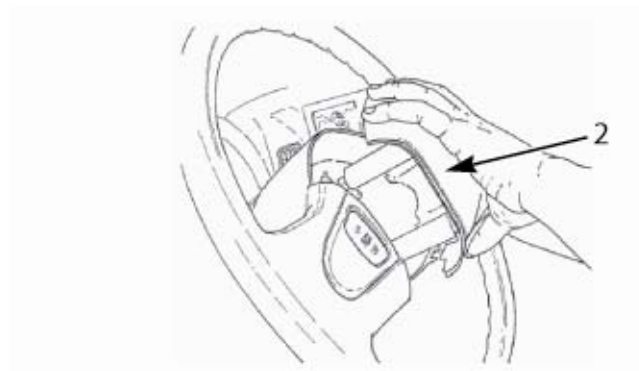
Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Install nut (9) on shaft spindle (10) and tighten to 55 to 60 lb-ft (75 to 81•N•m).



3. Reinstall the side covers (5) with retaining screws (6).



4. Reinstall front cover (2) by just lining it up and pressing it into place.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Start engine.
3. Verify operation of steering wheel.
4. Verify operation of clock spring.
5. Verify operation of switches.
6. Remove wheel chocks.
7. Test drive vehicle.
8. Shut engine OFF.
9. Battery Disconnect Switch OFF.
10. Set parking brake.
11. Wheel chocks.

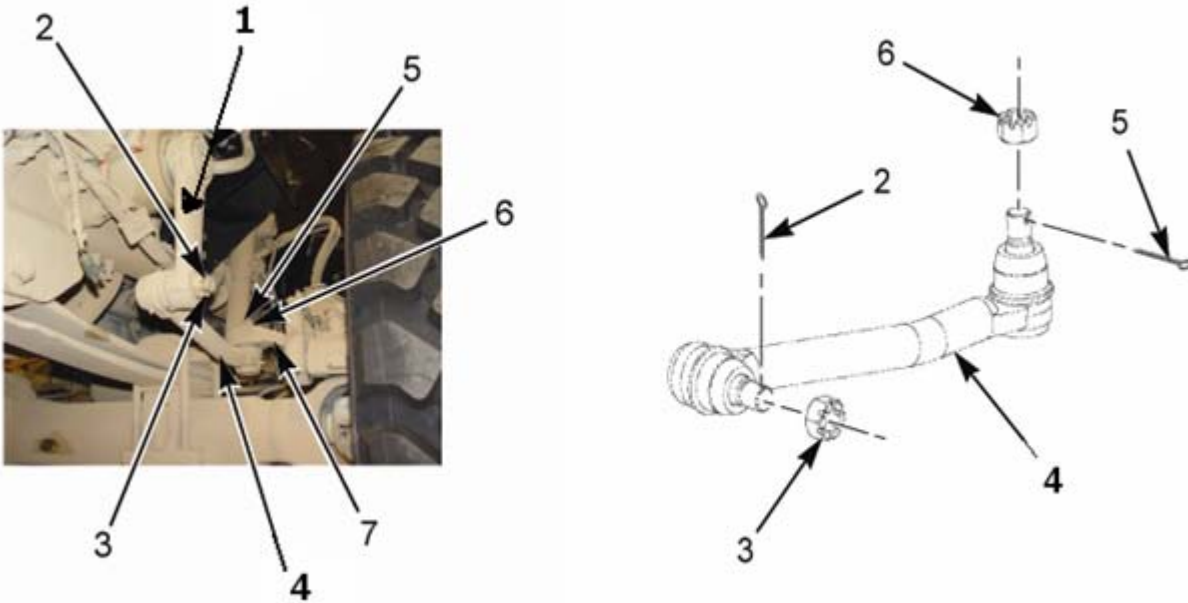
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.10 Steering Drag Link Replacement

STEERING DRAG LINK REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Steering Drag Link (1)</p>		<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Battery Disconnect Switch OFF Engine shut OFF Wheels chocked</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> None</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

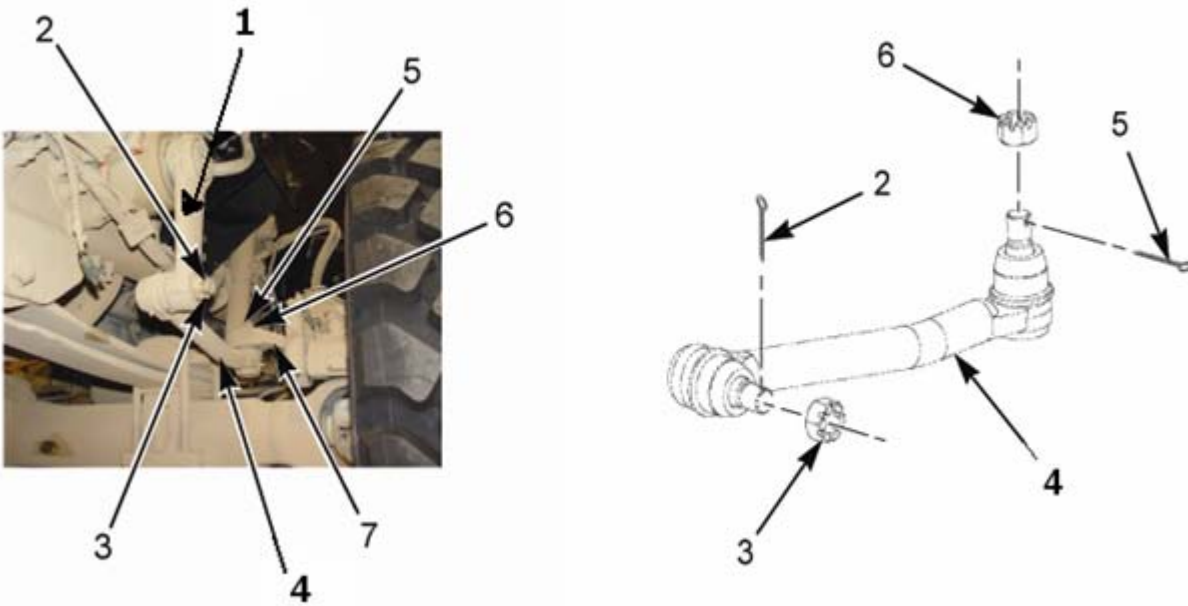
a) Removal



1. Using a pair of pliers, remove the cotter pin (2) and remove the nut (3) that connects the pitman arm (1) to the steering drag link (4).
2. Remove the drag link from pitman arm (1).
3. Using a pair of pliers, remove the cotter pin (5) and nut (6) that connects the steering drag link (4) to the steering arm (7).
4. Remove steering drag link (4) and discard.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new steering drag link (4).
2. Install nut (6) that connects the steering drag link to the steering arm (7).
3. Using a pair of pliers, install the cotter pin (5).
4. Install drag link (4) to pitman arm (1)
5. Install the nut (3) that connects the pitman arm (91) to the steering drag link (4).
6. Using a pair of pliers, install the cotter pin (2).

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.11 Power Steering Reservoir Replacement

POWER STEERING RESERVOIR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		
<u>Special Tools</u>		<u>Equipment Conditions</u>
None		Engine shut OFF Battery Disconnect Switch OFF Parking brake set Transmission set in NEUTRAL (N) Wheels chocked Power steering fluid drained/removed
<u>Personnel</u>		<u>Follow-On Maintenance</u>
One (1) Wheeled Vehicle Mechanic		Fill power steering reservoir Battery Disconnect Switch ON Start engine and check for air bubbles and leaks Remove wheel chocks Test drive vehicle to work out air bubbles Shut engine OFF Battery Disconnect Switch OFF Set parking brake Transmission set in NEUTRAL (N) Wheels chocked Top off power steering fluid
<u>Material Parts</u>		
Power Steering Reservoir (1) Power steering fluid (1.5 quarts)		
<u>Equipment Required</u>		
Drain Pan Rags		
<u>Reference</u>		
Parts Manual		

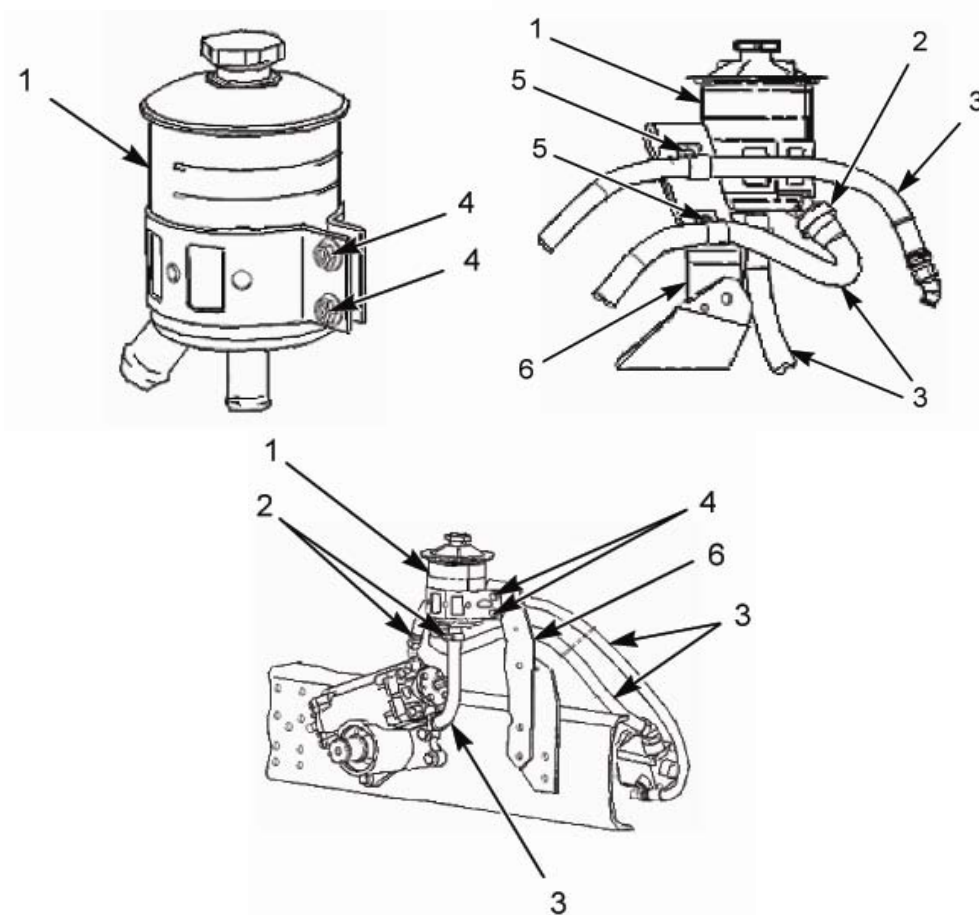
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear protective safety goggles/face shield while working with fluids. Make sure that vehicle is parked on a flat level surface. Make sure the ignition is turned OFF, transmission is in NEUTRAL (N), parking brake is set, and wheels are chocked. Failure to comply may result in serious injury or death to personnel.

Use extreme caution when moving about the engine compartment with the hood in open position or under vehicle. Availability of space limited for maneuvering tools, arms, hands, and components can make procedures difficult. Failure to comply may result in serious injury or death to personnel.



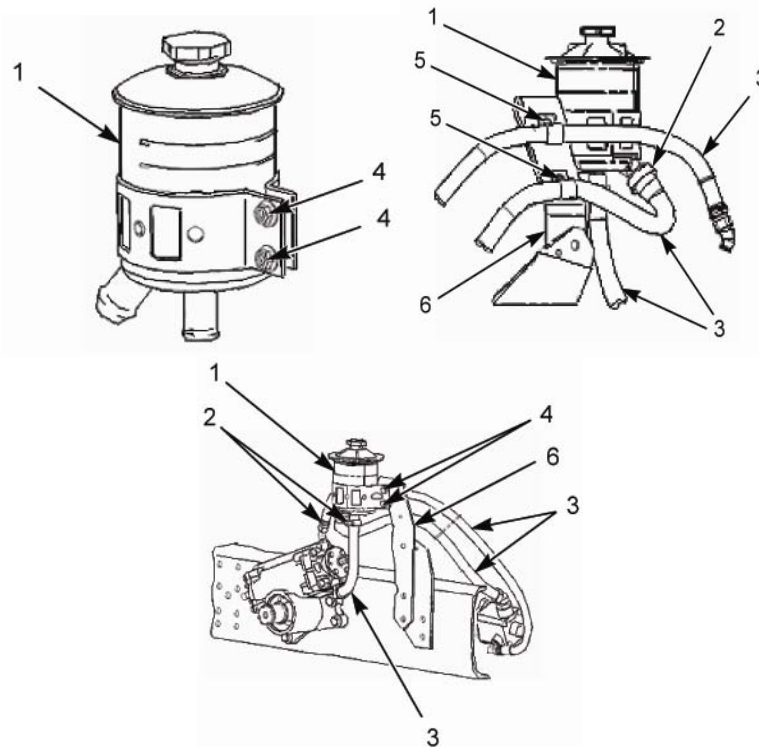
1. After suctioning fluid out of reservoir (1) position rags underneath reservoir and place a drain pan on floor under vehicle to catch any excess fluid that may spill out.
2. Disconnect clamps (2) off each of the three hoses (3) at the reservoir one at a time and cap the ends as not to loose too much fluid.
3. Locate two mounting bolts (4) and two nuts (5) and remove reservoir (1) from mounting bracket (6).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



1. Inspect new reservoir for any signs of damage before installation.
2. Apply anti-corrosion compound to bolts (4) and mounting bracket (6).
3. Install reservoir (1) to mounting bracket (6) with bolts (4) and nuts (5).
4. Re-connect hoses (3) with clamps (2) to reservoir (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Fill power steering reservoir.
2. Battery Disconnect Switch ON.
3. Start engine and check for air bubbles and leaks.
4. Remove wheel chocks.
5. Test drive vehicle to work out air bubbles.
6. Shut engine OFF.
7. Battery Disconnect Switch OFF.
8. Set parking brake.
9. Transmission set in NEUTRAL (N).
10. Wheels chocked.
11. Top off power steering fluid, if needed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.12 Power Steering Tubing and Hose Replacement

POWER STEERING TUBING AND HOSE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Power Steering Heater Hose (1) Power Steering Hose (1) Power Steering Hose Assy (1) C-Clip Clamp (2) if needed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Rags Drain pan</p>	<p><u>Equipment Conditions</u> Battery Disconnect Switch OFF Parking brake set Transmission set in NEUTRAL (N) Wheels chocked Engine Shut OFF Left side FSS nozzle bracket removed Left side armor removed. Drain power steering fluid</p> <p><u>Follow-On Maintenance</u> Fill power steering fluid reservoir Battery Disconnect Switch ON Start engine Turn steering wheel in both directions to work out any air bubbles in hoses Re-check power steering fluid level in reservoir and add to fill if needed Close engine hood Clean up any spills and dispose of rags and oil per regulations Remove wheel chocks Test drive vehicle Shut engine OFF Re-check fluid level and top off if needed Battery Disconnect Switch OFF Wheels chocked Install left side armor Install left side FSS nozzle bracket</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

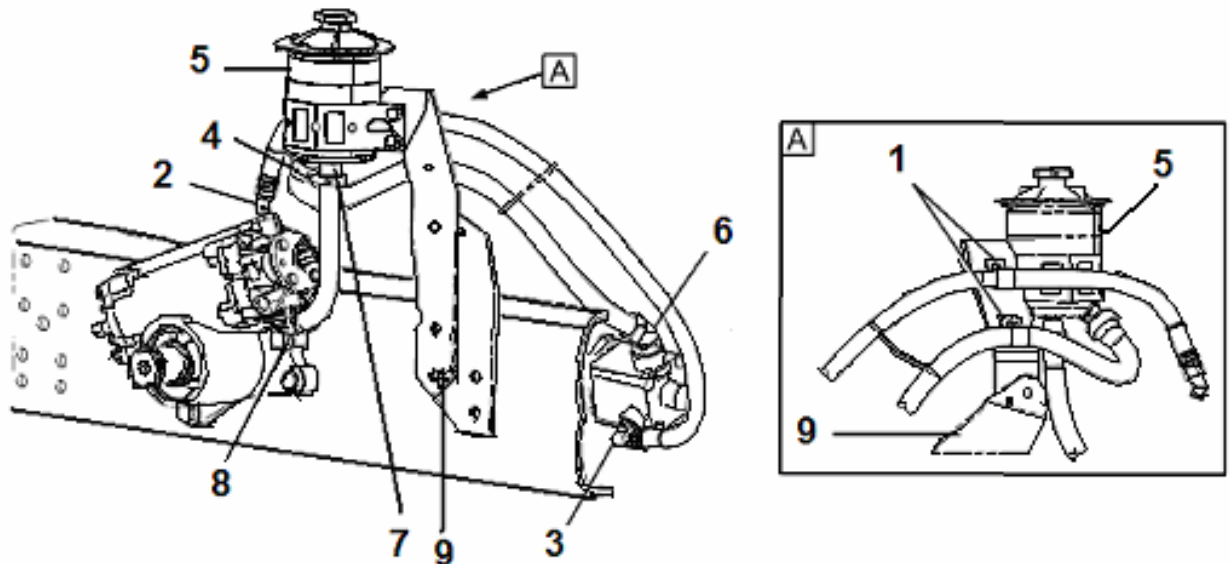


Wear eye protection when working on or around hydraulic systems. Hydraulic hoses, fittings, and components can contain high pressure. Failure to comply may result in injury or death to personnel.

Increased effort may be required to turn steering wheel if there is a failure of power steering system or engine stops running. Stop vehicle as soon as road conditions permit. Operating vehicle with impaired steering can result in damage to equipment and or serious injury or death to personnel.

Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.

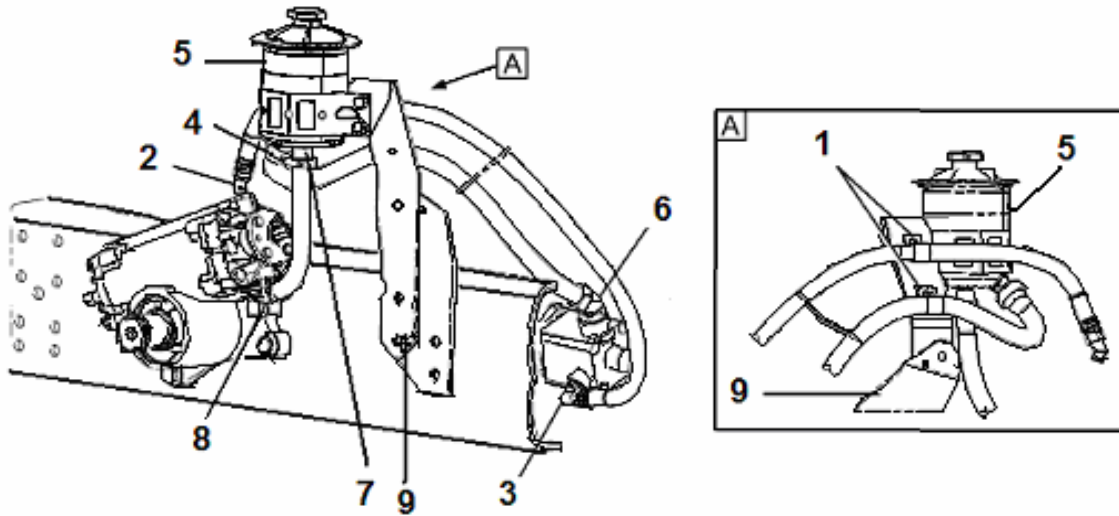
Engine components become extremely hot during normal operation. Always allow engine to cool completely prior to performing any task or procedures on it. Working in close quarters in engine compartment can be difficult moving around. Wear proper safety equipment; safety goggles, work gloves, long sleeves, or shop coat. Failure to comply may result in serious burns, cuts, or injury or death to personnel.



1. Remove the two hose c-clips (1) on the back-side of power steering reservoir (5) mounting bracket (9). Retain c-clips for install of new hoses unless damaged.
2. Place rags at hose ends and drain pan underneath to catch any spills of fluid left in hoses.
3. Remove the power steering hose at the elbow (2) and at the heat exchanger (3) and discard hose.
4. Remove the power steering hose (4) under the reservoir (5) and at the heat exchanger (6) and discard hose.
5. Remove the heater hose at reservoir (7) connection and at the steering gear (8) and discard hose.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



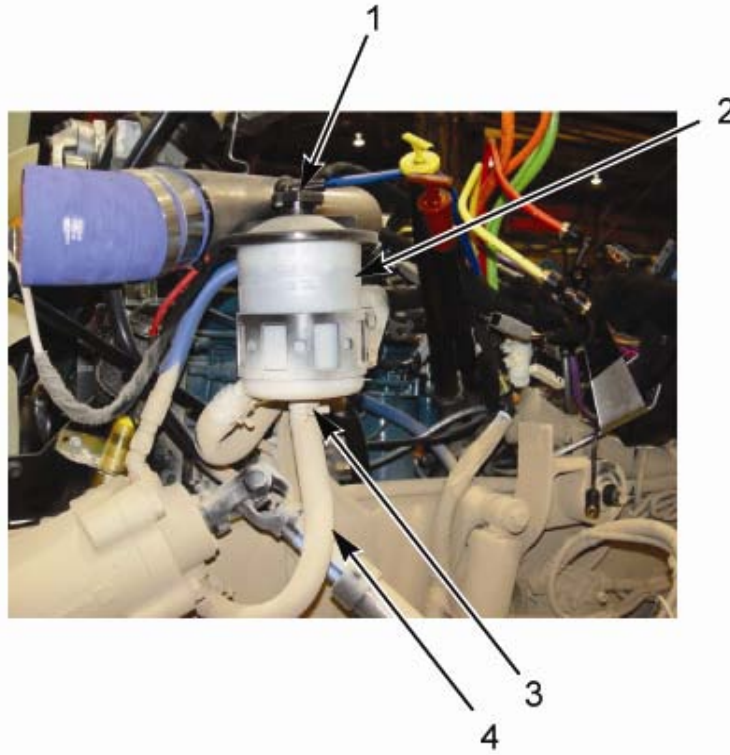
1. Install heater hose at steering gear (8) and at bottom of reservoir (7) and clamp into place.
2. Install power steering hose (4) at heat exchanger (6) and where it attaches under the reservoir (5) and clamp into place.
3. Install the power steering hose at heat exchanger (3) and at the elbow (2) and clamp into place.
4. Install the two hose c-clips (1) on the back-side of the power steering reservoir (5) mounting bracket (9) and tighten.
5. Remove drain pan and rags from under vehicle and engine compartment. Clean up any spills.

c) Follow-On Maintenance

1. Fill power steering fluid reservoir.
2. Battery Disconnect Switch ON.
3. Start engine.
4. Turn steering wheel in both directions to work out air bubbles in hoses.
5. Re-check power steering fluid level in reservoir and add to fill if needed.
6. Close engine hood.
7. Clean up any spills and dispose of rags and oil per regulations.
8. Remove wheel chocks.
9. Test drive vehicle.
10. Shut engine OFF.
11. Re-check fluid level and top off if needed.
12. Battery Disconnect Switch OFF.
13. Wheels chocked.
14. Install left side armor.
15. Install left side FSS nozzle bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Drain



1. Remove clamp (3) and disconnect the return line (4) from the pressure accumulator at the main hydraulic reservoir (2).
2. Allow the hydraulic fluid to drain into a suitable container.
3. Connect the return line (4) to the hydraulic reservoir. Connect the clamp.

b) Fill

1. Locate the fill cap (1) on top of the hydraulic fluid reservoir (2). Remove cap (1) and set aside.
2. Fill reservoir (2) with hydraulic fluid.
3. Insert the fill cap (1), and hand-tighten.
4. Clean the top of the reservoir (2) and the surrounding area.
5. Start engine and let the engine idle for a few minutes. DO NOT rev the engine.
6. Inspect the top of the reservoir (2) around the cap (1). If a leak exists, the top of the reservoir (2) will be wet with hydraulic fluid.
7. If a leak is present, notify your supervisor.

c) Follow-On Maintenance

1. Start the engine, and let the vehicle run for 10 to 20 seconds at an idle. DO NOT rev the engine.
2. Turn off engine.
3. Check the fluid in the reservoir (2) to verify that the reservoir is filled to the fill line.
4. Dispose of used hydraulic fluid in accordance with local regulations.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-11.14 Power Steering Filter and Filter Head Replacement

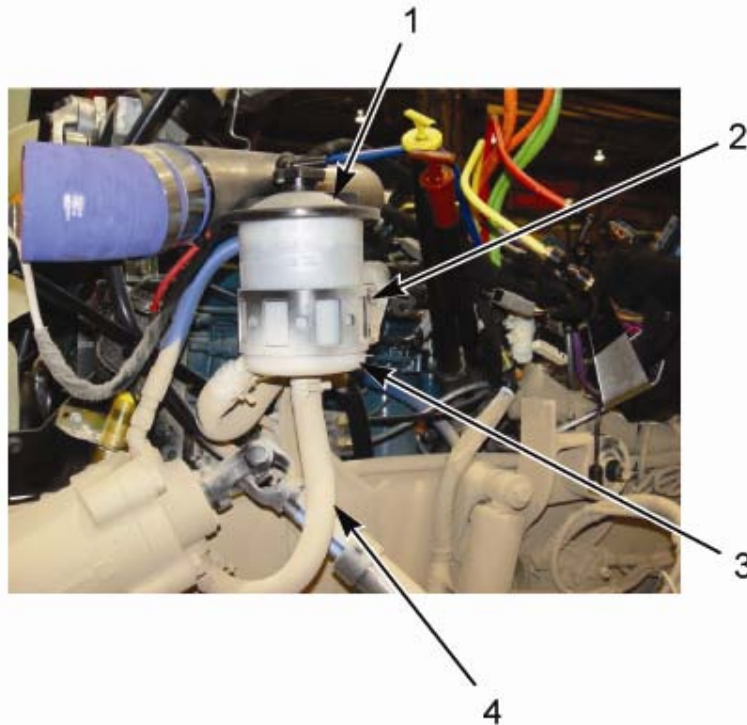
POWER STEERING FILTER AND FILTER HEAD REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Equipment Required</u> Drain Pan</p> <p><u>Material/Parts</u> Hydraulic Filter Hydraulic Fluid</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p>	<p><u>Equipment Condition</u> Engine shut down Wheels chocked Transmission in NEUTRAL (N) Hydraulic reservoir drained Return line disconnected Input line disconnected</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Dispose of used oil and old filter Reconnect input lines Reconnect return lines Fill reservoir Check for leaks</p>	



Wear eye protection and non-porous gloves. If hydraulic fluid comes into contact with skin, remove contaminated clothing, including shoes. Wash immediately. If hydraulic fluid comes into contact with eyes, flush with water for 15 minutes. See a doctor immediately. Failure to do so could result in personal injury or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Loosen the screws (2) that hold the hydraulic reservoir (3) in its bracket.
2. Lift the reservoir (3) from its bracket.
3. Remove the reservoir cover (1) by turning counterclockwise.
4. Locate the filter and filter head inside the reservoir (3) and pull the filter and the filter head from the reservoir.
5. Inspect the reservoir (3) for sediment that contains particulate. If particulate exists, notify your supervisor.

b) Installation

1. Insert a new filter and filter head into the hydraulic reservoir (3).
2. Replace the reservoir cover (1). Ensure seal is in place.
3. Insert the reservoir (3) into its bracket.
4. Tighten the screws (2) that hold the hydraulic reservoir (3) in its bracket.

c) Follow-On Maintenance

1. Dispose of used oil and old filter in accordance with local regulations.
2. Reconnect input lines.
3. Reconnect return lines.
4. Fill reservoir.
5. Check for leaks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

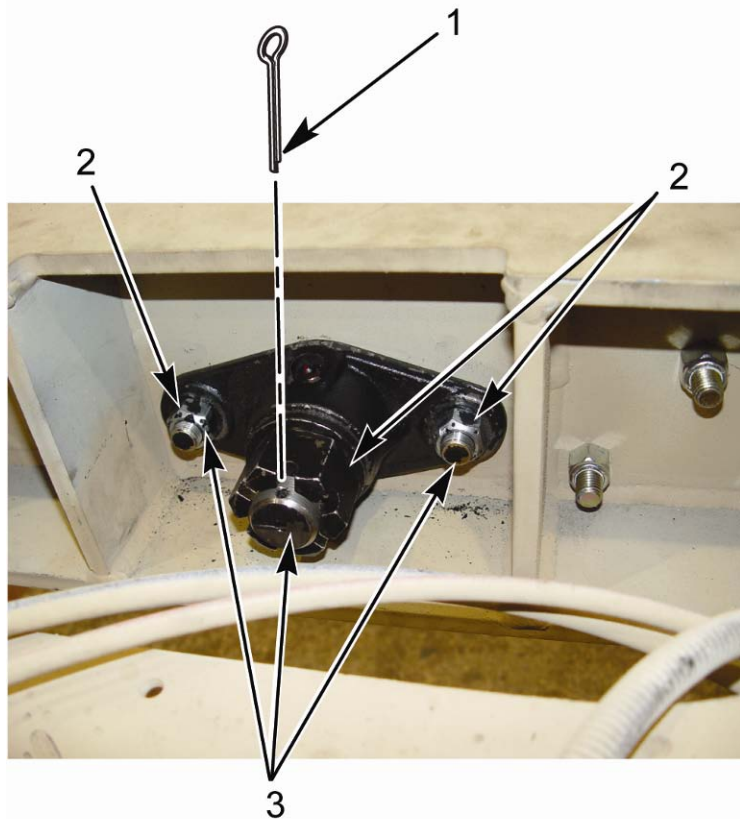
a) Removal



Vehicle's engine must be off, brakes set and wheels chocked prior to performing this task. Failure to comply may result in serious injury or death to personnel.

NOTE

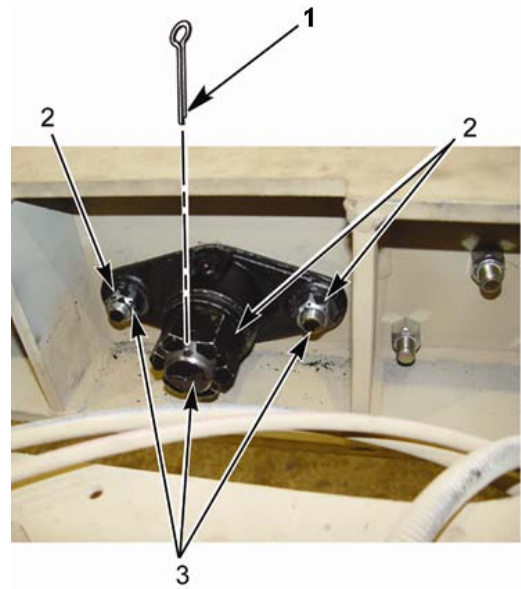
Note location and position of bolts, nuts, and cotter pin prior to removal to ensure proper installation.



1. Pull cotter pin (1) from pintle stud, loosen nuts (2) from bolts (3).
2. Remove pintle hook from rear crossmember.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install pintle (1) on crossmember with bolts (3). Secure with nuts and lock nut (2).
2. Install cotter pin (4) through pintle lock nut.

c) Follow-On Maintenance

1. Install Muffler.
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-12.2 Tow Hook Replacement

TOW SHACKLE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Material/Parts</u> Tow Hook (1) Pin (1) Cotter Pin (1)</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p>		<p><u>Equipment Condition</u> Transmission set in (N) Parking Brake set Battery Disconnect Switch OFF Engine shut OFF Wheels chocked</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Remove wheel chocks</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

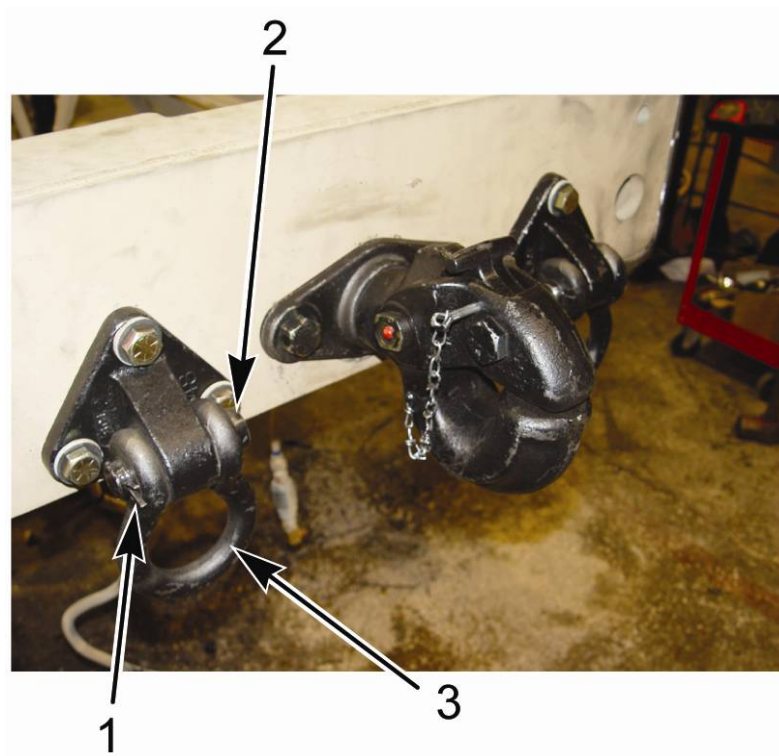
a) Removal



Vehicle's engine must be off, brakes set and wheels chocked prior to performing this task. Failure to comply may result in serious injury or death to personnel.

NOTE

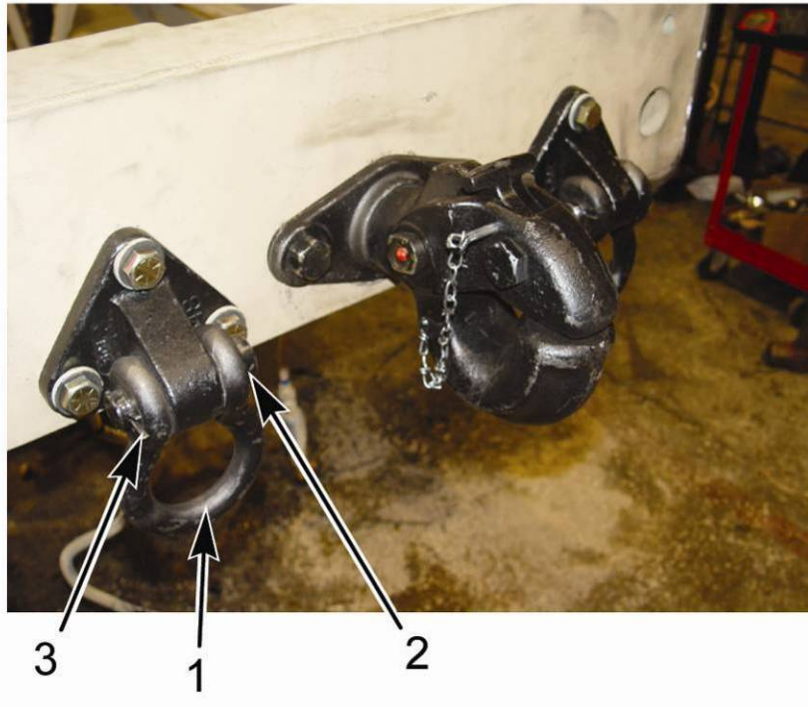
Front and Rear Tow Shackles are installed and removed the same way. Rear Tow Shackles are shown.



1. Remove cotter pin (1) from hook pin (2).
2. Remove tow hook (3) from bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install Tow Shackle (1) on bracket, install pin (2).
2. Install cotter pin (3) through pin and tow hook, then secure.

c) Follow-On Maintenance

1. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-12.3 Winch Cable Replacement

WINCH CABLE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		
<u>Special Tools</u>		<u>Equipment Required</u>
None		None
<u>Personnel</u>		<u>Equipment Conditions</u>
One (1) Wheeled Vehicle Mechanic		Engine shut OFF
One (1) Crewmember		Parking brake set
		Transmission set in NEUTRAL (N)
		Wheels chocked
		<u>Reference</u>
		Parts Manual
<u>Material Parts</u>		<u>Follow-On Maintenance</u>
Winch Cable		Ignition switch ON
		Verify operation of winch cable
		Ignition switch OFF
		Battery Disconnect Switch OFF
		Remove wheel chocks

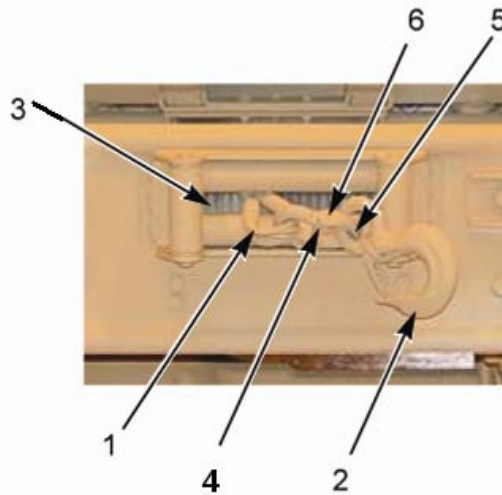
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Ensure that proper safety equipment is being used, protective eye wear and gloves. Failure to comply may result in serious injury or death to personnel.

When operating winch, ensure that there are no objects in the path of the cable or vehicle. Failure to comply may result in serious injury or death to personnel.



1. When paying out winch cable (1) for replacement, use strap supplied with winch kit around hook (2) to assist on pulling it off of drum spool (3).
2. Before paying out, remove hook (2) from cable (1) by tapping out pin (4) from links (5) and sleeve (6) from hook (2) and check for damage and replace if necessary.
3. Wrap strap that comes with winch kit through cable (1) loop and turn ignition switch to the on position to start pay-out on winch, pulling cable off drum spool (3).



4. When cable (1) is extended all the way, stop winch and turn ignition switch off. Loosen set screw (7) that secure cable (1) to the drum spool (3) and remove.
5. Carefully roll up old cable (1).
6. Check drum spool (3) for any signs of damage, corrosion, cracks and repair or replace as necessary.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Always pre-stretch wire rope and re-spool under load before use. Tightly wound wire rope reduces chances of “binding”, which is wire rope working it’s way down into a loosely wound wire rope layer and catching or damaging itself. Failure to comply may result in damage to equipment and may cause serious injury or death to personnel.

When installing new cable, make sure you secure it to the spool drum with screws. Failure to comply may result in damage to equipment or serious injury or death to personnel.

Make sure that cable is free of kinks and binds or frayed wires before installing onto drum spool. Failure to comply may result in damage to equipment.

Anti-corrosion compound is toxic. Use only in well-ventilated area. Use NIOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in easy; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately.

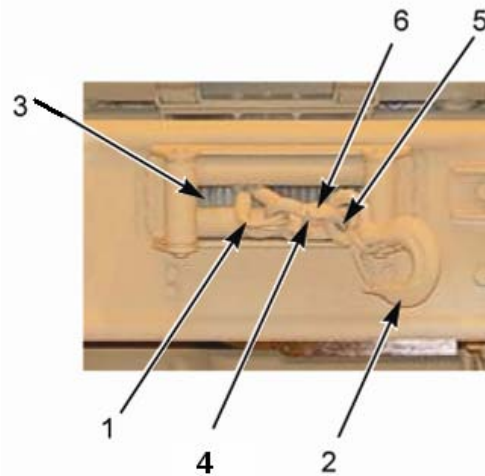
Cable is under tension when installed take care with personal protection. Have safety goggles and gloves. DO NOT have loose clothing, it can get caught up in cable as it is being wound round spool drum and pull personnel in and cause serious injury or possibly death.

DO NOT hold onto cable when pulling in new one. Failure to comply may result in serious injury or death to personnel.



When installing new winch cable, there can be no kinks or binds in the new cable. There has to be tension on the new cable when it is installed. Failure to comply may result in damage to equipment.

Chapter 4 – MAINTENANCE INSTRUCTIONS



1. Apply anti-corrosion compound where applicable on drum spool (3).
2. Before installing new cable (1) on spool drum (3), the new cable (1) needs to be unrolled completely for proper installation and be inspected for damage looking for any frayed wires or sections that have kinks and/or binds.



3. Install cable (1) onto spool drum (3) with screw (7) and tighten to 25 ft-lb (34 N•m).
4. Wrap strap through cable loop and make sure no one is in the way of the cable (1) and winch.
5. Turn ignition switch to on position and start pay-in keeping tension on cable (1) at all times to ensure proper installation onto drum spool (3).
6. When cable is installed attach the hook (2) with links (5), sleeve (6), and pin (4) to cable loop.

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Ignition switch to the ON position.
3. Test operation of winch cable.
4. Ignition switch to the OFF position.
5. Battery Disconnect Switch OFF.
6. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-12.4 Winch Replacement

WINCH REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crewmember</p> <p><u>Material Parts</u> Winch</p>		<p><u>Equipment Required</u> Suitable lifting device Suitable lifting straps</p> <p><u>Equipment Condition</u> Engine shut OFF Battery Disconnect Switch OFF Wheels chocked Park brake set Transmission in NEUTRAL (N) Winch cable removed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Battery Disconnect Switch ON Engine ON Verify winch operation Reinstall winch cable Shut engine OFF Battery Disconnect Switch OFF Remove wheel chocks</p>

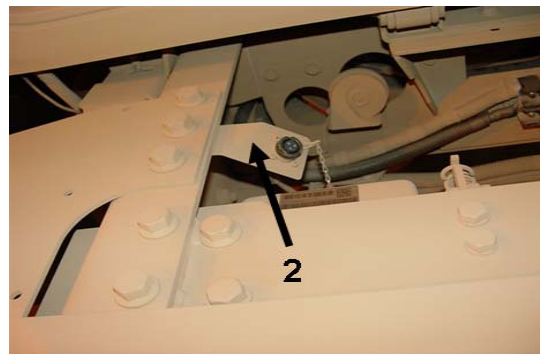
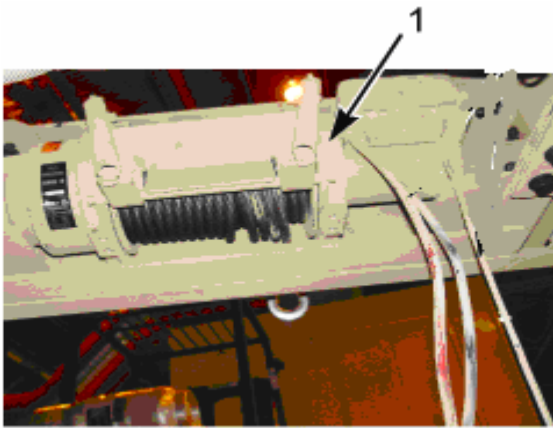
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

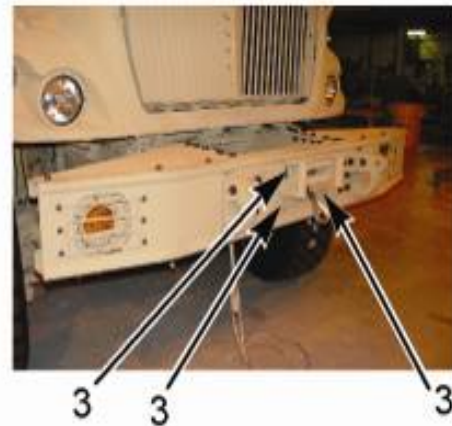
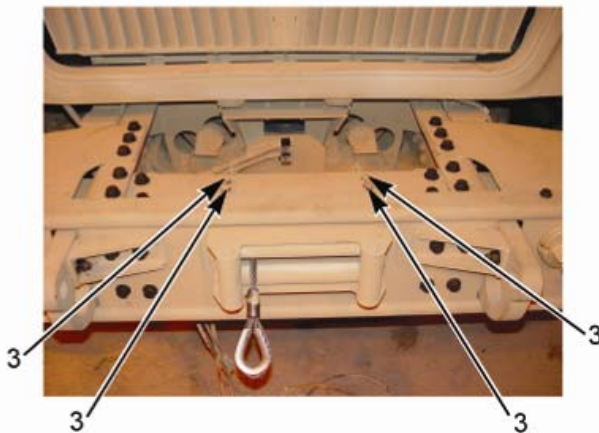


DO NOT attempt to remove winch from vehicle on your own. The winch is extremely heavy. Needs the aid of an assistant and a suitable lifting device to remove and install onto the front of vehicle. Wear safety goggles and work gloves while removing and installing. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

When removing winch cable before the removal of winch from vehicle, also check cable for signs of damage. Make sure you have heavy work gloves on when handling the winch cable. Inspect for frayed wires, binds or kinks in the cable. If found replace cable. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



1. With lifting sling device in place around ends of winch (1) for support. Have strap around winch for safety and slight tension on sling. Add tension as bolts are removed.
2. Remove bolt from passenger side holding down remote electrical connection bracket (2) and move bracket out of the way.



3. Remove six mounting bolts on passenger side (3) of winch (1) and pick up slack in sling around winch.
4. Remove six mounting bolts from driver side (3) of winch (1) and lift forks of lifting device and remove winch from vehicle and lower to pallet on ground.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.

Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

1. Clean area where winch (1) will be mounted. Any dirt, build-up mud, corrosion should be cleaned with wire brush and conditioned for new winch.
2. Apply anti-corrosion compound to mounting bolts and winch.
3. Apply lubrication to electrical remote connection.
4. Check new winch for any signs of damage before installing it onto vehicle.
5. Place lifting straps around winch (1) and strap to hold into place. With assistance move winch to vehicle.
6. Position winch over mounting place and lower.
7. Install mounting bolts and align mounting bolts holes on frame with those on winch (1) on passenger (3) and driver side and start bolts, but do not tighten yet.
8. Align winch (1) so it sits square on frame/bumper and tighten to 50 ft-lb (67 Nm).
9. Remove strap and lifting straps from winch.
10. Install remote electrical connector bracket and bolt (2) on passenger side.

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Engine ON.
3. Verify winch operation.
4. Reinstall winch cable.
5. Shut engine OFF.
6. Battery Disconnect Switch OFF.
7. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-12.5 Gladhands Replacement

GLADHANDS REPLACEMENT

This task covers:

a) Removal

b) Installation

c) Follow-On Maintenance

INITIAL SETUP

Special Tools

None

Personnel

One (1) Wheeled Vehicle Mechanic

Material/Parts

One (1) Gladhand

(Up to 4 may be needed)

Reference

Parts Manual

Equipment Required

None

Equipment Condition

Parking brake set

Wheels chocked

Transmission in NEUTRAL (N)

Engine shut OFF

Battery Disconnect Switch OFF

Air tanks and reservoirs drained

Follow-On Maintenance

Close reservoir tank air valves

Engine ON to build up system air pressure

Check IP gauges for correct air pressure

Battery Disconnect Switch ON

Verify glad hands operation

Engine shut OFF

Battery Disconnect Switch shut OFF

Transmission in NEUTRAL (N)

Parking brake SET

Wheel Chocks removed

Chapter 4 – MAINTENANCE INSTRUCTIONS

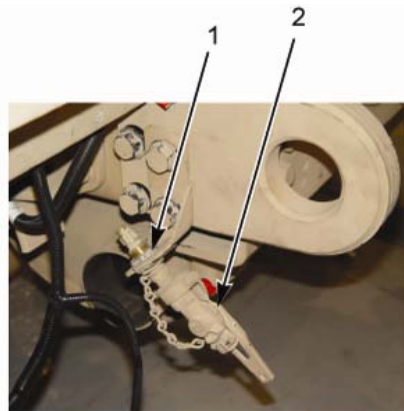
a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Drain all air from the air system before removing brake system components. Failure to do so could result in personal injury and/or death.

1. Remove air line from gladhand.
2. Remove nut (1) from gladhand (2).



3. Remove gladhand (2).

b) Installation

1. Install new gladhands (2).
2. Install nut and bolt (1). Tighten to specification.
3. Install air line to gladhand.
4. Check gladhand for proper operation.

c) Follow-On Maintenance

1. Close reservoir tank air valves.
2. Engine ON to build up system air pressure.
3. Check IP gauges for correct air pressure.
4. Battery Disconnect Switch ON.
5. Verify gladhands operation.
6. Engine shut OFF.
7. Battery Disconnect Switch shut OFF.
8. Transmission in NEUTRAL (N).
9. Parking brake SET.
10. Chock wheels.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-12.6 Frame Support Bolts Replacement

FRAME SUPPORT BOLTS REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Material/Parts</u> All-Thread (1) Nuts (2) Sleeve (1)</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p>	<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Drop armor belly plate (to floor if needed)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Install belly armor plate</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

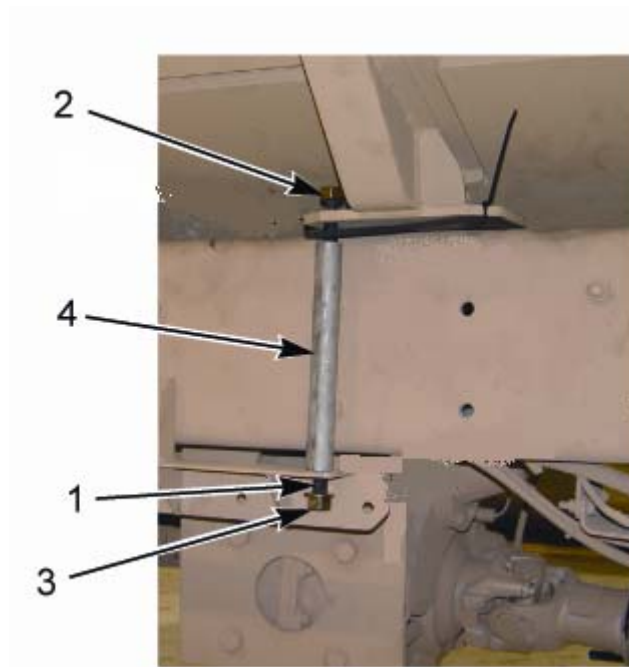
a) Removal



Vehicle's engine must be off, brakes set and wheels chocked prior to performing this task. Failure to comply may result in serious injury or death to personnel.

NOTE

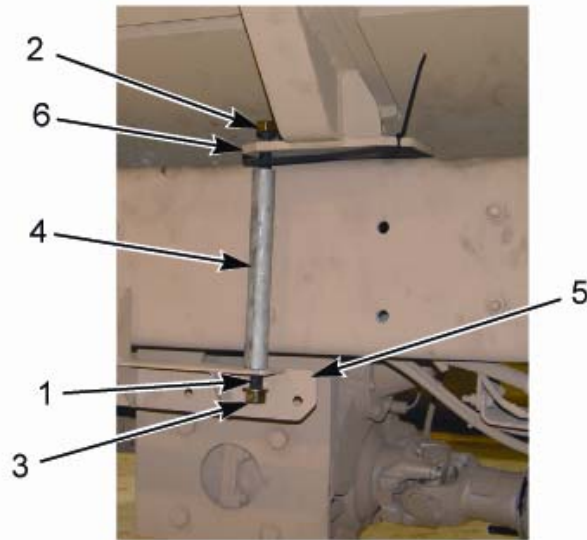
Note location and position of bolts and nuts prior to removal to ensure proper installation.



1. Remove belly armor if required.
2. Remove and discard top nut (2) from all-thread (1).
3. Remove and discard bottom nut (3), if required, from all-thread (1).
4. Remove and discard all-thread (1) and sleeve (4).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Insert new all-thread (1) through bottom frame support (5) and through new sleeve (4).
2. Insert all-thread through top frame support (6) and secure with new nut (2).
3. Install new bottom nut (3) on all-thread.
4. Tighten nuts (2) and (3).
5. Reinstall belly armor plating if removed.

c) Follow-On Maintenance

1. Reinstall belly armor plating.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-13 Suspension

4-13.1 Shock Absorber Replacement

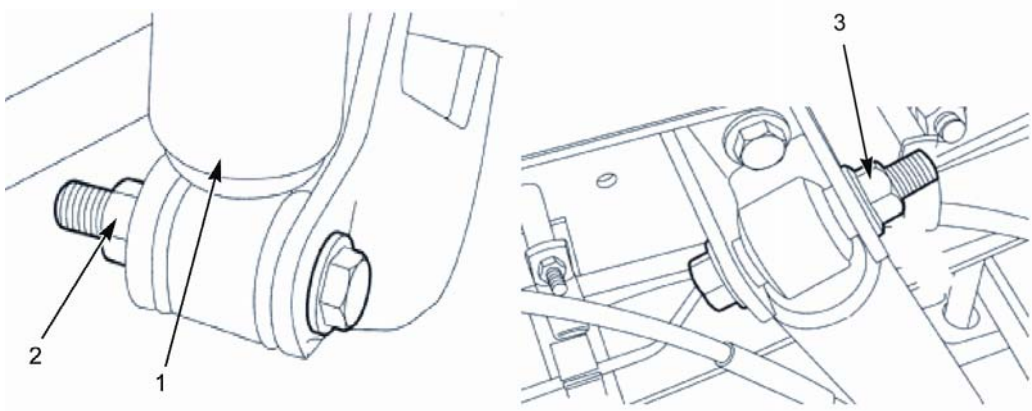
SHOCK ABSORBER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque wrench</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Shock Absorbers (2) Upper Shock Absorber Nut and Bolt (2) Lower Shock Absorber Nut and Bolt (2)</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Left & Right FSS Nozzle brackets removed Left & Right armor plates removed</p> <p><u>Equipment Required</u> Jack (10 Ton) Jack Stands (10 Ton) (2)</p> <p><u>Follow-On Maintenance</u> Remove jack stands Remove jack Install left & right armor plates Install left & right FSS Nozzle brackets</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

Raise and support the vehicle using a suitable jack and rated jack stands that can support the weight of the vehicle.

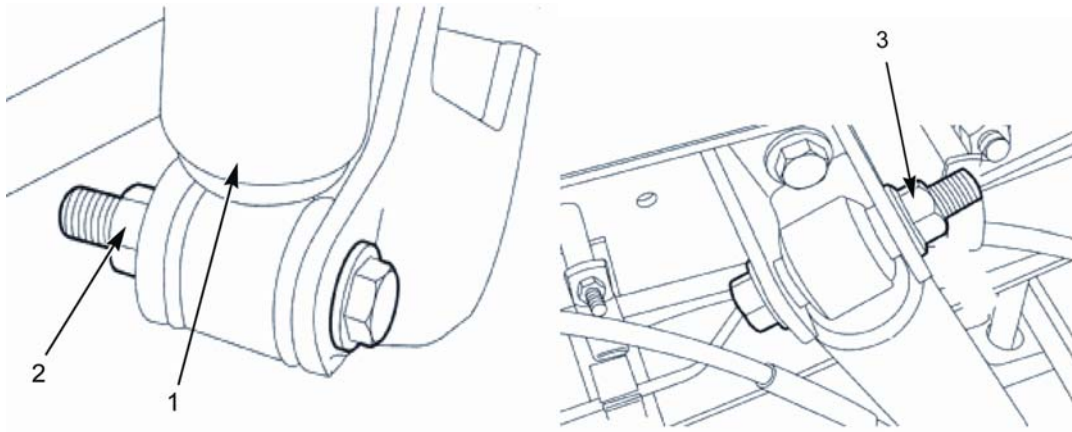
a) Removal



1. Using a suitable jack, raise and support the front axle with jack stands.
2. Remove the front wheels.
3. Remove and discard the shock absorber lower nut and bolt (2).
4. Remove and discard the shock absorber upper nut and bolt (3).
5. Note orientation of shock absorber for installation.
6. Remove and discard the shock absorber (1).
7. Repeat procedure for other side of vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new shock absorber (1) in mount bracket with proper orientation.
2. Install new upper nut and bolt (3).
3. Install new lower nut and bolt (2).
4. Tighten upper and lower nut and bolt to 135-165 ft-lb (183-224 N•m).
5. Repeat procedure for other side of vehicle.

c) Follow-On Maintenance

1. Remove jack stands.
2. Remove jack.
3. Install left & right Armor plates.
4. Install left & right FSS Nozzle Brackets.

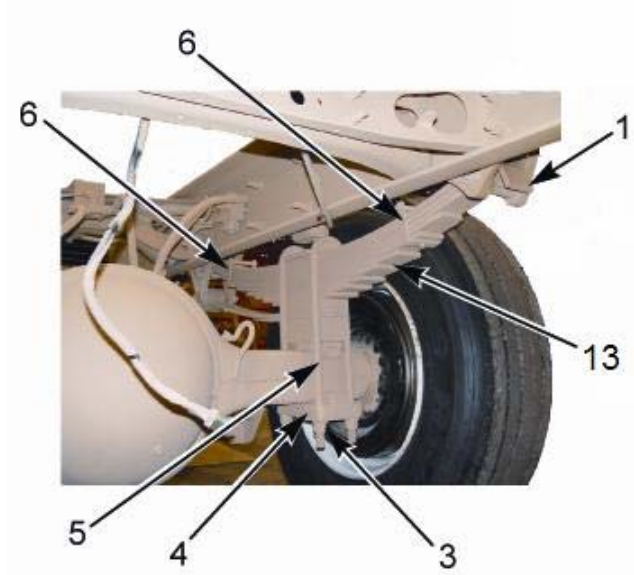
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-13.2 Leaf Spring Brackets Replacement

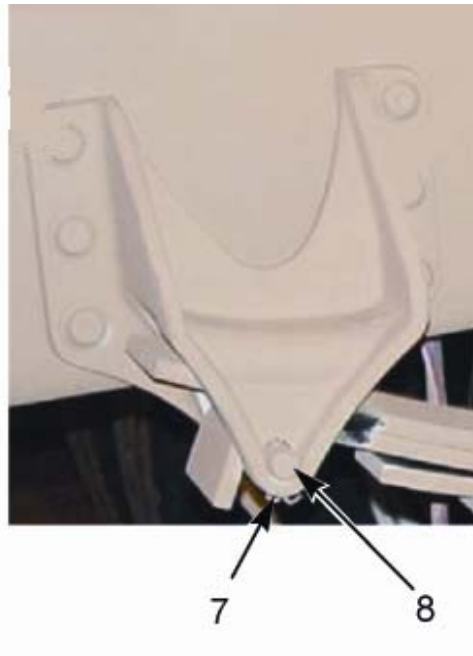
LEAF SPRING BRACKETS REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Rear Leaf Spring Brackets (2) Cotter Pins (2)</p> <p><u>Reference</u> Parts Manual</p>		<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Rear wheels removed</p> <p><u>Equipment Required</u> Jack (10 Ton) Jack Stands (10 Ton)</p> <p><u>Follow-On Maintenance</u> Install wheels Remove jack stands</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

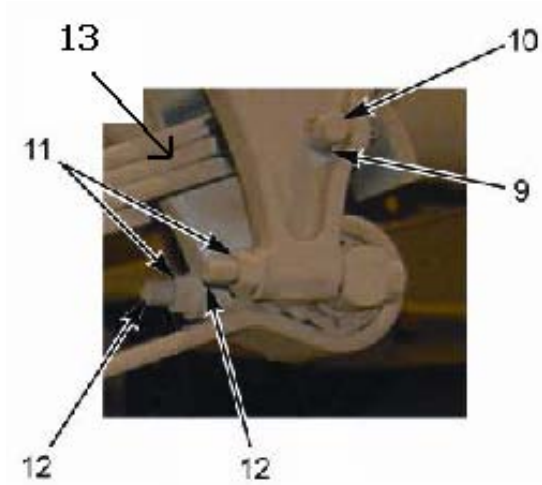


1. Using a hydraulic jack, raise and support the rear axle.
2. Place two jack stands one on each side of the vehicle at the frame (1).
3. Lower the rear axle onto the jack stands to release the tension on the springs (13).
4. Remove the four U-bolt nuts (3) and U-bolt plate (4).
5. Remove the two U-bolts (5).
6. Remove the two front shackle nuts and bolts (6).

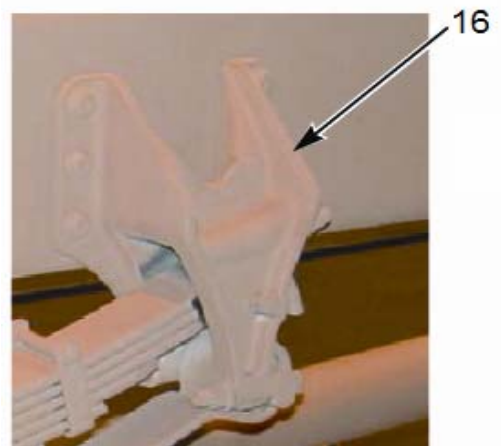
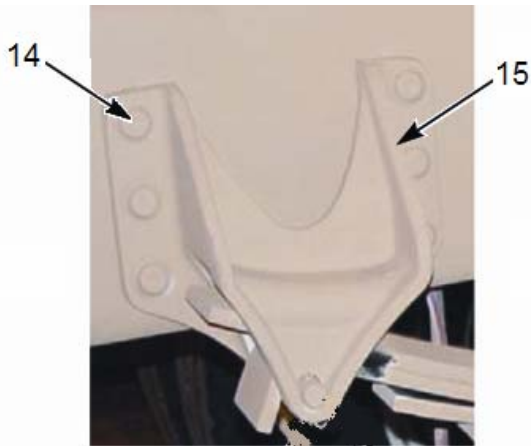


7. Remove and discard the cotter pin (7), then remove the leaf spring front retaining spring pin (8).

Chapter 4 – MAINTENANCE INSTRUCTIONS



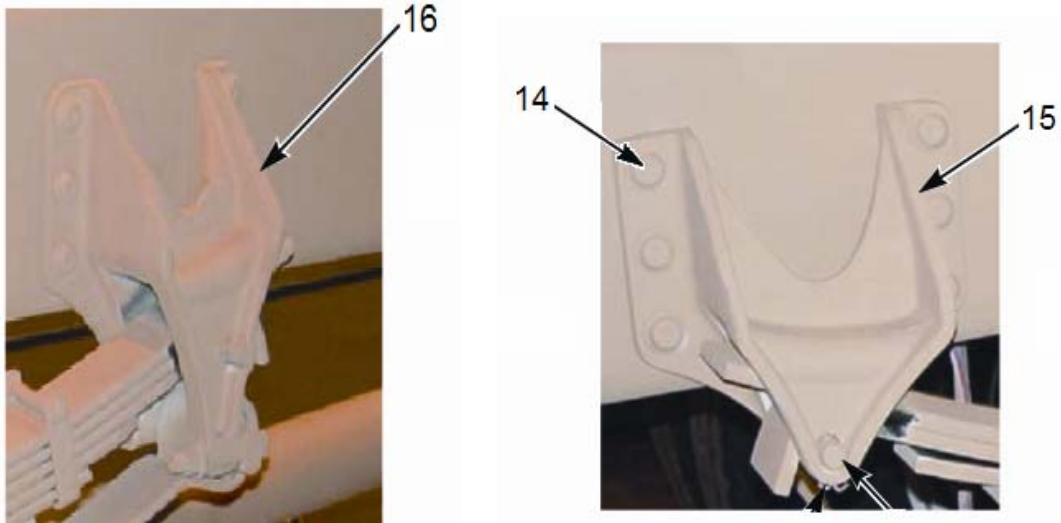
8. Remove and discard cotter pins (9) then remove the retaining spring pin (10).
9. Remove two retaining nuts (11) and two retaining pins (12).
10. Remove the leaf spring assembly (13).



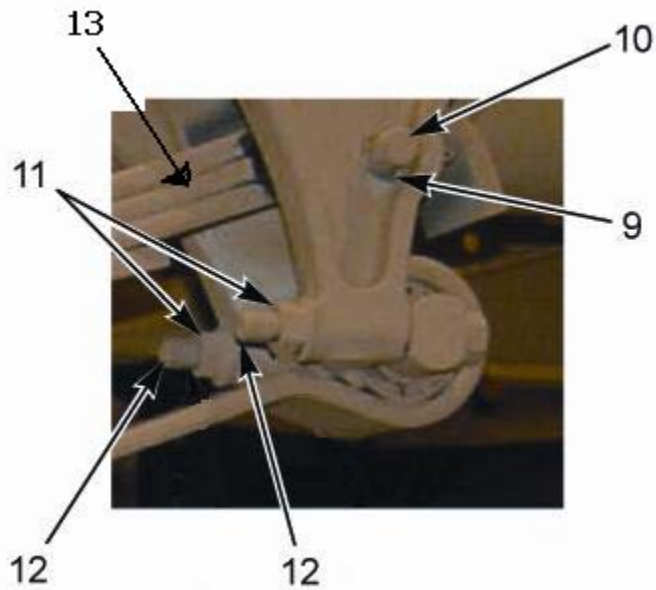
11. Remove twelve leaf spring bracket mounting nuts and bolts (14) and discard leaf spring bracket (15) and (16).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

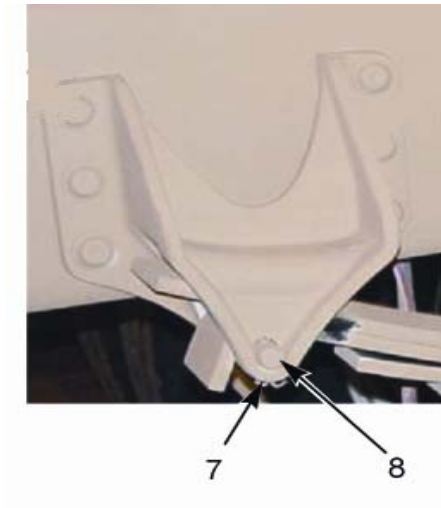


1. Install new leaf spring bracket (16) and install six leaf spring bracket bolts and nuts (14).
2. Tighten leaf spring bracket bolts 200 to 240 lb-ft (271 to 325 N•m).
3. Install new leaf spring bracket (15) and install six leaf spring bracket bolts and nuts (14).
4. Tighten leaf spring bracket bolts 200 to 240 lb-ft (271 to 325. N•m).
5. Install the leaf spring assembly (13).

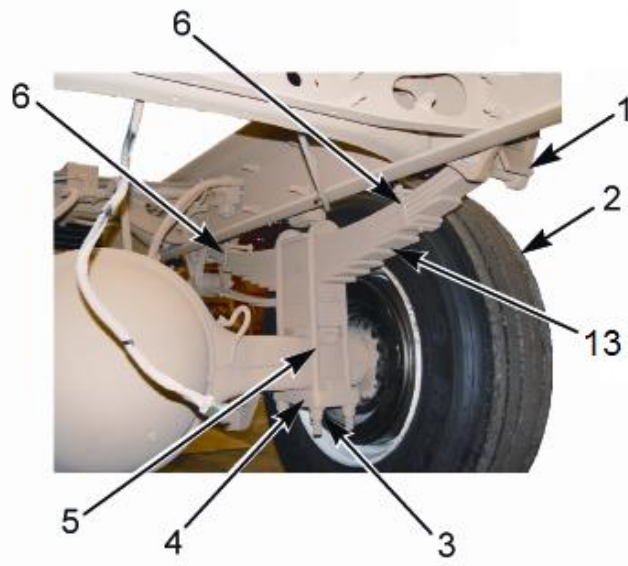


6. Install two retaining pins (12) and two retaining nuts (11).
7. Tighten retaining nuts.
8. Install the retaining spring pin (10) and new cotter pin (9).

Chapter 4 – MAINTENANCE INSTRUCTIONS



9. Install the leaf spring front retaining spring pin (8) and new cotter pin (7).



10. Install the two front shackle nuts and bolts (6).
11. Tighten shackle nuts.
12. Install the two U-bolts (5).
13. Install the U-bolt plate (4) and four U-bolt nuts (3).
14. Using a diagonal pattern tighten U-bolts and nuts to 15 lb-ft (20 N•m).
15. Using a diagonal pattern, re-tighten the four U-bolts nuts to 100 lb-ft (135 N•m).
16. Using a diagonal pattern, re-tighten the four U-bolts nuts to 200 lb-ft (270 N•m).
17. Using a diagonal pattern, re-tighten the four U-bolts nuts to 300 lb-ft (407 N•m).
18. Using a diagonal pattern, re-tighten the four U-bolts nuts to 425 lb-ft (576 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

19. Using a diagonal pattern, re-tighten the four U-bolts nuts to 425 to 450 lb-ft (576 to 610 N•m).
 20. Raise the rear axle off the jack stands.
 21. Remove two jack stands one on each side of the vehicle at the frame (1).
 22. Lower the hydraulic jack and remove.
 23. Repeat Removal and Installation for other side of vehicle.
- c) Follow-On Maintenance**
1. Install wheels.
 2. Remove jack stands.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-13.3 Leaf Spring Bushing Replacement

LEAF SPRING BUSHING REPLACEMENT	
This task covers:	
a) Removal	b) Clean
d) Follow-On Maintenance	c) Installation
INITIAL SETUP	<u>Equipment Condition</u>
<u>Special Tools</u>	Parking Brake set
Drill with Wire Brush	Wheels chocked
Torque Wrench	Transmission set in (N)
	Engine shut OFF
	Battery Disconnect Switch OFF
	Rear wheels removed
<u>Personnel</u>	<u>Reference</u>
One (1) WHEELED VEHICLE MECHANIC	Parts Manual
<u>Material/Parts</u>	<u>Equipment Required</u>
Leaf Spring Bushing (1)	Jack (10 Ton)
Cotter Pins (2)	Jack Stands (10 Ton)
Loctite RC680 or Perma-Bond HM160	
	<u>Follow-On Maintenance</u>
	Install wheels
	Remove jack stands



Prior to removing the leaf springs, park the vehicle on a flat surface. Place the transmission in the park position. Set the parking brake and set the wheel chocks in place.

A jack must never be used alone to support the vehicle while under chassis service is being performed. The jack may lower and serious personal injury could result. Always support the vehicle with floor stands.

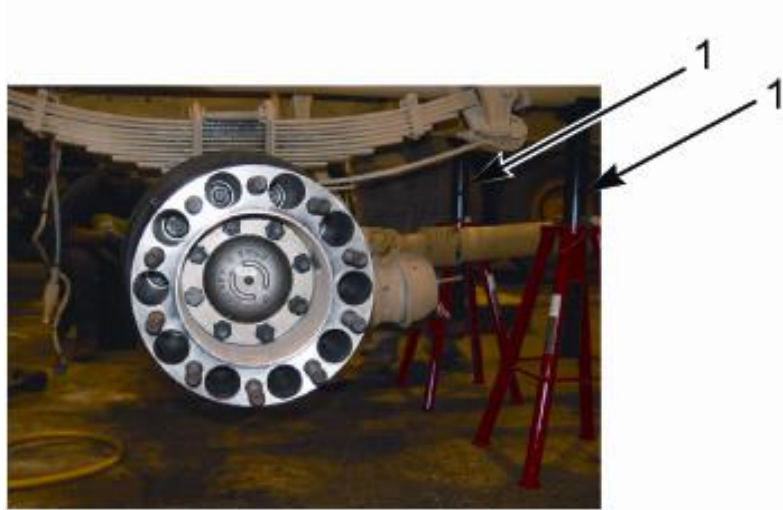
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

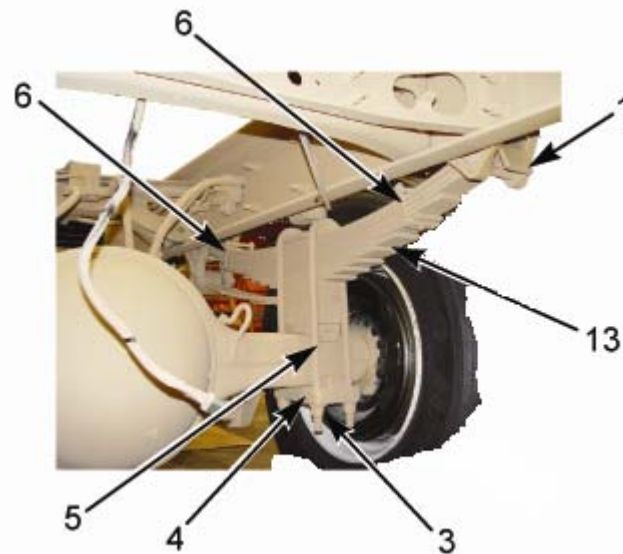
NOTE

The bushing assembly is mounted in each main support member assembly. This assembly is pressed into the main support member assembly flange must be on the in-board side. The main support member assembly with bushing is placed into the chassis forward spring suspension mounting bracket and is bolted in place. The bushing pin angle must be relative to the main support member. Mark the orientation of bushing on main support member. When replacing new bushing check alignment with mark on main support member. When replacing new bushing check alignment with mark on main support member.

1. Using a hydraulic jack, raise and support the rear axle.



2. Place two jack stands one on each side of the vehicle at the frame (1).
3. Lower the rear axle onto the jack stands to release the tension on the springs.



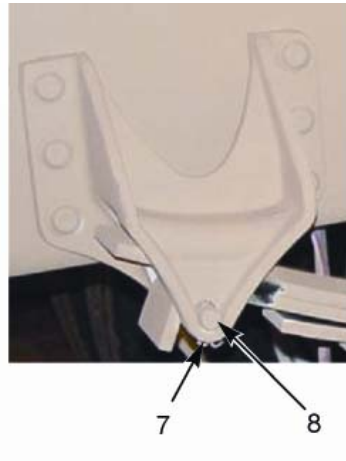
4. Remove the four U-bolt nuts (3) and U-bolt plate (4).
5. Remove the two U-bolts (5).

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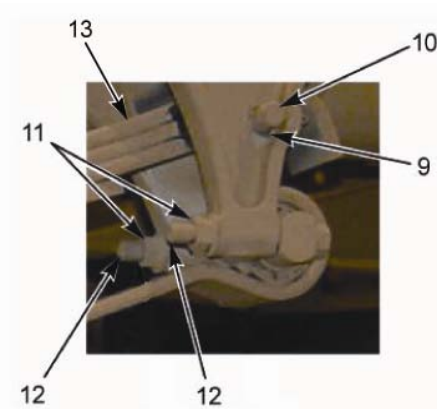
Chapter 4 – MAINTENANCE INSTRUCTIONS

Chapter 4 – MAINTENANCE INSTRUCTIONS

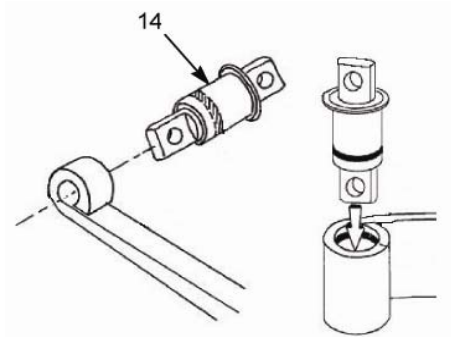
6. Remove the two front shackle nuts and bolts (6).



7. Remove and discard the cotter pin (7), then remove the leaf spring front retaining spring pin (8).



8. Remove and discard cotter pins (9) then remove the retaining spring pin (10).
9. Remove two retaining nuts (11) and two retaining pins (12).
10. Remove the leaf spring assembly (13).
11. Place leaf spring assembly with the spring bushing clamped into a workbench vise.
12. Using a punch and hammer, remove the bushing (14) and discard.



Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Clean

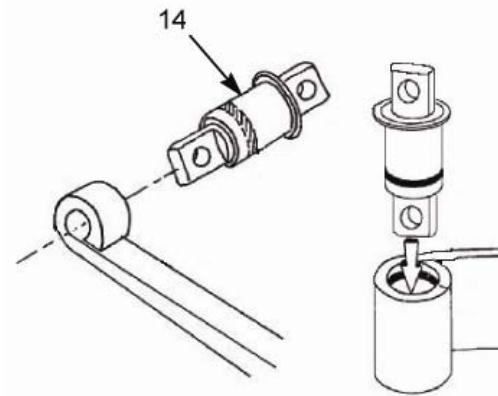
1. To ensure proper mounting of new bushing, clean main support member where bushing is to be press fitted with degreasing fluid and wire brush. Use drill mounted wire brush only.
2. Bushing must be clean and free of oil and grease prior to installation.

c) Installation

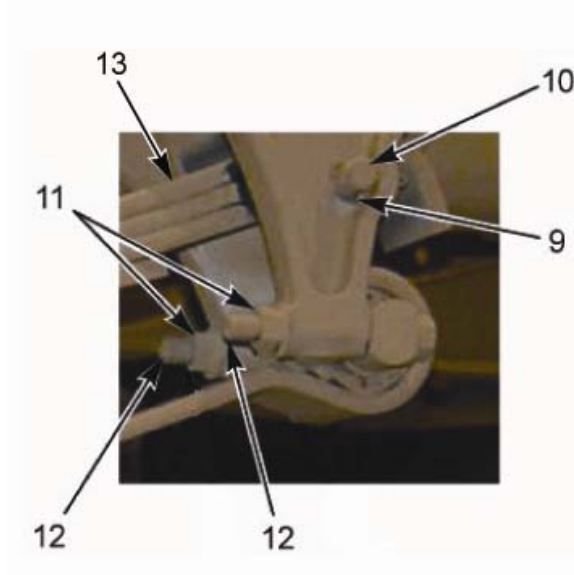
1. Apply ¼- ½ inch wide ring of bonding agent (Loctite or Perma-Bond) to lower quarter of bushing before pressing into spring eye.

NOTE

Unless otherwise specified, minimum push out force after 24 hours cure is 6750 lb for threaded bushings and 4000 lb for all other bushings.



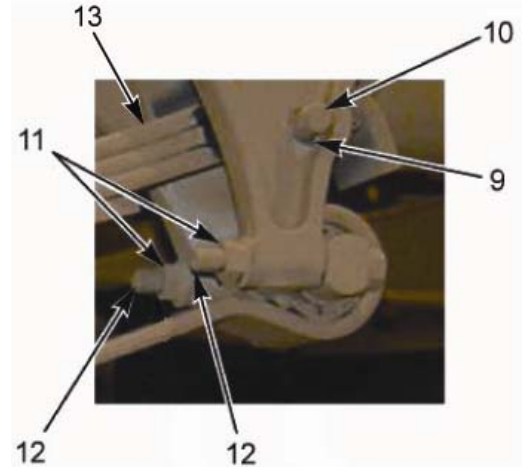
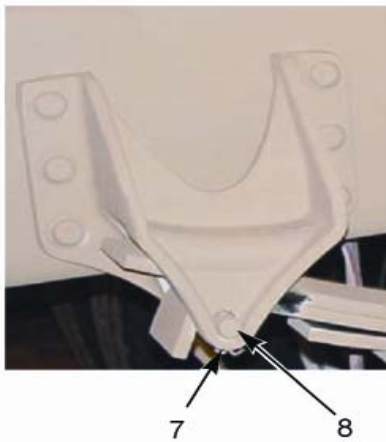
2. Using a press, press the new bushing (14) into the leaf spring.
3. After bushing is installed, residual bonding agent must be removed.



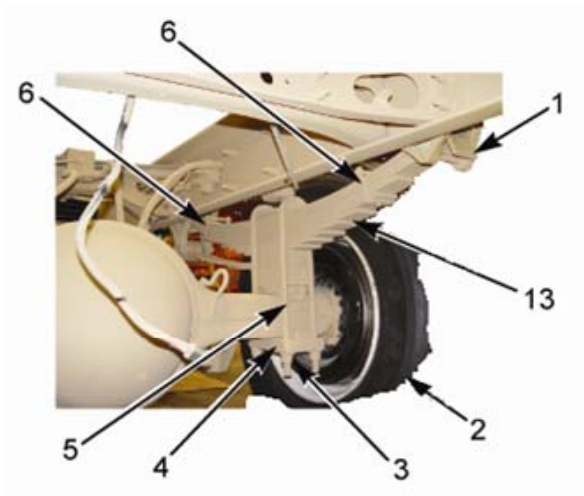
4. Align both the eye holes so that both pins are parallel and at 90 degrees to the leaf spring bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

5. Install the leaf spring assembly (13).
6. Install two retaining pins (12) and two retaining nuts (11) and tighten retaining nuts (11).
7. Install retaining pin (10) and new cotter pin (9).



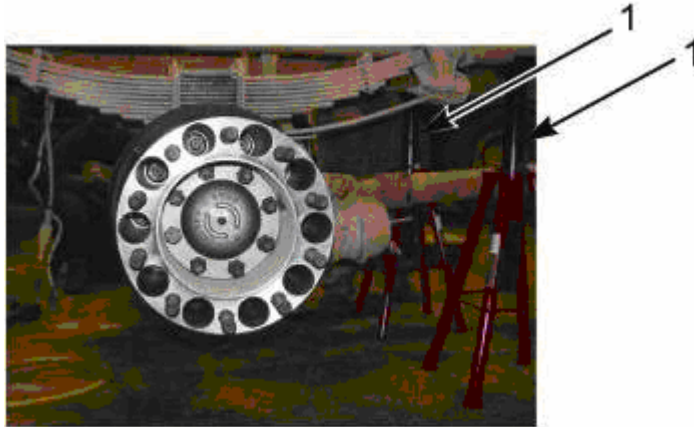
8. Install the leaf spring front retaining spring pin (8) and new cotter pin (7).
9. Install the two front shackle nuts and bolts (6).
10. Tighten shackle nuts.
11. Install the two U-bolts (5).



12. Install the U-bolt plate (4) and four U-bolt nuts (3).
13. Using a diagonal pattern tighten U-bolts and nuts to 15 lb-ft (20 N•m).
14. Using a diagonal pattern, re-tighten the four U-bolts nuts to 100 lb-ft (135 N•m).
15. Using a diagonal pattern, re-tighten the four U-bolts nuts to 200 lb-ft (270 N•m).
16. Using a diagonal pattern, re-tighten the four U-bolts nuts to 300 lb-ft (407 N•m).
17. Using a diagonal pattern, re-tighten the four U-bolts nuts to 425 lb-ft (576 N•m).
18. Using a diagonal pattern, re-tighten the four U-bolts nuts to 400-450 lb-ft (542-610 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

19. Raise the rear axle off the jack stands.



20. Remove two jack stands one on each side of the vehicle at the frame (1).

21. Lower the hydraulic jack and remove.

22. Repeat Removal and Installation for other side of vehicle.

d) Follow-On Maintenance

1. Install wheels.
2. Remove jack stands.

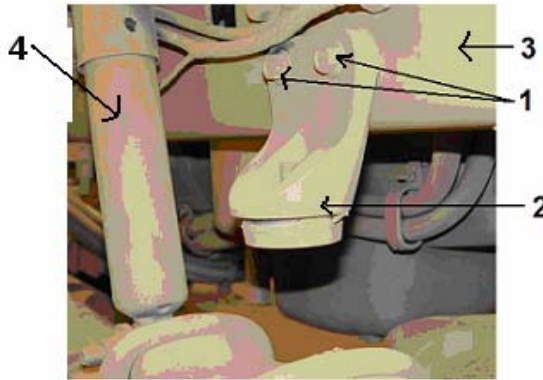
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-13.4 Bounce Stops (Front) Replacement

BOUNCE STOPS (FRONT) REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u> NONE
<u>Special Tools</u> Torque Wrench		<u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF
<u>Personnel</u> One (1) Wheeled Vehicle Mechanic		
<u>Material Parts</u> Bounce Stop (2)		
<u>Reference</u> Parts Manual		<u>Follow-On Maintenance</u> Remove wheel chocks

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove two hex bolts (1) and lock hex nuts from bounce stop (2) in frame rail (3) just behind front shock (4).
2. Remove bounce stop (2) from frame rail (3) and discard.
3. Repeat procedure for other side.

b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

1. Apply anti-corrosion compound to bolts and nuts.
2. Position bounce stop (2) on frame rail (3).
3. Install the two hex bolts (1) and lock hex nuts through mounting holes in bounce stop (2) and frame rail (3). Tighten bolts to 200-240 ft-lb (271-325 N•m).
4. Repeat procedure for other side.

c) Follow-On Maintenance

1. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-13.5 Rear Auxiliary Overload Spring Replacement

REAR AUXILIARY OVERLOAD SPRING REPLACEMENT		
This task covers:		
a) Removal d) Follow-On Maintenance	b) Repair	c) Installation
INITIAL SET UP		<u>Equipment Required</u>
<u>Special Tools</u> Torque Wrench		Jack (10 Ton) Jack Stands (10 Ton) (Tall)
<u>Personnel</u> One (1) Wheeled Vehicle Mechanic		<u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Rear wheel and tire assembly removed
<u>Material Parts</u> Rear leaf spring assembly (2) U-bolt nuts (4) Leaf spring front retaining pin (1) Leaf spring rear retaining pin (1) Cotter pins (8)		<u>Follow-On Maintenance</u> Install wheel Remove jack stand Remove jack
<u>Reference</u> Parts Manual		



Use suitable jack and rated jack stand that can support the weight of the vehicle. Use safety goggles and proper work gloves. Use assistance of other personnel when removing wheel and tire assembly. Failure to comply may result in serious injury or death to personnel.

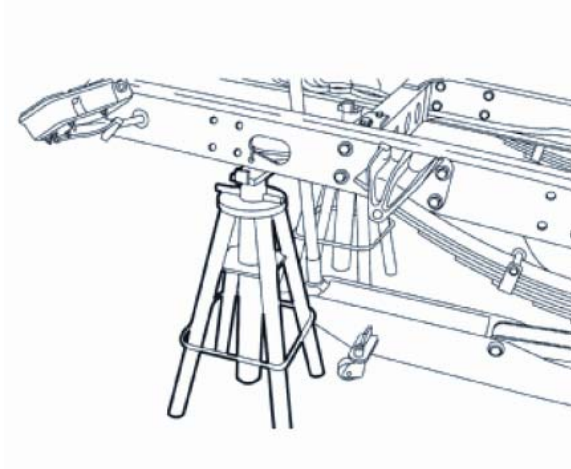
NOTE

Raise and support the vehicle using a suitable jack and rated jack stands that can support the weight of the vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Using a suitable jack, raise and support the rear axle. Raise the vehicle enough to relieve all the weight from the spring to be removed.

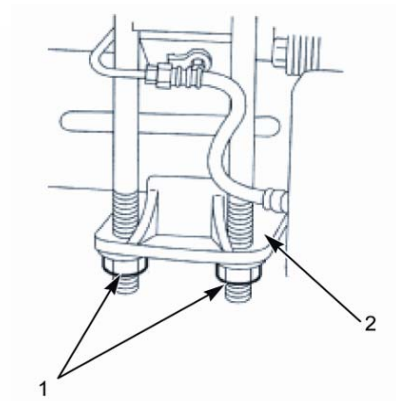
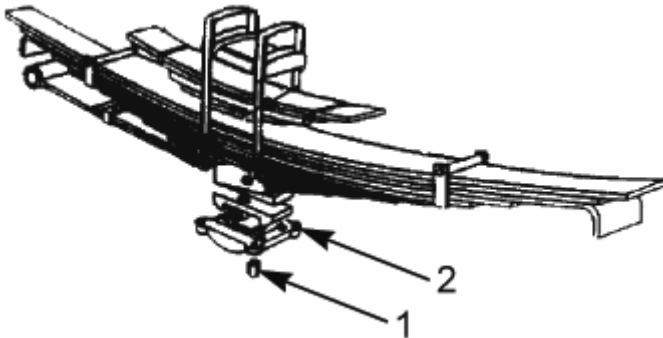


2. Using two jack stands, support the vehicle at the frame.

NOTE

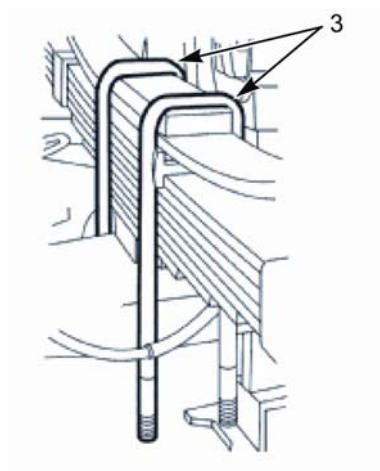
The rear springs are under tension. Adjust the height of the rear axle to relieve the tension as necessary before removing any shackle bolts, nuts, or spring pins.

3. Lower the rear axle on the jack stands to release the tension on the springs.
4. Remove the rear wheels.

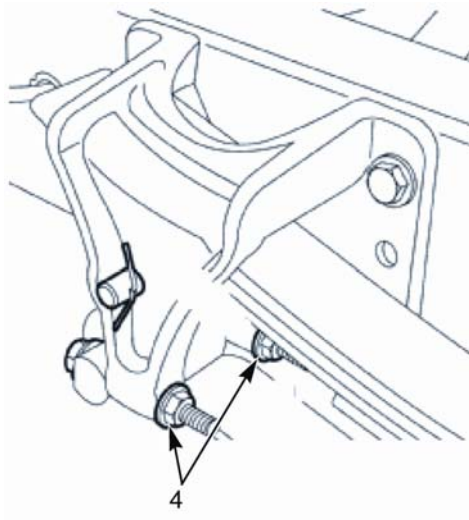


5. Remove the four U-bolt nuts (1) and the U-bolt plate (2).

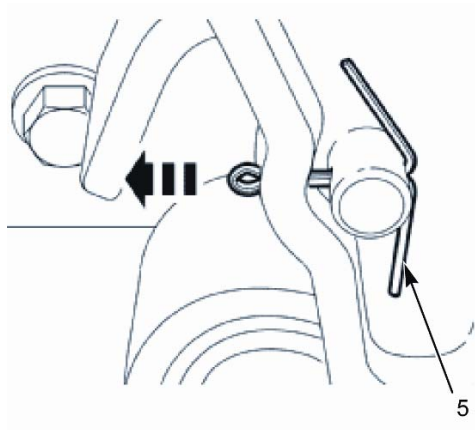
Chapter 4 – MAINTENANCE INSTRUCTIONS



6. Remove the two U-bolts (3) that secure auxiliary spring and leaf spring.
7. Remove the spring bumper and retainer and the spring bottom plate.
8. Remove the lubricators (not on spring having rubber bushings).

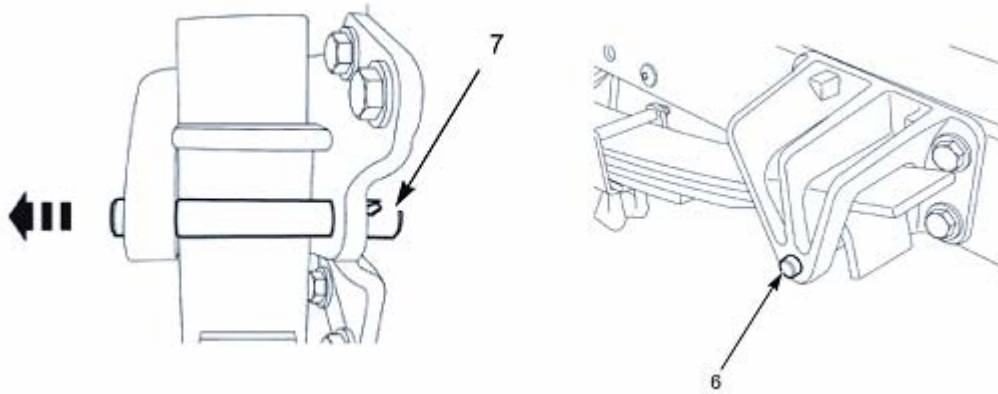


9. Remove the two front shackle nuts and bolts (4).



10. Remove and discard the cotter pin (5), then remove the leaf spring front retaining pin.

Chapter 4 – MAINTENANCE INSTRUCTIONS



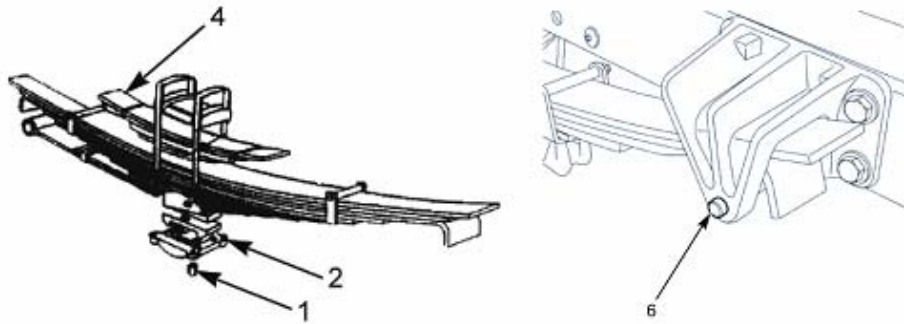
11. Remove and discard the cotter pin (7), then remove the leaf spring rear retaining pin (6).
12. Remove and discard the spring assembly.

b) Repair

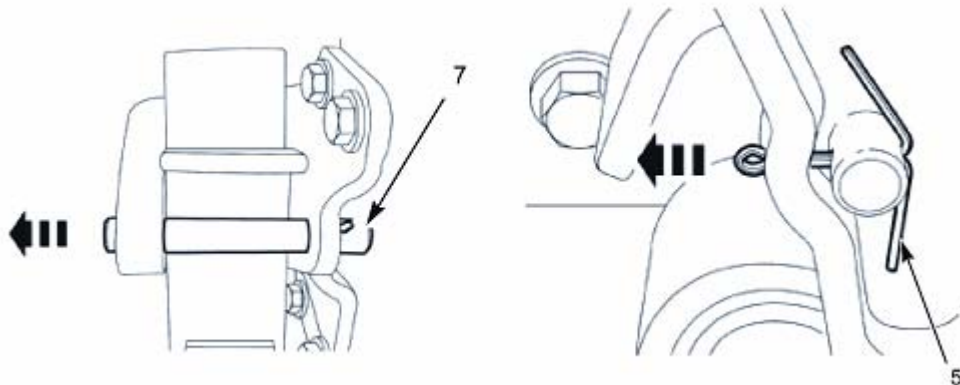
1. Leaf springs are repaired by removing the damaged leaf and replacing it with a new leaf.

c) Installation

1. Install new spring assembly (4).

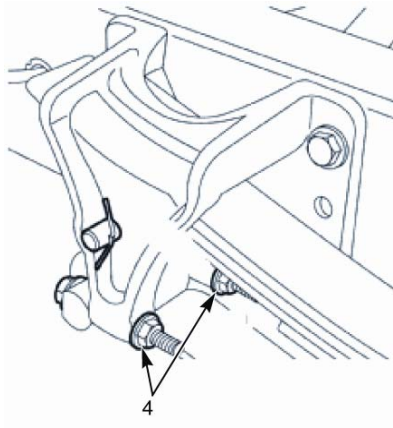


2. Install rear leaf spring retaining pin (6) and secure with new cotter pin (7).

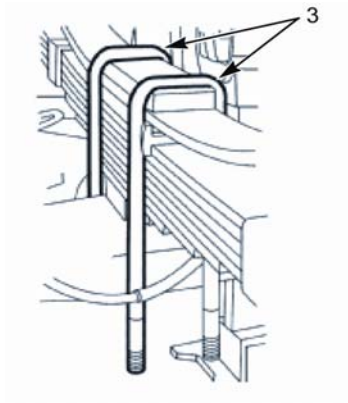


Chapter 4 – MAINTENANCE INSTRUCTIONS

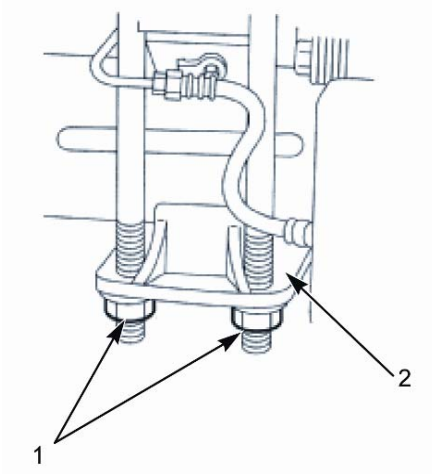
3. Install front leaf spring retaining pin and secure with new cotter pin (5).



4. Install the two front shackle nuts and bolts (4).



5. Install the two U-bolts (3).



Chapter 4 – MAINTENANCE INSTRUCTIONS

6. Install the spring bumper and retainer and the spring bottom plate.
7. Install the U-bolt plate (2) and four U-bolt nuts (1).
8. Tighten four U-bolt nuts using the following direction:
 - a. Using a diagonal pattern tighten U-bolts and nuts to 15 lb-ft (20 N•m).
 - b. Using a diagonal pattern, re-tighten the four U-bolts nuts to 100 lb-ft (135 N•m).
 - c. Using a diagonal pattern, re-tighten the four U-bolts nuts to 200 lb-ft (270 N•m).
 - d. Using a diagonal pattern, re-tighten the four U-bolts nuts to 300 lb-ft (407 N•m).
 - e. Using a diagonal pattern, re-tighten the four U-bolts nuts to 425 lb-ft (576 N•m).
 - f. Using a diagonal pattern, re-tighten the four U-bolts nuts to 400-450 lb-ft (542-610 N•m).
9. Install the lubricators (not on spring having rubber bushings).
10. Install rear wheels.

d) Follow-On Maintenance

1. Install wheels.
2. Remove jack stand.
3. Remove jack.
4. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-13.6 Upper and Lower King Pin (Bushings) Replacement

UPPER AND LOWER KING PIN (BUSHINGS) REPLACEMENT		
This task covers:		
a) Removal	b) Inspection/ Cleaning	c) Installation
d) Follow-On Maintenance		
INITIAL SET UP		<u>Personnel</u>
		One (1) Wheeled Vehicle Mechanic
<u>Special Tools</u>		One (1) Crewmember
Hub Puller		
Bushing Removal Sleeve		
Loctite® Ultra Grey Sealant #18581		
		<u>Equipment Required</u>
		Suitable lifting device
		Suitable rated jack stands
		Emery/Crocus Cloth
<u>Material Parts</u>		
Upper king pin bushing (2 ea axle)		
Lower king pin bushing (2 ea axle)		
Thrust bearing (2 ea axle)		<u>Reference</u>
Grease seal, Upper Cap (2 ea axle)		Parts Manual
Socket plug (4 ea axle)		
Cotter Pin (2 ea axle)		
Inner Wheel Bearing Cone (2 ea axle)		
Outer Wheel Bearing Cone (2 ea axle)		
Wheel Bearing Cup (4 ea axle)		
Outer Axle Shaft Bushing (2 ea axle)		
Grease Seal axle bushing (2 ea axle)		
Inner Axle Shaft Bushing (2 ea axle)		
Oil Seal axle bushing (2 ea axle)		
Oil Seal Sleeve spindle (2 ea axle)		
(Table continued on next page.)		

Chapter 4 – MAINTENANCE INSTRUCTIONS

UPPER AND LOWER KING PIN (BUSHINGS) REPLACEMENT (Continued)

Equipment Conditions

Follow-On Maintenance

Parking brake set

Install axle shaft

Wheels chocked

Install steering knuckle

Transmission set in NEUTRAL (N)

Install tie rod end

Engine shut OFF

Install spindle

Battery Disconnect Switch OFF

Install steering arm (front only)

Remove wheel & tire assembly

Install wheel hub

Drain air tanks and reservoirs

Install brake drum

Disconnect air lines to air brake chamber

Install air brake chamber

Remove air brake chamber

Re-connect air lines

Remove brake drum

Install wheel and tire assembly

Remove wheel hub

Remove jack stand

Remove steering arm (front only)

Check and align front wheels

Remove spindle

Battery Disconnect Switch ON

Disconnect tie rod end

Start engine

Remove axle shaft

Re-charge air tanks, verify air gauges

Remove steering knuckle

Remove wheel chocks

Test drive vehicle

Verify operation of steering and brakes

Shut engine OFF

Battery Disconnect Switch OFF

Wheels chocked

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



International Mine Protected Vehicle (I-MPV) armor parts are HEAVY. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

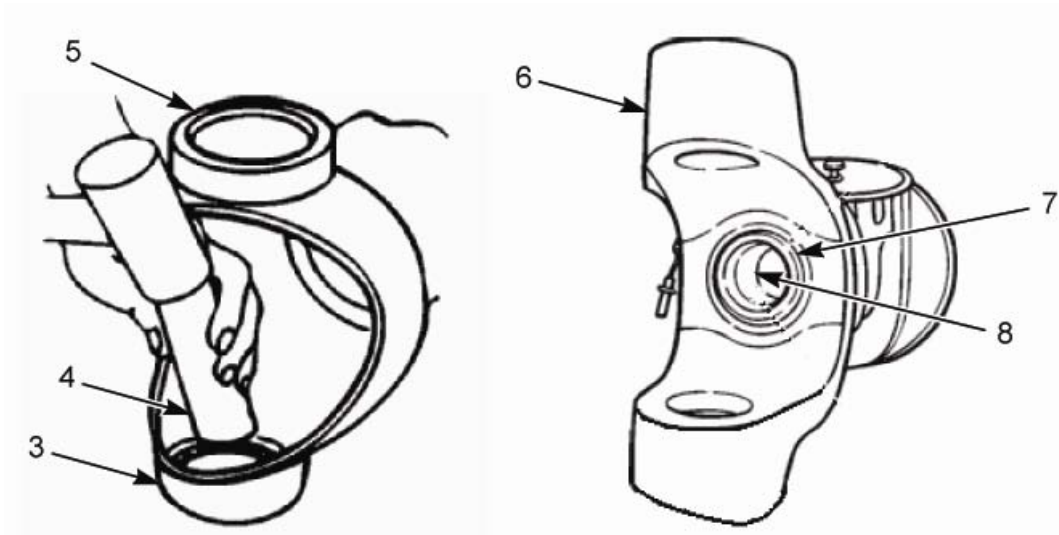
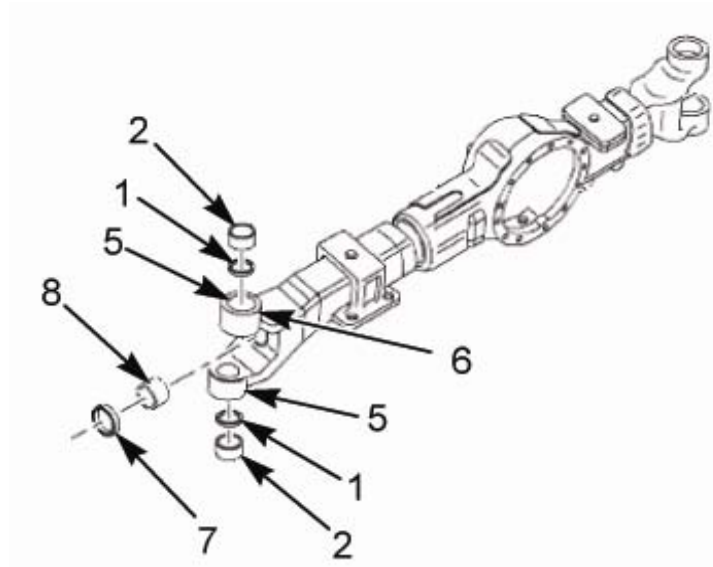
Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

NEVER use compressed air or dry brushing to clean brake parts or assemblies, carefully clean parts in a well ventilated or open air area. During disassembly, carefully place all parts on the floor to avoid getting dust into the air. Use an industrial vacuum cleaner with a HEPA filter system to clean dust from the brake drums, backing plates and other brake parts. After using the vacuum, remove any remaining dust with a rag soaked in water and wrung until nearly dry. DO NOT use compressed air to clean your clothing after working on brakes, use vacuum with HEPA filter system. Failure to comply may result in serious injury or death to personnel.

Never connect or disconnect air hoses containing pressure, it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted. Failure to comply may result in serious injury or death to personnel.

DO NOT use heat on components to facilitate removal of arms. This may weaken other connecting parts. Use lubricating spray and a breaker bar to break loose after letting soak for a few minutes. Remember to use the proper socket wrench as not to damage bolt heads. Failure to comply will result in damage to equipment and or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

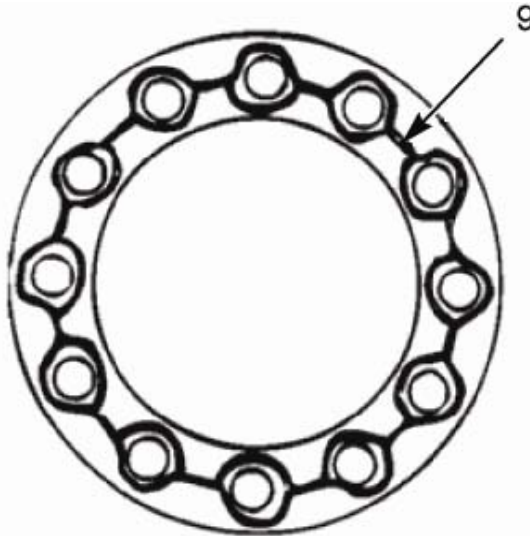


1. Drive the socket plugs (1) and king pin bushings (2) toward the outside of the socket (3) using a sleeve (4) that is slightly smaller than the socket bore (5) out of the axle (6).
2. Clean all grease and dirt from the bores (5) before reassembly.
3. Check for any signs of damage in all the axle bores (5) for pitting, scoring, wear marks.
4. Check the axle shaft oil seal (7) and bushing (8) from the axle housing (6). Replace oil seal (7) and bushing (8) if damaged.
5. Discard removed kin pin bushings (2) and socket plugs (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Inspection/Cleaning

1. Replace any worn or damaged axle assembly part when reassembling like washers, gaskets, oil seals, grease seals, felt seals.
2. If fastener head (bolts, screws, nuts) corners are worn, replace them.
3. Remove rough edges from parts that were machined or grounded surfaces. Fine file, emery cloth or crocus cloth will do for this purpose.
4. If any part of the axle is bent, DO NOT TRY TO STRAIGHTEN IT, replace axle assembly.



The amount of silicone material applied must not exceed a 0.125 inch (3.18 mm) diameter bead. Too much gasket material can block lubrication passages and result in damage to the components. Wait 20 minutes before filling the assembly with lubricant when using silicone gasket.

5. Clean parts and apply a 0.125-inch (3.18 mm) diameter continuous bead of new silicone gasket material (9) if/where required around one surface. Also, apply gasket material around edge of all fastener holes on the surface. Assemble immediately to permit gasket material to compress evenly between parts.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Installation

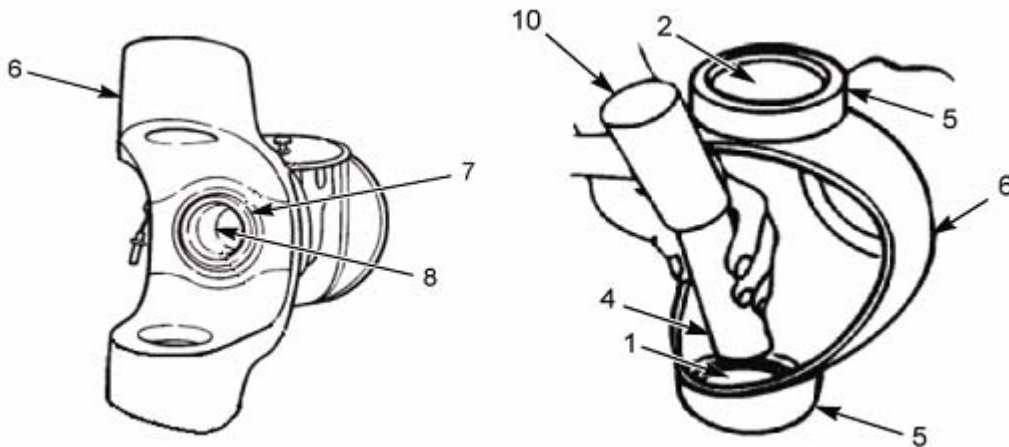


Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



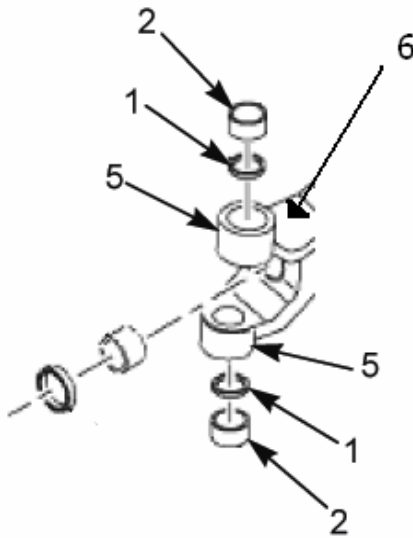
The lip of the grease seals must be installed correctly to prevent any possible damage. The lip of the seal that is installed in the cam end must enter the opening first. The lip of the seal that is installed in the opposite end of the cam tube must enter last.

1. Apply anti-corrosion compound to mounting bolts.



2. Install new inner axle bushing (8) and oil seal (7) in the housing (6) using correct size sleeve or driver (4) to install them. **DO NOT FORCE OR HIT** after it is installed correctly in its seat. This can damage the bushing or oil seal. Apply a layer of Loctite on the outside diameter of the bushing (8).

Chapter 4 – MAINTENANCE INSTRUCTIONS



3. Install socket plugs (1) by positioning the socket plug (1) in the housing (6) up against the counter bore (5).



4. Strike the domed socket plugs (1) with a hammer (10) to flatten and seat the plugs.
5. Drive new bushings (2) into the socket bores (5) so that the bushings (2) are level with the outside of the socket. Use correct size sleeve or driver (4).
6. Pack bushing (2) with grease before installing into axle end (6).

Chapter 4 – MAINTENANCE INSTRUCTIONS

d) Follow-On Maintenance

1. Install axle shaft.
2. Install steering knuckle.
3. Install tie rod end.
4. Install spindle.
5. Install steering arm (front only).
6. Install wheel hub.
7. Install brake drum.
8. Install air brake chamber.
9. Re-connect air lines.
10. Install wheel and tire assembly.
11. Remove jack stand.
12. Check and align front wheels.
13. Battery Disconnect Switch ON.
14. Start engine.
15. Re-charge air tanks, verify air gauges.
16. Remove wheel chocks.
17. Test drive vehicle.
18. Verify operation of steering and brakes.
19. Shut engine OFF.
20. Battery Disconnect Switch OFF.
21. Wheels chocked.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14 Cab and Body

4-14.1 Crew and Front Passenger Seat Replacement

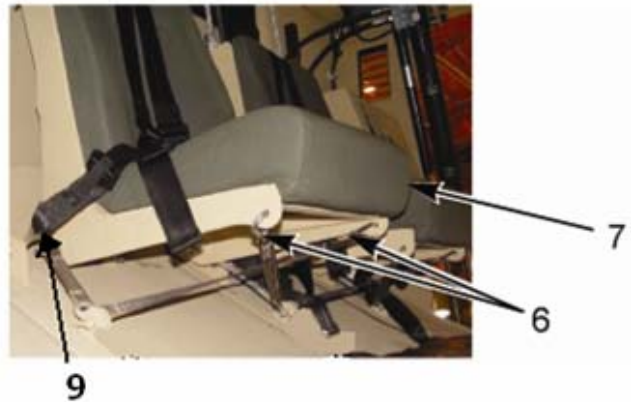
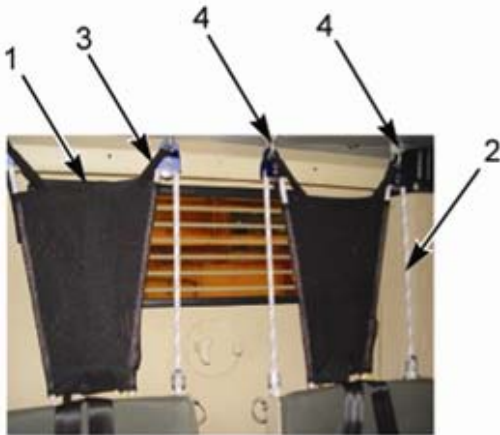
CREW AND FRONT PASSENGER SEAT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u> None
<u>Special Tools</u> None		<u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF
<u>Personnel</u> One (1) Wheeled Vehicle Mechanic		
<u>Material Parts</u> Seats (1-9) Safety belt clip (1-9) "M" Ropes for 1-9 seats replaced Roof/Floor clip (3 per seat) 1-9 seats		<u>Reference</u> Parts Manual <u>Follow-On Maintenance</u> None

Chapter 4 – MAINTENANCE INSTRUCTIONS

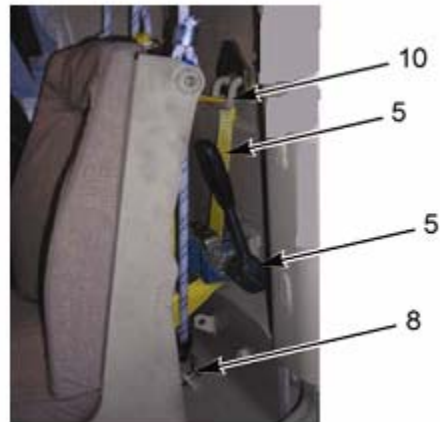
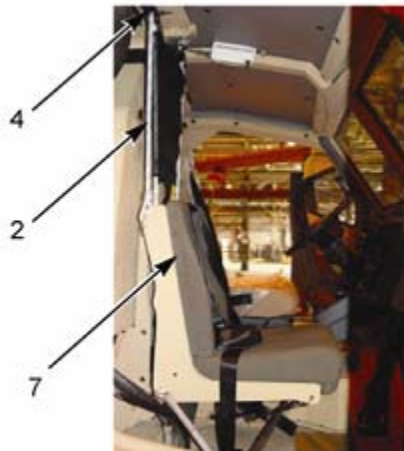
a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



1. Remove the headrests (1) from the back “M” ropes (2) by un-doing the Velcro straps (3) from the top roof clips (4) and the Velcro strip down the back side of it.
2. Reach behind or over the back of the seat with socket wrench and remove rear seat hanger safety straps (5) mounting.
3. Disconnect and remove the cross-over straps (6) that are located underneath the seat (7).
4. Disconnect strap (9) at rear bottom of seat by removing the two eyebolts and nuts.
5. Disconnect and remove the back “M” ropes (2) from the roof clips (4) and the floor clips (8).



6. Remove that safety belt from the wall hook (10) located behind the seat.
7. Remove the seat (7) from the vehicle. Discard defective seat in accordance with regulations.

Chapter 4 – MAINTENANCE INSTRUCTIONS

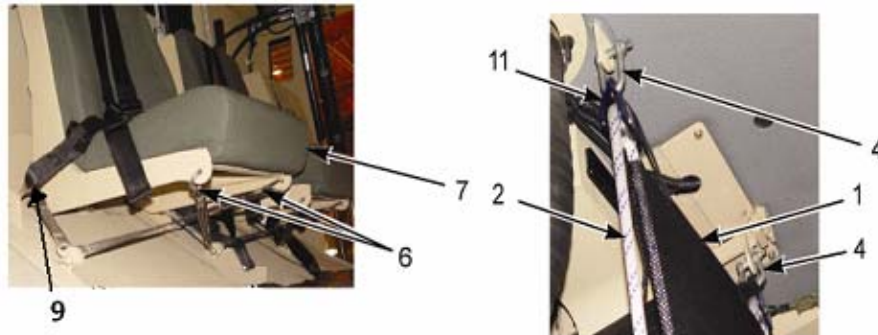
b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



1. Attach new back “M” ropes (2) to the roof clips (4) and the floor clip (8), making sure that the pulleys (11) are in the correct positions.



2. Attach the cross-over straps (6) from underneath the seat.
3. Attach strap (9) to rear of seat bottom using two eyebolts and nuts.
4. Attach rear straps (5) and tighten with socket wrench.
5. Attach the headrest (1) to the top roof clips (4) and around the back “M” ropes (2).
6. Seat (7) is now installed and ready for use.

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.2 Drivers Seat Replacement

DRIVERS SEAT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Driver's Seat</p>	<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u></p> <p><u>Follow-On Maintenance</u> None</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

a) Removal



1. Remove four bolt and washers that secure the driver's seat (3) to the seat platform (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Remove Drivers seat (3).

b) Installation



1. Install driver's seat (3) on to the seat platform (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Secure driver's seat (3) to the seat platform (1) with four bolts and washers (2).

c) Follow-On Maintenance

1. None.

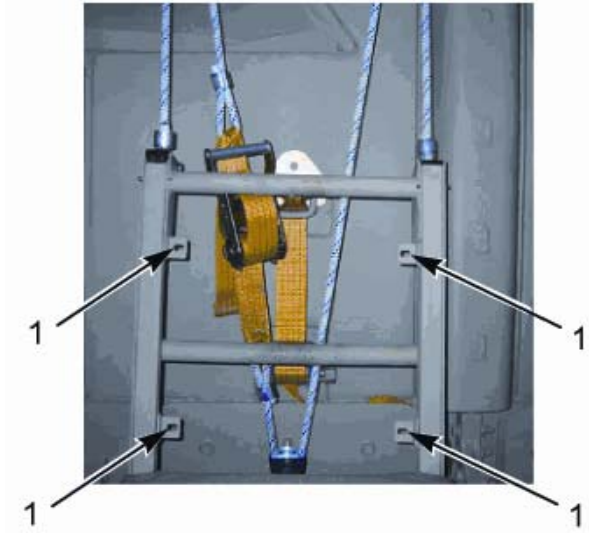
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.3 Seat Cushion Replacement

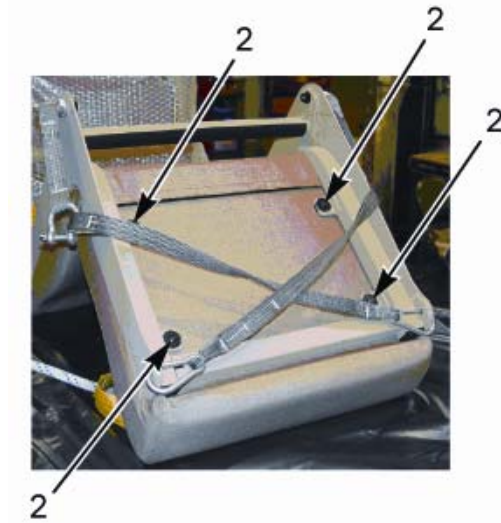
SEAT CUSHIONS REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Seat back screws (4 per seat) Seat bottom screws (4 per seat)</p>		<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in (N) Engine shut OFF Battery Disconnect Switch OFF Crew seats removed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u></p> <p><u>Follow-On Maintenance</u> Install crew seats Battery Disconnect Switch ON</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove and discard four screws (1) securing seat back cushion to frame.



2. Remove and discard four screws (2) securing seat bottom cushion to frame.

b) Installation

1. Insert four new screws (1) to secure seat back cushion to frame.
2. Insert four new screws (2) to secure seat bottom cushion to frame.

c) Follow-On Maintenance

1. Install crew seats.
2. Turn Battery Disconnect Switch to ON.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.4 Seat Belt Replacement

SEAT BELT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Seat Belts (1-9)</p> <p><u>Equipment Required</u> None</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Remove seat cushions</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Install seat cushions Check operation of seat belts</p>	

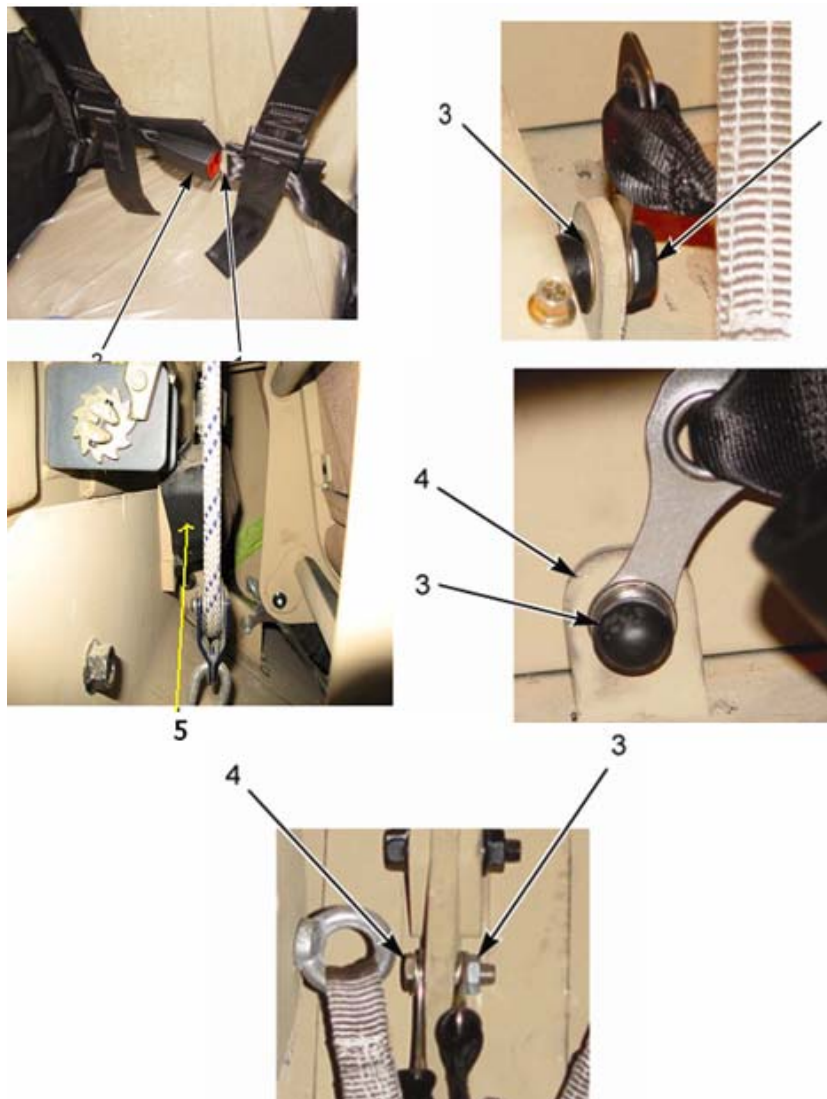
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Notice the placement and direction of the rear seat belt retractor before removal. The new retractor has to be installed properly for it to work properly. To ensure proper placement, notice which direction the retractor is placed. Either facing the back of the seat or towards the vehicle panel, and which way does it pull. If installed improperly the seat belt will not work correctly. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



1. Once you have access to the rear seat belt retractor assembly (5), note the way it is laid-out before you un-bolt it, for proper installation of replacement. If installed the wrong way the retractor will not work properly. Unbolt the hold-down bolts and remove.

Chapter 4 – MAINTENANCE INSTRUCTIONS

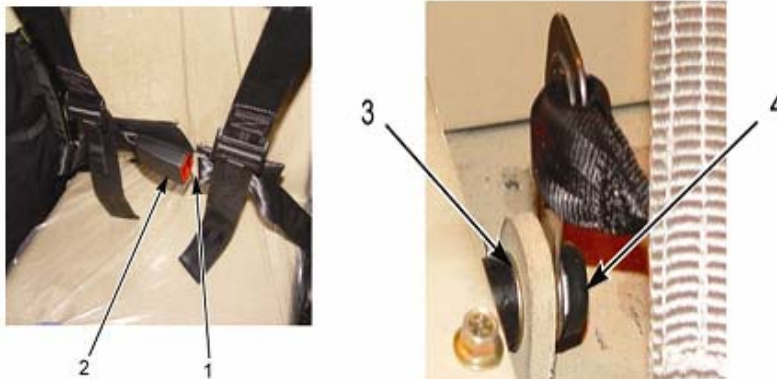
2. The two side seat belts are manually adjustable and both are removed the exact same way. The latch side (1) is on the left side of the seat and the buckle side (2) is on the right side of the seat. Loosen and remove the nut (3) and bolt (4) to remove seat belt. Discard defective seat belt.
3. Repeat same procedure for other side of seat belt.

b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Notice the placement and direction of the rear seat belt retractor before removal. The new retractor has to be installed properly or it will not work. To ensure proper placement notice which direction retractor is placed, facing back of seat or vehicle panel, pulls in which way. If installed improperly seat belt will not work. Failure to comply may result in serious injury or death to personnel.



1. The two side seat belts are manually adjustable and both installed the same way. Install the latch (1) on the left side of the seat and the buckle (2) on the right side of the seat. Tighten nuts (3) and bolts (4) to specification.
2. Install the rear seat belt retractor assembly and remember to install the same way the old part came out for proper operation of the seat belt. Install bolts and re-check operation pull of retractor before tightening bolts.
3. Tighten bolts to 25-30 ft-lb (34-41N•m).

c) Follow-On Maintenance

1. Install seat cushions.
2. Check operation of seat belts.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.5 Stowage Box Replacement

STOWAGE BOX REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic Two (2) Crewmembers</p> <p><u>Material/Parts</u> Stowage Box</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Drain Air Tanks Disconnect Batteries</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Reconnect Batteries</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

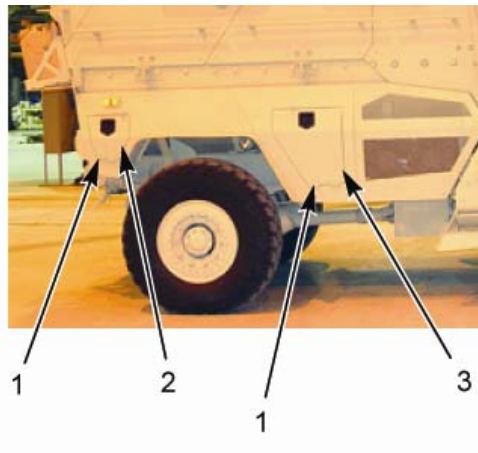


To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

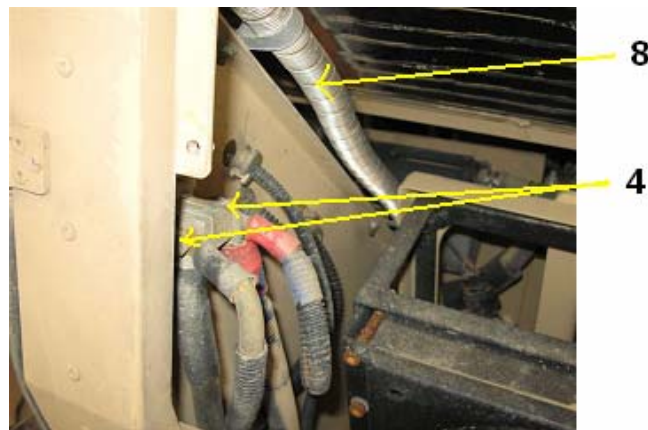
NOTE

All boxes are removed in the same manner. Some boxes are smaller and have a few variations.

1. Remove six mounting bolts from hinges (1) of stowage boxes to be removed.

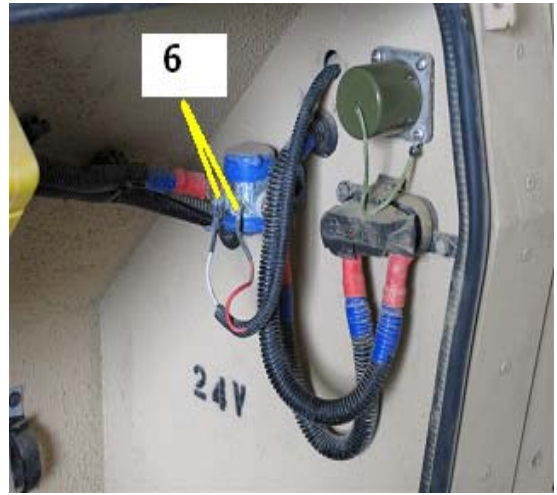
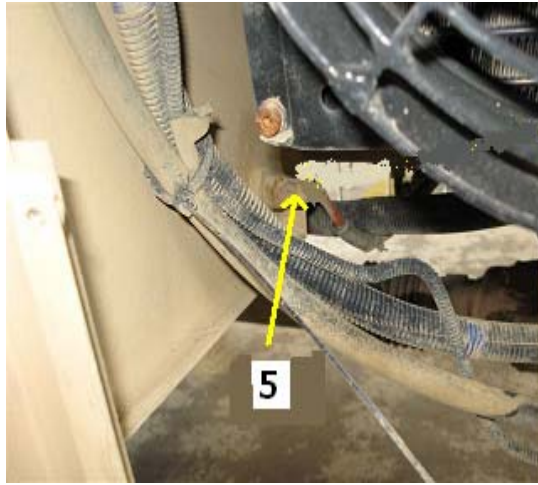


2. Remove access door on stowage box.
3. Remove condenser panel.
4. Tag and disconnect electrical cables from Slave receptacle (4).

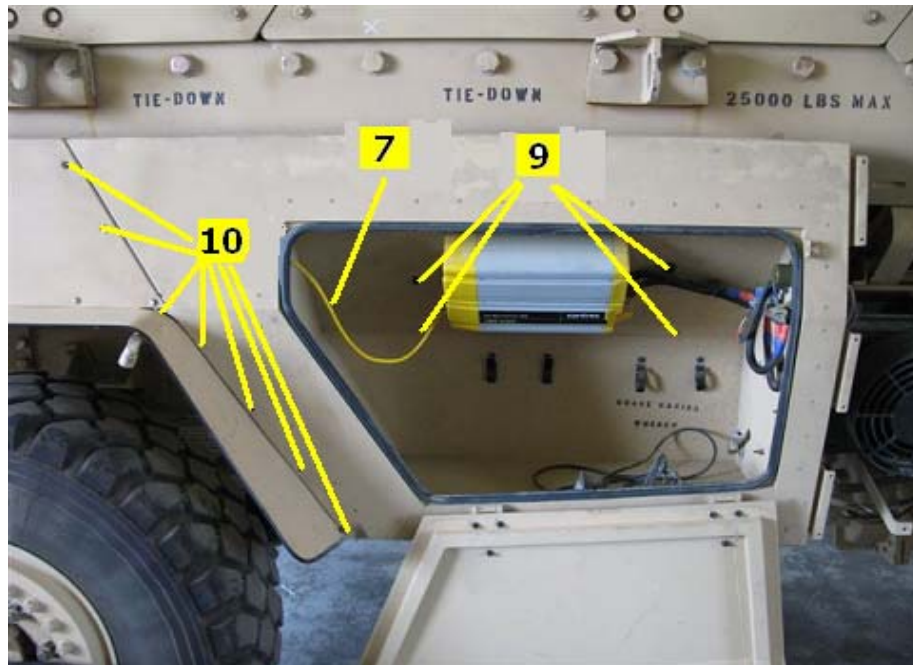


Chapter 4 – MAINTENANCE INSTRUCTIONS

5. Disconnect air line (5) from fitting outside box.

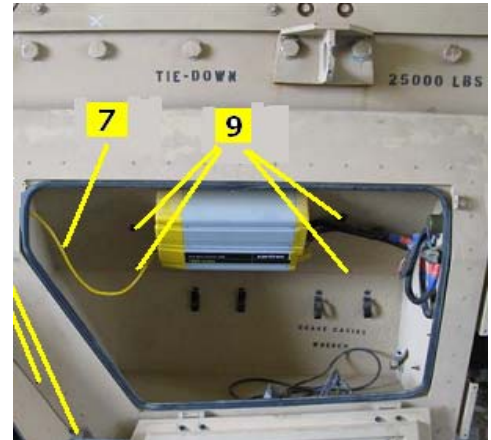
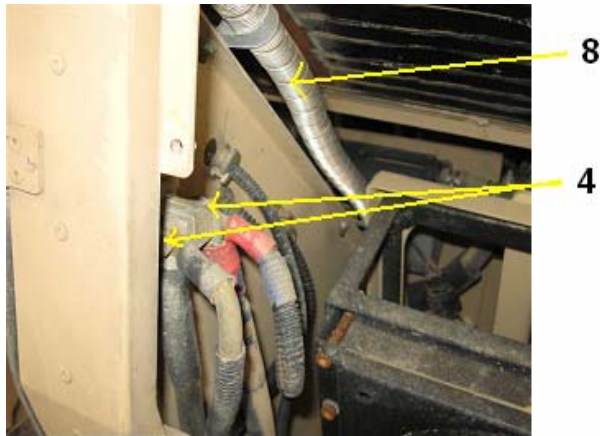


6. Tag and disconnect two electrical wires (6) from solenoid.
7. Disconnect electrical wire (7) from Inverter.

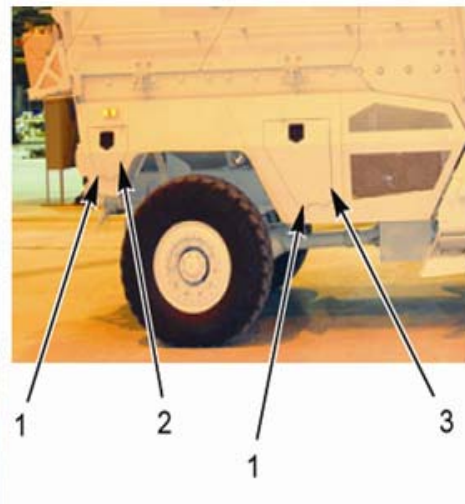
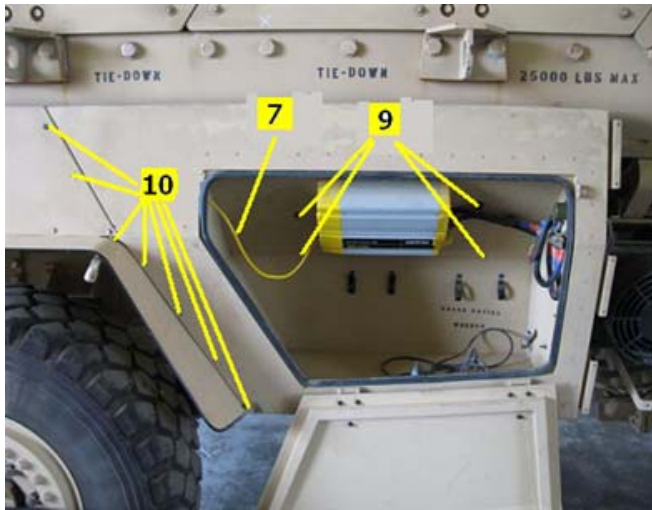


Chapter 4 – MAINTENANCE INSTRUCTIONS

8. Disconnect Heater exhaust hose (8) from back of stowage box.



9. Remove 12 ea bolts (9) from inside stowage box that connect box to mounting bracket.
10. Remove 7 ea bolts (10) from outside panel at rear of stowage box.
11. Remove stowage box.

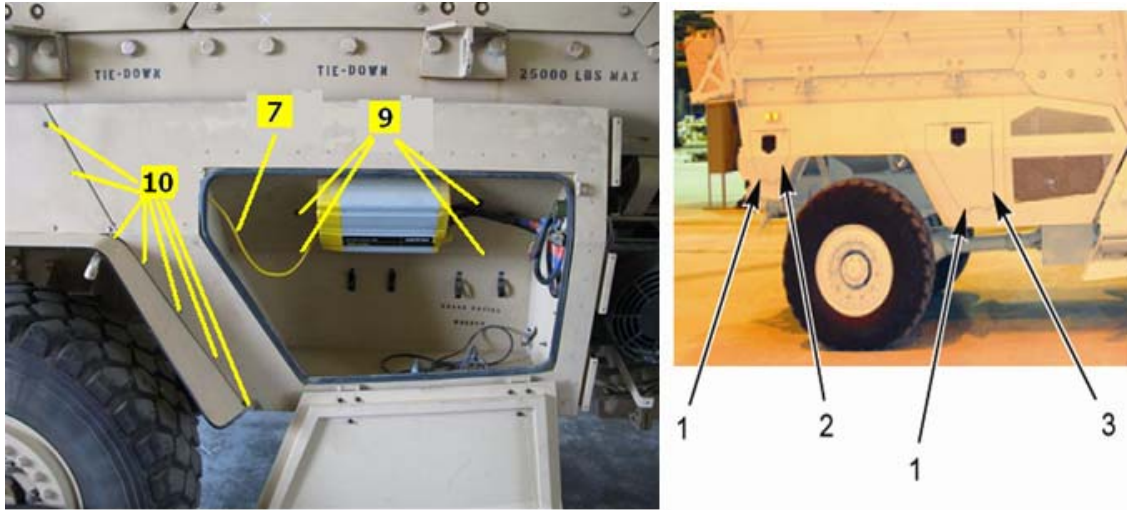


b) Installation

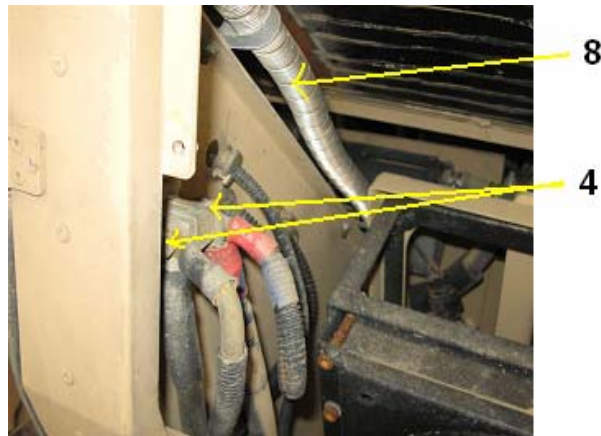
1. Install Stowage Box.
2. Install 7 ea bolts (10) on outside panel at rear of stowage box.

Chapter 4 – MAINTENANCE INSTRUCTIONS

3. Install 12 ea bolts (9) inside Stowage Box connecting box to mounting bracket. Do not tighten until all bolts are installed.

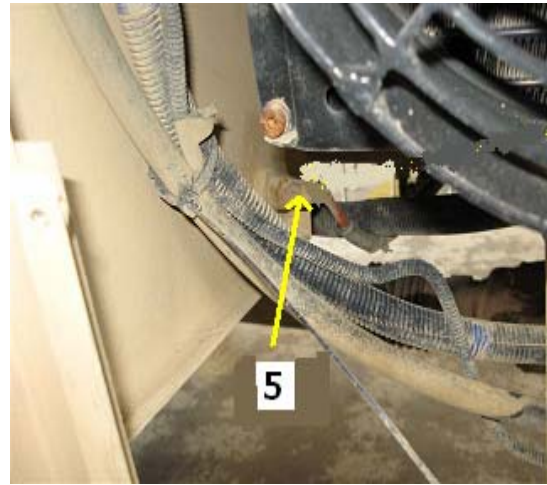


4. Connect heater exhaust hose (8) to back of box.

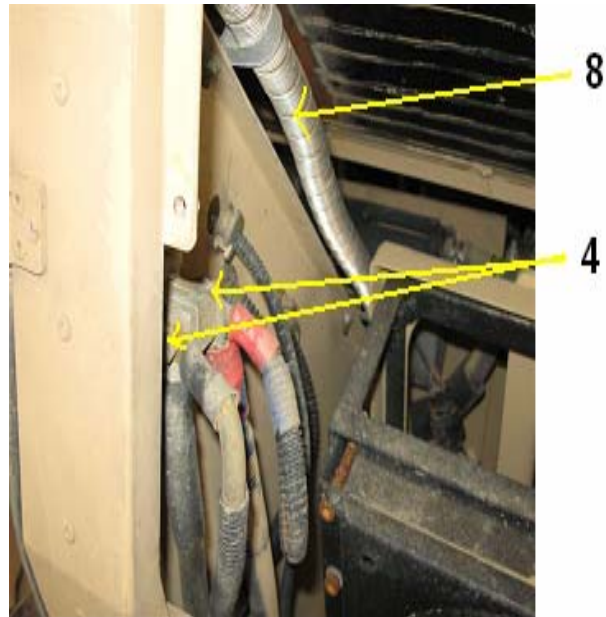
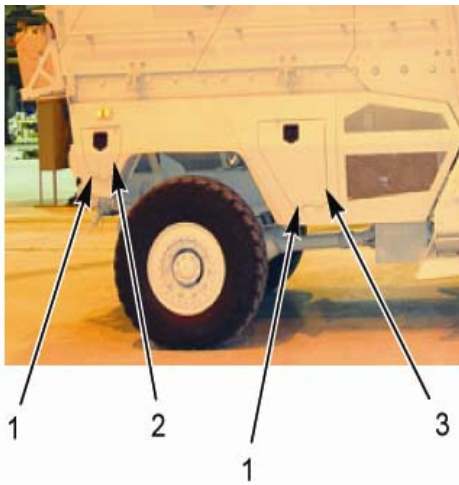


5. Connect electrical wire (7) to Inverter.
6. Connect electrical leads (6) to solenoid.

Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Connect air line (5) to fitting on outside of box.
8. Reconnect electrical cables and slave receptacle (4).
9. Install Condenser Panel.
10. Install six mounting bolts to hinges (1). Tighten.
11. Check storage box for proper operation.



c) Follow-On Maintenance

1. Reconnect batteries.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.6 Door Replacement

DOOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crewmember</p> <p><u>Material Parts</u> Door & Window Assembly Anti-Corrosion Compound Dielectric Grease</p> <p><u>Equipment Required</u> Suitable Lifting Device Lifting Sling</p> <p><u>Reference</u> Parts Manual</p>		<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Drain air tanks Remove door armor w/window cage and mirror assembly Remove door window</p> <p><u>Follow-On Maintenance</u> Reinstall door window Reinstall door armor w/window cage and mirror assembly Battery Disconnect Switch ON Start engine Re-fill air tanks and verify air gauge operation Test operation and alignment of door Shut engine OFF Battery Disconnect Switch OFF</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS



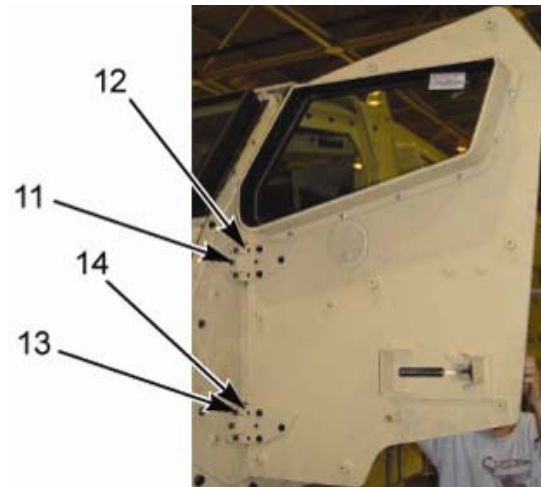
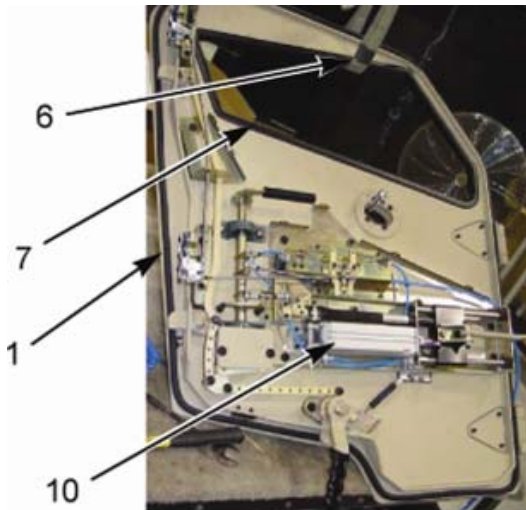
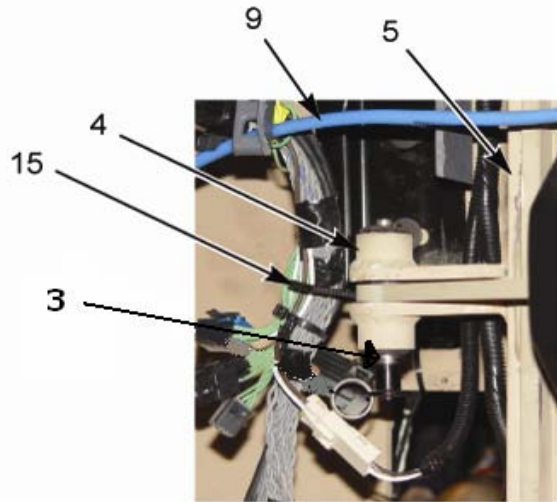
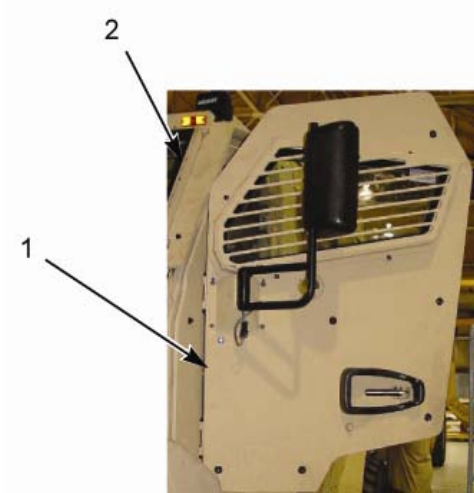
International Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Adhesives, solvents, and sealing compounds burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury or death to personnel.

Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Open door (1) to vehicle (2) and remove quick release pin (3) from center brace (4) at dash A-pillar (5).
2. Affix lifting strap (6) through window opening (7) on door (1) and attach to suitable lifting device.
3. Remove door trim panel (8) and disconnect air line (9) to door actuator (10) and mirror connection (15).
4. Lift up on suitable lifting device until slack is out of lifting sling (6) holding weight of door (1) slightly, this should not move vehicle (2) when this is done correctly.
5. Loosen the three mounting bolts (11) from the top hinge to body (12) and remove. Pick up any slack in the lifting sling as the bolts are being removed.
6. Loosen the three mounting bolts (13) and bottom hinge to body (14) and pick up slack in lifting sling. Remove bolts (11) and (13) while keeping tension on the lifting sling at same time. If a bolt will not come loose there is either too much or too little tension on the lifting sling, adjust accordingly.
7. With assistance, guide door to floor/pallet and remove from lifting sling.

Chapter 4 – MAINTENANCE INSTRUCTIONS

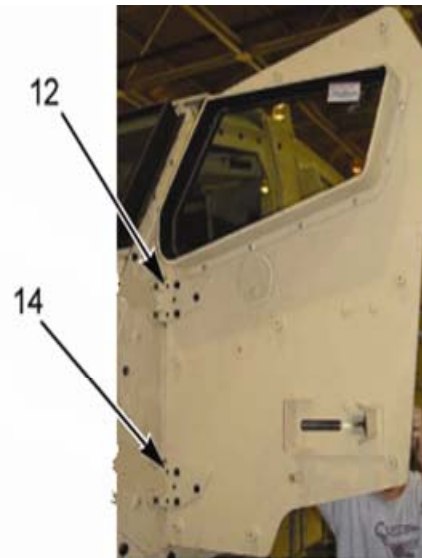
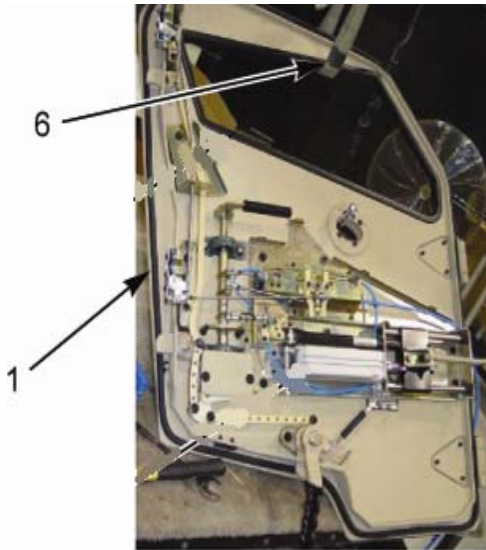
b) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use NIOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin contacted, wash thoroughly with soap and water. Failure to comply may cause serious injury or death to personnel.

1. Apply anti-corrosion compound to bolts and bolt holes on vehicle and door.
2. Apply a thin layer of electrical lubricant to electrical connectors.

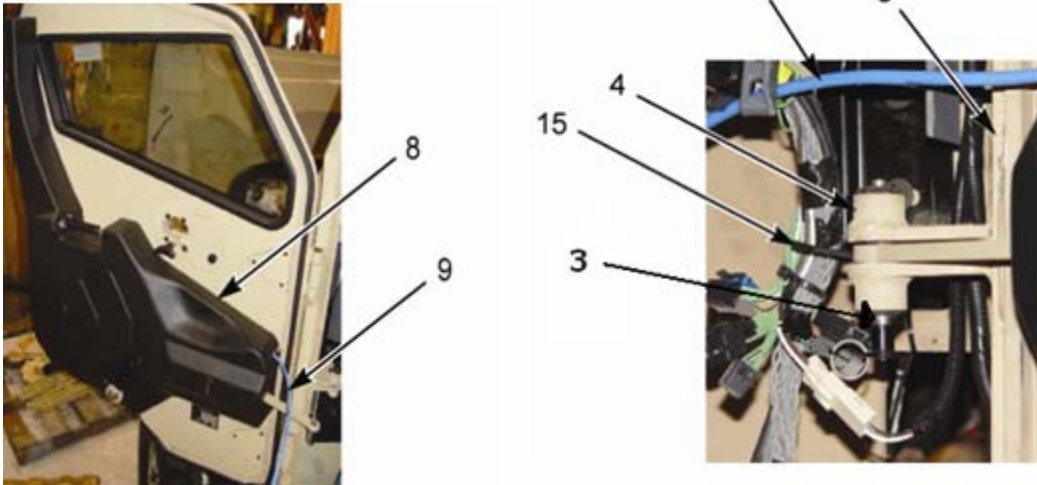


3. With assistance stand new door (1) up and fit into lifting sling (6) and suitable lifting device.
4. Raise and carefully align bolt holes on hinges (12) and (14) and start center bolts in both hinges. Do not tighten all the way at this time.

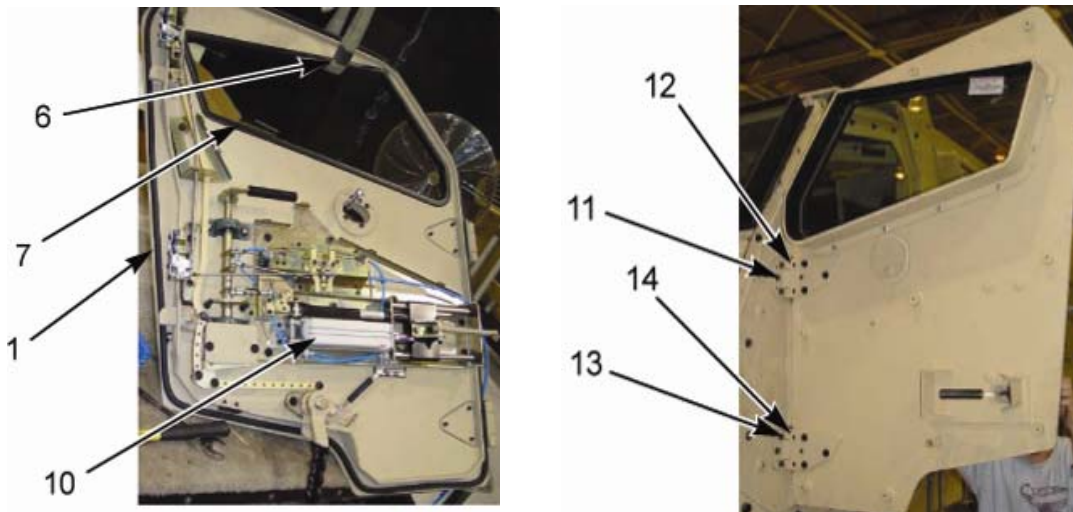
Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

Need to start with center bolts on hinges to align door for proper closure. Wiggling of door after tightening sequence ensures that the door and hinges will align properly for correct door operation.



5. Insert top and bottom (11) and (13) bolts in both hinges (12) and (14) and lightly tighten.
6. Adjust the tension on the lifting sling (6) to ensure proper alignment.
7. Slightly tighten bolts (11) and (13).



8. Re-check alignment of bolts (11) and (13) and hinge mounting holes (12) and (14).
9. Tighten the center bolt of each hinge, re-adjust and align door.

Chapter 4 – MAINTENANCE INSTRUCTIONS

10. Tighten the top bolt of each hinge, re-adjust and align door.
11. Tighten the bottom bolt of each hinge, and make sure door is adjusted and aligned properly.
12. Reinstall air line (9) to door actuator (10) and quick release pin (3) to center brace (4) at dash pillar (5) and mirror electrical connector (15).
13. Reinstall door trim panel (8) and remove lifting sling (6).

c) Follow-On Maintenance

1. Reinstall door window.
2. Reinstall door armor, w/window cage and mirror assembly.
3. Battery Disconnect Switch ON.
4. Start engine.
5. Fill air tanks and verify air gauge operation.
6. Test operation and alignment of door.
7. Shut engine OFF.
8. Battery Disconnect Switch OFF.

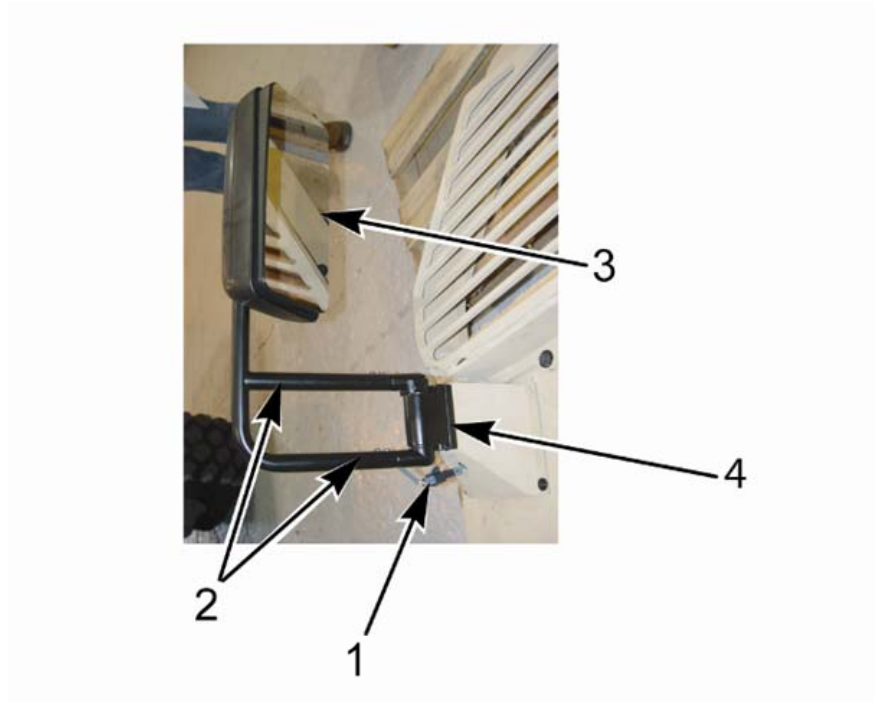
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.7 Door Mounted Mirror Replacement

DOOR MOUNTED MIRROR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Mirror assembly (1)</p>	<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Verify that the mirrors can be easily adjusted Battery Disconnect Switch ON Remove wheel chocks</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Disconnect the mirror remote control sensor (1).
2. Grasp the mirror adjustment bars (2); carefully pull up the mirror assembly (3) to remove it from the bracket track (4).

b) Installation

1. Carefully install the mirror assembly (3) onto the bracket track (4) until it locks into place.
2. Connect the remote control sensor (1).
3. Manually adjust the door mounted mirror by grasping the mirror adjustment bars (2) and pushing or pulling them in a horizontal motion.

c) Follow-On Maintenance

1. Verify that the mirrors can be easily adjusted.
2. Battery Disconnect Switch ON.
3. Remove wheel chocks.

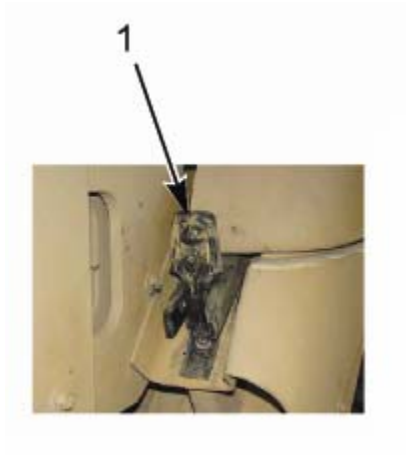
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.8 Fender Mirror Replacement

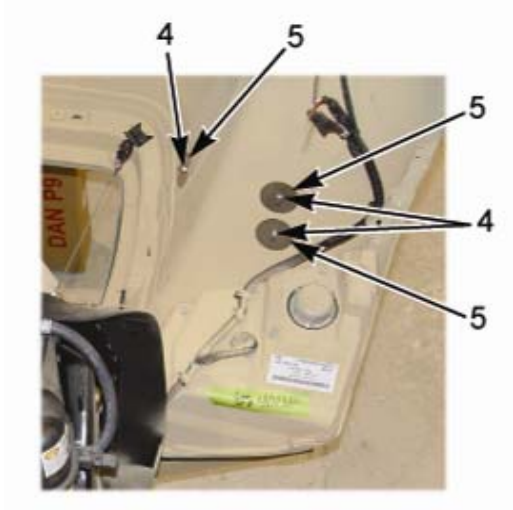
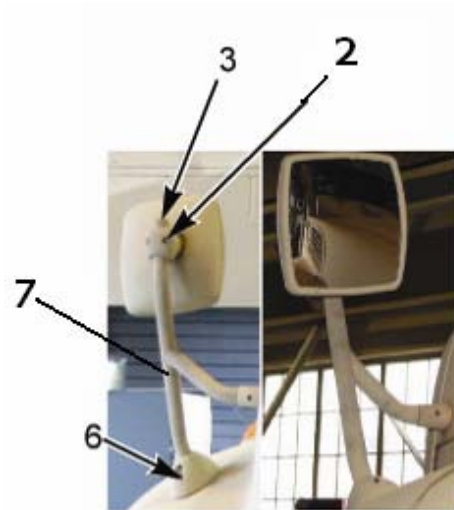
FENDER MIRROR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torx Bit Set</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Fender Mirror (1) Fender Mirror Mount</p>		<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> None</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



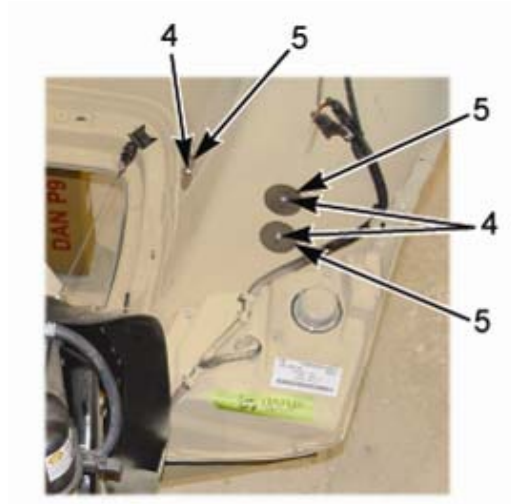
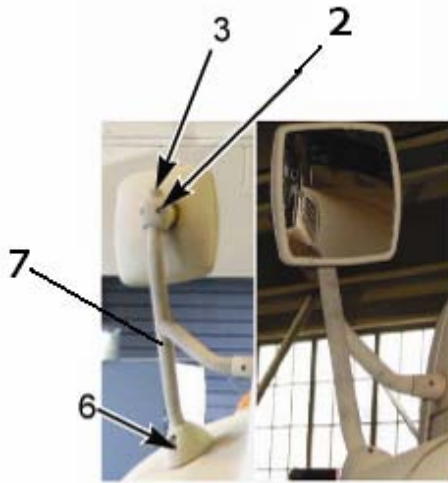
1. Locate the hood latches on both sides of the vehicle and release the hood latch to the open position (1).
2. On the back of the mirror, remove the mirror mount capscrew (2) and remove the mirror (3).



3. Under each front fender, remove three nuts (4) and washers (5) that secure the mirror mount to the vehicle.
4. Remove the hood holder mount capscrew (6).
5. Remove the mirror mount (7) and discard.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new mirror mount (7).
2. Install and tighten three washers (5) and nuts (4).
3. Install and tighten the hood mount capscrew (6).
4. Install mirror (3) on mounting bracket (7).
5. Install the Hood Holder mount capscrew (6).
6. Get in vehicle and have the mirror adjusted before tightening the capscrew (2).
7. Once mirror is adjusted, tighten capscrew (2).
8. Repeat Removal and Installation for other side of vehicle.



9. Bring the hood down to the close position.
10. Secure the hood latch clamp to the close position (8).

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.9 Mirror Glass Replacement

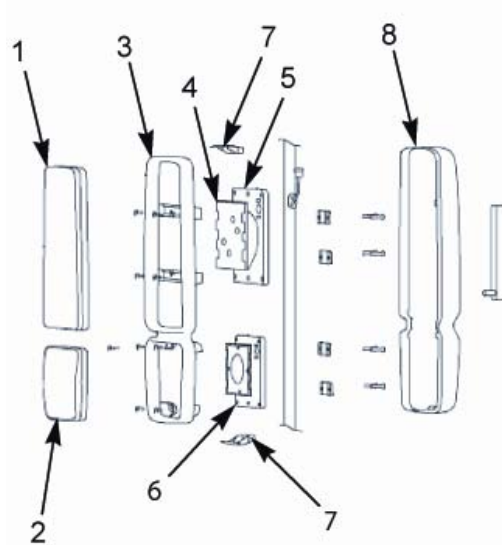
MIRROR GLASS REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Mirror Glass (Flat or Convex) (1 Ea.) Contact Cleaner (1) Upper or Lower Split Mirror Trim Kit (1 Ea.)</p>	<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Verify that the mirrors can be easily adjusted Battery Disconnect Switch ON Remove wheel chocks</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

The following procedure is applicable for the driver or passenger side replacement of the larger flat glass mirror (1) or the lower smaller convex mirror (2).

a) Removal



1. Remove and discard the damaged mirror (1) or (2) from the bezel (3) in the mirror back cover (8).
2. If required, remove and discard upper or lower split mirror trim kit (7).

b) Installation

1. Clean any contacts from mirror actuator control (4), mirror structure flat plate (5), or mirror structure convex mounting plate (6).
2. If required, install new upper or lower split mirror trim kit (7).
3. Insert new flat or convex mirror glass (1) or (2) into bezel (3). Make sure it snaps into place and is seated in back cover (8).
4. Apply power and test mirror for proper operation.

c) Follow-On Maintenance

1. Verify that the mirrors can be easily adjusted.
2. Battery Disconnect Switch ON.
3. Remove wheel chocks.

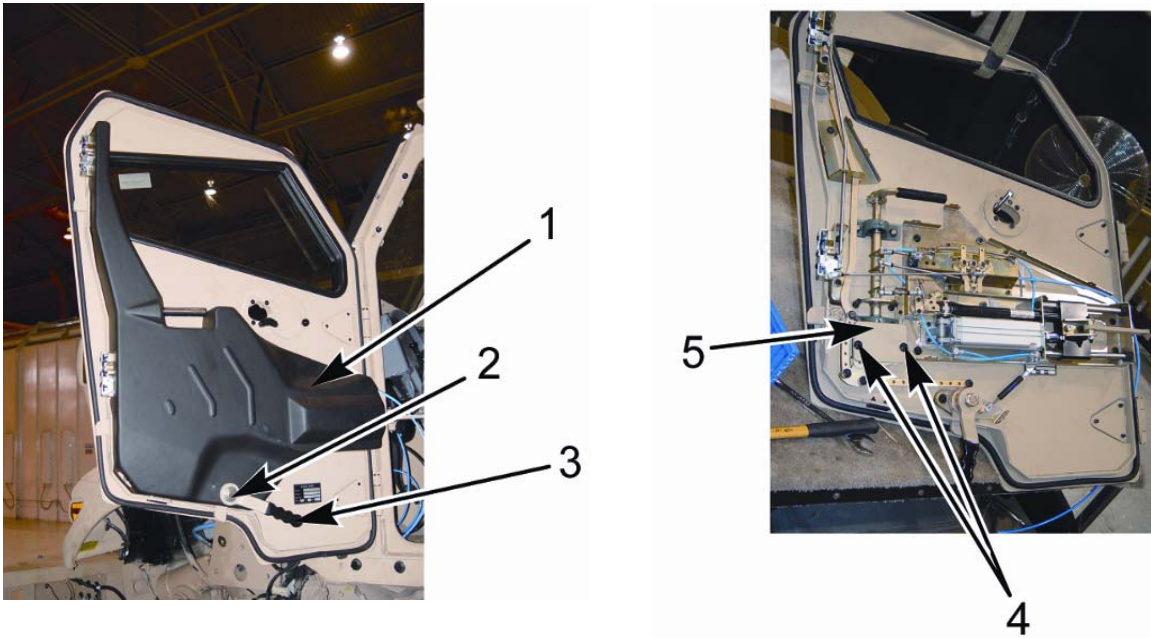
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.10 Cab Door Exterior Handle Assembly Replacement

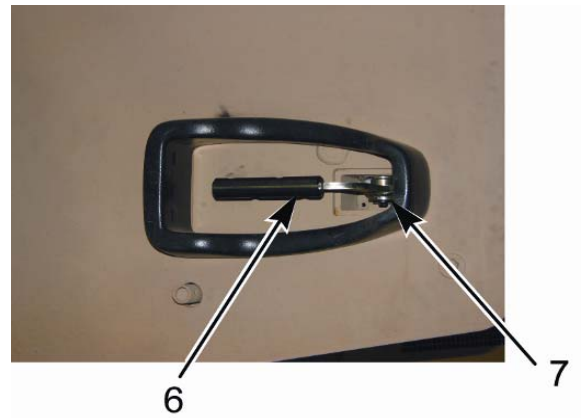
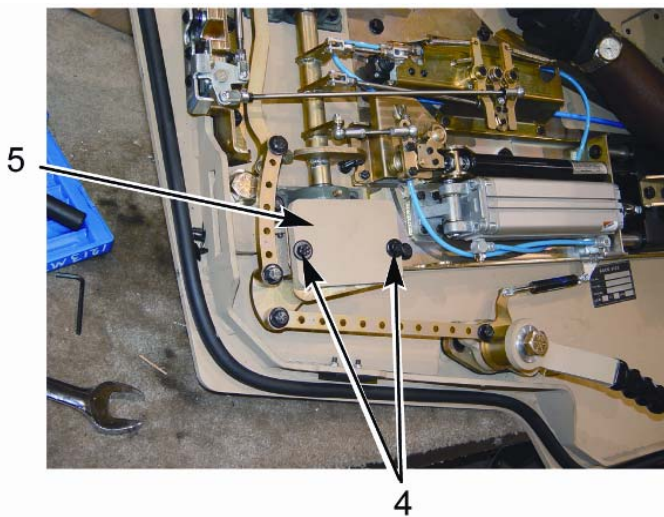
CAB DOOR EXTERIOR HANDLE ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torx Set</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Door handle (1 ea) Door handle bolt (1 ea)</p>	<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Remove front cab door trim panel</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u></p>	<p><u>Follow-on Maintenance</u> Battery Disconnect Switch ON Install front cab door trim panel Test door handle and door for proper operation</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



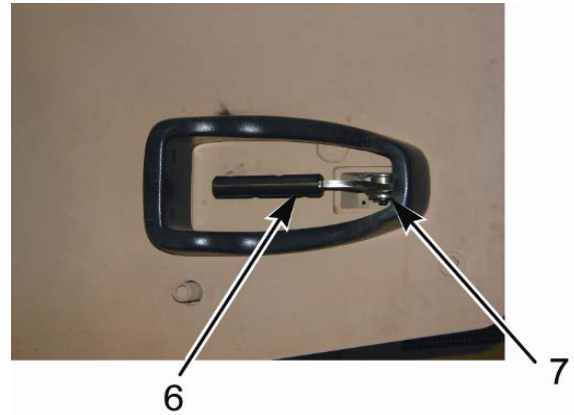
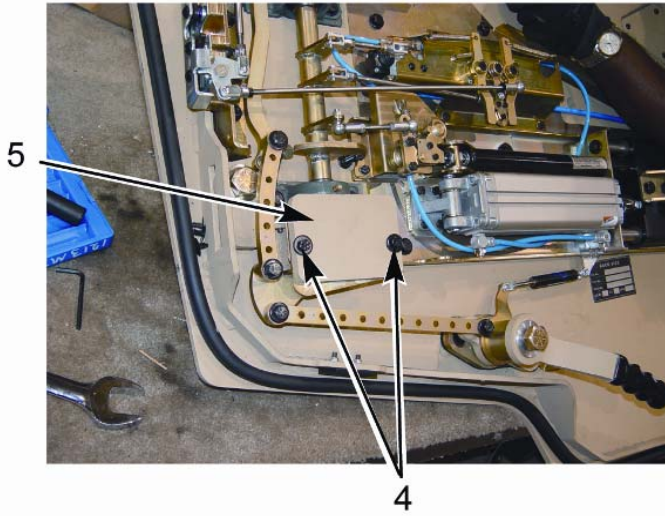
1. Remove and stow nut (2) securing combat lock (3) to door trim panel (1). Remove and stow combat lock handle (3) and nut (2). (Drivers door shown).
2. Remove and stow retainers securing door trim panel (1). Remove and stow trim panel (1).
3. Remove and stow two mount bolts (4) securing door plate (5).
4. Remove and stow door plate (5) to allow access to outside door handle (6).



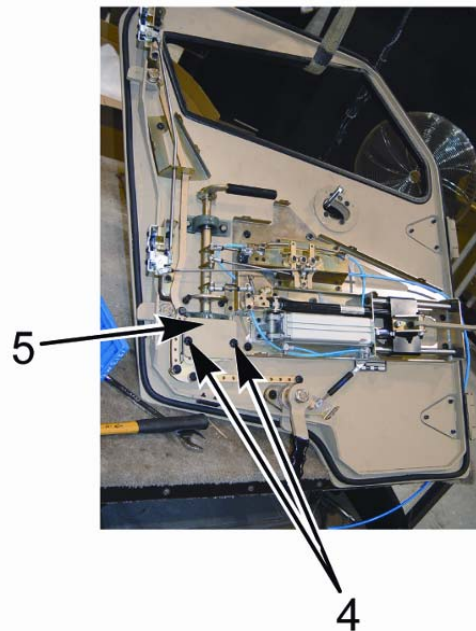
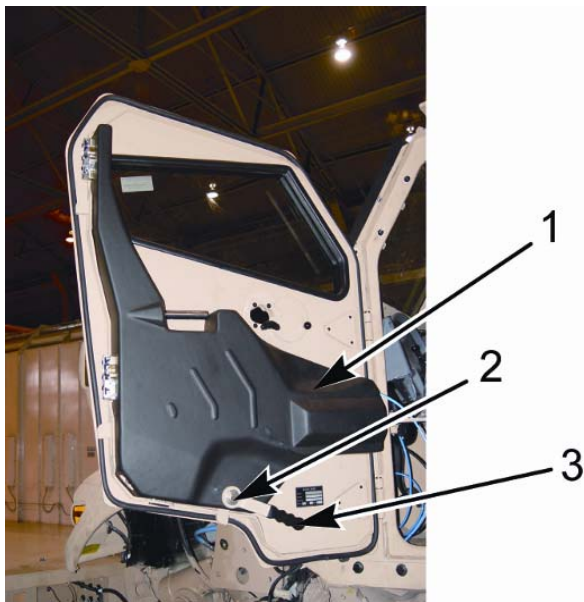
5. From inside cab door remove and discard door handle bolt (7) securing door handle (6).
6. Remove and discard door handle (6).
7. Repeat procedure to remove passenger side outer cab door handle on front cab door if required.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. From exterior, install new door handle (6) on inner cab door handle control rod.
2. From interior, secure door handle to inner cab door handle control rod using door handle bolt (7).
3. Install door plate (5) and secure with two mount bolts (4).



4. Install door trim panel (1) using retainers removed above.
5. Install combat lock handle (3) and secure with nut (2).
6. Test door handle and door for proper operation.
7. Repeat procedure to install passenger side outer cab door handle on front cab door if required.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Turn Battery Disconnect Switch to ON.
2. Install front cab door trim panel.
3. Test door handle and door for proper operation.

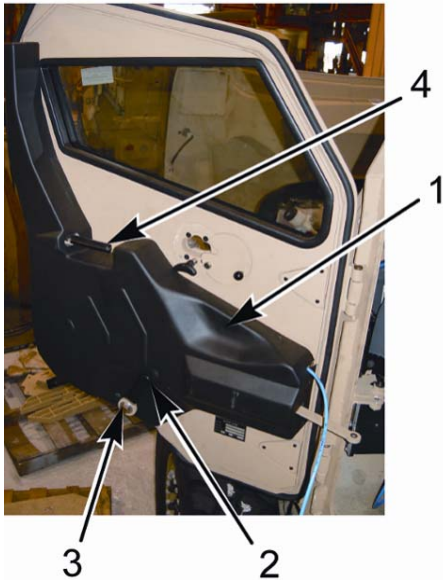
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.11 Cab Door Interior Handle Assembly Replacement

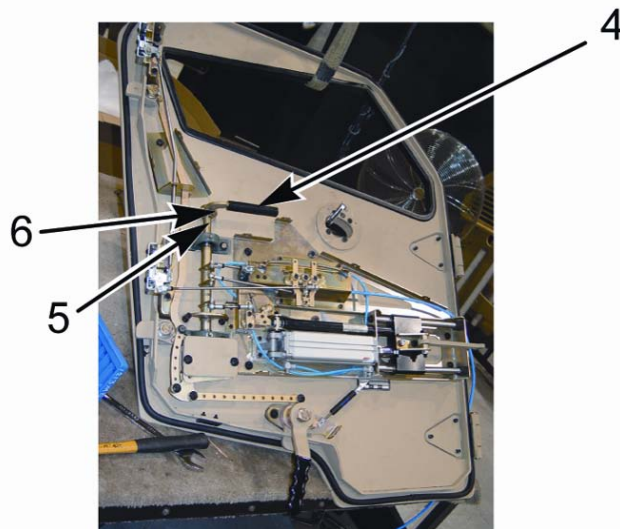
CAB DOOR INTERIOR HANDLE ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Door handle (1 ea) Door handle retaining screw (1 ea)</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Condition</u> Parking Brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Remove door trim panel</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Install door trim panel. Battery Disconnect Switch ON Test door(s) for proper operation</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



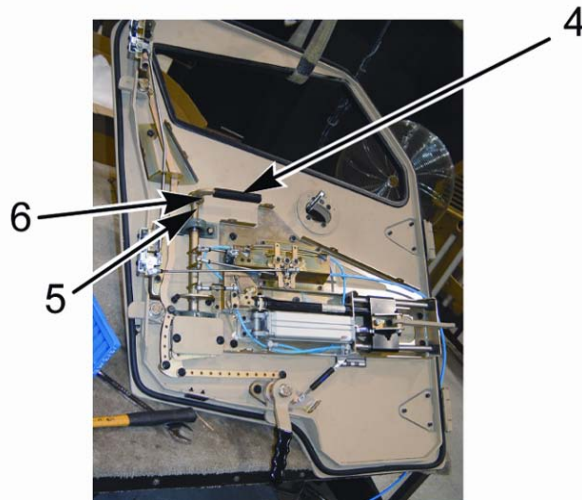
1. Remove and stow nut (3) securing combat lock (2) to door trim panel (1). Remove and stow combat lock handle (2) and nut (3). (Drivers door shown).
2. Remove and stow retainers securing door trim panel (1). Remove and stow trim panel (1).



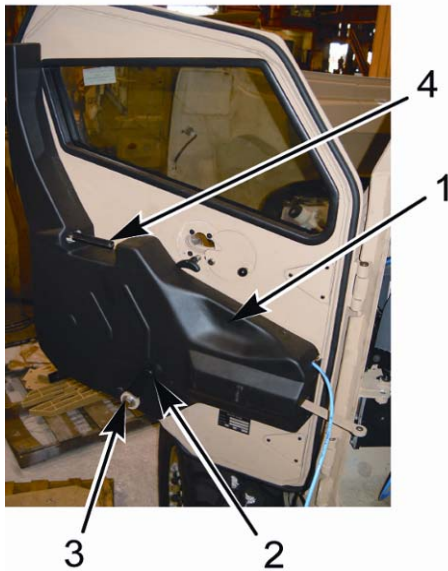
3. Remove and discard screw (6) securing cab door handle (4) to inner cab door handle control rod (5).
4. Remove and discard door handle (4).
5. Repeat procedure, if required, to remove passenger side front inner cab door handle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install new cab door handle (4) on cab door handle control rod (5).
2. Secure door handle with new screw (6).



3. Install trim panel (1) over door handle assembly.
4. Secure trim panel assembly (1) with retainers retained in removal.
5. Install combat lock handle (3) and secure with nut (2) removed above.
6. Test door for proper operation.
7. Repeat procedure on passenger door if required.

c) Follow-On Maintenance

1. Install door trim panel.
2. Turn Battery Disconnect Switch to ON.
3. Test door(s) for proper operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.12 Cab Door Combat Lock Assembly Replacement

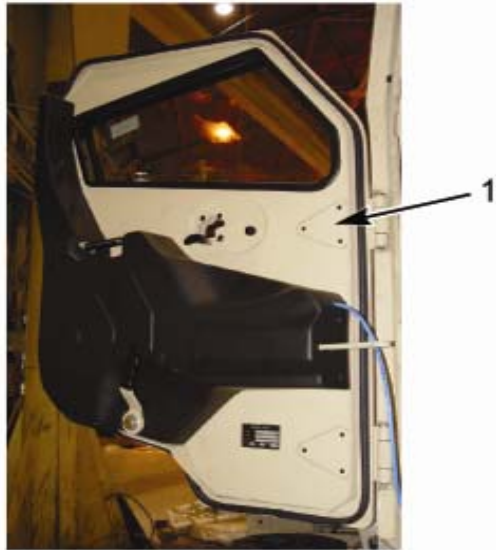
CAB DOOR COMBAT LOCK ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u> None
<u>Special Tools</u> None		<u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF
<u>Personnel</u> One (1) Wheeled Vehicle Mechanic		<u>Reference</u> Parts Manual
<u>Material Parts</u> Combat Lock Assembly (1)		<u>Follow-On Maintenance</u> Check combat lock operation

Chapter 4 – MAINTENANCE INSTRUCTIONS

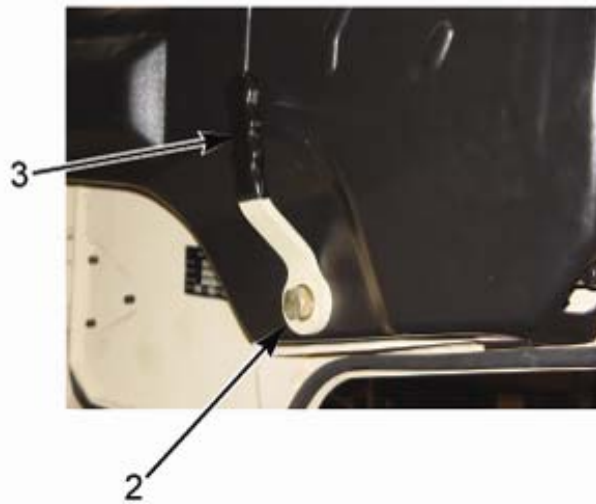
a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.



1. Open cab door (1).

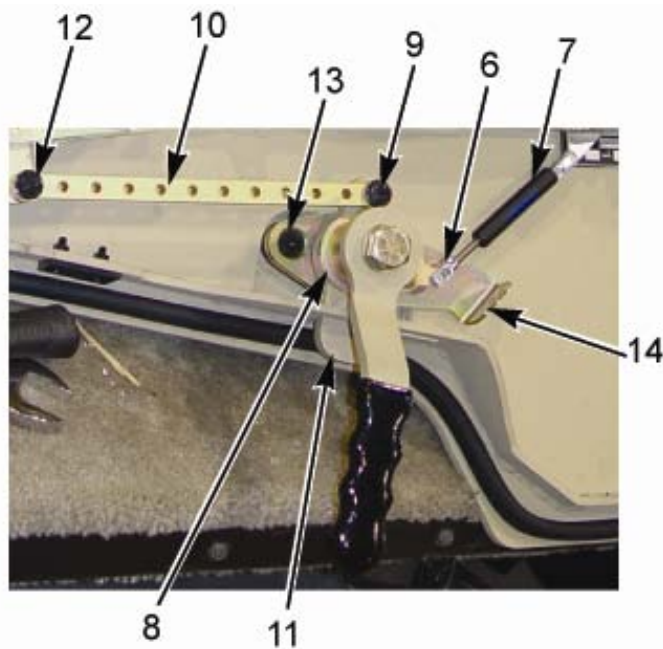


2. Remove bolt, washer (2), and latch handle (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS



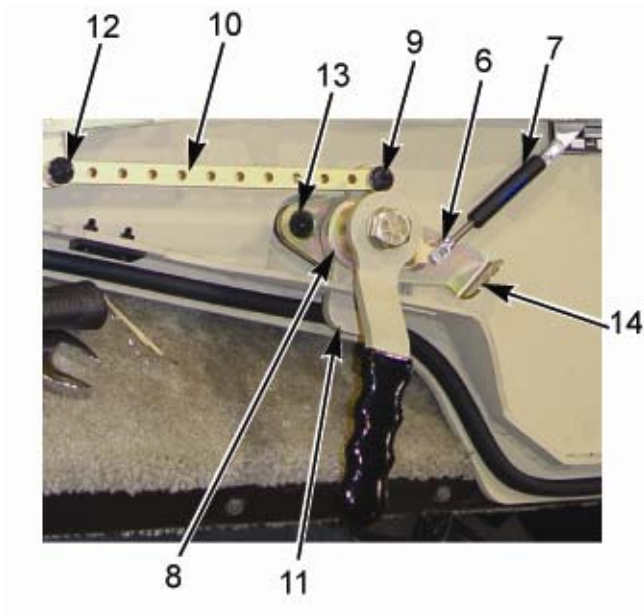
3. Remove all retainers (4) from door trim panel (5). Remove panel.



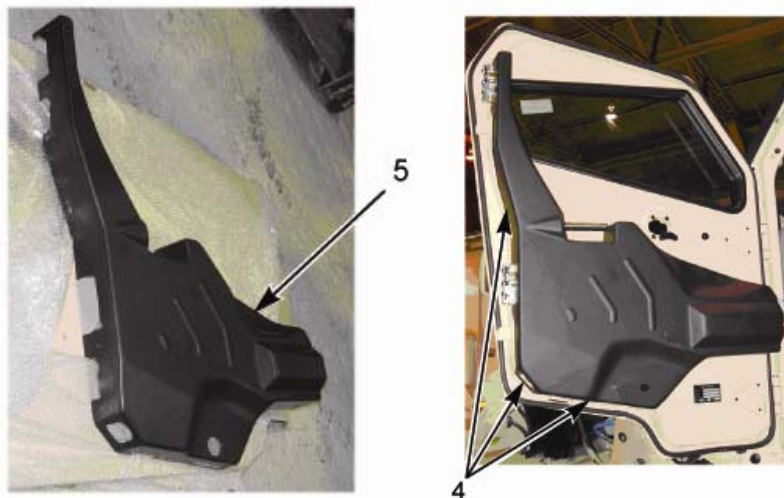
4. Remove bolt and lynch pin (6) from link rod (7).
5. Remove lock cylinder (8).
6. Remove Torx mounting bolt (9) from control arm (10) and inner latch (11). Loosen control arm's second Torx mounting bolt (12).
7. Remove inner latch (11).
8. Remove Torx mounting bolt (13) from door latch (14).
9. Remove door latch (14).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

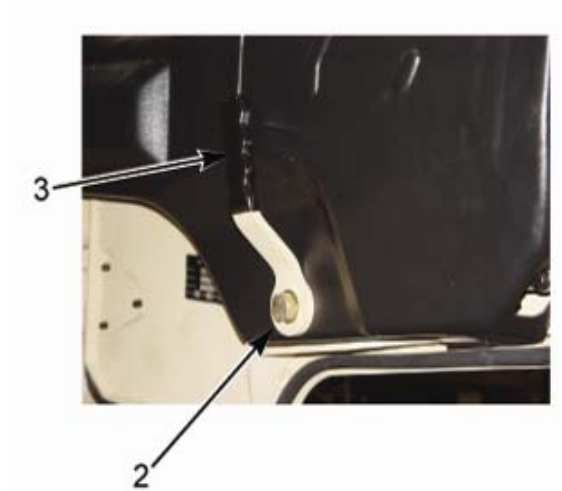


1. Replace and install new latch (14).
2. Install Torx bolt (13).
3. Install inner latch (11).
4. Align inner latch (11) and control arm (10) holes.
5. Install Torx bolts (9) and (12).
6. Install cylinder lock (8).
7. Align lock cylinder (8) and link rod (7) holes.
8. Install bolt and lynch pin (6). Tighten bolt.



9. Install door trim panel (5).
10. Make sure door trim panel fits properly. Install trim retainers (4).

Chapter 4 – MAINTENANCE INSTRUCTIONS



11. Install lock handle (3) with washer and bolt (2).
12. Make sure combat latch locks and unlocks securely.

c) Follow-On Maintenance

1. Check combat lock operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.13 Weapon (Sliding) Hatch Replacement (Gunners Hatch)

WEAPON (SLIDING) HATCH REPLACEMENT (GUNNERS HATCH)		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u>
		Suitable lifting device
<u>Special Tools</u>		Suitable lifting sling (2)
None		
		<u>Equipment Conditions</u>
<u>Personnel</u>		Parking brake set
One (1) Wheeled Vehicle Mechanic		Wheels chocked
One (1) Crewmember		Transmission in NEUTRAL (N)
		Engine shut OFF
<u>Material Parts</u>		Battery Disconnect Switch OFF
Gunners (Sliding) Hatch (1)		
		<u>Reference</u>
		Parts Manual
		<u>Follow-On Maintenance</u>
		Check hatch operation



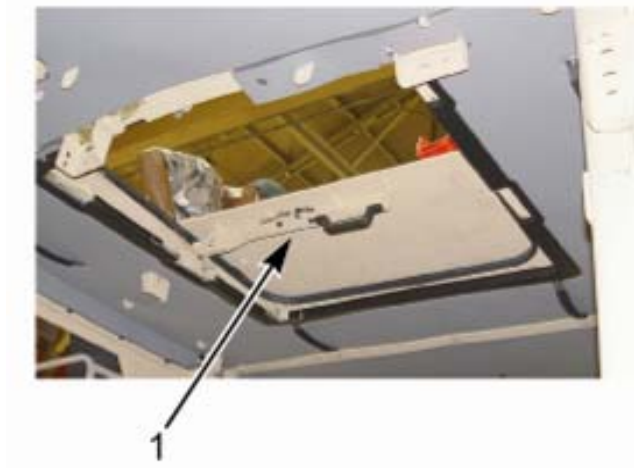
Gunners hatch is extremely heavy, use caution when opening and closing it. Make sure that latch locks are secure into place in the open and or close positions before vehicle starts moving and personnel are set in place securely. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

The gunner's sliding hatch can only be opened or closed when the vehicle is stationary and on a level surface. DO NOT attempt to open or close the hatch when the vehicle is in motion, or if the vehicle is on a longitudinal slope. Keep arms and hands clear of gunners hatch when opening or closing it. Failure to comply may result in serious injury or death to personnel.

Wear safety goggles and gloves during gunners hatch removal and installation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



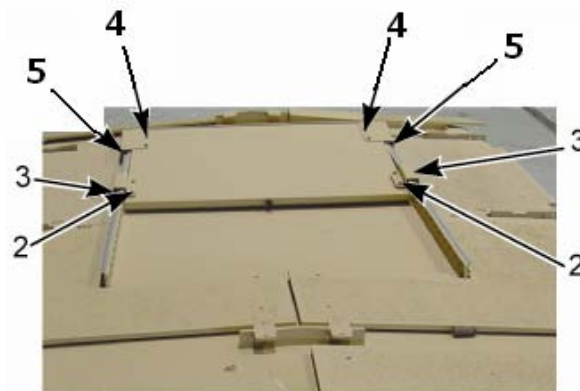
1. Unlatch inside gunner's hatch (1). Partially open the hatch.



International Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing and/or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

The gunners hatch must be secured before moving or lifting. Failure to comply may result in serious injury or death to personnel.

2. Use a suitable lifting device and two slings to secure the hatch. Cradle the hatch in the slings.

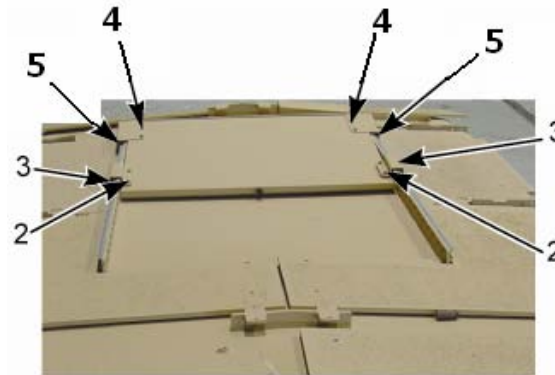


3. Remove the four bolts (2) from the front mounting brackets (3).
4. Remove the four bolts (4) from the rear mounting brackets (5).
5. Slide rear mounts (3) and front mount (5) away from hatch for clearance.
6. Using the suitable lifting device, lift and remove the gunners hatch.
7. Remove the rollers from the mounting brackets, if worn.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

1. Install new rollers to the mounting brackets (3) and (5), if needed.



2. Using a suitable lifting device and slings, lift and install the gunners hatch.
3. Align hatch and mounting bracket holes.



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in easy; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

4. Before installing, apply anti-corrosion compound to the bolts.
5. Install the four bolts (4) to the front mounting brackets (5).
6. Loosely tighten bolts to align.
7. Install the four bolts (2) to the rear mounting brackets (3).
8. Loosely tighten bolts to align.
9. Make sure hatch easily slides along rails, opening and closing securely.
10. Remove slings and suitable lifting device.
11. Tighten all bolts to specification.

c) Follow-On Maintenance

1. Check gunner hatch operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.14 Weapon (Sliding) Hatch Inner Lock Assembly Replacement

WEAPON (SLIDING) HATCH INNER LOCK ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Hatch Inner Lock Assembly (1) Lock Spring and Bolt (1), if necessary Latch Hook Bolt (1), if necessary</p>	<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Check operation of latch assembly Remove wheel chocks</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS



Gunners hatch is extremely heavy, use caution when opening and closing it. Make sure that latch locks are secure into place in the open and or close positions before vehicle starts moving and personnel are set in place securely. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

The gunner's sliding hatch can only be opened or closed when the vehicle is stationary and on a level surface. **DO NOT** attempt to open or close the hatch when the vehicle is in motion, or if the vehicle is on a longitudinal slope. Keep arms and hands clear of gunners hatch when opening or closing it. Failure to comply may result in serious injury or death to personnel.

Wear safety goggles while working on interior of gunners hatch.

a) Removal

Lock Assembly



1. From inside of vehicle, grab hold of hatch handle (1) unlatch the inside latch on the gunners hatch (2) and slide hatch (2) open and secure into open position.
2. Remove mounting nuts, washers, and bolts (3) from the inner lock assembly (4) and remove and discard defective lock assembly in accordance with regulations.

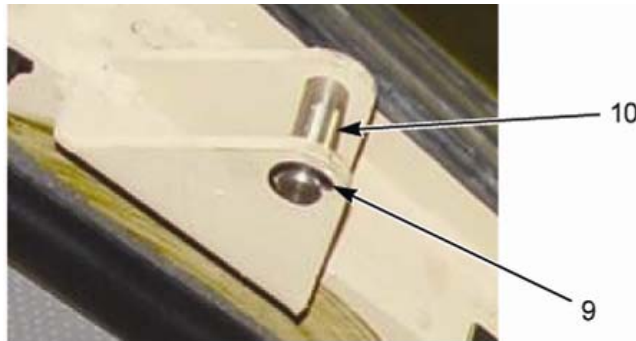
Chapter 4 – MAINTENANCE INSTRUCTIONS

Latch Hook Assembly



1. Remove mounting nut, washer, and bolt (5) to latch hook assembly (6).
2. Remove latch hook spring (7) and mounting bolts (8).
3. Discard defective latch hook (6), spring (7), and mounting bolts (5) and (8) in accordance with regulations.

Latch Assembly



Remove C-clips (9) from latch pin (10), remove latch pin (10) and discard defective or worn parts in accordance with regulations.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



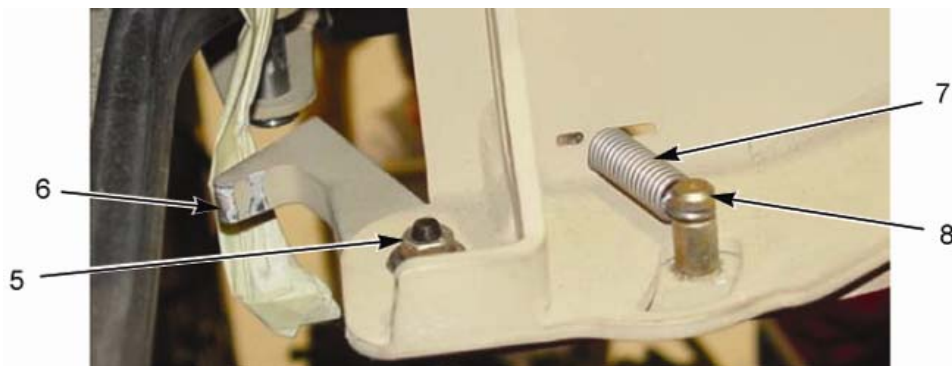
Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. **DO NOT** get in easy; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Lock Assembly



1. Apply anti-corrosion compound to mounting bolts and nuts.
2. Align new lock assembly (4) with mounting holes and insert mounting bolts, washers and nuts (3).
3. Tighten loosely and align with mating side before tightening. Once aligned for closure purpose, tighten.

Latch Hook Assembly

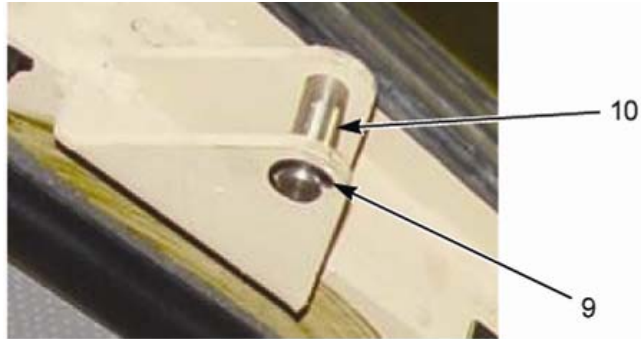


1. Apply anti-corrosion compound to mounting nut and bolt (5).

Chapter 4 – MAINTENANCE INSTRUCTIONS

2. Align latch hook (6) and mounting bolt and nut (5) and loosely tighten.
3. Install latch spring assembly (7) and mounting bolts (8) and align.
4. Once latch hook assembly (6) and latch spring assembly (7) are aligned properly, tighten.

Latch Assembly



Install new latch pin (10) with new C-clips (9).

c) Follow-On Maintenance

1. Check operation of latch assembly.
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.15 Cabin Emergency Hatch Replacement

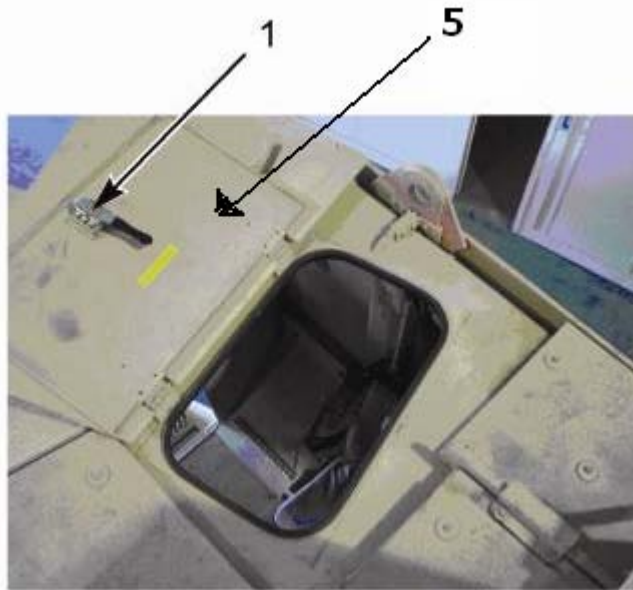
CABIN EMERGENCY HATCH REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Cabin Emergency Hatch (1)</p>	<p><u>Equipment Required</u> Suitable lifting sling Suitable lifting device</p> <p><u>Equipment Conditions</u> Set parking brake Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Check hatch operation</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

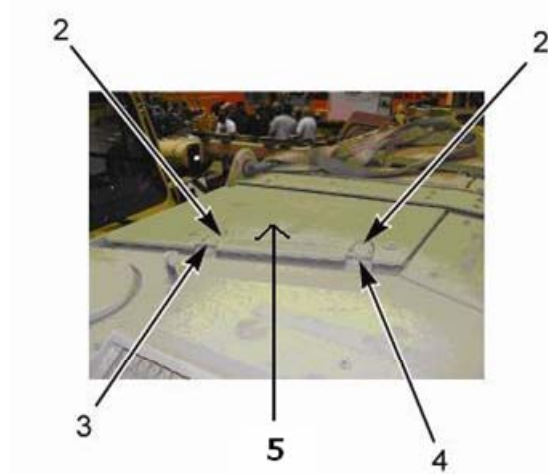
a) Removal



International Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing and/or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel. Wear safety goggles and gloves during hatch removal and installation.



1. Unlock Latch (1), inside hatch (5).



2. Remove the three mounting bolts (2) from the left hinge (3).
3. Remove the three mounting bolts (2) from the right hinge (4).
4. Using the suitable lifting sling and device, lift and remove the hatch (5).

Chapter 4 – MAINTENANCE INSTRUCTIONS

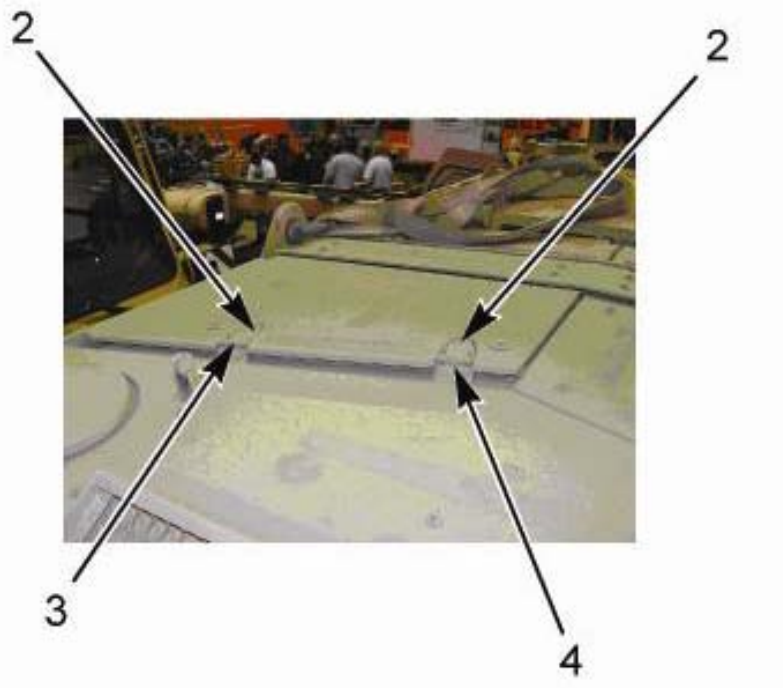
b) Installation

1. Using the suitable lifting sling and device, lift new hatch into place.
2. Make sure that the hatch and hinge holes are aligned correctly.



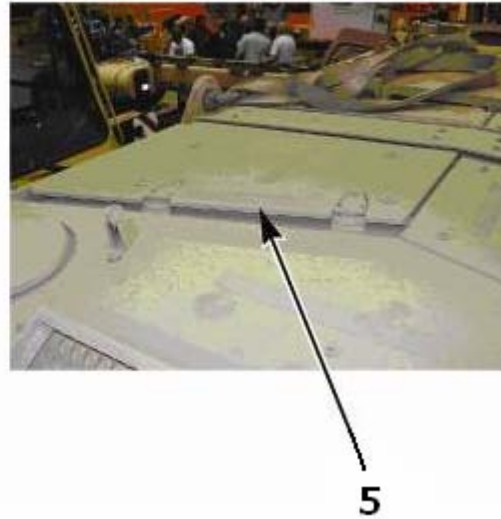
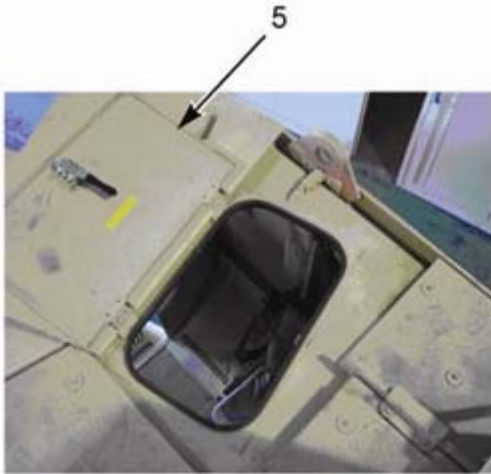
Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in easy; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

3. Lubricate mounting bolts before reinstalling.



4. Install the three mounting bolts (2) into the left hinge (3).
5. Install the three mounting bolts (2) into the right hinge (4).
6. Loosely tighten bolts to align.

Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Make sure that hatch (5) opens and closes securely.
8. Tightened bolts to specification.

c) Follow-On Maintenance

1. Check hatch operation.

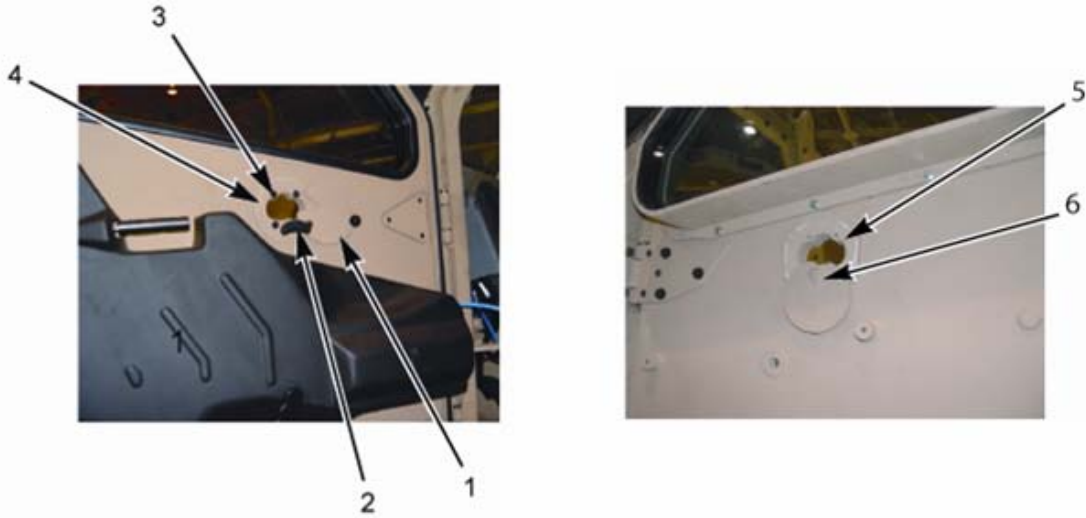
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.16 Gun Port Replacement

GUN PORT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Gun Port Assembly, Internal (1 ea) Gun Port Assembly, External (1 ea) Internal knob and Drift Pin (1 ea) Mounting Screw (4 ea)</p>	<p><u>Equipment Condition</u> Set parking brake Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Wheels chocked</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Test gun port (open/close) Remove wheel chocks</p>	

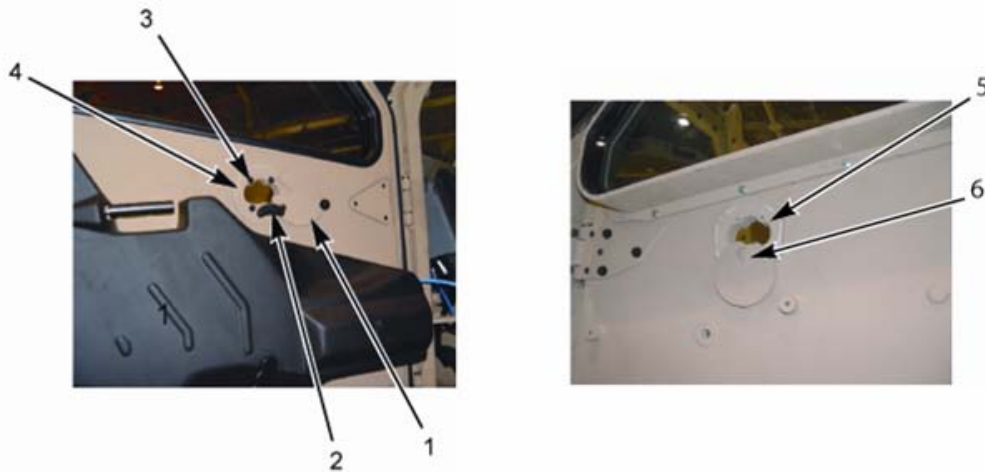
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Slide internal gun port cover (1) to open position.
2. Turn knob (2) for external gun port cover to open position (6).
3. Remove and discard four screws (3) securing internal gun port (4) through vehicle side to external gun port (5).
4. Remove drift securing knob (2) to shaft on external gun port (5).
5. Remove knob (2) from external gun port (5) shaft.
6. Remove and discard internal gun port (4), knob (2), and external gun port (5).

b) Installation



1. Insert external gun port (5) in side of vehicle. Align gun port pivot point on bottom side of port.
2. Insert internal gun port (4) inside of vehicle. Align gun port handle to bottom side so mounting screws line up.
3. Secure internal to external gun port with four mounting screws (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS

4. Install gun port handle (2) on shaft and secure with Drift Pin.
5. Check gun port for proper opening and closing.

c) Follow-On Maintenance

1. Test gun port (open/close).
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.17 Cabin Emergency Hatch Handle/Lock Assembly Replacement

CABIN EMERGENCY HATCH HANDLE/LOCK ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Hatch Handle/Lock Assembly (1) Mounting Screw (6)</p>	<p><u>Equipment Condition</u> Set parking brake Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Wheels chocked</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Check operation of latch assembly Remove wheel chocks</p>	



Cabin emergency hatch is heavy. Make sure the hatch is secured so it will not move. Failure to do so may allow the hatch cover to move causing personal injury or death.

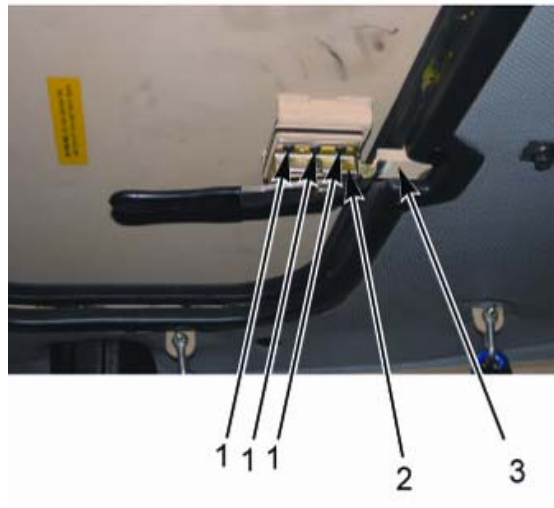
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove and discard six emergency hatch handle mounting screws (1).
2. Remove and discard emergency hatch handle (2).

b) Installation



1. Install new emergency hatch handle assembly (2) to hatch cover with six new mounting screws (1).
2. Ensure hatch handle properly latches (3).

c) Follow-On Maintenance

1. Check operation of latch assembly.
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.18 Rear Door/Ramp Assembly Replacement

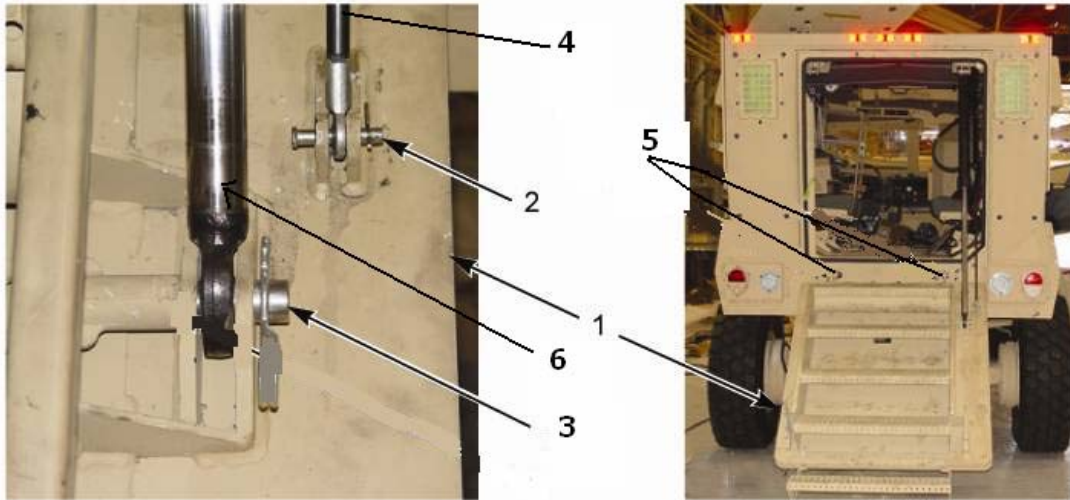
REAR DOOR/RAMP ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>None</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u></p> <p>One Rear Door/Ramp Assembly</p>	<p><u>Equipment Condition</u></p> <p>Parking brake set</p> <p>Wheels chocked</p> <p>Transmission in NEUTRAL (N)</p> <p>Engine shut OFF</p> <p>Battery Disconnect Switch OFF</p> <p><u>Reference</u></p> <p>Parts Manual</p> <p><u>Equipment Required</u></p> <p>Suitable lifting device</p> <p>Suitable sling</p> <p><u>Follow-On Maintenance</u></p> <p>Verify rear door/ramp operation</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



International Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing and/or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

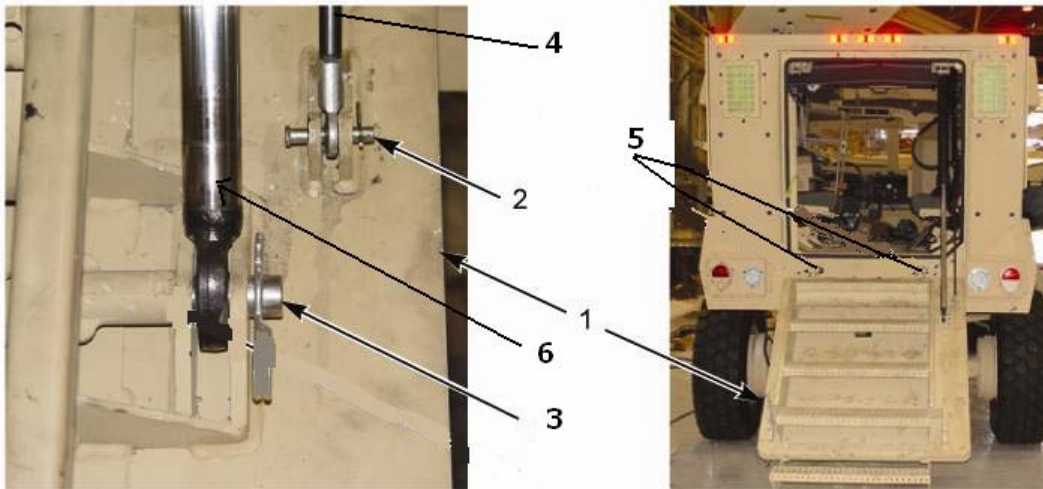


Before removal, secure rear door/ramp using a suitable sling and lifting device.

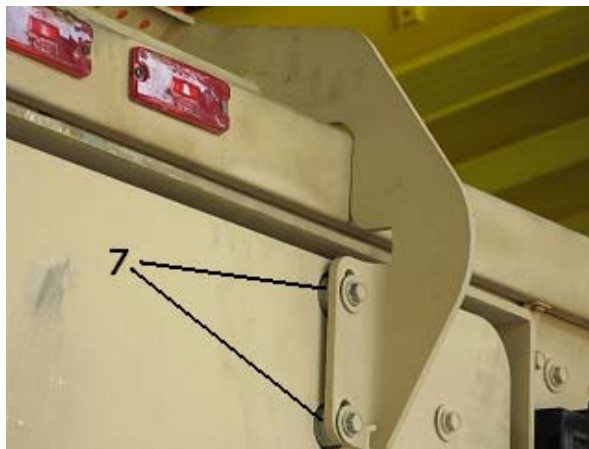
1. Lower the rear door and ramp (1).
2. Remove safety pin (2) from shock absorber arm (4).
3. Remove safety pin (3) from hydraulic lifting arms (6).
4. Using the suitable sling and lifting device, relieve pressure and remove ramp bolts (5), and remove the rear door/ramp (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Using the suitable sling and lifting device, install the rear door/ramp (1).
2. Install ramp bolts (5). Align and tighten.
3. Install safety pin (3) to the hydraulic lifting arm (6).
4. Install safety pin (2) to the shock absorber arm (4).
5. Make sure rear door/ramp operates properly.
6. Make sure door seals properly. Adjust rear door lock assembly if needed.



7. If needed, adjust bottom step by adding spacers (7) so step doesn't hit top of vehicle, but allows proper sealing of ramp/door.

c) Follow-On Maintenance

1. Verify rear door/ramp operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.19 Bottom Ramp Step Replacement

BOTTOM RAMP STEP REPLACEMENT

This task covers:

a) Removal

b) Installation

c) Follow-On Maintenance

INITIAL SETUP

Equipment Condition

Parking brake set

Wheels chocked

Transmission in NEUTRAL (N)

Engine shut OFF

Battery Disconnect Switch OFF

Special Tools

NONE

Personnel

One (1) Wheeled Vehicle Mechanic

Equipment Required

NONE

Material/Parts

Ramp Step (1)

Spacers (as needed)

Follow-On Maintenance

Start Engine

Check Operation of Ramp

Reference

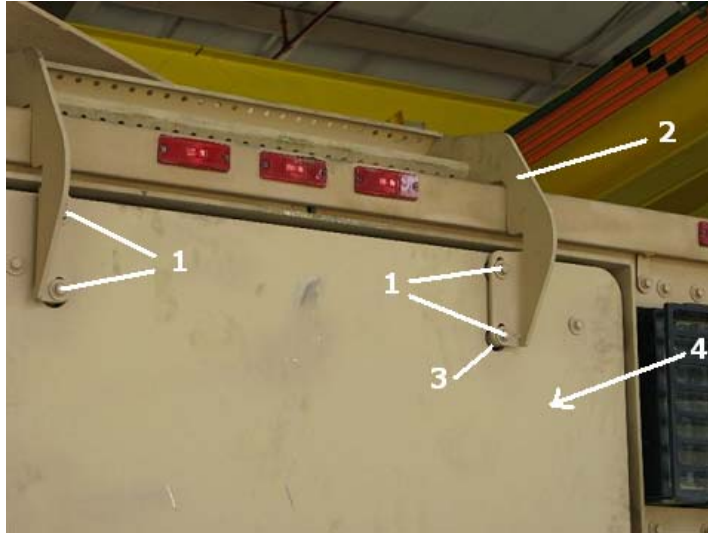
Parts Manual

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Rear cabin door is heavy. Make sure the door is secured so it will not move. Failure to do so may allow the door to move causing personal injury or death.



1. Remove 4 ea bolts (1) from bottom step (2).

NOTE

There are spacers between step (2) and ramp door (4). Retain spacers for reuse during installation.

2. Remove step from ramp door.

b) Installation

1. Install step to ramp door using bolts and spacers retained in the removal process.
2. Add spacers to ensure step does not hit top of vehicle causing the door not to seal properly.

c) Follow-On Maintenance

1. Start engine.
2. Check Operation of Ramp.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.20 Rear Door Lock Assembly Replacement

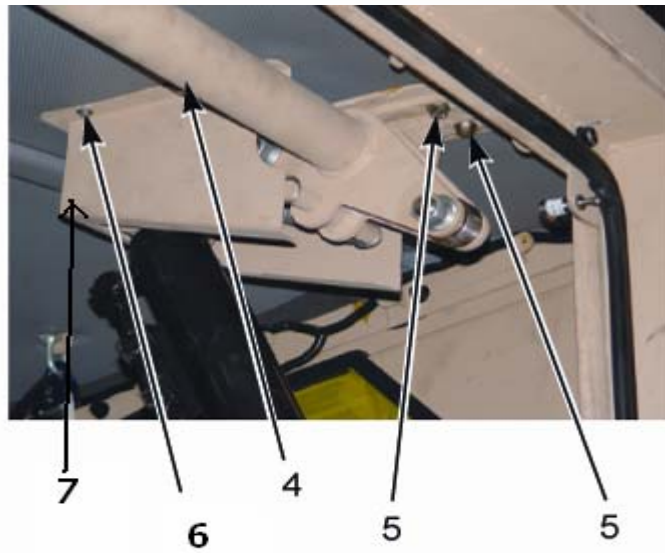
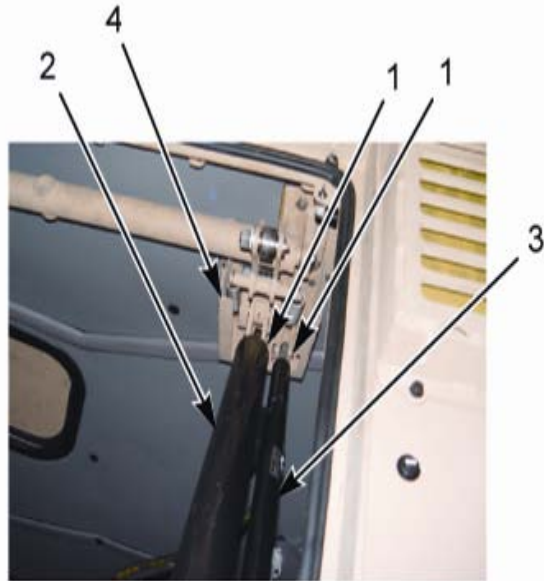
REAR DOOR LOCK ASSEMBLY REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
INITIAL SET UP	<u>Equipment Required</u>
	None
<u>Special Tools</u>	<u>Equipment Conditions</u>
None	Parking Brake set
	Wheels chocked
<u>Personnel</u>	Transmission set in NEUTRAL (N)
One (1) Wheeled Vehicle Mechanic	Engine shut OFF
One (1) Crewmember	Battery Disconnect Switch OFF
<u>Material Parts</u>	Rear door/ramp open
Mount Bolts (8) each side	
Door Lock Assembly (1)	<u>Follow-On Maintenance</u>
	Battery Disconnect Switch ON
<u>Reference</u>	Test door lock operation
Parts Manual	Remove wheel chocks



Rear cabin door is heavy. Make sure the door is secured so it will not move. Failure to do so may allow the door to move causing personal injury or death.

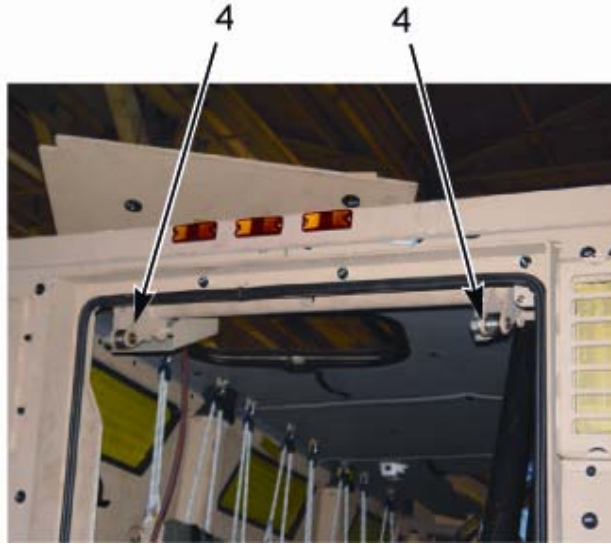
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



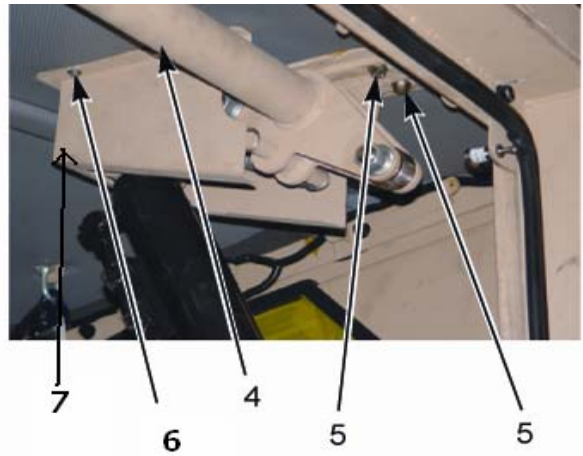
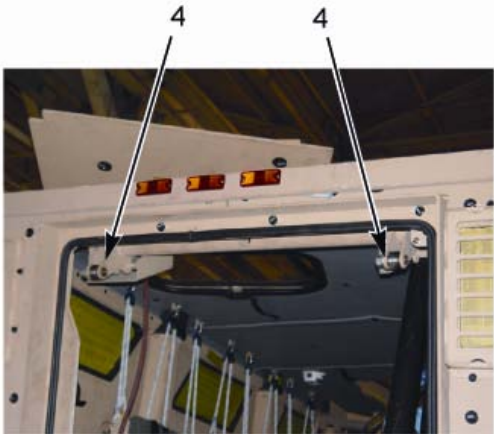
1. Open rear door.
2. Remove bolts (6) securing door lock assembly shroud cover (7).
3. Remove and stow cotter pins (1) securing shock absorbers (3) and hydraulic cylinders (2) to door lock assembly (4).
4. Remove and discard bolts (5) securing door lock assembly (4) to roof.

Chapter 4 – MAINTENANCE INSTRUCTIONS



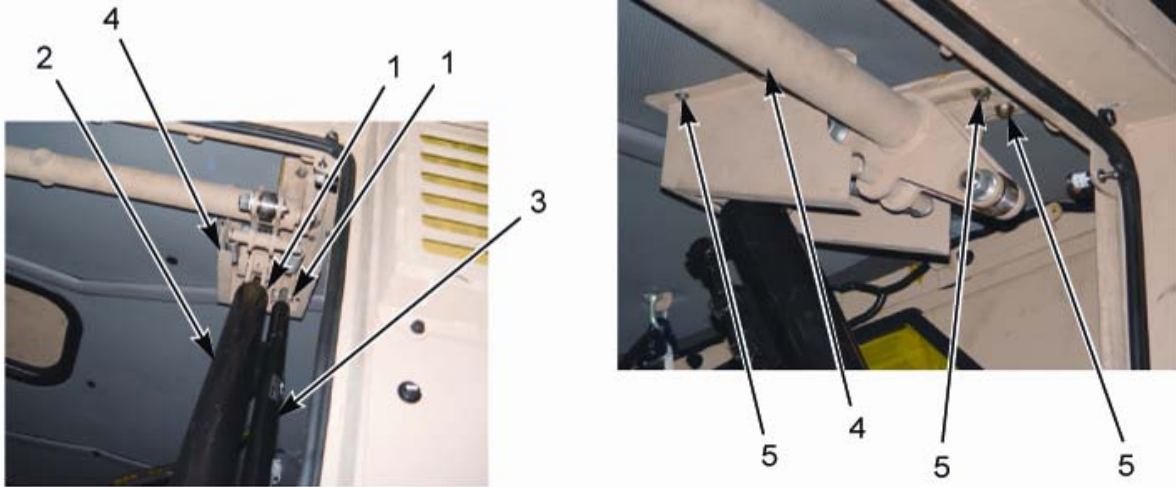
5. Remove and discard bolts (5) securing door lock assembly (4) on drivers side.
6. Remove and discard door lock assembly (4).

b) Installation



1. Place new door lock assembly (4) on roof (note orientation), and secure with one bolt (5) on each side.

Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Install remaining bolts (5) on each side securing door lock assembly (4) to roof.
3. Install shock absorbers (3) and hydraulic cylinders (2) and secure with cotter pins (1).
4. Turn Battery Disconnect Switch ON.
5. Raise rear door/ramp assembly and note that the door latches properly.

NOTE

If ramp assembly does not properly latch, loosen bolts (5) and adjust door lock assembly (4) for proper operation. Tighten bolts (5).

6. Adjust step as required to allow for proper sealing.
7. Install Shroud (7) using bolts (6) retained.

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Ensure door properly locks in closed position.
3. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.21 Rear Door Hydraulic Assist Replacement

REAR DOOR HYDRAULIC ASSIST REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SETUP	<u>Equipment Condition</u>	
<u>Special Tools</u>	Wheels chocked	
None	Engine shut OFF	
<u>Personnel</u>	Battery Disconnect Switch OFF	
One (1) Wheeled Vehicle Mechanic	<u>Reference</u>	
<u>Material/Parts</u>	Parts Manual	
One (1)Rear Door Hydraulic Assist	<u>Equipment Required</u>	
	Jack Stand	
	Drain Pan	
	<u>Follow-On Maintenance</u>	
	None	



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

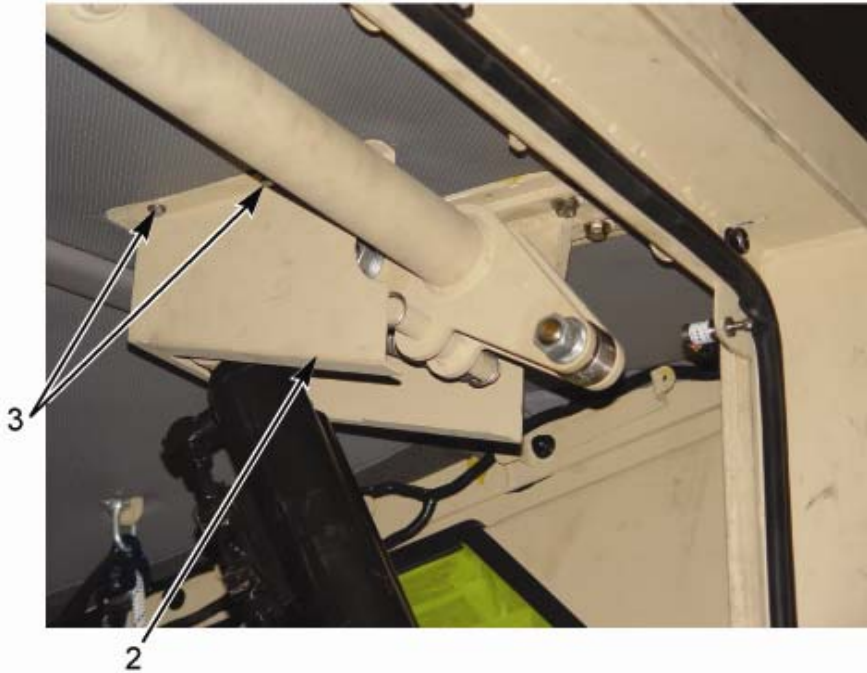
Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Lower rear ramp door (1) to the lowered position, place support stand under ramp door for support safety.

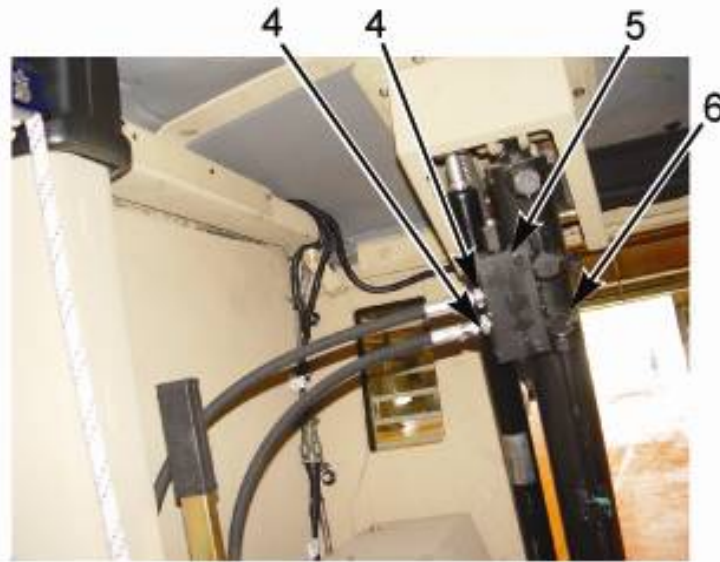


2. Remove shroud (2) from ceiling by unscrewing six screws (3).
3. Place a container under the two hydraulic lines at the hydraulic transfer block.

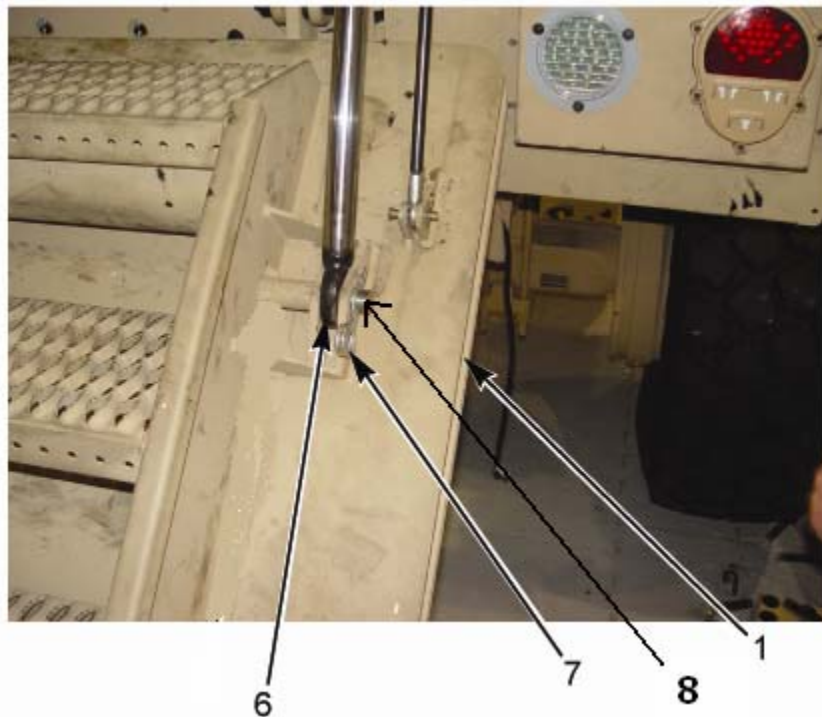
Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

Tag lines before removal.

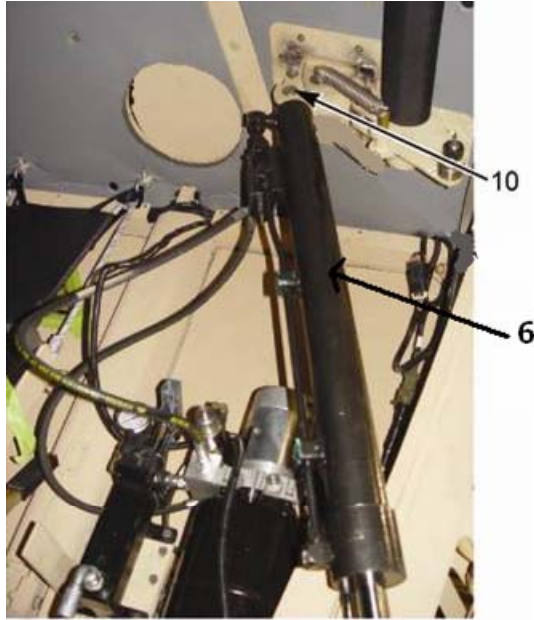


4. Remove two hydraulic lines (4) from the transfer block (5) mounted on the hydraulic cylinder (6), drain excess hydraulic fluid into container.



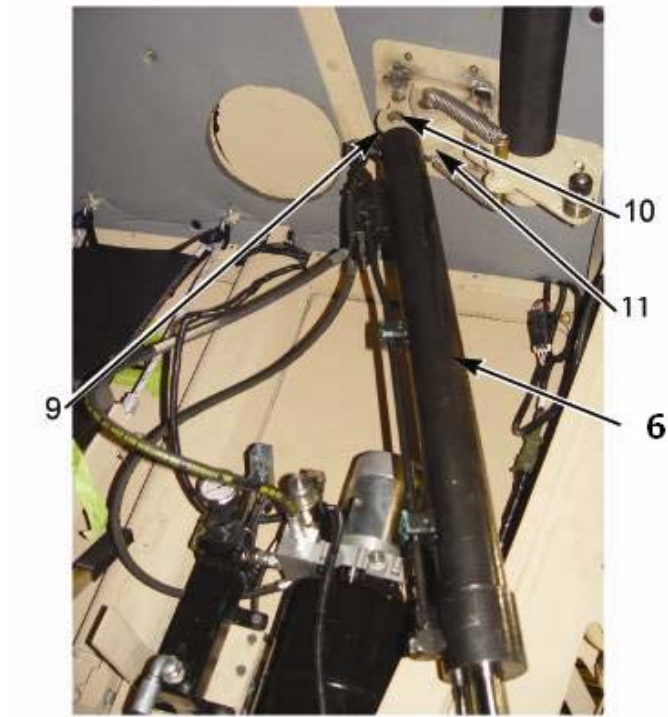
5. Remove the retainer pin (7) which secures the lock pin (8) holding the hydraulic cylinder (6) to the ramp door (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS



6. Remove the upper lock pin (9) which secures the lock bolt (10) to the upper door mechanism.
7. Remove hydraulic cylinder (6).

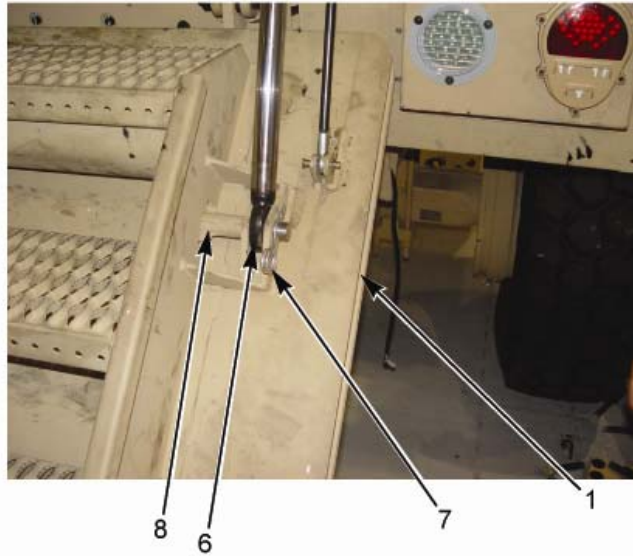
b) Installation



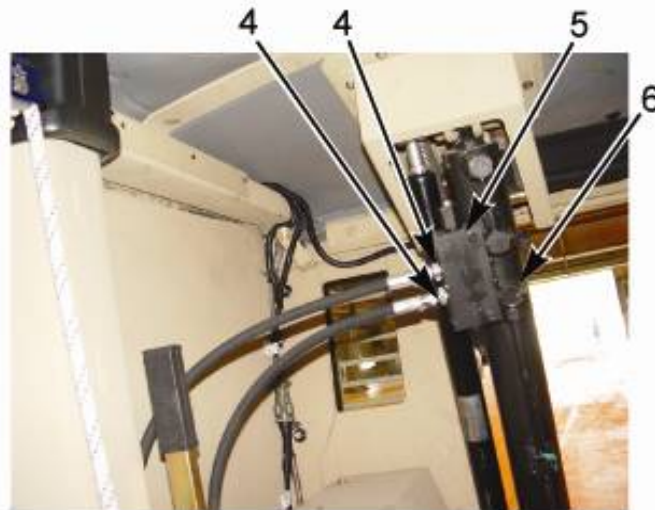
1. Install the Hydraulic Cylinder (6) by placing it into the upper door mechanism (11).

Chapter 4 – MAINTENANCE INSTRUCTIONS

2. Install the upper lock pin (10) through the upper door mechanism, through the hydraulic Cylinder's locator hole on the other side of the door mechanism (11).
3. Insert cotter Pin (9) into upper lock pin.

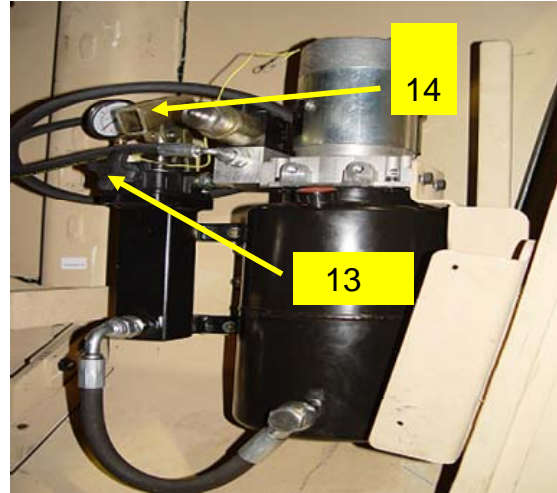
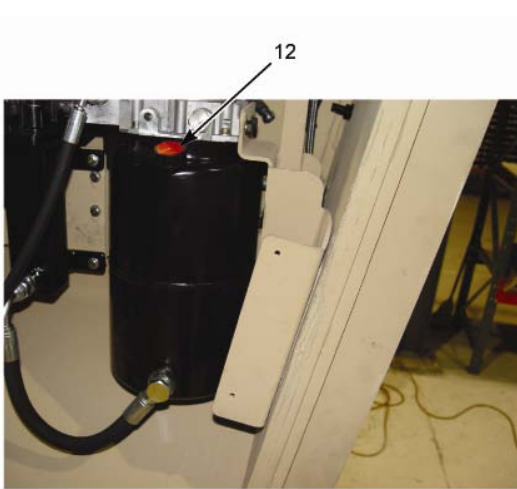


4. Position the Hydraulic Cylinder (6) in the mounting bracket on the door ramp (1).
5. Install the lock pin (8) through the bracket hole on the door ramp (1), securing the hydraulic Cylinder (6).
6. Insert retainer pin (7).



7. Install two hydraulic lines (4) to the Transfer Block (5) mounted on the Hydraulic Cylinder (6).

Chapter 4 – MAINTENANCE INSTRUCTIONS

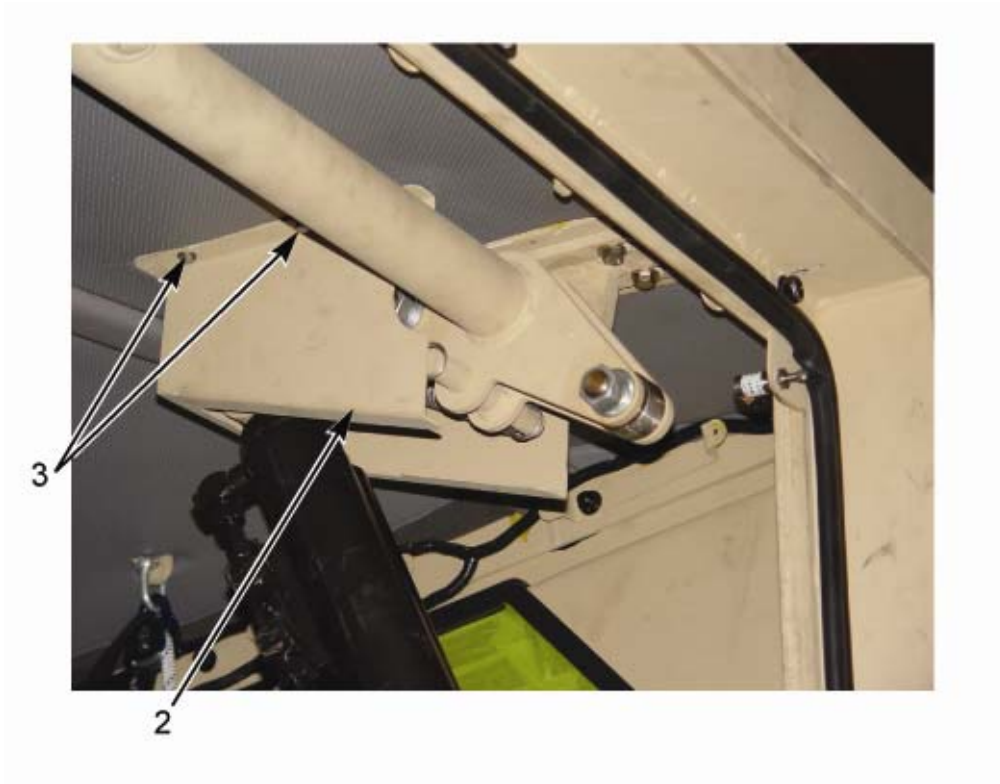


8. Refill Hydraulic reservoir (12) on the pump assembly.
9. Turn the black knob (13) under the manual jack (14) clockwise, to ensure that it is tight, and then manually pump the handle until it is stiff. Release knob counter-clockwise and air will vent out from the bleeder behind the knob. Repeat if necessary.



10. Remove support stand, sequence opening and closing the ramp door (1), checking for leaks or hydraulic failures.

Chapter 4 – MAINTENANCE INSTRUCTIONS



11. Replace shroud (2), to ceiling by securing with six screws (3).

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.21 Rear Door Hydraulic Reservoir Replacement

REAR DOOR HYDRAULIC RESERVOIR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u>
		Hydraulic fluid catch container
<u>Special Tools</u>		<u>Equipment Conditions</u>
None		Parking Brake set
		Wheels chocked
<u>Personnel</u>		Transmission set in NEUTRAL (N)
One (1) Wheeled Vehicle Mechanic		Engine shut OFF
		Battery Disconnect Switch OFF
<u>Material Parts</u>		Rear door/ramp open
Hydraulic Reservoir (1)		Hydraulic system drained
Gasket (1)		
<u>Reference</u>		<u>Follow-On Maintenance</u>
Parts Manual		Check hydraulic system fluid level
		Remove catch pan
		Battery Disconnect Switch ON
		Remove wheel chocks

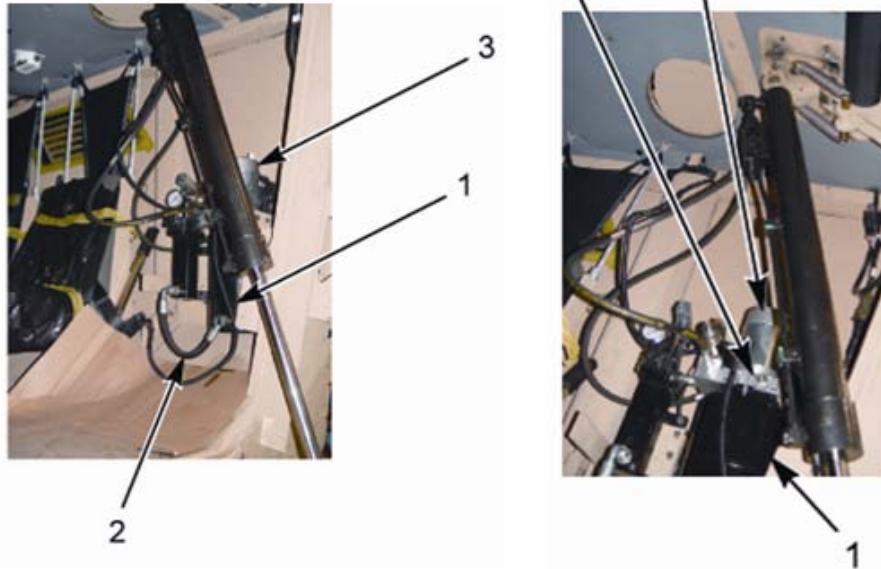


Rear cabin door is heavy. Make sure the door is secured so it will not move. Failure to do so may allow the door to move causing personal injury or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Open rear door.
2. Place catch pan under hydraulic reservoir (1).
3. Remove hydraulic line (2) from hydraulic reservoir (1).
4. Ensure hydraulic system is drained.



5. Remove and stow screws (4) securing reservoir (1) to pump (3).
6. Remove and discard reservoir (1) and gasket.

b) Installation

1. Install new gasket on new hydraulic reservoir (1). Lubricate gasket with clean hydraulic fluid.
2. Install new hydraulic reservoir (1) on pump (3).
3. Secure reservoir to pump with screws removed above.
4. Connect hydraulic line (2) to reservoir (1).
5. Refill hydraulic system.
6. Battery Disconnect Switch ON
7. Raise rear door/ramp assembly and note that the door operates properly.
8. Check reservoir for leaks.
9. Remove hydraulic catch pan.

NOTE

If ramp assembly does not properly operate, check for leaks, purge hydraulic lines, and check fluid level.

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Check hydraulic system fluid level.
2. Remove catch pan.
3. Battery Disconnect Switch ON.
4. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.23 Rear Door Hydraulic Pump Replacement

REAR DOOR HYDRAULIC PUMP REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Hydraulic Pump Assembly (1) Hydraulic fluid to fill</p> <p><u>Equipment Required</u> Drain pan Rags</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Rear ramp door in open position Drain rear door hydraulic fluid</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Battery Disconnect Switch ON Fill rear door hydraulic fluid reservoir Engine ON Verify operation of pump and rear door Shut engine OFF Battery Disconnect Switch OFF Re-check hydraulic fluid level and top off Reinstall hydraulic pump cover</p>

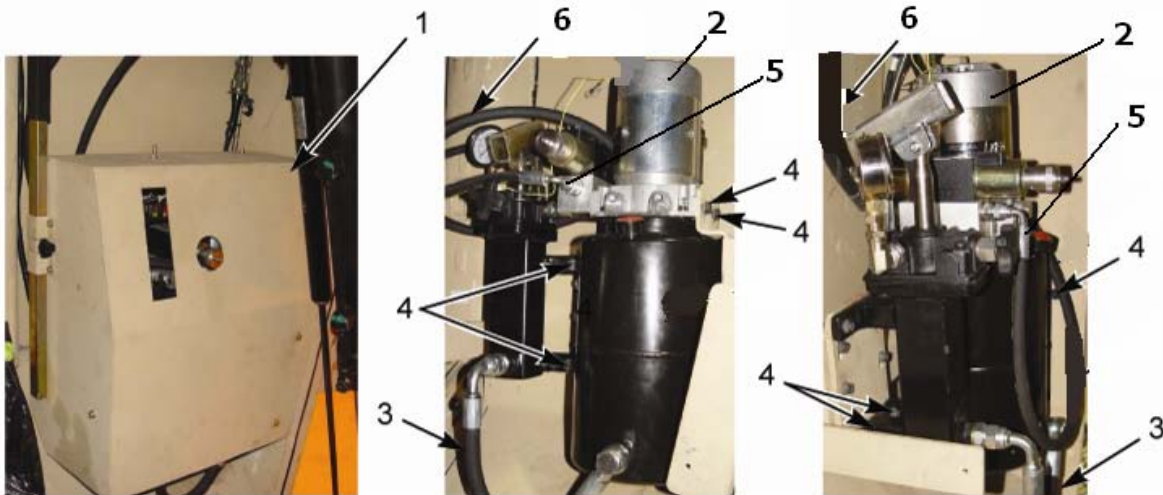
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Make certain (by looking out one of the small rear windows) that no one is behind the vehicle when lowering the rear door/ramp. DO NOT operate the rear door/ramp when vehicle is in motion. Use extreme caution when using the emergency rear door/ramp release that no one can be struck by the door as it falls open. Keep arms and legs clear of rear door/ramp when closing it. Failure to comply may result in serious injury or death to personnel.



1. Remove cover (1) from rear door hydraulic pump (2) at passenger side rear of crew compartment.
2. Mark, tag, and disconnect all electrical connections and hoses before removal for easier installation.
3. Place drain pan under rear door hydraulic pump (2) and loosen and disconnect hydraulic hoses (3) (5), and (6).
4. Plug hose openings once hoses (3) have been removed.
5. Loosen and remove mounting bolts (4) and remove defective rear door hydraulic pump (2).
6. Discard defective rear door hydraulic pump (2) and clean-up any fluid spills.

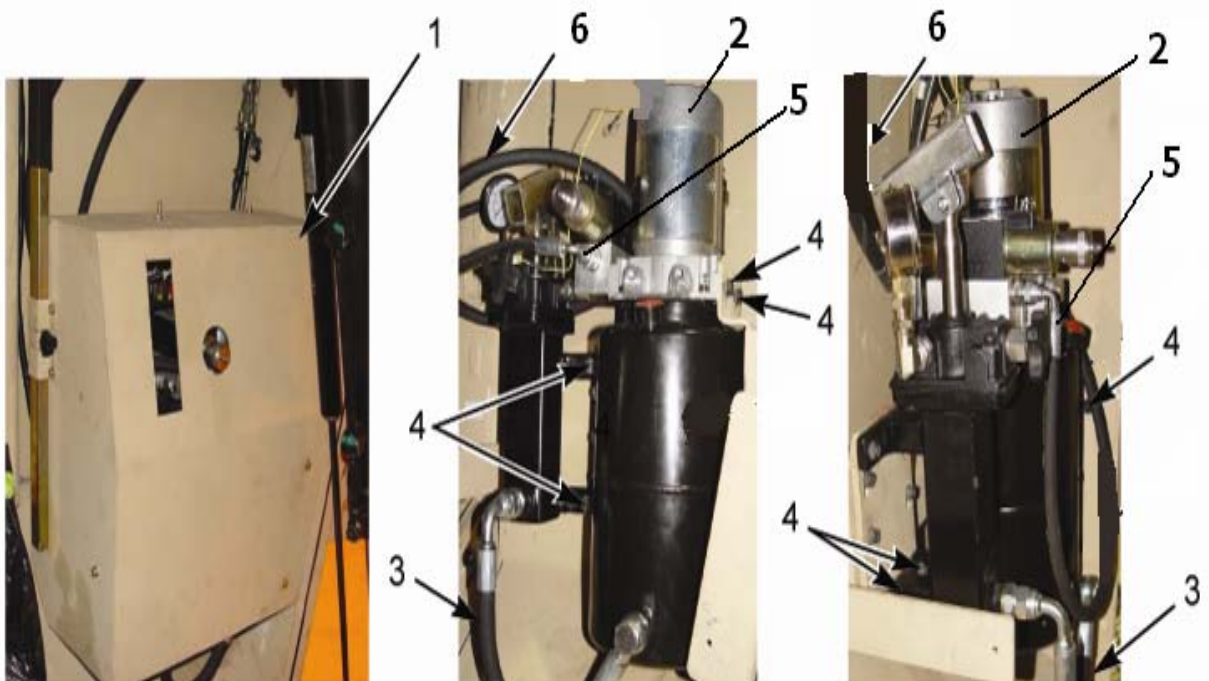
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



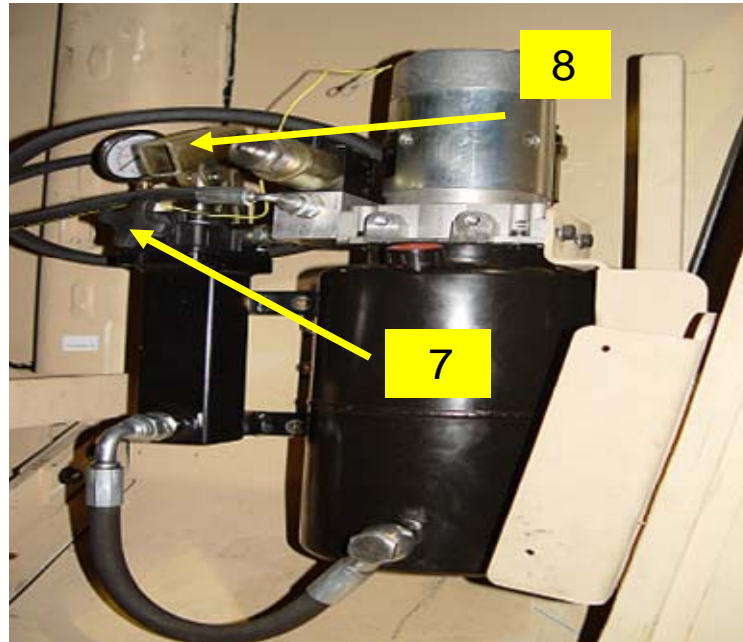
Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.



1. Apply connector lubricant to electrical connectors.
2. Apply anti-corrosion compound to mounting bolts.
3. Lift new rear door hydraulic pump (2) to mounting area and install mounting bolts (4) and align with mounting holes. Insert mounting bolts and loosely tighten.
4. Make sure all bolts are aligned properly and tighten.
5. Reinstall hydraulic hoses (3), (5), and (6) and connect all electrical connectors.

Chapter 4 – MAINTENANCE INSTRUCTIONS



6. Fill hydraulic reservoir.
7. Purge the hydraulic system after filling by turning the black knob (7) located under the manual jack (8) clockwise, to ensure it is tight. Manually pump the handle until it is stiff and then slowly release knob counter-clockwise and air will vent out from the bleeder behind the knob. Repeat if necessary.

c) Follow-On Maintenance

1. Fill rear door hydraulic fluid reservoir.
2. Battery Disconnect Switch ON.
3. Start engine.
4. Verify operation of rear door hydraulic door pump and rear door.
5. Shut engine OFF.
6. Battery Disconnect Switch OFF.
7. Re-check hydraulic fluid level and top off.
8. Reinstall hydraulic pump cover (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.24 Rear Door Hose Replacement

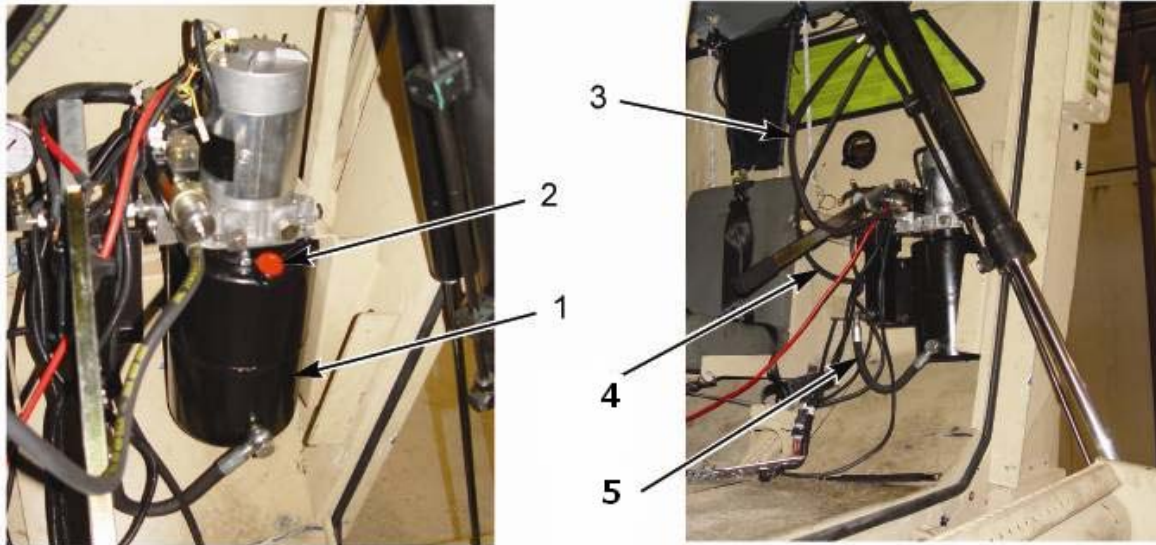
REAR DOOR HOSE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Three (3) tubes/hoses</p>		<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Drain Pan</p> <p><u>Follow-On Maintenance</u> Verify hydraulic pump tubing and hosing operation Verify rear door/ramp operation</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.



1. Before draining, place drip pan under hydraulic fluid reservoir (1).
2. Remove hydraulic reservoir dipstick (2).
3. Remove hydraulic fluid.
4. Remove hoses (3), (4), or (5).

b) Installation

1. Install hoses (3), (4), or (5).
2. Fill hydraulic fluid.
3. Replace hydraulic reservoir dipstick (2).
4. Remove drip pan.
5. Verify hydraulic pump operation.

c) Follow-On Maintenance

1. Verify hydraulic pump operation.
2. Verify rear door/ramp operation.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.25 Windshield and Body Window Replacement

WINDSHIELD AND BODY WINDOW REPLACEMENT	
This task covers:	
a) Removal	b) Installation c) Follow-On Maintenance
INITIAL SET UP	<u>Equipment Required</u>
	Suitable Lifting Device
<u>Special Tools</u>	Suitable Rated Lifting Sling
Putty Knife	
Caulking Gun	<u>Equipment Conditions</u>
	Parking brake set
<u>Personnel</u>	Wheels chocked
Two (2) to Four (4) Wheeled Vehicle Mechanics	Transmission set in NEUTRAL (N)
	Engine shut OFF
<u>Material Parts</u>	Battery Disconnect Switch OFF
Body Window (1-6)	Remove window cage
Two-sided insulation tape	Remove window armor
Sika Flex 252 sealant	Remove body armor
	Remove windshield wiper arm (for windshield replacement only)
<u>Reference</u>	<u>Follow-On Maintenance</u>
Parts Manual	Install window cage
	Install body armor
	Install windshield wiper arm

Chapter 4 – MAINTENANCE INSTRUCTIONS



International Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing and/or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Adhesives, solvents, and sealing compounds burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury or death to personnel.

Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

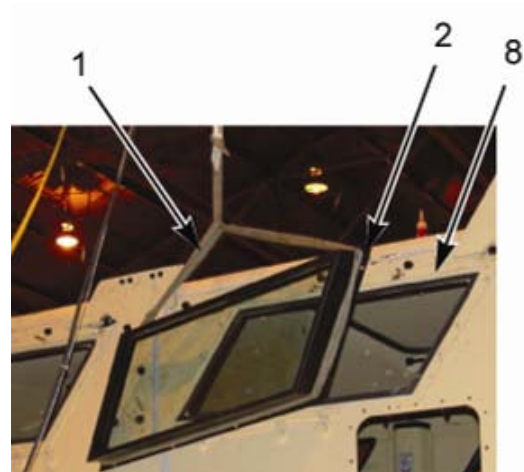
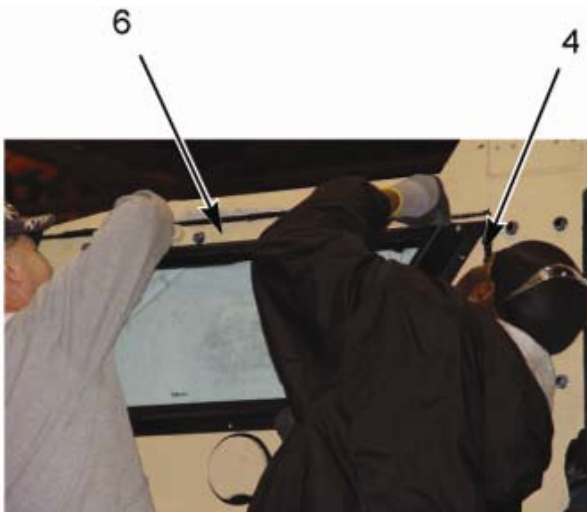
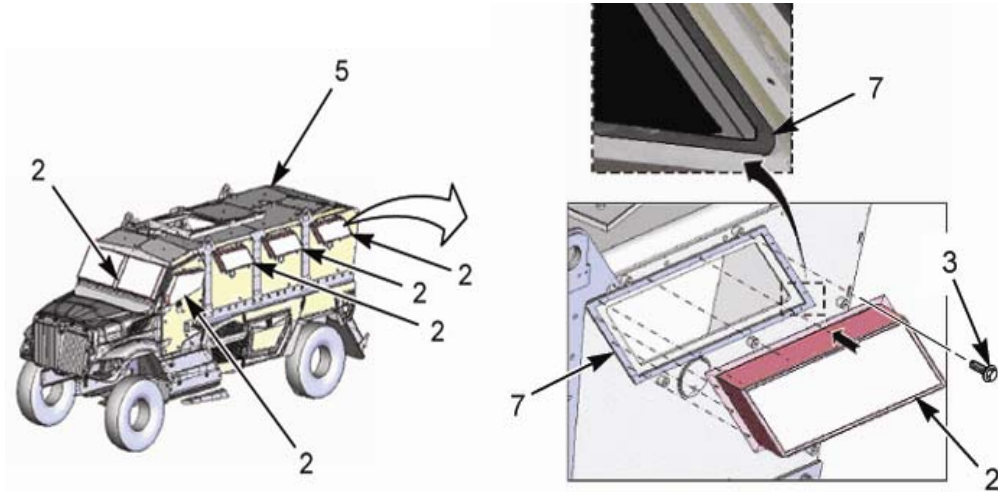
NOTE

There is a sealant seal around each window that will have to be completely loosened before window can be removed. To break seal use a small putty-knife along the outside edges of the window to loosen the sealant and free window to be replaced. After window is removed, remaining sealant needs to be removed from opening and cleaned before new window can be installed to ensure proper installation and sealing.

Procedures are the same for all windows in the vehicle. The windshield is a two-piece window and personnel will have to be on a suitable lifting basket and/or lifting device. The body windows are easily accessed with a suitable lifting device with basket and lifting sling for windows.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



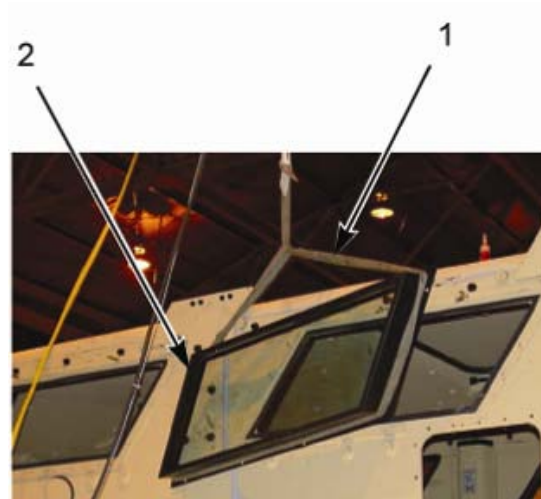
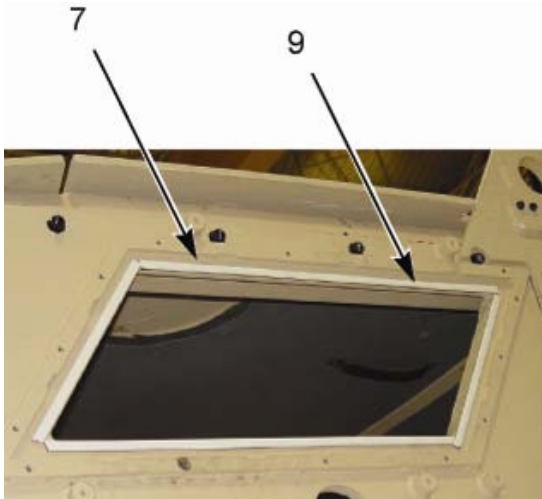
1. Install suitable lifting strap (1) around window (2) being replaced.
2. Loosen mounting bolts (3) and break sealant seal (4) that secures the window (2) to the vehicle (5). Using a putty knife around the edges of the window (2) should loosen the sealant (4) so the window can be removed.
3. With window (2) secure in lifting sling (1), slowly start working window from its seated position (6).
4. Once window (2) is loose lifting sling (1) with lifting device should take all the weight remove fourteen mounting bolts (3).
5. Lower window (2) in lifting sling (1) to flat surface pallet and remove from sling.
6. Clean all old sealant from around window frame (7) and prep the window mounting surface (8) for new window (2).
7. Repeat steps (one through six) for each window removed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

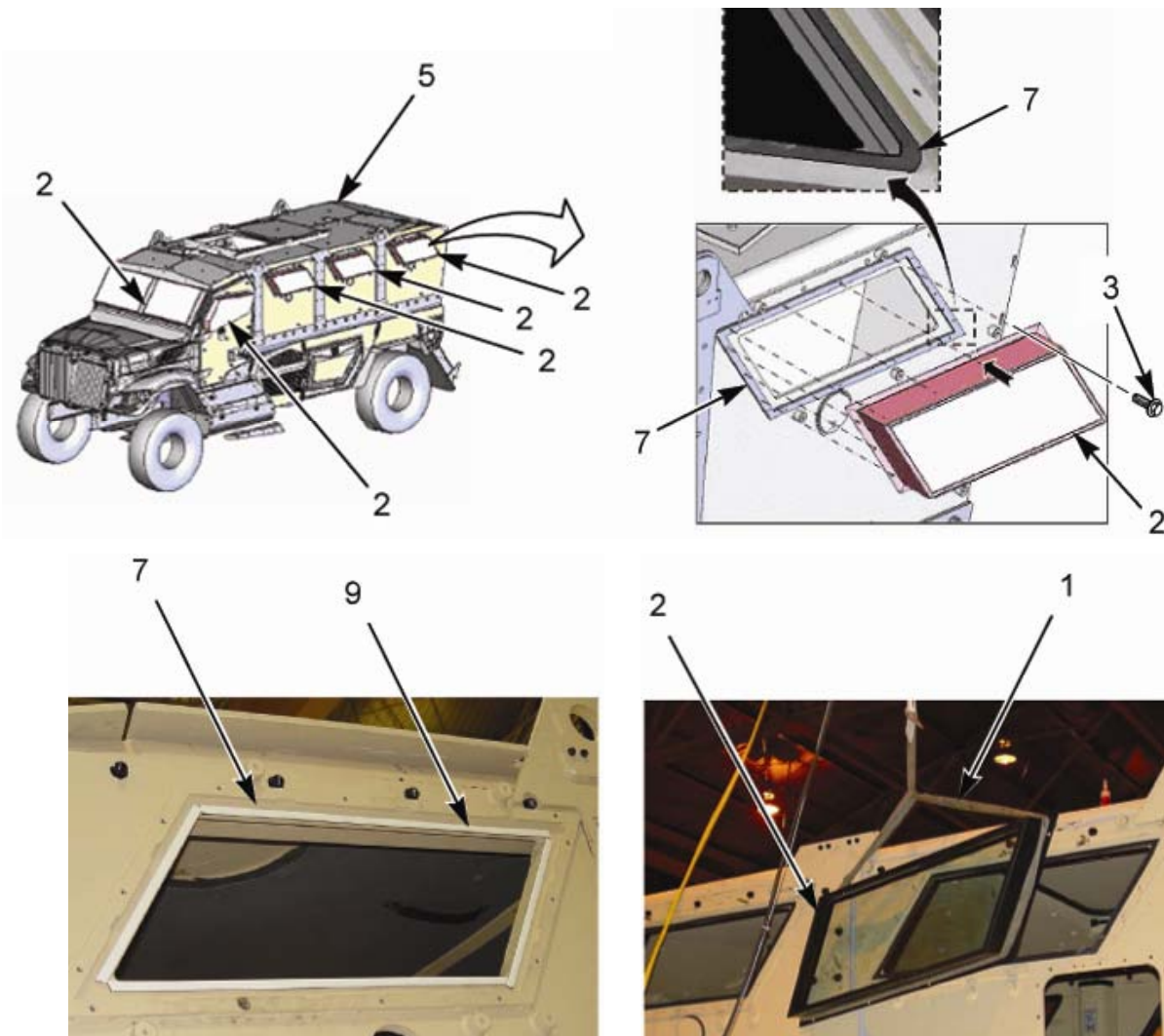
b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



Chapter 4 – MAINTENANCE INSTRUCTIONS



1. Attach two sided insulation tape (9) to the vehicle window frame (7).
2. Apply a 1/4 inch bead of Sika Flex 252 sealant around the mounting frame of the window (2).
3. Secure new windshield/window (2) to lifting sling (1) and with suitable lifting device lift windshield/window (2) to vehicle (5).
4. While window (2) is in lifting sling (1), have two personnel guide windshield/window (2) into position and insert mounting bolts (3). Do not remove lifting sling (1) until window (2) is adjusted, aligned and tightened.
5. Start center bolts (3) top, bottom and sides for proper alignment. Once all fourteen mounting bolts are installed tighten evenly so the window is mounted square and secure.
6. Remove lifting sling (1).
7. Repeat steps (one through six) for each window installed.

c) Follow-On Maintenance

1. Install window cage.
2. Install body armor.
3. Install Wiper Arm and Blade (for windshield replacement only).

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.26 Cab Mount Replacement

CAB MOUNT REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Cab mounts front (2) Cab to floor bolts and nuts (4) Cab mount bushing (2) Cab mount bushing bolt and nut (2) Loctite (for mounting bolts)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Suitable overhead lifting devices Suitable lifting slings (at least 2)</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Drop armor belly plate (to floor if needed) Raise engine hood Remove engine side armor plates in wheel wells</p> <p><u>Follow-On Maintenance</u> Install engine side armor plates in wheel wells Raise and install armor belly plate (if it was lowered to floor) Close engine hood Battery Disconnect Switch ON Engine ON Remove wheel chocks Test drive and verify cab alignment Shut engine OFF Battery Disconnect Switch OFF Parking brake set Transmission set in NEUTRAL (N)</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

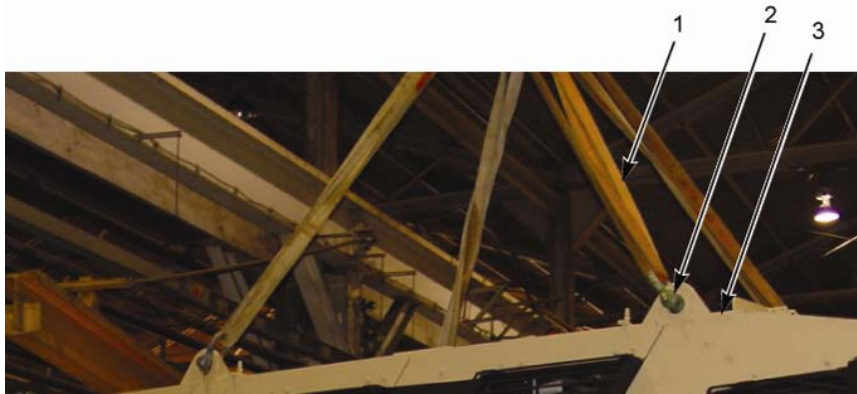
a) Removal



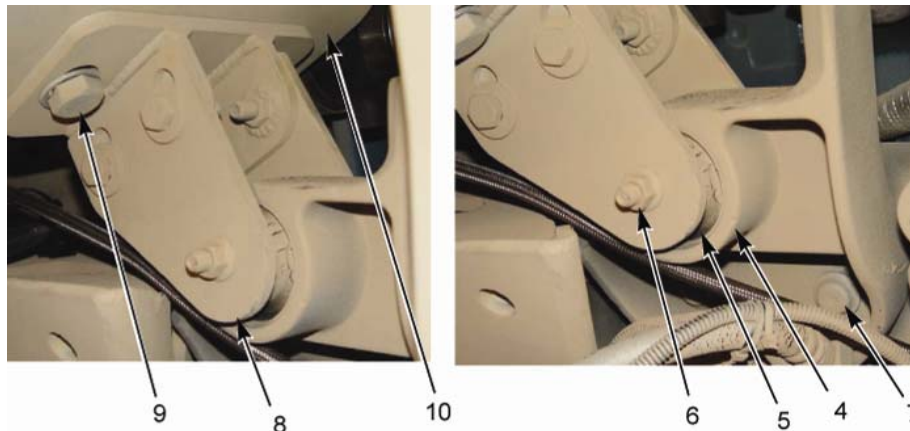
International Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing and/or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Engine components become extremely hot during normal operation. Allow engine to cool completely prior to performing any task. DO NOT touch the exhaust system components with bare hands or with your cab use protective work gloves and long sleeves. Failure to comply may result in damage to equipment and or serious burns, injury or death to personnel.

Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



1. Attach suitable lifting sling (1) to the lifting eyelets (2) of the vehicle roof (3). This is for safety purpose only.



2. Mark position of upper and lower brackets and mounting bolts for easier installation of replacements.
3. While having tension on lifting straps (1), loosen lower cab mount (4) bushing (5) center nut and bolt (6).
4. Loosen and remove mounting nuts and bolts (7) for lower mounting bracket (4).

Chapter 4 – MAINTENANCE INSTRUCTIONS

5. Work lower mounting bracket (4) from upper cab mount bracket (8) and set aside.
6. Loosen and remove cab to floor mounting bolts (9) from upper cab mount bracket (8).
7. Remove upper cab mount (8) and discard damaged parts.

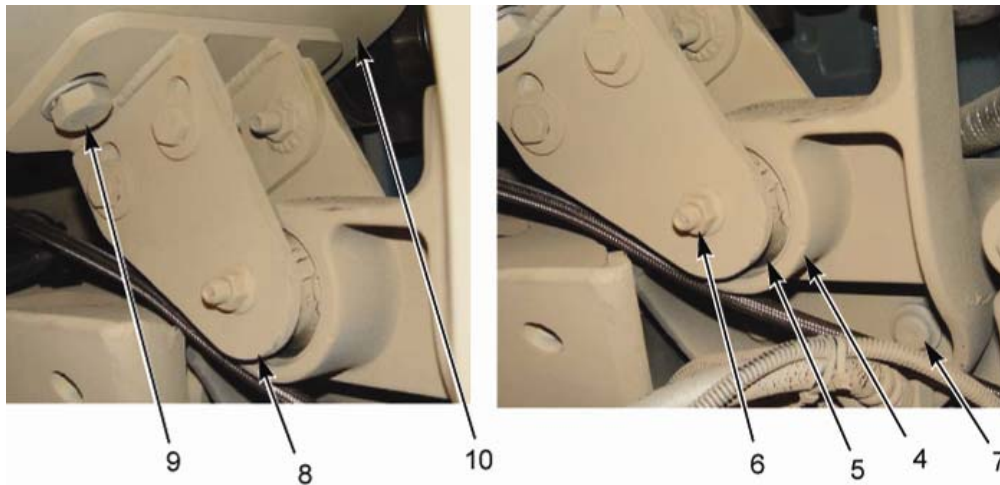
b) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in easy; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.

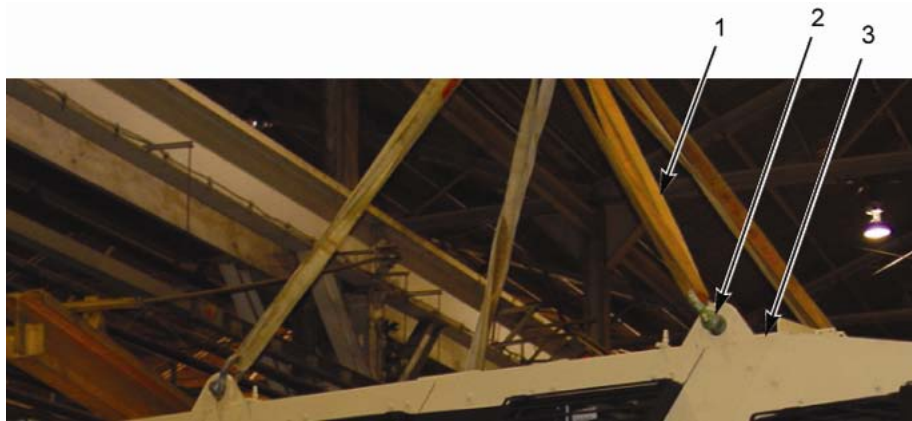
1. Apply anti-corrosion compound to top half of bolts.
2. Apply Loctite to the bottom three or four threads of mounting bolt.
3. Insert mounting bolts (9) into the upper cab mounting bracket (8) and align with mounting holes in floor of vehicle under cab (10).



4. Loosely install mounting bolts (9), making sure they align with old marks and identification marks you made on removal.
5. Install new bushing (5) in lower mounting bracket (4) and work into opening of upper cab mount bracket (9).

Chapter 4 – MAINTENANCE INSTRUCTIONS

6. Line up center mounting nut and bolt holes on both upper (8) and lower mounting brackets (4) and insert mounting bolt and nut (6).
7. Loosely tighten nut and bolt (8) to center bushing (5).
8. Align and loosely install lower mounting bracket (4) bolts (7).
9. Once all bolts are installed and aligned properly, tighten and then tighten to 55-60 ft-lb (71-74 N•m).
10. Release tension on lifting straps (1) and remove from vehicle roof (3) eyelets (2).



c) Follow-On Maintenance

1. Install engine side armor plates in wheel wells.
2. Raise and install armor belly plate (if it was lowered to the floor).
3. Close engine hood.
4. Battery Disconnect Switch ON.
5. Engine ON.
6. Remove wheel chocks.
7. Test drive vehicle and verify cab alignment.
8. Shut engine OFF.
9. Battery Disconnect Switch OFF.
10. Set parking brake.
11. Transmission set in NEUTRAL (N).
12. Wheels chocked.

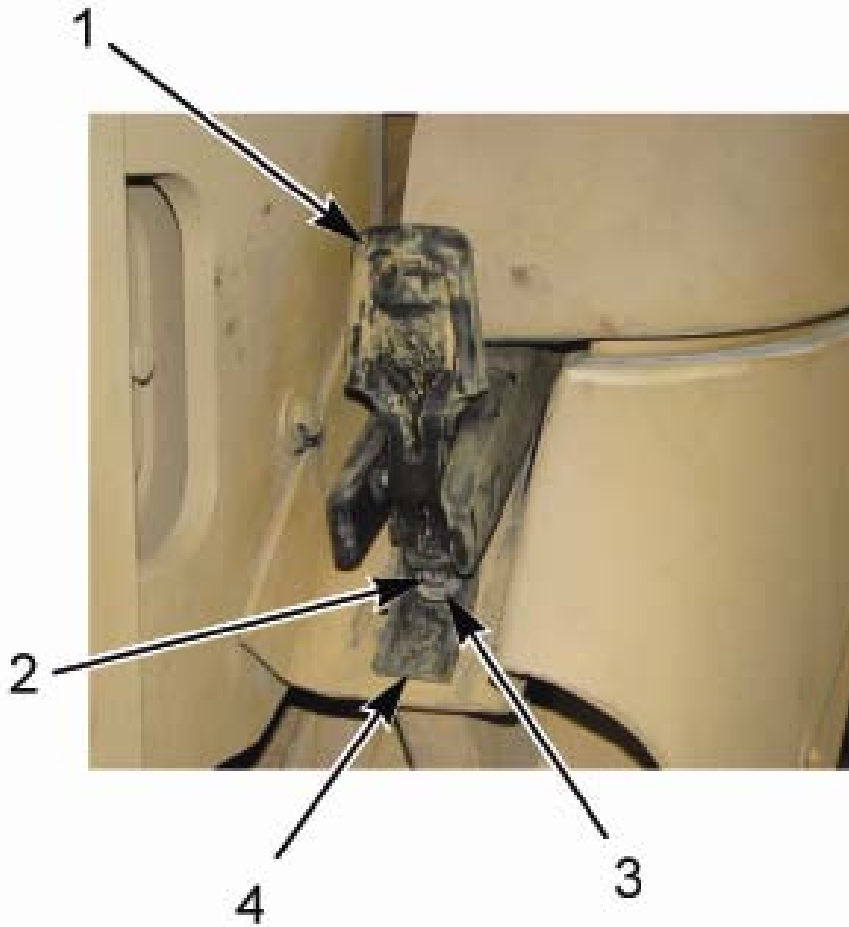
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.27 Hood/Fender Latch Replacement

HOOD/FENDER LATCH REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) Hood/Fender Latch Assembly</p>	<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u></p> <p><u>Follow-on Maintenance</u> Check hood for securing integrity</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

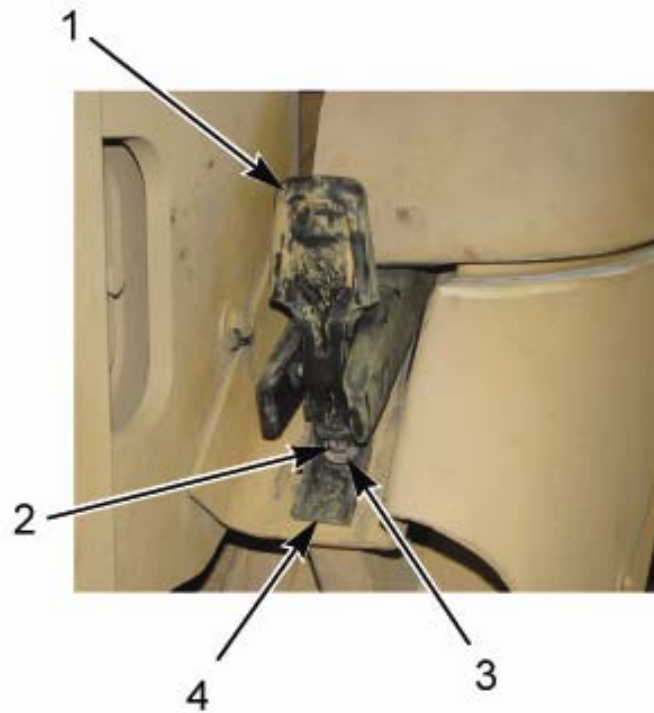
a) Removal



1. Release the latching mechanism (1) both sides of the hood and tilt hood forward.
2. Loosen and remove the hood latch bracket mounting bolts (2), washers (3) and remove the bracket assembly from the hood assembly.
3. Locate, loosen and remove the mounting bolts (2), washers (3) securing the cowl latch base (4).
4. Follow same procedure for removal of opposite side.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install the hood latch bracket (1) with mounting bolts (2), washers (3) and install the bracket assembly to the hood assembly.
2. Install the mounting bolts (2), washers (3) securing the cowl latch base (4) to the cowl.
3. Follow same procedure for installation of opposite side.

c) Follow-On Maintenance

1. Check hood for securing integrity.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.28 Hood Tilt Mount Removal and Replacement

HOOD TILT MOUNT REMOVAL AND REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SETUP		<u>Equipment Condition</u>
		Parking brake set
		Wheels chocked
		Transmission in NEUTRAL (N)
		Engine shut OFF
		Battery Disconnect Switch OFF
<u>Special Tools</u>		
None		
<u>Personnel</u>		
Three (3) Wheeled Vehicle Mechanic		
<u>Material/Parts</u>		<u>Reference</u>
One (1) Hood Tilt Mount		Parts Manual
		<u>Equipment Required</u>
		None
		<u>Follow-On Maintenance</u>
		None

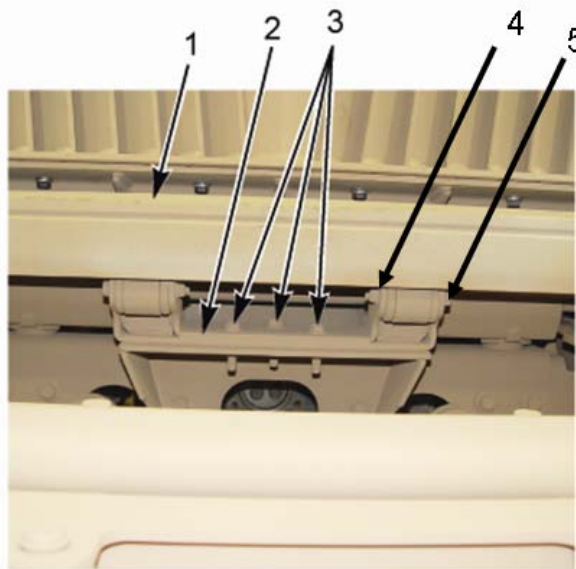
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Wear gloves to protect hands while holding hood.



1. Raise the hood (1).
2. With a person holding the hood up at each side, remove three (3) mounting bolts (3) from hood tilt mounting bracket. (2).
3. Locate the hood hinge pin (4) and hex nut (5) on the hinge assembly and remove.
4. Remove hood tilt mounting bracket (2).

b) Installation

1. Install hood tilt mounting bracket (2).
2. Install hood hinge pin (4) and hex nut (5) on hinge assembly.
3. Install three (3) mounting bolts (3) to hood tilt mounting bracket. Loosely tighten. Torque bolts to 70 to 85 lb-ft (95 to 115 N•m).
4. Lower the hood.

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.29 Hood Assembly Replacement

HOOD ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Reference</u> Parts Manual</p> <p><u>Personnel</u> Two (2) Wheeled Vehicle Mechanics</p> <p><u>Material/Parts</u> One (1) Hood Assembly</p>	<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF FSS Engine Compartment Sensor removed Remove mirrors</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Install mirrors Install FSS Engine Compartment Sensor</p>	

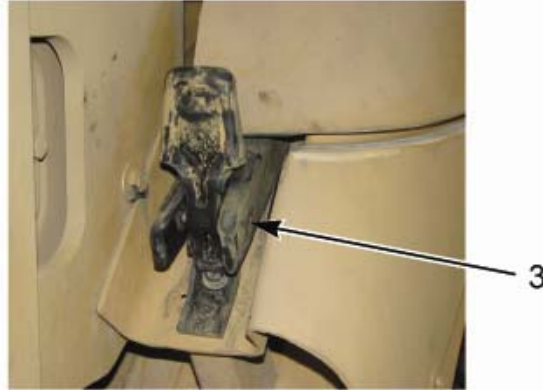


To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

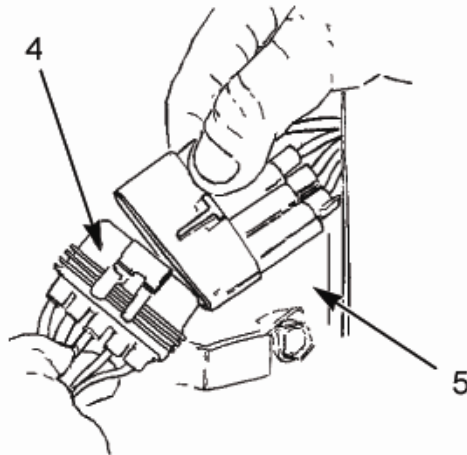
Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

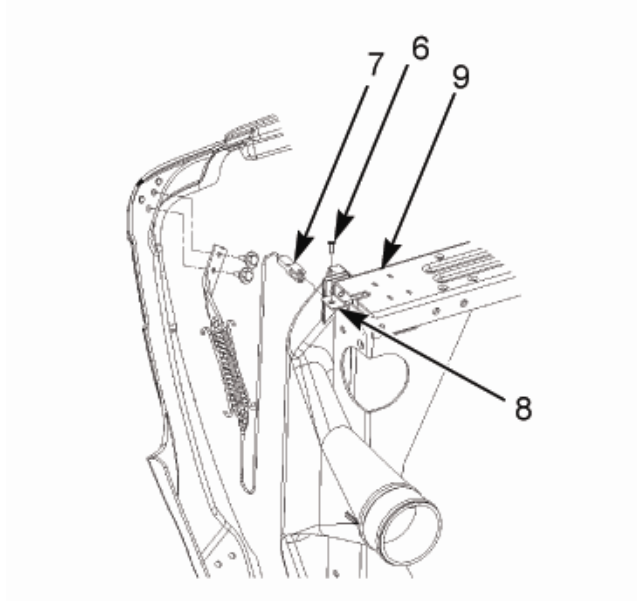


1. Release hood latches (3) on each side of the hood and tilt the hood assembly to a 45 degree angle. Support the tilted hood with a floor stand to relieve tension on the hood spring stop assemblies.

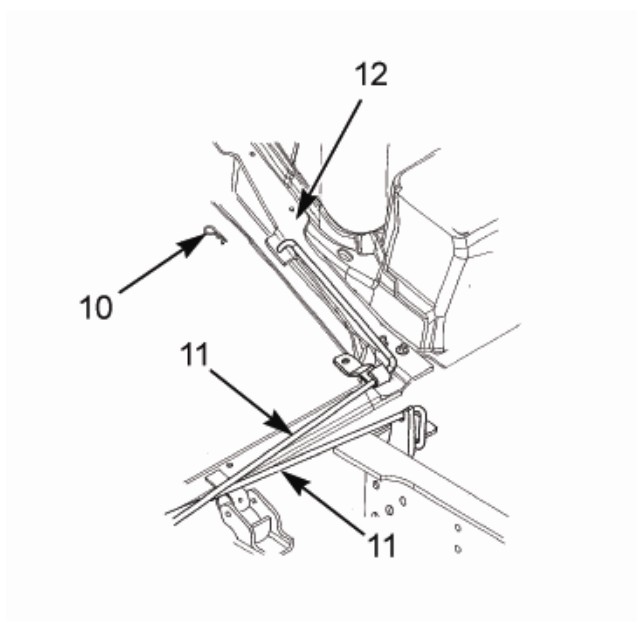


2. Disconnect front end pigtail connectors (4) from the front end wire harness connector located at the top of the frame rail (5) on both the driver's side and passenger side of the radiator. Remove wire harness clips and loop clamps securing the harness between dash panel and hood, as necessary. (The harness stays with the hood.)

Chapter 4 – MAINTENANCE INSTRUCTIONS

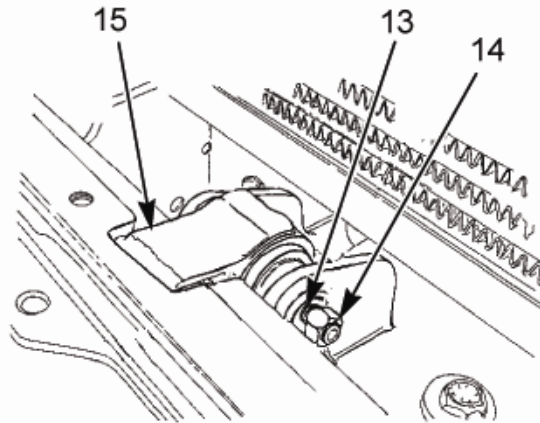


3. Remove the clevis pin (6) from the clevis (7). Remove the clevis from the radiator clevis attachment bracket (8) on the radiator top frame (9) driver and passenger side.



4. Locate the torsion bar hood tilt assist assembly upper brackets. Remove the retaining pin (10) that secures the torsion assist bar to the hood tilt assist bracket driver and passenger side.
5. Remove the torsion assist bars (11) from the chassis torsion bar retainer bracket (12).
6. With an assistant, tilt the hood back to the original position.

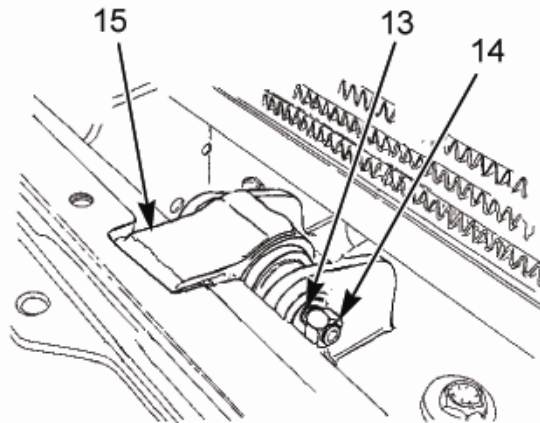
Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Locate the hood hinge pin (13) and hex nut (14), on the hinge assembly (15).
8. Loosen and remove the hinge bolt/pin flat washers and hex nuts.
9. With an assistant, remove the hood assembly. Place the hood on an appropriate padded surface to protect painted surfaces.

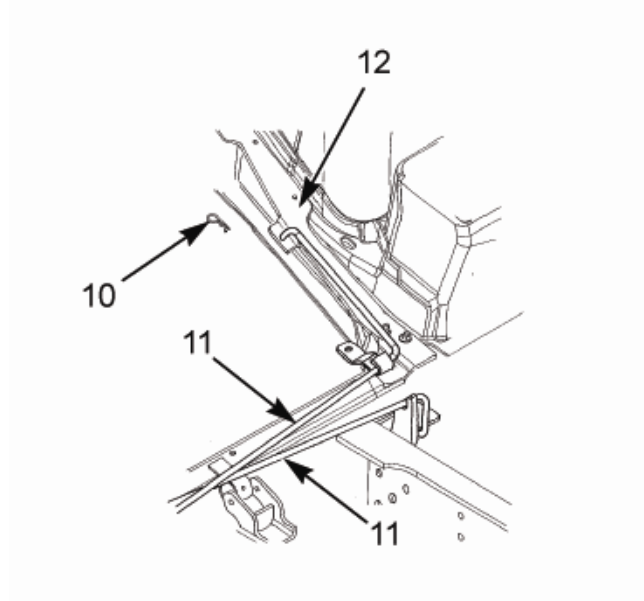
b) Installation

1. With an assistant, install the hood assembly. Place the hood on vehicle with care as to not too damage under hood components and hood assembly.

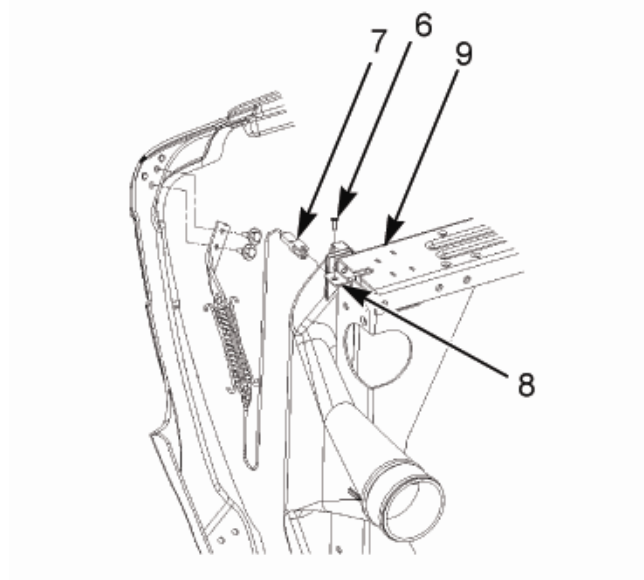


2. Install the hood hinge pin (13) and hex nut (14), on the hinge assembly (15) and tighten to spec.
3. Open the Hood Assembly, carefully rest it in the open position and tilt the hood assembly to a 45 degree angle. Support the tilted hood with a floor stand to relieve tension on the hood spring stop assemblies.

Chapter 4 – MAINTENANCE INSTRUCTIONS

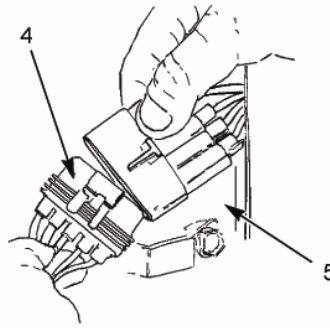


4. Install the torsion assist bars (11) to the chassis torsion bar retainer bracket. (12).
5. Locate the torsion bar hood tilt assist assembly upper brackets. Install the retaining pin (10) that secures the torsion assist bar to the hood tilt assist bracket, driver and passenger side.



6. Install the clevis pin (6) to the clevis (7). Install the clevis to the radiator clevis attachment bracket (8) on the radiator top frame (9) driver and passenger side.

Chapter 4 – MAINTENANCE INSTRUCTIONS

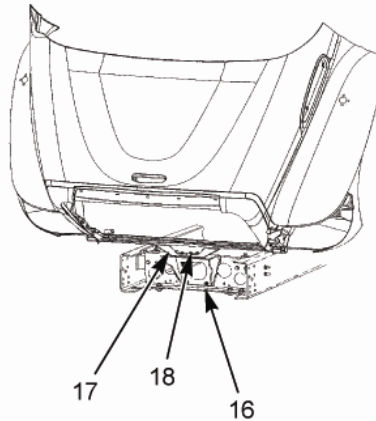


7. Connect front end pigtail connectors (4) from the front end wire harness connector located at the top of the frame rail (5) on both the driver's side and passenger side of the radiator. Install wire harness clips and loop clamps securing the harness between dash panel and hood, as necessary.

Hood Adjustment and Alignment

NOTE

The 7000 series front hood adjustment is done by moving the hinge plate attachment located at the front crossmember (16).



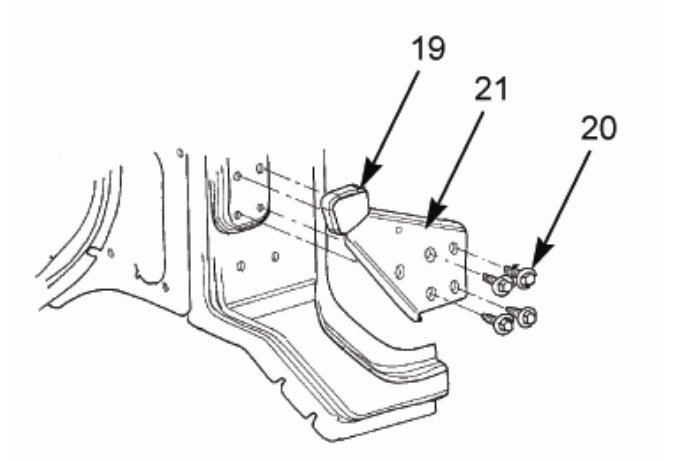
1. To adjust the hood left to right. From the Hinge Plate Assembly (17) by loosening the hinge attachment bolts (18) and slides the hinge plate assembly left or right.
2. Check the alignment with the hood contour lines. If the hood alignment is proper, tighten the hinge plate bolts. Torque to required value.
3. To adjust hood forward and back, loosen the hinge mounting bolts (18) at the mounting plate on the front crossmember.
 - a. Slide the hood forward or aft as required.
 - b. Check the distance between the rear edge of hood and clearance to windshield.
4. Tighten the hinge mounting bolts and torque to required values.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Hood Stop Adjustment

NOTE

Hood height adjustment at the cowl and rear edge of the hood is adjusted by moving the hood stop either up or down.



1. Adjust the hood stops (19) on each side of the vehicle with allow for a cleaner fit and seal between the hood and cowl tray.
2. Tilt hood forward and loosen the four mounting bolts (20) to adjust the hood stop height.
3. With the hood stop bolts loosened slide the bracket (21) up or down for desired adjustment. Tighten bolts, close hood and check alignment. If alignment is correct, open hood and torque mounting bolts to prescribed torque values. If hood is not at desired position, loosen hood stop and adjust.



4. Latch hood latches (3) on each side of the hood.

c) Follow-On Maintenance

1. Reinstall FSS Engine Compartment Sensor.
2. Install mirrors.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.30 Armor Grill Replacement

ARMOR GRILL REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Armor Grill (1) Mounting bolts (8) if damaged</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Required</u> Suitable lifting device Suitable lifting sling</p> <p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Engine hood removed</p> <p><u>Follow-On Maintenance</u> Align, install, and tighten to specification the engine hood Check alignment and clearance while closing hood.</p>	

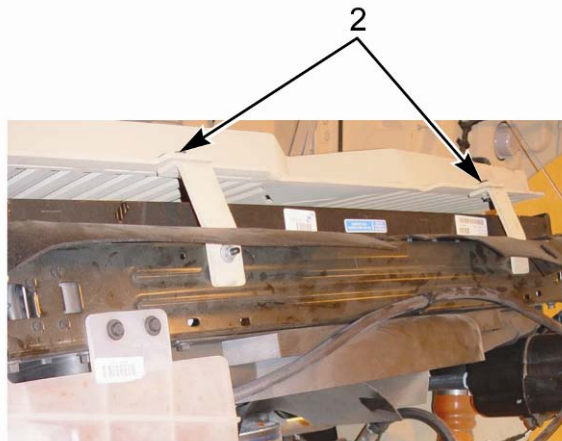
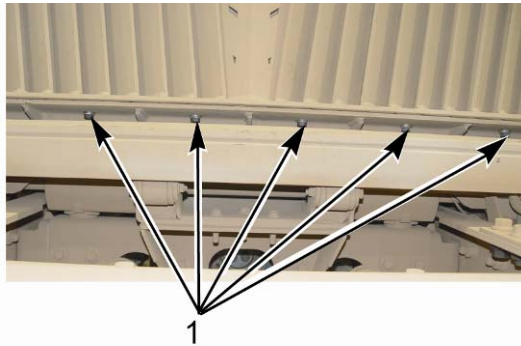


International® Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Engine components become extremely hot during normal operation. Always allow engine to cool completely prior to performing any task or procedures on it. Working in close quarters in engine compartment can be difficult moving around. Wear proper safety equipment; safety goggles, work gloves, long sleeves or shop coat. Failure to comply may result in serious burns, cuts, or injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. With suitable lifting sling, thread one end through pleats on grill, hook both hooped ends to suitable lifting device and take up slack.
2. Loosen and remove six bottom mounting bolts (1).
3. Check bolts for any signs of weakness or damage. If present replace bolts (1) with new ones.
4. Take up slack in the lifting sling, and loosen and remove top two mounting bolts (2).
5. Lift armor grill enough to clear vehicle and set on pallet or ground.
6. Remove suitable lifting sling and discard of armor grill in accordance with local regulations.

b) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

1. Apply anti-corrosion compound to all mounting bolts.
2. With suitable lifting sling, thread sling hoop end through pleats on new grill.
3. Hook both hooped ends to suitable lifting device and carefully lift armor grill up and to vehicle.
4. Slowly lower armor grill to vehicle and align mounting holes at the bottom of the grill.
5. Loosely install the bottom bolts (1).
6. Align the top mounting bolts (2) and tighten.
7. Tighten bottom mounting bolts (1).
8. Remove suitable lifting sling.

c) Follow-On Maintenance

1. Install and align engine hood.
2. Check alignment and clearance while closing hood.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.31 Left Side Engine Armor Plate

LEFT SIDE ENGINE ARMOR PLATE		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>½” Drive 1 1/8” Socket Torque Wrench ½” Drive</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic One (1) Crew Member</p> <p><u>Material/Parts</u></p> <p>None</p>	<p><u>Equipment Condition</u></p> <p>Parking Brake Set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Left Side FSS Nozzle Bracket removed Power Distribution Plate removed</p> <p><u>Reference</u></p> <p>None</p> <p><u>Equipment Required</u></p> <p>GMTK</p> <p><u>Follow-On Maintenance</u></p> <p>Reinstall FSS Nozzle Bracket</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Loosen 5 bolts from armor to frame (1).



Plate weighs approximately 100-120 lbs. If not properly secured before removal of final bolt, plate will slip or fall, resulting in personal injury or damage to equipment.

2. Remove two bolts (from rear of left side armor plate (2)).
3. Remove all but one belt. Secure armor plate before removal of last belt. Have crew member assist in removal of armor plate.



b) Installation

1. Install armor on frame. Have crew member assist.
2. Install 5 bolts (1). Torque to 275-300 ft-lb (373-407 N•m).
3. Install 2 bottles (2) and tighten.

c) Follow-On Maintenance

1. Reinstall FSS Nozzle Bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.32 Right Side Armor Plate

RIGHT SIDE ARMOR PLATE	
This task covers:	
a) Removal	b) Installation
	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> ½” Drive 1 1/8” Socket Torque Wrench ½” Drive</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crew Member</p> <p><u>Material/Parts</u> None</p>	<p><u>Equipment Condition</u> Parking Brake Set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Right Side FSS Nozzle Bracket removed</p> <p><u>Reference</u> None</p> <p><u>Equipment Required</u> GMTK</p> <p><u>Follow-On Maintenance</u> Reinstall FSS Nozzle Bracket</p>

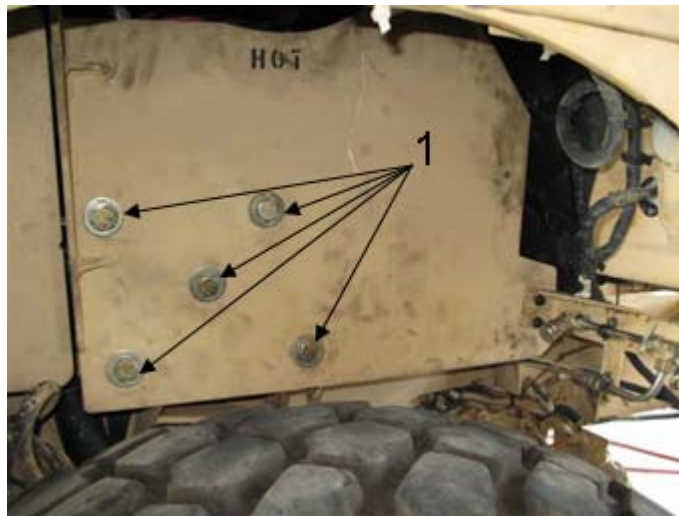
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Loosen 5 bolts (1) from armor to frame.



Plate weighs approximately 100-120 lbs. If not properly secured before removal of final bolt, plate will slip or fall, resulting in personal injury or damage to equipment.



2. Remove all but one bolt. Secure armor plate before removal of last bolt. Have crew member assist in removal of armor plate.

b) Installation

1. Install armor on frame. Have crew member assist.
2. Install 5 bolts (1) Torque to 275-300 ft-lb (373-407 N•m).

c) Follow-On Maintenance

1. Reinstall FSS Nozzle Bracket.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.33 Body Panels Exterior Armor Plating Replacement

BODY PANELS EXTERIOR ARMOR PLATING REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> Alignment Tool</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crew Member</p> <p><u>Material Parts</u> Armor Plate (1) Mounting Bolts (varies with plate) Washers (varies with plate)</p> <p><u>Equipment Required</u> Suitable lifting device Suitable lifting sling</p>	<p><u>Equipment Conditions</u> Parking Brake Set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Remove attached components</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> Install attached components Battery Disconnect Switch ON Remove wheel chocks</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS



Before performing maintenance, be sure that parking brake is applied, transmission is in NEUTRAL (N) and wheels are chocked. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

International® Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Hydraulic jacks are intended only for lifting the vehicle and not for supporting the vehicle while performing maintenance. DO NOT get under vehicle after vehicle is raised, unless it is properly supported with blocks or jack stands. Failure to comply may result in injury or death to personnel.

Vehicle must be parked on hard, level surface where jacks will have stable surface. Attempting to change assembly on non-level or soft surface may result in jack/jack stand and or vehicle falling. Failure to comply will result in equipment damage and or serious injury or death to personnel.



Do not allow armor to come into contact with extreme heat such as welding equipment or a cutting torch. Extreme heat will degrade the capability of the armor. Failure to comply will result in damage to equipment.

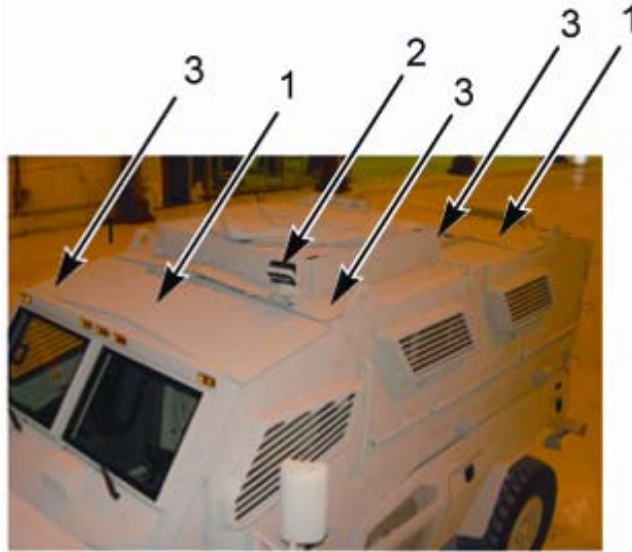
NOTE

Armor plating is heavy. Utilize a suitable lifting/holding device to assist in the removal/installation of any armor plating.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Roof Armor Plating

a) Removal



1. Install lifting device on plate (1) to be removed.
2. Remove any components (2) or hardware attached to the armor plate.
3. Remove fifty-eight bolts (3) securing armor plate to vehicle.
4. Use lifting device to remove plate.

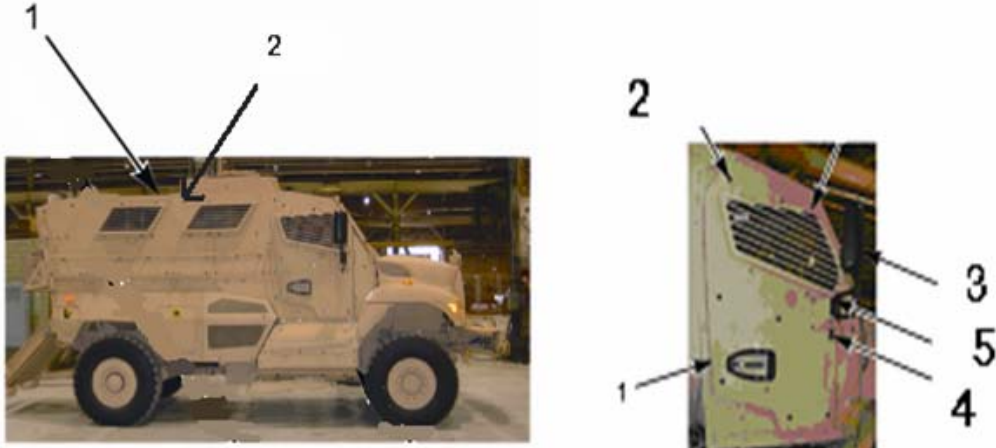
b) Installation

1. Using lifting device, install new armor plate (1) on vehicle.
2. Using alignment tool align mounting holes in armor plate to mounting holes in vehicle.
3. Attach armor plate to vehicle with new bolts (3).
4. Attach any components (2) removed.
5. Remove lifting device.
6. Torque mounting bolts (3) to 34-38 ft-lb (46-51 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

Vehicle Side Plating

a) Removal



1. Remove any compartment covers required for access to armor plate being removed.
2. If removing armor plating on either door, first remove mirror (3).
3. To remove mirror (3), disconnect remote wiring at connector (4). Remove bolts (5) securing mirror to vehicle.
4. Remove and stow mirror (3).
5. Install lifting device on armor plate (1) to be removed.
6. Remove bolts (2) securing armor plate to vehicle.
7. Use lifting device to remove plate.

b) Installation

1. Using lifting device install new armor plate (1) on vehicle.
2. Using alignment tool align mounting holes in armor plate to mounting holes in vehicle.
3. Attach new armor plate (1) to vehicle with new bolts (2).
4. Attach any components removed in removal steps.
5. Remove lifting device.
6. Torque mounting bolts (2) to 34-38 ft-lb (46-51 N•m).

c) Follow-on Maintenance

1. Install attached components.
2. Battery Disconnect Switch ON.
3. Remove wheel chocks.

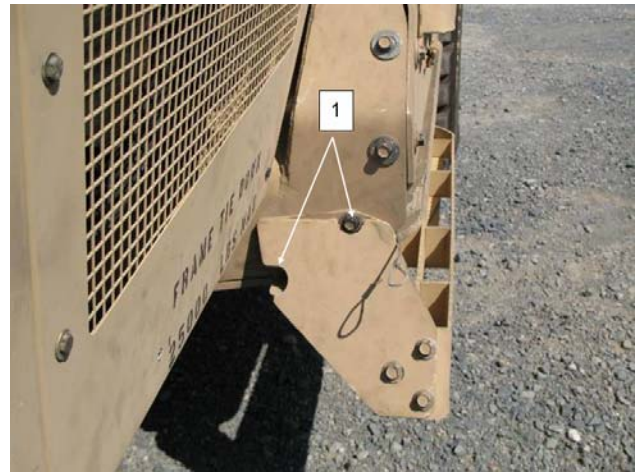
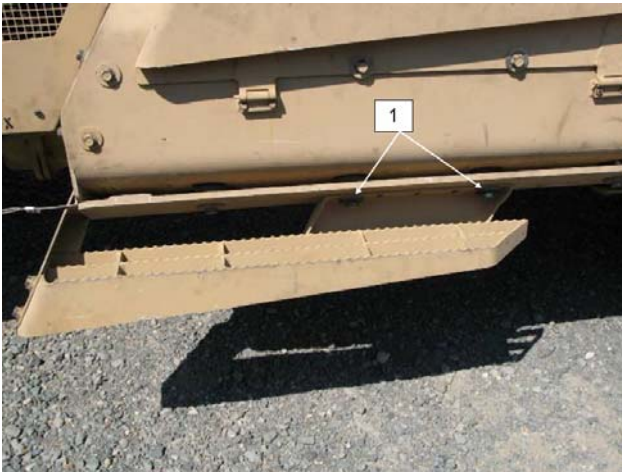
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.34 Step Replacement

STEP REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crew Member</p> <p><u>Material Parts</u> Step</p> <p><u>Equipment Required</u> None</p>	<p><u>Equipment Conditions</u> Parking Brake Set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> None</p>	

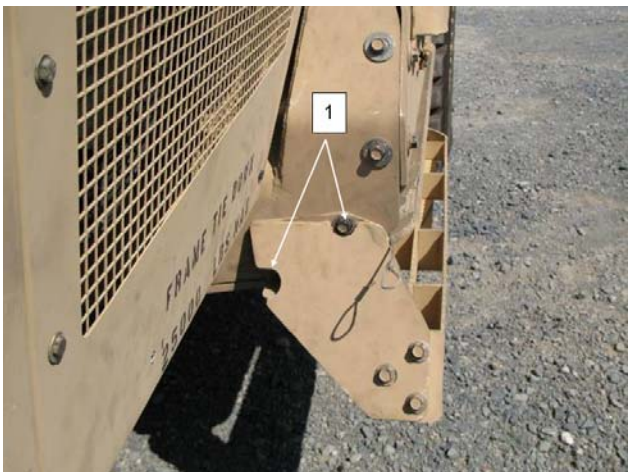
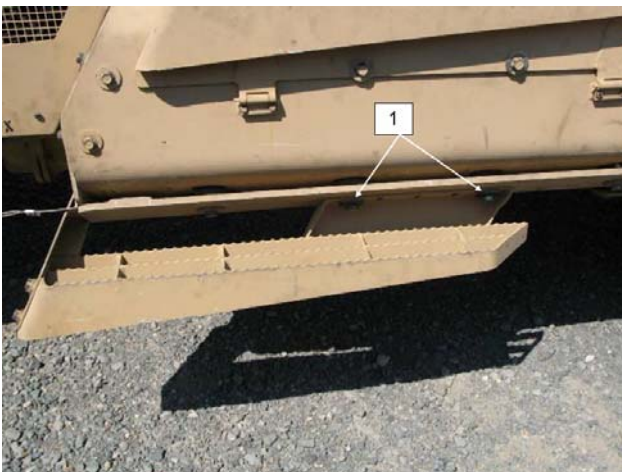
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove four bolts in step plate (1).
2. Remove step plate from vehicle.

b) Installation



1. Install four bolts in step plate (1).
2. Install step plate on vehicle.

c) Follow On Maintenance

1. None.

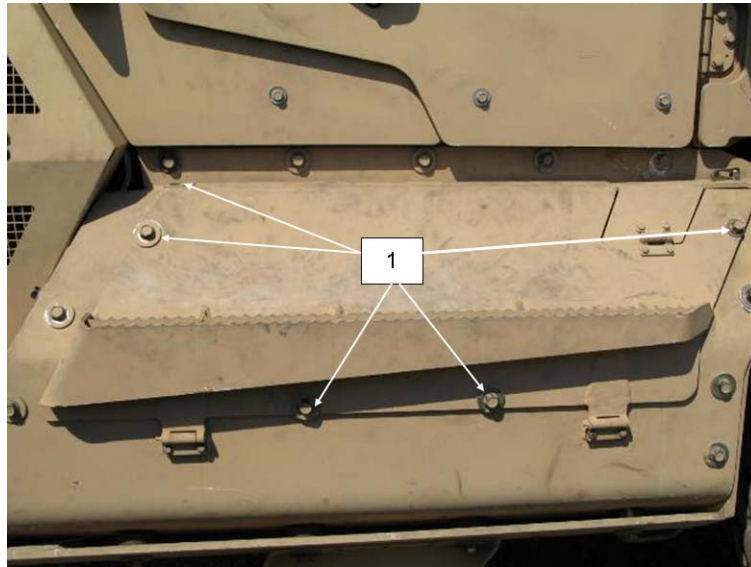
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.35 Exterior Battery Box/Fuel Tank Armor Door Replacement

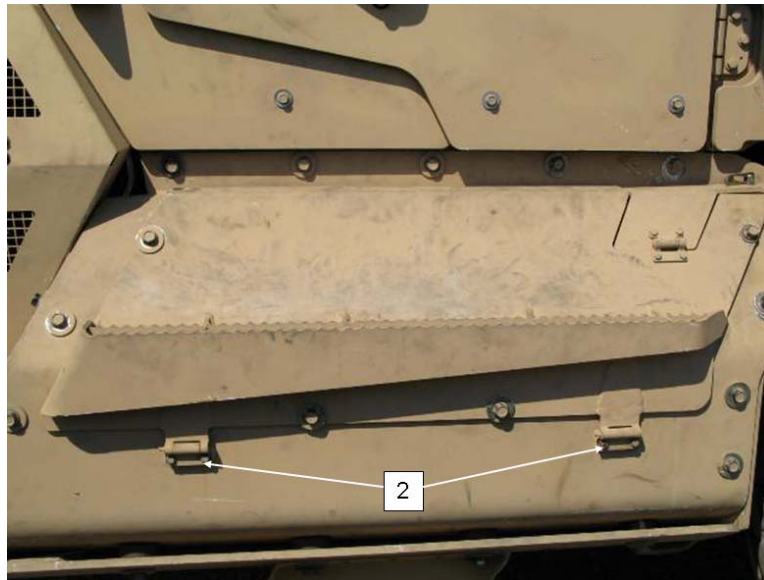
EXTERIOR BATTERY BOX/FUEL TANK ARMOR DOOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic One (1) Crew Member</p> <p><u>Material Parts</u> Battery Box Armor Door Fuel Tank Armor Door</p> <p><u>Equipment Required</u> None</p>		<p><u>Equipment Conditions</u> Parking Brake Set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Follow-On Maintenance</u> None</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



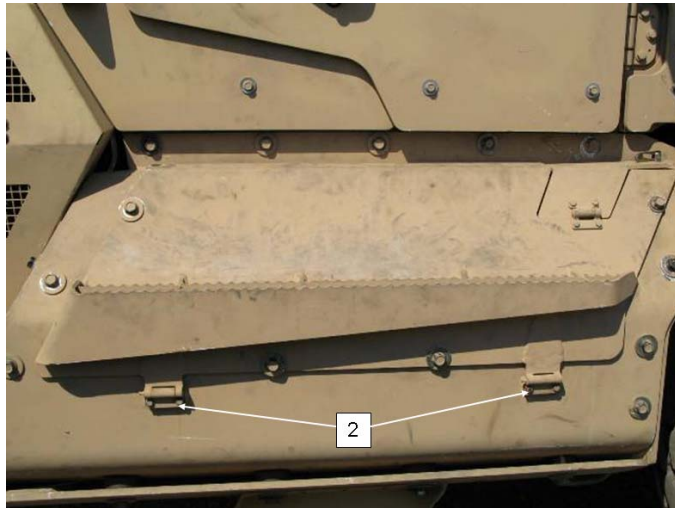
1. Remove five access cover bolts (1).



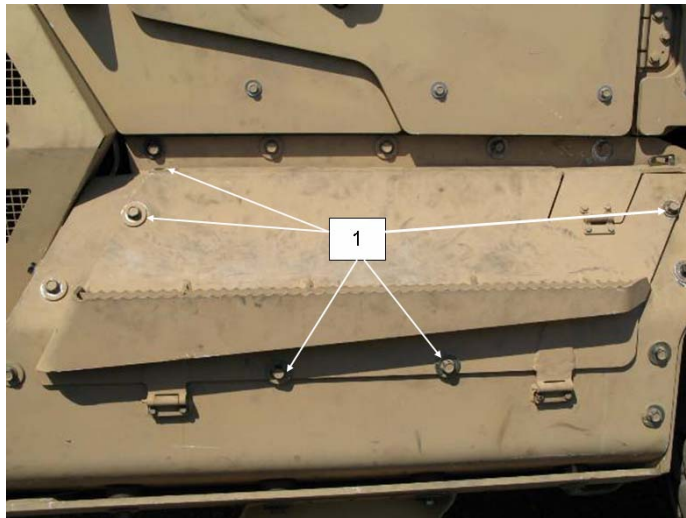
2. Remove four hinge bolts (2).
3. Remove access door.
4. Perform same procedure on driver's side to allow access to fuel tank.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Position armor plate and install four hinge bolts (2) and tighten bolts.



2. Install five bolts (1) in access plate and tighten bolts.

c) Follow-On Maintenance

1. None.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-14.36 Belly Armor Replacement

BELLY ARMOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>Belly Armor Installation Kit – ZTSE4903</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic</p> <p>Four (4) Crewmembers</p> <p><u>Material/Parts</u></p> <p>Bolts – ½"x4" Long – 2 ea.</p> <p>Nuts – ½" – 2 ea.</p> <p>Washers – ½" – 4 ea.</p> <p><u>Reference</u></p> <p>Parts Manual</p>	<p><u>Equipment Condition</u></p> <p>Parking Brake Set</p> <p>Wheels chocked</p> <p>Transmission in NEUTRAL (N)</p> <p>Engine shut OFF</p> <p>Battery Disconnect Switch OFF</p> <p>Left & Right side Steps Removed</p> <p>Exterior Battery Box/Fuel Tank Armor Door removed.</p> <p><u>Equipment Required</u></p> <p>GMTK</p> <p>Hydraulic Jack</p> <p><u>Follow-On Maintenance</u></p> <p>Exterior Battery Box/Fuel Tank Armor Door installed.</p> <p>Left & Right side Steps Reinstalled</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



International[®] Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

NOTE

Belly Armor replacement task instructions should be discussed prior to starting and determination made that it is understood by all participants.

1. Remove the eleven rear right side armor plate bolts (2) and the outer two internal bolts (2).

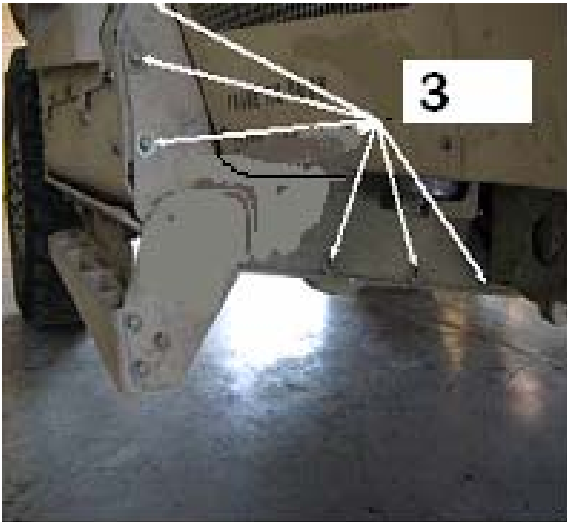


Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

The belly armor plate is removed and installed with the left side fuel tank cover plate attached to help the task.

2. Remove the six left side rear armor plate retaining bolts (3) and plate. The upper bolt is difficult to access and may require removal of the condenser screen (4) to gain access the upper retaining bolt.



3. Loosen but do not remove the remaining four retaining bolts (5) from the left side lower fuel tank cover armor plate retaining bolts (5). LOOSEN ONLY as the removal kit chain hoist will be installed into the upper forward and rear bolt holes.



4. Remove the eleven bolts (nine outer and two internal forward) on the right side air tank cover plate retaining bolts (6), while noting the position of the rubber bushings and washers.

Chapter 4 – MAINTENANCE INSTRUCTIONS



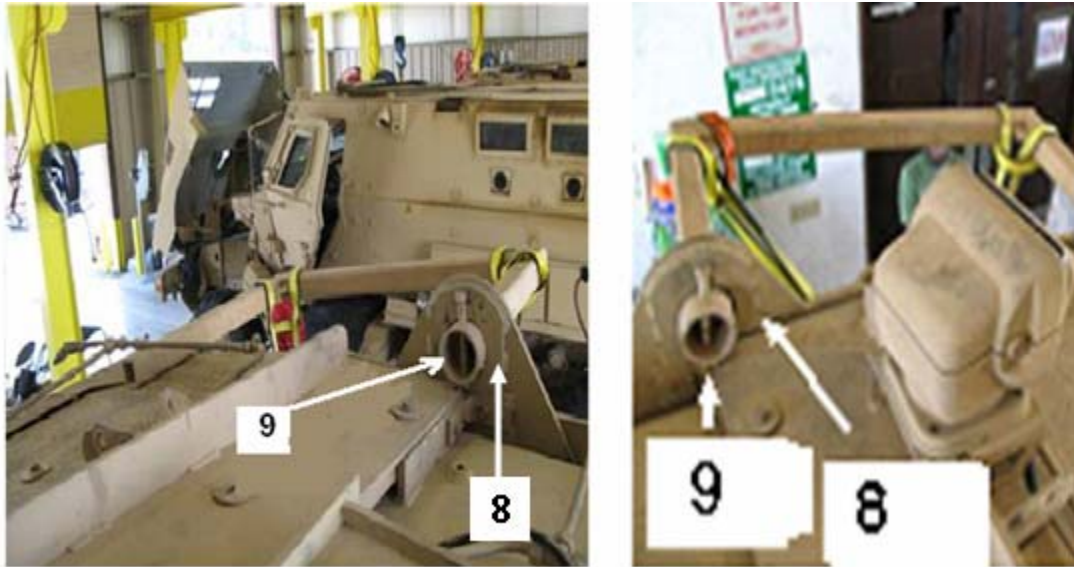
5. Remove the four bolts securing the left and right side fire suppression support tubes (7), along the top of the vehicle (in the vicinity of the sling load eyelets) and position the tubes clear for the installation of the support brackets.



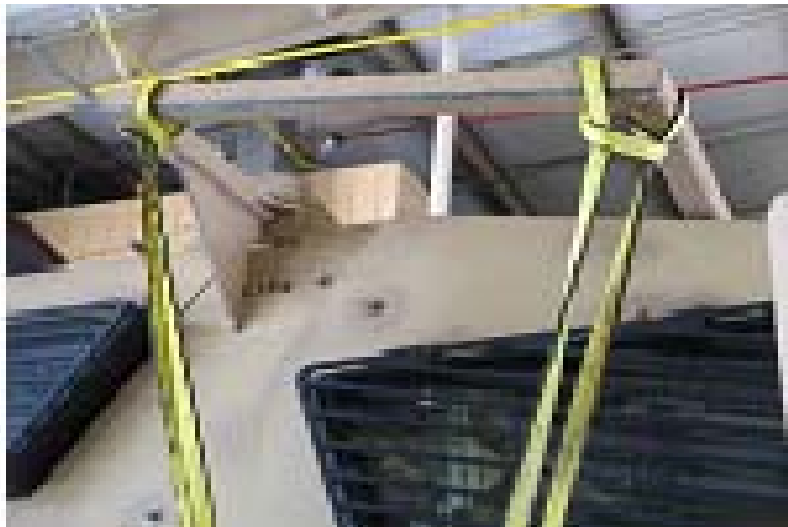
The belly armor plate assembly weight is approximately 1200 lbs. Ensure chain falls and straps have been attached and tensioned prior to removing rear center hardware. Injury to personnel and damage to equipment may occur if plate is allowed to fall.

6. Install the left and right belly armor kit supports through the lifting eye brackets (8) and insert the retaining pins (9).

Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Install two straps on the corners of the right and left supports, as illustrated below. Instructions are the same for hooking-up right and left side support bracket straps.

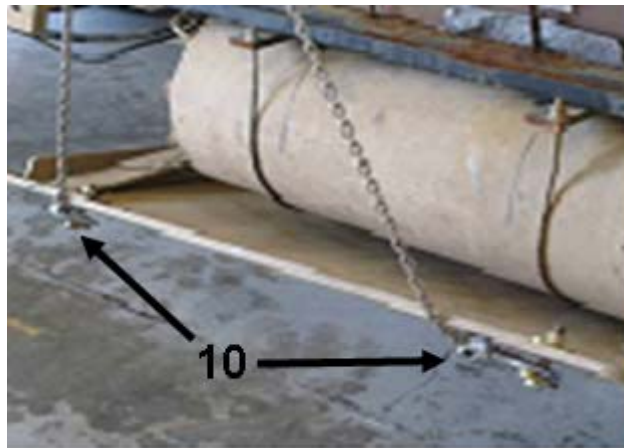


8. Attach chain hoist hooks to upper fuel tank cover corner mount holes.

Chapter 4 – MAINTENANCE INSTRUCTIONS



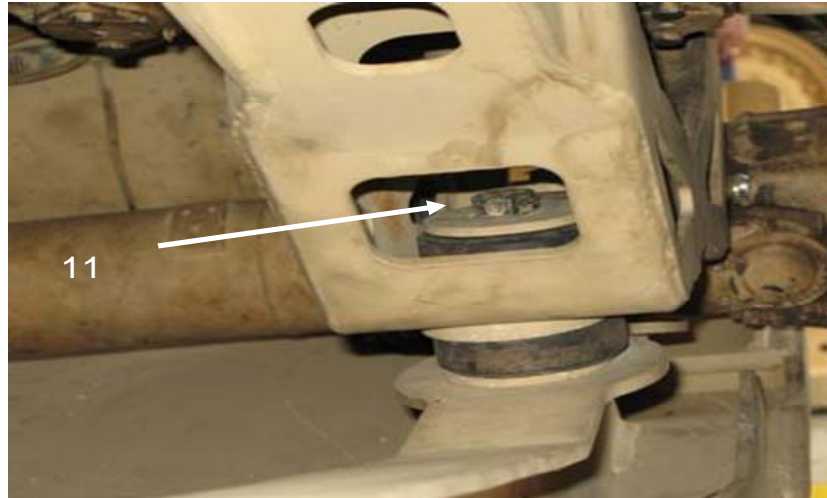
9. Install two ½"x4" bolts (10) and attach chain hoist to right side belly armor and apply tension on chain hoist as required to support the belly armor plate.



The belly armor plate assembly weights approximately 900 lbs. Ensure chain hoist and straps have been attached and tensioned prior to removing rear center hardware. Injury to personnel and damage to equipment may occur if plate is allowed to fall.

Chapter 4 – MAINTENANCE INSTRUCTIONS

10. Remove the two rear center belly armor retaining bolts (11), noting the position of the rubber bushings and washers. The belly armor plate will now only be supported by the forward mounting bolts.

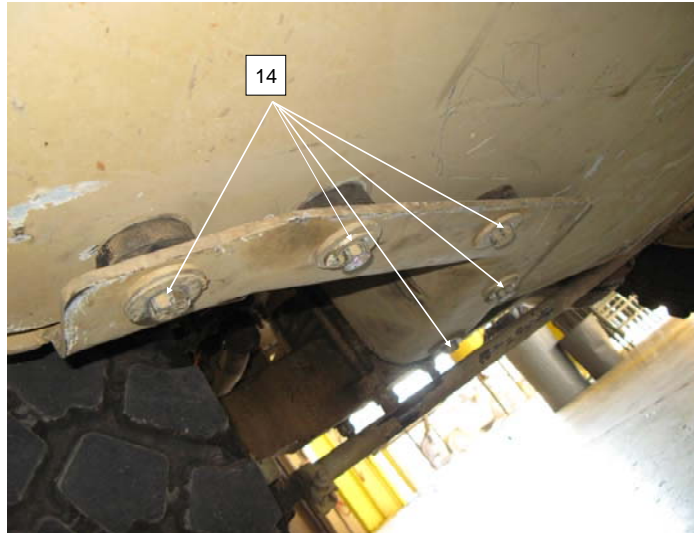


11. Remove the five retaining bolts (12) from the right side of the belly armor plate. Note the position of the rubber bushings and washers while adjusting tension on the sling as needed.



Chapter 4 – MAINTENANCE INSTRUCTIONS

12. Remove five left side front belly armor retaining bolts (14) while tensioning sling as needed for support.



NOTE

All bolts are now removed and the remaining task is to tension the sling, as needed, while removal proceeds. The rear of the belly armor plate must be lowered first to allow clearance for removal while noting the cut-out for the drive shaft. The left side forward fuel tank retaining strap can cause binding and must be observed while positioning the plate during removal.



13. Lower plate to the ground and remove from under the vehicle.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

1. Position belly armor plate under vehicle.
2. Attach chain hoists on both sides as shown below in illustrations.



3. Raise the front of the plate into position noting the drive shaft cut-out and fuel tank strap location for clearance. Ensure forward rubber bushings on left side fuel tank armor are removed.

NOTE

It may be helpful to tape the rubber bushings and washers together to prevent slippage during installation.

4. With plate in correct bolt-hole alignment, install all the forward retaining bolts, rubber bushings and washers. Torque nuts to 86-102 ft-lb (116-138 N•m).

NOTE

To aid in installing forward left rubber bushings, washers, and nuts, it is necessary for a person to move into position onto the belly armor from the rear.

5. Install rear center plate retaining bolts, nuts, and rubber bushings. Torque nuts to 296-354 ft-lb (402-480 Nm).

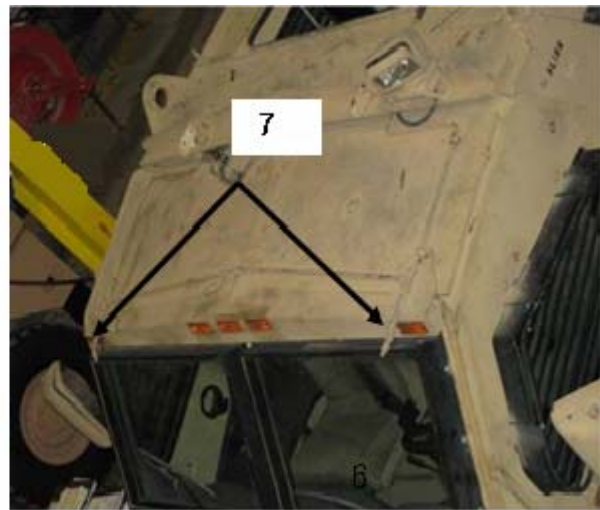
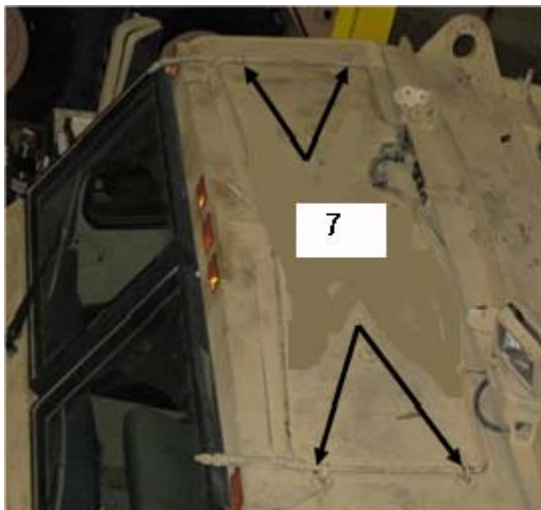
NOTE

Utilize a hydraulic jack to aid in compressing the rear center rubber bushings during installation.

Chapter 4 – MAINTENANCE INSTRUCTIONS



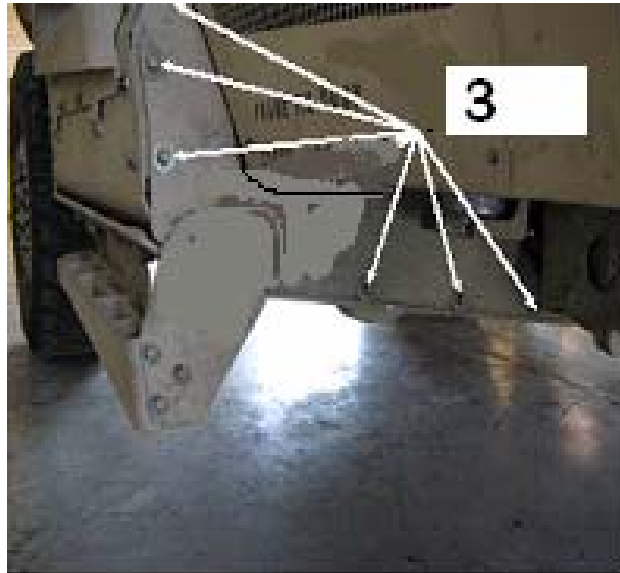
6. Remove the support brackets, chain hoists, and straps.



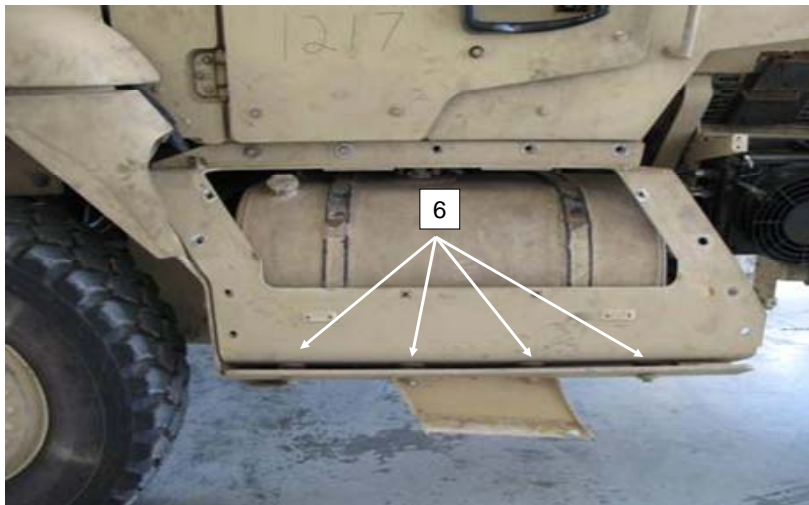
7. Install the four bolts (7) securing the fire support tubes along the top of the vehicle in the vicinity of the sling load eyelets.

Chapter 4 – MAINTENANCE INSTRUCTIONS

8. Install the left side rear armor plate with six retaining bolts and washers (3), and torque to 55- 65 ft-lb (74-88 N•m).



9. Install the right side rear armor plate with six retaining bolts – noting location of upper bolt. Torque bolts to 55-65 ft-lb (74-88 N•m).
10. Tighten the lower fuel tank cover retaining bolts (6). Torque bolts to 55-65 ft-lb (74-88 N•m).



11. Install right side armor plate with the rubber bushings, nuts, and washers (4) and torque bolts to 55-65 ft-lb (74-88 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS



c) Follow-On Maintenance

1. Exterior Battery Box/Fuel Tank armor door reinstalled.
2. Left and right side steps reinstalled.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15 Other

4-15.1 Windshield Wiper Motor Linkage and Transmission Assembly Replacement

WINDSHIELD WIPER MOTOR LINKAGE AND TRANSMISSION ASSEMBLY REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SETUP		<u>Equipment Condition</u>
		Parking Brake Set
<u>Special Tools</u>		Wheels chocked
None		Transmission in NEUTRAL (N)
		Engine shut OFF
<u>Personnel</u>		Battery Disconnect Switch OFF
One (1) Wheeled Vehicle Mechanic		Hood fully opened
<u>Material/Parts</u>		<u>Reference</u>
Windshield Wiper Motor Linkage and Transmission Assembly (1)		Parts Manual
Hex Retaining Nuts and Lock Washers (2)		
Bolts (2)		<u>Equipment Required</u>
Tie-wrap (1)		None
		<u>Follow-On Maintenance</u>
		Remove wheel chocks
		Check operation of wiper motor

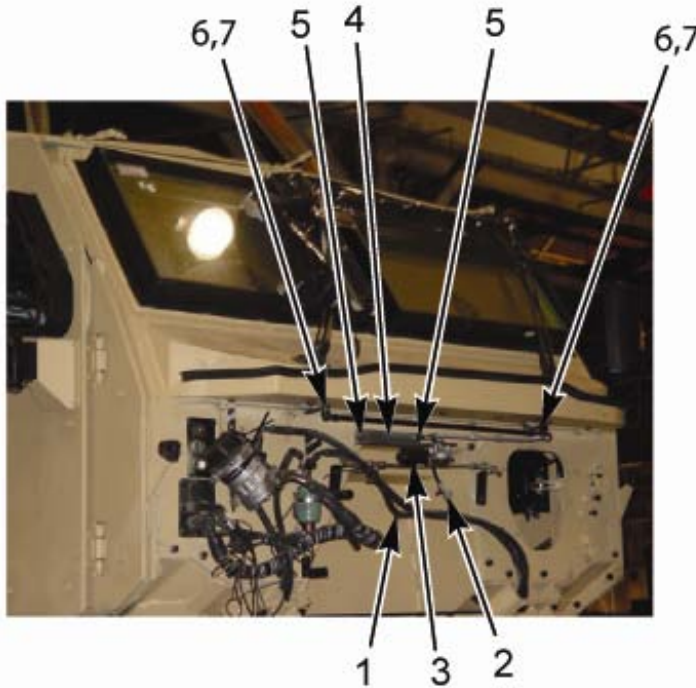


Do not attempt to move the blades through their sweep by grasping the wiper arm. This action may result in the teeth being broken off the drive gear or the linkage bent. If blades are frozen to windshield, do not operate control until they have been freed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. With the ignition key in ON position, cycle wiper arm to the end of the sweep cycle (wiper blade by left side of windshield). Turn key to OFF position.
2. Unlatch hood on both sides and tilt hood to fully open position.



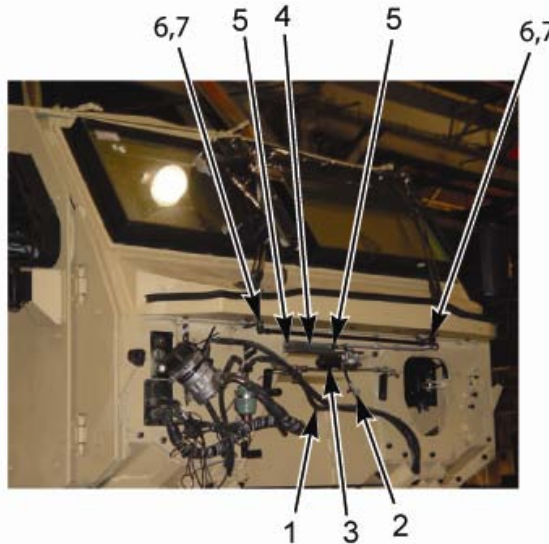
3. Disconnect wiring harness connector (1) from windshield wiper motor connector (2).
4. If required, cut tee-wrap securing wiring harness to windshield wiper motor (3) and/or windshield wiper motor mounting bracket (4).
5. Remove two bolts (5) to the windshield wiper motor, securing windshield wiper motor mounting bracket.
6. Remove hex flanged nut (6) securing windshield wiper assembly to mounting stud (7) on driver side of cab. Lay it out of the way and save it for installation.
7. Remove hex flanged nut (6) securing windshield wiper assembly to mounting stud (7) on passenger side of cab. Lay it out of the way and save it for installation.
8. Remove windshield wiper motor linkage and transmission assembly from the cab cowl. Lay it out of the way and save for installation, unless damaged and being replaced.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Do not attempt to move the blades through their sweep by grasping the wiper arm. This action may result in the teeth being broken off the drive gear or the linkage bent. If blades are frozen to windshield, do not operate control until they have been freed.



1. Position new wiper motor linkage and transmission assembly (3) in place with the wiper motor mounting bracket (4).
2. Install two hex flanged bolts (5) removed above, securing electric wiper motor assembly with the wiper motor mounting bracket.
3. Install hex flanged nut (6) securing windshield wiper assembly to mounting stud (7) on driver side of cab.
4. Install hex flanged nut (6) securing windshield wiper assembly to mounting stud (7) on passenger side of cab.
5. Tighten hex flanged nuts (6).
6. If required, position wiring harness (1) at windshield wiper motor (3) and/or windshield wiper motor mounting bracket (4). Secure with tie-wrap (7).
7. Connect wiring harness connector (1) to windshield wiper motor connector (2).
8. With ignition key in ON position, cycle wiper arm to the end of the sweep cycle (wiper blade by left side of windshield). Turn key to OFF position.
9. Lower hood to closed position and latch hood on both sides.

c) Follow-On Maintenance

1. Turn wipers on to high speed and activate windshield washer to check for proper operation. Adjust position of windshield wiper arm and blade assembly if required to obtain proper wiper operation.
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.2 Windshield Wiper Arm and Blade Replacement

WINDSHIELD WIPER ARM AND BLADE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Windshield Wiper Arm and Blade (1) Driver Side (1) Passenger Side (1)</p>	<p><u>Equipment Condition</u> Parking Brake Set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Hood fully opened</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Remove chocks Check operation of wiper motor</p>	

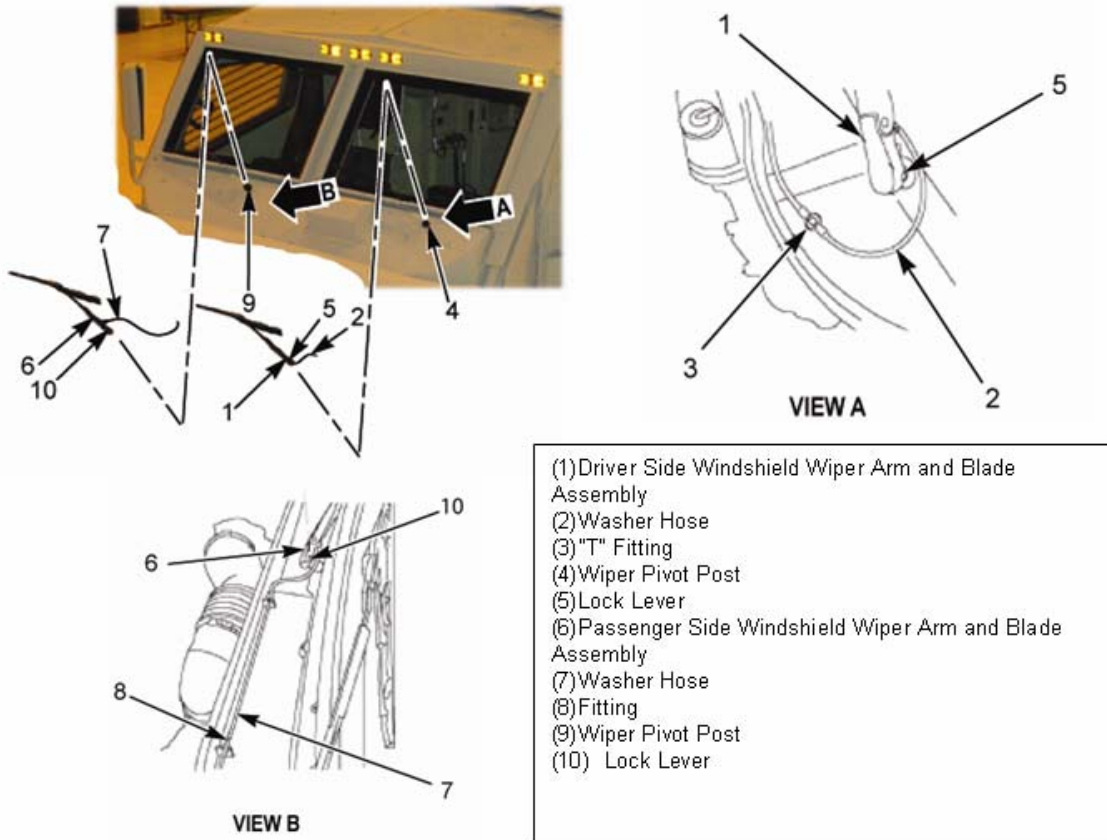


Do not attempt to move the blades through their sweep by grasping the wiper arm. This action may result in the teeth being broken off the drive gear or the linkage bent. If blades are frozen to windshield, do not operate control until they have been freed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. With the ignition key in ON position, cycle wiper arm to the end of the sweep cycle (wiper blade by left side of windshield). Turn key to OFF position.
2. Unlatch hood on both sides and tilt hood to fully open position.



3. To remove driver side windshield wiper arm and blade assembly (1), first remove washer hose (2) from "T" fitting (3). Note position of windshield wiper arm and blade assembly on wiper pivot post (4) for installation before removing it. Lift up on lock lever (5) securing windshield wiper arm and blade assembly with washer hose out of the way and save for installation, unless damaged and being replaced.
4. To remove passenger side windshield wiper arm and blade assembly (6), first remove washer hose (7) from fitting (8). Note position of windshield wiper arm and blade assembly on wiper pivot post (9) for installation before removing it. Lift up on lock lever (10) securing windshield wiper arm and blade assembly to wiper pivot post and pull it off. Lay passenger side windshield wiper arm and blade assembly with washer hose out of the way and for installation, unless damaged and being replaced.

Chapter 4 – MAINTENANCE INSTRUCTIONS



Do not attempt to move the blades through their sweep by grasping the wiper arm. This action may result in the teeth being broken off the drive gear or the linkage bent. If blades are frozen to windshield, do not operate control until they have been freed.

b) Installation

1. To install driver side windshield wiper arm and blade assembly (1), first install washer hose (2) to "T" fitting (3). Note position of windshield wiper arm from "removal sequence"; secure driver side windshield wiper arm and blade assembly (1), by pressing the assembly on to the wiper pivot post.
2. To install passenger side windshield wiper arm and blade assembly (6), first install washer hose (7) to fitting (8). Note position of windshield wiper arm from "removal sequence"; secure passenger side windshield wiper arm and blade assembly (6), by pressing the assembly on to the wiper pivot post.

c) Follow-On Maintenance

1. Remove chocks.
2. Check operation of wiper motor.

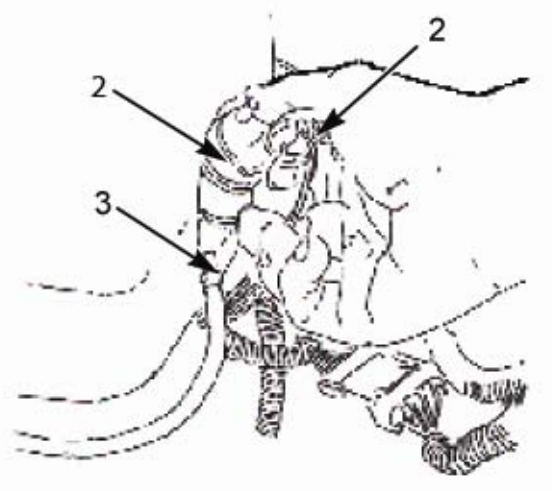
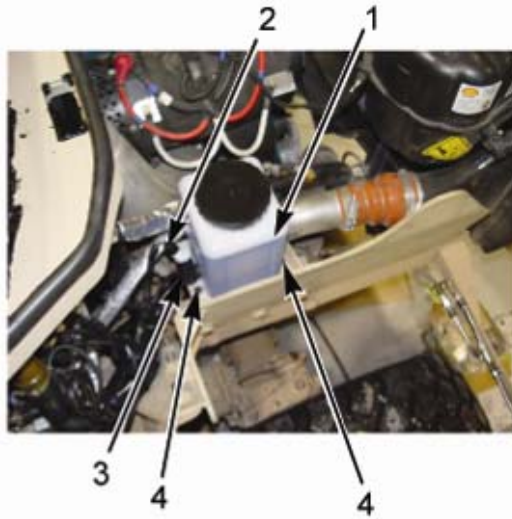
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.3 Windshield Washer Reservoir and Pump Motor Replacement

WINDSHIELD WASHER RESERVOIR AND PUMP MOTOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>None</p> <p><u>Personnel</u></p> <p>One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u></p> <p>Windshield Washer Reservoir and Pump Motor (1)</p> <p>Mounting bolts (4)</p> <p>Windshield Washer Fluid (1)</p>		<p><u>Equipment Condition</u></p> <p>Parking Brake Set</p> <p>Wheels chocked</p> <p>Transmission in NEUTRAL (N)</p> <p>Engine shut OFF</p> <p>Battery Disconnect Switch OFF</p> <p>Hood fully opened</p> <p><u>Reference</u></p> <p>Parts Manual</p> <p><u>Equipment Required</u></p> <p>Drain Pan</p> <p>Rags</p> <p><u>Follow-On Maintenance</u></p> <p>Check operation of wiper motor</p> <p>Remove wheel chocks</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

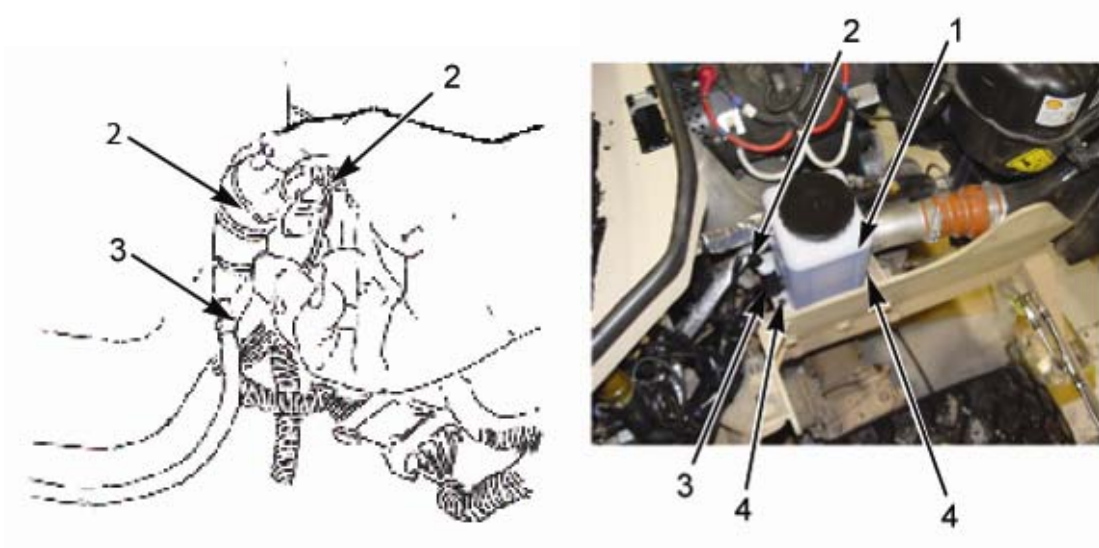
a) Removal



1. Unlatch hood on both sides and tilt hood to fully open position and locate windshield washer fluid reservoir (1).
2. To remove reservoir, locate and disconnect windshield washer fluid supply pump harness (2).
3. With reservoir pump connection harness unplugged, locate and disconnect windshield wiper washer supply hose (3) from pump.
4. Let fluid in reservoir drain. Use clean container to save the washer fluid.
5. Remove four bolts (4) and reservoir.
6. Remove pump motor (3) from reservoir (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Attach new Pump motor (3) to Windshield Washer Reservoir (1).
2. Attach Windshield washer Reservoir (1) and Pump Motor (3) assembly to vehicle with four bolts (4).
3. Attach Reservoir Supply Hose and Harness (3), to Windshield Washer Reservoir and Pump assembly.
4. Fill Windshield Washer Reservoir with Washer Fluid.

c) Follow-On Maintenance

1. Turn wipers on to high speed and activate windshield washer to check for proper operation. Adjust position of windshield wiper arm and blade assembly if required to obtain proper wiper operation.
2. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.4 FSS Engine Compartment Sensor Replacement

FSS ENGINE COMPARTMENT SENSOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> FSS Engine Sensor (1)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Rag or Paper Towel Corrosion Lubricant Anti-Corrosion Compound</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Engine hood raised FSS system disabled</p> <p><u>Follow-On Maintenance</u> Battery Disconnect Switch ON Ignition switch turned ON Verify light on FSS control panel is OFF for engine sensor Verify circuit operation Ignition switch turned to OFF position Battery Disconnect Switch OFF Close engine hood and latch</p>	

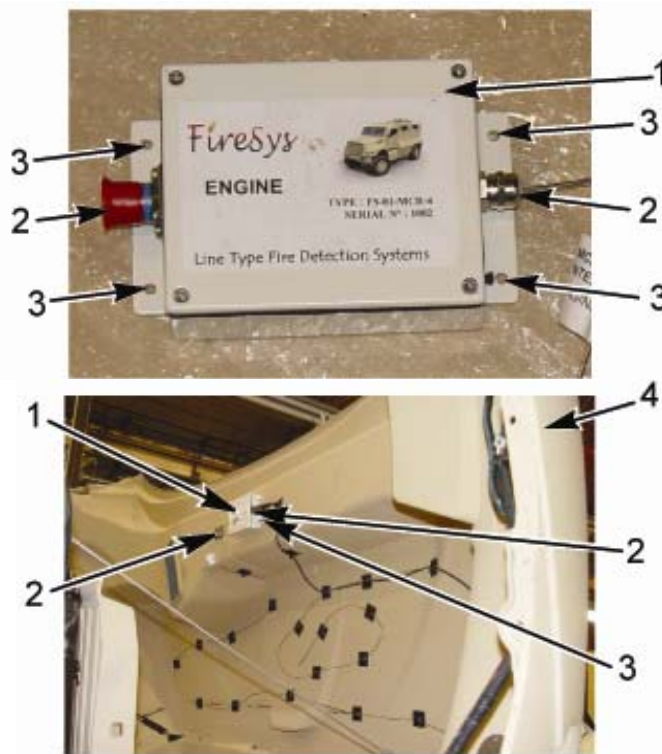
Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.



1. Disconnect engine FSS sensor (1) mounted to engine hood (4) just above the cowl by removing two electrical connections (2) and four mounting bolts (3).
2. Remove sensor (1) and discard.

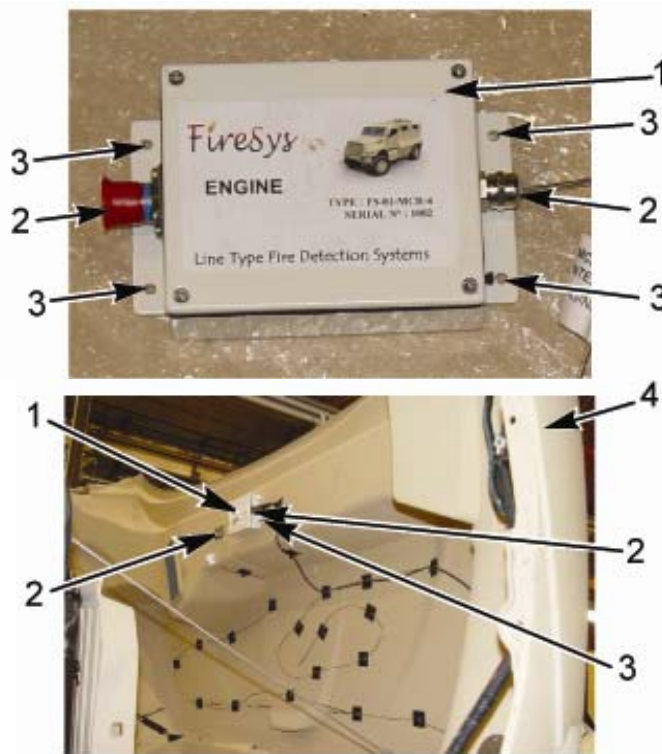
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury to personnel.

Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



1. Apply thin layer of connector lubricant to electrical connectors.
2. Apply anti-corrosion compound to mounting bolts.
3. Install mounting bolts (3) into mounting holes of engine FSS sensor (1) and align with holes in hood (4).
4. Tighten bolts.
5. Connect the two electrical connectors (2).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Ignition switch turned ON.
3. Verify light on FSS control panel is OFF for engine sensor.
4. Verify circuit operation.
5. Ignition switch turned to OFF position.
6. Battery Disconnect Switch OFF.
7. Close engine hood and latch.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.5 FSS Cab/Crew Compartment Sensor Replacement

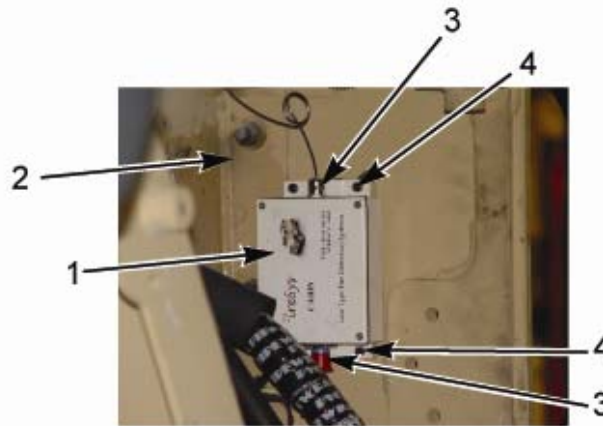
FSS CAB/CREW COMPARTMENT SENSOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u>
		None
<u>Special Tools</u>		<u>Equipment Conditions</u>
None		Parking brake set
		Wheels chocked
<u>Personnel</u>		Transmission set in NEUTRAL (N)
One (1) Wheeled Vehicle Mechanic		Engine shut OFF
		Battery Disconnect Switch OFF
<u>Material Parts</u>		Disable FSS system
FSS Cab/Crew sensor (1)		
Connector Lube		<u>Follow-On Maintenance</u>
Anti-Corrosion Compound		Battery Disconnect Switch ON
		Ignition switch turned ON
<u>Reference</u>		Verify light on FSS control panel is OFF for cabin sensor
Parts Manual		Verify circuit operation
		Ignition switch turned to OFF position
		Battery Disconnect Switch OFF

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



1. Locate the cabin FSS sensor (1) mounted to passenger side kick panel (2).
2. Disconnect the two electrical connections (3) and four mounting bolts (4).
3. Remove sensor (1) and discard.

b) Installation



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury to personnel.

Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

1. Apply thin layer of connector lubricant to electrical connectors.
2. Apply anti-corrosion compound to mounting bolts.
3. Install mounting bolts (4) into mounting holes of cabin FSS sensor (1) and align with holes in kick panel (2).
4. Tighten bolts (4).
5. Connect the two electrical connectors (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Ignition switch turned ON.
3. Verify light on FSS control panel is OFF for cabin sensor.
4. Verify circuit operation.
5. Ignition switch turned to OFF position.
6. Battery Disconnect Switch OFF.

Chapter 4 – MAINTENANCE INSTRUCTIONS



Immediate have extinguisher replaced after use, even if only partly used. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

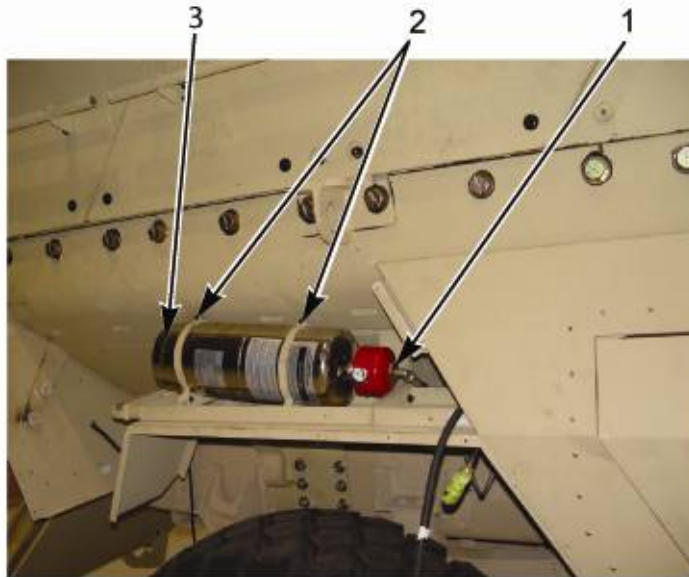
Some fire suppression systems have a safety pin to install before disconnecting lines. Check to see if this system uses a safety pin and install it before disconnecting lines. When disconnecting the extinguisher lines use extreme caution. **DO NOT DISTURB** the pyrotechnic actuator and pressure switch; this will cause the extinguisher to go off automatically. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

It is recommended that you **DO NOT** inhale the gas. In case of accidental inhalation exposure, go quickly to fresh air. In case of skin irritation, consult medical physician. If gets in eyes, flush with water for at least 15 minutes and contact medical physician. In case swallowed, **DO NOT INDUCE VOMITING**, contact medical physician. Failure to comply may result in serious injury or death to personnel.

Check and verify extinguisher before installing into vehicle that the proper part number is being installed. There is no visible damage to the canister like dents, cracked plastic, chips or scratches where hoses connect. If damage is visible anywhere, **DO NOT USE**, contact your supervisor. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Fire Extinguishers

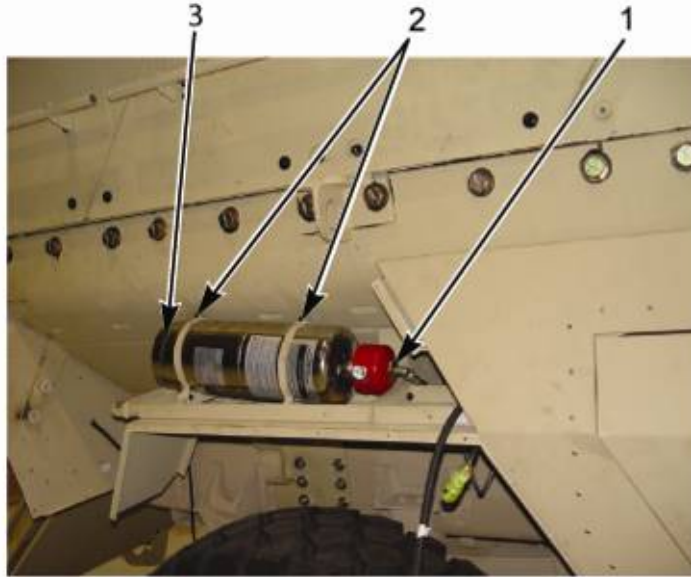
a) Removal



1. Remove Fire Extinguishers (note that there are three different types of fire retardants used with these Fire Extinguishers, replace with correct Extinguisher with the correct retardant) by disconnecting the fitting of the FSS tube (1) that connects to the Fire Extinguishers (3).
2. Remove Fire Extinguishers (3) by unscrewing the nuts and bolts (place nuts and bolts aside for reuse) that secure the two metal bands (2) that secure the Extinguishers to the vehicle.
3. Remove Fire Extinguisher.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Install the correct Fire Extinguisher (note type of chemical retardant used in previous fire extinguisher so that the replacing Fire Extinguisher (3) has the same replacing retardant).
2. All cylinders (3) should be free from corrosion, damaged threads, and shape distortion.
3. Connect the fitting of the FSS tube (1) that connects to the Fire Extinguisher (3).
4. Secure the Fire Extinguishers (3) using two Nuts and two Bolts (2) that were removed in previous removal operation.

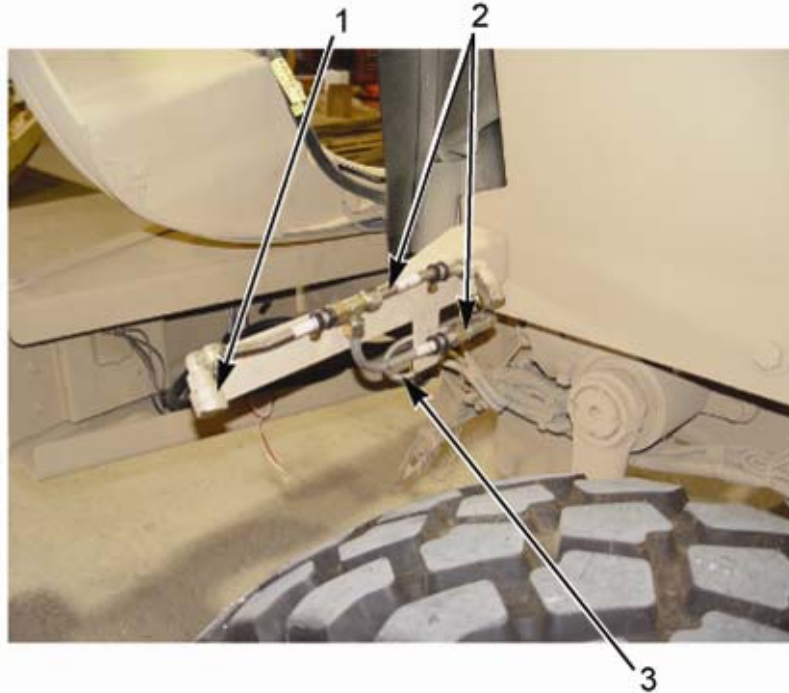
c) Follow-On Maintenance

1. Check for leaks and proper gauge pressure.

Chapter 4 – MAINTENANCE INSTRUCTIONS

Nozzles and Tubes

a) Removal



1. Check all nozzles (1), and tubes (2), to be free and clean of any obstruction, all rigid and flexible pipes (3) and tubes should be without any damage (injured, cracked, or worn).
2. Disconnect all pipes from the Extinguisher and flow compressed air. Check there are no obstruction and free air flow.
3. Remove defective nozzle tube or pipe.

b) Installation

1. If all nozzles (1) and rigid and flexible tubes (2) appear intact, use compressed air or water to clear the system.
2. Clean all nozzles (1) and dispersion tubes (2).
3. Install new nozzles (1), rigid and flexible tubes (2), replacing any damaged pipe or tube.

c) Follow-On Maintenance

1. Inspections should be performed when the system is initially placed in service and thereafter at approximately 30 days intervals. Inspections should be performed in accordance with the owner's manual supplied with the FSS.

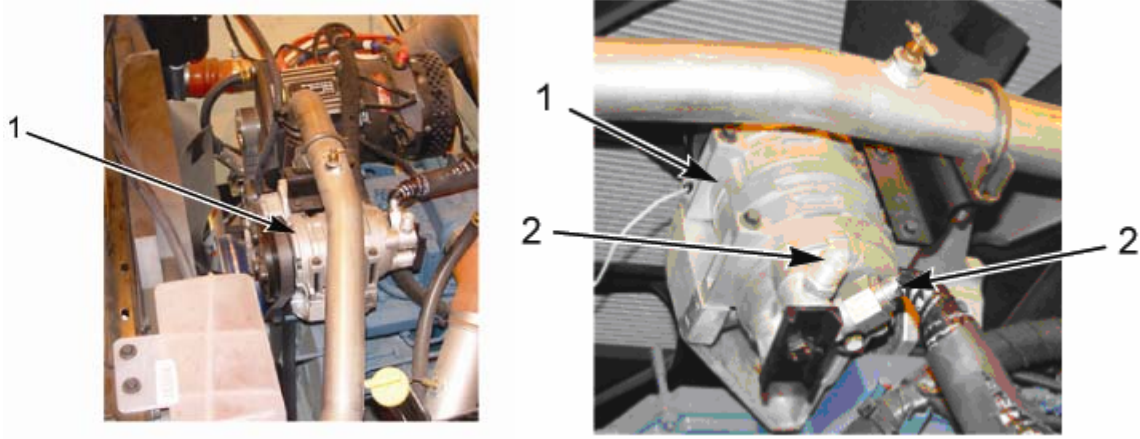
Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.7 Air Conditioner Compressor Replacement

AIR CONDITIONER COMPRESSOR REPLACEMENT		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Material/Parts</u> Compressor/Clutch assembly (1) Mineral-based oil (1) O-rings (2) C-plates (2)</p> <p><u>Personnel</u> One (1) Certified A/C Technician</p>		<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF A/C system recovery A/C belts removed AC lines removed</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Reinstall A/C lines Reinstall A/C belts Recharge System</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Disconnect compressor clutch wiring connector at compressor (1).
2. Remove and save compressor mounting bolts, noting the locations of any brackets secured by the mounting bolts.
3. Remove compressor/clutch assembly from the engine.

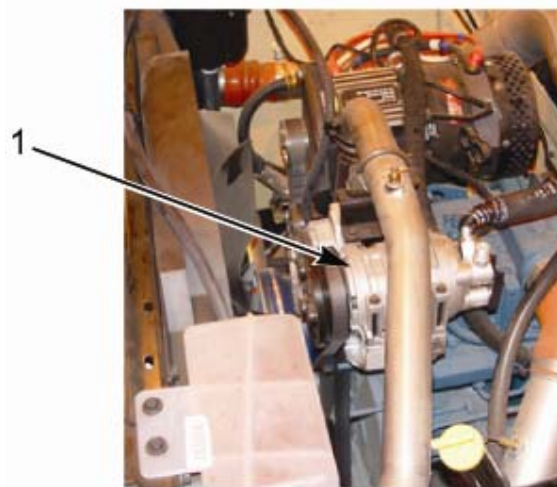
b) Installation

NOTE

Verify that the clutch is installed on the compressor before performing the following installation procedure.

After the system is to be flushed or purged, perform that operation before reassembling the system. Refer to Purging or Flushing the Air Conditioning System.

Before installing the compressor, refer to its Oil Fill Guidelines. The oil shipped in new compressors must be drained when determining the correct amount of refrigerant oil to be added to the system.

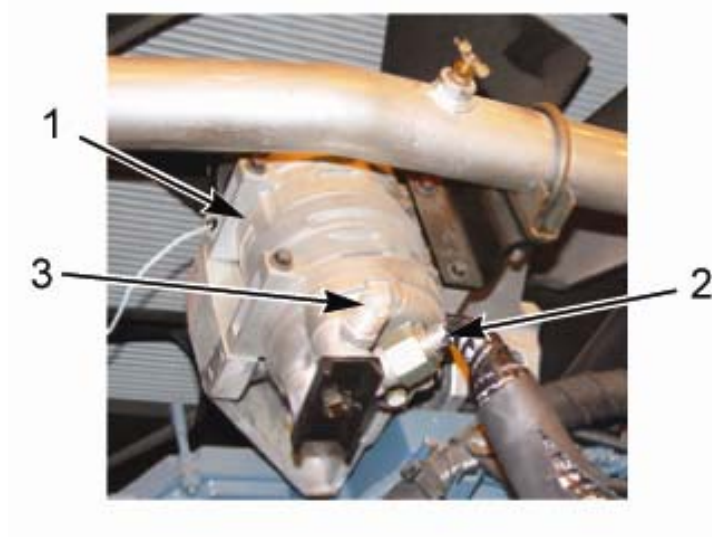


1. Install compressor assembly (1) including any brackets previously secured by the compressor mounting bolts.
2. Tighten compressor mounting bolts to 16-24 ft-lb (23-29 N•m).

Chapter 4 – MAINTENANCE INSTRUCTIONS

NOTE

Always lubricate O-rings with mineral-based oil during installation.



3. Connect compressor clutch wiring connector to engine harness.

c) Follow-On Maintenance

NOTE

A/C system holds 6.2 lbs.

1. Reinstall A/C lines.
2. Reinstall A/C belt.
3. Recharge system.
4. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.8 A/C BELT REPLACEMENT

A/C BELT REPLACEMENT		
This task covers:		
a. Removal	b. Installation	c. Follow-On Maintenance
<p><u>INITIAL SET UP</u></p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One MOS 3521</p> <p><u>Material Parts</u> A/C Belt 6 rib (1)</p> <p><u>Reference</u> Parts Manual</p>		<p><u>Equipment Required</u> None</p> <p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Master power switch OFF Raise and secure engine hood Remove fan</p> <p><u>Follow-On</u> Install fan Master power switch ON Start engine Check and verify operation Shut engine OFF Master power switch OFF Close and secure engine hood Remove wheel chocks</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

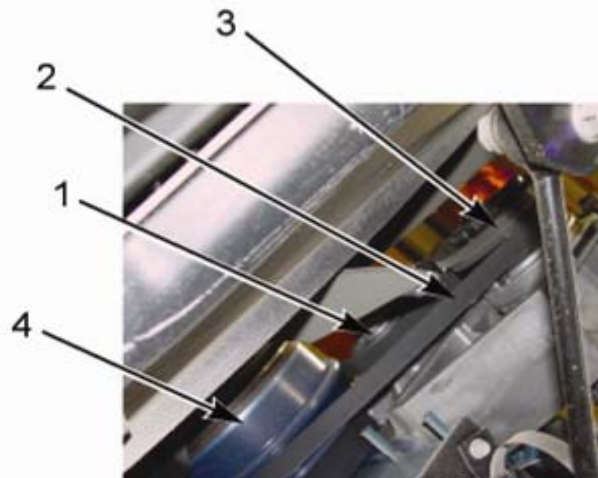
a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.

International® Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Engine components become extremely hot during normal operation. Allow engine to cool completely prior to performing any task. DO NOT touch the exhaust system components with bare hands or with your body use protective work gloves and long sleeves. Failure to comply may result in damage to equipment and or serious burns, injury or death to personnel.



1. Insert breaker bar into belt tensioner (1) and remove tension from A/C belt (2).
2. Remove A/C belt from a/c compressor pulley (3).
3. Release belt tensioner (1).
4. Remove A/C belt (2) from around fan clutch pulley (4).
5. Remove defective A/C belt and discard per local regulations.

b) Installation

1. Examine new belt before installing for any signs of damage. If damage is present replace again.
2. Install A/C belt (2) around the fan clutch pulley (4). Make sure the ribs of the A/C belt (2) are facing towards the fan clutch pulley (4).

Chapter 4 – MAINTENANCE INSTRUCTIONS

3. Apply pressure to the belt tensioner (1) to loop A/C belt around the a/c compressor pulley (3). Make sure that ribs of A/C belt are towards the compressor pulley (3).
4. Release pressure on belt tensioner (1) and remove breaker bar.

c) Follow-On Maintenance

1. Install fan.
2. Master power switch ON.
3. Start engine.
4. Check and verify operation.
5. Shut engine OFF.
6. Master power switch OFF.
7. Close and secure engine hood.
8. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.9 Air Conditioner Service/Recharge Procedure

AIR-CONDITIONING SERVICE/RECHARGE PROCEDURE		
This task covers:		
a) Recovery	b) Recharge	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>Recovery/Recharging Station</p> <p><u>Material/Parts</u></p> <p>O-rings New C-Plates</p> <p><u>Personnel</u></p> <p>One (1) A/C Mechanic</p>	<p><u>Equipment Condition</u></p> <p>Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Master power switch OFF</p> <p><u>Reference</u></p> <p>Parts Manual</p> <p><u>Equipment Required</u></p> <p><u>Follow-On Maintenance</u></p> <p>Check for leaks</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS



Carbon monoxide is a colorless, odorless, and dangerous gas that is present in vehicle exhaust. When it is necessary to operate the engine during vehicle service in a confined area, always use the proper equipment to vent the exhaust gasses outside of the work area. Failure to comply may result in serious injury or death to personnel.

Safety goggles or other adequate eye protection must be worn when working with refrigerant. The temperature of liquid refrigerant is -20°F (-29C). Serious injury or blindness will result from refrigerant contacting the eyes.

If refrigerant comes in contact with your eyes, DO NOT rub them. Flush the eyes with cold water for at least 15 minutes to gradually get the temperature above the freezing point. See a doctor immediately. Failure to comply may result in serious injury or death to personnel.

Wear non-porous gloves. If refrigerant comes into contact with skin, remove contaminated clothing, including shoes. Wash immediately. Treat the injury as though the skin had been frostbitten or frozen. See a doctor immediately. Failure to comply may result in serious injury or death to personnel.

DO NOT expose pressurized refrigerant containers to open flame or to temperatures above 125°F (5C). Store, install, and dispose of containers in accordance with all state and local ordinances. Failure to comply may result in serious injury or death to personnel.

R-134a refrigerant must not be mixed with air and then pressurized. When mixed with large quantities of air and pressurized, R-134 becomes combustible.

Refrigerant must be recovered from the air-conditioning system with approved equipment before any components of the system are removed or replaced. Removing components while pressure is in the system will cause personal injury or death.

Refrigerant evaporates very quickly and may displace the oxygen surrounding the work area. If a leak should occur, avoid breathing the refrigerant and lubricant vapor. Thoroughly ventilate the area before continuing with service. Federal and state laws require that refrigerant be recovered and recycled.

DO NOT install or remove air-conditioning testing or charging equipment while the engine is running. Failure to comply may result in serious injury or death to personnel.



The valve for the electronic vacuum gauge must be CLOSED until you are instructed to open it. If the valve is open during system charging, excess pressure may damage the electronic vacuum gauge.

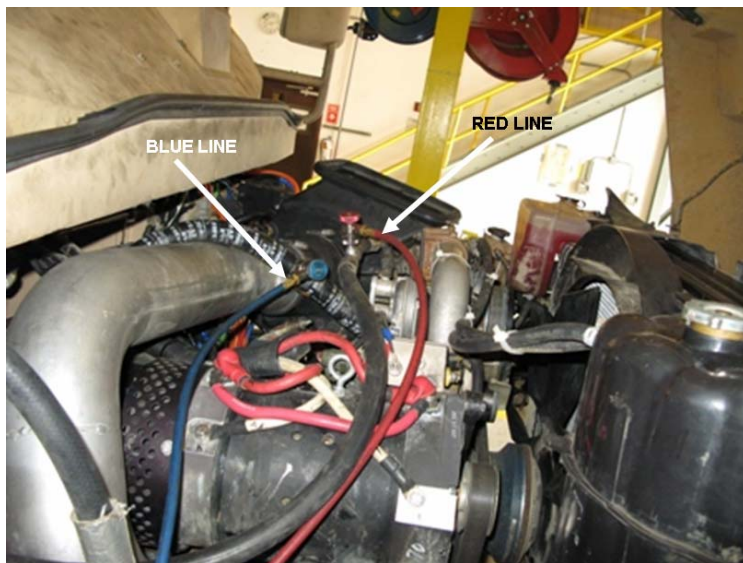
When charging the air-conditioning system, the refrigerant tank must be kept upright. If the tank is not in the upright position, liquid refrigerant may enter the system and cause compressor damage.

Overcharging the system will result in excessively high head pressures during operation and may damage the compressor.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Recovery

1. Check all air conditioning lines and connections for leaks.
2. Connect lines from the E-Vac machine to service ports (blue hose to low side, red hose to high side).
3. Open high and low valves on E-Vac machine.
4. Select “Recover” mode with selector button on dash of E0Vac machine and press “Start”.
5. When both gauges read “zero”, recovery is complete.
6. Select “Vacuum” mode with mode selector on dash of E-Vac machine. When gauge reads -25 to -28 on vacuum gauge, “Vacuum” is complete.
7. Let system stand for 10-15 minutes and check for leaks.



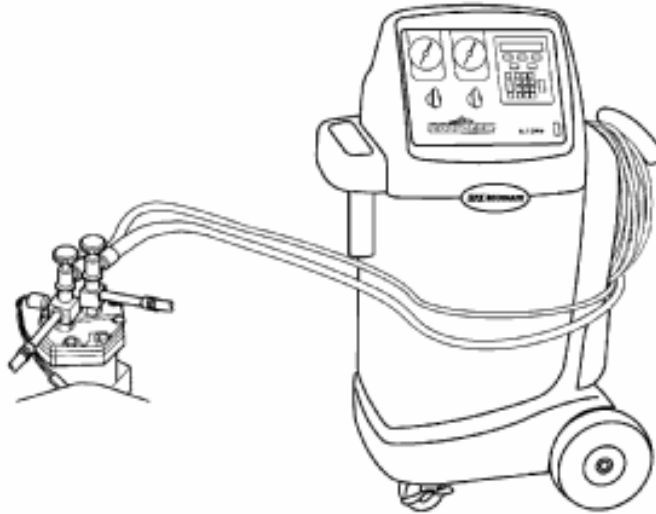
b) Recharge

NOTE

Before charging the air conditioning system, verify that the following actions have been completed:

- The system components have been repaired and/or replaced.
 - The system has been flushed or purged.
1. Verify that the recovery station blue (suction) hose is still connected.
 2. Verify that the recovery station red (discharge) hose is still connected.
 3. The amount of refrigerant needed to fully charge the air-conditioning system is 6.2 lbs.

Chapter 4 – MAINTENANCE INSTRUCTIONS



4. Set the recovery station to charge the system with 6.2 lbs. refrigerant:
 - (a). Set the low side valve to CLOSED.
 - (b). Set the high side valve to CHARGE.
 - (c). Press the CHARGE button to start the charge procedure. When the system is full charged, the recovery station will turn OFF.
 - (d). Complete the charging procedure by setting both hand valves on the recovery station to the CLOSED position.
 5. Before disconnecting the recovery station from the air-conditioning system, perform the system operating test procedures.
 6. After the pressure test is completed, stop the engine, and close the valves on the quick-connect fittings by turning the knobs fully clockwise.
 7. Disconnect the **BLUE** quick-connect fitting from the vehicle service ports.
 8. Disconnect the **RED** quick-connect fitting from the vehicle service ports.
 9. Install the protective caps on both of the vehicle service port fittings.
- c) Follow-On Maintenance**
1. Check for leaks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.10 Air Conditioner Condenser Fan/Motor Replacement

AIR CONDITIONER CONDENSER FAN/MOTOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) A/C Mechanic</p> <p><u>Material Parts</u> Air condenser (1) Fan/Motor Assembly (1)</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Required</u> A/C Evacuation Station</p> <p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Remove body plate compartment armor Raise, prop, and secure engine hood Recover A/C system</p> <p><u>Follow-On Maintenance</u> Charge A/C system Install body plate compartment armor Battery Disconnect Switch ON Start engine Check for leaks in A/C lines Verify operation of A/C system Verify operation of condenser motors Close engine hood Shut engine OFF Battery Disconnect Switch OFF</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS



Safety goggles and full face shield should be worn while working with refrigerant. The temperature of liquid refrigerant is -20° F (-29° C). DO NOT rub eyes if refrigerant gets in them. Splash with cold water to gradually increase temperature above freezing and seek immediate medical attention. Failure to comply may result in serious injury or death to personnel.

Wear protective rubberized gloves. Wear protective clothing while working with refrigerant. If refrigerant comes in contact with skin, remove all contaminated clothing. Treat skin as though it were frostbitten or frozen and seek immediate medical attention. Failure to comply may result in serious injury or death to personnel.

DO NOT expose any refrigerant containers empty or full to open flames or temperatures above 125° F (51° C). DO NOT discard empty containers where they may be subject to heat of trash burner, they may explode. Containers must be stored, installed and disposed of in accordance with local regulations. Failure to comply may result in serious injury or death to personnel.

Refrigerant will turn into a poisonous gas in the presence of heat. Do not smoke or allow any type of flame in immediate area while servicing the air conditioning system. Never weld, solder, steam clean, or use excessive heat on any part of the air conditioning system while charged/pressurized. Refrigerant must not be mixed with air and then pressurized. When mixed and then pressurized refrigerant becomes combustible. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Refrigerant must be recovered from the system with authorized recommended equipment before any work can be performed on the unit. Always use approved recycling equipment to prevent accidental discharge. Refrigerant evaporates very quickly and will take up all the oxygen in your work area, especially if a small or enclosed area. This can cause suffocation or brain damage for anyone in the work area. If a leak occurs avoid breathing the refrigerant vapor and thoroughly ventilate area before continuing service. If you do breathe in refrigerant vapors, contact emergency medical personnel right away. Failure to comply may result in serious injury or death to personnel.

You can not check the compressor oil level while the A/C system is charged with refrigerant. Never open the high side hand valve of the manifold gauge set while A/C system is operating. If hot, high pressure refrigerant is forced through the gauge to the refrigerant supply cylinder and it could rupture. Do not use parts other than those specified for the system being serviced. Failure in using improper parts may result in damage to equipment and/or serious injury or death to personnel.

International[®] Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

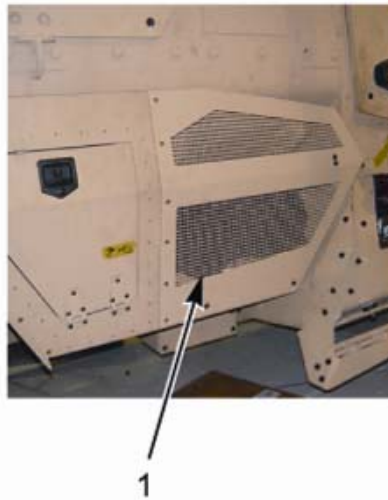


To prevent damage to test equipment, make sure test equipment is clear of all moving parts in the engine compartment. When installing and removing any service hose or fitting, a small amount of refrigerant may escape. Always follow all safety precautions. Failure to comply may result in damage to equipment.

NOTE

Service Equipment is made by different brands and may look differently than equipment shown in any part of the Air Conditioning System Section. The function of the equipment used for each service procedure is basically the same. If you are performing these service procedures using service equipment different from what is shown, refer to the manufacturer's instructions supplied with that equipment.

a) Removal

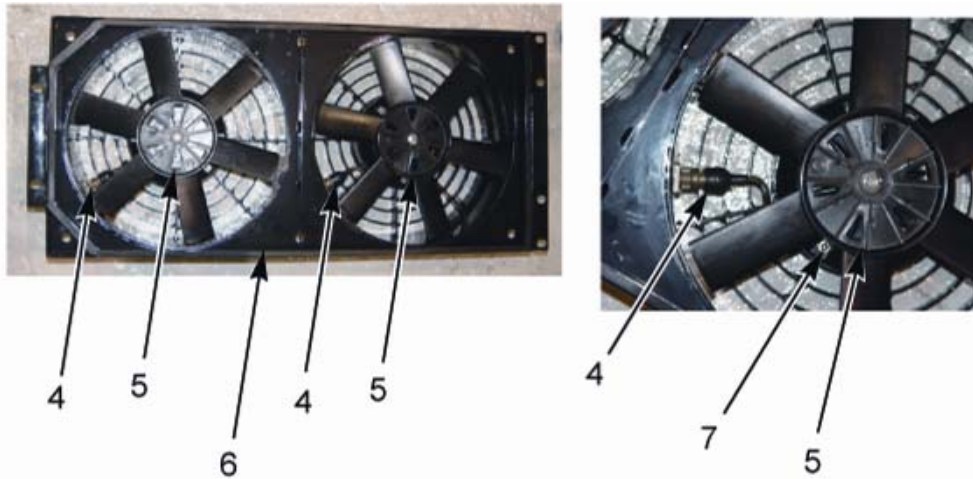


1. Remove body plate armor (1).

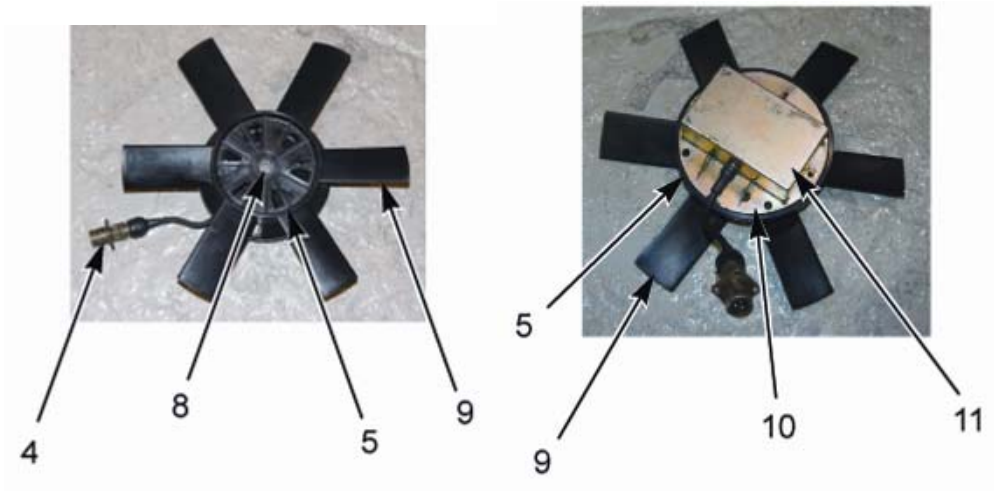


Chapter 4 – MAINTENANCE INSTRUCTIONS

2. Remove six bolts, 12 flat washers, and six lock nuts, securing fan shroud to mounting assembly.
3. Tag and mark all wire and hose connections and remove tie straps.



4. Remove two cannon plugs (4) from fan motor (5).
5. Remove shroud (6).
6. Remove fan motor cap nut (8).
7. Remove fan (9).
8. Remove six Allen screws and lock washers (7) securing fan motor (5).
9. Remove four screws and lock washers from cannon plug bracket (4).
10. Remove fan motor cannon plug (4) mount bracket.

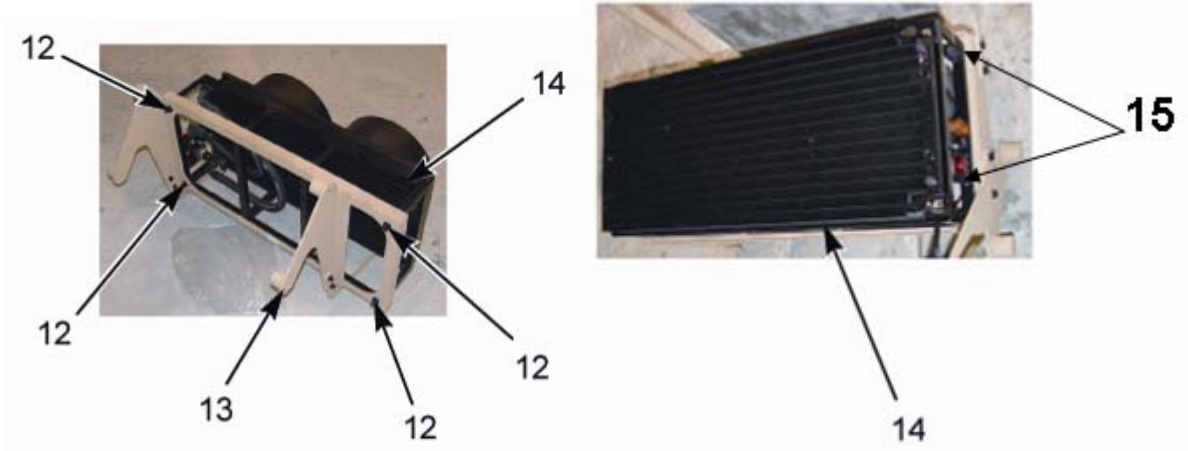


11. Remove fan motor (5).
12. Remove fan motor cover plate (10).
13. Remove and discard motor (11).

Chapter 4 – MAINTENANCE INSTRUCTIONS

If removing condenser

1. Evacuate A/C system.



2. Label and remove A/C lines, and cannon plugs.
3. Remove four bolts and nuts (12) securing condenser (14) to mounting assembly (13).
4. Remove two bolts and two nuts and four washers (15) from condenser mount assembly.
5. Remove old air condenser unit (14) and discard.

Chapter 4 – MAINTENANCE INSTRUCTIONS

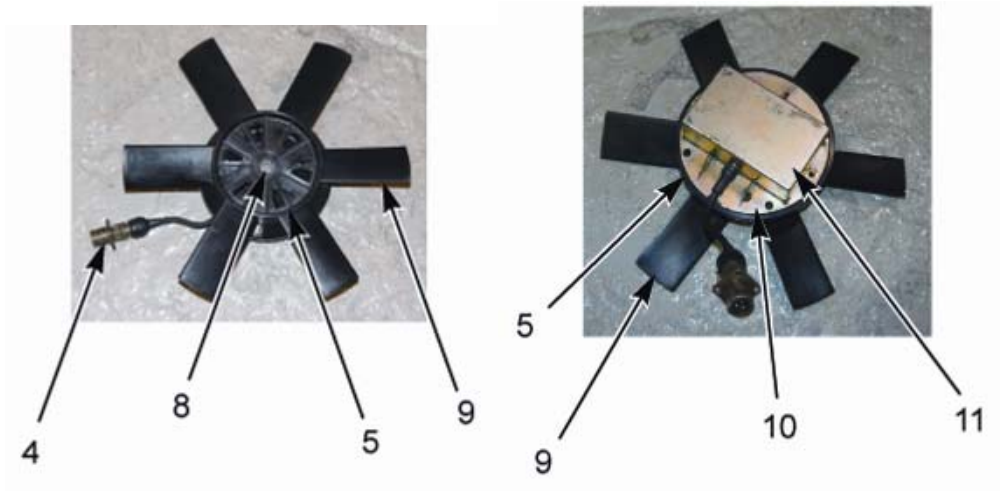
b) Installation



Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. DO NOT get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

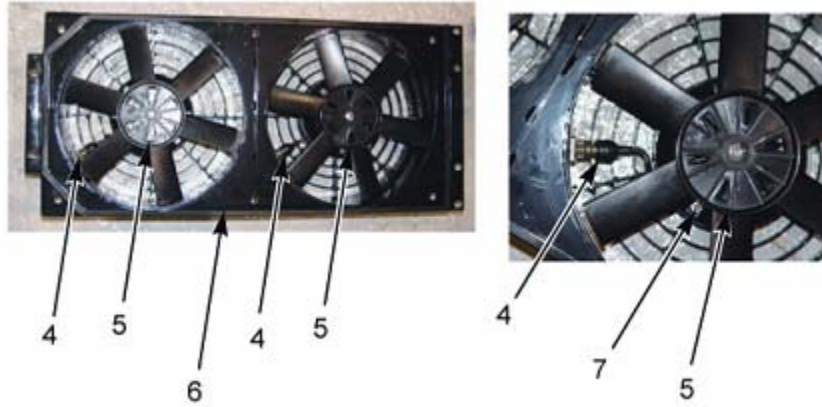
Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.

If installing new condenser



1. Install motor (11) on back of fan (9).
2. Install fan (9).
3. Install fan motor cover plate (10).
4. Install fan motor cap nut (8).
5. Install fan motor cannon plug (4).
6. Install four screws and lock washers securing cannon plug (4) to bracket (4).

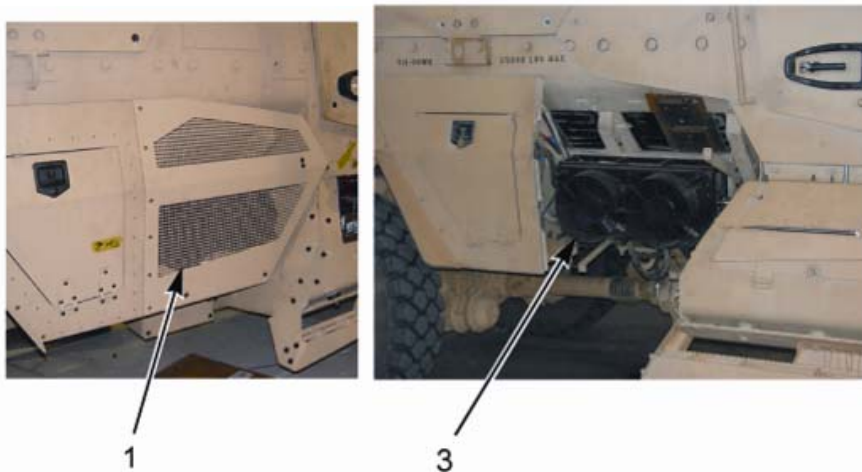
Chapter 4 – MAINTENANCE INSTRUCTIONS



7. Install six Allen screws and lock washers (7) securing fan motor (5).
8. Install shroud (6).
9. Install two cannon plugs (4) from fan motor (5).



10. Reconnect all wire and hose connections.
11. Install eight torque bolts (2), 16 flat washers, and eight locknuts, that secure fan assembly to mounting assembly.



12. Install body plate armor (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Charge A/C system.
2. Install body plate compartment armor.
3. Battery Disconnect Switch ON.
4. Start engine.
5. Check for leaks in A/C lines.
6. Verify operations of A/C system.
7. Verify operation of condenser motors.
8. Close engine hood.
9. Shut engine OFF.
10. Battery Disconnect Switch OFF.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.11 Air Conditioner Receiver/Dryer Replacement

AIR CONDITIONER RECEIVER/DRYER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> Soldering Iron (Torch)</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Receiver/Dryer (1) O-rings (5)</p> <p><u>Equipment Required</u> A/C service station unit Lube Oil Solder</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Discharge and evacuate A/C system Raise engine hood Remove engine side armor Disconnect A/C hoses</p> <p><u>Follow-On Maintenance</u> Re-connect A/C hoses Battery Disconnect Switch ON Evacuate and re-charge A/C system per service station unit Start engine Verify all operations of A/C system Check for any leaks Shut A/C system OFF Shut engine OFF Battery Disconnect Switch OFF Reinstall engine side armor Close engine hood</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



Safety goggles and full face shield should be worn while working with or around refrigerant. The temperature of liquid refrigerant is -20° F (-29° C). DO NOT rub eyes if refrigerant get in them. Splash with cold water to gradually increase temperature above freezing and seek immediate medical attention. Failure to comply may result in serious injury or death to personnel.

Wear protective rubberized gloves. Wear protective clothing while working with refrigerant. If refrigerant comes in contact with skin, remove all contaminated clothing. Treat skin as though it were frostbitten or frozen and seek immediate medical attention. Failure to comply may result in serious injury or death to personnel.

DO NOT expose any refrigerant containers empty or full to open flames or temperatures above 125° F (51° C). DO NOT discard empty containers where they may be subject to heat of trash burner, they may explode. Containers must be stored, installed and disposed of in accordance with local regulations. Failure to comply may result in serious injury or death to personnel.

Refrigerant will turn into a poisonous gas in the presence of heat. Do not smoke or allow any type of flame in immediate area while servicing the air conditioning system. Never weld, solder, steam clean, or use excessive heat on any part of the air conditioning system while charged/pressurized. Refrigerant must not be mixed with air and then pressurized. When mixed and then pressurized refrigerant becomes combustible. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Refrigerant must be recovered from the system with authorized recommended equipment before any work can be performed on the unit. Always use approved recycling equipment to prevent accidental discharge. Refrigerant evaporates very quickly and will take up all the oxygen in your work area, especially if a small or enclosed area. This can cause suffocation or brain damage for anyone in the work area. If a leak occurs avoid breathing the refrigerant vapor and thoroughly ventilate area before continuing service. If you do breathe in refrigerant vapors, contact emergency medical personnel right away. Failure to comply may result in serious injury or death to personnel.

You cannot check the compressor oil level while the A/C system is charged with refrigerant. Never open the high side hand valve of the manifold gauge set while A/C system is operating. If hot, high pressure refrigerant is forced through the gauge to the refrigerant supply cylinder and it could rupture. Do not use parts other than those specified for the system being serviced. Failure in using improper parts may result in damage to equipment and/or serious injury or death to personnel.

International[®] Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.

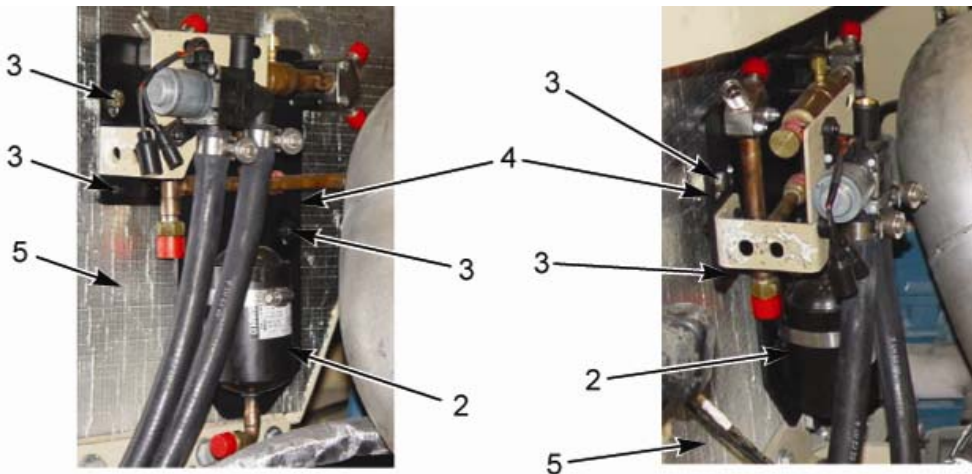
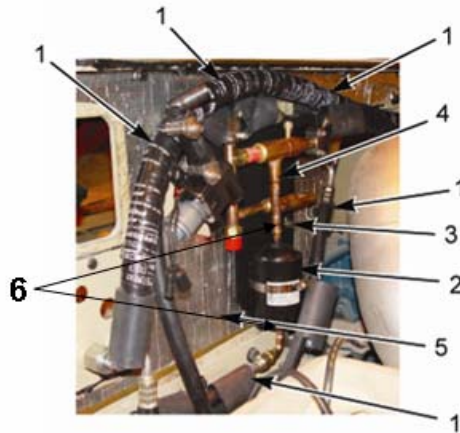
Chapter 4 – MAINTENANCE INSTRUCTIONS



To prevent damage to test equipment, make sure test equipment is clear of all moving parts in the engine compartment. When installing and removing any service hose or fitting, a small amount of refrigerant may escape. Always follow all safety precautions. Failure to comply may result in damage to equipment.

NOTE

Service Equipment is made by different brands and may look differently than equipment shown in any part of the Air Conditioning System Section. The function of the equipment used for each service procedure is basically the same. If you are performing these service procedures using service equipment different from what is shown, refer to the manufacturer's instructions supplied with that equipment.



1. Remove O-rings from all A/C lines (1) removed from receiver/dryer (2).
2. Loosen and remove mounting bolts (3) from receiver/dryer (2) mounting plate (4) at passenger side firewall (5) in engine compartment and remove.
3. Discard defective receiver/dryer (2) in accordance with local regulations.
4. Heat two each soldered joints (6) on each end of the dryer assembly. After joints are loose, remove dryer.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

1. Install new O-rings on each of the A/C lines (1).
2. Install new receiver/dryer (2) to passenger side firewall (5) in engine compartment with mounting bolts (3) and loosely tighten.
3. Align mounting holes and tighten.
4. Resolder joints.

c) Follow-On Maintenance

1. Re-connect A/C hoses.
2. Battery Disconnect Switch ON.
3. Evacuate and re-charge A/C system per service station unit.
4. Start engine.
5. Verify all operations of A/C system.
6. Check for any leaks.
7. Shut A/C system OFF.
8. Shut engine OFF.
9. Battery Disconnect Switch OFF.
10. Reinstall engine side armor.
11. Close engine hood.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.12 Air Conditioner Hose Replacement

AIR CONDITIONER HOSE REPLACEMENT	
This task covers:	
a) Removal	b) Clean and Inspect c) Installation
d) Follow-On Maintenance	
INITIAL SET UP	<u>Equipment Conditions</u>
	Parking brake set
<u>Special Tools</u>	Wheels chocked
None	Transmission set in NEUTRAL (N)
	Engine shut OFF
<u>Personnel</u>	Battery Disconnect Switch OFF
One (1) Wheeled Vehicle Mechanic	Recovery and evacuate A/C system
	Remove condenser armor cover plate or other armor as needed
<u>Material Parts</u>	<u>Follow-On Maintenance</u>
A/C Hose	Battery Disconnect Switch ON
O-rings (2 for each hose replaced)	Evacuate and re-charge A/C system
Lube Oil	Start engine
Sealing Compound Loctite (med strength)	Verify operation of A/C system
<u>Reference</u>	Check for leaks
Parts Manual	Shut system OFF
	Shut engine OFF
<u>Equipment Required</u>	Battery Disconnect Switch OFF
A/C System Station	Reinstall armor cover plates if removed.

Chapter 4 – MAINTENANCE INSTRUCTIONS



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DO NOT expose any refrigerant containers empty or full to open flames or temperatures above 125° F (51° C). DO NOT discard empty containers where they may be subject to heat of trash burner, they may explode. Containers must be stored, installed and disposed of in accordance with local regulations. Failure to comply may result in serious injury or death to personnel.

Refrigerant will turn into a poisonous gas in the presence of heat. Do not smoke or allow any type of flame in immediate area while servicing the air conditioning system. Never weld, solder, steam clean, or use excessive heat on any part of the air conditioning system while charged/pressurized. Refrigerant must not be mixed with air and then pressurized. When mixed and then pressurized refrigerant becomes combustible. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Refrigerant must be recovered from the system with authorized recommended equipment before any work can be performed on the unit. Always use approved recycling equipment to prevent accidental discharge. Refrigerant evaporates very quickly and will take up all the oxygen in your work area, especially if a small or enclosed area. This can cause suffocation or brain damage for anyone in the work area. If a leak occurs avoid breathing the refrigerant vapor and thoroughly ventilate area before continuing service. If you do breathe in refrigerant vapors, contact emergency medical personnel right away. Failure to comply may result in serious injury or death to personnel.

You can not check the compressor oil level while the A/C system is charged with refrigerant. Never open the high side hand valve of the manifold gauge set while A/C system is operating. If hot, high pressure refrigerant is forced through the gauge to the refrigerant supply cylinder and it could rupture. Do not use parts other than those specified for the system being serviced. Failure in using improper parts may result in damage to equipment and/or serious injury or death to personnel.

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Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS



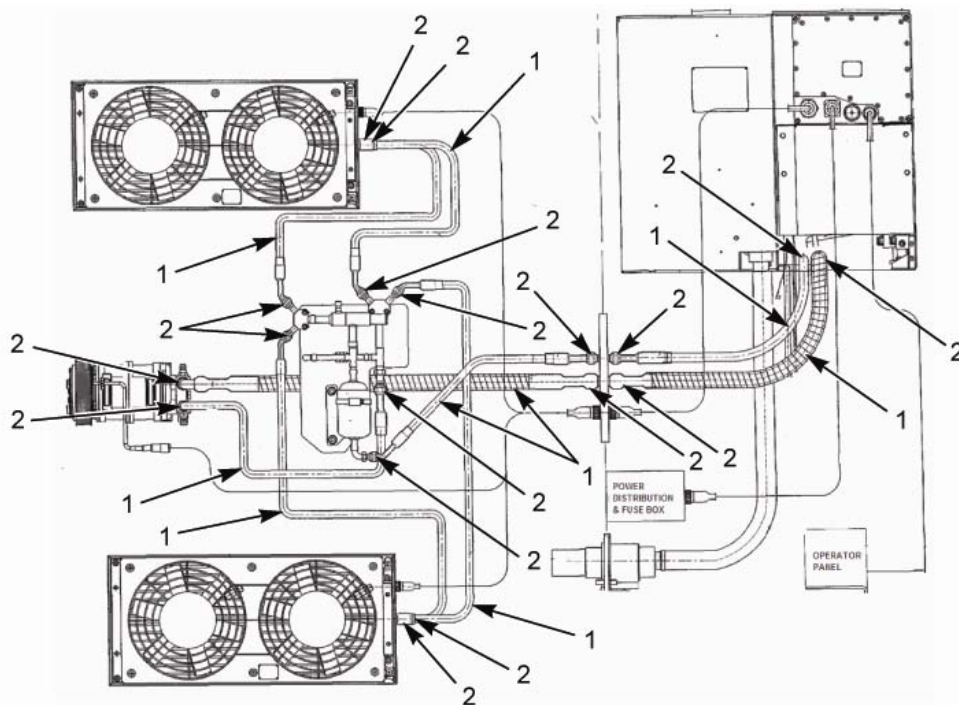
To prevent damage to test equipment, make sure test equipment is clear of all moving parts in the engine compartment. When installing and removing any service hose or fitting, a small amount of refrigerant may escape. Always follow all safety precautions. Failure to comply may result in damage to equipment.

NOTE

Service Equipment is made by different brands and may look differently than equipment shown in any part of the Air Conditioning System Section. The function of the equipment used for each service procedure is basically the same. If you are performing these service procedures using service equipment different from what is shown, refer to the manufacturer's instructions supplied with that equipment.

All A/C hoses are removed and installed the same way even though they may be different sizes. Each A/C hose being replaced also needs to have new O-rings installed. For each hose installed there are two O-rings, one for each end. Make sure that you have the correct O-ring for the hose installed. There are four size hoses and O-rings that need to match when installed or the A/C system will not seal or work correctly

a) Removal



1. Locate A/C hose (1) being replaced.
2. Remove plastic tie down straps from hoses. Disconnect defective A/C hose (1) at both ends.
3. Remove old O-rings (2) from hose connection.

Chapter 4 – MAINTENANCE INSTRUCTIONS

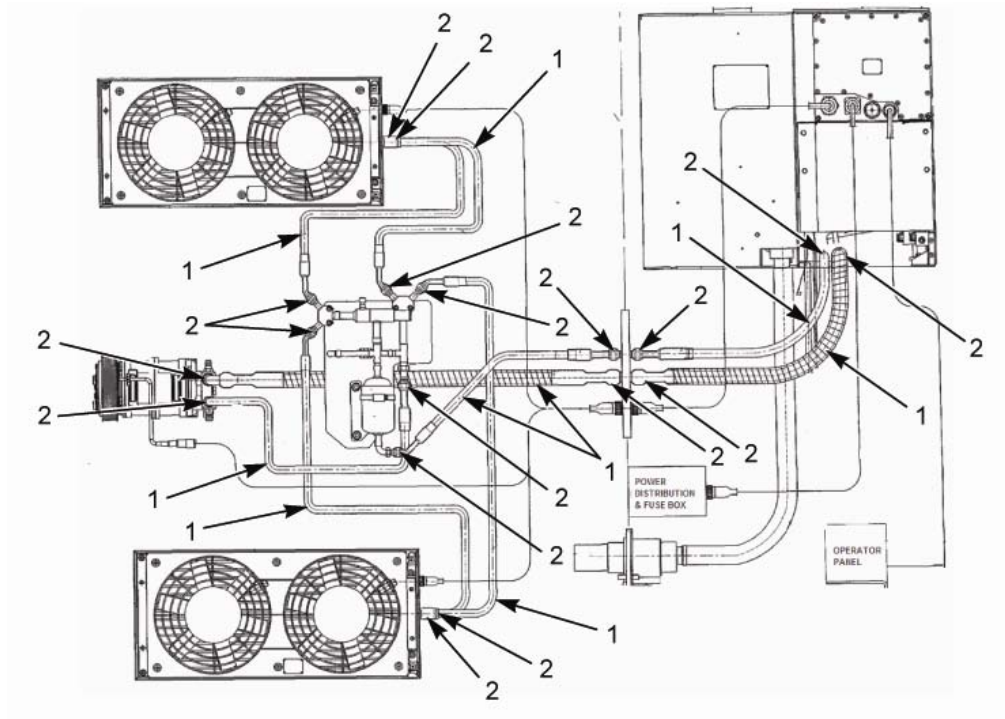
4. Discard defective A/C hose (1) and O-ring (2).
5. Repeat procedure steps 1 thru 4 for more than one hose replacement.

b) Clean and Inspect

1. Clean and inspect hose ends for any signs of damage, pitting, corrosion and connection and components should be repaired or replaced.

c) Installation

1. Install new O-ring (2) into A/C hose (1) connection.
2. Verify you have correct hose (1), then install new hose (1). You should be able to hear a slight click when hose connection is made properly.
3. Secure hose with plastic tie down straps.
4. Repeat procedure steps 1 thru 2 for more than one hose installation.



d) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Evacuate and re-charge A/C system.
3. Start engine.
4. Verify operation of A/C system.
5. Check for leaks.
6. Shut system OFF.
7. Shut engine OFF.
8. Battery Disconnect Switch OFF.
9. Reinstall armor cover plates if removed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.13 Air Conditioner Service Port/Schrader Valve Replacement

AIR CONDITIONER SERVICE PORT/SCHRADER VALVE REPLACEMENT		
This task covers:		
a) Disassembly/Removal	b) Reassembly/Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Service Port/Schrader Valve (1 per line) O-rings (2 per A/C hose) A/C Hose/Line (1) O-ring (1 in valve)</p> <p><u>Equipment Required</u> A/C System Station</p> <p><u>Reference</u> Parts Manual</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Engine hood raised Remove engine side armor if needed Recovery and evacuate A/C system</p> <p><u>Follow-On Maintenance</u> Evacuate and recharge A/C system Battery Disconnect Switch ON Start engine Check for leaks Verify operation of A/C system Shut engine OFF Battery Disconnect Switch OFF Reinstall engine side armor if removed</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Disassembly/Removal



Safety goggles and full face shield should be worn while working with or around refrigerant. The temperature of liquid refrigerant is -20° F (-29° C). DO NOT rub eyes if refrigerant get in them. Splash with cold water to gradually increase temperature above freezing and seek immediate medical attention. Failure to comply may result in serious injury or death to personnel.

Wear protective rubberized gloves. Wear protective clothing while working with refrigerant. If refrigerant comes in contact with skin, remove all contaminated clothing. Treat skin as though it were frostbitten or frozen and seek immediate medical attention. Failure to comply may result in serious injury or death to personnel.

DO NOT expose any refrigerant containers empty or full to open flames or temperatures above 125° F (51° C). DO NOT discard empty containers where they may be subject to heat of trash burner, they may explode. Containers must be stored, installed and disposed of in accordance with local regulations. Failure to comply may result in serious injury or death to personnel.

Refrigerant will turn into a poisonous gas in the presence of heat. Do not smoke or allow any type of flame in immediate area while servicing the air conditioning system. Never weld, solder, steam clean, or use excessive heat on any part of the air conditioning system while charged/pressurized. Refrigerant must not be mixed with air and then pressurized. When mixed and then pressurized refrigerant becomes combustible. Failure to comply may result in damage to equipment and/or serious injury or death to personnel.

Refrigerant must be recovered from the system with authorized recommended equipment before any work can be performed on the unit. Always use approved recycling equipment to prevent accidental discharge. Refrigerant evaporates very quickly and will take up all the oxygen in your work area, especially if a small or enclosed area. This can cause suffocation or brain damage for anyone in the work area. If a leak occurs avoid breathing the refrigerant vapor and thoroughly ventilate area before continuing service. If you do breathe in refrigerant vapors, contact emergency medical personnel right away. Failure to comply may result in serious injury or death to personnel.

You can not check the compressor oil level while the A/C system is charged with refrigerant. Never open the high side hand valve of the manifold gauge set while A/C system is operating. If hot, high pressure refrigerant is forced through the gauge to the refrigerant supply cylinder and it could rupture. Do not use parts other than those specified for the system being serviced. Failure in using improper parts may result in damage to equipment and/or serious injury or death to personnel.

International[®] Mine Protected Vehicle (I-MPV) armor parts are heavy. Use care when removing or installing. DO NOT attempt to lift without the aid of an assistant and a suitable lifting device. Failure to comply may result in serious injury or death to personnel.

Before opening the hood, make sure that there is enough room in front of the vehicle for the hood to open completely without pinning or pinching yourself or an assistant between the hood and any other structure. Failure to comply may result in serious injury or death.

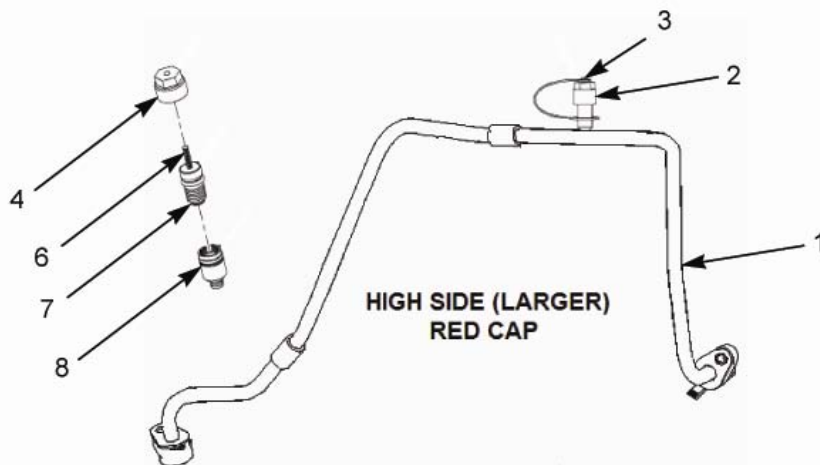
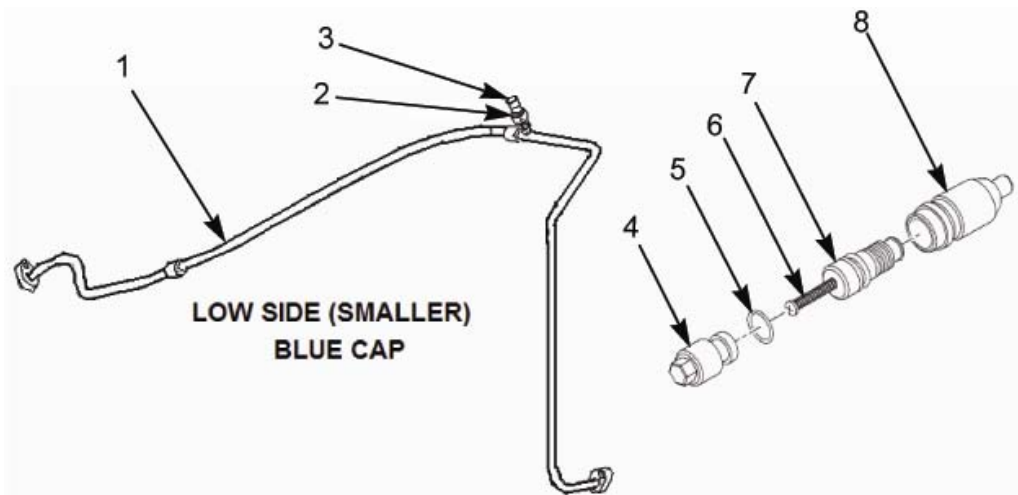
Chapter 4 – MAINTENANCE INSTRUCTIONS



To prevent damage to test equipment, make sure test equipment is clear of all moving parts in the engine compartment. When installing and removing any service hose or fitting, a small amount of refrigerant may escape. Always follow all safety precautions. Failure to comply may result in damage to equipment.

NOTE

Service Equipment is made by different brands and may look differently than equipment shown in any part of the Air Conditioning System Section. The function of the equipment used for each service procedure is basically the same. If you are performing these service procedures using service equipment different from what is shown, refer to the manufacturer's instructions supplied with that equipment.



1. Locate A/C hose/line (1) that needs the service port/Schrader valve (2) replaced.
2. Remove the service cap (3) red or blue and set aside.
3. Depending on what part needs to be replaced, disassemble service port (2) to part that needs service.

Chapter 4 – MAINTENANCE INSTRUCTIONS

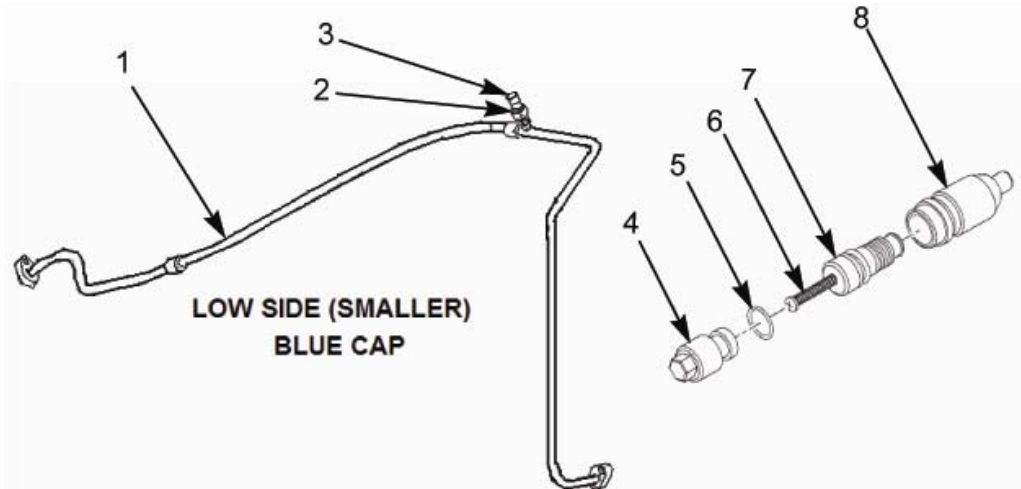
4. If the damage is to the body base of the service port/Schrader valve the whole A/C hose/line will have to be replaced. Follow procedure for Air Conditioner Hose Replacement.
5. Discard defective parts in accordance with local regulations.

b) Reassembly/Installation

1. If A/C hose/line (1) was replaced, follow procedure for Air Conditioner Hose Replacement.



Make sure not to cross thread any of the threads during reassemble. This can cause the A/C system to run out of refrigerant through leakage. Failure to comply may result in damage to equipment



2. Reassemble service port by inserting the Schrader valve stem (6) and new O-ring (5) onto the core (7), then insert the assembly into the body base (8) and install the switch cap (4).

c) Follow-On Maintenance

1. Evacuate and recharge A/C system.
2. Battery Disconnect Switch ON.
3. Start engine.
4. Check for leaks in A/C system.
5. Verify operation of A/C system.
6. Shut engine OFF.
7. Battery Disconnect Switch OFF.
8. Reinstall engine side armor if removed.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.14 Heater Replacement

HEATER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> Diesel Heater (1) Anti-Corrosion Compound Connector Lubricant ID Tags, as needed</p> <p><u>Equipment Required</u> Rags Drain pan</p> <p><u>Reference</u> Parts Manual</p>		<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Release fuel line pressure Drain engine coolant to safe level Remove passenger front stowage box</p> <p><u>Follow-On Maintenance</u> Re-fill radiator coolant level to full Battery Disconnect Switch ON Start engine Open/close bleeder screw on top of heater to release air bubbles in coolant Check for air, fuel and coolant leaks Verify operation of heater unit Shut engine OFF Battery Disconnect Switch OFF Reinstall passenger stowage box</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



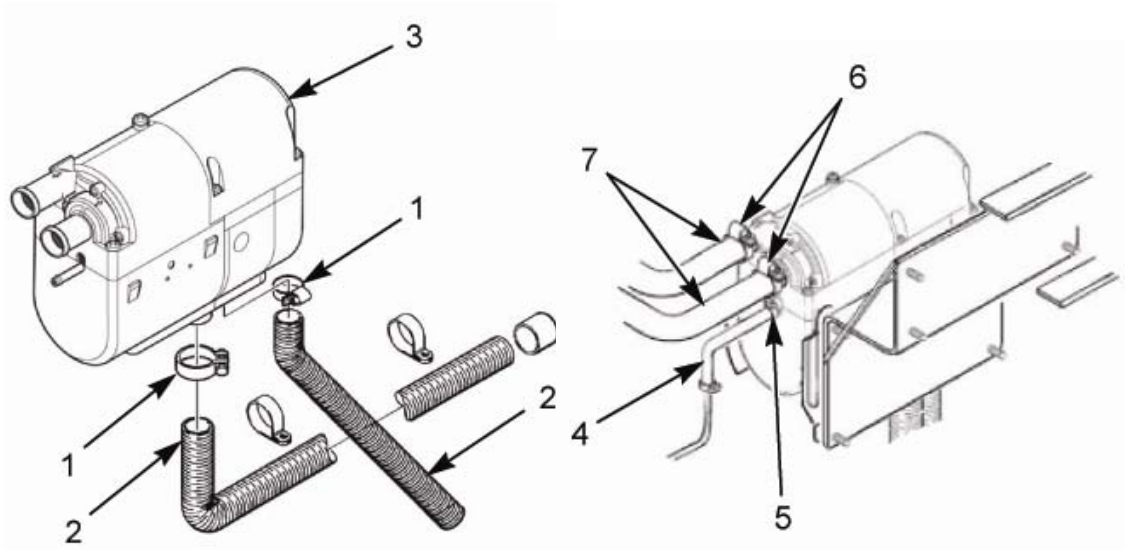
No smoking or open flames around diesel fuel, flammable and could cause explosion or fire if exposed. Have fire extinguisher on hand when working with fuel systems. Failure to comply may result in damage to equipment and serious injury or death to personnel.

Wear protective eye wear while working with systems under pressure. Failure to comply may result in serious injury or death to personnel.

Make sure that engine is shut off, battery disconnected or disconnect switch is turned off, wheels are chocked, transmission is in neutral/park, parking brake is set before starting service procedure on engine. Failure to comply may result in damage to equipment or serious injury or death to personnel.

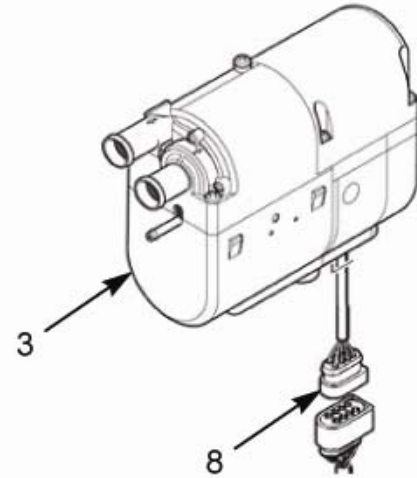
Dispose of used parts, rags, containers and engine fluids according to regulations. Failure to comply may result in equipment damage or serious injury or death to personnel.

1. Mark and label all hoses, lines and electrical connections before removal. This will quicken the installation of replacement.

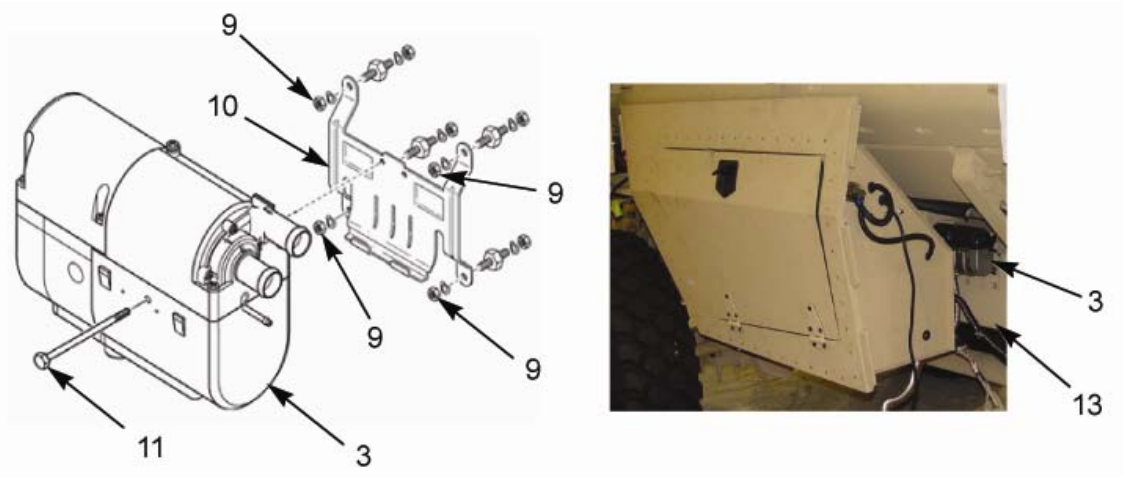


2. Loosen clamps (1) to exhaust and intake air hoses (2) at bottom of heater (3).
3. Loosen clamp (5) and disconnect fuel line (4).
4. Use caution when loosening clamps (6) and disconnecting coolant inlet and outlet hoses (7).

Chapter 4 – MAINTENANCE INSTRUCTIONS



5. Disconnect electrical connector (8) at bottom of heater (3).
6. Plug all hose ends to avoid spillage and plug heater (3) hose openings to contain what fluids it has.



7. Loosen and remove four mounting bolts (9) from mounting bracket (10).
8. Remove heater (3) from frame rail (13).
9. Loosen and remove center safety bolt (11) from heater (3) to mounting bracket (10), separate and discard defective heater (3) in accordance with local regulations.

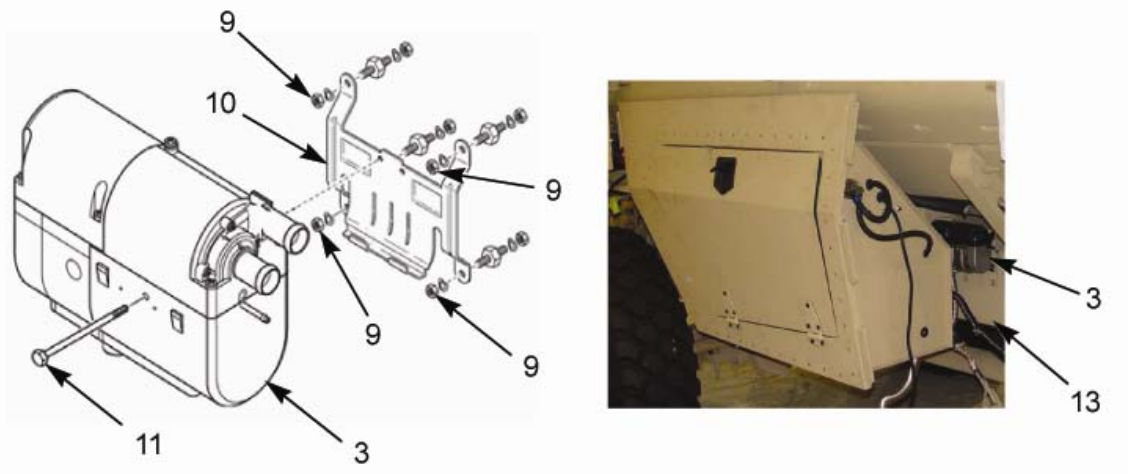
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



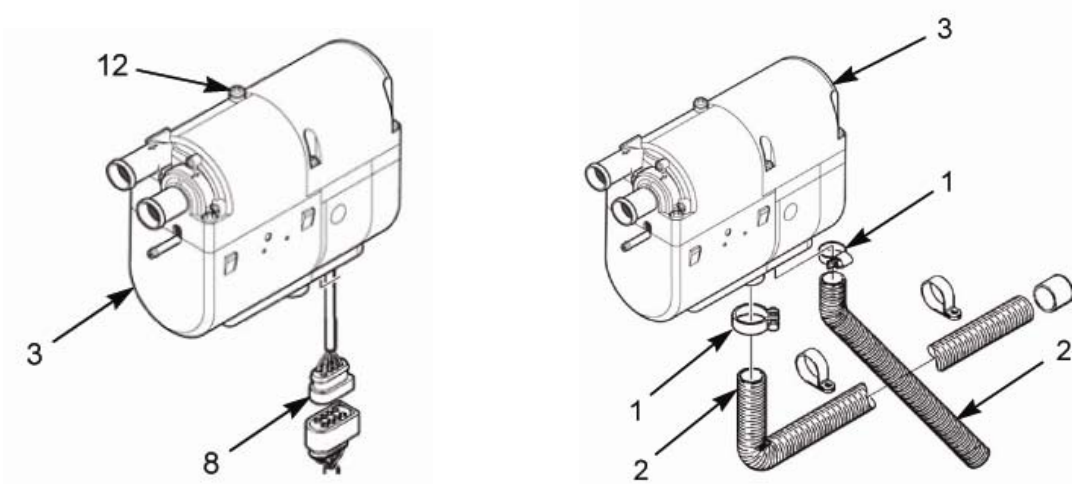
Anti-corrosion compound is toxic. Use only in well-ventilated area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**; contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury to personnel.

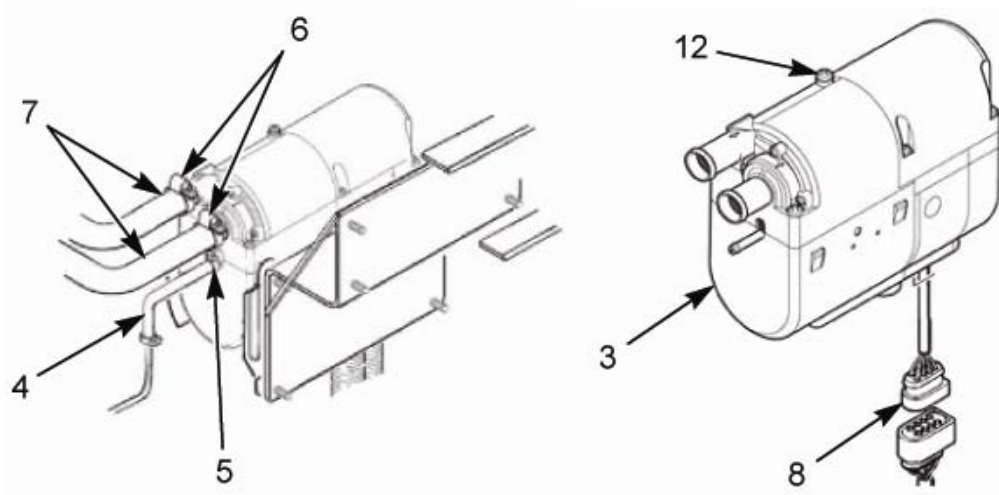


1. Apply anti-corrosion compound to mounting bolts (9) and (10).

Chapter 4 – MAINTENANCE INSTRUCTIONS



2. Apply connector lubricant to electrical connector (8).
3. Install new heater (3) to mounting bracket (10) with center safety bolt (11) and tighten.
4. Install heater (3) and mounting bracket (10) to frame rail (13) with four mounting bolts (9). Align and tighten.
5. Install exhaust and intake air hoses (2) with clamps (1) at bottom of heater (3) and tighten.

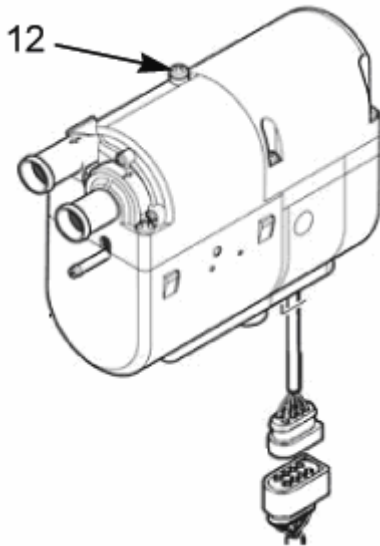


6. Install fuel line (4) with clamp (5).
7. Install coolant inlet and outlet hoses (7) with clamps (6).
8. Connect electrical connector (8) at bottom of heater (3).

Chapter 4 – MAINTENANCE INSTRUCTIONS

c) Follow-On Maintenance

1. Refill radiator coolant level to full.
2. Battery Disconnect Switch ON.
3. Start engine.
4. Open/close bleeder screw (12) on top of heater to release air bubbles in coolant.



5. Check for air, fuel, and coolant leaks.
6. Verify operation of heater unit.
7. Shut engine OFF.
8. Battery Disconnect Switch OFF.
9. Reinstall passenger side stowage box.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.15 LSS Blower Motor Replacement

LSS BLOWER MOTOR REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Required</u>
		None
<u>Special Tools</u>		<u>Equipment Conditions</u>
None		Parking brake set
		Wheels chocked
<u>Personnel</u>		Transmission set in NEUTRAL (N)
One (1) Wheeled Vehicle Mechanic		Engine shut OFF
<u>Material Parts</u>		Battery Disconnect Switch OFF
Blower Motor (1)		Remove side panel for access
Identification Tags		
Anti-Corrosion Compound		<u>Reference</u>
Electric Lube		Parts Manual
		<u>Follow-On Maintenance</u>
		Reinstall side panel
		Battery Disconnect Switch ON
		Start engine
		Verify operation of blower motor
		Shut engine OFF
		Battery Disconnect Switch OFF

Chapter 4 – MAINTENANCE INSTRUCTIONS

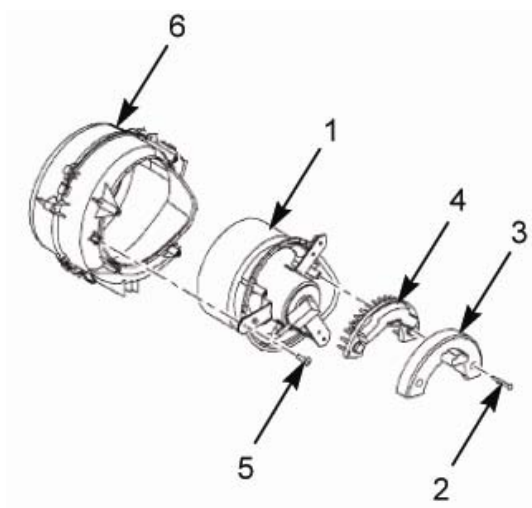
a) Removal



Wear safety goggles and work gloves while working on vehicle. Mark and label all connections and reference areas before removal of parts. Failure to comply may result in damage to equipment and or serious injury or death to personnel.



1. Mark and label all electrical connections and hoses needed to remove blower motor (1).
2. Loosen and remove two screws (2) for the linear power module cover (3) and linear power module (4).
3. Loosen and remove three screws (5) holding the blower motor into housing (6).
4. Discard defective blower motor (1) in accordance with local regulations.



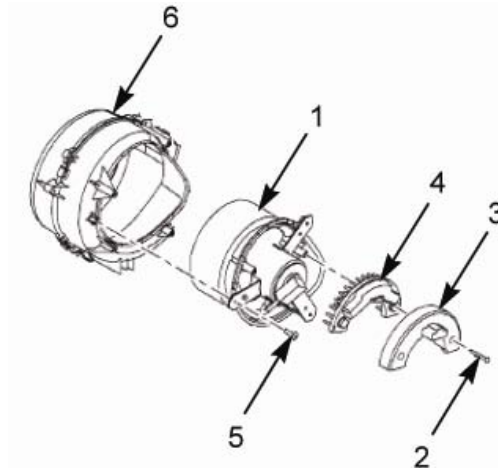
Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Anti-corrosion compound is toxic. Use only in a well vented area. Use approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, **DO NOT INDUCE VOMITING**, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin is contacted, wash thoroughly with soap and water. Failure to comply may result in serious injury or death to personnel.



1. Apply connector lubricant to electrical connectors.
2. Apply anti-corrosion compound to mounting screws.
3. Install new blower motor (1) into housing (6) and align holes.
4. Install three mounting screws (5).
5. Install linear power module (4) and linear power module cover (3) with two mounting screws (2) and align and tighten.
6. Connect all electrical connectors and hoses that were disconnected for removal.

c) Follow-On Maintenance

1. Reinstall side panel.
2. Battery Disconnect Switch ON.
3. Start engine.
4. Verify operation of blower motor.
5. Shut engine OFF.
6. Battery Disconnect Switch OFF.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.16 HVAC/LSS Control (Air Conditioner Thermo Switch) Replacement

HVAC/LSS CONTROL (AIR CONDITIONER THERMO SWITCH) REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> One (1) HVAC/LSS Control Unit ID Tags</p>		<p><u>Equipment Condition</u> Parking brake set Chock wheels Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Disconnect batteries</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> None</p> <p><u>Follow-On Maintenance</u> Reconnect batteries Battery Disconnect Switch ON Engine ON Verify HVAC/LSS control operation Remove wheel chocks</p>

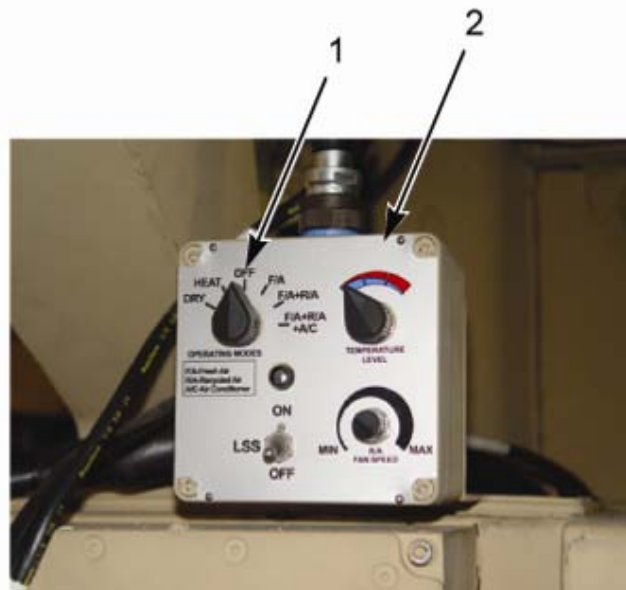
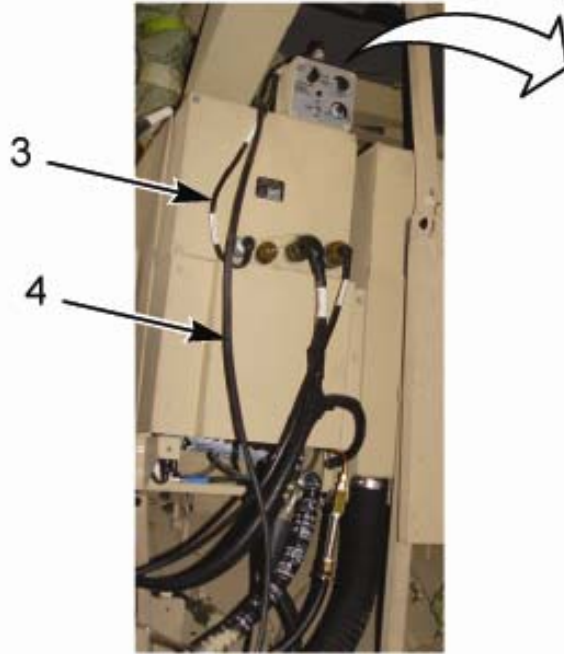
NOTE

The HVAC/LSS Control can be removed and installed without removing the refrigerant from the A/C system.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

1. Turn the power switch to OFF mode on the operating control panel (1) of the LSS unit (2).
2. Mark and label all electrical connectors (3) and hoses (4), and then disconnect them.



3. Remove the HVAC/LSS control unit (2).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

1. Install the HVAC/LSS control unit (2).
2. Reconnect the hoses (4) and electrical connections (3) to the HVAC/LSS control unit (2) and tighten.
3. Reconnect the batteries.
4. Verify HVAC/LSS control operation unit operation.

c) Follow-On Maintenance

1. Re-connect batteries.
2. Battery Disconnect Switch ON.
3. Engine ON.
4. Verify HVAC/LSS control operation.
5. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.17 Expansion Valve Replacement

EXPANSION VALVE REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> Torque Wrench</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Expansion Valve O-ring (1)</p>		<p><u>Equipment Condition</u> Parking brake set Chock wheels Transmission in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Mineral based oil</p> <p><u>Follow-On Maintenance</u> Battery Disconnect Switch ON Check system Remove wheel chocks</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS



The pressure transducer is not interchangeable with a pressure switch. To prevent damage to the A/C system, replace a defective transducer only with the recommended part.

NOTE

The expansion valve can be removed and installed without removing the refrigerant from the A/C system.

The expansion valve is located on the condenser-to-evaporator refrigerant line.



a) Removal

1. Disconnect the electrical connection (1) to the expansion valve (2).
2. Unscrew the expansion valve from the condenser-to-evaporator refrigerant line and cap the open fitting.

b) Installation

1. Install a new O-ring on the transducer fitting and lubricate the O-ring and threads with mineral-based oil.
2. Screw the expansion valve onto the A/C line fitting and tighten to 7 to 15 lb-ft (9.5 to 20.0 N•m).
3. Connect the electrical connector to the expansion valve.

c) Follow-On Maintenance

1. Battery Disconnect Switch ON.
2. Check system.
3. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.18 NBC/LSS Filter Replacement

NBC/LSS FILTER REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SET UP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> Two (2) Wheeled Vehicle Mechanic</p> <p><u>Material Parts</u> NBC Filter (1)</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u> Required NBC Safety Suit Suitable platform ladder Suitable lifting device for armor cover plate Suitable lifting sling for armor cover plate ID Tags, as needed Connector Lube Anti-Corrosion Compound</p>	<p><u>Equipment Conditions</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Batteries disconnected Remove outside armor cover plate Remove NBC access panel</p> <p><u>Follow-On Maintenance</u> Reinstall NBC access panel Reinstall armor cover panel Reconnect batteries Battery Disconnect Switch ON Start engine Turn NBC/LSS system ON Verify operation of NBC/LSS controls and system Turn NBC/LSS system OFF Shut engine OFF Battery Disconnect Switch OFF</p>	

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal

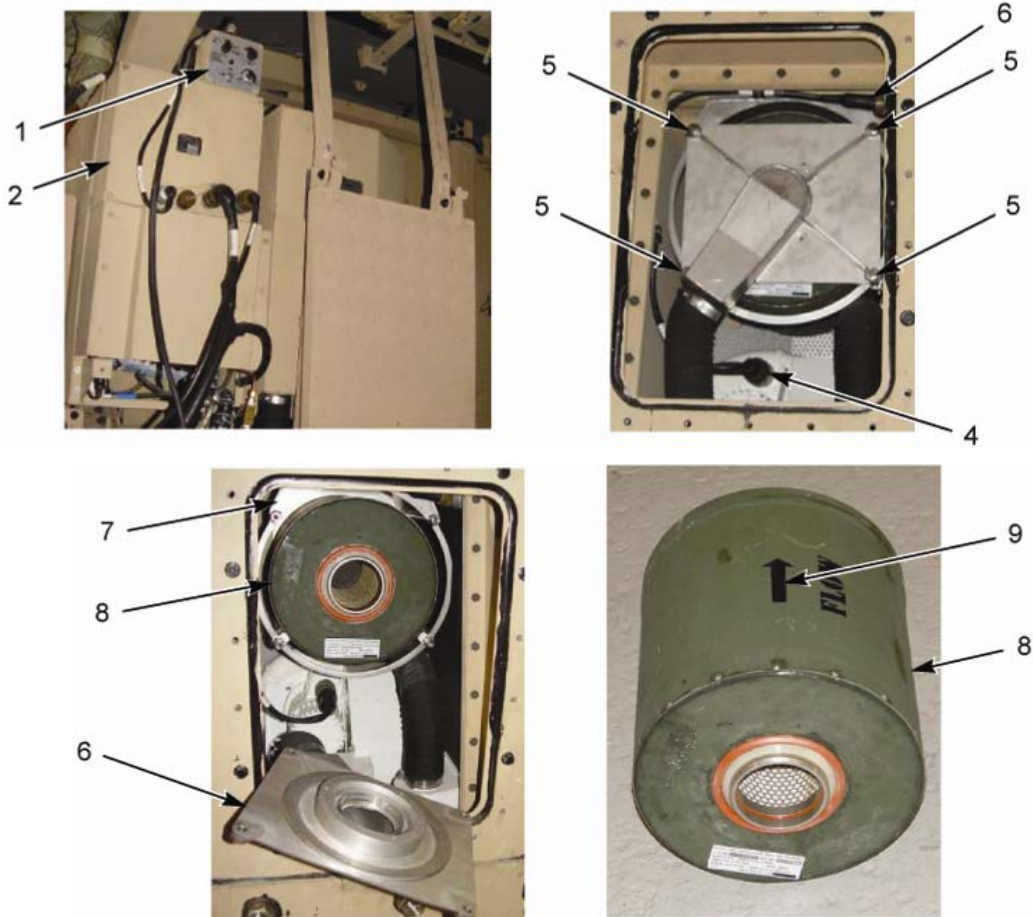


The NBC (nuclear/biological/chemical) LSS (Life Support System) regulates the fresh and re-circulated air within the vehicle in WAR TIME. The system may have been exposed to NBC AGENTS, USE EXTREME CARE WHEN REMOVING FILTER. Failure to comply may result in serious injury or death to personnel.

Do NOT service or maintain this system alone. This is a two person operation in case of Medical Emergency due to possible exposure to NBC Agents. This procedure must be performed by properly trained authorized personnel in suitable protective clothing. Make sure that batteries are disconnected, no open flames or smoking around vehicle, area is well ventilated, never operate system with cover or panel removed, have proper safety equipment and clothing. Failure to comply may result in serious injury or death to personnel.

First aid and fire control equipment should be available during all the operation and maintenance phases. People working with or near high voltages should be familiar with resuscitation methods. Failure to comply may result in serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS



1. Turn the power switch to OFF mode on the operating control panel (1) of the LSS unit (2).
2. Mark and label all electrical connectors (3 and 4) and then disconnect them.
3. Loosen and remove the four bolts/washers (5) that hold the filter cover (6) to the filter housing unit (7).
4. Carefully remove filter cover (6). Filter can possible have NBC contaminations, use caution.
5. Using extreme caution and properly suited, slide filter (8) out of the filter housing (7) and dispose of in accordance with regulations.



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin contacted, wash thoroughly with soap and water. Failure to comply may cause serious injury or death to personnel.

Anti-corrosion compound is toxic. Use only in a well vented area. Use NOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation

1. Apply anti-corrosion compound to armor bolts and NBC panel bolts.
2. Apply connector lubricant to all electrical connectors disconnected before removal of filter.
3. Carefully, insert the new NBC Filter (8) into the filter housing (7). Notice that the arrow mark (9) which is on the filter (8) is directed inside the filter housing (7), towards the inside (inward) of the vehicle.
4. Install the filter cover (6) with four bolts/washers (5).
5. Reconnect electrical connectors (3) and (4).

c) Follow-On Maintenance

1. Reinstall NBC outside panel.
2. Reinstall armor panel.
3. Reconnect batteries.
4. Battery Disconnect Switch ON.
5. Start engine.
6. Turn NBC/LSS system ON.
7. Verify operation of NBC/LSS controls and system.
8. Turn NBC/LSS system OFF.
9. Shut engine OFF.
10. Battery Disconnect Switch OFF.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-15.19 Overpressure System Replacement

OVERPRESSURE SYSTEM REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u></p> <p>None</p> <p><u>Personnel</u></p> <p>Two (2) Wheeled Vehicle Mechanics Two (2) Crewmembers</p> <p><u>Material/Parts</u></p> <p>NBC Unit ID Tags, as needed Connector Lube Anti-Corrosion Compound</p>		<p><u>Equipment Condition</u></p> <p>Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF Batteries disconnected</p> <p><u>Reference</u></p> <p>Parts Manual</p> <p><u>Equipment Required</u></p> <p>Required Safety Suit Fork Lift/Hi-lo</p> <p><u>Follow-On Maintenance</u></p> <p>Reconnect battery Recharge all lines slowly Check operation of system</p>

Chapter 4 – MAINTENANCE INSTRUCTIONS

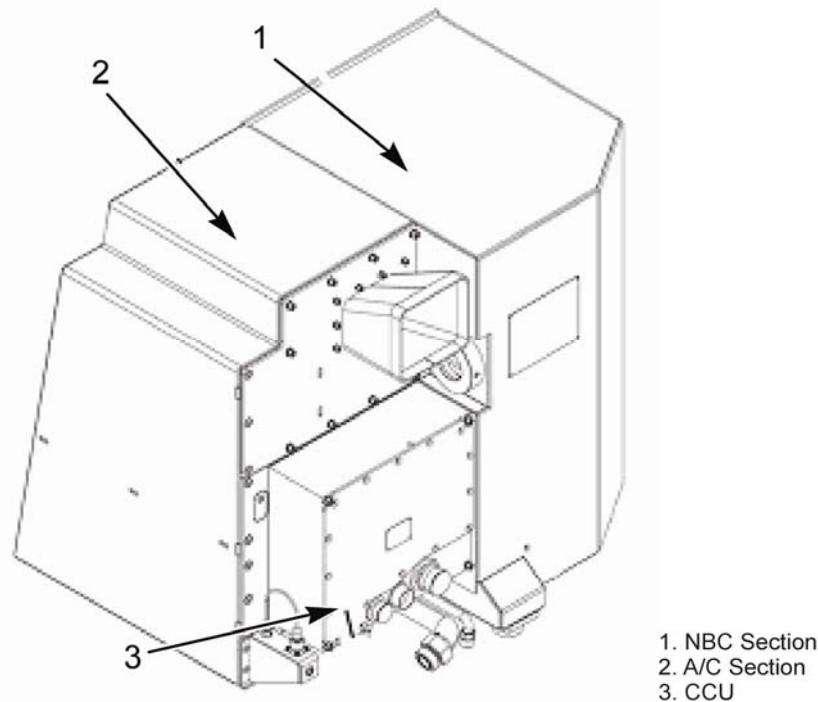
a) Removal



The NBC (nuclear/biological/chemical) LSS (Life Support System) regulates the fresh and re-circulated air within the vehicle in WAR TIME. The system may have been exposed to NBC AGENTS, USE EXTREME CARE WHEN REMOVING. Failure to comply may result in serious injury or death to personnel.

Do not work on the system alone, there should always be at least two persons working on the system at all times for safety. Failure to comply may result in serious injury or death to personnel.

Maintenance should only be performed on this system by properly trained and qualified personnel with proper safety suit. Failure to comply may result in serious injury or death to personnel.



1. Label all electrical connections and hoses before you disconnect them to ensure proper assembly on installation.
2. Make sure all hoses have had the pressure releases in them before you try to disconnect.
3. Disconnect all electrical connections and hoses.
4. Unbolt ceiling vent, floor air duct and top air duct and remove.
5. Unbolt unit from the floor pan.
6. Use caution when moving unit to rear of vehicle, move slowly.
7. When get to back hatch door, have hi-lo with pallet on forks and slide unit onto pallet. Do not stand or walk on pallet, may need a forth person for this portion of task.
8. Have hi-lo driver remove old NBC unit and bring new replacement on new pallet.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



Connector lubricant is harmful to skin. Prolonged or repeated contact with skin or contact with eyes may cause irritation. If eyes are contacted, rinse thoroughly and contact physician if irritation persists. If skin contacted, wash thoroughly with soap and water. Failure to comply may cause serious injury or death to personnel.

Anti-corrosion compound is toxic. Use only in a well vented area. Use NOSH/MSHA-approved respirator with dual organic vapor/mist and particulate cartridge. Do not get in eyes; wear chemical safety goggles and full face shield when using. Avoid contact with skin and wear rubber or plastic, solvent-resistant gloves. In case of contact, remove contaminated clothing and immediately wash area with soap and water. If eyes are contacted, flush eyes with large amounts of water for at least 15 minutes and get immediate medical attention. If swallowed, DO NOT INDUCE VOMITING, contact a physician immediately. Failure to comply may result in serious injury or death to personnel.



Inspect new unit before installation. Check unit walls for any dents, cracks, pits also check welds for cracks, missed welds, and bubbled welds. These are all signs of a bad unit and should not be installed in vehicle. If this were to happen the vehicle would not be available for mission until replaced.

1. Check unit from top to bottom for any sign of damage, if you find damage unit cannot be installed, notify your supervisor.
2. Apply anti-corrosion compound to bolts and bolt holes before putting unit back into place.
3. If ok, carefully move unit into place and bolt back into place still taking care not to damage unit in any way. Do not tighten until unit is square and level in place.
4. Once bolted down tighten bolts.
5. Install floor and top air ducts and bolt ceiling vent back into place.
6. Apply connector lubricant to electrical connectors before connecting.
7. Connect electrical connections and hoses to where they were removed from.
8. Re-check all connection and mounting bolts to make sure secure before connecting power back to vehicle.

c) Follow-On Maintenance

1. Reconnect battery.
2. Recharge all lines slowly.
3. Check operation of system.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-16 Weapon Station and Equipment

4-16.1 Gunner’s Platform/Stand Replacement

GUNNER’S PLATFORM/STAND REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
<p>INITIAL SETUP</p> <p><u>Special Tools</u> None</p> <p><u>Personnel</u> One (1) Wheeled Vehicle Mechanic</p> <p><u>Material/Parts</u> Gunner’s platform/stand assembly (1) Platform support lines (2) Platform support line shackles (4)</p>		<p><u>Equipment Condition</u> Parking brake set Wheels chocked Transmission set in NEUTRAL (N) Engine shut OFF Battery Disconnect Switch OFF</p> <p><u>Reference</u> Parts Manual</p> <p><u>Equipment Required</u></p> <p><u>Follow-On Maintenance</u> Test platform</p>



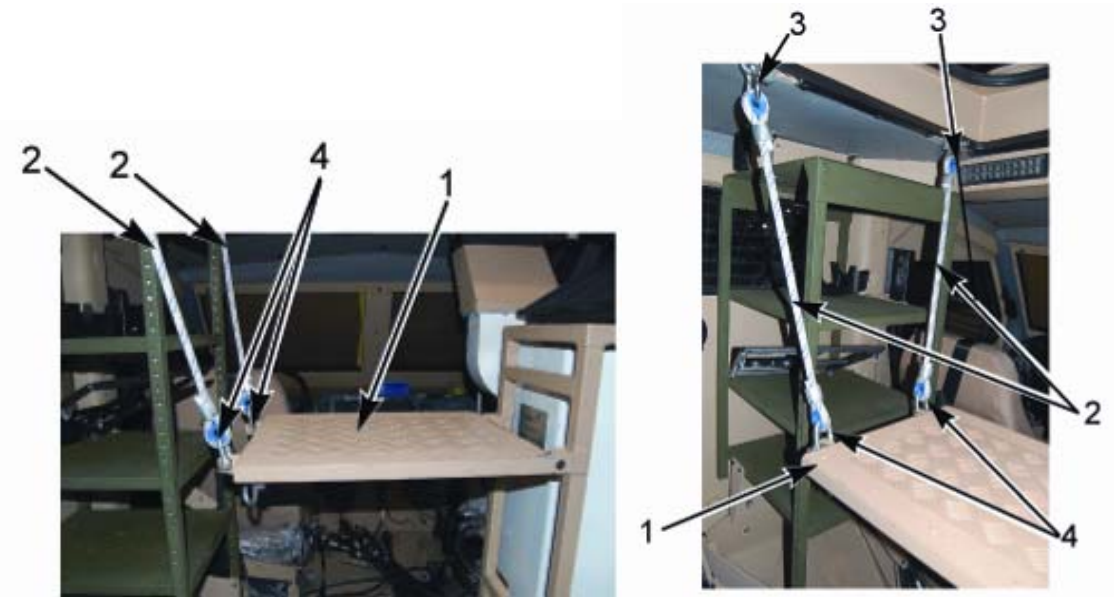
The gunner's sliding hatch can only be opened or closed when the vehicle is stationary and on a level surface. **DO NOT** attempt to open or close the hatch when the vehicle is in motion, or if the vehicle is on a longitudinal slope. Keep arms and hands clear of gunners hatch when closing it. Failure to comply may result in serious injury or death to personnel.

Make absolutely certain that the gunners hatch is completely locked in the open position before moving the vehicle with a gunner in position. Use extreme caution when standing in gunner's hatch while vehicle is in motion, gunner should be holding on to the weapon or other suitable handle to maintain a stable posture at all times. Failure to comply may result in serious injury or death to personnel.

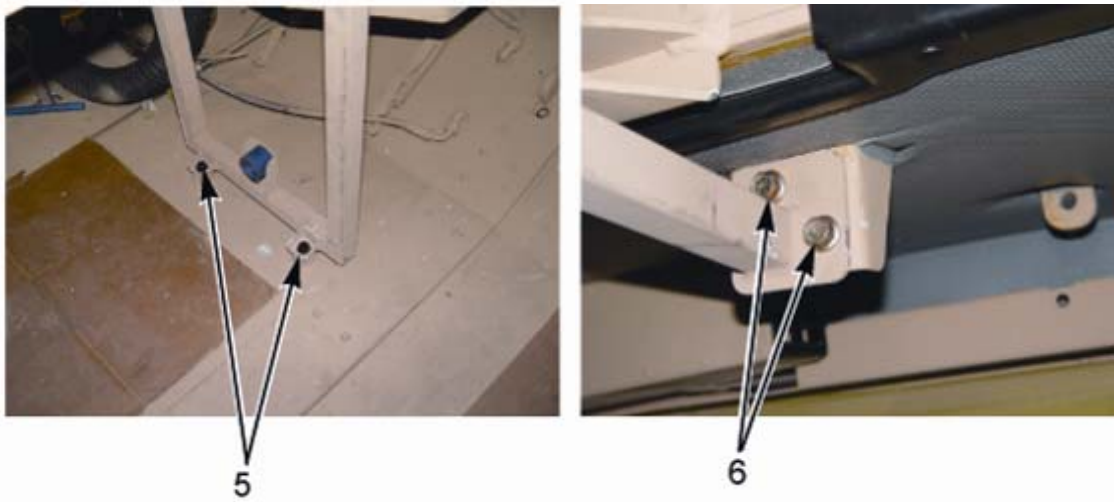
Use catch bag and catch bag retainer when firing a weapon from the machine gun mount. This is to prevent the links and spent hot brass cartridge casings from entering the crew compartment during firing. Failure to comply may result in damage to equipment or serious injury to personnel.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



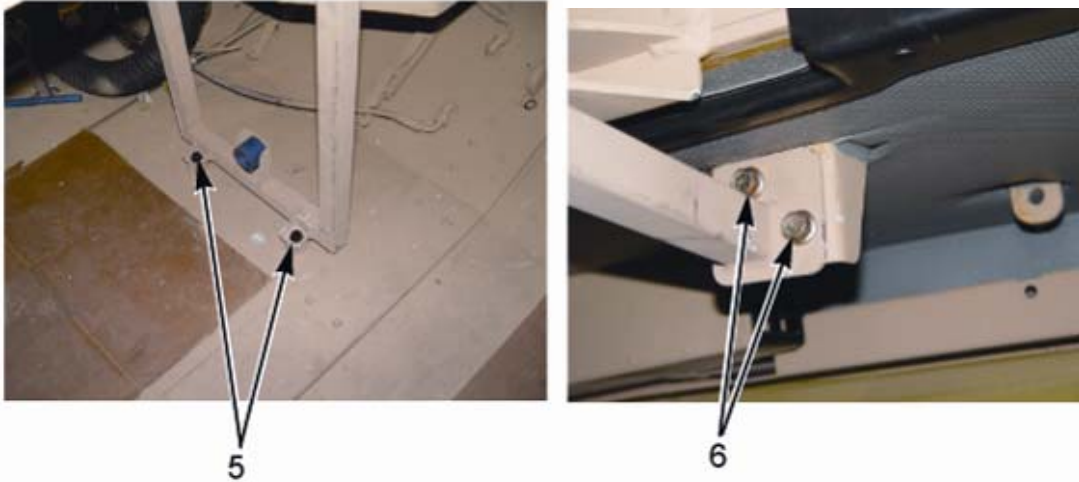
1. Remove from cabin ceiling and discard two platform (1) support lines (2), and two shackles (3) and (4).



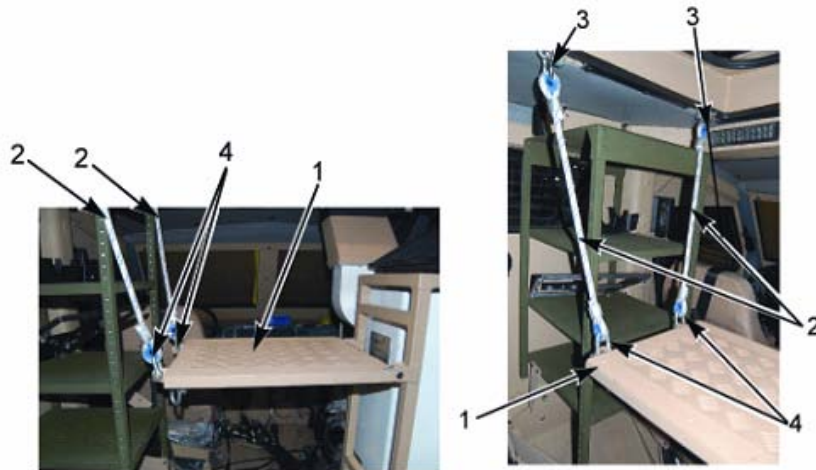
2. Remove and stow two bolts (5) securing gunner's platform/stand to floor.
3. Remove and stow four (two each arm) bolts (6) securing gunner's platform/stand arms to cabin wall.
4. Remove and discard gunner's platform/stand (1).

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Installation



1. Place new gunner's platform/stand (1) in position and mount base to floor using two screws (5) stowed in removal.
2. Mount the two platform arms to the cabin wall and secure with four bolts (6) stowed in removal.



3. Mount two platform (1) support lines (2) to cabin ceiling using two shackles (3).
4. Mount two platform (1) support lines (2) to gunner's platform using two shackles (4).
5. Test for proper operation.
6. Remove two shackles (4) supporting platform (1). Lower platform to storage position.
7. Store two support lines (2) to cabin ceiling with two shackles.

c) Follow-On Maintenance

1. Test platform.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-16.2 Rifle Racks Replacement

RIFLE RACKS REPLACEMENT		
This task covers:		
a) Removal	b) Installation	c) Follow-On Maintenance
INITIAL SET UP		<u>Equipment Conditions</u>
		Parking brake set
<u>Special Tools</u>		Wheels chocked
None		Transmission set in NEUTRAL (N)
		Engine shut OFF
<u>Personnel</u>		Battery Disconnect Switch OFF
One (1) Wheeled Vehicle Mechanic		
		<u>Reference</u>
<u>Material Parts</u>		Parts Manual
Hexagon Cap Screw (4 ea)		
Flat Washer (4 ea)		<u>Follow-On Maintenance</u>
Small Rack Storage (1 ea)		Secure weapon in rack
Mounting Bracket (1 ea)		Battery Disconnect Switch ON
Rifle Support Mount (1 ea)		Remove wheel chocks
<u>Equipment Required</u>		
None		



Remove any rifles that may be stored in the rifle racks being worked on. Ensure rifles are not loaded and stored in a safe manner. Failure to follow this procedure may result in serious injury or death.

Chapter 4 – MAINTENANCE INSTRUCTIONS

a) Removal



1. Remove and discard screws and flat washers securing mounting bracket (1).
2. Remove and discard mounting bracket (1).
3. Remove and discard screws and flat washers securing rifle mount support (2).
4. Remove and discard rifle mount support (2).

b) Installation

1. Install new rifle mount support (2).
2. Secure mount support with new screws and flat washers.
3. Install new mounting bracket (1).
4. Secure mounting bracket with new screws and flat washers.
5. Place weapon in rack and secure. Check for security of weapon.

c) Follow-On Maintenance

1. Secure weapon in rack.
2. Battery Disconnect Switch ON.
3. Remove wheel chocks.

Chapter 4 – MAINTENANCE INSTRUCTIONS

4-17. Preparation for Shipment

1) Vehicle Storage

The unit is responsible for adequate storage and protection of their new vehicles. Use the following procedures when storing the vehicle. Maintain records for vehicles in storage so that proper inspection and maintenance can be performed

NOTE

There is no warranty on this vehicle. Damage occurring to a vehicle while it is in storage will not be reimbursed.

a) Storage Duration - Two Months Or Less

Because you cannot accurately predict how long vehicles will remain in storage, always accomplish the following:

1. ALWAYS wash vehicles prior to placing vehicle in storage.

NOTE

Washing Instructions - Wash the vehicle with warm water and mild soap, then wipe wet surfaces with a chamois or soft cloth. DO NOT use hot water or strong soaps or detergents. DO NOT wash the vehicle in direct sun, or when the sheet metal is hot to the touch, because this will streak the finish. DO NOT wipe dirt off dry surfaces, because this will scratch the finish.

2. Inspect painted surfaces; touch up all exposed primed or raw metal areas to prevent rust.
3. Check the radiator coolant for proper level and adequate freeze protection (-40°F is standard for the vehicle).
4. Cover open ends of exhaust and air intake for the HVAC system.
5. Check state of charge in batteries; re-charge if open circuit voltage is below 12.6 volts.

NOTE

A low electrolyte level is normally the result of a broken case or years of usage; it will not be normally seen on new vehicles.

6. Fill fuel tank to maximum level. Ventilate system by releasing filler cap. If this can't be accomplished, completely drain the fuel tank.
7. Inspect vehicle prior to storage by performing a PMCS and make appropriate repairs. Ensure that maintenance services and lubrication are up to date.

Chapter 4 – MAINTENANCE INSTRUCTIONS

b) Storage Duration - Over Two Months

Units in storage three months or longer require the following additional procedures:

1. Inspect for the following:
 - a. Inspect for leaks.
 - b. Inspect for low or flat tires.
 - c. Inspect for corrosion.
 - d. Check for water in compartments.
 - e. Look for any other problems or shortcomings.
2. Start and run the vehicle at fast idle until it attains operating temperature. To remove surface charge from the battery, built up from previous start-ups and short idle periods, operate the heater and/or air conditioner and other accessories for a few minutes, and turn on the headlights.
3. Drive the vehicle a short distance. Shift the transmission in various ranges; engage and disengage the clutch and parking brake; apply and release the service and parking brake systems.
4. Perform the next scheduled major maintenance service (monthly, quarterly, or semi-annually).
5. Turn off the heater and/or air conditioner and any other accessories; shut off the lights. Park the vehicle and shut off the engine.
6. Disconnect and remove the batteries and store in a cool well-ventilated area. Recharge and clean before use.
7. Drain air brake reservoirs and close the drain cocks.
8. Check the radiator coolant for proper level and adequate freeze protection.
9. Lubricate all exposed components.

NOTE

After every 90 additional days of storage, perform Items 1 through 10.

For vehicles exposed to ultraviolet rays of the sun, apply a coating of Bon-Ami, or similar product, to the inside surfaces of the windshield and windows, to shade the interior.

10. Check the radiator coolant for proper level and adequate freeze protection.
11. Lubricate all exposed components.

c) Storage Facilities

Whenever possible, store vehicles indoors, protected from sunlight, in a dry, well ventilated area. If indoor storage is not available, select storage lots to eliminate conditions that cause deterioration.

1. Park away from transformers and/or electrical motors, because when the protective wax in tire compound cracks, ozone in the air attacks the exposed areas.
2. Park away from trees, high weeds and/or grass to prevent damage from tree or weed sap, and to minimize bird and insect stains.
3. Park away from railroad tracks, paint shops, smoky industrial areas, and locations of possible road splash contact.
4. If a vehicle is parked on an incline, block the wheels.

Chapter 4 – MAINTENANCE INSTRUCTIONS

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MAINTENANCE ALLOCATION CHART (MAC) AND SPECIAL TOOLS

Section I. INTRODUCTION

5-1. GENERAL

- a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.
- b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.
- c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.
- d. Section IV lists remarks (identified by an alphabetic code in Column 5 of the MAC) to provide a ready reference to the definition of the remark.

5-2. MAINTENANCE FUNCTIONS

Maintenance functions will be limited to and defined as follows:

- a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
- b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.
- c. **Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.
- d. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.
- e. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
- f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- g. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
- h. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

- (1) Service includes inspection, testing, service, adjustment, alignment, calibration and/or replacement.
- (2) Fault location/troubleshooting is the process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
- (3) Disassembly/Assembly encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least component identified as maintenance significant (i.e., assigned an SMR code) for the category of maintenance under consideration.
- (4) Actions include welding, grinding, riveting, straightening, facing, re-machining and/or resurfacing.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Marines. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to the equipment. The rebuild operation includes the act of returning to zero, those age measurements (hours/miles, etc.) considered in classifying Marine equipment/components.

5-3. EXPLANATIONS OF COLUMNS IN SECTION II

a. Column 1, Component/Assembly. Contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

b. Column 2, Maintenance Function. Lists the functions to be performed in the item listed in Column 1. (For detailed explanation of these functions, see paragraph **B-?**).

c. Column 3, Maintenance Category. Specifies, by the listing of a work time figure in the appropriate sub-column(s), the level of maintenance authorized to perform the function listed in Column 2. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of those tasks organized within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

- * 1st-First Echelon (Operator or Crew)
- * 2nd-Second Echelon (Organizational Repair)
- * 3rd-Third Echelon (Intermediate Repair)

*Asterisk indicates level of maintenance authorized to complete this function. No time is established.

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

d. Column 4, Tools and Equipment. Specifies, by code, those common tool sets (not individual tools) and special tools, Test Measurement and Diagnostic Equipment (TMDE), and support equipment required to perform the designated function.

e. Column 5, Remarks. When applicable, Column 5 will contain a letter code in alphabetic order, which shall be keyed to the remarks contained in Section IV.

5-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the Maintenance Allocation Chart (MAC), Section II, Column 4.

b. Column 2, Maintenance Level. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number (NSN). The national stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

5-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column 1, Reference Code. An alphabetic code listed in the 6th column of the MAC and 1st column of the Remarks section to identify remarks made to the MAC.

b. Column 2, Remarks. The complete text of the remarks made to the MAC.

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC)

(1)	(2)	(3)	(4) Maintenance Category			(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	ENGINE						
	Engine Assembly	Inspect		*			LORA
		Replace		*			
		Repair			*		
	Front Motor Mounts	Replace		*			
	Cylinder Head Replacement	Replace			*		
	Charge Air Cooler Hoses	Inspect	*				
		Replace		*			
	Air hoses (other)	Inspect	*				
		Test		*			
		Replace		*			
	Engine Oil Filter	Replace		*			
		Service		*			Drain & Fill
	Engine Oil Serpentine Belt	Inspect	*				
		Replace		*			
	Engine Oil Breather Hose	Replace		*			
	Engine Oil Pan	Replace		*			
	Turbo Charger Assembly	Inspect		*			
		Replace		*			
		Repair		*			
	High Pressure Oil Pump	Replace		*			LORA
	Turbo Charger Lubricant Line	Replace		*			
	Air Intake Tube (To Turbo)	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)	
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	High Pressure Injector Rail	Replace					
	Gasket			*			
	Engine Control Module (ECM)	Replace		*			
		Program		*			
	Rocker Cover and Gasket	Replace			*		
	Engine Sensors	Replace		*			
	Engine Starter Motor	Replace		*			
	Engine Oil Pressure Regulator	Replace		*			
	Front Vibration Damper	Replace		*			
	Push Tube	Replace			*		
	Rocker Arm Assembly	Replace			*		
	Engine Front Cover Assy	Replace		*			
	Piston and Liner Cylinder Head	Replace			*		
	Front Camshaft Oil Seal	Replace			*		
	Rear Camshaft Oil Seal	Replace			*		
	Camshaft	Replace		*			
	Engine Dip Stick	Replace	*				
	High Pressure Injector Pump	Replace		*			
	Air Cleaner Assembly	Replace		*			
	Air Filter Elements	Replace	*			Armor	

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category			(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Hoses Air Filter to Turbo Inlet	Replace		*			
	Charge Air Cooler Assembly	Replace		*			
	Exhaust Manifold	Replace		*			
	FUEL						
	Engine Fuel Hoses and Tubes	Replace		*			
	Fuel Level Sending Unit	Replace		*			
	Fuel Tank and Brackets	Replace		*			Armor
	Fuel Water Separators	Service	*				Purge
	Prim. Fuel/Water Separator Filter	Replace		*			
	Sec. Fuel/Water Separator Filter	Replace		*			
	Fuel Pump	Replace		*			
	Fuel Filter and Strainer	Replace		*			
	Fuel Injector Assembly	Replace		*			
	Fuel Primer Pump Assembly	Replace		*			
	Fuel Primer Regulator	Replace		*			
	Fuel Priming Test Sequence	service		*			
	Ether (Cold) Start Assembly	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	EXHAUST SYSTEM					
	Exhaust Pipes	Replace		*		
	Muffler and Shield	Replace		*		
	Fording Kit	Install	*			
		Replace	*			
		Repair	*			
	COOLING SYSTEM					
	Cooling system	Flush and Refill		*		
	Coolant	Add	*			
	Engine Water Pump Assembly	Replace		*		
	Radiator	Replace		*		
		Repair			*	LORA
	Cooling Fan	Replace		*		
	Cooling Fan Solenoid	Replace		*		
	Surge Tank	Replace		*		
	Radiator Shroud	Replace		*		
	Radiator	Test/Replace		*		
	Pressure Cap			*		
	Cooling Fan Drive Assembly			*		
	ELECTRICAL SYSTEM					
	Battery	Inspect	*			
		Replace		*		
	Alternator - 24V / 400 Amp	Replace		*		
		Repair			*	LORA

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category			(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Electrical System Computer	Replace		*			
		Repair			*		
	Headlight Assy	Inspect	*				
		Adjust		*			
		Replace		*			
	Headlight (LAMP)	Replace		*			
	Instrument Panel's)	Replace		*			LORA
	Individual Gauges	Replace		*			LORA
	Marker Light Assembly	Replace		*			
	Relay(s)	Replace		*			
	Throttle Position Control	Replace		*			
	Master Power Switch	Replace		*			
	Equalizer	Replace		*			
	Spotlight (Lamp)	Replace		*			
	Back Up Light Assembly	Replace		*			
	Blackout Drive Light Assembly	Replace		*			
	Composite Taillight Assembly	Replace		*			
	Turn Signal and Park Light Assembly	Replace		*			
		Inspect	*				
	Cab Interior Light	Inspect	*				
		Replace	*				

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)	
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Blackout Light Switch	Replace		*			
	Hazard Warning Light Switch	Replace		*			
	Hazard Warning Buzzer	Replace		*			
	Horn Assembly	Replace		*			
	Horn Switch	Replace		*			
	Battery Slave Connector (NATO)	Replace		*			
	24V Gauge	Replace		*			
	Filter Minder Gauge	Replace		*			
	Gauge (various)	Replace		*			
	Rocker / Toggle Switches - IP	Replace		*			
	Warning Indicators - IP	Replace		*			
	110V Receptacle	Replace		*			
	Engine Sensor Harness	Replace		*			
	Fuel Injector Harness	Replace		*			
	Transfer Case Selector Assembly	Replace		*			
	Engine Ignition / Start Switch	Replace		*			
	Ether Start Switch	Replace		*			
	Instrument Panel Light	Replace		*			
	ESC	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category			(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Neutral Safety Switch	Replace		*			
	Circuit Breaker	Inspect	*				
	Circuit Breaker	Replace		*			
	Circuit Breaker	Service	*				Reset
	Fuse	Inspect	*				
	Fuse	Replace		*			
	Windshield Washer / Wiper Control	Replace		*			
	Fire Extinguisher	Replace		*			
	Discharge Switch	Replace		*			
	I.R.Light	Inspect	*				
	IA.. Light	Replace		*			
	IA.. Light Switch	Replace		*			
	I.R. Harness	Replace		*			
	Inverter 110V	Replace		*			
	Instrument Panel Dim Switch	Replace		*			
	Fusible Link	Replace		*			
	Front Fender Lights (bulb)	Replace	*				
	Front Fender Light Assys (4)	Replace		*			
	Wiring Harness (all)	Replace		*			
		Repair			*		
	Transmission Gear Selector Assembly	Replace		*			
	Throttle Pedal Sensor	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	Barometric Sensor	Replace		*		
	Intake Air Engine Sensor	Replace		*		
	Mirror Remote Control Unit	Replace		*		
	Mirror Remote Control Wiring Harness	Replace		*		
	Black Light Control Assembly	Replace		*		
	Cruise Control Switch Module	Replace		*		
	Camshaft Sensor	Test/Replace		*		
	Injector Harness	Replace		*		
	Starter Harness	Replace		*		
	Trailer 24V Connector	Replace		*		
	TRANS-MISSION					
	Separate Engine From Transmission.	Separate		*		
	Transmission	Repair			*	
	Transmission	Replace		*		
	Transmission	Calibration				
	Re-Calibration				*	
	Transmission .	Service		*		Drain/Fill
	Transmission Breather	Replace		*		
	Transmission Cooler Hose	Replace		*		
	Transmission Oil Level Sensor	Replace		*		

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category			(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Transmission Control Module	Replace		*		Program- ming	LORA
	Transmission Output Yoke	Replace		*			
	Transmission Output Yoke Seal	Replace		*			
	Transmission Oil	Replace		*			
	Temperature Sending Unit						
	Transmission Dip Stick	Replace	*				
	Torque Converter	Replace			*		
	Converter Housing	Replace		*			
	Transmission Filter (External)	Replace		*			
	Transmission Filter (Internal)	Replace					
	Transmission Oil Pan & gasket	Replace			*		Armor
	TRANSFER CASE						
	Transfer Case Assembly	Repair			*		
	Transfer Case Assembly	Replace		*			
	Transfer Case Cooling Hose	Replace		*			
	Transfer Case	Service		*			Drain / Fill
	Prop shaft	Replace		*			
	Transfer Case Oil Cooler	Replace		*			
	Transfer Case Controller	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	Transfer Case	Replace		*		
	Input Yoke					
	Transfer Case	Replace		*		
	Input Yoke					
	Seal					
	Transfer Case	Replace				
	Output Yoke				*	
	Transfer Case	Replace				
	Output Yoke					
	Seal				*	
	Transfer Case	Replace		*		
	Shift Selector					
	Transfer Case	Replace		*		
	Shift Sensor					
	Air Hose (Air hose to Transfer Case)	Replace		*		
	Transfer Case	Replace		*		
	Breather					
	Transfer Case	Replace		*		
	Lock					
	Transfer Case	Replace				
	Lubrication Pump				*	
	Transfer Case	Repair				
	Lubrication Pump				*	
	PTO mounting	Replace			*	IF desired
	Transfer Case	Replace				
	Neutral Control Linkage			*		
	AXLES					
	Wheel End	Replace		*		
	Wheel Hub	Service		*		Drain & Fill
	Input Yoke	Replace		*		

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	Input seal	Replace		*		
	Axle Differential	Replace		*		
		Service		*		Drain & Fill
	Axle	Service		*		Alignment
	Rear Axle Assembly	Replace		*		
	Rear Axle Assembly	Repair			*	
	Rear Axle Seals	Replace		*		
	Rear Axle Bearings	Replace		*		
	Rear Axle Shaft	Replace		*		
	Rear Drive Axle Gasket	Replace			*	
	Front Axle Assembly	Replace		*		
	Front Axle Assembly	Repair			*	
	Front Axle Outer Hub	Service		*		Drain & Fill
	Front Axle Half Shafts	Replace		*		
	Front Axle Ring and Pinion Gear	Replace		*		
	Front Axle Ring and Pinion Seals	Replace		*		
	Front Axle Seals	Replace		*		
	Front Axle Bearings	Replace		*		
	Front Differential Lock	Replace		*		
	Differential	Replace			*	

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	BRAKES					
	Air Dryer	Replace				
	Air Dryer Filter	Replace		*		
	Air Governor	Adjustment		*		
	Air Governor	Replace		*		
	Air Lines / Hose	Replace		*		
	Air Reservoir And Check Valve	Replace		*		
	ABS Sensor	Replace		*		
	Service Brake Relay Valve	Replace		*		
	Air Manifold	Replace		*		
	Brake Air Chambers	Replace		*		
	Brakes	Replace		*		
	Brake System Switches	Service		*		
	Service Brake Double Check Valve	Replace		*		
	Hand Brake Valve	Replace		*		
	ABS Relay Valve	Replace		*		
	Brake Shoes	Replace		*		
	Brake Drum	Replace		*		
	Brake Assembly	Replace		*		
		Inspect/adjus t		*		
	ABS Control Module	Replace		*		
	ABS	Test/Recalibr ate		*		

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)	
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Air tanks	Test		*			
	Air Tanks	Service	*				Drain air
	Air tanks	Replace		*			
	Air Tank Transducer	Replace		*			
	S- Cam	Replace		*			
	S-Cam shaft Service	Service		*			
	Treadle Valve (Foot Brake)	Replace		*			
	WHEELS	Replace		*			
	Wheel Assy.	Inspect	*				
	Wheel Assy.	Replace	*				
	Tire with runflat insert	Replace		*		Issue	
	STEERING						
	Tie Rod	Replace		*			
	Steering Bracket	Replace		*			
	Steering Shaft	Replace		*			
	Steering Arm	Replace		*			
	Pitman Arm	Replace		*			
	Idler Arm	Replace		*			
	Steering Drag Link	Replace		*			
	Upper and Lower King Pin	Replace		*			
	Spindle	Replace		*			
	Spindle Bearing	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	Steering Gear Box	Replace		*		
	Steering Column	Replace		*		
	Steering Column U-Joint	Replace		*		
	Steering Wheel	Replace		*		
	Power steering Reservoir	Replace			*	
	Filter				*	
	Power steering Tubing And Hose	Replace		*		
	Power steering Reservoir	Service	*			
		Service		*		Add Fluid Drain & Fill
	Power Steering Pump	Replace.		*		
	FRAME					
	Pintle Hook	Replace		*		
	Tow Hook	Replace		*		
	Winch Cable	Replace		*		
	Winch Assembly	Replace		*		
	Cross member	Replace			*	
	Frame Rail	Replace			*	
	Huck Bolts	Replace			*	
	Body Mounts	Replace		*		
	Glad Hands	Replace		*		
	Front and Rear					
	Frame U-Bolts	Replace		*		

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category			(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	SUSPENSION						
	Shock Absorber	Inspect	*				
		Replace		*			
	Leaf Spring	Inspect					
		Replace		*			
	Bounce Stops	Inspect	*				
		Replace		*			
	CAB AND BODY						
	Drivers Seat	Replace		*			
	Passenger Seat (front)	Replace	*				
	Passenger Seat (Cabin)	Replace	*				
	Seat Cushions	Replace	*				
	Seat Belt	Replace		*			
	Stowage Boxes	Replace		*			
	Door And Window	Replace			*		LORA
	Windshield / Window	Replace		*			LORA
	Door Mirror Assembly	Replace		*			
	Fender Mirror	Replace		*			
	Mirror Glass	Replace		*			
	Mirror Mount to Frame	Replace		*			
	Cab Door Exterior Handle Assembly	Replace		*			
	Cab Door Interior Handle Assembly	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)	
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Cab Door	Replace		*			
	Combat Lock Assembly						
	Cab Door Air Assist	Replace		*			
	Cab Door	Replace		*			
	Weapon (Sliding) Hatch	Inspect	*				
	Weapon (Sliding) Hatch	Replace		*			
	Weapon (Sliding) Hatch	Replace		*			Lift Req
	Inner Lock Assembly						Lift Req
	Weapon (Sliding) Hatch	Replace		*			
	Outer Lock Assembly						
	Cabin	Replace		*			
	Emergency Hatch						Lift Req
	Cabin	Replace		*			
	Emergency Hatch Handle / Lock Assembly						
	Gun Ports	Replace		*			
	Rear Door/Ramp Assembly	Replace		*			
	Rear Door Lock Assembly	Replace		*			
	Rear Door Hydraulic Assist	Inspect					
	Rear Door Hydraulic Assist	Replace	*	*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)	
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Rear Door Hydraulic Assist	Service		*		Drain & fill	do together
	Rear Door Hydraulic Filter	Replace		*			do together
	Rear Door Tubing And Hose	Replace		*			
	Rear Door Hydraulic Reservoir	Replace		*			
	Rear Door Hydraulic Pump	Replace		*			
	Body Window	Replace				Lift Req	
	Cab & Body Assembly	Align			*	Lift Req	
	Cab and Body Assembly	Replace			*	Lift Req	
	Hood Latch	Replace		*			
	Hood Tilt Mount	Replace		*			
	Hood Retainer (Rubber) Straps	Replace		*			
	Hood 3 piece with Fenders	Replace		*			
	Rubber Fender Flares	Replace		*			
	Armor access Panels, Battery Box	Open/Close					
	Fuel tank		*				
	Armor Grill	Replace		*			
	Outer Body Panel	Replace		*			
	Inner Body Panels	Replace		*			LORA

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	ACCESSORY ITEMS					
	Windshield	Replace		*		
	Wiper Motor					
	Windshield	Replace		*		
	Wiper Arm					
	Windshield	Replace				
	Wiper Blade		*			
	Windshield	Replace		*		
	Wiper Motor					
	Windshield	Replace		*		
	Wiper Linkage and Transmission					
	Windshield Washer Fluid Reservoir	service				
	Windshield Washer Fluid Reservoir		*			Add fluid
	Windshield Washer Fluid Reservoir	Service		*		
	Windshield Washer Fluid Reservoir					Drain & Fill
	Windshield Washer	Replace		*		
	Windshield Washer Nozzles and Hoses					
	Windshield Washer Pump	Inspect				
	Windshield Washer Pump	Replace		*		
	Windshield Washer FSS Control Switches and Lights					
	Windshield Washer FSS Engine Compartment Sensor	Replace		*		
	Windshield Washer FSS Cab/Crew Compartment Sensor	Replace		*		
						LORA

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III) Remarks (See Section IV)
	FSS Bottles	Replace			*	
	FSS Bottles (Sensor)	Replace			*	
	FSS Pipes, Lines, and Nozzle	Replace		*		
	Portable Fire Extinguisher mounting brackets	Replace		*		
	Air Conditioner	Replace		*		
		Service / Recharge.		*		
	Air Conditioner Clutch	Replace		*		
	Air Conditioner Compressor	Replace		*		
	Air Conditioner Condensers	Replace		*		
	Air Conditioner Condenser Motor	Replace		*		
	Air Conditioner Receiver / Dryer	Replace		*		
	Air Conditioner Hose	Replace		*		
	Air Conditioner Clutch	Replace		*		
	Air Conditioner Thermo Switch	Replace		*		
	Air Conditioner Service Port /Schrader Valve	Replace		*		
	Heater	Replace		*		

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

MAINTENANCE ALLOCATION CHART (MAC) - Continued

(1)	(2)	(3)	(4) Maintenance Category		(5)	(6)	
Group Number	Component/ Assembly	Maintenance Function	Operator/ Crew	Field	Sustainment	Tools and Equipment (See Section III)	Remarks (See Section IV)
	Water Control Valve/s Heater	Replace		*			
	Heater Hose	Replace		*			
	Air Conditioner Expansion Valve	Replace		*			
	LSS Filter	Replace		*			
	NBC Filter	Replace		*			
	HVAC/LSS Control	Replace		*			
	NBC Filter	Replace		*			
	FA Blower	Replace		*			
	RA Blower	Replace		*			
	Over Pressure Blower Motor	Replace		*			
	NBC/HVAC Water Pump	Service		*			
		Replace		*			
	Over Pressure Regulator Valves	Clean		*			
	WEAPONS STATION AND EQUIPMENT						
	Gunner's Platform	Replace		*			
	Armor Skirt and Ring Mount	Replace		*			
	Rifle Racks	Replace		*			

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

5-6 EXPENDABLE AND DURABLE ITEMS LIST

a. Scope

This work package lists all expendable and durable items that you will need to operate and maintain the RG33 family of vehicles. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970 Expendable/Durable Items (except Medical, Class V Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

b. Explanations of Columns in the Expendable/Durable Items List

Column (1) - Item Number: This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item.

Column (2) – Level: This column includes the lowest level of maintenance that requires the listed item (C = Operator/Crew).

Column (3) - National Stock Number: This is the NSN assigned to the item which you can use to requisition it.

Column (4) - Description, Number (P/N) and Commercial and Government Entity Code (CAGEC): This column provides the other information you need to identify the item.

Column (5) - Unit of Issue (U/I): This code shows the smallest quantity of an item that can be requisitioned and issued.

EXPENDABLE AND DURABLE ITEMS LIST

(1) Item Number	(2) Level	(3) National Stock Numbers/ Part Numbers	(4) Description, Part Number, CAGEC	(5) U/I
1		NSN - 6685-00-945-2366	212 ° F (100 ° C) Thermo melt Crayon	
2		P/N - 1830742C92	6 Injector "O" ring sets	
3		NSN - 6850-01-441-3221	Antifreeze/Coolant	
4		NSN - 5330-00-469-6880	Axle-Differential - Meritor GL-5, SAE 85W/140 Gear Oil	
5		NSN - 4930-00-031-1505	Bearing Lubricant	
7		NSN -2840-00-633-1688	Bearing Oil Lubricant	
8		NSN - 4310-01-115-2297	Cable Ties	
9		NSN - 5925-00-001-5914	Circuit breakers of proper size & current rating (10 amps - 20 amps)	
10		NSN - 5345-00-800-8547	Contact Cleaner (1)	
11		NSN - 8040-01-531-8302	Corrosion Preventative Compound	
12		NSN - 5315-00-017-9096	Cotter Pins (Assortment)	
13		P/N - 381245R1	Dielectric grease	
14		NSN - 5640-00-103-2254	Duct tape	
15		NSN - 6850-00-302-5834	Emulsion cleaner or petroleum base cleaning solvent	
16		NSN - 9150-01-085-6037	Engine Oil	
17		NSN - 6640-00-585-5845	Ether bottle	
19		NSN - 5350-00-271-5950	Fine Grite Emery Cloth	
20		NSN - 8030-01-470-6256	Fuel Tank Sealing compound	

TM 9-2355-106-23-3
Chapter 5 – SUPPORTING INFORMATION

EXPENDABLE AND DURABLE ITEMS LIST - Continued

21		NSN -5920-01-337-9573	Fuse Assortment	
22		NSN - 4210-00-111-7019	Fusible link of proper rating	
23		NSN - 4720-01-143-2007	Heatshrink, Sealed (Various sizes)	
24		NSN - 5120-01-063-5554	Hub lubricant (1 qt)	
25		P/N - ZJB226606B	Hydraulic Fluid	
26		NSN - 5821-00-738-2869	Lamp Bulbs (for Instrument Panel)	
27		NSN - 6240-01-539-5100	Light Bulb Model 2049/2067	
28		NSN - 8030-00-907-3961	Liquid Sealant	
29		P/N - 1199Y3795	Loctite #277	
30		NSN - 7050-00-961-7663	Lubriplate™ Lubricant	
31		P/N - 2297-B-7022	Non-Hardening Sealing Compound	
32		NSN - 9150-01-514-3508	PAG Oil 5/6 bottles	
33		P/N - CH990625	Power Steering Fluid /Oil M110	
34		P/N - DUP134A30, REFR134A30P	Refrigerant R-134 - 30lbs (2 each)	
35		NSN - 9160-01-515-2484	RTV Sealant	
36		P/N - 423405001	Sika Flex 221 Sealant	
37		P/N - PTX80633	Thread Sealing Compound	
38		NSN - 2520-00-008-8944	Transmission fluid	
39		P/N - 3585048C1	Two-sided Insulation tape	
40		NSN - 5342-00-455-2743	Ty-wrap (1)	
41		NSN - 2640-00-256-5526	Wheel Lubricant	
42		NSN -2540-00-077-0521	Windshield washer fluid	
43		NSN - 8135-00-263-9317	Wire cable ties bulk - assorted	
45		P/N - 306132C1	Zip Ties (10)	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS <small>For use of this form, see AF 25-32; the proponent agency is DARSA</small>						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: <i>(Forward to proponent of publication or form) (Include ZIP Code)</i> PM-MRAP, AMSTA-LC-GMM, 6501 E. 11 Mile Road, Warren, MI 48397-5000						FROM: <i>(Activity and location) (Include ZIP Code)</i>	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER TM 9-2355-106-23-3						DATE	TITLE Maintenance Manual COTS for International Mine Resistant Vehicle Category 1 2355-01-553-4634 Category II 2355-01-553-4636
ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON	
<small>* Reference to line numbers within the paragraph or subparagraph.</small>							
TYPED NAME, GRADE OR TITLE						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

TO: <i>(Forward direct to addressee listed in publication)</i>			FROM: <i>(Activity and location) (Include ZIP Code)</i>				DATE	
PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS								
PUBLICATION NUMBER				DATE		TITLE		
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
PART III - REMARKS <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON. PLUS EXTENSION			SIGNATURE	

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:



JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0726008

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 990003,
requirements for TM 9-2355-101-23-3.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meter = 0.3937 Inch
 1 Decimeter = 10 Centimeters = 3.94 Inches
 1 Meter = 10 Decimeters = 100 Centimeters
 = 1000 Millimeters = 39.37 Inches
 1 Dekameter = 10 Meters = 32.8 Feet
 1 Hectometer = 10 Dekameters = 328.08 Feet
 1 Kilometer = 10 Hectometers = 1000 Meters
 = 0.621 Mile = 3,280.8 Feet
 Millimeters = Inches times 25.4
 Inches = Millimeters divided by 25.4

WEIGHTS

1 Centigram = 10 Milligrams = 0.154 Grain
 1 Decigram = 10 Centigrams = 1.543 Grains
 1 Gram = 0.001 Kilogram = 10 Decigrams
 = 1000 Milligrams = 0.035 Ounce
 1 Dekagram = 10 Grams = 0.353 Ounce
 1 Hectogram = 10 Dekagrams = 3.527 Ounces
 1 Kilogram = 10 Hectograms = 1000 Grams
 = 2.205 Pounds
 1 Quintal = 100 Kilograms = 220.46 Pounds
 1 Metric Ton = 10 Quintals = 1000 Kilograms
 = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liter = 0.034 Fluid Ounce
 1 Centiliter = 10 Milliliters = 0.34 Fluid Ounce
 1 Deciliter = 10 Centiliters = 3.38 Fluid Ounces
 1 Liter = 10 Deciliters = 1000 Milliliters
 = 33.82 Fluid Ounces
 1 Dekaliter = 10 Liters = 2.64 Gallons
 1 Hectoliter = 10 Dekaliters = 26.42 Gallons
 1 Kiloliter = 10 Hectoliters = 264.18 Gallons

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inch
 1 Sq Decimeter = 100 Sq Centimeters = 15.5 Sq Inches
 1 Sq Meter (Centare) = 10 Sq Decimeters
 = 10,000 Sq Centimeters = 10.764 Sq Feet
 1 Sq Dekameter (Are) = 100 Sq Meters = 1,076.4 Sq Feet
 1 Sq Hectometer (Hectare) = 100 Sq Dekameters
 = 2.471 Acres
 1 Sq Kilometer = 100 Sq Hectometers
 = 1,000,000 Sq Meters = 0.386 Sq Mile

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.061 Cu Inch
 1 Cu Decimeter = 1000 Cu Centimeters = 61.02 Cu Inches
 1 Cu Meter = 1000 Cu Decimeters
 = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9 (°F - 32°) = °C$
 $(9/5 x °C) + 32° = °F$
 -35° Fahrenheit is equivalent to -37° Celsius
 0° Fahrenheit is equivalent to -18° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 100° Fahrenheit is equivalent to 38° Celsius
 212° Fahrenheit is equivalent to 100° Celsius

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>	<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches	Centimeters	2.540	Centimeters	Inches	0.394
Feet	Meters	0.305	Meters	Feet	3.280
Yards	Meters	0.914	Meters	Yards	1.094
Miles	Kilometers	1.609	Kilometers	Miles	0.621
Square Inches	Square Centimeters	6.451	Square Centimeters ...	Square Inches	0.155
Square Feet	Square Meters	0.093	Square Meters	Square Feet	10.764
Square Yards	Square Meters	0.836	Square Meters	Square Yards	1.196
Square Miles	Square Kilometers	2.590	Square Kilometers	Square Miles	0.386
Acres	Square Hectometers	0.405	Square Hectometers ...	Acres	2.471
Cubic Feet	Cubic Meters	0.028	Cubic Meters	Cubic Feet	35.315
Cubic Yards	Cubic Meters	0.765	Cubic Meters	Cubic Yards	1.308
Fluid Ounces	Milliliters	29.573	Milliliters	Fluid Ounces	0.034
Pints	Liters	0.473	Liters	Pints	2.113
Quarts	Liters	0.946	Liters	Quarts	1.057
Gallons	Liters	3.785	Liters	Gallons	0.264
Ounces	Grams	28.349	Grams	Ounces	0.035
Pounds	Kilograms	0.454	Kilograms	Pounds	2.205
Short Tons	Metric Tons	0.907	Metric Tons	Short Tons	1.102
Pound-Feet	Newton-Meters	1.356	Newton-Meters	Pound-Feet	0.738
Pounds-Inches	Newton-Meters	0.11375	Kilopascals	Pounds per Square Inch	0.145
Pounds per Square Inch ..	Kilopascals	6.895	Kilometers per Liter ...	Miles per Gallon	2.354
Ounce-Inches	Newton-Meters	0.007062	Kilometers per Hour ...	Miles per Hour	0.621
Miles per Gallon	Kilometers per Liter	0.425	°Fahrenheit	°Celsius	$°C = (°F - 32) \times 5/9$
Miles per Hour	Kilometers per Hour	1.609	°Celsius	°Fahrenheit	$°F = (9/5 \times °C) + 32$

PIN: 084304-000