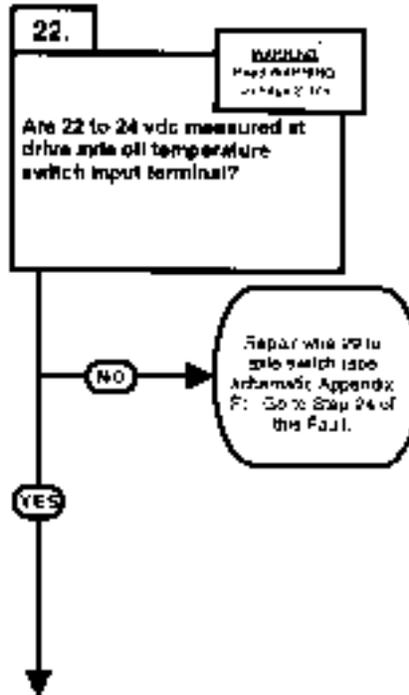


1. DRIVE AXLE OVERHEATING (CONT).

KNOWN INFO
<p>Engine temperature 105°F or over. Glow plug indicator operates. Parking brake OK. Brake fluid OK. Drive axle oil level correct. Master cylinder OK. Drive axle OK. Drive axle oil cooler ground wire OK. Drive axle oil cooler OK. Relay R7 ground wire OK. Wire 29 to relay R7 OK. Wire 73 OK. Relay R7 OK. Wire 29 to engine temperature switch OK. Engine temperature switch OK. Wire 71 OK. Axle oil pump ground wire OK. Axle oil pump OK. Relay R8 ground wire OK. Wire 29 to relay R8 OK. Wire 74 OK. Relay R8 OK.</p>
POSSIBLE PROBLEMS
<p>Wire 29 to drive axle temperature switch faulty. Drive axle oil temperature switch faulty. Wire 72 faulty.</p>



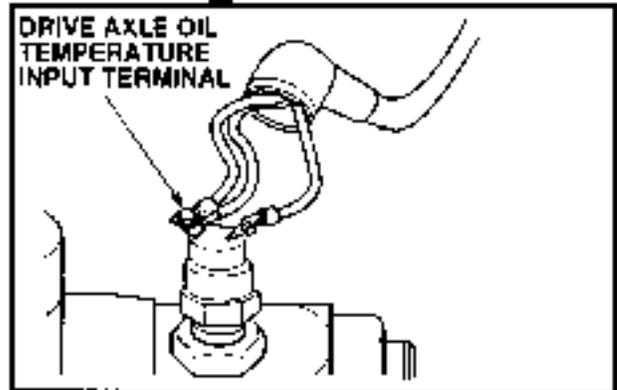
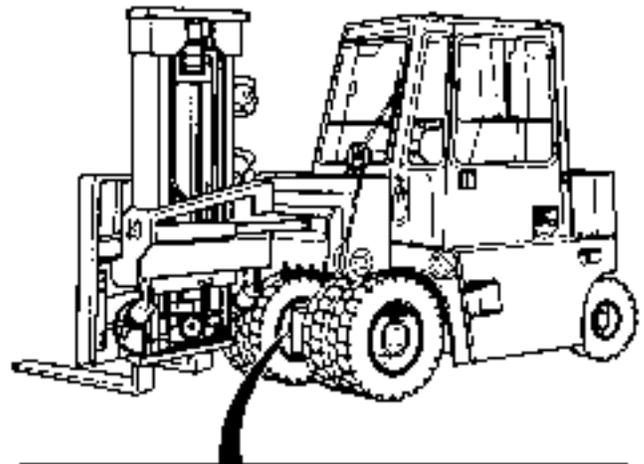
TEST OPTIONS
<p>Voltage test. STE/ICE-R #89.</p>
REASON FOR QUESTION
<p>If 22 to 24 vdc are not present, wire 29 to axle temperature switch is faulty.</p>

WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.
- Drive axle and oil retains extreme heat. Use extreme caution when checking components near drive axle. Failure to do so will result in severe burns to personnel.

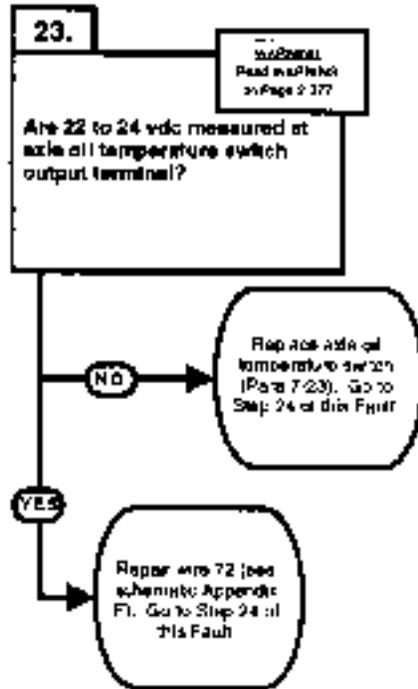
VOLTAGE TEST

- (1) Set multimeter select switch to VOLTS DC.
- (2) Connect positive (+) multimeter lead to axle oil temperature switch input terminal.
- (3) Connect negative (-) multimeter lead to a known good ground.
- (4) Set MAIN POWER switch to ON position (TM 10-3930-669-10).
- (5) Set engine switch to ignition position (TM 10-3930-669-10).
 - (a) If there are not 22 to 24 vdc present, perform Steps (6) and (7) below and repair wire 29 to axle switch (see schematic Appendix F).
 - (b) If there are 22 to 24 vdc present, wire 29 to axle switch is OK.
- (6) Set engine switch to off position.
- (7) Set MAIN POWER switch to OFF position.



1. DRIVE AXLE OVERHEATING (CONT).

KNOWN INFO
<p>Engine temperature 105°F or over. Glow plug indicator operates. Parking brake OK. Brake fluid OK. Drive axle oil level correct. Master cylinder OK. Drive axle OK. Drive axle oil cooler ground wire OK. Drive axle oil cooler OK. Relay R7 ground wire OK. Wire 29 to relay R7 OK. Wire 73 OK. Relay R7 OK. Wire 29 to engine temperature switch OK. Engine temperature switch OK. Wire 71 OK. Axle oil pump ground wire OK. Axle oil pump OK. Relay R8 ground wire OK. Wire 29 to relay R8 OK. Wire 74 OK. Relay R8 OK. Wire 29 to drive axle temperature switch OK.</p>
POSSIBLE PROBLEMS
<p>Drive axle oil temperature switch faulty. Wire 72 faulty.</p>



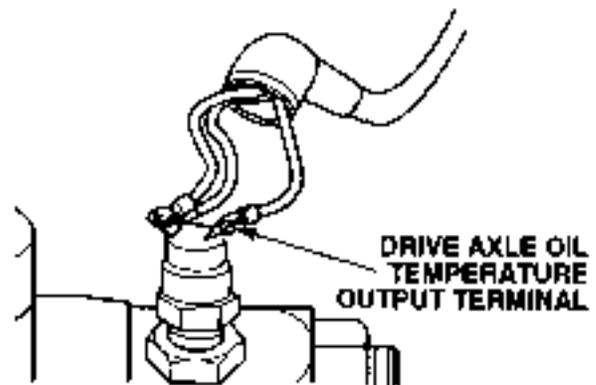
TEST OPTIONS
<p>Voltage test. STE/ICE-R #89.</p>
REASON FOR QUESTION
<p>If 22 to 24 vdc are not present, axle oil temperature switch is faulty. If axle oil temperature switch is OK, wire 72 is faulty.</p>

WARNING

- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.
- Drive axle and oil retains extreme heat. Use extreme caution when checking components near drive axle. Failure to do so will result in severe burns to personnel.

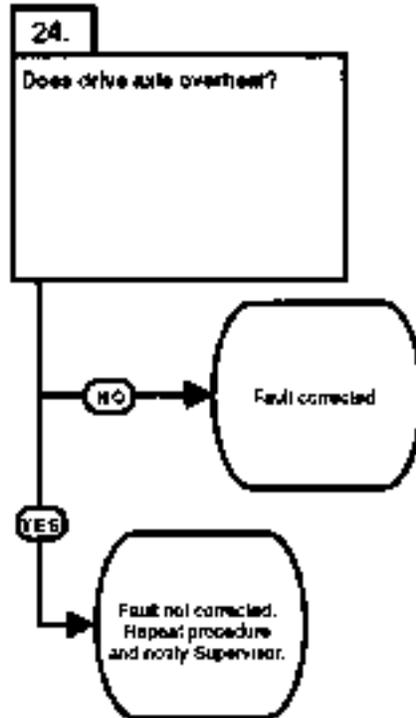
VOLTAGE TEST

- (1) Set multimeter select switch to VOLTS DC.
- (2) Connect positive (+) multimeter lead to axle oil temperature switch output terminal.
- (3) Connect negative (-) multimeter lead to a known good ground.
- (4) Set MAIN POWER switch to ON position (TM 10-3930-669-10).
- (5) Set engine switch to ignition position (TM 10-3930-669-10).
 - (a) If there are not 22 to 24 vdc present, perform Steps (6) and (7) below and replace axle oil temperature switch (Para 7-23).
 - (b) If there are 22 to 24 vdc present, perform Steps (6) and (7) below and repair wire 72 (see schematic Appendix F).
- (6) Set engine switch to off position.
- (7) Set MAIN POWER switch to OFF position.
- (8) Install oil filter tray (Para 4-13).



1. DRIVE AXLE OVERHEATING (CONT).

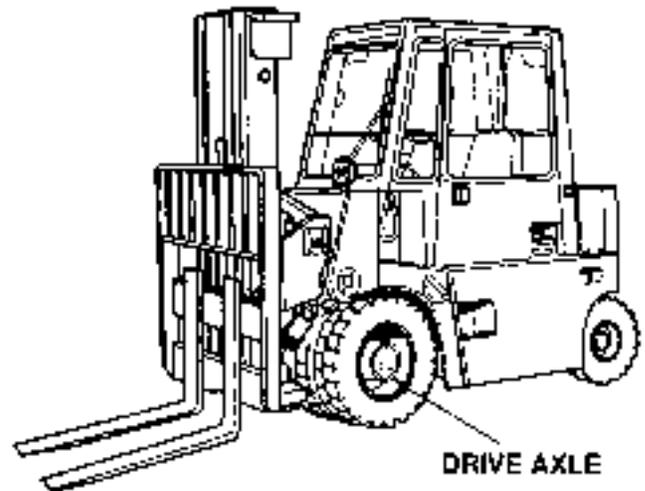
KNOWN INFO
Engine temperature 105°F or over. Glow plug indicator operates. Parking brake OK. Brake fluid OK. Drive axle oil level correct. Master cylinder OK. Drive axle OK. Drive axle oil cooler ground wire OK. drive axle oil cooler OK. Relay R7 ground wire OK. Wire 29 to relay R7 OK. Wire 73 OK. Relay R7 OK. Wire 29 to engine temperature switch OK. Engine temperature switch OK. Wire 71 OK. Axle oil pump ground wire OK. Axle oil pump OK. Relay R8 ground wire OK. Wire 29 to relay R8 OK. Wire 74 OK. Relay R8 OK. Wire 29 to drive axle temperature switch OK. Drive axle oil temperature switch OK. Wire 72 OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If drive axle does not overheat, fault has been corrected.

VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate forklift and periodically check axle for overheating.
 - (a) If axle does not overheat, fault corrected. Perform Step (3) below.
 - (b) If axle overheats, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
- (3) Shut down engine.



2-16. DRIVE AXLE SYSTEM TROUBLESHOOTING (CONT).

2. DRIVE AXLE NOISE GREATER UNDER POWER THAN DURING COAST.

INITIAL SETUP

Tools and Special Tools

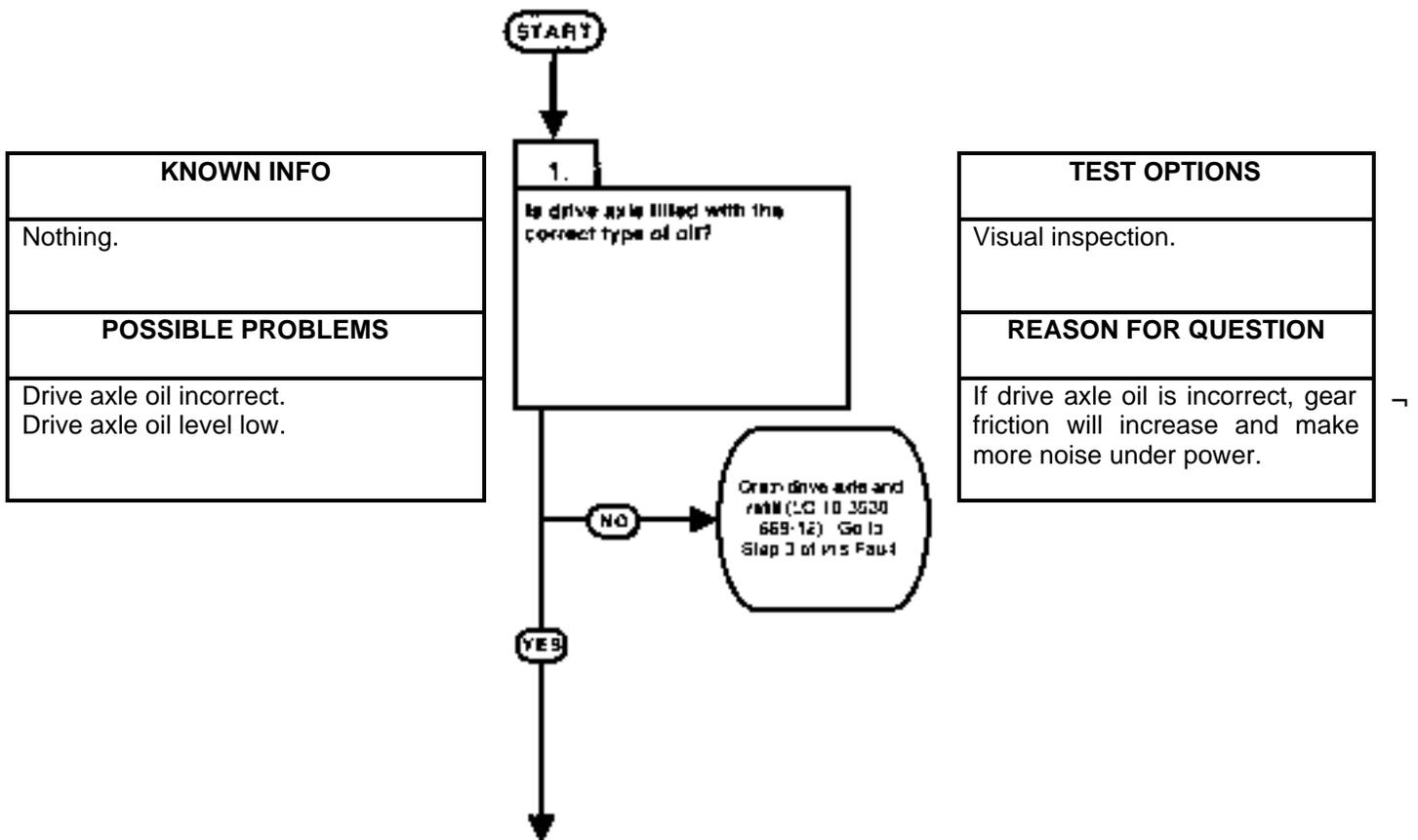
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

References

TM 10-3930-669-10
LO 10-3930-669-12

Equipment Condition

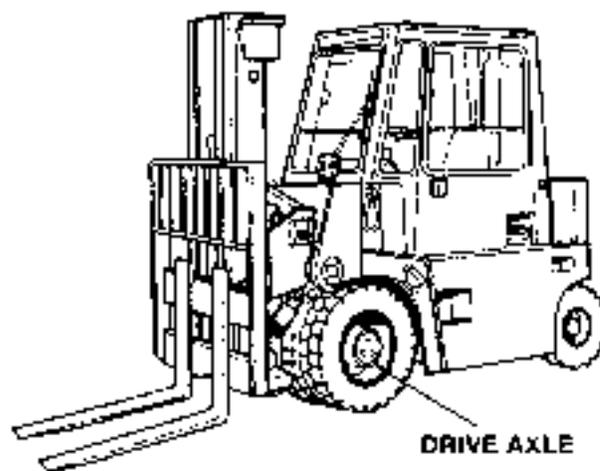
Engine OFF (TM 10-3930-669-10)
MAIN POWER switch OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)



VISUAL INSPECTION

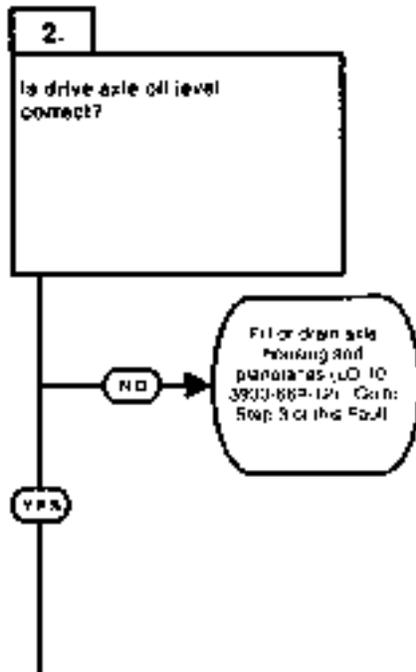
Inspect last maintenance form DD-214 for forklift.

- (a) If type of drive axle oil is incorrect, drain and refill drive axle (LO 10-3930-669-12).
- (b) If type of drive axle oil is correct, go to Step 2 of this Fault.



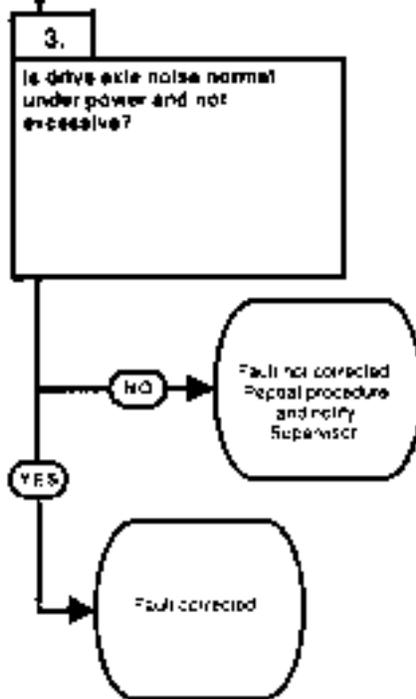
2. DRIVE AXLE NOISE GREATER UNDER POWER THAN DURING COAST (CONT).

KNOWN INFO
Drive axle oil OK.
POSSIBLE PROBLEMS
Drive axle oil level low.



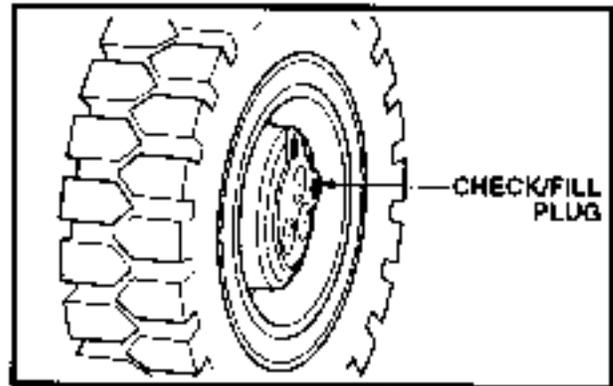
TEST OPTIONS
Drive axle oil level check.
REASON FOR QUESTION
If drive axle oil level is low, gear friction will increase and make more noise under power.

KNOWN INFO
Drive axle oil OK. Drive axle oil level OK.
POSSIBLE PROBLEMS

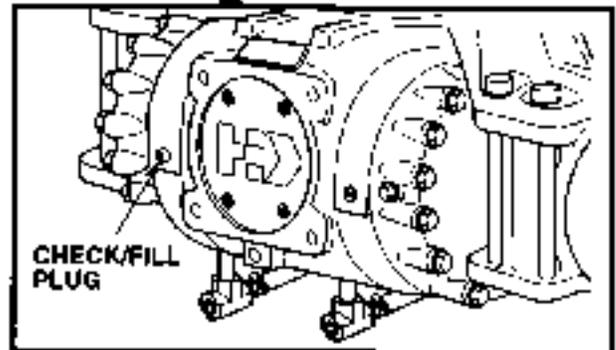
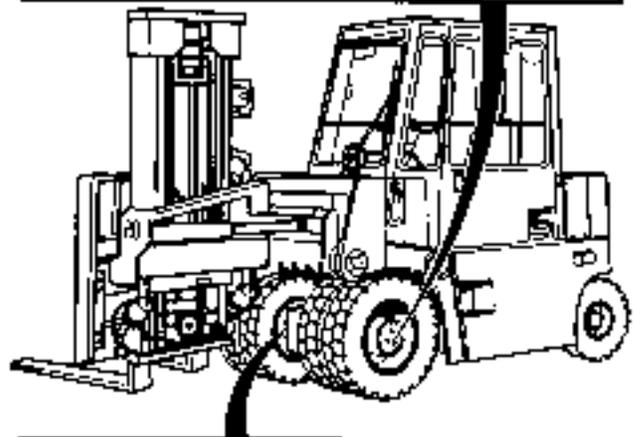


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If drive axle noise is normal under power, fault has been corrected.

DRIVE AXLE OIL LEVEL CHECK	
(1)	Remove check/fill plug (LO 10-3930-669-12).
(2)	Check oil level (LO 10-3930-669-12). <ul style="list-style-type: none"> (a) If oil level is low, drain and refill axle housing and planetaries. (b) If oil level is correct, oil level is OK.
(3)	Install check/fill plug.



VERIFY REPAIR	
(1)	Start engine (TM 10-3930-669-10).
(2)	Operate forklift and listen for drive axle noise. <ul style="list-style-type: none"> (a) If drive axle noise is excessive, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor. (b) If drive axle noise is not excessive, fault corrected.
(3)	Shut down engine.



2-16. DRIVE AXLE SYSTEM TROUBLESHOOTING (CONT).

3. DRIVE AXLE ENGAGING HARSHLY WHEN SWITCHING DIRECTION.

INITIAL SETUP

Tools and Special Tools

Tools and Special Tools
 Tool Kit, General Mechanic's: Automotive
 (Item 1, Appendix B)

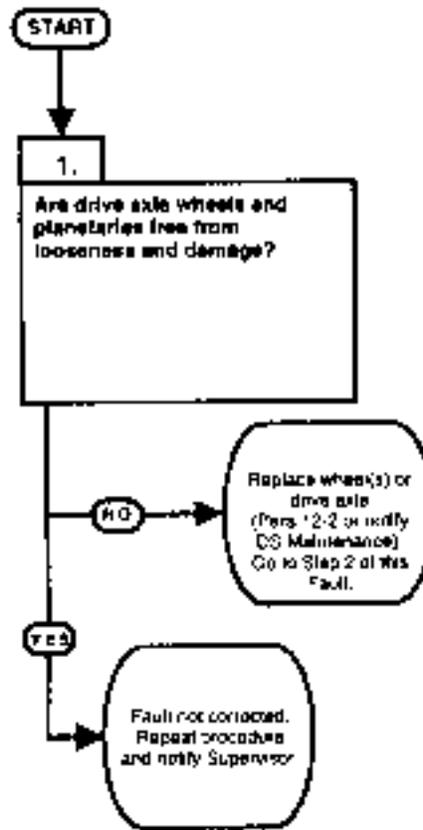
Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

References

TM 10-3930-669-10

KNOWN INFO
Nothing.
POSSIBLE PROBLEMS
Planetary or wheel(s) loose or damaged.

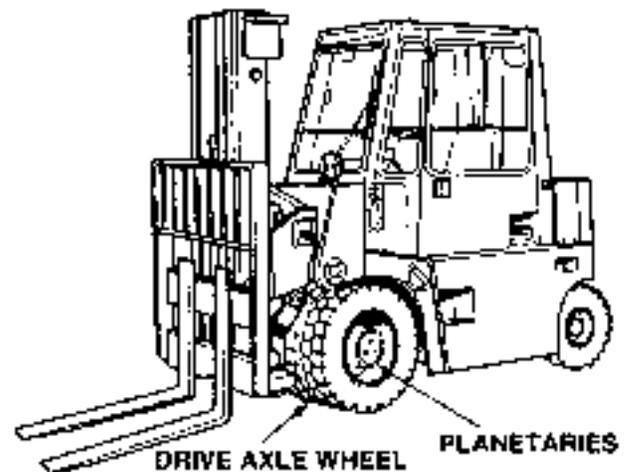


TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If wheels or planetaries are loose or damaged, axle will engage harshly.

VISUAL INSPECTION

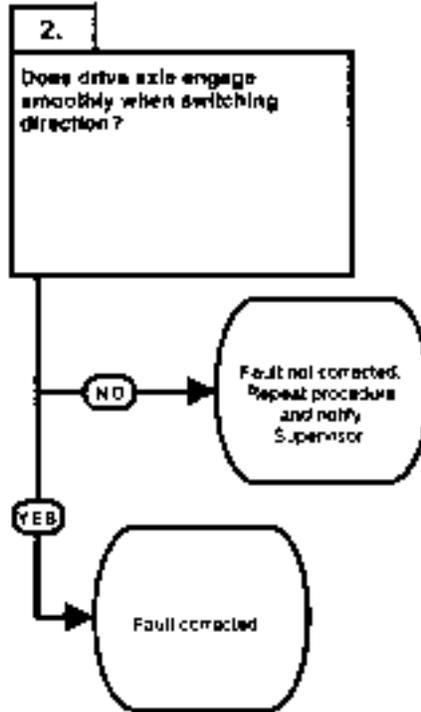
Inspect drive wheels and planetaries for damage and looseness.

- (a) If wheel(s) is loose or damaged, tighten or replace wheel(s) (Para 12-2).
- (b) If planetary is damaged, drive axle is faulty. Notify DS Maintenance.
- (c) if planetaries and wheels are not damaged or loose, planetaries and wheels are OK.



3. DRIVE AXLE ENGAGING HARSHLY WHEN SWITCHING DIRECTION (CONT).

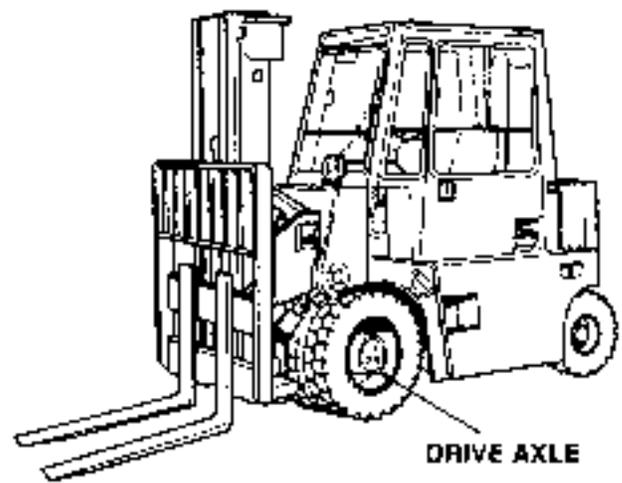
KNOWN INFO
Planetaries and wheels OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If drive axle engages smoothly, fault has been corrected.

VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate forklift forward and reverse.
 - (a) If drive axle engages harshly, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If drive axle does not engage harshly, fault corrected.
- (3) Shut down engine.



This Page Intentionally Left Blank

2-17. BRAKE SYSTEM TROUBLESHOOTING.

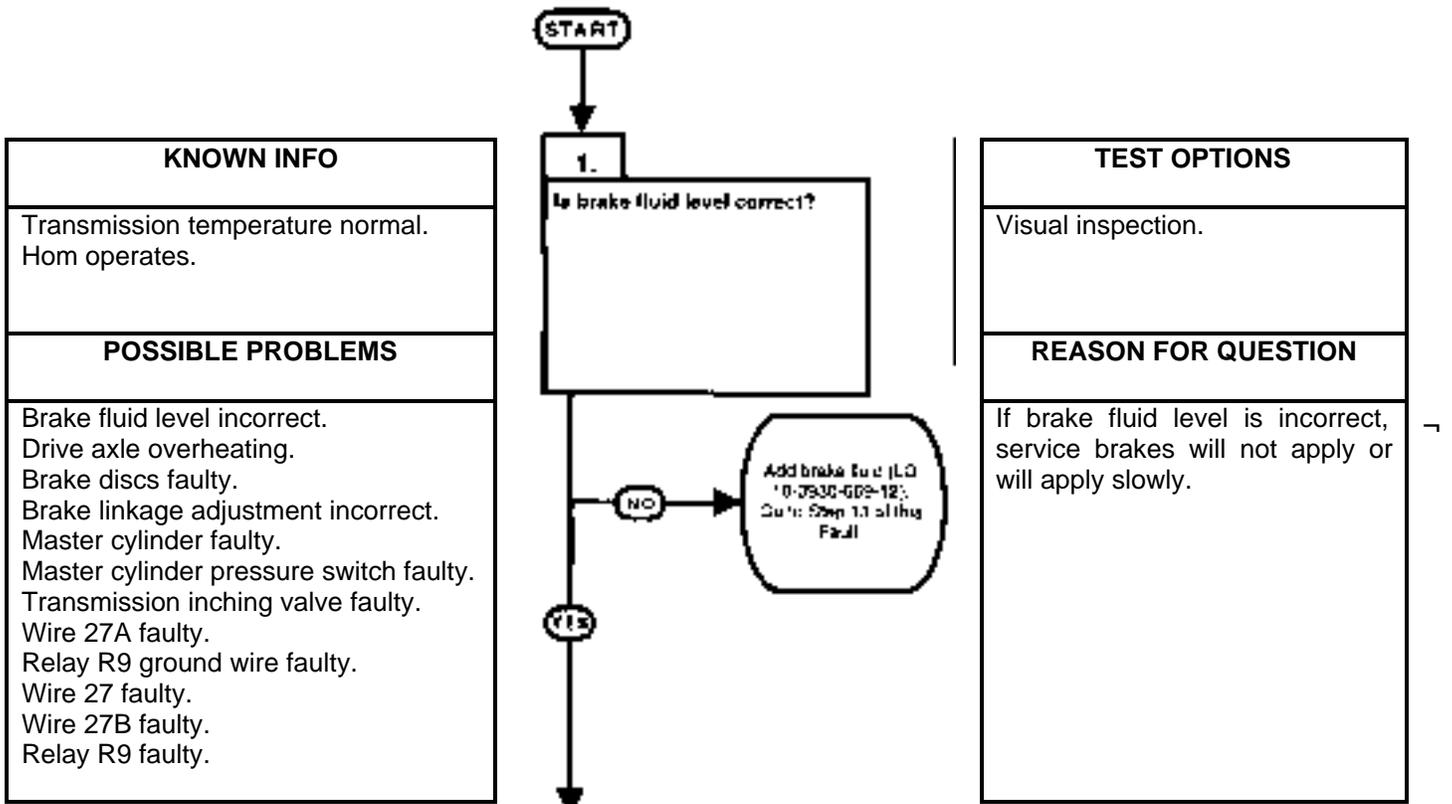
This paragraph covers Brake System Troubleshooting. The Brake System Fault Index, Table 2-8, lists faults for the brake system of the forklift.

Table 2-8. Brake System Fault Index

Fault No.	Troubleshooting Procedure	Page
1.	Service Brakes Do Not Apply or Apply Slowly	2-390
2.	Service Brakes Do Not Release or Release Slowly.....	2-408
3.	Parking Brake Does Not Engage or Disengage.....	2-414

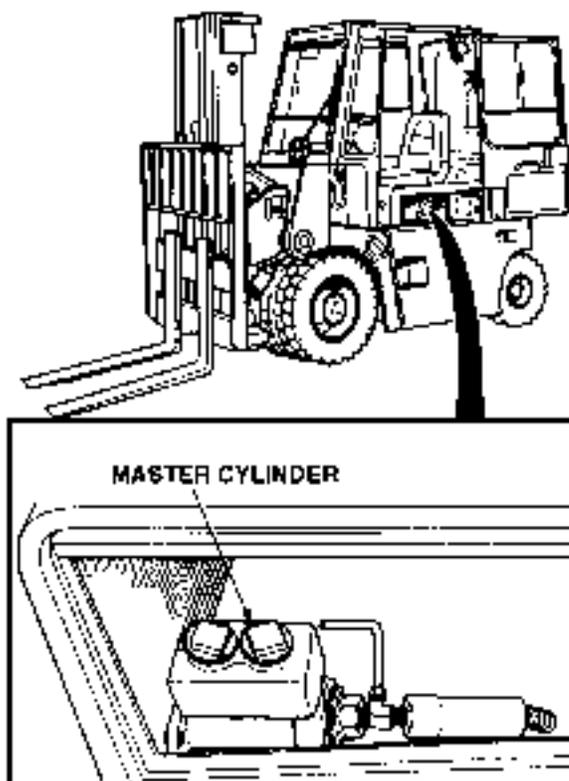
2-17. BRAKE SYSTEM TROUBLESHOOTING (CONT).

1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY.	
INITIAL SETUP	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B) STE/ICE-R (Optional) (Item 14, Appendix B) Pressure Test Kit (Item 2, Appendix B)	Engine OFF (TM 10-3930-669-10) MAIN POWER switch OFF (TM 10-3930-669-10) Parking brake applied (TM 10-3930-669-10) Wheels chocked (TM 10-3930-669-10)
<i>References</i>	
TM 10-3930-669-10 LO 10-3930-669-12	



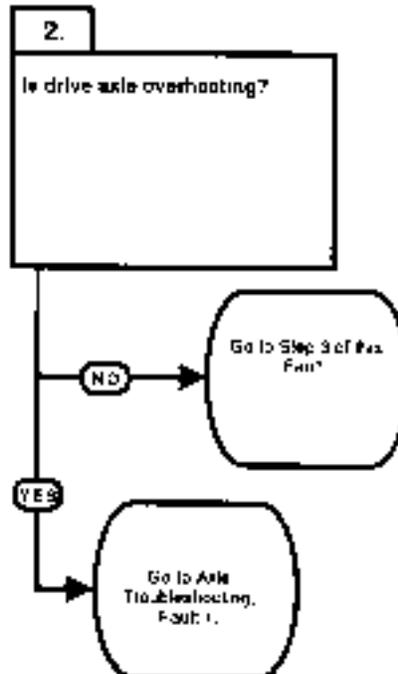
VISUAL INSPECTION

- (1) Remove master cylinder plug.
- (2) Check brake fluid level.
 - (a) If brake fluid is below correct level, add fluid (LO 10-3930-669-12).
 - (b) If brake fluid is at correct level, brake fluid level is OK.
- (3) Install master cylinder plug.



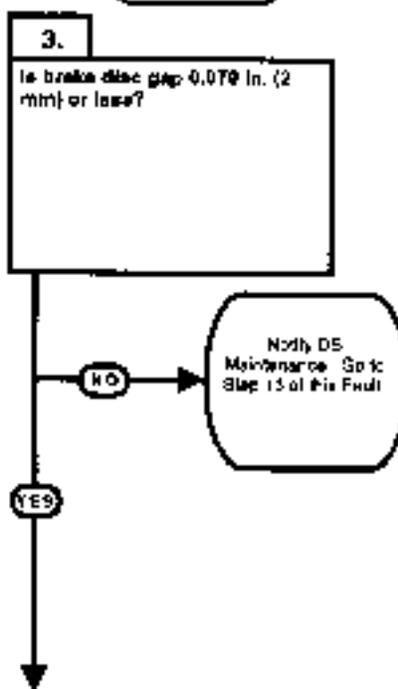
1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

KNOWN INFO
Transmission temperature normal. Horn operates. Brake fluid level correct.
POSSIBLE PROBLEMS
Drive axle overheating. Brake discs faulty. Brake linkage adjustment incorrect. Master cylinder faulty. Master cylinder pressure switch faulty. Transmission inching valve faulty. Wire 27A faulty. Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
This question eliminates a possible problem or group of possible problems determining where troubleshooting continues.

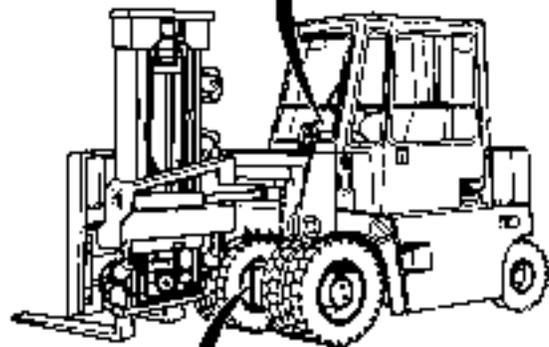
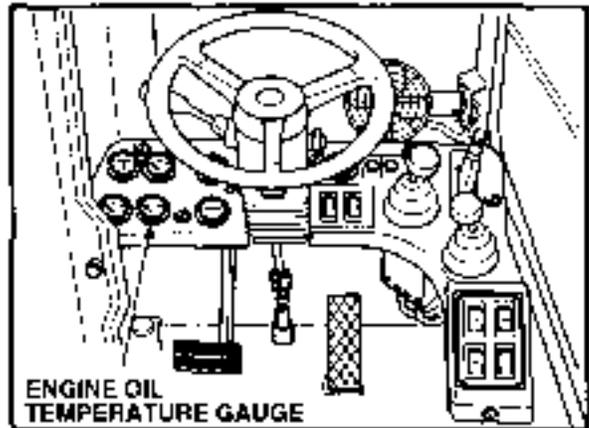
KNOWN INFO
Transmission temperature normal. Horn operates. Brake fluid level correct. Drive axle OK.
POSSIBLE PROBLEMS
Brake discs faulty. Brake linkage adjustment incorrect. Master cylinder faulty. Master cylinder pressure switch faulty. Transmission inching valve faulty. Wire 27A faulty. Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



TEST OPTIONS
Brake disc check.
REASON FOR QUESTION
If 0.079 in. (2 mm) or less is not measured, brake discs are faulty.

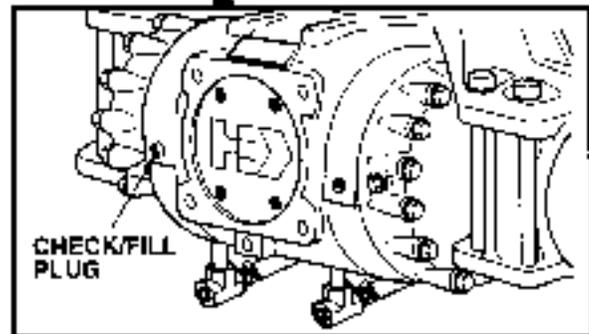
VISUAL INSPECTION

- (1) Start engine (TM 10-3930-669-10).
- (2) Check engine temperature gauge.
 - (a) If engine temperature is not above 195°F (90.56°C), go to Step (3) below.
 - (b) If engine temperature is above 195°F (90.56°C), perform Step (3) below and go to Axle Troubleshooting, Fault 1.
- (3) Shut down engine.
- (4) Remove drive axle check/fill plug (Para 10-1).
- (5) Inspect for signs of overheating.
 - (a) If drive axle is overheating, go to Axle Troubleshooting, Fault 1.
 - (b) If drive axle is not overheating, axle temperature is OK.
- (6) Install drive axle check/fill plug.



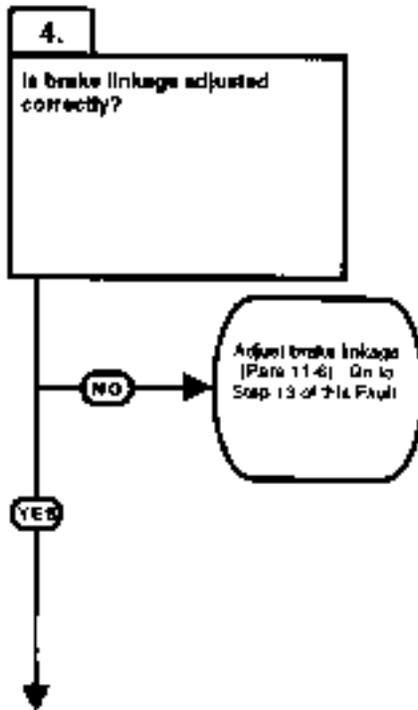
BRAKE DISC CHECK

- (1) Measure brake disc gap.
 - (a) If brake disc gap is not 0.079 in. (2 mm) or less, brake discs are faulty. Perform Step (2) below and notify DS Maintenance.
 - (b) If brake disc gap is 0.079 in. (2 mm) or less, brake discs are OK.
- (2) Install drive axle check/fill plug (LO 10-3930-669-12).



1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

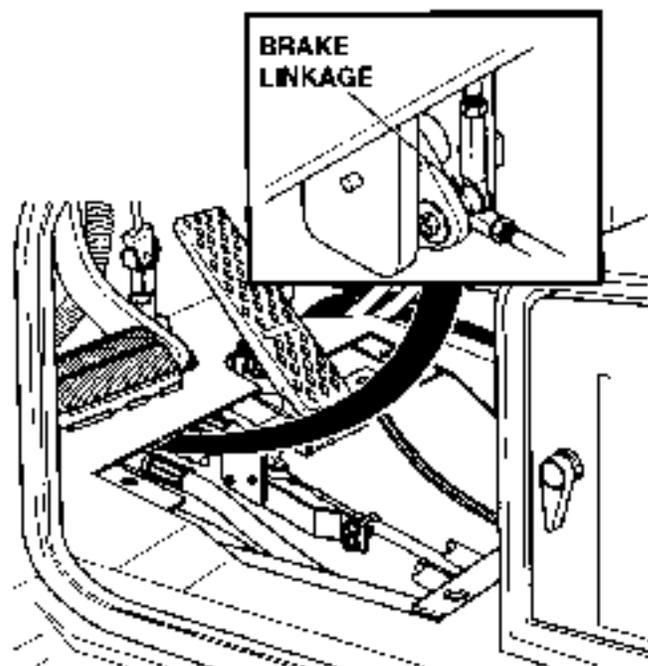
KNOWN INFO
Transmission temperature normal. Horn operates. Brake fluid level correct. Drive axle OK. Brake discs OK.
POSSIBLE PROBLEMS
Brake linkage adjustment incorrect. Master cylinder faulty. Master cylinder pressure switch faulty. Transmission inching valve faulty. Wire 27A faulty. Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



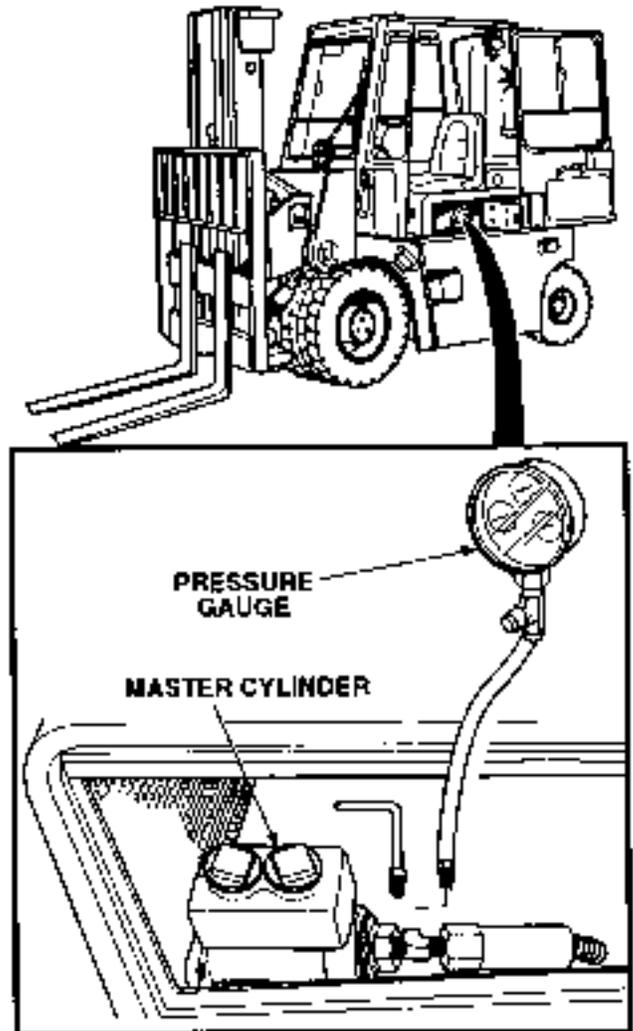
TEST OPTIONS
Brake linkage adjustment check.
REASON FOR QUESTION
If brake linkage adjustment is incorrect, brake linkage is faulty.

**BRAKE LINKAGE ADJUSTMENT
CHECK**

- (1) Remove cab floor plate (Para 15-12).
- (2) Check brake linkage adjustment (Para 11-6).
 - (a) If brake linkage is not adjusted correctly, adjust brake linkage.
 - (b) If brake linkage is adjusted correctly, brake linkage adjustment is OK.

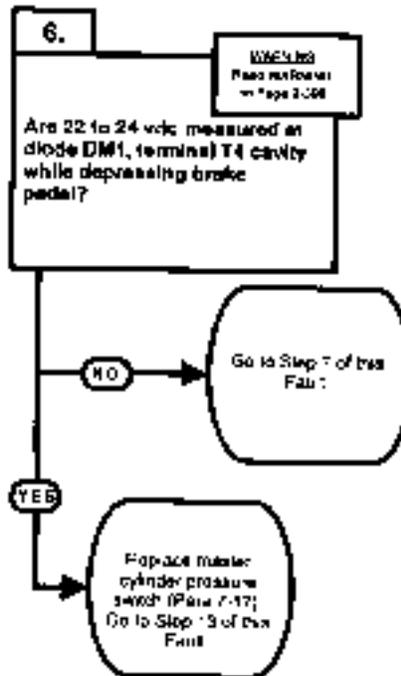


PRESSURE TEST	
(1)	Disconnect brake line and fitting from master cylinder (Para 11-4).
(2)	Connect 0 to 2,000 psi (0-13,790 kPa) pressure gauge to master cylinder.
(3)	Depress brake pedal and observe gauge.
(a)	If 1,100 to 1,200 psi (7,584 - 8,274 kPa) are not present, perform Step (4) below and replace master cylinder.
(b)	If pressure drops at 90 psi (621 kPa) or higher, relief valve is OK.
(4)	Remove 0 to 2,000 psi (0-13,790 kPa) pressure gauge.
(5)	Connect brake line on master cylinder.



1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

KNOWN INFO
Transmission temperature normal. Horn operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK.
POSSIBLE PROBLEMS
Master cylinder pressure switch faulty. Transmission inching valve faulty. Wire 27A faulty. Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



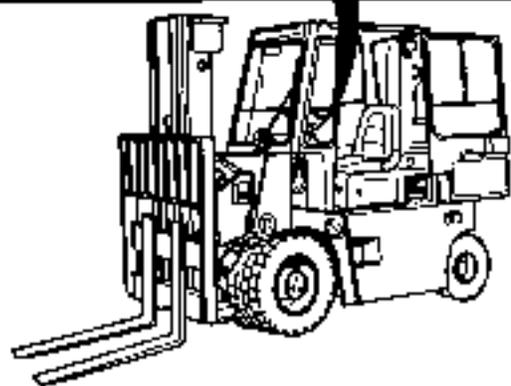
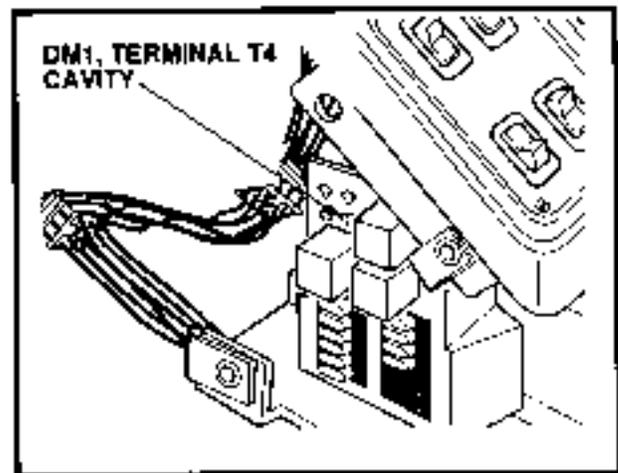
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 22 to 24 vdc are not present, master cylinder pressure switch is faulty.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

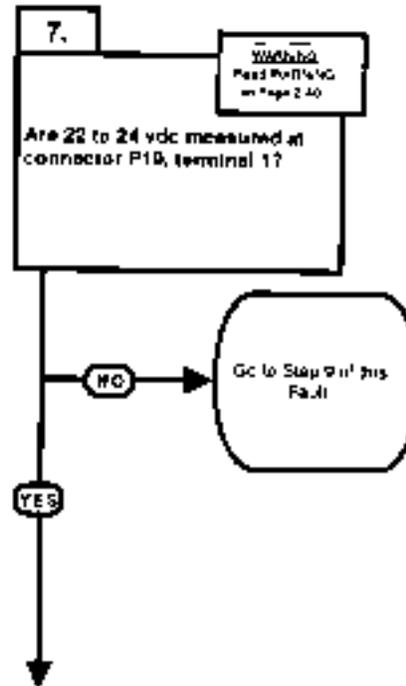
VOLTAGE TEST

- (1) Remove diode DM1 (Para 7-33).
- (2) Set multimeter select switch to VOLTS DC.
- (3) Connect positive (+) multimeter lead to diode DM1, terminal T4 cavity.
- (4) Connect negative (-) multimeter lead to a known good ground.
- (5) Set MAIN POWER switch to ON position (TM 10-3930-669-10).
- (6) Set engine switch to ignition position (TM 10-3930-669-10).
 - (a) If there are not 22 to 24 vdc present, perform Steps (7) through (9) below and go to Step 8 of this Fault.
 - (b) If there are 22 to 24 vdc present, perform Steps (7) through (9) below and replace master cylinder pressure switch (Para 7-17).
- (7) Set engine switch to off position.
- (8) Set MAIN POWER switch to OFF position.
- (9) Install diode DM1.



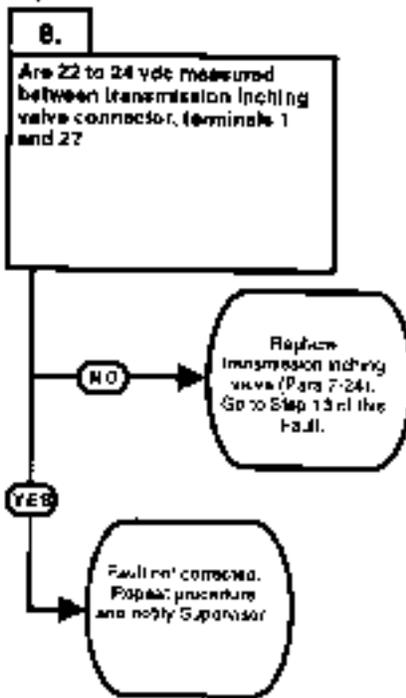
1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

KNOWN INFO
Transmission temperature normal. Hom operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK.
POSSIBLE PROBLEMS
Transmission inching valve faulty. Wire 27A faulty. Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
This question eliminates a possible problem or group of possible problems determining where troubleshooting continues.

KNOWN INFO
Transmission temperature normal. Hom operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK. Wire 27A OK. Relay R9 ground wire OK. Wire 27 OK. Wire 27B OK. Relay R9 OK.
POSSIBLE PROBLEMS
Transmission inching valve faulty.



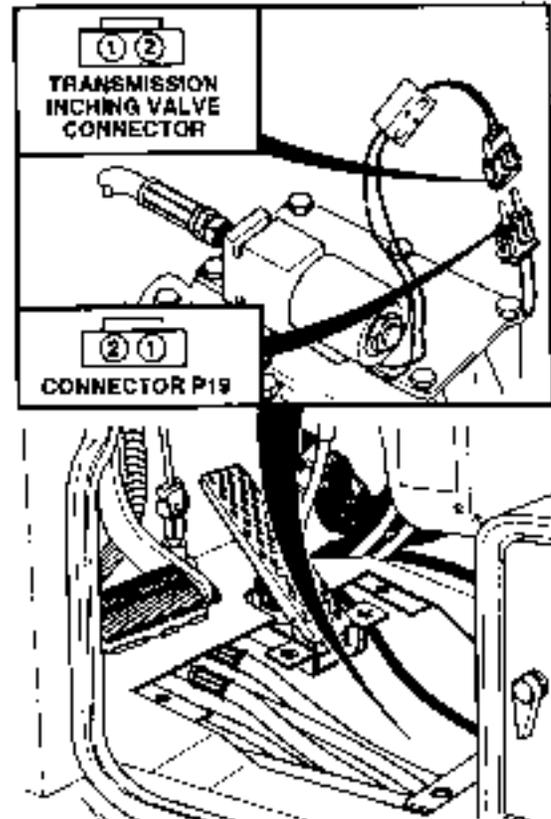
TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 22 to 24 vdc are not present, transmission inching valve is faulty.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

VOLTAGE TEST

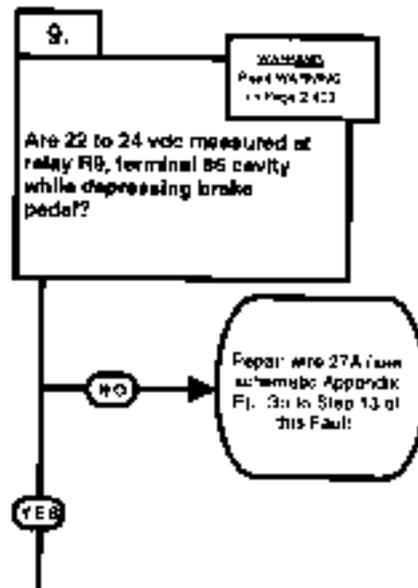
- (1) Remove floor plate (Para 15-12).
- (2) Disconnect connector P19 from transmission inching valve connector.
- (3) Set multimeter select switch to VOLTS DC.
- (4) Connect positive (+) multimeter lead to connector P19, terminal 1.
- (5) Connect negative (-) multimeter lead to a known good ground.
- (6) Set MAIN POWER switch to ON position (TM 10-3930-669-10).
- (7) Set engine switch to ignition position (TM 10-3930-669-10).
 - (a) If there are not 22 to 24 vdc present, perform Steps (8) through (10) below and go to Step 9 of this Fault.
 - (b) If there are 22 to 24 vdc present, Perform Steps (B) and (9) below and go to Step 8 of this Fault.
- (8) Set engine switch to off position.
- (9) Set MAIN POWER switch to OFF position.
- (10) Install floor plate.

**VOLTAGE TEST**

- (1) Set multimeter select switch to VOLTS DC.
- (2) Turn Main power switch to the ON position (TM 10-3930-669-10).
- (3) Check for 22 to 24 vdc between transmission inching valve connector, terminals 1 and 2.
 - (a) If there is not 22 to 24 vdc, replace transmission inching valve (Para 7-24).
 - (b) If there is 22 to 24 vdc, fault not corrected. Perform Steps (4), (5), and (6) below. Repeat procedure and notify Supervisor.
- (4) Turn Main power switch to the OFF position.
- (5) Connect connector P19 on transmission inching valve connector.
- (6) Install floor plate (Para 15-12).

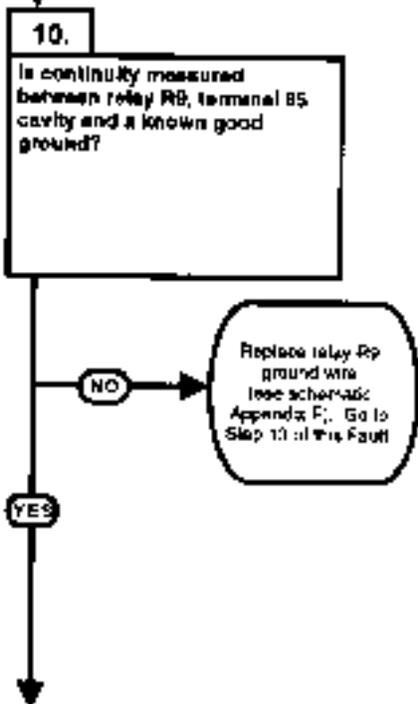
1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

KNOWN INFO
Transmission temperature normal. Hom operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK. Transmission inching valve OK.
POSSIBLE PROBLEMS
Wire 27A faulty. Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 22 to 24 vdc are not present, wire 27A is faulty.

KNOWN INFO
Transmission temperature normal. Hom operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK. Transmission inching valve OK. Wire 27A OK.
POSSIBLE PROBLEMS
Relay R9 ground wire faulty. Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



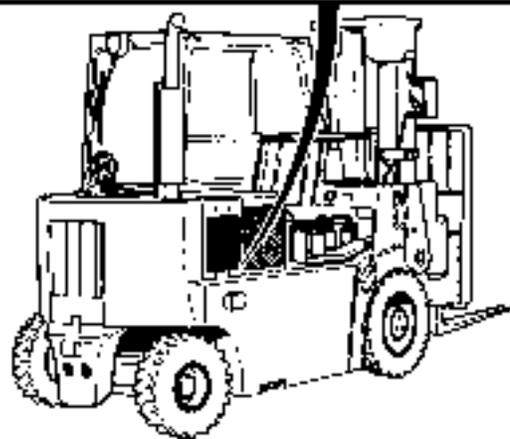
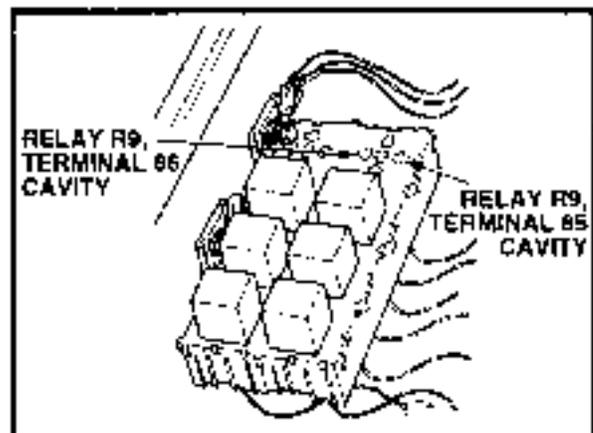
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, relay R9 ground wire is faulty.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

VOLTAGE TEST

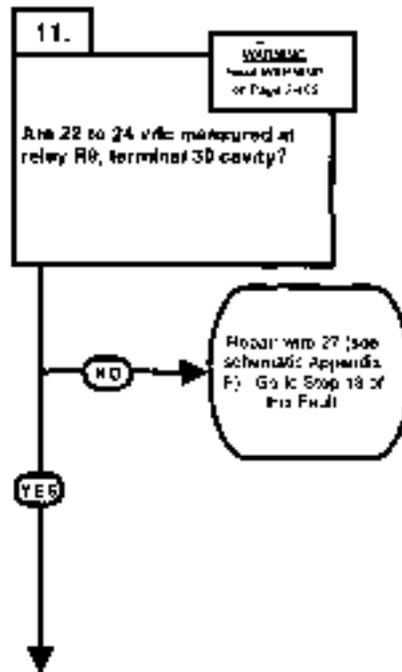
- (1) Remove relay R9 (Para 7-33).
- (2) Set multimeter select switch to VOLTS DC.
- (3) Connect positive (+) multimeter lead to relay R9, terminal 86 cavity.
- (4) Connect negative (-) multimeter lead to a known good ground.
- (5) Set MAIN POWER switch to ON position (TM 10-3930-669-10).
- (6) Set engine switch to ignition position (TM 10-3930-669-10).
- (7) Depress brake pedal (TM 10-3930-669-10).
 - (a) If there are not 22 to 24 vdc present, perform Steps (8) and (9) below and repair wire 27A (see schematic Appendix F).
 - (b) If there are 22 to 24 vdc present, wire 27A is OK.
- (8) Set engine switch to off position.
- (9) Set MAIN POWER switch to OFF position.

**CONTINUITY TEST**

- (1) Set multimeter select switch to OHMS.
- (2) Check continuity between relay R9, terminal 85 cavity and a known good ground.
 - (a) If there is no continuity, replace relay R9 ground wire (see schematic Appendix F).
 - (b) If there is continuity, relay R9 ground wire is OK.

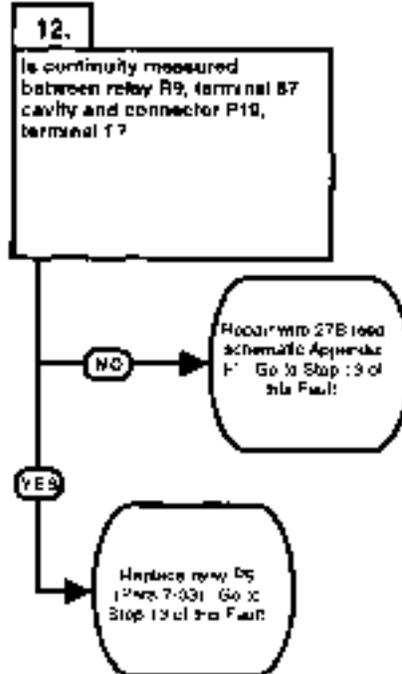
1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

KNOWN INFO
Transmission temperature normal. Hom operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK. Transmission inching valve OK. Wire 27A OK. Relay R9 ground wire OK.
POSSIBLE PROBLEMS
Wire 27 faulty. Wire 27B faulty. Relay R9 faulty.



TEST OPTIONS
Voltage test. STE/ICE-R #89.
REASON FOR QUESTION
If 22 to 24 vdc are not present, wire 27 is faulty.

KNOWN INFO
Transmission temperature normal. Hom operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK. Transmission inching valve OK. Wire 27A OK. Relay R9 ground wire OK. Wire 27 OK.
POSSIBLE PROBLEMS
Wire 27B faulty. Relay R9 faulty.



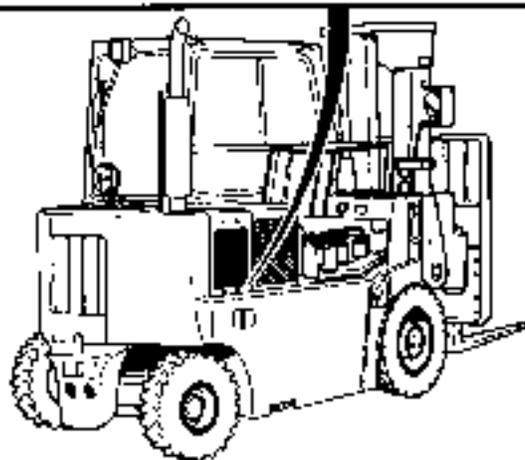
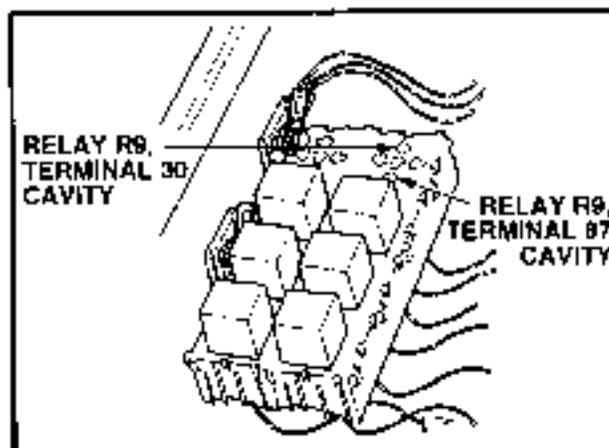
TEST OPTIONS
Continuity test. STE/ICE-R #91.
REASON FOR QUESTION
If continuity is not present, wire 27B is faulty. If wire 27B is OK, relay R9 is faulty.

WARNING

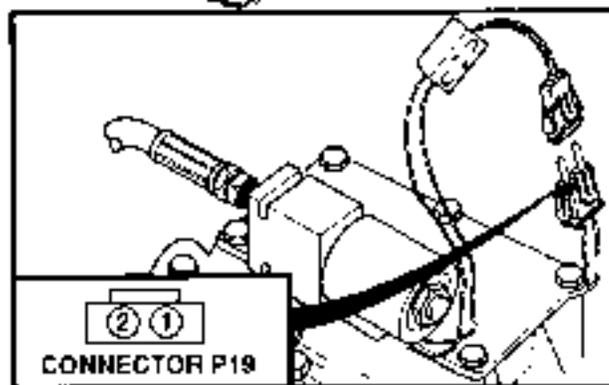
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

VOLTAGE TEST

- (1) Set multimeter select switch to VOLTS DC.
- (2) Connect positive (+) multimeter lead to relay R9, terminal 30 cavity.
- (3) Connect negative (-) multimeter lead to a known good ground.
- (4) Set MAIN POWER switch to ON position (TM 10-3930-669-10).
- (5) Set engine switch to ignition position (TM 10-3930-669-10).
 - (a) If there are not 22 to 24 vdc present, perform Steps (6) and (7) below and repair wire 27 (see schematic Appendix F).
 - (b) If there are 22 to 24 vdc present, wire 27 is OK.
- (6) Set engine switch to off position.
- (7) Set MAIN POWER switch to OFF position.

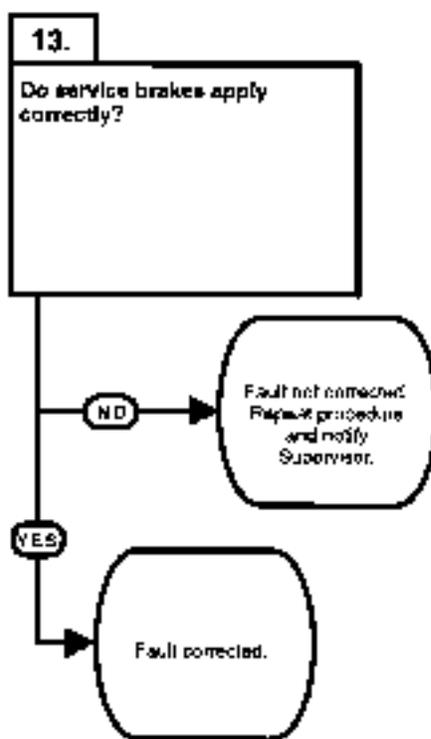
**CONTINUITY TEST**

- (1) Set multimeter select switch to OHMS.
- (2) Ground connector P19, terminal 1.
- (3) Check continuity between relay R9, terminal 87 and a known good ground.
 - (a) If there is no continuity, repair wire 27B (see schematic Appendix F).
 - (b) If there is continuity, replace relay R9.
- (4) Connect connector P19 on transmission inching valve connector.
- (5) Install floor plate (Para 15-12).
- (6) Install relay R9 (Para 7-33).



1. SERVICE BRAKES DO NOT APPLY OR APPLY SLOWLY (CONT).

KNOWN INFO
Transmission temperature normal. Horn operates. Brake fluid level correct. Drive axle OK. Brake discs OK. Brake linkage adjustment correct. Master cylinder OK. Master cylinder pressure switch OK. Transmission inching valve OK. Wire 27A OK. Relay R9 ground wire OK. Wire 27 OK. Wire 27B OK. Relay R9 OK.
POSSIBLE PROBLEMS

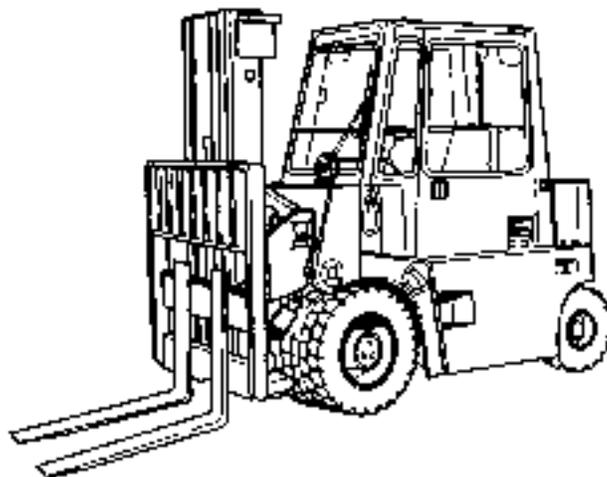


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If service brakes apply correctly, fault has been corrected.



VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate vehicle and apply service brakes.
 - (a) If service brakes do not apply correctly, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If service brakes apply correctly, fault corrected.
- (3) Shut down engine.



2-17. BRAKE SYSTEM TROUBLESHOOTING (CONT).

2. SERVICE BRAKES DO NOT RELEASE OR RELEASE SLOWLY.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
 (Item 1, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)

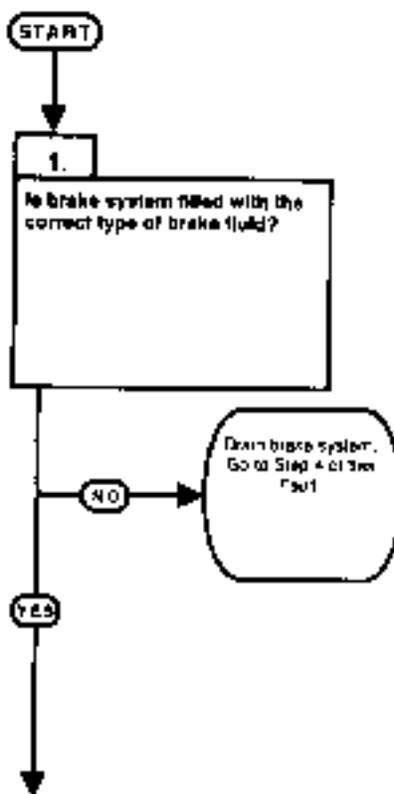
Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

References

TM 10-3930-669-10

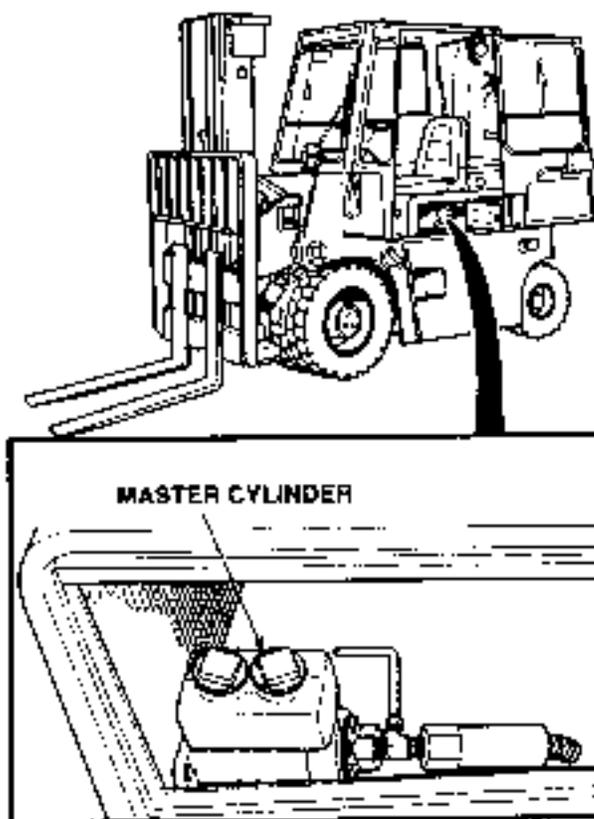
KNOWN INFO
Nothing.
POSSIBLE PROBLEMS
Brake fluid faulty. Master cylinder faulty. Drive axle faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If brake fluid is incorrect, drive axle will overheat. ←

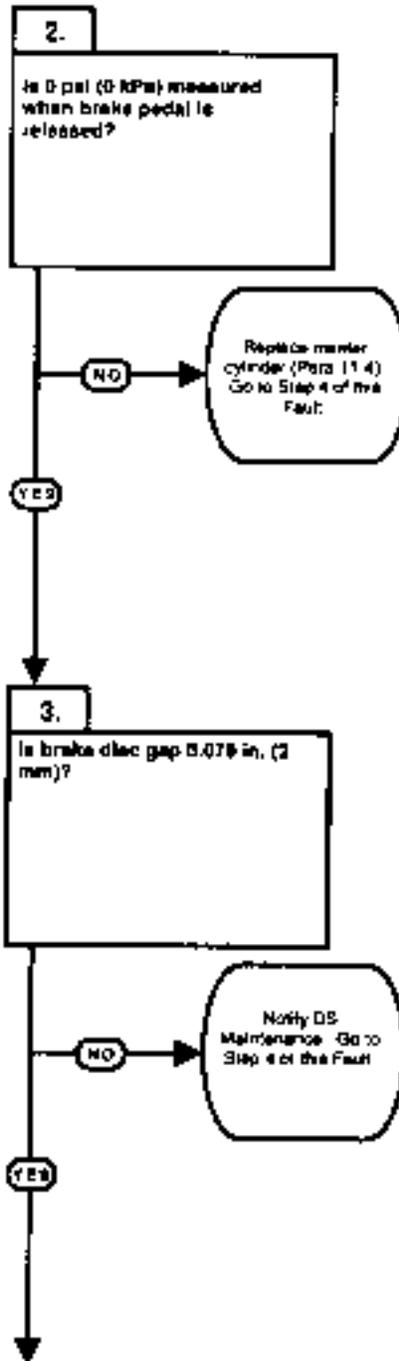
VISUAL INSPECTION

- Inspect last maintenance DA form 2404 for forklift.
- (a) If type of brake fluid is incorrect, drain brake system.
 - (b) If type of brake fluid is correct, go to Step 2 of this Fault.



2. SERVICE BRAKES DO NOT RELEASE OR RELEASE SLOWLY (CONT).

KNOWN INFO
Brake fluid OK.
POSSIBLE PROBLEMS
Master cylinder faulty. Drive axle faulty.

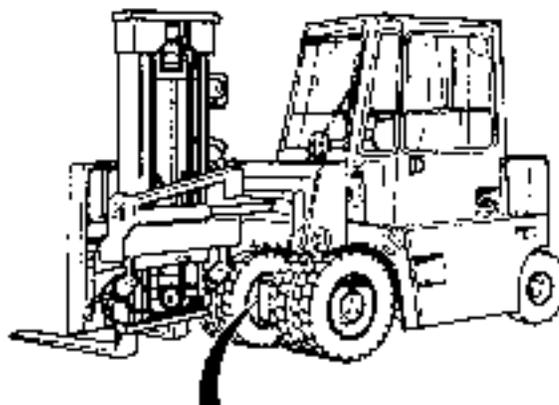
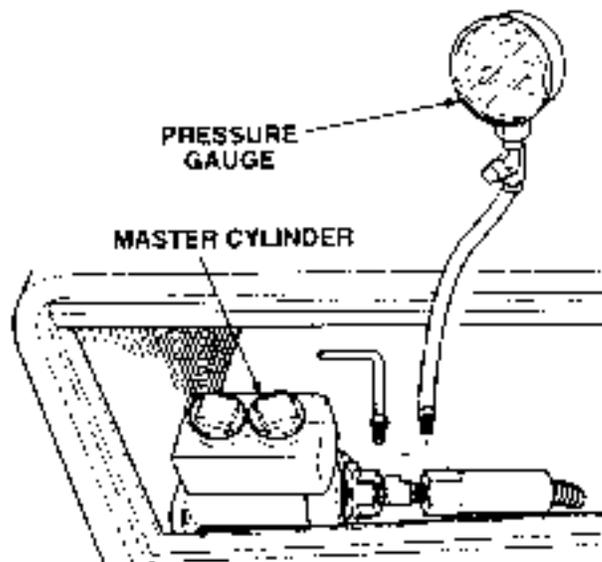


TEST OPTIONS
Pressure test. STE/ICE.R #50.
REASON FOR QUESTION
If 0 psi (0 kPa) is not present, master cylinder is faulty.

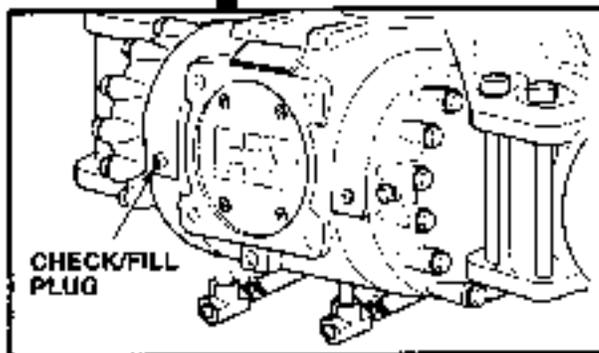
KNOWN INFO
Brake fluid OK. Master cylinder OK.
POSSIBLE PROBLEMS
Drive axle faulty.

TEST OPTIONS
Brake disc check.
REASON FOR QUESTION
If 0.079 in. (2 mm) is not measured, drive axle is faulty.

PRESSURE TEST
<ol style="list-style-type: none"> (1) Disconnect brake line from master cylinder (Para 11-4). (2) Connect 0 to 2,000 psi (0-13,790 kPa) pressure gauge to master cylinder. (3) Depress and release brake pedal and observe gauge. <ol style="list-style-type: none"> (a) If 0 psi (0 kPa) is not present, perform Step (4) below and replace master cylinder (Para 11-4). (b) If 0 psi (0 kPa) is present, relief valve is OK. (4) Remove 0 to 2,000 psi (0-13,790 kPa) pressure gauge. (5) Connect brake line on master cylinder.

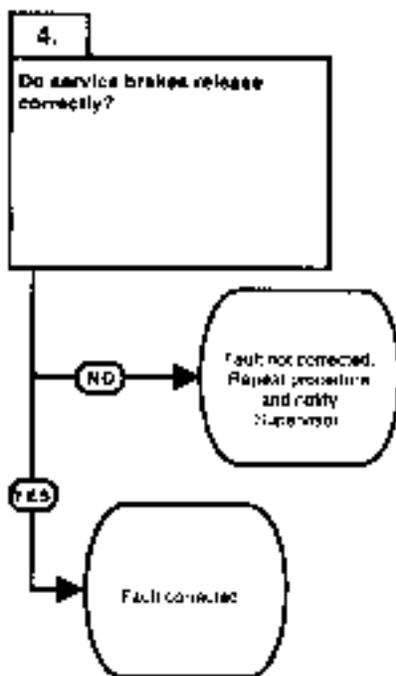


BRAKE DISC CHECK
<ol style="list-style-type: none"> (1) Remove drive axle check/fill plug (LO 10-3930-669-12). (2) Measure brake disc thickness. <ol style="list-style-type: none"> (a) If brake disc gap is not 0.079 in. (2 mm), brake discs are faulty. Perform Step (2) below and notify DS Maintenance. (b) If brake disc gap is 0.079 in. (2 mm), brake discs are OK. (3) Install drive axle check/fill plug.



2. SERVICE BRAKES DO NOT RELEASE OR RELEASE SLOWLY (CONT).

KNOWN INFO
Brake fluid OK. Master cylinder OK. Drive axle OK.
POSSIBLE PROBLEMS

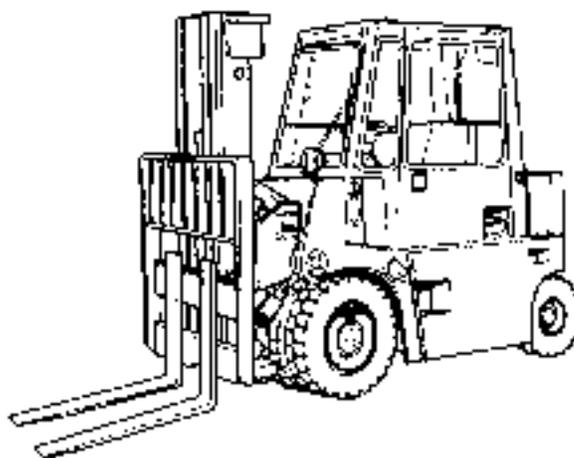


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If service brakes release correctly. fault has been corrected.



VERIFY REPAIR

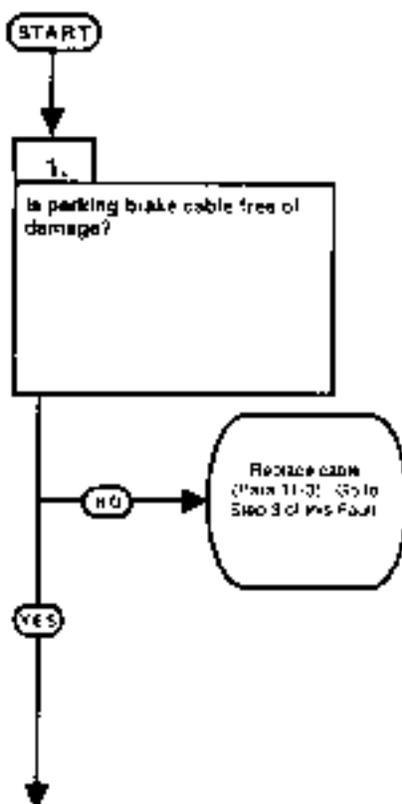
- (1) Start engine (TM 10-3930-669-10).
- (2) Operate vehicle and apply and release service brakes.
 - (a) If service brakes do not release correctly, fault not corrected, Perform Step (3) below and notify DS Maintenance.
 - (b) If service brakes release correctly, fault corrected.
- (3) Shut down engine.



2-17. BRAKE SYSTEM TROUBLESHOOTING (CONT).

3. PARKING BRAKE DOES NOT ENGAGE OR DISENGAGE.	
INITIAL SETUP	
<i>Tools and Special Tools</i> Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)	<i>Equipment Condition</i> Engine OFF (TM 10-3930-669-10) MAIN POWER switch OFF (TM 10-3930-669-10) Parking brake applied (TM 10-3930-669-10) Wheels chocked (TM 10-3930-669-10)
<i>References</i> TM 10-3930-669-10	

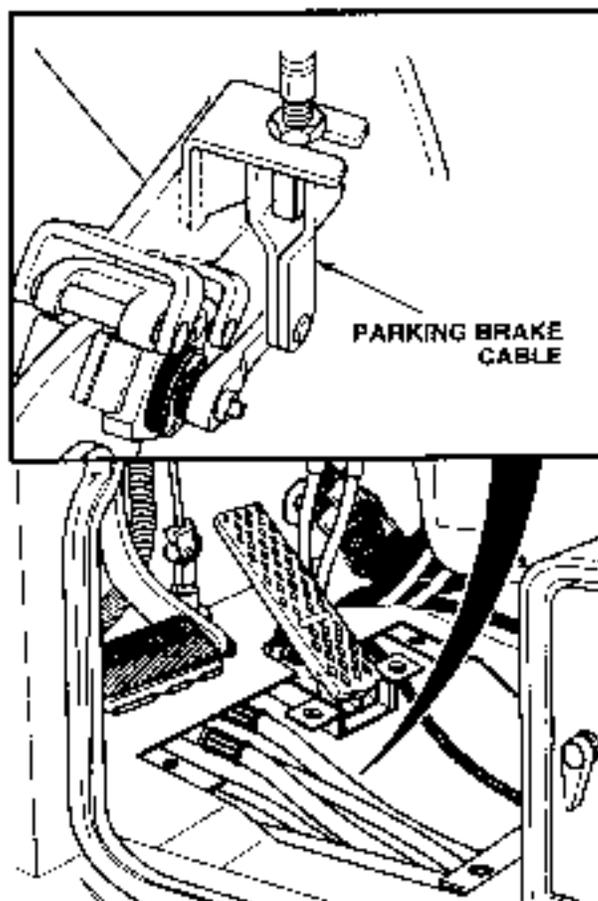
KNOWN INFO
POSSIBLE PROBLEMS
Parking brake cable faulty. Parking brake adjustment incorrect. Parking brake pads faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If parking brake cable is damaged, parking brake cable faulty.

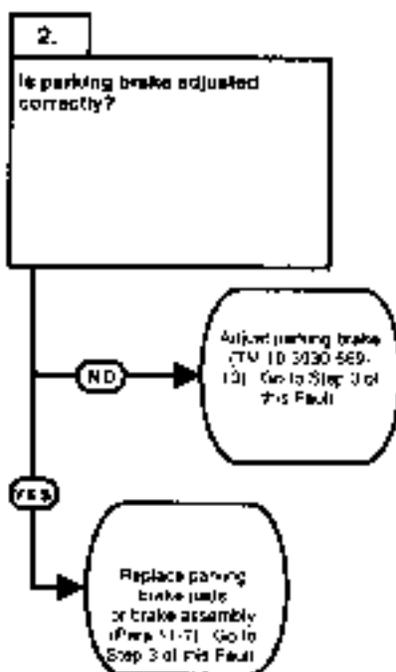
VISUAL INSPECTION

- (1) Remove floor plate (Para 15-12).
- (2) Inspect parking brake cable.
 - (a) If parking brake is damaged, replace cable (Para 11-3).
 - (b) If parking brake is not damaged, cable OK.



3. PARKING BRAKE DOES NOT ENGAGE OR DISENGAGE (CONT).

KNOWN INFO
Parking brake cable OK.
POSSIBLE PROBLEMS
Parking brake adjustment incorrect. Parking brake pads faulty.

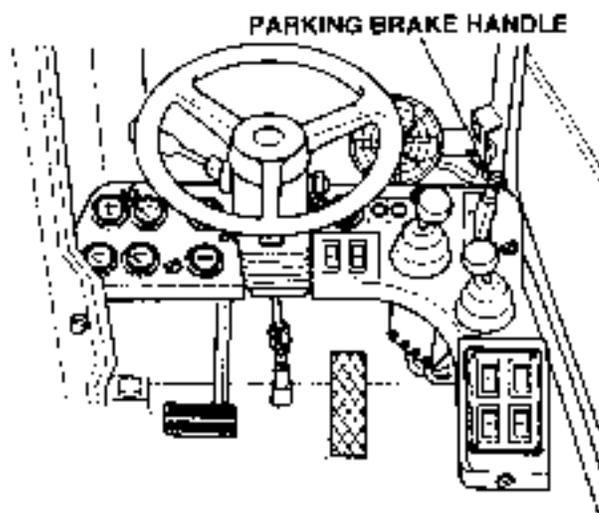


TEST OPTIONS
Parking brake adjustment check.
REASON FOR QUESTION
If parking brake adjustment is correct, parking brake pads are faulty. ←

**PARKING BRAKE ADJUSTMENT
CHECK**

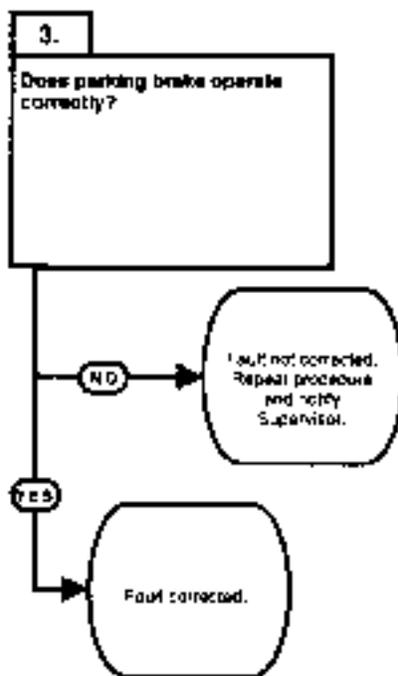
Check parking brake adjustment
(TM 10-3930-669-10).

- (a) If parking brake is not
adjusted, adjust parking brake.
- (b) If parking brake is adjusted,
replace parking brake pads
or brake assembly (Para 11-7).



3. PARKING BRAKE DOES NOT ENGAGE OR DISENGAGE (CONT).

KNOWN INFO
Parking brake cable OK. Parking brake adjustment correct. Parking brake pads OK.
POSSIBLE PROBLEMS

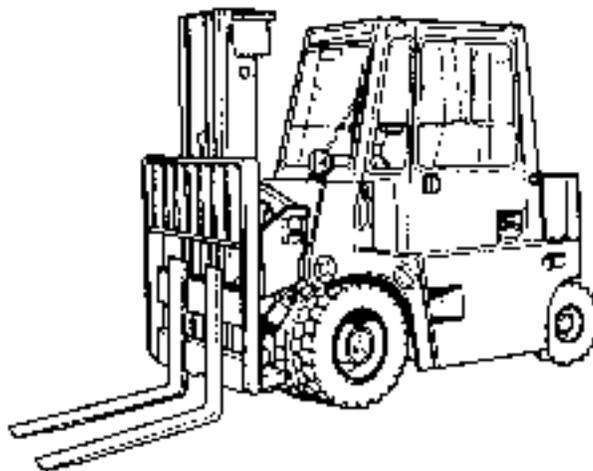


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If parking brake operate correctly, fault has been corrected.



VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Apply throttle lightly and operate parking brake.
 - (a) If parking brake will not operate, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If parking brake operates, fault corrected.
- (3) Shut down engine.



This Page Intentionally Left Blank.

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING.

This paragraph covers Hydraulic System Troubleshooting. The Hydraulic System Fault Index, Table 2-8, lists faults for the hydraulic system of the forklift.

Table 2-8. Hydraulic System Fault Index

Fault No.	Troubleshooting Procedure	Page
1.	No Lift/Shift or Pivot/Tilt Functions	2-422
2.	Tilt Cylinders Do Not Operate or Operate Slowly	2-428
3.	Pivot Cylinder Does Not Operate or Operates Slowly.....	2-436
4.	No Lift and Shift Functions.....	2-444
5.	Steering Cylinder Does Not Operate.....	2-450
6.	Side Shift Cylinder Does Not Operate.....	2-456
7.	Lift Cylinder(s) Does Not Operate	2-462
8.	Load Cannot Be Lifted to Maximum Height.....	2-468
9.	Lift Cylinder(s) Will Not Hold Load (Downdrift)	2-474
10.	Hydraulic Mast Lift Speed Sluggish.....	2-482

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

1. NO LIFT/SHIFT OR PIVOT/TILT FUNCTIONS.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

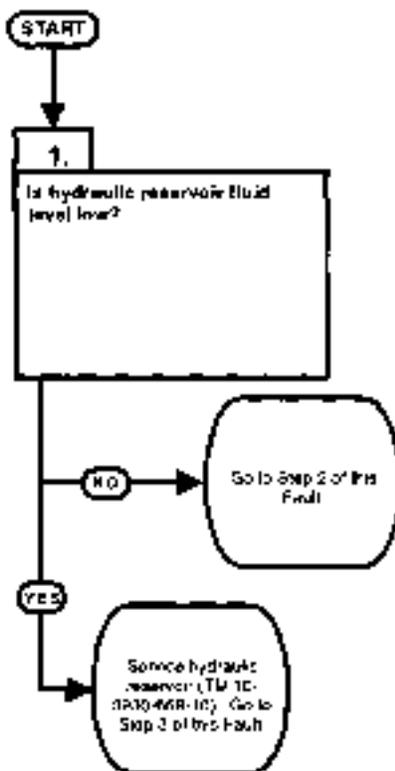
References

TM 10-3930-669-10

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

KNOWN INFO
Transmission operates.
POSSIBLE PROBLEMS
Hydraulic fluid level low. Hydraulic reservoir to pump main hydraulic hose leaking or damaged. Hydraulic pump faulty.

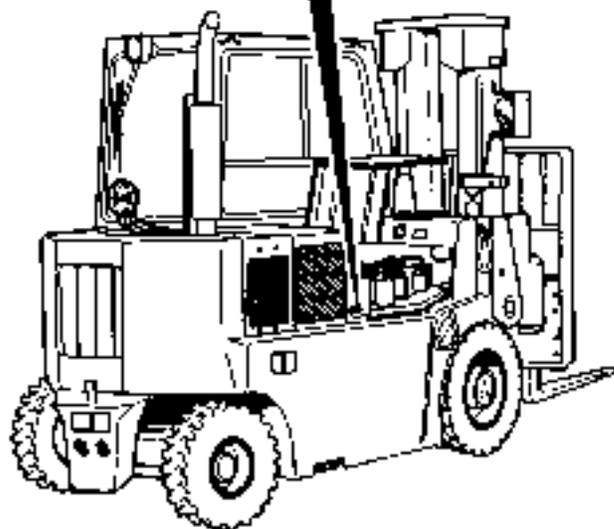
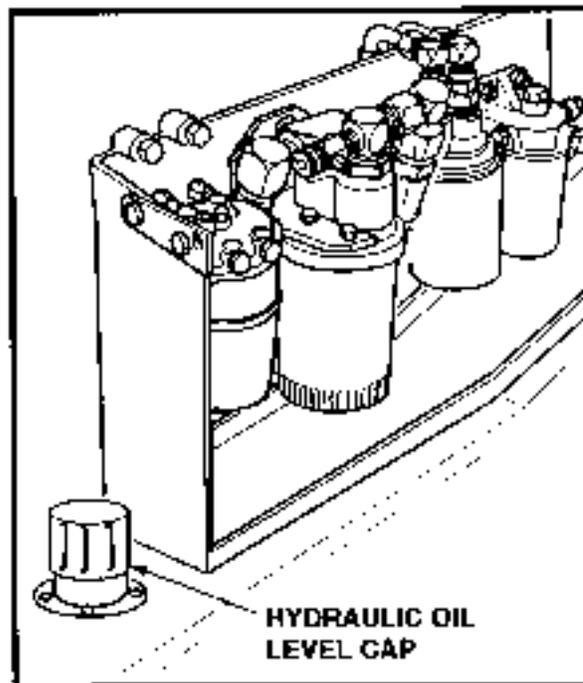


TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hydraulic fluid level is low, hydraulic cylinders will not operate.



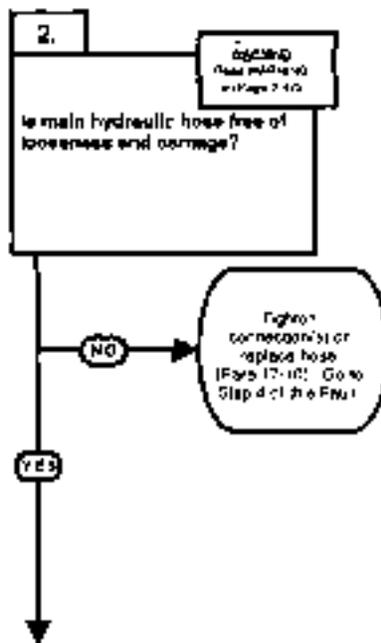
VISUAL INSPECTION

- (1) Open right-hand engine access cover (TM 10-3930-669-10).
- (2) Inspect hydraulic oil reservoir for correct oil level (TM 10-3930-669-10).
 - (a) If hydraulic oil level is low, service reservoir with clean hydraulic oil (TM 10-3930-669-10).
 - (b) If hydraulic oil is not low, perform Step (3) below and go to Step 2 of this Fault.
- (3) Close right-hand engine access cover.



1. NO LIFT/SHIFT OR PIVOT/TILT FUNCTIONS (CONT).

KNOWN INFO
Transmission operates. Hydraulic fluid level OK.
POSSIBLE PROBLEMS
Hydraulic reservoir to pump main hydraulic hose leaking or damaged. Hydraulic pump faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If main hydraulic hose is faulty, hydraulic cylinders will not operate. If main hydraulic hose is OK, hydraulic pump is faulty.

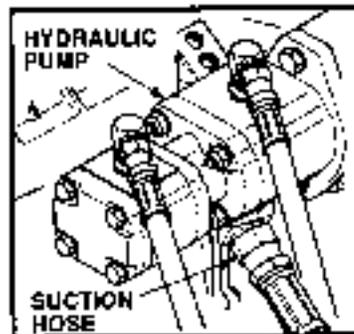
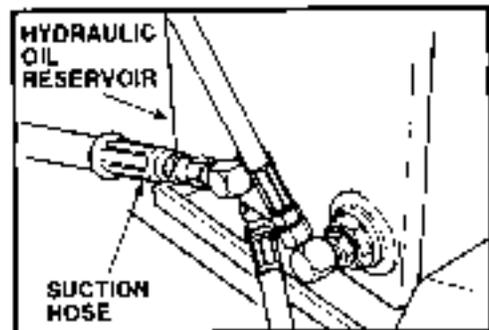


WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

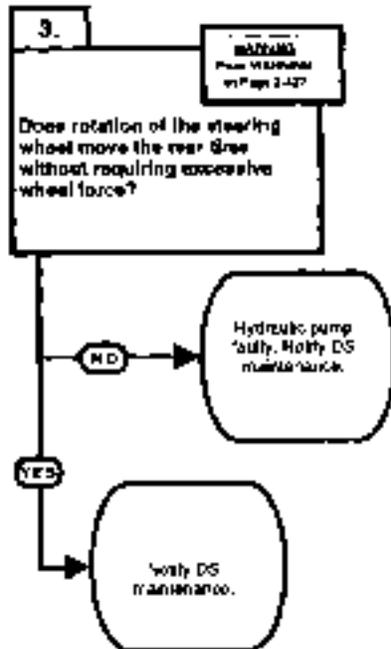
VISUAL INSPECTION

- (1) Position cab for service (Para 15-2).
- (2) Inspect hydraulic pump main hydraulic hose and fittings for looseness and damage.
 - (a) If main hydraulic hose fittings are loose, tighten fittings.
 - (b) If hose and/or fittings are damaged, replace hose and/or fittings (Para 17-10). Go to Step 3 of this Fault.
 - (c) If main hydraulic hose and fittings are not loose or damaged. Perform Step (3) below and go to Step 3 of this Fault.
- (3) Install cab (Para 15-2).



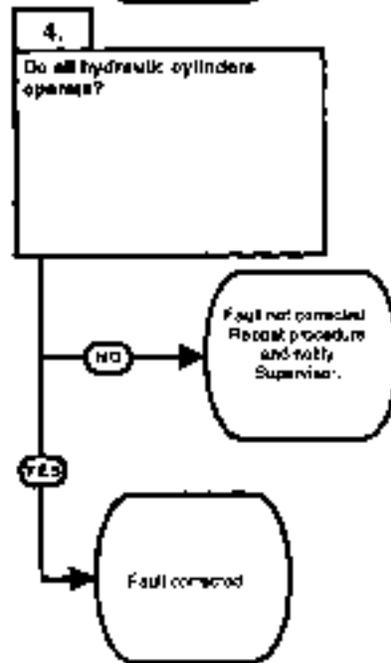
1. NO LIFT/SHIFT OR PIVOT/TILT FUNCTIONS (CONT).

KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic reservoir to pump main hydraulic hose OK.
POSSIBLE PROBLEMS
Hydraulic pump faulty.



TEST OPTIONS
Pressure test STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic pump is faulty, lift and shift cylinders will not operate.

KNOWN INFO
Transmission operates. Hydraulic reservoir oil level OK. Hydraulic reservoir to pump main hydraulic hose OK. Hydraulic pump OK.
POSSIBLE PROBLEMS

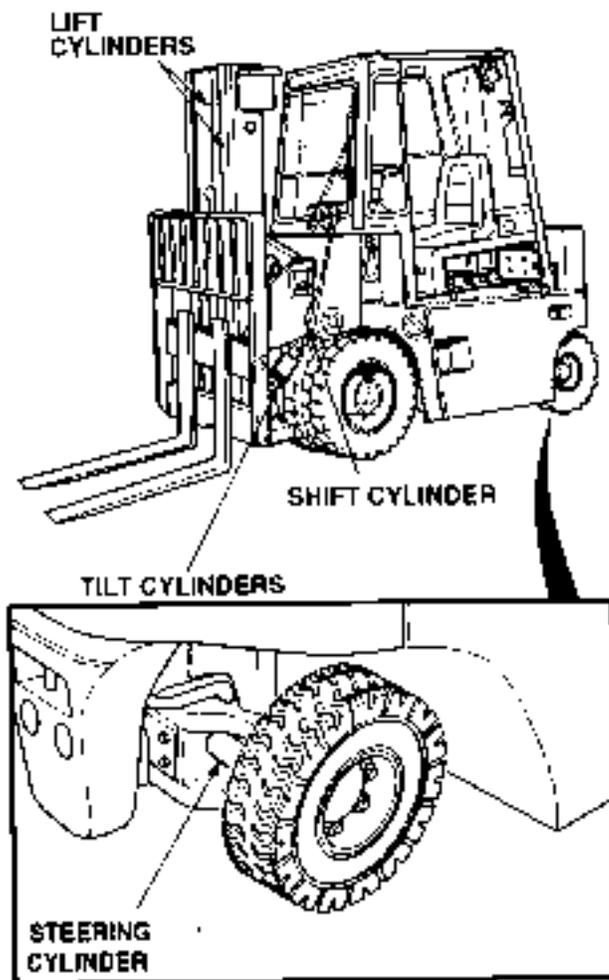


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If all hydraulic cylinders operate, fault has been corrected.

WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

PRESSURE TEST
(1) Start engine (TM 10-3930-669-10). (2) Steer forklift and observe response. (a) If steering cylinder does not operate, hydraulic pump is faulty. Notify DS maintenance. (b) If steering cylinder operates pump is OK. (3) Shut down engine (TM 10-3930-669-10).



VERIFY REPAIR
(1) Start engine (TM 10-3930-669-10). (2) Operate lift, tilt, and shift cylinders on mast and observe operation (TM 10-3930-669-10). (a) If lift, tilt, and shift cylinders do not operate. Perform Step (3) below. Repeat procedure and notify Supervisor. (b) If lift, tilt, and shift cylinders operate, fault corrected. (3) Shut down engine.

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

2. TILT CYLINDERS DO NOT OPERATE OR OPERATE SLOWLY.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)
 STEVICE-R (Optional) (item 14, Appendix B)

References

TM 10-3930-669-10

Personnel Required

Two

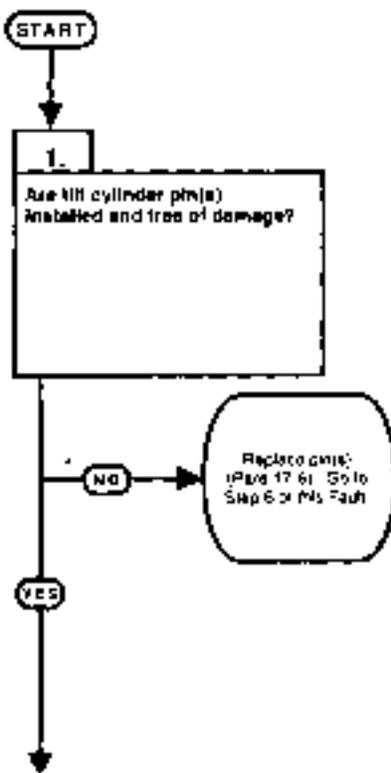
Equipment Condition

Engine OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

Materials/Parts

Cap and Plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

KNOWN INFO
Lift, shift, and pivot cylinders operate.
POSSIBLE PROBLEMS
Tilt cylinder pin(s) damaged or missing. Hydraulic hoses to tilt cylinder(s) leaking or damaged. Tilt control cable damaged or unadjusted. Control valve faulty. Tilt cylinder faulty. Mast tilt faulty.

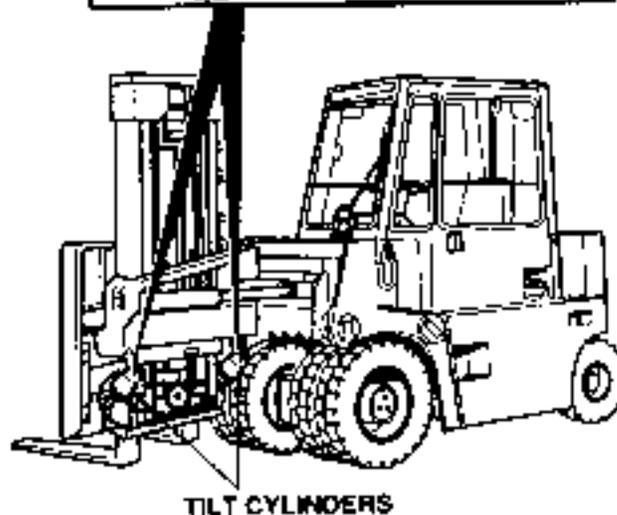
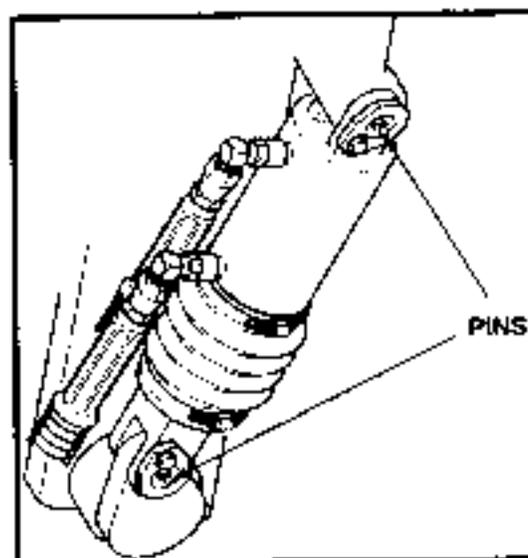


TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
It tilt cylinder pin(s) is damaged or missing, the mast will not tilt.



VISUAL INSPECTION

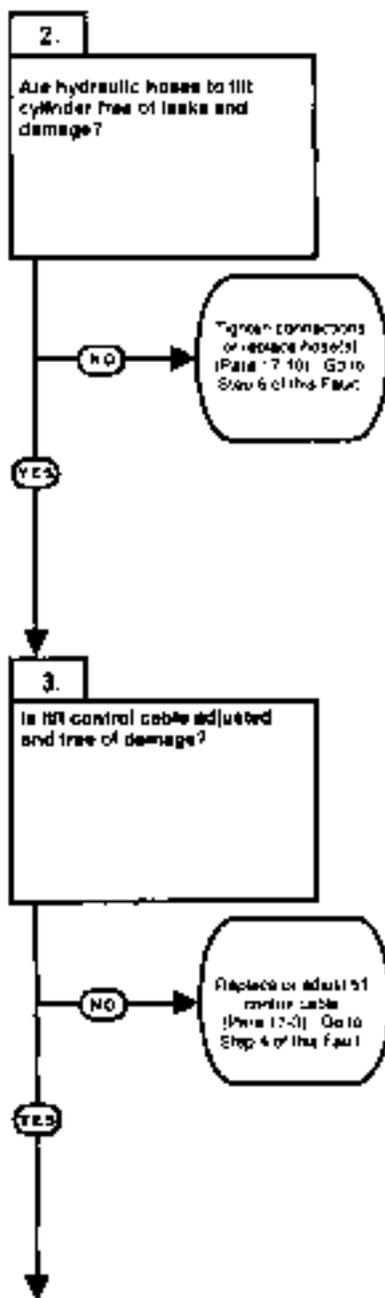
- Inspect tilt cylinder for missing or damaged pins.
- (a) If pin(s) is missing or damaged, replace pin(s) (Para 17-6).
 - (b) If pin(s) is not missing or damaged, tilt cylinder pins OK.



2. TILT CYLINDERS DO NOT OPERATE OR OPERATE SLOWLY (CONT).

KNOWN INFO
Lift, shift, and pivot cylinders operate. Tilt cylinder pin(s) OK.
POSSIBLE PROBLEMS
Hoses to tilt cylinder(s) leaking or damaged. Tilt control cable damaged or unadjusted. Stack valve faulty. Tilt cylinder faulty. Mast tilt faulty.

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hose(s) is loose or damaged, tilt cylinder will not operate.



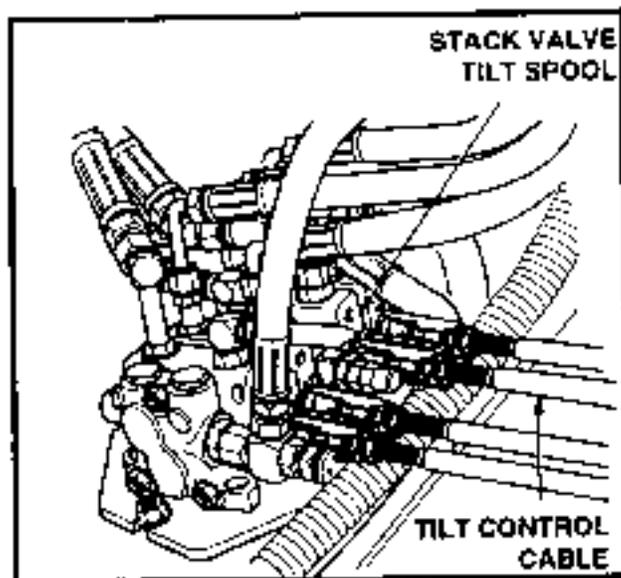
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If tilt control cable is damaged or unadjusted, tilt cylinder will not operate or will operate slowly.

KNOWN INFO
Lift, shift, and pivot cylinders operate. Tilt cylinder pin(s) OK. Hoses to tilt cylinders OK.
POSSIBLE PROBLEMS
Tilt control cable damaged or unadjusted. Stack valve faulty. Tilt cylinder faulty. Mast tilt faulty.

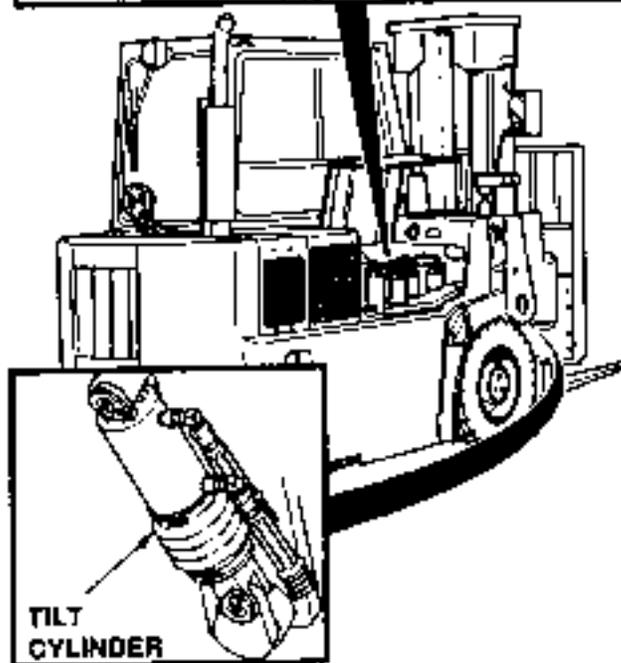
WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

VISUAL INSPECTION
<ol style="list-style-type: none"> (1) Remove cab floor plate (Para 15-12). (2) Inspect stack valve tilt hoses and fittings from stack valve tilt spool to tilt cylinder for looseness and damage. <ol style="list-style-type: none"> (a) If tilt hose fittings are loose, tighten fittings. (b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings (Para 17-10). (c) If hoses and fittings are not loose or damaged, hoses are OK.

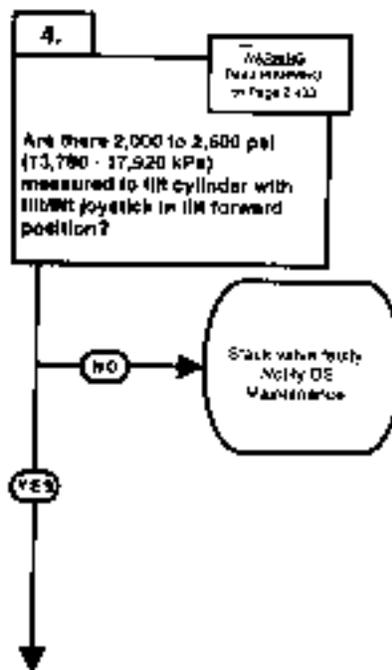


VISUAL INSPECTION
<ol style="list-style-type: none"> (1) Open right-hand engine access cover (TM 10-3930-669-10). (2) Inspect tilt control cable for damage. <ol style="list-style-type: none"> (a) If tilt control cable is damaged, replace tilt control cable (Para 17-3). (b) If cable is not damaged, adjust cable (Para 17-3). (c) If cable is not damaged or adjusted properly, cable is OK.



2. TILT CYLINDERS DO NOT OPERATE OR OPERATE SLOWLY (CONT).

KNOWN INFO
Lift, shift, and pivot cylinders operate. Tilt cylinder pin(s) OK. Hoses to tilt cylinders OK. Tilt control cable OK.
POSSIBLE PROBLEMS
Stack valve faulty. Tilt cylinder faulty. Mast tilt faulty.



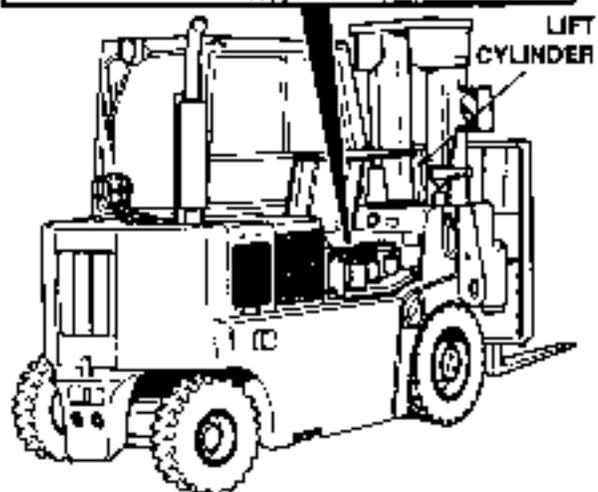
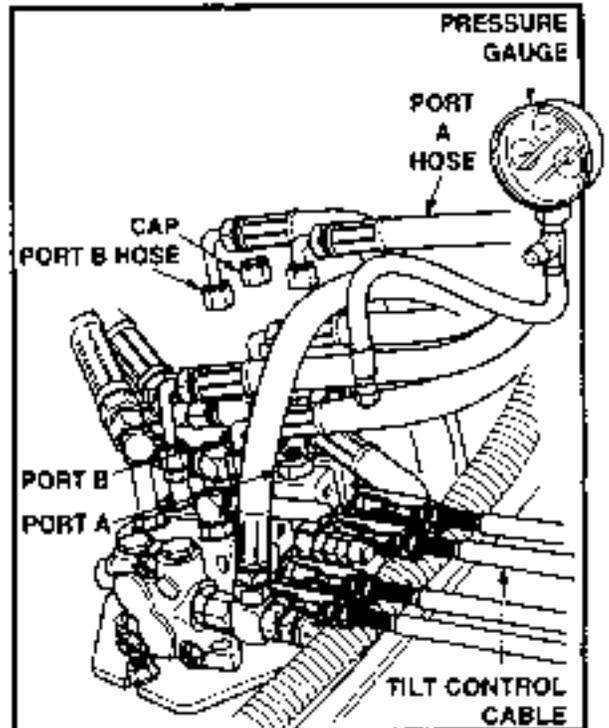
TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If stack valve is faulty, tilt cylinder will not operate.



WARNING

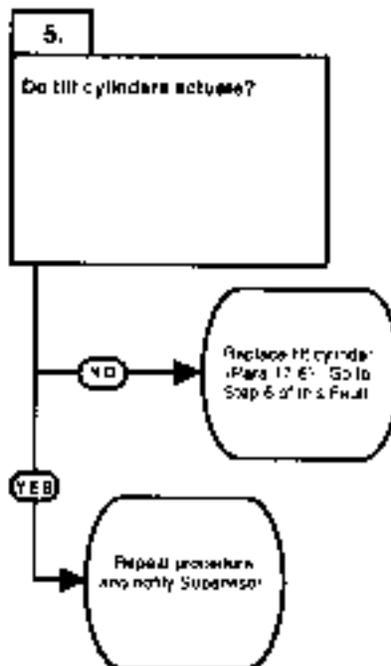
- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

PRESSURE TEST	
(1)	Tag and disconnect hose from stack valve tilt spool port A hose fitting.
(2)	Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to stack valve tilt spool port A hose fitting.
(3)	Install pressure cap on stack valve spool open port.
(4)	Start engine (TM 10-3930-669-10).
(5)	With the aid of an assistant, move tilt/lift joystick to tilt forward position and observe pressure gauge (TM 10-3930-669-10). (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, stack valve is faulty. Perform Steps (6) and (7) below and notify DS Maintenance. (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, go to Step (6) below.
(6)	Shut down engine.
(7)	Remove pressure gauge, tag, cap, and connect hose to stack valve tilt spool port A fitting.
(8)	Tag and disconnect hose from stack valve tilt spool port B hose fitting.
(9)	Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to stack valve tilt spool port A hose fitting.
(10)	Install pressure cap on stack valve spool open port.
(11)	Start engine.
(12)	Move tilt/lift joystick to tilt back position and observe pressure gauge. (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, stack valve is faulty. Perform Steps (13) and (14) below and notify DS Maintenance (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, stack valve is OK.
(13)	Shut down engine.
(14)	Remove pressure gauge, tag, cap, and connect hose to stack valve tilt spool port A fitting.
(15)	Install cab floor plate (Para 15-12).
(16)	Close right-hand engine access cover.



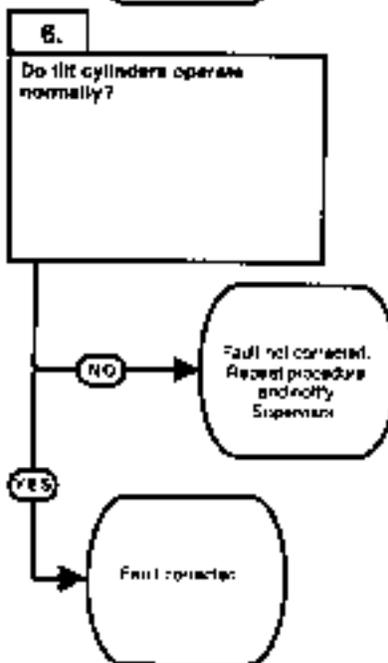
2. TILT CYLINDERS DO NOT OPERATE OR OPERATE SLOWLY (CONT).

KNOWN INFO
Lift, shift, and pivot cylinders operate. Tilt cylinder pin(s) OK. Hoses to tilt cylinders OK. Tilt control cable OK. Stack valve OK.
POSSIBLE PROBLEMS
Tilt cylinder faulty. Mast tilt faulty.



TEST OPTIONS
Tilt cylinder test.
REASON FOR QUESTION
If tilt cylinders are faulty, tilt cylinders will not operate or will operate slowly. If tilt cylinders are OK, mast tilt is faulty.

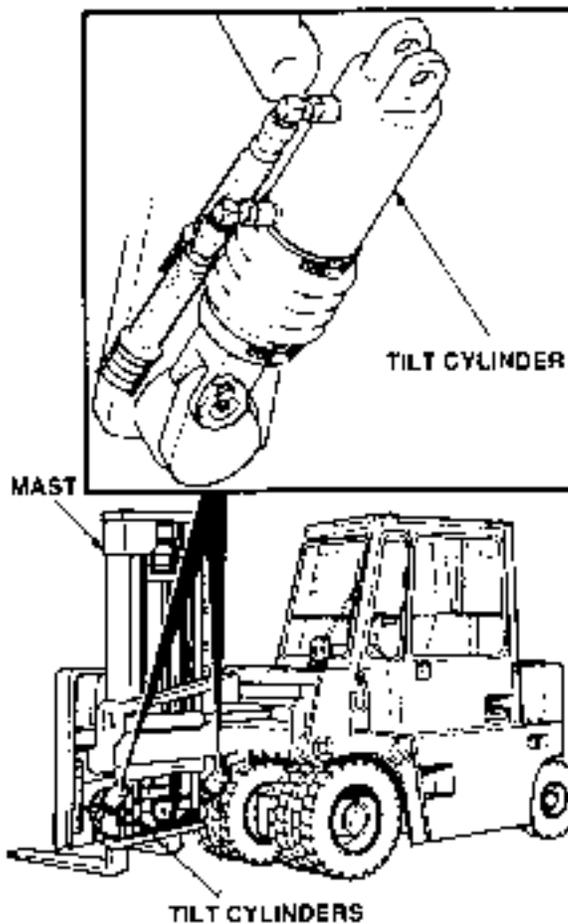
KNOWN INFO
Lift, shift, and pivot cylinders operate. Tilt cylinder pin(s) OK. Hoses to tilt cylinders OK. Tilt control cable OK. Tilt cylinders OK. Mast tilt OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If tilt cylinders operate normally, fault has been corrected.

TILT CYLINDER TEST

- (1) Disconnect tilt cylinders from rail (Para 17-6).
- (2) Start engine (TM 10-3930-669-10).
- (3) With aid of an assistant, move tilt/lift joystick to tilt forward position and observe tilt cylinders (TM 10-3930-669-10).
 - (a) If tilt cylinders do not actuate, perform Step (4) below and replace tilt cylinders (Para 17-6).
 - (b) If tilt cylinders actuate, mast tilt is faulty. Perform Steps (4) and (5) below. Repeat procedure and notify Supervisor.
- (4) Shut down engine.
- (5) Connect tilt cylinders to rail.



VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Move tilt/lift joystick to tilt forward and back position and observe mast (TM 10-3930-669-10).
 - (a) If mast does not tilt forward and back. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If mast tilts forward and back, fault corrected.
- (3) Shut down engine.

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

3. PIVOT CYLINDER DOES NOT OPERATE OR OPERATES SLOWLY.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)

References

TM 10-3930-669-10

Personnel Required

Two

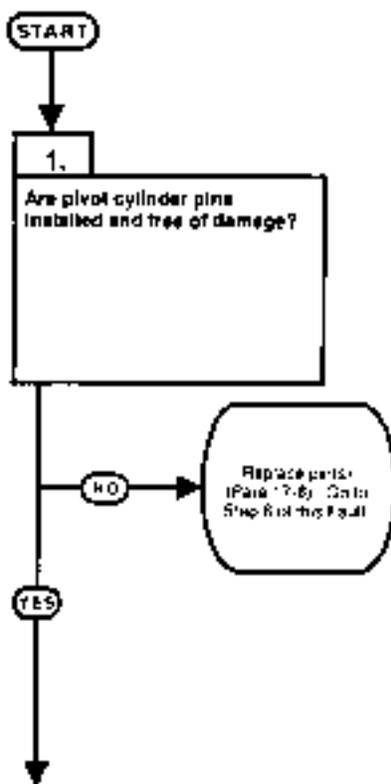
Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

Materials/Parts

Cap and plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

KNOWN INFO
Lift, shift, and tilt cylinders operate.
POSSIBLE PROBLEMS
Pivot cylinder pins damaged or missing. Hydraulic hoses to pivot cylinder loose or damaged. Pivot control cable damaged or unadjusted. Stack valve faulty. Pivot cylinder faulty. Pivot shaft bearings faulty.



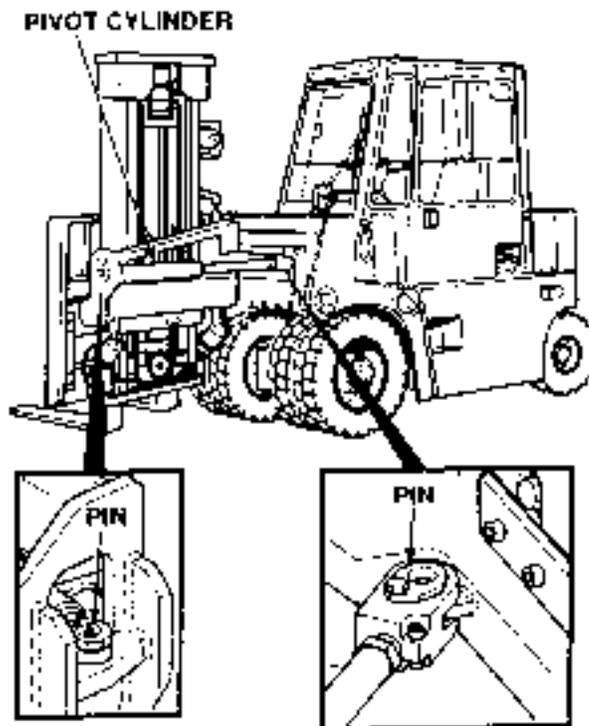
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If pivot cylinder pin(s) is damaged or missing, the mast will not pivot.



VISUAL INSPECTION

Inspect pivot cylinder for missing or damaged pins.

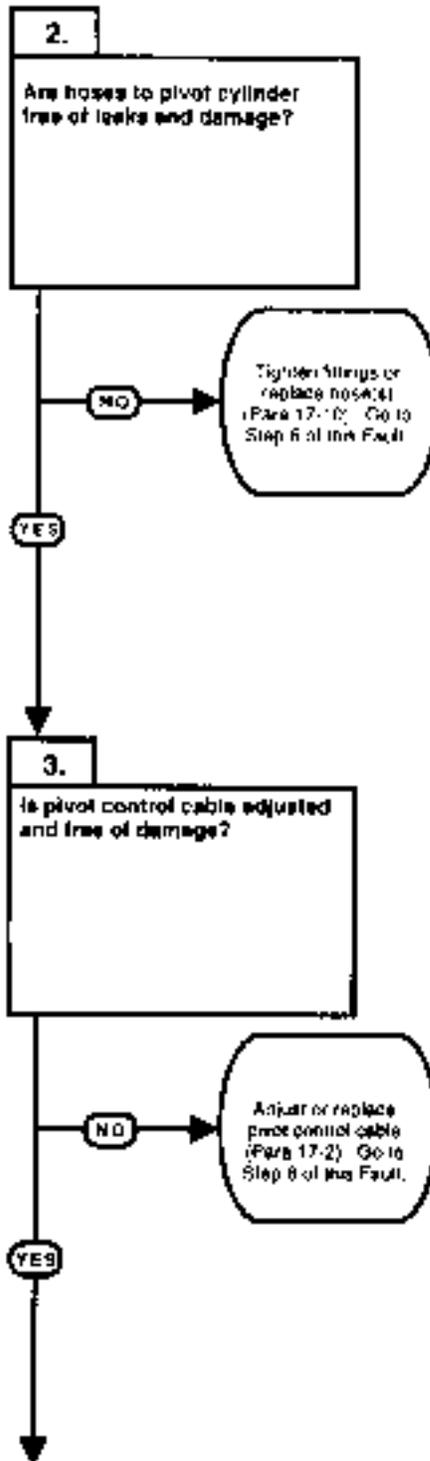
- (a) If pin(s) is missing or damaged, replace pin(s) (Para 17-8).
- (b) If pin(s) is not missing or damaged, pivot cylinder pins OK.



3. PIVOT CYLINDER DOES NOT OPERATE OR OPERATES SLOWLY (CONT).

KNOWN INFO
Lift, shift, and tilt cylinders operate. Pivot cylinder pins OK.
POSSIBLE PROBLEMS
Hydraulic hoses to pivot cylinder loose or damaged. Pivot control cable damaged or unadjusted. Stack valve faulty. Pivot cylinder faulty. Pivot shaft bearings faulty.

KNOWN INFO
Lift, shift, and tilt cylinders operate. Pivot cylinder pins OK. Hydraulic hoses to pivot cylinder OK.
POSSIBLE PROBLEMS
Pivot control cable damaged or unadjusted. Stack valve faulty. Pivot cylinder faulty. Pivot shaft bearings faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hose(s) is loose or damaged, pivot cylinder will not operate.

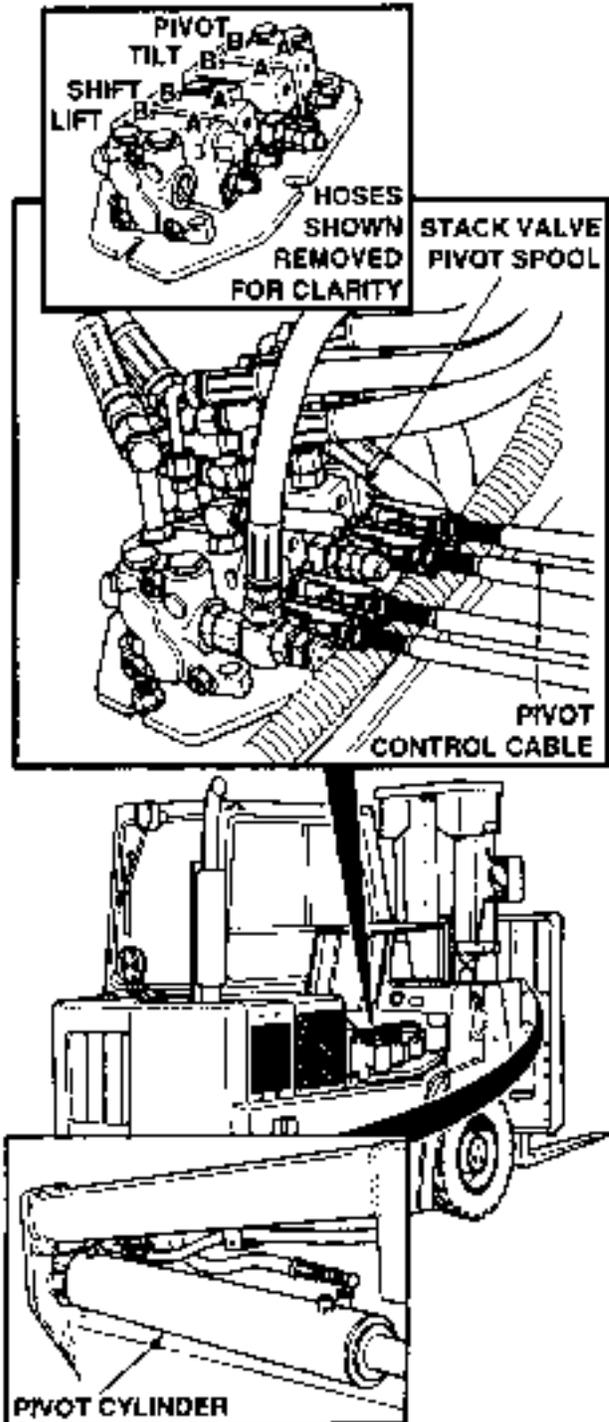
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If pivot control cable is damaged or adjusted, pivot cylinder will not operate or will operate slowly.

WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

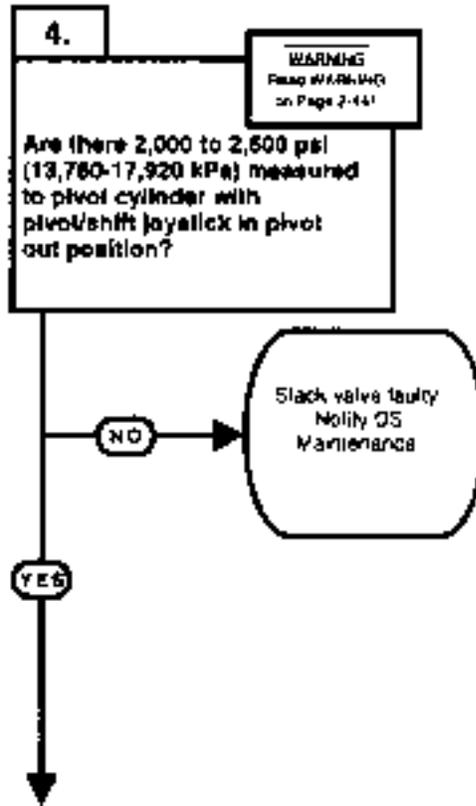
VISUAL INSPECTION
<p>(1) Open right-hand engine access cover (TM 10-3930-669-10).</p> <p>(2) Inspect stack valve pivot hoses and fittings from stack valve pivot spool to pivot cylinder for looseness and damage.</p> <p>(a) If pivot hose fittings are loose, tighten fittings.</p> <p>(b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings (Para 17-10).</p> <p>(c) If hose(s) and fittings are not loose or damaged, hoses are OK.</p> <p>(3) Close right-hand engine access cover.</p>

VISUAL INSPECTION
<p>Inspect pivot control cable for damage.</p> <p>(a) If cable is damaged, replace pivot control cable (Para 17-2).</p> <p>(b) If cable is not damaged, adjust cable (Para 17-2).</p> <p>(c) If cable is not damaged or unadjusted, cable is OK.</p>



3. PIVOT CYLINDER DOES NOT OPERATE OR OPERATES SLOWLY (CONT).

KNOWN INFO
Lift, shift, and tilt cylinders operate. Pivot cylinder pins OK. Hydraulic hoses to pivot cylinder OK. Pivot control cable OK.
POSSIBLE PROBLEMS
Stack valve faulty. Pivot cylinder faulty. Pivot shaft bearings faulty.



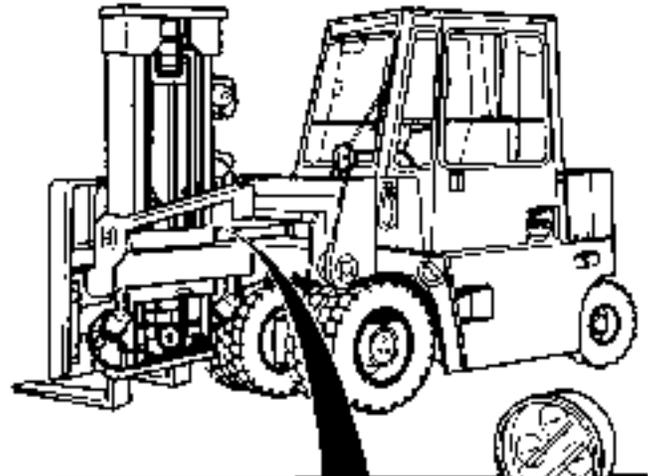
TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If stack valve is faulty, pivot cylinder will not operate.



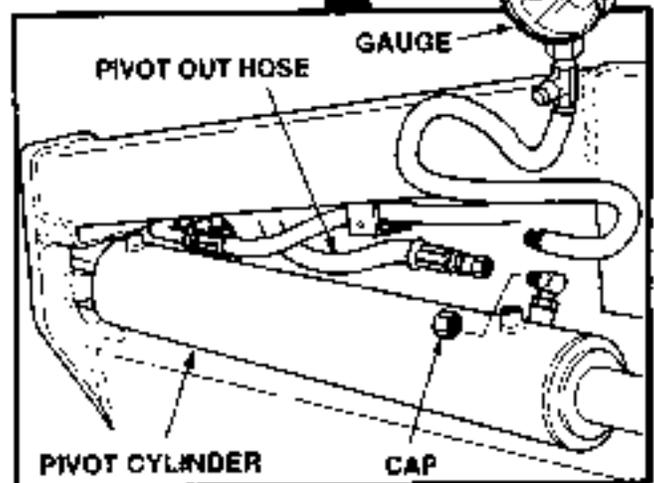
2-440

WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

**PRESSURE TEST**

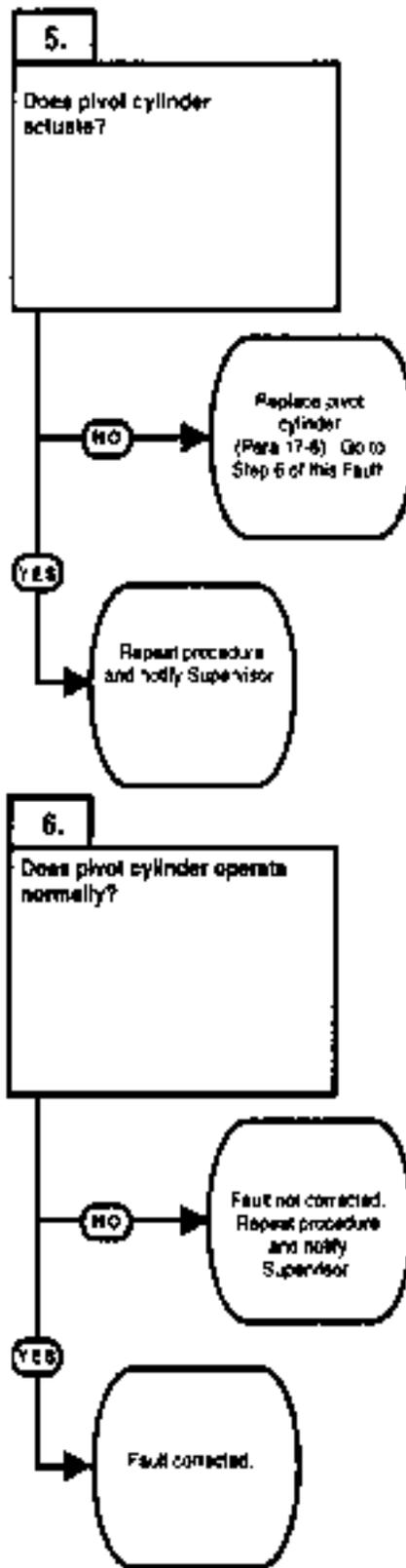
- (1) Tag and disconnect pivot out hose from pivot cylinder.
- (2) Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to pivot out hose.
- (3) Install pressure cap on pivot cylinder open port.
- (4) Start engine (TM 10-3930-669-10).
- (5) With aid of an assistant, move pivot/shift joystick in pivot out position and observe pressure gauge (TM 10-3930-669-10).
 - (a) if 2,000 to 2,600 psi (13,780- 17,920 kPa) are not measured, stack valve is faulty. Perform Steps (6) and (7) below and notify DS Maintenance.
 - (b) If 2,000 to 2,600 psi (13,780- 17,920 kPa) are measured, stack valve is OK.
- (6) Shut down engine.
- (7) Remove pressure gauge, tag, and cap and connect pivot out hose to pivot cylinder.



3. PIVOT CYLINDER DOES NOT OPERATE OR OPERATES SLOWLY (CONT).

KNOWN INFO
Lift, shift, and Tilt cylinders operate. Pivot cylinder pins OK. Hydraulic hoses to pivot cylinder OK. Pivot control cable OK. Stack valve OK.
POSSIBLE PROBLEMS
Pivot cylinder faulty. Pivot shaft bearings faulty.

KNOWN INFO
Lift, shift, and tilt cylinders operate. Pivot cylinder pins OK. Hydraulic hoses to pivot cylinder OK. Pivot control cable OK Stack valve OK. Pivot cylinder OK. Pivot shaft bearings OK.
POSSIBLE PROBLEMS

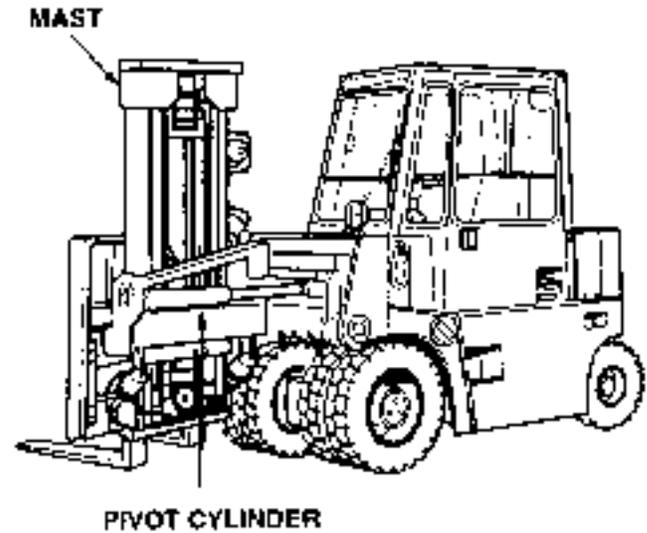


TEST OPTIONS
Pivot cylinder test.
REASON FOR QUESTION
If pivot cylinder is faulty, pivot cylinder will not operate or will operate slowly. If pivot cylinder is OK, pivot shaft bearings are faulty.

TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If pivot cylinder operates normally, fault has been corrected.

PIVOT CYLINDER TEST

- (1) Start engine (TM 10-3930-669-10).
- (2) With aid of an assistant, move pivot/shift joystick in pivot out position and observe pivot cylinder (TM 10-3930-669-10).
 - (a) If pivot cylinder does not actuate, perform Step (3) below and replace pivot cylinder (Para 17-8).
 - (b) If pivot cylinder actuates, Perform Step (3) below. Repeat procedure and notify Supervisor.
- (3) Shut down engine.
- (4) Close right-hand engine access cover.

**VERIFY REPAIR**

- (1) Start engine (TM 10-3930-669-10).
- (2) Move pivot/shift joystick in pivot out and in position and observe mast.
 - (a) If mast does not pivot in and out, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If mast pivots in and out, fault corrected.
- (3) Shut down engine.

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

4. NO LIFT AND SHIFT FUNCTIONS..

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)

References

TM 10-3930-669-10

Personnel Required

Two

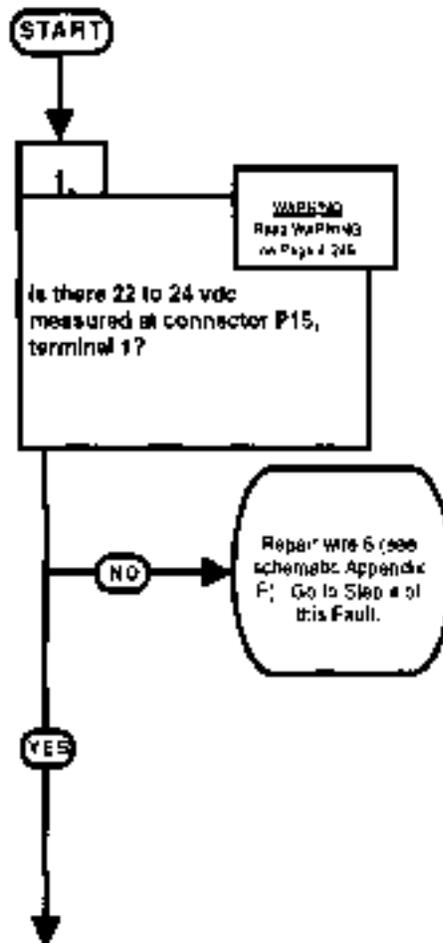
Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

Materials/Parts

Cap and plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

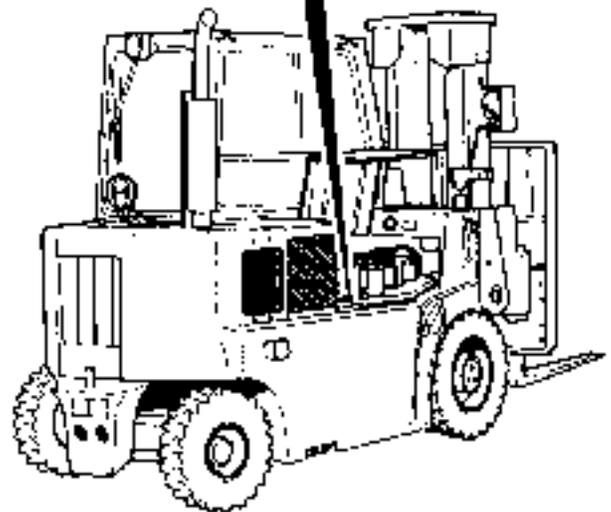
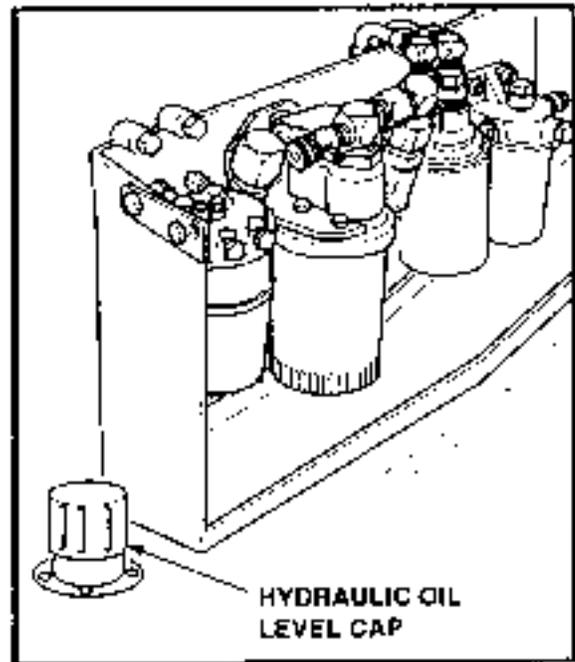
KNOWN INFO
Transmission operates.
POSSIBLE PROBLEMS
Hydraulic fluid level low. Hydraulic pump faulty. Priority valve faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If hydraulic fluid level is low, hydraulic cylinders will not operate.

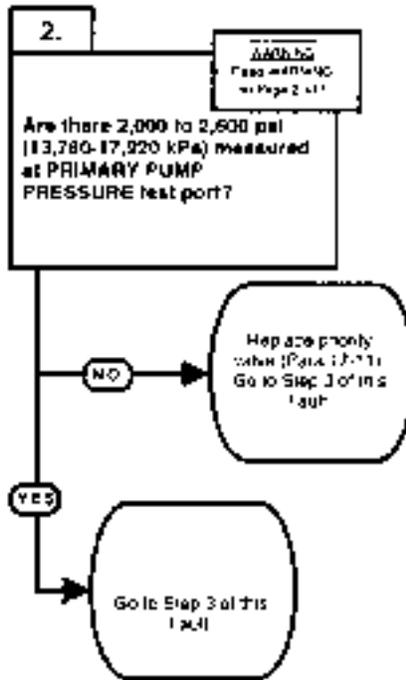
VISUAL INSPECTION

- (1) Open right-hand engine access cover (TM 10-3930-669-10).
- (2) Inspect hydraulic oil reservoir for correct oil level (TM 10-3930-669-10).
 - (a) If hydraulic oil level is low, fill reservoir with clean hydraulic oil (TM 10-3930-669-10).
 - (b) If hydraulic oil is not low, oil level is OK.
- (3) Close right-hand engine access cover.



4. NO LIFT AND SHIFT FUNCTIONS (CONT).

KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic pump OK.
POSSIBLE PROBLEMS
Priority valve faulty.



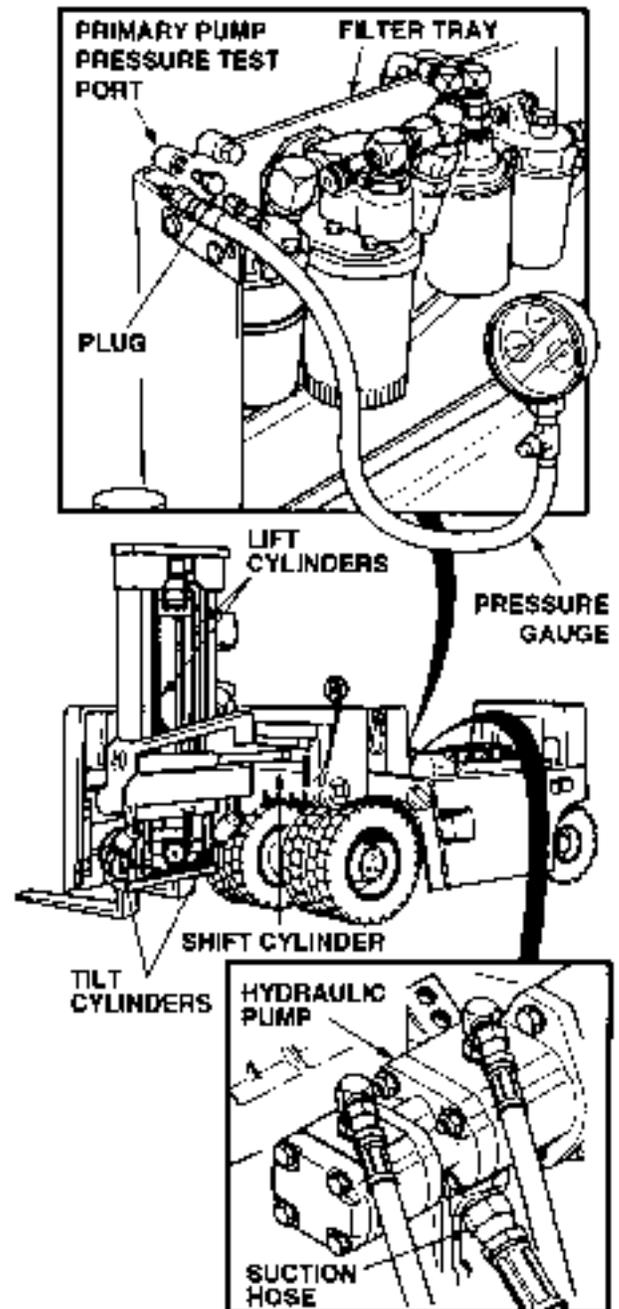
TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If priority valve is faulty, lift and shift cylinders will not operate.

WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

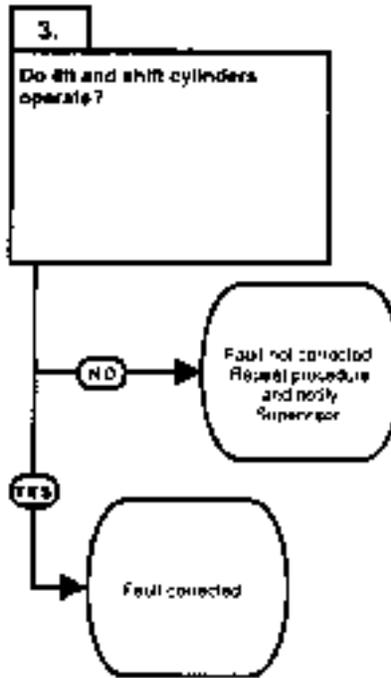
PRESSURE TEST

- (1) Remove test port plug and connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to PRIMARY PUMP PRESSURE test port.
- (2) Start engine (TM 10-3930-669-10).
- (3) With aid of an assistant, operate any hydraulic control and observe pressure gauge.
 - (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, perform Steps (4) and (5) below and replace priority valve (Para 17-11).
 - (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, priority valve is OK.
- (4) Shut down engine.
- (5) Remove pressure gauge from PRIMARY PUMP PRESSURE test port and install test port plug.
- (6) Install cab (Para 15-2).



4. NO LIFT AND SHIFT FUNCTIONS (CONT).

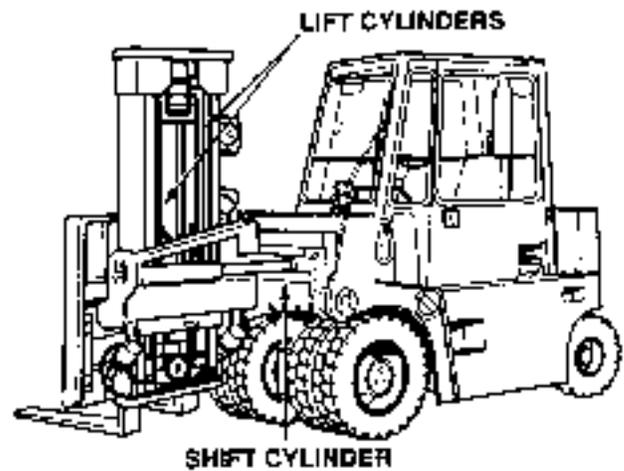
KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic tank to pump suction hose OK. Hydraulic pump OK. Priority valve OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If lift and shift cylinders operate, fault has been corrected.

VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate mast lift and shift cylinders.
 - (a) If lift and shift cylinders do not operate, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If lift and shift cylinders operate, fault corrected.
- (3) Shut down engine.



2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

5. STEERING CYLINDER DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)

Personnel Required

Two

Materials/Parts

Cap and plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

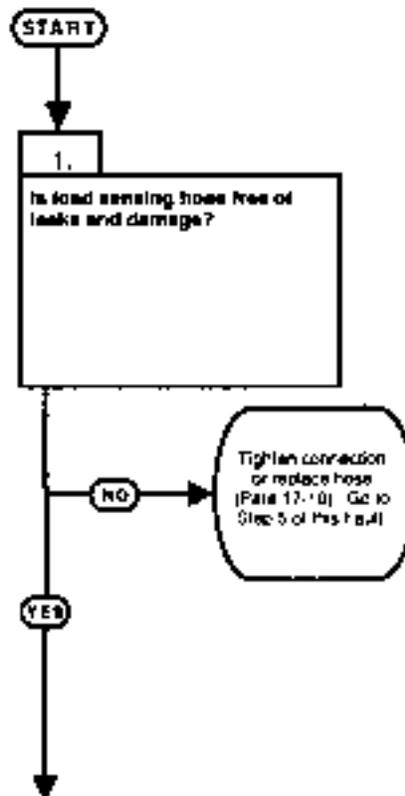
References

TM 10-3930-669-10

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

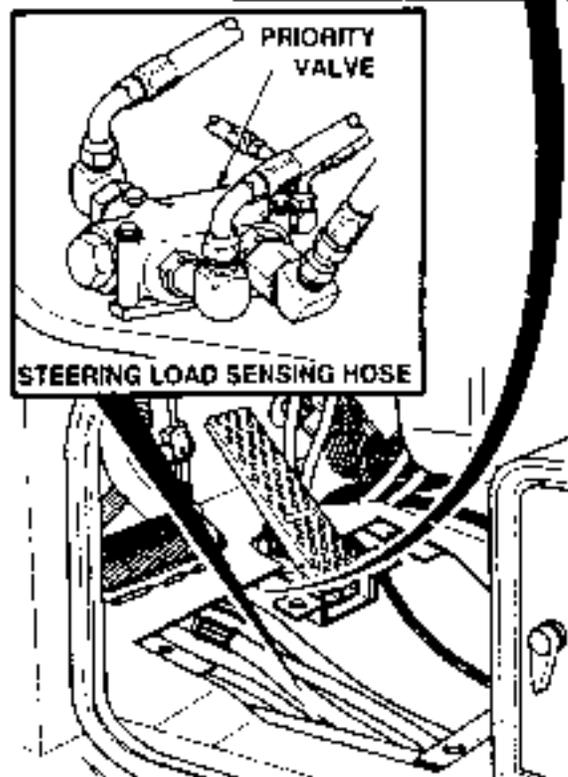
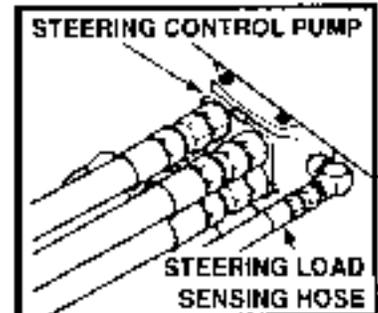
KNOWN INFO
Lift, shift, and pivot cylinders operate.
POSSIBLE PROBLEMS
Steering load sensing hose leaking or damaged. Steering control pump faulty. Priority valve faulty. Steering cylinder faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If load sensing hose is faulty, steering cylinder will not operate.

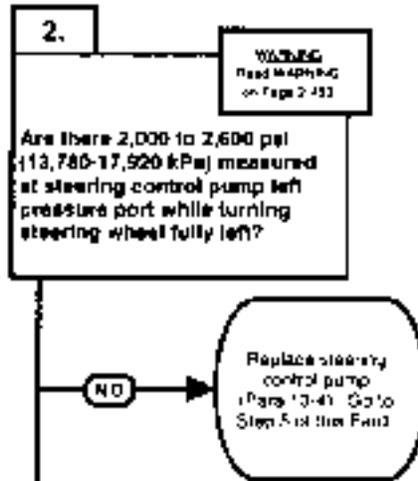
VISUAL INSPECTION

- (1) Remove cab floor plate (Para 15-12).
- (2) Inspect steering load sensing hose and fittings from steering control pump to priority valve for looseness and damage.
 - (a) If steering load sensing hose fittings are loose, tighten fittings.
 - (b) If hose and/or fittings are damaged, replace hose and/or fittings (Para 17-10).
 - (c) If hose and fittings are not loose or damaged, steering load sensing hose is OK.



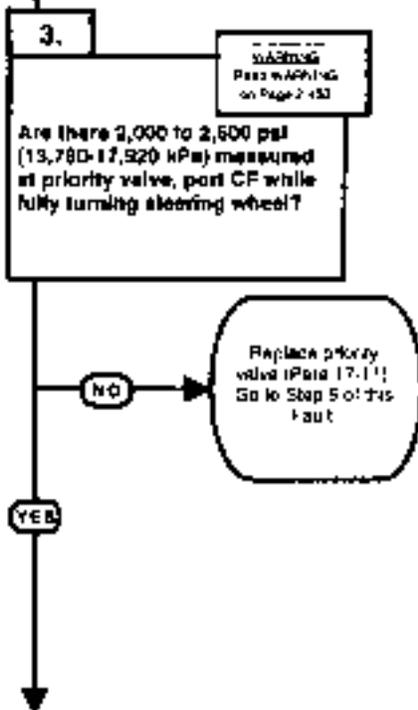
5. STEERING CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Lift, shift and pivot cylinders operate. Load sensing hose OK.
POSSIBLE PROBLEMS
Steering control pump faulty. Priority valve faulty. Steering cylinder faulty.



TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If steering control pump is faulty, steering cylinder will not operate.

KNOWN INFO
Lift, shift and pivot cylinders operate. Load sensing hose OK. Steering control pump OK.
POSSIBLE PROBLEMS
Priority valve faulty. Steering cylinder faulty.



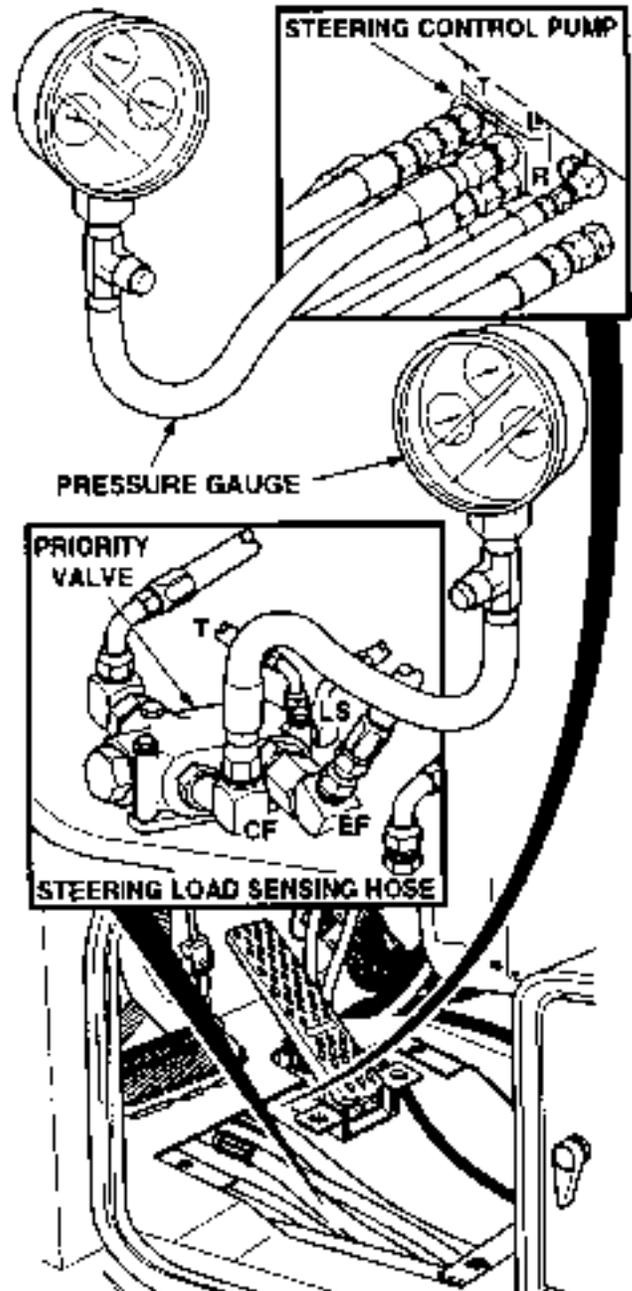
TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If priority valve is faulty, steering cylinder will not operate.

WARNING

- **High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.**
- **Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.**

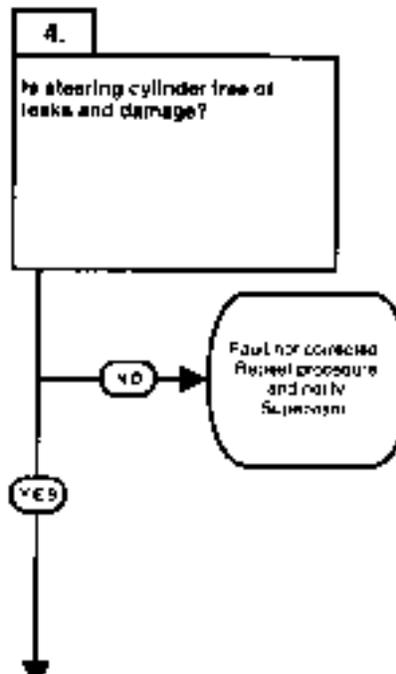
PRESSURE TEST	
(1)	Tag and disconnect hose from steering control pump port L fitting.
(2)	Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to steering control pump port L fitting.
(3)	Install pressure plug in L port hose.
(4)	Start engine (TM 10-3930-669-10).
(5)	With the aid of an assistant, turn steering wheel fully to the left and observe pressure gauge.
(a)	If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, perform Steps (6) and (7) below and replace steering control pump (Para 13-4).
(b)	If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, steering control pump is OK.
(6)	Shut down engine.
(7)	Remove pressure gauge, tag, and plug and connect hose to steering control pump port L fitting.

PRESSURE TEST	
(1)	Tag and disconnect hose from priority valve port CF fitting.
(2)	Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to priority valve port CF fitting.
(3)	Install pressure plug in valve hose.
(4)	Start engine (TM 10-3930-669-10).
(5)	With the aid of an assistant, turn steering wheel fully to the right and observe pressure gauge.
(a)	If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, perform Steps (6) and (7) below and replace priority valve (Para 17-11). Go to Step 5 of this Fault.
(b)	If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, priority valve is OK.
(6)	Shut down engine.
(7)	Remove pressure gauge, tag, and plug and connect hose to priority valve port CF fitting.



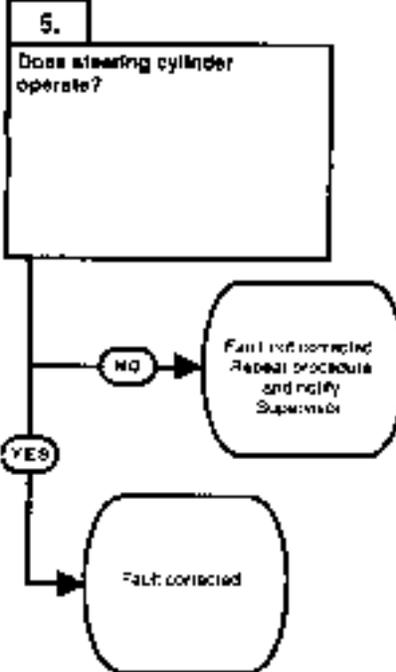
5. STEERING CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Lift, shift, and pivot cylinders operate. Load sensing hose OK. Steering control pump OK. Priority valve OK.
POSSIBLE PROBLEMS
Steering cylinder faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If steering cylinder is faulty, steering cylinder will not operate.

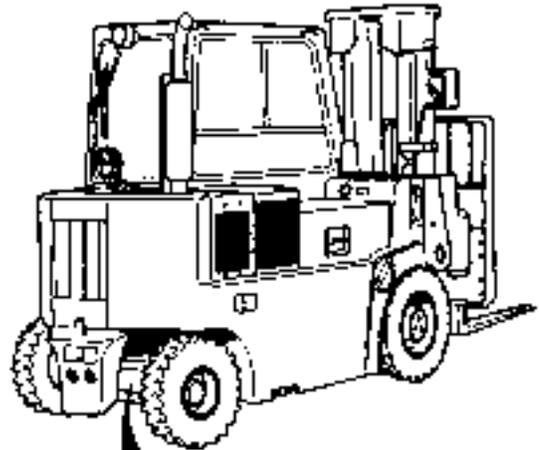
KNOWN INFO
Lift, shift, and pivot cylinders operate. Load sensing hose OK. Steering control pump OK. Priority valve OK. Steering cylinder OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If steering cylinder operates, fault has been corrected.

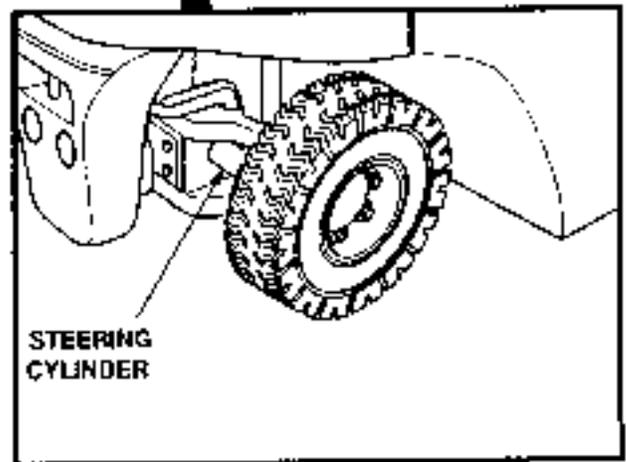
VISUAL INSPECTION

- (1) Start engine (TM 10-3930-669-10).
- (2) With aid of assistant, fully turn steering wheel left and right and observe steering axle.
 - (a) If steering cylinder leaks, perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If steering cylinder does not leak, steering cylinder is OK.
- (3) Shut down engine.
- (4) Install cab floor plate (Para 15-12).



VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Steer forklift and observe response.
 - (a) If steering cylinder does not operate, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If steering cylinder operates, fault corrected.
- (3) Shut down engine.



2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

6. SIDE SHIFT CYLINDER DOES NOT OPERATE.

INITIAL SETUP

Tools and Special Tools

Tools and Special Tools
 Tool Kit, General Mechanic's: Automotive
 (Item 1, Appendix B)
 Pressure gauge 0-5000 PSI (Item 2, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)

References

TM 10-3930-669-10

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

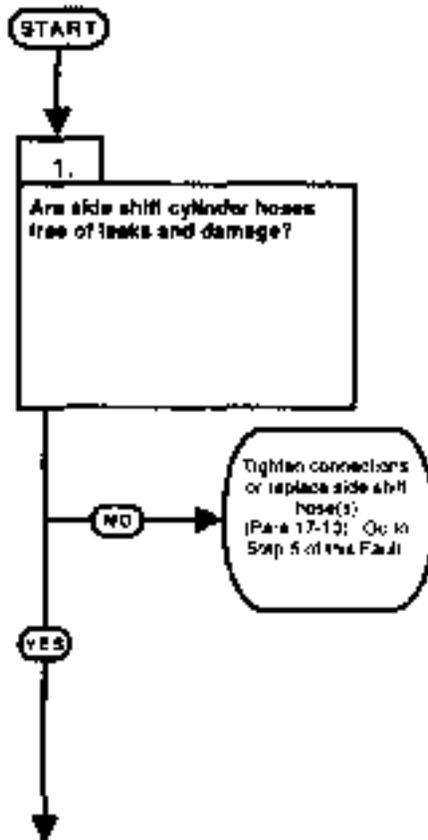
Personnel Required

Two

Materials/Parts

Cap and plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

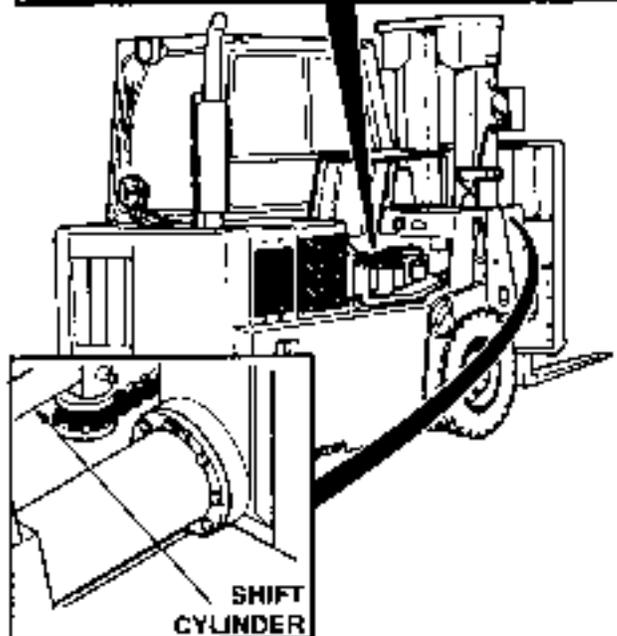
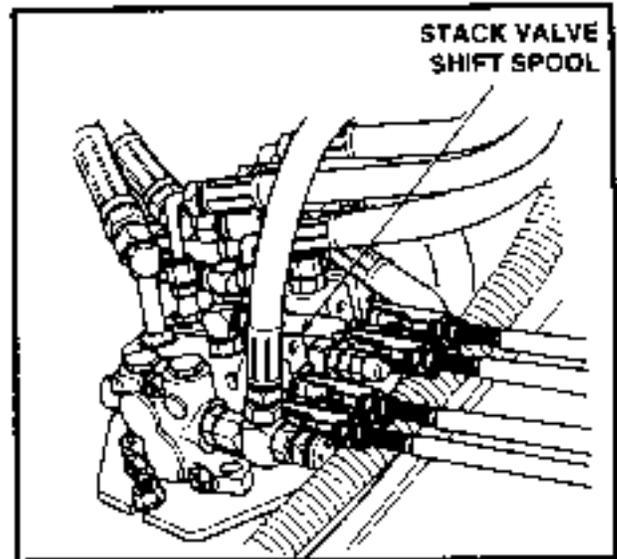
KNOWN INFO
Nothing.
POSSIBLE PROBLEMS
Side shift cylinder hose(s) leaking or damaged. Priority valve faulty. Stack valve faulty. Side shift assembly faulty. Side shift cylinder faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If side shift cylinder hose(s) is loose or damaged, side shift cylinder will not operate.

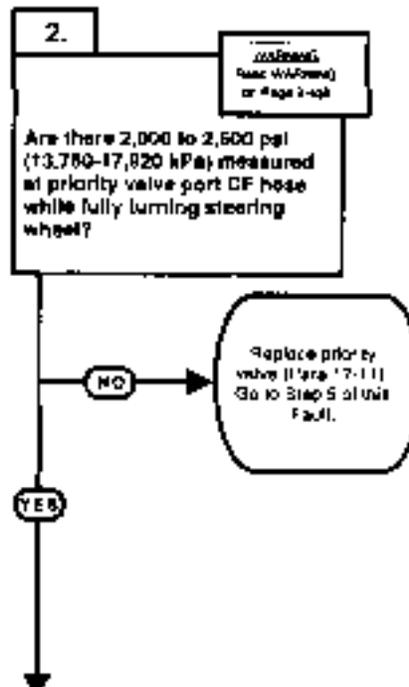
VISUAL INSPECTION

- (1) Remove cab floor plate (Para 15-12).
- (2) Inspect side shift cylinder hoses and fittings from stack valve pivot spool to side shift cylinder for looseness and damage.
 - (a) If side shift cylinder hose fittings are loose, tighten fittings.
 - (b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings (Para 17-10).
 - (c) If hose(s) and fittings are not loose or damaged, hoses are OK.



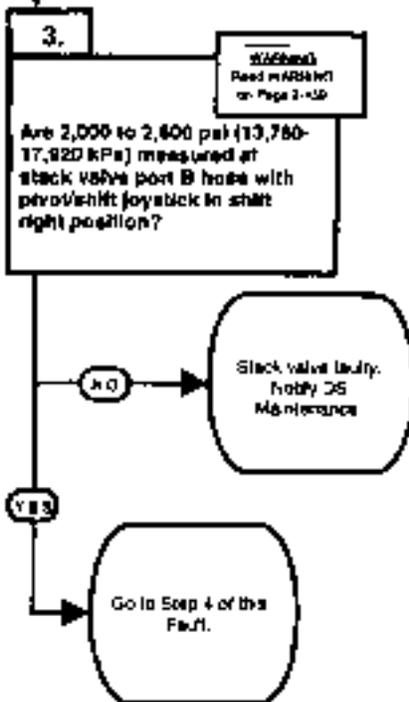
6. SIDE SHIFT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Side shift cylinder hoses OK.
POSSIBLE PROBLEMS
Priority valve faulty. Stack valve faulty. Side shift assembly faulty. Side shift cylinder faulty.



TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If priority valve is faulty, side shift cylinder will not operate.

KNOWN INFO
Side shift cylinder hoses OK. Priority valve OK.
POSSIBLE PROBLEMS
Stack valve faulty. Side shift assembly faulty. Side shift cylinder faulty.



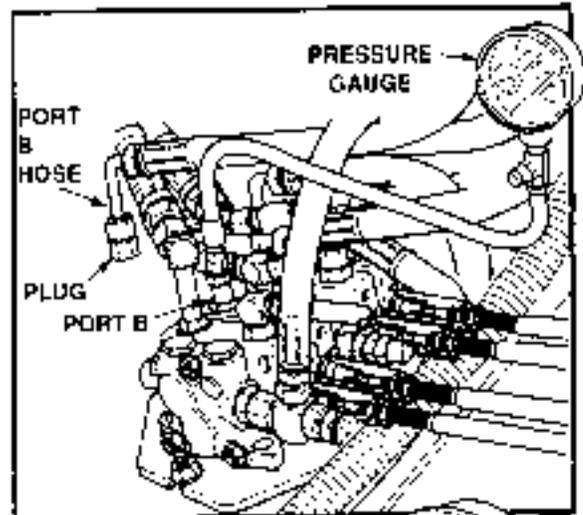
TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If stack valve is faulty, side shift cylinder will not operate.

WARNING

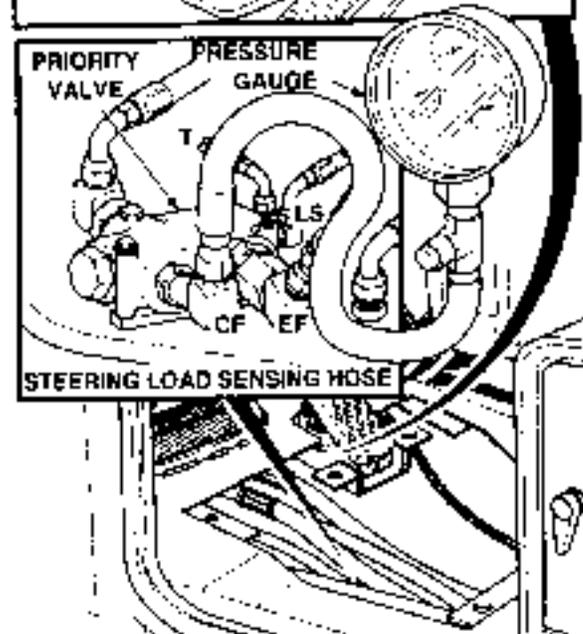
- High-pressure hydraulics [oil under 3,000 psi (20.700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

PRESSURE TEST

- (1) Tag and disconnect hose from priority valve port CF fitting.
- (2) Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to priority valve port CF fitting.
- (3) Install pressure plug in CF port hose.
- (4) Start engine (TM 10-3930-669-10).
- (5) With aid of assistant, fully turn steering wheel and observe pressure gauge.
 - (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, perform Steps (6) and (7) below and replace priority valve (Para 17-11).
 - (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, priority valve is OK.
- (6) Shut down engine.
- (7) Remove pressure gauge, tag, and plug and connect hose to priority valve port CF fitting.

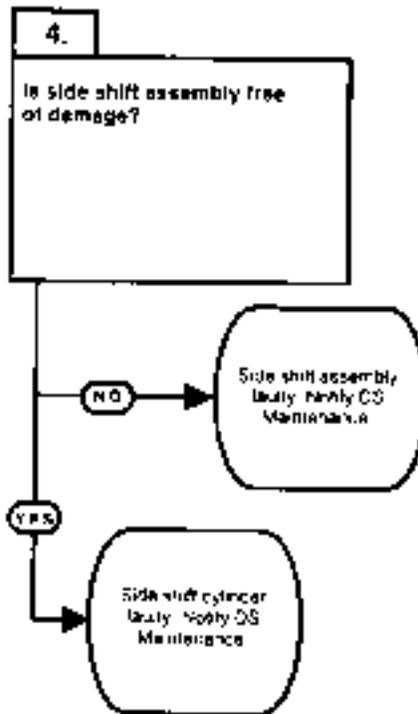
**PRESSURE TEST**

- (1) Tag and disconnect hose from stack valve shift spool port B hose fitting.
- (2) Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to stack valve shift spool port B hose fitting.
- (3) Install pressure plug in shift spool port B hose.
- (4) Start engine (TM 10-3930-669-10).
- (5) With the aid of an assistant, move pivot/shift joystick to shift right position and observe pressure gauge.
 - (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, stack valve is faulty. Perform Steps (6) and (7) below and notify DS Maintenance.
 - (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, stack valve is OK.
- (6) Shut down engine.
- (7) Remove pressure gauge, tag, and plug and connect hose to stack valve shift spool port B fitting.
- (8) Install cab floor plate (Para 15-12).



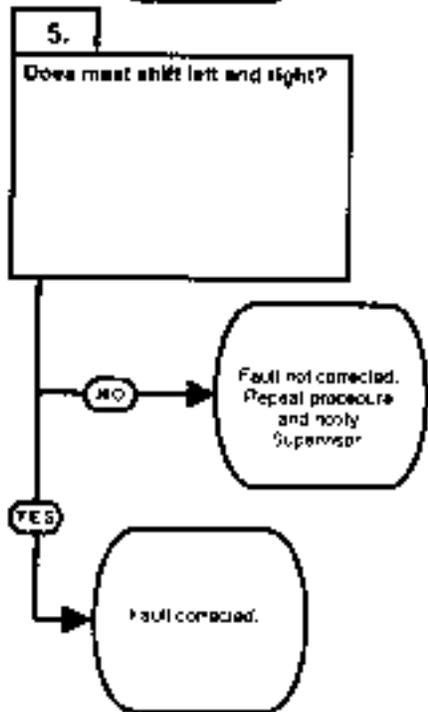
6. SIDE SHIFT CYLINDER DOES NOT OPERATE (CONT).

KNOWN INFO
Side shift cylinder hoses OK. Priority valve OK. Stack valve OK.
POSSIBLE PROBLEMS
Side shift assembly faulty. Side shift cylinder faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If side shift assembly is faulty, side shift cylinder will not operate. If side shift assembly is OK, side shift cylinder is faulty.

KNOWN INFO
Side shift cylinder hoses OK. Priority valve OK. Stack valve OK. Side shift assembly OK. Side shift cylinder OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If mast shifts left and right, fault has been corrected.

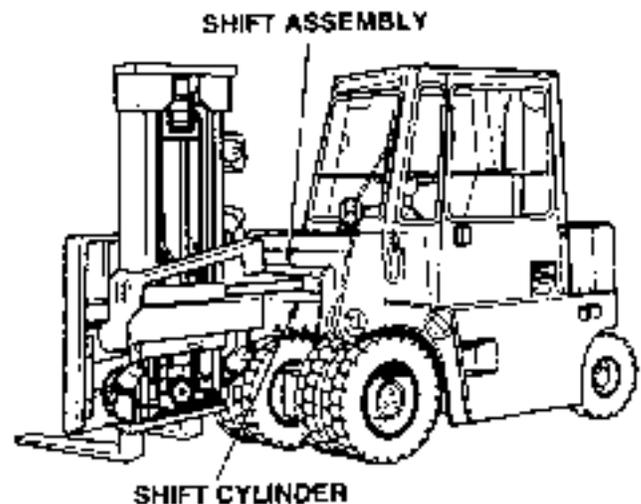
VISUAL INSPECTION

Inspect side shift assembly and side shift cylinder.

- (a) If side shift assembly is damaged, side shift assembly is faulty. Notify DS Maintenance.
- (b) If side shift cylinder leaks, side shift cylinder is faulty. Notify DS Maintenance.
- (c) If side shift assembly is not damaged and side shift cylinder does not leak, go to Step 5 of this Fault.

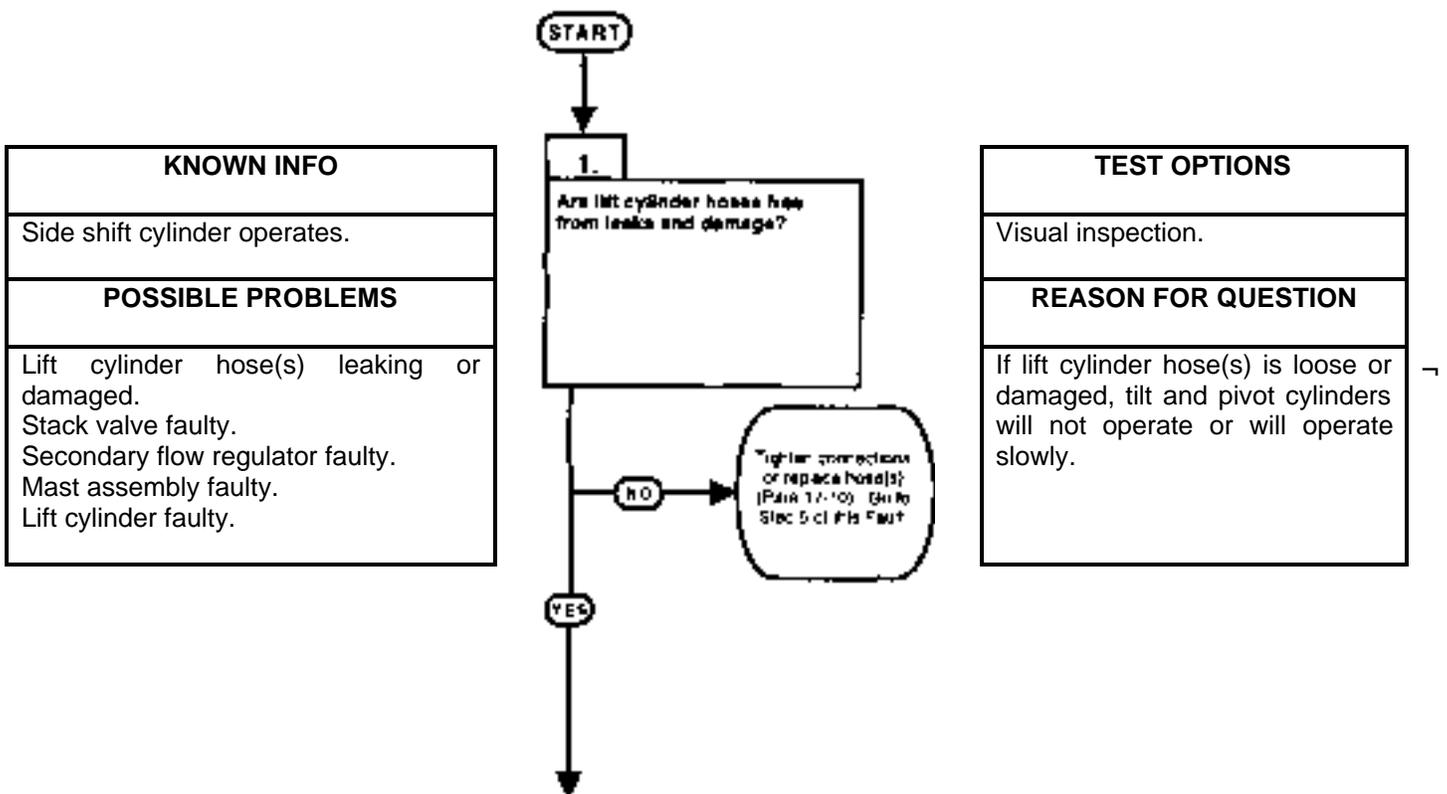
VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate mast side shift cylinder and observe operation (TM 10-3930-669-10).
 - (a) If mast does not shift left and right, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If mast operates, fault corrected.
- (3) Shut down engine.



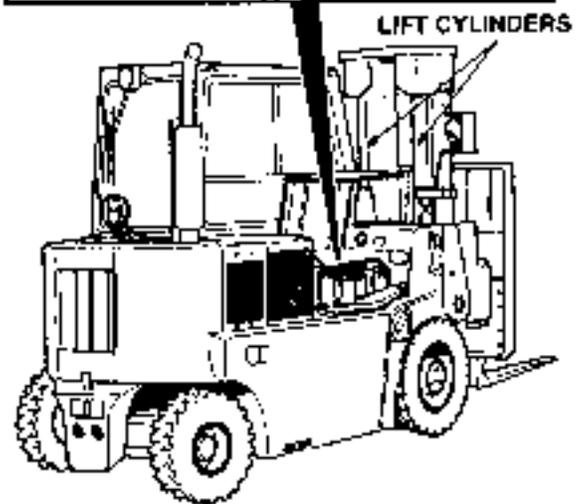
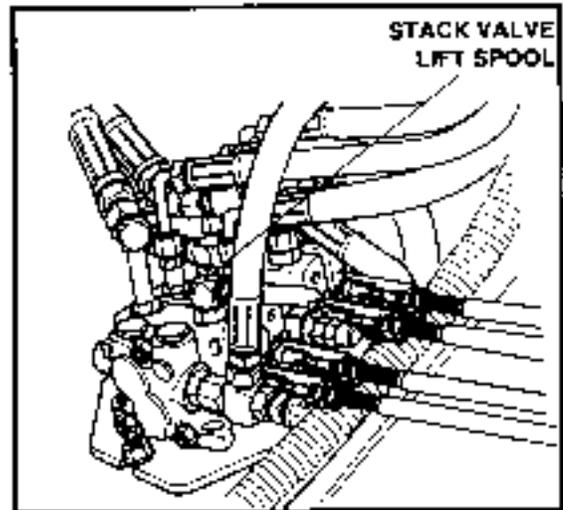
2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

7. LIFT CYLINDER(S) DOES NOT OPERATE.	
INITIAL SETUP	
<i>Tools and Special Tools</i>	<i>References</i>
Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B) Pressure Test Kit (Item 2, Appendix B) STE/ICE-R (Optional) (Item 14, Appendix B)	TM 10-3930-669-10
<i>Personnel Required</i>	<i>Equipment Condition</i>
Two	Engine OFF (TM 10-3930-669-10) MAIN POWER switch OFF (TM 10-3930-669-10) Parking brake applied (TM 10-3930-669-10) Wheels chocked (TM 10-3930-669-10)
<i>Materials/Parts</i>	
Cap and plug Set (Item 5, Appendix C) Tags, Identification (Item 21, Appendix C)	



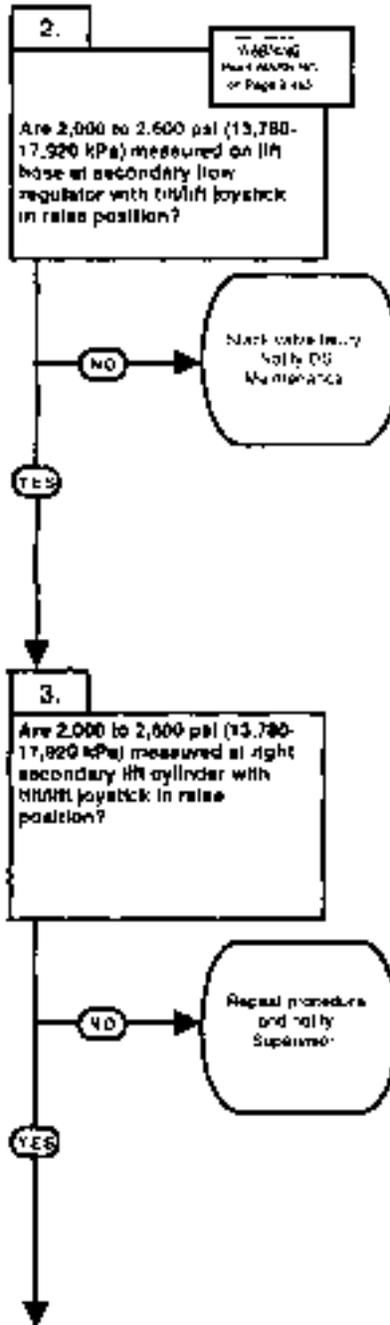
VISUAL INSPECTION

- (1) Remove cab floor plate (Para 15-12).
- (2) Inspect lift cylinder hoses and fittings from stack valve to lift cylinders for looseness and damage.
 - (a) If lift cylinder hose fittings are loose, tighten fittings.
 - (b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings are damaged, replace hoses and/or fittings (Para 17-10).
 - (c) If hoses and fittings are not loose or damaged, hoses is OK.



7. LIFT CYLINDER(S) DOES NOT OPERATE (CONT).

KNOWN INFO
Side shift cylinder operates. Lift cylinder hoses OK.
POSSIBLE PROBLEMS
Stack valve faulty. Secondary flow regulator faulty. Mast assembly faulty. Lift cylinder faulty.



TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If stack valve is faulty, lift cylinders will not operate.

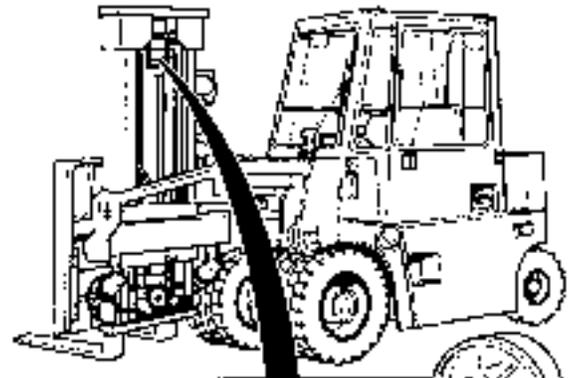
KNOWN INFO
Side shift cylinder operates. Lift cylinder hoses OK. Stack valve OK.
POSSIBLE PROBLEMS
Secondary flow regulator faulty. Mast assembly faulty. Lift cylinder faulty.

TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If stack valve is faulty, lift cylinders will not operate.

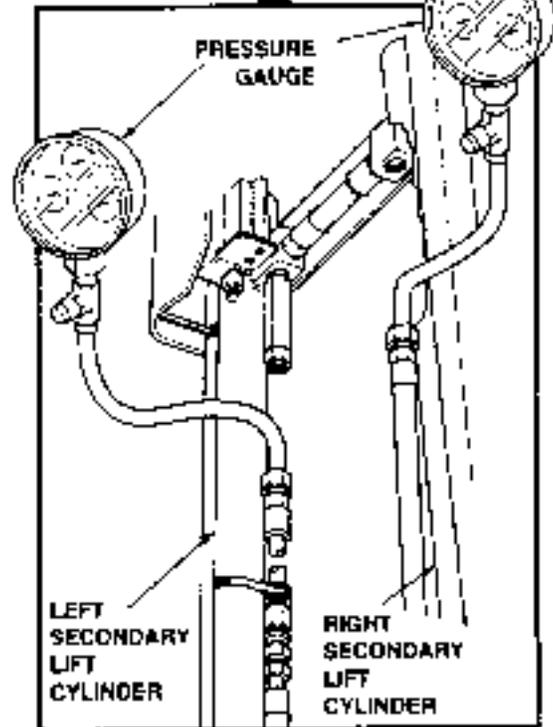
WARNING

- High-pressure hydraulics (oil under 3,000 psi (20.700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury. wipe up spilled oil with rags.

PRESSURE TEST	
(1)	Tag and disconnect hose from secondary flow regulator fitting.
(2)	Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to secondary flow regulator hose.
(3)	Install pressure cap on regulator open port fitting.
(4)	Start engine (TM 10-3930-669-10).
(5)	With aid of an assistant, move tilt/ lift joystick to raise position and observe pressure gauge (TM 10-3930-669-10). (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, stack valve is faulty. Perform Steps (6) and (7) below and notify DS Maintenance. (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, stack valve is OK.
(6)	Shut down engine.
(7)	Remove pressure gauge, tag, and cap and connect hose to secondary flow regulator fitting.

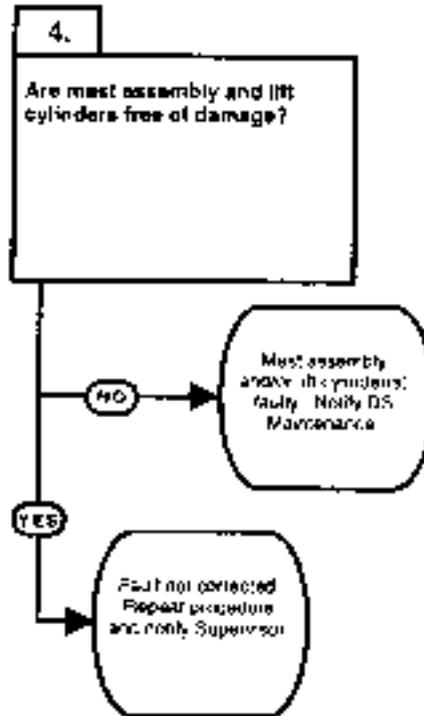


PRESSURE TEST	
(1)	Tag and disconnect hose from right secondary lift cylinder fitting.
(2)	Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to right secondary lift cylinder hose.
(3)	Install pressure cap on lift cylinder open port fitting.
(4)	Start engine (TM 10-3930-669-10).
(5)	With aid of an assistant, move tilt/ lift joystick to raise position and observe pressure gauge (TM 10-3930-669-10). (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, perform Steps (6) and (7) below. Repeat procedure and notify Supervisor. (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, secondary flow regulator is OK.
(6)	Shut down engine.
(7)	Remove pressure gauge, tag, and cap and connect hose to right secondary lift cylinder fitting.
(8)	Install cab floor plate (Para 15-12).



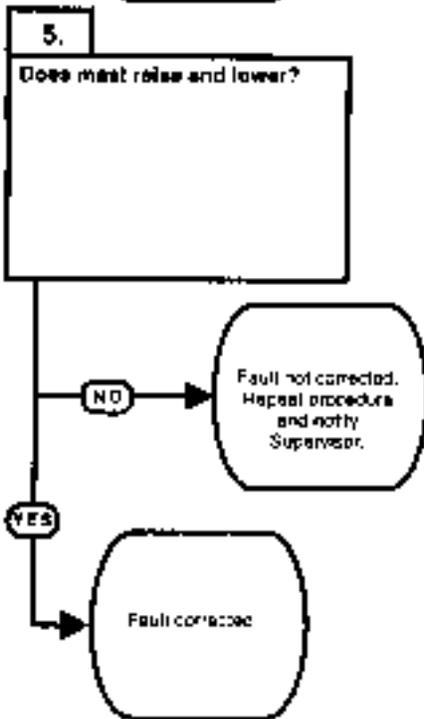
7. LIFT CYLINDER(S) DOES NOT OPERATE (CONT).

KNOWN INFO
Side shift cylinder operates. Lift cylinder hoses OK. Stack valve OK. Secondary flow regulator OK.
POSSIBLE PROBLEMS
Mast assembly faulty. Lift cylinder faulty.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If mast assembly is damaged, lift cylinders will not operate. If mast assembly is OK, lift cylinder(s) is faulty.

KNOWN INFO
Side shift cylinder operates. Lift cylinder hoses OK. Stack valve OK. Secondary flow regulator OK. Mast assembly OK. Lift cylinder OK.
POSSIBLE PROBLEMS

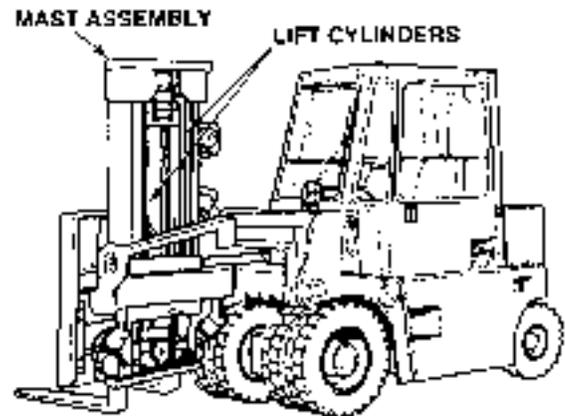


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If mast raises and lowers, fault has been corrected.

VISUAL INSPECTION

Inspect mast assembly and lift cylinders.

- (a) If mast assembly is damaged, mast assembly is faulty. Notify DS Maintenance.
- (b) If lift cylinder(s) leaks, lift cylinder(s) is faulty. Notify DS Maintenance.
- (c) If mast assembly is not damaged and lift cylinders do not leak, fault not corrected. Repeat procedure and notify Supervisor.



VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate mast lift cylinders and observe operation.
 - (a) If mast does not raise and lower, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If mast raises and lowers, fault corrected.
- (3) Shut down engine.

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

8. LOAD CANNOT BE LIFTED TO MAXIMUM HEIGHT.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)

Personnel Required

Two

Materials/Parts

Cap and plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

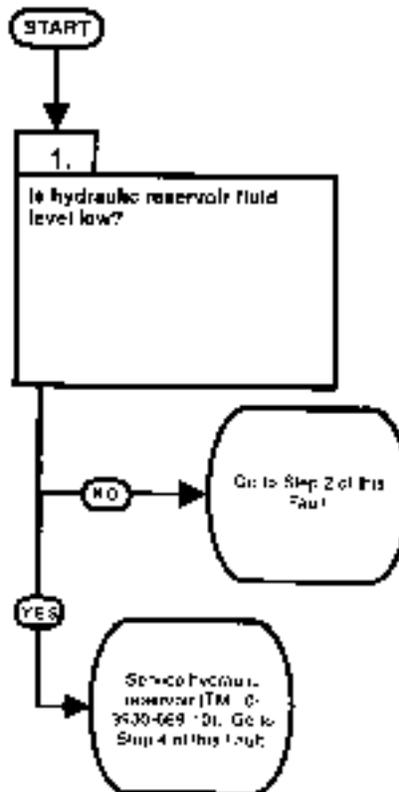
References

TM 10-3930-669-10

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

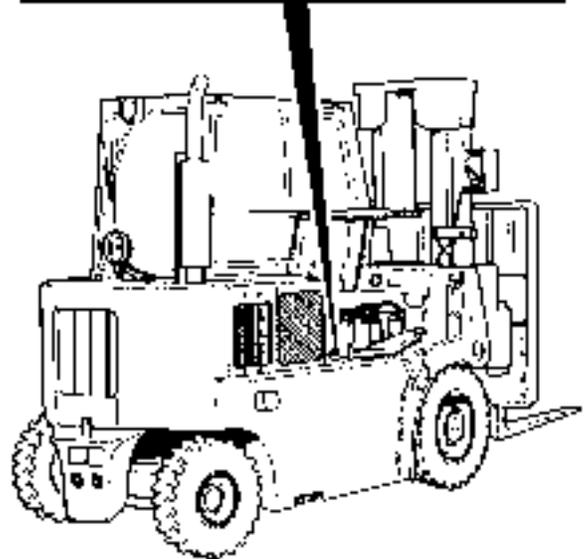
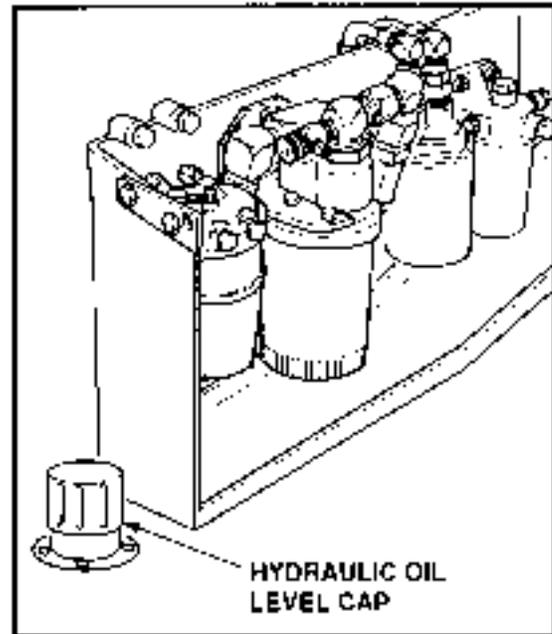
KNOWN INFO
Transmission operates.
POSSIBLE PROBLEMS
Hydraulic fluid level low. Hydraulic reservoir to pump main hydraulic hose leaking or damaged. Hydraulic pump faulty. Priority valve faulty. Stack valve faulty. Mast adjustment faulty.



TEST OPTIONS
Visual inspection,
REASON FOR QUESTION
If hydraulic fluid level is low, hydraulic lift cylinders will not lift load to maximum height.

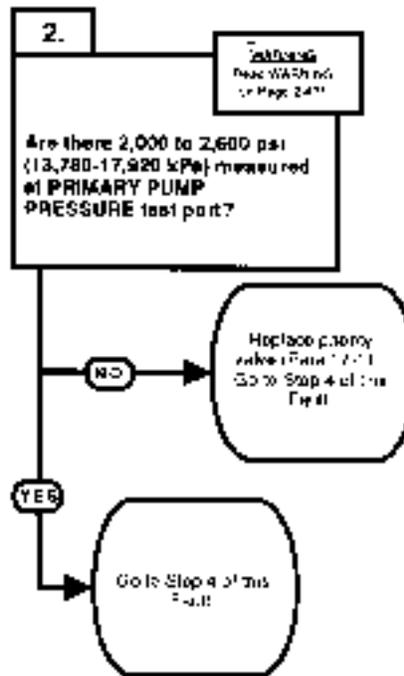
VISUAL INSPECTION

- (1) Open right-hand engine access cover (TM 10-3930-669-10).
- (2) Inspect hydraulic oil reservoir for correct level (TM 10-3930-669-10).
 - (a) If hydraulic oil level is low, service reservoir with clean hydraulic oil (TM 10-3930-669-10).
 - (b) If hydraulic oil is not low, oil level is OK.
- (3) Close right-hand engine access cover.



8. LOAD CANNOT BE LIFTED TO MAXIMUM HEIGHT (CONT).

KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic tank to pump suction hose OK. Hydraulic pump OK.
POSSIBLE PROBLEMS
Priority valve faulty. Stack valve faulty. Mast adjustment faulty.



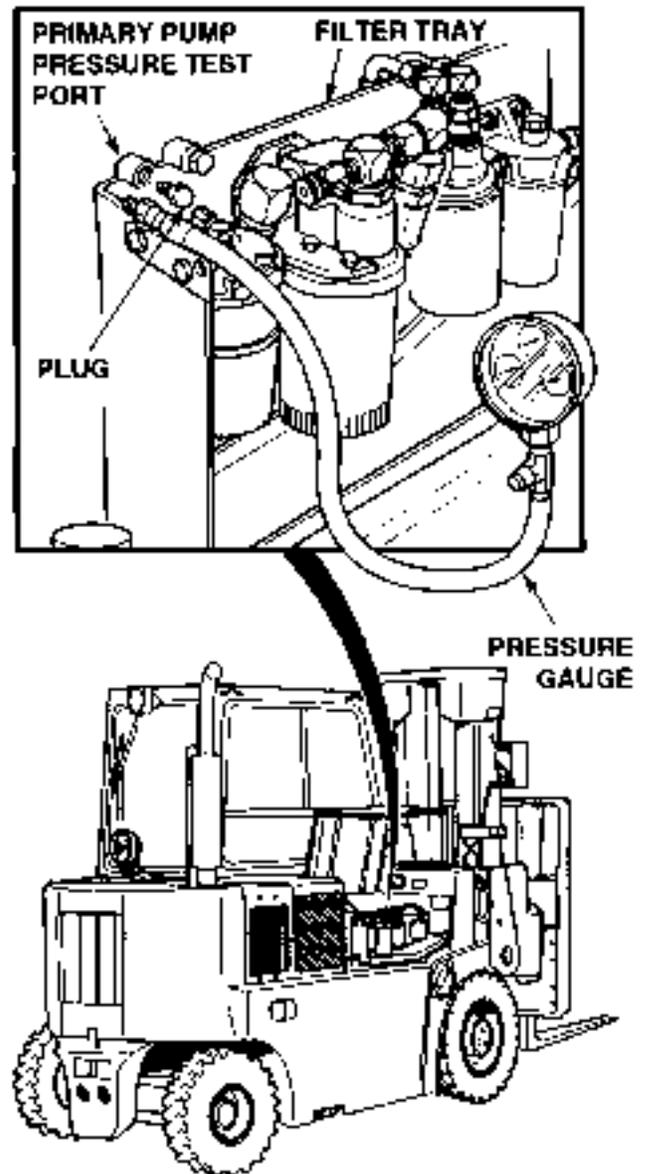
TEST OPTIONS
Pressure test. STE/ICE-R #51
REASON FOR QUESTION
If priority valve is faulty, lift cylinders will not lift load to maximum height.

WARNING

- High-pressure hydraulics [(oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

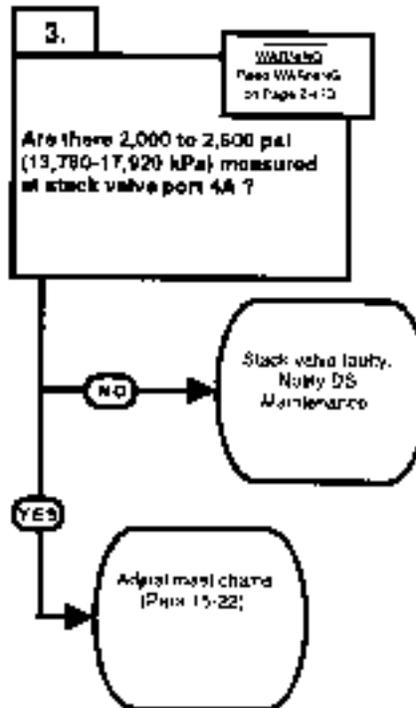
PRESSURE TEST

- (1) Remove test port plug and connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to PRIMARY PUMP PRESSURE test port.
- (2) Start engine (TM 10-3930-669-10).
- (3) With aid of an assistant operate any hydraulic control and observe pressure gauge.
 - (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, perform Steps (4) and (5) below and replace priority valve (Para 17-11).
 - (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, priority valve is OK.
- (4) Shut down engine.
- (5) Remove pressure gauge from PRIMARY PUMP PRESSURE test port and install test port plug.



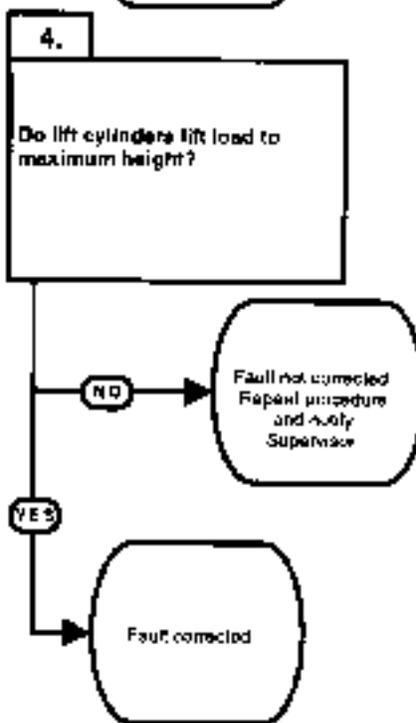
8. LOAD CANNOT BE LIFTED TO MAXIMUM HEIGHT (CONT).

KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic tank to pump suction hose OK. Hydraulic pump OK. Priority valve OK.
POSSIBLE PROBLEMS
Stack valve faulty. Mast adjustment faulty.



TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If stack valve is faulty, lift cylinders will not lift load to maximum height. If stack valve is OK, mast adjustment is faulty.

KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic tank to pump suction hose OK. Hydraulic pump OK. Priority valve OK. Stack valve OK. Mast adjustment OK.
POSSIBLE PROBLEMS



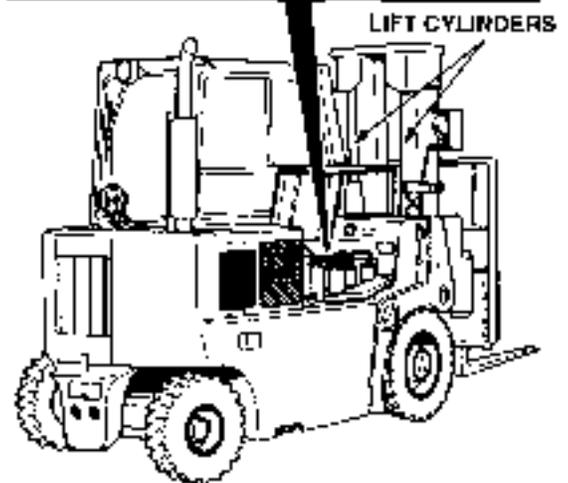
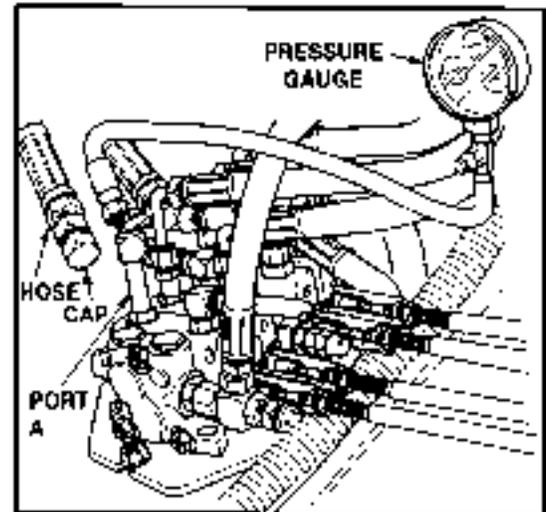
TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If lift cylinders lift load to maximum height, fault has been corrected.

WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

PRESSURE TEST

- (1) Tag and disconnect lift cylinder hose at stack valve lift spool port A hose fitting.
- (2) Connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to stack valve lift spool port A hose fitting.
- (3) Install pressure plug in stack valve lift spool port A hose.
- (4) Start engine (TM 10-3930-669-10).
- (5) With aid of an assistant operate any hydraulic control and observe pressure gauge.
 - (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, stack valve is faulty. Perform Steps (6) and (7) below and notify DS Maintenance.
 - (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, mast adjustment is faulty. Perform Steps (6) through (8) below and notify DS Maintenance.
- (6) Shut down engine.
- (7) Remove pressure gauge, tag, and plug and connect hose to stack valve lift spool port A fitting.
- (8) Install cab (Para 15-2).

**VERIFY REPAIR**

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate mast lift cylinders to maximum height with load.
 - (a) If lift cylinders do not lift load to maximum height, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If lift cylinders lift load to maximum height, fault corrected.
- (3) Shut down engine.

2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

9. LIFT CYLINDER(S) WILL NOT HOLD LOAD (DOWNDRIFT).

INITIAL SETUP

Tools and Special Tools

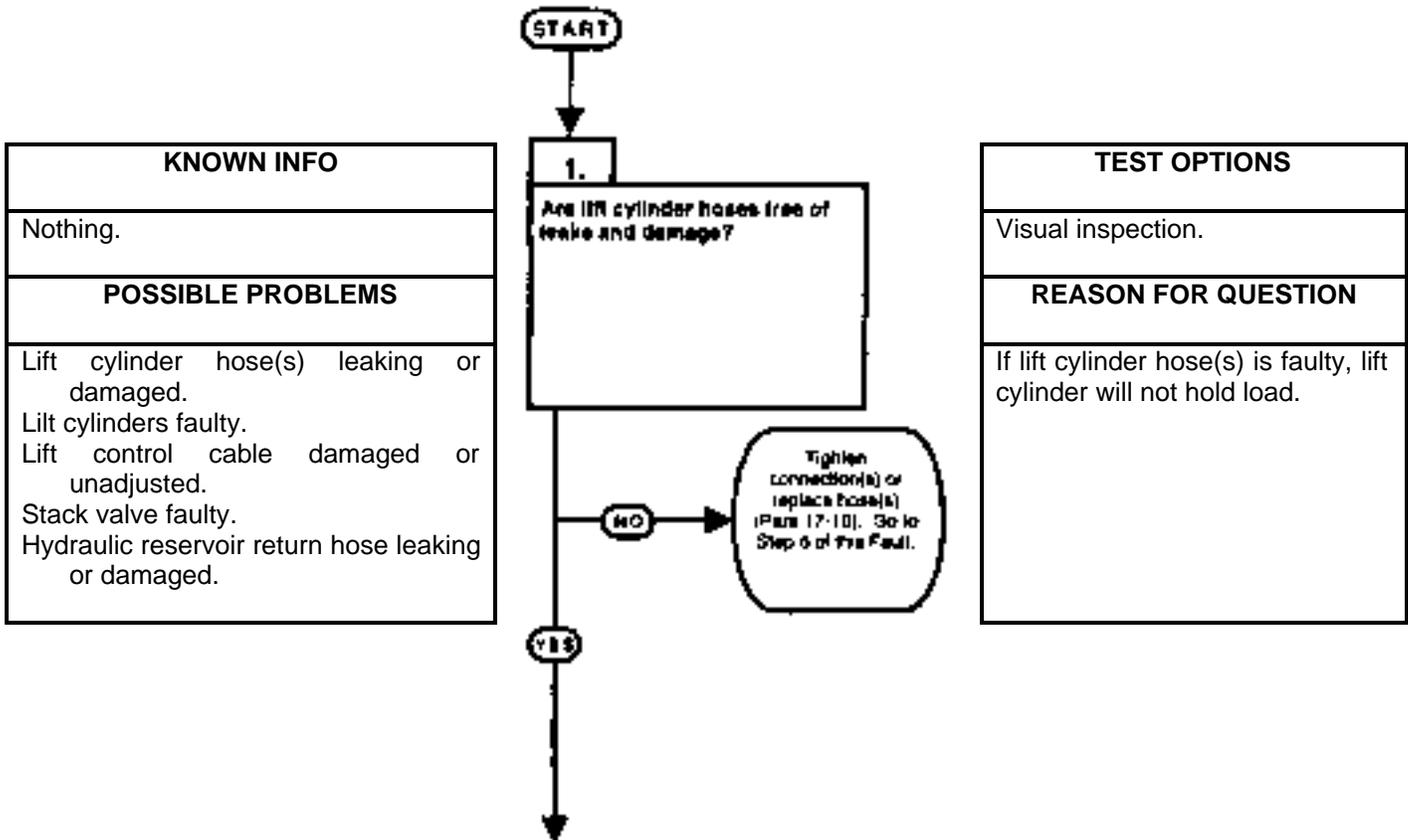
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

References

TM 10-3930-669-10

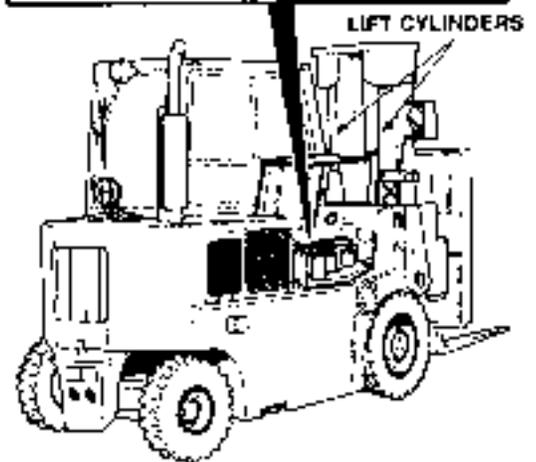
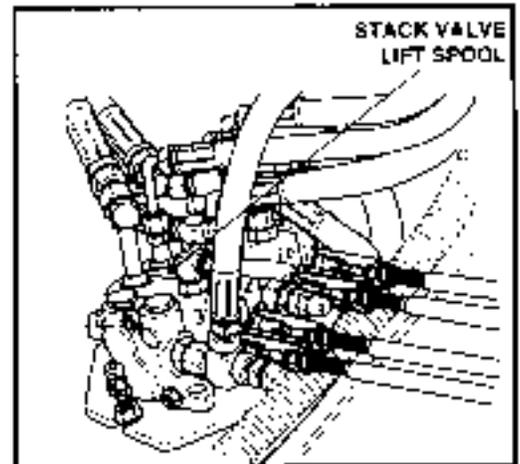
Equipment Condition

Engine OFF (TM 10-3930-669-10)
MAIN POWER switch OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)



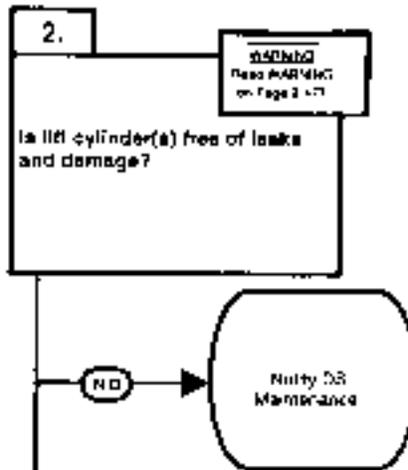
VISUAL INSPECTION

- (1) Open right-hand engine access cover (TM 10-3930-669-10).
- (2) Inspect lift cylinder hoses and fittings from stack valve lift spool to lift cylinders for looseness and damage.
 - (a) If lift hose fittings are loose, tighten fittings.
 - (b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings (Para 17-10).
 - (c) If hose(s) and fittings are not loose or damaged, hoses are OK.



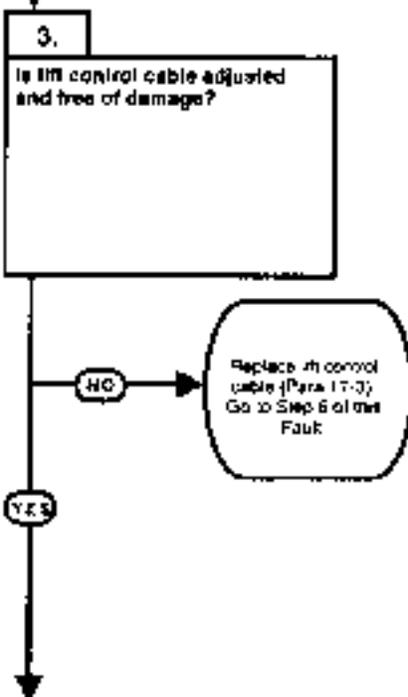
9. LIFT CYLINDER(S) WILL NOT HOLD LOAD (DOWNDRIFT) (CONT).

KNOWN INFO
Lift cylinder hose(s) OK.
POSSIBLE PROBLEMS
Lift cylinder(s) faulty. Lift control cable damaged or unadjusted. Stack valve faulty. Hydraulic reservoir return hose leaking or damaged.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If lift cylinder(s) is faulty, lift cylinder will not hold load.

KNOWN INFO
Lift cylinder hose(s) OK. Lift cylinder(s) OK.
POSSIBLE PROBLEMS
Lift control cable damaged or unadjusted. Stack valve faulty. Hydraulic reservoir return hoses leaking or damaged.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If lift control cable is damaged or unadjusted, lift cylinder(s) will not hold load.

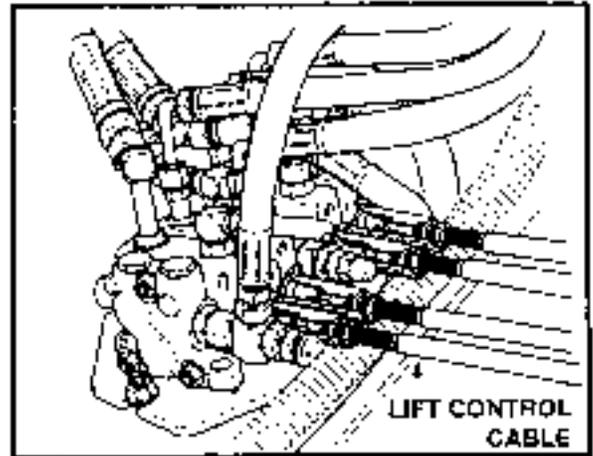
WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

VISUAL INSPECTION

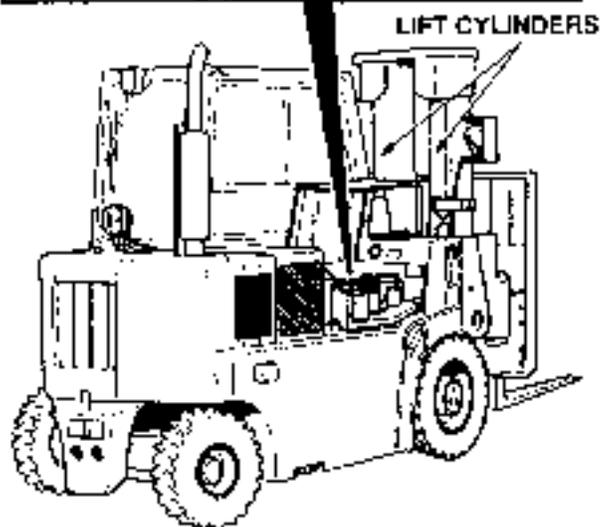
Inspect lift cylinder(s).

- If lift cylinder(s) leaks, cylinder(s) is faulty. Notify DS Maintenance.
- If lift cylinder(s) is not damaged and does not leak, lift cylinder(s) is OK.

**VISUAL INSPECTION**

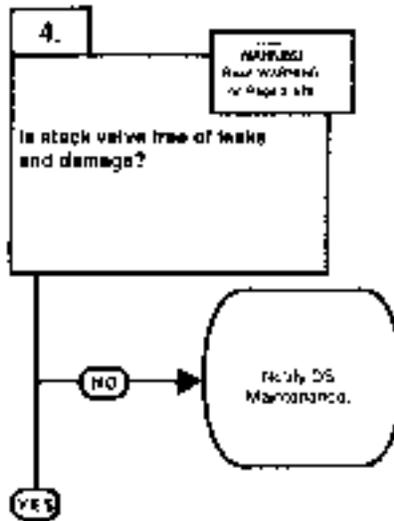
Inspect lift control cable for damage.

- If cable is damaged, replace lift control cable (Para 17-3).
- If cable is not damaged, adjust cable (Para 17-3).



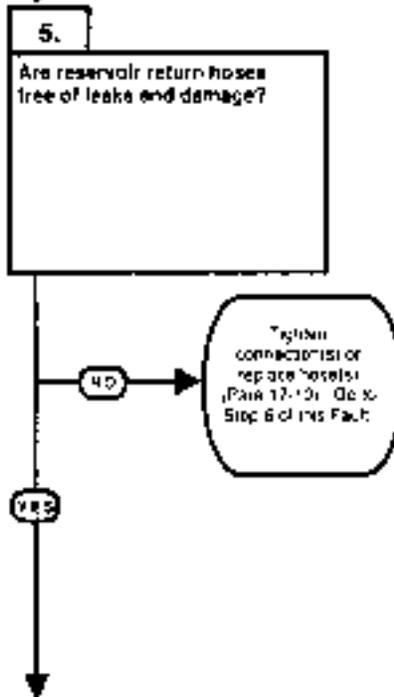
9. LIFT CYLINDER(S) WILL NOT HOLD LOAD (DOWNDRIFT) (CONT).

KNOWN INFO
Lift cylinder hose(s) OK. Lift cylinder(s) OK. Lift control cable OK.
POSSIBLE PROBLEMS
Stack valve faulty. Hydraulic reservoir return hoses leaking or damaged.



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If stack valve is faulty, lift cylinder will not hold load.

KNOWN INFO
Lift cylinder hose(s) OK. Lift cylinder(s) OK. Lift control cable OK. Stack valve OK.
POSSIBLE PROBLEMS
Hydraulic reservoir return hose leaking or damaged.

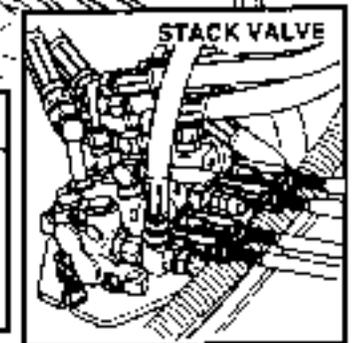
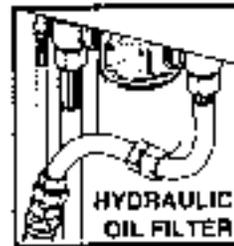
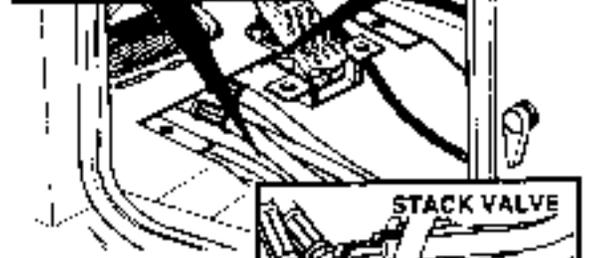
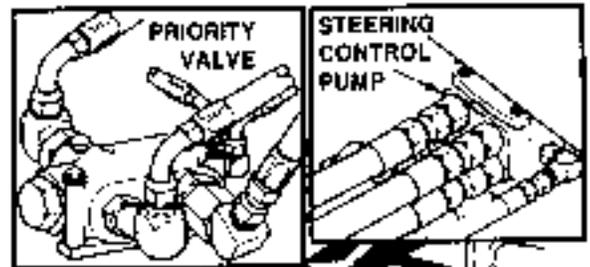


TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If reservoir return hoses are faulty, lift cylinders will not hold load.

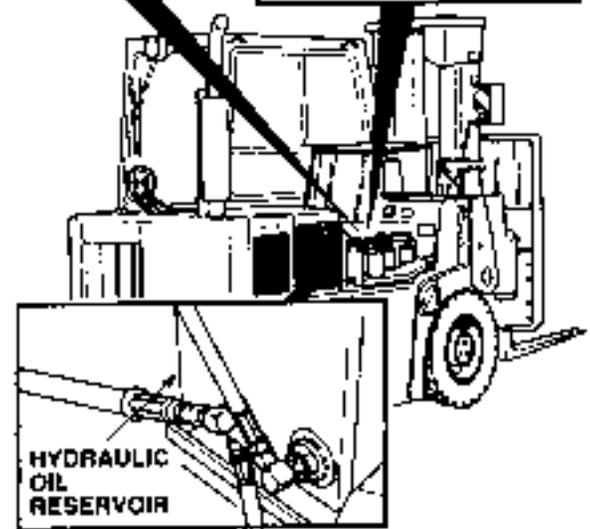
WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

VISUAL INSPECTION
Inspect stack valve. <ul style="list-style-type: none"> (a) If stack valve is damaged or leaks, notify DS Maintenance. (c) If stack valve is not damaged and does not leak, stack valve is OK.

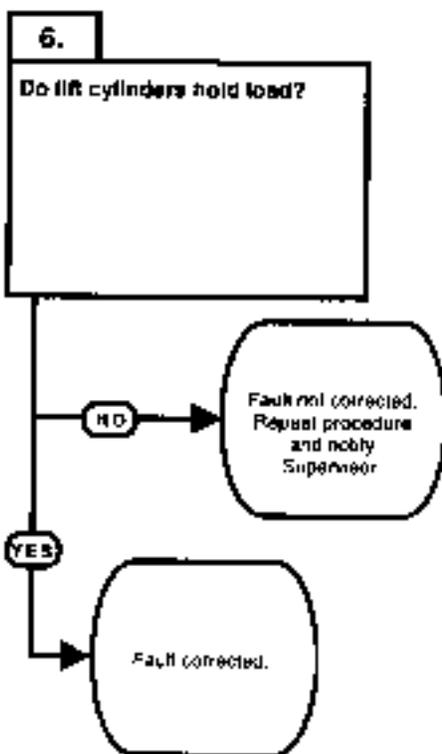


VISUAL INSPECTION
<ol style="list-style-type: none"> (1) Remove cab floor plate (Para 15-12). (2) Inspect reservoir return hoses and fittings from steering control pump to priority valve to stack valve to hydraulic filter to reservoir for looseness and damage. <ul style="list-style-type: none"> (a) If hose fittings are loose, tighten fittings. (b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings (Para 17-10). (c) If hoses and/or fittings are not loose or damaged, hoses are OK. (3) Close right-hand engine access cover. (4) Install cab floor plate (Para 15-12).



9. LIFT CYLINDER(S) WILL NOT HOLD LOAD (DOWNDRIFT) (CONT).

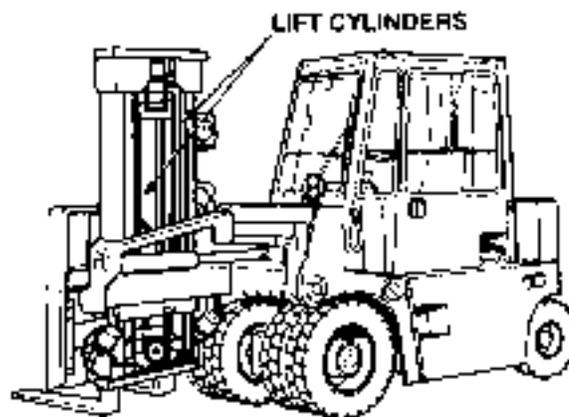
KNOWN INFO
Lift cylinder hose(s) OK. Lift cylinder(s) OK. Lift control cable OK. Stack valve OK. Hydraulic reservoir return hose OK.
POSSIBLE PROBLEMS



TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If lift cylinders hold load, fault has been corrected.

VERIFY REPAIR

- (1) Start engine (TM 10-3930-669-10).
- (2) Operate mast lift cylinders with load using tilt/ lift joystick.
 - (a) If lift cylinders do not hold load, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor.
 - (b) If lift cylinders hold load, fault corrected.
- (3) Shut down engine.



2-18. HYDRAULIC SYSTEM TROUBLESHOOTING (CONT).

10. HYDRAULIC MAST LIFT SPEED SLUGGISH.

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
 Pressure Test Kit (Item 2, Appendix B)
 STE/ICE-R (Optional) (Item 14, Appendix B)

Personnel Required

Two

Materials/Parts

Cap and plug Set (Item 5, Appendix C)
 Tags, Identification (Item 21, Appendix C)

References

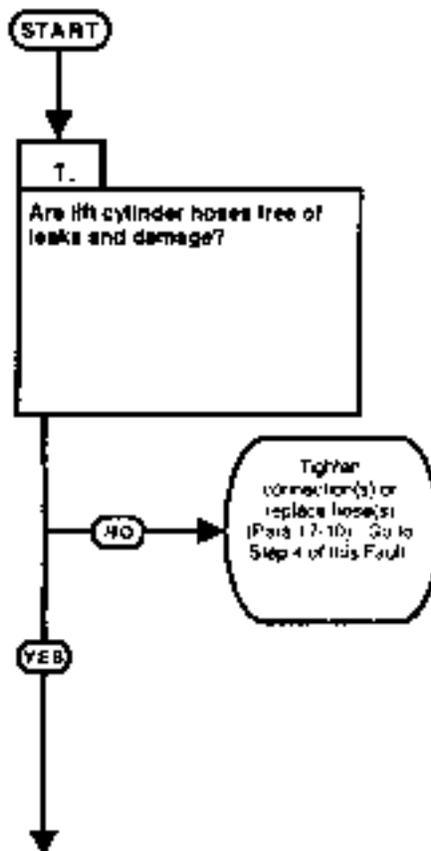
TM 10-3930-669-10

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 MAIN POWER switch OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)

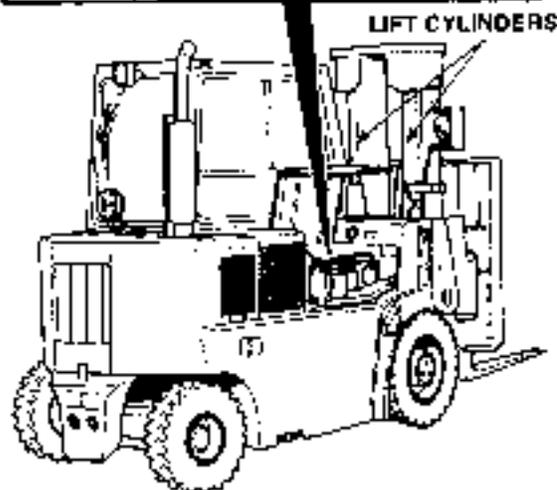
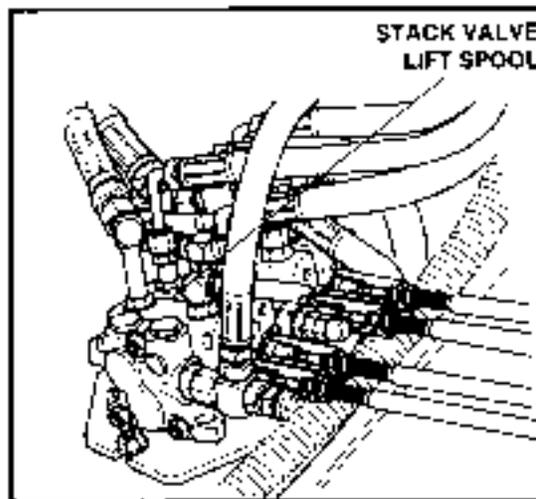
KNOWN INFO
Nothing.
POSSIBLE PROBLEMS
Lift cylinder hoses leaking or damaged. Lift control cable damaged or unadjusted. Hydraulic pump faulty. Stack valve faulty.

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If lift cylinder(s) are faulty, hydraulic mast lift speed will be sluggish.



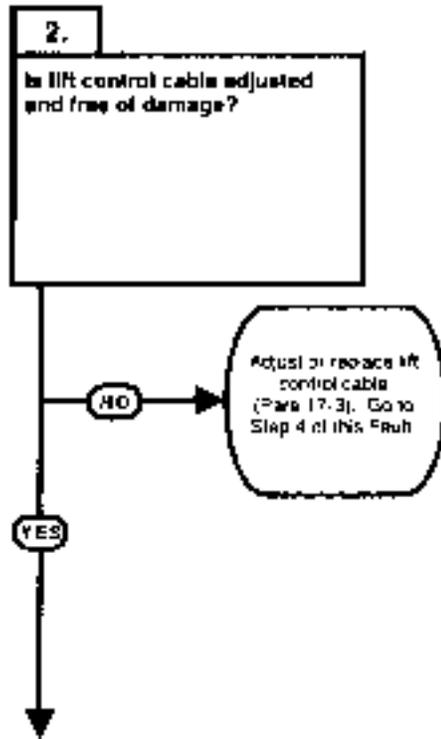
VISUAL INSPECTION

- (1) Open right-hand engine access cover (TM 10-3930-669-10).
- (2) Inspect lift cylinder(s) hoses from stack valve lift spool to lift cylinders for looseness and damage.
 - (a) If lift hose fittings are loose, tighten fittings.
 - (b) If hose(s) and/or fittings are damaged, replace hose(s) and/or fittings (Para 17-10).
 - (c) If hose(s) and fittings are not loose or damaged, hoses are OK.



10. HYDRAULIC MAST LIFT SPEED SLUGGISH (CONT).

KNOWN INFO
Lift cylinder hose(s) OK.
KNOWN INFO
Lift control cable damaged or unadjusted. Hydraulic pump faulty. Stack valve faulty.

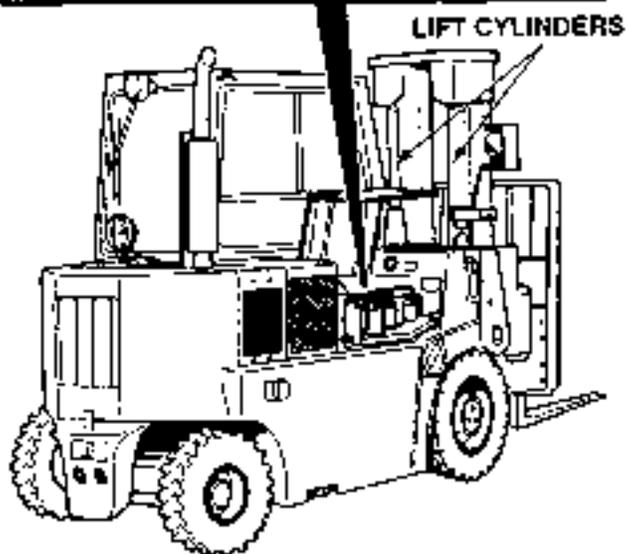
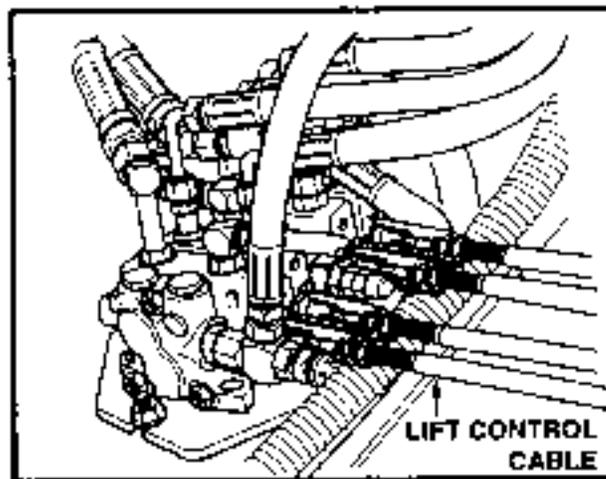


TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If lift control cable is damaged or unadjusted, hydraulic mast lift speed will be sluggish.

VISUAL INSPECTION

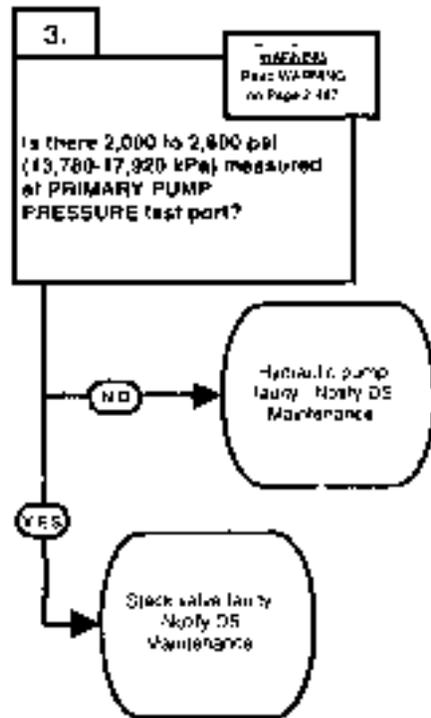
Inspect lift control cable for damage.

- (a) If cable is damaged, replace lift control cable (Para 17-3).
- b) If cable is not damaged, adjust cable (Para 17-3).



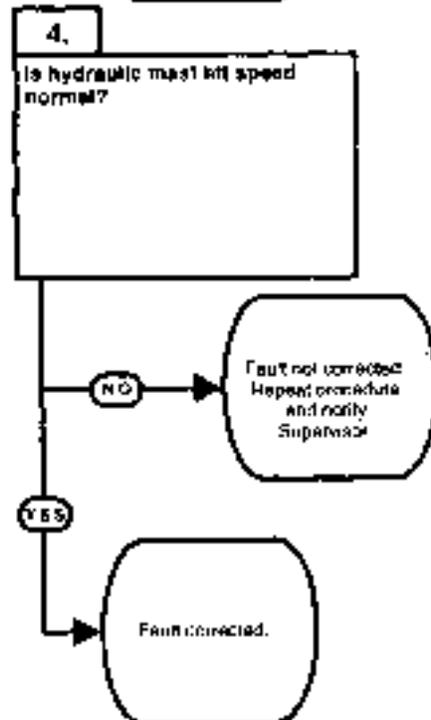
10. HYDRAULIC MAST LIFT SPEED SLUGGISH (CONT).

KNOWN INFO
Lift cylinder hose(s) OK. Lift control cable OK.
POSSIBLE PROBLEMS
Hydraulic pump faulty. Stack valve faulty.



TEST OPTIONS
Pressure test. STE/ICE-R #51.
REASON FOR QUESTION
If hydraulic pump is faulty, hydraulic mast lift speed will be sluggish ←

KNOWN INFO
Transmission operates. Hydraulic fluid level OK. Hydraulic tank to pump suction hose OK. Hydraulic pump OK. Stack valve OK.
POSSIBLE PROBLEMS

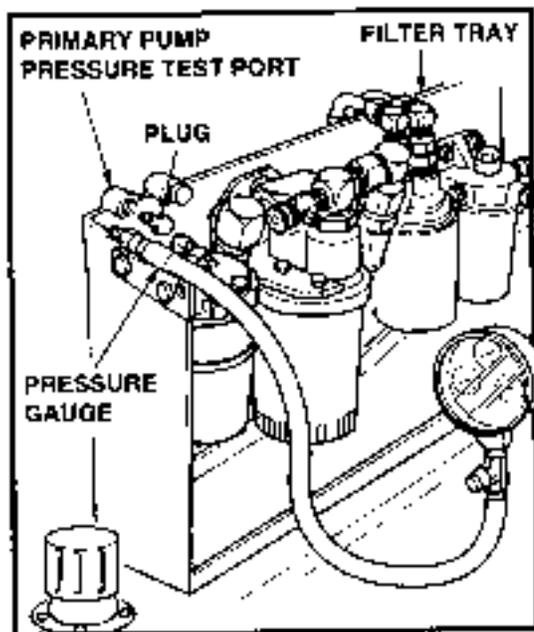


TEST OPTIONS
Verify repair.
REASON FOR QUESTION
If hydraulic mast speed is normal, fault has been corrected. ←

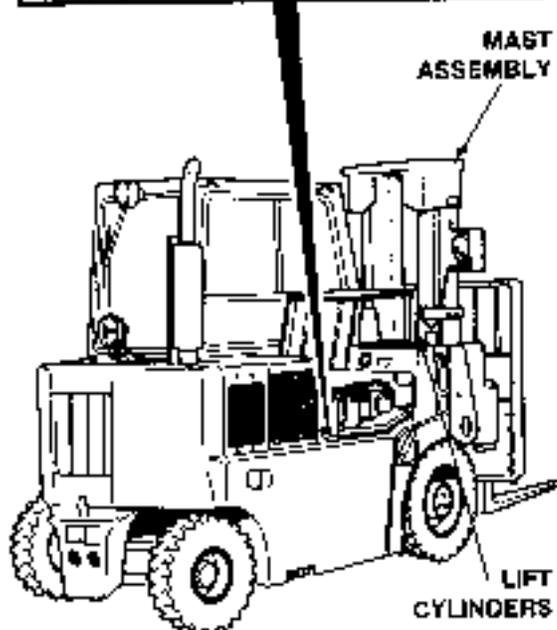
WARNING

- High-pressure hydraulics [oil under 3,000 psi (20,700 kPa) pressure] operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in injury to personnel.
- Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

PRESSURE TEST	
(1)	Remove test port plug and connect a 0 to 4,000 psi (0-27,567 kPa) pressure gauge to PRIMARY PUMP PRESSURE test port.
(2)	Start engine (TM 10-3930-669-10).
(3)	With aid of an assistant, move tilt/lift joystick to raise position and observe pressure gauge (TM 10-3930-669-10). <ul style="list-style-type: none"> (a) If 2,000 to 2,600 psi (13,780-17,920 kPa) are not measured, hydraulic pump is faulty. Perform Steps (4) and (5) below and notify DS Maintenance. (b) If 2,000 to 2,600 psi (13,780-17,920 kPa) are measured, stack valve is faulty. Notify DS Maintenance.
(4)	Shut down engine.
(5)	Remove pressure gauge from PRIMARY PUMP PRESSURE test port and install test port plug.
(6)	Close right-hand engine access cover



VERIFY REPAIR	
(1)	Start engine (TM 10-3930-669-10).
(2)	Operate mast lift cylinders and observe lift speed. <ul style="list-style-type: none"> (a) If mast lift speed is sluggish, fault not corrected. Perform Step (3) below. Repeat procedure and notify Supervisor. (b) If mast lift speed is normal, fault corrected.
(3)	Shut down engine.



Section V. MAINTENANCE PROCEDURES

2-19. MAINTENANCE INTRODUCTION.

This section provides general maintenance procedures for Unit Maintenance as specified in the Maintenance Allocation Chart (MAC). When a special procedure is necessary, the detailed procedure will be in the section covering that component.

2-20. GROUND HANDLING.

- a. Towing.** One towing eye is located on the lower rear of the forklift recessed into the counterweight.
- b. Parking.** Parking brake is designed to hold the forklift with or without rated load capacity on a maximum of a 15 percent grade.
- c. Mooring and Transport.** Forklift is equipped with four rings for use in tying down. Refer to TM 10-3930-669-10.
- d. Slinging.** Forklift is equipped with four rings for use in slinging. Refer to TM 10-3930-669-10.

2-21. GENERAL REMOVAL INSTRUCTIONS.

- a. Work Required.** Remove parts for repair or replacement as required. Do not disassemble a component any further than needed.
- b. Preparation.** Before removal of any electrical components, disconnect battery ground cable to ensure that circuits and components are not energized. Before removal of any hydraulic components, relieve hydraulic system pressure. Before removal of fasteners (nuts, screws), remove any paint on threads to ease removal and installation.
- c. Identification.** To ease assembly and installation, tag and mark shims, connectors, wires, and mating ends of lines before disconnecting them. Identify similar parts to ensure correct assembly.
- d. Position of Valves.** Before removing valve handles, mark or diagram their positions when opened or closed. This will help during assembly.
- e. Tire Removal.** Before removing any tires, position wooden blocks under frame. This will secure the forklift for safe tire removal.
- f. Location.** Before removing cable ties, cushioned clamps, hoses, tubing, wiring, etc., note the location, position, and routing to ensure correct assembly.

2-22. GENERAL DISASSEMBLY INSTRUCTIONS.

- a. Cleanliness.** Work area must be as clean as possible to prevent contamination of components. Hydraulic components, engines, transmissions, and axles require extremely clean work area when disassembled.
- b. Locking Parts.** Replace all lockwire, lock washers, cotter pins, and lock nuts at time of disassembly. Self-locking fasteners that are loosened or removed must be replaced.
- c. Expendable Parts.** All gaskets, packings, and seals removed during repair must be discarded and replaced with new parts.
- d. Removing Seals.** Be sure all traces of oil, gaskets, and sealants are removed from components. When possible, use wood or plastic probes and scrapers to prevent damage to machined surfaces.

CAUTION

Do not use tape to close off fuel or oil openings. Sticky surface of tape can mix with fuel and oil and cause engine malfunctions.

- e. Parts Protection.** To keep dust, moisture, and other objects out of internal parts of the system or components, cap or tape over tubes, hoses, air lines, fittings, and component openings as soon as part is removed. Wrap all removed parts in clean paper or dip parts in preservation oil.

2-23. GENERAL CLEANING INSTRUCTIONS.**WARNING**

- **Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100°F (38°C) and for type II is 138°F (50°C). Failure to do so may result in injury or death to personnel.**
 - **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**
 - **Never use fuel to clean parts. Fuel is highly flammable. Serious personal injury could result if fuel ignites during cleaning.**
- a. Cleaning Solvents.** Use only approved cleaning solvents to clean parts. Drycleaning solvent (P-D-680) is commonly used. Always work in a well-ventilated area.

2-23. GENERAL CLEANING INSTRUCTIONS (CONT.).**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

b. Removing Deposits. Soak parts in drycleaning solvent (P-D-680) and wash away deposits by flushing or spraying. When necessary, brush with a soft-bristle brush (not wire) moistened in solvent. Use compressed air to dry parts, except bearings, after cleaning. Bearings must drip and air dry.

c. Tools. Do not use wire brushes, abrasive wheels, or compounds to clean parts unless specifically approved in the detailed procedures. Parts may be scratched or altered and may be weakened.

d. Ball and Roller Bearings. When cleaning ball or roller bearings, place them in a basket and suspend them in a container of drycleaning solvent (P-D-680) . If needed, use a brush to remove caked grease, chips, etc. Avoid rotating bearing before solid particles are removed to prevent damage to precision bearing surfaces. When bearings have been cleaned, coat them lightly with lubricating oil to remove solvent.

CAUTION

Do not clean tires, lubricant seals, rubber hoses, or electrical components with solvent mixture.

e. Rubber Parts. Do not clean preformed packings or rubber parts in drycleaning solvent. Wipe parts clean with a dry, cleaning cloth.

WARNING

Steam cleaning creates hazardous noise levels and severe burn potential. Eye, skin, and ear protection is required. Failure to comply may result in injury to personnel.

f. Exterior Parts. Steam clean all exterior parts thoroughly before removing. This will make inspection and disassembly easier.

WARNING

Solvents used with a spray gun must be used in a spray booth with filter. Face shield must be used by personnel operating spray gun. Failure to comply may result in injury to personnel.

g. Engine, Cab, and Body. Use a spray gun and solvent mixture for cleaning exterior of engine, cab, and body. Allow mixture to remain on item for ten minutes before rinsing. Rinse with hot water under 80 to 120 pounds of pressure, if available. An ordinary garden hose with nozzle may be used if other equipment is not available. Rinse thoroughly.

CAUTION

To prevent corrosion, parts should be dipped in rust preventive within two hours of degreasing.

h. Degreasing Machine. A degreasing machine may be used to remove heavy grease and oil from metal parts.

WARNING

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
- Never use fuel to clean parts. Fuel is highly flammable. Serious personal injury could result if fuel ignites during cleaning.

i. Passages. After degreasing, check all oil passages and cavities for dirt or blockage before coating with lubricating oil. Run a thin, flexible wire through oil passages to make sure they are not clogged. Use a pressure spray gun and drycleaning solvent (P-D-680) to clean dirty passages.

j. Electrical Parts. Electrical parts, such as coils, junction blocks, and switches, should not be soaked or sprayed with drycleaning solutions. Clean these parts with a cleaning cloth moistened with drycleaning solvent (P-D-680).

CAUTION

Do not use soap or alkalis for cleaning tank interiors.

k. Oil and Fuel Tanks. Pay special attention to all warnings and cautions when working on forklift fuel tank. Oil tanks and fuel tanks should be flushed, using a spray gun and drycleaning solvent (P-D-680).

l. Battery. Exterior surfaces of the electrical system and battery should be cleaned with a weak solution of baking soda and water. Apply solution with a bristle brush to remove corrosion. Pay special attention to all warnings and cautions when working on the battery.

m. Hydraulic System. When cleaning hydraulic system parts, use drycleaning solvent (P-D-680). Clean and dry parts thoroughly to make sure no solvent residue remains. If a coating preservative is required before assembly, apply a light film of lubricant. This lubricant must be of the same type used in the forklift's system.

2-24. GENERAL INSPECTION INSTRUCTIONS.

a. *Cleaning.* Clean all parts before inspection. Check for defects such as physical distortion, wear, cracks, and burrs. If any defect is found, correct it before assembly.

b. *Sealing Surfaces.* Inspect all surfaces in contact with grease, packings, or seals for nicks and burrs. If any defect is found, correct it before assembly.

c. *Bearings.* Inspect bearings for rusting, pitting, rolling, peening, scoring, burning, brinnelling, and fatigue cracking.

d. *Gear and Splined Shafts.* Inspect gears and splined shafts for wear, pitting, rolling, peening, scoring, burning, brinnelling, and fatigue cracking.

e. *Tubing and Hoses.* Inspect all hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or contact with other parts of the forklift. Inspect copper tubing lines for kinks. Inspect fitting threads for damage. Replace any defective parts. After assembly and during initial forklift operation period, check for leaks.

f. *Electrical Parts.* Inspect all wiring harnesses for broken, chafed, or burned wiring. Inspect all terminal connectors for loose or broken parts.

g. *Metal Parts.* Visually inspect all castings and weldments for cracks. Parts that carry a great load should receive magnetic particle inspection. Critical non-ferrous parts may be inspected with fluorescent penetrant.

h. *Drain Plugs.* When removing drain plugs from transmission, engine, hydraulic system components, or axle differential and planetary hubs, check amount of sediment on plugs. Accumulations of grit or fine metal particles may indicate actual or potential component failure. A few fine particles are normal. This inspection helps to determine if there are defective parts prior to internal inspection of the component and to predict degradation of the equipment.

2-25. GENERAL REPAIR INSTRUCTIONS.

a. *Burrs.* Remove burrs from surface with a fine-cut file or crocus cloth.

b. *Exterior Parts.* Chassis and exterior painted parts may be resurfaced when paint is damaged or where parts have been repaired.

NOTE

Polished or machined steel parts not protected by cadmium, tin, copper, or other plating or surface treatments require protection. Bare metal surfaces must be free of moisture when protective coating is applied.

c. *Protecting Parts.* Protect bare steel surfaces from rust when not actually undergoing repair work. Dip parts in, or spray them with, corrosion preventive compound. Aluminum parts may require protection in atmospheres having a high salt content.

d. Screws, Nuts, and Fittings. Replace any screw, nut, or fitting with damaged threads. Inspect tapped holes for thread damage. If cross-threading is evident, retap the hole for the next oversize screw or stud. If the retapping will weaken the part, or if the cost of the part makes retapping impractical, replace the part. Chasing the threads with proper size tap or die may be adequate.

e. Stud Installation. When installing studs, use a proper driver. A worn stud driver may damage the end thread and a chasing die must be used before a nut can be installed. This procedure will remove cadmium plating and allow corrosion. Before installing a stud, inspect the hole for chips. Blow out foreign matter and start stud by hand. Before installation, coat thread with a film of antiseize compound. Install stud to proper "setting height," which is the total projecting length.

f. Dents. Straighten minor body dents by bumping with a soft-faced hammer while using a wooden block backing.

2-26. GENERAL ASSEMBLY INSTRUCTIONS.

a. Preparation. Remove protective grease coatings from new parts before installation.

b. Performed Packing Installation. Clean groove that performed packing is to be installed in before installation. Lubricate performed packing, prior to installation, with a clean lubricant. This lubricant must be of the same type used in the component the performed packing is to be installed in. Do not over-stretch performed packing during installation. Use care not to cut performed packing during installation.

c. Pipe Joints and Fittings. Use non-hardening sealing compound or Teflon pipe sealant to join piping and fittings.

d. Oil Seals. Coat oil seals, before installing, with clean lubricant. This lubricant must be of the same type used in the component the oil seal is to be installed in. Wipe all excess lubricant from side of oil seal that is on the outside of the component (away from lubricant). Install oil seals with seal lip facing toward lubricant, applying an even force to the outer edge of the seal. If oil seals are to be installed over keyed or splined shafts, use a guide to prevent sharp edge of keyway or splines from cutting the seal. Construct guides of very thin gauge sheet metal and shape to the required diameter. Make certain guide edges are not sharp and are bent slightly inward so they do not cut the seal.

e. Bearings and Shafts. When mounting bearings on shafts, always apply force to the inner races. When mounting bearings into housing, always apply the force to the outer race.

f. Bearing Lubrication. Lubricate bearings, before assembly, with clean lubricant. This lubricant must be of the same type used in the component the bearing is to be installed in.

2-26. GENERAL ASSEMBLY INSTRUCTIONS (CONT).**WARNING**

On direct contact, uncured silicon sealant irritates eyes. In case of contact, flush eyes with water and seek medical attention. In case of skin contact, wipe off and flush with water.

g. *Silicone Sealant.* Silicone sealant is often used instead of a gasket to seal mating parts. The mating parts must be clean, dry, and free of oil or grease for proper adhesion. After silicone sealant has been applied, the mating parts must be assembled immediately. Silicone sealant starts to set-up in 15 minutes and takes 24 hours to completely set. Excess silicone sealant should be removed after assembling the mating parts.

h. *Gaskets.* Remove all traces of previous gasket and sealant before installing new gasket.

2-27. GENERAL INSTALLATION INSTRUCTIONS.

a. *Preparation.* When unpacking items, remove all packing material, barrier paper, tape, plastic, plastic bags, protective caps, and protective grease coatings. Handle and store removed components carefully.

CAUTION

Use sealing compound sparingly and only on threads. Do not apply compound to hose connections. Damage to equipment may result.

b. *Sealing Compounds.* Use sealing compounds as required in each maintenance task.

c. *Torquing.* Tighten screws as required in Appendix E or in each maintenance task.

d. *Identification Tags.* Use identification tags and other identifying markings to ensure hoses, tubes, lines, and electrical wiring are installed and connected correctly.

e. *Hoses, Air Lines, and Wiring.* After installing hoses, air lines, and wiring, ensure that they do not contact moving parts or components edges. Secure in place, out of the way, with cable ties and cushion clips.

f. *Filters.* Install Spin-on Filters hand tight. Once filter stops, turn 1/3.

2-28. ADJUSTMENT.

Make changes to equipment pressures, settings, and positions only as required in each maintenance task. Adjustments will bring equipment into proper operating condition.

2-29. PLACING IN SERVICE.

When a new or reconditioned forklift is first received by the gaining organization, it is necessary to determine that the forklift is in satisfactory condition and will operate properly when first placed into service. The service procedures are as follows:

- a.** Visually inspect forklift upon receipt for obvious damage, such as broken, cracked, dented, or missing parts. Report any damage, in accordance with DA PAM 738-750.
- b.** Refer to TM 10-3930-669-10 for the necessary preventive checks and services.
- c.** Refer to LO 10-3930-669-12 for proper lubrication of the forklift.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT**2-30. PREPARATION FOR STORAGE OR SHIPMENT INTRODUCTION.**

- a.** This section gives instructions for making the forklift ready for storage or shipment.
- b.** Refer to AR 750-1 for detailed administrative storage instructions.
- c.** Refer to TB 9-2300-422-20 for security procedures.

2-31. PREPARATION FOR SHIPMENT.

Preparing for shipment: Refer to TB 9-2300-281-35 for procedures covering preservation of shipment for shipment. General procedures for shipment are in FM 55-15. Specific information may be found in TM 55-2200-001-12 for Rail transport and TB 55-45 for Air Transport.

2-32. STORAGE MAINTENANCE PROCEDURES.

- a.** Before preparing forklift for lengthy storage, exercise the engine, transmission, and hydraulic systems to obtain normal operating temperatures to distribute lubricants and to displace trapped moisture.
 - b.** Choose a dry, protected enclosure with a solid floor, concrete preferred, for forklift storage. Protection from direct sunlight and provision of constant ambient temperature with low humidity are desirable if available.
 - c.** Allow sufficient working area around the perimeter of the forklift to permit access to the engine compartment and for elevating the forklift.
 - d.** Forks may be removed from the mast carriage for extra floor space. Forks may be strapped or banded sideways on the carriage face.
- a.** Mast is to be rotated to the front of the forklift to collapse the pivot cylinder.

2-32. STORAGE MAINTENANCE PROCEDURES (CONT.).

f. Tilt the mast assembly forward to collapse both tilt cylinders.

g. Position the sideshift front end to the right side of the forklift. One shift cylinder will collapse with the second extended.

h. Remove batteries (Para 7-48).

(1) Brush and clean battery cable terminal ends if corrosion is present. Coat with a thin coat of grease.

CAUTION

Do not place battery on concrete floor; use wood as an insulator. Failure to comply may result in damage to the battery.

(2) Place battery where it may be periodically serviced and charged.

i. Perform complete lubrication in accordance with LO 10-3930-669-12.

WARNING

- **Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**

j. Clean off the lubricating grease from exposed metal side shift channels or guides using drycleaning solvent (P-D-680). Spray all exposed side shift surfaces with a long-term corrosion inhibitor.

k. Protect the exposed shift cylinder rod and chains by spraying corrosion inhibitor.

l. Protect mast assembly chains, carriage tips, and any other exposed metal parts by spraying with corrosion inhibitor.

CHAPTER 3
ENGINE MAINTENANCE

Para	Contents	Page
3-1	Introduction.....	3-1
3-2	Valve Covers Replacement	3-2
3-3	Valve Overlap Determination	3-4
3-4	Rocker Arm Adjustment.....	3-8
3-5	Engine Oil Filter Adapter Assembly Replacement/Repair.....	3-11
3-6	Engine Oil and Filter Replacement	3-23
3-7	Engine Oil Cooler Replacement.....	3-28
3-8	Engine Oil Breather Replacement.....	3-30
3-9	Engine AOAP Valve Replacement.....	3-32

3-1. INTRODUCTION.

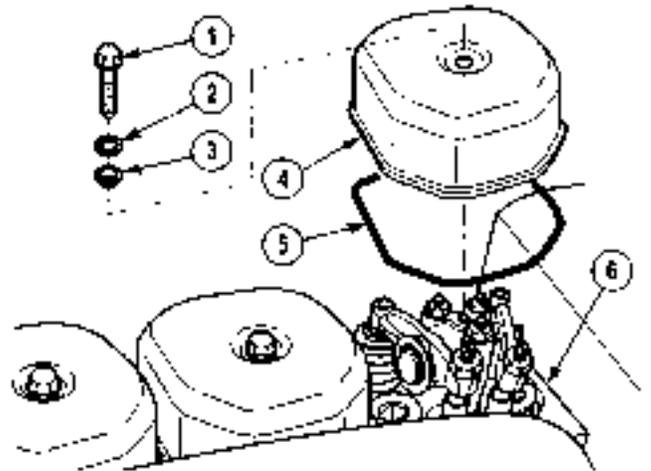
This chapter contains maintenance instructions for removing, replacing, repairing, installing and adjusting engine components authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.

- c. **Installation.** Install washer (2), washer (3), and valve cover (4) on engine (6) with screw (1). Tighten screw 5 to 11 lb-ft (7-15 Nm).

NOTE

Follow-on Maintenance:

- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

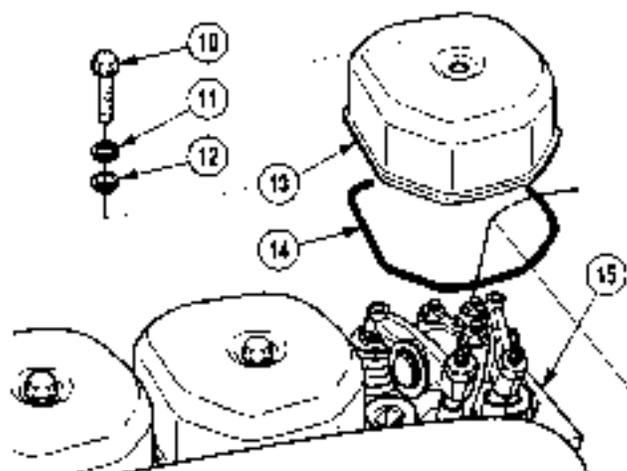


END OF TASK

NOTE

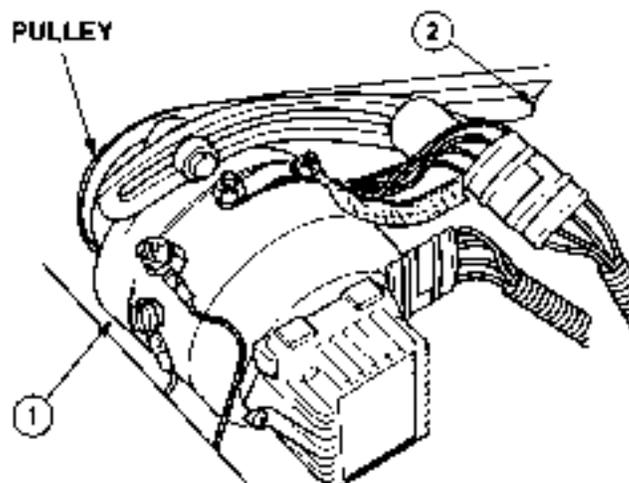
All valve covers are removed the same way. Valve cover No. 1 is shown.

- (6) Remove four screws (10), washers (11), washers (12), valve covers (13) and gaskets (14) from engine (15). Discard gaskets.

**b. Adjustment.****NOTE**

- All turning of the engine will be done using the alternator pulley, nut, and alternator belt.
- All turning of engine will be described as if looking at the crankshaft pulley end of engine.

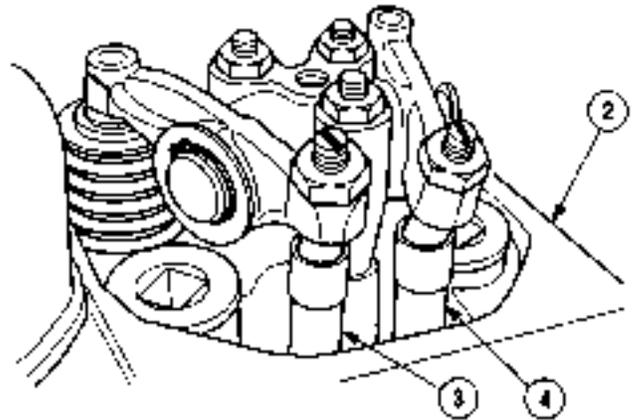
- (1) Using a wrench on alternator (1) pulley, rotate engine (2) to left.



3-3. VALVE OVERLAP DETERMINATION (CONT).**NOTE**

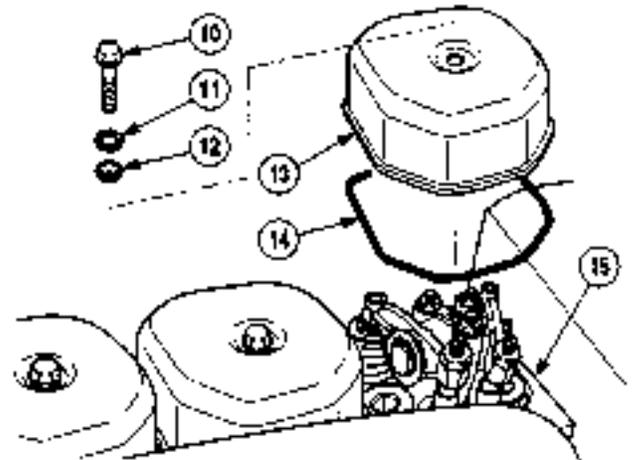
Valve overlapping is when exhaust valve is about to close and inlet valve is about to open. Both pushrods will not rotate at this position.

- (2) As described in Step (1), continue turning engine (2) until exhaust valve pushrod (3) overlaps intake valve pushrod (4).
- (3) Repeat Steps (1) and (2) for remaining cylinders, as required.

**c. Installation.****NOTE**

All valve covers are installed the same way. Valve cover No. 1 is shown.

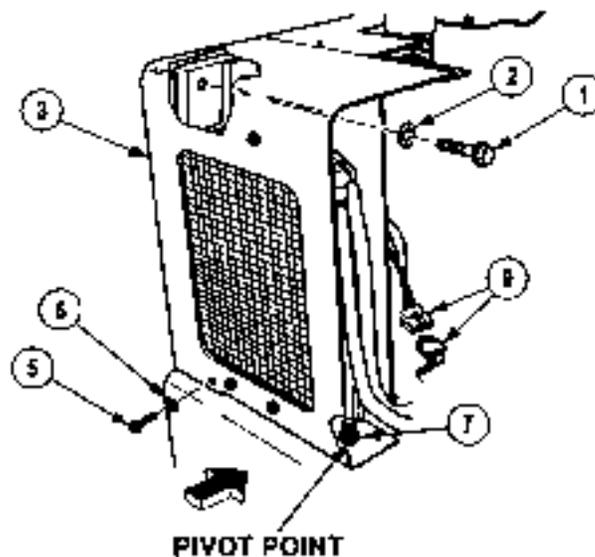
- (1) Install four gaskets (14) and valve covers (13) on engine (15) with four washers (12), washers (11), and screws (6). Tighten screws 5 to 11 lb-ft (7-15 Nm).



NOTE

Lift cover when pivoting inward to clear mounting tab.

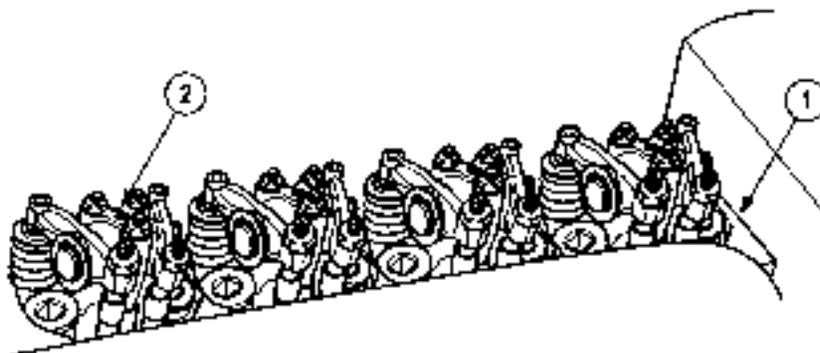
- (2) Pivot cover (3) inward and forward.
- (3) Connect connector (9).
- (4) Install cover (3) with screw (5) and washer (6) and screw (1) and washer (2).
- Tighten screws.
- (5) Tighten nut (7).

**NOTE****Follow-on Maintenance:**

- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

b. Adjustment



NOTE

- All turning of engine will be done using the alternator pulley nut and the alternator belt.
- All turning of engine will be described as if looking at the crankshaft pulley end of engine.
- Rocker arm adjustment for cylinder No. 1 is shown. Adjustment for all other cylinders is similar.

(1) Prepare engine (1) for valve overlap of cylinder (2) (Para 3-3) and corresponding cylinder valve adjustment. Refer to Table 3-1.

Table 3-1. Valve Adjustment Sequence

Cylinder Valve Overlap	Valve Adjustment
No. 4.	No 1
No. 3.	No 2
No. 1.	No 4
No. 2	No.3

3-4. ROCKER ARM ADJUSTMENT (CONT).

- (2) Loosen nut (3) on rocker arm (4), then turn screw (5) to adjust rocker arm valve stem clearance to 0.006 (0.15 mm). Refer to Table #3-2.
- (3) Hold screw (5) and tighten nut (3).
- (4) Check clearance and adjust if required.
- (5) Repeat Steps (1) through (4) for remaining cylinders.

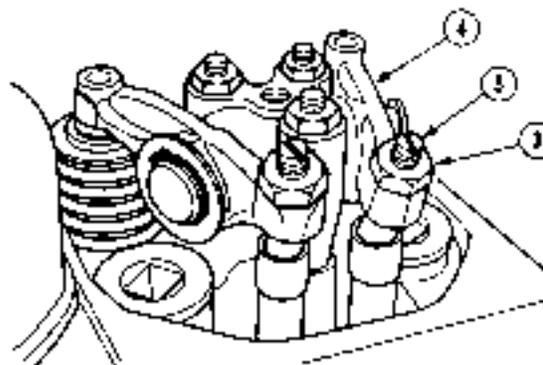


Table 3-2. Valve Clearance (Engine Cold)

Inlet	Degrees	Exhaust	Degrees
Open	32°before T.D.C	Open	70°before B.D.C
Closed	60°before B.D.C.	Closed	32°before T.D.C.

c. Installation.

NOTE

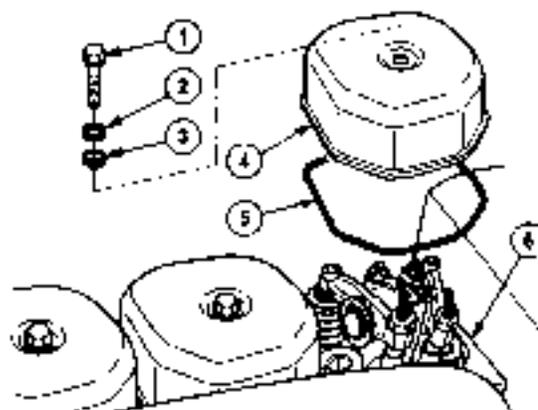
One valve cover is shown. All four are installed the same way.

Install washer (2), washer (3), valve cover (4), and gasket (5) on engine (6) with screw (1). Tighten screw 5 to 11 lb-ft (7-15 Nm).

NOTE

Follow-on Maintenance:

- Install cab (Para 15-2).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

3-5.. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR

This task covers

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | |

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
- Vise (Item 2, Appendix B)
- Vise Jaws, Soft (Item 2, Appendix B)

Materials/Parts

- Cap and Plug Set (Item 5, Appendix C)
- Rags, Wiping (Item 19, Appendix C)
- Solvent, Dry-cleaning (Item 20, Appendix C)
- Tags, Identification (Item 21, Appendix C)
- Washer, Lock

Materials/Parts (cont)

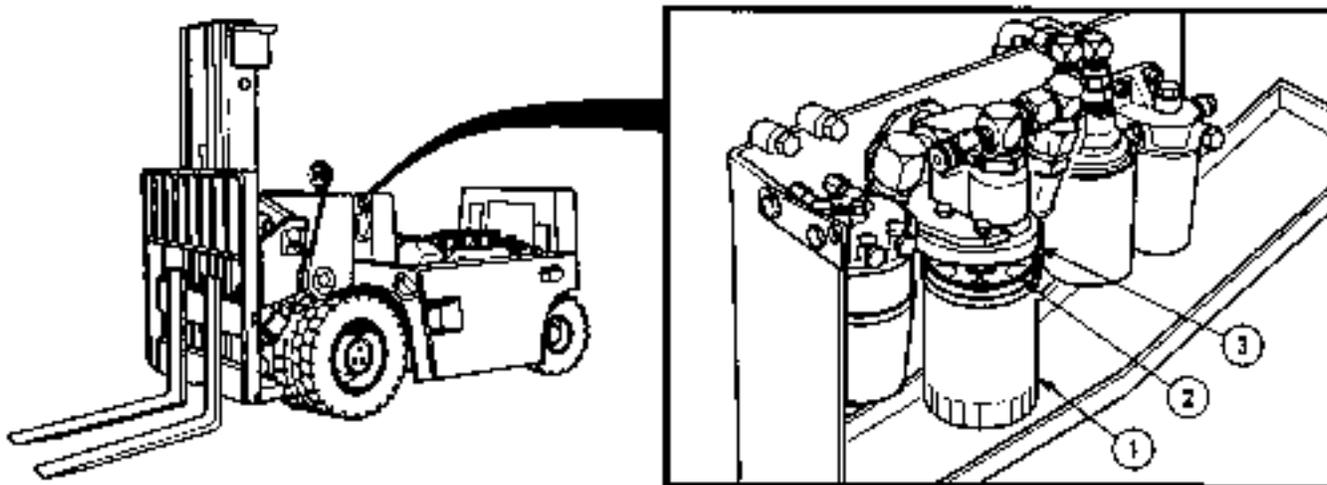
- Washer, Lock
- Packing, Preformed
- Washers, Lock (4)
- Oil, Engine
- Filter, Oil
- Packing, Preformed

Equipment Condition

- Engine OFF (TM 10-3930-669-10)
- Wheels chocked (TM 10-3930-669-10)
- Cab removed (As required to service engine oil adapter and hoses)(Para 15-2)

3-5. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR (CONT).

a. Removal.

**WARNING**

Engine oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

CAUTION

Area around oil filter must be very clean. Any contaminants entering oil filter mount will damage equipment.

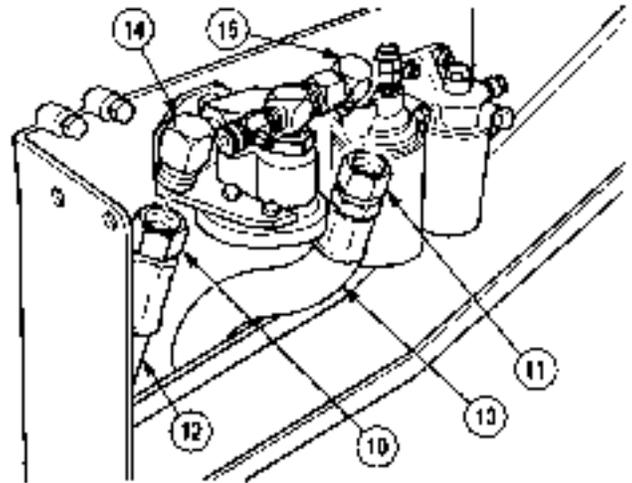
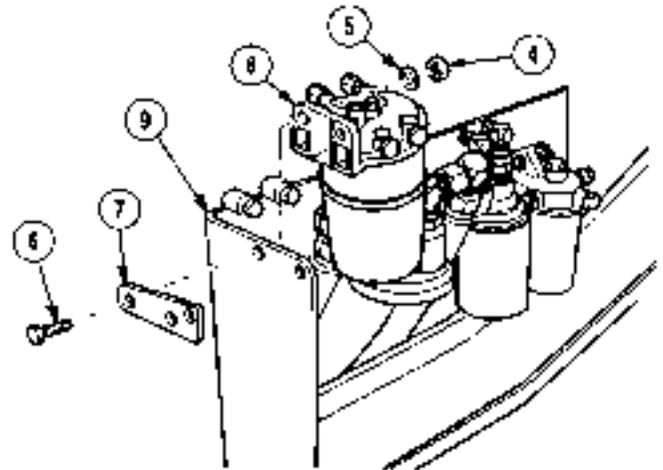
- (1) Using wiping rags, clean area around oil filter (1).
- (2) Position wiping rags under oil filter (1) to catch excess engine oil.
- (3) Remove oil filter (1) and preformed packing (2) from oil filter adapter assembly (3). Discard filter and preformed packing.

NOTE

- Tag and mark all hoses prior to removal.

- Cap and plug all fittings and hoses after removal.

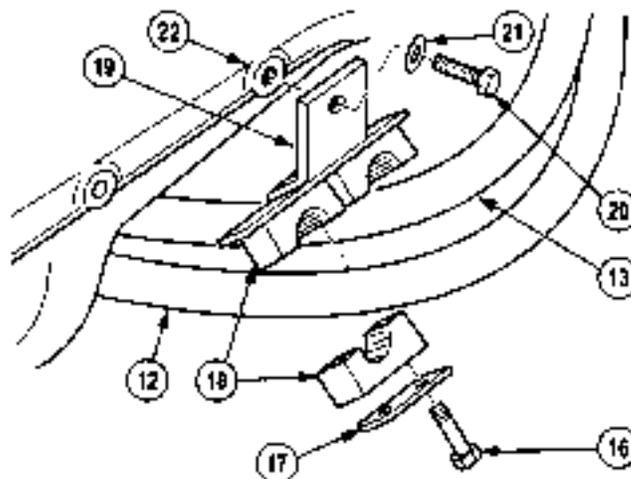
- (4) Remove two nuts (4), washers (5), screws (6), bracket (7), and fuel/water separator (8) from filter tray (9). Position fuel/water separator clear of filter tray.
- (5) Loosen two fittings (10 and 11) and remove hoses (12 and 13) from fittings (14 and 15).



3-5. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR (CONT).**NOTE**

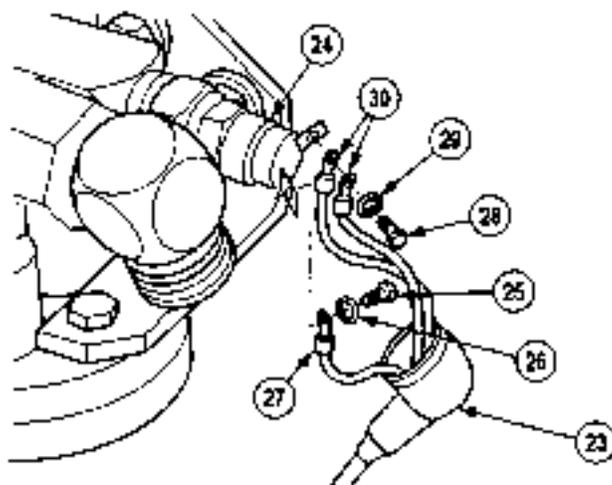
If required, perform steps (6 and 7). If not, go to step (8).

- (6) Remove four screws (16), two clamp plates (17), four clamp halves (18), and hoses (12 and 13) from bracket (19).
- (7) Remove screw (20), washer (21), and bracket (19) from engine (22).
- (8) Remove cap (23) from oil temperature switch (24).

**NOTE**

Tag and mark wires prior to removal.

- (9) Remove screw (25), lock washer (26), and wire (27) from oil temperature switch (24). Discard lock washer.
- (10) Remove screw (28), lock washer (29), and two wires (30) from oil temperature switch (24). Discard lock washer.



- (11) Remove three nuts (31), washers (32), screws (33), and oil filter adapter assembly (3) from filter tray (9).

NOTE

Cab must be removed prior to performing Steps (12) through (14).

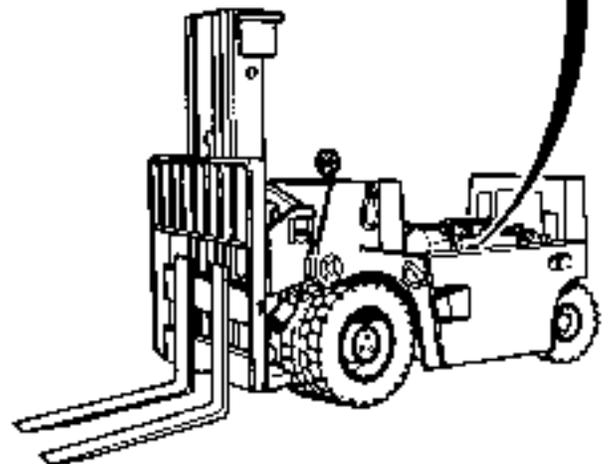
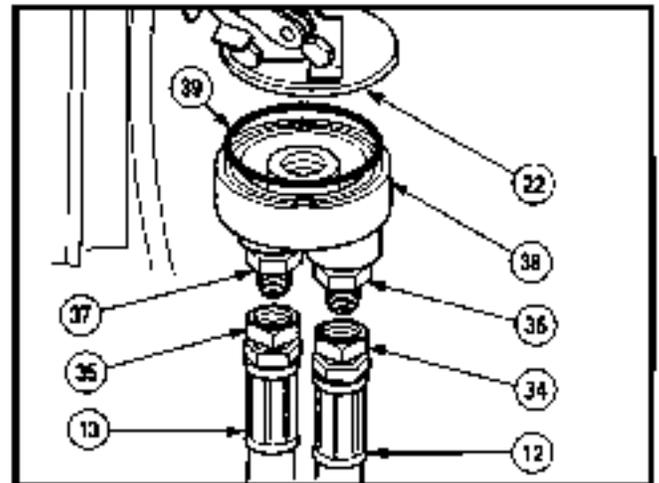
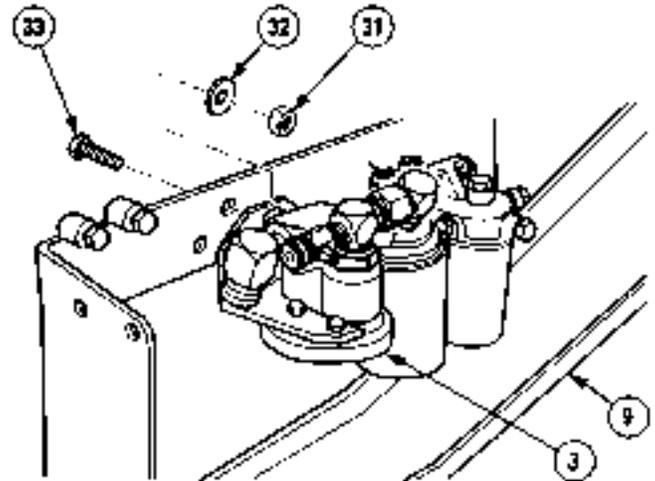
- (12) Loosen two fittings (34 and 35) and remove hoses (12 and 13) from fittings (36 and 37).

NOTE

Note position of hoses prior to removal.

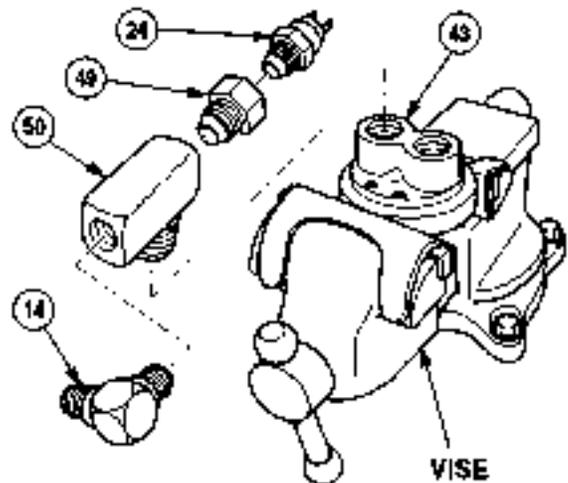
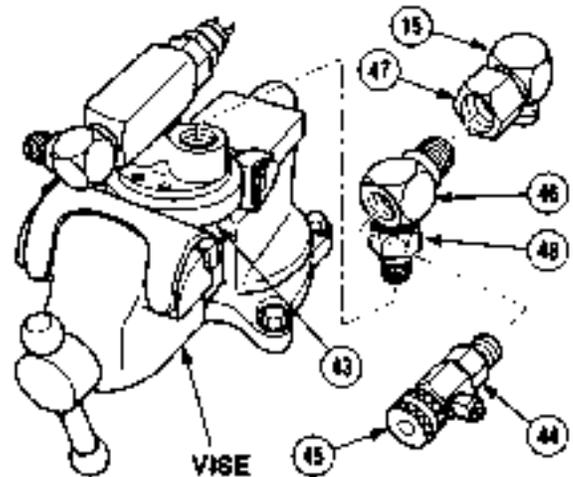
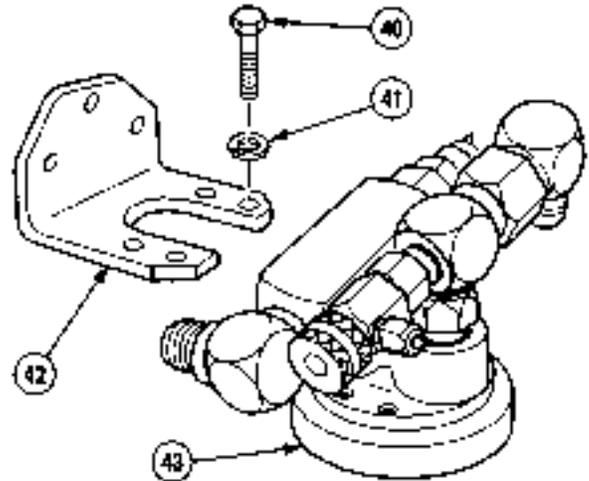
- (13) Remove two hoses (12 and 13) from hull of engine compartment.

- (14) Remove adapter (38) and preformed packing (39) from engine (22). Discard preformed packing.

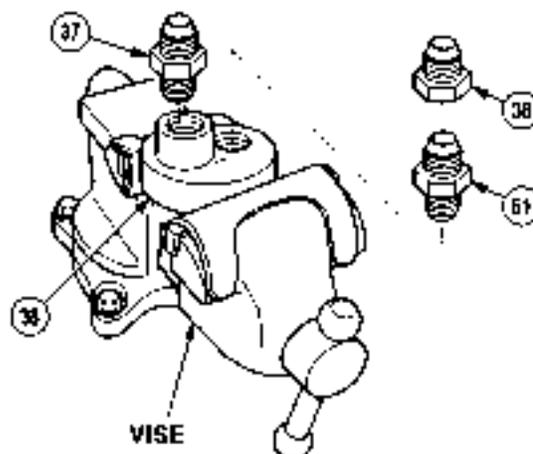


3-5. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR (CONT).**b. Disassembly.**

- (1) Remove four screws (40), lock washers (41), and bracket (42) from oil filter adapter (43).
- (2) Place oil filter adapter (43) in a soft-jawed vise.
- (3) Loosen fitting (44) and remove engine AOAP valve (45) from fitting (46).
- (4) Loosen fitting (47) and remove fitting (15) from fitting (46).
- (5) Loosen fitting (48) and remove fitting (46) from oil filter adapter (43).
- (6) Remove oil temperature switch (24) from reducer (49).
- (7) Remove reducer (49) from fitting (50).
- (8) Remove fitting (14) from fitting (50).
- (9) Remove fitting (50) from oil filter adapter (43).
- (10) Remove oil filter adapter (43) from vise.



- (11) Place adapter (38) in a soft-jawed vise.
- (12) Remove fitting (36) from fitting (51).
- (13) Remove fitting (51) from adapter (38).
- (14) Remove fitting (37) from adapter (38).
- (15) Remove adapter (38) from vise.



c. Cleaning/Inspection.

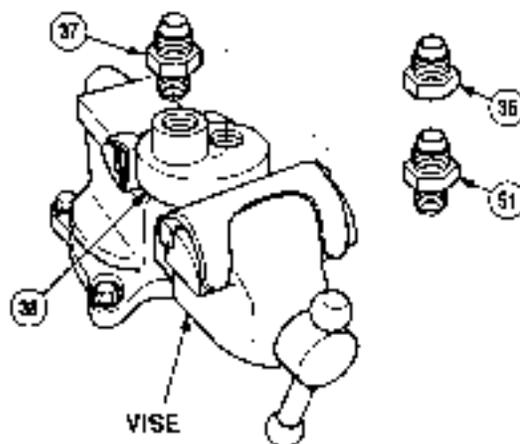
WARNING

- Dry-cleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I Dry-cleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

- (1) Clean all parts with Dry-cleaning solvent.
- (2) Inspect hoses for holes, cracks, and deterioration.
- (3) Inspect oil filter adapter for cracks and damage.
- (4) Notify supervisor of any damage.

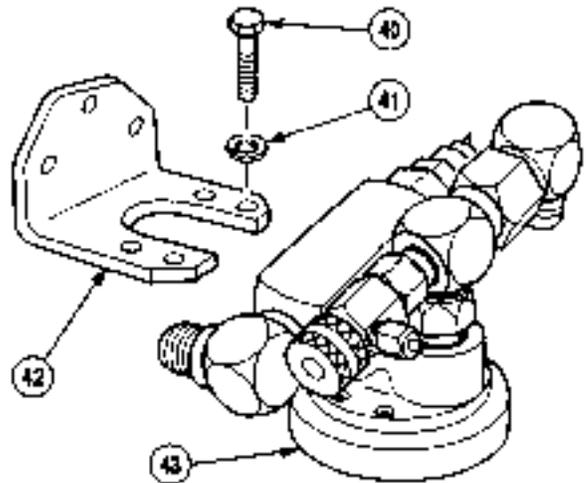
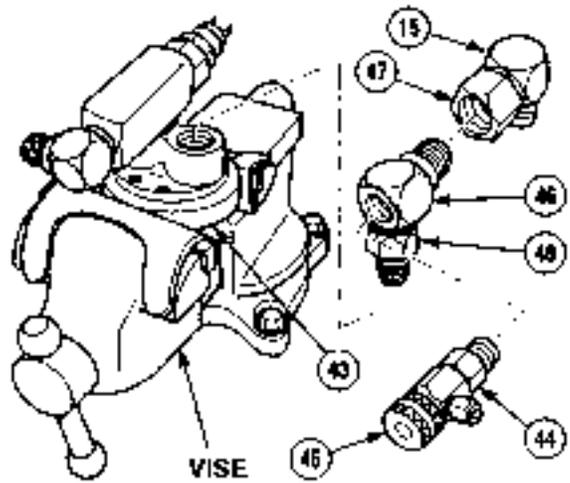
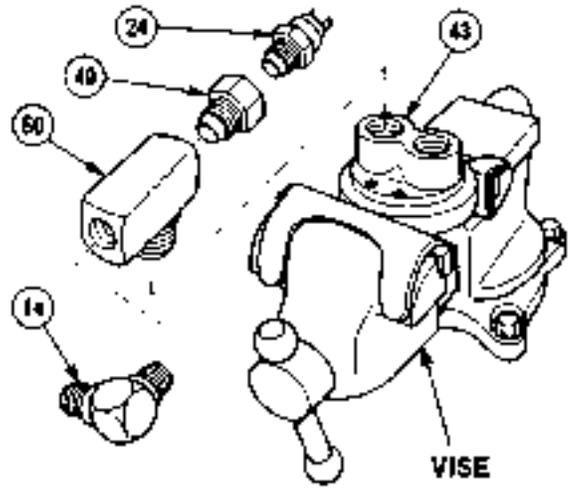
d. Assembly.

- (1) Place adapter (38) in a soft-jawed vise.
- (2) Install two fittings (37 and 51) on adapter (38).
- (3) Install fitting (36) on fitting (51).
- (4) Remove adapter (38) from vise.



3-5. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR (CONT).

- (5) Place oil filter adapter (43) in a soft-jawed vise.
- (6) Install fitting (50) on oil filter adapter (43).
- (7) Install fitting (14) on fitting (50).
- (8) Install reducer (49) on fitting (50).
- (9) Install oil temperature switch (24) on reducer (49).
- (10) Install fitting (46) on oil filter adapter (43) and tighten fitting (48).
- (11) Install fitting (15) on fitting (46) and tighten fitting (47).
- (12) Install engine AOAP valve (45) on fitting (46) and tighten fitting (44).
- (13) Remove oil filter adapter (43) from vise.
- (14) Install bracket (42) on oil filter adapter (43) with four lock washers (41) and screws (40).

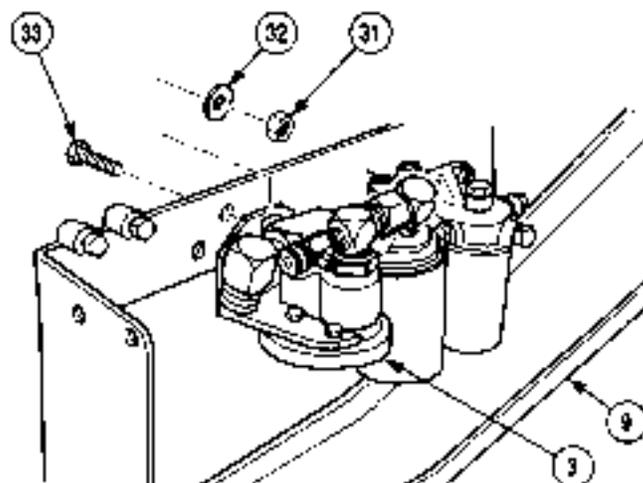
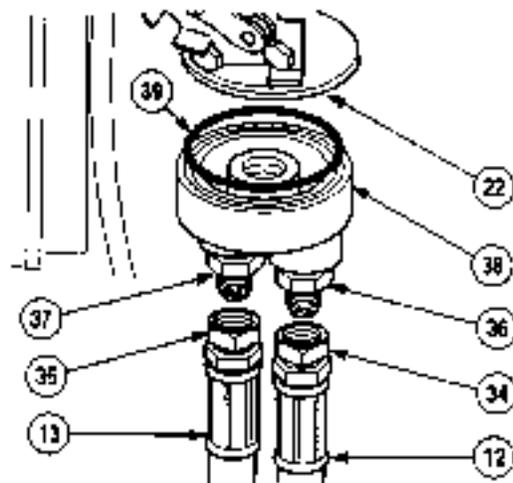


e. Installation.

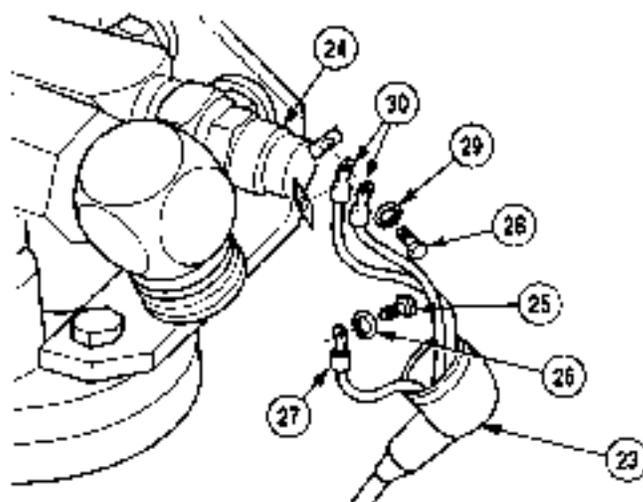
NOTE

Install all hoses as noted during removal.

- (1) Apply a light coat of clean engine oil to performed packing (39) and install on engine (22) with adapter (38). Tighten adapter one-half turn after performed packing contacts engine mount.
- (2) Position two hoses (12 and 13) in hull of engine compartment.
- (3) Install two hoses (12 and 13) on fittings (36 and 37) and tighten fittings (34 and 35).
- (4) Install oil filter adapter assembly (3) on filter tray (9) with three screws (33), washers (32), and nuts (31).



- (5) Install two wires (30) on oil temperature switch (24) with lock washer (29) and screw (28).
- (6) Install wire (27) on oil temperature switch (24) with lock washer (26) and screw (25).
- (7) Place cap (23) on oil temperature switch (24).

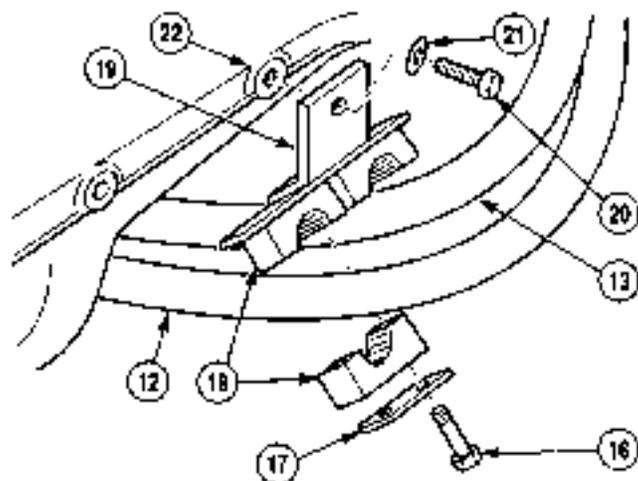


3-5. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR (CONT).**NOTE**

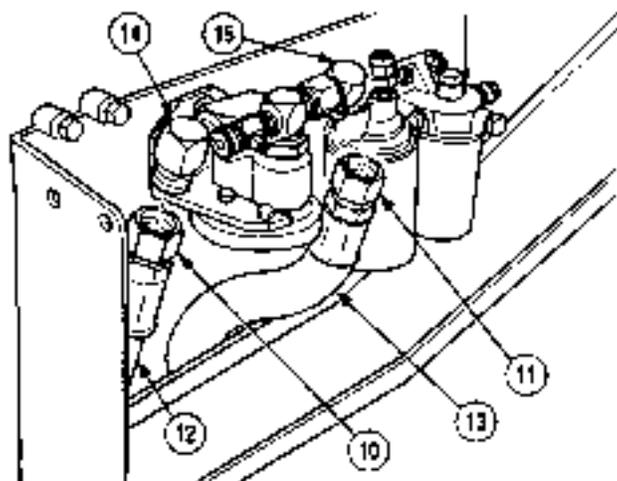
If bracket was removed, perform steps (8) and (9). If not, go to step (9).

(8) Install bracket (19) on engine (22) with washer (21) and screw (20).

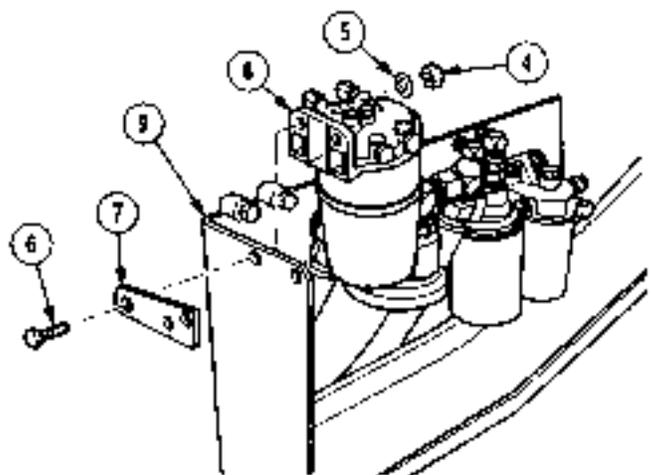
(9) Install two hoses (12 and 13) on bracket (19) with four clamp halves (18), two clamp plates (17), and four screws (16).



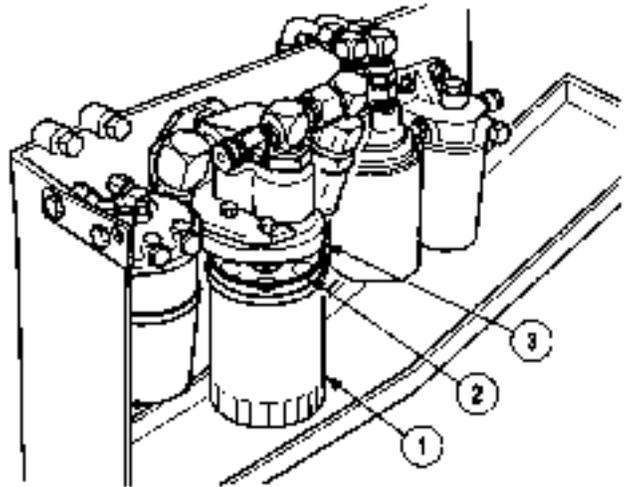
(10) Install two hoses (12 and 13) on fittings (14 and 15) and tighten fittings (10 and 11).



(11) Install fuel/water separator (8) on filter tray (9) with bracket (7), two screws (6), washers (5), and nuts (4).



- (12) Apply a light coat of clean engine oil to preformed packing (2) and install on oil filter adapter assembly (3) with oil filter (1). Tighten oil filter one-half turn after preformed packing contacts oil filter adapter.
- (13) Remove wiping rags from under oil filter (1).
- (14) Install cab (Para 15-2).
- (15) Check engine oil (TM 10-3930-669-10).
- (16) Start engine (TM 10-3930-669-10).



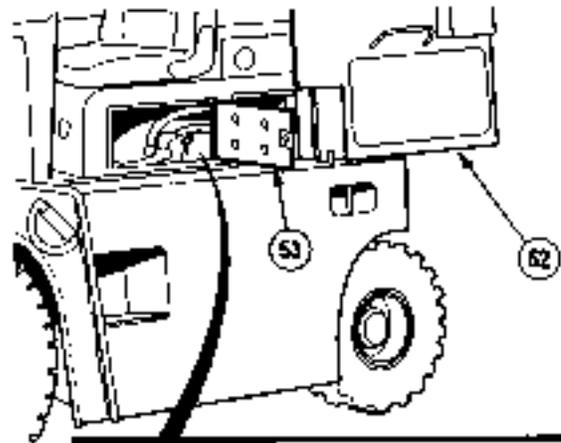
NOTE

Allow engine to run for two minutes.

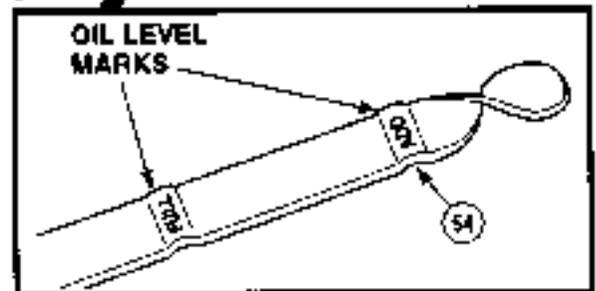
- (17) Shut off engine (TM 10-3930-669-10).

CAUTION

- Use care when filling engine with oil to prevent spilling oil on engine. Oil is flammable and damage to equipment could result.
- During final filling of engine with oil, the oil level should be checked often, using the engine oil dipstick. Avoid overfilling. If engine is overfilled, drain excess oil from engine, or damage to equipment could result.



- (18) Open cab door (52).
- (19) Open cab engine access panel (53) and check engine oil level using dipstick (54).



3-5. ENGINE OIL FILTER ADAPTER ASSEMBLY REPLACEMENT/REPAIR (CONT.)

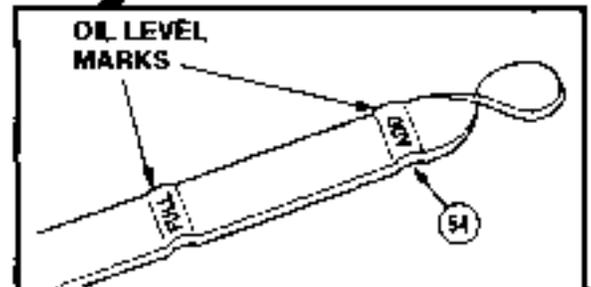
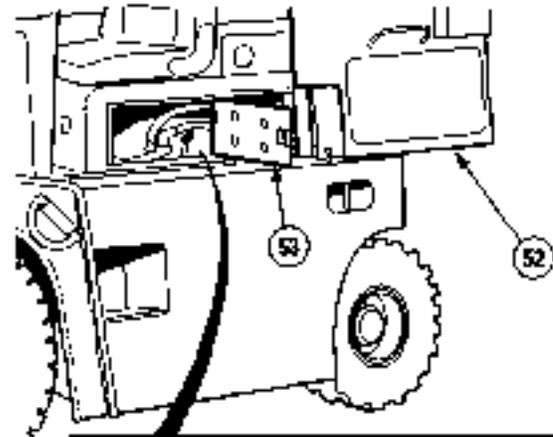
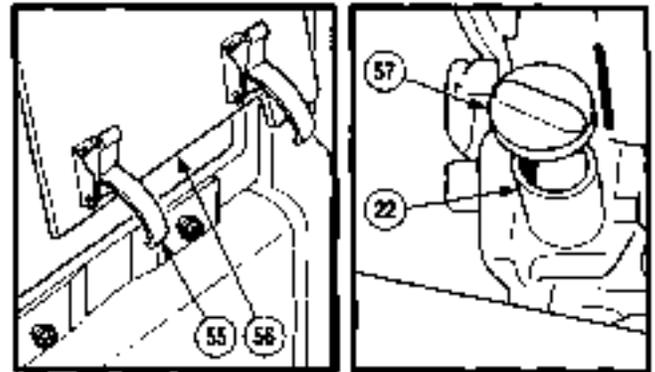
- (20) Unlock two latches (55) and open left hand rear access cover (56).
- (21) Remove cap (57) from engine (22).
- (22) Add engine oil until oil level is indicated on the dipstick (54) between oil level marks.
- (23) Close engine access panel (53).
- (24) Close cab door (52).
- (25) Install cap (57) on engine (22).
- (26) Close left-hand rear access cover (56) and lock two latches (55).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



3-6. ENGINE OIL AND FILTER REPLACEMENT.

This task covers

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools and Special Tools

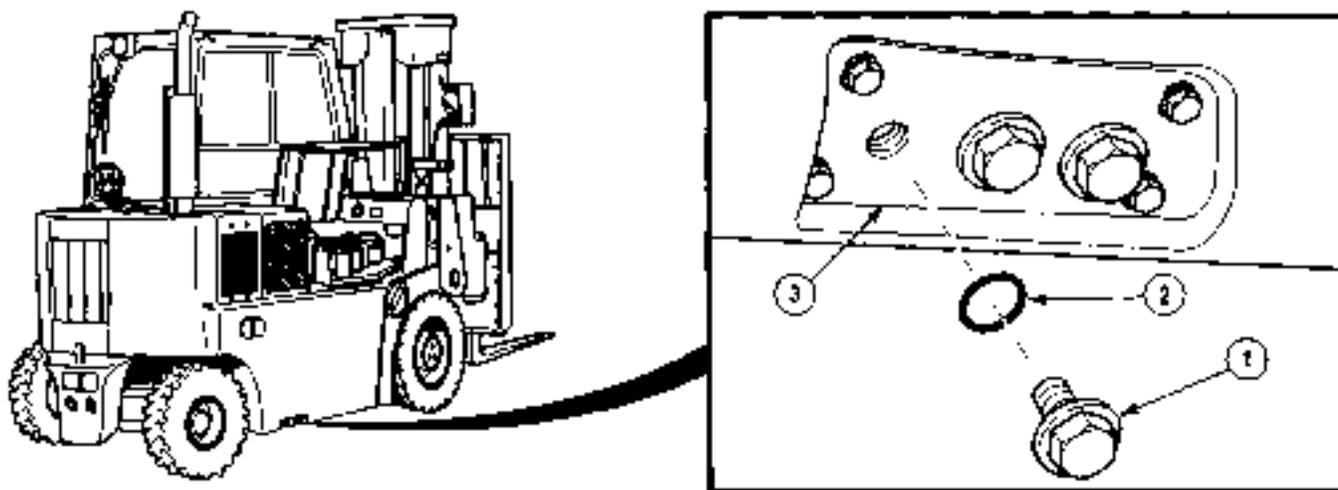
Tool Kit, General Mechanic's: Automotive
 (Item 1, Appendix B)
 Pan, Drain 12 qt (11 1) capacity
 (Item 11, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)
 Right-hand engine access cover open
 (TM 10-3930-669-10)

Materials/Parts

Rags, Wiping (Item 19, Appendix C)
 Solvent, Drycleaning (Item 20, Appendix C)
 Filter, Oil
 Oil, Engine
 Packing, Preformed

3-6. ENGINE OIL AND FILTER REPLACEMENT (CONT).**a. Removal.**

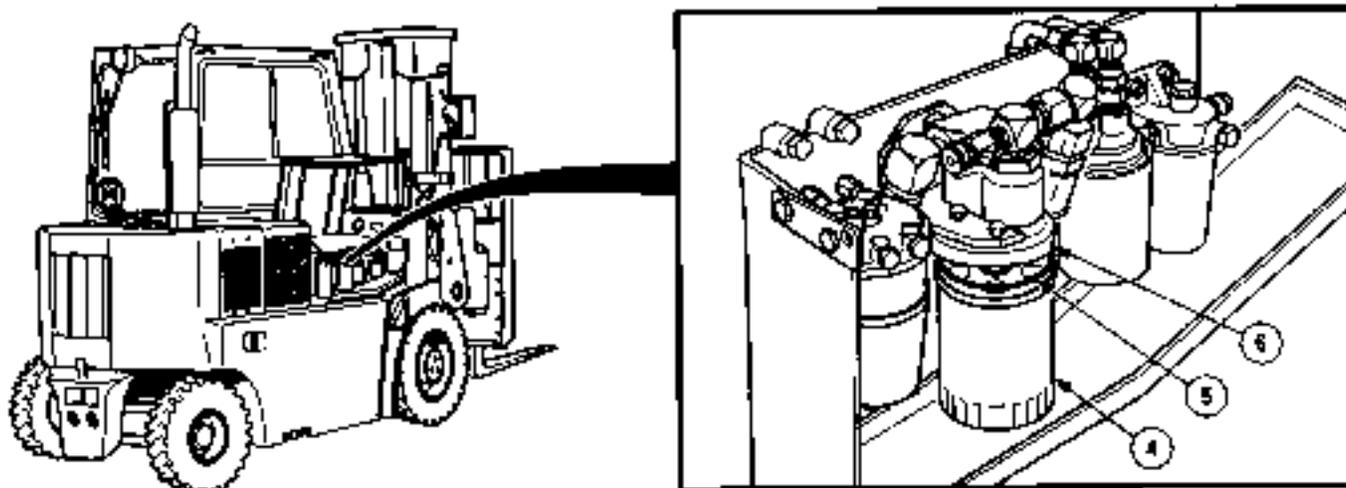
- (1) Start engine (TM 10-3930-669-10) and run for five minutes.
- (2) Shut off engine (TM 10-3930-669-10).

WARNING

- Engine oil may be hot when drained. Do not come in contact with hot oil. Failure to do so may result in injury to personnel.
- Engine oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.

NOTE

- Forklift should be on level surface to ensure oil level can be checked correctly and that all oil is drained.
 - Position suitable drain pan with an 12 qt (11 1) capacity under drain plug prior to start of procedure.
 - Engine oil will come out immediately when drain plug is removed.
 - Allow five minutes for engine oil to settle before draining.
- (3) Remove drain plug (1) and preformed packing (2) from drain plate (3). Discard preformed packing.



CAUTION

Area around filter must be very clean. Any contaminants entering oil filter adapter assembly will damage equipment.

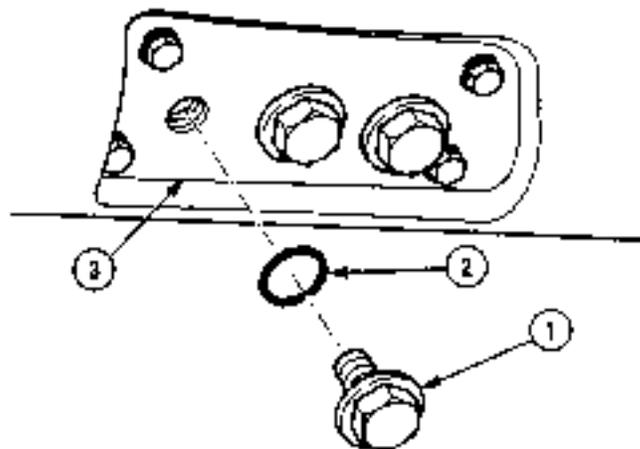
- (4) Using wiping rags clean area around oil filter (4).
- (5) Position wiping rags under oil filter (4) to catch excess engine oil.
- (6) Remove oil filter (4) and preformed packing (5) from oil filter adapter assembly (6). Discard filter and preformed packing.

b. Cleaning/Inspection.

- (1) Inspect oil filter adapter assembly for cracks and damage.
- (2) Replace damaged parts or notify supervisor.

c. Installation.

- (1) Coat surface of preformed packing (5) with a light coat of clean engine oil.
- (2) Install oil filter (4) with preformed packing (5) on oil filter adapter assembly (6). Tighten oil filter one-half turn after preformed packing contacts oil filter adapter assembly.
- (3) Remove wiping rags from under oil filter (4).
- (4) Coat preformed packing (2) with clean engine oil.
- (5) Install preformed packing (2) and drain plug (1) in drain plate (3).



3-6. ENGINE OIL AND FILTER REPLACEMENT (CONT).

- (6) Unlock two latches (7) and open left hand rear access cover (8).
- (7) Remove cap (9) from engine (10).

CAUTION

Use care when filling engine with oil to prevent spilling oil on engine. Oil is flammable and damage to equipment could result.

- (8) Fill engine oil (LO 10-3930-669-12).
- (9) Open cab door (11).
- (10) Start engine (TM 10-3930-669-10).

NOTE

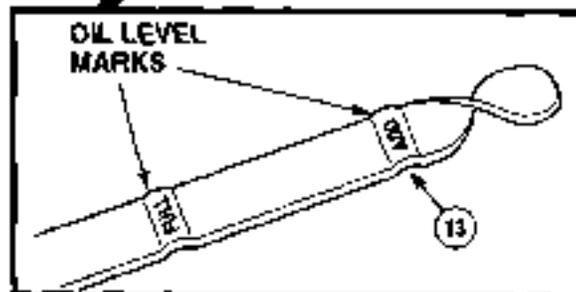
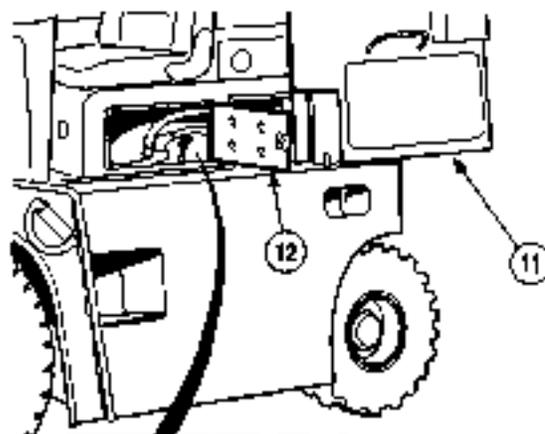
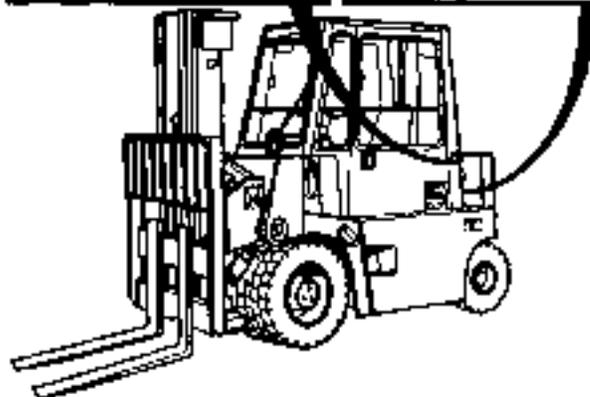
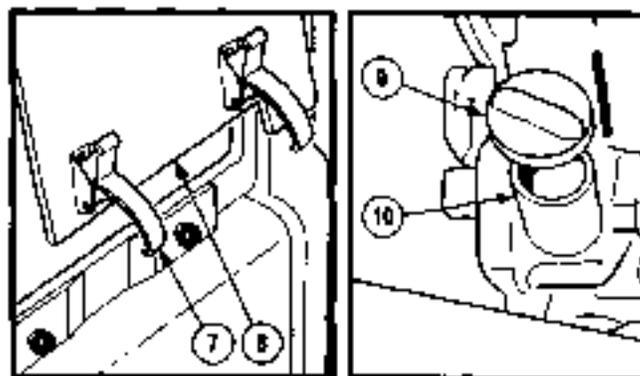
Allow engine to run for two minutes.

- (11) Shut off engine (TM 10-3930-669-10).
- (12) Open engine access panel (12) and check oil level using dipstick (13).

CAUTION

- Use care when filling engine with oil to prevent spilling oil on engine. Oil is flammable and damage to equipment could result.
- During final filling of engine with oil. The oil level should be checked often, using the engine oil dipstick. Avoid overfilling. If engine is overfilled, drain excess oil from engine or damage to equipment could result.

- (13) Add engine oil until oil level indicated on the dipstick (12) is between oil level marks.
- (14) Close engine access panel (11).
- (15) Close cab door (10).



(16) Install cap (9) on engine (10).

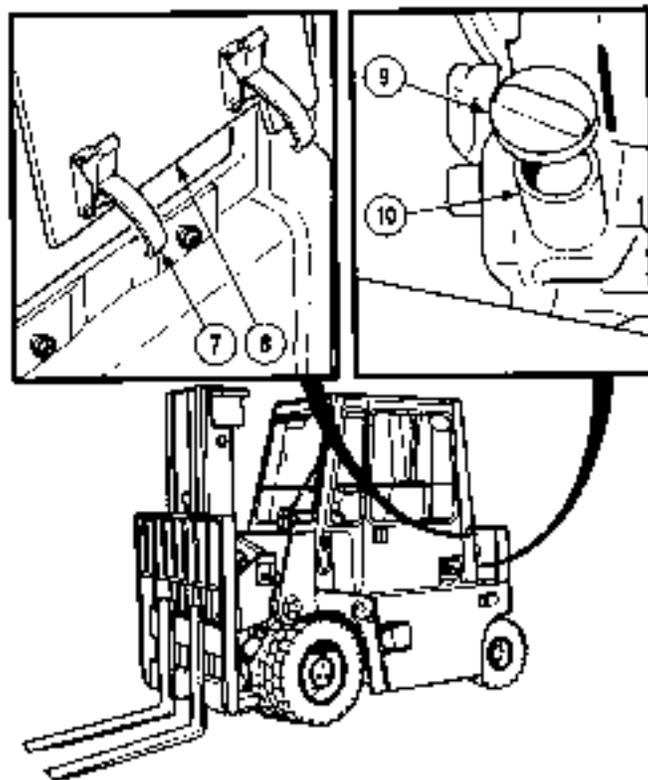
(17) Close left-hand rear access cover (8).

NOTE

Follow-on Maintenance:

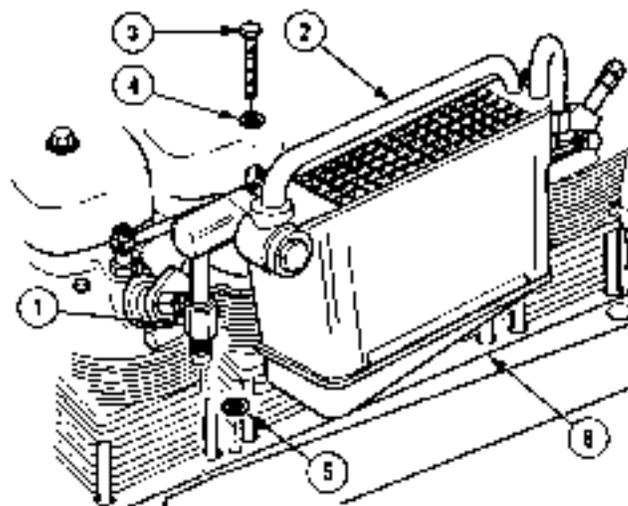
- Close right-hand engine access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



b. Installation.

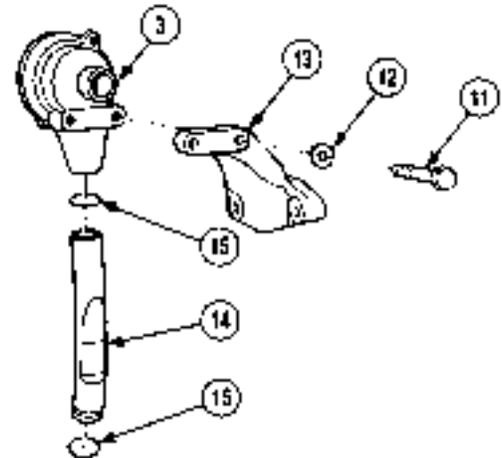
- (1) Position three washers (5) and oil cooler (2) on engine (6).
- (2) Install three washers (4) and screws (3) on oil cooler (2).
- (3) Tighten two fittings (1) on oil cooler (2).

**NOTE****Follow-on Maintenance:**

- Install fuel pipes (Para 4-8).
- Install cab (Para 15-2).
- Remove wheel chocks

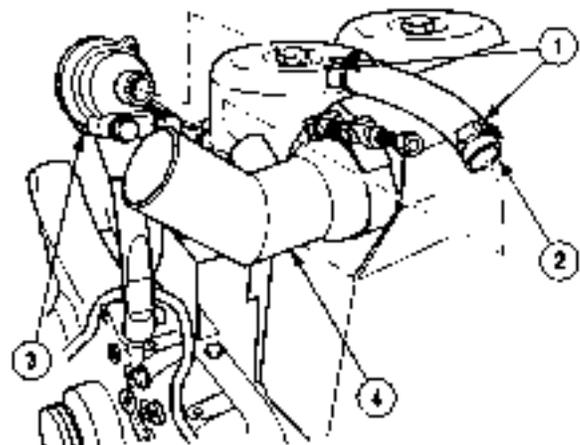
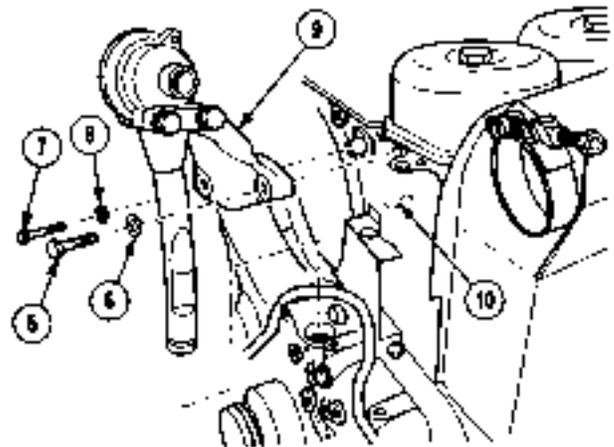
END OF TASK

- (4) Remove two screws (11), washers (12), and support bracket (13) from engine oil breather (3).
- (5) Remove engine oil breather pipe (14) from engine oil breather (3).
- (6) Remove two preformed packings (15) from engine oil breather pipe (14). Discard preformed packings.



b. Installation.

- (1) Install two preformed packings (15) on engine oil breather pipe (14).
- (2) Install engine oil breather pipe (14) in engine oil breather (3).
- (3) Install support bracket (13) on engine oil breather (3) with two washers (12) and screws (11).
- (4) Install engine oil breather assembly (9) on engine (10) with washer (8), screw (7), washer (6), and screw (5).
- (5) Install two clamps (1) on oil breather hose (2).
- (6) Install breather hose (2) on engine oil breather (3) and tube (4) and tighten clamps (1).



NOTE

Follow-on Maintenance:

- Install air cleaner (Para 4-4).
- Install left rear engine access cover (Para 15-10).
- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

CHAPTER 4

FUEL SYSTEM MAINTENANCE

Para	Contents	Page
4-1	Introduction	4-1
4-2	Injector Replacement.....	4-2
4-3	Fuel Supply Pump Replacement	4-4
4-4	Air Cleaner Assembly Replacement/Repair	4-6
4-5	Fuel Pipe Replacement	4-10
4-6	Fuel Filler Tube Replacement.....	4-17
4-7	Governor Adjustment	4-19
4-8	Fuel Filter Replacement	4-22
4-9	Fuel Filter Head Replacement	4-24
4-10	Fuel/Water Separator Replacement/Repair	4-27
4-11	Throttle Pedal Replacement	4-35
4-12	Throttle Cable Replacement/Adjustment.....	4-38
4-13	Oil Filter Tray Replacement	4-42

4-1. INTRODUCTION.

This chapter contains maintenance instructions for removing, installing, repairing, and testing fuel system components as authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.

b. Installation.

- (1) Position heat shield (4) in cylinder head (3).

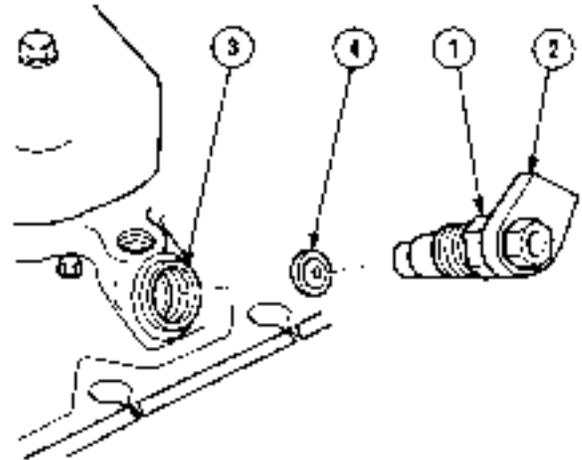
NOTE

- All four injectors are installed the same way. No. 2 injector is shown installed.
- When installing injector, align to fuel pipe prior to tightening.

- (2) Install injector (2) in cylinder head (3) with cap screw (1). Tighten cap screw to 18 to 22 lb-ft (25-30 Nom).

NOTE**Follow-on Maintenance:**

- Install fuel pipes (Para 4-5).
- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

b. Cleaning/Inspection.**WARNING**

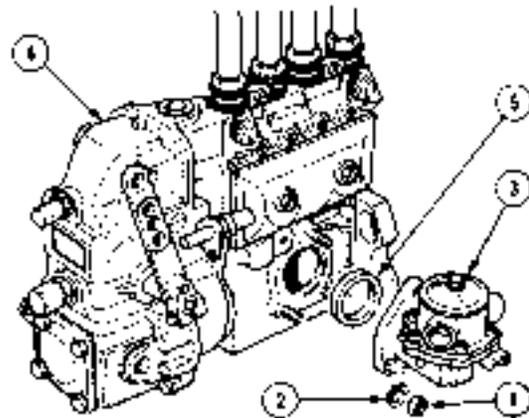
- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
 - (1) Clean all metal parts with drycleaning solvent.
 - (2) Do not allow drycleaning solvent to come in contact with rubber parts.
 - (3) Inspect parts for breaks, cracks, burrs, and sharp edges.
 - (4) Replace all damaged parts.

c. Installation.

- (1) Install seal (5) on fuel supply pump (3).
- (2) Install fuel supply pump (3) on injection pump (4) with three lock washers (2) and nuts (1). Tighten nuts to 7 lb-ft (10 Nm).

NOTE**Follow-on Maintenance:**

- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

**END OF TASK**

4-4. AIR CLEANER ASSEMBLY REPLACEMENT/REPAIR.

This task covers:

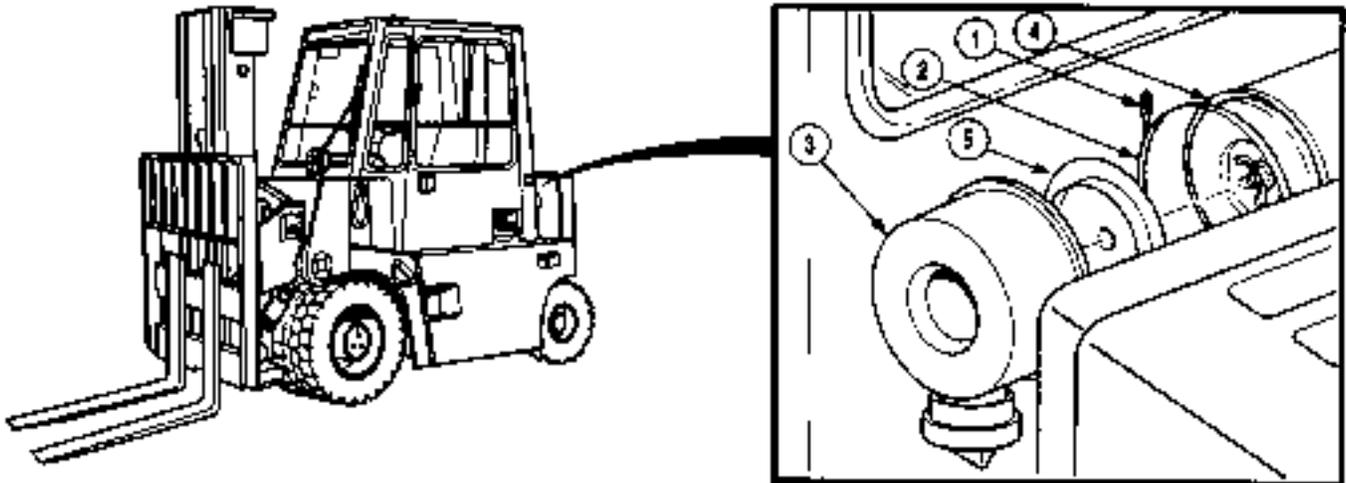
- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Equipment Condition

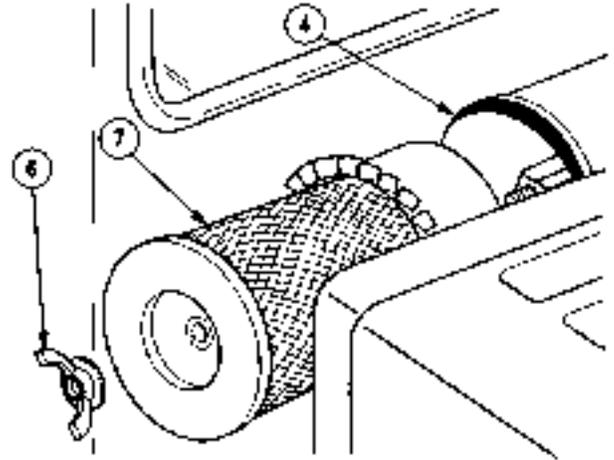
Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Left rear engine access cover removed
(TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

a. Removal.**CAUTION**

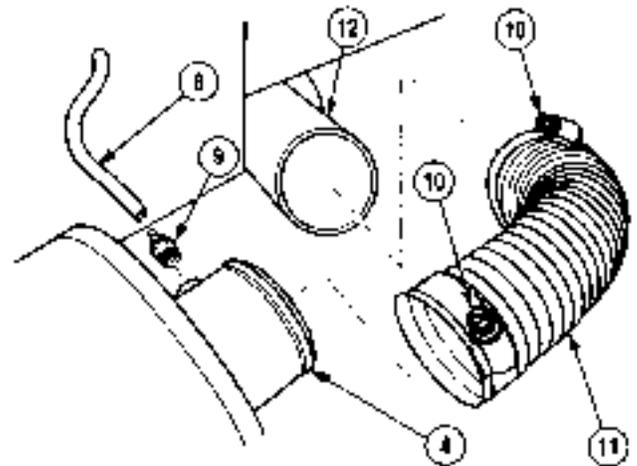
Do not operate engine with air cleaner removed. Foreign objects may be drawn into engine and damage to equipment may occur.

- (1) Turn screw (1) to loosen clamp (2) and remove cover (3) from air cleaner housing (4).
- (2) Remove screw (1) and clamp (2) and baffle assembly (5) from air cleaner housing (4).

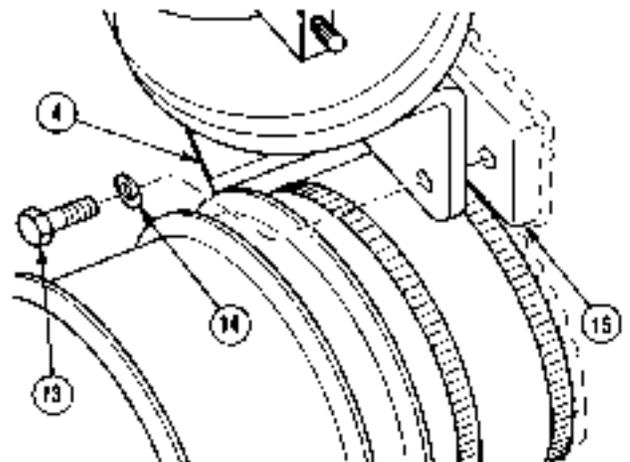
- (3) Remove wing nut (6) and air filter (7) from air cleaner housing (4).



- (4) Remove hose (8) from fitting (9).
- (5) Remove fitting (9) from air cleaner housing (4).
- (6) Remove two clamps (10) and hose (11) from air cleaner housing (4) and tube (12).

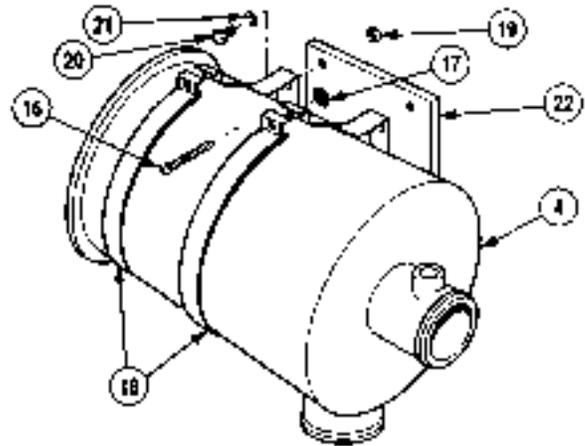


- (7) Remove two screws (13), washers (14), and air cleaner housing (4) from forklift (15).

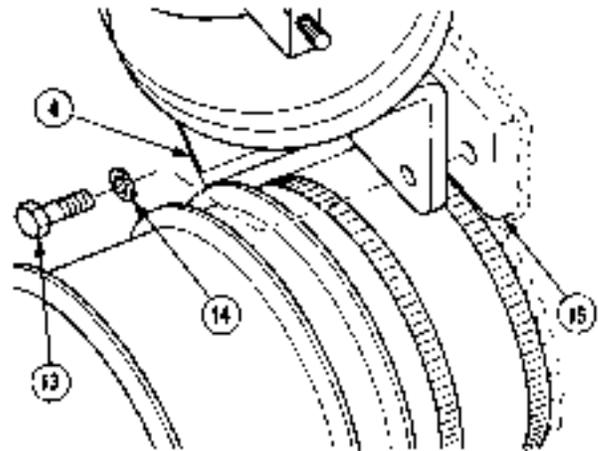


4-4. AIR CLEANER ASSEMBLY REPLACEMENT/REPAIR (CONT).**b. Disassembly.**

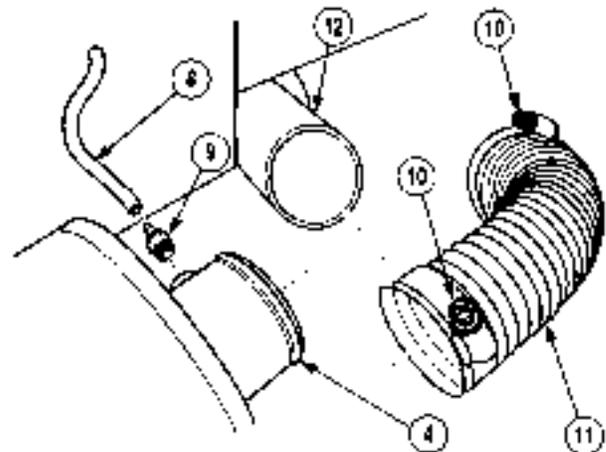
- (1) Remove two screws (16) and nuts (17) from straps (18).
- (2) Pull air cleaner housing (4) from straps (18).
- (3) Remove four nuts (19), screws (20), washers (21), and two straps (18) from bracket (22).

**c. Assembly.**

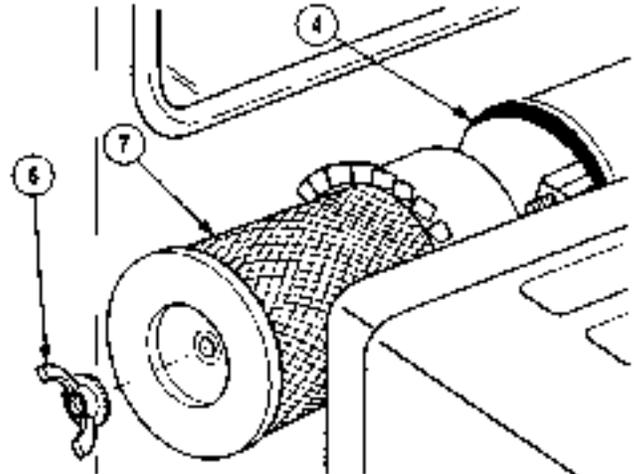
- (1) Install two straps (18) on bracket (22) with four washers (21), screws (20), and nuts (19).
- (2) Position air cleaner housing (4) in straps (18).
- (3) Install two screws (16) and nuts (17) on straps (18) and tighten until air cleaner housing (4) is secured.

**d. Installation.**

- (1) Install air filter housing (4) on forklift (15) with two washers (14) and screws (13).
- (2) Install hose (11) on air cleaner housing (4) and tube (12) with two clamps (10).
- (3) Install fitting (9) on air cleaner housing (4).
- (4) Install hose (8) on fitting (9).



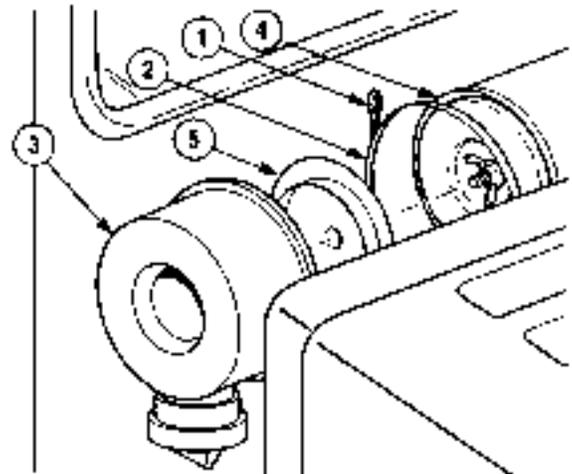
- (5) Install air filter (7) in air cleaner housing (4) with wing nut (6).



- (6) Position clamp (2) and screw (1) on air cleaner housing (4).

- (7) Position baffle assembly (5) in air cleaner housing (4).

- (8) Install cover (3) on air cleaner housing (4) with clamp (2) and screw (1). Tighten screw.



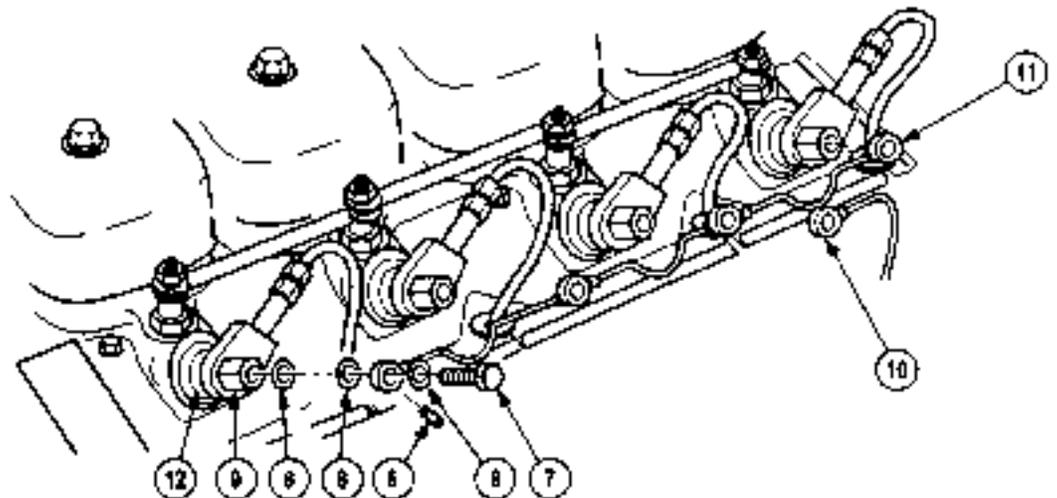
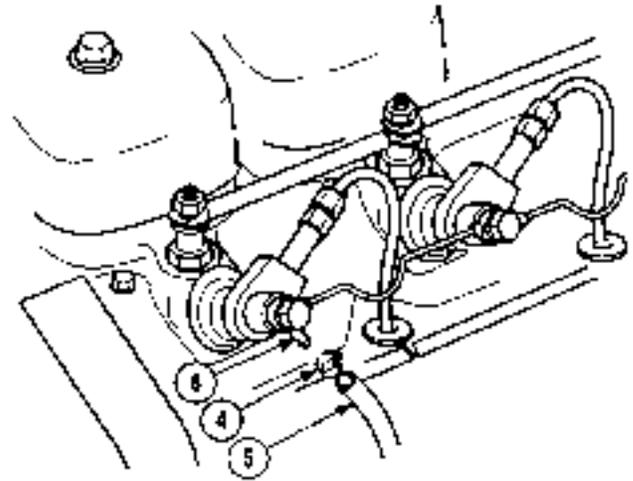
NOTE

Follow-on Maintenance:

- Install left rear engine access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

- (2) Remove clamp (4) and hose (5) from nipple (6).



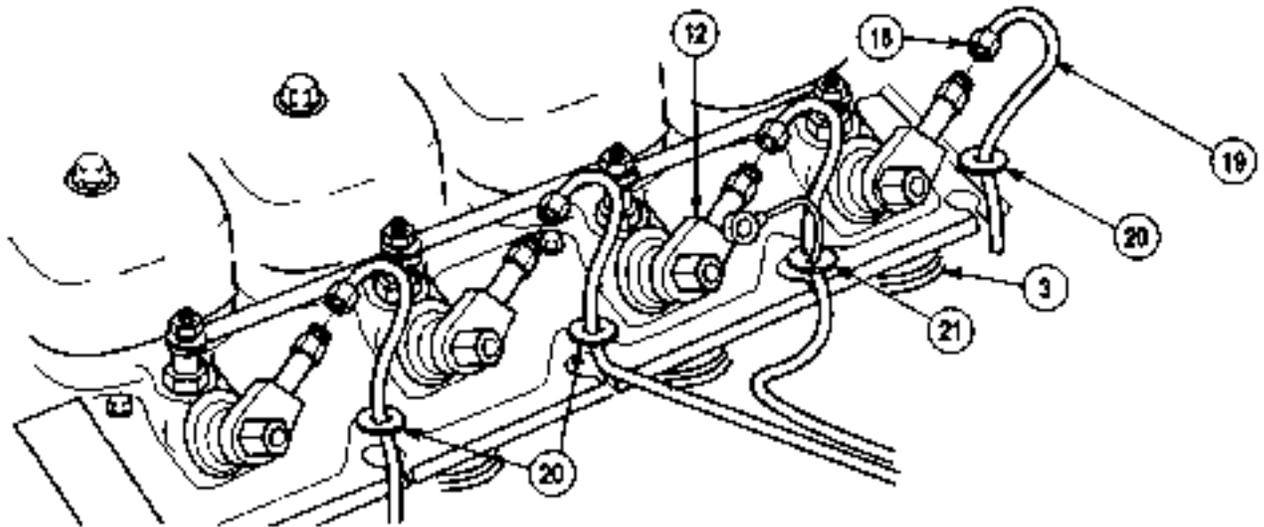
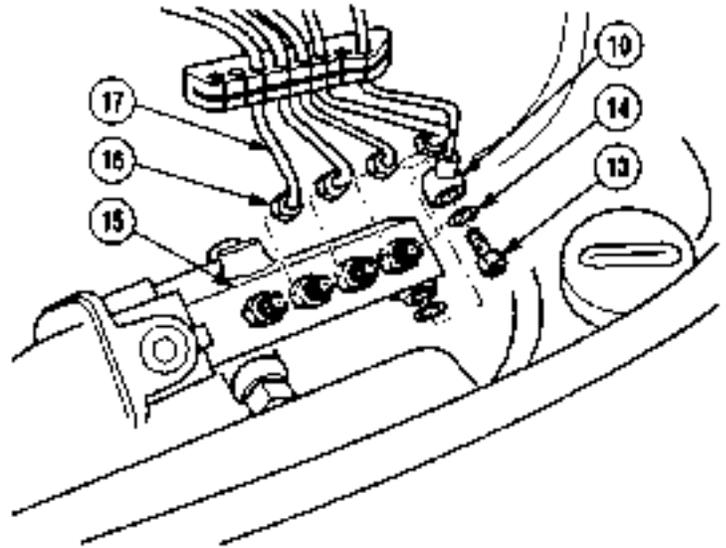
NOTE

- **Screws used in connecting the fuel pipes are banjo screws and cannot be replaced by standard screws.**
- **One injector line shown removed, all four are removed the same way.**

- (3) Remove nipple (6), banjo screw (7), washers (8), two fuel return pipes (9 and 10) and fuel return pipe (11) from injector (12). Discard washers.

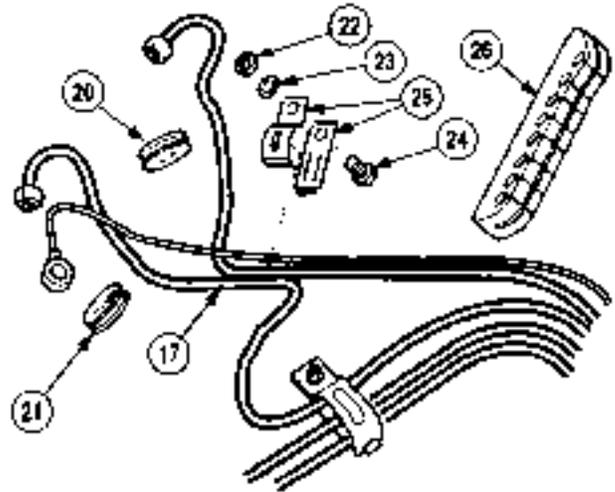
4-5. FUEL PIPE REPLACEMENT (CONT).

- (4) Remove relief valve (13), two washers (14), and fuel return pipe (10) from injection pump (15).
- (5) Loosen four fittings (16) and remove fuel pipe assembly (17) from injection pump (15).



- (6) Loosen four fittings (18) on injectors (12).
- (7) Remove fuel pipe assembly (19), three grommets (20), and grommet (21) from engine (3).

- (8) Remove three grommets (20) and grommet (21) from fuel pipe assembly (17).
- (9) Remove two nuts (22), lock washers (23), screws (24), and clamps (25) from fuel pipe assembly (17). Discard lock washers.
- (10) Remove rubber seal (26) from fuel pipe assembly (17).



b. Cleaning/Inspection.

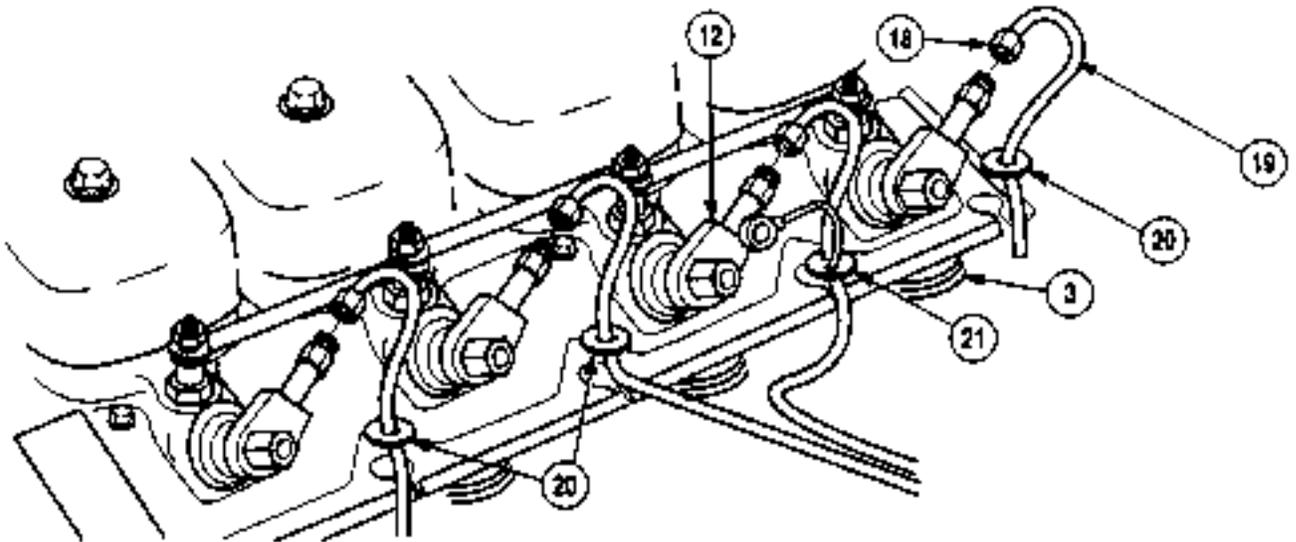
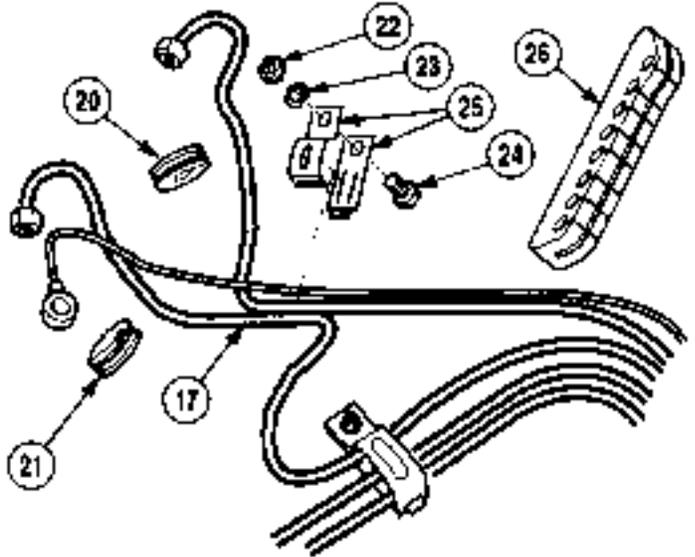
WARNING

- Dry-cleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
 - If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
 - Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).
- (1) Clean all fittings and lines (exterior) with clean cloth moistened with dry-cleaning solvent.
 - (2) Introduce 25 to 30 psi (172 - 206 kpa) of dry air into lines to clear any foreign matter.
 - (3) Inspect lines for cracks, chafing, and defective connectors. Replace if defective.
 - (4) Inspect fittings for cracks and thread distortions. Replace if defective.

4-5. FUEL PIPE REPLACEMENT (CONT).

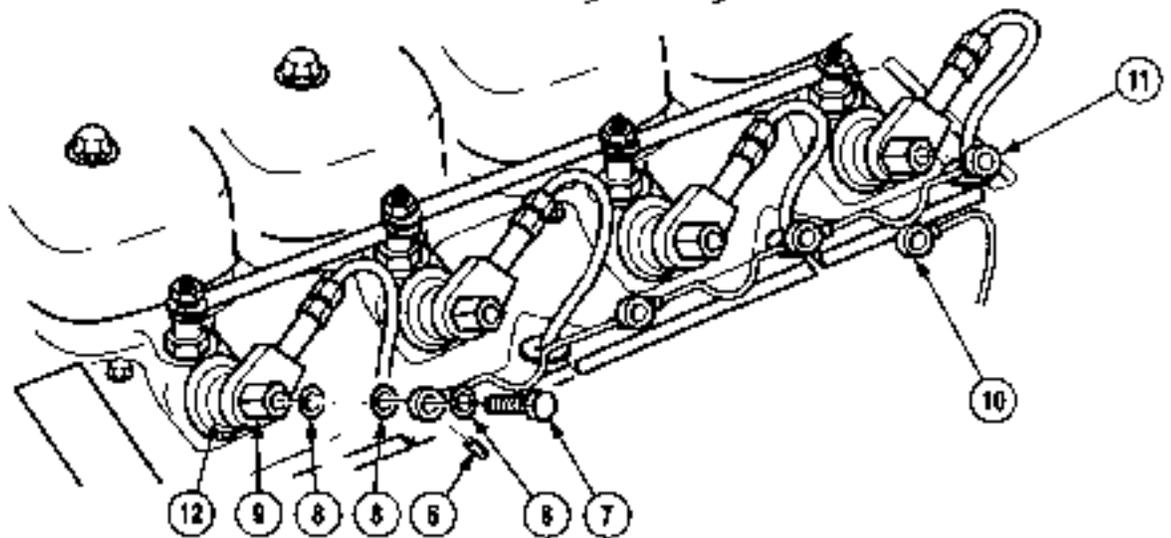
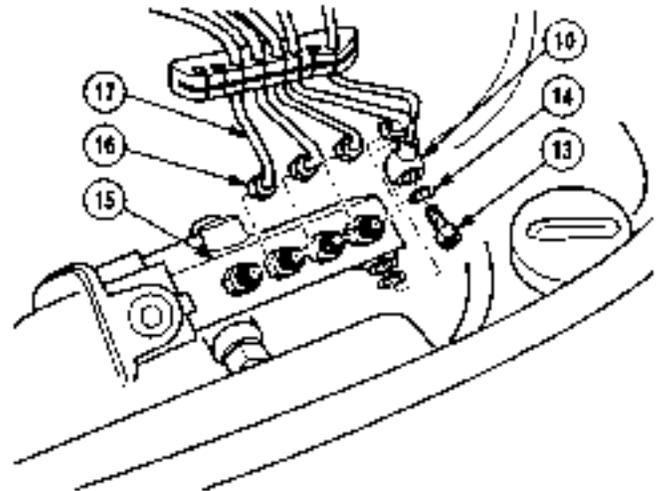
c. Installation.

- (1) Install rubber seal (26) on fuel pipe assembly (17).
- (2) Install two clamps (25), screws (24), lock washers (23), and nuts (22) on fuel pipe assembly (17).
- (3) Position grommet (21) and three grommets (20) on fuel pipe assembly (17).



- (4) Position fuel pipe assembly (19), three grommets (20), and grommet (21) on engine (3).
- (5) Position four fittings (18) on injectors (12) and tighten fittings.

- (6) Install fuel pipe assembly (17) on injection pump (15) and tighten four fittings (16).
- (7) Install fuel return pipe (10), two washers (14), and relief valve (13) on injection pump (15).



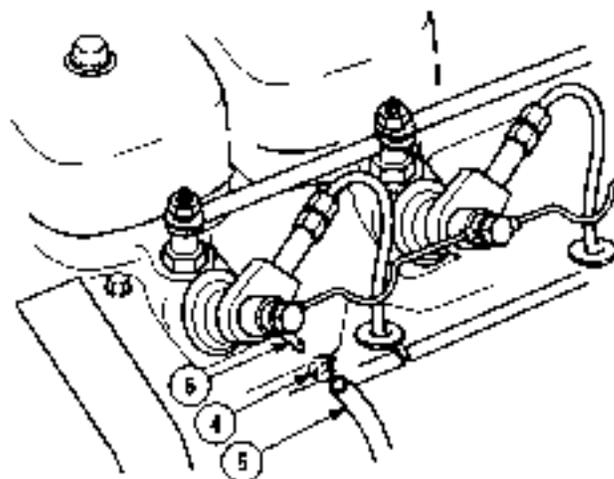
NOTE

One injector line shown installed; all four are installed the same way.

- (8) Install fuel return pipe (11), nipple (6), two fuel return pipes (9 and 10) on injectors (12) with washers (8) and banjo screw (7).

4-5. FUEL PIPE REPLACEMENT (CONT).

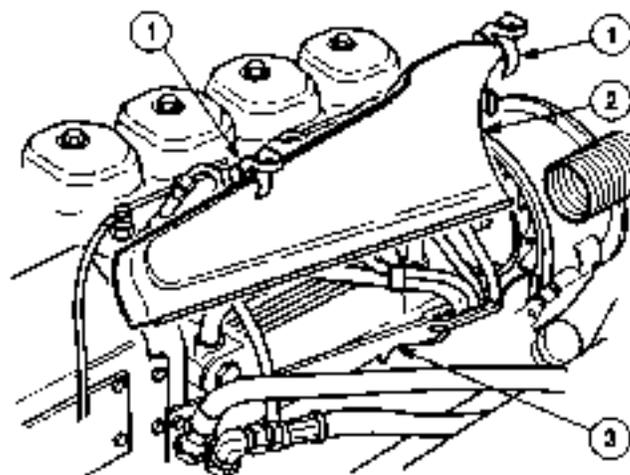
- (9) Install hose (5) and clamp (4) on nipple (6).



- (10) Install cover (2) on engine (3) and lock two latches (1).

NOTE**Follow-on Maintenance:**

- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

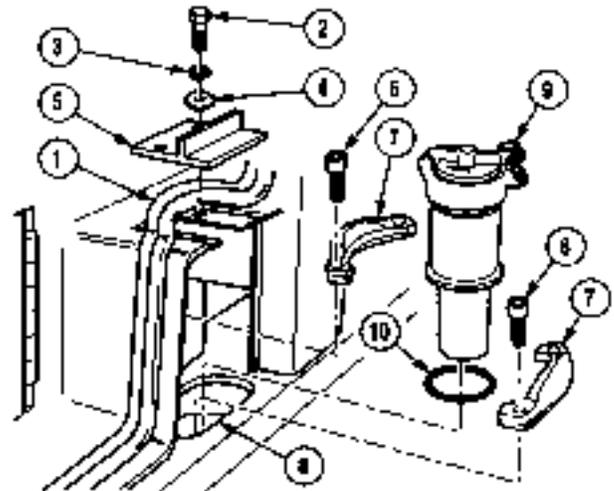
4-6. FUEL FILLER TUBE REPLACEMENT (CONT).

b. *Installation.*

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15 m)**.

- (1) Position seal (10) on fuel filler tube (9).
- (2) Position fuel filler tube (9) in fuel tank (8).
- (3) Install two retainers (7) on fuel tank (8) with four screws (6).
- (4) Install plate (5) with two screws (2), washers (4), and lock washers (3).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, 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.

- (5) Apply adhesive to seal (1).
- (6) Install seal (1) on plate (3).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Remove wheel chocks (TM 3930-669-10).

END OF TASK

4-7. GOVERNOR ADJUSTMENT.

This task covers:

- a. Removal
- b. Adjustment
- c. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)
STE/ICE-R Kit (Item 14, Appendix B)

Materials/Parts

Seal

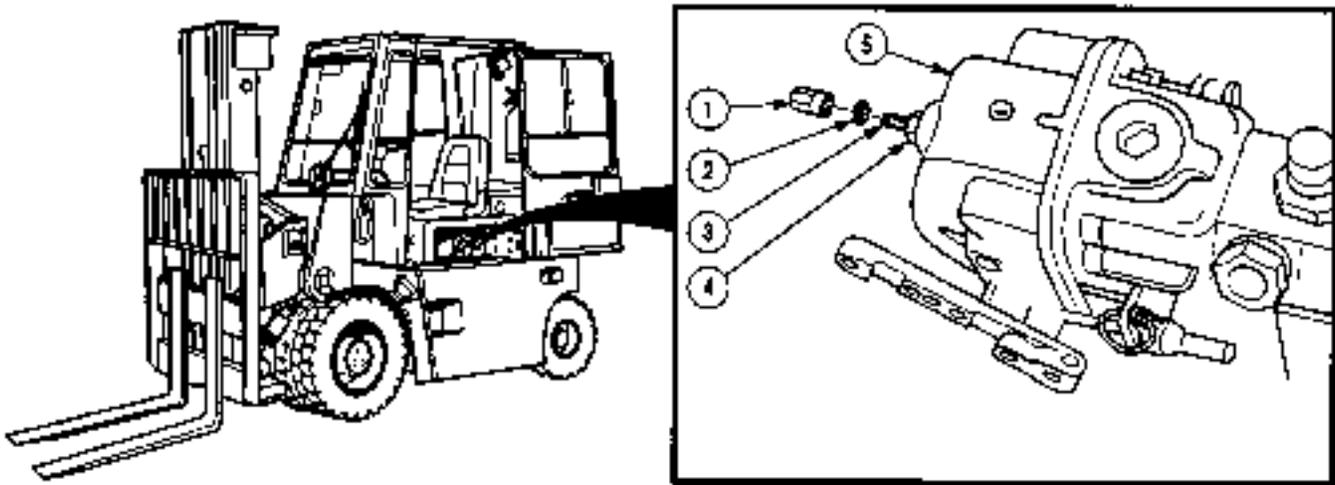
Personnel Required

Two

Equipment Condition

Engine at operating temperature
(TM 10-3930-669-10)
Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Left-hand rear access cover open
(TM 10-3930-669-10)
Cab door open (TM 10-3930-669-10)

a. Removal.



Remove nut (1) and seal (2) from idle adjustment screw (3) and locking nut (4) on governor (5). Discard seal.

4-7. GOVERNOR ADJUSTMENT (CONT).**b. Adjustment.**

- (1) With the aid of an assistant, start engine (TM 10-3930-669-10) and observe engine idle speed on STE/ICE-R.

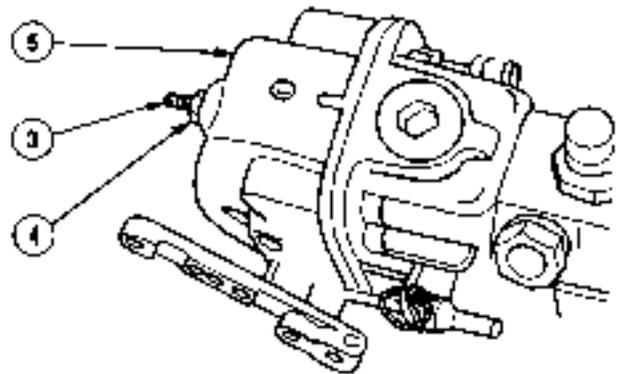
CAUTION

Do not allow engine speed to exceed 2800 RPM. Damage to engine could result.

NOTE

- **If engine idle speed is other than 650-700 RPM, proceed to step (2).**
- **If engine idle speed is 650-700 RPM, proceed to step (5).**

- (2) Holding idle adjustment screw (3) stationary loosen locking nut (4) on governor (5).
- (3) With the aid of an assistant, turn screw (3) to the right or left until the engine idle speed is 650-700 RPM.
- (4) Holding idle adjustment screw (3) stationary, tighten locking nut (4).
- (5) With the aid of an assistant, observe engine idle speed on STE/ICE-R.
- (6) Shut engine OFF (TM 10-3930-669-10).

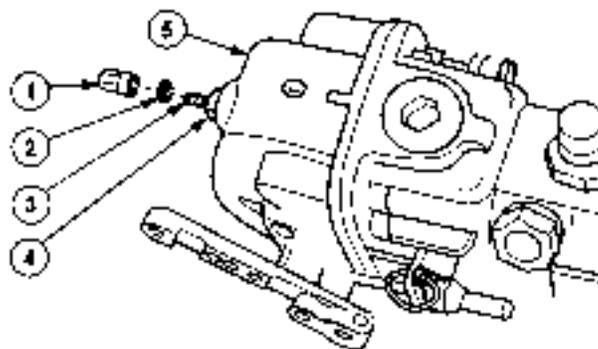


c. Installation.

Install seal (2) and nut (1) on locking nut (4) and screw (3).

NOTE**Follow-on Maintenance:**

- Close cab door (TM 10-3930-669-10).
- Close left-hand rear access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

4-8. FUEL FILTER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

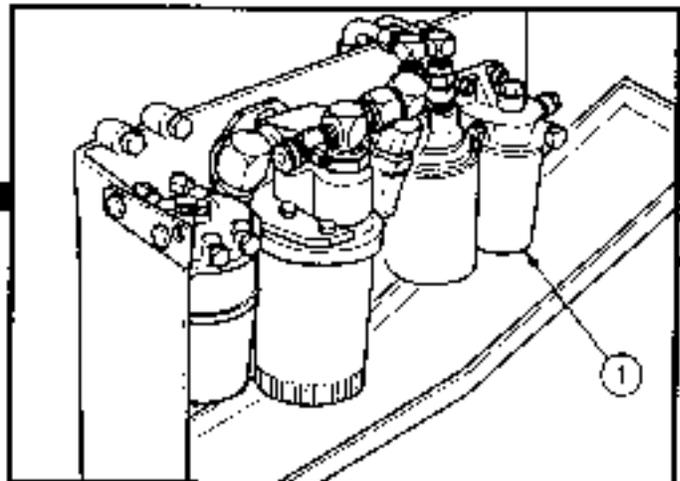
Materials/Parts

Fuel Oil, Diesel (Item 9, Appendix C)
 Rags, Wiping (Item 19, Appendix C)
 Solvent, Drycleaning (Item 20, Appendix C)
 Filter, Fuel
 Packing, Preformed

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)
 Right-hand engine access cover open (TM 10-3930-669-10)
 Batteries disconnected (Para 7-48)

a. Removal.



WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).

(1) Position wiping rags under fuel filter (1) to catch excess fuel.

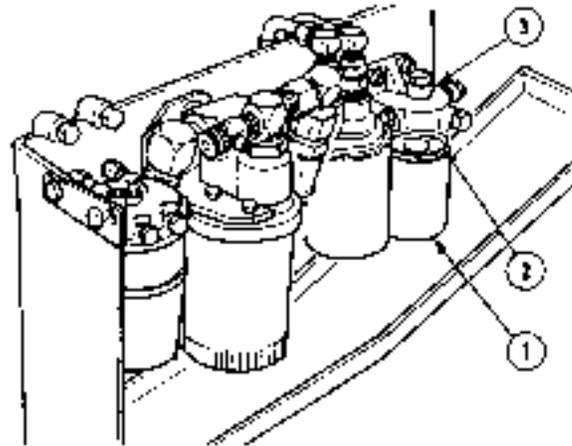
CAUTION

Area around filter must be very clean. Any contaminants entering filter adapter will damage equipment.

- (2) Using wiping rags, clean area around fuel filter (1).
- (3) Remove fuel filter (1) and preformed packing (2) from fuel filter head (3). Discard fuel filter and preformed packing.

b. Installation.

- (1) Fill fuel filter (1) with fuel.
- (2) Coat surface of preformed packing (2) with a light coat of clean fuel.
- (3) Install fuel filter (1) and preformed packing (2) on fuel filter head (3). Tighten fuel filter one-half turn after preformed packing contacts fuel filter mount.
- (4) Remove wiping rags from under fuel filter (1).
- (5) Start engine (TM 10-3930-669-10).

**NOTE**

Run engine for five minutes to allow air to escape from fuel system.

- (6) Shut off engine (TM 10-3930-669-10).

NOTE**Follow-on Maintenance:**

- Connect batteries (Para 7-48).
- Close right-hand engine access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

4-9. FUEL FILTER HEAD REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts (Continued)

Packing, Preformed

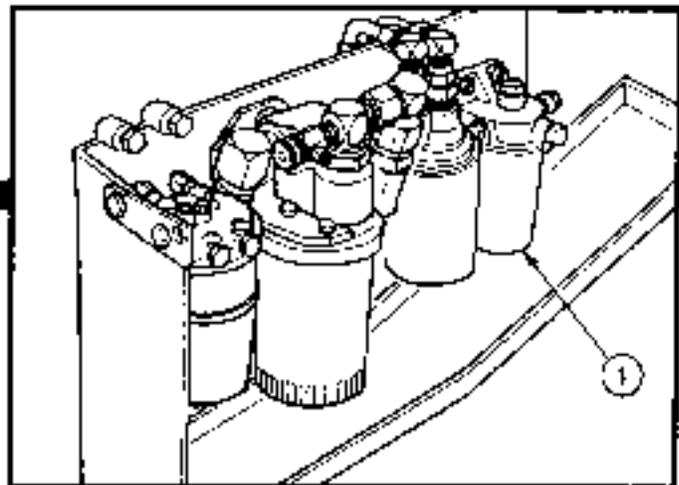
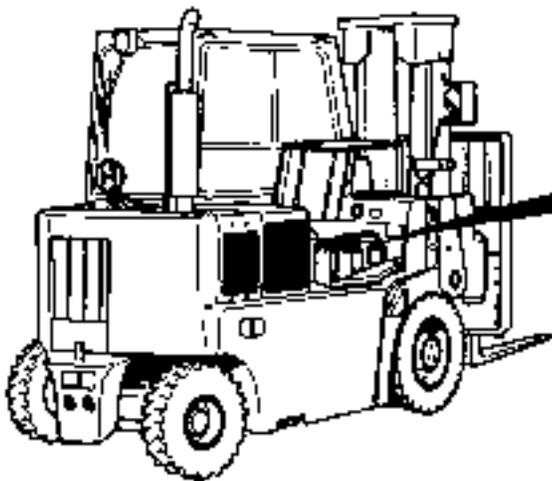
Materials /Parts

Fuel Oil, Diesel (Item 9, Appendix C)
Rags, Wiping (Item 19, Appendix C)
Solvent, Drycleaning (Item 20, Appendix C)
Tags, Identification (Item 21, Appendix C)
Filter, Fuel

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Right-hand engine access cover opened
(TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal



WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).

- (1) Position wiping rags under fuel filter (1) to catch excess fuel.

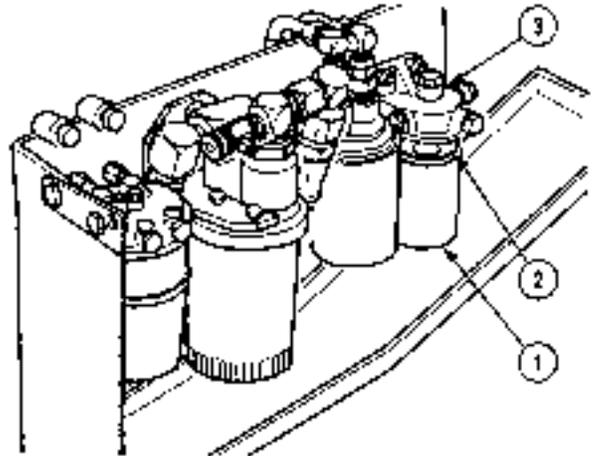
WARNING

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

CAUTION

Area around filter must be very clean. Any contaminants entering filter adapter will damage equipment.

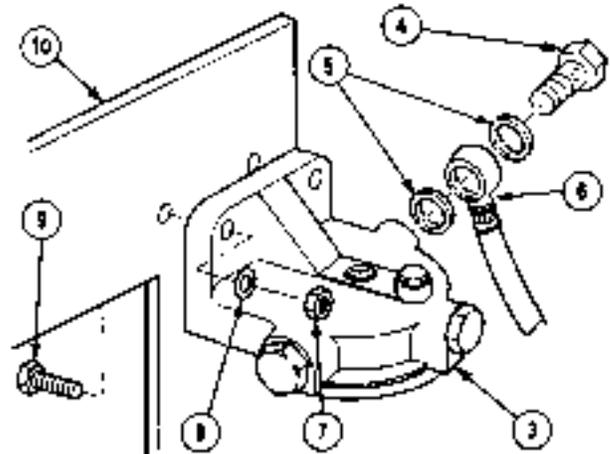
- (2) Using wiping rags, clean area around fuel filter (1).
- (3) Remove fuel filter (1) and preformed packing (2) from fuel filter head (3). Discard filter and preformed packing.



NOTE

Tag and mark fuel hoses prior to removal.

- (4) Remove two screws (4), four washers (5), and two fuel hose (6) from fuel filter head (3).
- (5) Remove two nuts (7), washers (8), screws (9) and fuel filter head (3) from filter tray (10).



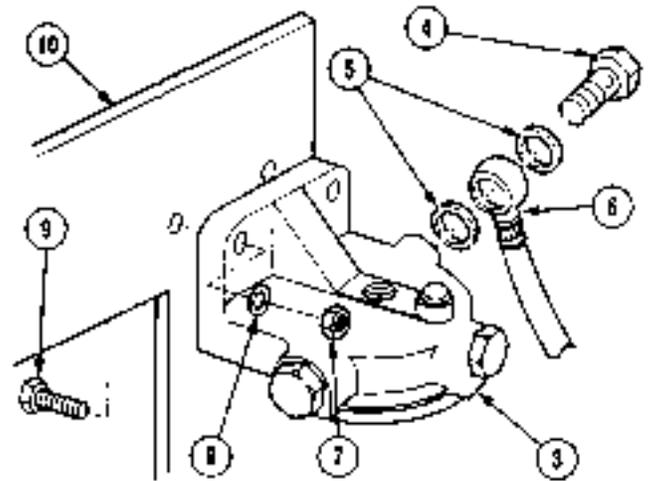
4-9. FUEL FILTER HEAD REPLACEMENT (CONT).**b. Installation.**

- (1) Install fuel filter head (3) on filter tray (10) with two screws (9), washers (8), and nuts (7).

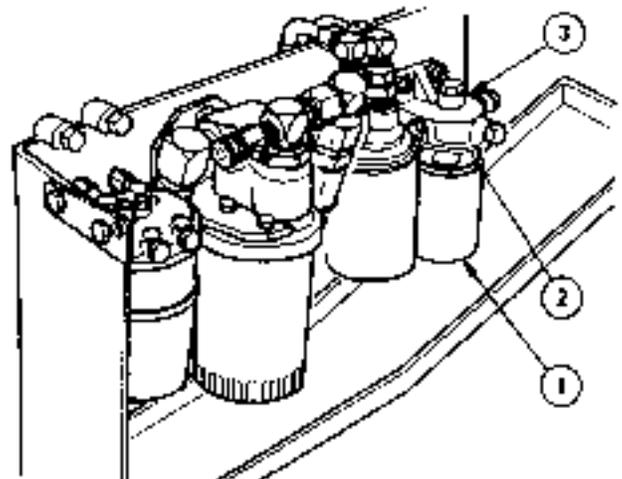
NOTE

Install fuel hoses as tagged during removal.

- (2) Install two fuel hoses (6) on fuel filter head (3) with four washers (5) and two screws (4).



- (3) Fill fuel filter (1) with fuel.
- (4) Coat surface of preformed packing (2) with a light coat of clean fuel.
- (5) Install fuel filter (1) and preformed packing (2) on fuel filter head (3). Tighten fuel filter one-half turn after preformed packing contacts fuel filter head.
- (6) Remove wiping rags from under fuel filter (1).
- (7) Start engine (TM 10-3930-669-10).

**NOTE**

Run engine for five minutes to allow air to escape from fuel system.

- (8) Shut off engine (TM 10-3930-669-10).

NOTE**Follow-on Maintenance:**

- Connect batteries (Para 7-48).
- Close right-hand engine access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

4-10. FUEL/WATER SEPARATOR REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | |

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 3, Appendix B)

Materials/Parts Continued

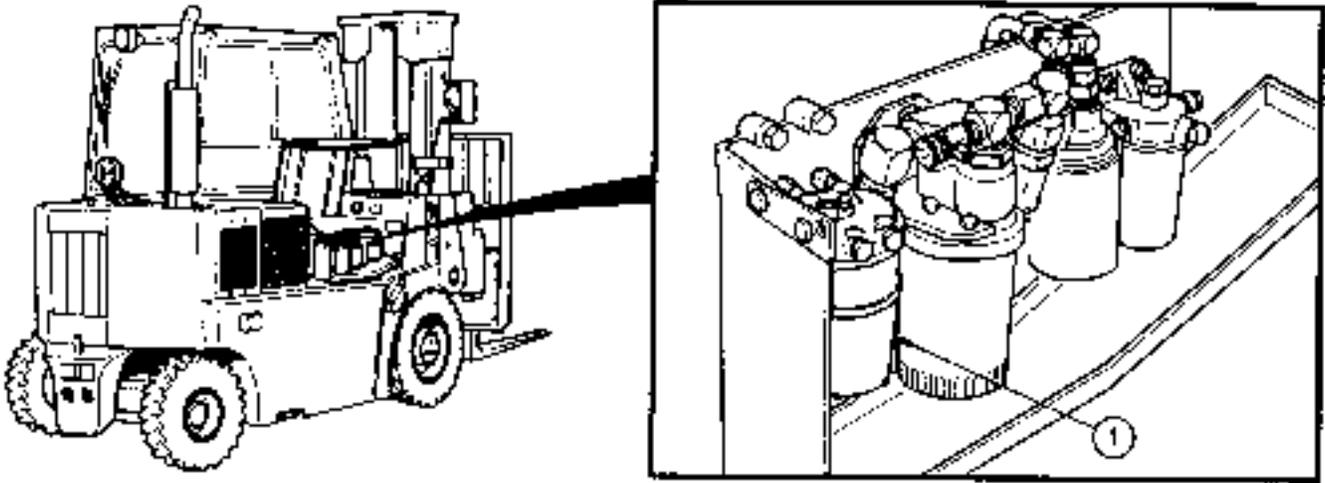
Packing Preformed
Packing, Preformed (2)
Filter

Materials / Parts

Cap and Plug Set (Item 5, Appendix C)
Fuel Oil, Diesel (Item 9, Appendix C)
Rags, Wiping (Item 19, Appendix C)
Solvent, Drycleaning (Item 20, Appendix C)
Tags, Identification (Item 21, Appendix C)
Packing, Preformed
Packing, Preformed
Packing, Preformed

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Right-hand engine access cover opened
(TM 10-3930-669-10)
Fuel/water separator drained
(TM 10-3930-669-10)

4-10. FUEL/WATER SEPARATOR REPLACEMENT/REPAIR (CONT).**a. Removal.****WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15 m)**.

- (1) Position wiping rags under fuel/water separator (1) to catch excess fuel.

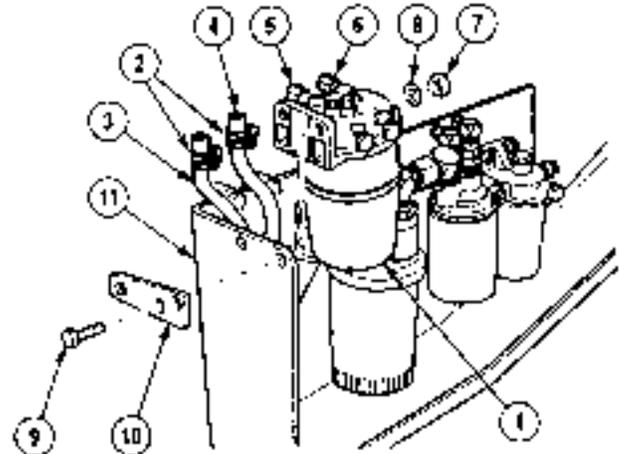
CAUTION

Area around moisture bowl must be very clean. Any contaminants entering fuel/water separator head will damage equipment.

- (2) Using wiping rags, clean area around fuel/water separator (1).

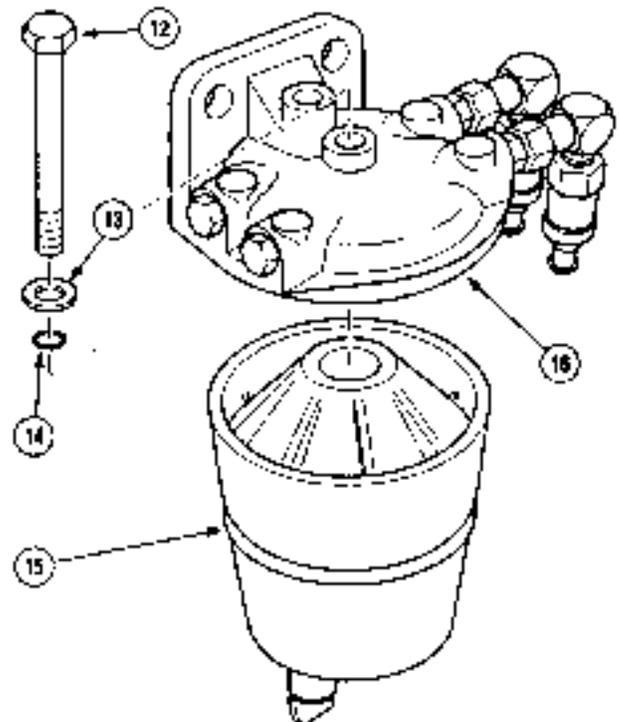
NOTE

- Cap and plug all hoses after removal.
 - Tag and mark all hoses prior to removal.
- (3) Loosen two clamps (2) and remove hoses (3 and 4) from fittings (5 and 6).
 - (4) Remove two nuts (7), washers (8), screws (9), fuel/water separator (1) and, bracket (10) from filter tray (11).



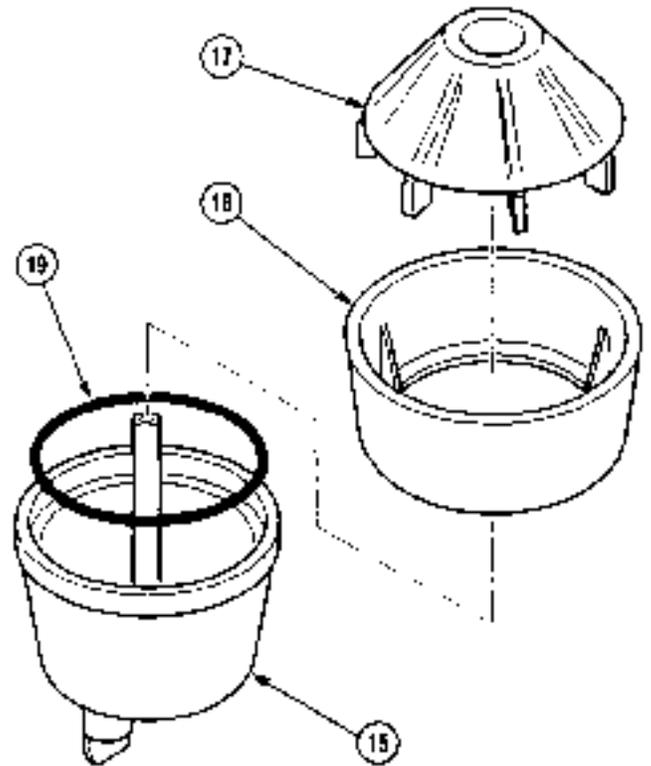
b. Disassembly.

- (1) Remove screw (12), washer (13), preformed packing (14), and fuel container (15) from fuel/water separator head (16). Discard preformed packing.

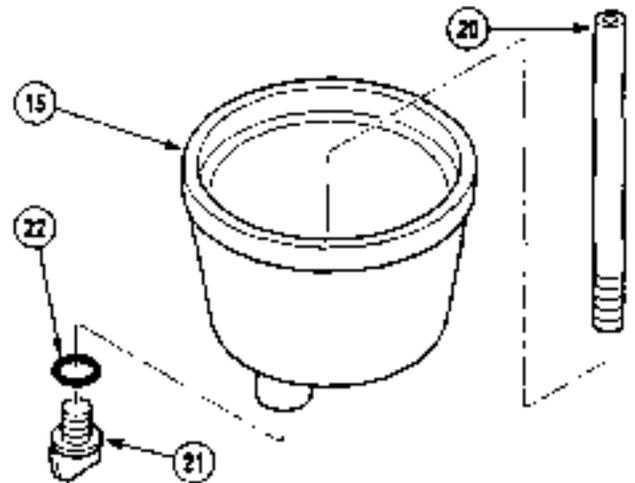


4-10. FUEL/WATER SEPARATOR REPLACEMENT/REPAIR (CONT).

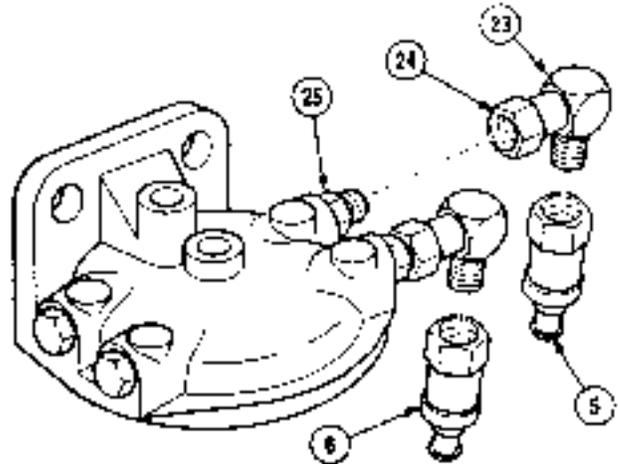
- (2) Remove baffle (17), container section (18), and preformed packing (19) from fuel container (15). Discard preformed packing



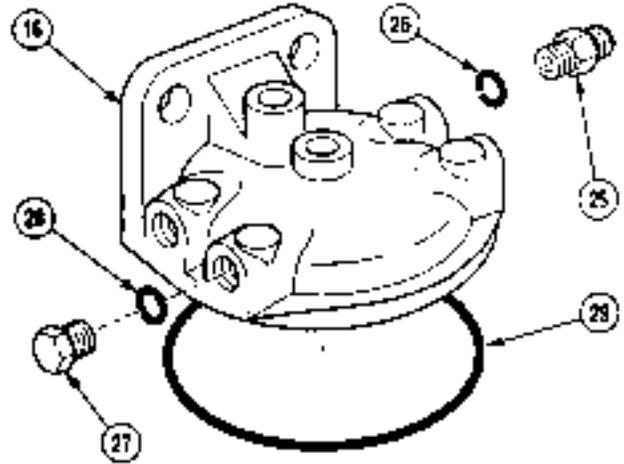
- (3) Remove stud (20), drain plug (21), and preformed packing (22) from fuel container (15). Discard preformed packing.



- (4) Remove two fittings (5 and 6) from fittings (23).
- (5) Loosen two fittings (24) and remove fittings (23) from fittings (25).



- (6) Remove two fittings (25) and preformed packings (26) from fuel/water separator head (16). Discard preformed packings.
- (7) Remove two plugs (27) washers, (28) and preformed packing (29) from fuel/water separator head (16). Discard preformed packing.



4-10. FUELWATER SEPARATOR REPLACEMENT/REPAIR (CONT).

c. *Cleaning/Inspection.*

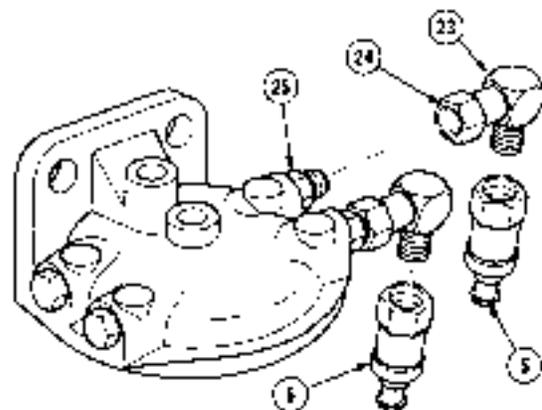
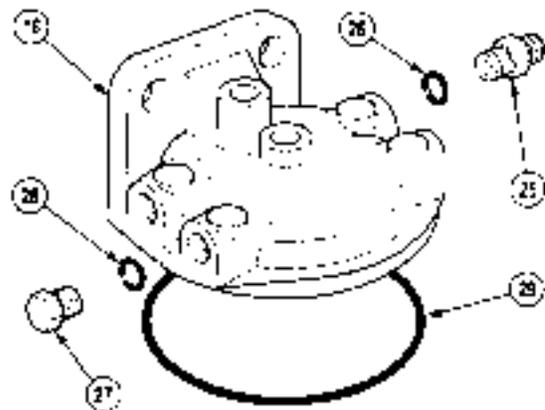
WARNING

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

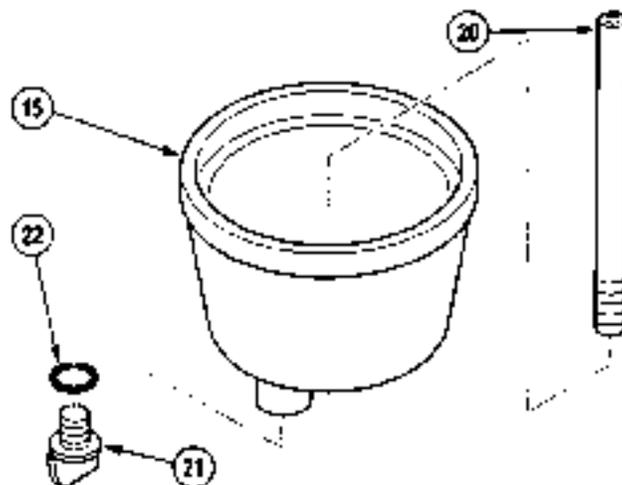
- (1) Use drycleaning solvent and clean wiping rag to clean surface of filter.
- (2) Inspect parts for cracks and damage.
- (3) Replace all damaged parts or notify

d. *Assembly.*

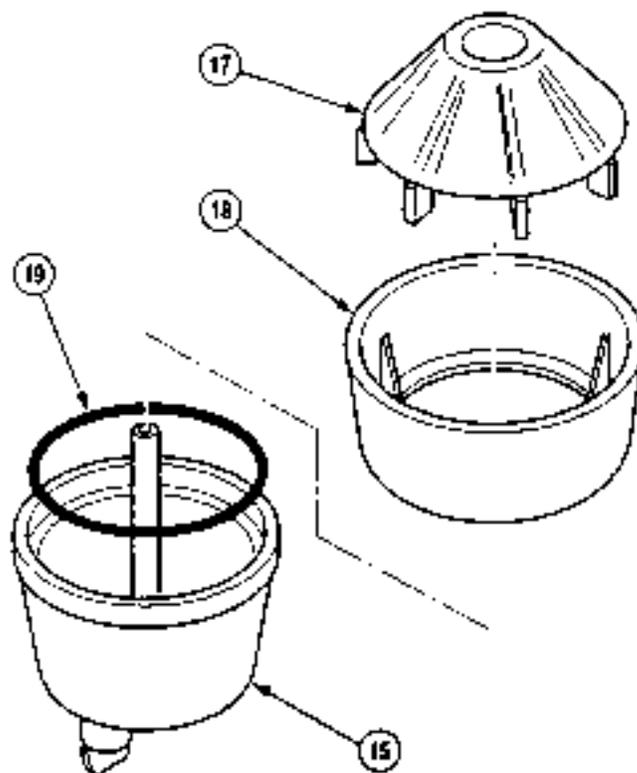
- (1) Install preformed packing (29), two plugs (27), and washers (28) on fuel/water separator head (16).
- (2) Install two fittings (25) and preformed packings (26) on fuel/water separator head (16).
- (3) Install two fittings (23) on fittings (25) and tighten fittings (24).
- (4) Install two fittings (5 and 6) on fittings (23).



- (5) Install stud (20), drain plug (21), and preformed packing (22) on fuel container (15).

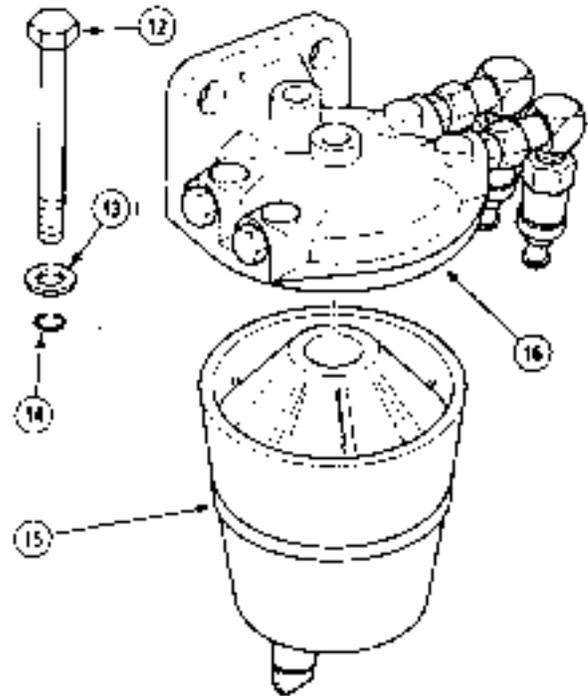


- (6) Install preformed packing (19), container section (18), and baffle (17) on fuel container (15).



4-10. FUEL/WATER SEPARATOR REPLACEMENT/REPAIR (CONT).

- (7) Install fuel container (15) on fuel/water separator head (16) with preformed packing (14), washer (13), and screw (12).



e. Installation.

- (1) Fill fuel/water separator (1) with clean fuel.
- (2) Install bracket (10) and fuel/water separator (1) on filter tray (11) with two screws (9), washers (8), and nuts (7).
- (3) Install two hoses (3 and 4) on fittings (5 and 6) with two clamps (2).
- (4) Remove wiping rags from under fuel/water separator (1).
- (5) Start engine (TM 10-3930-669-10).

NOTE

Run engine for five minutes to allow air to escape from fuel system.

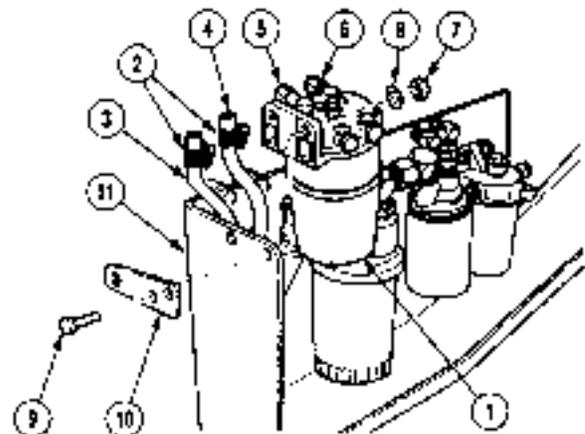
- (6) Shut off engine (TM 10-3930-669-10).

NOTE

Follow-on Maintenance:

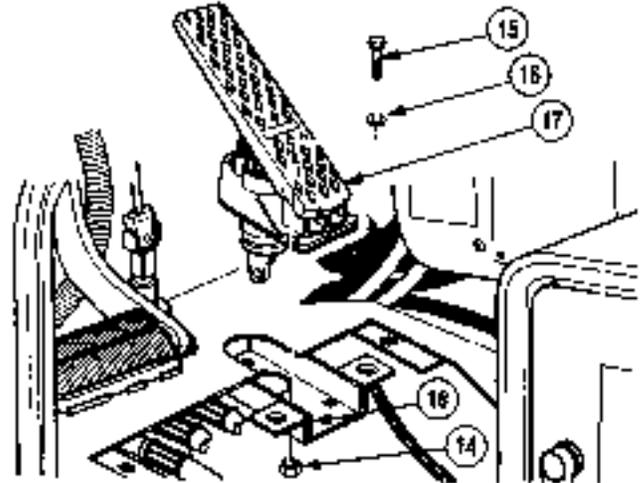
- Close right-hand engine access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



4-11. THROTTLE PEDAL REPLACEMENT (CONT).

- (5) Remove three nuts (14), screws (15), and washers (16) from throttle pedal assembly (17) and floor plate (18).
- (6) Remove throttle pedal assembly (17) from floor plate (18).

**b. Cleaning/Inspection.****WARNING**

- Dry-cleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
 - If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
- (1) Clean all metal parts with dry-cleaning solvent.
 - (2) Inspect all parts for breaks, cracks, burrs, and sharp edges.
 - (3) Replace all damaged parts.

c. Installation.

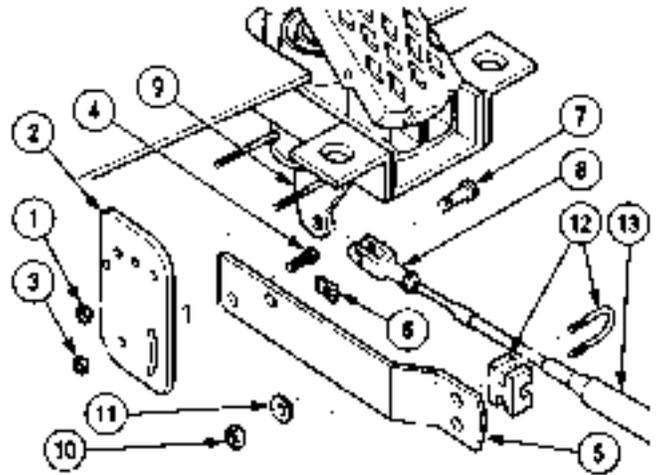
- (1) Install throttle pedal assembly (17) in floor plate (18) with three washers (16), screws (15), and nuts (14). Tighten screw to 7 lb-in (10 N•m).

- (2) Install cable (13) on bracket (5) with clamp (12), two washers (11), and nuts (10).
- (3) Install clevis (8) on throttle bracket (9) with pin (7) and clip (6).
- (4) Install plate (2) on bracket (5) with two screws (4) and nuts (3).
- (5) Install two nuts (1) on plate (2).

NOTE

Follow-on Maintenance:

- Install cab floor plate (Para 15-12).
- Adjust throttle cable (Para 4-12).
- Close cab door (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

4-12. THROTTLE CABLE REPLACEMENT/ADJUSTMENT.

This task covers:

- | | |
|------------------------|-----------------|
| a. Removal | c. Installation |
| b. Cleaning/Inspection | d. Adjustment |

INITIAL SETUP*Tools and Special Tools*

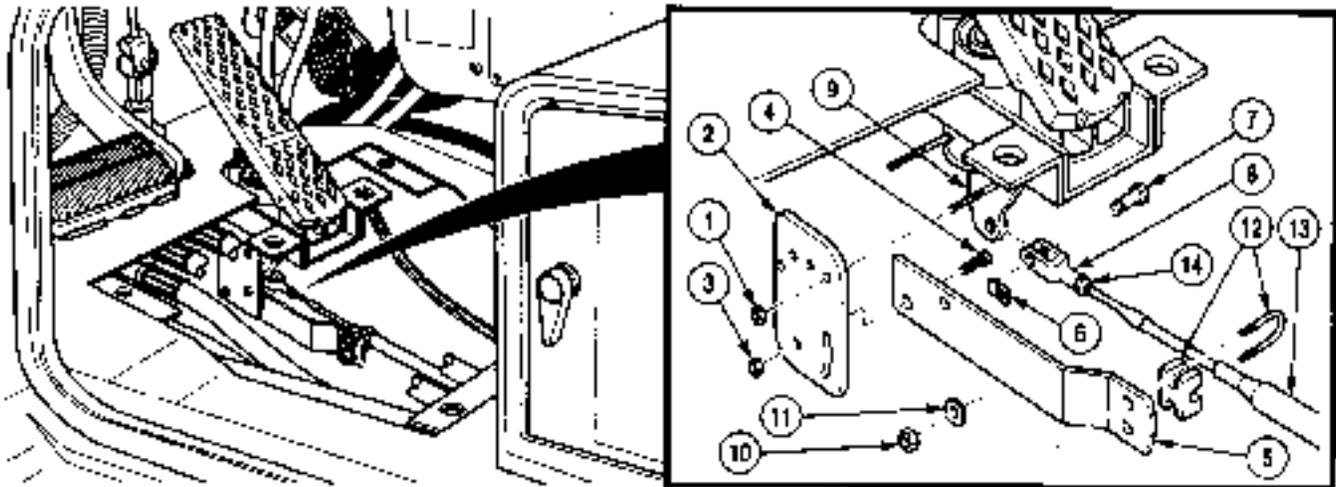
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts

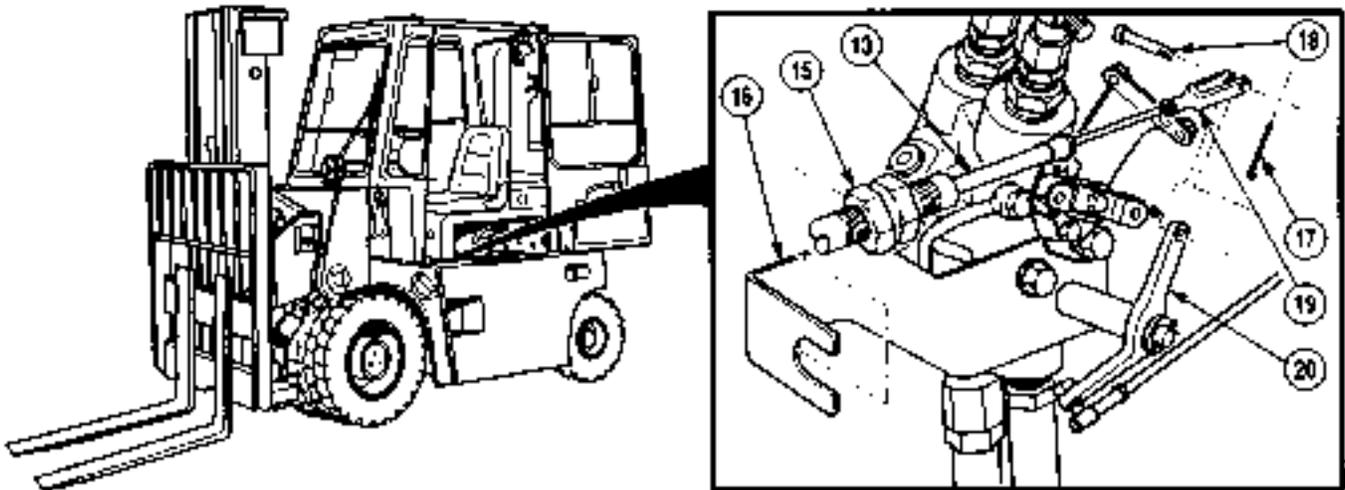
Solvent, Dry-cleaning (Item 20, Appendix C)
Pin, Cotter (1)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door open (TM 10-3930-669-10)
Cab floor plate removed (Para 15-12)

a. Removal.

- (1) Remove two nuts (1) from plate (2).
- (2) Remove two nuts (3), screws (4), and plate (2) from bracket (5).
- (3) Remove clip (6), pin (7), and clevis (8) from throttle bracket (9).
- (4) Remove two nuts (10), washers (11), clamp (12), and cable (13) from bracket (5).
- (5) Loosen locking nut (14).
- (6) Remove clevis (8) and locking nut (14) from cable (13).



- (7) Loosen throttle cable nut (15) and remove cable (13) from bracket (16).
- (8) Remove cotter pin (17), pin (18), and clevis (19) from lever (20). Discard cotter pin.

b. Cleaning/Inspection.

WARNING

- Dry-cleaning solvent (P-D-680) is **TOXIC** and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

- (1) Clean all metal parts with dry-cleaning solvent.
- (2) Inspect all parts for breaks, cracks, burrs, and sharp edges.
- (3) Replace all damaged parts.

c. Installation.

- (1) Install clevis (19) on lever (20) with pin (18) and cotter pin (17).
- (2) Install cable (13) on bracket (16) and tighten throttle cable nut (15).

4-12. THROTTLE CABLE REPLACEMENT/ADJUSTMENT (CONT).

- (3) Position throttle cable nut (14) on cable (13).
- (4) Install clevis (8) on cable (13) with throttle cable nut (14).
- (5) Install cable (13) on bracket (5) with clamp (12), two washers (11), and nuts (10).
- (6) Install clevis (8) on throttle bracket (9) with pin (7) and clip (6).
- (7) Install plate (2) on bracket (5) with two screws (4) and nuts (3).
- (8) Install two nuts (1) on plate (2).

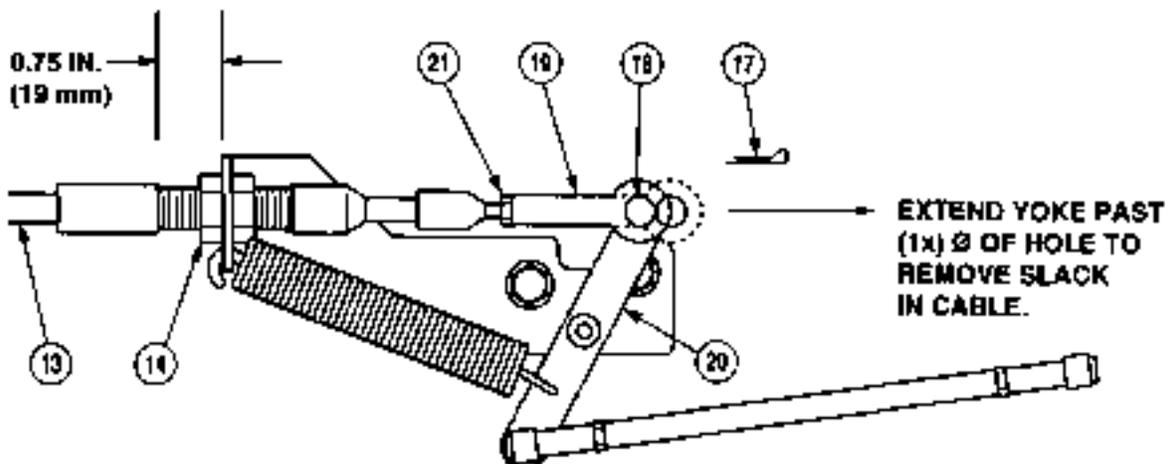
d. Adjustment.

- (1) Adjust cable (13) to obtain .75 inch dimension as shown and tighten throttle cable nut (14).

NOTE

Position clevis end so that the hole is offset of the throttle lever.

- (2) Extend clevis (19) past hole of lever (20) a distance equal to the hole of clevis and tighten nut (21).
- (3) Readjust cable (13) so that clevis (19) hole aligns with lever (20) hole.
- (4) Install clevis (19) on lever (20) with pin (18) and cotter pin (17).



NOTE

Follow-on Maintenance:

- **Install cab floor plate (Para 15-12).**
- **Close cab door (TM 10-3930-669-10).**
- **Remove wheel chocks (TM 10-3930-669-10).**

END OF TASK

4-13. OIL FILTER TRAY REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

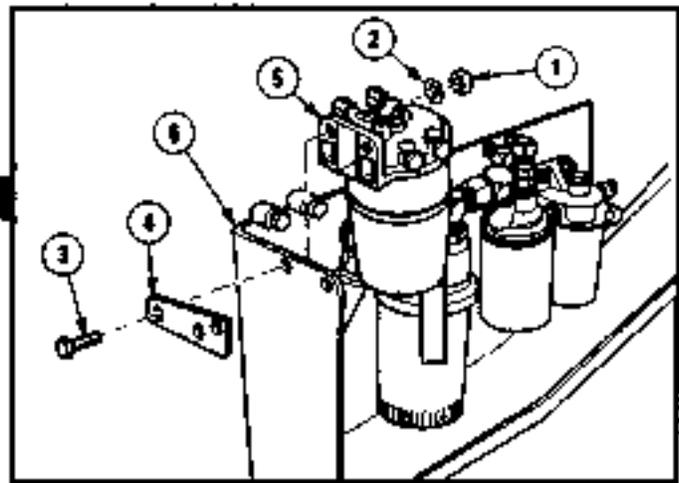
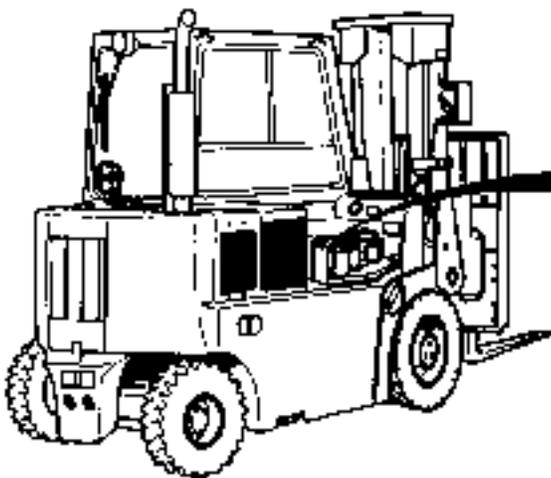
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts

Cap and Plug Set (Item 5, Appendix C)
Tags, Identification (Item 21, Appendix C)
Washer, Lock (2)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Right-hand engine access cover removed (Para 15-8)

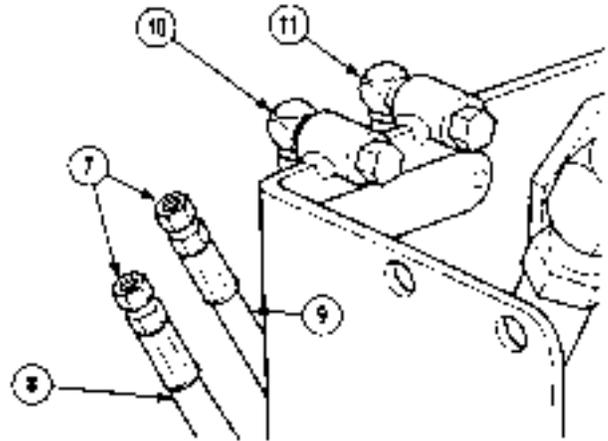
a. Removal.

- (1) Remove two nuts (1), washers (2), screws (3), bracket (4), and fuel/water separator (5) from filter tray (6).
Position fuel/water separator clear of filter tray.

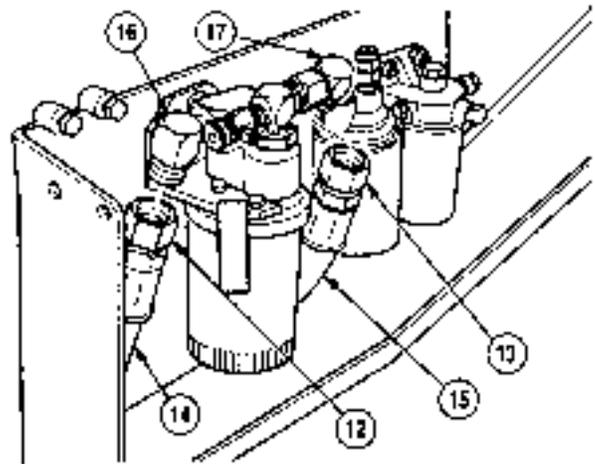
NOTE

- Tag and mark wires and hoses prior to removal.
- Cap and plug all hoses after removal.

(2) Loosen two fittings (7) and remove hoses (8 and 9) from elbows (10 and 11).



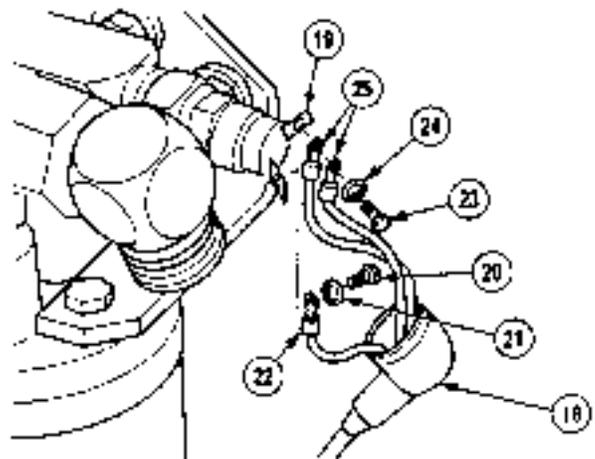
(3) Loosen two fittings (12 and 13) and remove hoses (14 and 15) from elbows (16 and 17).



(4) Remove cap (18) from oil pressure sensor (19).

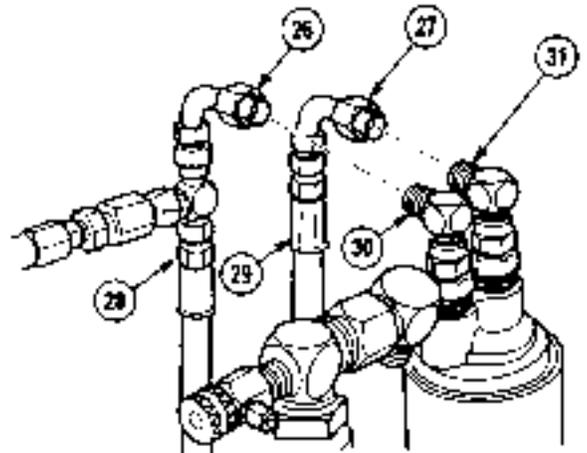
(5) Remove screw (20), lock washer (21), and wire (22) from oil pressure sensor (19).
Discard lock washer.

(6) Remove screw (23), lock washer (24), and two wires (25) from oil pressure sensor (19).
Discard lock washer.

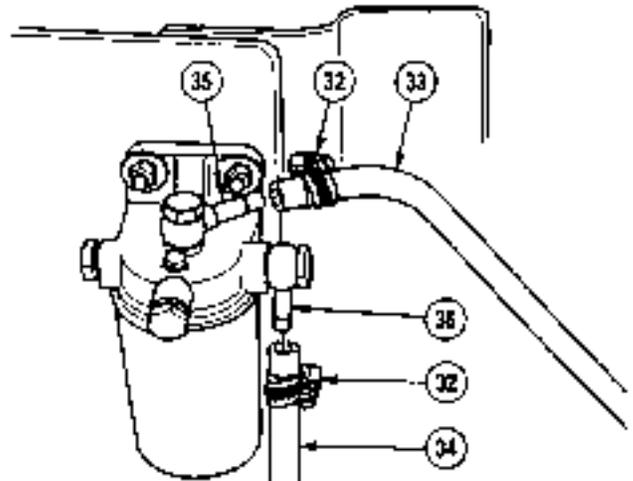


4-13. OIL FILTER TRAY REPLACEMENT (CONT).

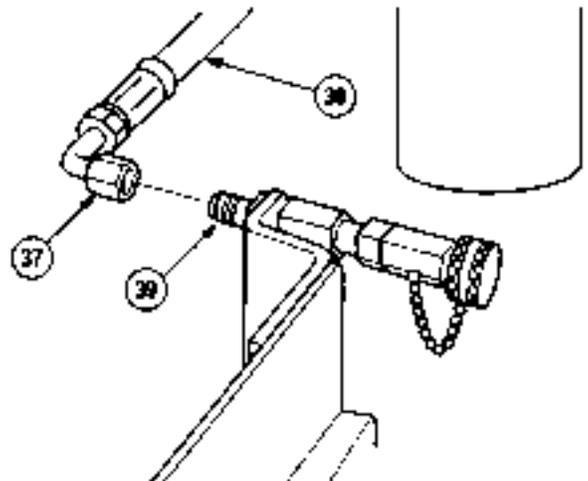
- (7) Loosen two fittings (26 and 27) and remove hoses (28 and 29) from elbows (30 and 31).



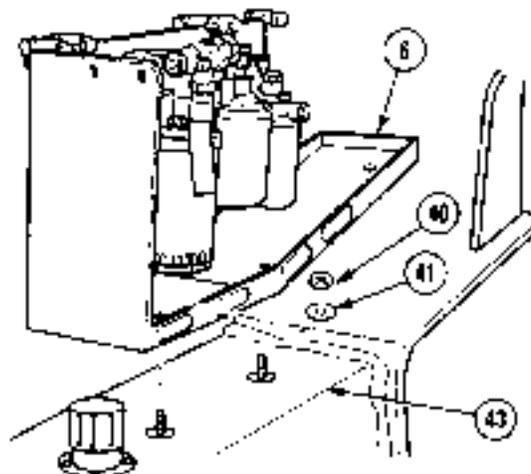
- (8) Loosen two clamps (32) and remove hoses (33 and 34) from fittings (35 and 36).



- (9) Loosen fitting (37) and remove hose (38) from AOAP drain valve (39).

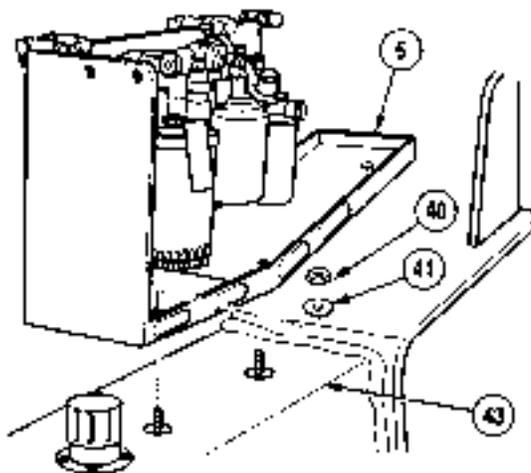


- (10) Remove four nuts (40), washers (41), and filter tray (6) from forklift (43).

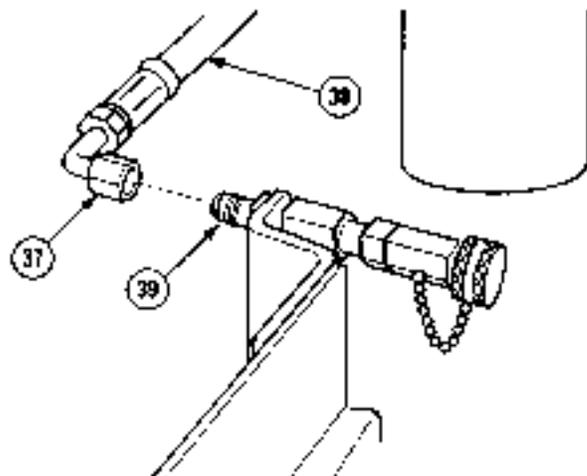


b. Installation.

- (1) Install filter tray (6) on forklift (43) with four washers (41) and nuts (40).

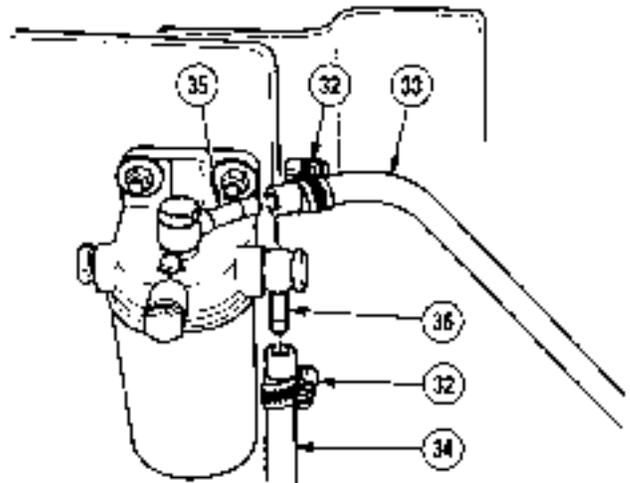


- (2) Install hose (38) on AOAP valve (39) and tighten fitting (37).

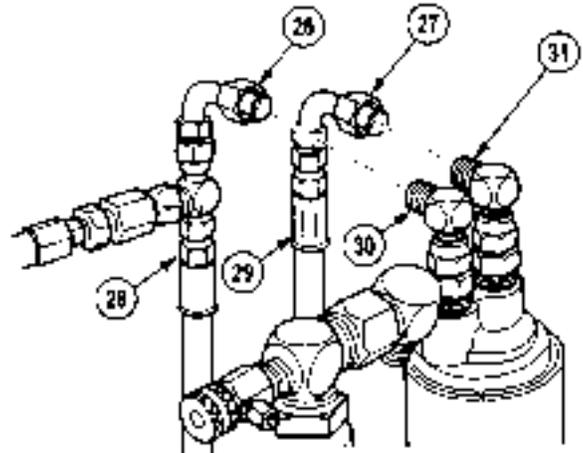


4-13. OIL FILTER TRAY REPLACEMENT (CONT).

- (3) Install two hoses (33 and 34) on fittings (35 and 36) and tighten clamps (32).



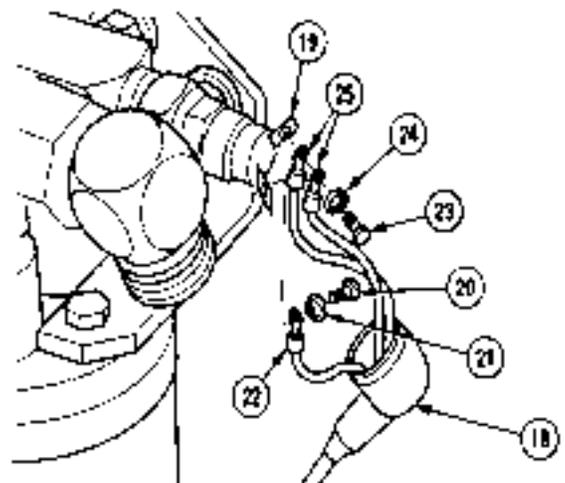
- (4) Install two hoses (28 and 29) on elbows (30 and 31) and tighten fittings (26 and 27).



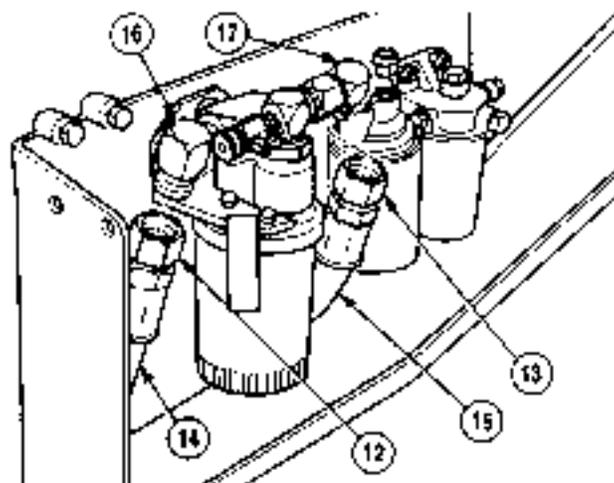
- (5) Install two wires (25) on oil pressure sensor (19) with lock washer (24) and screw (23).

- (6) Install wire (22) on oil pressure sensor (19) with lock washer (21) and screw (20).

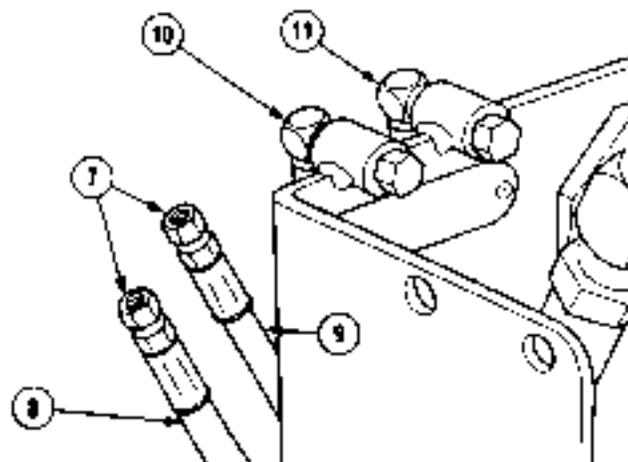
- (7) Position cap (18) on oil pressure sensor (19).



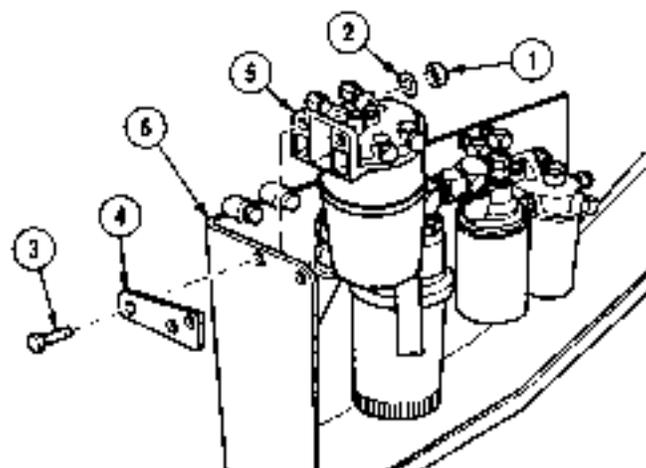
- (8) Install two hoses (14 and 15) on elbows (16 and 17) and tighten fittings (12 and 13).



- (9) Install two hoses (8 and 9) on elbows (10 and 11) and tighten fittings (7).



- (10) Install fuel/water separator (5) and bracket (4) on filter tray (6) with two screws (3), washers (2), and nuts (1).



NOTE

Follow-on Maintenance:

- Install right-hand engine access cover (Para 15-8).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

CHAPTER 5

EXHAUST SYSTEM MAINTENANCE

Para	Contents	Page
5-1	Introduction.....	5-1
5-2	Muffler and Pipe Replacement.....	5-2

5-1. INTRODUCTION.

This chapter contains maintenance instructions for removing, repairing, and installing exhaust system components as authorized by the Maintenance Allocation Chart (MAC) at Unit Maintenance level.

5-2. MUFFLER AND PIPE REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

Personnel Required

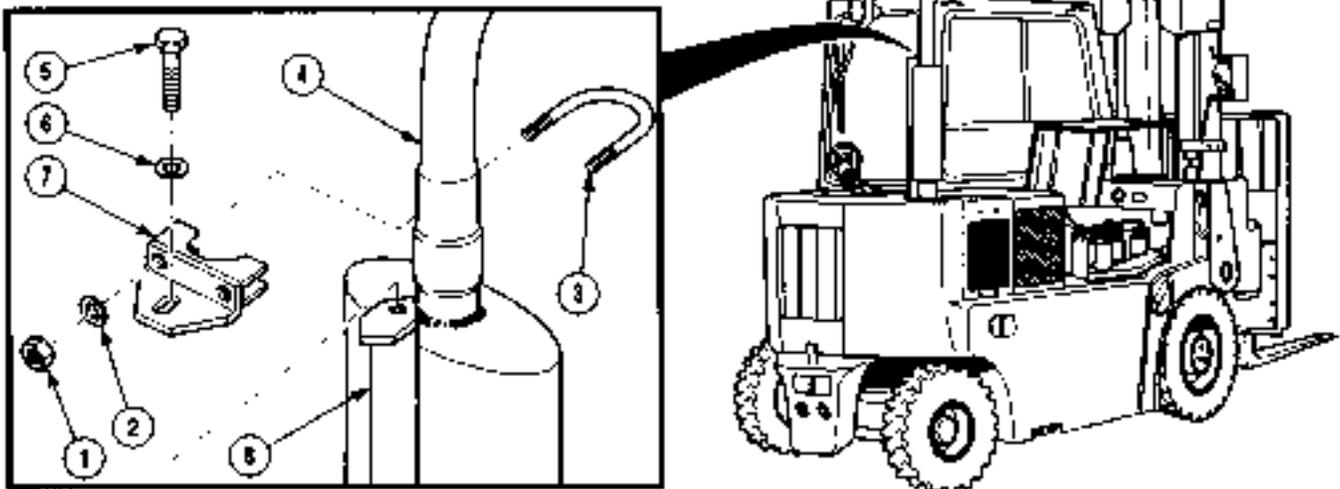
Two

Materials/Parts

Gasket

Equipment Condition

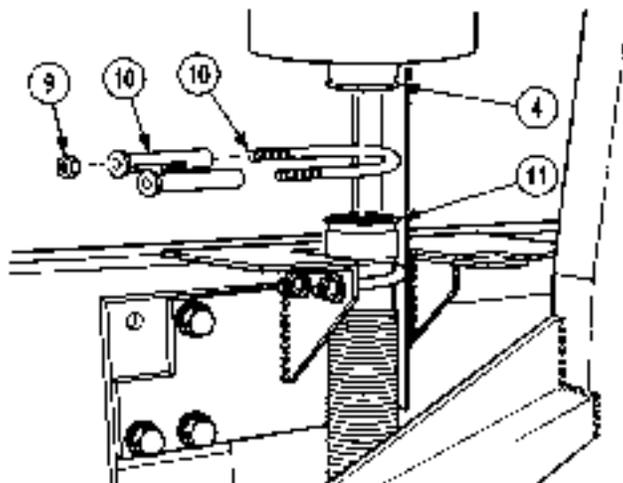
Engine OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)
 Batteries disconnected (Para 7-48)
 Left-hand rear engine access cover removed (Para 15-10)
 Right-hand ventilation panel removed (Para 6-3)
 Engine ventilation panel removed (Para 6-2)

a. Removal.**WARNING**

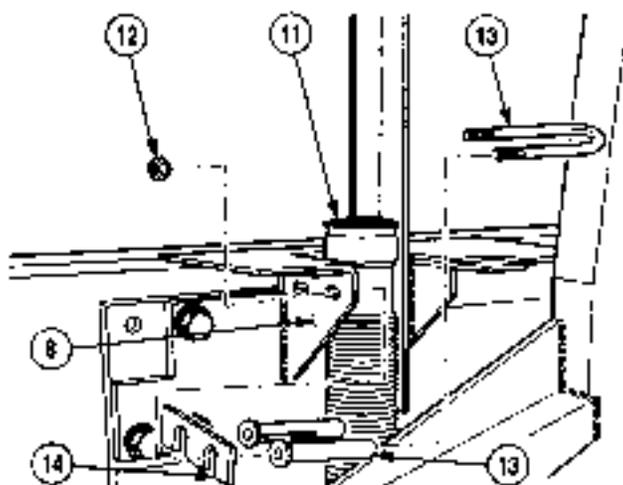
- Allow engine to cool before performing maintenance on the muffler, exhaust pipe, exhaust manifold, or turbocharger. If necessary, use insulated pads and gloves.
- Do not touch hot exhaust system with bare hands; injury to personnel will result.

- (1) Remove two nuts (1), washers (2), and clamp (3) from muffler (4).
 (2) Remove screw (5), washer (6), and bracket (7) from bracket (8).

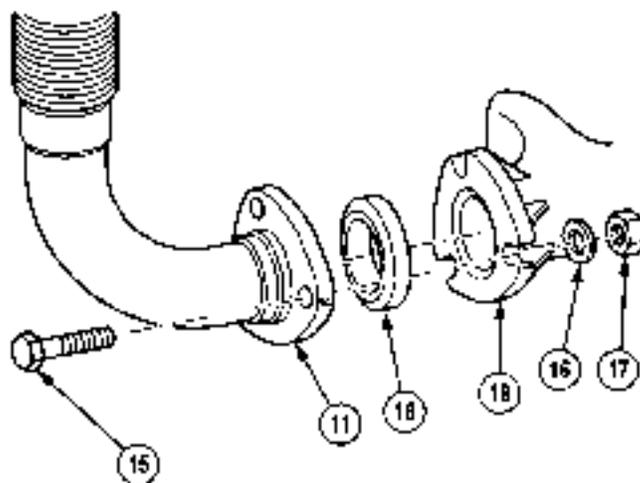
- (3) Remove two nuts (9) and clamp (10), and slide muffler (4) from elbow (11).



- (4) Remove two nuts (12), clamp (13), and shim (14) from bracket (8) and elbow (11).



- (5) Remove three screws (15), washers (16), nuts (17), elbow (11), and gasket (18) from exhaust manifold (19). Discard gasket.

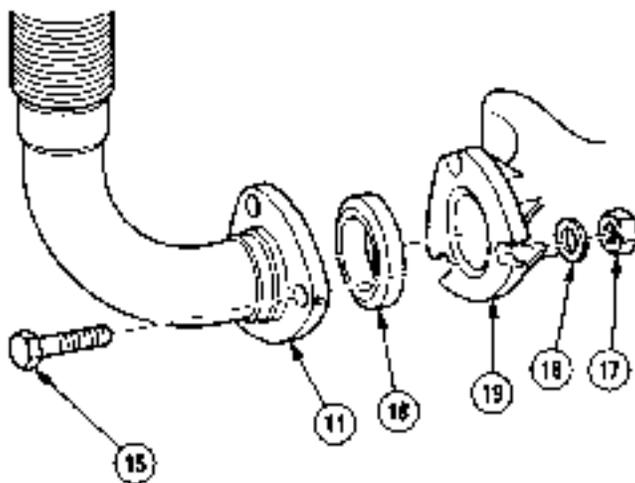
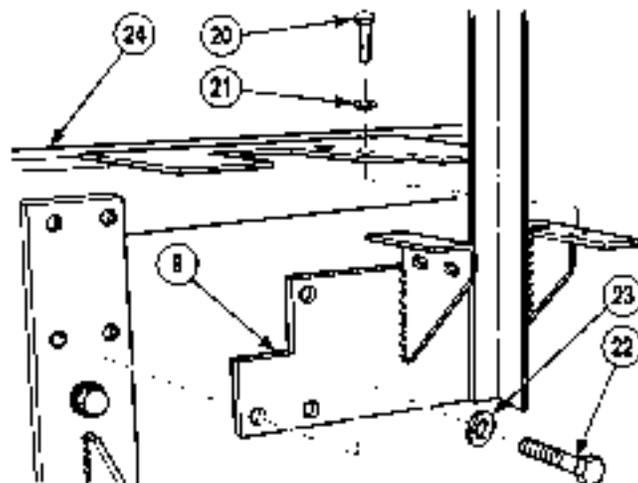


5-2. MUFFLER AND PIPE REPLACEMENT (CONT).

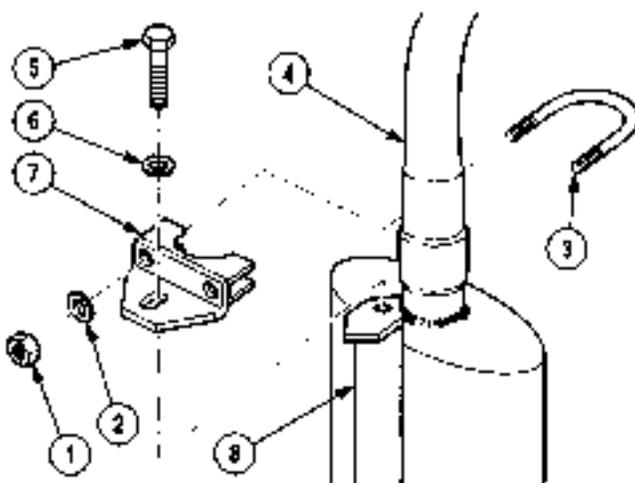
- (6) Remove two screws (20) and washers (21) from bracket (8).
- (7) Remove three screws (22), washers (23), and bracket (8) from fork lift (24).

b. Installation.

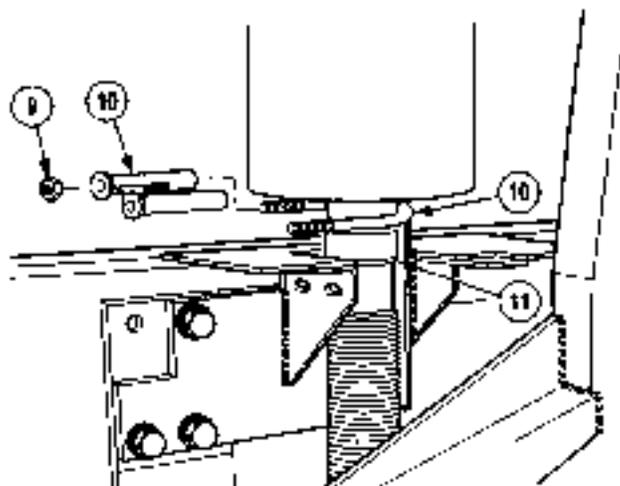
- (1) Install bracket (8) on forklift (24) with three washers (23), screws (22), two washers (21), and screws (20).
- (2) Position gasket (18) and elbow (11) on exhaust manifold (19) and install with three washers (16), screws (15), and nuts (17). Tighten nuts only until gasket is seated.



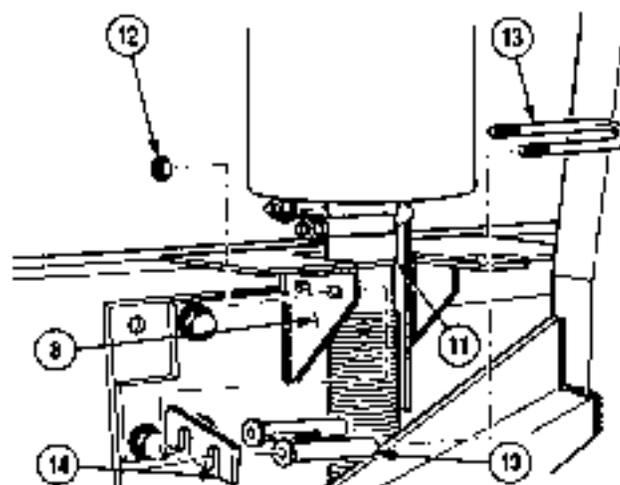
- (3) Install bracket (7) on bracket (8) with washer (6) and screw (5).
- (4) Positioning muffler (4) in elbow (11) install clamp (3) and bracket (7) with two washers (2) and nuts (1).



- (5) Install clamp (10) on elbow (11) and secure with two nuts (9) and clamp (10).
- (6) Position piping assembly so that no strain is evident at elbow (11). Tighten nuts (9).



- (7) Install clamp (13) on elbow (11) and bracket (8) with shim (14) and nuts (12).



NOTE

Follow-on Maintenance:

- Install engine ventilation panel (Para 6-2).
- Install right-hand ventilation panel (Para 6-3).
- Install left-hand rear engine access cover removed (Para 15-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

CHAPTER 6

COOLING SYSTEM MAINTENANCE

Para	Contents	Page
6-1	Introduction.....	6-1
6-2	Engine Ventilation Panel Replacement.....	6-2
6-3	Right-Hand Ventilation Panel Replacement.....	6-4
6-4	Blower Replacement.....	6-5
6-5	Blower Belt Replacement.....	6-11
6-6	Blower Belt Tensioner Replacement.....	6-13

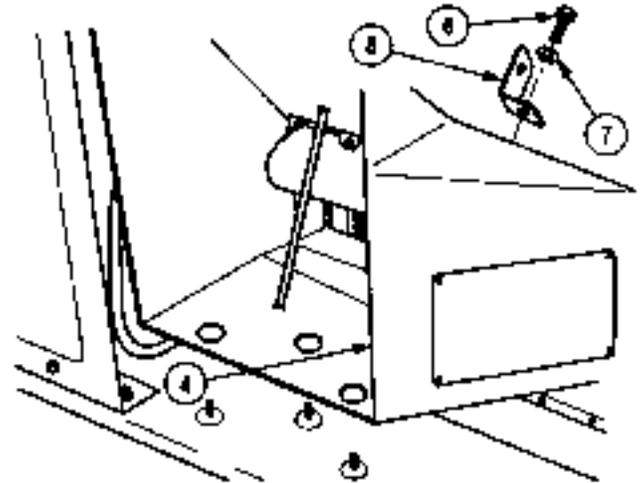
6-1. INTRODUCTION.

This chapter contains maintenance instructions for removing, adjusting, servicing, and installing cooling system components as authorized by the Maintenance Allocation Chart (MAC) at Unit Maintenance level.

- (3) If damaged, remove screw (6), washer (7), and bracket (8) from engine ventilation panel (4).

b. Installation.

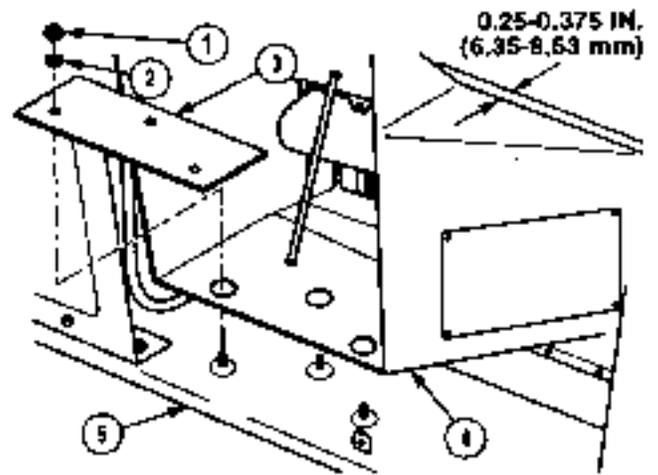
- (1) If removed, install bracket (8) on engine ventilation panel (4) with washer (7) and screw (6).



CAUTION

Make sure gap is maintained between engine ventilation panel and engine. Failure to maintain proper gap may result in vibration and cause damage to equipment.

- (2) Position ventilation panel (4) on forklift (5) so that 1/4 - 3/8 in. (6.35 - 9.53 mm) gap exists between engine ventilation panel and engine.
- (3) Install plate (3), three washers (2), and nuts (1) on engine ventilation panel (4).



NOTE

Follow-on Maintenance:

- Right-hand engine access cover closed (TM 10-3930-660-10).
- Right-hand ventilation panel installed (Para 6-3).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

6-3. RIGHT-HAND VENTILATION PANEL REPLACEMENT.

This task covers:

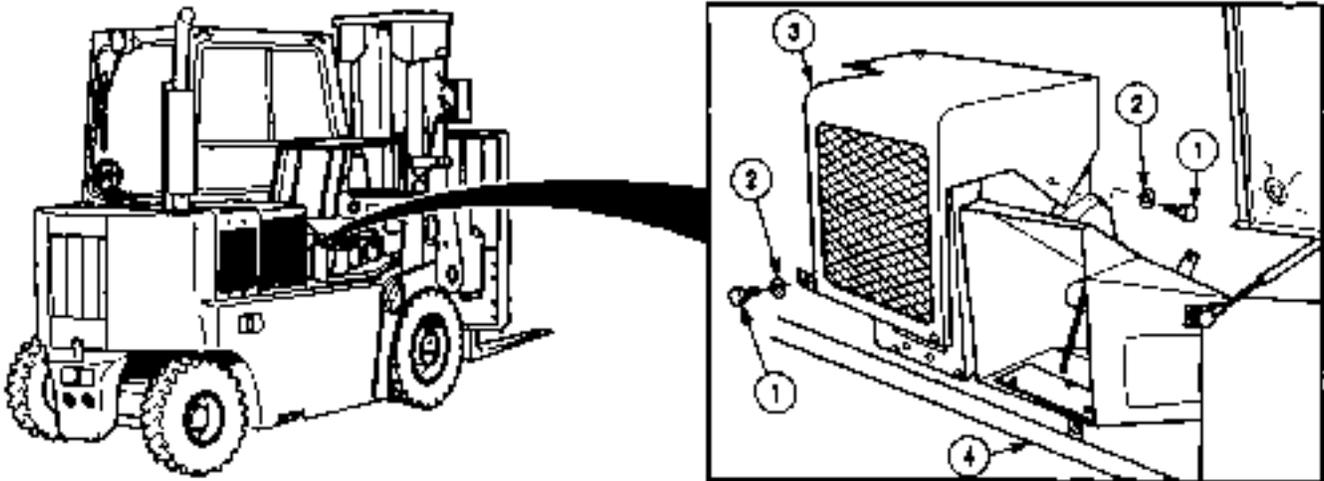
- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)
 Right-hand engine access cover opened (TM 10-3930-669-10)

a. Removal.

- (1) Remove five screws (1), washers (2), and ventilation panel (3) from forklift (4).

b. Installation.

- (1) Install ventilation panel (3) on forklift (4) with five washers (2) and screws (1).

NOTE**Follow-on Maintenance:**

- Close right-hand engine access cover (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

6-4. BLOWER REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

Materials/Parts

Ties, Cable (Item 4, Appendix C)
 Rags, Wiping (Item 19, Appendix C)
 Solvent, Drycleaning (Item 20, Appendix C)

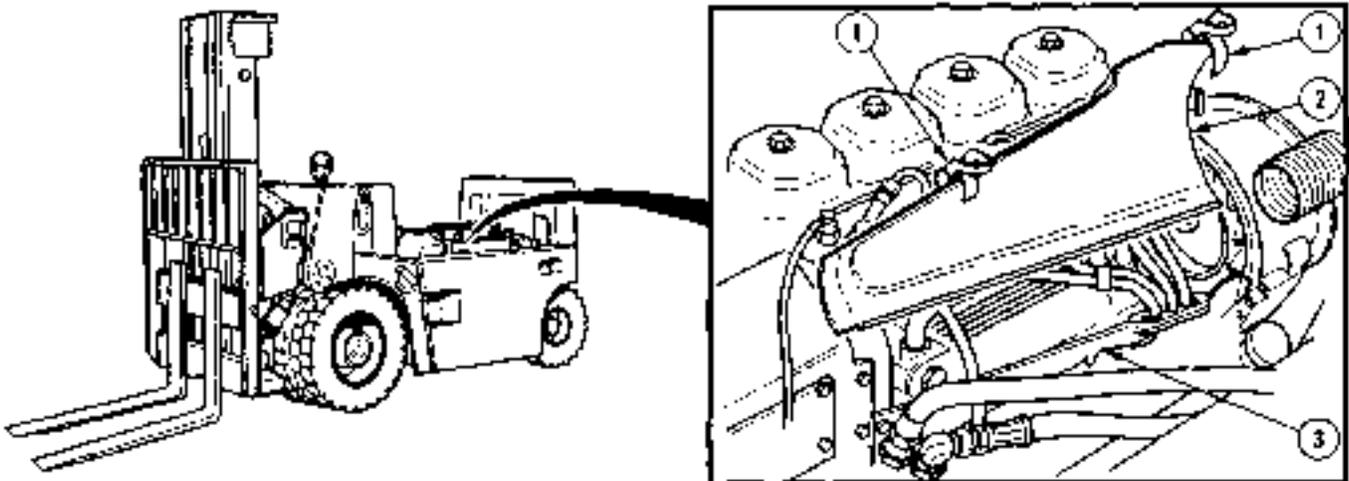
Materials/Parts Continued

Washer, Lock
 Washer, Lock
 Washer, Lock (2)

Equipment Condition

Cab removed (Para 15-2)

a. Removal.



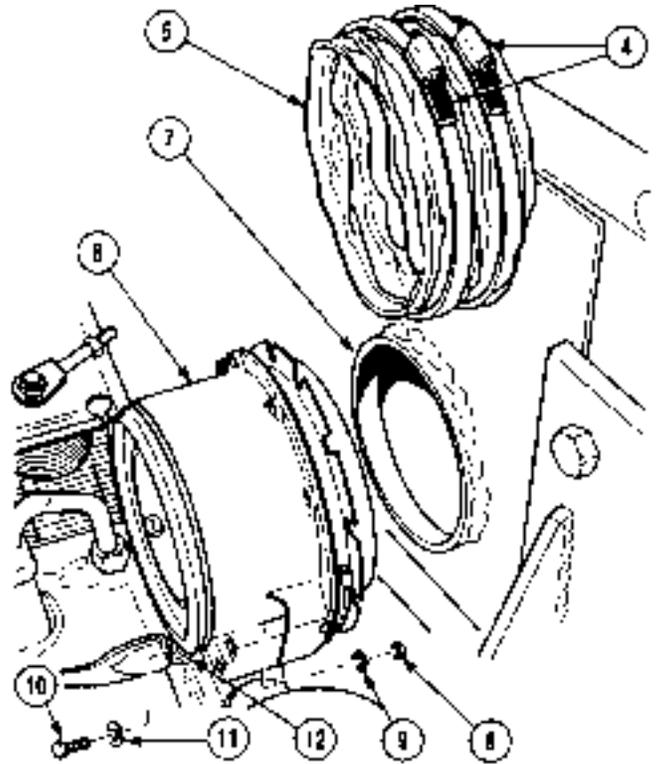
NOTE

Remove cable ties as necessary.

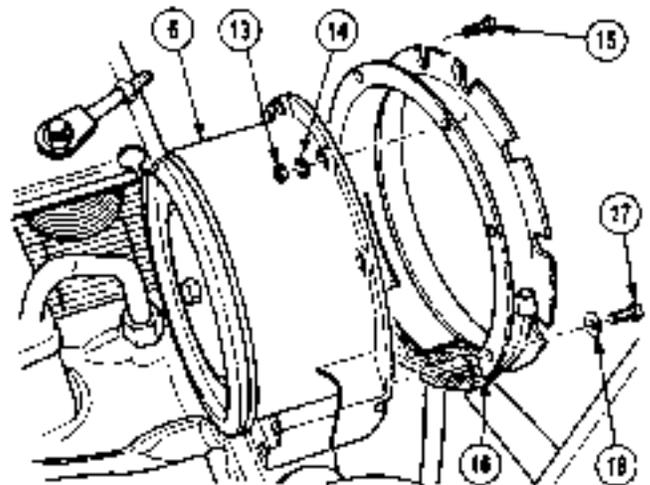
- (1) Unlock two latches (1) and remove cover (2) from engine (3).

6-4. BLOWER REPLACEMENT (CONT).

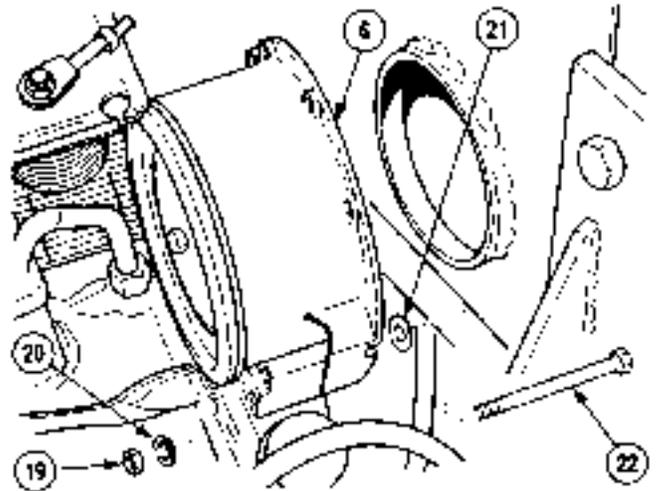
- (2) Remove two clamps (4) and hose (5) from blower (6) and plate (7).
- (3) Remove nut (8), lockwasher (9), screw (10), and washer (11) from blower (6) and base ducting (12). Discard lockwasher.



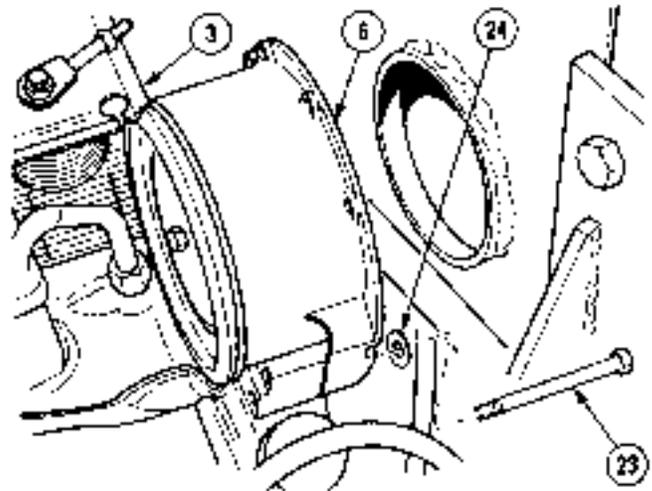
- (4) Remove two nuts (13), lock washers (14), and screws (15), from air feed (16) and blower (6). Discard lock washers.
- (5) Remove screw (17), washer (18), and air feed (16) from blower (6).



- (6) Remove nut (19), lock washer (20), washer (21), and screw (22) from blower (6). Discard lock washer.



- (7) Remove three screws (23), washers (24), and blower (6) from engine (3).



b. Cleaning/Inspection.

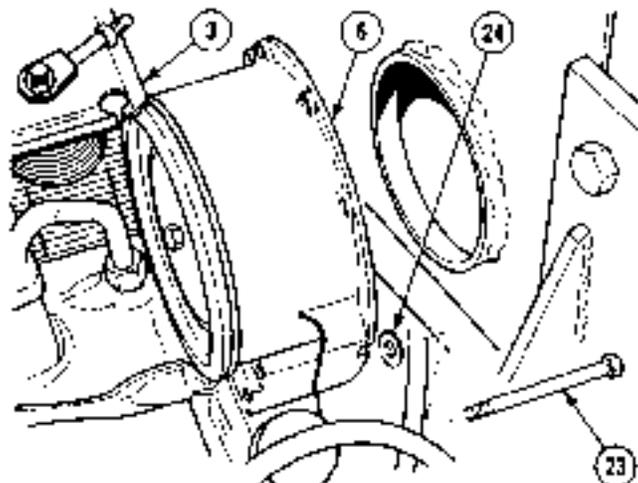
WARNING

- **Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**

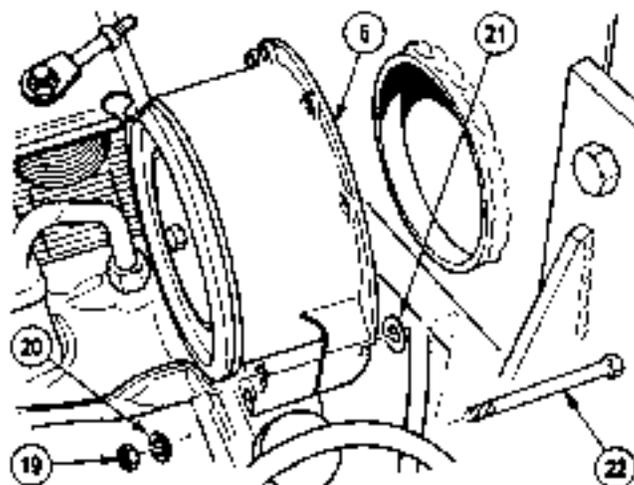
- (1) Clean all metal parts with drycleaning solvent.
- (2) Dry all parts with wiping rags.
- (3) Inspect all parts for breaks, cracks, burrs, and sharp edges.
- (4) Replace all damaged parts.

6-4. BLOWER REPLACEMENT (CONT).**c. Installation.**

- (1) Install blower (6) on engine (3) with three washers (24) and screws (23).

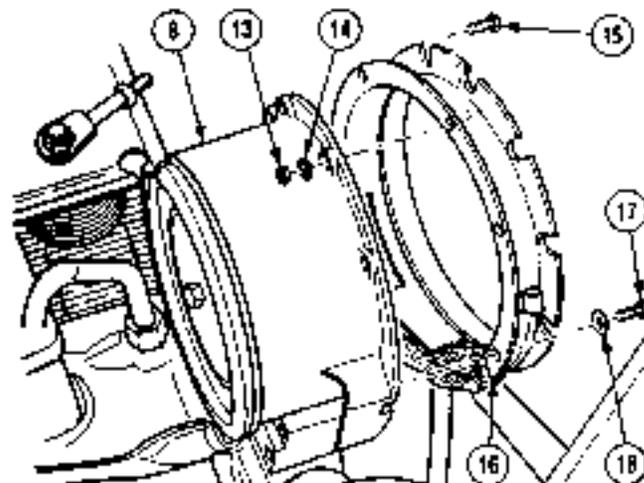


- (2) Install washers (21), screw (22), lock washer (20), and nut (19) on blower (6).



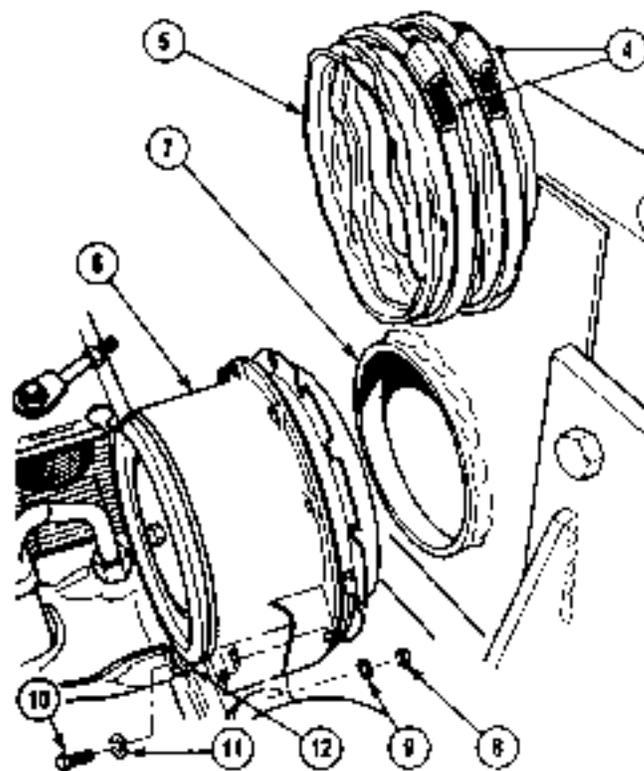
(3) Install air feed (16) on blower (6) with washer (18) and screw (17).

(4) Install two screws (15), lock washers (14), and nuts (13) on blower (6) and air feed (16).



(5) Install washer (11), screw (10), lock washer (9), and nut (8) on base ducting (12) and blower (6).

(6) Install hose (5) and two clamps (4) on blower (6) and plate (7).

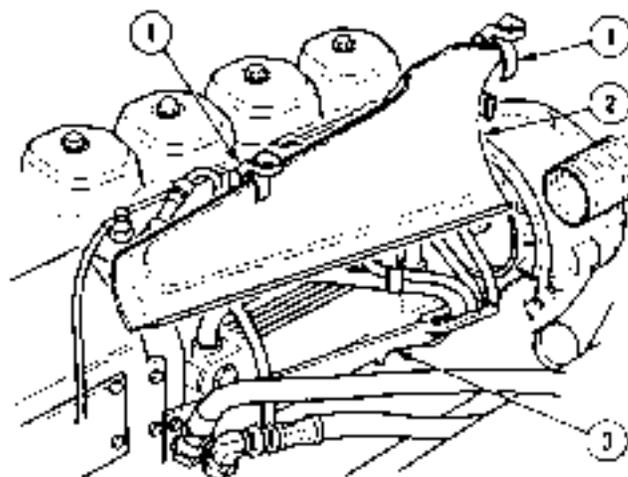


6-4. BLOWER REPLACEMENT (CONT).

- (7) Replace cover (2) on engine (3) and lock two latches (1).

NOTE**Follow-on Maintenance:**

- Install cab (Para 15-2).

END OF TASK

6-5. BLOWER BELT REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

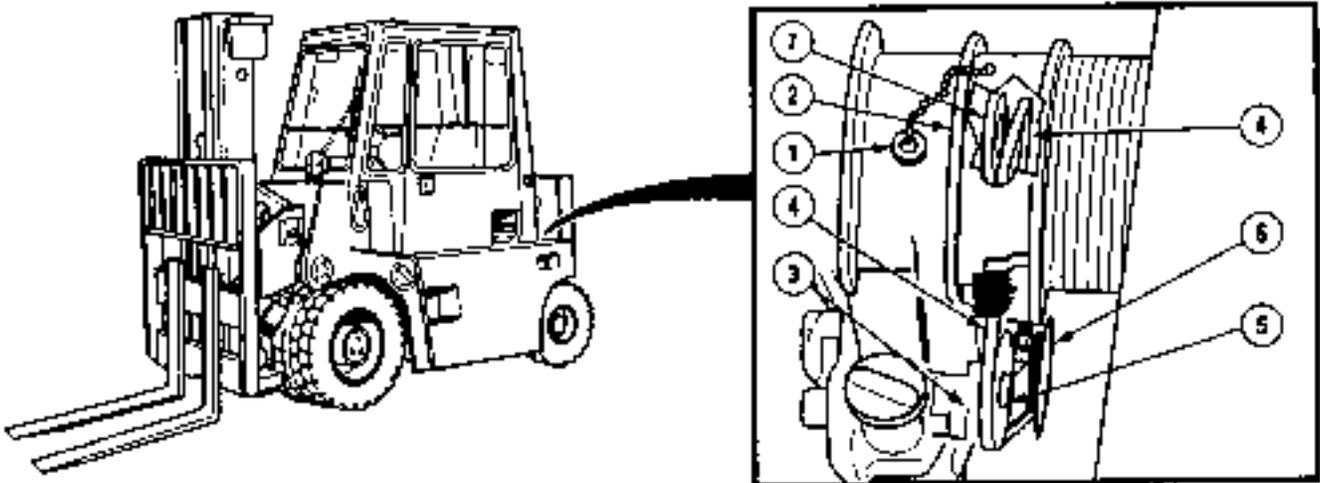
Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

Materials/Parts

Belt, Blower

Equipment Condition

Engine OFF (TM 10-3930-669-10)
 Parking brake applied (TM 10-3930-669-10)
 Wheels chocked (TM 10-3930-669-10)
 Batteries disconnected (Para 7-48)
 Alternator belt removed (Para 7-4)

a. Removal.**WARNING**

Allow engine to cool before performing maintenance. Severe injury to personnel may result.

- (1) Remove view hole cap (1) from blower (2).
- (2) Using prybar, push in on tensioner (3) and remove belt (4) from tensioner pulley (5).
- (3) Remove belt (4) from crank pulley (6).
- (4) Remove belt (4) from blower pulley (7) and pull through slot in bottom of blower (2).

6-5. BLOWER BELT REPLACEMENT (CONT).**b. Installation.**

- (1) Install belt (4) up through slot in bottom of blower (2) and on blower pulley (7).
- (2) Install belt (4) on crank pulley (6).

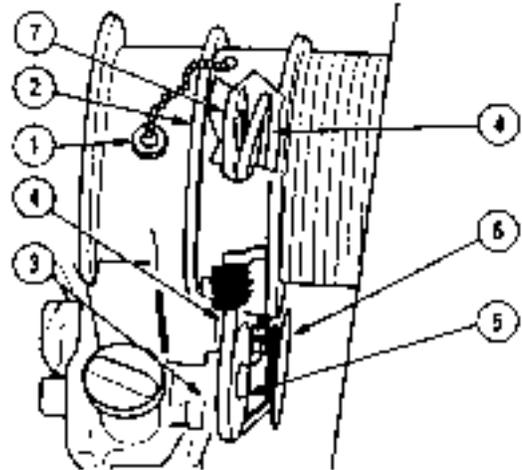
CAUTION

Make sure belt is not twisted on pulleys or damage to equipment will result.

- (3) Using prybar, push in on tensioner (3) and install belt (4) on tensioner pulley (5).
- (4) Install view hole cap (1) on blower (2).

NOTE**Follow-on Maintenance:**

- **Install alternator belt (Para 7-4).**
- **Connect batteries (Para 7-8).**
- **Remove wheel chocks (TM 10-3930-669-10).**

**END OF TASK**

6-6. BLOWER BELT TENSIONER REPLACEMENT.

This task covers:

- a. Removal b. Cleaning/Inspection c. Installation

INITIAL SETUP*Tools and Special Tools*

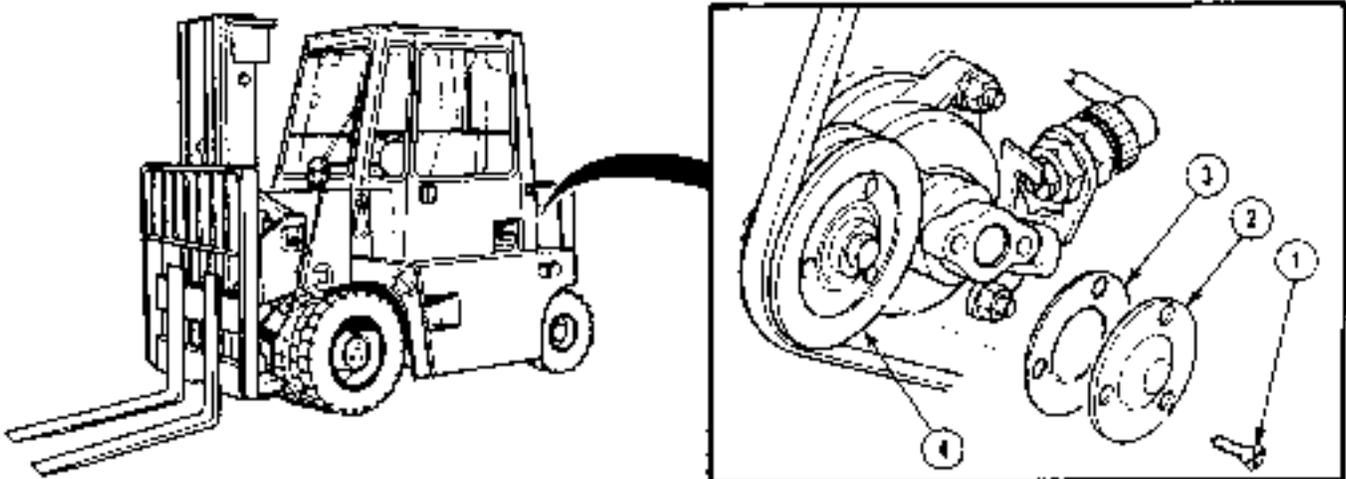
Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
Wrench, Torque (0-60 N•m)
(Item 12, Appendix B)

Materials/Parts

Solvent, Drycleaning (Item 20, Appendix C)
Gasket
Packing, Preformed

Equipment Condition

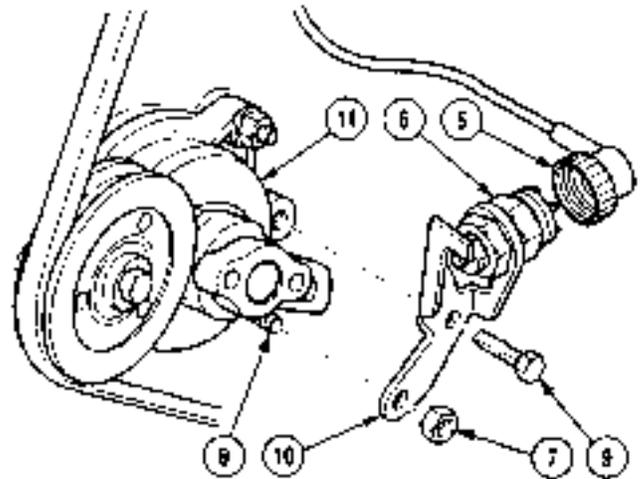
Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Left-hand rear access cover opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal.

- (1) Remove three screws (1), cover (2), and gasket (3) from blower belt tensioner pulley (4). Discard gasket.

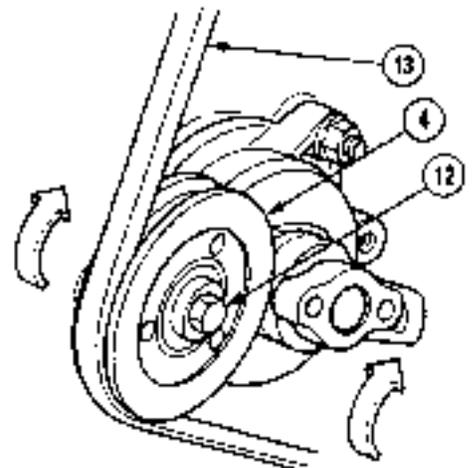
6-6. BLOWER BELT TENSIONER REPLACEMENT (CONT).

- (2) Remove connector (5) from broken belt sensor switch (6).
- (3) Remove nut (7) from stud (8).
- (4) Remove screw (9), broken belt sensor switch (6), and bracket (10) from engine (11).

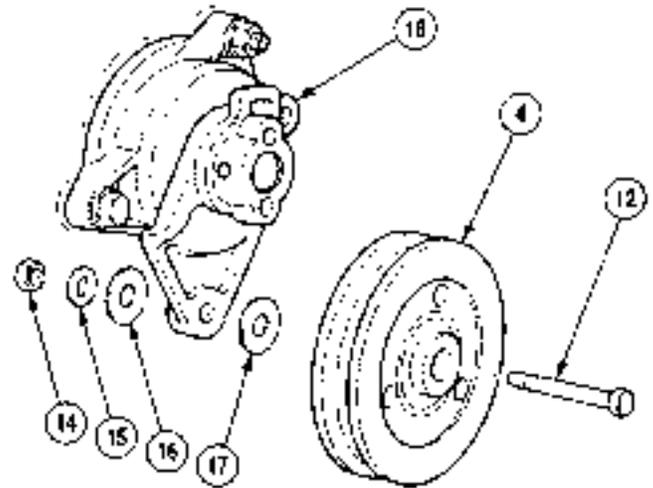
**WARNING**

Blower belt tensioner is under spring tension and could cause injury.

- (5) Using a wrench on screw (12), turn blower belt tensioner pulley (4) towards the right and remove belt (13). Slowly release tension.

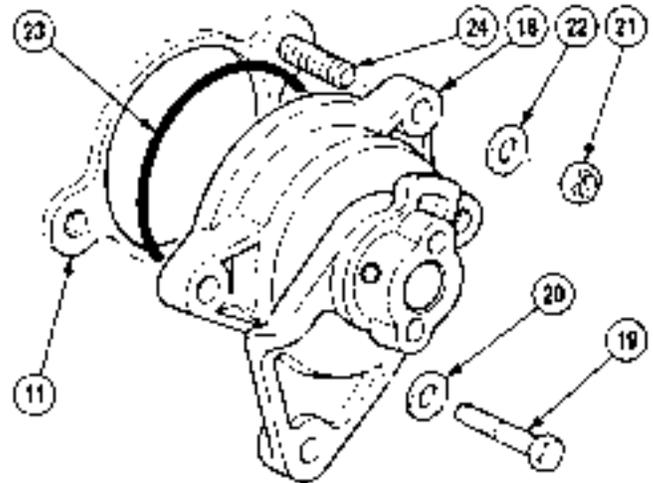


- (6) Remove nut (14), washer (15), washers (16 and 17), screw (12), and blower belt tensioner pulley (4) from blower belt tensioner (18).



- (7) Remove screw (19) and washer (20) from blower belt tensioner (18).

- (8) Remove nut (21), washer (22), blower belt tensioner (18), and preformed packing (23) from engine (11) and stud (24). Discard preformed packing.



b. Cleaning/Inspection.

WARNING

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100F (38C) and for type II is 138F (50C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

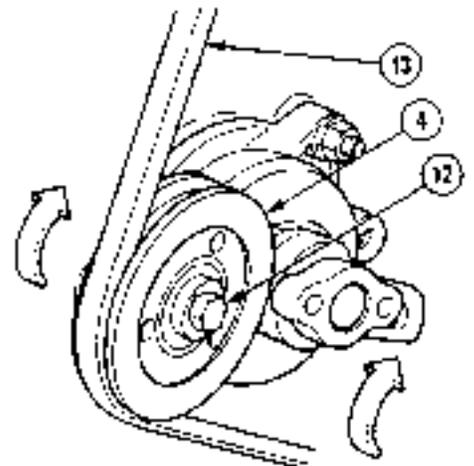
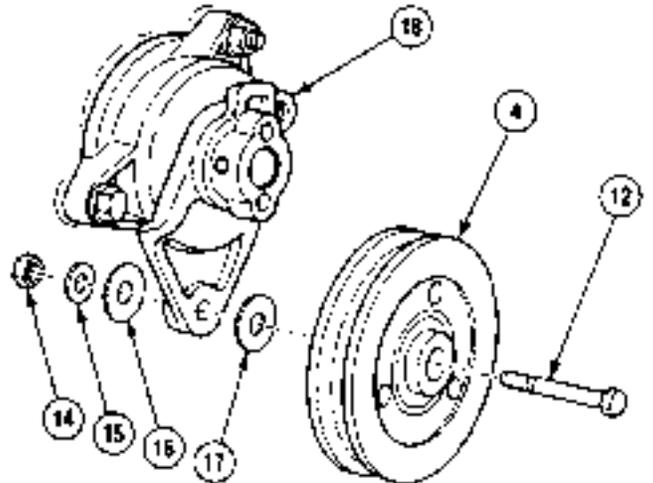
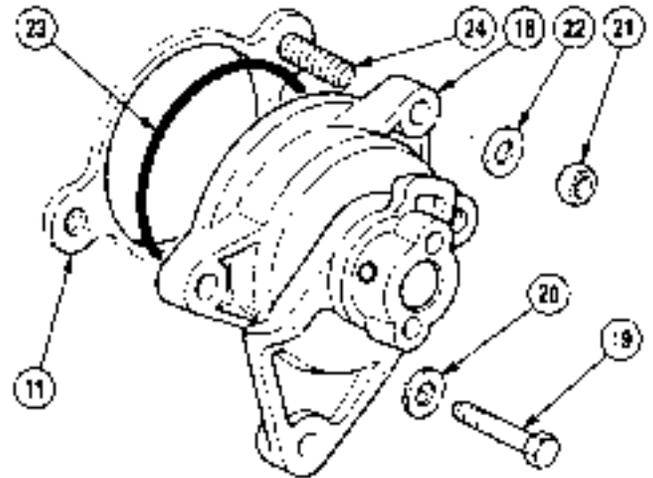
- (1) Clean all wire connectors and terminals.
- (2) Do not allow drycleaning solvent to come in contact with preformed packing.

6-6. BLOWER BELT TENSIONER REPLACEMENT (CONT).

- (3) Inspect switch and wires for damage, cracks, burrs, and sharp edges.
- (4) Replace all damaged parts.

c. Installation.

- (1) Place preformed packing (23) on broken belt tensioner (18).
- (2) Install preformed packing (23) and broken belt tensioner (18) on engine (11) with washer (22) and screw (21). Tighten nut to 18 lb-ft (25 N•m).
- (3) Apply sealing compound to screw (19).
- (4) Install screw (19) and washer (20) on blower belt tensioner (18).
- (5) Install blower belt tensioner pulley (4) on blower belt tensioner (18) with screw (12), two washers (17 and 16), washer (15), and nut (14). Tighten nut to 18 lb-ft (25 N•m).

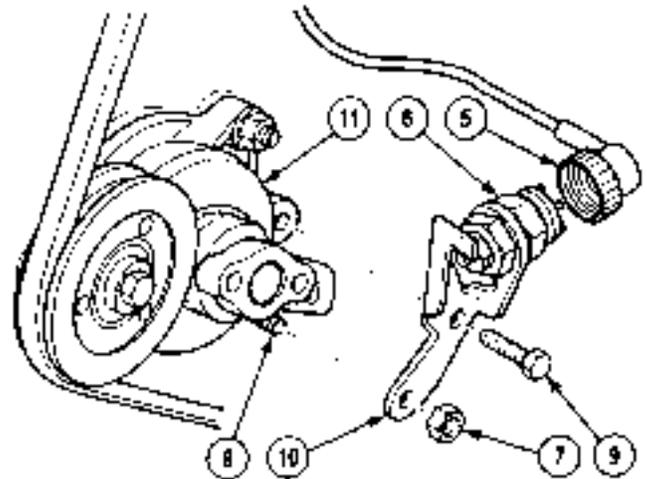


WARNING

Blower belt tensioner is under spring tension and could cause injury.

- (6) Using a wrench on screw (12) turn blower belt tensioner pulley (4) towards the right and install belt (13). Slowly release tension.

- (7) Install broken belt sensor switch (6) and bracket (10) on engine (11) with screw (9). Tighten screw to 18 lb-ft (25 N•m).
- (8) Install nut (7) on stud (8). Tighten nut to 18 lb-ft (25 N•m).
- (9) Connect connector (5) on broken belt sensor switch (6).

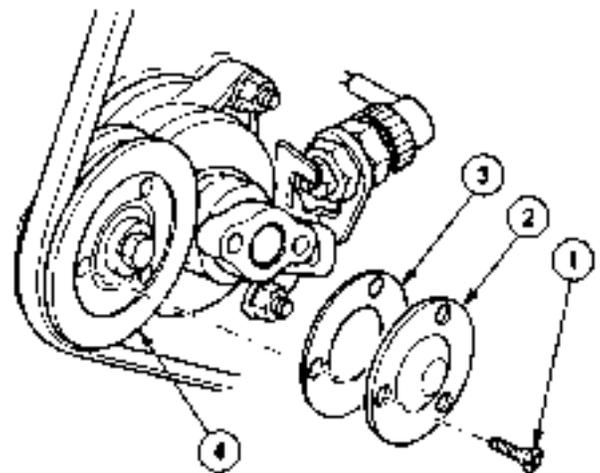


- (10) Install gasket (3) and cover (2) on blower belt tensioner pulley (4) with three screws (1).

NOTE

Follow-on Maintenance:

- **Connect batteries (Para 7-48).**
- **Close left-hand rear access cover (TM 10-3930-669-10).**
- **Remove wheel chocks (TM 10-3930-669-10).**



END OF TASK

6-17/(6-18 blank)

CHAPTER 7
ELECTRICAL SYSTEM MAINTENANCE

Para	Contents	Page
7-1	Introduction.....	7-2
7-2	Alternator Replacement.....	7-3
7-3	Alternator Belt Adjustment.....	7-6
7-4	Alternator Belt Replacement.....	7-8
7-5	Voltage Regulator Replacement.....	7-11
7-6	Starter Assembly Replacement.....	7-12
7-7	Glow Plug Replacement.....	7-14
7-8	Instrument Panel Replacement.....	7-16
7-9	General Gauge Replacement.....	7-20
7-10	Hour Meter Replacement.....	7-23
7-11	Air Restriction Indicator Gauge Replacement.....	7-25
7-12	Cab Heater Blower Switch Replacement.....	7-27
7-13	Glow Plug Switch Replacement.....	7-29
7-14	Engine Switch Replacement.....	7-31
7-15	Main Power Switch Replacement.....	7-33
7-16	Front/Rear Lights Switch Replacement.....	7-35
7-17	Master Cylinder Pressure Switch Replacement.....	7-37
7-18	Brake Switch Replacement.....	7-39
7-19	Transmission Speed Selector/Wiper Switch Replacement.....	7-41
7-20	Transmission Shift Lever Replacement.....	7-44
7-21	Transmission Control Switch Replacement.....	7-46
7-22	Engine Temperature Switch Replacement.....	7-50
7-23	Drive Axle Oil Temperature Switch Replacement.....	7-51
7-24	Transmission Inching Valve Replacement.....	7-53
7-25	Gauge Lamp Replacement.....	7-55
7-26	Front/Rear/Mast Light Lamp Replacement.....	7-57
7-27	Taillight Lamp Replacement.....	7-58
7-28	Front Work Light Replacement.....	7-59
7-29	Rear Work Light Replacement.....	7-61
7-30	Mast Light Replacement.....	7-63
7-31	Taillight/Stoplight Replacement.....	7-65
7-32	Cab Interior Light Replacement.....	7-67
7-33	Fuse, Relay, Diode, and Buss Bar Replacement.....	7-69
7-34	Fuse Panel Replacement.....	7-74
7-35	Fuel Level Sensor Replacement.....	7-77
7-36	Fuel Shutoff Solenoid Replacement.....	7-80
7-37	Drive Axle Cooling Fans Replacement/Repair.....	7-82
7-38	Shunt Assembly Replacement.....	7-85
7-39	Broken Belt Indicator Replacement.....	7-89
7-40	Broken Belt Sensor Replacement.....	7-91
7-41	Engine Oil Temperature Sensor Replacement.....	7-92
7-42	Engine Oil Pressure Sensor Replacement.....	7-94
7-43	Transmission Oil Temperature Sensor Replacement.....	7-96

Para	Contents	Page
7-44	Glow Plug Indicator Replacement.....	7-98
7-45	Horn Replacement.....	7-100
7-46	Horn Button Replacement.....	7-102
7-47	Battery Replacement	7-105
7-48	Battery Cable Service	7-111
7-49	Engine Ground Strap Replacement	7-116
7-50	Broken Belt Warning Buzzer Replacement	7-118
7-51	Relay Panel Replacement	7-120
7-52	NATO Plug Replacement	7-122
7-53	General Cable Replacement.....	7-124
7-54	General Connector Repair.....	7-134

7-1. INTRODUCTION.

This chapter contains maintenance instructions for removing, installing, adjusting, replacing, and testing electrical system components as authorized by the Maintenance Allocation Chart (MAC) at the Unit Maintenance level.

7-2. ALTERNATOR REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

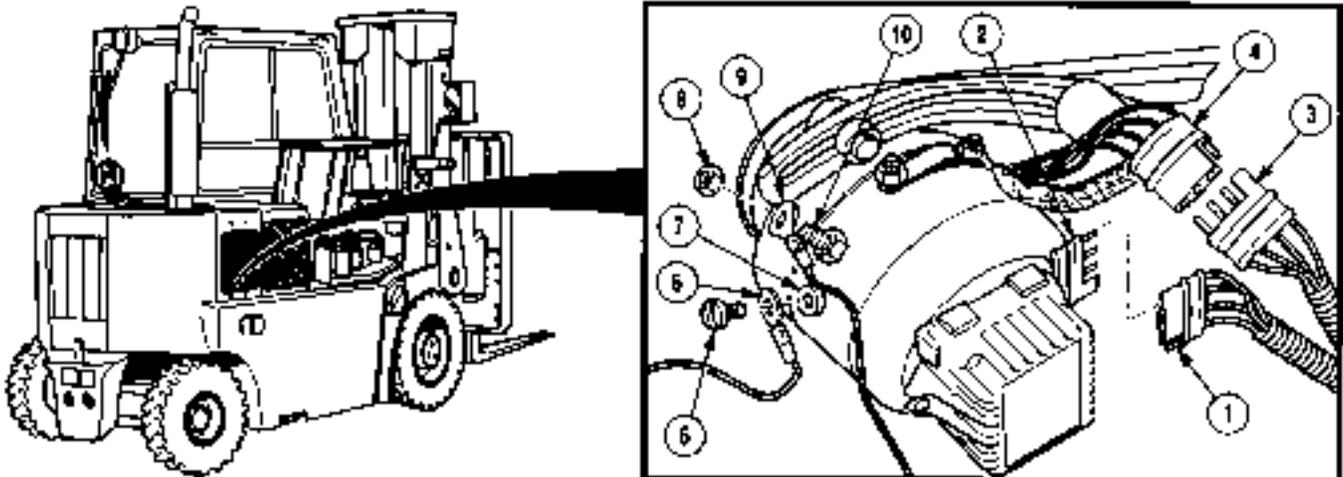
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)
Wrench, Torque (0 to 175 lb-ft [0-237 Nm])
(Item 2, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)
Drive axle oil cooler assembly removed (Para 10-2)

Materials/Parts

Tags, Identification (Item 21, Appendix C)
Screw, Lock
Washer, Lock

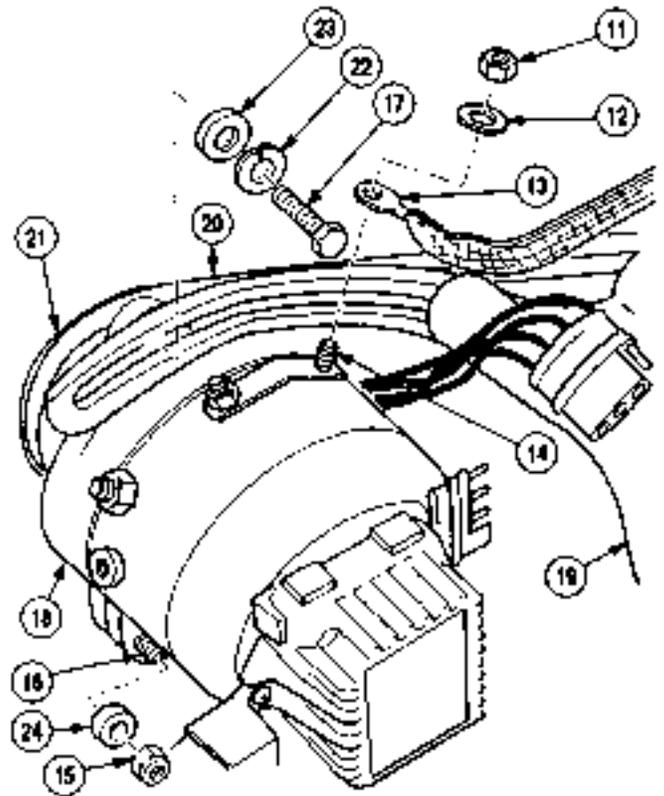
a. Removal.**NOTE**

Tag and mark all wires and connectors prior to removal.

- (1) Disconnect connector (1) from voltage regulator (2).
- (2) Disconnect connector (3) from alternator connector (4).
- (3) Remove lock screw (5) and wire (6) from terminal (7). Discard lock screw.
- (4) Remove nut (8) and wire (9) from terminal (10).

7-2. ALTERNATOR REPLACEMENT (CONT.)

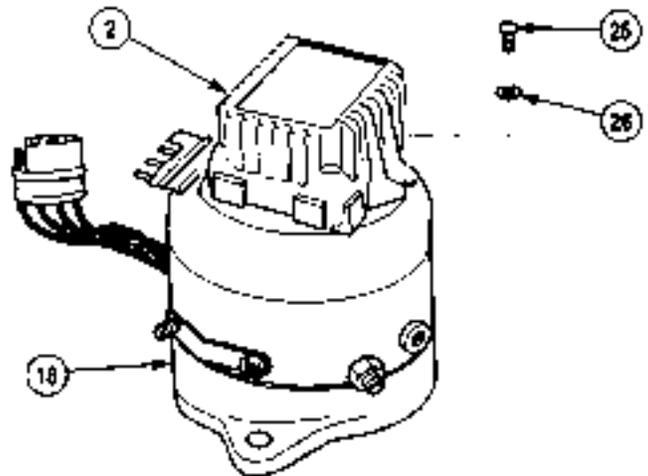
- (5) Remove nut (11), washer (12), and ground strap (13) from terminal (14).
- (6) Loosen nut (15) on screw (16).
- (7) Loosen screw (17).
- (8) Move alternator (18) toward engine (19) and remove belt (20) from pulley (21).
- (9) Remove screw (17), and lock washer (22), and flat washer (23) from alternator (18). Discard lock washer.
- (10) Remove nut (15), washer (24), screw (16), and alternator (18) from engine (19).
- (11) Place alternator (18) on clean work surface.



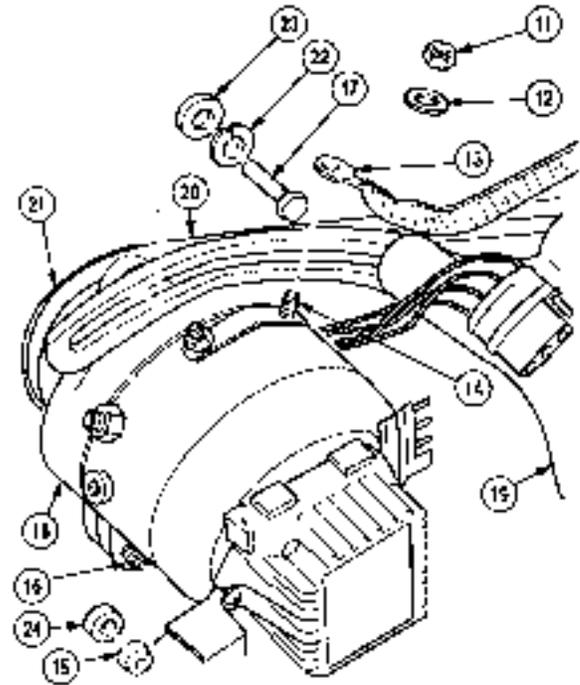
- (12) Remove two screws (25), washers (26), and voltage regulator (2) from alternator (18).

b. Installation.

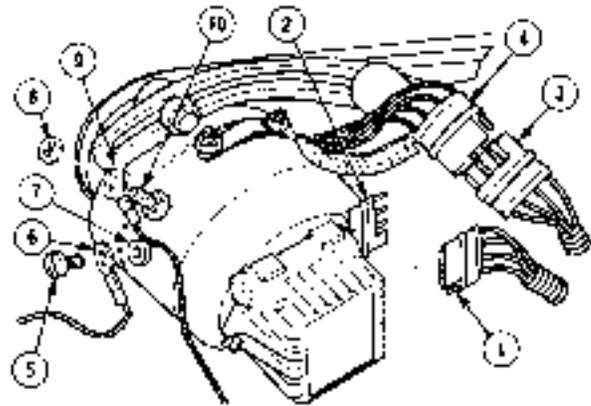
- (1) Install voltage regulator (2) on alternator (18) with two washers (26) and screws (25).



- (2) Position alternator (18) on engine (19) with screw (16) and nut (15). Do not tighten.
- (3) Move alternator (18) toward engine (19) and place belt (20) on pulley (21).
- (4) Move alternator (18) away from engine (19) until tension is on belt (20).
- (5) Install flat washer (23), lock washer (22), and screw (17) on alternator (18). Tighten to 18 lb-ft (25 N.m).
- (6) Tighten nut (15) on screw (16) to 36 lb-ft (49 N.m).
- (7) Install ground strap (13) on terminal (14) with washer (12) and nut (11).



- (8) Install wire (9) on terminal (10) with nut (8).
- (9) Install wire (6) on terminal (7) with lock screw (5).
- (10) Connect alternator connector (4) on connector (3).
- (11) Install connector (1) on voltage regulator (2).



NOTE

Follow-on Maintenance:

- Connect batteries (Para 7-48)
- Adjust alternator belt (Para 7-3).
- Install drive axle oil cooler assembly (Para 10-2).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-3. ALTERNATOR BELT ADJUSTMENT.

This task covers:

Adjustment

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive:
(Item 1, Appendix B)

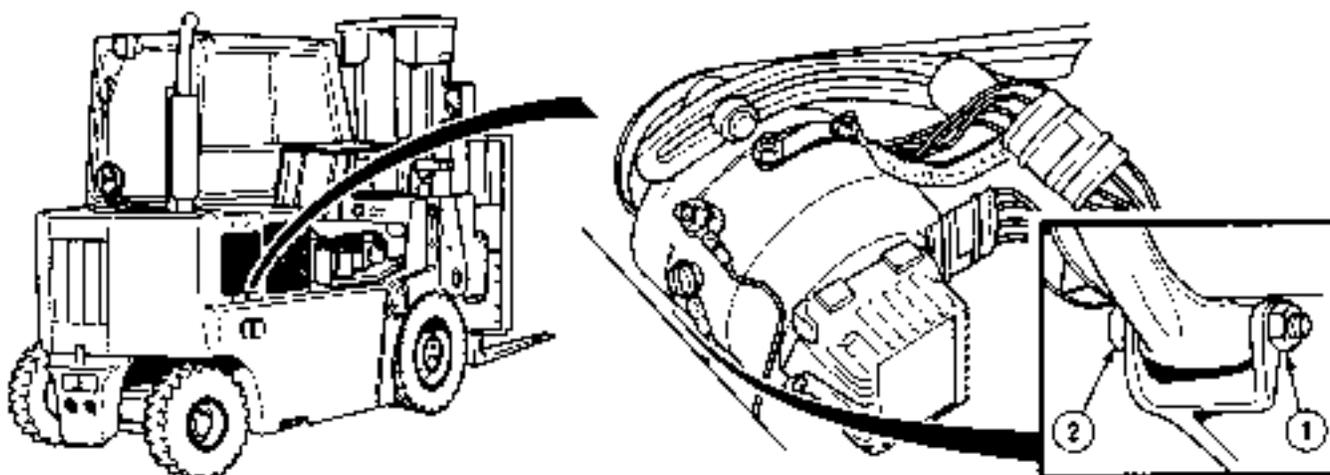
Materials /Parts

Washer, Lock

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Ventilation panel removed (Para 6-2)
Batteries disconnected (Para 7-48)
Adjustment.

Adjustment.



WARNING

Allow engine to cool before performing maintenance. Severe injury to personnel may result.

- (1) Loosen nut (1) on alternator lower mounting screw (2). Do not remove.

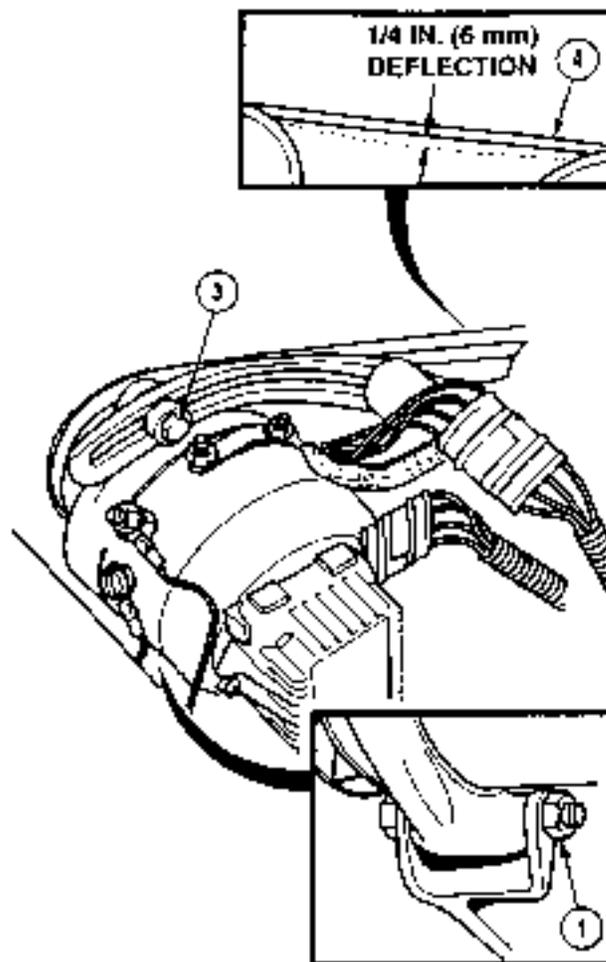
- (2) Loosen screw (3).
- (3) Measure and adjust alternator belt (4) deflection to 1/4 in (6 mm).
- (4) Tighten screw (3).
- (5) Tighten nut (1).

NOTE

Follow-on Maintenance:

- Install ventilation panel (Para 6-2).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-4. ALTERNATOR BELT REPLACEMENT.

This task covers:

- | | |
|------------------------|-----------------|
| a. Removal | c. Installation |
| b. Cleaning/Inspection | d. Adjustment |

INITIAL SETUP*Tools and Special Tools*

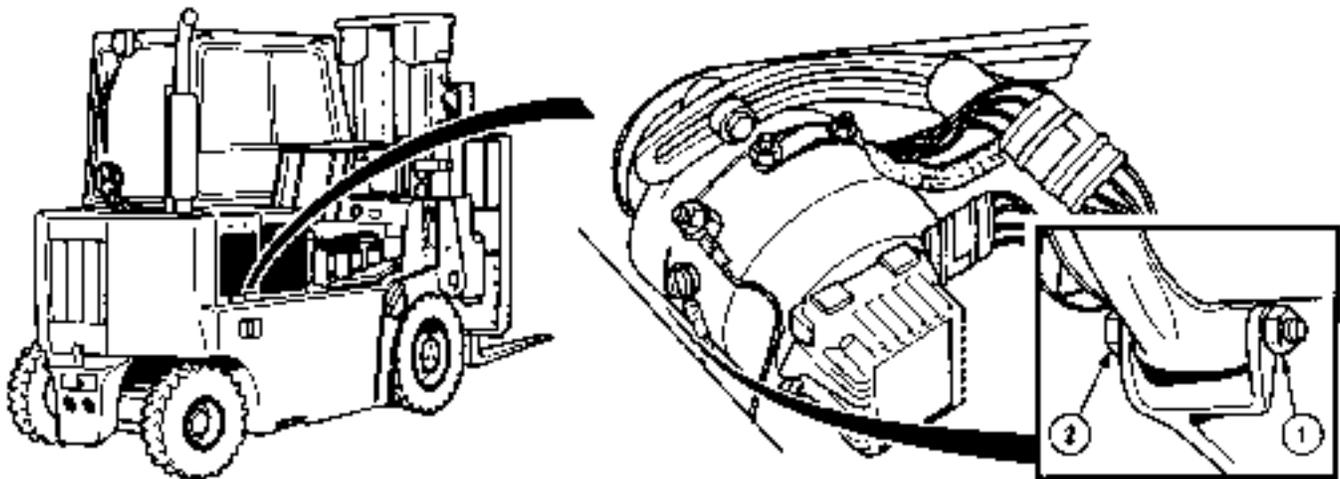
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Rags, Wiping (Item 16, Appendix C)
Solvent, Drycleaning (Item 20, Appendix C)
Belt, Alternator
Washer, Lock

Equipment Condition

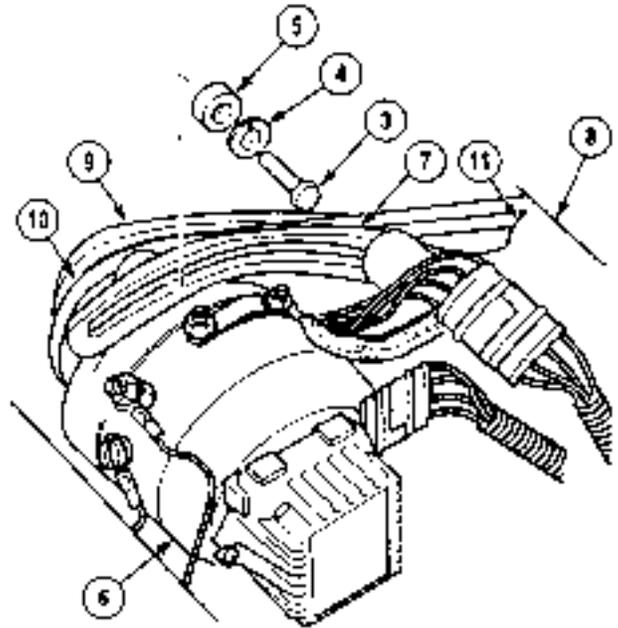
Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Ventilation panel removed (Para 6-2)
Batteries disconnected (Para 7-48)

a. Removal**WARNING**

Allow engine to cool before performing maintenance. Severe injury to personnel may result.

- (1) Loosen nut (1) on alternator lower mounting screw (2). Do not remove.

- (2) Remove screw (3), lockwasher (4), and spacer (5) from alternator (6) and adjustment arm (7). Discard lock washer.
- (3) Position alternator (6) towards engine (8) and remove alternator belt (9) from alternator pulley (10) and crankshaft pulley (11). Discard alternator belt.



b. Cleaning/Inspection.

WARNING

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100°F (38°C) and for type II is 138°F (50°C). Failure to do so may result in injury or death to personnel.
 - If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
- (1) Inspect pulleys for cracks or belt residue.
 - (2) Clean metal pulleys with drycleaning solvent and wiping rag.
 - (3) Inspect alternator for cracks or damage.
 - (4) Replace damaged parts or notify supervisor.

c. Installation.

- (1) Position alternator (6) towards engine (8).

CAUTION

Make sure belt is not twisted on pulleys or damage to equipment will result.

- (2) Position alternator belt (9) on crankshaft pulley (11) and alternator pulley (10).
- (3) Position lockwasher (4), spacer (5), and screw (3) on alternator (6) and adjustment arm (7). Do not tighten.

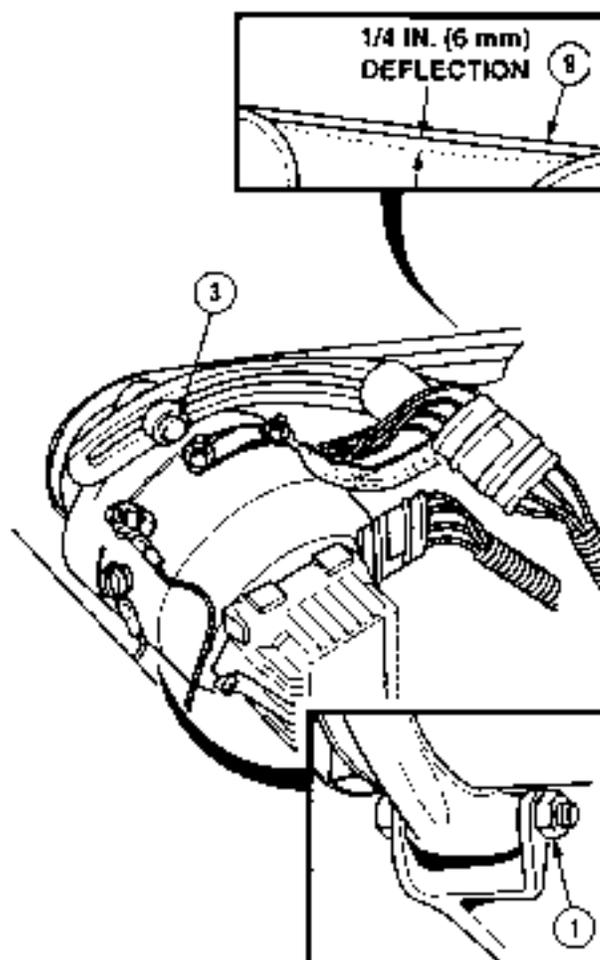
7-4. ALTERNATOR BELT REPLACEMENT (CONT).**d. Adjustment.**

- (1) Measure and adjust belt deflection to 1/4 in. (6 mm).
- (2) Tighten screw (3) and tighten nut (1).

NOTE

Follow-on Maintenance:

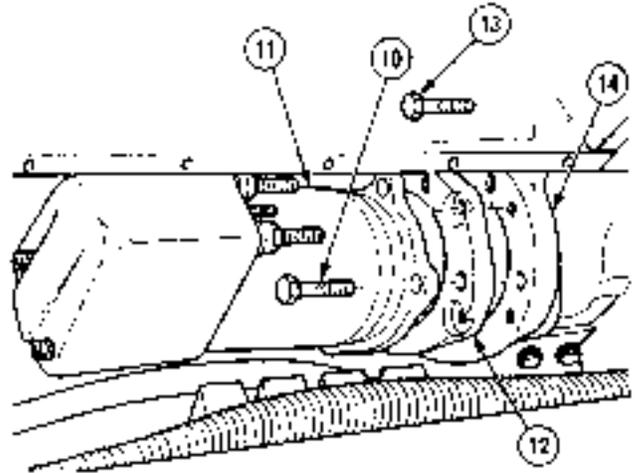
- Install ventilation panel (Para 6-2).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

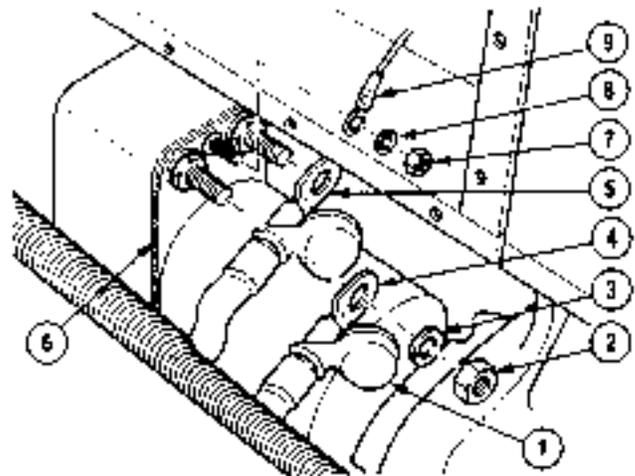
- (3) Remove three screws (10) and starter (11) from flange (12).
- (4) Remove three screws (13) and flange (12) from engine (14).

b. Installation.

- (1) Install flange (12) on engine (14) with three screws (13).
- (2) Install starter (11) on flange (12) with three screws (10).



- (3) Install wire (9) on starter solenoid (6) with lock washer (8) and nut (7).
- (4) Install two cables (4 and 5) on starter solenoid (6) with two lock washers (3) and nuts (2). Lift two covers (1).



NOTE

Follow-on Maintenance:

- Install drive axle oil cooler assembly (Para 10-2).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-7. GLOW PLUG REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

- Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)
- Wrench, Torque (0 to 175 lb-ft [0-237 N-m]) (Item 2, Appendix B)

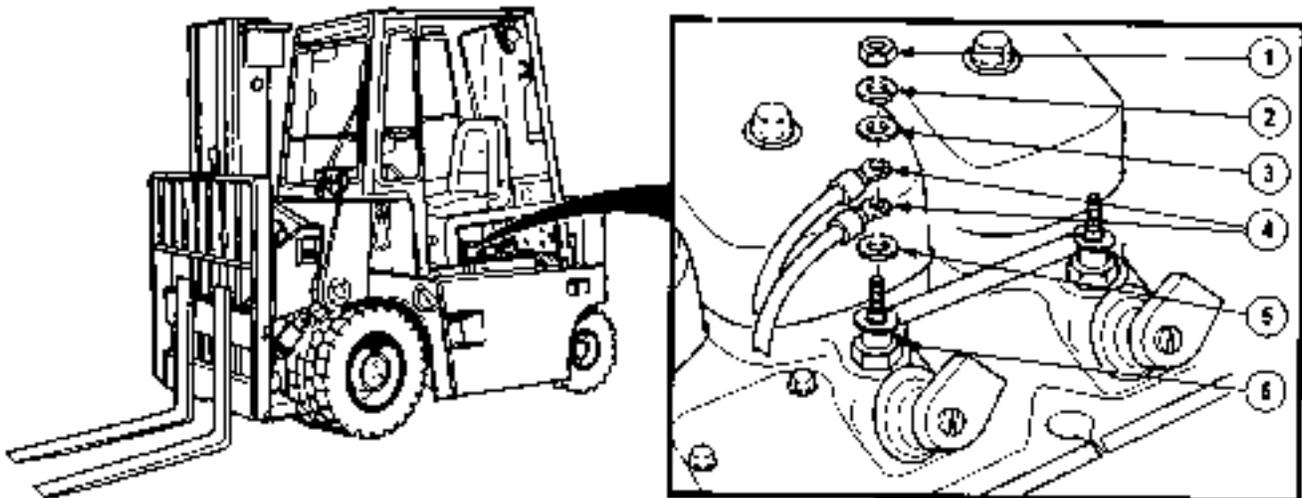
Equipment Condition

- Engine OFF (TM 10-3930-669-10)
- Parking brake applied (TM 10-3930-669-10)
- Wheels chocked (TM 10-3930-669-10)
- Cab positioned for service (Para 15-2)

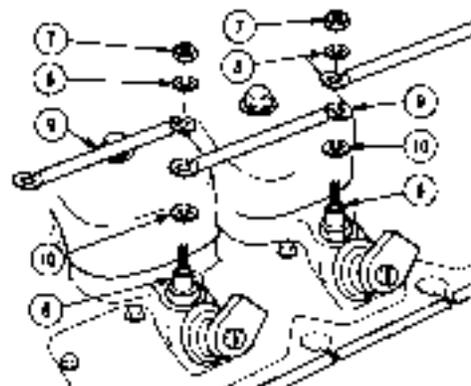
Materials/Parts

- Washer, Lock

a. Removal



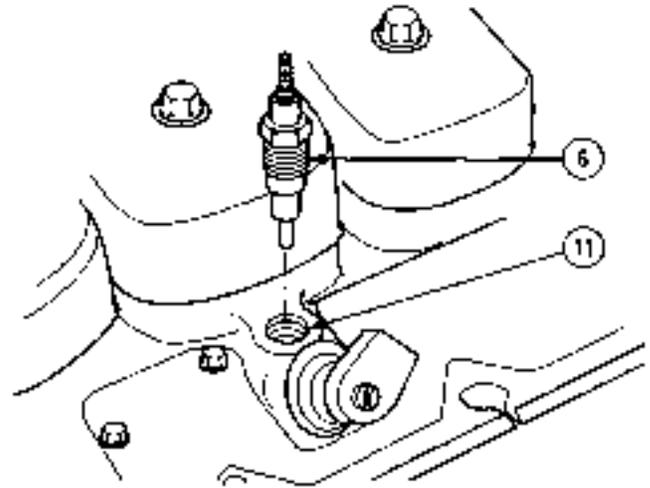
- (1) Remove nut (1), lock washer (2), washer (3), two wires (4), and washer (5) from glow plug (6). Discard lock washer.
- (2) Remove two nuts (7), washers (8), three connecting rails (9), and two washers (10) from glow plugs (6).



NOTE

All glow plugs are removed the same way. Cylinder No. 3 glow plug is shown.

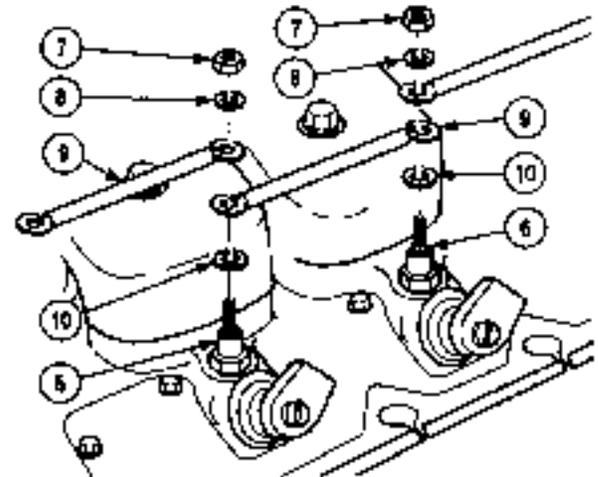
- (3) Remove glow plug (6) from cylinder head (11).



b. Installation.

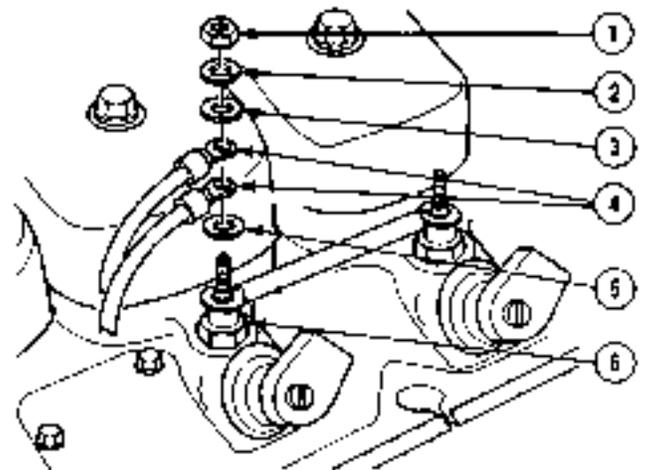
- (1) Install glow plug (6) in cylinder head (11). Tighten glow plug (6) to 65 lb-ft (88 N.m).

- (2) Position four washers (10) and three connecting rails (9) on glow plugs (6).



- (3) Install two washers (8) and nuts (7) on glow plugs (6).

- (4) Install washer (5), two wires (4), washer (3), lock washer (2), and nut (1) on glow plug (6).



NOTE
Follow-on Maintenance:

- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-8. INSTRUMENT PANEL REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts

Cable Ties (Item 4, Appendix C)
Tags, Identification (Item 21, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Pivot/Shift joystick removed (Para 17-2)
Tilt/Lift joystick removed (Para 17-3)
Fuse panel removed (Para 7-34)
Batteries disconnected (Para 7-48)

a. Removal

NOTE

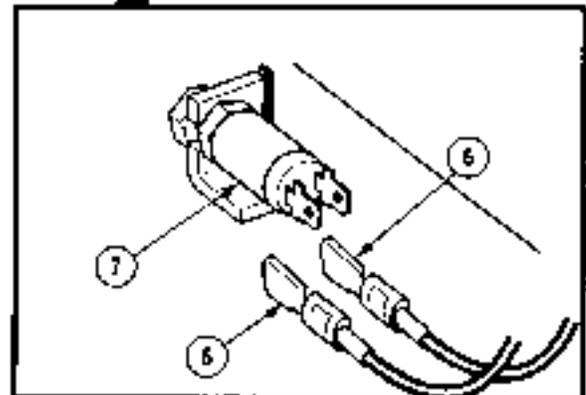
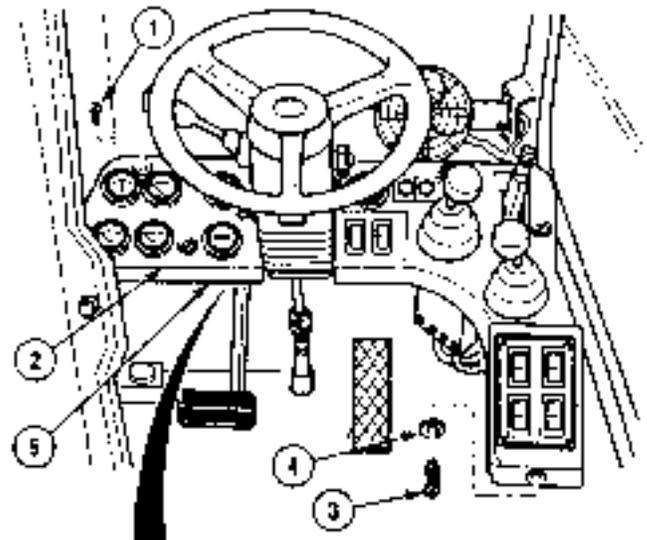
Cut cable ties as required.

- (1) Remove four screws (1) from instrument panel (2).
- (2) Remove screw (3), washer (4), and instrument panel (2) from dash frame (5).

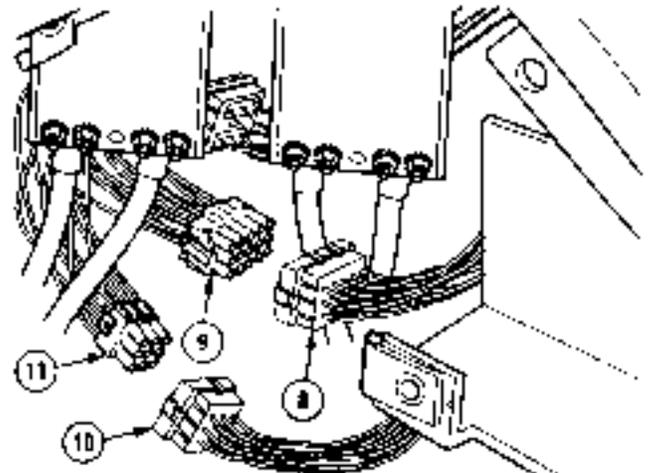
NOTE

Tag and mark all wires and hoses prior to removal.

- (3) Remove two wires (6) from brake switch (7).

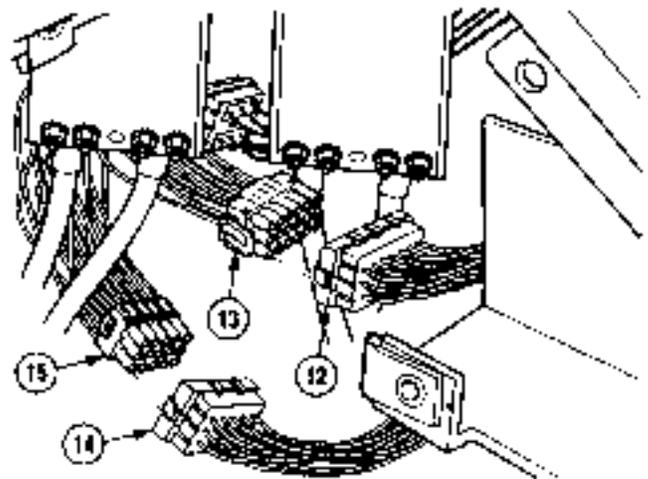


- (4) Disconnect two engine connectors P6 (8) from S6 (9) and P7 (10) from S7 (11).



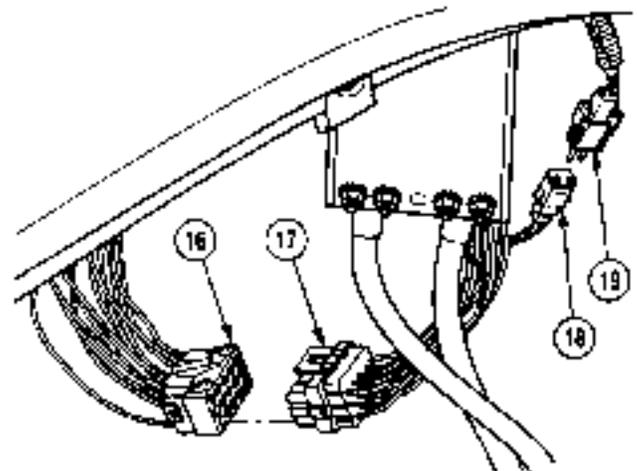
H1 1679B

- (5) Disconnect two cab connectors P8 (12) from S8 (13) and P9 (14) from S9 (15).



- (6) Disconnect connector P13 (16) from connector S13 (17).

- (7) Disconnect emergency brake connector P20 (18) from emergency brake connector S20 (19).

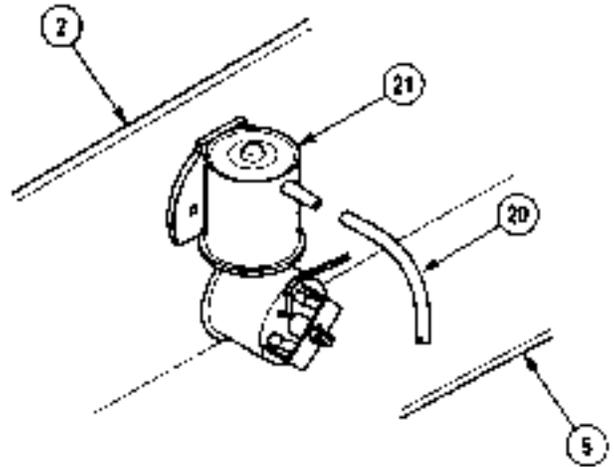


7-8. INSTRUMENT PANEL REPLACEMENT (CONT).

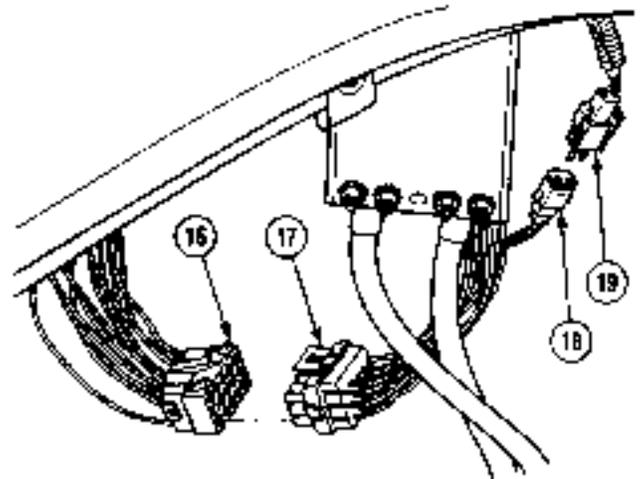
- (8) Remove hose (20) from air restriction indicator (21).
- (9) Remove instrument panel (2) from dash frame (5).

b. Installation.

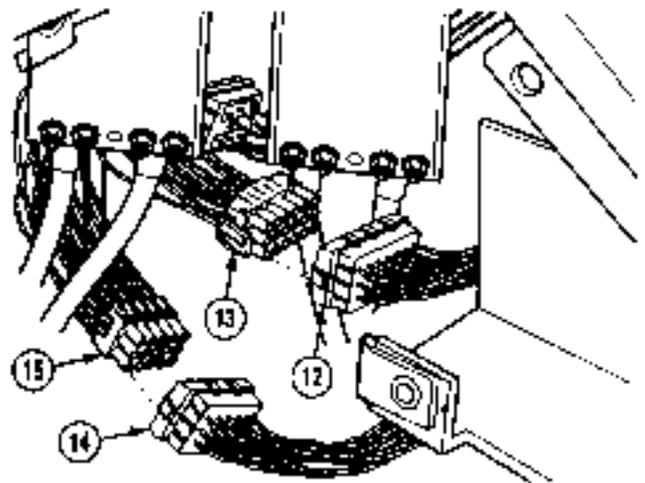
- (1) Position instrument panel (2) on dash frame (5).
- (2) Install hose (20) on air restriction indicator (21).



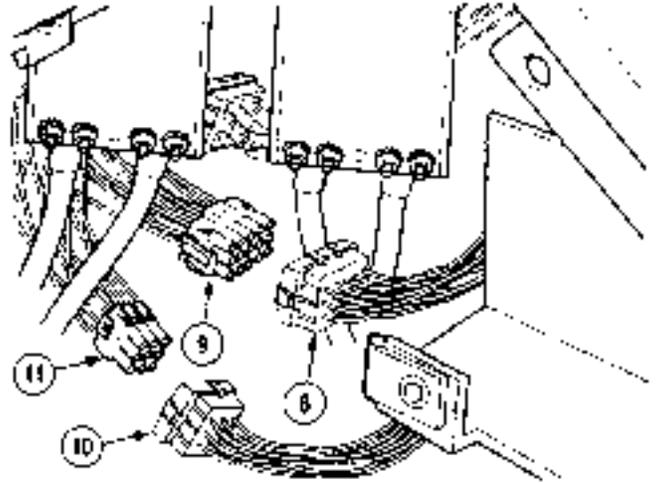
- (3) Connect emergency brake connector S20 (19) to emergency brake connector P20 (18).
- (4) Connect connector S13 (17) to connector P13 (16).



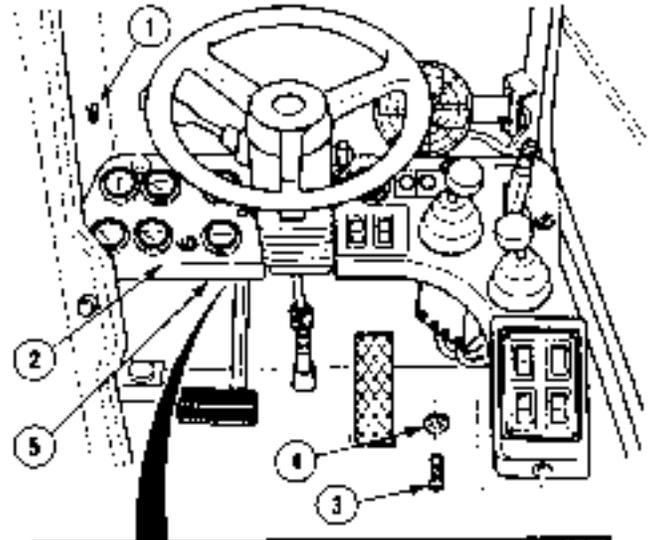
- (5) Connect two cab connectors S9 (15) to P9 (14) and S8 (13) to P8 (12).



- (6) Connect two engine connectors S7 (11) to P7 (10) and S6 (9) to P6 (8).



- (7) Install two wires (6) on brake pedal light switch (7).
- (8) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).
- (9) Install four screws (1) on instrument panel (2).

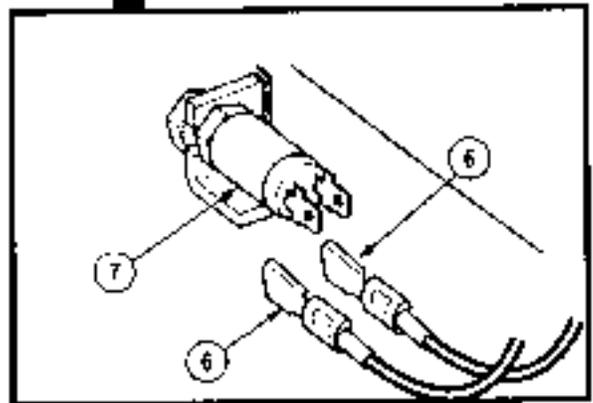


NOTE

Follow-on Maintenance:

- Install pivot/shift joystick (Para 17-2).
- Install tilt/lift joystick (Para 17-3).
- Install fuse panel (Para 7-34).
- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-9. GENERAL GAUGE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

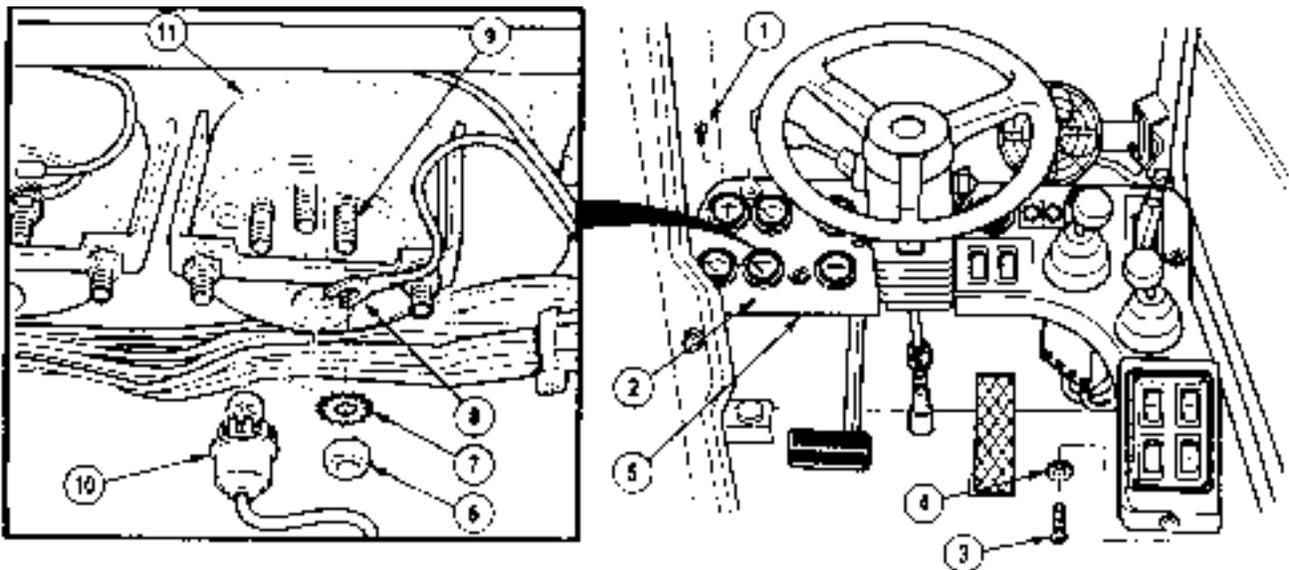
Materials/Parts

Ties, Cable (Item 4, Appendix C)
Tags, Identification (Item 21, Appendix C)
Washer, Lock (5)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal



NOTE

- Replacement procedure for engine oil temperature gauge is shown. The ammeter, engine oil pressure, fuel, engine oil temperature, and transmission oil temperature gauges are all replaced the same way.
- Remove cable ties as required.

- (1) Remove four screws (1) from instrument panel (2).
- (2) Remove screw (3) and washer (4), and raise instrument panel (2) from dash frame (5).

NOTE

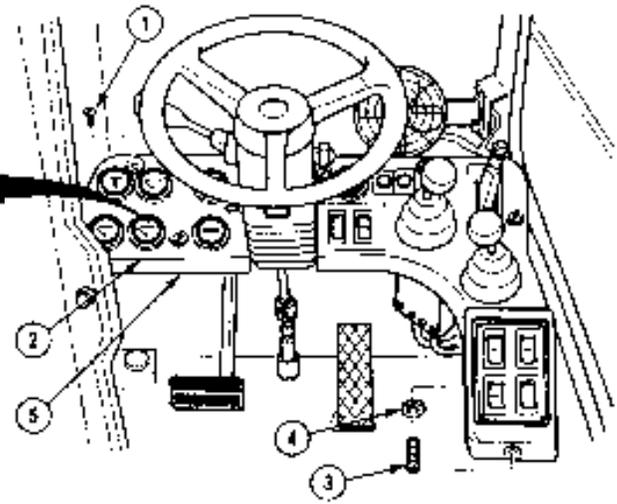
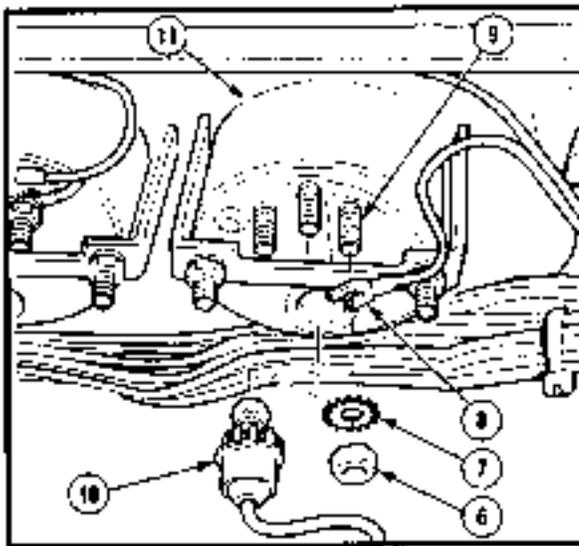
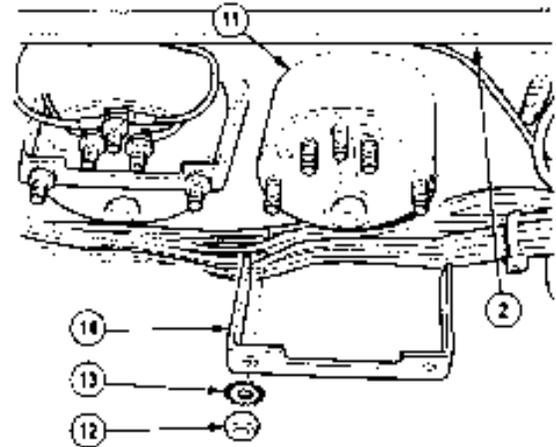
Tag and mark all wires prior to removal.

- (3) Remove three nuts (6), lock washers (7), and five wires (8) from gauge terminals (9). Discard lock washers.
- (4) Remove lamp assembly (10) from gauge (11).

- (5) Remove two nuts (12), lock washers (13), and retaining bracket (14) and gauge (11) from instrument panel (2).

b. Installation.

- (1) Install gauge (11) in instrument panel (2) with retaining bracket (14), two lock washers (13), and nuts (12).



- (2) Install lamp assembly (10) in gauge (11).

NOTE

Install cable ties as required.

- (3) Install five wires (8) on gauge terminals (9) with three lock washers (7) and nuts (6).
- (4) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).
- (5) Install four screws (1) on instrument panel (2).

7-9. GENERAL GAUGE REPLACEMENT (CONT).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-22

7-10. HOUR METER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts

Cable Ties (Item 4, Appendix C)
Tags, Identification (Item 21, Appendix C)
Washer, Lock

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal

NOTE

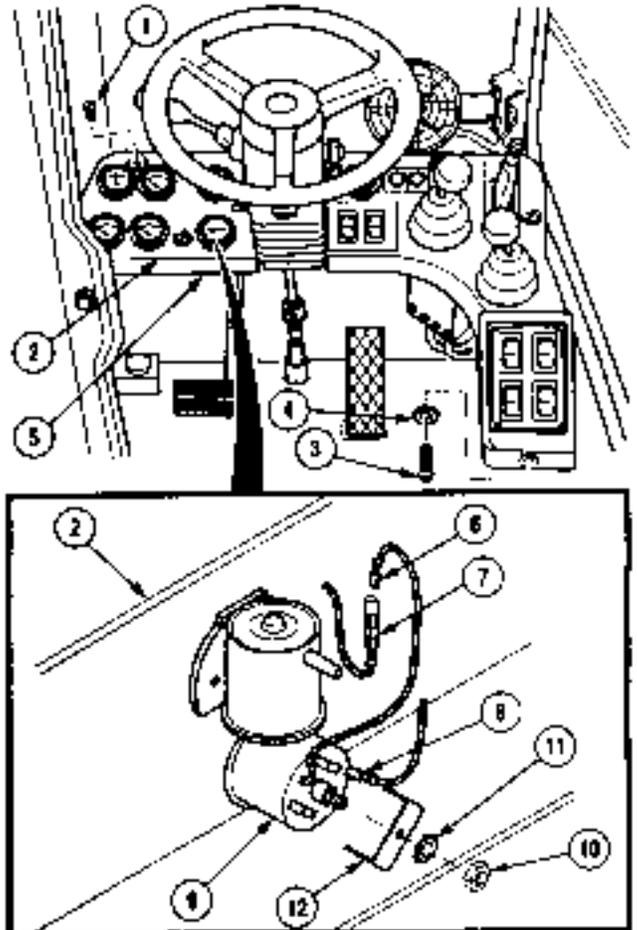
Cut cable ties as required.

- (1) Remove four screws (1) from instrument panel (2).
- (2) Remove screw (3) and washer (4), and raise instrument panel (2) from dash frame (5).

NOTE

Tag and mark all wires prior to removal.

- (3) Disconnect wire (6) from resistor (7).
- (4) Disconnect two wires (8) from hour meter (9).
- (5) Remove nut (10), lock washer (11), bracket (12), and hourmeter (9) from instrument panel (2). Discard lock washer.



7-10. HOUR METER REPLACEMENT (CONT).***b. Installation.***

- (1) Install hour meter (9) in instrument panel (2) with bracket (12), lock washer (11), and nut (10).
- (2) Connect two wires (8) on hour meter (9).

NOTE

Install cable ties as required.

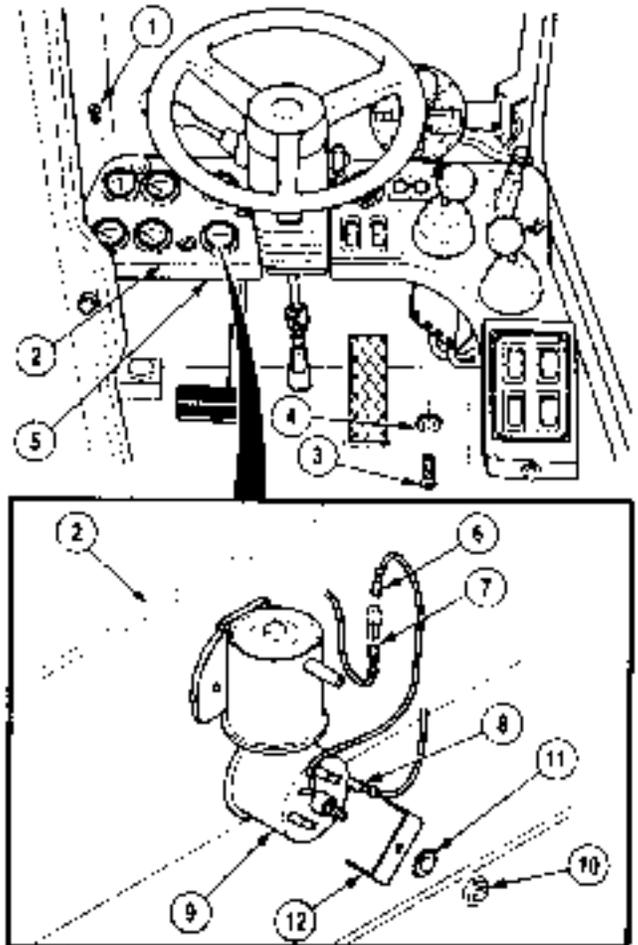
- (3) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).
- (4) Install four screws (1) on instrument panel (2).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

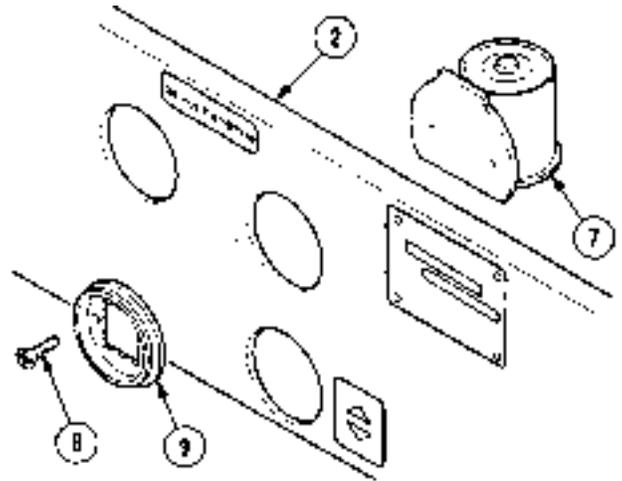


7-11. AIR RESTRICTION INDICATOR GAUGE REPLACEMENT (CONT).

- (4) Remove two screws (8), cover (9), and gauge (7) from instrument panel (2).

b. Installation.

- (1) Install gauge (7) and cover (9) on instrument panel (2) with two screws (8).



- (2) Install hose (6) on gauge (7).

NOTE

Install cable ties as required.

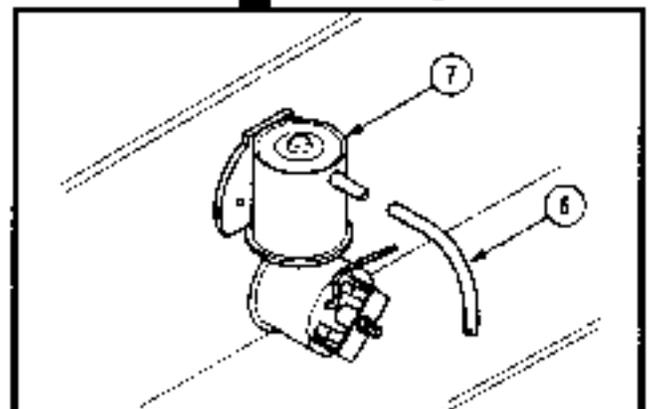
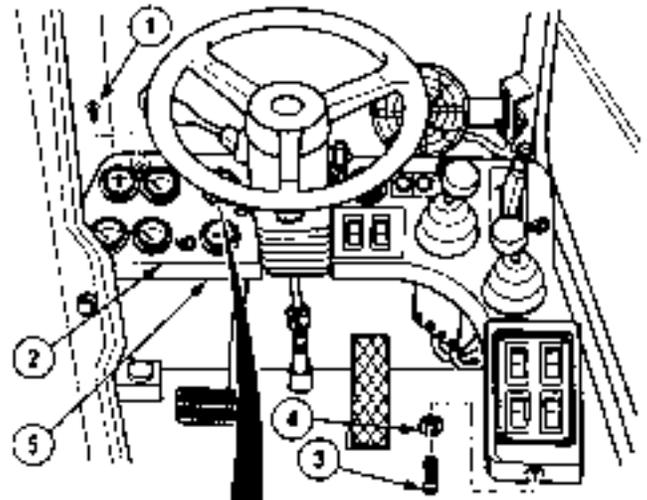
- (3) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).

- (4) Install four screws (1) on instrument panel (2).

NOTE

Follow-on Maintenance:

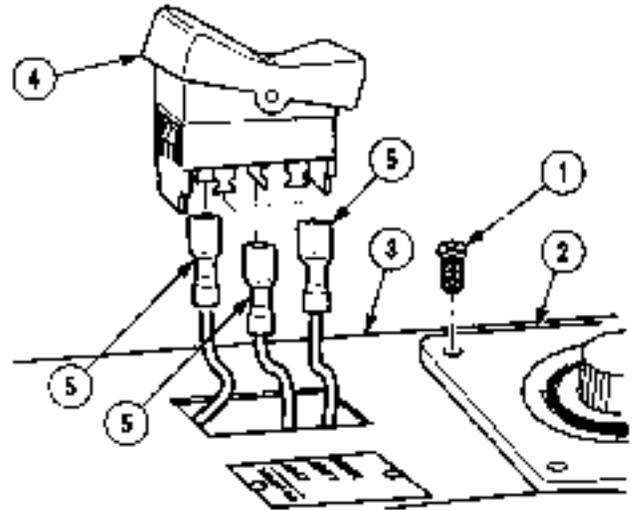
- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

7-12. CAB HEATER BLOWER SWITCH REPLACEMENT (CONT).**b. Installation.**

- (1) Connect three wires (5) to switch (4).
- (2) Install switch (4) in cab (3).
- (3) Install heater temperature control (2) on cab (3) with four screws (1).

**NOTE**

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-13. GLOW PLUG SWITCH REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

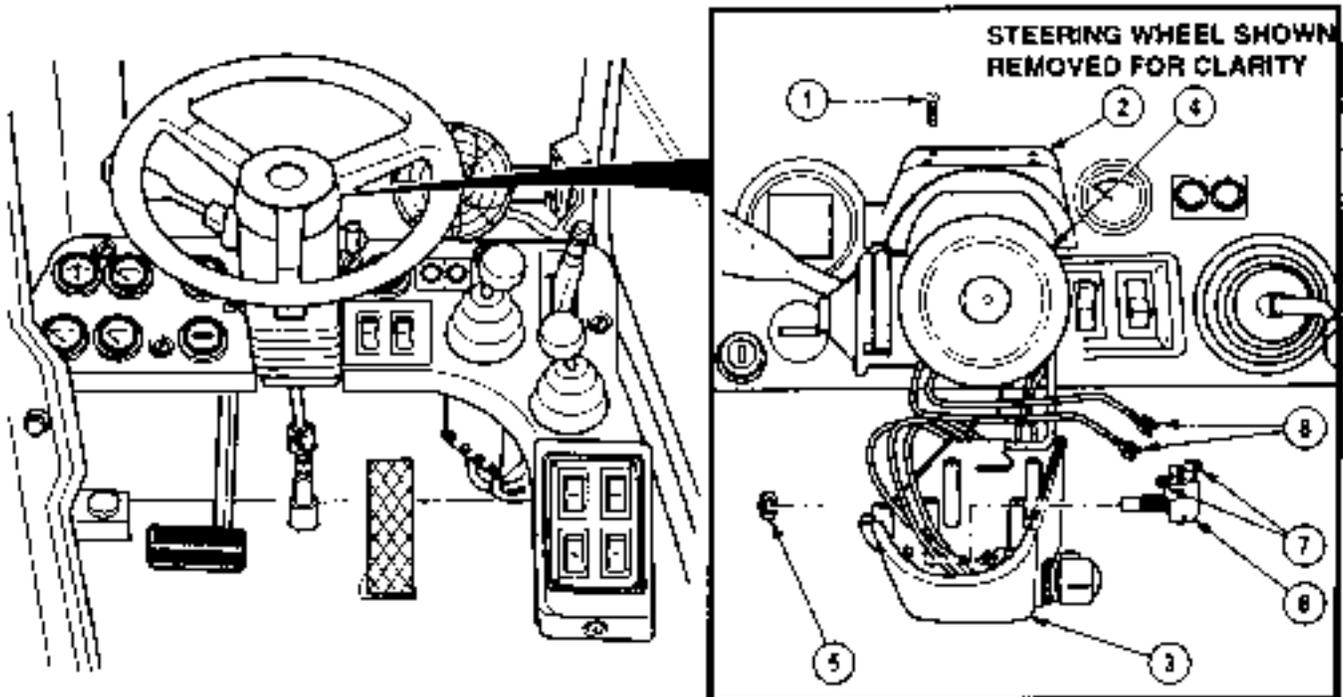
Materials/Parts

Tags, Identification (Item 21, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal



- (1) Remove four screws (1), upper cover (2), and lower cover (3) from steering column (4).
- (2) Remove nut (5) and glow plug switch (6) from lower cover (3).

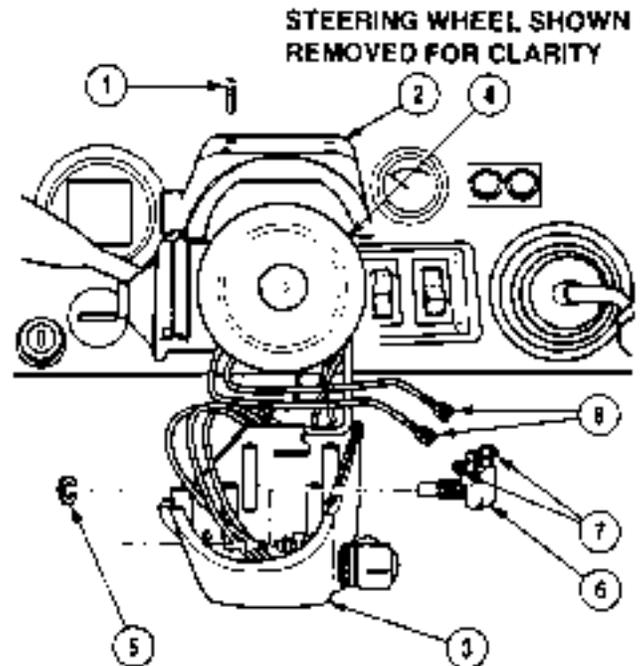
NOTE

Tag and mark all wires prior to removal.

- (3) Loosen two screws (7) and remove two wires (8) from glow plug switch (6).

7-13. GLOW PLUG SWITCH REPLACEMENT (CONT).***b. Installation.***

- (1) Install two wires (8) on glow plug switch (6) and tighten two screws (7).
- (2) Install glow plug switch (6) in lower cover (3) with nut (5).
- (3) Install lower cover (3) and upper cover (2) on steering column (4) with four screws (1).

**NOTE**

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

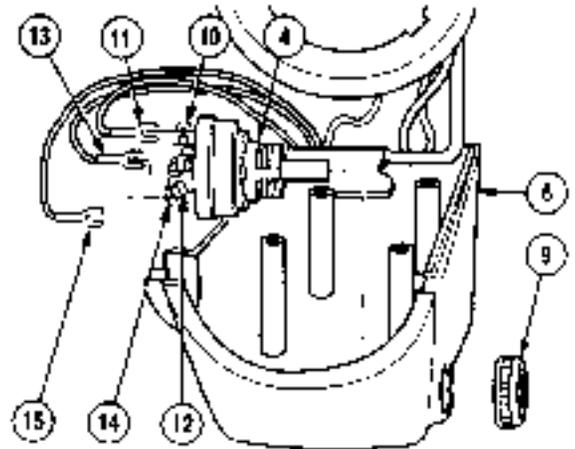
7-14. ENGINE SWITCH REPLACEMENT (CONT).

- (3) Remove nut (9) and engine switch (4) from lower cover (6).

NOTE

Tag and mark all wires prior to removal.

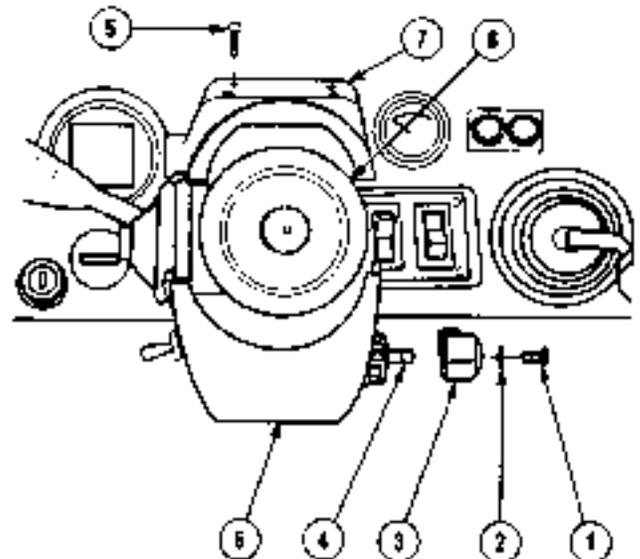
- (4) Loosen screw (10) and remove wire (11) from engine switch (4).
- (5) Loosen screw (12) and remove two wires (13) from engine switch (4).
- (6) Loosen screw (14) and remove wire (15) from engine switch (4).



b. Installation.

- (1) Install wire (15) on engine switch (4) and tighten screw (14).
- (2) Install two wires (13) on engine switch (4) and tighten screw (12).
- (3) Install wire (11) on engine switch (4) and tighten screw (10).
- (4) Install engine switch (4) in lower cover (6) with nut (9).
- (5) Install lower cover (6) on upper cover (7) and steering column (8) with four screws (5).
- (6) Install knob (3) on engine switch (4) with lock washer (2) and screw (1).

STEERING WHEEL SHOWN REMOVED FOR CLARITY



NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

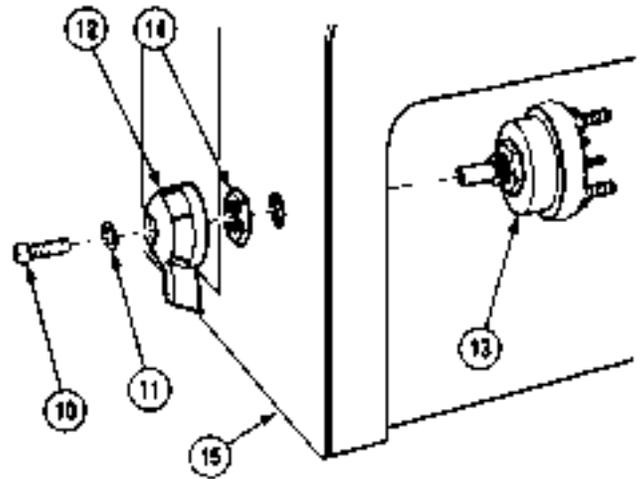
END OF TASK

7-15. MAIN POWER SWITCH REPLACEMENT (CONT).

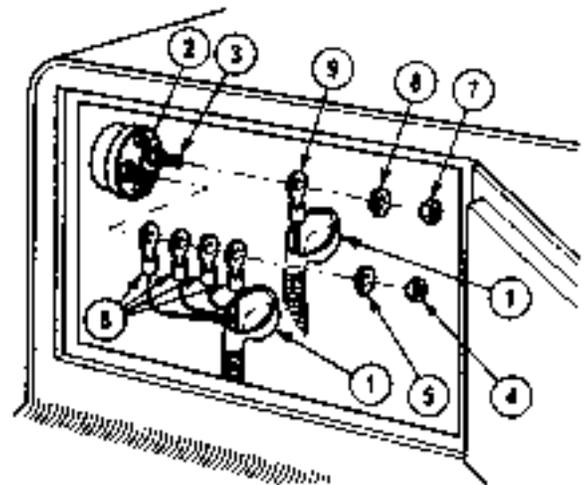
- (4) Remove screw (10), lock washer (11), and knob (12) from switch (13). Discard lock washer.
- (5) Remove nut (14) and switch (13) from cab wall (15).

b. Installation.

- (1) Install switch (13) on cab wall (15) with nut (14).
- (2) Install knob (12) on switch (13) with lock washer (11) and screw (10).



- (3) Install wire (9) on terminal (3) with lock washer (8) and nut (7).
- (4) Install four wires (6) on terminal (2) with lock washer (5) and nut (4).
- (5) Lift two terminal covers (1) on two terminals (2 and 3).



NOTE

Follow-on Maintenance:

- Close engine access panel (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-16. FRONT/REAR LIGHTS SWITCH REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive (Item 1, Appendix B)

Materials/Parts

Cable Ties (Item 4, Appendix C)
Tags, Identification (Item 21, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal

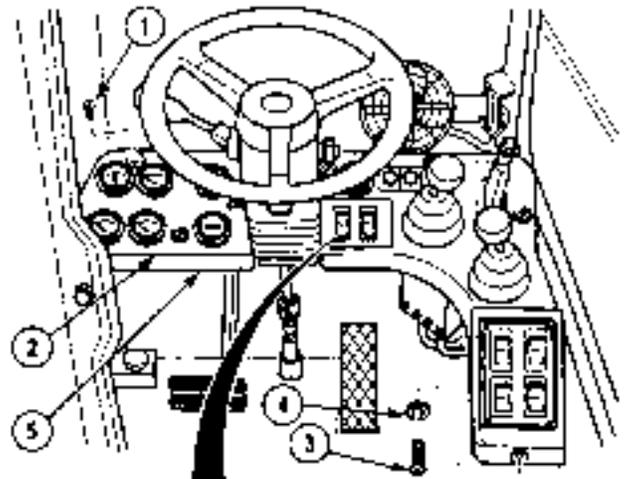
NOTE

- Replacement procedure for front lights switch is shown. The rear light switch is replaced the same way.

- Remove cable ties as required.

(1) Remove four screws (1) from instrument panel (2).

(2) Remove screw (3) and washer (4), and raise instrument panel (2) from dash frame (5).



NOTE

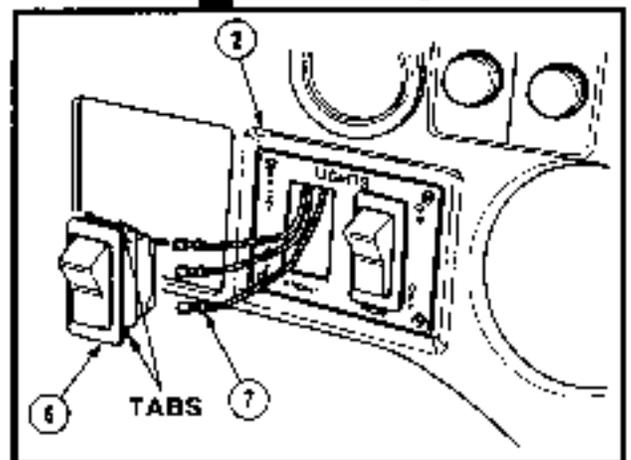
Depress tabs on ends of switch to remove switch.

(3) Remove switch (6) from instrument panel (2).

NOTE

Tag and mark all wires prior to removal.

(4) Disconnect three wires (7) from switch (6).



7-16. FRONT/REAR LIGHTS SWITCH REPLACEMENT (CONT).**b. Installation.**

- (1) Install three wires (7) on switch (6).
- (2) Install switch (6) in instrument panel (2).

NOTE

Install cable ties as required.

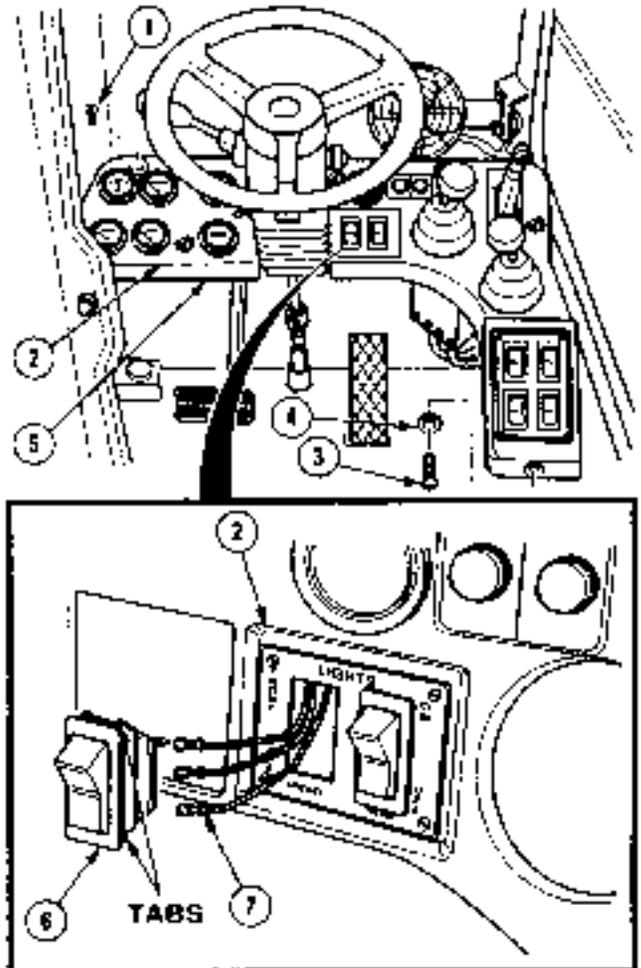
- (3) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).
- (4) Install four screws (1) on instrument panel (2).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-17. MASTER CYLINDER PRESSURE SWITCH REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

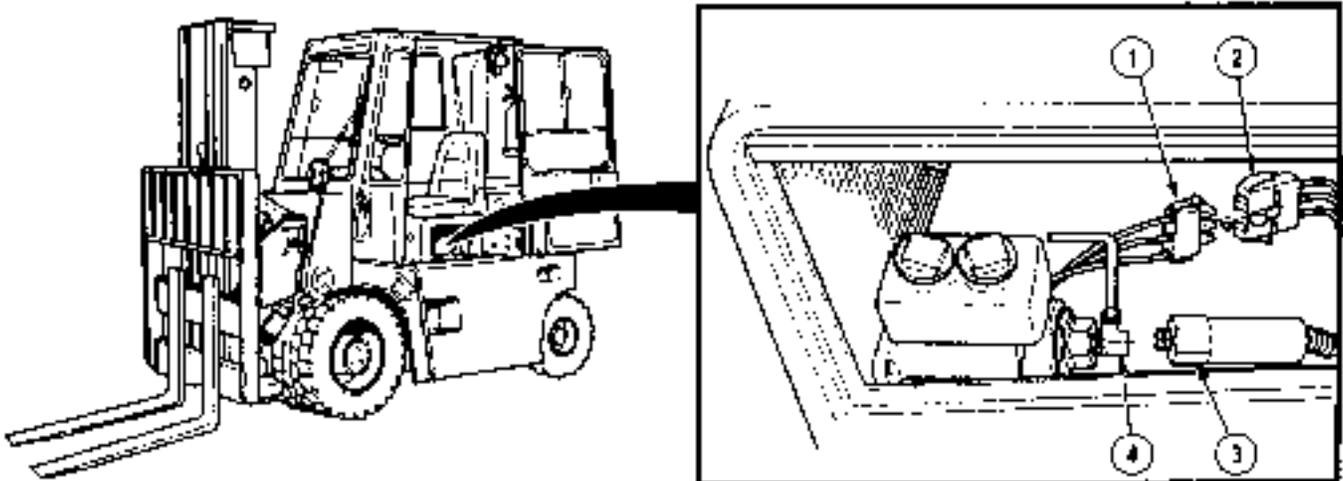
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)

Equipment Condition - Continued

Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Engine access panel opened
(TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

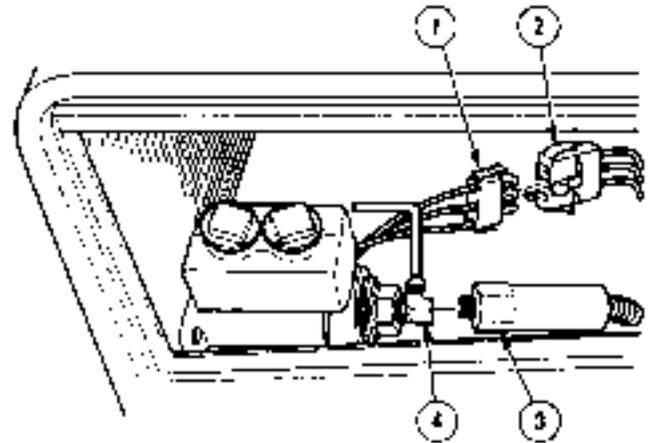
a. Removal

- (1) Disconnect connector P21 (1) from brake switch connector (2).
- (2) Remove pressure switch (3) from fitting (4).

7-17. MASTER CYLINDER PRESSURE SWITCH REPLACEMENT (CONT).**b. Installation.****WARNING**

Brake fluid, lubricants, and other chemicals can cause serious injury to eyes. If your eyes are effected, flush immediately with cold water and seek medical attention.

- (1) Install pressure switch (3) on fitting (4).
- (2) Connect brake switch connector (2) on connector P21 (1).

**NOTE**

Follow-on Maintenance:

- Close engine access panel (TM 10-3930-669-10).
- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-18. BRAKE SWITCH REPLACEMENT/ADJUSTMENT.

This task covers:

- a. Removal b. Installation c. Adjustment

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials/Parts

Cable Ties (Item 4, Appendix C)
Tags, Identification (Item 21, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal

NOTE

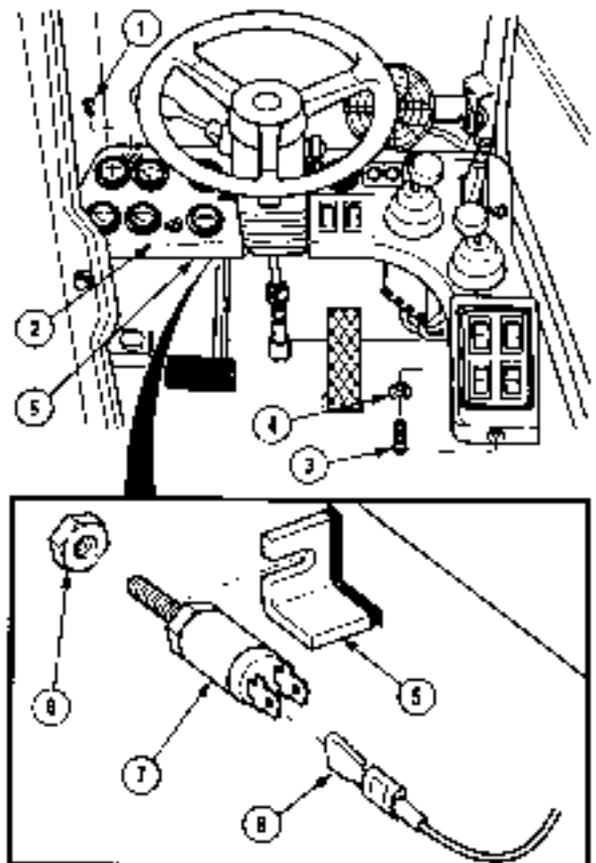
Cut cable ties as required.

- (1) Remove four screws (1) from instrument panel (2).
- (2) Remove screw (3) and washer (4), and raise instrument panel (2) from dash frame (5).

NOTE

- Tag and mark all wires prior to removal.
- Pull steering column cover up to see brake switch.

- (3) Disconnect two wires (6) from brake switch (7).
- (4) Loosen nut (8) and remove brake switch (7) from dash frame (5).



7-18. BRAKE SWITCH REPLACEMENT (CONT).

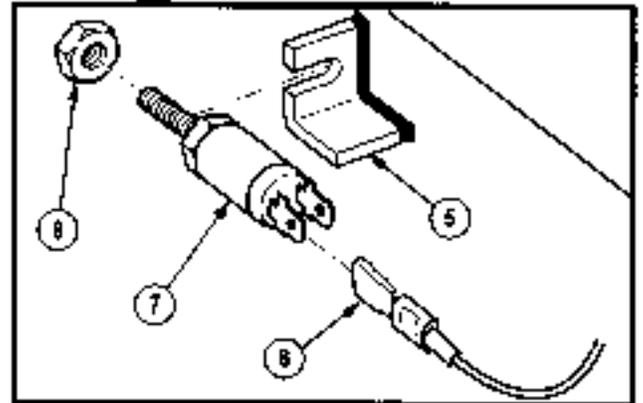
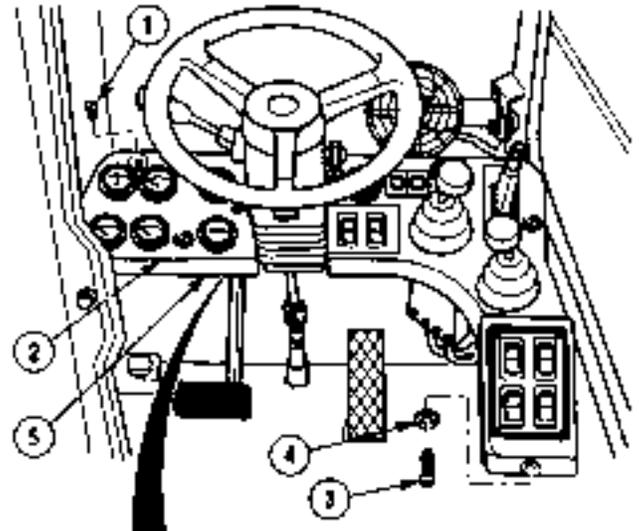
b. Installation.

- (1) Position brake switch (7) on dash frame (5) and tighten nut (8).
- (2) Connect two wires (6) on brake switch (7).

NOTE

Install cable ties as required.

- (3) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).
- (4) Install four screws (1) on instrument panel (2).



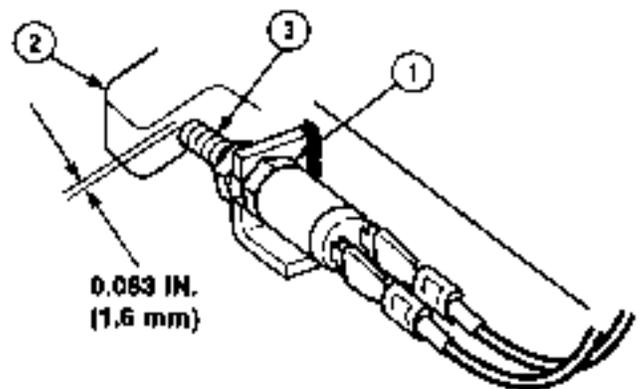
c. Adjustment.

- (1) With pedal up, adjust switch (1) position to .063 inch (1.6 mm) clearance between brake pedal actuating tab (2) and metal housing of switch (3) when switch is held closed.
- (2) If proper adjustment cannot be obtained, adjust brake pedal (Para 11-6).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

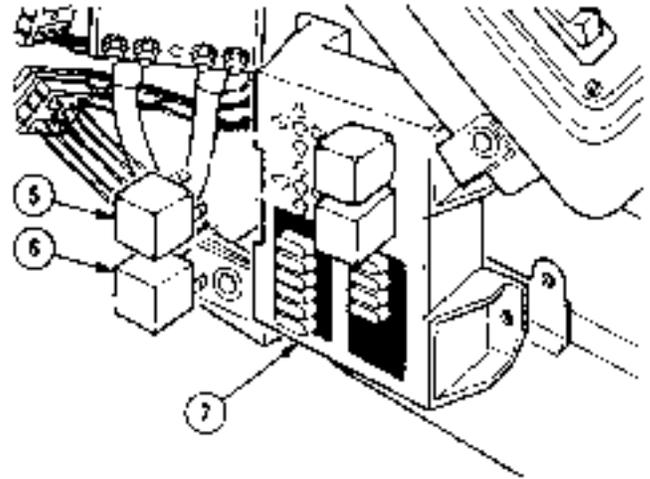


END OF TASK

7-19. TRANSMISSION SPEED SELECTOR/WIPER SWITCH REPLACEMENT (CONT).**NOTE**

Tag and mark diodes and relays prior to removal.

- (2) Remove two diodes (5) and relays (6) from fuse panel (7).

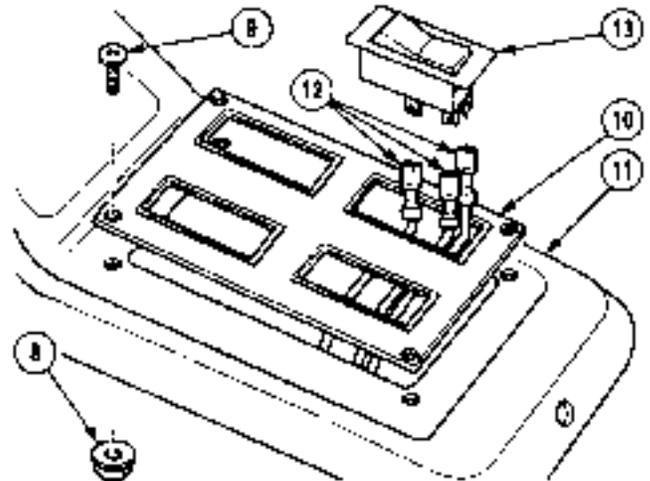


- (3) Remove four lock nuts (8), screws (9), and switch ID plate (10) from instrument panel (11). Discard lock nuts.

NOTE

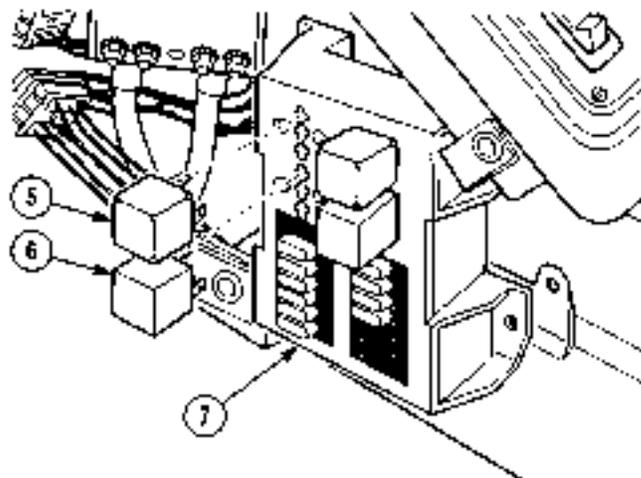
Tag and mark all wires prior to removal.

- (4) Disconnect three wires (12) from transmission speed selector switch (13).
- (5) Remove switch (13) from switch ID plate (10).

**b. Installation.**

- (1) Install switch (13) on switch ID plate (10).
- (2) Connect three wires (12) on switch (13).
- (3) Install switch ID plate (10) on instrument panel (11) with four screws (9) and lock nuts (8).

- (4) Install two relays (6) and diodes (5) on fuse panel (7).



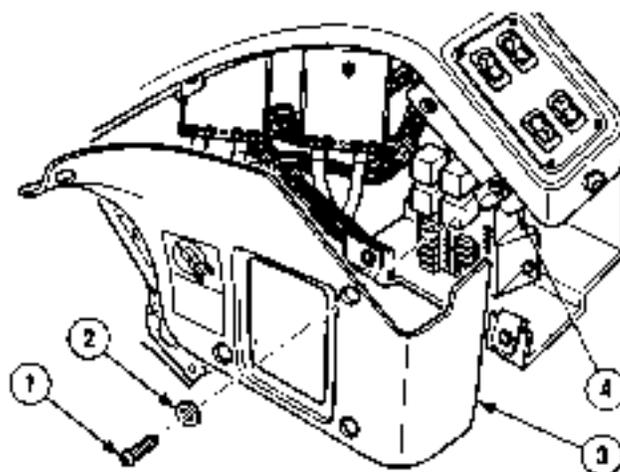
- (5) Install lower dash panel (3) on dash frame (4) with seven washers (2) and screws (1).

NOTE

Follow-on Maintenance:

- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



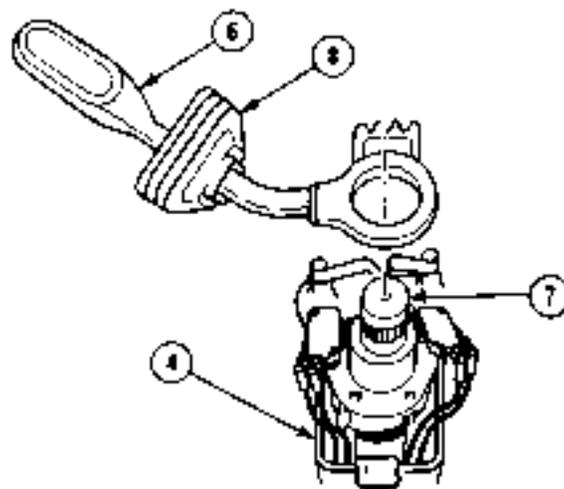
NOTE

Transmission shift lever should be in the neutral (center position) during removal.

- (3) Remove transmission shift lever (6) from steering shaft (7) of steering column (4).
- (4) Remove rubber boot (8) from transmission shift lever (6).

b. Installation.

- (1) Install rubber boot (8) on transmission shift lever (6).
- (2) Install transmission shift lever (6) on steering shaft (7) of steering column (4).
- (3) Install horn ring (5) on steering column (4).
- (4) Install lower cover (3) and upper cover (2) on steering column (4) with four screws (1).

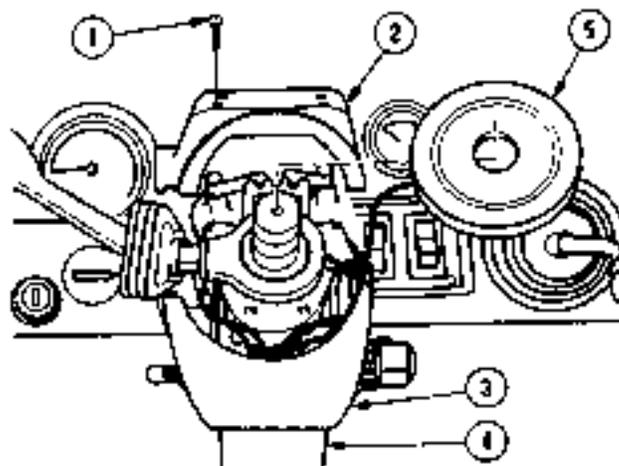


NOTE

Follow-on Maintenance:

- Install steering wheel (Para 13-3).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-21. TRANSMISSION CONTROL SWITCH REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools and Special Tools*

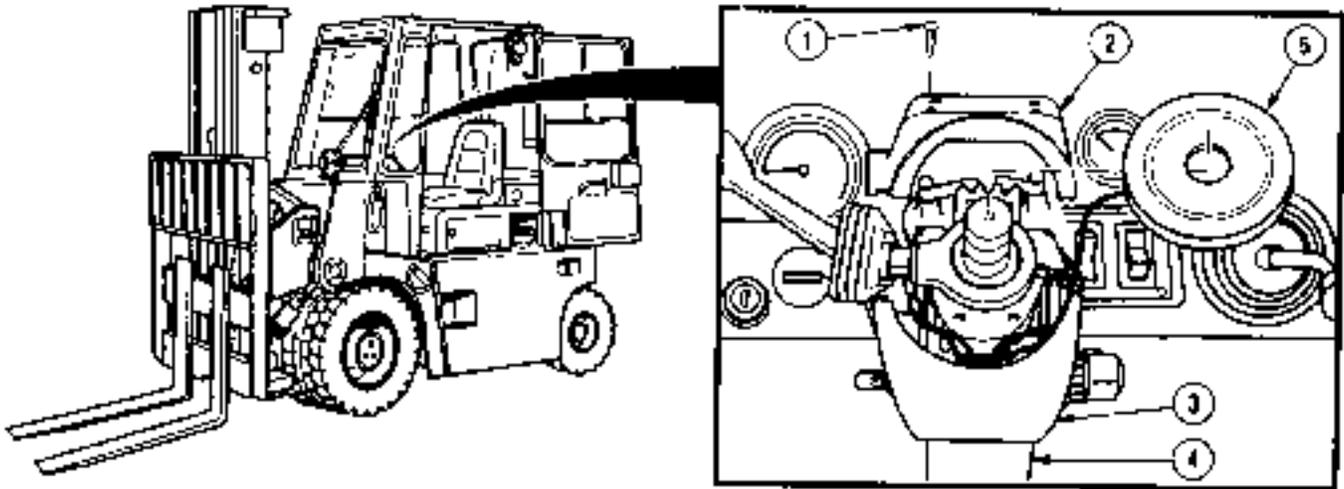
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Tags, Identification (Item 21, Appendix C)
Nut, Lock

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)
Steering wheel removed (Para 13-3)

a. Removal.**NOTE**

Replacement procedure for reverse transmission switch is shown. The forward transmission switch is replaced the same way.

- (1) Remove four screws (1), upper cover (2), and lower cover (3) from steering column (4).
- (2) Remove horn ring (5) from steering column (4).

NOTE

Place transmission shift lever in neutral (center position) prior to removal.

- (3) Remove transmission shift lever (6) and rubber boot (7) from steering shaft (8).

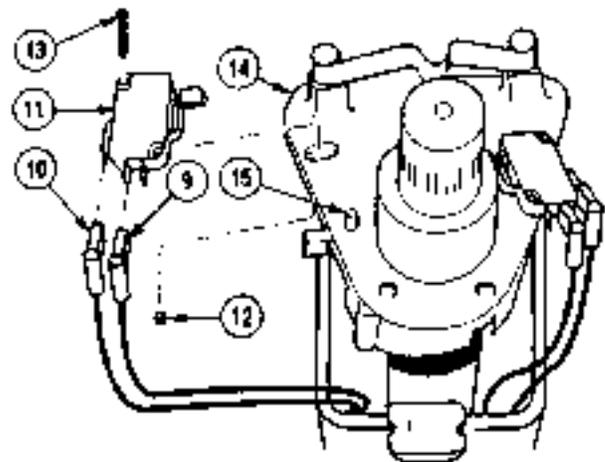
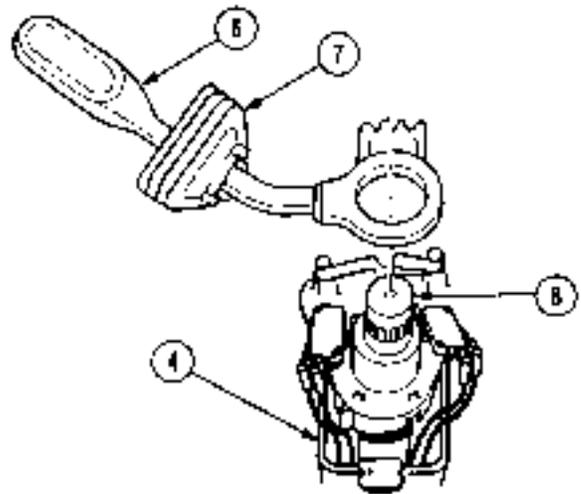
NOTE

Tag and mark all wires prior to removal.

- (4) Disconnect two wires (9 and 10) from switch (11).
- (5) Remove lock nut (12) and screw (13) from switch (11) and mounting plate (14). Discard lock nut.
- (6) Remove switch (11) from pin (15) on mounting plate (14).

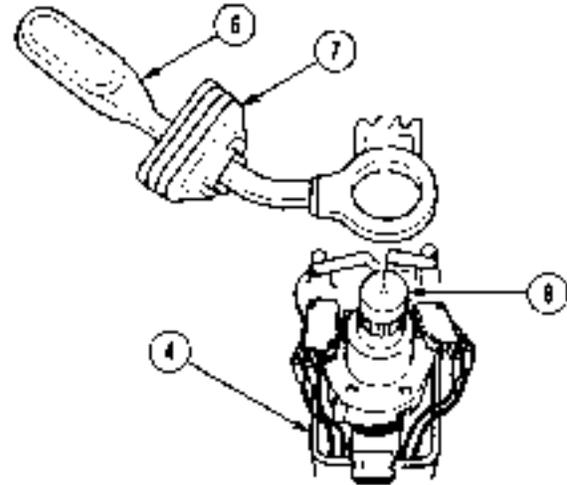
b. Installation.

- (1) Position switch (11) on pin (15) of mounting plate (14).
- (2) Install screw (13) and lock nut (12) on switch (11) and mounting plate (14).
- (3) Connect two wires (9 and 10) on switch (11).



7-21. TRANSMISSION CONTROL SWITCH REPLACEMENT (CONT).

- (4) Install transmission shift lever (6) with rubber boot (7) on steering shaft (8).

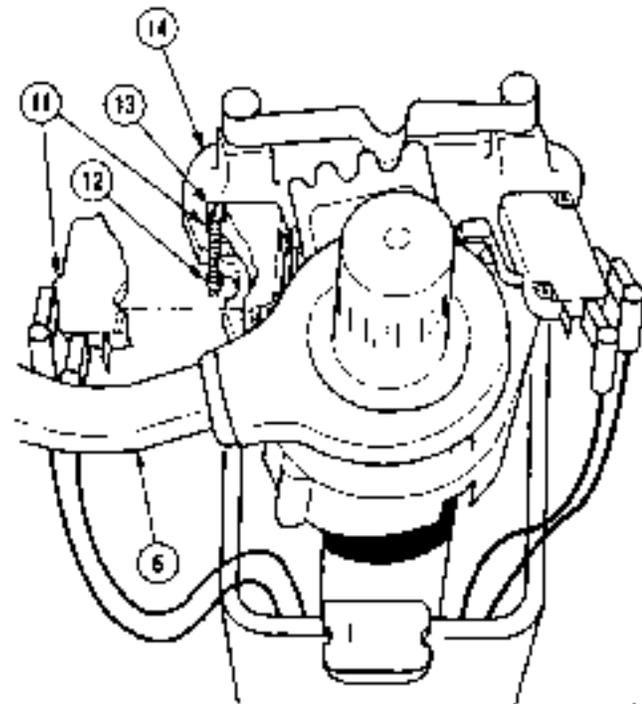


- (5) Position transmission shift lever (6) in reverse.

NOTE

Reverse and forward switch adjustments are similar. Reverse switch is shown.

- (6) Loosen lock nut (12) and screw (13) on switch (11) and mounting plate (14).
- (7) Move switch (11) toward transmission shift lever (6) until a click is heard in switch (11). Tighten lock nut (12).
- (8) Position transmission shift lever (6) in neutral.



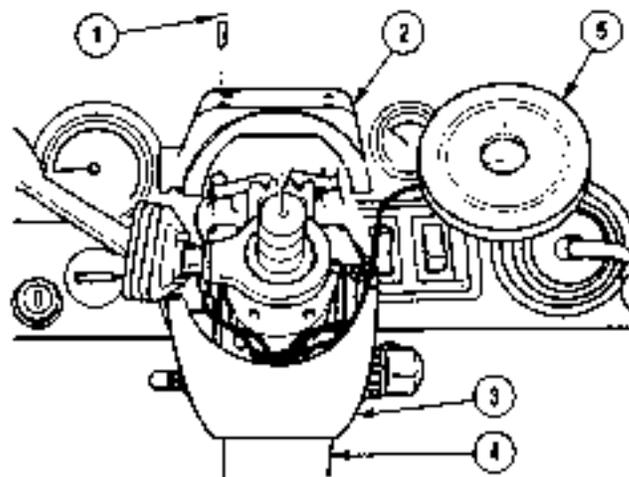
- (9) Install horn ring (5) on steering column (4).
- (10) Install lower cover (3) and upper cover (2) on steering column (4) with four screws (1).

NOTE

Follow-on Maintenance:

- Install steering wheel (Para 13-3).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-22. ENGINE TEMPERATURE SWITCH REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Tags, Identification (Item 21, Appendix C)
Washer, Lock (2)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal.**NOTE**

Tag and mark all wires before disconnecting.

- (1) Lift back cover (1) and remove two screws (2), lock washers (3), and three wires (4, 5, and 6) from switch (7). Discard lock washers.
- (2) Remove switch (7) from engine oil filter head (8).

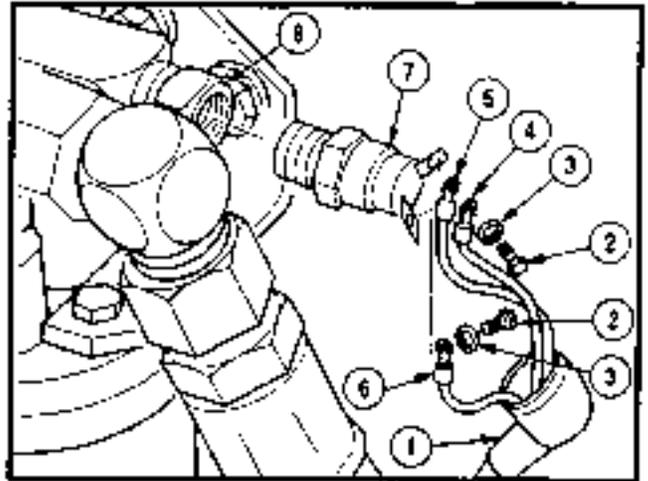
b. Installation.

- (1) Install switch (7) on engine oil filter head (8).
- (2) Install three wires (4, 5, and 6) on switch (7) with two lock washers (3) and screws (2). Lift cover (1).

NOTE

Follow-on Maintenance:

- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-23. DRIVE AXLE OIL TEMPRATURE SWITCH REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

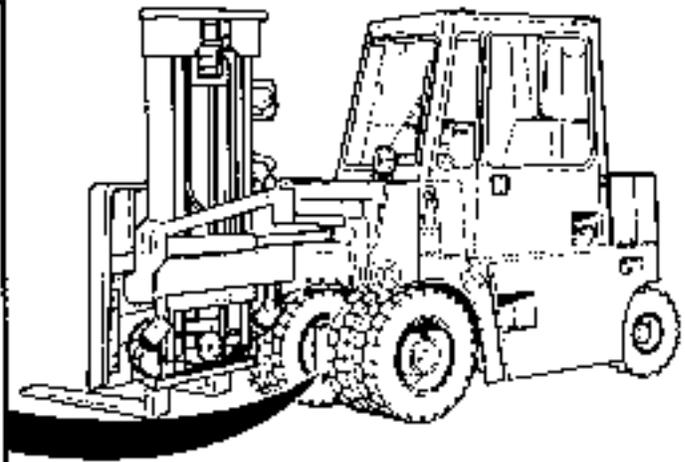
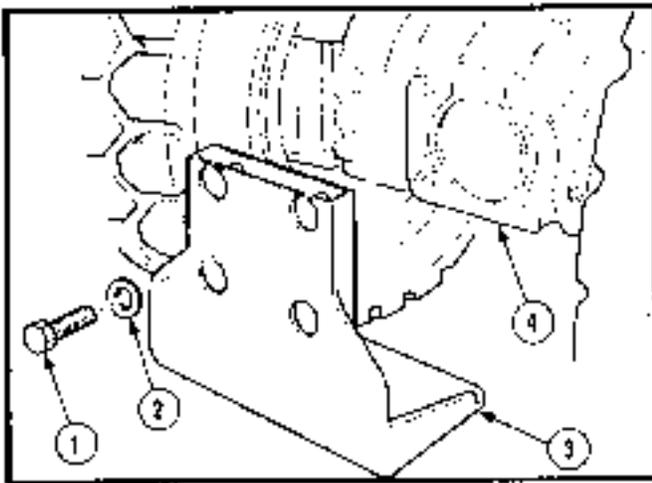
Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Mast pivoted 90°(TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

Materials /Parts

Washer, Lock (2)

a. Removal.



- (1) Remove four screws (1), washers (2) and bracket (3) from drive axle housing (4).

7-23. DRIVE AXLE OIL TEMPERATURE SWITCH REPLACEMENT (CONT).

- (2) Lift back cover (5) and remove two screws (6), lock washers (7), and three wires (8, 9, and 10) from drive axle oil temperature switch (11). Discard lock washers.
- (3) Remove drive axle oil temperature switch (11) from drive axle housing (4).

b. Installation.

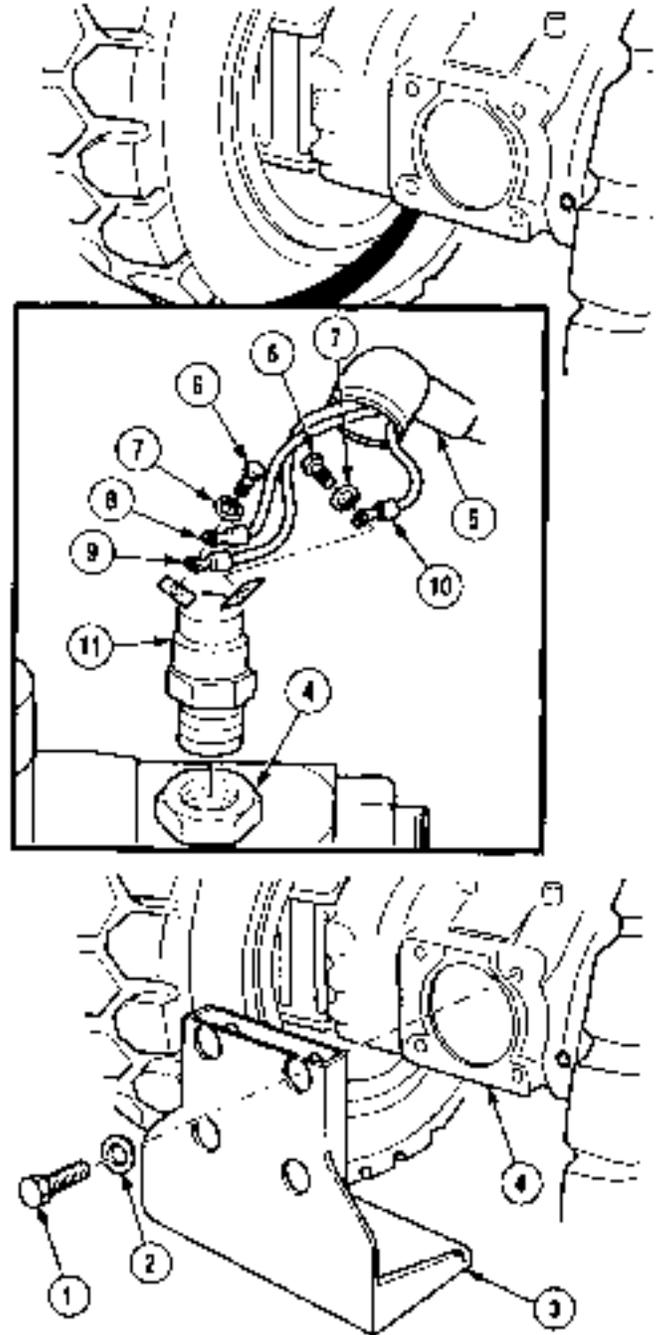
- (1) Install drive axle oil temperature switch (11) on drive axle housing (4).
- (2) Install three wires (8, 9, and 10) on drive axle oil temperature switch (11) with two lock washers (7) and screws (6). Lift cover (5).
- (3) Install bracket (3) on drive axle housing (4) with four washers (2) and screws (1).

NOTE

Follow-on Maintenance:

- Connect batteries (Para 7-48).
- Pivot mast to front (TM 10-3930-669-10)
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-24. TRANSMISSION INCHING VALVE REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

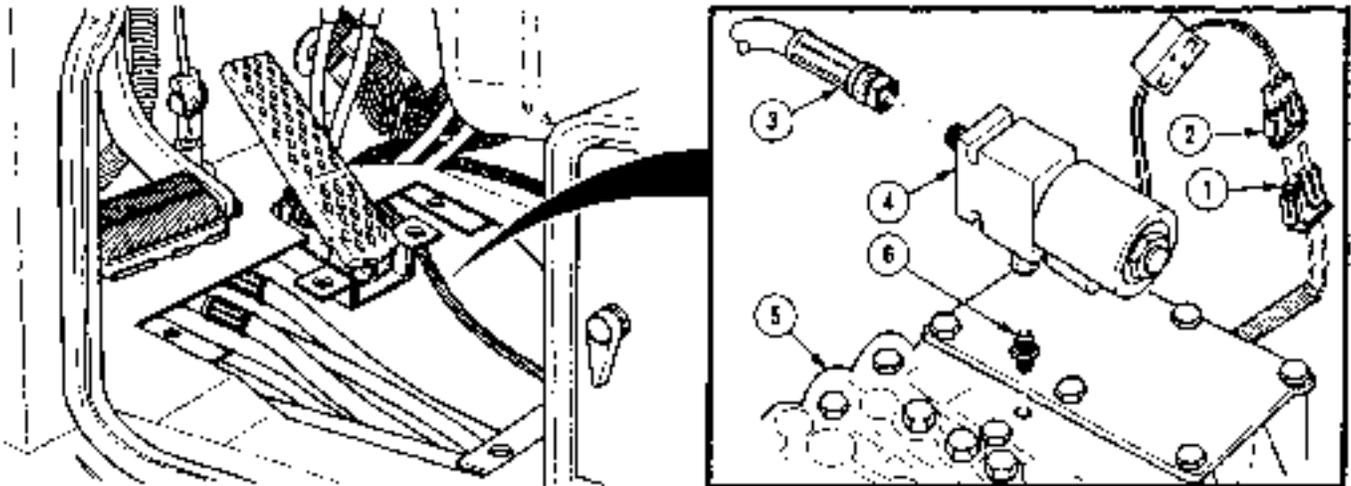
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Cap and Plug Set (Item 5, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab floor plate removed (Para 15-12)

a. Removal.

- (1) Disconnect connector P19 (1) from inching valve connector (2).
- (2) Remove hose (3) from inching valve (4).
- (3) Remove inching valve (4) from transmission housing (5).
- (4) Remove adapter (6) from inching valve (4).

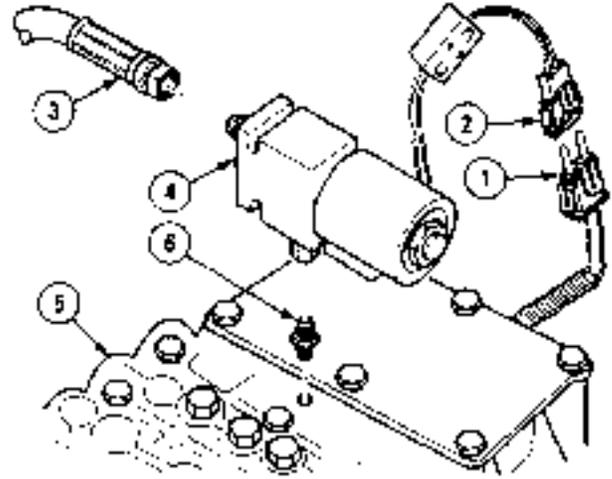
7-24. TRANSMISSION INCHING VALVE REPLACEMENT (CONT).**b. Installation.**

- (1) Install adapter (6) on inching valve (4).
- (2) Install inching valve (4) on transmission housing (5).
- (3) Install hose (3) on inching valve (4).
- (4) Install inching valve connector (2) on connector P19 (1).

NOTE

Follow-on Maintenance:

- Install cab floor plate (Para 15-12).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-25. GAUGE LAMP REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

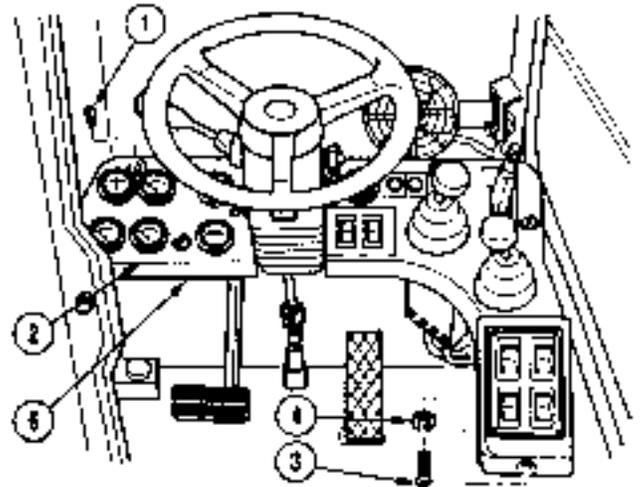
Cable, Ties (Item 4, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal**NOTE**

- Replacement procedure for engine oil temperature gauge lamp is shown. All other gauge lamps are replaced the same way.
 - Cut cable ties as required.
- (1) Remove four screws (1) from instrument panel (2).
 - (2) Remove screw (3) and washer (4), and raise instrument panel (2) from dash frame (5).



7-25. GAUGE LAMP REPLACEMENT (CONT).

- (3) Remove lamp socket (6) from gauge (7).
- (4) Remove lamp (8) from lamp socket (6).

b. Installation.

- (1) Install lamp (8) in lamp socket (6).
- (2) Install lamp socket (6) in gauge (7).

NOTE

Install cable ties as required.

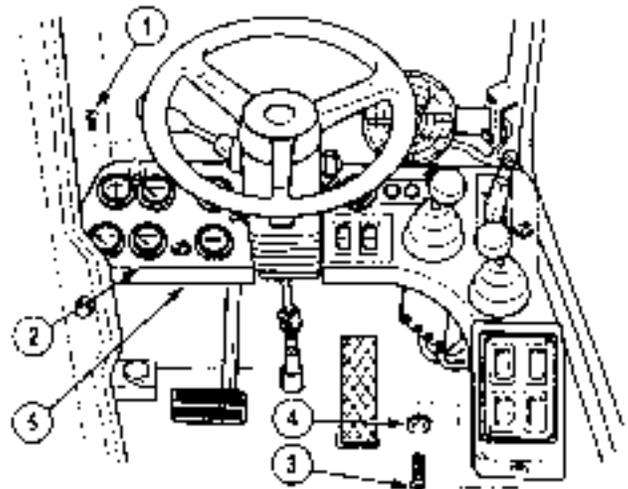
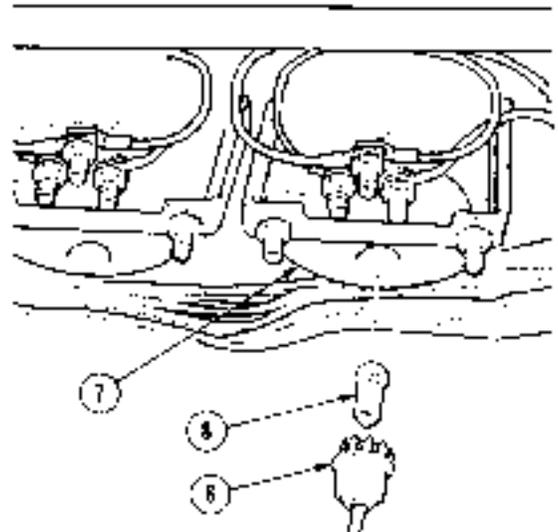
- (3) Install instrument panel (2) on dash frame (5) with washer (4) and screw (3).
- (4) Install four screws (1) on instrument panel (2).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-26. FRONT/REAR/MAST LIGHT LAMP REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

a. Removal**NOTE**

Replacement procedure for rear light lamp is shown. Front and mast lamps are replaced the same way.

- (1) Remove lamp (1) from light cover (2).
- (2) Disconnect lamp (1) from light connector (3).

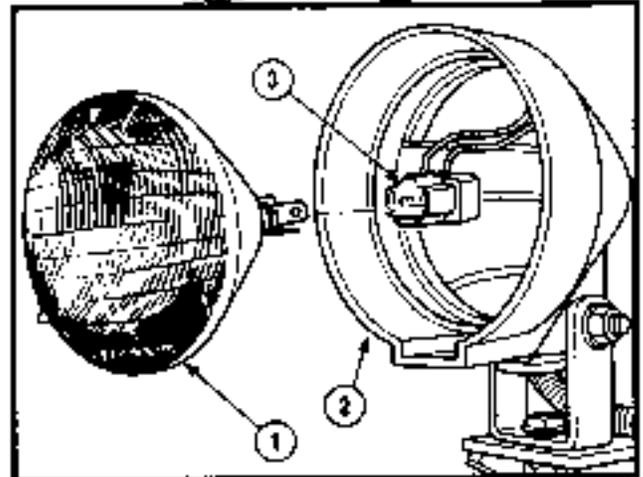
b. Installation.

- (1) Connect light connector (3) on lamp (1).
- (2) Install lamp (1) in light cover (2).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

7-27. TAILLIGHT LAMP REPLACEMENT.

This task covers:

a. Removal

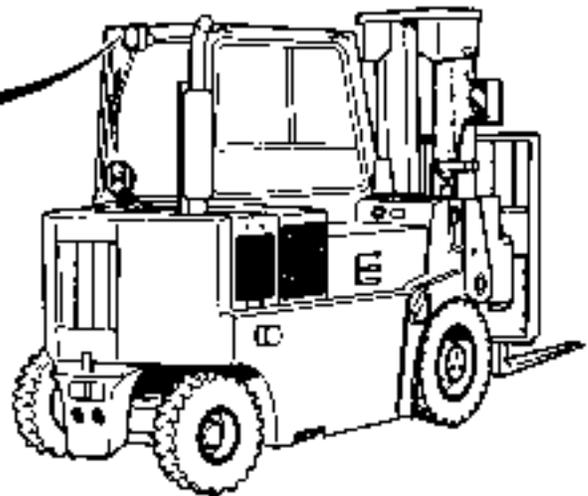
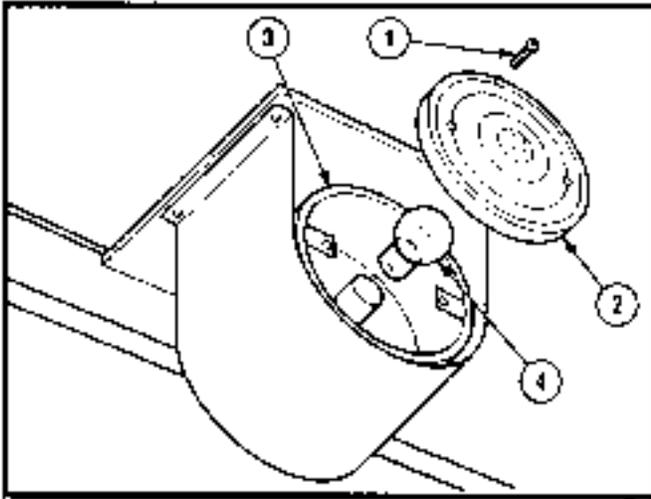
b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

a. Removal

(1) Remove two screws (1) and taillight lamp lens (2) from taillight lamp housing (3).

(2) Remove lamp (4) from taillight lamp housing (3).

b. Installation.

(1) Install lamp (4) in taillight lamp housing (3).

(2) Install taillight lamp lens (2) on taillight lamp housing (3) with two screws (1).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-28. FRONT WORK LIGHT REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

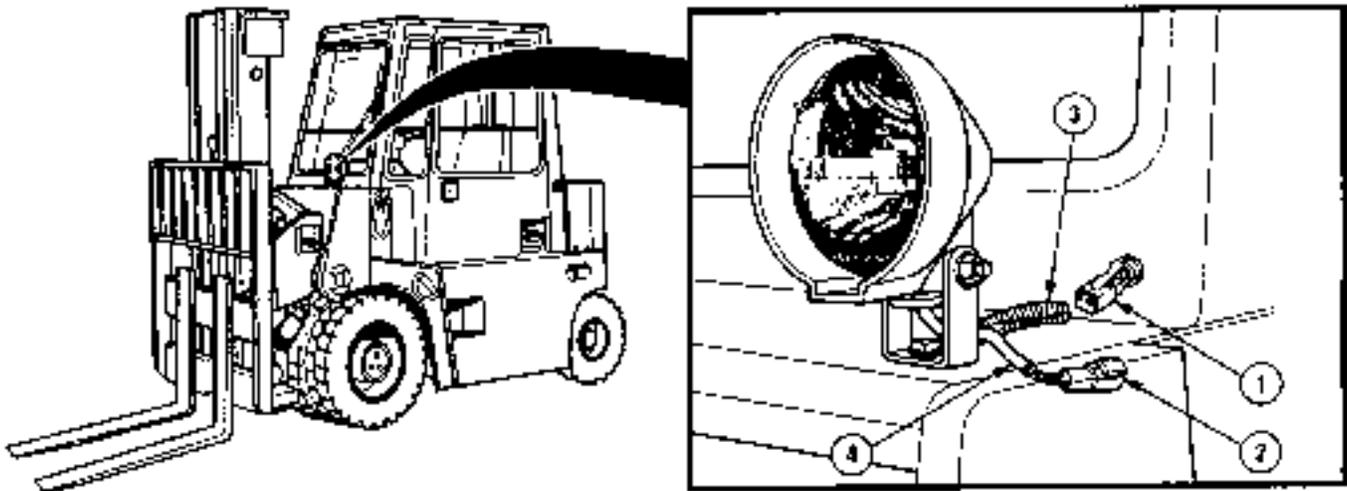
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Washers, Lock (2)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

a. Removal

- (1) Disconnect connector (1) from light connector (2).
- (2) Remove conduit (3) from light wire (4).

7-28. FRONT WORK LIGHT REPLACEMENT (CONT).

- (3) Remove nut (5), screw (6), two lock washers (7), and light assembly (8) from bracket (9). Discard lock washers.
- (4) Remove screw (10), washer (11), and bracket (9) from chassis (12).

b. Installation.

- (1) Install bracket (9) on chassis (12) with washer (11) and screw (10).
- (2) Install light assembly (8) on bracket (9) with two lock washers (7), screw (6), and nut (5).

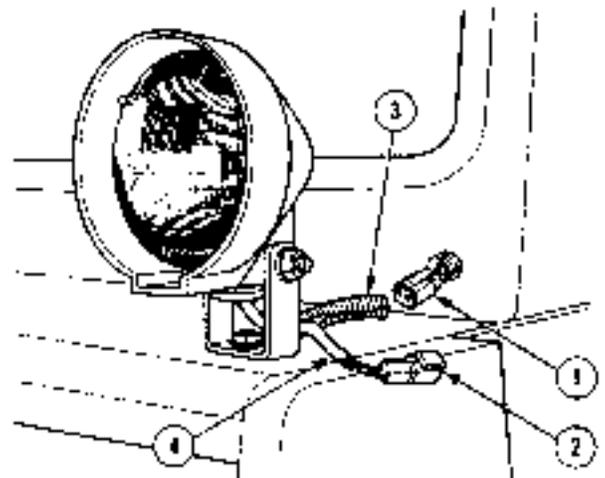
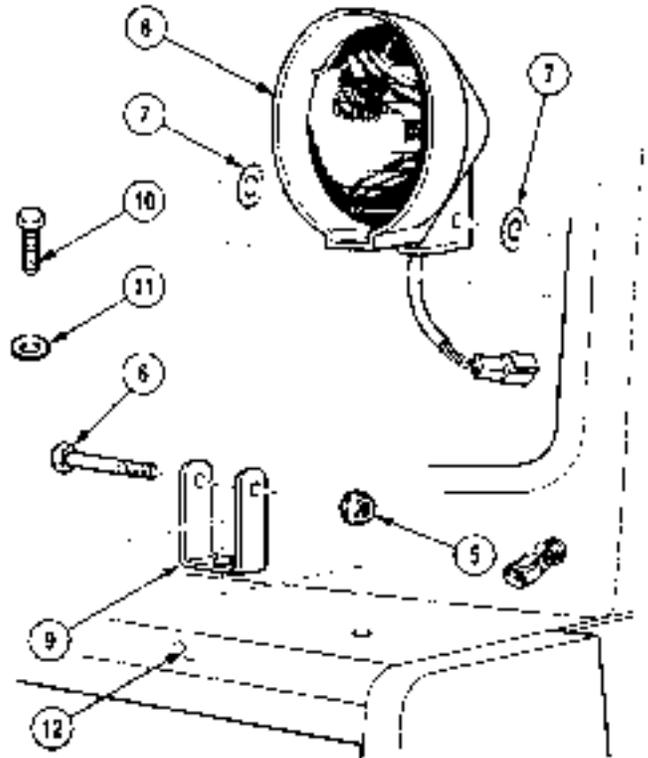
- (3) Install light wire (4) in conduit (3).
- (4) Connect connector (1) on light connector (2).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-29. REAR WORK LIGHT REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

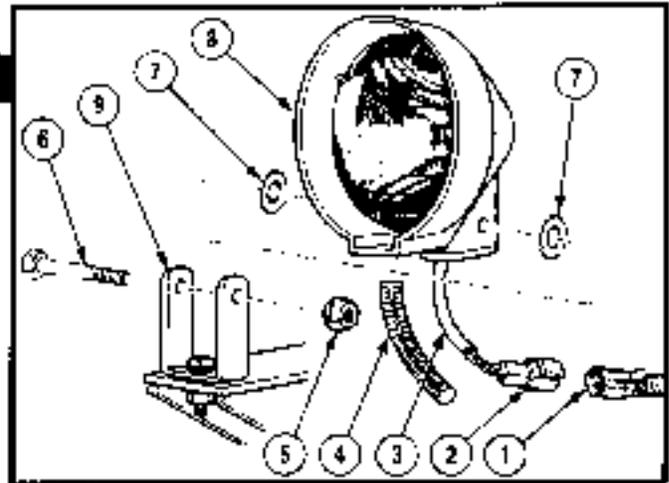
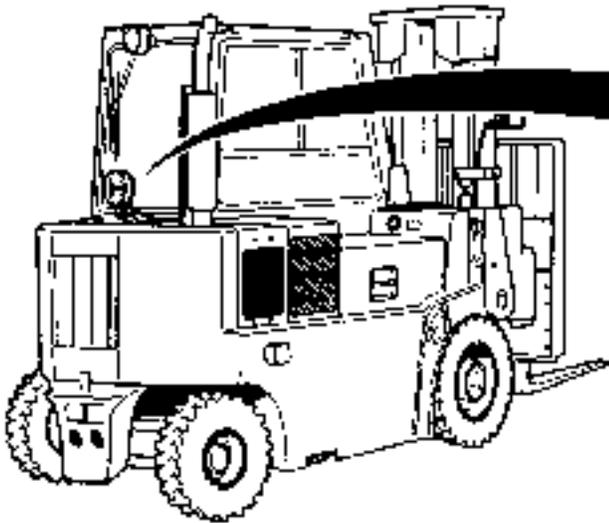
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Washers, Lock (2)
Washer, Lock

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

a. Removal.

- (1) Disconnect connector (1) from light connector (2).
- (2) Remove light wire (3) from conduit (4).
- (3) Remove nut (5), screw (6), two lock washers (7), and light assembly (8) from bracket (9). Discard lock washers.

7-29. REAR WORK LIGHT REPLACEMENT (CONT).

- (4) Remove nut (10), lock washer (11), screw (12), and bracket (9) from bracket (13).
- (5) Remove two screws (14), washers (15), and bracket (13) from chassis (16).

b. Installation.

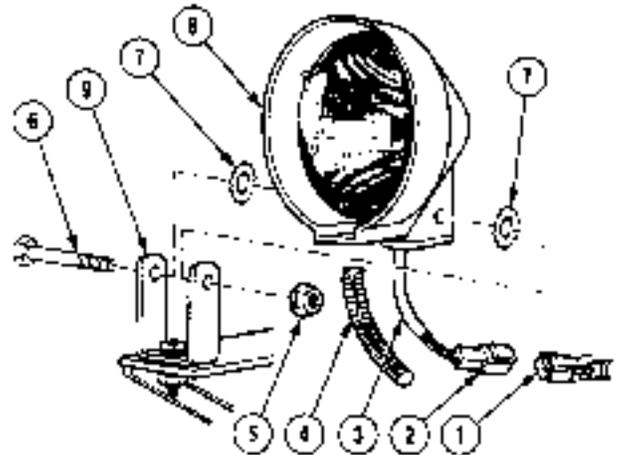
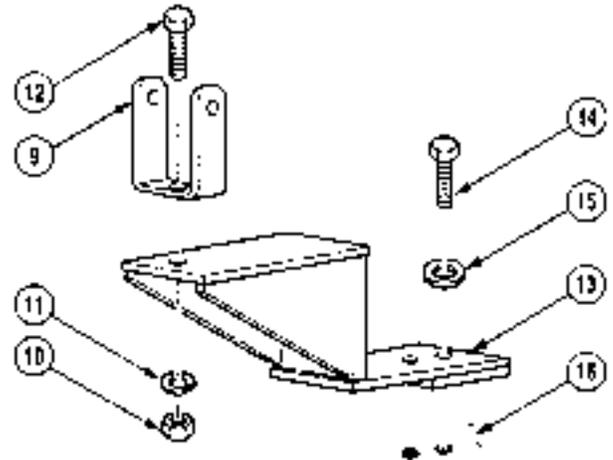
- (1) Install bracket (13) on chassis (16) with two washers (15) and screws (14).
- (2) Install bracket (9) on bracket (13) with screw (12), lock washer (11), and nut (10).
- (3) Install light assembly (8) on bracket (9) with two lock washers (7), screw (6), and nut (5).
- (4) Install light wire (3) in conduit (4).
- (5) Connect connector (1) on light connector (2).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-30. MAST LIGHT REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

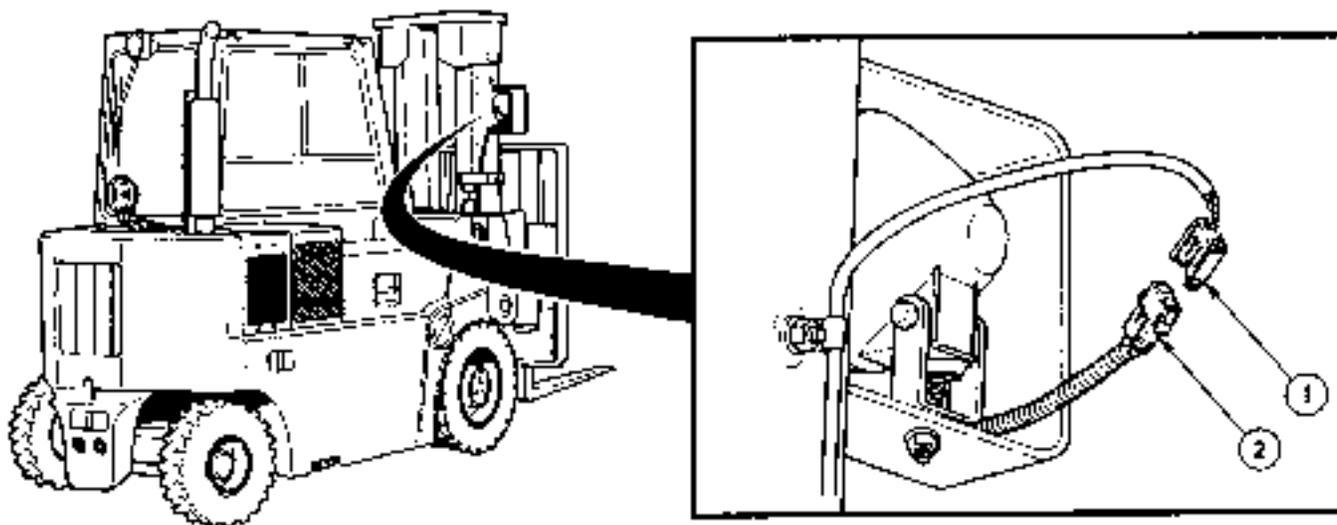
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

Materials /Parts

Washers, Lock (2)
Washer, Lock

a. Removal.

(1) Disconnect connector (1) from light connector (2).

7-30. MAST LIGHT REPLACEMENT (CONT).

- (2) Remove nut (3), screw (4), two lock washers (5), and light assembly (6) from bracket (7). Discard lock washers.
- (3) Remove light wire (8) from conduit (9).
- (4) Remove nut (10), lock washer (11), screw (12), and bracket (7) from mast (13). Discard lock washer.

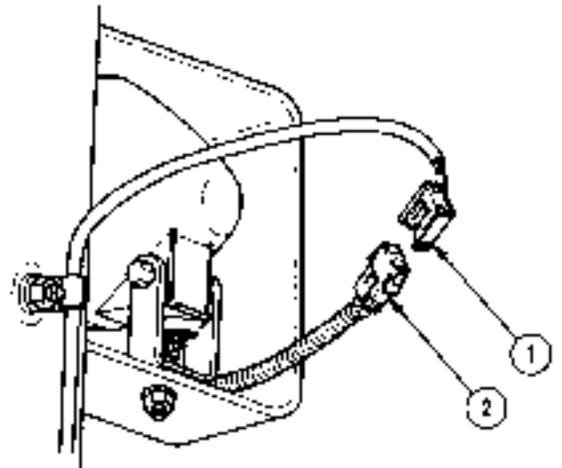
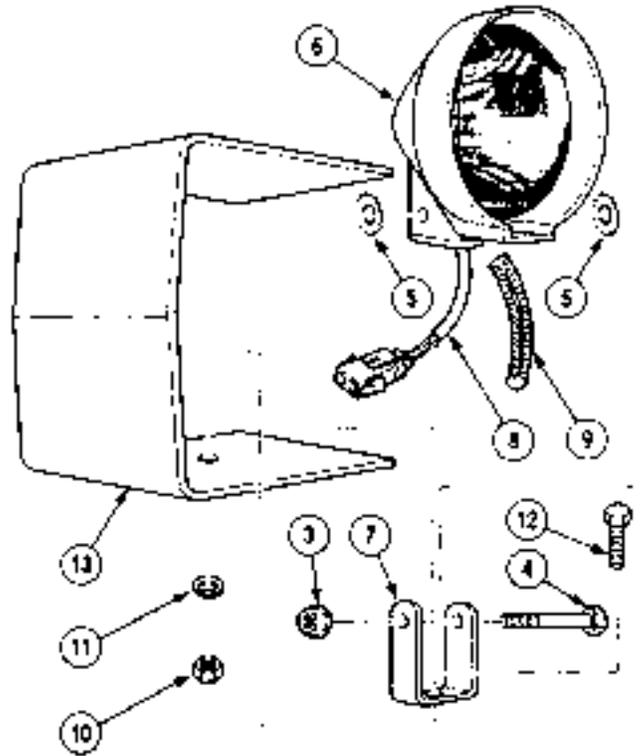
b. Installation.

- (1) Install bracket (7) on mast (13) with screw (12), lock washer (11) and nut (10).
- (2) Install light wire (8) in conduit (9).
- (3) Install light assembly (6) on bracket (7) with two lock washers (5), screw (4), and nut (3).
- (4) Connect connector (1) on light connector (2).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

7-31. TAILLIGHT/STOPLIGHT REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

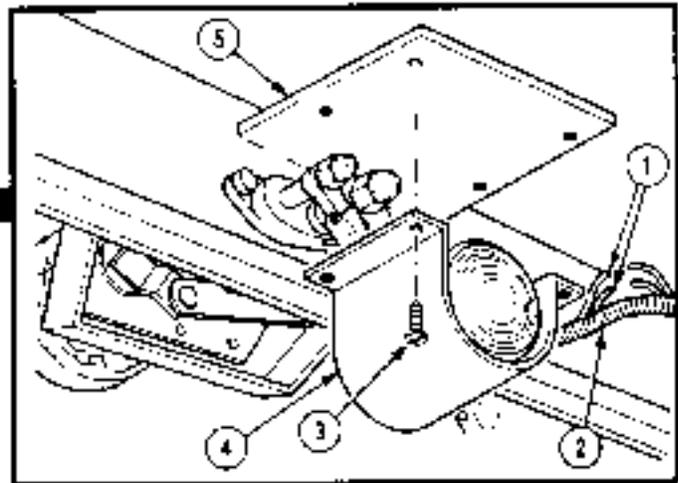
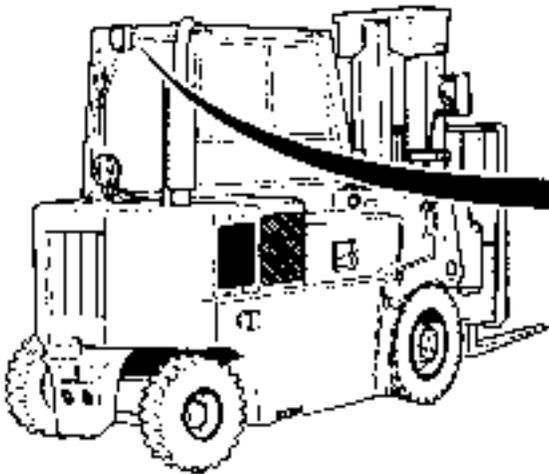
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Washers, Lock (2)
Tags, Identification (Item 21, Appendix C)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)

a. Removal

(1) Remove two wires (1) from conduit (2).

NOTE

- Separate the wires where the colors of the wires differ.
- Tag and mark all wires before separating.

(2) Separate two wires (1).

(3) Remove four screws (3) and taillight/stoplight assembly (4) from bracket (5).

7-31. TAILLIGHT/STOPLIGHT REPLACEMENT (CONT).

- (4) Remove two screws (6) and back cover (7) from housing (8).
- (5) Remove two nuts (9), lock washers (10), and taillight/stoplight assembly (4) from housing (8). Discard lock washers.

b. Installation.

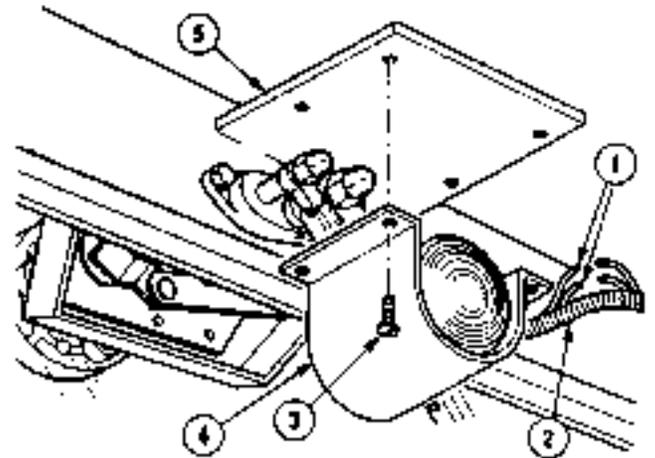
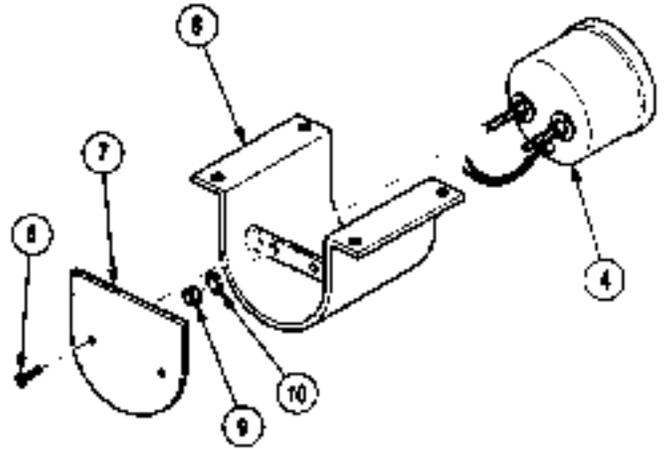
- (1) Install taillight/stoplight assembly (4) on housing (8) with two lock washers (10) and nuts (9).
- (2) Install cover (7) on housing (8) with two screws (6).
- (3) Install taillight/stoplight assembly (4) on bracket (5) with four screws (3).
- (4) Connect two wires (1).
- (5) Install two wires (1) in conduit (2).

NOTE

Follow-on Maintenance:

- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-32. CAB INTERIOR LIGHT REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

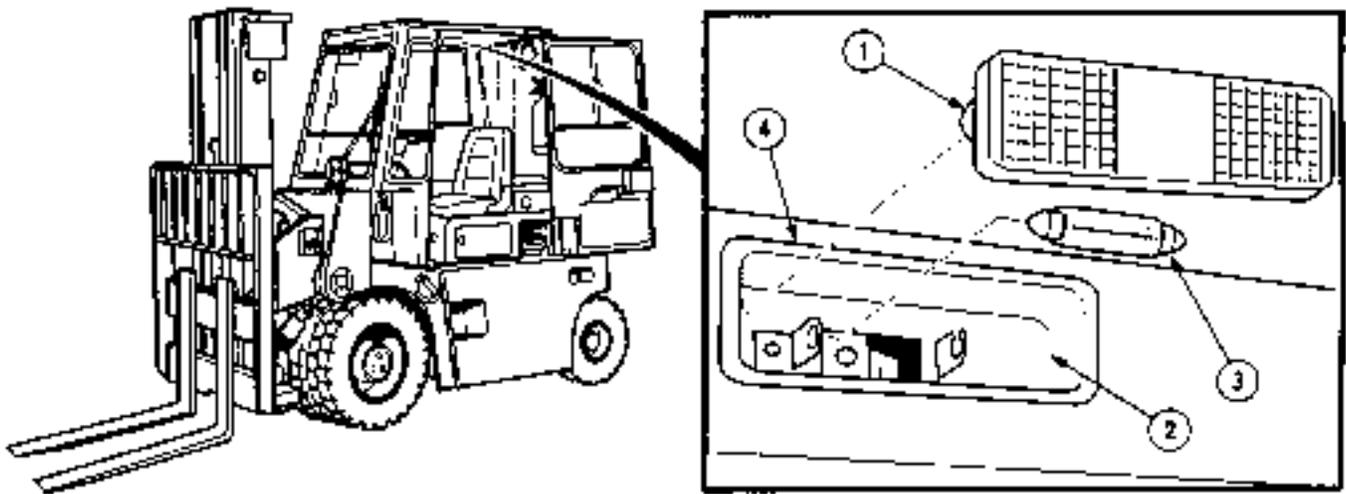
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Tags, Identification (Item 21, Appendix C)
Washer, Lock (6)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

a. Removal**NOTE**

- There are two cab interior lights. Both are replaced the same way.
- Depress tabs on ends of light to remove light.

- (1) Remove lens (1) from bracket (2).
(2) Remove cab interior lamp (3) from light (4).

7-32. CAB INTERIOR LIGHT REPLACEMENT (CONT).

NOTE

Tag and mark wires prior to removal.

- (3) Remove two screws (5), six lock washers (6), wire (7), and bracket (8) from cab (9). Discard lock washers.
- (4) Disconnect two wires (7 and 10) from light (3).
- (5) Remove light (3) from bracket (8).

b. Installation.

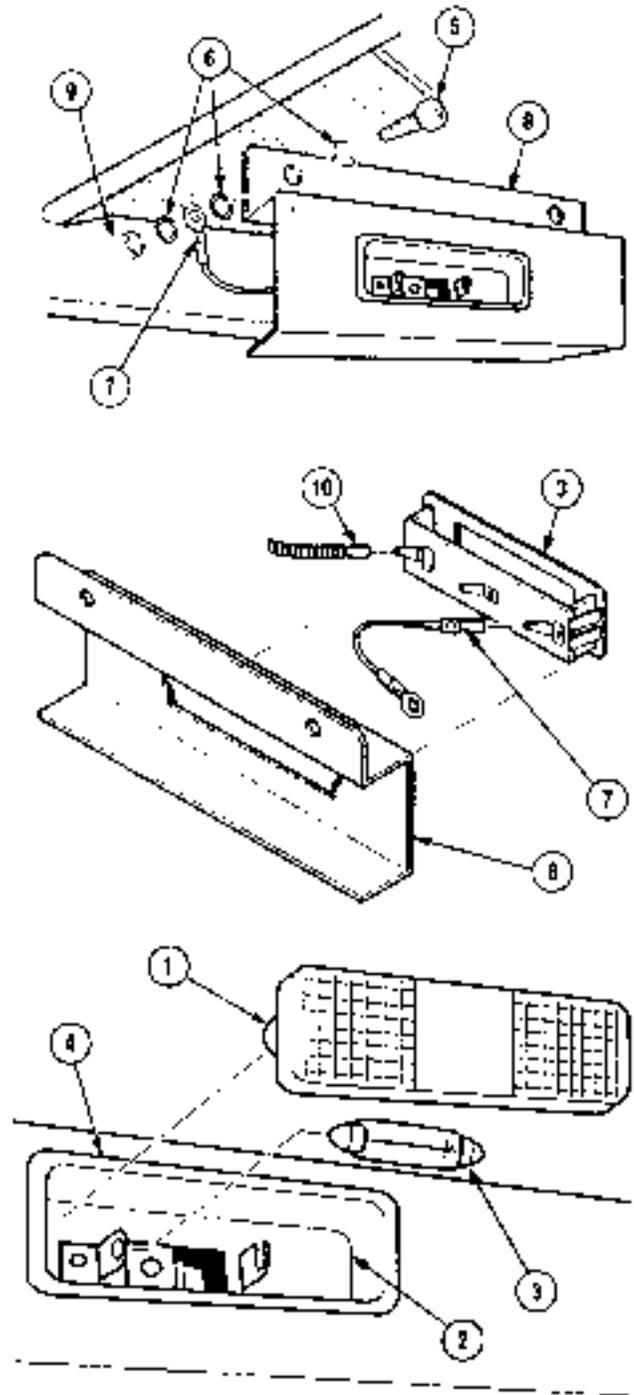
- (1) Install light (3) on bracket (8).
- (2) Connect two wires (7 and 10) on light (3).
- (3) Install wire (7) and bracket (8) on cab (9) with six lock washers (6) and two screws (5).
- (4) Install cab interior lamp (3) in light (4).
- (5) Install lens (1) in bracket (2).

NOTE

Follow-on Maintenance:

- Connect batteries (Para 7-48).
- Close cab door (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-33. FUSE, RELAY, DIODE, AND BUSS, BAR REPLACEMENT.

This task covers:

a. Removal

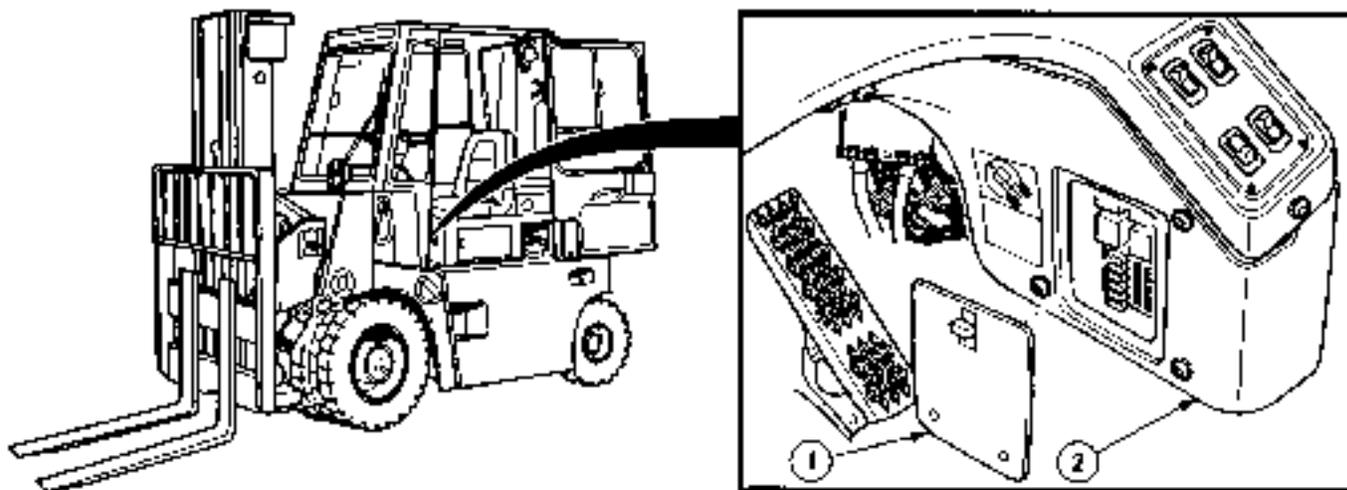
b. Installation

INITIAL SETUP*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)

a. Removal.**NOTE**

Steps (1) through (5) below cover the replacement of all fuses, diodes, and relays R2 and R3.

- (1) Remove fuse cover (1) from lower dash panel (2).

7-33. FUSE, RELAY, DIODE, AND BUSS BAR REPLACEMENT (CONT).

NOTE

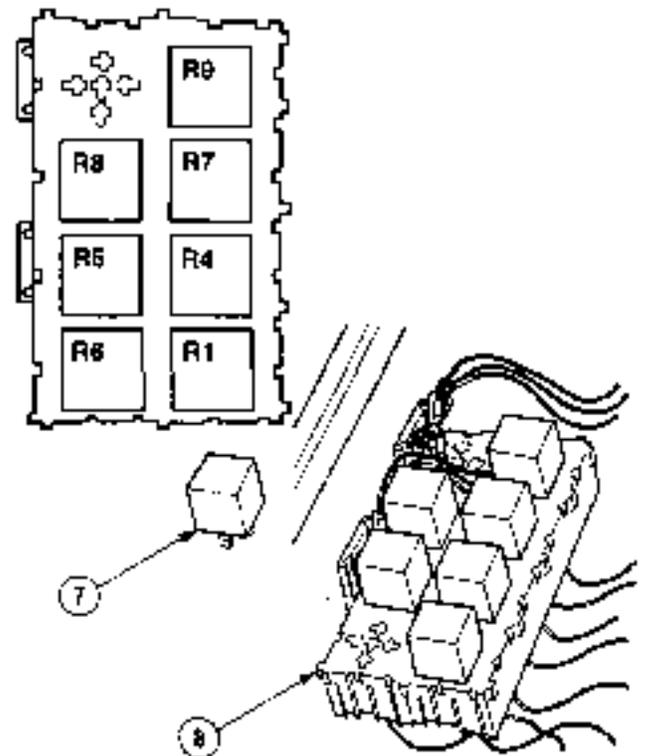
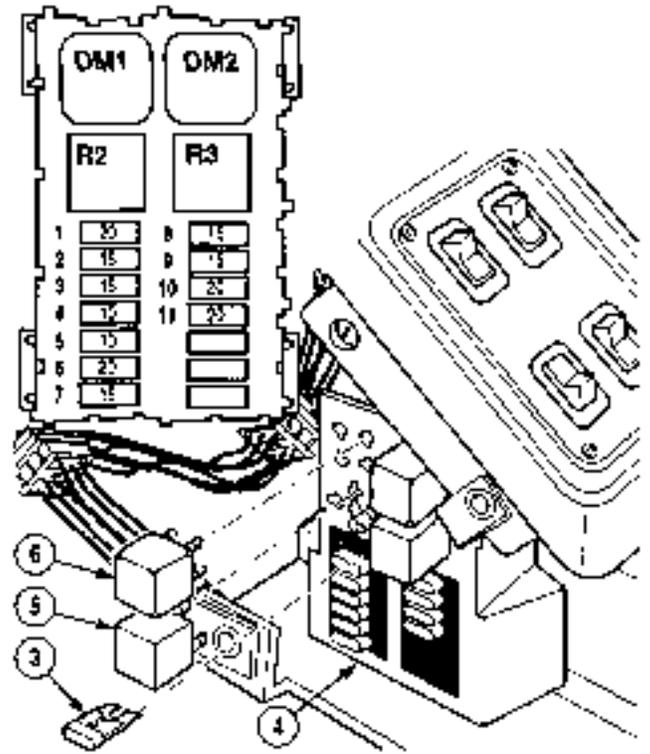
Refer to wiring diagram for specific fuse, diode, and relay replacement.

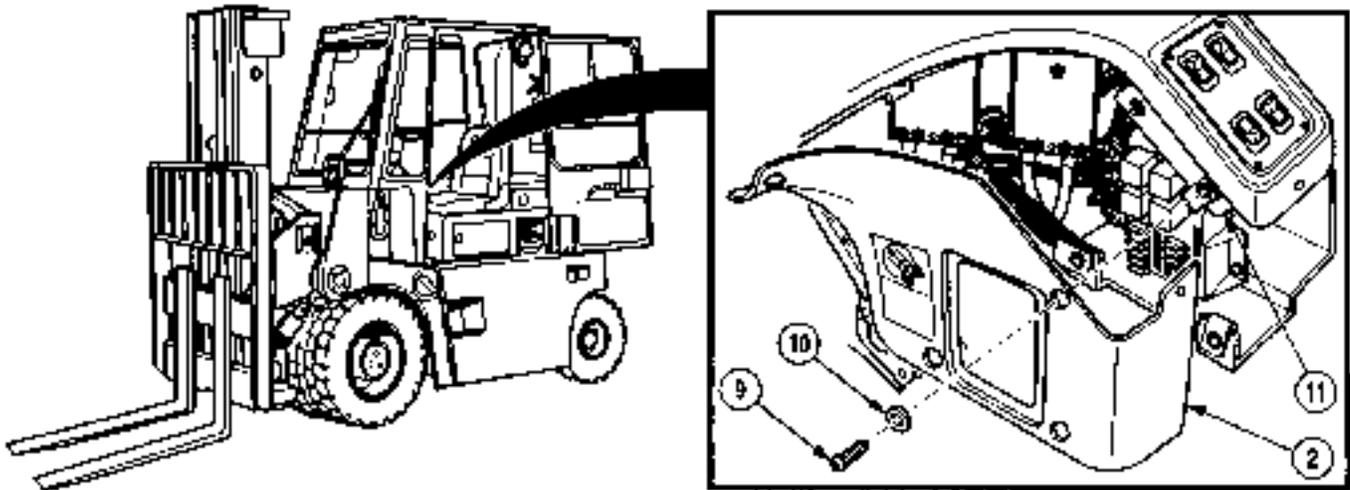
- (2) Remove fuse (3) from fuse panel (4).
- (3) Remove relay (5) from fuse panel (4).
- (4) Remove diode (6) from fuse panel (4).

NOTE

- Steps (5) and (6) below cover the replacement of relays R1 and R4 through R9.
- Refer to wiring diagram for specific relay replacement.

- (5) Remove engine ventilation panel (Para 6-2).
- (6) Remove relay (7) from relay panel (8).

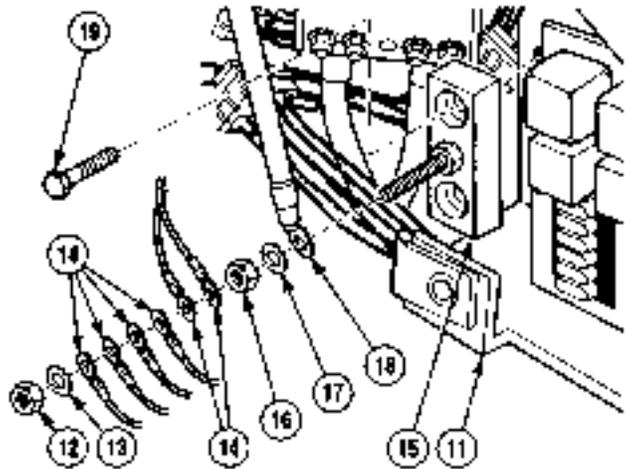




- (7) Remove seven screws (9), washers (10), and lower dash panel (2) from dash frame (11).
- (8) Remove nut (12), washer (13), and six wires (14) from cab shunt (15).
- (9) Remove nut (16), washer (17), and cable (18) from cab shunt (15).
- (10) Remove two screws (19) and cab shunt (15) from dash frame (11).

b. Installation.

- (1) Install cab shunt (15) on dash frame (11) with two screws (19).
- (2) Install cable (18) on cab shunt (15) with washer (17) and nut (16).
- (3) Install six wires (14) on cab shunt (15) with washer (13) and nut (12).



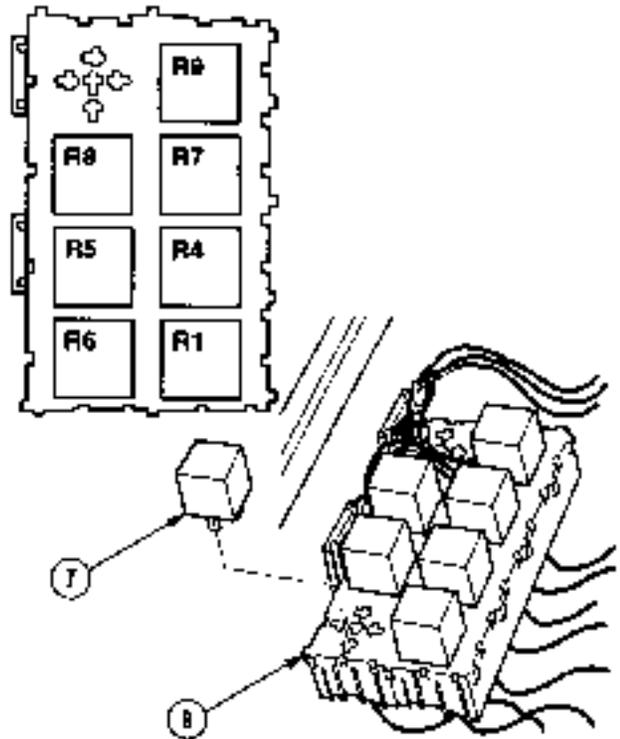
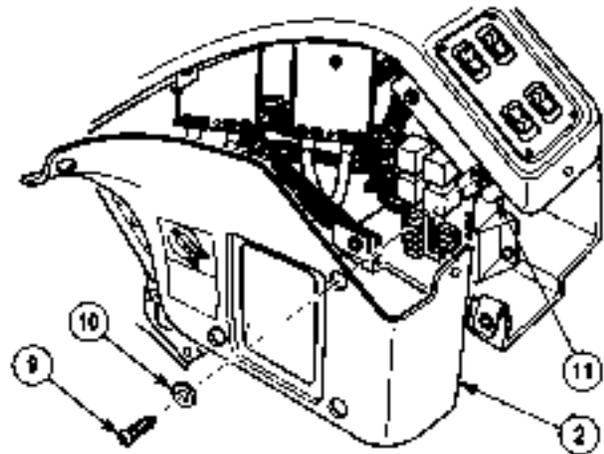
7-33. FUSE, RELAY, DIODE, AND BUSS BAR REPLACEMENT (CONT).

- (4) Install lower dash panel (2) on dash frame (11) with seven washers (10) and screws (9).

NOTE

Steps (5) and (6) below cover the replacement of relays R1 and R4 through R9.

- (5) Install relay (7) on relay panel (8).
- (6) Install engine ventilation panel (Para 6-2).



NOTE

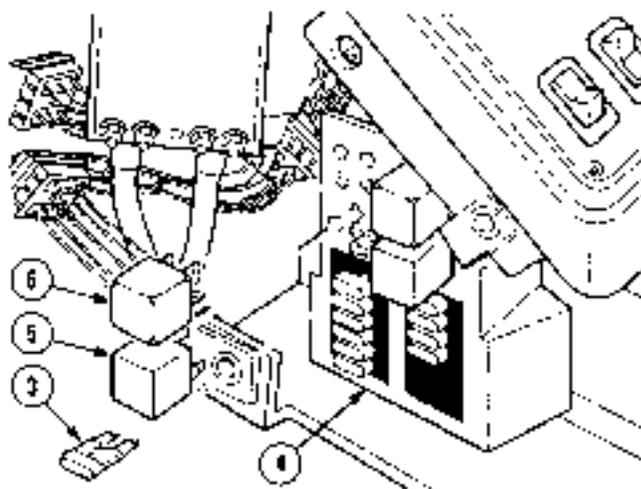
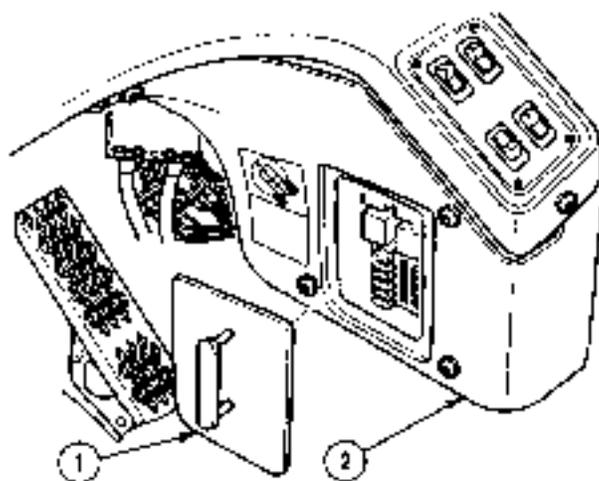
Steps (3) through (6) below covers the replacement of all fuses, diodes, and relays R2 and R3.

- (7) Install diode (6) in fuse panel (4).
- (8) Install relay (5) in fuse panel (4).
- (9) Install fuse (3) in fuse panel (4).
- (10) Install cover (1) on lower dash panel (2).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).

**END OF TASK**

7-34. FUSE PANEL REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

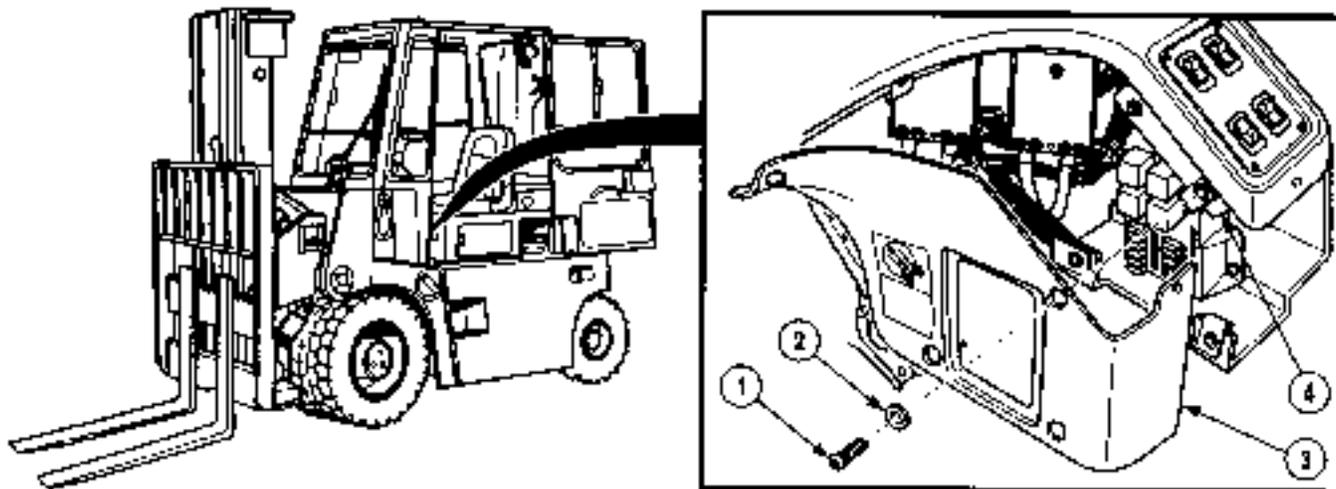
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)
Tool, Kit, Electrical (Item 2, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Batteries disconnected (Para 7-48)

Materials /Parts

Tags, Identification (Item 21, Appendix C)

a. Removal.

(1) Remove seven screws (1), washers (2), and lower dash panel (3) from dash frame (4).

NOTE

Tag and mark all wires prior to removal.

- (2) Remove four screws (5), washers (6), three wires (7), and fuse panel (8) from cab wall (9).

NOTE

Record all components in each position of the fuse panel.

- (3) Remove 11 fuses (10), two relays (11), and diodes (12) from fuse panel (8).

NOTE

One connector removal and installation is shown. All other connectors are removed and installed the same way.

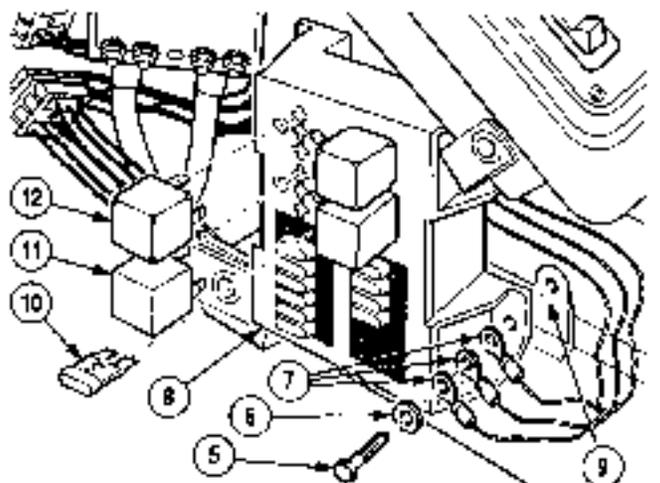
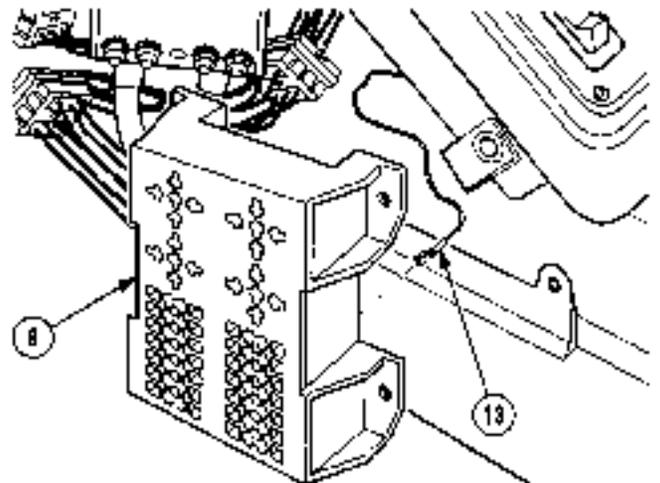
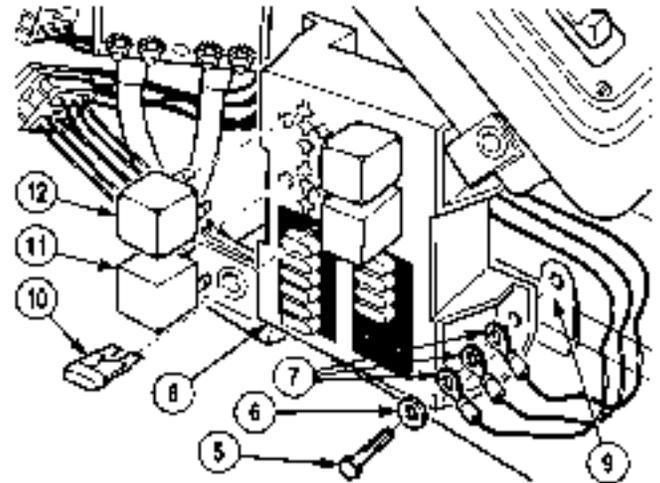
- (4) Using connector tool, remove 26 connectors (13) from fuse panel (8).

b. Installation.

- (1) Using connector tool, install 26 connectors (13) in fuse panel (8).

- (2) Install two diodes (12), relays (11), and 11 fuses (10) on fuse panel (8).

- (3) Install fuse panel (8) on cab wall (9) with three wires (7), four washers (6), and four screws (5).



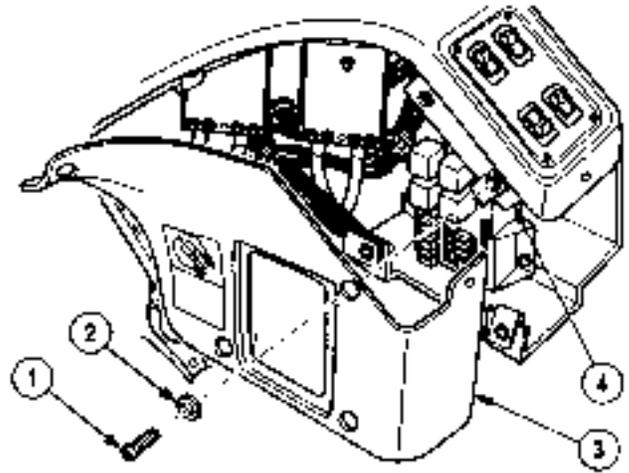
7-34. FUSE PANEL REPLACEMENT (CONT).

- (4) Install lower dash panel (3) on dash frame (4) with seven washers (2) and screws (1).

NOTE

Follow-on Maintenance:

- Close cab door (TM 10-3930-669-10).
- Connect batteries (Para 7-48).
Remove wheel chocks (TM 10-3930-669-10).

END OF TASK

7-35. FUEL LEVEL SENSOR REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

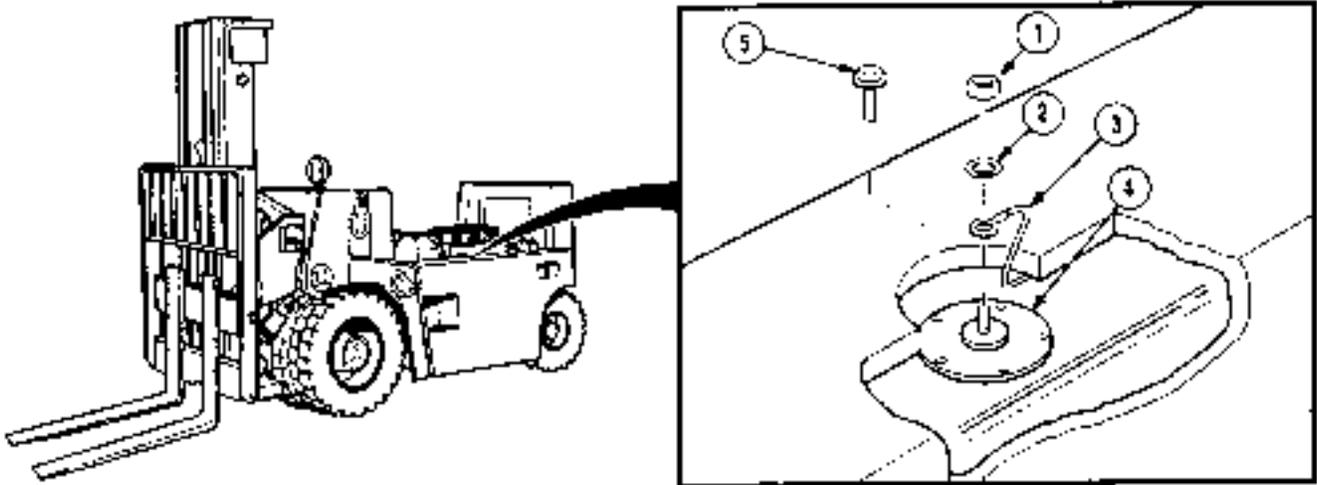
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Materials /Parts

Gasket
Washer, Lock

Equipment Condition

Wheels chocked (TM 10-3930-669-10)
Cab removed (Para 15-2)

a. Removal.**WARNING**

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15 m).
- Diesel fuel is flammable. Do not perform this procedure near fire, flame, or sparks. Injury or death to personnel could result.

- (1) Remove nut (1), lock washer (2), and wire (3) from fuel level sender (4). Discard lock washer.
- (2) Remove five screws (5) from fuel level sender (4).

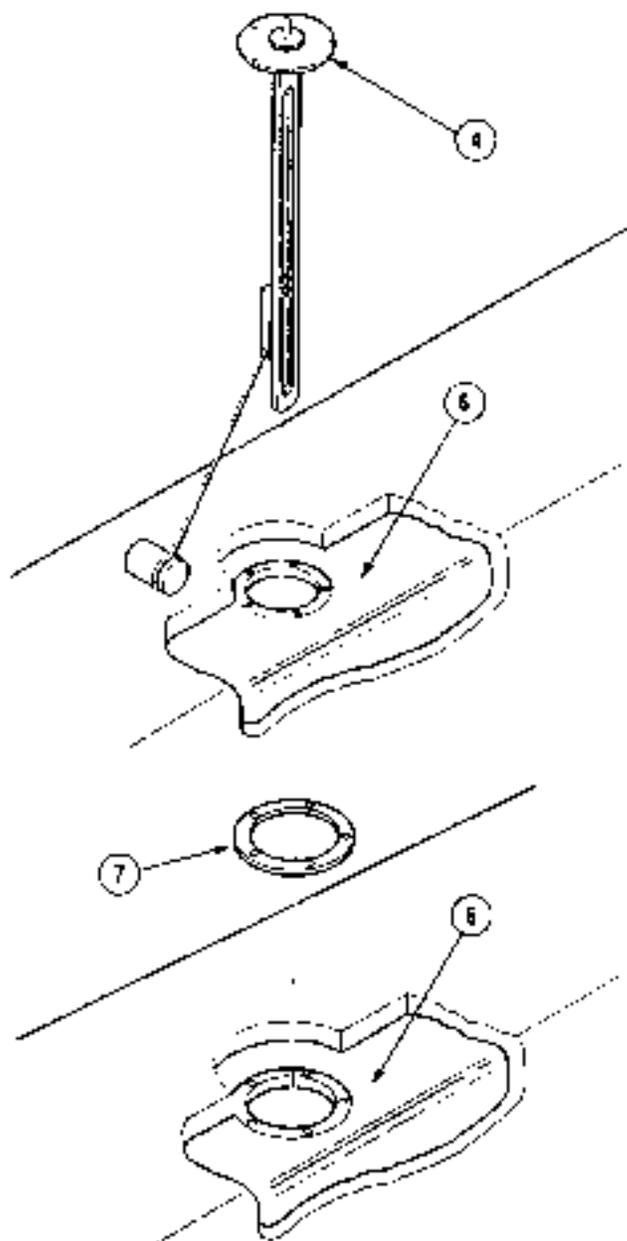
7-35. FUEL LEVEL SENSOR REPLACEMENT (CONT).

- (3) Remove fuel level sender (4) from fuel tank (6).

- (4) Remove gasket (7) from fuel tank (6). Discard gasket.

b. Installation.

- (1) Position gasket (7) on fuel tank (6).



(2) Install fuel level sender (4) in fuel tank (6).

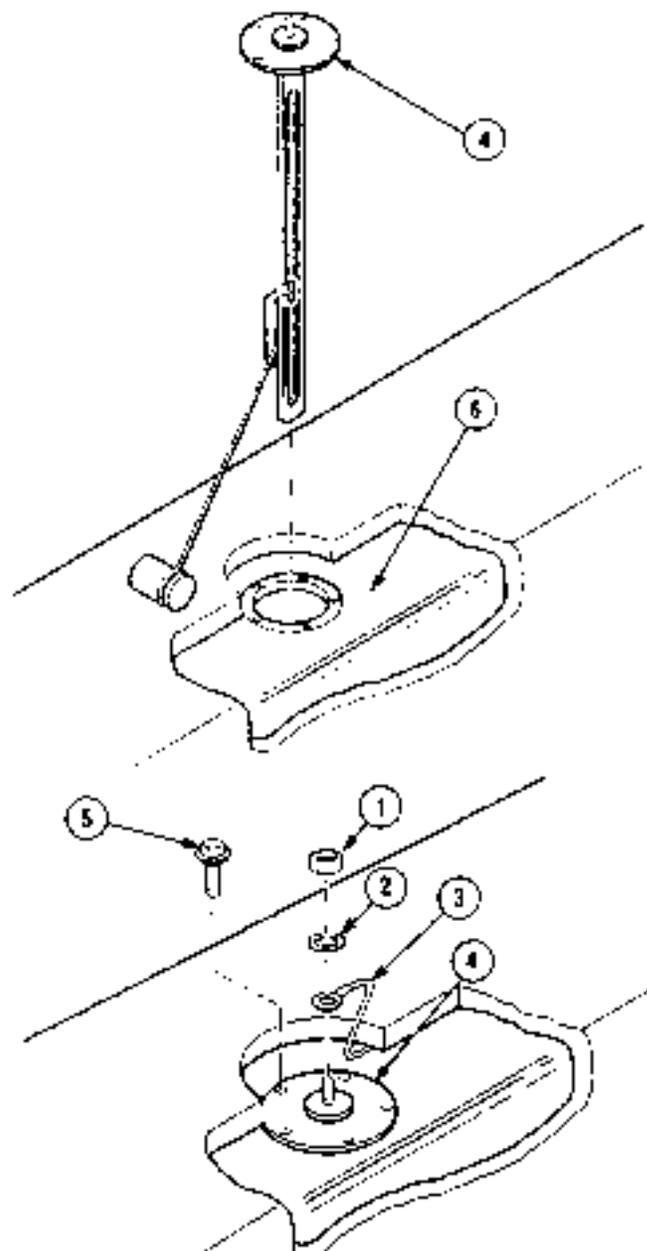
(3) Install five screws (5), wire (3), lock washer (2), and nut (1) on fuel level sender (4).

NOTE

Follow-on Maintenance:

- Install cab (Para 15-2).
- Remove wheel chocks (TM 10-3930-669-10).

END OF TASK



7-36. FUEL SHUTOFF SOLENOID REPLACEMENT.

This task covers:

a. Removal

b. Installation

INITIAL SETUP*Tools and Special Tools*

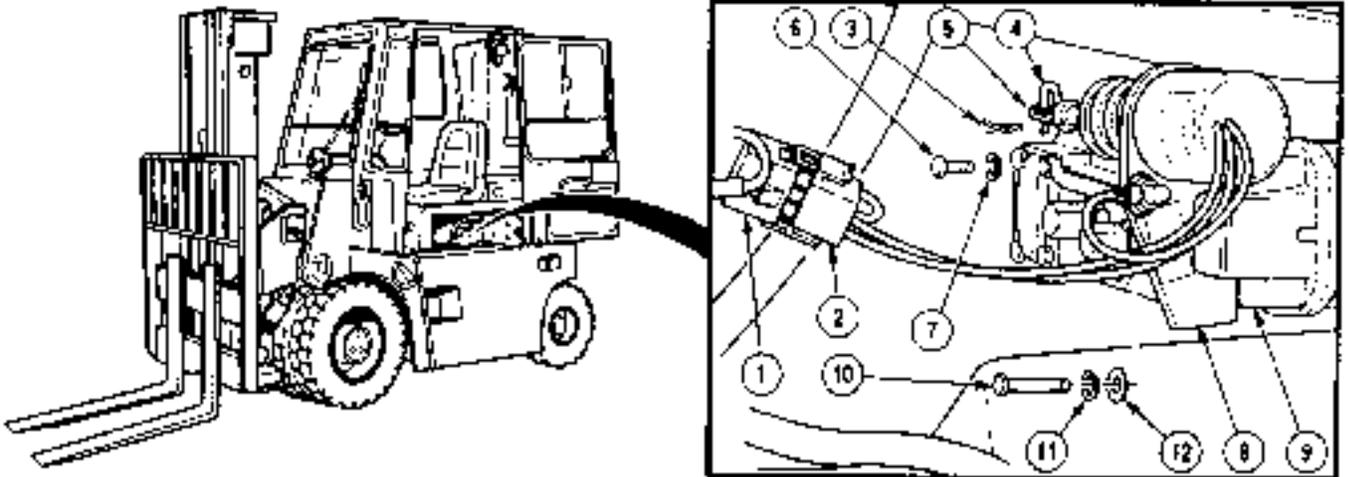
Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Cab door opened (TM 10-3930-669-10)
Cab engine access cover opened
(TM 10-3930-669-10)

Materials /Parts

Washer, Lock (2)
Washer, Lock

a. Removal**WARNING
BURN HAZARD**

Allow engine to cool before performing maintenance on the muffler, exhaust pipe, exhaust manifold, or turbocharger. If necessary, use insulated pads and gloves.

- (1) Disconnect connector P10 (1) from solenoid connector (2).
- (2) Remove retaining clip (3) and plunger (4) from fuel shutoff lever (5).
- (3) Remove screw (6) and lock washer (7) from fuel shutoff solenoid (8) brace and fuel injection pump (9). Discard lock washer.
- (4) Remove two screws (10), lock washers (11), washers (12), and fuel shutoff solenoid (8) from fuel injection pump (9). Discard lock washers.

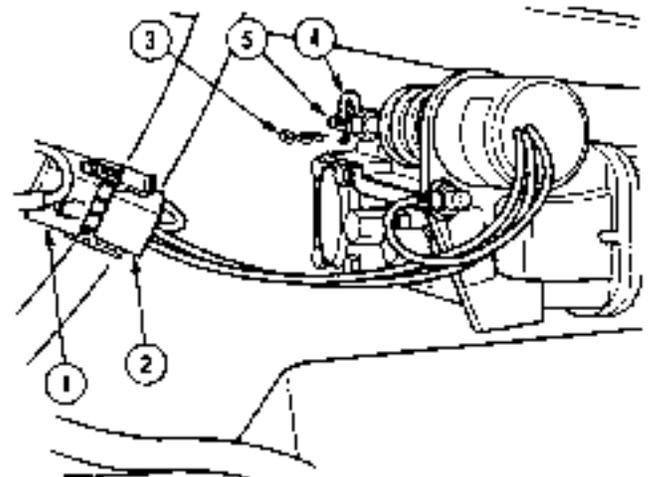
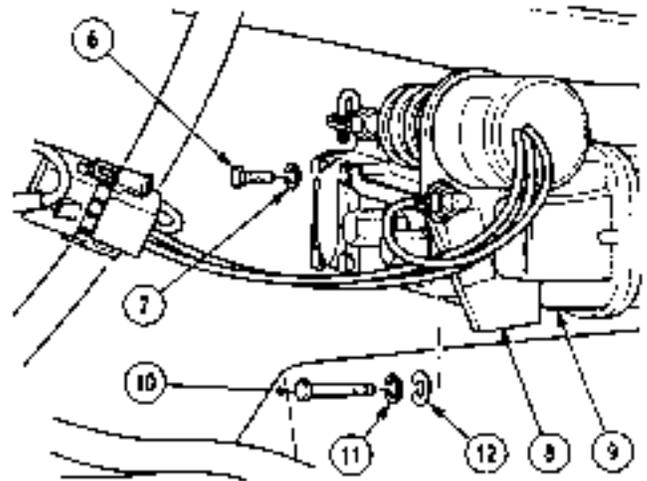
b. Installation.

- (1) Install fuel shutoff solenoid (8) on fuel injection pump (9) with two washers (12), lock washers (11), and screws (10). Tighten screws to 7 lb-ft (10 N.m).
- (2) Install fuel shutoff solenoid (8) brace on injection pump (9) with lock washer (7) and screw (6). Tighten screw to 7 lb-ft (10 N.m).
- (3) Install plunger (4) in fuel shutoff lever (5) with retaining clip (3).
- (4) Connect solenoid connector (2) on connector P10 (1).

NOTE

Follow-on Maintenance:

- Close cab engine access cover (TM 10-3930-669-10).
- Close cab door (TM 10-3930-669-10).
- Remove wheel chocks (TM 10-3930-669-10).



END OF TASK

7-37. DRIVE AXLE COOLING FANS REPLACEMENT/REPAIR.

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SETUP

Tools and Special Tools

Tool Kit, General Mechanic's: Automotive
(Item 1, Appendix B)

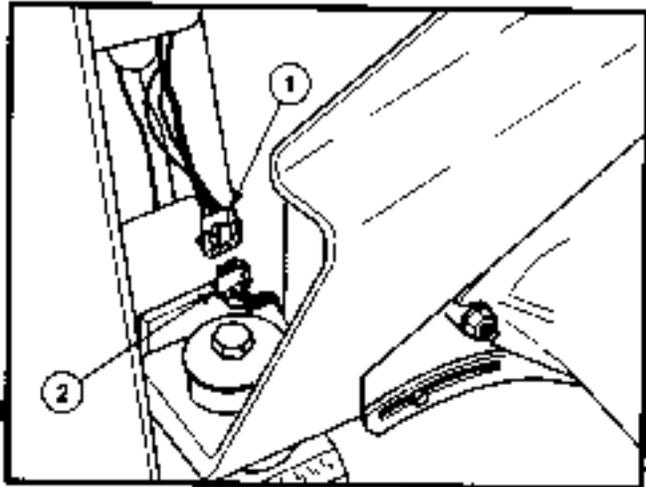
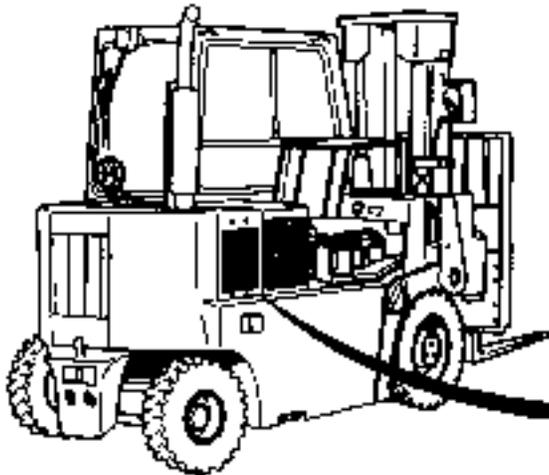
Equipment Condition

Engine OFF (TM 10-3930-669-10)
Parking brake applied (TM 10-3930-669-10)
Wheels chocked (TM 10-3930-669-10)
Engine ventilation panel removed
(Para 6-2)

Materials /Parts

Cable Ties (Item 4, Appendix C)
Tags, Identification (Item 21, Appendix C)

a. Removal.



NOTE

- Tag and mark wires prior to removal.
- Remove cable ties as required.

(1) Disconnect connector P17 (1) from connector S17 (2).