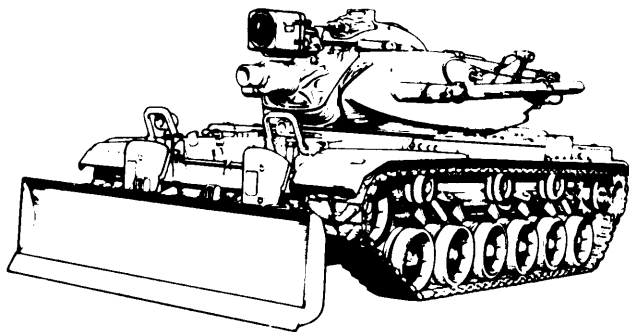


TECHNICAL MANUAL
ORGANIZATIONAL MAINTENANCE
VOLUME 3 OF 5
CHAPTERS 5 THRU 9

POWERPLANT MAINTENANCE	5-1
ENGINE MAINTENANCE	6-1
FUEL SYSTEM MAINTENANCE	7-1
EXHAUST SYSTEM	8-1
COOLING SYSTEM	9-1



COMBAT ENGINEER VEHICLE,
FULL-TRACKED, M728
2350-00-795-1797
(HULL)

This copy is a reprint which includes current
pages from Changes 1 thru 4

TA141003

CHANGE

NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 22 July 1993

TECHNICAL MANUAL
ORGANIZATIONAL MAINTENANCE
VOLUME 3 OF 5
CHAPTERS 5 THRU 9

COMBAT ENGINEER VEHICLE,
FULLTRACKED, M728
2350-00-795-1797
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5-31 and 5-32
None
5-33 and 5-34
5-37 and 5-38
None
5-39 and 5-40
5-41 and 5-42
None
5-47 thru 5-52
5-61 and 5-62
6-1 and 6-2
6-9 thru 6-12
6-13 and 6-14
6-15 and 6-16
6-17 thru 6-26
6-35 thru 6-40
6-47 and 6-48
6-49 and 6-50
6-77 and 6-78

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6-77 and 6-78

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Remove Pages

6-79 and 6-80
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 6-149 thru 6-152
 6-163 and 6-164
 6-165 and 6-166
 6-179 and 6-180
 6-181 thru 6-184
 6-185 thru 6-188
 6-189 and 6-190
 7-1 thru 7-6
 7-7 and 7-8
 7-9 thru 7-14
 7-15 thru 7-20
 7-21 and 7-22
 7-47 thru 7-50
 7-63 and 7-64
 7-69 thru 7-72
 7-81 thru 7-86
 7-87 thru 7-92
 7-93 thru 7-100
 7-101 and 7-102
 7-103 and 7-104
 7-105 thru 7-108
 7-109 and 7-110
 7-115 and 7-116
 7-117 thru 7-132
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 7-265 and 7-266
 7-283 thru 7-288
 7-327 thru 7-332
 7-391 and 7-392
 7-393 and 7-394

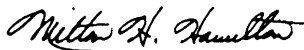
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By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



MILTON H. HAMILTON
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To be distributed in accordance with DA Form 12-37-E, Block 1504, requirements for
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CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
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ORGANIZATIONAL MAINTENANCE
COMBAT ENGINEER VEHICLE
FULL-TRACKED, M728
NSN (2350 -00-795-1 797)
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7-93 and 7-94	7-93 and 7-94
7-105 and 7-106	7-105 and 7-106
7-111 and 7-112	7-111 and 7-112
7-115 thru 7-118	7-115 thru 7-118
7-121 and 7-122	7-121 and 7-122
7-125 and 7-126	7-125 and 7-126
7-131 thru 7-134	7-131 thru 7-134
7-137 and 7-138	7-137 and 7-138
7-141 and 7-142	7-141 and 7-142
7-147 and 7-148	7-147 and 7-148
7-148.1 thru 7-148.4	7-148.1 thru 7-148.4
7-148.7 and 7-148.8	7-148.7 and 7-148.8
7-148.13 thru 7-148.16	7-148.13 thru 7-148.16

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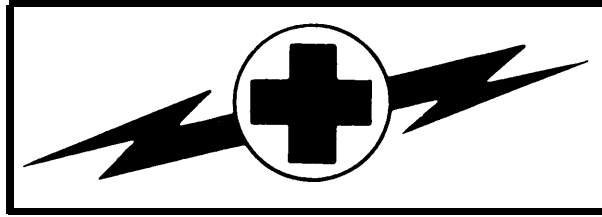
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WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which when breathed deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and/or coma. Permanent brain damage or death can result from severe exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to make sure of the safety of personnel whenever the personnel heater, main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

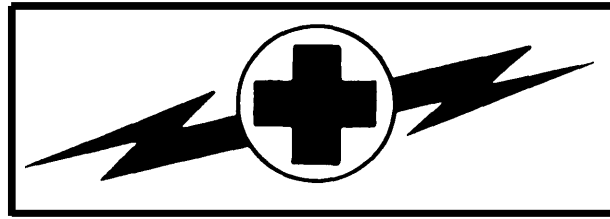
1. **DO NOT** operate heater or engine of vehicle in an enclosed area unless the area is **ADEQUATELY VENTILATED**.
2. **DO NOT** idle engine for long periods without maintaining **ADEQUATE VENTILATION** in personnel compartment.
3. **DO NOT** drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
4. **BE ALERT** at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, **IMMEDIATELY VENTILATE** personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; **DO NOT PERMIT PHYSICAL EXERCISE**.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

For artificial respiration, refer to FM 21-11.

TA143224

WARNING



WARNING

HIGH VOLTAGE

Used in the operation of this equipment

DEATH ON CONTACT

May result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When a technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the master battery switch and battery ground straps should be either turned off or disconnected before beginning work on the equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Before you work around tracked vehicles, remove rings, bracelets, and wristwatches. These items may be caught on projections and cause injury or may be shorted across an electrical circuit and cause severe burns and electrical shock.

For artificial respiration, refer to FM 21-11.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

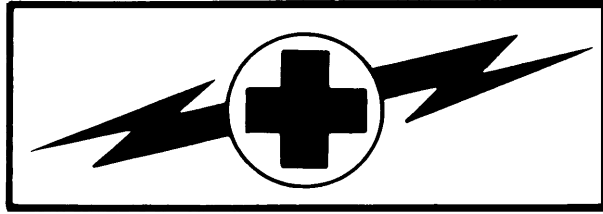
To prevent screws from pulling out of box and injuring personnel, a minimum of 200 pounds must be placed atop the door before attempting to remove screws.

Compressed air used for cleaning air filter elements and oil coolers will not exceed 90 psi. Use only with effective chip guarding and personal protective equipment (goggles, face shield, gloves, long sleeves, etc.).

Always wear goggles and face shield when using compressed air. If dirt blows in your eyes, you can be blinded.

Make sure unauthorized personnel are not in the area where this task is being performed. Failure to do so may result in injury.

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 OF VEHICLE."



WARNING

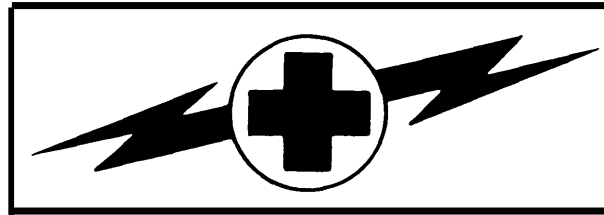
CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which when breathed deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and/or coma. Permanent brain damage or death can result from severe exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to make sure of the safety of personnel whenever the personnel heater, main or auxiliary engine of any tank is operated for maintenance purposes or tactical use.

1. **DO NOT** operate heater or engine of tank in an enclosed area unless the area is **ADEQUATELY VENTILATED**.
2. **DO NOT** idle engine for long periods without maintaining **ADEQUATE VENTILATION** in personnel compartment.
3. **DO NOT** drive any tank with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
4. **BE ALERT** at all times during tank operation for exhaust odors and exposure symptoms. If either are present, **IMMEDIATELY VENTILATE** personnel compartments. If symptoms persist, remove affected personnel from tank and treat as follows: expose to fresh air; keep warm; **DO NOT PERMIT PHYSICAL EXERCISE**.
5. **BE AWARE** neither the gas particulate filter unit nor the field protection mask for nuclear-biological-chemical protection will protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

For artificial respiration. refer to FM 21-11.

WARNING**WARNING****HIGH VOLTAGE**

Used in the operation of this equipment

DEATH ON CONTACT

May result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When a technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the master battery switch and battery ground straps should be either turned off or disconnected before beginning work on the equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Before you work around tracked vehicles, remove rings, bracelets, and wristwatches. These items may be caught on projections and cause injury or may be shorted across an electrical circuit and cause severe burns and electrical shock.

For artificial respiration, refer to FM 21-11.

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**ORGANIZATIONAL MAINTENANCE
COMBAT ENGINEER VEHICLE
FULL TRACKED, M728
NSN (2350-00-795-1797)
(HULL)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

**TABLE OF CONTENTS
VOLUME 1**

			Page
HOW TO USE THIS MANUAL			iii
CHAPTER	1.	INTRODUCTION	1-1
Section	I.	General Information	1-1
Section	II.	Equipment Description and Data	1-2
CHAPTER	2.	PRINCIPLES OF OPERATION	2-1
Section	I.	Functional Description	2-1
Section	II.	Systems Operation	2-1
CHAPTER	3.	HULL MAINTENANCE INSTRUCTIONS	3-1
Section	I.	Repair Parts, Special Tools, TMDE, and Support Equipment	3-1
Section	II.	Service Upon Receipt	3-5
Section	III.	Preventive Maintenance Checks and Services - Hull (Automotive)	3-7

VOLUME 2

CHAPTER	4.	TROUBLESHOOTING	4-1
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VOLUME 3

CHAPTER	5.	POWERPLANT MAINTENANCE	5-1
CHAPTER	6.	ENGINE MAINTENANCE	6-1

*This manual, together with TM 9-2350-222-20-1-1, 20 February 1981, TM 9-2350-222-20-1-2, 20 February 1981, TM 9-2350-222-20-1-4, 20 February 1981, and TM 9-2350-222-20-1-5, 20 February 1981, supersedes TM 9-2350-222-20, 27 September 1965, including all changes.

TABLE OF CONTENTS - Continued

Page

CHAPTER	7.	FUEL SYSTEM MAINTENANCE	7-1
CHAPTER	8.	EXHAUST SYSTEM MAINTENANCE	8-1
CHAPTER	9.	COOLING SYSTEM	9-1

VOLUME 4

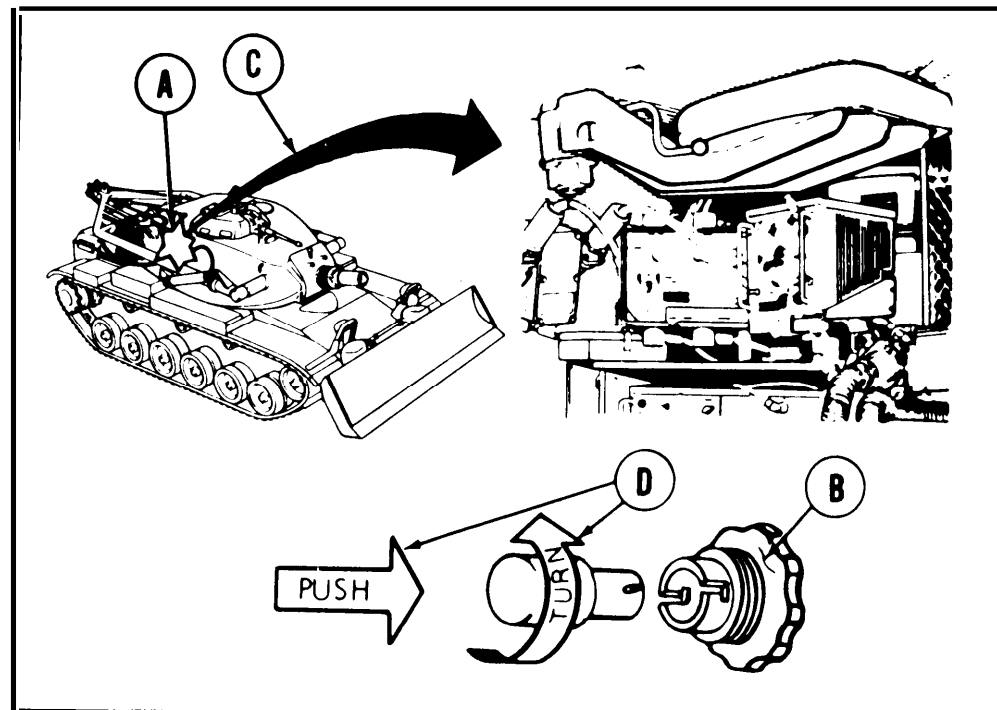
CHAPTER	10.	ELECTRICAL SYSTEM MAINTENANCE.	10-1
CHAPTER	11.	TRANSMISSION AND SHIFTING MAINTENANCE	11-1
CHAPTER	12.	FINAL DRIVE AND UNIVERSAL JOINTS MAINTENANCE	12-1
CHAPTER	13.	BRAKE SYSTEM MAINTENANCE..	13-1
CHAPTER	14.	TRACKS AND SUSPENSION SYSTEM MAINTENANCE	14-1
CHAPTER	15.	STEERING CONTROL MAINTENANCE	15-1

VOLUME 5

CHAPTER	16.	EXTERIOR HULL MAINTENANCE..	16-1
CHAPTER	17.	INTERIOR HULL MAINTENANCE..	17-1
CHAPTER	18.	HYDRAULIC SYSTEM	18-1
CHAPTER	19.	PERSONNEL HEATER MAINTENANCE	19-1
CHAPTER	19.1	BILGE PUMP AND GENERATOR EXHAUST MAINTENANCE	19.1-1
CHAPTER	20.	SPEEDOMETER AND TACHOMETER MAINTENANCE	20-1
CHAPTER	21.	FIRE EXTINGUISHER SYSTEM MAINTENANCE	21-1
CHAPTER	22.	GAS PARTICULATE SYSTEM MAINTENANCE	22-1
CHAPTER	23.	SMOKE GENERATOR MAINTENANCE	23-1
APPENDIX	A.	REFERENCES	A-1
APPENDIX	B.	MAINTENANCE ALLOCATION CHART	B-1
APPENDIX	C.	GENERAL MAINTENANCE	C-1
APPENDIX	D.	EXPENDABLE SUPPLIES AND MATERIALS	D-1
APPENDIX	E.	ELECTRICAL SCHEMATICS	E-1
APPENDIX	F.	ILLUSTRATED LIST OF MANUFACTURED ITEMS	F-1
		ALPHABETICAL INDEX	I-1
		MAINTENANCE INFORMATION INDEX	MI-1

HOW TO USE THIS MANUAL:

- This manual is divided into chapters.
- Chapters are by functional group code and are presented in same order as the RPSTL (Repair Parts and Special Tool List).
- Procedure indexes are on procedures that are four pages or more, and indicate how the procedure is set up, i.e., disassembly, removal, cleaning and inspection, etc.
- All manual references within this technical manual refer to page numbers.
- Steps are numbered and are to be performed in that order.
- Be sure to read all NOTES, WARNINGS, AND CAUTIONS.
- Locator views are included wherever necessary. These will help you locate the item for which the procedure is referencing,
- Jagged circle (☼) on locator (A) indicates a cutout and means the item is inside the vehicle.
- A (↪) symbol represents the outside surface (B) of a piece of equipment that cannot be shown in its entirety.
- Callouts are shown by a circle with a letter inside.
- Locator arrows (C) are black and mechanical motion arrows (D) are white.
- Broken leader arrow (--->) indicates the item is either inside or under the vehicle and cannot be seen.



TA143226

HOW TO USE THIS MANUAL - Continued

- Certain sections of the manual have detailed 'how to use' instructions at the beginning of the section - for example, troubleshooting.
- A maintenance information index is located in back of this manual. It is set up in alphabetical order and maintenance function, for example, disassemble, clean, inspect, repair, remove, install, assemble, and test.
- An illustrated list of manufactured items, or better known as fabricated tools, is located in back of this manual. It is nothing more than direction on how to fabricate tools that are listed throughout the manual.

CHAPTER 5
POWERPLANT MAINTENANCE INDEX

PROCEDURE	PAGE
Powerplant Replacement (2D Engine)	5-25
2D Engine Powerplant Tests (Ground Hop)	5-48

All data on pages 5-2 thru 5-24 deleted. ■

Change 4 5-1/(5-2 blank)

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 1 of 23)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-26
Installation	5-37

- TOOLS:** 5 ton hoist or comparable lifting device capable of lifting powerplant 12 ft. high
 Ratchet with 1/2 in. drive
 2 in. extension with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 Ratchet with 3/4 in. drive
 1-1/2 in. socket with 3/4in. drive
 Torque wrench with 3/4 in. drive (0-600 lb-ft) (0-813 N.m)
 7/16 in. combination box and open end wrench
 11/16 in. combination box and open end wrench
 5/16 in. combination box and open end wrench
 Adjustable wrench
 Spanner wrench
 Long round nose pliers
 Flat-tip screwdriver
 9/16 in. combination box and open end wrench
 3/8 in. combination box and open end wrench

SPECIAL TOOLS: Engine and transmission sling (Item 31, Chapter 3, Section I)

- FABRICATED TOOLS:** Final drive guide shield (Fig F-1, Appendix F) (2 required)
 Final drive adapter hook-up tool (Fig F-4, Appendix F)

- SUPPLIES:** Covers for fire extinguisher tubing fittings Rubber gloves (Item 73, Appendix D)
 Covers for primary fuel line fittings Plastic caps
 Covers for hydraulic brake line fittings Goggles (Item 74, Appendix D)
 Covers for fuel return line fittings Rags (Item 65, Appendix D)
 Covers for air cleaner outlet hose connect points Dry cleaning solvent (Item 54, Appendix D)
 Covers for fire extinguisher elbows (3 required) Appendix D)
 Grease (Item 36, Appendix D)
 Small rope
 Wooden blocks, 12 in. x 12 in. x 14 in. (3 required)
 Masking tape (Item 57, Appendix D)
 Lockwasher (10 required)
 Lockwasher (2 required)
 Cotter pin

PERSONNEL: Three

REFERENCE: TM 9-2350-222-10

Go on to Sheet 2

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 2 of 23)

- PRELIMINARY PROCEDURES: Park vehicle on level ground, block both tracks at front and rear
Release parking brake (TM 9-2350-222-10)
Place MASTER BATTERY switch to OFF (TM 9-2350-222-10)
Disconnect battery ground straps (page 10-283)
Remove lower engine access cover (page 16-41)
Remove top deck (page 16-21)
Remove transmission shroud (page 9-20)
Remove right angle drive, pump and clutch (page 18-100)
Remove engine shroud (page 9-2)

REMOVAL:

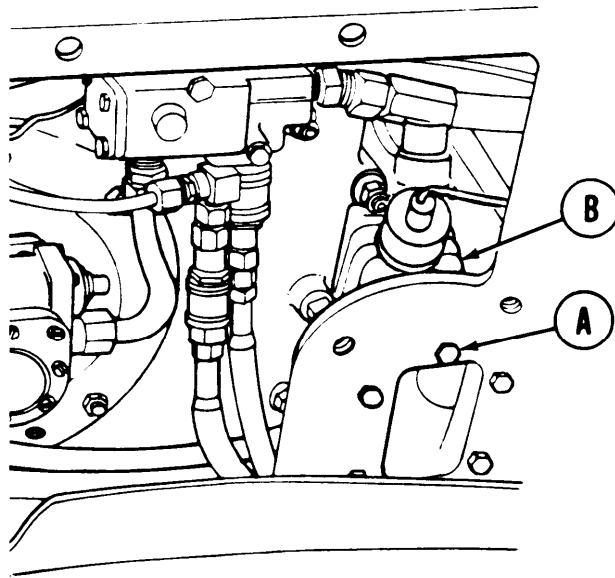
NOTE

Procedures for the removal and installation of the powerplant equipped with a AVDS 1790-2D or AVDS 1790-2DA are similar. Differences are noted in the procedure.

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 OF VEHICLE.'

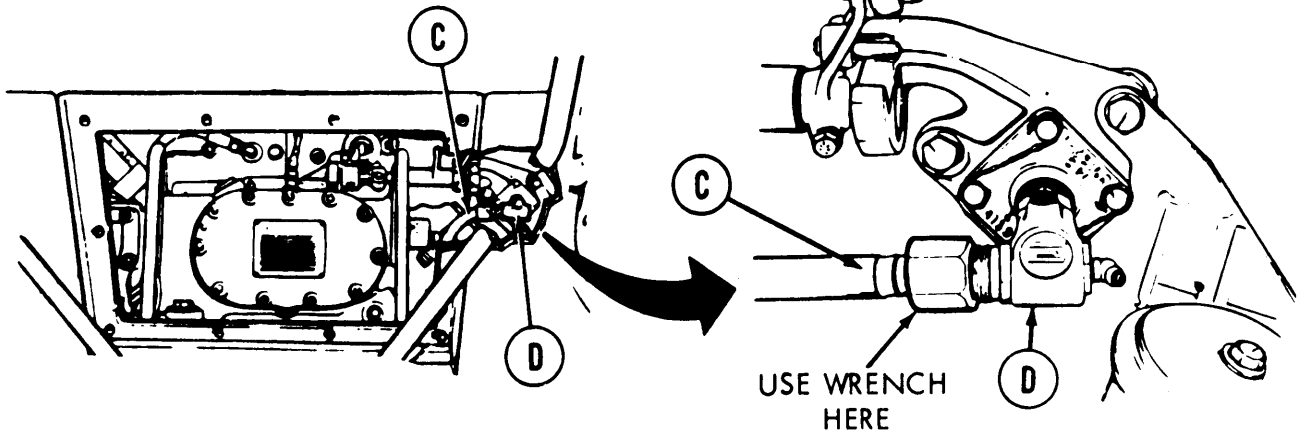
1. Using 7/16 inch wrench, remove six screws (A) holding generator air duct (B) to bulkhead wall
2. Fasten generator air duct (B) to engine with light rope or heavy masking tape.



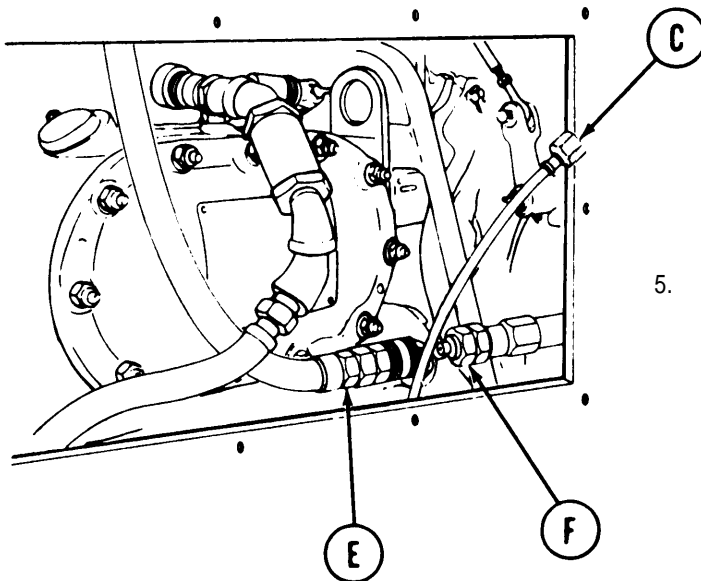
Go on to Sheet 3

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 3 of 23)

3. Reaching through engine access cover opening, use adjustable wrench to remove tachometer cable (C) at adapter (D).



4. Using light rope or heavy masking tape, tie free end of tachometer cable (C) to inside of turret.



5. Reaching through engine access cover opening, manually disconnect main fuel line (E) at quick-disconnect fitting (F). Put protective coverings on ends of fuel line (E) and quick-disconnect fitting (F).

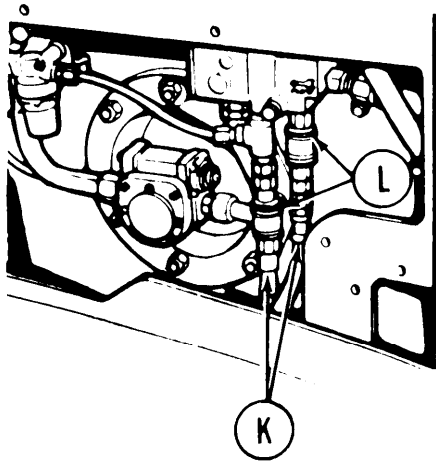
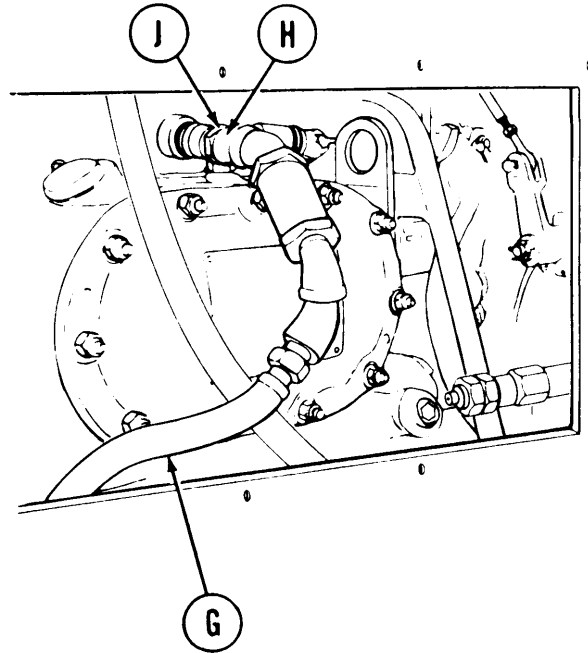
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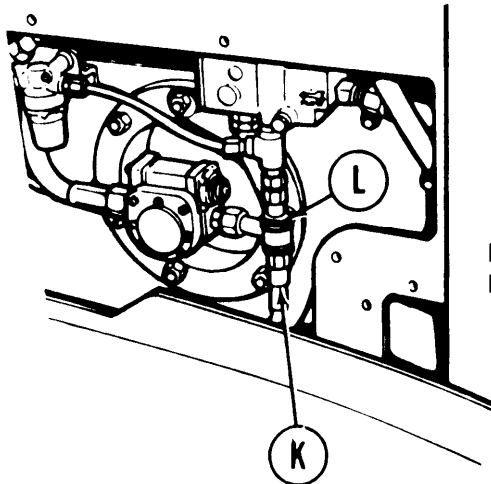
POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 4 of 23)

6. Reaching through engine access cover opening, manually disconnect fire extinguisher tubing (G) at quick-disconnect fitting (H).
7. Using light rope or heavy masking tape, tie free end of fire extinguisher tubing (G) out of the way.
8. Reaching through engine access cover opening, put protective coverings over end of fire extinguisher tubing (G) and its connect point (J) at the engine.



EARLY MODEL

9. On early model, reach through lower engine access cover opening and manually disconnect two priming fuel lines (K) at quick-disconnect fittings (L). Put protective coverings over open ends of both fittings (L) and (K).



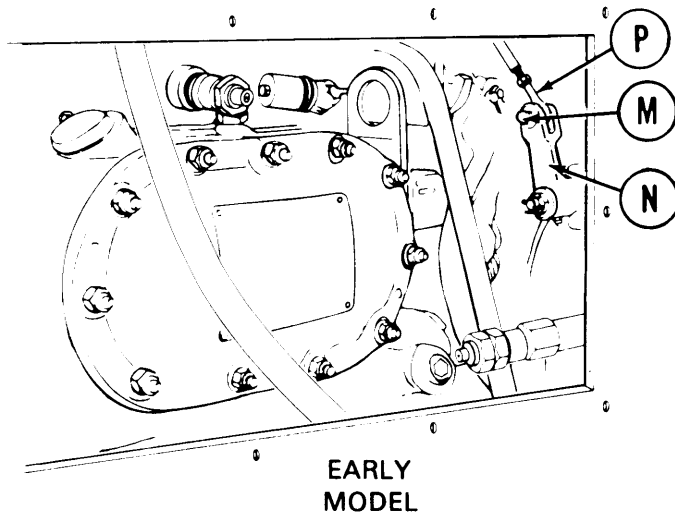
LATE MODEL

- 9.1. On late model, reach through lower engine access cover opening and manually disconnect priming fuel line (K) at quick-disconnect fitting (L). Put protective covering over open end of fitting (L) and (K).

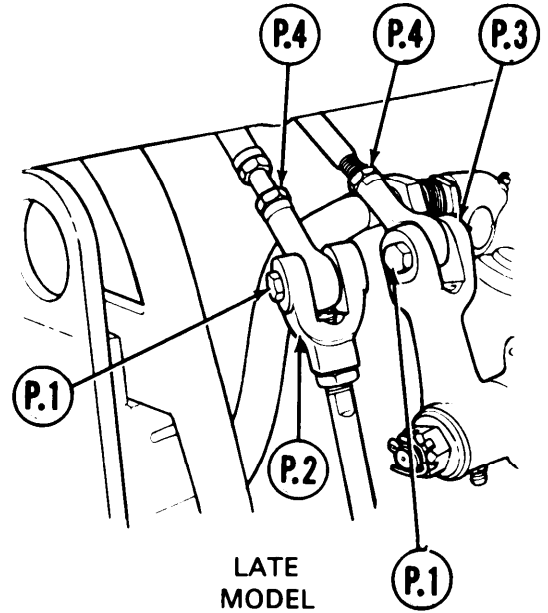
Go on to Sheet 5

TA253167

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 5 of 23)

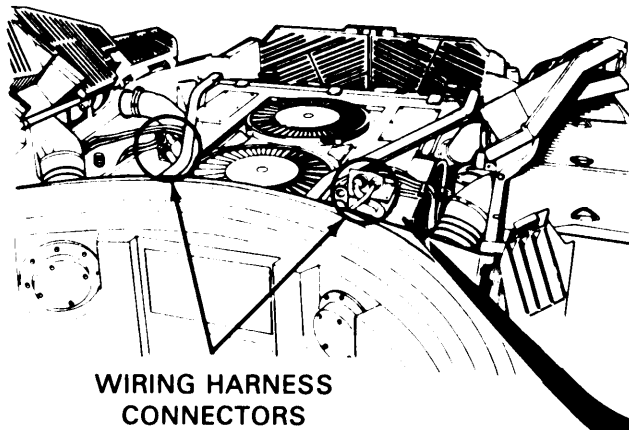


10. On early model, reach through engine access cover opening and use 7/16 inch wrench to remove bolt (M) holding accelerator linkage clevis (N) to rod end (P).

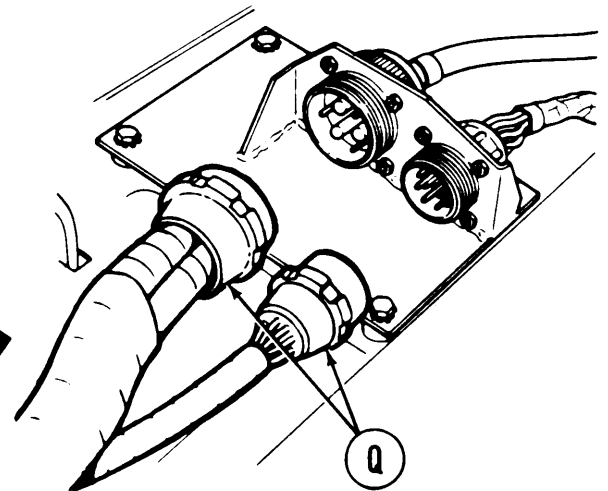


10.1. On late model, reach through engine access cover opening and use 7/16 inch wrench to remove two bolts (P. 1) securing manual fuel shutoff clevis (P.2) and accelerator linkage lever (P.3) to rod ends (P.4).

10.2. On late model, separate accelerator linkage lever (P.3) and fuel shutoff clevis (P.2) from two rod ends (P.4).



11. Using spanner wrench, remove four electrical harness connectors (Q).



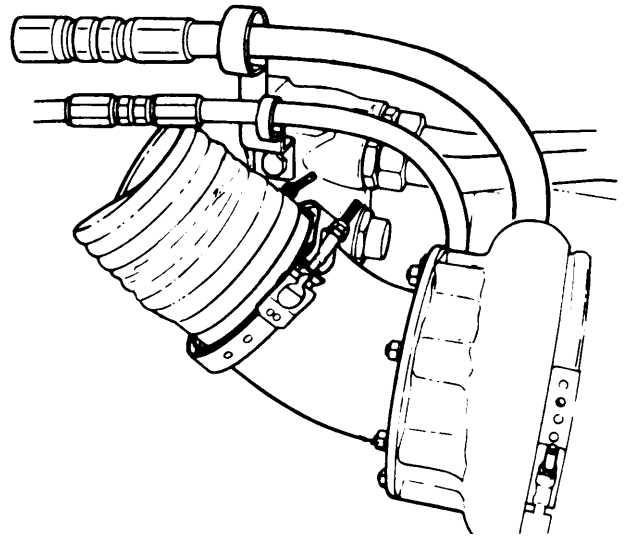
12. Using light rope or heavy masking tape, tie electrical connectors out of way of powerplant.

Go on to Sheet 5.1

TA249051

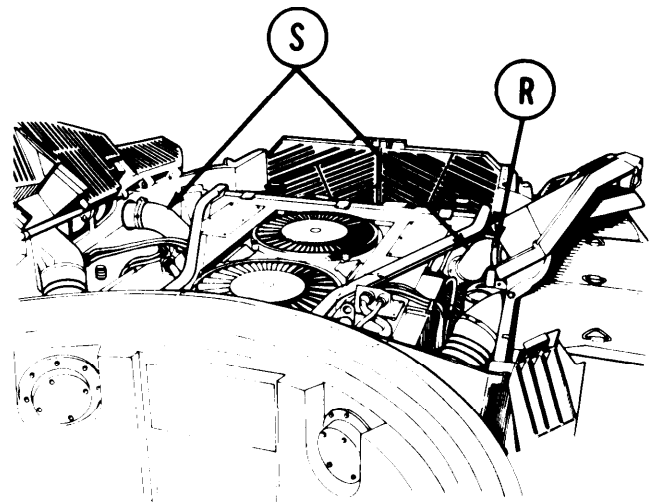
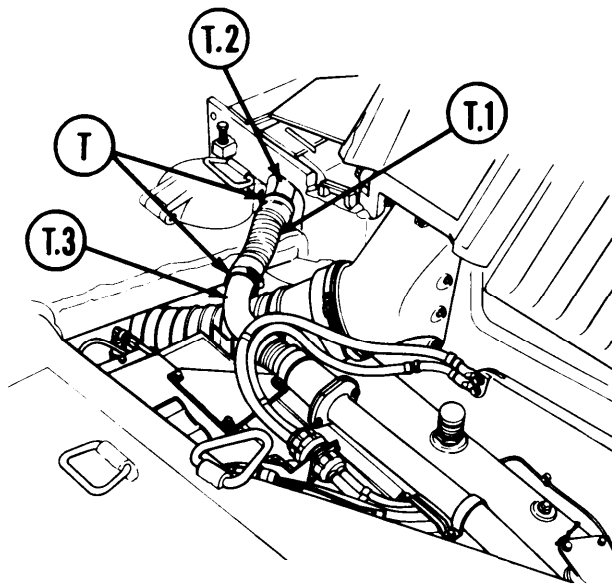
POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 5.1 of 23)

13. Using screwdriver, loosen two clamps (R) securing two air cleaner outlet hoses (S).
14. Disconnect two air cleaner hoses (S). Cover hose end openings.



NOTE

If your vehicle is equipped with a 2DA engine, do steps 14.1 and 14.2. If not, proceed to step 15.



- 14.1. Using screwdriver, loosen two clamps (T).
- 14.2. Slide hose (T.1) off manifold (T.2) and back onto tube (T.3).

Go on to Sheet 6

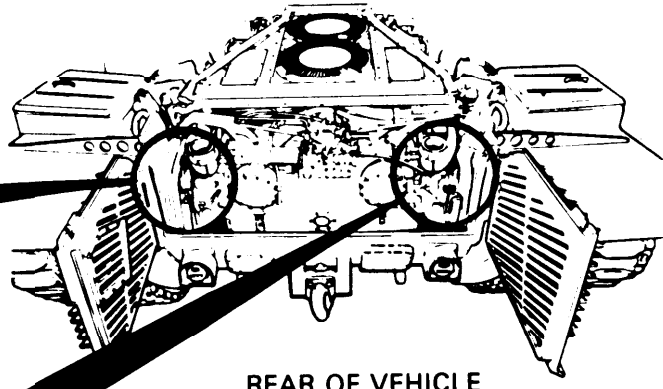
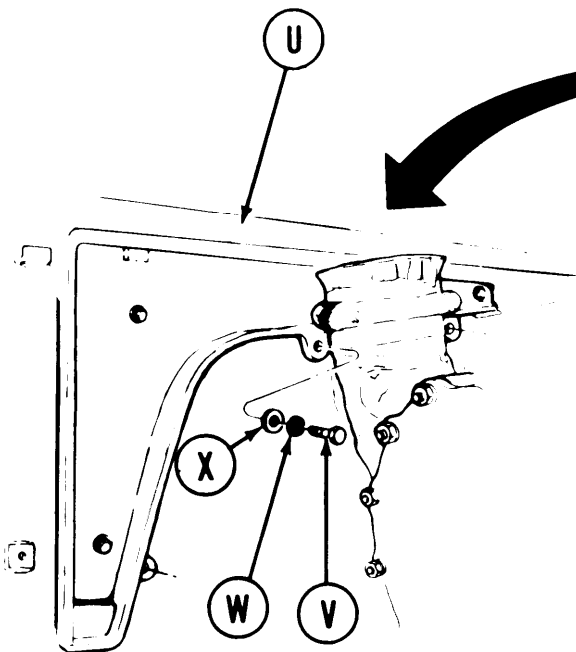
TA249052

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 6 of 23)

NOTE

One angle bracket (U) is located on each side at rear of vehicle.

15. Using 9/16 inch socket with 2 inch extension, remove three screws (V), lockwashers (W), and washers (X) securing each angle bracket (U). Throw lockwashers away.



REAR OF VEHICLE

16. Lift up rear corner of bracket (U) to remove it.

NOTE

If you have an early model vehicle, go on to step 17. If you have a late model vehicle, do steps 16.1 thru 16.7 and skip steps 17 thru 20.

Go on to Sheet 6.1

TA249053

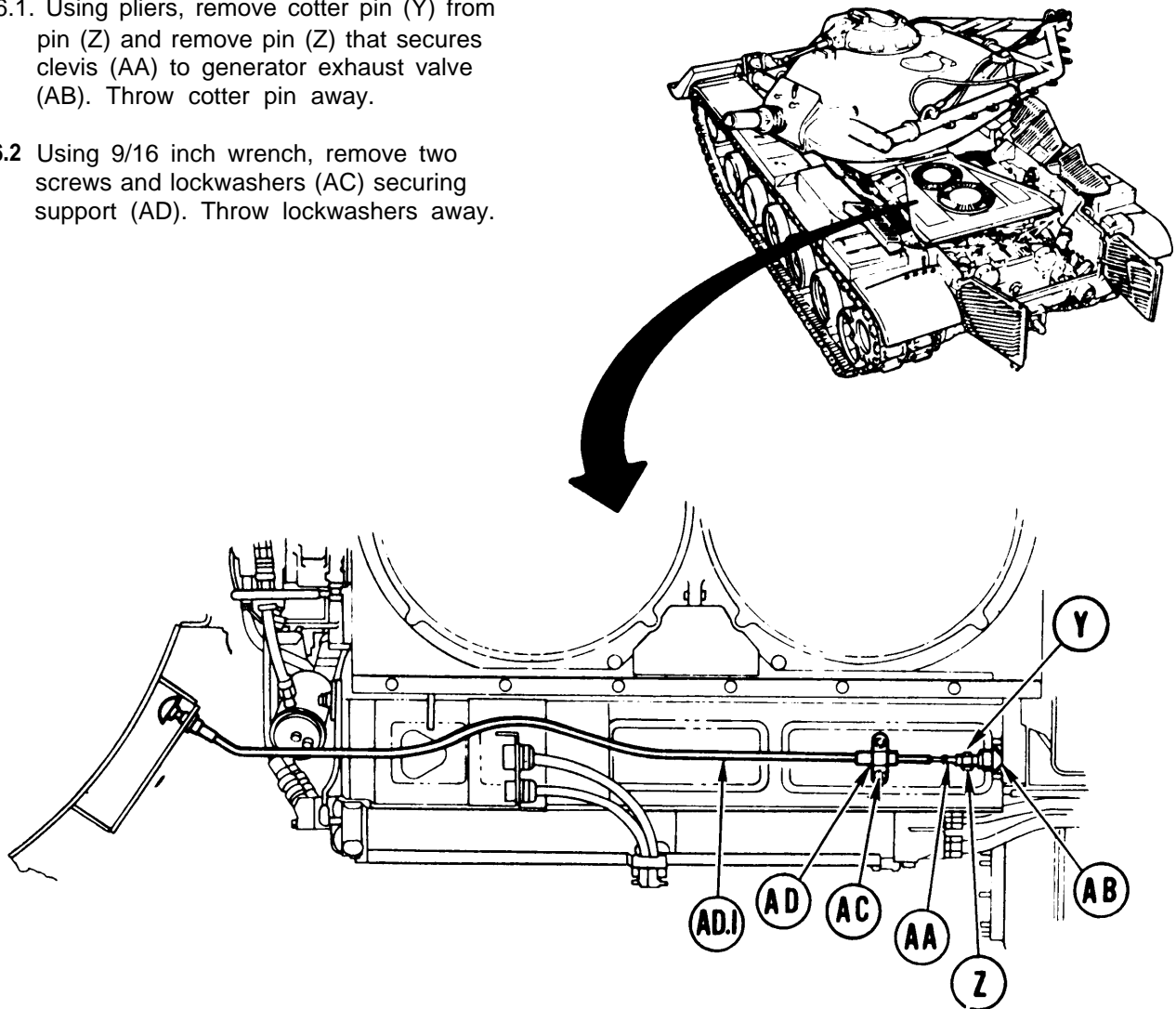
POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 6.1 of 23)

NOTE

Perform steps 16.1 through 16.7 on late model vehicles only.

16.1. Using pliers, remove cotter pin (Y) from pin (Z) and remove pin (Z) that secures clevis (AA) to generator exhaust valve (AB). Throw cotter pin away.

16.2 Using 9/16 inch wrench, remove two screws and lockwashers (AC) securing support (AD). Throw lockwashers away.



16.3. Using light rope or heavy masking tape, tie control cable (AD.1) out of way of powerplant.

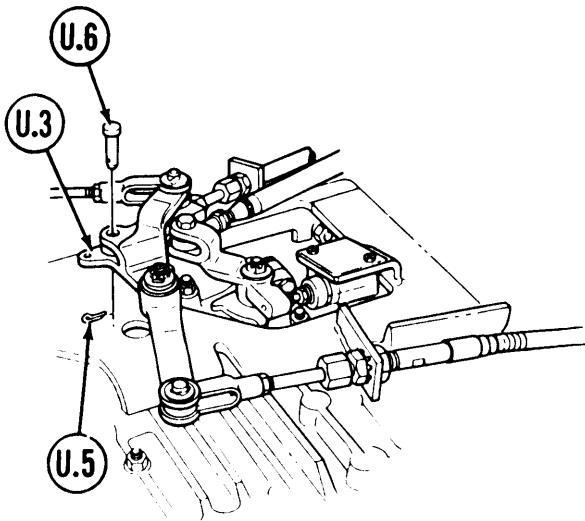
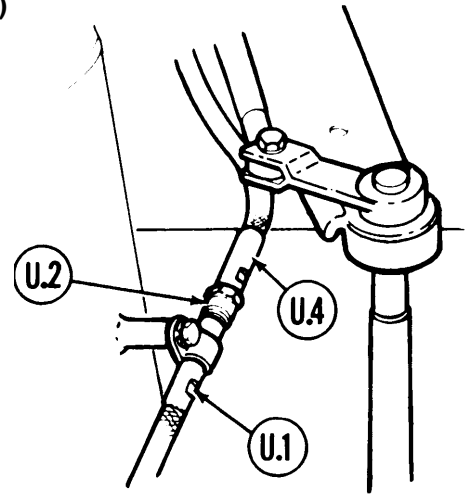
Go on to Sheet 6.2

TA253170

Change 1 5-30.1

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 6.2 of 23)

16.4. Using an adjustable wrench on the flats of control assembly (U.1) and 7/8 inch wrench on disconnect nut (U.2), loosen nut.



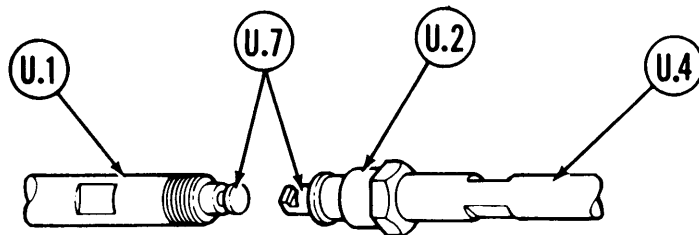
16.5 With shift lever in park 'P' position, manually move bellcrank (U.3) at top of transmission fully clockwise,

NOTE

This will force the two control assemblies (U.1 and U.4) to open up at the disconnect point.

16.6. Using pliers, remove cotter pin (U.5) and remove straight pin (U.6).

16.7 Manually disconnect the inner pushrods (U.7) of the control assemblies (U. 1 and U.4) and move control assembly (U.4).

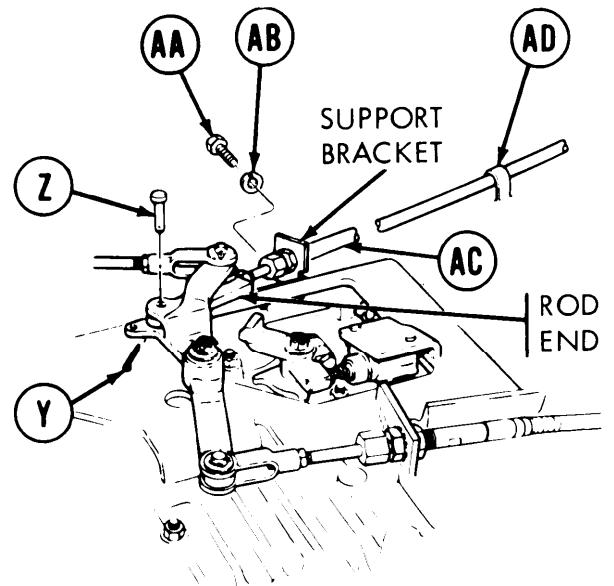


Go on to Sheet 7, step 21.

TA253171

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 7 of 23)

17. Using pliers, pull cotter pin (Y).
18. Removing straight pin (Z), separate rod end of parking brake control from bellcrank.
19. Using 9/16 inch socket, remove two screws (AA) and lockwashers (AB) holding parking brake support bracket.



CAUTION

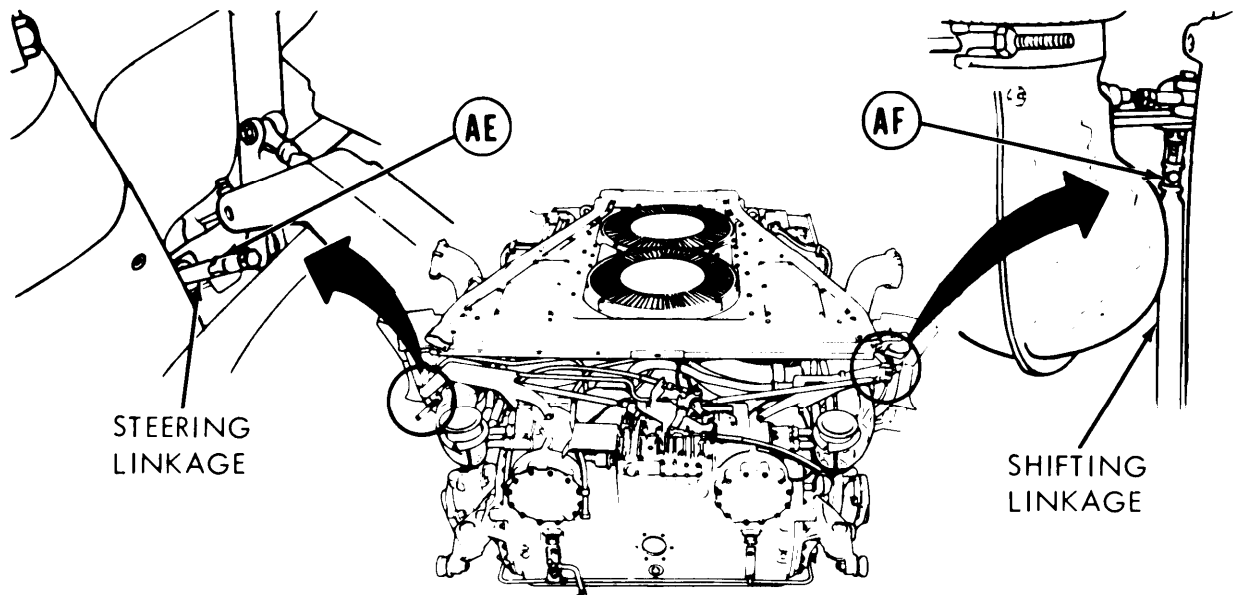
Parking brake control should be tied to rear outrigger using rope or wiring to prevent damage to cable.

20. Release parking brake control rod (AC) from retaining clip (AD) and move parking brake control rod (AC) out of the way.

NOTE

If bolt (AE) or screw (AF) is safety wired, use diagonal cutting pliers to remove safety wire.

21. Using 7/16 inch wrench, remove bolt (AE) holding steering linkage and screw (AF) holding shifting linkage at sides of transmission.
22. Manually separate steering and shifting linkages from connecting linkages on transmission.



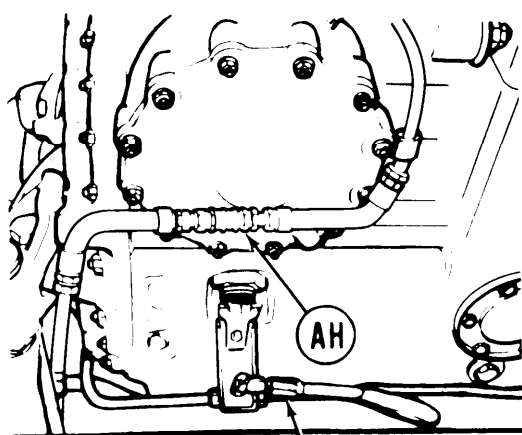
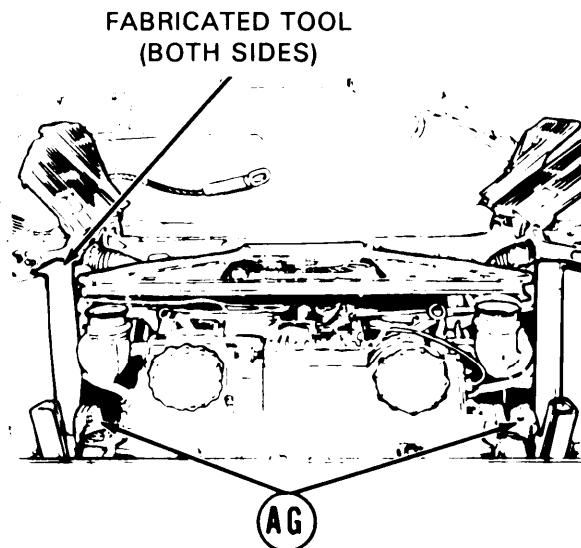
Go on to Sheet 8

REAR TOP VIEW OF POWER PLANT

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 8 of 23)

23. Disconnect final drive adapters and universal joints from final drive flanges (page 12-12, step 1-7).

24. Hang fabricated tools (Fig. 1, Appendix F) (one on each side) at final drive universal joints (AG) so there are no hangups when powerplant is lifted from compartment.



25. Manually pull back on quick-disconnect (AH) to separate fuel return line at fittings.

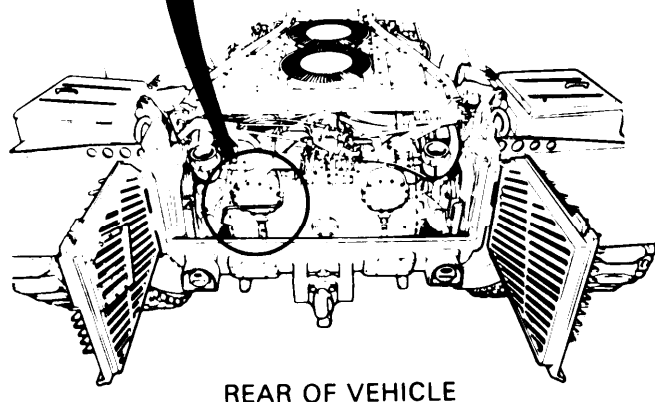
26. Using plastic caps, cover two fittings.

NOTE

If your vehicle is equipped with the hydraulic brake quick-disconnect, proceed to step 28.1.

27. Using 11/ 16 inch wrench, separate brake line (AJ).

28. Using plastic caps, cover two fittings.



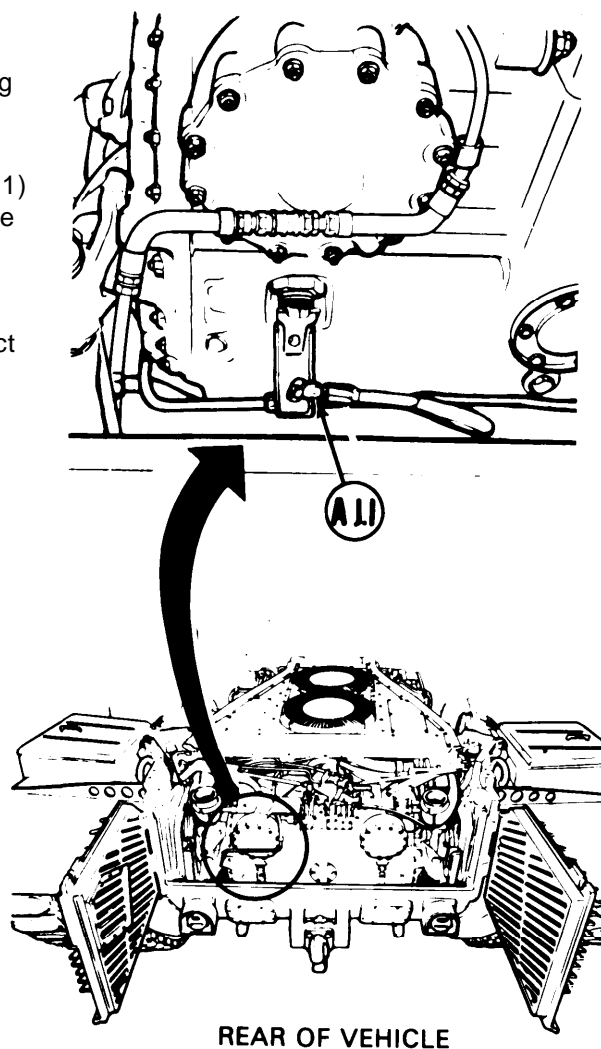
Go on to Sheet 8.1

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 8.1 of 23)

WARNING

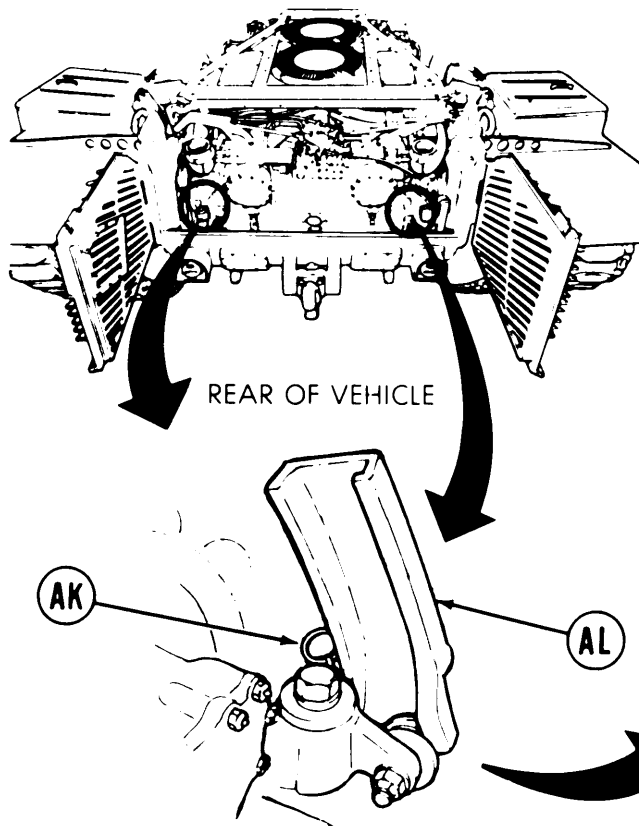
Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

- 28.1. Before disengaging quick-disconnect coupling (AJ.1), place rags under coupling and clean with dry cleaning solvent.
- 28.2. Disengage quick-disconnect coupling (AJ.1) by pulling up and twisting collar of female half until it snaps off locking nut of male half.
- 28.3. Using plastic caps, cover quick-disconnect coupling halves.

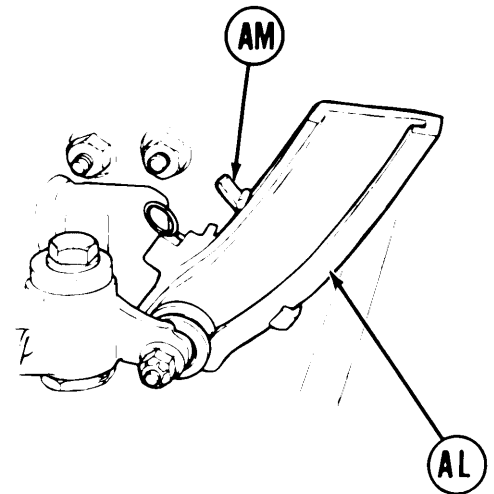


Go on to Sheet 9

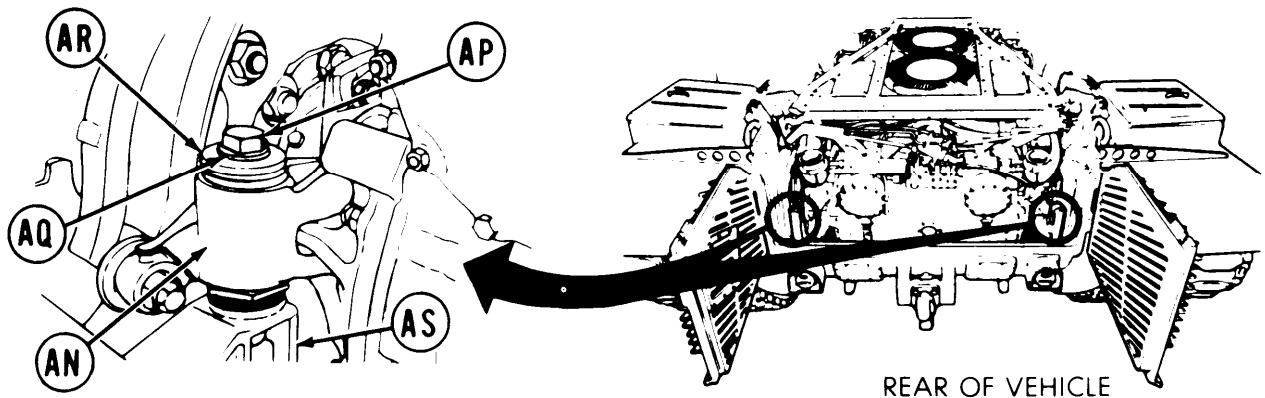
POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 9 of 23)



29. Manually pull one locking (AK) on each side of powerplant to unlock powerplant guides (AL). Swing guides (AL) rearward from powerplant until they lock.



30. Make sure powerplant guide locks (AM) engage when guides (AL) are all the way back.



31. Using 1-1/2 inch socket, remove two capscrews (AP), two lockwashers (AQ), and two flat washers (AR) holding two mounting brackets (AN) to transmission mounts (AS).

Go on to Sheet 10

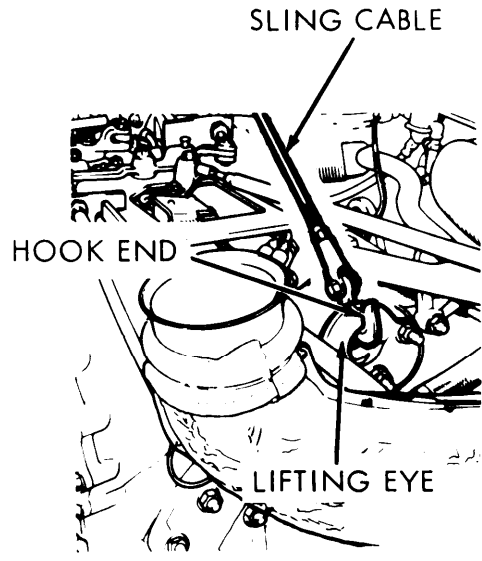
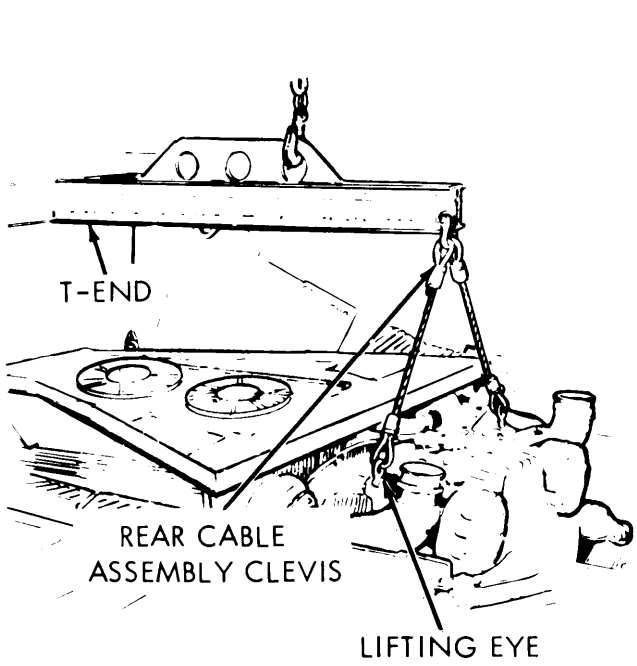
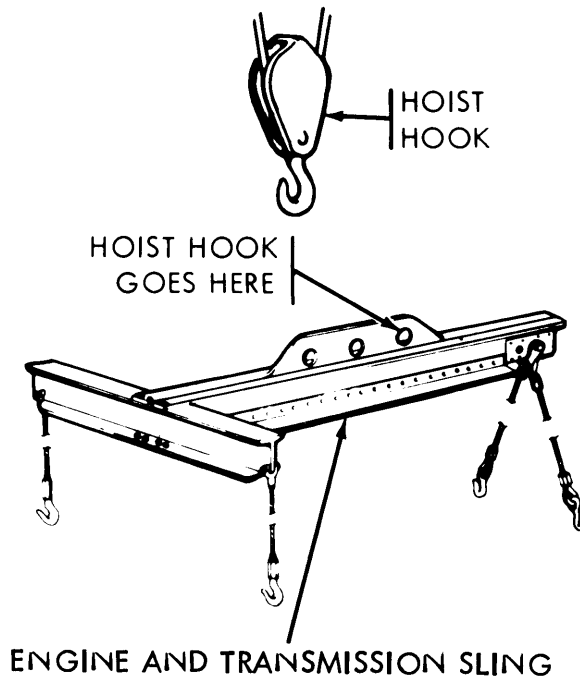
TA140225

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 10 of 23)

CAUTION

Check all disconnected rod and line ends, hoses, and cables to make sure they will be out of the way during powerplant removal.

32. Connect hoist hook to engine and transmission sling. Make sure hoist hook is put through hole used to lift powerplant.
33. Using hoist with engine and transmission sling, position sling over powerplant so T-end is to front of vehicle.
34. Attach four cable hooks of engine and transmission sling to four lifting eyes on powerplant. Make sure hook ends are toward outside of vehicle.
35. Position personnel to guide powerplant as it is hoisted out of vehicle.



Go on to Sheet 11

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 11 of 23)**WARNING**

The powerplant weighs more than 8500 pounds. Careless handling may result in serious injury to personnel or damage to equipment.

CAUTION

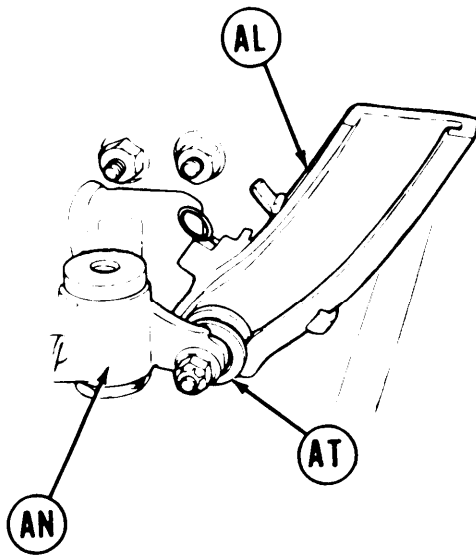
The powerplant may be damaged by bumping against the hull or by a sudden drop onto the support blocks.

NOTE

The rear of the powerplant will rise first while the front remains in place.

CAUTION

When removing powerplant, turret may have to be traversed to the right or left so powerplant will clear outer turret components.



36. Using hoist, slowly lift powerplant until rollers (AT) on transmission mounting brackets (AN) contact lower surfaces of top of powerplant guides (AL).

CAUTION

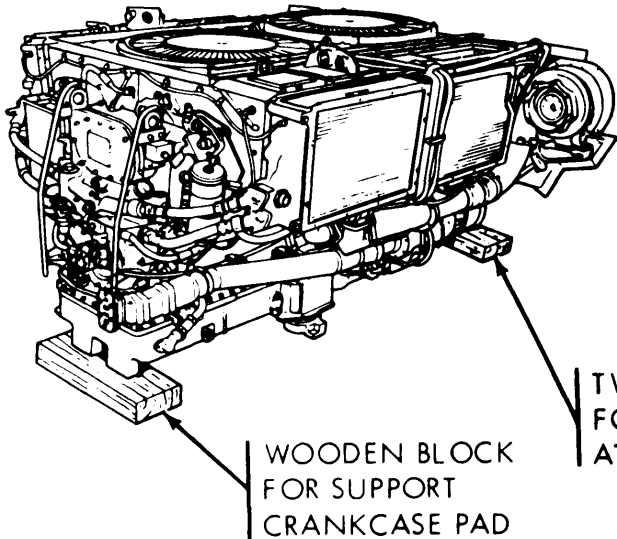
Maintain straight, upward lift when lifting powerplant. Move hoist rearward between lifts. Keep checking clearances between powerplant and hull. Rear of powerplant comes out first.

Go on to Sheet 12

TA140227

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 12 of 23)

37. Lift powerplant in short, even lifts.



WOODEN BLOCK
FOR SUPPORT
CRANKCASE PAD

TWO WOODEN BLOCKS
FOR SUPPORT
AT TRANSMISSION

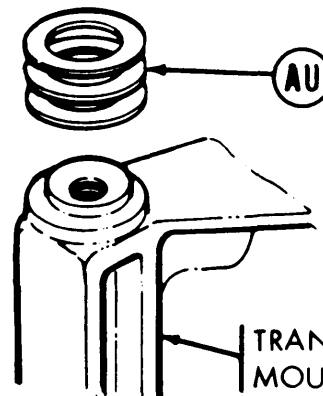
38. Remove powerplant. Move it away from vehicle. Lower it to a few feet from ground level and stop. Position one block under left side of transmission.

39. Position another block under right side of transmission.

40. Position third block under crankcase pad at front of engine.

41. Carefully lower powerplant onto supporting blocks.

42. Remove six spring washers (AU) (three each side) from transmission mounts.



TRANSMISSION
MOUNT

Go on to Sheet 13

TA140228

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 13 of 23)

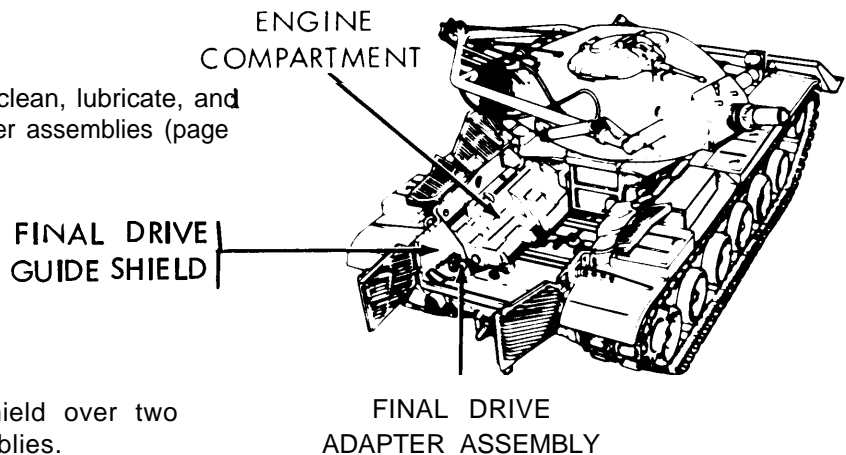
INSTALLATION:

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 OF VEHICLE.'

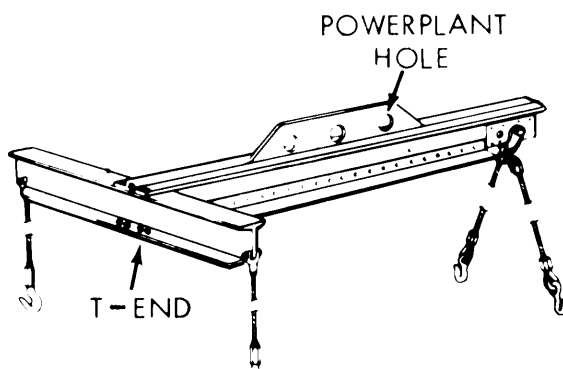
1. Remove final drive guide shields covering two final drive adapter assemblies.

2. Remove (page 12-9, step 1), clean, lubricate, and install two final drive adapter assemblies (page 12-10, steps 4-7).



3. Install final drive guide shield over two final drive adapter assemblies.

4. Apply a light coat of grease to powerplant mounting surfaces.



5. Make sure hoist hook is in powerplant hole of engine and transmission sling.

NOTE

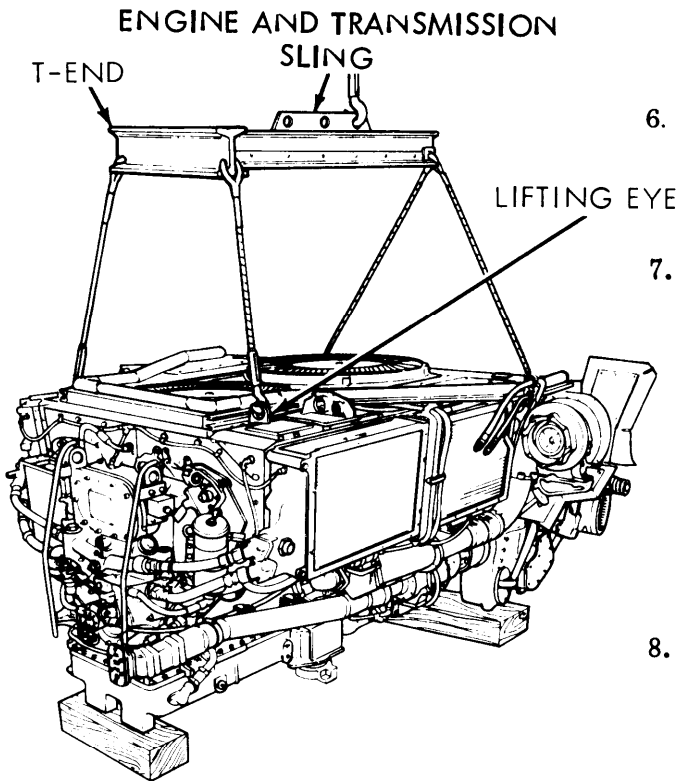
T-end of engine and transmission sling should be toward front (engine end of powerplant).

Go on to Sheet 14

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 14 of 23)

NOTE

Working area where powerplant mounts is tight and limited. Make sure all connections are ready. Remove tools, rags, or other materials not required from engine compartment before installing powerplant.



6. Position turret as necessary to accomplish installation of powerplant.
7. Using hoist, pick up engine and transmission sling and install four sling hooks through four lifting eyes on powerplant.
8. Ends of engine and transmission sling hooks should point toward outer side of powerplant.

WARNING

Be careful when lifting powerplant. Serious injury to personnel can result from careless handling.

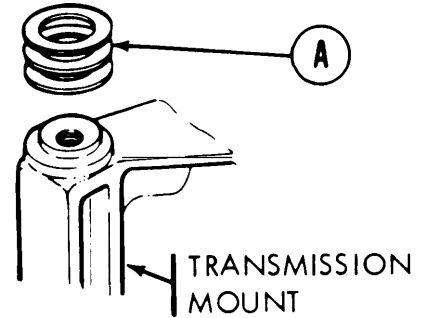
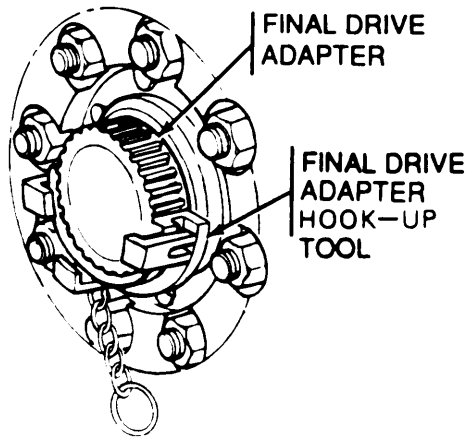
CAUTION

Powerplant can be damaged if bumped against hull.

Go on to Sheet 15

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 15 of 23)

9. Install six spring washers (A) (three on each side) to top of transmission mounts.
- 9.1. Install final drive adapter hook-up tool in final drive adapter splines with opening pointed up and slightly back (1 or 2 teeth from level position).

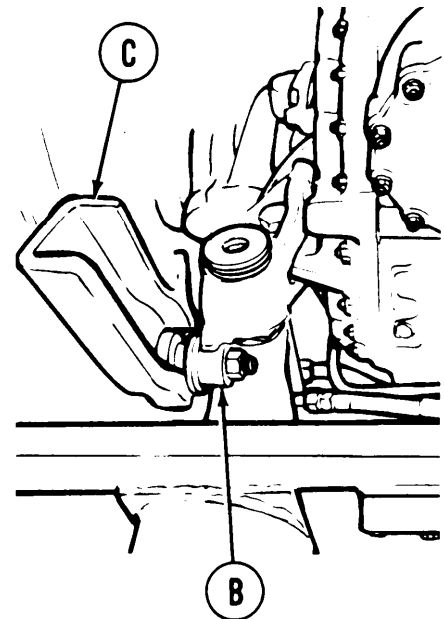


10. Using hoist with engine and transmission sling, lift powerplant into position over engine compartment.
11. Use personnel to guide powerplant into hull.

CAUTION

When installing powerplant, turret may have to be traversed so powerplant will clear outer turret components.

12. Make sure transmission rollers (B) fit into both powerplant guides (C).



Go on to Sheet 15.1

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 15.1 of 23)

NOTE

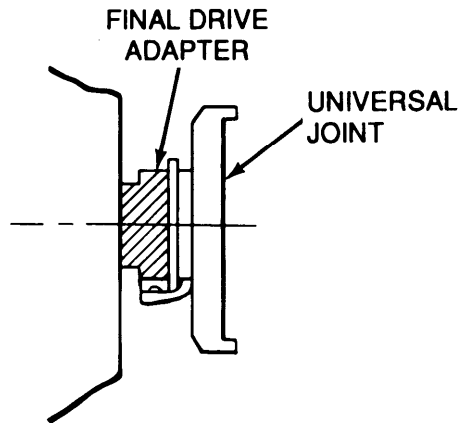
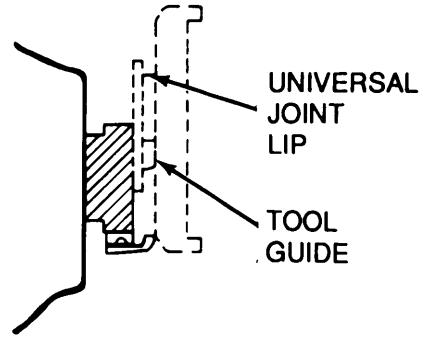
When powerplant is in place, the universal joint and final drive adapter will be axially aligned.

- 12.1. While slowly lowering powerplant, align universal joint so lip enters tool guides.

WARNING

Do not place your hands inside the engine compartment. Serious injury may result if power-plant shifts unexpectedly.

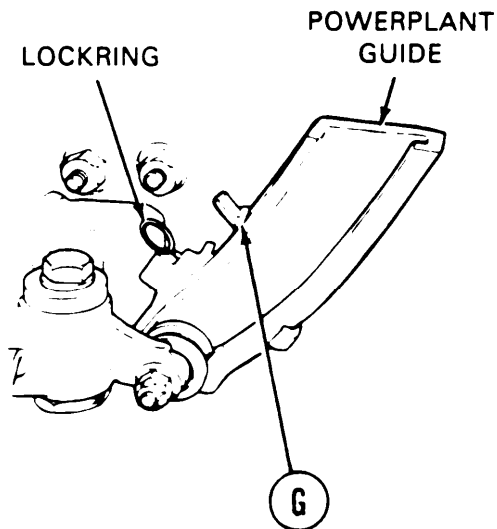
- 12.2. Using pry bar or rope, rotate universal joint to align splines with final drive adapter splines.
13. When powerplant is seated, remove final drive guide shields, and retrieve final drive adapter hook-up tool.
14. Check that powerplant is correctly seated. Check all clearances around powerplant.
15. Remove four engine and transmission sling hooks from four powerplant lifting eyes.



Go on to Sheet 16

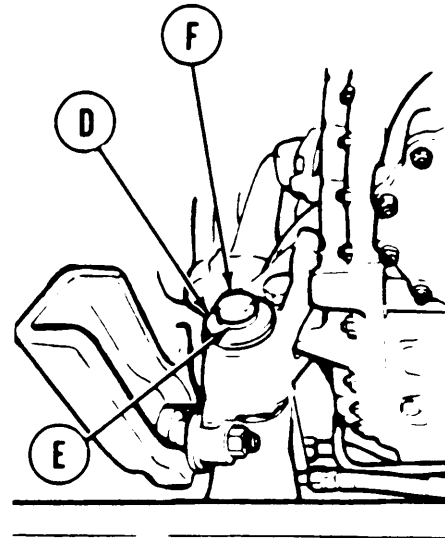
POWER PLANT REPLACEMENT (2D ENGINE) (Sheet 16 of 23)

16. Using 1-1/2 inch socket, install two flat washers (D), two new lockwashers (E), and two capscrews (F).
17. Using torque wrench and 1-1/2 inch socket, tighten two capscrews (F) 380 to 420 lb-ft (515 to 570 N·m).

**NOTE**

If parking brake was tied to rear outrigger, remove at this time.

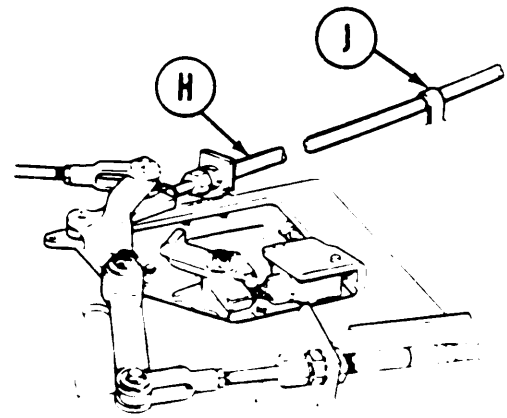
21. Position parking brake control rod (H) onto transmission.
22. Position parking brake control rod (H) under retaining clip (J).



18. Connect final drive adapters and universal joints with final drive flanges (page 12-14, steps 14, 15, and 17 thru 21).
19. Manually raise guide lock (G).
20. Push powerplant guide forward until locking snaps into place. Guide is now locked into position.

NOTE

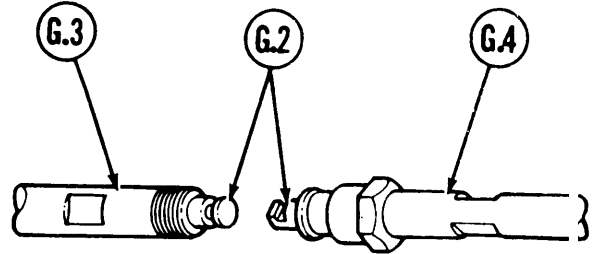
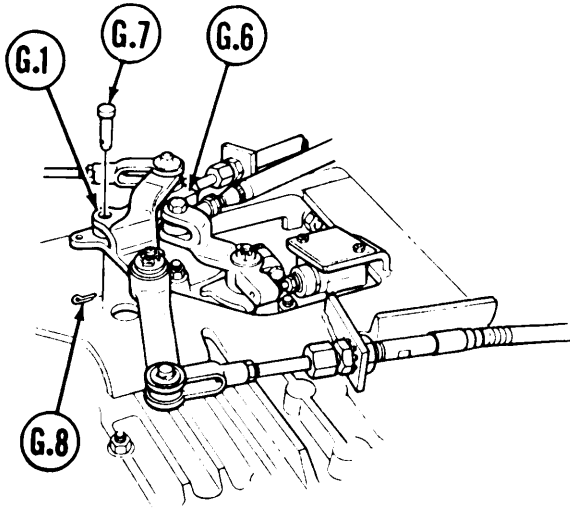
If you have an early model vehicle, go to step 21. If you have a late model vehicle, do steps 20.1 thru "20.1 1 and skip steps 21 thru 26.



Go on to Sheet 16.1

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 16.1 of 23)

20.1 With shift lever in park 'P' position and bellcrank (G.1) fully clockwise, place inner pushrods (G.2) of control assemblies (G.3 and G.4) in connected position.



20.2. Move bellcrank (G.1) fully counterclock wise.

NOTE

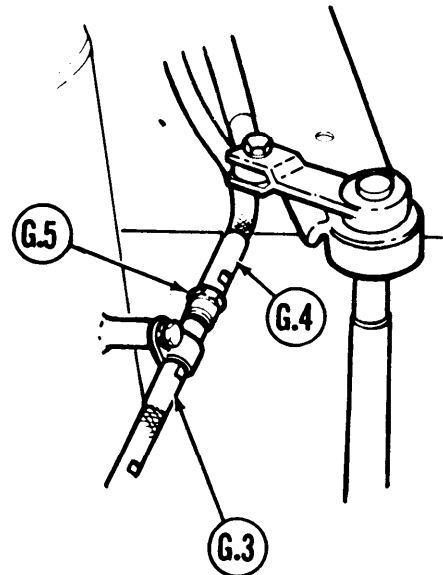
Moving bellcrank counterclockwise will close gap between control assemblies.

20.3, Manually tighten disconnect nut (G.5).

20.4. Using adjustable wrench on flats of control assembly (G.3) and torque wrench with 7/8 inch crowfoot, tighten disconnect nut (G.5) to 35-50 lb-in (8.9-12.7 N.m).

20.5. Position rod end (G.6) of control assembly to bellcrank (G. 1) and install straight pin (G.7).

20.6. Using pliers, install new cotter pin (G.8) through end of straight pin (G.7). Bend ends of cotter pin.



Go on to Sheet 16.2

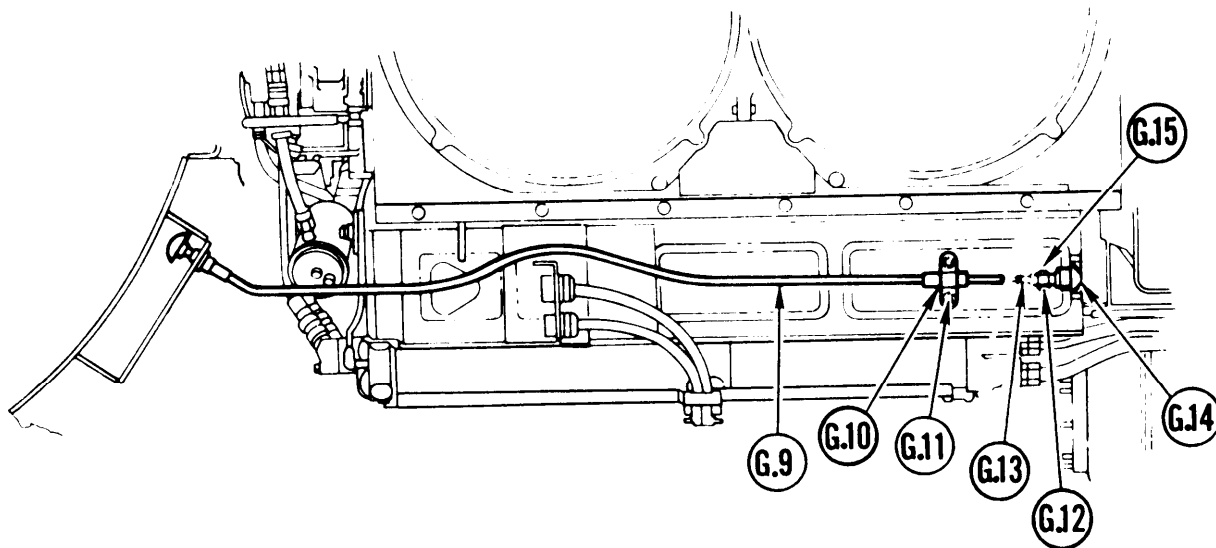
TA253173

Change 1 5-40.1

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 16.2 of 23)

20.7. Position control cable (G.9) and support (G.10) on engine.

20.8. Using 9/16 inch wrench, install two screws and lockwashers (G.11) to secure support (G.10).



20.9. Using hands, install pin (G.12) through clevis (G.13) and generator exhaust valve lever (G.14).

20.10. Install new cotter pin (G.15) through pin (G.12).

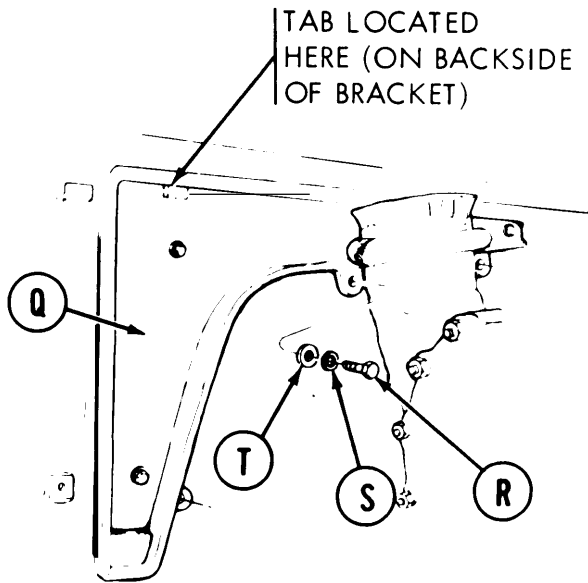
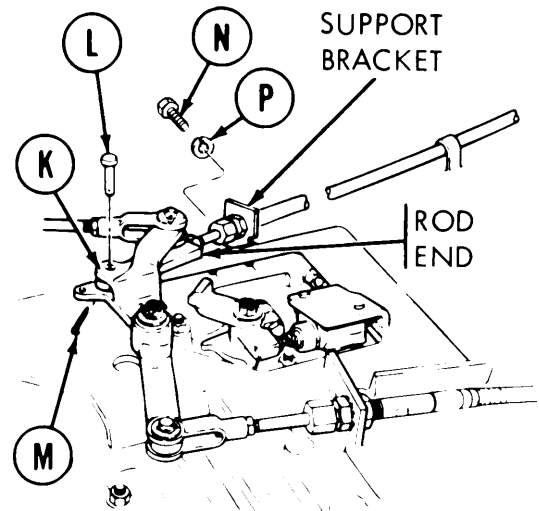
20.11. Using pliers, bend end of cotter pin (G.15).

Go on to Sheet 17, step 27.

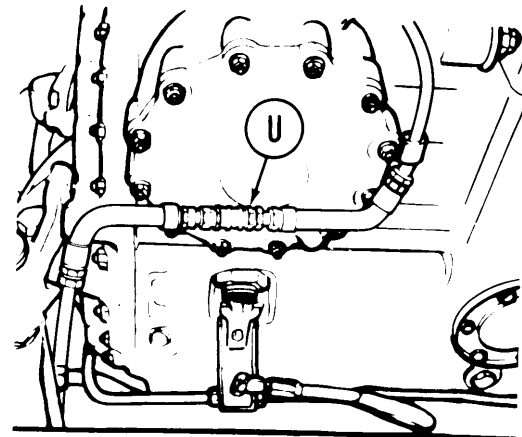
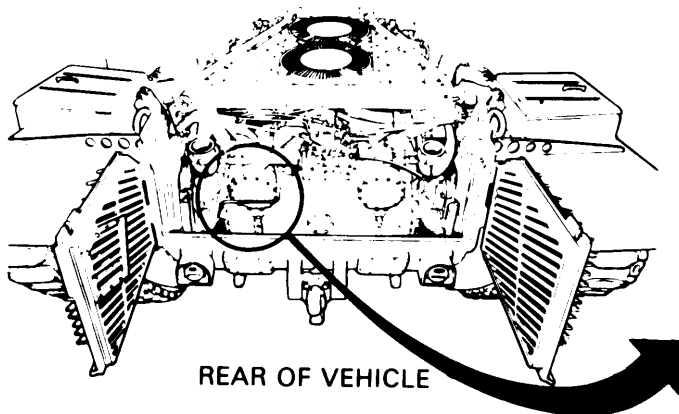
TA253174

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 17 of 23)

23. Position rod end of parking brake control into bellcrank (K).
24. Manually install straight pin (L).
25. Using pliers, install cotter pin (M).
26. Using 9/16 inch socket, install two screws (N) and lockwashers (P) to hold parking brake support bracket.



27. Position angle brackets (Q) to rear side walls (by powerplant guides). Hang tab of brackets onto tabs on compartment side walls.
28. Manually start three screws (R), lockwashers (S), and washers (T) to hold angle bracket (Q) to side walls.
29. Using 9/16 inch socket with 2 inch extension, tighten three screws (R) to secure angle brackets (Q) to side walls.
30. Remove protective coverings from fuel return line openings.
31. Manually connect fuel return line by pulling back on quick-disconnect fitting (U) and inserting male connector into female connector.



Go on to Sheet 18

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 18 of 23)

32. Remove protective coverings from hydraulic brake line openings.

NOTE

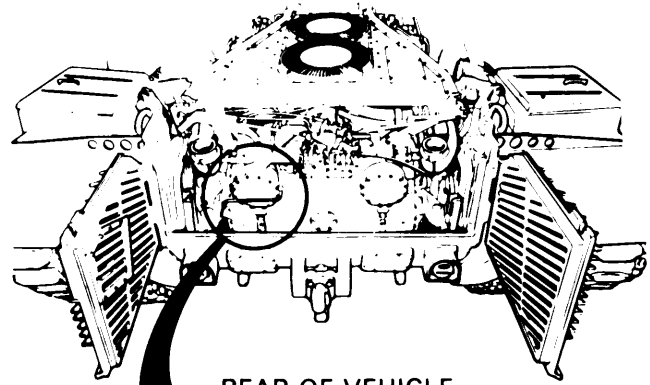
If your vehicle is equipped with the hydraulic brake quick-disconnect, proceed to step 33.1.

33. Using 9/16 inch wrench, install brake line (V).

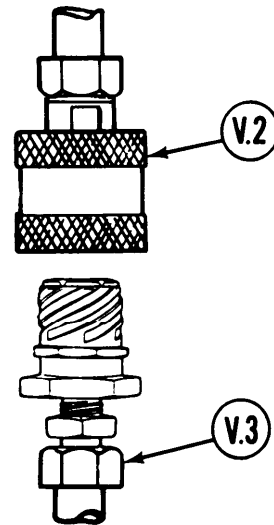
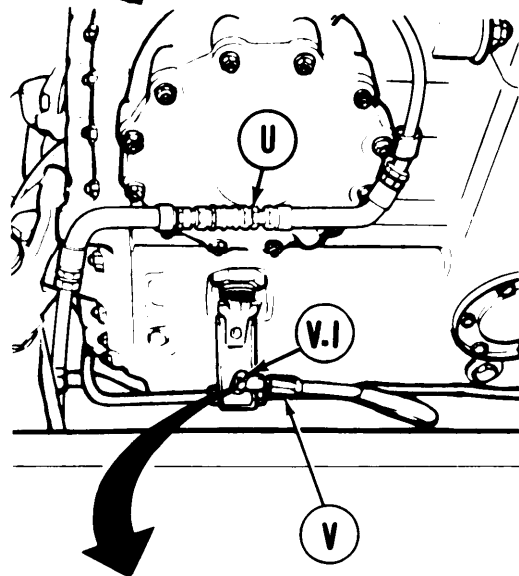
WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

- 33.1. Using dry cleaning solvent, clean both halves of quick-disconnect coupling (V.1).
- 33.2. Check spring action of movable collar (V.2) on female half of quick-disconnect coupling. If action is not smooth, pour dry cleaning solvent between collar (V.2) and inner element and work collar (V.2) back and forth until free of dirt and grime and action is smooth.
- 33.3. Using dry rags, dry both halves of quick-disconnect coupling.
- 33.4. Connect female half of quick-disconnect coupling to male half by twisting clockwise until collar (V.2) snaps over locking nut (V.3). Be sure collar (V.2) is securely locked down over locking nut (V.3).



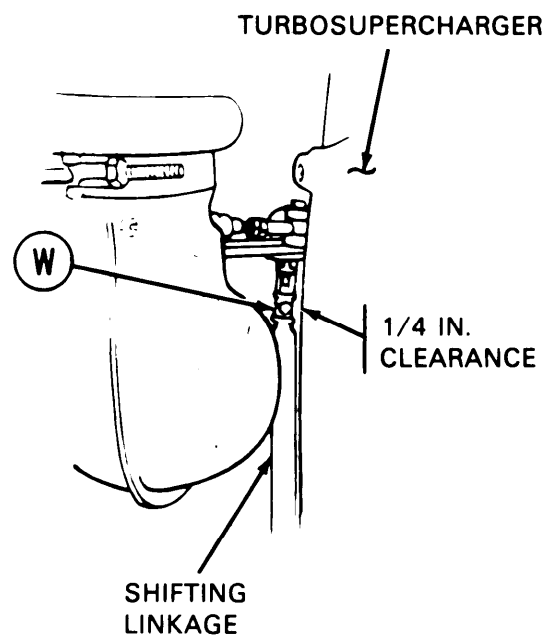
REAR OF VEHICLE



Go on to Sheet 18.1

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 18.1 of 23)

34. Aline shifting linkage rod flats.
35. Push linkage socket until it seats.
36. Using 7/16 inch wrench, install capscrew (W).

**NOTE**

Check assembled shifting linkage rods. Clearance should be at least 1/4 inch between rods and turbosupercharger.

Go on to Sheet 19

WARNING

The following summary list is adapted from the warnings within this volume. However, all warnings should be observed as noted in the text.

Support brake access covers with hand to prevent personal injury when removing covers.

Powerplant weighs more than 8500 pounds. Careless handling may result in serious injury to personnel or damage to equipment. Do not permit powerplant to strike hull.

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

Do not allow smoking, open flames, and tank or other vehicle operation within 50 feet while draining fuel tanks.

Do not let upper and lower fuel-water sensor probes come into direct contact with each other or with metal container during operational tests. Do not touch bare ends of sensor probe cables.

Assign one person with a fire extinguisher as fire guard during all powerplant tests.

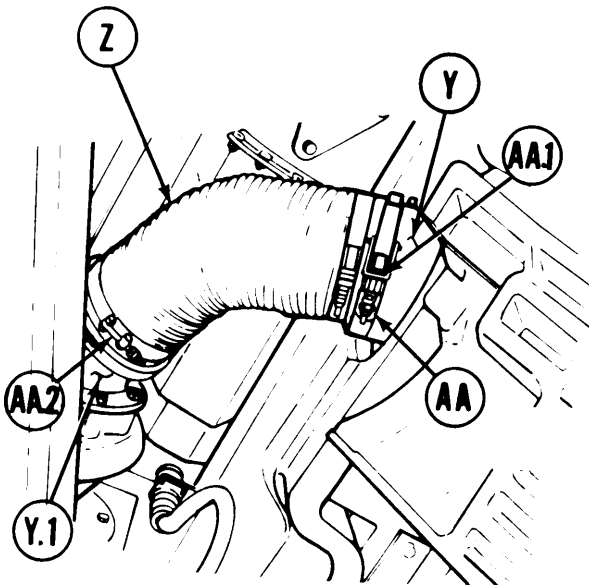
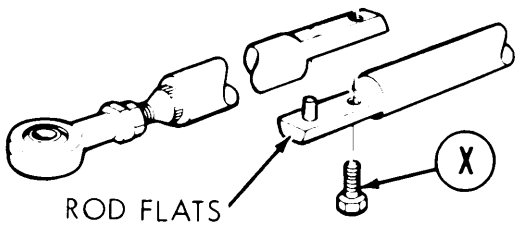
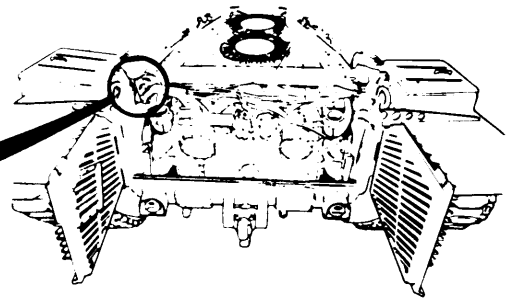
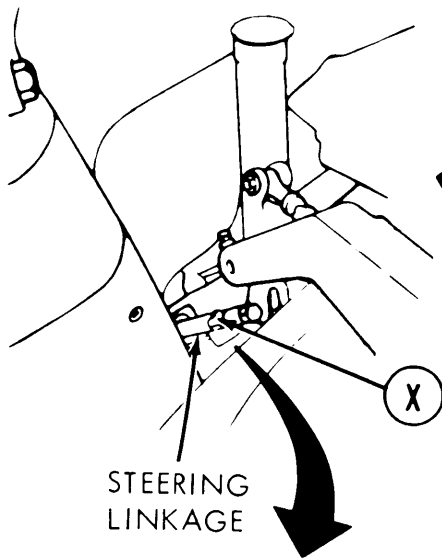
Take all necessary safety precautions to eliminate possible injury to personnel or damage to equipment. Stand clear of transmission output flanges whenever engine is running. Hearing protection is required.

During engine fuel leak check, observe for fuel leakage from a safe distance. Fuel is delivered under high pressure from fuel pump to fuel injector nozzles. Injury to personnel could result if contact spray from loose or defective fuel lines.

Ignition coils on engine are capable of producing extremely high voltage. Output of the ignition system is sufficient to cause a dangerous electrical shock. Never touch any uncovered or live connections.

Transmission shroud is hot after operation. Allow engine to cool 1 hour before removing shroud. Wear asbestos gloves for protection.

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 19 of 23)



37. Alining steering rod linkage flats, install capscrew (X).
38. Using 7/16 inch wrench, tighten capscrew (X).
39. Remove protective coverings from air cleaner outlet elbow (Y) and turbosupercharger elbow (Y.1) on each side of powerplant.
40. Manually install two air cleaner outlet hoses (Z) on each side of powerplant.
41. Using socket, tighten adjusting nut (AA) on clamp (AA.1) to eliminate clearance between hasp and "T" bolt. Turn nut one additional turn.
- 41.1 Using socket and torque wrench, tighten nut of clamp (AA.2) to 25 to 35 lb. in. (3 to 4 N^m).

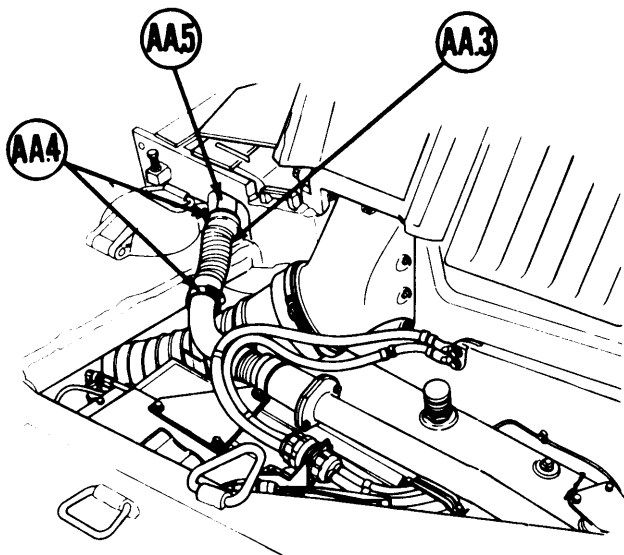
Go on to Sheet 19.1

TA249054

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 19.1 of 23)

NOTE

If your vehicle is not equipped with a 2DA engine, proceed to step 42.



41.2 Slide hose (AA.3) and clamp (AA.4) up over manifold tube (AA.5).

41.3 Using screwdriver, tighten clamps (AA.4).

- 42. Untie hoses and cables tied during removal.
- 43. Install four electrical harness connectors (AB).
- 44. Using spanner wrench, tighten electrical connectors (AB).

Go on to Sheet 20

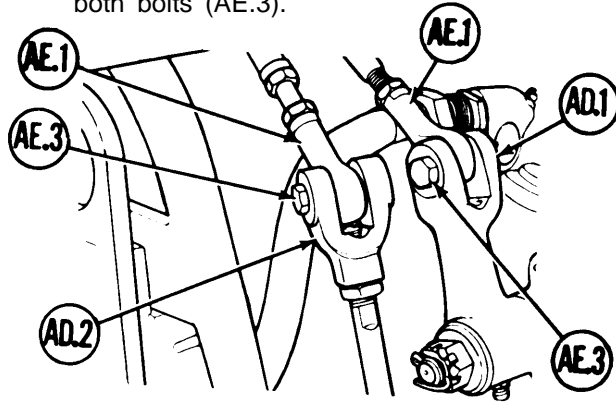
TA249055

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 20 of 23)

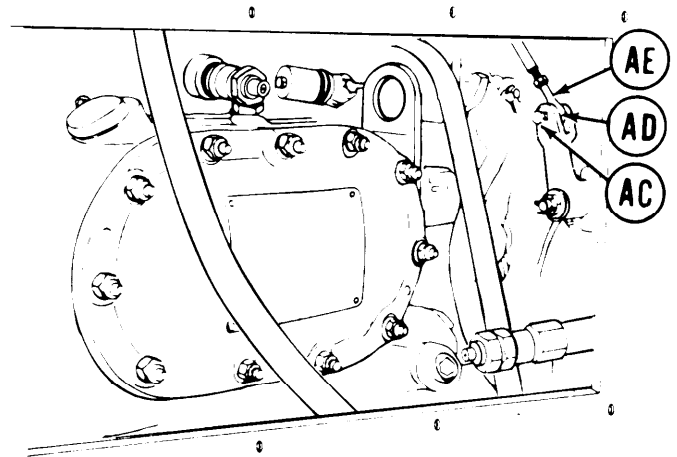
45. On early model, reach through engine access cover opening and use 7/16 inch wrench to install accelerator bolt (AC) to hold accelerator linkage clevis (AD) to rod end (AE).

45.1. On late model, reach through engine access cover opening and mount rod ends (AE.1) to accelerator linkage lever (AD.1) and fuel shutoff clevis (AD.2).

45.2. On late model, install two self-locking bolts (AE.3). Using 7/16 inch wrench, tighten both bolts (AE.3).



LATE MODEL



EARLY MODEL

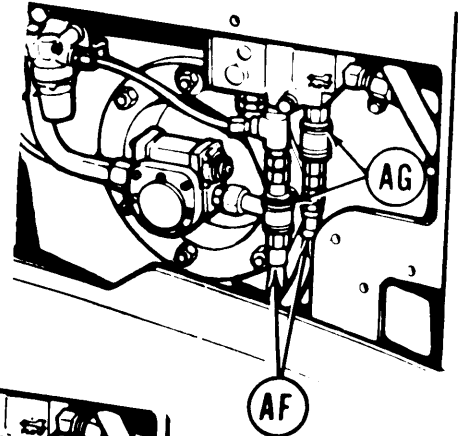
46. On early model, reach through engine access cover opening and remove protective coverings from two primary fuel lines (AF) and quick-disconnect fittings (AG).

46.1 On late model, reach through engine access cover opening and remove protective coverings from primary fuel line (AF.1) and quick-disconnect fitting (AG.1).

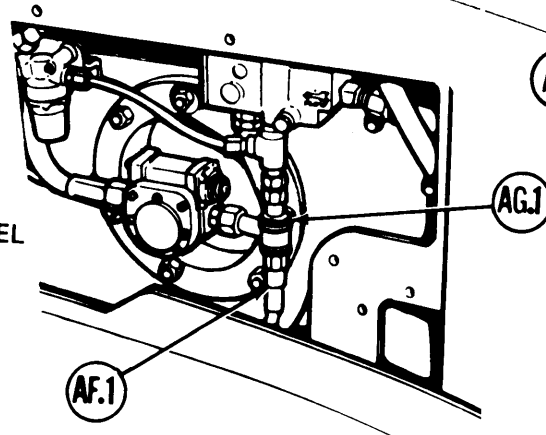
47. On early model, reach through lower engine access cover opening and manually connect two priming fuel lines (AF) to quick-disconnect fittings (AG).

47.1 On late model, reach through lower engine access cover opening and manually connect priming fuel line (AF. 1) to quick-disconnect fitting (AG.1),

EARLY MODEL



LATE MODEL

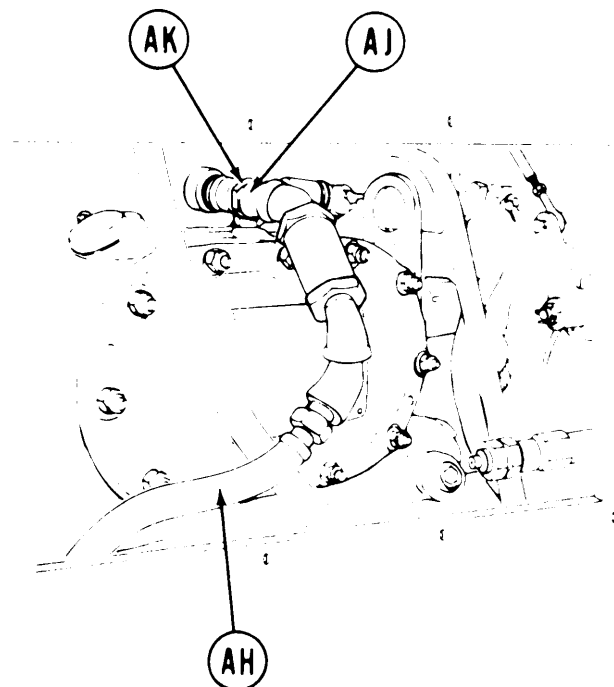


Go on to Sheet 21

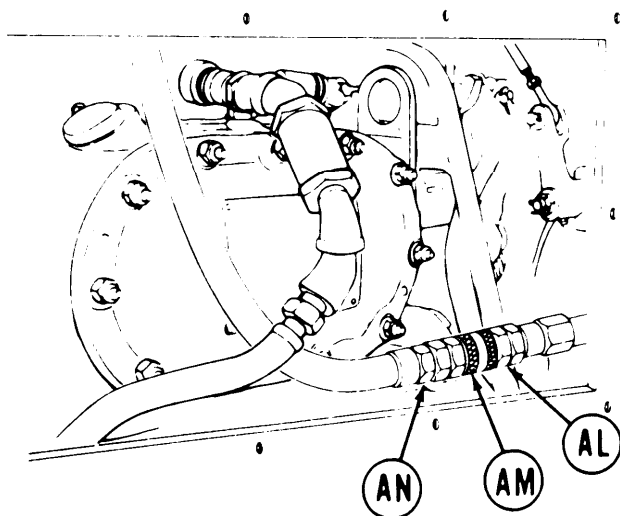
TA249056 ■

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 21 of 23)

- 48. Reaching through engine access cover opening, remove light rope or heavy masking tape holding free end of fire extinguish; tubing (AH),
- 49. Reaching through engine access cover opening, remove protective coverings from ends of fire extinguisher tubing fitting and engine fitting .



- 50. Reaching through engine access cover opening, manually connect fire extinguisher tubing fitting (AJ) to engine fitting (AK), by pulling back on tubing fitting (AJ) and inserting male connector into female connector.
- 51. Reaching through engine access cover opening, remove protective coverings from main fuel line fittings (AL) and (AM).

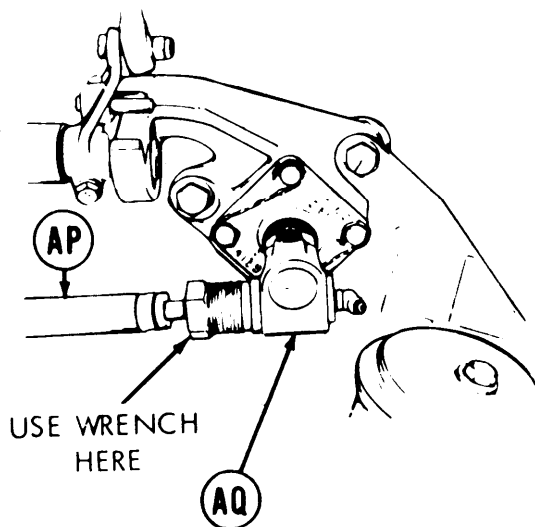


- 52. Reaching through engine access cover opening, manually connect main fuel line (AN) to quick-disconnect fitting (AL), by pulling back on fitting (AM) and inserting male connector into female connector.

Go on to Sheet 22

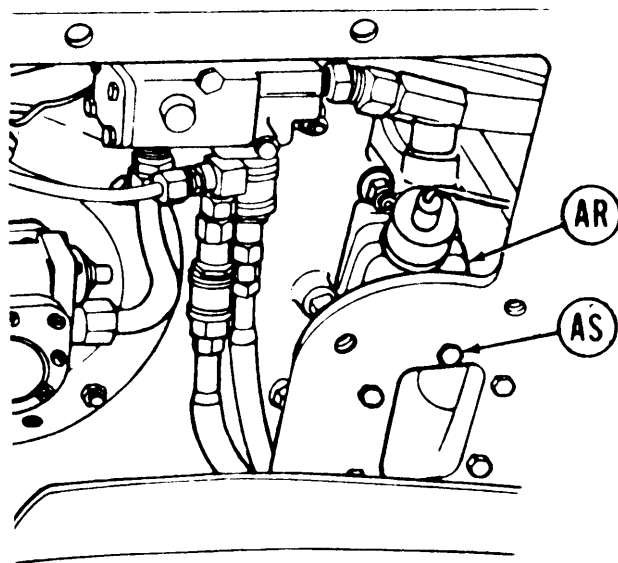
TA140237

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 22 of 23)



53. Reaching through engine access cover opening, use adjustable wrench to install tachometer cable (AP) to adapter (AQ).

- 54. Position generator air duct (AR) to bulkhead wall.
- 55. Using 7/16 inch wrench, install six screws (AS) to hold generator air duct (AR) to bulkhead wall.



56. If engine, transmission, or shifting control linkage was replaced, check shifting control linkage adjustment (page 11-2). Adjust linkage if necessary (page 11-2).

57. If engine, transmission, or steering control linkage was replaced, check steering control linkage adjustment (page 15-2). Adjust linkage if necessary (page 15-2).

Go on to Sheet 23

TA140238

POWERPLANT REPLACEMENT (2D ENGINE) (Sheet 23 of 23)

58. If engine, transmission, or accelerator control linkage was replaced. check accelerator control linkage adjustment (page 7-415). Adjust linkage if necessary (page 7-415).
59. Install upper engine access cover (page 16-40).
60. Install right angle drive, pump, and clutch (page 18-104).
61. Connect battery ground straps (page 10-283),
62. Install transmission shroud (page 9-23).
63. Install top deck (page 16-23).
64. Remove blocks from both tracks at front and rear.
65. Perform operational test (TM 9-2350-222-10).

End of Task

2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 1 of 15)
 PROCEDURE INDEX

PROCEDURE	PAGE
Test Hookup	5-49
Idle Test	5-52
Governed No-Load Test	5-53
Stall Test	5-55
Engine Fuel Leak Test	5-60
After-Test Disconnect	5-62

TOOLS: 1/2 in. combination box and open end wrench
 3/4 in. combination box and open end wrench
 3/4 in. socket with 1/2 in. drive
 Flat-tip screwdriver with 1/4 in. blade
 Ratchet with 1/2 in. drive
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N°m)
 1-1/4 in. socket with 1/2 in. drive
 Spanner wrench

■ SUPPLIES: Goggles (Item 74, Appendix D)

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section 1)
 ■ Fan rotor hub spacer (Item 2, Chapter 3, Section 1)

FABRICATED TOOLS: Throttle linkage adjusting go/no-go gage (Fig. 3, Appendix F)
 Tachometer assembly (Fig. 2, Appendix F)

PERSONNEL: Three

REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)
 Remove universal joints (page 12-11, starting with step 8).

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 OF VEHICLE.'

Go on to Sheet 2

2D ENGINE POWER PLANT TESTS (GROUND HOP) (Sheet 2 of 15)

TEST HOOK-UP:

NOTE

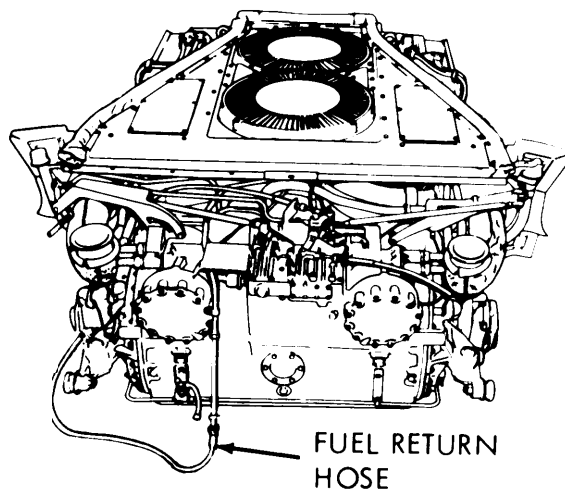
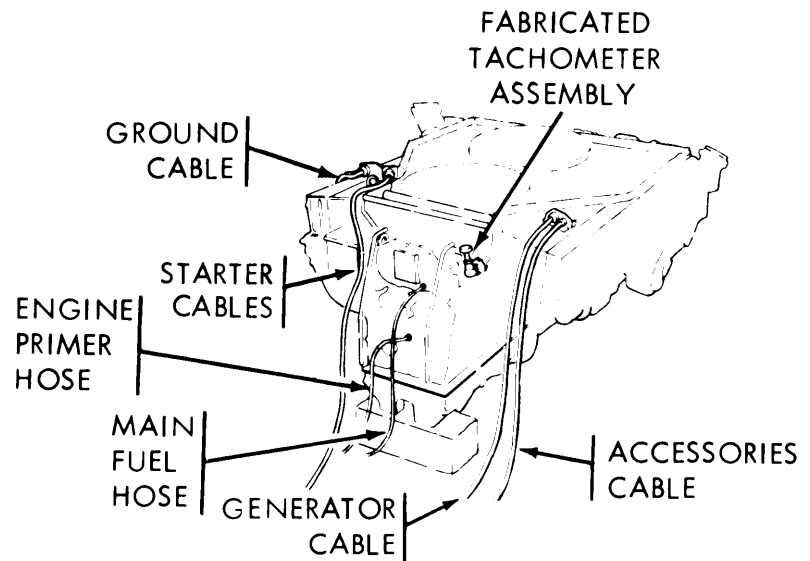
All or any one test can be performed in any order. If more than one test is to be performed, do not disconnect test hookup.

Disconnect test hookup only when test or tests are complete.

NOTE

No two cable and hose connectors are the same. Match ground hop cable and hose connectors with engine cable and hose connectors for hookup procedures.

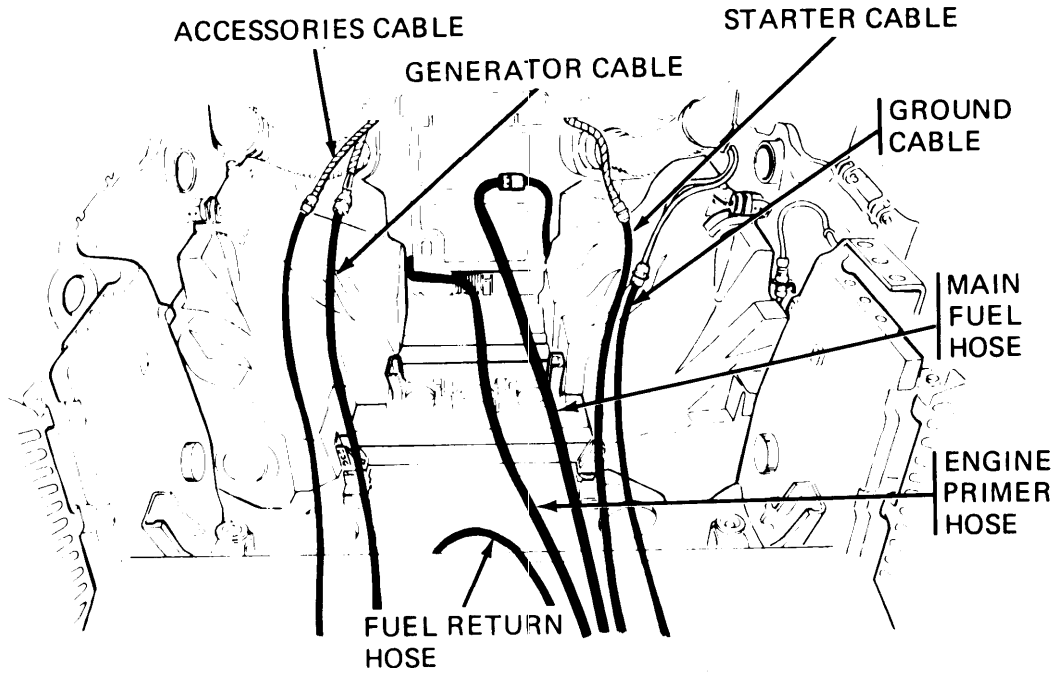
1. Position and support powerplant so that there is free air circulation and access to all sides of powerplant.
2. Position powerplant close to hull to permit connection of electrical cable assemblies and fuel hose assemblies.
3. Connect cable assemblies and hose assemblies to powerplant as shown.



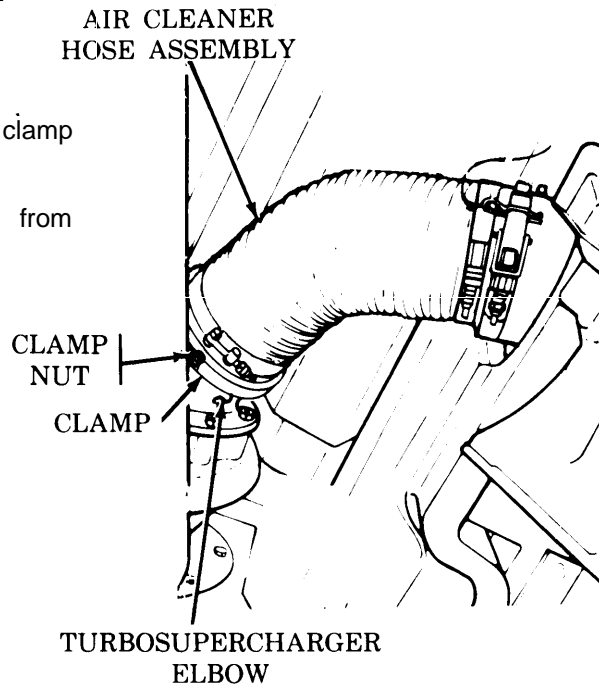
Go on to Sheet 3

2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 3 of 15)

4. Connect cable assemblies and hose assemblies to hull as shown.



5. Using 7/16-inch socket and ratchet, loosen clamp nut securing clamp.
6. Remove air cleaner hose assembly from turbosupercharger elbow.



Go on to Sheet 4

2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 4 of 15)

7. Position ground hop hose assembly with clamp and filter to right turbosupercharger elbow.
8. Using 7/16-inch socket and ratchet, tighten clamp nut to secure hose assembly to turbosupercharger elbow.
9. Repeat steps 7 and 8 on left side.

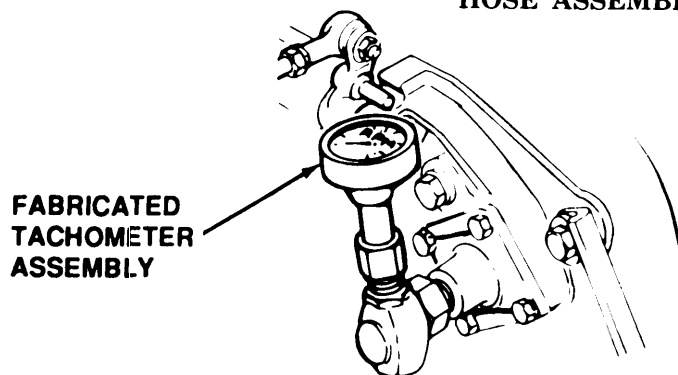
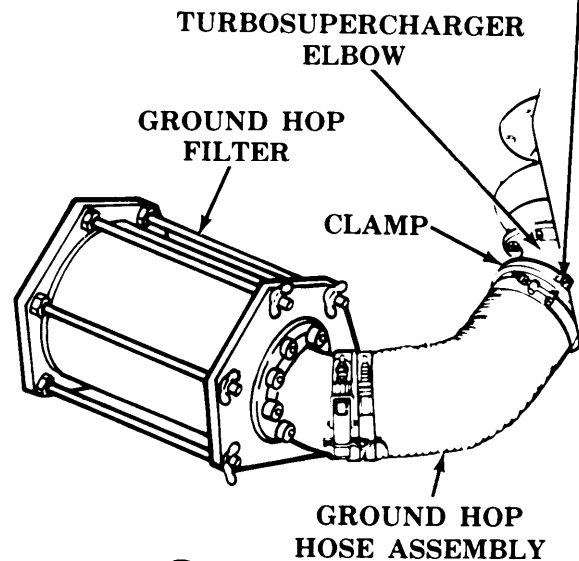
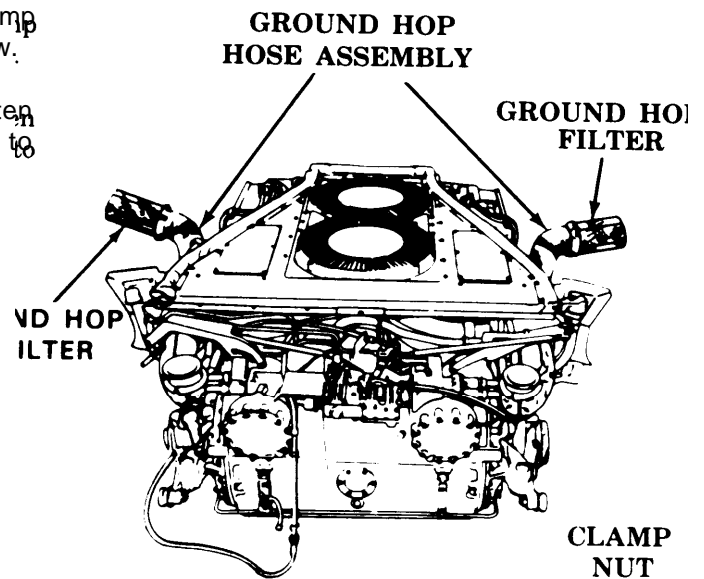
WARNING

Assign one crewmember with a fire extinguisher as a fire guard during all powerplant tests.

NOTE

During these tests, the electrical instruments, switches and warning lights in the vehicle will be operative. All mechanical and hydraulic controls and vehicle tachometer will be inoperative. It will be necessary to manually position or actuate the throttle or shifting control and fuel shut off.

10. Install fabricated tachometer assembly.
11. Connect battery ground straps (page 10-268).



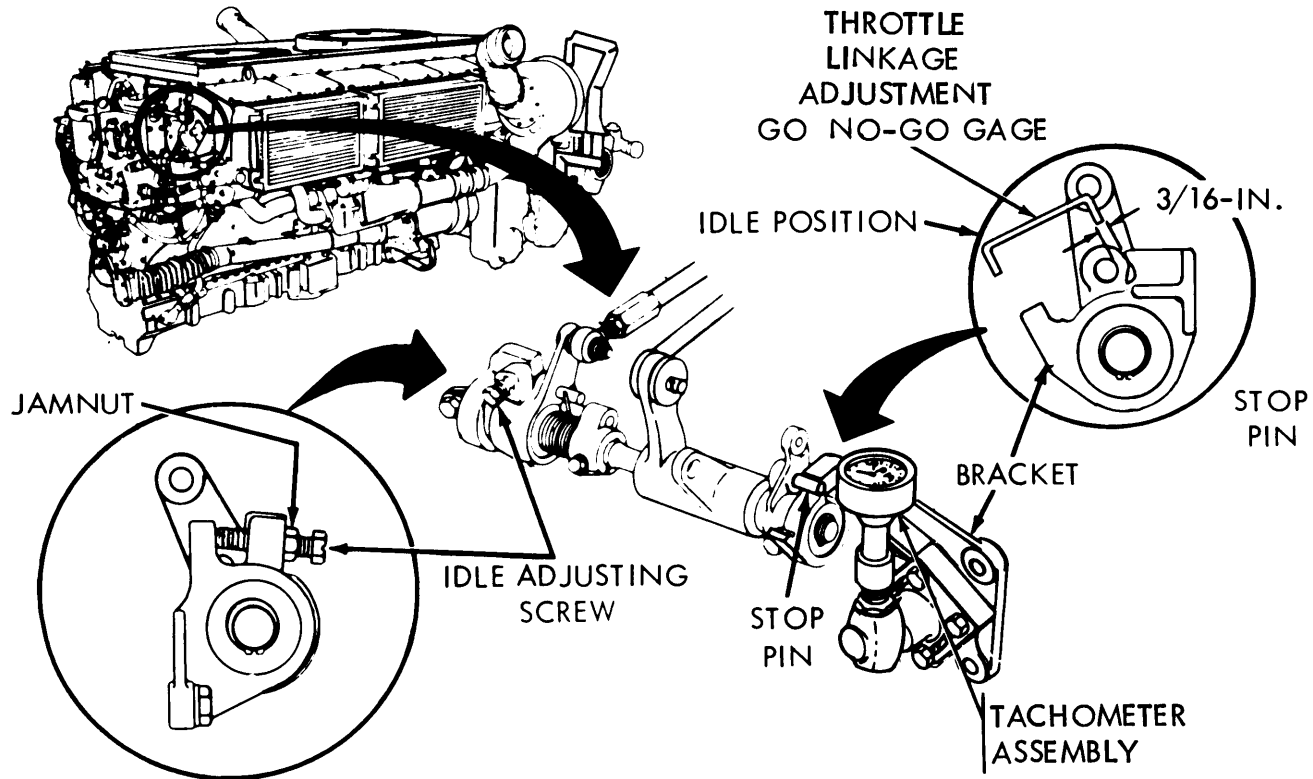
Go on to Sheet 5

2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 5 of 15)

IDLE TEST:

WARNING

Take all necessary safety precautions to eliminate possible injury to personnel or damage to equipment. Stand clear of transmission output flanges whenever the engine is running.



1. Start and operate engine until normal operating temperatures are reached (TM 9-2350-222-10).
2. Check tachometer for indication of 700-750 rpm. If indication is not within range, adjust idle adjusting screw according to steps 3 thru 6.
3. Using 1/2 inch wrench, loosen jamnut on idle adjusting screw.
4. Using 1/2 inch wrench, adjust idle adjusting screw until 700-750 rpm shows on tachometer.
5. Using 1/2 inch wrench, tighten jamnut.
6. Install 3/16 inch end of throttle linkage adjusting gage between stop pin and bracket shoulder. If distance is not a minimum of 3/16 inch, notify support maintenance.
7. Check tachometer. If indication is not between 700-750 rpm, notify maintenance supervisor.

Go on to Sheet 6

2A ENGINE AND 2D ENGINE POWER PLANT TESTS (GROUND HOP) (Sheet 6 of 15)

GOVERNED NO-LOAD TEST:

1. Start and operate engine until normal operating temperatures are reached (TM 9-2350-222-10).

WARNING

Take all necessary safety precautions to eliminate possible injury to personnel or damage to equipment. Stand clear of transmission output flanges whenever engine is running.

CAUTION

The engine speed must not be permitted to exceed 2640 rpm for more than 2 or 3 seconds in the event of governor malfunction.

NOTE

An indicator on the linkage shaft and four dots on the body transmission valve casting indicate shift position.

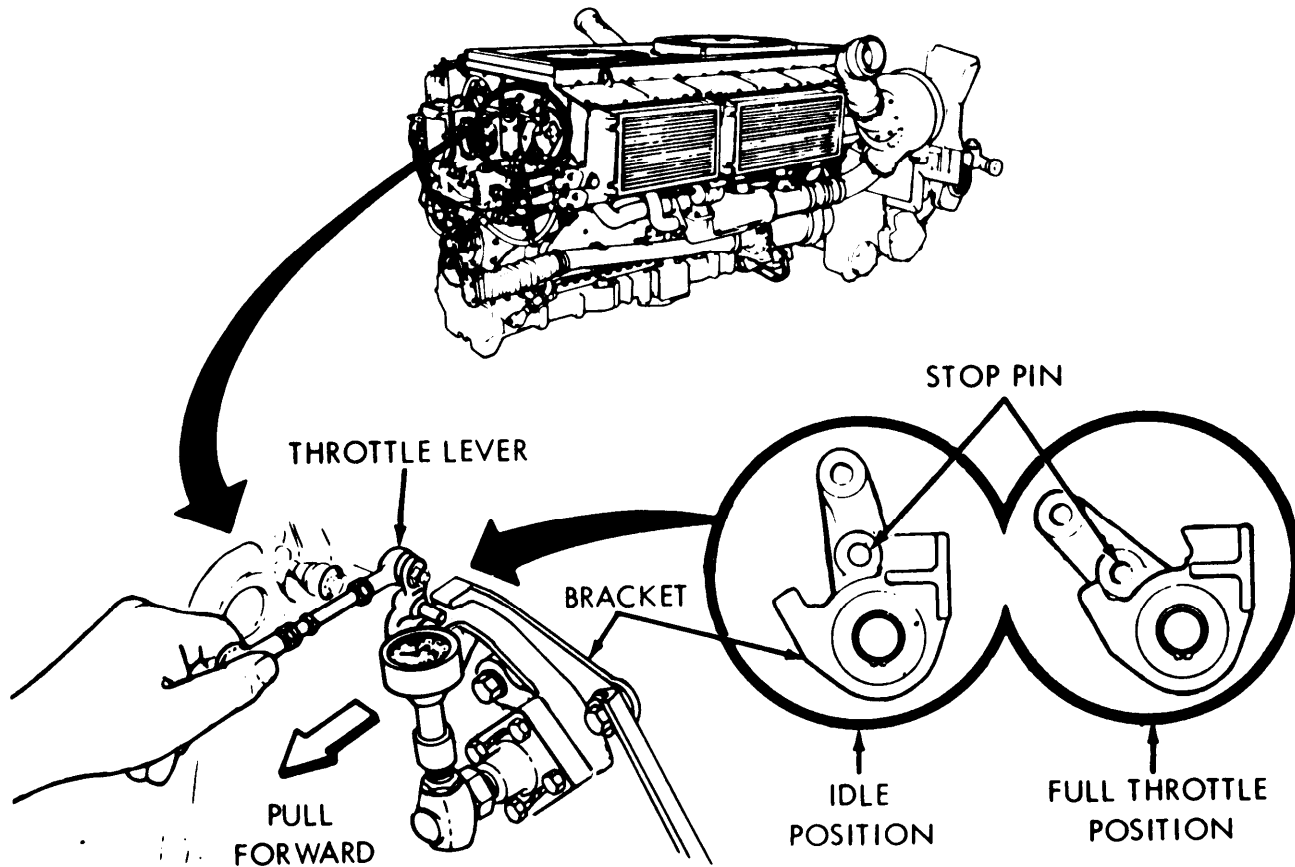
2. Be sure transmission is in neutral position by checking shifting position indicator. If not in neutral position, grasp shift lever and pull or push lever to set indicator to desired position.

Go on to Sheet 7

TA130283

2A ENGINE AND 20 ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 7 of 15)

3. Manually and gradually actuate throttle by pulling forward on throttle lever to full open position. -



4. Watch tachometer. In most cases, engine speed will surge over 2600 rpm and then stabilize within 30 seconds between 2550 and 2640 rpm. If rpm does not fall within this range, or keeps changing, notify maintenance supervisor.
6. Gradually release throttle lever, allowing engine to return to idle speed (700-750 rpm).

Go on to Sheet 8

TA130284

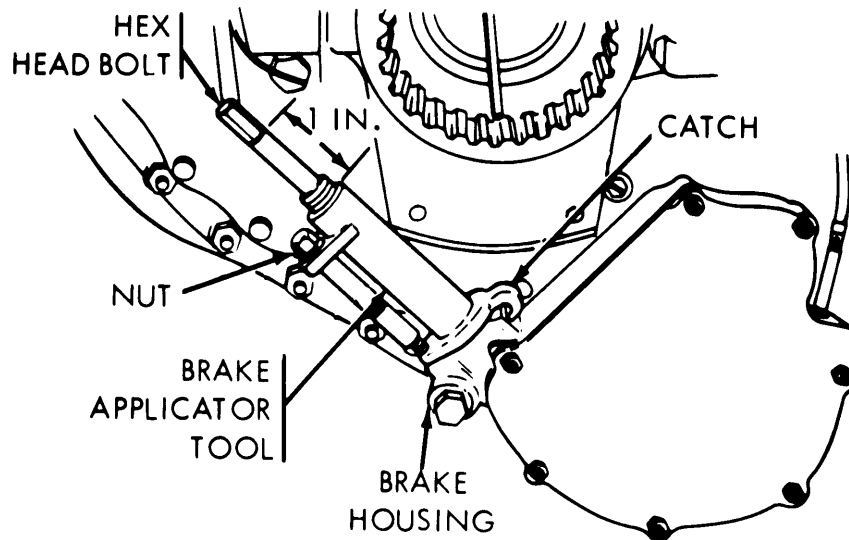
2A ENGINE AND 2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 8 of 15)

STALL TEST:

NOTE

Before performing stall test, check brake adjustment (page 13-2)

1. Remove right brake slave cylinder (page 13-64).
2. Remove left brake slave cylinder (page 13-60).
3. Position brake applicator tool over rod sticking out of brake housing (where slave cylinder was).
4. Engage catch on tool into notch in brake housing.



5. Using 3/4 inch wrench, tighten nut to secure brake applicator tool to brake housing.
6. Using 3/4 inch wrench, set brake by rotating hex head bolt until bottom of bolt is approximately one inch from top of tube.
7. Using torque wrench and 3/4 inch socket, tighten hex head bolt to 10-20 lb-ft (14-27 N^om).

Go on to Sheet 9

TA130285

Change 2 5-55

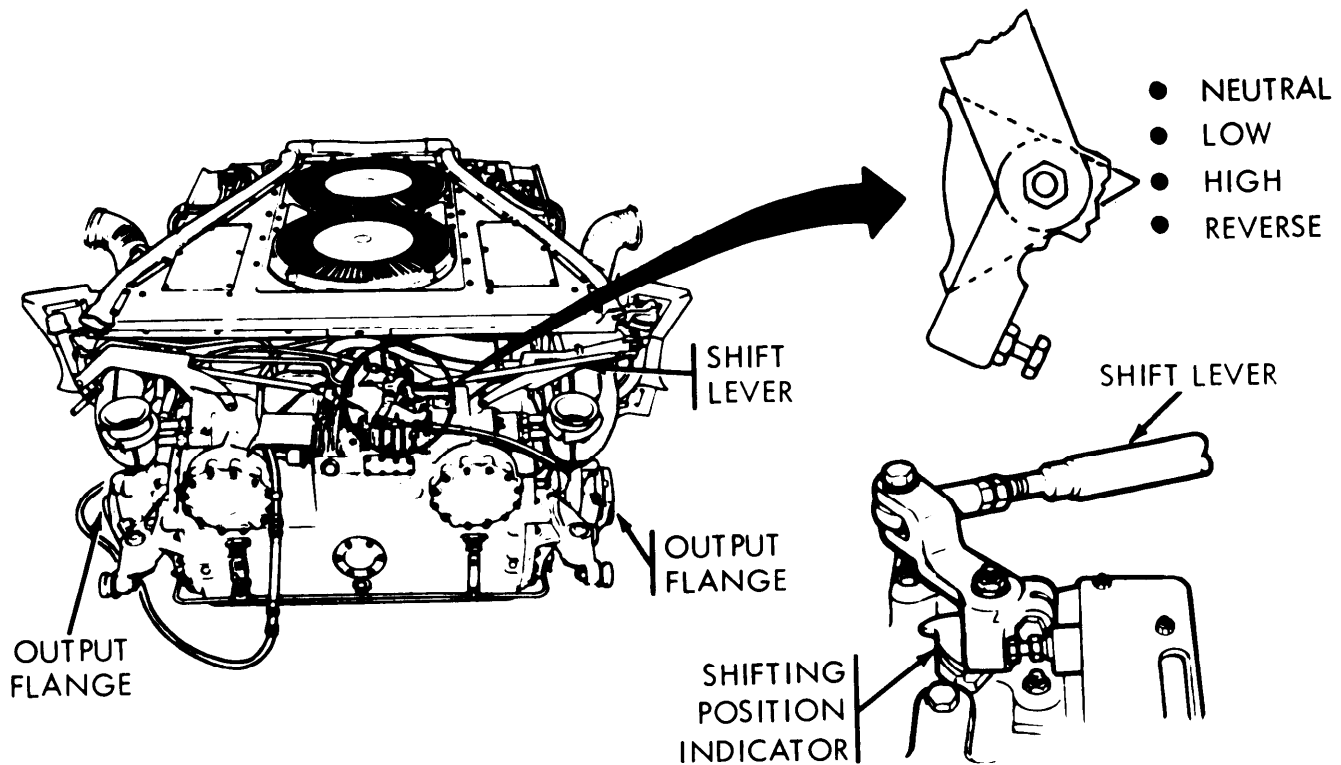
2A ENGINE AND 2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 9 of 15)

8. Check oil levels in engine and transmission (LO 9-2350-222-12). Make sure levels are up to full range on level gages.

WARNING

Take all necessary safety precautions to eliminate possible injury to personnel or damage to equipment. Stand clear of transmission output flanges whenever engine is running.

9. Start and operate engine until normal operating temperatures are reached (TM 9-2350- 222-10).



NOTE

An indicator on the linkage shaft and four dots on the body transmission valve casting indicate shift position.

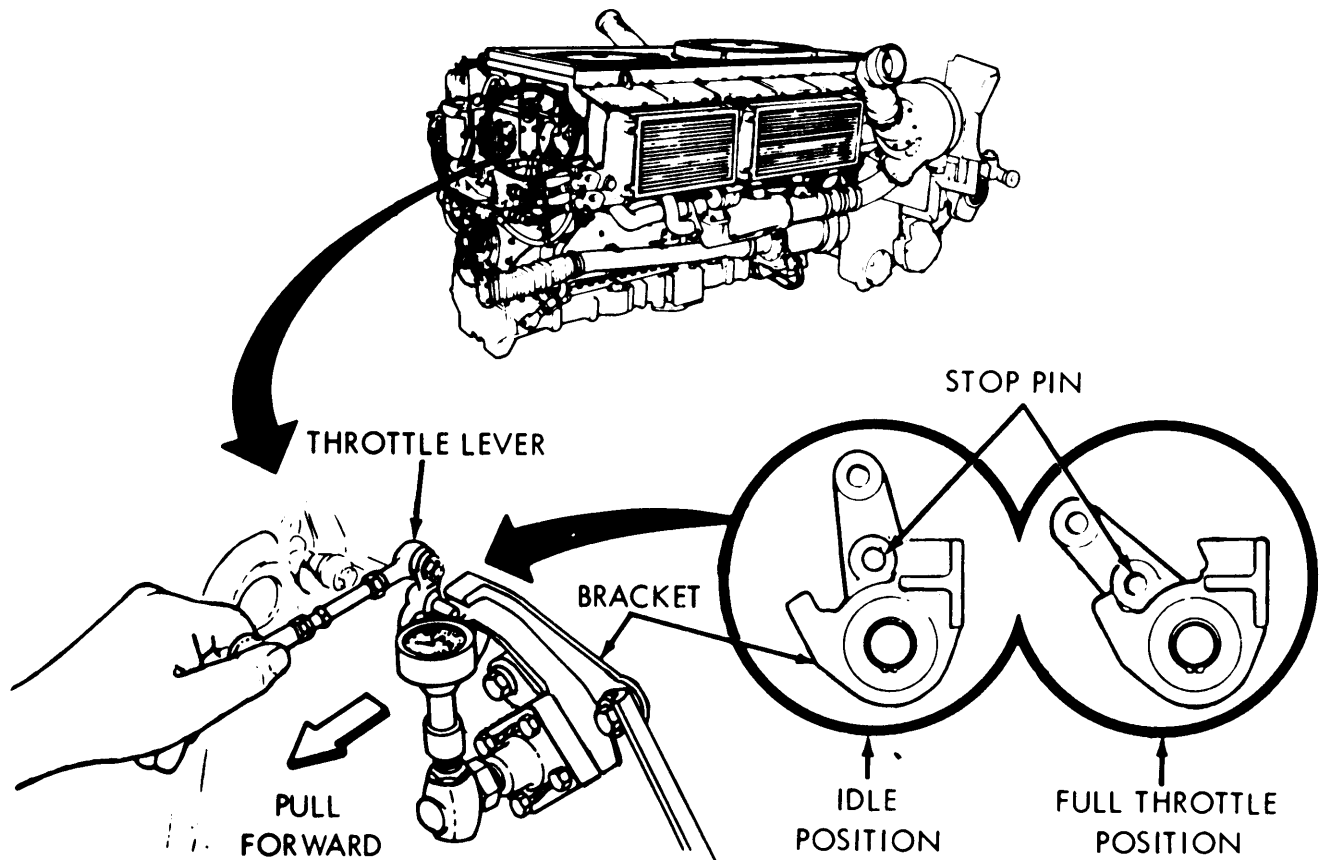
10. Set transmission in high range by grasping shift lever and pull or push lever to set indicator to high range.

Go on to Sheet 10

TA130286

2A ENGINE AND 2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 10 of 15)

11. Manually and gradually actuate throttle by pulling forward on throttle lever to full open position.



CAUTION

Do not do stall test for more than 30 seconds at full throttle or allow transmission oil temperature to go into red area on transmission oil temperature indicator.

12. Watch tachometer and operate engine at full throttle for no more than 30 seconds, three times.
 13. If engine speed is below 1800 rpm, engine is not operating properly; notify support maintenance.

Go on to Sheet 11

TA130287

2A ENGINE AND 20 ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 11 of 15)

14. If engine speed is over 2050 rpm, there is clutch slippage in transmission. Verify that shift control lever is in high (check control indicator position). Notify support maintenance.

NOTE

This test may also be used to determine if the low-range or reverse-range transmission servobands are slipping.

15. Set transmission in low or reverse range by grasping shift control lever and pull or push lever to set indicator to selected range.

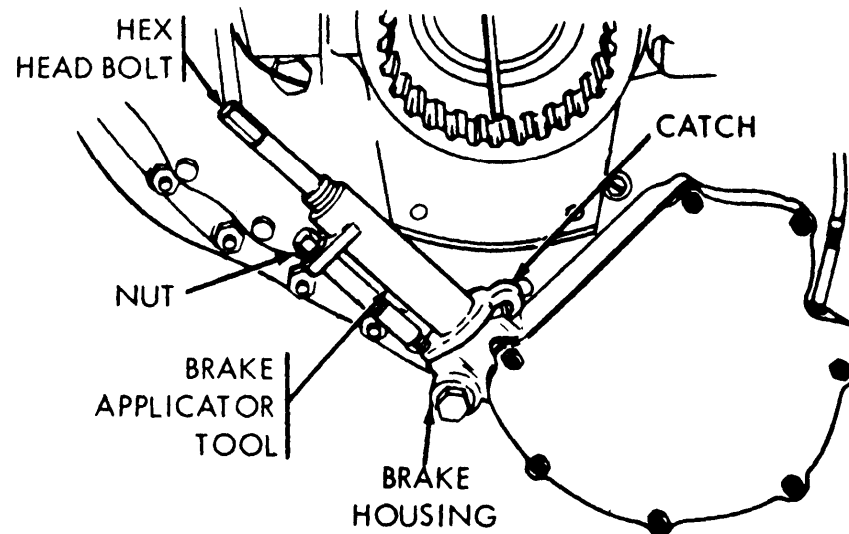
CAUTION

Do not do stall test for more than 30 seconds at full throttle or allow transmission oil temperature to go into red area on transmission oil temperature indicator.

16. Watch tachometer and operate engine at full throttle for no more than 30 seconds, three times.
17. If engine speed is below 1800 rpm after three checks, engine is not operating properly. Notify maintenance supervisor that check of engine performance is required.
18. If engine speed exceeds 2050 rpm, servobands are slipping. Verify that shift control lever is in selected range (check position of control indicator) and adjust forward or reverse servobands (page 11-63).

2A ENGINE AND 20 ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 12 of 15)

19. After adjusting servobands, repeat steps 15 thru 18, If slippage still exists, notify support maintenance.
20. When tests are completed, shut down engine (TM 9-2350-222-10).
21. Using 3/4 inch wrench, back off hex head bolt to release brake.



22. Using 3/4 inch wrench, back off nut to release brake applicator tool from brake housing.
23. Remove brake applicator tool from brake housing.
24. Install right brake slave cylinder (page 13-67).
25. Install left brake slave cylinder (page 13-62).

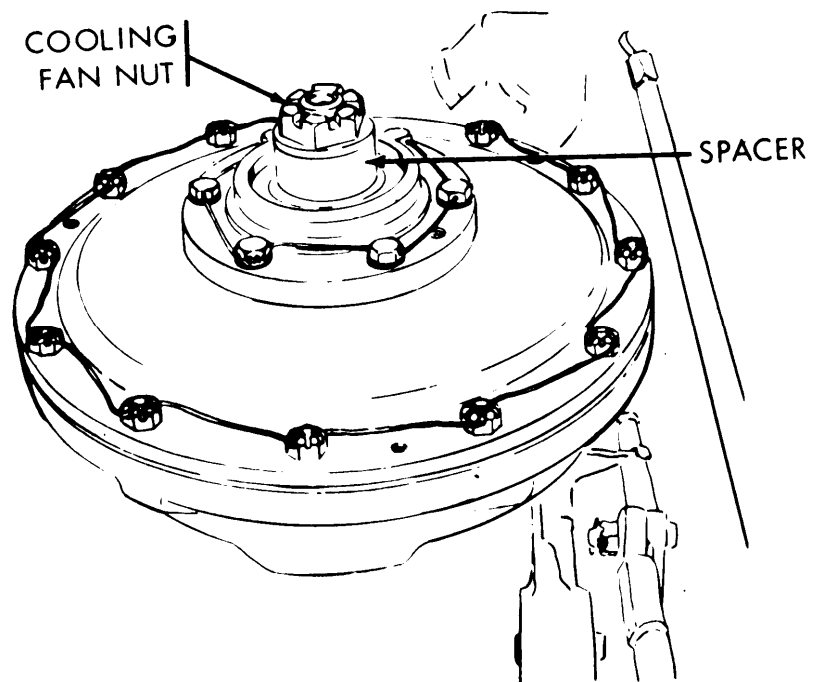
Go on to Sheet 13

TA130289

2A ENGINE AND 2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 13 of 16)

ENGINE FUEL LEAK CHECK:

1. Remove engine shroud (page 9-2).
2. Remove right bank engine access covers 2A engine (page 6-79) or 2D engine (page 6-81).
3. Remove left bank engine access covers 2A engine (page 6-86) or 2D engine (page 6-90).
4. Remove cooling fans (page 9-47).
5. Install spacer onto each drive shaft.
6. Using socket, install coding fan nut.
7. Using torque wrench and 1-1/4 inch socket, tighten cooling fan nut 45-55 ib-ft (61-74 N°m).



Go on to Sheet 14

TA130290

2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 14 of 15)**WARNING**

Fuel is delivered under high pressure from fuel pump to injector nozzles. Injury to personnel could result if contacted by spray from loose or defective fuel line.

CAUTION

DO NOT run engine for more than 10 minutes and do not exceed 700-750 rpm.

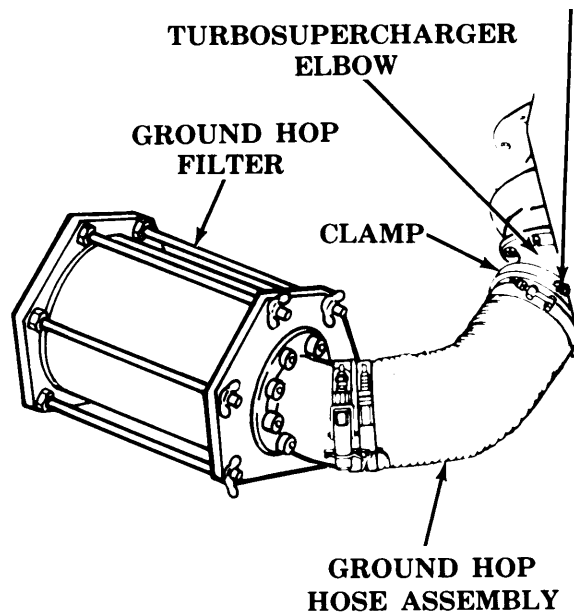
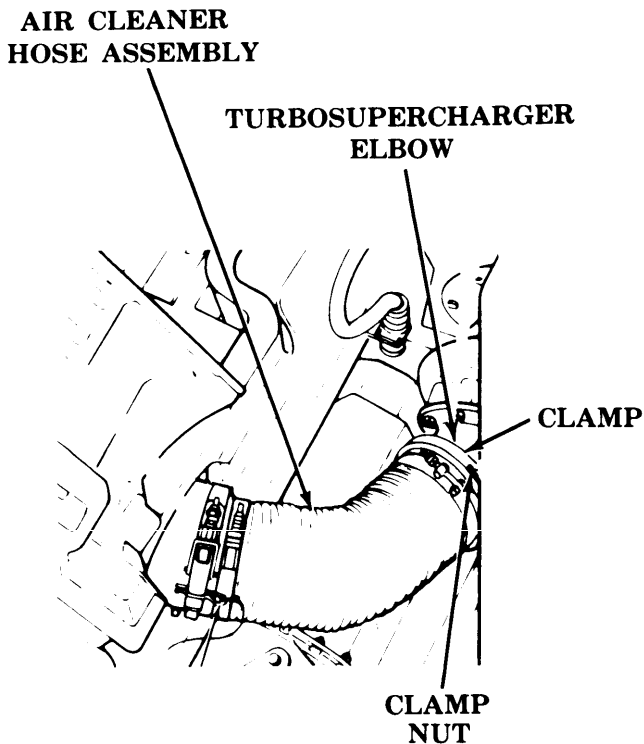
8. Start engine and run engine at idle speed (700-750 rpm) (TM 9-2350-222-10).
9. Wearing goggles, check for leakage at all fuel line connections.
10. If leak is observed, shut down engine (TM 9-2350-222-10) and tighten or replace bad fuel line or fittings.
11. When no leaks are observed, shut down engine (TM 9-2350-222-10).
12. Using 1-1/4 inch socket, remove cooling fan nut,
13. Remove fan rotor hub spacers from fan drive shafts.
14. Install cooling fans (page 9-49).
15. Install left bank engine access covers (page 6-93)..
16. Install right bank engine access covers (page 6-84).
17. Install engine shroud (page 9-3).

Go on to Sheet 15

2D ENGINE POWERPLANT TESTS (GROUND HOP) (Sheet 15 of 15)

AFTER TEST DISCONNECT:

1. Disconnect three battery ground straps (page 10-268).
2. Disconnect four electrical cable assemblies and three hose assemblies from powerplant and hull (pages 5-49 and 5-50).
3. Remove fabricated tachometer assembly.
4. Using 7/16-inch socket with ratchet, loosen clamp nut that secures right ground hop hose assembly clamp.
5. Remove ground hop hose assembly with clamp and filter from turbosupercharger elbow.



6. Position air cleaner hose assembly with clamp to right turbosupercharger elbow.
7. Using 7/16-inch socket with ratchet, tighten clamp nut to secure air cleaner hose assembly to turbosupercharger elbow.
8. Repeat steps 4 through 7 on left side.
9. Install universal joints (page 12-14, steps 1 thru 13).
10. Install powerplant (page 5-37).

End of Task

CHAPTER 6

ENGINE MAINTENANCE INDEX

PROCEDURE	PAGE
Front Powerplant Guide (Left and Right) Replacement	6-3
Rear Powerplant Guide (Left and Right) Replacement	6-4
Engine Mounts (Left and Right) Replacement	6-6
Transmission Mounts (Left and Right) Replacement	6-9
Engine Oil Cooler Bypass Valve Assembly Replacement (2D Engine)	6-15
Engine Oil Filter Element Replacement (2D Engine)	6-27
Oil Damper Housing Straight Tube Hose Adapter Replacement	6-32
Engine Oil Level Gage Cap Replacement (2D Engine)	6-40
Oil Filler Tube (Upper) Replacement	6-43
Oil Filler Tube and Hose (Lower) Replacement	6-47
Drain Engine Oil (2D Engine)	6-51
Cylinder Head and Oil Pan Drain Tubes (Left and Right) Replacement	6-54
Turbosupercharger Oil Drain Tube (Right Bank) Replacement	6-58
Turbosupercharger Oil Drain Tube (Left Bank) Replacement	6-62
Multiple Fluid Pressure Line Connector Replacement	6-66
Crankcase Breather Tee and Rear Tube Replacement	6-72
Oil Cooler Vent Hoses and Fittings Replacement (2D Engine)	6-76
Engine Access Covers (Right Bank) Replacement (2D Engine)	6-81

ENGINE MAINTENANCE INDEX - Continued

PROCEDURE	PAGE
Engine Access Covers (Left Bank) Replacement (2D Engine)	6-90
Powerplant Right Bank Oil Cooler Frame and Brackets Replacement (2D Engine)	6-100
Powerplant Left Bank Oil Cooler Frame and Brackets Replacement (2D Engine)	6-109
Engine Oil Cooler Screen Replacement	6-118
Transmission Oil Cooler Screen Replacement	6-120
Engine Oil Cooler Replacement (2D Engine)	6-130
Transmission Oil Cooler Replacement (2D Engine)	6-146
Engine Oil Cooler Fluid Pump Connector Replacement (2D Engine)	6-156
Thermostatic Engine Oil Cooler Valve (Left and Right) Replacement	6-160
Thermostatic Transmission Oil Cooler Valve Assembly (Right Side) Test and Replacement (2D Engine)	6-167
Thermostatic Transmission Oil Cooler Valve Assembly (Left Side) Test and Replacement (2D Engine)	6-174
Engine to Transmission Oil Line Tube Assemblies (Inner and Outer) Replacement (2D Engine)	6-185
Engine Oil Cooler Inlet or Outlet Hose Replacement	6-188.1
Oil Coolers - Cleaning	6-189

FRONT POWERPLANT GUIDE (LEFT AND RIGHT) REPLACEMENT (Sheet 1 of 1)

TOOLS: 15/16 in. combination box and open end wrench
 15/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 Hinged handle with 1/2 in. drive
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N°m)

SUPPLIES: Lockwasher (MS35338-50) (6 required)

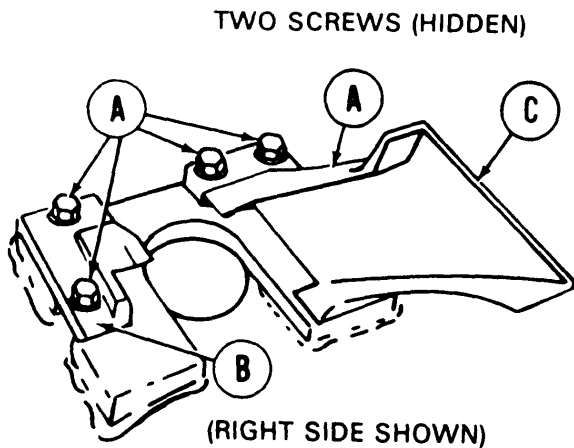
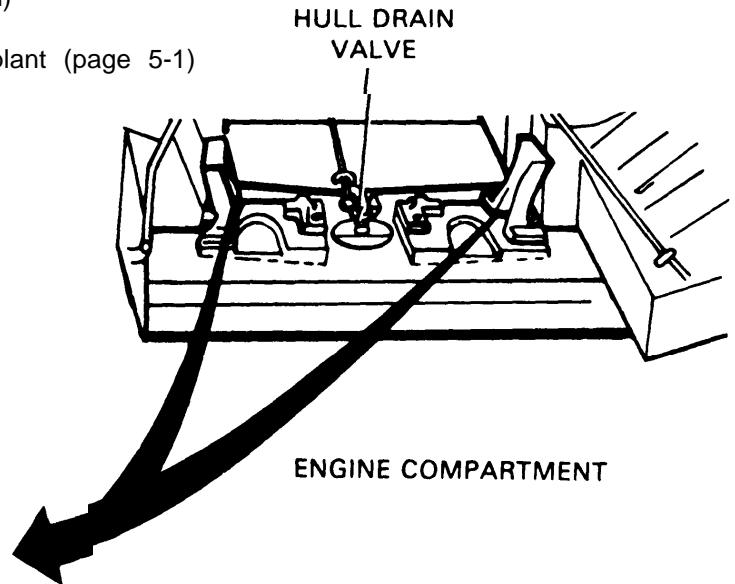
PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:

NOTE

Three screws on right guide cannot be loosened or removed using socket. Use wrench to remove screws that cannot be removed using socket.

1. Using socket with hinged handle, loosen screws (A).
2. Using socket or wrench, remove six screws lockwashers (A). Throw lockwashers away.



3. Remove inner support (B) and front guide (C).

INSTALLATION:

1. Mount inner support (B) and front guide (C).
2. Install six screws and new lockwashers (A).
3. Using socket with torque wrench, tighten screws (A) to 111-149 lb-ft (150-201 N°m).
4. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA253179

REAR POWERPLANT GUIDE (LEFT AND RIGHT) REPLACEMENT (Sheet 1 of 2)

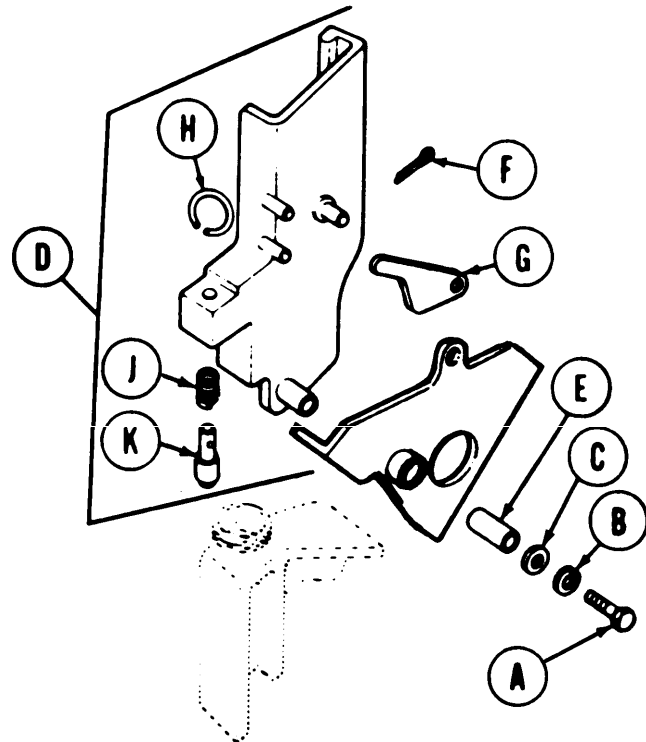
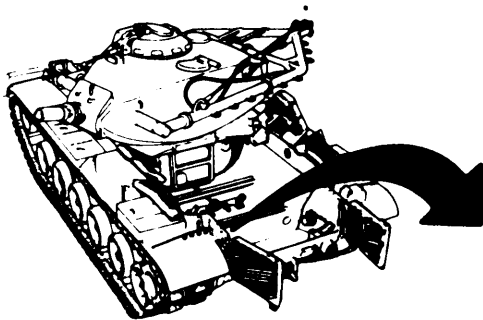
TOOLS: 9/16 in. socket with 1/2 in. drive
Hinged handle with 1/2 in. drive (breaker bar)
Ball peen hammer
Long round nose pliers
Slip joint pliers
Slip joint pliers
Chisel
Chisel
Brass drift

SUPPLIES: Cotter pin (MS24665-136)
Connecting ring (8744683)
Sleeve bearing (5160090)
Wood block, 4 in. x 6 in. (approximately)
Lockwasher (MS35338-46)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:

1. Using socket, remove screw (A), lockwasher (B), and flat washer (C) securing rear powerplant guide (D) to support. Throw lockwasher away.
2. Using hammer, tap guide (D) from mounting place. Remove guide from vehicle.



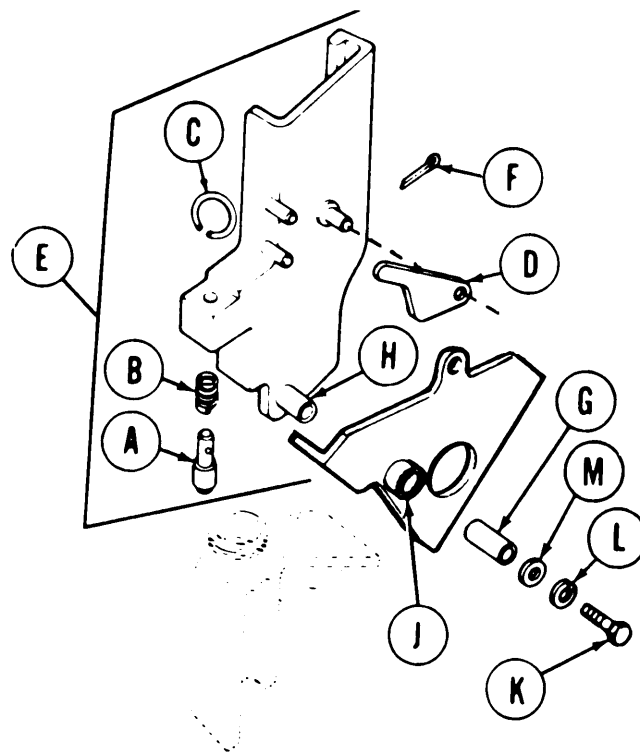
3. Using brass drift, drive bearing (E) from support. Throw bearing away.
4. Using long round nose pliers, remove cotter pin (F) and latch (G). Throw cotter pin away.
5. Using chisel, cut ring (H).
6. Using slip joint pliers, separate ring (H) and remove ring (H), spring (J), and pin (K). Throw ring away.

Go on to Sheet 2

TA2531S0

REAR POWERPLANT GUIDE (LEFT AND RIGHT) REPLACEMENT (Sheet 2 of 2)**INSTALLATION:**

1. Place pin (A) and spring (B) in position.
2. Using slip joint pliers, install new ring (C).
3. Place latch (D) on guide (E).
4. Using long nose pliers, install new cotter pin (F).
5. Using hammer and wood block, install new bearing (G) in mounting hole (J).
6. Mount guide (E) with arm (H) through support mounting hole (J).



7. Using socket, install screw (K), new lockwasher (L), and flat washer (M).
8. Have ring (C) brazed at ring opening.
9. Install 2A Powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA139372

ENGINE MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 1 of 3)

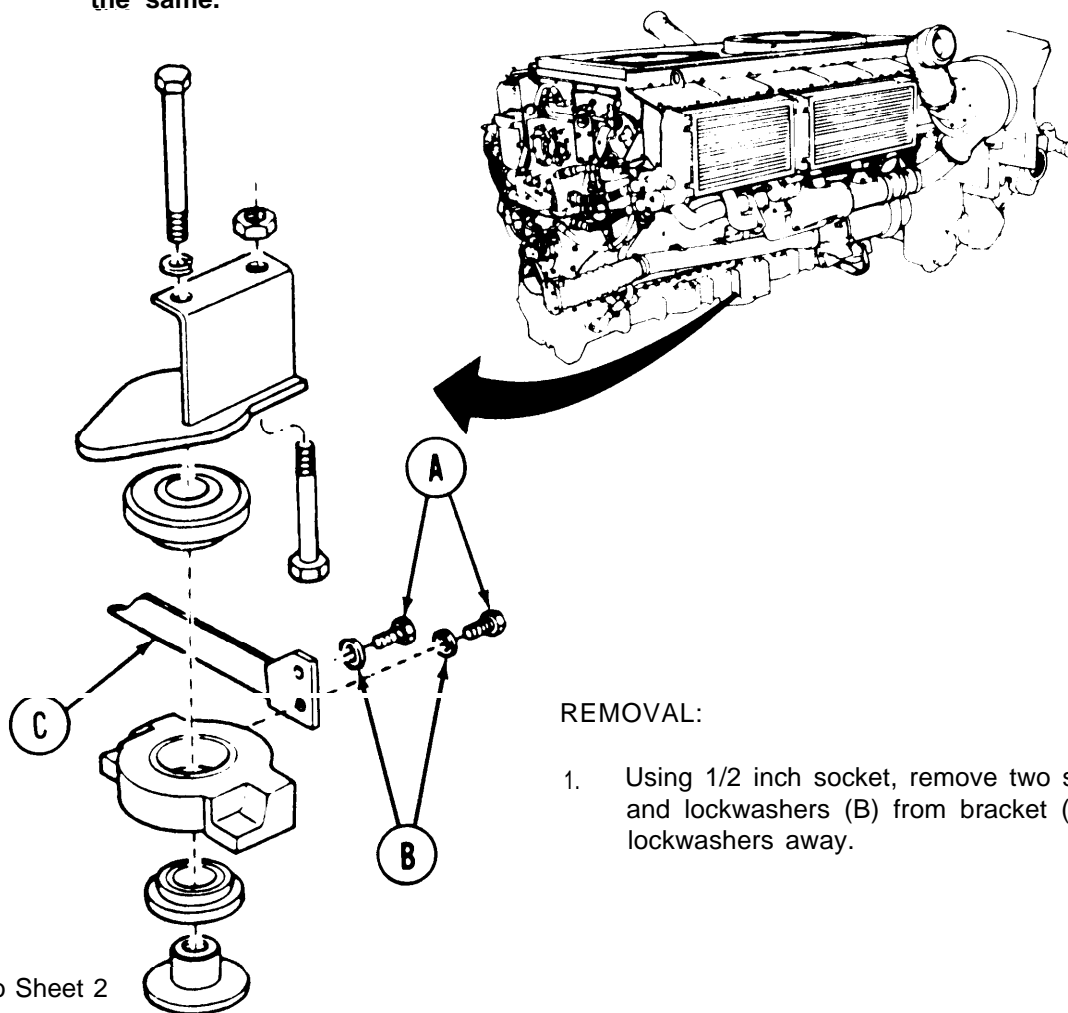
TOOLS: 1-1/16 in. open end wrench
1-1/8 in. socket with 3/4 in. drive
Ratchet with 3/4 in. drive
1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
36 in. extension with 3/4 in. drive
T-slide handle with 3/4 in. drive

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
Rags (Item 65, Appendix D)
Lockwasher (MS35338-45) (2 required)
Lockwasher (MS35338-51)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1).

NOTE

Removal and installation of left and right engine mounts are the same.



REMOVAL:

1. Using 1/2 inch socket, remove two screws (A) and lockwashers (B) from bracket (C). Throw lockwashers away.

Go on to Sheet 2

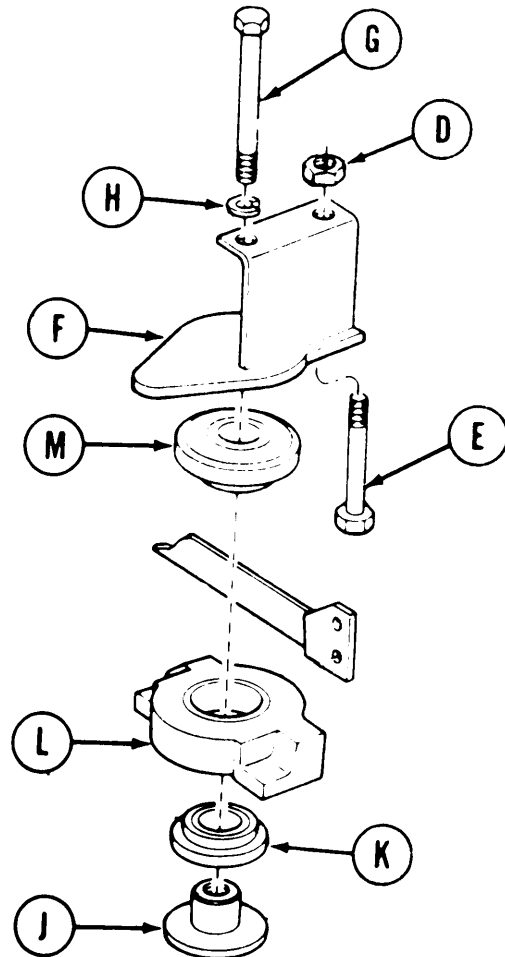
TA139373

ENGINE MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 2 of 3)

2. Using 1-1/8 inch wrench to hold nut (D) and 1-1 /8 inch socket on bolt (E), remove nut (D) and bolt (E) from bracket (F).
3. Using 1-1/8 inch socket, remove bolt (G) and lockwasher (H) from bracket (F) while holding bushing (J) with 3/4 inch drive T-slide and 36 inch extension bar. Throw lockwasher away.
4. Remove bushing (J), mount (K), mounting (L), and mount (M) from engine assembly.

CLEANING AND INSPECTION:

1. Clean all parts with dry cleaning solvent (Item 54, Appendix D) and wipe dry with clean rag (Item 65, Appendix D),
2. Inspect bushing, mounts, and mountings for nicks and burrs. Replace damaged parts.



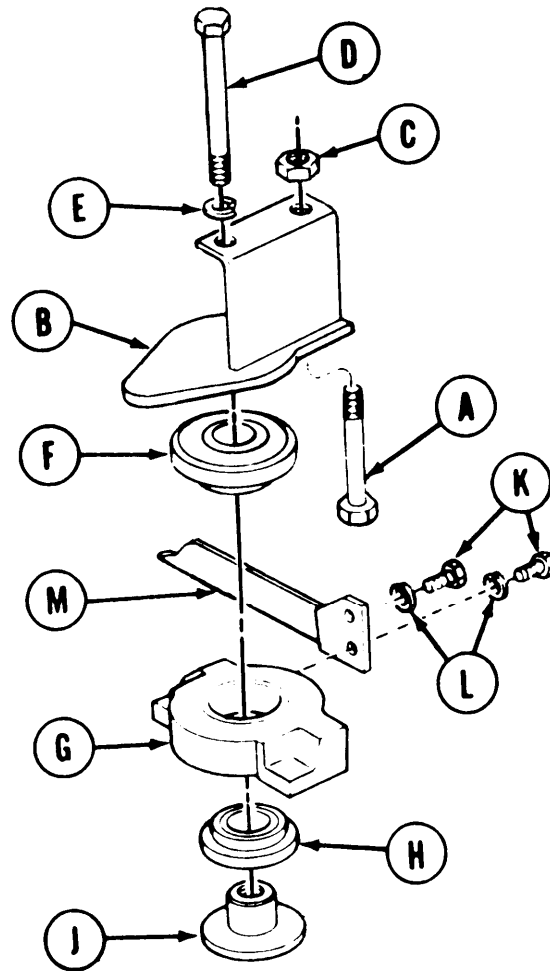
Go on to Sheet 3

TA139374

ENGINE MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. Position bolt (A) through bracket (B) and install nut (C). Using 1-1/16 inch wrench to hold nut (C) and 1-1/8 inch socket, tighten bolt (A).
2. Position bolt (D) through new lockwasher (E), bracket (B), mount (F), mounting (G), mount (H), and bushing (J). Use 1-1/8 inch socket tighten bolt (D) while holding bushing (J) with 3/4 inch drive T-slide and 36 inch bar extension.
3. Using 1/2 inch socket, install two screws (K) through new lockwashers (L) and bracket (M) into mounting (G).
4. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA139375

TRANSMISSION MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-10
Cleaning and Inspection	6-11
Installation	6-11

- TOOLS:
- 3-1/8 in. socket with 3/4 in. drive
 - T-slide handle with 3/4 in. drive
 - Diagonal cutting pliers
 - 36 in. extension with 3/4 in. drive
 - Slip joint pliers
 - 1-1/2 in. open end wrench
 - 1-1/2 in. socket with 3/4 in. drive
 - Ratchet with 3/4 in. drive
 - 3/4 in. socket with 1/2 in. drive
 - Ratchet with 1/2 in. drive
 - 1-5/16 in. open end wrench
 - Bench vise
 - Torque wrench with 3/4 in. drive (0-600 lb-ft) (0-813 N°m)
 - Bit screwdriver with 1/2 in. drive
 - Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N°m)
 - Ball peen hammer

SPECIAL TOOLS: Remover tool (Item 34, Chapter 3, Section 1)

- SUPPLIES:
- Dry cleaning solvent (Item 54, Appendix D)
 - Goggles (Item 74, Appendix D)
 - Rubber gloves (Item 73, Appendix D)
 - Lockwire (Item 59, Appendix D)
 - Rags (Item 65, Appendix D)
 - Self-locking nut
 - Lockwasher
 - Lockwasher(3 required)

PERSONNEL: Two

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

NOTE

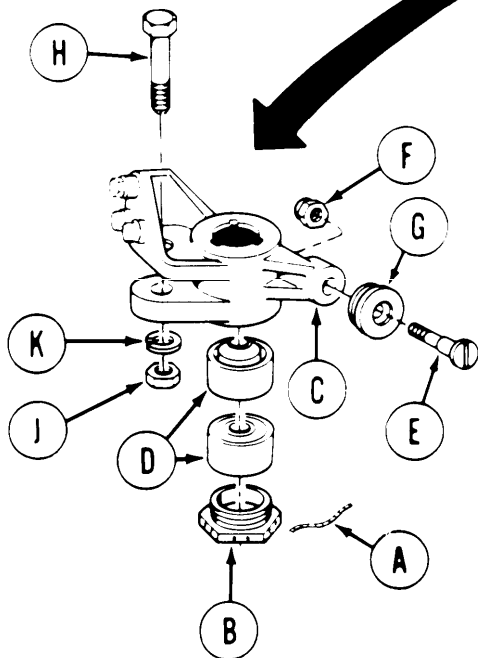
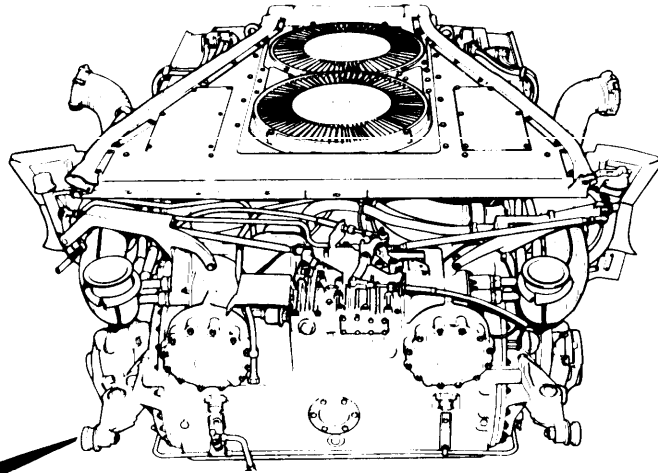
The procedure applies to both right and left transmission mounts.

Go on to Sheet 2

TRANSMISSION MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using diagonal cutting pliers, cut safety wire (A) and remove it from bushing (B) and bracket (C).
2. Using 3-1/8 inch socket and T-slide wrench, remove bushing (B) from bracket (C).



3. Using remover tool, remove two mounts (D) from bracket (C).
4. Using bit screwdriver to hold screw (E), use 1-5/16 inch wrench to remove self-locking nut (F) from screw (E). Throw self-locking nut away.
5. Remove screw (E) and roller (G) from bracket (C).
6. With second person using 1-1/2 inch wrench to hold bolt (H), use 1-1/2 inch socket and extension to remove nut (J) from bolt (H),

7. Remove lockwasher (K) and bolt (H) from bracket (C). Throw lockwasher away.

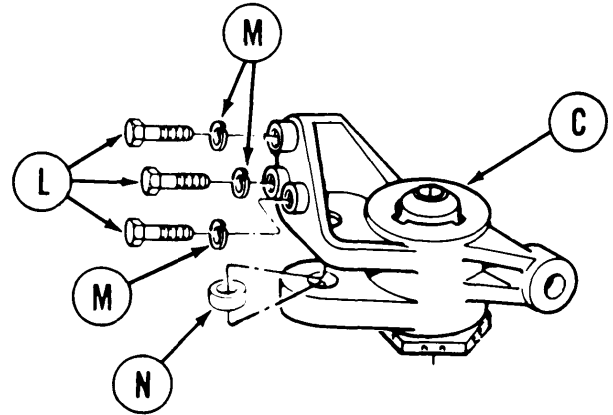
Go on to Sheet 3

TRANSMISSION MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 3 of 4)

NOTE

It may be necessary to turn universal joint to gain access to screws (L).

8. Using 3/4 inch socket, remove three screws (L) and lockwashers (M) from bracket (C). Throw lockwashers away.
9. Remove bracket (C) from transmission.
10. Using hammer, remove spacer (N) from bracket (C).



CLEANING AND INSPECTION:

1. Inspect bushing, mounts, and roller for damages. If any parts are nicked, burred, or out-of-round, replace damaged part.

WARNING

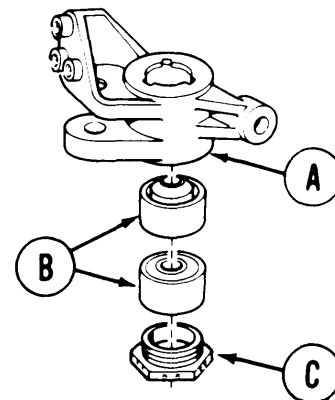
Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

2. Clean all parts with dry cleaning solvent and wipe dry with rags.

Go to Sheet 4

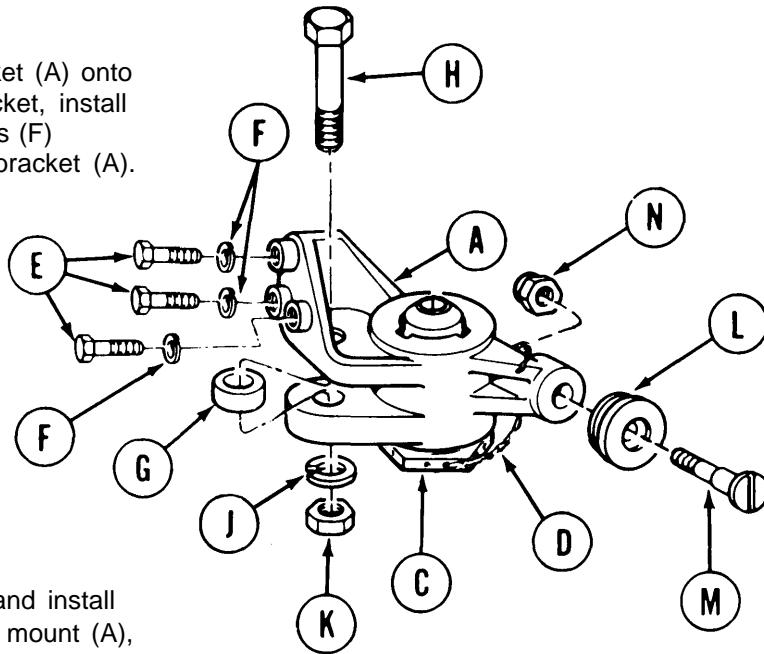
INSTALLATION:

1. Position bracket (A) in vise and, using remover tool, install two mounts (B) into bracket (A).
2. Using 3-1/8 inch socket and T-slide handle, install bushing (C) into bracket (A).



TRANSMISSION MOUNTS (LEFT AND RIGHT) REPLACEMENT (Sheet 4 of 4)

3. Using slip joint pliers, install lockwire (Item 59, Appendix D) (D) between bushing (C) and bracket (A).
4. Remove from vise and position bracket (A) onto transmission and, using 3/4 inch socket, install three screws (E) and new lockwashers (F) through mount on transmission into bracket (A). Leave screws loose.



5. Position spacer (G) into bracket (A) and install bolt (H), through spacer (G), through mount (A), and new lockwasher (J).
6. With second person using 1-1/2 inch wrench to hold bolt (H), use 1-1/2 inch socket and torque wrench to tighten nut (K) to 380 to 415 lb-ft (515-562 N^om).
7. Position roller (1.) onto screw (M) and install screw (M) through bracket (A).
8. Using bit screwdriver and 1/2 inch drive ratchet to hold screw (M), use 1-5/16 inch wrench to install new self-locking nut (N) into screw (M).

NOTE

It may be necessary to turn universal joint to gain access to screws (E).

9. Using torque wrench and 3/4 inch socket, tighten screws (E) to 70-75 lb-ft (95-102 N^om).
10. Install powerplant (page 5-37).

End of Task

■ All data on pages 6-13 and 6-14 deleted.

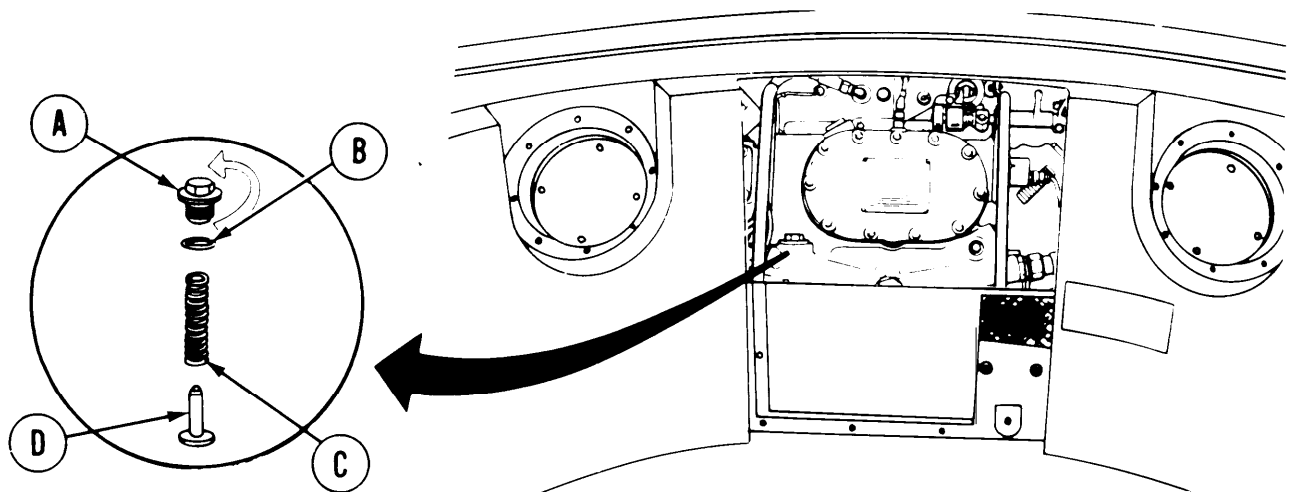
ENGINE OIL COOLER BYPASS VALVE ASSEMBLY REPLACEMENT (2D ENGINE)
(Sheet 1 of 2)

TOOLS: 1-1/8 in. open end wrench

SUPPLIES: Gasket (MS35769-47)
 Oil (Item 43, Appendix D)

REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

PRELIMINARY PROCEDURES: Traverse turret to forward position with gun tube over forward slope (TM 9-2350-222-10)
 Drain engine oil (page 6-51)
 Remove upper engine access cover (page 16-40)



REMOVAL:

1. Using wrench, remove plug (A).
2. Pull gasket (B) from plug (A). Throw gasket (B) away,
3. Lift spring (C) and plunger (D) from hole.

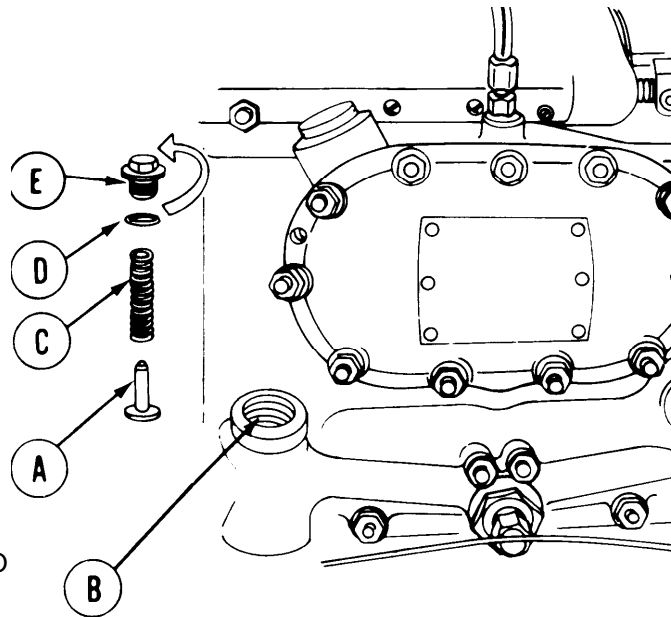
Go on to Sheet 2

TA139382

ENGINE OIL COOLER BYPASS VALVE ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 2 of 2)

INSTALLATION:

1. Put plunger (A) in hole (B).
2. Put spring (C) on plunger (A). Make plunger shank align with inside of spring.
3. Put new gasket (D) on plug (E).
4. Start threads of plug (E) into socket (B) by hand.
5. Using wrench, tighten plug (E).
6. Install engine upper access cover (page 16-40).
7. Replenish engine oil (Item 43, Appendix D) (LO 9-2350-222-12).



End of Task

■ All data on pages 6-17 thru 6-26 deleted.

ENGINE OIL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

PROCEDURE INDEX

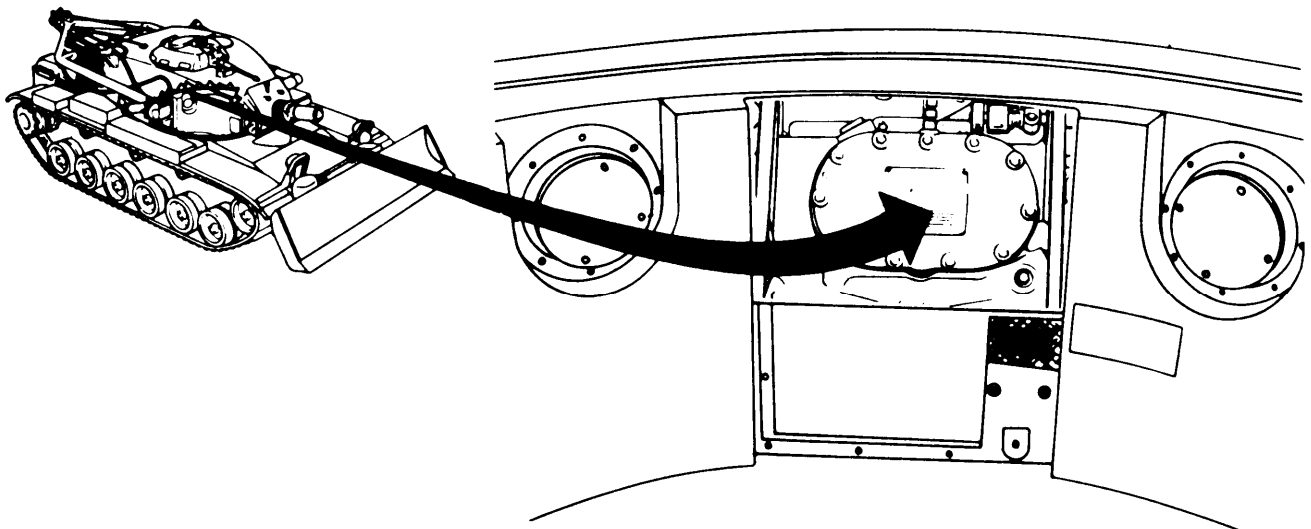
PROCEDURE	PAGE
Removal	6-28
Cleaning and Inspection	6-29
Installation	6-30

TOOLS: Ratchet with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 3/4 in. combination box and open end wrench

SUPPLIES: 3/8-24NF by 3 in. screws (2 required) Rags (Item 65, Appendix D)
 Sealing washer (NAS1598-6V)
 Gasket (11684047)
 Self-locking nut (MS21045-6) (10 required)
 Container to catch drained oil

REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove upper engine access cover (page 16-40)
 Remove fire extinguisher line (page 5-4, step 7)
 Open engine compartment drain valve (TM 9-2350-222-10)
 Drain engine oil (page 6-51)



Go on to Sheet 2

TA139394

ENGINE OIL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 2 of 5)

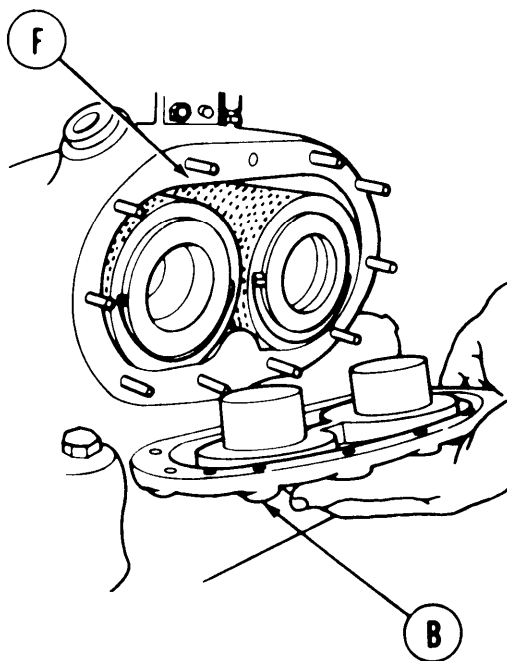
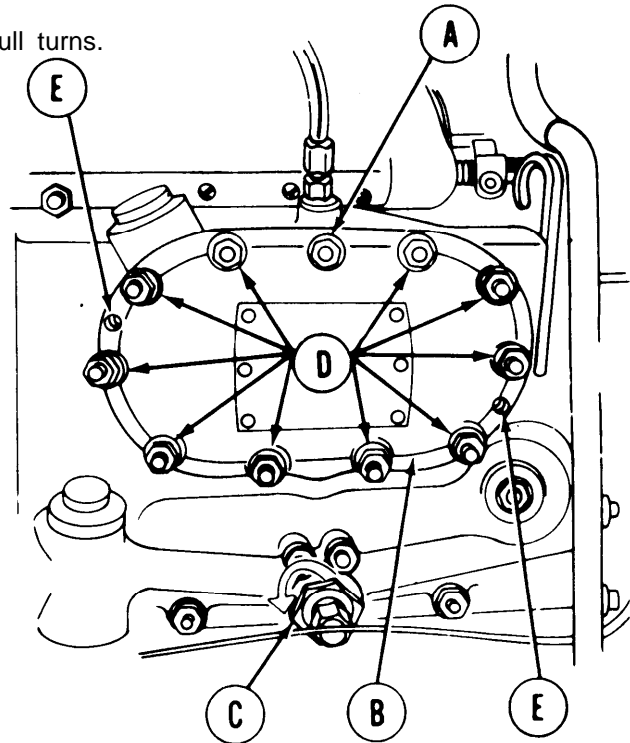
REMOVAL:

1. Place rags (Item 65, Appendix D) and container under oil filter to catch drained oil.
2. Using socket, remove screw (A) and sealing washer from filter element cover (B). Throw sealing washer away.
3. Using wrench, turn valve (C) counterclockwise six full turns.

NOTE

Wait about 5 minutes for oil to drain before doing steps 4 thru 8.

4. Using socket, remove 10 self-locking nuts and washers (D). Throw self-locking nuts away.
5. Install two 3/8-24NF by 3 inch screws in threaded holes (E).



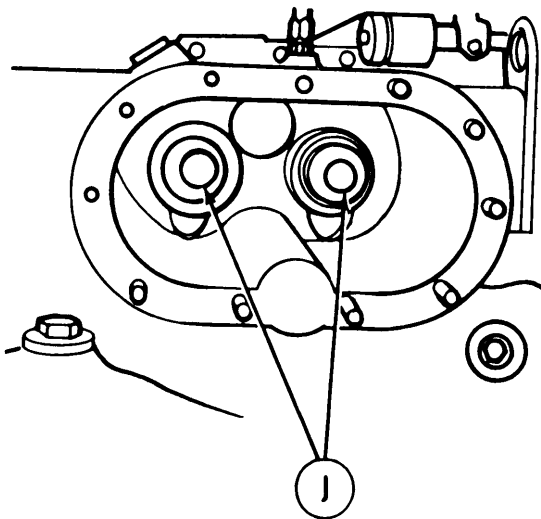
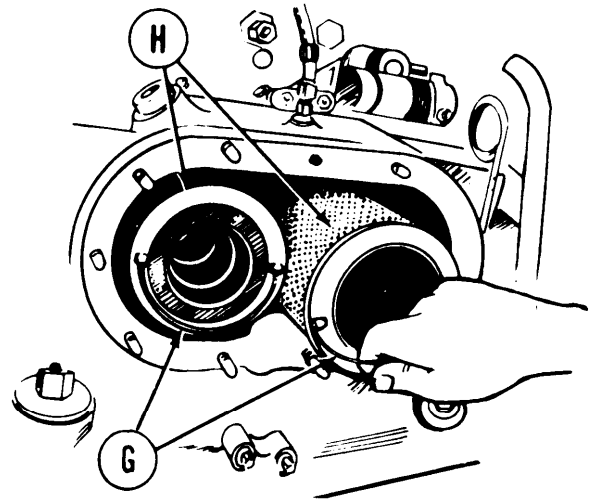
6. Using socket, tighten screws in hole (E) and remove filter cover (B).
7. Remove gasket (F) and throw away.

Go on to Sheet 3

TA139395

ENGINE OIL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 3 of 5)

8. Using handles (G), remove two filter elements (H) and throw away.

**CLEANING AND INSPECTION:**

1. Using rags (Item 65, Appendix D), clean oil), parts (J).
2. Check studs for stripped threads.
3. Inspect filter cover for holes, chips, and cracks.
4. Check sealing washer and packing for cracks and wear.
5. Replace parts as needed.

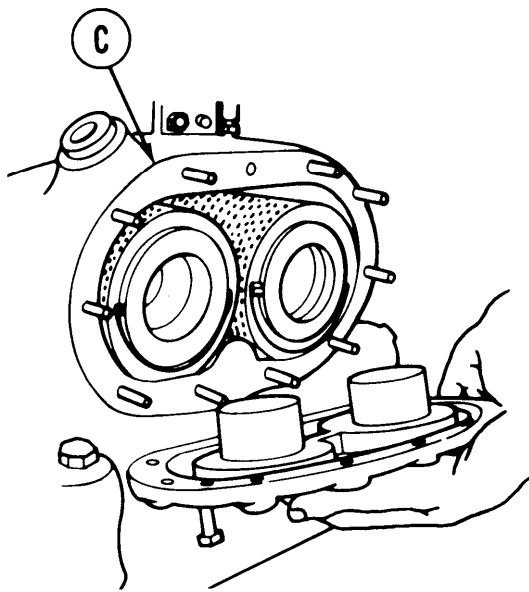
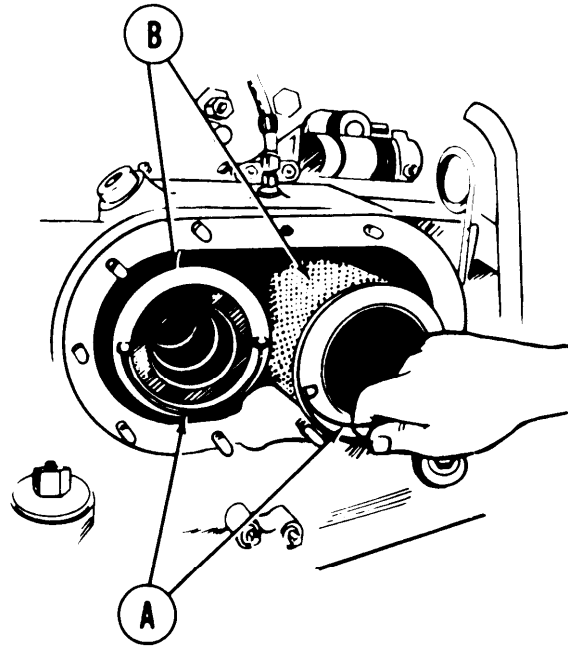
Go on to Sheet 4

TA139396

ENGINE OIL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 4 of 5)

INSTALLATION:

1. Using handles (A), install two new filter elements (B).



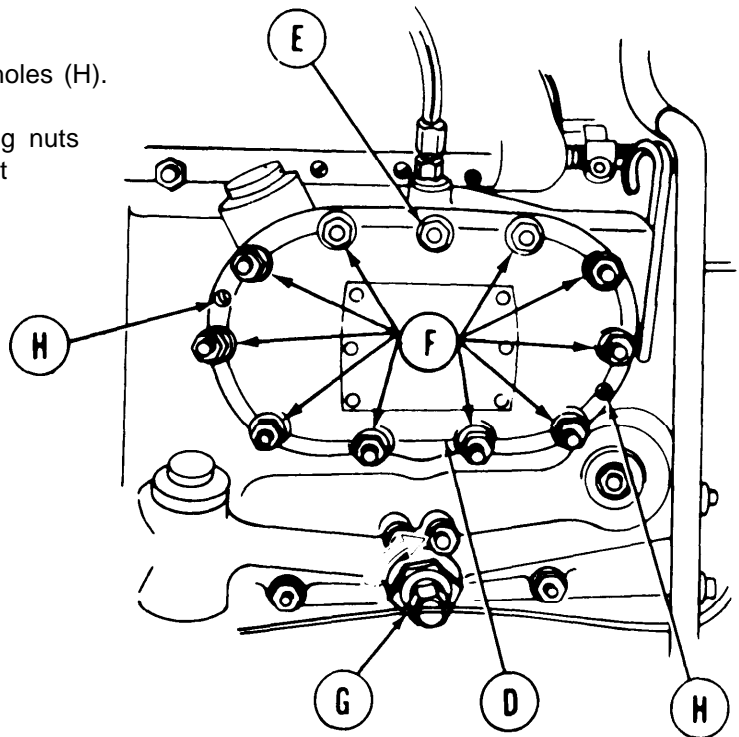
2. Install new gasket (C).

Go on to Sheet 5

TA139397

ENGINE OIL FILTER ELEMENT REPLACEMENT (20 ENGINE) (Sheet 5 of 5)

3. Install filter cover (D), making sure hole (E) is at the top.
4. Using socket, remove two screws from holes (H).
5. Using socket, install ten new self-locking nuts and washers (F) to secure cover. Do not overtighten, as stripping may result.



6. Using socket, install screw and new sealing washer in cover at hole (E).
7. Using wrench, turn valve (G) clockwise until tight.
8. Install fire extinguisher line (page 5-21, step 58).
9. Close engine compartment drain valve (TM 9-2350-222-10).
10. Replenish engine oil (LO 9-2350-222-12).
11. Start and run engine (TM9-2350-222-10).
12. Check for leaks.
13. Shut down engine (TM9-2350-222-10).
14. Install upper engine access cover (page 16-40).

End of Task

TA139398

**OIL DAMPER HOUSING STRAIGHT TUBE HOSE ADAPTER REPLACEMENT
(Sheet 1 of 4)**

PROCEDURE INDEX

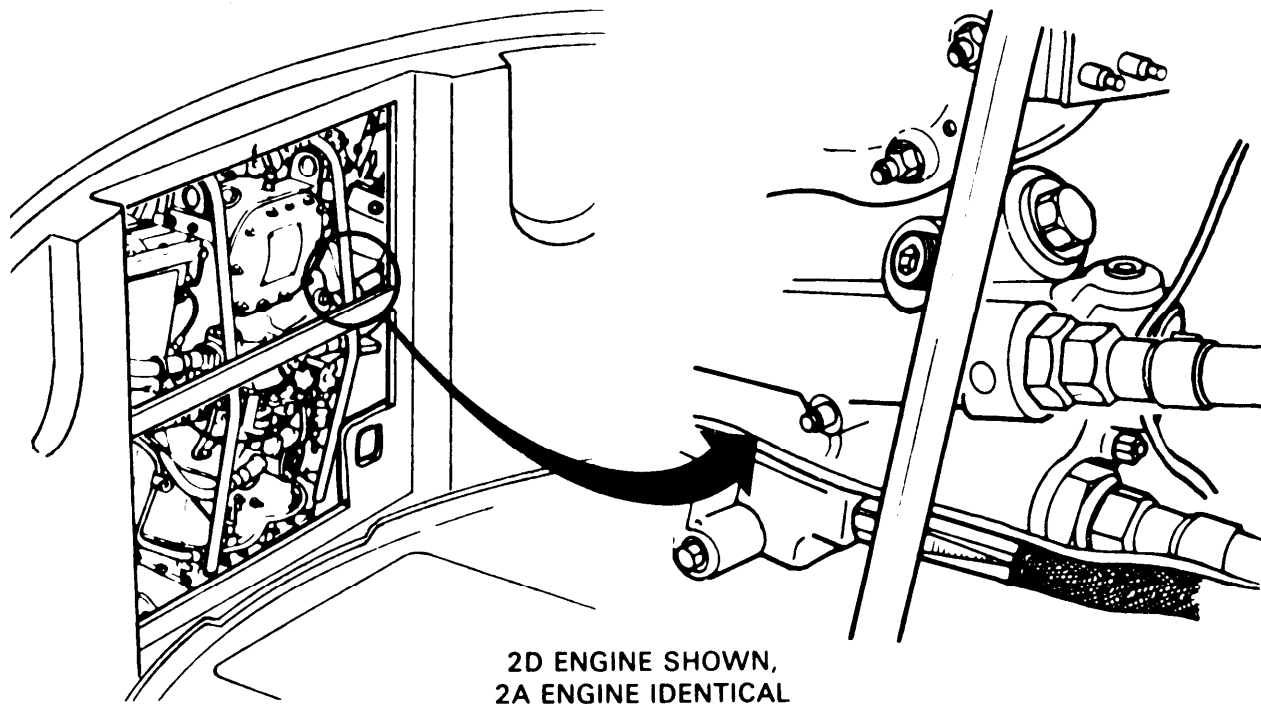
PROCEDURE	PAGE
Removal	6-33
Installation	6-34

TOOLS: 3/4 in. socket with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 3/4 in. combination box and open end wrench
 1-1/2 in. open end wrench
 1-9/16 in. open end wrench
 Ratchet with 1/2 in. drive

SUPPLIES: Spacer ring (NAS1598-6V) (2D engine only)
 Washer (MS9320-12)
 Rags (Item 65, Appendix D)

REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

PRELIMINARY PROCEDURE: Remove lower engine access cover (page 16-41)

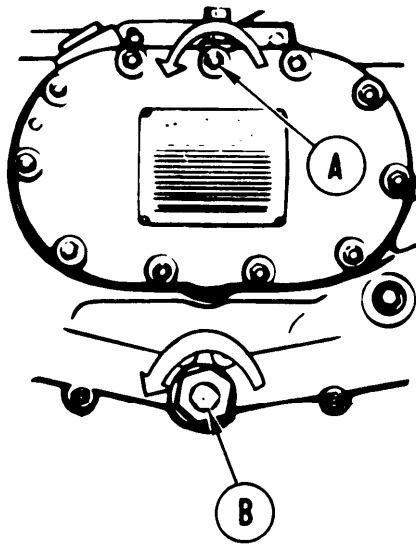


Go on to Sheet 2

TA139399

OIL DAMPER HOUSING STRAIGHT TUBE HOSE ADAPTER REPLACEMENT (Sheet 2 of 4)

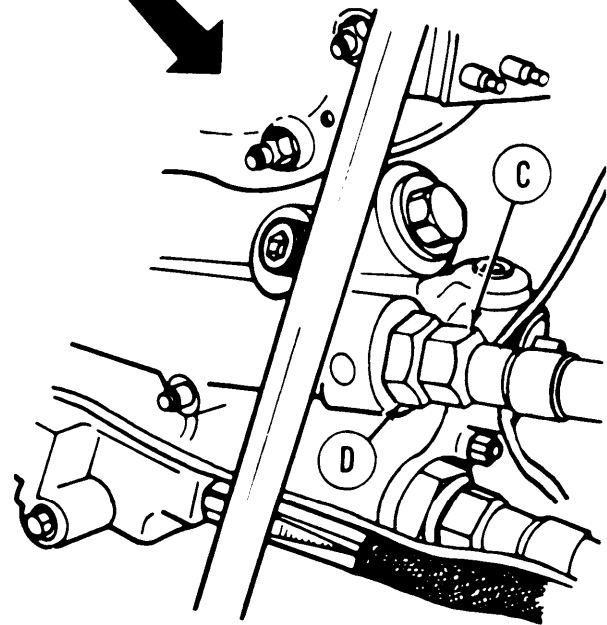
REMOVAL:



NOTE

If replacing adapter on 2A engine, go to step 3.

1. Using 9/16 inch socket, remove screw (A) and washer. Throw washer away.
2. Using 3/4 inch wrench, loosen valve (B) six complete turns.



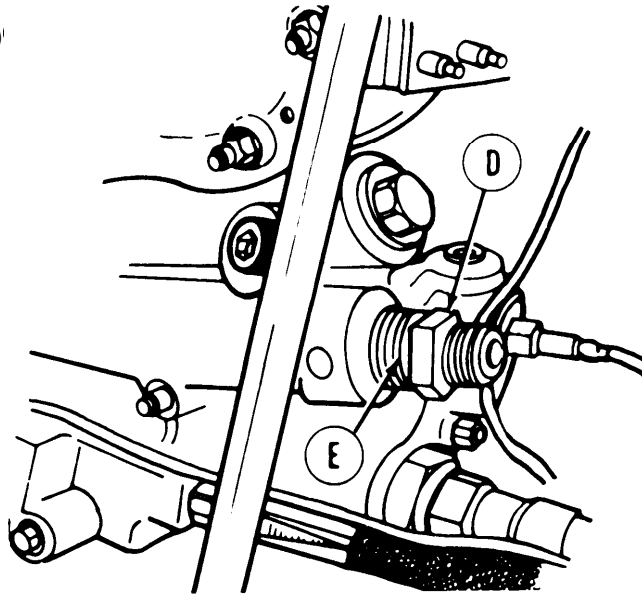
3. Place rags (Item 65, Appendix D) under coupling (C) to catch dripping oil.
4. Hold adapter (D) with 1-9/16 inch wrench and, using 1-1/2 inch wrench, remove hose coupling (C).

Go on to Sheet 3

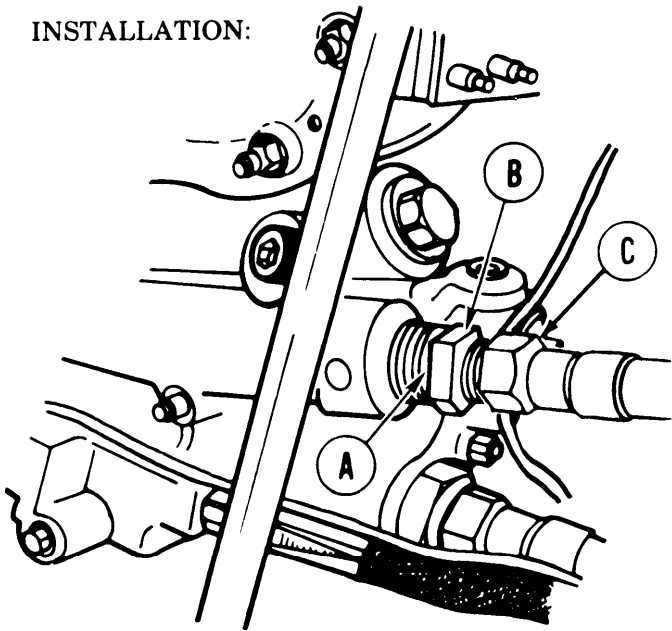
TA139401

OIL DAMPER HOUSING STRAIGHT TUBE HOSE ADAPTER REPLACEMENT (Sheet 3 of 4)

- Using 1-9/16 inch wrench, remove adapter (D) and spacer ring (E). Throw spacer ring away.
- Check adapter for cracks and thread damage. Replace damaged adapter.

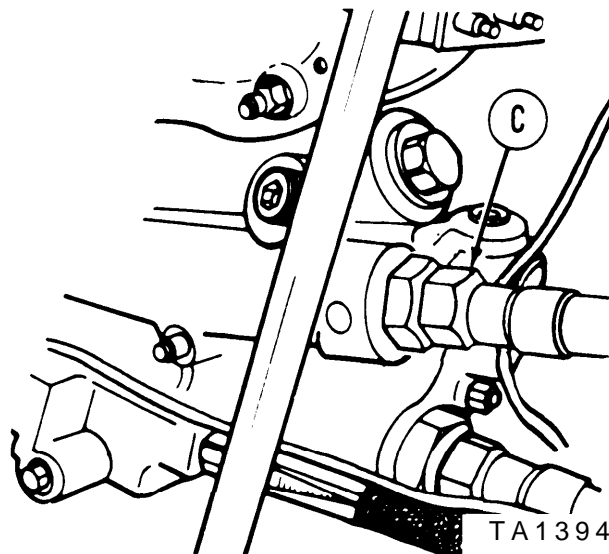


INSTALLATION:



- Install new spacer ring (A) on adapter (B).
- Using 1-9/16 inch wrench, install adapter (B) and new spacer ring (A).

- Using 1-9/16 inch wrench to hold adapter (B), use 1-1/2 inch wrench to install coupling (C).
- Remove rags placed under coupling (C) to catch dripping oil. Discard rags.

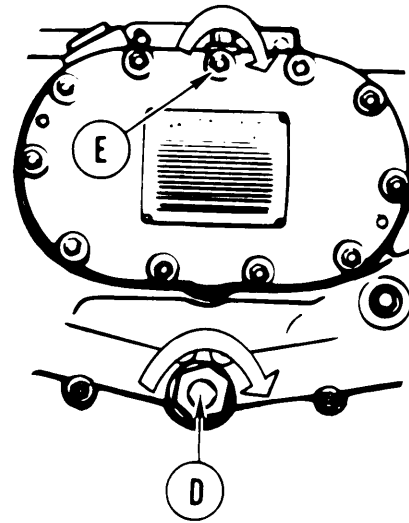


Go on to Sheet 4

TA139402

OIL DAMPER HOUSING STRAIGHT TUBE HOSE ADAPTER REPLACEMENT (Sheet 4 of 4)

5. Using 3/4inch socket and torque wrench, tighten valve (D) to not more than 150 lb-in (17 N-m).
6. Install new washer on screw (E).
7. Using 9/16 inch socket, install screw (E).
8. Check engine oil level (TM 9-2350-222-10).
9. Replenish engine oil lost during adapter replacement (LO 9-2350-222-12).
10. Install lower engine access cover (page 16-42).



End of Task

All data on pages 6-36 thru 6-39 deleted. ■

Change 4

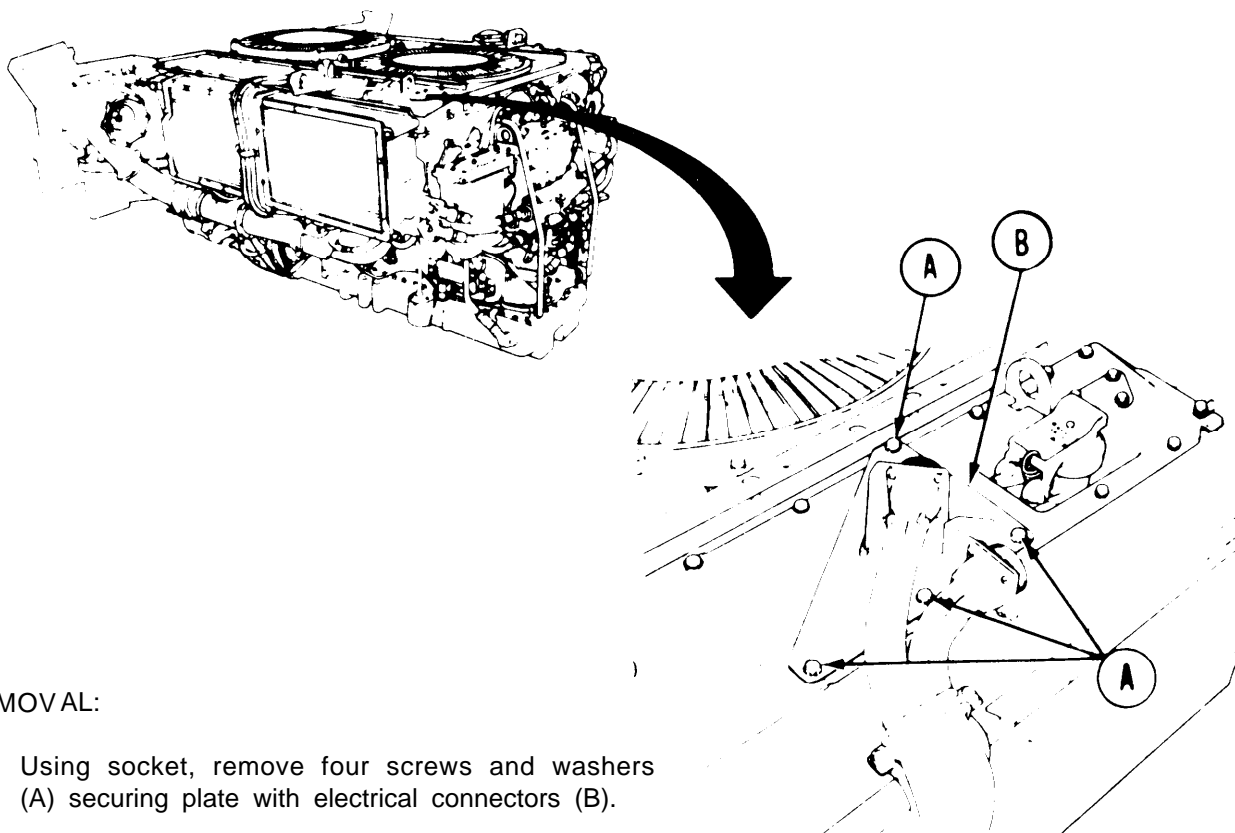
6-35

ENGINE OIL LEVEL GAGE CAP REPLACEMENT (2D ENGINE) (Sheet 1 of 3)

TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive

SUPPLIES: Gasket (10935621)
Lockwasher (7410218) (2 required)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
Remove engine shroud (page 9-2)



REMOVAL:

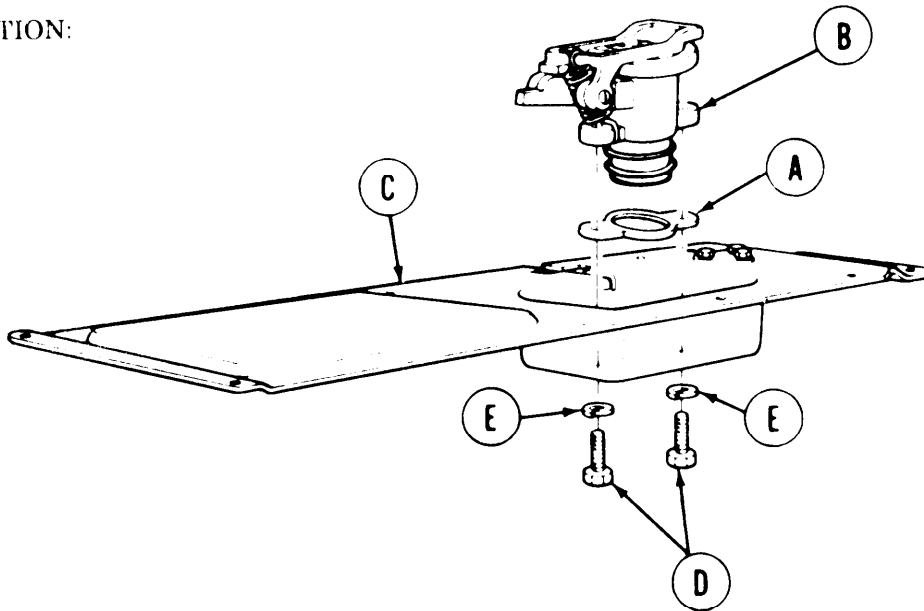
1. Using socket, remove four screws and washers (A) securing plate with electrical connectors (B).
2. Position plate with electrical connector (B) aside.

Go on to Sheet 2

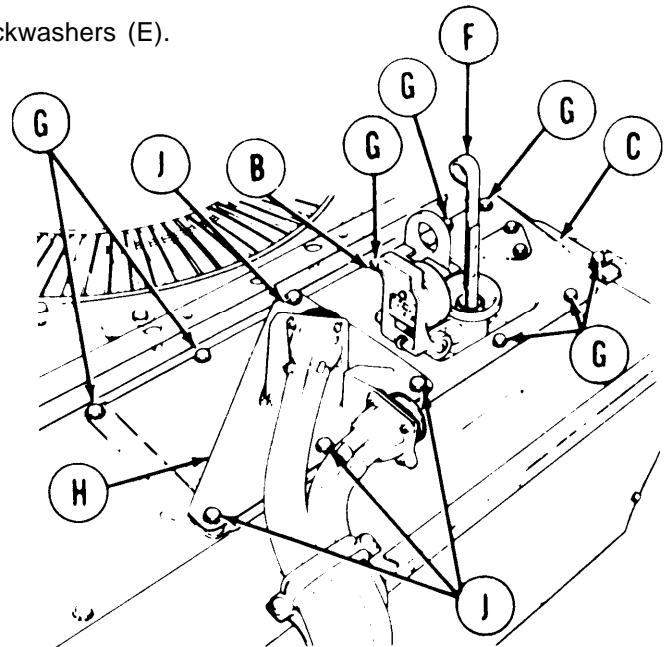
TA139408

ENGINE OIL LEVEL GAGE CAP REPLACEMENT (2D ENGINE) (Sheet 3 of 3)

INSTALLATION:



1. Place new gasket (A) on cap assembly (B).
2. Place cap assembly (B) in position on engine access Plate (C).
3. Using socket, install two screws (D) and new lockwashers (E).
4. Place engine access plate (C) in Position on powerplant and push down until seated.
5. Using socket, install eight screws and washers (G).
6. Place plate with electrical connectors (H) in position.
7. Using socket, install four screws and washers (J).
8. Open filler cap (B), insert gage (F), and Close filler cap (B).
9. Install engine shroud (page 9-3).
10. Install powerplant page (5-37).



End of Task

TA139410

OIL FILLER TUBE (UPPER) REPLACEMENT (Sheet 1 of 4)

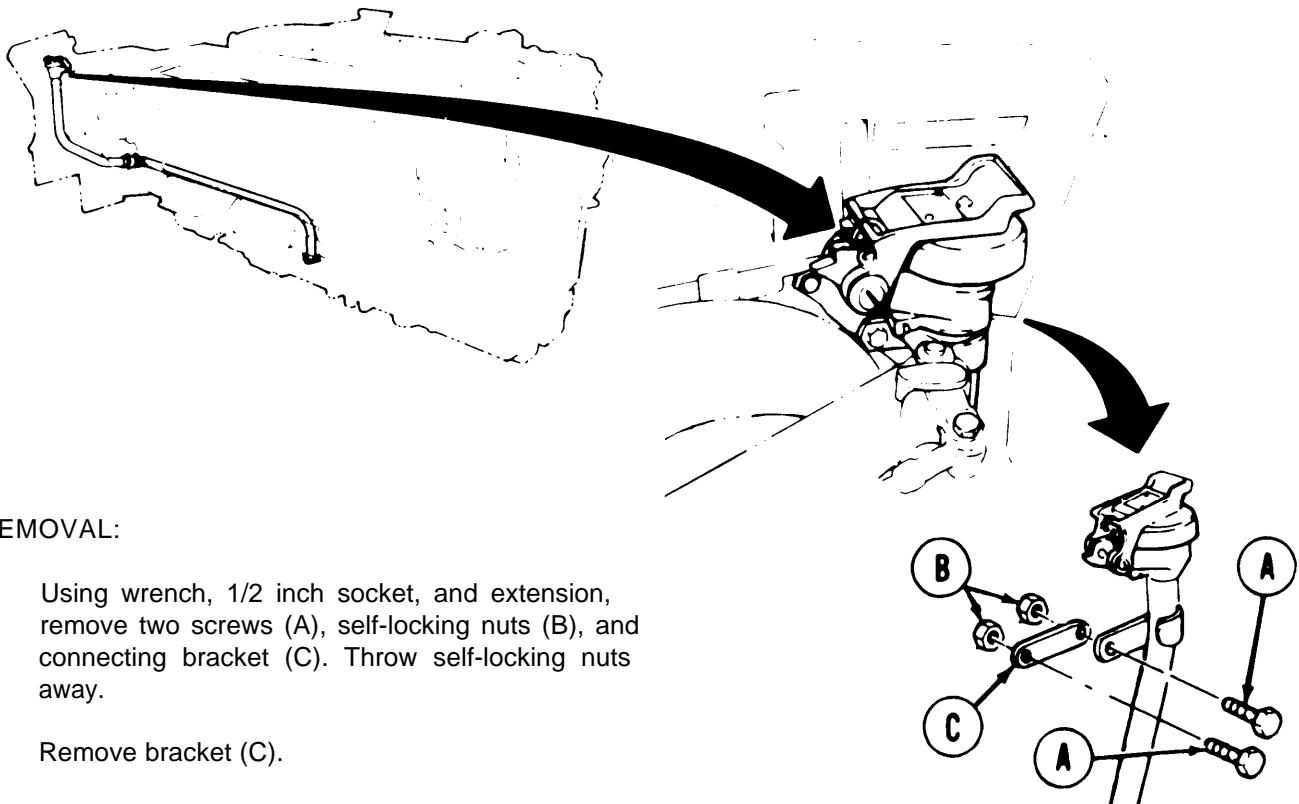
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-43
Installation	6-45

TOOLS: 5/16 in. socket with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 1/2 in. combination box and open end wrench
 Putty knife
 Flat-tip screwdriver
 Vise
 Hammer

SUPPLIES: Packing (8717158)
 Lockwashers (MS35338-45) (2 required)
 Self-locking nut (MS21044N5) (2 required)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



REMOVAL:

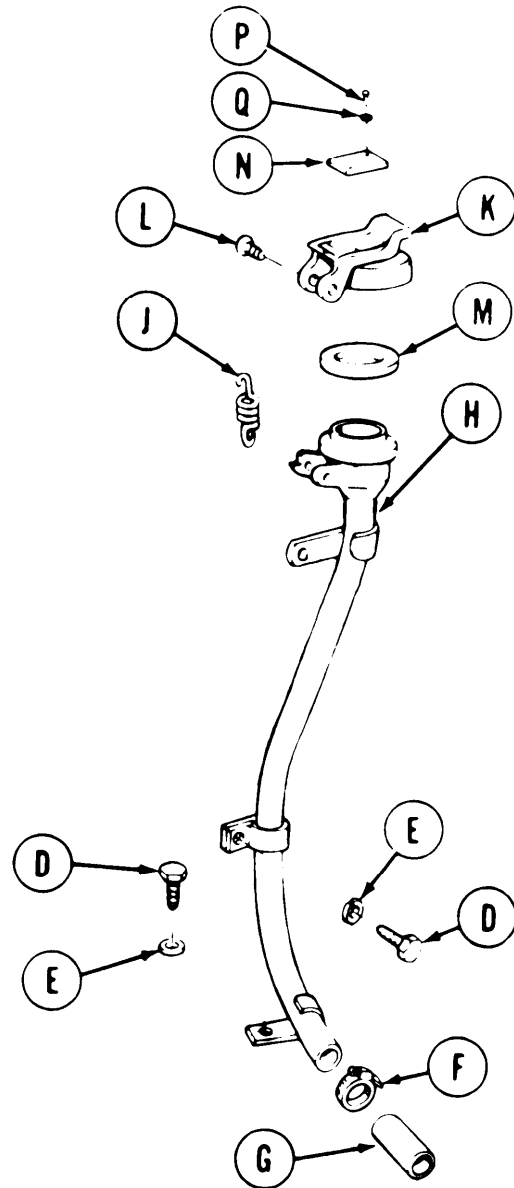
- Using wrench, 1/2 inch socket, and extension, remove two screws (A), self-locking nuts (B), and connecting bracket (C). Throw self-locking nuts away.
- Remove bracket (C).

Go on to Sheet 2

TA139411

OIL FILLER TUBE (UPPER) REPLACEMENT (Sheet 2 of 4)

3. Using 1/2 inch socket, remove two screws (D) and lockwashers (E). Throw lockwashers away.
4. Using 5/16 inch socket on nut of clamp (F), loosen clamp.
5. Slip clamp (F) off hose (G).
6. Pull tube assembly (H) loose from hose (G) and remove tube assembly.
7. Using screwdriver, release spring (J) from cap assembly (K). Remove spring.
8. Using screwdriver, remove two screws (L) and remove cap assembly (K).
9. Remove packing (M) from under lip of cap assembly (K). Throw packing away.
10. Using putty knife under plate (N), remove two drive screws (P), flat washers (Q), and date (N).

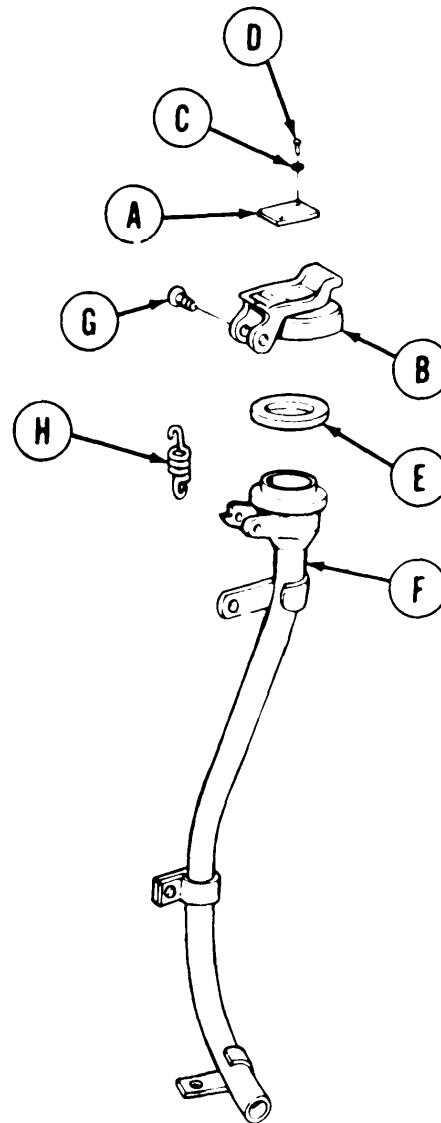


Go on to Sheet 3

TA139412

OIL FILLER TUBE (UPPER) REPLACEMENT (Sheet 3 of 4)**INSTALLATION:**

1. Position plate (A) on cap assembly (B).
2. Place two flat washers (C) on two drive screws (D).
3. Using hammer, carefully tap two drive screws through holes in plate (A) into cap assembly (B).



4. Press new packing (E) under lip of cap assembly (B).
5. Position cap assembly (B) on tube assembly (F).
6. Using screwdriver, install two screws (G).
7. Place tube assembly (F) in vise, place rounded end of spring (H) in notch of cap assembly (B) and, using screwdriver, work end of spring in notch of tube assembly (F).

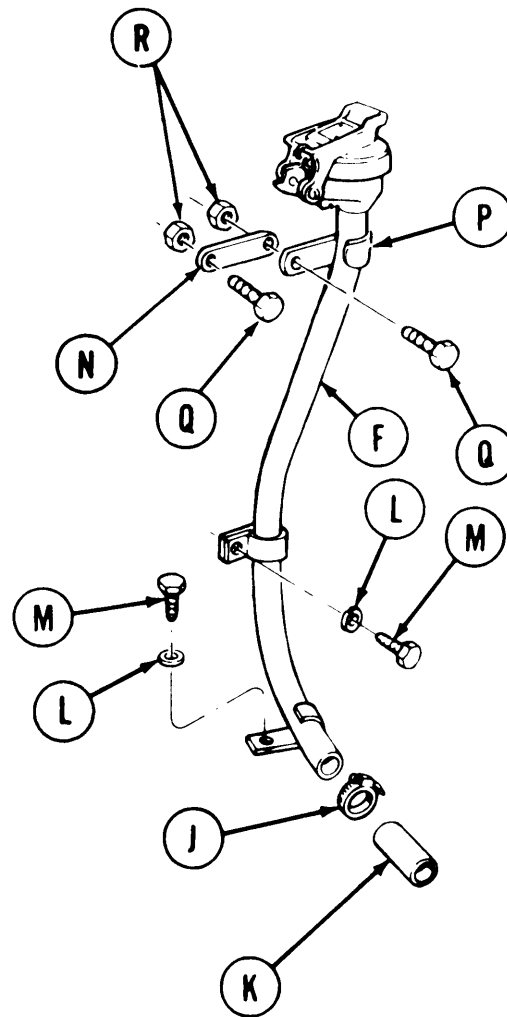
GO on to Sheet 4

TA139413

OIL FILLER TUBE (UPPER) REPLACEMENT (Sheet 4 of 4)

8. Place clamp (J) on hose (K) with nut facing you.
9. Position tube assembly (F) with its assembled parts on powerplant.
10. Push tube assembly (F) into hose (K).
11. Position clamp (J) over end of hose (K).

12. Place two new lockwashers (L) on two screws (M).
13. Start two screws (M) through clamps of tube assembly (F).
14. Using 1/2 inch socket, tighten two screws (M).
15. With clamp (J) positioned over end of hose, use 5/16 inch socket and tighten nut of clamp (J).
16. Position bracket (N), clamp (P), and screw (Q).
17. Start nuts (R) on screw (Q).
18. Using 1/2 inch socket and wrench, tighten nuts (R).
19. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA139414

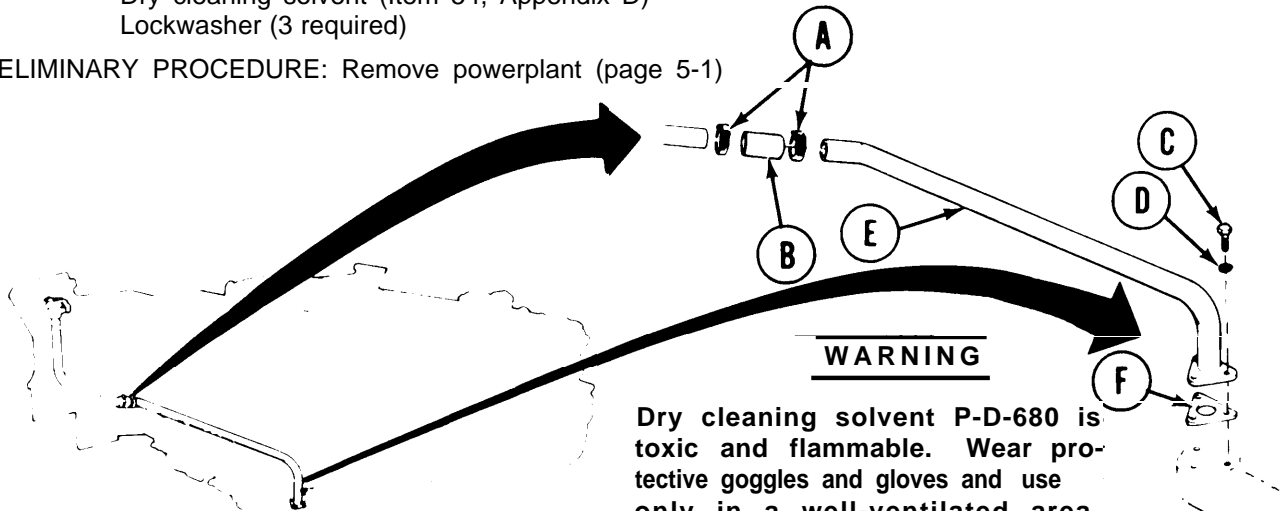
OIL FILLER TUBE AND HOSE (LOWER) REPLACEMENT (Sheet 1 of 2)

TOOLS: 5/16 in. socket with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 1/2 in. combination box and open end wrench
 Putty knife
 Ratchet with 1/2 in. drive

SUPPLIES: Gasket
 Rags (Item 65, Appendix D)
 Dry cleaning solvent (Item 54, Appendix D)
 Lockwasher (3 required)

Goggles (Item 74, Appendix D)
 Rubber gloves (Item 73, Appendix D)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



WARNING
 Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning Solvent is 100°F (38°C) and for Type #2 is 140 °F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

NOTE

REMOVAL: Using dry cleaning solvent and rags, clean all parts and general area prior to removal.

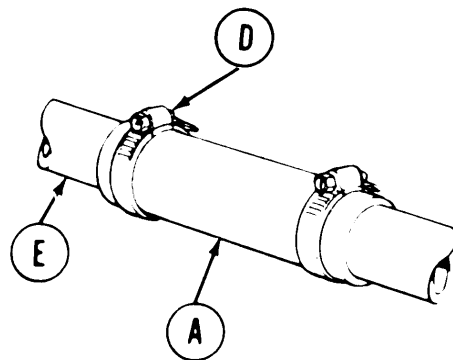
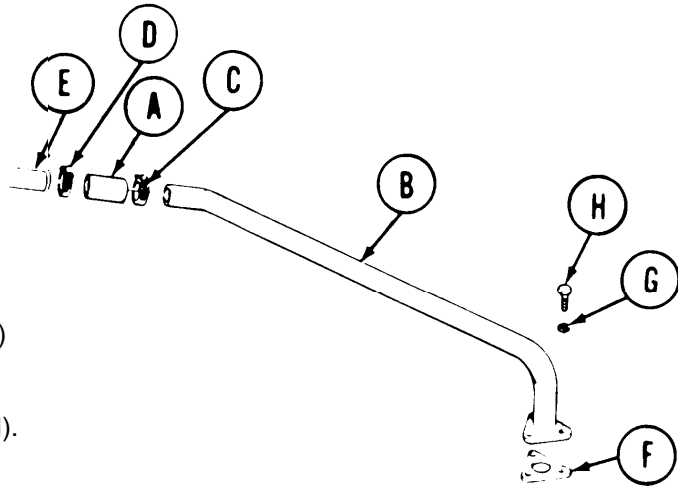
1. Using socket, loosen two clamps (A) from hose (B).
2. Using 1/2 inch wrench, remove three screws (C) and lockwashers (D) from tube assembly (E). Throw lockwashers away.
3. Pull tube assembly (E) and hose (B) loose and slip off two clamps (A).
4. Using putty knife, remove gasket (F) and throw away.

Go on to Sheet 2

OIL FILLER TUBE AND HOSE (LOWER) REPLACEMENT (Sheet 2 of 2)

INSTALLATION:

1. Push hose (A) over tube assembly (B).
2. Position clamp (C) over tube assembly (B) end of hose (A).
3. Using socket, tighten nut of clamp (C).
4. Place clamp (D) loosely over hose (A) with clamp nut facing you.
5. Place assembled parts (A) through (D) in position on powerplant.
6. Push end of hose (A) over upper tube end (E).
7. Position new gasket (F) and tube assembly (B) on powerplant port.
8. Place new lockwashers (G) on three screws (H).
9. Insert three screws (H) in flange of tube assembly (B) and tighten finger tight.
10. Using wrench, tighten screws (H).
11. Position clamp (D) on hose (A) over end of upper tube end (E).
12. Using socket, tighten nut of clamp (D).
13. Install powerplant (page 5-37).



End of Task

■ All data on pages 6-49 and 6-50 deleted.

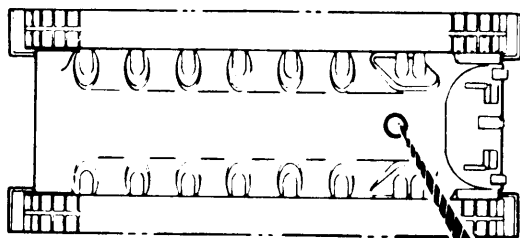
DRAIN ENGINE OIL (2D ENGINE) (Sheet 1 of 3)

TOOLS: 9/16 in. socket with 3/8 in. drive
 10 in. extension with 1/2 in. drive
 Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N•m)
 Ratchet with 1/2 in. drive
 Flat-tip screwdriver
 Putty knife
 9/16 in. combination box and open end wrench
 3/4 in. socket with 1/2 in. drive

SUPPLIES: Container to catch oil (minimum 20 gal. capacity)
 Gasket (7320462)
 Sealing washer (NAS1598-6V)
 Rags (Item 65, Appendix D)
 Lockwasher (MS35338-67) (4 required)

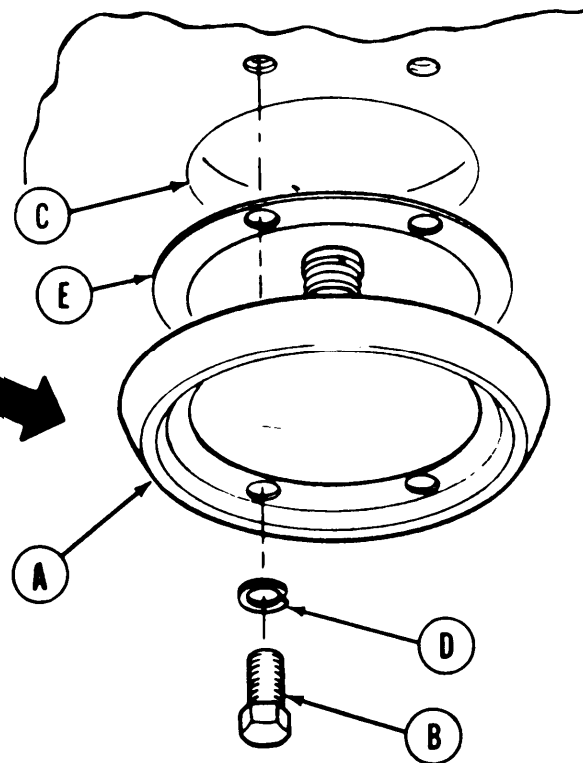
REFERENCES: LO 9-2350-222-12
 TM 9-2350-222-10

PRELIMINARY PROCEDURES: Open rear drain valve (TM 9-2350-222-10)
 Remove upper engine access cover (page 16-40)

**WARNING**

Hold valve seat (A) up when removing last screw (B) attaching valve seat (A) to hull floor (C). Valve seat (A) is heavy and can cause injury if it falls.

1. Using 3/4 inch socket, remove four screws (B) and lockwashers (D) holding valve seat (A) and gasket (E) to hull floor (C). Throw lockwashers away.
2. While holding valve seat (A), use screwdriver and pry valve seat (A) from hull floor (C).
3. Using putty knife, scrape gasket (E) from hull floor (C) and valve seat (A). Throw gasket away.

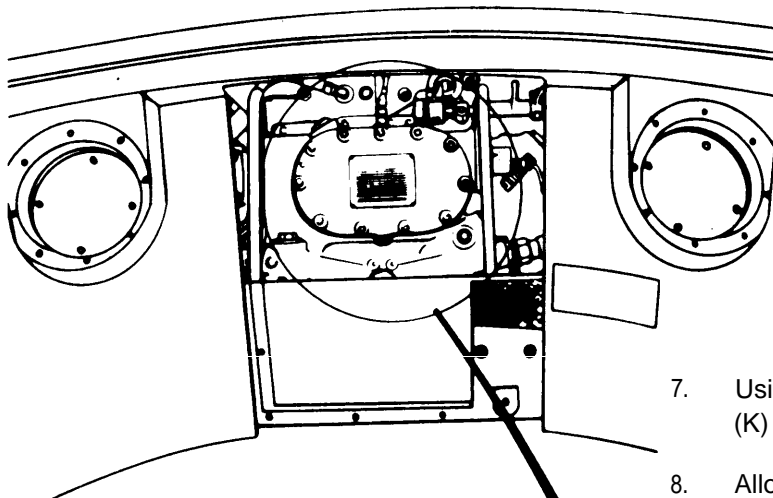
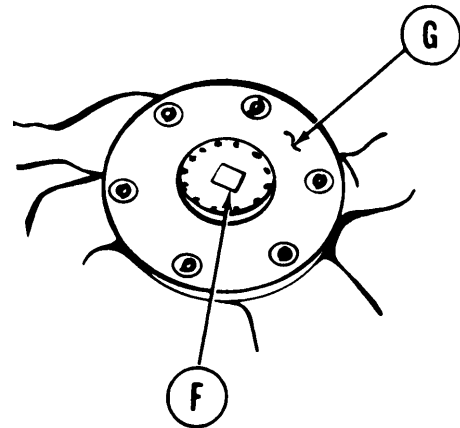


Go on to Sheet 2

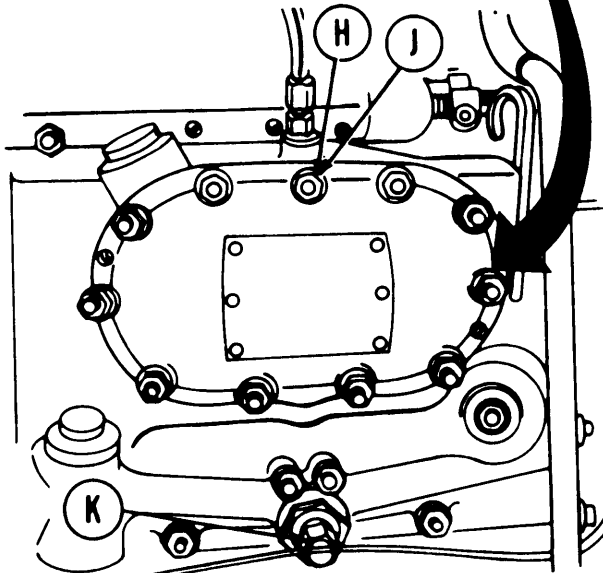
TA139419

DRAIN ENGINE OIL (2D ENGINE) (Sheet 2 of 3)

4. Position container under drain valve opening.
5. Using ratchet and extension, remove oil drain plug (F) from engine oil pan (G).
6. Using 9/16 inch socket with extension, remove vent bolt (H) and sealing washers (J). Throw washers away.



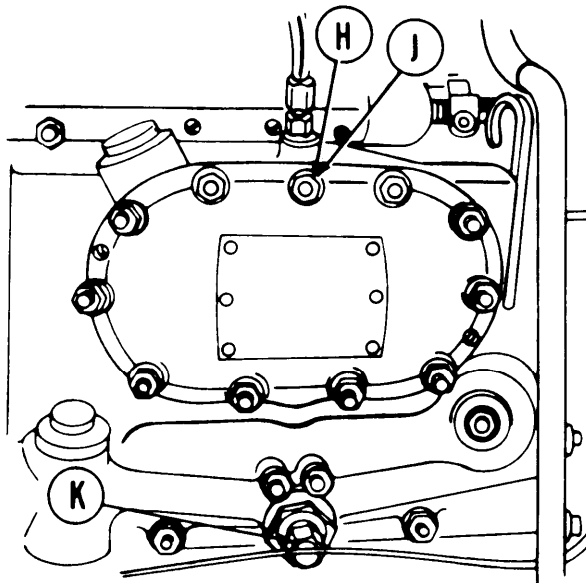
7. Using 3/4 inch socket, loosen oil drain valve (K) six complete turns.
8. Allow engine oil to drain into container.
9. After draining, clean area around drain plug (F) with rags and, using ratchet and extension, install drain plug (F) into engine oil pan (G).



Go on to Sheet 3

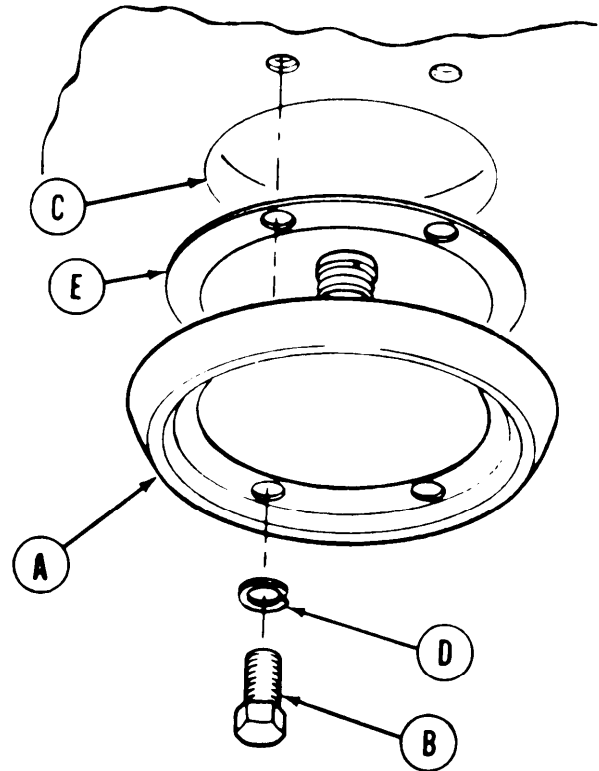
TA139420

DRAIN ENGINE OIL (2D ENGINE) (Sheet 3 of 3)



10. Using 3/4 inch socket, tighten oil drain valve (K).
11. Using torque wrench, tighten oil drain valve (K) to 150 lb-in (17 N•m).
12. Using 9/16 inch socket with extension, install vent bolt (H) and new sealing washer (J).
13. Refill crank case (LO 9-2350-222-12).

14. Install upper engine access cover (page 16-40).
15. Line up four holes in valve seat (A), new gasket (E), and hull floor (C) under vehicle.
16. Using 3/4 inch socket, install four screws (B) and new lockwashers (D) holding valve seat (A) and new gasket (E) to hull floor (C).
17. Operate rear drain valve to make sure valve opens and closes smoothly. If valve does not open or close properly, remove, inspect, and install valve assembly again.



End of Task

TA139421

**CYLINDER HEAD AND OIL PAN DRAIN TUBES (LEFT AND RIGHT) REPLACEMENT
(Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-54
Inspection	6-55
Installation	6-56

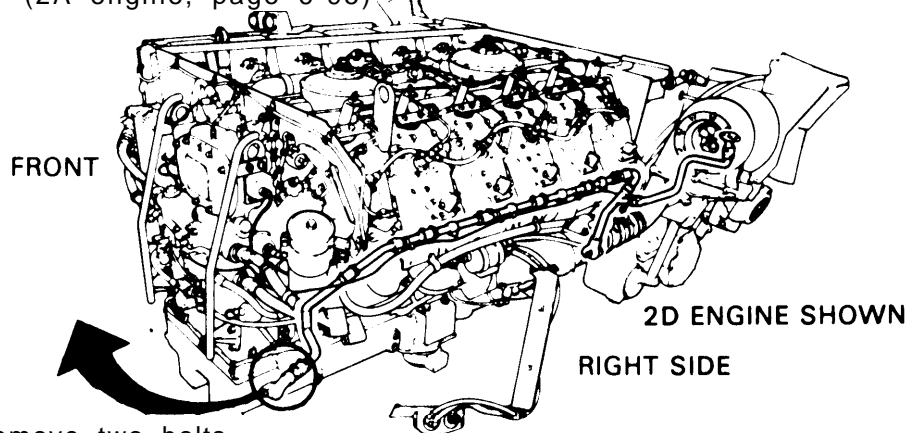
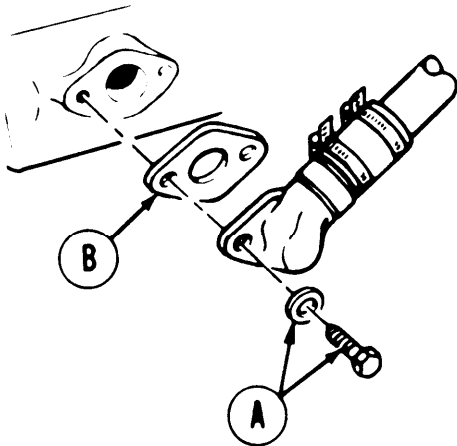
TOOLS: 7/8 in. socket with 1/2 in. drive
 Flat-tip screwdriver
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 Diagonal cutting pliers
 Slip joint pliers
 3/8 in. combination box and open end wrench

SUPPLIES: Lockwire (Item 59, Appendix D)
 Gasket (8682772)
 Lockwasher (7410210) (2 required)

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

REFERENCE: LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Drain engine oil (2A engine, page 6-49) (2D engine, page 6-51)
 Remove left oil cooler frame and brackets (2A engine, page 6-95) (2D engine, page 6-109) (as required)
 Remove right oil cooler frame and bracket (2A engine, page 6-95) (2D engine, page 6-100) (as required)
 Remove powerplant oil cooler frames and brackets (2A engine, page 6-95)



REMOVAL:

1. Using 1/2 inch socket, remove two bolts and lockwashers (A). Throw lockwashers away.
2. Remove gasket (B) and throw away.

Go on to Sheet 2

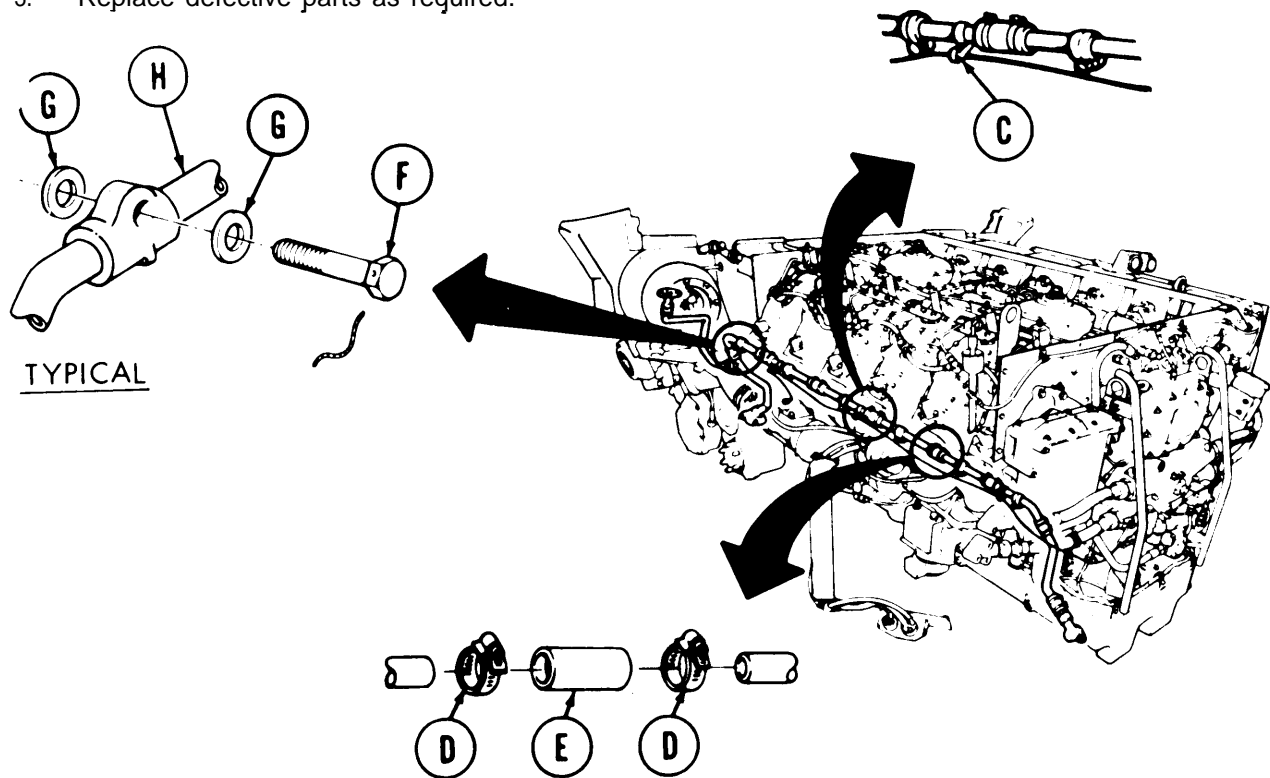
TA139422

CYLINDER HEAD AND OIL PAN DRAIN TUBES (LEFT AND RIGHT) REPLACEMENT Sheet 2 of 4)

3. Holding nut with wrench and using screwdriver, disconnect four fuel line clamps (C) from oil drain line.
4. Using screwdriver, loosen 16 clamps (D) on eight hoses (E) on each end of drain tube assembly.
5. Using pliers, cut lockwire on six capscrews (F).
6. Using 7/8 inch socket, remove six capscrews (F) and 12 washers (G).
7. Remove washers (G) and throw away.
8. Remove drain tube assembly (H) from engine.

INSPECTION:

1. Inspect capscrews for stripped threads.
2. Inspect hose clamps for general serviceability.
3. Replace defective parts as required.



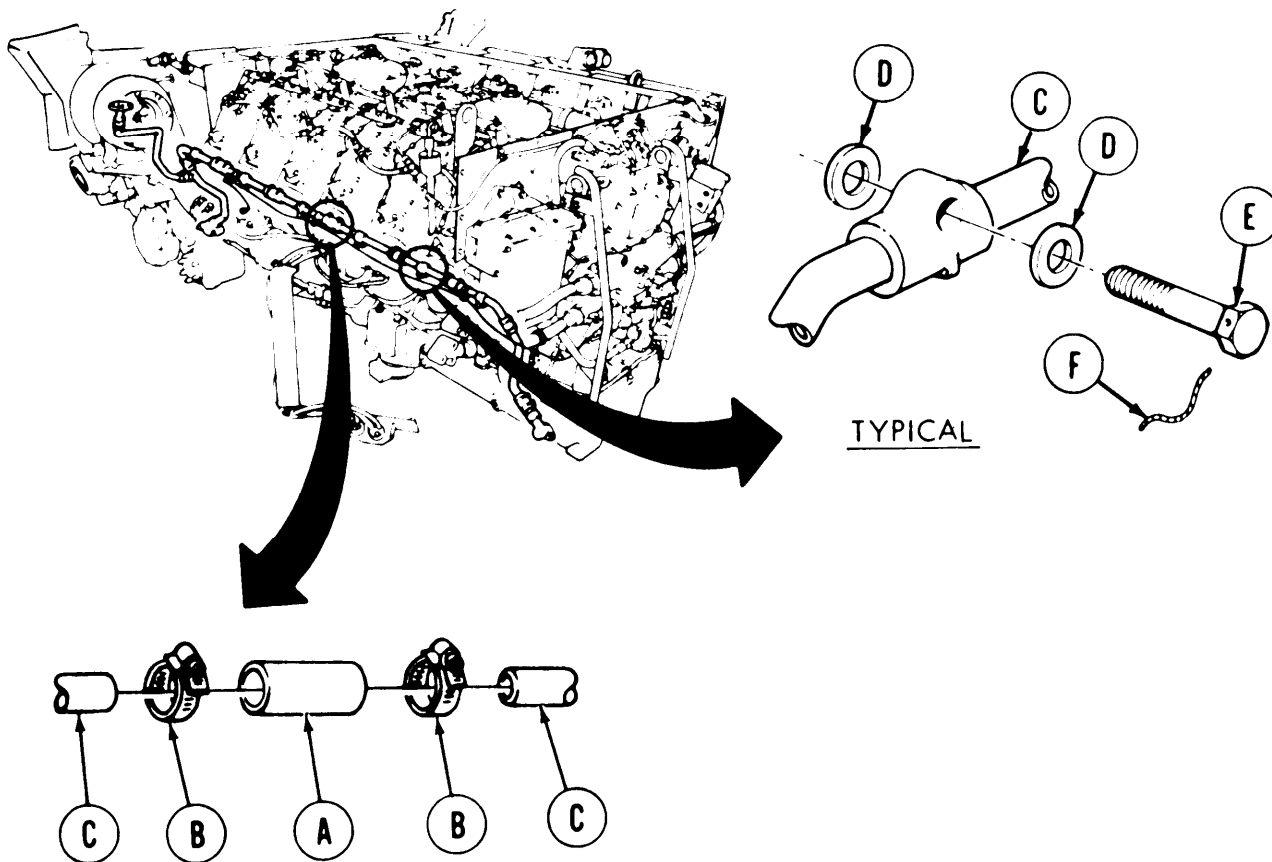
Go on to Sheet 3

TA139423

CYLINDER HEAD AND OIL PAN DRAIN TUBES (LEFT AND RIGHT) REPLACEMENT (Sheet 3 of 4)

INSTALLATION:

1. Cut eight hoses (A) to prescribed length (3 inches).
2. Install 16 clamps (B) on drain line assembly (C).
3. Install eight hoses (A) on drain line assembly (C).
4. Position assembled drain tube assembly (C) to engine.
5. Install 12 washers (D) on six capscrews (E).
6. Using 7/8 inch socket, install six capscrews (E).
7. Using pliers, install lockwire (Item 59, Appendix D) (F).

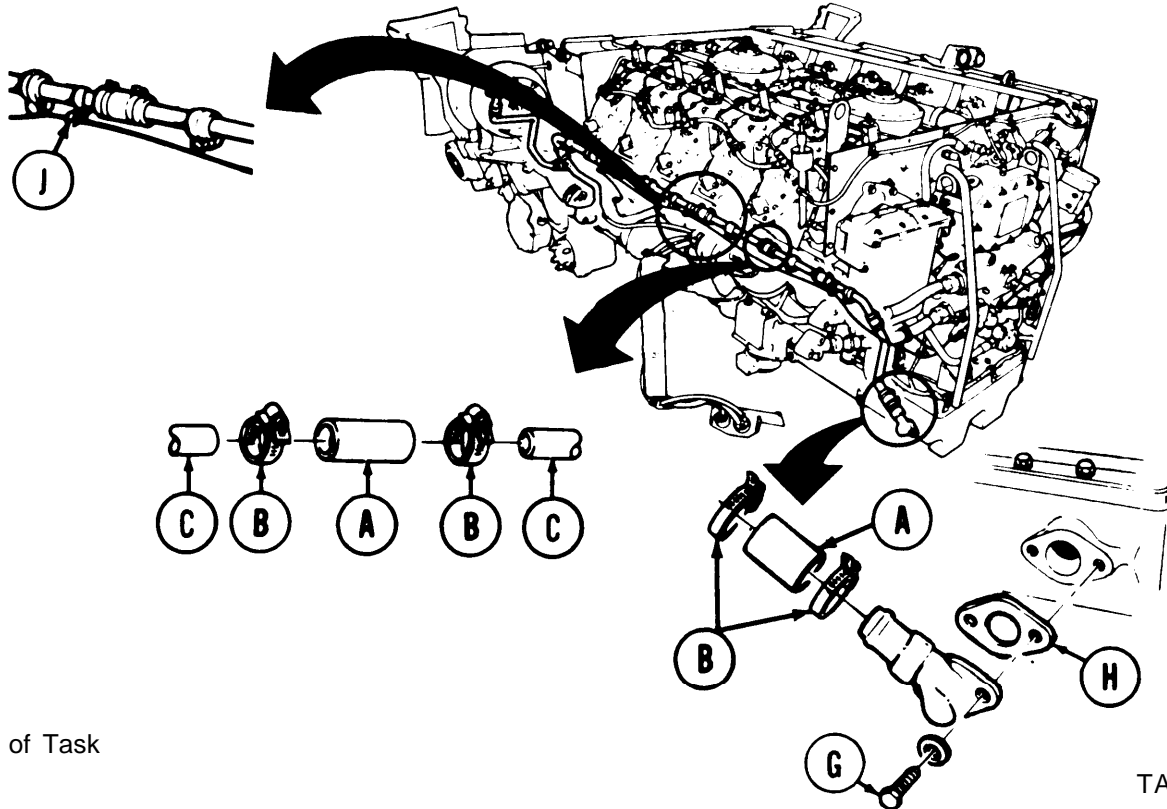


Go on to Sheet 4

TA139424

**CYLINDER HEAD AND OIL PAN DRAIN TUBES (LEFT AND RIGHT) REPLACEMENT
(Sheet 4 of 4)**

8. Position two bolts and new lockwashers (G) through lower drain tube end and place new gasket (H) over bolts.
9. Using 1/2 inch socket, tighten two bolts and lockwashers (G) to engine.
10. Using screwdriver, tighten 16 clamps (B) on hoses on each end of lower drain lines assembly.
11. Holding nut with 3/8 inch wrench and using screwdriver, connect four fuel line clamps (J) to oil drain line.
12. Install left oil cooler frame and brackets (2D engine) (page 6-114) (as required).
13. Install right oil cooler frame and brackets (2D engine) (page 6-104) (as required).
14. Install powerplant (2A engine) oil cooler frame and brackets (page 6-97).
15. Replenish engine oil (LO 9-2350-222-12).
16. Connect powerplant test (ground hop) equipment (Item 30, Chapter 3, Section I) (page 5-49).
17. Start engine and check for leaks.
18. Disconnect powerplant test (ground hop) equipment (page 5-62).
19. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA139425

TURBOSUPERCHARGER OIL DRAIN TUBE (RIGHT BANK) REPLACEMENT
 (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-58
Inspection	6-59
Installation	

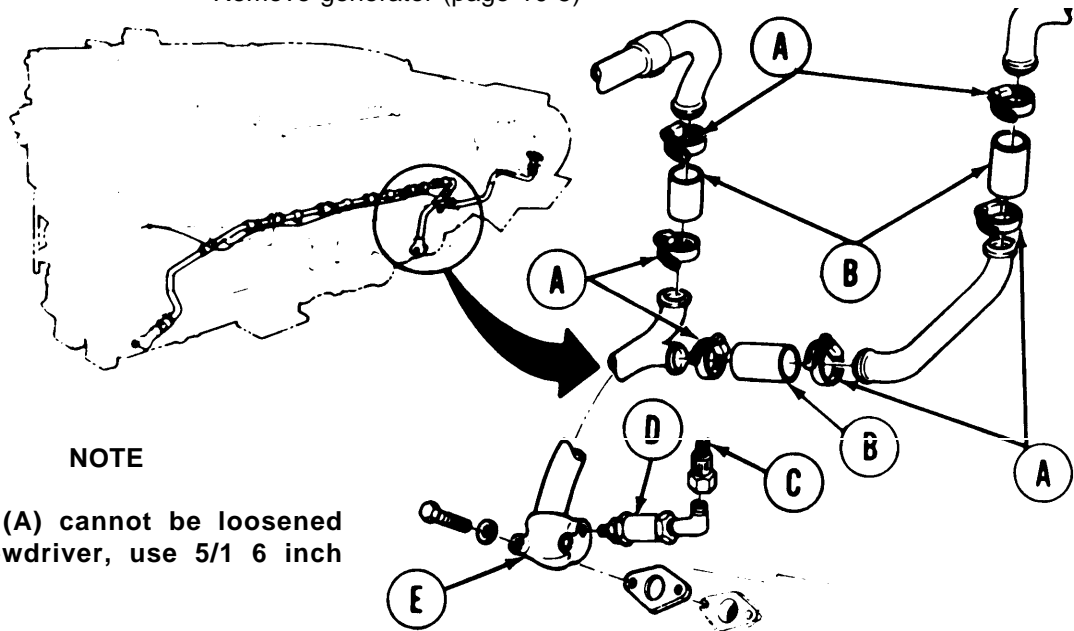
TOOLS: 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 Flat-tip screwdriver
 9/16 in. combination box and open end wrench
 5/8 in. combination box and open end wrench

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Gasket (8682772)
 Lockwasher (7410218) (2 required)

REFERENCE: LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Drain engine oil (2A engine, page 6-49) (2D engine, page 6-51)
 Remove generator (page 10-5)



NOTE

If clamp (A) cannot be loosened with screwdriver, use 5/16 inch wrench.

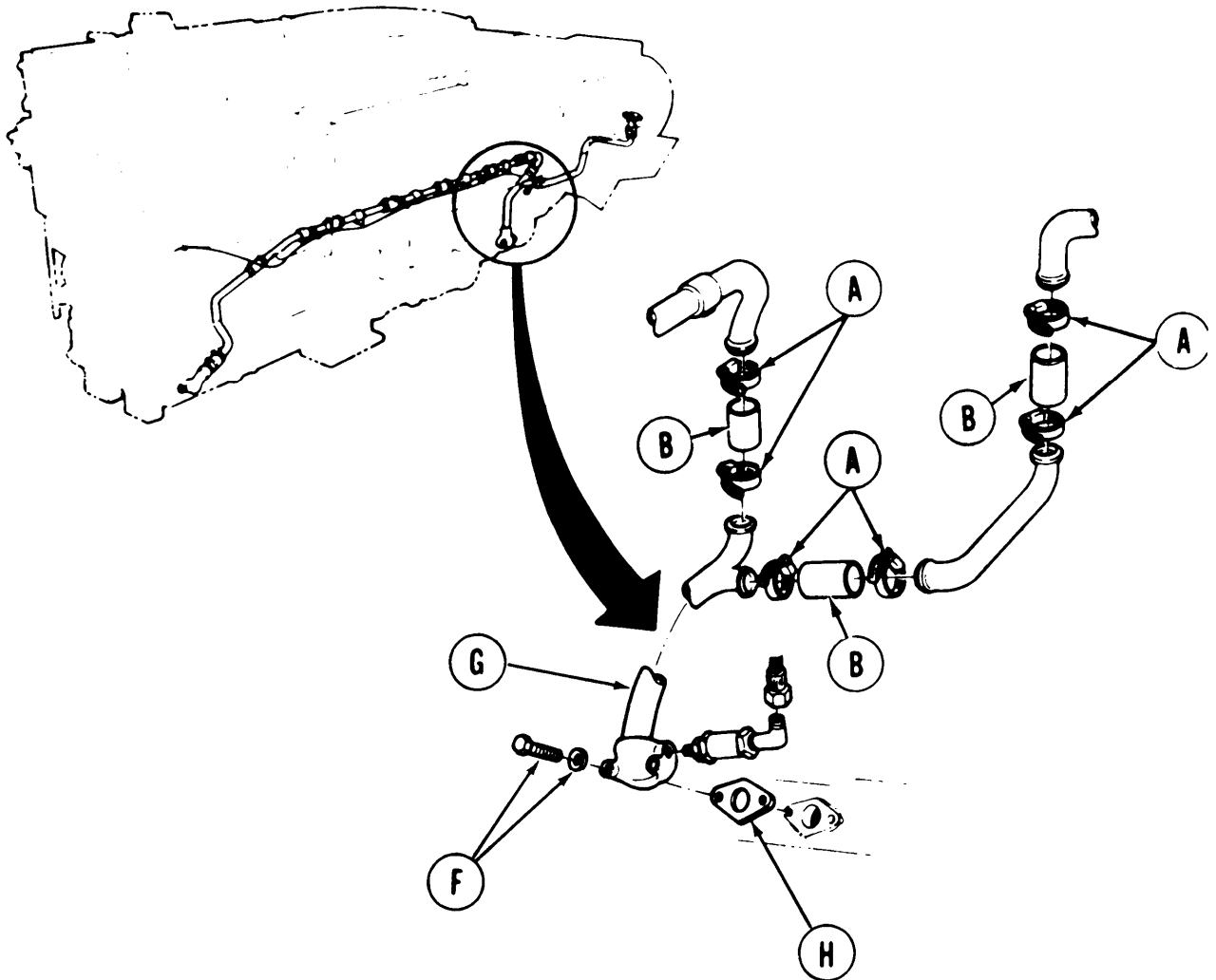
1. Using screwdriver, loosen six clamps (A) on three hoses (B) on each end of upper drain tube.
2. Using 9/16 inch wrench, disconnect hose (C) from generator oil drain check valve (D).
3. Using 5/8 inch wrench, disconnect generator oil drain check valve (D) from tube assembly (E).

Go on to Sheet 2

TA139426

**TURBOSUPERCHARGER OIL DRAIN TUBE (RIGHT BANK) REPLACEMENT
(Sheet 2 of 4)**

4. Using socket, remove two bolts and lockwashers (F) securing tube (G) to engine. Throw lockwashers away.
5. Remove oil drain tube assembly (G) from engine,



6. Remove gasket (H) and throw away.
7. Separate three hoses (B) and clamps (A) from tube (G).

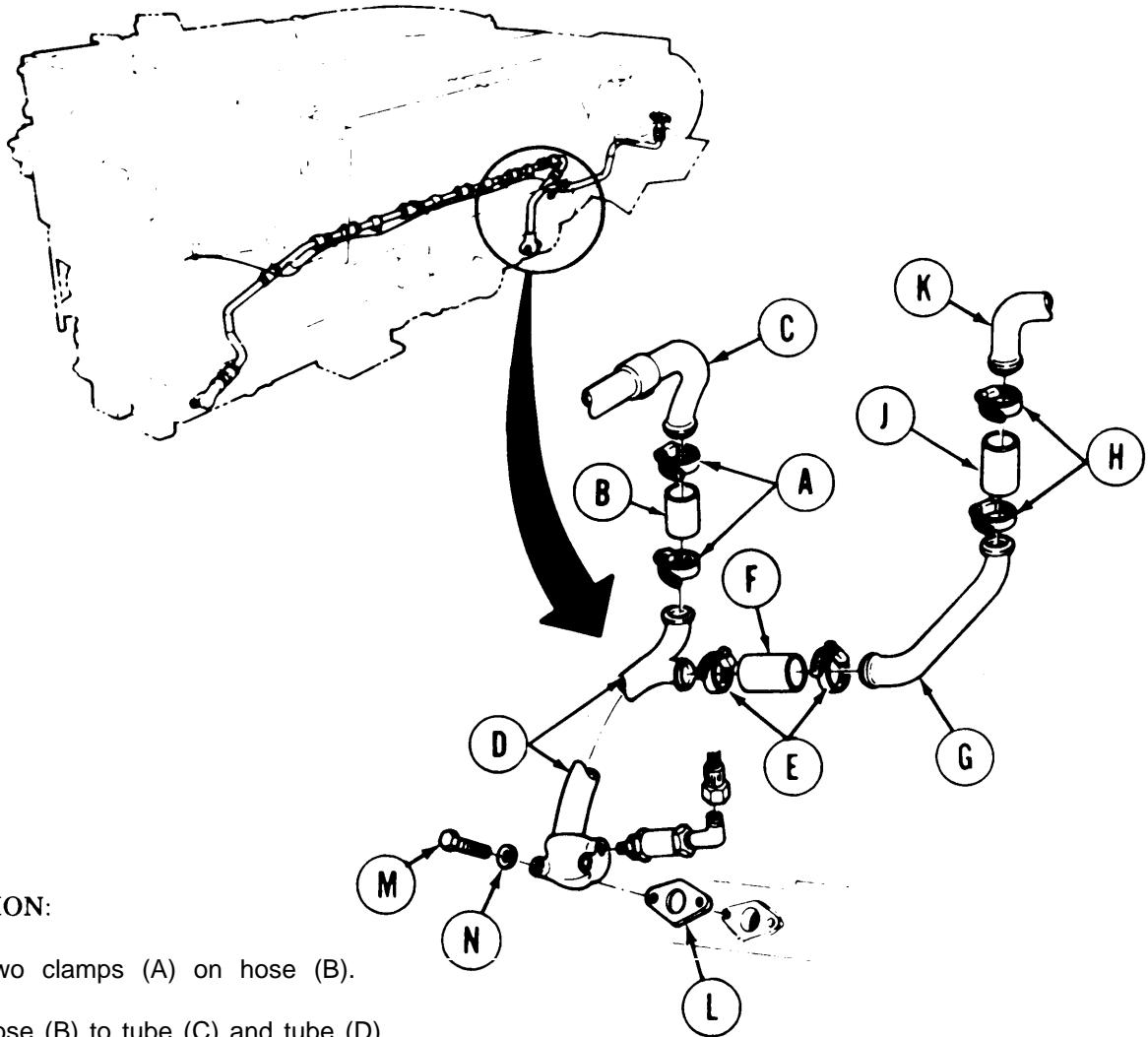
INSPECTION:

Inspect hose clamps for general serviceability.

2. Replace defective parts as required.
- Go on to Sheet 3

TA139427

TURBOSUPERCHARGER OIL DRAIN TUBE (RIGHT BANK) REPLACEMENT
(Sheet 3 of 4)



INSTALLATION:

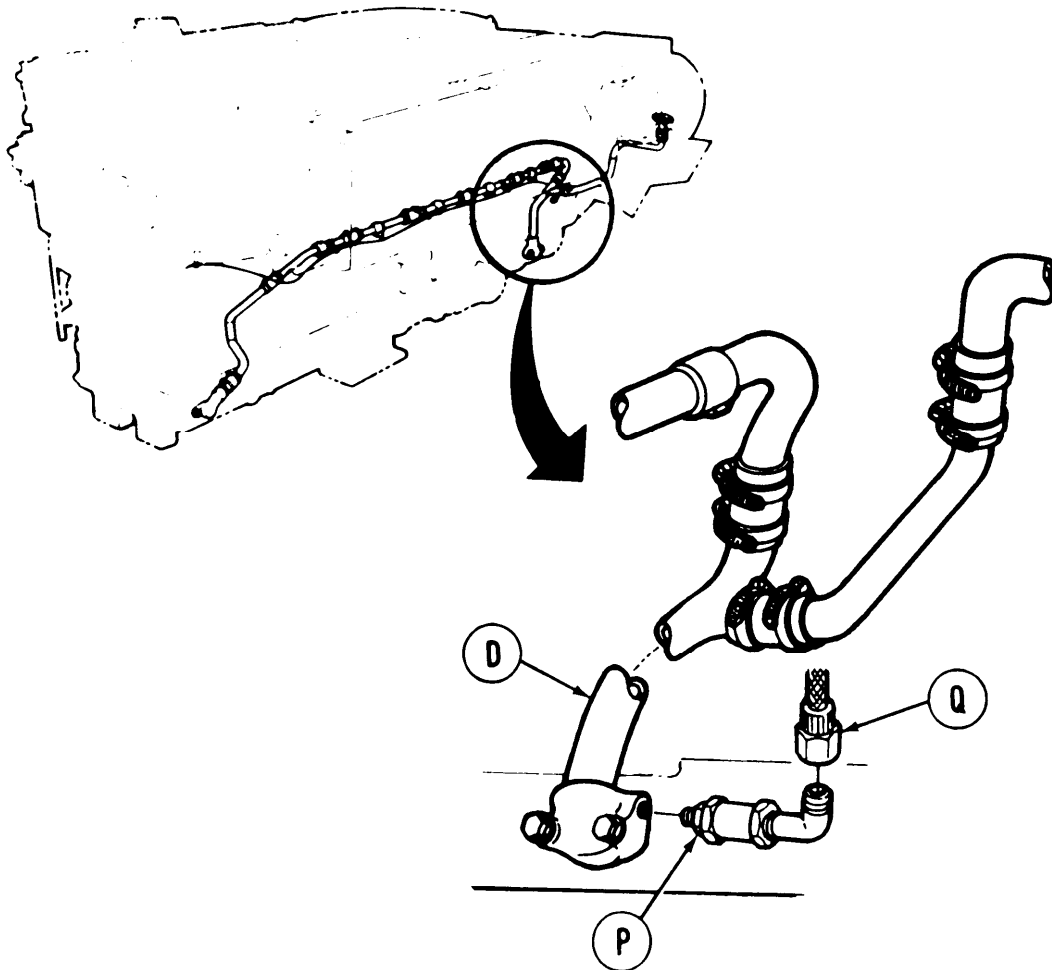
1. Install two clamps (A) on hose (B).
2. Install hose (B) to tube (C) and tube (D).
3. Install two clamps (E) on hose (F).
4. Install hose (F) to tube (D) and tube (G).
5. Install two clamps (H) on hose (J).
6. Install hose (J) to tube (G) and tube (K).
7. Install new gasket (L), two bolts (M), and new lockwashers (N) to secure tube (D) to engine.
8. Using socket, tighten two bolts (M).
9. Using screwdriver, tighten clamps (A), (E), and (H).

Go on to Sheet 4

TA139428

TURBOSUPERCHARGER OIL DRAIN TUBE (RIGHT BANK) REPLACEMENT (Sheet 4 of 4)

10. Using 5/8 inch wrench, connect generator oil drain check valve (P) to tube (D).
11. Using 9/16 inch wrench, connect hose (Q) to generator oil drain check valve (P).
12. Replenish engine oil (LO 9-2350-222-12).
13. Install generator (page 10-12).
14. Connect powerplant test (groundhog) equipment (page 5-49).
15. Start engine and check for leaks.
16. Disconnect powerplant test (groundhog) equipment (page 5-62).
17. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA139429

TURBOSUPERCHARGER OIL DRAIN TUBE (LEFT BANK) REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-62
Inspection	6-63
Installation	6-64

TOOLS: 1/2 in. socket with 1/2 in. drive
 Flat-tip screwdriver
 Ratchet with 1/2 in. drive
 5/16 in. combination box and open end wrench

SUPPLIES: Hose (7350206) (3 required)
 Gasket (8682772)
 Lockwasher (7410218) (2 required)

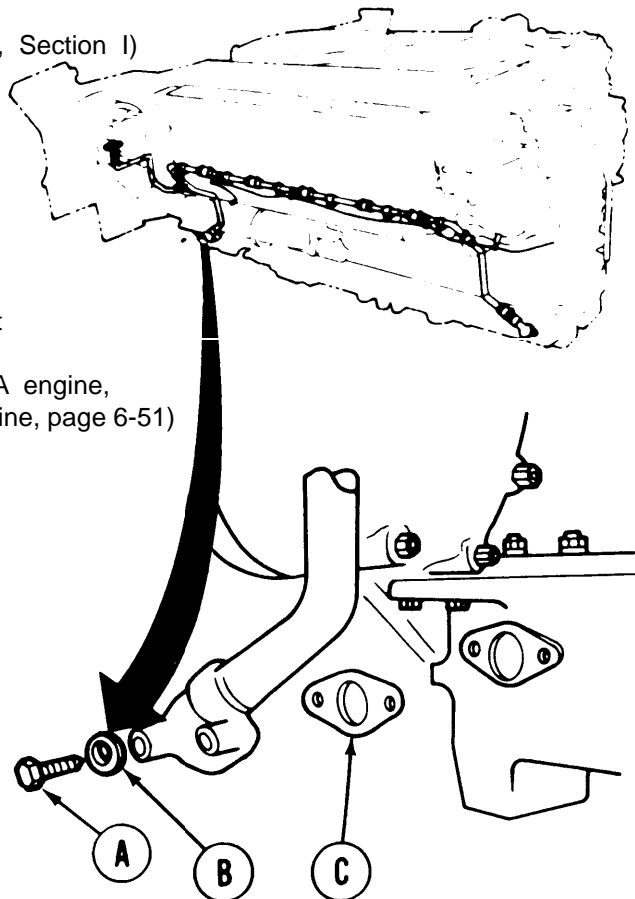
SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

REFERENCE: LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Drain engine oil (2A engine, page 6-49) (2D engine, page 6-51)

REMOVAL:

1. Using socket, remove two bolts (A) and two lockwashers (B). Throw lockwashers away.
2. Remove gasket (C).
3. Throw gasket away.



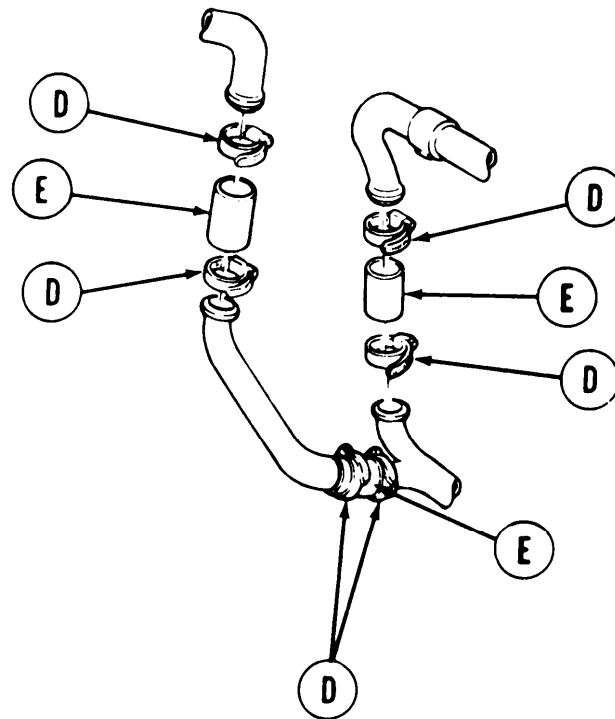
Go on to Sheet 2

TA139430

TURBOSUPERCHARGER OIL DRAIN TUBE (LEFT BANK) REPLACEMENT (Sheet 2 of 4)**NOTE**

If clamps (D) cannot be loosened using a screwdriver, use 5/16 inch wrench.

- Using screwdriver, loosen six clamps (D) on hoses (E).



- Remove oil drain tube assembly from engine.
- Remove six clamps (D) and three hoses (E) from tube assembly.

INSPECTION:

- Inspect capscrews for stripped threads.
- Inspect hose clamps for general serviceability.
- Replace defective parts as required.

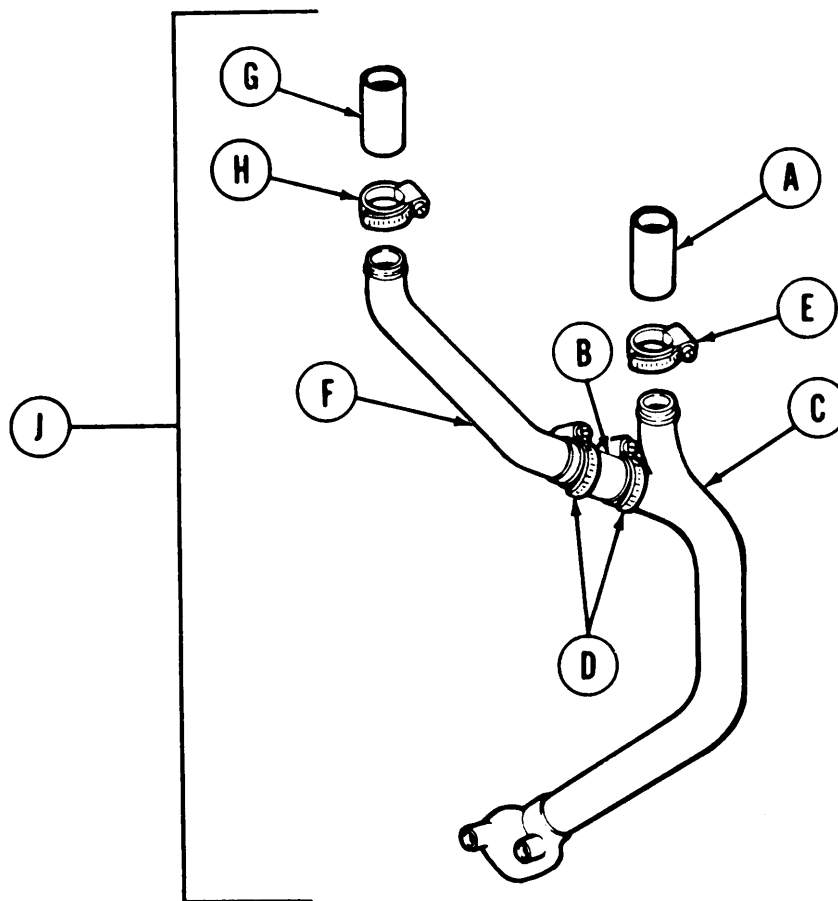
Go on to Sheet 3

TA139431

TURBOSUPERCHARGER OIL DRAIN TUBE (LEFT BANK) REPLACEMENT (Sheet 3 of 4)

INSTALLATION:

1. Cut three hoses to prescribed length (approximately 3 inches).
2. Install two new hoses (A) and (B) on tube (C).
3. Install two clamps (D) on hose (B).
4. Install clamp (E) on hose (A).
5. Connect tube (F) to hose (B).
6. Connect hose (G) to tube (F).
7. Install clamp (H) to hose (G).
8. Position tube assembly (J) to engine.

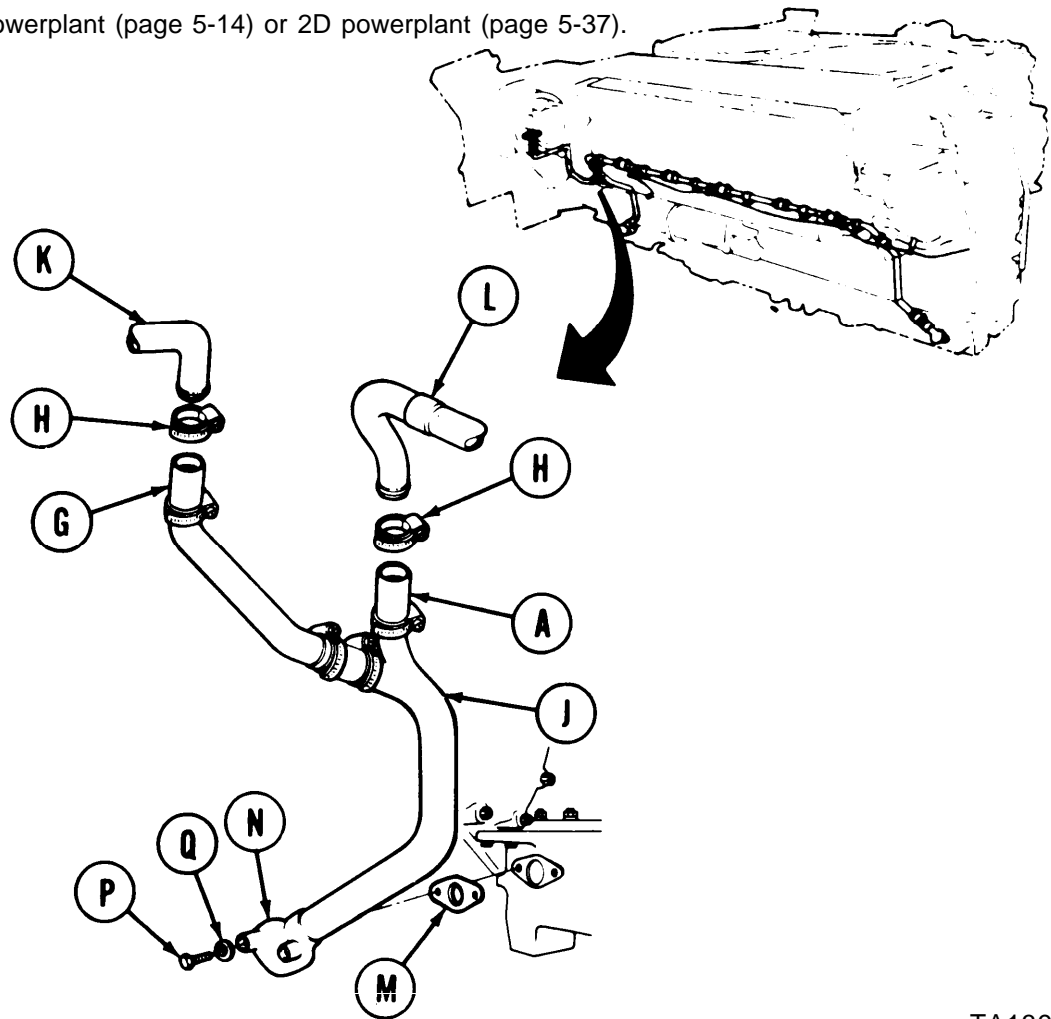


Go on to Sheet 4

TA139432

TURBOSUPERCHARGER OIL DRAIN TUBE (LEFT BANK) REPLACEMENT (Sheet 4 of 4)

9. Install two clamps (H) on hoses (A) and (G).
10. Install tube assembly (J) between tube (K) and tub (L).
11. Position new gasket (M) on flange (N) of tube assembly (J).
12. Using socket, install two bolts (P) and two new lockwashers (Q) to secure tube assembly (J).
13. Using screwdriver, tighten six clamps to secure hoses to tubes.
14. Replenish engine oil (LO 9-2350-222-12).
15. Connect powerplant test (ground hop) equipment (page 5-49).
16. Start engine and check oil drain line assembly for leaks.
17. Disconnect powerplant test (ground hop) equipment (page 5-62).
18. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA139433

MULTIPLE FLUID PRESSURE LINE CONNECTOR REPLACEMENT (Sheet 1 of 6)

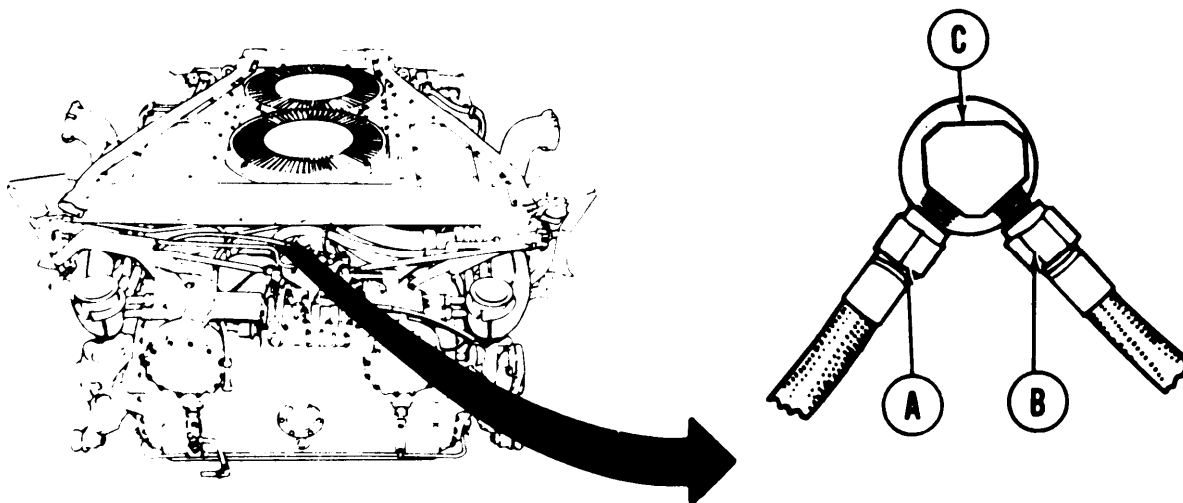
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-66
Inspection	6-68
Installation	6-68

TOOLS: 1/2 in. combination box and open end wrench
 1-1/8 in. deep well socket with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 11/16 in. combination box and open end wrench
 1 in. combination box and open end wrench
 1-1/8 in. open end wrench
 Flat-tip screwdriver

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Remove rear engine cooling fan (page 9-48)



REMOVAL:

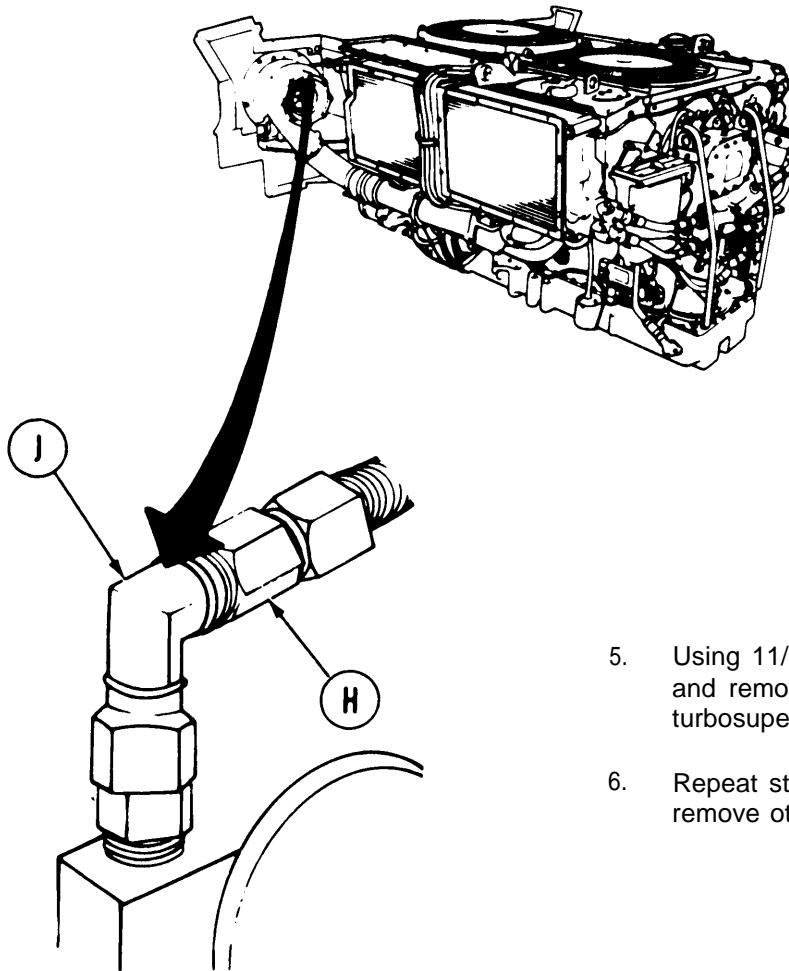
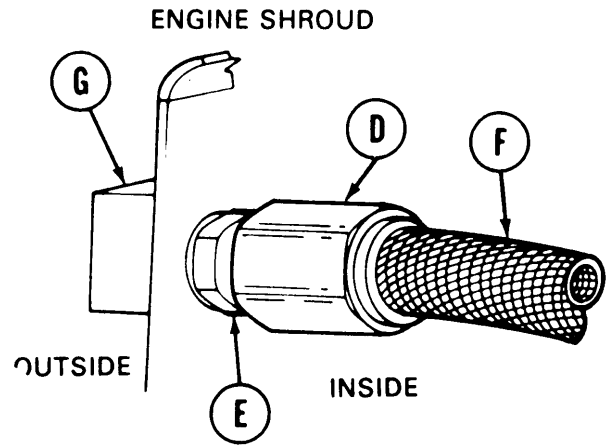
1. Using 11/16 inch wrench, disconnect hoses (A) and (B) from connector (C).

Go on to Sheet 2

TA139434

MULTIPLE FLUID PRESSURE LINE CONNECTOR REPLACEMENT (Sheet 2 of 6)

2. Using 1 inch wrench, loosen hose connector (D) while holding retaining nut (E) with 1-1/8 inch wrench.
3. Remove hose (F) from connector (G).
4. Using 1-1/8 inch deep well socket wrench, remove retaining nut (E) and washer from connector (G).



5. Using 11/16 inch wrench, loosen hose (H) and remove it from elbow (J) on the right turbosupercharger.
6. Repeat step 5 on left turbosupercharger to remove other hose.

Go on to Sheet 3

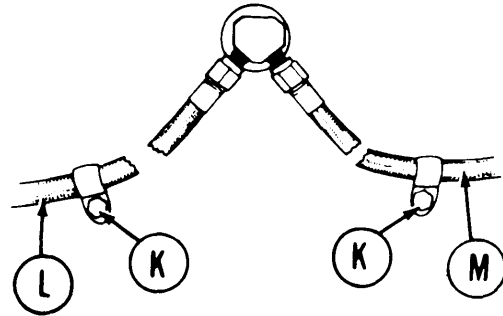
TA139435

MULTIPLE FLUID PRESSURE LINE CONNECTOR REPLACEMENT (Sheet 3 of 6)

- Using 1/2 inch wrench, remove loop clamp (K) that secures left hose (L) to engine shroud.
- Using 1/2 inch socket, remove loop clamp (K) that secures right hose (M) to engine shroud.
- Remove hose grommets from left and right side engine shrouds.
- Remove hoses (M) and (L) to inside.

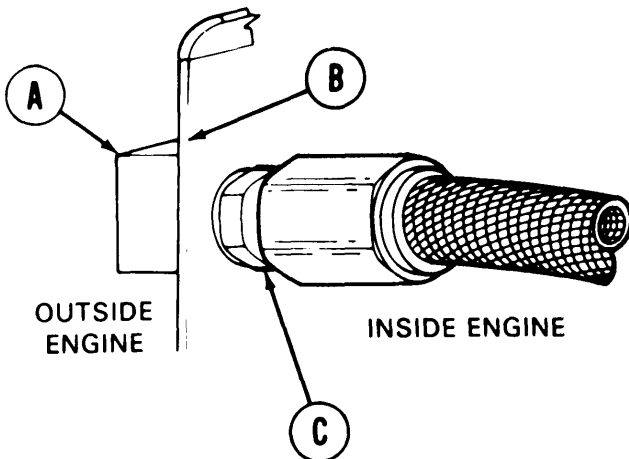
INSPECTION:

- Check hoses for cracks, holes, and leaks.
- Check hose connectors for stripped threads and wear.
- Check loop clamps for serviceability
- Replace parts as needed.



INSTALLATION:

- Using 1-1/8 inch socket, secure connector (A) to engine shroud (B) with flat washer and retaining nut (C).

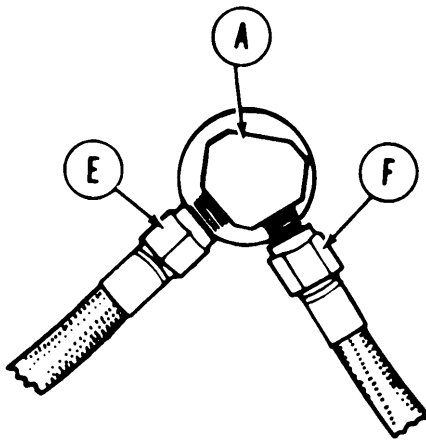
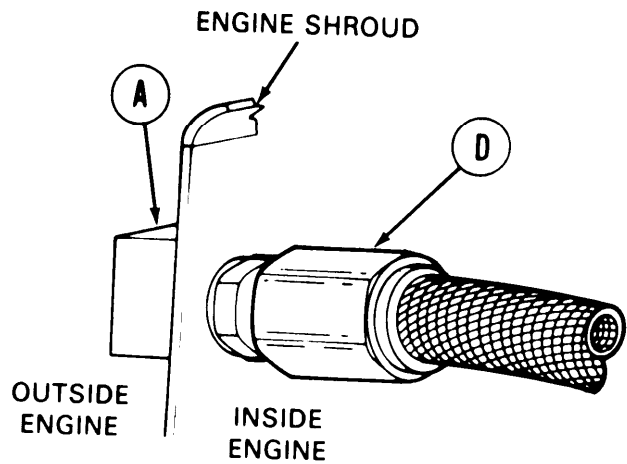


Go on to Sheet 4

TA139436

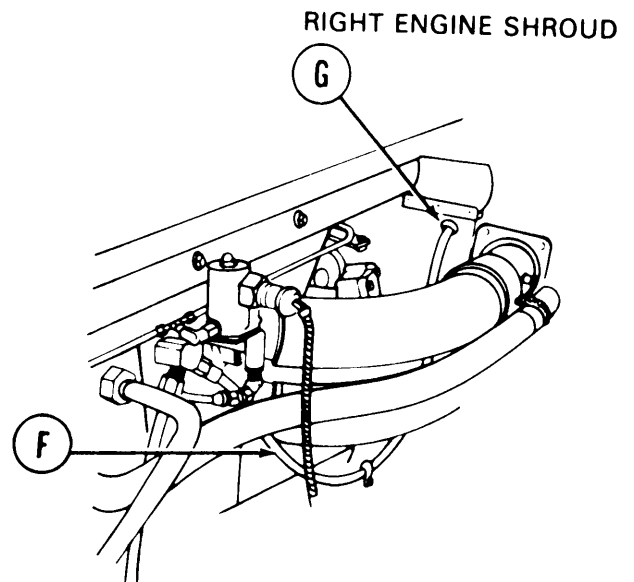
MULTIPLE FLUID PRESSURE LINE CONNECTOR REPLACEMENT (Sheet 4 of 6)

2. Connect hose (D) to connector (A).
3. Using 1 inch wrench, tighten hose connector (D). Make sure connector (A) is installed with hose fittings pointed down.



4. Connect hoses (E) and (F) to connector (A).
5. Using 11/16 inch wrench, tighten connectors (E) and (F).

6. Position hose (F) so that free end passes through right engine shroud. Using fingers and screwdriver, position grommet (G) over hose and into shroud.



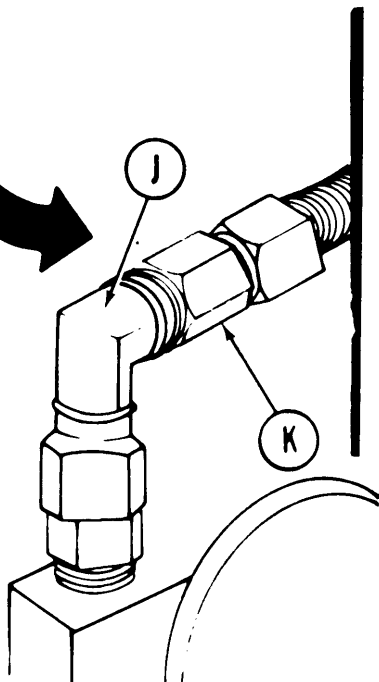
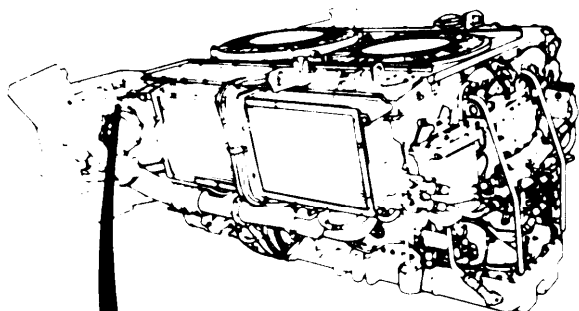
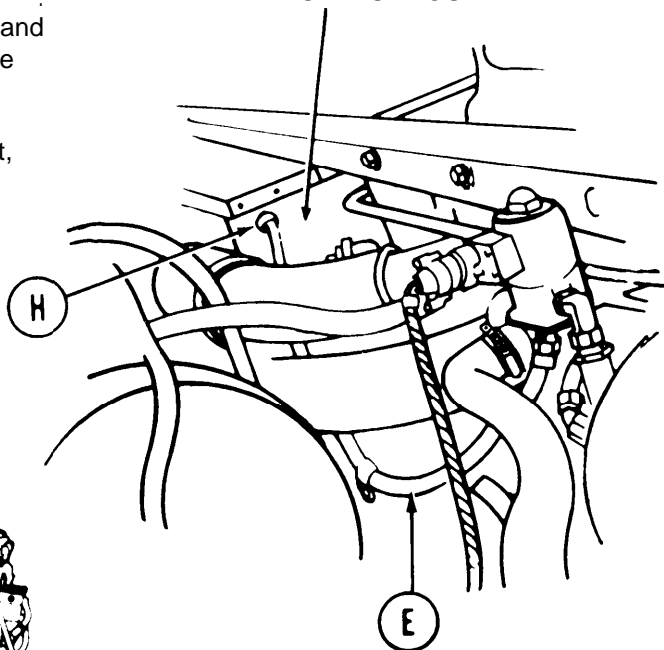
Go on to Sheet 5

TA139437

MULTIPLE PRESSURE LINE CONNECTOR REPLACEMENT (Sheet 5 of 6)

- 7. Position hose E) so that free end passes through left engine shroud. Using fingers and screwdriver, position grommet (H) over hose and into shroud.
- 8. Using 1/2 inch wrench and 1/2 inch socket, secure each hose with loop clamp.

LEFT ENGINE SHROUD



- 9. Using 11/16 inch wrench, connect hose connector (K) to elbow (J) On right turbosupercharger.
- 10. Repeat step 9 on left turbosupercharger to connect hose (E).

Go on to Sheet 6

TA139438

MULTIPLE FLUID PRESSURE LINE CONNECTOR REPLACEMENT (Sheet 6 of 6)

CAUTION

Do not operate powerplant longer than 10 minutes with cooling fans removed. Engine speed should not exceed 750 rpm.

11. Ground hop powerplant (page 5-49).
12. Check all connections for leaks.
13. Disconnect ground hop equipment (page 5-62).
14. Install rear engine cooling fan (page 9-49).
15. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA139439

CRANKCASE BREATHER TEE AND REAR TUBE REPLACEMENT (Sheet 1 of 6)

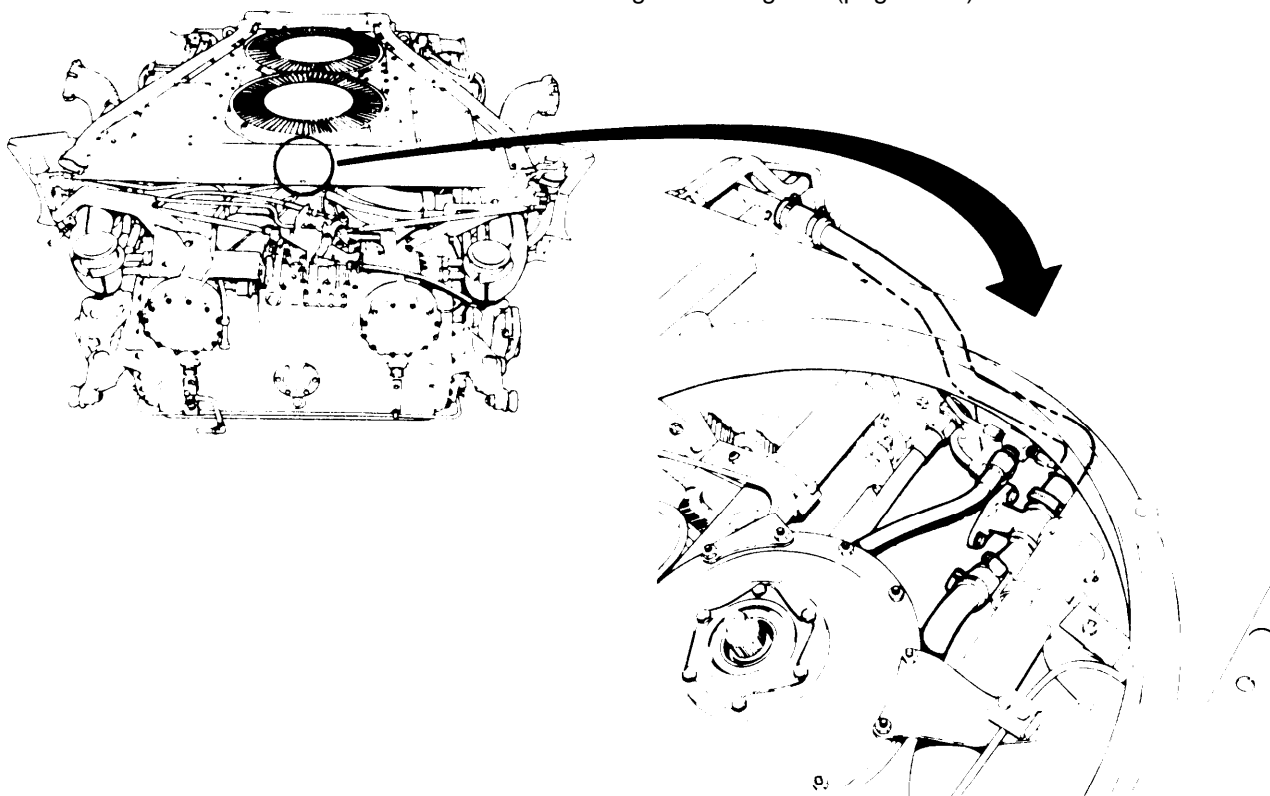
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-73
Installation	6-74.1

TOOLS: 1/2 in. combination box and open end wrench
 Flat-tip screwdriver with 1/4 in. blade

SUPPLIES: Gasket (8682770) (2 required)
 Hose (10898793)
 Hose (10898793-1)
 Hose (10898794)
 Lockwasher (7410218) (2 required)
 Self-locking nut (MS21045-5)

PRELIMINARY PROCEDURES: Remove top deck (page 16-21)
 Remove transmission shroud (page 9-20).
 Remove rear engine cooling fan (page 9-48)

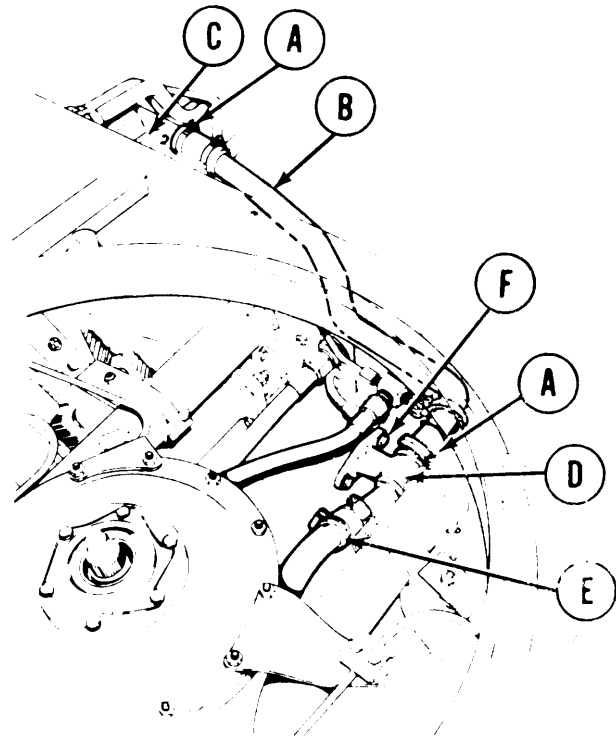


Go on to Sheet 2

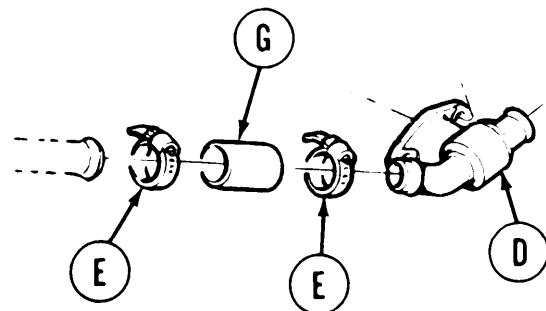
TA249057

CRANKCASE BREATHER TEE AND REAR TUBE REPLACEMENT (Sheet 2 of 6)**REMOVAL:**

1. Using screwdriver, loosen two clamps (A) holding breather tube (B) to exhaust tube (C) and breather tee (D).
2. Remove two clamps (A) and breather tube (B) from vehicle.
3. Using screwdriver, loosen clamp (E).
4. Using wrench, remove two screws and lockwashers (F) holding breather tee (D) to engine. Throw lockwashers away.



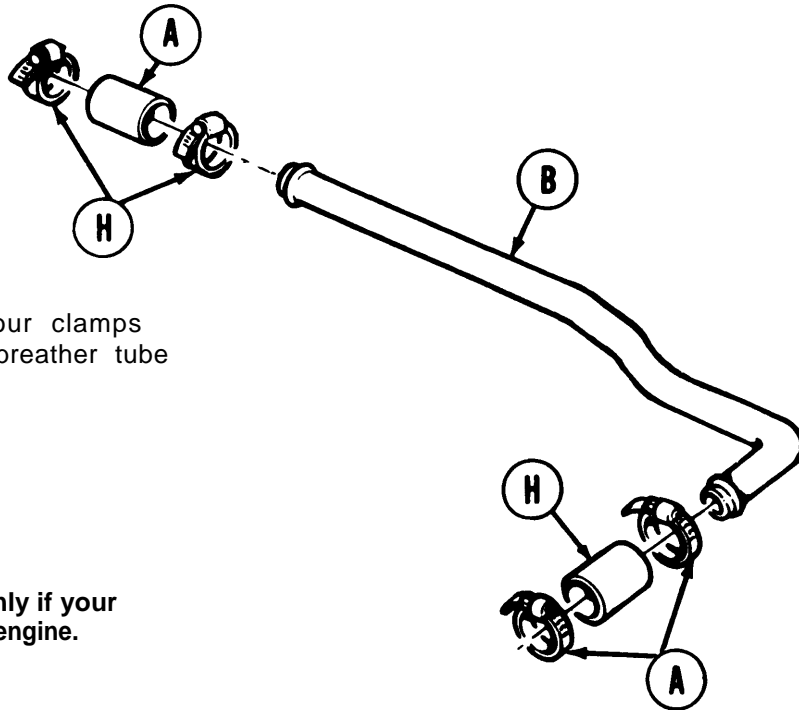
5. Remove breather tee (D), spacer, and two gaskets from engine. Throw gaskets away.
6. Using screwdriver, remove two clamps (E) and hose (G) from breather tee (D). Throw hose (G) away.



Go on to Sheet 3

TA249058

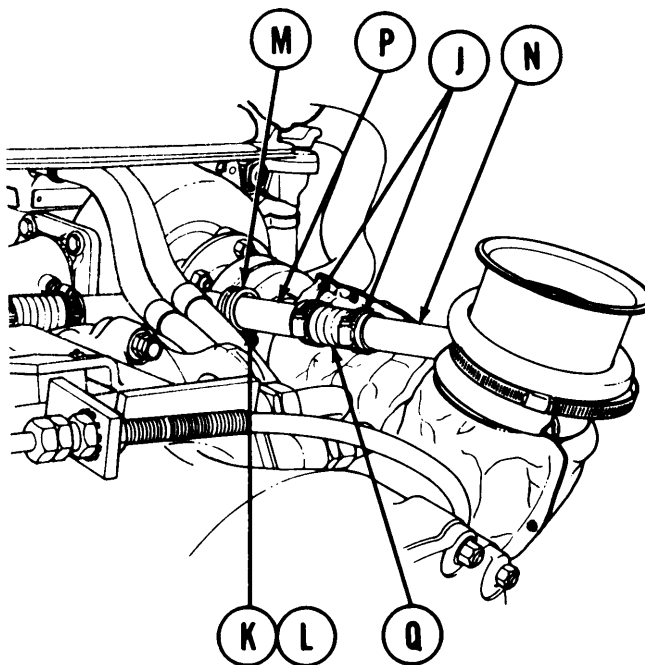
CRANKCASE BREATHER TEE AND REAR TUBE REPLACEMENT (Sheet 3 of 6)



- Using screwdriver, remove four clamps (A) and two hoses (H) from breather tube (B). Throw hoses away.

NOTE

Perform steps 8 through 11 only if your vehicle is equipped with a 2DA engine.



- Using screwdriver, loosen two clamps (J).
- Using one wrench to hold nut (K), use another wrench and remove screw (L) securing clamp (M) to bracket on left ejector tube (N). Throw nut away.
- Remove clamp (M) from engine breather tube extension (P).
- Remove engine breather tube extension (P), hose (Q), and clamps (J). Throw hose away.

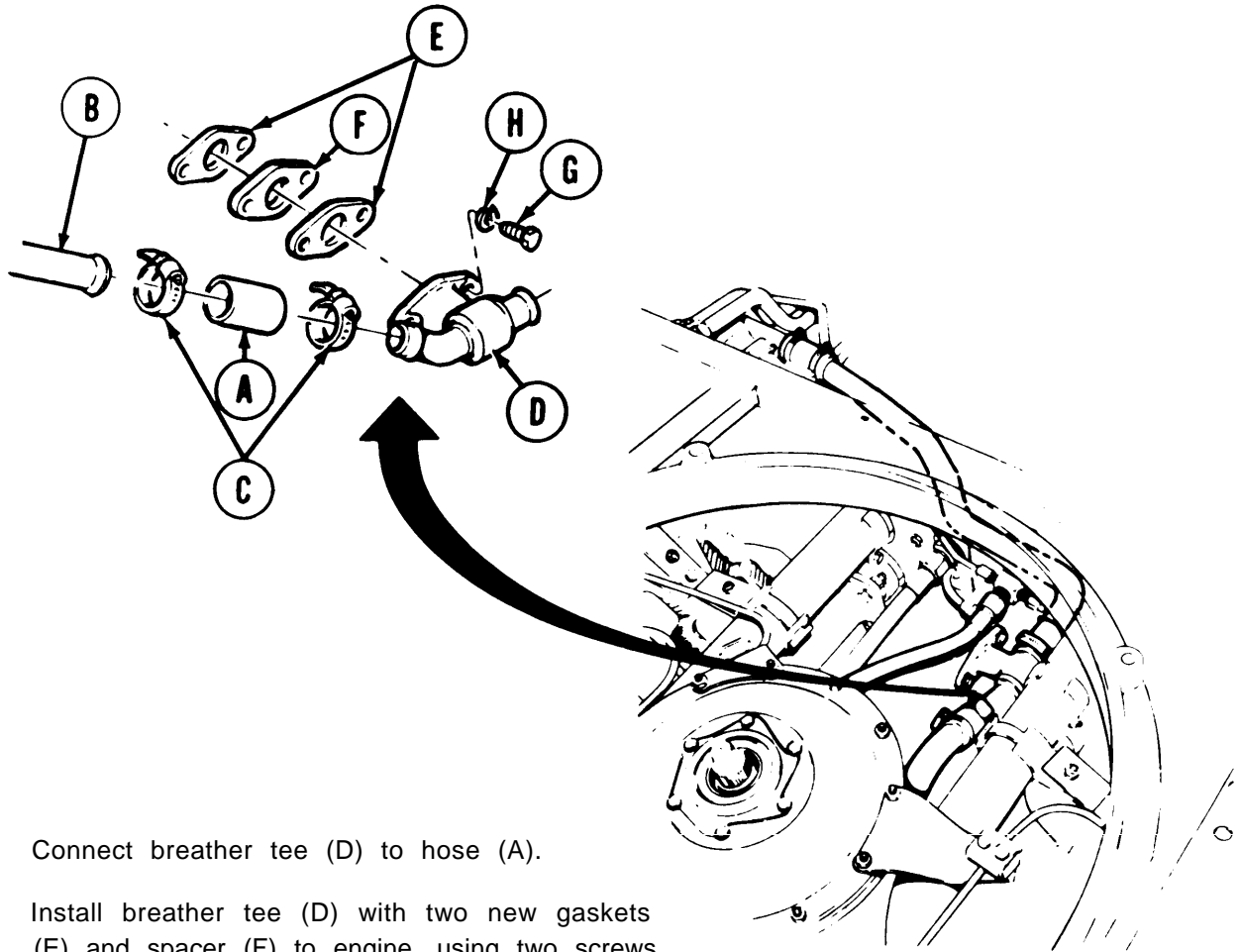
Go on to Sheet 4

TA249060

CRANKCASE BREATHER TEE AND REAR TUBE REPLACEMENT (Sheet 4 of 6)

INSTALLATION:

- 10 Install new hose (A) on breather tube (B). Place two clamps (C) on hose (A).

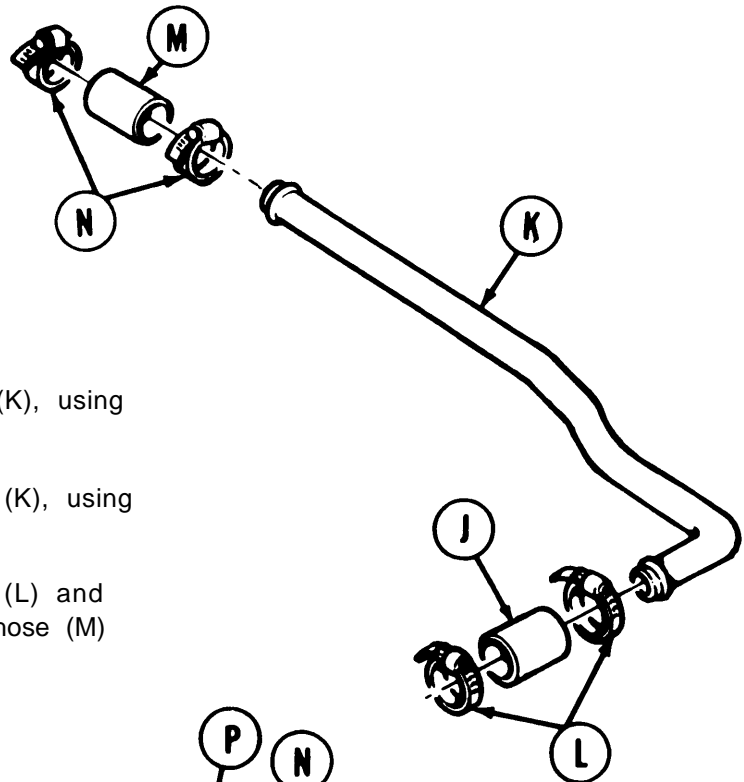


2. Connect breather tee (D) to hose (A).
3. Install breather tee (D) with two new gaskets (E) and spacer (F) to engine, using two screws (G) and new lockwashers (H).
4. Using screwdriver, tighten two clamps (C).
5. Using wrench, tighten two screws (G).

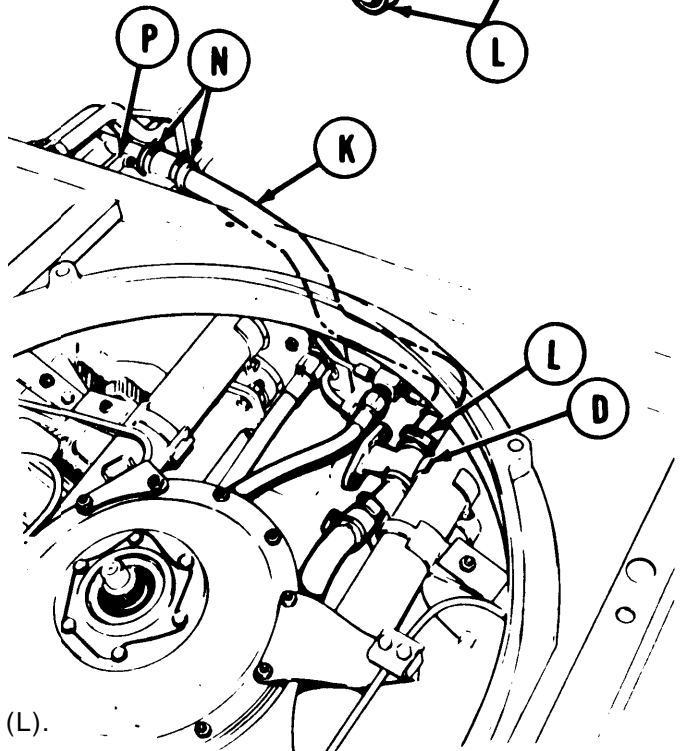
Go on to Sheet 5

TA249059

CRANKCASE BREATHER TEE AND REAR TUBE REPLACEMENT (Sheet 5 of 6)



6. Install new hose (J) to breather tube (K), using two clamps (L).
7. Install new hose (M) to breather tube (K), using two clamps (N).
8. Using screwdriver, tighten one clamp (L) and one clamp (N) to secure hose (J) and hose (M) to breather tube (K).



NOTE

If your vehicle is equipped with a 2DA engine, install breather tube (K) to breather tee (D) only.

9. Install breather tube (K) to breather tee (D) and exhaust tube (P).

NOTE

Do not tighten clamps (N) if vehicle is equipped with a 2DA engine.

10. Using screwdriver, tighten clamps (N) and (L).

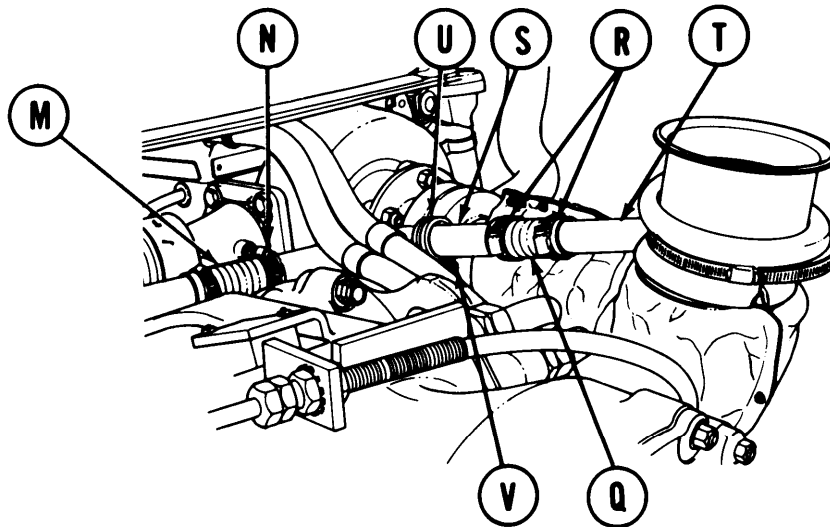
TA249061

Go on to Sheet 6

CRANKCASE BREATHER TEE AND REAR TUBE REPLACEMENT (Sheet 6 of 6)

NOTE

Perform steps 11 through 15 only if your vehicle is equipped with a 2DA engine.,



11. Install new hose (Q) and clamps (R) onto engine breather tube extension (S).
12. Install end of engine breather tube extension (S) into hose (M). Install hose end of breather tube extension (S) onto left ejector tube (T).
13. Slide clamps (R) and (N) over hoses (M) and (Q). Using screwdriver, tighten clamps (R) and (N).
14. Install clamp (U) onto engine breather tube extension (S).
15. Using two wrenches, install screw and new self-locking nut (V) to secure clamp (U) to bracket on left ejector tube (T).
16. Install rear engine cooling fan (page 9-49).
17. Install transmission shroud (page 9-23).
18. Install top deck (page 16-23).

End of Task

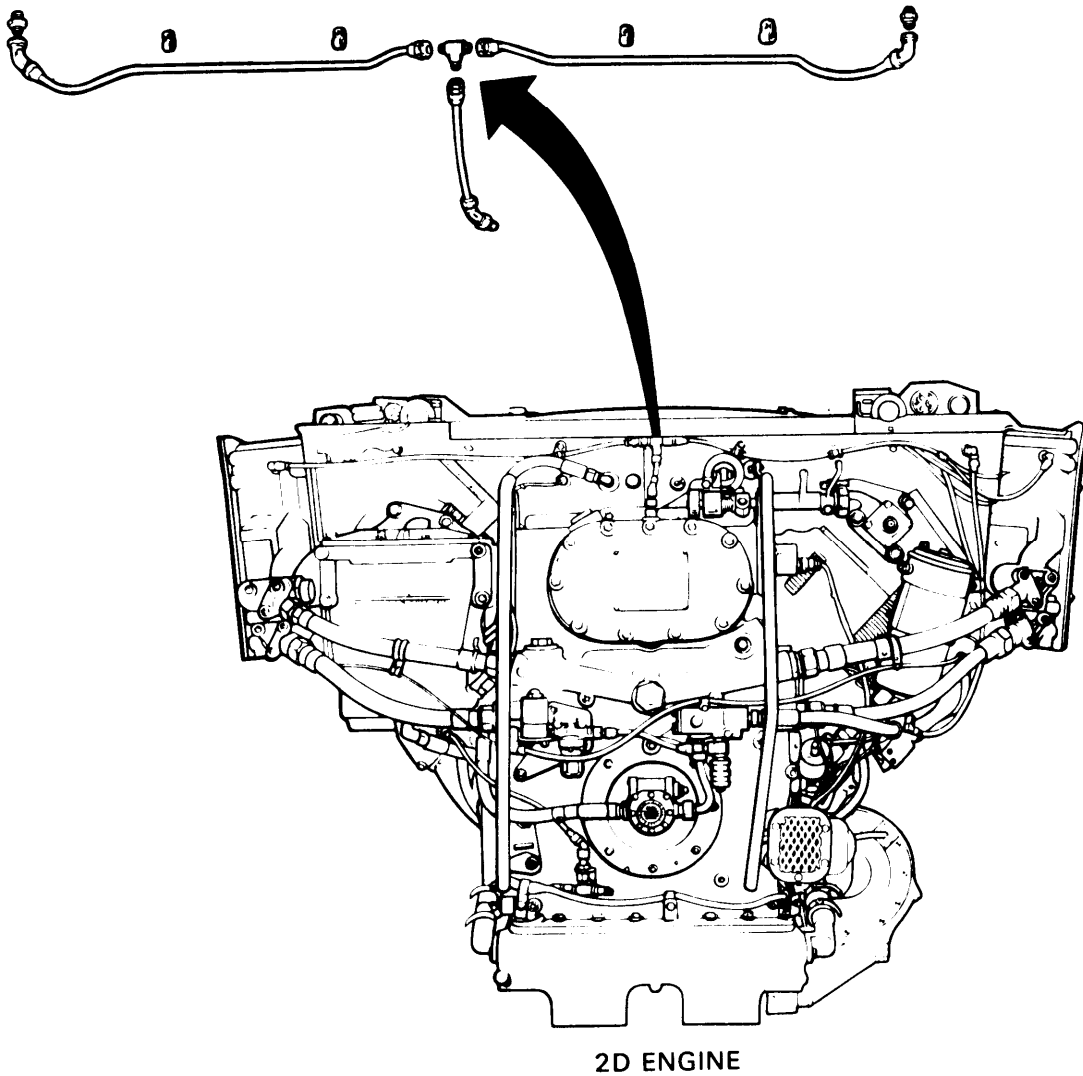
TA249062

OIL COOLER VENT HOSES AND FITTINGS REPLACEMENT (2D ENGINE) (Sheet 1 of 3)

TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
9/16 in. combination box and open end wrench
11/16 in. combination box and open end wrench
7/16 in. combination box and open end wrench

SUPPLIES: Packing (MS9388-012) (2 required)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-26)

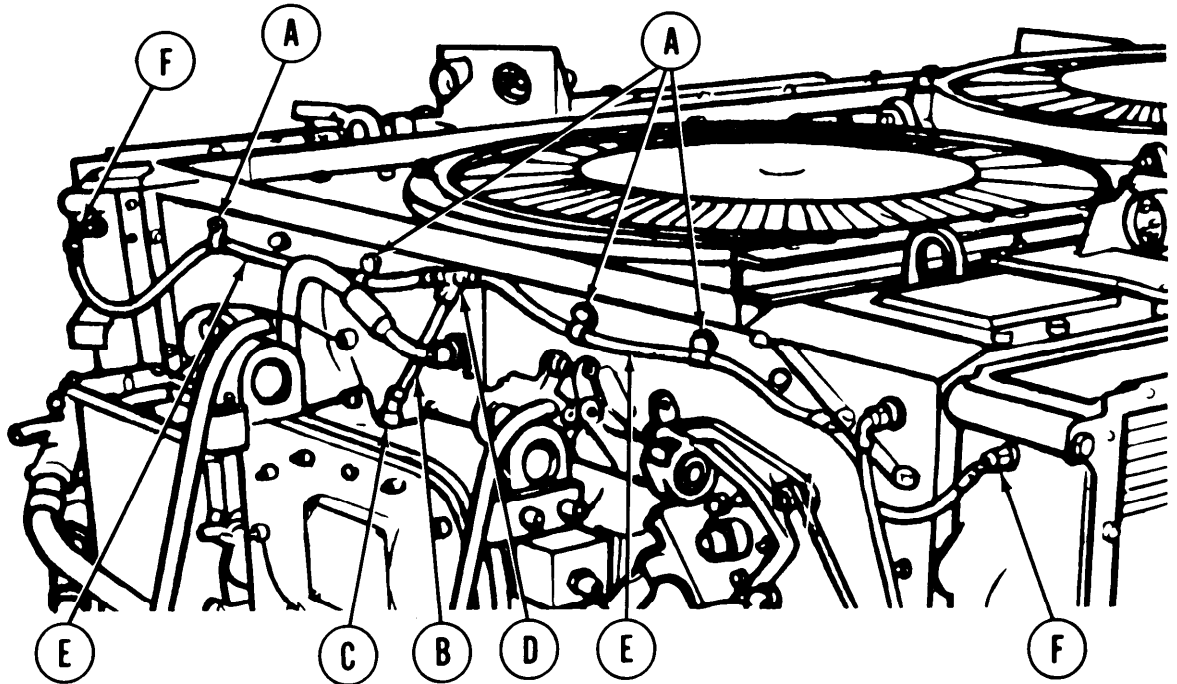


Go on to Sheet 2

TA139444

OIL COOLER VENT HOSES AND FITTINGS REPLACEMENT (2D ENGINE) (Sheet 2 of 3)**REMOVAL:**

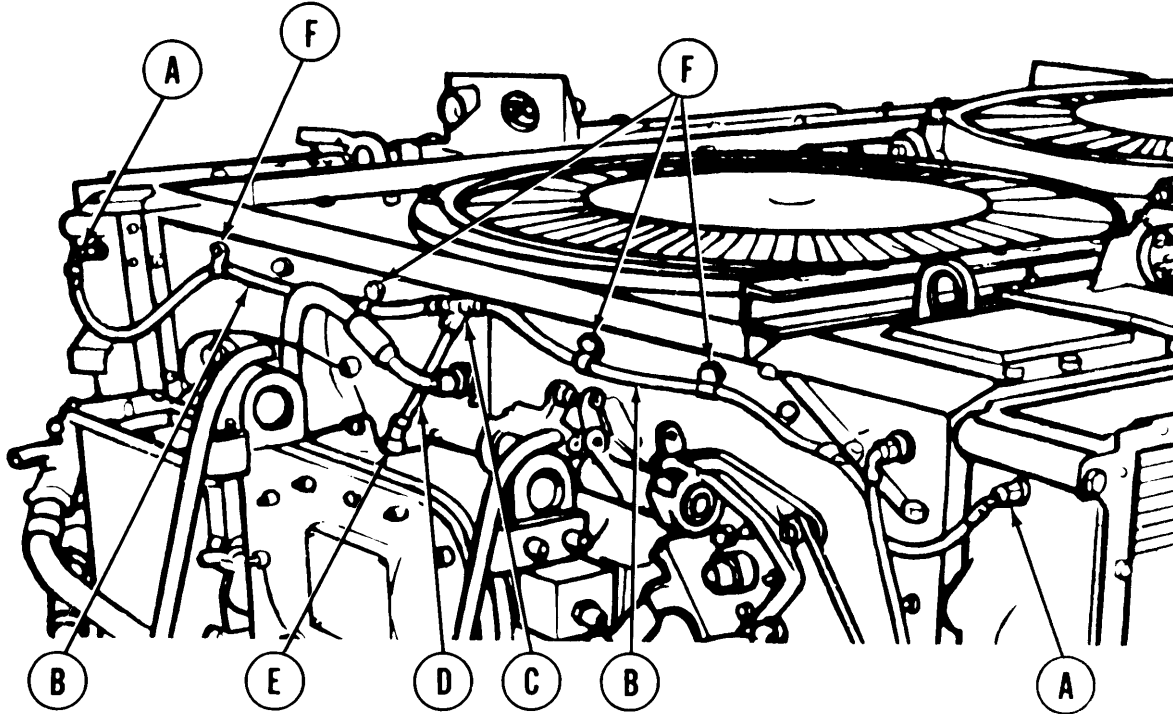
1. Using socket, remove four screws (A) holding loop clamps.
2. Using 9/16 inch wrench, remove hose assembly (B) from adapter (C).
3. Using 9/16 inch wrench, remove hose assembly (B) from tee tube (D).
4. Holding tee tube (D) with 7/16 inch wrench and using 9/16 inch wrench, remove two hose assemblies (E) from tee tube (D).
5. Using 9/16 inch wrench, remove two hose assemblies (E) from two adapters (F).
6. Using 11/16 inch wrench, remove two adapters (F) from oil coolers.
7. Using 9/16 inch wrench, remove adapter (C).
8. Remove packing from two adapters (F). Throw packing away.
9. Check two hoses (B) for frayed covering and damaged threads. Replace damaged hoses.
10. Check fittings for cracks and thread damage. Replace damaged fittings.



Go on to Sheet 3

TA139445

OIL COOLER VENT HOSES AND FITTINGS REPLACEMENT (2D ENGINE) (Sheet 3 of 3)



INSTALLATION:

1. Install new packing into two adapters(A).
2. Using 11/16 inch wrench, install two adapters(A) into oil coolers.
3. Using 9/16 inch wrench, install adapter (E).
4. Using 9/16 inch wrench, install two hose assemblies (B) to two adapters (A).
5. Holding tee tube (C) with 7/16 inch open end wrench and using 9/16 inch wrench, install two hose assemblies (B) to tee tube (C).
6. Using 9/16 inch wrench, install hose assembly (D) to tee tube (C).
7. Using 9/16 inch wrench, install hose assembly (D) to adapter (E).
8. Using socket, install four screws (F) holding loop clamps.
9. Install powerplant (page 5-37).

End of Task

• All data on pages 6-79 and 6-80 deleted.

ENGINE ACCESS COVERS (RIGHT BANK) REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-81
Installation	6-84

TOOLS: 1/2 in. socket with 1/2 in. drive
 4 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 9/16 in. combination box and open end wrench
 11/ 16 in. combination box and open end wrench
 Drain pan

SUPPLIES: Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
 Remove engine shroud (page 9-2)

REMOVAL:

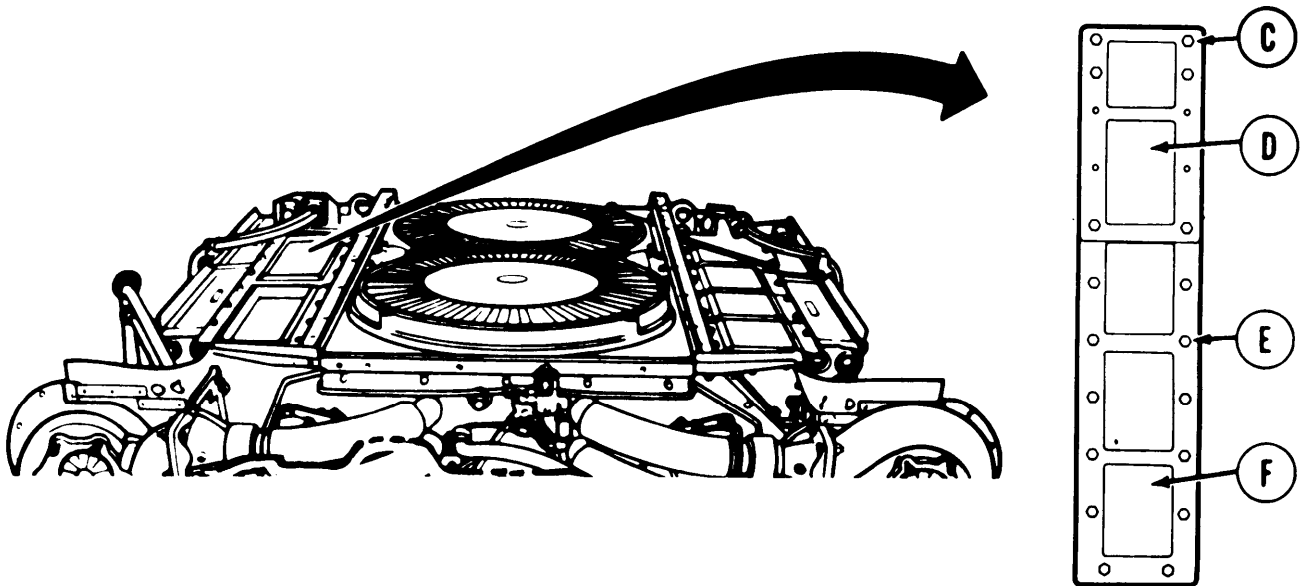
1. Using socket, remove four screws and washers (A) securing plate with electrical connectors (B) to front engine access cover.
2. Place plate with electrical connectors (B) aside.

Go on to Sheet 2

TA139449

ENGINE ACCESS COVERS (RIGHT BANK) REPLACEMENT (2D ENGINE) (Sheet 2 of 5)

3. Using socket, remove remaining six screws and washers (C) securing front engine access cover (D).
4. Remove front engine access cover (D).



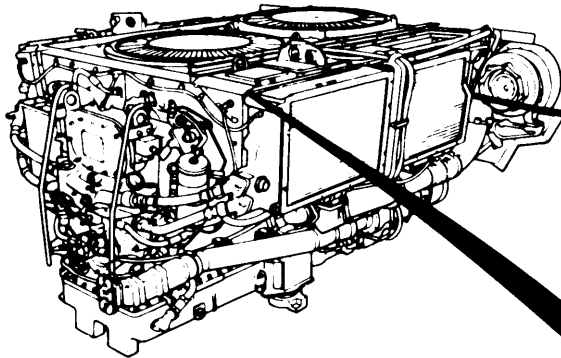
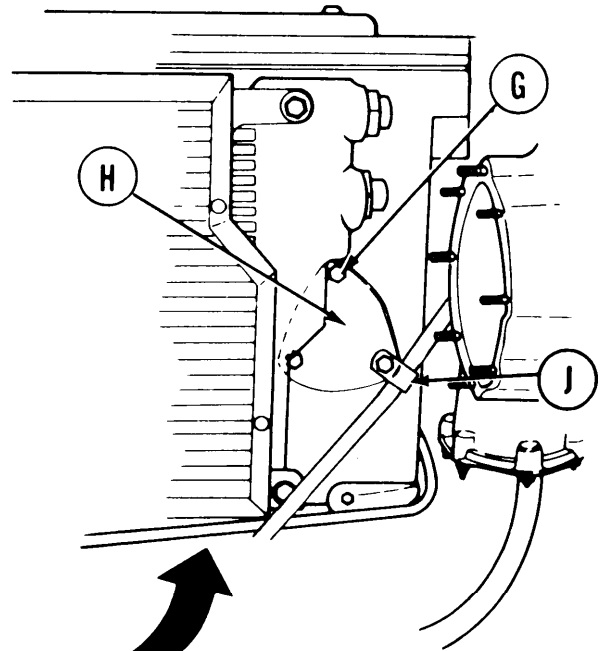
5. Using socket, remove remaining 12 screws and washers (E) securing rear engine access cover (F).
6. Remove rear engine access cover (F).

Go on to Sheet 3

TA139450

ENGINE ACCESS COVERS (RIGHT BANK) REPLACEMENT (2D ENGINE) (Sheet 3 of 5)

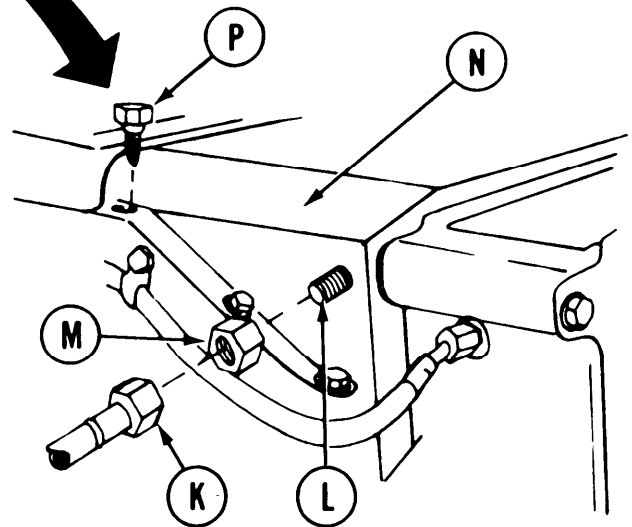
7. Using socket, remove three screws and washers (G) securing timing access cover (H) to engine.
8. Remove timing access cover (H) and fuel line hose and clamp (J) from cover (H).



NOTE

Use a suitable container or rags (Item 65, Appendix D) to catch fuel leakage when any fuel line or fitting is loosened or disconnected.

9. Using 9/16 inch wrench, disconnect fuel return hose fitting (K) from union (L).
10. Using 11/16 inch wrench, remove nut (M) securing union (L) to access cover (N).
11. Pull union (L) with hose attached out of access cover, (Pull union and hose toward rear of engine.)
12. Using socket and extension, remove three screws and washers (P).
13. Remove access cover (N).



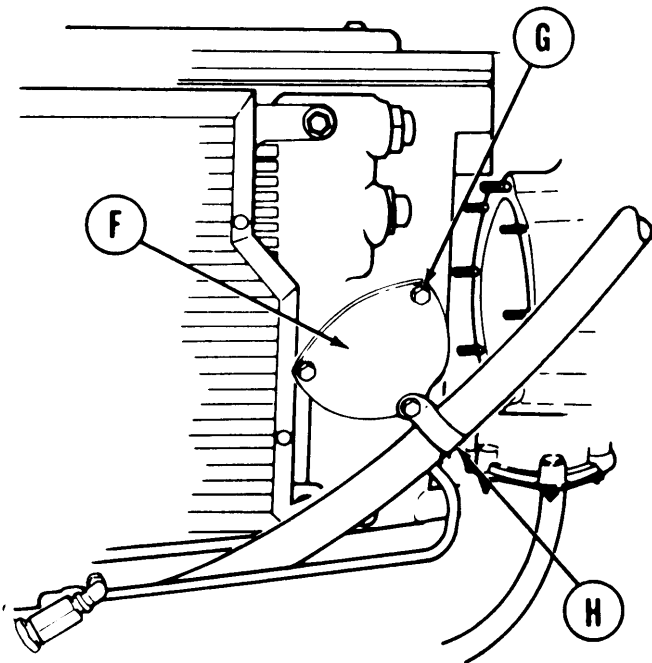
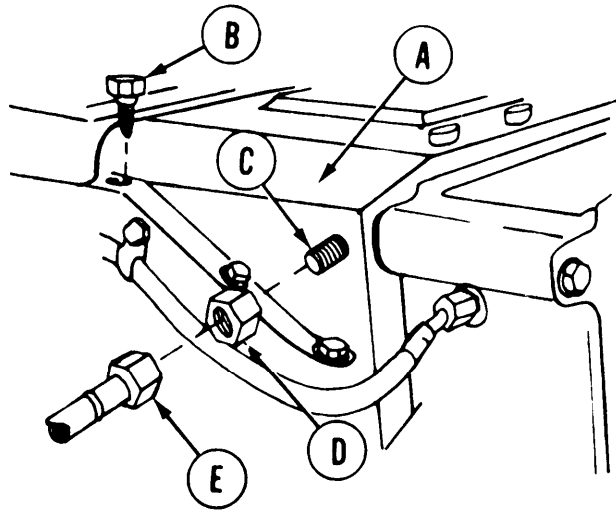
Go on to Sheet 4

TA139451

ENGINE ACCESS COVERS (RIGHT BANK) REPLACEMENT (2D ENGINE) (Sheet 4 of 5)

INSTALLATION:

1. Position access cover (A) in place on engine.
2. Install three screws and washers (B) to secure access cover.
3. Using socket and extension, tighten three screws (B).
4. Install union (C) with hose attached in access cover (A).
5. Install nut (D) onto union (C). Using 11/16 inch wrench, tighten nut (D).
6. Connect fuel return hose fitting (E) to union (C) Using 9/16 inch wrench, tighten hose fitting (E).



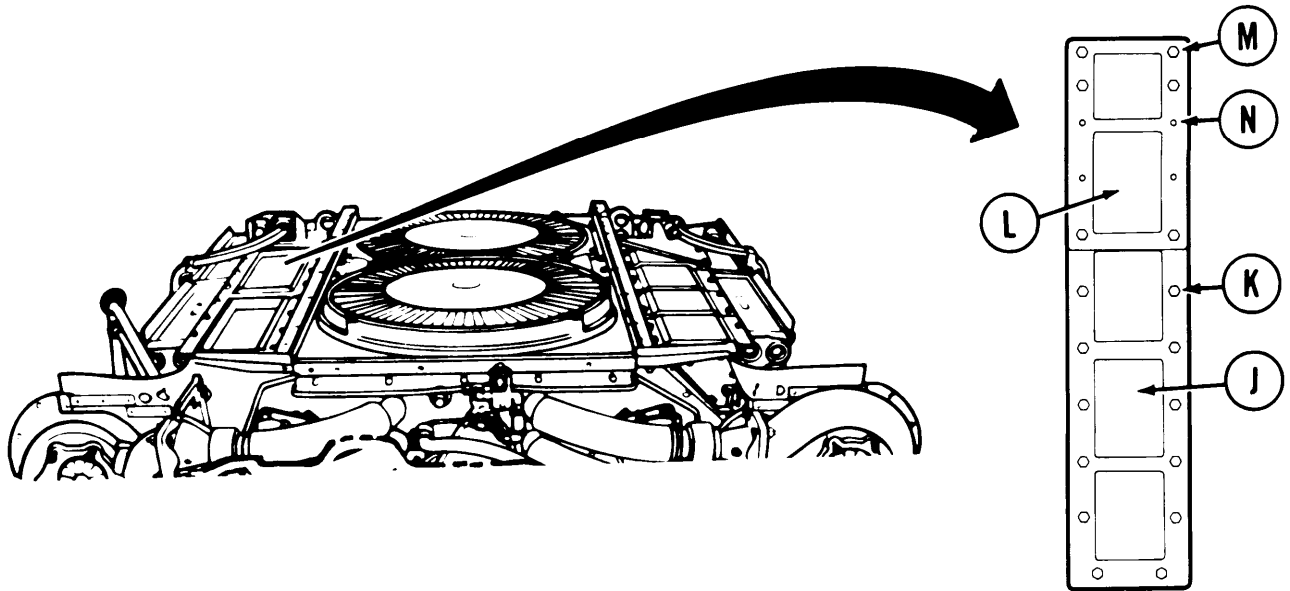
7. Position timing access cover (F) in place on engine.
8. Install three screws and washers (G) to secure timing access cover (F) and fuel line hose clamp (H) on engine. Using socket, tighten three screws (G).

Go on to Sheet 5

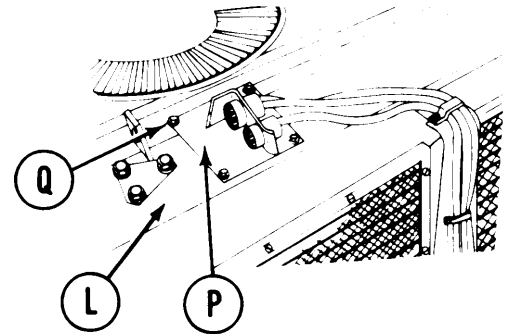
TA139452

ENGINE ACCESS COVERS (RIGHT BANK) REPLACEMENT (2D ENGINE) (Sheet 5 of 5)

9. Position rear engine access cover (J) in place on engine.
10. Install 12 screws and washers (K). Do not install screws in last holes toward front of engine. Using socket, tighten 12 screws (K).



11. Position front engine access cover (L) in place on engine.
12. Install six screws and washers (M). Do not install screw in four holes (N). Using socket, tighten six screws (M).
13. Position plate with electrical connector (P) on front engine access cover (L). Align screw holes in plate (P) with those in front engine access cover (L).
14. Install four screws and washers (Q) to secure plate to shroud. Using socket, tighten four screws (Q).
15. Install engine shroud (page 9-3).
16. Install powerplant (page 5-37).



End of Task

All data on pages 6-86 thru 6-89 deleted.

ENGINE ACCESS COVERS (LEFT BANK) REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

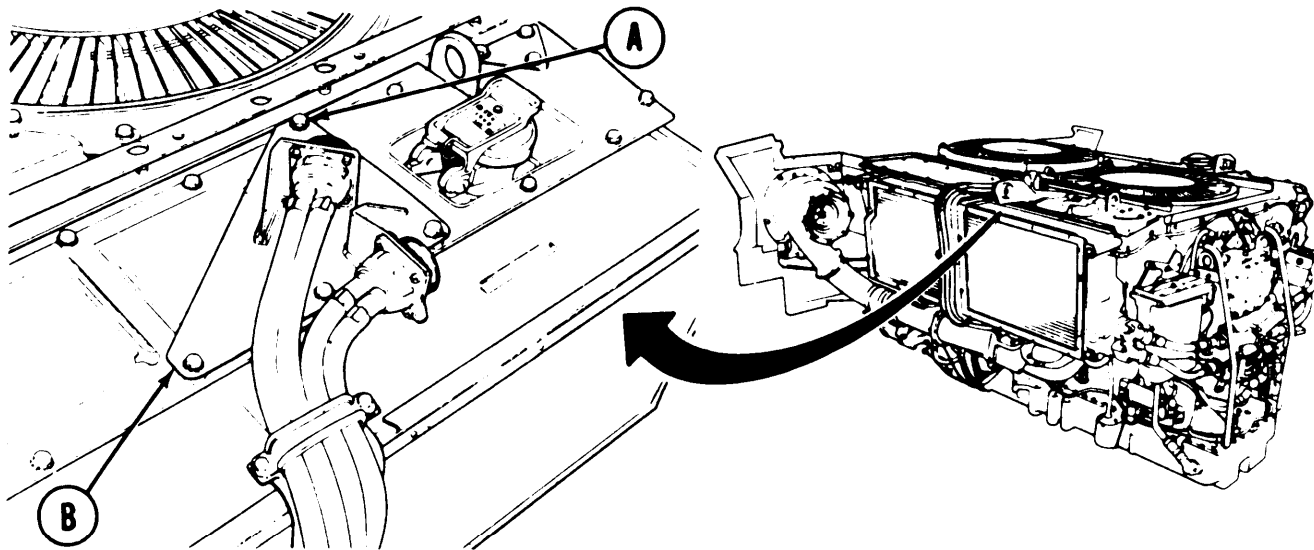
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-90
Installation	6-93

TOOLS: 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 3 in. extension with 1/2 in. drive
 1/2 in. combination box and open end wrench

SUPPLIES: Gasket (10935621)
 Lockwasher (7410218) (2 required)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
 Remove engine shroud (page 9-2)



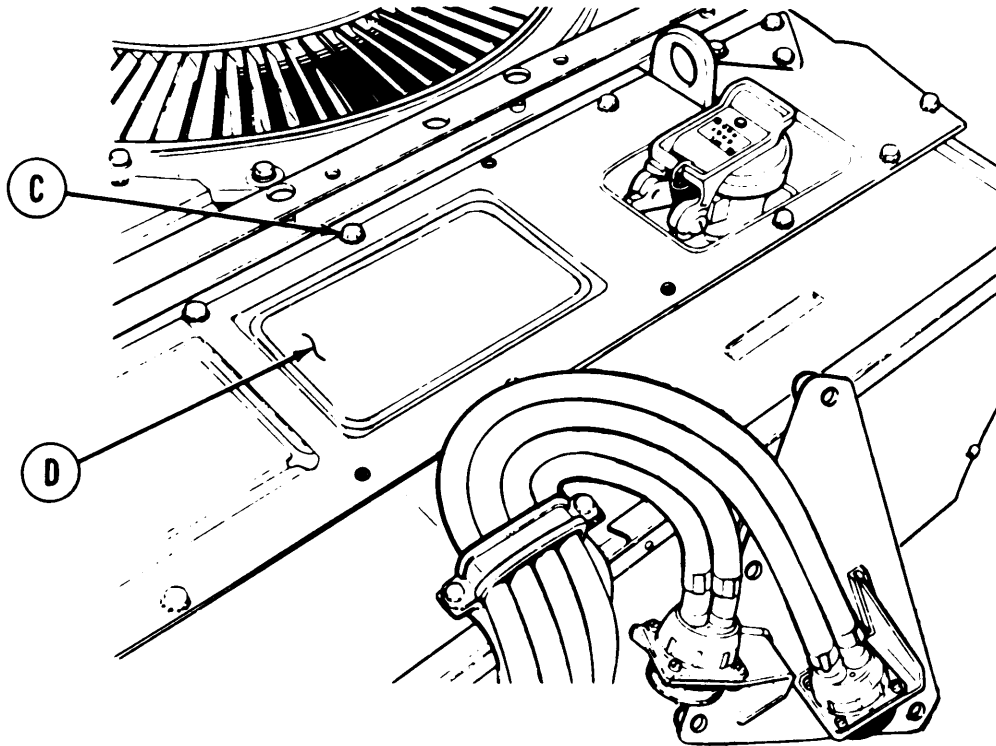
REMOVAL:

1. Using socket, remove four screws and washers (A) securing plate with electrical connectors (B).
2. Position plate with electrical connectors (B) aside.

Go on to Sheet 2

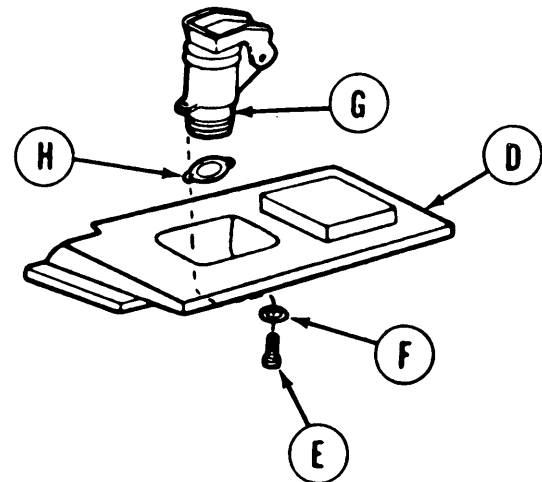
TA139458

ENGINE ACCESS COVERS (LEFT BANK) REPLACEMENT (2D ENGINE) (Sheet 2 of 5)



Using socket, remove eight screws and washers (c).

4. Remove front engine access plate (D) with cap assembly (G).
5. Using socket, remove two screws (E) and lockwasher (F).
6. Remove cap assembly (G) and gasket (H) from access plate (D). Throw gasket (H) away.

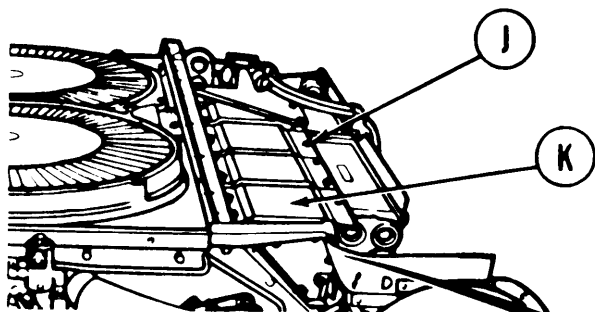


Go on to Sheet 3

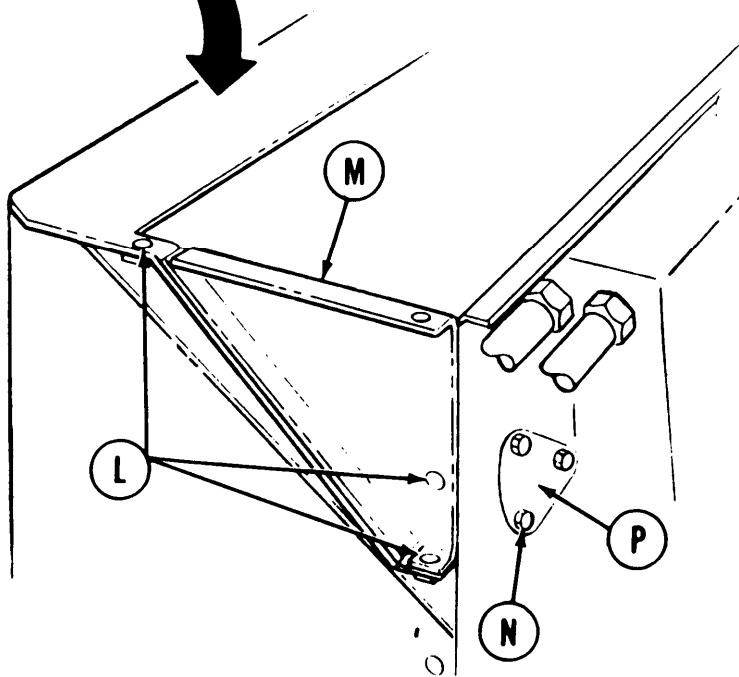
TA139459

ENGINE ACCESS COVERS (LEFT BANK) REPLACEMENT (2D ENGINE) (Sheet 3 of 5)

7. Using socket, remove ten screws and washers (J).
8. Remove rear engine access cover (K).



9. Using wrench or socket, remove six screws and washers (L).
10. Remove access cover (M).
11. Using wrench, remove three screws and washers (N).
12. Remove timing access cover (P).



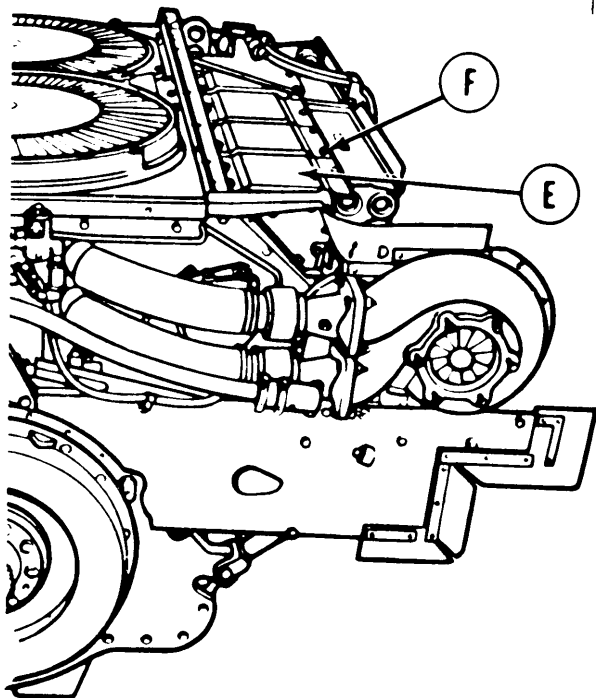
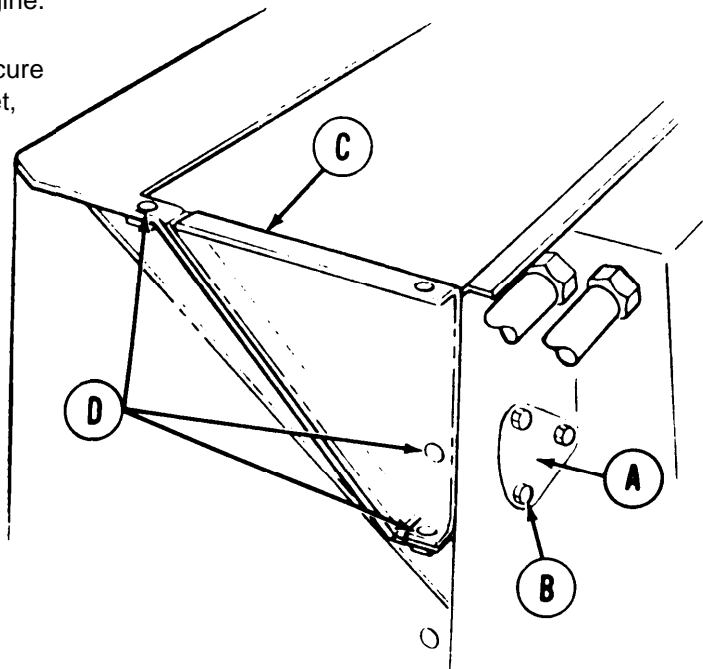
Go on to Sheet 4

TA139460

ENGINE ACCESS COVERS (LEFT BANK) REPLACEMENT (2D ENGINE) (Sheet 4 of 5)

INSTALLATION:

1. Position timing access cover (A) to engine.
2. Install three screws and washers (B) to secure timing cover (A) to engine. Using wrench, tighten screws.
3. Position access cover (C) in place on engine.
4. Install six screws and washers (D) to secure access cover (C). Using wrench or socket, tighten screws.



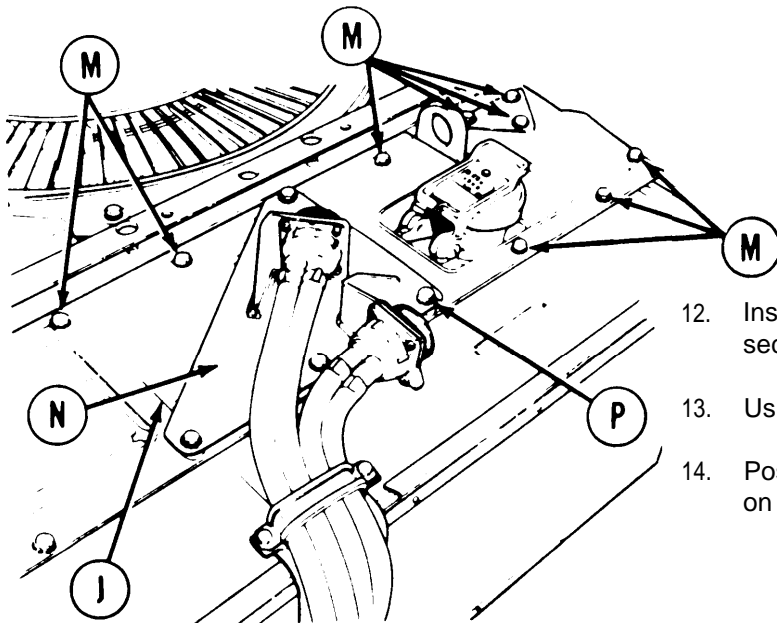
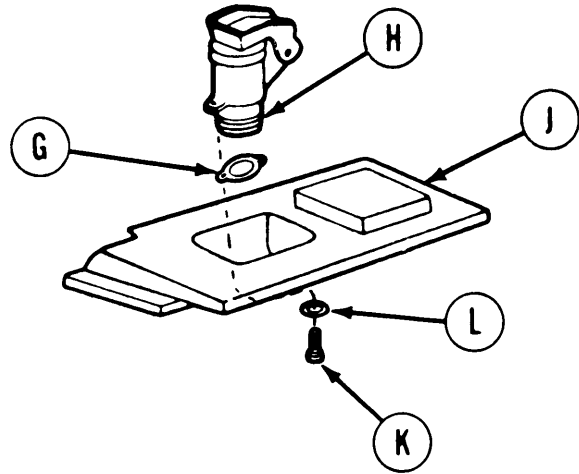
5. Position rear engine access cover (E) to engine.
6. Install 10 screws and washers (F) to secure rear engine access cover (E). Do not install screws in last two holes toward front of engine.
7. Using socket, tighten screws (F),

Go on to Sheet 5

TA139461

ENGINE ACCESS COVERS (LEFT BANK) REPLACEMENT (2D ENGINE) (Sheet 5 of 5)

8. Position new gasket (G) and cap assembly (H) to front engine access cover (J).
9. Install two screws (K) and new lockwashers (L) to secure cap assembly (H) to front engine access cover (J).
10. Using socket, tighten screws (K).
11. Position front engine access cover (J) and cap assembly (H) in place on engine.



12. Install eight screws and washers (M) to secure front engine access cover.
13. Using socket, tighten screws (M).
14. Position plate with electrical connectors (N) on engine.

15. Install four screws and washers (P) to secure plate with electrical connectors (N).
16. Using socket, tighten screws (P).
17. Install engine shroud (page 9-3).
18. Install powerplant (page 5-37).

End of Task

TA139462

**POWERPLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 1 of 9)**

PROCEDURE INDEX

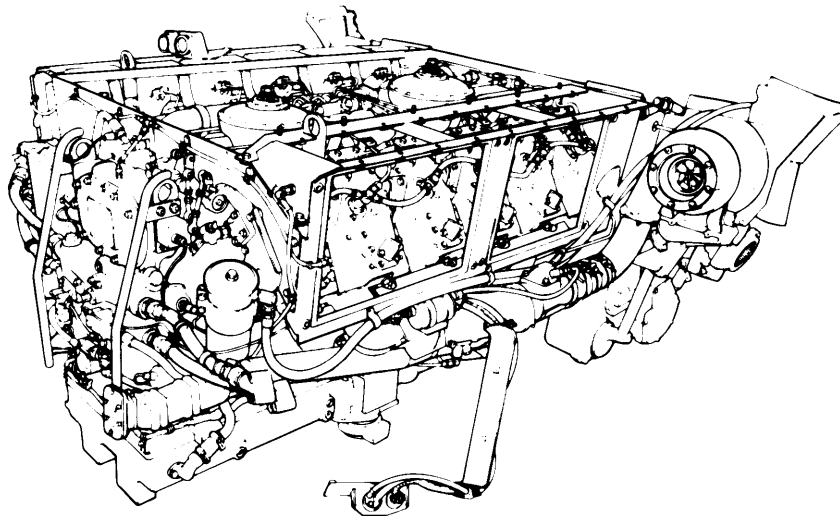
PROCEDURE	PAGE
Removal	6-101
Installation	6-104

TOOLS: Ratchet with 1/2 in. drive
 Hinged handle with 1/2 in. drive
 6 in. extension with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 Alining punch
 3/4 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 7/16 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 11/16 in. socket with 1/2 in. drive

SUPPLIES: Self-locking nut (8 required)
 Self-locking nut (6 required)

PERSONNEL: Two

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
 Remove engine shroud (page 9-2)
 Remove engine right oil cooler (page 6-130)
 Remove transmission right oil cooler (page 6-146)
 Remove engine cooling fan shroud (page 9-52)
 Remove engine cooling fans (page 9-48)
 Remove centrifugal fan housings (page 9-59)
 Remove engine access covers (right bank) (page 6-81)



Go on to Sheet 2

All data on pages 6-95 thru 6-99 deleted.

(6-99 blank)/6-100 Change 4

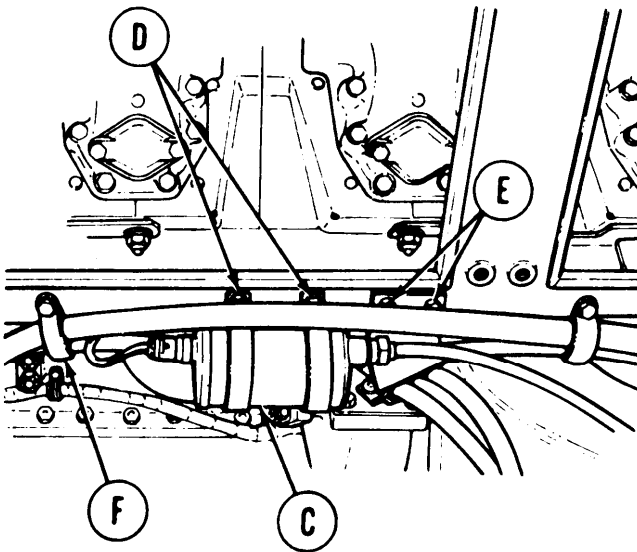
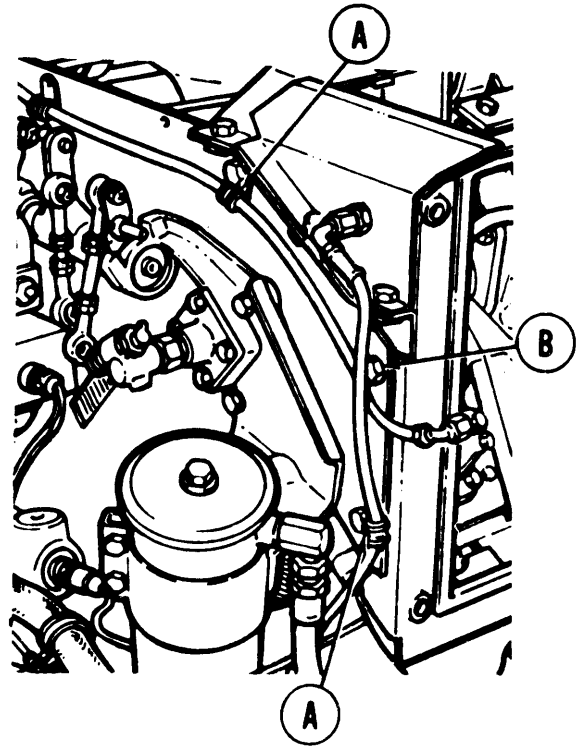
POWERPLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 2 of 9)

NOTE

Because of space limitations, it may be necessary to interchange like-size sockets with wrenches to get at a particular screw.

REMOVAL:

1. Using 1/2 inch socket and extension, remove two assembled washer bolts and cushioned clamps (A).
2. Using 1/2 inch socket and extension, remove washer bolt (B).
3. While supporting ignition unit (C), and using 1/2 inch wrench, remove two capscrews (D).
4. Remove ignition unit (C) with clamps and leads from frame.

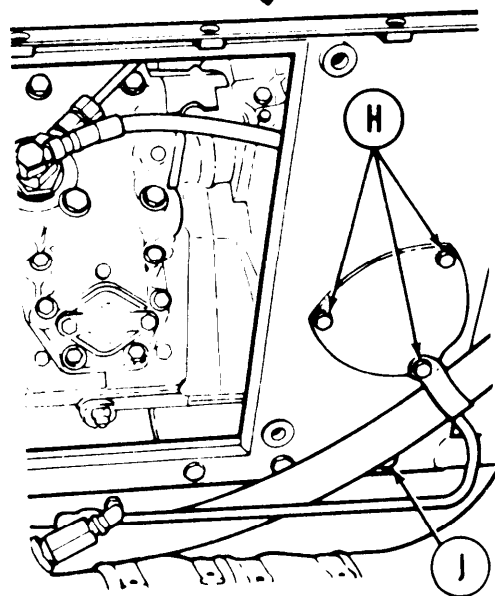
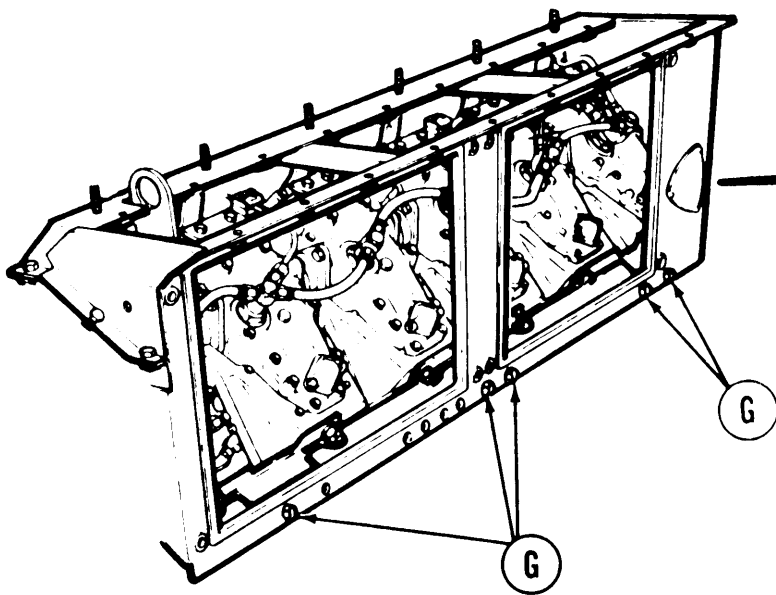


5. Using 1/2 inch socket, remove two capscrews (E) and self-locking nuts from bracket. Use 1/2 inch wrench to keep nuts from turning. Throw self-locking nuts away.
6. Using 9/16 inch socket, remove screw with cushioned clamp (F) holding cable assembly. Use 9/16 inch wrench to keep nut from turning.

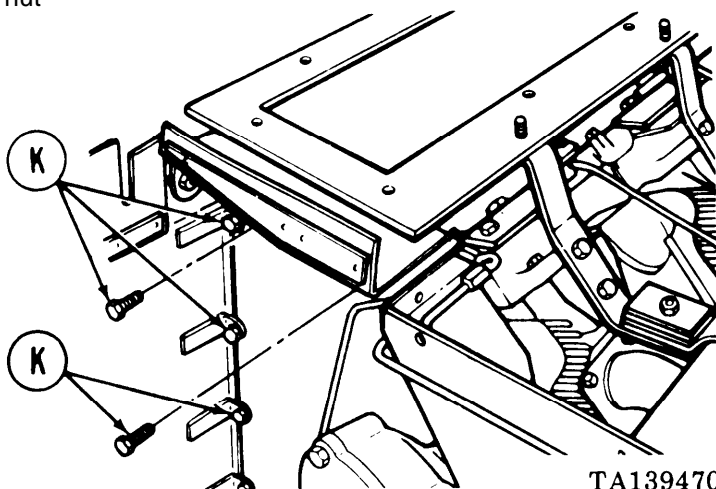
Go on to Sheet 3

TA139469

**POWER PLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 3 of 9)**



7. Using 9/16 inch socket, remove five capscrews (G) and self-locking nuts. Use 9/16 inch wrench to keep nuts from turning, Throw self-locking nuts away.
8. Using 1/2 inch socket, remove three screws (H) and cushioned clamp holding timing access cover to support frame.
9. Using 9/16 inch socket, remove capscrew (J) and self-locking nut. Use 9/16 inch wrench to keep nut from turning, Throw self-locking nut away.
10. Using 1/2 inch socket with extension, or 1/2 inch wrench, remove five screws (K).



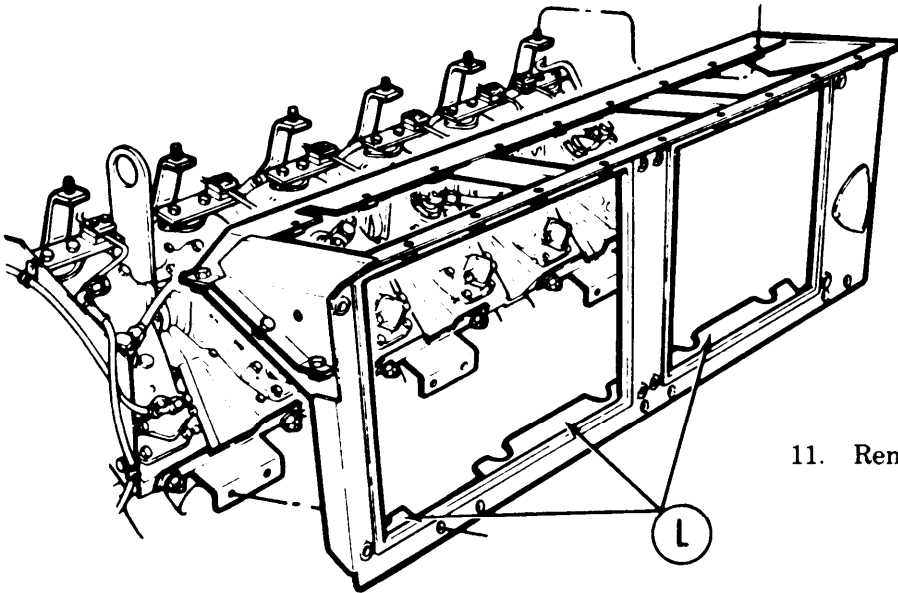
Go on to Sheet 4

TA139470

**POWERPLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 4 of 9)**

NOTE

It may be necessary to depress three flanges (L) on frame bottom during removal to clear protruding obstacles on the engine.

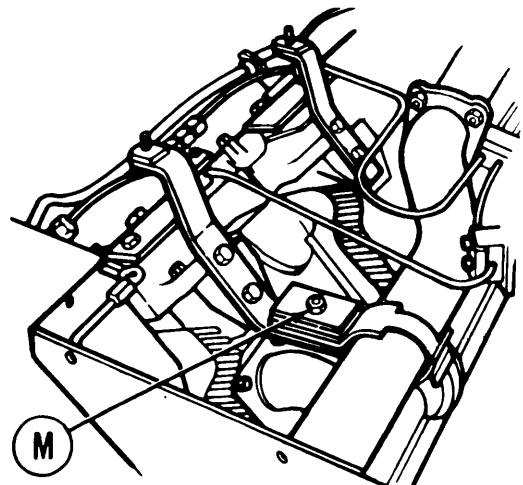


11. Remove oil cooler support frame.

NOTE

Five of the six cooler frame upper brackets are identical and are mounted the same way. The sixth bracket (M) is located closest to the engine flywheel end and requires three shims and an additional screw with self-locking nut for proper installation.

12. Using 9/16 inch socket with extension, remove nut securing shims (M). Hold screw head below shims with 9/16 inch wrench to keep screw from turning.

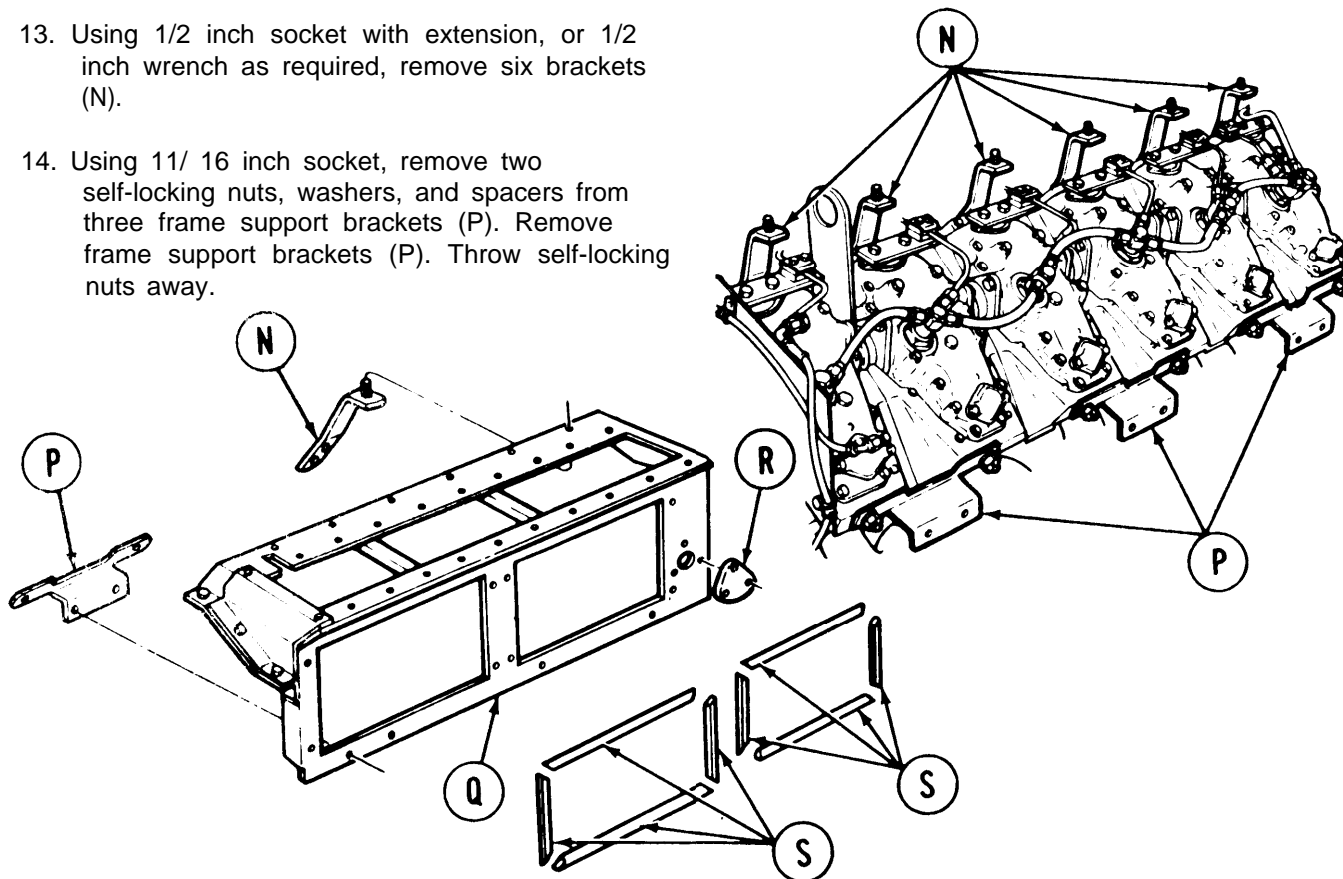


Go on to Sheet 5

TA139471

**POWERPLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (sheet 5 of 9)**

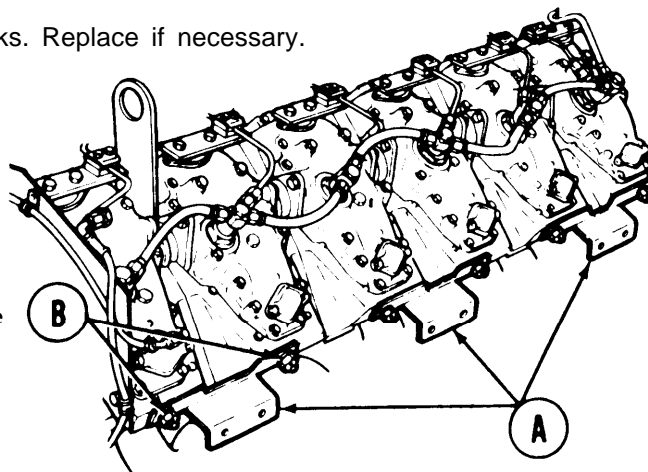
13. Using 1/2 inch socket with extension, or 1/2 inch wrench as required, remove six brackets (N).
14. Using 11/ 16 inch socket, remove two self-locking nuts, washers, and spacers from three frame support brackets (P). Remove frame support brackets (P). Throw self-locking nuts away.



15. Check oil cooler support frame (Q) for dents and breaks. Repair if possible, or replace if necessary.
16. Check timing access cover (R) for breaks. Replace if necessary.
17. Check rubber strips (S) for tears and breaks. Replace if necessary.
18. Check brackets (P) and (N) for cracks and breaks. Replace if necessary.

INSTALLATION:

1. Position each frame support bracket (A) for mounting.
2. Using 11/16 inch socket, install two washers, spacers, and new self-locking nuts (B) to secure each bracket.



Go on to Sheet 6

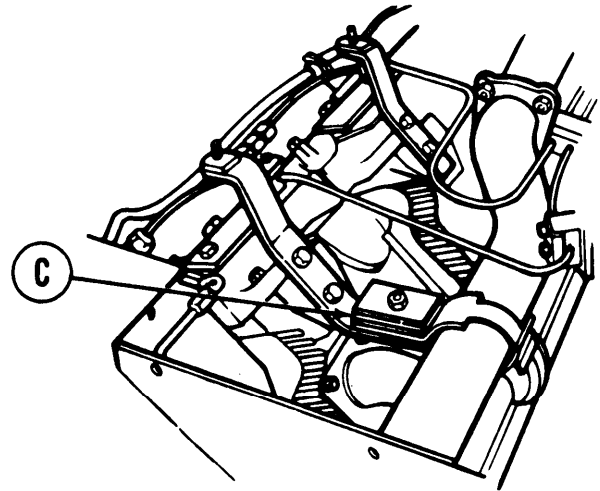
TA139472

**POWERPLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 6 of 9)**

NOTE

Five of the six cooler frame upper brackets are identical and are mounted the same way. The sixth bracket (C) is located closest to the engine flywheel end and requires shims and an additional screw and self-locking nut for proper installation.

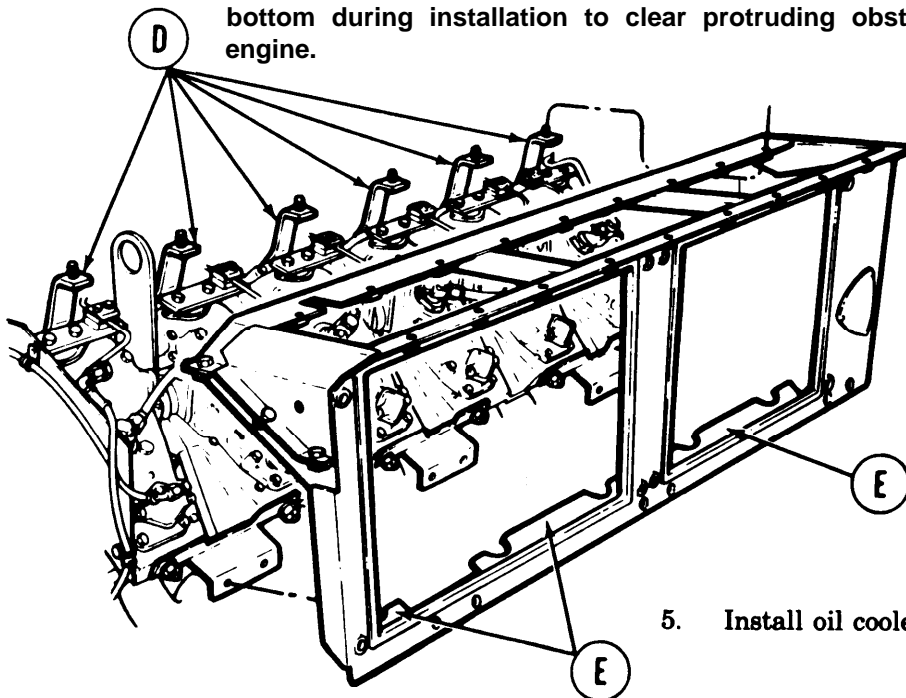
3. Using 9/16 inch socket with extension, install six shims (C). Hold screw head below shims with 9/16 inch wrench to keep screw from turning.



4. Using 1/2 inch socket with extension, install six brackets (D).

NOTE

It may be necessary to depress three flanges (E) on frame bottom during installation to clear protruding obstacles on the engine.



5. Install oil cooler support frame.

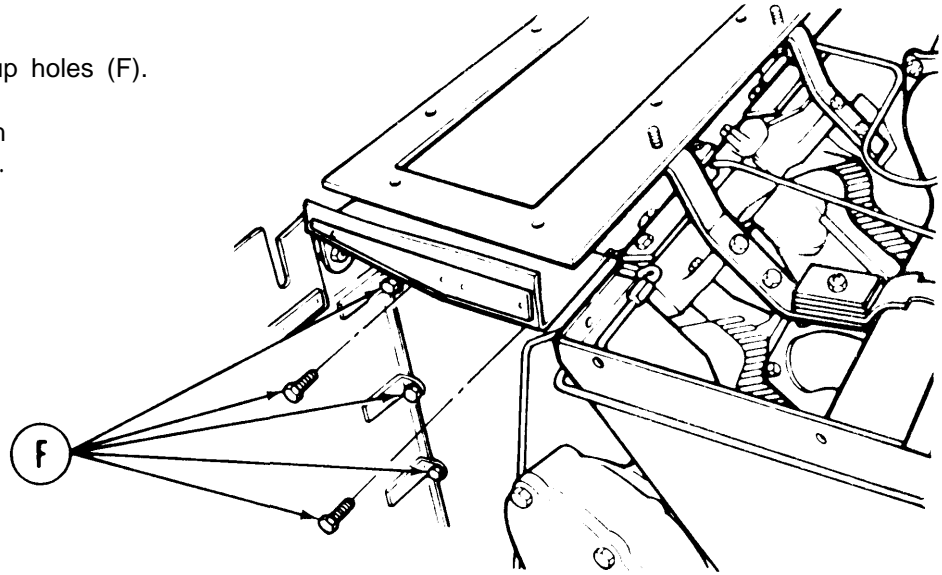
Go on to Sheet 7

TA139473

**POWER PLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 7 of 9)**

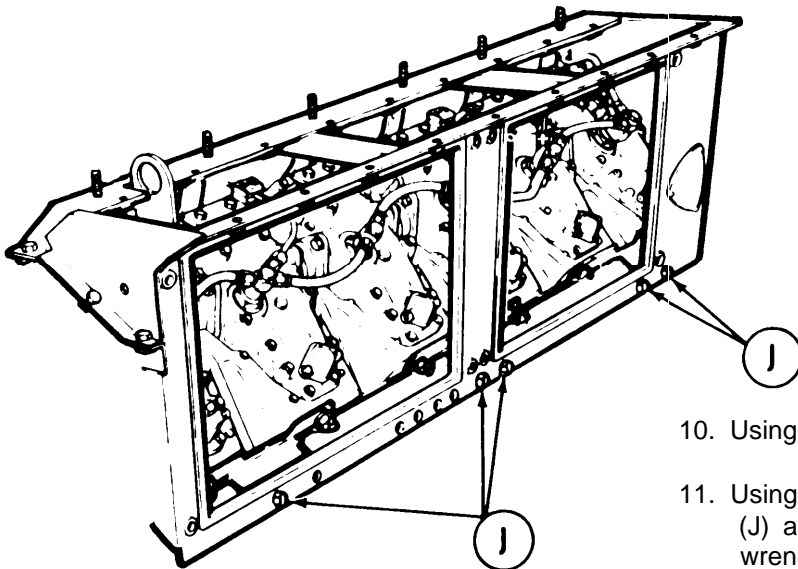
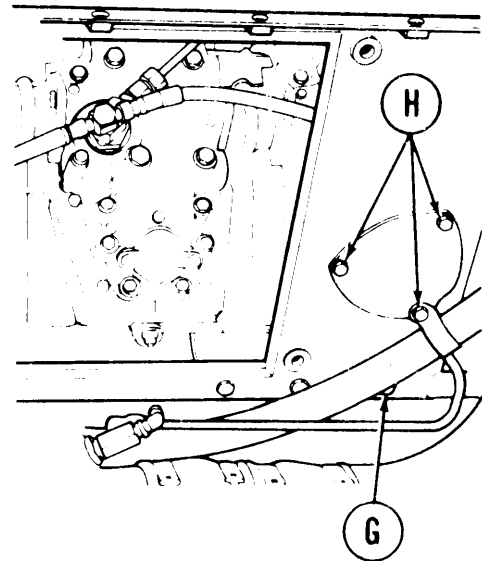
6. Using alining punch, line up holes (F).

7. Using 1/2 inch socket with inch wrench, install five screws (F).



8. Using 9/16 inch socket, install capscrew (G) and new self-locking nut. Use 9/16 inch wrench to keep nut from turning.

9. Using 1/2 inch socket, install three screws (H) and cushioned clamp holding timing access cover to frame.



10. Using alining punch, line up holes (J).

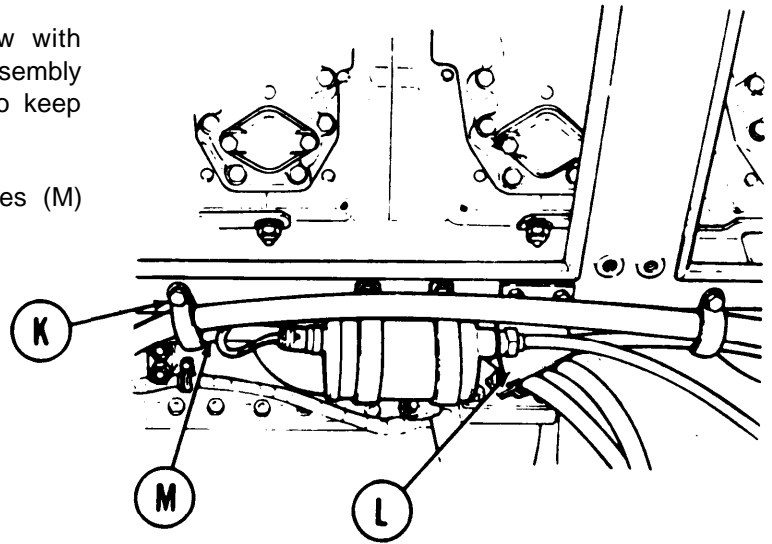
11. Using 9/16 inch socket, install five cap screws (J) and new self-locking nuts. Use 9/16 inch wrench to keep nuts from turning.

Go on to Sheet 8

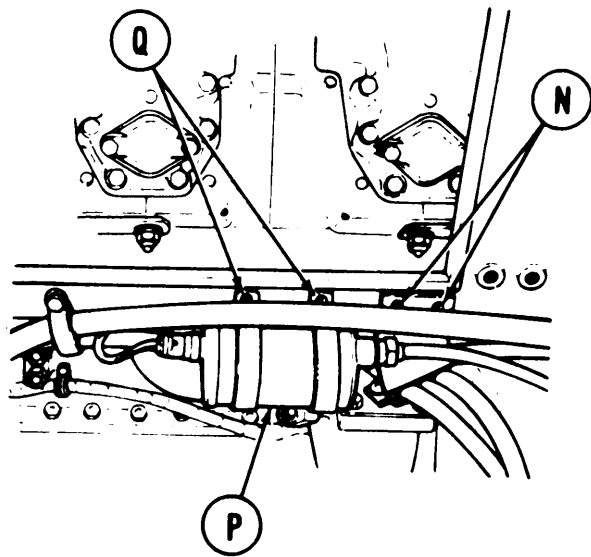
TA139474

**POWERPLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 8 of 9)**

12. Using 9/16 inch wrench, install screw with cushioned clamp (K) to hold cable assembly against frame. Use 9/16 inch wrench to keep nuts from turning.
13. Position bracket (L) to frame with hoses (M) behind bracket (L).



14. Using 1/2 inch socket, install two capscrews (N) and new self-locking nuts, Use 1/2 inch wrench to keep nuts from turning,

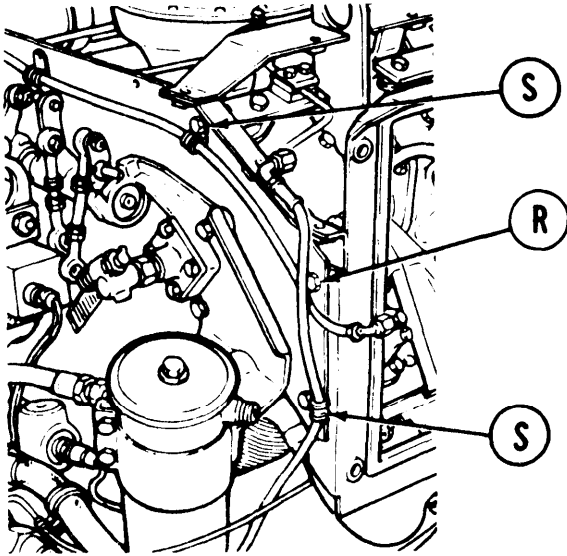


15. Position ignition unit (P) with clamps and leads to frame.
16. Using 1/2 inch wrench, install two capscrews (Q).

Go on to Sheet 9

TA139475

**POWER PLANT RIGHT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 9 of 9)**



17. Using alining punch, line up hole (R).

18. Using 1/2 inch socket and extension, install washer bolt (R).

19. Using 1/2 inch socket and extension, install two assembled washer bolt and cushioned clamps (s).

20. Install engine access covers (right bank) (page 6-84).
21. Install centrifugal fan housings (page 9-60).
22. Install engine cooling fans (page 9-49).
23. Install engine cooling fan shroud (page 9-55).
24. Install transmission right oil cooler (page 6-151).
25. Install engine right oil cooler (page 6-133).
26. Install engine shroud (page 9-3).
27. Install powerplant (page 5-37).

End of Task

TA139476

**POWERPLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 1 of 9)**

PROCEDURE	PROCEDURE INDEX	PAGE
Removal		6-110
Installation		6-114

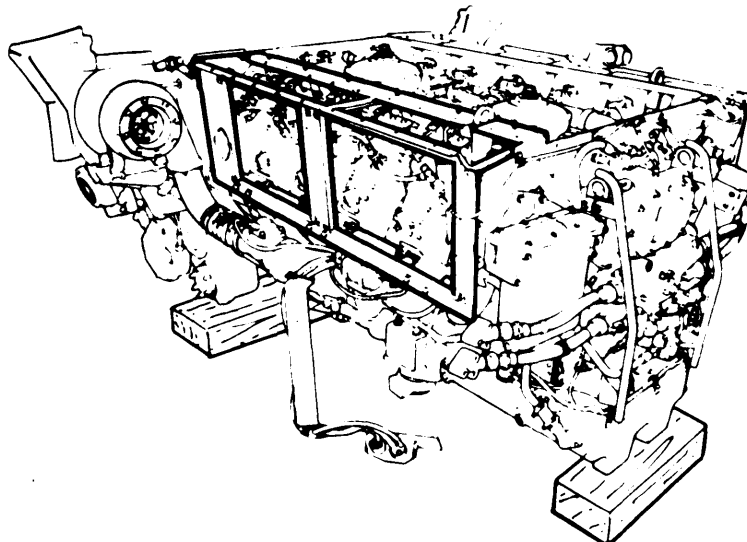
TOOLS: Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 5/8 in. socket with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 11/16 in. socket with 1/2 in. drive
 4 in. flat-tip screwdriver

Alining punch
 1/2 in. combination box and open end wrench
 3/8 in. combination box and open end wrench
 9/16 in. combination box and open end wrench

SUPPLIES: Lockwasher (7410218) (4 required)
 Self-locking nut (MS21045-4) (4 required)
 Self-locking nut (MS21045-6) (9 required)
 Self-locking nut (8764639)
 Self-locking nut (MS21044N5) (12 required)
 Self-locking nut (MS21045-5)
 Self-locking nut (MS21045-7) (6 required)

PERSONNEL: Two

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
 Remove engine shroud (page 9-2)
 Remove centrifugal fan housing (page 9-59)
 Remove engine cooling fans (page 9-48)
 Remove engine cooling fan shroud (page 9-52)
 Remove engine access covers (left bank) (page 6-90)
 Remove engine left oil cooler (page 6-130)
 Remove transmission left oil cooler (page 6-146)



Go on to Sheet 2

TA139477

**POWERPLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 2 of 9)**

NOTE

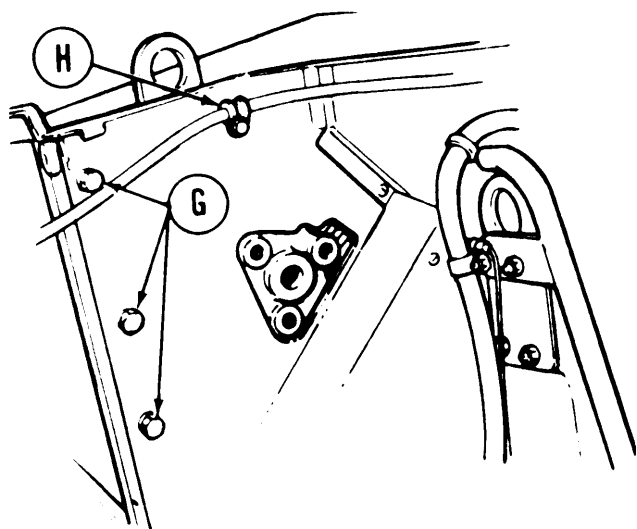
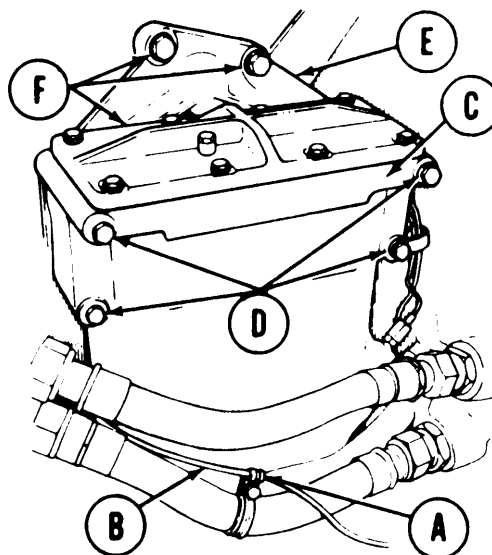
Because of space limitations, it may be necessary to interchange like-size sockets with wrenches to get at a particular screw.

REMOVAL:

NOTE

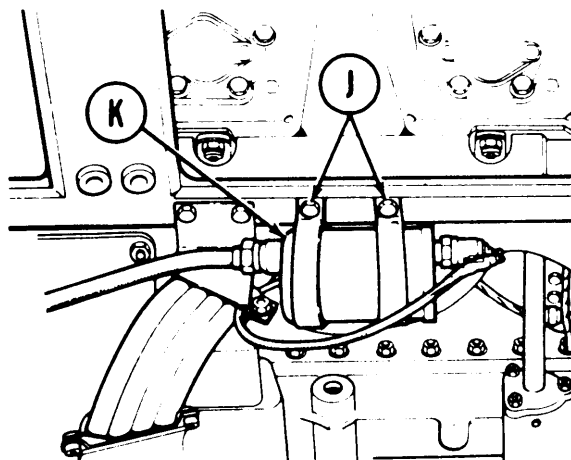
It may be necessary to use screwdriver and 3/8 inch wrench to remove clamp (A) and move tube (B) before fuel water separator filter (C) can be lowered.

- Using 1/2 inch socket, remove four capscrews, lockwashers, and flat washers (D). Throw lockwashers away.



- Lower fuel-water separator filter (C) away from mounting bracket (E).
- Using 5/8 inch socket, remove three screws (F) securing mounting bracket (E) to engine. Remove mounting bracket (E).
- Using 1/2 inch socket, remove three assembled washer bolts (G).

- Using 1/2 inch socket, remove screw and clamp (H),
- Using 1/2 inch socket with extension and 1/2 inch wrench, remove two screws and self-locking nuts (J). Throw nuts away.
- Remove ignition unit (K) with clamps and leads from frame.

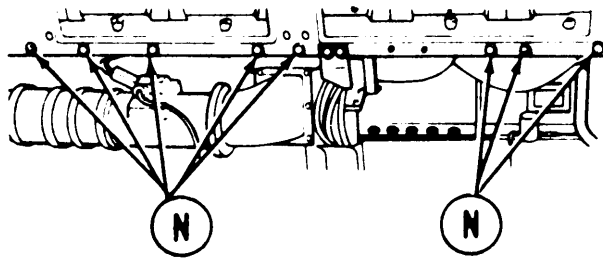
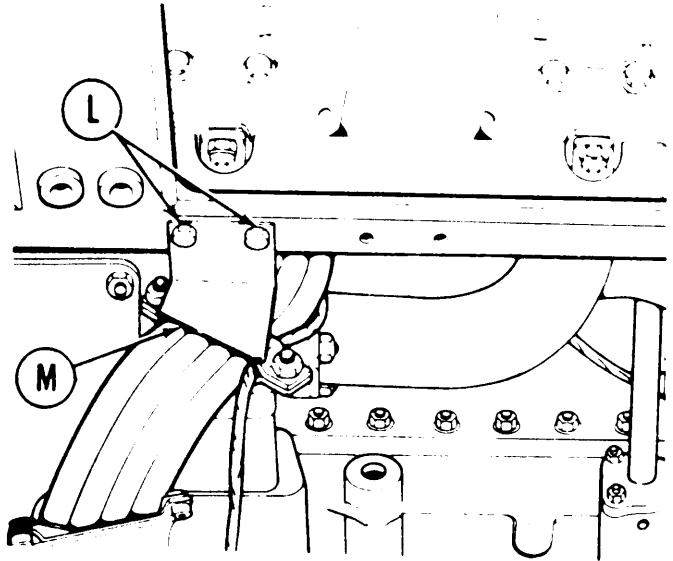


Go on to Sheet 3

TA139478

**POWER PLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 3 of 9)**

8. Using 1/2 inch socket and 1/2 inch wrench, remove two capscrews and self-locking nuts (L). Throw nuts away.
9. Remove bracket (M) with harness attached from frame.

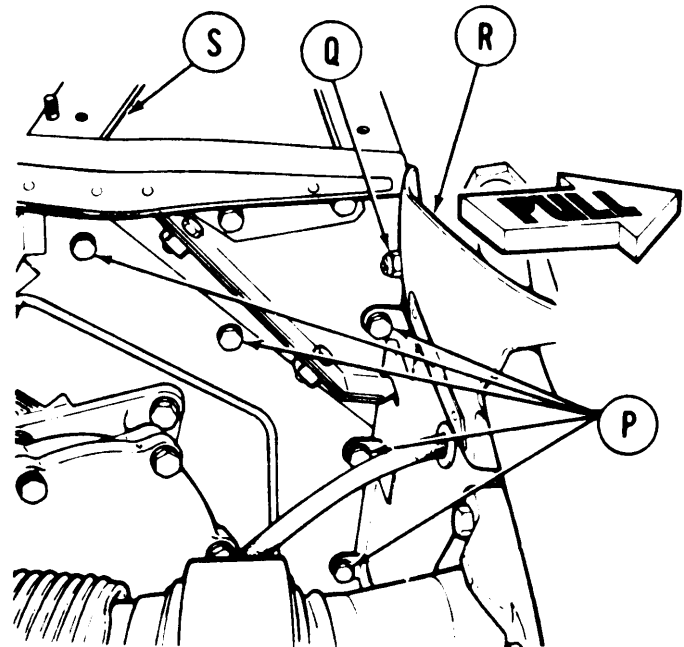


10. Using 9/16 inch socket and 9/16 inch wrench, remove eight capscrews and self-locking nuts (N). Use 9/16 inch wrench to keep nuts from turning. Throw nuts

11. Using 1/2 inch socket with extension, remove five screws (P).
12. Using 1/2 inch socket and 1/2 inch wrench, remove screw and self-locking nut (Q). Throw nut away.

NOTE

It may be necessary to pull frame (R) out before oil cooler support frame (S) can be removed.



Go on to Sheet 4

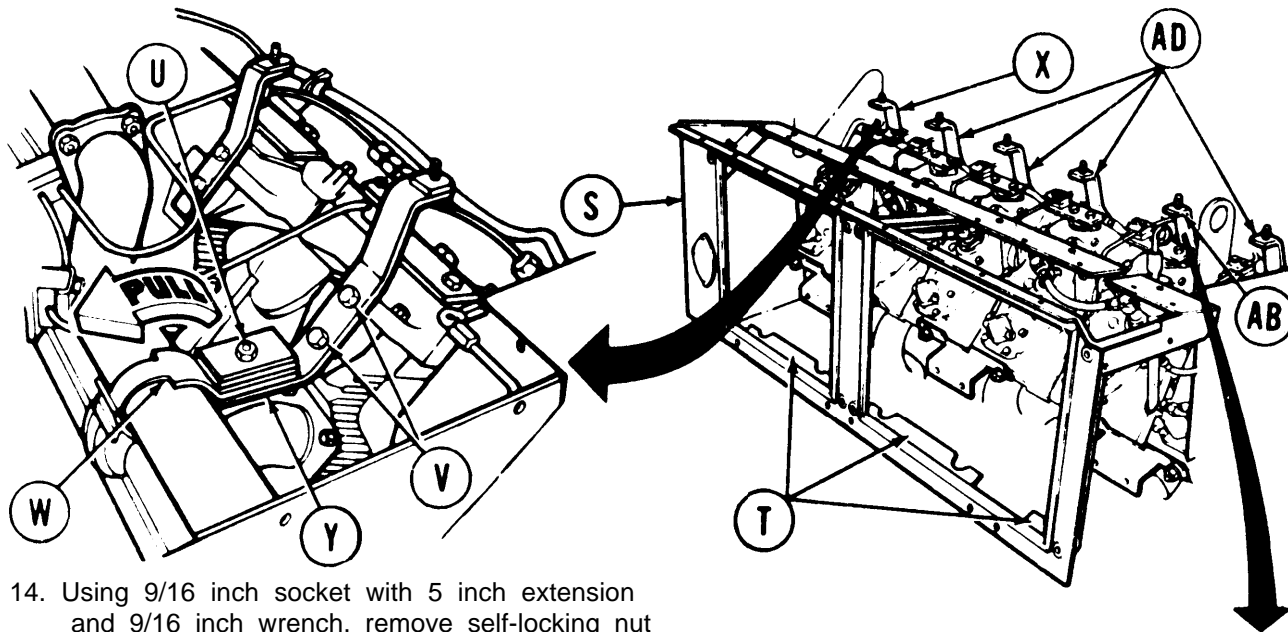
TA139479

**POWER PLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 4 of 9)**

NOTE

It may be necessary to depress three flanges (T) on frame bottom during removal to clear protruding obstacles on the engine.

13. Remove oil cooler support frame (S).



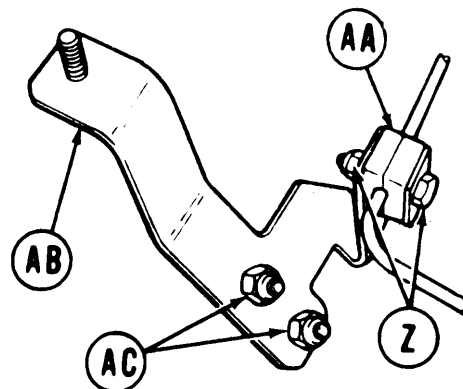
14. Using 9/16 inch socket with 5 inch extension and 9/16 inch wrench, remove self-locking nut (U), Throw nut away.

15. Using 1/2 inch socket with extension, remove self-locking nuts (V). Throw nuts away.

16. Move clamp (W) to up position and remove bracket (X) and screw (Y).

17. Remove screw (Y) from bracket (X).

18. Using 1/2 inch socket and 1/2 inch wrench, remove screw and self-locking nut (Z). Throw nut away.



19. Remove clamp (AA) from bracket (AB) and fuel line.

21. Remove bracket (AB).

20. Using 1/2 inch socket with extension, remove self-locking nuts (AC). Throw nuts away.

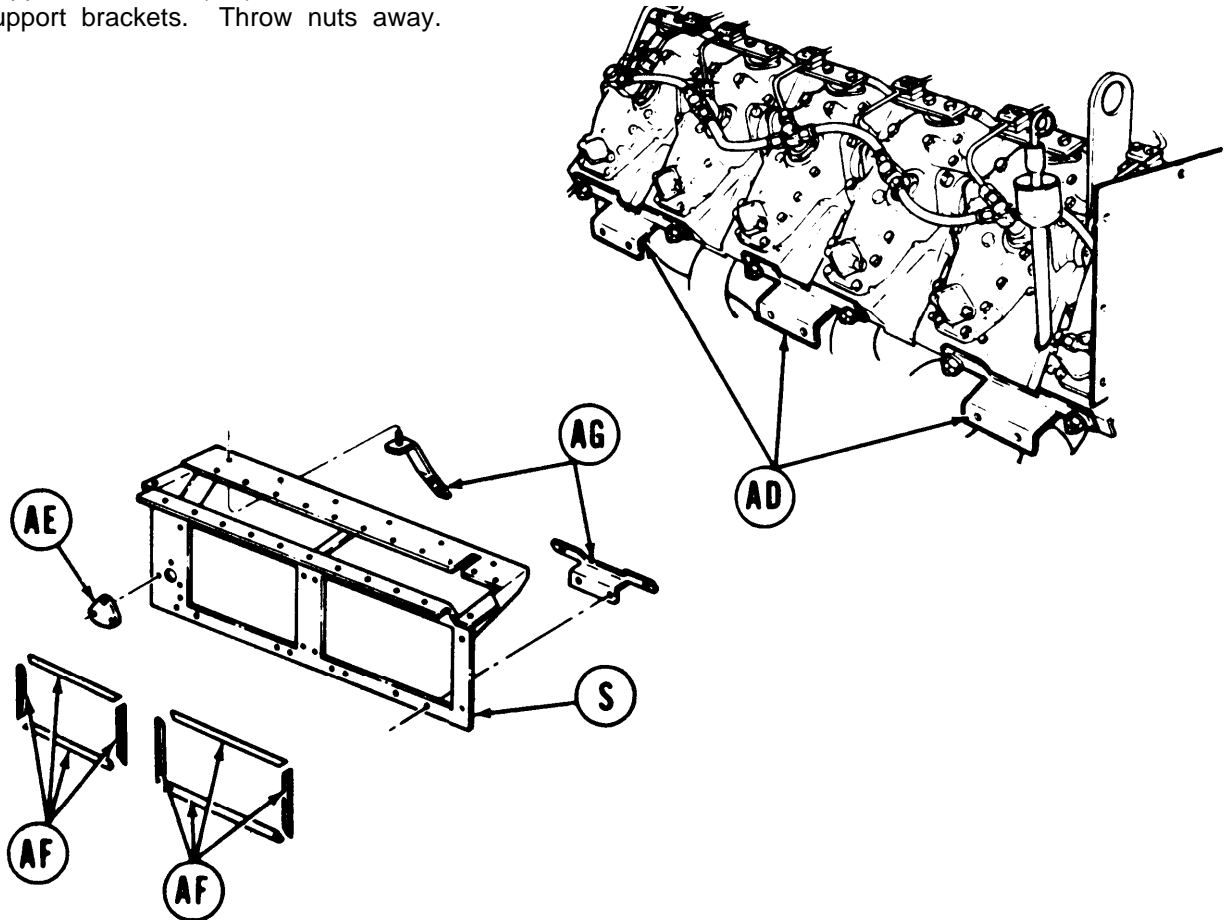
22. Using 1/2 inch socket with extension, remove four brackets (AD).

Go on to Sheet 5

TA139480

**POWERPLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 5 of 9)**

23. Using 11/16 inch socket, remove two self-locking nuts and spacers from three frame support brackets (AD). Remove three frame support brackets. Throw nuts away.



24. Check oil cooler support frame (S) for dents and breaks. Repair if possible, or replace if necessary.
25. Check timing access cover (AE) for breaks. Using 1/2 inch socket, replace if necessary.
26. Check rubber strips (AF) for breaks and tears. Replace if necessary.
27. Check brackets (AG) for cracks and breaks. Replace if necessary.

Go on to Sheet 6

TA139481

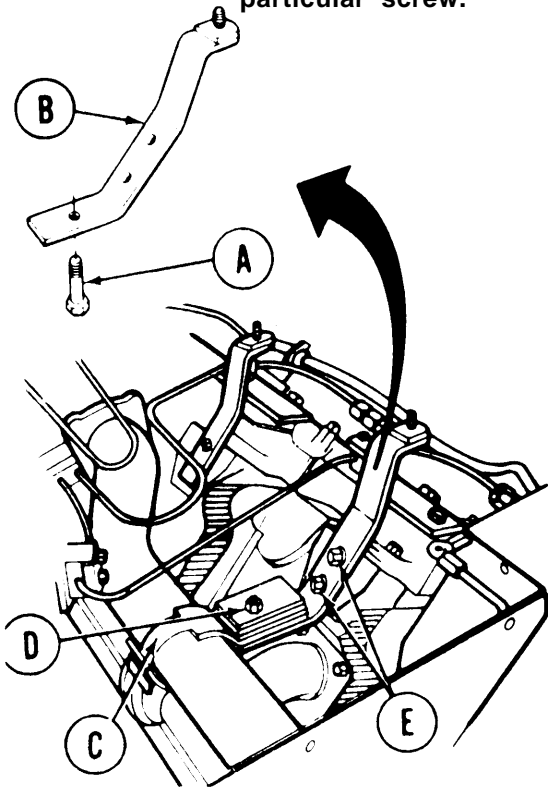
**POWER PLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 6 of 9)**

INSTALLATION:

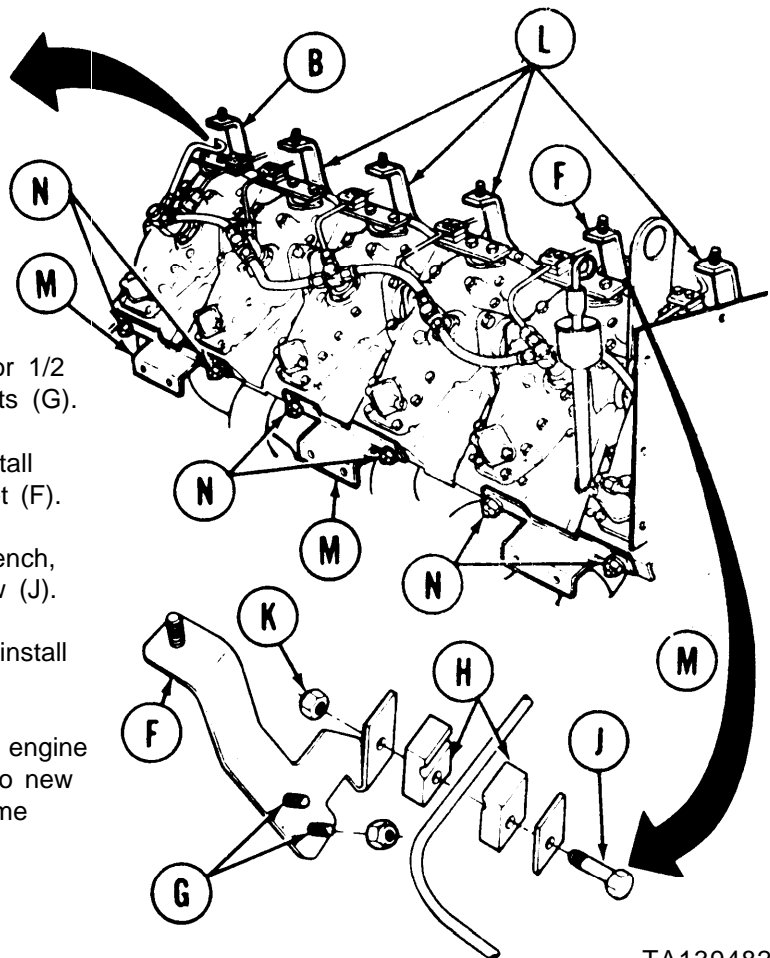
NOTE

Because of space limitations, it may be necessary to interchange like-size sockets with wrenches to get at a particular screw.

1. Install screw (A) through bracket (B).
2. Position bracket (B) and screw (A) on engine.
3. Install clamp (C) on screw (A).
4. Using 9/16 inch socket and 9/16 inch wrench, install new self-locking nut (D).
5. Using 1/2 inch socket with extension, install new self-locking nuts (E).
6. Position bracket (F) on engine.



7. Using 1/2 inch socket with extension, or 1/2 inch wrench, install new self-locking nuts (G).
8. Position clamp (H) on fuel line and install screw (J) through clamp (H) and bracket (F).
9. Using 1/2 inch socket and 1/2 inch wrench, install new self-locking nut (K) on screw (J).
10. Using 1/2 inch socket with extension. install four brackets (L).
11. Position frame support brackets (M) on engine and, using 11/ 16 inch socket, install two new self-locking nuts (N) to secure each frame support bracket (M).



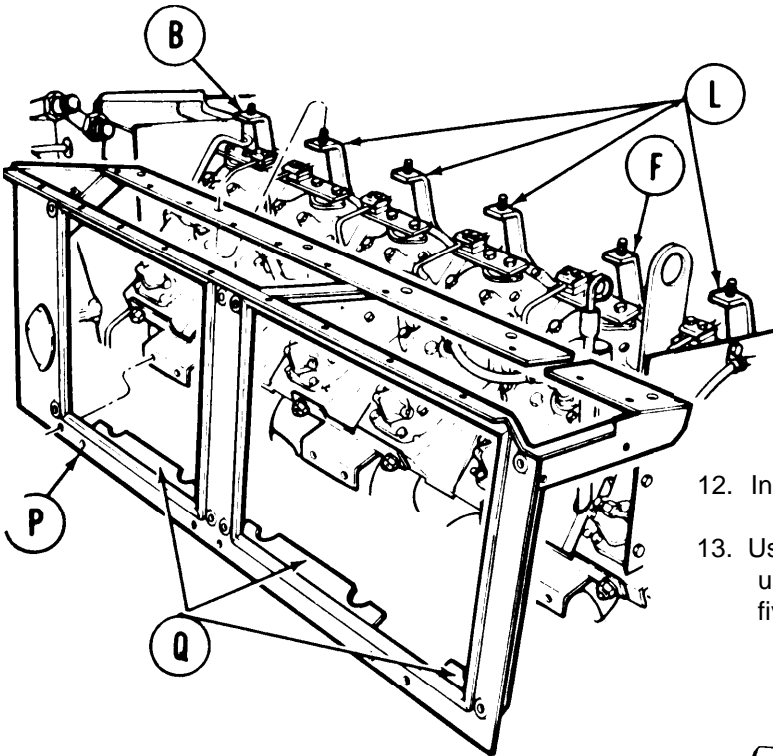
Go on to Sheet 7

TA139482

POWERPLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 7 of 9)

NOTE

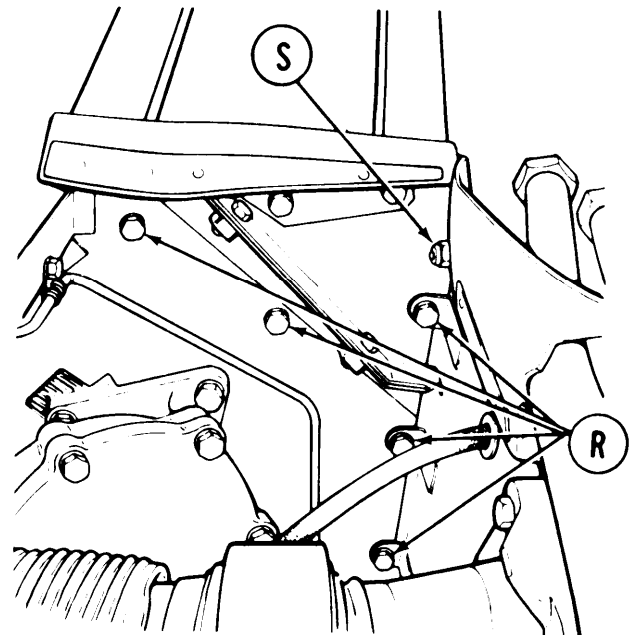
It may be necessary to pull frame (P) out and depress three flanges (Q) on frame bottom during installation to clear protruding obstacles on the engine. It may be necessary to loosen and move brackets (B), (F), and (L) slightly before oil cooler support frame can be installed.



14. Using 1/2 inch socket and 1/2 inch wrench, install screw and new self-locking nut (S),

12. Install oil cooler support frame.

13. Using alining punch, aline screw holes and, using 1/2 inch socket with extension, install five screws (R).

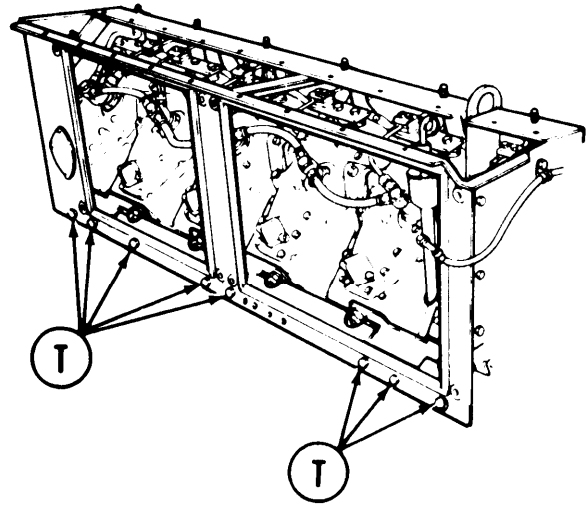
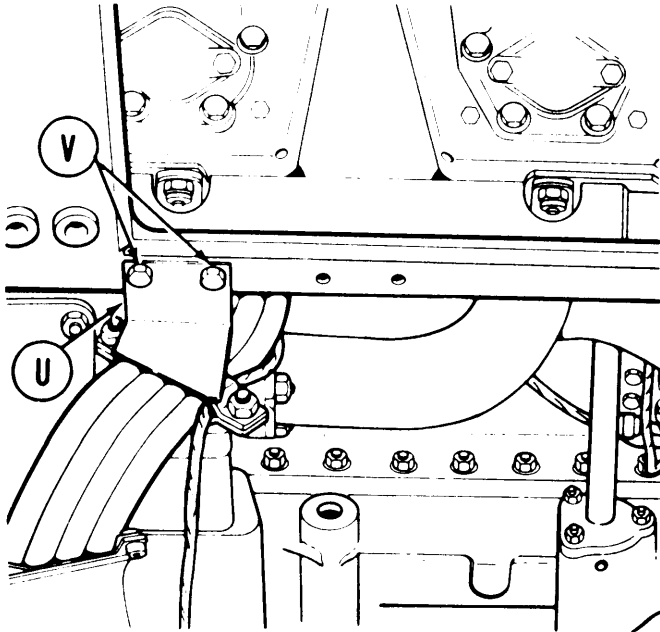


Go on to Sheet 8

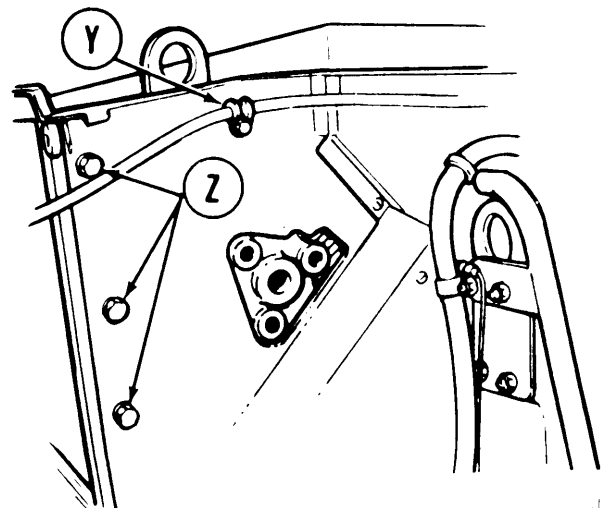
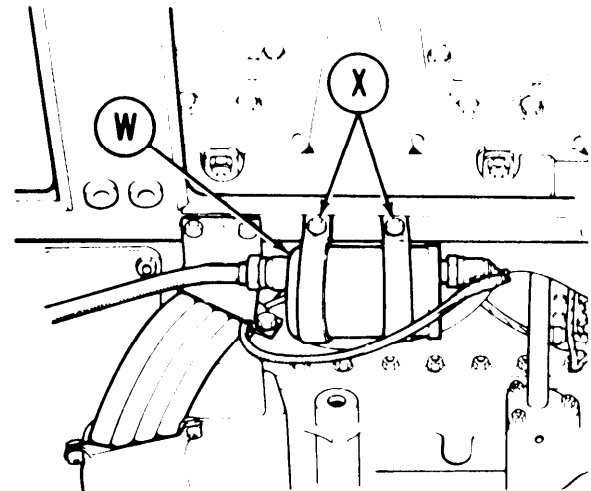
TA139483

**POWERPLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 8 of 9)**

15. Using alining punch, aline screw holes and, using 9/16 inch socket and 9/16 inch wrench, install eight capscrews and new self-locking nuts (T).



16. Position bracket (U) to frame.
17. Using 1/2 inch socket and 1/2 inch wrench, install two capscrews and new self-locking nuts (V) to hold bracket (U) to frame.
18. Position ignition unit (W) with clamps and leads to frame.
19. Using 1/2 inch socket and 1/2 inch wrench, install two capscrews and new self-locking nuts (x).
20. Using 1/2 inch socket, install screw and cushioned clamp (Y).
21. Using 1/2 inch socket, install three assembled washer bolts (Z).

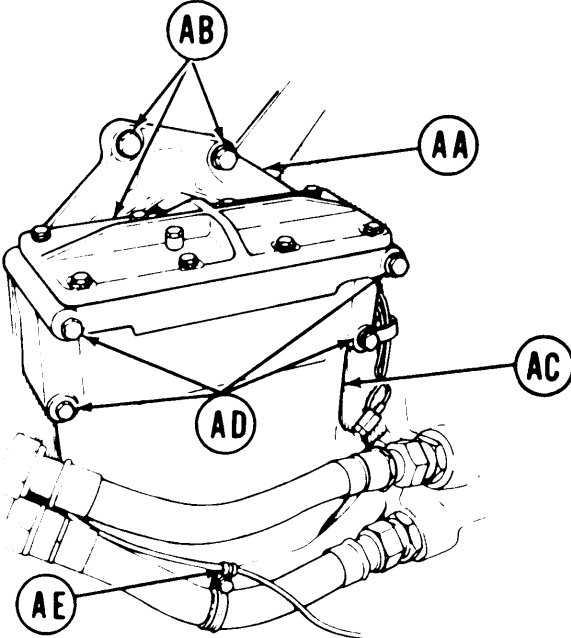


Go on to Sheet 9

TA139484

**POWERPLANT LEFT BANK OIL COOLER FRAME AND BRACKETS REPLACEMENT
(2D ENGINE) (Sheet 9 of 9)**

22. Place mounting bracket (AA) in position and, using 5/8 inch socket, install three screws (AB).



23. Position fuel-water separator (AC) to mounting bracket (AA).

CAUTION

Mounting bracket (AA) is made of aluminum. Over tightening of cap screws (AD) could strip threads.

24. Using 1/2 inch socket, install four cap screws, new lockwashers, and flat washers (AD).

25. Using screwdriver and 3/8 inch wrench, install clamp (AE) if removed.
26. Install transmission left oil cooler (page 6-151).
27. Install engine left oil cooler (page 6-133).
28. Install engine access covers (left bank) (page 6-93).
29. Install engine cooling fan shroud (page 9-55).
30. Install engine cooling fans (page 9-49).
31. Install centrifugal fan housing (page 9-60).
32. Install engine shroud (page 9-3).
33. Install powerplant (page 5-37).

End of Task

TA139485

ENGINE OIL COOLER SCREEN REPLACEMENT (Sheet 1 of 2)

TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
5 in. extension with 1/2 in. drive

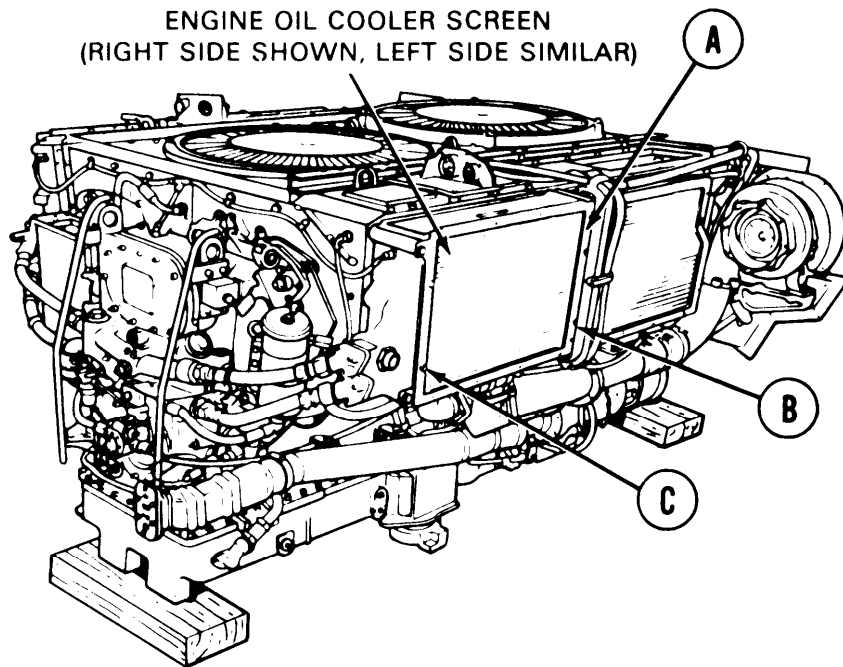
PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

NOTE

If removing screens on 2A engine, go to step 3.

REMOVAL:

1. Using socket with extension through harness and into bracket (A), remove two screws and washers (B).
2. Pull harness and bracket (A) to right of oil cooler screen for access to screws (C).
3. Using socket, remove four screws and washers (c).
4. Lift cooler screen away.



INSPECTION:

1. Check screen and brackets for cracks, tears, bending, and dents.
2. Replace bad parts.

Go on to Sheet 2

TA139486

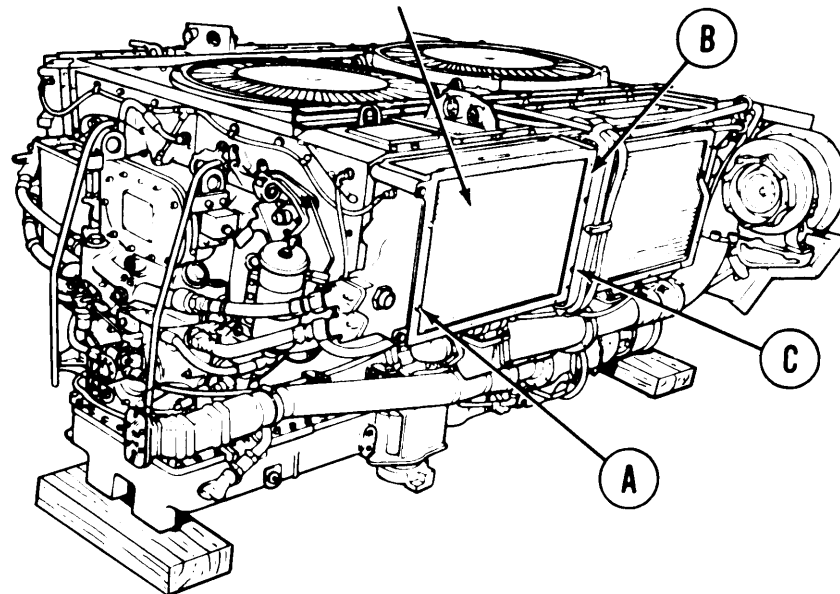
ENGINE OIL COOLER SCREEN REPLACEMENT (Sheet 2 of 2)**NOTE**

If installing screens on 2A engine, do steps 1, 2, and 5.

INSTALLATION:

1. Place cooler screen on oil cooler.
2. Start threads of four screws with washers (A) by hand to hold screen in place.
3. Using socket, tighten screws and washers (A).
4. Using socket with extension through harness and into bracket (B), install and tighten two screws and washers (C).
5. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

**ENGINE OIL COOLER SCREEN
(RIGHT SIDE SHOWN, LEFT SIDE SIMILAR)**



End of Task

TA139487

TRANSMISSION OIL COOLER SCREEN REPLACEMENT (Sheet 1 of 2)

TOOLS: 1/2 in. socket with 1/2 in. drive
 6 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 1/2 in. combination box and open end wrench
 3/4 in. combination box and open end wrench

PRELIMINARY PROCEDURES: Remove both air cleaner outlet hose assemblies (page 7-73)
 Remove powerplant (page 5-1)

NOTE

Left side shown, right side similar.

REMOVAL:

NOTE

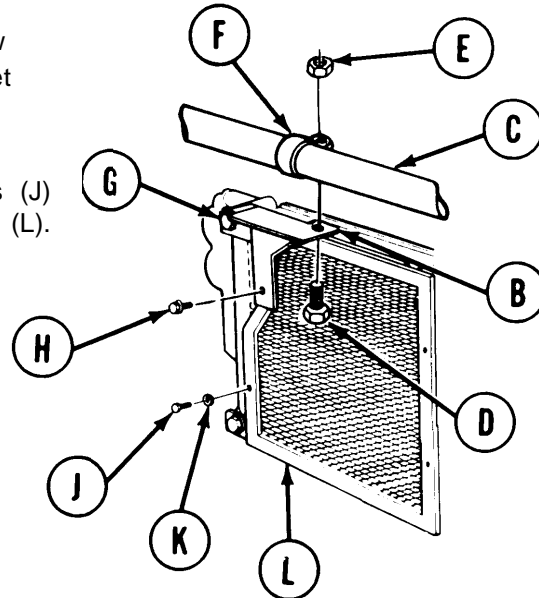
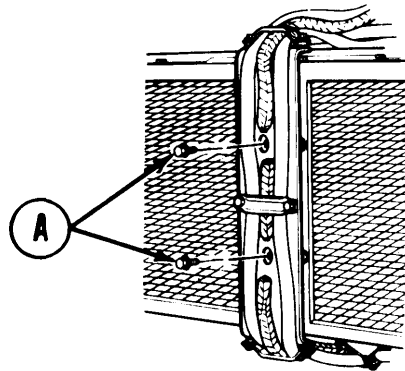
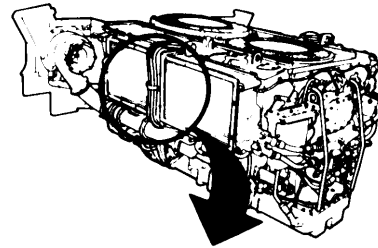
If removing 2A engine screen, go to step 6.

- Using socket, extension, and ratchet through harness and into bracket, remove two assembled washer screws (A).

NOTE

You will have bracket (B) and tube (C) only if your vehicle is equipped with a 2DA engine.

- Using socket, extension, ratchet, and 1/2 inch wrench, remove screw (D) and locknut (E) securing clamp (F) and tube (C) to bracket (B).
- Using 3/4 inch wrench, remove bolt (G).
- Using socket, remove assembled washer screw (H), screw (J), and washer (K) securing bracket (B) and oil cooler screen (L).
- Remove bracket (B) and oil cooler screen (L).
- For 2A engine; using socket, remove four screws (J) and four washers (K) securing oil cooler screen (L). Remove oil cooler screen (L).

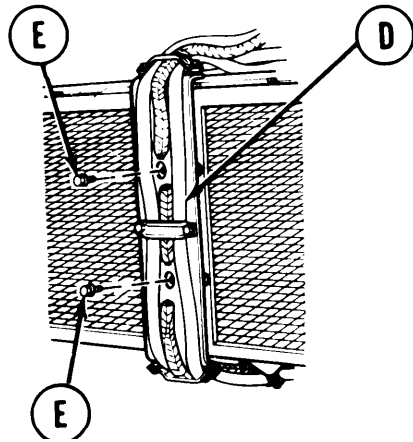
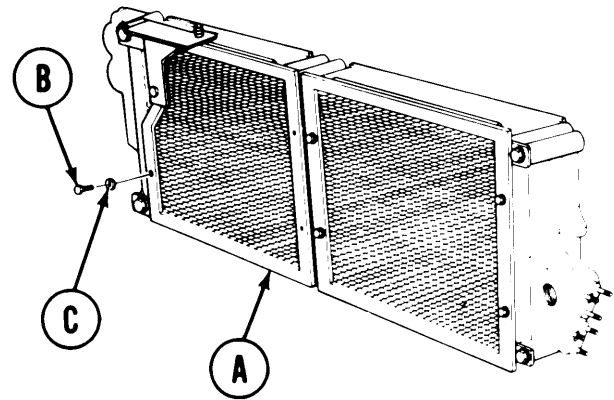


Go on to Sheet 2

TRANSMISSION OIL COOLER SCREEN REPLACEMENT (Sheet 2 of 2)

INSTALLATION:

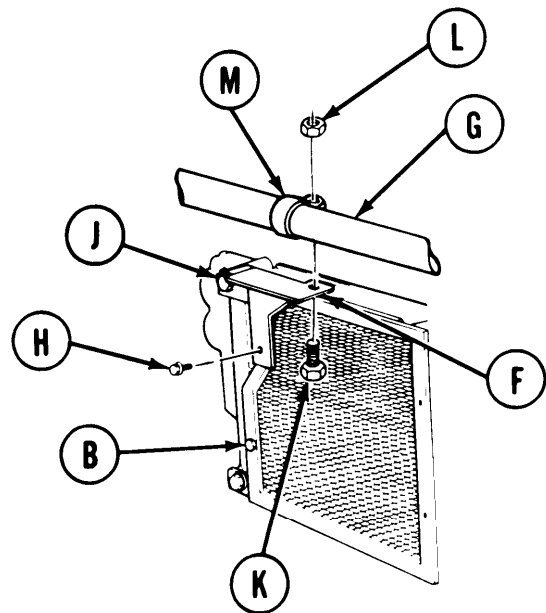
1. Position oil cooler screen (A) into place on oil cooler.
2. Install screw (B) and washer (C).



NOTE

You will have bracket (F) and tube (G) only if your vehicle is equipped with a 2DA engine.

3. Position harness and bracket (D) into place on oil cooler.
4. Using socket, extension, and ratchet through harness and into bracket, install two assembled washer screws (E).
5. Position bracket (F) to oil cooler.
6. Install assembled washer screw (H).
7. Using socket, tighten screws (B) and (H).
8. Using 3/4 inch wrench, install bolt (J).
9. Using socket, extension, ratchet, and 1/2 inch wrench, install screw (K) and nut (L) to secure clamp (M) and tube (G) to bracket (F).
10. Install powerplant (page 5-1).
11. Install both air cleaner outlet hose assemblies (page 7-75).



End of Task

All data on pages 6-122 thru 6-129 deleted. ■

ENGINE OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-130
Installation	6-133

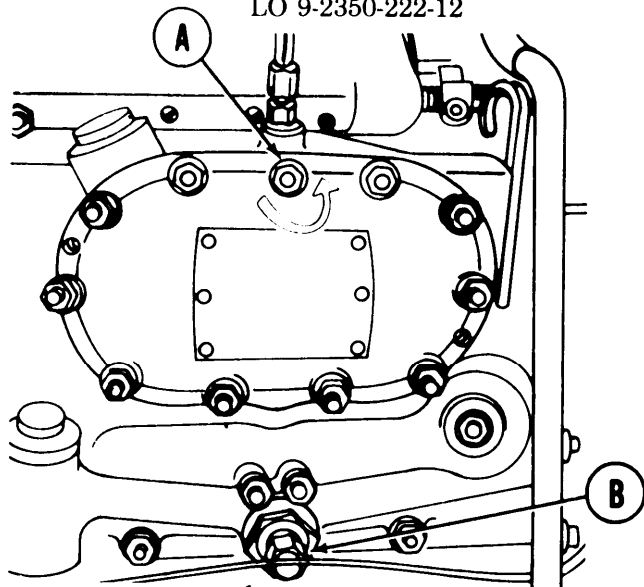
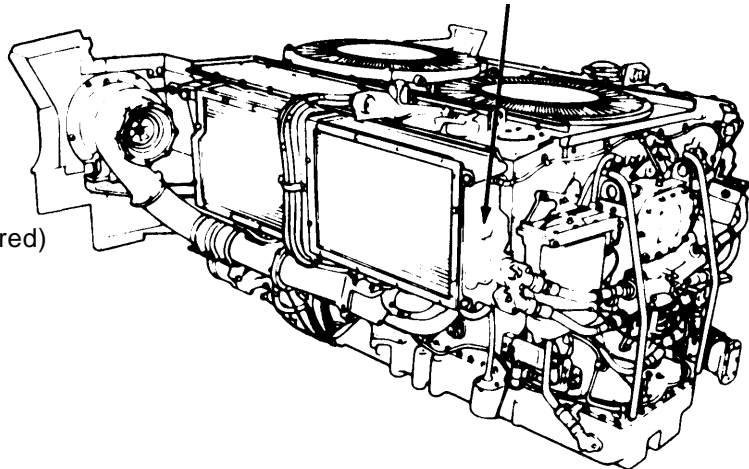
TOOLS: Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N-m)
 3/4 in. socket with 3/8 in. drive
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 1/2 in. combination box and open end wrench
 3/4 in. combination box and open end wrench
 1-1/2 in. open end wrench

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Washer (NAS1598-6V)
 Drip pan
 Masking tape (Item 57, Appendix D)
 Plastic barrier material (Item 41, Appendix D)
 Lockwasher (MS35338-43) (4 required)

REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)



PRELIMINARY PROCEDURES:

- Remove powerplant (page 5-25)
- Remove engine shroud (page 9-2)

REMOVAL:

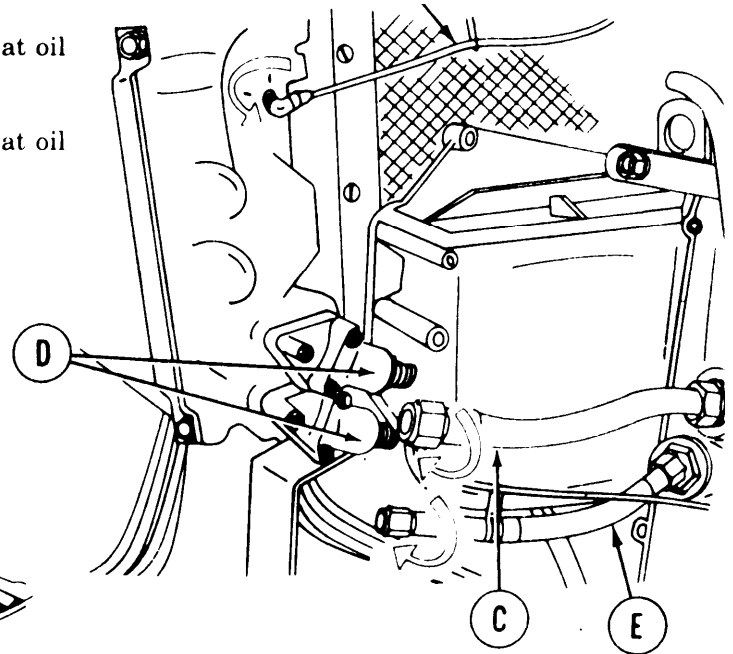
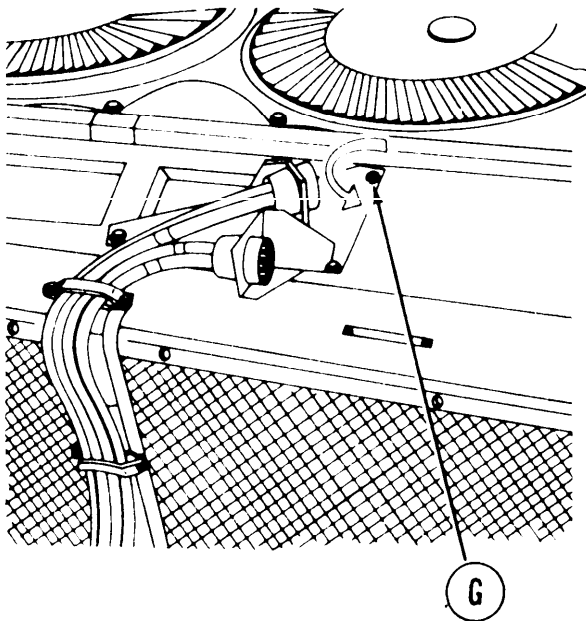
1. Using 1/2 inch socket, remove screw and washer (A). Throw washer away.
2. Using 3/4 inch wrench, loosen valve (B) six complete turns.

Go on to Sheet 2

TA139499

ENGINE OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 2 of 6)

3. Put drip pan on fiat surface under oil cooler connectors (D).
4. Using 1-1/2 inch wrench, remove hose (C) at oil cooler connectors (D).
5. Using 1-1/2 inch wrench, remove hose (E) at oil cooler connectors (D).



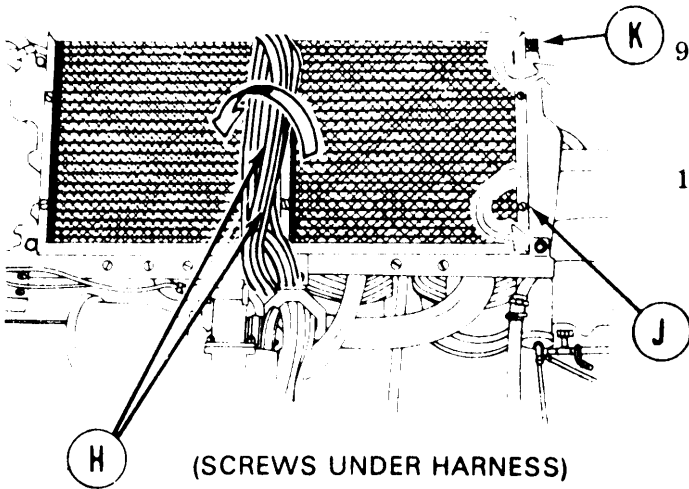
6. Using plastic material (Item 41, Appendix D) and masking tape (Item 57, Appendix D), wrap ends of hoses (C) and (E) and oil cooler connectors (D) to keep them clean and from dripping.
7. Using 9/16 inch wrench, remove oil cooler vent hose (F) at top of cooler.

8. Using 1/2 inch wrench, remove four screws and lockwashers (G). Throw lockwashers away.

Go on to Sheet 3

TA139498

ENGINE OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 3 of 6)



9. Using 1/2 inch socket with extension through harness and into bracket, remove two screws and washers (H).
10. Lower harness from coolers with bracket attached.

11. Using 1/2 inch socket, remove four screws and washers (J) holding oil cooler screen to cooler.
12. Remove oil cooler screen from cooler.

CAUTION

Support oil cooler to keep it from falling while doing step 13.

13. Using 3/4 inch wrench, remove four screws and washers (K) holding oil cooler frame.
14. Lift away oil cooler and mounting brackets,

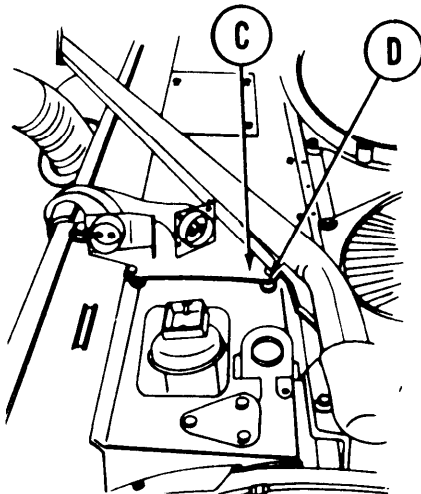
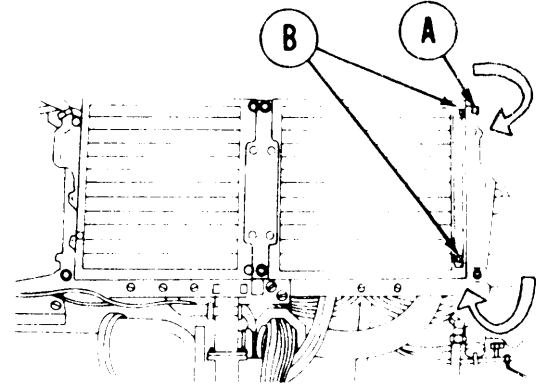
Go on to Sheet 4

TA140028

ENGINE OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 4 of 6)

INSTALLATION:

1. Place oil cooler and oil cooler screen mounting bracket into place on oil cooler frame.
2. Start threads of four screws with washers (A) by hand to hold oil cooler in place.
3. Using 3/4 inch wrench, tighten screws (A).
4. Lift screen into place on oil cooler.
5. Start threads of four screws with washers (B) by hand to hold oil cooler screen in place,
6. Using 1/2 inch socket, tighten screws and washers (B).

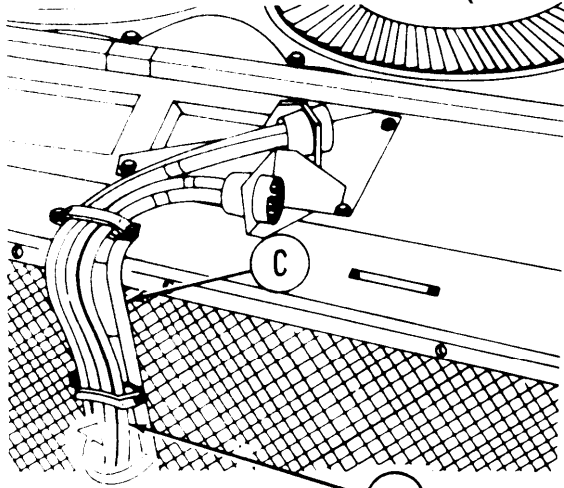


7. Lift starter cable mounting bracket (C) into place at top of oil cooler.
8. Start threads of four screws with new lockwashers (D) by hand.
9. Using 1/2 inch wrench, tighten screws and lockwashers (D).

Go on to Sheet 5

TA139500

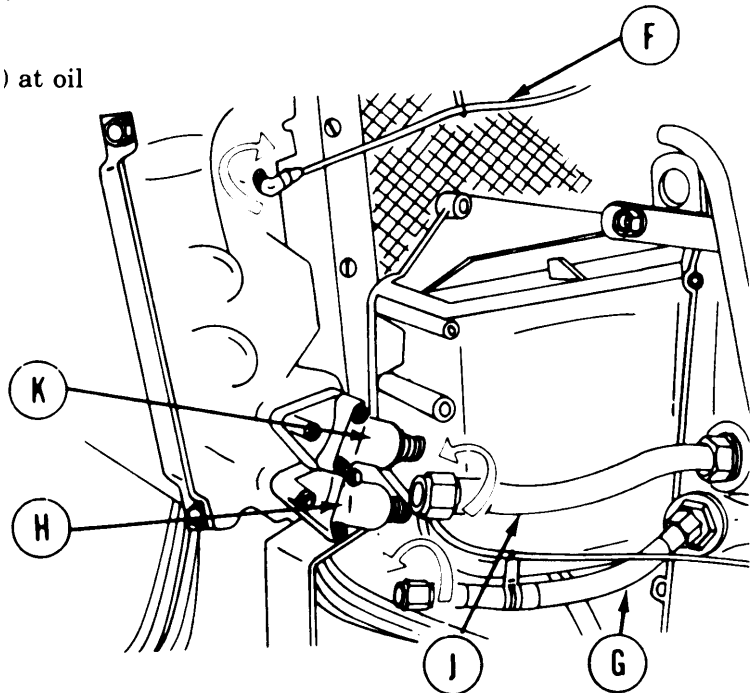
ENGINE OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 5 of 6)



- Using 1/2 inch socket with extension through harness and into bracket, install two washers and screws (E).

(HOLES UNDER HARNESS) (E)

- Using 1/2 inch wrench, install oil cooler vent hose (F) at top of cooler.
- Position new gaskets (G) and oil cooler connectors (H) onto cooler.
- Remove plastic material (Item 41, Appendix D) and masking tape (Item 57, Appendix D) from ends of hoses (G) and (J) and oil cooler connectors (H) and (K).
- Using 1-1/2 inch wrench, install hose (G) at oil cooler connector (H).
- Using 1-1 /2 inch wrench, install hose (J) at oil cooler connector (K).

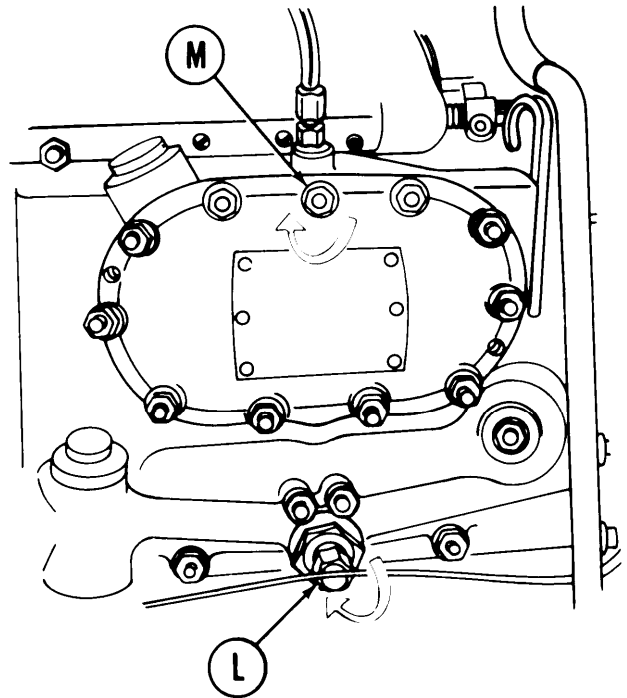


Go on to Sheet 6

TA139501

ENGINE OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 6 of 6)

16. Using 3/4 inch socket, tighten valve (L) to 150 lb-in (17 N-m).
17. Install new washer on screw (M).
18. Using 1/2 inch socket, install screw (M).
19. Check engine oil level indicator gage rod (TM 9-2350-222-10).
20. Replenish lubricating oil lost during oil cooler replacement (LO 9-2350-222-12).
21. Connect engine for powerplant ground hop kit (page 5-48).
22. Start and run engine (TM9-2350-222-10). Check for oil leaks at oil cooler and line connect
23. Shut down engine. Disconnect engine from powerplant ground hop kit (page 5-62).
24. Install engine shroud (page 9-3).
25. Install powerplant (page 5-37).



End of Task

All data on pages 6-136 thru 6-145 deleted.

Change 4

6-135

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 1 of 10)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-147
Installation	6-151

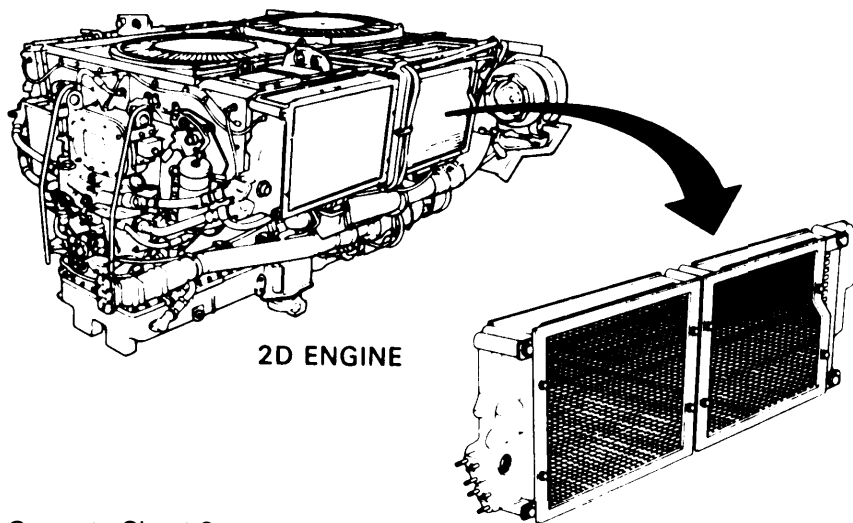
TOOLS: 1/2 in. socket with 1/2 in. drive
 6 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 3/4 in. combination box and open end wrench
 1-1/2 in. open end wrench
 Flat-tip screwdriver

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Drip pan
 Masking tape (Item 57, Appendix D)
 Plastic barrier material (Item 41, Appendix D)
 Rags (Item 65, Appendix D)
 Cover for turbosupercharger air inlet port
 Lockwasher (MS35335-34) (4 required)

REFERENCE: LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
 Remove engine shroud (page 9-2)



NOTE
 Right side shown, left side similar.

Go on to Sheet 2

TA139513

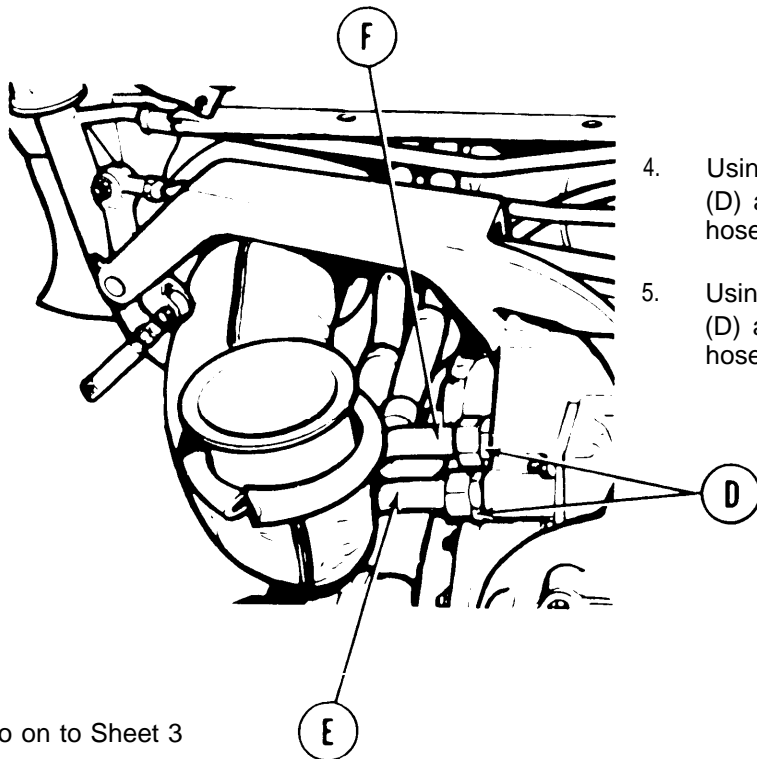
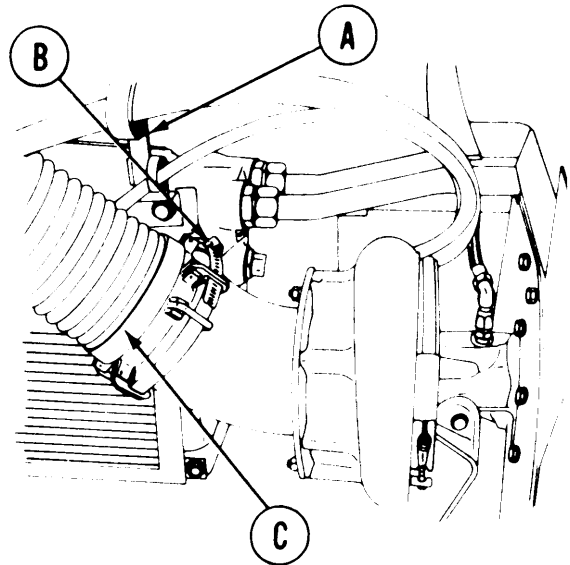
TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 2 of 10)

REMOVAL:

NOTE

Removal procedures are the same for the right and left coolers except that the upper rear mount bolt on the right cooler additionally secures support bracket (A).

1. Using screwdriver, loosen clamp (B) to remove air inlet hose (C). Remove air inlet hose (C).
2. Place cover over air inlet port to keep out dirt.
3. Place drip pan or rags under transmission connectors (D).

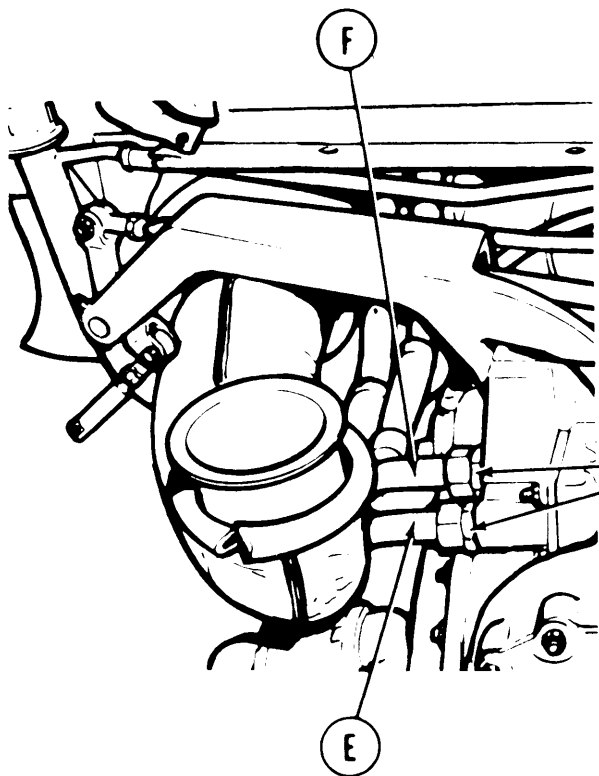


4. Using 1-5/8 inch wrench to hold connector (D) and, using 1-1/2 inch wrench, remove hose (E) from transmission connectors (D).
5. Using 1-5/8 inch wrench to hold connector (D) and, using 1-1/2 inch wrench, remove hose (F) from transmission connectors (D).

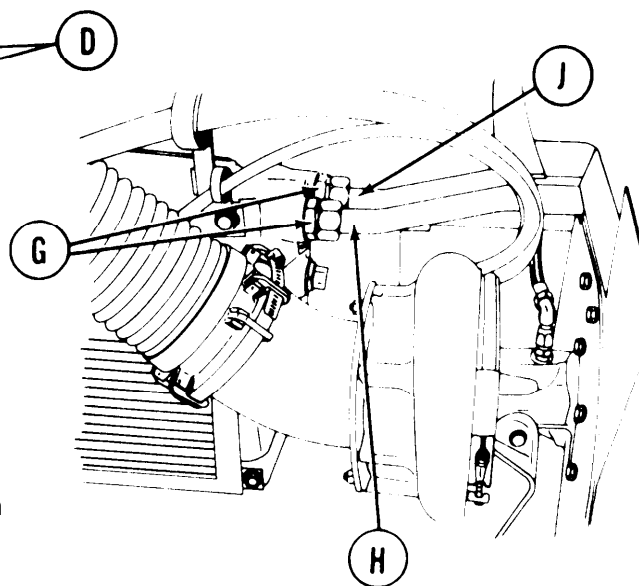
Go on to Sheet 3

TA139514

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 3 of 10)



6. Using plastic barrier material (Item 41, Appendix D) and masking tape (Item 57, Appendix D), wrap ends of hoses (E) and (F) and transmission connectors (D) to keep out dirt.
7. Place drip pan or rags under cooler connectors (G).



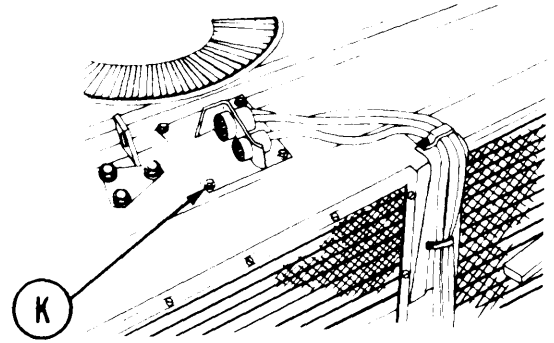
8. Using 1-1/2 inch wrench, remove hose (H) from cooler connectors (G).
9. Using 1-1/2 inch wrench, remove hose (J) from cooler connector (G).
10. Using plastic barrier material (Item 41, Appendix D) and masking tape (Item 57, Appendix D), wrap ends of hoses (H) and (J) and cooler connectors (G) to keep out dirt.
11. Move hoses out of the way toward rear of powerplant.

Go on to Sheet 4

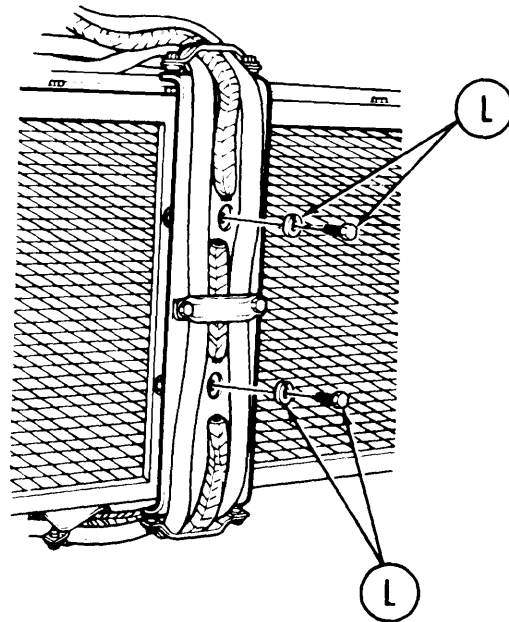
TA139515

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 4 of 10)

12. Using socket, remove four screws and lockwashers (K). Throw lockwashers away.



13. Using socket and extension through harness and into bracket, remove two screws and washers (L).



14. Lower harness away from coolers with brackets attached.

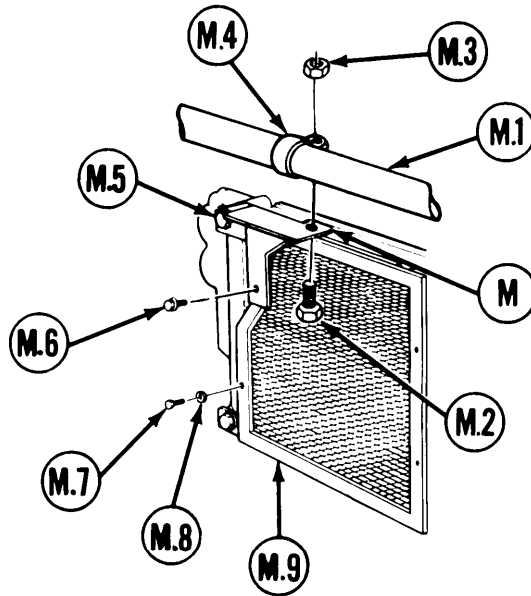
Go on to Sheet 5

TA139516

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 5 of 10)

NOTE

You will have bracket (M) and tube (M.1) only if your vehicle is equipped with a 2DA engine.

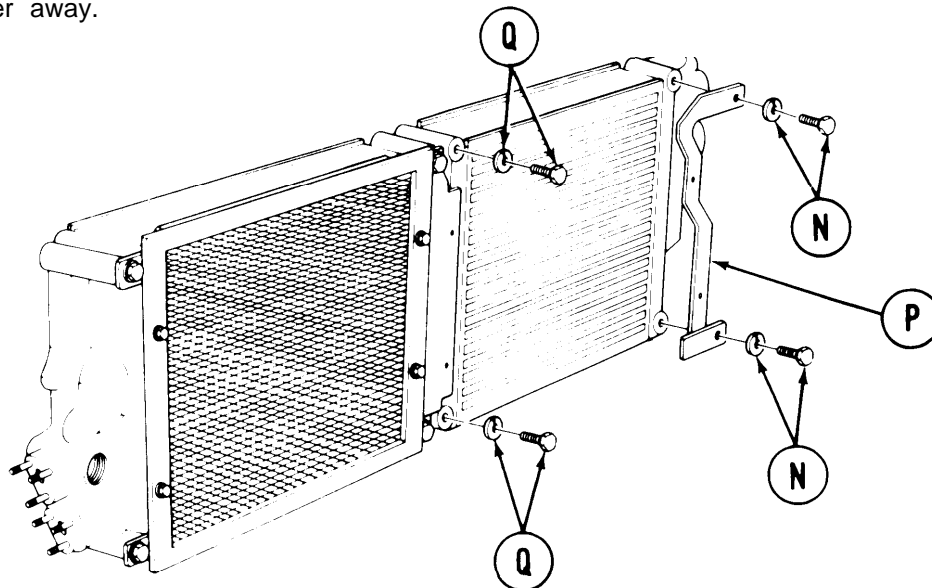


15. Using socket, extension, ratchet, and 1/2 inch wrench, remove screw (M.2) and locknut (M.3) securing clamp (M.4) and tube (M.1) to bracket (M).
- 15.1. Using 3/4 inch wrench, remove bolt (M.5).
- 15.2. Using socket, remove assembled washer screw (M.6), screw (M.7), and washer (M.8) securing bracket (M) and oil cooler screen (M.9).
16. Remove bracket (M) and oil cooler screen (M.9).

CAUTION

Using another person, support oil cooler to keep it from falling while doing steps 17 through 19.

17. Using 3/4 inch wrench, remove two screws and washers (N) holding oil cooler screen mounting bracket (P) to oil cooler and oil cooler to oil cooler frame.
18. Remove oil cooler screen mounting bracket (P).
19. Using 3/4 inch wrench, remove two screws and washers (Q) holding oil cooler to oil cooler frame.
20. Lift oil cooler away.



Go on to Sheet 6

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 6 of 10)

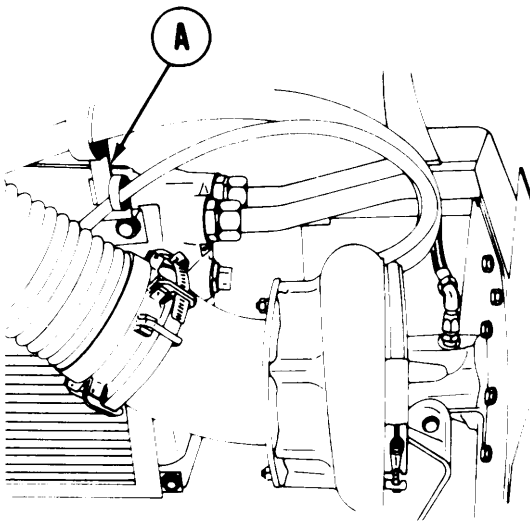
INSTALLATION:

NOTE

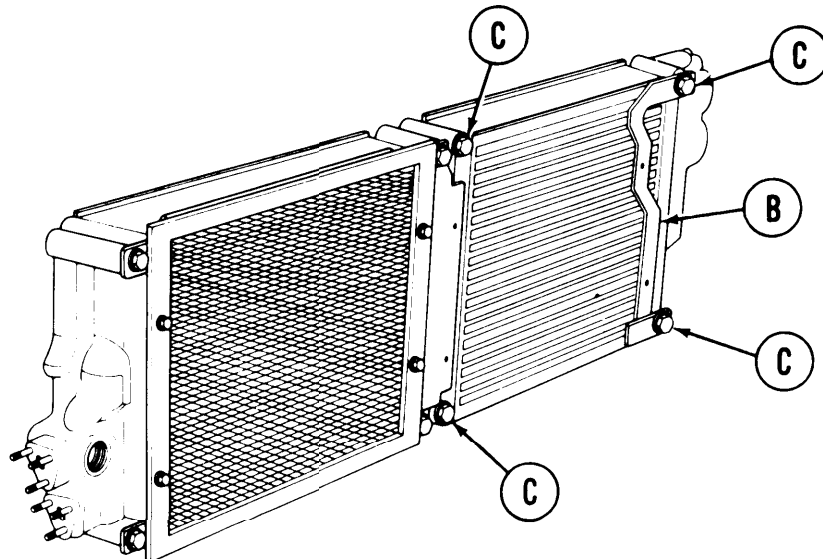
Installation procedures are the same for the right and left coolers except that the upper rear mount bolt on the right cooler additionally secures support bracket (A).

CAUTION

Using another person, support oil cooler to keep it from falling while doing steps 1 through 3.



1. Position oil cooler and oil cooler screen mounting bracket (B) into place on oil cooler frame.
2. Start threads of four screws with washers (C) by hand to hold oil cooler and oil cooler screen mounting bracket in place.
3. Using 3/4 inch wrench, tighten screws and washers (C).
4. Position oil cooler screen into place on oil cooler.



Go on to Sheet 7

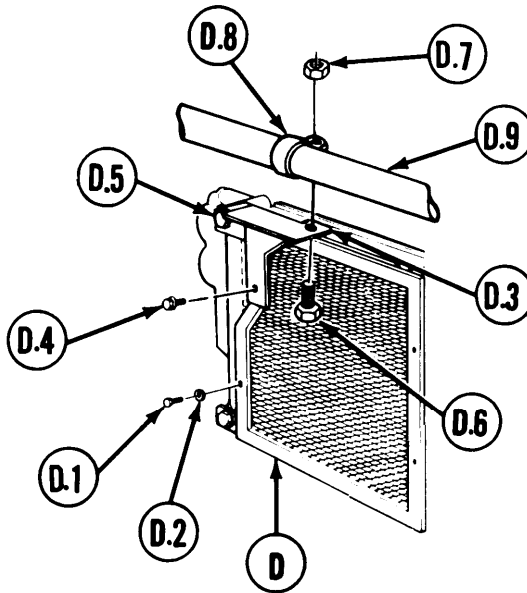
TA139518

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 7 of 10)

5. Position oil cooler screen (D) into place on oil cooler. Install screw (D.1) and washer (D.2).

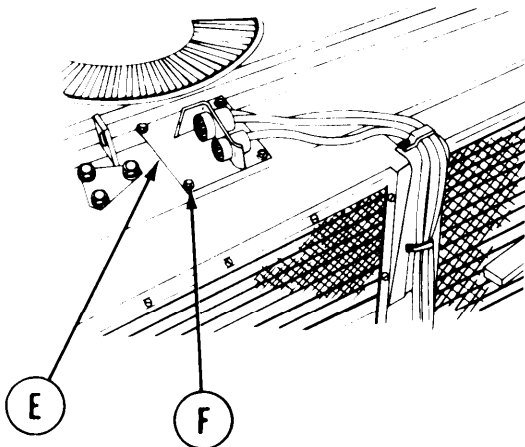
NOTE

You will have bracket (D.3) and tube (D.9) only if your vehicle is equipped with a 2DA engine.



6. Position bracket (D.3) to oil cooler.
- 6.1. Install assembled washer screw (D.4).
- 6.2. Using socket, tighten screws (D.1) and (D.4).
- 6.3. Using 3/4 inch wrench, install bolt (D.5).
- 6.4. Using socket, extension, ratchet, and 1/2 inch wrench, install screw (D.6) and nut (D.7) to secure clamp (D.8) and tube (D.9) to bracket (D.3).

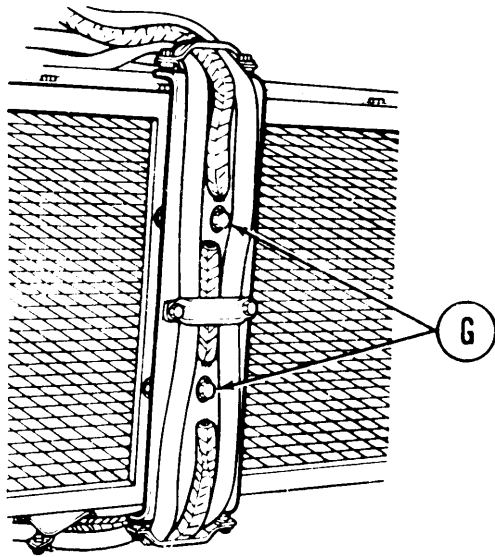
7. Lift starter cable mounting bracket (E) into place at top of oil cooler.



8. Start threads of four screws with new lockwashers (F) by hand.
9. Using socket, tighten four screws and lockwashers (F).

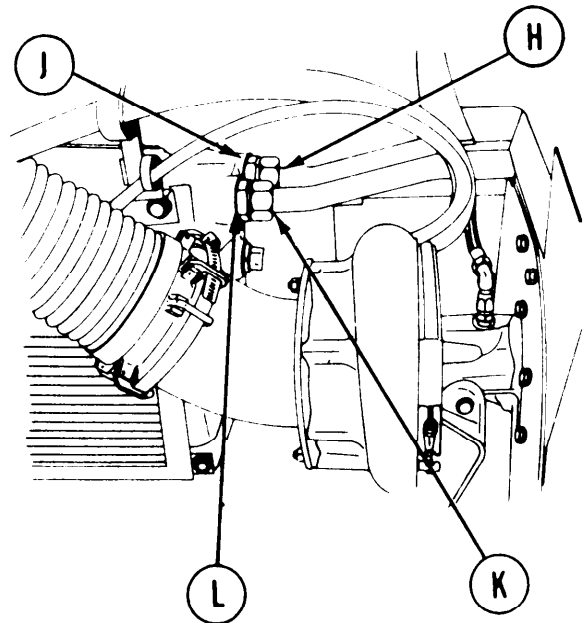
Go on to Sheet 8

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 8 of 10)



10. Using socket with extension through harness, install screws and washers (G).

11. Remove plastic barrier material and masking tape from end of hose (H) and cooler connector (J).
12. Using 1-1/2 inch wrench, install hose (H) to cooler connector (J).
13. Remove plastic barrier material and masking tape from ends of hose (K) and cooler connector (L).
14. Using 1-1/2 inch wrench, install hose (K) to cooler connector (L).

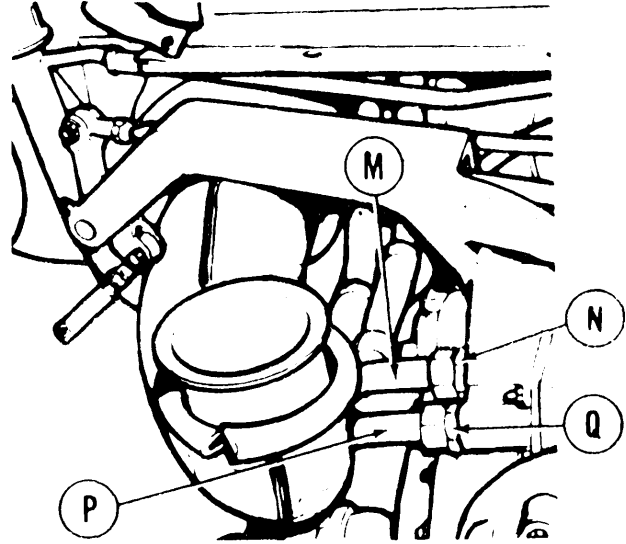


Go on to Sheet 9

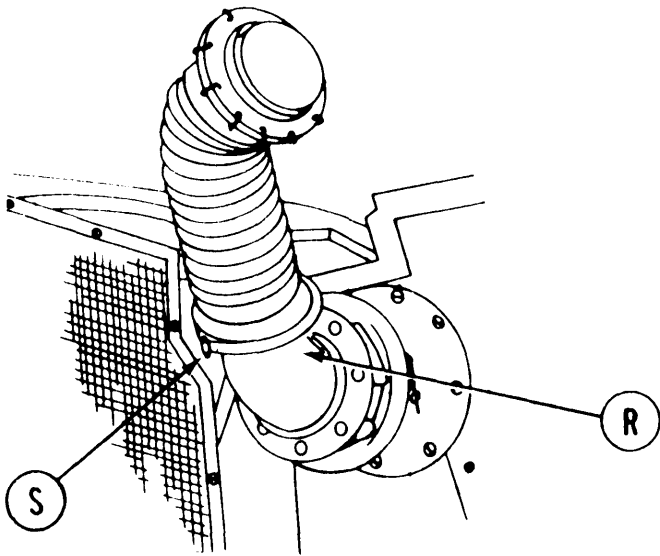
TA139520

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 9 of 10)

- 15. Remove drip pan or rags from under cooler connectors.
- 16. Remove plastic barrier material and masking tape from ends of hose (M) and transmission connector (N).
- 17. Using 1-5/8 inch wrench to hold connector (N), and using 1-1/2 inch wrench, install hose (M) to transmission connector (N).



- 18. Remove plastic barrier material and masking tape from ends of hose (P) and transmission connector (R).
- 19. Using 1-1/2 inch wrench, install hose (P) to transmission connector (Q).



- 20. Using rags, wipe up oil which may have dripped or leaked during oil cooler replacement.
- 21. Remove cover from turbosupercharger air inlet port.
- 22. Position clamp and air inlet hose onto elbow (R).
- 23. Using screwdriver, tighten screw (S).

Go on to Sheet 10

TA139521

TRANSMISSION OIL COOLER REPLACEMENT (2D ENGINE) (Sheet 10 of 10)

24. Replenish oil lost during oil cooler replacement (LO 9-2350-222-12).
25. Connect engine for powerplant ground hop (page 5-48).
26. Start and run engine. Check for oil leaks at oil cooler and line connections.
27. Shut down engine. Disconnect engine from powerplant ground hop kit (page 5-62)
28. Install engine shroud (page 9-3).
29. Install powerplant (page 5-37).

End of Task

TA139522

ENGINE OIL COOLER FLUID PUMP CONNECTOR REPLACEMENT (2D ENGINE)
(Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-157
Inspection	6-158
Installation	6-158

TOOLS: 9/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 3/8 in. combination box and open end wrench
 1-1/2 in. open end wrench (2 required)
 3/4 in. combination box and open end wrench
 Flat-tip screwdriver
 Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N-m)
 3/4 in. socket with 3/8 in. drive

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Rags (Item 65, Appendix D)
 Gasket (8682679)
 Washer (NAS1598-6V)
 Nuts (MS21044-N5) (3 required)

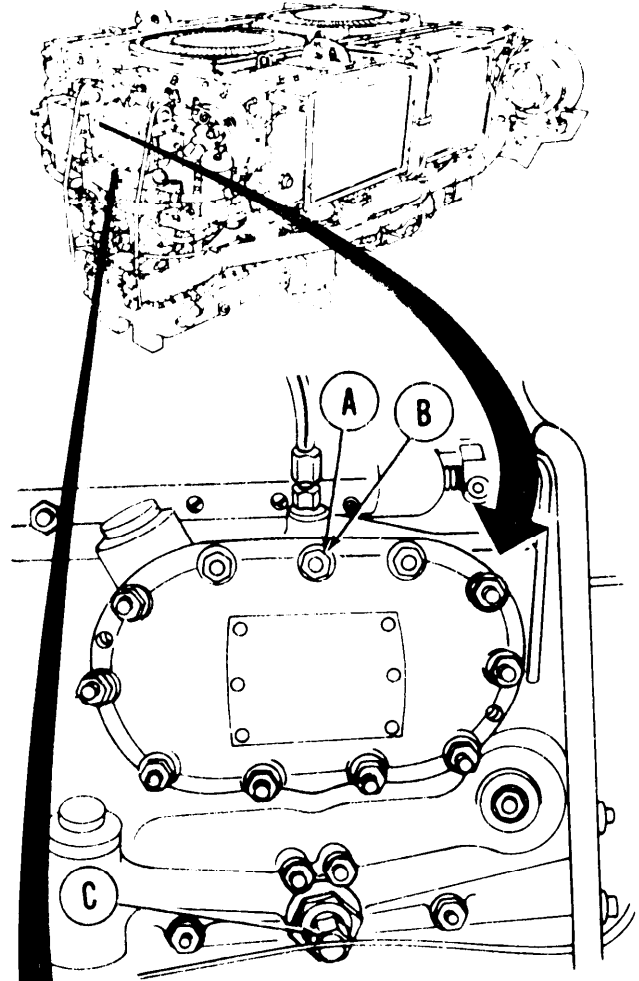
REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

PRELIMINARY PROCEDURE: Remove powerplant (page 5-25)

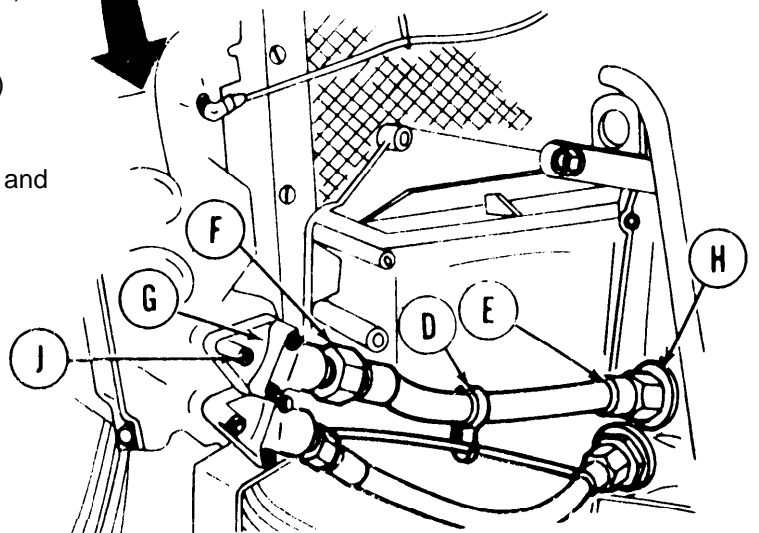
ENGINE OIL COOLER FLUID PUMP CONNECTOR REPLACEMENT (2D ENGINE)
Sheet 2 of 4)

REMOVAL:

1. Using 9/16 inch wrench, remove vent bolt (A) and sealing washer (B).
2. Throw washer (B) away.
3. Using 3/4 inch wrench, loosen oil drain valve (C) six complete turns.



4. Using screwdriver and 3/8 inch wrench, remove clamp (D) on hose (E) if clamp is attached to hose. If clamp (D) is not attached to hose (E), go to step 5.
5. Using 1-1/2 inch wrench, remove fitting (F) from connector (G).
6. Using two 1-1/2 inch wrenches on hose (E) and fitting (H), remove hose (E).
7. Using 1/2 inch wrench, remove three self-locking nuts (J) from connector (G).
8. Throw three nuts (J) away
9. Remove connector (G)

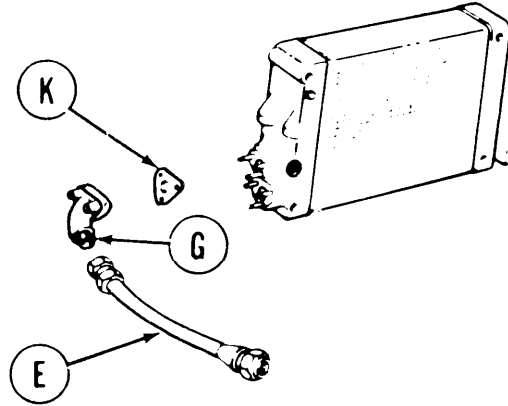


Go on to Sheet 3

TA139524

ENGINE OIL COOLER FLUID PUMP CONNECTOR REPLACEMENT (2D ENGINE)
(Sheet 3 of 4)

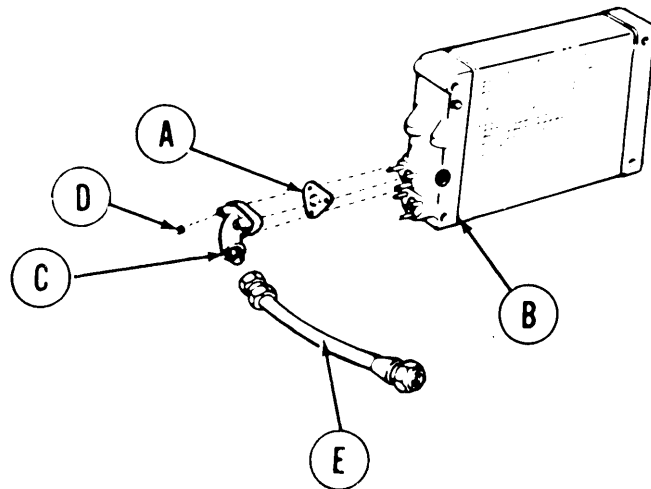
10. Remove and throw away gasket (K) under connector (G).



1. Using dry cleaning solvent (Item 54, Appendix D), clean hose (E) and connector (G).
2. Replace connector (G) if cracked or broken.
3. Inspect threads on hose (E) and connector (G). Replace as required.
4. Replace hose (E) if woven shielding is worn or broken.

INSTALLATION:

1. Position new gasket (A) on oil cooler (B).
2. Position connector (C) over gasket (A).
3. Using 1/2 inch wrench, install three new self-locking nuts (D).
4. Using 1-1/2 inch wrench, install hose (E) to connector (C).



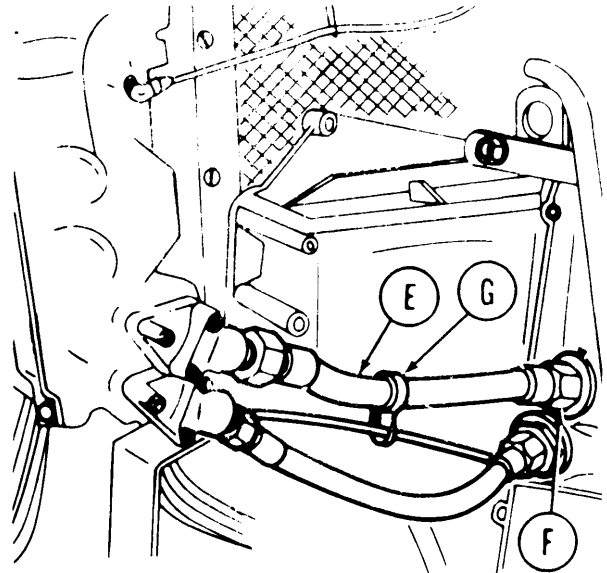
Go on to Sheet 4

TA139525

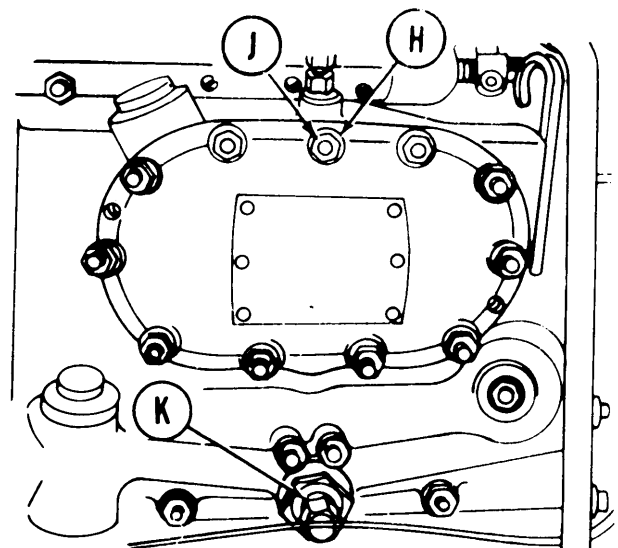
ENGINE OIL COOLER FLUID PUMP CONNECTOR REPLACEMENT (2D ENGINE)

(Sheet 4 of 4)

5. Using two 1-1/2 inch wrenches, install hose (E) to fitting (F).
6. Using screwdriver and 3/8 inch wrench, install clamp (G) on hose (E) if removed during disassembly.
7. Position new sealing washer (H) over vent hole.
8. Using 9/16 inch wrench, install vent bolt (J) through washer (H).
9. Using socket and torque wrench, tighten drain valve (K) to 150 lb-in (17 N-m).



10. Perform ground hop (page 5-48). Run engine at idle until oil temperature is in normal operating range (TM 9-2350-222-10).
11. Check oil level. Add oil as required (LO 9-2350-222-12).
12. Disconnect ground hop kit (page 5-62).
13. Install powerplant (page 5-37).



End of Task

TA139526

**THERMOSTATIC ENGINE OIL COOLER VALVE ASSEMBLY (LEFT AND RIGHT)
REPLACEMENT (Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-161
Inspection	6-161
Test	6-162
Installation	6-163

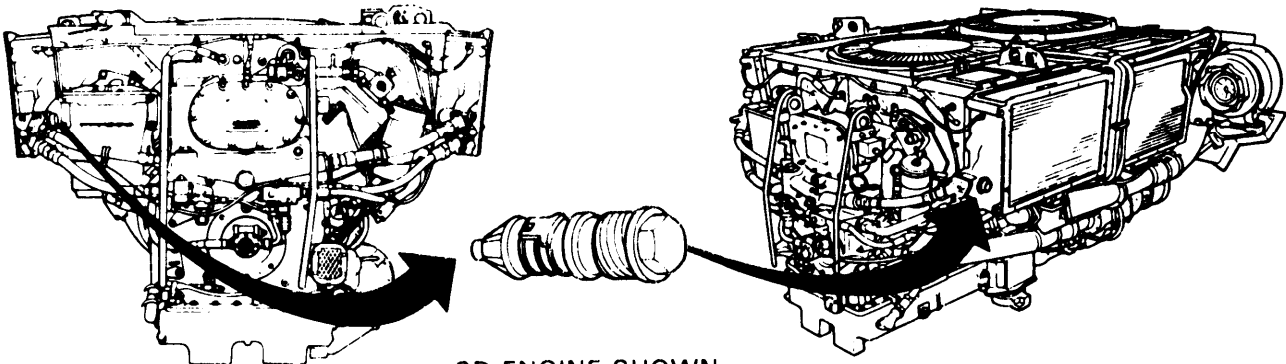
TOOLS: 1-3/4 in. open end wrench
Ruler
Low-pressure compressed air facility

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Cooking stove (mounted in vehicle) Drip pan
12 in. length of scrap wire Spacer ring (7403580)
Pencil Paper

REFERENCE: LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Remove engine oil filter vent bolt and sealing washer
(page 6-130) 2D engine only
Drain engine oil 2A engine (page 6-49) 2D engine (page 6-51)
Loosen engine oil drain valve (page 6-130) 2D engine only
Disconnect and cover engine oil return hose and fitting
(page 6-131, step 3 and 5)
Remove left side engine oil cooler when left
thermostat is to be replaced 2A engine (page 6-122)
2D engine (page 6-130)



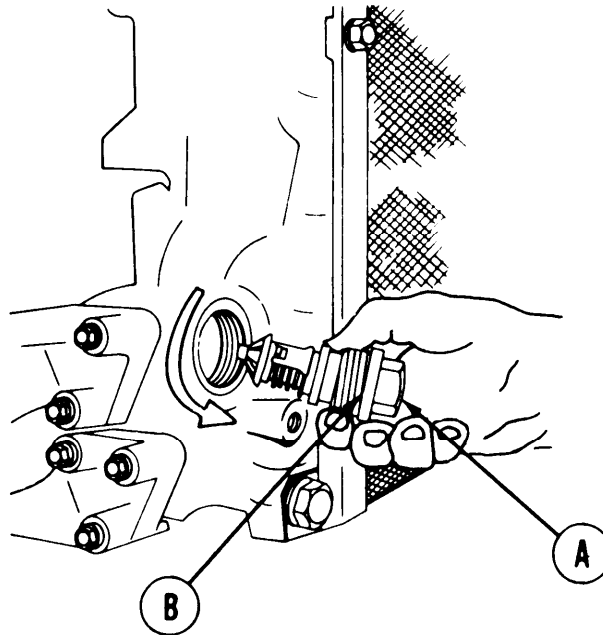
**2D ENGINE SHOWN
2A ENGINE IDENTICAL**

Go on to Sheet 2

TA253181

**THERMOSTATIC ENGINE OIL COOLER VALVE ASSEMBLY (LEFT AND RIGHT)
REPLACEMENT (Sheet 2 of 4)****REMOVAL:**

1. Place drip pan on flat surface under valve and valve socket.
2. Using wrench, loosen valve (A).
3. Remove valve (A) from engine oil cooler.
4. Throw away spacer ring (B).

**INSPECTION:**

1. Inspect valve for stripped or damaged threads.
2. Throw away and replace valve if threads are stripped or damaged.

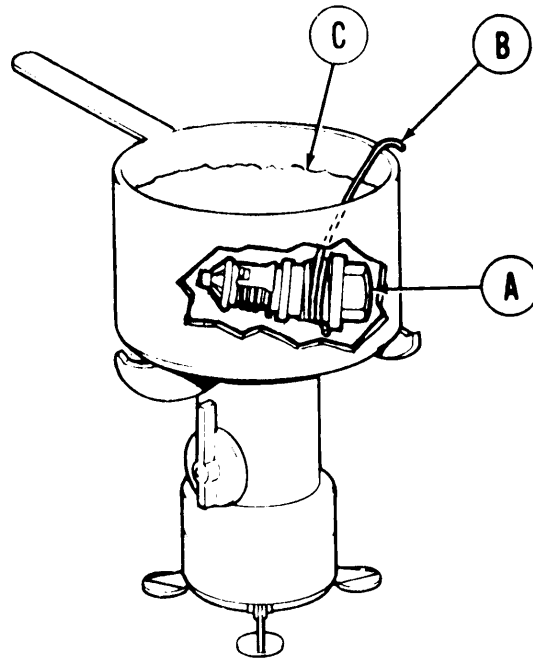
Go on to Sheet 3

TA139528

**THERMOSTATIC ENGINE OIL COOLER VALVE ASSEMBLY (LEFT AND RIGHT)
REPLACEMENT (Sheet 3 of 4)**

TEST:

1. Using ruler, measure overall length of valve (A) at room temperature.
2. Write down overall length of valve (A).
3. Using wire (B), Wrap one end tightly around threads of valve (A).



4. Place valve (A) in water (C) just so it is covered. Let free end of wire (B) hang over edge of container.
5. Slowly increase temperature of water.
6. Using free end of wire (B), take valve out of water when water begins to boil.
7. Using ruler, immediately measure overall length of valve (A).
8. Write down overall length of valve (A).
9. Compare measurements written down when cool to the touch and at heated temperatures.

NOTE

After heating, valve length must have increased by 1/4 inch minimum, If valve length increased less than 1/4 inch, throw valve away. Obtain new valve and repeat test. If new valve passes test, install it.

Go on to Sheet 4

TA139529

**THERMOSTATIC ENGINE OIL COOLER VALVE ASSEMBLY (LEFT AND RIGHT)
REPLACEMENT (Sheet 4 of 4)**

INSTALLATION:

NOTE

If replacing valve assembly, the engine oil cooler bypass valve also must be replaced. Go to page 6-13 or 6-15 for replacement.

WARNING

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

1. Using low-pressure compressed air, dry valve.
2. Install new gasket (B) on valve (A).
3. Seat threads of valve (A) in engine oil cooler socket (C) by hand.
4. Using wrench, tighten valve (A).
5. Install left engine oil cooler (page 6-133) (if required).
6. Connect engine oil return hose to fitting (page 6-134, step 14).
7. Tighten engine oil drain valve (page 6-135, step 16).
8. Install engine oil filter vent bolt (page 6-135, steps 17 and 18).
9. Check engine oil level indicator gage rod (TM 9-2350-222-10).
10. Replenish lubricating oil lost during valve assembly replacement.
11. Using ground hop kit, perform ground hop test (page 5-48).
12. Install powerplant (page 5-37).

End of Task

All data on pages 6-164 thru 6-166 deleted. ■**Change 4 6-163/(6-164 blank)**

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (RIGHT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 1 of 7)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-169
Test	6-170
Installation	6-171

TOOLS: 1-1/2 in. open end wrench
 1-5/8 in. open end wrench
 Automotive adjustable wrench
 Ruler
 Low-pressure compressed air facility

SUPPLIES: Heat source, temperature adjustable (tanker stove)
 12 in. length of scrap wire
 Pencil
 Rags (Item 65, Appendix D)
 Spacer ring (7403580)

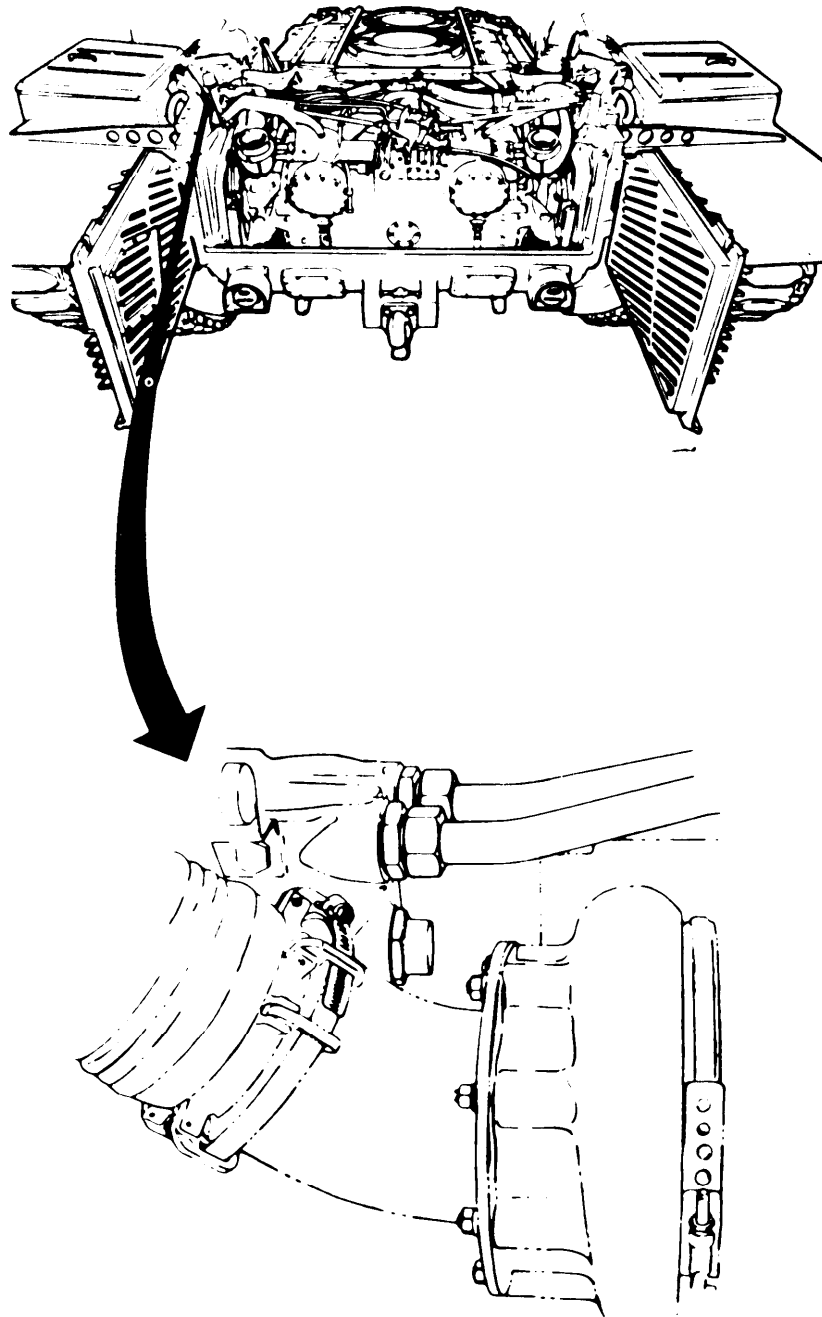
REFERENCES: TM 9-2350-222-10
 LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove transmission shroud (page 9-20)
 Remove engine shroud (page 9-2)

Go on to Sheet 2

TA139534

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 2 of 7)**



Go on to Sheet 3

TA139535

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (RIGHT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 3 of 7)**

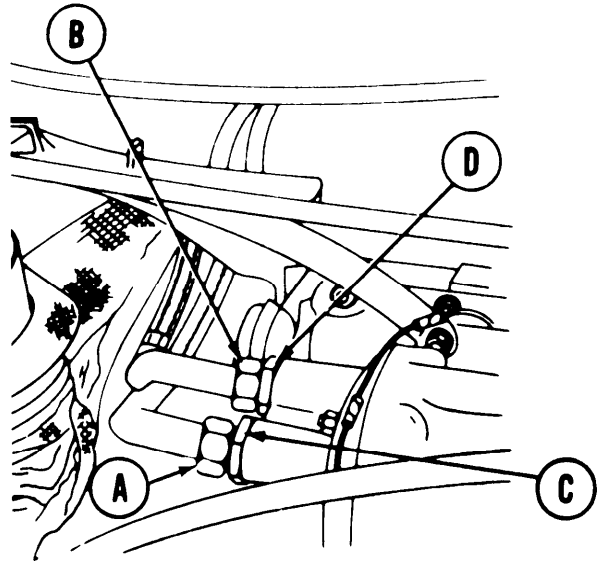
REMOVAL:

1. Place rags (Item 65, Appendix D) under tube end fittings (A) and (B) on transmission.

NOTE

It may be necessary to hold adapters (C) and (D) with 1-5/8 inch wrench while removing tube end fittings (A) and (B).

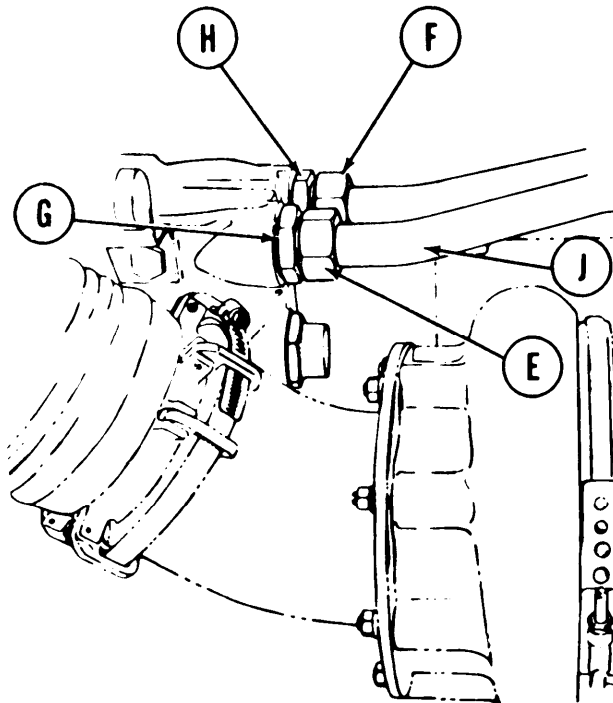
2. Using 1-1/2 inch wrench, remove tube end fitting (A) from adapter (C).



3. Place rags under tube end fittings (E) and (F) at oil cooler.

NOTE

It may be necessary to hold adapters (G) and (H) with 1-5/8 inch wrench while removing tube end fittings (E) and (F).



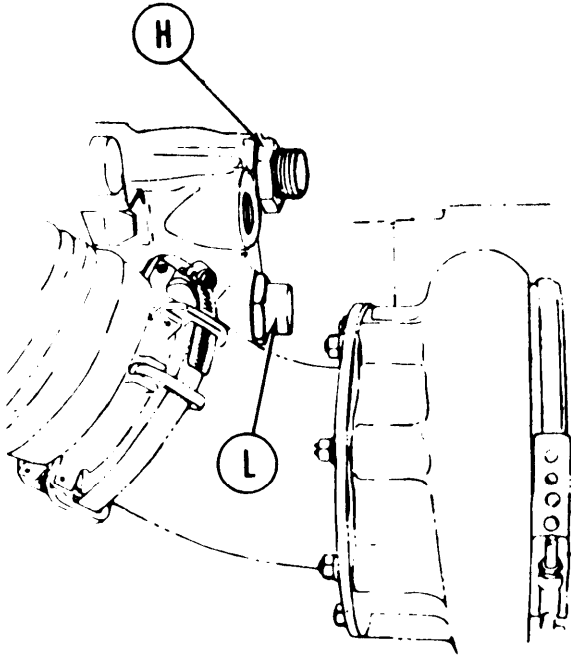
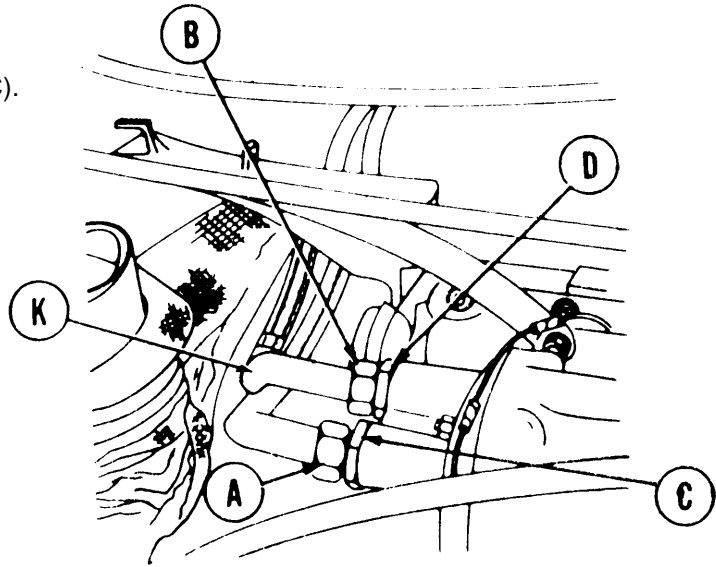
4. Using 1-1/2 inch wrench, remove outside tube end fitting (E) from adapter (G).
5. Displace tube (J).
6. Using 1-5/8 inch wrench, remove adapter (G).
7. Using 1-1/2 inch wrench, remove tube end fitting (F) from adapter (H).

Go on to Sheet 4

TA139536

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 4 of 7)**

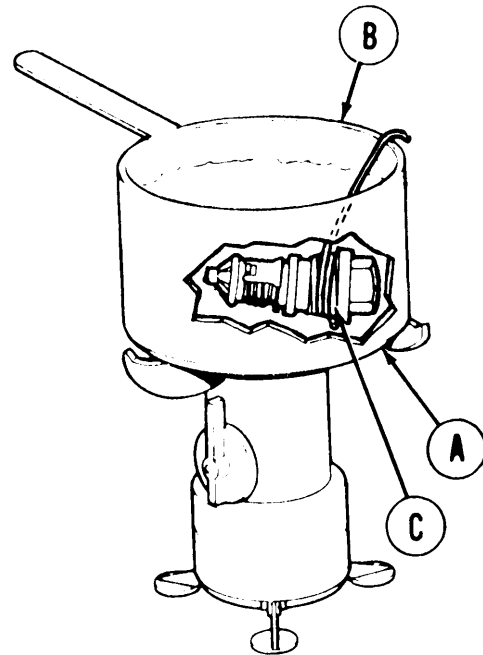
8. Using 1-5/8 inch wrench, remove adapter (C).
9. Using 1-1 /2 inch wrench, remove tube end fitting (B) from adapter (D).
10. Using hands, displace tube (K).



11. Using 1-5/8 inch wrench, remove adapter (H).
12. Using automotive wrench, remove valve assembly and spacer ring (L). Throw spacer ring away.

TEST:

1. Using heat source (A), heat container (B) of clean water to boiling.
2. Using ruler, measure overall length of valve at room temperature. Record length.
3. Using wire, wrap one end tightly around threads (C) on valve.



Go on to Sheet 5

TA139537

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (RIGHT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 5 of 7)**

4. Place valve in boiling water. Let free end of wire hang over edge of container.
5. After about 30 seconds, use free end of wire to take valve out of water.
6. Using ruler, measure overall length of valve. Record length.
7. Compare length of valve before and after heating. If valve length increased less than 1/4 inch, throw valve away. Obtain new valve and repeat test. If new valve passes test, install it.

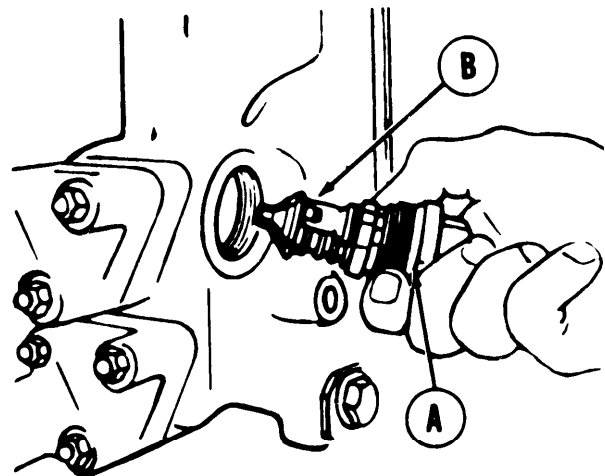
WARNING

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

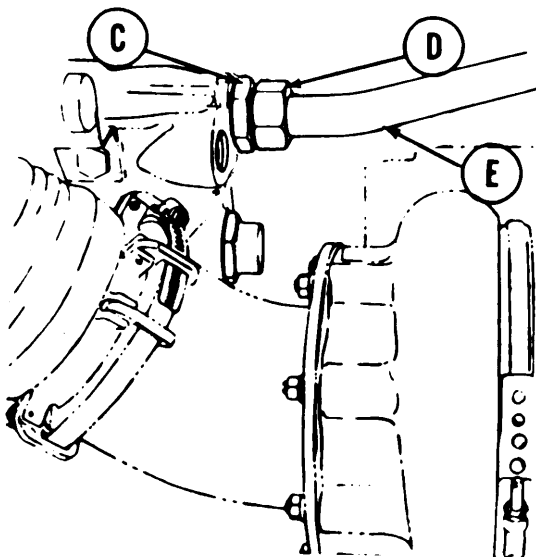
8. Using low-pressure compressed air, dry good valve.

INSTALLATION:

1. Install new spacer ring (A) on valve (B).
2. Using hands, install valve (B) to transmission oil cooler.
3. Using automotive wrench, tighten valve (B).



4. Using 1-5/8 inch wrench, install inside adapter (C).
5. Using hands, install tube end fitting (D) on adapter (C).
6. Go to other end of tube (E).

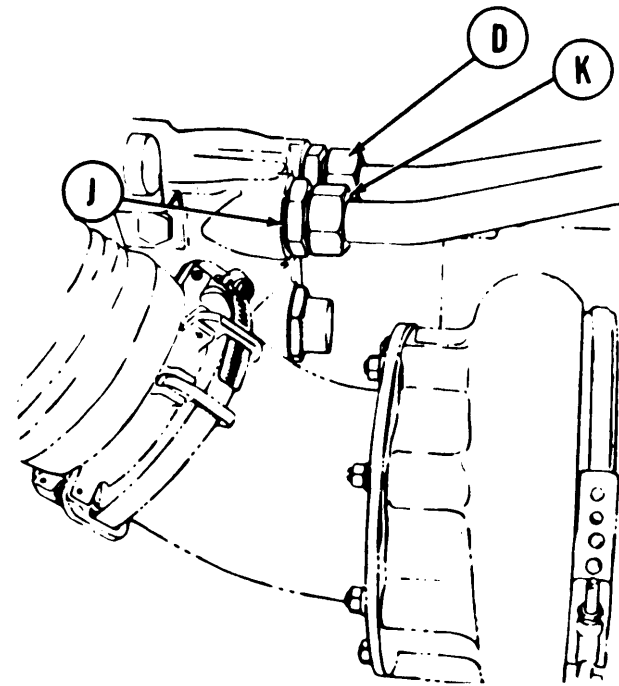
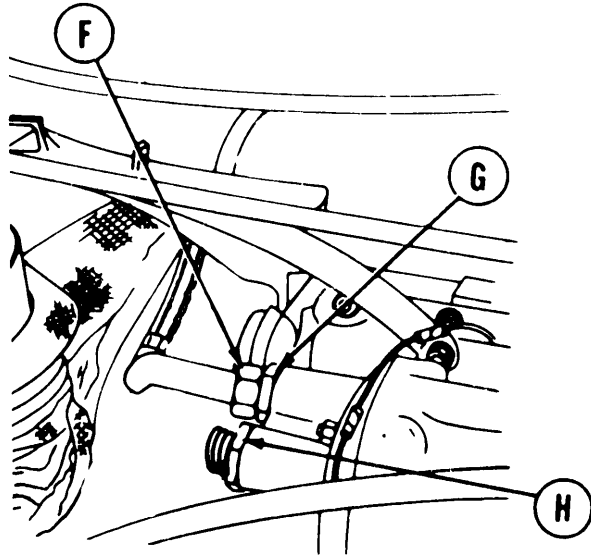


Go on to Sheet 6

TA139538

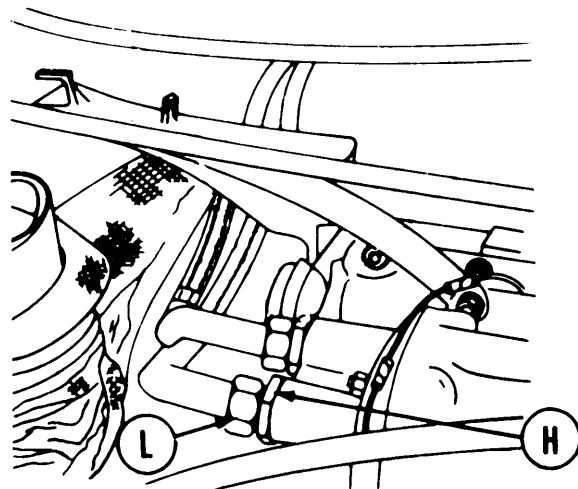
**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (RIGHT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 6 of 7)**

7. Using 1-1/2 inch wrench, install tube end fitting (F) on adapter (G).
8. Using 1-5/8 inch wrench, install adapter (H).



9. Using 1-1/2 inch wrench, tighten tube end fitting (D).
10. Using 1-5/8 inch wrench, install adapter (J).
11. Using hands, install tube end fitting (K) on adapter (J).

12. Using 1-1/2 inch wrench, install tube end fitting (L) on adapter (H).
13. Using 1-1/2 inch wrench, tighten tube end fitting (K) at oil cooler.



Go on to Sheet 7

TA139539

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (RIGHT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 7 of 7)**

14. Replenish oil lost during valve assembly replacement (LO 9-2350-222-12).
15. Remove rags from transmission and oil cooler.
16. Start and run engine (TM 9-2350-222-10). Check for oil leaks.
17. Install engine shroud (page 9-3).
18. Install transmission shroud (page 9-23).

End of Task

TA139540

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 1 of 6)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-176
Test	6-177
Installation	6-178

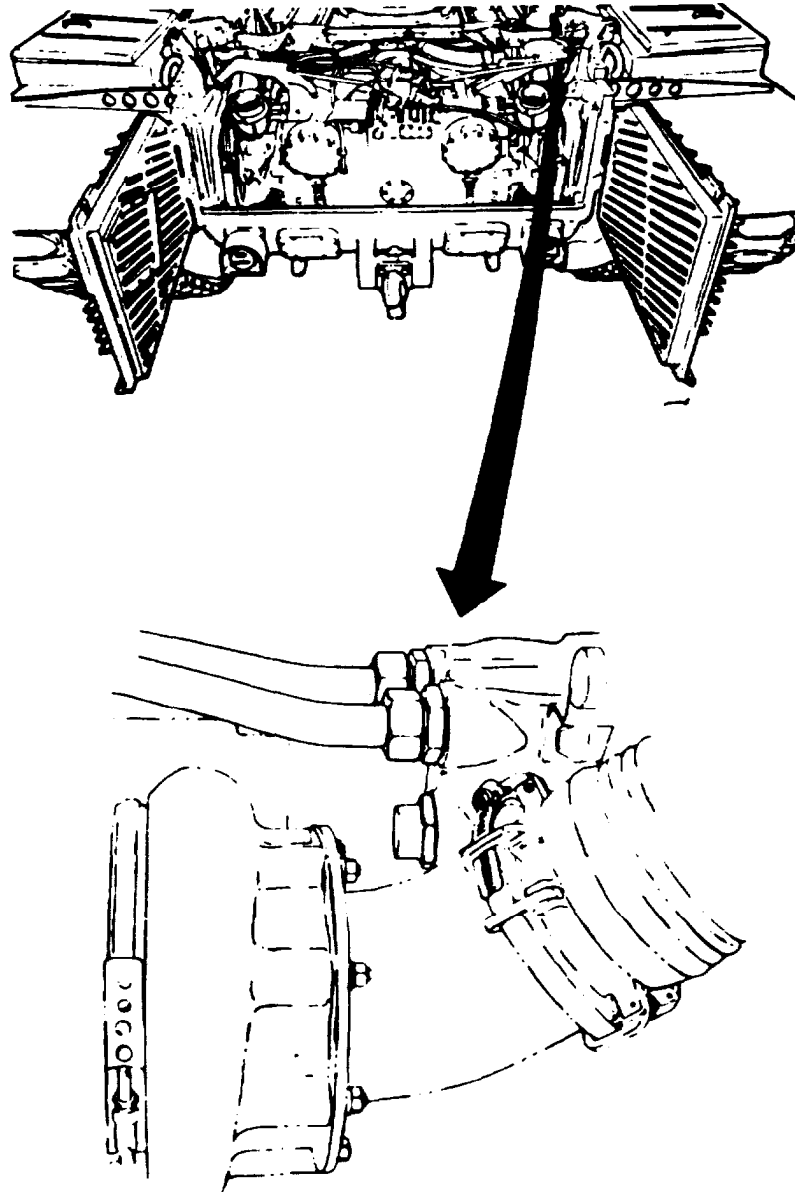
TOOLS: 1-1/2 in. open end wrench
1-5/8 in. open end wrench
Automotive wrench
Ruler
Low-pressure compressed air facility

SUPPLIES: Heat source, temperature adjustable (tanker stove)
12 in. length of scrap wire
Pencil
Rags (Item 65, Appendix D)
Spacer ring (7403580)

REFERENCES: TM 9-2350-222-10
LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove transmission shroud (page 9-20)
Remove engine shroud (page 9-2)

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 2 of 6)**



Go on to Sheet 3

TA139542

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 3 of 6)**

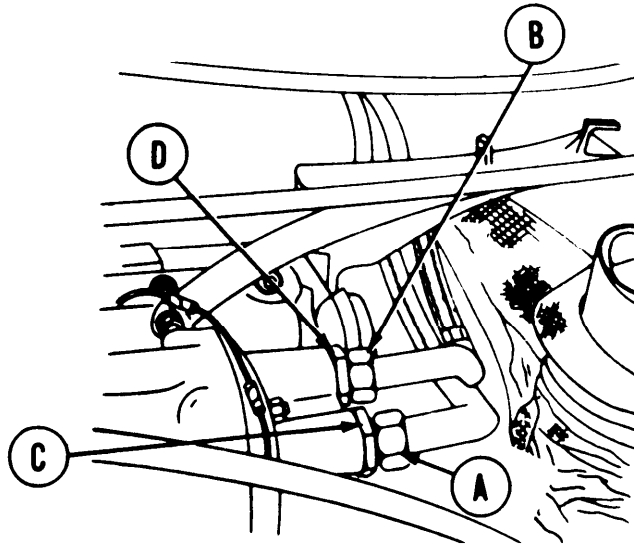
REMOVAL:

1. Place rags (Item 65, Appendix D) under tube end fittings (A) and (B) on transmission

NOTE

It may be necessary to hold adapters (C) and (D) with 1-5/8 inch wrench while removing tube end fittings (A) and (B).

2. Using 1-1/2 inch wrench, remove tube end fitting (A) from adapter (C).
3. Using 1-1/2 inch wrench, remove tube end fitting (B) from adapter (D).

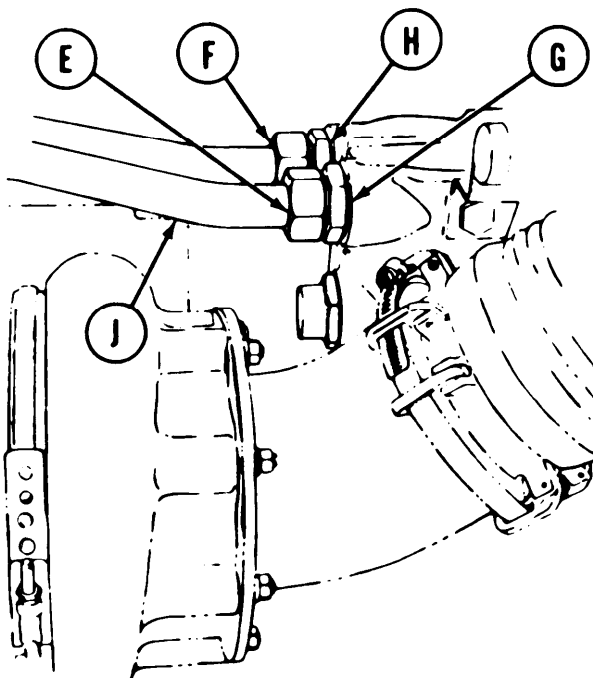


4. Place rags under tube end fittings (E) and (F) on oil cooler.

NOTE

It may be necessary to hold adapters (G) and (H) with 1-5/8 inch wrench while removing tube end fittings (E) and (F).

5. Using 1-1/2 inch wrench, remove outside tube end fitting (E) from adapter (G).
6. Using hands, displace outside tube (J).
7. Using 1-5/8 inch wrench, remove adapter (G)

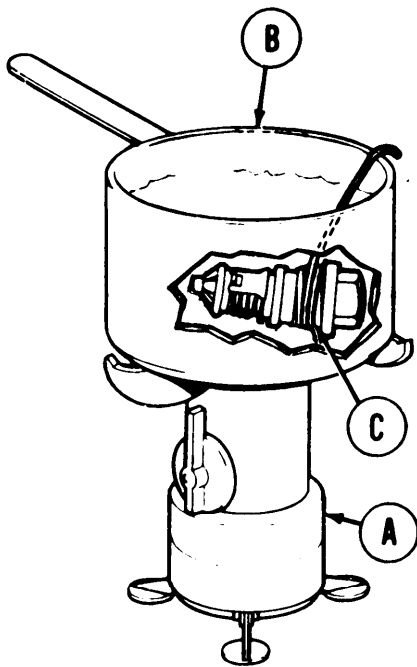
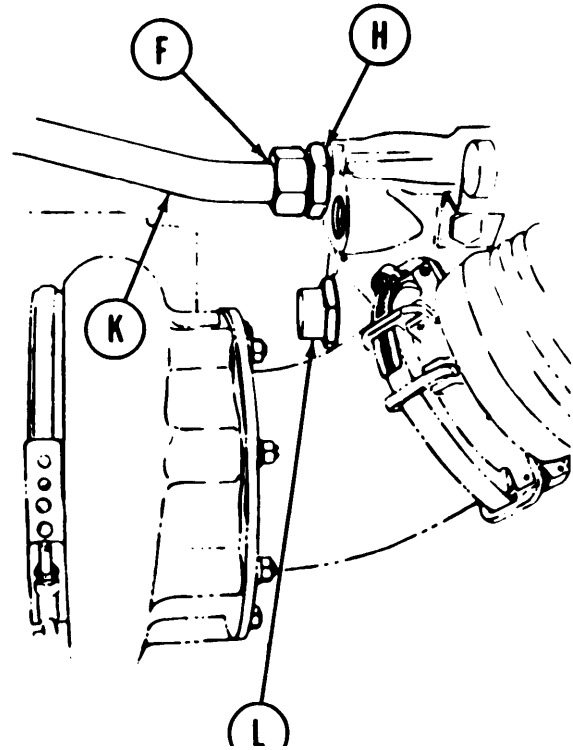


Go on to Sheet 4

TA139543

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 4 of 6)**

8. Using 1-1/2 inch wrench, remove tube end fitting (F) from adapter (H).
9. Using hands, displace tube (K).
10. Using 1-5/8 inch wrench, remove adapter (H).
11. Using automotive wrench, remove valve assembly and spacer ring (L), Throw spacer ring away.



TEST:

1. Using heat source (A), heat container (B) of clean water to boiling.
2. Using ruler, measure overall length of valve at room temperature. Write down overall length of valve.

3. Using wire, wrap one end tightly around threads (C) of valve,
4. Place valve in boiling water just so valve is covered. Let free end of wire hang over edge of container.
5. After about 30 seconds, use free end of wire to take valve out of water.

Go on to Sheet 5

TA139544

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 5 of 6)**

- Using ruler, measure overall length of valve. Write down overall length of valve.
- Compare measurements written down at room temperature and at heated temperature.

WARNING

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

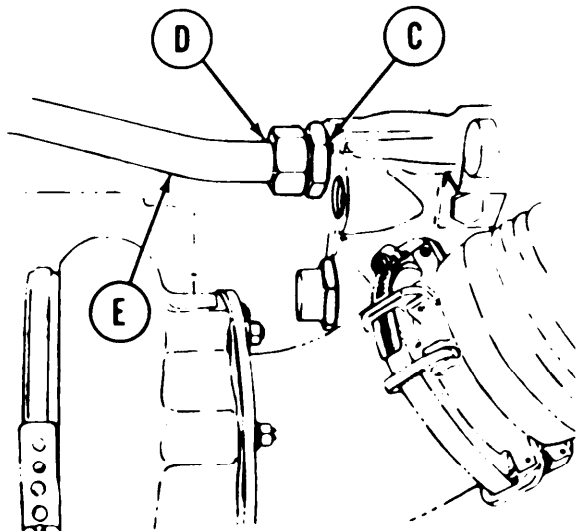
- Using low-pressure compressed air, dry valve.

NOTE

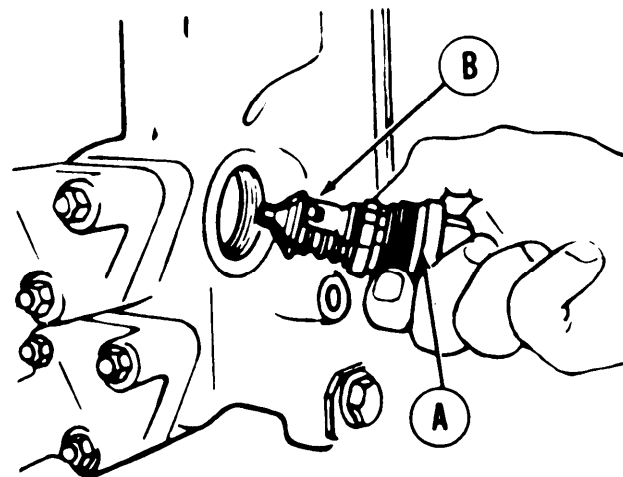
After heating, valve length must have increased by 1/4 inch minimum. If valve length increased less than 1/4 inch, throw valve away. Obtain new valve and repeat test.

INSTALLATION:

- Install new spacer ring (A) on valve (B).
- Using hands, install valve (B) to transmission oil cooler.
- Using automotive wrench, tighten valve (B).



Go on to Sheet 6

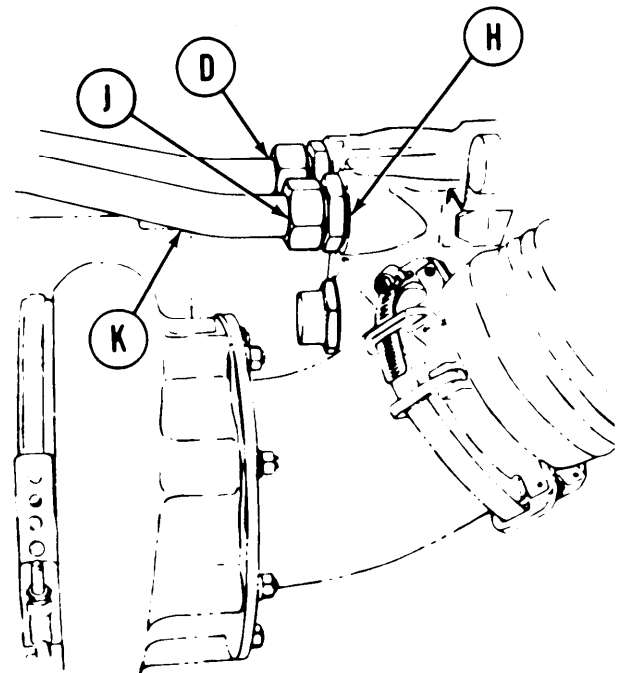
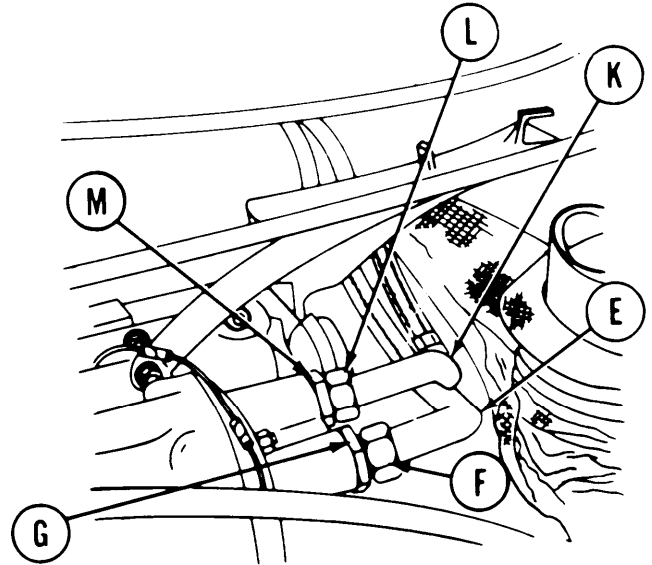


- Using 1-5/8 inch wrench, install inside adapter (C).
- Using hands, install tube end fitting (D) on adapter (C).
- Go to other end of tube (E).

TA139545

**THERMOSTATIC TRANSMISSION OIL COOLER VALVE ASSEMBLY (LEFT SIDE)
TEST AND REPLACEMENT (2D ENGINE) (Sheet 6 of 6)**

7. At other end of tube (E), using 1-1/2 inch wrench, install tube end fitting (F) on adapter (G).
8. Using 1-1/2 inch wrench, tighten tube end fitting (D) at oil cooler.
9. Using 1-5/8 inch wrench, install adapter (H).
10. Using hands, install tube end fitting (J) on adapter (H).
11. Go to other end of tube (K) and, using 1-1/2 inch wrench, install tube end fitting (L) on adapter (M).
12. Using 1-1/2 inch wrench, tighten tube end fitting (J) at oil cooler.
13. Replenish oil lost during valve assembly replacement (LO 9-2350-222-12).
14. Remove rags from transmission and oil cooler.
15. Start and run engine (TM 9-2350-222-10). Check for oil leaks.
16. Install engine shroud (page 9-3),
17. Install transmission shroud (page 9-23).



End of Task

All data on pages 6-180 thru 6-184 deleted. ■

Change 4 6-179/(6-180 blank)

**ENGINE TO TRANSMISSION OIL LINE TUBE ASSEMBLIES (INNER AND OUTER)
REPLACEMENT (2D ENGINE) (Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	6-186
Installation	6-187

TOOLS: 1-1/2 in. open end wrench
 1-5/8 in. open end wrench (5120-00-203-4802)
 1-5/8 in. socket with 3/4 in. drive
 Adapter, 1/2 in. female to 3/4 in. male
 Handle with 3/4 in. drive
 Torque wrench with 1/2 in. drive (0-175 ft-lb) (0-62•N m)

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

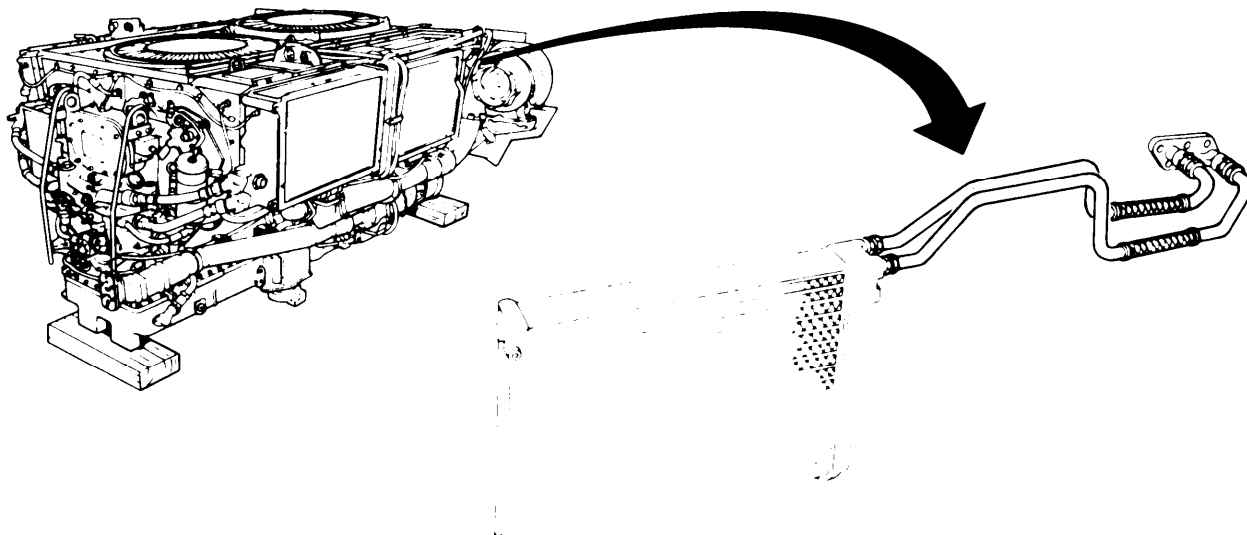
SUPPLIES: Masking tape (Item 57, Appendix D)
 Plastic barrier material (Item 41, Appendix D)
 Rags (Item 65, Appendix D)
 Gasket (4 required)

REFERENCE: LO 9-2350-222-12

PRELIMINARY PROCEDURES: Remove powerplant (page 5-25)
 Remove engine shroud (page 9-2)
 Remove rear engine shroud support (page 9-4)

NOTE

Right side shown, left side identical.



Go on to Sheet 2

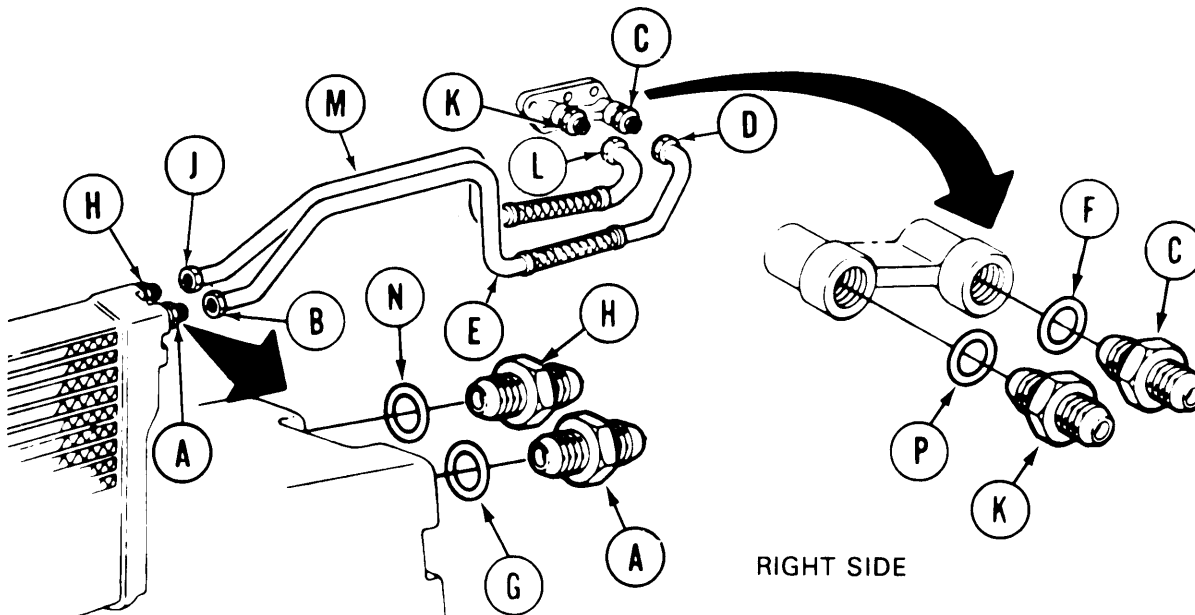
**ENGINE TO TRANSMISSION OIL LINE TUBE ASSEMBLIES (INNER AND OUTER)
REPLACEMENT (2D ENGINE) (Sheet 2 of 4)**

NOTE

Upon removing tubes and fittings, seal powerplant openings with plastic barrier material (Item 41, Appendix D) and masking tape (Item 57, Appendix D) to prevent unnecessary exposure to moisture and contamination. Remove plastic barrier material and masking tape when installing tubes and fittings.

REMOVAL:

1. Put rags under oil line disconnect points to catch oil when lines are disconnected.
- 1.1. Using 1-5/8 inch wrench to hold adapter (A), use 1-1/2 inch wrench and loosen connector (B).
2. Using 1-5/8 inch wrench to hold adapter (C), use 1-1/2 inch wrench and loosen connector (D).
3. Using hands, disconnect and remove tube (E) from powerplant.



4. Using 1-5/8 inch socket, remove adapters (A) and (C) and gaskets (F) and (G). Throw gaskets away.
5. Using 1-5/8 inch wrench to hold adapter (H), use 1-1/2 inch wrench and loosen connector (J).
6. Using 1-5/8 inch wrench to hold adapter (K), use 1-1/2 inch wrench and loosen connector (L).
7. Using hands, disconnect and remove tube (M) from powerplant.
8. Using 1-5/8 inch socket, remove adapters (H) and (K) and gaskets (N) and (P). Throw gaskets away.

Go on to sheet 3

ENGINE TO TRANSMISSION OIL LINE TUBE ASSEMBLIES (INNER AND OUTER) REPLACEMENT (2D ENGINE) (Sheet 3 of 4)

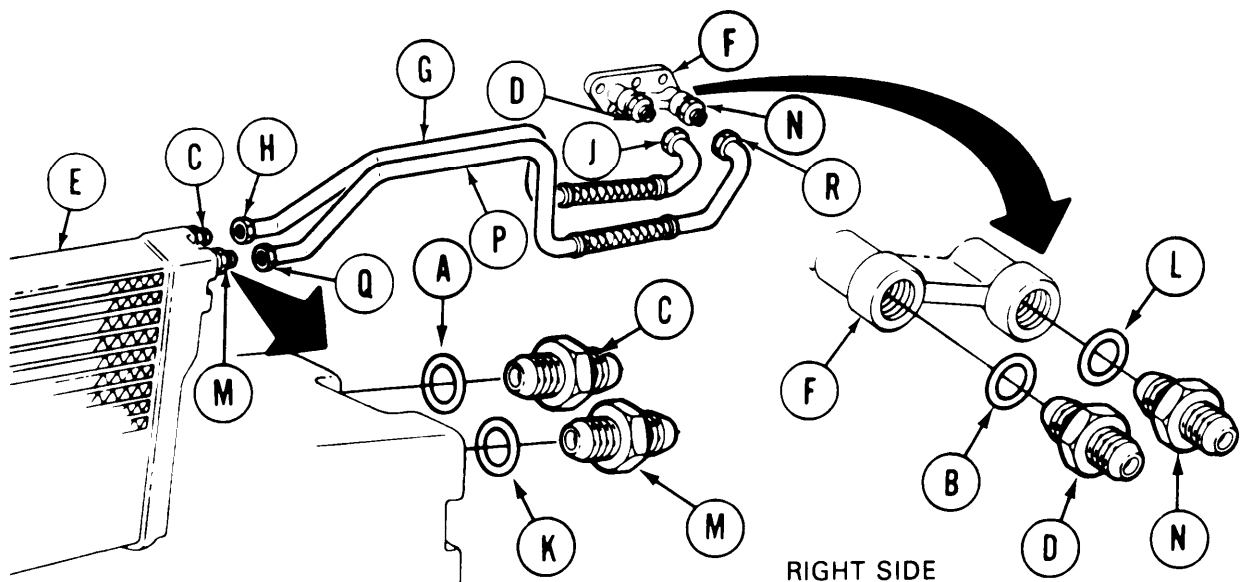
INSTALLATION:

1. Position new gaskets (A) and (B) onto adapters (C) and (D).
2. Using 1-5/8 inch socket, install adapter (C) into oil cooler (E) and adapter (D) into transmission mount (F).
3. Using 1-5/8 inch socket, adapter, and torque wrench, tighten adapters (C) and (D) to 50 lb-ft (67.7 N•m).

CAUTION

Do not allow adapters to turn when tightening oil cooler line tube nuts. Do not overtighten tube nuts. Damage to the transmission oil coolers could result.

4. Position tube (G) through engine shroud and, using 1-5/8 inch wrench to keep adapters (C) and (D) from turning, use a 1-1/2 inch wrench to tighten tube nuts (H) and (J) onto the adapters.



5. Position new gaskets (K) and (L) onto adapters (M) and (N).
6. Using 1-5/8 inch socket, install adapter (M) into oil cooler (E) and adapter (N) into transmission mount (F).
7. Using 1-5/8 inch socket, adapter, and torque wrench, tighten adapters (M) and (N) to 50 lb-ft (67.7 N•m).
8. Position tube (P) through engine shroud and, using 1-5/8 inch wrench to keep adapters (M) and (N) from turning, use 1-1/2 inch wrench to tighten tube nuts (Q) and (R) onto the adapters.

Go on to Sheet 4

**ENGINE TO TRANSMISSION OIL LINE TUBE ASSEMBLIES (INNER AND OUTER)
REPLACEMENT (2D ENGINE) (Sheet 4 of 4)**

9. Remove rags placed under oil line disconnect points.
10. Replenish oil lost during oil line tube assemblies removal (LO9-2350-222-12).
11. Connect powerplant for powerplant ground hop (page 5-48).
12. Start and run engine (TM 9-2350-222-10). Check for oil leaks at oil cooler and transmission oil line tube assembly connections.
13. Shut down engine (TM 9-2350-222-10). Disconnect powerplant from ground hop kit (page 5-62).
14. Install engine shroud (page 9-3).
15. Install rear engine shroud support (page 9-5).
16. Install powerplant (page 5-37).

End of Task

ENGINE OIL COOLER INLET OR OUTLET HOSE REPLACEMENT (Shoot 1 of 3)

TOOLS: 9/16 in. combination box and open end wrench
3/8 in. combination box and open end wrench
1-1/2 in. open end wrench
9/16 in. open end wrench
3/4 in. combination box and open end wrench
Flat-tip screwdriver
Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N-m)
3/4 in. socket with 3/8 in. drive
Drip pan

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Dry cleaning solvent (Item 55, Appendix D)
Washer (NAS1598-6V)

REFERENCES: TM 9-2350.222-10
LO 9-2350-222-12

PRELIMINARY PROCEDURE: Remove powerplant (page 52)

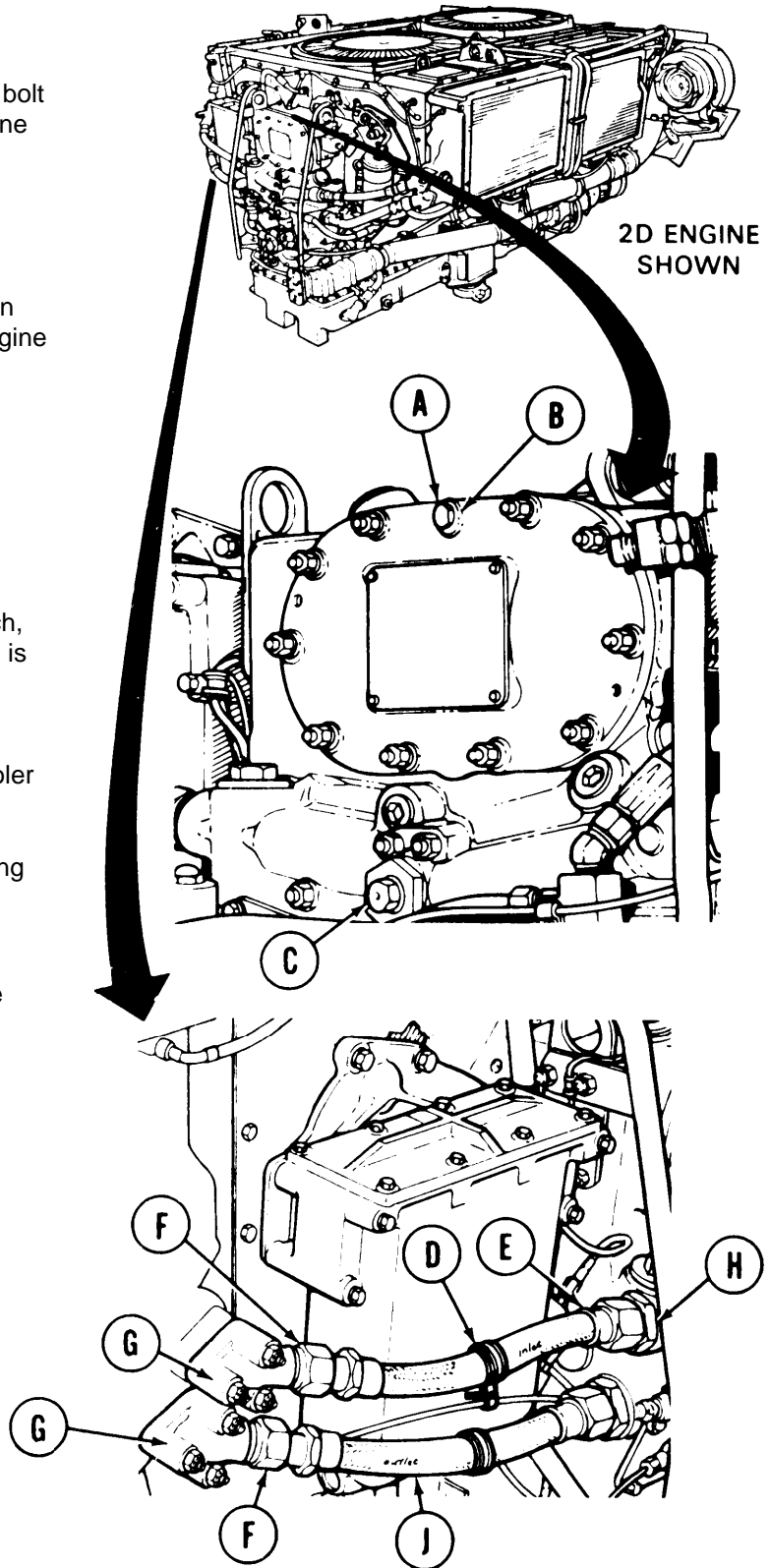
NOTE

This procedure is to be used to replace either the inlet or outlet oil line to either the left or right engine oil cooler.

ENGINE OIL COOLER INLET OR OUTLET HOSE REPLACEMENT (Sheet 2 of 3)

REMOVAL:

1. Using 9/16 inch wrench, remove vent bolt (A) and sealing washer (B) (on 2D engine only).
2. Throw washer (B) away (on 2D engine only).
3. Using 3/4 inch wrench, loosen oil drain valve (C) six complete turns (on 2D engine only).
4. Using screwdriver and 3/8 inch wrench, remove clamp (D) on hose (E) if clamp is attached to hose. If clamp (D) is not attached to hose (E), go to step 5.
5. Position drip pan under engine oil cooler connector (G).
6. Using 1-1/2 inch wrench, remove fitting (F) from connector (G).
7. Using 1-1/2 inch wrench on hose (E) or (J) and 9/16 in. wrench on fitting (H), remove hose (E) or (J).



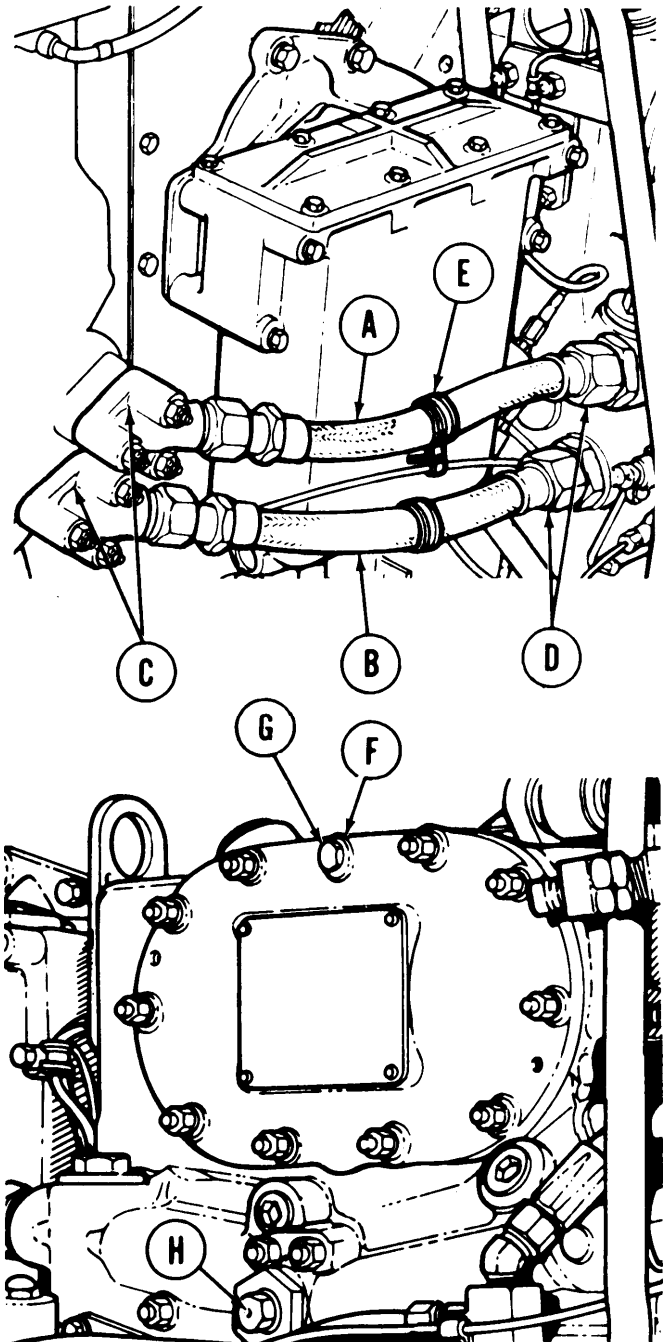
Go on to Sheet 3

TA253183

ENGINE OIL COOLER INLET OR OUTLET HOSE REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. Using 1-1/2 inch wrench, install hose (A) or (B) to connector (C).
2. Using 1-1/2 inch wrench, install hose (A) or (B) while holding fitting (D) with 9/16 in. wrench.
3. Using screwdriver and 3/8 inch wrench, install clamp (E) on hose (A) if removed during disassembly.
4. Position new sealing washer (F) over vent hole (on 2D engine only).
5. Using 9/16 inch wrench, install vent bolt (G) through new washer (F) (on 2D engine only).
6. Using socket and torque wrench, tighten drain valve (H) to a minimum of 150 lb-in (17 N·m). Do not overtighten. (On 2D engine only)
7. Perform ground hop (page 5-48). Run engine at idle until oil temperature is in normal operating range (TM 9-2350-222-10).
8. Check oil level. Add oil as required (LO9-2350-222-12).
9. Disconnect ground hop kit (page 5-62).
10. Install (2A powerplant, page 5-14) (2D powerplant, page 5-37).



End of Task

TA253184

OIL COOLERS - CLEANING (Sheet 1 of 3)

TOOLS: Oil cooler cleaning tool

SUPPLIES: Detergent (Item 33, Appendix D)
Water source
50 to 90 psi air supply
Water hose
Goggles (Item 74, Appendix D)

SPECIAL TOOLS: Oil cooler cleaner (Item 32, Chapter 3, Section I)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Remove top deck (pages 16-20)
Remove engine shroud (page 9-2)
Remove engine access covers (page 6-81 or 6-90)

Open hull drains (TM 9-2350-222-10)

CLEANING:

WARNING

Always wear safety glasses or goggles when cleaning oil coolers to prevent dirt particles and cleaning agent from splashing in eyes.

NOTE

The oil cooler cleaning tool will clean the two engine oil coolers as well as the two transmission oil coolers with the powerplant in or out of the vehicle.

If oil coolers are to be cleaned with powerplant removed, oil cooler screens must be removed as part of preliminary procedures (pages 6-118 and 6-1 20).

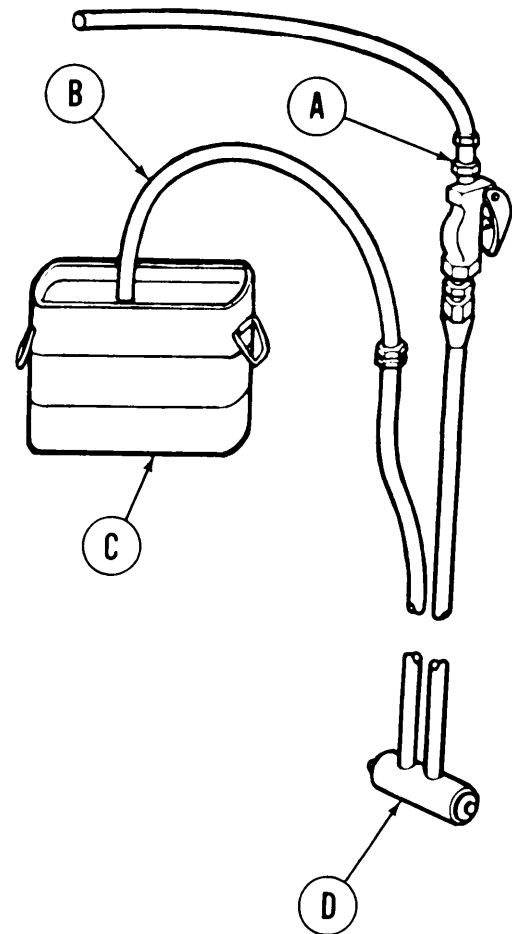
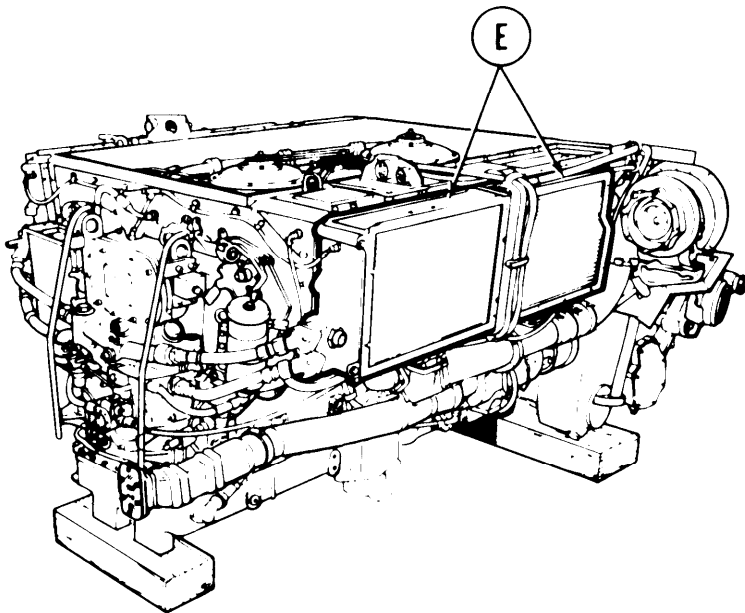
Go on to Sheet 2

OIL COOLERS - CLEANING (Sheet 2 of 3)

NOTE

If powerplant is installed in vehicle, all preliminary procedures must be accomplished prior to cleaning. For cleaning coolers in or out of vehicle, make sure oil filter and indicator covers are tightly closed. Cover all exposed engine openings.

1. Connect oil cooler cleaner (Item 32, Chapter 3, Section I) air inlet (A) to a 50 to 90 psi air supply.
2. Mix one part detergent to approximately five parts of water as cleaning solution. Insert siphon hose (B) into cleaning solution container (C).
3. Position cleaner head (D) behind oil cooler fins (E) with spray holes toward fins.



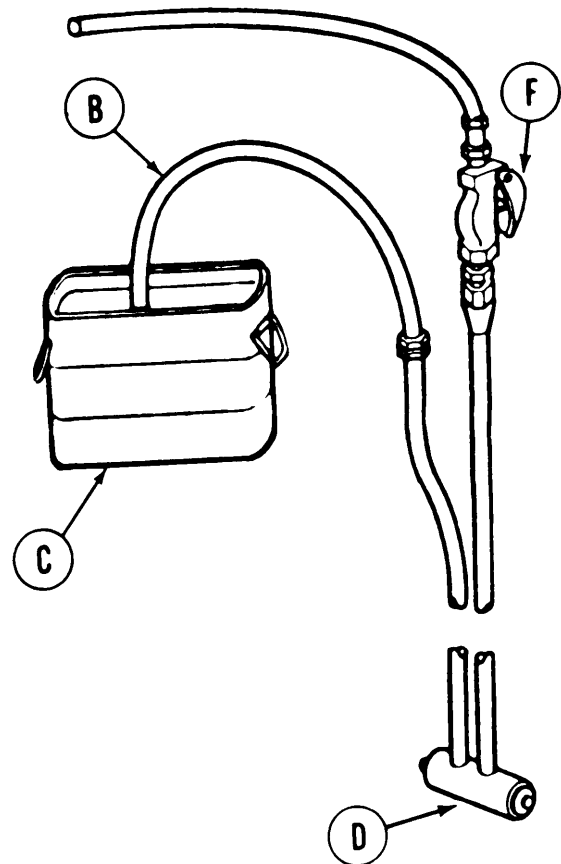
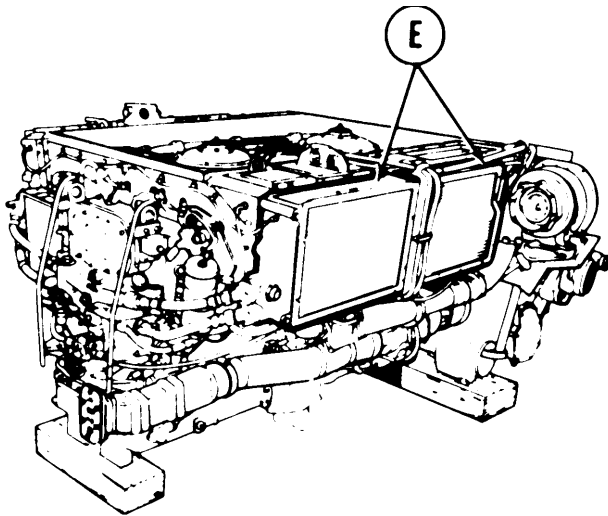
Go on to Sheet 3

OIL COOLERS - CLEANING (Sheet 3 of 3)

4. Squeeze lever (F) to obtain an air-liquid mixture and spray fins (E) with cleaning solution. Allow time for solution to soak between oil cooler fins.
5. Clean oil coolers by alternately moving cleaner head (D) from left to right and up and down. Cleaning solution flows freely through entire oil cooler area.

NOTE

If oil coolers were cleaned with powerplant installed, use hose and water to make sure oil cooler screens are clear.



6. When oil cooler fins (E) are clean, use hose to flush with water.
7. Dry all parts with air by removing end of siphon hose (B) from cleaning solution container (C) and squeezing lever (F).
8. Remove engine opening protective coverings.
9. Close hull drains (TM 9-2350-222-10).
10. Install engine access covers 2A engine (page 6-80 or 6-88) or 2D engine (page 6-84 or 6-93).
11. Install engine shroud (page 9-3).
12. Install screens, if removed (pages 6-119 or 6-121).
13. Install top deck (page 16-23).

End of Task

TA139557

CHAPTER 7
FUEL SYSTEM MAINTENANCE INDEX

PROCEDURE	PAGE
Purge Fuel System (2D Engine)	7-10
Inspect Fuel Injector Nozzles and Holders	7-12
Fuel Return Lines Replacement (2DEngine)	7-22
Tube Assembly (Fuel Injection Pump Inlet to Bulkhead Elbow) Replacement	7-32
Engine Fuel Pump Replacement	7-37
Fuel Backflow Valve Replacement	7-41
Primary Fuel Filter Outlet-to-Fuel Backflow Valve Hose Assembly Replacement (2D Engine)	7-50
Fuel Pump Replacement - Left Fuel Tank	7-52
Fuel Pump Replacement - Right Fuel Tank	7-61
Personnel Heater Fuel Pump Replacement	7-67
Air Cleaner Turbocharger Elbow Replacement	7-70
Air Cleaner Outlet Hose Replacement	7-73
Air Cleaner Outlet Elbow Replacement	7-76
Air Cleaner (Left and Right) Restriction Indicator Replacement	7-78
Air Cleaner Intake Elbow Replacement	7-79
Air Cleaner Intake and Hose Replacement	7-82
Air Cleaner Replacement (Top Loading)	7-93
Air Cleaner Door Replacement (Top Loading)	7-103

FUEL SYSTEM MAINTENANCE INDEX - Continued

PROCEDURE	PAGE
Air Cleaner Filter Element Cleaning Or Replacement (Top Loading)	7-110
Air Cleaner Plug Replacement	7-116
Air Cleaner (Armored) Circuit Breaker Replacement	7-133
Air Cleaner (Armored) Blower Fan Power Lead Replacement	7-134
Air Cleaner (Armored) Blower Fan Hose Replacement	7-137
Air Cleaner (Armored) Blower Fan Ground Lead Replacement	7-138
Air Cleaner (Armored) Blower Fan Replacement	7-140
Air Cleaner (Armored) Blower Cover and Gasket Replacement	7-147
Air Cleaner Manifold Cover and Gasket Replacement	7-148.2
Air Cleaner Manifold and Related Parts Replacement	7-148.4
Dust Detector Pressure Switch and Bracket Replacement	7-148.8
Dust Detector Filter Strip and Cover Replacement	7-148.12
Service Dust Detector Filter Strip	7-148.15
Air Pressure Hose Assemblies Replacement	7-148.17
Fuel Tank Repair	7-150
Draining Fuel Tank and Removing Condensate	7-152

FUEL SYSTEM MAINTENANCE INDEX - Continued

PROCEDURE	PAGE
Fuel Tank (Right) Filler Repair	7-159
Fuel Tank (Left) Emergency Filler Repair	7-165
Fuel Tank (Left and Right) Level Gage Transmitter Replacement	7-167
Fuel Tank (Left and Right) Condensate Relief Valve Replacement	7-171
Fuel Tank Plug and Bracket Replacement	7-175
Fuel Tank to Air Cleaner Vent Replacement	7-178
Fuel Tank Breather Line Replacement	7-184
Fuel Tank (Left and Right) Drain Plug Replacement	7-189
Fuel Tank Crossover Valve Replacement	7-190
Fuel Shutoff Valve, Lever, Link, and Bracket Replacement (Early Model)	7-197
Fuel Shutoff Handle Replacement	7-206
Fuel Shutoff Cable Mounting Bracket Replacement (Early Model)	7-208
Fuel Shutoff Cable Mounting Bracket Replacement (Late Model)	7-212
Fuel Tank (Left) Engine Outlet Tube Assembly Replacement	7-212.6
Fuel Tee to Engine Hose Assembly Replacement	7-216
Primer Pump Fuel Inlet or Outlet Hose Assembly Replacement (Early Model)	7-221
Primer Pump-to-Bulkhead Union Fuel Lines Replacement (Early Model)	7-223
Inter-Tank Swing Check Valve Replacement	7-235
Engine Fuel Return Tube Assembly Replacement	7-240
Fuel Return Hose (Right Fuel Tank) Replacement	7-242
Engine Fuel Return Hose Replacement	7-244
Fuel Return Tube Assembly (Right Fuel Tank) Replacement	7-246
Fuel Return Hose (Left Fuel Tank) Replacement	7-249

FUEL SYSTEM MAINTENANCE INDEX - Continued

PROCEDURE	PAGE
Engine Fuel Return Tube Replacement	7-251
Engine Fuel Return Selector Cock Replacement	7-253
Engine Fuel Return Selector Cock Instruction Plate Replacement	7-257
Fuel-Water Separator Operational Tests (2D Engine)	7-266
Fuel-Water Separator Fluid Pressure Filter Replacement	7-277
Primary Fuel Filter Replacement (2D Engine)	7-288
Fuel Inlet Fluid Pressure Filter Replacement	7-291
Fuel Inlet Fluid Pressure Filter Repair	7-294
Fuel-Water Separator Fuel Filter Outlet Hose Assembly Replacement	7-296
Fuel Pump-to-Fuel-Water Separator Hose Assembly Replacement	7-299
Fuel-Water Separator Drain Solenoid Wiring Harness Replacement (2D Engine)	7-304
Fuel-Water Separator Drain Solenoid Valve Replacement (2D Engine)	7-305
Fuel-Water Separator Drain Lines Replacement (2D Engine)	7-308
Fuel-Water Separator Control Assembly Replacement (2D Engine)	7-314
Fuel-Water Separator Filter Element Replacement	7-322
Primary Fuel Filter Element Replacement (2D Engine)	7-332
Primer Pump Fuel Lines Replacement (Late Model)	7-337
Primer Pump-to Nipple Fuel Outlet Tube Assembly Replacement (Late Model)	7-343
Primer Pump-to-Tee Fuel Line Assembly Replacement (Late Model)	7-348

FUEL SYSTEM MAINTENANCE INDEX - Continued

PROCEDURE	PAGE
Primer Inlet Fuel Tube Assembly (Nipple-to-Filter) Replacement (Late Model)	7-350
Personnel Heater Fuel Line Replacement (Late Model)	7-353
Personnel Heater Fuel Line Replacement (Early Model)	7-354.1
Hull Primer Fuel Line to Engine Hose Replacement (Late Model)	7-356
Fuel Primer Engine Feed Tube Assembly Replacement (Late Model)	7-357
Primer Pump Replacement (Early Model)	7-358.3
Primer Pump Replacement (Late Model)	7-359
Manifold Heater Operational Check	7-363
Manifold Heater (Left and Right) Replacement	7-365
Manifold Heater Nozzle Replacement	7-369
Manifold Heater Spark Plug Replacement	7-372
Manifold Heater Return Fuel Check Valve Replacement	7-373
Manifold Heater Fuel Return Solenoid Valve Replacement	7-376
Manifold Heater (Left and Right Bank) Fuel Return Tube Assembly Replacement	7-381
Manifold Heater Fuel Return Tube Assembly Replacement	7-388
Manifold Heater Ignition Coil and Cable Replacement (2D Engine)	7-394
Manifold Heater Input Solenoid Valve and Fuel Line Replacement	7-397
Input Fuel Line Replacement	7-397
Input Solenoid Valve Replacement	7-402
Manifold Heater Fuel Filter, Element and Input Fuel Line Replacement	7-407
Fuel Filter Replacement	7-407
Fuel Filter Element Replacement	7-412
Fuel Filter Input Fuel Line Replacement	7-414
Accelerator Linkage Adjustment	7-415
Engine Idle Adjustment	7-423
Accelerator Pedal Return Spring Adjustment	7-424
Accelerator Foot Pedal Lock Assembly Replacement	7-426

FUEL SYSTEM MAINTENANCE INDEX - Continued

PROCEDURE	PAGE
Accelerator Crossover Rod Assembly Replacement	7-429
Accelerator Lever Assembly Replacement	7-435
Accelerator Connecting Link Assembly Replacement	7-438
Accelerator Tube Assembly Replacement	7-442
Accelerator Pedal Assembly Replacement	7-446
Accelerator Connecting Link Replacement	7-450
Accelerator Bulkhead Flange Assembly Nut Replacement	7-451
Accelerator Bulkhead Flange Assembly Nut Repair	7-455

■ All data on pages 7-7 thru 7-9 deleted.

PURGE FUEL SYSTEM (2D ENGINE) (Sheet 1 of 2)

TOOLS: 7/16 in. combination box and open end wrench
Flashlight

PERSONNEL: Two

REFERENCE: TM 9-2350-222-10

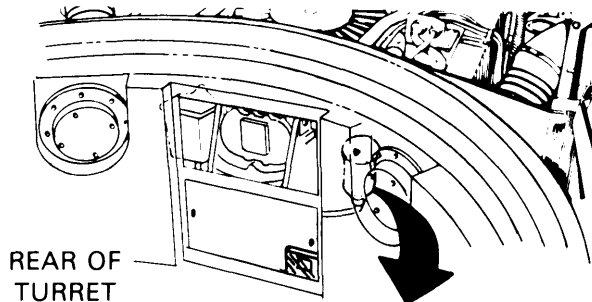
PRELIMINARY PROCEDURE: Remove upper engine access cover (page 16-40)

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 OF VEHICLE.'

PURGING:

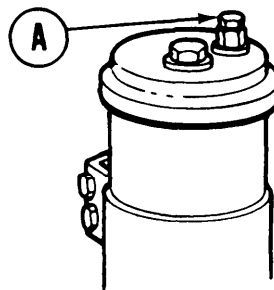
1. Using wrench and flashlight, reach through access and loosen fuel filter bleed cap (A).
2. Set FUEL PUMP switch to ON (TM 9-2350-222-10).
3. Set MASTER BATTERY switch to ON (TM 9-2350-222-10).



NOTE

If no air bubbles are observed in step 4, go to step 7.

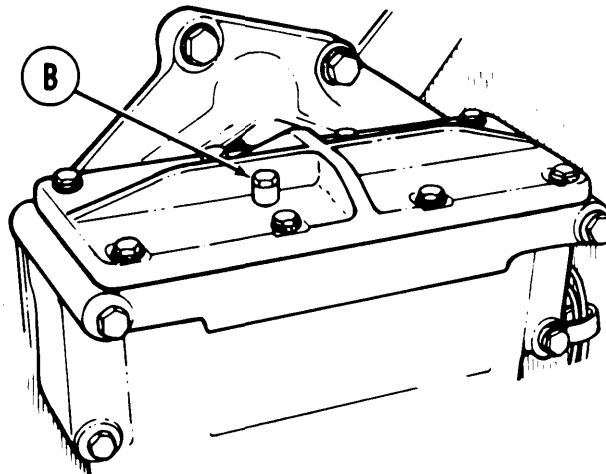
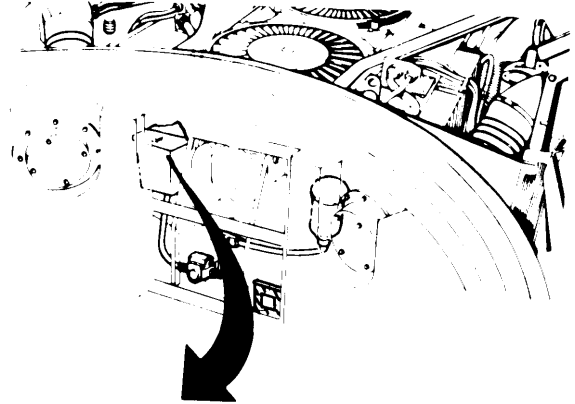
4. Observe for air release bubbles from bleed cap (A).
5. Set MASTER BATTERY switch to OFF (TM 9-2350-222-10).
6. Wait approximately 1 minute, then repeat steps 3 and 4 until a constant fuel flow is observed from fluid cap (A).
7. Using wrench, tighten bleed cap (A).
8. Set MASTER BATTERY and FUEL PUMP switches to OFF (TM 9-2350-222-10).



Go on to Sheet 2

PURGE FUEL SYSTEM (2D ENGINE) (Sheet 2 of 2)

9. Using wrench and flashlight, reach through access and loosen fuel-water separator bleed cap (B).
10. MANUALLY operate primer pump handle (TM 9-2350-222-10).
11. Observe air release bubbles from fuel-water separator bleed cap (B).
12. Continue to operate primer pump until a constant fuel flow is observed from bleed cap (B).
13. Using wrench, close bleed cap (B).
14. Install engine upper access cover (page 16-40).



End of Task

TA141536

INSPECT FUEL INJECTOR NOZZLES AND HOLDERS (Sheet 1 of 3)

TOOLS: Ratchet with 1/2 in. drive
1-1/4 in. socket with 1/2 in. drive
Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N·m)

SPECIAL TOOLS: Fan rotor hub spacer (2) (Item 2, Chapter 3, Section I) (2 required)
Open end wrench (Item 3, Chapter 3, Section I)

PERSONNEL: Two

REFERENCE: TM 9-2350-222-10

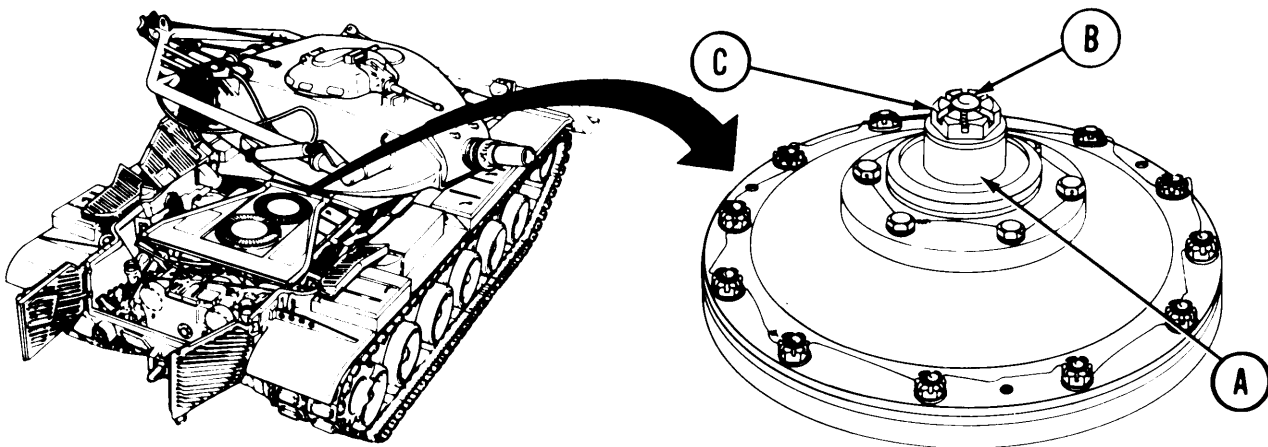
PRELIMINARY PROCEDURES: Remove engine cooling fan (page 9-48)
Remove engine access cover (right bank) (2A engine, page 6-79) (2D engine, page 6-81)
Remove engine access cover (left bank) (2A engine, page 6-86) (2D engine, page 6-90)

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 OF VEHICLE."

INJECTOR NOZZLE AND HOLDER TIGHTENING:

1. Using socket, install fan rotor hub spacers (A) on fan drive shafts (B) and secure with nuts (C).



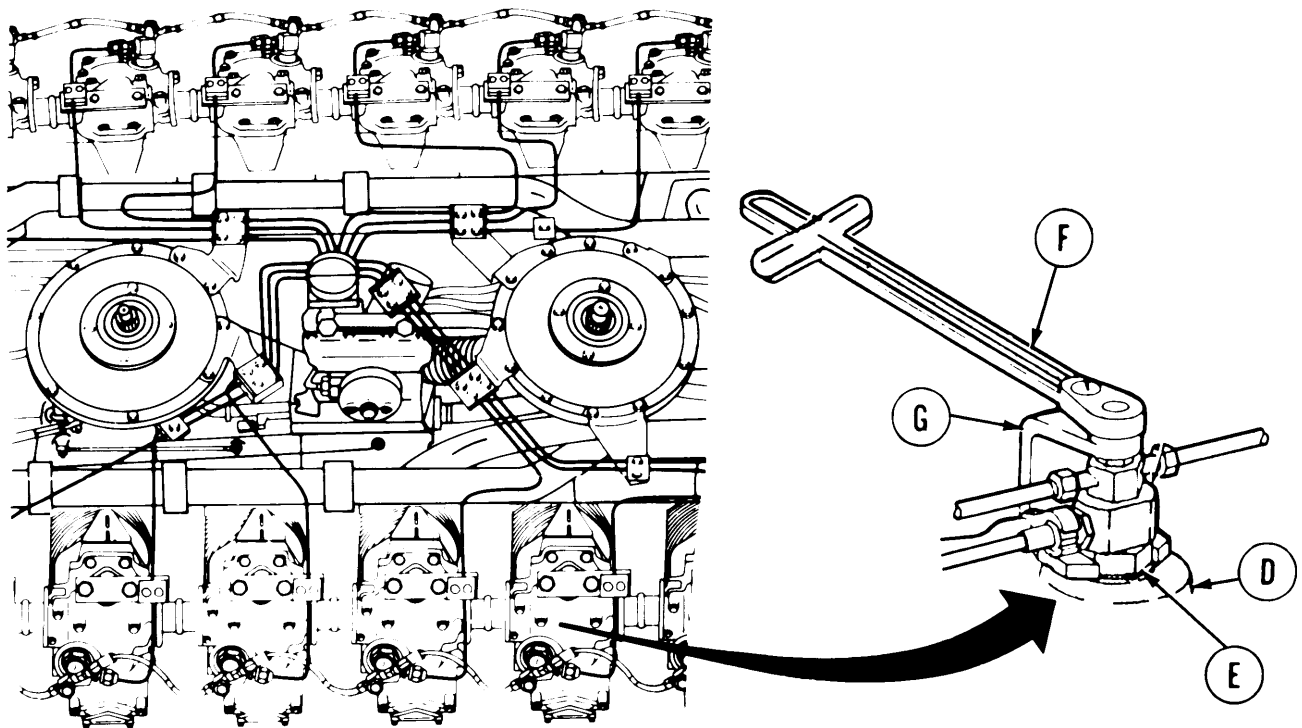
Go on to Sheet 2

INSPECT FUEL INJECTOR NOZZLES AND HOLDERS (Sheet 2 of 3)

CAUTION

Do not exceed 700 to 750 rpm and do not run engine for more than 10 minutes at a time. Before restarting, allow engine to cool.

2. Start engine (TM9-2350-222-10).
3. Place hand between nozzle heads (D) and top of holders (E) on each fuel injector. If movement is felt, stop the engine.
4. Using torque wrench (F) and open end wrench (G) torque nozzle holders (E) to 42 lb-ft (57 N·m).

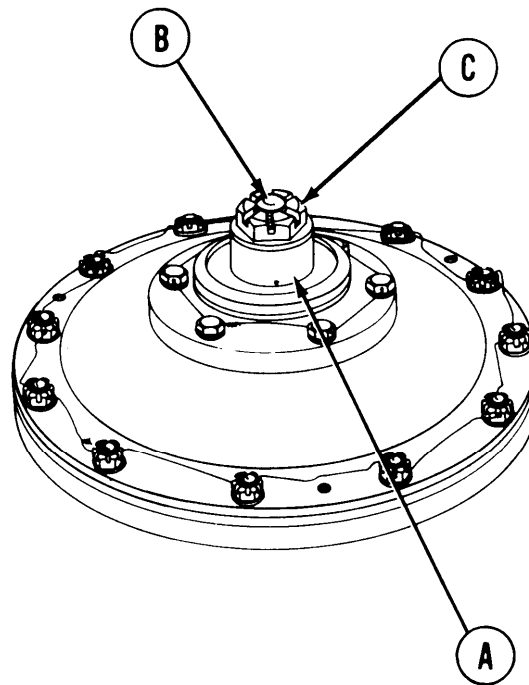


5. Start engine (TM 9-2350-222-10).
6. Place hand between nozzle heads (D) and top of holders (E) on each fuel injector. If movement is still felt, notify support maintenance.

Go on to Sheet 3

INSPECT FUEL INJECTOR NOZZLES AND HOLDERS (Sheet 3 of 3)

7. Using 1-1/4 inch socket, remove nut (C) and fan rotor hub spacers (A) from fan drive shaft (B).
8. Install cooling fans (page 9-49).



End of Task

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 1 of 10)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-23
Cleaning and Inspection	7-26
Installation	7-27

TOOLS: 1/2 in. socket with 1/2 in. drive
 9/16 in. combination box and open end wrench
 Ratchet with 1/2 in. drive
 11/16 in. socket with 1/2 in. drive
 7/8 in. combination box and open end wrench
 1-1/8 in. open end wrench
 5 in. extension with 1/2 in. drive
 1/2 in. combination box and open end wrench
 7/16 in. combination box and open end wrench
 3/4 in. combination box and open end wrench
 15/16 in. combination box and open end wrench
 Flat-tip screwdriver
 Drip pan

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Lockwasher
 Washer (12 required)
 Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURES: Remove cooling fans (page 9-48)
 Remove engine access cover (left bank) (page 6-90)
 Remove engine access cover (right bank) (page 6-81)

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 OF VEHICLE."

Go on to Sheet 2

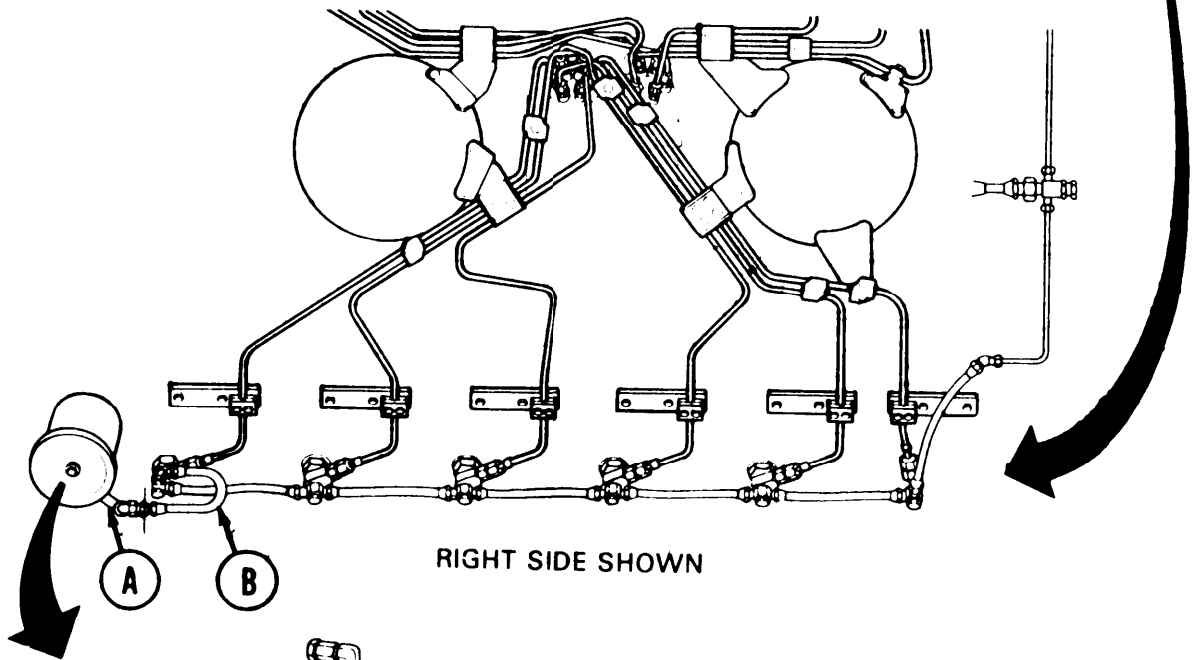
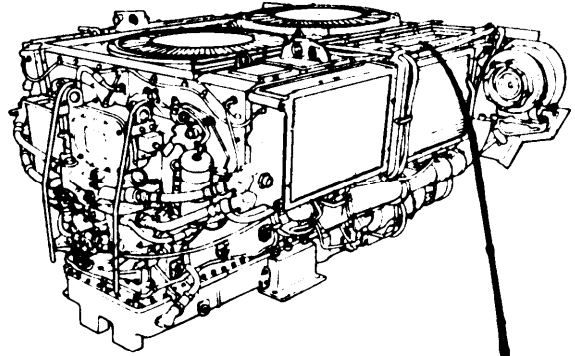
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FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 2 of 10)

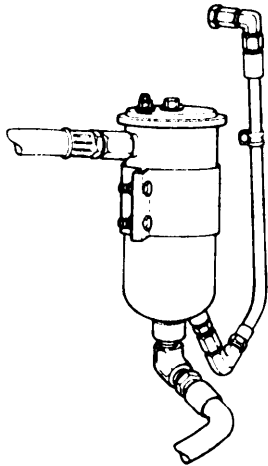
REMOVAL:

NOTE

Left and right side fuel return lines are removed the same except for fuel return lines (A) and (B) on right side. For left side fuel return lines removal, go to step 5, skipping steps 1 through 4.



RIGHT SIDE SHOWN

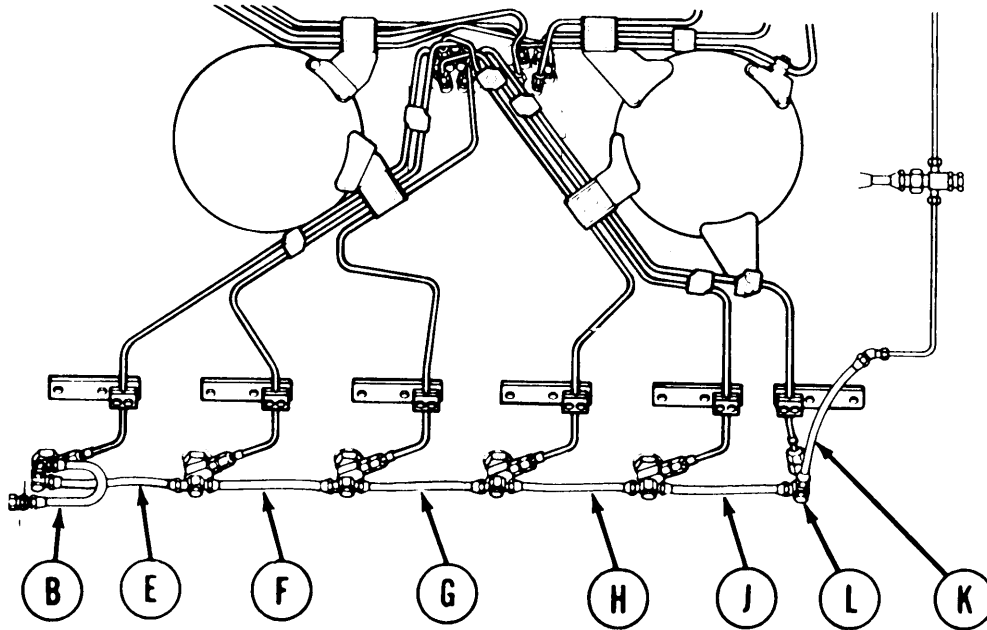


1. Using 1/2 inch wrench, remove screw and lockwasher (C) securing clamp (D). Throw lockwasher away.
2. Place drip pan under fuel filter (E).
3. Using 9/16 inch wrench, disconnect fuel return line (A) at fuel filter (E) and let fuel drain.
4. Using 9/16 inch wrench, remove fuel return line (A).
6. Remove clamp (D) from fuel return line (A).

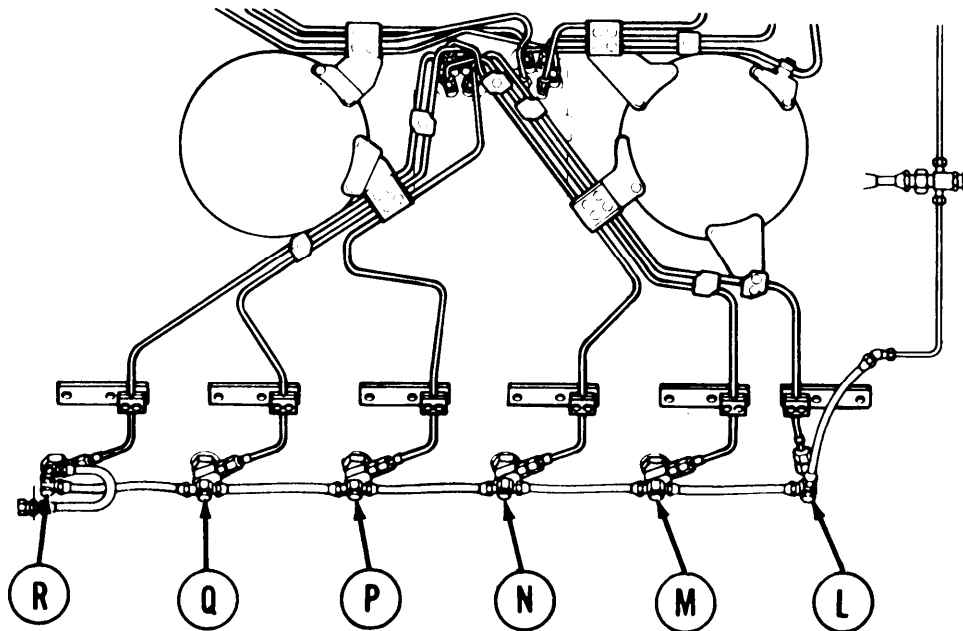
Go on to Sheet 3

TA141499

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 3 of 10)



6. Using 9/16 inch wrench, remove fuel return line (B).
7. Using 9/16 inch wrench, remove fuel return lines (E), (F), (G), (H), and (J).
8. Using 9/16 inch wrench, disconnect fuel return line (K) from connector (L).

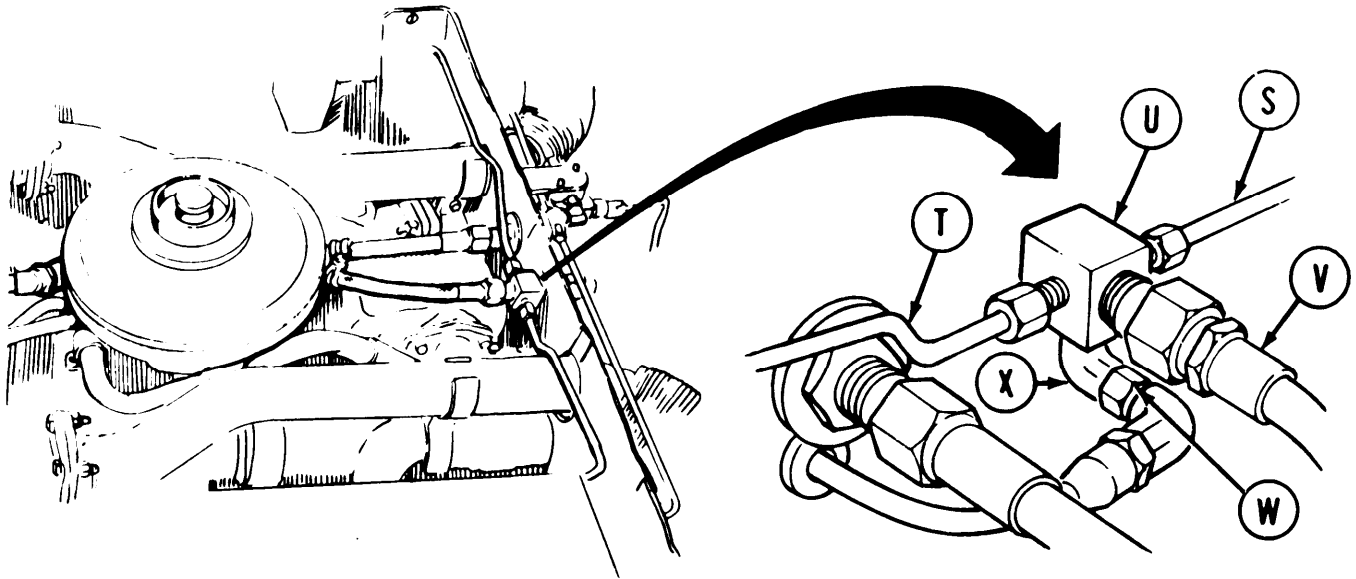


9. Using 11/16 inch socket, remove bolts, washers, and connectors (L) (M), (N), (P), (Q), and (R). Throw washers away.

Go on to Sheet 4

TA141548

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 4 of 10)



10. Using 9/16 inch wrench, disconnect fuel return lines (S) and (T) from cross tube (U).
11. Using 7/8 inch wrench, disconnect fuel return line (V) from cross tube (U).
12. Using 9/16 inch wrench, disconnect hose (W) from elbow (X).

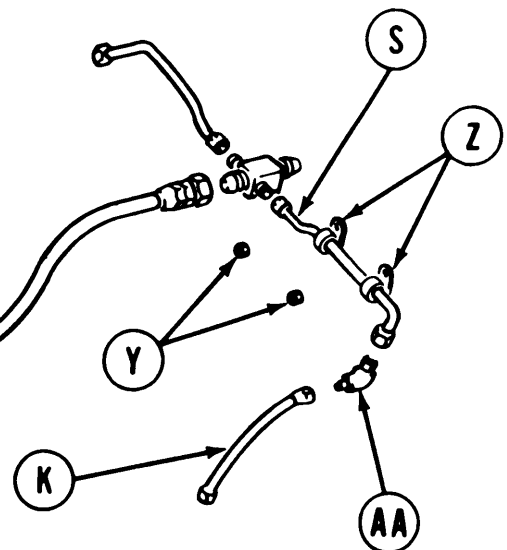
13. Using 1/2 inch socket and 1/2 inch wrench, remove two nuts (Y) securing two clamps (Z).

14. Remove fuel return lines (K) and (S) from engine.

15. Using screwdriver, remove two clamps (Z) from fuel return line (S).

16. Using 7/16 inch wrench on elbow (AA) and 9/16 inch wrench on fuel return line (K), remove fuel return line (K).

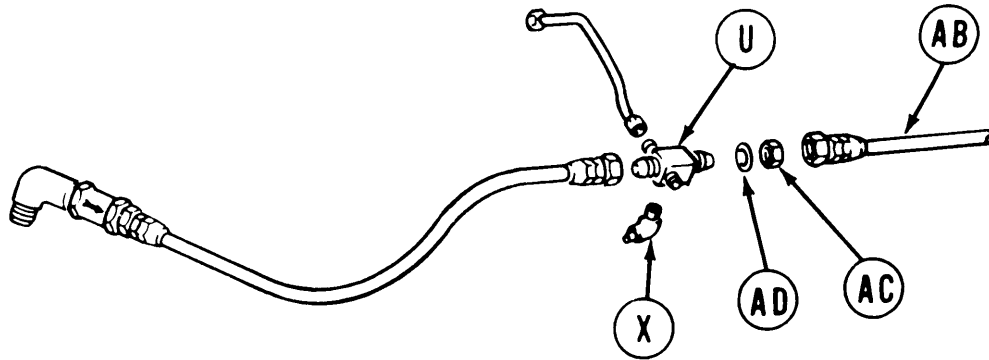
17. Using 1/2 inch wrench on elbow (AA) and 9/16 inch wrench on fuel return line (S), remove fuel return line (S).



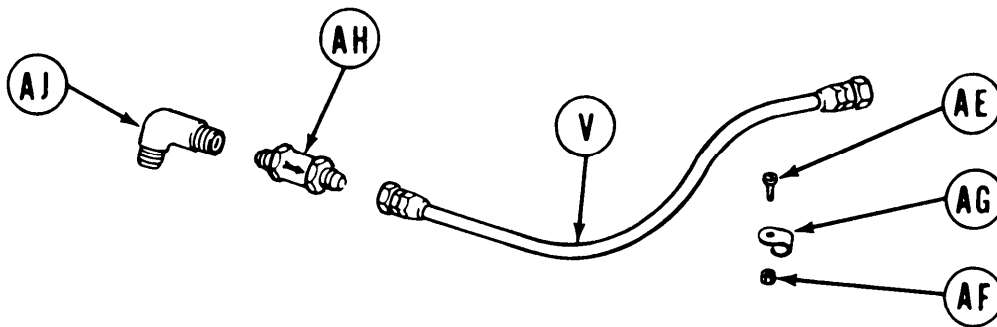
Go on to Sheet 5

TA141549

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 5 of 10)



18. Using 1-1/8 inch wrench, disconnect fuel return line (AB) from cross tube (U).
19. Using 1-1/8 inch wrench, remove nut (AC) from cross tube (U).
20. Remove flat washer (AD) and cross tube (U).
21. Place cross tube (U) in vise and, using 7/16 inch wrench, remove elbow (X).
22. Remove cross tube (U) from vise.



23. Using screwdriver and 7/16 inch wrench, remove screw (AE) and nut (AF) securing clamp (AG).
24. Remove clamp (AG) from fuel return line (V).
25. Using 3/4 inch wrench on vent valve (AH) and 7/8 inch wrench on fuel return line (V), remove vent valve (AH) from fuel return line (V).
26. Using 15/16 inch wrench on elbow (AJ) and 3/4 inch wrench on vent valve (AH), remove vent valve (AH) from elbow (AJ).

CLEANING AND INSPECTION:

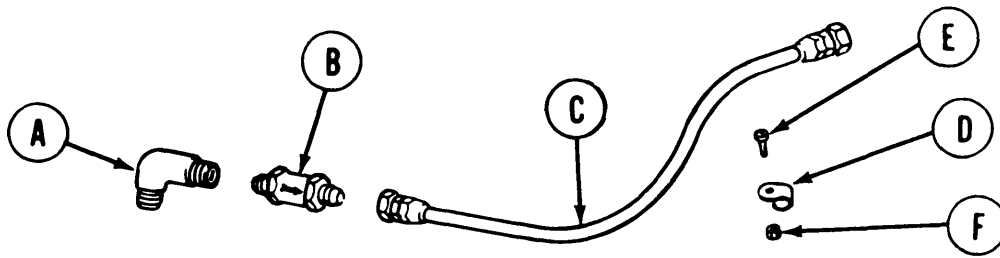
Inspect fuel return lines for deterioration, cracks, stripped threads, and clogging of lines. Replace unserviceable parts as required.

Go on to Sheet 6

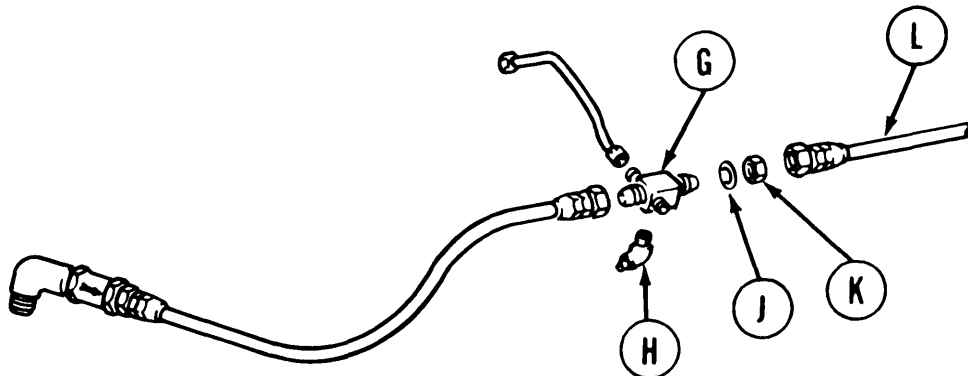
TA141550

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 6 of 10)

INSTALLATION:



1. Using 15/16 inch wrench on elbow (A) and 3/4 inch wrench on vent valve (B), install vent valve (B) in elbow (A).
2. Using 3/4 inch wrench on vent valve (B) and 7/8 inch wrench on fuel return line (C), install fuel return line (C) on vent valve (B).
3. Install clamp (D) on fuel return line (C).
4. Using screwdriver and 7/16 inch wrench, install screw (E) and nut (F) securing clamp (D).



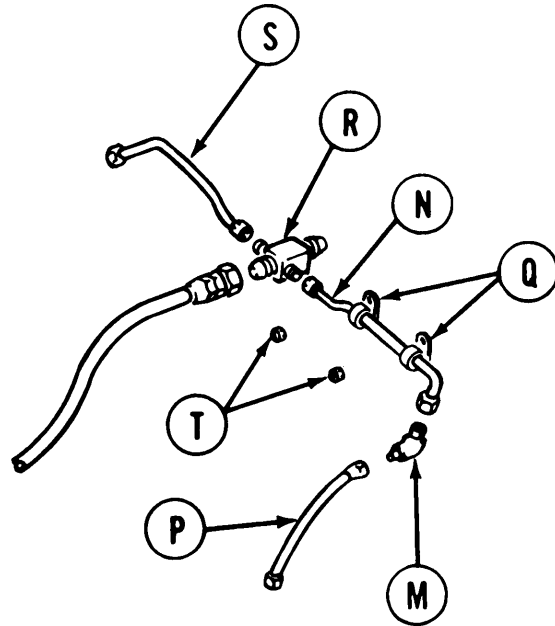
5. Place cross tube (G) in vise and, using 7/16 inch wrench, install elbow (H) in cross tube (G). Remove from vise.
6. Place cross tube (G) in position and, using hands, install flat washer (J), nut (K), and fuel return line (L) on cross tube (G).
7. Using 1-1/8 inch wrench, tighten nut (K) and fuel return line (L) on cross tube (G).

Go on to Sheet 7

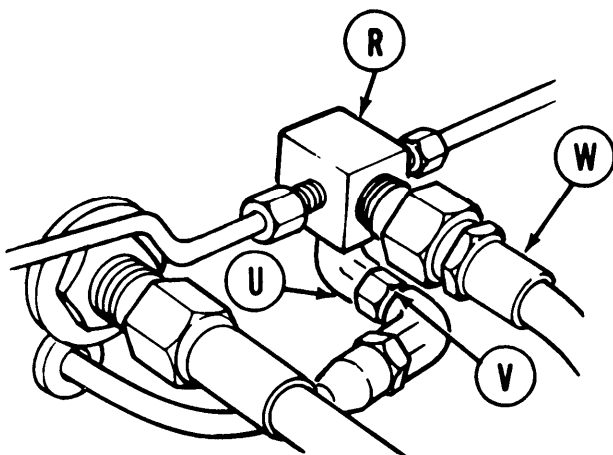
TA141551

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 7 of 10)

8. Using 1/2 inch wrench on elbow (M) and 9/16 inch wrench on fuel return line (N), install fuel return line (N) on elbow (M).
9. Using 1/2 inch wrench on elbow (M) and 9/16 inch wrench on fuel return line (P), install fuel return line (P) on elbow (M).
10. Install two clamps (Q) on fuel return line (N).
11. Place fuel return lines (N) and (P) in position on engine.



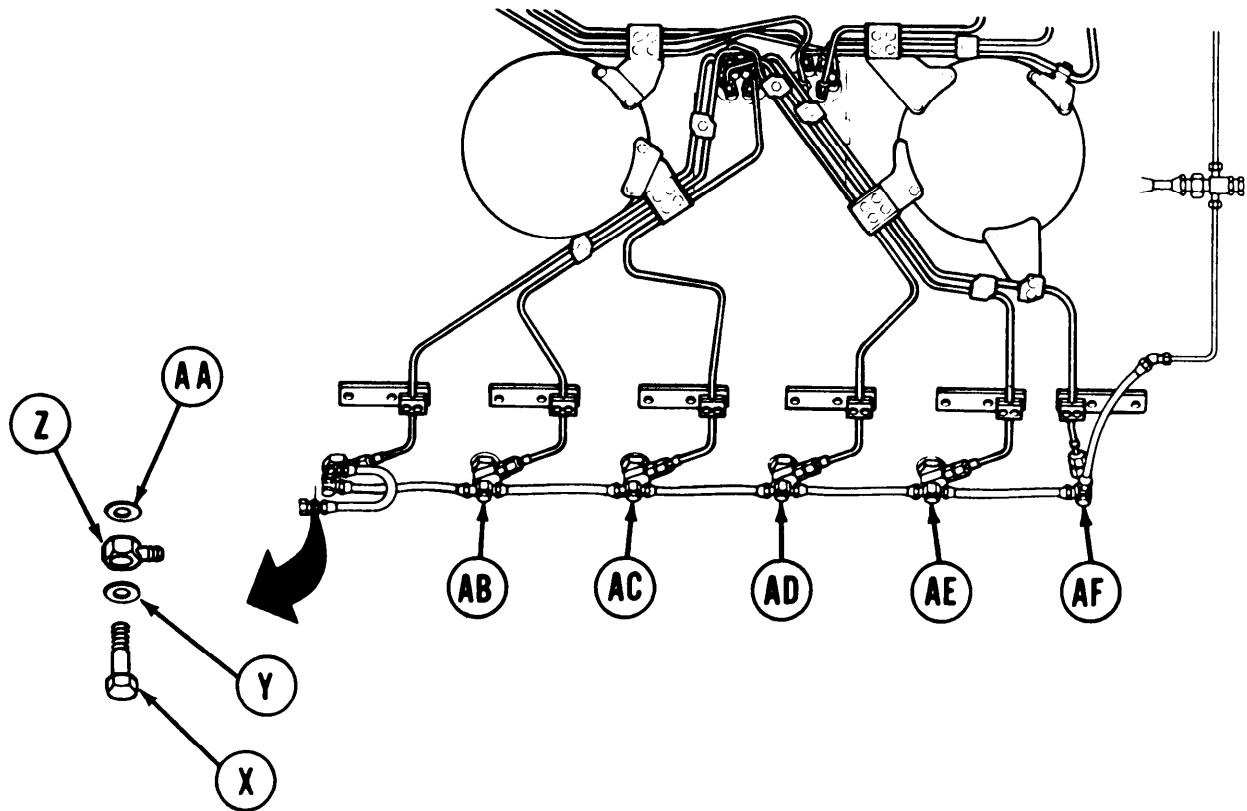
12. Using 9/16 inch wrench, install fuel return line (N) on cross tube (R).
13. Using 9/16 inch wrench, install fuel return line (S) on cross tube (R).
14. Using 1/2 inch socket with extension and 1/2 inch wrench, install two nuts (T) securing two clamps (Q).
15. Using 9/16 inch wrench on hose (V), install hose (V) on elbow (U).
16. Using 7/8 inch wrench, install fuel return line (W) on cross tube (R).



Go on to Sheet 8

TA141552

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 8 of 10)



NOTE

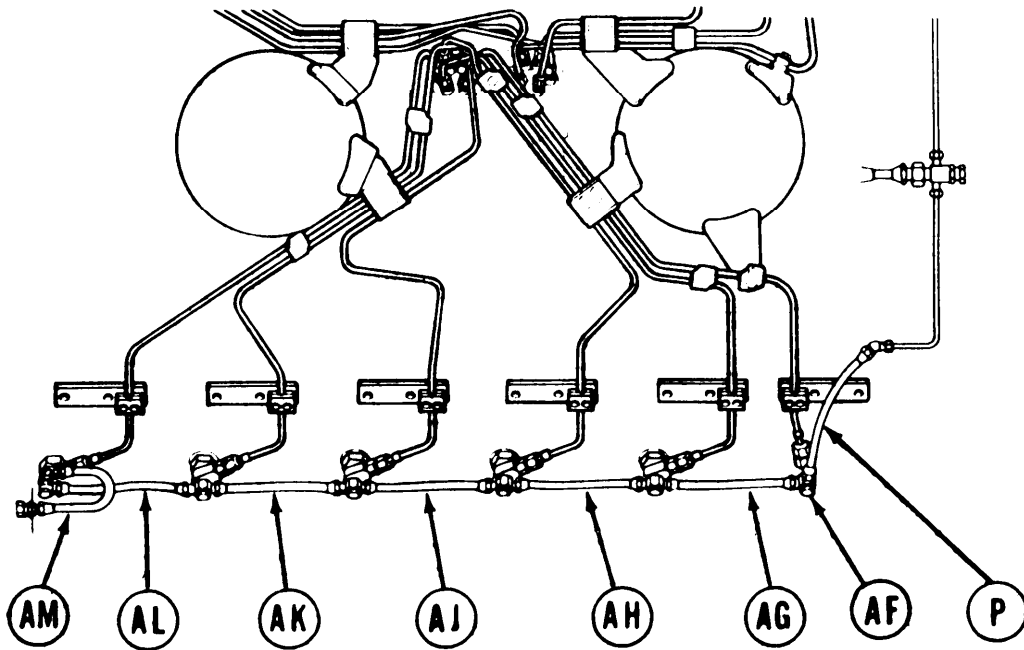
Connectors on left and right sides are same except for last connector at accessory end of engine. Connector at accessory end on left side of engine has only one connection.

17. Using 11/ 16 inch socket, install bolt (X) securing new washer (Y), connector (Z), and new washer (AA).
18. Using 11/16 inch socket, install bolts, new washers, and connectors (AB), (AC), (AD), (AE), and (AF).

Go on to Sheet 9

TA141500

FUEL RETURN LINES REPLACEMENT (2D ENGINE) (Sheet 9 of 10)



19. Using 9/16 inch wrench, install fuel return line (P) to connector (AF).

20. Using 9/16 inch wrench, install fuel return lines (AG), (AH), (AJ), (AK), and (AL).

NOTE

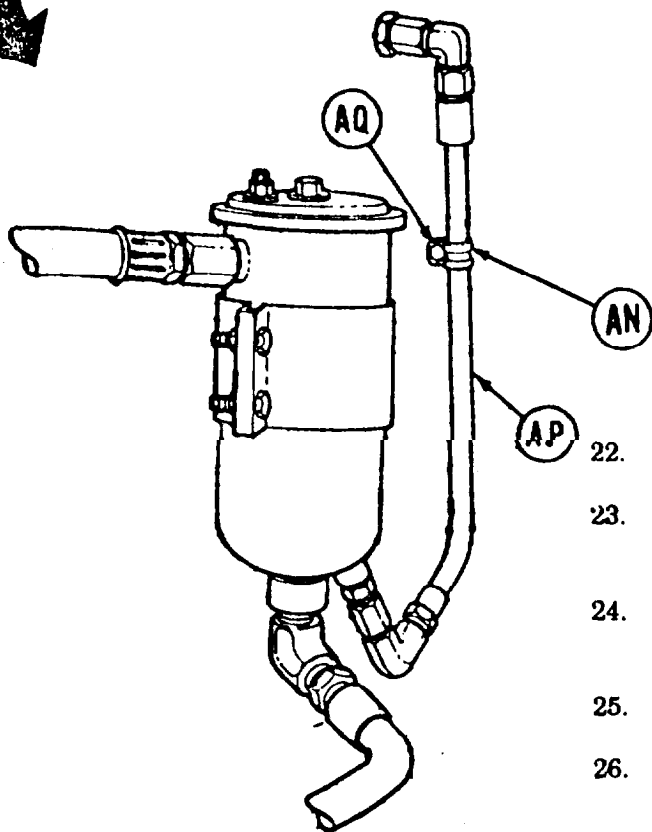
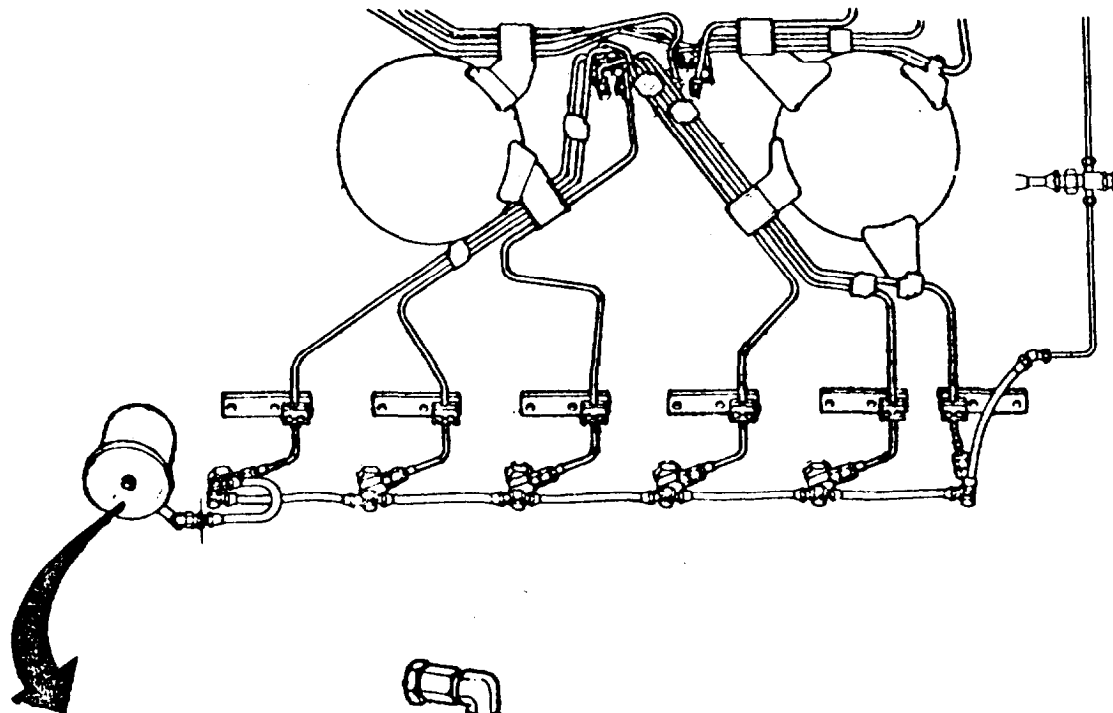
Steps 21 thru 24 are for right side only. If left side fuel return lines are being replaced, go to step 25, skipping steps 21 through 24.

21. Using 9/16 inch wrench, install fuel return line (AM).

Go on to Sheet 10

TA141501

FULL RETURN LINES REPLACEMENT (20 ENGINE) (Sheet 10 of 10)



- 22. Install clamp (AN) on fuel return line (AP).
- 23. Using 9/16 inch wrench, install fuel return line (AP).
- 24. Using 1/2 inch wrench, install screw and new lockwasher (AQ) securing clamp (AN).
- 25. Install cooling fans (page 9-49).
- 26. Ground hop engine. Purge fuel system (page 7-10) and check for leaks.
- 27. Install engine access covers (right bank) (page 6-84).
- 28. Install engine access covers (left bank) (page 6-93).

End of Task

TA141502

TUBE ASSEMBLY (FUEL INJECTION PUMP INLET TO BULKHEAD ELBOW) REPLACEMENT (Sheet 1 of 5)

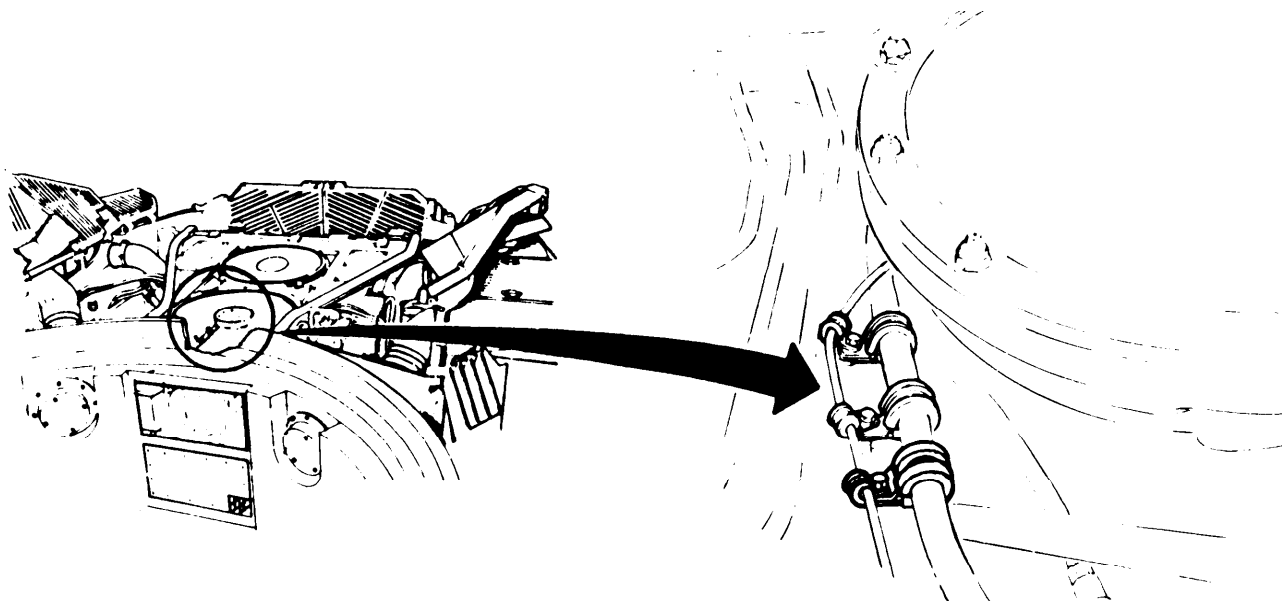
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-33
Cleaning and Inspection	7-34
Installation	7-34

TOOLS: 1 in. combination box and open end wrench
7/8 in. combination box and open end wrench
3/4 in. combination box and open end wrench
3/8 in. combination box and open end wrench
Wire brush
Flat-tip screwdriver

SUPPLIES: Rags (Item 65, Appendix D)
Drain pan
Sealing compound (Item 27, Appendix D)
Dry cleaning solvent (Item 54, Appendix D)
Lockwasher (MS35335-40)
Locknut (MS21083-N3) (3 required)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Remove cooling fans (page 9-48)



Go on Sheet 2

TA141503

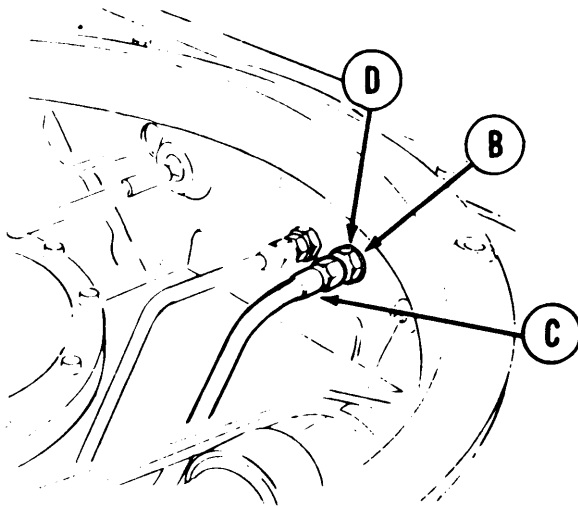
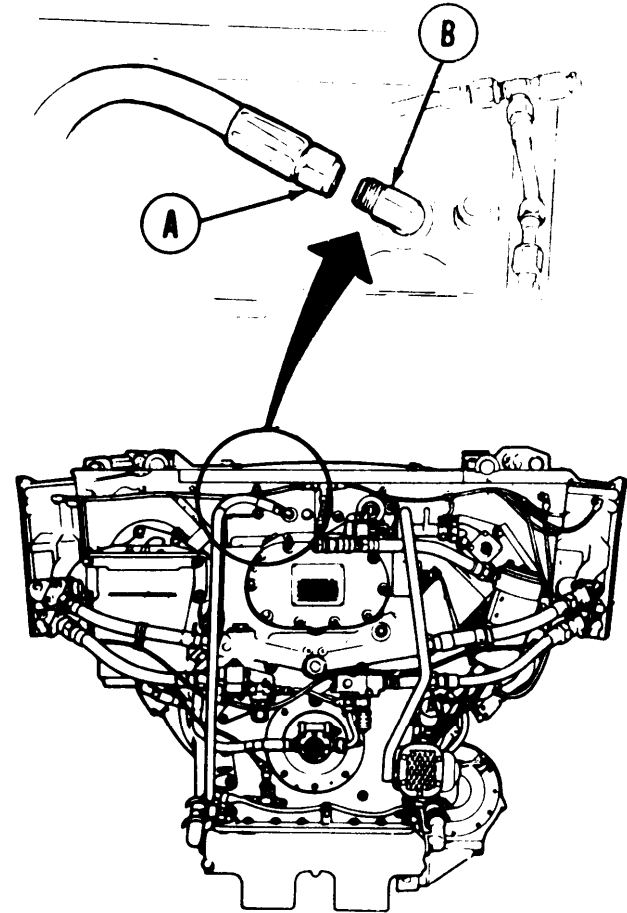
**TUBE ASSEMBLY (FUEL INJECTION PUMP INLET TO BULKHEAD ELBOW) REPLACEMENT
(Sheet 2 of 5)**

NOTE

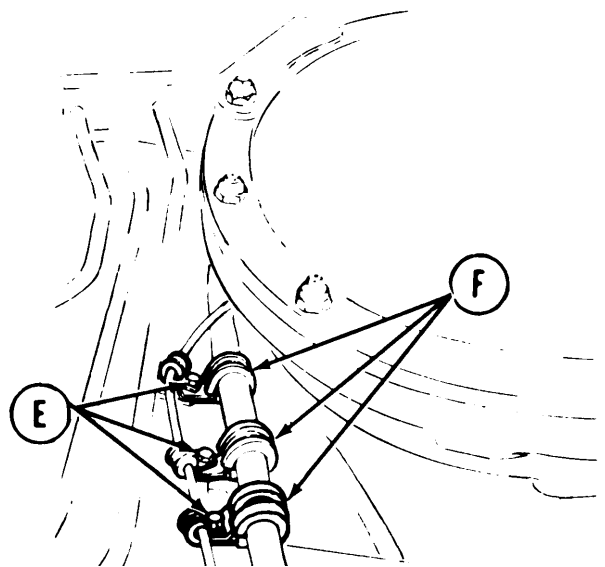
Use drain pan and rags (Item 65, Appendix D) to catch fuel in hose and tube assemblies.

REMOVAL:

1. Using 7/8 inch wrench, remove hose assembly (A) from bulkhead elbow (B).
2. Using 1 inch wrench to hold nut of bulkhead elbow (B) and 7/8 inch wrench, remove tube assembly (C) from bulkhead elbow (B).
3. Using 3/4 inch wrench to hold bulkhead elbow (B) and 1 inch open end wrench, remove nut, lockwasher, and flat washer (D) from bulkhead elbow (B). Throw lockwasher away.
4. Remove bulkhead elbow (B) from engine bulkhead.



5. Using 3/8 inch wrench and screwdriver, remove three screws and self-locking nuts (E) from tube clamps (F). Throw nuts away.



6. Using fingers, remove three tube clamps (F) from tube assembly (C).

Go on to Sheet 3

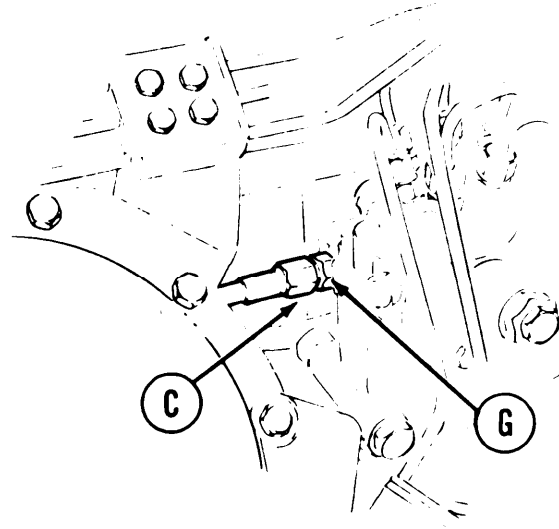
TA141504

TUBE ASSEMBLY (FUEL INJECTION PUMP INLET TO BULKHEAD ELBOW) REPLACEMENT (Sheet 3 of 5)

7. Using 7/8 inch wrench, remove tube assembly (C) from fuel injection pump adapter (G).
8. Using fingers, remove tube assembly (C) from vehicle.

CLEANING AND INSPECTION:

1. Using clean rags and dry cleaning solvent (Item 65 and 54, Appendix D), clean elbow and tube assembly mounting hardware thoroughly. Using wire brush, clean threaded parts.
2. Inspect elbow and tube assembly mounting hardware for bends, breaks, rounded edges, wear, or thread damage. Replace if required.
3. Inspect adapter on fuel injection pump for thread damage.

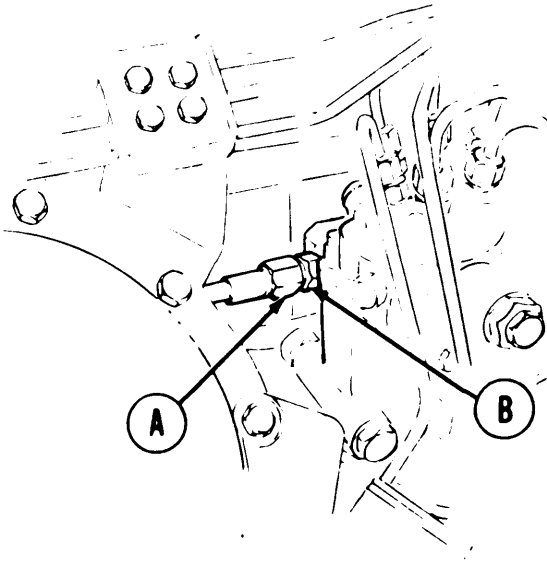


INSTALLATION:

NOTE

Coat pipe threads of fittings with sealing compound (Item 27, Appendix D) before installation.

1. Using 7/8 inch wrench, install tube assembly (A) on fuel injection pump adapter (B).

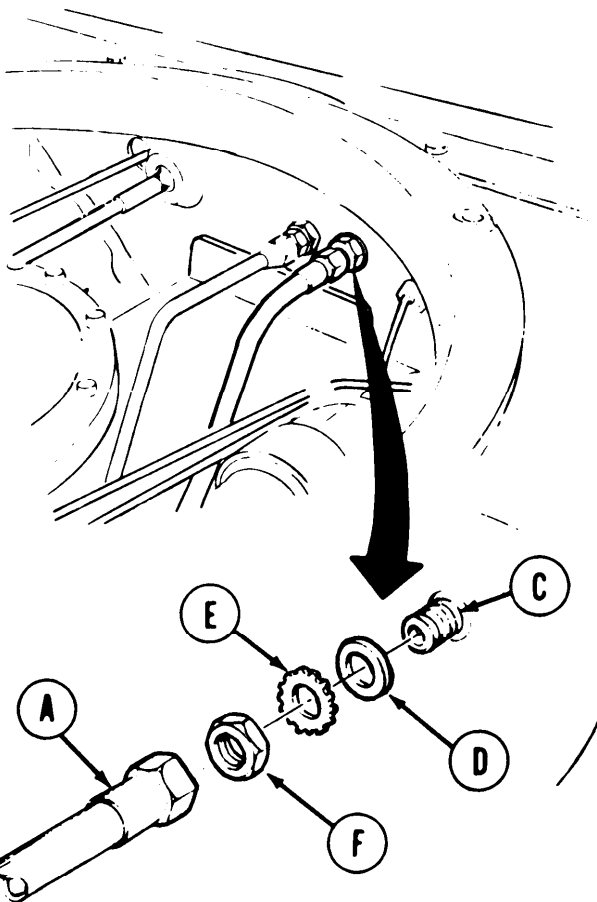
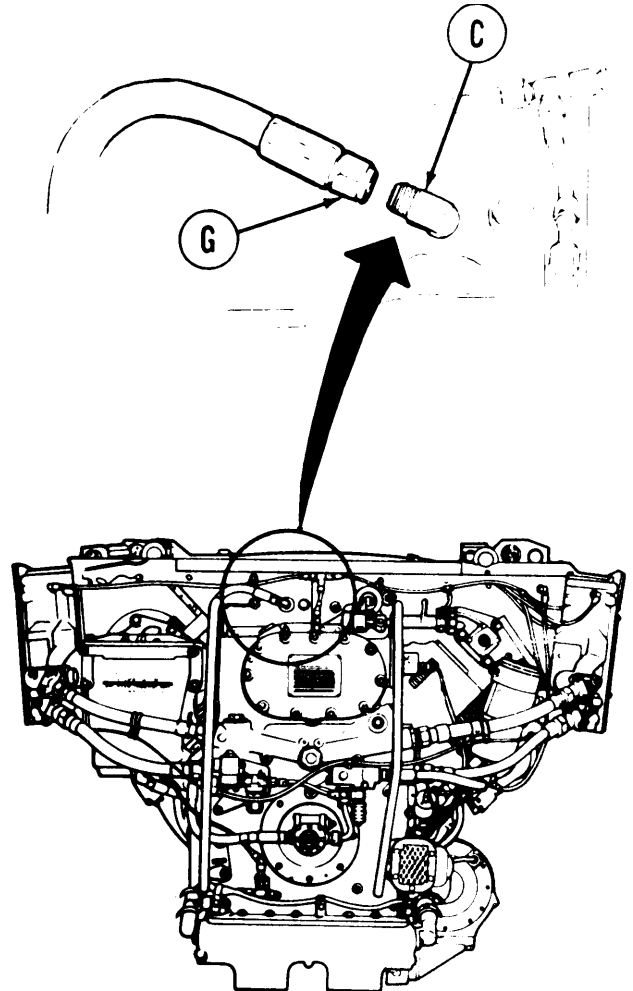


Go on to Sheet 4

TA141505

TUBE ASSEMBLY (FUEL INJECTION PUMP INLET TO BULKHEAD ELBOW) REPLACEMENT
 (Sheet 4 of 5)

2. Using fingers, install bulkhead elbow (C) in hole in front side of engine bulkhead.
3. Using 3/4 inch wrench to hold bulkhead elbow (C) and 1 inch wrench, install flat washer (D), new lockwasher (E), and nut (F) on bulkhead elbow (C).
4. Using 3/4 inch wrench, turn bulkhead elbow (C) until alined with hose assembly (G). Tighten nut (F).



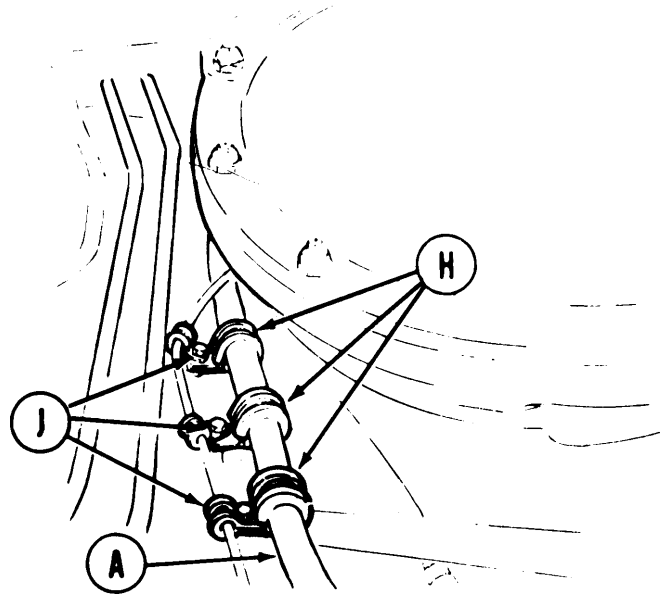
5. Using 1 inch wrench to hold nut (F) and 7/8 inch wrench, install tube assembly (A) on bulkhead elbow (C).
6. Using 7/8 inch wrench, install hose assembly (G) on bulkhead elbow (C).

Go on to Sheet 5

TA141506

**TUBE ASSEMBLY (FUEL INJECTION PUMP INLET TO BULKHEAD ELBOW) REPLACEMENT
(Sheet 5 of 5)**

7. Using fingers, install three tube clamps (H) on tube assembly (A).
8. Using 3/8 inch wrench and screwdriver, install three screws and new self-locking nuts (J) through tube clamps (H).
9. Install cooling fans (page 9-49).
10. Install ground hop kit (page 5-49).
11. Perform powerplant test run (page 5-52).
12. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA141507

ENGINE FUEL PUMP REPLACEMENT (Sheet 1 of 4)

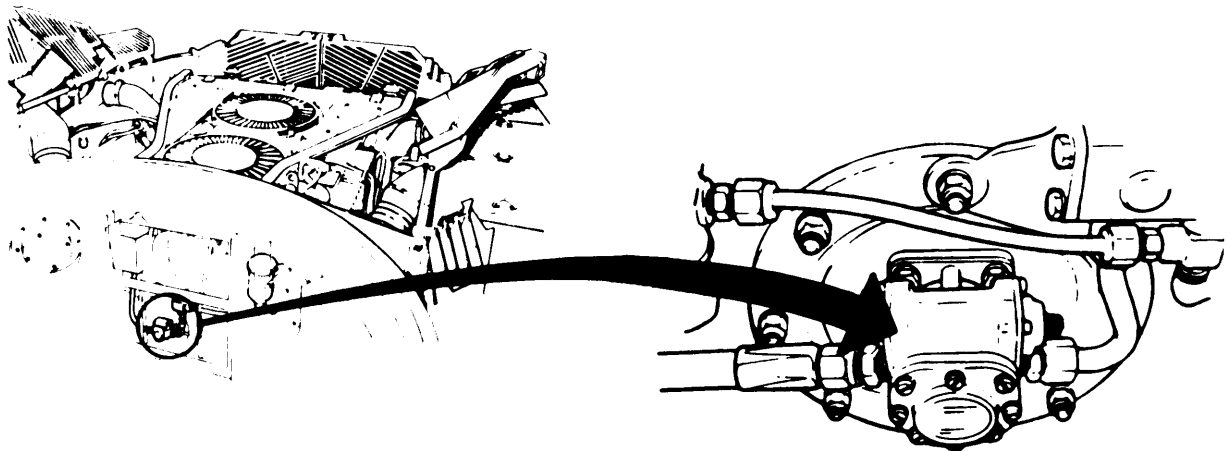
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-38
Cleaning and Inspection	7-39
Installation	7-39

TOOLS: 3/4 in. combination box and open end wrench
 13/16 in. combination box and open end wrench
 7/8 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 5/8 in. combination box and open end wrench

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Fuel pump replacement kit (7320385)
 Sealing compound (Item 27, Appendix D)
 Drain pan
 Gasket (7415354)
 Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURE: Remove lower engine access panel (page 16-41)



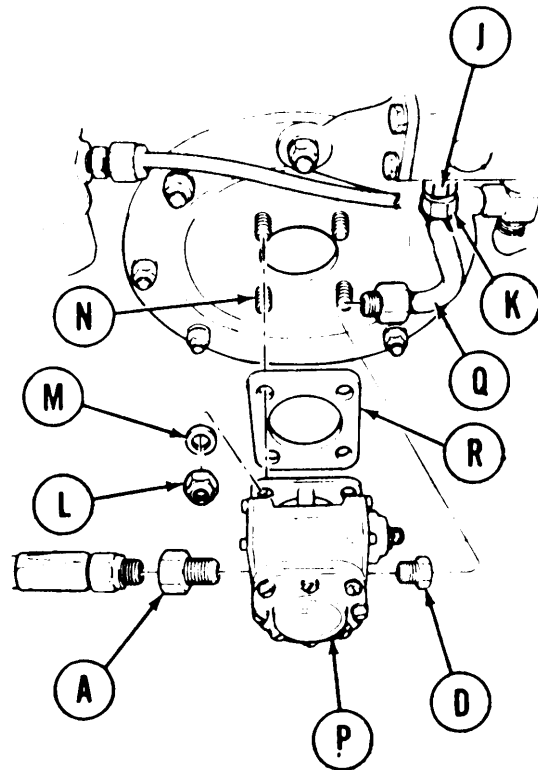
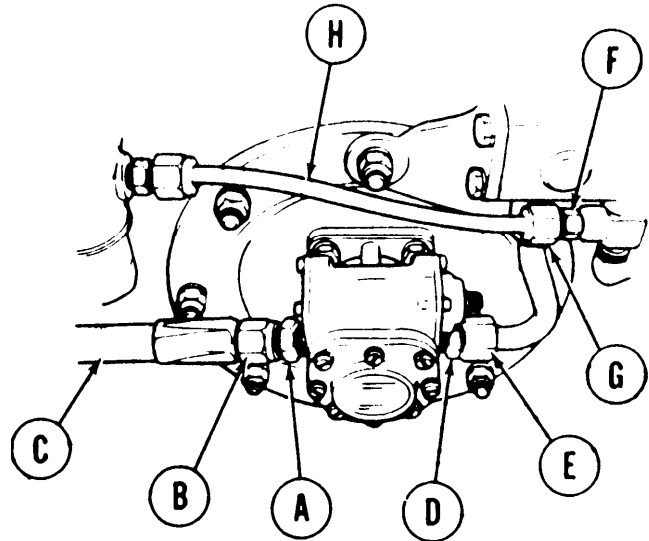
Go on to Sheet 2

TA141508

ENGINE FUEL PUMP REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using 13/16 inch wrench on adapter (A) and 7/8 inch wrench on line nut (B), remove hose assembly (C).
2. Using 3/4 inch wrench on adapter (D) and 7/8 inch wrench on line nut (E), loosen line nut (E).
3. Using 3/4 inch wrench, loosen adapter (D) 1/2 turn. Do not remove adapter (D) at this time.
4. Using 1/2 inch wrench to hold adapter (F) and 5/8 inch wrench on hose fitting (G), loosen fitting (G).
5. Using fingers, pull hose assembly (H) loose from adapter (F).
6. Using 1/2 inch wrench, remove adapter (F).
7. Using 3/4 inch wrench on adapter (J) and 7/8 inch wrench on line nut (K), loosen line nut (K).
8. Using 13/16 inch wrench, remove adapter (A).
9. Using 1/2 inch wrench, remove four nuts (L) and washers (M) from mounting studs (N).
10. Using both hands, carefully remove fuel pump (P) from mounting studs (N). Tube (Q) will disconnect.
11. Remove tube (Q).
12. Using 3/4 inch wrench, remove adapter (D).
13. Using fingers, remove gasket (R) from mounting studs (N).
14. Throw gasket (R) away.



Go on to Sheet 3

TA141509

ENGINE FUEL PUMP REPLACEMENT (Sheet 3 of 4)

CLEANING AND INSPECTION:

1. Using rags and dry cleaning solvent, (Items 65 and 54, Appendix D), clean fittings and mounting hardware thoroughly,
2. Inspect fittings and mounting hardware for nicks, cracks, wear, or thread damage. Replace if required.

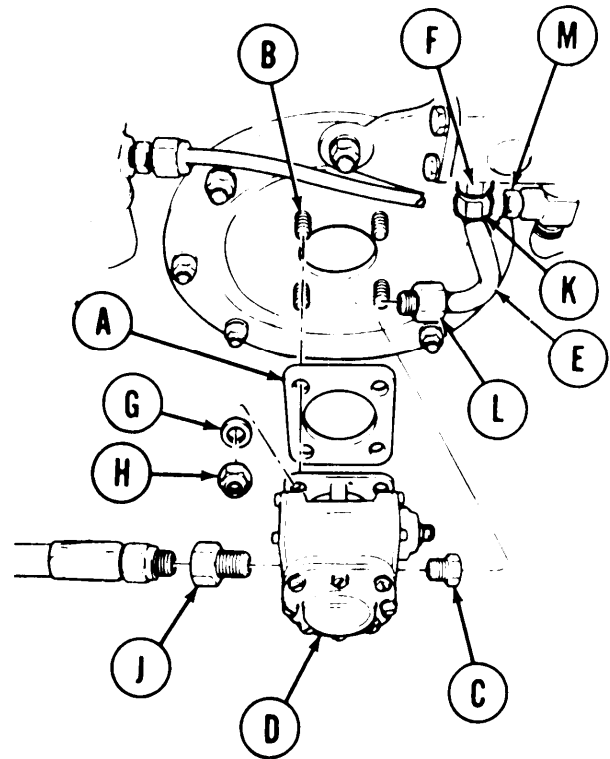
INSTALLATION:

1. Using fingers, install new gasket (A) on mounting studs (B).

NOTE

Coat threads of all fittings with sealing compound (Item 27, Appendix D).

2. Using 3/4 inch wrench, install adapter (C).
3. Using both hands, carefully install fuel pump assembly (D) on mounting studs (B) and, at the same time, install tube (E) into adapters (F) and (C).
4. Using 1/2 inch wrench, install four washers (G) and nuts (H) on mounting studs (B).
5. Using 13/16 inch wrench, install adapter (J) on fuel pump assembly (D),
6. Using 7/8 inch wrench, tighten line nut (K) on adapter (F).
7. Using 7/8 inch wrench, tighten line nut (L) on adapter (C).
8. Using 1/2 inch wrench, install adapter (M).

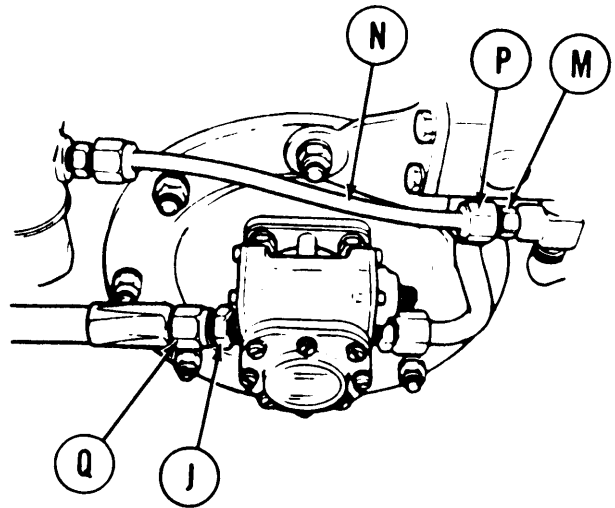


Go on to Sheet 4

TA141510

ENGINE FUEL PUMP REPLACEMENT (Sheet 4 of 4)

9. Using fingers, install hose assembly (N) into adapter (M).
10. Using 1/2 inch wrench to hold adapter (M) and 5/8 inch wrench on hose fitting (P), tighten fitting (P).
11. Using 7/8 inch wrench, install hose assembly (Q) on adapter (J).
12. Perform engine fuel leak test (page 5-60).
13. Install lower engine access panel (page 16-42).



End of Task

TA141511

FUEL BACKFLOW VALVE REPLACEMENT (Sheet 1 of 7)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-42
Cleaning and Inspection	7-45
Installation	7-45

TOOLS: 9/16 in. combination box and open end wrench
 5/8 in. combination box and open end wrench
 13/16 in. combination box and open end wrench
 7/8 in. combination box and open end wrench
 Ratchet with 1/2 in. drive

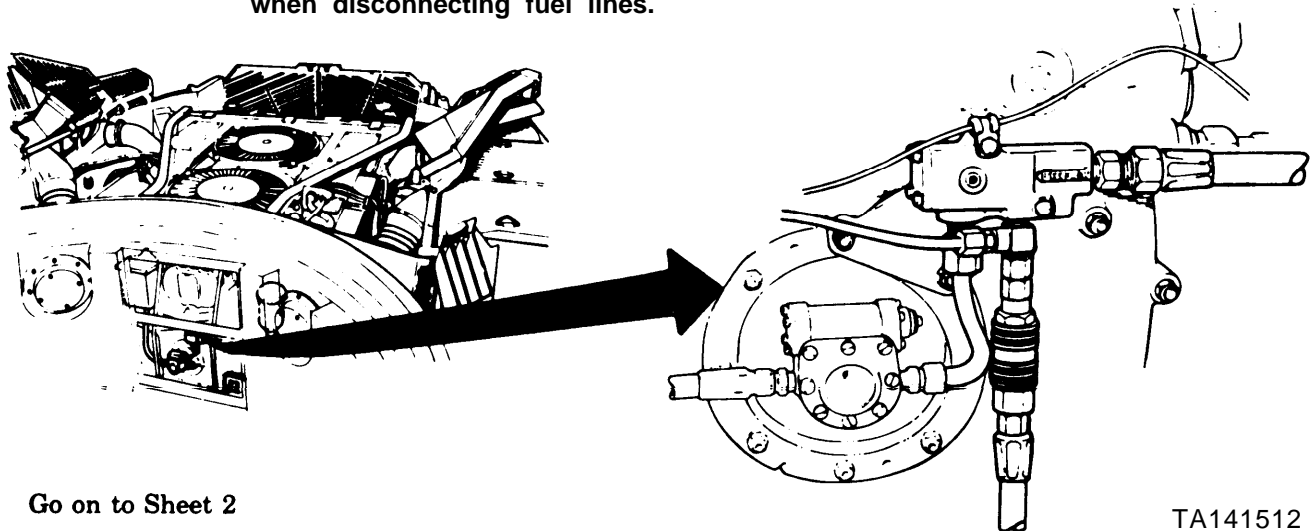
7/16 in. socket with 1/2 in. drive
 1 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 11/16 in. combination box and open end wrench (2 required)
 3/4 in. combination box and open end wrench

SUPPLIES: Rags (Item 65, Appendix D)
 Dry cleaning solvent (Item 54, Appendix D)
 Sealing compound (Item 27, Appendix D)
 Fuel line plug
 Lockwasher (23E06) (2 required)

PRELIMINARY PROCEDURE: Remove lower engine access panel (page 16-41)

NOTE

Place rags under disconnect points to soak up fuel spilled when disconnecting fuel lines.



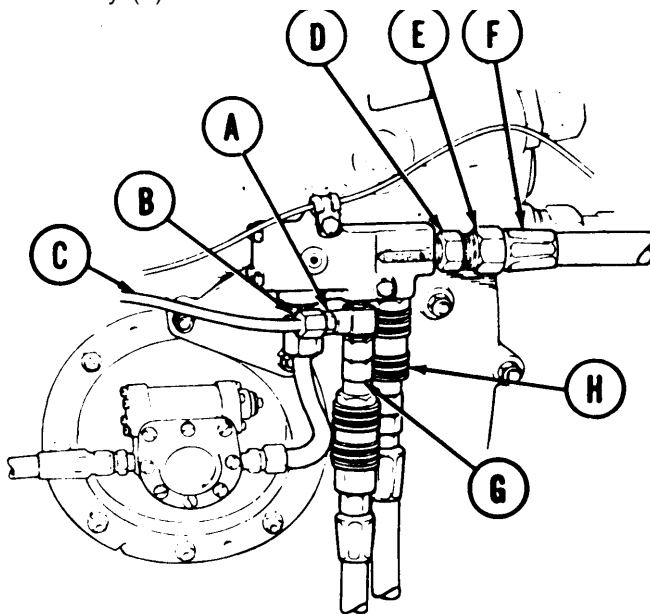
Go on to Sheet 2

TA141512

FUEL BACKFLOW VALVE REPLACEMENT (Sheet 2 of 7)

REMOVAL:

1. Using 1/2 inch wrench to hold adapter (A) and 5/8 inch wrench on hose fitting (B), loosen fitting (B).
2. Using fingers, pull hose assembly (C) loose from adapter (A).
3. Using 13/16 inch wrench to hold adapter (D) and 7/8 inch wrench on hose fitting (E), loosen fitting (E).
4. Using fingers, pull hose assembly (F) loose from adapter (D).
5. Insert fuel line plug into hose assembly (F).



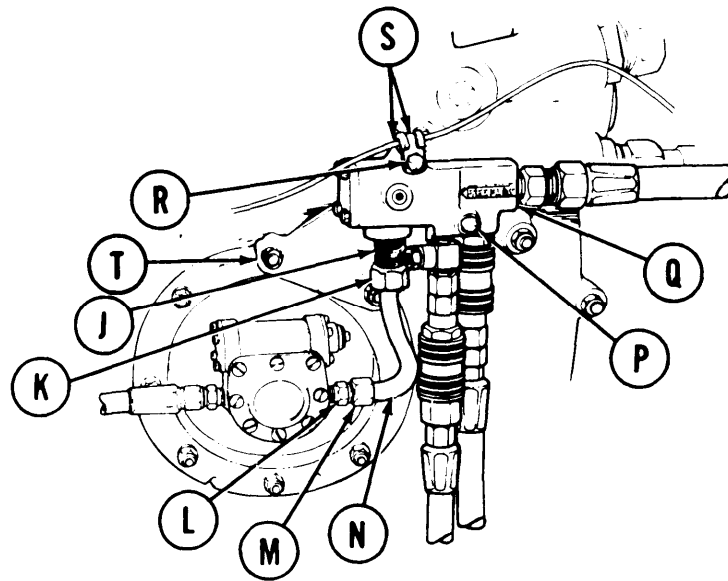
6. Using fingers, disconnect two primer fuel lines from fuel backflow valve quick-disconnects (G) and (Early Model Only) (H).

Go on to Sheet 3

TA253189

FUEL BACKFLOW VALVE REPLACEMENT (Sheet 3 of 7)

7. Using 3/4 inch wrench to hold adapter (J) and 7/8 inch wrench on coupling nut (K), loosen coupling nut (K) until completely loose from adapter (J).
8. Using 3/4 inch wrench to hold adapter (L) and 7/8 inch wrench on coupling nut (M), loosen coupling nut (M). Do not completely loosen coupling nut (M) at this time. Tube assembly (N) will be removed later.

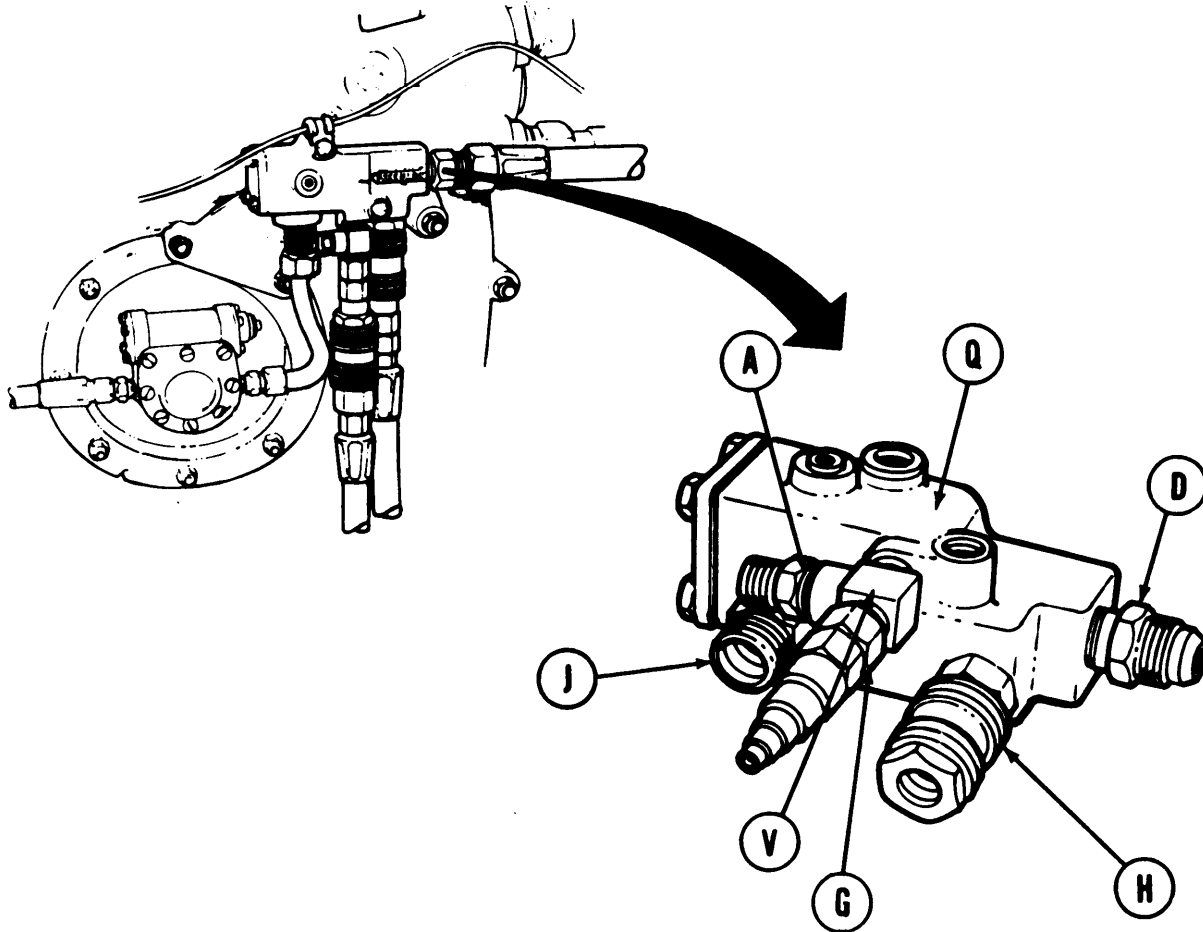


9. Using socket, remove screw, lockwasher, and washer (P) from fuel backflow valve assembly (Q). Throw lockwasher away.
10. Using socket, remove screw and lockwasher (R) and clamp (S) securing fuel backflow valve assembly (Q) to mounting bracket (T). Throw lockwasher away.
11. Remove backflow valve assembly (Q) from mounting bracket (T).
12. Using 7/8 inch wrench, loosen coupling nut (M). Remove tube assembly (N).

Go on to Sheet 4

TA141514

FUEL BACKFLOW VALVE REPLACEMENT (Sheet 4 of 7)



13. Using 11/16 inch wrench, remove quick disconnect (G) from tee (V).
14. (Early Model Only) using 1 inch wrench, remove coupling assembly (H) from fuel backflow valve assembly (Q).
15. Using 1/2 inch wrench, remove adapter (A) from tee (V).
16. Using 3/4 inch wrench, remove tee (V) from fuel backflow valve assembly (Q).
17. Using 13/16 inch wrench, remove adapter (D) from fuel backflow valve assembly (Q).
18. Using 3/4 inch wrench, remove adapter (J) from fuel backflow valve assembly (Q).

Go on to Sheet 5

TA25319C

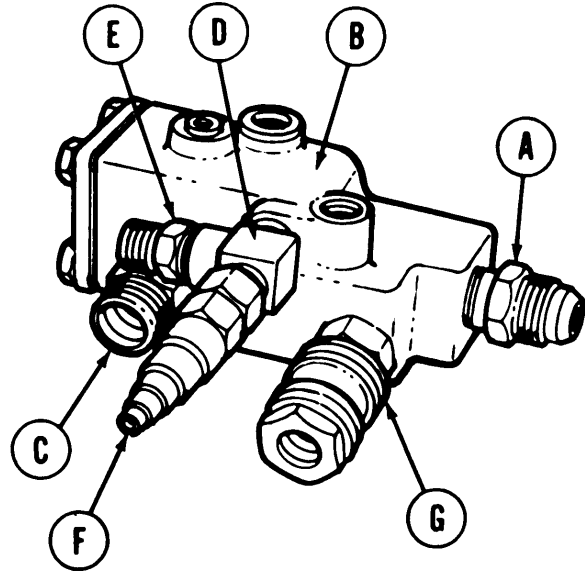
FUEL BACKFLOW VALVE REPLACEMENT (Sheet 5 of 7)**CLEANING AND INSPECTION:**

1. Using clean rags and dry cleaning solvent (Items 65 and 54, Appendix D), clean fittings and mounting hardware thoroughly.
2. Inspect fittings and mounting hardware for nicks, cracks, wear, or thread damage. Replace if required.

INSTALLATION:**NOTE**

Coat threads of fitting with sealing compound (Item 27, Appendix D) before installation.

1. Using 13/16 inch wrench, install adapter (A) on fuel backflow valve assembly (B).
2. Using 3/4 inch wrench, install adapter (C) on fuel backflow valve assembly (B).
3. Using 3/4 inch wrench, install tee (D) on fuel backflow valve assembly (B). Make sure tee (D) is positioned as shown in illustration.
4. Using 1/2 inch wrench, install adapter (E) on tee (D).
5. Using 3/4 inch wrench, hold tee (D) in position for steps 6 thru 8 following.
6. Using 9/16 inch wrench, install quick disconnect (F) on tee (D).
7. (Early Model Only) using 1 inch wrench, install coupling assembly (G) on fuel backflow valve (B).



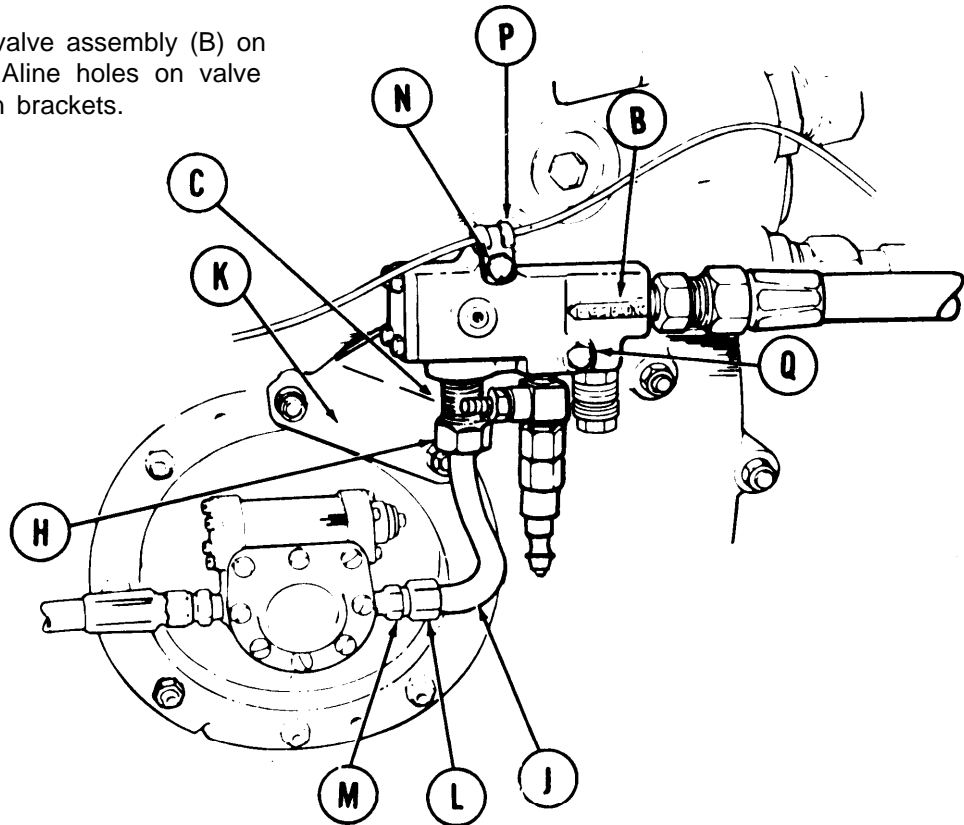
Go on to Sheet 6

TA253191

Change 1 7-45

FUEL BACKFLOW VALVE REPLACEMENT (Sheet 6 of 7)

8. Using fingers, loosely connect coupling nut (H) of tube assembly (J) to adapter (C).
9. Position fuel backflow valve assembly (B) on mounting bracket (K). Aline holes on valve assembly with those on brackets.



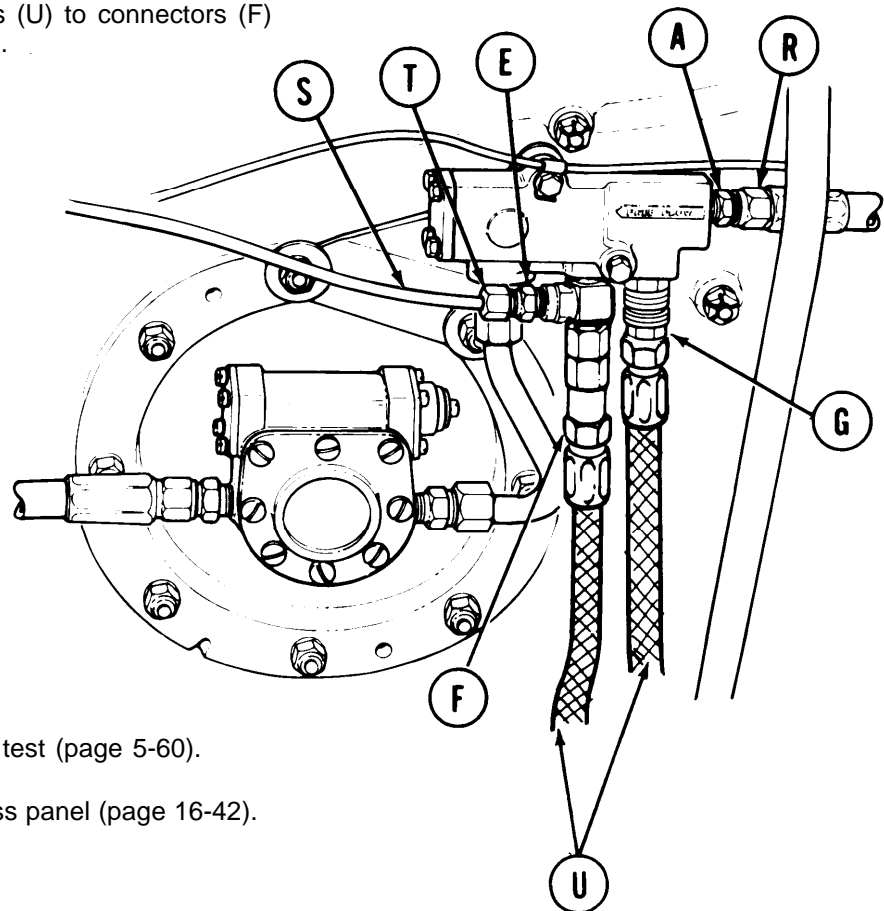
10. Using fingers, loosely connect coupling nut (L) to adapter (M).
11. Using socket, install screw and new lockwasher (N) through clamp (P) mounting fuel backflow valve assembly (B) on mounting bracket (K).
12. Using socket, install screw, new lockwasher, and washer (Q) mounting fuel backflow valve assembly (B) on mounting bracket (K).
13. Using 7/8 inch wrench, tighten coupling nuts (H) and (L).

Go on to Sheet 7

TA1493090

FUEL BACKFLOW VALVE REPLACEMENT (Sheet 7 of 7)

14. Remove fuel line plug from hose (R).
15. Using 7/8 inch wrench, install hose assembly (R) on adapter (A).
16. Using fingers, install hose assembly (S) into adapter (E).
17. Using 1/2 inch wrench to hold adapter (E) and 5/8 inch wrench on hose fitting (T), tighten fitting (T).
18. Connect two primer lines (U) to connectors (F) and (Early Model Only) (G).



19. Perform engine fuel leak test (page 5-60).
20. Install lower engine access panel (page 16-42).

End of Task

All data on pages 7-48 and 7-49 deleted. ■

Change 4

7-47

**PRIMARY FUEL FILTER OUTLET-TO-FUEL BACKFLOW VALVE HOSE ASSEMBLY
REPLACEMENT (2D ENGINE) (Sheet 1 of 2)**

TOOLS: 7/8 in. combination box and open end wrench
13/16 in. combination box and open end wrench

SUPPLIES: Sealing compound (Item 27, Appendix D)
Drain pan
Rags (Item 65, Appendix D)

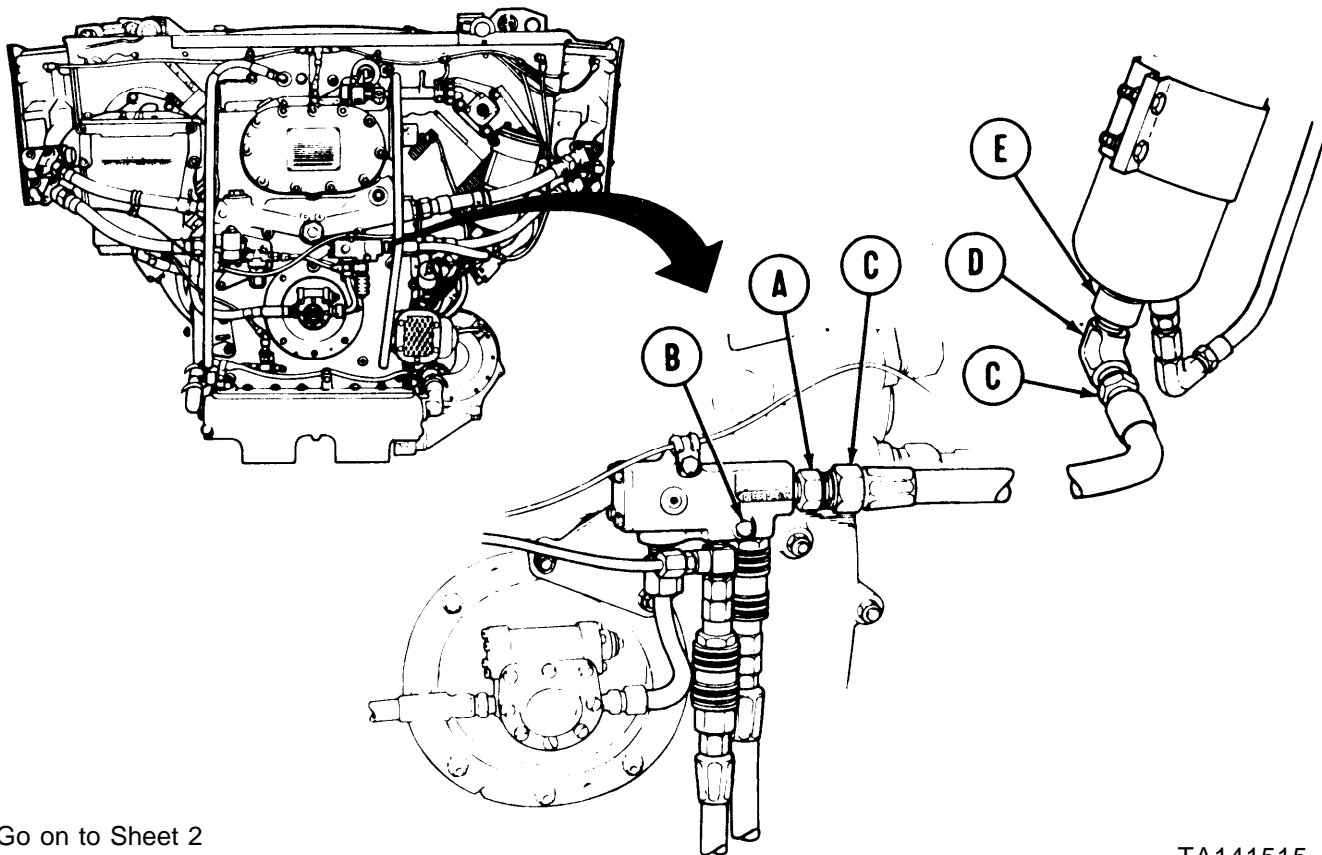
PRELIMINARY PROCEDURE: Remove powerplant (page 5-26)

NOTE

**Use drain pan and rags (Item 65, Appendix D) to catch fuel in
line and filter.**

REMOVAL:

1. Using 13/16 inch wrench on adapter (A) of fuel backflow valve (B) and 7/8 inch wrench on hose assembly (C), remove hose assembly (C) from adapter (A).
2. Using 7/8 inch wrench, remove hose assembly (C) from elbow (D) of primary filter (E).

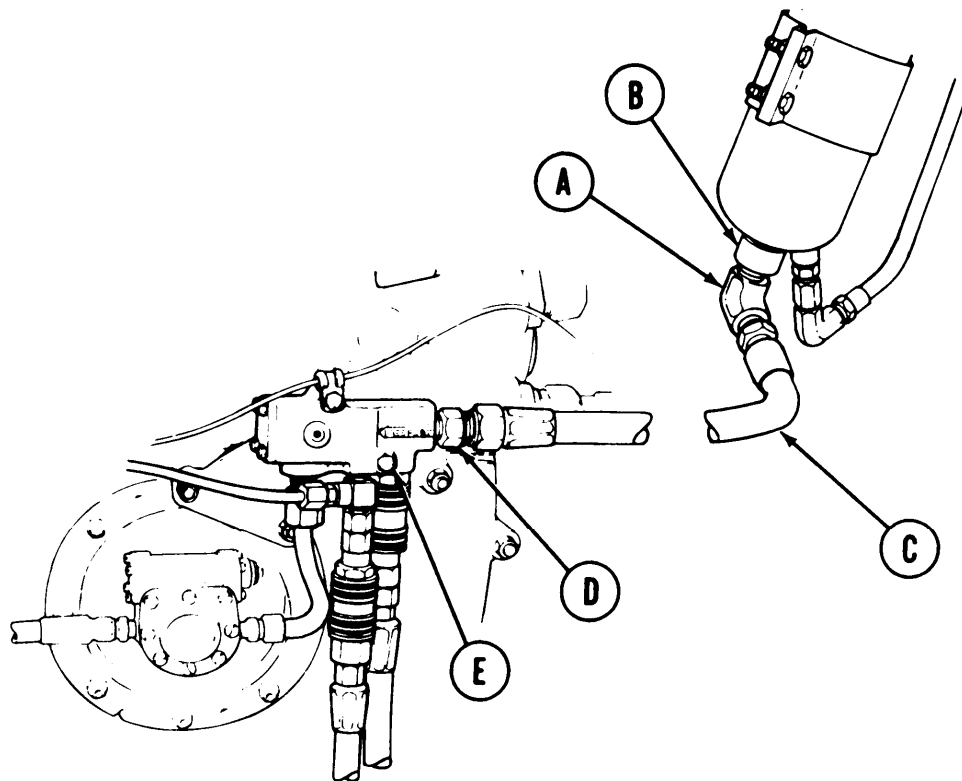


Go on to Sheet 2

TA141515

**PRIMARY FUEL FILTER OUTLET-TO-FUEL BACKFLOW VALVE HOSE ASSEMBLY
REPLACEMENT (2D ENGINE) (Sheet 2 of 2)****INSTALLATION:**

1. Coat threads of elbow (A) on primary fuel filter (B) with sealing compound (Item 27, Appendix D).
2. Using 7/8 inch wrench, install hose assembly (C) on elbow (A) of primary fuel filter (B).
3. Coat threads of adapter (D) on fuel backflow valve (E) with sealing compound (Item 27, Appendix D).
4. Using 7/8 inch wrench, install hose assembly (C) on adapter (D) of fuel backflow valve (E).
5. Perform engine fuel leak test (page 5-60).
6. Install powerplant (page 5-37).



End of Task

TA141516

FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 1 of 9)

PROCEDURE INDEX

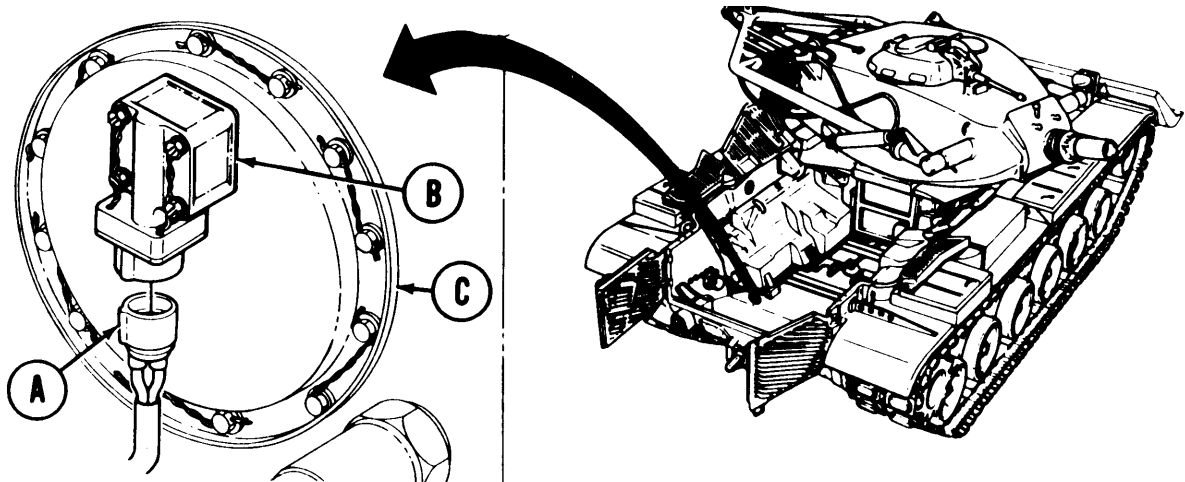
PROCEDURE	PAGE
Removal	7-52
Installation	7-57

TOOLS: 1/4 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 1/2 in. socket with 3/8 in. drive
 Ratchet with 3/8 in. drive
 Diagonal cutting pliers
 Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N•m)
 Slip joint pliers
 Flat-tip screwdriver

SUPPLIES: Lockwire (Item 60, Appendix D)
 Gasket (10873918)
 Lockwasher (MS35333-38) (2 required)
 Lockwasher (MS45904-72)
 Lockwasher (MS35338-44) (4 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Isolate left fuel tank (TM 9-2350-222-10)
 Drain left fuel tank (page 7-152)
 Remove powerplant (page 5-1) .



REMOVAL:

CAUTION

When powerplant is removed for any reason, note position of electrical lead (A). Turn capacitor and housing assembly (B), if necessary, so lead (A) enters from below.

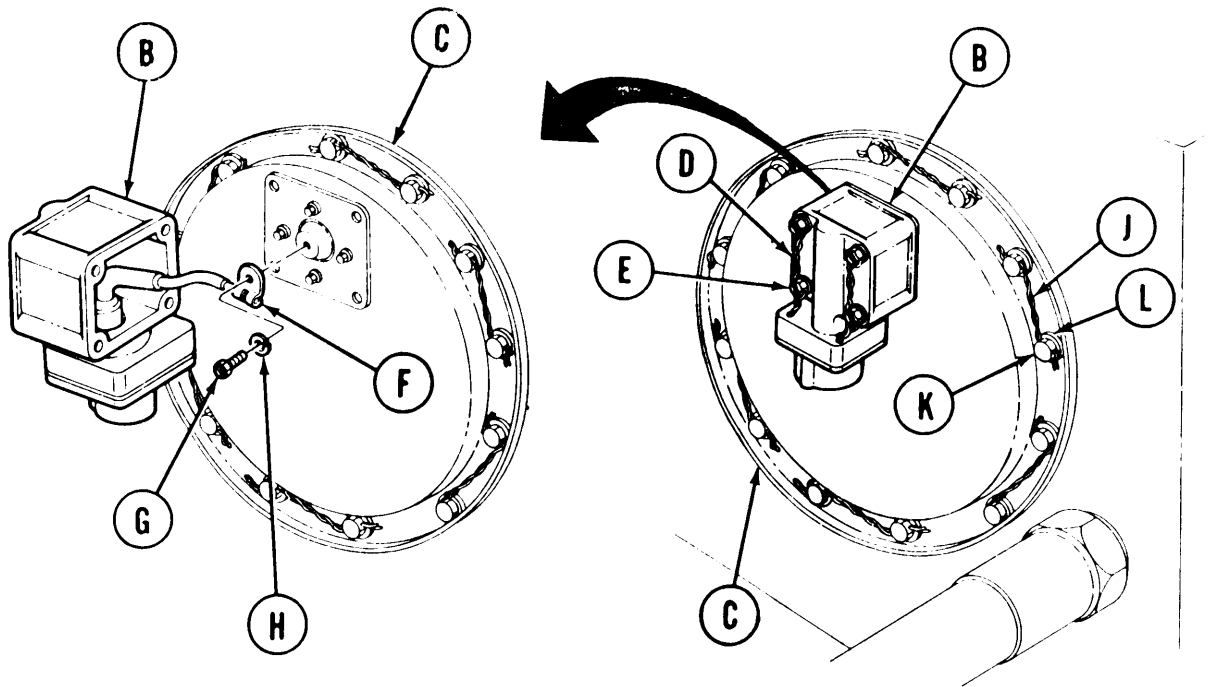
- Using hands, unplug electrical lead (A) from capacitor and housing assembly (B) located on fuel pump access cover (C).

Go on to Sheet 2

TA253194

FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 2 of 9)

2. Using diagonal cutting pliers, remove lockwire (D) securing four screws (E).
3. Using screwdriver, remove four screws, lockwashers, and flat washers (E) from capacitor and housing assembly (B). Throw lockwashers away. Slowly separate capacitor and housing assembly (B) from fuel pump access cover (C). Capacitor and housing assembly is connected to cover (C) by electrical lead (F).



4. Using screwdriver, remove screw (G) and lockwasher (H) that secure electrical lead (F). Throw lockwasher (H) away. Remove capacitor and housing assembly (B) from cover (C).
5. Using diagonal cutting pliers, remove lockwire (J) securing 12 screws (K) on fuel pump access cover (C).
6. Using socket, remove 12 screws (K) and flat washers (L).

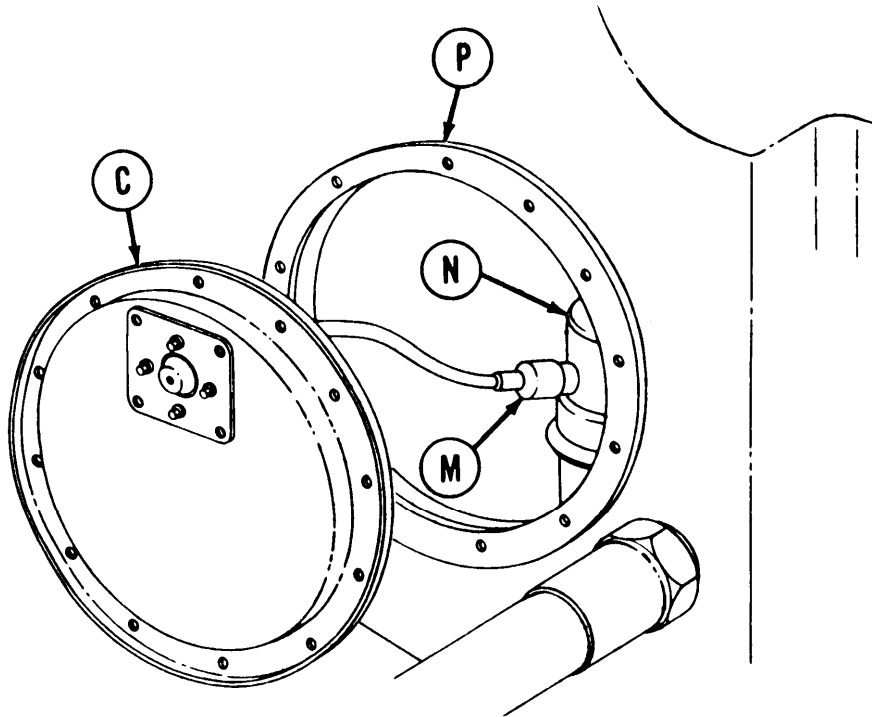
Go on to Sheet 3

TA253195

Change 1 7-53

FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 3 of 9)

7. Slowly pull back fuel pump access cover (C) to expose electrical lead (M) connecting fuel pump access cover to fuel pump (N).
8. Using hands, disconnect electrical lead (M) from fuel pump (N). Remove gasket (P) and throw it away.

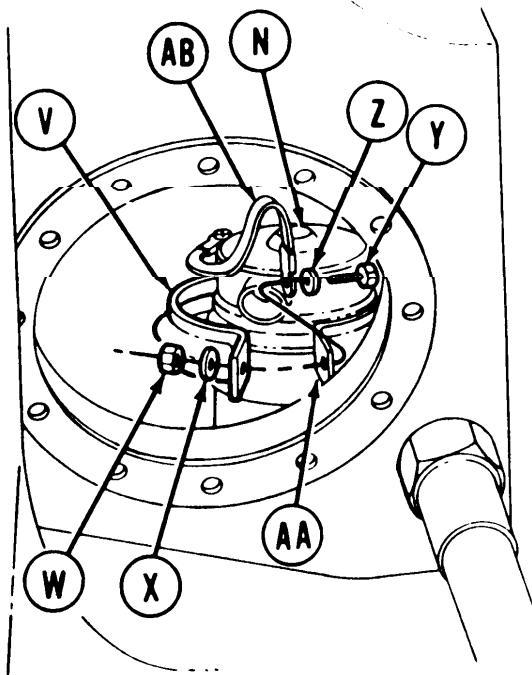
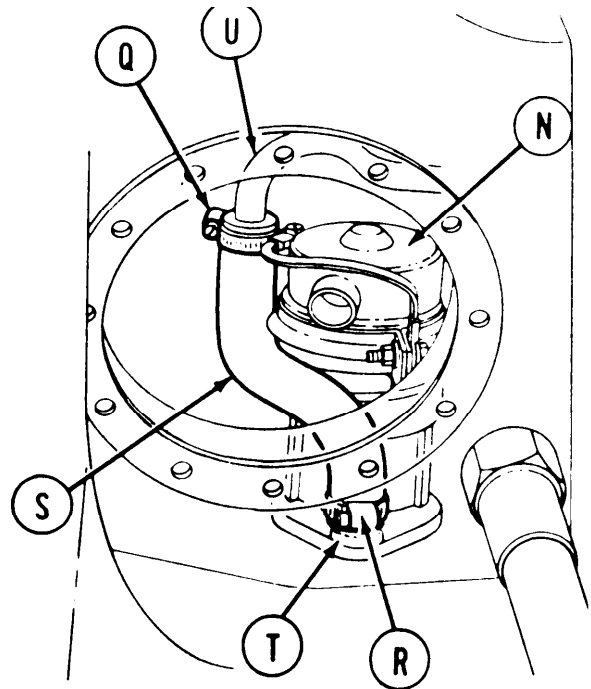


Go on to Sheet 4

TA141519

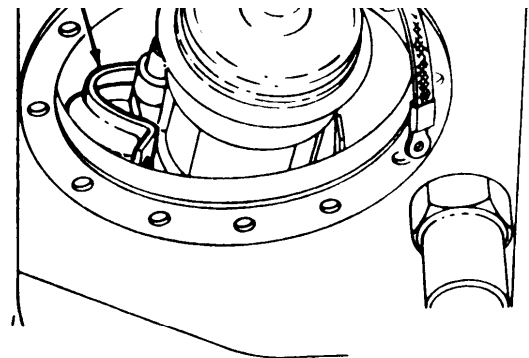
FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 4 of 9)

9. Using screwdriver, loosen two hose clamps (Q) and (R) on hose (S) attached to fuel pump (N),
10. Remove bottom of hose (S) from fuel pump hose connection (T),
11. Remove top of hose (S) from fuel line (U). Remove hose (S).



12. 'Hold retainer (V) in place against body of fuel pump (N),
13. Using socket and 1/2 inch wrench, remove nut (W) and lockwasher (X) from screw (Y). Throw lockwasher (X) away.
14. Remove screw (Y) and washer (Z) from mounting bracket (AA). Let ground lead (AB) fall away.

15. Hold fuel pump (N). Swing back retainer (V).
16. Remove fuel pump (N).

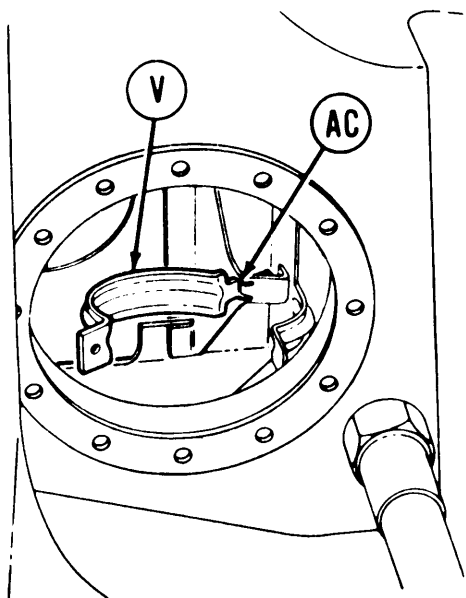


Go on to Sheet 5

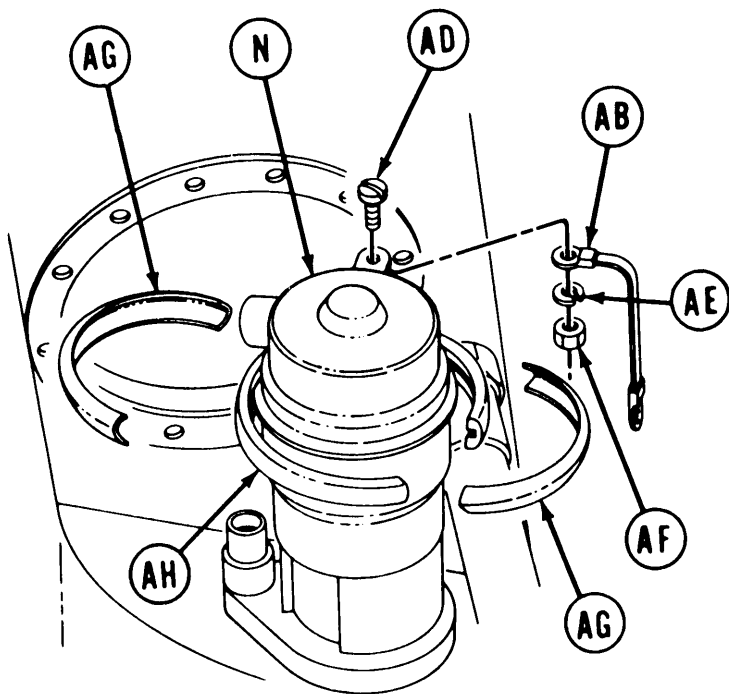
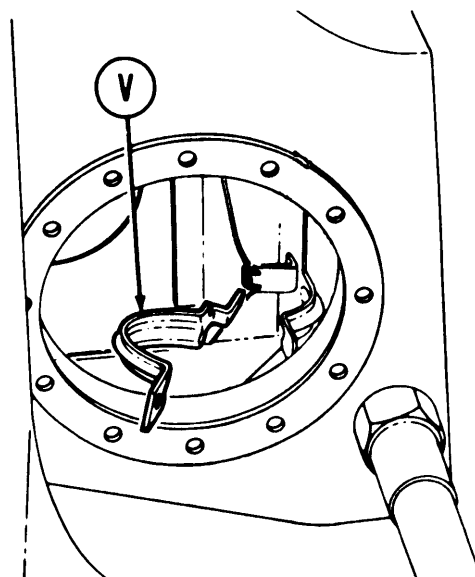
TA141520

FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 5 of 9)

17. Remove retainer (V) from slot (AC).



18. Remove retainer (V).



Using screwdriver and 1/4 inch wrench, remove screw (AD), lockwasher (AE), and nut (AF), and remove ground lead (AB) from fuel pump (N). Throw lockwasher away.

Using hands, remove two clamps (AG) and packing (AH) from pump.

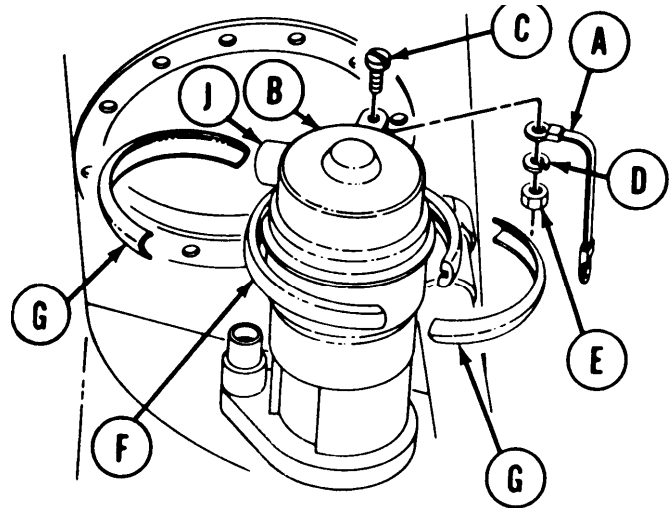
Go on to Sheet 6

TA141521

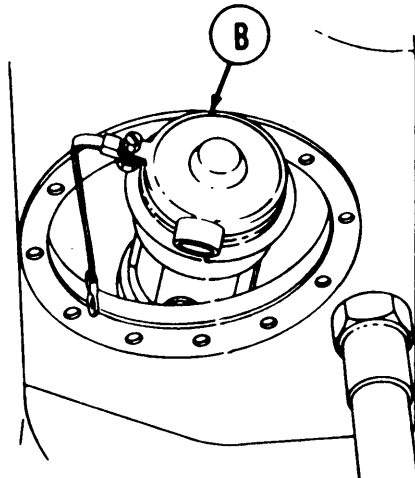
FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 6 of 9)

INSTALLATION:

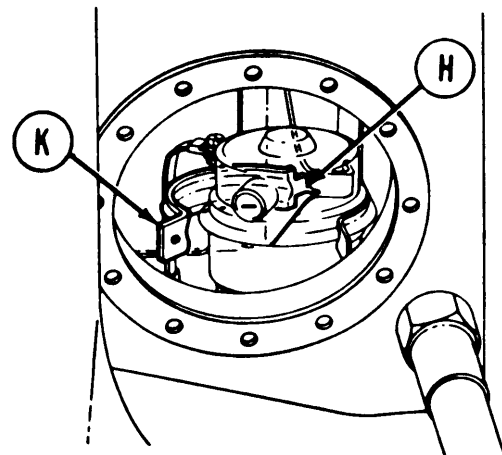
1. Using screwdriver and 1/4 inch wrench, install ground strap (A) of fuel pump (B) with screw (C), new lockwasher (D), and nut (E).
2. Using hands, position packing (F) and two clamps (G) on fuel pump (B).



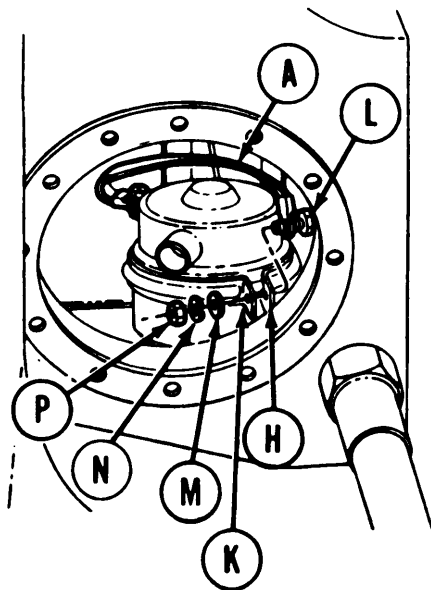
3. Insert fuel pump (B) through opening in fuel tank and onto mounting bracket (H) so that electrical connector (J) is to the left as shown.



4. Insert end of retaining strap (K) into mounting bracket (H) slot.



5. Position ground strap (A) terminal on mounting bracket (H). Insert screw (L) through terminal of ground strap (A), mounting bracket (H), and retaining strap (K). Using fingers, install washer (M) and new lockwasher (N).
6. Using fingers, install nut (P) loosely onto screw (L).

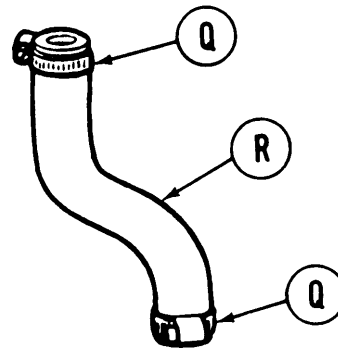
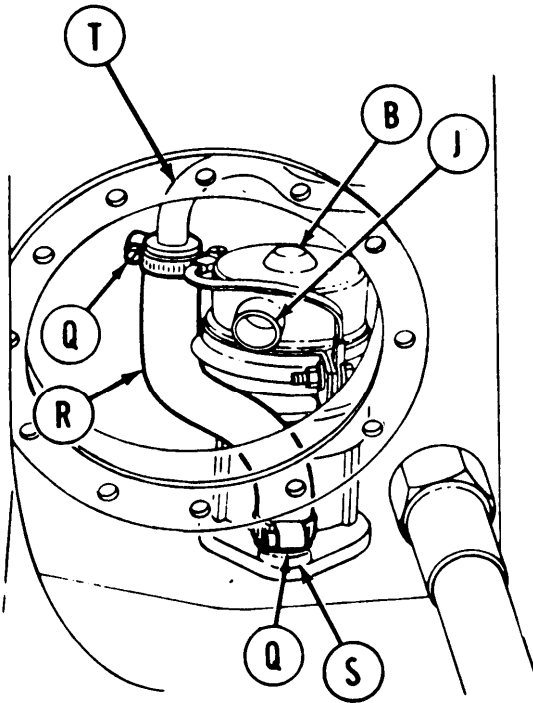


Go on to Sheet 7

TA141522

FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 7 of 9)

7. Install clamp (Q) on each end of hose (R).

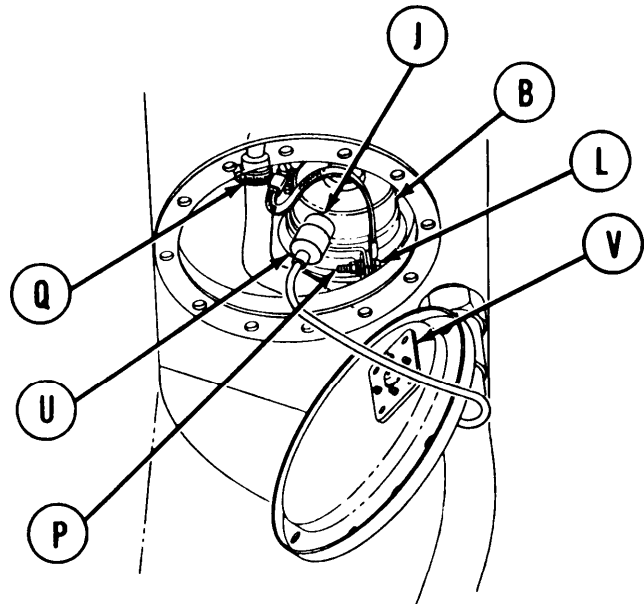


NOTE

It may be necessary to turn fuel pump (B) 1/4 turn in order to install hose (R) onto fuel pump outlet (S).

8. Install hose (R) between fuel pump outlet (S) and fuel line (T). Using screwdriver, tighten screws on clamps (Q).

9. Turn fuel pump (B) so electrical connector (J) is clear of top clamp (Q). Using hands, connect electrical connector (U) at back of capacitor housing (V) to electrical connector (J).
10. Using 1/2 inch wrench to hold screw (L), use socket and tighten nut (P).

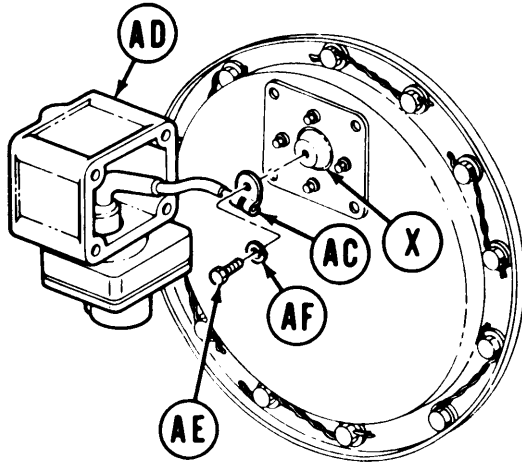
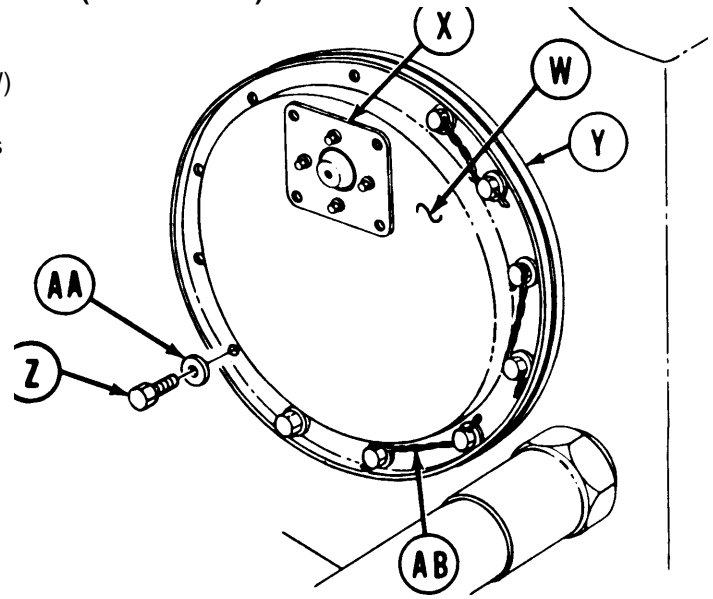


Go on to Sheet 8

TA141523

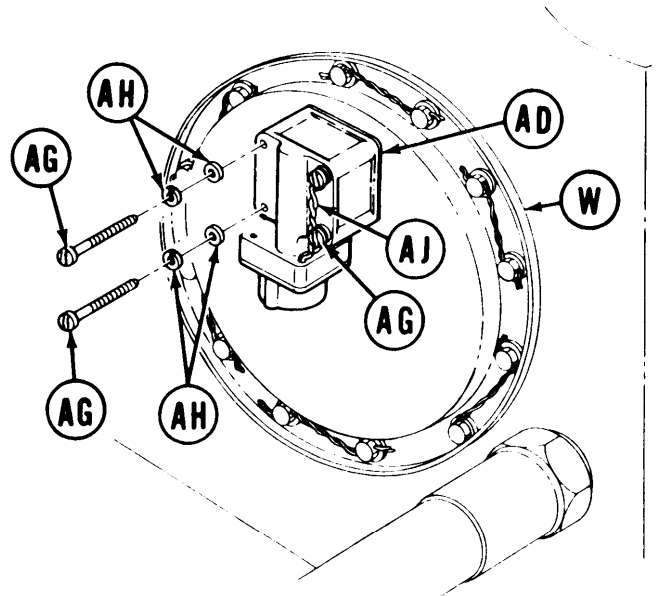
FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 8 of 9)

- Position new gasket (Y) and access cover (W) with capacitor housing adapter (X) up (as shown). Aline cover and gasket screw holes with those in fuel tank, and using 1/2 inch socket, install 12 screws and washers (AA). Use torque wrench and socket to tighten screws (Z) to 40-83 lb-in. (6-9 N m).



- Using slip joint pliers, install lockwire (AB) between screws (Z).
- Using screwdriver, secure electrical lead (AC) of housing and capacitor (AD) to adapter (X) with screw (AE) and new lockwasher (AF).

- Position capacitor and housing (AD) onto cover (W). Using screwdriver, install four screws (AG), washers, and new lockwashers (AH) securing capacitors and housing (AD) to cover (W).
- Using slip joint pliers, install lockwire (AJ) (Item 60, Appendix D) into screws (AG).

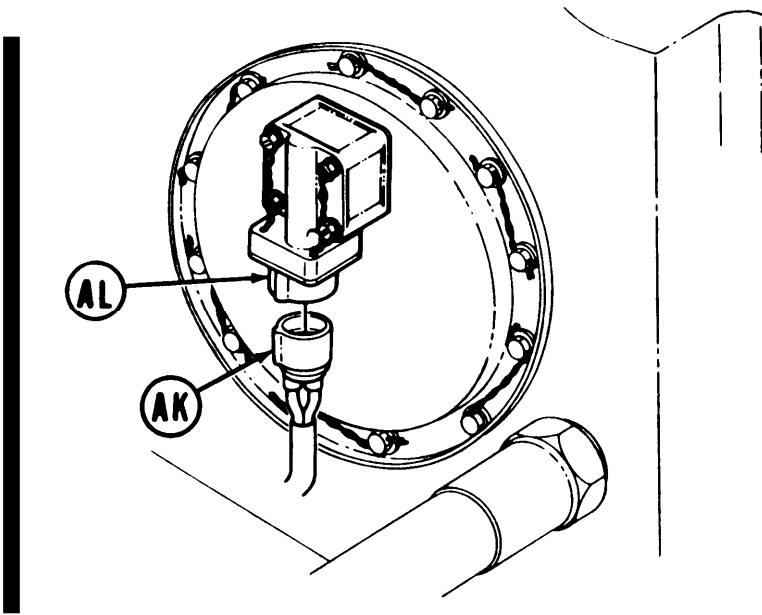


Go on to Sheet 9

TA253196

FUEL PUMP REPLACEMENT - LEFT FUEL TANK (Sheet 9 of 9)

16. Install electrical lead (AK) to connector (AL).
17. Turn fuel isolate valves back to original position (TM 9-2350-222-10).
18. Fill fuel tank.
19. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA253197

FUEL PUMP REPLACEMENT - RIGHT FUEL TANK (Sheet 1 of 6)

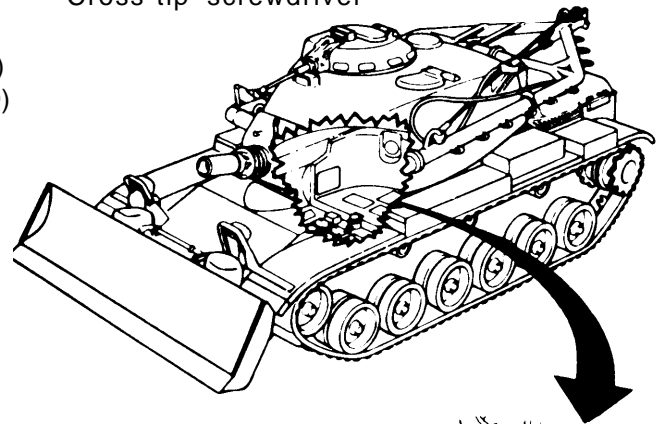
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-61
Installation	7-64

TOOLS: 7/16 in. socket with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2in. drive
 Torque wrench with 1/2in. drive
 (0-175 lb-ft) (0-237 N•m)

Diagonal cutting pliers
 Flat-tip screwdriver
 Offset flat-tip screwdriver
 3/8 in. combination box and open end wrench
 Cross-tip screwdriver

SUPPLIES: Sealing compound (Item 28, Appendix D)
 Silicone compound (Item 32, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwire (Item 59, Appendix D)
 Gasket (10873918)
 Gasket (11637078)
 Lockwasher (MS35333-38)
 Lockwasher (MS35338-44) (2 required)

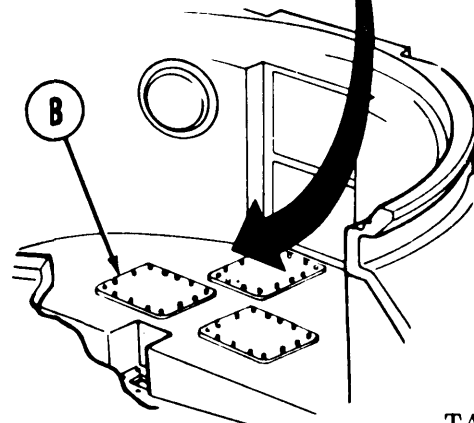
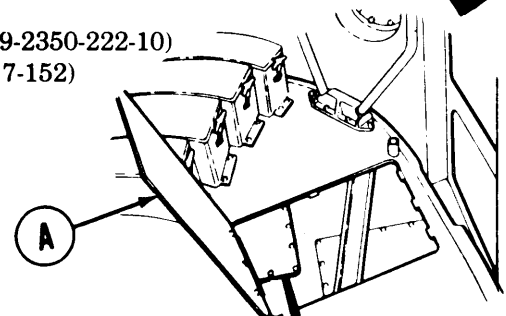


REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Isolate right fuel tank (TM 9-2350-222-10)
 Drain right fuel tank (page 7-152)

REMOVAL:

1. Open turret platform access door (A) (TM 9-2350-222-10).
2. Traverse turret to gain access to cover (B) in subfloor over right fuel tank (TM 9-2350-222-10).
3. Using offset flat-tip screwdriver, remove 14 screws securing access cover (B). Remove access cover.

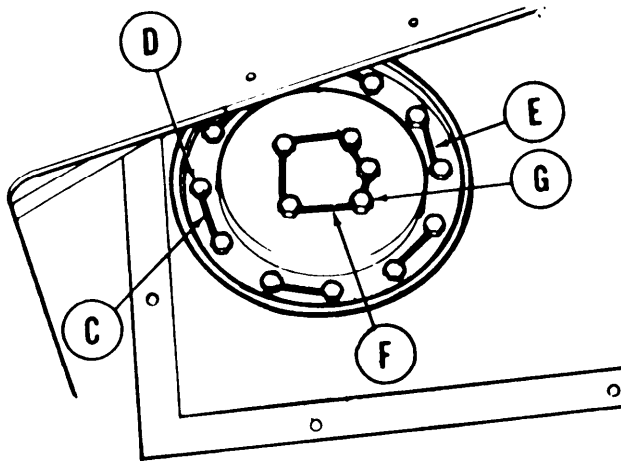


TURRET
 REMOVED
 FOR CLARITY

Go on to Sheet 2

TA141526

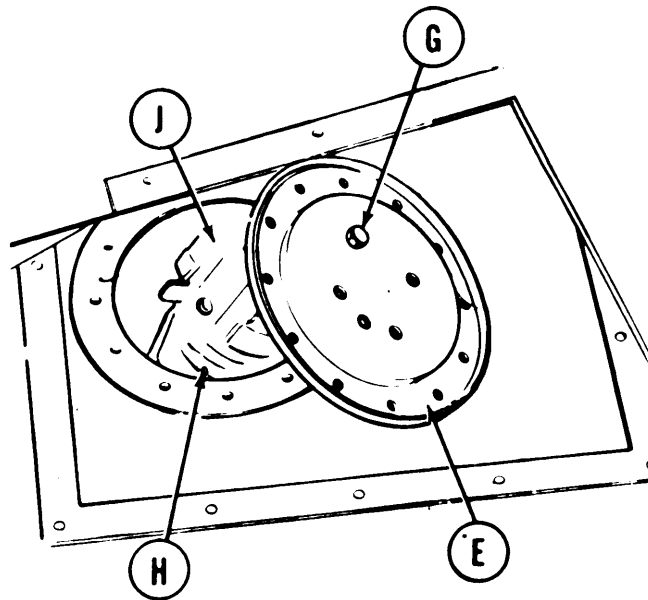
FUEL PUMP REPLACEMENT - RIGHT FUEL TANK (Sheet 2 of 6)



4. Using pliers, cut lockwire (C). Using 1/2 inch socket, remove 12 screws and washers (D) securing fuel pump access cover (E).

5. Using pliers, cut lockwire (F). Using 9/16 inch socket, remove four of five screws (G) securing access cover (E) to fuel pump mounting bracket (underneath cover). Loosen, but do not remove, fifth screw.

6. Swivel access cover (E) on fifth screw (G) until you can withdraw mounting bracket (H) with fuel pump (J) attached part way out of fuel tank.

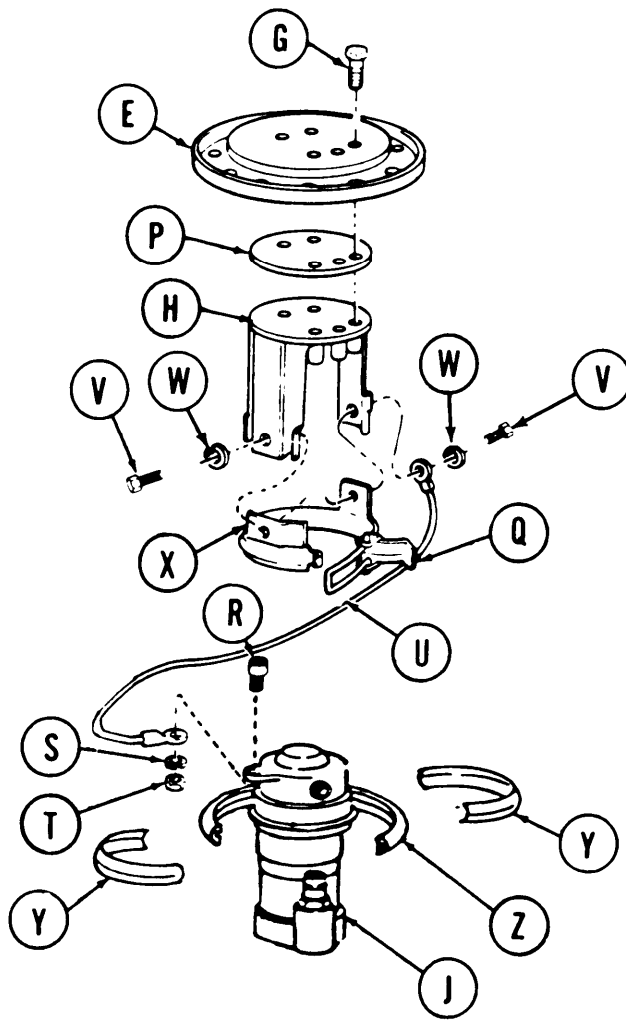
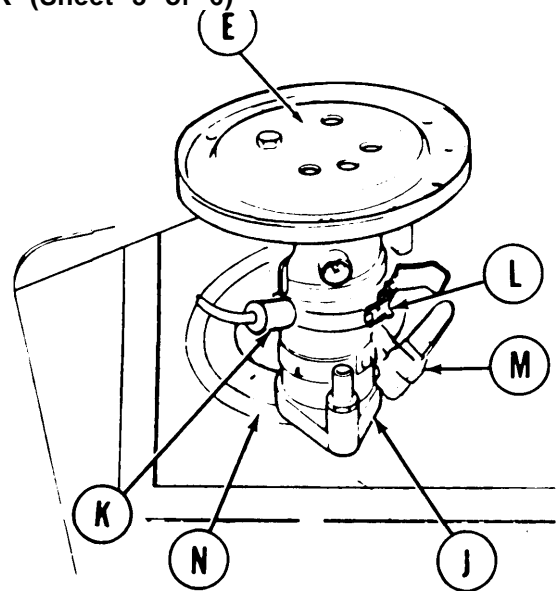


Go on to Sheet 3

TA141527

FUEL PUMP REPLACEMENT - RIGHT FUEL TANK (Sheet 3 of 6)

7. Disconnect electrical connector (K).
8. Using flat-tip screwdriver, loosen hose clamp (L). Remove hose (M) from fuel pump (J).
9. Remove gasket (N) and fuel pump (J) from fuel pump opening. Throw gasket away.



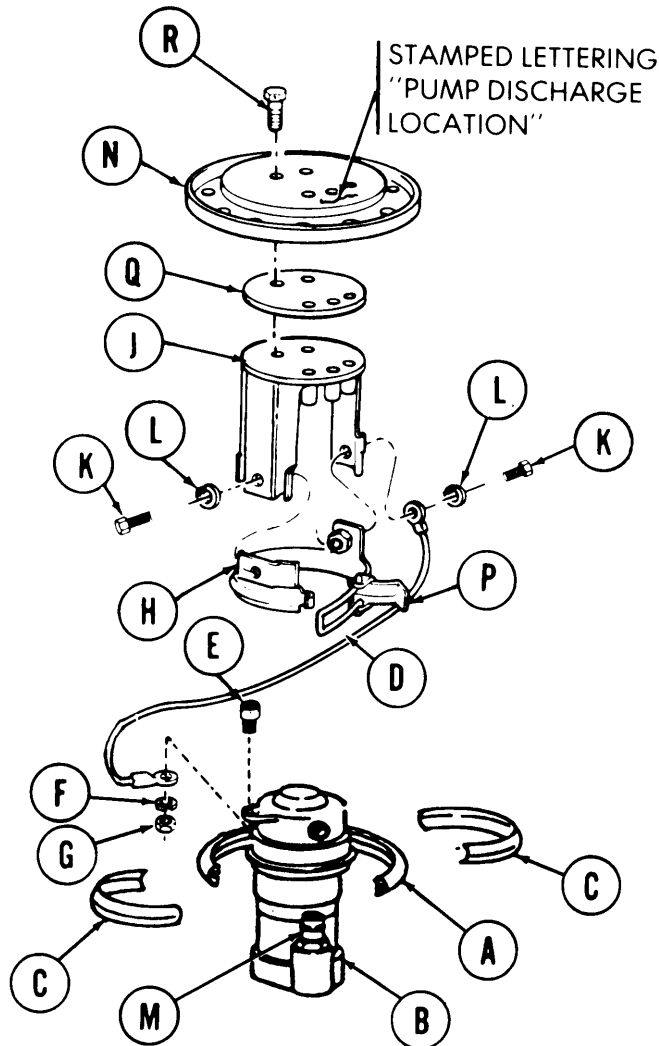
10. Remove remaining screw (G) from access cover (E).
11. Separate cover (E), gasket (P), and mounting bracket (H). Throw gasket away.
12. Open clamp lever (Q) and remove fuel pump (J) from mounting bracket (H).
13. Using screwdriver and 3/8 inch wrench, remove screw (R), lockwasher (S), and nut (T) securing ground lead (U) to pump (J). Remove ground lead from pump. Throw lockwasher away.
14. Using 7/16 inch socket, remove two screws (V), and two lockwashers (W) securing clamp (X) to bracket (H). Remove clamp. Throw lockwashers away.
15. Using hands, remove two clamps (Y) and packing (Z) from pump (J).

Go on to Sheet 4

TA141528

FUEL PUMP REPLACEMENT - RIGHT FUEL TANK (Sheet 4 of 6)

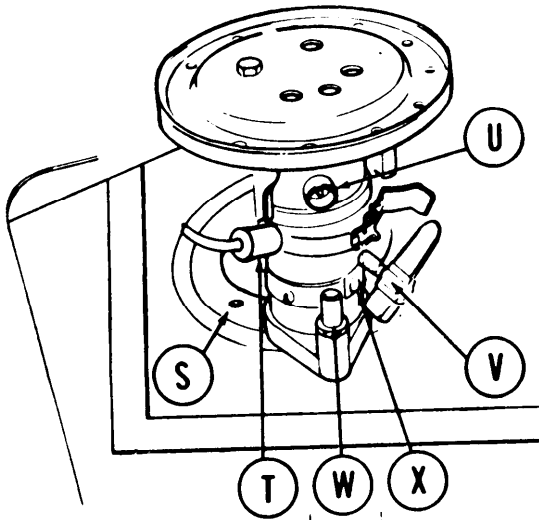
INSTALLATION:



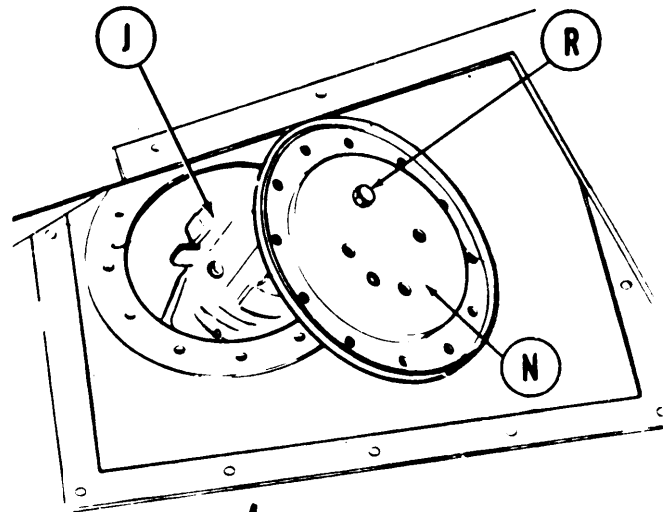
1. Position packing (A) around pump (B) and, using hands, install clamps (C) around packing (A) and pump (B).
2. Using screwdriver and 3/8 inch wrench, secure ground lead (D) to fuel pump (B) with screw (E), new lockwasher (F), and nut (G).
3. Using 7/16 inch socket, secure clamp (H) to bracket (J) with two screws (K) and two new lockwashers (L).
4. Position fuel pump (B) in mounting bracket (J) so that pump discharge port (M) will be directly beneath stamped lettering 'PUMP DISCHARGE LOCATION' on access cover (N). Lock pump in bracket by closing clamp lever (P).
5. Position new gasket (Q) on mounting bracket (J). Apply sealing compound to threads of one screw (R). Install one screw (R) through access cover (N) and gasket (Q) into mounting bracket (J). Leave screw (R) loose.

Go on to Sheet 5

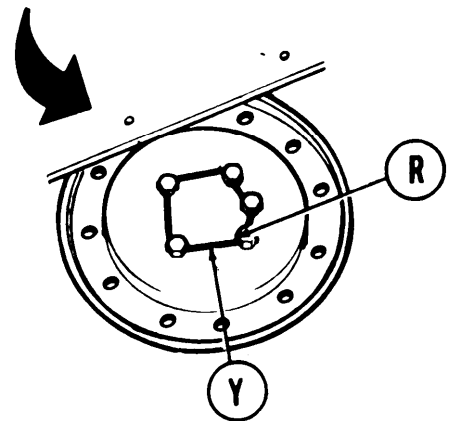
FUEL PUMP REPLACEMENT - RIGHT FUEL TANK (Sheet 5 of 6)



6. Place new gasket (S) over opening in fuel tank.
7. Place silicone compound (Item 32, Appendix D) on electrical lead (T).
8. Place fuel pump close to opening of fuel tank. Connect electrical lead (T) to electrical connector (U).
9. Place hose (V) on pump outlet port (W). Using screwdriver, tighten clamp (X) on hose.



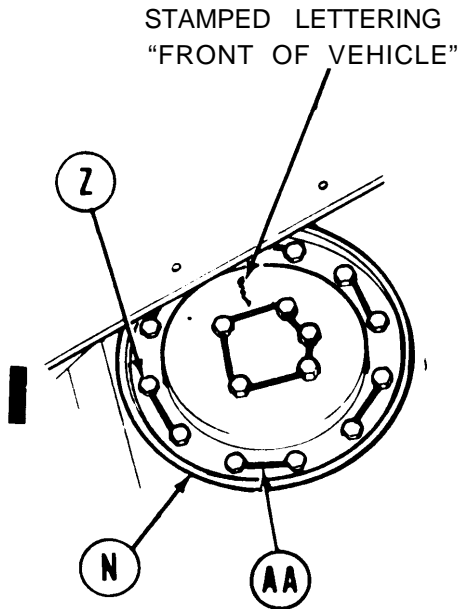
10. Swivel access cover (N) on single installed screw (R) to work fuel pump into position in fuel tank.
11. Position access cover and gasket on mounting bracket (J).
12. Apply sealing compound (Item 28, Appendix D) to threads of remaining four screws (R). Using 9/16 inch socket, install and tighten all five screws (R). Secure screws with lockwire (Y) (Item 59, Appendix D).



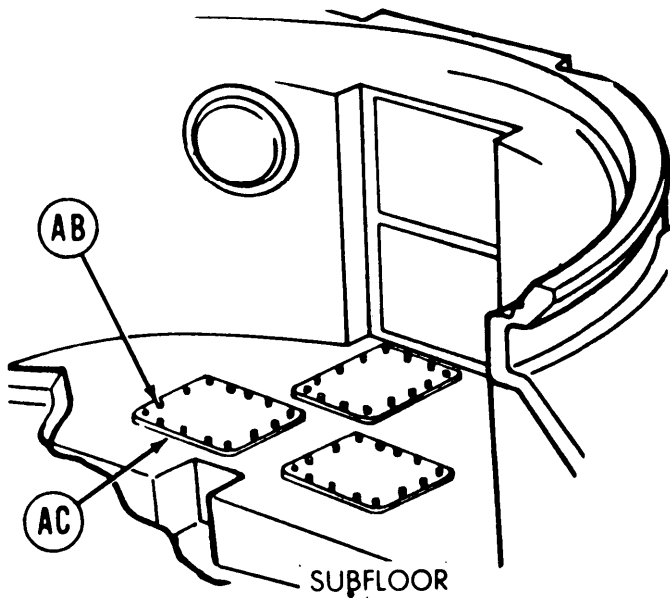
Go on to Sheet 6

Change 1 TA253258

FUEL PUMP REPLACEMENT - RIGHT FUEL TANK (Sheet 6 of 6)



13. Position access cover (N) over fuel tank opening so that lettering 'FRONT OF VEHICLE' stamped on cover is facing toward front of vehicle.
14. Using 1/2 inch socket, install 12 screws and 12 washers (Z) securing cover (N).
15. Using torque wrench, tighten screws (Z) to 13-18 lb-ft (18-24 N•m).
16. Secure screws with lockwire (AA) (Item 59, Appendix D).
17. Using offset flat-tip screwdriver, install 14 screws (AB) securing access cover (AC).
18. Open fuel tank crossover valve (TM 9-2350-222-10).
19. Fill fuel tanks.



End of Task

TA253259

PERSONNEL HEATER FUEL PUMP REPLACEMENT (Sheet 1 of 3)

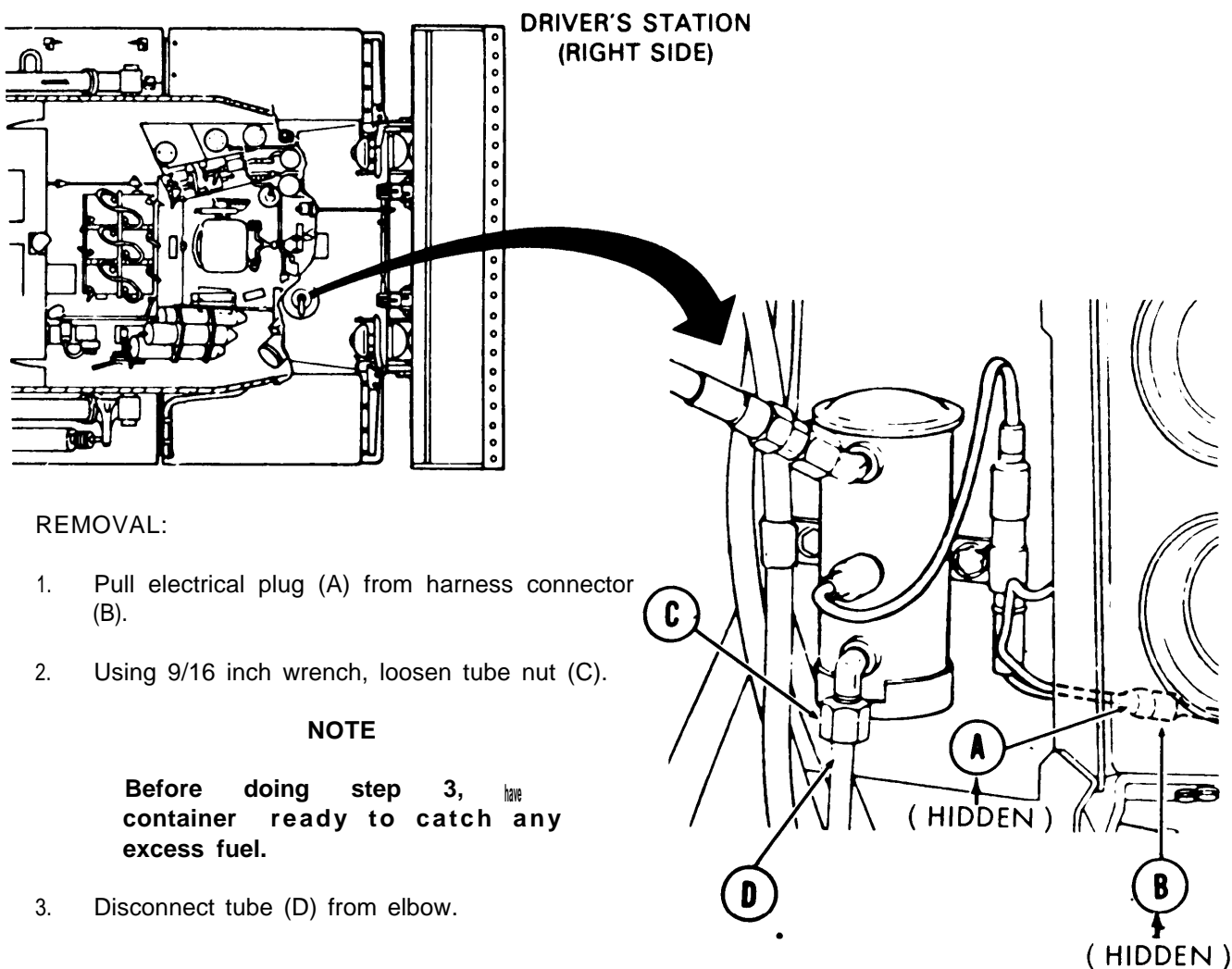
TOOLS: 9/16 in. combination box and open end wrench
 5/8 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. drive

Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 7/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench

SUPPLIES: Container
 Chalk
 Lockwasher (MS35337-25) (2 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: HEATER MASTER switch OFF



REMOVAL:

1. Pull electrical plug (A) from harness connector (B).
2. Using 9/16 inch wrench, loosen tube nut (C).

NOTE

Before doing step 3, have container ready to catch any excess fuel.

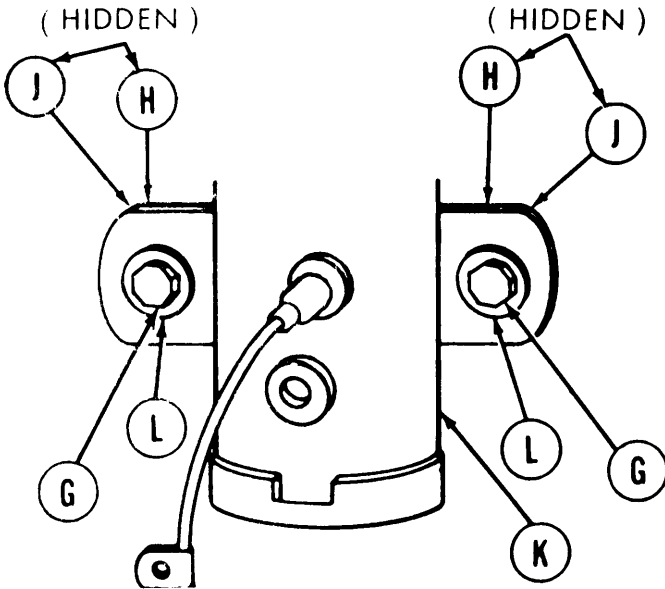
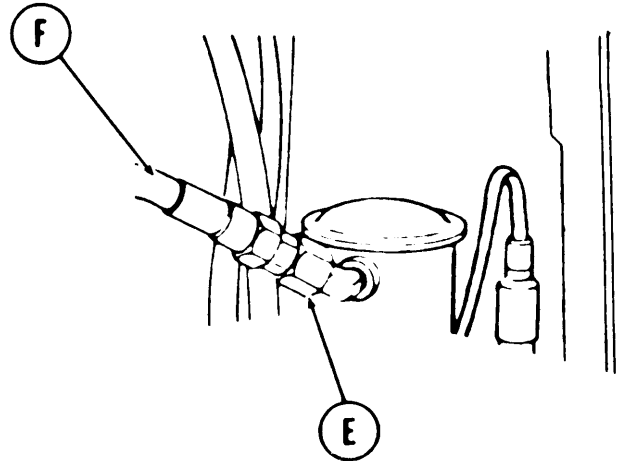
3. Disconnect tube (D) from elbow.

Go on to Sheet 2

TA141471

PERSONNEL HEATER FUEL PUMP REPLACEMENT (Sheet 2 of 3)

4. Using 5/8 inch wrench, loosen nut (E).
5. Disconnect hose (F) from elbow.
6. Using socket, loosen two screws (G) while holding nuts (H) with 7/16 inch wrench.

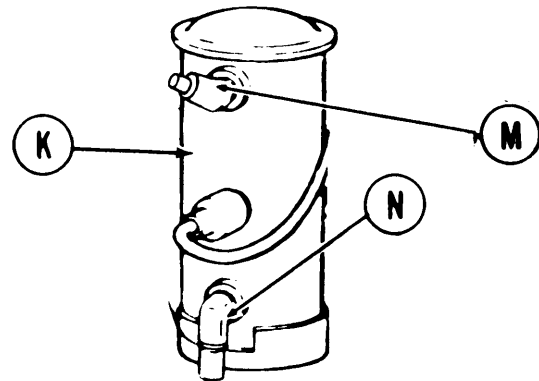


NOTE

Using chalk, mark direction each elbow is pointing on body of fuel pump.

9. Using 1/2 inch wrench, remove elbow (M) from pump (K).
10. Using 7/16 inch wrench, remove elbow (N) from pump (K).

7. Remove two nuts (H) and two lockwashers (J). Throw lockwashers away.
8. Lift fuel pump (K) along with two screws (G), flat washer (L), and condenser bracket from mounting place.



Go on to Sheet 3

TA141472

PERSONNEL HEATER FUEL PUMP REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

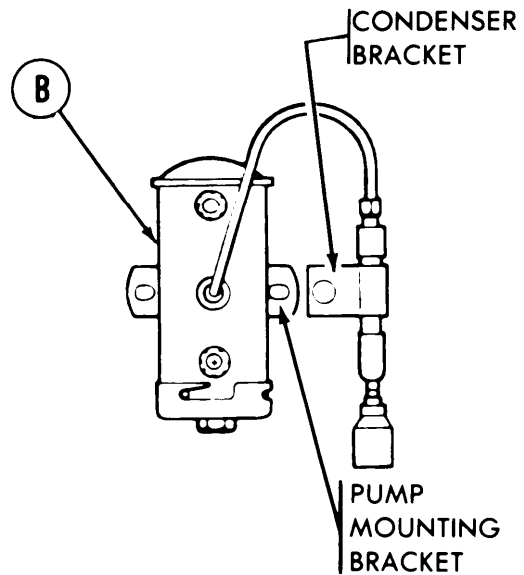
1. Using 1/2 inch wrench, install elbow (A) into pump (B).
2. Using 7/16 inch wrench, install elbow (C) into pump (B).

NOTE

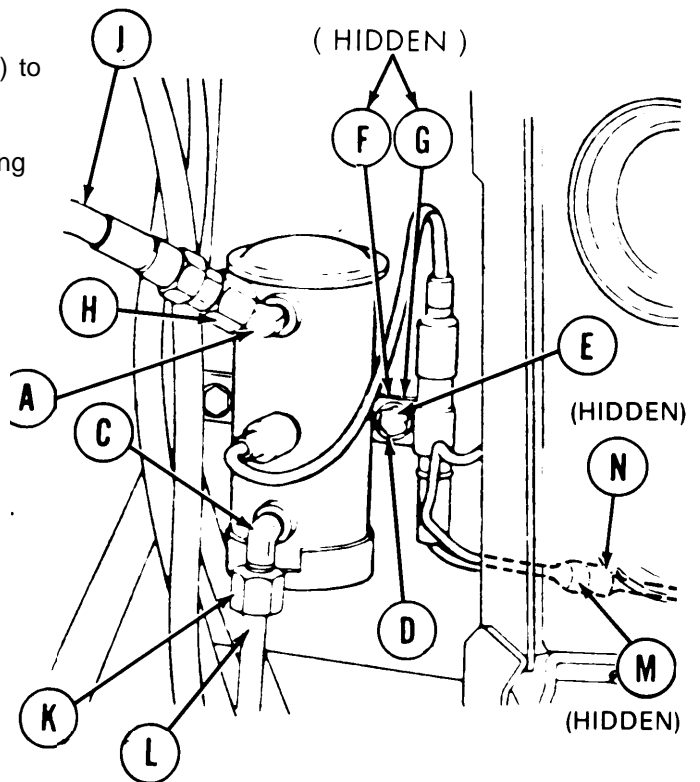
When installing heater pump, make sure cable condenser bracket is secured with pump mounting bracket.

NOTE

Be sure elbows (A) and (C) are alined with the chalk marks on the pump.



3. Mount condenser bracket and fuel pump (B) to plate. Using fingers, install two screws (D) and flat washers (E).
4. Install two new lockwashers (F) and nuts (G) to other side of mounting plate.
5. Using socket, tighten screws (D) while holding nuts (G) with 7/16 inch wrench,
6. Using 5/8 inch wrench, connect and tighten nut (H) to connect hose (J) to 45°elbow.
7. Using 9/16 inch wrench, connect and tighten nut (K) of tube (L) to 90° elbow.
8. Plug electrical connector (M) to harness (N).
9. Operate personnel heater (TM 9-2350-222-10).



End of Task

TA141473

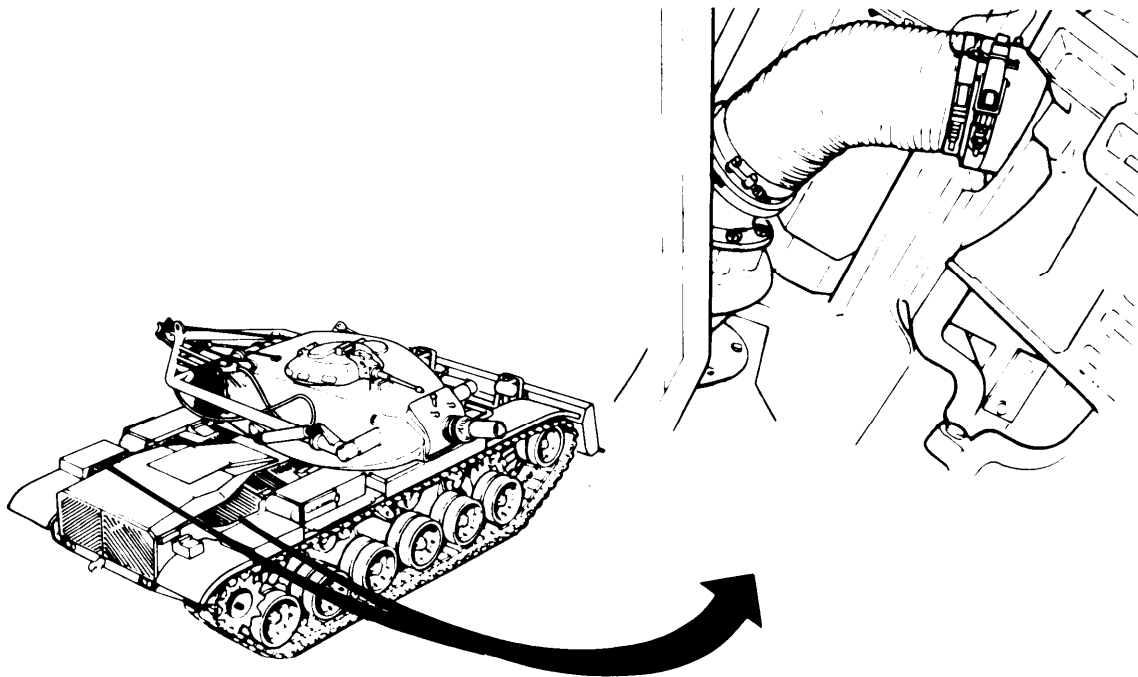
AIR CLEANER TURBOCHARGER ELBOW REPLACEMENT (Sheet 1 of 3)

TOOLS: Flat-tip screwdriver
1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
1/2 in. combination box and open end wrench
10 in. extension with 1/2 in. drive

SUPPLIES: Gasket
Lockwasher (8 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Traverse turret so gun tube is over left or right fender
(TM9-2350-222-10)
Open top deck grille doors (TM 9-2350-222-10)



Go on to Sheet 2

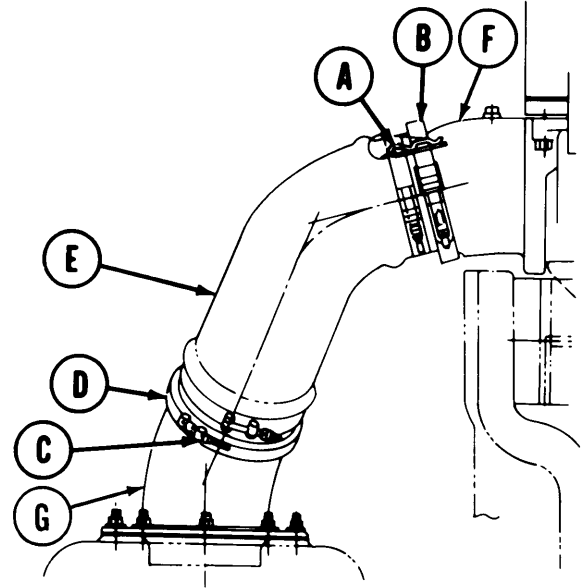
AIR CLEANER TURBOCHARGER ELBOW REPLACEMENT (Sheet 2 of 3)

REMOVAL:

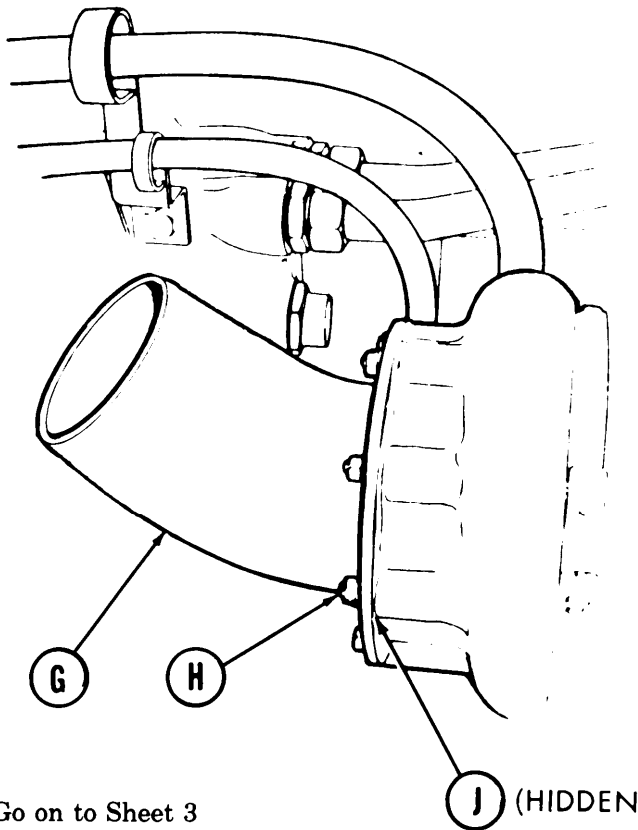
WARNING

If NBC exposure is suspected, all air filter media must be handled by personnel wearing protective equipment. Contact your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

1. Pull pin (A) and release quick release clamp (B).
2. Remove quick release clamp (B) from hose and elbow.
3. Using socket, loosen nut (C) securing clamp (D).
4. Remove hose assembly (E).
5. Remove clamp (D).



6. Cover air cleaner outlet elbow (F) and turbosupercharger inlet elbow (G) with rags to prevent entrance of foreign matter.



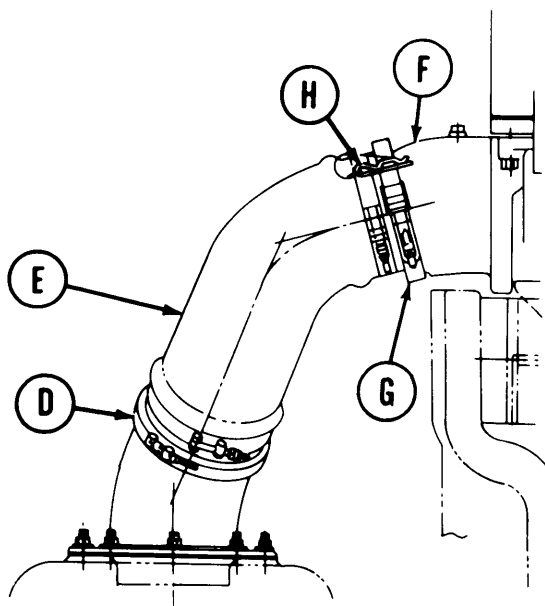
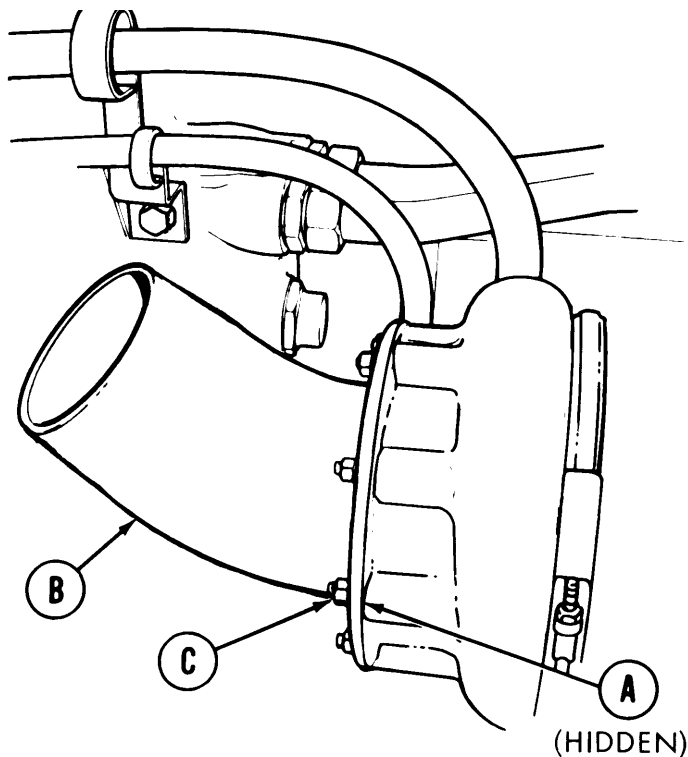
7. Using socket with extension and wrench, remove eight nuts, lockwashers, and flat washers (H) securing elbow (G) to turbocharger.
8. Remove elbow (G) and gasket (J). Throw gasket (J) away.
9. Make sure turbocharger inlet mating surface is not nicked, burred, or damaged. If turbocharger inlet mating surface is damaged, notify support maintenance. Make sure eight nuts and studs are not stripped or damaged. Repair as necessary.

Go on to Sheet 3

AIR CLEANER TURBOCHARGER ELBOW REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. Position new gasket (A) onto studs of turbocharger.
2. Position elbow (B) onto studs of turbocharger.
3. Install eight flat washers, lock-washers, and nuts (C) onto studs to secure elbow.
4. Using socket with extension and wrench, tighten nuts (C).



5. Put clamp (D) on turbosupercharger elbow flange.
6. Position hose assembly (E) between air cleaner outlet elbow and turbosupercharger inlet elbow.
7. Aline hose flange to turbosupercharger elbow flange. Position clamp (D) on hose assembly (E) and hand tighten clamp nut.
8. Aline hose flange to air cleaner outlet elbow (F) and install clamp (G).
9. Engage "T" bolts to hasp on clamp (G) and close clamp handle.
10. Install pin (H) to secure clamp handle.
11. Using socket, tighten nuts on clamps (D), (G), and (H).
12. Close top deck grille doors (TM 9-2350-222-10).

End of Task

AIR CLEANER OUTLET HOSE ASSEMBLY REPLACEMENT (Sheet 1 of 3)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-73
Installation	7-74

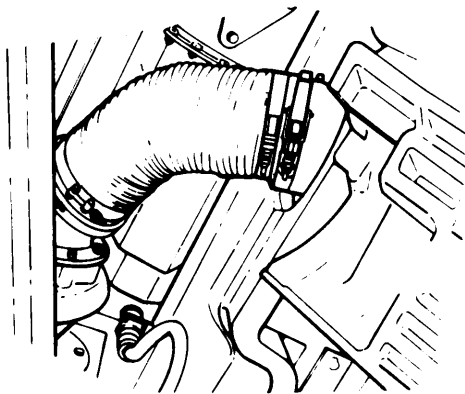
TOOLS: 7/16 in. deepwell socket, 3/8 in. drive
 Knife, pocket
 Ratchet, 3/8 in. drive
 Wrench, torque, 3/8 in. drive, 0 to 200 lb in.

SUPPLIES: Packing, preformed (10870861) (2 required)
 Adhesive (Item 4, Appendix D)
 Rag, wiping (Item 65, Appendix D)

REFERENCE: TM9-2350-222-10

NOTE

Replacement of left and right side air cleaner outlet hose assemblies is the same. Left side shown.



REMOVAL:

CAUTION

Do not open top deck doors when air cleaner door assembly is open.
 Damage to air cleaner door may result.

1. Open top deck door assemblies (TM 9-2350-222-10).

Go on to Sheet 2

TA249065

AIR CLEANER OUTLET HOSE ASSEMBLY REPLACEMENT (Sheet 2 of 3)

2. Pull pin (A) and release quick release clamp (B).

3. Remove quick release clamp (B) from hose and elbow.

4. Using socket, loosen nut (C) securing clamp (D).

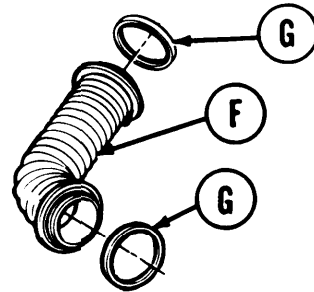
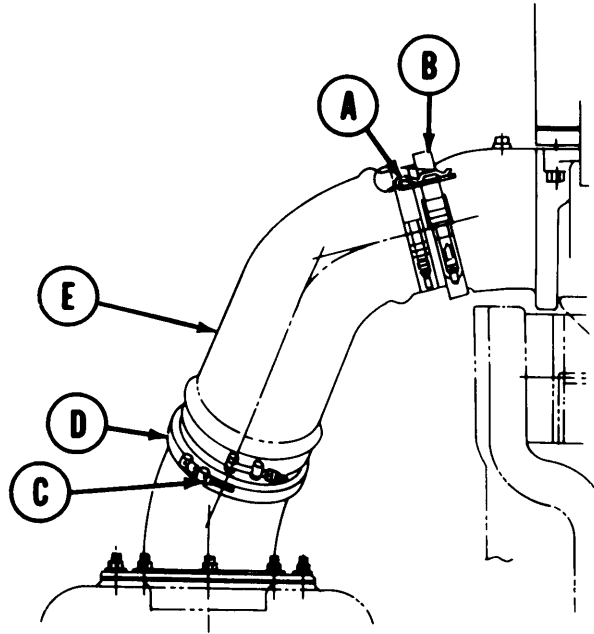
5. Remove hose assembly (E).

6. Remove clamp (D).

7. Cover air cleaner outlet elbow and turbosupercharger inlet elbow with rags to prevent entrance of foreign matter.

8. Inspect hose assembly (E) for damage or defective parts. Replace hose assembly if hose or flange is unserviceable.

9. If hose (F) is serviceable, remove preformed packings (G) from ends of hose assembly flanges. Throw packings away. Using knife, clean old adhesive from grooves in flanges.



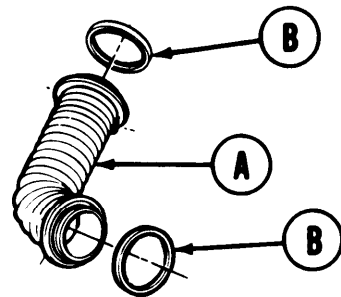
INSTALLATION:

NOTE

If installing new hose assembly, skip steps 1 and 2.

1. Apply adhesive (Item 4, Appendix D) to grooves in flanges in hose (A).

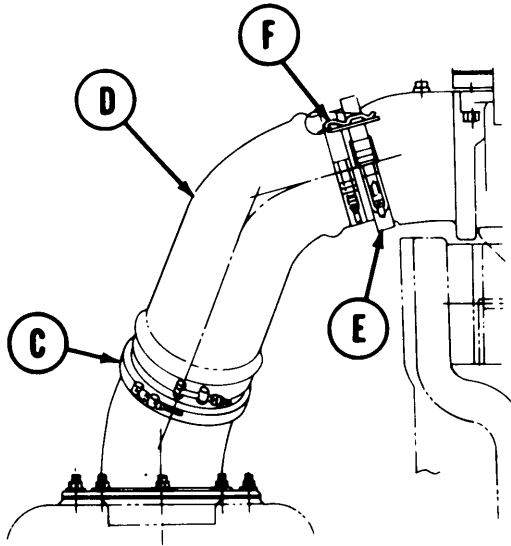
2. Install new preformed packings (B) into grooves in flanges.



Go on to Sheet 3

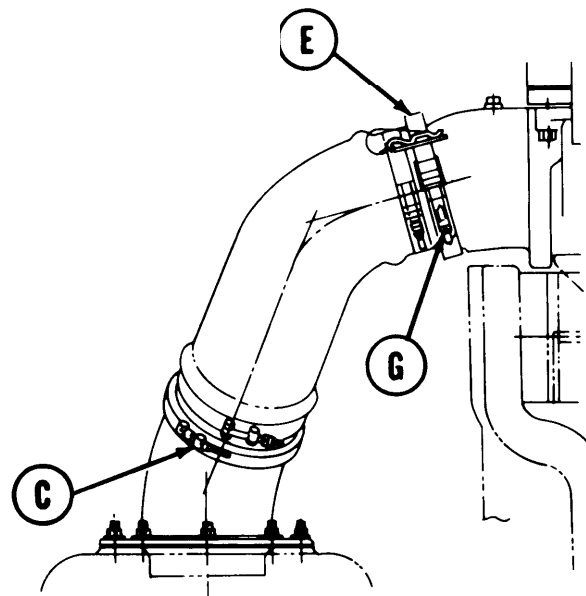
TA249066

AIR CLEANER OUTLET HOSE ASSEMBLY REPLACEMENT (sheet 3 of 3)



3. Put clamp (C) on turbosupercharger elbow flange.
4. Position hose assembly (D) between air cleaner outlet elbow and turbosupercharger inlet elbow.
5. Aline hose flange to turbosupercharger elbow flange. Position clamp (C) on hose assembly (D) and hand tighten clamp nut.

6. Aline hose flange to air cleaner outlet elbow and install clamp (E).
7. Engage "T" bolts to hasp on clamp (E) and close clamp handle.
8. Install pin (F) to secure clamp handle.
9. Using socket, tighten adjusting nut (G) on clamp (E) to eliminate clearance between hasp and "T" bolt. Turn nut one additional turn.
10. Using socket and torque wrench, tighten nut of clamp (C) to 25 to 35 lb. in. (3 to 4 N•m).
11. Close top deck door assemblies (TM 9-235 0-222 -10).



End of Task

TA249067

AIR CLEANER OUTLET ELBOW REPLACEMENT (Sheet 1 of 2)

- TOOLS:**
- 9/16 in. socket with 1/2 in. drive
 - Ratchet with 1/2 in. drive
 - Torque wrench with 1/2 in. drive
(0-175 lb.-ft) (0-237 N•m)
 - 10 in. extension with 1/2 in. drive
 - Pry bar
 - 9/16 in. combination box and open end wrench
 - Universal joint with 1/2 in. drive

- SUPPLIES:**
- Gasket (12304168)
 - Self-locking nuts (MS21044-N6) (14 required)

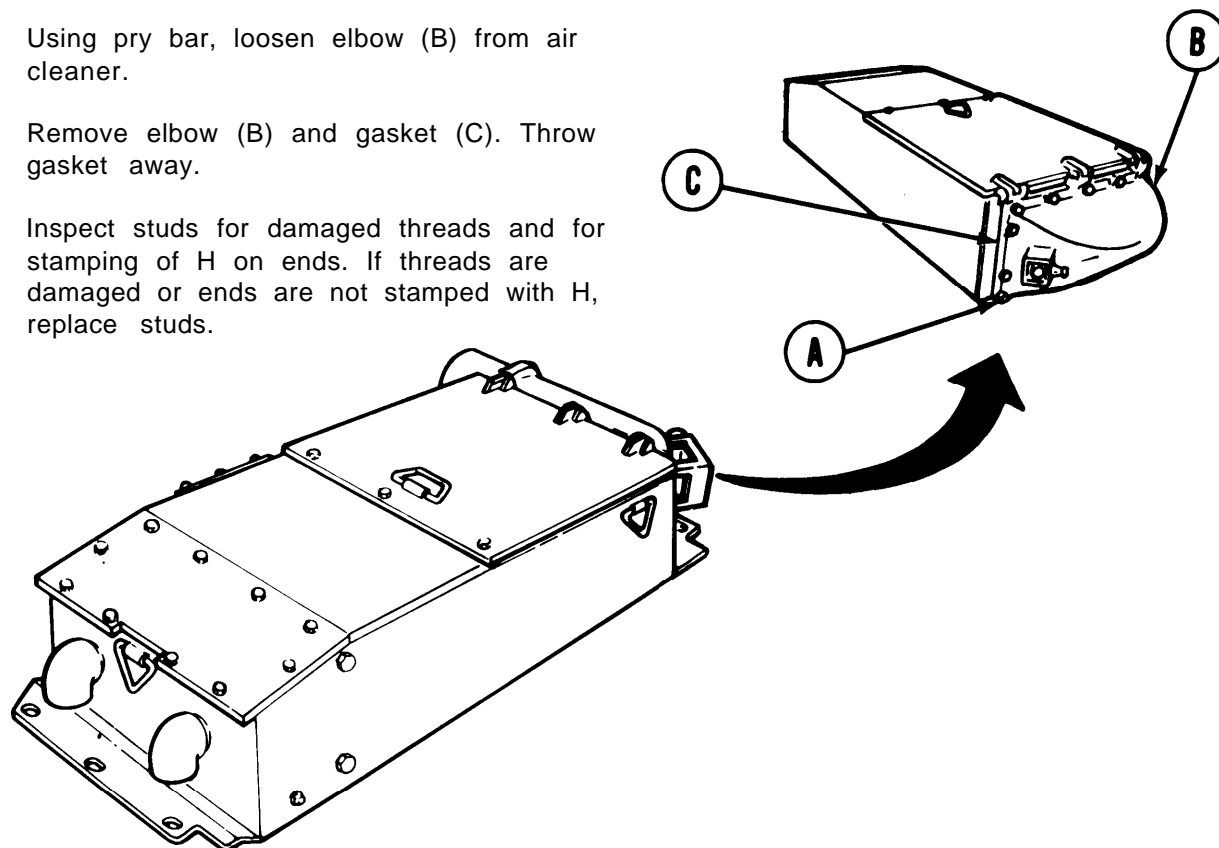
PRELIMINARY PROCEDURES: Remove air cleaner (top loading, page 7-94; side loading, page 7-88)
Remove restriction indicator (page 7-78)

NOTE

Removal of left or right outlet elbow is the same. Left side shown.

REMOVAL:

1. Using socket and wrench, remove 14 nuts (A).
2. Using pry bar, loosen elbow (B) from air cleaner.
3. Remove elbow (B) and gasket (C). Throw gasket away.
4. Inspect studs for damaged threads and for stamping of H on ends. If threads are damaged or ends are not stamped with H, replace studs.



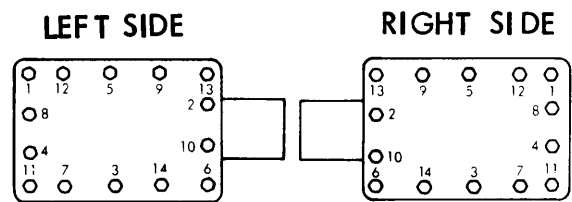
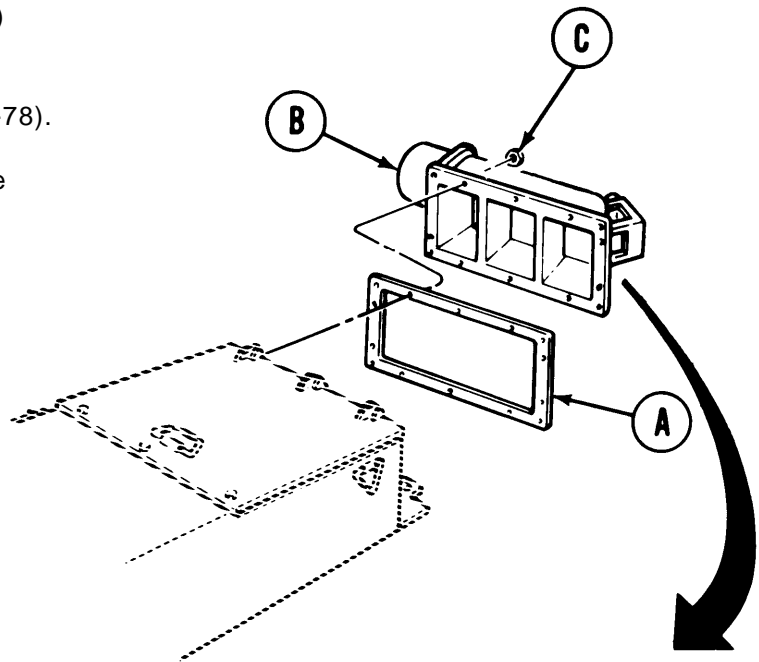
Go on to Sheet 2

TA249068

AIR CLEANER OUTLET ELBOW REPLACEMENT (Sheet 2 of 2)

INSTALLATION:

1. Position new gasket (A) and elbow (B) onto studs on air cleaner.
2. Using socket, extension, and wrench, install 14 new nuts (C) securing elbow (B) to air cleaner. Tighten nuts (C) to 35 lb-ft (47 N•m) using sequence shown.
3. Repeat sequence tightening nuts (C) to 50 lb-ft (68 N•m)
4. Install restriction indicator (page 7-78).
5. Install air cleaner (top loading, page 7-97; side loading, page 7-90).



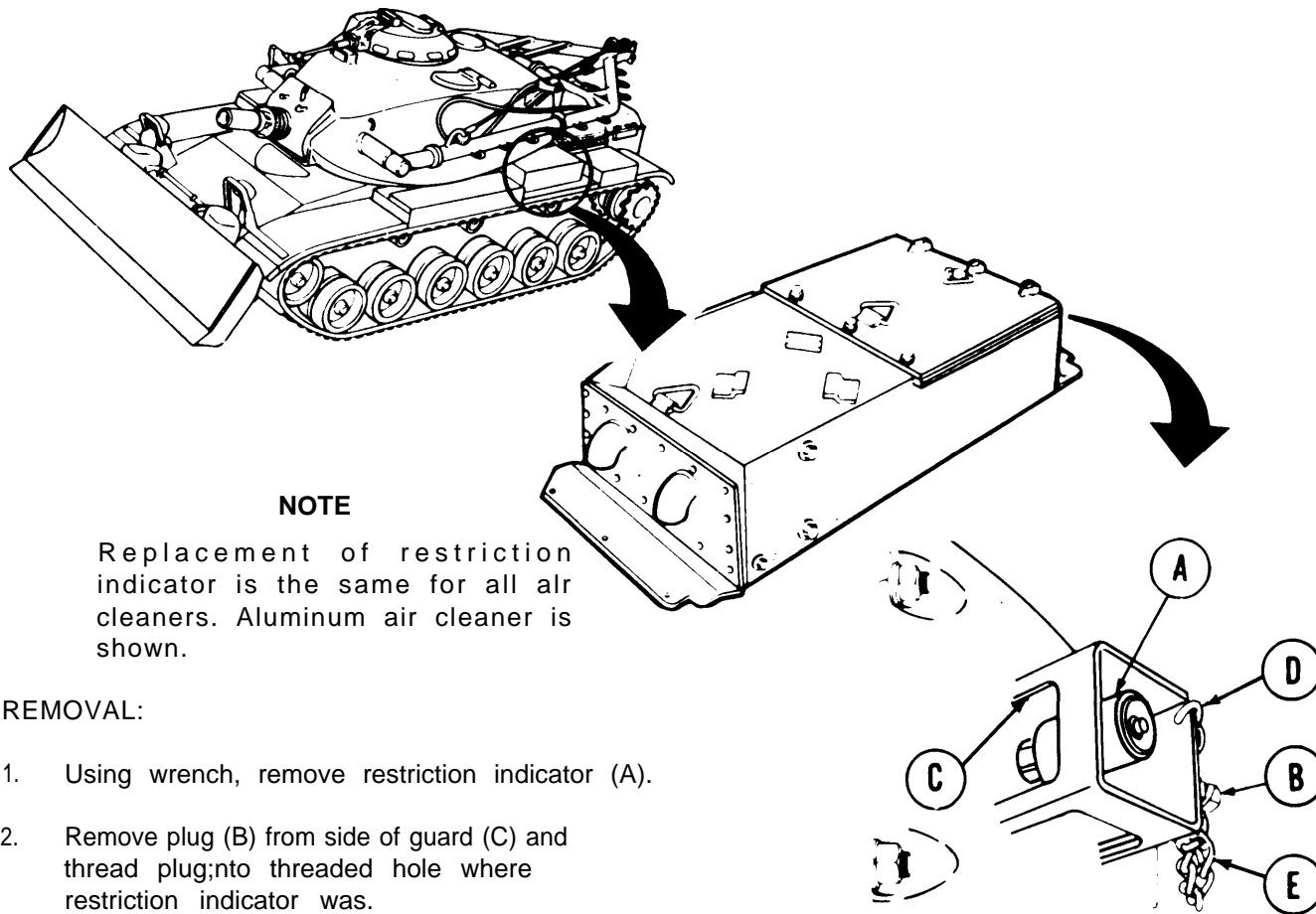
NUT-TIGHTENING SEQUENCE

End of Task

TA249069

AIR CLEANER (LEFT AND RIGHT) RESTRICTION INDICATOR REPLACEMENT (Sheet 1 of 1)

TOOLS: 7/16 in. combination box and open end wrench
Slip joint pliers



NOTE

Replacement of restriction indicator is the same for all air cleaners. Aluminum air cleaner is shown.

REMOVAL:

1. Using wrench, remove restriction indicator (A).
2. Remove plug (B) from side of guard (C) and thread plug into threaded hole where restriction indicator was.
3. Using pliers, open hooks (D) and replace hooks (D), chain (E), or plug (B), as necessary.

INSTALLATION:

1. Remove plug (B) from restriction indicator mounting hole.
2. Install restriction indicator (A). Using wrench, tighten restriction indicator.
3. Thread plug (B) into threaded hole on side of guard (C).

End of Task

TA141482

AIR CLEANER INTAKE ELBOW REPLACEMENT (Sheet 1 of 3)

TOOLS: 11/16 in. combination box and open end wrench
 5/8 in. combination box and open end wrench
 3/8 in. combination box and open end wrench

9/16 in. socket with 1/2 in. drive
 10 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 9/16 in. combination box and open end wrench
 Universal joint with 1/2 in. drive
 Prybar

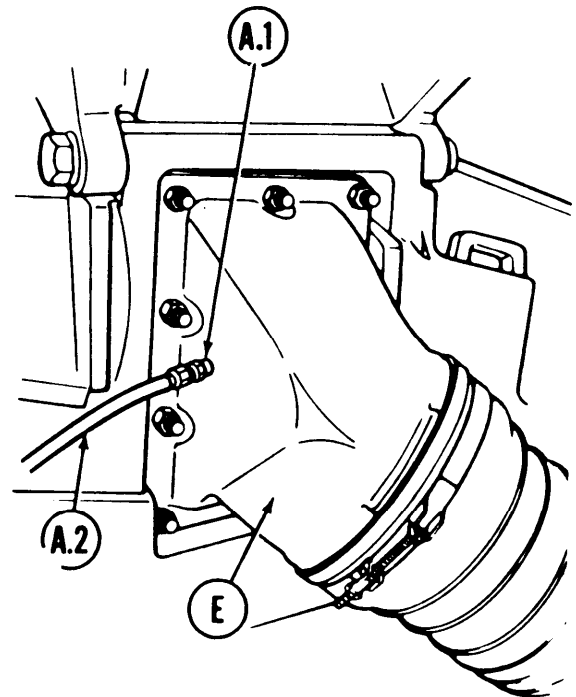
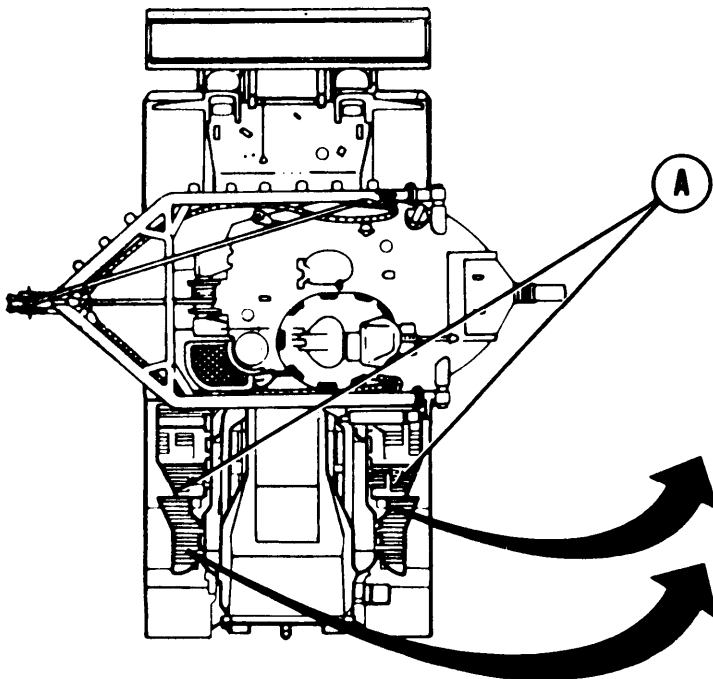
SUPPLIES: Gasket (8762775)
 Rags (Item 65, Appendix D)
 Self-locking nuts (MS21044-N6) (10 required)

REMOVAL:

1. Open top deck grille doors (A) (page 16-21, steps 1 and 2).
- 1.1. Using 5/8 inch wrench to hold adapter (A. 1), use 11/16 inch wrench to disconnect tube assembly (A.2) from adapter (A.1).
- 1.2. Using 5/8 inch wrench, remove adapter (A.1) from left air cleaner intake elbow (E).

NOTE

Steps 1.1 and 1.2 apply to left air cleaner only on late models.

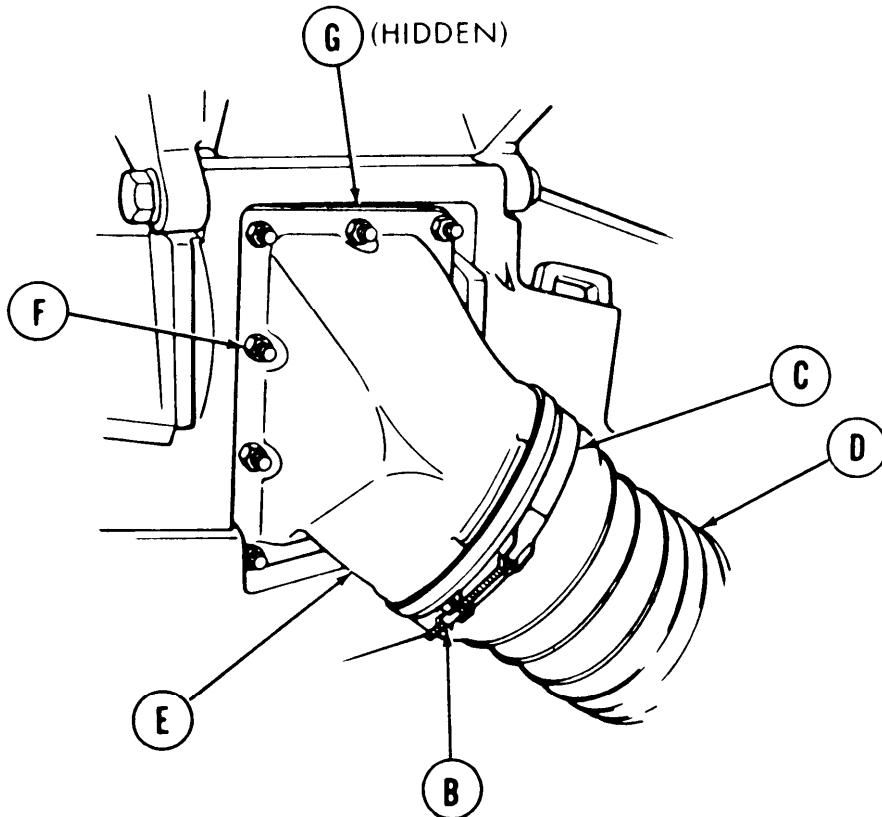


Go on to Sheet 2

TA253198

AIR CLEANER INTAKE ELBOW REPLACEMENT (Sheet 2 of 3)

2. Using 3/8 inch wrench, loosen clamp nut (B).
3. Slide clamp (C) down over hose (D).
4. Disconnect hose (D) from elbow (E).
5. Using socket, universal joint, and 9/16 inch wrench, as necessary, remove 10 self-locking nuts (F) securing elbow (E). Throw self-locking nuts away.



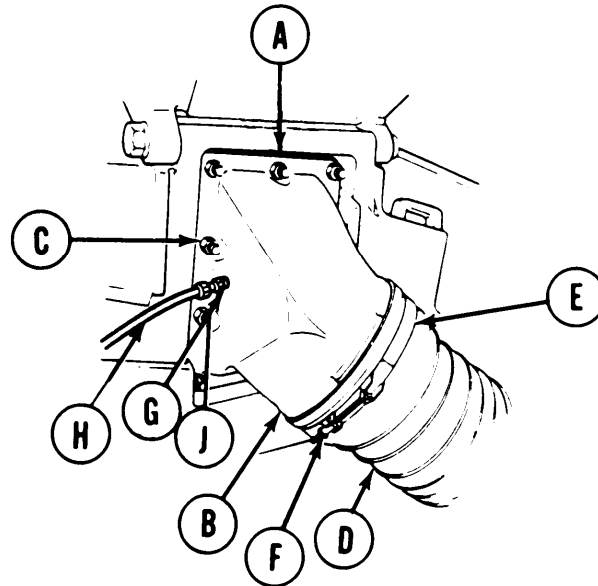
6. Using prybar, pry elbow (E) away from air cleaner.
7. Remove elbow (E) from studs of air cleaner.
8. Remove gasket (G) from studs of air cleaner. Throw gasket away.

Go on to Sheet 3

TA14148

AIR CLEANER INTAKE ELBOW REPLACEMENT (Sheet 3 of 3)**INSTALLATION:**

1. Position new gasket (A) onto studs of air cleaner.
2. Install elbow (B) onto studs of air cleaner.
3. Install 10 new self-locking nuts (C) onto studs to secure elbow (B) to air cleaner.



4. Using socket or 9/16 inch wrench, tighten 10 self-locking nuts (C).
5. Install hose (D) onto elbow (B).
6. Slide clamp (E) up over hose (D) and onto elbow (B).
7. Using 3/8 inch wrench, tighten clamp nut (F) to secure clamp (E).

NOTE

If your vehicle is not equipped with final drive vent line (H), skip steps 8 and 9 and go on to step 10.

8. Using 5/8 inch wrench, install adapter (G) in elbow (B).
9. Using 11/16 inch wrench, install and tighten vent line (H) on adapter (G).
10. Using 5/8 inch wrench, install plug (J) in hole in left intake elbow (B).
11. Close top deck grille doors (page 16-24, steps 8 and 9).

End of Task

AIR CLEANER INTAKE AND HOSE REPLACEMENT (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-83
Installation	7-85

TOOLS: 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 Flat-tip screwdriver
 Putty knife
 3/8 in. combination box and open end wrench
 Universal joint with 1/2 in. drive

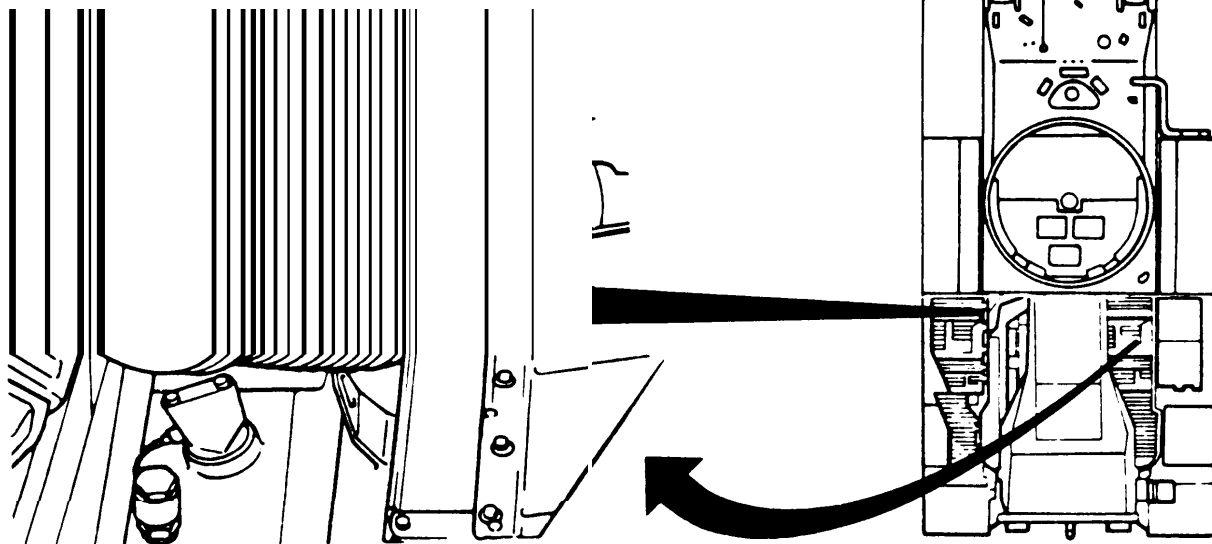
SUPPLIES: Gasket
 Gasket
 Gasket
 Lockwasher (4 required)
 Lockwasher (14 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Traverse turret so gun tube points over left or right side of vehicle (TM 9-2350-222-10)
 Open top deck grille doors (TM 9-2350-222-10)

NOTE

Removal of left or right intake hose is same. Left side shown.

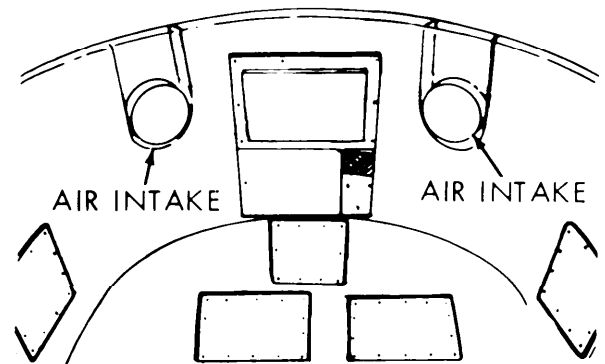
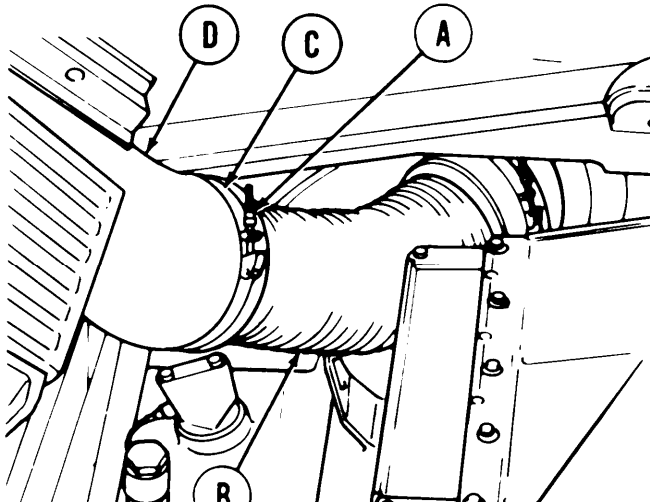


Go on to Sheet 2

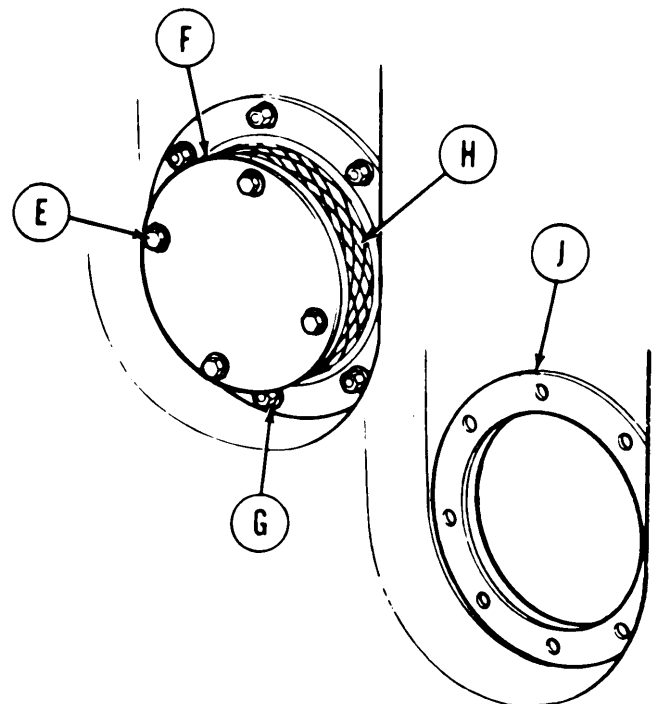
AIR CLEANER INTAKE AND HOSE REPLACEMENT (Sheet 2 of 5)

REMOVAL:

1. Using wrench, loosen clamp nut (A) at end of intake hose (B).
2. Slide clamp (C) over intake hose (B) to middle of hose.
3. Using screwdriver, pry hose (B) from elbow (D) and remove clamp (C).



4. Close grille doors and go inside turret.
5. Traverse turret to gain access to air intake.
6. Using 1/2 inch socket, remove four screws and lockwashers (E). Throw lockwashers away.
7. Remove cover and gasket (F),
8. Inspect gasket cemented to cover (F). If damaged, use putty knife and remove gasket. Apply adhesive (Item 2, Appendix D) to new gasket and position onto cover.
9. Using 9/16 inch socket, remove eight nuts and lockwashers (G). Throw lockwashers away.
10. Remove air intake flange assembly (H) and hose.
11. Inspect gasket (J) cemented to bulkhead. If damaged, use putty knife and remove gasket. Apply adhesive (Item 2, Appendix D) to new gasket (J) and position on bulkhead,

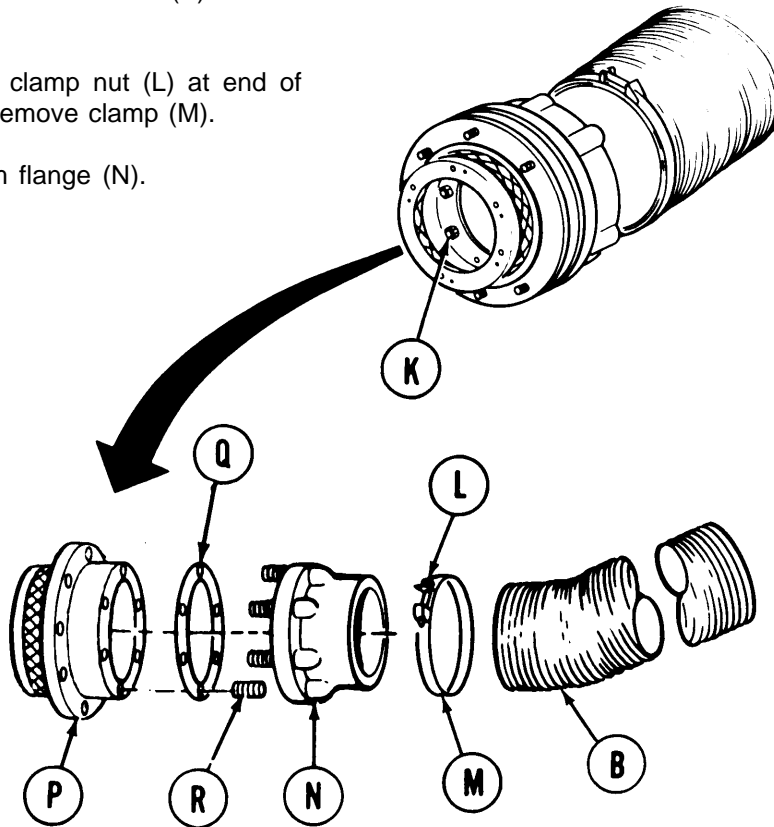


Go on to Sheet 3

TA141487

AIR CLEANER INTAKE AND HOSE REPLACEMENT (Sheet 3 of 5)

12. Using 9/16 inch socket and universal joint, remove six nuts and lockwashers (K). Throw lockwashers away.
13. Using wrench, loosen clamp nut (L) at end of intake hose (B) and remove clamp (M).
14. Remove hose (B) from flange (N).



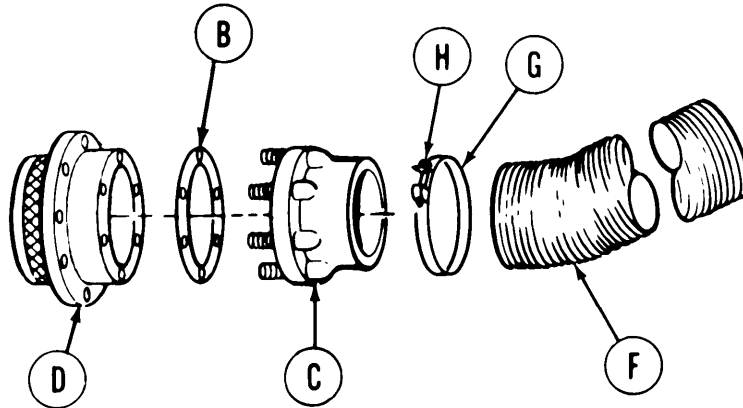
15. Separate intake (P) from flange (N).
16. Clean and inspect gasket (Q).
17. If gasket (Q) is damaged, replace.
18. Inspect and replace studs (R) in flange (N) as necessary.

Go on to Sheet 4

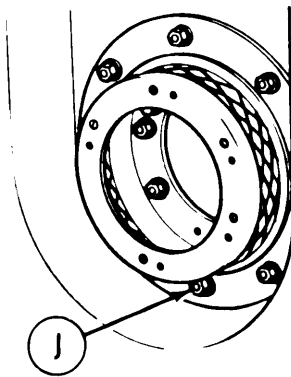
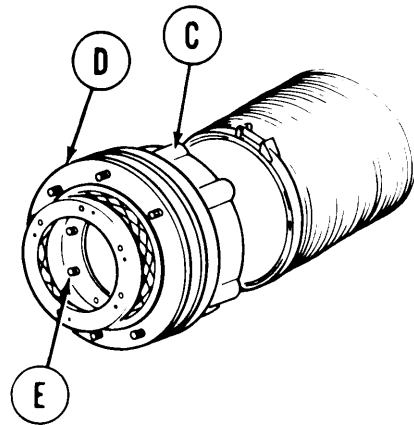
AIR CLEANER INTAKE AND HOSE REPLACEMENT (Sheet 4 of 5)

INSTALLATION:

1. Position gasket (B) over studs on flange (C).
2. Position intake (D) over studs on flange (C).



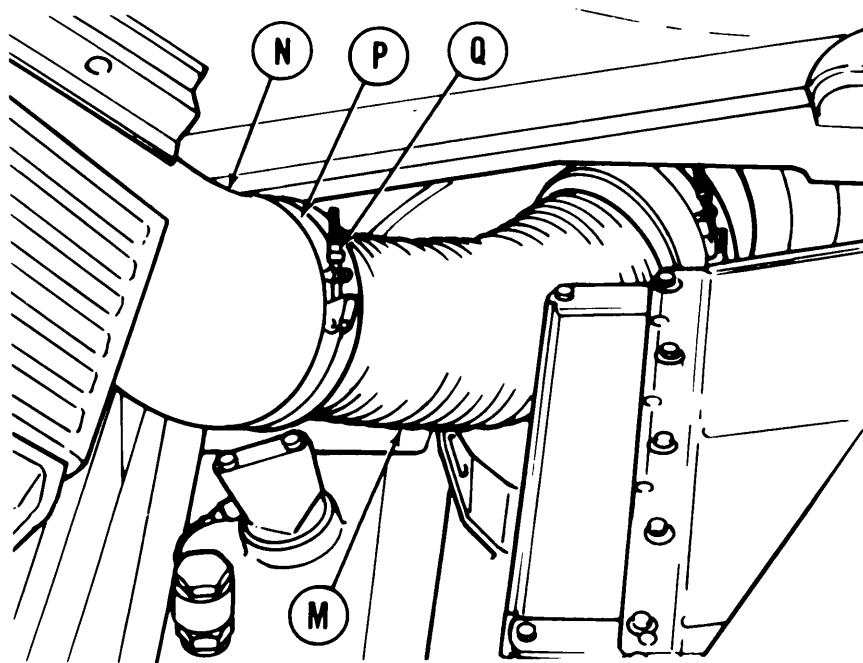
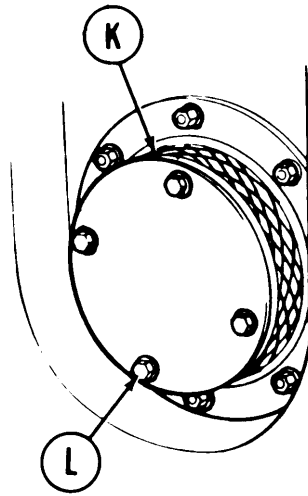
3. Install six nuts and new lockwashers (E) to secure intake (D) and flange (C). Using 9/16 inch socket and universal joint, tighten nuts (E).
4. Position hose (F) and clamp (G) onto flange (C) and, using 3/8 inch wrench, tighten nut (H) on clamp (G) securing hose (F) to flange (C).
5. Position intake (D) and flange (C) assembly (assembled in steps 1 through 4) with flange (C) toward engine, over studs on bulkhead.
6. Install eight new lockwashers and nuts (J) to secure intake and flange assembly to bulkhead. Using 9/16 inch socket, tighten nuts (J).



Go on to Sheet 5

AIR CLEANER INTAKE AND HOSE REPLACEMENT (Sheet 5 of 5)

7. Position cover and gasket (K) onto intake.
8. Install four screws and new lockwashers (L) to secure cover and gasket (K) to intake. Using 1/2 inch socket, tighten screws (L).
9. Traverse turret so gun tube points over left or right side of vehicle. Open top deck grille doors (TM9-2350-222-10).
10. Install hose (M) on elbow (N).
11. Position clamp (P) onto edge of hose. Using wrench, tighten clamp nut (Q) securing hose (M) to elbow (N).
12. Close top deck grille doors (TM 9-2350-222-10).



End of Task

■ All data on pages 7-87 thru 7-92 deleted.

AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 1 of 8)

PROCEDURE INDEX

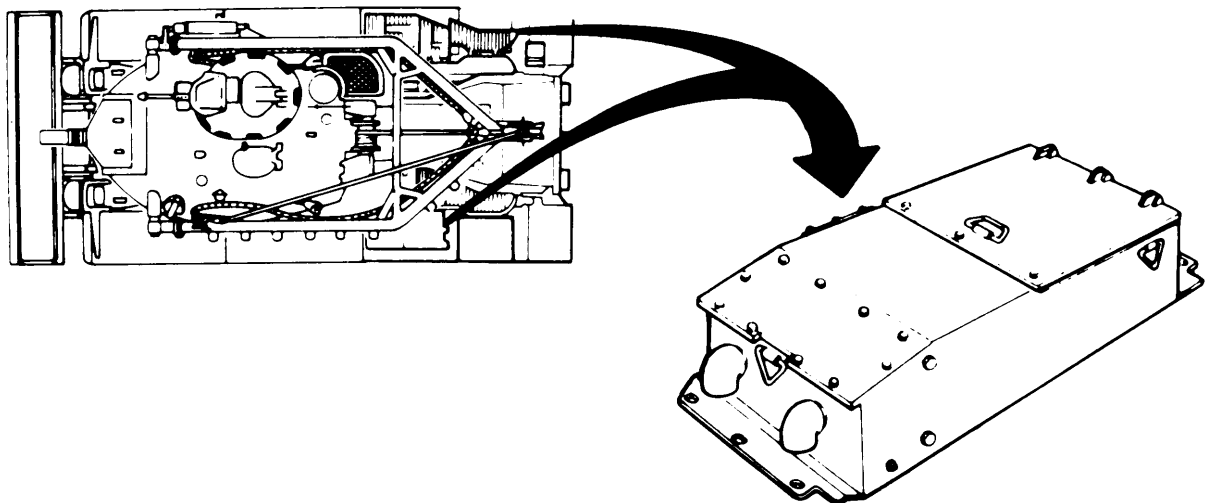
PROCEDURE	PAGE
Removal	7-94
Installation	7-97

TOOLS: 3/8 in. combination box and open end wrench
 Flat-tip screwdriver
 Torque wrench with 1/2 in. drive (0-1751b-ft) (0-237 N m)
 Ratchet with 1/2 in. drive
 Hinged handle with 1/2 in. drive

9/16 in. socket with 1/2 in. drive
 9/16 in. combination box and open end wrench
 5/8 in. socket with 1/2 in. drive
 5/8 in. combination box and open end wrench
 11/16 in. combination box and open end wrench
 10 in. extension with 1/2 in. drive

SUPPLIES: Lockwasher
 Locknut (2 required)
 Silicone compound (Item 32, Appendix D)
 Cover (for turbocharger hose)
 Locking compound (Item 18, Appendix D)
 Primer paint (Item 49, Appendix D)
 Lubricant (Item 40, Appendix D)
 Self-locking bolt (4 required)

PERSONNEL: Two
REFERENCE: TM 9-2350-222-10



Go on to Sheet 2

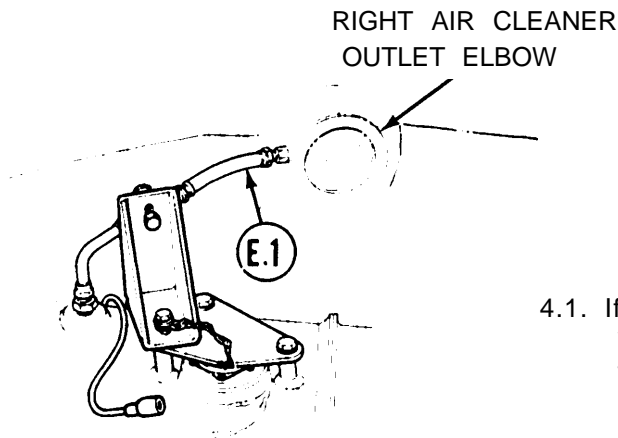
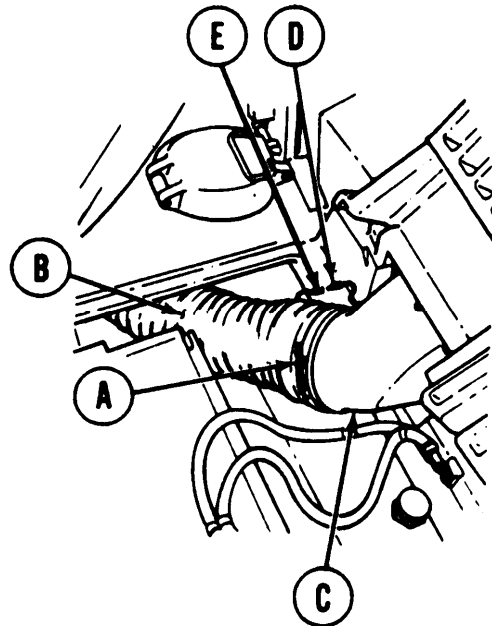
AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 2 of 8)

REMOVAL:

NOTE

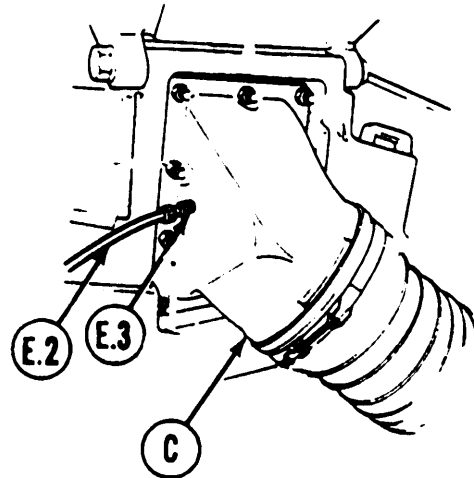
If equipped with 2DA engine, disconnect dust ejector tube (refer to page 7-148.5, steps 1 & 2).

1. Open top deck grille door (TM 9-2350-222-10).
2. Using 3/8 inch wrench, loosen clamp (A) nut securing inlet hose (B) to inlet elbow (C).
3. Separate hose (B) far enough from inlet elbow (C) to allow air cleaner to be removed without pulling hose.
4. Pull air cleaner electrical lead (D) from harness connector (E).



- 4.1. If removing right air cleaner, use 9/16 inch wrench to disconnect fuel tank vent hose (E1) from elbow, if equipped.

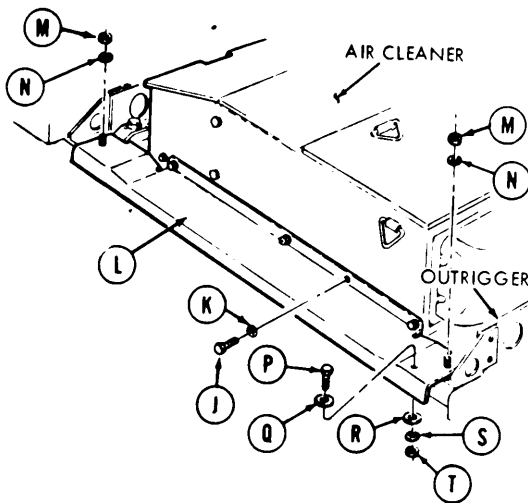
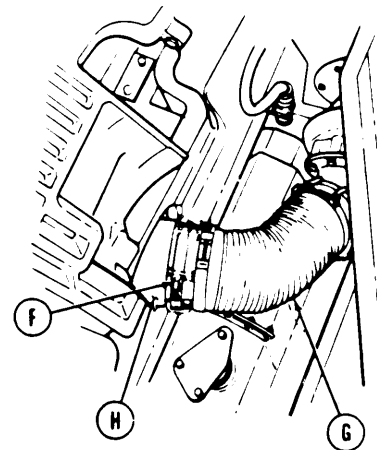
- 4.2. If removing left air cleaner, use 11/16 inch wrench to disconnect final drive vent line (E.2) and remove adapter (E.3) from inlet elbow (C), if equipped.



Go on to Sheet 3

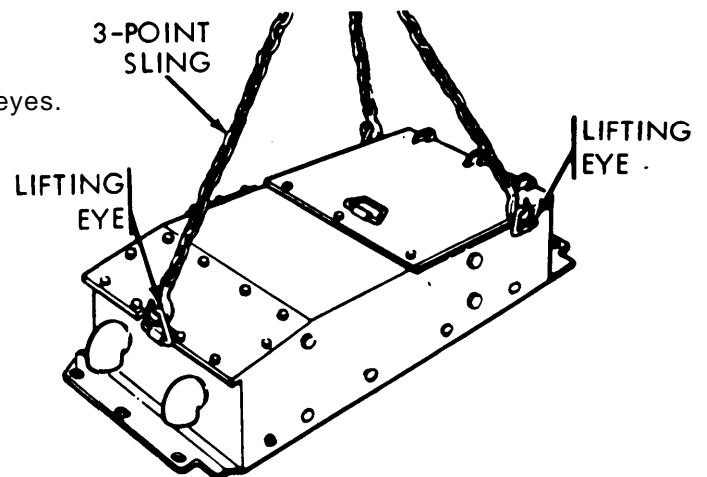
AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 3 of 8)

5. Using screwdriver, loosen clamp (F) securing air cleaner outlet hose (G) to turbocharger.
6. Disconnect hose from air cleaner elbow (H). Cover hose (G). Close top deck grille door (TM 9-2350-222-10).



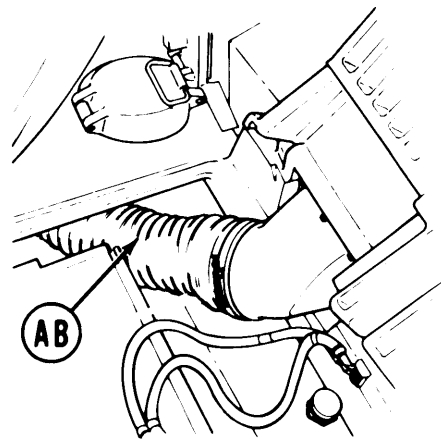
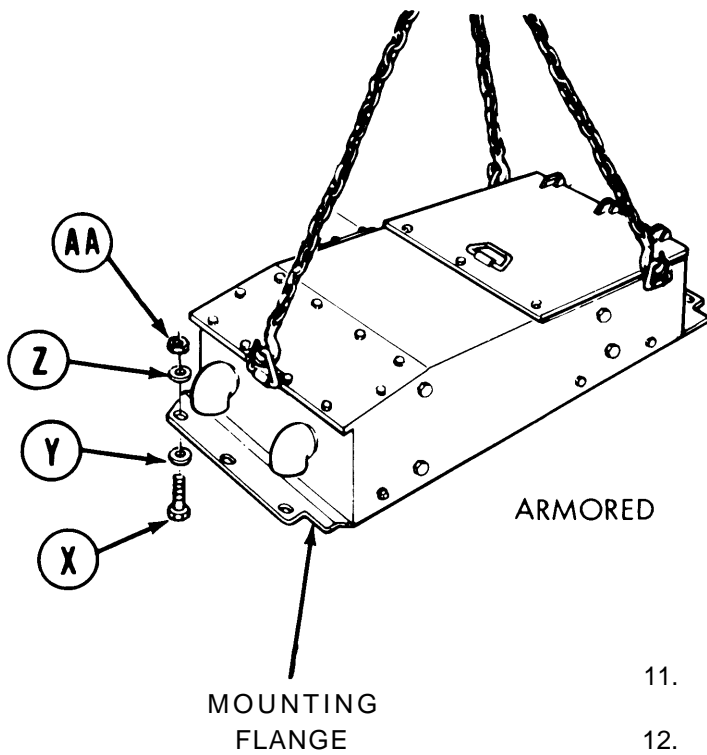
7. Using 9/16 inch socket, remove four self-locking bolts (J) and washers (K) securing fender skirt (L) to air cleaner. Throw self-locking bolts away.
8. Using 9/16 inch socket, remove locknuts (M) and washers (N) securing fender skirt to both outriggers. Throw locknuts away.
9. Using 9/16 inch socket, remove bolt (P), washer (Q), washer (R), lockwasher (S), and nut (T) securing fender skirt. Remove fender skirt (L). Throw lockwasher away.

10. Attach three-point sling to three lifting eyes. Take up slack on sling with hoist.



Go on to Sheet 4

AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 4 of 8)



11. Deleted.
12. Using 5/8 inch socket to hold nut and 5/8 inch open end wrench to hold bolt, remove six bolts (X), washers (Y), washers (Z), and nuts (AA) securing air cleaner.
13. Have two persons guide air cleaner and lift it off vehicle.
14. Install hose covers on hose (AB).

Go on to Sheet 5

AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 5 of 8)

INSTALLATION:

NOTE

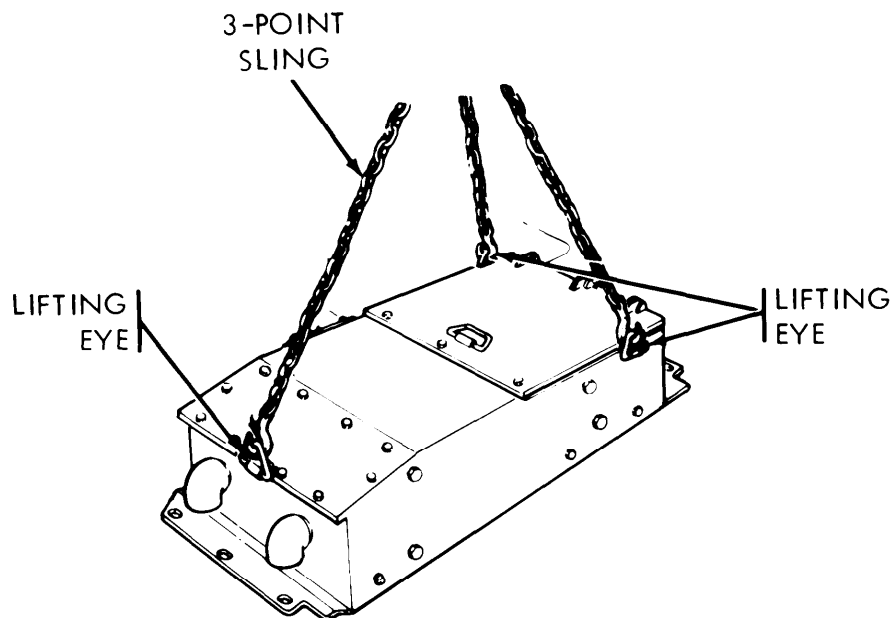
Clean all dirt and debris from mounting area before installing air cleaner.

1. Using three-point sling to install air cleaner, lift air cleaner to mounting place on vehicle.

NOTE

It may be necessary to open top deck grille doors while guiding air cleaner into place. Close doors after air cleaner is positioned.

2. Have two persons guide air cleaner into mounting place. Make sure electrical lead goes through hull access opening,



Go on to Sheet 6

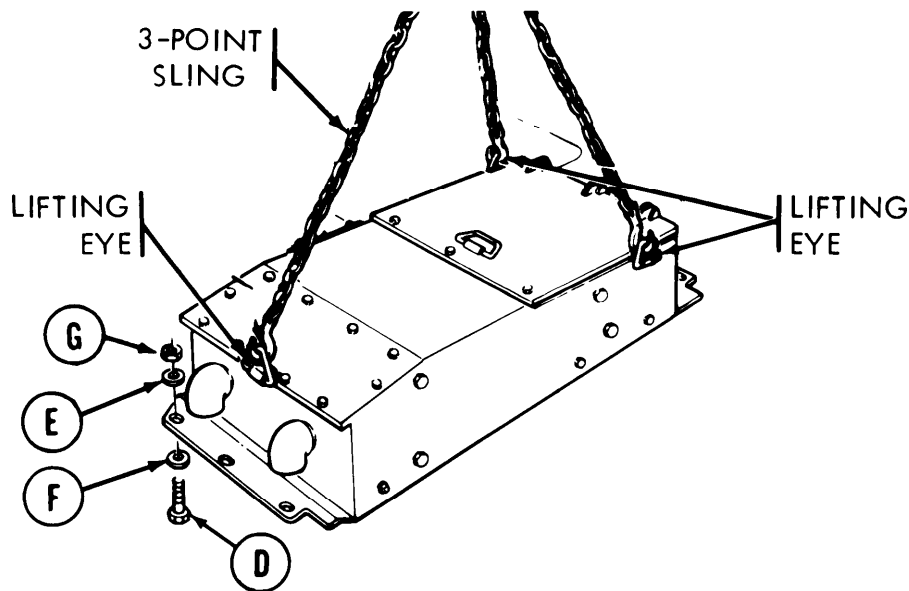
AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 6 of 8)

3. Deleted.
4. Deleted.
5. Deleted.
6. Deleted.

7. Before installing air cleaner, apply primer and locking compound to threads of nuts (G) and bolts (D) and to washers (E).

8. Using 5/8 inch socket, install six bolts (D), washers (F), washers (E), and nuts (G).

9. Using torque wrench and 5/8 inch socket, tighten six bolts (D) to 85-95 lb-ft (115-129 Nm).



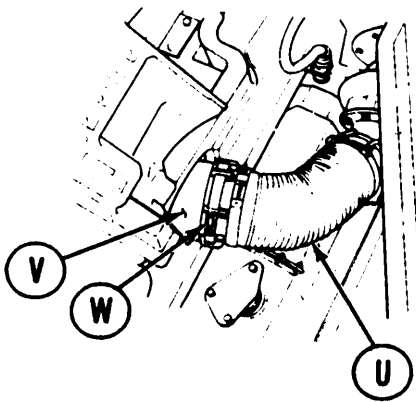
Go on to Sheet 7

AIR CLEANER REPLACEMENT (TOP LOADING) (Sheet 7 of 8)

-
10. Position fender skirt (H).
 11. Using 9/16 inch socket, install two new locknuts (J) and washers (K) to hold fender skirt (H) to both outriggers.
 12. Coat four screws (L) with lubricant (Item 40, Appendix D).
 13. Using 9/16 inch socket, install four new self-locking bolts (L) and washers (M) to hold fender skirt (H) to air cleaner (N).
 14. Using torque wrench and 9/16 inch socket, tighten four screws (L) to 20-30 lb-ft (27-41 Nm).
 15. Install washer (P) and bolt (Q) from top of fender skirt.
 16. Install bolt (Q) through washer (P) and fender skirt.
 17. Place washer (R), new lockwasher (S), and nut (T) on bolt (Q). Using 9/16 inch socket on bolt (Q) and 9/16 inch open end wrench on nut (T), tighten nut (T).

Go on to Sheet 8

AIR CLEANER REPLACEMENT (TOP LOADING)(Sheet8of 8)

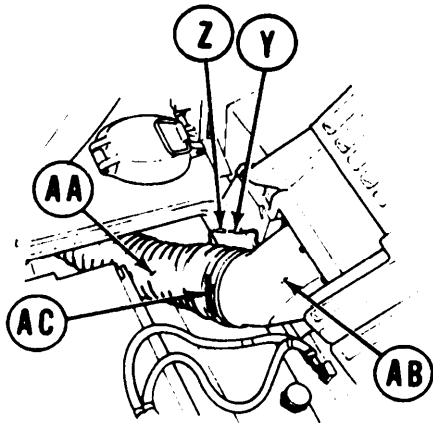
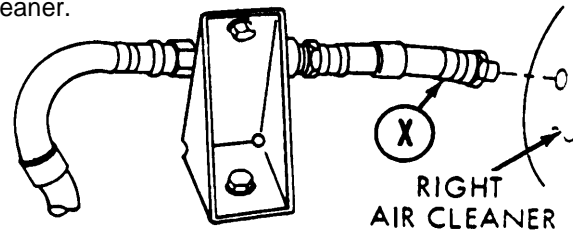


1. Open top deck grille doors (TM9-2350-222-10) and remove cover horn hose (U) opening.
2. Connect outlet hoses (U) to turbocharger air cleaner elbow (V).

NOTE

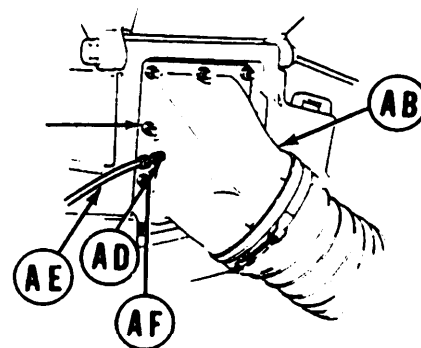
If equipped with 2DA engine, connect dust ejector tube (refer to page 7-146.7, steps 15 & 16).

3. Using screwdriver, tighten clamp (W) in place.
4. If right air cleaner is being replaced, using 9/16 inch wrench, install hose (X) to air cleaner.



22. Coat electrical leads (Y) and (Z) with silicone compound (Item 32, Appendix D).
23. Connect air cleaner lead (Y) to wiring harness lead (Z).
24. Remove hose cover and connect inlet hose (AA) to inlet elbow (AB).
25. Using 3/8 inch wrench, tighten clamp (AC) nut to hold hose (AA) to elbow (AB).

26. If left air cleaner is being replaced, use 11/16 inch wrench and install adapter (AD) and connect final drive vent line (AI?) to adapter (AD) on left inlet elbow (AB), if equipped. If not equipped with final drive vent line, install plug (AF) in inlet elbow.
27. Test air cleaner (TM 9-2350-222-10).
28. If air cleaner is operational, close top deck grille doors (TM 9-2350-222-10).



End of Task

■All data on pages 7-101 and 7-102 deleted.

AIR CLEANER DOOR REPLACEMENT (TOP LOADING) (Sheet 1 of 3)

TOOLS: 9/16 in. combination box and open end wrench
 Hammer (or mallet)
 Long round nose pliers
 Slip joint pliers
 Low pressure compressed air facility

SUPPLIES: Gasket
 Cotter pins (3 required)
 Goggles (Item 74, Appendix D)
 Leather gloves (Item 72, Appendix D)
 Loctite adhesive (Item 75, Appendix D)
 Face shield (Item 76, Appendix D)

REMOVAL:

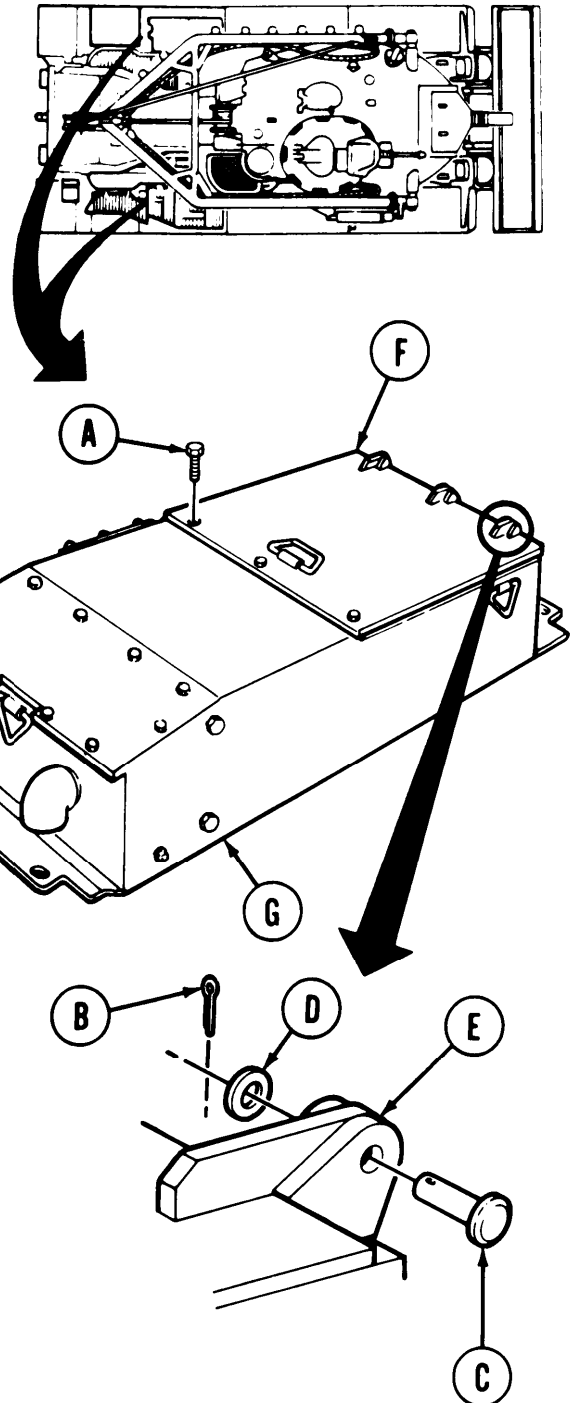
WARNING

To prevent screws from pulling out of box and injuring personnel, a minimum of 200 pounds must be placed atop the door before attempting to remove screws.

NOTE

If captive screws are used, they will only be loosened and not removed.

1. Using wrench, remove three screws (A).
2. Using pliers, pull three cotter pins (B) out of three straight pins (C). how cotter pins away.
3. Remove flat washers (D).
4. Using hammer, tap straight pins (C) free of door hinges (E).
5. Using pliers, pull three straight pins (C) from door hinges.
6. Lift door assembly (F) and remove it from air cleaner housing (G).

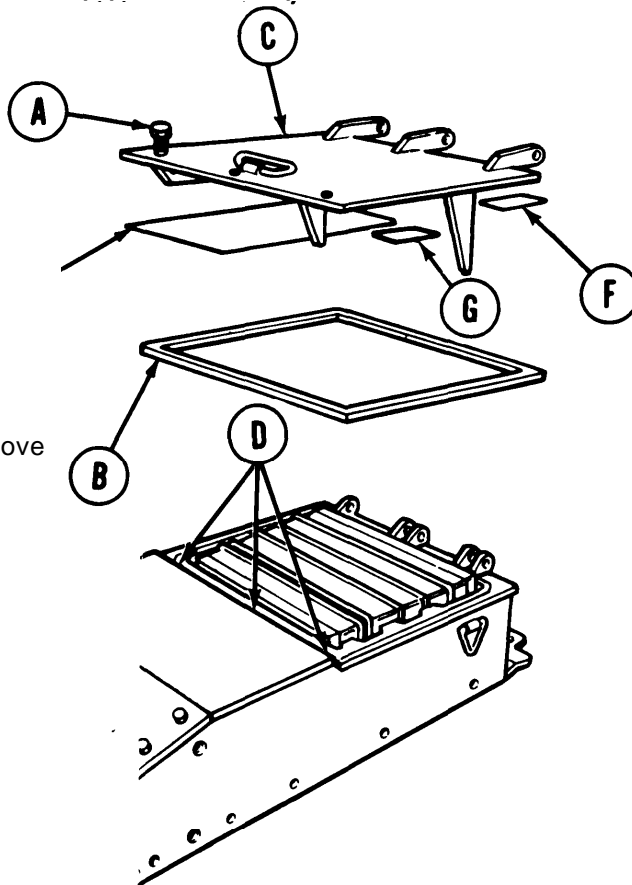


Go on to Sheet 2

AIR CLEANER DOOR REPLACEMENT (TOP LOADING) (Sheet 2 of 3)

INSPECTION AND REPAIR:

1. Inspect screws (A) and gasket (B).
2. If threads of screws (A) are stripped, replace screws.
- 3* If gasket (B) is damaged in any way, remove it. Throw gasket (B) away.
4. Apply Loctite adhesive (Item 75, Appendix D) on new gasket (B). Install gasket into groove at underside of door (C).



WARNING

- **Compressed air used for cleaning purposes will not exceed 30 PSL Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).**
- **Make sure unauthorized personnel are not in the area when this task is being performed. Failure to do so may result in injury..**

5. Inspect screw holes (D) in housing. If holes are not drilled through, use-compressed air to remove sand, dirt, or debris from holes.
6. Replace marker (E), identification plate (F), or NBC warning decal (G) as necessary. Install marker (E) and decal (G) so they can be read from center of vehicle.

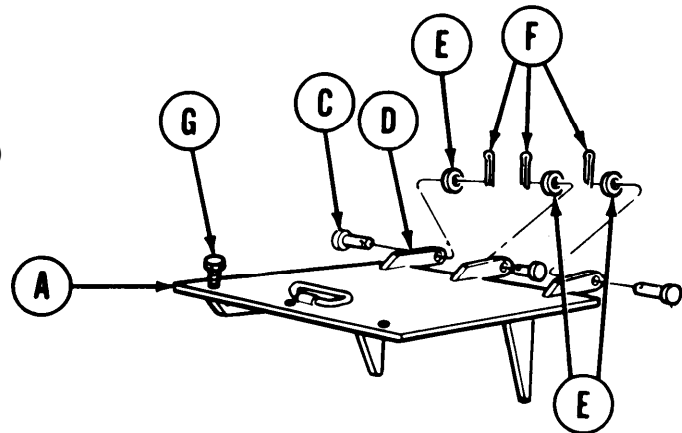
Go on to Sheet 3

■ All data on pages 7-105 thru 7-109 deleted.

AIR CLEANER DOOR REPLACEMENT (TOP LOADING) (Sheet 3 of 3)

INSTALLATION:

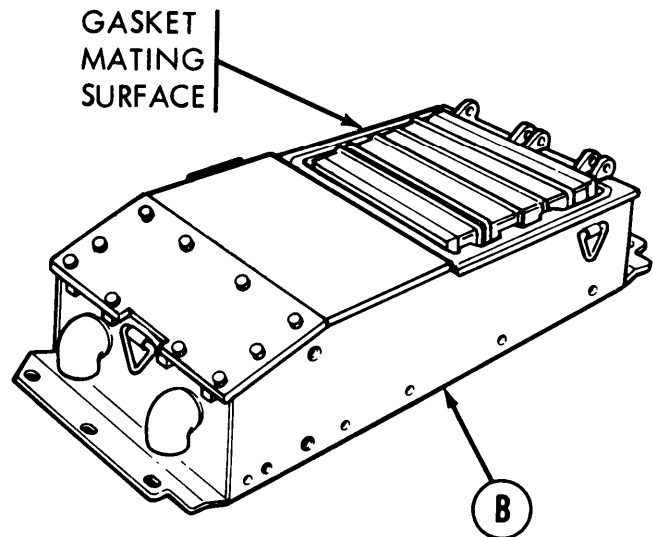
1. Lift door assembly (A) into place on air cleaner housing (B).
2. Using hammer, tap three straight pins (C) into three hinges (D).
- 3* Install three flat washers (E) onto three straight pins (C).
4. Using hammer, tap three new cotter pins (F) into holes in straight pins (C).
5. Using hammer, tap cotter pins (F) around straight pins (C) to secure washers (E) and pins (C) in place.
6. Make sure door assembly (A) is in closed position (lowered).



WARNING

To prevent screws from pulling out of box and injuring personnel, a minimum of 200 pounds must be placed atop the door before installing screws.

7. Using wrench, install and tighten three screws (G) to secure door assembly (A) to air cleaner housing (B).



End of Task

TA249072

AIR CLEANER FILTER ELEMENT CLEANING OR REPLACEMENT (TOP LOADING)
 (Sheet 1 of 5)

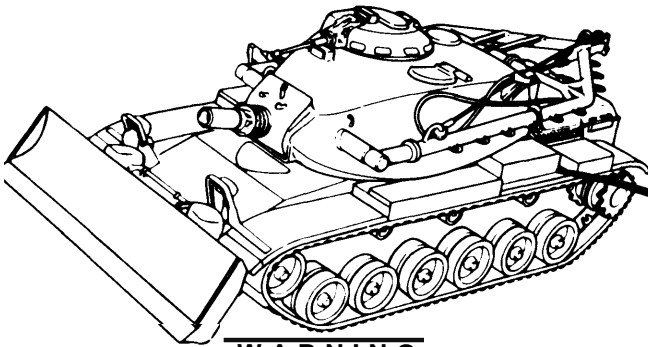
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-111
Inspection	7-112
Cleaning	7-112
Installation	7-113

TOOLS: 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive

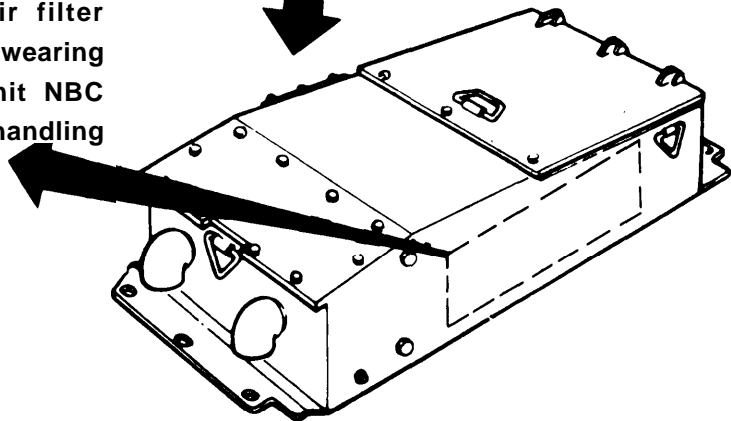
SPECIAL TOOLS: V-pack cleaner assembly (Item 34.1, Chapter 3, section I)

SUPPLIES: Leather gloves (Item 72, Appendix D) Watch
 Goggles (Item 74, Appendix D) Container for washing filter
 Face shield (Item 76, Appendix D) Low-pressure, compressed air source
 Liquid detergent (Item 33, Appendix D) Water
 Rags (Item 65, Appendix D) Extension light



WARNING

If NBC exposure is suspected, all air filter media must be handled by personnel wearing protective equipment. Contact your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.



Go on to Sheet 2

AIR CLEANER FILTER ELEMENT CLEANING OR REPLACEMENT (TOP LOADING)
(Sheet 2 of 5)

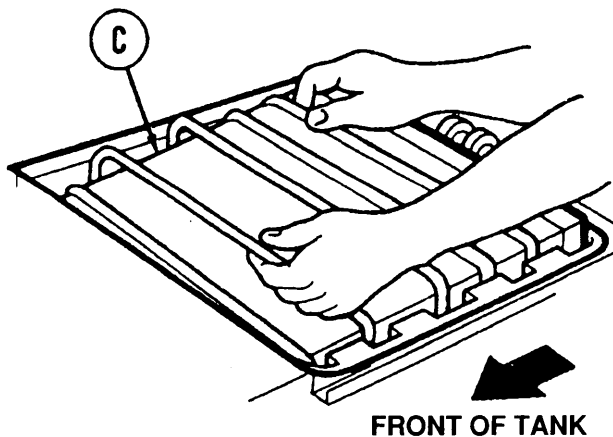
REMOVAL:

WARNING

● If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

● To prevent screws from pulling out of box and injuring personnel, a minimum of 200 pounds must be placed on top of the door before attempting to remove the screws.

1. Using socket, loosen three screws (A) and remove from door (B).
2. Open door (B) until it rests on rear fender box.
3. Inspect gasket on door (B). If damaged, replace (page 7-103).



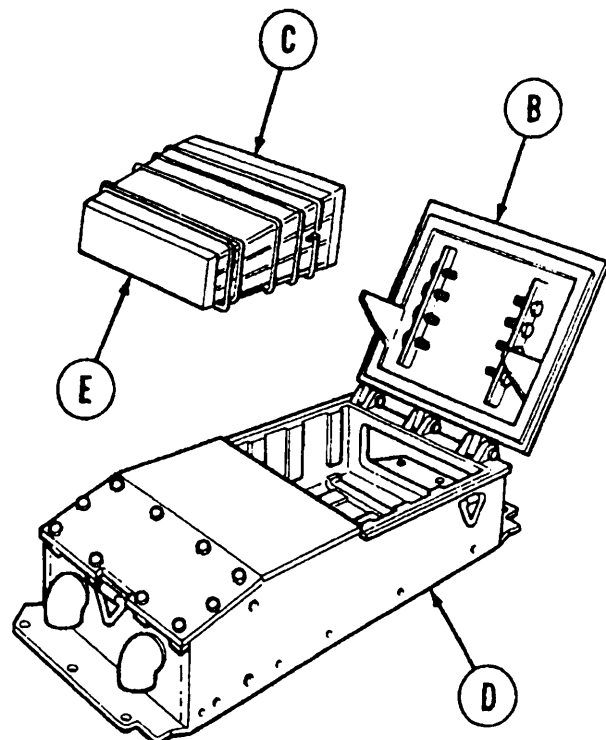
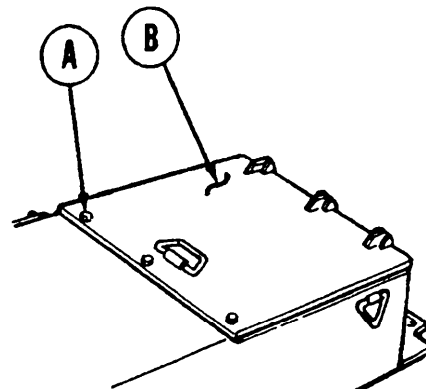
4. Slide filter element (C) toward front of tank.
5. Carefully lift filter element (C) out of air cleaner housing (D).

Go on to sheet 3

CAUTION

When moving filter element (C), use care not to damage filter seal (E). Do not stand filter element on seal end.

6. Close door (B) to keep out dust.



**AIR CLEANER FILTER ELEMENT CLEANING OR REPLACEMENT (TOP LOADING)
(Sheet 3 of 5)**

INSPECTION:

1. Inspect filter element for rupture in filter material or damage or looseness of seal. Replace element if damaged in any way.
2. Inspect filter element to determine if contaminated with dust or oil. Element can be cleaned by using compressed air or by washing.
3. If filter is contaminated with dust, clean by using 90 psi compressed air.
4. If filter is contaminated with carbon or oil deposits, clean by washing.

CLEANING:

WARNING

- **Compressed air used for cleaning purposes will not exceed 90 psi. Use only with effective chip guarding and personal protective equipment (goggles, face shield, gloves, long sleeves, etc.)**
- **Always wear goggles and face shield when using compressed air. If dirt blows in your eyes, you can be blinded.**
- **Make sure unauthorized personnel are not in the area where this task is being performed, Failure to do so may result in injury.**

Compressed Air:

1. Using V-Pack cleaner assembly (Item 34.1, Chapter 3, Section I), direct stream of compressed air against inside of filter element.
2. Move air stream up and down length of pleats until no dust is visibly being blown out.

Washing:

CAUTION

Do not hit element against solid object. Damage may occur to element.

1. Shake or blow off dust before wetting filter element.
2. Prepare solution of warm water (80°F to 110°F) and detergent (Item 33, Appendix D) in container large enough to hold filter element.

Go on to Sheet 4

TA24 9075

AIR CLEANER FILTER ELEMENT CLEANING OR REPLACEMENT (TOP LOADING) (Sheet 4 of 5)

3. Soak filter element in cleaning solution for 15 to 20 minutes, then gently shake it back and forth for 2 to 3 minutes to free dirt deposits.
4. Rinse filter element with cool water (35°F to 80°F) until all traces of dirt and detergent are removed.
5. If hose is used to rinse filter element, maximum line pressure of 40 psi should be used.

CAUTION

Make sure filter element is completely dry before using. Inspect filter element after drying to be sure dust is not caked inside element.

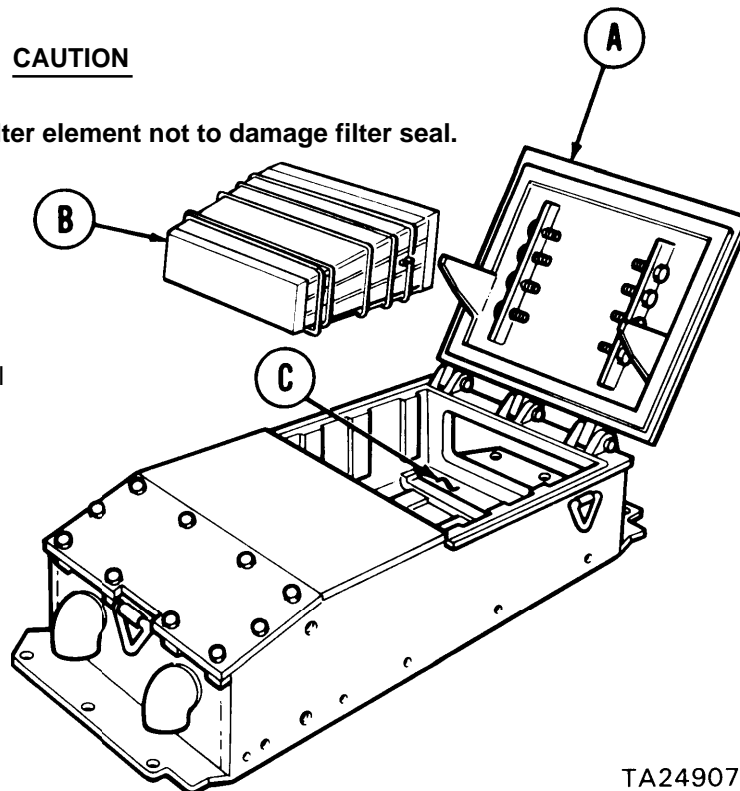
6. Air dry at normal room temperature until filter element is completely dry. If circulating air is used, temperature must not exceed 180°F.
7. After cleaning, inspect filter element for damage to seal or ruptured filter material, place light inside filter element, and inspect from outside. If ruptured, replace with new filter element.
8. Use a clean, damp rag and wipe out filter compartment.

INSTALLATION:

CAUTION

Be careful when installing filter element not to damage filter seal.

1. Open door (A).
2. Install filter element (B) by lowering it to bottom of filter compartment (C).
3. Slide filter element (B) rearward to seal element in position.



Go on to Sheet 5

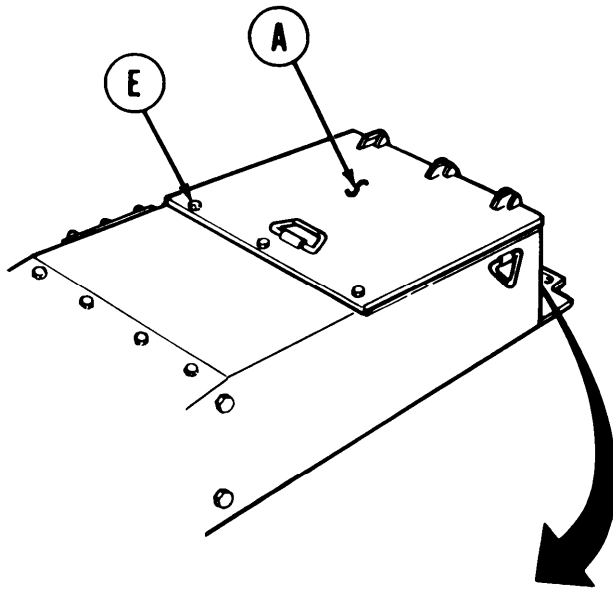
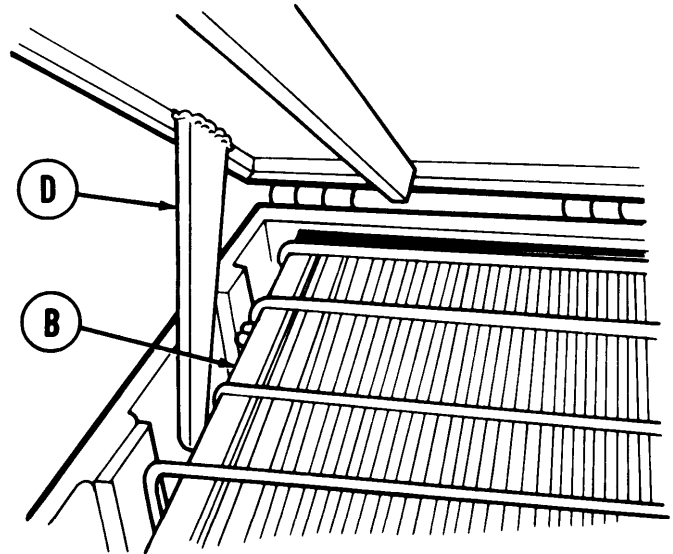
TA24907

AIR CLEANER FILTER ELEMENT CLEANING OR REPLACEMENT (TOP LOADING) (Sheet 5 of 5)

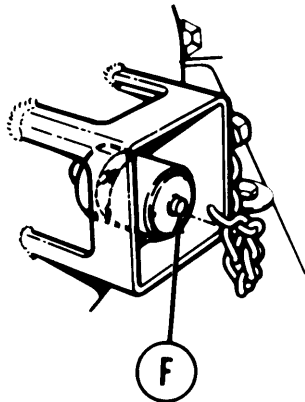
- 40 Make sure that filter element (B) is properly positioned so that door arms (D) engage locking pins on sides of filter element.

WARNING

To prevent screws from pulling out of box and injuring personnel, a minimum of 200 pounds must be placed atop the door before installing screws.



- 5* Close door (A) and, using socket, install screws (E).
6. Using socket, tighten screws (E) to secure door (A).
7. Press indicator reset button (F) to make sure indicator shows clear window.



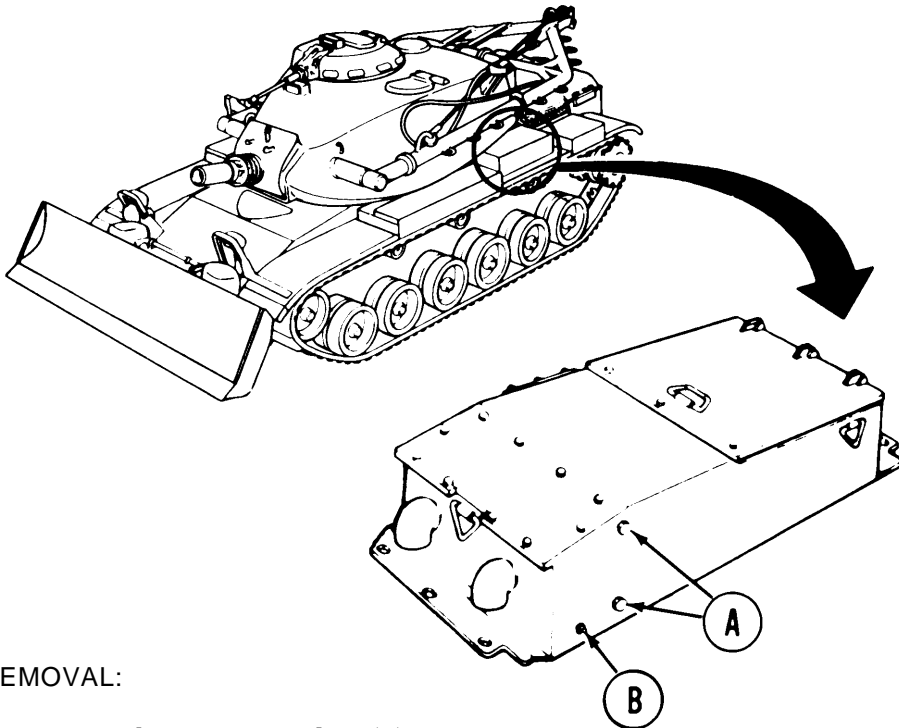
End of Task

TA249077

AIR CLEANER PLUG REPLACEMENT (Sheet 1 of 1)

TOOLS: 1-1/8 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
7/16 in. combination box and open end wrench

SUPPLIES: Sealing compound (Item 18, Appendix D)



REMOVAL:

1. Using socket, remove plug (A).
2. Using wrench, remove plug (B).
3. Inspect plug threads for damage. Replace as necessary,

INSTALLATION:

1. Coat threads of plugs (A) and (B) with sealer (Item 18, Appendix D) and install into air cleaner housing.
2. Using socket, tighten plugs (A).
3. Using wrench, tighten plug (B).

End of Task

All data on page 7-115 deleted.

All data on pages 7-117 thru 7-132 deleted.

(7-115 blank) /7-116

Change 4

AIR CLEANER (ARMORED) CIRCUIT BREAKER REPLACEMENT (Sheet 1 of 1)

TOOLS: Cross-tip screwdriver

SUPPLIES: Lockwasher (MS35338-41) (4 required)

REFERENCE: TM 9-2350222-10

PRELIMINARY PROCEDURE: Remove air cleaner cover and gasket (page 7-148, steps 1 thru 4)

NOTE

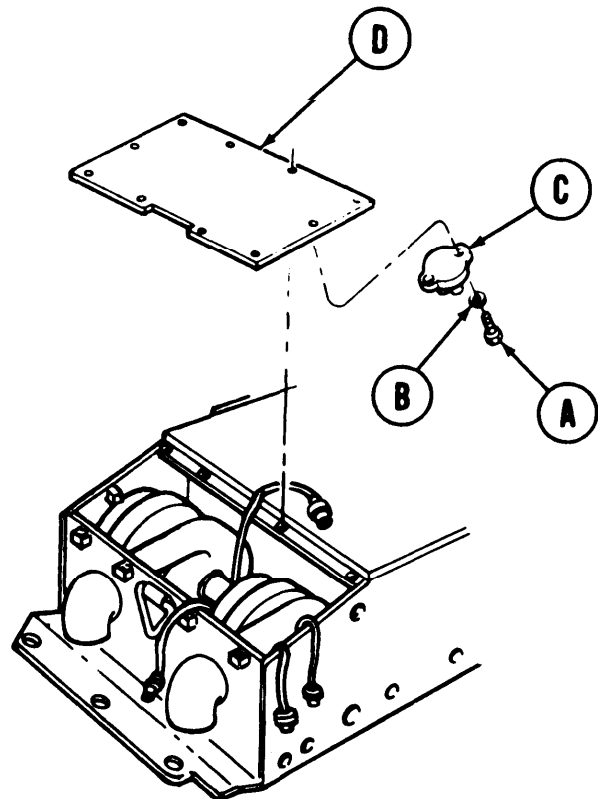
All air cleaner circuit breakers are removed and installed the same.

REMOVAL:

1. Using screwdriver, remove screws (A) and lockwashers (B) securing circuit breaker (C) to cover (D). Throw lockwashers away.
2. Remove circuit breaker (C).
3. Disconnect two electrical leads (circuit 415).

INSTALLATION:

1. Position circuit breaker (C) onto cover (D).
2. Install new lockwashers (B) and screws (A) to secure circuit breaker (C) to cover (D). Using screwdriver, tighten screws (A).
3. Connect two electrical leads (circuit 415).
4. Install cover and gasket (D) (page 7-149, steps 3 thru 7).
5. Check operation of blowers (TM9-2350-222-10)



End of Task

TA141395

AIR CLEANER (ARMORED) BLOWER FAN POWER LEAD REPLACEMENT (Sheet 1 of 3)

TOOLS: Slip joint pliers

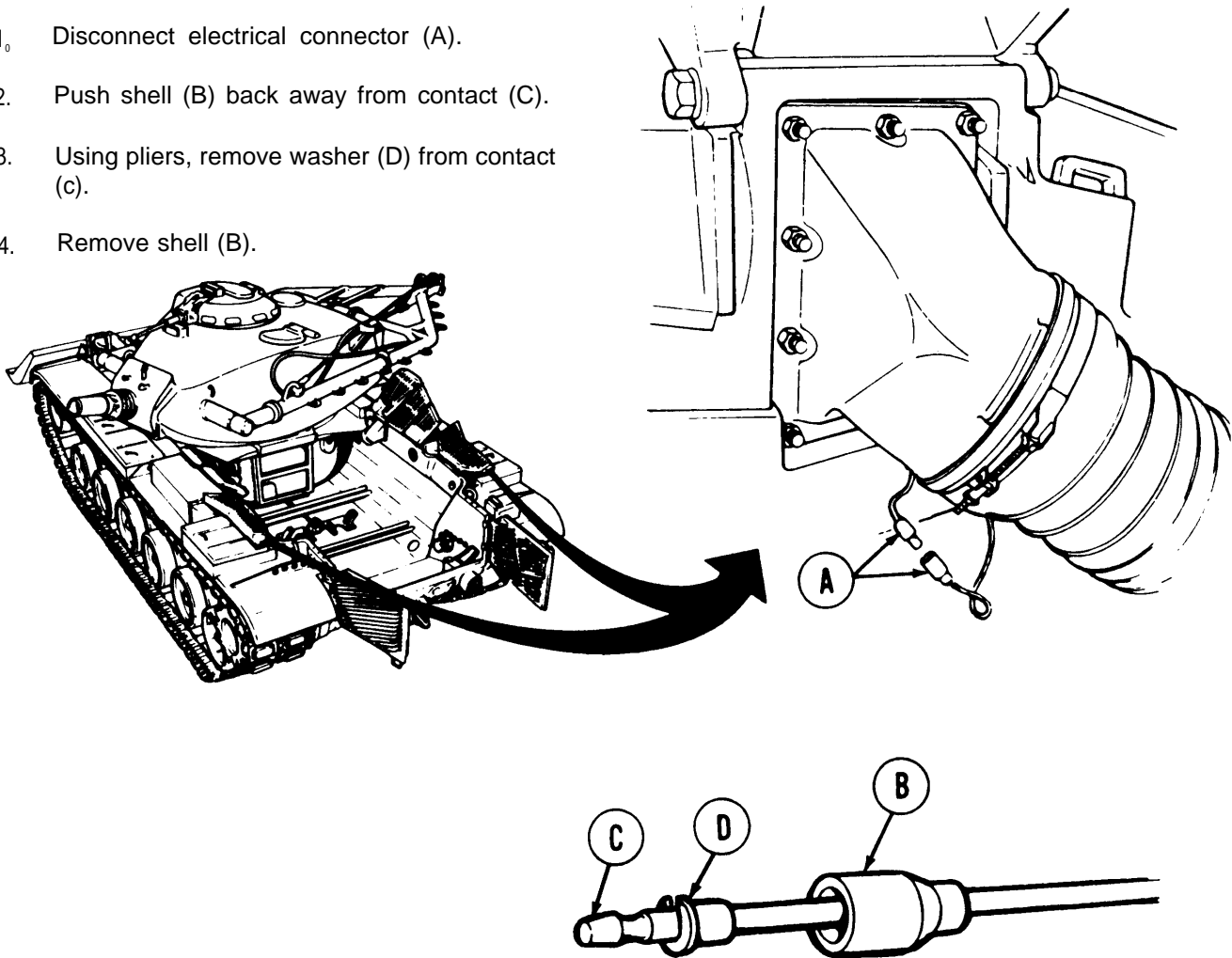
SUPPLIES: Gasket (10933723)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Open top deck grille doors (TM 9-2350-222-10)
Remove blower fans (page 7-141)

REMOVAL:

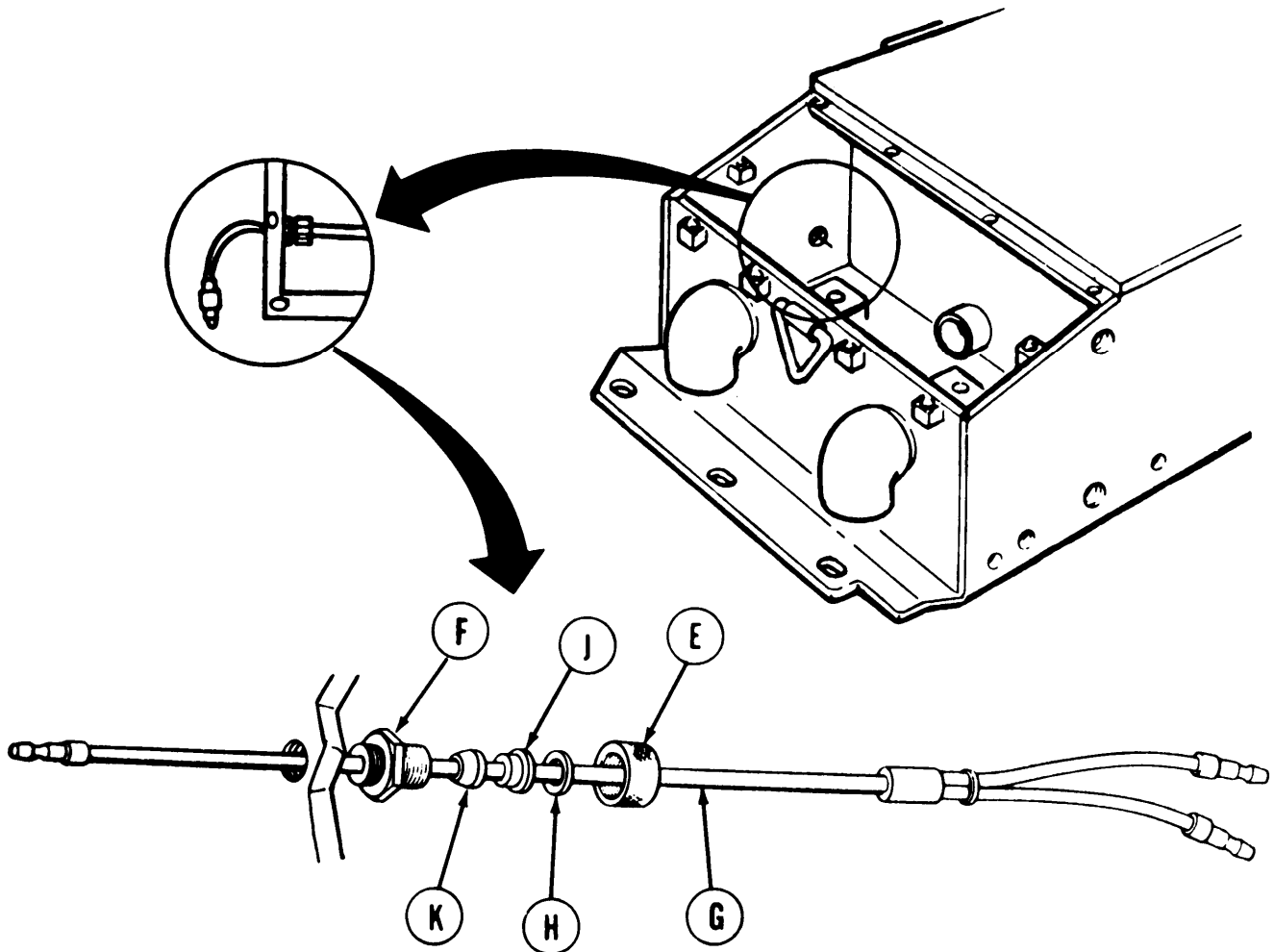
1. Disconnect electrical connector (A).
2. Push shell (B) back away from contact (C).
3. Using pliers, remove washer (D) from contact (C).
4. Remove shell (B).



Go on to Sheet 2

TA141396

AIR CLEANER (ARMORED) BLOWER FAN POWER LEAD REPLACEMENT (Sheet 2 of 3)

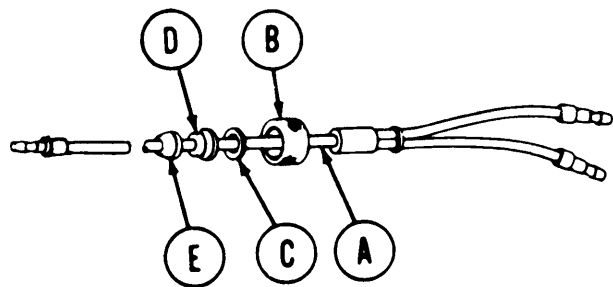


5. Using pliers, disconnect nut (E) from adapter (F).
6. Pull lead (G) out of adapter (F). When lead is pulled, wash&s (H) and (J) and gasket (K) will also be pulled out.
7. Remove lead (G). Remove washers (H) and (J) and nut (E) from lead (G). Throw gasket (K) away.
8. Inspect all parts removed for defects or deterioration. Replace as necessary.

Go on to Sheet 3

TA141397

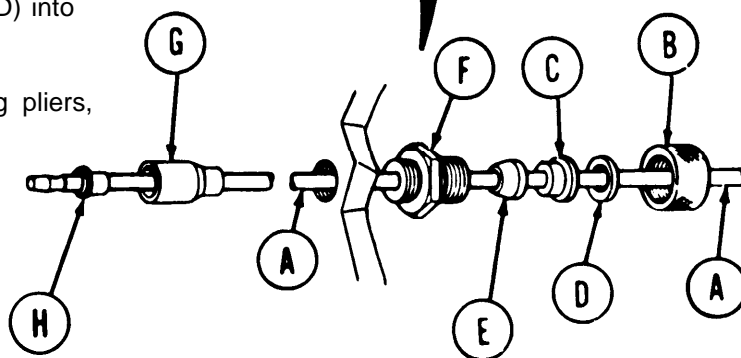
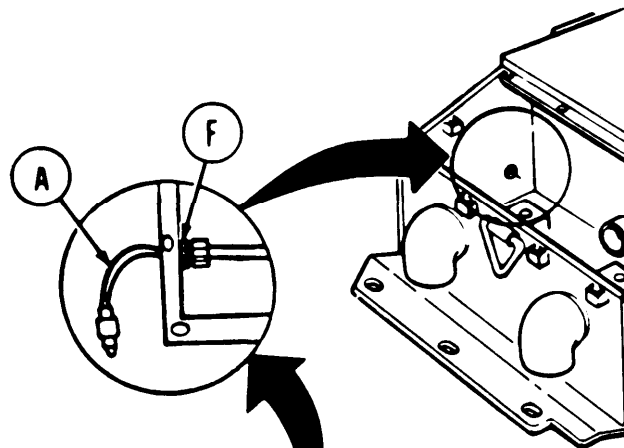
AIR CLEANER (ARMORED) BLOWER FAN POWER LEAD REPLACEMENT (Sheet 3 of 3)



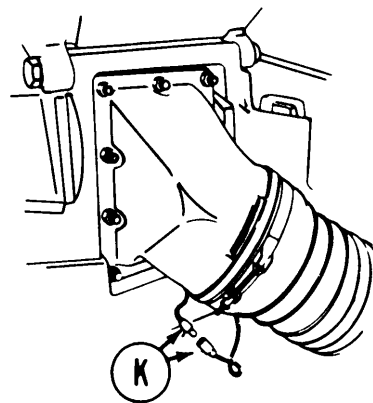
INSTALLATION:

1. Install the following parts onto lead (A): nut (B), washer (C), washer (D), and new gasket (E).

2. Install lead (A) through adapter (F). Pull approximately 10 inches of lead out of adapter.
3. Install shell (G) approximately 5 inches over end of lead (A) and install washer (H).
4. Full shell (G) toward end until it is stopped by washer (H).
5. Push gasket (E) and washers (C) and (D) into adapter (F).
6. Thread nut (B) onto adapter (F). Using pliers, tighten nut.



7. Install blower fans (page 7-143).
8. Connect electrical connector (K).
9. Check operation of air cleaner (TM 9-2350-222-10).
10. Close top deck grille doors (TM 9-2350-222-10).



End of Task

TA141398

AIR CLEANER (ARMORED) BLOWER FAN HOSE REPLACEMENT (Sheet 1 of 1)

TOOLS: Flat-tip screwdriver.

SUPPLIES: Silicone compound (Item 32, Appendix D).

PRELIMINARY PROCEDURE: Remove air cleaner cover and gasket (page 7-148, steps 1 thru 4)

REMOVAL:

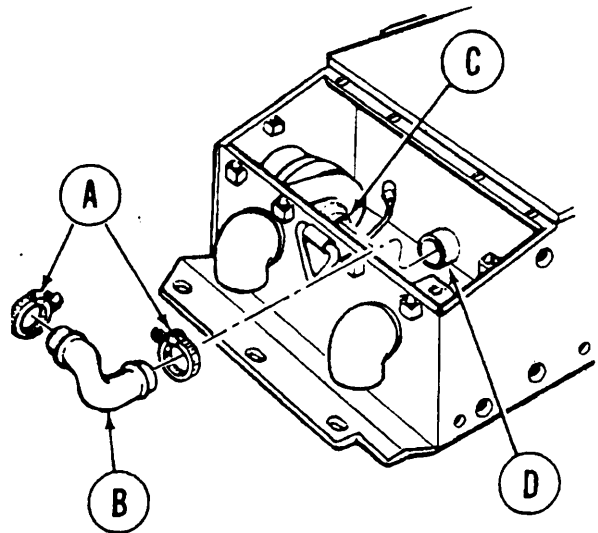
WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

1. Using screwdriver, loosen clamps (A).
2. Slide clamps (A) onto hose (B).
3. Remove hose (B) from blower fan (C) and housing (D).
4. Inspect hose (B) and clamps (A). Replace as necessary

INSTALLATION:

1. Position clamps (A) onto hose (B).
2. Coat inside diameter of hose ends with silicone compound (Item 32, Appendix D) and install hose (B) to blower fan (C) and housing (D).
3. Slide clamps (A) to ends of hose. Using screwdriver, tighten clamps (A).
4. Install air cleaner cover and gasket (page 7-149, steps 3 thru 7).



End of Task

AIR CLEANER (ARMORED) BLOWER FAN GROUND LEAD REPLACEMENT (Sheet 1 of 2)

TOOLS: 7/16 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive.
10 inch extension with 1/2 in. drive.

SUPPLIES: Lockwashers (MS35335-33) (2 required)

REFERENCE: TM 9-2350-222-10).

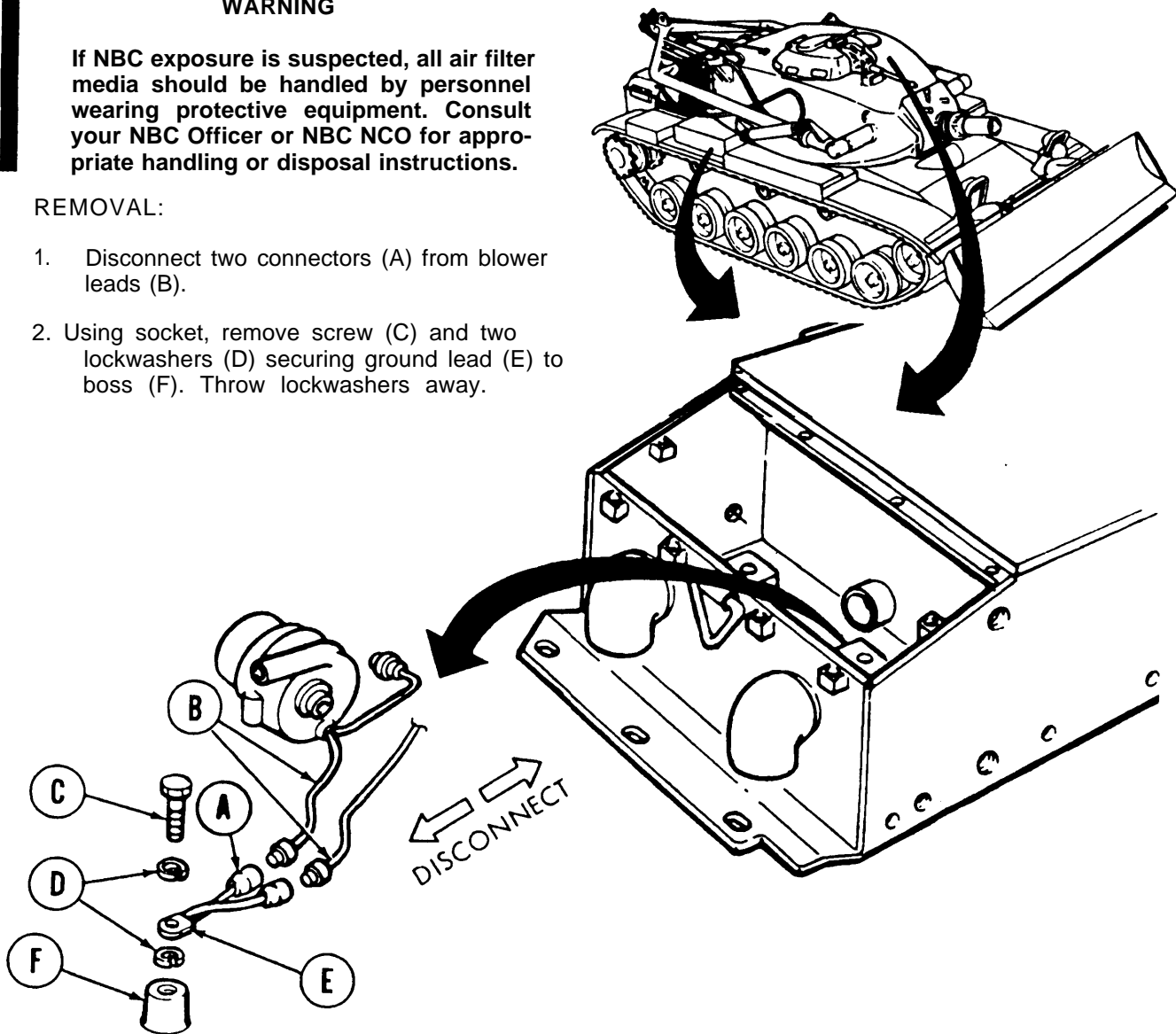
PRELIMINARY PROCEDURE: Remove air cleaner cover and gasket (page 7-148, steps 1 thru 4).

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your NBC Officer or NBC NCO for appropriate handling or disposal instructions.

REMOVAL:

1. Disconnect two connectors (A) from blower leads (B).
2. Using socket, remove screw (C) and two lockwashers (D) securing ground lead (E) to boss (F). Throw lockwashers away.

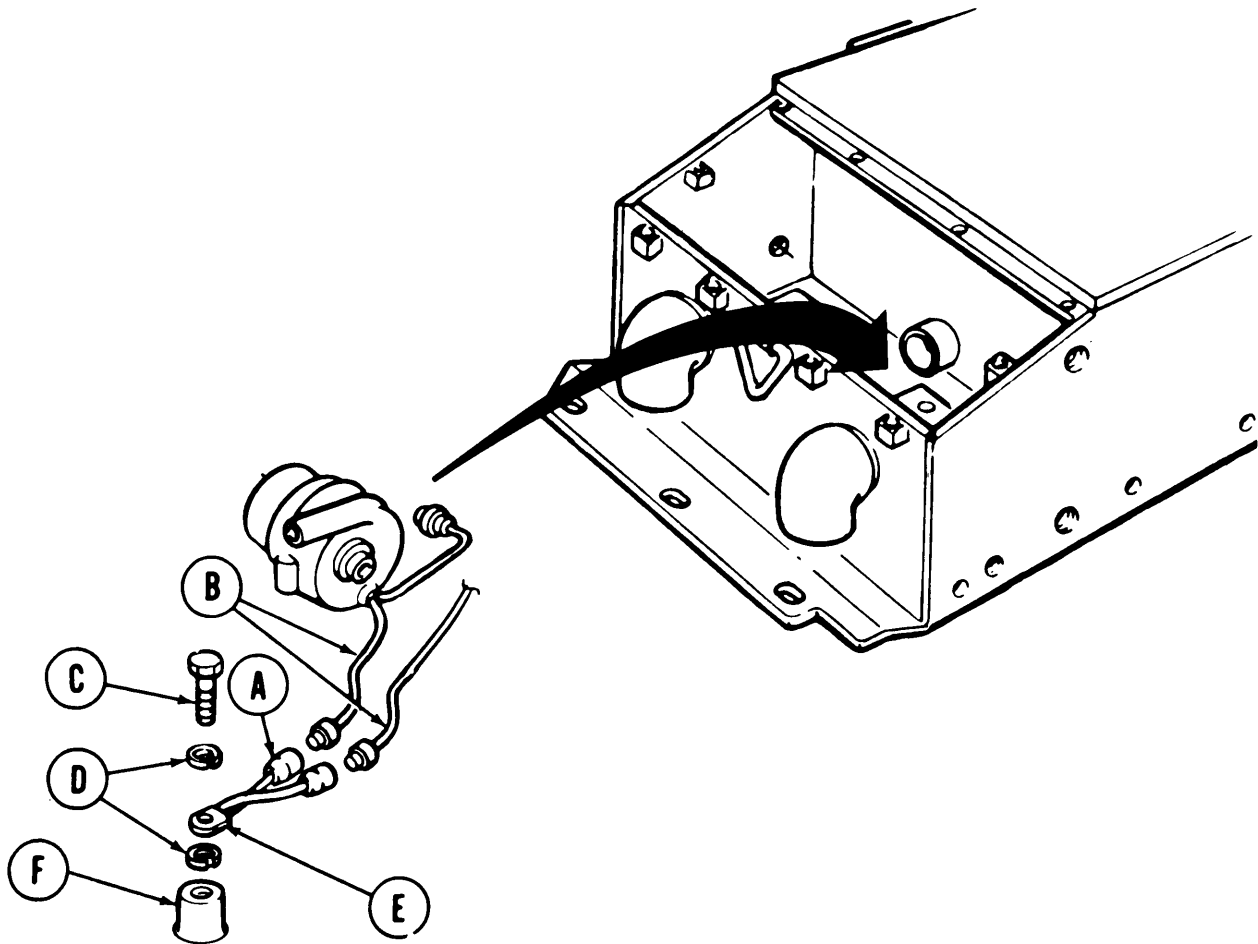


Go on to Sheet 2

AIR CLEANER (ARMORED) BLOWER FAN GROUND LEAD REPLACEMENT Sheet 2 of 2)

INSTALLATION:

1. Connect two connectors (A) to blower leads (B).
2. Install screw (C) and two new lockwashers (D) to secure ground lead (E) terminal to boss (F).
3. Using socket, tighten screw (C).
4. Install air cleaner cover and gasket (page 7-149, steps 3 thru 7).
5. Check operation of blower (TM 9-2350-222-10).



End of Task

TA141401

AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 1 of 7)

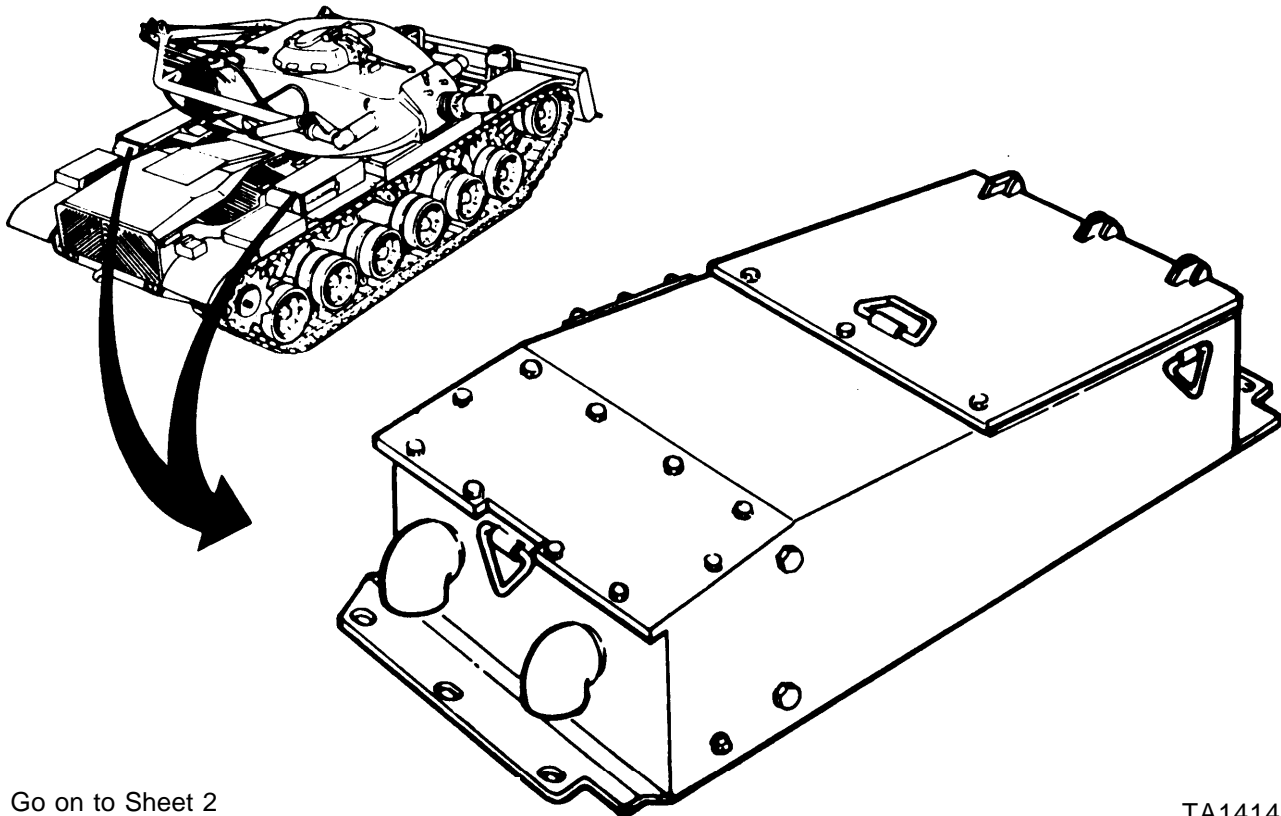
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-141
Inspection and Repair	7-142
Installation	7-143

TOOLS: 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 10 in. extension with 1/2 in. drive
 Flat-tip screwdriver
 Multimeter

SUPPLIES: Sealing compound (Item 24, Appendix D)
 Silicone compound (Item 32, Appendix D)
 Gasket (12251902)
 Lockwasher (MS35338-45) (16 required)

REFERENCE: TM 9-2350-222-10



Go on to Sheet 2

TA141402

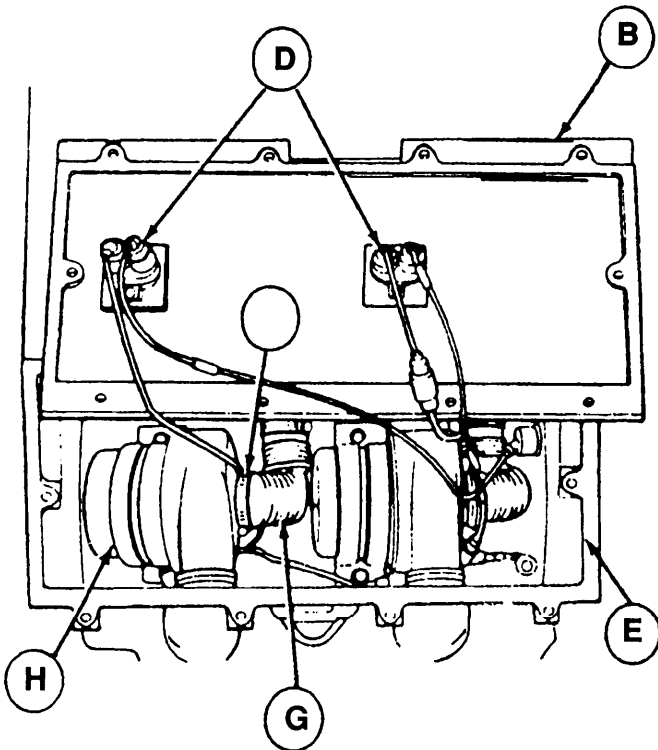
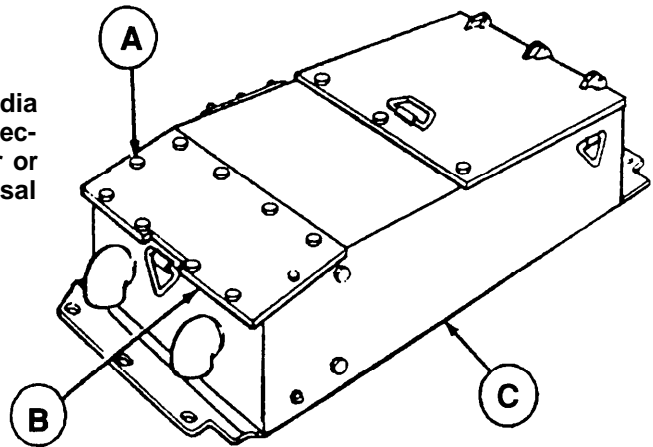
AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 2 of 7)

REMOVAL:

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

1. Using socket, remove ten screws and lockwashers (A) securing cover (B). Throw lockwashers away.
2. Lift cover (B) horn opening and place onto top of housing.



3. Disconnect four electrical leads from two circuit breakers (D) mounted to underside of cover (B).
4. Remove cover (B) and gasket (E). Throw gasket away.

NOTE

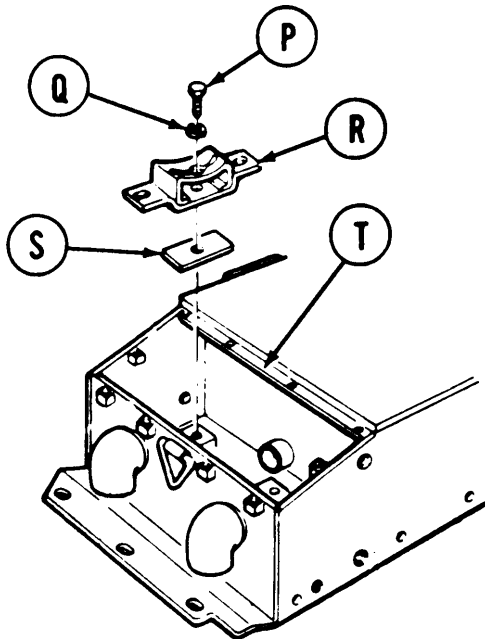
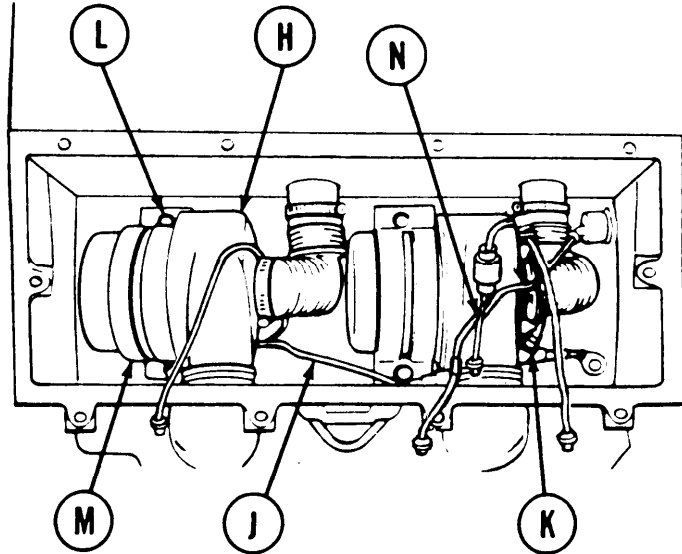
There are two blower fans in each air cleaner. Each blower fan is removed in the same way.

5. Using screwdriver, loosen clamp (F) securing hose (G) to inlet of blower fan (H). Slide clamp onto hose.
6. Remove hose (G) from inlet of blower fan (H).

Go on to Sheet 3

AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 3 of 7)

7. Disconnect blower fan lead (J) from ground lead (K).
8. Using socket and extension, remove two screws and lockwashers (L) securing strap (M). Throw lockwashers away.
9. Remove strap (M).
10. Remove blower fan (H).



11. Disconnect jumper lead (N) from blower fan lead.
12. Using socket and extension, remove screw (P) and lockwasher (Q). Throw lockwasher away.
13. Remove support (R) and pad (S).

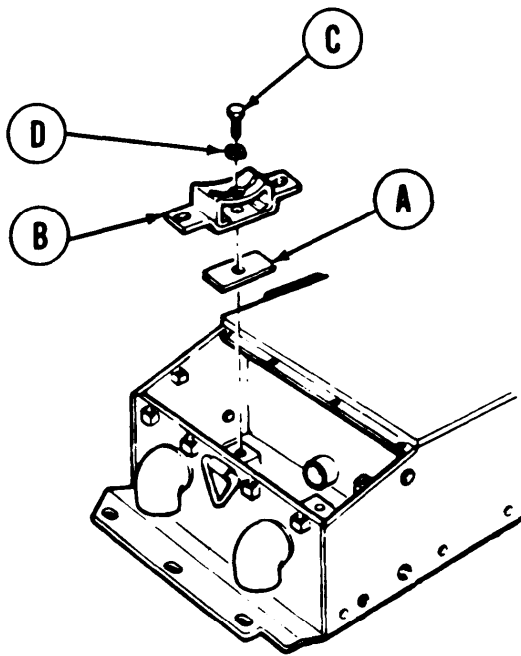
INSPECTION AND REPAIR:

1. Inspect gasket (T) on housing. If damaged or deteriorating, replace.

Go on to Sheet 4

AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 4 of 7)

2. Inspect support for defects or damage. Replace or repair as necessary.
3. Inspect condition of pad. If defective or deteriorating, replace.
4. Inspect jumper lead. Check condition of insulation, connectors, and for continuity. Replace as necessary.
5. Inspect all threaded holes for damage or defects. Repair as necessary.

**INSTALLATION:**

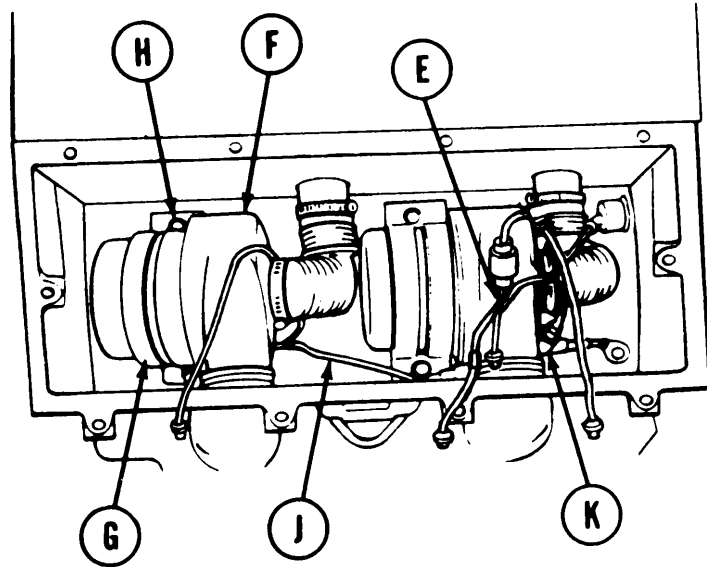
1. Position pad (A) and support (B) into housing.
2. Coat threads of screw (C) with sealing compound (Item 24, appendix D) and install with new lockwasher (D) to secure support (B).
3. Using socket with extension, tighten screw (C).

Go on to Sheet 5

TA141405

AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 6 of 7)

4. Connect jumper lead (E) to short lead from blower fan (F).
5. Position blower fan (F) into housing (with exhaust outlet of blower facing exhaust elbows) onto support.
6. Position strap (G) over blower fan (F).

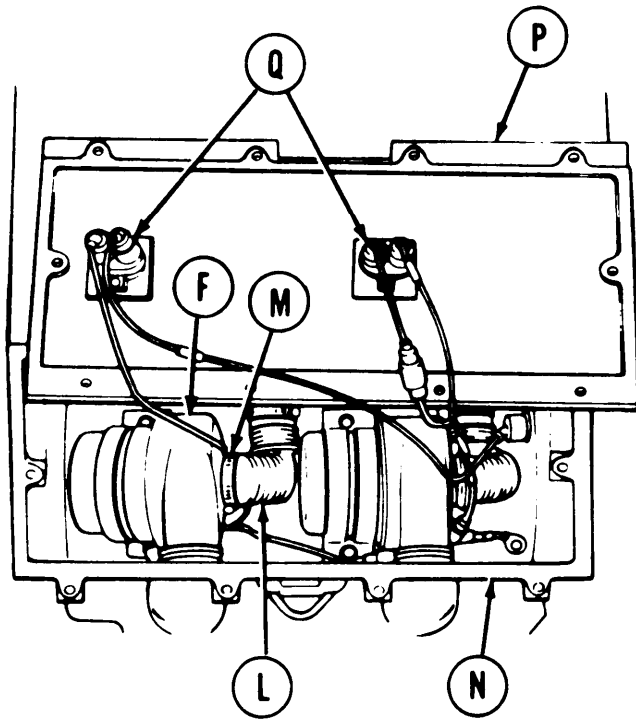


7. Install two screws and new lockwashers (H) to secure strap (G) to support.
8. Using socket with extension, tighten screws (H).
9. Connect long lead (J) from blower fan (F) to ground lead connector (K).

Go on to Sheet 6

TA141406

AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 6 of 7)



10. Apply silicone compound (Item 32, Appendix D) to inside diameter of hose end and connect hose (L) to inlet of blower fan (F).

11. Slide clamp (M) up over hose and inlet of blower fan (F).

12. Using screwdriver, tighten clamp (M).

13. If new gasket (N) is being used, apply sealing compound (Item 24, Appendix D) to gasket and position onto housing.

14. Lay cover (P) (with circuit breakers facing up) on air cleaner housing.

15. Connect four electrical leads to two circuit breakers (Q).

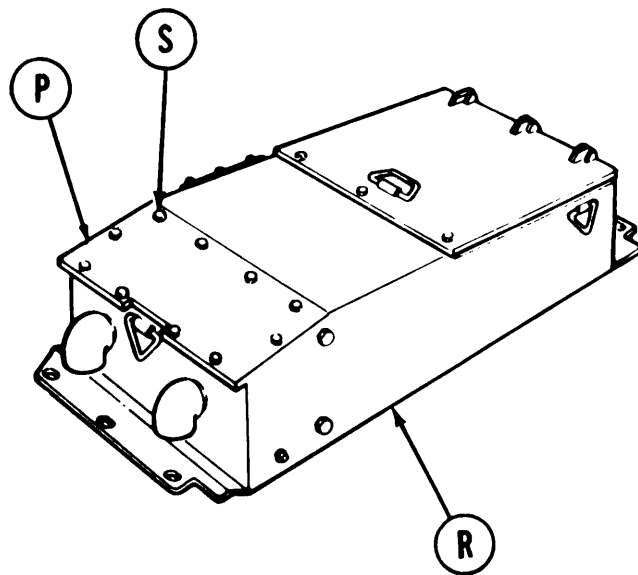
16. Check operation of blower fan (TM 9-2350-222-10).

Go on to Sheet 7

TA141407

AIR CLEANER (ARMORED) BLOWER FAN REPLACEMENT (Sheet 7 of 7)

17. Position cover (P) onto housing (R).
18. Install ten screws and new lockwashers (S) to secure cover (P).
19. Using socket, tighten screws (S).



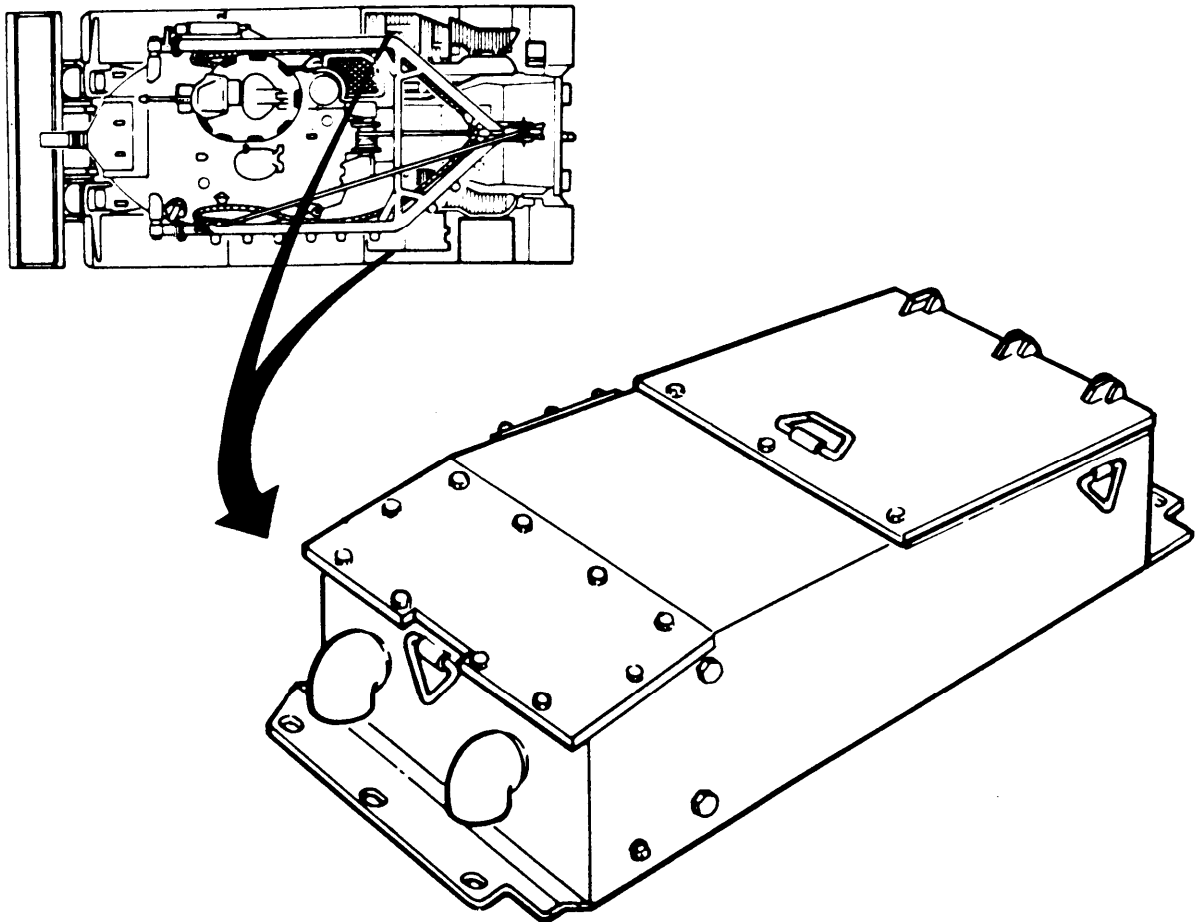
End of Task

TA141408

AIR CLEANER (ARMORED) BLOWER COVER AND GASKET REPLACEMENT
(Sheet 1 of 3)

TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
2 in. extension with 1/2 in. drive
Cross-tip screwdriver

SUPPLIES: Sealing compound (Item 24, Appendix D)
Silicone compound (Item 32, Appendix D)
Gasket (12251902)
Lockwasher (MS35338-41) (4 required)
Lockwasher (MS35338-45) (10 required)



Go on to Sheet 2

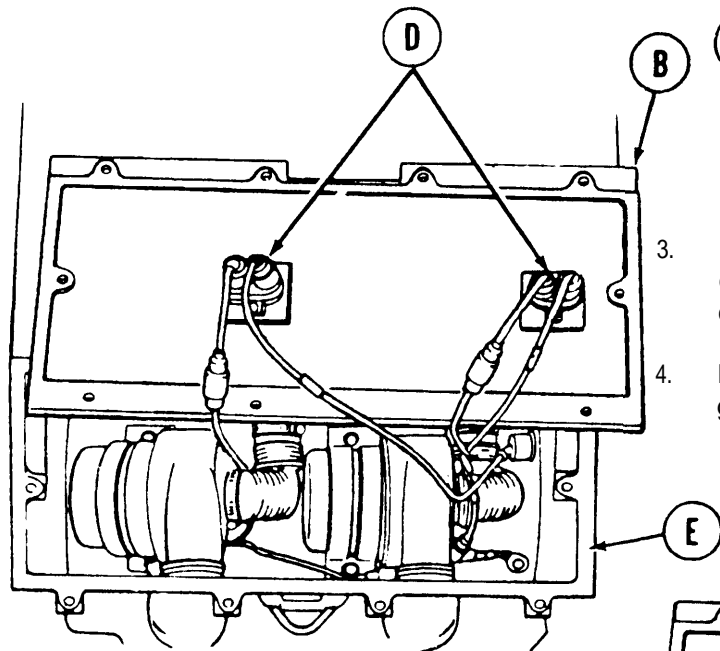
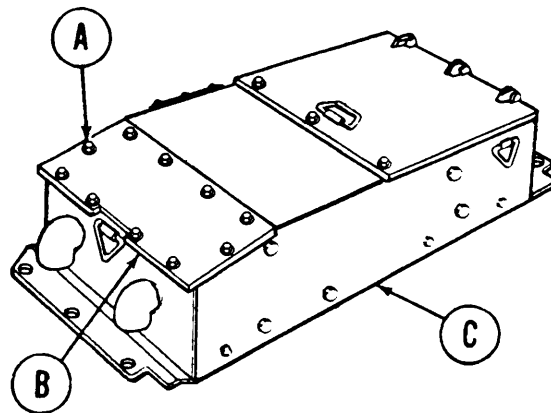
AIR CLEANER (ARMORED) BLOWER COVER AND GASKET REPLACEMENT
 (Sheet 2 of 3)

WARNING

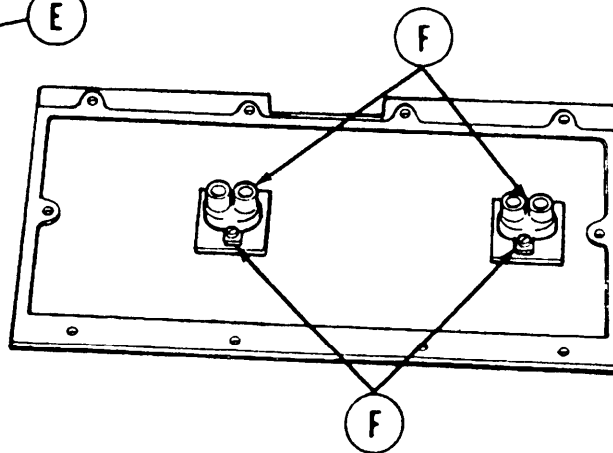
If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

REMOVAL:

1. Using socket, remove ten screws and lockwashers (A) securing cover (B). Throw lockwashers away.
2. Place cover (B) on top of housing (C).



3. Disconnect four electrical leads from two circuit breakers (D) mounted to underside of cover (B).
4. Remove cover (B) and gasket (E). Throw gasket away.



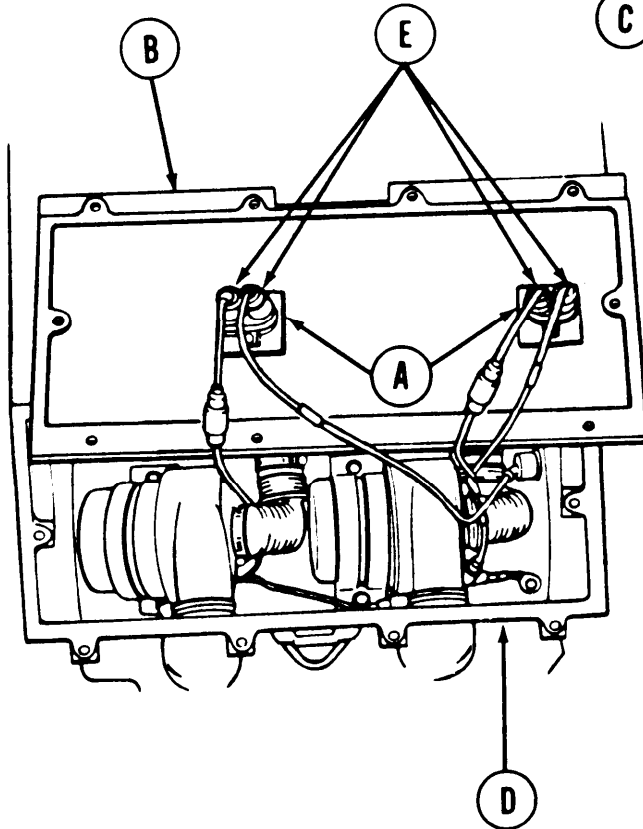
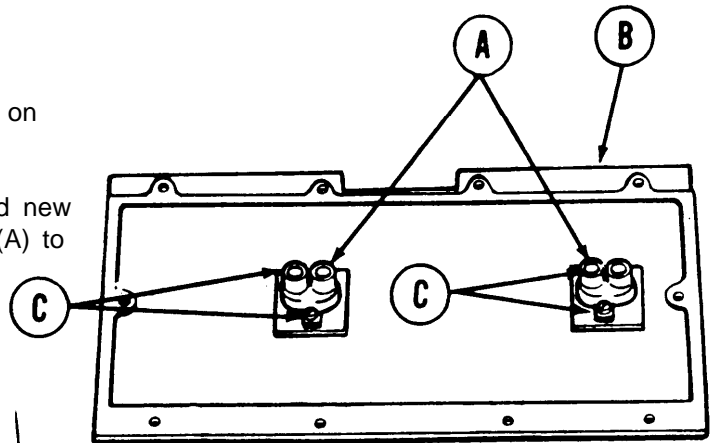
5. Using screwdriver, remove four screws and lockwashers (F) securing two circuit breakers to cover (B). Throw lockwashers away.

Go on to Sheet 3

AIR CLEANER (ARMORED) BLOWER COVER AND GASKET REPLACEMENT
(Sheet 3 of 3)

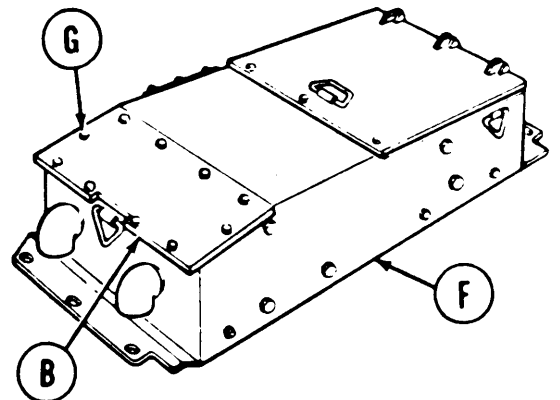
INSTALLATION:

1. Place two circuit breakers (A) in position on cover (B).
2. Using screwdriver, install four screws and new lockwashers (C) securing circuit breaker (A) to cover (B).



3. Apply sealing compound (Item 24, Appendix D) on new gasket (D) and place in position.
4. Apply silicone compound (Item 32, Appendix D) to four male leads (E).
5. Connect leads (E) to two circuit breakers (A).

6. Place cover (B) in position on air cleaner (F).
7. Using socket, install ten screws and new lockwashers (G).

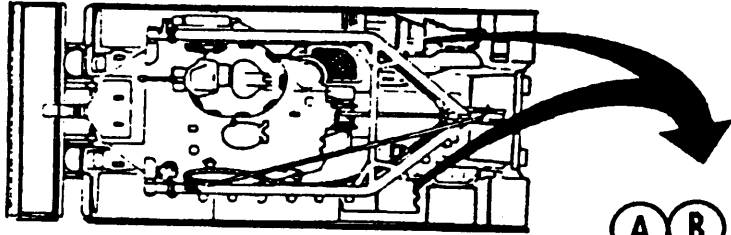


End of Task

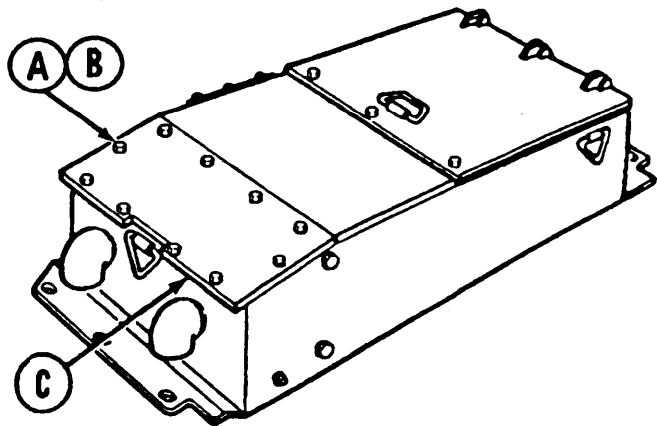
AIR CLEANER MANIFOLD COVER AND GASKET REPLACEMENT (Sheet 1 of 2)

TOOLS: 1/2 in. socket with 1/2 in. drive.
Ratchet with 1/2 in. drive.
2 in. extension with 1/2 in. drive.

SUPPLIES: Sealing compound (Item 24, Appendix D)
Gasket (12251902)
Lockwasher (MS35338-45) (10 required)



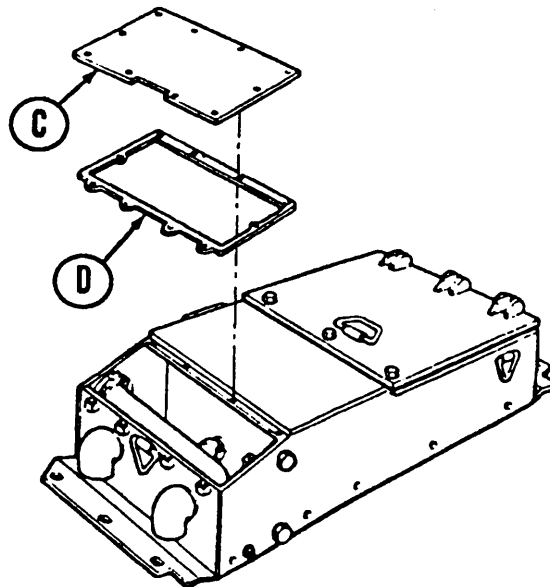
REMOVAL:



WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your NCO Officer or NBC NCO for appropriate handling or disposal instructions.

1. Using socket, remove 10 screws (A) and lockwashers (B) securing cover (C). Throw lockwashers away.
2. Remove cover (C) and gasket (D). Throw gasket away.

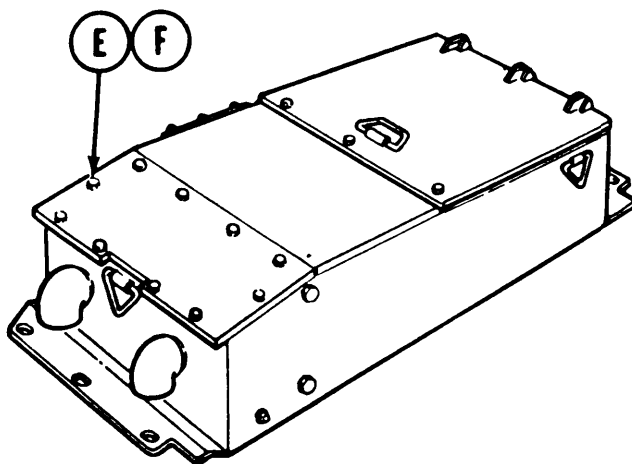
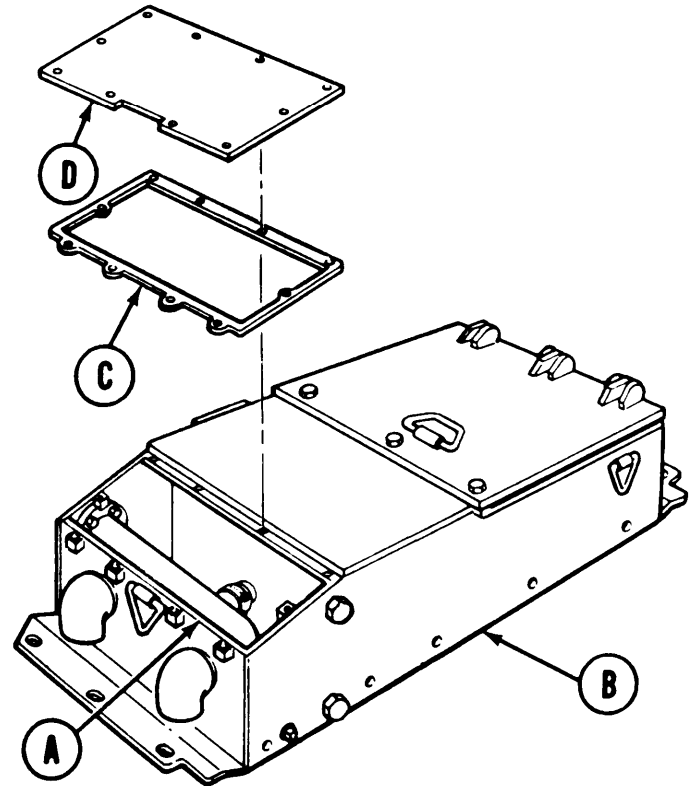


Go on to Sheet 2

AIR CLEANER MANIFOLD COVER AND GASKET REPLACEMENT (Sheet 2 of 2)

INSTALLATION:

1. Apply sealing compound (Item 24, Appendix D) to mounting surface (A) of air cleaner (B).
2. Put gasket (C) in place on mounting surface (A).
3. Place cover (D) in position on air cleaner (B).



4. Using socket, install 10 screws (E) and new lockwashers (F).

End of Task

AIR CLEANER MANIFOLD AND RELATED PARTS REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-148.5
Installation	7-148.6

TOOLS: 1/4 in. flat-tip screwdriver
 7/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 1/2 in. socket with 1/2 in. drive
 6 in. extension with 1/2 drive
 Ratchet with 1/2 in. drive

SUPPLIES: Silicone compound (Item 32, Appendix D)
 Sealing compound (Item 24, Appendix D)
 Gasket (12304318 - Right, 12304325- Left)
 Hose (MS52130-1A-2-12-3) (2 required)
 Lockwasher (MS35338-139) (5 required)
 Lockwasher (MS35338-140)

REFERENCE: TM 9-2350-222-10

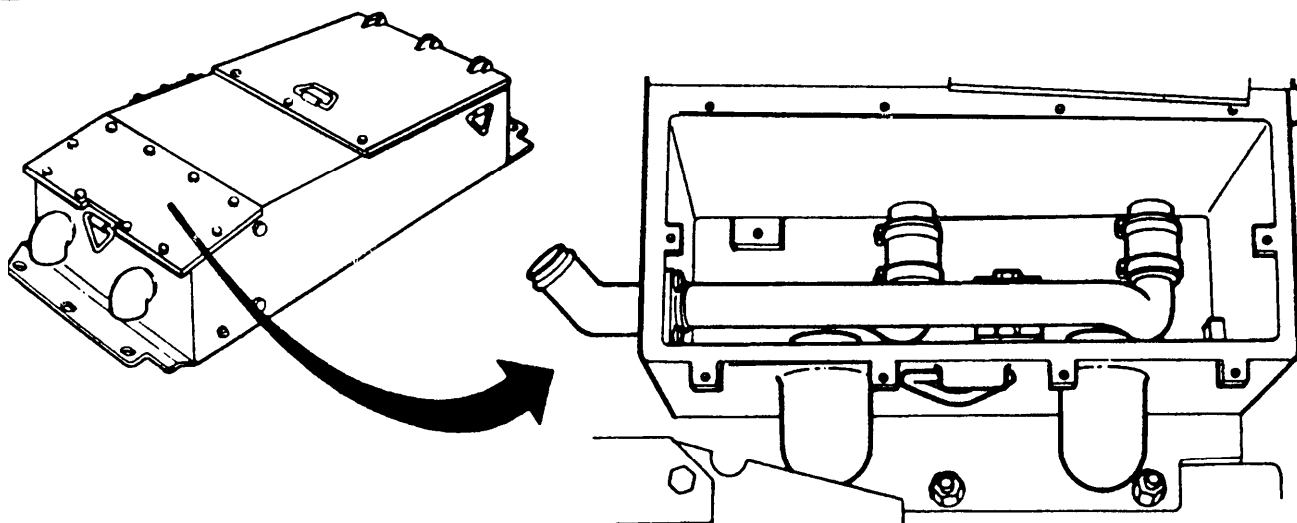
PRELIMINARY PROCEDURES: Open top deck grille doors (TM 9-2350-222-10)
 Remove manifold cover (page 7-148.2)

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

NOTE

Replacement of left or right manifolds is similar. Left manifold shown.

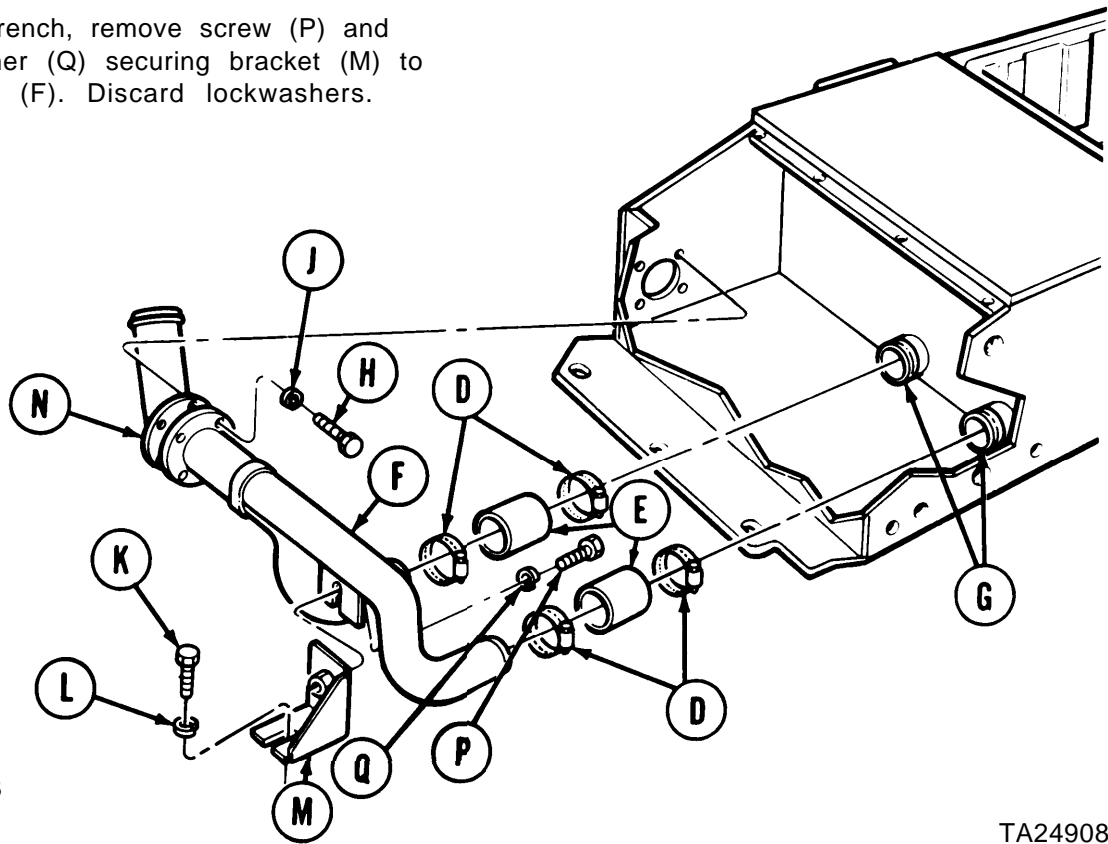
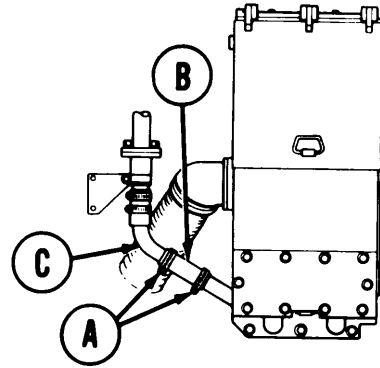


Go on to Sheet 2

AIR CLEANER MANIFOLD AND RELATED PARTS REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using screwdriver, loosen clamps (A) securing hose (B).
2. Slide hose (B) back onto elbow (C).
3. Using screwdriver, loosen four clamps (D) securing two hoses (E) to manifold (F) and precleaned tubes (G).
4. Using wrench, remove four screws (H) and lockwashers (J) securing manifold (F) to side of housing. Discard lockwashers.
5. Using socket, remove screw (K) and lockwasher (L) securing bracket (M) to bottom of housing. Discard lockwasher.
6. Slide hoses (E) onto manifold (F) until hoses are even with edge of manifold. Turn manifold until both inlet tubes are facing up. Remove clamps (D).
7. Remove manifold (F) from housing.
8. Remove and discard hoses (E) and gasket (N) from manifold (F).
9. Using wrench, remove screw (P) and lockwasher (Q) securing bracket (M) to manifold (F). Discard lockwashers.



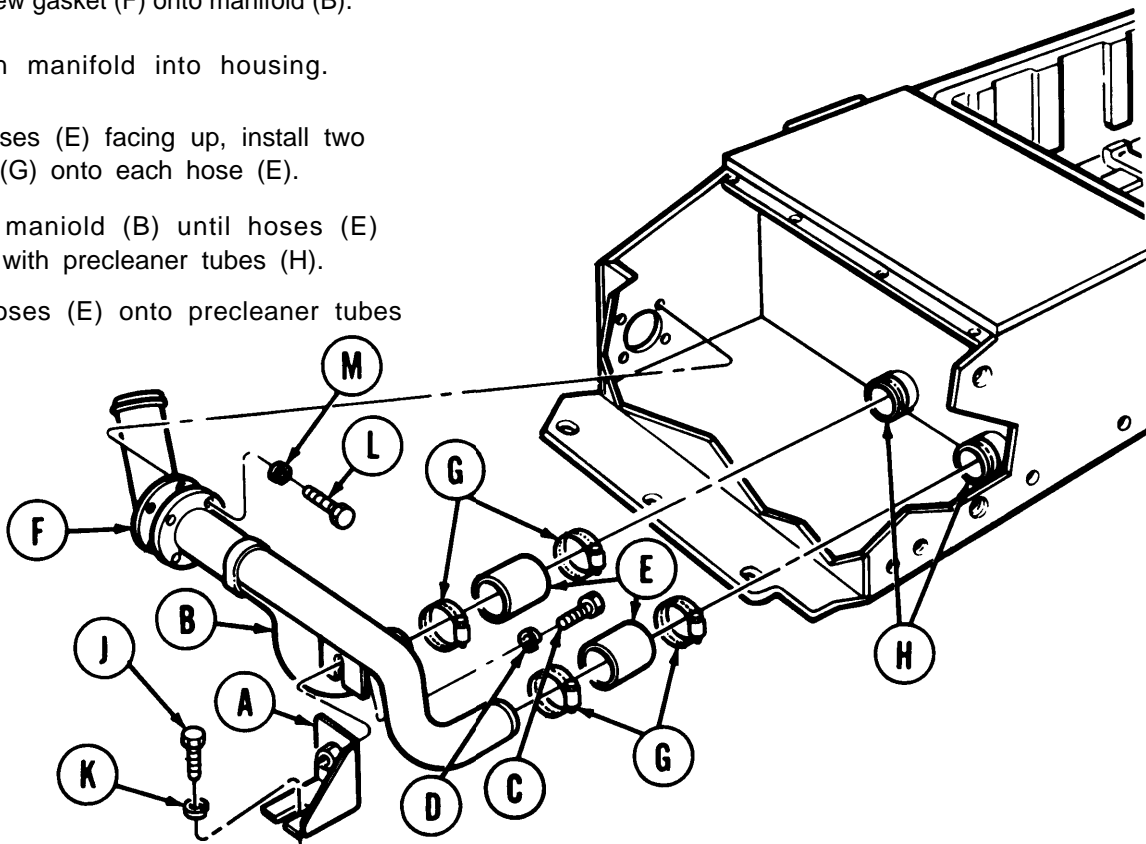
Go on to Sheet 3

TA249081

AIR CLEANER MANIFOLD AND RELATED PARTS REPLACEMENT (Sheet 3 of 4)

INSTALLATION:

1. Position bracket (A) to manifold (B).
2. Using wrench, install screw (C) and new lockwasher (D) to secure manifold (B) to bracket (A).
3. Apply silicone compound (Item 32, Appendix D) to inside ends of two new hoses (E).
4. Slide hoses (E) onto manifold (B).
5. Install new gasket (F) onto manifold (B).
6. Position manifold into housing.
7. With hoses (E) facing up, install two clamps (G) onto each hose (E).
8. Rotate manifold (B) until hoses (E) line up with precleaner tubes (H).
9. Slide hoses (E) onto precleaner tubes (H).



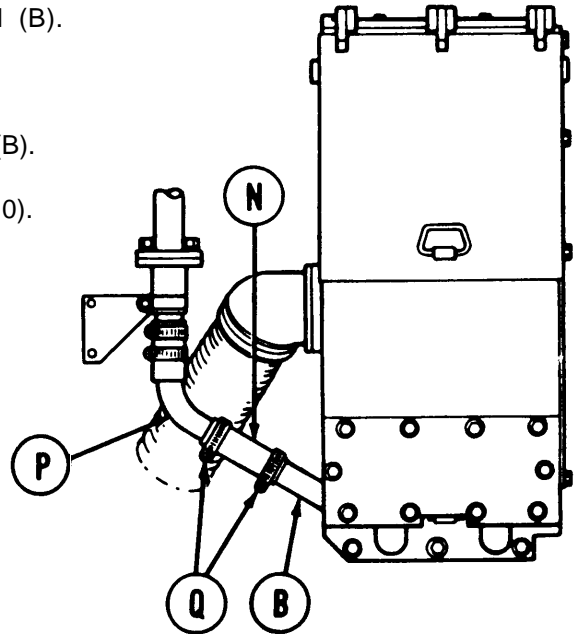
10. Using socket, install screw (J) and new lockwasher (K) to secure bracket (A) to bottom of housing.
11. Apply a thin coat of sealing compound (Item 24, Appendix D) to threads of four screws (L).
12. Using wrench, install four screws (L) and new lockwashers (M) to secure manifold (B) and gasket (F) to side of housing.
13. Position clamps (G) on hoses (E) over manifold (B) and precleaned tubes (H). Use screw-driver and tighten clamps (G).

Go on to Sheet 4

TA249082

AIR CLEANER MANIFOLD AND RELATED PARTS REPLACEMENT (Sheet 4 of 4)

14. Install manifold cover (page 7-148.3).
15. Slide hose (N) from elbow (P) onto manifold (B).
16. Position clamps (Q) over hose (N) and, using screwdriver, tighten clamps (Q) to secure hose (N) to elbow (P) and manifold (B).
17. Close top deck grille doors (TM 9-2350-222-10).



End of Task

DUST DETECTOR PRESSURE SWITCH AND BRACKET REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-148.8
Installation	7-148.10

TOOLS: 7/16 in. combination box and openend wrench.
 9/16 in. combination box and openend wrench (2 required).
 5/8 in. combination box and open end wrench (2 required)

SUPPLIES: Preformed packing (MS28778-4)
 Preformed packing (MS28778-5)
 Lockwasher (11657469-3) (3 required)

REFERENCE: TM 9-2350-257-10

WARNING

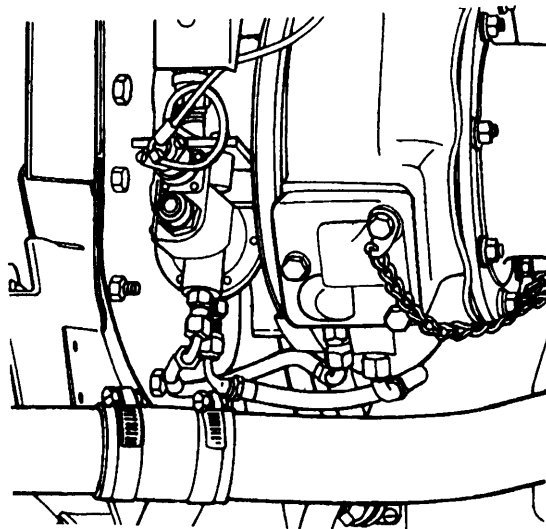
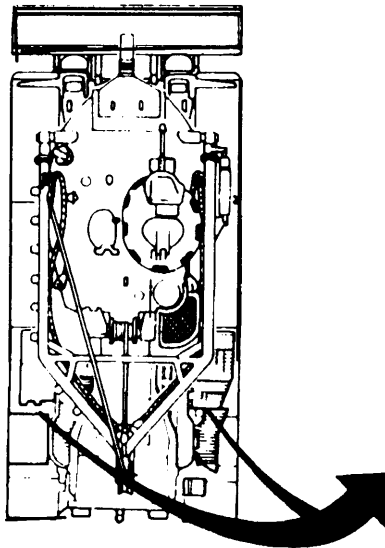
If NBC exposure is suspected, all air filter media should be handled by personal wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

NOTE

Replacement procedures for the left and right side pressure switch and bracket are the same except the left side requires removal of the top deck.

PRELIMINARY PROCEDURES: Open top deck grille doors (TM 9-2350-222- 10)
 For left side only, remove top deck (page 16-21)

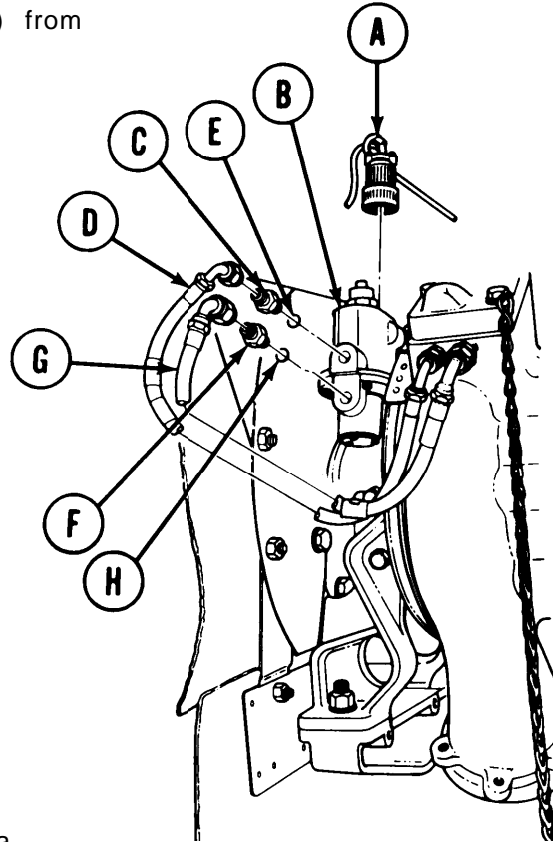
REMOVAL:



Go on to Sheet 2

DUST DETECTOR PRESSURE SWITCH AND BRACKET REPLACEMENT (Sheet 2 of 4)

1. Disconnect electrical connector (A) from pressure switch (B).



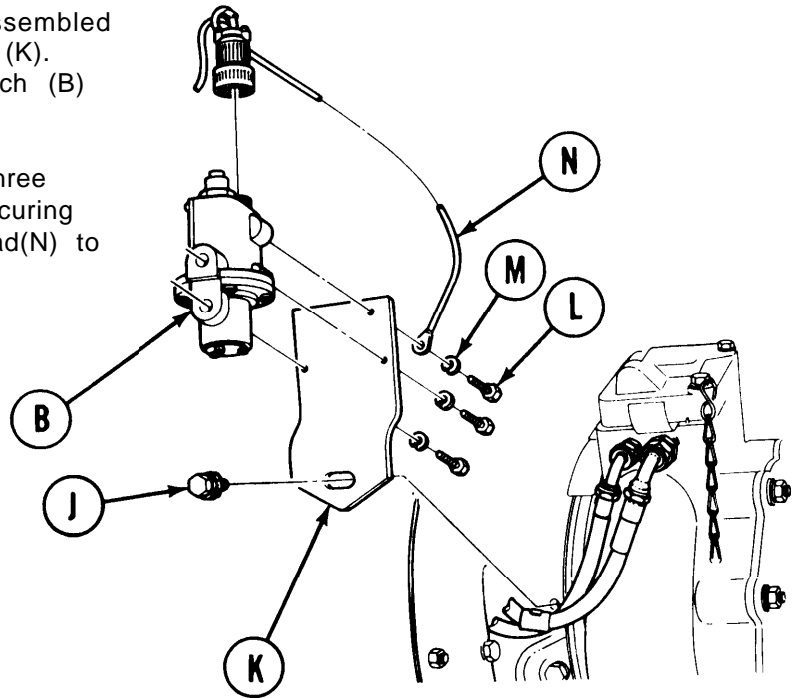
2. Using one 9/16 inch wrench to hold a (C), use other 9/16 inch wrench and disconnect hose assembly (D) from adapter (C).
3. Using 9/16 inch wrench, remove adapter (C) and preformed packing (E) from pressure switch (B). Discard preformed packing.
4. Using one 5/8 inch wrench to hold adapter (F), use other 5/8 inch wrench and disconnect hose assembly (G) from adapter (F).
5. Using 5/8 inch wrench, remove adapter (F) and preformed packing (H) from pressure switch (B). Discard preformed packing.

Go on to Sheet 3

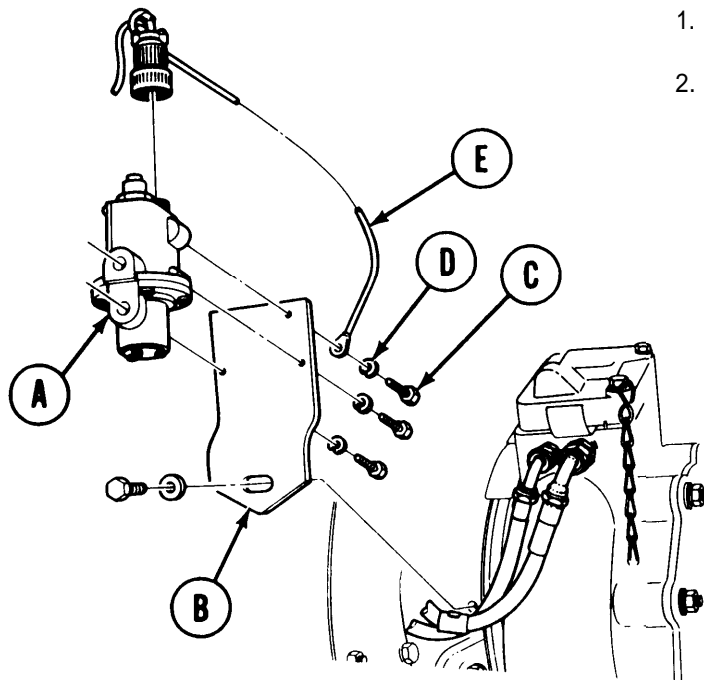
TA249085

DUST DETECTOR PRESSURE SWITCH AND BRACKET REPLACEMENT (Sheet 3 of 4)

6. Using 9/16 inch wrench remove assembled washer-screw (J) securing bracket (K). Remove bracket with pressure switch (B) from turbosupercharger.
7. Using 7/16 inch wrench, remove three screws (L) and lockwashers (M) securing pressure switch (B) and ground lead (N) to bracket (K). Discard lockwashers.
8. Remove pressure switch (B).



INSTALLATION:



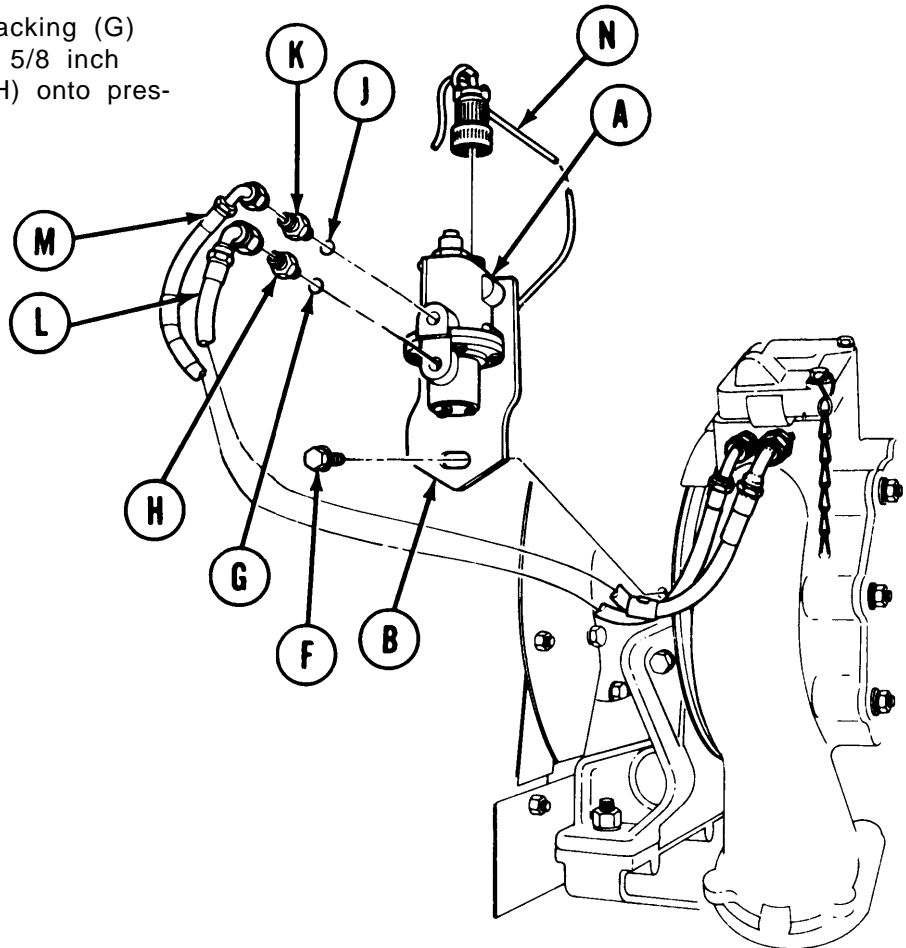
1. Position pressure switch (A) to bracket (B).
2. Using 7/16 inch wrench, install three screws (C) and three new lockwashers (D) to secure pressure switch (A) and ground lead (E) to bracket (B).

Go on to Sheet 4

TA249086

DUST DETECTOR PRESSURE SWITCH AND BRACKET REPLACEMENT (Sheet 4 of 4)

3. Position bracket (B) with pressure switch (A) to turbosupercharger and, using 9/16 inch wrench, install assembled washer screw (F) to secure bracket (B) to turbosupercharger.
4. Install new preformed packing (G) onto adapter (H). Using 5/8 inch wrench, install adapter (H) onto pressure switch (A).



5. Install new preformed packing (J) onto adapter (K). Using 9/16 inch wrench, install adapter (K) onto pressure switch (A).
6. Using 5/8 inch wrench, connect and tighten hose assembly (L) to adapter (H).
7. Using 9/16 inch wrench, connect and tighten hose assembly (M) to adapter (K).
8. Connect electrical connector (N) to pressure switch (A).
9. Perform operational test (page 10-350.19).
10. For left side only, install top deck (page 16-23).
11. Close top deck grille doors (TM 9-2350-222-10).

End of Task

TA249087

TM 9-2350-222-20-1-3

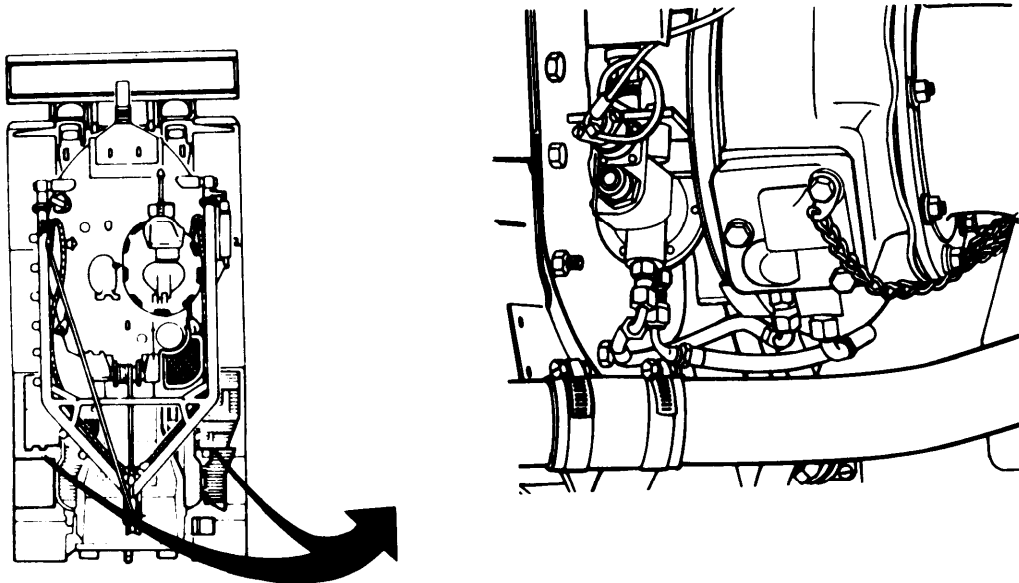
DUST DETECTOR FILTER STRIP AND COVER REPLACEMENT (Sheet 1 of 3)

TOOLS: 1/2 in. combination box and open end wrench

SUPPLIES: Preformed packing (MS9068-038)
preformed packing (MS9068-018)
Preformed packing (MS9068-013)

REFERENCE: TM 9-2350-257-10

PRELIMINARY PROCEDURES: Open top deck grille doors (TM 9-2350-222-10)



Go on to Sheet 2

TA249088

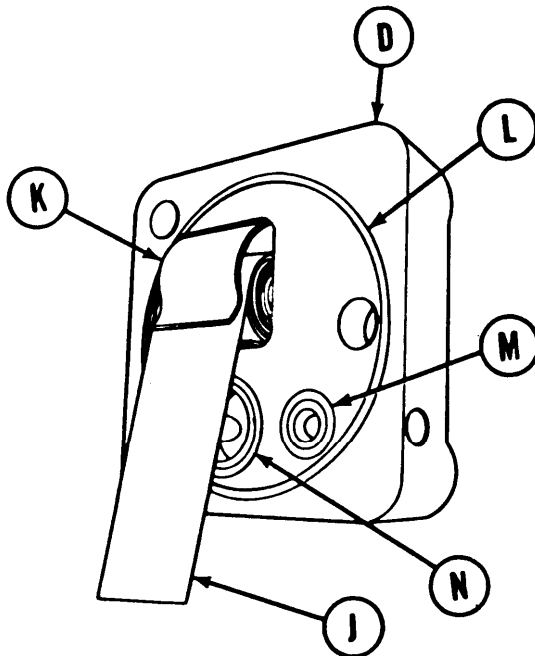
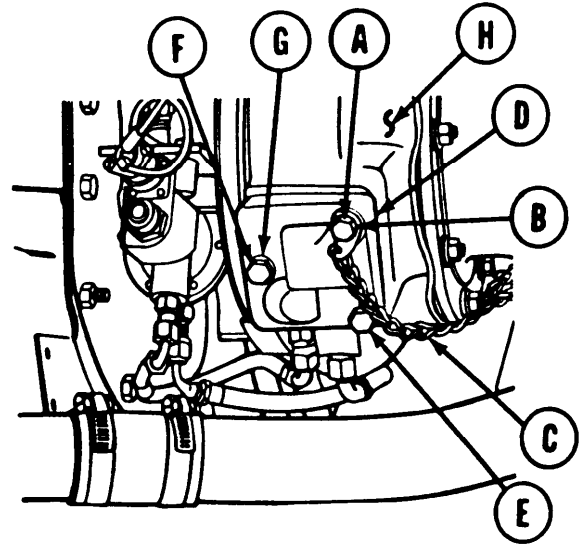
DUST DETECTOR FILTER STRIP AND COVER REPLACEMENT (Sheet 2 of 3)

REMOVAL:

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

1. Using wrench, remove screw (A) and washer (B) securing chain and fastener (C).
2. Using wrench, remove screw and washer (E).
3. Using wrench, remove screw (F) and packing with retainer (G).
4. Remove cover (D) from turbosupercharger (H).
5. Remove filter strip (J) and retaining strap (K) from cover (D).
6. Remove and discard preformed packings (L), (M), and (N).

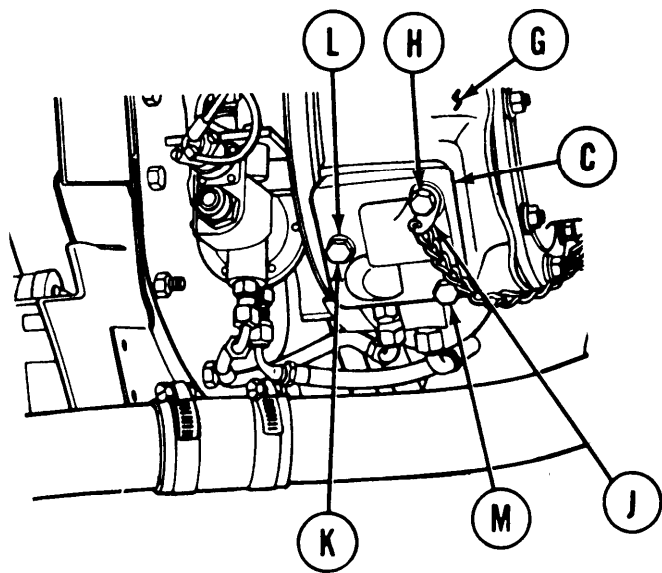
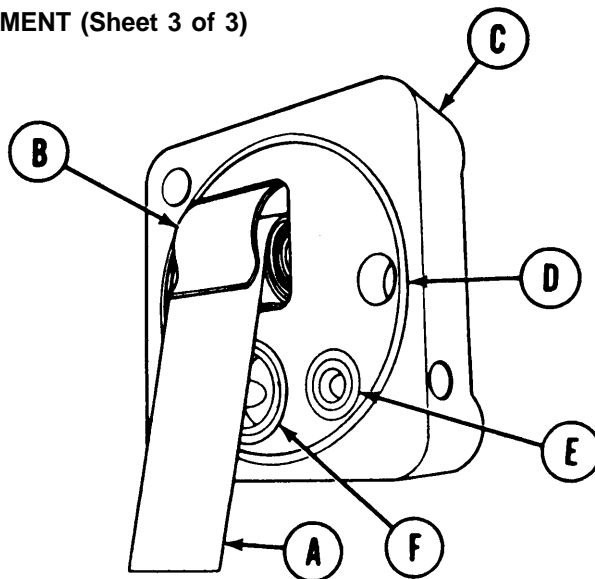


Go on to Sheet 3

DUST DETECTOR FILTER STRIP AND COVER REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. Install filter strip (A) into retaining strap (B) and insert into cover (C).
2. Install new preformed packings (D), (E), and (F) into cover (C).
3. Pull out filter strip (A) so it extends about 1/2 inch past edge of cover (C).
4. Position assembled cover (C) onto turbo-supercharger compressor housing (G).



5. Install screw and washer (H) through chain fastener (J) and cover (C).
6. Install screw (K) and packing with retainer (L).
7. Install screw and washer (M).

8. Using wrench, tighten screws (H), (K), and (M).
9. Perform dust detector operational test (page 10-350.19).

End of Task

* U.S. GOVERNMENT PRINTING OFFICE: 1991-543-025 40067

SERVICE DUST DETECTOR FILTER STRIP (Sheet 1 of 2)

- SUPPLIES: Pipe cleaner (Item 70, Appendix D)
 Tubing, non-metallic (Item 71, Appendix D)
 Wire, 0.030 inch diameter
 Cloth (Item 12, Appendix D)
 Dry cleaning solvent (Item 54, Appendix D)
 Goggles (Item 74, Appendix D)
 Rubber gloves (Item 73, Appendix D)

PRELIMINARY PROCEDURE: Remove dust detector filter strip and cover (page 7-148.12)

SERVICE:

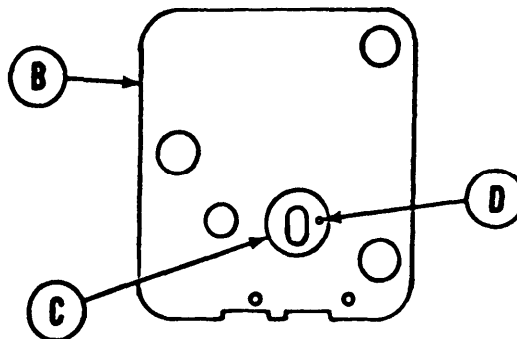
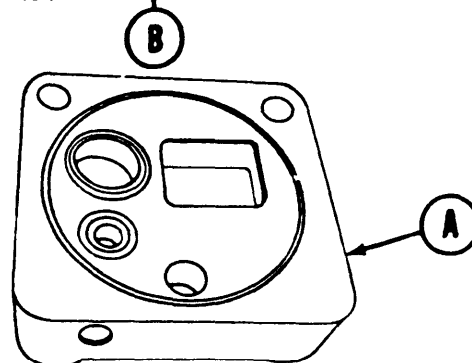
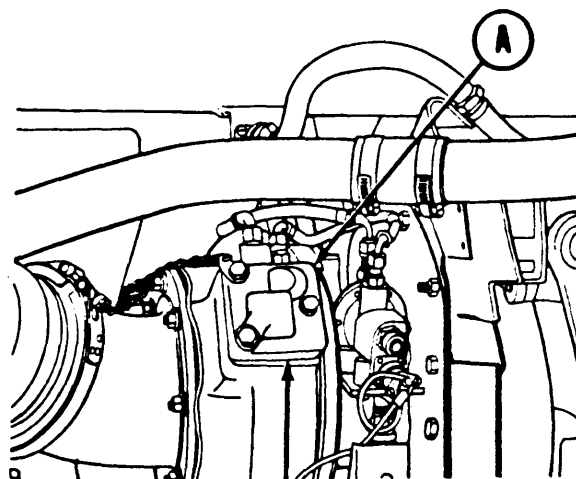
WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning Solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

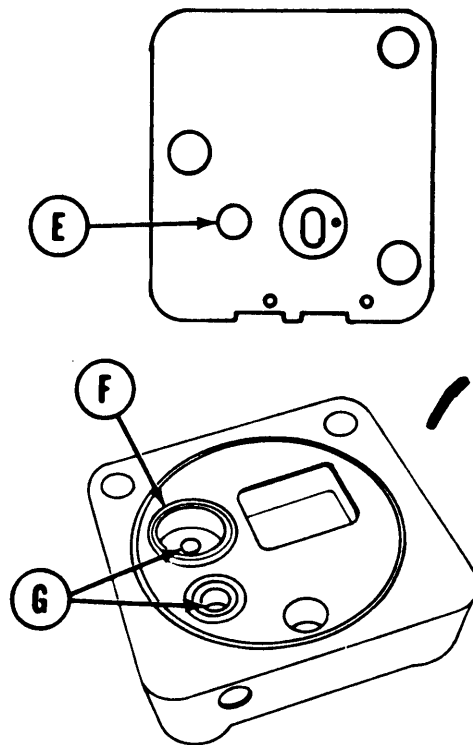
1. Using clean cloth dampened with cleaning solvent, clean cover (A) and mounting face of compressor housing (B).
2. Inspect compressor housing chamber (C) for contamination. Clean chamber (C) as required.
3. Using pipe cleaner (Item 70, Appendix (D)), clean compressor housing orifice chamber (C). Use wire to clean orifice (D). Blow out chamber (C) and orifice (D) by mouth, using a short piece of tubing.



Go on to Sheet 2

SERVICE DUST DETECTOR FILTER STRIP (Sheet 2 of 2)

4. Blow out (by mouth) compressor housing hole (E).
5. Inspect cover chamber (F) for contamination. Clean chamber (F) as required.
6. Using pipe cleaner (Item 70, Appendix D), clean drilled holes (G) and blow out (by mouth).
7. Install dust detector filter strip and cover (page 7-148.14).



End of Task

AIR PRESSURE HOSE ASSEMBLIES REPLACEMENT (Sheet 1 of 2)

TOOLS: 9/16 in. combination box and open end wrench (2 required)
5/8 in. combination box and open end wrench (2 required)

NOTE

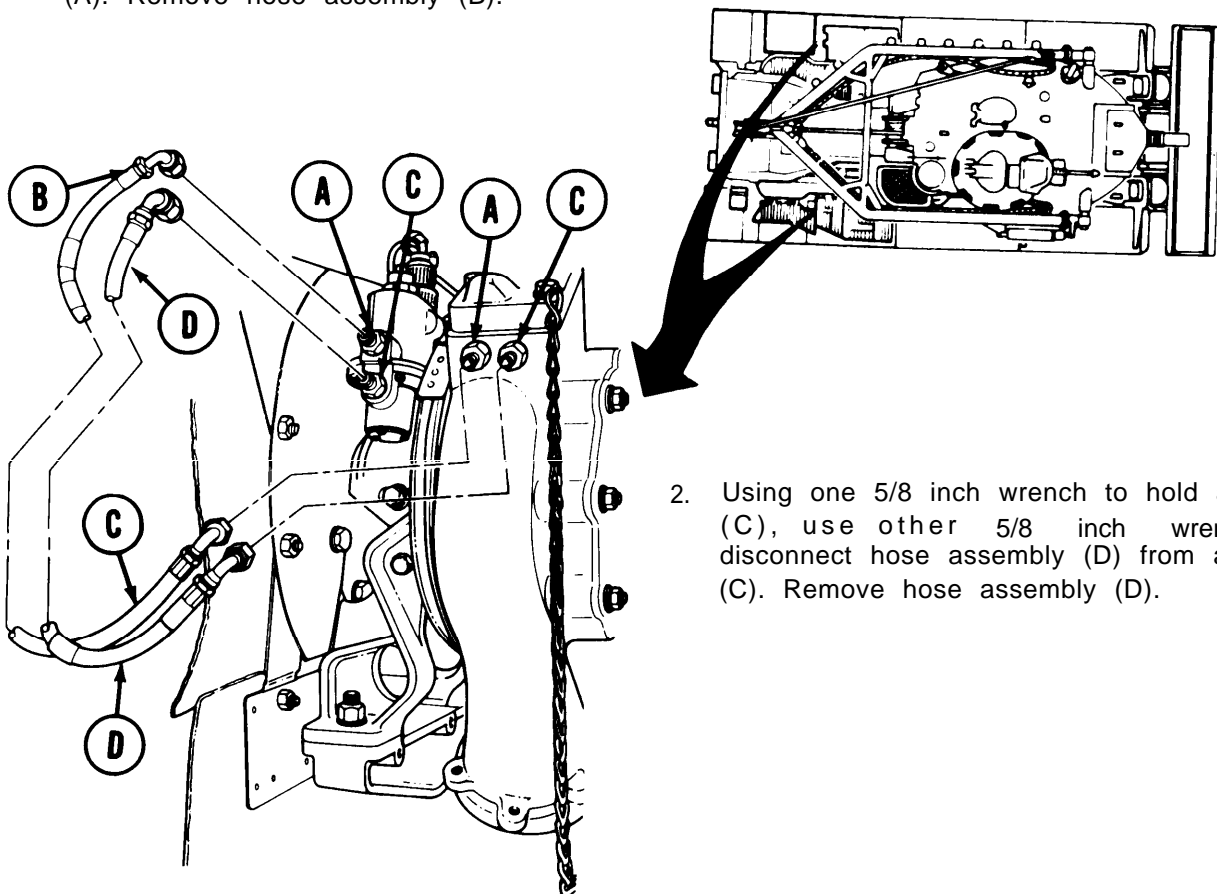
Replacement of the left side air pressure hose assemblies will require removal of the top deck.

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Open top deck grille doors (TM 9-2350-222-10)
For left side only, remove top deck (page 16-21)

REMOVAL:

- Using one 9/16 inch wrench to hold adapters (A), use other 9/16 inch wrench to disconnect hose assembly (B) from adapters (A). Remove hose assembly (B).



- Using one 5/8 inch wrench to hold adapters (C), use other 5/8 inch wrench to disconnect hose assembly (D) from adapters (C). Remove hose assembly (D).

Go on to Sheet 2

TA249093

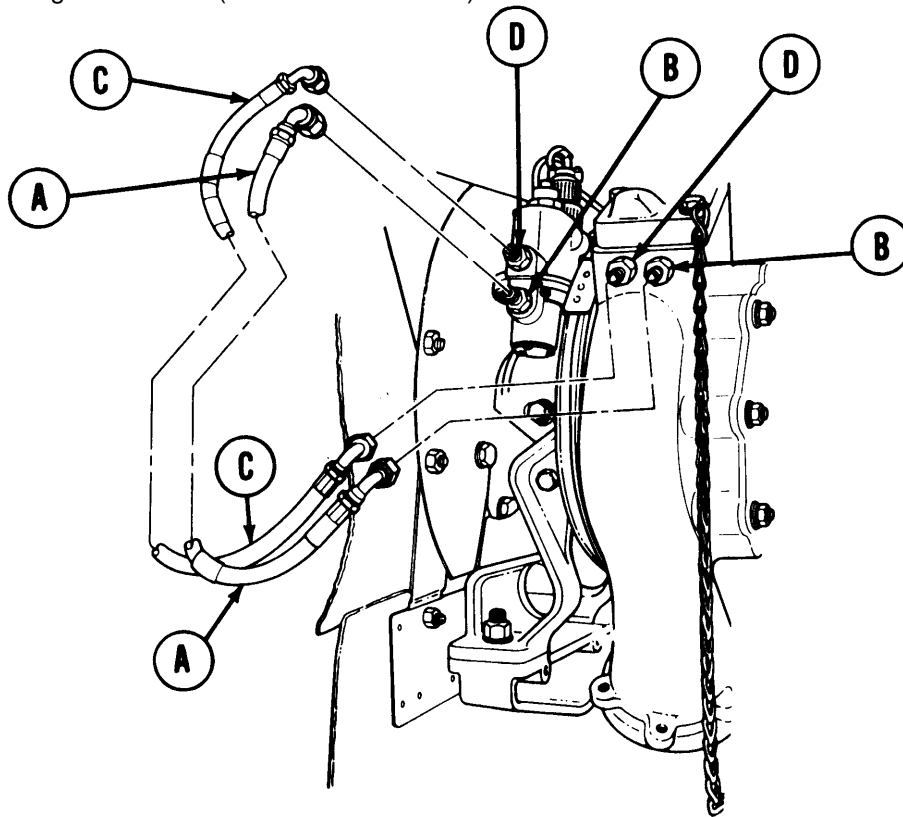
Change 2

7-148.17

AIR PRESSURE HOSE ASSEMBLIES REPLACEMENT (Sheet 2 of 2)

INSTALLATION:

1. Connect hose assembly (A) to adapters (B). Using 5/8 inch wrench, tighten hose assembly (A) onto adapters (B).
2. Connect hose assembly (C) to adapters (D). Using 9/16 inch wrench, tighten hose assembly (C) onto adapter (D).
3. For left side only, install top deck (page 16-23).
4. Close top deck grille doors (TM 9-2350-222-10).



End of Task

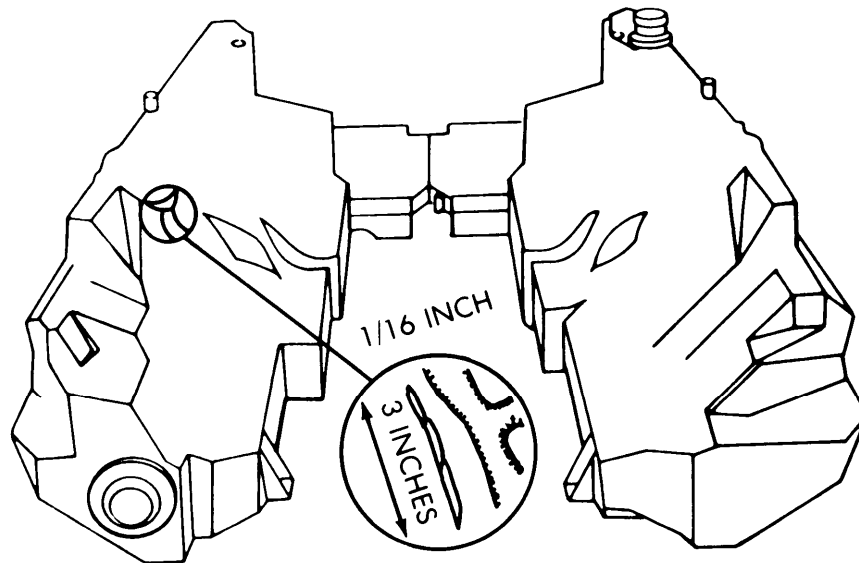
TA249094

FUEL TANK REPAIR (Sheet 1 of 2)

TOOLS: 1/4 in. portable electric drill
1/8 in. dia. twist drill
6 in. steel rule

SUPPLIES: Accelerator and sealer (Item 62, Appendix D)
Dry cleaning solvent (Item 54, Appendix D)
Sandpaper (Item 51, Appendix D)
Grease (Item 36, Appendix D)
Container (to mix accelerator and sealer)
Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Drain fuel tank to level approximately 3 in. below crack (7-152)



NOTE

Repair of minor cracks in fuel tanks (up to 3 inches long and 1/16 inch wide) can be made. Cracks in excess of these dimensions will be repaired by support maintenance.

Go on to Sheet 2

TA141412

FUEL TANK REPAIR (Sheet 2 of 2)

WARNING

Use dry cleaning solvent in a well-ventilated area only.

CLEANING:

1. Using dry cleaning solvent (Item 54, Appendix D), clean area around crack to remove all traces of dirt and grease. Wipe dry with rags (Item 65, Appendix D).
2. Using sandpaper (Item 51, Appendix D), sand area around crack for proper adhesion of sealer. Wipe with rag after sanding.

REPAIR:

1. Coat drill bit with grease (Item 36, Appendix D) to minimize amount of metal chips falling into fuel tank.
2. Using drill, bore hole about 1/2 to 1 inch from visible ends of crack as shown.
3. Clean crack and surrounding area with rag (Item 65, Appendix D) dampened in dry cleaning solvent (Item 54, Appendix D). Wipe dry. Do not allow fingerprints, oil, or moisture on cleaned surface.

NOTE

**Do not apply sealer at temperatures below 45 degrees F.
Sealer will cure in approximately 24 hours at room
temperature.**

4. Mix accelerator and sealer (Item 62, Appendix D) in container.
5. Apply 3/16 inch thickness of sealer to cleaned surface and at least 1/2 inch beyond crack.
6. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 1 of 7)

PROCEDURE INDEX

PROCEDURE	PAGE
Installing Hand Pump	7-153
Removing Condensate	7-156
Removing Hand Pump	7-156
Draining Fuel Tank	7-158

TOOLS: Hand fuel pump assembly (7971068)
Hose (8724493) (2 required)
Adapter (1087033)

SUPPLIES: 55 gallon drum
Rags (Item 65, Appendix D)
Drain pan

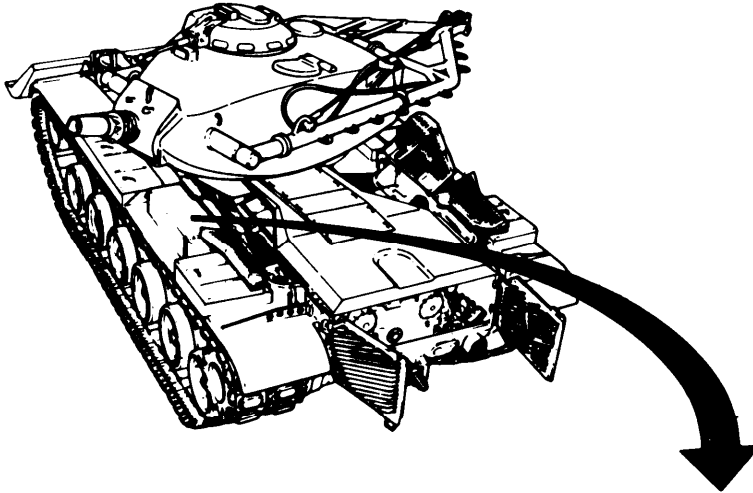
REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Open top deck grille doors (TM 9-2350-222-10)

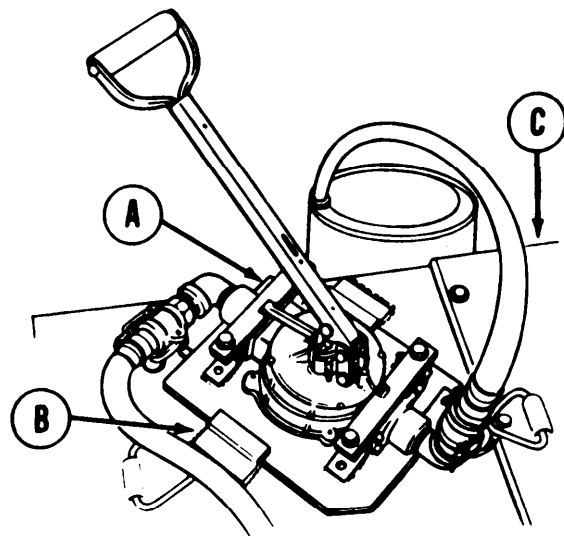
Go on to Sheet 2

DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 2 of 7)**INSTALLING HAND PUMP:****NOTE**

The procedures for condensate removal from left and right fuel tanks are identical. Left fuel tank condensate removal is covered in this task.



1. Install hand fuel pump (A) inside of lips of welded brackets (B) on air cleaner (C).



Go on to Sheet 3

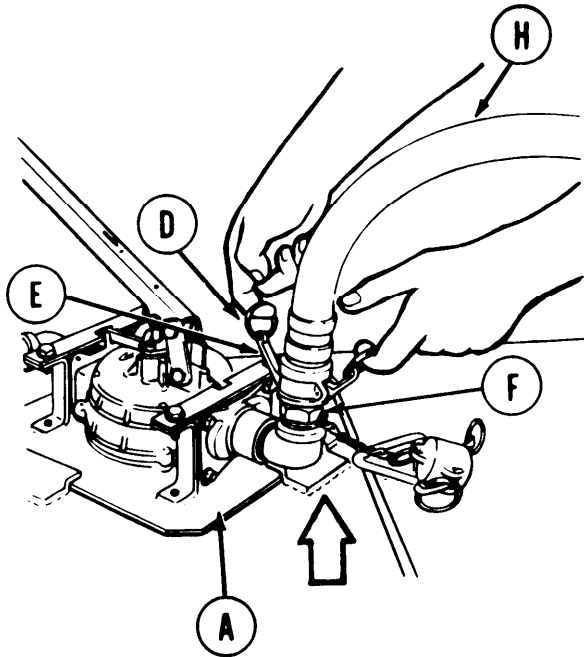
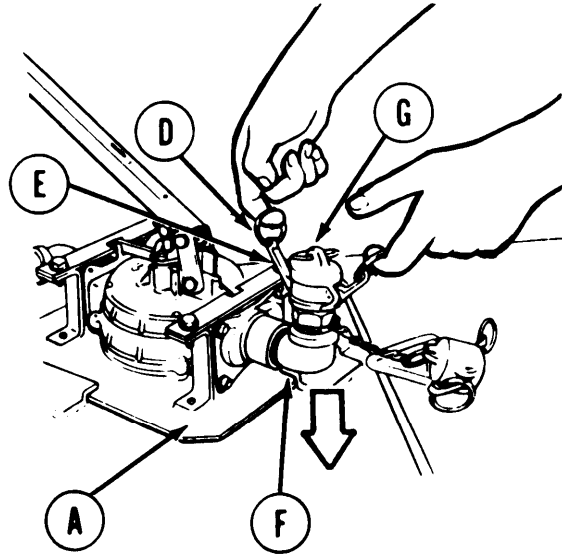
TA141413

DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 3 of 7)

NOTE

Steps 2 and 3 apply to removal of dust covers from hand fuel pump and hoses.

2. Using fingers in clamp ring (D), pull clamps (E) out and down against body of connector (F) to loosen dust cover (G).
3. Remove dust cover (G) from connector (F).
4. Install hose (H) on connector (F) on discharge side of hand fuel pump (A).



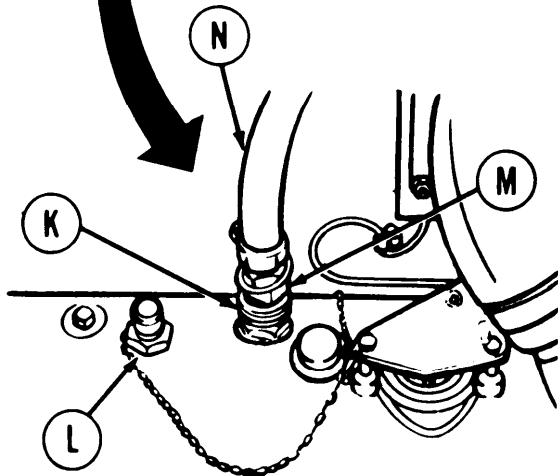
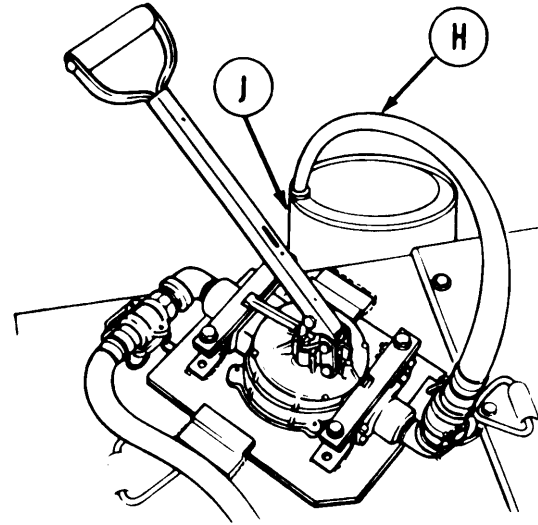
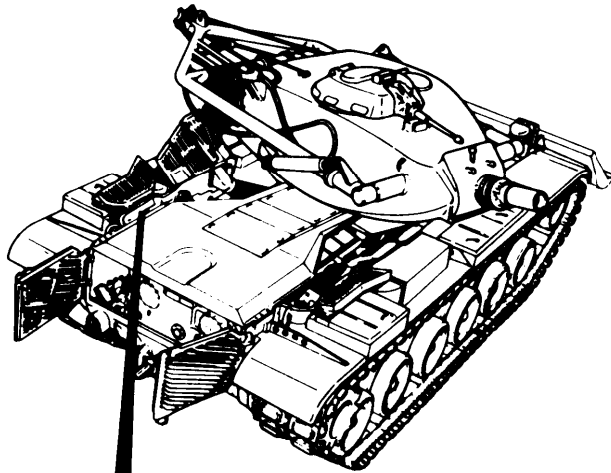
5. Using fingers in clamp ring (D), pull clamp (E) out and up against hose (H) to clamp hose (H) in place.
6. Repeat steps 4 and 5 for installing hose on connector on suction side of hand fuel pump (A).

Go on to Sheet 4

TA141414

DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 4 of 7)

7. Install loose end of discharge hose (H) in 55-gallon drum (J).



8. Using one hand to push quick-disconnect (K) down, remove dust cover (L).
9. Install adapter (M) on suction hose (N).
10. Install adapter (M) on quick-disconnect (K) by pushing adapter down until it snaps into place.

Go on to Sheet 5

TA141415

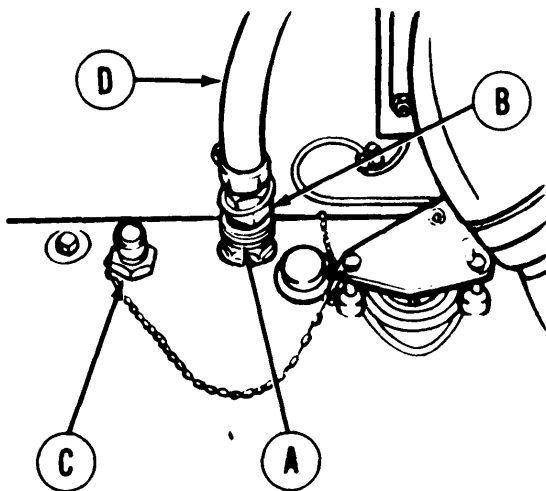
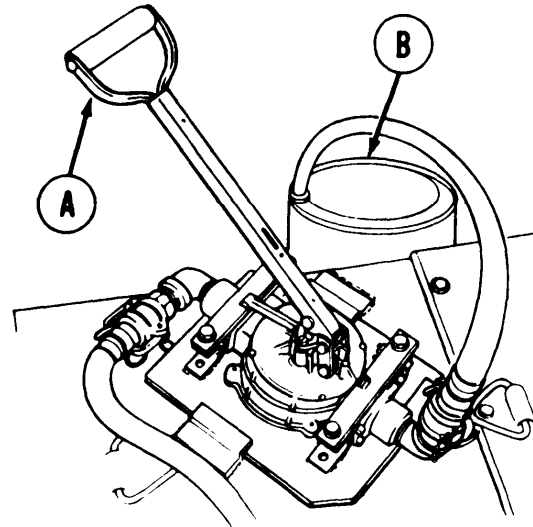
DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 5 of 7)

REMOVING CONDENSATE:

CAUTION

Use care not to spill fuel over vehicle. Wipe away any spilled fuel immediately with rags. (Item 65, Appendix D)

1. Operate pump handle (A) to transfer fuel from fuel tank to 55-gallon drum (B).
2. Continue operating pump handle (A) until all fuel has been removed from fuel tank.



REMOVAL OF HAND PUMP:

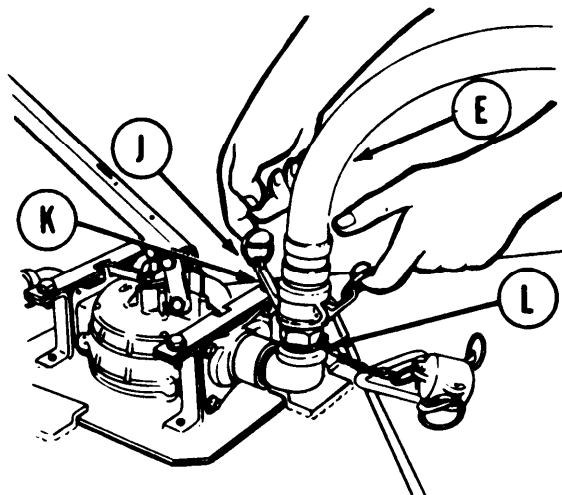
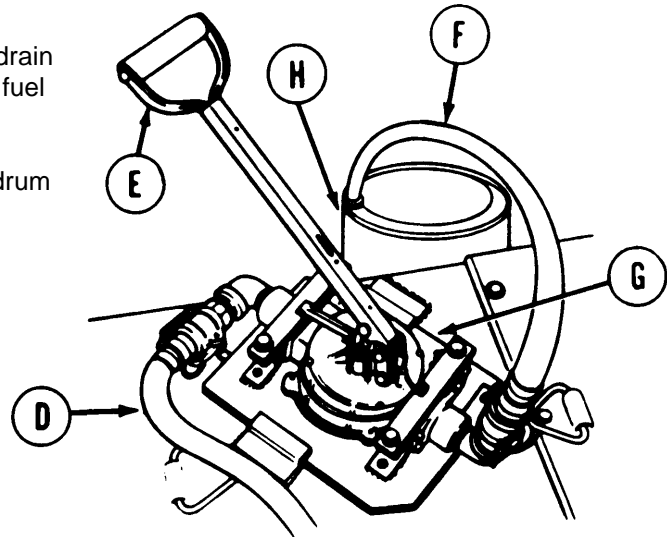
1. Using one hand to push quick-disconnect (A) down, remove adapter (B) from quick-disconnect (A).
2. Install dust cover (C) on quick-disconnect (A) by pushing dust cover (C) down until it snaps into place.
3. Remove adapter (B) from suction hose (D).

Go on to Sheet 6

TA141416

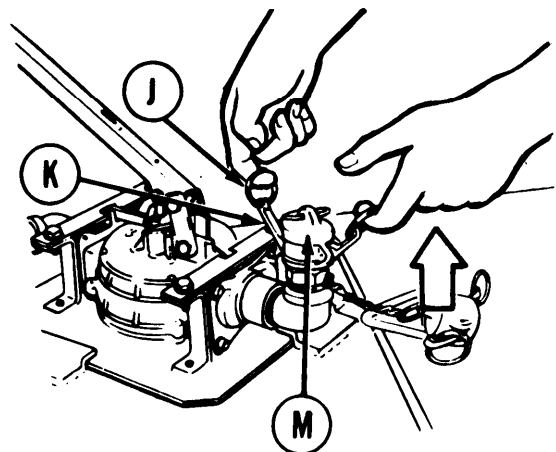
DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 6 of 7)

4. Operate pump handle (E) several times to drain any fuel left in hoses (D) and (F) and hand fuel pump (G).
5. Remove discharge hose (F) from M-gallon drum (H), and let hose hang over side of vehicle.



6. Using fingers in clamp rings (J), pull clamps (K) out and down to loosen discharge connector (L).
7. Remove discharge hose (E) from pump discharge connector (L).
8. Repeat steps 6 and 7 for removal of suction hose.

9. Install dust cover (M) on discharge connector (L).
10. Using fingers in clamp rings (J), pull clamps (K) out and up against dust cover (M) to clamp dust cover in place.
11. Repeat steps 9 and 10 for installing dust cover on hand fuel pump suction connector and hoses.

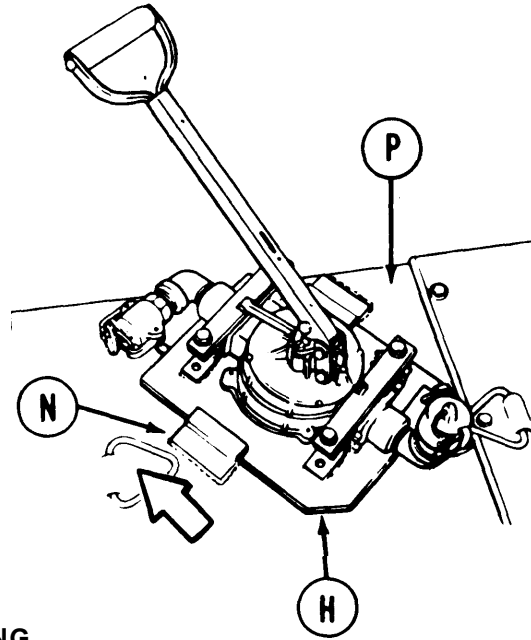


Go on to Sheet 7

TA141417

DRAINING FUEL TANK AND REMOVING CONDENSATE (Sheet 7 of 7)

12. Using both hands, slide hand fuel pump (H) out of lips of welded brackets (N).
13. Remove hand fuel pump (H) from vehicle air cleaner (P).
14. Close top deck grille doors (TM 9-2350-222-10).



DRAINING FUEL TANK:

WARNING

Do not allow smoking, open flames, tank or other vehicle operation within 50 feet while draining fuel tanks.

NOTE

Whenever possible, start draining procedure when amount of fuel is indicated on fuel level indicator.

NOTE

Fuel may be drained from both fuel tanks by removing drain plug from left fuel tank. Some fuel will still be trapped in bottom of fuel tanks after draining.

1. Position drain pan under vehicle.
2. Remove fuel drain plug (page 7-189).
3. Allow time for fuel to drain from fuel tank.
4. Install drain plug (page 7-189).

End of Task

TA141418

FUEL TANK (RIGHT) FILLER REPAIR (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-159
Cleaning	7-162
Inspection	7-162
Installation	7-163

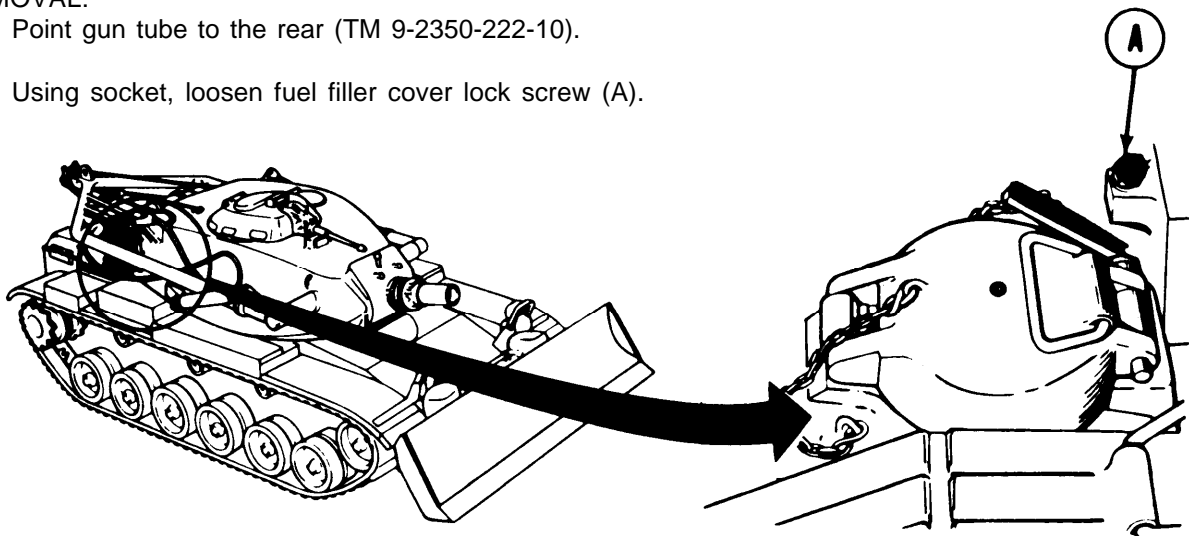
TOOLS: Ratchet with 1/2 in. drive
 3/4 in. socket with 1/2 in. drive
 Putty knife
 Diagonal cutting pliers
 Slip joint pliers
 10 in. extension with 1/2 in. drive
 Flat-tip screwdriver, 1/4 in. blade
 1/4 in. socket head screw key (allen wrench)

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Lint-free cloth (Item 12, Appendix D)
 Gasket (7398888) Washer, Non-Metallic (7398889)
 Gasket (7398887) Washer, Non-Metallic (7398890)
 Lockwire (Item 59, Appendix D) Screw (128232) (8 required)

REFERENCE: TM 9-2350-222-10

REMOVAL:

1. Point gun tube to the rear (TM 9-2350-222-10).
2. Using socket, loosen fuel filler cover lock screw (A).

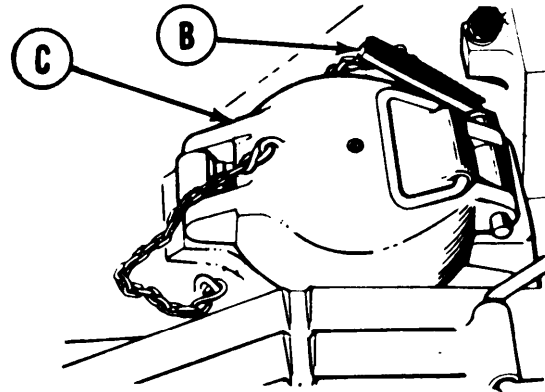


Go on to Sheet 2

TA141419

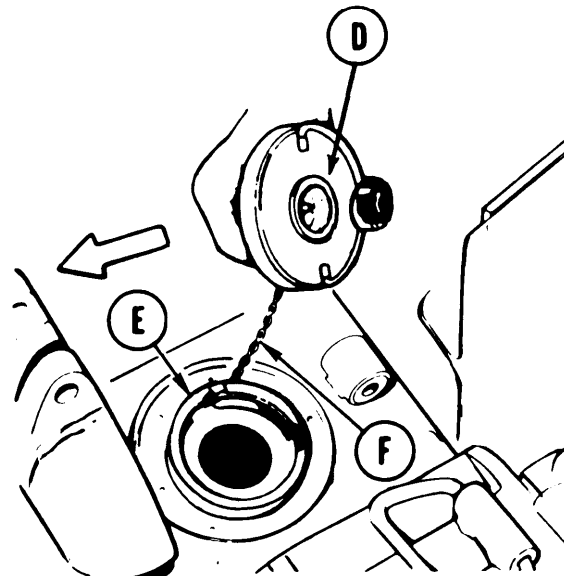
FUEL TANK (RIGHT) FILLER REPAIR (Sheet 2 of 6)

3. Remove lockpin (B) securing fuel filler cover (C).



4. Raise and pull up and out to remove fuel filler cover (C) to gain access to fuel tank filler.

5. Rotate filler cap (D) 1/4 turn left and remove from filler neck (E).



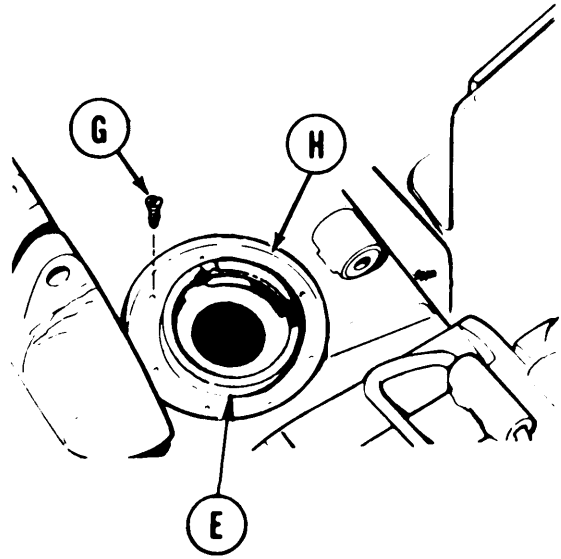
6. Disconnect filler cap retaining chain (F) from filler neck (E).

Go on to Sheet 3

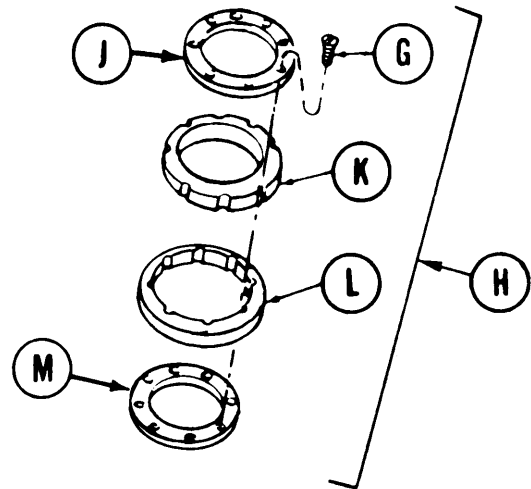
TA141420

FUEL TANK (RIGHT) FILLER REPAIR (Sheet 3 of 6)

7. Using screwdriver, remove eight screws (G) securing filler neck seal assembly (H) between filler neck (E) and hull. Throw screws away.
8. Remove filler neck seal washer (J), two gaskets (K) and (L) and neck washer (M) from between filler neck (E) and hull.



9. Throw away seal assembly (H) (items (J), (K), (L), and (M)).

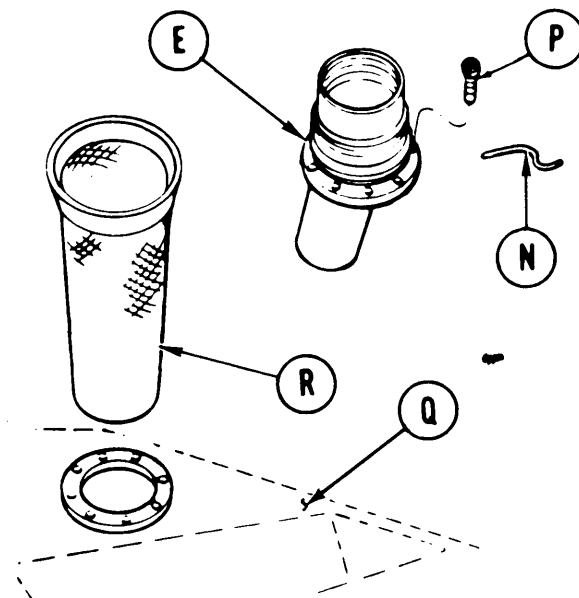


Go on to Sheet 4

TA141421

FUEL TANK (RIGHT) FILLER REPAIR (Sheet 4 of 6)

10. If required, use diagonal cutting pliers to remove lockwire (N) securing screws (P).
11. Using allen wrench, remove eight screws (P) securing filler neck (E) to fuel tank (Q).
12. Remove filler neck (E) from fuel tank (Q).
13. Remove strainer element (R) from fuel tank (Q).

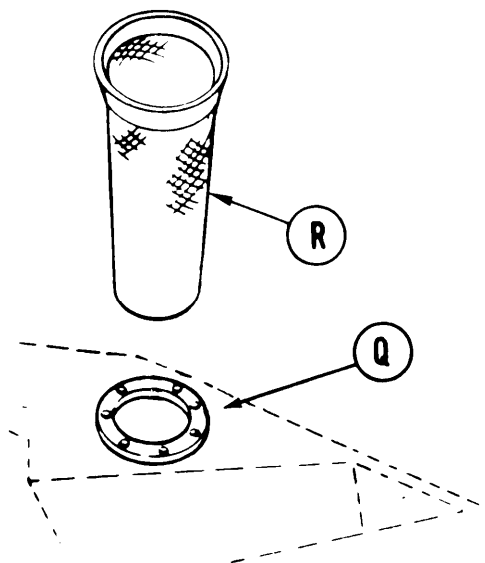


CLEANING:

1. Using dry cleaning solvent (Item 54, Appendix D), clean strainer (R).
2. Using putty knife, dry cleaning solvent, and lint-free cloth (Item 12, Appendix D), clean around filler hole area of fuel tank (Q).

INSPECTION:

1. Inspect strainer (R) for contamination or damage. Replace strainer (R) if unserviceable.



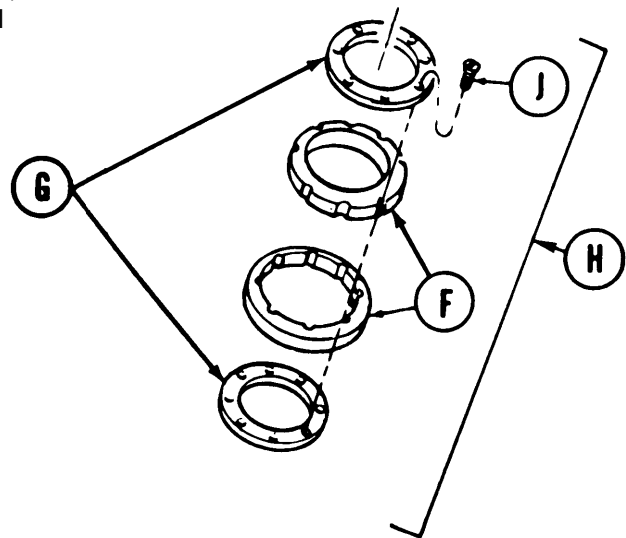
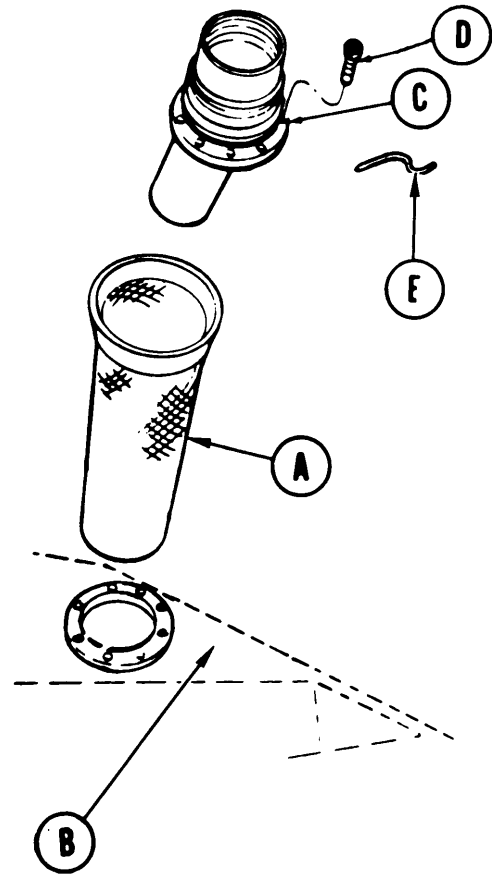
Go on to Sheet 5

TA141422

FUEL TANK (RIGHT) FILLER REPAIR (Sheet 5 of 6)

INSTALLATION:

1. Install strainer (A) in fuel tank (B).
2. Install filler neck (C) on fuel tank (B).
3. Using allen wrench, secure filler neck (C) to fuel tank (B) using eight screws (D).
4. If required, use slip joint pliers and install lockwire (Item 59, Appendix D) (E) in eight screws (D).
5. Using two new gaskets (F) and new washers (G), assemble seal assembly (H) and install eight new screws (J) finger tight.
6. Install seal assembly (H) on filler neck. While holding filler neck in position, use screwdriver, and tighten screws (J) until gaskets (F) and (G) are compressed to form tight seal between fill neck and hull.

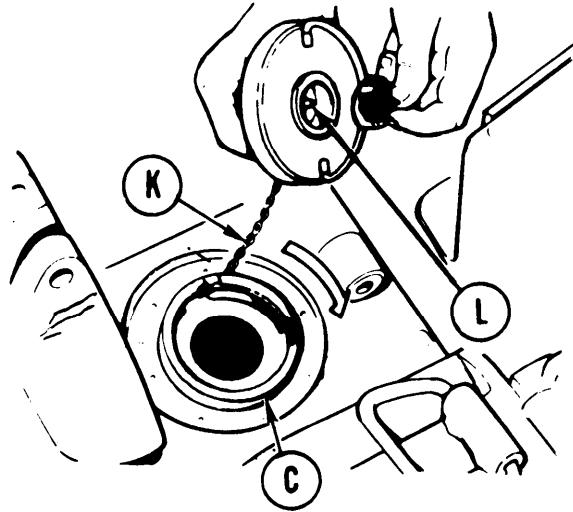


Go on to Sheet 6

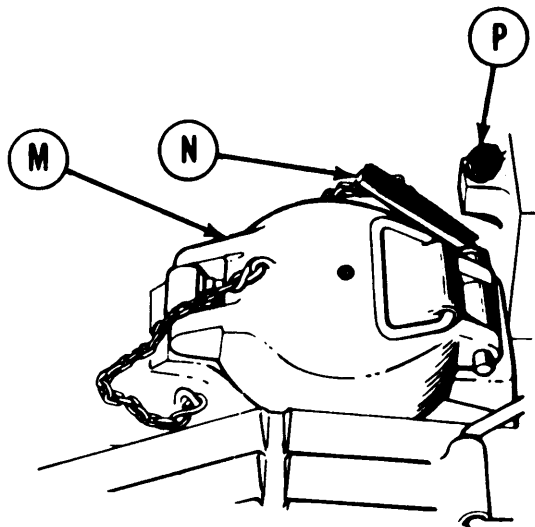
TA141423

FUEL TANK (RIGHT) FILLER REPAIR (Sheet 6 of 6)

7. Connect filler cap retaining chain (K) to filler neck (C).
8. Install filler cap (L) and rotate cap 1/4 turn right to secure to filler neck (C).



9. Close fuel filler cover (M) and secure with lockpin (N).
10. Using socket, tighten lock screw (P).



End of Task

TA141424

FUEL TANK (LEFT) EMERGENCY FILLER REPAIR (Sheet 1 of 2)

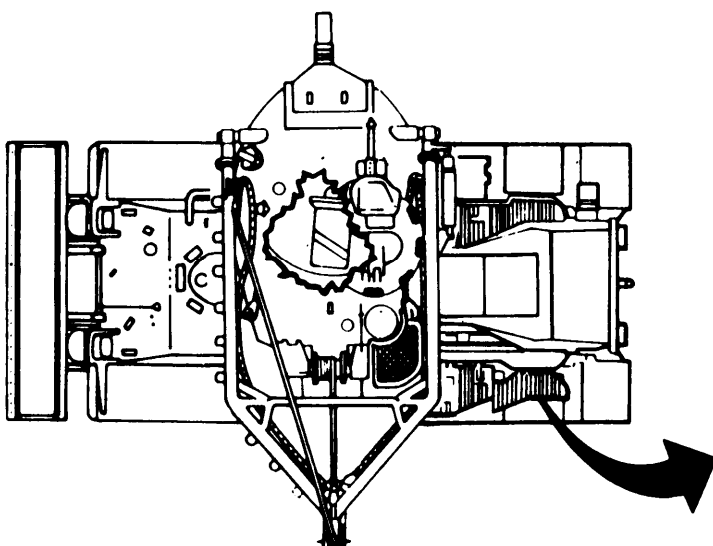
TOOLS: Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive
 10-1/2 in. socket extension
 Diagonal cutting pliers
 Slip joint pliers
 Putty knife
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N.m)

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Lint-free cloth (Item 12, Appendix D)
 Gasket (10884006)
 Lockwire (Item 60 Appendix D)

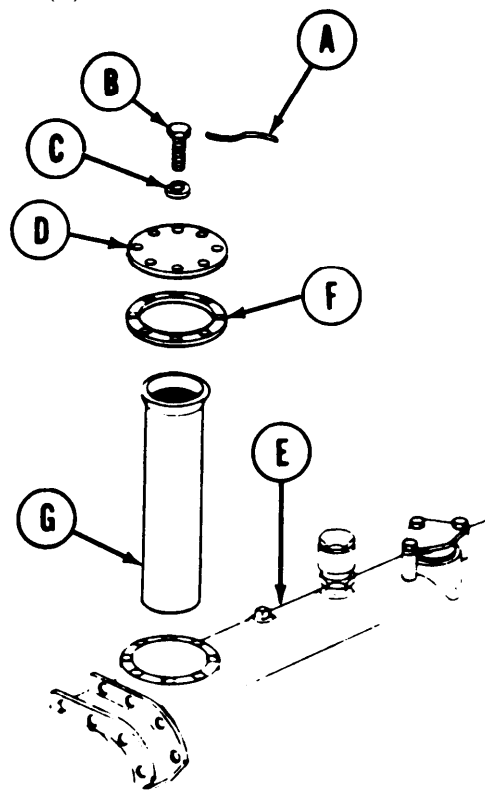
PRELIMINARY PROCEDURE: Open left top deck grille door assembly (page 16-21, steps 1 and 2)

REMOVAL:

- Using diagonal cutting pliers, remove lockwire (A) from screws(B).



- Using socket, remove eight screws (B) and washers (C) holding cover (D) to fuel tank (E).
- Remove cover (D) and gasket (F). Throw gasket away.
- Lift out strainer (G) from fuel tank (E).



Go on to Sheet 2

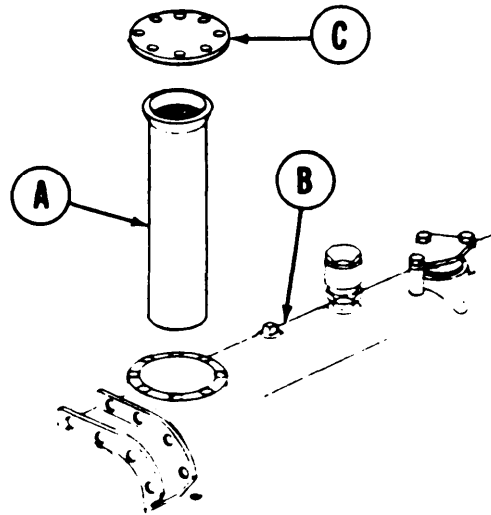
TA253200

Change 1 7-165

FUEL TANK (LEFT) EMERGENCY FILLER REPAIR (Sheet 2 of 2)

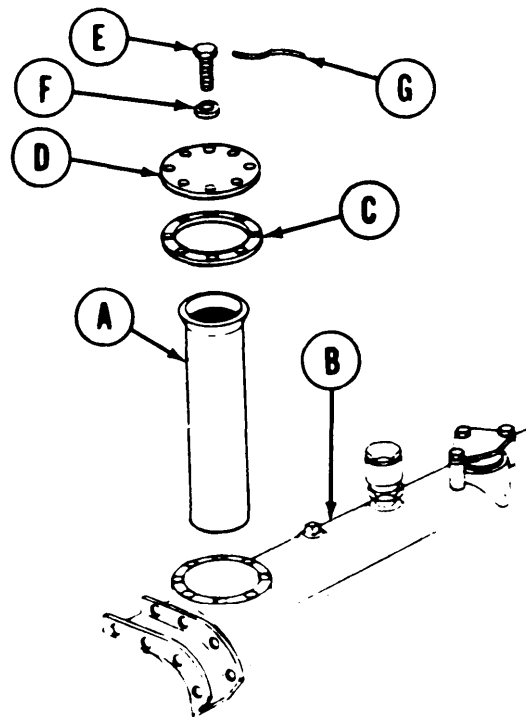
CLEANING AND INSPECTION:

1. Using dry cleaning solvent (Item 54, Appendix D), clean strainer (A).
2. Using putty knife, dry cleaning solvent (Item 54, Appendix D), and lint-free cloth (Item 12, Appendix D), clean excess gasket material from fuel tank (B) and cover (C).
3. Inspect strainer (A) for contamination or damaged element. Replace strainer (A) if unserviceable.



INSTALLATION:

1. Install strainer (A) in fuel tank (B).
2. Install new gasket (C) and cover (D), using eight screws (E) and washers (F).
3. Using socket and torque wrench, tighten eight screws (E) to 4-6 lb-ft (6-8 N-m).
4. Using slip joint pliers, install new lockwire (G) (Item 60, Appendix D) through eight screws (E).
5. Close left top deck grille doors (page 16-24, steps 8 and 9).



End of Task

TA253201

FUEL TANK (LEFT AND RIGHT) LEVEL GAGE TRANSMITTER REPLACEMENT
 (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-167
Installation	7-169

TOOLS: 7/16 in. combination box and open end wrench
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive
 Diagonal cutting pliers
 Flat-tip screwdriver
 Putty knife

SUPPLIES: Gasket (8378722)
 Lockwire (Item 59, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwasher (MS35338-44)
 Lockwasher (MS35338-45) (3 required)

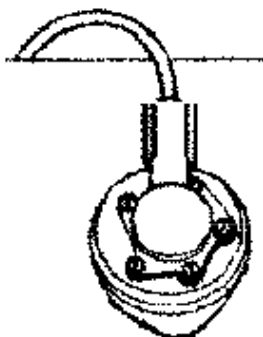
REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Open left or right top deck grille door (TM 9-2350-222-10)

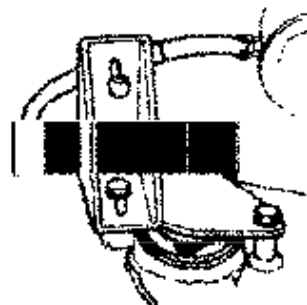
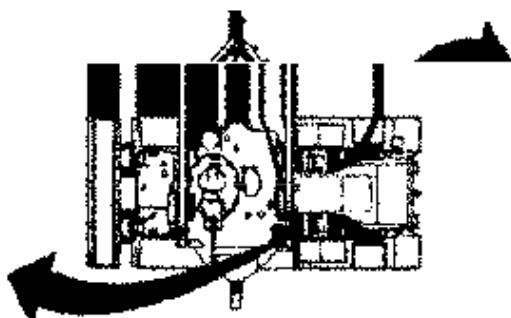
REMOVAL:

NOTE

This procedure applies to both the left and right fuel gage transmitted unless otherwise noted.



LEFT FUEL TANK TRANSMITTER



RIGHT FUEL TANK TRANSMITTER

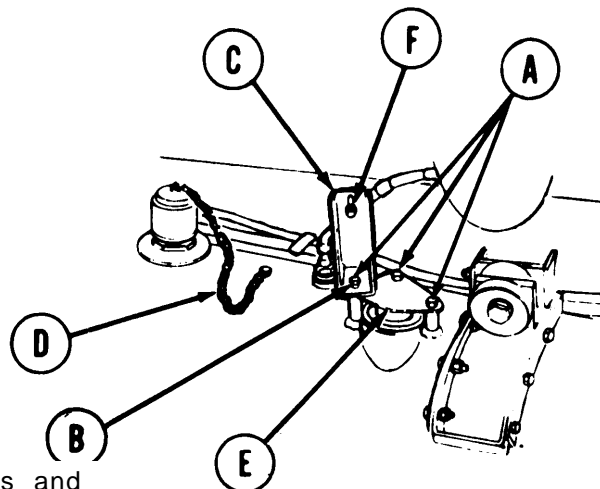
Go on to Sheet 2

TA141427

FUEL TANK (LEFT AND RIGHT) LEVEL GAGE TRANSMITTER REPLACEMENT
 (Sheet 2 of 4)

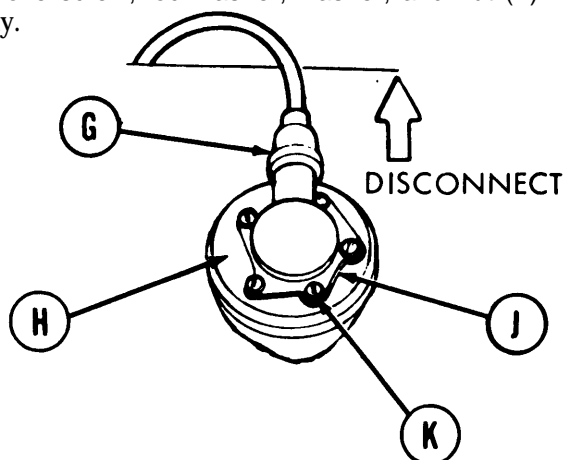
NOTE

Steps 1, 2, and 3 only apply to right fuel gage transmitter.



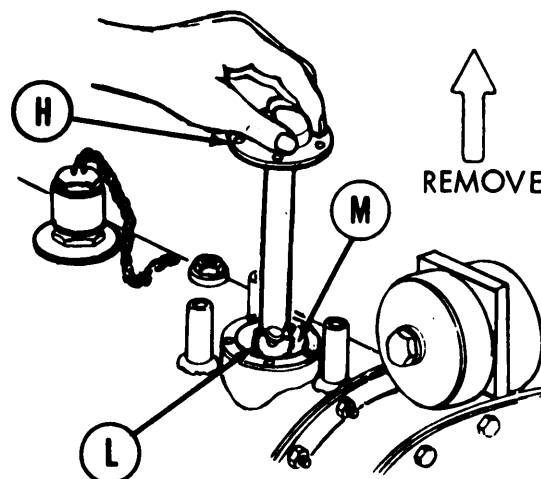
1. Using 1/2 inch socket, remove three screws and lockwashers (A) and one flat washer (B) securing bracket (C), safety chain (D), and cover (E) to fuel tank. Throw lockwashers away.
2. Using wrench to hold nut, use 7/16 inch socket to remove screw, lockwasher, washer, and nut (F) securing clamp to bracket (C). Throw lockwasher away.

3. Remove bracket (C) and cover (E).
4. Disconnect electrical lead (G) from transmitter (H).



5. Using pliers, cut and remove lockwire (J).
6. Using screwdriver, remove five screws and washers (K) securing transmitter (H) to fuel tank.

7. Carefully lift transmitter (H) out of fuel tank until float arm gears (L) are visible in fuel tank opening (M).
8. Reach in with finger and pull upon visible tip of float arm. Pull transmitter (H) out of fuel tank opening (M) until float appears.

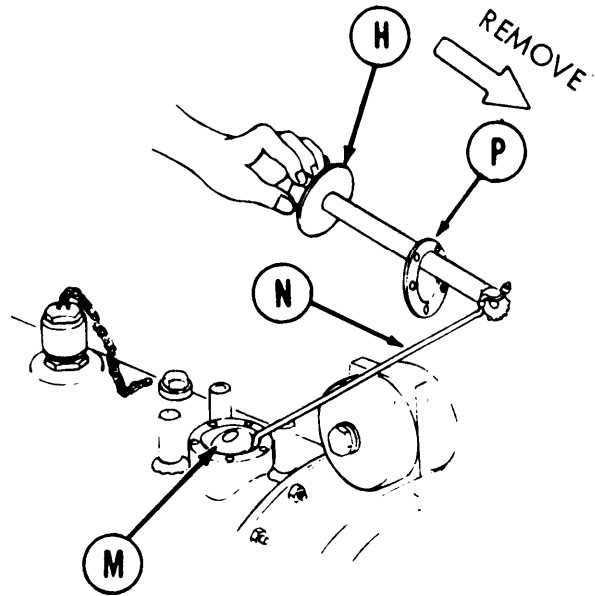


Go on to Sheet 3.

TA141 428

FUEL TANK (LEFT AND RIGHT) LEVEL GAGE TRANSMITTER REPLACEMENT
Sheet 3 of 4)

9. Tilt transmitter (H). Withdraw float arm (N) from fuel tank opening (M).
10. Using putty knife, remove gasket (P) from transmitter (H). Throw gasket away.
11. Cover opening (M) with clean rags (Item 65, Appendix D) to keep dirt out of fuel tank.

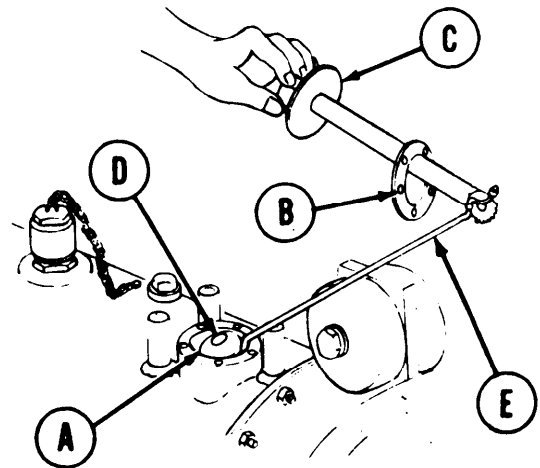


INSTALLATION:

NOTE

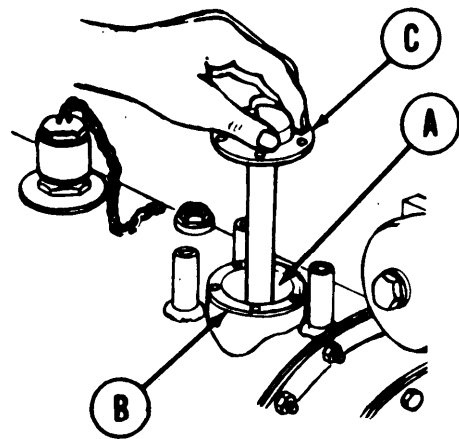
This procedure applies to both left and right fuel transmitters unless otherwise noted.

1. Remove rags covering fuel tank opening (A).
2. Slip new gasket (B) onto transmitter (C).
3. Carefully work float (D) and float arm (E) into fuel tank opening (A).
4. Place gasket (B) in position on fuel tank opening (A).
5. Carefully lower transmitter (C) into position.



NOTE

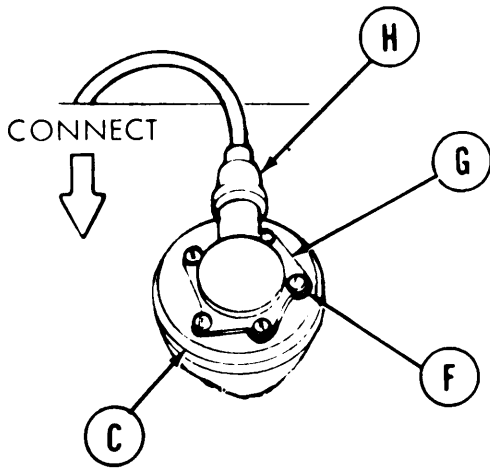
Transmitter mounting holes are patterned so that transmitter can only be installed with electrical connector facing hull wall.



GO on to Sheet 4

TA141429

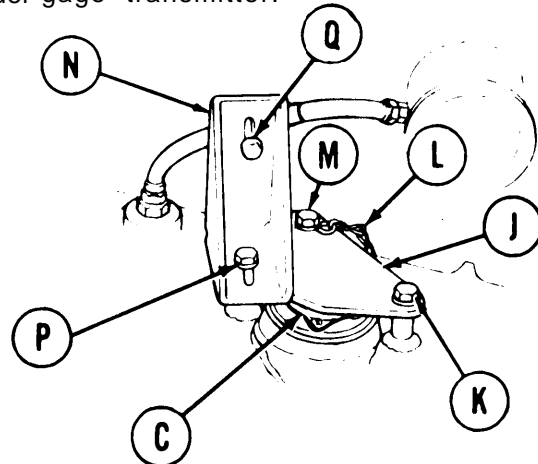
FUEL TANK (LEFT AND RIGHT) LEVEL GAGE TRANSMITTER REPLACEMENT
 (Sheet 4 of 4)



6. Using screwdriver, install five screws and washers (F) securing transmitter (C) to fuel tank.
7. Secure screws (F) with new lockwire (G) (Item 59, Appendix D).
8. Connect electrical connector (H) to transmitter (C).
9. Check fuel gage for proper operation (TM 9-2350-222-10).

NOTE

Steps 10 thru 16 apply only to right fuel gage transmitter.



10. Place cover (J) in position over transmitter (C) and install screw and lockwasher (K).
11. Position safety chain (L) on cover (J) and install flat washer, new lockwasher, and screw (M).
12. Position bracket (N) on cover (J) and install screw and washer (P).
13. Using 1/2 inch socket, tighten three screws and new lockwashers (K), (M), and (P) securing cover (J) to fuel tank.
14. Install screw, new lockwasher, washer, and nut (Q) securing clamp to bracket (N).
15. Using wrench to hold nut, use 7/16 inch socket to tighten screw (Q).
16. Check fuel gage for proper operation (TM 9-2350-222-10).
17. Close top deck grille doors (TM 9-2350-222-10).

End of Task

TA141430

FUEL TANK (LEFT AND RIGHT) CONDENSATE RELIEF VALVE REPLACEMENT
 (Sheet 1 of 4)

PROCEDURE INDEX

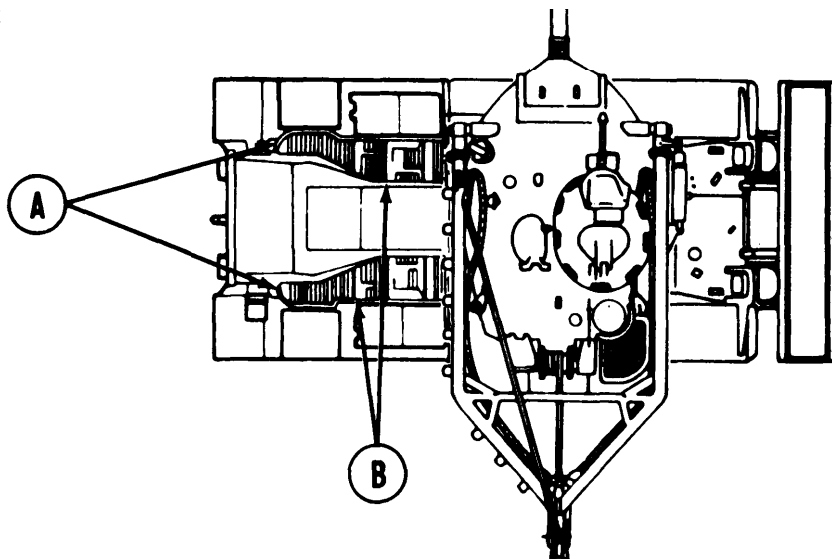
PROCEDURE	PAGE
Removal	7-171
Cleaning and Inspection	7-173
Installation	7-173

TOOLS: 1-3/4 in. open end wrench
 6 in. ruler
 Retaining ring pliers
 Slip joint pliers
 Ratchet with 1/2 in. drive
 15/16 in. socket with 1/2 in. drive

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Preformed packing (MS28775-214)
 Rags (Item 65, Appendix D)
 Grease (Item 36, Appendix D)

REMOVAL:

- Using socket, loosen bolts (A) securing top assembly doors (B). Open doors (B) to gain access to left and right



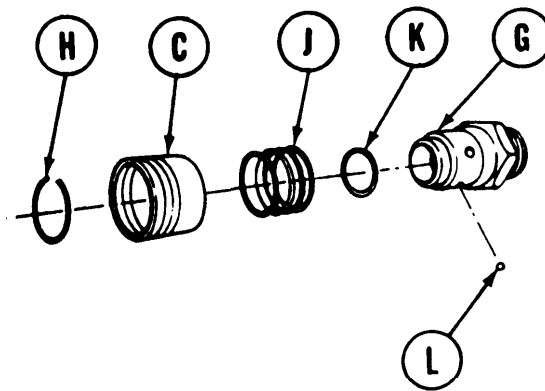
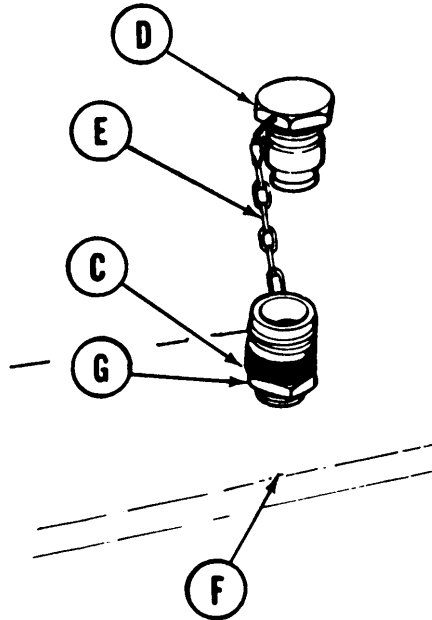
Go on to Sheet 2

TA253263

Change 1 7-171

FUEL TANK (LEFT AND RIGHT) CONDENSATE RELIEF VALVE REPLACEMENT
(Sheet 2 of 4)

2. Press down on lockring (C) and remove plug (D).
3. Using slip joint pliers, remove chain (E) from plug (D).
4. Using wrench, remove sleeve (G) from fuel tank (F). Cover fuel tank opening (F) with clean rags (Item 66, Appendix D).
5. Press and hold down lockring (C) Using retaining ring pliers, remove retaining ring (H).
6. Remove lockring (C), spring (J), preformed packing (K), and three ball bearings (L) from sleeve (G). Throw preformed packing (K) away.



Go on to Sheet 3

TA253264

FUEL TANK (LEFT AND RIGHT) CONDENSATE RELIEF VALVE REPLACEMENT
Sheet 3 of 4)

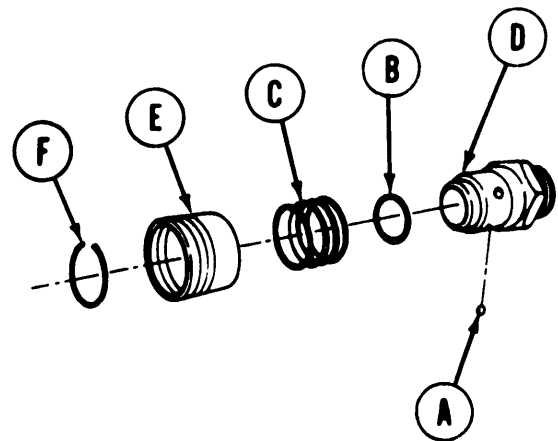
CLEANING AND INSPECTION:

Using dry cleaning solvent (Item 54, Appendix D), clean all components.

2. Inspect components for cracks or breaks. Replace unserviceable components.
3. Using 6 inch ruler, check that free length of spring (C) is 1 inch long or longer.

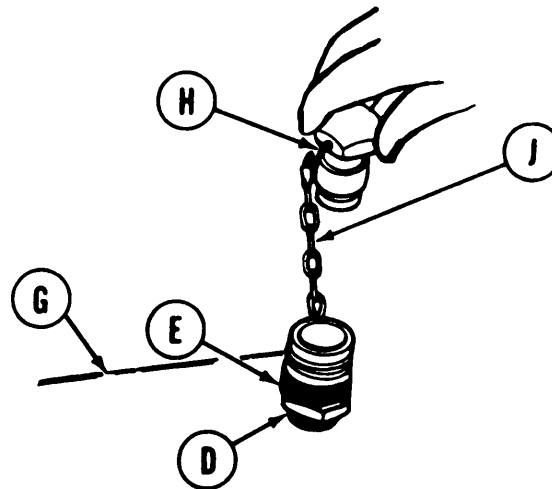
INSTALLATION:

1. Position three ball bearings (A), new preformed packing (B), and spring (c) on pipe adapter (D).
2. Press lockring (E) down on sleeve (D).
Using snap ring pliers, install retaining ring (F).
3. Remove rags from fuel tank.
- 3.1. Apply a coat of grease (Item 36, Appendix D) to threads of sleeve (D).
4. Using wrench, install sleeve (D) in fuel tank (G).



Press down on lockring (E) and install plug (H).

6. Using slip joint pliers, install chain (J) on plug (H).



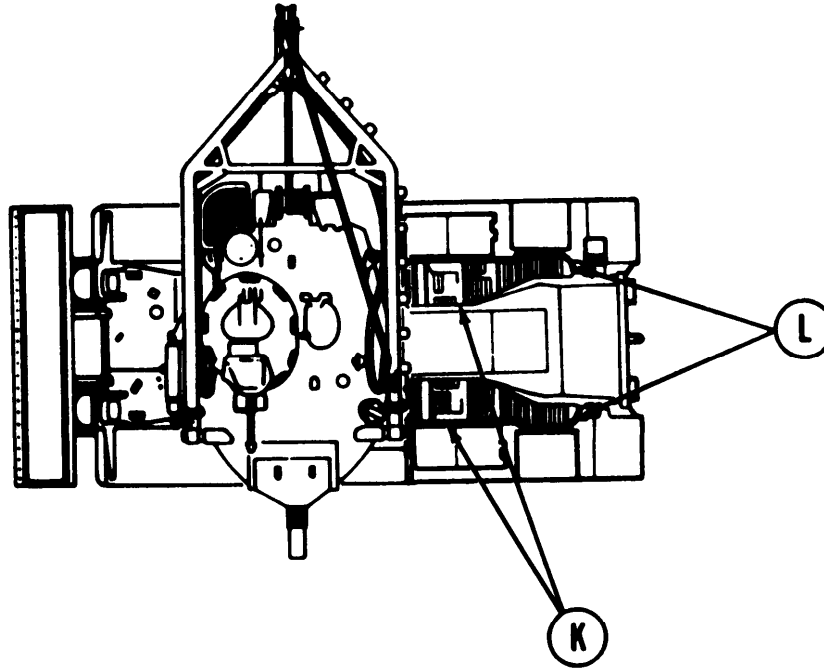
Go on to Sheet 4

TA253265

Change 1 7-173

**FUEL TANK (LEFT AND RIGHT) CONDENSATE RELIEF VALVE REPLACEMENT
(Shoot 4 of 4)**

- 7. Close top assembly doors (K). Using socket, thghten bolts (L) to secure (K)



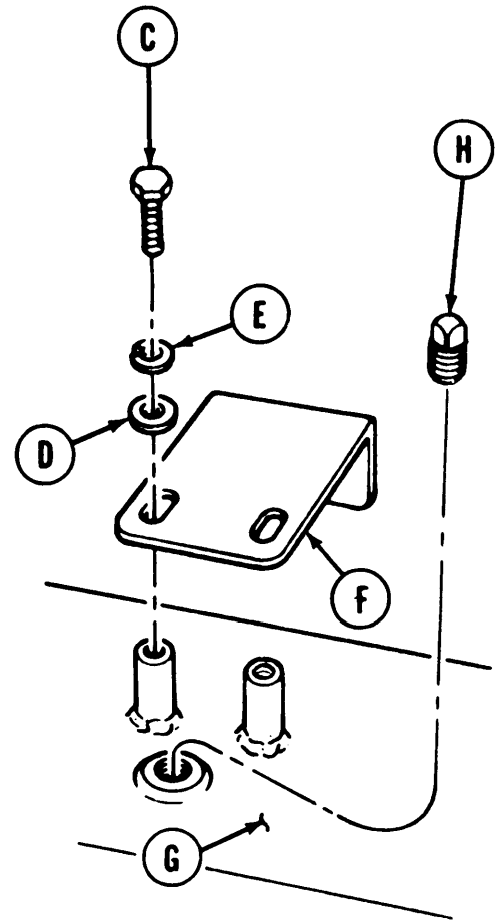
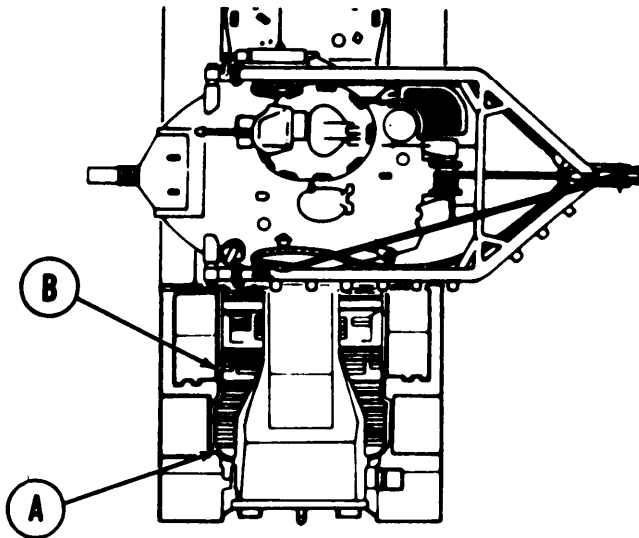
End of Task

TA141435

FUEL TANK PLUG AND BRACKET REPLACEMENT (Sheet 1 of 3)

TOOLS: Ratchet with 1/2 in. drive
 1/2in. socket with 1/2in. drive
 1/2 in. combination box and open end wrench
 3/4in. socket with 1/2in. drive
 9/16 in. combination box and open end wrench
 Stud remover

SUPPLIES: Lockwasher (MS35338-45) (2 required)
 Grease (Item 36, Appendix D)



REMOVAL:

1. Using 3/4 inch socket, loosen bolt (A) holding doors (B). Open three doors (B) to gain access to left fuel tank.
2. Using 1/2 inch socket, remove two screws (C), washers (D), and lockwashers (E) holding bracket (F) to fuel tank (G). Throw lockwashers away.

NOTE

If flats of plug (H) are badly rounded or deformed, throw plug away.

3. Using 9/16 inch wrench or stud remover, remove plug (H) from fuel tank (G).

Go on to Sheet 2

TA253267

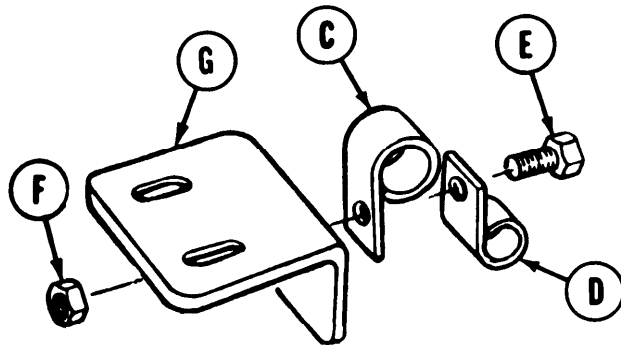
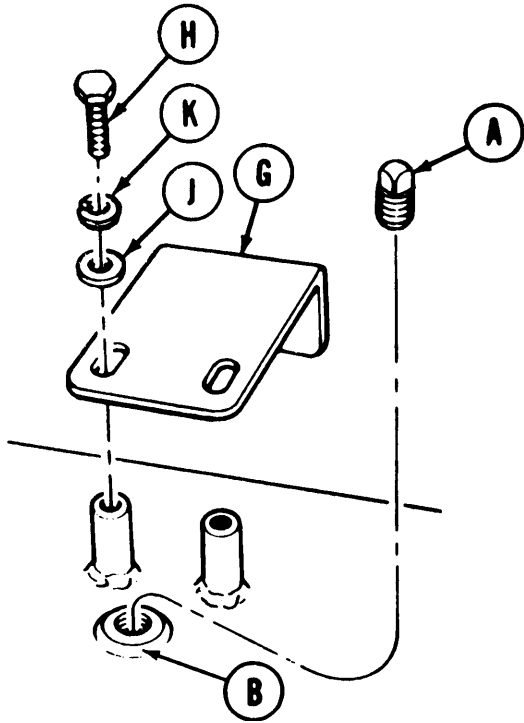
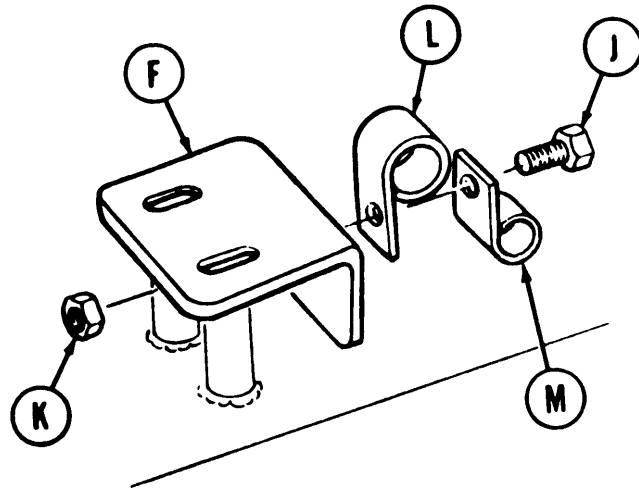
Change 1 7-175

FUEL TANK PLUG AND BRACKET REPLACEMENT (Shoot 2 of 3)

4. Using 1/2 inch socket and 1/2 inch wrench, remove screw (J) and nut (K) holding clamps (L) and (M).
5. Remove clamps (L) and (M).
6. Remove bracket (F) from fuel tank.

INSTALLATION:

1. Apply a coat of grease (Item 36, Appendix D) to threads of plug (A).
- 1.1. Using 9/16 inch wrench, install plug (A) in fuel tank (B).
2. Install hose clamp (C) and (D) to bracket (G), using screw (E) and nut (F).
3. Using 1/2 inch socket and 1/2 inch wrench, tighten screw (E) and nut (F).
4. Install bracket (G) using two screws (H), washers (J), and new lockwashers (K).
5. Using 1/2 inch socket, tighten screws (H).

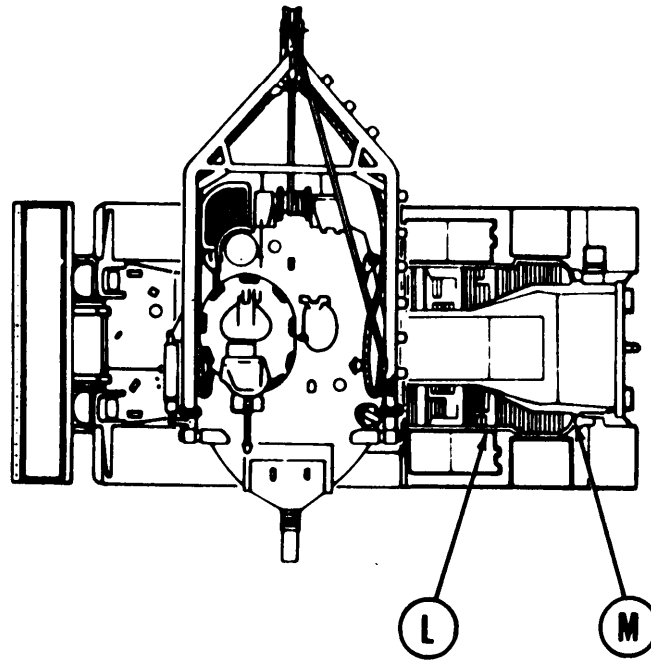


Go on to Sheet 3

TA253268

FUEL TANK PLUG AND BRACKET REPLACEMENT (Sheet 3 of 3)

6. Close three top door assemblies (L).
7. Using 3/4 inch socket, tighten bolt (M), securing top door assemblies (L).



End of Task

TA141437

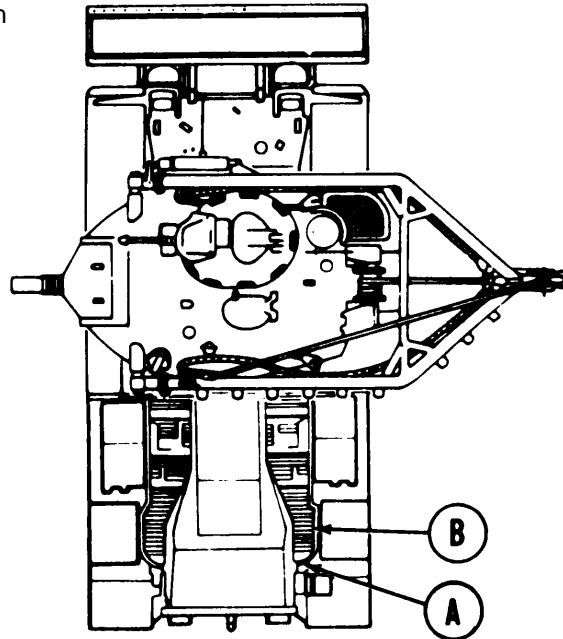
FUEL TANK TO AIR CLEANER VENT REPLACEMENT (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-178
Cleaning and Inspection	7-181
Installation	7-181

TOOLS: Ratchet with 1/2 in. drive
7/16 in. socket with 1/2 in. drive
7/16 in. combination box and open end wrench
9/16 in. combination box and open end wrench
15/ 16 in. combination box and open end wrench
1-1/ 16 in. open end wrench
7/8 in. combination box and open end wrench

SUPPLIES: Lockwasher (MS35336-44)
Grease (Item 36, Appendix D)



REMOVAL:

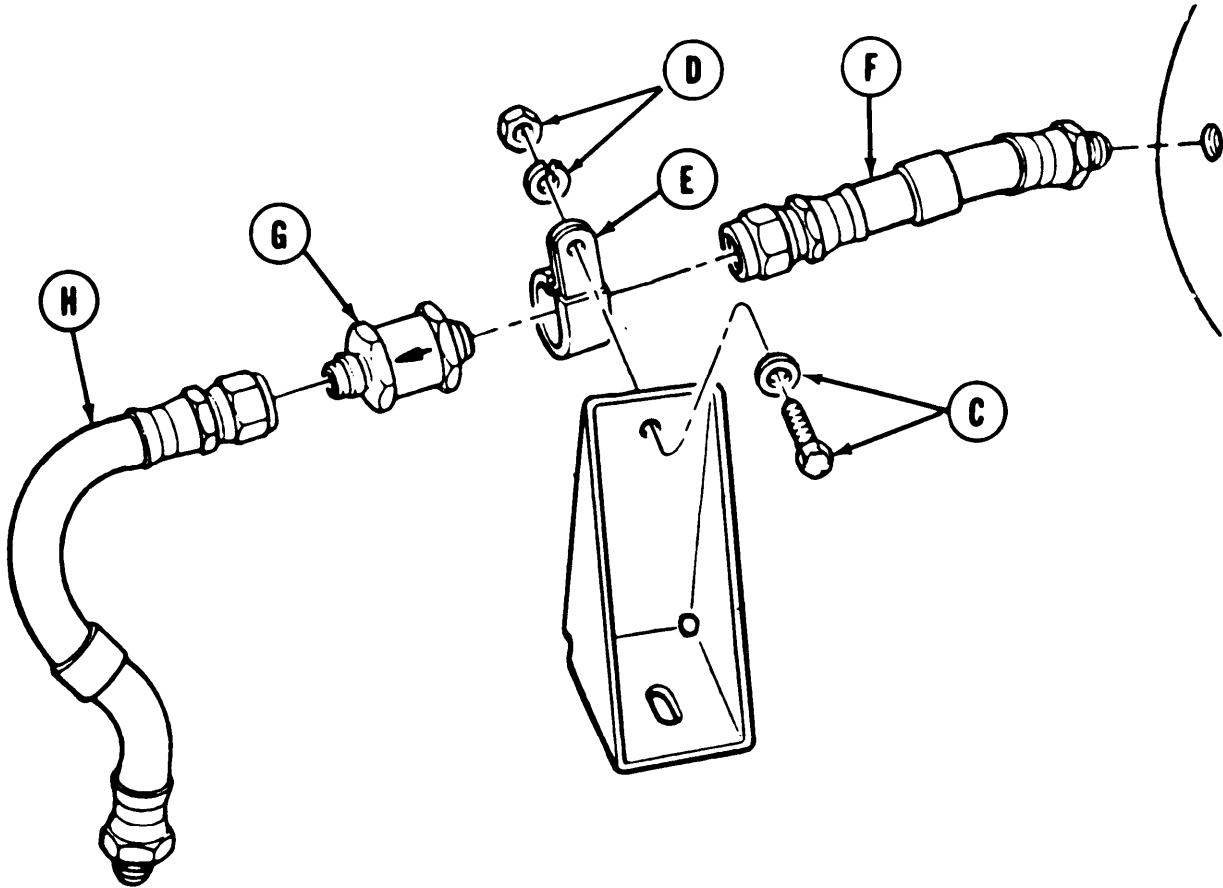
1. Using 15/16 inch wrench, loosen bolt (A).
2. Open top deck grille (B) (page 16-21, step 1 and 2) to expose top of right fuel tank.

Go on to Sheet 2

TA253202

FUEL TANK TO AIR CLEANER VENT REPLACEMENT (Sheet 2 of 6)

3. Using socket on screw (C) and 7/16 inch wrench on nut (D), remove screw and washer (C) and nut and lockwasher (D) from clamp (E). Throw lockwasher away,



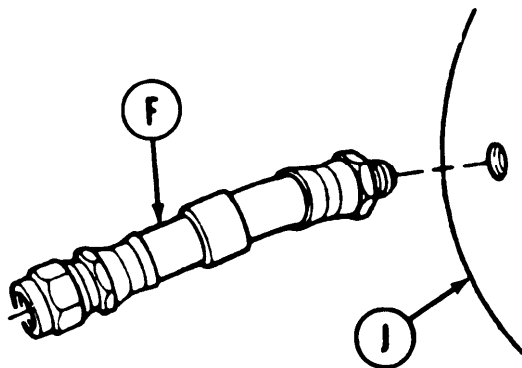
4. Using 9/16 inch wrench on hose (F) and 1-1/16 inch wrench on vent valve (G), remove hose (F) from vent valve (G).
5. Using 9/16 inch wrench on hose (H) and 1-1/16 inch wrench on vent valve (G), remove hose (H) from vent valve (G).
6. Remove clamp (E) from vent valve (G).

Go on to Sheet 3

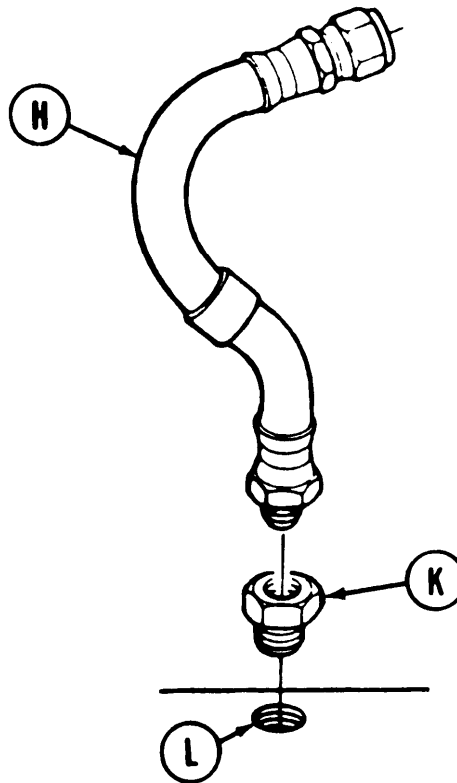
TA141439

FUEL TANK TO AIR CLEANER VENT REPLACEMENT (Sheet 3 of 6)

- Using 9/16 inch wrench, remove hose (F) from air cleaner outlet (J).



- Using 9/16 inch wrench on hose (H) and 7/8 inch wrench on bushing (K), remove hose (H) from bushing (K).



- Using 7/8 inch wrench, remove bushing (K) from fuel tank (L).

Go on to Sheet 4

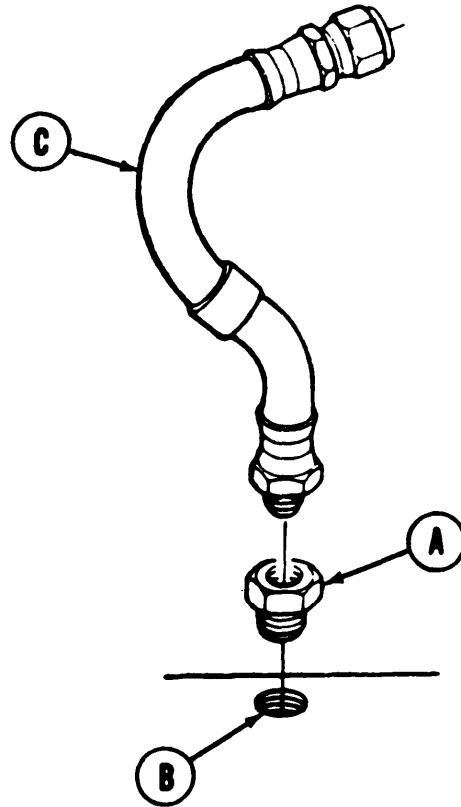
TA141440

FUEL TANK TO AIR CLEANER VENT REPLACEMENT (Sheet 4 of 6)**INSPECTION:**

Inspect hose assemblies for deterioration, connectors **and** fittings for cracks, and sealed surface for **nicks**. Replace unserviceable parts as required.

INSTALLATION:

1. Apply a coat of grease (Item 36, Appendix D) to threads of bushing (A).
- 1.1. Using 7/8 inch wrench, install bushing (A) into fuel tank (B).
2. Using 7/8 inch wrench on bushing (A) and 9/16 inch wrench on hose (C), install hose (C) to bushing (A).



Go on to Sheet 5

TA253270

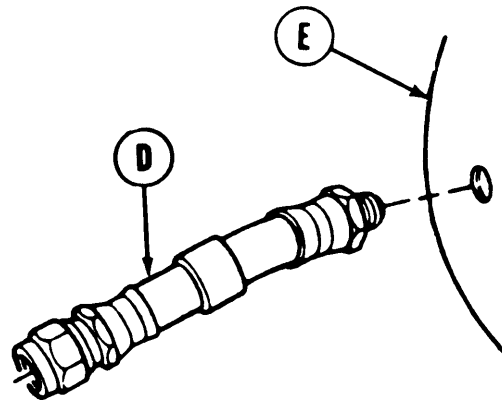
Change 1 7-181

FUEL TANK TO AIR CLEANER VENT REPLACEMENT (Sheet 5 of 6)

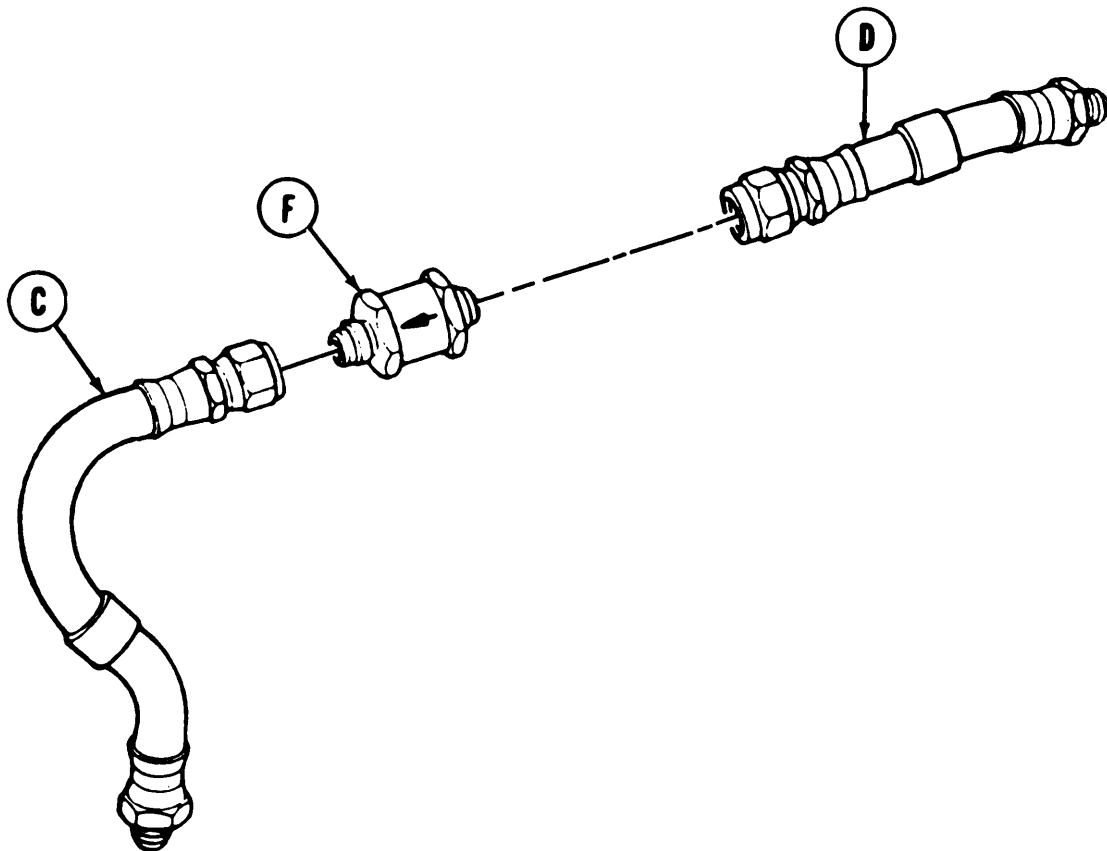
- Using 9/16 inch wrench, install hose (D) to air cleaner outlet (E).

NOTE

Make sure arrow on vent valve (F) is pointed toward fuel tank hose (c).



- Using 1-1/16 inch wrench on vent valve (F) and 9/16 inch wrench on hose (D), install vent valve (F) to hose (D).
- Using 1-1/16 inch wrench on vent valve (F) and 9/16 inch wrench on hose (C), install hose (C) to vent valve (F).

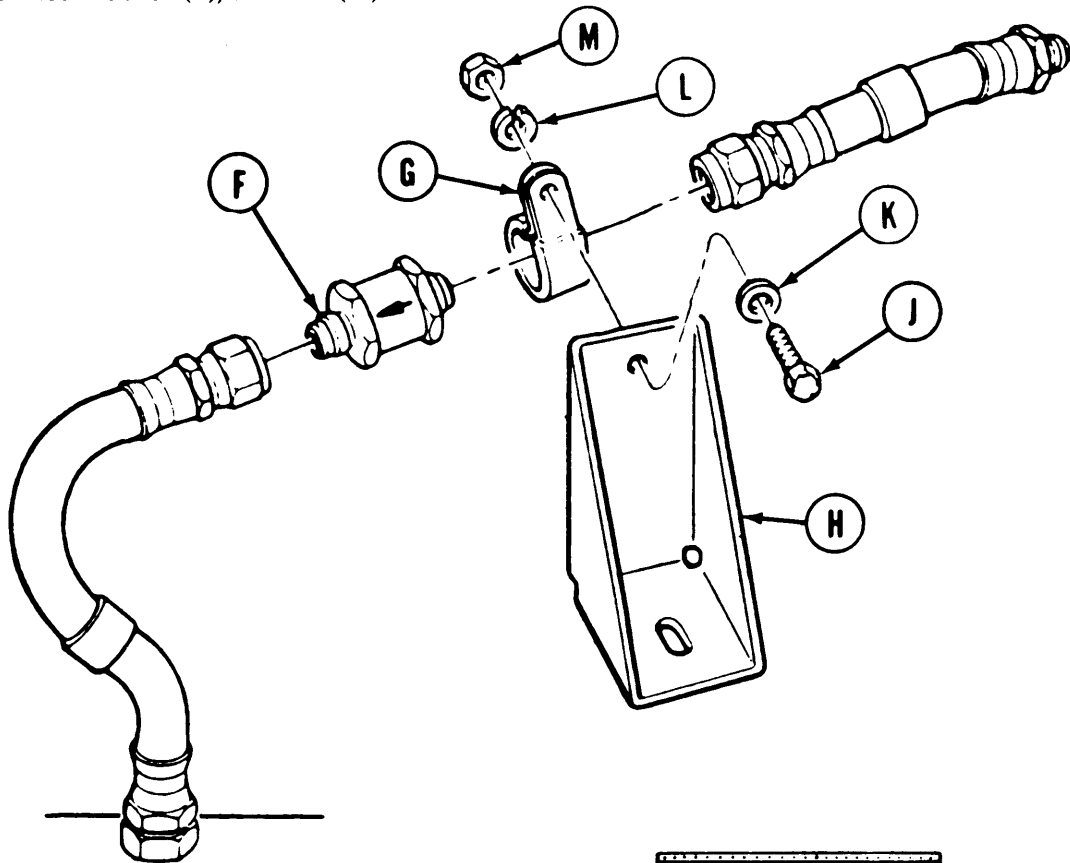


Go on to Sheet 6

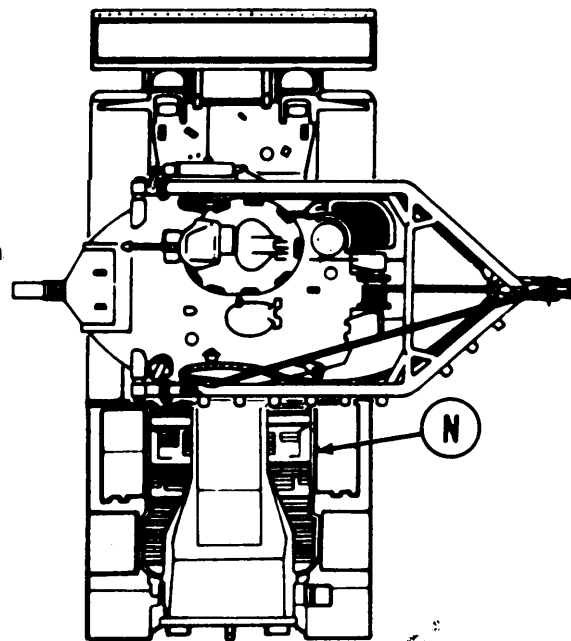
TA141570

FUEL TANK TO AIR CLEANER VENT REPLACEMENT (Sheet 6 of 6)

6. Using socket, install hose clamp (G) to vent valve (F) to adapter (H) with screw (J), washer (K), new lockwasher (L), and nut (M).



7. Using socket on screw (J) and 7/16 inch wrench on nut (M), tighten nut (M) and screw (J).
8. Close top door assemblies (N) (TM 9-2350-222-10).



End of Task

TA141571

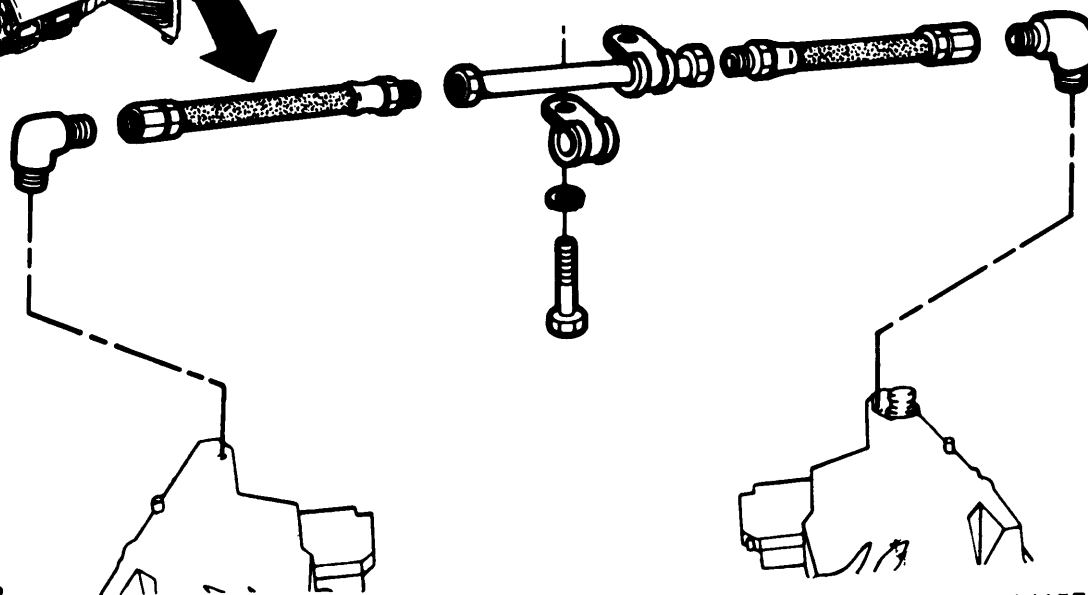
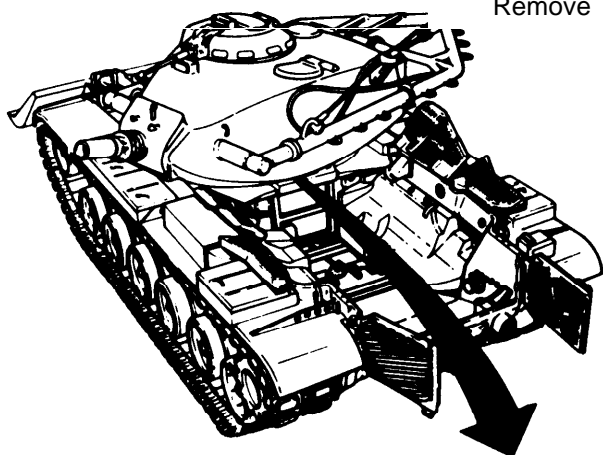
FUEL TANK BREATHER LINE REPLACEMENT (Sheet 1 of 6)
 PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-185
Inspection	7-186
Installation	7-187

TOOLS: Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive
 1-1/2 in. open end wrench (2 required)
 Pipe wrench

SUPPLIES: Lockwasher (MS353338-44) (2 required)

PRELIMINARY PROCEDURES: Remove powerplant (page 6-1)
 Remove air cleaner intake hose (page 7-83)



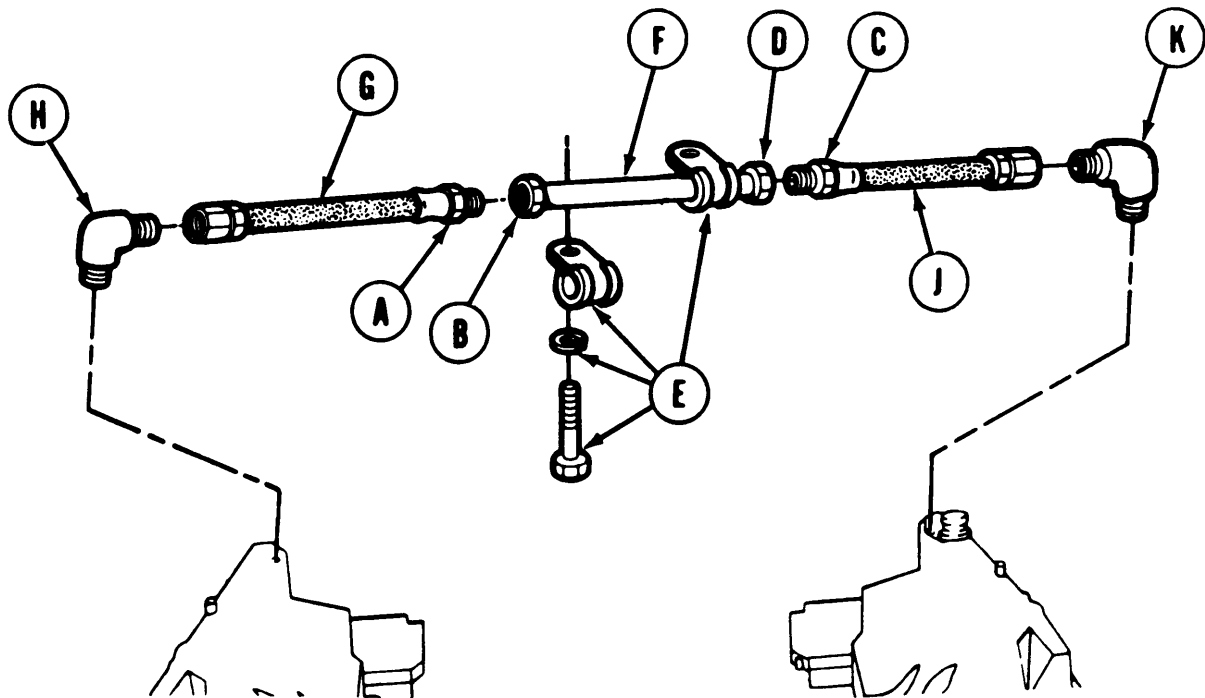
Go on to Sheet 2

TA141572

FUEL TANK BREATHER LINE REPLACEMENT (Sheet 2 of 5)

REMOVAL:

1. Using two wrenches, disconnect connector (A) from (B) and connector (C) from (D).

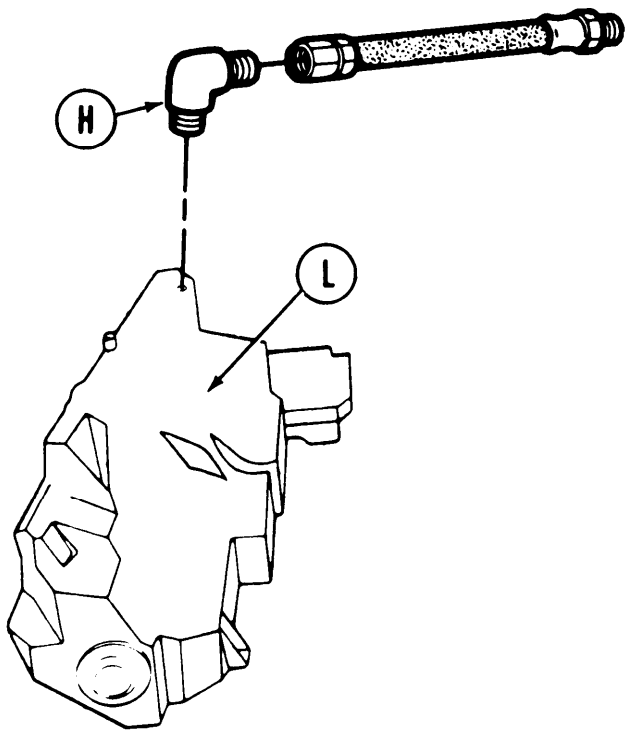


2. Using socket, remove two screws, lockwashers, and loop clamps (E) and remove metal tube (F). Throw lockwashers away.
3. Using wrench, disconnect hose (G) from elbow (H) and hose (J) from elbow (K).

Go on to Sheet 3

TA141573

FUEL TANK BREATHER LINE REPLACEMENT (Sheet 3 of 5)



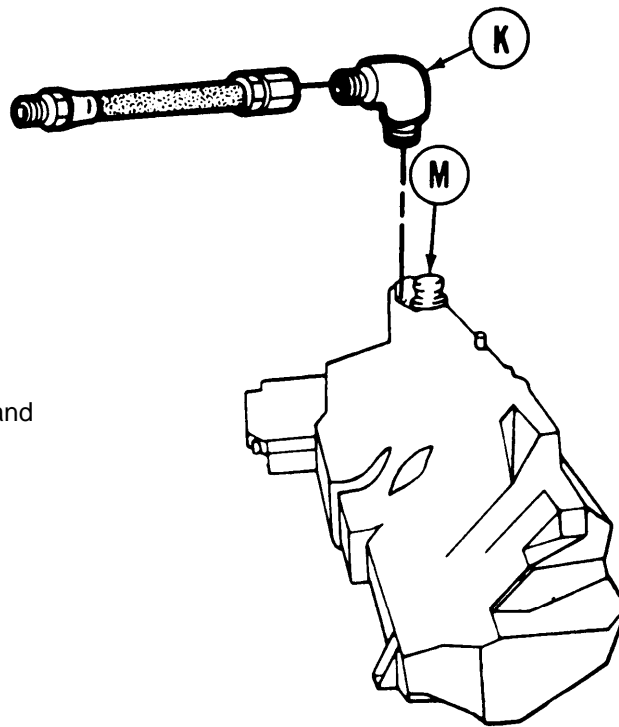
NOTE

If may be necessary to use pipe wrench.

4. Using wrench, remove elbow (H) from left fuel tank (L) and elbow (K) from right fuel tank (M).

INSPECTION:

1. Check all hoses for cracks and holes.
2. Check all hose connections for tightness and stripped threads.
3. Replace parts as needed.



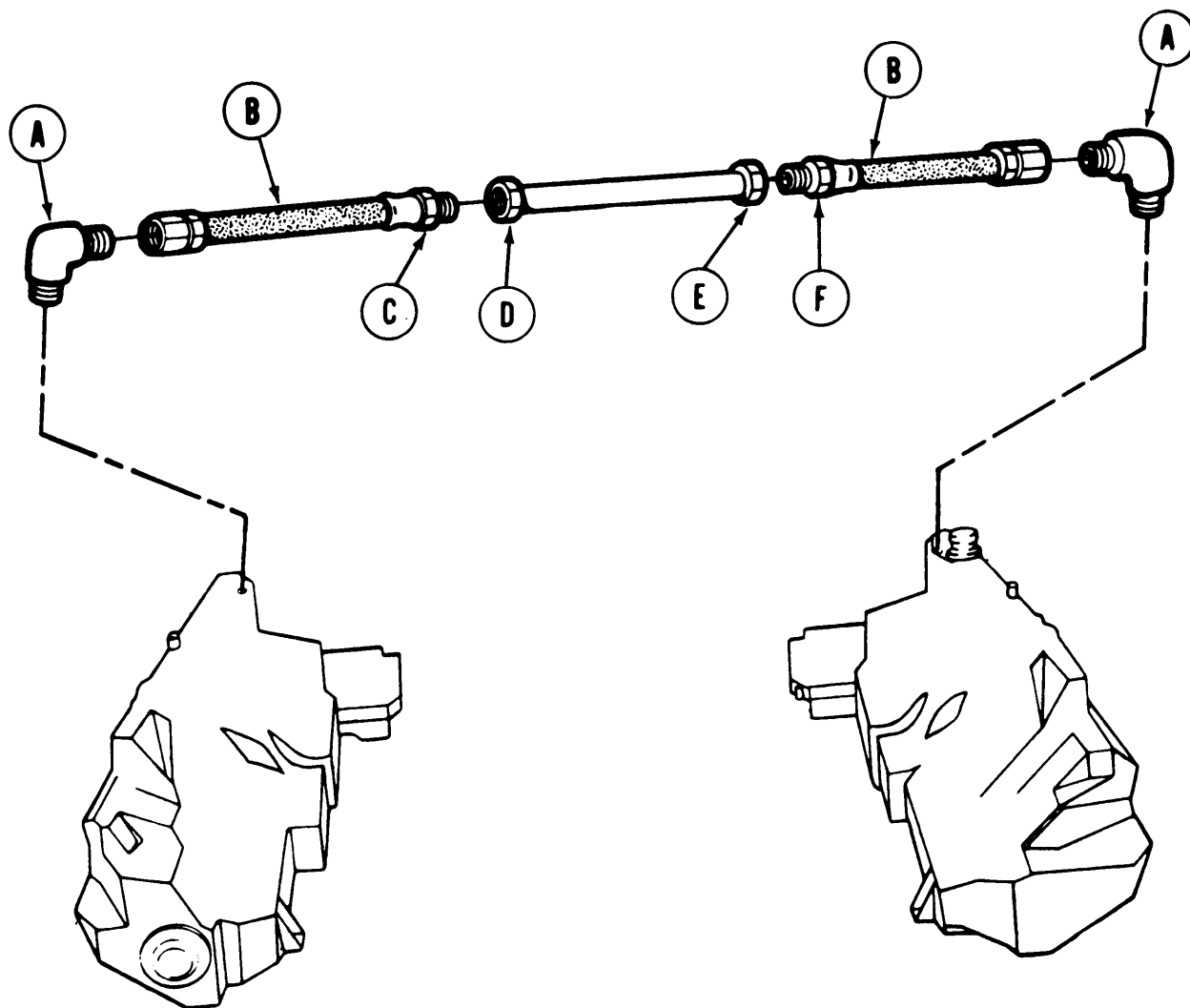
Go on to Sheet 4

TA141574

FUEL TANK BREATHER LINE REPLACEMENT (Sheet 4 of 5)

INSTALLATION:

1. Using wrench, install elbow (A) on left and right fuel tanks.
2. Using wrench, install rubber breather hose (B) on each elbow.



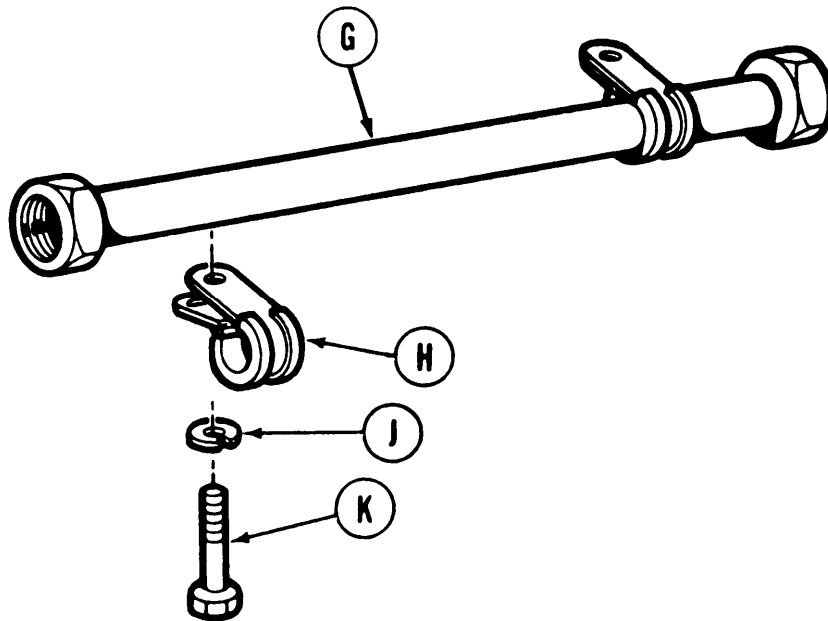
3. Using two wrenches, connect hose connector (C) to connector (D) and connector (E) to connector (F).

Go on to Sheet 5

TA141575

FUEL TANK BREATHER LINE REPLACEMENT (Sheet 5 of 5)

4. Install two loop clamps on metal breather tube (G).



5. Using socket, install two loop clamps (H), new lockwashers (J), and screws (K).
6. Check all hose connections for tightness.
7. Tighten if necessary.
8. Install air cleaner intake hoses (page 7-85).
9. Install 2A powerplant (page 5-14) or 2D powerplant (5-37).

End of Task

TA148973

FUEL TANK (LEFT AND RIGHT) DRAIN PLUG REPLACEMENT (Sheet 1 of 1)

TOOLS: 10 in. extension with 1/2 in. drive
 Hinged handle with 1/2 in. drive
 3/4 in. combination box and open end wrench

SUPPLIES: Grease (Item 36, Appendix D)
 Lockwasher (MS35338-67) (4 required)

PRELIMINARY PROCEDURE: Drain fuel tanks (page 7-152)

REMOVAL:

NOTE

Fuel drain plug is removed to drain fuel tanks (preliminary procedures). Procedures are the same for left and right fuel tanks.

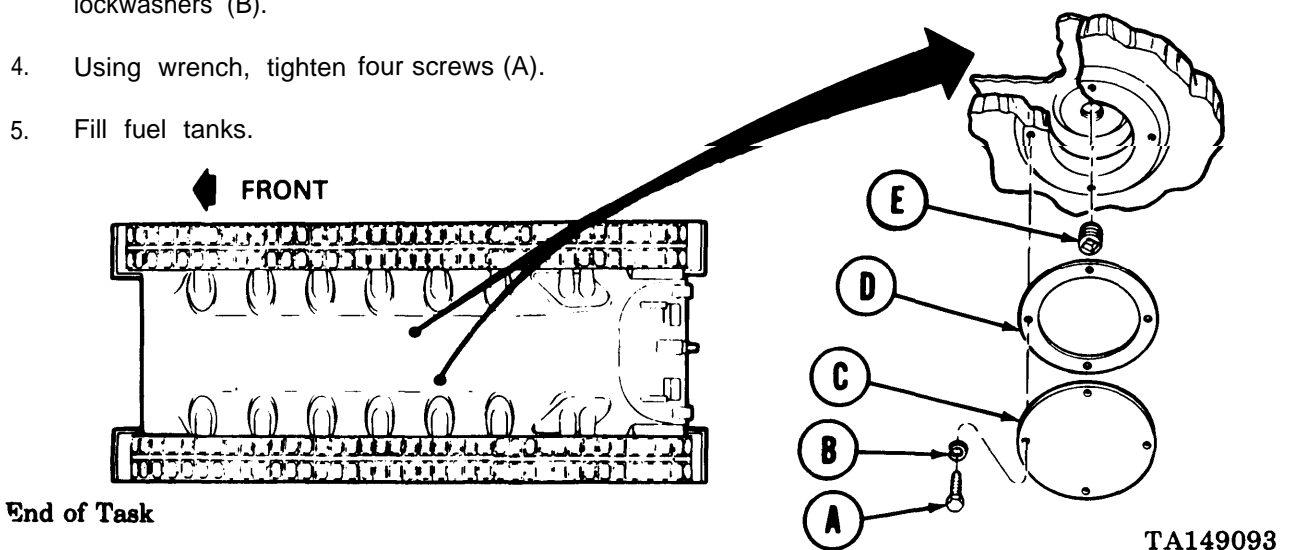
1. Using wrench, remove four screws (A) and lockwashers (B). Hold access cover to keep from falling. Throw lockwashers away.
2. Remove access cover (C) and gasket (D).
3. Using extension and handle, remove drain plug (E).

INSPECTION:

Inspect fuel drain plug for stripped threads or damaged flats. Replace unserviceable plug.

INSTALLATION:

1. Coat fuel drain plug threads with grease (Item 36, Appendix D).
2. Using extension and hinge handle, install fuel drain plug (E).
3. Install fuel drain access cover (C) and gasket (D). Secure with four screws (A) and new lockwashers (B).
4. Using wrench, tighten four screws (A).
5. Fill fuel tanks.



FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 1 of 7)

PROCEDURE INDEX

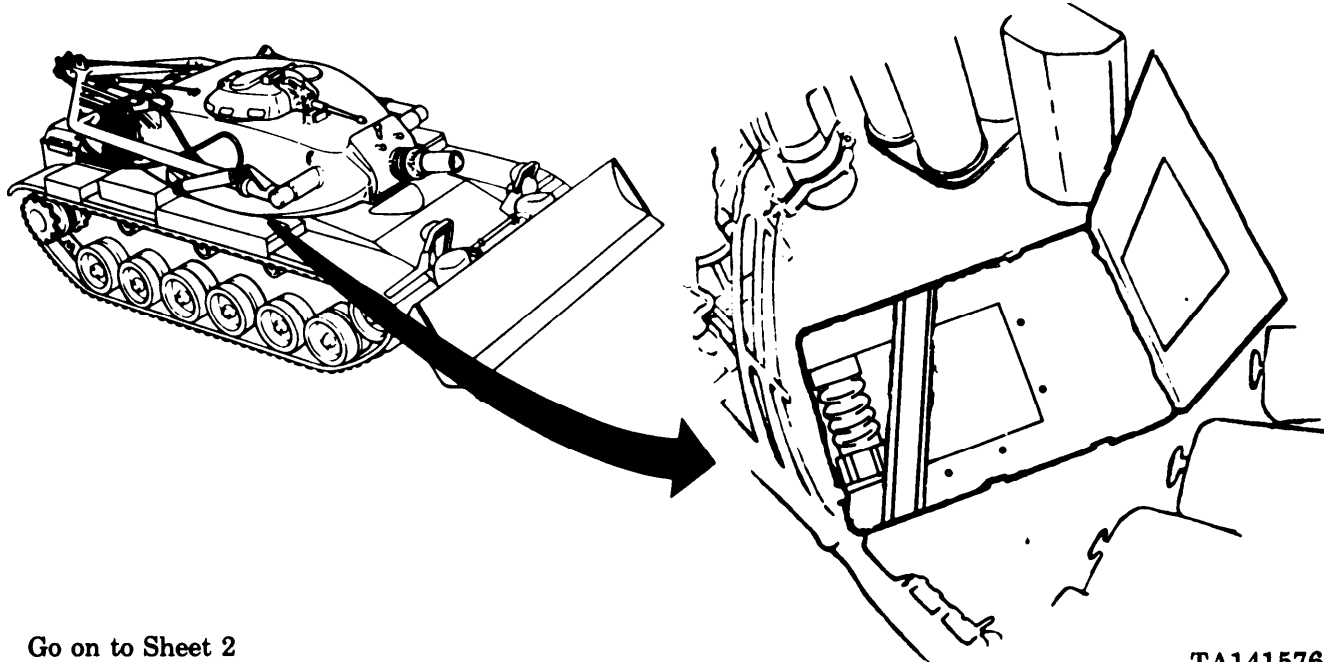
PROCEDURE	PAGE
Removal	7-191
Installation	7-193

TOOLS: Ratchet with 1/2 in. drive
5 in. extension with 1/2 in. drive
1/2 in. socket with 1/2 in. drive
Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-238 N.m)
1/2 in. combination box and open end wrench
Slip joint pliers
Diagonal cutting pliers
Putty knife

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
Rags (Item 65, Appendix D)
Gasket (10864231)
Lockwire (Item 59, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Drain both fuel tanks (page 7-152)
Remove powerplant (page 5-1)
Remove fuel crossover access cover (page 16-37)



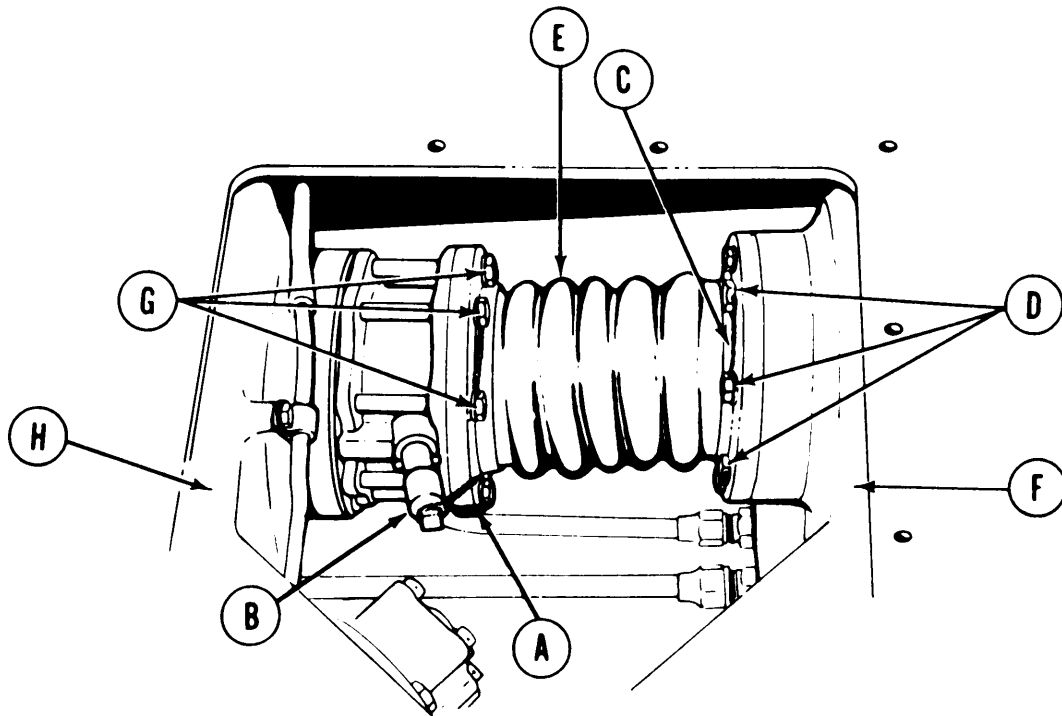
Go on to Sheet 2

TA141576

FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 2 of 7)

REMOVAL:

- Using diagonal cutting pliers, remove lockwire (A) from cross over control valve (B).



- Using diagonal cutting pliers, reach through crossover access and remove lockwire (C) from three screws (D) holding preformed hose (E) to left fuel tank (F), and three screws (G) holding preformed hose (E) to right fuel tank (H).
- Using 1/2 inch wrench, remove three screws and washers (D) holding preformed hose (E) to left fuel tank (F).
- Using 1/2 inch wrench, remove three screws and washers (G) from valve (B) to right fuel tank (H).

Go on to Sheet 3

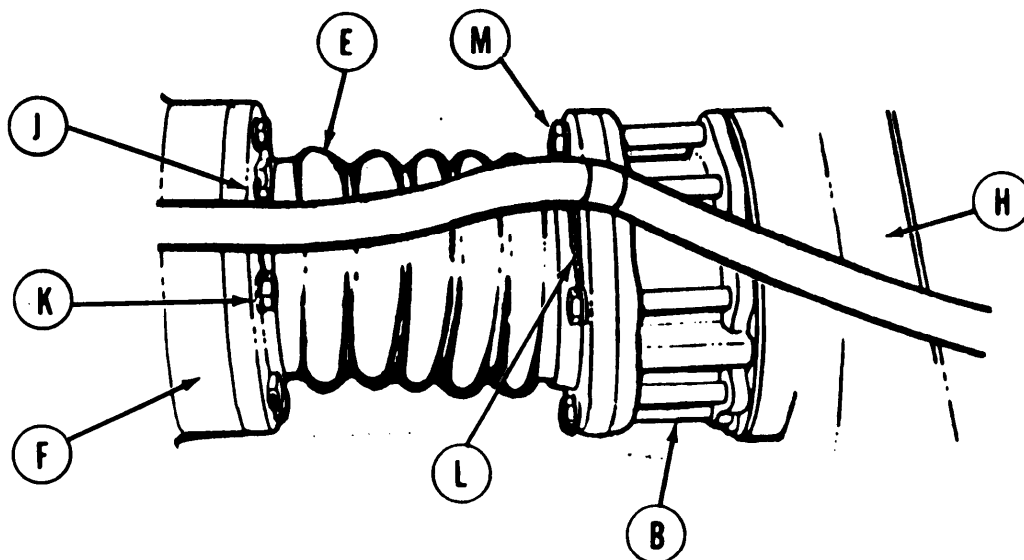
TA141577

FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 3 of 7)

NOTE

Remaining steps for removal of butterfly valve will be performed in engine compartment.

5. Using diagonal cutting pliers, remove lockwire (J) from five screws (K) holding preformed hose (E) to left fuel tank (F).
6. Using diagonal cutting pliers, remove lockwire (L) from five screws (M) holding valve (B) to right fuel tank (H).



7. Using 1/2 inch wrench, remove five screws (K) holding preformed hose (E) to left fuel tank (F).
8. Using 1/2 inch wrench, remove five screws (M) holding valve (B) to right fuel tank (H).
9. Remove crossover valve (B), preformed hose (E), and gasket from the vehicle. Throw gasket away.

Go on to Sheet 4

TA141578

FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 4 of 7)

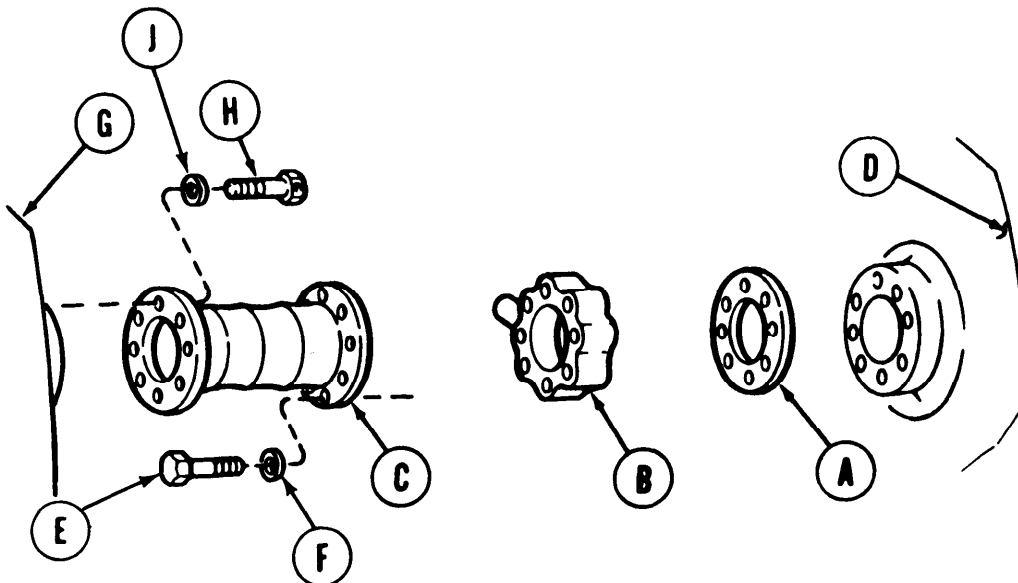
10. Using dry cleaning solvent (Item 54, Appendix D), rags (Item 65, Appendix D), and putty knife, clean excess material from fuel tank.

NOTE

The following steps of valve installation will be performed in engine compartment.

INSTALLATION:

1. Install new gasket (A), crossover valve (B), and preformed hose (C) to right fuel tank (D) using five screws (E) and washers (F).
2. Install preformed hose (C) to left fuel tank (G) using five screws (H) and Washers (J).



3. Using 1/2 inch wrench, tighten five screws (E) and five screws (H).

Go on to Sheet 5

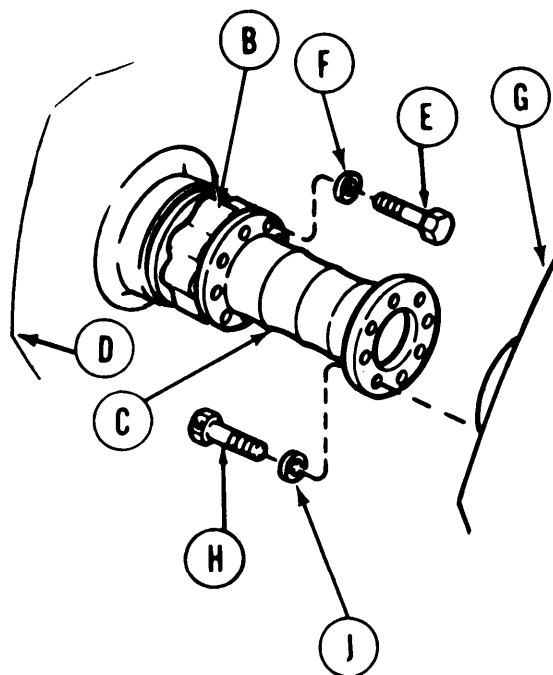
TA141579

FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 5 of 7)

NOTE

The following steps of valve installation will be performed through the butterfly valve access in turret.

4. Install remaining three screws (E) and washers (F) holding crossover valve (B) and preformed hose (C) to right fuel tank (D).



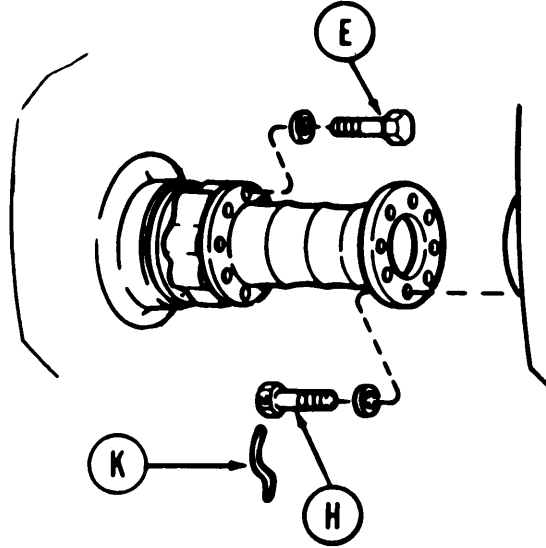
5. Install remaining three screws (H) and washer (J) holding preformed hose (C) to left fuel tank (G).
6. Using 1/2 inch wrench, tighten three screws (E) and (H).

Go on to Sheet 6

TA141580

FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 6 of 7)

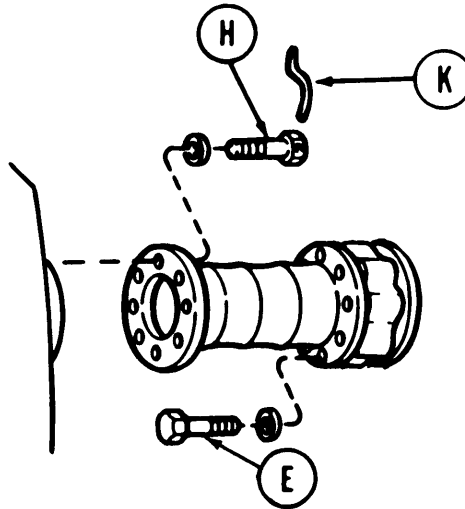
7. Using torque wrench, tighten three screws (E) and (H) to 13-18 lb-ft (18-24 N·m).
8. Using slip joint pliers, install new lockwire (K) (Item 59, Appendix D) in three screws (E) and (H).



NOTE

The following steps of valve installation will be performed in engine compartment.

9. Using torque wrench, tighten the remaining five screws (E) and (H) to 13-18 lb-ft (18-24 N·m).
10. Using slip joint pliers, install new lockwire (K) (Item 59, Appendix D) in five screws (E) and (H).



Go on to Sheet 7

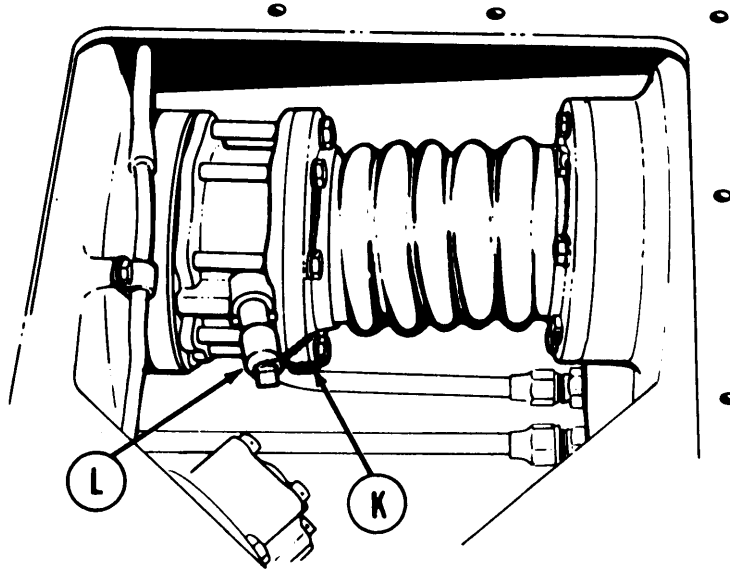
TA253271

FUEL TANK CROSSOVER VALVE REPLACEMENT (Sheet 7 of 7)

NOTE

The remaining steps of valve installation will be performed in turret.

11. Using slip joint pliers, install new lockwire (K) (Item 59, Appendix D) and valve control (L).



12. Install fuel crossover access cover (page 16-37).
13. Fill fuel tanks (TM 9-2350-222-10).
14. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA253272

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
(Sheet 1 of 9)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-198
Cleaning and Inspection	7-201
Installation	7-201

TOOLS: Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 7/16 in. combination box and open end wrench
 10 in. adjustable wrench
 7/16 in. socket with 1/2 in. drive
 Long round nose pliers
 Ball peen hammer
 1/8 in. drive pin punch
 Wire brush
 vise
 1 in. open end wrench
 1-1/8 in. open end wrench

SUPPLIES: Sealing compound (Item 24, Appendix D)
 Cotter pin (MS24665-132) (2 required)
 Lockwasher (MS35338-45) (2 required)
 Preformed packing (MS28778-10) (2 required)
 Plastic cap
 Lockwasher (MS35336-44) (2 required)

REFERENCE: TM 9-2350-222-10

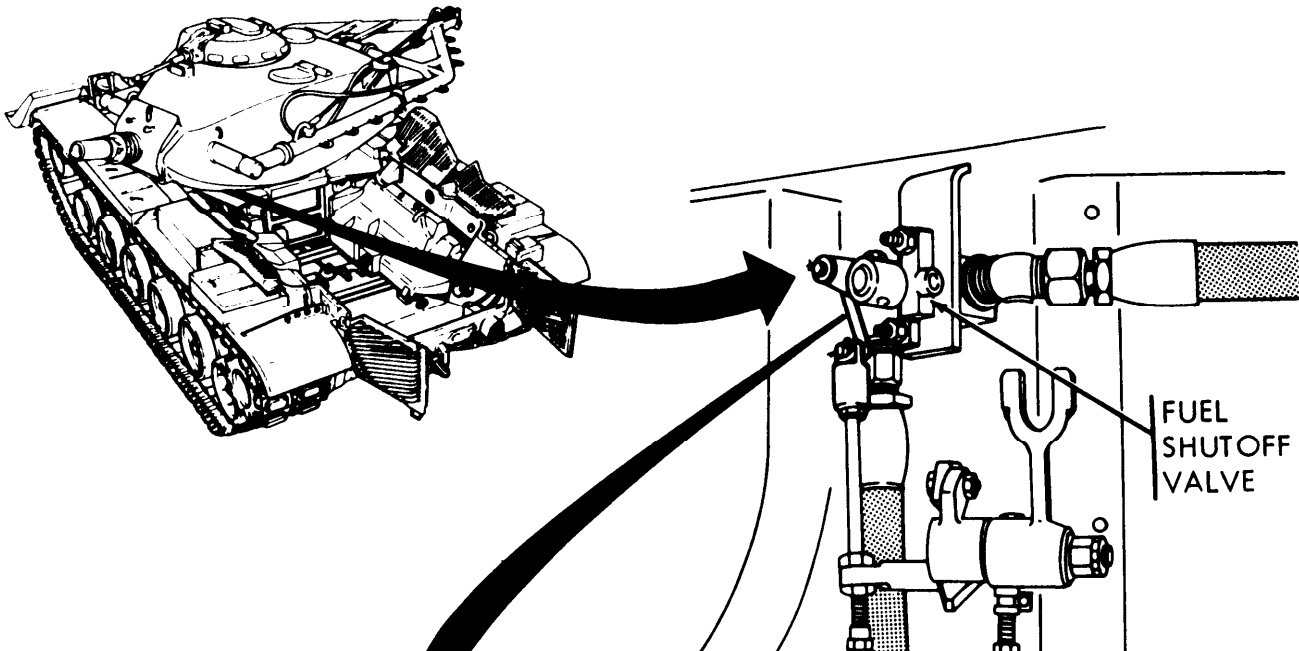
PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Pull fuel shutoff valve handle halfway up (TM 9-2350-222-10)

Go on to Sheet 2

TA253273

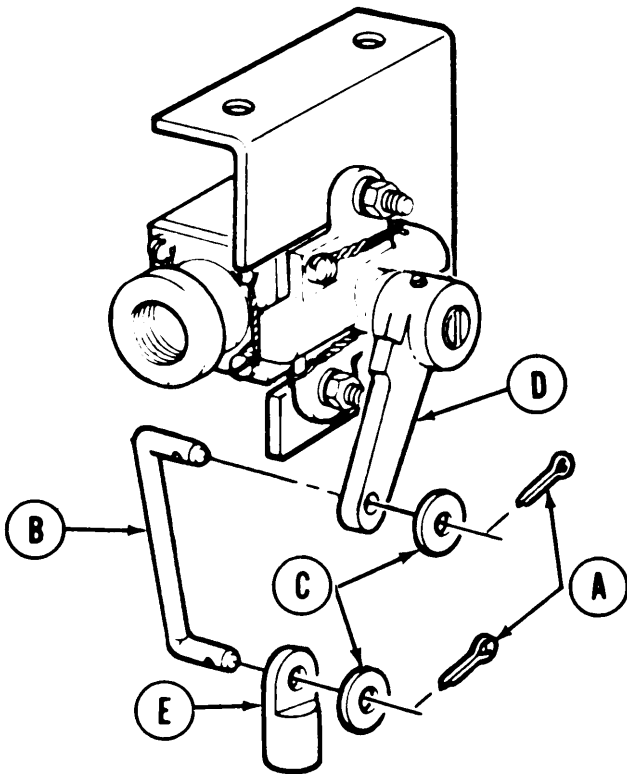
Change 1 7-197

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
(Sheet 2 of 9)



REMOVAL:

1. Using pliers, remove two cotter pins (A) from link (B). Throw cotter pins away.
2. Slide two flat washers (C) from link (B).
3. Remove link (B) from lever (D) and rod end (E).
4. Push lever (D) so it is pointing down.

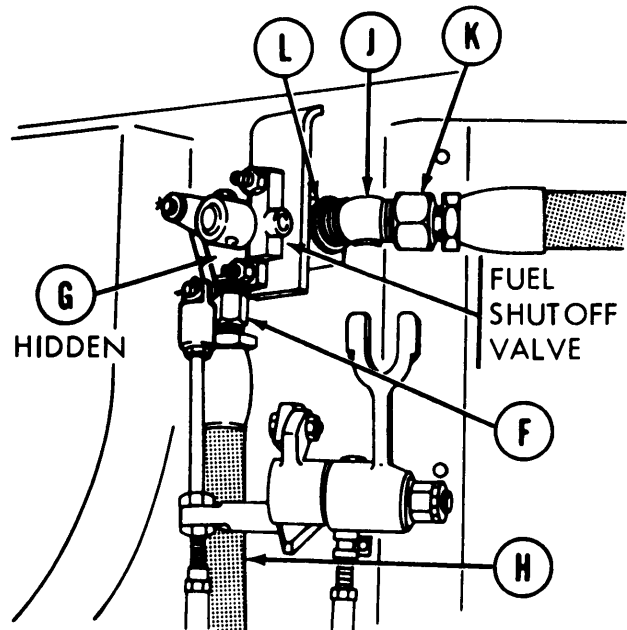


Go on to Sheet 3

TA253203

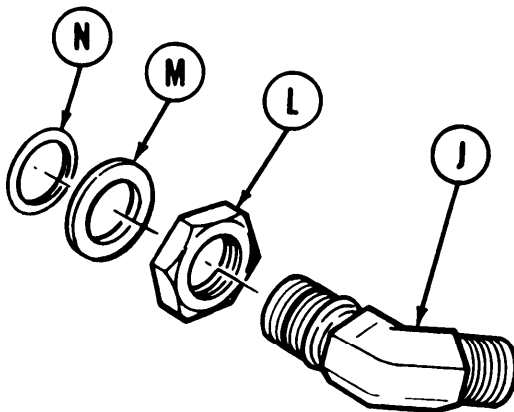
FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL) (Sheet 3 of 9)

- Using 1-1/8 inch wrench, remove tube nut (F) from elbow (G).



- Using plastic cap, cap end of hose (H) to prevent fuel loss.

- Using adjustable wrench to hold elbow (J), use 1 inch wrench to remove tube nut (K) from elbow (J).
- Using adjustable wrench to hold elbow (J), use 1-1/8 inch wrench to loosen nut (L) about 1/2 turn.



- Using adjustable wrench, remove elbow (J) with nut (L), washer (M), and preformed packing (N) from fuel shutoff valve as an assembly.

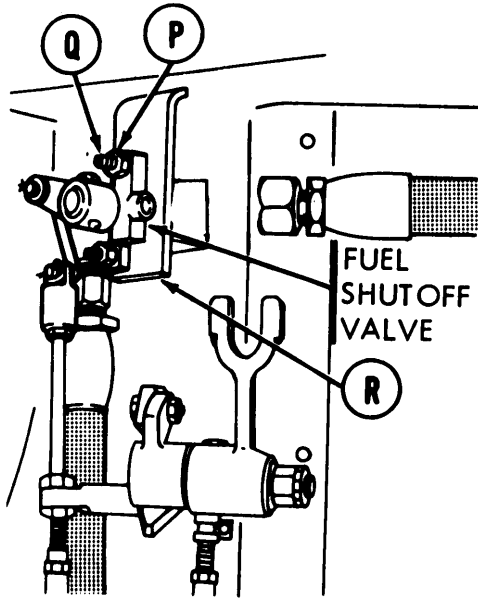
- Manually remove preformed packing (N) and washer (M) from elbow (J). Throw preformed packing (N) away.
- Using adjustable wrench to hold elbow (J), use 1-1/8 inch wrench to remove nut (L) from elbow (J).

Go on to Sheet 4

TA253274

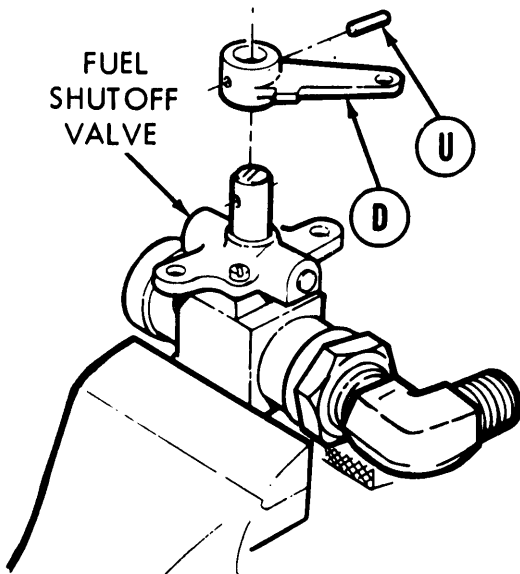
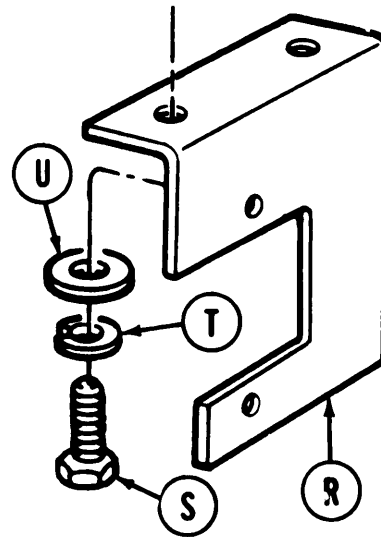
Change 1 7-199

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
 (sheet 4 of 9)



12. Using 7/16 inch wrench and 7/16 inch socket with extension, remove two nuts and lockwashers (P) and two screws (Q). Throw lockwashers away.
13. Remove fuel shutoff valve from bracket (R).

14. Using 1/2 inch socket with extension, remove two screws (S), lockwashers (T), and flat washers (U) holding bracket (R). Throw lockwashers (T) away.
15. Remove fuel shutoff valve and bracket (R) from vehicle.
16. Manually install fuel shutoff valve into vise.



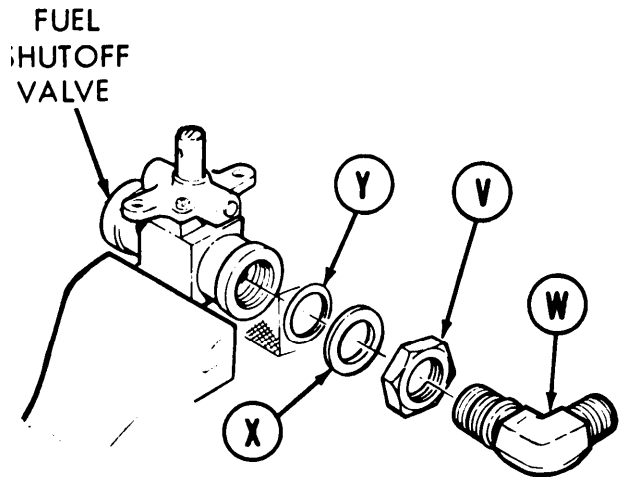
17. Using hammer and drive pin punch, start spring pin (U) out of lever (D).
18. Using pliers, remove spring pin (U) from lever (D).
19. Manually remove lever (D) from fuel shutoff valve.

Go on to Sheet 5

TA253275

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
(Sheet 5 of 9)

20. Using 1-1/8 inch wrench, loosen nut (V) about 1/2 turn.
21. Using adjustable wrench, remove elbow (W) with nut (V), washer (X), and preformed packing (Y) from fuel shutoff valve as an assembly.



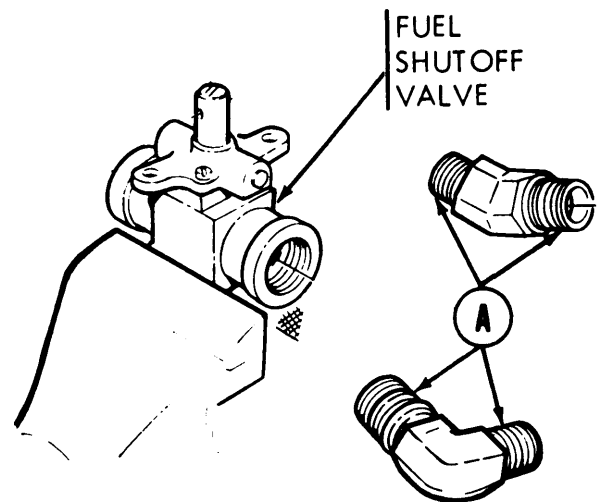
22. Manually remove preformed packing (Y) and washer (X) from elbow (W). Throw preformed packing (Y) away.
23. Using adjustable wrench to hold elbow (W), use 1-1/8 inch wrench to remove nut (V) from elbow (W).

CLEANING AND INSPECTION:

1. Using wire brush, clean threads on two elbows.
2. Inspect parts for damage. Replace as necessary.

INSTALLATION:

1. Manually install fuel shutoff valve into vise.
2. Using sealing compound (Item 24, Appendix D), lightly coat threads (A) on two elbows.



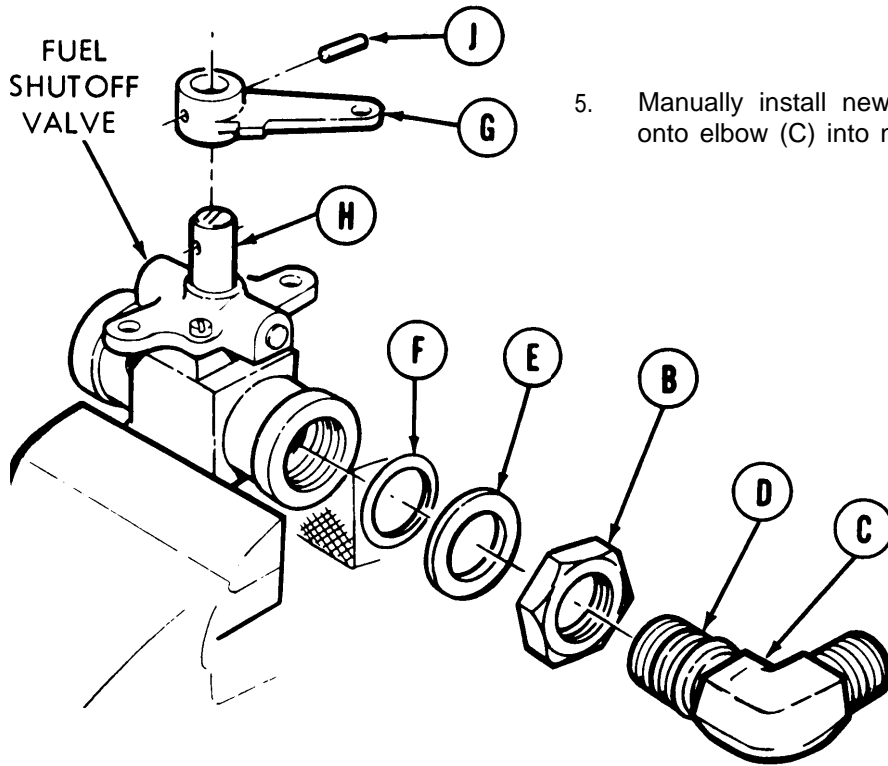
Go on to Sheet 6

TA253276

Change 1 7-201

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
(Sheet 6 of 9)

3. Manually thread nut (B) onto 90 degree elbow (C) past notch (D) in threads.
4. Manually slide washer (E) onto elbow (C).



5. Manually install new preformed packing (F) onto elbow (C) into notch (D) in threads.

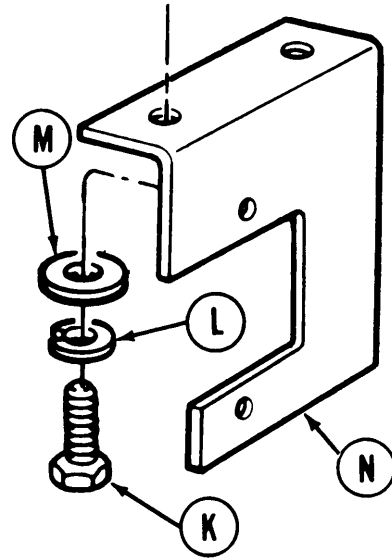
6. Using adjustable wrench, install elbow (C) with nut (B), washer (E), and new preformed packing (F) into fuel shutoff valve as an assembly, to correct position for vehicle installation.
7. Using adjustable wrench to hold elbow (C), use 1-1/8 inch wrench to tighten nut (B) against fuel shutoff valve.
8. Alining holes in lever (G) with holes in shaft (H), install lever (G) onto fuel shutoff valve,
9. Using hammer, install spring pin (J) through lever (G) and shaft (H).
10. Remove fuel shutoff valve from vise.

Go on to Sheet 7

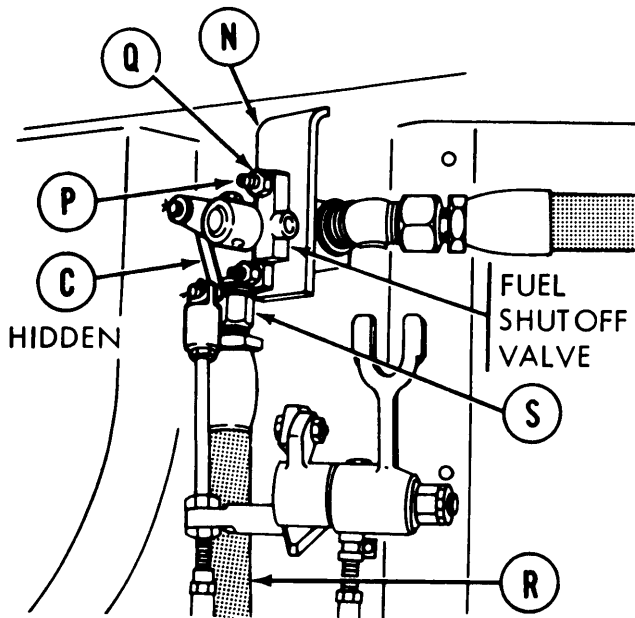
TA253277

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
 (Sheet 7 of 9)

11. Using 1/2 inch socket with extension, install two screws (K), new lockwashers (L), and flat washers (M) to hold bracket (N) to hull.
12. Position fuel shutoff valve for installation to bracket (N).



13. Using 7/16 inch wrench and 7/16 inch socket with extension, install two screws (P) and two new lockwashers and nuts (Q).



14. Remove plastic cap from end of hose (R).
15. Using 1-1/8 inch wrench, install tube nut (S) to elbow (C).

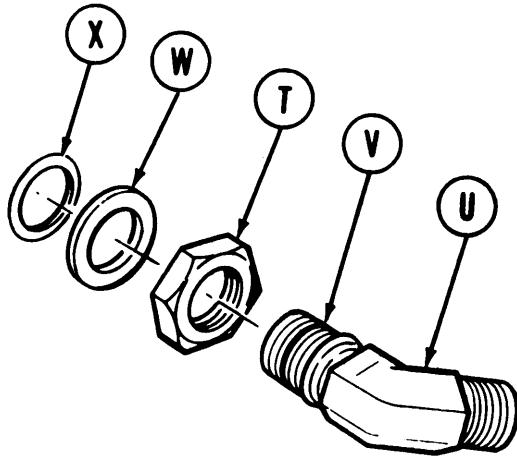
Go on to Sheet 8

TA253278

Change 1 7-203

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
(Sheet 8 of 9)

16. Manually thread nut (T) onto 45 degree elbow (U) past notch (V) in threads.



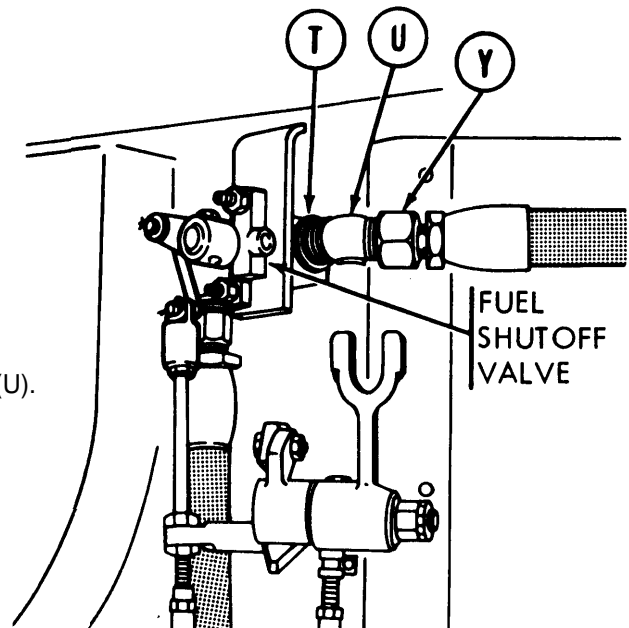
17. Manually slide washer (W) onto elbow (U).

18. Manually install new preformed packing (X) onto elbow (U) into notch (V) in threads.

19. Using adjustable wrench, install elbow (U) with nut (T), washer (W), and new preformed packing (X) into fuel shutoff valve as an assembly, to correct position for vehicle installation.

20. Using adjustable wrench to hold elbow (U), use 1-1/8 inch wrench to tighten nut (T) against fuel shutoff valve.

21. Using 1 inch wrench, install tube nut (Y) to elbow (U).



Go on to Sheet 9

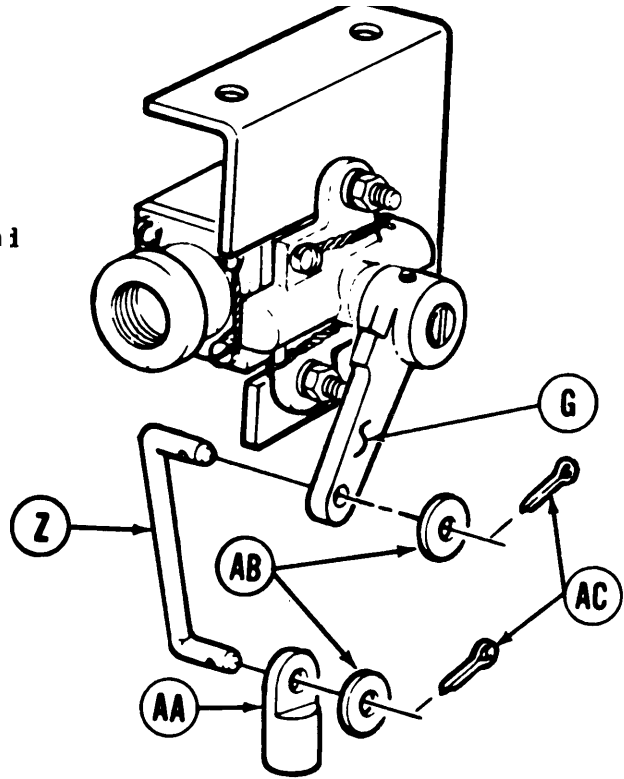
TA253279

FUEL SHUTOFF VALVE, LEVER, LINK, AND BRACKET REPLACEMENT (EARLY MODEL)
(Sheet 9 of 9)

22. Install link (Z) to lever (G) and rod end (AA).

23. Install two flat washers (AB), one onto each end of link (Z).

24. Using pliers, install two new cotter pins (AC), one into each end of link (Z).



25. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA253204

Change 1 7-205

FUEL SHUTOFF HANDLE REPLACEMENT (Sheet 1 of 2)

- TOOLS: Vise
1/2 in. combination box and open end wrench
Drive punch
Hammer
Slip joint pliers
9/16 in. combination box and open end wrench

SUPPLIES: Pin (MS171525) (2 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Set ENGINE FUEL SHUTOFF switch to OFF (TM 9-2350-222-10)

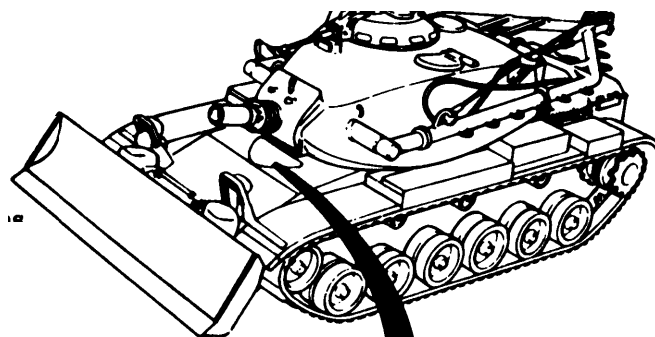
REMOVAL:

1. Hold extension (A) with 1/2 inch wrench while loosening jamnut (B) with 9/16 inch wrench.

NOTE

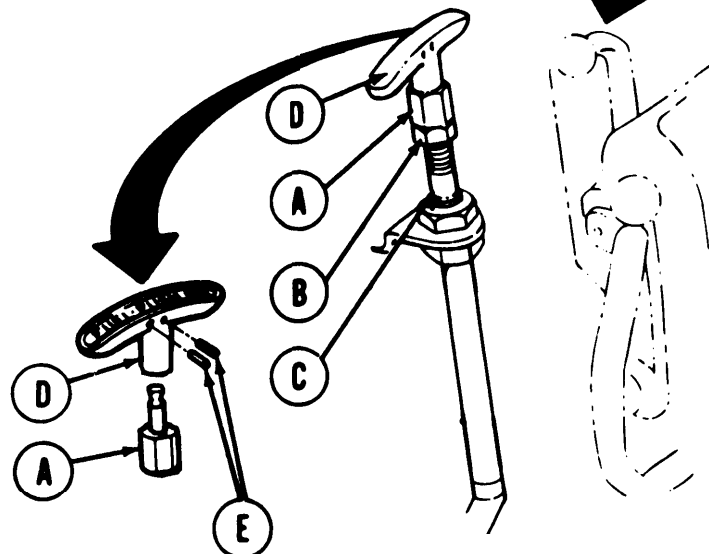
If necessary, grip cable (C) with pliers to remove handle (D) and extension (A).

2. Remove handle (D) and handle extension (A) as assembly from cable (C).
3. Using 9/16 inch wrench, remove jamnut (B).



DISASSEMBLY:

1. Using vise to hold handle (D), drive two pins (E) out of handle (D) with hammer and drive punch. Throw pins away.
2. Separate handle (D) from extension (A).



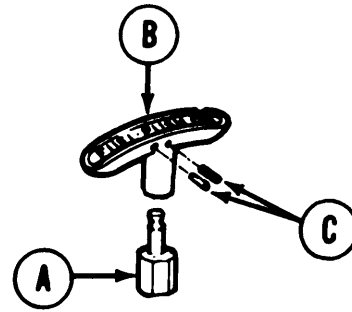
Go on to Sheet 2

TA141591

FUEL SHUTOFF HANDLE REPLACEMENT (Sheet 2 of 2)

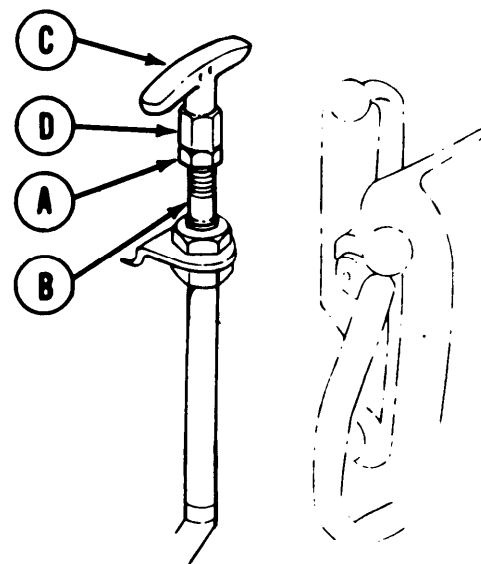
ASSEMBLY:

1. Position handle extension (A) in handle (B).
2. Using hammer, tap two new pins (C) into holes in handle (B) to secure extension (A).



INSTALLATION:

1. Screw jamnut (A) onto end of cable (B).
2. Thread handle (C) and extension (D) as an assembly all the way onto cable (B).
3. Using 1/2 inch wrench, hold extension (D) and, using 9/16 inch wrench, on jamnut (A), tighten jamnut against handle assembly (C) and (D).



End of Task

TA253280

Change 1 7-207

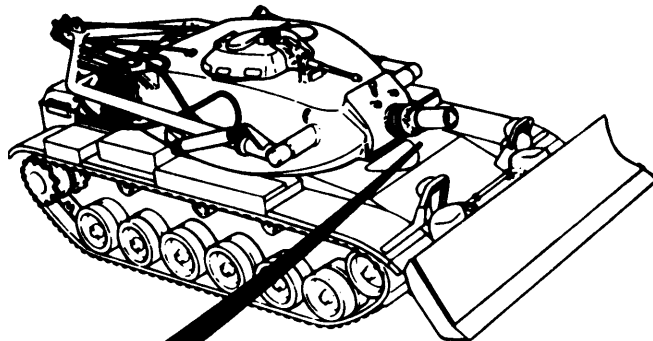
FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (EARLY MODEL) (Sheet 1 of 4)

PROCEDURE INDEX	
PROCEDURE	PAGE
Removal	7-208
Installation	7-210

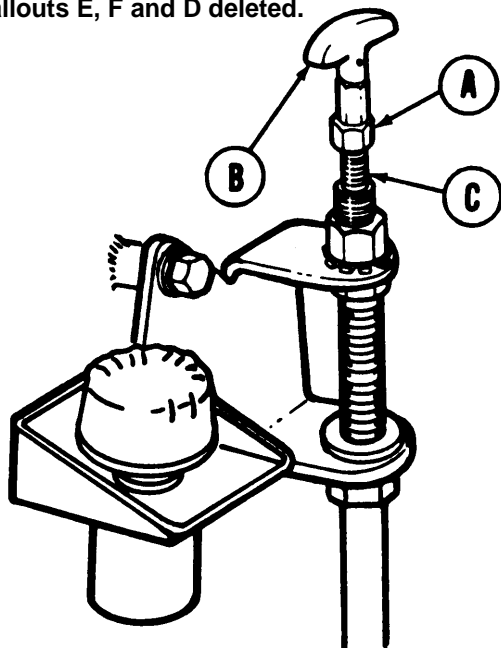
TOOLS: 15/16 in. combination box and open end wrench (2 required)
 9/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. square drive
 Ratchet with 1/2 in. square drive
 3/32 in. drive punch
 Hammer
 7/16 inch combination box and open end wrench

SUPPLIES: Pin (MS171525) (2 required)
 Lockwasher (MS35335-39) (2 required)
 Lockwasher (MS35333-44) (2 required)

REMOVAL:



NOTE
 Callouts E, F and D deleted.

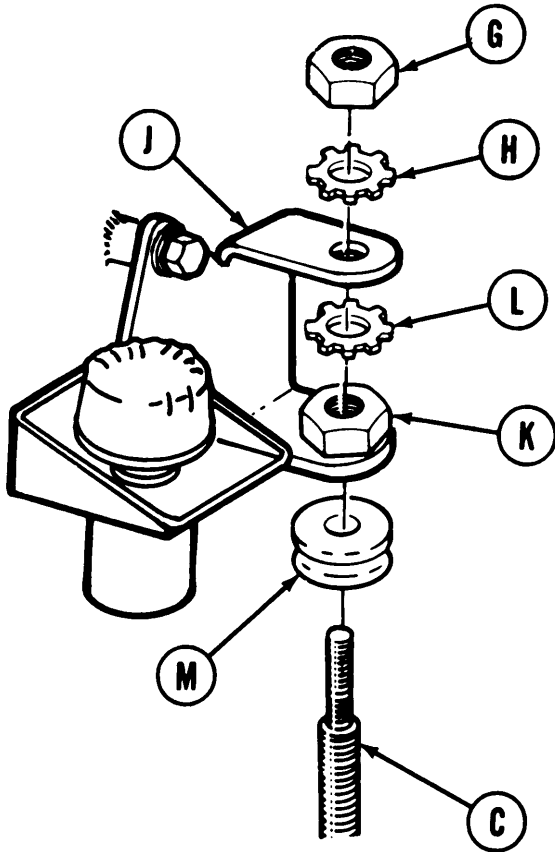


1. Using 9/16 inch wrench and 1/2 inch wrench, loosen nut (A) and remove handle assembly (B) from cable (C).
2. Deleted.
3. Deleted.
4. Remove nut (A) from cable (C).

Go on to Sheet 2

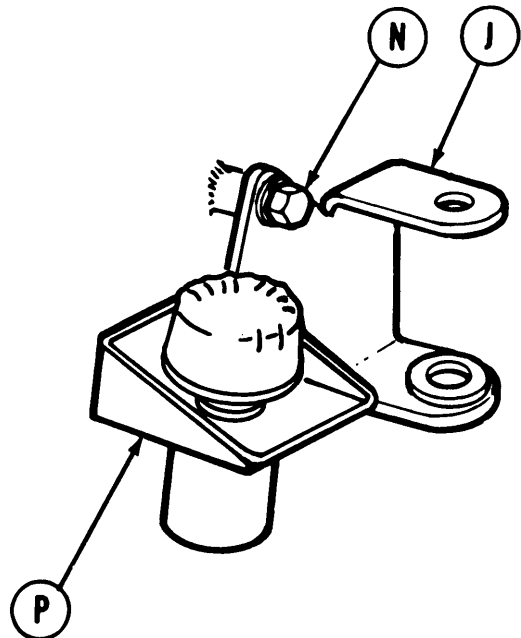
TA253205

FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (EARLY MODEL) (Sheet 2 of 4) ■



5. Using 15/16 inch wrenches, remove top nut (G) and lockwasher (H) securing cable (C) to bracket (J), Throw lockwasher away.
6. Pull cable (C) out of bracket (J) as you unthread nut (K) and lockwasher (L). Throw lockwasher away.
7. Remove grommet (M) from bracket (J).

8. Using 7/16 inch socket and 7/16 inch wrench, remove two screws and lockwashers (N) securing bracket (J) and gas particulate air heater hose bracket (P) to reservoir. Throw lockwashers away.
9. Position gas particulate air heater hose bracket (P) aside and remove bracket (J) from vehicle.



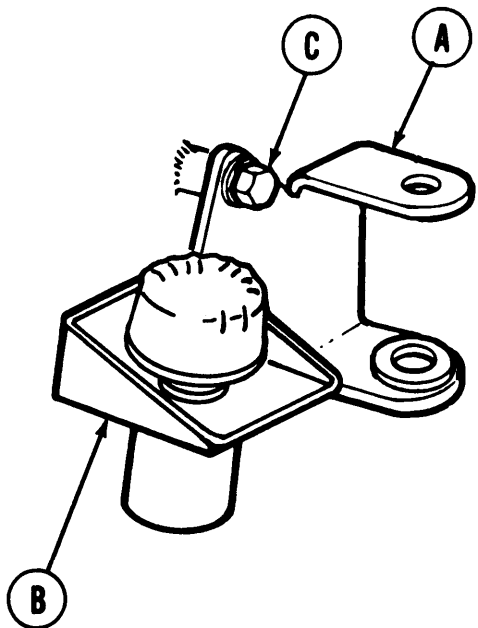
Go on to Sheet 3

TA253281

Change 1 7-209

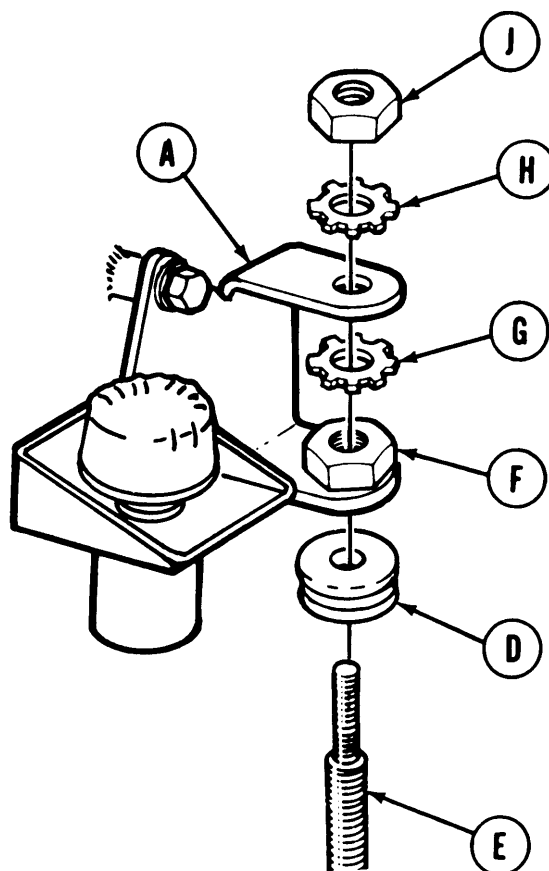
FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (EARLY MODEL) (Sheet 3 of 4)

INSTALLATION:



1. Position bracket (A) and gas particulate air heater hose bracket (B) to mounting bosses on reservoir.
2. Using 7/16 inch socket and 7/16 inch wrench, secure brackets (A) and (B) to reservoir with two screws and new lockwashers (C).

3. Install grommet (D) in lower hole of bracket (A).
4. Thread cable (E) through grommet (D) in lower hole of mounting bracket (A).
5. As you thread cable (E) through grommet, install nut (F) and new lockwasher (G) onto cable (E) and continue threading cable through top hole in mounting bracket (A).
6. Install new lockwasher (H) and nut (J) onto cable (E).

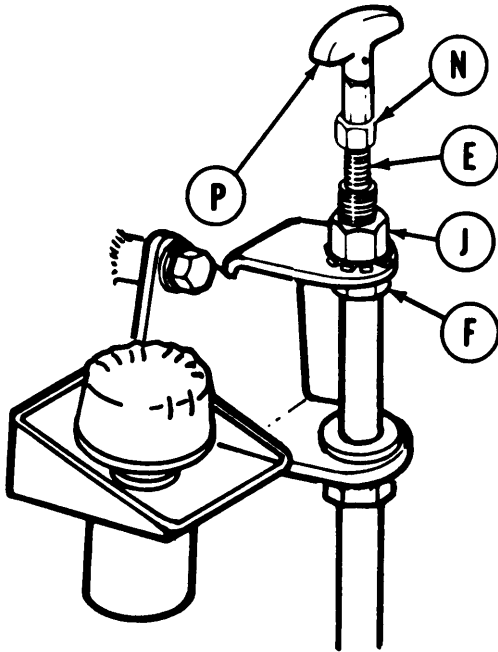


Go on to Sheet 4

TA253282

FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (EARLY MODEL) (Sheet 4 of 4)

NOTE
Callouts K, L, and M deleted.



7. Deleted.
8. Thread handle jamnut (N) and handle assembly (P) onto cable (E).
9. Using 1/2 inch wrench and 9/16 inch wrench, lock handle jamnut (N) and handle assembly (P) by tightening against each other.
10. Using two 15/16 inch wrenches, tighten upper and lower cable mounting nuts (J) and (F).

End of Task

TA253206

Change 1 7-211

FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (LATE MODEL) (Sheet 1 of 6)

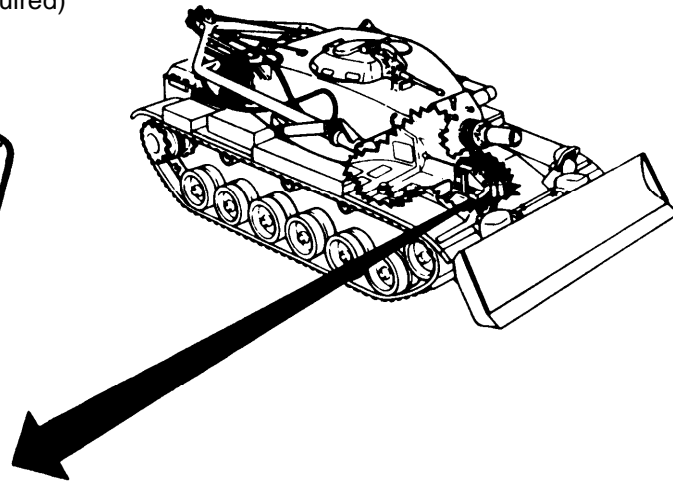
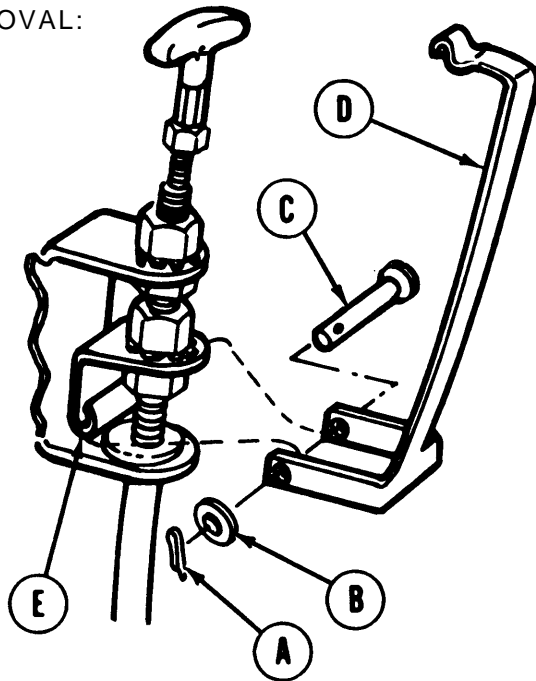
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-212
Installation	7-212.3

TOOLS: 15/16 in. combination box and open end wrench (2 required)
 9/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. square drive
 Ratchet with 1/2 in. square drive
 3/32 in. drive punch
 Hammer
 7/16 in. combination box and open end wrench
 Pliers, Slip Joint

SUPPLIES: Pin (MS171525) (2 required)
 Lockwasher (MS35335-39) (4 required)
 Lockwasher (MS35336-44) (2 required)
 Cotter pin (MS24665-132)

REMOVAL:



1. Using pliers, remove cotter pin (A), flat washer (B), and pin (C) holding spring (D) to hinge (E). Throw cotter pin away.
2. Remove spring (D).

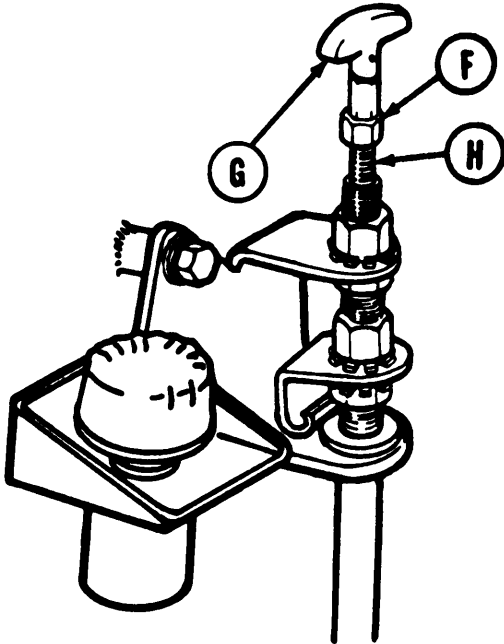
Go on to Sheet 2

TA253207

FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (LATE MODEL) (Sheet 2 of 6)

NOTE

Callouts J, K, and L deleted.



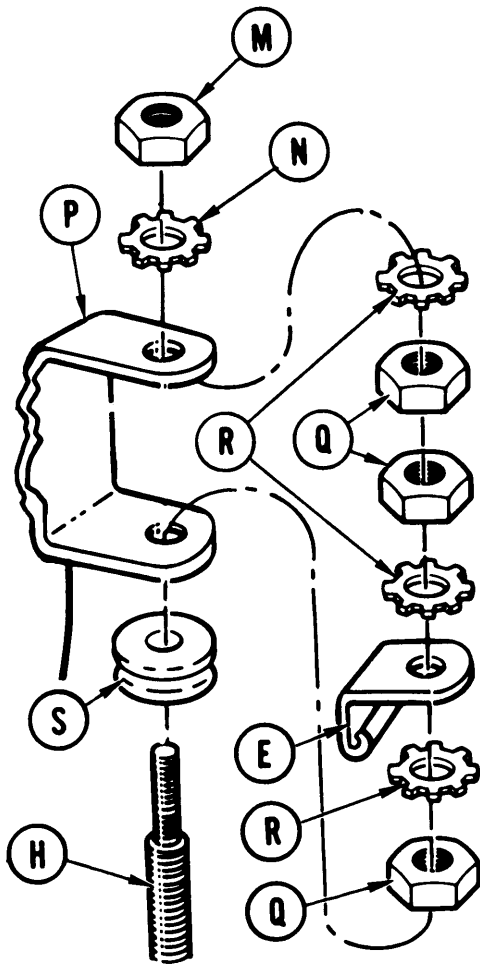
3. Using 9/16 inch wrench and 1/2 inch wrench, loosen nut (F) and remove handle assembly (G) from cable (H).
4. Deleted
6. Deleted
6. Remove nut (F) from cable (H).

Go on to Sheet 3

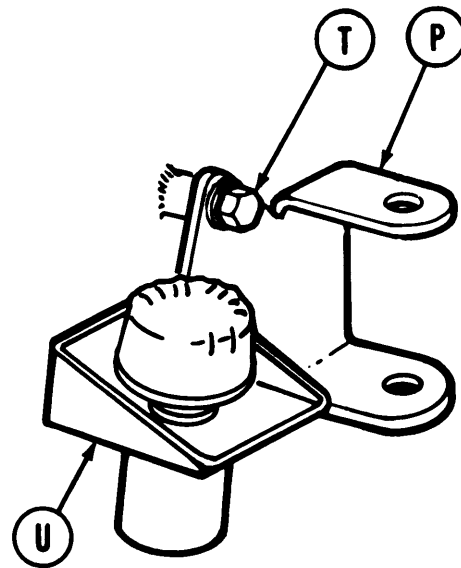
TA253283

Change 1 7-212.1

F FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (LATE MODEL) (Sheet 3 of 6)



7. Using two 15/16 inch wrenches, remove top nut (M) and lockwasher (N) securing cable (H) to bracket (P).
8. Using two 15/16 inch wrenches, loosen three nuts (Q), lockwashers (R), and hinge (E) on cable (H).
9. Pull cable (H) out of bracket (P) you unthread nuts (Q) and lockwashers (R). Throw lockwashers away.
10. Remove grommet (S) from bracket (P).



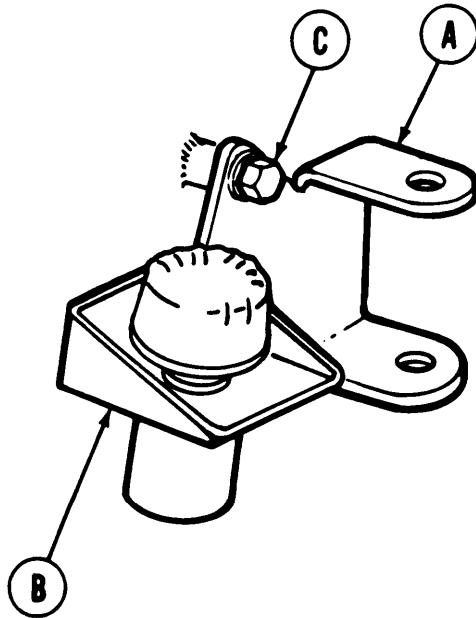
11. Using 7/16 inch socket and 7/16 inch wrench, remove two screws and lockwashers (T) securing bracket (P) and gas particulate air heater hose bracket (U) to reservoir. Throw lockwashers away.
12. Position gas particulate air heater hose bracket (U) aside and remove bracket (P) from vehicle.

Go on to Sheet 4

T A 2 5 3 2 8 4

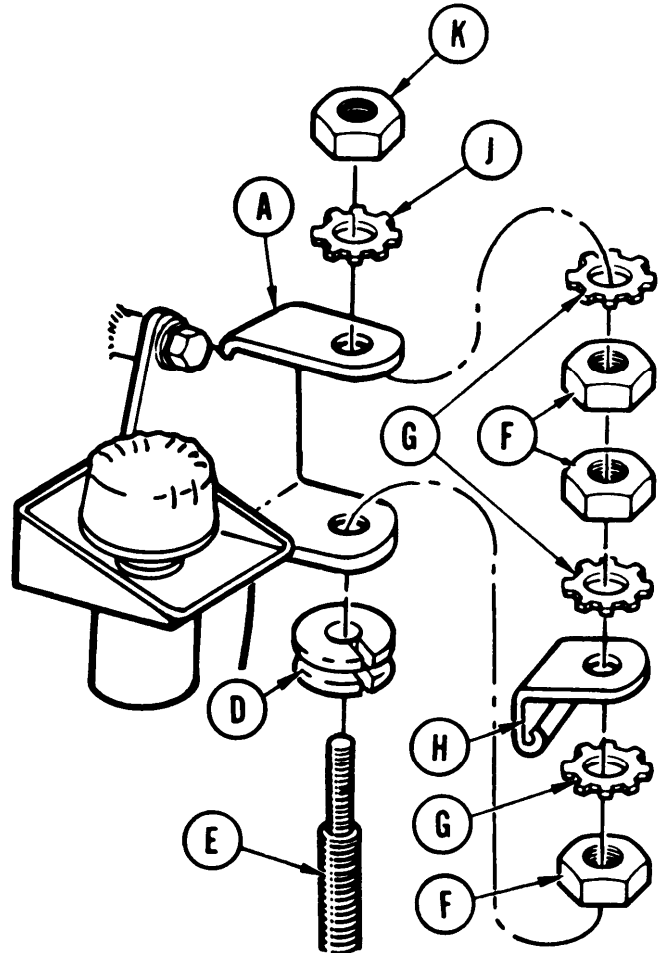
FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (LATE MODEL) (Sheet 4 of 6)

INSTALLATION:



1. Position bracket (A) and gas particulate air heater hose bracket (B) to mounting bosses on reservoir.
2. Using 7/16 inch socket and 7/16 inch wrench, secure brackets (A) and (B) to reservoir with two screws and new lockwashers (C).

3. Install grommet (D) in lower hole of bracket (A).
4. Thread cable (E) through grommet (D) in lower hole of mounting bracket (A).
5. As you thread cable (E) through grommet, install three nuts (F), new lockwashers (G), and hinge (H) onto cable (E) and continue threading cable through top hole in mounting bracket (A).
6. Install new lockwasher (J) and nut (K) onto cable (E).



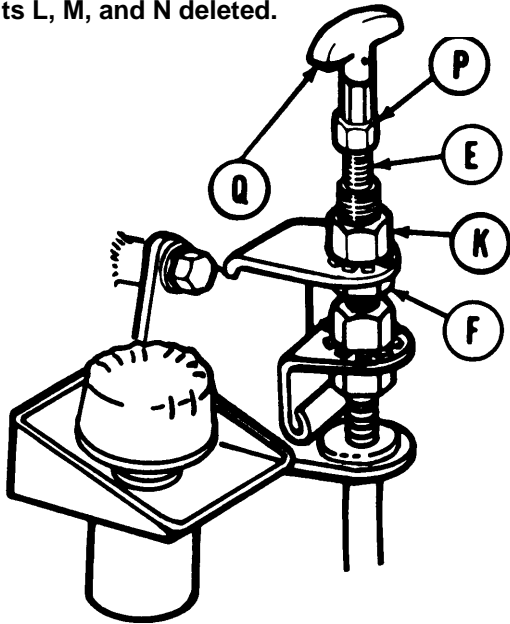
Go on to Sheet 5

TA253285

Change 1 7-212.3

FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (LATE MODEL) (Sheet 5 of 6)

NOTE
Callouts L, M, and N deleted.



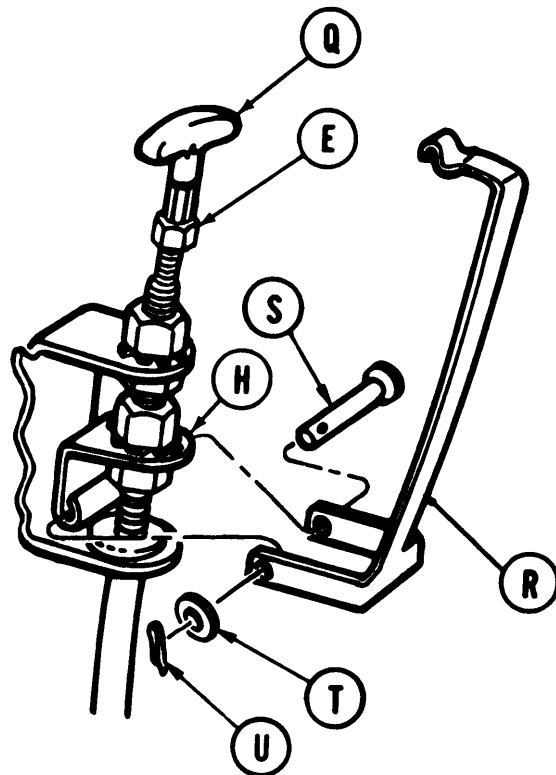
11. Install spring (R) to hinge (H) and secure with pin (S) and flat washer (T).

NOTE

Cotter pin (U) will be removed and reinstalled in later steps.

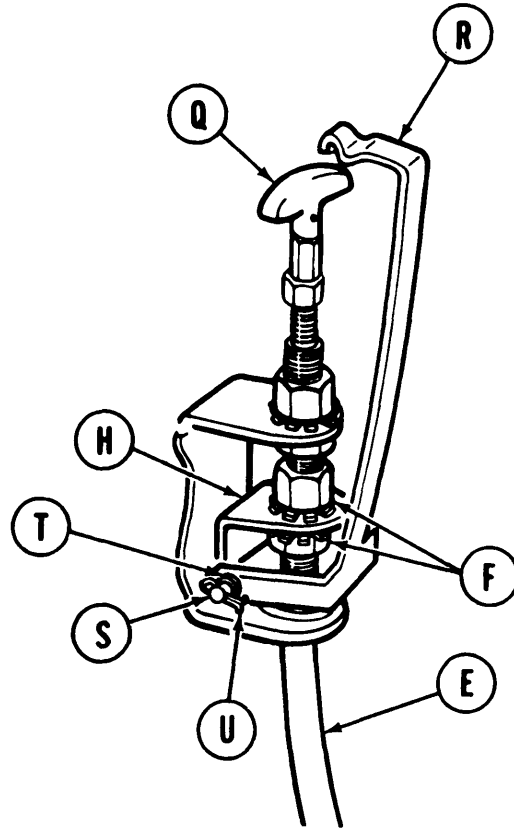
12. Install new cotter pin (U) in pin (S) and spread cotter pin a small amount with fingers.
13. Push handle (Q) down to full "on" position.

7. Deleted.
8. Thread handle jamnut (P) and handle assembly (Q) onto cable (E).
9. Using 1/2 inch wrench and 9/16 inch wrench, lock handle jamnut (P) and handle assembly (Q) by tightening against each other.
10. Using two 15/16 inch wrenches, tighten upper and lower cable mounting nuts (F) and (K).



FUEL SHUTOFF CABLE MOUNTING BRACKET REPLACEMENT (LATE MODEL) (Sheet 6 of 6)

14. Position spring (R) over handle (Q).
15. Using fingers, adjust position of hinge (H) on cable (E) by moving upper cable nut (F) until spring (R) is firmly seated on handle (Q).



16. Remove cotter pin (U), flat washer (T), pin (S), and spring (R).
17. Using two 15/16 inch wrenches, lock hinge (H) in position by tightening upper nut (F) and lower nut (F) against each other.

18. Install spring (R), pin (S), and flat washer (T) through hinge (H).
19. Using pliers, install cotter pin (U) through pin (S) spread cotter pin (U) to hold spring(R).

End of Task

TA253287

Change 1 7-212.5

FUEL TANK (LEFT) ENGINE OUTLET TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-213
Installation	7-214

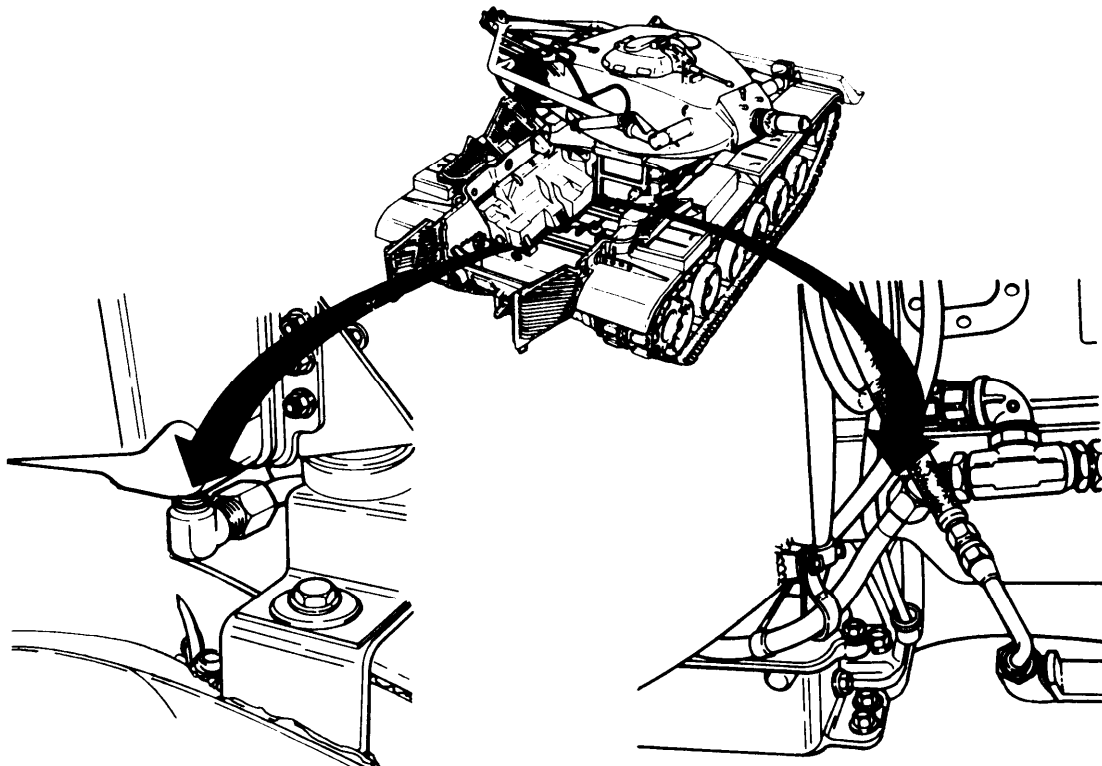
TOOLS: Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive
 7/8 in. combination box and open end wrench (2 required)
 1 in. open end wrench
 1-1/4 in. open end wrench

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Sealing compound (Item 24, Appendix D)
 Lockwasher (MS35338-44)
 Rags (Item 65, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Drain left fuel-tank (page 7-152)



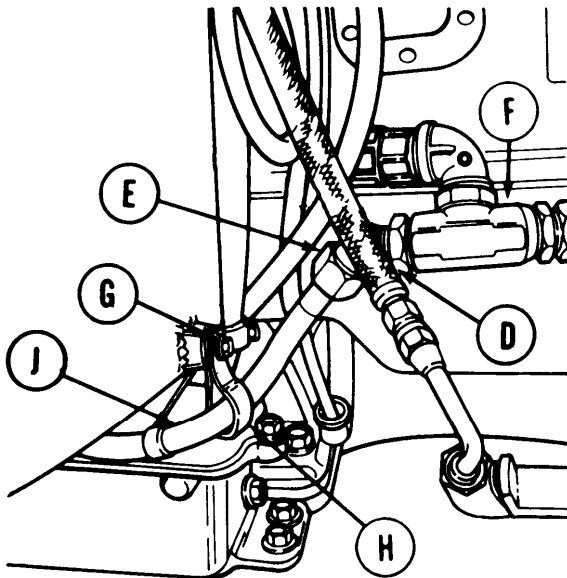
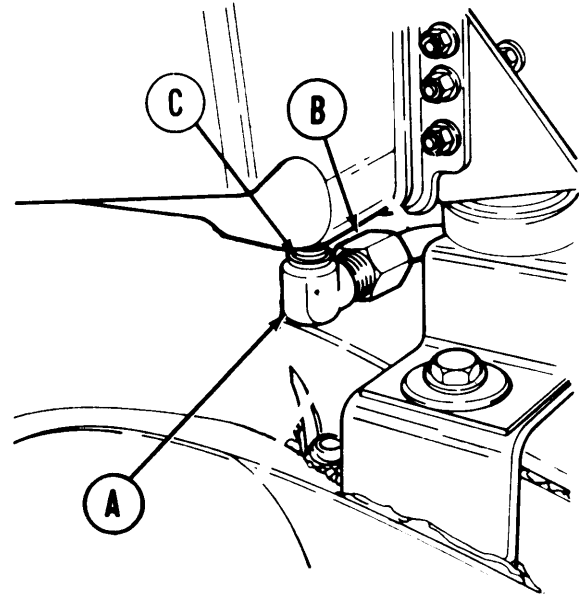
Go on to Sheet 2

TA253288

FUEL TANK (LEFT) ENGINE OUTLET TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 4)

REMOVAL:

- Place rags under elbow (A)
- 2. Using 1 inch wrench, remove tube nut (B) from elbow (A).
- 3. Using 7/8 inch wrench to hold adapter (C), use 7/8 inch wrench to remove elbow (A) from adapter (C).
- 4. Place rags under elbow (D).
- 5. Using 1 inch wrench, remove tube nut (E) from elbow (D).



- 6. Using 1-1/4 inch wrench on check valve (F) and 7/8 inch wrench on elbow (D), remove elbow (D) from check valve (F).
- 7. Using socket, remove screw (G) with lockwasher holding clamp (H). Throw lockwasher away.
- 8. Remove clamp (H) from tube (J) for use with new tube.

- 9. Remove elbow (A), elbow (D), and tube (J) from vehicle.

o on to Sheet 3

TA141594

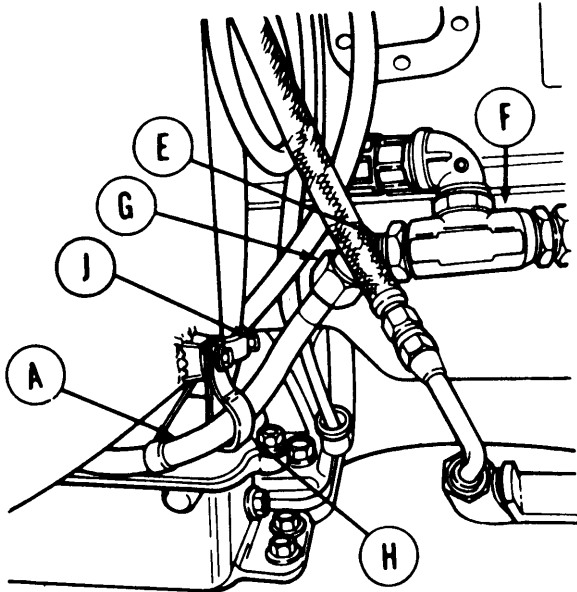
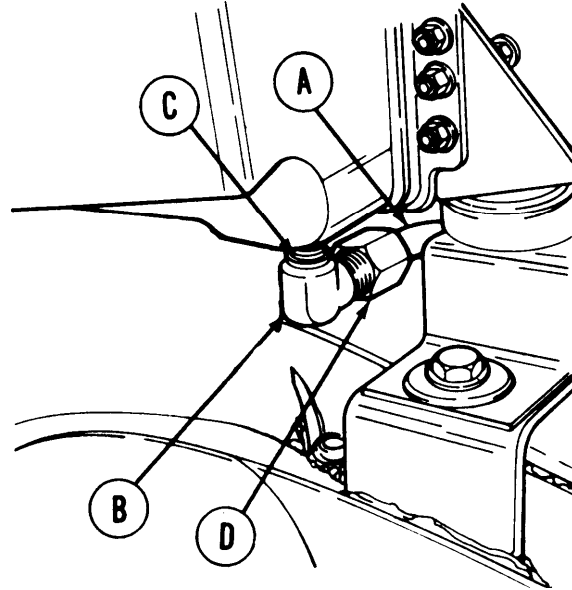
FUEL TANK (LEFT) ENGINE OUTLET TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 4)

INSTALLATION:

NOTE

Apply a light coating of sealing compound (Item 24, Appendix D), to outer threads of fuel line fittings before installing.

1. Position tube (A) into vehicle"
2. Using 7/8 inch wrench, install elbow (B) into adapter (C).
3. Using 1 inch wrench, install tube nut (D) onto elbow (B).



4. Using 1-1/4 inch wrench on check valve (F), and 7/8 inch wrench on elbow (E), install elbow (E) into check valve, (F).
5. Using 1 inch wrench, install tube nut (G) onto elbow (E).
6. Place clamp (H) onto tube (A).

7. Using socket, install screw (J) with new lockwasher to hold clamp (H).
8. Transfer some fuel from right fuel tank to left fuel tank (TM 9-2350-222-10).

Go on to Sheet 4

TA14159

FUEL TANK (LEFT) ENGINE OUTLET TUBE ASSEMBLY REPLACEMENT (Sheet 4 of 4)

9. Connect engine for powerplant ground hop (page 6-49).
10. Start and run engine (TM 9-2350222-10).

NOTE

If any replaced fitting leaks while engine is running, shut down engine and tighten or reinstall fitting.

11. Check replaced fitting for leaks.
12. Shut down engine (TM 9-2W222-10).
13. Disconnect engine from powerplant ground hop (page 5-62).
14. Remove rags from engine compartment.
16. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

■ FUEL TEE TO ENGINE HOSE ASSEMBLY REPLACEMENT (Sheet 1 of 6)

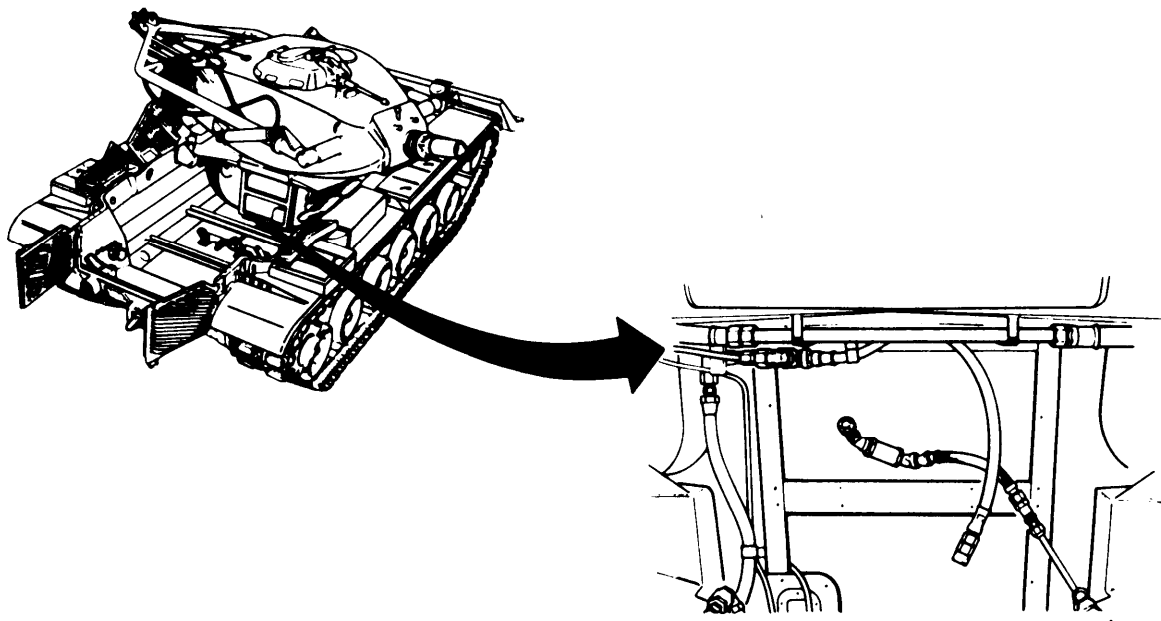
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-217
Installation	7-219

TOOLS: 1-1/4 in. combination box and open end wrench
 Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive
 10 in. adjustable wrench

SUPPLIES: Rags (Item 65, Appendix D)
 Lockwasher (MS35338-44) (2 required)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

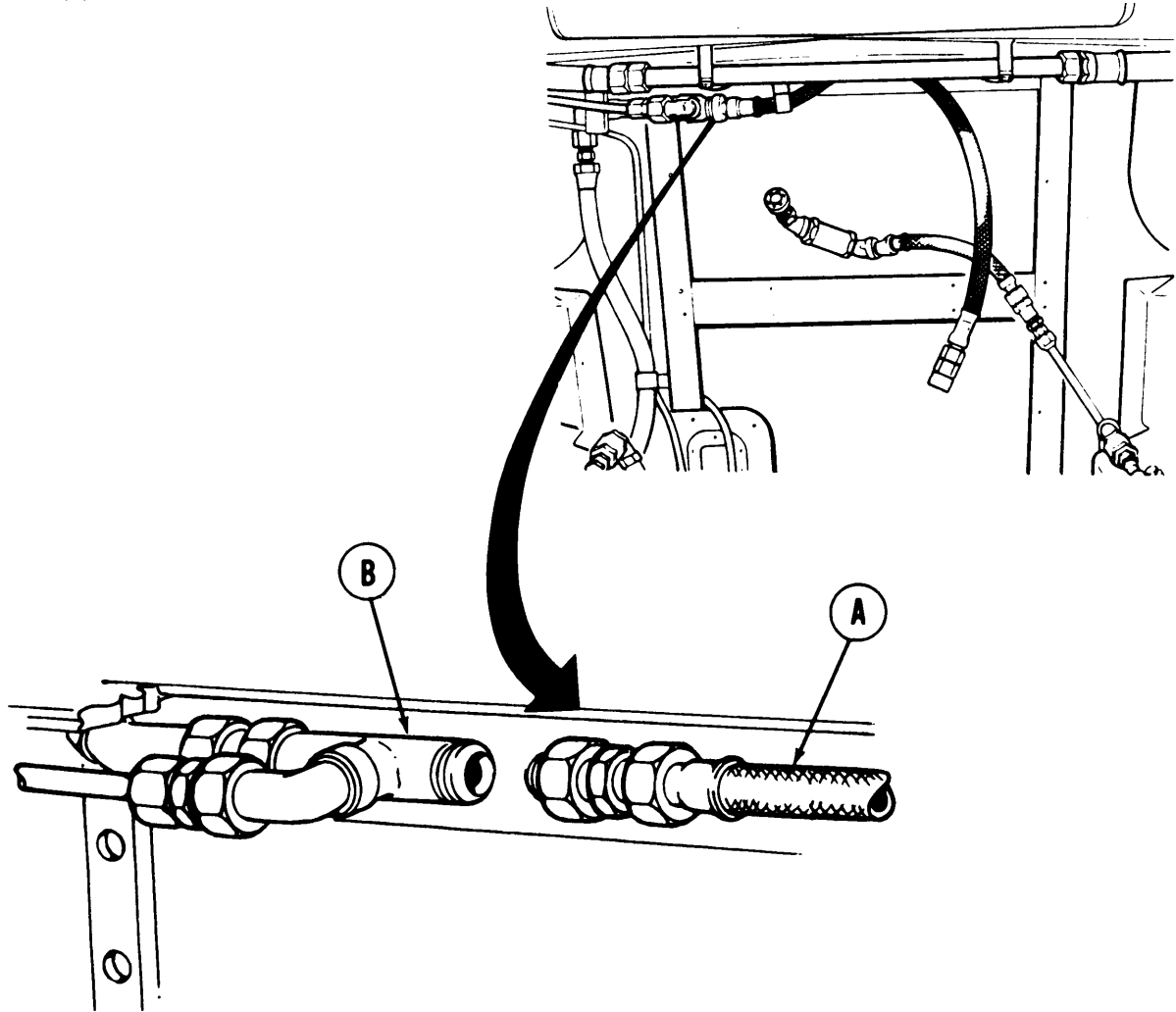


Go on to Sheet 2

TA253299

FUEL TEE TO ENGINE HOSE ASSEMBLY REPLACEMENT (Sheet 2 of 6)**REMOVAL:**

1. Using 1-1/4 inch wrench and 10 inch adjustable wrench, disconnect hose assembly (A) from tee (B).

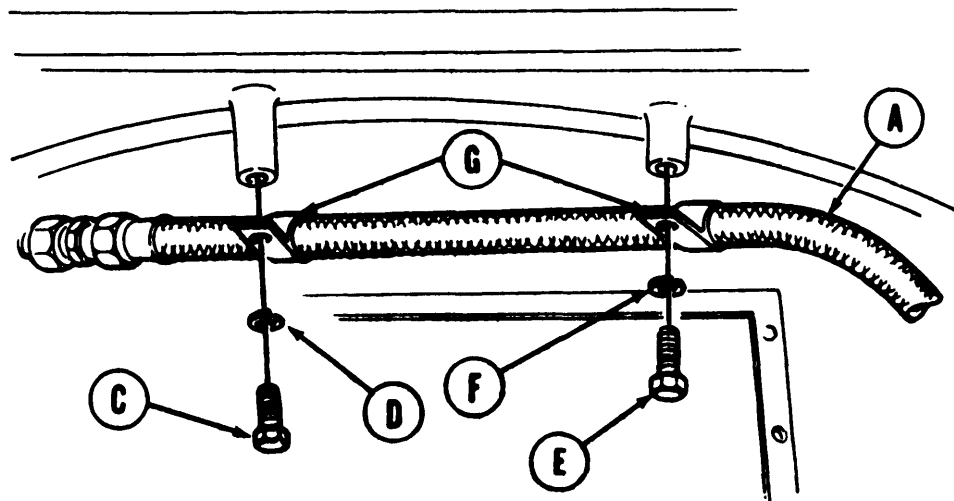


Go on to Sheet 3

TA253300

Change 1 7-217

■ FUEL TEE TO ENGINE HOSE ASSEMBLY REPLACEMENT (Sheet 3 of 5)



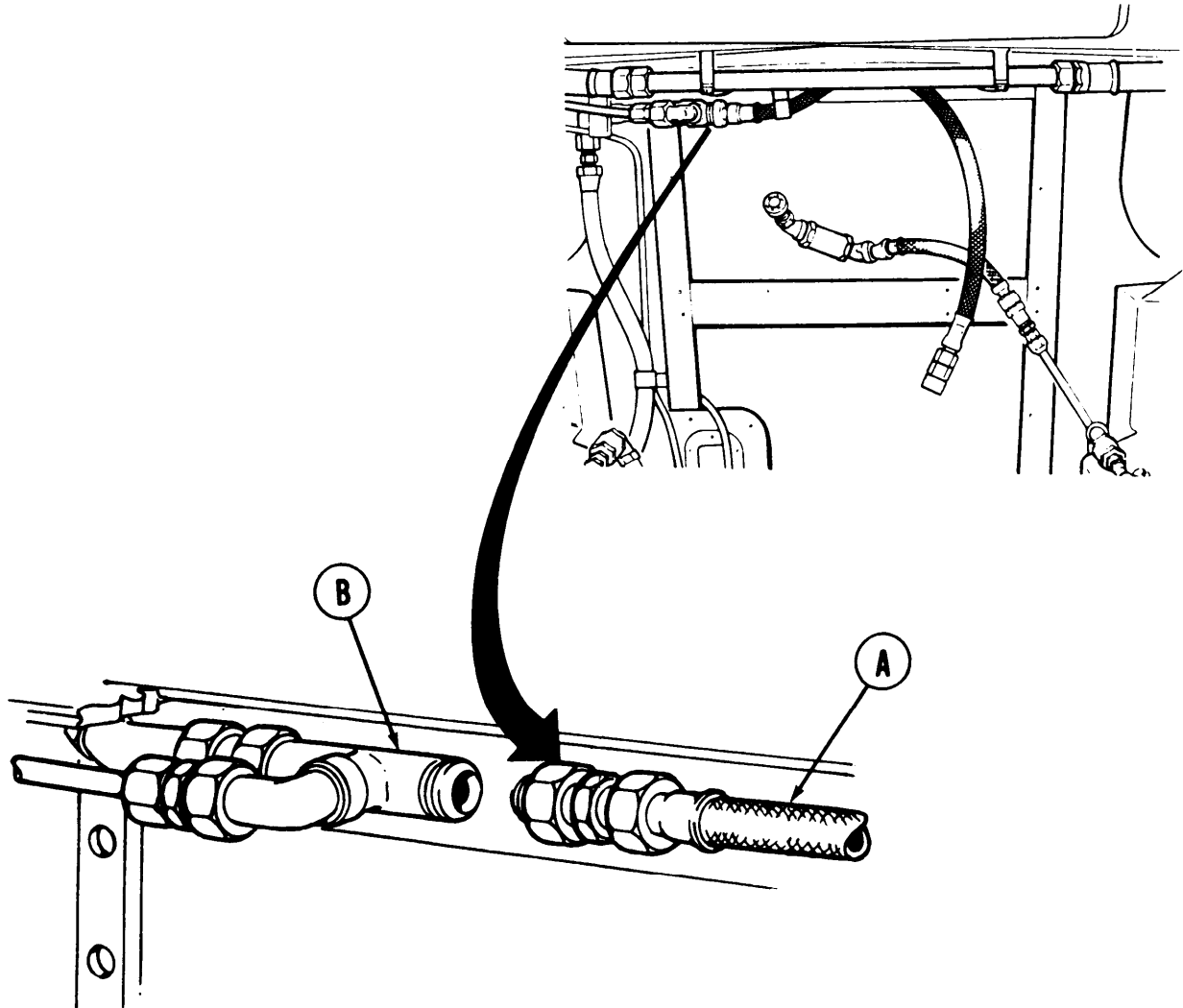
2. Using socket, remove screw (C) and lockwasher (D). Throw lockwasher away.
3. Using socket, remove screw (E) and lockwasher (F). Throw lockwasher away.
4. Remove hose assembly (A) with clamp (G).
5. Remove clamps (G) from hose assembly.
6. Remove hose assembly (A) from vehicle.

Go on to Sheet 4

TA253301

FUEL TEE TO ENGINE HOSE ASSEMBLY REPLACEMENT (Sheet 4 of 6)**INSTALLATION:**

1. Position hose assembly (A) into vehicle.
2. Using 1-1/4 inch wrench and 10 inch adjustable wrench, secure hose assembly (A) onto tee (B).

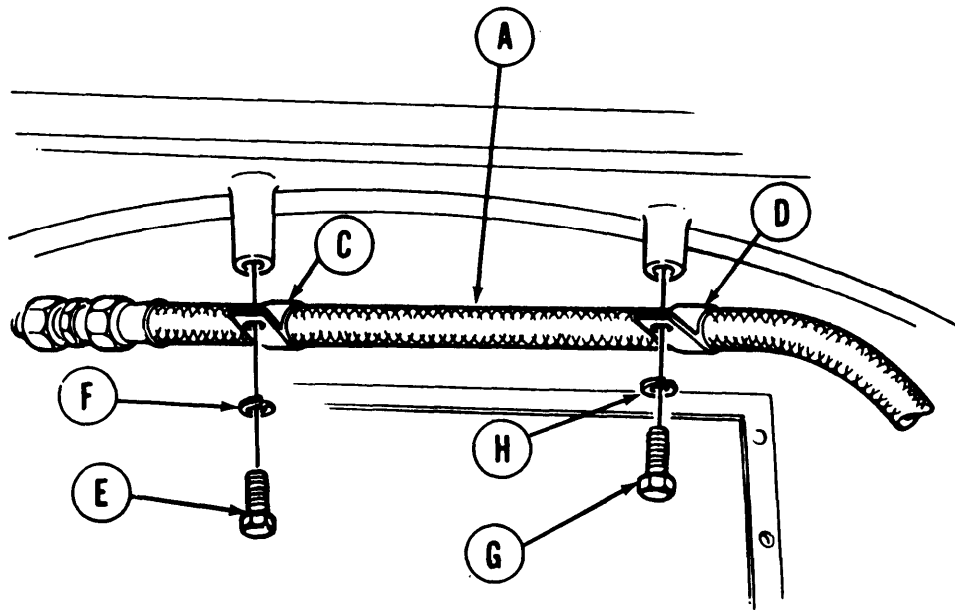


Go on to Sheet 5

TA253302

Change 1 7-219

FUEL TEE TO ENGINE HOSE ASSEMBLY REPLACEMENT (Sheet 6 of 6)



3. Install clamps (C) and (D) on hose assembly (A).
4. Using socket, install screw (E) and new lockwasher (F) to secure clamp (C).
5. Using socket, install screw (G) and new lockwasher (H) to secure clamp (D).
6. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA253303

PRIMER PUMP FUEL INLET OR OUTLET HOSE ASSEMBLY REPLACEMENT (EARLY MODEL) (Sheet 1 of 2)

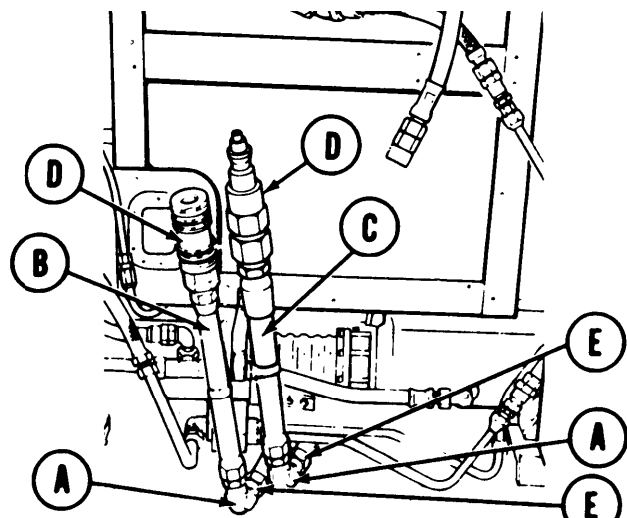
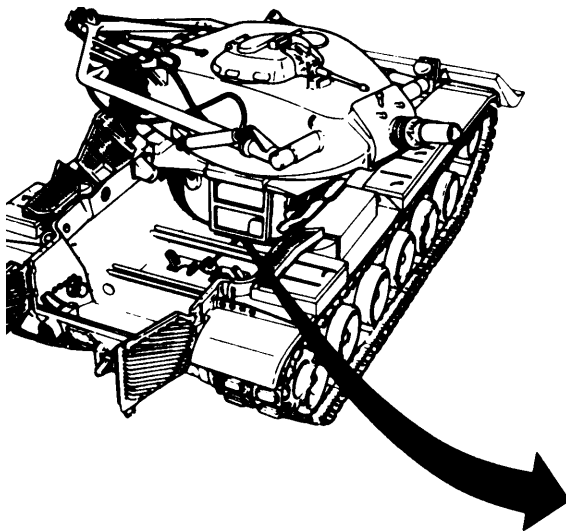
TOOLS: 5/8 in. combination box and open end wrench
9/16 in. combination box and open end wrench
3/4 in. combination box and open end wrench
10 in. adjustable wrench

SUPPLIES: Lint-free cloth (Item 12, Appendix D)
Dry cleaning solvent (Item 54, Appendix D)
Sealing compound (Item 27, Appendix D)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:

1. Clean fittings with lint-free cloth (Item 12, Appendix D) moistened with dry cleaning solvent (Item 54, Appendix D).
2. Using adjustable wrench, hold elbow (A) to keep from turning.
3. Using 9/16 inch wrench, remove hose assembly (B) or (C) from elbow (A).
4. Using 9/16 inch wrench and 3/4 inch wrench, remove coupling assembly (D) from hose assembly (B) or (C).
5. Using adjustable wrench to hold elbow (A), use 5/8 inch wrench and disconnect tube nut (E) from elbow (A).



Go on to Sheet 2

TA253208

Change 1 7-221

PRIMER PUMP FUEL INLET OR OUTLET HOSE ASSEMBLY REPLACEMENT (EARLY MODEL) (Sheet 2 of 2)

CLEANING AND INSPECTION:

1. Clean fittings and replacement parts with dry cleaning solvent (Item 54, Appendix D).
2. Inspect threaded fittings for nicks, burrs or other defects which could cause leakage. Replace any damaged parts.

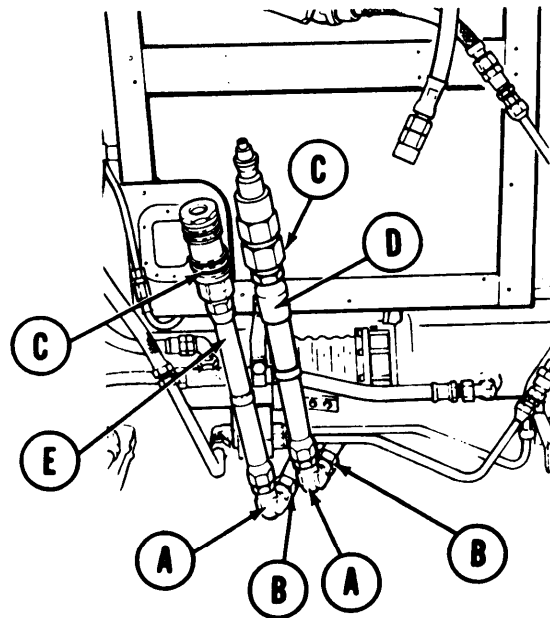
INSTALLATION:

1. Using adjustable wrench to hold elbow (A), use 5/8 inch wrench and connect tube nut (B) to elbow.
2. Using 9/16 inch wrench and 3/4 inch wrench, install coupling assembly (C) on hose assembly (D) or (E).

NOTE

Apply sealing compound (Item 27, Appendix D) to threads before installing parts.

3. Using adjustable wrench, hold elbow (A) to keep from turning.
4. Using 9/16 inch wrench, install hose assembly (D) or (E) to elbow (A).
5. Install 2A powerplant (page 6-14) or 2D powerplant (page 5-37).



End of Task

TA253209

PRIMER PUMP TO BULKHEAD UNION FUEL LINES REPLACEMENT (EARLY MODEL) (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-223
Cleaning and Inspection	7-225
Installation	7-225

TOOLS: 5/8 in. combination box and open end wrench (2 required)
 9/16 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive

SUPPLIES: Rags (Item 65, Appendix D)
 Lockwasher (MS35338-44) (S-required)

REMOVAL:

NOTE

- To remove primer pump fuel inlet lines do steps 1 and 3 through 12.
- To remove primer pump fuel outlet lines do steps 2 through 12.

1. Using 5/8 inch wrench remove tube nut (A) from tee (B). Move inlet tube assembly (C) slightly away from tee.
- 1.1 Using 1/2 inch wrench to hold adapter (D) use 5/8 inch wrench and remove tube nut (E) from adapter (D). Move outlet tube assembly (F) away from adapter.

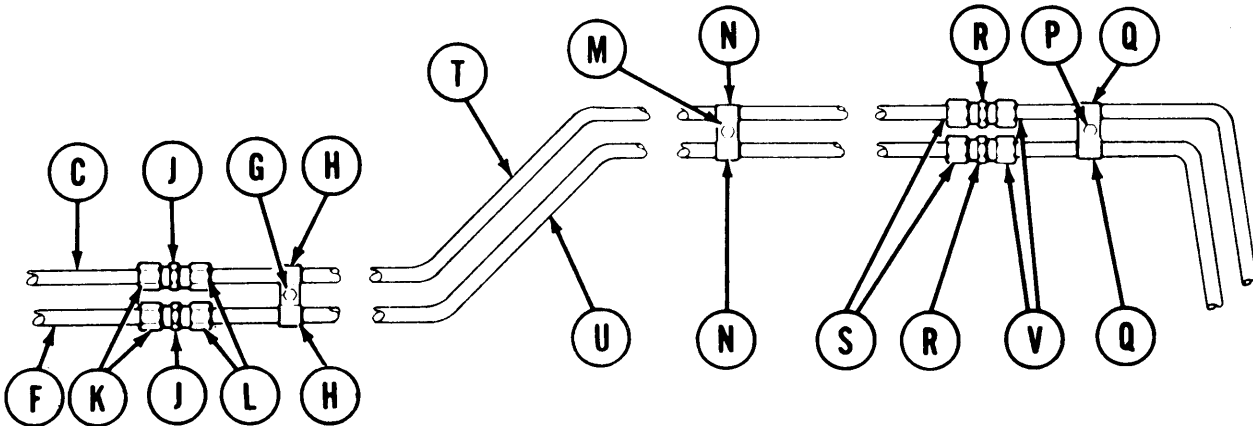
Go on to Sheet 2

TA253304

Change 1 7-223

PRIMER PUMP TO BULKHEAD UNION FUEL LINES REPLACEMENT (EARLY MODEL) (Sheet 2 of 5)

2. Using socket, remove screw and lockwasher (G). Remove clamp (H). Throw lockwasher away.



3. Using 5/8 inch wrench, hold nipple (J).
4. Using 5/8 inch wrench, remove tube nut (K) from nipple (J). know tube assembly (c) or (F).
5. Using 5/8 inch wrench, remove tube nut (L) and remove nipple (J).

NOTE

Traverse turret as necessary to get at the following parts.

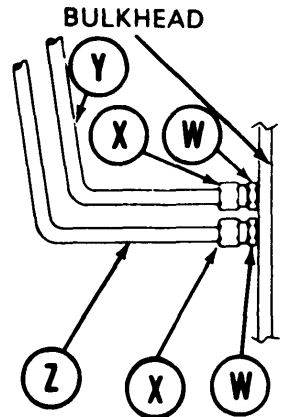
6. Using socket, remove screw and lockwasher (M). Remove clamp (N). Throw lockwasher away.
7. Using socket, remove screw and lockwasher (P). Remove clamp (Q). Throw lockwasher away.
8. Using 5/8 inch wrench, hold nipple (R).
9. Using 5/8 inch wrench, remove tube nut (S) from nipple (R). Remove tube assembly (T) or (U).
10. Using 5/8 inch wrench, remove tube nut V) and remove nipple (R).

Go on to Sheet 3

TA253305

RIMER PUMP TO BULKHEAD UNION FUEL LINES REPLACEMENT (EARLY MODEL) (Sheet 3 of 5)

11. Using 11/16 inch wrench to hold union (w) **use 5/8 inch wrench** and remove tube nut (X) from union.
12. Remove tube assembly (Y) or (z).



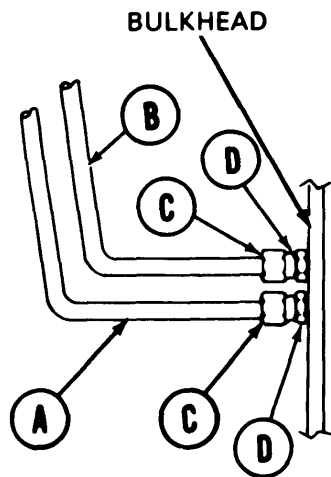
CLEANING AND INSPECTION:

1. Clean tube assemblies and nuts with rags. (Items 65, Appendix D).
2. Inspect all parts for damage or wear. Replace any damaged or worn part.

INSTALLATION:

NOTE

- To install primer pump fuel inlet lines do steps 1 through 10 and 14 through 16.
- To install pump fuel outlet do steps 1 through 7 and 11 through 16.



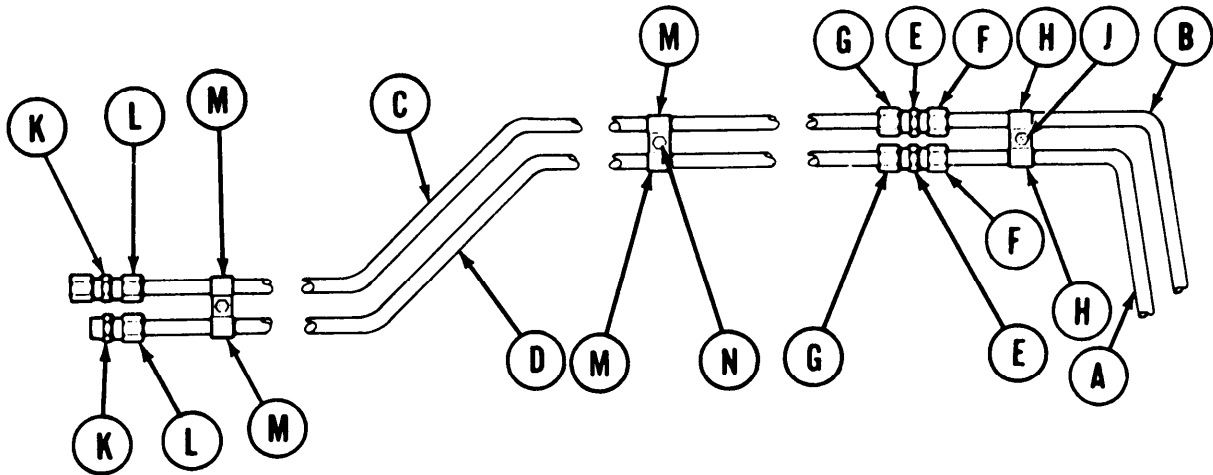
1. Place tube assembly (A) or (B) in position.
2. Using 5/8 inch wrench, connect tube nut (C) to union (D).

Go on to Sheet 2

TA253306

Change 1 7-225

PRIMER PUMP TO BULKHEAD UNION FUEL LINES REPLACEMENT (EARLY MODEL) (Sheet 4 of 5)

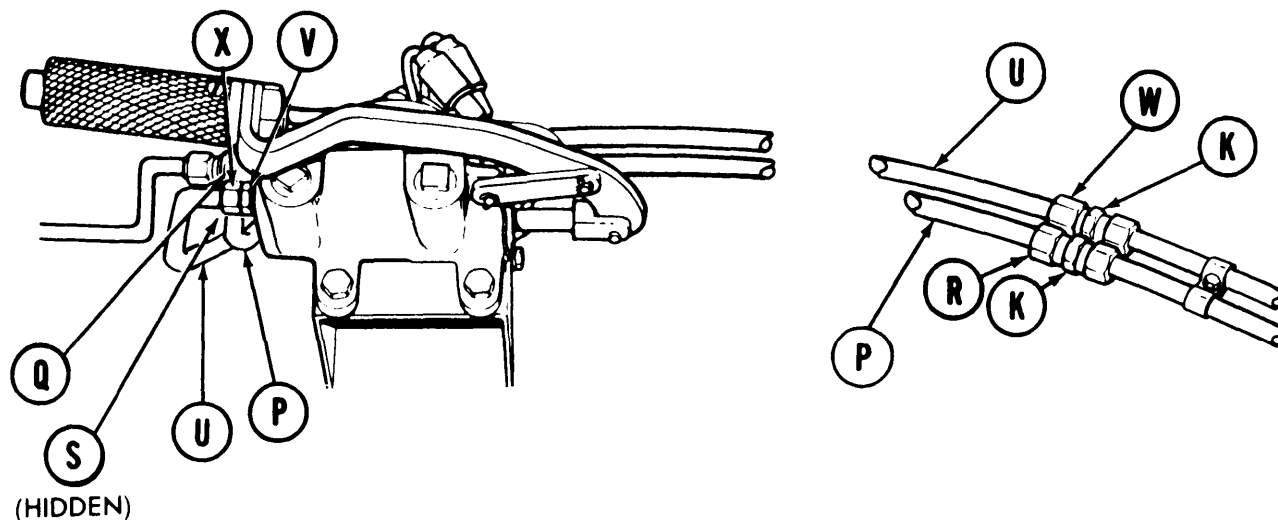


3. Position tube assembly (C) or (D)
4. Using 5/8 inch wrench to hold nipple (E) use 5/8 inch wrench and connect tube nuts (G and F).
5. Position clamps (H) on tube assemblies (A & B) and using socket secure with new lockwasher and screw (J).
6. Using 5/8 inch wrench to hold nipple (K), use 5/8 inch wrench and connect tube nut (L) to nipple (K).
7. Position clamps (M) on tube assemblies (C and D) and using socket secure with new lockwashers and screws (N).

Go on to Sheet 5

TA253307

RIMER PUMP TO BULKHEAD UNION FUEL LINES REPLACEMENT (EARLY MODEL) (Sheet 5 of 6)



8. Position tube assembly (P) to nipple (K) and tee (Q).
9. Using 5/8 inch wrench to hold nipple (K) use 5/8 inch wrench and connect tube nut (R) to nipple (K).
10. Using 5/8 inch wrench, connect tube nut (S) to tee (Q)
position tube assembly (U) to nipple (K) and adapter (V).
12. Using 5/8 inch wrench to hold nipple (K) use 5/8 inch wrench and connect tube nut (W) to nipple (K).
13. Using 5/8 inch wrench connect tube nut (X) to adapter (V).
14. Check all connections for tightness, tighten as required.
15. Operate primer pump (TM 9-2350-222-10) and check for leaks. Correct leaks as necessary.
16. Using rags (Item 65, appendix D) clean all fuel spillage.

of Task

TA253308

Change 1 7-227
(7-228 through 7-234 deleted)

INTER-TANK SWING CHECK VALVE REPLACEMENT (Sheet 1 of 5)

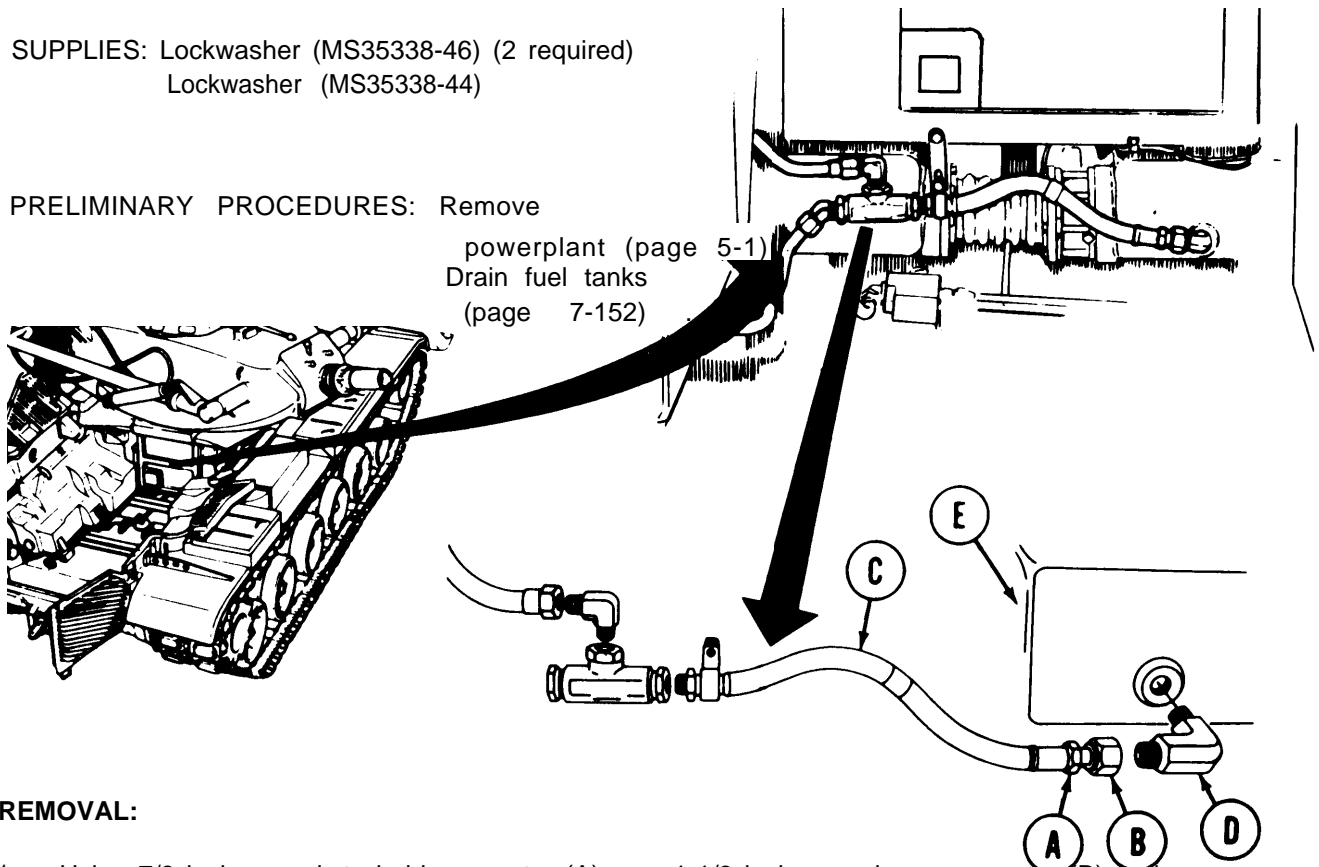
PROCEDURE	PROCEDURE INDEX	PAGE
Removal		7-235
Inspection		7-237
Installation		7-237

TOOLS: Automotive wrench
 1-1/8 in. open end wrench
 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 1-1/4 in. open end wrench
 Vise
 7/16 in. socket with 1/2 in. drive

7/8 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 1 in. combination box and open end wrench

SUPPLIES: Lockwasher (MS35338-46) (2 required)
 Lockwasher (MS35338-44)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Drain fuel tanks (page 7-152)



REMOVAL:

- Using 7/8 inch wrench to hold connector (A), use 1-1/8 inch wrench on connector (B) and remove hose (C) from elbow (D).
- Using automotive wrench, remove elbow (D) from right fuel tank (E).

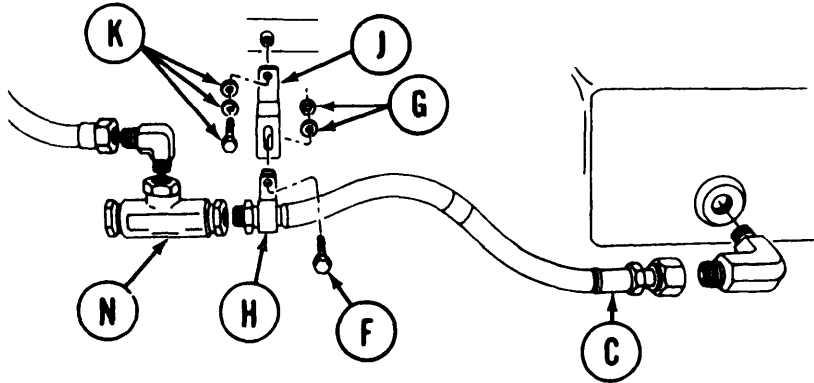
Go on to Sheet 2

RA148999

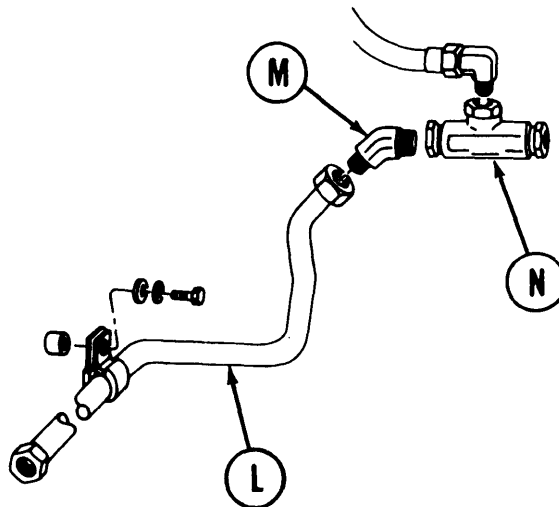
INTER-TANK SWING CHECK VALVE REPLACEMENT (Sheet 2 of 6)

- 3. Using 9/16 inch socket and 9/16 inch wrench, remove screw (F) and nut and lockwasher (G) holding clamp (H) to bracket (J). Throw lockwasher away.

- 4. Remove clamp (H) from hose (C).



- 5. Using 9/16 inch socket, remove screw, lockwasher, and washer (K) holding bracket (J) to hull. Throw lockwasher away.
- 6. Remove bracket (J).
- 7. Using 1 inch wrench on fuel hose (L) and 7/8 inch wrench on elbow (M), loosen fuel line (L) from elbow (M).
- 8. Using 7/8 inch wrench on fuel hose (C) coupling nut and 1-1/4 inch wrench on check valve (N), remove fuel hose (C).
- 9. Using 1-1/4 inch wrench on check valve (N) and 7/8 inch wrench on elbow (M), remove elbow (M). Use vise if necessary.

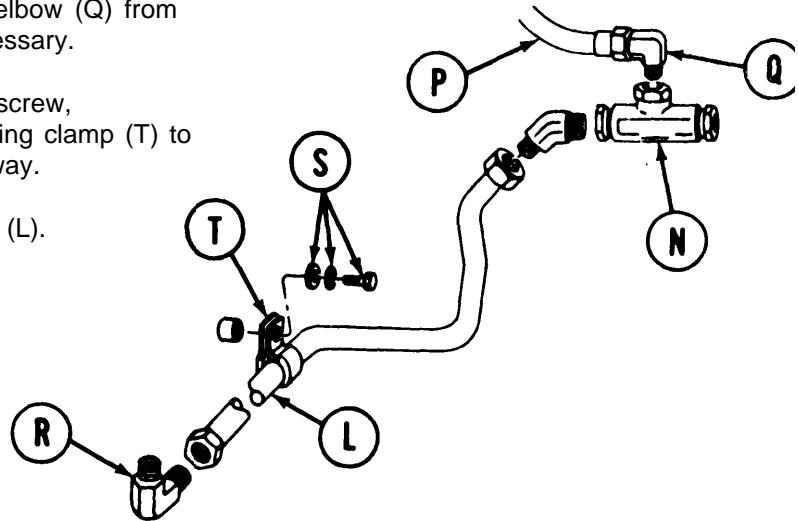


Go on to Sheet 3

TA148998

INTER-TANK SWING CHECK VALVE REPLACEMENT (Sheet 3 of 5)

10. Using 1 inch wrench on fuel line (P) and 7/8 inch wrench on elbow (Q), loosen fuel line (P) from elbow (Q).
11. Using 7/8 inch wrench, remove elbow (Q) from check valve (N). Use vise if necessary.
12. Using 7/16 inch socket, remove screw, lockwasher, and washer (S) holding clamp (T) to fuel tank. Throw lockwasher away.
13. Remove clamp (T) from fuel line (L).



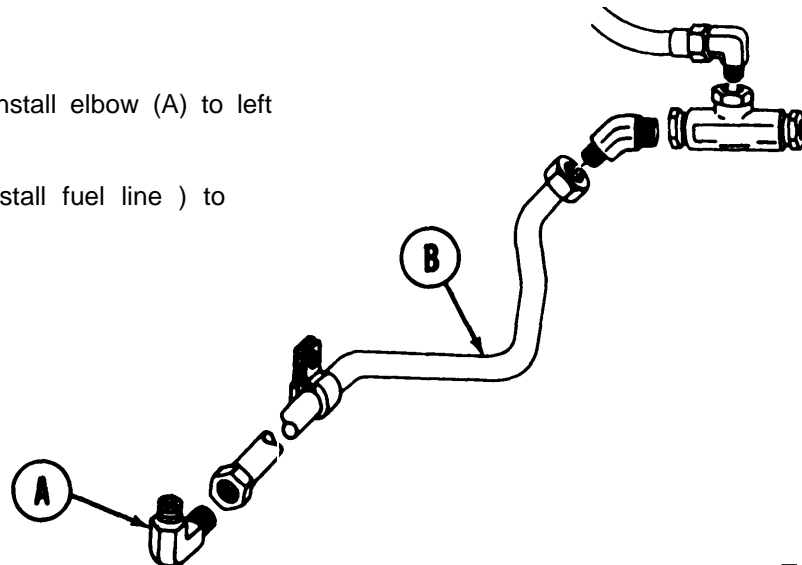
14. Using 1 inch wrench on fuel line (L) and 7/8 inch wrench on elbow (R), loosen fuel line (L) from elbow (R) (located behind left fuel tank rear mount).
15. Using 7/8 inch wrench, remove elbow (R) from left fuel tank.
16. Remove fuel line (L).

INSPECTION:

Inspect threaded parts for bad threads. Check tubing for cracks or bends. Replace defective parts.

INSTALLATION:

1. Using 7/8 inch wrench, install elbow (A) to left fuel tank.
2. Using 1 inch wrench, install fuel line (B) to elbow (A).

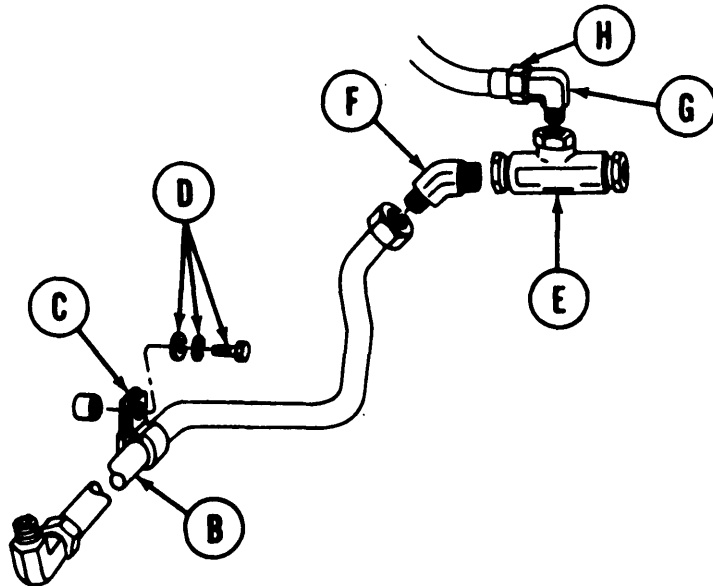


Go on to Sheet 4

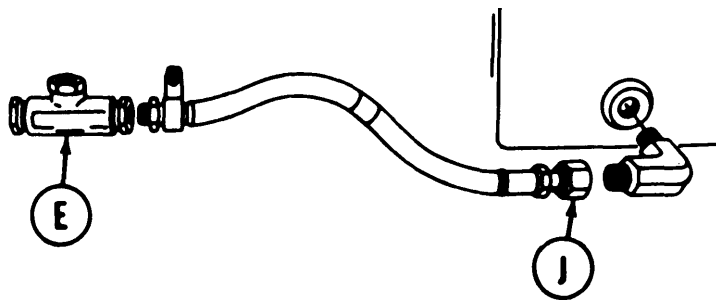
TA148997

INTER-TANK SWING CHECK VALVE REPLACEMENT (Sheet 4 Of 5)

3. Install clamp (C) to fuel line (B).
4. Using 7/16 inch socket, install screw, new lockwasher, and washer (D) to secure clamp (C) to hull.



5. Using 1-1/4 inch wrench on check valve (E) and 7/8 inch wrench on elbow (F), install elbow(F) to check valve (E).
6. Using 1-1/4 inch wrench on check valve (E) and 7/8 inch wrench on elbow (G), install elbow (F) on check valve (E).
7. Using 7/8 inch wrench on elbow (F) and 1 inch wrench on fuel line (B) install fuel line (B) to elbow (F).
8. Using 7/8 inch wrench on elbow (G) and 1 inch wrench on fuel line (H), install fuel line (H) to elbow (G).
9. Using 1-1/4 inch wrench on check valve (E) and 7/8 inch wrench on fuel line (J), install fuel line (J) to check valve (E).

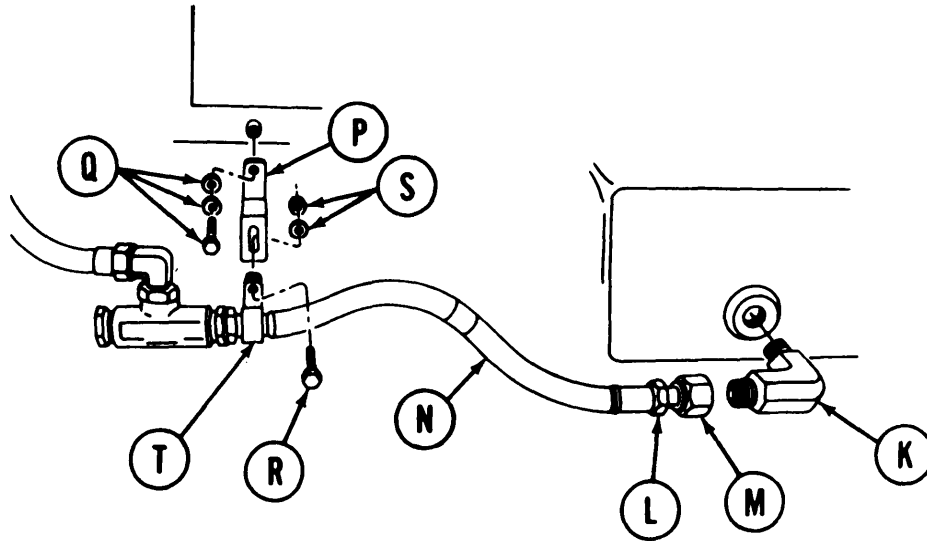


Go onto Sheet 5

TA148996

INTER-TANK SWING CHECK VALVE REPLACEMENT (Sheet 5 of 6)

10. Using 7/8 inch wrench, install elbow (K) to right fuel tank.
11. Using 7/8 inch wrench to hold connector (L) and 1-1/8 inch wrench on connector (M) install fuel line (N) to elbow (K).



12. Using 9/16 inch socket, install bracket (P) to hull using screw, new lockwasher, and washer (Q).
13. Install clamp (T) to hose (N).
14. Using 9/16 inch socket on screw (R) and 9/16 inch wrench on nut (S), install screw (R) and new lockwasher and nut (S) through clamp (T) and bracket (P).
15. Tighten screw (R) and nut and lockwasher (S).
16. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).
17. Fill fuel tanks.

End of Task

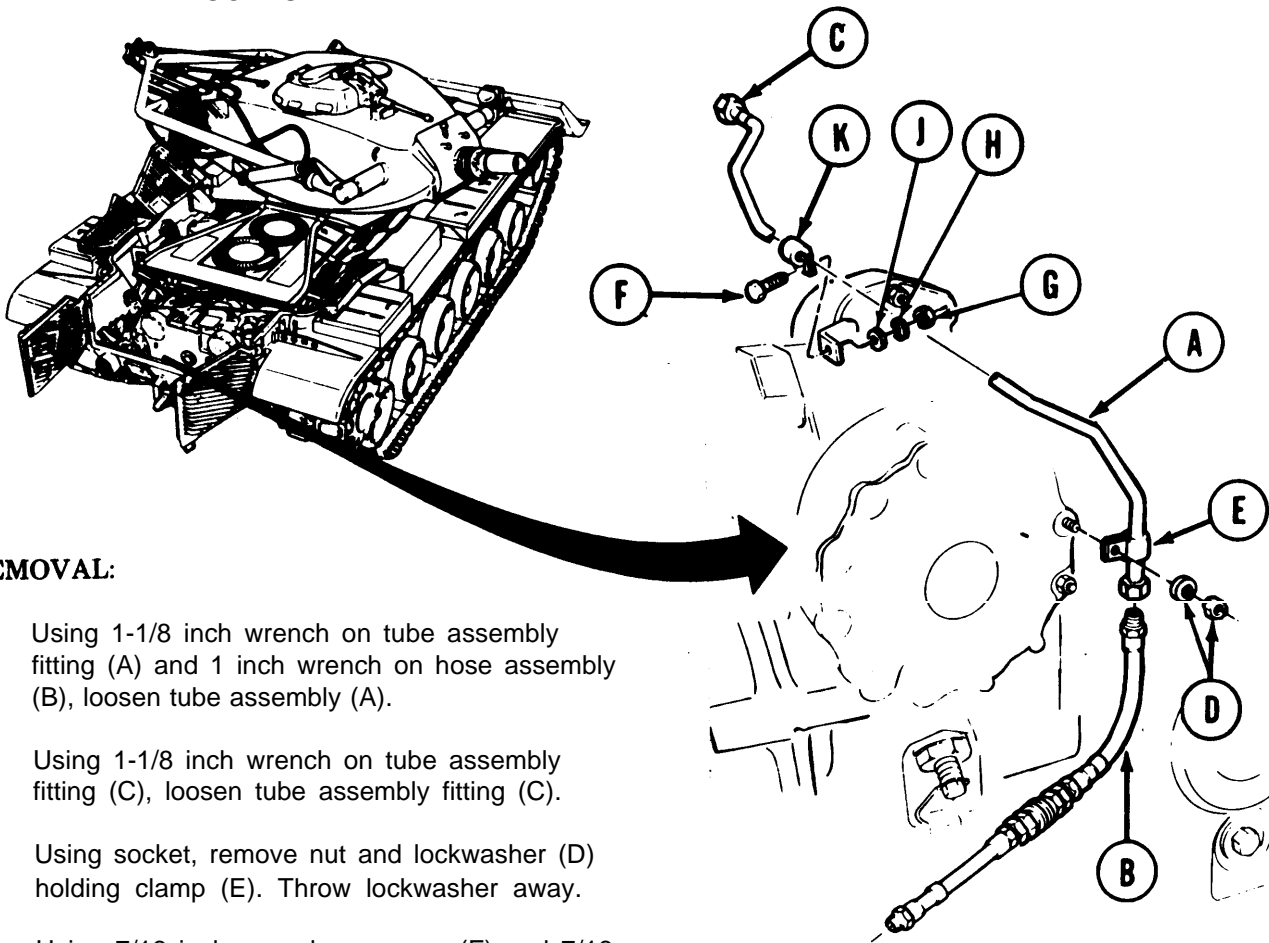
TA148995

ENGINE FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 2)

- Tools:** 1 in. combination box and open end wrench
 1-1/8 in. open end wrench
 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 7/16 in. combination box and open end wrench (2 required)

SUPPLIES: Lockwasher (MS35338-44) (2 required)

PRELIMINARY PROCEDURE: Remove transmission shroud (page 9-20).



REMOVAL:

1. Using 1-1/8 inch wrench on tube assembly fitting (A) and 1 inch wrench on hose assembly (B), loosen tube assembly (A).
2. Using 1-1/8 inch wrench on tube assembly fitting (C), loosen tube assembly fitting (C).
3. Using socket, remove nut and lockwasher (D) holding clamp (E). Throw lockwasher away.

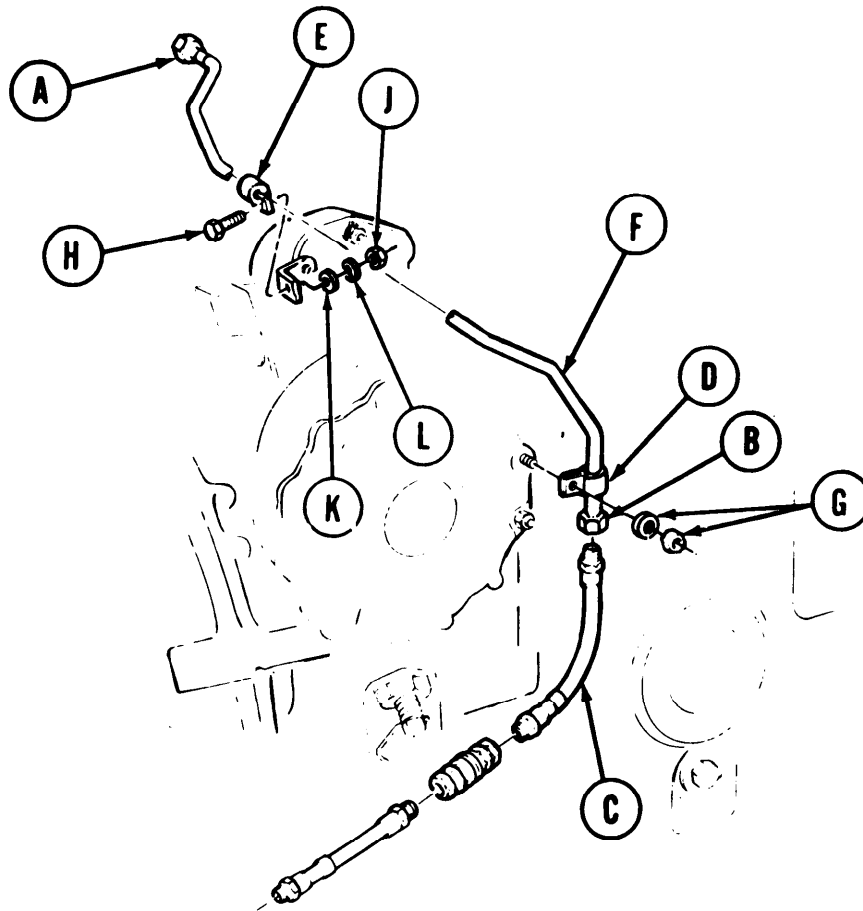
 Using 7/16 inch wrench on screw (F) and 7/16 inch wrench on nut (G), remove screw (F) nut (G), lockwasher (H), and washer (J), holding clamp (K). Throw lockwasher (H) away.
5. Remove clamps (E) and (K) from tube assembly (A).
6. Remove tube assembly (A) from vehicle.

Go on to Sheet 2

TA148994

ENGINE FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 2)**INSTALLATION:**

- Using 1-1/8 inch wrench, install tube assembly fitting (A).
2. Using 1-1/8 inch wrench on tube assembly fitting (B) and 1 inch wrench on hose assembly (C), install tube assembly fitting (B) to hose (C).
 3. Install clamps (D) and (E) to tube assembly (F).
 4. Using socket, install nut and new lockwasher (G) to secure clamp (D).
 5. Using 7/16 inch wrench on screw (H) and 7/16 inch wrench on nut (J), install screw (H), washer (K), new lockwasher (L), and nut (J) to secure damp (E).
 6. Install transmission shroud (page 9-23).



End of Task

TA148993

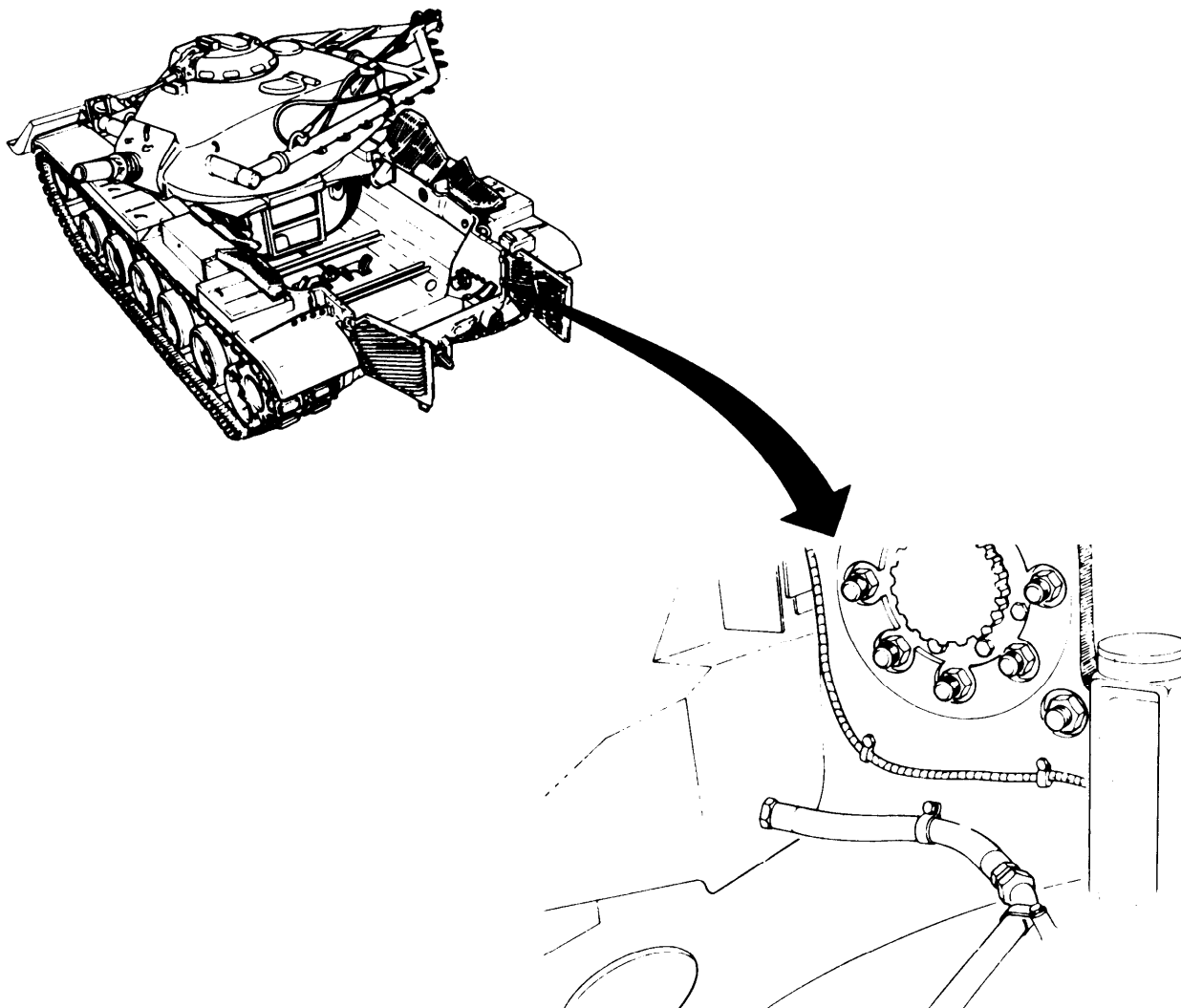
FUEL RETURN HOSE (RIGHT FUEL TANK) REPLACEMENT (Sheet 1 of 2)

TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
1-1/2 in. open end wrench
1-7/16 in. open end wrench
Wire brush

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Sealing compound (Item 24, Appendix D)
Rags (Item 65, Appendix D)
Lockwasher (MS35338-45)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Drain fuel tanks (page 7-152)



Go on to Sheet 2

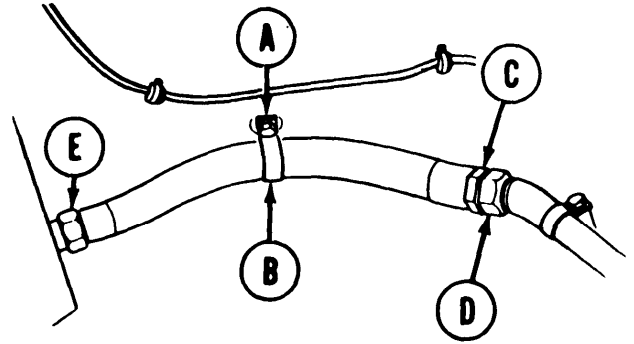
TA148992

FUEL RETURN HOSE (RIGHT FUEL TANK) REPLACEMENT (Sheet 2 of 2)**NOTE**

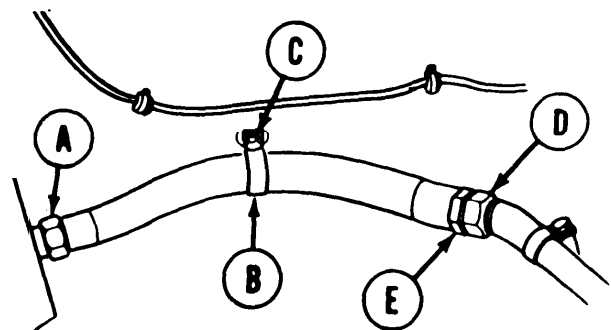
Put rags (Item 65, Appendix D) 'under each connection before removing hose end fittings.

REMOVAL:

1. Using socket, loosen and remove bolt and lockwasher (A) from hose clamp (B). Throw lockwasher away.
2. Using 1-7/16 inch wrench on hose and fitting (C), and 1-1/2 inch wrench on fitting (D), hold hose at point (C) while loosening fitting (D) away from hose and fitting (C).
3. Using 1-7/16 inch wrench, loosen fitting (with hose) (E). Remove hose.

**INSTALLATION:**

1. Lightly coat threads of both male hose ends with sealing compound (Item 24, Appendix D).
2. Using 1-7/16 inch wrench, secure fitting (with hose) (A).
3. Using socket, secure clamp (B) with bolt and new lockwasher (C).
4. Using 1-7/16 inch wrench on hose and fitting and 1-1/2 inch wrench on fitting (E), hold hose at point (D) while securing fitting (E).
5. Ground hop engine and allow it to run for brief time while checking for leaks. If leak is detected, stop engine and tighten fitting. If fittings do not leak, disconnect ground hop.
6. Replace 2A powerplant (page 5-14) or 2D powerplant (page 5-37).
7. Fill fuel tanks.



End of Task

TA148991

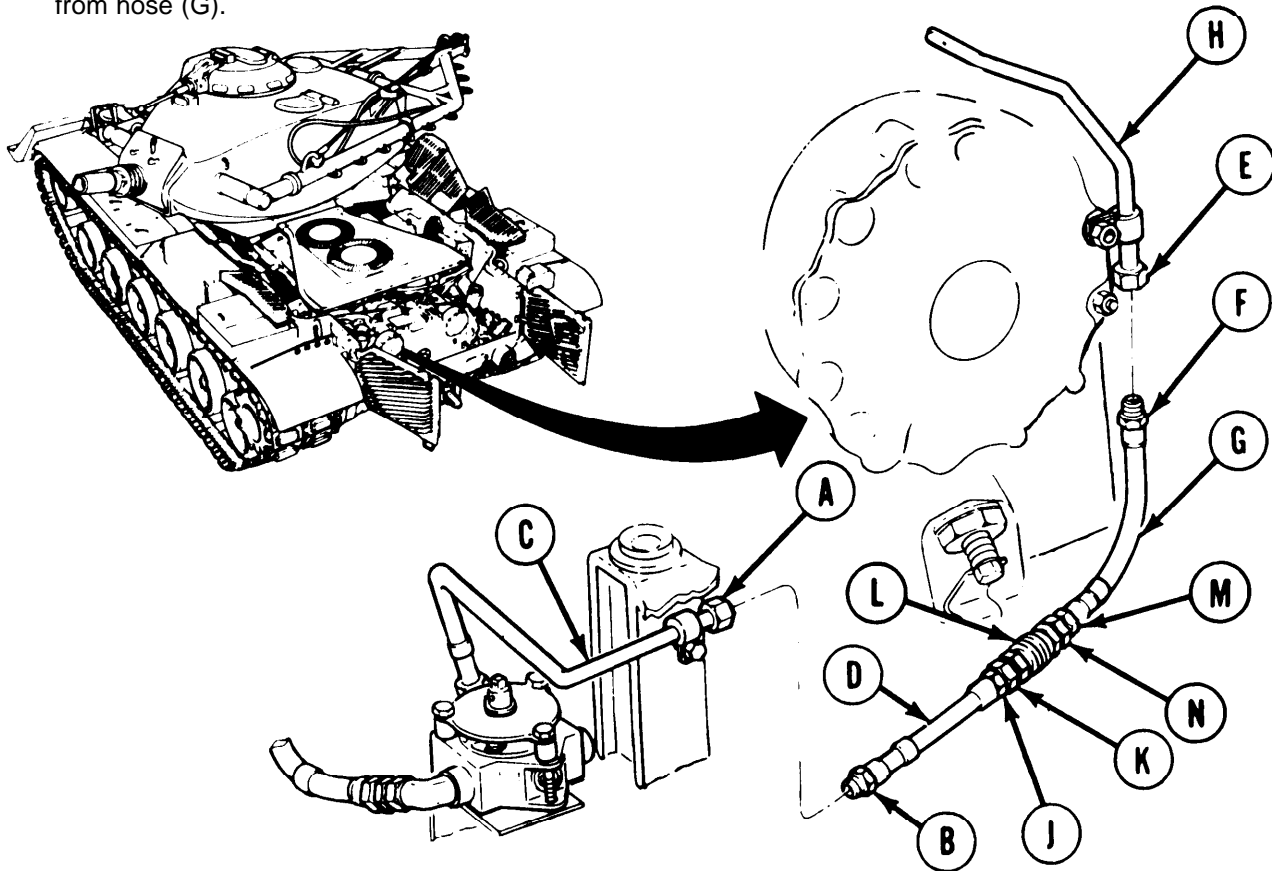
ENGINE FUEL RETURN HOSE REPLACEMENT (Sheet 1 of 2)

TOOLS: 1-1/8 in. open end wrench
1 in. combination box and open end wrench
1-1/4 in. open end wrench

PRELIMINARY PROCEDURES: Remove transmission shroud (page 9-20)
Drain fuel tanks (page 7-152)

REMOVAL:

1. Using 1-1/8 inch wrench on fitting (A) and 1 inch wrench on fitting (B), loosen fuel line (C) from fuel hose (D).
2. Using 1-1/8 inch wrench on fitting (E) and 1 inch wrench on fitting (F), loosen fuel hose (G) from fuel line (H).
3. Remove hoses (D) and (G) from vehicle.
4. Using 1 inch wrench on hose fitting (J) and 1-1/4 inch wrench on fitting (K), remove hose (D) from coupling (L).
5. Using 1 inch wrench on hose fitting (M) and 1-1/4 inch wrench on fitting (N), remove coupling (L) from hose (G).



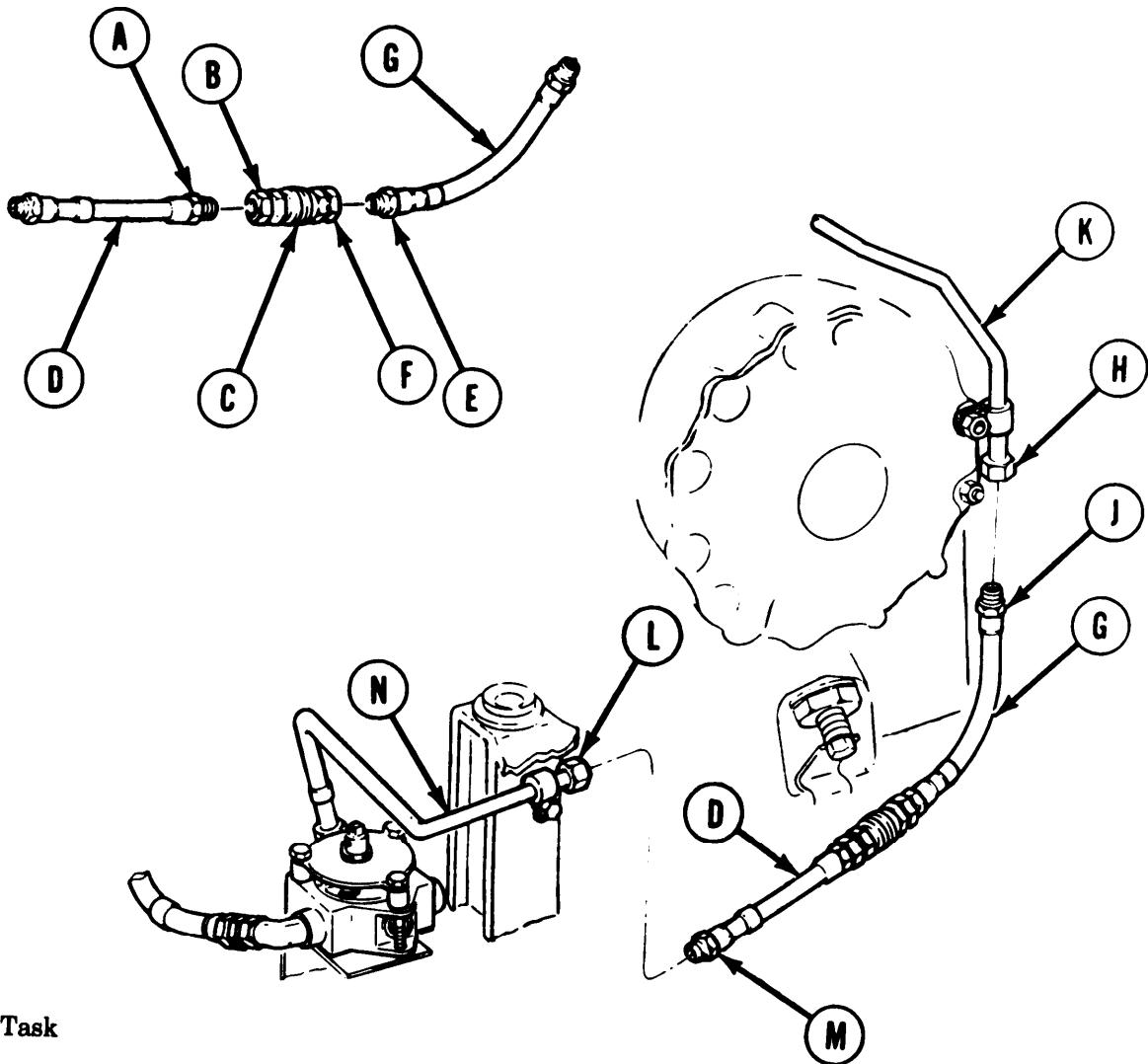
Go on to Sheet 2

TA148990

ENGINE FUEL RETURN HOSE REPLACEMENT (Sheet 2 Of 2)

INSTALLATION:

- Using 1 inch wrench on hose fitting (A) and 1-1/4 inch wrench on fitting (B), install coupling (C) to hose (D).
2. Using 1 inch wrench on fitting (E) and 1-1/4 inch wrench on fitting (F), install hose (G) to coupling (c).
 3. Using 1-1/8 inch wrench on fitting (H) and 1 inch wrench on fitting (J), install hose (G) to line (K).
 4. Using 1-1/8 inch wrench on fitting (L) and 1 inch wrench on fitting (M), install hose (D) to line (N).
 5. **Install transmission shroud (page 9-23).**
 6. **Fill fuel tanks.**



End of Task

TA148989

FUEL RETURN TUBE ASSEMBLY (RIGHT FUEL TANK) REPLACEMENT (Sheet 1 of 3)

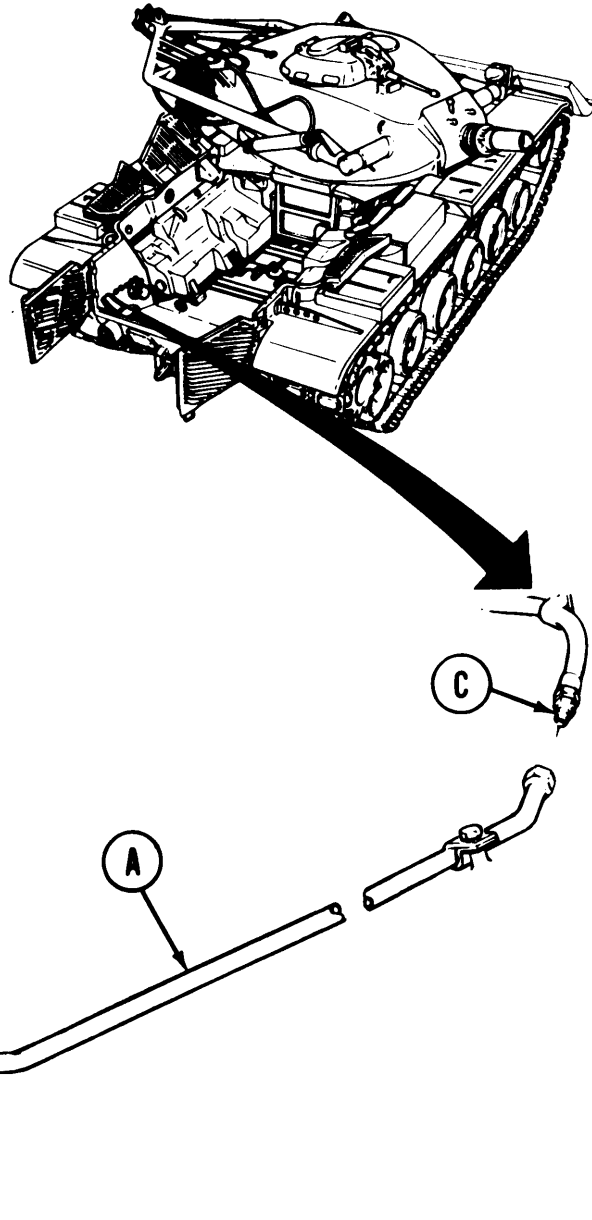
TOOLS: 1-3/8 in. open end wrench
1-1/2 in. open end wrench
7/16 in. socket with 1/2 in drive
Ratchet with 1/2 in. drive

SUPPLIES: Rags (Item 65, Appendix D)
Lockwasher (MS35338-44)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Drain fuel tanks (Page 7-152)

REMOVAL:

1. Using 1-3/8 inch wrench and 1-1/2 inch wrench, disconnect left nut of tube (A) from fuel tank selection valve adapter (B).
2. Using 1-1/2 inch wrench and 1-3/8 inch wrench, disconnect right nut of tube (A) from right fuel tank return hose (C).



Go on to Sheet 2

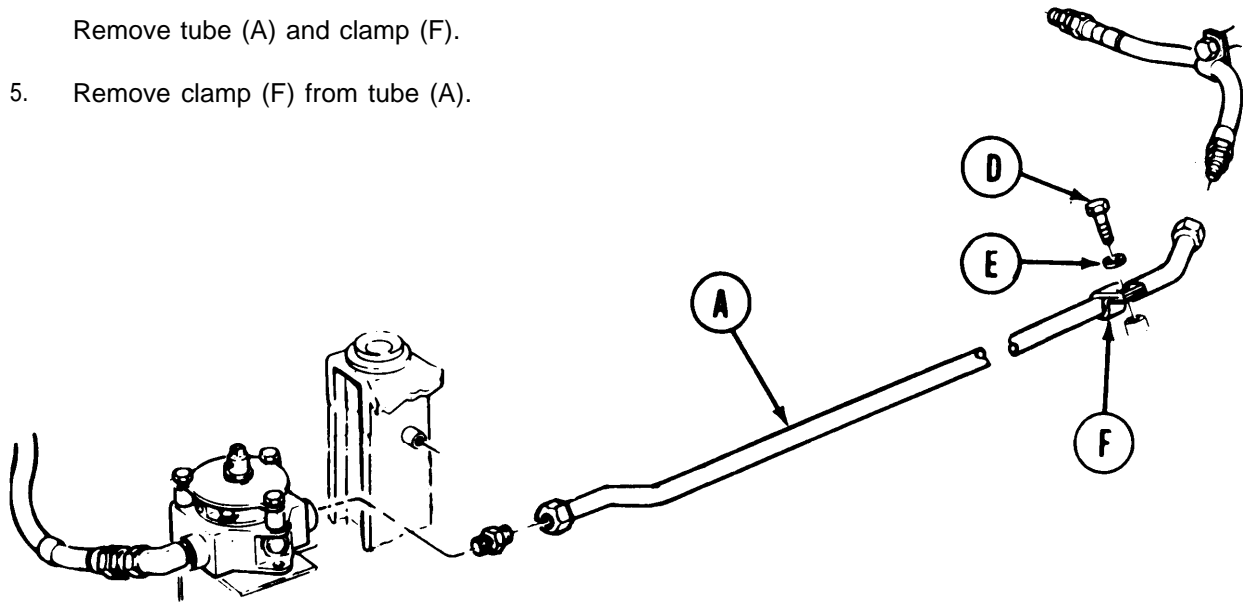
TA148988

FUEL RETURN TUBE ASSEMBLY (RIGHT FUEL TANK) REPLACEMENT (Sheet 2 of 3)

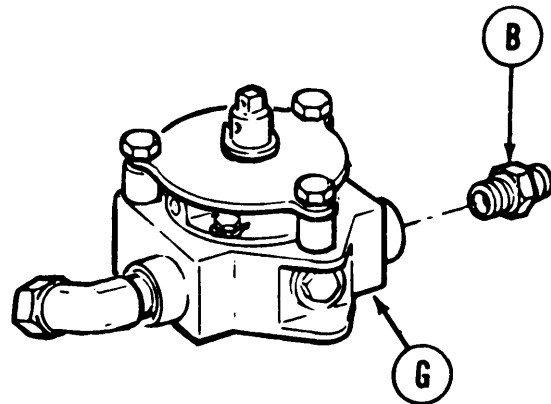
3. Using socket, remove screw (D) and lockwasher (E) holding tube (A) and clamp (F) to threaded stud. Throw lockwasher away.

Remove tube (A) and clamp (F).

5. Remove clamp (F) from tube (A).



Using 1-3/8 inch wrench, remove adapter (B) from fuel tank selector valve (G).



Go on to Sheet 3

TA148987

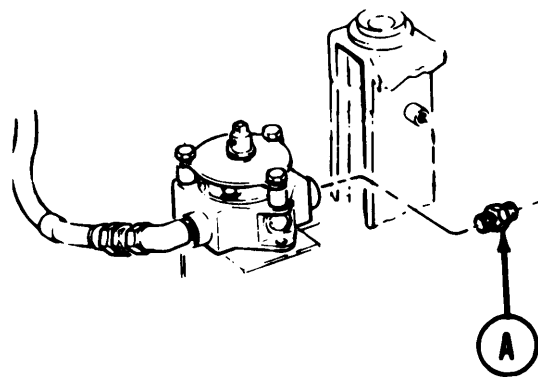
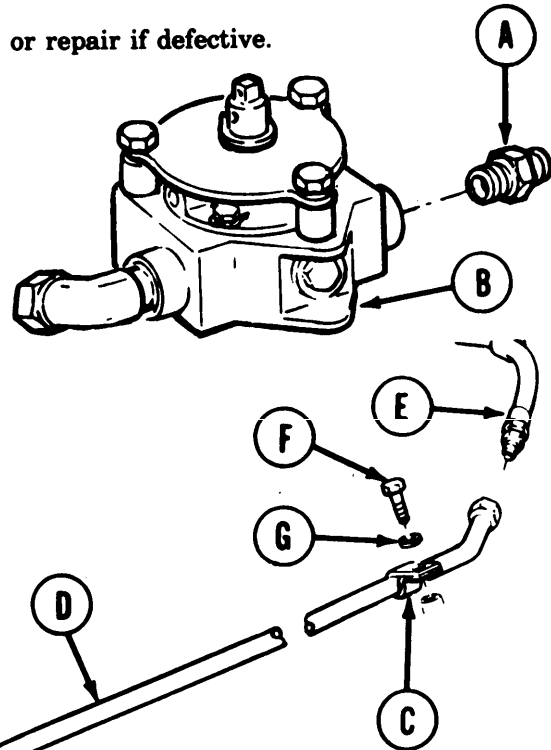
FUEL RETURN TUBE ASSEMBLY (RIGHT FUEL TANK) REPLACEMENT (Sheet 3 of 3)

INSPECTION:

Inspect threaded components for thread damage. Replace **or repair if defective.**

INSTALLATION:

1. Using 1-3/8 inch wrench, install adapter (A) to fuel tank selector valve (B).
2. Install clamp (C) to tube (D).
3. Using 13/8 inch wrench and 1-1/2 inch wrench, loosely install left nut of tube (D) to fuel tank selector valve adapter (A).



4. Using 1-1/2 inch wrench and 1-3/8 inch wrench, loosely install right nut of tube (D) to right fuel tank return hose (E).
5. Using socket, secure clamp (C) and tube (D) to hull floor with screw (F) and new lockwasher (G).
6. Tighten right and left nuts of tube (D).
7. Install 2A powerplant (page 5-14) or 2D powerplant (page &37).
8. Fill fuel tanks.

End of Task

TA148986

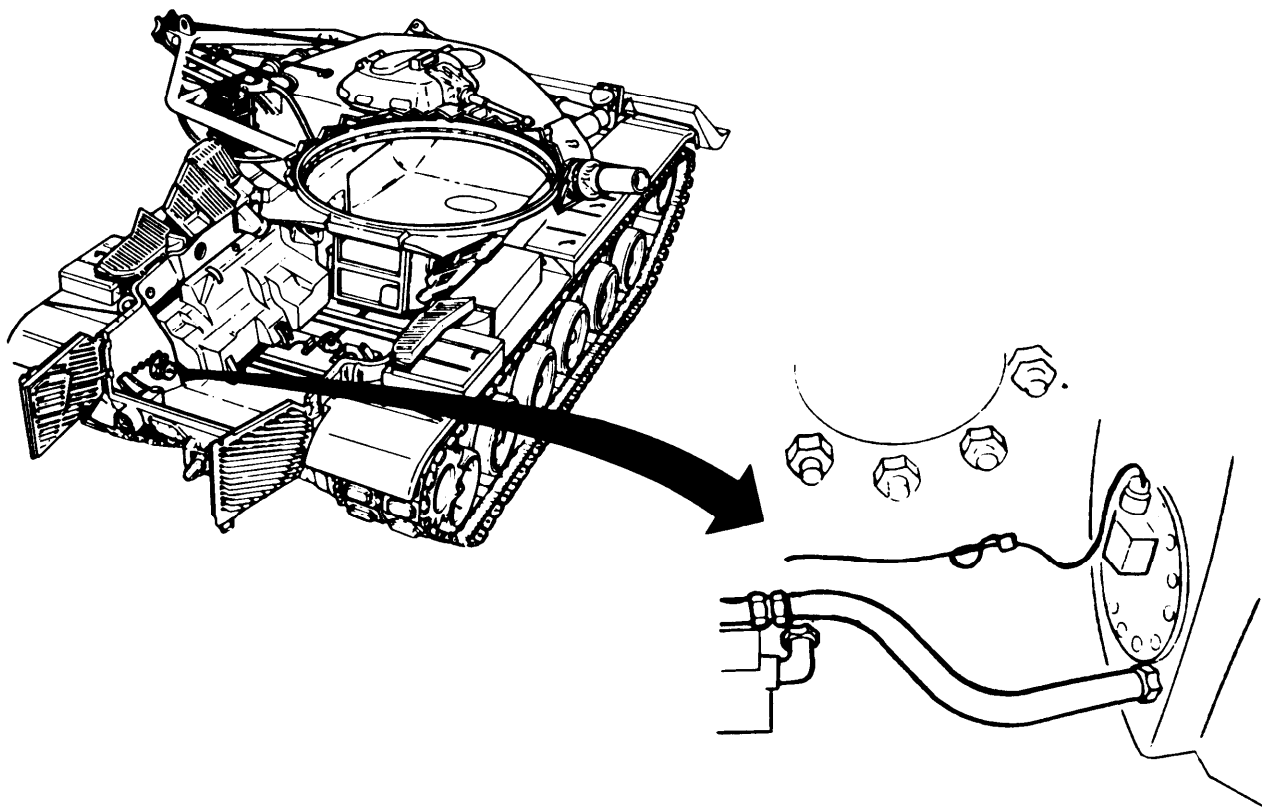
FUEL RETURN HOSE (LEFT FUEL TANK) REPLACEMENT (Sheet 1 of 2)

TOOLS: 1-1/4 in. open end wrench
1-1/2 in. open end wrench
1-3/8 in. open end wrench

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Sealing compound (Item 24, Appendix D)
Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Drain fuel tanks (page 7-152)
Remove engine fuel return hose (page 7-244)



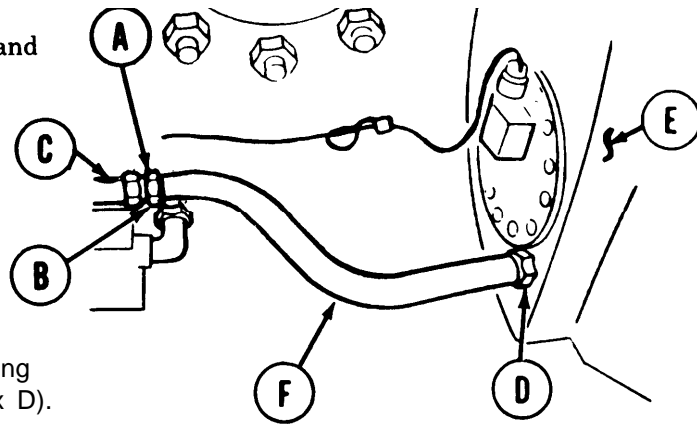
Go on to Sheet 2

TA148985

FUEL RETURN HOSE (LEFT FUEL TANK) REPLACEMENT (Sheet 2 of 2)

REMOVAL:

1. Using 1-1/4 inch wrench to hold fitting (A), use 1-1/2 inch wrench and loosen fitting (B) from elbow (C).
2. Using 1-3/8 inch wrench, loosen fitting (D) from fuel tank (E).
3. Carefully remove hose (F) from elbow (C) and fuel tank (E).



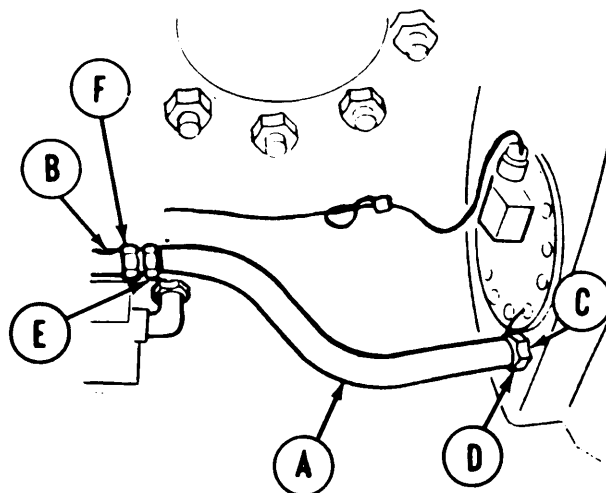
INSTALLATION:

CAUTION

Make sure that drain plugs of both fuel tanks are correctly sealed.

1. Lightly coat threads of each hose end fitting with sealing compound (Item 24, Appendix D).
2. Position hose (A) onto elbow (B) and fuel tank mount (C).

Using 1-3/8 inch wrench, tighten fitting (D) to fuel tank mount (C).
4. Using 1-1/4 inch wrench to hold fitting (E), use 1-1/2 inch wrench and tighten fitting (F) to elbow (B).
5. Install engine fuel return hose (page 7-245).
6. Ground hop engine (page 5-49).



7. Allow engine to run for a brief time while checking for leaks. If a leak is detected, stop engine and tighten fittings.
8. Disconnect ground hop (page 5-62).
9. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

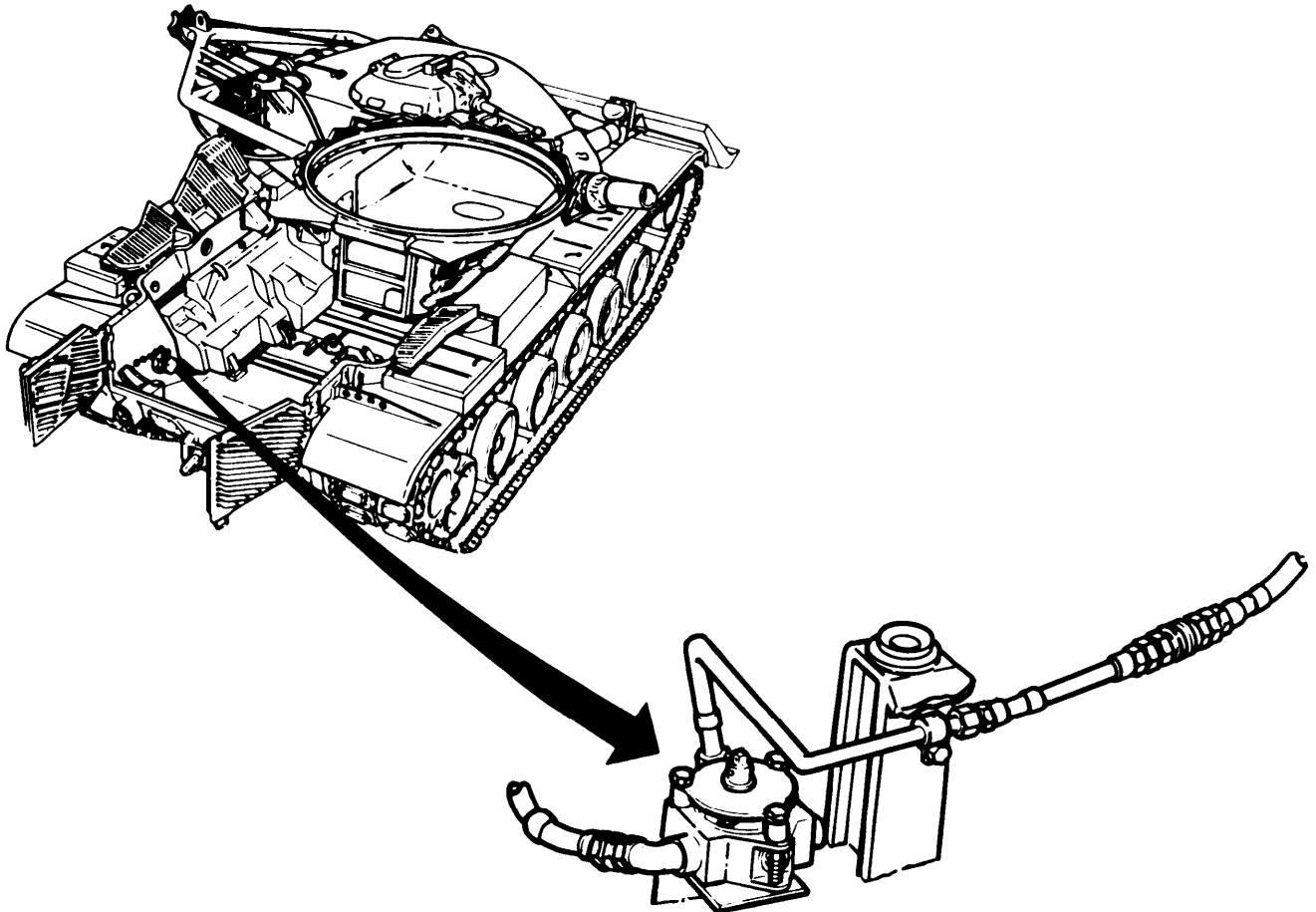
TA148984

ENGINE FUEL RETURN TUBE REPLACEMENT (Sheet 1 of 2)

TOOLS: 1-1/8 in. open end wrench
7/16 in. combination box and open end wrench

SUPPLIES: Sealing compound (Item 24, Appendix D)
Lockwasher (MS35338-44)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Drain left fuel tank (page 7-152)



Go on to Sheet 2

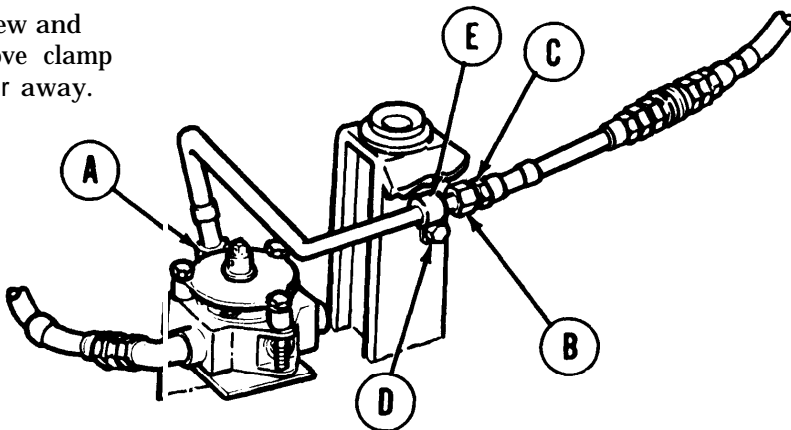
TA148983

7-251

ENGINE FUEL RETURN TUBE REPLACEMENT (Sheet 2 of 2)

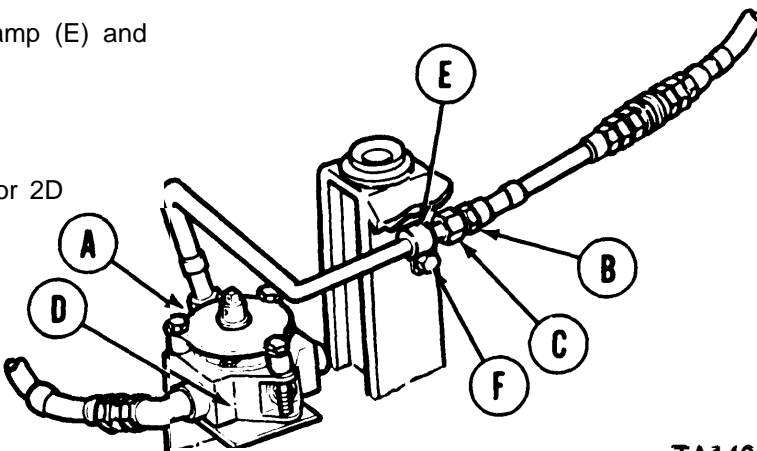
REMOVAL:

1. Using 1-1/8 inch wrench, loosen tube fitting (A).
2. Using 1-1/8 inch wrench on tube fitting (B) and 1 inch wrench on hose fitting (C), loosen tube fitting (B) from hose fitting (C).
3. Using 7/16 inch wrench, remove screw and lockwasher (D) from clamp (E). Remove clamp (E) from tube (B). Throw lockwasher away.
4. Remove tube (B) from vehicle.



INSTALLATION:

1. Lightly coat tube assembly connections (A) and (B) with sealing compound (Item 24, Appendix D).
2. Using 1-1/8 inch wrench on tube fitting (C) and 1 inch wrench on hose fitting (B), install tube assembly (C) to hose (B).
3. Using 1-1/8 inch wrench on tube fitting (A), install tube fitting (A) to selector cock (D).
4. Using 7/16 inch wrench, install clamp (E) and screw and new lockwasher (F).
5. Fill fuel tanks.
6. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA149232

ENGINE FUEL RETURN SELECTOR COCK REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-254
Inspection	7-255
Installation	7-255

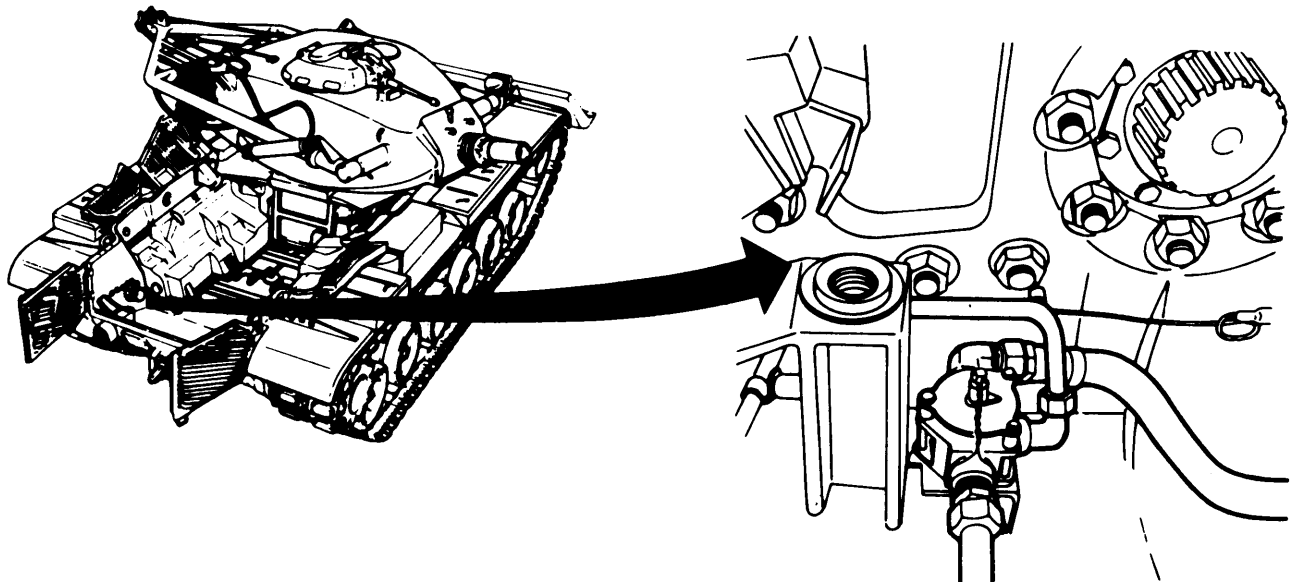
TOOLS: Vise
 10 in. adjustable wrench
 7/16 in. socket with 1/2 in. drive
 1-1/2 in. open end wrench
 1-3/8 in. open end wrench
 1-1/8 in. open end wrench
 Diagonal cutting pliers
 Slip joint pliers
 Ratchet with 1/2 in. drive

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Sealing compound (Item 23, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwire (Item 59, Appendix D)
 Cotter pin (112726)
 Lockwasher (MS35338-44) (3 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Drain fuel tank (page 7-152)



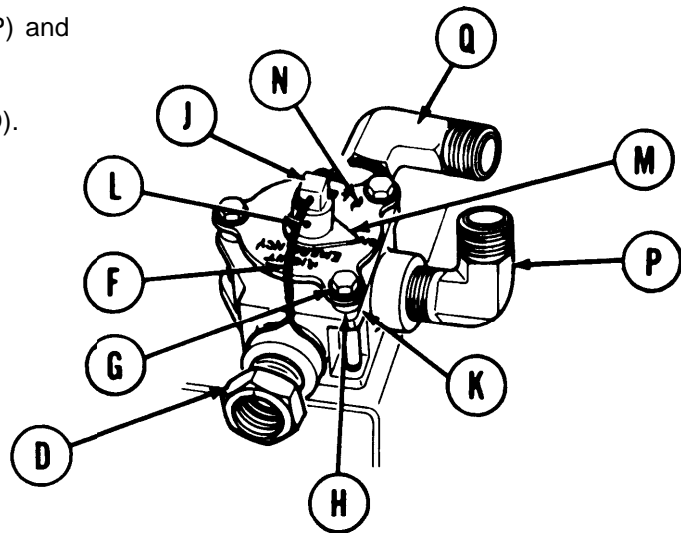
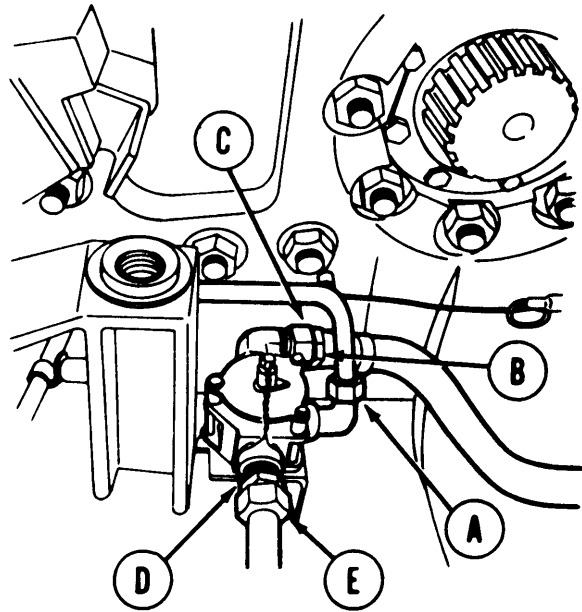
Go on to Sheet 2

TA149231

ENGINE FUEL RETURN SELECTOR COCK REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using 1-1/8 inch wrench, disconnect fitting (A).
2. Using one 1-1/8 inch wrench, hold fitting (B) secure and loosen fitting (C) with 1-1/2 inch wrench.
3. Using 1-3/8 inch and 1-1/2 inch wrenches, hold fitting (D), and loosen fitting (E) with 1-1/2 inch wrench.
4. Using cutting pliers, cut lockwire (F), remove, and throw away.
5. Using socket, remove three screws and lockwashers (G) and spacers (H) securing return selector cock (J) to mounting brackets (K). Remove selector cock. Throw lockwashers away.
6. Remove cotter pin and headless straight pin (L). Throw cotter pin away.
7. Remove pointer assembly (M).
8. Remove instruction plate (N).
9. Using adjustable wrench, remove elbows (P) and (Q).
10. Using 1-3/8 inch wrench, remove fitting (D).



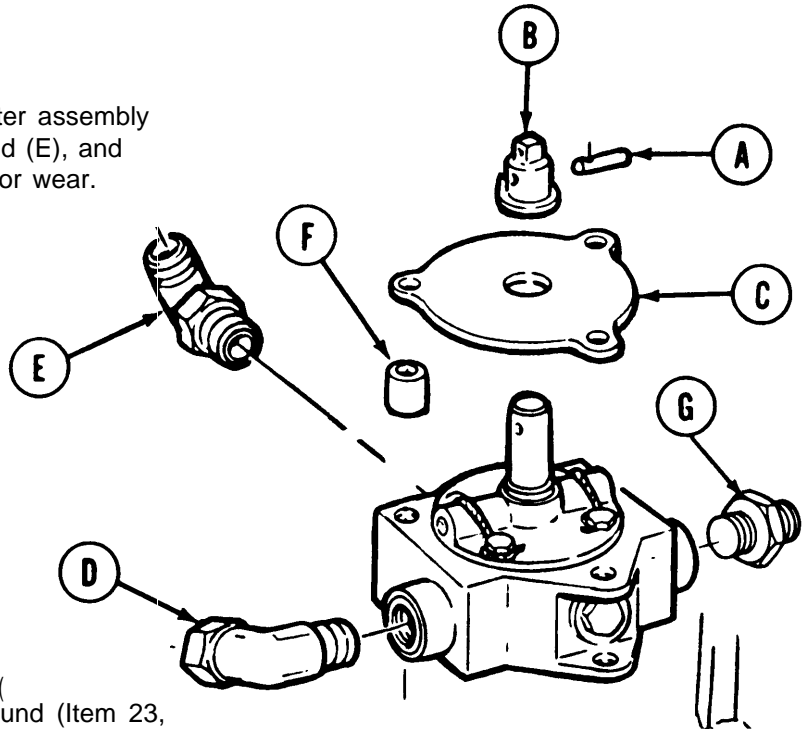
Go on to Sheet 3

TA148977

ENGINE FUEL RETURN SELECTOR COCK REPLACEMENT (Sheet 3 of 4)

INSPECTION:

Inspect headless straight pin (A), pointer assembly (B), instruction plate (C), elbows (D) and (E), and spacers (F) and fitting (G) for damage or wear. Replace if necessary.

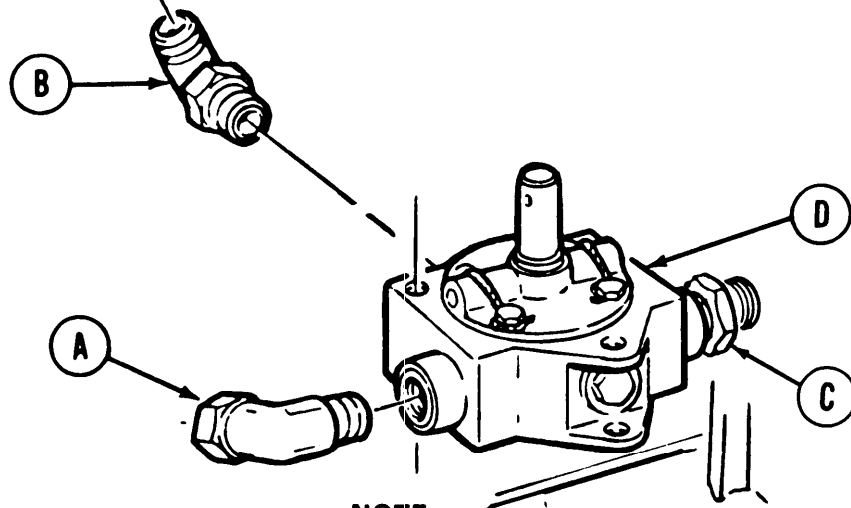


INSTALLATION:

1. Lightly coat male ends of elbows (D) and fitting (G) with sealing compound (Item 23, Appendix D).

Using adjustable wrench, install elbows (A) and (B) on return selector cock (D).

3. Using 1-3/8 inch wrench, install fitting (C) on fuel return selector cock (D).



NOTE

Be sure elbows, when tightened, face in direction shown.

Go on to Sheet 4

TA148976

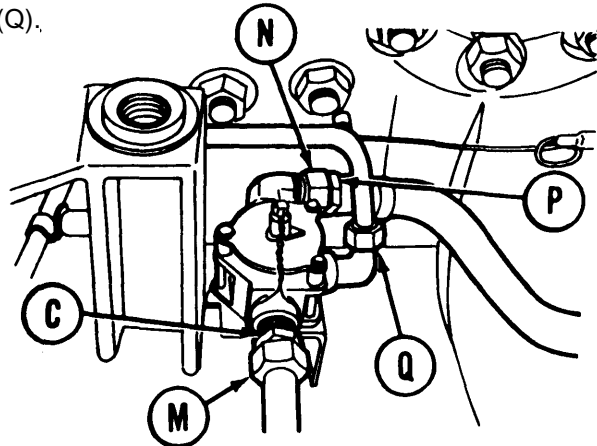
ENGINE FUEL RETURN SELECTOR COCK REPLACEMENT (Sheet 4 of 4)

4. Position indicator plate (E) on return selector cock (D) with word BOTH at engine fuel return tube elbow (center outlet).
5. Position pointer assembly (F) at BOTH position.

NOTE

Check to be sure all three openings in return selector cock are open.

6. Install headless straight pin (G) in pointer assembly (F) and secure with new cotter pin.
- 7* Secure pointer assembly (F) in BOTH position with new lockwire (H) (Item 59, Appendix D).
8. Using socket, secure return selector cock on mounting bracket (J) with three screws and new lockwashers (K) and spacers (L).
9. Using 1-3/8 inch wrench on fitting (C) and 1-1/2 inch wrench on fitting (M), hold fitting (C) in a fixed position while securing fitting (M).
10. Using one 1-1/2 inch wrench on fitting (N) and one 1-1/8 inch wrench on fitting (P), hold (P) in a fixed position while securing fitting (N).
11. Using 1-1 /8 inch wrench, secure tube fitting (Q).



12. Fill fuel tanks.
13. Attach ground hop kit (page 5-49).
14. Start engine (TM 9-2350-222-10) and allow it to run for a brief time while checking for leaks (,page 5-60).
16. Disconnect ground hop kit (page 5-62).
16. Replace 2A powerplant (page &14) or 2D powerplant (page 5-37).

End of Task

TA148975

ENGINE FUEL RETURN SELECTOR COCK INSTRUCTION PLATE REPLACEMENT (Sheet 1 of 2)

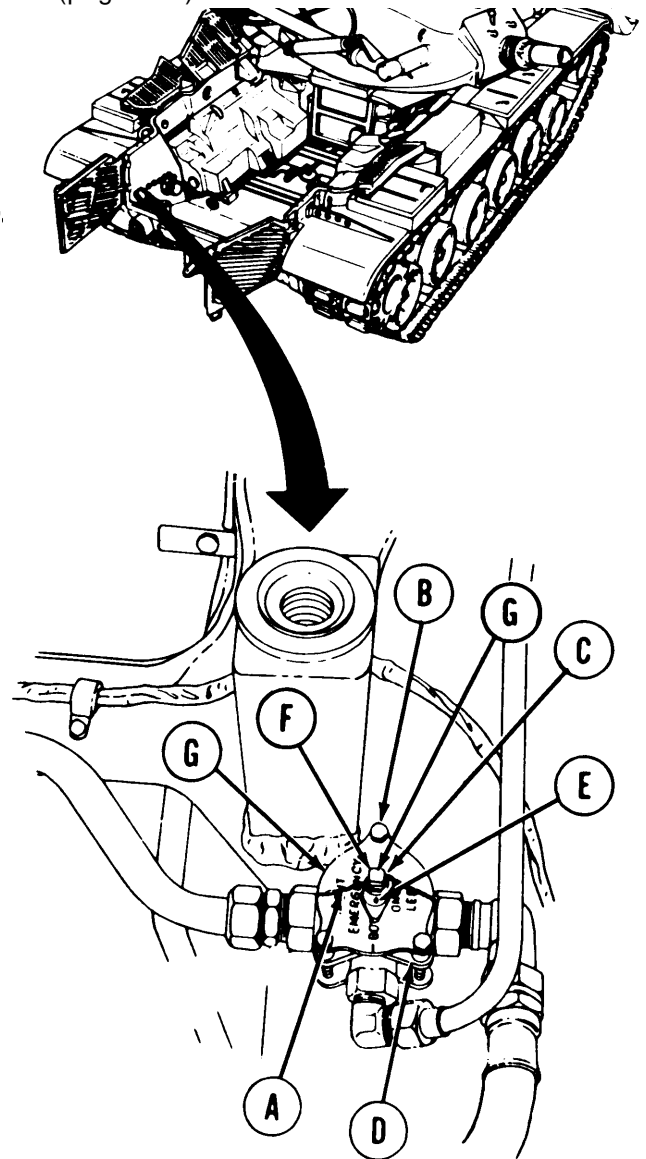
TOOLS: 7/16 in. socket with 1/2 in. drive
 Extension with 1/2 in. drive, 3 in. long
 Ratchet with 1/2 in. drive
 Diagonal cutting pliers
 Slip joint pliers

SUPPLIES: Rags (Item 65, Appendix D)
 Lockwire (Item 59, Appendix D)
 Cotter pin (112726)
 Lockwasher (MS35338-44) (3 required)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

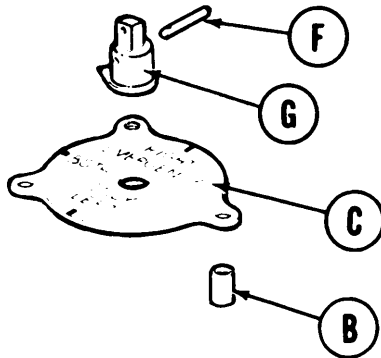
REMOVAL:

1. Using cutting pliers, remove lockwire (A).
Throw lockwire away.
2. Using socket, remove three screws, lockwashers, and spacers (B) securing instruction plate (C) to mounting brackets (D). Throw lockwashers away.
3. Using slip joint pliers, remove cotter pin (E) (hidden). Remove pin (F). Throw cotter pin away.
4. Remove pointer assembly (G).
5. Remove instruction plate (C).



INSPECTION:

Inspect headless straight pin (F), pointer assembly (G), instruction plate (C), and spacers (B) for damage or wear. Replace if necessary.



Go on to Sheet 2

TA148974

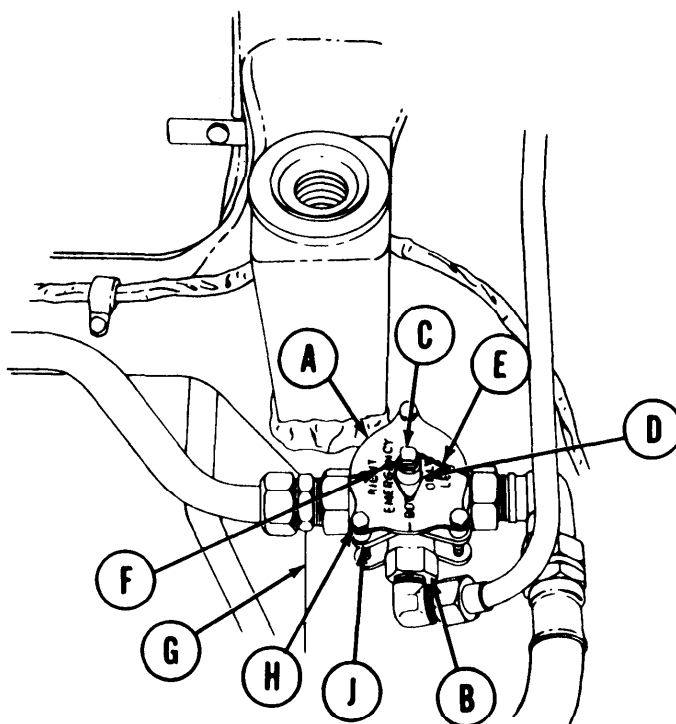
ENGINE FUEL RETURN SELECTOR COCK INSTRUCTION PLATE REPLACEMENT (Sheet 2 of 2)

INSTALLATION:

1. Position instruction plate (A) on return selector cock with word BOTH at engine fuel return tube quick-disconnect (center outlet) (B).
2. Position pointer assembly (C) at BOTH position.

NOTE

Check to make sure all three openings in fuel selector cock valve are open.



3. Install straight pin (D) in pointer assembly (C) and secure with new cotter pin (E) (hidden).
4. Secure pointer assembly (C) in BOTH position with new lockwire (F).
5. Using socket, secure return selector cock on mounting bracket (G) with three screws and new lockwashers (H), and spacers (J).
6. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA149230

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 1 of 11)

PROCEDURE INDEX

PROCEDURE	PAGE
Manual Drain Test	7-267
Automatic Drain Test	7-269
15-Second Drain Test	7-271
Sequential Drain Test	7-273

TOOLS: Slip joint pliers Ratchet with 1/2 in. drive
 6 in. adjustable wrench 1/2 in. combination box and open end wrench
 1/2 in. socket with 1/2 in. drive 7/16 in. combination box and open end wrench
 5 in. extension with 1/2 in. drive 9/16 in. combination box and open end wrench

FABRICATED TOOLS: One 3ft cable (Figure F-8, Appendix F)
 One 10ft cable (Figure F-7, Appendix F)

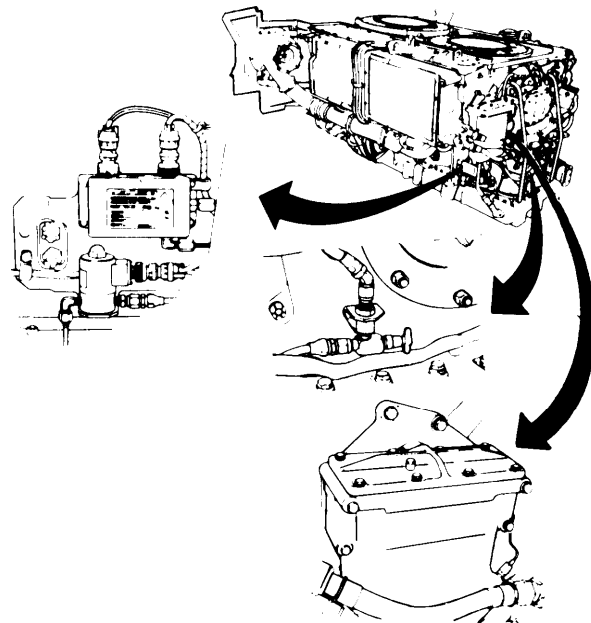
SUPPLIES: 24 vdc power source Fuel can (1 gal. capacity)
 1/8 in. pipe plug (2 required) Watch with second hand
 Metal container Drip pan
 (1 gal. capacity) (2 required) Lockwasher (4 required)
 Rags (Item 65, Appendix D) Lockwasher (8 required)
 Gasket Lockwasher (8 required)
 Parts kit

PERSONNEL: Two

PRELIMINARY PROCEDURE: Remove 2D powerplant (page 5-14)

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 OF VEHICLE.'
- l Fuel is slippery and can cause falls. To avoid injury, wipe up spilled fuel with rags.



Go on to Sheet 2

All data on pages 7-259 thru 7-265 deleted.

(7-265 blank) 7-266

Change 4

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 2 of 11)

NOTE

In order to perform any of the tests in this procedure, they must be performed in the sequence listed.

MANUAL DRAIN TEST:

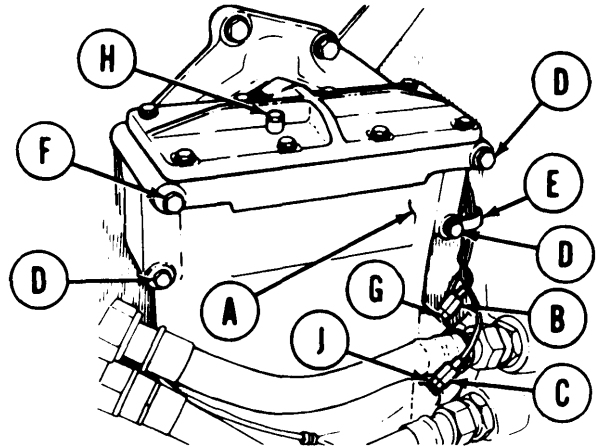
1. Place drip pan under fuel-water separator (A) and sensor probes (B) and (C).
2. Using socket, remove three capscrews, lockwashers, and flat washers (D). Throw lockwashers away.
3. Using hands, remove clamp (E) from sensor probe wires (B) and (C).
4. Using socket, loosen capscrew (F) to provide movement of fuel-water separator.

CAUTION

Be very careful not to disturb center filter element. Center filter element must be replaced if disturbed in any way.

NOTE

It may be necessary to use hammer and punch to unseat sensors (B) and (C) by tapping upward on edge of sensor retaining nut (G).



5. Using 1/2 inch wrench to hold sensor retaining nut (G), use 9/16 inch wrench and remove upper sensor (B) from fuel-water separator.
6. Using 1/2 inch wrench, open and then close bleed cap (H).
7. Check to see if fluid level is above upper sensor probe (B) hole by noting leakage from upper sensor probe (B) hole when bleed cap (H) is open.
8. Using 1/2 inch wrench, remove sensor retaining nut (G).
9. Using adjustable wrench, install pipe plug into upper sensor probe (B) hole.
10. Using 1/2 inch wrench to hold sensor retaining nut (J), use 9/16 inch wrench and remove lower sensor (C) from fuel-water separator,

NOTE

It may be necessary to remove capscrew (F) and move fuel-water separator (A) before lower sensor (C) can be removed. If removed, capscrew (F) should be reinstalled after step 10.

Go on to Sheet 3

TA253314

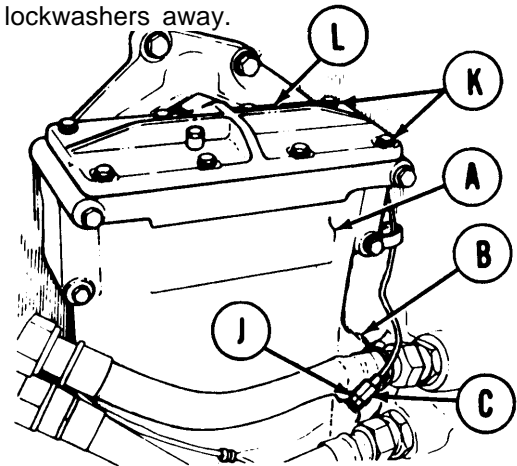
Change 1 7-267

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 3 of 11)

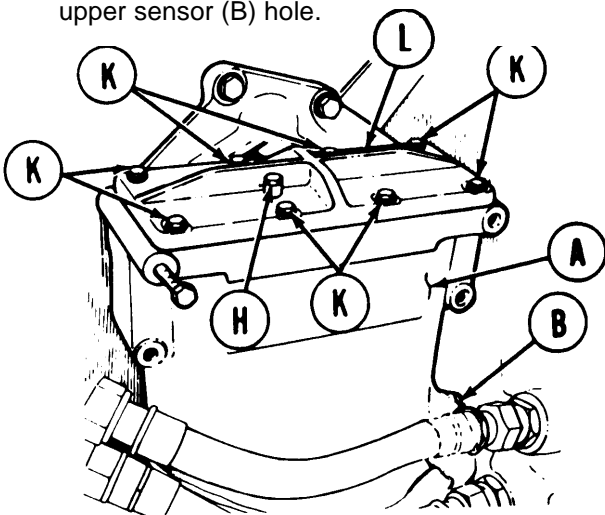
11. Using 1/2 inch wrench, remove sensor retaining nut (J).
12. Using adjustable wrench, install pipe plug into lower sensor probe (C) hole.
13. If fuel did not leak from upper sensor (B) hole, use adjustable wrench to remove pipe plug from upper sensor (B) hole and go to step 14. If fuel did leak from upper sensor (B) hole, go to step 18.
14. Using 7/16 inch wrench, remove eight screws, lockwashers, and flat washers (K) securing cover (L) to separator (A). Remove cover (L) from separator (A). Throw lockwashers away.

CAUTION

There is a gasket located between fuel-water separator cover and fuel-water separator body. To avoid fuel leaks, each time cover is removed, care must be taken not to disturb gasket.



15. Add fuel to fuel-water separator (A) until fuel leaks from upper sensor (B) hole.
16. Using adjustable wrench, install pipe plug in upper sensor (B) hole.



17. Place cover (L) in position and, using 7/16 inch wrench, install eight screws, new lockwashers, and flat washers (K).
18. Using 1/2 inch wrench, open bleed cap (H) by turning counterclockwise.
19. Place metal container (M) under outlet of manual drain valve (N).

20. Open manual drain valve (N) by turning petcock (P) counterclockwise. Allow small amount of fluid to drain into metal container (M), and then close manual drain valve (N).
21. If fluid does not drain, refer to troubleshooting procedure (page 4-1).
22. If fluid does drain, go on to automatic drain test on next page.

Go on to Sheet 4

TA253213

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 4 of 11)

AUTOMATIC DRAIN TEST:

1. Place metal container (A) under solenoid drain valve tube (B).
2. Using pliers, disconnect engine electrical harness connector (C) from fuel-water separator control box (D) by turning counterclockwise.
3. Fill metal container (E) with water.
4. Connect black wire of cable (Figure F-8, Appendix F) from negative (-) terminal of power source (F) to metal container (E).
5. Connect connector (G) of cable (Figure F-7, Appendix F) to fuel-water separator control box.

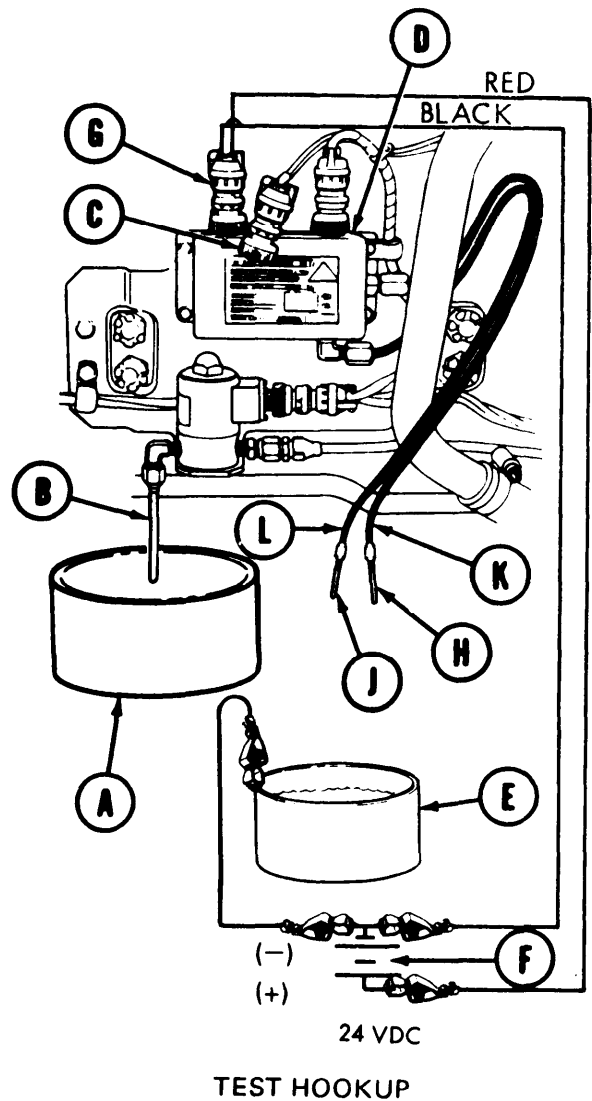
WARNING

To avoid shock and inaccurate test results:

Do not let upper (H) and lower (J) sensor probes come in contact with each other or with bottom or side of metal container (E). When moving sensor probes, do so by holding insulated cables (K) and (L). Do not touch probes (H) or (J) with hands.

6. Connect red wire of cable to positive (+) terminal of power source (F).
- 6.1 Connect black wire of cable to negative (-) terminal of power source (F).

Go on to Sheet 5



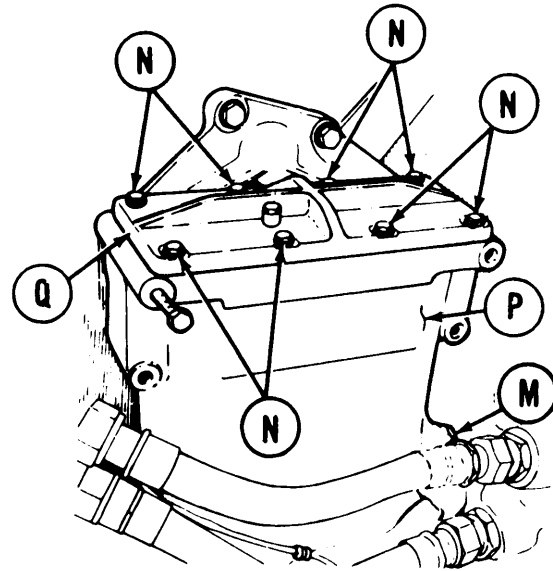
FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 5 of 11)

7. Using adjustable wrench, loosen pipe plug in upper sensor hole enough to allow fuel to leak.
8. Check to see if fuel leaks from upper sensor hole (M).
9. If fuel does not leak from upper sensor hole (M), remove pipe plug from upper sensor hole (M) and go on to step 10. If fuel does leak from upper sensor hole (M), use adjustable wrench to tighten pipe plug in upper sensor hole (M) and go to step 14.

CAUTION

Be very careful not to disturb center filter element. Center filter element must be replaced if disturbed in any way.

10. Using 7/16 inch wrench, remove eight screws, lockwashers, and flat washers (N) securing cover to separator (P). Remove cover (Q) from separator (P). Throw lockwashers away.

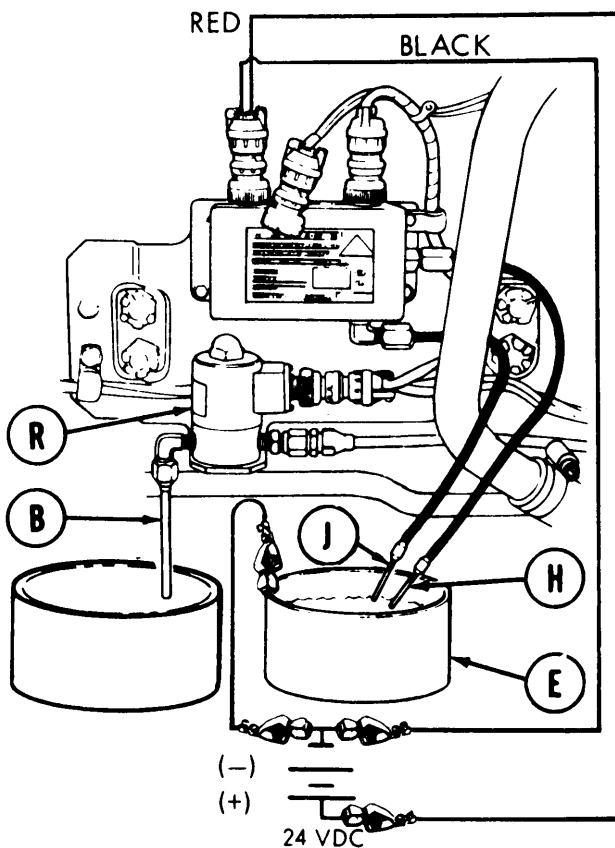


11. Add fuel to fuel-water separator (P) until fuel leaks from upper sensor hole (M).
12. Using adjustable wrench, install pipe plug into upper sensor hole (M).
13. Place cover (Q) in position and, use 7/16 inch wrench, install eight screws, lockwashers, and flat washers (N).
14. Hold tips of upper (H) and lower (J) sensor probes in water in metal container (E).

NOTE

Remove both upper (H) and lower (J) sensor probes from water in metal container (E) as soon as fluid begins draining from drain tube (B).

15. Listen for solenoid drain valve (R) to click and watch for fluid to begin draining from solenoid drain valve drain tube (B).
16. If fluid does not begin draining, refer to troubleshooting procedures (see page 4-1).
17. If fluid does begin draining, go on to 15-second drain test on next page.



Go on to Sheet 6

TA253316

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 6 of 11)

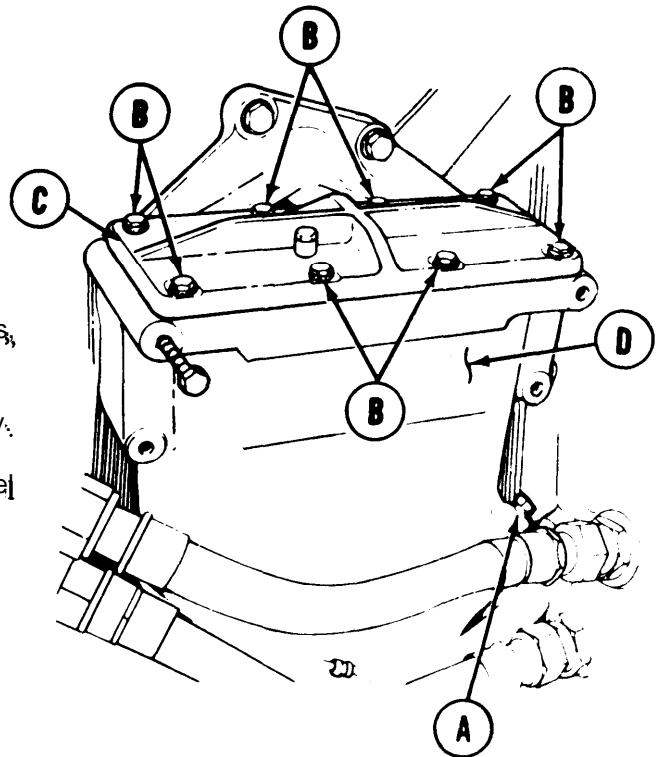
15-SECOND DRAIN TEST:

1. Using adjustable wrench, loosen pipe plug in upper sensor hole (A) enough to allow fuel to leak.
2. Check to see if fuel leaks from upper sensor hole (A).
3. If fuel does not leak from upper sensor hole (A), remove pipe plug from upper sensor hole (A) and go on to step 4. If fuel does leak from upper sensor hole (A), use adjustable wrench to tighten pipe plug in upper sensor hole (A), and go to step 8.

CAUTION

Be very careful not to disturb center filter element. Center filter element must be replaced if disturbed in any way.

4. Using 7/16 inch wrench, remove eight screws, lockwashers, and flat washers (B) securing cover (C) to separator (D). Remove cover (C) from separator (D). Throw lockwashers away.
5. Add fuel to fuel-water separator (D) until fuel leaks from upper sensor hole (A).
6. Using adjustable wrench, install pipe plug into upper sensor hole (A).
7. Place cover (C) in position and, using 7/16 inch wrench, install eight screws, new lockwashers, and flat washers (B).



Go on to Sheet 7

TA253317

Change 1 7-271

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 7 of 11)

WARNING

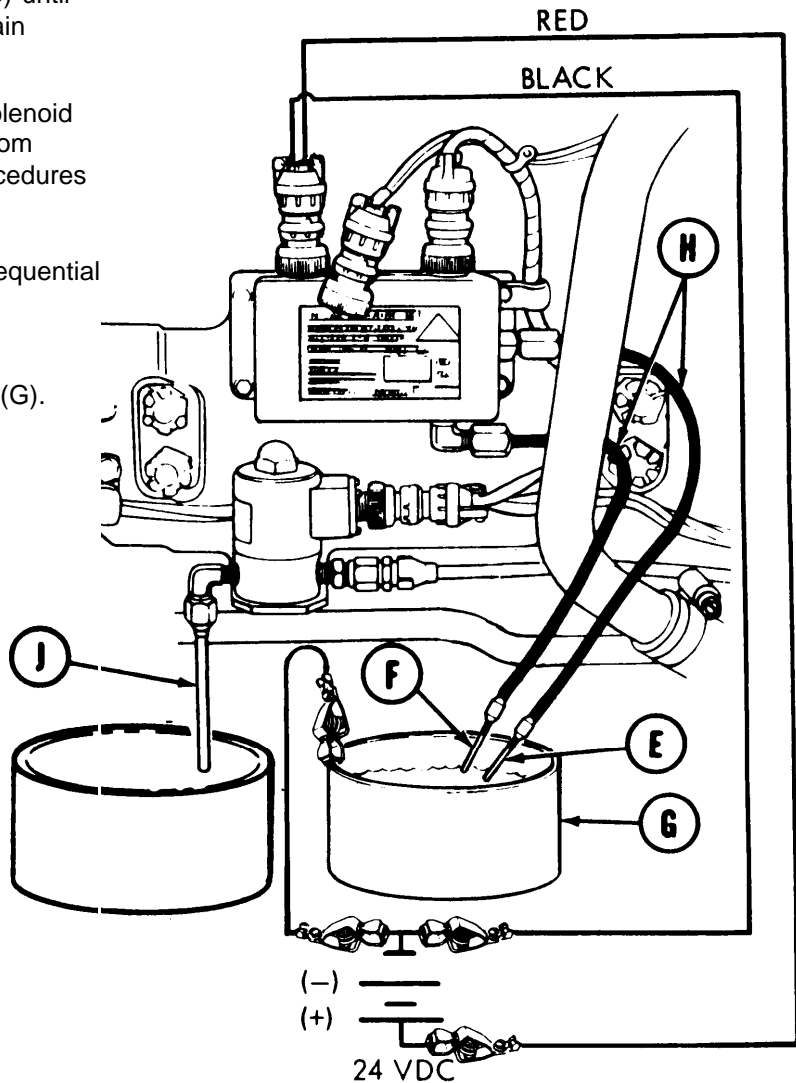
To avoid shock and inaccurate test results:

Do not let upper (E) and lower (F) sensor probes come into direct contact with each other.

Do not let upper (E) or lower (F) sensor probes come into contact with metal container (G).

Hold insulated cables (H) attached to upper (E) and lower (F) sensor probes. Do not touch either probe.

8. Hold tips of upper(E) and lower(F) sensor probes in water in metal container (G) until fluid stops draining from solenoid drain tube (J).
9. If fluid does not stop draining from solenoid drain tube (J) within 15-20 seconds from starting, refer to troubleshooting procedures (see page 4-337).
10. If fluid does begin draining, go to sequential drain test on next page.
11. Remove upper (E) and lower (F) sensor probes from metal container (G).



Go on to Sheet 8

TA253234

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 8 of 11)

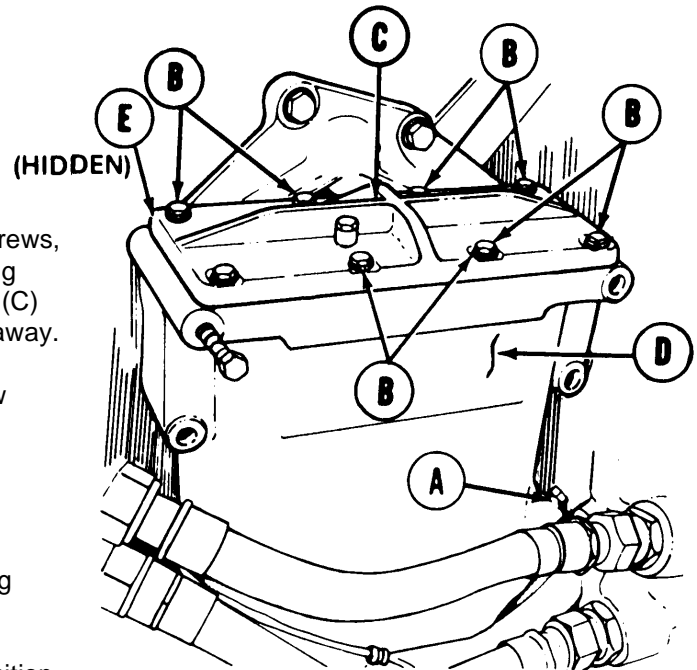
SEQUENTIAL DRAIN TEST:

1. Using adjustable wrench, loosen pipe plug in upper sensor hole (A) enough to allow fuel to leak.
2. Check to see if fuel leaks from upper sensor hole (A),
3. If fuel does not leak from upper sensor hole (A), remove pipe plug from upper sensor hole (A) and go on to step 4. If fuel does leak from upper sensor hole (A), use adjustable wrench to tighten pipe plug in upper sensor hole (A) and go to step 8.

CAUTION

Be very careful not to disturb center filter element. Center filter element must be replaced if disturbed in any way.

4. Using 7/16 inch wrench, remove eight screws, lockwashers, and flat washers (B) securing cover (C) to separator (D). Remove cover (C) from separator (D). Throw lockwashers away.
- 4.1 Remove gasket (E) from cover (C). Throw gasket away.
5. Add fuel to fuel-water separator (D) until fluid level is above upper sensor hole (A).
6. Using adjustable wrench, install pipe plug into upper sensor hole (A).
7. Place cover (C) and new gasket (E) in position and, using 7/16 inch wrench, install eight screws, new lockwashers, and flat washers (B).



Go on to Sheet 9

TA253235

Change 1 7-273

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 9 of 11)

WARNING

To avoid shock and inaccurate test results:

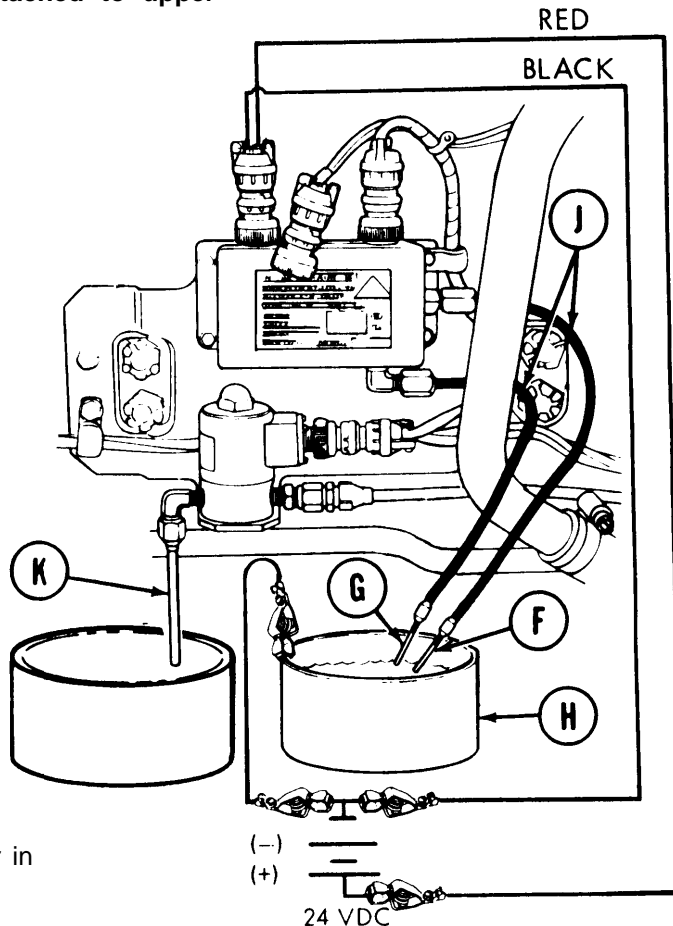
Do not let upper (F) and lower (G) sensor probes come into direct contact with each other.

Do not let upper (F) or lower (G) sensor probes come into contact with metal container(H).

Hold insulated cables (J) attached to upper (F) and lower (G) sensor probes.

NOTE

Steps 8 thru 11 must be performed within 15 seconds.



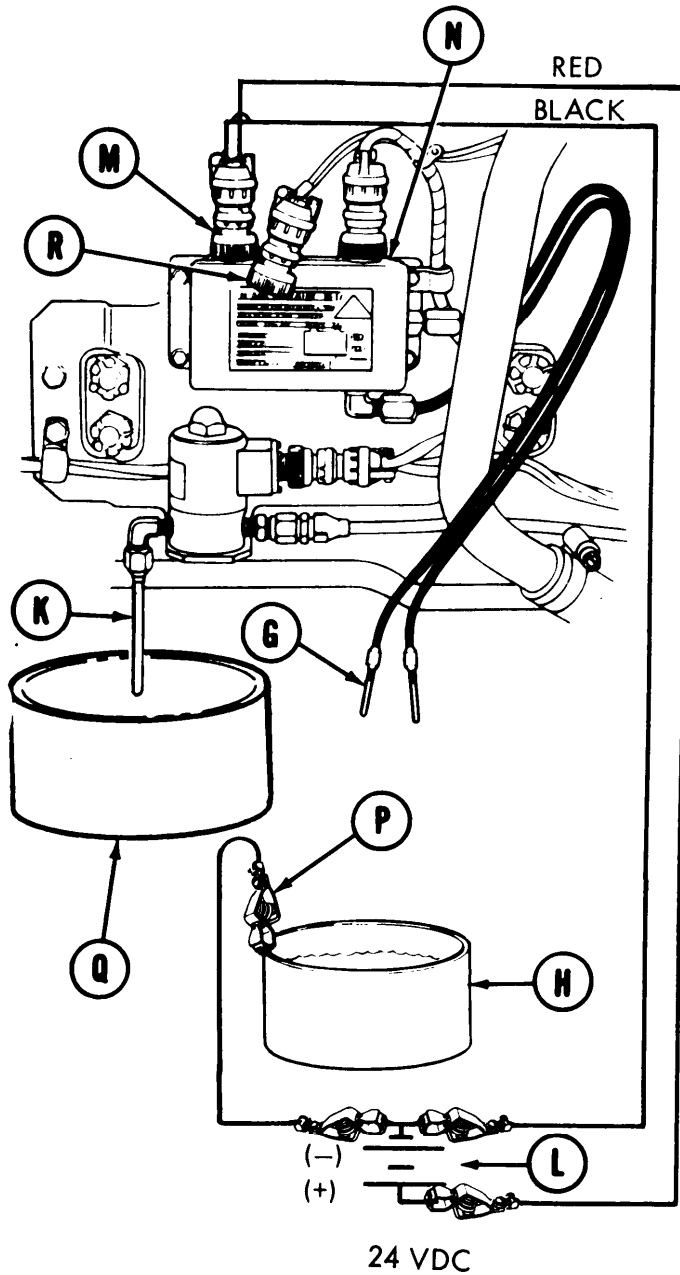
8. Hold tip of lower (G) sensor probe in water in metal container (H).
9. Hold tip of upper (F) sensor probe in water in metal container (H) and check if fluid starts draining from solenoid drain tube (K).
10. Remove tip of upper (F) sensor probe from water in metal container (H) and check if fluid keeps draining from solenoid drain tube (K).

Go on to Sheet 10

TA253236

FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 10 of 11)

- Remove tip of lower (G) sensor probe from water in metal container (H) before 15 seconds have gone by from time of putting it in and check if fluid stops draining from solenoid drain tube (K).



- If fluid does not start draining (step 9), does not keep draining (step 10), or does not stop draining (step 11), refer to troubleshooting procedures (see page 4-1).
- Disconnect cable (F-7, Appendix F) from both terminals of power source (L).
- Disconnect connector (M) at fuel-water separator control box (N).
- Disconnect cable (P) (Figure F-8, Appendix F) from power source (L).
- Disconnect cable (P) (Figure F-8, Appendix F) from metal container (H).
- Remove metal container (Q) from under solenoid drain tube (K).
- Using pliers, connect engine electrical harness connector (R) to fuel-water separator control box (N) by turning clockwise.

Go on to Sheet 11

TA253237

Change 1 7-275

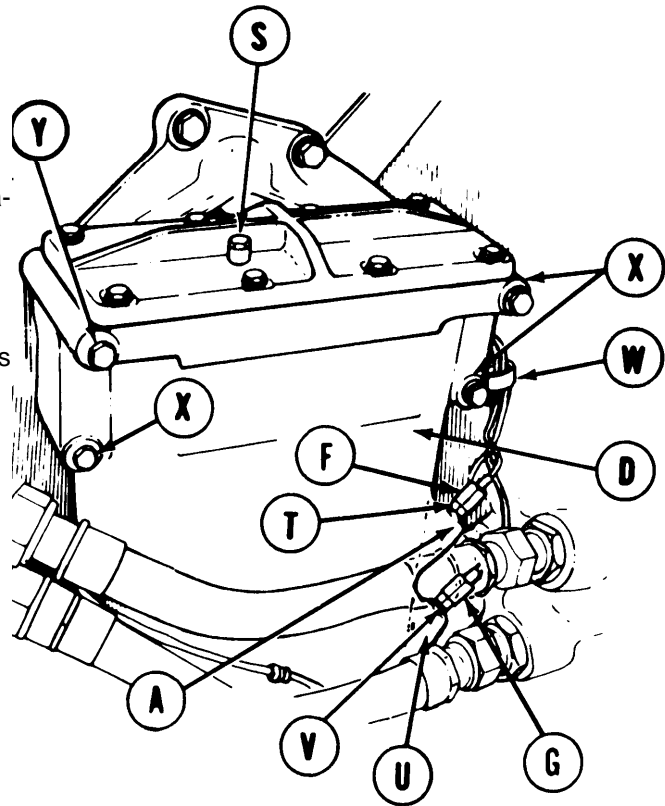
FUEL-WATER SEPARATOR OPERATIONAL TESTS (2D ENGINE) (Sheet 11 of 11)

- 19. Using 1/2 inch wrench, close bleed cap (S) until snug by turning clockwise.
- 20. Using adjustable wrench, remove pipe plug from upper sensor hole (A).
- 21. Using 1/2 inch wrench, install sensor retaining nut (T).

NOTE

Upper sensor (F) is longer than lower sensor (G).

- 22. Using 1/2 inch wrench to hold sensor retaining nut (T), use 9/16 inch wrench to install upper sensor (F) into fuel-water separator (D).
- 23. Using adjustable wrench, remove pipe plug from lower sensor hole (U).
- 24. Using 1/2 inch wrench, install sensor retaining nut (V).
- 25. Using 1/2 inch wrench to hold sensor retaining nut (V), use 9/16 inch wrench and install lower sensor (G) into fuel-water separator (D).
- 26. Position clamp (W) onto fuel-water separator and, using 1/2 inch socket, install three capscrews, new lockwashers, and flat washers (X).
- 27. Using 1/2 inch socket, tighten capscrew (Y).
- 28. Install 2D powerplant (page 5-37).
- 29. Purge fuel system (page 7-10).



End of Task

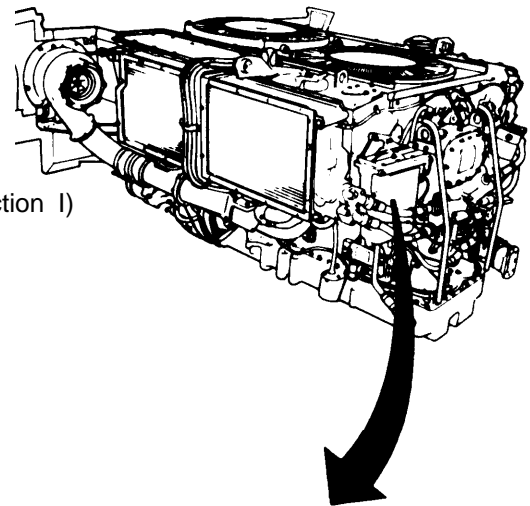
TA253238

FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 1 of 7)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-278
Installation	7-281
Test	7-283

TOOLS: 1/2 in. socket with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 7/16 in. combination box and open end wrench
 7/8 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 Hammer
 1/8 in. drive

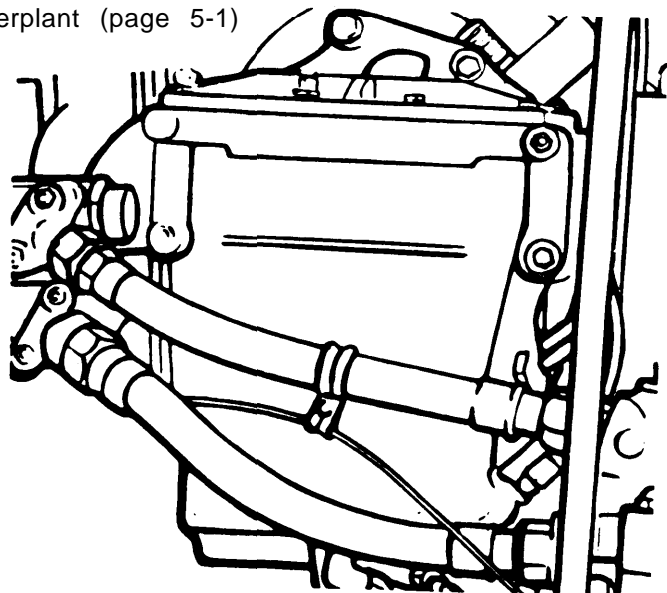


SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Drip pan
 Rags (Item 65, Appendix D)
 Masking tape (Item 57, Appendix D)
 Plastic barrier material (Item 41, Appendix D)
 Tags
 Lockwasher (MS35338-45) (4 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



NOTE

These procedures apply to fuel-water separator filters on 2A and 2D engines. Where there are differences in procedures, they are noted. The 2D engine is used to illustrate the procedures.

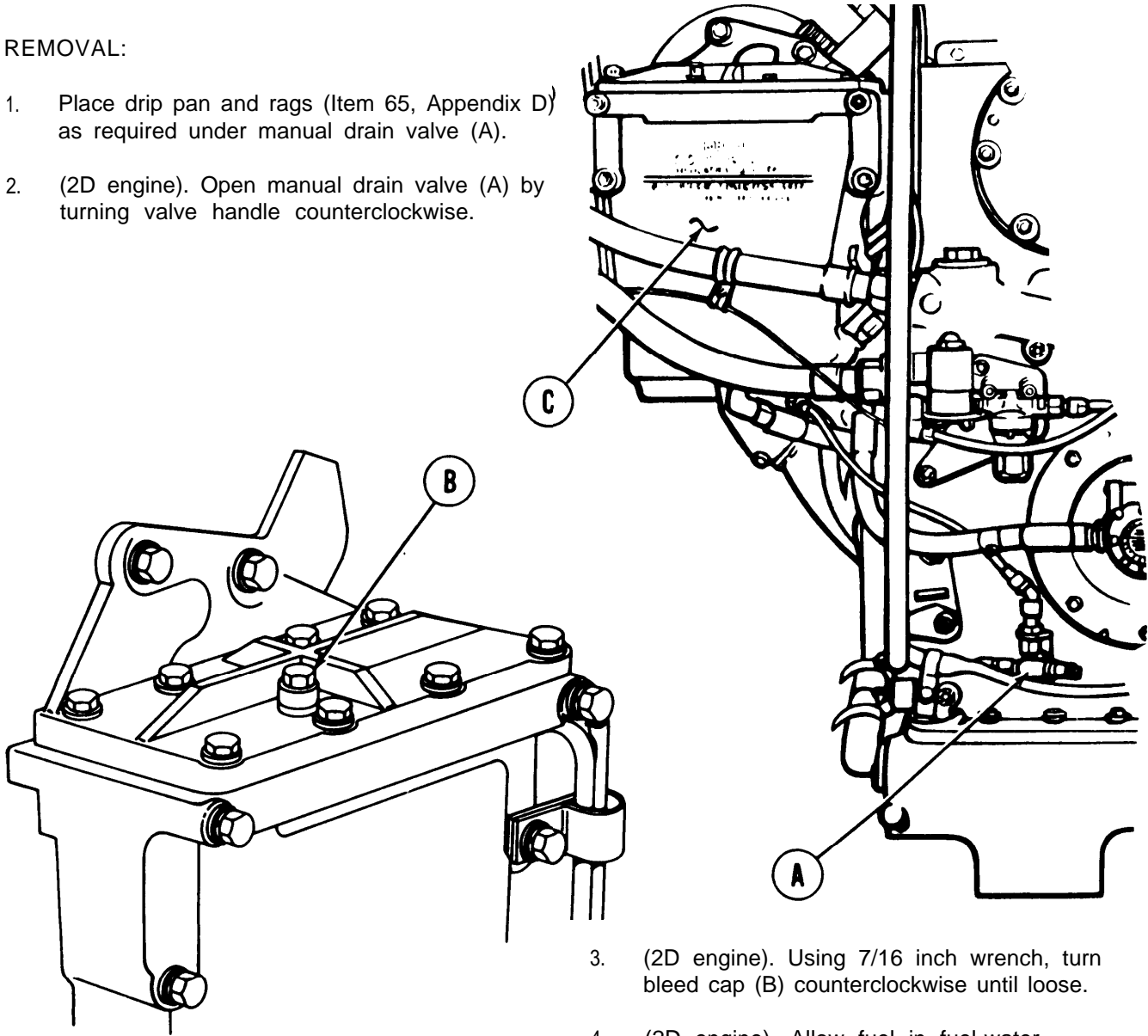
Go on to Sheet 2

TA149059

FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 2 of 7)

REMOVAL:

1. Place drip pan and rags (Item 65, Appendix D) as required under manual drain valve (A).
2. (2D engine). Open manual drain valve (A) by turning valve handle counterclockwise.

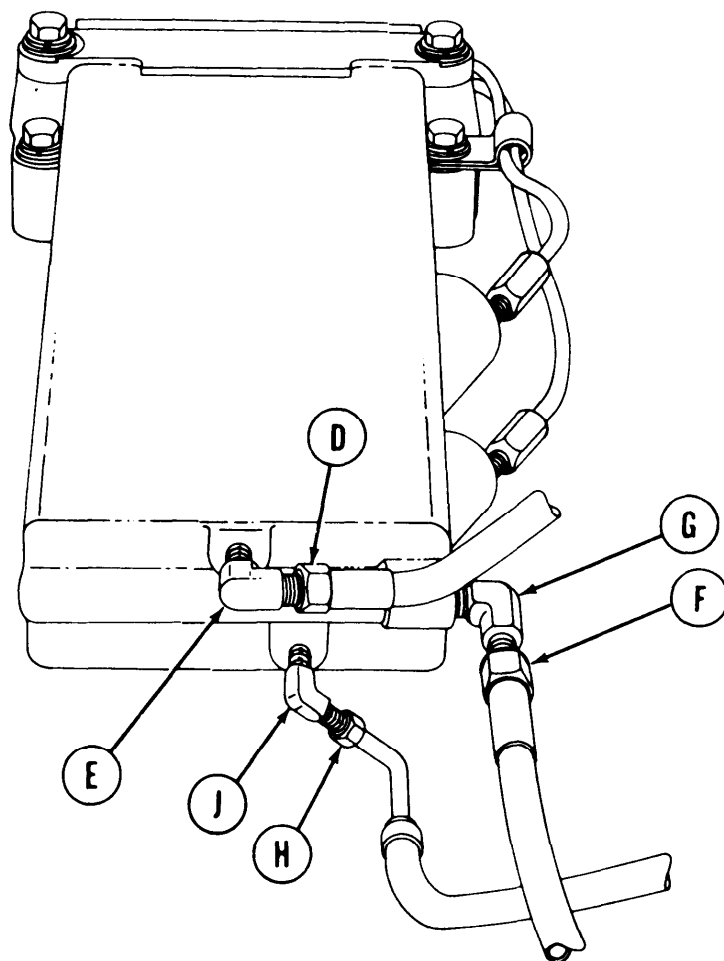


3. (2D engine). Using 7/16 inch wrench, turn bleed cap (B) counterclockwise until loose.
4. (2D engine). Allow fuel in fuel-water separator filter (C) to drain through manual drain valve (A).
5. Using 7/16 inch wrench, turn bleed cap (B) clockwise until snug.
6. Place drip pan under fuel-water separator filter (C).

Go on to Sheet 3

TA149061

FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 3 of 7)



7. Using 7/8 inch wrench, remove fuel outlet line (D) from elbow (E).
8. Using plastic barrier material (Item 41, Appendix D) and tape (Item 57, Appendix D) seal openings of fuel outlet line (D) and elbow (E).
9. Using 7/8 inch wrench, remove fuel inlet line (F) from elbow (G).
10. Using plastic barrier material (Item 41, Appendix D) and tape (Item 57, Appendix D), seal openings of fuel inlet line (F) and elbow (G).

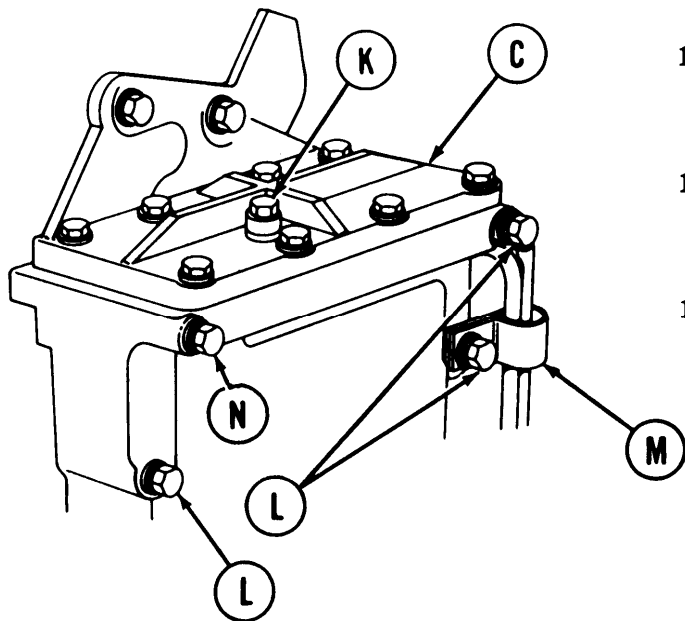
VIEW FROM BOTTOM OF FILTER
(SHOWN REMOVED FROM ENGINE
FOR CLARITY)

Using 9/16 inch wrench, remove condensate drain line (H) from elbow (J).

Go on to Sheet 4

TA149060

FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 4 of 7)



12. Using 7/16 inch wrench, turn bleed cap (K) counterclockwise until loose. Let fuel-water filter drain.
13. Using socket, remove three capscrews, lockwashers, and flat washers (L). Throw lockwashers away.
14. (2D engine). Remove clamp (M) from filter (c).

NOTE

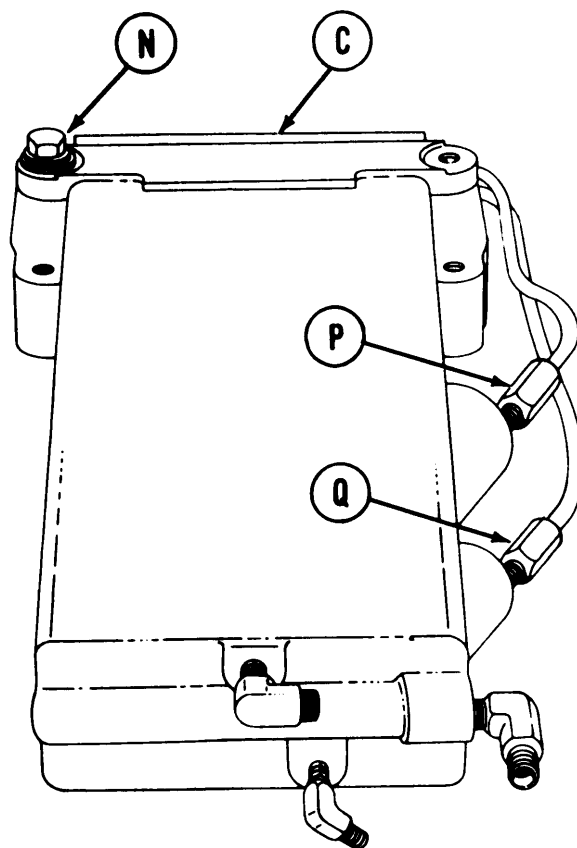
It may be necessary to tap sensor just above threaded portion of adapter with 1/8 inch punch and hammer.

15. Using socket, loosen capscrew (N) to provide movement to fuel-water separator filter (C).

NOTE

Go to step 20 if you have a 2A engine.

16. Using 9/16 inch wrench, remove upper sensor (P) from fuel-water separator filter (C).
17. Tag upper sensor (P) to make sure of correct installation.
18. Using 9/16 inch wrench, remove lower sensor (Q) from fuel-water separator filter (C).
19. Tag lower sensor (Q) to make sure of correct installation.

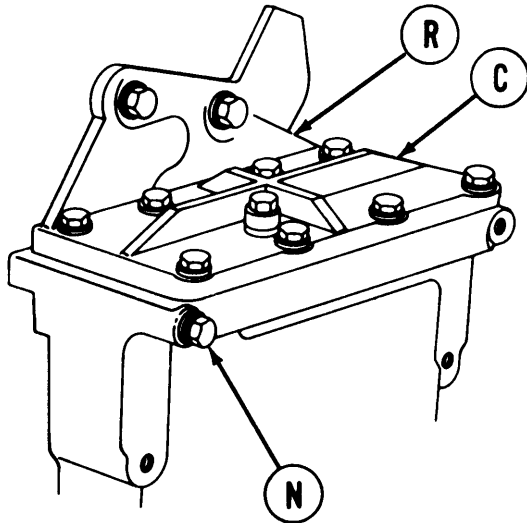


**VIEW FROM BOTTOM OF FILTER
(SHOWN REMOVED FROM ENGINE
FOR CLARITY)**

Go on to Sheet 5

TA149062

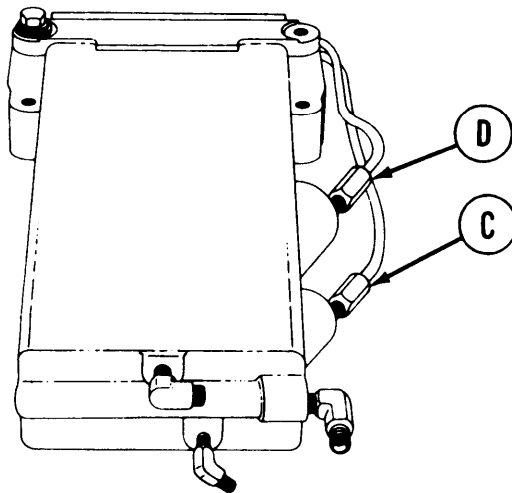
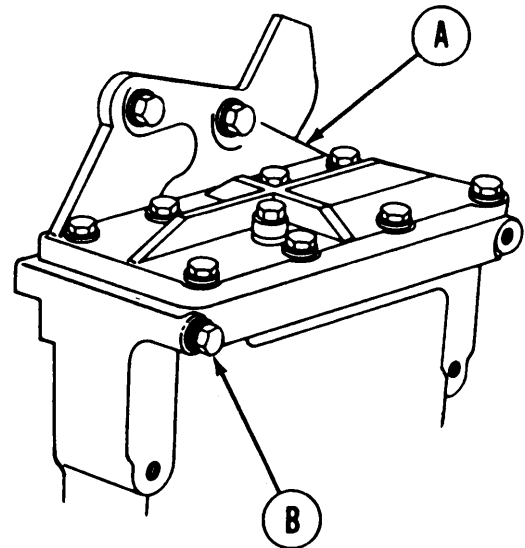
FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 5 of 7)



20. Support fuel-water separator filter (C) to keep it from falling.
21. Using socket, remove capscrew, lockwasher, and flatwasher (N). Throw lockwasher away.
22. Lift fuel-water separator filter (C) away from mounting bracket (R).

INSTALLATION:

1. Position fuel-water separator filter on' mounting bracket (A).
2. Using socket, loosely install capscrew, new lockwasher, and flat washer (B).



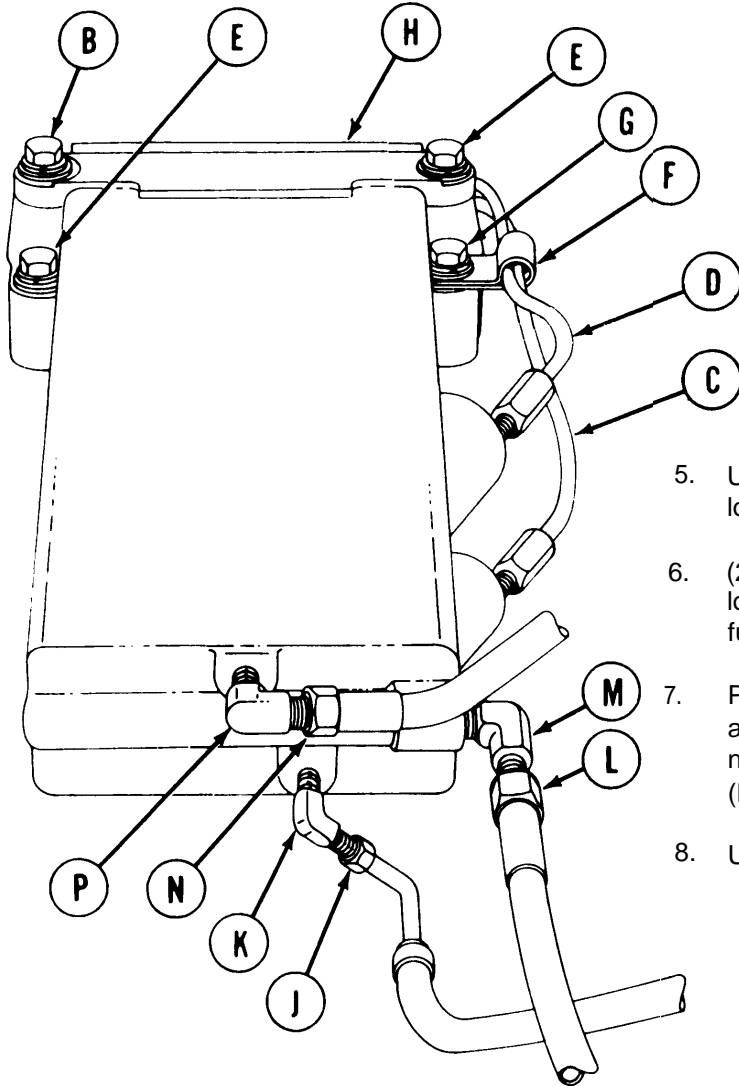
**VIEW FROM BOTTOM OF FILTER
(SHOWN REMOVED FROM ENGINE
FOR CLARITY)**

3. (2D engine). Using 9/16 inch wrench, install lower sensor (C) to fuel-water separator filter. Remove tag.
4. (2D engine). using 9/16 inch wrench, install upper sensor (D) to fuel-water separator filter. Remove tag.

Go on to Sheet 6

TA149063

FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 6 of 7)



5. Using socket, install two capscrews, new lockwashers, and flat washers (E).
6. (2A engine). Install capscrew, new lockwasher, and flat washer (G) onto fuel-water separator filter (H).
7. Position clamp (F) around sensor wires (C) and (D) and, using socket, install capscrew, new lockwasher, flat washer (G), and clamp (F) onto fuel-water separator filter (H).
8. Using socket, tighten capscrew (B).

VIEW FROM BOTTOM OF FILTER
(SHOWN REMOVED FROM ENGINE
FOR CLARITY)

9. Using 9/16 inch wrench, install condensate drain line (J) to elbow (K).
10. Remove plastic barrier material and tape from openings of fuel inlet line (L) and elbow (M).
11. Using 7/8 inch wrench, install fuel line (L) to elbow (M).
12. Remove plastic barrier material and tape from openings of fuel outlet line (N) and elbow (P).
13. Using 7/8 inch wrench, install outlet line (N) to elbow (P).

Go on to Sheet 7

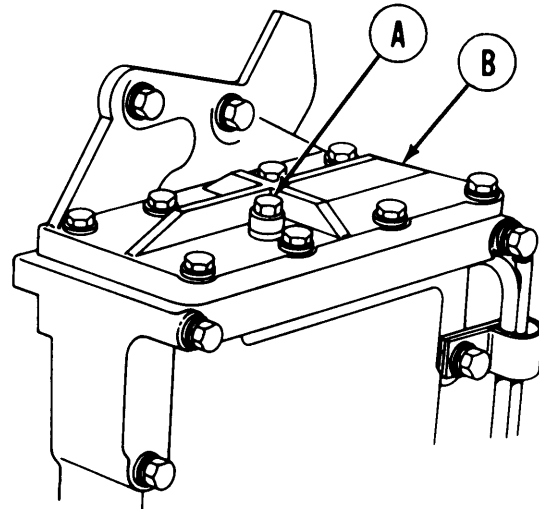
TA149064

FUEL-WATER SEPARATOR FLUID PRESSURE FILTER REPLACEMENT (Sheet 7 of 7)

14. Using rags (Item 65, Appendix D) , wipe bottom of fuel-water separator filter and connecting lines clean of fuel.
15. Remove drip pan.

TEST:

1. (2D engine). Perform operational check of automatic drain (page 7-267).
2. Connect engine for powerplant ground hop (page 5-49).
3. Using 7/16 inch wrench, open bleed cap (A).
4. Set FUEL PUMPS switch to ON (TM 9-2350-222-10).
5. Set MASTER BATTERY switch to ON (TM 9-2350-222-10). Watch bleed cap (A) of fuel-water separator filter (B) for air release (bubbles).
6. Set MASTER BATTERY switch to OFF (TM 9-2350-222-10). After about one minute, repeat step 4. When constant fuel flow is seen, go to step 7.

**NOTE**

It may be necessary to perform steps 4 and 5 several times until constant fuel flow (no bubbles) from bleed cap (A) is observed.

7. Check for leaks and tighten or replace components as necessary.
8. Using 7/16 inch wrench, tighten fuel-water separator bleed cap (A) until snug.
9. Set FUEL PUMPS switch to OFF (TM 9-2350-222-10),
10. Set MASTER BATTERY switch to OFF (TM 9-2350-222-10).
11. Disconnect engine from powerplant ground hop (page 5-62).
12. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

All data on pages 7-284 thru 7-287 deleted.

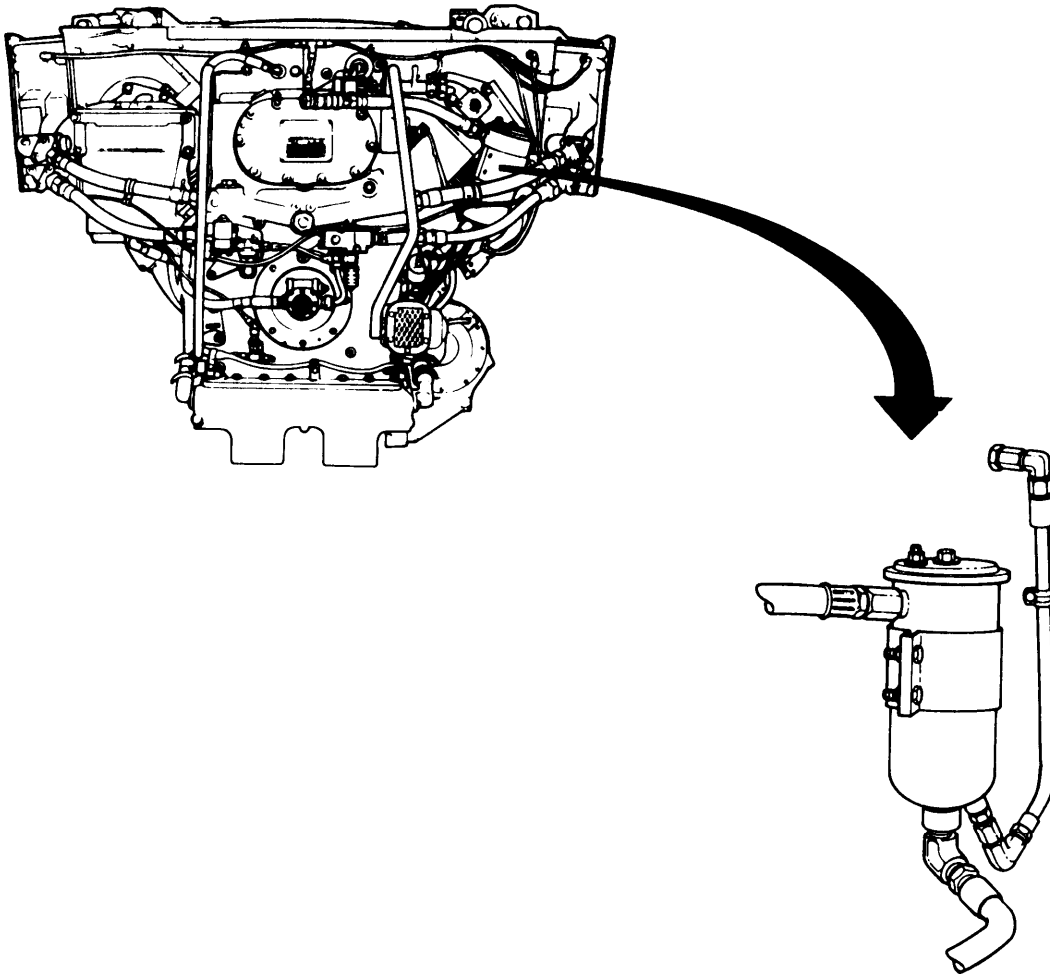
Change 4 7-283

PRIMARY FUEL FILTER REPLACEMENT (2D ENGINE) (Sheet 1 of 3)

TOOLS: 1/2 in. socket, with 1/2 in. drive
Ratchet with 1/2 in. drive
1/2 in. combination box and open end wrench
7/8 in. combination box and open end wrench
11/16 in. combination box and open end wrench
9/16 in. combination box and open end wrench

SUPPLIES: Sealing compound (Item 28, Appendix D)
Gallon can
Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURE: Remove 2D powerplant (page 5-26)



Go on to Sheet 2

TA149070

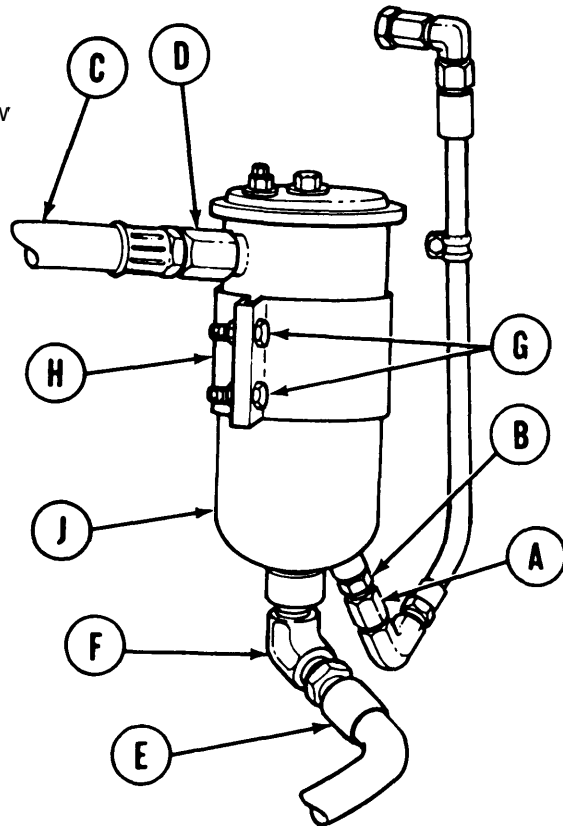
PRIMARY FUEL FILTER REPLACEMENT (2D ENGINE) (Sheet 2 of 3)

REMOVAL:

NOTE

Use suitable container and rags (Item 65, Appendix D) as required to catch and wipe fuel drainage from disconnected lines.

1. Using 9/16 wrench, disconnect connector (A) from connector filter (B).
2. Using 7/8 inch wrench, disconnect fuel inlet hose (C) from fuel inlet elbow (D).
3. Using 7/8 inch wrench, disconnect fuel outlet hose (E) from fuel outlet elbow (F).
4. Using socket and 1/2 inch wrench, loosen bolts (G) on bracket (H).
5. Remove primary fuel filter (J).
6. Using 7/8 inch wrench, remove fuel inlet elbow (D).



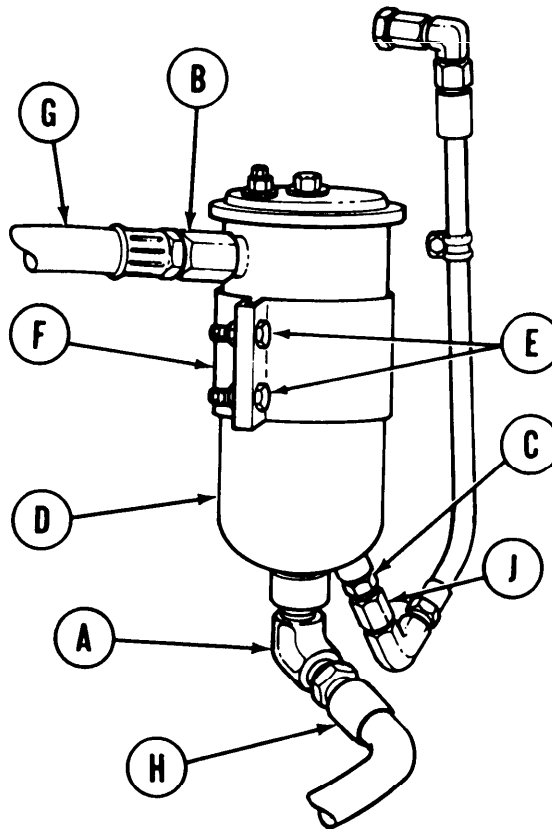
7. Using 3/4 inch wrench, remove fuel outlet elbow (F).
 8. Using 9/16 inch wrench, remove connector filter (B) from fuel filter (J).
- Go on to Sheet 3

TA149071

PRIMARY FUEL FILTER REPLACEMENT (2D ENGINE) (Sheet 3 of 3)

INSTALLATION:

1. Lightly coat elbow assembly fittings with sealing compound (Item 28, Appendix D).
2. Using 3/4 inch wrench, install fuel outlet elbow (A).
3. Using 7/8 inch wrench, install fuel inlet elbow (B).
4. Using 9/16 inch wrench, install connector filter (C) to primary fuel filter (D).
5. Install primary fuel filter (D).
6. Using socket and 1/2 inch wrench, tighten bolts (E) on bracket (F).
7. Using 7/8 inch wrench, connect fuel outlet hose (G) to fuel outlet elbow (B).
8. Using 7/8 inch wrench, connect fuel outlet hose (H) to fuel inlet elbow (A).
9. Using 9/16 inch wrench, connect connector (J) to connector filter (C).
10. Purge fuel system and check for leaks (pa
11. Install 2D powerplant (page 5-37).



End of Task

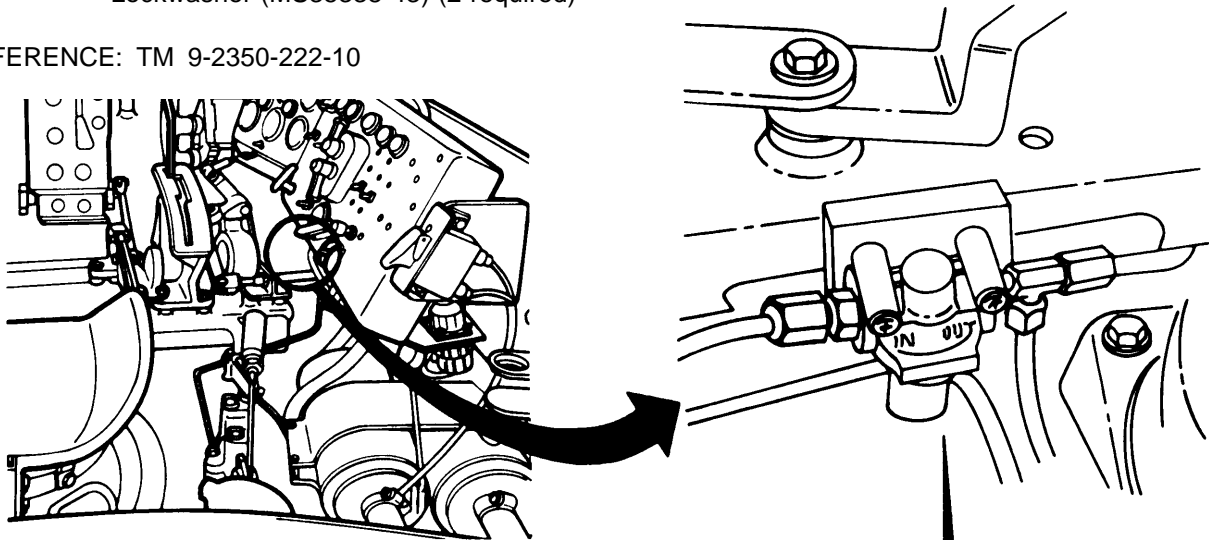
TA149072

FUEL INLET FLUID PRESSURE FILTER REPLACEMENT (Sheet 1 of 3)

TOOLS: 1/2 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 Cross-tip screwdriver
 6 in. adjustable wrench

SUPPLIES: Sealing compound (Item 23, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwasher (MS35338-43) (2 required)

REFERENCE: TM 9-2350-222-10



REMOVAL:

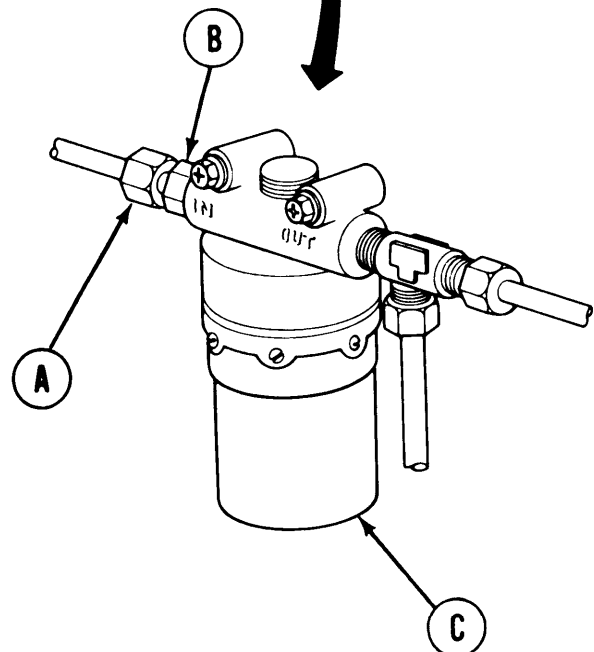
1. Place rags (Item 65, Appendix D) under filter (C) to soak up any fuel that may be in lines.
2. Place 9/16 inch wrench on connector (A).
3. Place 1/2 inch wrench on adapter (B).

NOTE

Fuel lines will be loosened all of the way, but cannot be disconnected from filter (C) until later.

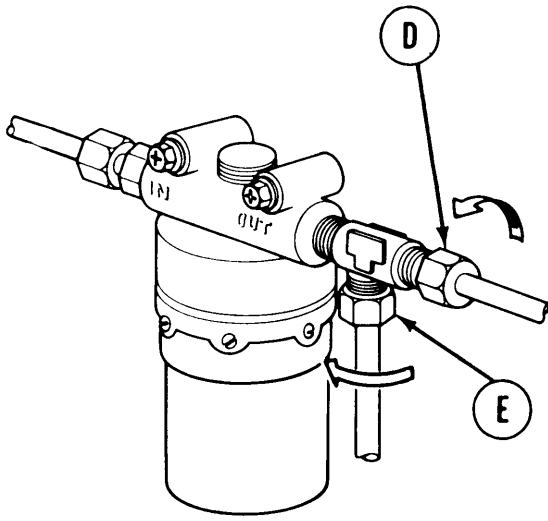
4. While holding adapter (B), loosen connector (A).

Go on to Sheet 2



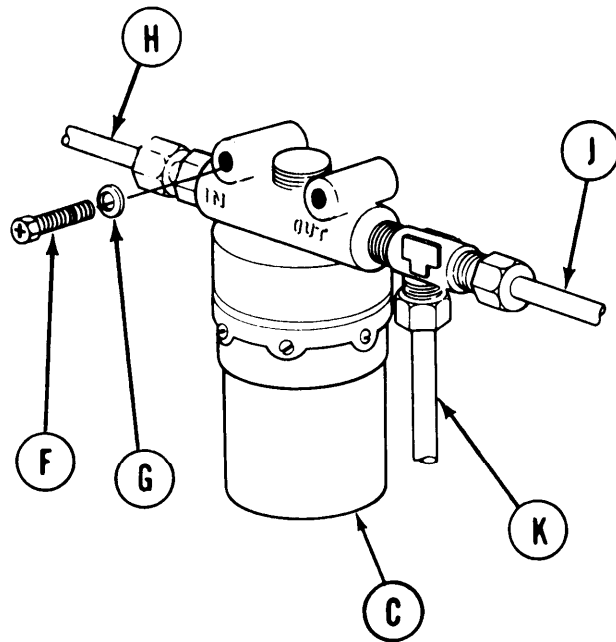
TA149073

FUEL INLET FLUID PRESSURE FILTER REPLACEMENT (Sheet 2 of 3)



5. Using 9/16 inch wrench, loosen connector (D).
6. Using 9/16 inch wrench, loosen connector (E).

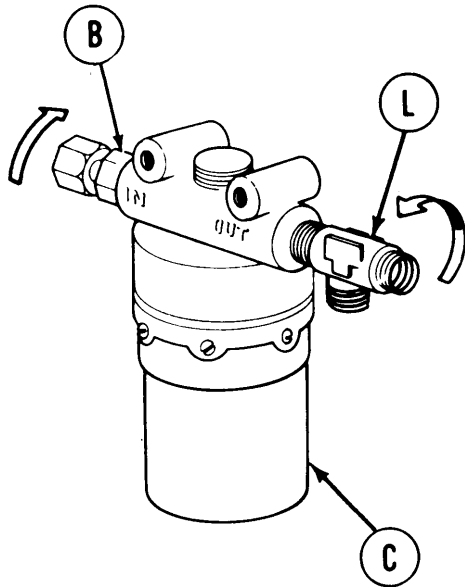
7. Using screwdriver, remove two screws (F) and lockwashers (G) securing filter (C) to vehicle. Throw lockwashers (G) away.
8. Remove filter (C) from mounting bracket, thus disconnecting three lines (H), (J), and (K) from filter.



9. Using 1/2 inch wrench, remove adapter (B) from filter (C),
10. Using adjustable wrench, remove tee connector (L),

NOTE

Filter (C) may have to be put in vise for removal of adapter (B) and tee connector (L).



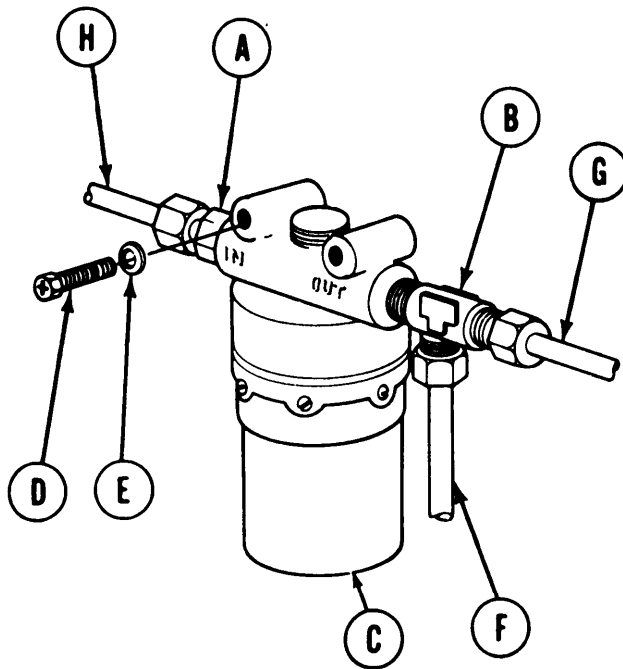
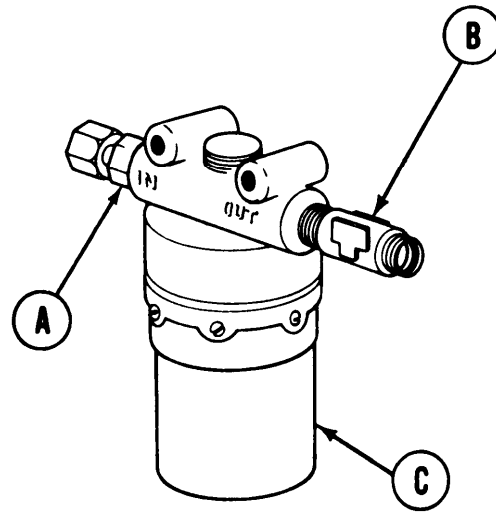
Go on to Sheet 3

TA149074

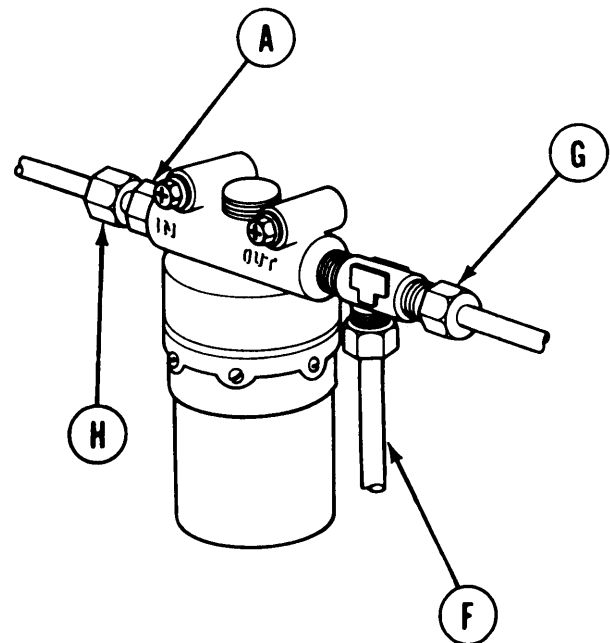
FUEL INLET FLUID PRESSURE FILTER REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. Apply sealing compound (Item 23, Appendix D) to threads of adapter (A) and tee connector (B).
2. Using 1/2 inch wrench, install adapter (A) in filter (C).
3. Using adjustable wrench, install tee connector (B) in filter (C).



4. Using screwdriver, install two screws (D) and new lockwashers (E) securing filter (C) to vehicle.
5. Align three lines (F), (G), and (H) with tee connector (B) and adapter (A).



6. Using 9/16 inch wrench, tighten connector on line (G).
7. Using 9/16 inch wrench, tighten connector on line (F).
8. Using 1/2 inch wrench to hold adapter (A), use 9/16 inch wrench to tighten connector (H) onto adapter (A).
9. Start engine and check for leaks (TM 9-2350-222-10).

End of Task

TA253239

FUEL INLET FLUID PRESSURE FILTER REPAIR (Sheet 1 of 2)

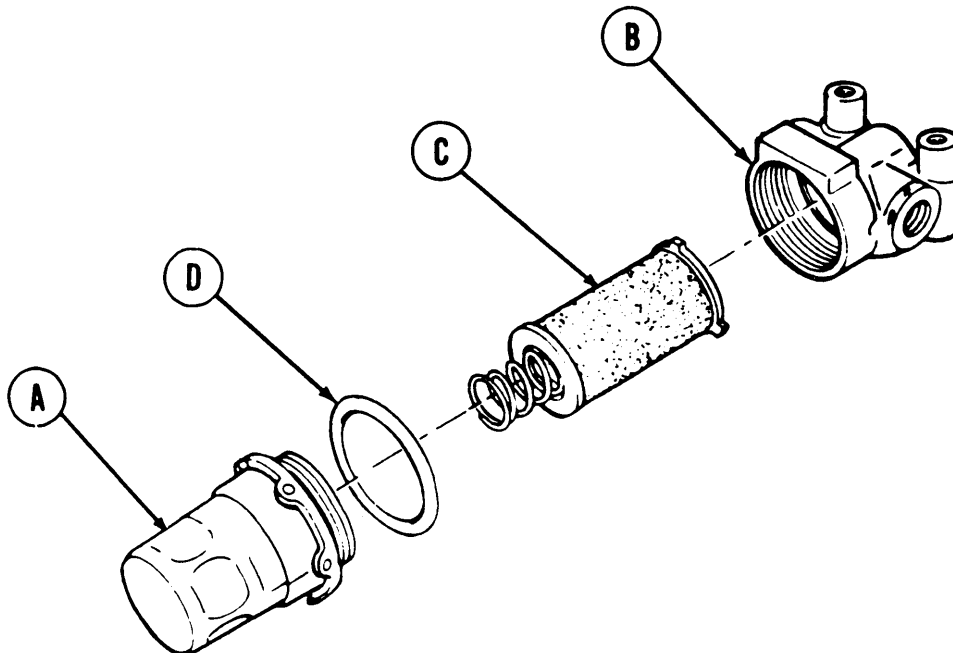
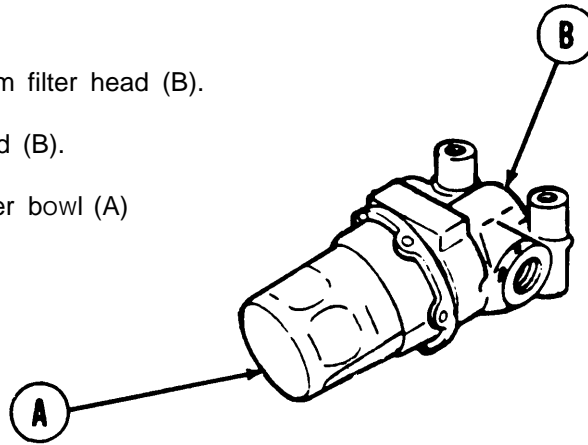
TOOLS: 10 in. adjustable wrench

SUPPLIES: Low-pressure compressed air source
Dry cleaning solvent (Item 54, Appendix D)
Preformed packing (MS29513-125)

PRELIMINARY PROCEDURE: Remove fuel inlet filter (page 7-291)

DISASSEMBLY:

1. Using wrench, remove filter bowl (A) from filter head (B).
2. Remove filter element (C) from filter head (B).
3. Remove preformed packing (D) from filter bowl (A)
4. Throw preformed packing away.



Go on to Sheet 2

TA253214

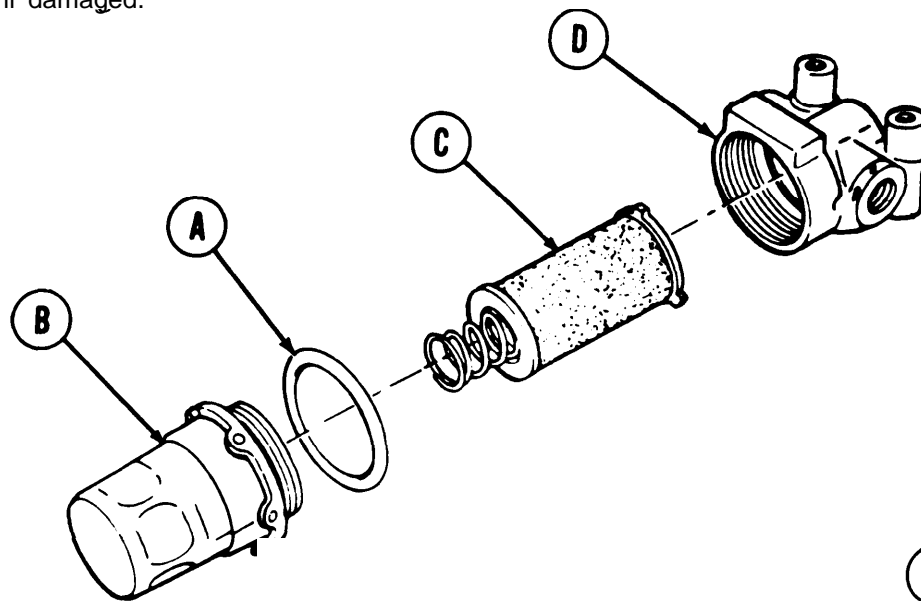
FUEL INLET FLUID PRESSURE FILTER REPAIR (Sheet 2 of 2)

CLEANING AND INSPECTION:

WARNING

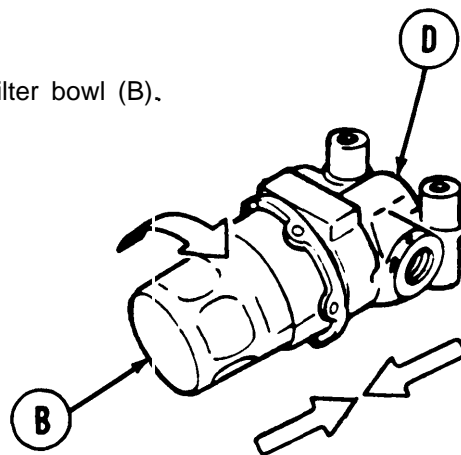
Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

1. Inspect for broken, cracked components and for general serviceability. Replace as necessary.
2. Clean filter bowl, element, and spring with dry cleaning solvent (Item 54, Appendix D).
3. Blow low-pressure, compressed air through filter element to remove dirt particles. Replace element if damaged.



ASSEMBLY:

1. Place new preformed packing (A) in position on filter bowl (B).
2. Place filter element and spring (C) in filter head
3. Place filter bowl (B) and filter head (D) together.
4. Using wrench, screw together filter bowl (B) and filter head (D).
5. Install fuel inlet filter (page 7-293).
6. Start engine and check for leaks (TM 9-2350-222-10).



End of Task

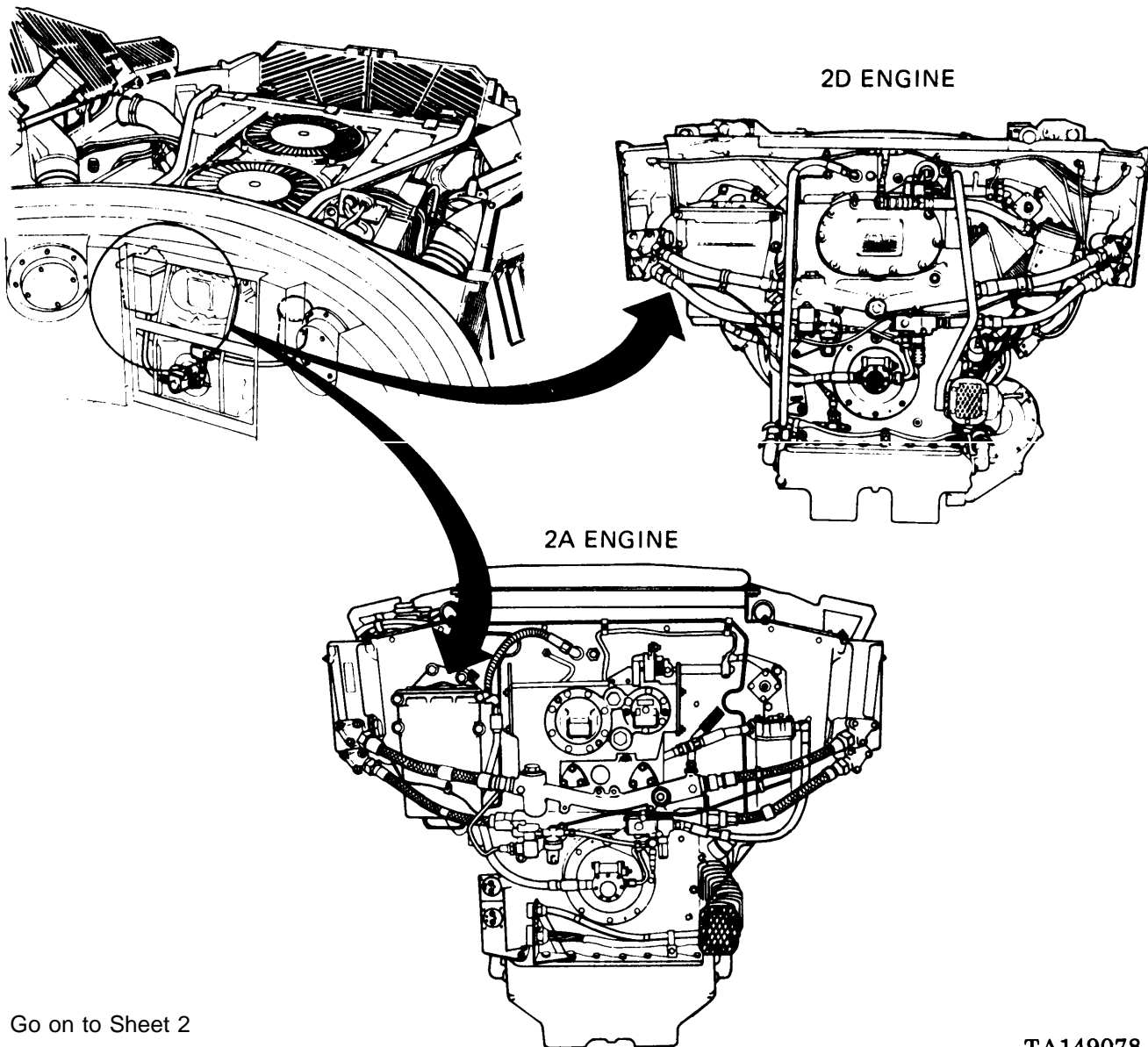
TA149077

FUEL-WATER SEPARATOR FUEL FILTER OUTLET HOSE ASSEMBLY REPLACEMENT (Sheet 1 of 3)

TOOLS: 7/8 in. combination box and open end wrench
9/16 in. combination box and open end wrench

SUPPLIES: Rags (Item 65, Appendix D)
Sealing compound (Item 27, Appendix D)
Drain pan
Dry cleaning solvent (Item 54, Appendix D)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Drain fuel-water separator fuel filter (page 7-277, steps 1 thru 4 for
2D engine, steps 1 thru 12 for 2A engine)



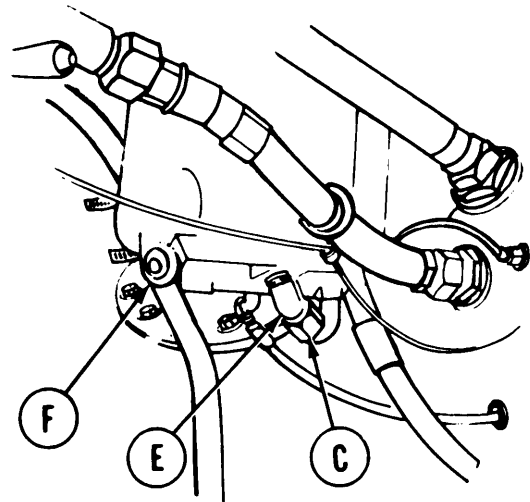
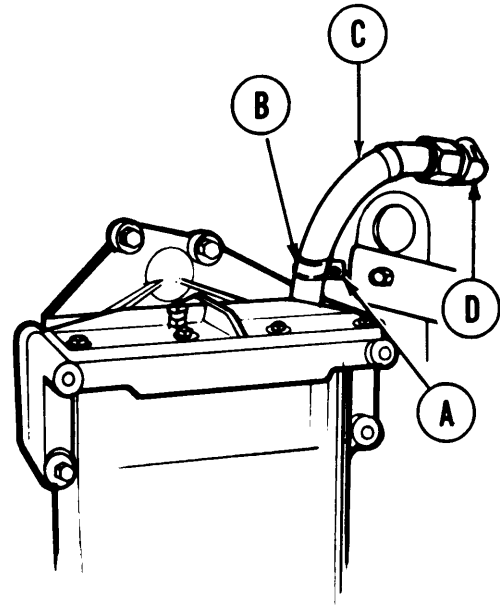
Go on to Sheet 2

TA149078

FUEL-WATER SEPARATOR FUEL FILTER OUTLET HOSE ASSEMBLY REPLACEMENT (Sheet 2 of 3)

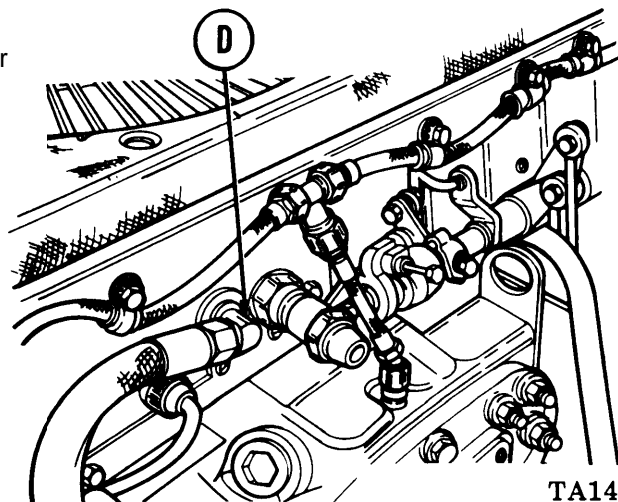
REMOVAL:

1. Using 9/16 inch wrench, remove self-locking nut (A) and hose clamp (B) from hose assembly (C).
2. Using 7/8 inch wrench, remove hose assembly (C) from bulkhead elbow (D).
3. Using 7/8 inch wrench, remove hose assembly (C) from elbow (E) of water separator fuel filter (F).



CLEANING AND INSPECTION:

1. Using clean rags (Item 65, Appendix D) and dry cleaning solvent (Item 54, Appendix D), clean hose clamp and self-locking nut thoroughly.
2. Inspect hose clamp and self-locking nut for wear or damage.
3. Inspect bulkhead elbow and water separator fuel filter outlet elbow for stripped threads.
4. Replace defective parts as required.



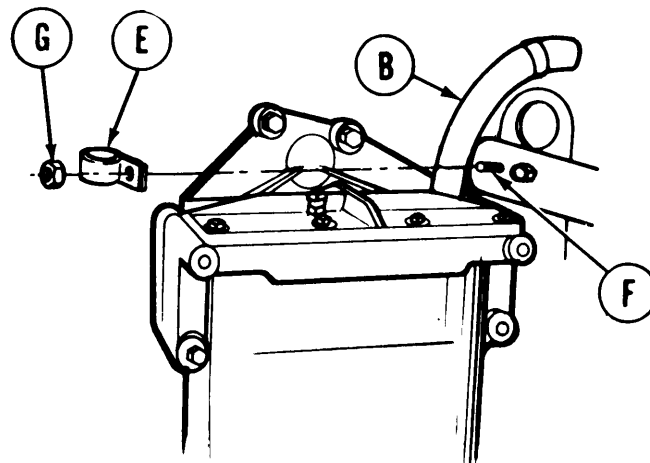
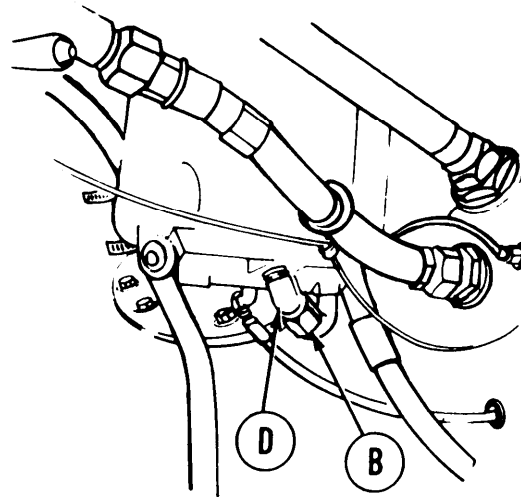
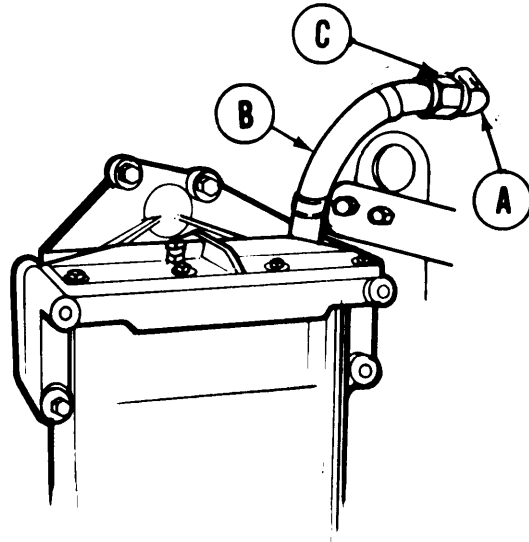
Go on to Sheet 3

TA149079

FUEL-WATER SEPARATOR FUEL FILTER OUTLET HOSE ASSEMBLY REPLACEMENT
 (Sheet 3 of 3)

INSTALLATION:

1. Coat threads of bulkhead elbow (A) with sealing compound (Item 27, Appendix D).
2. Using fingers, install hose assembly (B) on bulkhead elbow (A).
3. Using 7/8 inch wrench, tighten nut (C) of hose assembly (B) on bulkhead elbow (A).
4. Coat threads of water separator fuel filter outlet elbow (D) with sealing compound (Item 27, Appendix D).
5. Using fingers, install hose assembly (B) on water separator fuel filter outlet elbow (D).
6. Using 7/8 inch wrench, tighten nut of hose assembly (B) on water separator fuel filter outlet elbow (D).
7. Using fingers, install hose clamp (E) on hose assembly (B).
8. Using fingers, install hose clamp (E) and hose assembly (B) on mounting stud (F).
9. Using 9/16 inch wrench, install self-locking nut (G) on hose clamp (E) and mounting stud (F).
10. Perform powerplant test run (page 5-52).
11. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA149080

FUEL PUMP-TO-FUEL-WATER SEPARATOR HOSE ASSEMBLY REPLACEMENT
 (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-300
Inspection	7-301
Installation	7-302
Test	7-302

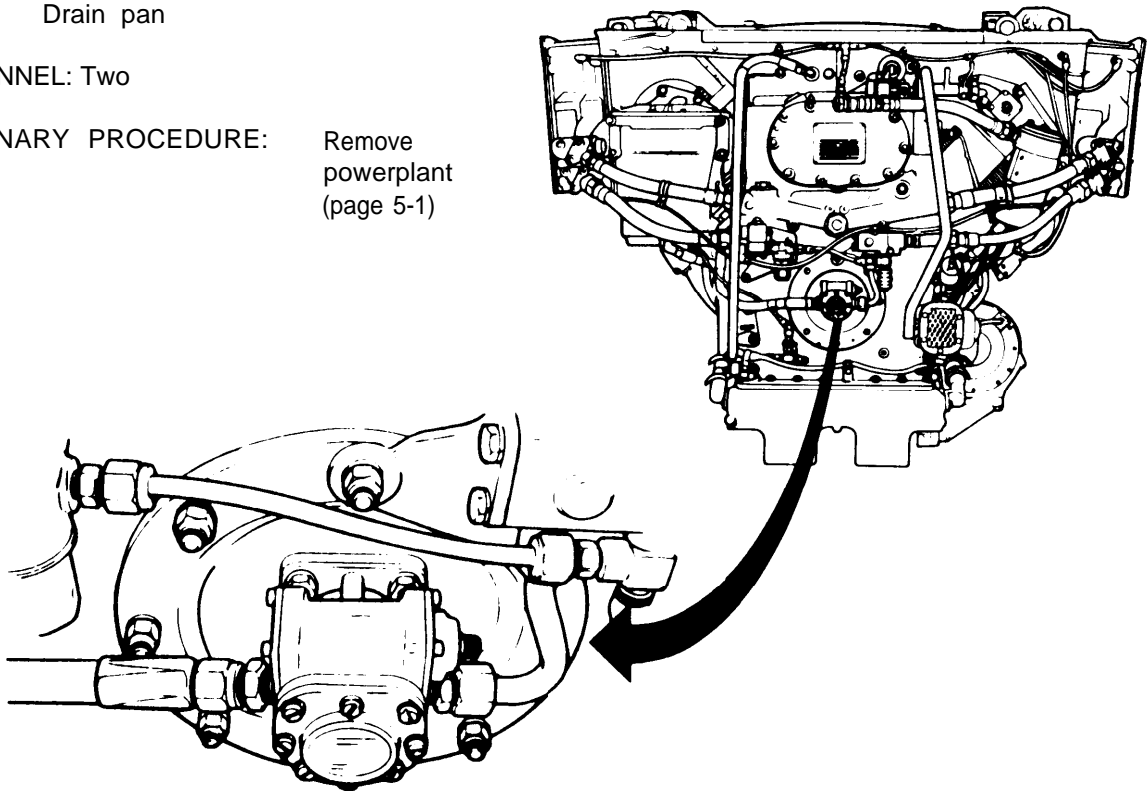
TOOLS: 7/16 in. combination box and open end wrench
 13/16 in. combination box and open end wrench
 7/8 in. combination box and open end wrench

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Rags (Item 65, Appendix D)
 Drain pan

PERSONNEL: Two

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



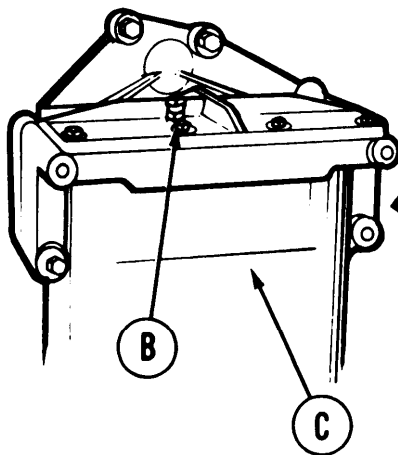
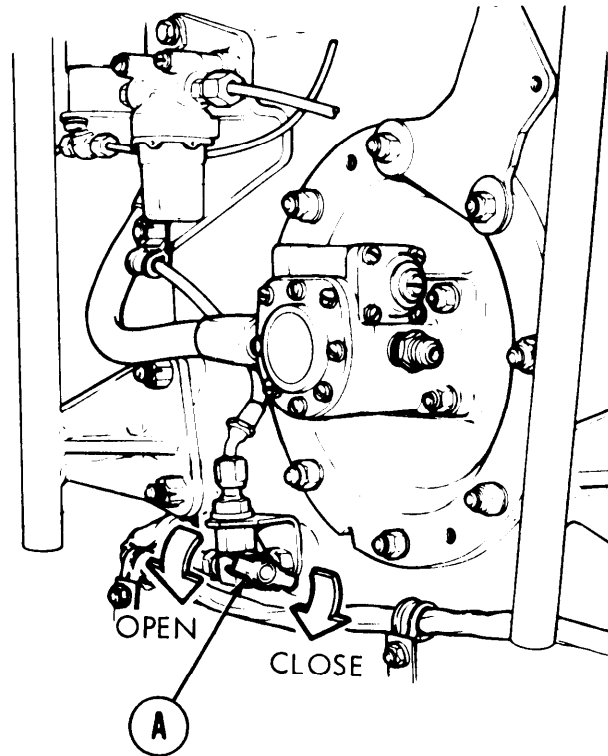
Go on to Sheet 2

TA149081

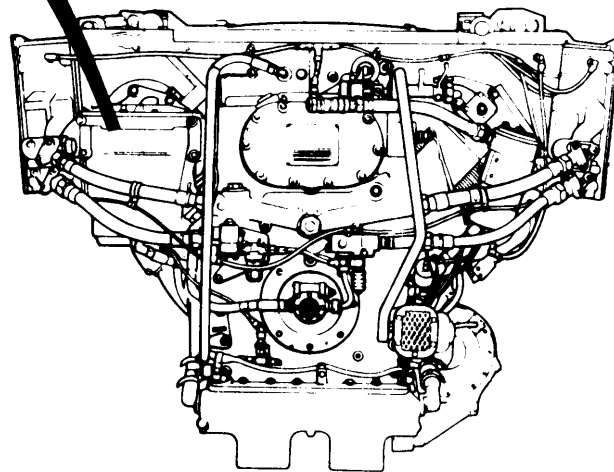
FUEL PUMP-TO-FUEL-WATER SEPARATOR HOSE ASSEMBLY REPLACEMENT (Sheet 2 of 5)

REMOVAL:

1. Place drain pan and rags (Item 65, Appendix D) as required under manual drain valve (A).
2. Open manual drain valve (A) by turning valve handle counterclockwise.
3. Using 7/16 inch wrench, turn fuel-water separator bleed cap (B) counterclockwise until loose.



4. Allow fuel in fuel-water separator filter (C) to drain through manual drain valve (A).
5. Using 7/16 inch wrench, turn bleed cap (B) clockwise until snug.

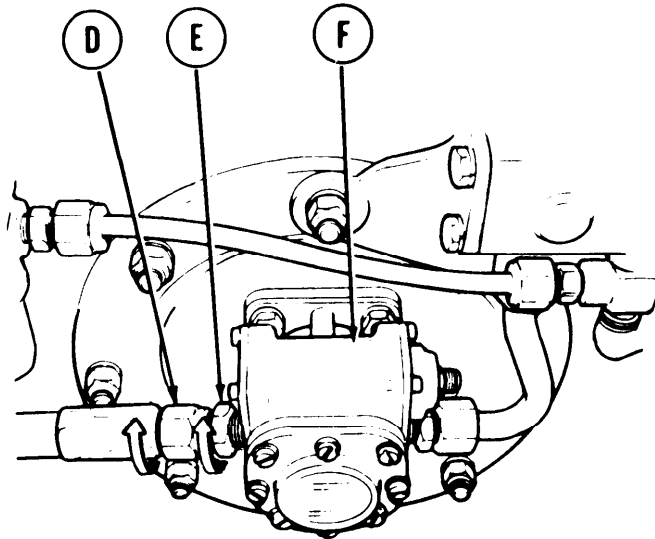


6. Close manual drain handle clockwise.

Go on to Sheet 3

TA149082

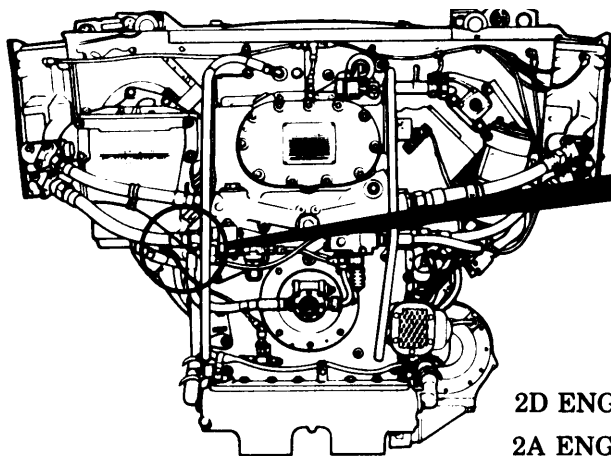
FUEL PUMP-TO-FUEL-WATER SEPARATOR HOSE ASSEMBLY REPLACEMENT
 (Sheet 3 of 5)



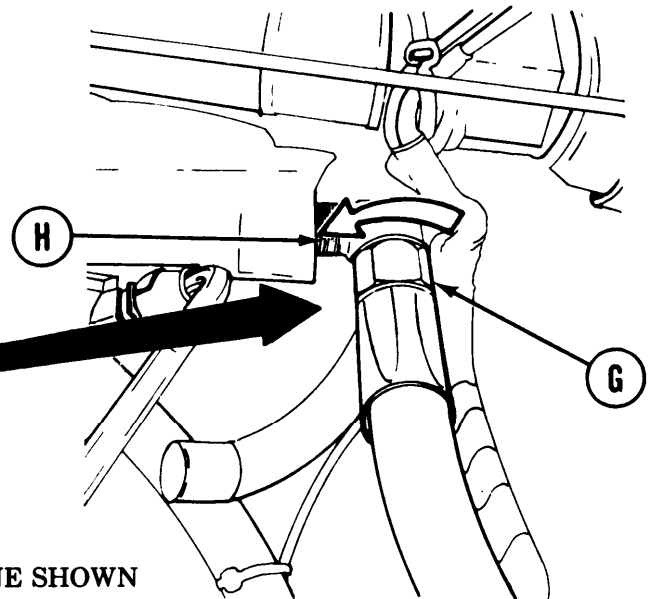
7. Using 7/8 inch wrench on hose connector (D) and 13/ 16 inch wrench on adapter (E), remove hose connector (D) from adapter (E).

Using 13/16 inch wrench, remove adapter (E) from fuel pump (F).

9. Using 7/8 inch wrench, remove hose connector (G) from elbow (H).



**2D ENGINE SHOWN
 2A ENGINE SIMILAR**



INSPECTION:

1. Check assembly components for cracks, breaks, frayed hose, crossed threads, and general serviceability.
2. Replace components as necessary.

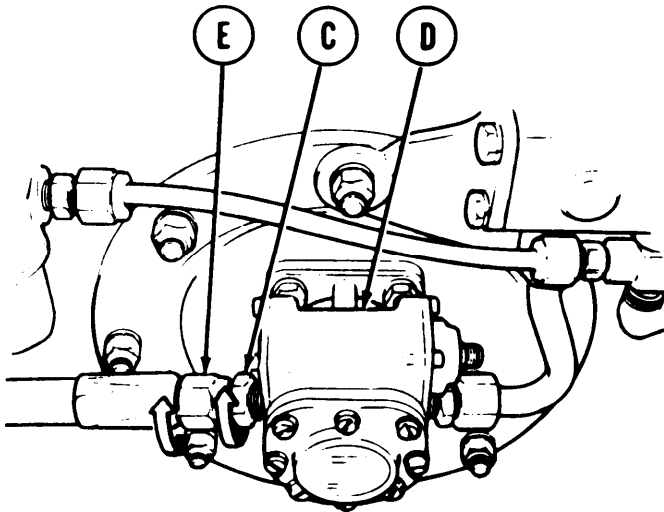
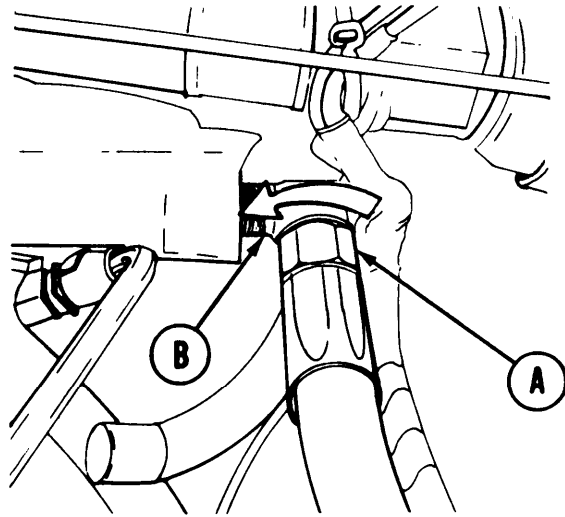
Go on to Sheet 4

TA148880

FUEL PUMP-TO-FUEL-WATER SEPARATOR HOSE ASSEMBLY REPLACEMENT (Sheet 4 of 5)

INSTALLATION:

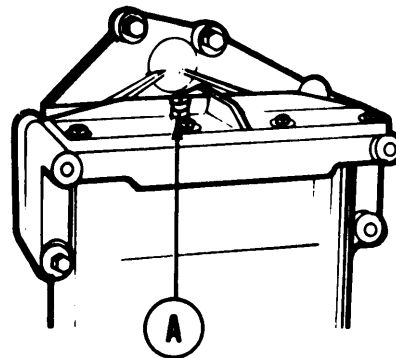
1. Using 7/8 inch wrench, install hose connector (A) to elbow (B).
2. Using 13/16 inch wrench, install adapter (C) to fuel pump (D).



3. Using 7/8 inch wrench, install hose connector (E) to adapter (C).
4. Remove drain pan and rags placed under manual drain valve.

TEST:

1. Connect engine for powerplant ground hop (page 5-49).
2. Using 7/16 inch wrench, turn fuel-water separator bleed cap (A) counterclockwise until loose.

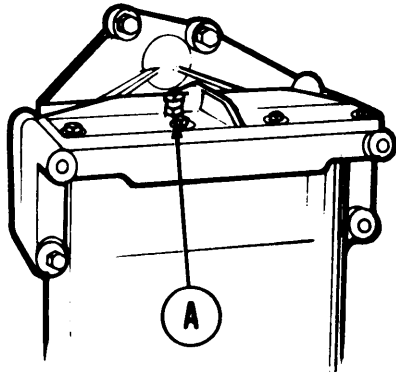


Go on to Sheet 5

TA148881

FUEL PUMP-TO-FUEL-WATER SEPARATOR HOSE ASSEMBLY REPLACEMENT (Sheet 5 of 5)

3. Set FUEL PUMPS switch to ON.
4. Set MASTER BATTERY switch to ON.
5. Watch fuel-water separator bleed cap (A) until air release (bubbles) appears, then set MASTER BATTERY switch to OFF.



NOTE

It may be necessary to perform steps 5 and 6 several times until a constant fuel flow (no bubbles) from the bleed cap (A) is observed. Two persons are required to perform steps 3, 4, and 6.

6. Wait about one minute and repeat step 4 until a constant free flow is observed at bleed cap (A).
7. Using 7/16 inch wrench, turn bleed cap (A) clockwise until snug.
8. Check for leaks. Tighten or replace components as necessary.
9. (2D engine only). Perform operational check of automatic drain (page 7-269).
10. Set MASTER BATTERY switch to OFF.
11. Disconnect engine from powerplant ground hop (page 5-62).
12. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

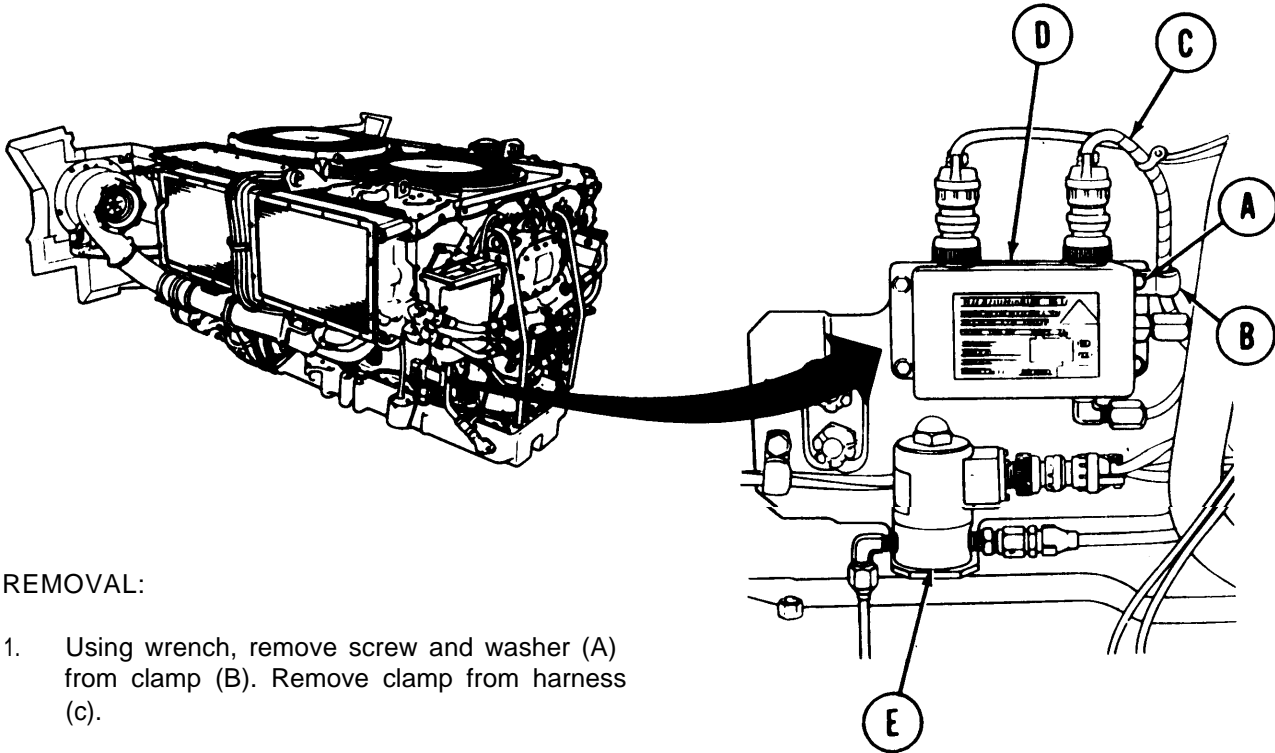
End of Task

TA148882

FUEL-WATER SEPARATOR DRAIN SOLENOID WIRING HARNESS REPLACEMENT (2D ENGINE) (Sheet 1 of 1)

TOOLS: 5/16 in. combination box and open end wrench
Slip joint pliers

PRELIMINARY PROCEDURE: Remove 2D powerplant (page 5-26)



REMOVAL:

1. Using wrench, remove screw and washer (A) from clamp (B). Remove clamp from harness (C).
2. Using pliers, disconnect harness (C) from control assembly (D) and drain solenoid (E), and remove harness from powerplant.

INSTALLATION:

1. Connect harness (C) to control assembly (D) and drain solenoid (E) as shown.
2. Using pliers, tighten connectors on ends of harness (C).
3. Position clamp (B) around harness (C) as shown, being sure to place clamp around leads at control assembly.
4. Using wrench, install screw and washer (A) through clamp (B) into control assembly mount.
5. Install 2D powerplant (page 5-37).

End of Task

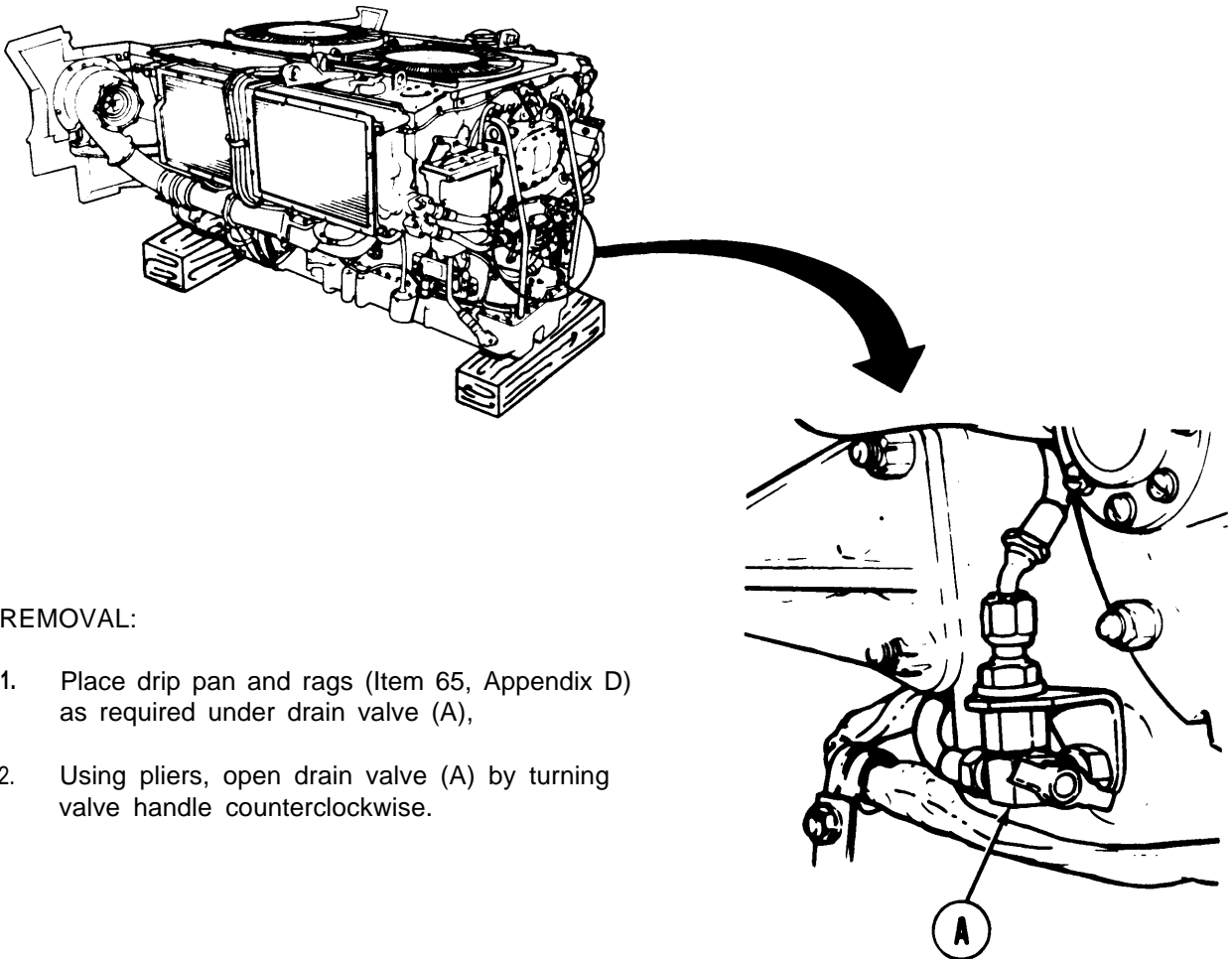
TA1488883

FUEL-WATER SEPARATOR DRAIN SOLENOID VALVE REPLACEMENT (2D ENGINE) (Sheet 1 of 3)

TOOLS: 5/16 in. combination box and open end wrench
7/16 in. combination box and open end wrench
9/16 in. combination box and open end wrench (2 required)
Slip joint pliers

SUPPLIES: Drip pan
Rags (Item 65, Appendix D)
Zinc chromate primer (Item 50, Appendix D)
Washer (502244) (2 required)

PRELIMINARY PROCEDURE: Remove 2D powerplant (page 5-26)



REMOVAL:

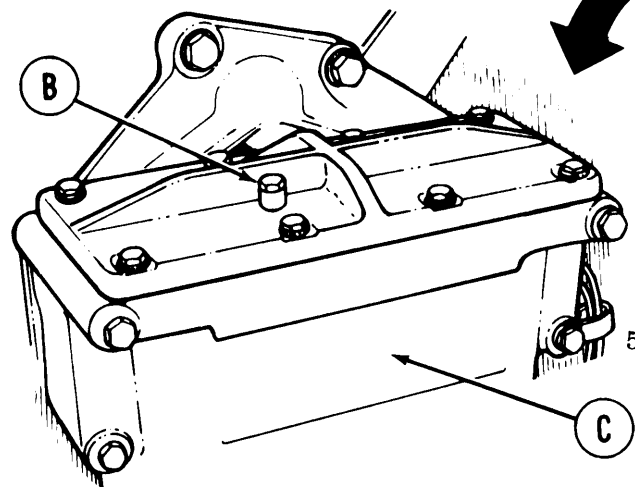
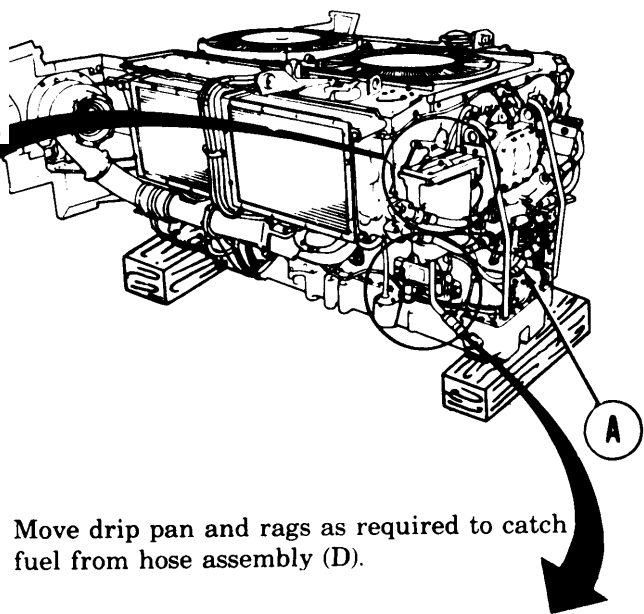
1. Place drip pan and rags (Item 65, Appendix D) as required under drain valve (A),
2. Using pliers, open drain valve (A) by turning valve handle counterclockwise.

GO on to Sheet 2

TA148884

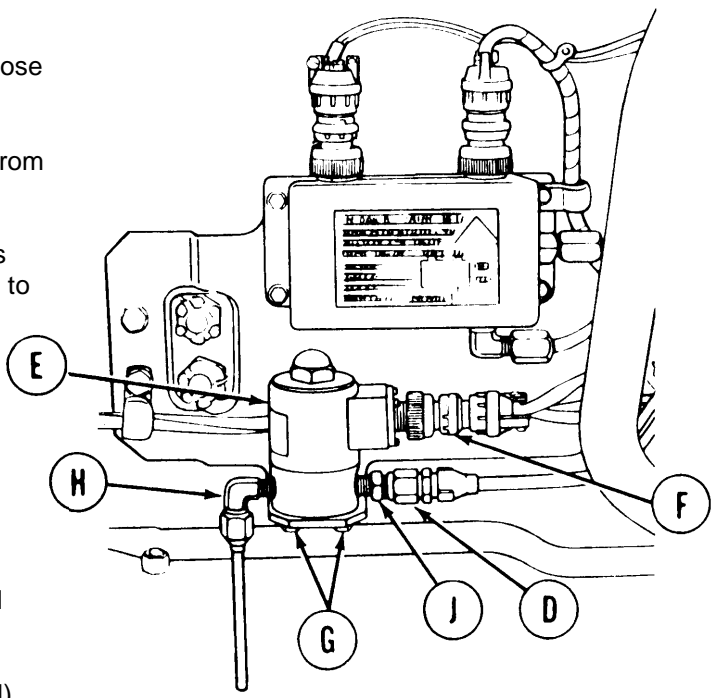
FUEL-WATER SEPARATOR DRAIN SOLENOID VALVE REPLACEMENT (2D ENGINE)
 (Sheet 2 of 3)

3. Using 7/16 inch wrench, turn fuel-water separator bleed cap (B) counterclockwise until loose.
4. Allow fuel in fuel-water separator filter (C) to drain through drain valve (A).



5. Move drip pan and rags as required to catch fuel from hose assembly (D).

6. Using two 9/16 inch wrenches, disconnect hose assembly (D) from solenoid valve (E).
7. Using pliers, disconnect electrical lead (F) from solenoid valve (E).
8. Using 5/16 inch wrench, remove two screws and washers (G) securing solenoid valve (E) to bracket. Throw washers (G) away.
9. Remove solenoid valve (E).



NOTE

It will be necessary to secure solenoid valve (E) in vise.

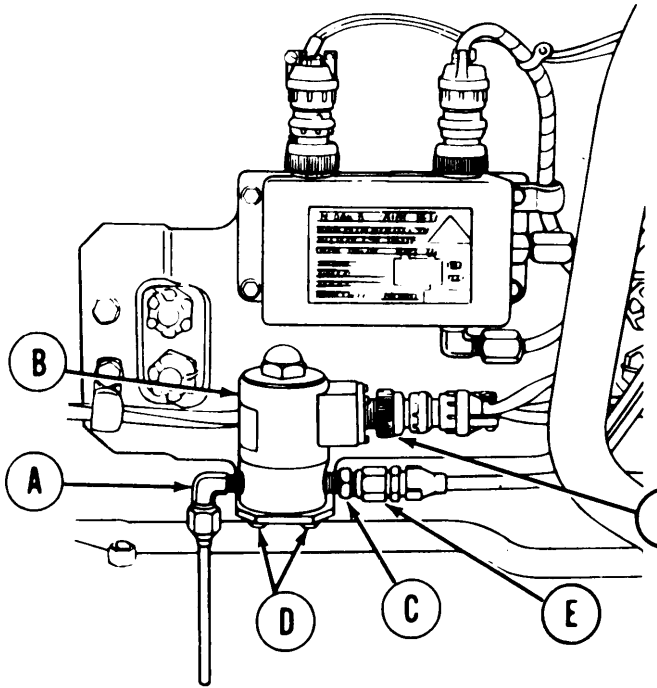
10. Using 9/16 inch wrench, remove elbow and tube (H) as a unit from solenoid valve (E).
11. Using 9/16 inch wrench, remove adapter (J) from solenoid valve (E).

Go on to Sheet 3

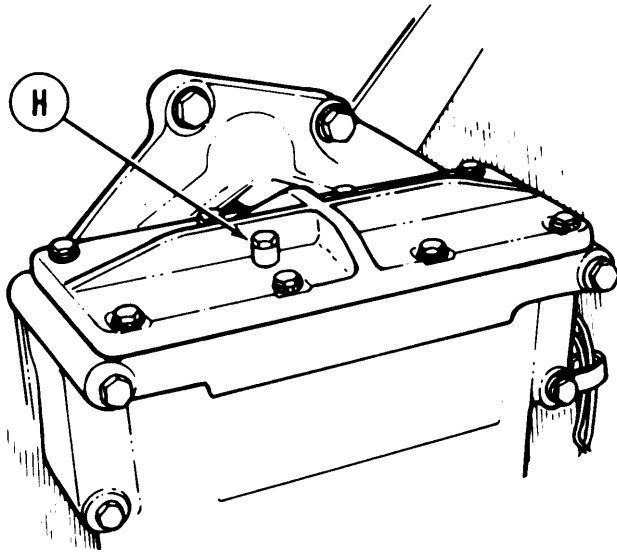
TA148885

FUEL-WATER SEPARATOR DRAIN SOLENOID VALVE REPLACEMENT (2D ENGINE)
 (Sheet 3 of 3)

INSTALLATION:



7. Close drain valve (G) by turning valve handle clockwise.

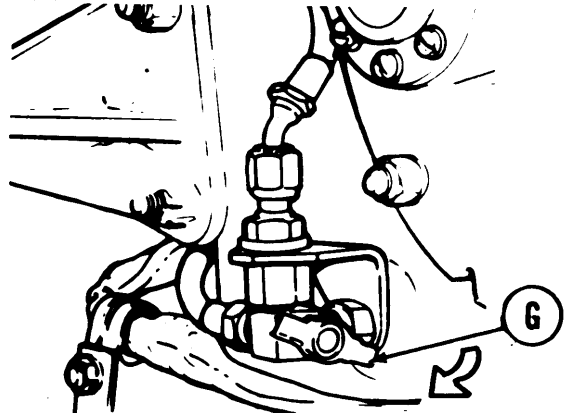


End of Task

NOTE

Coat all exposed threads of adapter and elbow with zinc-chromate (Item 50, Appendix D) before installing.

1. Using 9/16 inch wrench, install elbow and tube (A) to solenoid valve(B).
2. Using 9/16 inch wrench, install adapter (C) in solenoid valve (B).
3. Position solenoid valve (B) to bracket.
4. Using 5/16 inch wrench, install two screws and new washers (D) to secure solenoid valve (B) to bracket.
5. Using two 9/16 inch wrenches, connect hose assembly (E) to adapter (C).
6. Connect electrical lead (F) to solenoid valve (B).



8. Using 7/16 inch wrench, turn bleed cap (H) clockwise until snug.
9. Test fuel-water separator (page 7-283, steps 1 thru 11).
10. Install 2D powerplant (page 5-37).

TA148886

FUEL-WATER SEPARATOR DRAIN LINES REPLACEMENT (2D ENGINE)(Sheet 1 of 6)

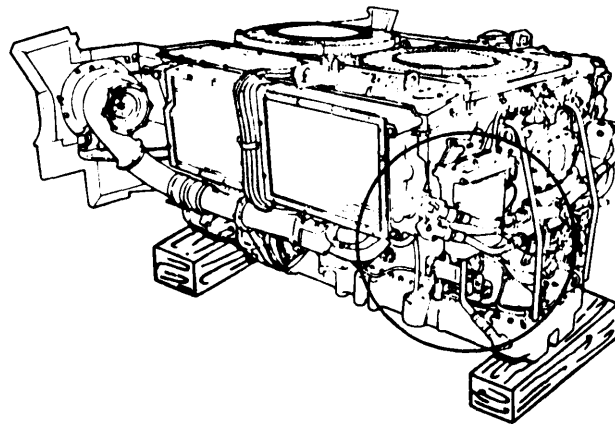
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-309
Installation	7-312

TOOLS: 11/16 in. combination box and open end wrench (2 required)
 9/16 in. combination box and open end wrench
 7/16 in. combination box and open end wrench
 5/8 in. combination box and open end wrench
 6 in. adjustable wrench
 Vise
 Slip joint pliers

SUPPLIES: Rags (Item 65, Appendix D)
 Drip pan
 Lockwasher (MS35337-28)

PRELIMINARY PROCEDURE: Remove 2D powerplant (page 5-26)



NOTE

These procedures are given for replacement of 2D engine fuel-water separator drain lines. Only perform those steps necessary to replace the defective part.

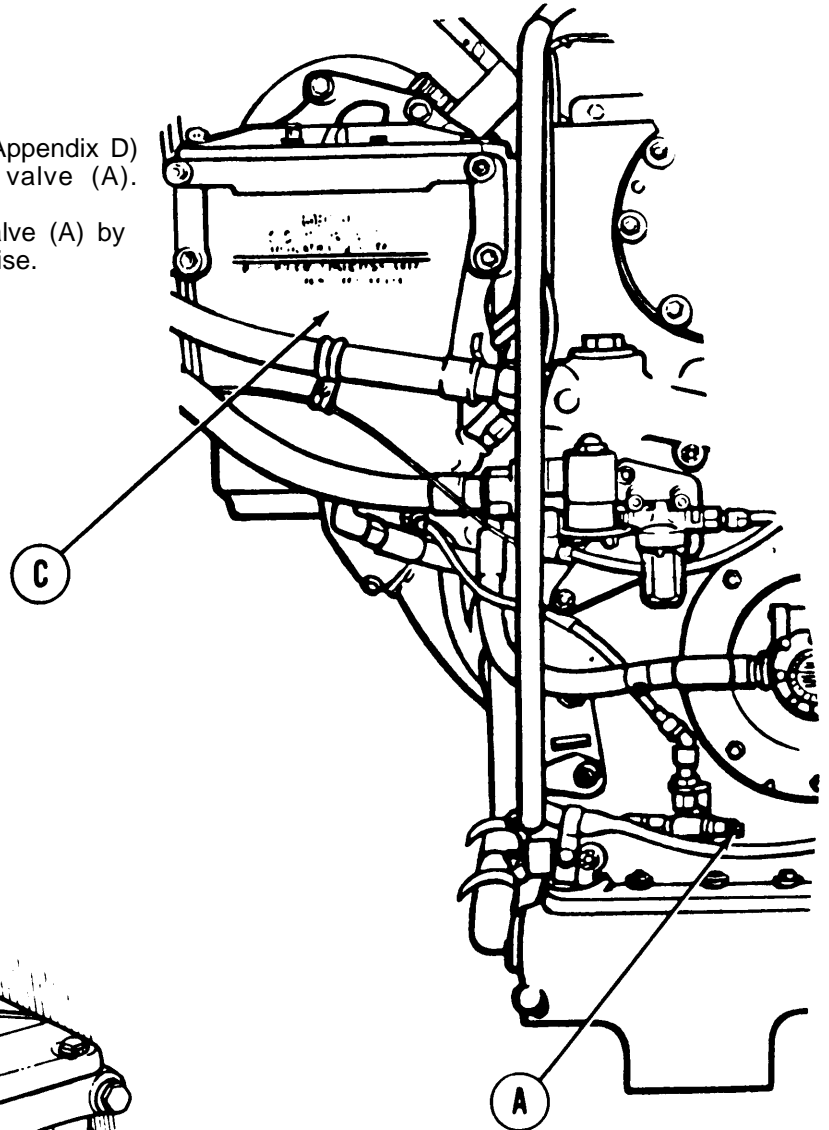
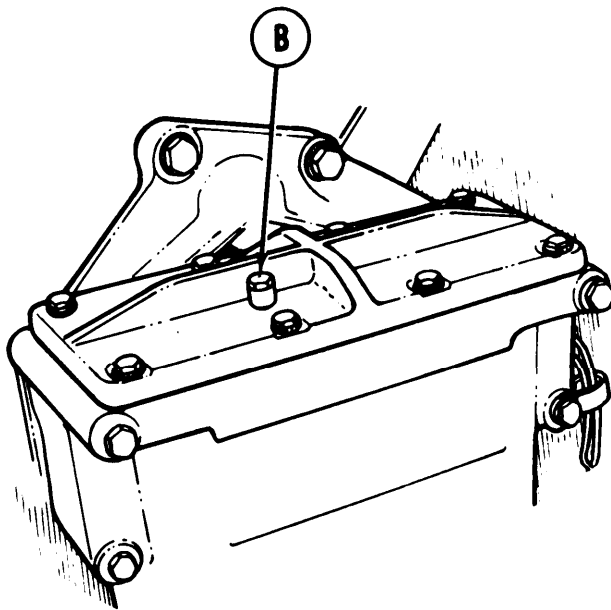
Go on to Sheet 2

TA148887

FUEL-WATER SEPARATOR DRAIN LINES REPLACEMENT (2D ENGINE) (Sheet 2 of 6)

REMOVAL:

1. Place drip pan and rags (Item 65, Appendix D) as required under manual drain valve (A).
2. Using pliers, open manual drain valve (A) by turning valve handle counterclockwise.

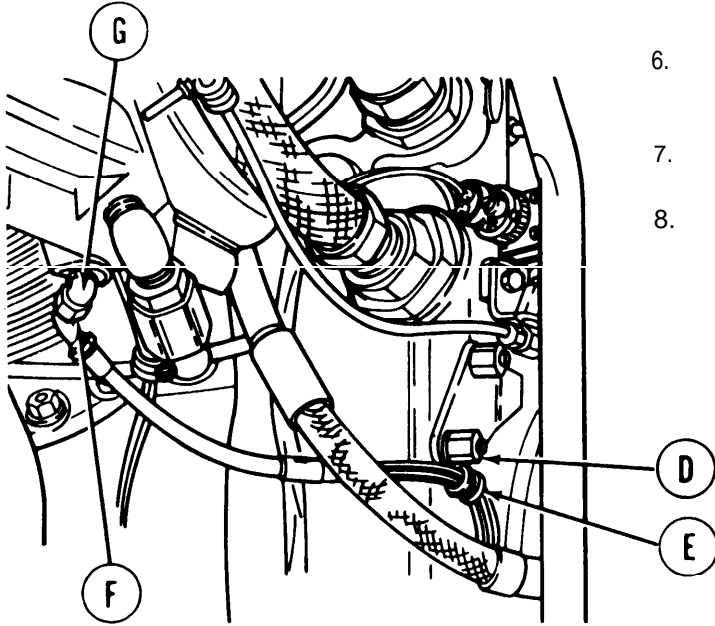


3. Using 7/16 inch wrench, turn bleed cap (B) counterclockwise until loose.
4. Allow fuel in fuel-water separator filter (C) to drain through manual drain valve (A).
5. Using 7/16 inch wrench, turn bleed cap (B) clockwise until snug.

Go on to Sheet 3

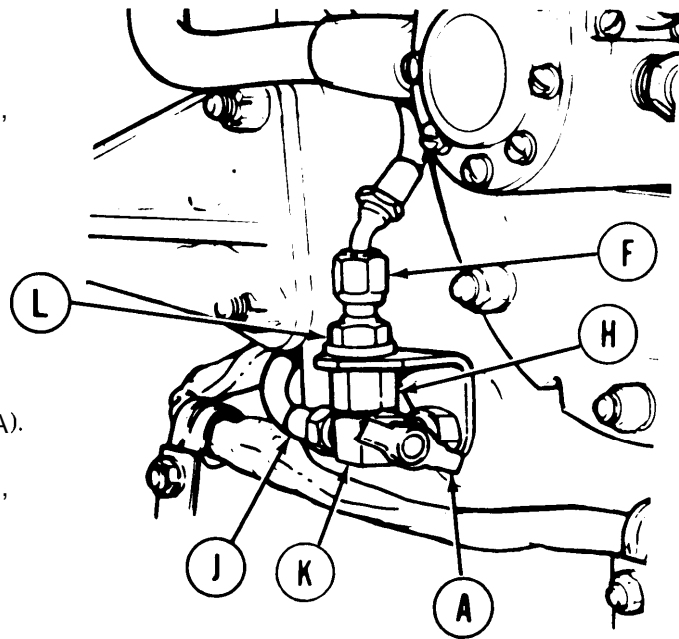
TA148888

FUEL-WATER SEPARATOR DRAIN LINES REPLACEMENT (2D ENGINE) (Sheet 3 of 6)



6. Using 9/16 inch wrench, remove nut (D) securing clamp (E).
7. Remove clamp (E) from hose assembly (F).
8. Using 9/16 inch wrench, disconnect hose assembly (F) from elbow (G).

9. Using 11/16 inch wrench to hold adapter (H), use 9/16 inch wrench and disconnect hose assembly (F) from adapter (H).
10. Remove hose assembly (F).
11. Using 9/16 inch wrench, disconnect hose assembly (J) from tee (K).
12. Using 5/8 inch wrench to hold tee (K), use adjustable wrench and remove drain valve (A).
13. Using 11/16 inch wrench to hold adapter (H), use 11/ 16 inch wrench and remove nut and lockwasher (L). Tee (K) and adapter (H) will fall free when nut (L) is removed. Throw lockwasher away.

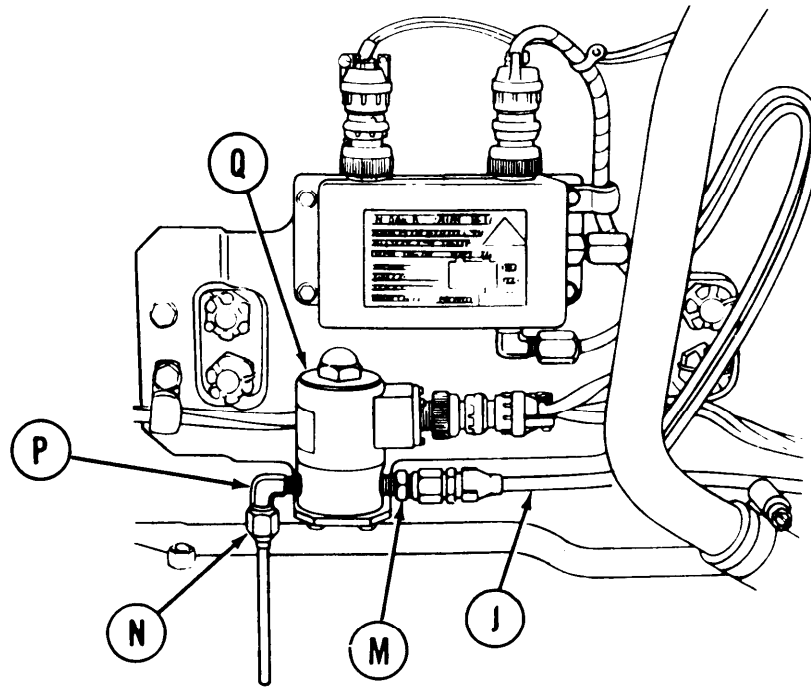


14. Install tee (K) into vise, and, using 11/ 16 inch wrench, remove adapter (H) from tee (K).

Go on to Sheet 4

TA148889

FUEL-WATER SEPARATOR DRAIN LINES REPLACEMENT (2D ENGINE) (Sheet 4 of 6)



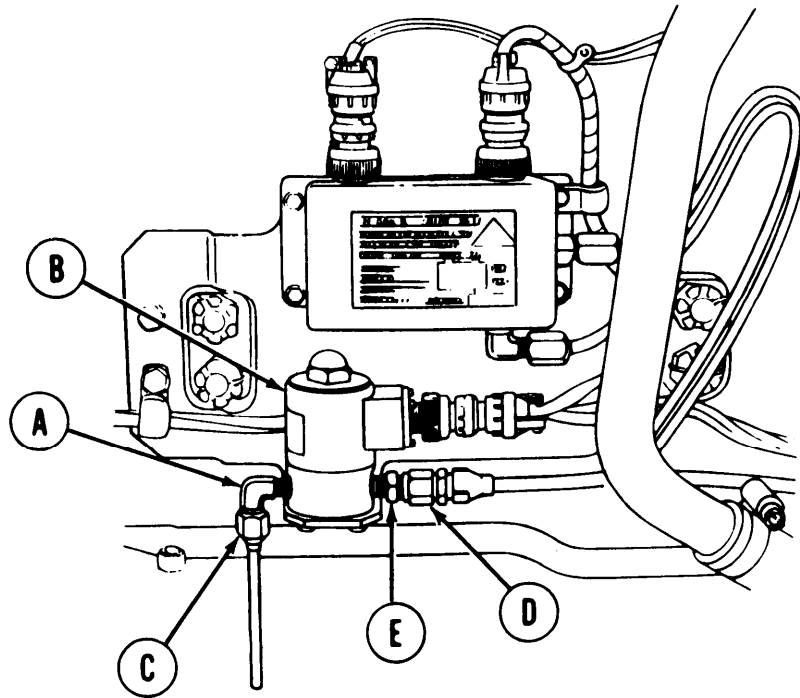
15. Using 9/16 inch wrench, disconnect hose assembly (J) from solenoid valve adapter (M).
16. Remove hose assembly (J).
17. Using 9/16 inch wrench, disconnect tube assembly (N) from elbow (P).
18. Using 9/16 inch wrench, remove elbow (P) from solenoid valve (Q).
19. Using 9/16 inch wrench, remove adapter (M) from solenoid valve (Q).

Go on to Sheet 5

TA148890

FUEL-WATER SEPARATOR DRAIN LINES REPLACEMENT (2D ENGINE) (Sheet 5 of 6)

INSTALLATION:



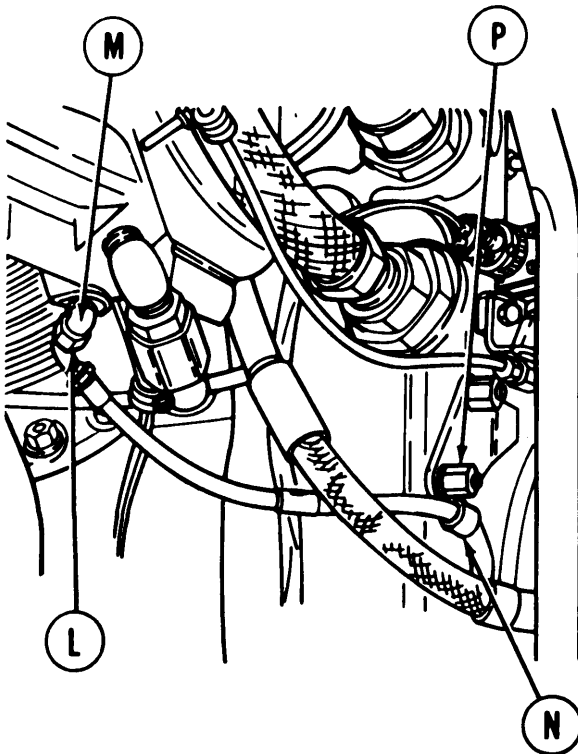
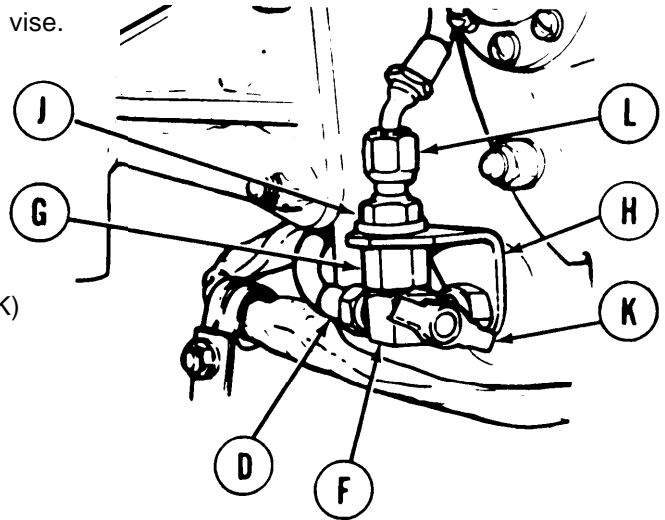
1. Using 9/16 inch wrench, install elbow (A) to solenoid valve (B).
2. Using 9/16 inch wrench, install tube assembly (C) onto elbow (A).
3. Using 9/16 inch wrench, install adapter (E) into solenoid valve (B).
4. Position hose assembly (D) to solenoid valve (B) and along engine block.
5. Using 9/16 inch wrench, install hose assembly (D) to solenoid valve adapter (E).

Go on to Sheet 6

TA148891

FUEL-WATER SEPARATOR DRAIN LINES REPLACEMENT (2D ENGINE) (Sheet 6 of 6)

6. Install tee (F) into vise, and using 11/ 16 inch wrench, install adapter (G) into tee (F).
7. Remove tee (F) and adapter (G) assembly from vise.
8. Position tee (F) and adapter (G) assembly into mounting bracket (H).
9. Using 11/16 inch wrench to hold adapter (G), use 11/16 inch wrench and install new lockwasher and nut (J) onto adapter (G).
10. Using adjustable wrench, install drain valve (K) into tee (F).



11. Position hose assembly (L) to adapter (G) and elbow (M).
12. Using 9/16 inch wrench, install hose assembly (L) to adapter (G) and elbow (M).
13. Using 9/16 inch wrench, install hose assembly (D) to tee (F).
14. Position clamp (N) onto hose assembly (L).
15. Using 9/16 inch wrench, install nut (P) to secure clamp (N).
16. Close drain valve (K) by turning clockwise.
17. Test fuel-water separator (page 7-283, steps 1 thru 11).
18. Install 2D powerplant (page 5-37).

End of Task

TA148892

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)
(Sheet 1 of 8)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-315
Installation	7-318
Test	7-320

TOOLS: Hammer
 5/16 in. socket with 1/2 in. drive
 1/2in. socket with 1/2 in. drive
 6 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 5/16 in. combination box and open end wrench
 7/16 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 Flat-tip screwdriver
 Slip joint pliers
 1/8 in. drive punch

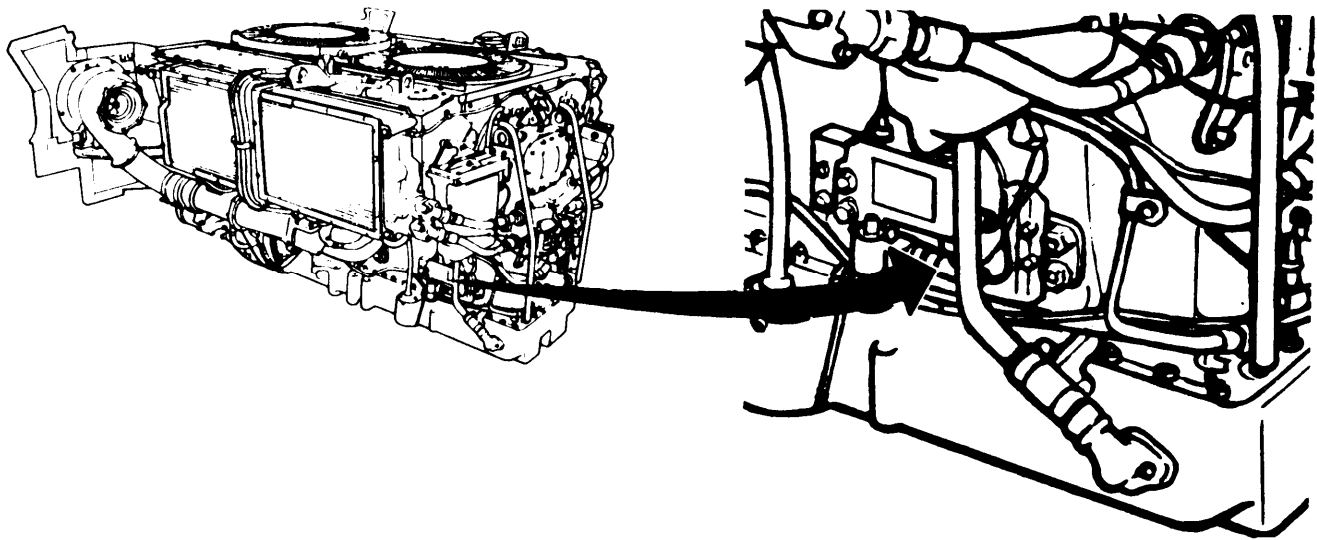
SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Drip pan
 Lockwasher (MS35338-45) (3 required)

PERSONNEL: Two

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove 2D powerplant (page 5-26)



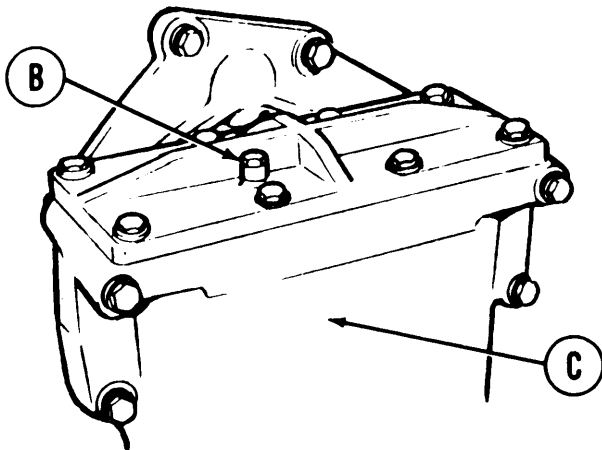
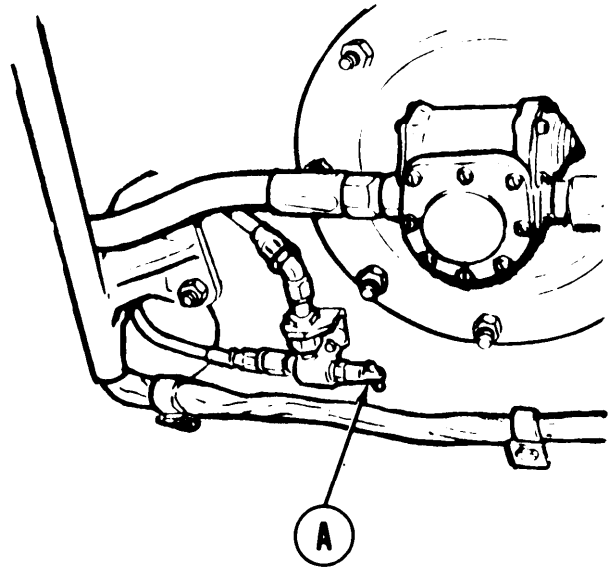
Go on to Sheet 2

TA148893

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 2 of 8)

REMOVAL:

1. Place drip pan under manual drain valve (A).
2. Open manual drain valve (A) by turning valve handle counterclockwise.
3. Using 7/16 inch wrench, turn fuel-water separator bleed cap (B) counterclockwise until loose.



4. Allow fuel in fuel-water separator filter (C) to drain through manual drain valve (A).
5. Using 7/16 inch wrench, turn fuel-water separator bleed cap (B) clockwise until snug.

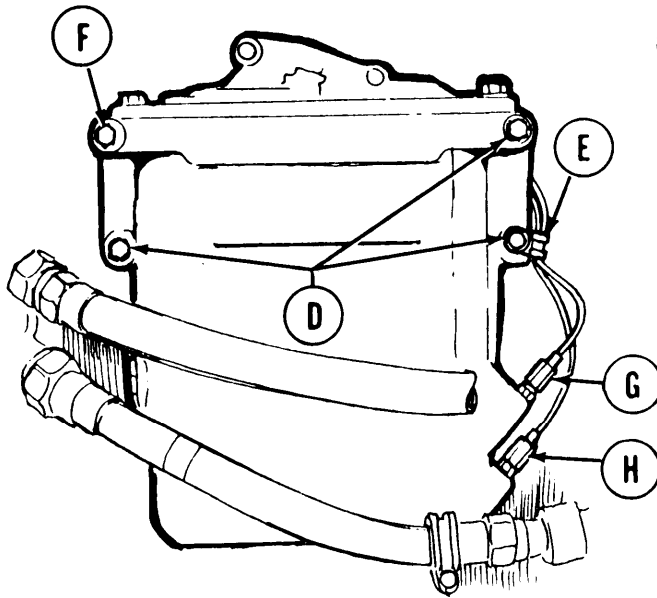
6. Close manual drain valve (A) by turning valve handle clockwise.
7. Remove drip pan placed under manual drain valve (A).

Go on to Sheet 3

TA148894

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)

(Sheet 3 of 8)



8. Using 1/2 inch socket and extension, remove three cap screws, lockwashers, flat washers (D), and clamp (E). Throw lockwashers away.
9. Using 1/2 inch socket and extension, loosen cap screw (F) to provide movement to fuel-water separator filter.

NOTE

If adapters turn while removing sensors, use 1/2 inch wrench to hold them in place.

10. Using 9/16 inch wrench, remove upper sensor (G) from fuel-water separator filter.

NOTE

It may be necessary to use hammer and punch to unseat sensors (G) and (H) by tapping upward on the edge of the sensor retaining nut.

11. Using 9/16 inch wrench, remove lower sensor (H) from fuel-water separator filter.

Go on to Sheet 4

TA148895

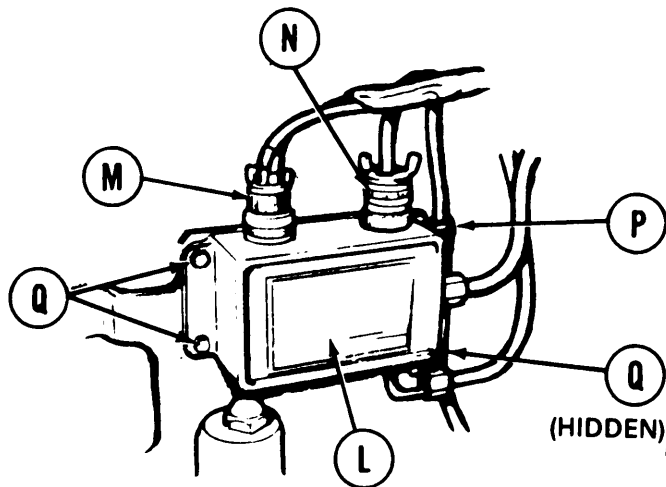
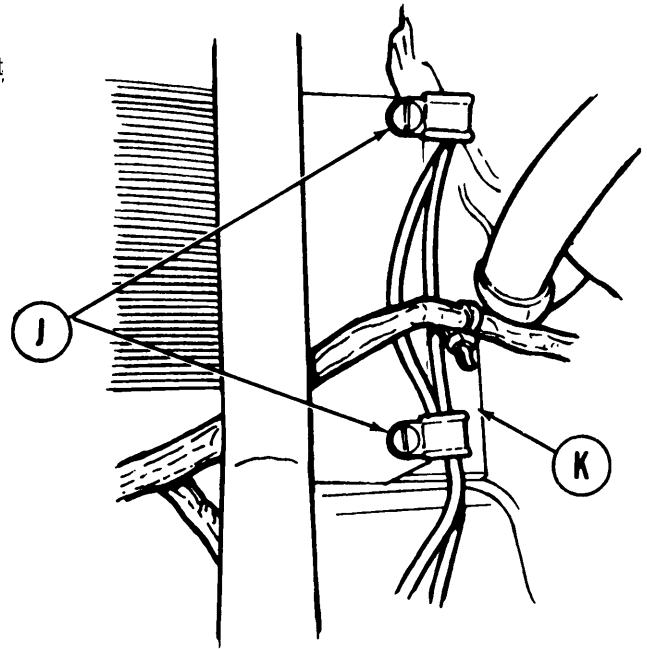
FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)
(Sheet 4 of 8)

12. Using screwdriver, remove two screws and two cushioned clamps (J) and mounting plate (K) at right side and above fuel-water separator control assembly (L).

NOTE

It may be necessary to use pliers to start removal of connectors in steps 13 and 14.

13. Manually disconnect engine electrical harness connector (M) from fuel-water separator control assembly (L).
14. Manually disconnect solenoid valve electrical lead (N) from fuel-water separator control assembly (L).



15. Using 5/16 inch wrench, remove screw and cushioned clamp (P) holding solenoid valve electrical lead (N) to fuel-water separator control assembly (L).
16. Using 5/16 inch wrench, remove three remaining screws and washers (Q) holding fuel-water separator control assembly (L) to mounting plate. Remove control assembly.

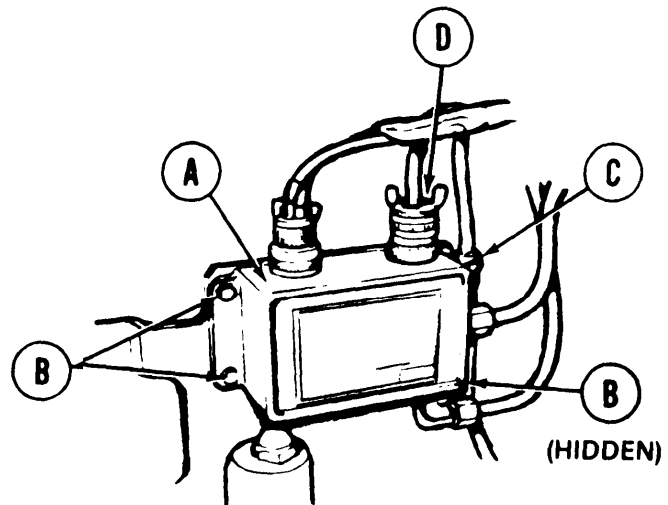
Go on to Sheet 5

TA148896

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)
(Sheet 5 of 8)

INSTALLATION:

1. Position three cushioned clamps into sensor leads from replaced fuel-water separator control assembly.
2. Position fuel-water separator control assembly (A) onto mounting plate.
3. Using 5/16 inch socket with extension, install three screws and washers(B).
4. Using 5/16 inch wrench, install screw and cushioned clamp (C) holding solenoid valve electrical lead (D) to fuel-water separator control assembly (A).



Go on to Sheet 6

TA148897

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)
 (Sheet 6 of 8)

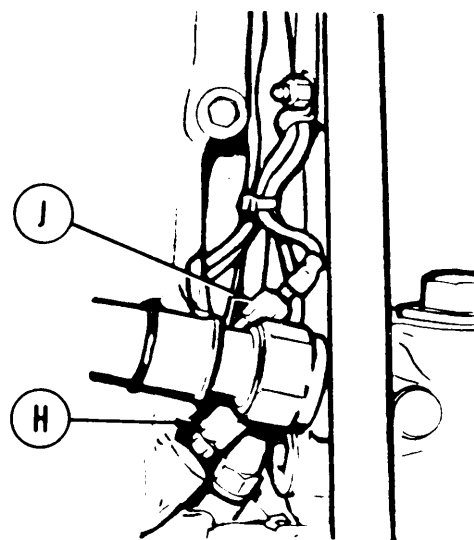
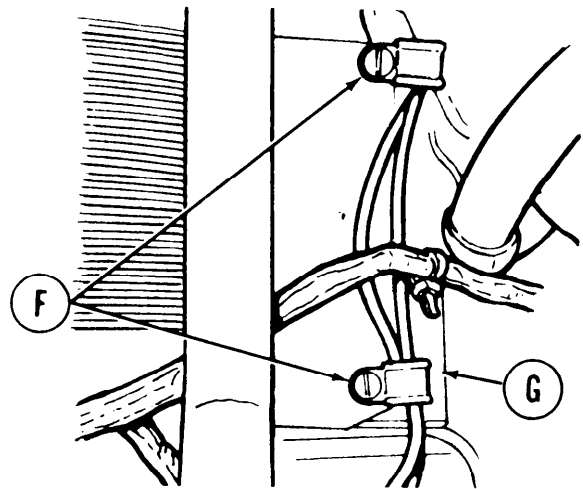
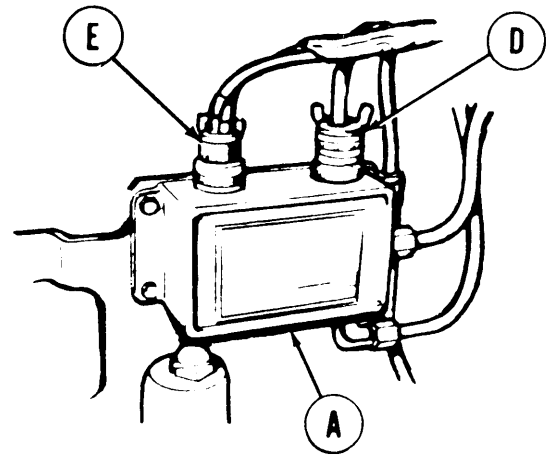
CAUTION

Be careful not to strike ends of sensors during installation or damage may result.

NOTE

Straight edge of mounting plate (G) must be installed to the right against the fuel-water separator.

5. Manually connect solenoid valve electrical lead (D) to fuel-water separator control assembly (A).
6. Manually connect engine electrical harness connector (E) to fuel-water separator control assembly (A).
7. Using screwdriver, install two screws and two cushioned clamps (F) and mounting plate (G) at right side and above fuel-water separator control assembly.
8. Using 9/16 inch wrench, install lower (shorter) sensor (H) to fuel-water separator filter.
9. Using 9/16 inch wrench, install upper (longer) sensor (J) to fuel-water separator filter.

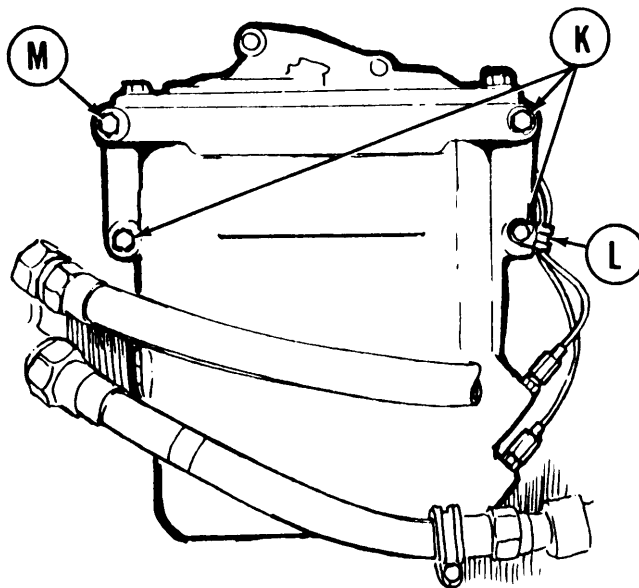


Go on to Sheet 7

TA148898

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)
(Sheet 7 of 8)

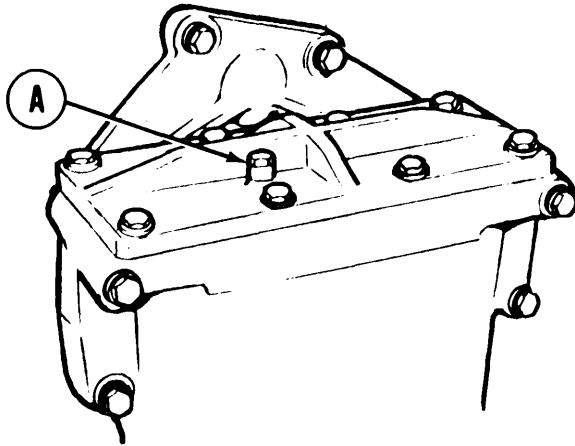
10. Using 1/2 inch socket and extension, install three capscrews, new lockwashers, and flat washers (K) and clamp (L).
11. Using 1/2 inch socket, tighten capscrew (M).



TEST:

1. Connect engine for powerplant ground hop (page 5-49).
2. Set FUEL PUMPS switch in ON position (TM 9-2350-222-10).

FUEL-WATER SEPARATOR CONTROL ASSEMBLY REPLACEMENT (2D ENGINE)
 (Sheet 8 of 8)



3. Set MASTER BATTERY switch to ON (TM 9-2350-222-10). Watch fuel-water separator bleed cap (A) for air release (bubbles).
4. Set MASTER BATTERY switch to OFF (TM 9-2350-222-10). After about one minute, repeat step 3.

NOTE

It may be necessary to perform steps 4 and 5 several times until a constant fuel flow (no bubbles) from the bleed cap (A) is observed.

5. Check for leaks and tighten or replace components as necessary.
6. Using 7/16 inch wrench, turn fuel-water separator bleed cap (A) to the right until snug,
7. Perform operational check of automatic drain (page 7-266).
8. Set FUEL PUMPS switch to OFF (TM 9-2350-222-10),
 Set MASTER BATTERY switch to OFF (TM 9-2350-222-10).
10. Disconnect engine from powerplant ground hop (page 5-62).
11. Install powerplant (page 5-37),

End of Task

TA148900

FUEL-WATER SEPARATOR FILTER ELEMENT REPLACEMENT (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-323
Cleaning and Inspection	7-324
Installation	7-324

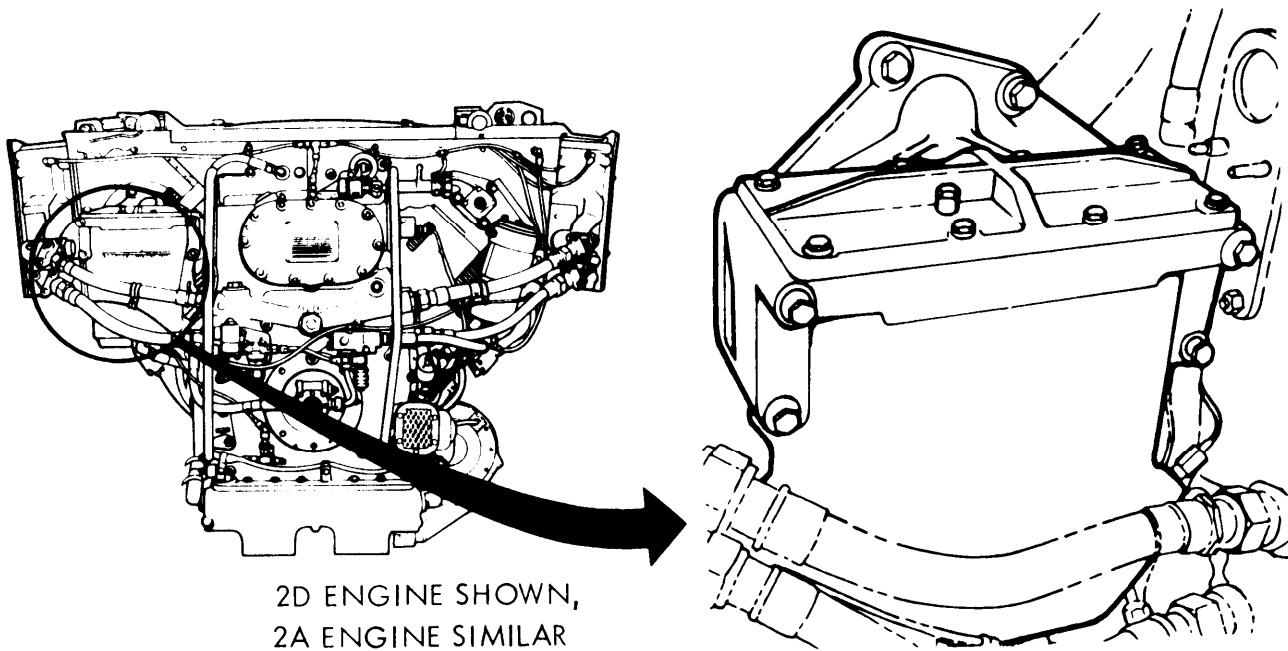
TOOLS: 7/16 in. combination box and open end wrench
 7/8 in. combination box and open end wrench

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Parts kit (5702738)
 Container
 Rags (Item 65, Appendix D)
 Crocus cloth (Item 14, Appendix D)
 Lockwasher (11657469-3) (8 required)

REFERENCE: TM 9-2350-222-10

PERSONNEL: Two

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



Go on to Sheet 2

TA148901

FUEL-WATER SEPARATOR FILTER ELEMENT REPLACEMENT (Sheet 2 of 6)

REMOVAL:

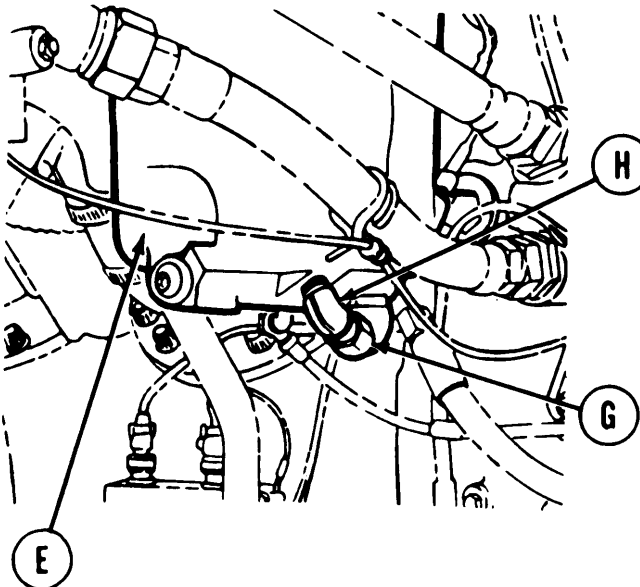
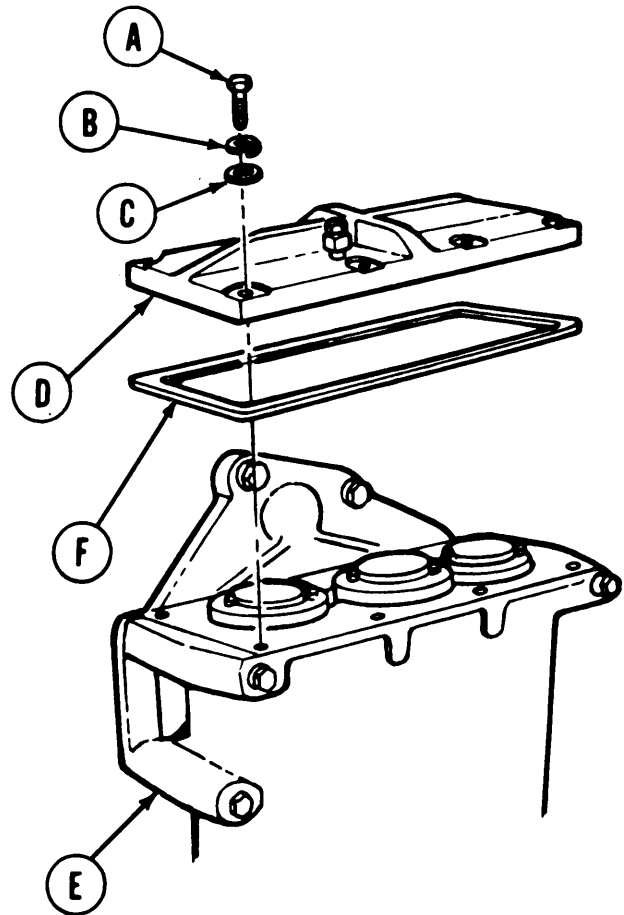
NOTE

Replacement of outer filter elements is required semiannually or every 1500 miles of vehicle operation. Center filter element is to be replaced annually.

NOTE

When removing cover, make sure not to let any dirt fall into fuel-water separator.

1. Using 7/16 inch wrench, remove eight screws (A), lockwashers (B), and flat washers (C). Throw lockwashers away.
2. Remove cover (D) from fuel-water separator (E).
3. Remove preformed packing (F) from cover (D). Throw packing away.



4. Place container under fuel-water separator (E) to catch fuel from fuel outlet line.
5. Using 7/8 inch wrench, disconnect fuel outlet line (G) from elbow (H).
6. Using rags (Item 65, Appendix D), cover fuel outlet line (G) to avoid dirt getting into line.

Go on to Sheet 3

TA148902

FUEL-WATER SEPARATOR FILTER ELEMENT REPLACEMENT (Sheet 3 of 6)

NOTE

Do not remove or otherwise disturb center element during outer filter element replacement unless all three elements are scheduled for replacement.

7. Using hands, remove two outer filter elements (J) by turning slightly and lifting out. Throw filter elements away.
8. Remove center filter element (K) in same manner as outer filter elements, if required.

CLEANING AND INSPECTION:

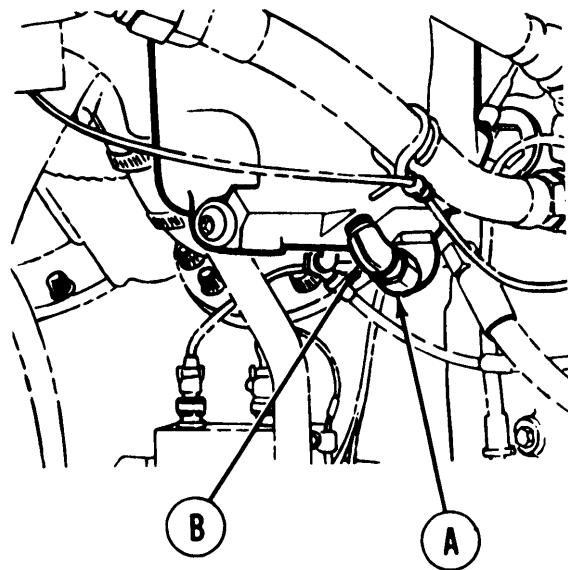
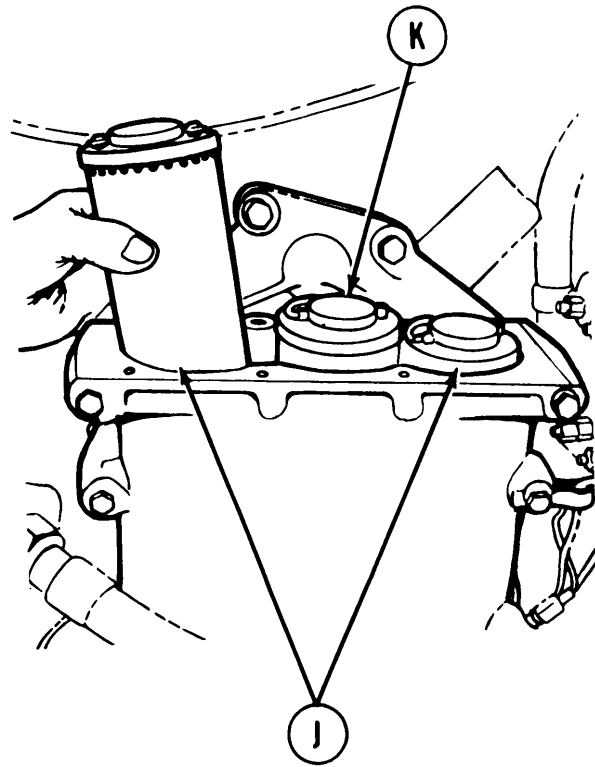
NOTE

Take care when cleaning inside of fuel-water separator not to damage any internal parts.

1. Using dry cleaning solvent (Item 54, Appendix D) and rags (Item 65, Appendix D) , clean inside of fuel-water separator.
2. Inspect fuel-water separator for cracks or fractures. Inspect interior for scores and burrs.
3. Using dry cleaning solvent (Item 54, Appendix D) and crocus cloth (Item 14, Appendix D), remove minor burrs and scores. If cracked, excessively burred, or scored, contact your supervisor.
4. Flush with dry cleaning solvent (Item 54, Appendix D).

INSTALLATION:

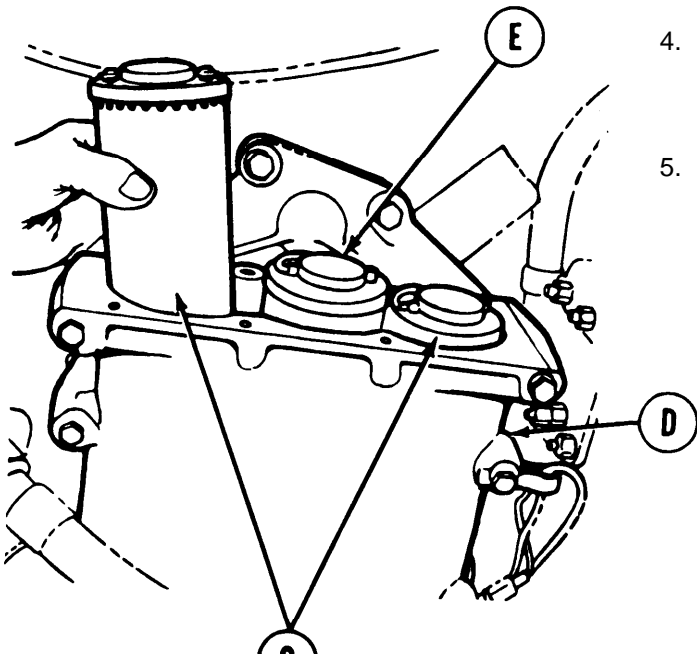
1. Remove container from under fuel-water separator.
2. Remove rag from fuel outlet line (A).
3. Using 7/8 inch wrench, install fuel outlet line (A) to elbow (B).



Go on to Sheet 4

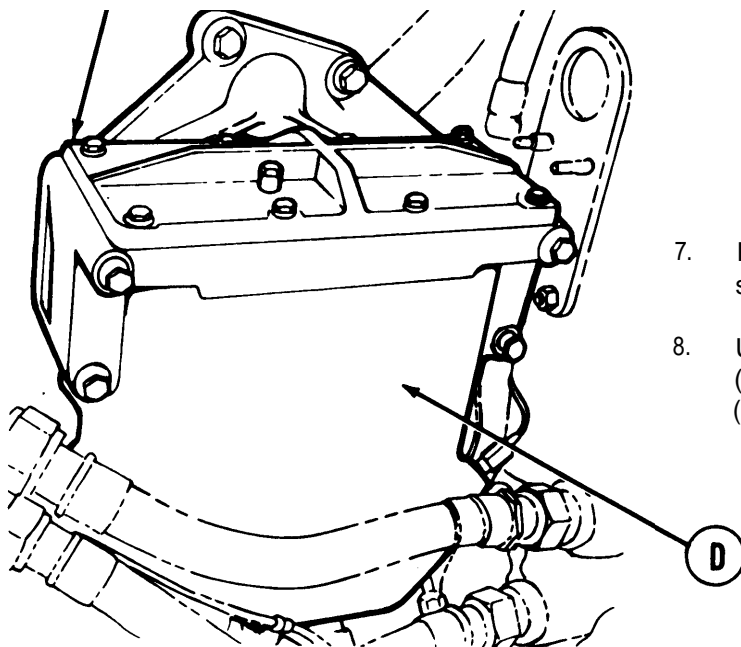
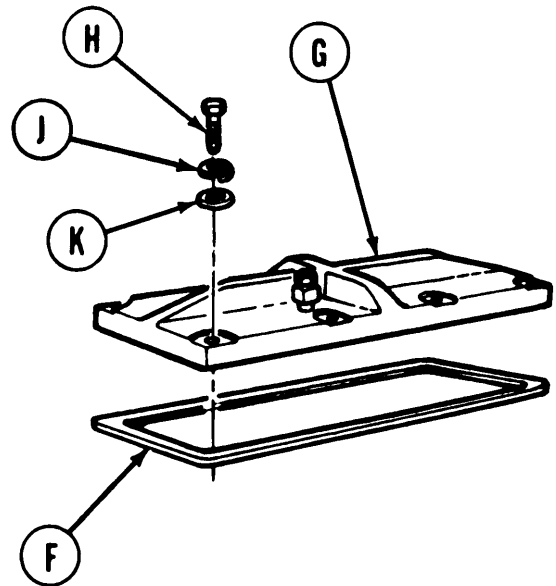
TA148903

FUEL-WATER SEPARATOR FILTER ELEMENT REPLACEMENT (Sheet 4 of 6)



4. Place two new outer filter elements (C) from parts kit in position in fuel-water separator (D).
5. Place center filter element (E) in position in fuel-water separator (D), if required.

6. Place new preformed packing (F) from parts kit in position in cover (G).



7. Place cover (G) in position on fuel-water separator (D).
8. Using 7/16 inch wrench, install eight screws (H), new lockwashers (J) and flat washers (K).

Go on to Sheet 5

TA148904

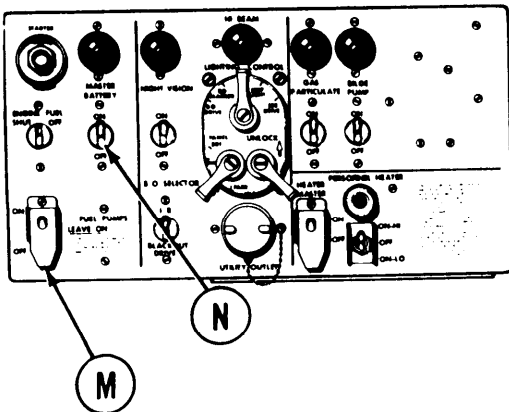
FUEL-WATER SEPARATOR FILTER ELEMENT REPLACEMENT (Sheet 5 of 6)

9. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

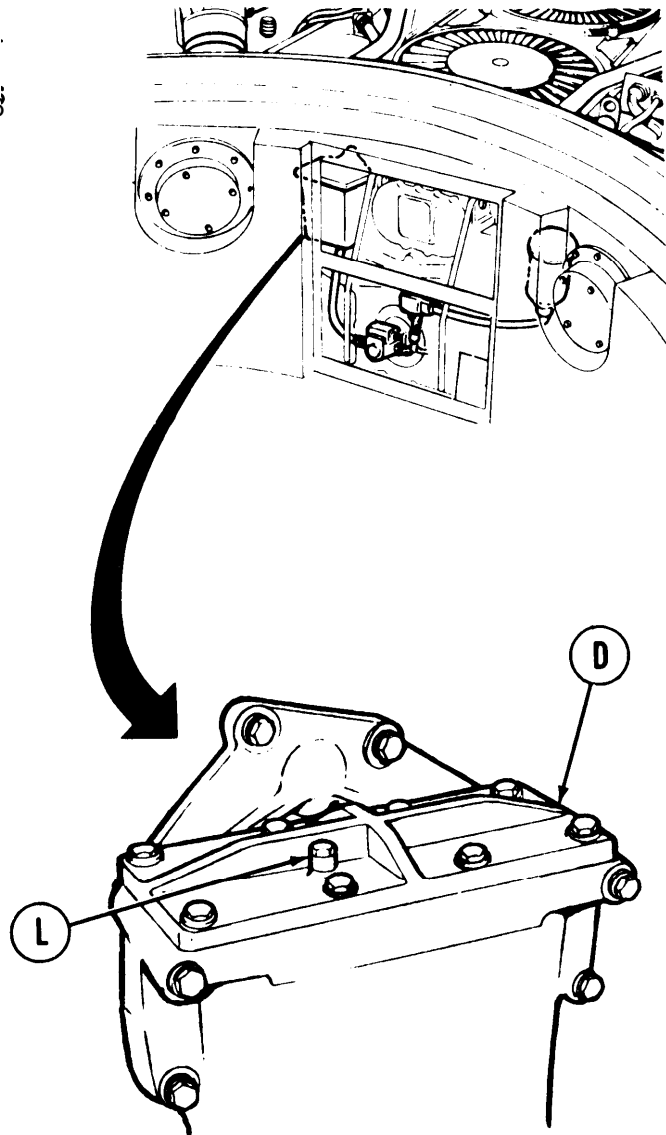
NOTE

The following steps require assistance of second person located at driver's station.

10. Remove engine upper access cover (page 16-40):
11. Locate fuel-water separator (D), and using 7/16 inch wrench, loosen bleeder valve (L). Do not remove.
12. Person in driver's station set FUEL PUMPS switch (M) to ON and MASTER BATTERY switch (N) to ON (TM 9-2350-222-10).



13. Person at fuel-water separator observe for air release (bubbles) from bleeder valve (L).
14. Person in driver's station set MASTER BATTERY switch (N) to OFF (TM 9-2350-222-10).

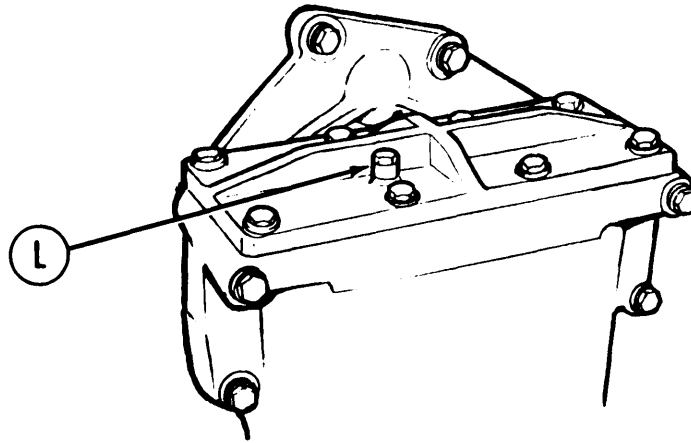


Go on to Sheet 6

TA148905

FUEL-WATER SEPARATOR FILTER ELEMENT REPLACEMENT (Sheet 6 of 6)

15. Repeat steps 12 and 13. It may be necessary to do this several times until constant flow (no bubbles) of fuel is observed.
16. Using 7/16 inch wrench, tighten bleeder valve (L).
17. Install engine upper access cover (page 16-40).



End of Task

All data on pages 7-328 thru 7-331 deleted. ■

Change 4 7-327

PRIMARY FUEL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-332
Cleaning and Inspection	7-334
Installation	7-334

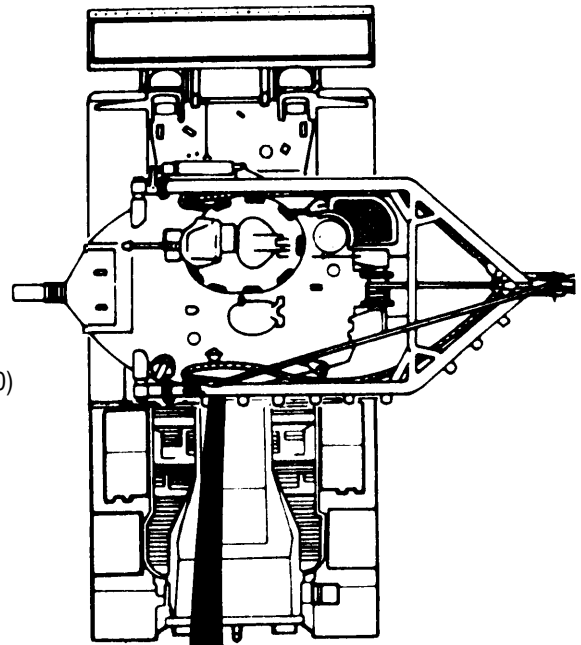
TOOLS: 9/16 in. combination box and open end wrench
8 in. adjustable wrench

SUPPLIES: Parts kit (5704487)
Rags (Item 65, Appendix D)
Watch

PERSONNEL: Two

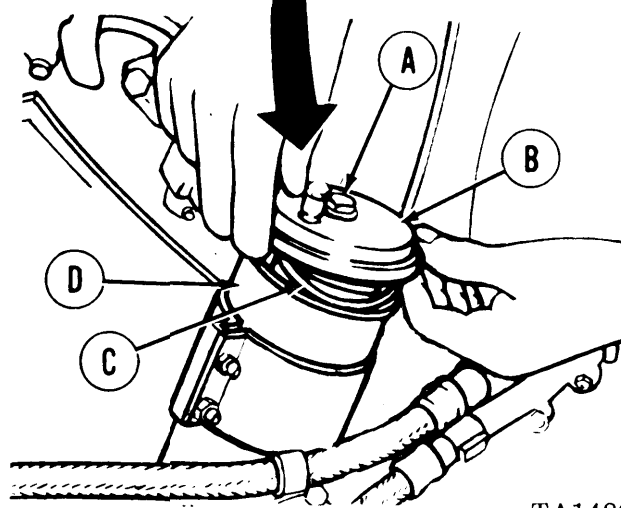
REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Open front left intake grille door (TM9-2350-222-10)



REMOVAL:

1. Position rags (Item 65, Appendix D) to catch fuel and, using 9/16 inch wrench, loosen capscrew (A) until capscrew turns free.
2. Lift cover (B) and gasket (C) off filter body (D). Throw gasket away.

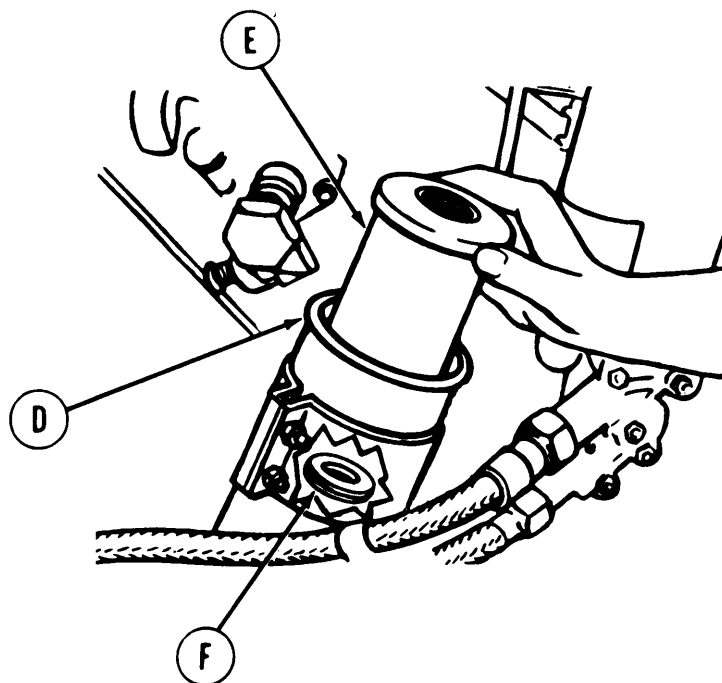


Go on to Sheet 2

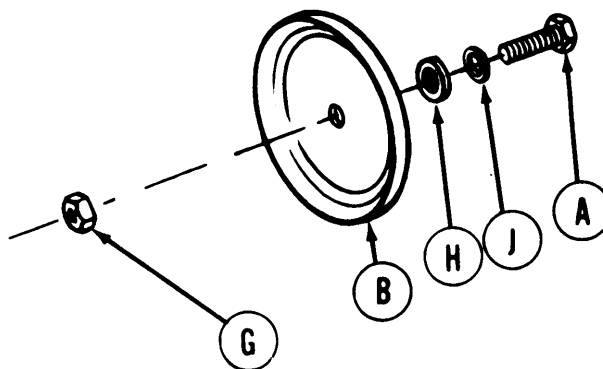
TA148911

PRIMARY FUEL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 2 of 6)

3. Remove filter element (E) from filter body (D). Throw element away.



4. Remove preformed packing (F) from element seat inside filter body. Throw preformed packing away.



5. Using 9/16 inch wrench and adjustable wrench, remove nut (G), cover (B), gasket (H), and washer (J) from screw (A). Throw gasket (H) away.

Go on to Sheet 3

TA148912

PRIMARY FUEL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 3 of 5)

CLEANING AND INSPECTION:

1. Using clean rags (Item 66, Appendix D), clean inside of filter body and around filter body rim.
2. Inspect filter body and cover for cracks, holes, or dents on sealing edges.
3. Replace any damaged parts.

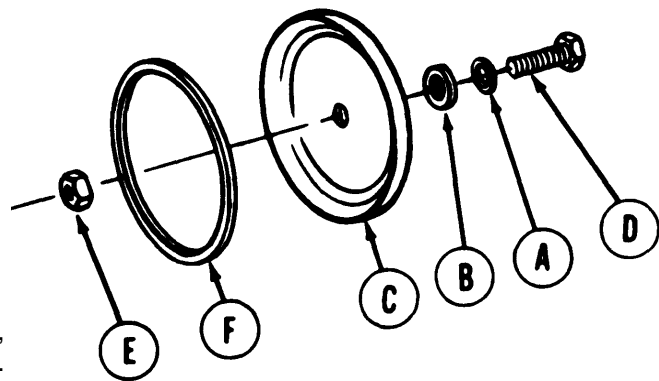
INSTALLATION:

1. Install washer (A), new gasket (B) from parts kit, and cover (C) on screw (D).

N O T E

Do not tighten nut (E) down completely. Leave enough nut showing to allow removal.

2. Using 9/16 inch wrench and adjustable wrench, install nut (E) on screw (D) and tighten nut (E).
3. Install new gasket (F) from parts kit into seat on inside of cap (C).

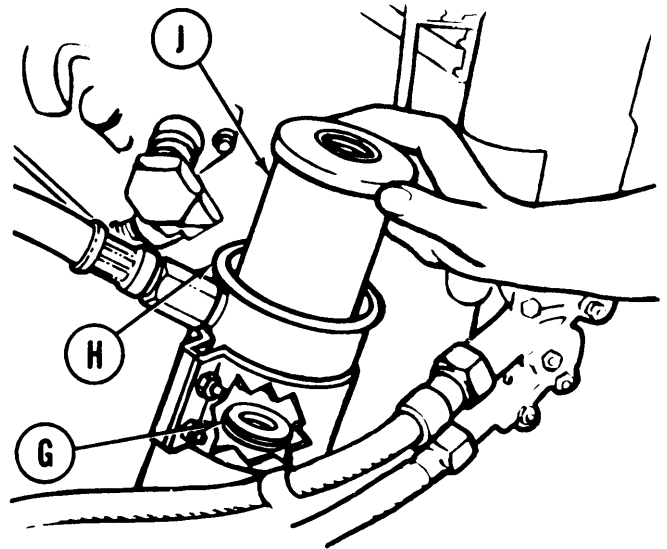


Go on to Sheet 4

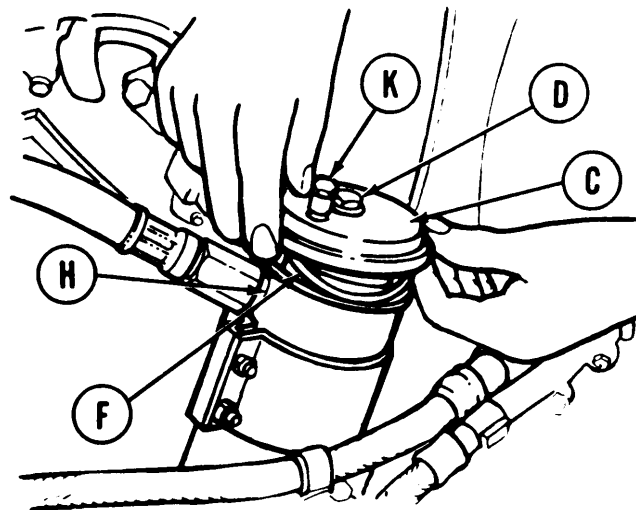
TA148913

PRIMARY FUEL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 4 of 5)

4. Install new preformed packing (G) from kit onto seat inside filter body (H).
5. Install new filter element (J) from kit inside filter body (H).
6. Install cap (C) with new gasket (F) from kit on rim of filter body (H) and tighten screw (D) enough to get good seal between cap (C) and filter body (H).



7. Unscrew bleed cap (K) until it can be opened or closed, using fingers. Leave valve open.

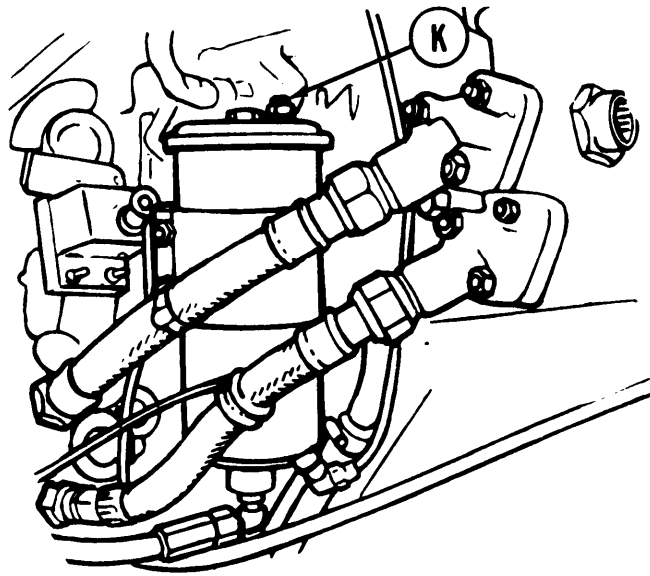


Go on to Sheet 5

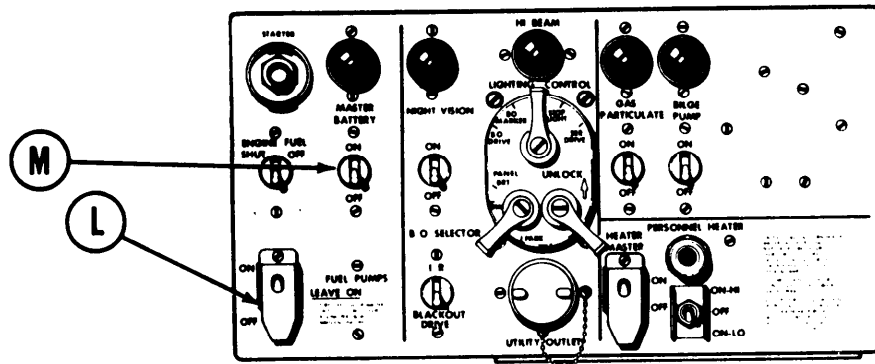
TA148914

PRIMARY FUEL FILTER ELEMENT REPLACEMENT (2D ENGINE) (Sheet 5 of 5)

8. Using another person, set FUEL PUMPS switch (L) on master control panel at driver's station to ON.
9. set MASTER BATTERY switch (M) to on and observe air release (bubbles) from bleed cap (K).



10. Set MASTER BATTERY switch (M) to OFF and, after about 1 minute, repeat step 9.



11. Repeat steps 9 and 10 until a steady flow of fuel comes out of bleed cap (K), then close bleed cap (K) and set MASTER BATTERY switch to OFF.
12. Using adjustable wrench, tighten bleed cap (K) enough so it cannot be opened with the fingers.
13. Close front left intake grille door (TM 9-2350-222-10).

End of Task

TA148915

PRIMER PUMP FUEL LINES REPLACEMENT (LATE MODEL) (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-337
Cleaning and Inspection	7-340
Installation	7-340

TOOLS: Droplight/flashlight
 1/2 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. drive
 Wire brush
 5/8 in. combination box and open end wrench
 Ratchet with 1/2 in. drive
 5 in. extension with 1/2 in, drive

SUPPLIES: Rags (Item 65, Appendix D)
 Lockwasher (MS35338-44) (4 required)

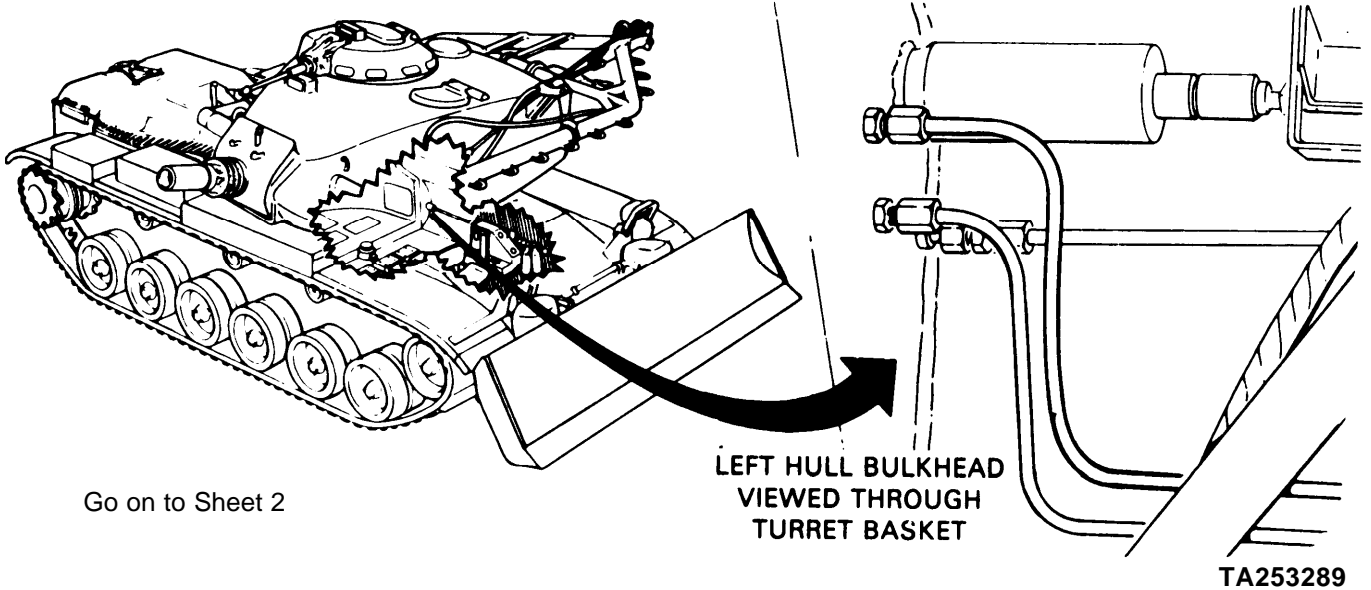
PERSONNEL: Two

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Drain fuel tanks (page 7-152)

REMOVAL:

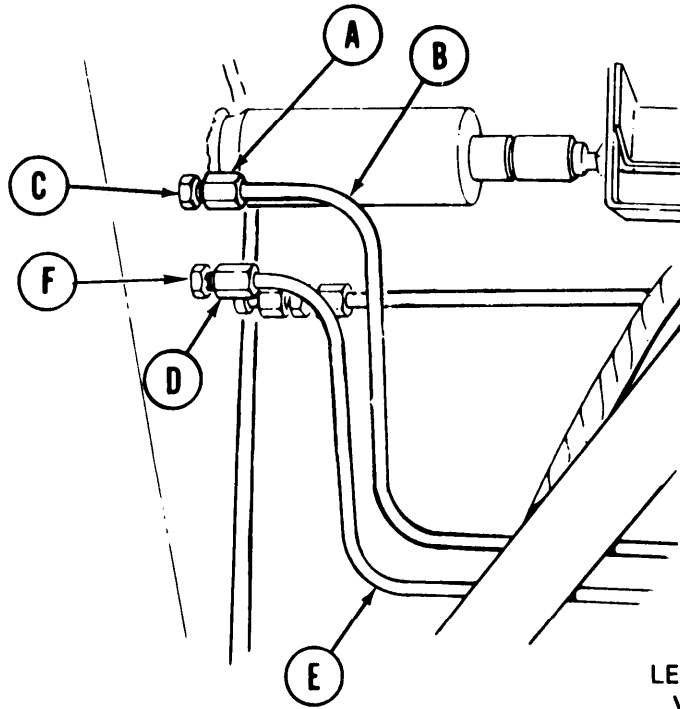
1. Manually traverse turret to position gun tube over right side to provide access to left bulkhead,



Go on to Sheet 2

PRIMER PUMP FUEL LINES REPLACEMENT (LATE MODEL) (Sheet 2 of 6)

- Using 9/16 inch wrench on fuel line nut(A) remove fuel line (B) from bulkhead nipple (C).



LEFT HULL BULKHEAD
VIEWED THROUGH
TURRET BASKET

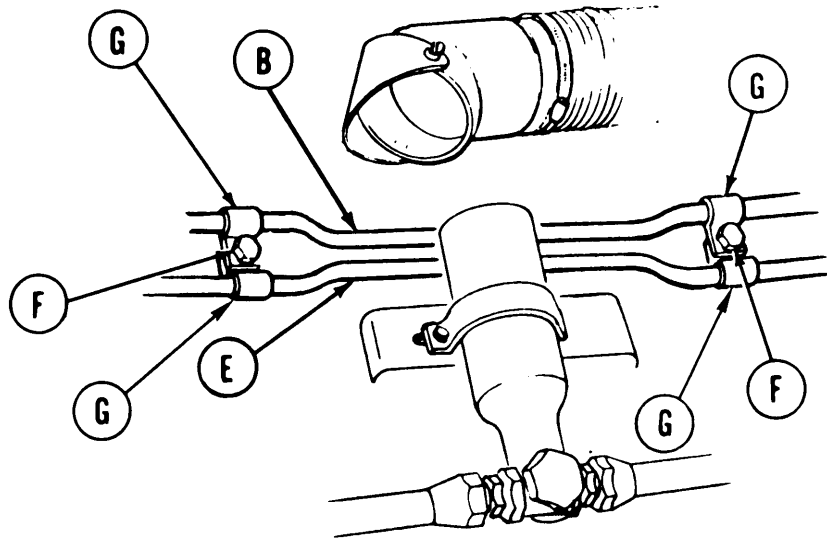
- Using 9/16 inch wrench on fuel line nut (D) remove fuel line (E) from bulkhead nipple (F).

Go on to Sheet 3

TA253240

PRIMER PUMP FUEL LINES REPLACEMENT (LATE MODEL) (Sheet 3 of 6)

4. Manually traverse turret to provide access to fuel lines (B) and (E) and clamps (G).

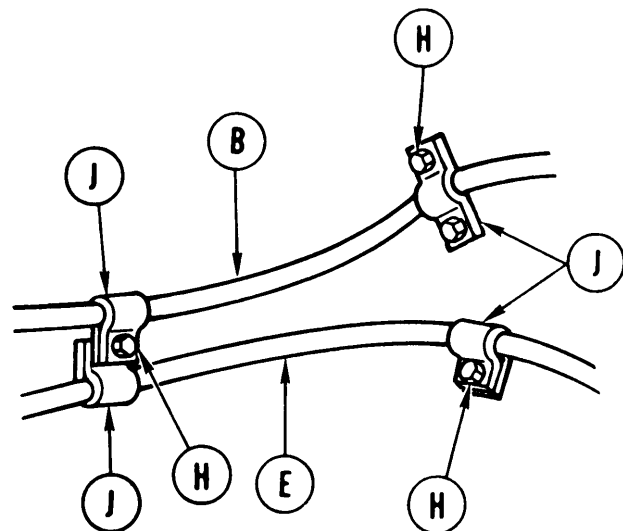


5. Using socket, remove two screws and lockwashers (F) holding four clamps (G). Remove four clamps (g) from fuel lines (B) and (E). Throw lockwashers away.

NOTE

The following steps will be performed at the driver's station.

6. Using socket remove three screws and lockwashers (H) holding four clamps(J) to fuel lines (B) and (E). Remove clamps (J) from fuel lines (B) and (E). Throw lockwashers away.

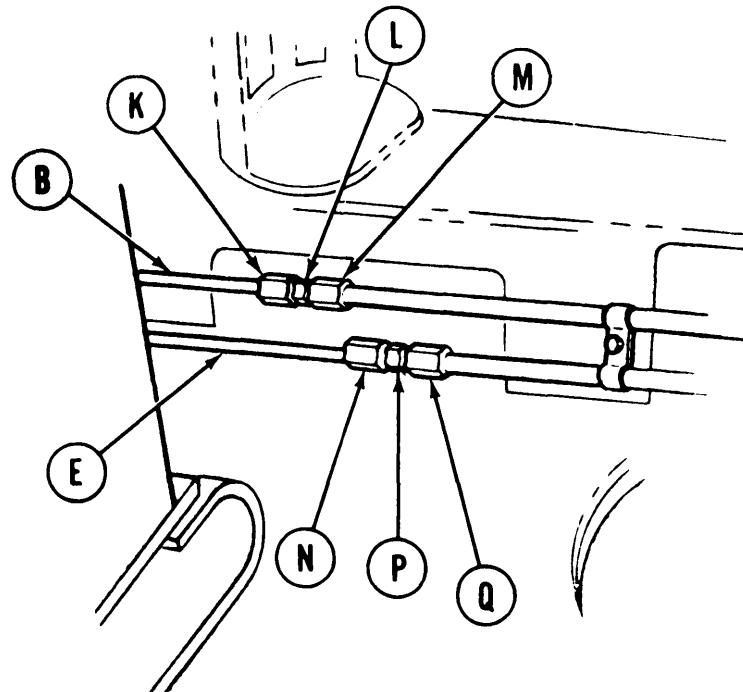


Go on to Sheet 4

TA253290

PRIMER PUMP FUEL LINES REPLACEMENT (LATE MODEL) (Sheet 4 of 6)

7. Using 9/16 inch wrench on fuel line nut (K) and 1/2 inch wrench on adapter (L), disconnect fuel line (B). Using 9/16 inch wrench on fuel line nut (M), remove adapter (L).
8. Using 9/16 inch wrench on fuel line nut (N) and 1/2 inch wrench on adapter (P) disconnect fuel line (E). Using 9/16 inch wrench on fuel line nut (Q) remove adapter (P).



9. With one person at driver's station and one person in turret, remove the two fuel lines from vehicle through turret access opening.

CLEANING AND INSPECTION:

1. Using wire brush, clean threaded parts.
2. Inspect threaded parts for bad threads or other damage. Replace all defective parts.

INSTALLATION:

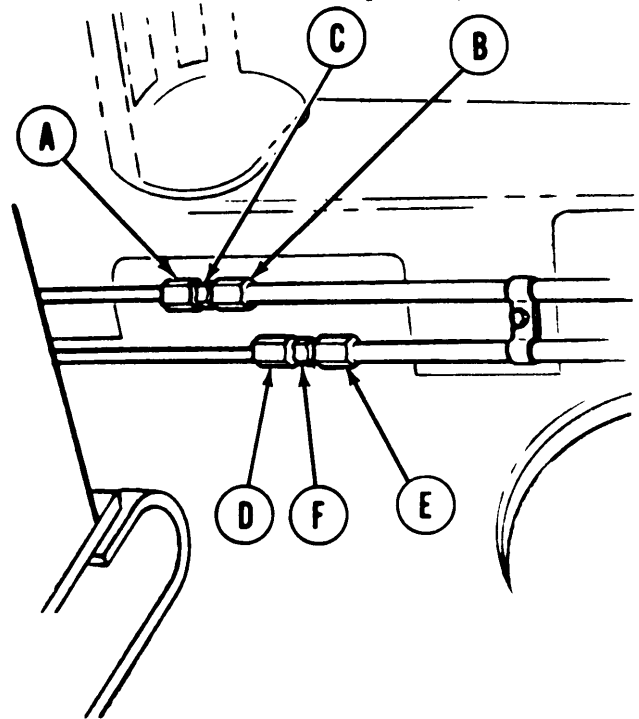
1. With one person in turret and one person at driver's station, install two fuel lines through turret access to driver's station.

Go on to Sheet 5

TA253291

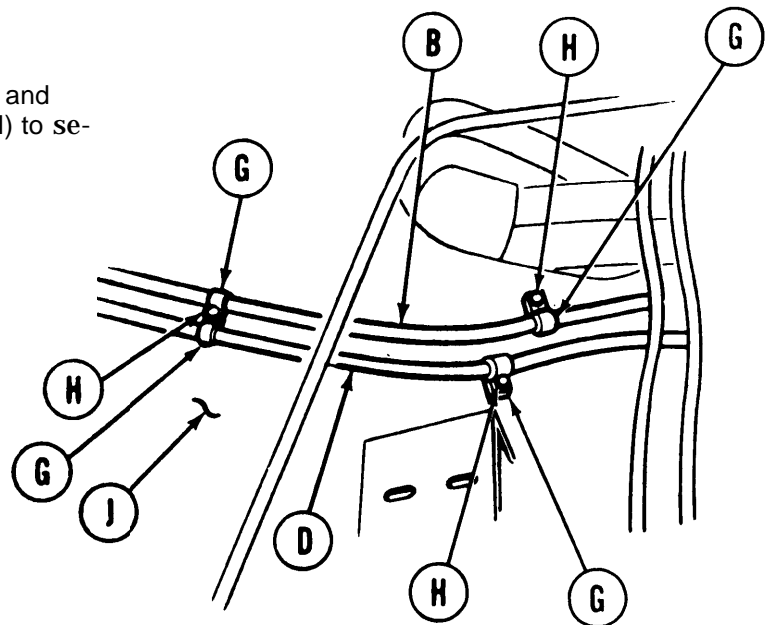
PRIMER PUMP FUEL LINES REPLACEMENT (LATE MODEL) (Sheet 5 of 6)

- Using 9/16 inch wrench on fuel lines (A) or (B) and 1/2 inch wrench on adapter (C), install adapter (C) to fuel lines (A) and (B).



- Using 9/16 inch wrench on fuel lines (D) or (E) and 1/2 inch wrench on adapter (F), install adapter (F) to fuel lines (D) and (E).

- Using socket, install four clamps (G) and three screws and new lockwashers (H) to secure fuel lines (B) and (D) to hull (J).



Go on to Sheet 6

TA253292

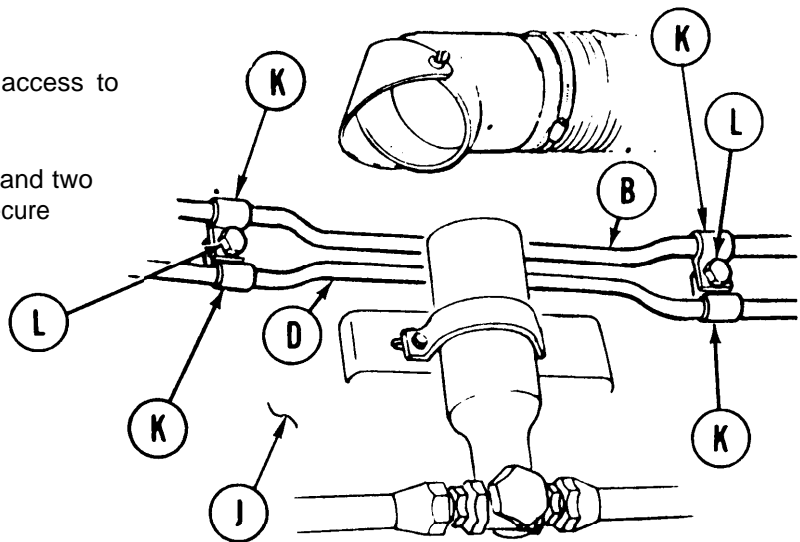
Change 1 7-341

PRIMER PUMP FUEL LINES REPLACEMENT (LATE MODEL) (Sheet 6 of 6)

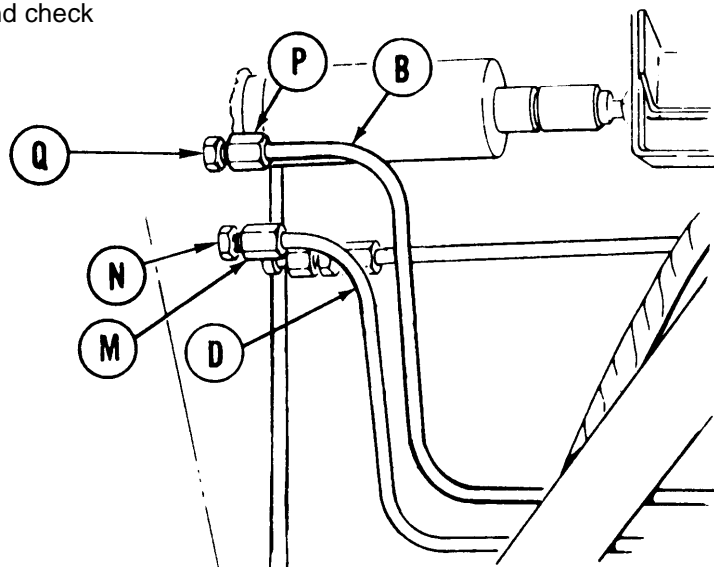
NOTE

The following steps will be performed in the turret compartment.

5. Manually traverse turret to provide access to fuel lines (B) and (D).
6. Using socket, install four clamps (K) and two screws and new lockwashers (L) to secure fuel lines (B) and (D) to hull (J).



7. Using 9/16 inch wrench on fuel line nut (M), install fuel line (D) to bulkhead nipple (N).
8. Using 9/16 inch wrench on fuel line nut (P), install fuel line (B) to bulkhead nipple (Q).
9. Fill fuel tanks.
10. Operate engine (TM 9-2350-222-10) and check for leaks. Correct leaks as necessary.



End of Task

TA253241

PRIMER PUMP-TO-NIPPLE FUEL OUTLET TUBE ASSEMBLY REPLACEMENT (LATE MODEL)
 (Sheet 1 of 5)

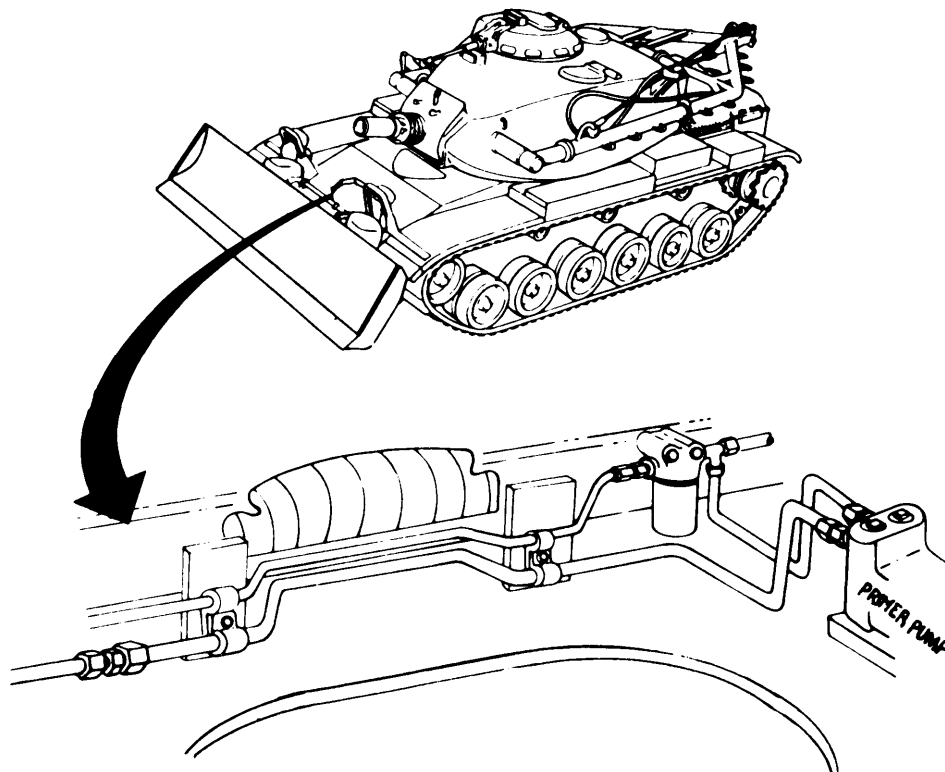
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-344
Cleaning and Inspection	7-346
Installation	7-346

TOOLS: 9/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive

SUPPLIES: Rags (Item 65, Appendix D)
 Lockwasher (MS35338-44) (2 required)

REFERENCE: TM 9-2350-222-10



Go on to Sheet 2

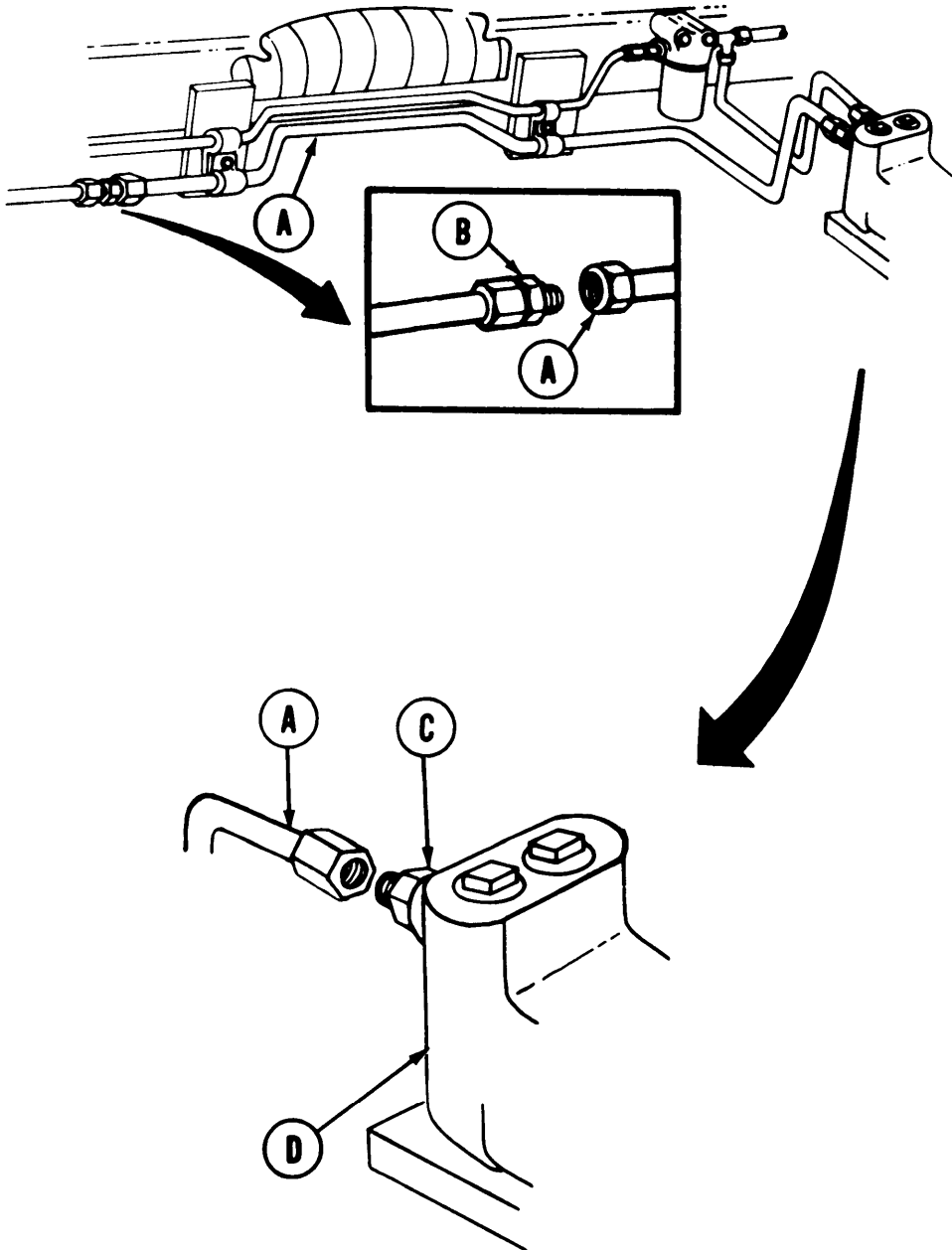
TA253242

Change1 7-343

PRIMER PUMP-TO-NIPPLE FUEL OUTLET TUBE ASSEMBLY REPLACEMENT (LATE MODEL)
(Sheet 2 of 5)

REMOVAL:

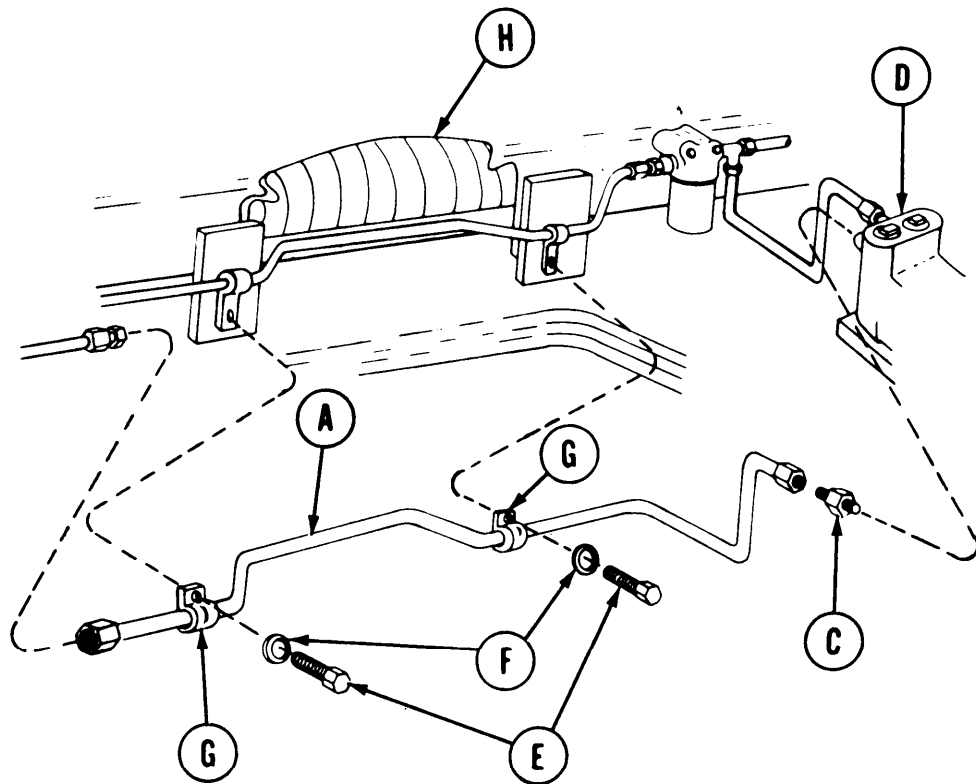
1. Using both wrenches, disconnect left nut of tube (A) from nipple (B).
2. Using both wrenches, disconnect right end of tube (A) from adapter (C) on primer pump (D).



Go on to Sheet 3

TA253243

PRIMER PUMP-TO-NIPPLE FUEL OUTLET TUBE ASSEMBLY REPLACEMENT (LATE MODEL)
 (Sheet 3 of 5)



3. Using socket, remove two screws (E) and lockwashers (F) holding two clamps (G) and tube (A) to torsion bar cover (H). Throw lockwashers (F) away.
4. Remove tube (A) and two clamps (G).
5. Remove two clamps (G) from tube (A).
6. Using 1/2 inch wrench, remove nipple (C) from primer pump outlet (D).

Go on to Sheet 4

TA253244

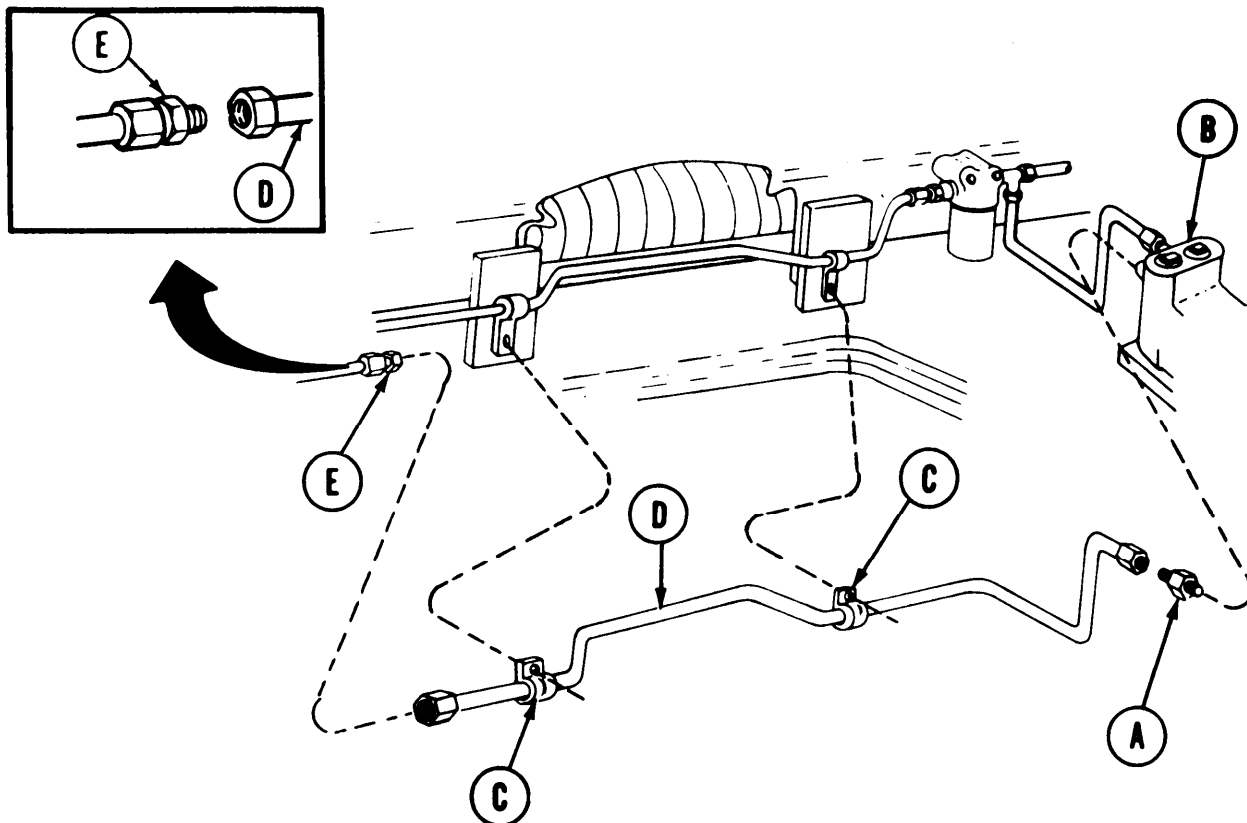
Change 1 7-345

PRIMER PUMP-TO-NIPPLE FUEL OUTLET TUBE ASSEMBLY REPLACEMENT (LATE MODEL)
(Sheet 4 of 5)

CLEANING AND INSPECTION:

Inspect threaded components for thread damage. Replace or repair if defective.

INSTALLATION:



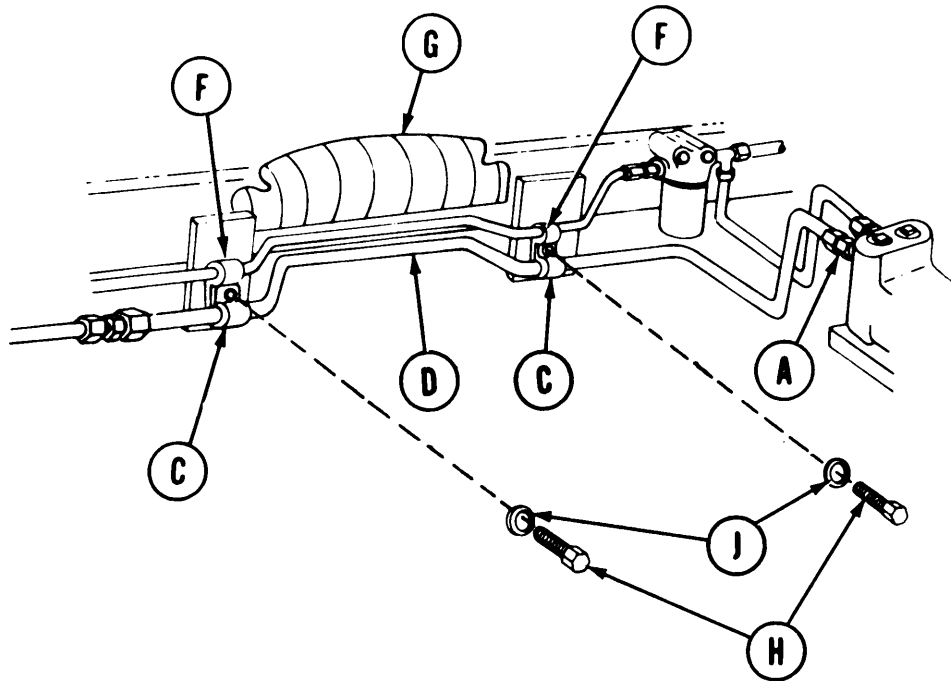
Using 9/16 inch wrench, install adapter (A) in outlet of primer pump (B).

2. Install two clamps (C) to tube (D).
3. Using both wrenches, loosely install left end of tube (D) to nipple (E) in outlet tube.

Go on to Sheet 5

TA253245

PRIMER PUMP-TO-NIPPLE FUEL OUTLET TUBE ASSEMBLY REPLACEMENT (LATE MODEL)
 (Sheet 5 of 5)



4. Using both wrenches, loosely install right nut of tube (D) to adapter (A) on primer pump.

NOTE

Make sure that two inlet tube clamps (F) are also secured with outlet clamps (C) attaching hardware.

5. Using socket, secure tube (D) and clamps (C and F) to torsion bar cover (G) with two screws (H) and new lockwashers (J).
6. Tighten left and right nuts on tube (D).
7. Operate fuel primer system and check for leaks (TM 9-2350-222-10).

End of Task

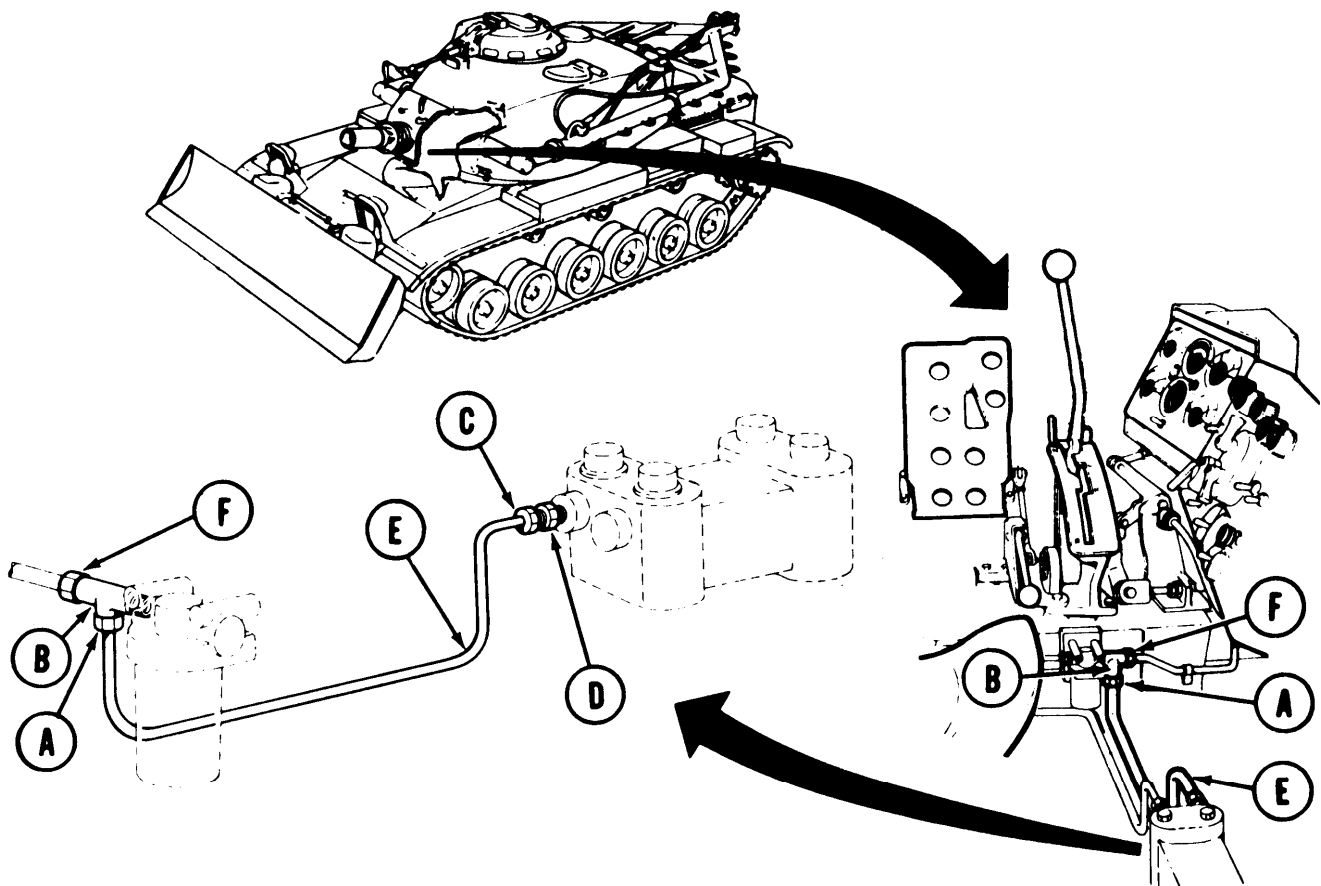
TA253246

Change 1 7-347

PRIMER PUMP-TO-TEE FUEL LINE ASSEMBLY REPLACEMENT (LATE MODEL)
(Sheet 1 of 2)

TOOLS: 1/2 in. combination box and open end wrench
9/16 in. combination box and open end wrench
7/16 in. combination box and open end wrench
Droplight
Flashlight

REFERENCE: TM 9-2350-222-10



REMOVAL:

1. Using 9/16 inch wrench on fitting (A), remove fitting (A) from tee (B).
2. Using 9/16 inch wrench on fitting (C) and 1/2 inch wrench on adapter (D), remove fitting (C) and tube assembly (E).
3. Using 1/2 inch wrench, remove adapter (D).
4. Using 9/16 inch wrench, remove fitting (F) from tee (B).

Go on to Sheet 2

TA253247

PRIMER PUMP-TO-TEE FUEL LINE ASSEMBLY REPLACEMENT (LATE MODEL)
(Sheet 2 of 2)

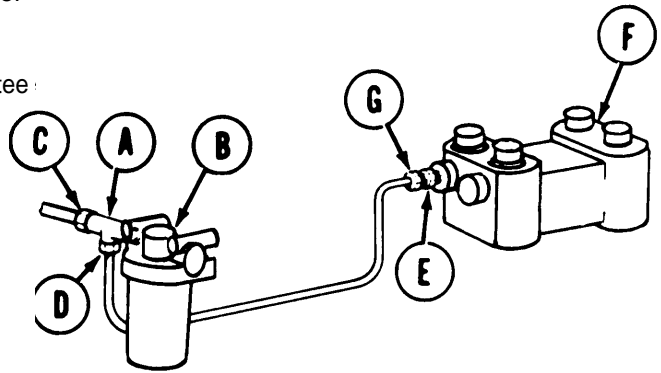
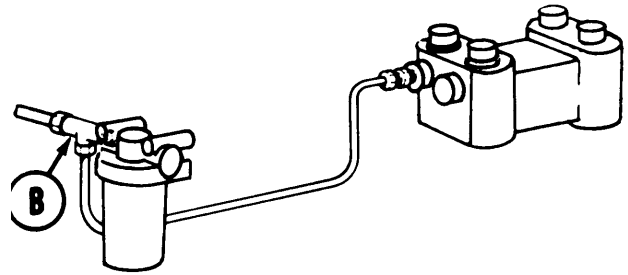
- Using 7/16 inch wrench, remove tee (B) from filter.

INSPECTION:

- Inspect all parts for damage or wear.
- Replace worn or damaged parts as required.

INSTALLATION:

- Using 7/16 inch wrench, install tee (A) to filter (B).
- Using 9/16 inch wrench, install fitting (C) to tee (A).
- Using 9/16 inch wrench, install fitting (D) to tee (A).
- Using 1/2 inch wrench, install adapter (E) to primer pump (F).
- Using 9/16 inch wrench, install fitting (G) to adapter (E).
- Operate primer pump and check for leaks (TM 9-2350-222-10).



End of Task

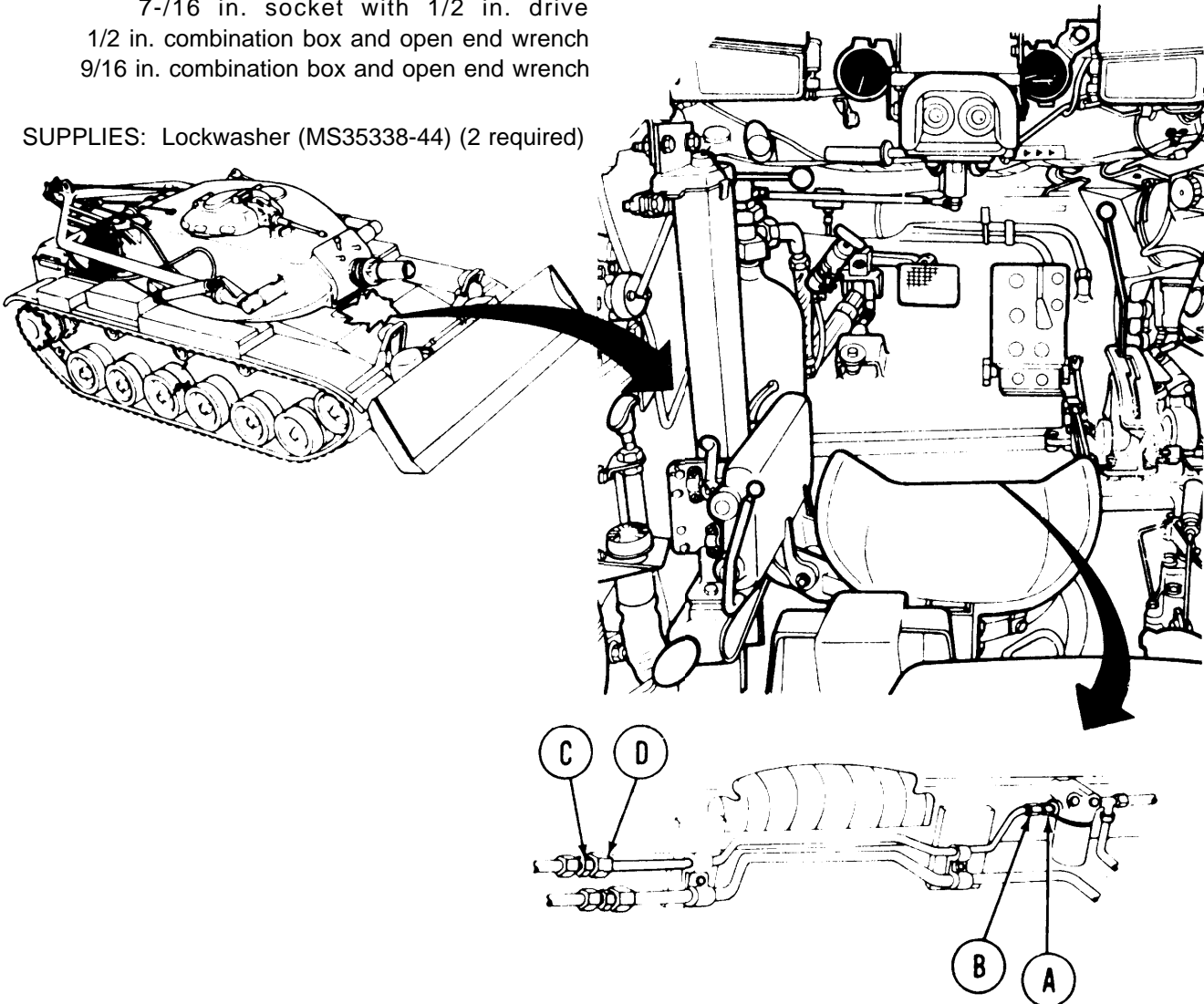
TA253293

Change 1 7-349

PRIMER INLET FUEL TUBE ASSEMBLY (NIPPLE-TO-FILTER) REPLACEMENT (LATE MODEL)
(Sheet 1 of 3)

TOOLS: Ratchet with 1/2 in. drive
7-/16 in. socket with 1/2 in. drive
1/2 in. combination box and open end wrench
9/16 in. combination box and open end wrench

SUPPLIES: Lockwasher (MS35338-44) (2 required)



REMOVAL:

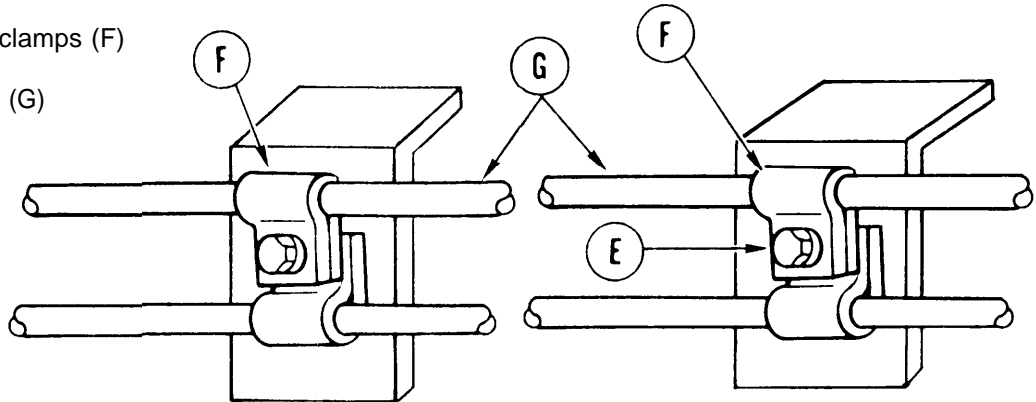
1. Using 1/2 inch wrench to hold adapter (A), use 9/16 inch wrench on nut (B) and remove nut (B) from adapter (A).
2. Using 1/2 inch wrench to hold nipple (C), use 9/16 inch wrench on nut (D) and remove nut (D) from nipple (C).

Go on to Sheet 2

TA253294

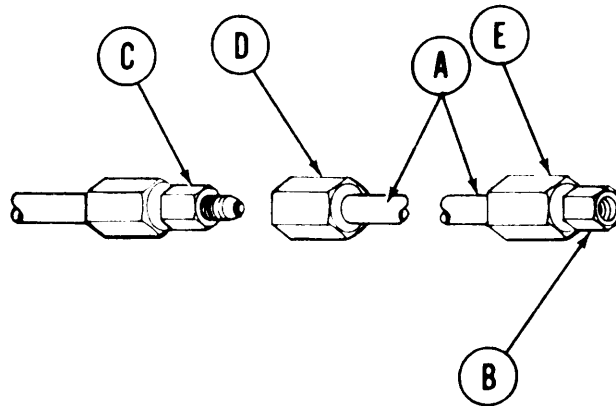
**PRIMER INLET FUEL TUBE ASSEMBLY (NIPPLE-TO-FILTER) REPLACEMENT LATE MODEL
(Sheet 2 of 3)**

3. Using socket, remove two screws and lockwashers (E). Throw lockwashers away.
4. Remove two clamps (F)
5. Remove tube (G)



INSTALLATION:

1. Position replacement tube (A) between adapter (B) and nipple (C).
2. Using fingers, connect tube nuts (D) and (E) to adapter (B) and nipple (C).



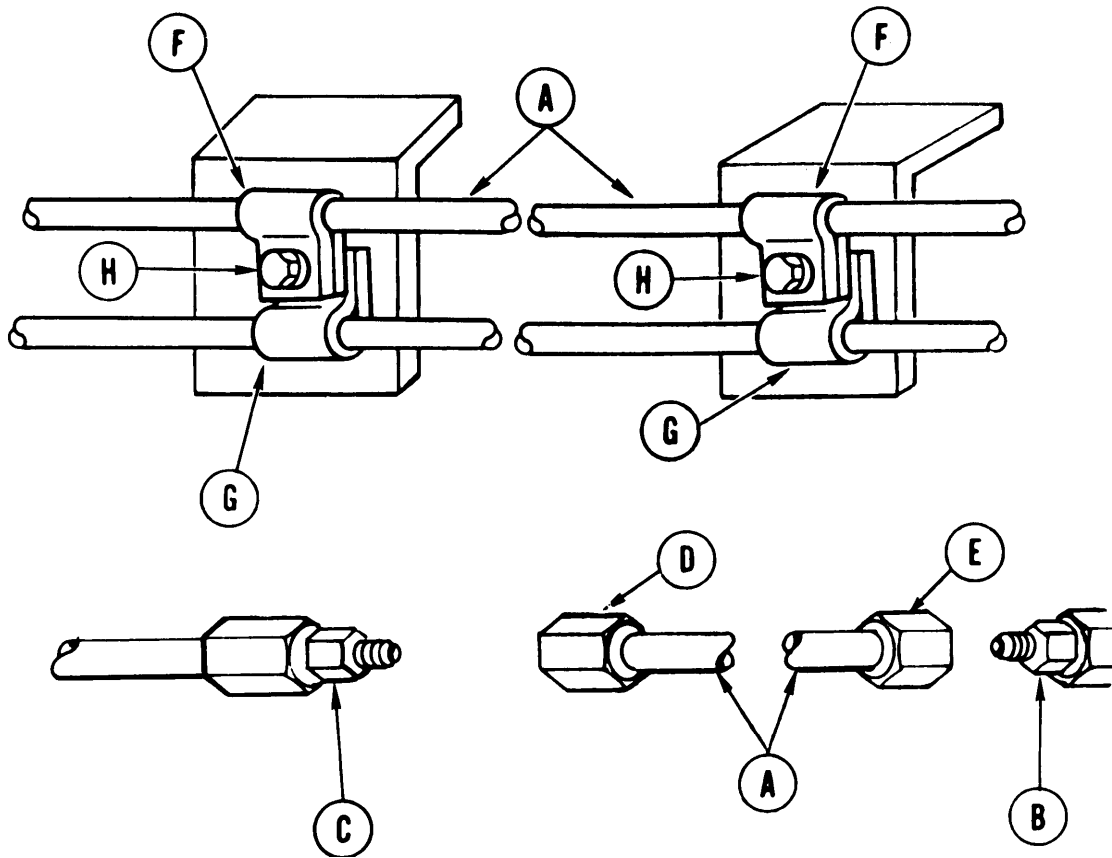
Go on to Sheet 3

TA253295

Change 1 7-351

PRIMER INLET FUEL TUBE ASSEMBLY (NIPPLE-TO-FILTER) REPLACEMENT (LATE MODEL)
(Sheet 3 of 3)

3. Install two clamps (F) on tube (A).
4. Using socket, secure four clamps (F) and (G) with two screws and new lockwashers (H).
5. Using 1/2 inch wrench to hold nipple (C), use 9/16 inch wrench and tighten nut (D) onto nipple (C).
6. Using 1/2 inch wrench on hold adapter (B), use 9/16 inch wrench and tighten nut (E) onto adapter (B).



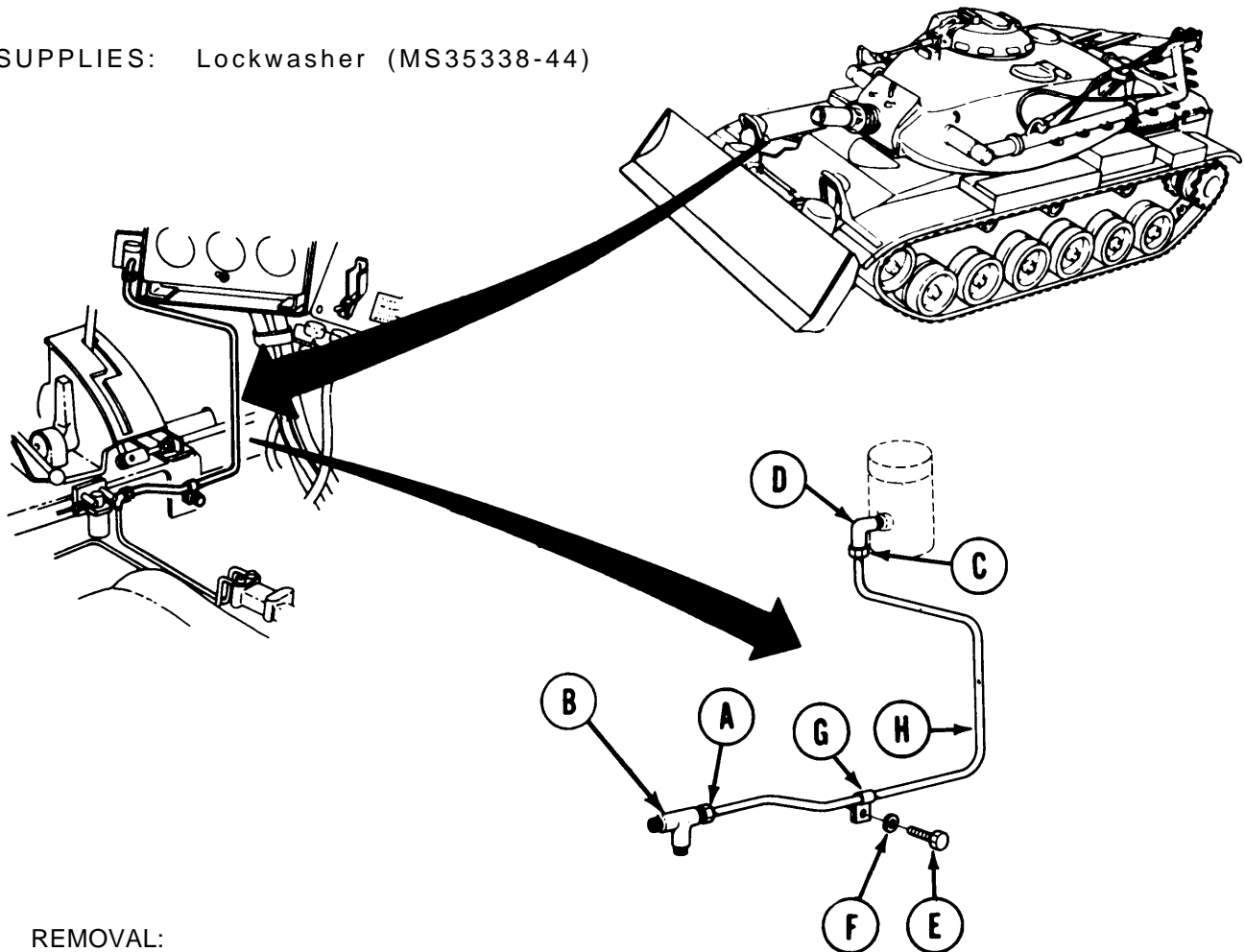
End of Task

TA253248

PERSONNEL HEATER FUEL LINE REPLACEMENT (LATE MODEL) (Sheet 1 of 2)

TOOLS: 1/2 in. combination box and open end wrench
7/16 in. combination box and open end wrench

SUPPLIES: Lockwasher (MS35338-44)



REMOVAL:

1. Using 9/16 inch wrench on fitting (A), remove fitting (A) from tee (B).
2. Using 9/16 inch wrench on fitting (C), remove fitting from elbow (D).
3. Using 7/16 inch wrench, remove screw (E) and lockwasher (F) from clamp (G). Remove clamp. Throw lockwasher away.
4. Remove fuel line (H).
5. Using 1/2 inch wrench, remove elbow (D).

Go on to Sheet 2

TA253249

Change 17-353

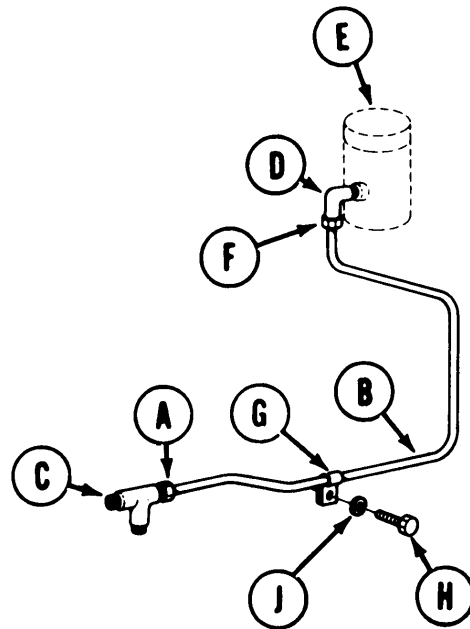
PERSONNEL HEATER FUEL LINE REPLACEMENT (LATE MODEL) (Sheet 2 of 2)

INSPECTION:

1. Inspect all parts for damage.
2. Replace damaged parts as required.

INSTALLATION:

1. Using 9/16 inch wrench, install fitting (A) on fuel line (B) to tee (C).
2. Using 1/2 inch wrench, install elbow (D) to personnel heater fuel pump (E).
3. Using 9/16 inch wrench, install fitting (F) to elbow (D).
4. Position clamp (G) over fuel line (B) with hole aligned to hull.
5. Using 7/16 inch wrench, install screw (H), new lockwasher (J), and secure clamp (G) to hull.



End of Task

TA253250

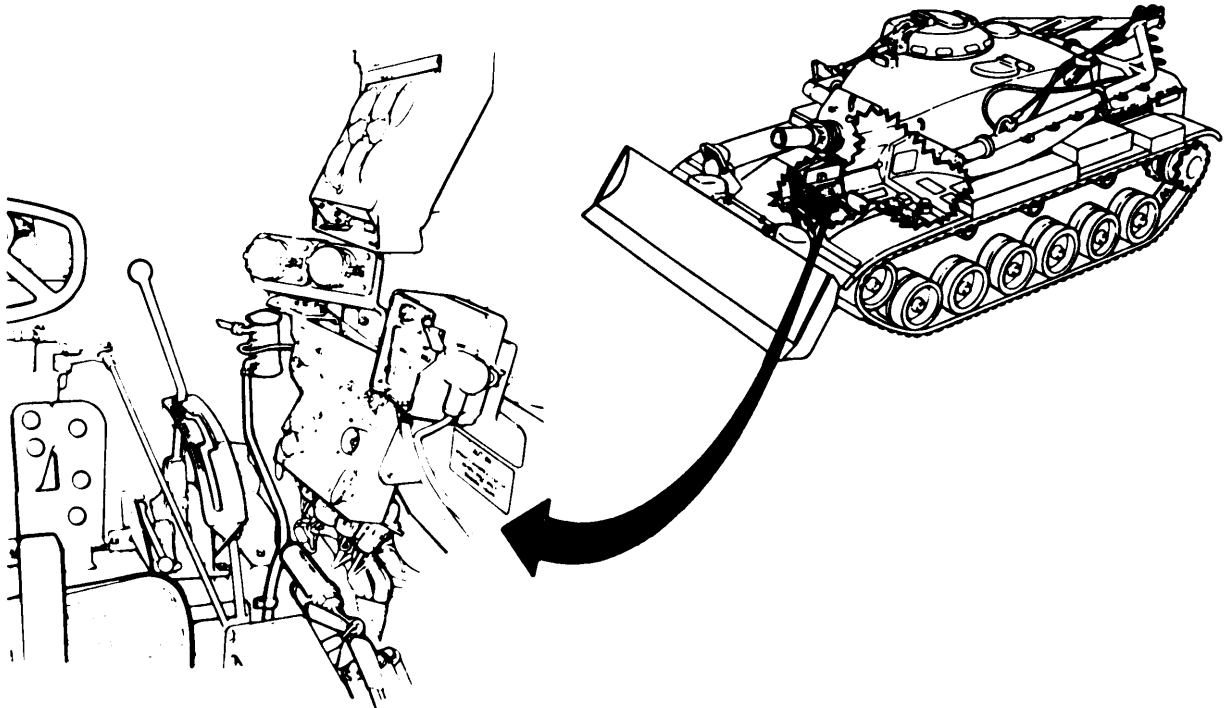
PERSONNEL HEATER FUEL LINE REPLACEMENT (EARLY MODEL) (Sheet 1 of 3)

TOOLS: 5/8 in. combination box and open end wrench
7/16 in. combination box and open end wrench

SUPPLIES: Rags (Item 65, Appendix D)
Empty container (1 gal.)
Lockwasher (MS35338-44)

REFERENCE: TM 9-2350-260-10

PRELIMINARY PROCEDURES: Shut off FUEL PUMPS switch (TM 9-2350-222-10).



Go on to Sheet 2

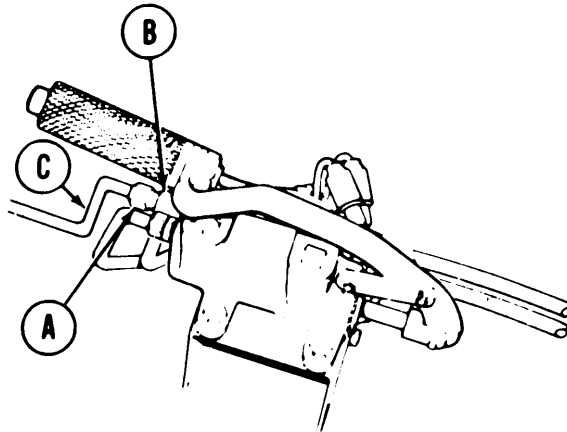
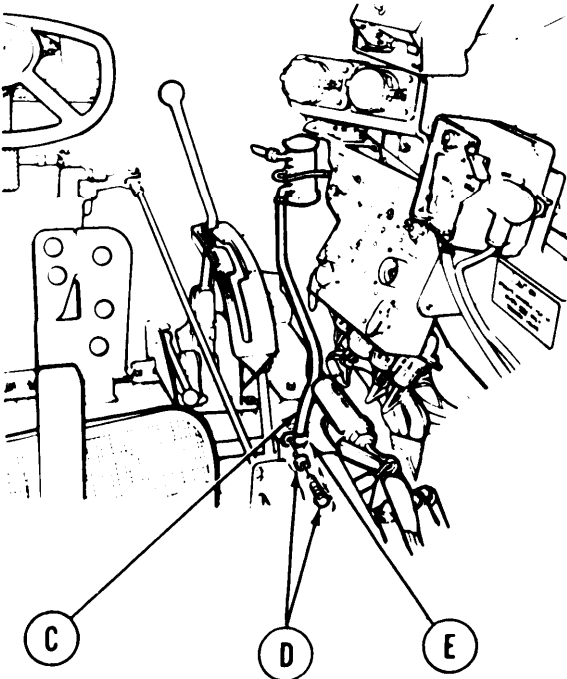
TA253296

Change 1 7-354.1

PERSONNEL HEATER FUEL LINE REPLACEMENT (EARLY MODEL) (Sheet 2 of 3)

REMOVAL:

1. Using 5/8 inch wrench, loosen fitting(A) from tee (B). Move tube assembly (C) slightly away from tee (B).



2. Using 7/16 inch wrench, remove screw and lockwasher (D) securing clamp(E) to tube assembly (C). Throw lockwasher away.
3. Remove clamp(E) from tube assembly(C).

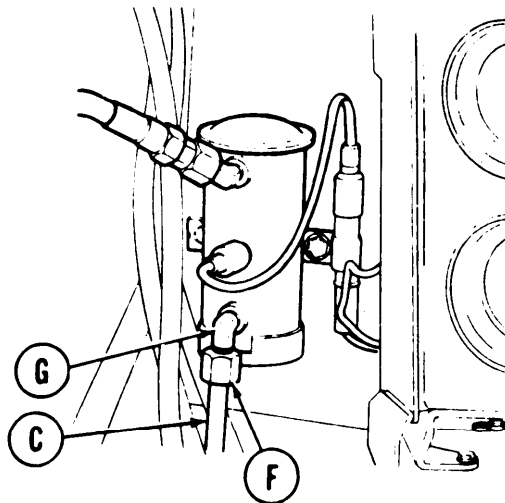
NOTE

Use empty container to catch any fuel draining from fuel pump.

4. Using 5/8 inch wrench, loosen fitting (F) from elbow (G) on fuel pump.
5. Remove tube assembly (C).

INSPECTION:

Inspect inlet and outlet elbows for cracks, thread damage, and burrs. Replace if necessary.



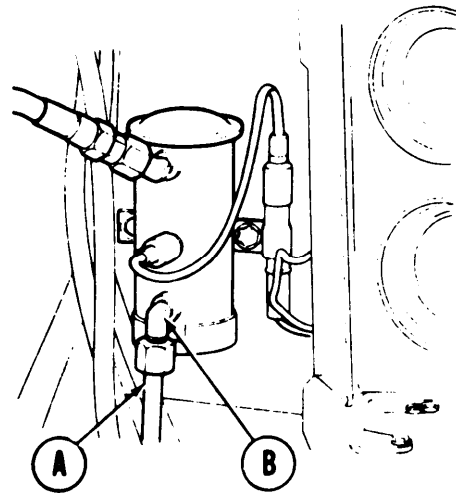
Go on to Sheet 3

TA253297

PERSONNEL HEATER FUEL LINE REPLACEMENT (EARLY MODEL) (Sheet 3 of 3)

INSTALLATION:

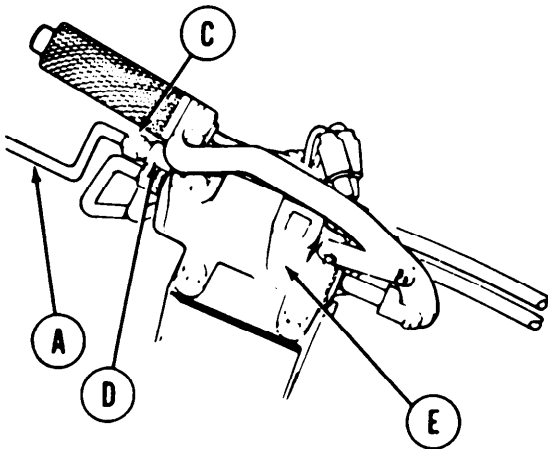
1. Position tube assembly(A) in tank.
2. Using 5/8 inch wrench, install tube assembly (A) on elbow(B) and tighten securely.



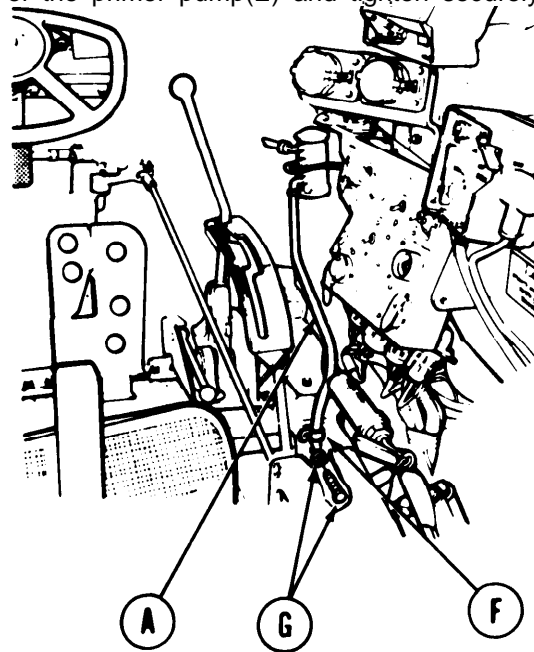
NOTE

Be sure to inspect the routing of tube assembly (A) from personnel heater fuel pump to primer pump. Make sure it is not bent or crimped.

3. Using 5/8 inch wrench, connect fitting(C) to tee (D) of the primer pump(E) and tighten securely.



4. Install clamp (F) on tube (A).
5. Using 7/16 inch wrench, install screw and new lockwasher (G) through clamp(F) and tighten.
6. Wipe up any fuel spills.



End of Task

TA253322

Change 1 7-355

HULL PRIMER FUEL LINE TO ENGINE HOSE REPLACEMENT (LATE MODEL) (Sheet 1 of 1)

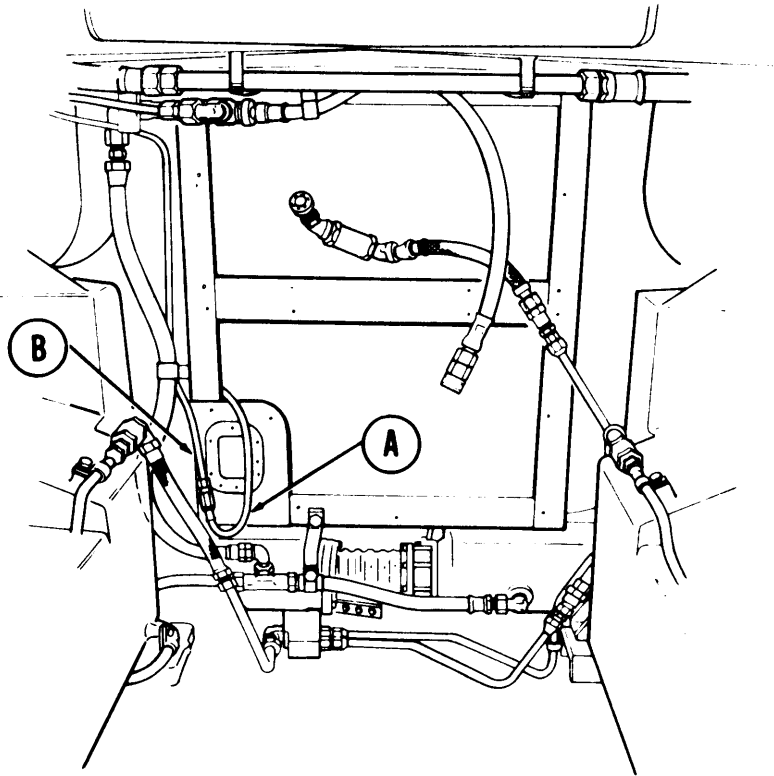
TOOLS: 9/16 in. combination box and open end wrench (2 required)

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:

1. Using two 9/16 inch wrenches, disconnect hose assembly (A) from tube assembly (B).
2. Remove hose assembly (A) from hull.



INSTALLATION:

1. Connect hose assembly (A) to tube assembly (B).
2. Using two 9/16 inch wrenches, tighten hose assembly (A) to tube assembly (B).
3. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA253323

FUEL PRIMER/ENGINE FEED TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (sheet 1 of 4)

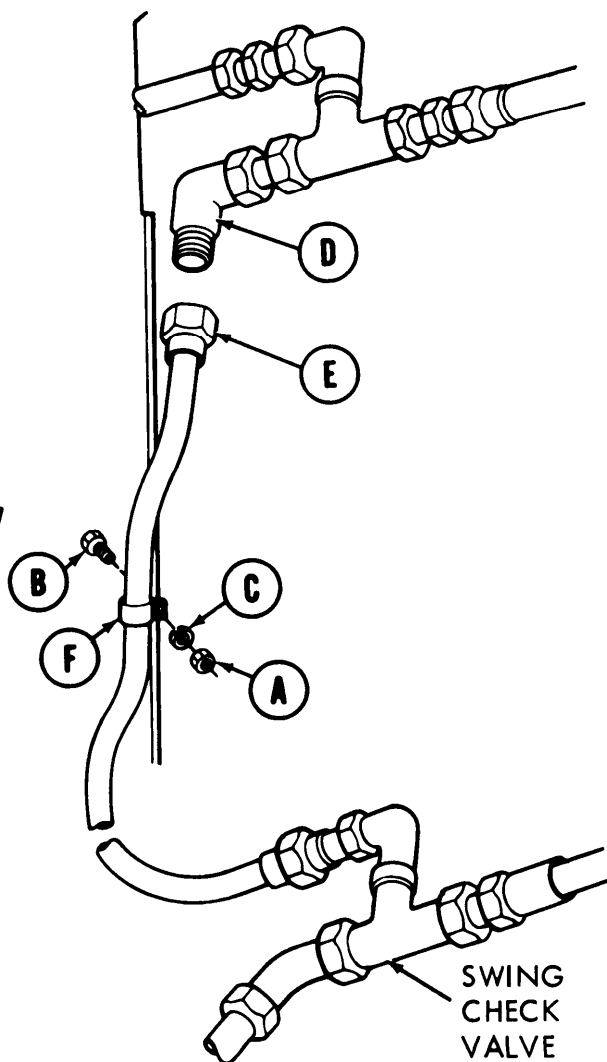
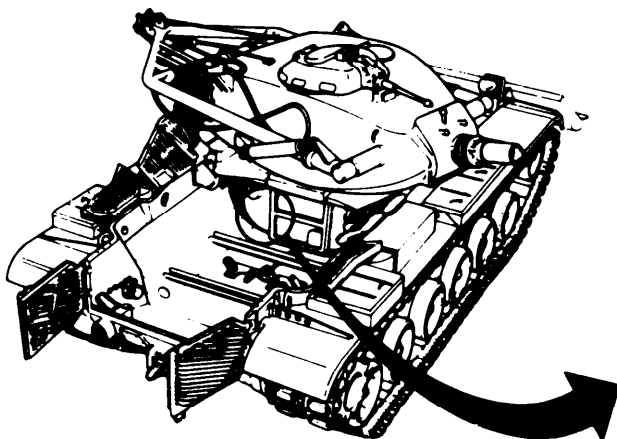
TOOLS: 5/8 in. combination box and open end wrench
 11/16 in. combination box and open end wrench
 7/16 in. combination box and open end wrench
 7/8 in. combination box and open end wrench
 1 in. combination box and open end wrench
 1-1/8 in. open end wrench
 12 in. adjustable wrench (2 required)
 7/16 in. socket with 1/2 in. square drive
 Ratchet with 1/2 in. square drive

SUPPLIES: Lockwasher (MS 35338-44)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)

REMOVAL:

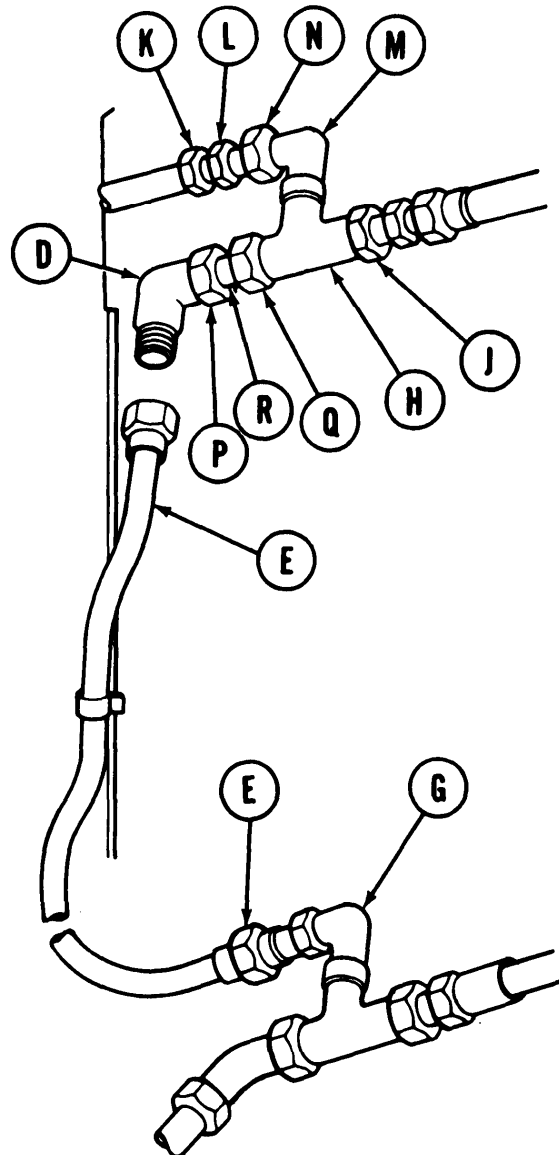


1. Using 7/16 inch wrench to hold nut (A), use 7/16 inch socket to remove screw (B) and lockwasher (C). Throw lockwasher away.
2. Using adjustable wrench to hold elbow (D), use 1-1/8 inch wrench to remove hose assembly, (E) from elbow (D). Remove clamp (F) from hose assembly (E).

TA 253324

FUEL PRIMER/ENGINE FEED TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 2 of 4)

3. Using adjustable wrench to hold elbow (G), use 7/8 in. wrench to disconnect hose assembly (E) from elbow (G).
4. Using adjustable wrench to hold tee (H) use 1 inch wrench to disconnect hose assembly (J) from tee (H).
5. Using 5/8 inch wrench on tube nut (K) and 11/16 inch wrench on adapter (L), disconnect tube nut (K) from adapter (L).
6. Remove from vehicle as a unit, elbows (D and M) and tee (H).
7. Using adjustable wrench to hold elbow (M) use 1 inch wrench to remove nut (N) and adapter (L) as a unit.
8. Using two adjustable wrenches, remove elbow (M) from tee (H).



9. Using adjustable wrench to hold elbow (D), use 1-1/8 inch wrench to disconnect tube nut (P) from elbow (D). Remove elbow (D).
10. Using adjustable wrench to hold tee (H), use 1 inch wrench to disconnect nut (Q) from tee (H).
11. Remove tube (R) with nuts (P and Q).

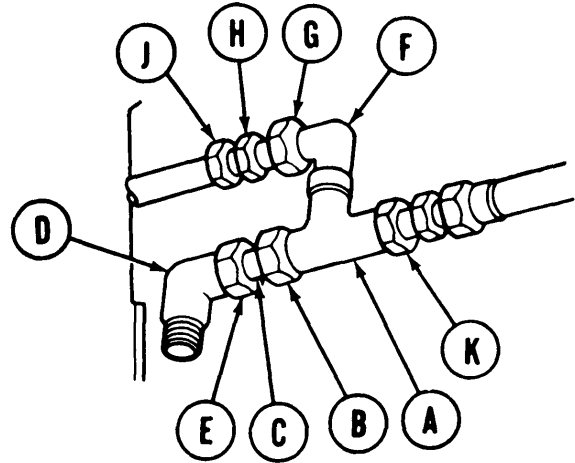
Go on to Sheet 3

TA253251

FUEL PRIMER/ENGINE FEED TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 3 of 4)

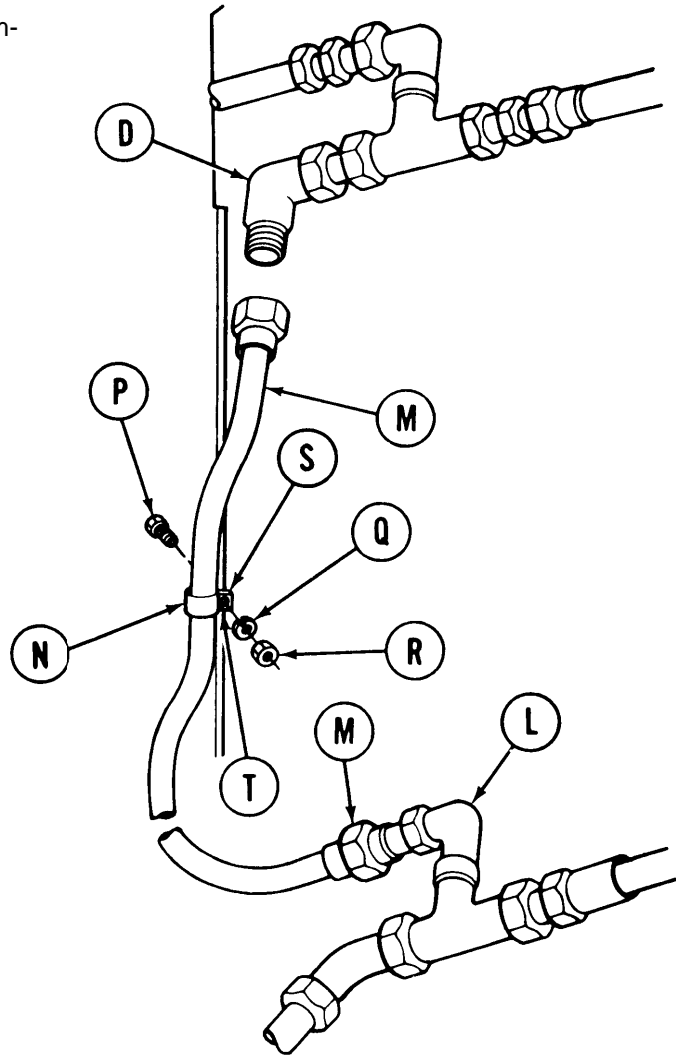
INSTALLATION:

- Using adjustable wrench to hold tee (A). use 1 inch wrench to connect nut (B) on tube (C) to tee (A).
2. Using adjustable wrench to hold elbow (D), use 1 inch wrench to connect nut (E) on tube (C) to elbow (D).
 3. Using adjustable wrench to hold tee (A), use another adjustable wrench to connect elbow (F) to tee (A).
 4. Using adjustable wrench to hold elbow (F), use 1 inch wrench to install nut (G) of adapter (H) to elbow (F).
 5. Position assembled elbows (D and F), tube (C), tee (A) and adapter (H) into vehicle.
 6. Using fingers, connect tube assembly (J) to adapter (H).
Using fingers, connect hose assembly (K) to tee (A).
 8. Using 11/16 inch wrench to hold adapter (H), use 5/8 inch wrench to tighten tube assembly (J) to adapter (H).
 9. Using adjustable wrench to hold tee (A), use 1 inch wrench to tighten hose assembly (K) to tee (A).



FUEL PRIMER/ENGINE FEED TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 4 of 4)

10. Using adjustable wrench to hold elbow (L) use 7/8 inch wrench to connect hose assembly (M) to elbow (L).
11. Install clamp (N) on hose assembly (M).
12. Using adjustable wrench to hold elbow (D), use 1-1/8 inch wrench to connect hose assembly (M) to elbow (D).
13. Using 7/16 inch wrench and 7/16 inch socket, install screw (P), new lockwasher (Q) and nut (R) to secure clamps (N and S) to bracket (T).
14. Fill fuel tanks (TM 9-2350-222-10).
15. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).
16. Operate engine and check for leaks (TM9-2350-222-10).



End of task

TA253253

PRIMER PUMP REPLACEMENT (EARLY MODEL) (sheet 1 of 4)

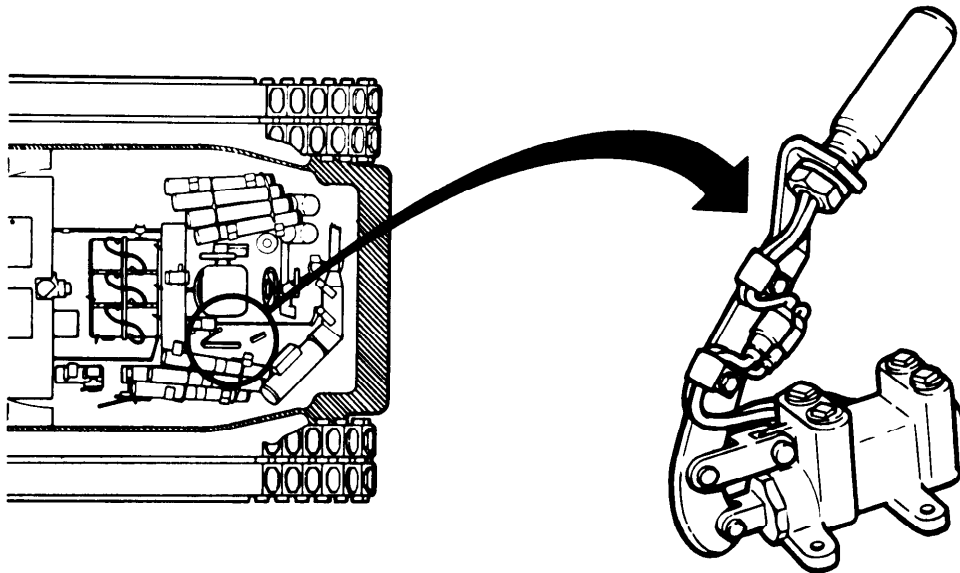
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-358.3
Cleaning and Inspection	7-358.5
Installation	7-358.5

- TOOLS:
- Wire brush
 - 1/2 in. combination box and open end wrench
 - 9/16 in. combination box and open end wrench
 - 9/16 in. socket with 1/2 in. drive
 - Ratchet with 1/2 in. drive
 - 3 in. extension with 1/2 in. drive
 - 7/16 in. combination box and open end wrench

- SUPPLIES:
- Sealing compound (Item 28, Appendix D)
 - Silicone compound (Item 32, Appendix D)
 - Rags (Item 65, Appendix D)
 - Lockwasher (MS35338-46) (4 required)

REFERENCE: TM 9-2350-222-10



Go on to Sheet 2

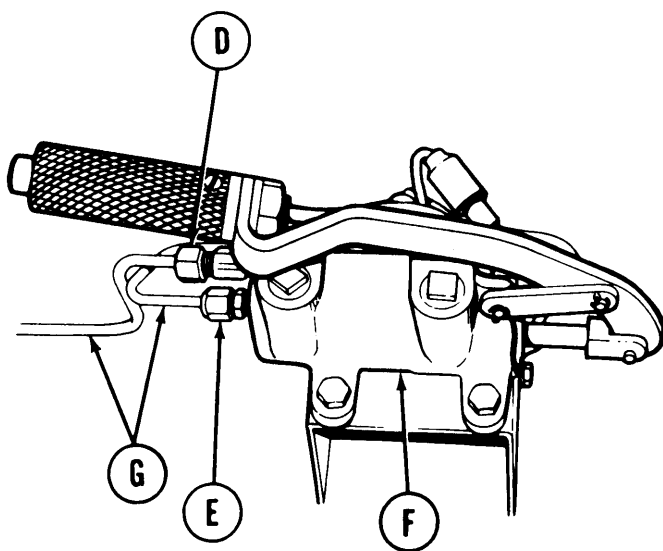
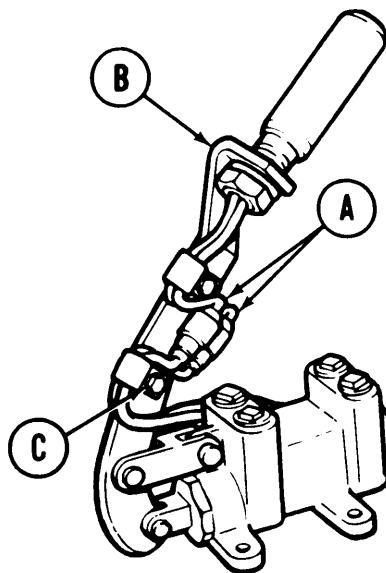
TA253254

Change 1 7-358.3

PRIMER PUMP REPLACEMENT (EARLY MODEL) (Sheet 2 of 4)

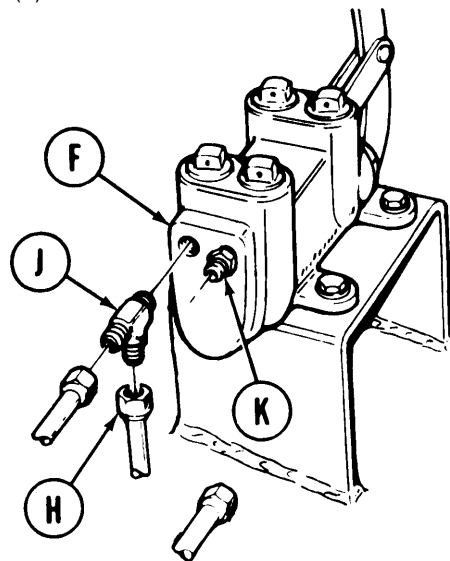
REMOVAL

1. Disconnect two electrical connectors (A) located on handle support bracket (B) by pulling apart.
2. Raise handle to the up position. Using 7/16 inch wrench, remove bolt and wire bracket (C).



Using 9/16 inch wrench, remove heater tube nut (D) and outlet tube nut (E) from primer pump (F).

4. Pull back two tubes (G) from primer pump (F).



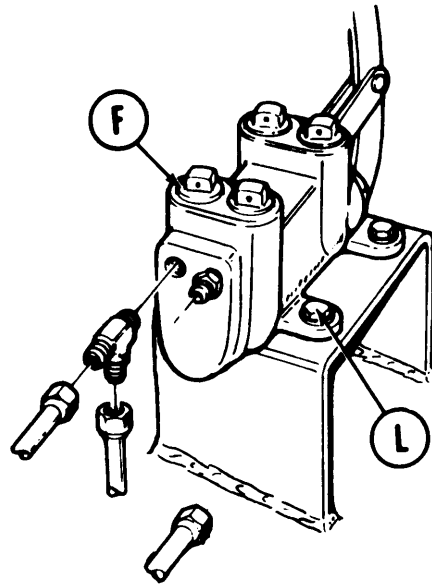
5. Using 9/16 inch wrench, remove inlet tube nut (H) from tee (J).
6. Using 1/2 inch wrench, remove tee (J) and adapter (K) from primer pump (F).

Go on to Sheet 3

TA253255

PRIMER PUMP REPLACEMENT (EARLY MODEL) (Sheet 3 of 4)

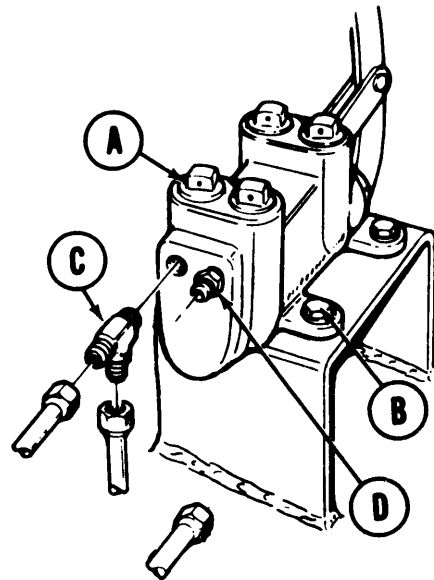
7. Using socket, remove four bolts, lockwashers, and flat washers (L) securing primer pump (F) to hull. Throw lockwashers away.
8. Remove primer pump (F).

**CLEANING AND INSPECTION:**

1. Clean all threads with wire brush.
2. Inspect all parts for cracks or crossed threads. Replace as required.

INSTALLATION:

1. Place primer pump (A) in position in tank.
2. Using socket, install four bolts, new lockwashers, and flat washer (B) securing primer pump (A) to hull.



3. Place sealing compound (Item 28, Appendix D) on male pipe threads of tee (C) and adapter (D).
4. Using 1/2 inch wrench, install tee (C) and adapter (D) in primer pump (A).

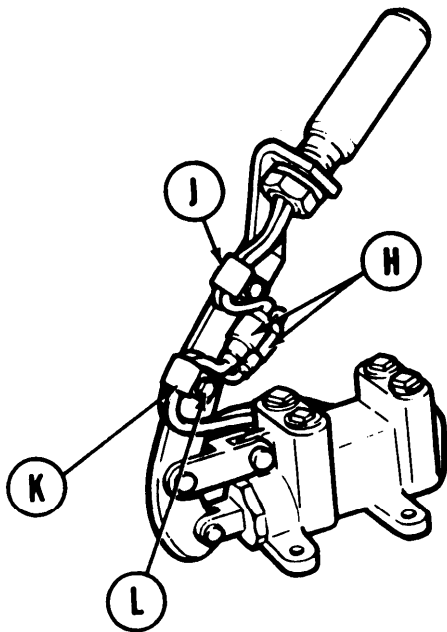
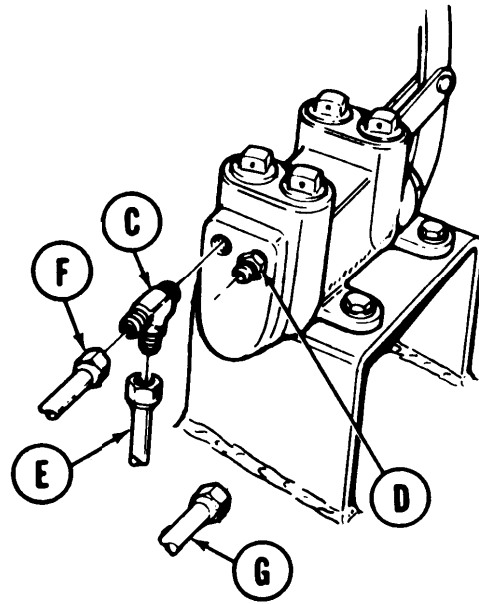
Go on to Sheet 4

TA253256

Change 17-358.5

PRIMER PUMP REPLACEMENT (EARLY MODEL) (Shoot 4 of 4)

5. Using 9/16 inch wrench, install inlet tube (E) and heater tube (F) on tee (C).
6. Using 9/16 inch wrench, install outlet tube (G) on adapter (D).



7. Apply silicone compound (Item 32, Appendix (D)) to two electrical connectors (H).
8. Connect two electrical connectors (H) located on handle support bracket (J) by pushing together.
9. Raise handle to up position. Using 7/16 inch wrench, install wire bracket (K) with bolt (L).

End of Task

TA253257

PRIMER PUMP REPLACEMENT (LATE MODEL) (Sheet 1 of 4)

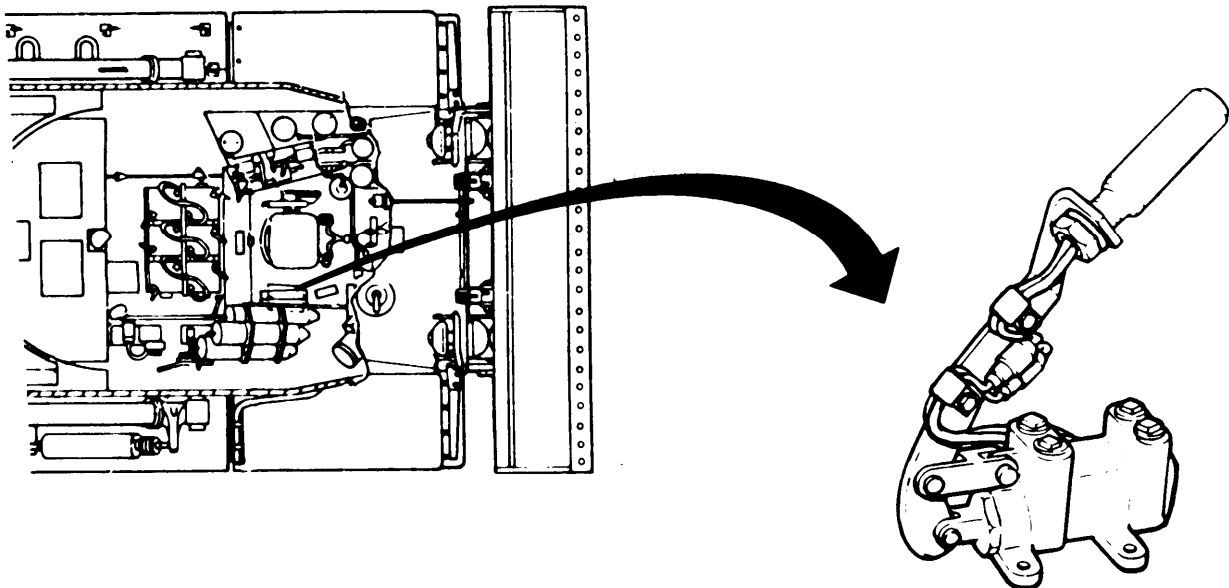
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-359
Cleaning and Inspection	7-361
Installation	7-361

TOOLS: Wire brush
 1/2 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 3 in. extension with 1/2 in. drive
 7/16 in. combination box and open end wrench

SUPPLIES: Sealing compound (Item 28, Appendix D)
 Silicone compound (Item 32, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwasher (MS35338-46) (4 required)

PRELIMINARY PROCEDURE: (Early model only) shut off fuel at fuel shutoff cock (TM 9-2350-222-10)



Go on to Sheet 2

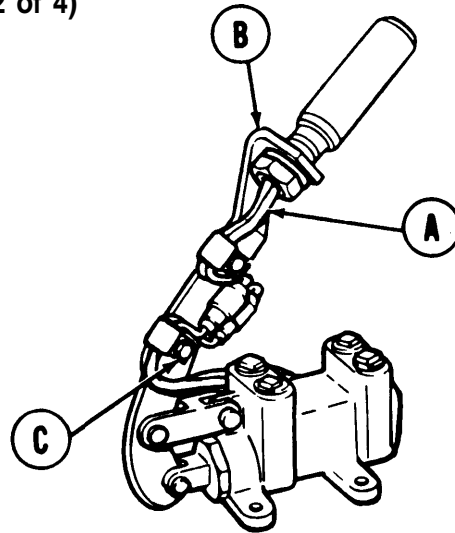
TA253318

Change 1 7-359

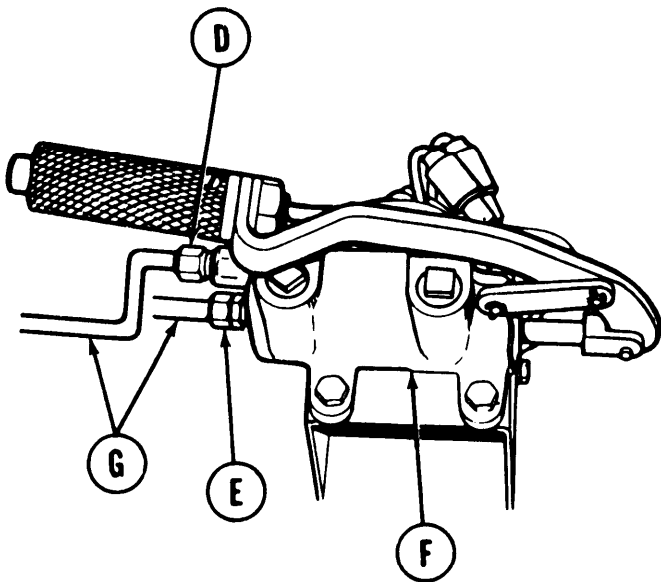
PRIMER PUMP REPLACEMENT (LATE MODEL) (Sheet 2 of 4)

REMOVAL:

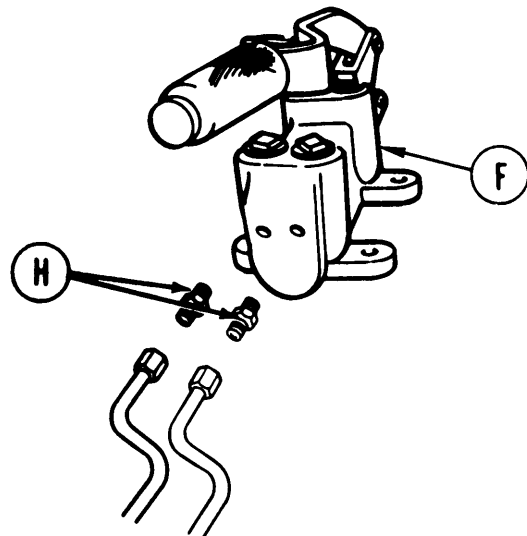
1. Disconnect two electrical connectors (A) located on handle support bracket (B) by pulling apart.
2. Raise handle to the up position Using 7/16 inch wrench, remove bolt and wire bracket (C).



3. Using 9/16 inch wrench, remove inlet tube nut (D) and outlet tube nut (E) from primer pump (F).



4. Pull back two tubes (G) from primer pump (F).



5. Using 1/2 inch wrench, remove two adapters (H) from primer pump (F).

Go on to Sheet 3

TA253319

PRIMER PUMP REPLACEMENT (LATE MODEL) (Sheet 3 of 4)

6. Using socket, remove four bolts, lockwashers, and flat washers (J) securing primer pump (F) to hull. Throw lockwashers away.
7. Remove primer pump (F).

CLEANING AND INSPECTION:

1. Clean adapter threads with wire brush.
2. Inspect adapters for cracks or crossed threads. Replace as required.

INSTALLATION:

1. Place primer pump (A) in position in vehicle.
2. Using socket, install four bolts, new lockwashers, and flat washers (B) securing primer pump (A) to hull.
3. Place sealing compound (Item 28, Appendix D) on male pipe threads of two adapters (C).
4. Using 1/2 inch wrench, install two adapters (C) in primer pump (A).

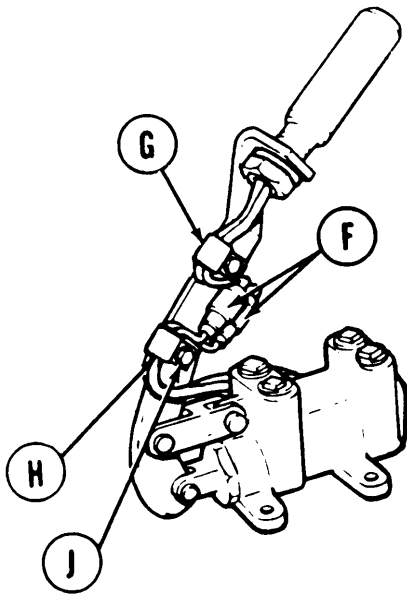
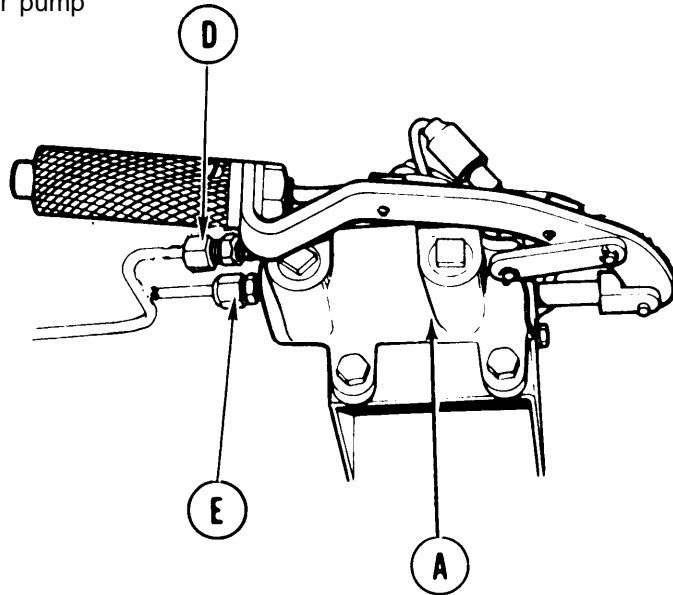
Go on to Sheet 4

TA253325

Change 1 7-361

PRIMER PUMP REPLACEMENT (LATE MODEL) (Sheet 4 of 4)

- Using 9/16 inch wrench, install inlet tube (D) and outlet tube (E) on adapters of primer pump (A).



- Apply silicone compound (Item 32, Appendix D) to two electrical connectors (F).
- Connect two electrical connectors (F) located on handle support bracket (G) by pushing together.
- Raise handle to up position. Using 7/16 inch wrench, install wire bracket (H) with bolt (J),

End of Task

TA253326

MANIFOLD HEATER OPERATIONAL CHECK (Sheet 1 of 2)

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

PERSONNEL: TWO

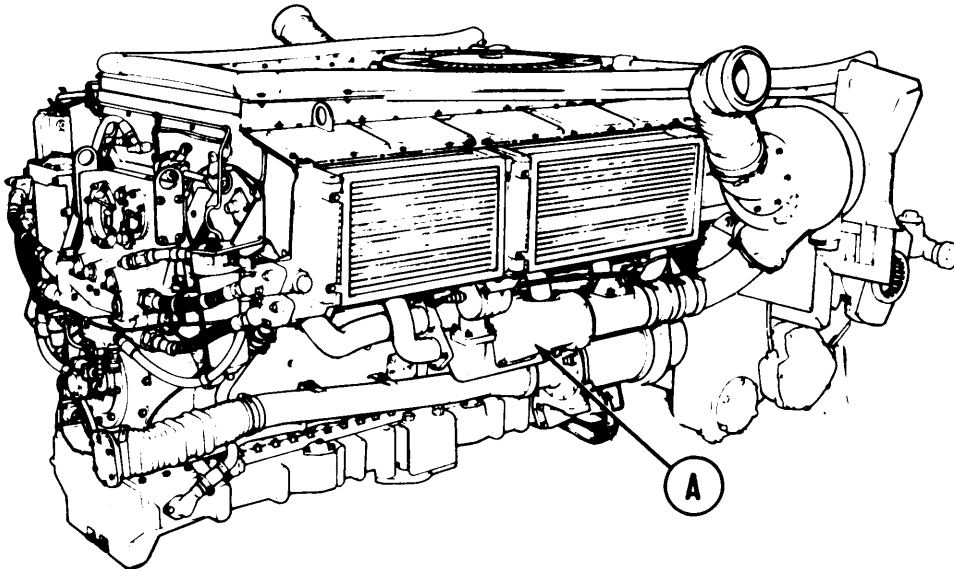
PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

OPERATIONAL CHECK:

NOTE

This procedure applies to manifold heaters on both 2A and 2D powerplants. Make this check after any part of manifold heater system is replaced. It requires two persons to complete.

1. Prepare engine for powerplant test run (page 5-49).
2. Station one person on side of engine that maintenance was performed, with one hand on intake manifold heater tube (A).

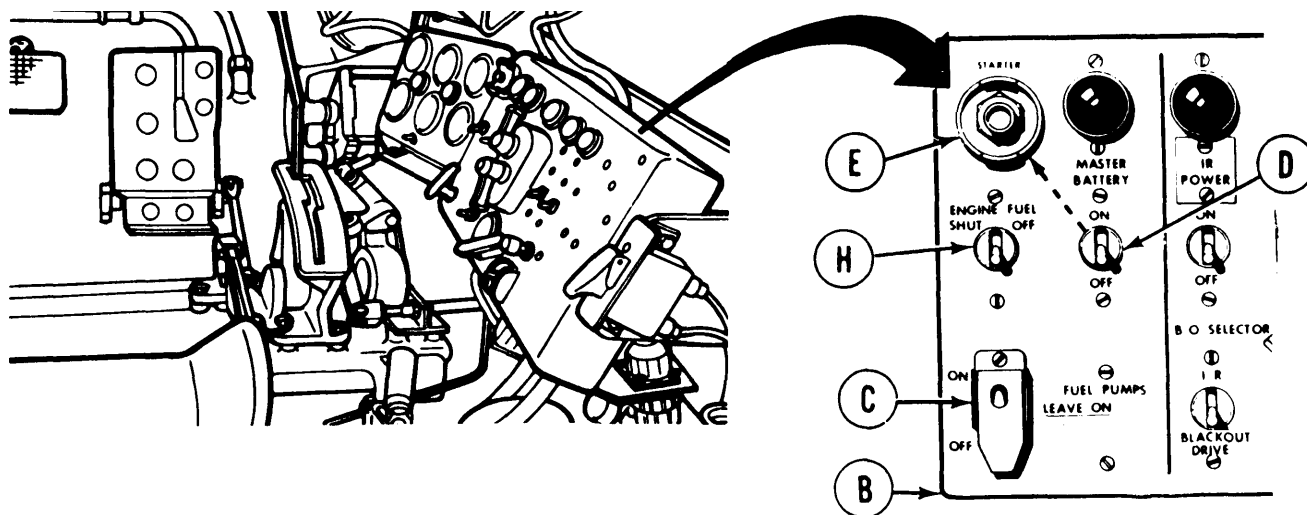


**2A ENGINE SHOWN, 2D LOCATION
IS THE SAME**

Go on to Sheet 2

TA148926

MANIFOLD HEATER OPERATIONAL CHECK (Sheet 2 of 2)



3. At driver's station on master control panel (B) set FUEL PUMPS switch (C) to OFF (down) and MASTER BATTERY switch (D) to ON (up).
4. Press STARTER BUTTON (E) and at same time operate purge pump handle (F) while pressing heater button (G) on end of handle.
5. Check system for leaks. Correct as necessary.
6. Check that heater is operating. Heat will be felt at intake manifold heater tube. If no heat is felt, troubleshoot and correct (page 4-1).
7. When checks are complete, stop operating purge pump handle (F). Hold ENGINE FUEL SHUTOFF switch (H) to OFF. Set MASTER BATTERY switch to OFF (down).
8. Disconnect engine from powerplant test run hookup (page 5-62).
9. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA148927

MANIFOLD HEATER (LEFT AND RIGHT) REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

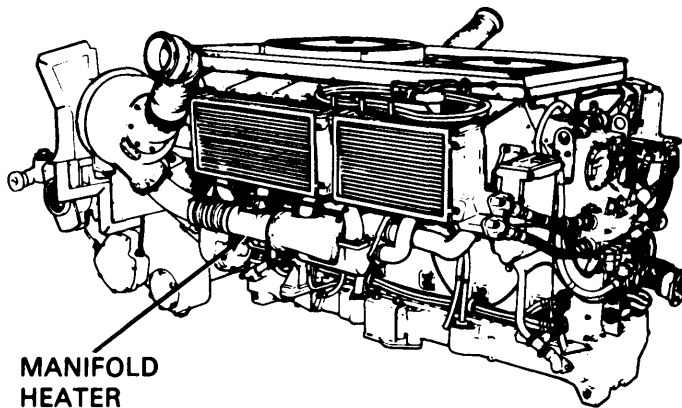
PROCEDURE	PAGE
Removal	7-366
Installation	7-367

TOOLS: 3/4 in. combination box and open end wrench
 7/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 5/8 in. combination box and open end wrench

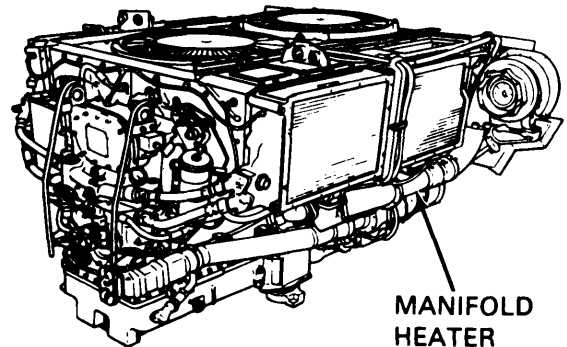
SUPPLIES: Container to catch fuel leaks
 Rags (Item 65, Appendix D)
 Gasket (8682503)

Filter (11610365-1) (2D engine only)
 Filtering disc (11650355) (2D engine only)
 Self-locking nuts (MS21044N5) (4 required)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



**2A ENGINE
(LEFT)**



**2D ENGINE
(RIGHT)**

NOTE

Manifold heaters on 2A and 2D engines are the same. This procedures applies to both powerplants. Procedures for replacement of left or right manifold heater are the same. Procedures given here are for right manifold heater.

Go on to Sheet 2

TA148928

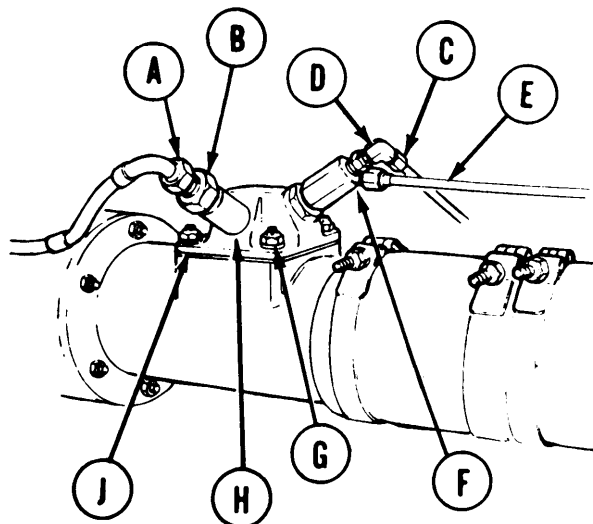
MANIFOLD HEATER (LEFT AND RIGHT) REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using 3/4 inch wrench, disconnect ignition lead (A) from spark plug (B).

NOTE

Use suitable container and rags (Item 65, Appendix D) as required to catch or wipe up fuel spillage whenever any fuel line or fitting is loosened or removed.



2. Using 7/16 inch wrench, disconnect fuel input tube (C) from elbow (D).
3. Using 9/16 inch wrench, disconnect fuel return tube (E) from elbow (F).
4. Using 1/2 inch wrench, remove four nuts and washers (G). Throw nuts away.
5. Remove manifold heater (H) and gasket (J). Throw gasket away.

Go on to Sheet 3

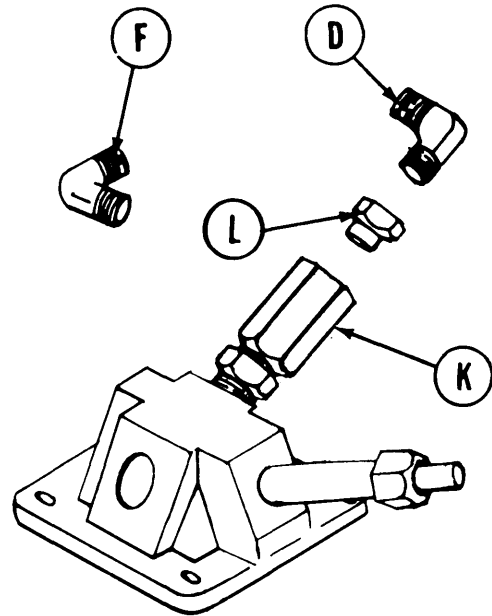
TA148929

MANIFOLD HEATER (LEFT AND RIGHT) REPLACEMENT (Sheet 3 of 4)

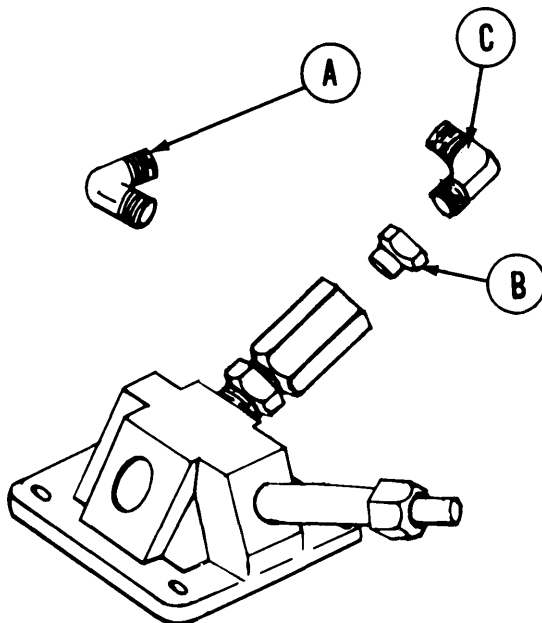
NOTE

Some 2D engines have a filtering disc between elbow (F) and nozzle (K), and a filter between bushing (L) and nozzle (K). Remove and throw away filter and disc if present.

6. Using 7/16 inch wrench, remove elbow (F).
7. Using 7/16 inch wrench, remove elbow (D).
8. Using 5/8 inch wrench, remove bushing (L) from nozzle (K).
9. Inspect all items disconnected or removed for cracks, nicks, or other damage. Replace as necessary.



INSTALLATION:



NOTE

Position and install elbows as shown.

NOTE

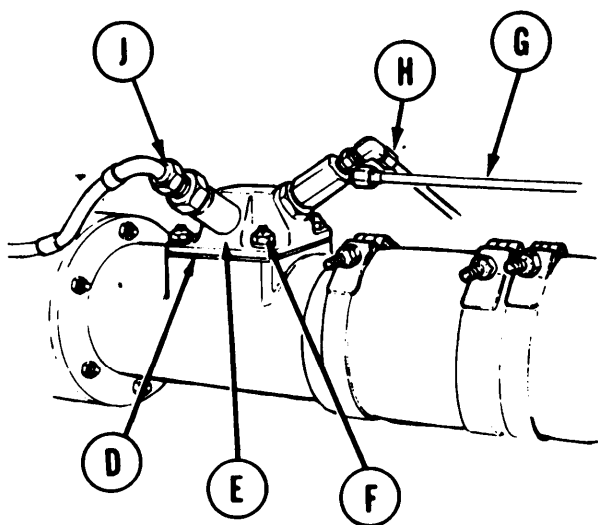
Some 2D engines require a filtering disc between elbow (A) and nozzle, and a filter between bushing (B) and fuel nozzle.

1. Install elbow (A). Using 7/16 inch wrench) tighten elbow.
2. Install bushing (B). Using 5/8 inch wrench, tighten bushing.
3. Install elbow (C). Using 7/16 inch wrench, tighten elbow.

Go on to Sheet 4

TA148930

MANIFOLD HEATER (LEFT AND RIGHT) REPLACEMENT (Shoot 4 of 4)



4. Position new gasket (D) and manifold heater (E) onto manifold.
5. Install four washers and new nuts (F) to secure manifold heater.
6. Using 1/2 inch wrench, tighten nuts (F).

NOTE

Adjust elbows to align with fuel tube connectors.

7. Connect fuel input tube (H) to elbow. Using 7/16 inch wrench, tighten tube.
8. Connect fuel return tube (G) to elbow. Using 9/16 inch wrench, tighten tube.
9. Connect ignition lead (J) to spark plug. Using 3/4 inch wrench, tighten ignition lead.
10. Perform manifold heater operational check (page 7-363).
11. Install 2A powerplant (page 6-14) or 2D powerplant (page 6-37).

End of Task

TA148931

MANIFOLD HEATER NOZZLE REPLACEMENT (Sheet 1 of 3)

TOOLS: 5/8 in. combination box and open end wrench
7/16 in. combination box and open end wrenches (2 required)
9/16 in. combination box and open end wrench
13/16 in. combination box and open end wrench
1/2 in. combination box and open end wrench
1 in. combination box and open end wrench

SUPPLIES: Rags (Item 65, Appendix D)
Filter (11650365-1) (2D engine only)
Nozzle (7335555)
Filtering disc (11650365) (2D engine only)

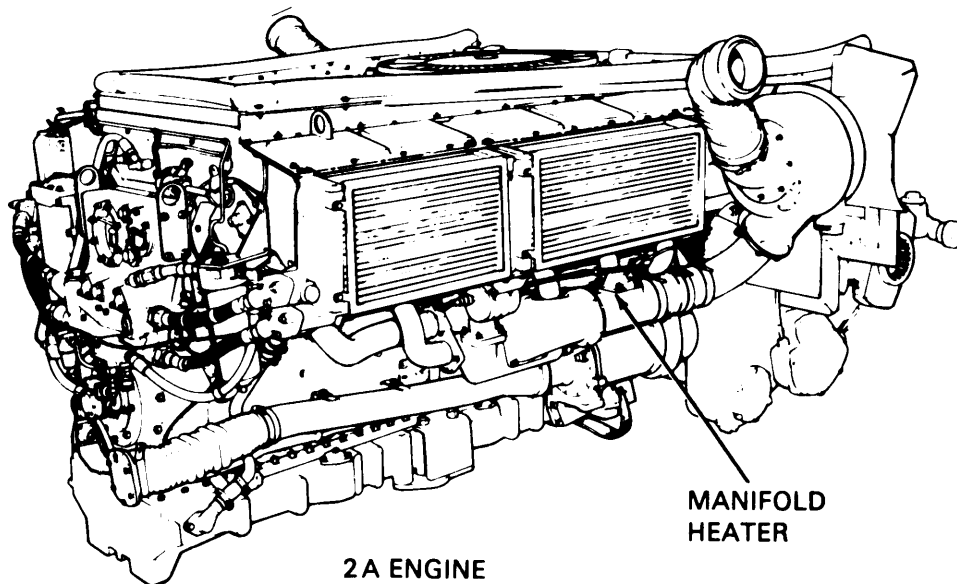
PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

NOTE

Manifold heaters on 2A and 2D engines are similar. This procedure applies to both powerplants.

NOTE

Nozzle on right manifold heater is shown. Nozzle on left manifold is similar.



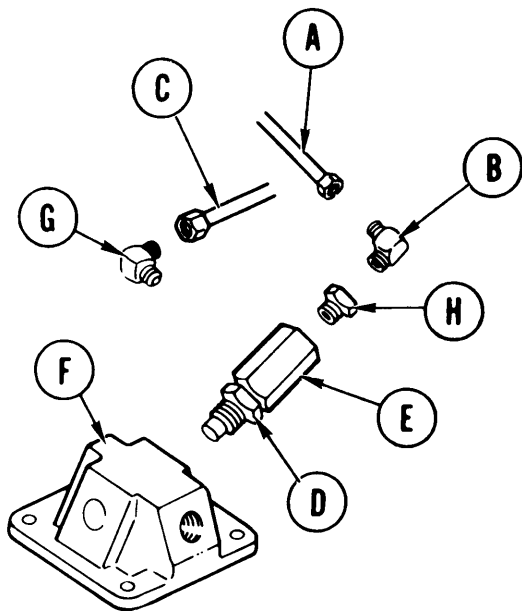
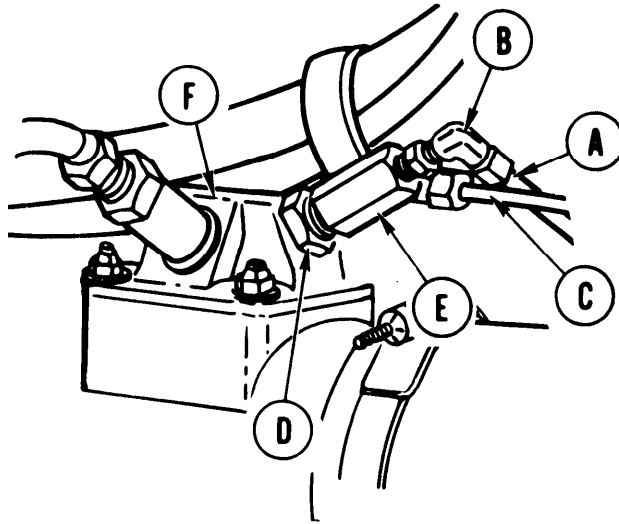
Go on to Sheet 2

TA148932

MANIFOLD HEATER NOZZLE REPLACEMENT (Sheet 2 of 3)

REMOVAL:

1. Using two 7/16 inch wrenches, disconnect fuel inlet line (A) from elbow (B).
2. Using 7/16 inch and 9/16 inch wrenches, disconnect fuel return line (C) from elbow.
3. Using 1 inch wrench, loosen jamnut (D).
4. Using 13/16 inch wrench, remove nozzle (E) and fitting from manifold heater (F).



5. Using 7/16 inch wrench, remove elbow (G) and (if present) filtering disc from nozzle. Throw filtering disc away.
6. Using 5/8 inch and 7/16 inch wrenches, remove elbow (B) from nozzle.
7. Using 5/8 inch and 13/16 inch wrenches, remove bushing (H) and (if present) filtering disc. Throw filtering disc away.
8. Throw nozzle (E) away.

9. Inspect all parts disconnected or removed. Replace all items as necessary.

Go on to Sheet 3

TA148933

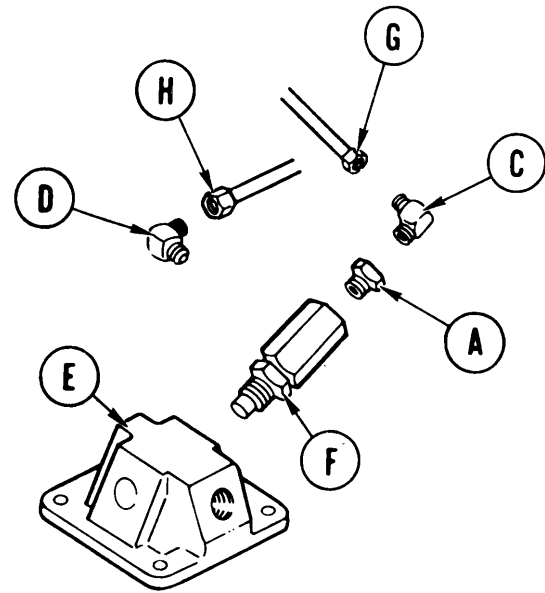
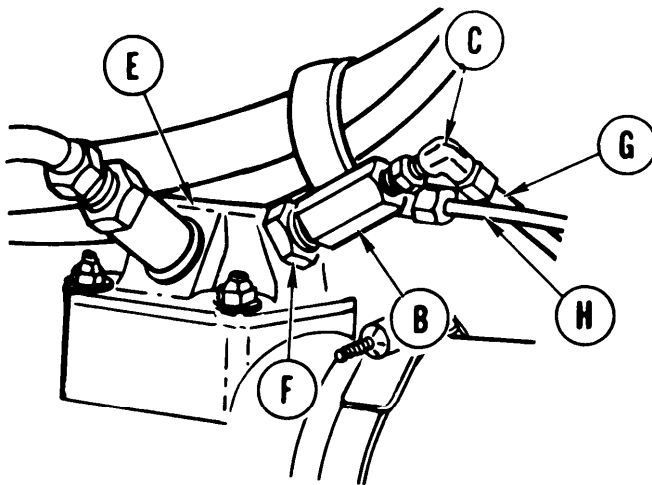
MANIFOLD HEATER NOZZLE REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

NOTE

On 2D engines, install new filter between bushing (A) and nozzle (B) and new filtering disc between elbow (D) and nozzle.

1. Using 13/16 inch and 5/8 inch wrenches, install bushing (A) in new nozzle (B).
2. Using 5/8 inch and 7/16 inch wrenches, install elbow (C) to bushing (A).
3. Using 7/16 inch wrench, install elbow (D) into nozzle (B).



4. Install nozzle (B) and fittings into manifold heater (E).
5. Aline nozzle for ease of connecting fuel lines. Using 1 inch wrench, tighten jamnut (F).
6. Using two 7/16 inch wrenches, connect inlet fuel line (G) to elbow (C).
7. Using 7/16 inch and 9/16 inch wrenches, install return fuel line (H) to elbow (D).
8. Perform manifold heater operational check (page 7-363).
9. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

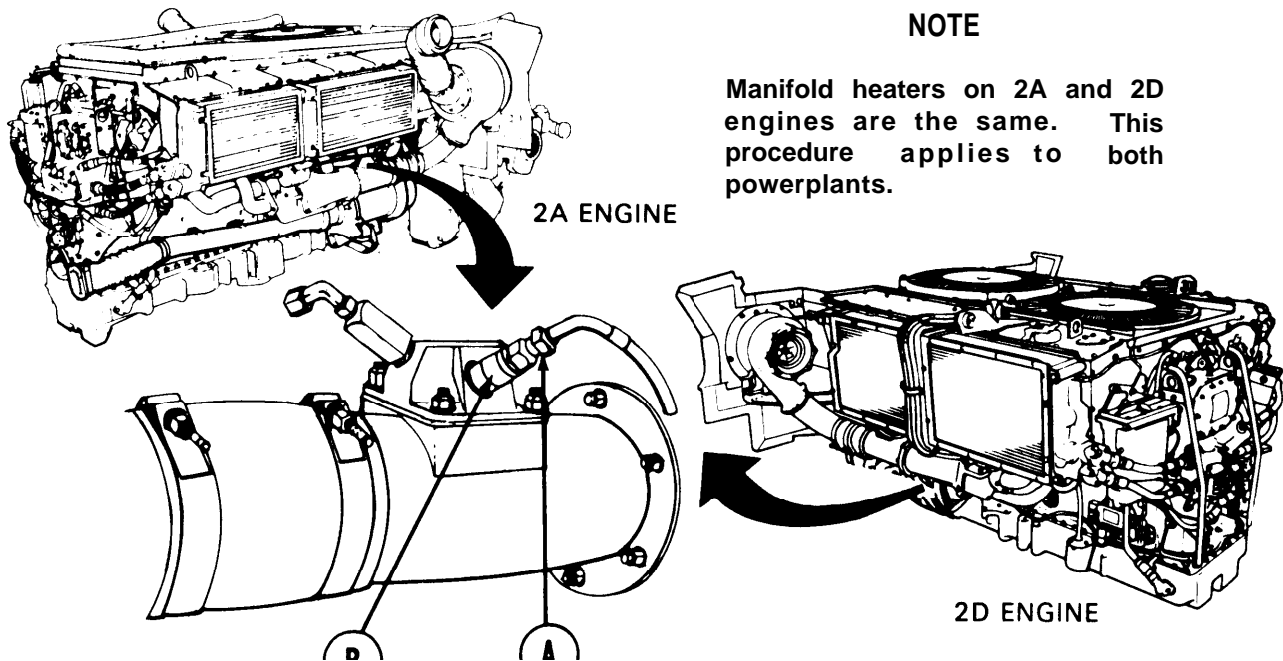
TA148934

MANIFOLD HEATER SPARK PLUG REPLACEMENT (Sheet 1 of 1)

TOOLS: 3/4 in. combination box and open end wrench
7/8 in. combination box and open end wrench
Feeler gage

SUPPLIES: Gasket (150190)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



REMOVAL:

1. Using 3/4 inch wrench, disconnect ignition cable (A) from spark plug (B).
2. Using 7/8 inch wrench, remove spark plug (B) with gasket. Throw gasket away,

INSTALLATION:

1. Using feeler gage, set spark plug gap at 0.097 inch (-0.003 or +0.017).
2. Using 7/8 inch wrench, install spark plug (B) and new gasket.
3. Connect ignition cable (A) to spark plug (B). Using 3/4 inch wrench, tighten ignition cable (A) to spark plug (B).
4. Perform manifold heater operational check (page 7-363).
5. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA141553

MANIFOLD HEATER RETURN FUEL CHECK VALVE REPLACEMENT (Sheet 1 of 3)

TOOLS: Wrench set (combination box and open end 5/16 in. thru 1 in. openings)
Wire brush

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

SUPPLIES: Drain pan
Sealing compound (Item 28, Appendix D)
Filtering disc (11610365) (2D engine only)

REFERENCES: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Remove engine shroud (page 9-2)

REMOVAL:

CAUTION

When removing or installing fuel lines, care must be taken not to damage fittings and threads or twist or distort fuel lines or hoses.

NOTE

It may be necessary to use two wrenches for removal or installation of hoses and tubes.

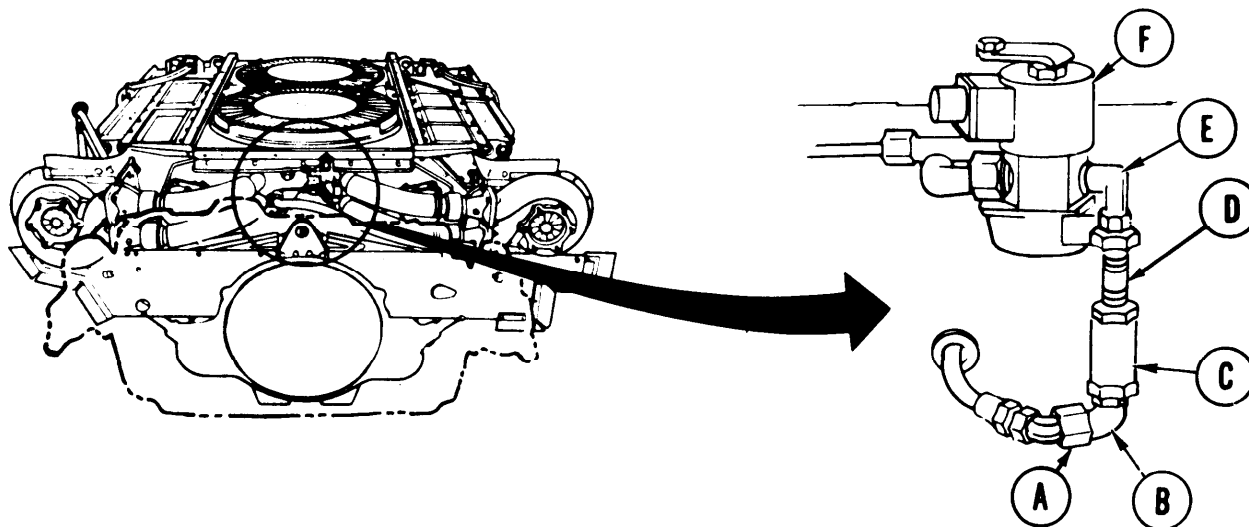
Go on to Sheet 2

TA141554

MANIFOLD HEATER RETURN FUEL CHECK VALVE REPLACEMENT (Sheet 2 of 3)

NOTE

Use suitable container to catch any fuel that may leak out whenever any part of fuel system is loosened or disconnected.



1. Using 7/16 inch and 9/16 inch wrenches, disconnect end fitting of hose assembly (A) from elbow (B).
2. Using 7/16 inch and 13/16 inch wrenches, remove elbow (B) from check valve (C).
3. Using 13/ 16 inch and 7/16 inch wrenches, remove check valve (C) from nipple (D).
4. Using 7/16 inch and 9/16 inch wrenches, remove nipple (D) from elbow (E).
5. Using 9/16 inch wrench, remove elbow (E) from solenoid valve (F).

NOTE

Some 2D engines may have a filtering disc installed between elbow (E) and solenoid valve (F). If present, remove disc and throw away.

CLEANING AND INSPECTION:

1. Using wire brush, clean threaded parts.
2. Inspect all hoses, tube assemblies, and fittings. Replace as required.

Go on to Sheet 3

TA141555

MANIFOLD HEATER RETURN FUEL CHECK VALVE REPLACEMENT (Sheet 3 of 3)

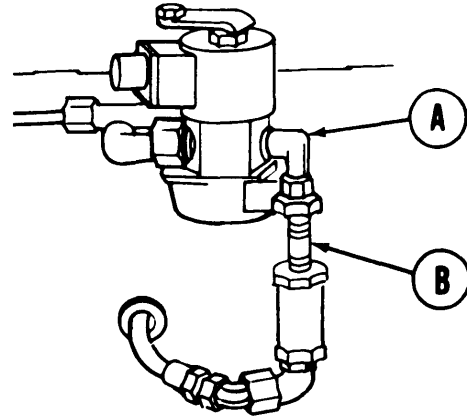
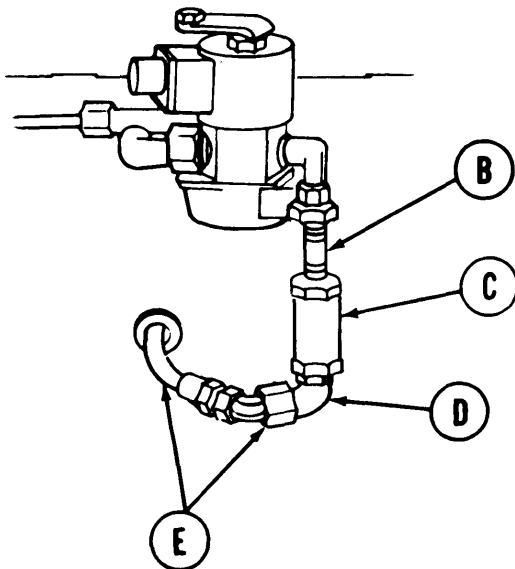
INSTALLATION:

Coat threads of elbow (A), nipple (B), check valve (C), and elbow (D) with sealing compound (Item 28, Appendix D).

NOTE

Some 20 engines require a filtering disc between elbow (A) and solenoid valve.

2. Using 9/16 inch wrench, install elbow (A) to solenoid valve in position shown.
3. Install nipple (B) to elbow (A).
4. Install check valve (C) to nipple (B).
5. Install elbow (D) to check valve (C).



6. Using proper wrenches, tighten and **aline parts (B), (C), (D)** to be able to connect end fitting of hose assembly (E) to elbow (D).
7. Connect hose assembly (E) to elbow (D).
8. Using 7/16 inch and 9/16 inch wrenches, **tighten** hose assembly (E) connection to elbow (D).

9. Connect for powerplant test run (page 5-49).
10. Operate primer pump (TM 9-2350-222-10) and check for leaks. If leaks are found, tighten connection as required.
11. Disconnect powerplant test kit (page 5-62).
12. Install engine shroud (page 9-3).
13. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA148935

MANIFOLD HEATER FUEL RETURN SOLENOID VALVE REPLACEMENT (Sheet 1 of 5)

PROCEDURE INDEX

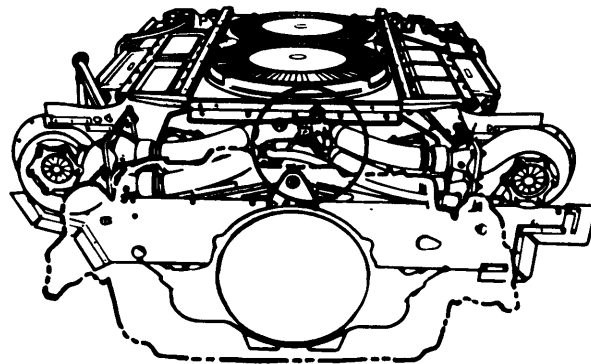
PROCEDURE	PAGE
Removal	7-377
Inspection	7-378
Installation	7-379

TOOLS: Spanner wrench
 9/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 5/16 in. combination box and open end wrench
 1/2 in. socket with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive

SUPPLIES: Filtering disc (11610365) (2 required) (2D engine only)
 Container to catch fuel leakage
 Rags (Item 65, Appendix D)
 Sealing compound (Item 28, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove engine shroud (page 9-2)



NOTE

Use suitable container and rags (Item 65, Appendix D) as required to catch or wipe up any fuel that may leak out whenever any part of fuel system is loosened or disconnected.

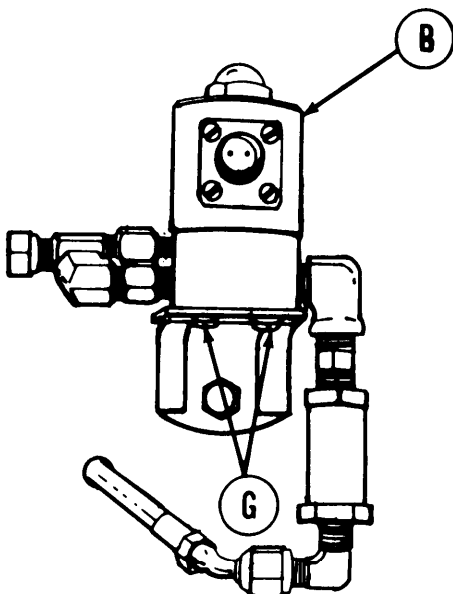
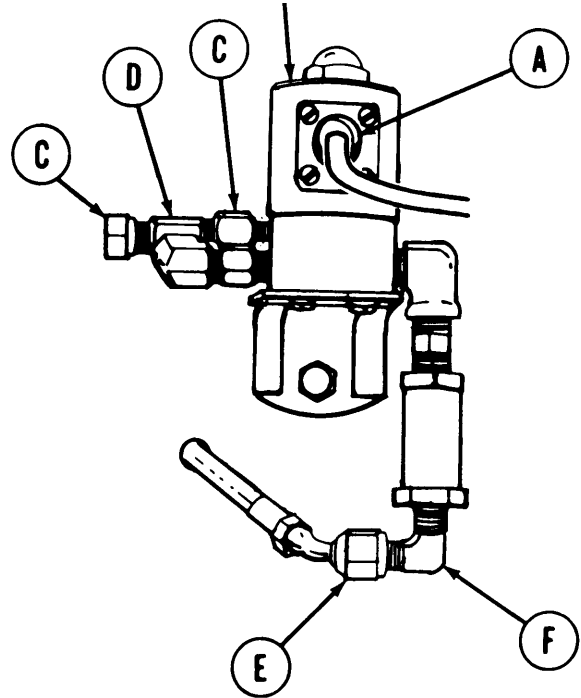
Go on to Sheet 2

TA141556

MANIFOLD HEATER FUEL RETURN SOLENOID VALVE REPLACEMENT (Sheet 2 of 5)**REMOVAL:**

Using spanner wrench, disconnect electrical connector(A) from solenoid valve(B).

2. Using 9/16 inch wrench, disconnect two fuel lines (C) from tee (D).
3. Using 9/16 inch wrench, disconnect hose assembly (E) from elbow (F).

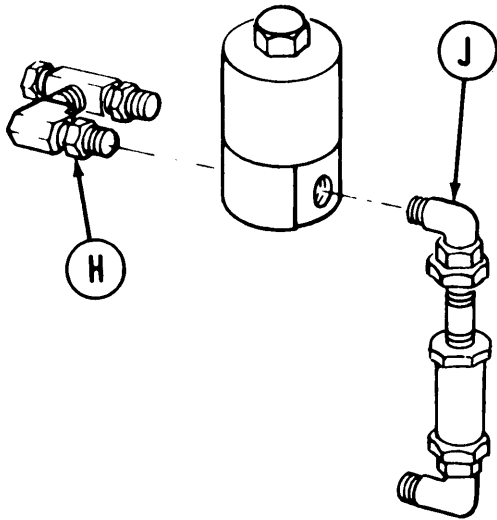


4. Using 5/16 inch wrench, remove two screws and washers (G) that secure solenoid valve (B) to bracket.
5. Remove solenoid valve (B) and fittings as a unit.

Go on to Sheet 3

TA141557

MANIFOLD HEATER FUEL RETURN SOLENOID VALVE REPLACEMENT (Sheet 3 of 5)



6. Using 1/2 inch wrench, remove coupling (H) with elbow and tee attached.
7. Using 9/16 inch wrench, remove elbow (J) with nipple, check valve, and elbow attached.

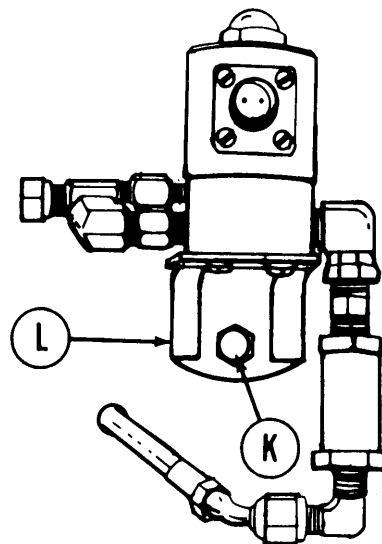
NOTE

Some 2D engine solenoid valves have filtering discs installed in fuel openings. If present, remove discs. Throw discs away.

8. Using 1/2 inch wrench and socket, remove three screws (K) that secure bracket (L) to shroud.
9. Remove bracket (L).

INSPECTION:

Inspect all items disconnected or removed. Replace defective parts as necessary.



Go on to Sheet 4

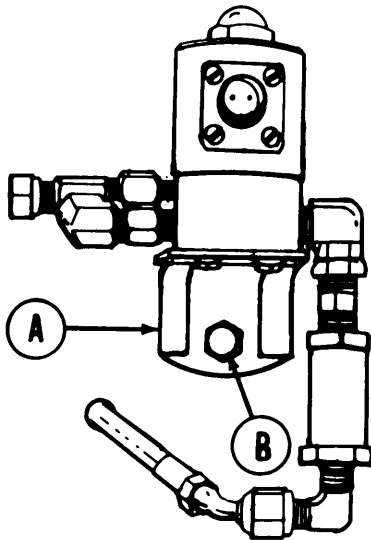
TA141558

MANIFOLD HEATER FUEL RETURN SOLENOID VALVE REPLACEMENT (Sheet 4 of 5)

INSTALLATION:

NOTE

Coat all male threads of fittings with sealing compound (Item 28, Appendix D) before installation.

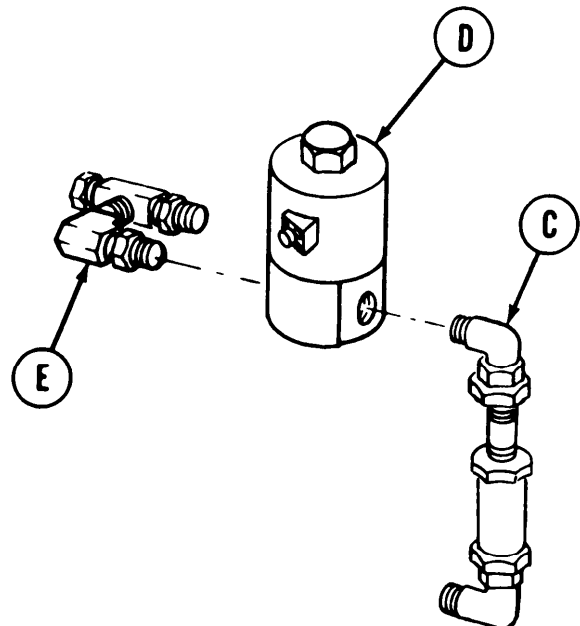


1. Position bracket (A) in place on shroud.
2. Using 1/2 inch wrench and socket, install three screws (B) to secure bracket to shroud.

NOTE

Some 2D engine solenoid valves require filtering discs in fuel openings. Install discs as required.

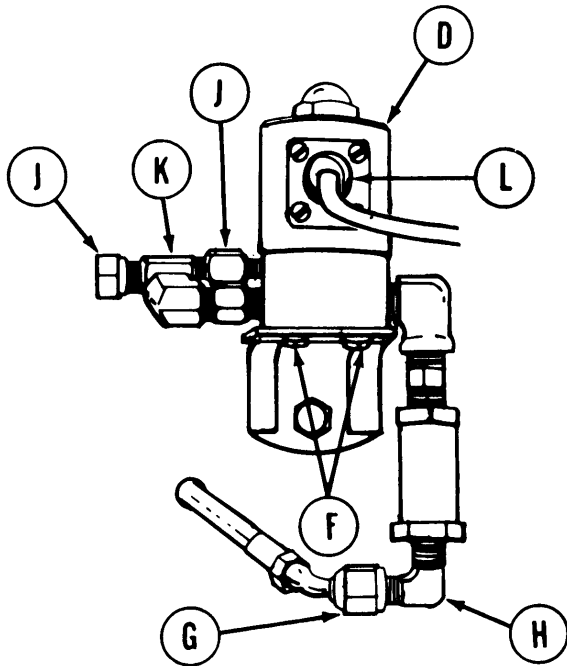
3. Using 9/16 inch wrench, install elbow with nipple, check valve and elbow (C) as a unit on solenoid valve (D).
4. Using 1/2 inch wrench, install coupling with elbow and tee (E) on solenoid valve (D).



Go on to Sheet 5

TA141559

MANIFOLD HEATER FUEL RETURN SOLENOID VALVE REPLACEMENT (Sheet 5 of 5)



5. Place solenoid valve (D) with fittings on bracket. Position solenoid valve so electrical connector is facing rearward.
6. Using 5/16 inch wrench, install two screws and washers (F) to secure solenoid valve (D) to bracket.

7. Connect hose assembly (G) to elbow (H). Using 9/16 inch wrench, tighten hose assembly (G) to elbow (H),
8. Connect two fuel lines (J) to tee (K). Using 9/16 inch wrench, tighten fuel lines (J) to tee (K).
9. Using spanner wrench, install electrical connector (L) to valve.
10. Operate primer pump (TM 9-2350-222-10). Check for leaks. If leaks are found, correct as necessary.
11. Install engine shroud (page 9-3).

End of Task

TA141560

MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 7)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-382
Cleaning and Inspection	7-384
Installation	7-385

TOOLS: 5/16 in. combination box and open end wrench
 8 in. adjustable wrench
 Flat-tip screwdriver
 Hammer
 9/16 in. combination box and open end wrench (2 required)
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 1/2 in. combination box and open end wrench

SUPPLIES: Rags (Item 65, Appendix D)
 Sealing compound (Item 27, Appendix D)
 Dry cleaning solvent (Item 54, Appendix D)
 Container

PERSONNEL: TWO

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Remove engine shroud (page 9-2)

CAUTION

When removing or installing fuel lines, care must be taken not to damage fittings and threads or twist or distort fuel lines or hoses.

NOTE

There are two manifold heater fuel return tube assemblies, one for left bank and one for right bank. Removal and installation procedures for both tube assemblies are similar. This procedure covers right bank tube assembly.

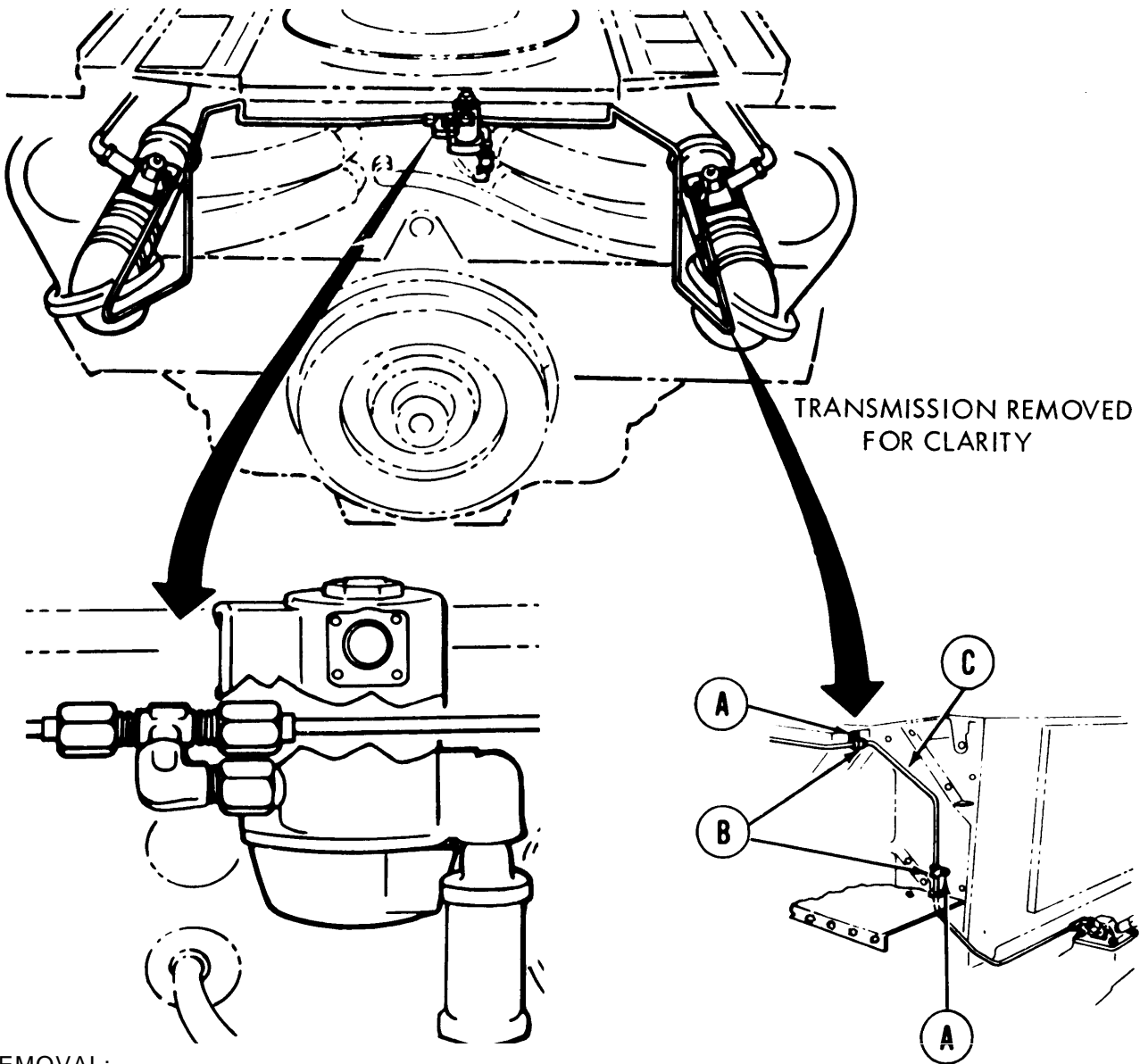
Go on to Sheet 2

TA141561

MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 7)

NOTE

Use suitable container and rags (Item 65, Appendix D) as required to catch or wipe up any fuel that may leak out whenever any part of fuel system is loosened or disconnected.



REMOVAL:

1. Using screwdriver and 1/2 inch wrench, remove two screws and washers (A) from two clamps (B).
2. Using fingers, remove clamps (B) from tube assembly (C).

Go on to Sheet 3

TA141562

MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 7)

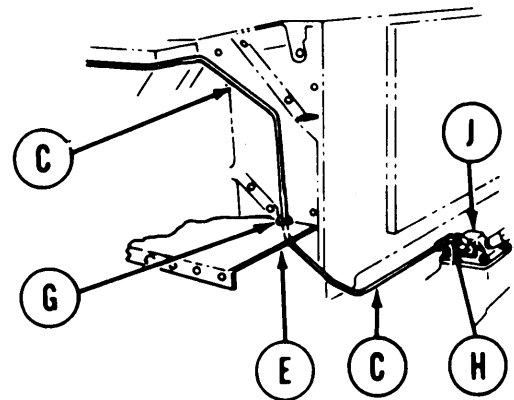
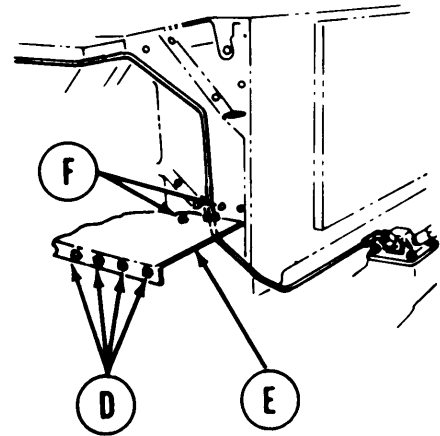
Using socket and 1/2 inch wrench, remove four screws and washers (D) from lower engine cooling fan shroud (E).

4. Using screwdriver, remove two screws and washers (F) from lower engine cooling fan shroud (E). (Left screw is hidden. You will have to feel for it.)

NOTE

Engine cooling fan shroud (E) must be slightly displaced in step 5 to allow clearance for removal of manifold heater return tube (C).

5. Using hammer handle, tap on bottom of engine cooling fan shroud (E). Second person, using screwdriver, pry up on front lip of cooling fan shroud and slightly displace it.
6. Using fingers, remove grommet (G) from tube assembly (C).
7. Using 9/16 inch wrench, remove line nut of tube assembly (C) from elbow (H) on manifold heater (J).

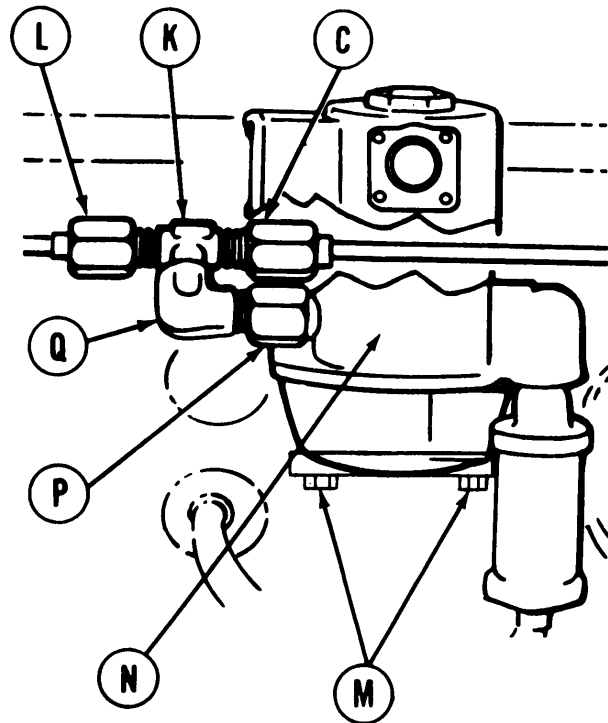


Go on to Sheet 4

TA141563

**MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT
(Sheet 4 of 7)**

8. Using 9/16 inch wrench, remove line nut of tube assembly (C) from tee (K).
9. Using 9/16 inch wrench, remove line nut of tube assembly (L) from tee (K).
10. Using 5/16 inch wrench, remove two screws (M) and pull solenoid valve (N) forward approximately one inch.
11. Using 1/2 inch wrench on coupling (P), remove coupling with elbow and tee attached.
12. Using 9/16 inch wrench on elbow (Q) and adjustable wrench on tee (K), remove tee (K) from elbow (Q).
13. Using 9/16 inch wrench on elbow (Q) and 1/2 inch wrench on coupling (P), remove elbow (Q) from coupling (P).
14. Push engine cooling fan shroud aside to allow clearance for removal of tube assembly (C). Other person, using both hands, carefully remove tube assembly (C) from engine.



CLEANING AND INSPECTION:

1. Using clean rags (Item 65, Appendix D) and dry cleaning solvent (Item 54, Appendix D), clean fittings thoroughly.
2. Inspect fittings for nicks, cracks, thread damage, or wear. Replace if required.
3. Inspect internal threads of manifold heater and solenoid adapter for damage.

Go on to Sheet 5

TA141564

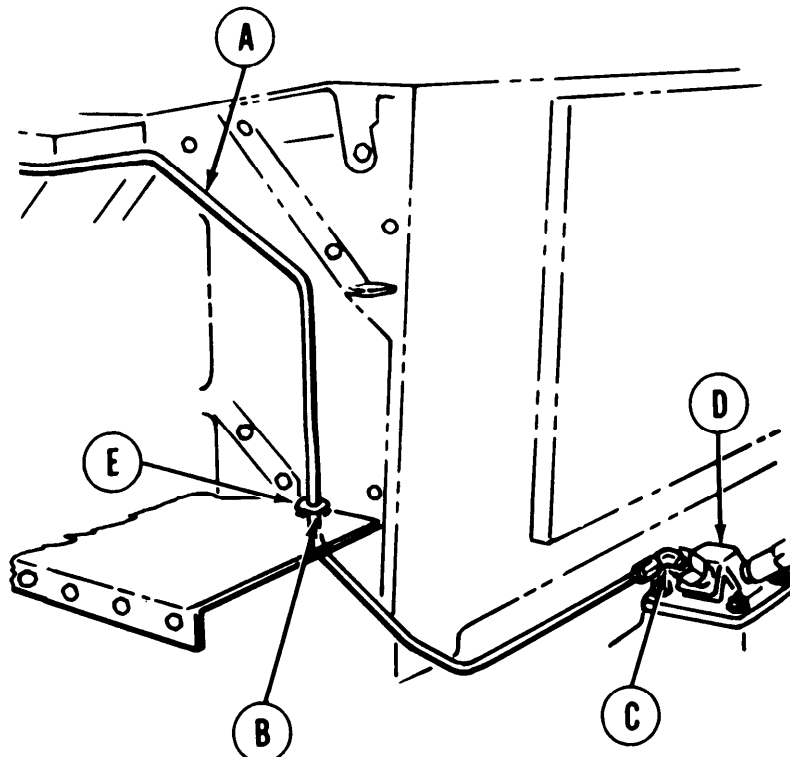
MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 5 of 7)

INSTALLATION:

NOTE

Coat pipe thread fittings with sealing compound (Item 27, Appendix D) before installation.

1. Using both hands, carefully push tube assembly (A) down through lower engine cooling shroud opening (B).
2. Using 9/16 inch wrench, install line nut of tube assembly (A) on elbow (C) at manifold heater (D).
3. Install grommet (E) on tube assembly (A) with flat side of grommet facing toward front of engine.

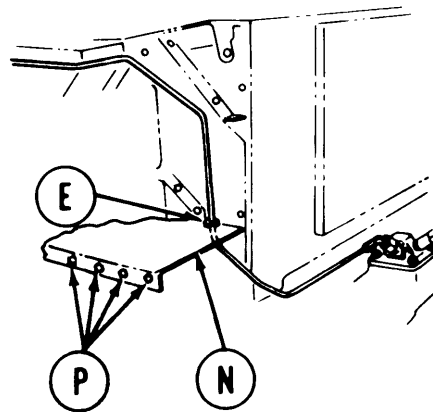
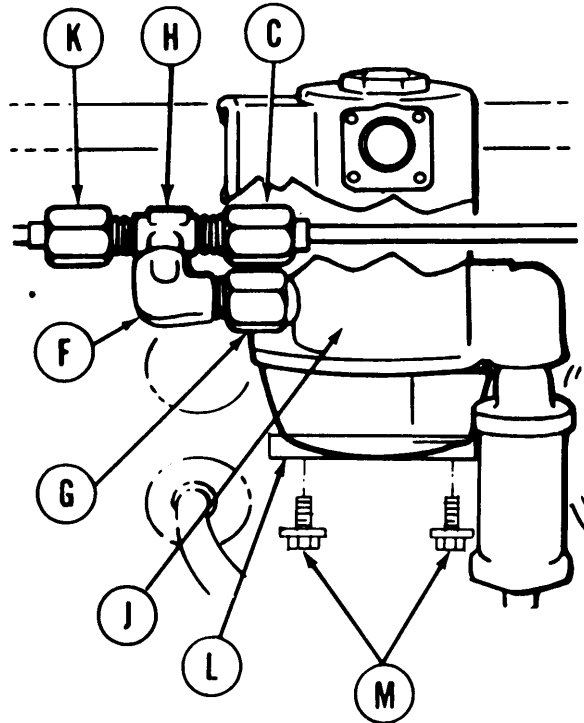


Go on to Sheet 6

TA141565

**MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT
(Sheet 6 of 7)**

4. Using 9/16 inch wrench, install elbow (F) on adapter (G).
5. Using 9/16 inch wrench on elbow (F) and adjustable wrench on tee (H), install elbow (F) on tee (H).
6. Using 1/2 inch wrench, install adapter (G), elbow (F), and tee (H) to solenoid valve (J).
7. Using 9/16 inch wrench, install tube assembly line nut of tube (K) on tee (H).
8. Using 9/16 inch wrench, install line nut of tube assembly (C) on tee (H).
9. Position solenoid valve (J) on bracket (L).
10. Using 5/16 inch wrench, install two screws and washers (M) through bracket (L) and into solenoid valve (J).
11. Using fingers, install grommet (E) in slot of lower engine cooling fan shroud (N).
12. Using both hands, install lower engine cooling fan shroud (N) over mounting holes in engine bulkhead.
13. Using hands, manually install four screws and washers (P) in lower engine cooling fan shroud (N).
14. Using socket and 1/2 inch wrench, tighten four screws and washers (P) in lower engine cooling fan shroud (N).

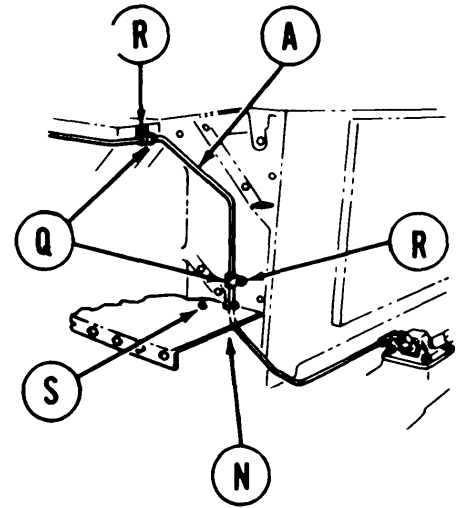


Go on to Sheet 7

TA141566

MANIFOLD HEATER (LEFT AND RIGHT BANK) FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 7 of 7)

15. Using fingers, install clamps (Q) on tube assembly (A).
16. Using screwdriver and 1/2 inch wrench, install two screws and washers (R) through clamps (Q).
17. Using screwdriver, install two screws and washers (S) in lower engine cooling fan shroud (N).
18. Perform operational test of manifold heaters (page 7-363).
19. Install engine shroud (page 9-3).
20. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA141567

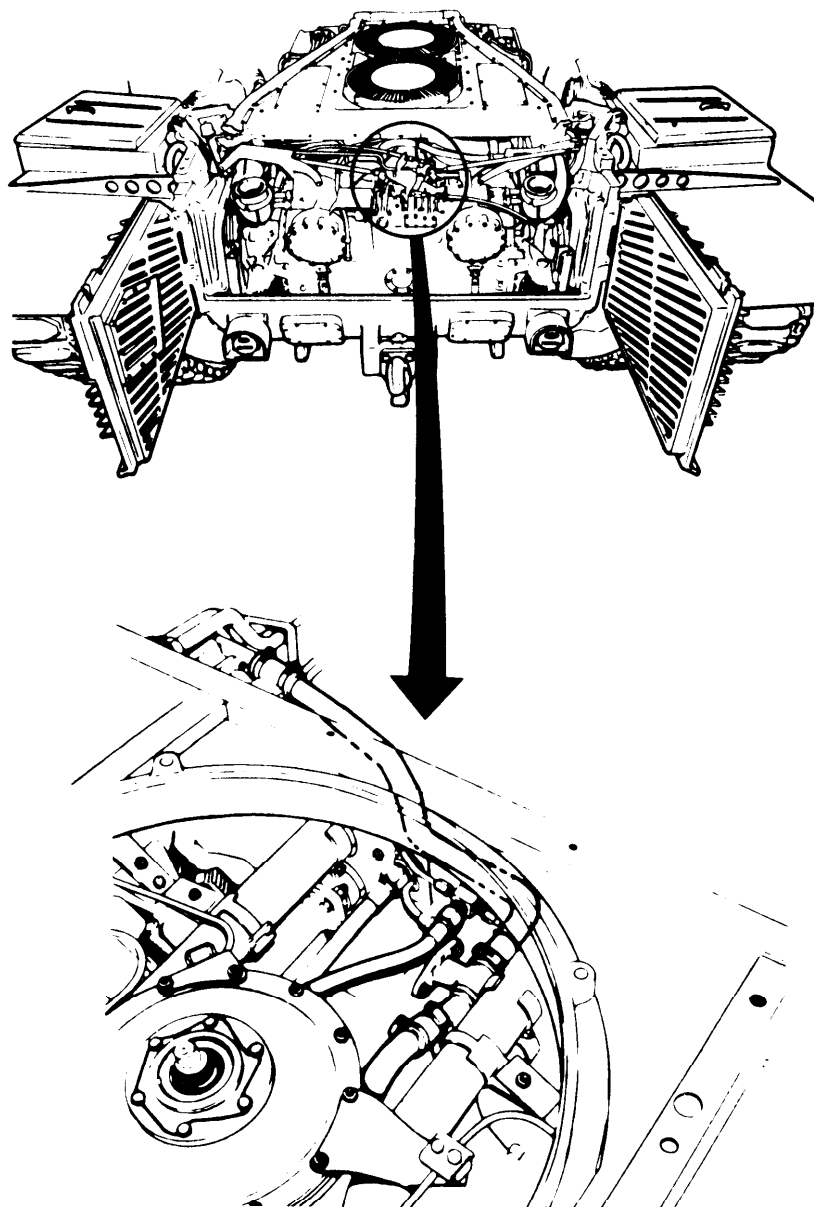
MANIFOLD HEATER FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 3)

TOOLS: 9/16 in. combination box and open end wrench

SUPPLIES: Grommet (MS35489-105)
Rags (Item 65, Appendix D)
Container to catch fuel

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove rear cooling fan (page 9-48)



Go on to Sheet 2.

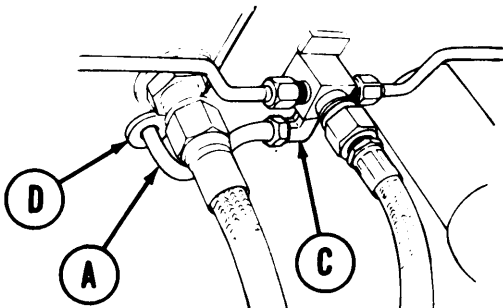
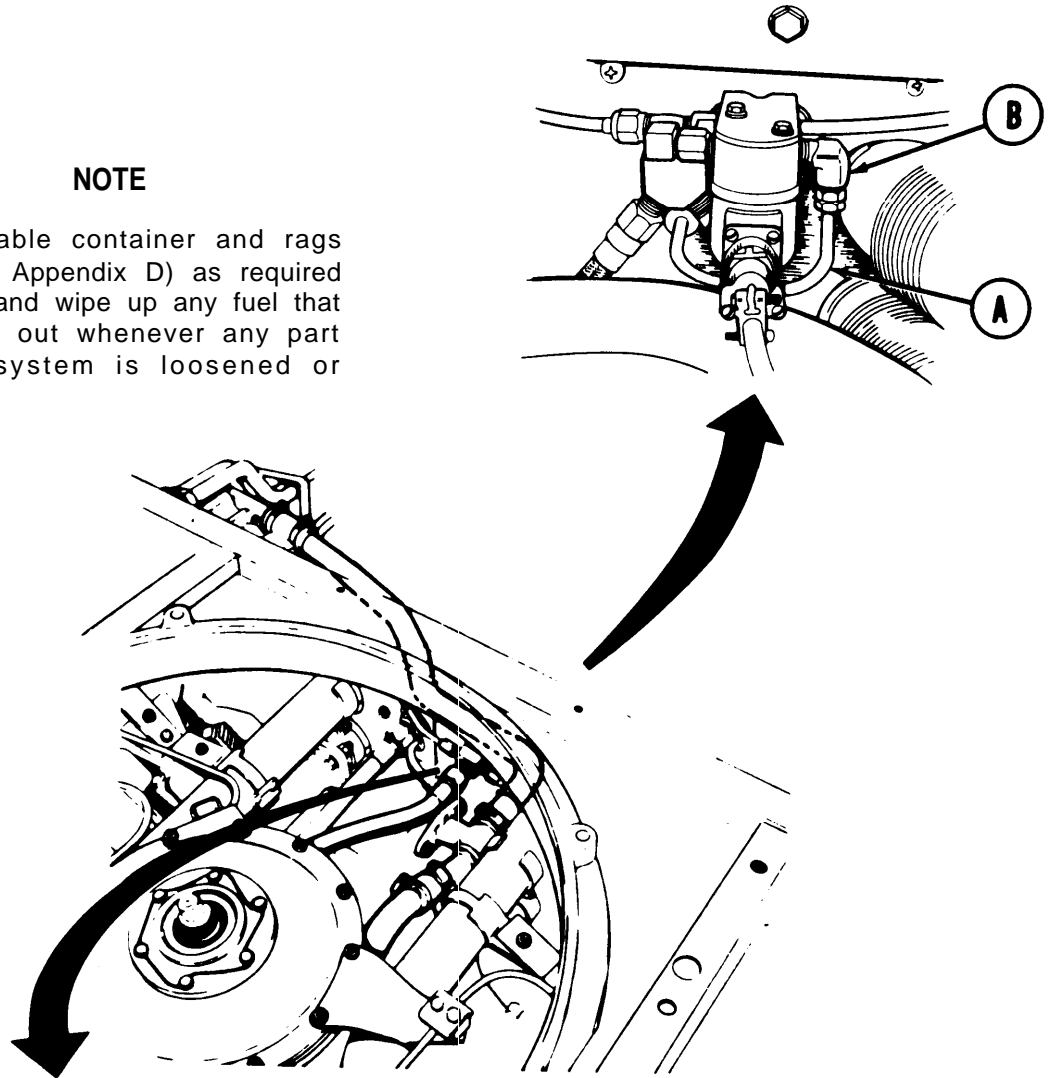
TA148936

MANIFOLD HEATER FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 3)

REMOVAL:

NOTE

Use suitable container and rags (Item 65, Appendix D) as required to catch and wipe up any fuel that may leak out whenever any part of fuel system is loosened or disconnected.



1. Using wrench, disconnect tube assembly (A) from elbow (B).
2. Using wrench, disconnect tube assembly (A) from elbow (C).
3. Remove grommet (D) from tube assembly and shroud. Throw grommet away.
4. Remove tube assembly (A).

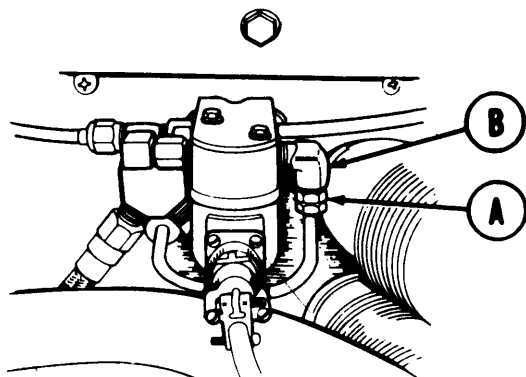
Go on to Sheet 3

TA148987

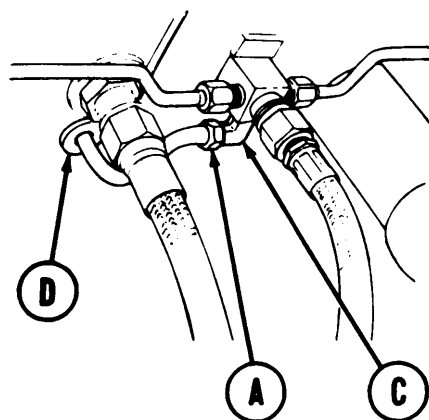
MANIFOLD HEATER FUEL RETURN TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. Install tube assembly (A) through opening in shroud.



2. Connect tube assembly (A) to elbow (B).



3. Connect tube assembly (A) to elbow (C).
4. Position new 'grommet (D) onto tube assembly (A) and to shroud.
5. Using wrench, tighten tube assembly (A) coupling nuts at elbows (B) and (C).
6. Operate primer pump (TM 9-2350-222-10). Check for leaks. Make necessary repairs.
7. Install rear cooling fan (page 9-49).

End of Task

TA148938

MANIFOLD HEATER IGNITION COIL AND CABLE REPLACEMENT (2D ENGINE) (Sheet 1 of 3)

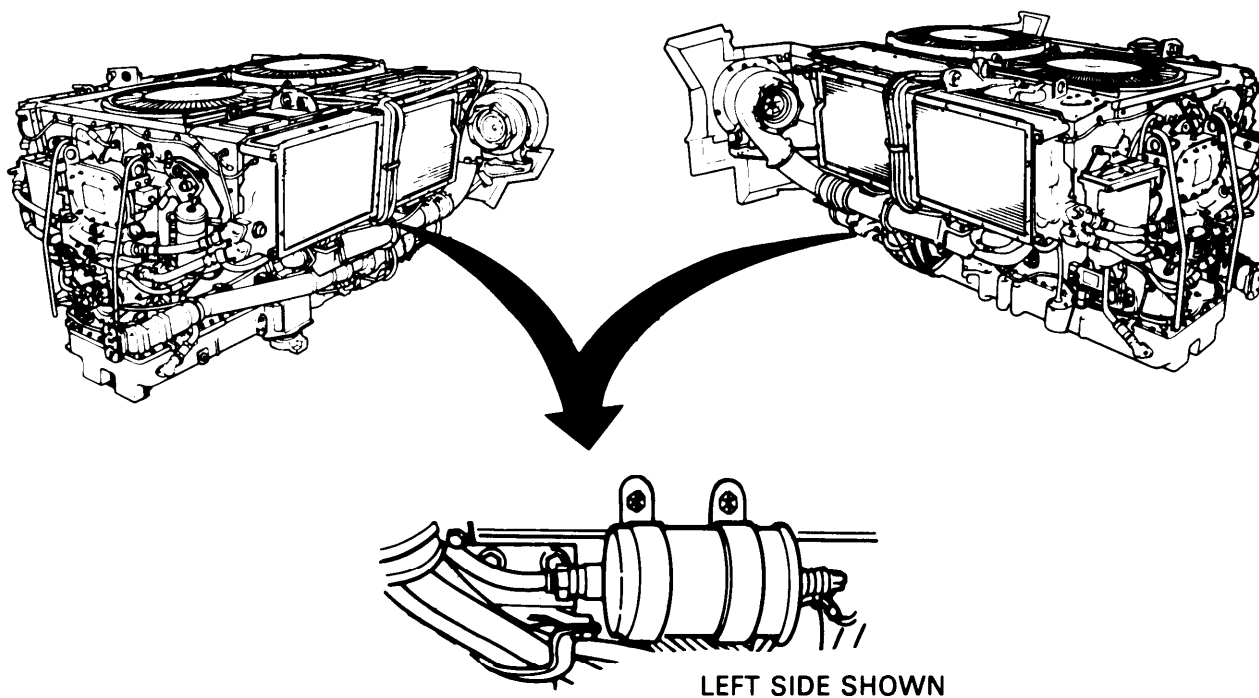
TOOLS: 7/8 in. combination box and open end wrench
3/4 in. combination box and open end wrench
1/2 in. combination box and open end wrench
1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
5 in. extension with 1/2 in. drive
Spanner wrench
7/16 in. socket with 1/2 in. drive

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove powerplant (page 5-26)

WARNING

Remove rings, bracelets, wristwatches, and neck chains before working around the tank or other vehicles. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.



NOTE

Replacement instructions are the same for both sides. Therefore, only the left side is shown.

Go on to Sheet 2

All data on pages 7-391 thru 7-393 deleted.

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Change 4

MANIFOLD HEATER IGNITION COIL AND CABLE REPLACEMENT (2D ENGINE)

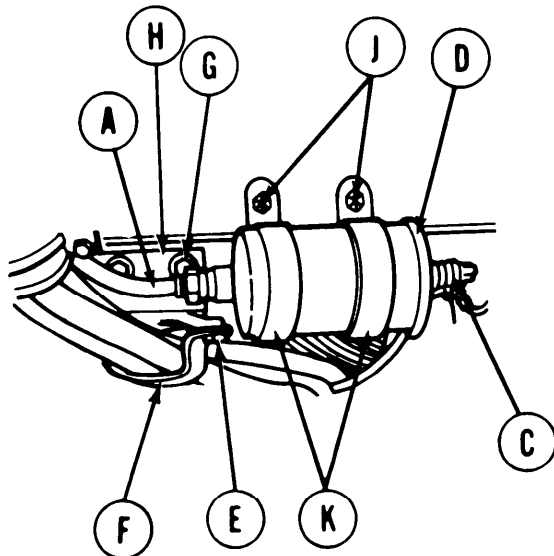
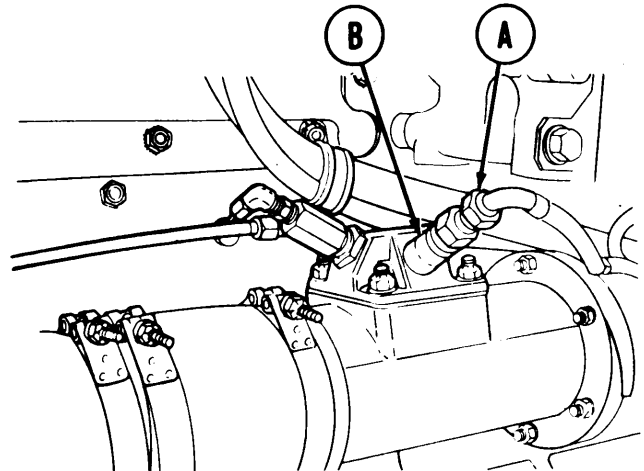
Sheet 2 of 3)

REMOVAL:

WARNING

Ignition coils on engine are capable of producing extremely high voltage. Output of this ignition system is sufficient to cause a dangerous electrical shock. Never touch any uncovered or live connections.

1. Using 3/4 inch wrench, disconnect cable (A) from spark plug (B).



2. Using spanner wrench, disconnect electrical connector (C) from coil (D).
3. Using 7/16 inch socket, remove two screws (E) and cable clamp (F).
4. Using 1/2 inch socket, extension, and 1/2 inch wrench, remove two screws (G) and cable bracket (H).
5. Using hands, put down pressure on coil (D) to give access to screws (J).
6. Using 1/2 inch socket and extension, remove two screws (I).

Remove coil (D), lead (A), and clamps (K) as a unit.

8. Remove clamps (K) from coil (D),
9. Using 7/8 inch wrench, disconnect cable (A) from coil (D).

INSPECTION:

1. Inspect clamps and coil for cracks or other damage.
2. Check continuity and insulation resistance of cable.
3. Replace faulty parts as required.

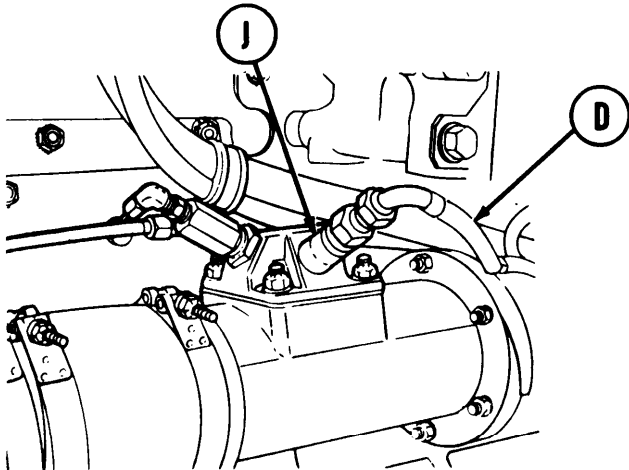
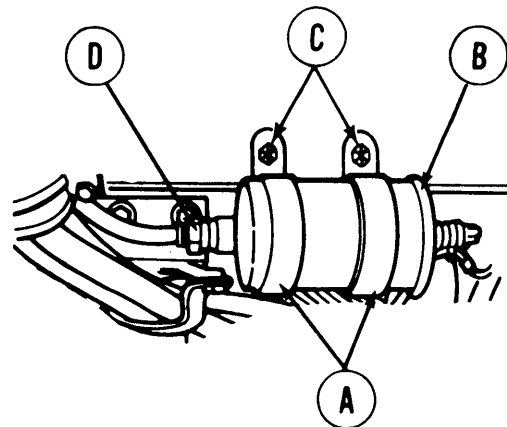
Go on to Sheet 3

TA148943

MANIFOLD HEATER IGNITION COIL AND CABLE REPLACEMENT (2D ENGINE)
(Sheet 3 of 3)

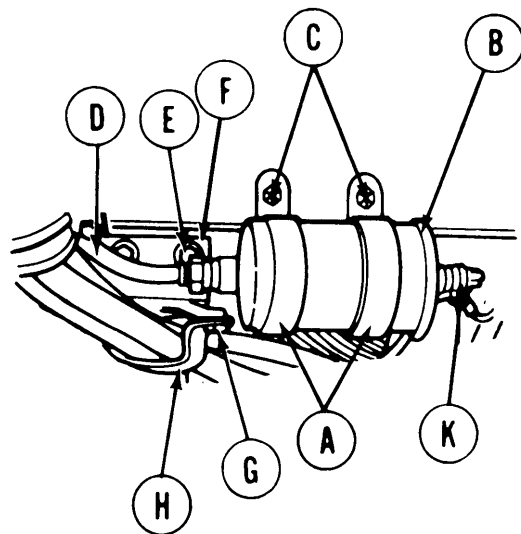
INSTALLATION:

1. Position two clamps (A) onto coil (B).
2. Position coil (B) and clamps (A) on frame.



3. Install two screws (C) to secure clamps (A) to frame. Do not tighten.
4. Connect cable (D) to coil (B).
5. Using 7/8 inch wrench, tighten lead.
6. Using 1/2 inch socket and 1/2 inch wrench, install two screws (E) to hold bracket (F) to frame.
7. Using 7/16 inch socket, install two screws (G) and clamp (H) to bracket (F).

8. Route cable (D) over bracket and connect to spark plug (J).
9. Using 3/4 inch wrench, tighten cable (D).
10. Using 1/2 inch socket, tighten screws (C).
11. Alining keyway, connect electrical connector (K) to coil (B).
12. Using spanner wrench, tighten electrical connector (K).
13. Perform manifold heater operational check (page 7-363).
14. Install powerplant (page 5-37).



End of Task

TA148944

**MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT
(Sheet 1 of 10)**

PROCEDURE INDEX

PROCEDURE	PAGE
Input Fuel Line Replacement	7-397
Input Solenoid Valve Replacement	7-402

INPUT FUEL LINE REPLACEMENT (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-397
Installation	7-400

TOOLS: Ratchet with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 7/16 in. combination box and open end wrench
 3/8 in. combination box and open end wrench
 Flat-tip screwdriver

SUPPLIES: Container to catch fuel leakage
 Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:

NOTE

Replacement instructions for left or right side manifold heater input line are same except as noted.

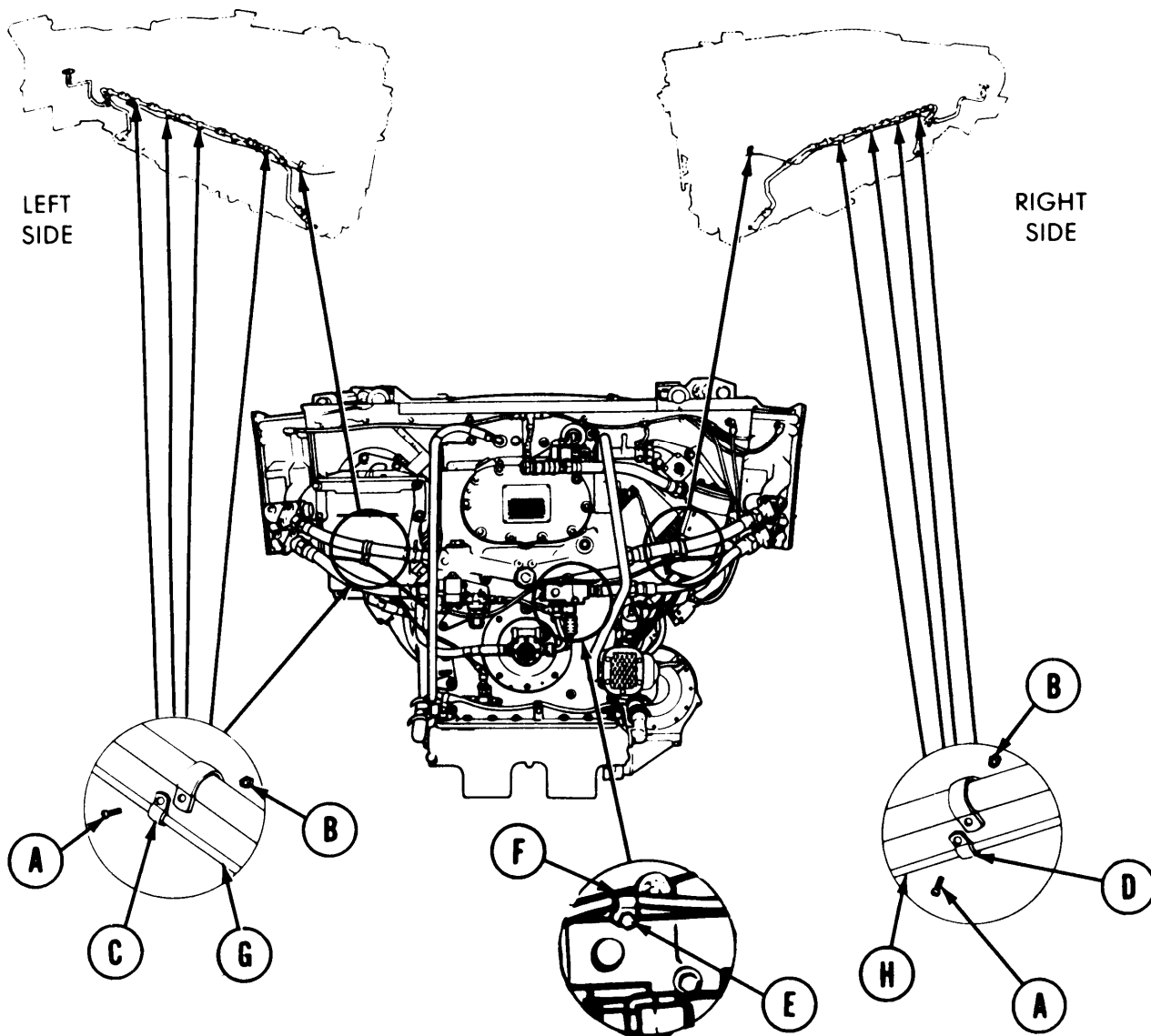
Go on to Sheet 2

TA141568

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT (Sheet 2 of 10)

Input Fuel Line Replacement (Sheet 2 of 5)

1. Using 3/8 inch wrench and screwdriver, remove screws (A) and nuts (B) that secure five clamps (C) on engine left side, or five clamps (D) on engine right side.
2. Using socket, remove bolt (E) that secures clamp (F) (right side only).
3. Remove clamps (C), (D), and (F) from tube assembly (G) or (H).



Go on to Sheet 3

TA141569

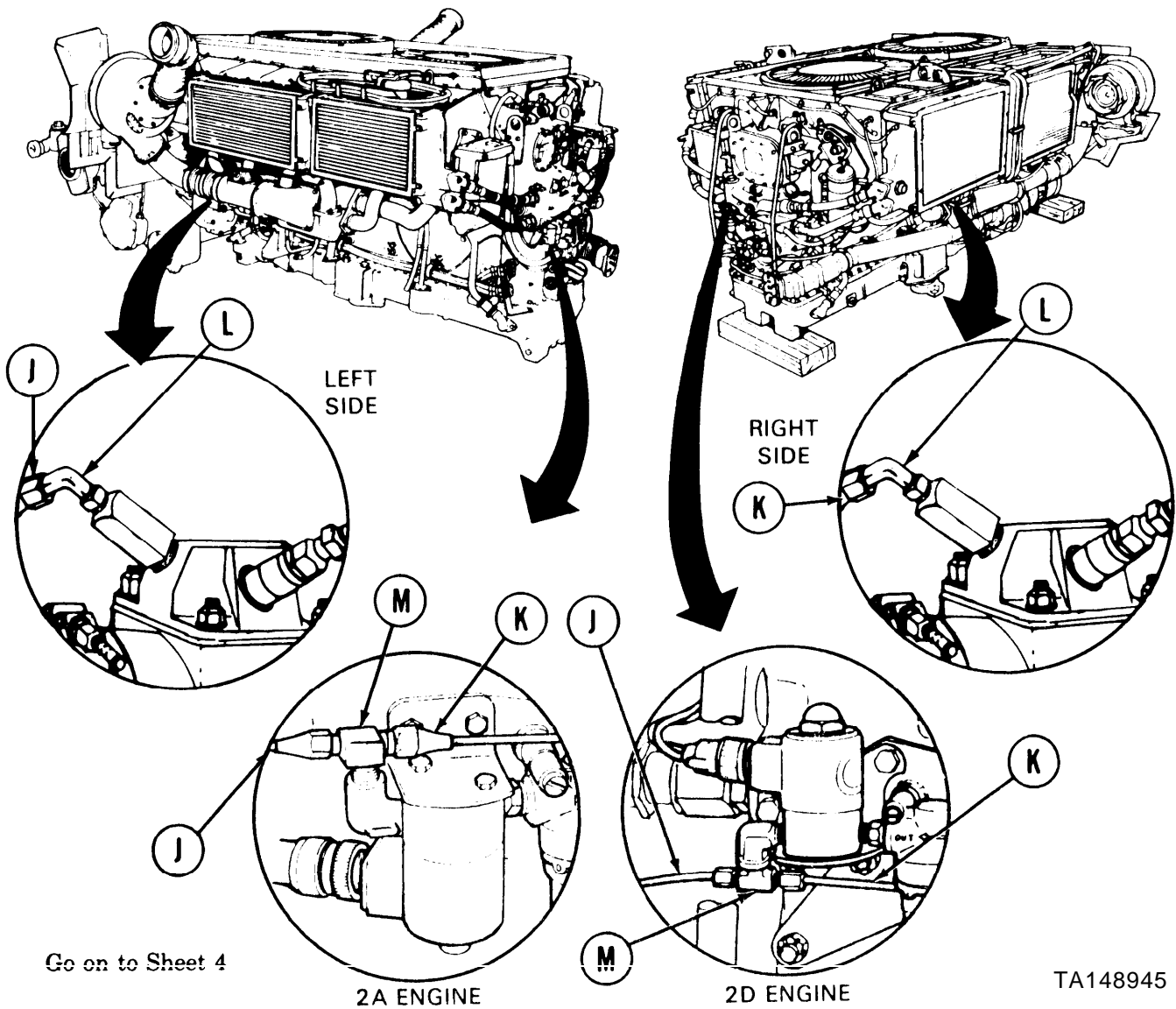
**MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT
(Sheet 3 of 10)**

Input Fuel Line Replacement (Sheet 3 of 5)

NOTE

Use suitable container to catch fuel whenever any fuel line or connection is loosened or disconnected. Use rags (Item 65, Appendix D) to wipe any spillage.

4. Using 7/16 inch wrench, disconnect input fuel line (J) or (K) from elbow (L) and tee (M).
5. Remove fuel input line (J) or (K).
6. Inspect elbows and tee for damage. Replace as necessary.



Go on to Sheet 4

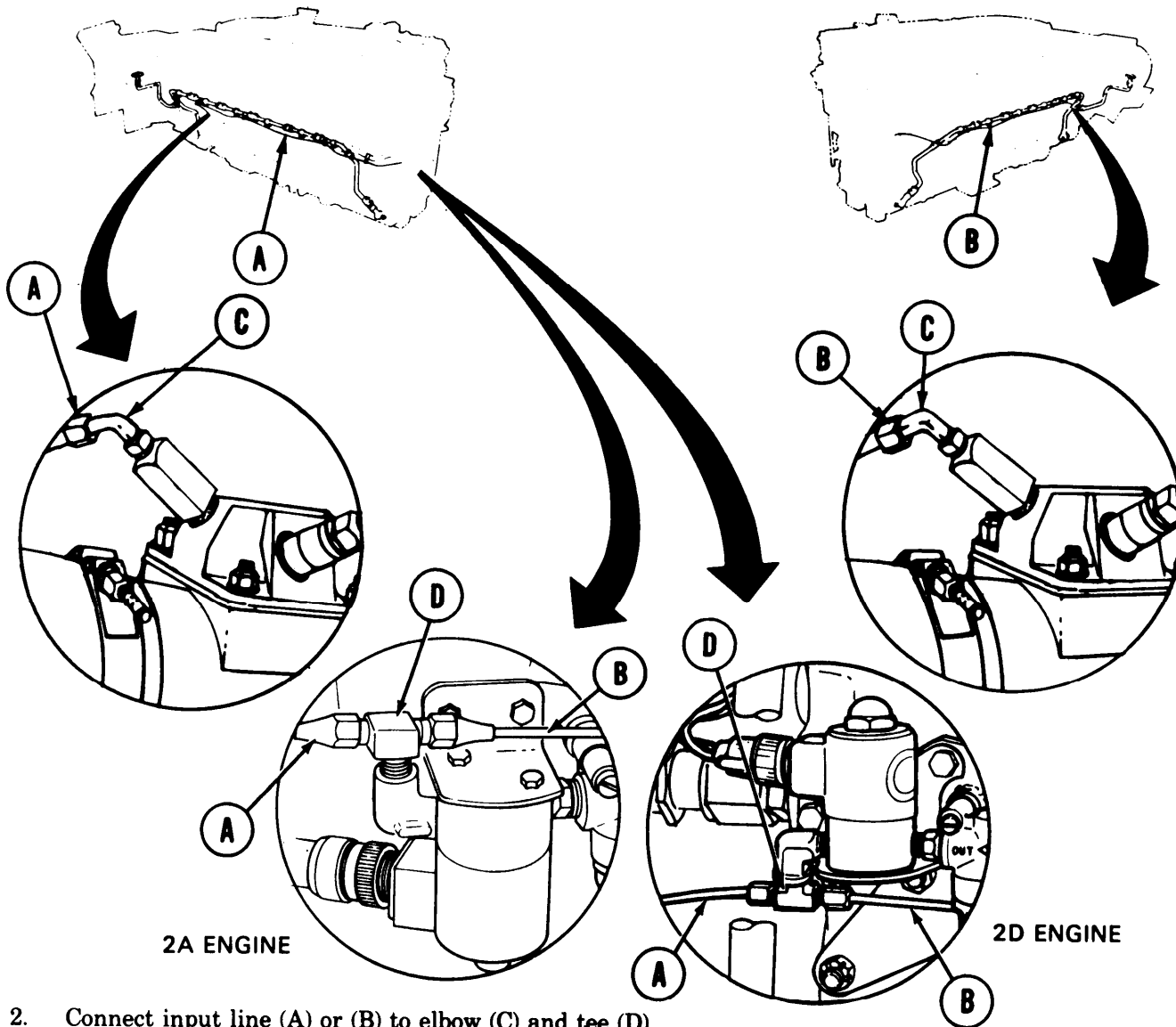
TA148945

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT (Sheet 4 of 10)

Input Fuel Line Replacement (Sheet 4 of 5)

INSTALLATION:

1. Position input fuel lines (A) or (B) in place on engine.



2. Connect input line (A) or (B) to elbow (C) and tee (D).
3. Using 7/16 inch wrench, tighten input line (A) or (B) to elbow (C) and tee (D).

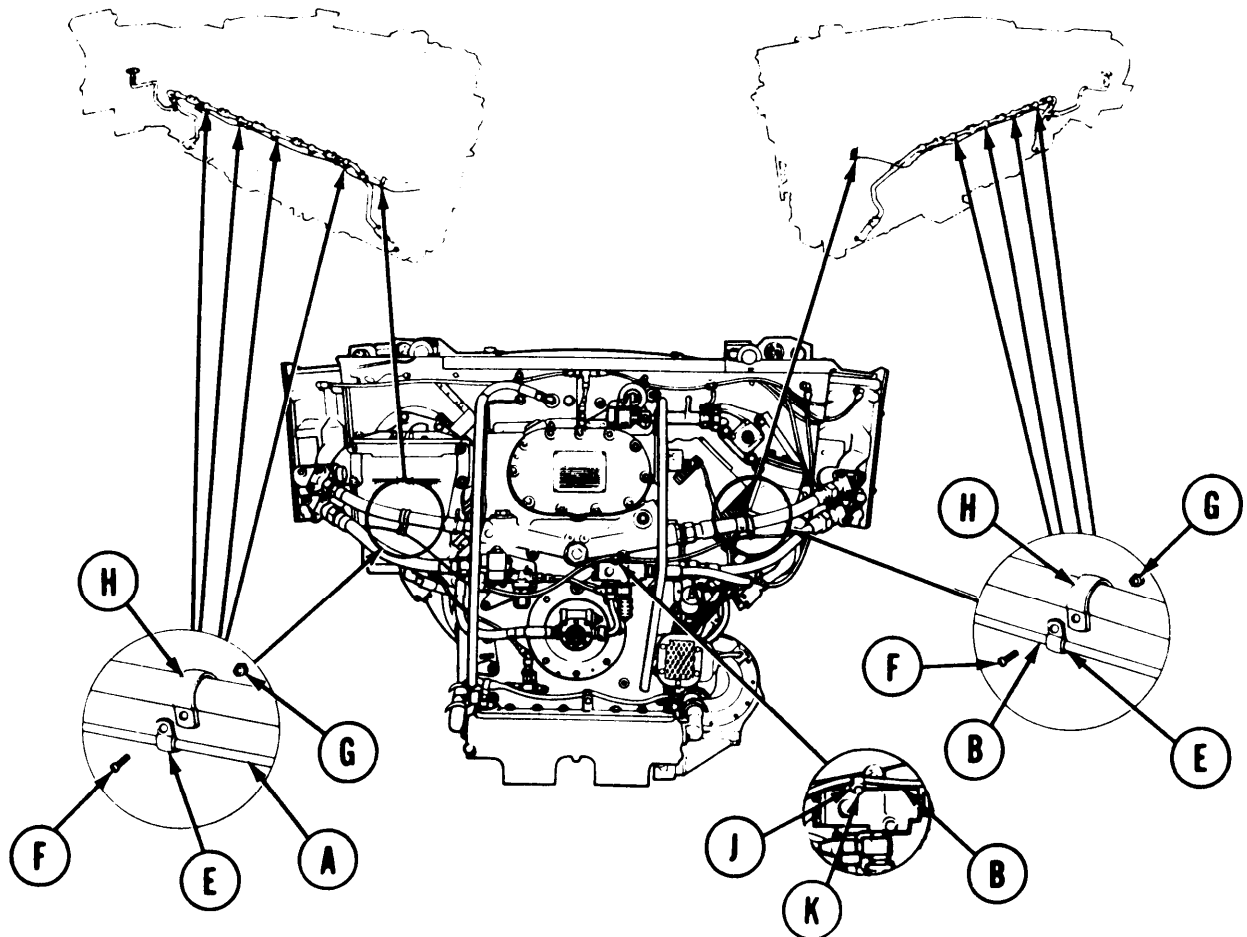
Go on to Sheet 5

TA130375

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT (Sheet 5 of 10)

Input Fuel Line Replacement (Sheet 5 of 5)

4. Install clamps (E) onto input fuel line (A) or (B).
5. Install screws (F) and nuts (G) to secure clamps (E) to clamps (H), Using 3/8 inch wrench and screwdriver, tighten screws (F) and nuts (G).
6. Install clamp (J) onto input line (B).
7. Install screw (K) to secure clamp (J). Using socket, tighten screw (K) (right side only).
8. Perform manifold heater operational check (page 7-363).
9. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA141442

**MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT
(Sheet 6 of 10)**

Input Solenoid Valve Replacement (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-403
Installation	7-405

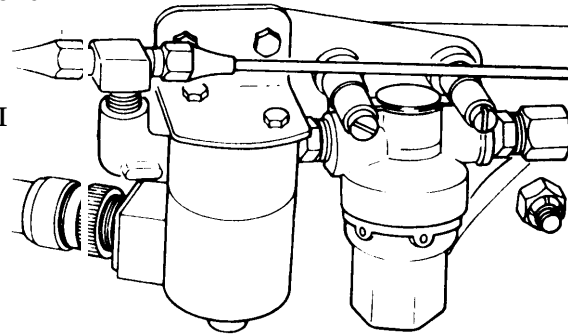
TOOLS: 7/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 5/8 in. combination box and open end wrench
 5/16 in. combination box and open end wrench
 9/16 in. combination box and open end wrench
 3/8 in. combination box and open end wrench
 Flat-tip screwdriver

SPECIAL TOOLS: Ground hop kit (Item 30, Chapter 3, Section I)

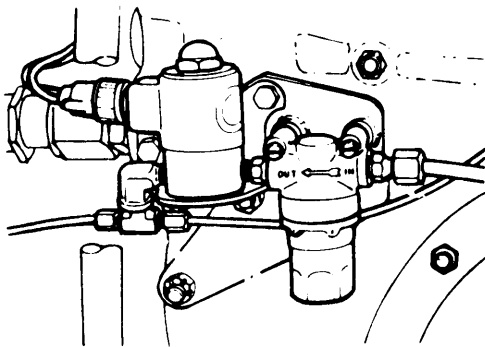
SUPPLIES: Container to catch fuel leakage
 Rags (Item 65, Appendix D)
 Sealing compound (Item 28, Appendix D)
 Lockwasher (MS35338-43) (2 required)

REFERENCE: TM 9-2350-222-10

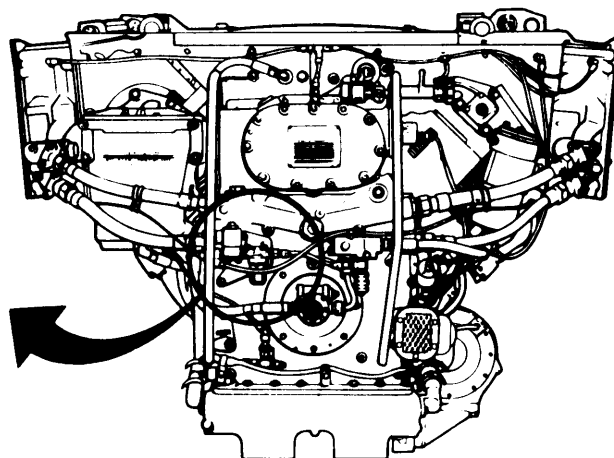
PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)



2A ENGINE



2D ENGINE



Go on to Sheet 2

TA149102

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT Sheet 7 of 10)

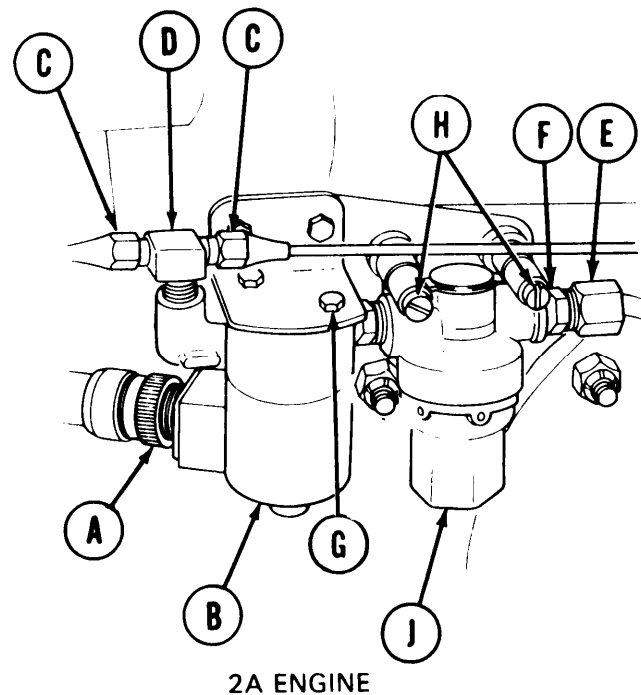
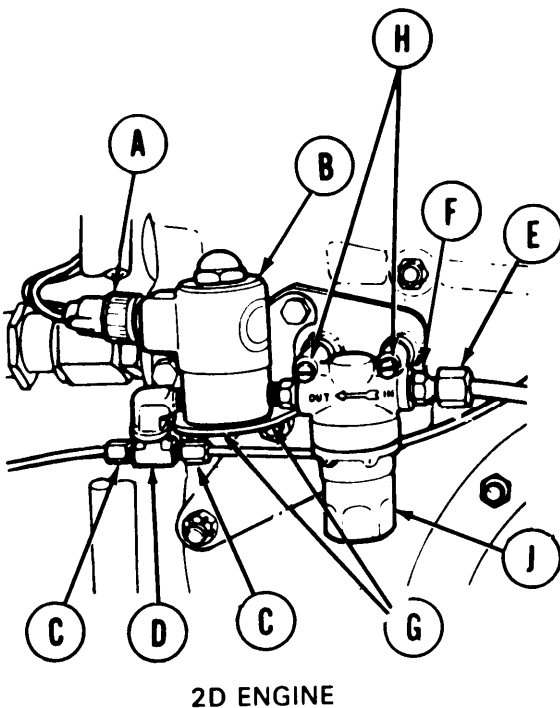
Input Solenoid Valve Replacement (Sheet 2 of 5)

NOTE

Use suitable container to catch fuel that may leak whenever any part of fuel system is loosened or disconnected. Use rags (Item 65, Appendix D) to wipe any spillage.

REMOVAL:

1. Disconnect electrical lead (A) from solenoid valve (B).
2. Using 7/16 inch and 1/2 inch wrenches, disconnect two fuel lines (C) from tee (D).
3. Using 1/2 inch and 5/8 inch wrenches, remove fuel line (E) from adapter (F).
4. Using 5/16 inch wrench, remove two screws and washers (G).
5. Using screwdriver, remove two screws (H) with lockwashers and flat washers. Throw lockwashers away.
6. Remove solenoid valve (B), fuel filter (J), and attached fittings as a unit.



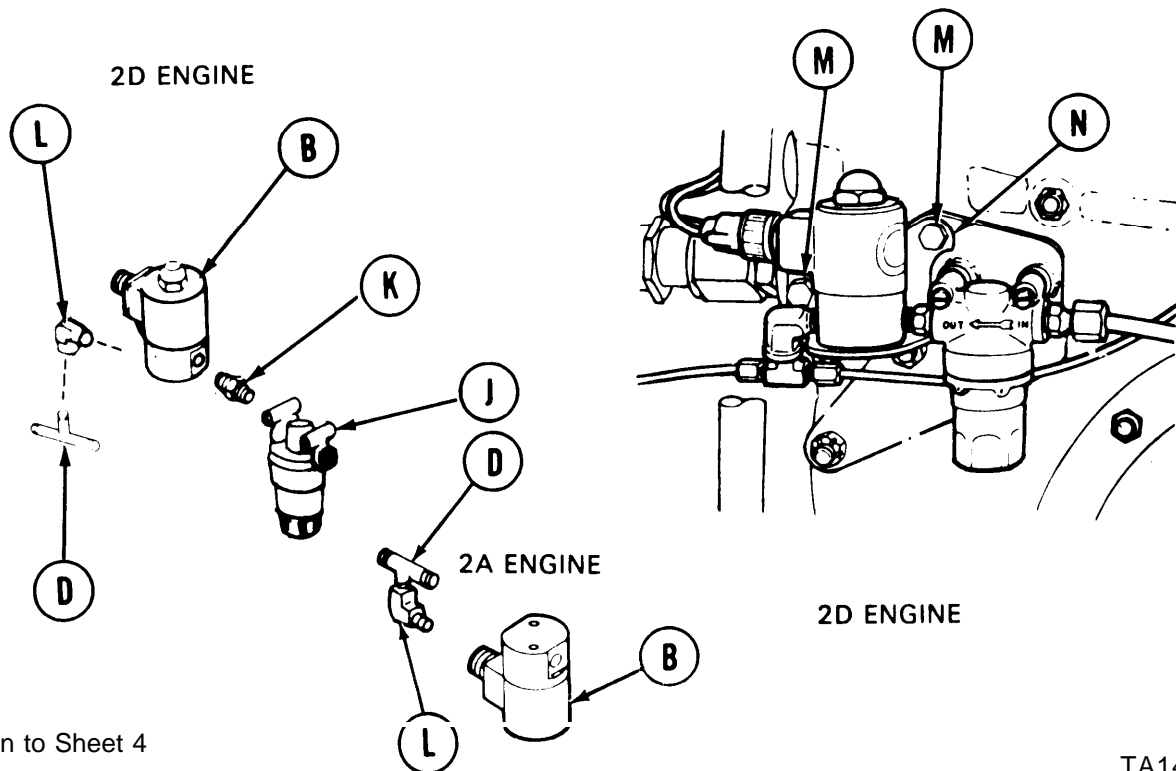
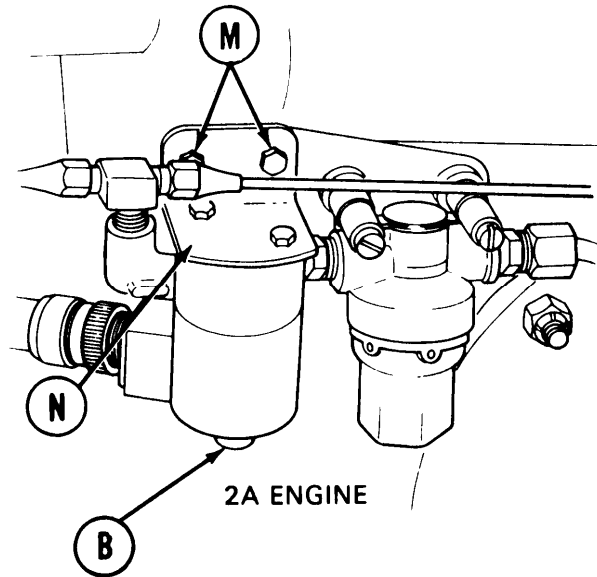
Go on to Sheet 3

TA149109

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT
 (Sheet 8 of 10)

Input Solenoid Valve Replacement (Sheet 3 of 5)

7. Using 7/16 inch wrench, hold nipple (K) and remove filter (J) from nipple (K).
8. Using 7/16 inch wrench, remove nipple (K) from solenoid valve (B).
9. Using 7/16 inch wrench, remove tee (D) from elbow (L).
10. Using 9/16 inch wrench, remove elbow (L) from solenoid valve (B).
11. Using 7/16 inch wrench, remove two screws (M) that secure bracket (N).
12. Remove bracket (N).
13. Inspect all removed parts for nicks, burrs, and cracks. Replace parts as necessary.



Go on to Sheet 4

TA149103

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT

(Sheet 9 of 10)

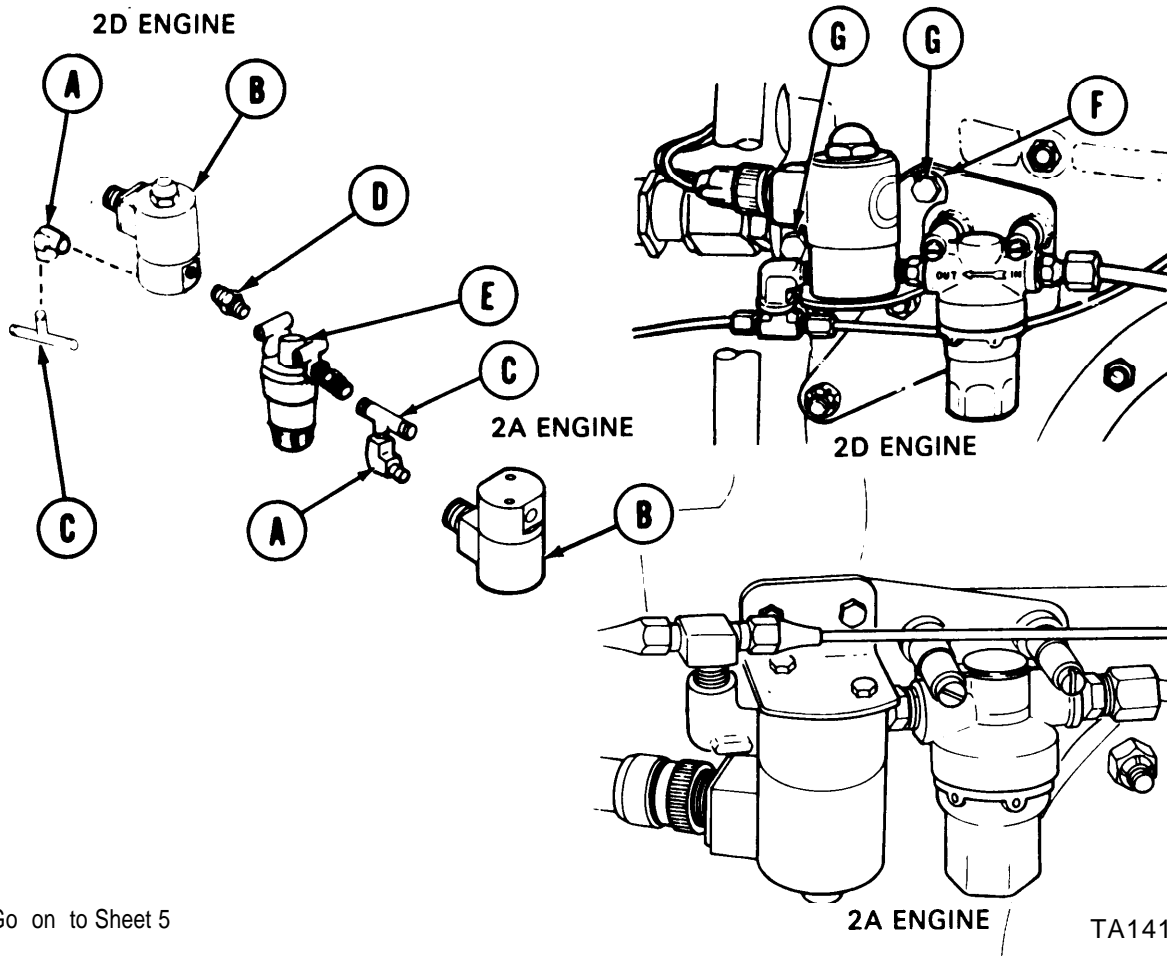
Input Solenoid Valve Replacement (Sheet 4 of 5)

INSTALLATION:

NOTE

Coat male threads of elbow, tee, and adapter with sealing compound (Item 28, Appendix D) before installation.

1. Install and align elbow (A) as shown to solenoid valve (B). Using 9/16 inch wrench, tighten elbow.
2. Install and align tee (C) as, shown to elbow (A). Using 7/16 inch wrench, tighten tee.
3. Install nipple (D) to solenoid valve (B). Using 7/16 inch wrench, tighten nipple.
4. Use 7/16 inch wrench, hold nipple (D) and install fuel filter (E) on nipple. Align filter as shown.
5. Position bracket (F) in place on engine.
6. Install two screws (G) to secure bracket. Using 7/16 inch wrench, tighten screws.



Go on to Sheet 5

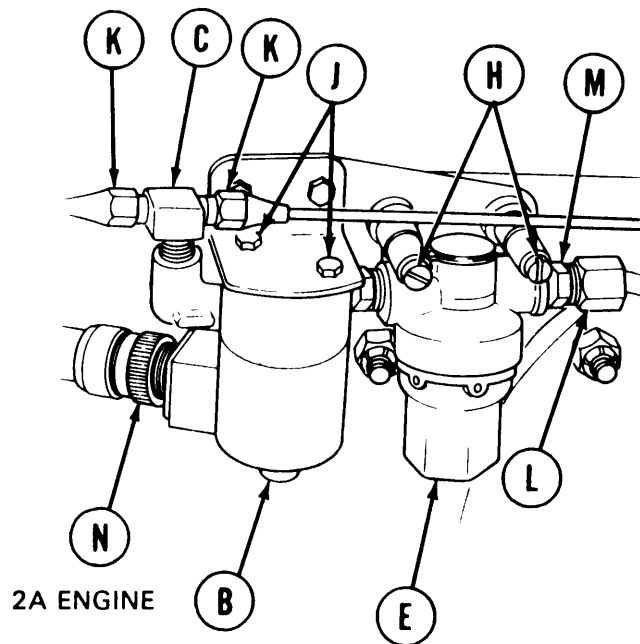
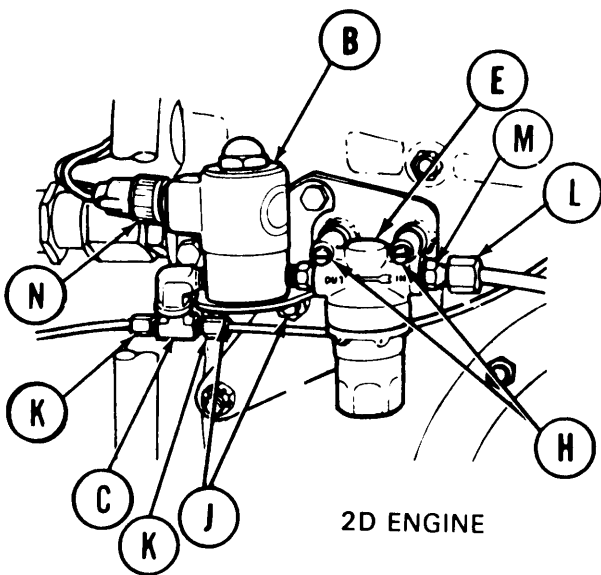
TA1414 43

MANIFOLD HEATER INPUT SOLENOID VALVE AND FUEL LINE REPLACEMENT

(Sheet 10 of 10)

Input Solenoid Valve Replacement (Sheet 5 of 5)

7. Position solenoid valve (B) and fuel filter (E) with attached fittings to brackets on engine.
8. Install two screws (H) with new lockwashers and flat washers to secure fuel filter (E) to engine bracket. Using screwdriver, tighten screws.
9. Install two screws and washers (J) to secure solenoid valve (B) to bracket. Using 5/16 inch wrench, tighten screws.
10. Connect two fuel lines (K) to tee (C), Using 7/16 inch wrench, tighten fuel line nuts.
11. Connect hose assembly (L) to adapter (M). Using 1/2 inch and 5/8 inch wrenches, tighten hose nut to adapter.
12. Connect electrical lead (N) to solenoid valve (B).
13. Operate primer pump (TM 9-2350-222-10). Check for leaks. If leaks are found, tighten connections as required.
14. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA14910

MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT (Sheet 1 of 8)

PROCEDURE INDEX

PROCEDURE	PAGE
Fuel Filter Replacement	7-407
Fuel Filter Element Replacement	7-412
Fuel Filter Input Fuel Line Replacement	7-414

FUEL FILTER REPLACEMENT (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-408
Installation	7-410

TOOLS: 5/16 in. thru 1 in. combination box and open end wrench set
Flat-tip screwdriver

SUPPLIES: Sealing compound (Item 27, Appendix D)
Drain pan
Rags (Item 65, Appendix D)
Lockwasher (MS35338-43) (2 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove lower engine access cover (page 16-41)

CAUTION

When removing or installing fuel lines, care must be taken not to damage fittings and threads or twist or distort fuel lines or hoses.

Go on to Sheet 2

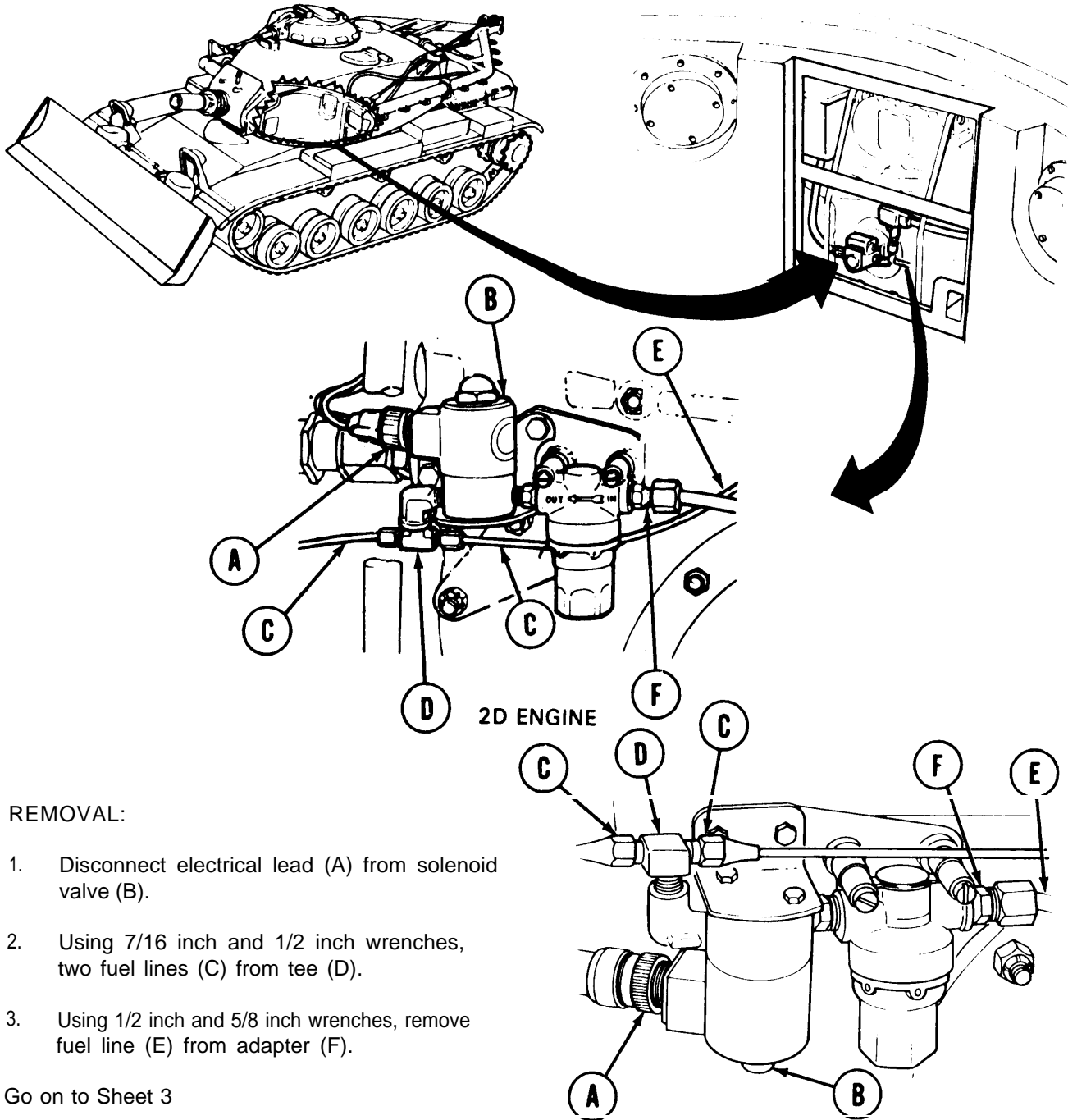
MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT

(Sheet 2 of 8)

Fuel Filter Replacement (Sheet 2 of 5)

NOTE

Use suitable container to catch any fuel that may leak out whenever any part of fuel system is loosened or disconnected. Use rags (Item 65, Appendix D) to wipe any spillage.



REMOVAL:

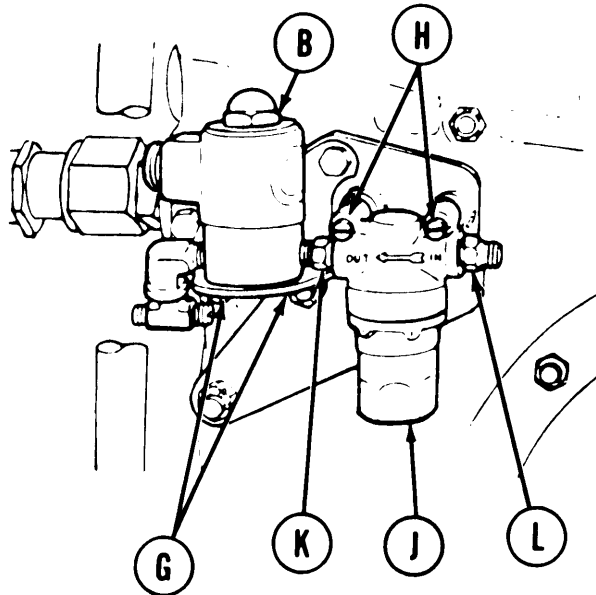
1. Disconnect electrical lead (A) from solenoid valve (B).
2. Using 7/16 inch and 1/2 inch wrenches, two fuel lines (C) from tee (D).
3. Using 1/2 inch and 5/8 inch wrenches, remove fuel line (E) from adapter (F).

Go on to Sheet 3

TA149110

MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT
 (Sheet 3 of 8)

Fuel Filter Replacement (Sheet 3 of 5)



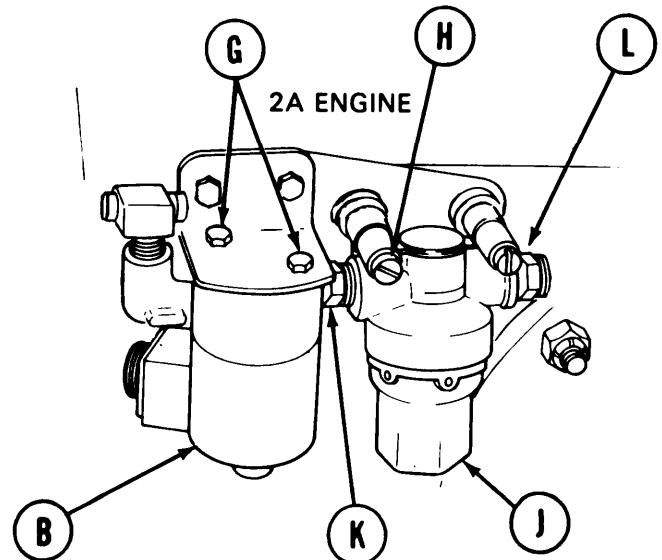
2D ENGINE

4. Using 5/16 inch wrench, remove two bolts and washers (G) securing solenoid valve (B) to bracket.
5. Using screwdriver, remove two screws, lockwashers, and flat washers (H) securing fuel filter (J) to bracket. Throw lockwashers away.
6. Remove solenoid valve (B), fuel filter (J), and attached fittings as a unit.

NOTE

It will be necessary to place solenoid valve in a vise.

7. Using 7/16 inch wrench, hold nipple (K) and remove fuel filter (J) from nipple,
8. Using 1/2 inch wrench, remove adapter (L) from fuel filter (J).
9. Inspect hoses, tube assemblies, and fittings for cracks and other damage.



2A ENGINE

TA149105

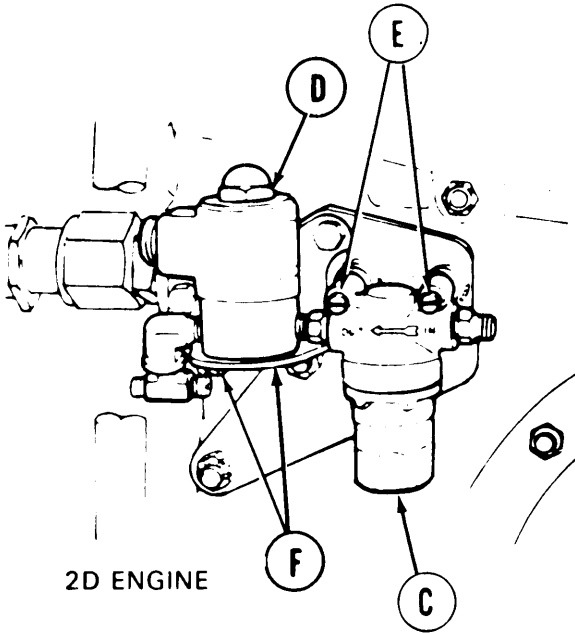
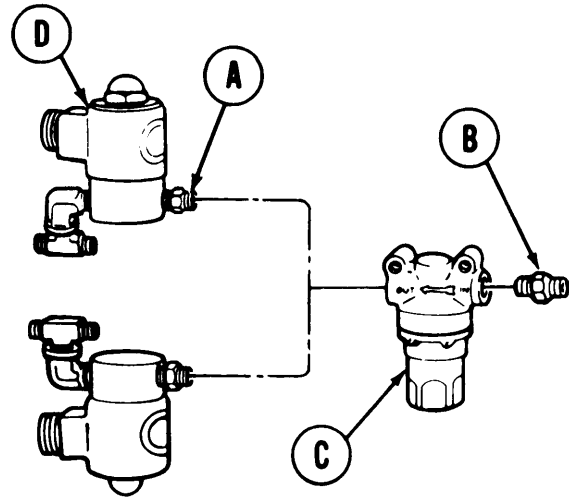
Go on to Sheet 4

MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT
(Sheet 4 of 8)

Fuel Filter Replacement (Sheet 4 of 5)

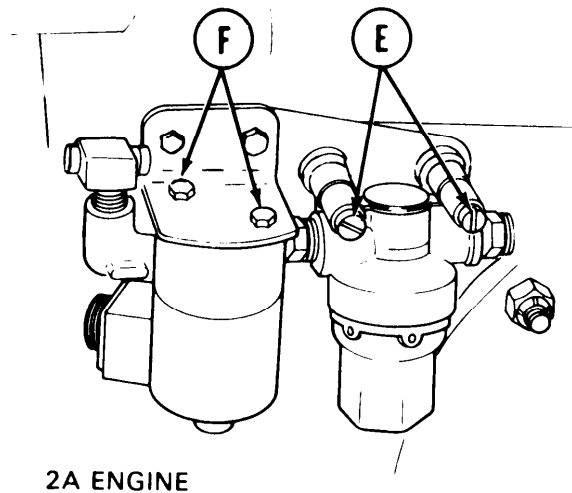
INSTALLATION:

1. Coat threads of nipple (A) and adapter (B) with sealing compound (Item 27, Appendix D).
2. Using 1/2 inch wrench, install and secure adapter (B) to input port of fuel filter (C).
3. Using 7/16 inch wrench, hold nipple (A) and install fuel filter (C) securely onto nipple (A).
4. Aline fuel filter (C) and solenoid valve (D) as shown on illustration.



5. Position solenoid valve (D) and fuel filter (C) with attached fittings to brackets on engine.
6. Using screwdriver, secure fuel filter (C) to bracket with two screws, new lockwashers, and flat washers (E).

7. Using 5/16 inch wrench, secure solenoid valve (D) to bracket with two bolts and washers (F).



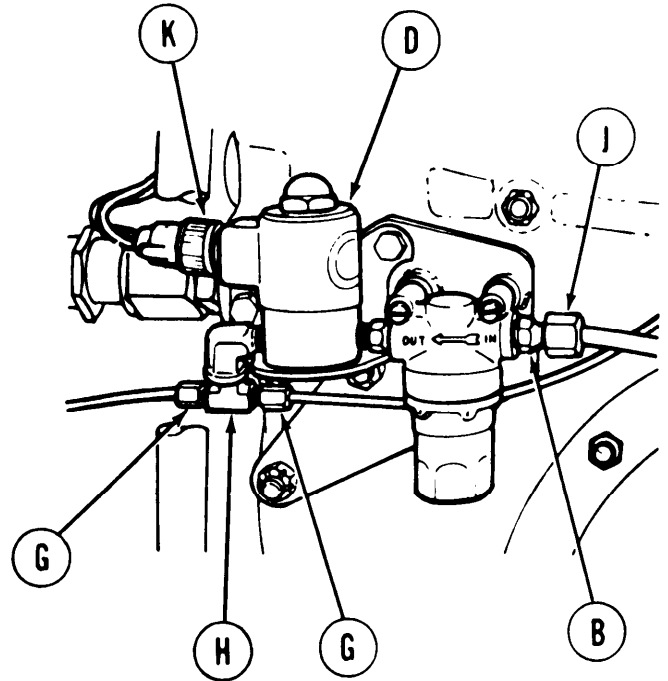
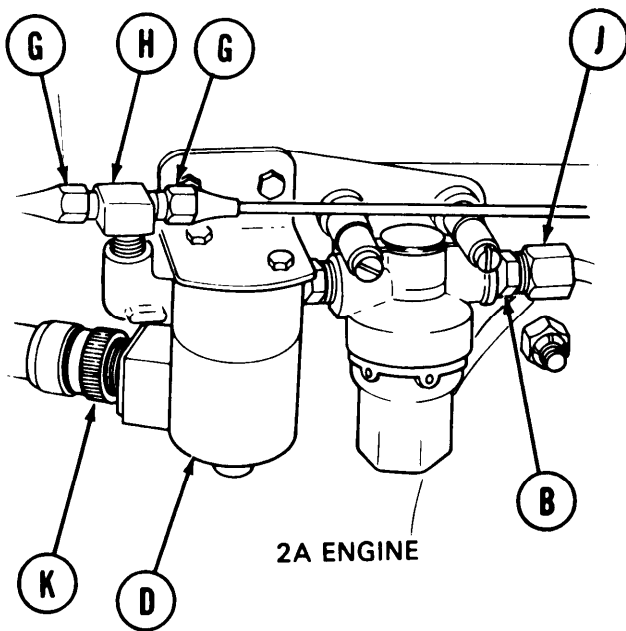
Go on to Sheet 5

TA149106

MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT
 (Sheet 5 of 8)

Fuel Filter Replacement (Sheet 5 of 5)

3. Connect two fuel lines (G) to tee (H). using 7/16 inch wrench, tighten fuel line nuts.
9. Connect fuel line (J) to adapter (B). Using 1/2 inch and 5/8 inch wrenches, tighten line nut to adapter.



10. Connect electrical lead (K) to solenoid valve (D).
11. Operate primer pump (TM 9-2350-222-10) and check for fuel leaks. If leaks are found, tighten connections as required.
12. Install lower engine access cover (page 16-42).

End of Task

TA149107

MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT
(Sheet 6 of 8)

Fuel Filter Element Replacement (Sheet 1 of 2)

TOOL: Adjustable wrench

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
Low-pressure compressed air
Rags (Item 65, Appendix D)
Preformed packing
Drain pan
Filter element

REFERENCE: TM 9-2350-222-10

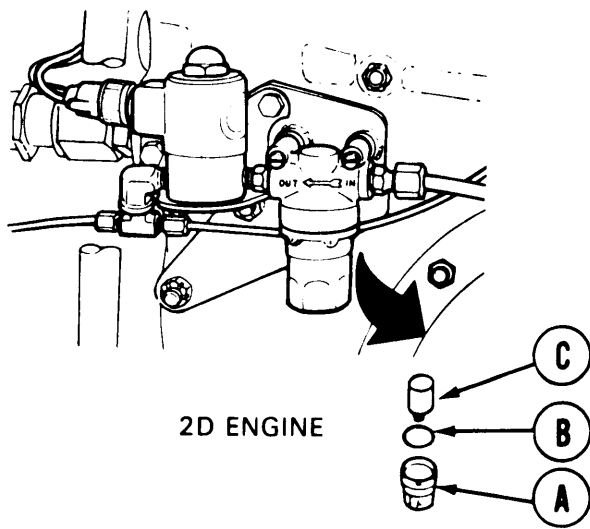
PRELIMINARY PROCEDURE: Remove lower engine access cover (page 16-41)

REMOVAL:

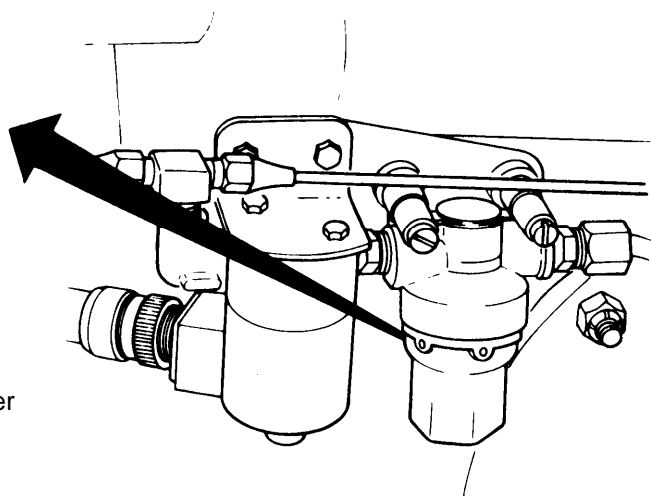
NOTE

Use suitable container to catch any fuel that may leak out when bowl is removed. Use rags (Item 65, Appendix D) to wipe any spillage.

1. Using wrench, loosen filter bowl (A).



2D ENGINE



2A ENGINE

2. Remove bowl (A), preformed packing (B), and filter element (C).
3. Throw away preformed packing (B) and filter element (C).
4. Clean filter bowl with dry cleaning solvent (Item 54, Appendix D).

Go on to Sheet 2

MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT
(sheet 7 of 8)

Fuel Filter Element Replacement (Sheet 2 of 2)

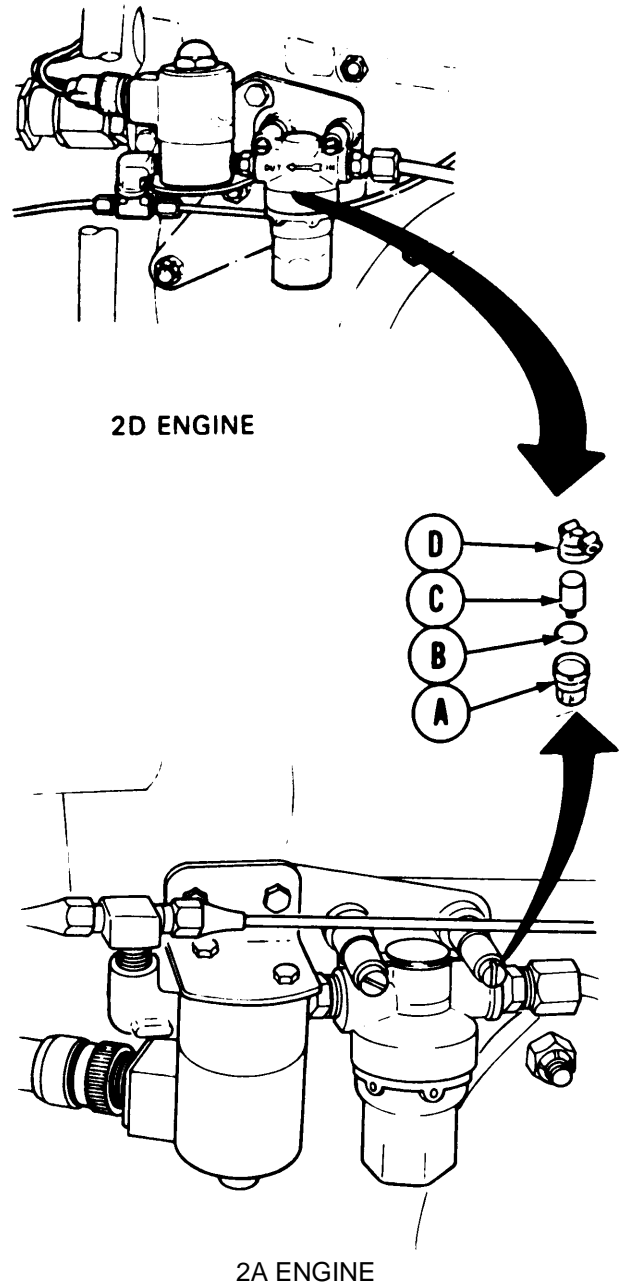
WARNING

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

5. Wipe out bowl (A) and dry with compressed air.

INSTALLATION:

1. Position new filter element (C) in filter bowl (A).
2. Position new preformed packing (B) over lip of filter bowl (A) and install to filter head (D).
3. Using wrench, tighten filter bowl (A) to filter head (D).
4. Operate primer pump (TM 9-2350-222-10) and check for leaks. If leak is found, tighten filter bowl.
5. Install lower engine access cover (page 16-42).



End of Task

TA149111

**MANIFOLD HEATER FUEL FILTER ELEMENT AND INPUT FUEL LINE REPLACEMENT
(Sheet 8 of 8)**

Fuel Filter Input Fuel Line Replacement (Sheet 1 of 1)

TOOLS: 1/2 in. combination box and open end wrench
5/8 in. combination box and open end wrench

SUPPLIES: Plastic tubing (70178261), 7.125 in lg.
Nut (189894) (2 required)
Sleeve (18991 1) (2 required)
Clean bucket or drip pan
Rags (Item 65, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove lower engine access cover (page 16-41)

REMOVAL:

CAUTION

When removing or installing fuel lines, care must be taken not to damage fittings and threads or twist or distort fuel lines or hoses.

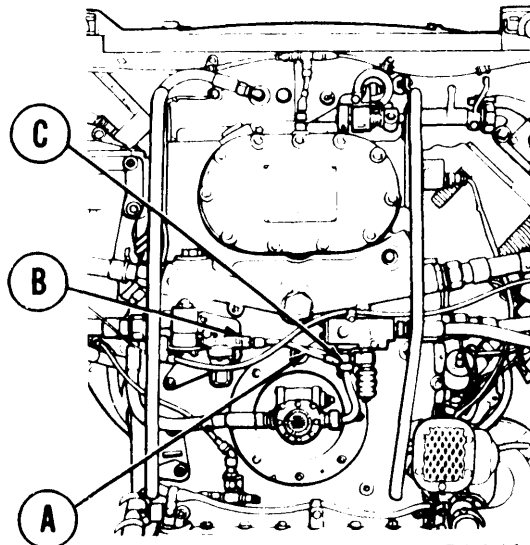
NOTE

Use suitable container to catch any fuel that may leak out whenever any part of fuel system is loosened or disconnected. Use rags (Item 65, Appendix D) to wipe any spillage.

1. Using both wrenches, disconnect both ends of line assembly (A) from adapters (B) and (C).
2. Remove line assembly (A).

INSTALLATION:

1. Make new line assembly (A).
 2. Position line assembly (A) to adapters (B) and (c).
 3. Using both wrenches, install line assembly to adapters.
 4. Operate primer pump (TM 9-2350-222-10) and check for leaks. If leak is found, tighten connection as required.
 5. Install lower engine access cover (page 16-42).
- End of Task



TA141444

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 1 of 8)

TOOLS: Long round nose pliers
 9/16 in. combination box and open end wrench (2 required)
 1/2 in. combination box and open end wrench (2 required)
 7/16 in. combination box and open end wrench
 Flashlight

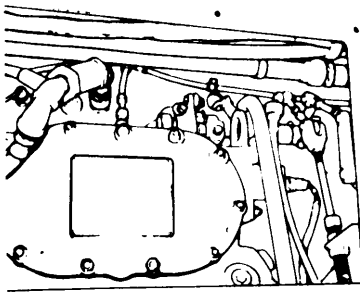
FABRICATED TOOLS: Throttle linkage adjusting go/no-go gage (Figure F-3, Appendix F)

SUPPLIES: 1/8 in. dia. by 2 by 4 in. long locating pin (2 required)
 1/16 in. dia. by 2 in. long pin
 Cotter pin (MS24665-281) (3 required)
 Cotter pin (MS2466S-132) (1 required)

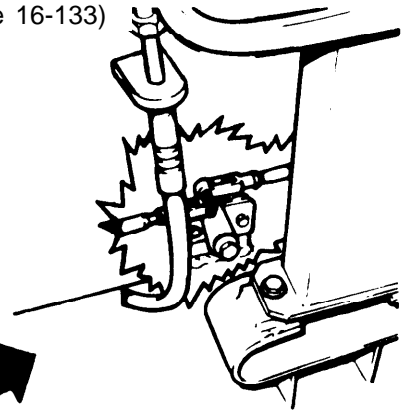
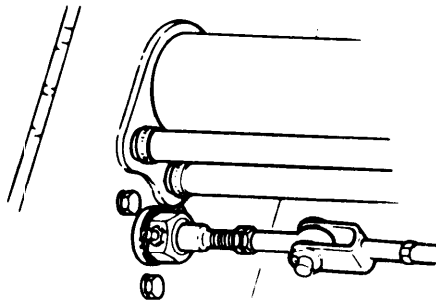
PERSONNEL: Two

REFERENCE: TM 9-2350-222-10

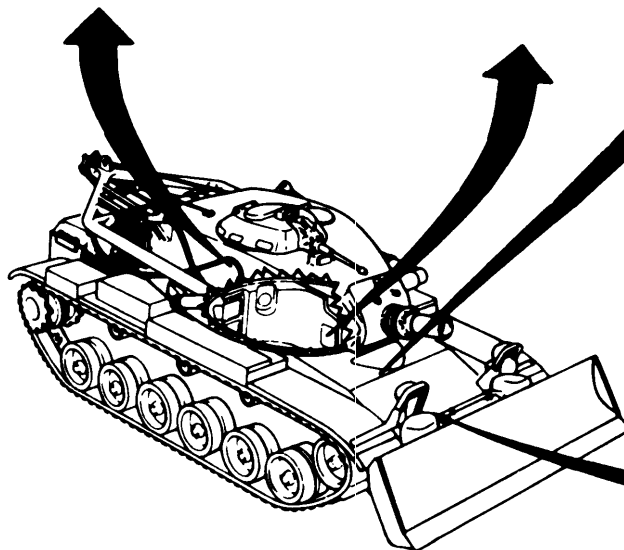
PRELIMINARY PROCEDURES: Place shift lever in P (park) position (TM 9-2350222- 10)
 Block tracks to prevent vehicle movement (TM 9-2350-222-10)
 Remove upper engine access cover (page 16-40)
 Remove driver's escape hatch (page 16-133)



ENGINE COMPARTMENT



**DRIVER'S STATION
 UNDER HYDRAULIC RESERVOIR**



DRIVER'S STATION

Go on to Sheet 2

TA253320

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 2 of 8)

ADJUSTMENT

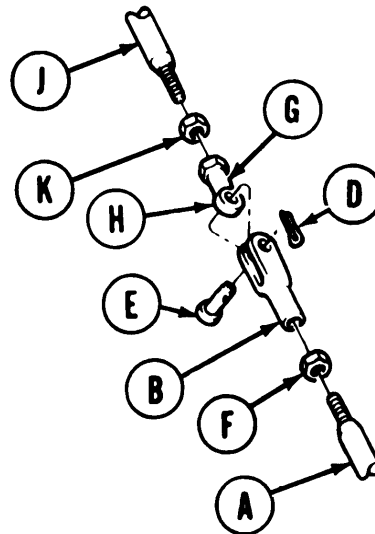
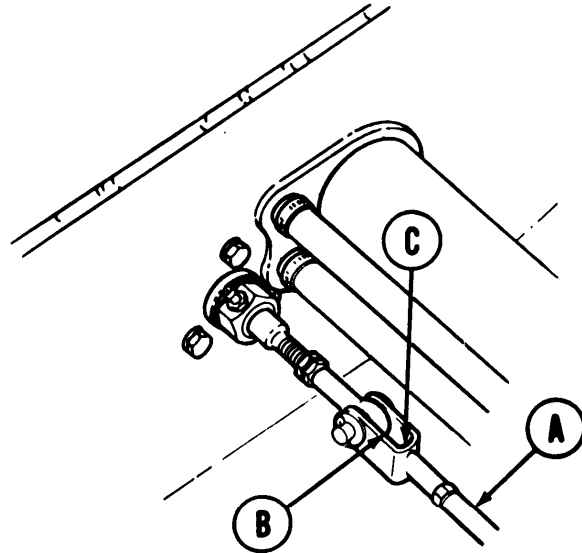
1. Open turret platform access door and traverse turret to position gun tube over right front fender stowage box (TM 9-2360-222-10).
2. Check to see if threaded shaft (A) is flush with inside of clevis (B) at location (C). If threaded shaft is flush, go to step 6. If threaded shaft is not flush, go to steps 3, 4, and 5.
3. Using pliers, remove cotter pin (D) and pin (E). Throw cotter pin away.
4. Using 9/16 inch wrench to hold clevis (B), use 1/2 inch wrench to loosen nut (F) and adjust clevis (B) so that shaft is flush with clevis.
5. Using 9/16 inch wrench to hold clevis (B), use 1/2 inch wrench to tighten nut (F).
6. Insert 1/16 inch diameter pin at location (G) in rod end bearing (H) to be sure that threads of tube assembly (J) go into rod end bearing beyond location (G). If tube assembly is not inserted beyond location (G), go to steps 7 and 8. If tube assembly is inserted beyond location (G), go to step 9.
7. Using 7/16 inch wrench to hold (on flats) rod end bearing (H) and 1/2 inch wrench to loosen nut (K), adjust rod end bearing as stated in step 6.
8. Using 7/16 inch wrench to hold (on flats) rod end bearing (H), use 1/2 inch wrench to tighten nut (K).

NOTE

Rod (H) or clevis (B) may be pulied in order to insert pin (E).

9. Insert pin (E) and, using pliers, install new cotter pin (D).

UNDER TURRET PLATFORM



Go on to Sheet 3

TA149112

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 3 of 8)

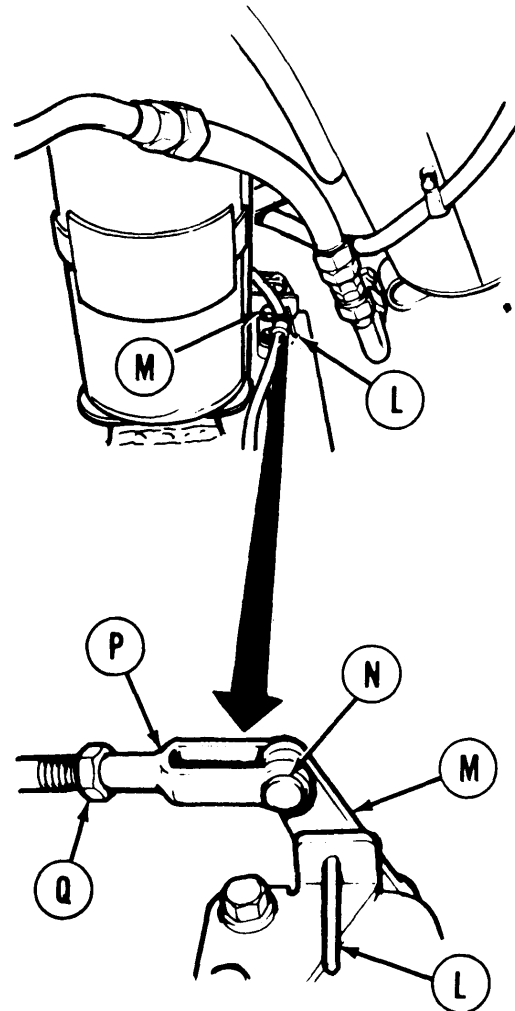
10. Close turret platform access door. Traverse turret to position gun tube to rear for entry to driver's compartment (TM 9-2350-222-10).
11. Insert 1/8 inch diameter locating pin (L) through alinement hole of remote control lever (M). If locating pin cannot be inserted, perform steps 12 thru 17. If locating pin (L) can be inserted, go to step 18.
12. Using pliers, remove cotter pin and pin (N). Throw cotter pin away.
13. Using 1/2 inch wrench to hold clevis (P), use 1/2 inch wrench to loosen nut (Q).
14. Position remote control lever (M). Insert locating pin (L) from behind.

NOTE

If necessary, remove locator pin (L) and push remote control lever (M) forward to allow clevis (P) to turn. Then repeat steps 14 and 15.

15. Turn clevis (P) until pin (N) slips freely into remote control lever (M).
16. Using pliers, install new cotter pin through pin (N).
17. Using 1/2 inch wrench to hold clevis (P), use 1/2 inch wrench to tighten nut (Q).
18. Leave locating pin (L) in position until step 36.

BEHIND FIRE EXTINGUISHER BRACKET

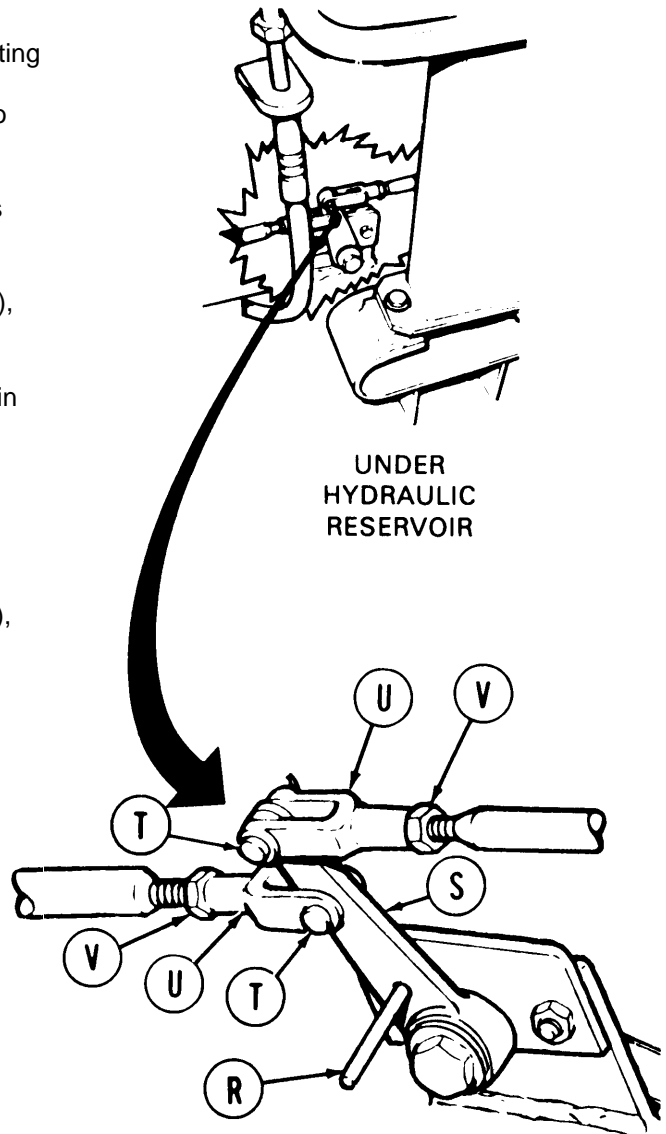


Go on to Sheet 4

TA149113

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 4 of 8)

19. Insert 1/8 inch diameter pin (R) through alignment hole of lever assembly (S). If locating pin (R) cannot be inserted, perform steps 20 thru 25. If locating pin can be inserted, go to step 25.
20. Using pliers, remove two cotter pins and pins (T). Throw cotter pins away.
21. Using 1/2 inch wrench to hold each clevis (U), use 1/2 inch wrench to loosen each nut (V).
22. Position lever assembly (S) so that locating pin (R) can be inserted.
23. Turn two clevises (U) until two pins (T) slip freely into lever assembly (S). Using pliers, install two new cotter pins through pins (T).
24. Using 1/2 inch wrench to hold each clevis (U), use 1/2 inch wrench to tighten each nut (V).
25. Remove locating pin (R).



Go on to Sheet 5

TA141446

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 5 of 8)

26. Traverse turret to position gun tube to front for access to engine compartment (TM 9-2350-222-10).

27. Insert 1/8 inch diameter locating pin (W) through alignment hole of remote control lever (X). If locating pin cannot be inserted, perform steps 28 through 34. If locating pin can be inserted, go to step 34.

28. Using 7/16 inch wrench to hold rod end bearing (Y) (on flats), use 1/2 inch wrench to loosen nut (Z).

29. Using 7/16 inch wrench, remove screw (AA).

30. Insert locating pin (W) through alignment hole into housing (AB).

NOTE

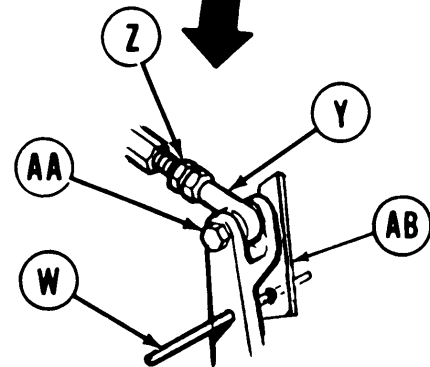
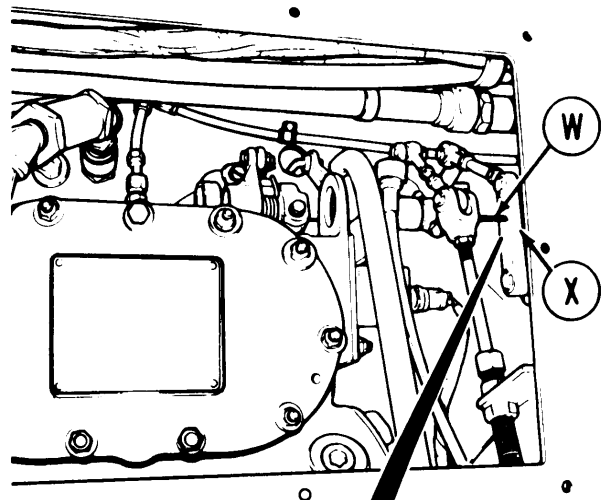
If rod (Y) cannot be adjusted short enough for screw (AA) to slip freely through lever (X), push rod (Y) forward and insert screw (AA).

31. Turn rod end bearing (Y) until screw (AA) slips freely through remote control lever (X) and rod end bearing.

32. Using 7/16 inch wrench to hold rod end bearing (Y), tighten nut (Z).

33. Using 7/16 inch wrench, tighten screw (AA).

34. Remove locating pin (W).

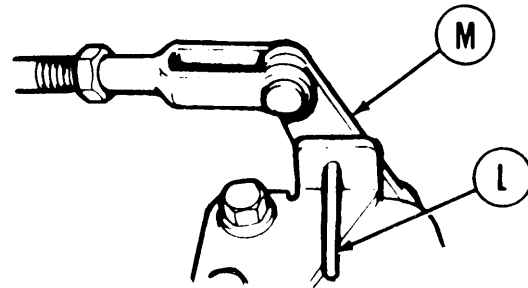


Go on to Sheet 6

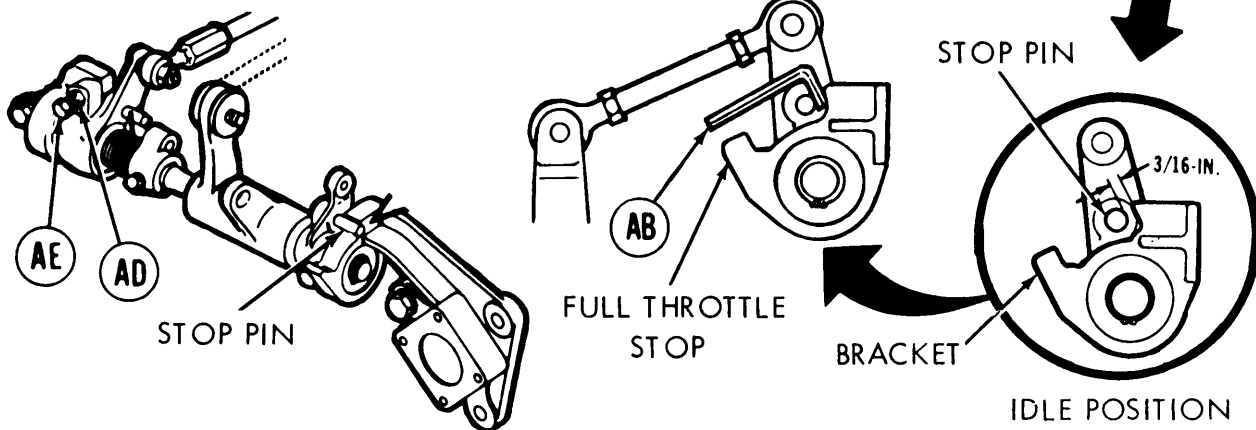
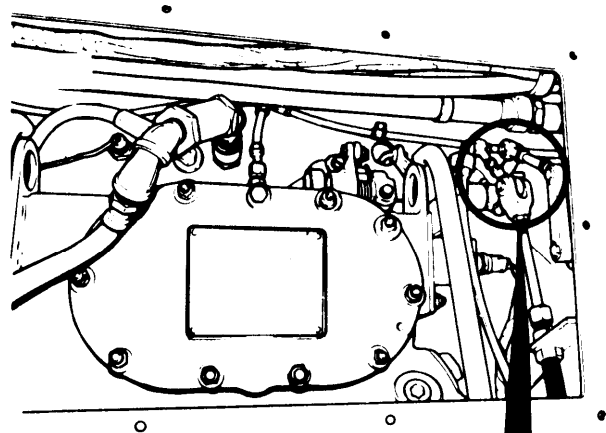
TA141447

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 6 of 8)

35. Traverse turret to position gun tube to rear for entry to driver's station (TM 9-2350-222-10).
36. Remove locating pin (L) from remote control lever (M).
37. Traverse turret to position gun tube to front for access to engine compartment (TM 9-2350-222-10).
38. Have one person in driver's station ready to start engine and watch tachometer while the other person measures accelerator travel at engine.
39. Start engine (TM 9-2350-222-10).



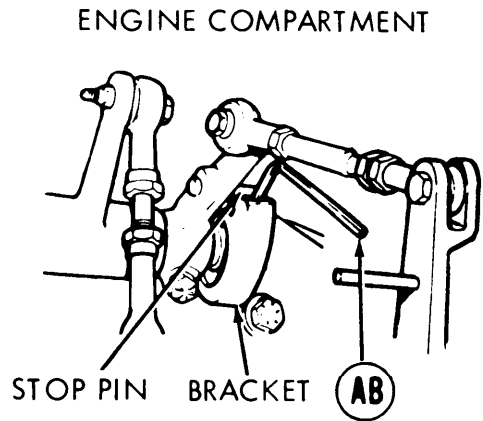
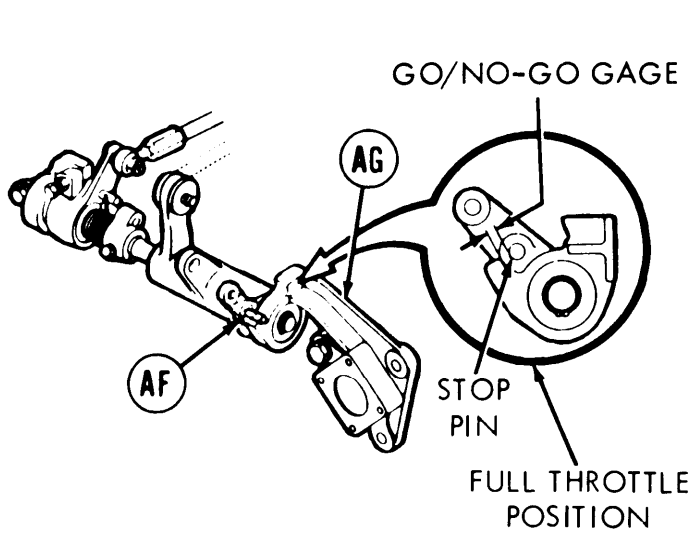
40. Using fabricated go/no go gage (AB) (Figure F-3, Appendix F), increase far at least 3/16 inch clearance at idle speed 700 to 750 rpm. If idle adjustment is necessary, perform steps 41 and 42. If adjustment is not necessary, go on to step 43.
41. Using 1/2 inch wrench, loosen nut (AD). Adjust idle adjustment screw (AE) to the requirements of step 40. If requirements are met, go to step 42; if requirements cannot be met, notify support maintenance.
42. Using 1/2 inch wrench, hold idle adjustment screw (AE). Using 1/2 inch wrench, tighten nut (AD).



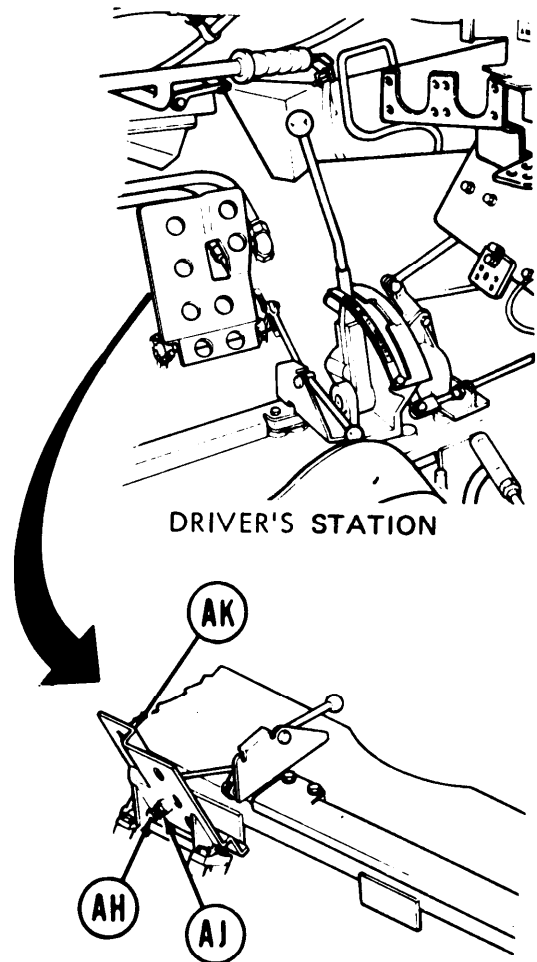
Go on to Sheet 7

TA141448

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 7 of 8)



43. Stop engine (TM 9-2350-222-10).
44. Insert either end of go/no-go gage (AB) between stop pin (AF) and bracket (AG). Hold in this position while person in driver's station presses pedal to full throttle position.
45. With pedal in full throttle position, screw (AH) must contact floor and stop pin must contact either end of go/no-go gage (AB). If this requirement cannot be met, do steps 46 thru 48. If requirement is met, go to step 49.
46. Using two 9/16 inch wrenches, loosen jamnut (AJ) and screw (AH) on back side of accelerator pedal (AK).
47. Using two 9/16 inch wrenches, hold screw (AH) and tighten jamnut (AJ),



Go on to Sheet 8

TA141449

ACCELERATOR LINKAGE ADJUSTMENT (Sheet 8 of 8)

48. Start engine (TM 9-2350-222-10).
49. Press accelerator pedal down to floor. Tachometer should read between 2550-2650 rpm. If engine will not accelerate to within 2550-2650 rpm, shut down engine (TM 9-2350-222-10). Go back and do steps 44 thru 50 to readjust. If engine does accelerate to between 2550-2650 rpm, go to step 51.
50. Stop engine (TM 9-2350-222-10).
51. Install upper engine access cover (page 16-40).
52. Install driver's escape hatch (page 16-134).
53. Remove blocks from track (TM 9-2350-222-10).

End of Task

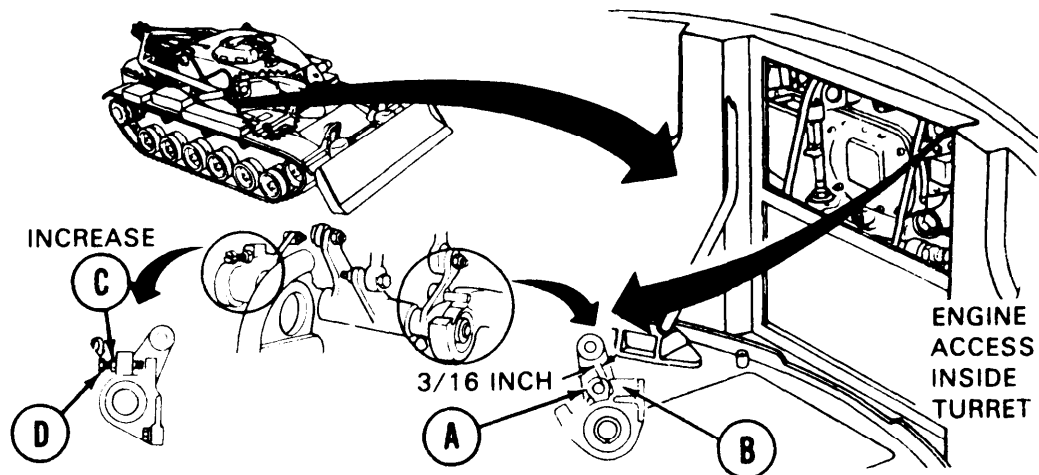
ENGINE IDLE ADJUSTMENT (Sheet 1 of 1)

TOOLS: 7/16 in. combination box and open end wrench
Flat-tip screwdriver

FABRICATED TOOLS: Gage (Figure F-3, Appendix F)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Start engine run at idle (TM 9-2350-222-10)
Engage parking brake (TM 9-2350-222-10)
Remove upper engine access cover (page 16-40)



1. Using 3/16 inch end of fabricated gage (Figure F-3, Appendix F), measure distance between stop pin (A) and bracket shoulder (B).
2. If distance is more than or less than 3/16 inch, use wrench and loosen jamnut (C) on idle adjustment screw (D).
3. Using screwdriver, turn screw (D) clockwise to increase distance and counterclockwise to decrease distance.
4. Using wrench, tighten jamnut (C).
5. Check idle speed. If it is not between 700-750 rpm (shown on tachometer), notify support maintenance.

Stop engine (TM 9-2350-222-10).
7. Install upper engine access cover (page 16-40).

End of Task

TA253216

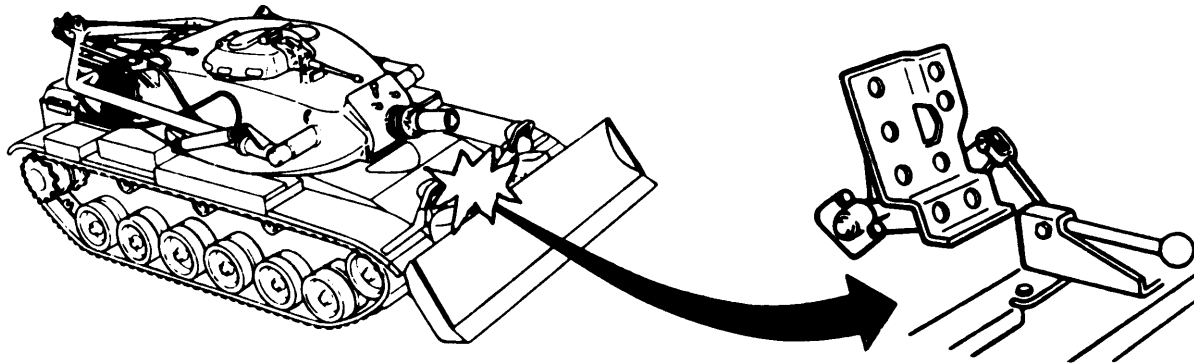
Change 1 7-423

ACCELERATOR PEDAL RETURN SPRING ADJUSTMENT (Sheet 1 of 2)

TOOLS: 7/16 in. combination box and open end wrench
Spring scale

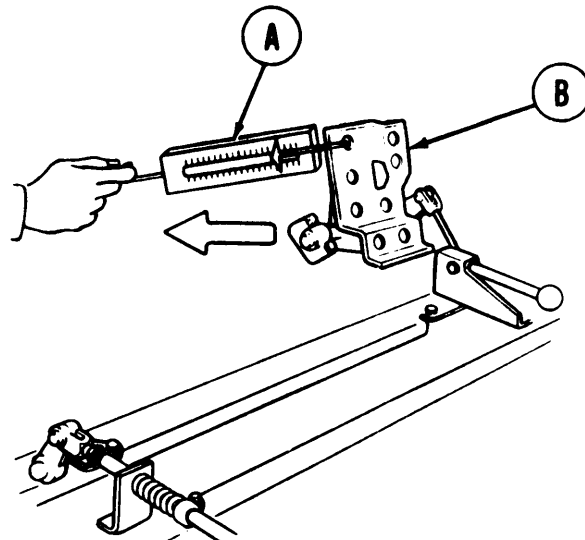
REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Place shift lever in P (park) position (TM 9-2350-222-10)
Disconnect accelerator linkage at powerplant (page 7-419, steps 28 and 29)



ADJUSTMENT:

1. Using spring scale (A), as shown from behind, check pressure required to depress accelerator pedal (B).
2. Scale should read between 7 and 8 pounds.
3. If scale reads more than 8 pounds, perform steps 5 thru 7.
4. If scale reads less than 7 pounds, perform steps 9 thru 11.

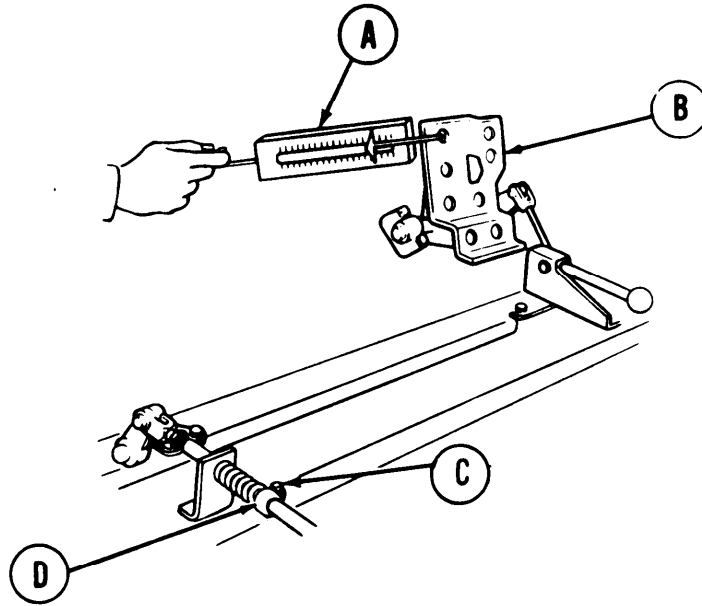


Go on to Sheet 2

TA141451

ACCELERATOR PEDAL RETURN SPRING ADJUSTMENT (Sheet 2 of 2)

5. Using wrench, loosen screw (C).
Using fingers, move clamp (D) slightly toward rear of vehicle.
7. Using wrench, tighten screw (C).



8. Repeat steps 1 and 2. If scale (A) still reads over 8 pounds, repeat steps 5 thru 7 until 8 pounds or less but more than 7 pounds are required to depress pedal.
9. Using wrench, loosen screw (C).
10. Using fingers, move clamp (D) slightly toward front of vehicle.
11. Using wrench, tighten screw (C).
12. Repeat steps 1 and 2. If scale (A) still reads less than 7 pounds, repeat steps 9 thru 11 until 7 pounds or more but not more than 8 pounds are required to depress pedal.
13. Connect accelerator linkage at powerplant (page 7-419, steps 32 and 33).

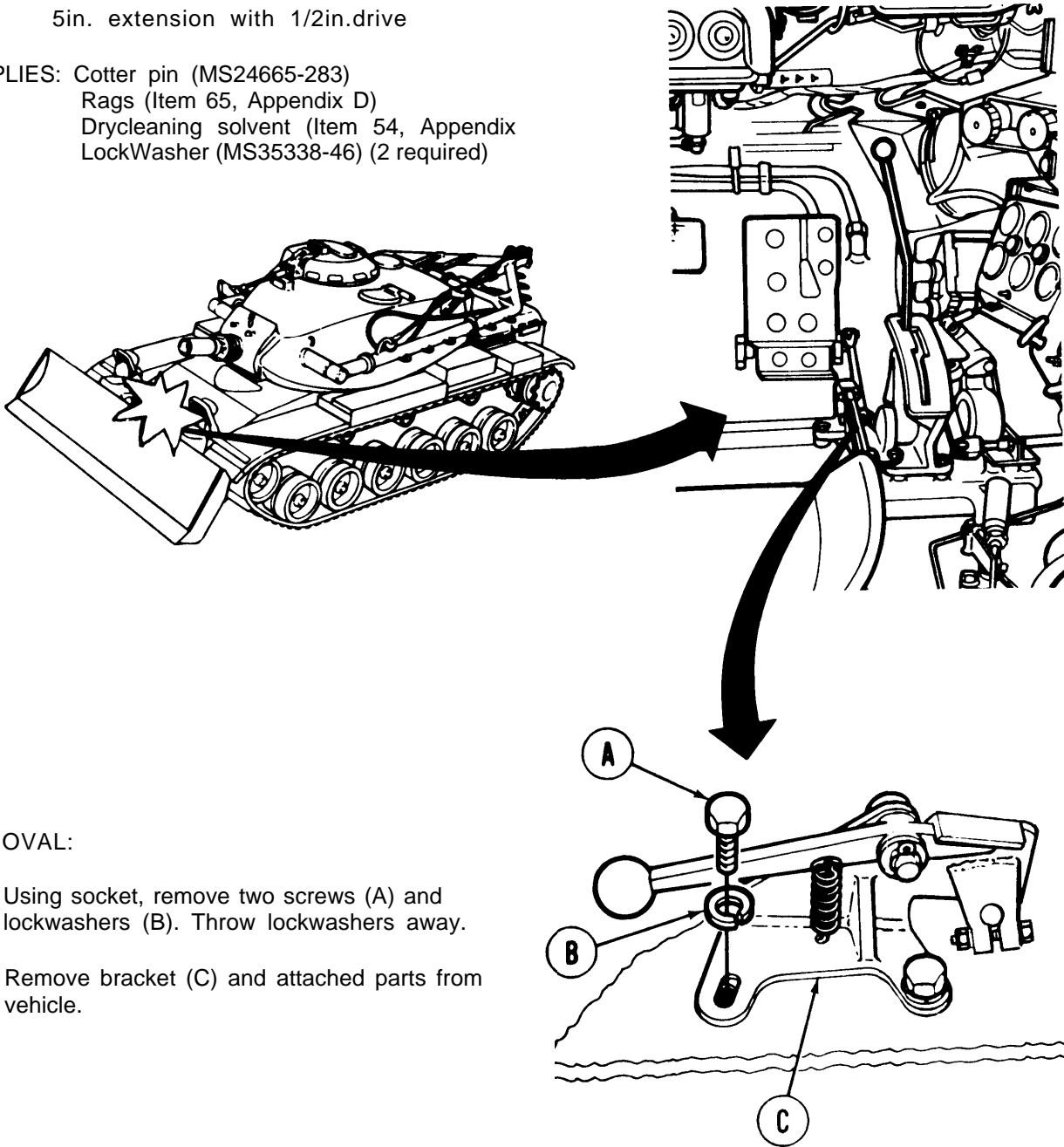
End of Task

TA141452

ACCELERATOR FOOT PEDAL LOCK ASSEMBLY REPLACEMENT (Sheet 1 of 3)

TOOLS: Slip joint pliers
Ratchet with 1/2in. drive
9/16 in. socket with 1/2in. drive
5in. extension with 1/2in. drive

SUPPLIES: Cotter pin (MS24665-283)
Rags (Item 65, Appendix D)
Drycleaning solvent (Item 54, Appendix
LockWasher (MS35338-46) (2 required)



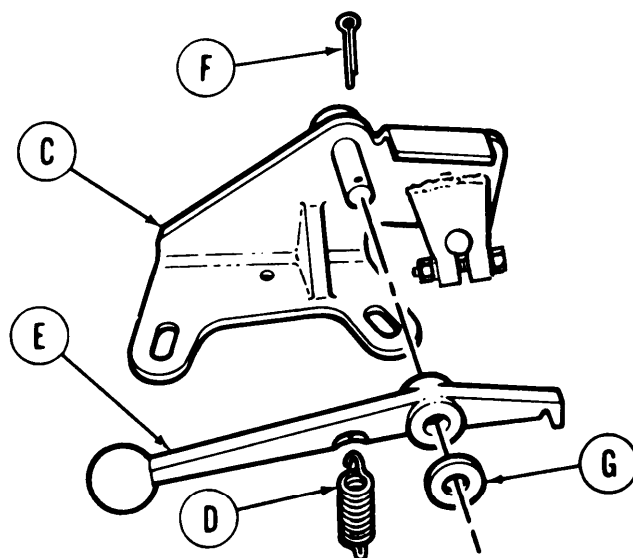
REMOVAL:

1. Using socket, remove two screws (A) and lockwashers (B). Throw lockwashers away.
2. Remove bracket (C) and attached parts from vehicle.

Go on to Sheet 2

TA141453

ACCELERATOR FOOT PEDAL LOCK ASSEMBLY REPLACEMENT (Sheet 2 of 3)



- Unhook spring (D) from bracket (C) and from control lever (E).

Using pliers, remove cotter pin (F). Throw cotter pin away.

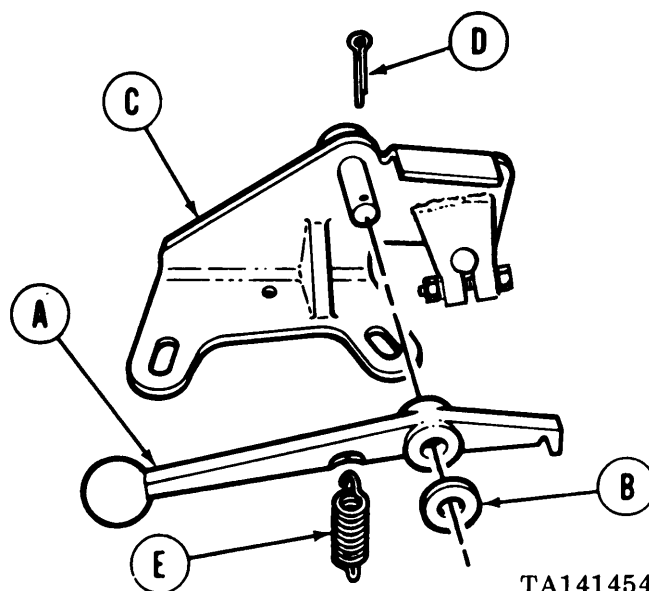
- Remove washer (G) and control lever (E) from bracket (C).

CLEANING AND INSPECTION:

- Clean all parts using dry cleaning solvent (Item 54, Appendix D) and rags (Item 65, Appendix D),
- Inspect all parts for cracks, bends, wear, or other defects. Replace defective parts.

INSTALLATION:

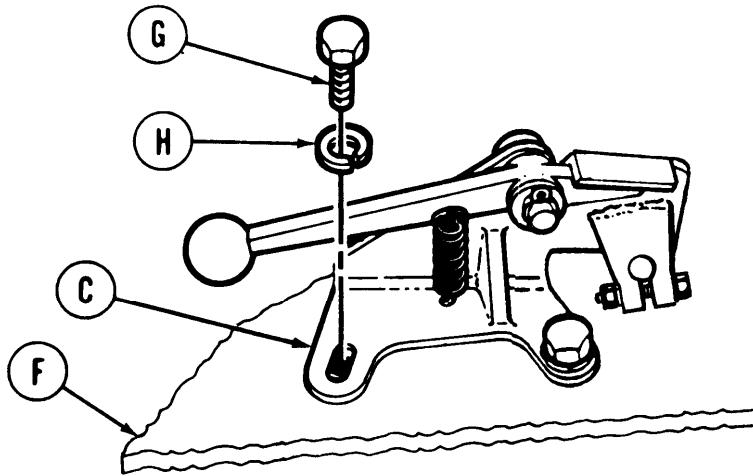
- Install control lever (A) and washer (B) on bracket (C).
- Using pliers, install new cotter pin (D).
- Hook spring (E) on control lever (A) and on bracket (C).



Go on to Sheet 3

TA141454

ACCELERATOR FOOT PEDAL LOCK ASSEMBLY REPLACEMENT (Sheet 3 of 3)



4. Line up holes in bracket (C) with holes in base (F).
5. Using socket and extension, install two screws (G) and new lockwashers (H) attaching bracket (C) to base (F).
6. Make sure accelerator lock operates properly. Check for things in the way, or missing parts, if accelerator lock does not operate properly.

End of Task

TA141455

ACCELERATOR CROSSOVER ROD ASSEMBLY REPLACEMENT (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-430
Cleaning and Inspection	7-432
Installation	7-432

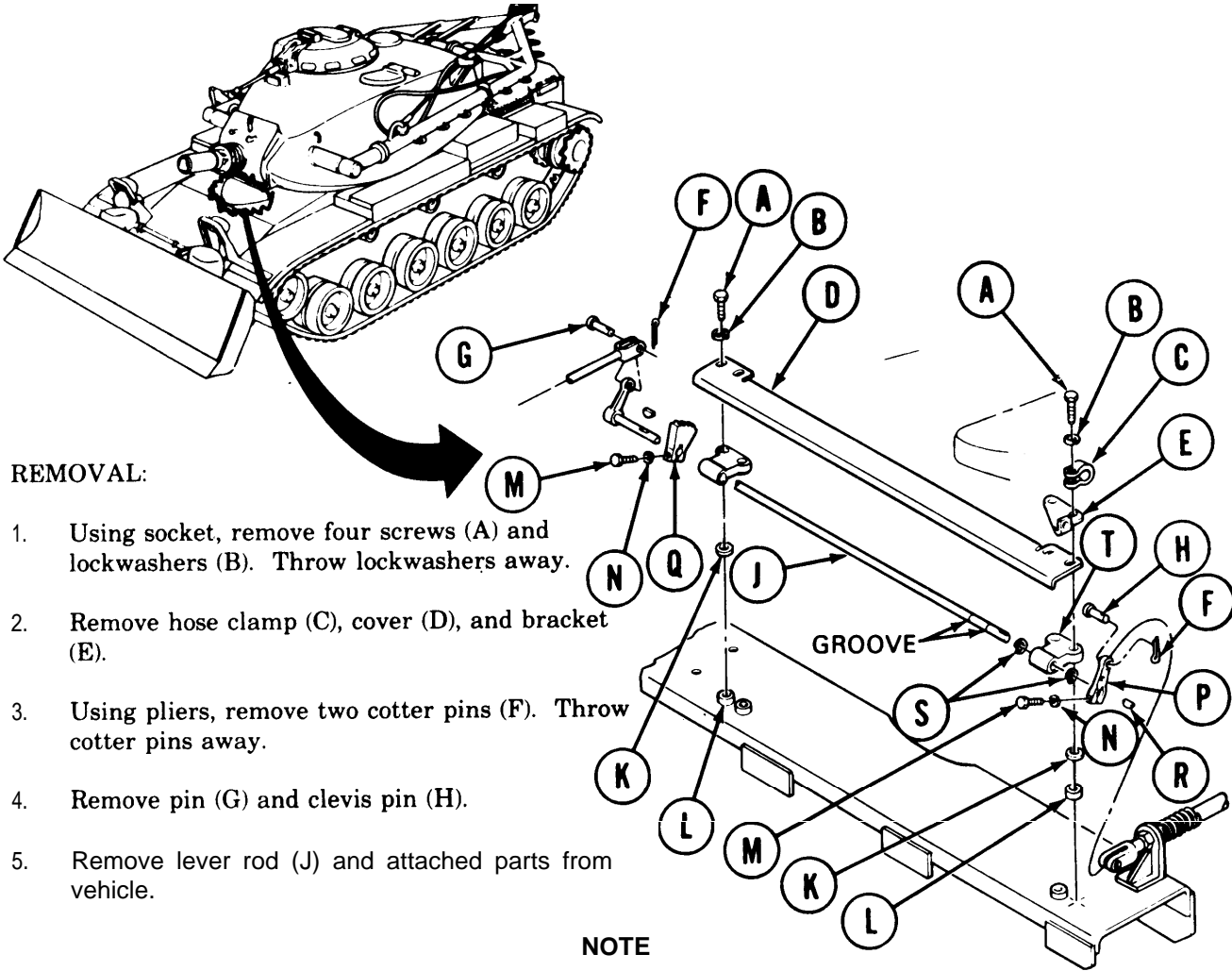
- TOOLS: Ratchet with 1/2in. drive
 Slip joint pliers
 Retaining ring pliers (outside)
 9/16 in. socket with 1/2in. drive
 7/16 in. combination box and open end wrench
 Ball peen hammer
 1/4 in. drive punch
 Vise

- SUPPLIES: Cotter pins (MS24665-281) (2 required)
 Dry cleaning solvent (Item 54, Appendix D)
 Pencil
 Paper
 Rags (Item 65, Appendix D)
 Lockwasher (MS35336-46) (6 required)

PRELIMINARY PROCEDURE: Remove accelerator foot pedal lock assembly (page 7-426)

Go on to Sheet 2

ACCELERATOR CROSSOVER ROD ASSEMBLY REPLACEMENT (Sheet 2 of 6)



REMOVAL:

1. Using socket, remove four screws (A) and lockwashers (B). Throw lockwashers away.
2. Remove hose clamp (C), cover (D), and bracket (E).
3. Using pliers, remove two cotter pins (F). Throw cotter pins away.
4. Remove pin (G) and clevis pin (H).
5. Remove lever rod (J) and attached parts from vehicle.

NOTE

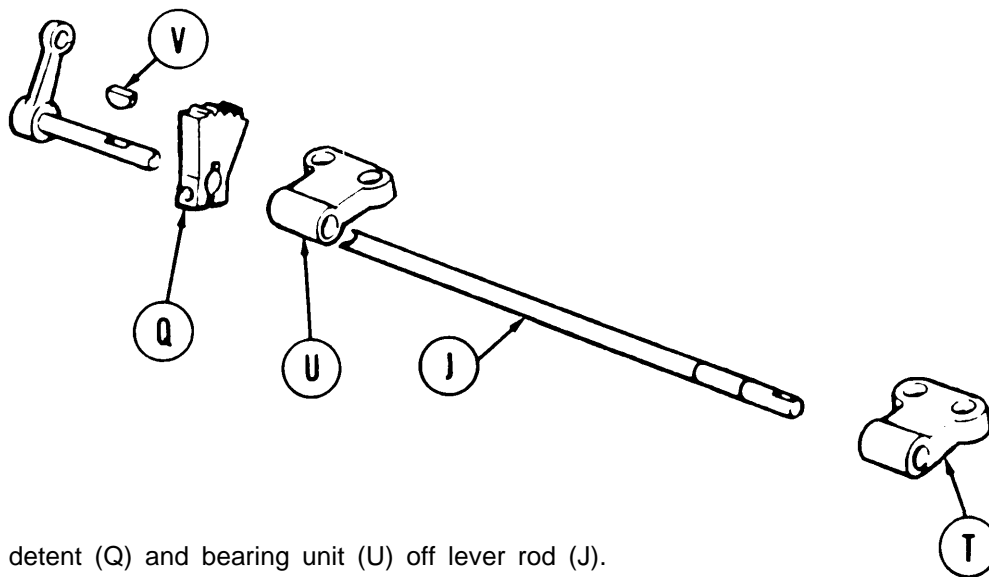
Write down number of shims (K) on each spacer (L) before removing shims (K).

6. Remove shims (K) and four spacers (L).
7. Using wrench, remove two screws (M) and lockwashers (N) from lever (P) and from detent plate (Q). Throw lockwashers away.
8. Remove lever (P) and woodruff key (R) from lever rod (J).
9. Using retaining ring pliers, remove retaining rings (S) from grooves in lever rod (J) and slide retaining rings (S) and bearing unit (T) off lever rod (J).

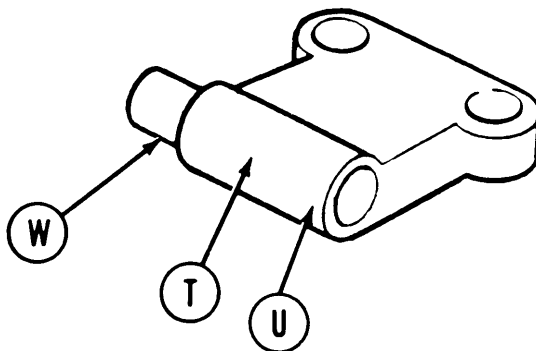
Go on to Sheet 3

TA149114

ACCELERATOR CROSSOVER ROD ASSEMBLY REPLACEMENT (Sheet 3 of 6)



10. Slide detent (Q) and bearing unit (U) off lever rod (J).
11. Remove woodruff key (V) from lever rod (J).
12. Inspect bearings (W) in bearing unit (T) and in bearing unit (U). If bearings (W) are worn, use hammer and punch to drive bearings (W) out of bearing unit (T) and bearing unit (U).



Go on to Sheet 4

TA149115

ACCELERATOR CROSSOVER ROD ASSEMBLY REPLACEMENT (Sheet 4 of 6)

CLEANING AND INSPECTION:

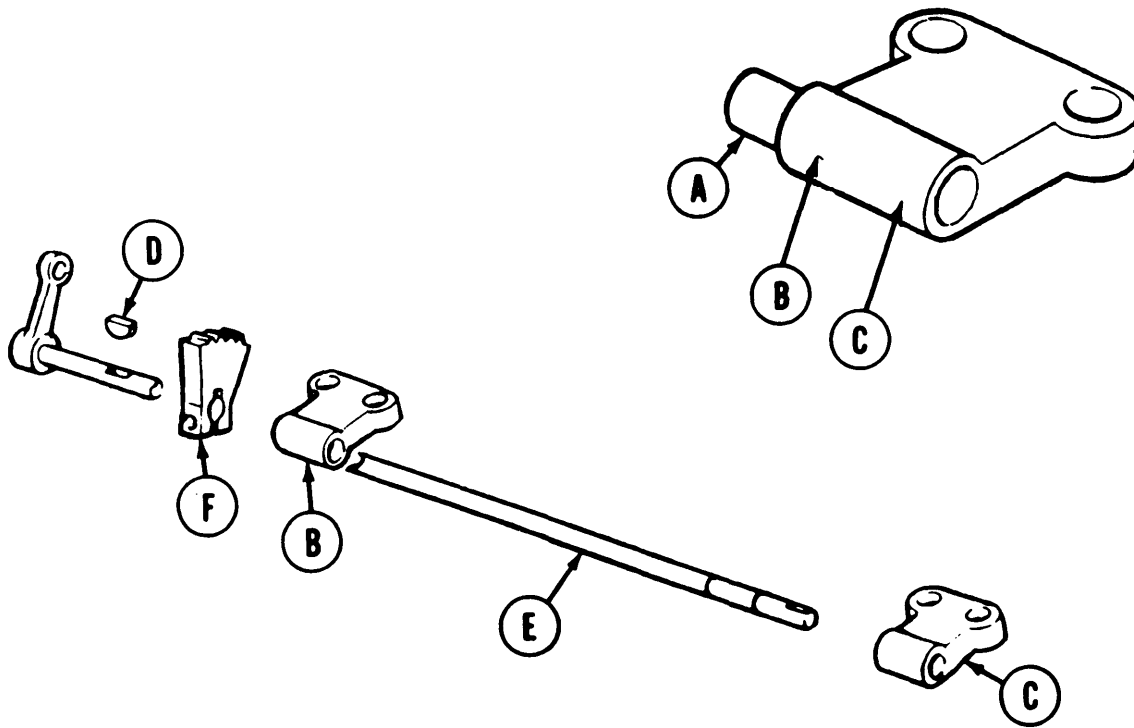
1. Using dry cleaning solvent (Item 54, Appendix D), and clean rags (Item 65, Appendix D), clean all parts.
2. Check all parts for bends, cracks, wear in holes, and other defects. Replace defective parts.

INSTALLATION:

NOTE

Steps 1 thru 9 are performed outside vehicle.

1. Using vise, press bearings (A) in bearing unit (B) and in bearing unit (C).
2. Install woodruff key (D) in lever rod (E).

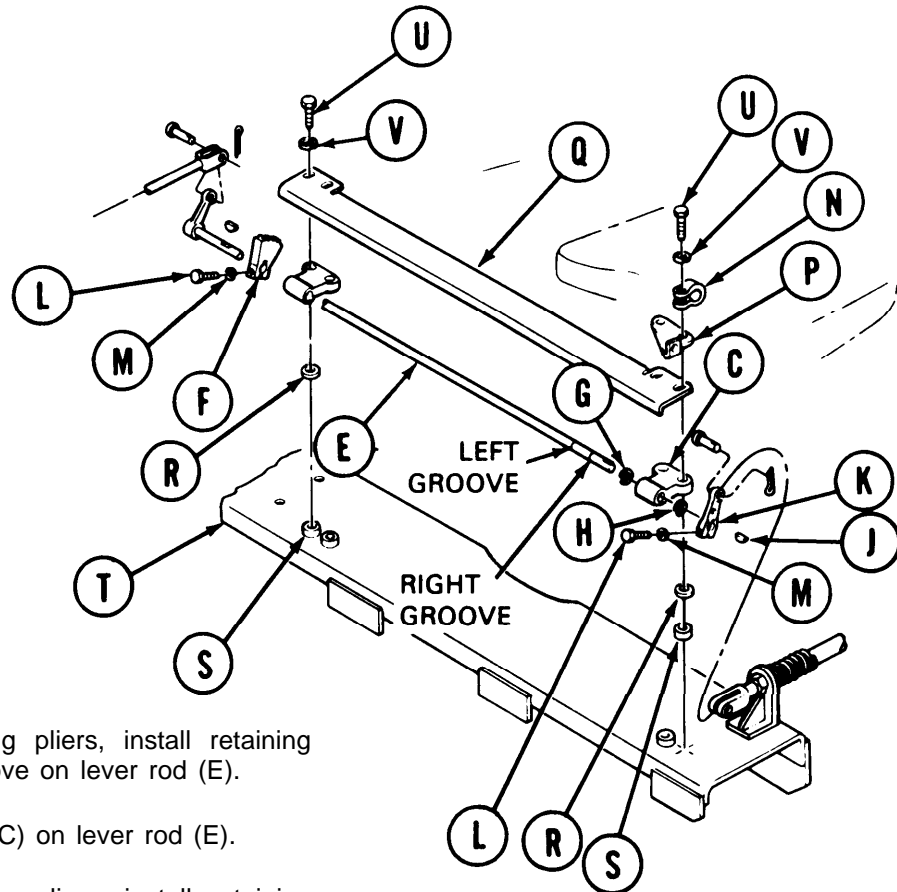


3. Slide detent plate (F) and one bearing unit (B) on lever rod (E) until detent plate (F) fits over woodruff key (D).

Go on to Sheet 5

TA149116

ACCELERATOR CROSSOVER ROD ASSEMBLY REPLACEMENT (Sheet 5 of 6)



4. Using retaining ring pliers, install retaining ring (G) in left groove on lever rod (E).
5. Slide bearing unit (C) on lever rod (E).
6. Using retaining ring pliers, install retaining ring (H) in right groove on lever rod (E).
7. Install woodruff key (J) on lever rod (E).
8. Slide lever (K) on lever rod (E) until lever (K) is over woodruff key (J).
9. Using wrench, install two screws (L) and new lockwashers (M) in detent plate (F) and lever (K).

NOTE

Make sure correct number of shims are under each hole.

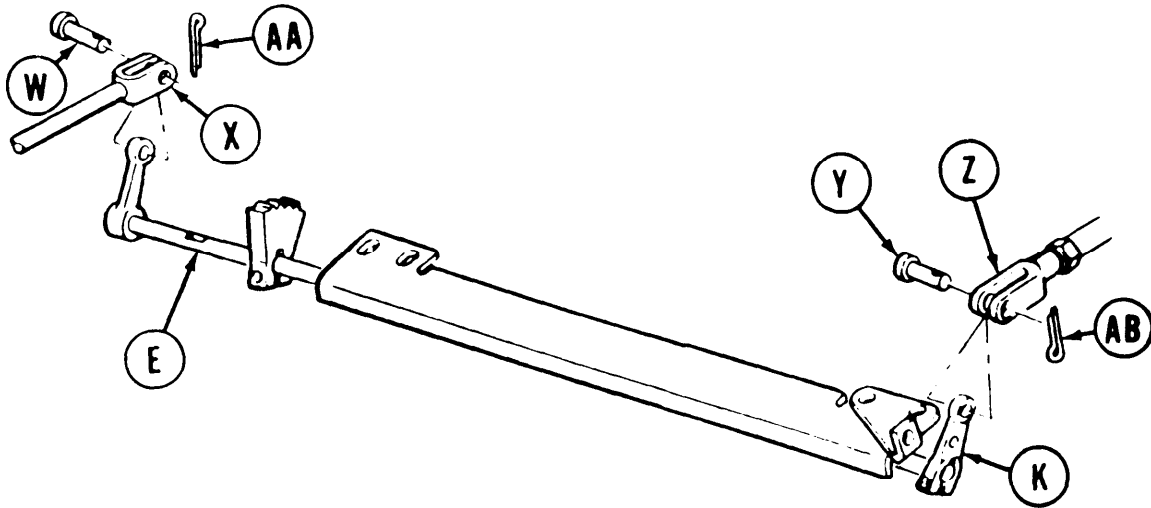
10. Line up holes in hose clamp (N), bracket (P), cover (Q), bearing units (G), shims (R), spacers (S), and channel (T).
11. Using socket, install four screws (U) and new lockwashers (V).

Go on to Sheet 6

TA149117

ACCELERATOR CROSSOVER ROD ASSEMBLY REPLACEMENT (Sheet 6 of 6)

12. Install pin (W) in connecting link (X) and lever rod (E).
13. Install clevis pin (Y) in clevis (Z) and lever (K).



14. Using pliers, install new cotter pin (AA) in pin (W).
15. Using pliers, install new cotter pin (AB) in clevis pin (Z).
16. Press accelerator pedal and make sure linkage operates smoothly. If linkage does not operate properly, remove things in the way and install any missing parts.
17. Check adjustment of accelerator linkage (page 7-415).
18. Install accelerator foot pedal lock assembly (page 7-427).

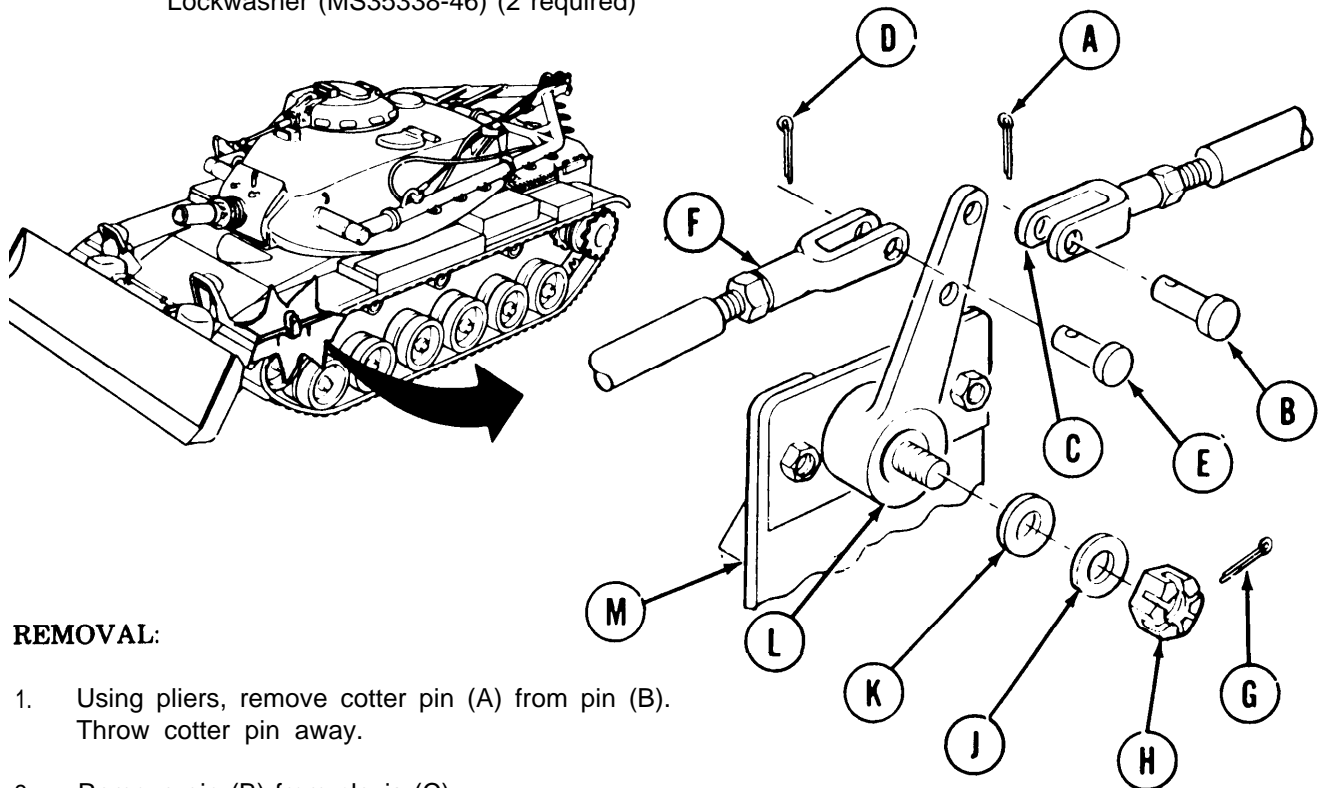
End of Task

TA141456

ACCELERATOR LEVER ASSEMBLY REPLACEMENT (Sheet 1 of 3)

TOOLS: Diagonal cutting pliers
 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 3/4 in. combination box and open end wrench
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N•m)

SUPPLIES: Cotter pin (MS24665-287)
 Cotter pin (MS24665-281) (2 required)
 Dry cleaning solvent (Item 54, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwasher (MS35338-46) (2 required)

**REMOVAL:**

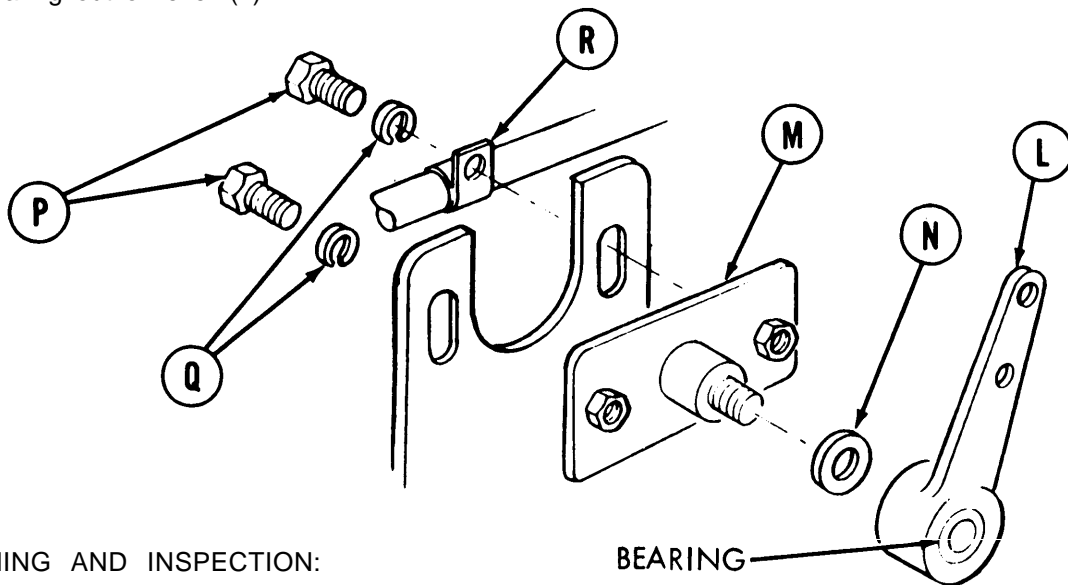
1. Using pliers, remove cotter pin (A) from pin (B). Throw cotter pin away.
2. Remove pin (B) from clevis (C).
3. Using pliers, remove cotter pin (D) from pin (E). Throw cotter pin away.
4. Remove pin (E) from clevis (F).
5. Using pliers, remove cotter pin (G) from nut (H). Throw cotter pin away.
6. Using wrench, remove nut (H), flat washer (J), washer bearing (K), and lever (L) from support (M).

Go on to Sheet 2

TA141457

ACCELERATOR LEVER ASSEMBLY REPLACEMENT (Sheet 2 of 3)

7. Remove washer bearing (N) from support (M).
8. Using socket, remove two screws (P), lockwashers (Q), and cable clamp (R). Throw lockwashers away.
9. Remove support (M) from vehicle.
10. Inspect bearing in lever (L). If bearing is defective, use hammer and drive pin punch and drive bearing out of lever (L).

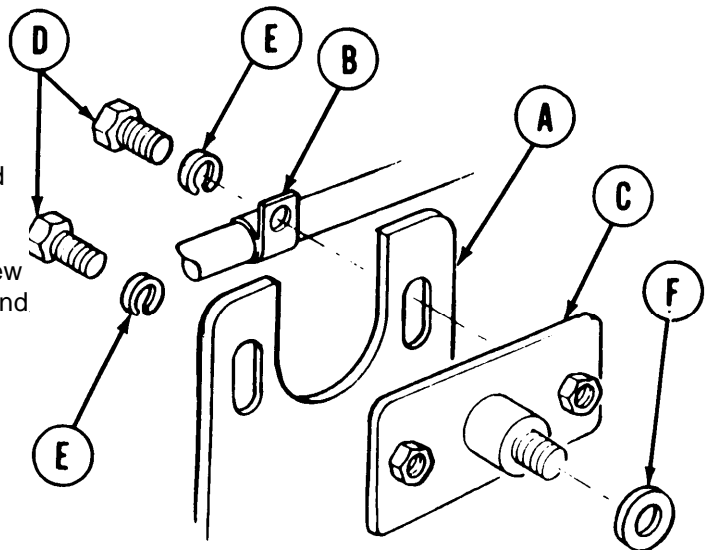


CLEANING AND INSPECTION:

1. Clean all parts using dry cleaning solvent (Item 54, Appendix D), and clean rags (Item 65, Appendix D).
2. Inspect all parts for cracks, bends, wear, and other defects.

INSTALLATION:

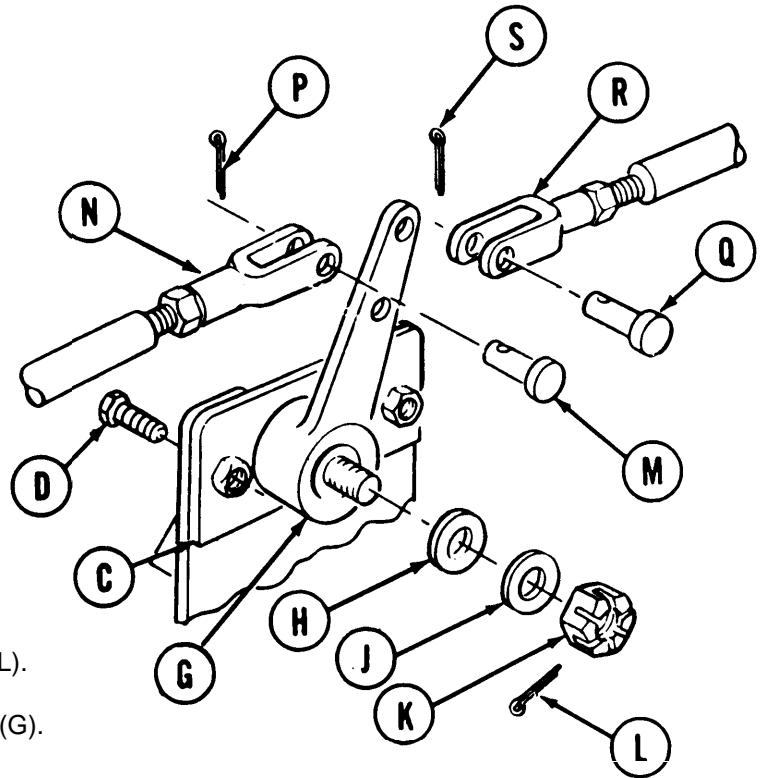
1. Line up holes in bracket (A), clamp (B), and support (C).
2. Using fingers, install two screws (D) and new lockwashers (E) in bracket (A), clamp (B), and support (C).
3. Install washer bearing (F) on support (C).



Go on to Sheet 3

TA141458

ACCELERATOR LEVER ASSEMBLY REPLACEMENT (Sheet 3 of 3)



4. Install lever (G) on support (C).
5. Using wrench, install washer bearing (H), washer (J), and nut (K).
6. Using pliers, install new cotter pin (L).
7. Install pin (M) in clevis (N) on lever (G).
8. Using pliers, install new cotter pin (P) in pin (M).
9. Install pin (Q) in clevis (R) on lever (G).
10. Using pliers, install new cotter pin (S) in pin (Q).
11. Using socket and torque wrench, tighten two screws (D) to 15-17 lb ft (20-23 N•m). Operate accelerator foot pedal to make sure linkage operates smoothly. If linkage does not operate smoothly, install any missing parts and remove things in the way.

End of Task

TA141459

ACCELERATOR CONNECTING LINK ASSEMBLY REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

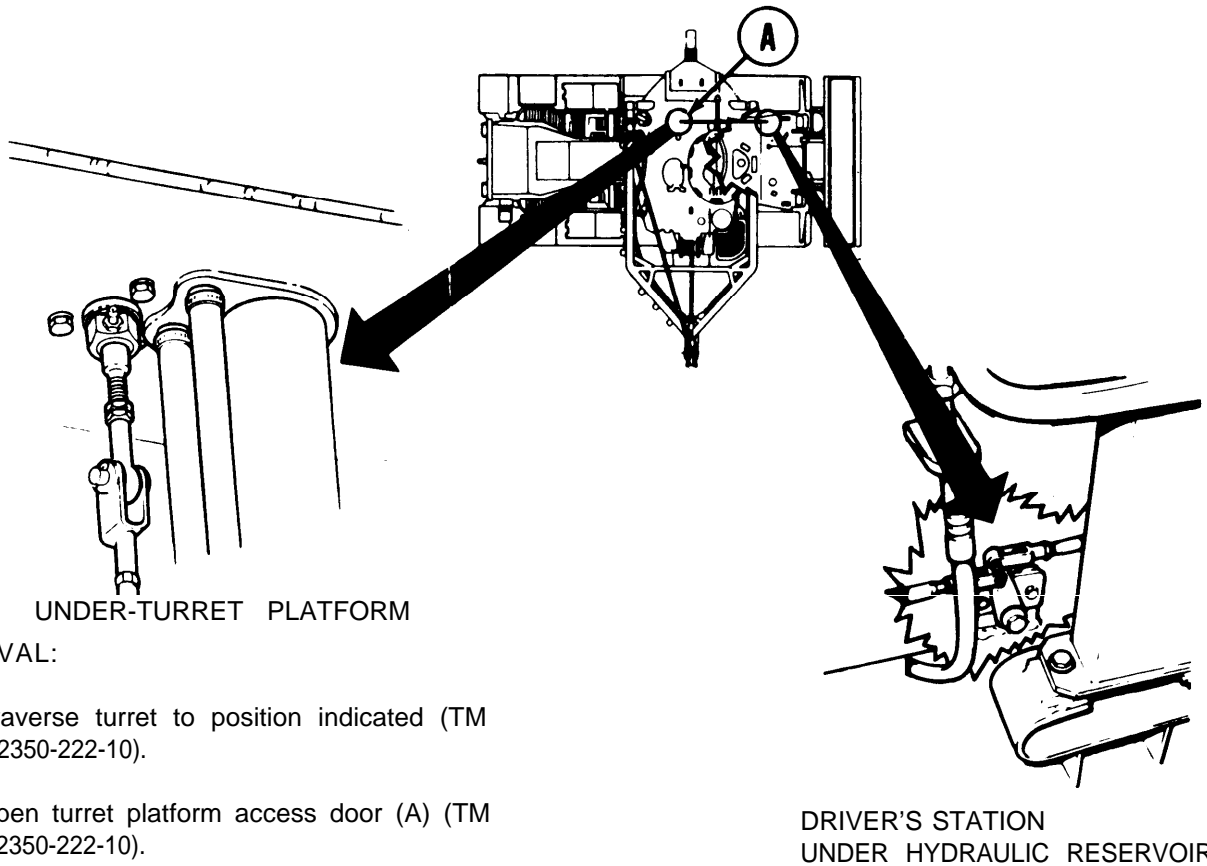
PROCEDURE	PAGE
Removal	7-438
Installation	7-440

TOOLS: Slip joint pliers
 1/2 in. combination box and open end wrench
 Flashlight

SUPPLIES: Pencil and paper
 Cotter pin (MS24665-281) (2 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove driver's escape hatch (page 16-133)



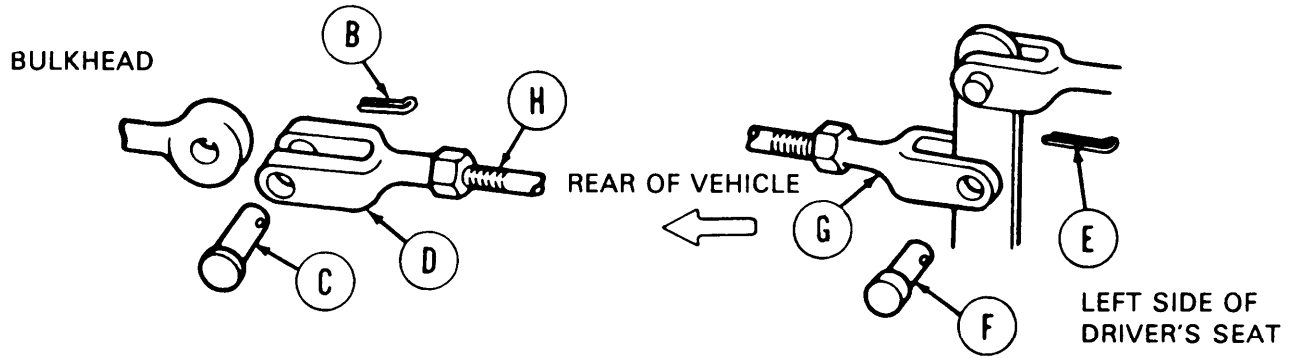
REMOVAL:

1. Traverse turret to position indicated (TM 9-2350-222-10).
2. Open turret platform access door (A) (TM 9-2350-222-10).

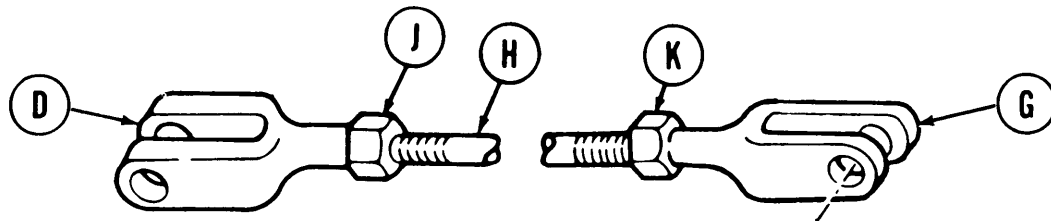
Go on to Sheet 2

TA141460

ACCELERATOR CONNECTING LINK ASSEMBLY REPLACEMENT (Sheet 2 of 4)



3. Using pliers, remove cotter pin (B) from pin (C). Throw cotter pin (B) away.
4. Remove pin (C) from clevis (D).
5. Go to driver's station.
6. Using pliers, remove cotter pin (E) from pin (F). Throw cotter pin away.
7. Remove pin (F) from clevis (G).
8. Remove connecting link (H) and attached parts from vehicle.
9. Using wrench, loosen jamnut (J) while holding clevis (D) with pliers.



NOTE

Write down number of turns needed to remove clevis (D).

10. Remove clevis (D) and jamnut (J) from connecting link (H).
11. Using wrench, loosen jamnut (K) while holding clevis (G) with pliers.

NOTE

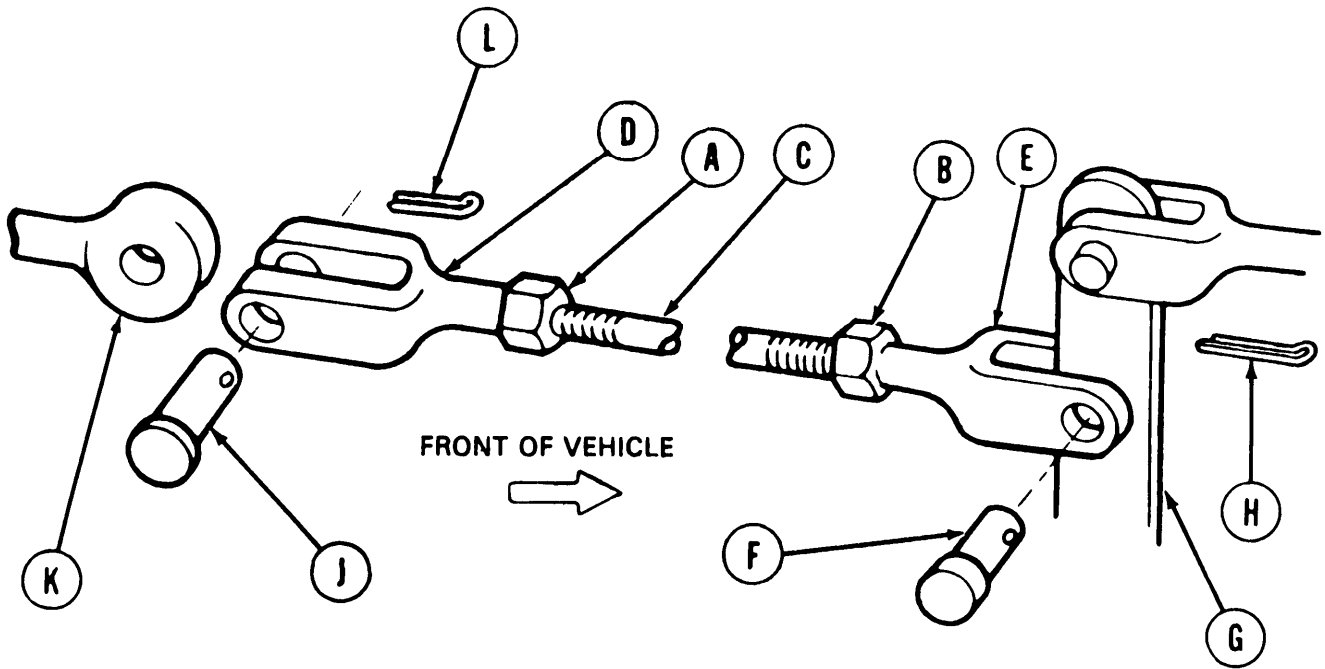
Write down number of turns needed to remove clevis (G).

12. Remove clevis (G) and jamnut (K) from connecting link (H).

Go on to Sheet 3

TA141461

ACCELERATOR CONNECTING LINK ASSEMBLY REPLACEMENT (Sheet 3 of 4)



INSTALLATION:

1. Screw jamnuts (A) and (B) all the way on ends of connecting link (C).
2. Screw clevises (D) and (E) on ends of connecting link (C) the recorded number of turns.
3. Using wrench, tighten jamnuts (A) and (B) securely against clevises (D) and (E) while holding clevises with pliers.
4. Position connecting link assembly in vehicle and install pin (F) in clevis (E) and lever (G).
5. Using pliers, install new cotter pin (H) in pin (F).
6. Install pin (J) in clevis (D) and in rod end (K).
7. Using pliers, install new cotter pin (L) in pin (J).

Go on to Sheet 4

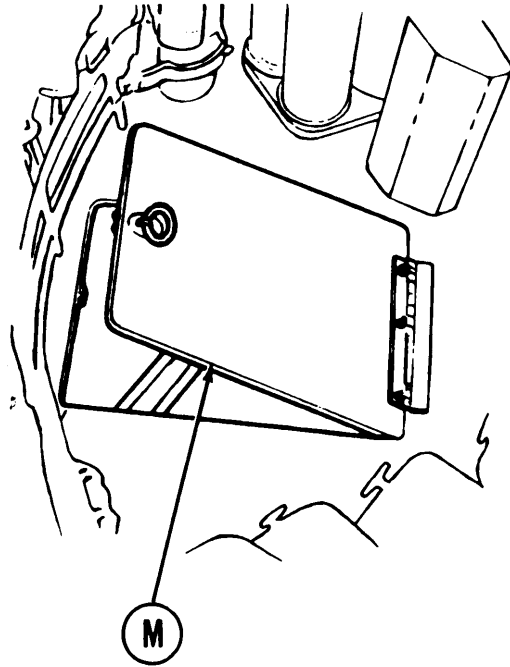
TA141462

ACCELERATOR CONNECTING LINK ASSEMBLY REPLACEMENT (Sheet 4 of 4)

8. Perform accelerator linkage adjustment (page 7-415).

9. Close turret platform access door (M) (TM 9-2350-222-10).

10. Install driver's escape hatch (page 16-134).



End of Task

TA141463

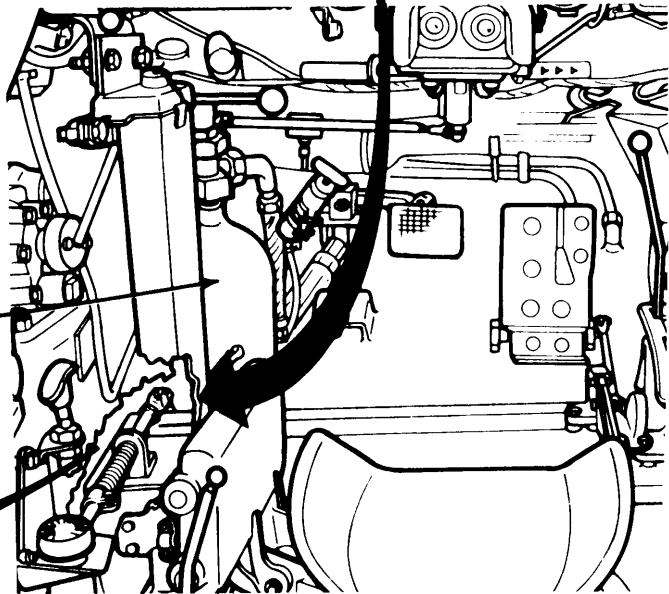
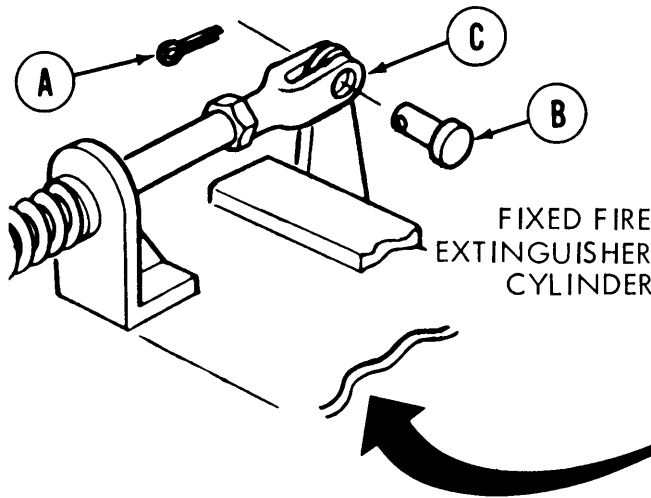
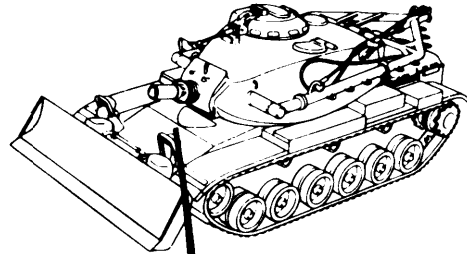
ACCELERATOR TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-442
Cleaning and Inspection	7-444
Installation	7-444

TOOLS: 1/2 in. combination box and open end wrench
 Slip joint pliers
 7/16 in. combination box and open end wrench
 Mechanic's scribe
 Torque wrench with 1/2in. drive (0-1751b-ft) (0-237Nm)
 1/2 in. crowfoot wrench with 1/2 in. drive
 Hinged handle with 1/2 in. drive

SUPPLIES: Cotter pin (MS24665-281)(2 required)
 Rags (Item 65, Appendix D)
 Dry cleaning solvent (Item 54, Appendix D)
 Pencil and paper
 Lockwasher (MS35338-44)



REMOVAL:

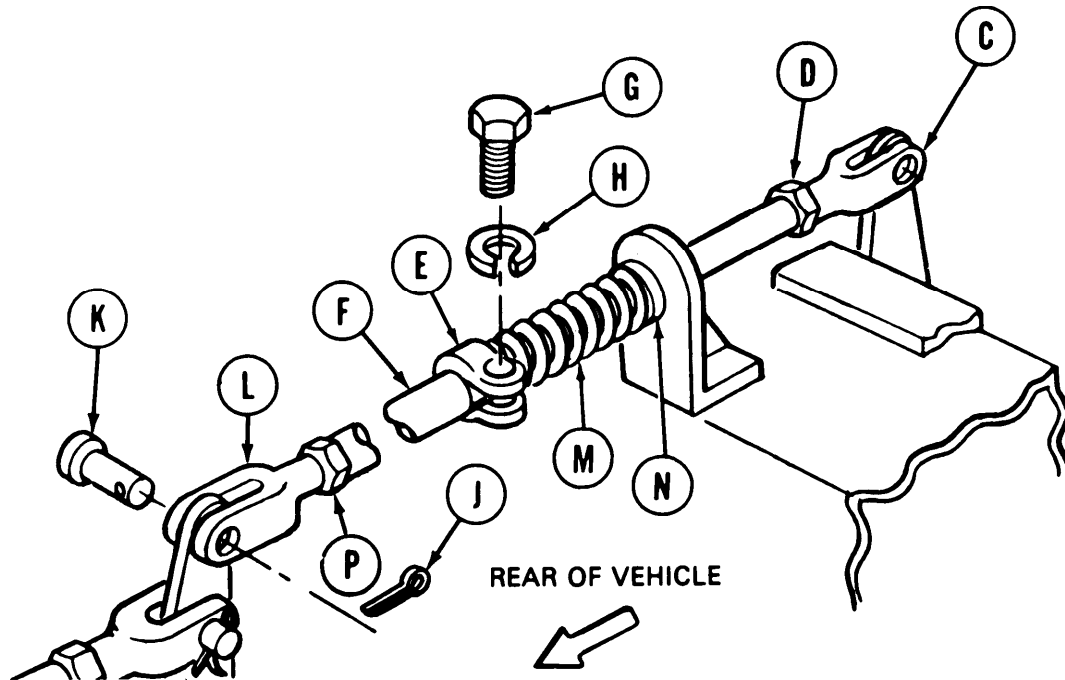
NOTE

Remove fixed fire extinguisher cylinder, if necessary to perform task (page 21-49).

1. Using pliers, remove cotter pin (A) from pin (B), Throw cotter pin away.
2. Remove pin (B) from clevis (C).
Go on to Sheet 2

TA148118

ACCELERATOR TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 4)



3. Using 1/2 inch wrench, loosen nut (D) from clevis (C).
4. Using pencil, mark location of clamp (E) on tube (F).

Using 7/16 inch wrench, remove screw (G) and lockwasher (H) from clamp (E). Throw lockwasher away.

NOTE

Count and write down number of turns needed to unscrew clevis (C).

6. Unscrew clevis (C) and nut (D) from tube (F).
7. Using pliers, remove cotter pin (J) from pin (K). Throw cotter pin away.
8. Remove pin (K) from clevis (L).
9. Pull tube (F) toward rear of vehicle and remove tube (F).
10. Remove clamp (E), spring (M), and flat washer (N) from tube (F).
11. Using 1/2 inch wrench, loosen jamnut (P) while holding clevis (L) with pliers.

NOTE

Count and write down number of turns needed to unscrew clevis (L).

12. Unscrew clevis (L) and jamnut (P) from tube (F).

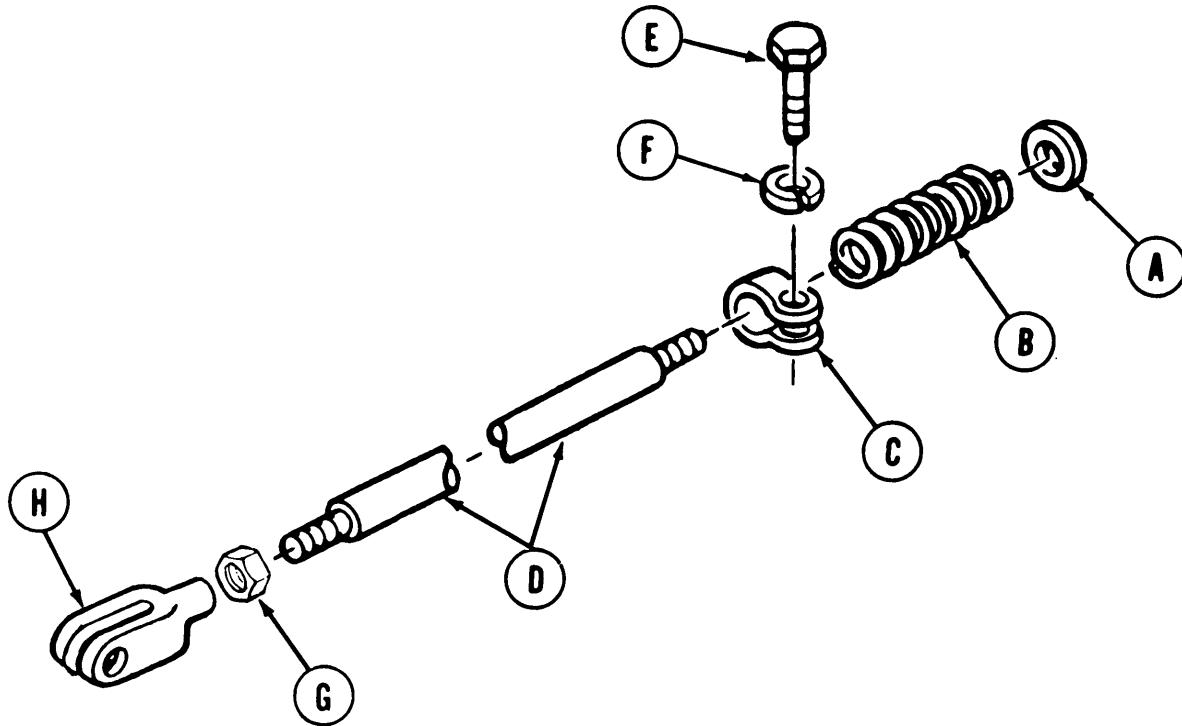
Go on to Sheet 3

TA149119

ACCELERATOR TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 4)

CLEANING AND INSPECTION:

1. Clean all parts, using dry cleaning solvent (Item 54, Appendix D) and clean rags (Item 65, Appendix D).
2. Inspect all parts for bends, cracks, stripped threads, wear, or other defects. Replace defective parts.



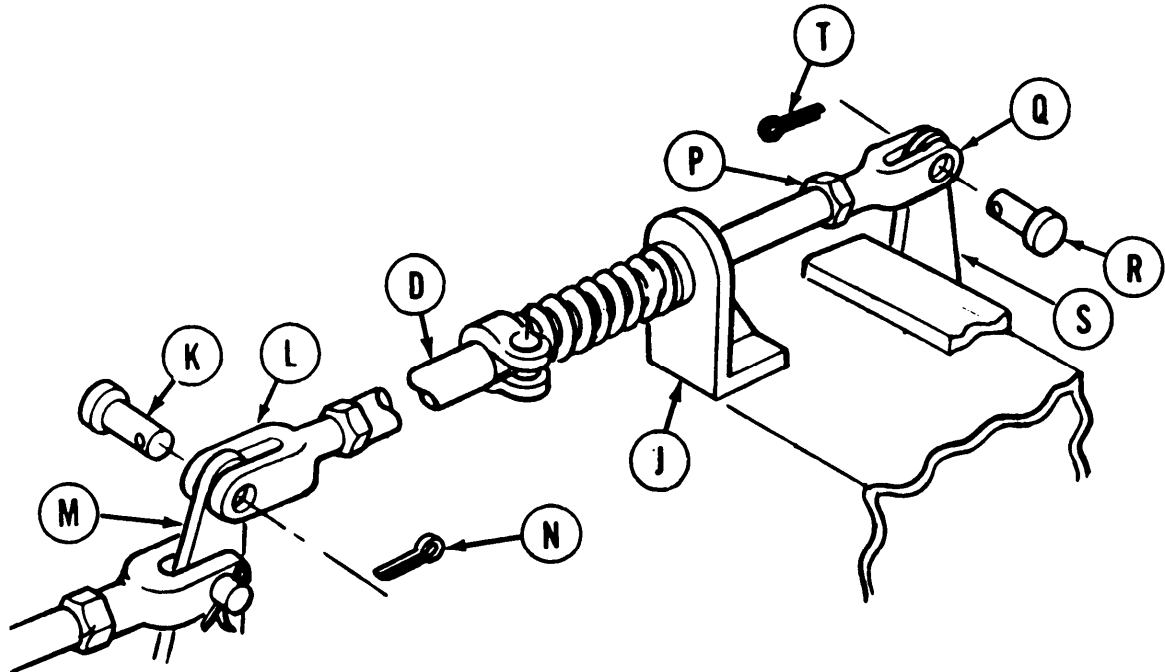
INSTALLATION:

1. Install flat washer (A), spring (B), and clamp (C) on tube (D) with clamp (C) on pencil mark on tube (D).
2. Using 7/16 inch wrench, install screw (E) and new lockwasher (F) in clamp (C).
3. Screw jamnut (G) all the way on tube (D).
4. Screw clevis (H) on tube (D) the recorded number of turns.
5. Using torque wrench and crowfoot, tighten jamnut (G) against clevis (H) to 13-15 lb-ft (18-20 N•m) while holding clevis (H) with pliers.

Go on to Sheet 4

TA141464

ACCELERATOR TUBE ASSEMBLY REPLACEMENT (Sheet 4 of 4)



6. Push tube (D) through hole in bracket (J).
7. Install pin (K) in clevis (L) and lever (M) while pushing tube (D) toward front of vehicle.
8. Using pliers, install new cotter pin (N) in pin (K).
9. Screw jamnut (P) all the way on tube (D).
10. Screw clevis (Q) on tube (D) the recorded number of turns.
11. Using torque wrench and crowfoot wrench, tighten jamnut (P) against clevis (Q) to 13-15 lb-ft (18-20 N•m) while holding clevis (Q) with Pliers
12. Install pin (R) in clevis (Q) and lever (S).
13. Using pliers, install new cotter pin (T) on pin (R).
14. Press accelerator foot pedal and make sure linkage operates smoothly. If linkage does not operate smoothly, replace any missing parts and remove things in the way.
15. Adjust pedal return spring (page 7-423).
16. Install fixed fire extinguisher cylinder, if cylinder was removed (page 21-51).

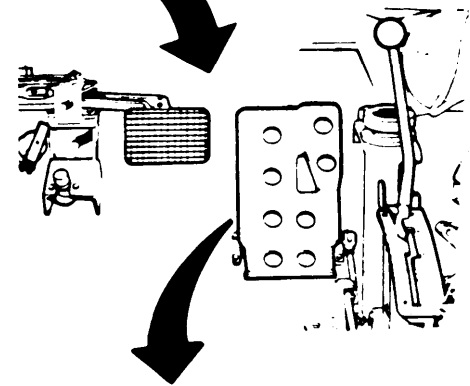
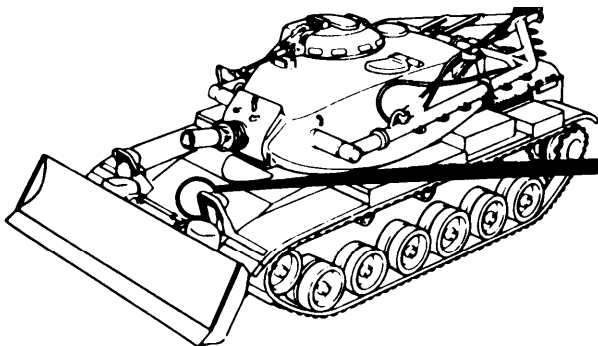
End of Task

TA141465

ACCELERATOR PEDAL ASSEMBLY REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	7-446
Cleaning and Inspection	7-448
Installation	7-448

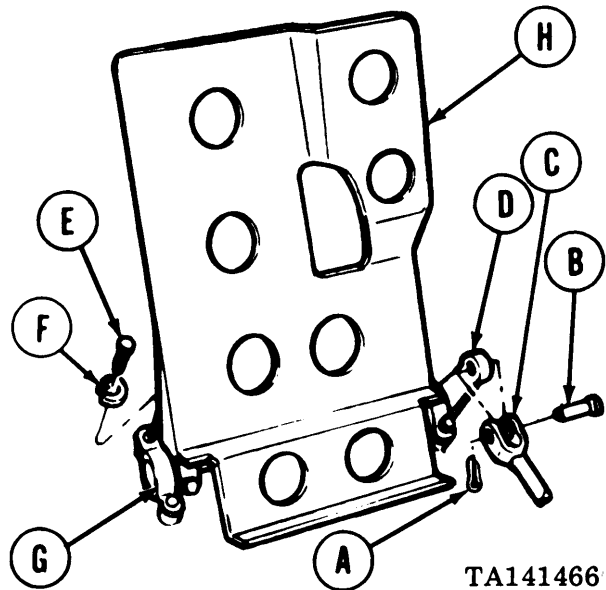


TOOLS: 7/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 9/16 in. combination box and open end wrench
 (2 required)
 Slip joint pliers
 3 in. extension with 1/2 in. drive
 Retaining ring pliers (outside)

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Cotter pin (MS24665-281)
 Lockwasher (MS35338-44) (6 required)
 Rags (Item 65, Appendix D)

REMOVAL:

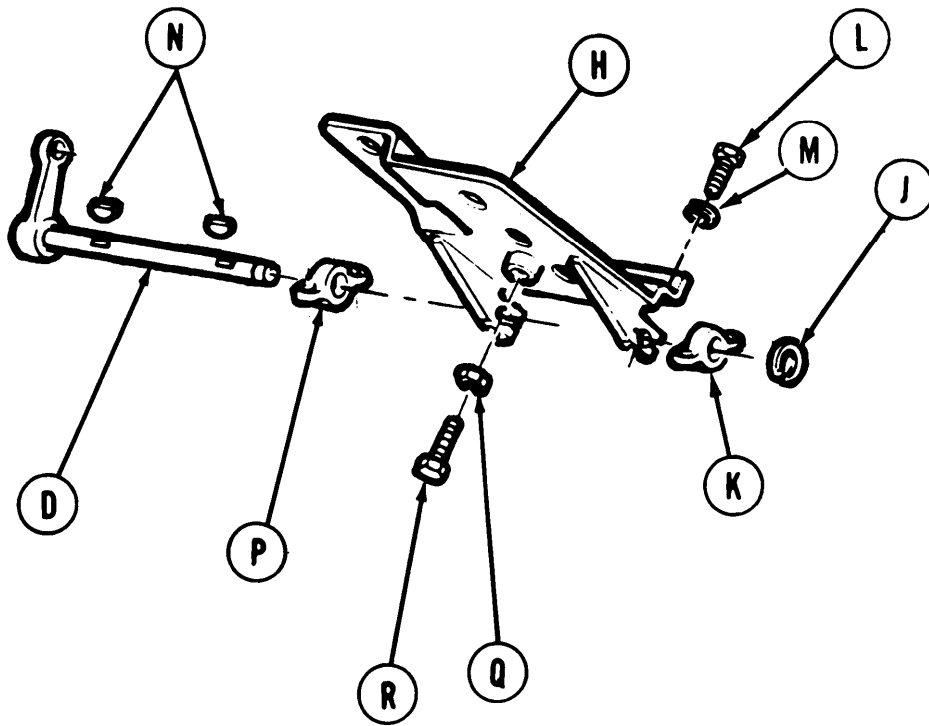
- Using pliers, remove cotter pin (A) from pin (B). Throw cotter pin away,
- Pull pin (B) out of connecting link (C) and out of lever rod (D).
- Using socket, remove four screws (E) and lockwashers (F) from two bearing units (G). Throw lockwashers away. Remove accelerator pedal assembly (H) from vehicle.



Go on to Sheet 2

TA141466

ACCELERATOR PEDAL ASSEMBLY REPLACEMENT (Sheet 2 of 4)



4. Using retaining ring pliers, remove retaining ring (J) from lever rod (D).
5. Remove bearing (K).
6. Using socket, remove two screws (L) and lockwashers (M) from pedal (H). Throw lockwashers away.
7. Pull lever rod (D) out of holes in pedal (H).
8. Remove two woodruff keys (N) from lever rod (D).
9. Remove bearing unit (P) from lever rod (D).
10. Using wrench, loosen jamnut (Q) while holding pedal travel stop (R) with wrench.
11. Unscrew pedal travel stop (R) and jamnut (Q) from pedal (H).
12. Remove jamnut (Q) from pedal travel stop (R).

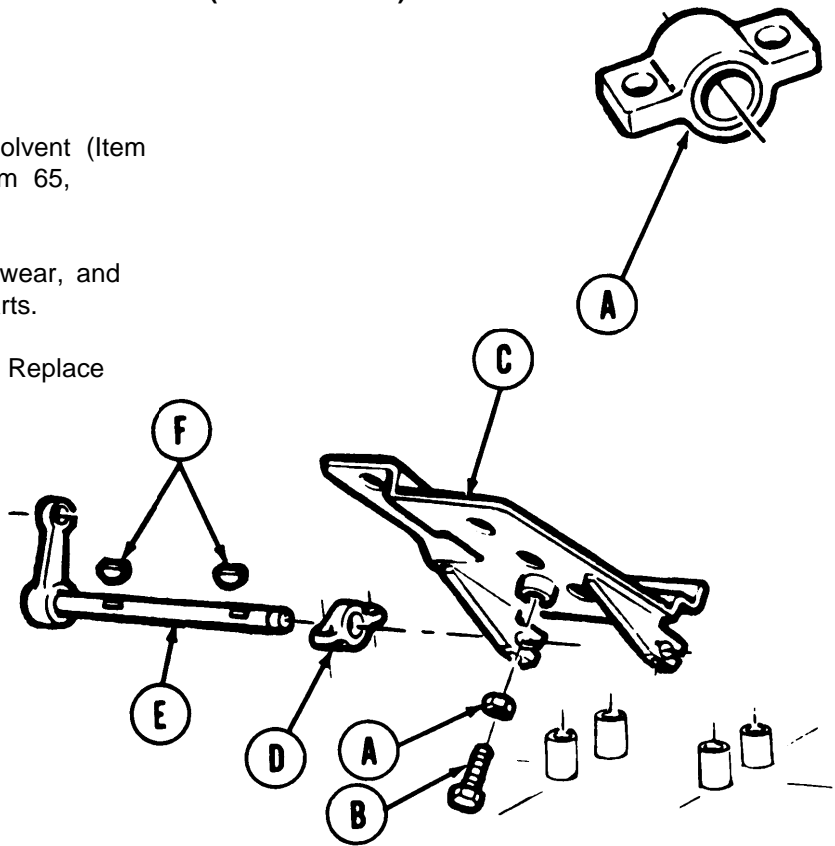
Go on to Sheet 3

TA141467

ACCELERATOR PEDAL ASSEMBLY REPLACEMENT (Sheet 3 of 4)

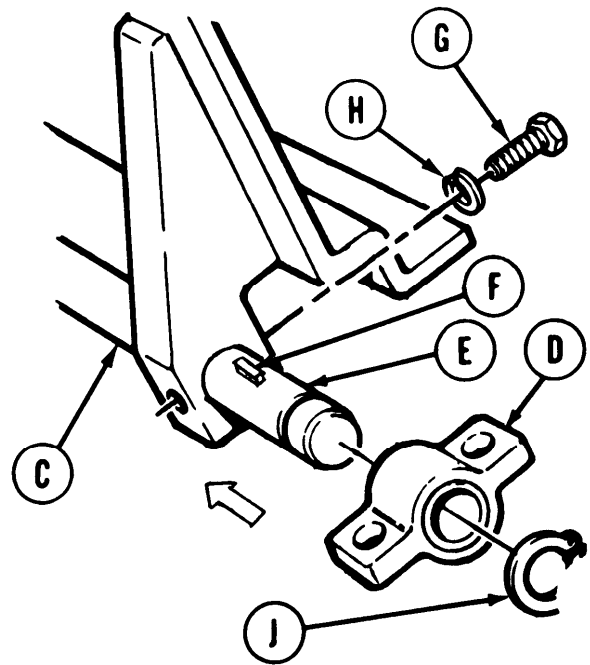
CLEANING AND INSPECTION:

1. Clean all parts with dry cleaning solvent (Item 64, Appendix D) and cl&n rags &m 65, Appendix D).
2. Inspect all parts for cracks, bends, wear, and other defects. Replace defective parts.
3. Inspect bearing units (A) for wear. Replace defective bearing units (A).



INSTALLATION:

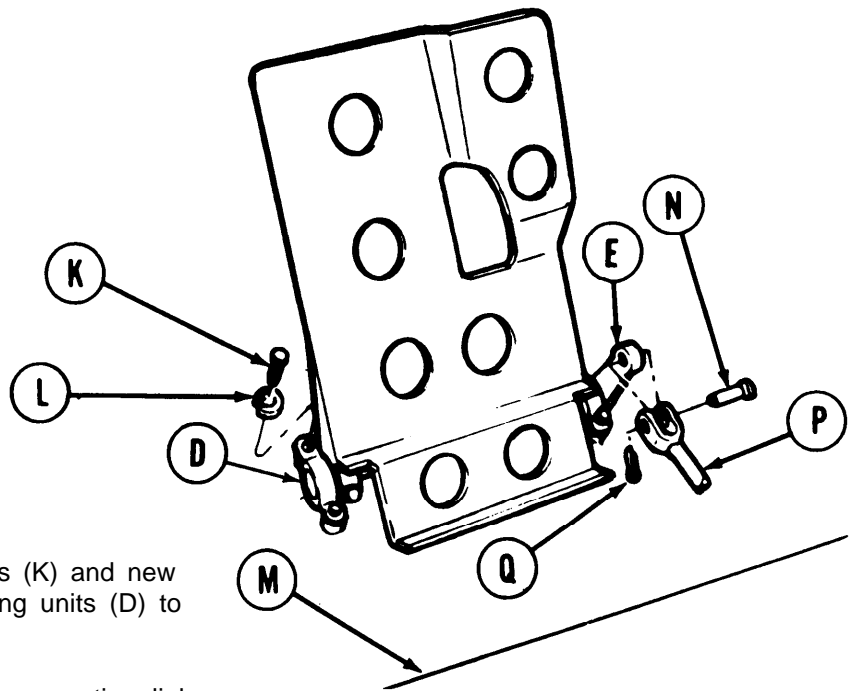
1. Install jamnut (A) on pedal travel stop (B).
2. Finger tighten pedal travel stop (B) on pedal (c).
3. Install one bearing unit (D) all the way on lever rod (E).
4. Install two woodruff keys (F) in lever rod (E).
5. Push lever rod (E) through holes in pedal (C) until woodruff keys (F) fit in slots in pedal (C).
6. Using socket, install two screws (G) and new lockwashers (H) in holes in pedal (C).
7. Slide bearing unit (D) on end of lever rod (E).
8. Using retaining ring pliers, install retaining ring (J) on lever rod (E).



Go on to Sheet 4

TA141468

ACCELERATOR PEDAL ASSEMBLY REPLACEMENT (Sheet 4 of 4)



9. Using socket, install four screws (K) and new lockwashers (L) attaching bearing units (D) to hull floor (M).
10. Install pin (N) through hole in connecting link (P) and hole in lever rod (E).
11. Using pliers, install new cotter pin (Q) in pin (N).
12. Adjust pedet travel stop (page 7-421, steps 45 thru 48).

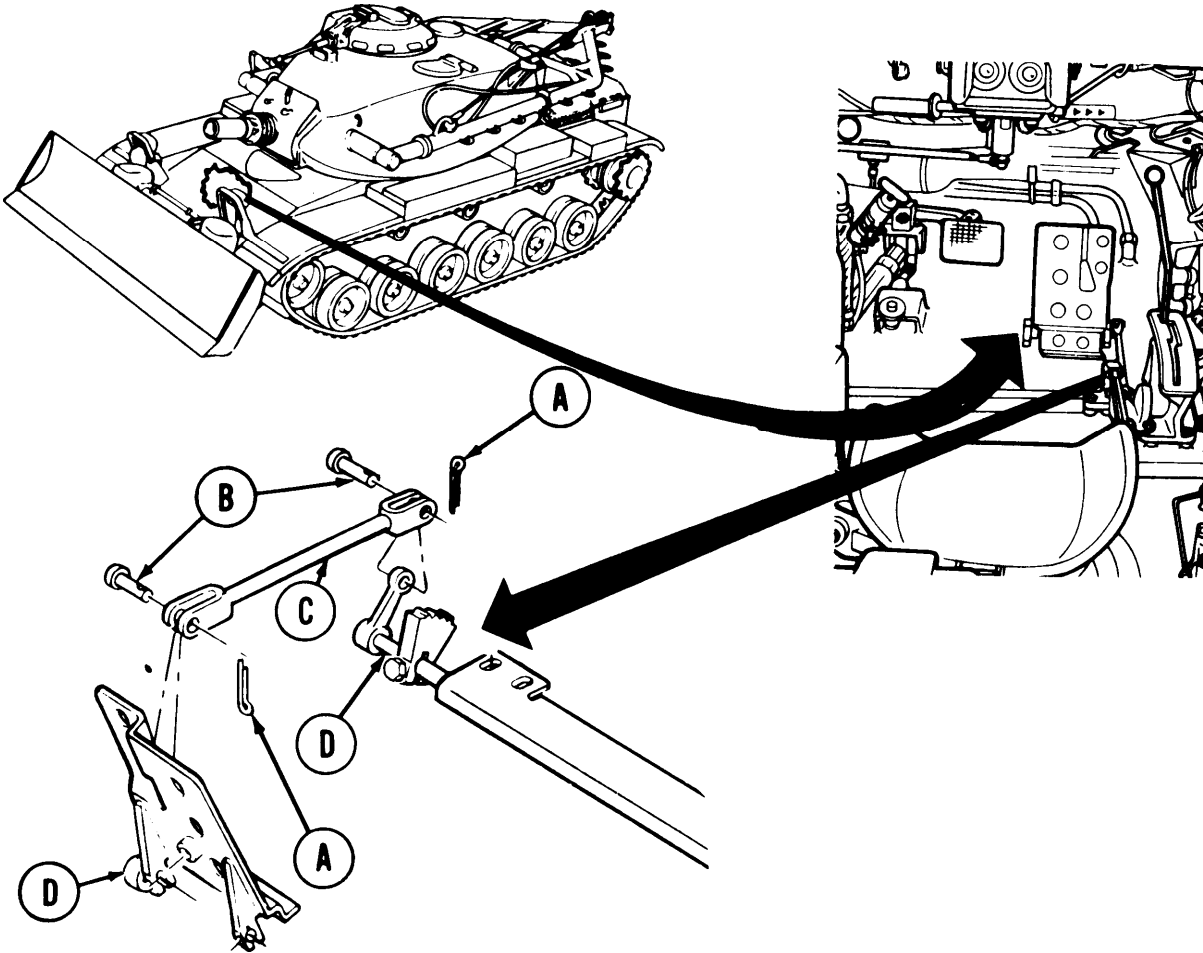
End of Task

TA141469

ACCELERATOR CONNECTING LINK REPLACEMENT (Sheet 1 of 1)

TOOLS: Slip joint pliers

SUPPLIES: Cotter pin (MS24665-281) (2 required)



REMOVAL:

1. Using pliers, remove two cotter pins (A). Throw cotter pins (A) away.
2. Remove two pins (B) from connecting link (C).
3. Remove connecting link (C).

INSTALLATION:

1. Install two pins (B) through holes in connecting link (C) and holes in two lever rods (D).
2. Using pliers, install two new cotter pins (A) in holes in two pins (B).

End of Task

TA149120

ACCELERATOR BULKHEAD FLANGE ASSEMBLY NUT REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

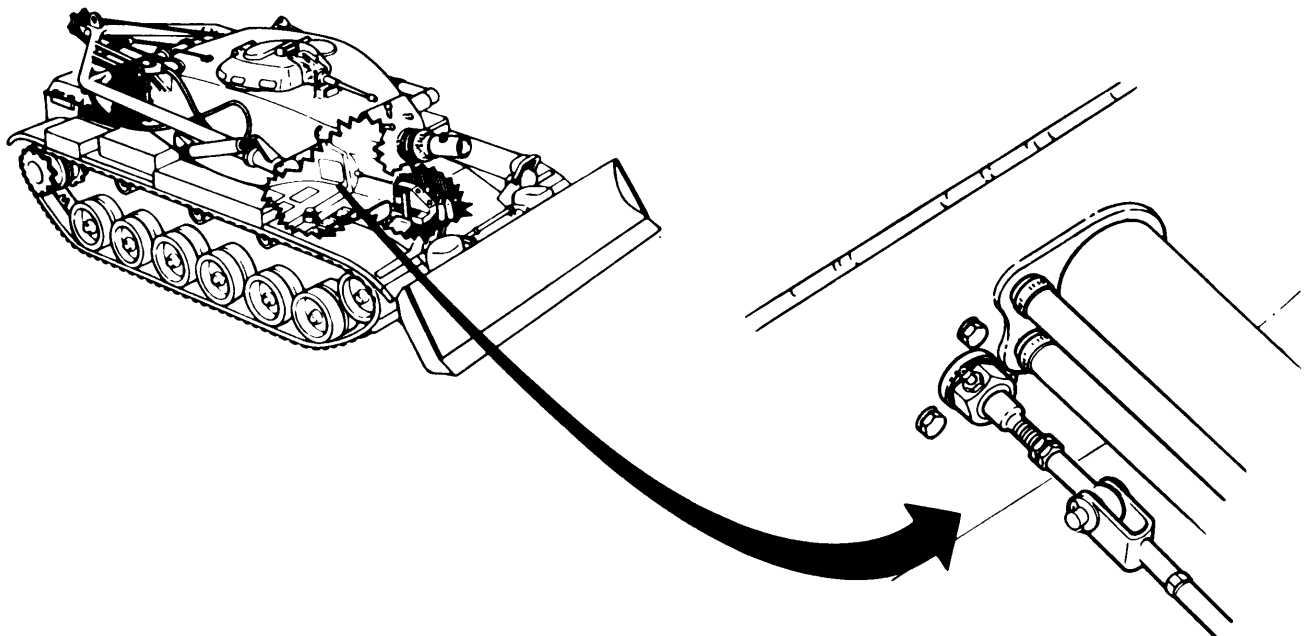
PROCEDURE	PAGE
Removal	7-452
Cleaning and Inspection	7-453
Installation	7-453

TOOLS: 1-7/16 in. open end wrench
 7/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 3/8 in. combination box and open end wrench
 Slip joint pliers
 3/32 in. socket head screw key (allen wrench)

SUPPLIES: Cotter pin (MS24665-132)
 Rags (Item 65, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Traverse turret to gain access through turret access cover
 (TM 9-2350-222-10)



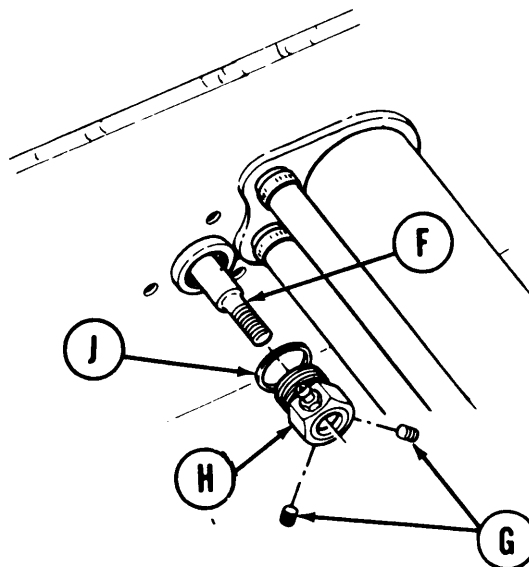
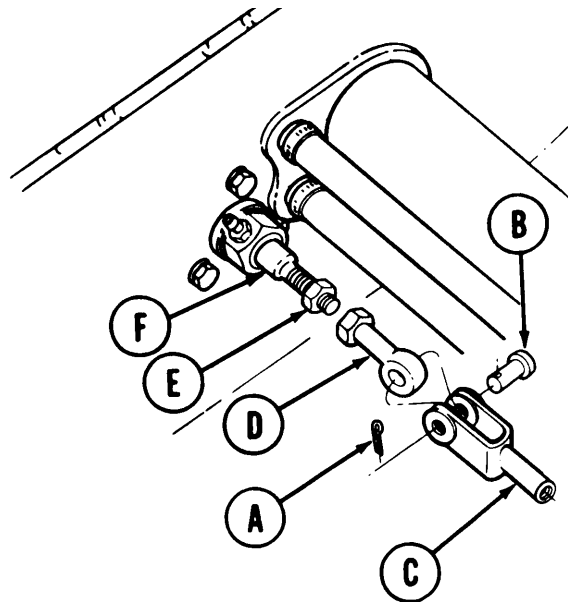
Go on to Sheet 2

TA149121

ACCELERATOR BULKHEAD FLANGE ASSEMBLY NUT REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using pliers, remove cotter pin (A) from pin (B). Throw cotter pin away.
2. Using fingers, remove pin (B) from clevis (C) and rod end (D).
3. Using hand, separate clevis (C) from rod end (D).
4. Using 1/2 inch wrench, loosen jamnut (E) on rod assembly (F).
5. Using 7/16 inch wrench, remove rod end (D),
6. Using allen wrench, remove two setscrews (G).
7. Using 1-7/16 inch wrench, remove nut (H) and washer (J).
8. Slide nut (H) off end of rod assembly (F). Remove nut (H) from vehicle.



Go on to Sheet 3

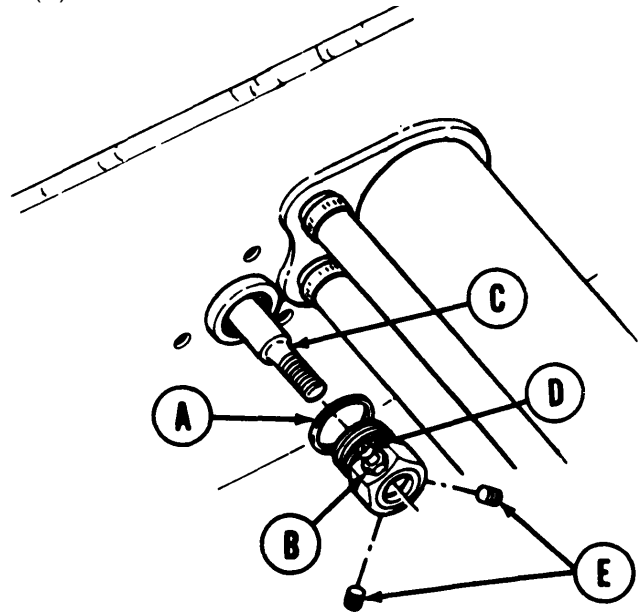
TA149122

ACCELERATOR BULKHEAD FLANGE ASSEMBLY NUT REPLACEMENT (Sheet 3 of 4)**CLEANING AND INSPECTION:**

1. Using rags (Item 65; Appendix D), clean nut.
2. Inspect grease fitting and seal for damage. Replace any damaged parts.

INSTALLATION:

1. Install washer (A) and nut (B) on rod assembly (C).
2. Using 1-7/16 inch wrench, tighten nut (B).
3. Check that grease fitting (D) is in uppermost hole in nut (B). If not, use 3/8 inch wrench and move grease fitting to uppermost hole.
4. Using allen wrench, install two setscrews (E) in nut (B).

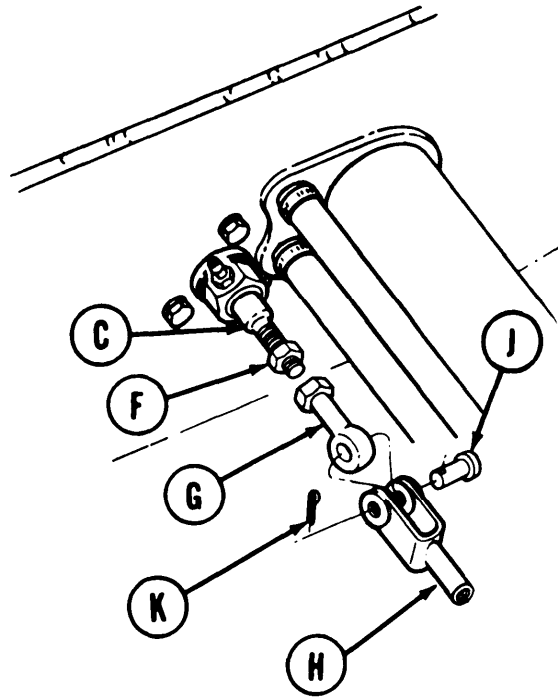


Go on to Sheet 4

TA149123

ACCELERATOR BULKHEAD FLANGE ASSEMBLY NUT REPLACEMENT (Sheet 4 of 4)

5. Using fingers, turn jamnut (F) on rod assembly (C).
6. Using 7/16 inch wrench, install rod end (G) on rod assembly (C). Turn rod end (G) until hole in rod end (G) is alined with holes in clevis (H).
7. Using 1/2 inch wrench, tighten jamnut (F) against rod end (G).
8. Using hands, position rod end (G) in clevis (H) and aline holes.
9. Install pin (J) through clevis (H) and rod end (G).
10. Using fingers, install new cotter pin (K) in pin (J).
11. Using pliers, bend ends of cotter pin (K) around pin (J).
12. Check adjustment of accelerator linkage (page 7-415).



End of Task

TA149124

ACCELERATOR BULKHEAD FLANGE ASSEMBLY NUT REPAIR (Sheet 1 of 2)

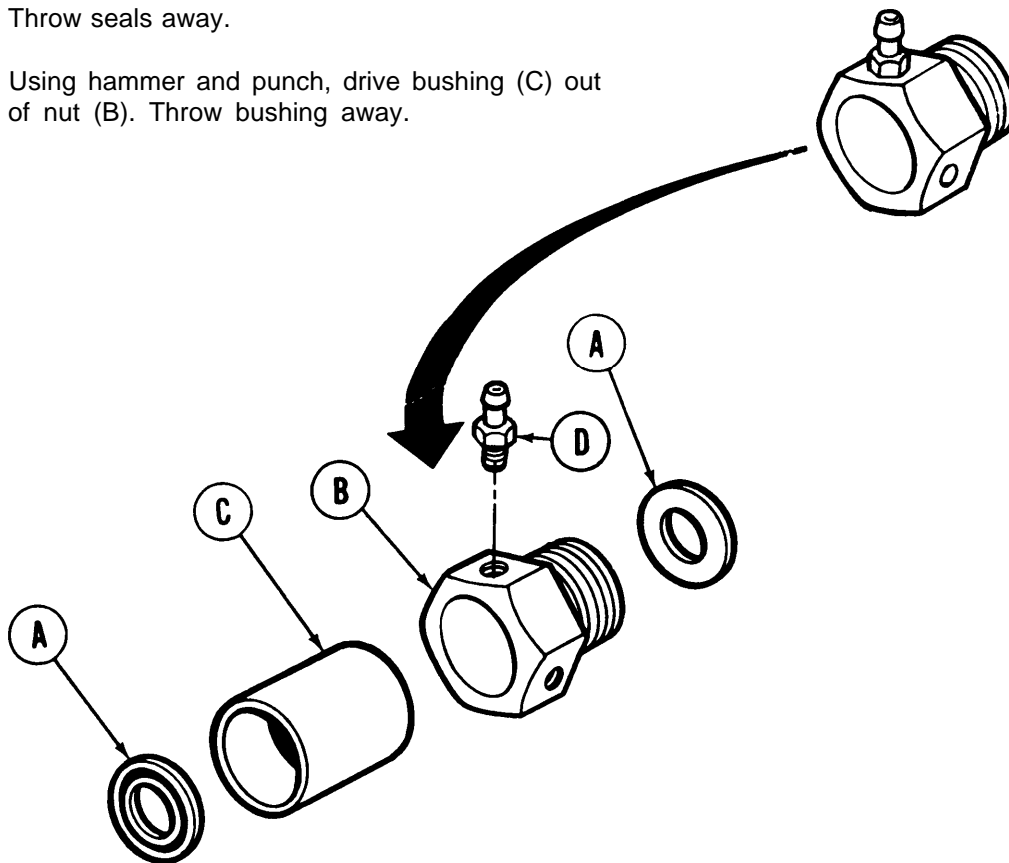
TOOLS: Vise
 Hammer
 5/8 in. drive punch
 3/8 in. combination box and open end wrench

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Seal (871 1329) (2 required)
 Bushing (7992946)
 Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURE: Remove flange assembly nut (page 7-452)

DISASSEMBLY:

1. Using hammer and punch, remove two seals (A).
2. Throw seals away.
3. Using hammer and punch, drive bushing (C) out of nut (B). Throw bushing away.
- 4.



Go on to Sheet 2

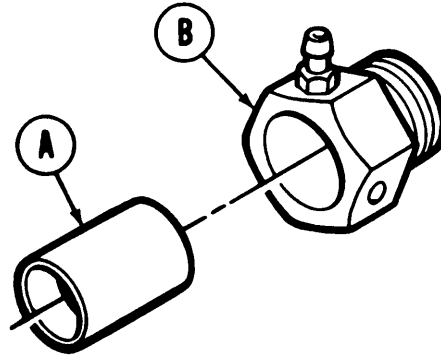
TA253215

Change 1 7-455

ACCELERATOR BULKHEAD FLANGE ASSEMBLY NUT REPAIR (Sheet 2 of 2)

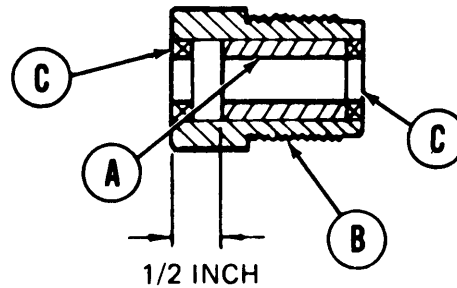
CLEANING AND INSPECTION:

1. Using clean rags and dry cleaning solvent clean bushing (A), nut (B), and fitting thoroughly.
2. Check bushing (A), nut (B), and fitting for damage or wear. Replace if required.

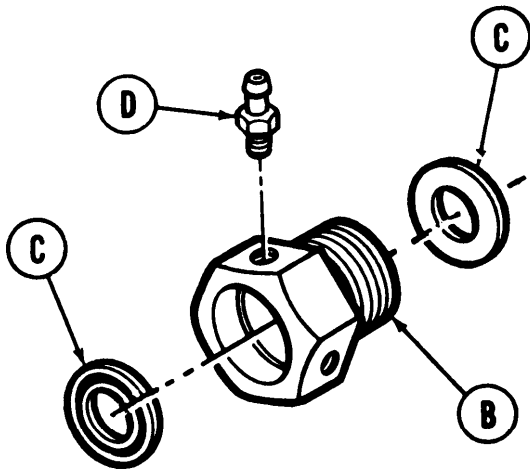


ASSEMBLY:

1. Position new bushing (A) in end of nut (B).
2. Place nut (B) and bushing (A) in vise.
3. Tighten vise against bushing (A) and nut (B) until bushing (A) is fully inserted in nut (B).
4. Remove nut (B) from vise.
5. Using old bushing or hammer and punch, insert bushing 1/2 inch into nut as shown.



6. Using fingers, press new seals (C) into ends of nut (B). Install seals (C) with lips outward.
7. Using wrench, install fitting (D) on nut (B).
8. Install nut (page 7-453).



End of Task

TA253321

CHAPTER 8

EXHAUST SYSTEM MAINTENANCE INDEX

PROCEDURE	PAGE
Exhaust Pipe Cap Assembly Replacement	8-2
Exhaust Pipe (Left Side) Replacement	8-5
Exhaust Pipe (Right Side) Replacement	8-9
Intake Tube and Hose Replacement	8-13
Cap Assembly Replacement	8-14
Intermediate Scavenger Tube Replacement	8-17
Left Exhaust Ejector Tube Replacement	8-21
Right Exhaust Ejector Tube Replacement	8-25

TA249096

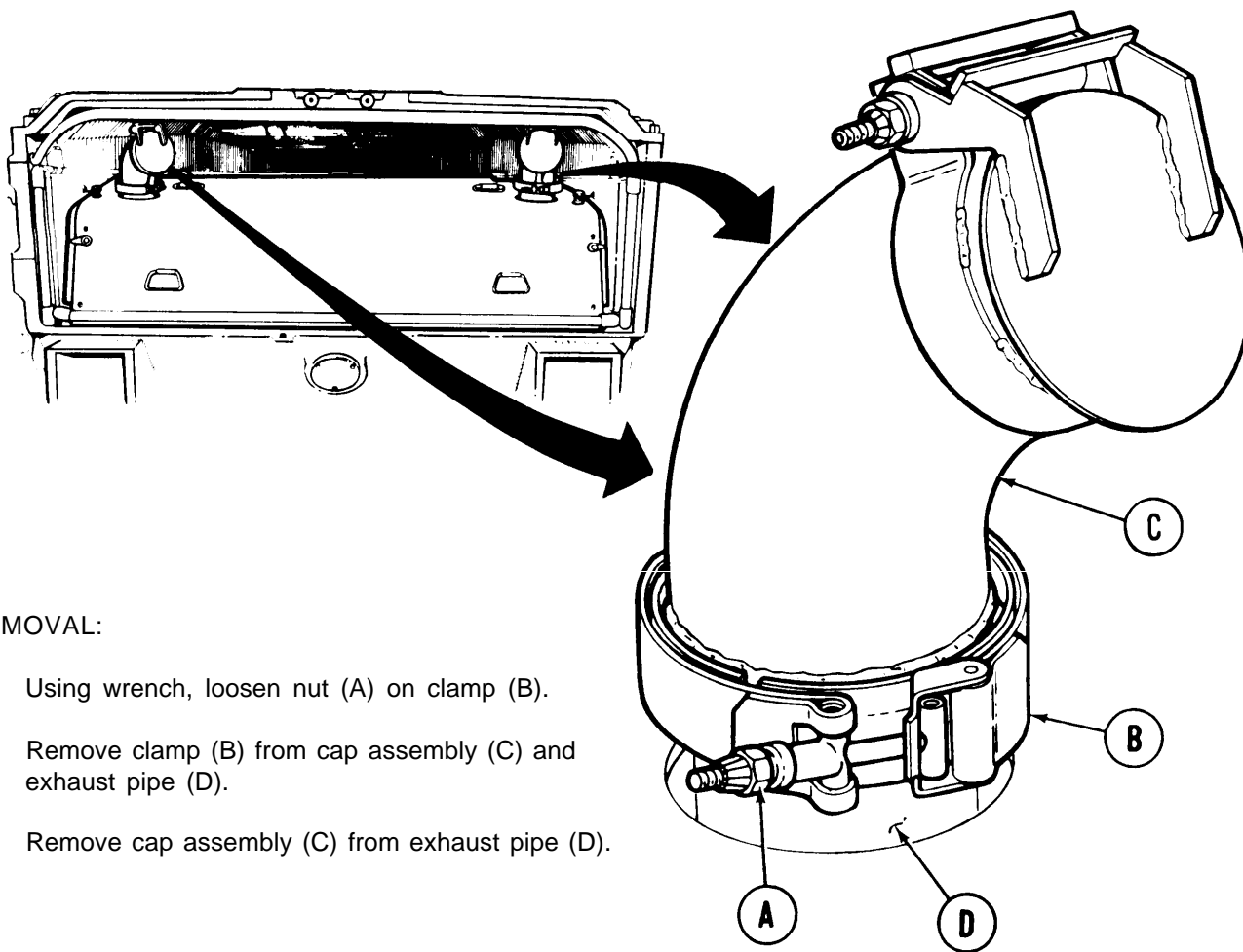
EXHAUST PIPE CAP ASSEMBLY REPLACEMENT (Sheet 1 of 3)

TOOL: 7/16 in. combination box and open end wrenches (2 required)

SUPPLIES: Self-locking nut (MS20500-428)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Open engine exhaust doors (TM 9-2350-222-10)



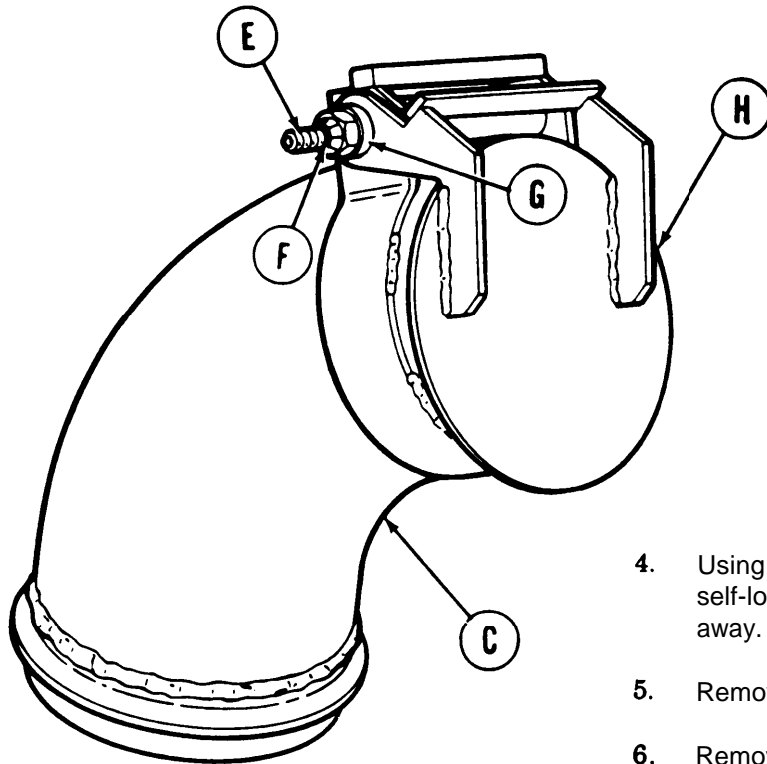
REMOVAL:

1. Using wrench, loosen nut (A) on clamp (B).
2. Remove clamp (B) from cap assembly (C) and exhaust pipe (D).
3. Remove cap assembly (C) from exhaust pipe (D).

Go on to Sheet 2

TA249097

EXHAUST PIPE CAP ASSEMBLY REPLACEMENT (Sheet 2 of 3)

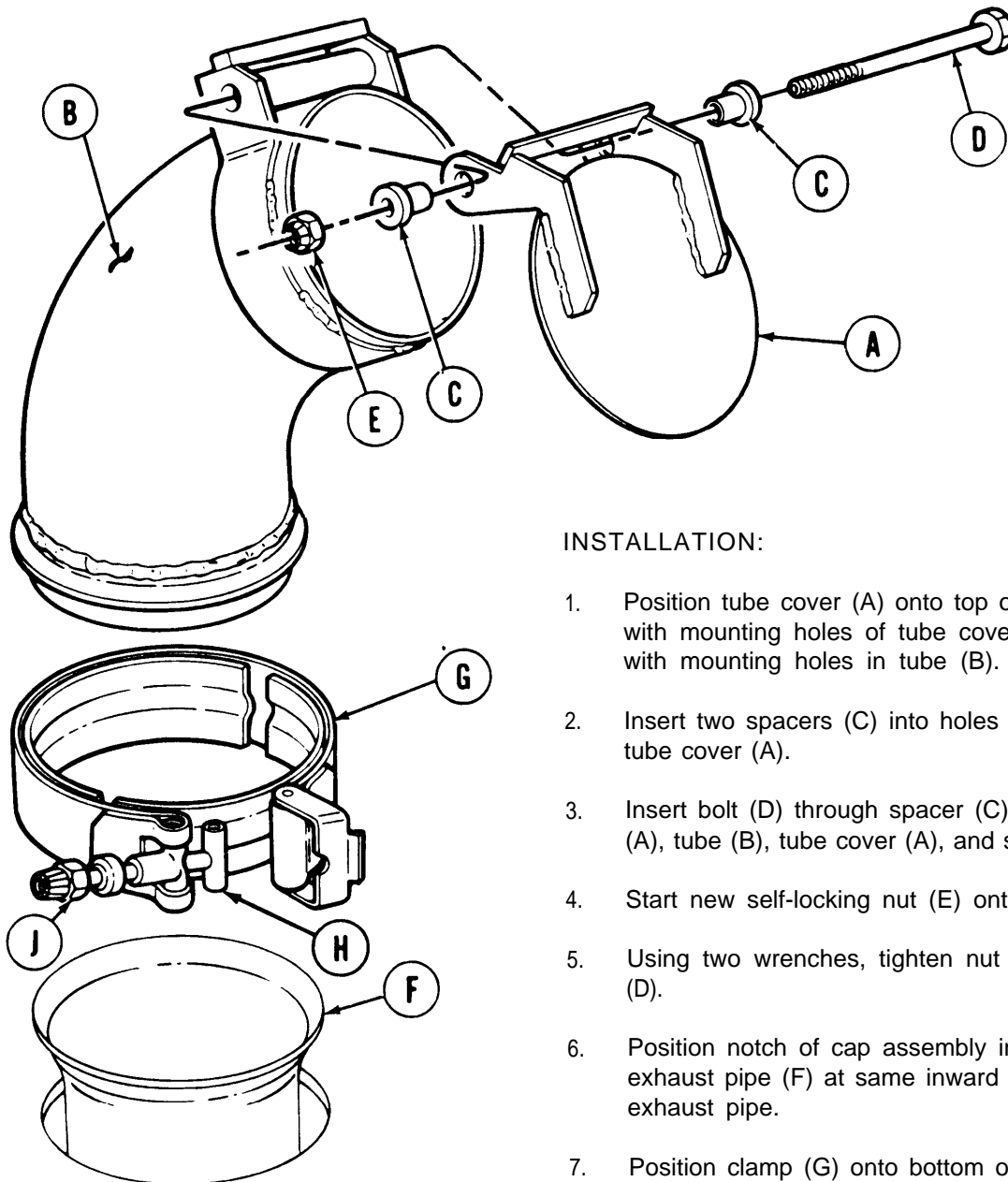


4. Using two wrenches, remove screw (E) and self-locking nut (F). Throw self-locking nut away.
5. Remove two spacers (G) from tube cover (H).
6. Remove tube cover (H) from tube (C).

Go on to Sheet 3

TA140457

EXHAUST PIPE CAP ASSEMBLY REPLACEMENT (Sheet 3 of 3)



INSTALLATION:

1. Position tube cover (A) onto top of tube (B) with mounting holes of tube cover (A) aligned with mounting holes in tube (B).
2. Insert two spacers (C) into holes in top of tube cover (A).
3. Insert bolt (D) through spacer (C), tube cover (A), tube (B), tube cover (A), and spacer (C).
4. Start new self-locking nut (E) onto bolt (D).
5. Using two wrenches, tighten nut (E) to bolt (D).
6. Position notch of cap assembly into notch of exhaust pipe (F) at same inward angle as exhaust pipe.
7. Position clamp (G) onto bottom of cap assembly and exhaust pipe (F). Latch clamp together with bolt (H).
8. Using wrench, tighten nut (J) on clamp (G) to hold cap assembly to exhaust pipe (F).
9. Close engine exhaust doors (TM 9-2350-222-10).

End of Task

TA140458

EXHAUST PIPE (LEFT SIDE) REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

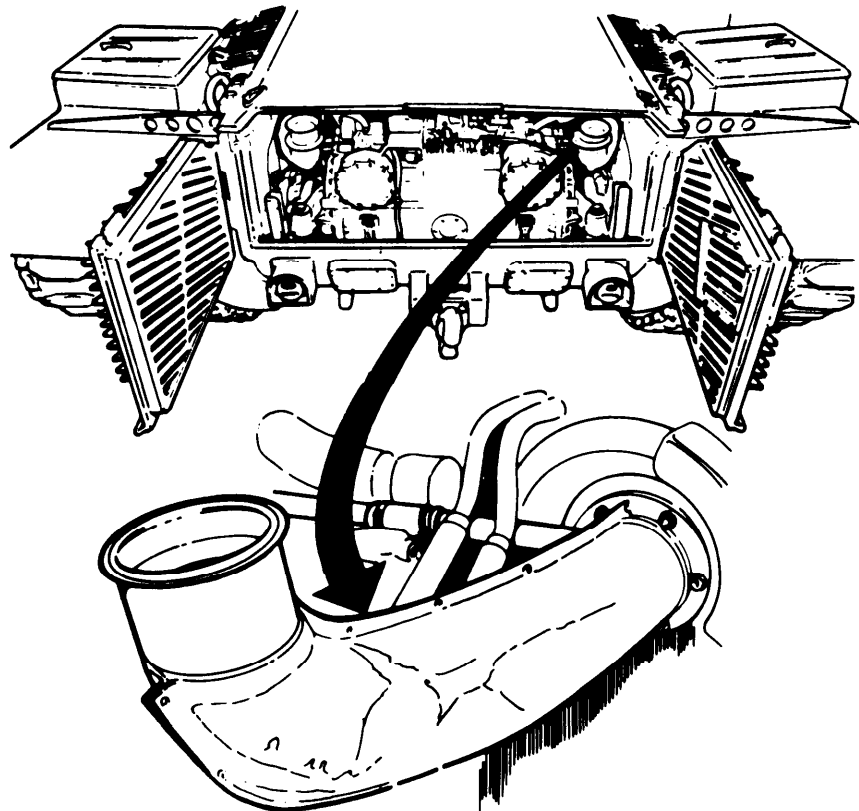
PROCEDURE	Page
Removal	8-6
Installation	8-7

TOOLS: Ratchet with 1/2 in. drive
 10 in. extension with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 Flat-tip screwdriver
 Cross-tip screwdriver
 5/16 in. combination box and open end wrench

SUPPLIES: Gasket (10864007)
 Self-locking nut (11640132) (6 required)
 Lockwasher (MS35338-58) (14 required)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURES: Open top grille doors (TM 9-2350-222-10)
 Remove transmission shroud (page 9-20).



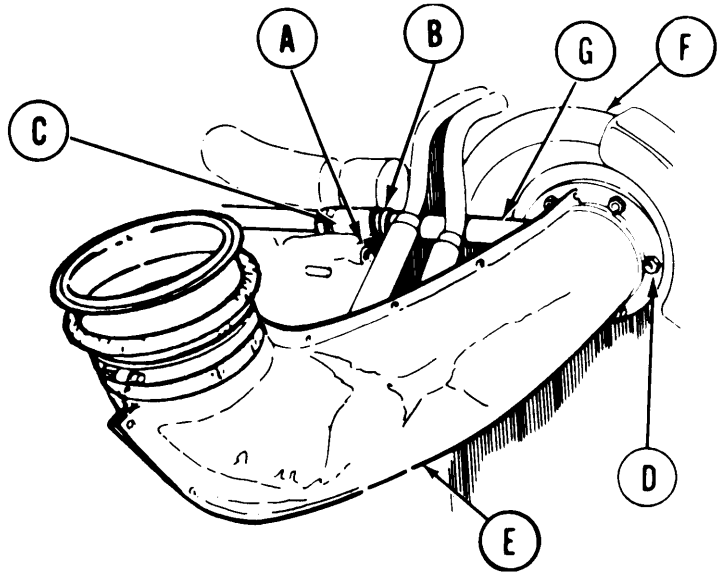
Go on to Sheet 2

TA140459

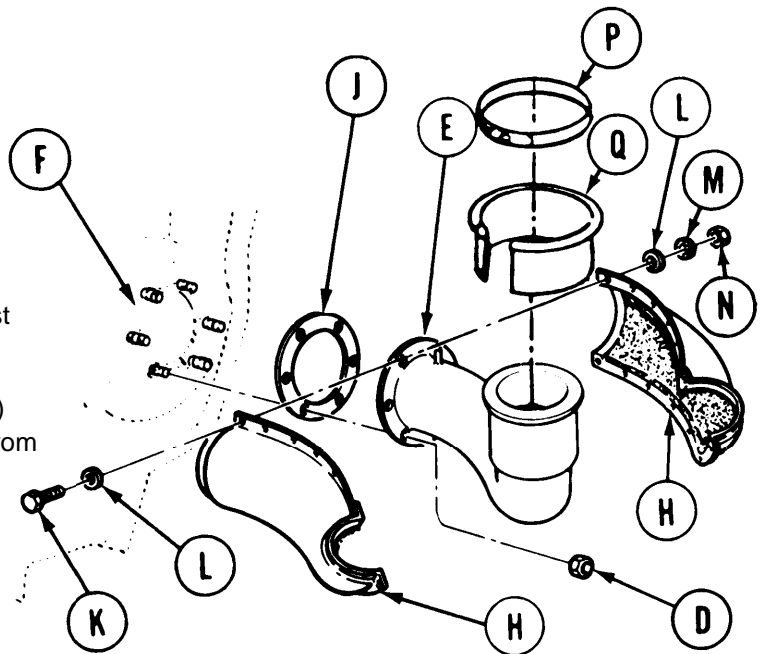
EXHAUST PIPE (LEFT SIDE) REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using flat-tip screwdriver, loosen screw (A) holding clamp (B) onto tube (C).



2. Using socket, remove six self-locking nuts (D) holding exhaust pipe (E) to turbosupercharger housing (F). Throw self-locking nuts (D) away.
3. Sliding exhaust pipe extension (G) out of tube (C), remove exhaust pipe (E) with insulation halves (H) and gasket (J) from turbosupercharger housing (F). Throw gasket (J) away.



4. Using cross-tip screwdriver and wrench, remove 14 screws (K), each with two flat washers (L), one lockwasher (M), and one nut (N) holding insulation halves (H) to exhaust pipe (E). Throw lockwashers (M) away.
5. Using flat-tip screwdriver, remove clamp (P) from packing (Q). Remove packing (Q) from pipe (E).

6. Remove insulation halves (H) from exhaust pipe (E).

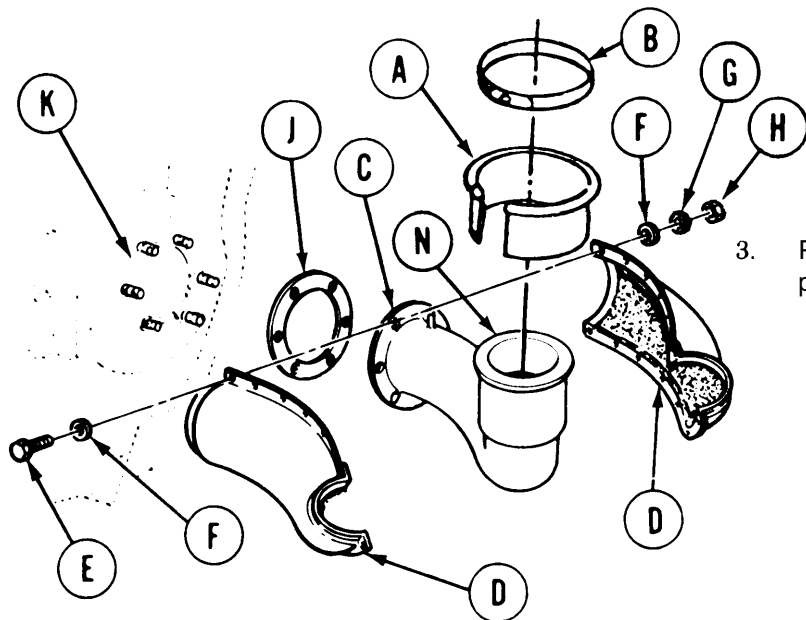
Go on to Sheet 3

TA140460

EXHAUST PIPE (LEFT SIDE) REPLACEMENT (Sheet 3 of 4)

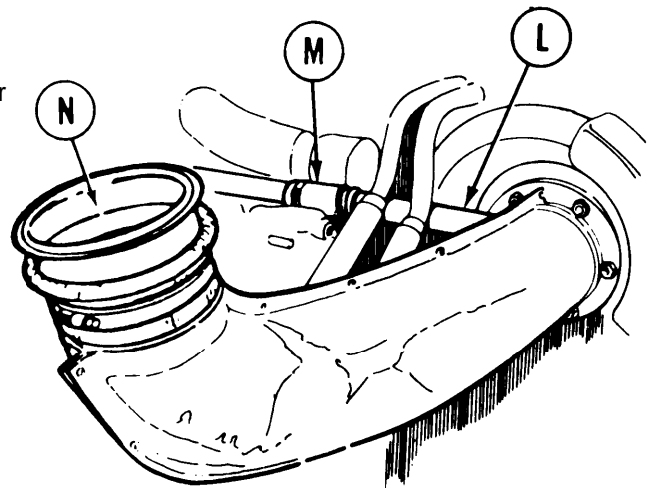
INSTALLATION:

1. Position packing (A) and clamp (B) onto pipe (C) and, using flat-tip screwdriver, tighten screw on clamp (B), securing packing to pipe (C).
2. Check insulation halves (D) and all attaching hardware for damage. Replace if necessary.



3. Position insulation halves (D) onto exhaust pipe (C).

4. Using wrench and cross-tip screwdriver, install 14 screws (E), each with two flat washers (F), one new lockwasher (G), and one nut (H) to hold insulation halves (D) to exhaust pipe (C).
5. Position new gasket (J) onto turbosupercharger housing (K).
6. Slide exhaust pipe extension (L) into tube (M) as far as it will go.
7. Position exhaust pipe (C) with installed insulation halves (D) onto turbosupercharger housing (K). Make sure exhaust port (N) is pointing up.



Go on to Sheet 4

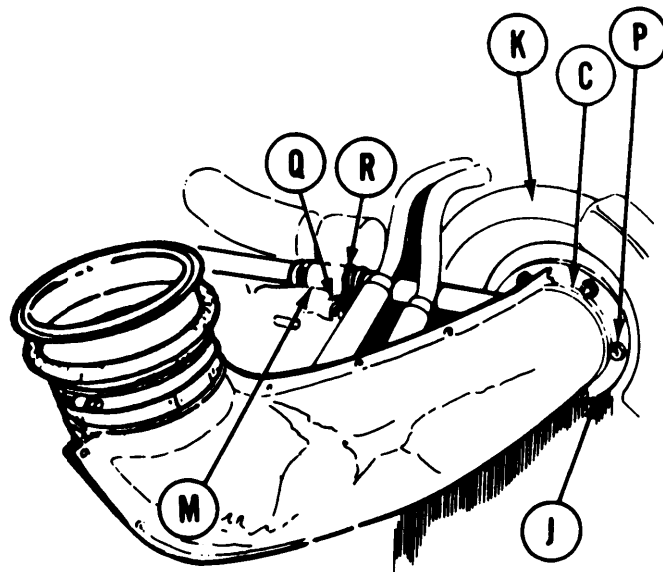
TA140461

EXHAUST PIPE (LEFT SIDE) REPLACEMENT (Sheet 4 of 4)

8. Manually start six new self-locking nuts (P) to hold exhaust pipe (C) to turbosupercharger housing (K).

9. Using socket, tighten six nuts (P).

10. Using flat-tip screwdriver, tighten screw (Q) to hold clamp (R) onto tube (M).



11. Start engine. Check for exhaust leaks around exhaust pipe gasket (J) and tube (M).

12. Install transmission shroud (page 9-23).

13. Close top grille doors (TM 9-2350-222-10).

End of Task

TA140462

EXHAUST PIPE (RIGHT SIDE) REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

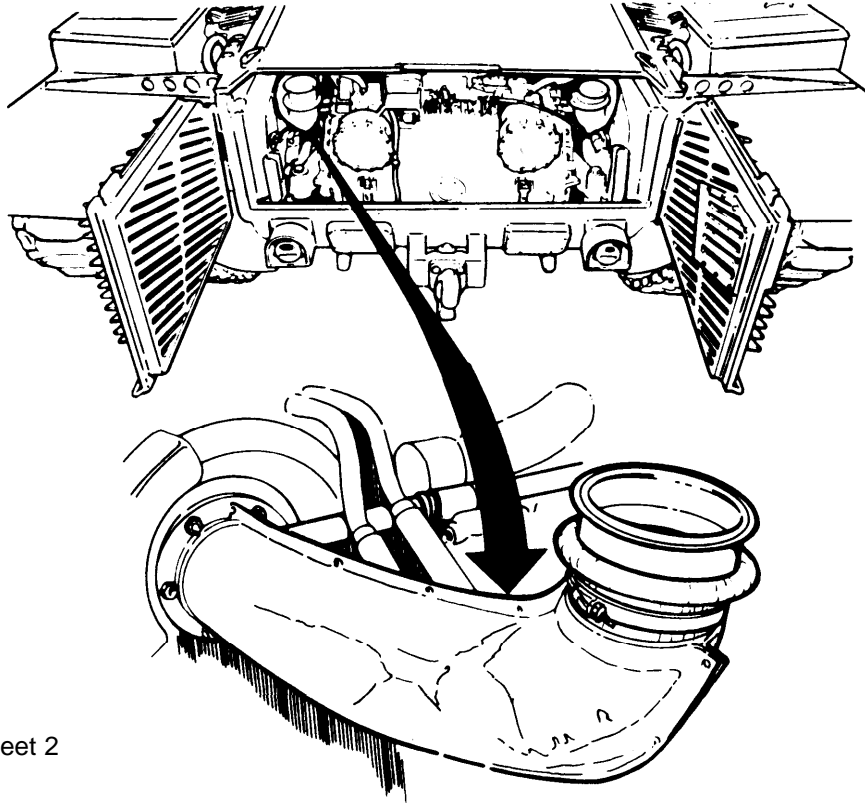
PROCEDURE	PAGE
Removal	8-10
Installation	8-11

TOOLS: Ratchet with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 7/8 in. combination box and open end wrench
 Cross-tip screwdriver
 5/16 in. combination box and open end wrench
 10 in. extension with 1/2 in. drive
 Hammer
 9/16 in. combination box and open end wrench
 Flat-tip screwdriver
 10 in. adjustable wrench

SUPPLIES: Gasket (10864007)
 Self-locking nut (11640132) (6 required)
 Lockwasher (MS35338-58) (14 required)

REFERENCE: TM 9-2350-222-10

RELIMINARY PROCEDURES: Open top deck grille doors (TM 9-2350-222-10)
 Remove transmission shroud (page 9-20)



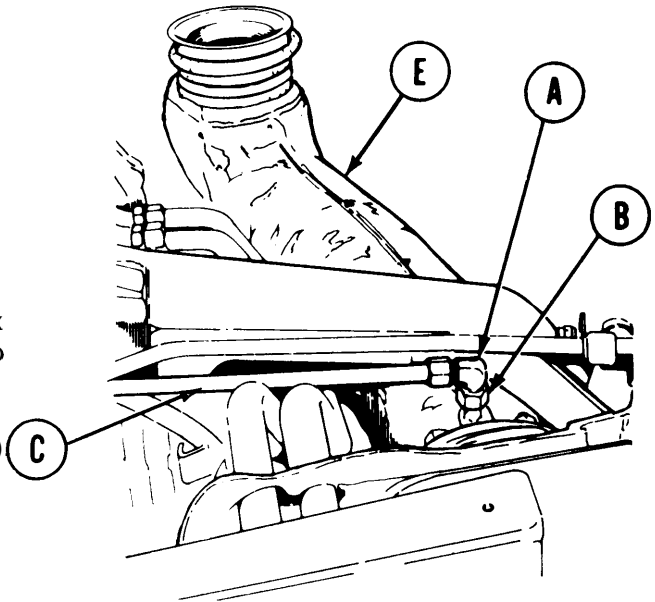
Go on to Sheet 2

TA140463

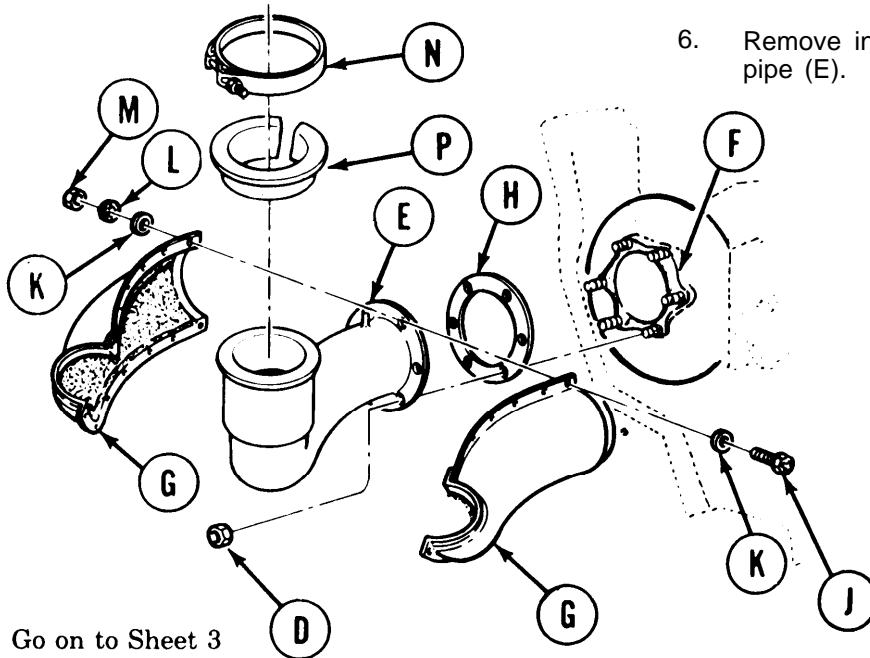
EXHAUST PIPE (RIGHT SIDE) REPLACEMENT (Sheet 2 of 4)

REMOVAL:

1. Using adjustable wrench to hold elbow (A), use 7/8 inch wrench and loosen fitting (B).
2. Using hammer, tap elbow (A) and lift tube (C) from exhaust pipe.
3. Using socket and 9/16 inch wrench, remove six self-locking nuts (D) holding exhaust pipe (E) to turbosupercharger housing (F). Remove exhaust pipe (E) with insulation halves (G) and gasket (H) from turbosupercharger housing (F). Throw gasket (H) and self-locking nuts (D) away.



4. Using cross-tip screwdriver and 5/16 inch wrench, remove 14 screws (J), each with two flat washers (K), one lockwashers (L), and one nut (M) holding insulation halves (G) to exhaust pipe (E). Throw lockwashers (L) away.
5. Using flat-tip screwdriver, remove clamp (N) from packing (P). Remove packing (P) from pipe (E).
6. Remove insulation halves (G) from exhaust pipe (E).



Go on to Sheet 3

TA140464

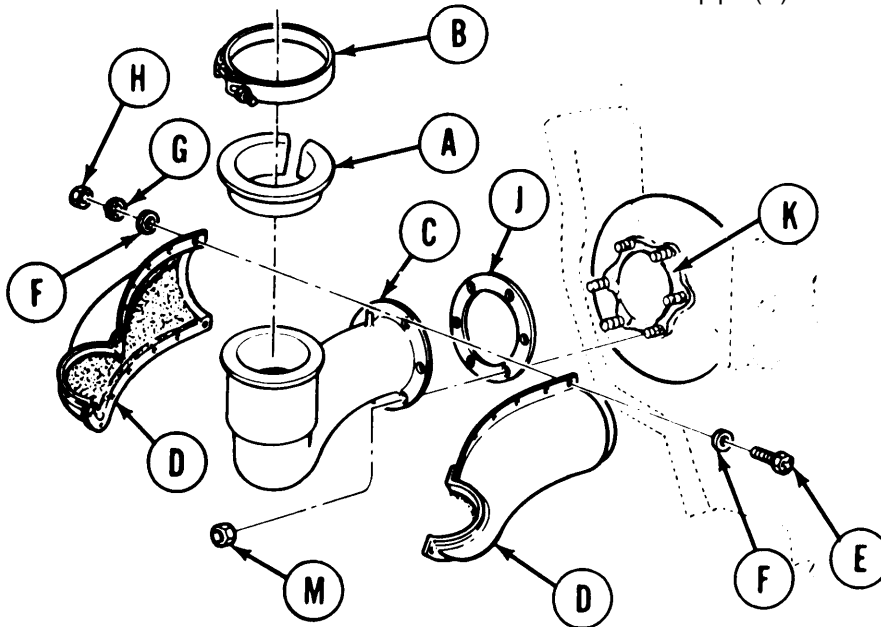
EXHAUST PIPE (RIGHT SIDE) REPLACEMENT (Sheet 3 of 4)

INSTALLATION:

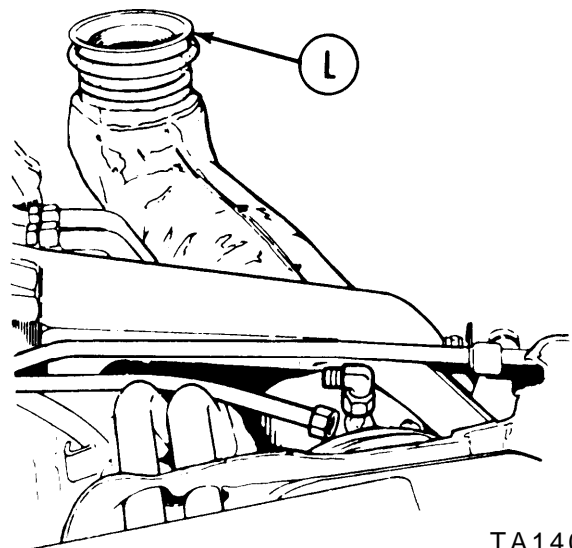
Position packing (A) and clamp (E) onto pipe (C) and, using flat-tip screwdriver, tighten screw on clamp (B) securing packing to pipe (C).

2. Check insulation halves (D) and all attaching hardware for damage. Replace if necessary.

3. Position insulation halves (D) onto exhaust pipe (C).



4. Using 5/16 inch wrench and cross-tip screwdriver, install 14 screws (E), each with two flat washers (F), one new lockwasher (G), and one nut (H) to hold insulation halves (D) to exhaust pipe (C).
5. Position new gasket (J) onto turbosupercharger housing (K).
6. Position exhaust pipe (C) with installed insulation halves (D) onto turbosupercharger housing (K). Make sure exhaust port (L) is pointing up.
7. Using 9/16 inch socket and 9/16 inch wrench, install six new self-locking nuts (M) securing exhaust pipe to housing.

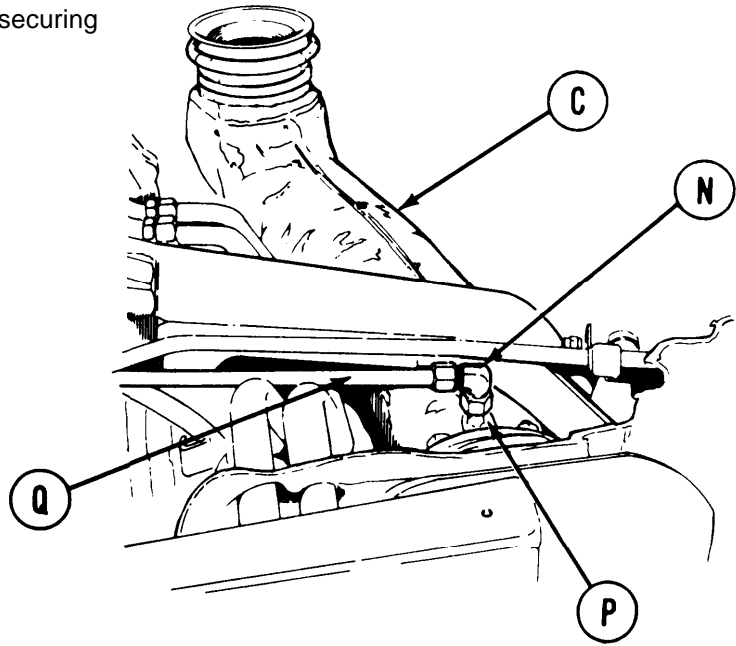


Go on to Sheet 4

TA140465

EXHAUST PIPE (RIGHT SIDE) REPLACEMENT (Sheet 4 of 4)

8. Using hands, position elbow (N) into nut (P).
9. Using 7/8 inch wrench, tighten nut (P) securing tube (Q) to exhaust pipe (C).



10. Start engine. Check for exhaust leaks around exhaust pipe gasket and transmission breather tube (Q) connections.
11. Install transmission shroud (page 9-23).
12. Close top deck grille doors (TM 9-2350-222-10).

End of Task

TA140466

INTAKE TUBE AND HOSES REPLACEMENT (Sheet 1 of 1)

TOOLS: 1/4 in. flat-tip screwdriver

SUPPLIES: Silicone compound (Item 32, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Open top deck grille doors (TM 9-2350-222-10)

REMOVAL:

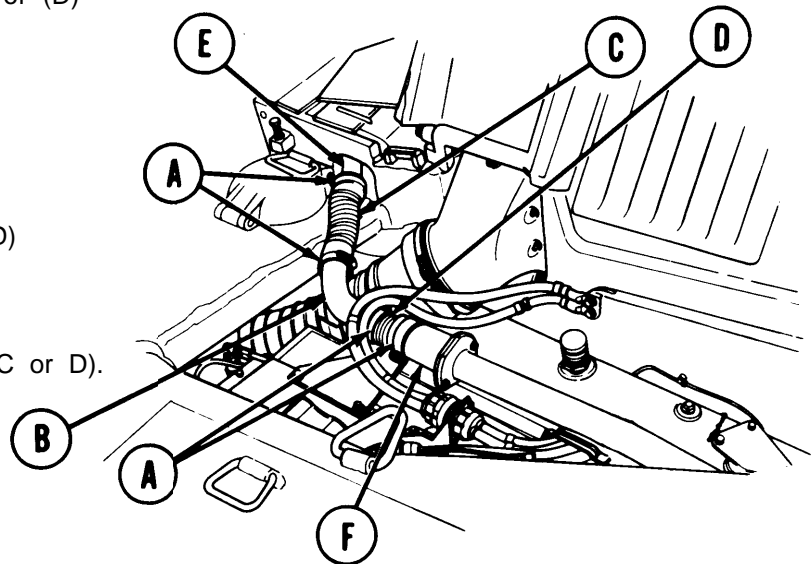
NOTE

Replacement of left or right intake tubes and hoses is the same.

1. Using screwdriver, loosen clamps (A) and remove tube (B) or hose (C) or (D) as required.
2. Remove clamps (A).

INSTALLATION:

1. Lightly coat inside ends of hose (C or D) with silicone compound (Item 32, Appendix D)
2. Install two clamps (A) onto hose (C or D).



3. Install hose (C) onto manifold (E) and tube (B). Using screwdriver, tighten clamps (A).
4. Install hose (D) onto tube (B) and cap assembly (F). Using screwdriver, tighten clamps (A).

End of Task

TA249098

CAP ASSEMBLY REPLACEMENT (Sheet 1 of 3)

TOOLS: 1/4 in. flat-tip screwdriver
1/2 in. combination box and open end wrench
1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
7/16 in. socket with 1/2 in. drive

SUPPLIES: Lockwasher (11657469-3)
Lockwasher (7410218)
Self-locking nut (MS21045-2)
Gasket (12275824)
Silicone compound (Item 32, Appendix D)

REFERENCE: TM 9-2350-222-10

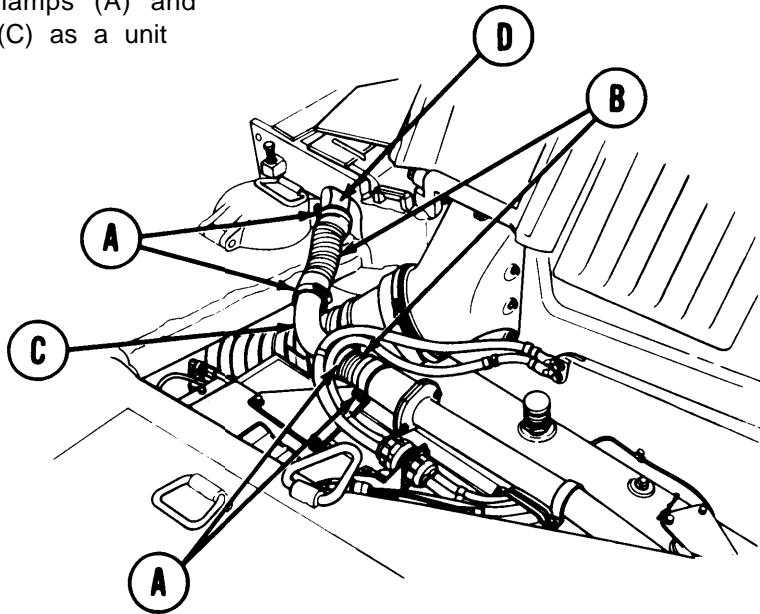
PRELIMINARY PROCEDURE: Open top deck grille doors (TM 9-2350-222-10)

REMOVAL:

NOTE

Replacement of left or right cap assembly is the same.

1. Using screwdriver, loosen clamps (A) and remove hoses (B) and tube (C) as a unit from manifold (D).

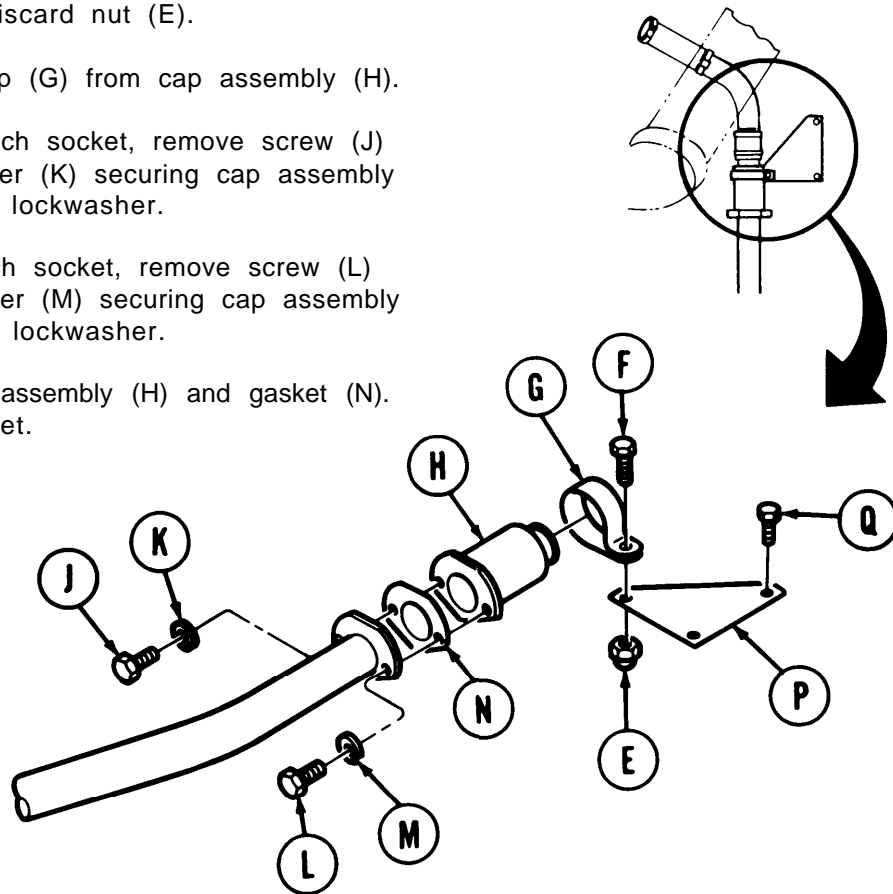


Go on to Sheet 2

TA249099

CAP ASSEMBLY REPLACEMENT (Sheet 2 of 3)

2. Using wrench to hold nut (E), use 1/2 inch socket and remove screw (F) securing clamp (G). Discard nut (E).
3. Remove clamp (G) from cap assembly (H).
4. Using 7/16 inch socket, remove screw (J) and lockwasher (K) securing cap assembly (H). Discard lockwasher.
5. Using 1/2 inch socket, remove screw (L) and lockwasher (M) securing cap assembly (H). Discard lockwasher.
6. Remove cap assembly (H) and gasket (N). Discard gasket.



7. Inspect bracket (P) for damage. If damaged and replacement is required, using 1/2 inch socket, remove two assembled washer screws (Q) securing bracket and remove bracket.

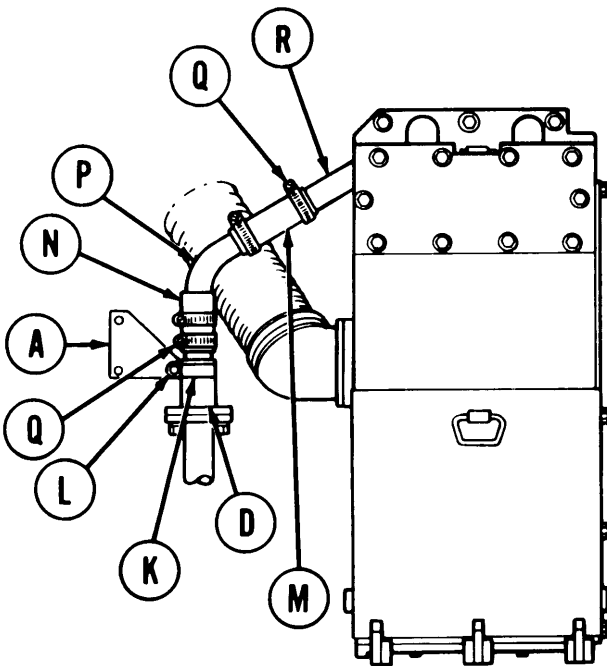
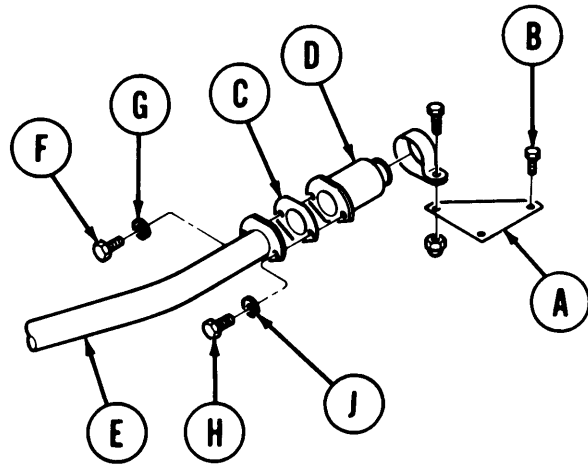
Go on to Sheet 3

TA249100

CAP ASSEMBLY REPLACEMENT (Sheet 3 of 3)

INSTALLATION:

1. If bracket (A) was removed, position new bracket (A) onto engine. Using 1/2 inch socket, install two screws (B) to secure bracket (A).
2. Position new gasket (C) and cap assembly (D) to intermediate tube assembly (E).
3. Using 7/16 inch or 1/2 inch socket, install but do not tighten screw (F) and new lockwasher (G) to secure cap assembly (D).
4. Using 1/2 inch or 7/16 inch socket, install screw (H) and new lockwasher (J) to secure cap assembly (D). Tighten two screws (F) and (H).



5. Install clamp (K) onto cap assembly (D).
6. Using 1/2 inch socket and wrench, install screw and new nut (L) to secure clamp (K) to bracket (A).
7. Coat ends of hoses (M and N) with silicone compound (Item 32, Appendix D).
8. Position hoses (M and N), tube (P), and clamps (Q), removed as a unit, to manifold (R) and cap assembly (D).
9. Using screwdriver, tighten clamps (G) to secure hoses (M and N) to manifold (R) and cap assembly (D).
10. Close top deck grille doors (TM 9-2350-222-10).

End of Task

TA249101

INTERMEDIATE SCAVENGER TUBE REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	8-17
Installation	8-19

TOOLS: 1/4 in. flat-tip screwdriver
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 1/2 in. combination box and open end wrench
 7/16 in. socket with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 9/16 in. combination box and open end wrench

SUPPLIES: Lockwasher (11657469-3)
 Lockwasher (7410218)
 Gasket (12275824)
 Self-locking nut (MS21045-5) (2 required)
 Self-locking nut (MS21045-6)
 Silicone compound (Item 32, Appendix D)

REFERENCE: TM 9-2350-222-10

PRELIMINARY PROCEDURE: Open top deck grille doors (TM 9-2350-222-10)

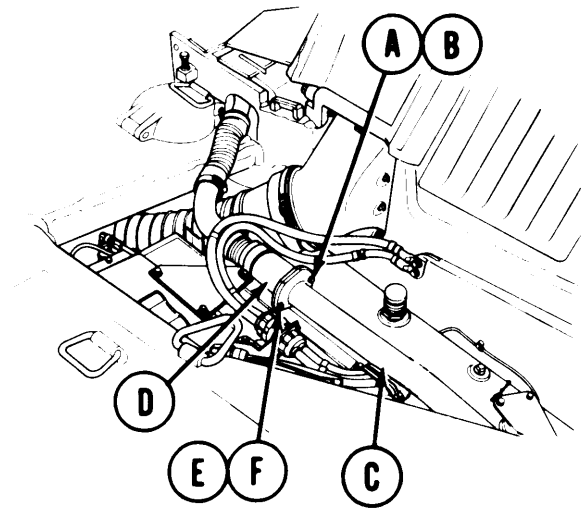
REMOVAL:

NOTE

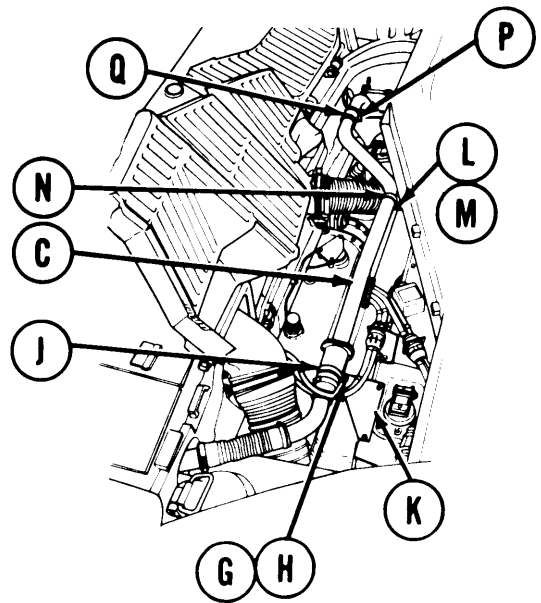
Replacement of left or right side intermediate scavenger tube is the same.

INTERMEDIATE SCAVENGER TUBE REPLACEMENT (Sheet 2 of 4)

1. Using 7/16 inch or 1/2 inch socket, remove screw (A) and lockwasher (B) securing intermediate scavenger tube (C) to cap assembly (D). Throw lockwasher (B) away.
2. Using 1/2 inch or 7/16 inch socket, remove screw (E) and lockwasher (F) securing intermediate scavenger tube (C) to cap assembly (D). Throw lockwasher (F) away.
3. Using 1/2 inch wrench to hold self-locking nut (G), use 1/2 inch socket and remove screw (H) securing clamp (J) to bracket (K). Throw self-locking nut (G) away.



4. Using 1/2 inch wrench to hold self-locking nut (L), use 1/2 inch socket and remove screw (M) securing clamp (N). Throw self-locking nut (L) away.
5. Using screwdriver, loosen clamp (P) securing intermediate scavenger tube (C) and hose (Q).

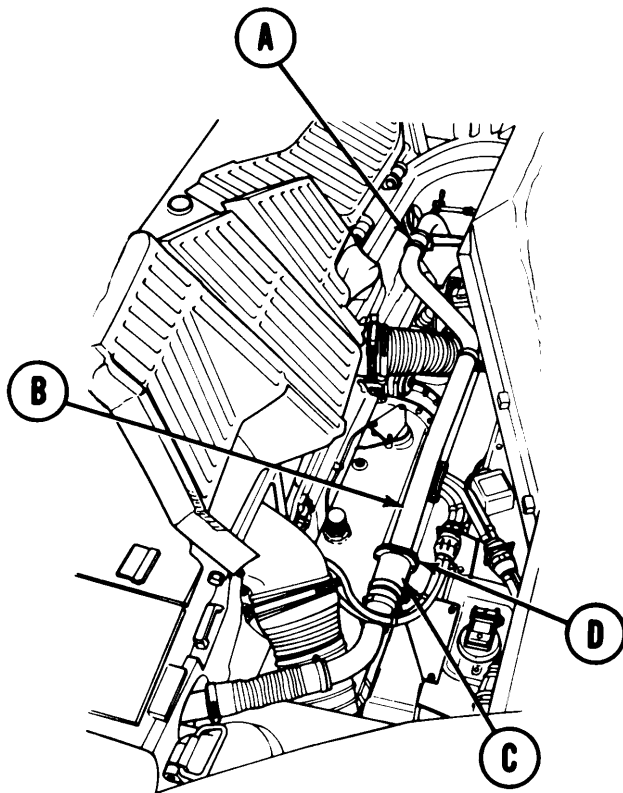
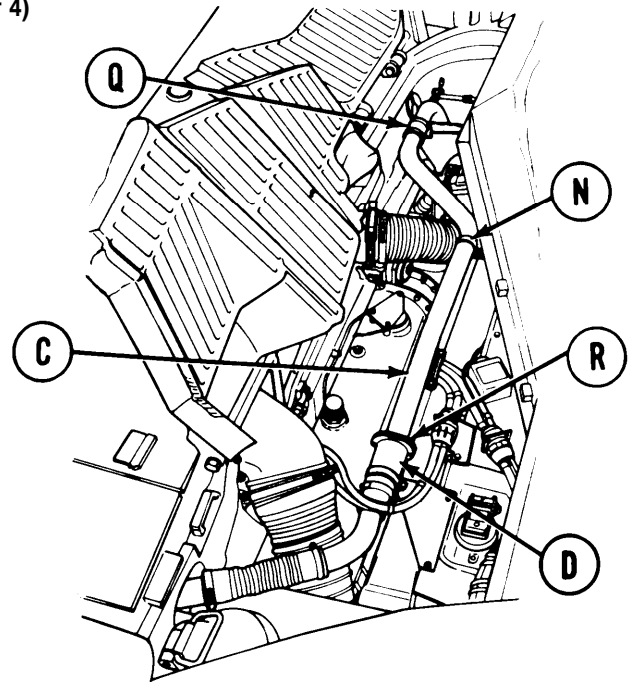


Go on to Sheet 3

TA249103

INTERMEDIATE SCAVENGER TUBE REPLACEMENT (Sheet 3 of 4)

6. Use twisting motion and separate intermediate scavenger tube (C) from cap assembly (D) and hose (Q).
7. Remove and throw away gasket (R) from between intermediate scavenger tube (C) and cap assembly (D).
8. Inspect hose (Q) for cracks and defects. Replace as required.
9. Remove clamp (N) from intermediate scavenger tube (C) and inspect for defects. Replace clamp as required.



INSTALLATION:

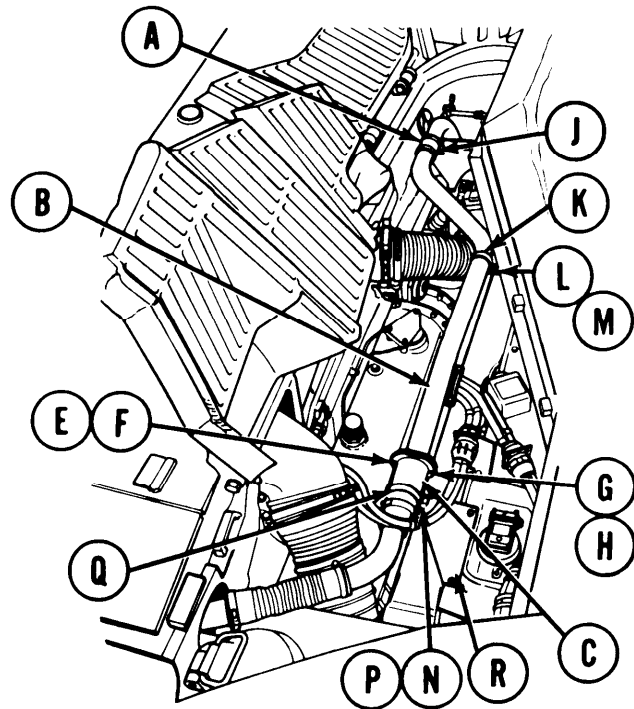
1. Apply coat of silicone compound (Item 32, Appendix D) to inside of hose (A).
2. Position and install end of intermediate scavenger tube (B) into hose (A) and to cap assembly (C).
3. Insert new gasket (D) between flange of intermediate scavenger tube (B) and cap assembly (C).

Go on to Sheet 4

TA249104

INTERMEDIATE SCAVENGER TUBE REPLACEMENT (Sheet 4 of 4)

4. Install screw (E) and new lockwasher (F) to secure intermediate scavenger tube (B) to cap assembly (C).
5. Install screw (G) and new lockwasher (H) to secure intermediate scavenger tube (B) to cap assembly (C).
6. Using 7/16 inch or 1/2 inch socket, tighten screw (E). Using 1/2 inch or 7/16 inch socket, tighten screw (G).
7. Position clamp (J) over hose (A) and intermediate scavenger tube (B). Using screwdriver, tighten clamp (J).



8. Install clamp (K) onto intermediate scavenger tube (B).
9. Using 1/2 inch socket and 1/2 inch wrench, install screw (L) and new self-locking nut (M) to secure clamp (K) to bracket.
10. Using 1/2 inch socket and 1/2 inch wrench, install screw (N) and new self-locking nut (P) to secure clamp (Q) to bracket (R).
11. Close top deck grille doors (TM 9-2350-222-10).

End of Task

LEFT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	8-21
Installation	8-23

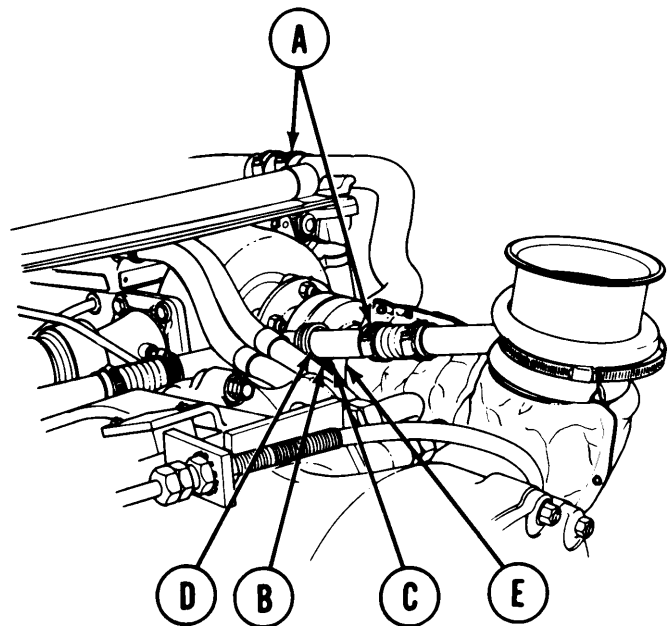
TOOLS: No. 1 cross-tip screwdriver
 9/16 in. open end wrench
 5/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench (two required)
 Screwdriver, flat-tip, 1/4 in.

SUPPLIES: Lockwasher (MS35335-58) (11 required)
 Gasket (10864007)
 Self-locking nut (SPL51712-6) (6 required)
 Silicone compound (Item 32, Appendix D)
 Self-locking nut (MS21045-5)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:

- Using flat-tip screwdriver, loosen two clamps (A).
- Using two 1/2 inch wrenches, hold self-locking nut (B) and remove screw (C) securing clamp (D) to left ejector tube bracket (E). Discard self-locking nut.



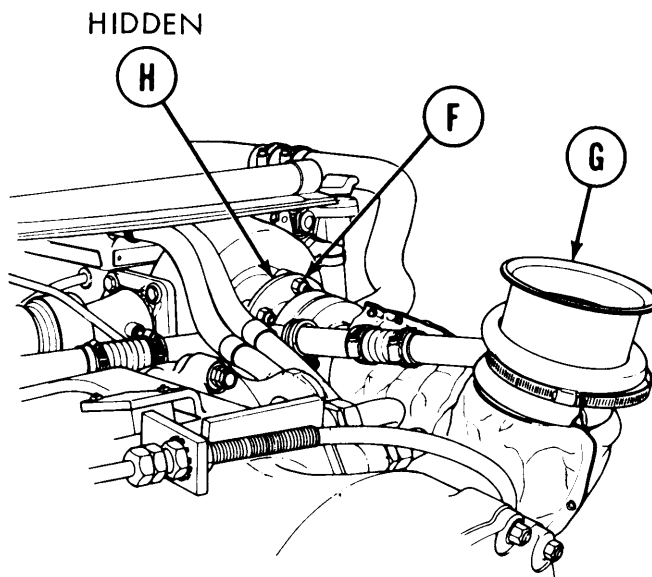
ENGINE LEFT BANK

Go on to Sheet 2

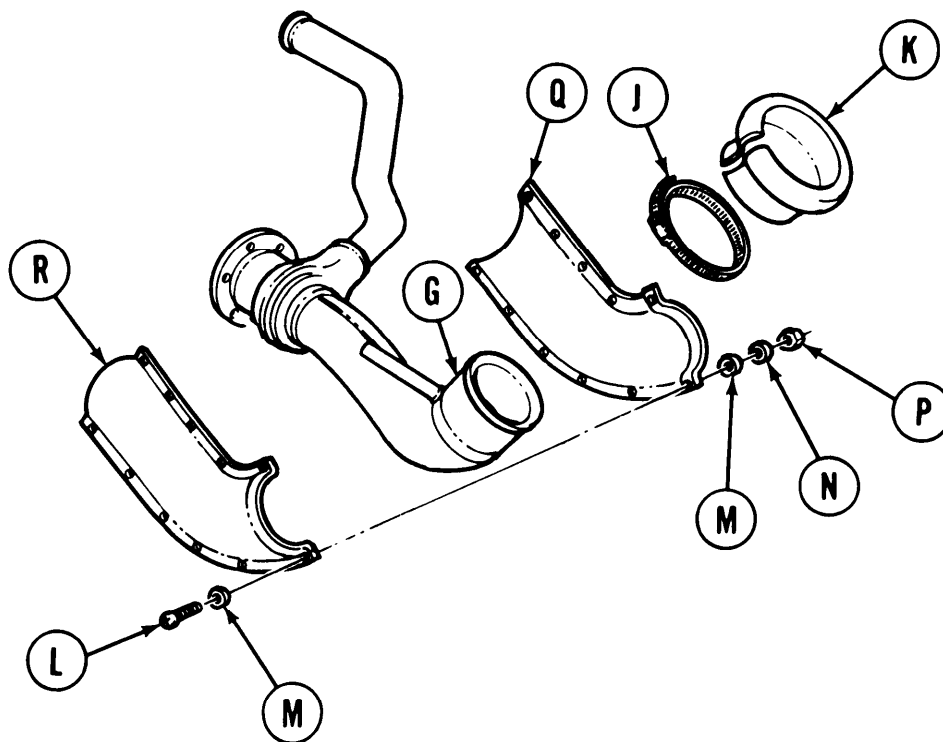
TA249106

LEFT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 2 of 4)

3. Using 9/16 inch wrench, remove and discard six self-locking nuts (F) securing ejector tube (G) to turbosupercharger.
4. Remove ejector tube (G) and gasket (H). Discard gasket.
5. Using flat-tip screwdriver, remove clamp (J) and packing (K) from ejector tube (G).
6. Using cross-tip screwdriver and 5/16 inch wrench, remove 11 screws (L), 22 flat washers (M), 11 lockwashers (N), and 11 nuts (P). Discard lockwashers.
7. Remove insulation (Q and R) from ejector tube (G).



ENGINE LEFT BANK



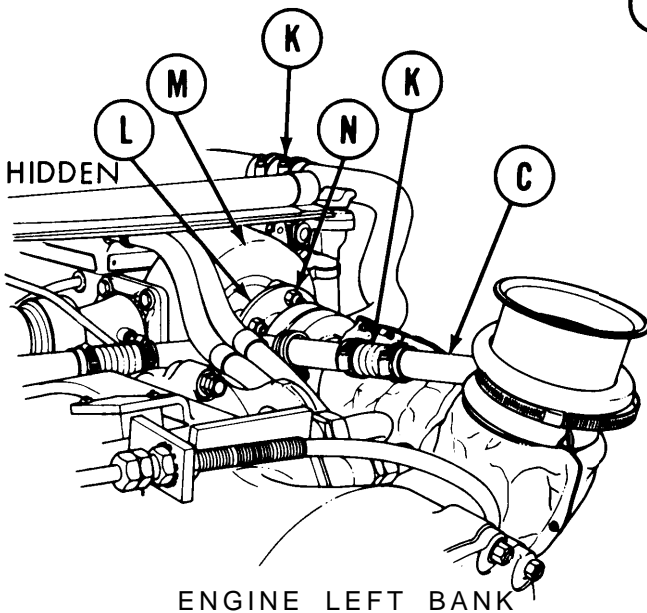
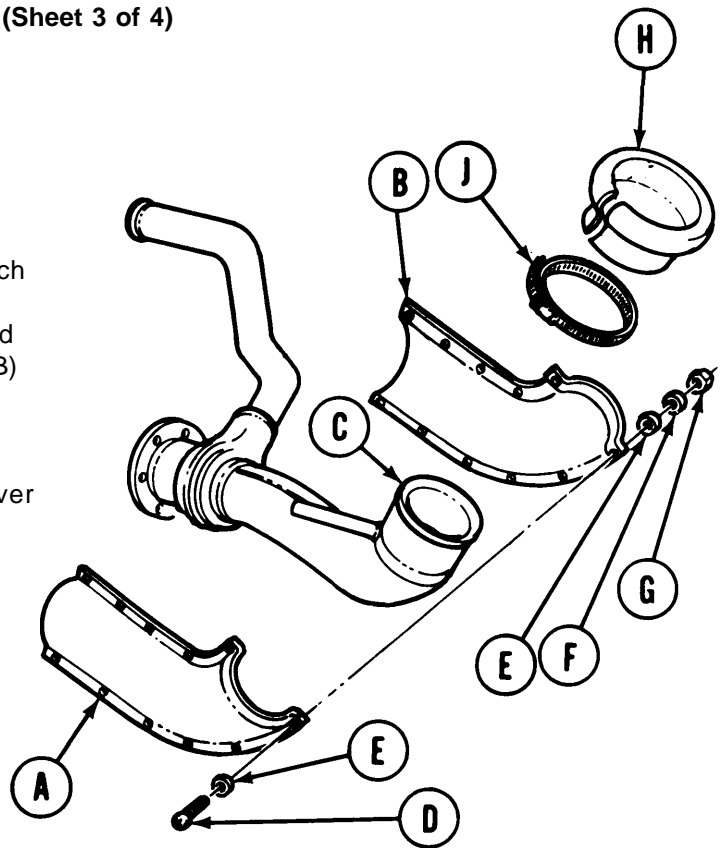
Go on to Sheet 3

TA249107

LEFT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 3 of 4)

INSTALLATION:

1. Position insulation (A and B) to ejector tube (C).
2. Using cross-tip screwdriver and 5/16 inch wrench, install 11 screws (D), 22 flat washers (E), 11 new lockwashers (F), and 11 nuts (G) to secure insulation (A and B) to ejector tube (C).
3. Position packing (H) and clamp (J) onto ejector tube (C). Use flat-tip screwdriver to tighten clamp (J).
4. Apply a light coat of silicone compound (Item 32, Appendix D) to end of two hoses (K).
5. Position left exhaust ejector tube (C) and new gasket (L) onto studs of turbosupercharger housing (M).



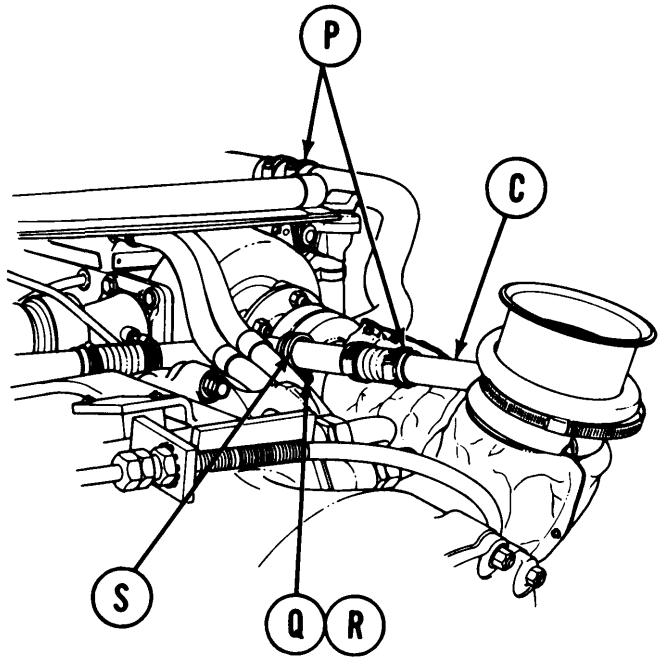
6. Using 9/16 inch wrench, install six new self-locking nuts (N) to secure left exhaust ejector tube (C) to turbosupercharger housing (M).

Go on to Sheet 4

TA249108

LEFT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 4 of 4)

7. Using flat-tip screwdriver, tighten two clamps (P).
8. Using two 1/2 inch wrenches, install new self-locking nut (Q) and screw (R) to secure clamp (S) to bracket on ejector tube (C).
9. Install powerplant (page 5-1).



End of Task

RIGHT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 1 of 4)

PROCEDURE INDEX

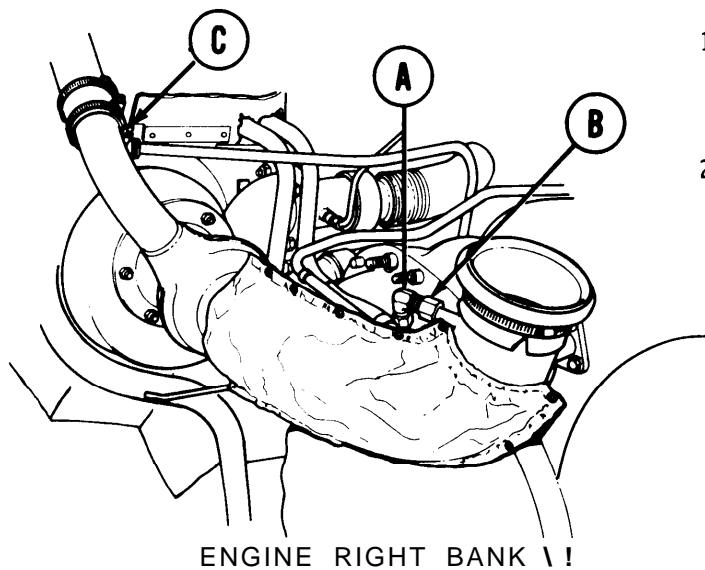
PROCEDURE	PAGE
Removal	8-25
Installation	8-27

TOOLS: 10 in. adjustable wrench
 No. 1 cross-tip screwdriver
 9/16 in. open end wrench
 7/8 in. combination box and open end wrench
 5/16 in. combination box and open end wrench
 Screwdriver, flat-tip, 1/4 in.

SUPPLIES: Lockwasher (MS35335-58) (11 required)
 Gasket (10864007)
 Self-locking nut (SPL51712-6) (6 required)
 Silicone compound (Item 32, Appendix D)

PRELIMINARY PROCEDURE: Remove powerplant (page 5-1)

REMOVAL:



1. Using adjustable wrench to hold elbow (A) and using 7/8 inch wrench, disconnect nut (B) from elbow (A).
2. Using flat-tip screwdriver, loosen clamp (C).

Go on to Sheet 2

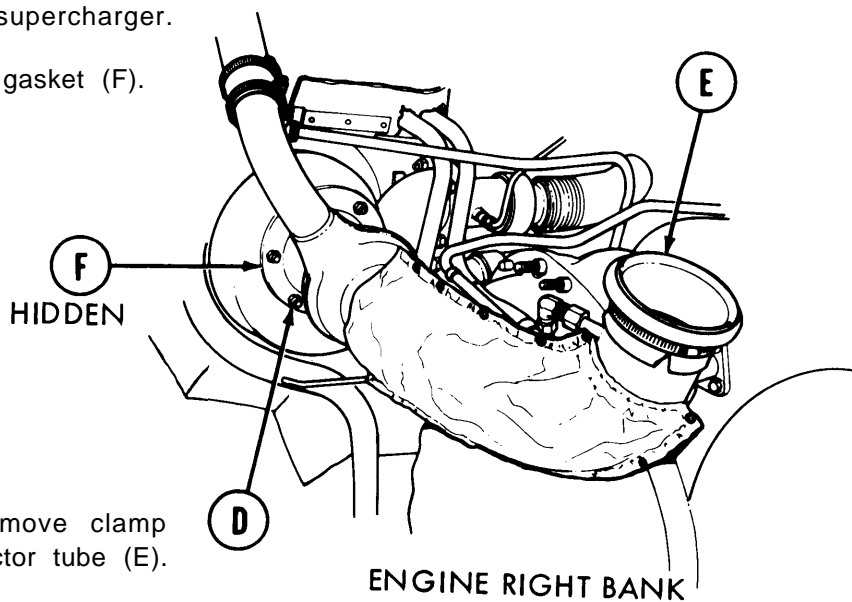
TA249110

Change 2

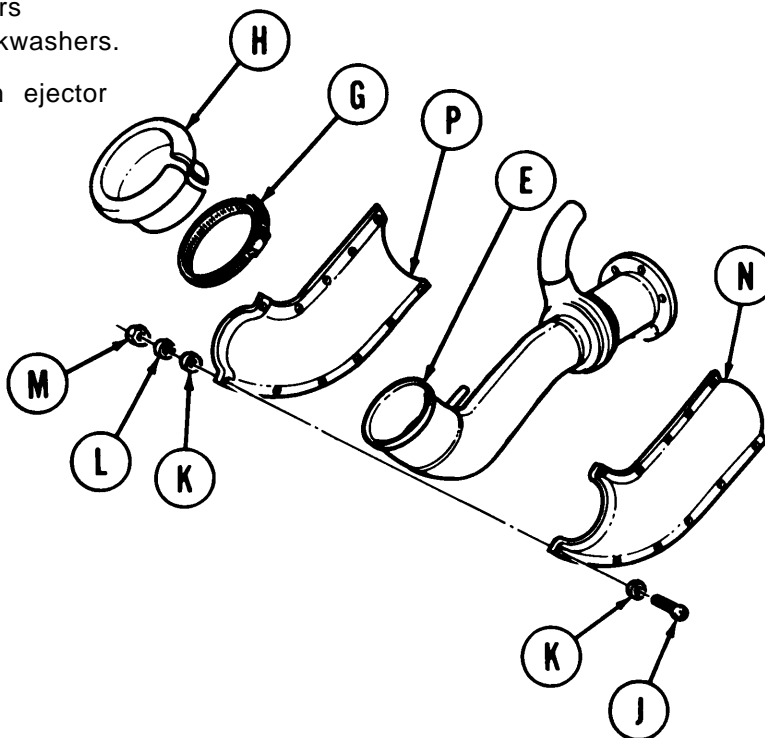
8-25

RIGHT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 2 of 4)

3. Using 9/16 inch wrench, remove and discard six self-locking nuts (D) securing ejector tube (E) to the turbosupercharger.
4. Remove ejector tube (E) and gasket (F). Discard gasket.



5. Using flat-tip screwdriver, remove clamp (G) and packing (H) from ejector tube (E).
6. Using cross-tip screwdriver and 5/16 inch wrench, remove 11 screws (J), 22 flat washers (K), 11 lockwashers (L), and 11 nuts (M). Discard lockwashers.
7. Remove insulation (N and P) from ejector tube (E).



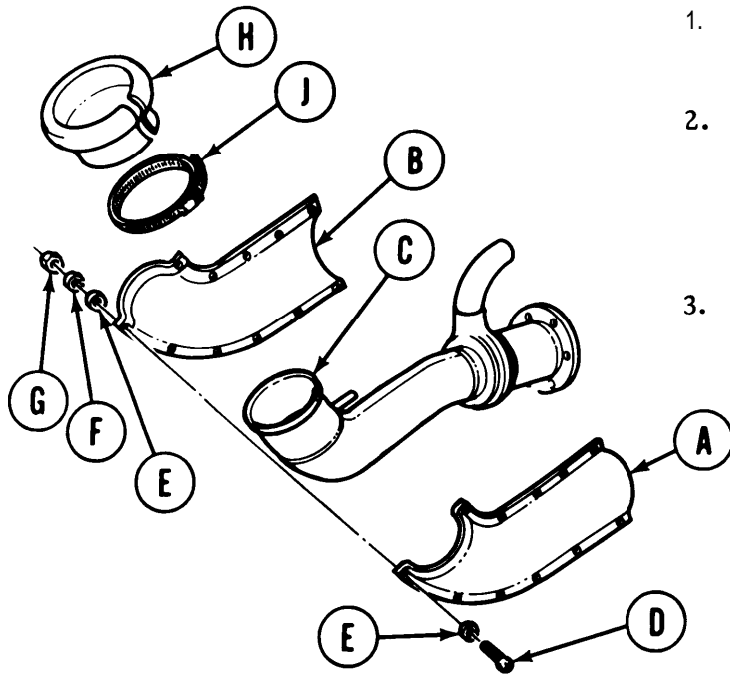
TYPICAL ENGINE RIGHT BANK SHOWN

Go on to Sheet 3

TA249111

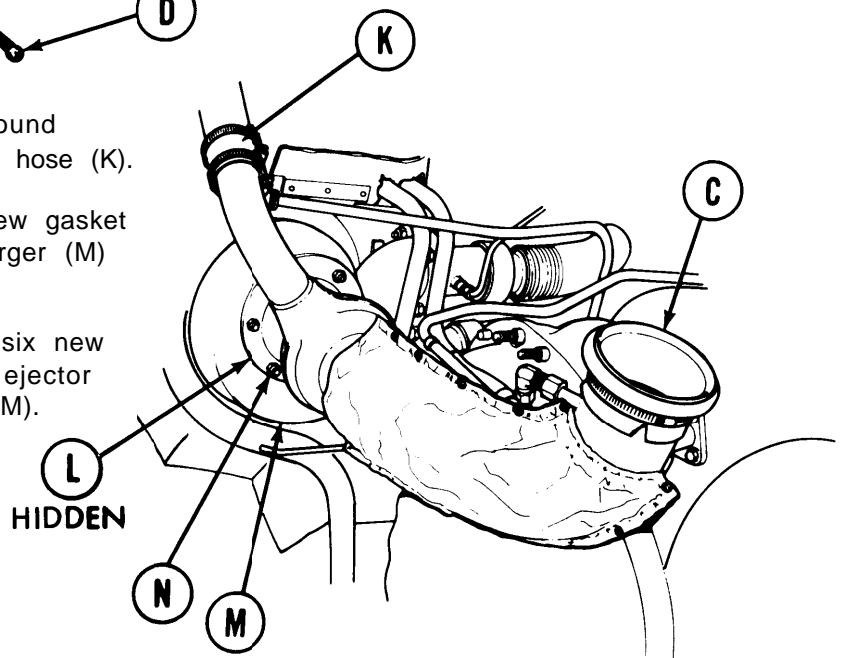
RIGHT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 3 of 4)

INSTALLATION:



1. Position insulation (A and B) to ejector tube (C).
2. Using cross-tip screwdriver and 5/16 inch wrench, install 11 screws (D), 22 flat washers (E), 11 new lockwashers (F), and 11 nuts (G) to secure insulation (A) and (B) to ejector tube (C).
3. Position packing (H) and clamp (J) onto ejector tube (C). Use flat-tip screwdriver to tighten clamp (J).

4. Apply coating of silicone compound (Item 32, Appendix C) to end of hose (K).
5. Position ejector tube (C) and new gasket (L) onto studs of turbosupercharger (M) and hose (K).
6. Using 9/16 inch wrench, install six new self-locking nuts (N) to secure ejector tube (C) to turbosupercharger (M).



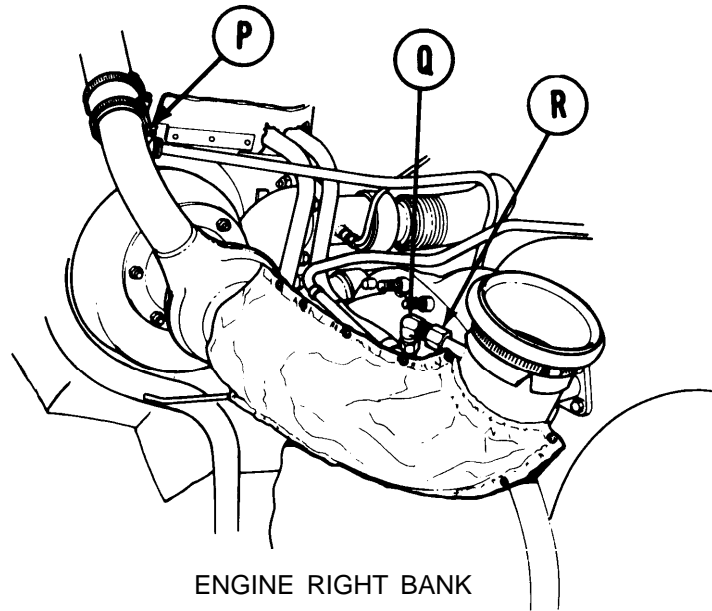
ENGINE RIGHT BANK

Go on to Sheet 4

TA249112

RIGHT EXHAUST EJECTOR TUBE REPLACEMENT (Sheet 4 of 4)

7. Using flat-tip screwdriver, tighten clamp (P).
8. Using adjustable wrench to hold elbow (Q), use 7/8 inch wrench to connect nut (R) to elbow (Q).
9. Install powerplant (page 5-1).



End of Task

TA249113

CHAPTER 9
COOLING SYSTEM INDEX

PROCEDURE	PAGE
Engine Shroud Replacement	9-2
Engine Shroud Support Replacement	9-4
Engine Shroud Repair On The Engine	9-6
Engine Shroud Repair Off Engine	9-11
Turbocharger Shrouds Replacement	9-13
Inner Shroud Replacement	9-13
Outer Shroud Replacement	9-17
Upper Shroud Replacement	9-18
Transmission Shroud Replacement	9-19
Transmission Shroud Repair	9-26
Transmission Shroud Bracket Repair	9-32
Transmission Shroud Supports (Left or Right) Replacement	9-38
Transmission Shrouds Replacements	9-39
Right Intermediate Shroud Replacement	9-39
Lower Shroud Replacement	9-44
Left Intermediate Shroud Replacement	9-46
Engine Cooling Fan Replacement	9-47
Engine Cooling Fan Shroud Replacement	9-51
Centrifugal Fan Housing Replacement	9-59
Fan Drive Oil Seal Replacement	9-62

ENGINE SHROUD REPLACEMENT (Sheet 1 of 2)

TOOLS: Ratchet with 1/2 in. drive
9/16 in. socket with 1/2 in. drive
3 in. extension with 1/2 in. drive
Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N-m)

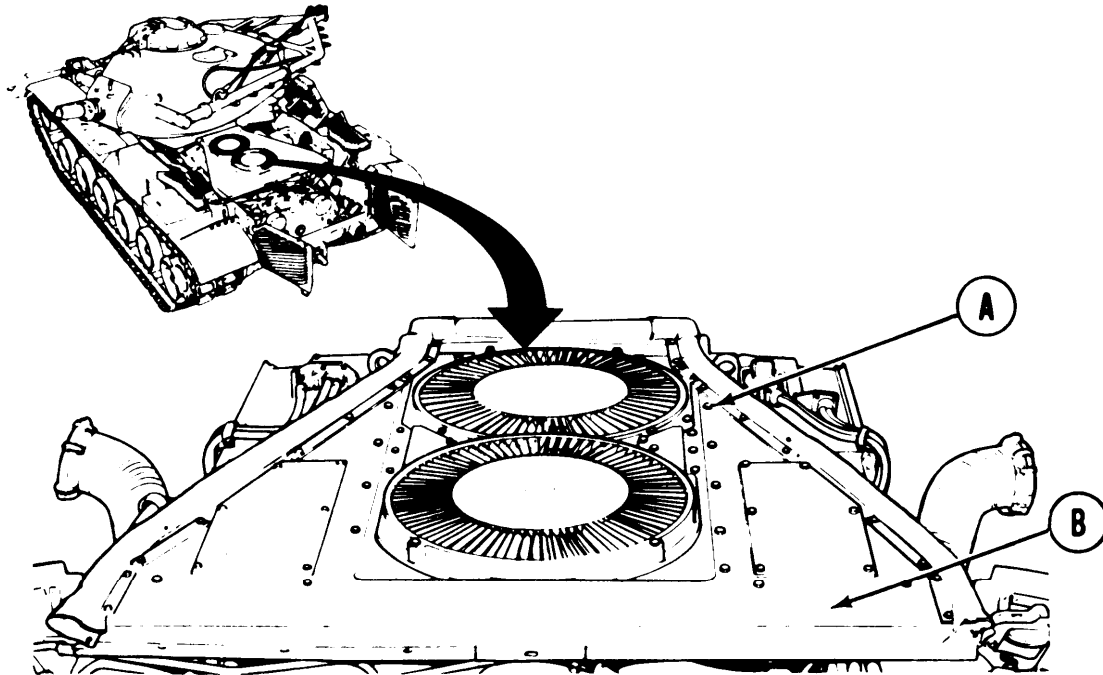
SUPPLIES: Lockwasher (MS27183-14) (22 required)

PERSONNEL: Two

PRELIMINARY PROCEDURES: Remove top deck assembly (page 16-21)
Remove transmission shroud (page 9-20)

REMOVAL:

1. Using socket, remove 22 screws, washers, and lockwashers (A) securing engine shroud (B) to engine. Throw lockwashers away.



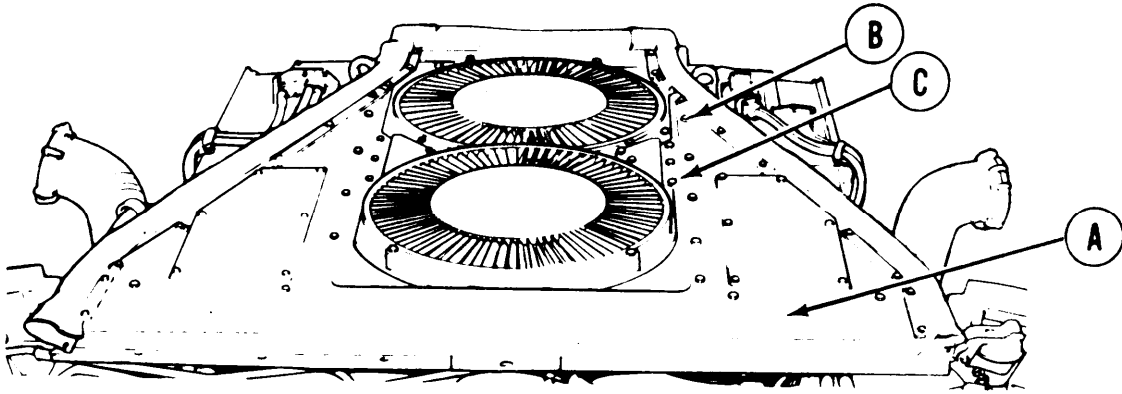
2. Remove engine shroud (B) from engine.

Go on to Sheet 2

TA140239

ENGINE SHROUD REPLACEMENT (Sheet 2 of 2)**INSTALLATION:**

Position engine shroud (A) on engine.



Using socket, install 22 screws, washers, and new lockwashers (B) securing engine shroud (A) to engine,

3. Using socket and torque wrench, tighten 22 screws (B) to 20-30 lb-ft (27-41 N-m).
4. Install transmission shroud (page 9-23).
5. Install top deck (page 16-23).

End of Task

TA140240

ENGINE SHROUD SUPPORT REPLACEMENT (Sheet 1 of 2)

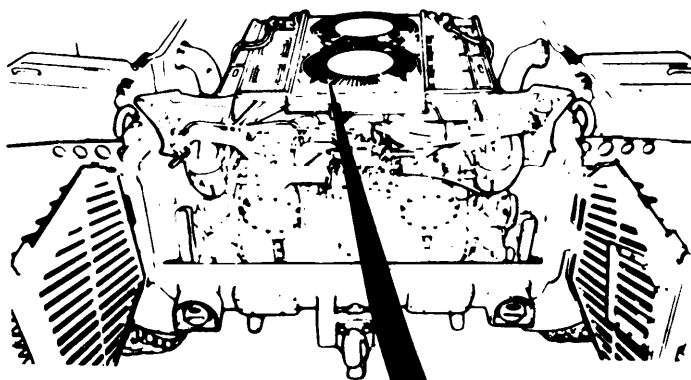
TOOLS: Putty knife
9/16 in. combination box and open end wrench

SUPPLIES: Adhesive (Item 1, Appendix D)
Insulation (8762981)
Insulation (10863503)
Lockwasher (MS35338-46) (8 required)
Dry cleaning solvent (Item 54, Appendix D)
Rags (Item 65, Appendix D)

PRELIMINARY PROCEDURES: Remove top deck (page 16-21)
Remove transmission shroud (page 9-20)
Remove engine shroud (page 9-2)

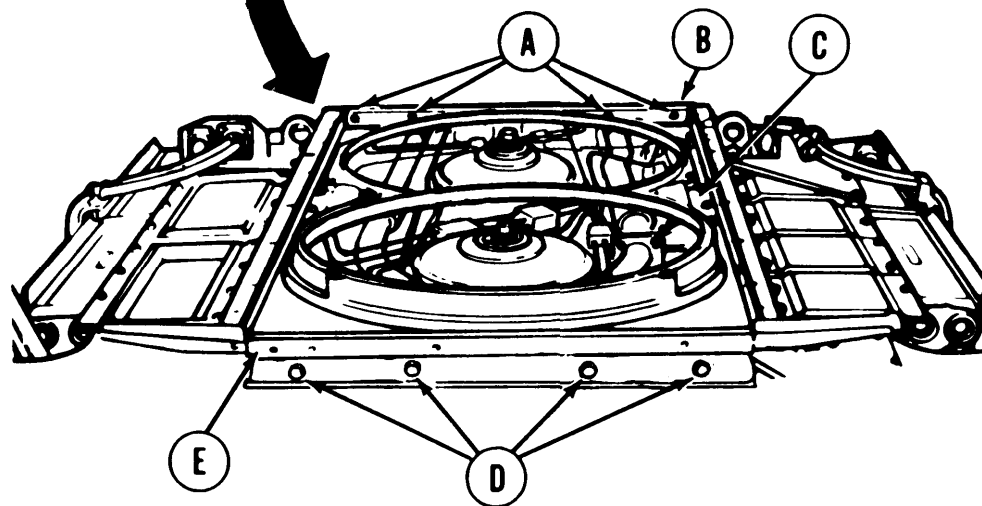
REMOVAL:

1. Using wrench, remove four screws, washers, and lockwashers (A) holding front shroud support assembly (B) to engine (C). Throw lockwashers away.
2. Remove shroud support.



Using wrench, remove four screws, washers, and lockwashers (D) holding rear shroud support assembly (E) to engine (C). Throw lockwashers away.

Remove shroud support.

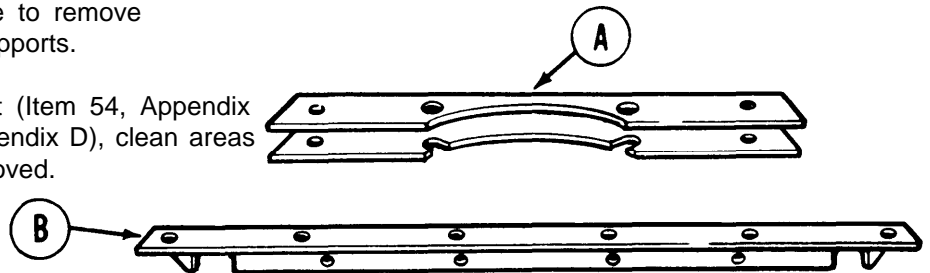


Go on to Sheet 2

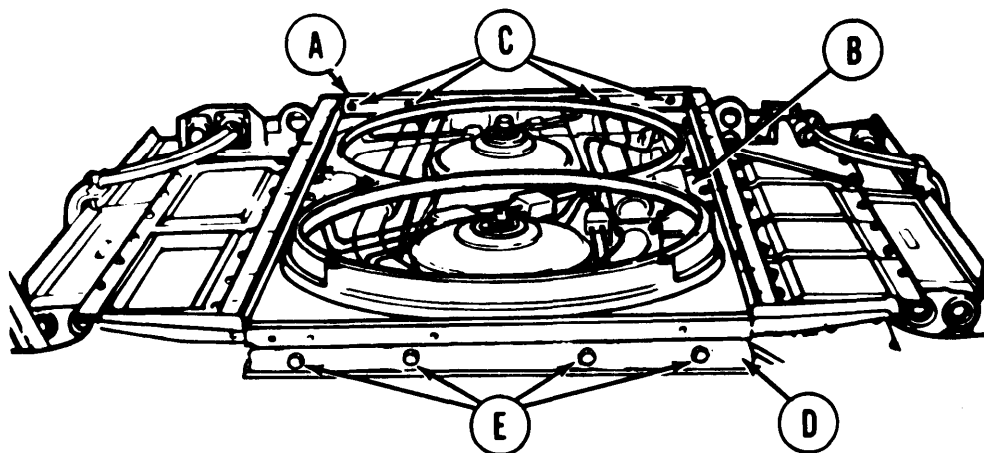
TA140241

ENGINE SHROUD SUPPORT REPLACEMENT (Sheet 2 of 2)**CLEANING AND INSPECTION:**

1. Inspect supports (A) and (B) insulation for wear, tears, or loose areas.
2. If required, use putty knife to remove insulation from shroud supports.
3. Using dry cleaning solvent (Item 54, Appendix D) and rags (Item 65, Appendix D), clean areas where insulation was removed.

**INSTALLATION:**

1. If required, use putty knife to apply adhesive (Item 1, Appendix D) to shroud supports. Install new insulation.
2. Position front support (A) onto engine (B). Using wrench, install four washers, new lockwashers, and screws (C) securing support (A) to engine (B).
3. Position rear support (D) onto engine (B). Using wrench, install four washers, new lockwashers, and screws (E) securing support (D) to engine (B).
4. Install engine shroud (page 9-3).
5. Install transmission shroud (page 9-23).
6. Install top deck (page 16-23).



End of Task

TA140242

ENGINE SHROUD REPAIR ON THE ENGINE (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	9-6
Assembly	9-8

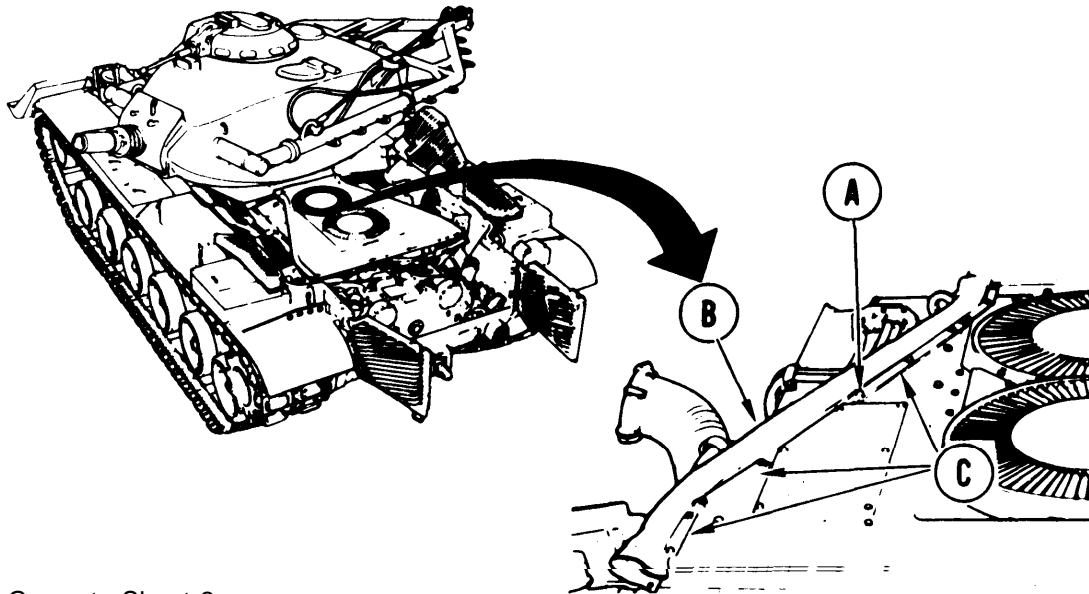
TOOLS: Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 3 in. extension with 1/2 in. drive
 Putty knife
 Cross-tip screwdriver

SUPPLIES: Adhesive (Item 4, Appendix D)
 Dry cleaning solvent (Item 54, Appendix D)
 Rags (Item 65, Appendix D)
 Lockwasher (MS35338-46) (29 required)
 Gasket (8762922) (2 required)

PRELIMINARY PROCEDURES: Remove top deck assembly (page 16-21)
 Remove transmission shroud (page 9-20)

DISASSEMBLY:

- Using 7/16 inch socket, remove seven screws, washers, and lockwashers (A) holding three seal (B) retainers (C) to engine shroud right and left sides. Throw lockwashers away.
- Remove retainers (C) from shroud.

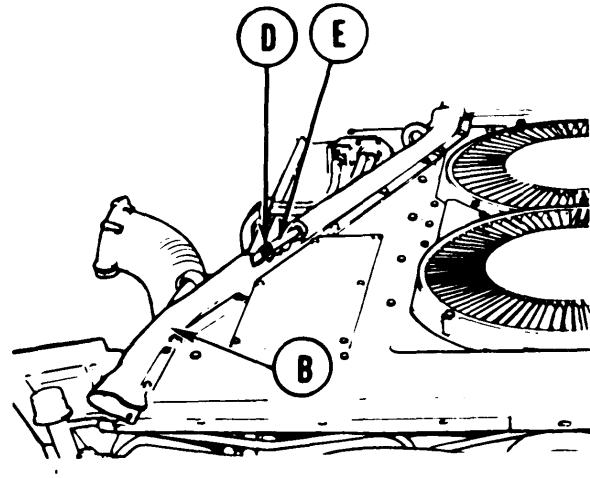


Go on to Sheet 2

TA140243

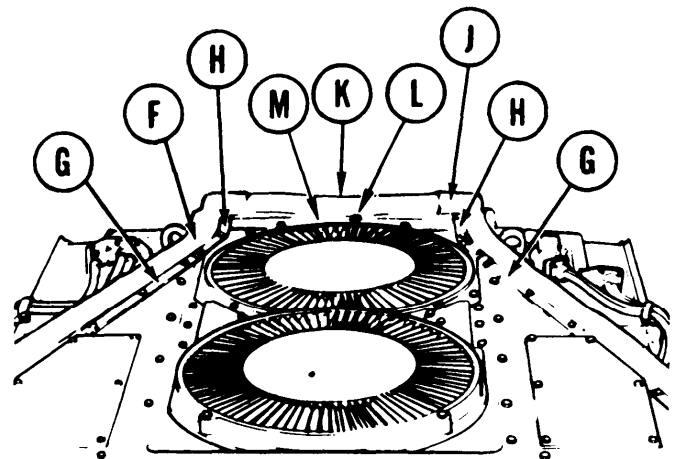
ENGINE SHROUD REPAIR ON THE ENGINE (Sheet 2 of 5)

3. Using screwdriver, remove two screws and lockwashers (D) hidden under seal, holding retainers (E) to engine shroud right and left sides. Throw lockwashers away.
4. Remove retainers (E) from shroud.
5. Displace seals (B) from shroud right and left sides.



6. Using 7/16 inch socket, remove six screws, washers, and lockwashers (F) holding two elbow retainers (G) to engine shroud. Throw lockwashers away.
7. Remove retainers (G) from engine shroud.
8. Remove seals (H) and elbows (J) from engine shroud.
9. Using screwdriver, lift front seal (K) and remove two screws and lockwashers (hidden) (L) holding retainer (M). Throw lockwashers away.

10. Remove retainer (M) from shroud.
11. Remove seal (K) from shroud.

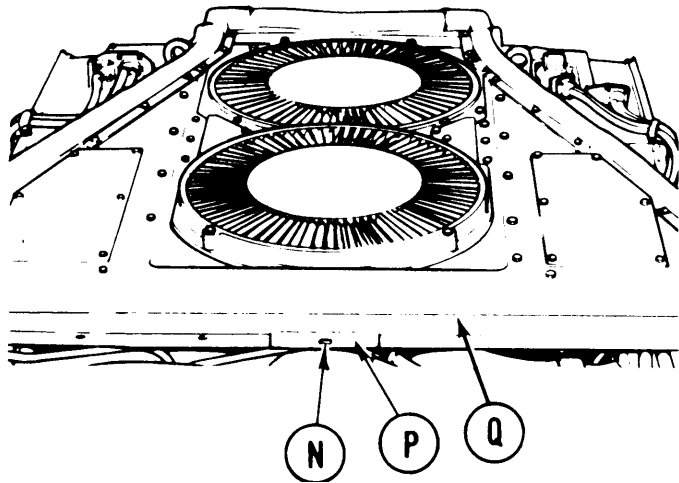


Go on to Sheet 3

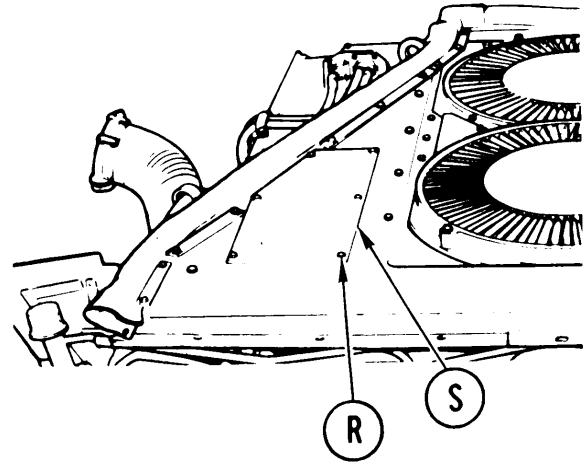
TA140244

ENGINE SHROUD REPAIR ON THE ENGINE (Sheet 3 of 5)

12. Using screwdriver, remove six screws and lockwashers (N) from retainer (P). Throw lockwashers away.
13. Remove retainer (P) from shroud.
14. Remove seal (Q) from shroud.

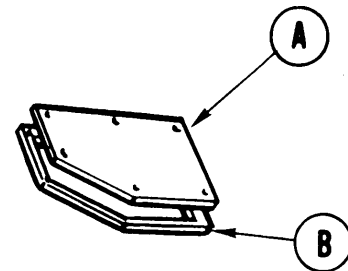


15. Using 9/16 inch socket, remove six screws, washers, and lockwashers (R) holding access plate (S) to right and left sides of shroud. Throw lockwashers away.
16. Remove access plate (S) with gasket from each side of shroud.
17. Using putty knife, remove gasket from each access plate (S). Throw gaskets away.
18. Using dry cleaning solvent (Item 54, Appendix D) and rags (Item 65, Appendix D), clean areas where gasket was removed.



ASSEMBLY:

1. Using putty knife, apply adhesive (Item 4, Appendix D) to back side of access plates (A).
2. Install new gaskets (B) to access plates (A).



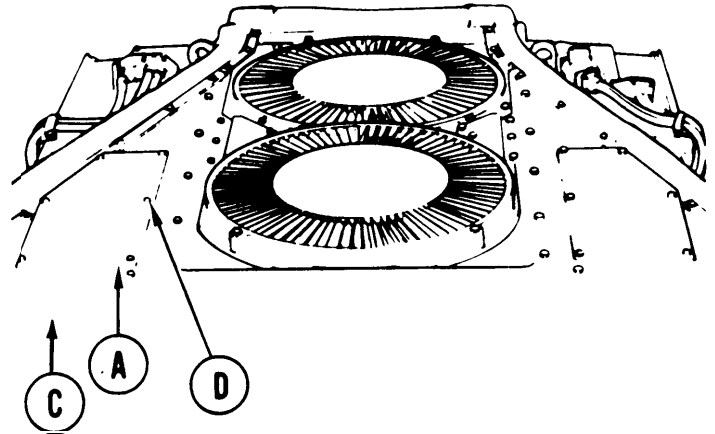
Go on to Sheet 4

TA140245

ENGINE SHROUD REPAIR ON THE ENGINE (Sheet 4 of 5)

3. Position access plates (A) on each side of engine shroud (C).

4. Using 9/16 inch socket, install six screws, washers, and new lockwashers (D) to secure access plate (A) to shroud (C).

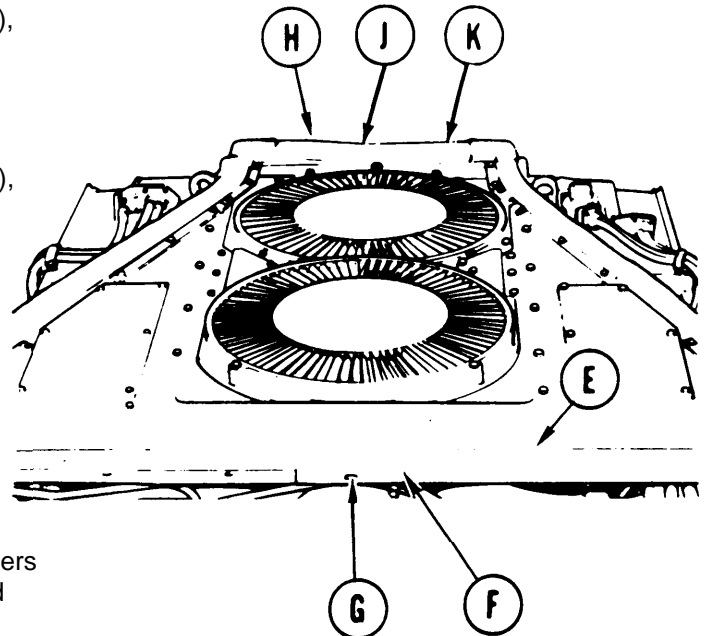


5. Install seal (E) and retainer (F) to shroud (C), using six screws and new lockwashers (G).

6. Using screwdriver, tighten six screws (G).

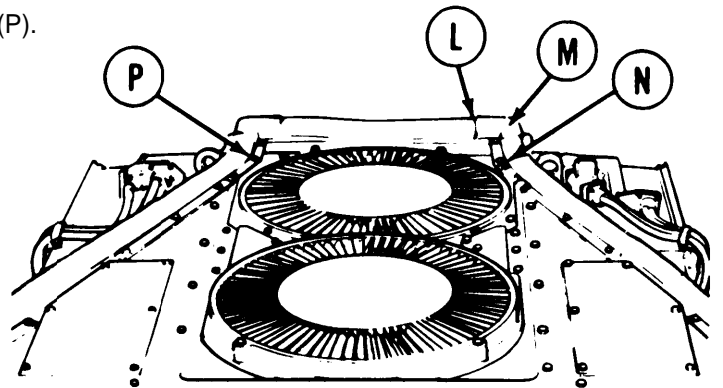
7. Install seal (H) and retainer (J) to shroud (C), using two screws and new lockwashers (K) (hidden).

8. Using screwdriver, tighten two screws (K).



9. Install elbow (L), seals (M), and elbow retainers (N) to shroud, using six screws, washers, and new lockwashers (P).

10. Using 7/16 inch socket, tighten six screws (P).

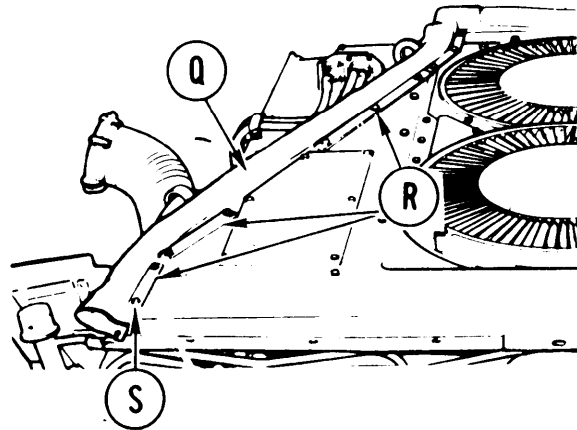


Go on to Sheet 5

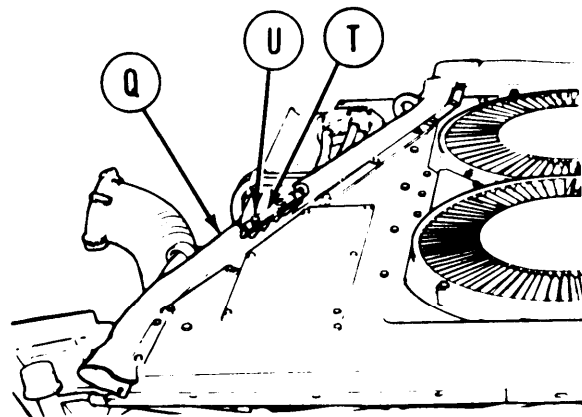
TA140246

ENGINE SHROUD REPAIR ON THE ENGINE (Sheet 5 of 5)

11. Install seals (Q) and three retainers (R) to shroud both sides, using seven screws, washers, and new lockwashers (S).
12. Using 7/16 inch socket, tighten seven screws (s).



13. Install retainer (T) and seal (Q) to shroud, using two screws and new lockwashers (U).
14. Using screwdriver, tighten two screws (U) on each side.
15. Install transmission shroud (page 9-23).
16. Install top deck assembly (page 16-23).



End of Task

TA140247

ENGINE SHROUD REPAIR OFF ENGINE (Sheet 1 of 2)

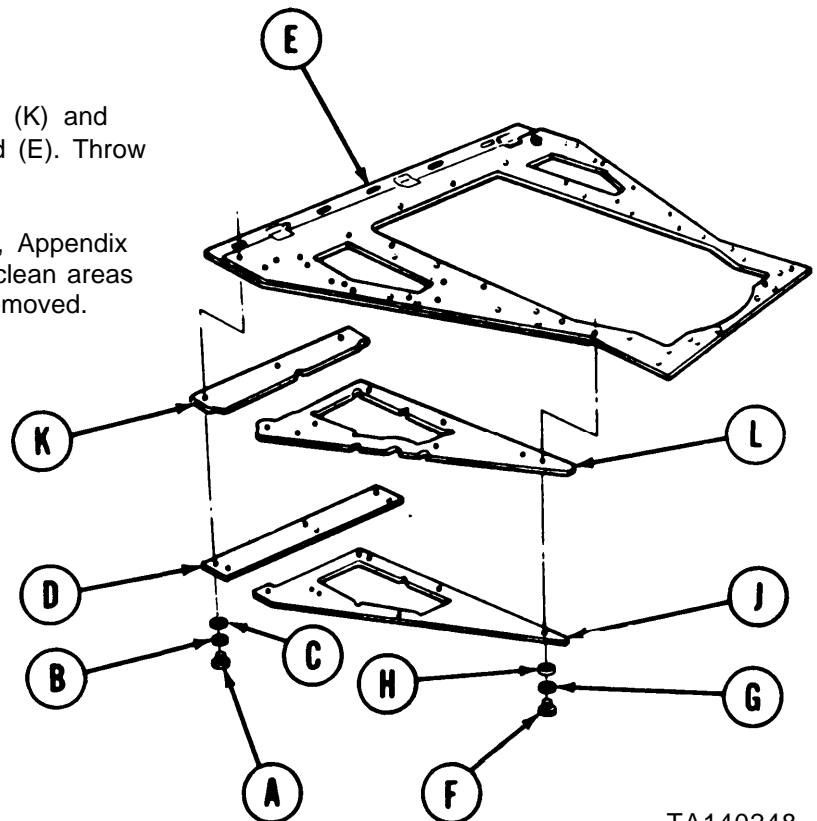
TOOLS: Putty knife
 Ratchet with 1/2 in. drive
 7/16 in. socket with 1/2 in. drive

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)
 Rags (Item 65, Appendix D)
 Adhesive (Item 4, Appendix D)
 Insulation (10863512)
 Insulation (8762924)
 Lockwasher (MS35338-46) (12 required)

PRELIMINARY PROCEDURE: Remove engine shroud (page 9-2)

DISASSEMBLY:

- Using socket, remove six screws (A), lockwashers (B), and flat washers (C) securing retainer (D) to engine shroud (E) both sides. Throw lockwashers (B) away.
- Using socket, remove six screws (F), lockwashers (G), and flat washers (H) securing retainer (J) to engine shroud (E) both sides. Throw lockwashers (G) away.
- Remove retainers (D) and (J).
- Using putty knife, remove insulation (K) and (L) from both sides of engine shroud (E). Throw insulation away.
- Using dry cleaning solvent (Item 54, Appendix D) and rags (Item 65, Appendix D), clean areas where insulation (K) and (L) were removed.



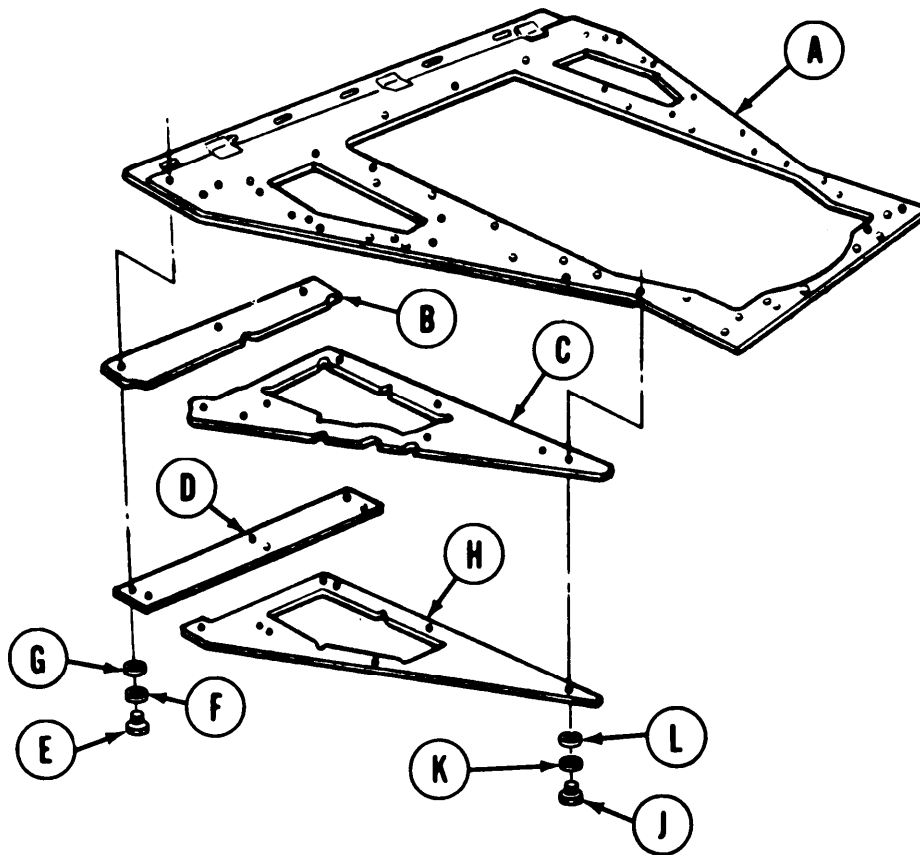
Go on to Sheet 2

TA140248

ENGINE SHROUD REPAIR OFF ENGINE (Sheet 2 of 2)

ASSEMBLY:

1. Using putty knife, apply adhesive (Item 4, Appendix D) to engine shroud (A) to hold new insulation (B) and (C) both sides.
2. Install insulation (B) and (C) to both sides at engine shroud (A).
3. Using socket, install retainer (D) with six screws (E), new lockwashers (F), and flat washers (G) both sides.
4. Using socket, install retainer (H) with six screws (J), new lockwashers (K), and flat washers (L).
5. Install engine shroud (page 9-3).



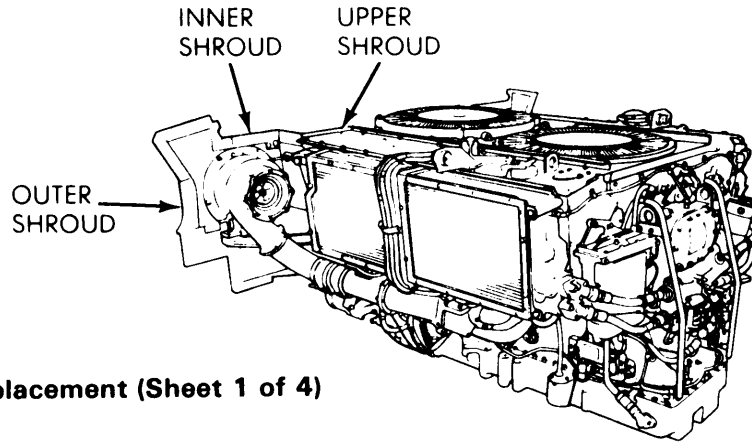
End of Task

TA140249

TURBOCHARGER SHROUDS REPLACEMENT (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Inner Shroud Replacement	9-13
Outer Shroud Replacement	9-17
Upper Shroud Replacement	9-18



Inner Shroud Replacement (Sheet 1 of 4)

PROCEDURE	PAGE
Removal	9-14
Installation	9-15

TOOLS: 11/16 in. combination box and open end wrench
 1/2 in. combination box and open end wrench
 1/2 in. socket with 1/2 in. drive
 5 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive

SUPPLIES: Self-locking nut (MS21044N5)
 Grommet (MS35490-16)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Remove rear engine shroud support (9-4)
 Remove transmission oil cooler lines (page 6-130 or 6-136)

Go on to Sheet 2

TA140250

TURBOCHARGER SHROUDS REPLACEMENT (Sheet 2 of 6)

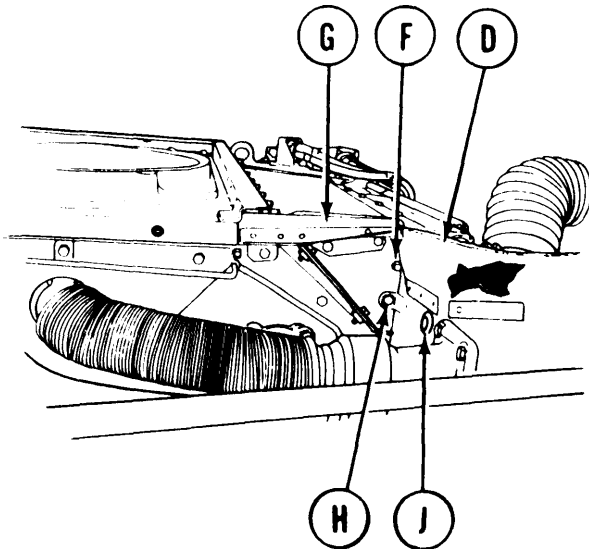
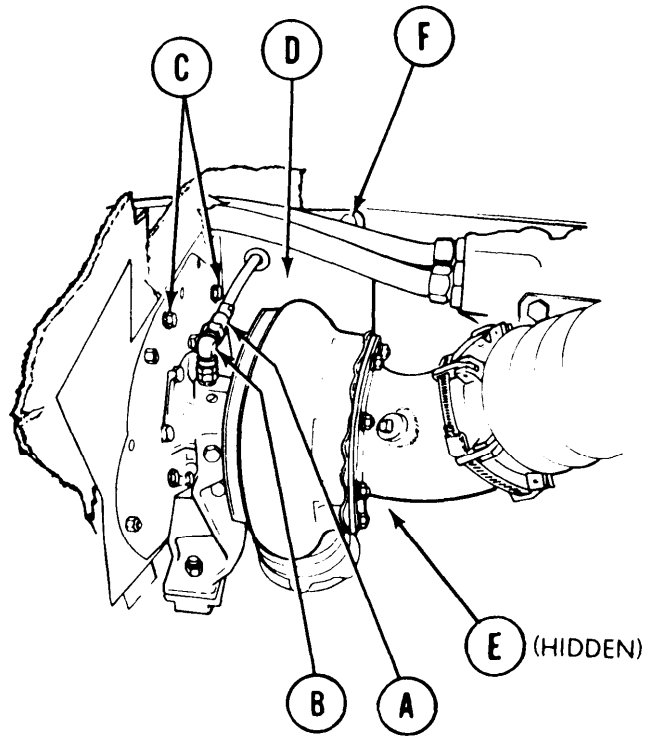
Inner Shroud Replacement (Sheet 2 of 4)

NOTE

Procedures for replacement of the left or right turbocharger shrouds are similar. Procedures for the left side are shown.

REMOVAL:

1. Using 11/16 inch wrench, disconnect hose assembly (A) from turbocharger elbow (B).
2. Using 1/2 inch socket, remove two screws and washers (C) securing inner shroud (D) to turbocharger plate.
3. Using 1/2 inch socket, remove two screws and washers (E) securing inner shroud (D) to turbocharger plate.



4. Using 1/2 inch wrench and 1/2 inch socket, remove screw and self-locking nut (F) securing inner shroud (D) to upper shroud (G). Throw self-locking nut away.
5. Using 1/2 inch socket, remove three screws and washers (H) securing inner shroud (D) to oil cooler frame.
6. Remove hose assembly (A) and grommet (J) from inner shroud (D).
7. Remove inner shroud (D).
8. Remove grommet (J) from hose assembly (A). Throw grommet (J) away.

Go on to Sheet 3

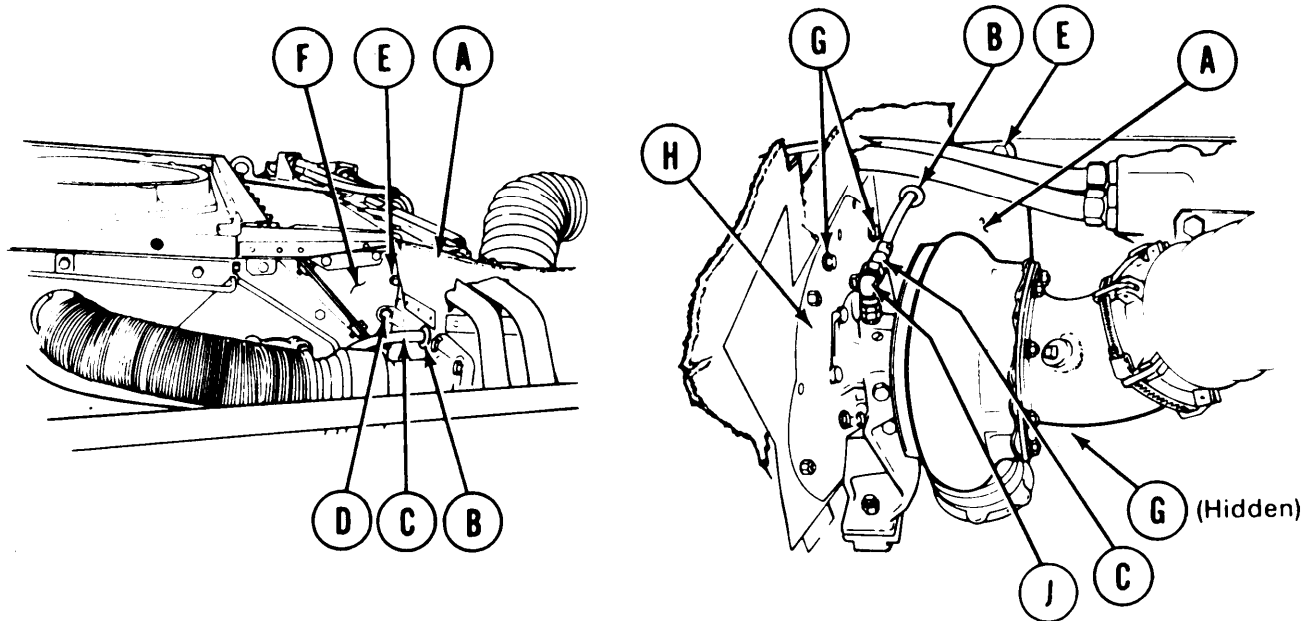
TA140251

TURBOCHARGER SHROUDS REPLACEMENT (Sheet 3 of 6)

Inner Shroud Replacement (Sheet 3 of 4)

INSTALLATION:

1. Place inner shroud (A) into position.
2. Install new grommet (B) on hose assembly (C).
3. Install grommet (B) and hose assembly (C) in inner shroud (A).



4. Install three screws and washers (D) securing inner shroud (A) to oil cooler frame.
5. Install screw and new self-locking nut (E) to secure inner shroud (A) to upper shroud (F).
6. Install four screws and washers (G) securing inner shroud (A) to turbocharger plate.
7. Using 1/2 inch socket, tighten four screws (G).
8. Using 1/2 inch socket with extension, tighten three screws (D).
9. Using 1/2 inch socket and 1/2 inch wrench, tighten screw and nut (E).
10. Connect hose assembly (C) to elbow (H). Using 11/16 inch wrench, tighten hose assembly (C) onto elbow (H).

Go on to Sheet 4

TA140252

TURBOCHARGER SHROUDS REPLACEMENT (Sheet 4 of 6)

Inner Shroud Replacement (Sheet 4 of 4)

11. Install transmission oil cooler lines (pages 6-132 or 6-136).
12. Ground hop engine (page 5-49) and check for oil leaks.
13. Install rear engine shroud support (page 9-5).
14. Disconnect engine from powerplant test run hookup (page 5-62).
15. Install engine shroud (page 9-3).
16. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TURBOCHARGER SHROUDS REPLACEMENT (Sheet 5 of 6)**Outer Shroud Replacement (Sheet 1 of 1)**

TOOLS: 1/2 in. combination box and open end wrench
 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive

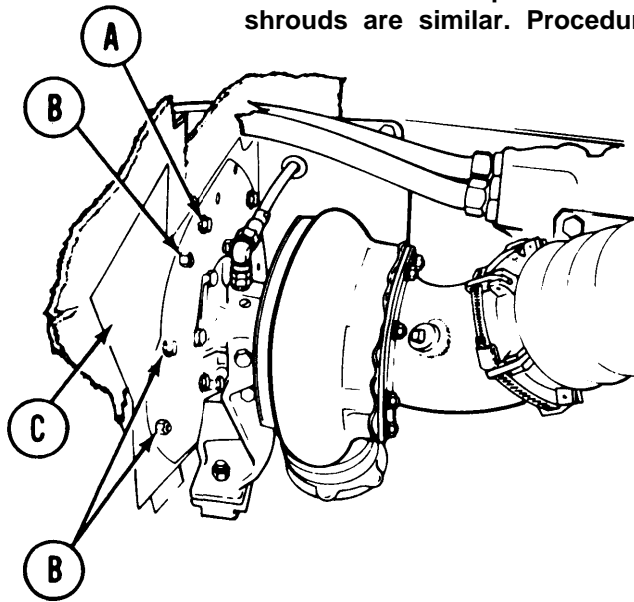
SUPPLIES: Self-locking nut (503345)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)

REMOVAL:

NOTE

Procedures for replacement of the left or right turbocharger shrouds are similar. Procedures for the left side are shown.



1. Using 1/2 inch socket and 1/2 inch wrench, remove four screws and self-locking nuts (A) securing outer shroud (B). Throw self-locking nuts away.
2. Remove outer shroud (B).

INSTALLATION:

1. Position outer shroud (B) to turbocharger.
2. Install four screws and new self-locking nuts (A) to secure outer shroud (B) to turbocharger.
3. Using 1/2 inch socket and 1/2 inch wrench, tighten screws (A) and (B).
4. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA140253

TURBOCHARGER SHROUDS REPLACEMENT (Sheet 6 of 6)

Upper Shroud Replacement (Sheet 1 of 1)

TOOLS: 1/2 in. combination box and open end wrench
1/2 in. socket with 1/2 in. drive
5 in. extension with 1/2 in. drive
Ratchet with 1/2 in. drive

SUPPLIES: Self-locking nut (MS21044N5)

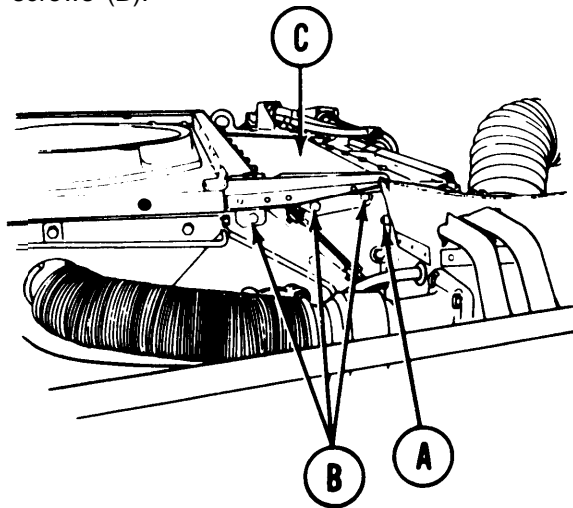
PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Remove rear engine shroud support (page 9-4)

NOTE

Procedures for replacement of the left or right turbocharger shrouds are similar. Procedures for the left side are shown.

REMOVAL:

1. Using 1/2 inch socket with extension and 1/2 inch wrench, remove screw and self-locking nut (A). Throw self-locking nut (A) away.
2. Using 1/2 inch socket, remove three screws (B).
3. Remove upper shroud (C).



INSTALLATION:

1. Position upper shroud (C) in place.
2. Install three screws (B).
3. " Install screw and new self-locking nut (A).
4. Using 1/2 inch socket with extension and 1/2 inch wrench, tighten screws (A) and (B).
5. Install rear engine shroud support (page 9-5).
6. Install engine shroud (page 9-3).
7. Install 2A powerplant (page 5-14) or 2D Powerplant (page 5-37).

End of Task

TA140254

TRANSMISSION SHROUD REPLACEMENT (Sheet 1 of 7)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	9-20
Installation	9-23

TOOLS: Ratchet with 1/2 in. drive
 3/4 in. socket with 1/2 in. drive
 1-1/8 in. socket with 1/2 in. drive
 7/16 in. combination box and open end wrench

SUPPLIES: Plastic covers for exhaust (2 required)

PERSONNEL: Two

WARNING

Allow engine to cool one hour before removing shroud. Wear asbestos gloves for protection against burns.

Go on to Sheet 2

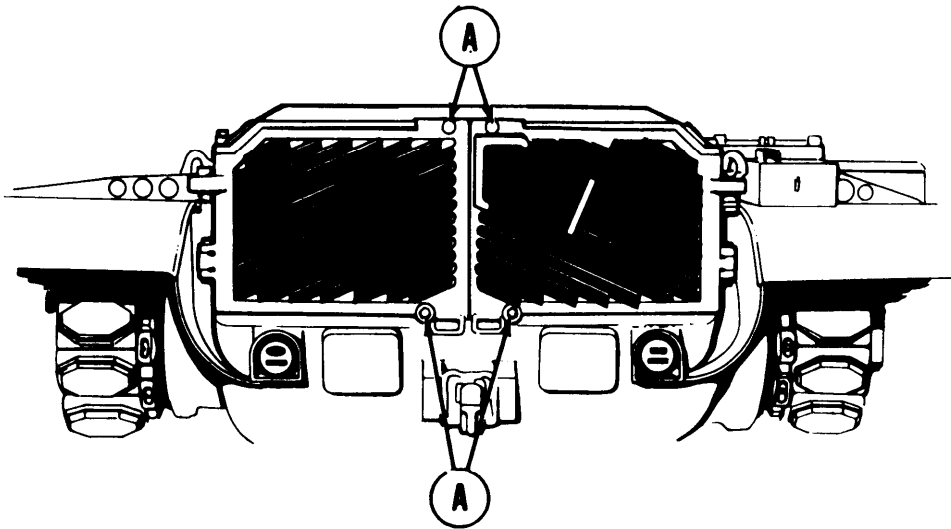
TRANSMISSION SHROUD REPLACEMENT (Sheet 2 of 7)

NOTE

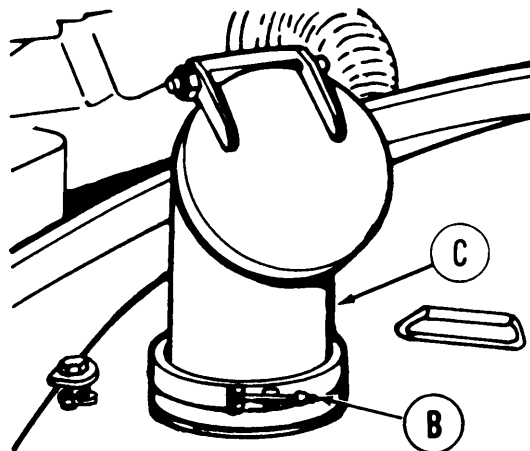
Remove bolts from right exhaust door first. Then remove bolts from left door.

REMOVAL:

1. Using 1-1/8 inch socket, remove four bolts (A) securing exhaust doors to hull.
2. Open both exhaust doors.



3. Using wrench, loosen clamp assembly (B) securing cap assembly (C) to exhaust pipe (both sides of vehicle). Unlock clamp assembly (B).
4. Remove cap assembly (C) from exhaust pipe (both sides of vehicle).



Go on to Sheet 3

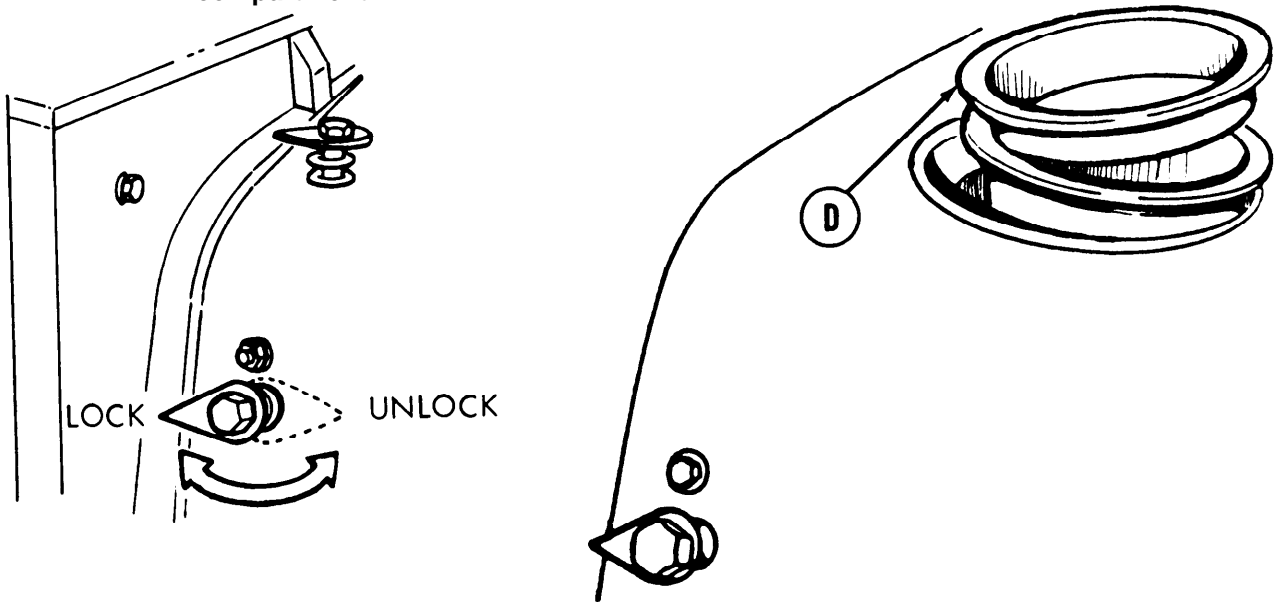
TA140255

TRANSMISSION SHROUD REPLACEMENT (Sheet 3 of 7)

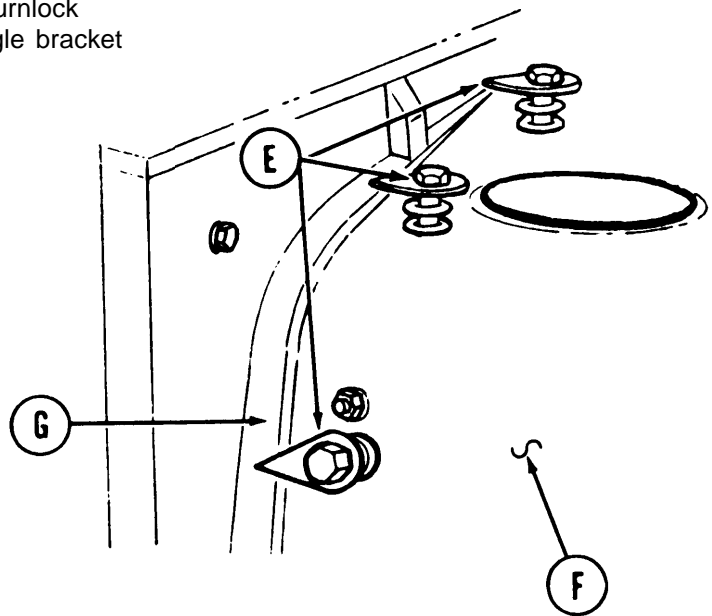
5. Install plastic covers (D) over exhausts.

NOTE

Narrow end of turnlock fasteners (E) must be rotated 180° from their original position so they point inside engine compartment.



6. Using 3/4 inch socket, unlock three turnlock fasteners (E) holding shroud (F) to angle bracket (G) on both sides of vehicle.



Go on to Sheet 4

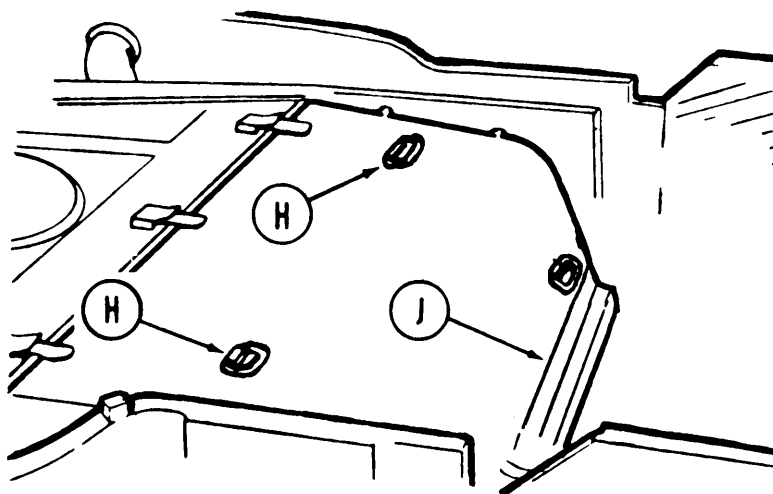
TA140256

TRANSMISSION SHROUD REPLACEMENT (Sheet 4 of 7)

- Both persons grasp handles (H) and lift shroud up (to clear exhaust pipe) and out.

CAUTION

Remove shroud carefully to avoid damage to shroud seal (J).



TRANSMISSION SHROUD REPLACEMENT (Sheet 5 of 7)

INSTALLATION:

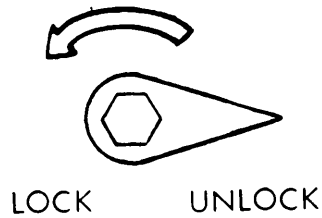
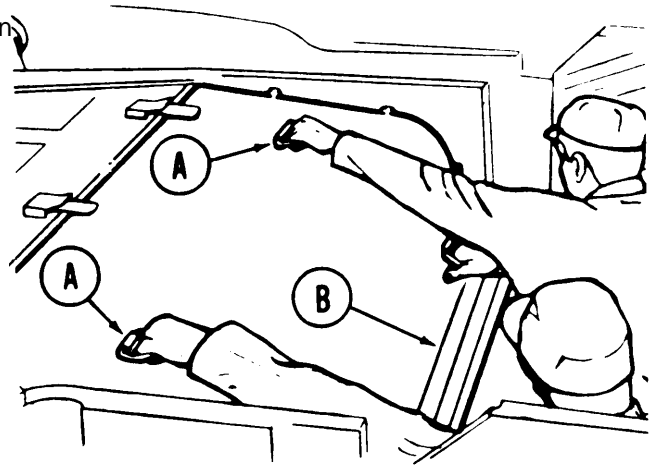
Both persons grasp handles (A) of transmission shroud and lift shroud into position on vehicle.

CAUTION

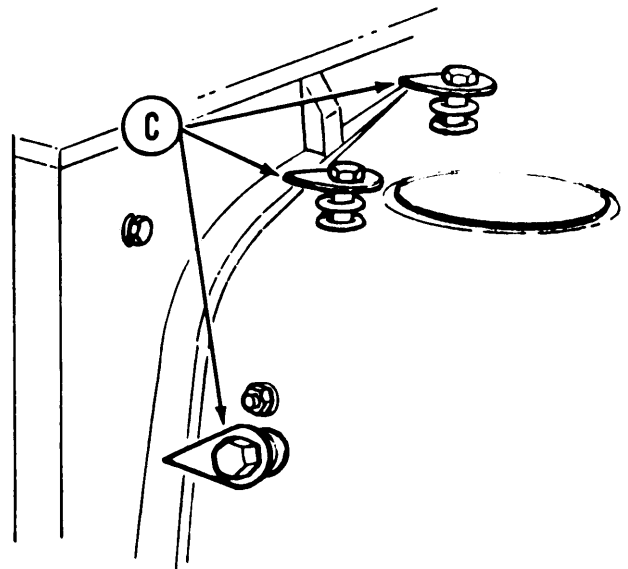
position shroud carefully onto vehicle to avoid damage to shroud seal (B).

NOTE

Narrow end of turnlock fasteners must be rotated 180° to lock.



- Using 3/4 inch socket, lock three turnlock fasteners (C) on each side of vehicle.

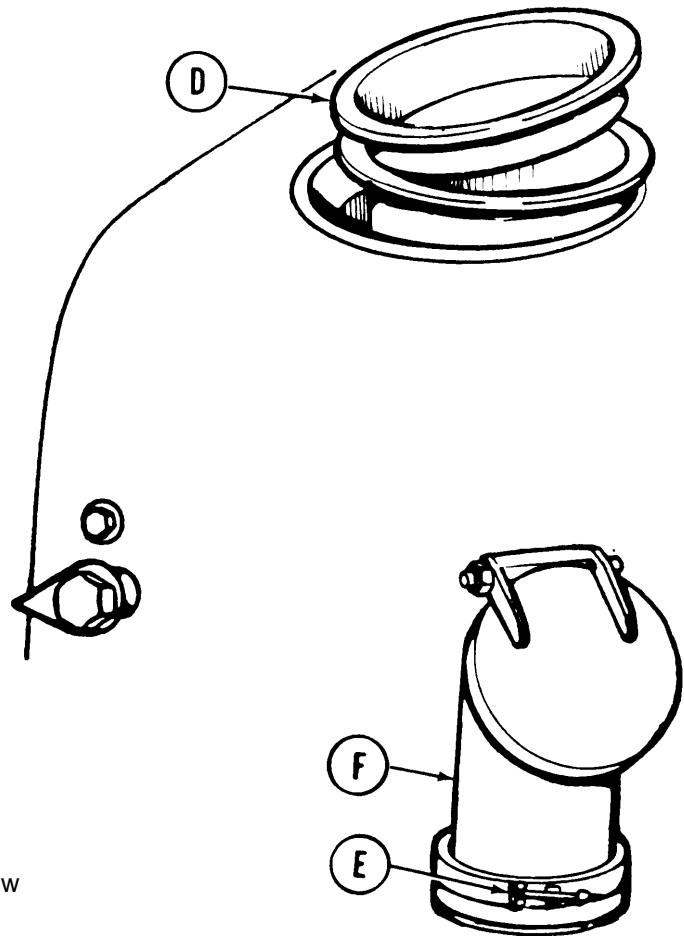


Go on to Sheet 6

TA140258

TRANSMISSION SHROUD REPLACEMENT (Sheet 6 of 7)

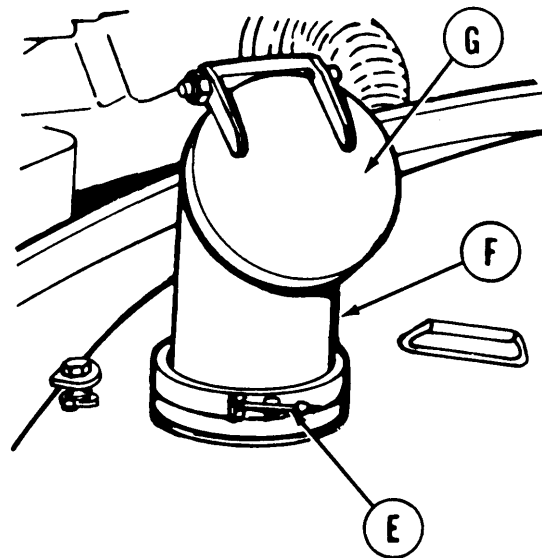
3. Remove plastic covers (D) from exhausts.



4. Position clamp assembly (E) over exhaust elbow assembly (F).

5. Position exhaust elbow assembly (F) over exhaust pipe (both sides of vehicle). Orient cap assemblies so that outlets (F) face rear of vehicle. Lock clamp assembly (E).

6. Using wrench, tighten clamp assembly (E).

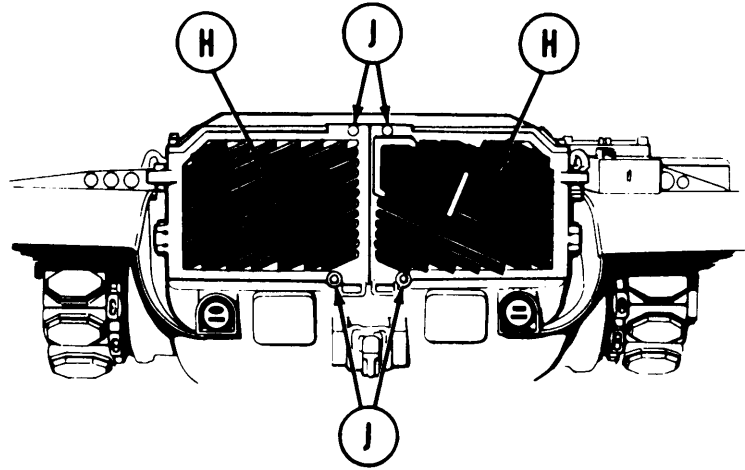


Go on to Sheet 7

TA140259

TRANSMISSION SHROUD REPLACEMENT (Sheet 7 of 7)

7. Close engine exhaust doors (H).
8. Using 1-1/8 inch socket, install and tighten four bolts (J).



End of Task

TA140260

TRANSMISSION SHROUD REPAIR (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	9-27
Cleaning and Inspection	9-29
Assembly	9-30

- TOOLS: 7/16 in. combination box and open end wrench
Diagonal cutting pliers
Ratchet with 1/2 in. drive
7/16 in. socket with 1/2 in. drive
3/4 in. socket with 1/2 in. drive
3/4 in. combination box and open end wrench
Putty knife
Slip joint pliers
Ball peen hammer
Cold chisel
Speeder brace with 1/2 in. drive

- SUPPLIES: Lockwire (Item 59, Appendix D)
Dry cleaning solvent (Item 54, Appendix D)
Rags (Item 65, Appendix D)
Lockwasher (MS35338-44) (6 required)
Self-locking nuts (MS20500-428) (10 required)
Key washers (10873733) (4 required)
Self-locking nuts (MS20500-820) (6 required)

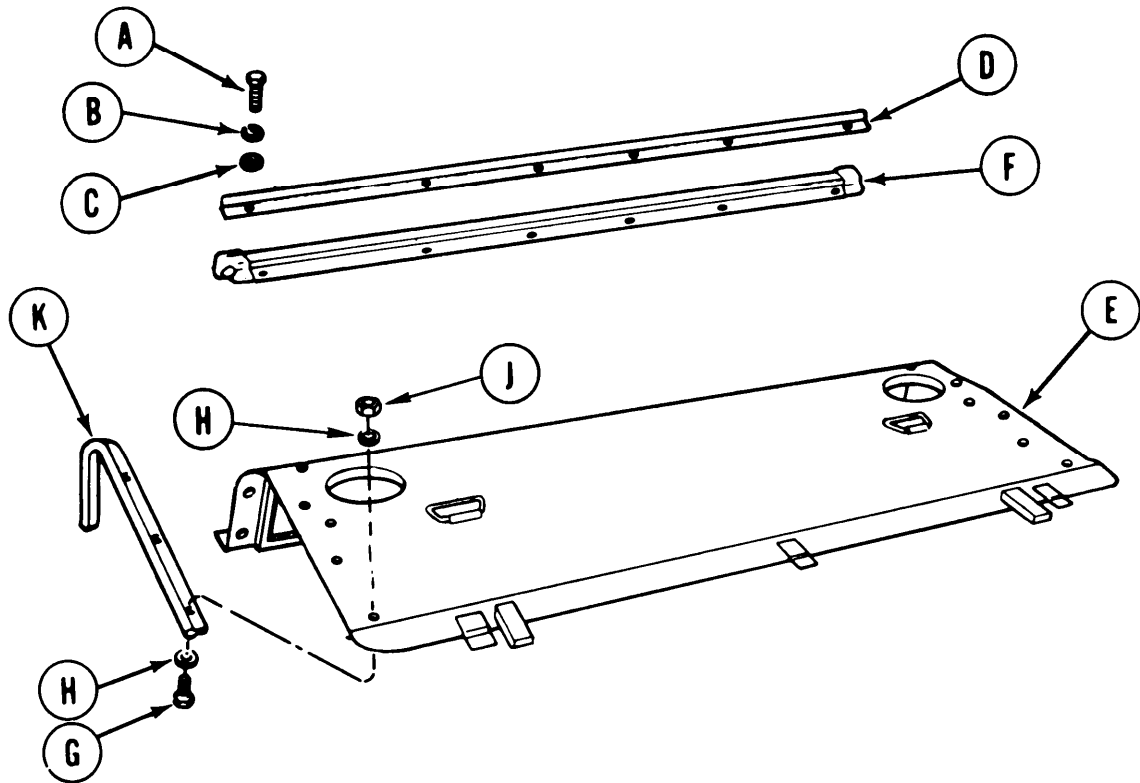
PRELIMINARY PROCEDURE: Remove transmission shroud (page 9-20)

Go on to Sheet 2

TRANSMISSION SHROUD REPAIR (Sheet 2 of 6)

DISASSEMBLY:

Using 7/16 inch socket, remove six screws (A), lockwashers (B), and flat washers (C) holding retainer (D) to transmission shroud (E). Throw lockwashers (B) away.



2. Remove retainer (D) from shroud (E).
3. Remove seal assembly (F) from shroud (E).
4. Using 7/16 inch socket and 7/16 inch wrench, remove five screws (G), ten flat washers (H), and five self-locking nuts (J) holding seal (K) to transmission shroud (E) both right and left sides: Throw self-locking nuts (J) away.

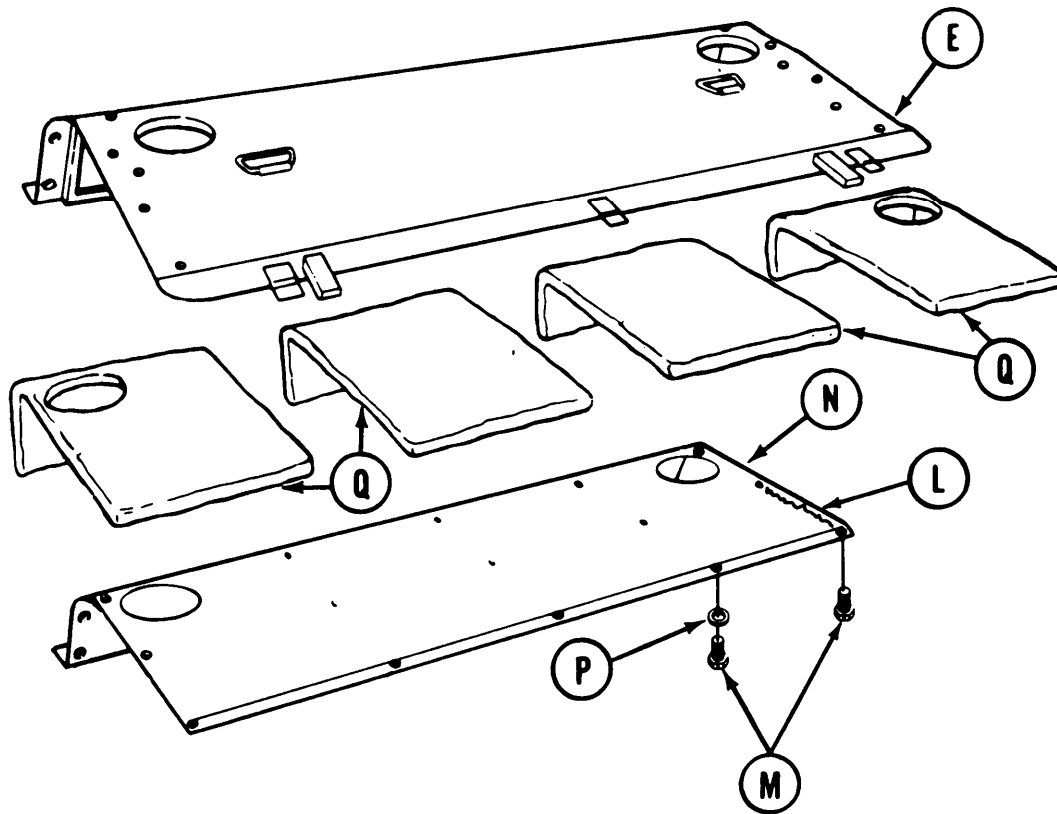
Remove seal assembly (K) from shroud (E).

Go on to Sheet 3

TA140261

TRANSMISSION SHROUD REPAIR (Sheet 3 of 6)

6. Using diagonal cutting pliers, remove lockwire (L) from 25 screws (M) on back side of retainer (N).
7. Using hammer and chisel, bend tabs on four key washers (P) away from screw heads.



NOTE

If desired, speed wrench may be used to remove screws (M).

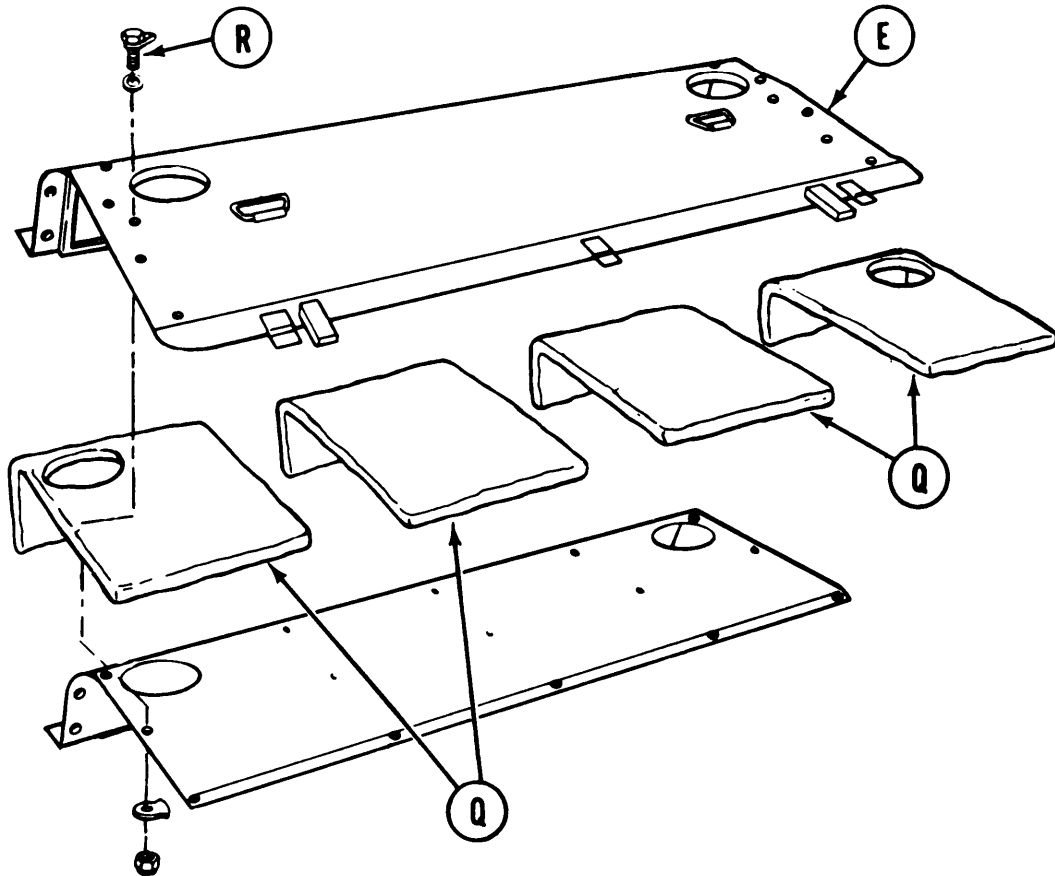
8. Using 7/16 inch socket, remove 25 screws (M) four key washers (P), and 21 flat washers holding retainer (N) to shroud (E). Throw key washers away.
9. Remove retainer (N) from shroud (E).
10. Remove insulation (Q) from shroud (E).

Go on to Sheet 4

TA140262

TRANSMISSION SHROUD REPAIR (Sheet 4 of 6)

- Using 3/4 inch socket and 3/4 inch wrench, remove three turnlock fasteners (R) from both sides of shroud (E). Throw self-locking nuts away.

**CLEANING AND INSPECTION:**

- Using dry cleaning solvent (Item 54, Appendix D) and rags (Item 65, Appendix D), clean all parts of transmission shroud.
- Inspect assembly for worn or damaged parts.
- Replace faulty parts.

Go on to Sheet 5

TA140263

TRANSMISSION SHROUD REPAIR (Sheet 5 of 6)

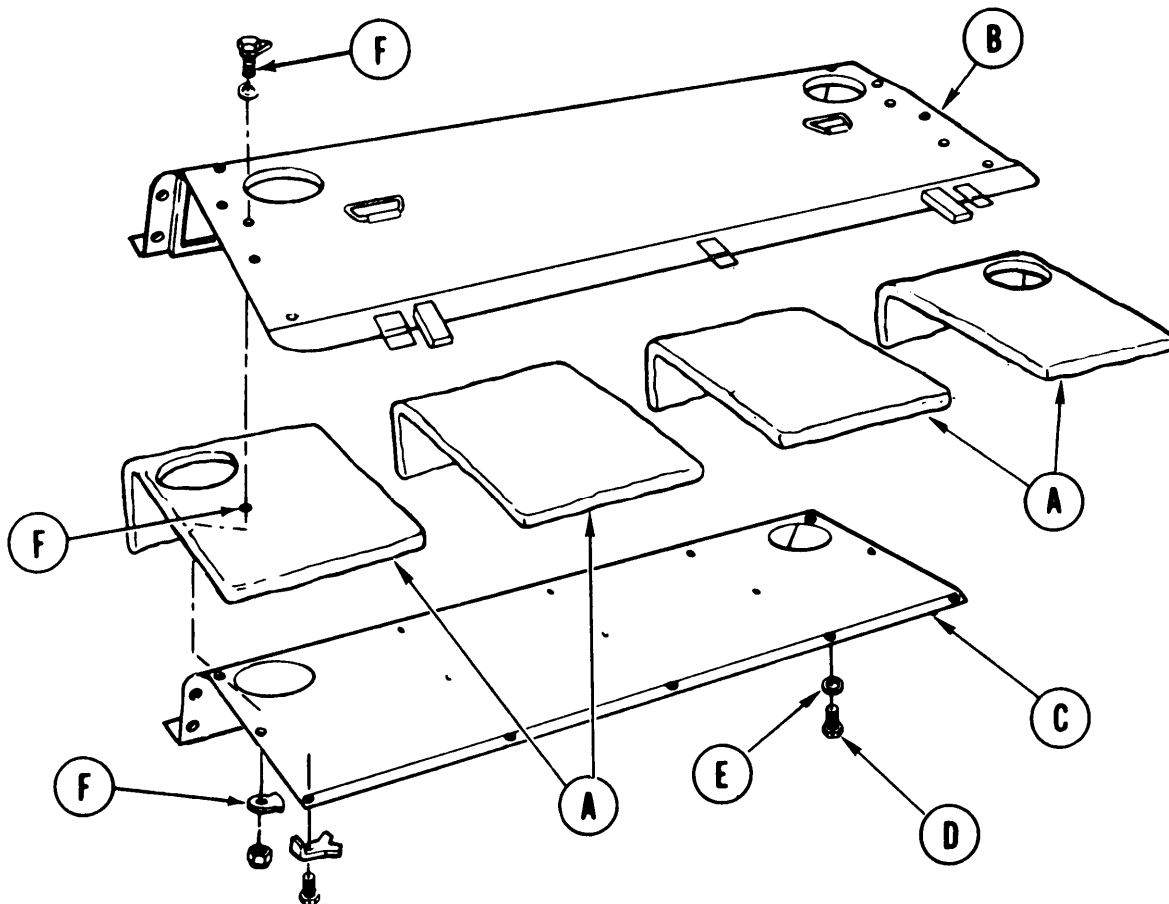
ASSEMBLY:

1. Position insulation (A) on shroud (B).
2. Using 7/16 inch socket, install retainer (C) to shroud with 25 screws (D) 21 washers (E), and four new key washers. Be sure to position four key washers properly and bend tabs with chisel and hammer.

NOTE

Both parts of turnlock fasteners must be pointing in same direction.

3. Using 3/4 inch socket and 3/4 inch wrench, install three turnlock fasteners (F) to both sides of shroud (B). Use new self-locking nuts.

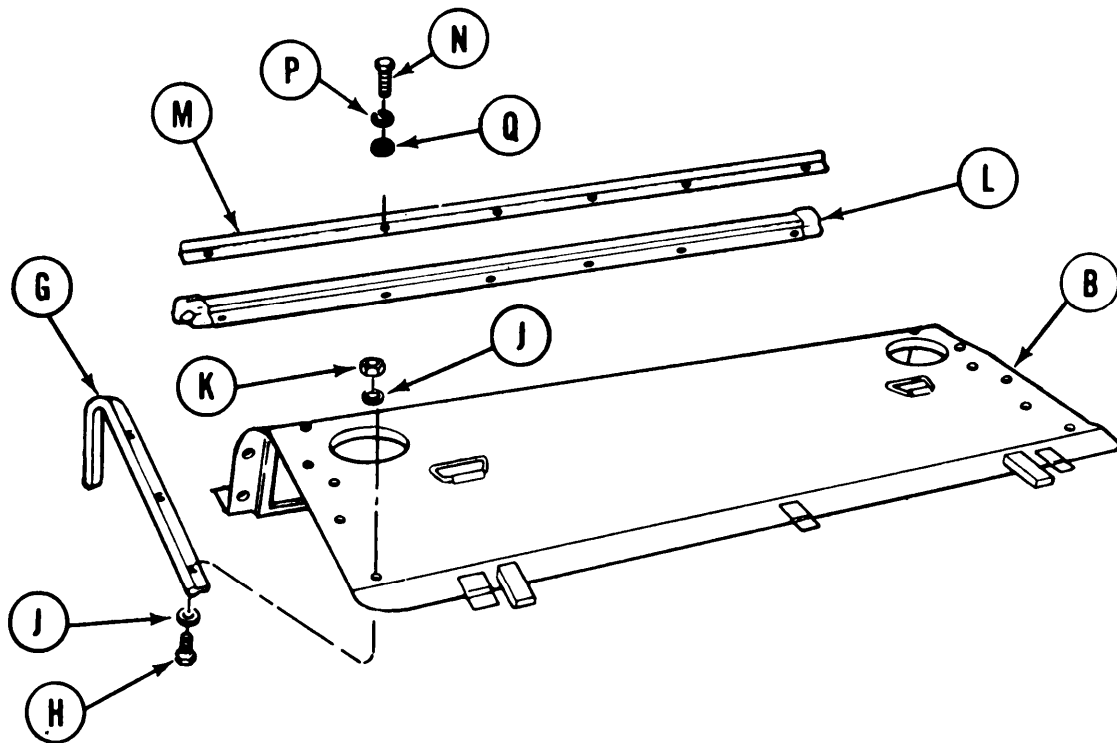


Go on to Sheet 6

TA140264

TRANSMISSION SHROUD REPAIR (Sheet 6 of 6)

4. Using slip joint pliers, install new lockwire (Item 59, Appendix D) in 25 screws (D).
5. Using 7/16 inch socket and 7/16 inch wrench, install seal (G) to shroud (B) each side with five screws (H), ten flat washers (J), and ten new self-locking nuts (K).



6. Position seal (L) and retainer (M) to shroud (B) with six screws (N), new lockwashers (P), and flat washers (Q).
7. Using 7/16 inch socket, tighten six screws (N).
8. Install transmission shroud (page 9-23).

End of Task

TA140265

TRANSMISSION SHROUD BRACKET REPAIR (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	9-32
Assembly	9-35

TOOLS: Putty knife

Ratchet with 1/2 in. drive

7/16 in. socket with 1/2 in. drive

Screwdriver, cross-tip, No. 2

Flat-tip screwdriver

SUPPLIES: Dry cleaning solvent (Item 54, Appendix D)

Silicone adhesive (Item 7, Appendix D)

Rags (Item 65, Appendix D)

Lockwasher (MS35338-25) (5 required)

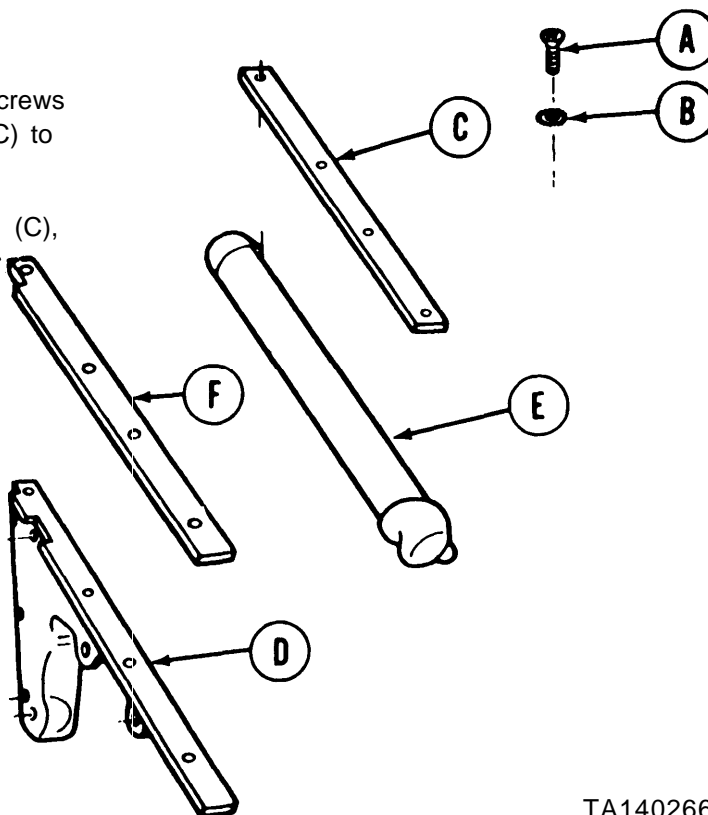
Lockwasher (MS35336-26) (2 required)

Lockwasher (MS35336-27) (7 required)

PRELIMINARY PROCEDURE: Remove shroud support (page 9-38)

DISASSEMBLY:

- Using cross-tip screwdriver, remove four screws (A) and lockwashers (B) holding retainer (C) to bracket (D). Throw lockwashers (B) away.
- Using flat-tip screwdriver, remove retainer (C), seal (E), and retainer (F) from bracket (D):



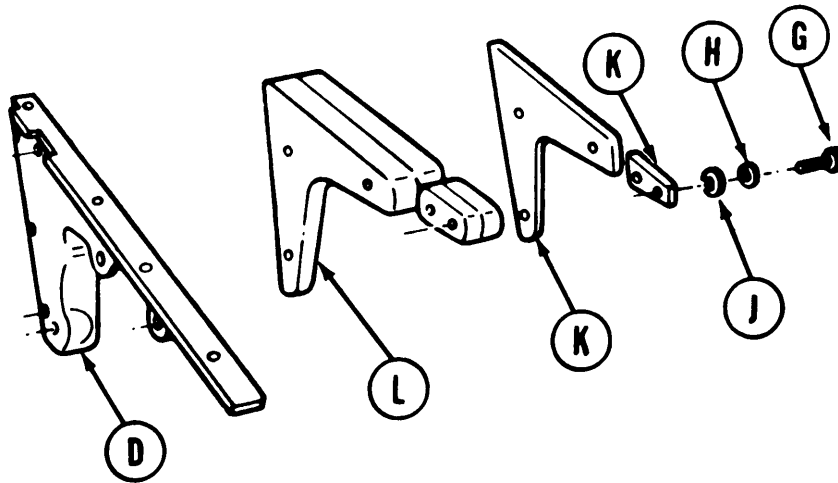
Go on to Sheet 2

TA140266

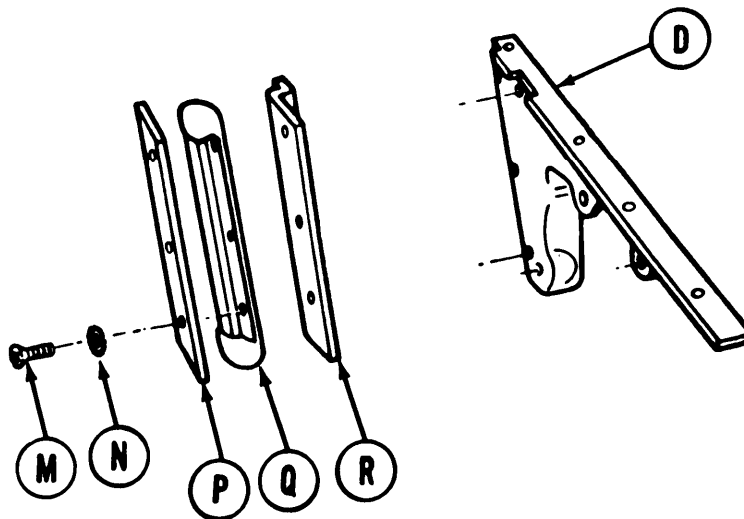
TRANSMISSION SHROUD BRACKET REPAIR (Sheet 2 of 6)

3. Using socket, remove five screws (G), lockwashers (H), and flat washers (J) securing retainers (K) to shroud bracket (D). Throw lockwashers (H) away.

Remove retainers (K) and side insulation (L) from shroud bracket (D).



5. Using cross-tip screwdriver, remove three screws (M) and lockwashers (N) securing retainer (P) to shroud bracket (D). Throw lockwashers (N) away.
6. Using flat-tip screwdriver, remove retainer (P), seal (Q), and retainer (R) from shroud bracket (D).

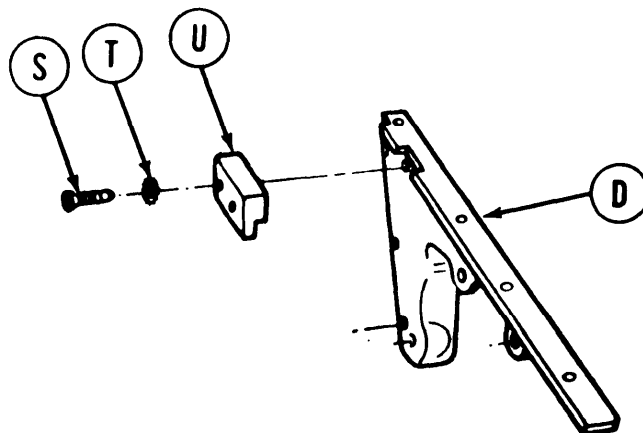


Go on to Sheet 3

TA140267

TRANSMISSION SHROUD BRACKET REPAIR (Sheet 3 of 6)

7. Using cross-tip screwdriver, remove two screws (S) and lockwashers (T) holding pad (U) to shroud bracket (D). Throw lockwashers (T) away.



8. Using putty knife, dry cleaning solvent (Item 54, Appendix D), and rags (Item 65, Appendix D), clean insulation from shroud bracket (D).

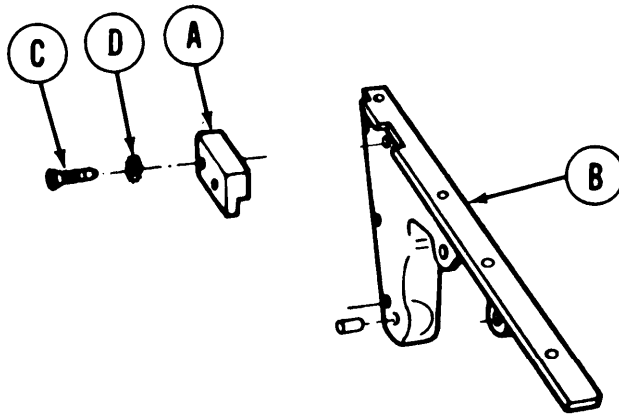
Go on to Sheet 4

TA140268

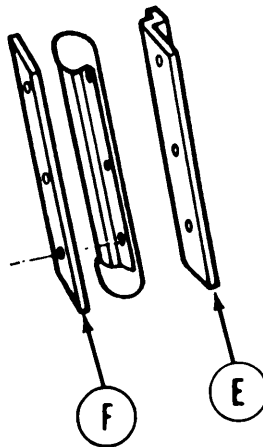
TRANSMISSION SHROUD BRACKET REPAIR (Sheet 4 of 6)

ASSEMBLY:

1. Install pad (A) to shroud bracket (B), using two screws (C) and new lockwashers (D).
2. Using cross-tip screwdriver, tighten screws (C).



3. Using putty knife, apply adhesive (Item 7, Appendix D) to retainers (E) and (F).

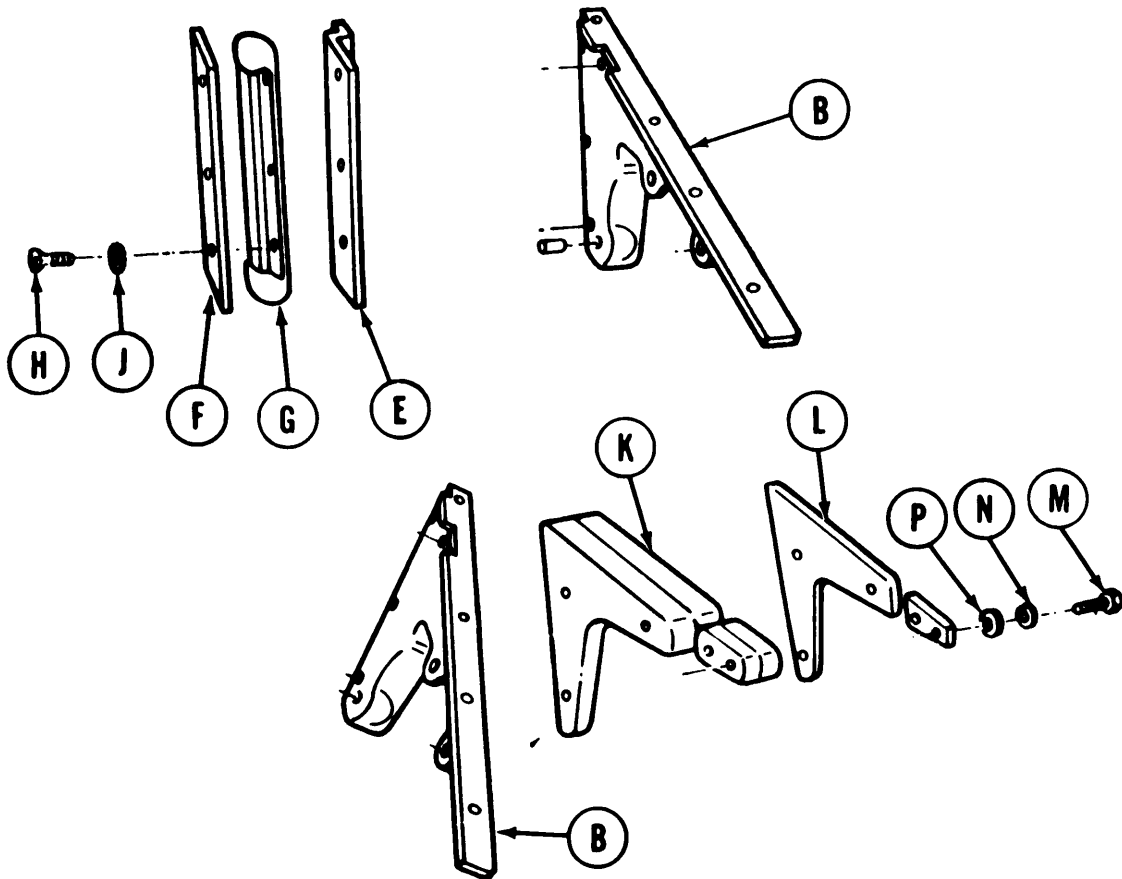


Go on to Sheet 5

TA140269

TRANSMISSION SHROUD BRACKET REPAIR (Sheet 5 of 6)

4. Install retainer (E), seal (G), and retainer (F) to bracket (B), using three screws (H) and new lockwashers (J).
5. Using cross-tip screwdriver, tighten screws (H).



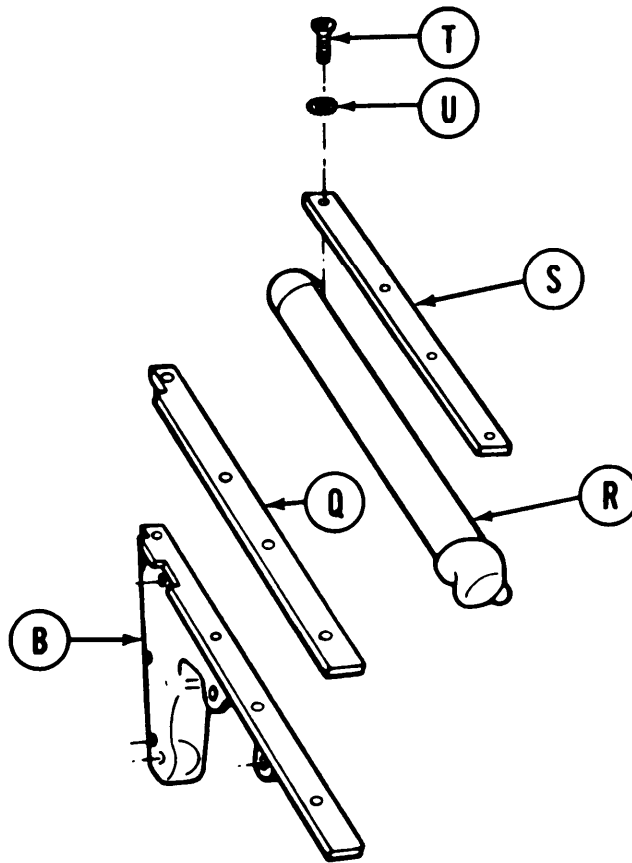
6. Using putty knife, apply adhesive (Item 7, Appendix D) to shroud bracket (B) to hold insulation (K).
7. Install insulation (K) and retainers (L) to shroud bracket (B) using five screws (M), new lockwashers (N), and flat washers (P).
8. Using socket, tighten screws (M).

Go on to Sheet 6

TA140270

TRANSMISSION SHROUD BRACKET REPAIR (Sheet 6 of 6)

9. Using putty knife, apply adhesive (Item 7, Appendix D) to retainer (Q) to hold seal (R).
10. Install retainer (Q), seal (R), and retainer (S) to bracket (B), using four screws (T) and new lockwashers (U).
11. Using cross-tip screwdriver, tighten screws (T).
12. Install shroud support (page 9-38).



End of Task

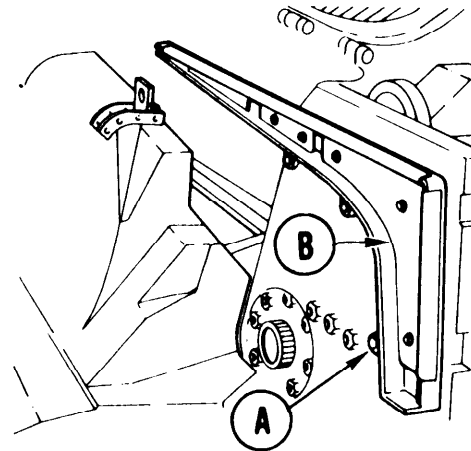
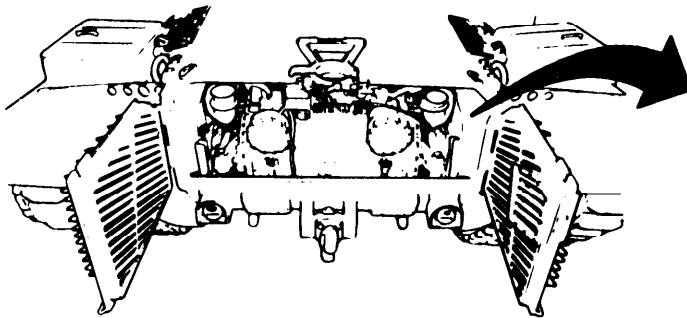
TA140271

TRANSMISSION SHROUD SUPPORTS (LEFT OR RIGHT) REPLACEMENT (Sheet 1 of 1)

TOOLS: Ratchet with 1/2 in. drive
9/16 in. socket with 1/2 in. drive
2 in. extension with 1/2 in. drive

SUPPLIES: Lockwasher (MS35338-46) (3 required)

PRELIMINARY PROCEDURE: Remove transmission shroud (page 9-20)



REMOVAL:

1. Using socket, remove three screws, washers, and lockwashers (A) holding supports (left or right) (B) to hull wall. Throw lockwashers (A) away.
2. Remove supports from vehicle.

INSTALLATION:

1. Position supports (B) (left or right) on hull wall bracket and attach supports with three screws, washers, and new lockwashers (A).
2. Using socket, tighten three screws, washers, and lockwashers (A).
3. Install transmission shroud (page 9-23).

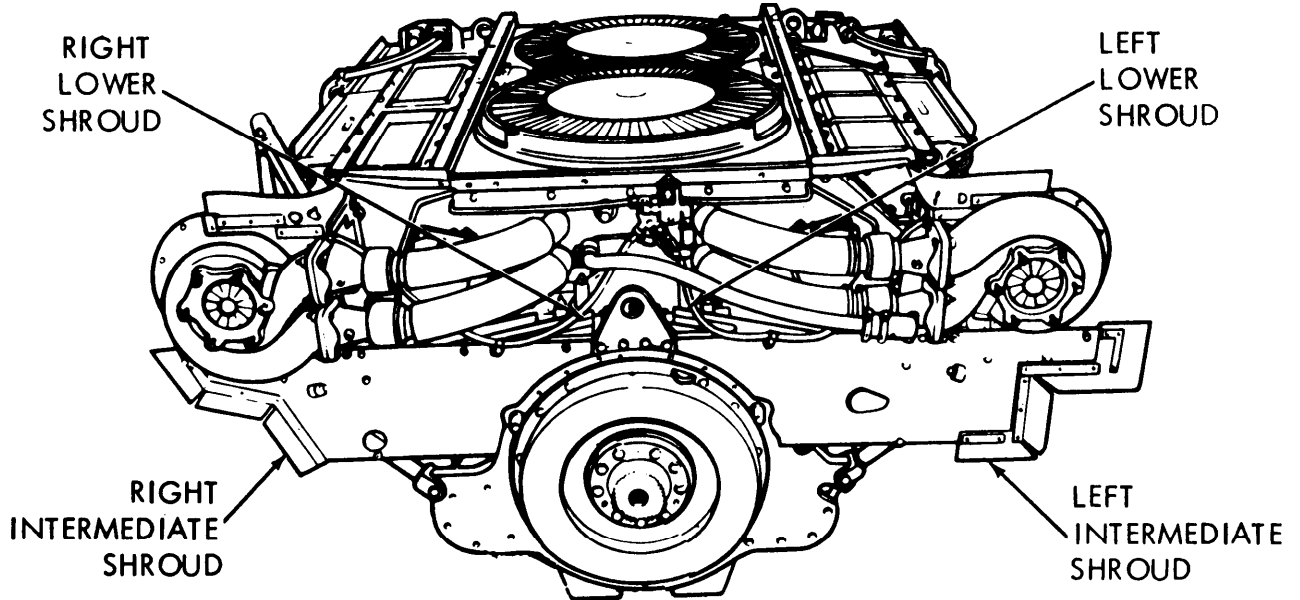
End of Task

TA140272

TRANSMISSION SHROUDS REPLACEMENT (Sheet 1 of 8)

PROCEDURE INDEX

PROCEDURE	PAGE
Right Intermediate Shroud Replacement	9-39
Lower Shroud Replacement	9-44
Left Intermediate Shroud Replacement	9-46



Right Intermediate Shroud Replacement (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	9-40
Installation	9-42

TOOLS: 1/2 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 1/2 in. combination box and open end wrench
 Spanner wrench

RELIMINARY PROCEDURE: Remove powerplant (page 5-1)

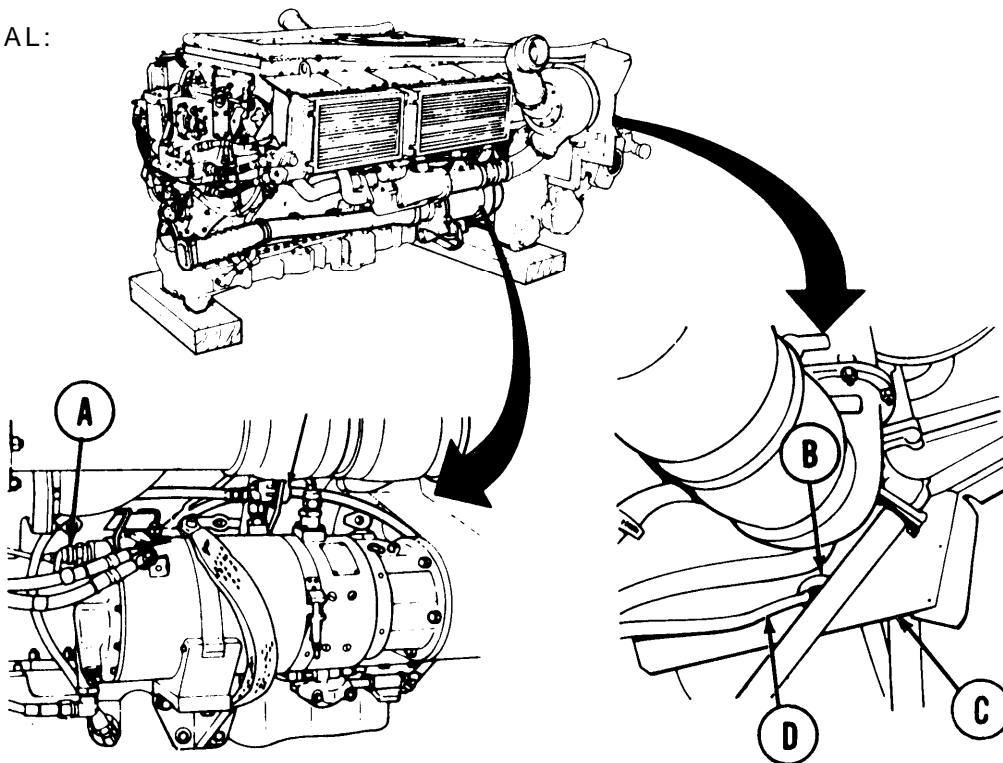
Go on to Sheet 2

TA140273

TRANSMISSION SHROUDS REPLACEMENT (Sheet 2 of 8)

Right Intermediate Shroud Replacement (Sheet 2 of 5)

REMOVAL:



NOTE

When removing the right intermediate shroud on a 2A engine remove engine wiring harness according to page 10-327, steps 1 thru 7 and proceed to step 5 of this procedure. When removing the rigid intermediate shroud on a 2D engine, start with step 1 of this procedure.

1. Using spanner wrench, disconnect connector (A) from generator connector.
2. Remove grommet (B) from shroud (C) and cable assembly (D).
3. Inspect grommet (B) for defects. If defective, replace grommet.
4. Pull cable assembly (D) through shroud (C).

Go on to Sheet 3

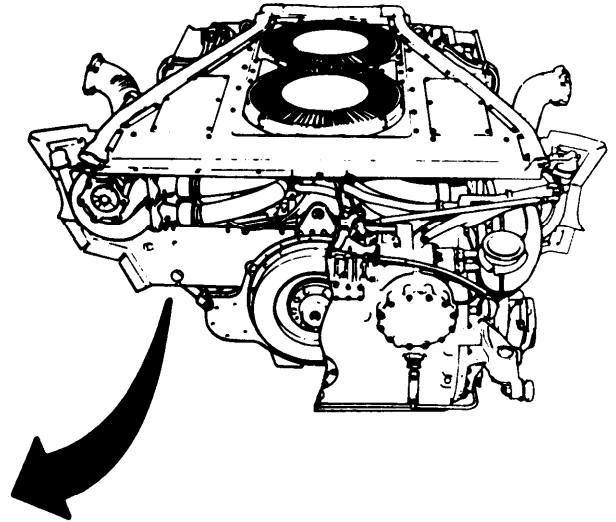
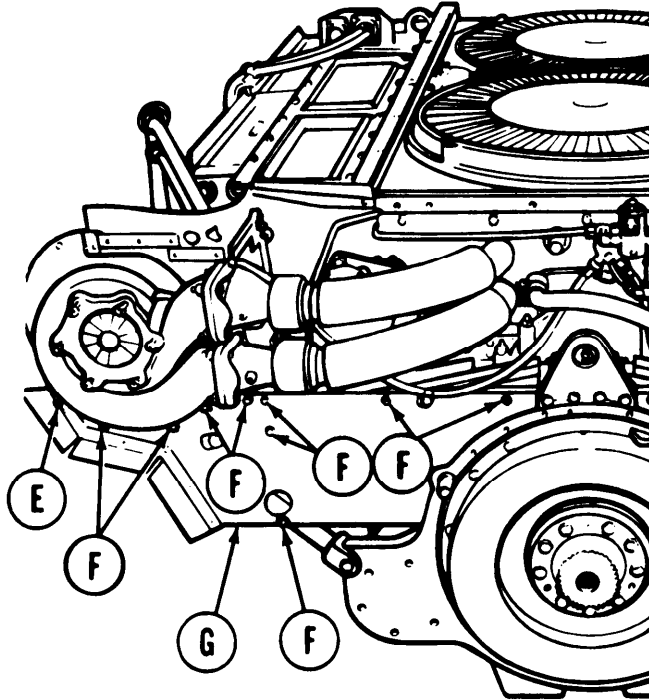
TA1402

TRANSMISSION SHROUDS REPLACEMENT
 (Sheet 3 of 8)

Right Intermediate Shroud Replacement (Sheet 3 of 5)

NOTE

Intermediate shroud is located between transmission and engine.



5. Using socket and wrench, remove assembled washer bolt (E).
6. Using socket or wrench, remove nine assembled washer bolts (F).
7. Remove intermediate shroud (G).

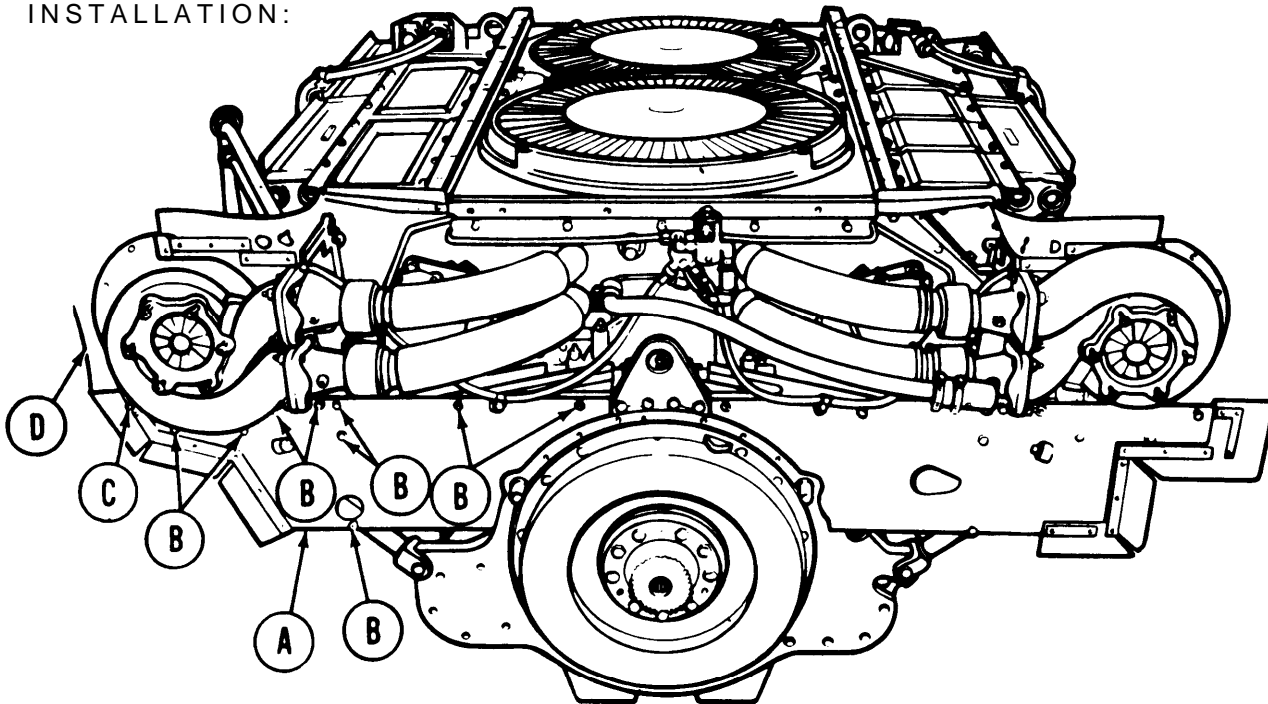
Go on to Sheet 4

TA140275

TRANSMISSION SHROUDS REPLACEMENT (Sheet 4 of 8)

Right Intermediate Shroud Replacement (Sheet 4 of 5)

INSTALLATION:



NOTE

When installing the right intermediate shroud on a 2A engine perform steps 1 thru 4 and proceed to page 10-333, step 1 and steps 22 thru 28. When installing the right intermediate shroud on a 2D engine, start with step 1 of this procedure.

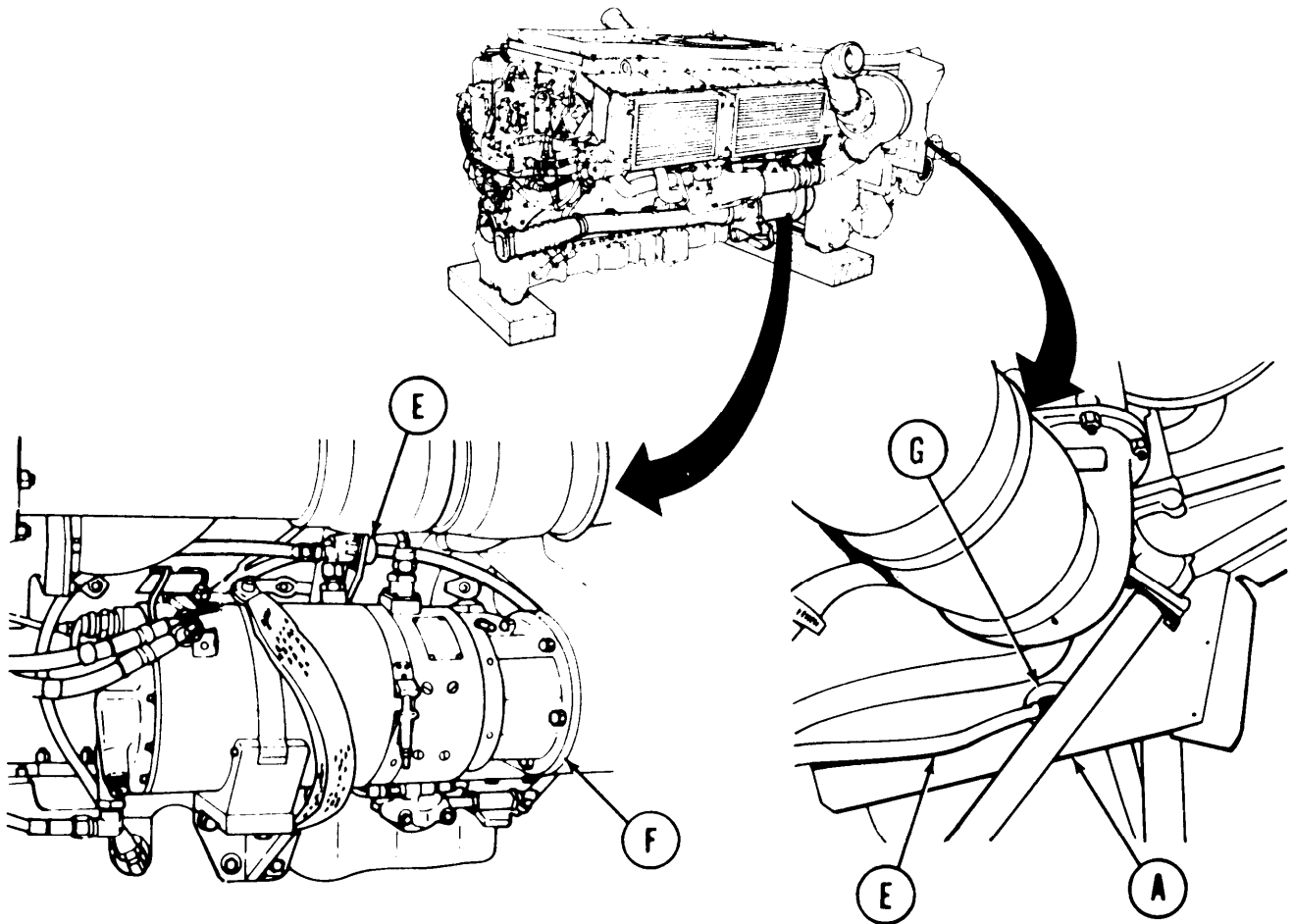
1. Position intermediate shroud (A) into place on engine.
2. Install nine assembled washer bolts (B) to secure intermediate shroud (A) to engine.
3. Install screw, assembled washer bolt (C) to secure intermediate shroud (A) to turbocharger shroud (D).
4. Using socket and wrench, tighten screws (B) and (C).

Go on to Sheet 5

TA140276

TRANSMISSION SHROUDS REPLACEMENT (Sheet 5 of 8)

Right Intermediate Shroud Replacement (Sheet 5 of 5)



5. Install cable assembly (E) through intermediate shroud (A).
6. Route cable assembly (E) to generator (F).
7. Using spanner wrench, connect cable assembly (E) connector to generator (F) connector.
Install grommet (G) around cable assembly (E) and into intermediate shroud (A).
9. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA140277

TRANSMISSION SHROUDS REPLACEMENT (Sheet 6 of 8)

Lower Shroud Replacement (Sheet 1 of 2)

- TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
1/2 in. combination box and open end wrench
6 in. flat-tip screwdriver
2 in. flat-tip screwdriver

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Remove engine shroud (page 9-2)

NOTE

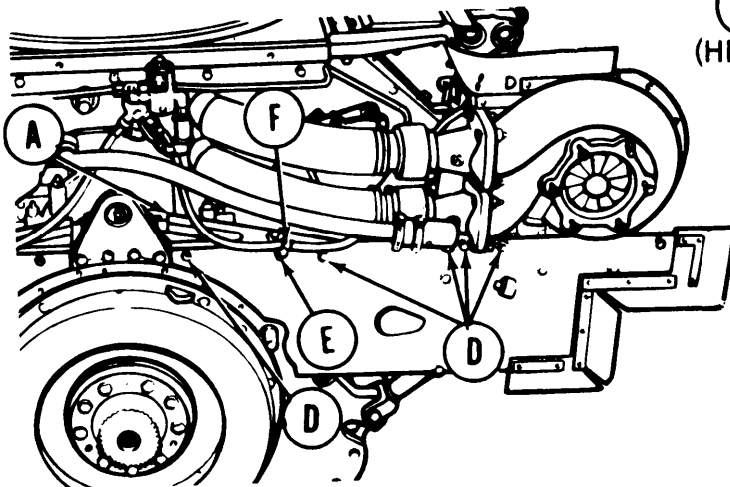
Replacement of right and left lower shrouds. (A) is similar. Left lower shroud (A) is shown.

REMOVAL:

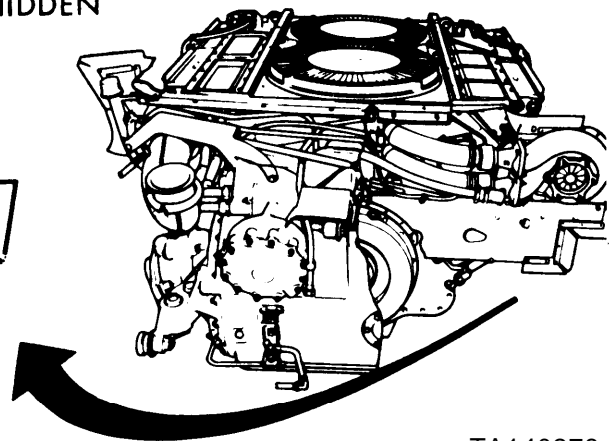
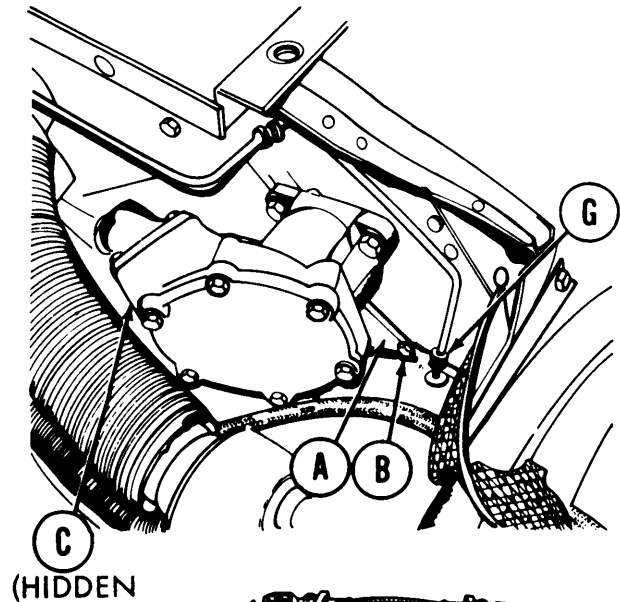
1. Using 2 inch screwdriver, remove screw (B).
2. Using 6 inch screwdriver, remove screw (C).
3. Using socket or wrench, remove five screws and washers (D).
4. Using socket or wrench, remove screw and washer (E) securing clamp (F).
5. Remove lower shroud (A). Be careful not to damage fuel return line when removing shroud (A).
6. Inspect grommet (G) for tears or deterioration. Replace if defective.

NOTE

When lower shroud is removed, a grommet (G) may come out with it or stay on fuel return line.



Go on to Sheet 2



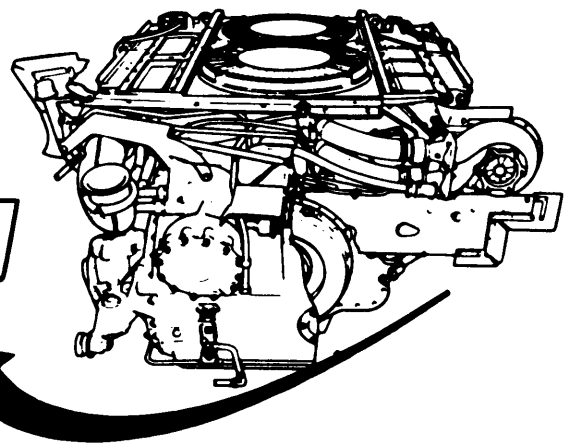
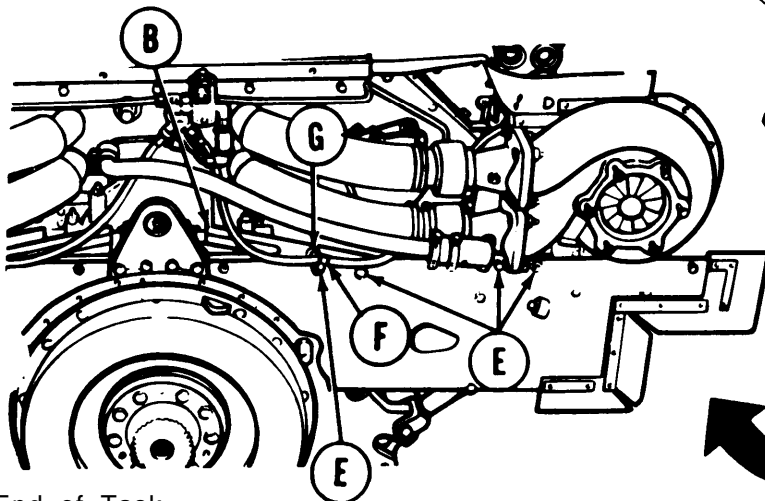
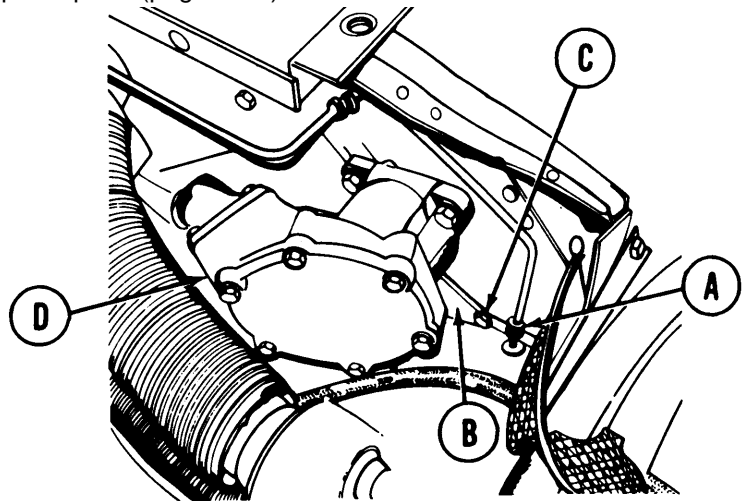
TA140278

TRANSMISSION SHROUDS REPLACEMENT (Sheet 7 of 8)

Lower Shroud Replacement (Sheet 2 of 2)

INSTALLATION:

1. Position grommet (A) on fuel line.
2. Position lower shroud (B) in place on engine and on grommet (A).
3. Using 2 inch screwdriver, install screw (C).
4. Using 6 inch screwdriver, install screw (D).
5. Using 1/2 inch socket or wrench, install five screws and washers (E).
6. Using 1/2 inch socket or wrench, install screw and washer (F) securing clamp (G).
7. Install engine shroud (page 9-3).
8. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).



End of Task

TA140279

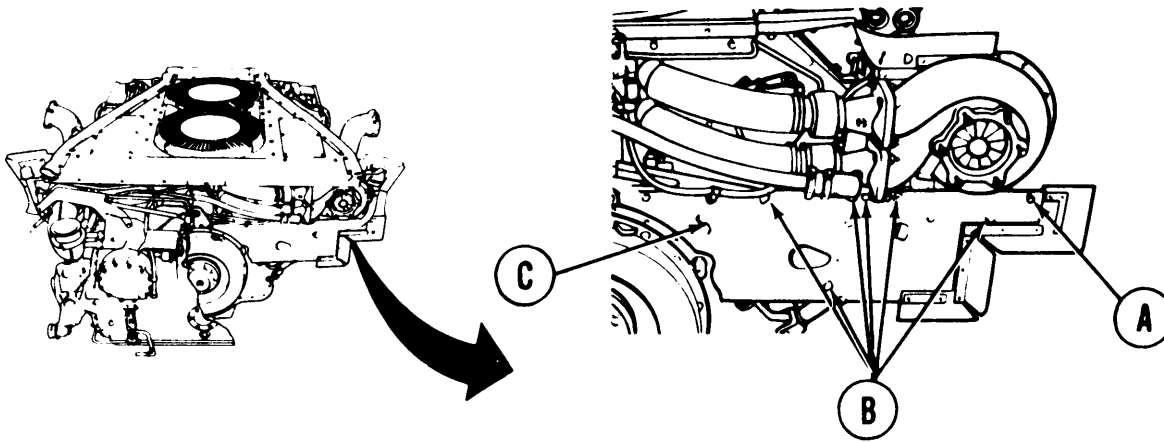
TRANSMISSION SHROUDS REPLACEMENT (Sheet 8 of 8)

Left Intermediate Shroud Replacement (Sheet 1 of 1)

TOOLS: 1/2 in. socket with 1/2 in. drive
Ratchet with 1/2 in. drive
1/2 in. combination box and open end wrench

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
Remove oil filler (upper) tube (page 6-43)

REMOVAL:



1. Using socket and wrench, remove assembled washer bolt (A).
2. Using wrench or socket, remove seven screws and washers (B) securing intermediate shroud (C) to engine.
3. Remove intermediate shroud (C).

INSTALLATION:

1. Position intermediate shroud (C) into place on engine.
2. Install seven screws and washers (B) to secure intermediate shroud (C) to engine.
3. Install assembled washer bolt (A).
4. Using wrench and socket, tighten screws (A) and (B).
5. Install engine oil filler tube (page 6-45).
6. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

TA140280

ENGINE COOLING FAN REPLACEMENT (Sheet 1 of 4)

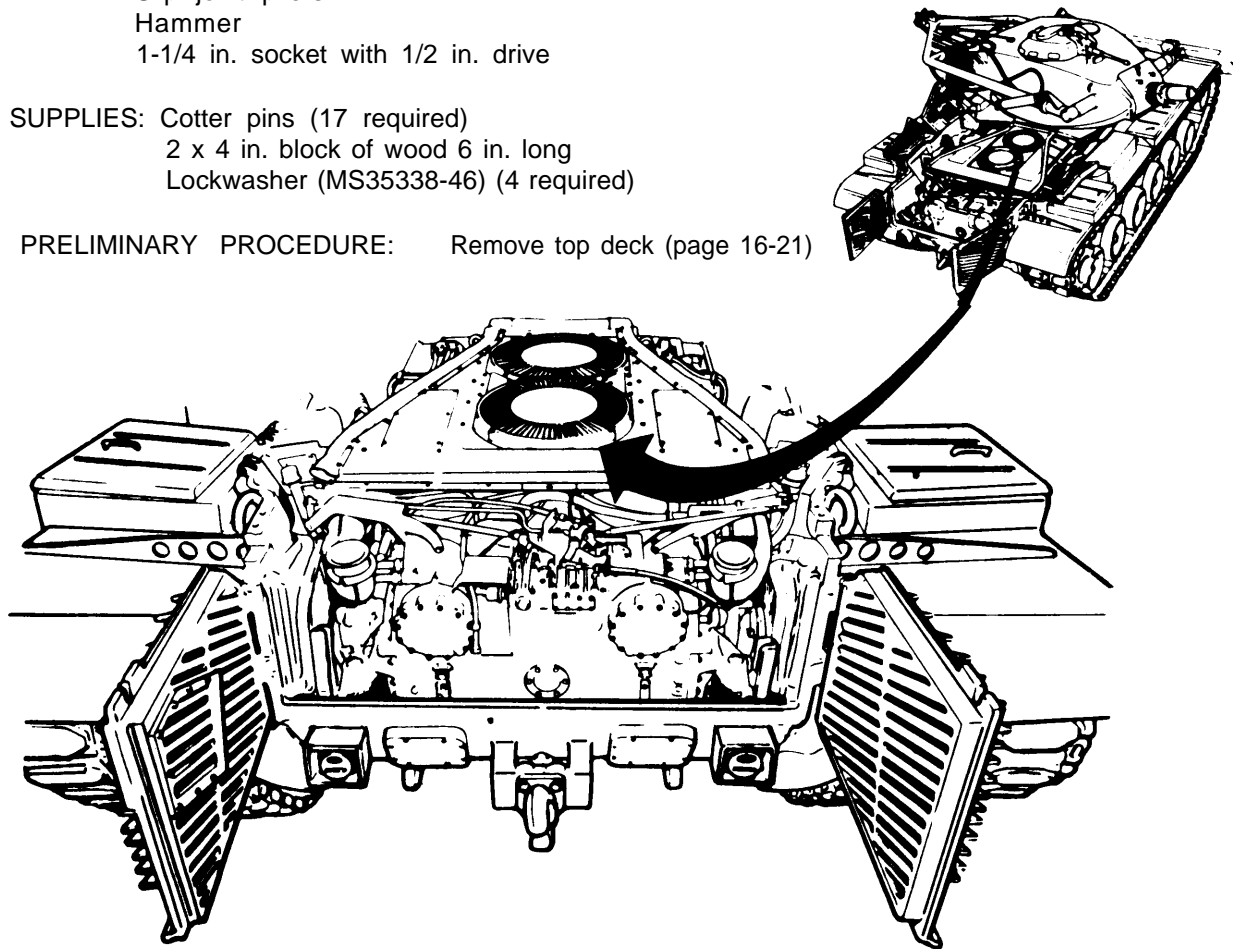
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	9-48
Installation	9-49

- TOOLS: Feeler gage
 Torque wrench with 1/2 in. drive (0-175 ft-lb) (0-237 N-m)
 Ratchet with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 1/2 in. socket with 1/2 in. drive
 1/2 in. combination box and open end wrench
 Slip joint pliers
 Hammer
 1-1/4 in. socket with 1/2 in. drive

- SUPPLIES: Cotter pins (17 required)
 2 x 4 in. block of wood 6 in. long
 Lockwasher (MS35338-46) (4 required)

PRELIMINARY PROCEDURE: Remove top deck (page 16-21)



Go on to Sheet 2

TA140281

ENGINE COOLING FAN REPLACEMENT (Sheet 2 of 4)

CAUTION

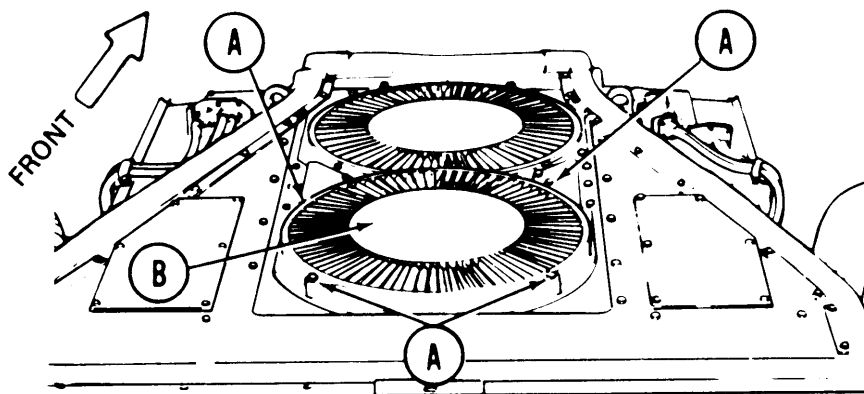
Do not drop screws and lockwashers into fan assembly.

NOTE

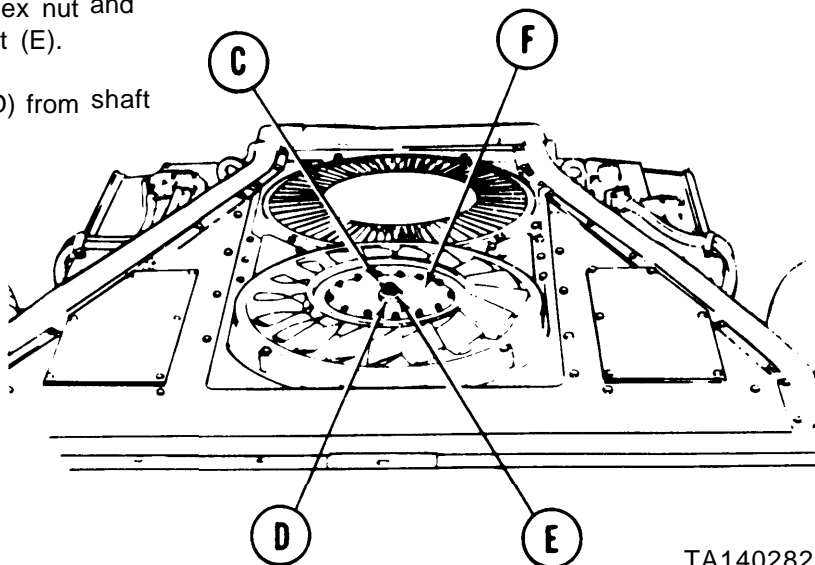
Both engine cooling fans are replaced the same.

REMOVAL:

1. Using 9/16 inch socket, remove four screws and lockwashers (A) holding fan cover (B) to engine. Throw lockwashers away.
2. Remove fan cover (B).



3. Using slip joint pliers, remove cotter pin (C) and throw away.
4. Using 1-1/4 inch socket, remove hex nut and flat washer (D) holding fan to shaft (E).
5. Remove assembled fan and hub (D) from shaft (E).

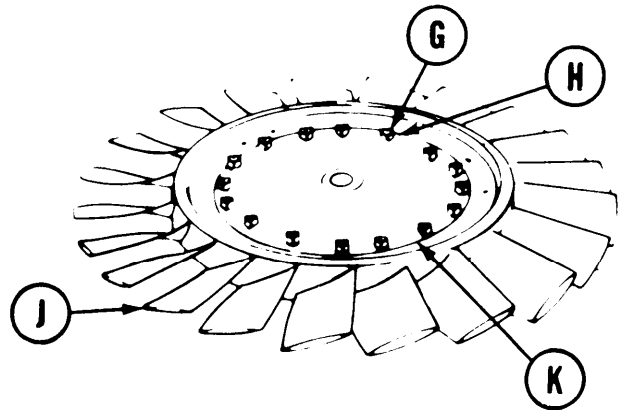


Go on to Sheet 3

TA140282

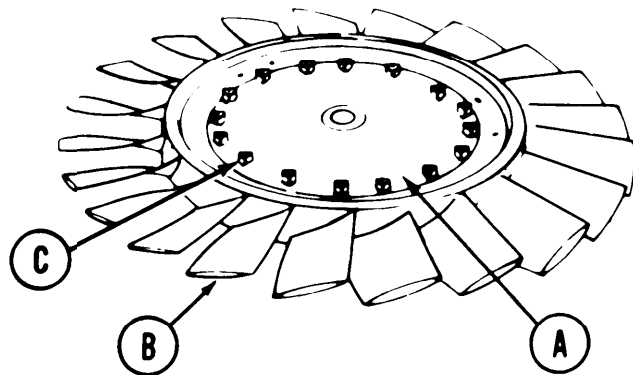
ENGINE COOLING FAN REPLACEMENT (Sheet 3 of 4)

6. Using slip joint pliers, remove 16 cotter pins (G) and throw away.
7. Using 1/2 inch socket and wrench, remove 16 nuts, bolts, and washers (H) holding fan (J) to hub (K).
8. Place block of wood on hub (K). Using hammer, strike block of wood until hub is separated from fan (J).
9. Inspect hub (K) for damages. Replace hub if damaged.

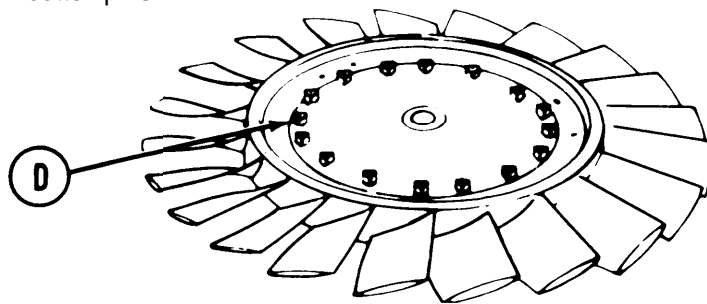


INSTALLATION:

1. Position hub (A) on fan (B), machined surface up (marked TOP).
2. Using 1/2 inch socket and wrench, install 16 bolts, nuts, and washers (C). Using torque wrench, tighten nuts to 15-20 lb-ft (20-27 N-m).



3. Using slip joint pliers, install 16 new cotter pins (D).

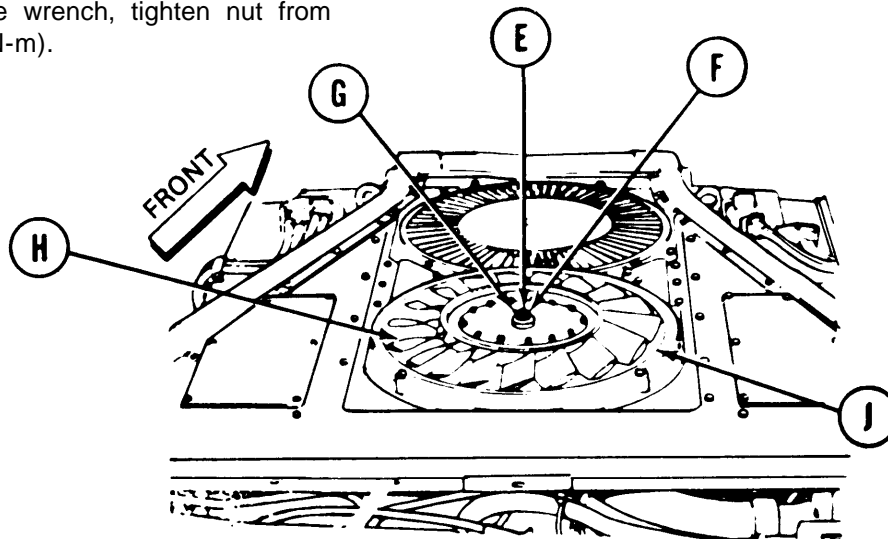


Go on to Sheet 4

TA140283

ENGINE COOLING FAN REPLACEMENT (Sheet 4 of 4)

4. Install assembled fan and hub on shaft (E).
5. Using 1-1/4 inch socket, install washer and hex nut (F). Using torque wrench, tighten nut from 45-55 lb-ft (61-75 N-m).



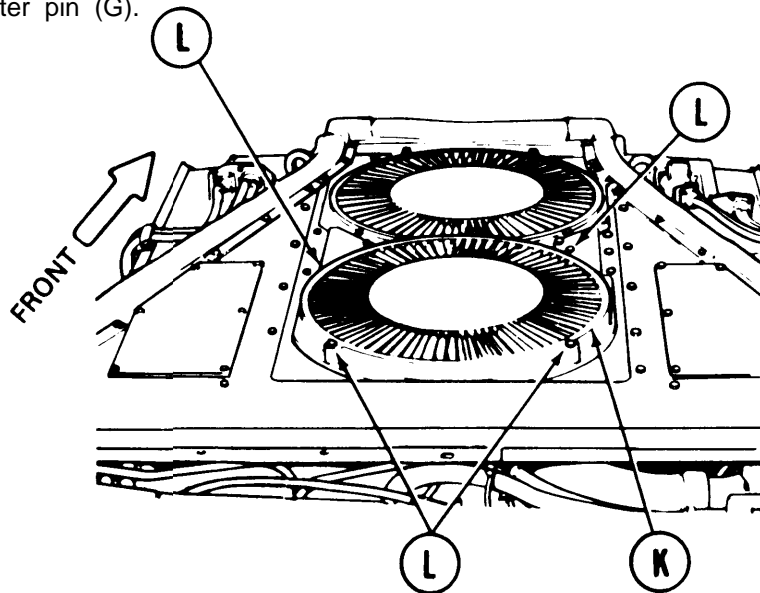
6. Using feeler gage, check clearance between fan (H) and housing (J). If clearance is less than 0.62 inch all around, go to page 9-58, steps 17 and 18 for adjustment procedures,
7. Using 1-1/4 inch socket and torque wrench, turn nut (F) clockwise and check that clutch releases (fan turns) between 20-25 ft-lb (27-34 N.m). If clutch does not release between 20-25 lb-ft (27-34 N-m), notify support maintenance.

8. Using slip joint pliers, install new cotter pin (G).

9. Position fan cover (K) over fans.

10. Using 9/16 inch socket, install four new lockwashers (L).

11. Install top deck (page 16-23).



End of Task

TA140284

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 1 of 8)

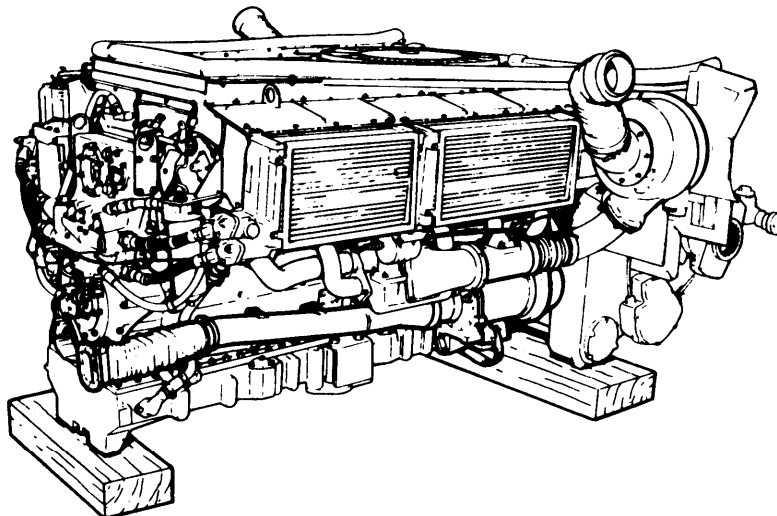
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	9-52
Installation	9-55

TOOLS: Slip joint pliers
 9/16 in. combination box and open end wrenches (2 required)
 1/2 in. socket with 1/2 in. drive
 3 in. extension with 1/2 in. drive
 Ratchet with 1/2 in. drive
 Thickness gage (feeler gage)
 1-1/4 in. socket with 1/2 in. drive
 1/2 in. combination box and open end wrench
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N-m)

SUPPLIES: Cotter pin
 Lockwasher (MS353348-46) (12 required)
 Self-locking nut (MS21044N6) (2 required)

PRELIMINARY PROCEDURES: Remove powerplant (page 5-1)
 Remove engine shroud supports (page 9-4)



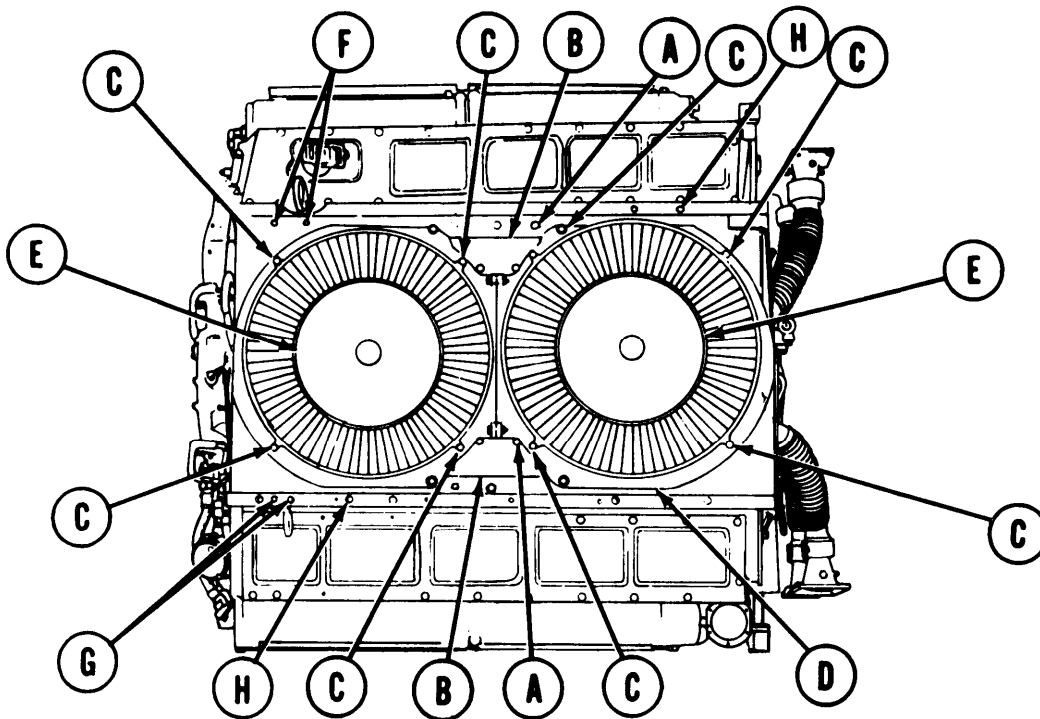
Go on to Sheet 2

TA140285

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 2 of 8)

REMOVAL:

1. Using 1/2 inch socket, remove ten bolts (A) securing two cover plates (B).
2. Remove two cover plates (B).
3. Using 9/16 inch socket, remove eight bolts and lockwashers (C) securing fan guards to shroud (D). Throw lockwashers away.
4. Remove fan guards (E) from shroud (D).



5. Using 1/2 inch socket, remove two bolts (F).

NOTE

To gain access to bolts (G) and nuts (H), reach through holes in shroud rails.

6. Using 1/2 inch socket, remove two bolts (G).
7. Using 1/2 inch socket, remove 12 nuts (H).

Go on to Sheet 3

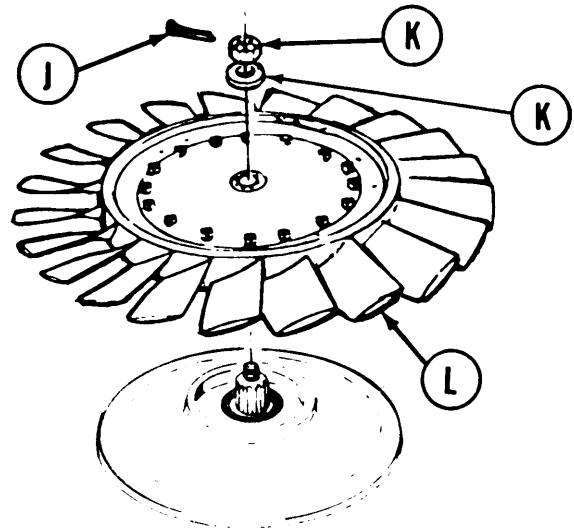
TA140286

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 3 of 8)

Using pliers, remove cotter pin (J) from nut (K).
Throw cotter pin away.

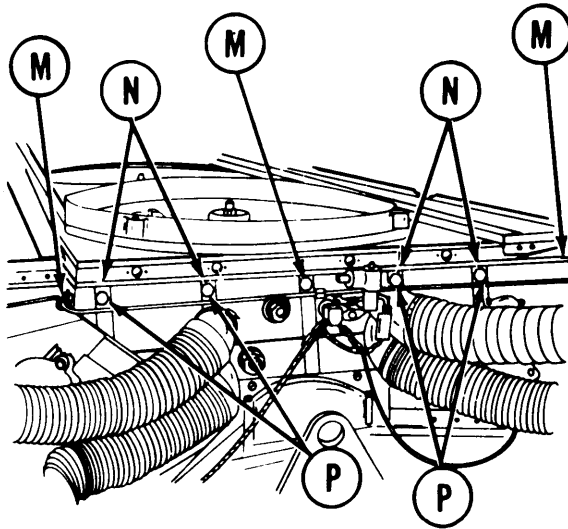
Using 1-1/4 inch socket, remove nut and washer (K) securing rear fan (L) to engine,

10. Lift fan (L) from engine.

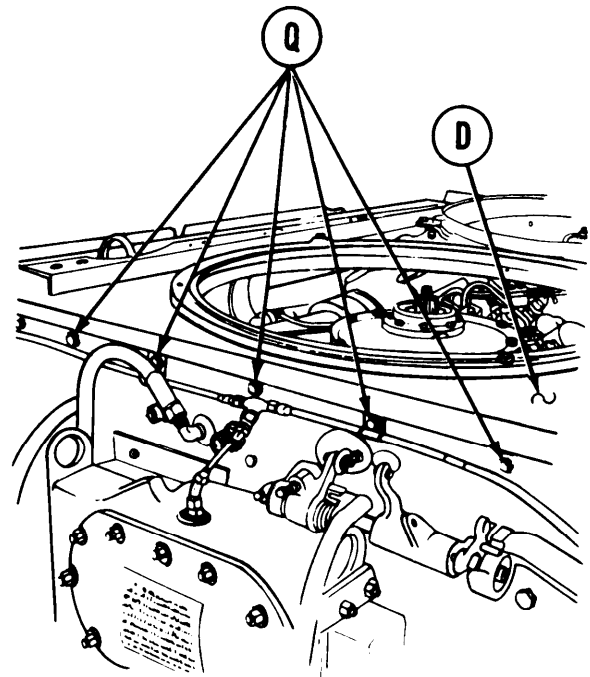


NOTE

Four nuts (N) are located under fan shroud and hold fuel line clamps. When nut (N) and screws (P) are removed, clamps will remain on fuel line.



11. Using 1/2 inch socket, remove three screws (M).
12. Using 1/2 inch wrench to hold nuts (N), use 1/2 inch socket and remove four screws (P) and nuts (N).
13. Using 1/2 inch socket, remove five screws (Q) securing shroud (D) to engine.



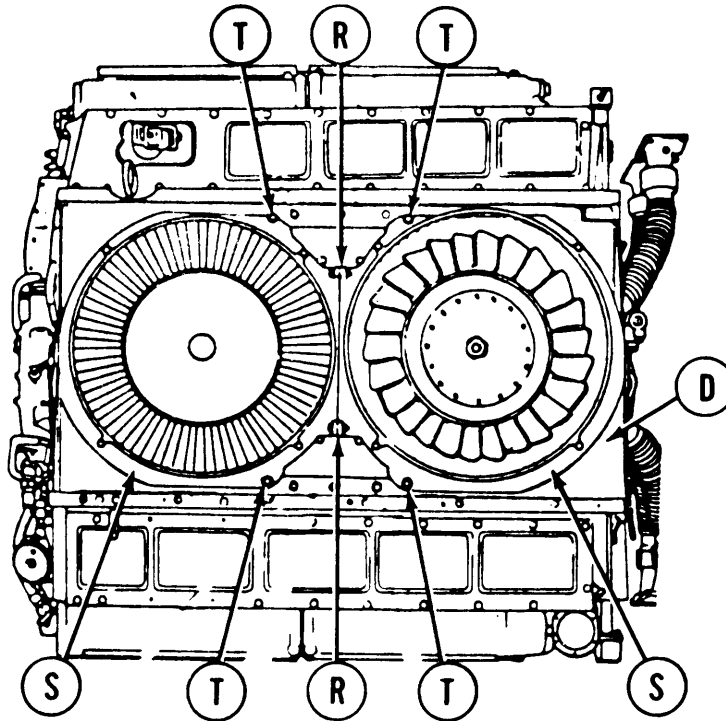
FRONT OF ENGINE

Go on to Sheet 4

TA140287

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 4 of 8)

- Using two 9/16 inch wrenches, remove two screws, washers, and self-locking nuts (R) from fan housing (S). Throw nuts away.



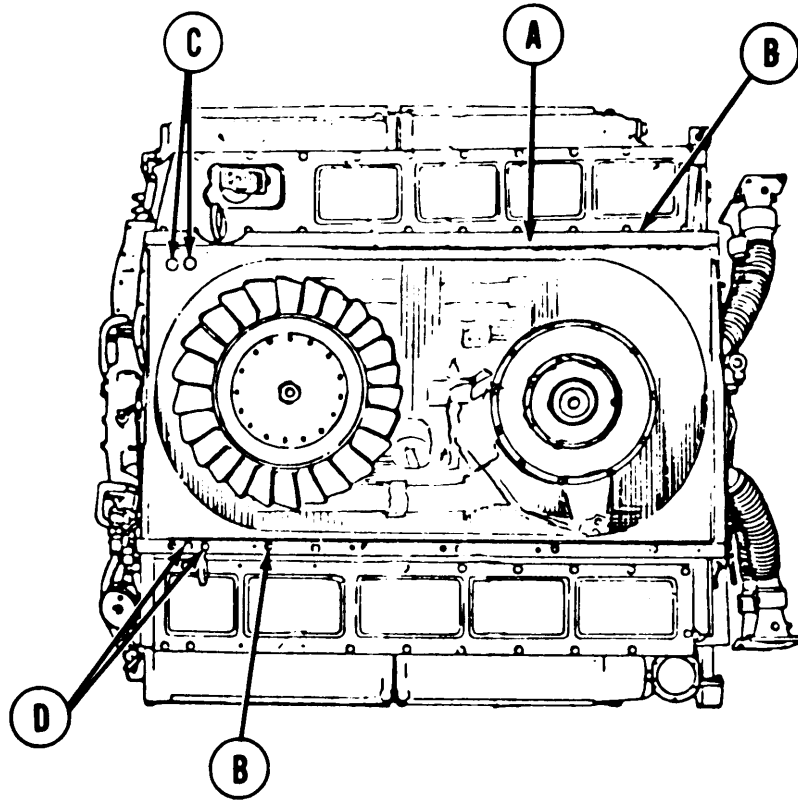
- Using 9/16 inch socket, remove four screws and lockwashers (T) from fan housing (S), Throw lockwashers away.
- Using hands, lift two pieces of fan housing (S) from powerplant.
- Using hands, lift shroud (D) from powerplant.

Go on to Sheet 5

TA140288

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 5 of 8)**INSTALLATION:**

Position cooling fan shroud (A) on engine.

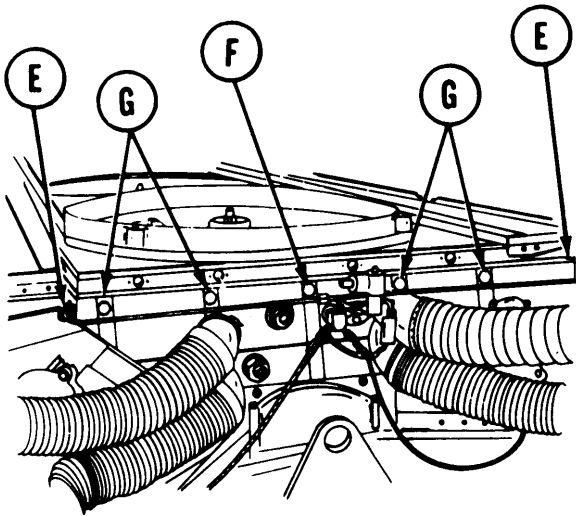


2. Using 1/2 inch socket, install 12 nuts (B).
3. Using 1/2 inch socket, install two bolts (C).
4. Using 1/2 inch socket, install two bolts (D).

Go on to Sheet 6

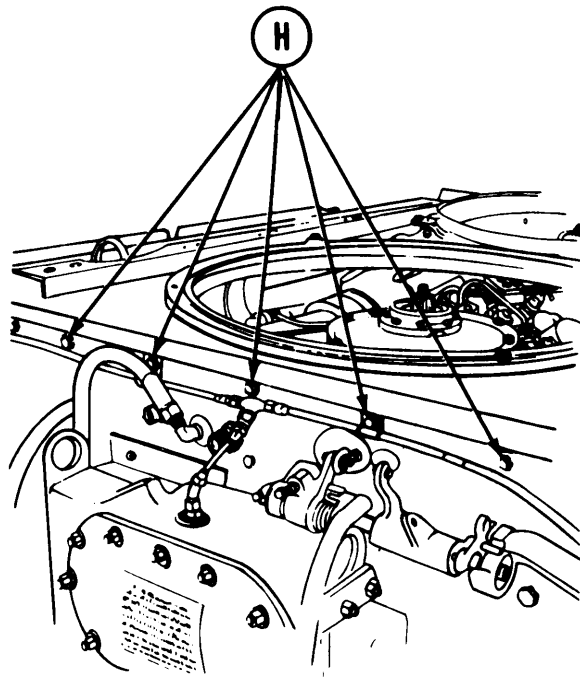
TA140289

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 6 of 8)



5. Using 1/2 inch socket, install two screws (E) securing shroud and fuel line clamps to engine.
6. Using 1/2 inch socket, install one screw (F) securing shroud to engine.
7. Using 1/2 inch socket, install four screws (G) securing shroud to engine.
8. Position clamps on fuel line, located on underside of shroud, onto screws (G). Using 1/2 inch wrench, install four nuts onto screws (G) securing fuel line clamp.

9. Using 1/2 inch socket, install five screws (H) securing clamps and engine shrouds to fan shrouds.



FRONT OF ENGINE

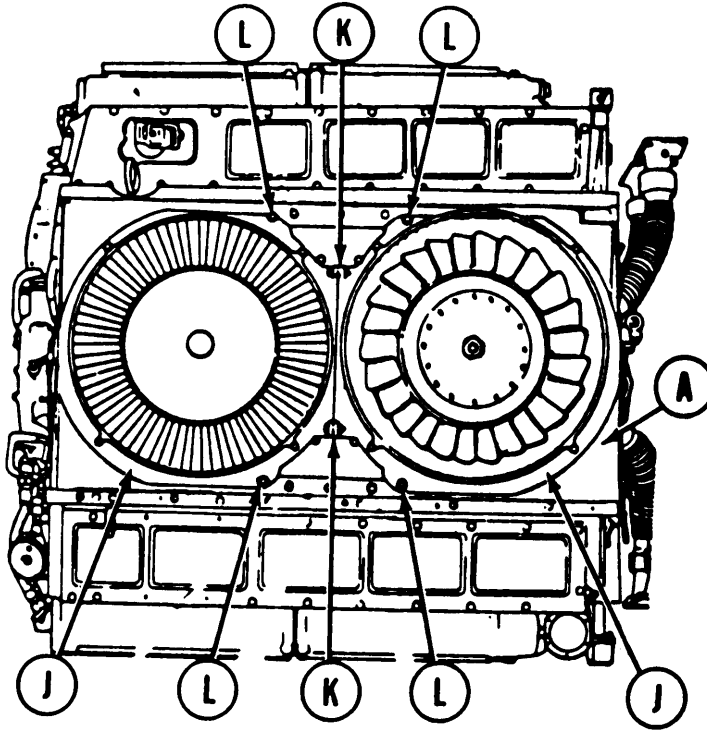
Go on to Sheet 7

TA140290

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 7 of 8)

10. Position two pieces of fan housing (J) onto powerplant.

Using two 9/16 inch wrenches, install two screws, washers, and new self-locking nuts (K) securing two pieces of fan housing (J) together.



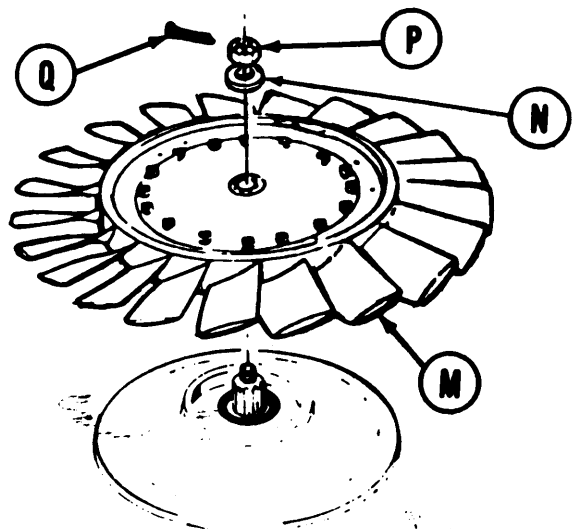
12. Using 9/16 inch socket, install four screws and new lockwashers (L) securing fan housing (J) to fan shroud (A).

13. Using hands, position fan (M) onto engine.

14. Using 1-1/4 inch socket, install washer (N) and nut (P) securing fan (M) to engine.

15. Using 1-1/4 inch socket and torque wrench, tighten nut (P) to 50-55 lb-ft (68-75 N-m).

16. Back nut (P) off until slot in nut (P) aligns with hole in shaft. Using pliers, install new cotter pin (Q).

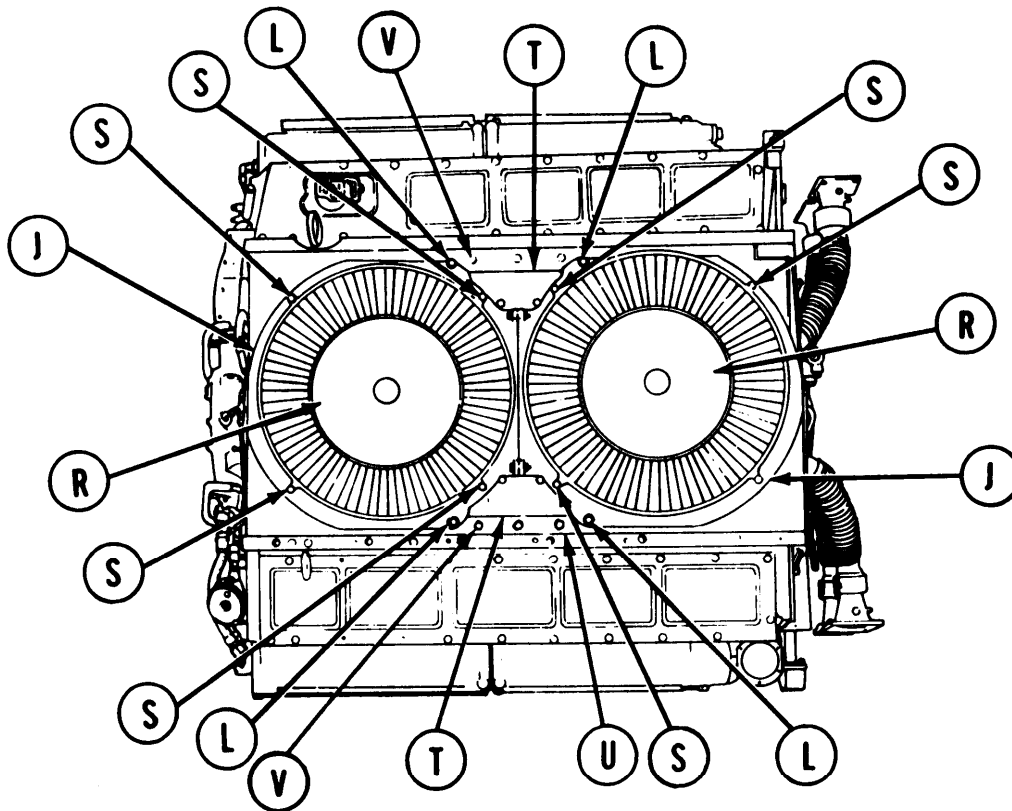


Go on to Sheet 8

TA140291

ENGINE COOLING FAN SHROUD REPLACEMENT (Sheet 8 of 8)

17. Using thickness gage, check clearance between tip of each fan blade and fan housing (J). If clearance is less than 0.062 inch (0.157 mm) all around, loosen screws.(L) and shift fan housing (J) as necessary to obtain clearance.
18. When clearance is obtained, use 9/16 inch socket and tighten screws (L).
19. Position two fan guards (R) onto fan housing (J).
20. Install eight bolts and new lockwashers (S) to secure fan guards (R) to fan housing (J).
21. Using 9/16 inch socket, tighten bolts (S).



22. Position two cover plates (T) onto shroud (U).
23. Using 1/2 inch socket, install five bolts (V) to secure each cover plate (T).
24. Install engine shroud supports (page 9-5).
25. Install engine shroud (page 9-3).
26. Install 2A powerplant (page 5-14) or 2D powerplant (page 5-37).

End of Task

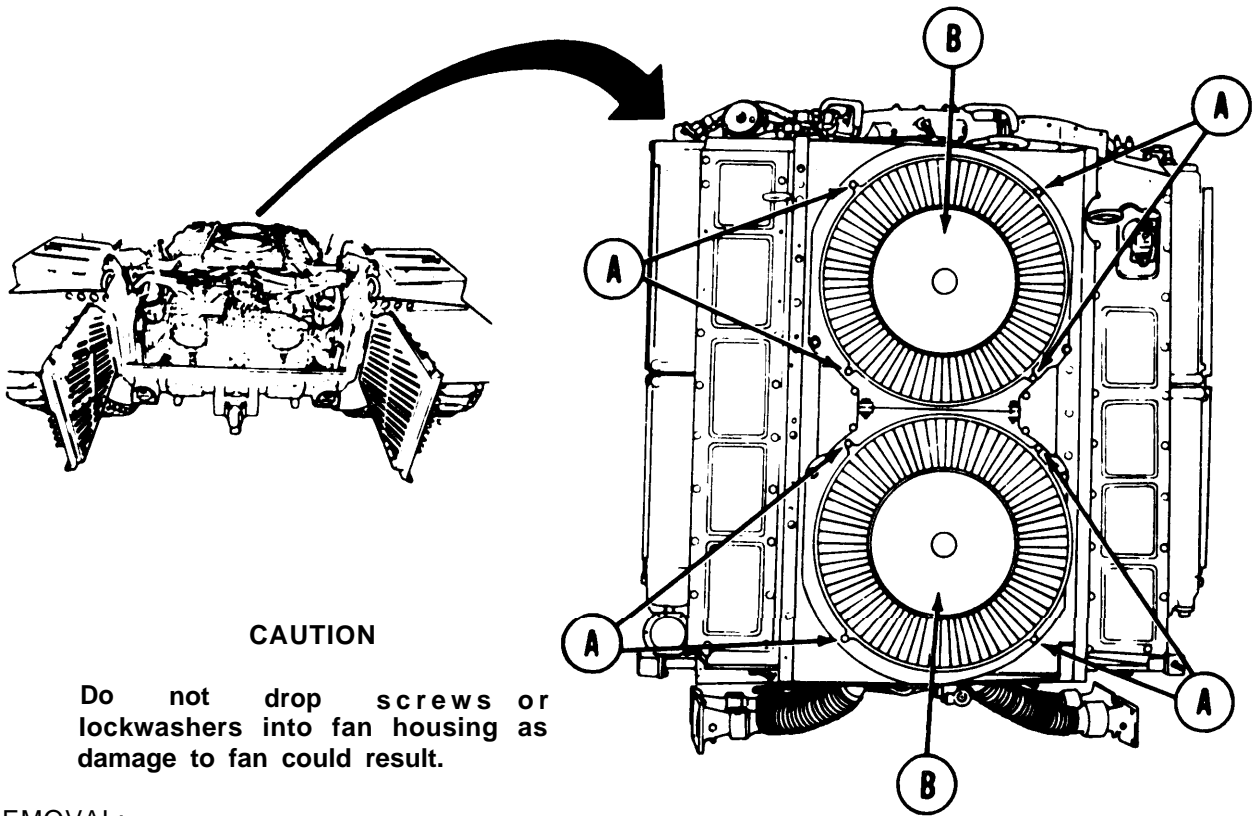
TA140292

CENTRIFUGAL FAN HOUSING REPLACEMENT (Sheet 1 of 3)

TOOLS: 1/2 in. socket with 1/2 in. drive
 9/16 in. socket with 1/2 in. drive
 Ratchet with 1/2 in. drive
 Feeler gage
 9/16 in. combination box and open end wrench (2 required)

SUPPLIES: Lockwasher (MS35338-46) (8 required)
 Self-locking nuts (MS21044N6) (2 required)

PRELIMINARY PROCEDURES: Remove top deck (page 16-21)
 Remove engine shroud (page 9-2)



CAUTION

Do not drop screws or lockwashers into fan housing as damage to fan could result.

REMOVAL:

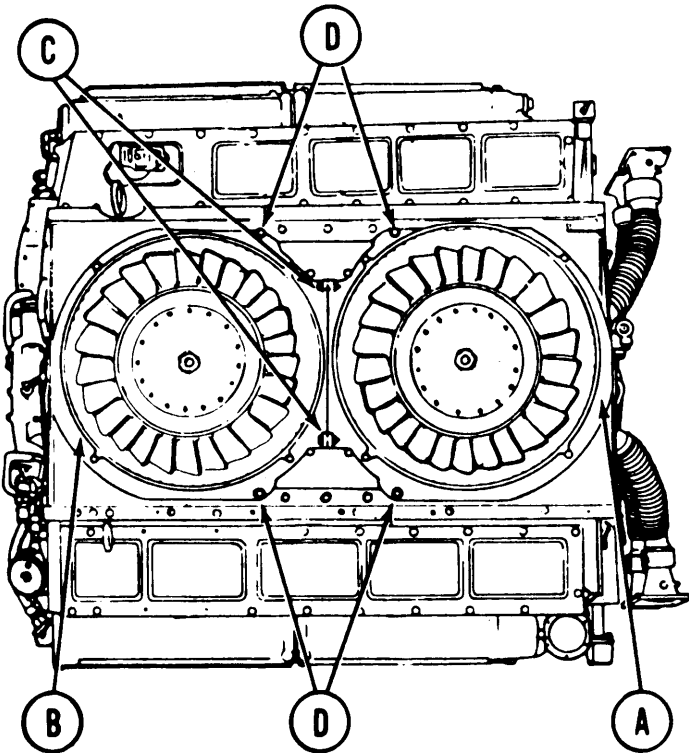
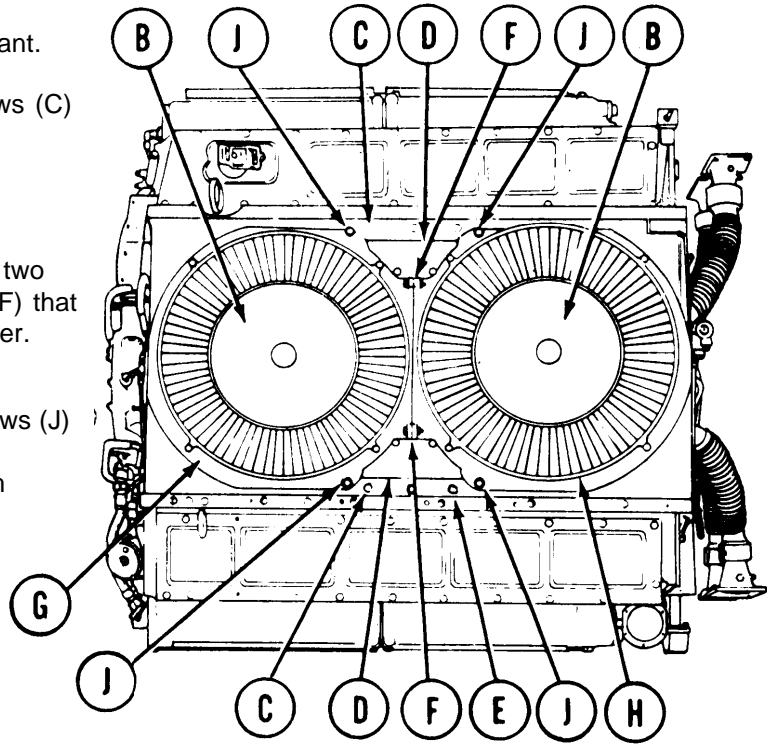
1. Using 9/16 inch socket, remove eight screws (A) and lockwashers holding two fan housings (B) to engine (front end and flywheel end). Throw lockwashers away.

Go on to Sheet 2

TA140293

CENTRIFUGAL FAN HOUSING REPLACEMENT (Sheet 2 of 3)

2. Remove fan housings (B) from powerplant.
3. Using 1/2 inch socket, remove ten screws (C) securing covers (D) to shroud (E).
4. Remove covers (D) from powerplant.
5. Using two 9/16 inch wrenches, remove two screws, washers, and self-locking nuts (F) that hold housing (G) and mount (H) together. Throw self-locking nuts away.
6. Using 9/16 inch socket, remove four screws (J) .
7. Remove housing (G) and mount (H) from powerplant.



INSTALLATION:

NOTE

Make sure no foreign matter is present in fan housing.

1. Position mount (A) and housing (B) onto powerplant.
2. Using two 9/16 inch wrenches, install two screws, washers, and new self-locking nuts (C) securing mount (A) and housing (B) together.
3. Using 9/16 inch socket, install four screws (D) securing mount (A) and housing (B) to engine shroud.

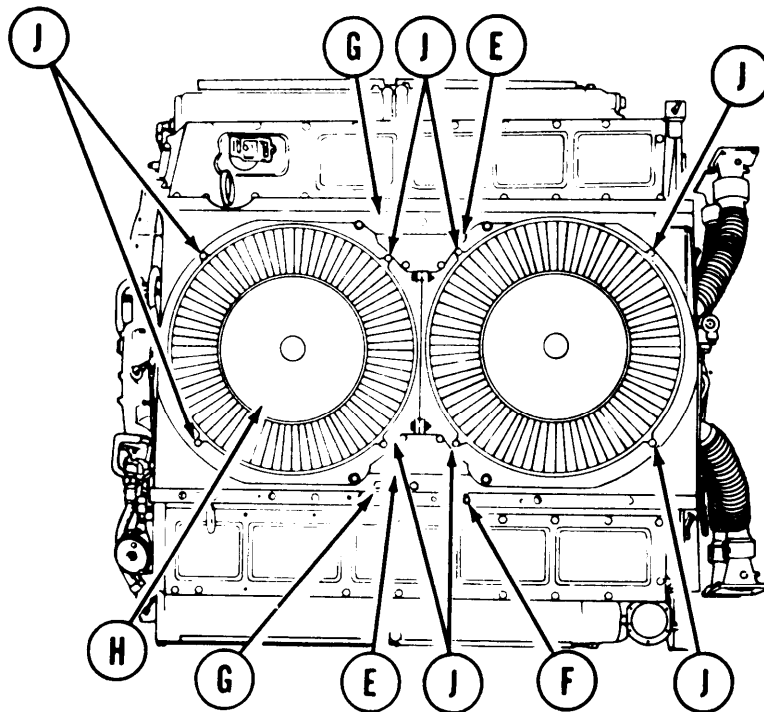
Using feeler gage, check clearance between tip of each fan blade and mount (A) and housing (B). If clearance is less than 0.062 inch, go to page 9-58, steps 17 and 18 for adjustment procedures.

Go on to Sheet 3

TA140294

CENTRIFUGAL FAN HOUSING REPLACEMENT (Sheet 3 of 3)

5. Position covers (E) onto shroud (F).
6. Using 1/2 inch socket, install ten screws (G) securing covers (E) to shroud (F).
7. Position fan housings (H) onto powerplant.
8. Using 9/16 inch socket, install eight screws and new lockwashers (J) securing two fan housings (H) to powerplant.
9. Install engine shroud (page 9-3).
10. Install top deck (page 16-23).



End of Task

TA140295

FAN DRIVE OIL SEAL REPLACEMENT (Sheet 1 of 5)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	9-63
Installation	9-64

TOOLS: Ratchet with 3/8 in. drive

- Putty knife
- Diagonal cutting pliers
- Slip joint pliers
- Hammer
- 1/2 in. socket with 3/8 in. drive
- Brass drift
- 5 in. extension with 3/8 in. drive
- Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N-m)

SPECIAL TOOLS: Screw pullers (Item 1, Chapter 3, Section I) (2 required)

SUPPLIES: Sealing compound (Item 24, Appendix D)

- Seal
- Lockwire (Item 60, Appendix D)
- Dry cleaning solvent (Item 54, Appendix D)
- Rags (Item 65, Appendix D)
- Watch
- Boards (2 in. x 4 in. x 24 in.) (2 required)

PRELIMINARY PROCEDURES: Remove top deck (page 16-21)
 Remove engine cooling fans (page 9-48)

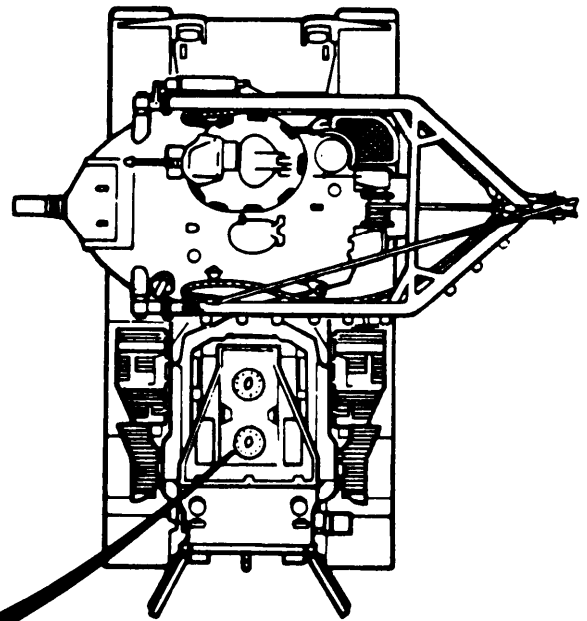
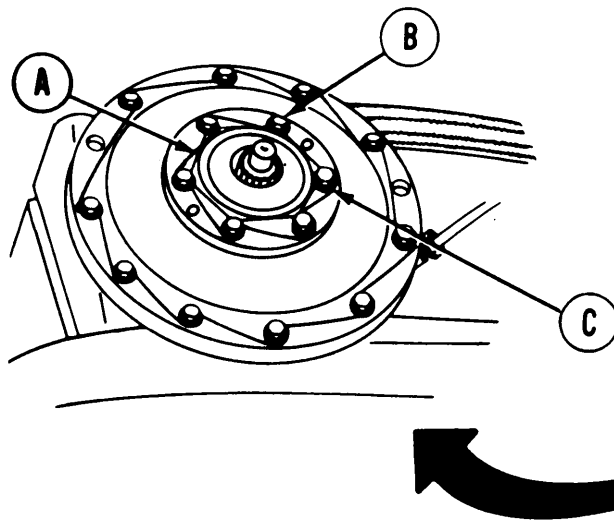
Go on to Sheet 2

FAN DRIVE OIL SEAL REPLACEMENT (Sheet 2 of 5)

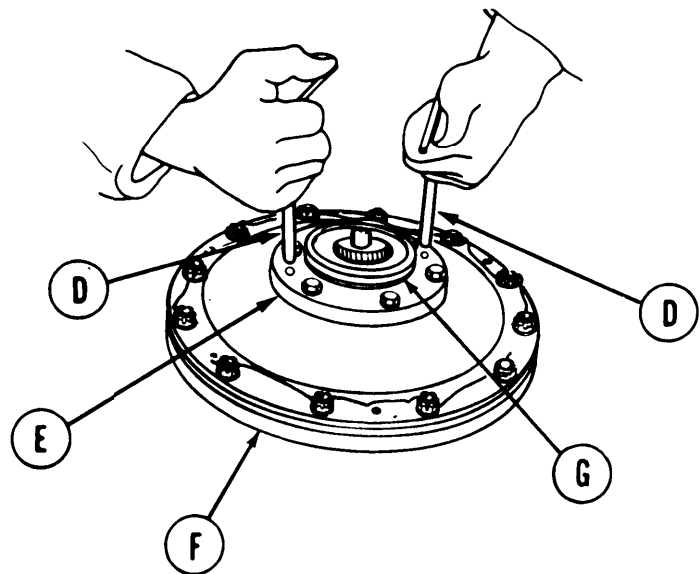
REMOVAL:

Using diagonal cutting pliers, cut and remove lockwire (A).

- Using socket, remove six bolts (B) and washers (C).



- Install two pullers (D) in screw holes in oil seal housing (E).
- Alternately tighten pullers (D) until oil seal housing separates from fan drive housing



Go on to Sheet 3

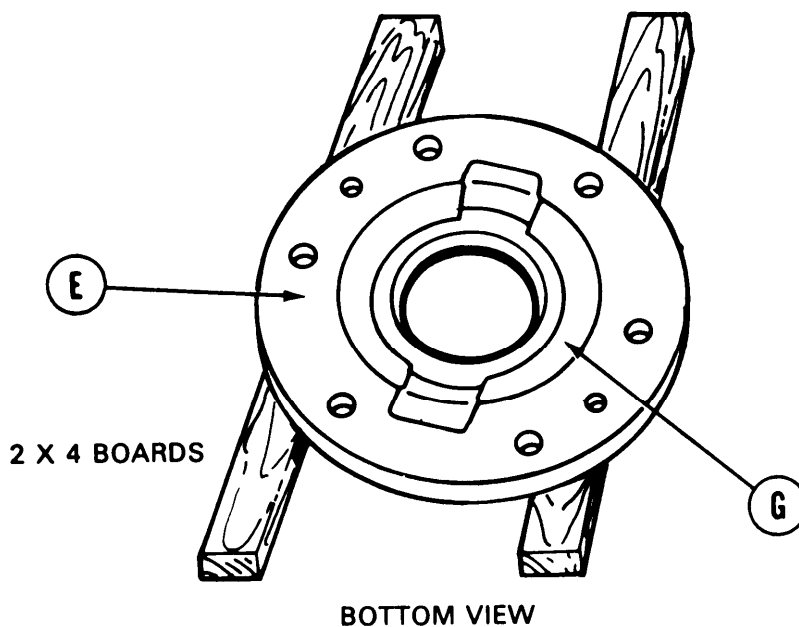
TA141281

FAN DRIVE OIL SEAL REPLACEMENT (Sheet 3 of 5)

NOTE

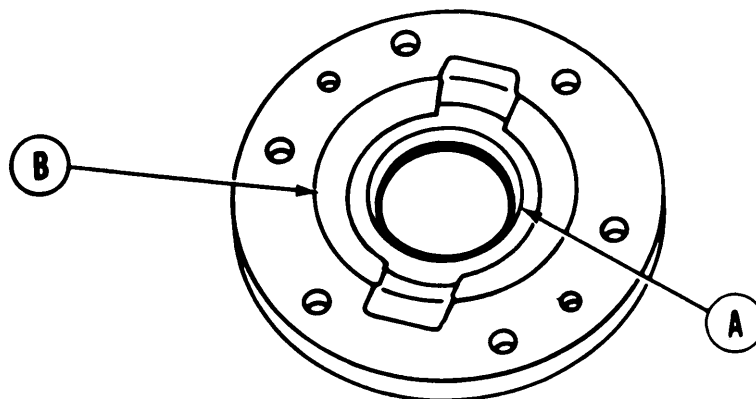
Place housing on boards before driving out seal.

5. Using hammer and brass drift, drive out oil seal (G) from housing (E) and throw seal away.
6. Clean housing (E) with dry cleaning solvent (Item 54, Appendix D) and rags and remove any dried adhesive and oil.



INSTALLATION:

1. Using putty knife, coat sides of replacement oil seal with sealing compound (Item 24, Appendix D). Use care to prevent sealing compound from contacting felt part of seal.
2. Position new oil seal (A) in housing with lip of seal toward gasket surface of oil seal housing (B).

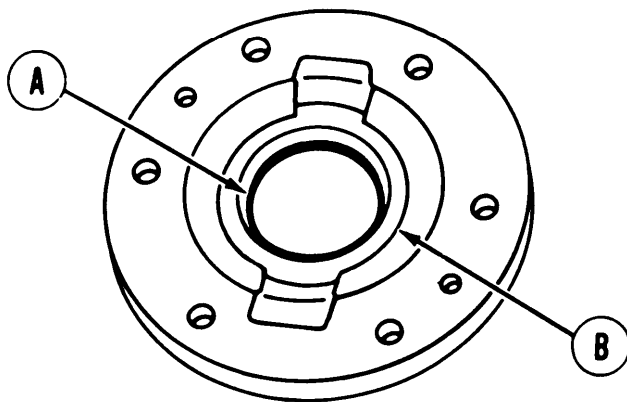


Go on to Sheet 4

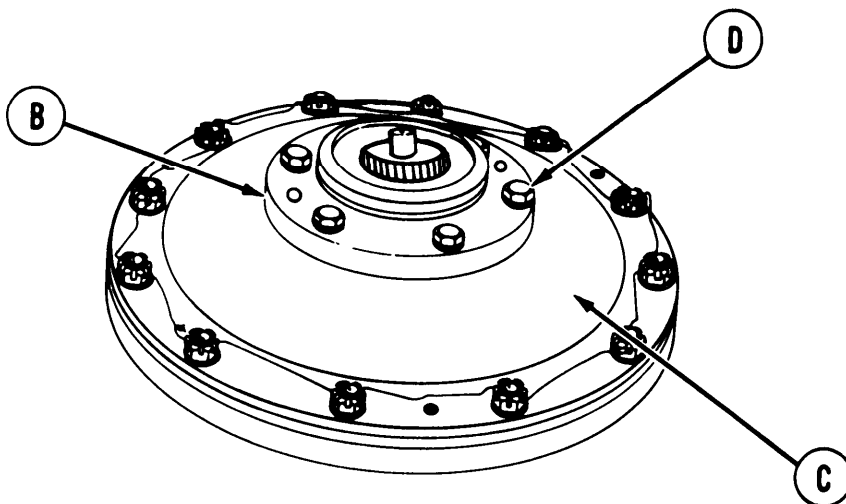
TA141282

FAN DRIVE OIL SEAL REPLACEMENT (Sheet 4 of 5)

- Using hammer and brass drift, drive new seal (A) into housing (B), seating seal. Remove excess sealing compound.



- Position assembled oil seal housing (B) on fan drive housing (C). Be sure puller holes in housing (B) align with indents in fan housing (C).
- Install and hand tighten six bolts and washers (D).
- Using 1/2 inch socket with 3/8 inch drive and torque wrench, tighten bolts (D) 150-175 in-lb (17-20 N-m).

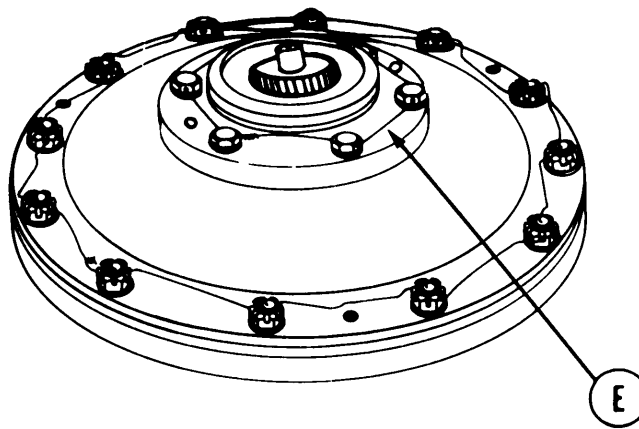


Go on to Sheet 5

TA140422

FAN DRIVE OIL SEAL REPLACEMENT (Sheet 5 of 5)

6. Install spacers (Item 2, Chapter 3, Section I) (page 9-49). Operate engine for 5 minutes. Stop engine, remove spacers and check for oil leaks around seal.
7. Using slip joint pliers, install lockwire (E) (Item 60, Appendix D) through bolt heads (C).



8. Install engine cooling fans (page 9-49).
9. Install top deck (page 16-23).

End of Task

TA140423

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

To be distributed in accordance with DA Form 12-37, Organizational Maintenance requirements for Combat Engineer, Full Track M728.

* U.S. GOVERNMENT PRINTING OFFICE : 1987 O- 181-421 (61071)

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
3		2	
109		51	
2-8			2-1
12	1-6a		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.

Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.

Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.

Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

SAMPLE

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THE METRIC SYSTEM AND EQUIVALENTS

LENGTH MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

VOLUME MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$\frac{5}{9}(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $\frac{9}{5}^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

