CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 15 February 1997

LUBRICATION ORDER

CARRIER, PERSONNEL, FULL-TRACKED, ARMORED, M 13A3
2350-01-219-7577

CARRIN COMMAND POST, LIGHT, TRACKED, M577A3
2350-01-3696085
CARRIER, ANTI-TANK (TOW), FULL T'RACKED, ARMORED, M901 A3
2350-01-369-7253

CARRIER, PERSONNEL, FULL-TRACKED, ARMORED FIRE SUPPORT, M981A3
2350-01-369-6079

CARRIER, SMOKE GENERATOR, FULL-TRACKED, M1059A3
2350-01-369-6083

CARRY MORTAR, 120-MM, SELF-PROPFTI.I.F, M1064A3
2350-01-369-6082

CARRIER, STANDARD INTEGRATED COMMAND POST SYSTEM, M1068A3
2350-01-369-6086

CHASSIS, MECHANIZED SMOKE OBSCURANT, M58
2350-01418-6654

L09-2350-277-12, 25 July 1994 is changed as follows:

1. Remove old cards and insert new cards as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.
3 Added or revised illustrations are indicated by pointing hand adjacent to the illustration.
4. Title is changed as shown above.
5. File this change sheet in front of publication for reference purposes.

Remove Cards	*Insert Cards*
CARD I of28 and CARD 2 of28	*CARD I of28 and CARD 2 of 28*
CARD 21 of28 and CARD 22 of28	*CARD 21 of2 and CARD* 22 of *28*

Approved for public release; distribution is unlimited

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
03025

DISTRIBUTION:

To be distributed in accordance with the initial distribution number (IDN) 371 694, requirements for LO 9-2350-277-12.

CARRIER, PERSONNEL, FULL TRACKED, ARMORED, M113A3:
2350-01-219-7577
CARRIER, COMMAND POST, LIGHT, TRACKED, M577A3:
2350-01-369-6085
CARRIER, ANTI-TANK (TOW), FULL TRACKED ARMORED, M901A3
2350-01-369-7253
CARRIER, PERSONNEL, FULL TRACKED ARMORED FIRE SUPPORT, M981A3:
2350-01-369-6079
CARRIER, SMOKE GENERATOR, FULL TRACKED, M1059A3:
2350-01-369-6083
CARRIER, MORTAR, 120-MM, SELF-PROPELLED, M1064A3:
2350-01-369-6082
CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, M1068A3:
2350-01-369-6086
CHASSIS, MECHANIZED SMOKE OBSCURANT, M58:
2350-01-418-6654

Reference: TM 9-2350-277-10, TM 9-2350-277-20, TM 9-2300-422-23&P, IL 9100SL, TB 43-0210, TB 43-0211, FOR ARCTIC OPERATIONS, FM 9-207, FOR DESERT OPERATIONS, FM 90-3, FOR MOUNTAIN OPERATIONS, FM 90-6

REPORTING OF ERRORS

You can improve this publication by calling attention to errors, recommending improvements and by stating your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications and Blank Forms, should be mailed directly to Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTAIM-AC, Warren, MI 48397-5000. A reply will be furnished directly to you.

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Service intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. Hard time intervals will be indicated by one of the following symbols as appropriate: Daily (D), Weekly O(N), Monthly (M), Semiannually (S), and Annually (A). On-condition (OC) oil sample intervals shall be applied unless changed by the Army Oil Analysis Program (AOAP) Laboratory. Change the hard time interval if lubricants are contaminated or if you are operating equipment under adverse operating conditions, including longer-than-usual operating hours. The hard time intervals may be extended during periods of low activity if adequate preservation precautions are taken. Hard time intervals will be applied to oil changes in the event AOAP Laboratory support is not available.

On-condition (OC) AOAP Laboratory determined oil change intervals shall be applied instead of hard time intervals such as hourly, calendar, or mileage, unless otherwise notified. The services will be required when directed by an Army Oil Analysis Program (AOAP) Laboratory which has analyzed the oil for serviceability.

WARNING

Dry cleaning solvent PD-680 is toxic and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes and clothes, and do not breathe vapors. Keep away from heat and flame. Never smoke when using solvent; the flash point for Type I dry cleaning solvent is 100°F (38°C) and for Type II is 138°F (50°C). Failure to do so may result in injury or death.

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.

Clean fittings before lubricating. Clean parts with dry cleaning solvent, PD-680 (SD), Type II. Dry before lubricating. Dotted arrow points indicate lubrication on both sides of equipment.

Level of maintenance. The lowest level of maintenance authorized to lubricate a point is indicated by one of the following symbols as appropriate: Operator/Crew (C); and Unit Maintenance (O). Unless specifically identified, all procedures apply to M1 13A3, M577A3, M901A3, M981A3, M1059A3, M1064A3, M1068A3, and M58 carriers.

NOTE

Park carrier on level ground to check oil levels. Check/lubricate all oil and grease fitting points after washing or fording.

ARMY OIL ANALYSIS PROGRAM (AOAP)

AOAP is an effective maintenance diagnostic tool and not a maintenance substitute. TB 43-0210 or TM 9-2300-422-23&P must not be interpreted to mean AOAP minimizes, in any way, the need to employ good maintenance practices and strong maintenance disciplines.

SAMPLING REQUIREMENTS

Samples may be taken without WARMING a component to operating temperature if the equipment has been operated within the last 30 days. If the equipment has not been operated within the last 30 days, the components must be brought to operating temperature. These requisites apply to both routine and special sampling. Oil samples must not be taken immediately after oil is added. When oil sampling valve is not available to take oil sample, use a vampire pump.

SAMPLING PROCEDURES

1. Perform DAILY operation checks and services.

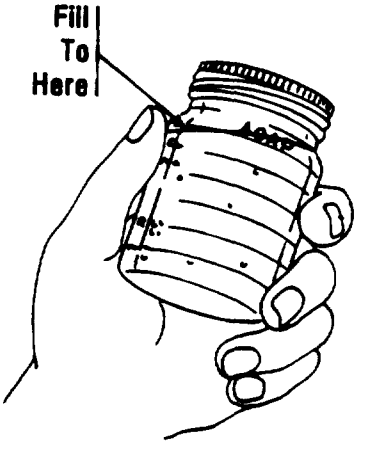
NOTE

DO NOT ADD OIL immediately prior to taking oil samples. When operation checks and services indicate the need to replenish oil levels WAIT until after taking samples. New oil added immediately prior to taking samples or before prolonged operation of components will adversely effect oil analysis results.

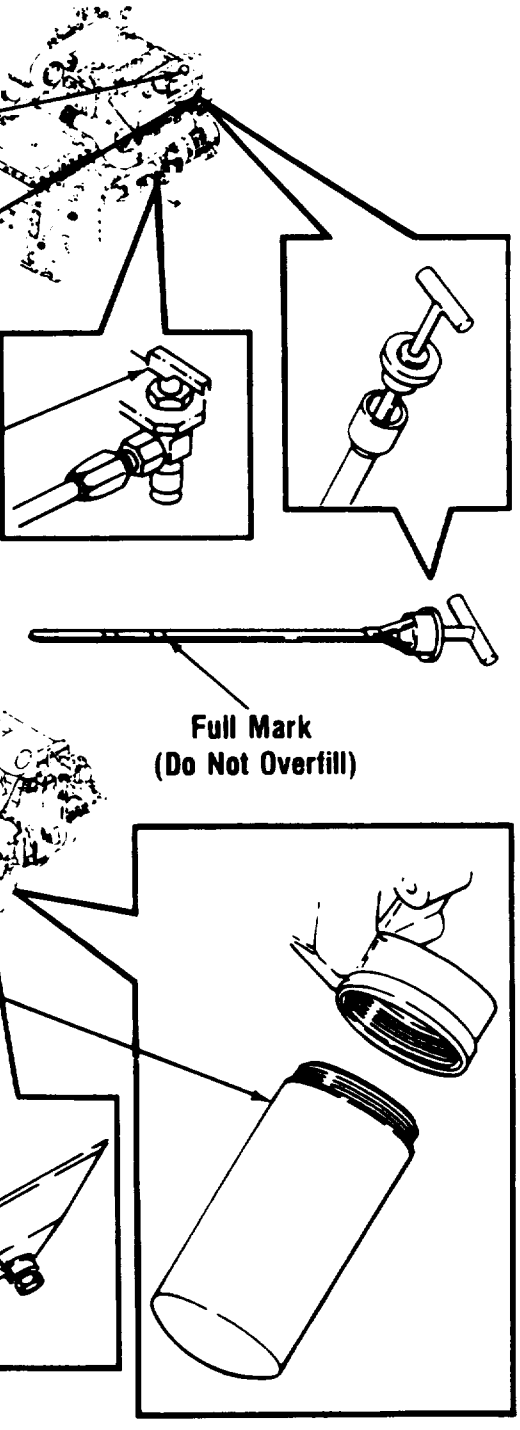
2. Obtain two sample bottles (NSN 8125-01-082-9697) and two DA Form 2026s from the unit AOAP monitor.
3. Start engine (TM 9-2350-277-10). If required (refer to Sampling Requirements), operate carrier to bring engine and transmission up to normal operating temperatures.
4. Stop carrier and set the brakes. (TM 9-2350-277-10).
5. Place range selector in SL position (steering lock) and keep engine running.
6. Remove driver's power plant access panel (TM 9-2350-277-10).
7. With engine running remove dust caps from engine and transmission oil sampling valves.
8. Open sample valve on engine oil filter and drain a small amount of oil into a container to clear valve of grit and contamination. (Properly dispose of container and oil upon completion of sample taking.) Fill sampling bottle to the neck shoulder and seal it. Attach DA Form 2026 to sample bottle.
9. Close oil sample valve and install dust cap.
10. Take oil sample from transmission in the same manner (steps 7 thru 9).
11. Stop engine (TM 9-2350-277-10).
12. Install driver's compartment power plant access panel and secure carrier.
13. Deliver sample bottles to the unit AOAP monitor.

NOTE

For location of nearest AOAP Laboratory and complete information about AOAP, refer to TB 43-0210.



	LUBRICANT	INTERVAL
ENGINE OIL FILL (See NOTES 1&2) (C)	OE/HDO	D
ENGINE OIL LEVEL (Check Level) (See NOTE 3) (C)	OE/HDO	D
ENGINE OIL SAMPLE VALVE (See NOTES 4&5) (C)	-	OC
ENGINE OIL FILTER (See NOTE 6) (O)	-	OC
ENGINE OIL DRAIN (See NOTES 7,8&9) (O)	-	OC



TOTAL MAN-HR	
INTERVAL	MAN-HR
D	0.3
OC	0.5

LUBRICATION ORDER

25 July 1994

LO 9-2350-277-12

(Supersedes LO 9-2350-277-12, May 1987)

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
OE/HDO (MIL-L-2104D) OR OEA (MIL-L-46167)	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE	18 qts	OE/HDO-15/40	OE/HDO-15/40	OEA	D — Daily OC — On Condition
(MIL-L-21260)	PRESERVATION OIL	Engine	PE 30-1	PE 30-1		

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. Do NOT mix OE/HDO-15W40 with single grade lubricants.

NOTE

Visual inspection of engine oil should not be justification to replace oil. Diesel engine oil may appear black due to additives.

2. Change oil and oil filters when converting from OE/HDO to OEA, PE-30-1 to OE/HDO, etc.

CAUTION

Engine can be damaged if filled above F (full) mark.

3. ENGINE OIL LEVEL. Before starting engine, check for oil level between F and L marks on gage rod. Do NOT add oil above F (full) mark.

4. FREQUENCY OF AOAP SAMPLE. Every 60 days obtain a sample of engine oil and send to the nearest AOAP Laboratory (TB 43-0210 and TM 9-2300-422-23&P). Take samples as near the prescribed interval as possible. If sampling at the prescribed interval is not possible, a 10 percent variance before or after the scheduled interval date or miles is permissible. The need for on-condition oil changes will be determined by the AOAP Laboratory.

5. HARD TIME INTERVAL. If AOAP laboratory support is not available, drain oil and change filter element/gasket every 1,500 miles or semi-annually. The hard time interval may be shortened if equipment is operated under adverse conditions.

6. ENGINE OIL FILTER. Filter element will be replaced each time an engine oil change is required (TM 9-2350-277-20).

NOTES (cont)

7 ENGINE OIL DRAIN AND FILTER ELEMENT REPLACEMENT.

WARNING

Hot parts can burn you. Use care when you work near hot power unit.

NOTE

Drain oil only when hot after engine operation. Allow oil to drain thoroughly.

a. Remove access cover from bottom of hull (TM 9-2350-277-20).
b. Place a suitable container under engine oil pan.
c. Remove plug from engine oil pan and drain oil into container.
d. Inspect plug and oil for metallic particles. If metal chips are found, notify direct support maintenance.
e. Clean and install drain plug in engine oil pan.
f. Install new oil filter element (TM 9-2350-277-20).
g. Fill engine with approximately 22 quarts of OE/HDO or OEA (see card 4) to bring level between F and L marks on gage rod.

8. OPERATIONAL CHECK

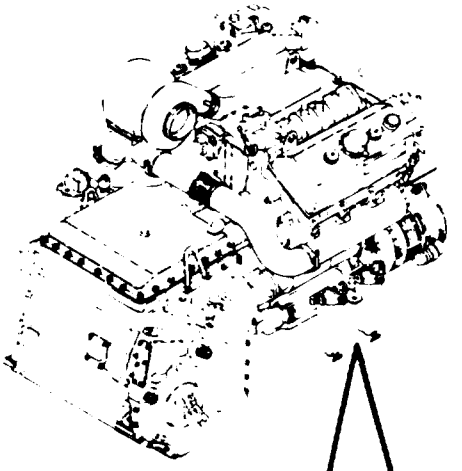
a. Start engine (TM 9-2350-277-10) and check for oil leaks at filter and drain plug. Stop engine.
b. Inspect access cover on hull bottom and replace if damaged.
c. Install access cover on hull bottom (TM 9-2350-277-20).

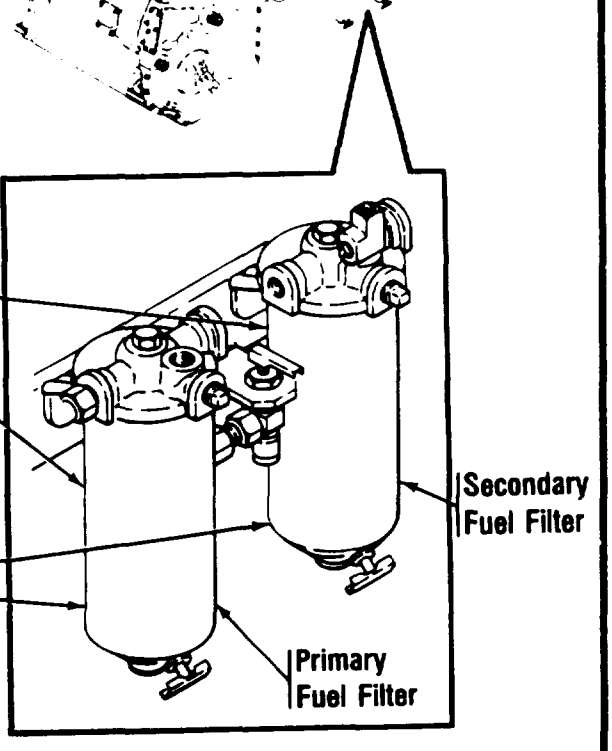
9. PRESERVATION OIL. If engine has been filled with preservation oil (MIL-L-21260, Grade PE 30-1), leave this oil in engine until first scheduled oil change. Maintain operating oil level by adding applicable grade oil (OE/HDO or OEA). When first scheduled oil change is made, refill engine with applicable grade of oil (see NOTE 6 and Temperature Key Chart).

LUBRICANT • INTERVAL

WARNING

Fuel is flammable. Always use in area with good air flow, away from heat or flames. Do not breathe fumes. If fuel gets on hands, wash them. If fuel gets in eyes,flush with water and get medical help. Keep fire extinguisher nearby.





FUEL FILTER CHANGE (2 places) (See NOTE 2) (O) - **S**

FUEL FILTER DRAIN (2 places) (See NOTE 1) (C) - **D**

TOTAL MAN-HR	
INTERVAL	**MAN-HR**
S	**0.3**
D	**0.3**

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
DIESEL FUEL VV-F-800		100 Gal	DF-2	DF-1	DF-A	S — Semi-annually or every 1,500 miles

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

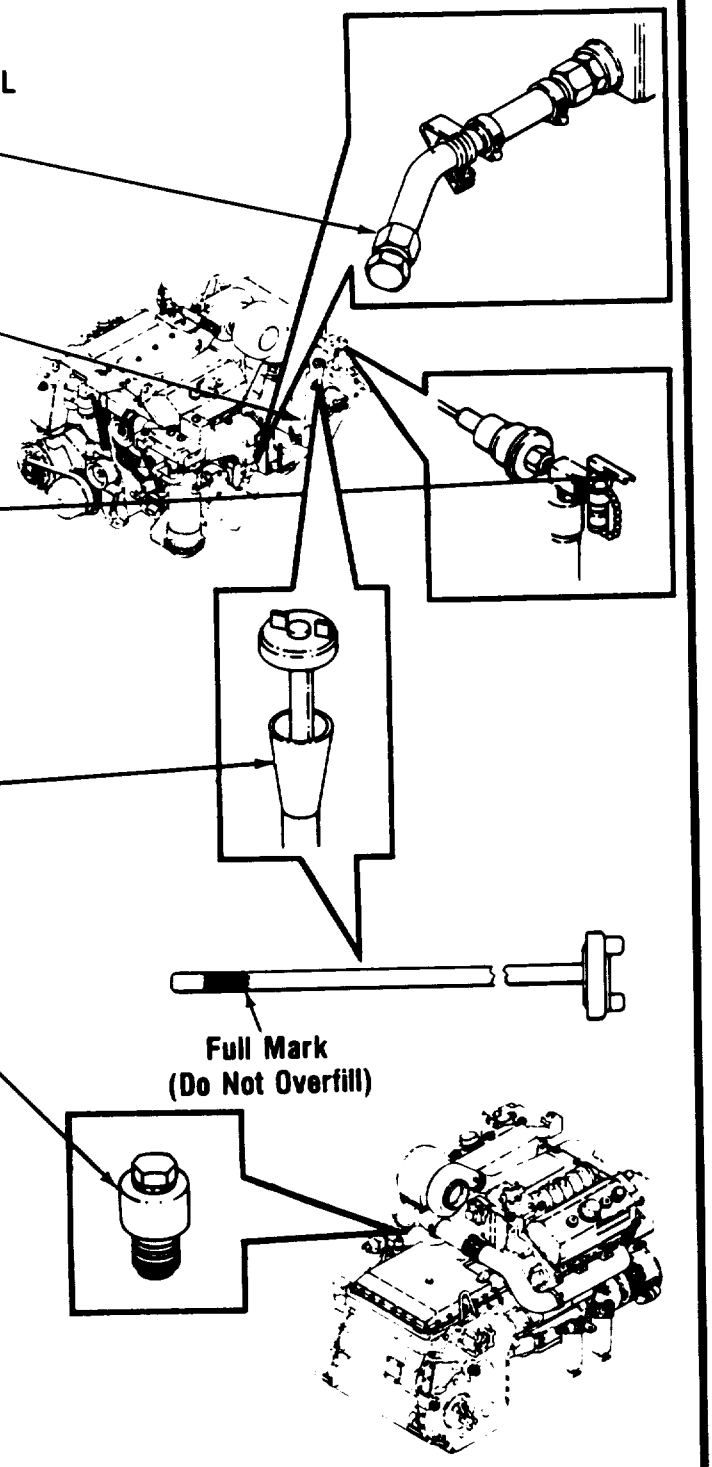
1. FUEL FILTER DRAIN. Before operation drain water and sediment from primary and secondary fuel filters as follows:

   a. Remove driver's power plant access panel (TM 9-2350-277-10).
   b. Place suitable container under primary fuel filter. Open drain cock and drain water and sediment from primary fuel filter. When clean fuel starts to drain out, close drain cock.
   c. Repeat step b. for secondary fuel filter.
   d. Check for fuel leaks at primary and secondary fuel filters while engine is running. If leak is found, notify unit maintenance.

2. FUEL FILTER CHANGE. Every 1,500 miles or semi-annually, replace fuel filter element.

   a. With engine stopped and master switch OFF, place suitable container under fuel filters. Drain both filters.
   b. Remove primary filter shell first and then secondary fuel filter shell (TM 9-2350-277-20). Clean inside of shells.
   c. Install new elements into shells. Pre-fill primary and secondary shells with fuel and install shells. If engine will not start or hesitates, check for trapped air and perform Note 1.

	LUBRICANT	• INTERVAL
TRANSMISSION OIL DRAIN TUBE (See NOTE 7) (O)	-	OC
TRANSMISSION OIL FILTER (See NOTES 2,5,6&7) (O)	OE/HDO	OC
TRANSMISSION OIL SAMPLE VALVE (See NOTE 4) (C)	-	OC
TRANSMISSION OIL LEVEL (Check & Fill) (See NOTES 1,3,8,9&11) (C)	OE/HDO	D
TRANSMISSION BREATHER (See NOTE 10) (O)	P-D-680	S



TOTAL MAN-HR	
INTERVAL	MAN-HR
D	0.2
OC	0.5
S	0.2

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
OE/HDO (MIL-L-2104D) OR OEA (MIL-L-46167)	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE	Initial fill — 12 gal or 57 qts. Refill after oil change — approx 36 qts.	OE/HDO-15/40	OE/HDO-15/40	OEA	D — Daily S — Semi-annually or every 1,500 miles OC — On Condition
(MIL-L-21260)	Transmission PRESERVATION OIL		PE-10-1	PE-10-1		

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. Do NOT mix OE/HDO 15W40 with single grade lubricants.

NOTE

Visual inspection of transmission oil should not be justification to change oil. Detergent transmission oils may appear dark in color due to additives.

2. Change oil and oil filter when converting from OE/HDO to OEA, OEA to OE/HDO, etc. in accordance with Temperature Key Chart.

CAUTION

Transmission can be damaged if filled above FULL mark. Check transmission oil level before operation. Transmission oil level should not be above FULL mark on gage rod.

3. TRANSMISSION OIL LEVEL. Before operation check transmission oil level. Oil level should be at FULL mark on gage rod. Just after carrier operation when oil is warm, oil level should be at or just above ADD mark on gage rod.

4. FREQUENCY OF AOAP SAMPLE: Every 60 days obtain a sample of transmission oil and send to the nearest AOAP Laboratory (TB 43-0210 and TM 9-2300-422-23&P). Samples should be taken as near the prescribed interval as possible. If sampling at the prescribed interval is not possible, a 10 percent variance before or after the scheduled interval date or miles for sampling is permissible. The need for on-condition oil changes will be determined by the AOAP Laboratory.

5. HARD TIME INTERVAL. If AOAP Laboratory support is not available, drain oil and change filter element/gasket every 6,000 miles or annually. Hard time interval may be shortened if equipment operates under adverse conditions.

6. TRANSMISSION OIL FILTER. Replace filter element (TM 9-2350-277-20) each time a transmission oil change is required.

NOTES (cont)

WARNING

Hot parts can burn you. Use care when you work near hot power unit.

7. TRANSMISSION OIL DRAIN AND FILTER ELEMENT REPLACEMENT.

NOTE

Drain oil (36 quarts) only when hot after operation. Allow oil to drain for 1 hour if time permits.

a. Remove access cover from hull bottom (TM 9-2350-277-20).
b. Place a suitable container under transmission drain tube.
c. Remove plug from drain tube and drain oil into container.
d. Inspect plug and oil for metallic particles. If metal chips are found, notify direct support maintenance.
e. Clean and install drain plug in oil drain tube.
f. Install new transmission oil filter element and gasket.
g. Fill transmission with approximately 36 quarts (refill capacity) or 57 quarts (initial fill) of OE/HDO or OEA, as listed above, to bring level between FULL and ADD marks on gage rod.

8. OPERATIONAL CHECK.

a. Start engine (TM 9-2350-277-10) and check for oil leaks at transmission filter cover and drain plug. Recheck oil level.
b. Inspect access cover for hull bottom and replace if damaged (TM 9-2350-277-20).
c. Install access cover on hull bottom (TM 9-2350-277-20).

9. TRANSMISSION OIL FLUSH PROCEDURE. Use the following procedure when changing oil grade or when oil is contaminated.

NOTE

Transmission oil must be flushed when changing oil grades.

a. Operate carrier until coolant reaches normal operating temperature.

NOTE

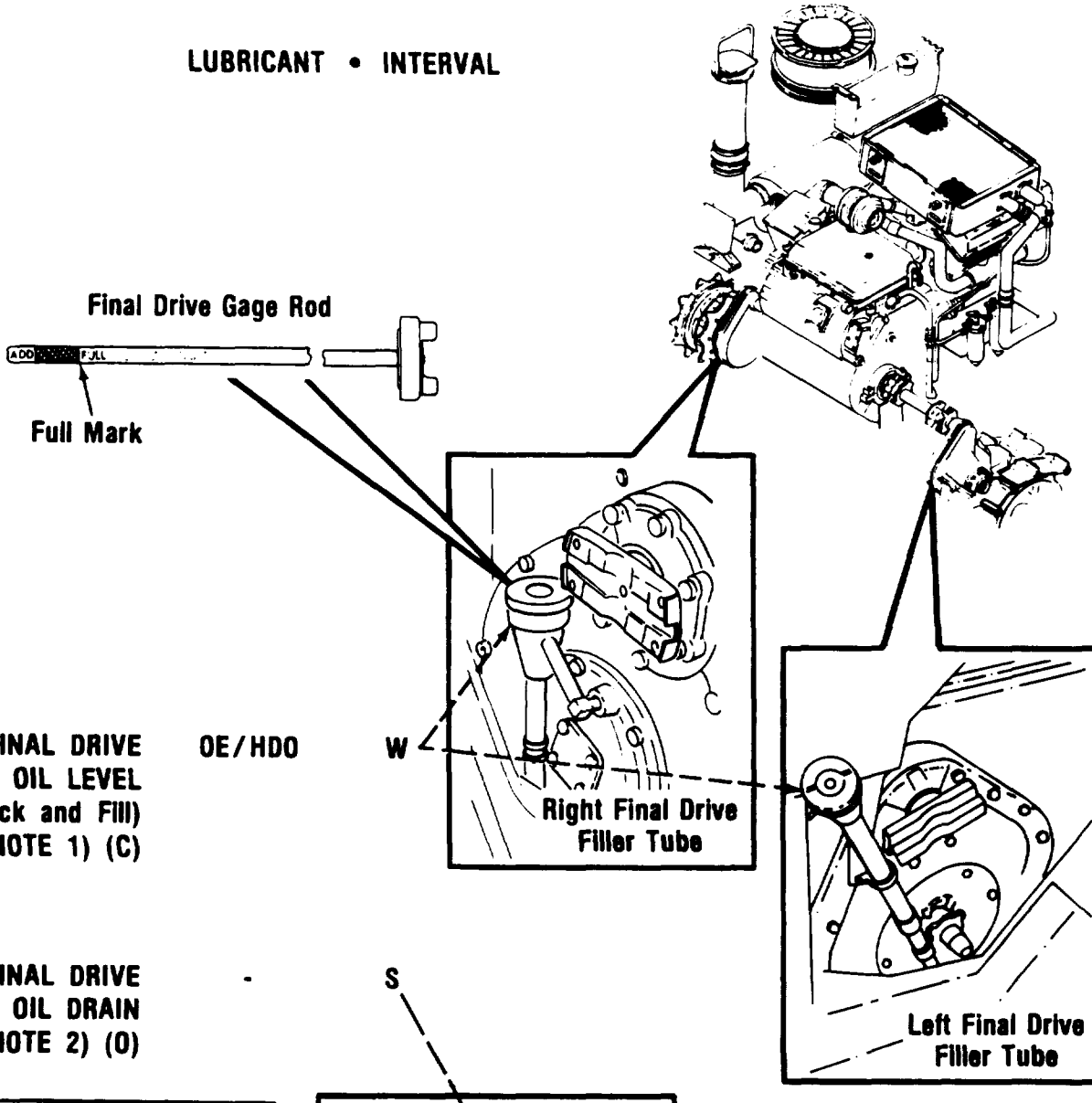
Do not change transmission oil filter at this time.

b. Drain transmission oil.
c. Fill transmission with new grade oil.
d. Operate transmission in 1-3 range with engine idling for 5-6 minutes.
e. Drain oil and change transmission oil filter.
f. Fill transmission with new grade oil.
g. Check oil level.

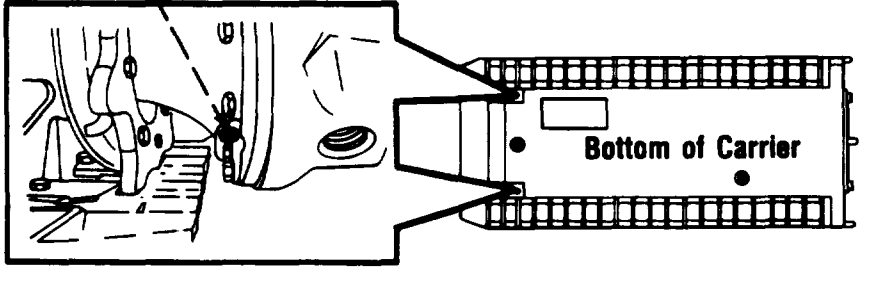
10. TRANSMISSION BREATHER. Every 1,500 miles or semi-annually, remove and clean transmission breather with dry cleaning solvent (P-D-680, type II). Dry breather and install on transmission (TM 9-2350-277-20).

11. PRESERVATION OIL. If transmission has been filled with preservation engine oil (MIL-L-21260, Grade PE 10-1), leave this oil in transmission until first scheduled oil change. Maintain operating oil level by adding applicable grade oil (OE/HDO or OEA). When first scheduled oil change is made, refill transmission with applicable grade oil (OE/HDO or OEA). (See NOTES 6 and 9.)

LUBRICANT • INTERVAL



FINAL DRIVE OIL LEVEL (Check and Fill) (See NOTE 1) (C)	OE/HDO	W
FINAL DRIVE OIL DRAIN (See NOTE 2) (O)	-	S



TOTAL MAN-HR	
INTERVAL	MAN-HR
W	0.2
S	0.5

LUBRICATION ORDER

25 July 1994

LO 9-2350-277-12

(Supersedes LO 9-2350-277-12, May 1987)

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
OE/HDO (MIL-L-2104D) OR OEA (MIL-L-46167)	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE		OE/HDO-15/40	OE/HDO-15/40	OEA	W — Weekly S — Semi-annually or every 1,500 miles
	Final Drives	3 1/2 qts or 7 pints (FULL mark on gage rod)				

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. FINAL DRIVES. Weekly (W), check oil in both final drives for level between ADD and FULL marks on gage rod. Add applicable OE/HDO or OEA as required in Temperature Key Chart.

NOTE

Drain oil (3 1/2 quarts) only when hot after operation.

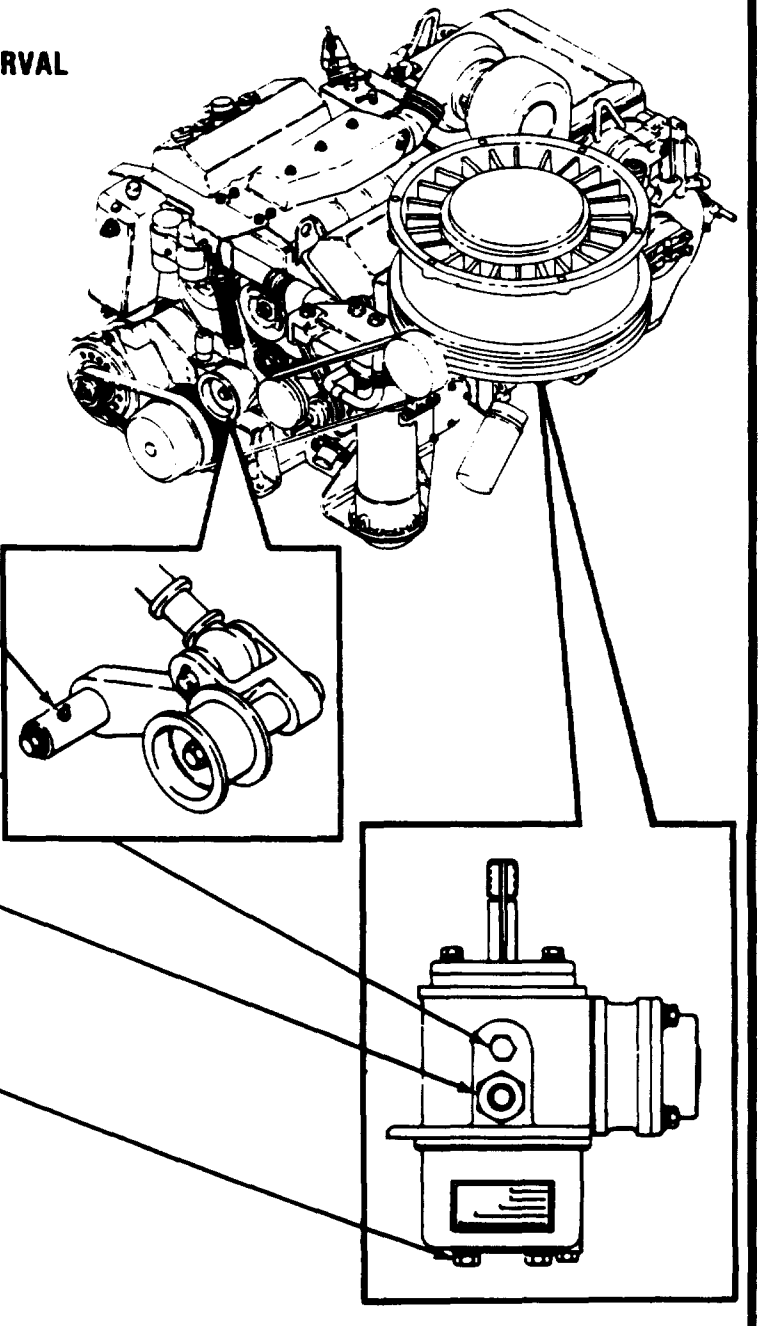
2. FINAL DRIVE OIL DRAIN. Drain final drives every 1,500 miles or semi-annually.

   a. Place a suitable container under final drive housing.
   b. Remove drain plugs from final drive housing and drain oil into the container (TM 9-2350-277-20).
   c. Inspect drain plugs and oil for metal particles. If metal chips are found, notify direct support maintenance.
   d. Clean and install the drain plug (TM 9-2350-277-20).
   e. Fill each final drive with OE/HDO or OEA, as applicable, to bring oil level to a point between the FULL and ADD marks on gage rod. Each final drive holds approximately 3 1/2 quarts.

NOTE

Do not substitute hydraulic fluid for OE/HDO or OEA. Red dye has been added to some final drives to aid in detection of leaks.

LUBRICANT • INTERVAL



PULLEY SUPPORT ARM (See NOTE 1) (O)	GAA	S
FAN GEARBOX FILL (See NOTE 2) (C)	OE/HDO	M
FAN GEARBOX OIL LEVEL CHECK (See NOTE 2) (C)	OE/HDO	M
FAN GEARBOX OIL DRAIN (See NOTE 3) (O)	-	S

TOTAL MAN-HR	
INTERVAL	MAN-HR
M	0.3
S	0.4

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
OE/HDO (MIL-L-2104D)	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE		OE/HDO-15/40	OE/HDO-15/40	OEA	M — Monthly S — Semi-annually or every 1,500 miles
	Fan Gearbox	18 oz or 3/4 pt				
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY					
	Pulley Support Arm Fittings	As required	ALL TEMPERATURES			

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. PULLEY SUPPORT ARM. Every 1,500 miles or semi-annually, lubricate with GAA (TM 9-2350-277-20). Use grease gun with flexible adapter on fitting.

2. FAN GEARBOX. Each month check fan gearbox oil level. Add OE/HDO or OEA, as needed, to bring oil level to center of sight glass.

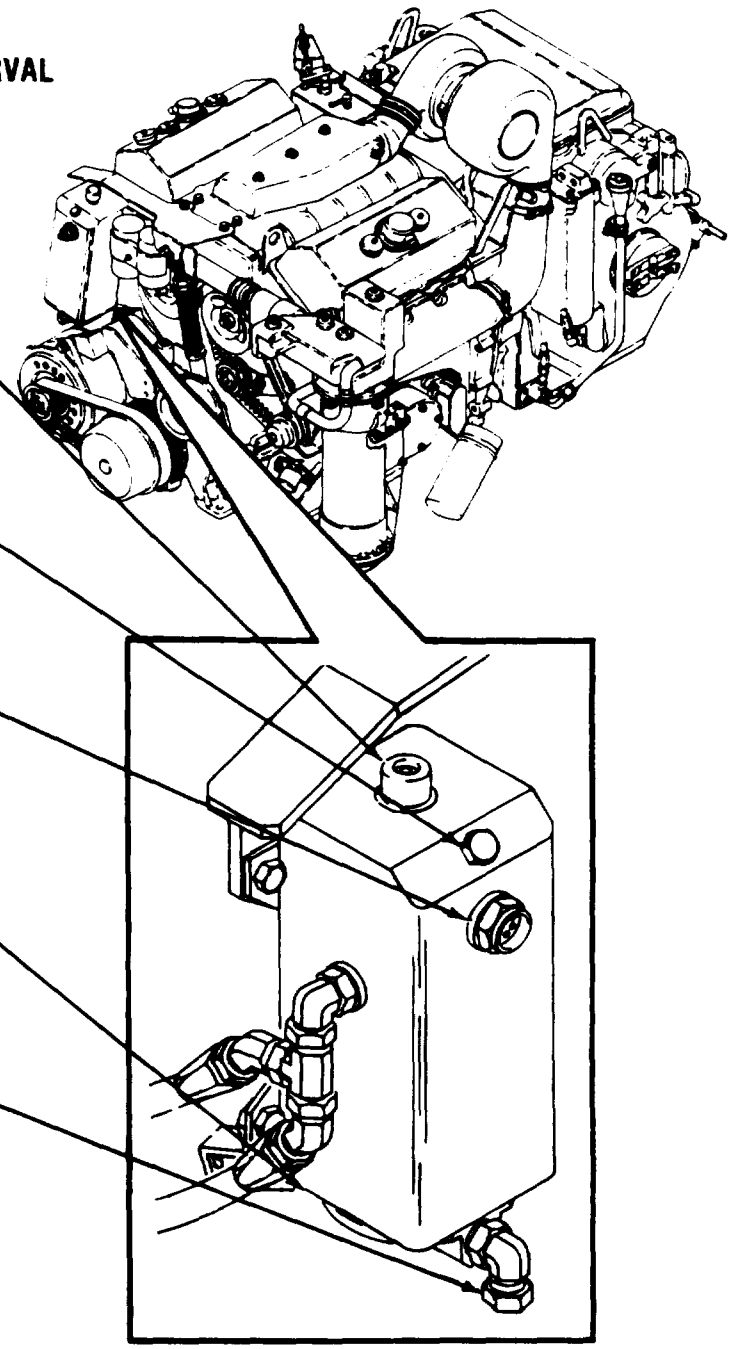
3. FAN GEARBOX OIL DRAIN. Drain fan gearbox every 1,500 miles, or semi-annually. To drain and refill gearbox, see steps a through f.

NOTE

Drain oil only when hot after operation.

a. Place a suitable container under fan gearbox drain.
b. Remove screw and washer from gearbox housing and drain oil into container. Discard packing.
c. Inspect screw, washer and oil for metallic particles and foreign matter. If metal chips are found, notify unit maintenance.
d. Lubricate new preformed packing with OE/HDO prior to installing.
e. Install screw and washer in gearbox housing. Tighten screw (TM 9-2350-277-20). Do NOT over tighten.
f. Fill gearbox with enough OE/HDO oil to bring the level to center of sight glass.

	LUBRICANT	• INTERVAL
HYDRAULIC SYSTEM TANK BREATHER (See NOTE 2) (O)	-	S
HYDRAULIC SYSTEM TANK FILL (See NOTE 1) (C)	FRH or OHA	D
HYDRAULIC SYSTEM TANK FLUID LEVEL CHECK (See NOTE 1) (C)	FRH or OHA	D
HYDRAULIC SYSTEM TANK STRAINER (See NOTE 2) (O)	FRH or OHA	S
HYDRAULIC SYSTEM TANK OIL DRAIN (See NOTE 2) (O)	FRH or OHA	S



TOTAL MAN-HR	
INTERVAL	MAN-HR
D	0.2
S	1.0

LUBRICATION ORDER

25 July 1994

LO 9-2350-277-12

(Supersedes LO 9-2350-277-12, May 1987)

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
FRH (MIL-H-46170)	HYDRAULIC FLUID, RUST INHIBITED, FIRE RESISTANT, (MIL-H-46170) Ramp System	3 1/2 qts or 7 pints	ALL TEMPERATURES			O — Daily S — Semi-annually or every 1,500 miles

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

WARNING

Fire resistant hydraulic (FRH) fluid may contain Tricresyl Phosphate which, if taken internally, can produce paralysis. Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking. Application of these measures is considered an effective control of the hazard.

CAUTION

Use only FRH hydraulic fluid. Do not mix different types of fluid. Do NOT overfill.

1. HYDRAULIC SYSTEM TANK. With ramp down and carrier on level ground, check hydraulic fluid level. Fluid level should be halfway in sight glass. To add FRH, remove fill plug and preformed packing from top of tank. Add FRH as needed. Install fill plug and new preformed packing.

2. Drain hydraulic system tank and service strainer every 1,500 miles, semi-annually or when hydraulic fluid is changed to FRH. Drain hydraulic system tank as follows:

WARNING

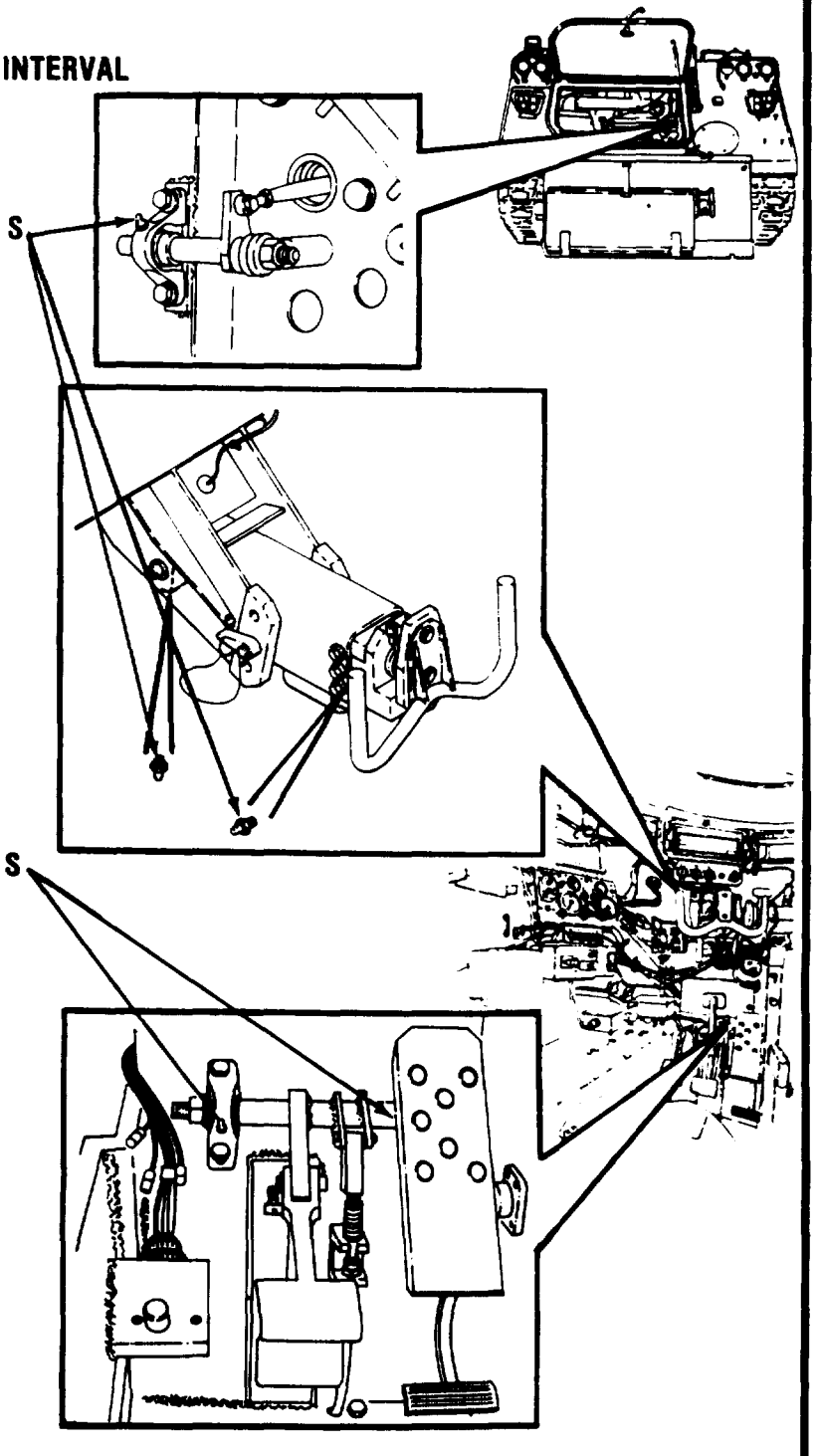
Lowering ramp could kill or injure personnel. Make sure no one is in ramp zone before you lower ramp. Unlocked ramp can fall open suddenly. Do not operate carrier if locks do not secure ramp properly. Keep away from ramps that have come open during carrier operation.

a. Lower ramp (TM 9-2350-277-10).
b. Place a suitable container under drain elbow on bottom of tank.
c. Remove drain cap and preformed packing from drain elbow. Discard packing.
d. Service hydraulic system tank breather and strainer (TM 9-2350-277-20).
e. Install drain cap with new preformed packing on drain elbow.
f. Remove fill plug and preformed packing from top of tank.
g. Fill hydraulic tank with FRH to bring level halfway in sight glass. Hydraulic tank takes approximately 3 1/2 quarts.
h. Install fill plug with new preformed packing in top of tank.

3. FLUSH HYDRAULIC TANK. When changing from OHA to FRH hydraulic fluid, flush the tank as follows:

a. Drain and fill tank (see Note 2).
b. Raise and lower ramp several times (TM 9-2350-277-10).
c. Drain and fill tank again (see Note 2).
d. Test hydraulic ramp system.

	LUBRICANT	• INTERVAL
STEERING CONTROL BEARINGS (3 Fittings) (See NOTES 1&3) (O)	GAA	S
FOOT BRAKE CROSS-SHAFT BEARINGS (2 Fittings) (See NOTES 2&3) (O)	GAA	S



TOTAL MAN-HR	
INTERVAL	MAN-HR
S	0.3

LUBRICATION ORDER

25 July 1994

LO 9-2350-277-12

(Supersedes LO 9-2350-277-12, May 1987)

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			S — Semi-annually or every 1,500 miles
	Steering Control Bearings Foot Brake Cross-shaft Bearings	As Required				

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. STEERING CONTROL BEARINGS. Every 1,500 miles or semi-annually, lubricate bearings with GAA through fitting at each end of steering support and power plant bulkhead. Use grease gun with flexible adapter.

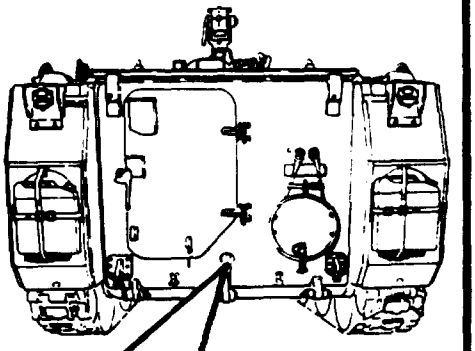
2. FOOT BRAKE CROSS-SHAFT BEARINGS. Every 1,500 miles or semi-annually, lubricate bearings with GAA through fittings.

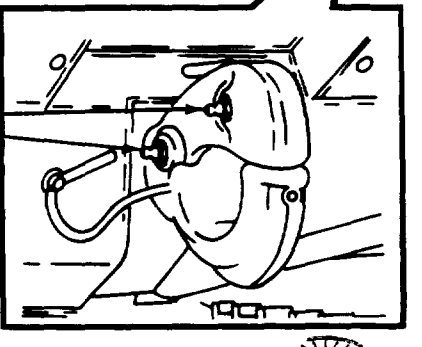
3. Clean fittings with dry cleaning solvent (P-D-680, type II) prior to lubrication. Check/lubricate grease fitting points after washing or fording.

NOTE

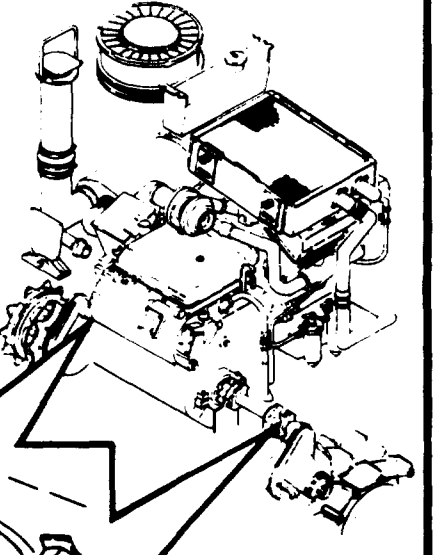
When grease fittings will not accept GAA, notify unit maintenance.

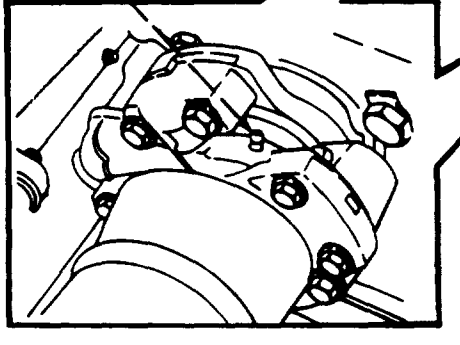
LUBRICANT • INTERVAL





TOWING PINTLE (2 Fittings) (See NOTES 1&3) (0) — GAA — A





UNIVERSAL JOINT (4 Fittings) (See NOTES 2&3) (0) — GAA — S

TOTAL MAN-HR	
INTERVAL	MAN-HR
A	0.1
S	0.5

LUBRICANTS/COMPONETS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to 10°F (+5°C to 23°C)	0°F to -65°F (-18°C to 54°C)	
GAA MIL-G-10924)	GREASE, AUTOMATIVE AND ARTILLERY Towing Pintle and Universal Joint	As Required	ALL TEMPERATURES			A - Annually or every 1,500 miles S- Semi-annually or every 1,500 miles

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. TOWING PINTLE. Every 1, 500 miles or annually, lubricate pintle through two fittings with GAA.

NOTE

Steps 2 and 3 only apply to universal Joints that are not permanently lubricated.

2. UNIVERSAL JOINTS. Every 1, 500 miles or semiannually, lubricate four universal joints through fittings with GAA. Universal joints are on ends of propeller shafts.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in **well ventilated area. Avoid contact with skin, eyes, and clothes. Do not breathe vapors. Do not use near open flame or excessive heat (flash point is 100 138°F or 38 50°C).**

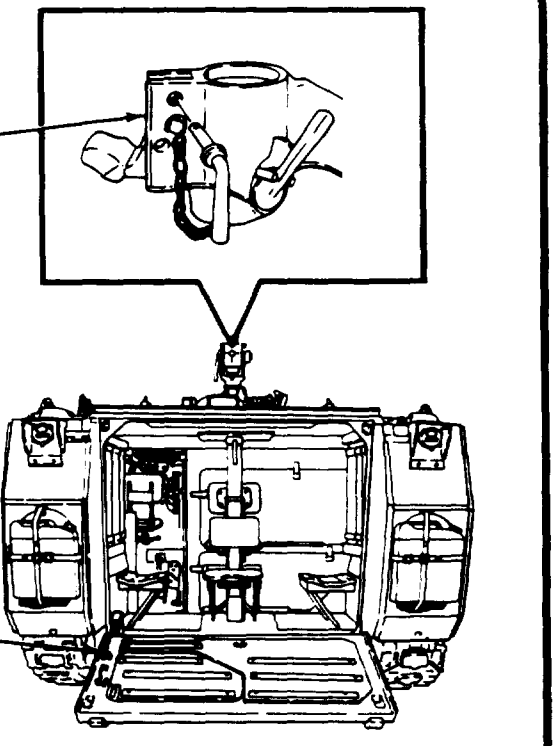
If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes Is made, wash your eyes with water and get medical aid Immediately.

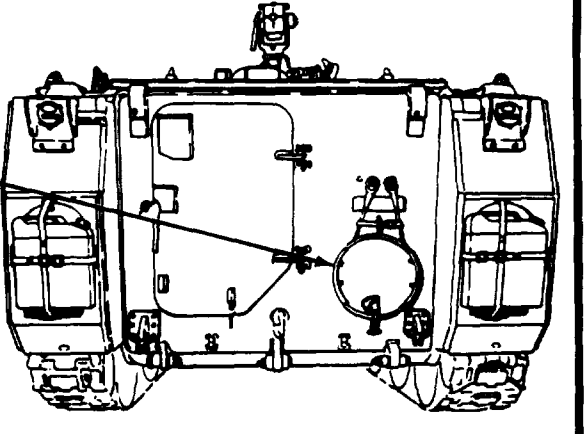
3. Clean fittings with dry cleaning solvent (P-D-680, Type II) prior to lubrication. Check/lubricate grease fitting points after washing or fording.

NOTE

When grease fitting will not accept GAA, notify unit maintenance.

	LUBRICANT	• INTERVAL
MACHINE GUN MOUNT (See NOTE 1) (C)	PL/SD-II	S
RAMP WIRE ROPE (See NOTE 2) (C)	CW-11	S
TOW CABLE (See NOTE 3) (C)	OE/HDO	S





TOTAL MAN-HR	
INTERVAL	MAN-HR
S	1.0

LUBRICATION ORDER

25 July 1994

LO 9-2350-277-12

(Supersedes LO 9-2350-277-12, May 1987)

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
OE/HDO (MIL-L-2104D) OR OEA (MIL-L-46167)	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE Tow Cable	As Required	OE/HDO-15/40	OE/HDO-15/40	OE/HDO-15/40	S — Semi-annually or every 1,500 miles
CW-11 (VV-L-751) OR GO-75W (MIL-L-2105)	LUBRICATING OIL CHAIN WIRE ROPE, EXPOSED GEAR Ramp Wire Rope	As Required	CW-11B	CW-11B	GO-75W	
PL-M (MIL-3150)	LUBRICATING OIL, GENERAL PURPOSE (Medium)					
PL-S (VV-L-800)	LUBRICATING OIL, GENERAL PURPOSE (Special) Machine Gun Mount	As Required	PL-M	PL-M	PL-S	

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated area. Avoid contact with skin, eyes, and clothes. Do not breathe vapors. Do not use near open flame or excessive heat (flash point is 100-138°F or 38-50°C).

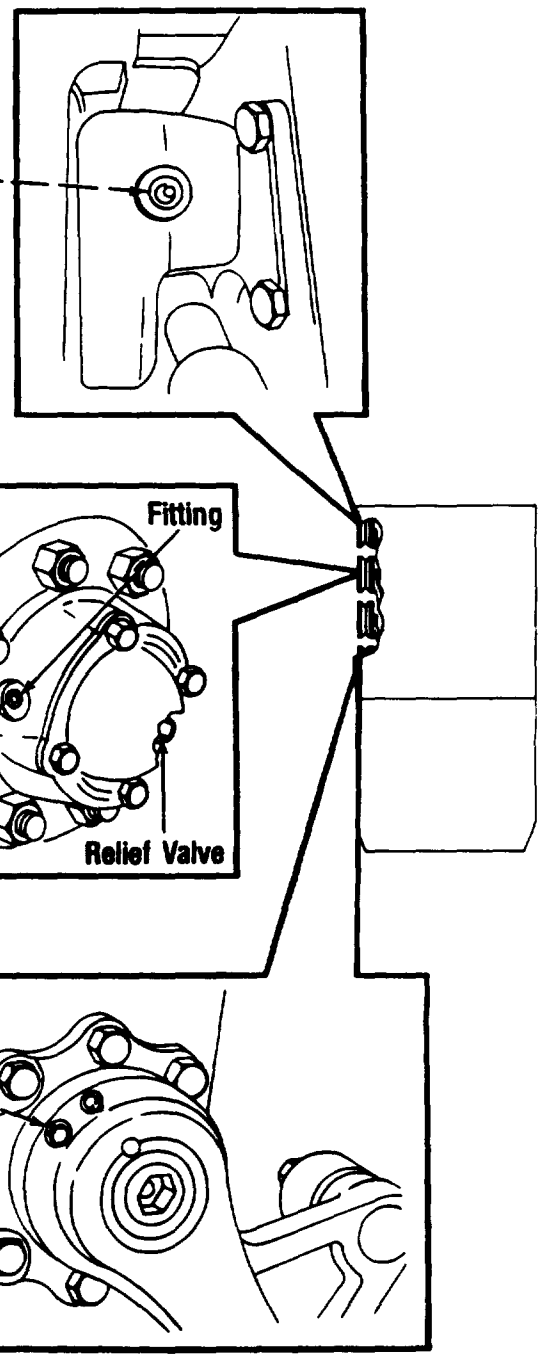
If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. MACHINE GUN MOUNT. Every 1,500 miles or semi-annually, clean with dry cleaning solvent (P-D-680, type II) and lubricate all moving parts with PL-M or PL-S as appropriate.

2. RAMP WIRE ROPE. Every 1,500 miles or semi-annually, lower ramp, clean exposed portion of wire rope with OE/HDO. Wipe off excess oil and coat with oil CW-11B. Remove rear floor plate (TM 9-2350-277-20), raise ramp, and clean concealed portion of wire rope with OE/HDO. Wipe off excess oil and coat with CW-11B.

3. TOW CABLE. Every 1,500 miles or semi-annually and after each use, clean cable with wire brush and oil. Wipe off excess oil.

	LUBRICANT	INTERVAL
IDLER WHEEL SUPPORT ARM BEARINGS (2 places) (See NOTES 1&4) (0)	GAA	S
ROAD WHEEL AND IDLER WHEEL BEARINGS (12 places) (See NOTES 2&4) (0)	GAA	S
ROAD WHEEL SUPPORT ARM BEARINGS (10 places) (See NOTES 3&4) (0)	GAA	S



TOTAL MAN-HR	
INTERVAL	MAN-HR
S	1.4

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			S — Semi-annually or every 1,500 miles
	Road and Idler Wheel Bearings	As required				
	Road and Idler Wheel Support Arm Bearings					

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES:

1. IDLER WHEEL SUPPORT ARM BEARINGS. Every 1,500 miles or semi-annually, lubricate idler wheel support arm bearings through fittings, as follows: use grease gun with GAA on fitting at rear of support arm until GAA appears at relief valve.

2. ROAD WHEEL AND IDLER WHEEL HUB BEARINGS. Every 1,500 miles or semi-annually, lubricate road wheel and idler wheel hub bearings as follows: use GAA and grease gun with flexible adapter. Lubricate hub through fitting until grease appears at relief valve.

3. ROAD WHEEL SUPPORT ARM BEARINGS. Every 1,500 miles or semi-annually, lubricate all road wheel support arm bearings. Use GAA and grease gun with flexible adapter on fitting until GAA appears at relief valve (TM 9-2350-277-20). If support arm has plugs but no fittings, remove one plug and install fitting. Remove remaining plug and install relief valve. Perform lubrication. Remove fitting and relief valve. Clean and install two plugs.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated area. Avoid contact with skin, eyes, and clothes. Do not breathe vapors. Do not use near open flame or excessive heat (flash point is 100-138°F or 38-50°C).

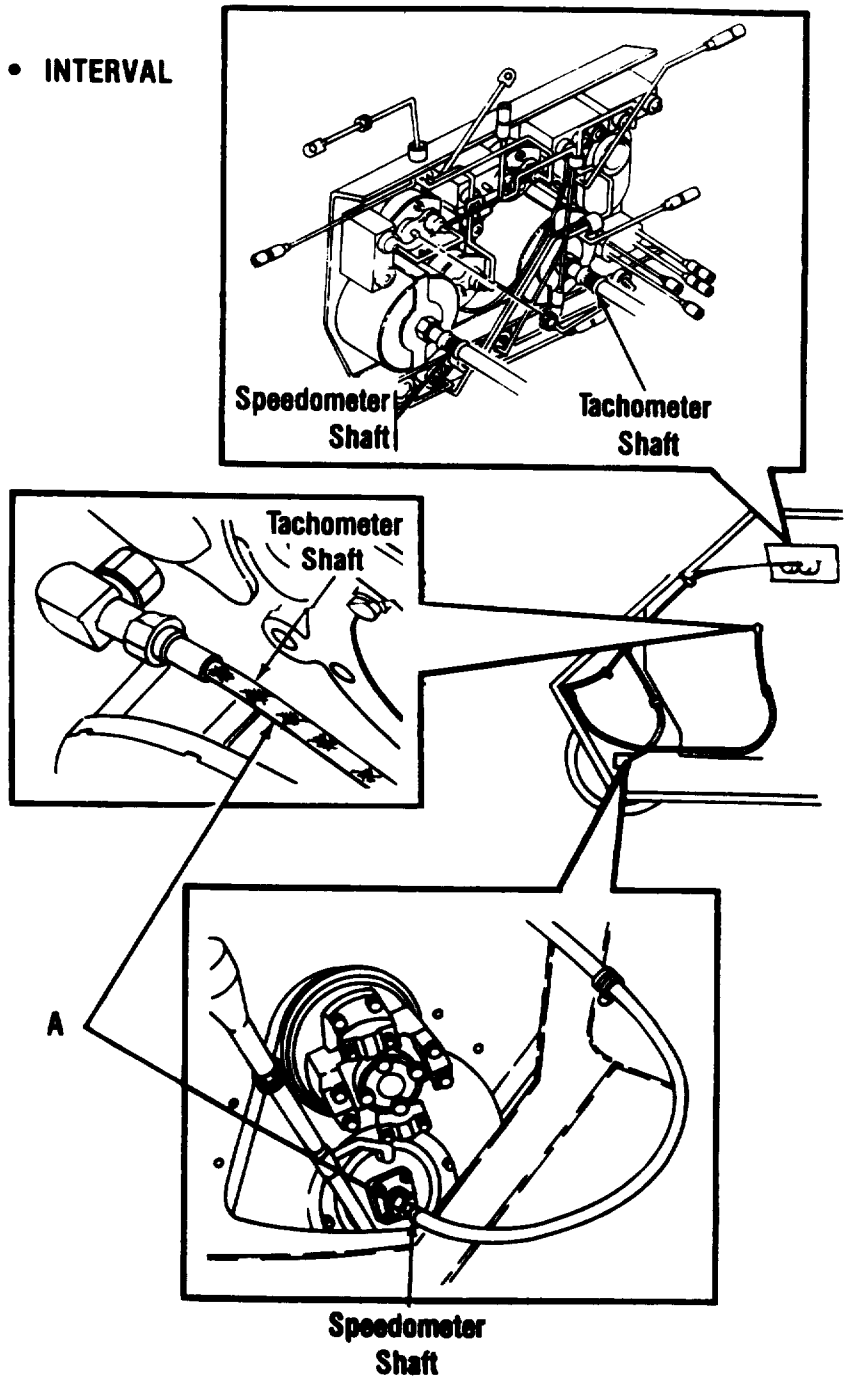
If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

4. Clean fittings with dry cleaning solvent (P-D-680, type II) prior to lubrication. Check/lubricate grease fitting points after washing or fording.

NOTE

When grease fitting will not accept GAA, notify unit maintenance.

LUBRICANT • INTERVAL



TACHOMETER AND SPEEDOMETER SHAFTS (See NOTES 1,2&3) (0) G1A

TOTAL MAN-HR	
INTERVAL	MAN-HR
A	0.1

LUBRICATION ORDER

25 July 1994

LO 9-2350-277-12

(Supersedes LO 9-2350-277-12, May 1987)

LUBRICANTS/COMPONENTS		CAPACITIES (APPROX)	EXPECTED TEMPERATURES*			INTERVALS
			Above +32°F (Above 0°C)	+40°F to -10°F (+5°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
GIA (MIL-G-23827)	GREASE, INSTRUMENT, AIRCRAFT	As required	ALL TEMPERATURES			A — Annually or every 1,500 miles
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY					S — Semi-annually or every 1,500 miles
OE/HDO (MIL-L-2104D) OR OEA (MIL-L-46167)	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE					

*FOR ARCTIC OPERATION REFER TO FM 9-207

NOTES

1. TACHOMETER AND SPEEDOMETER SHAFTS. Annually, disconnect shafts at both ends (TM 9-2350-277-20), remove slotted washers from drive ends of cores, and remove cores from instrument panel end of shafts. Clean and lubricate cores with GIA, insert cores in shafts. Install slotted washers, and connect both ends of shafts. If tachometer adapter has a grease fitting, lubricate sparingly with lubricant GIA.

2. OIL CAN POINTS. Every 1,500 miles, semi-annually or as required, lubricate fan tensioner, ramp hinges, ramp door hinges, power plant door hinges, driver's, commander's and cargo hatch hinges, control linkage pins and shafts and seat control. Use OE/HDO or OEA as appropriate.

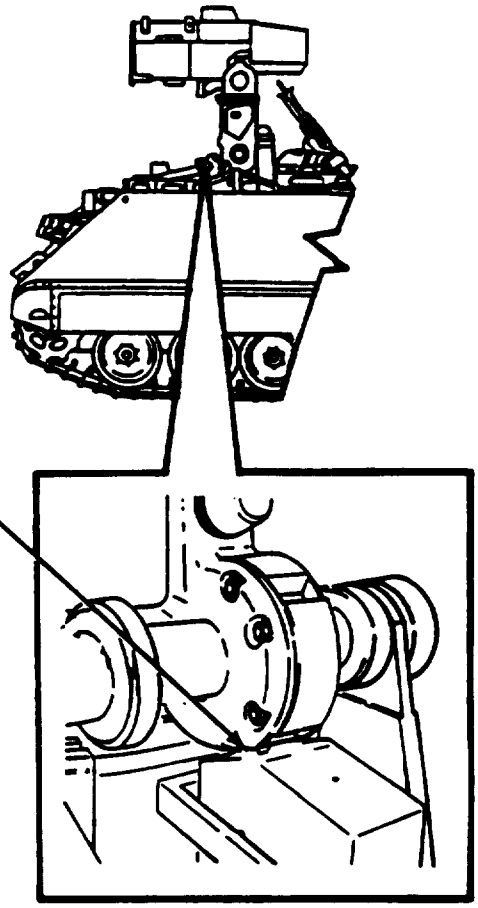
3. LUBRICATE AT TIME OF ASSEMBLY. Coat ends of suspension torsion bar, idler wheel support arm spindle and bearings, steering control linkage bearing surfaces and pins, and towing pintle shaft with GAA or GIA as specified during assembly.

Copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory.

M901A3 AND M981A3 ONLY

LUBRICANT • INTERVAL

Driver's Hatch Hold Open Stop (See NOTE)	CLP	D



NOTE

OIL CAN POINTS. Every 1500 miles, semianually, or as required, lubricate ramp hinges, ramp door hinges, power plant door hinges, trim vane hinges and latches; driver's, commander's, and cargo hatch hinges; control linkage pins and shafts, and seat control. Lubricate air box heater air motor. Use CLP as appropriate.

TOTAL MAN-HR	
INTERVAL	MAN-HR
D	0.2

By order of the Secretary of the Army:

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

Official:

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
07094

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. 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

'VEIGHTS

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

LIQUID 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

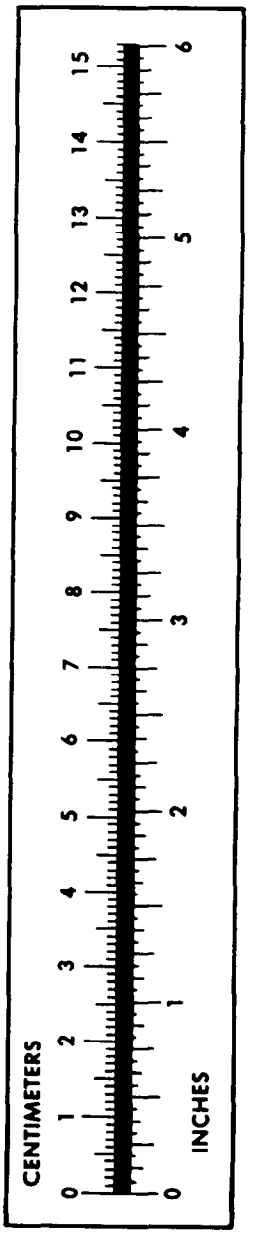
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	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
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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