

*Supersedes copy dated 31 March 1994

**TRUCK, TRACTOR, M1070, 8 X 8, HEAVY EQUIPMENT TRANSPORTER (HET)
(NSN 2320-01-318-9902)
EIC: B5C0.**

References: TM 9-2320-360-10, TM 9-2320-360-20

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications) through the Internet on the Army Electronic Product Support (AEPS) web site. The Internet address is <https://aeps.ria.army.mil>. The DA Form 2028 is located under the Public Applications section on the AEPS public home page. Fill out the form and click on SUBMIT. Using this form on the AEPS site will enable us to respond quicker to your comments and to better manage the DA Form 2028 program. You may also mail, fax, or e-mail your letter or DA Form 2028 directly to: TACOM Life Cycle Management Command, ATTN: AMSTA-LC- LPIT/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is ROCK-TACOM-TECH-PUBS@conus.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

Distribution Statement. Approved for public release; Distribution is unlimited.

Maintenance Levels. This lubrication order (LO) is for operator/crew and organizational maintenance. The lowest level of maintenance authorized to lubricate a point is indicated by either operator/crew (C) or organizational (O). Operator/Crew may lubricate points authorized for organizational when authorized by organizational.

WARNING

When servicing this vehicle performing maintenance, or disposing of materials such as engine coolant, transmission fluids, lubricants, batteries, battery acid or CARC paint, consult your Unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact the Army environmental hotline at 1-800-872-3845, DSN 584-1699. Improper disposal of this material may result in damage to environment or injury to personnel.

Lube Intervals. Lube intervals shown in this LO are either on-condition or hardtime. Hardtime maintenance is done at fixed intervals such as calendar time or miles driven. On-condition maintenance is performed based on the condition of an item as seen during scheduled inspections.

An example of a hardtime calendar lubrication interval is: S, in which S stands for semiannually (every six months). An example of a hardtime mileage and calendar interval is: 9/A, in which 9 stands for 9,000 mi (14,481 km), and A stands for annual (every 12 months). Perform the lubrication at whichever interval occurs first. Special lubrication intervals and services are shown by the use of asterisk (*) symbols. Notes are located on card 32.1.

LO 9-2320-360-12

Lube intervals and related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Engine oil/transmission, oil/hydraulic, oil/steering oil must be sampled at 90-day intervals as prescribed by DA Pam 750-8. Hardtime intervals will be applied in the event AOAP laboratory support is not available. For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions, such as longer-than-usual operating hours, extended idling periods, or extreme dust.

Oil Filters. Oil filters shall be serviced/cleaned/changed, as applicable, when:
They are known to be contaminated or clogged;
Service is recommended by AOAP laboratory analysis, or:
At prescribed hardtime intervals.

WARNING

SOLVENT CLEANING COMPOUND (DRY CLEANING SOLVENT)

Solvent cleaning compound MIL-PRF-680 Type II and III may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Use respirator as needed. Accidental ingestion can cause irritation of digestive tract and respiratory tract, may cause lung and central nervous system damage. Can be fatal if swallowed. Inhalation of high/massive concentrations can cause coma or be fatal. First aid for ingestion: do not induce vomiting. Seek immediate medical attention. First aid for skin contact: remove contaminated clothing. Wash skin thoroughly with soap and water. If symptoms persist, seek medical attention. First aid for eye contact: flush with water for 15 minutes or until irritation subsides. If symptoms persist, seek medical attention. First aid for inhalation: move to fresh air. If not breathing, provide artificial respiration. If symptoms persist, seek medical attention. Keep away from open flames and other sources of ignition. Failure to follow this warning may result in injury or death to personnel.

- The flashpoint for type II solvent cleaning compound is 141-198°F (61-92C) and type III is 200-241°F (93-116C).
- Improper cleaning methods and use of unauthorized cleaning solvents may injure personnel and damage equipment.
- Fire extinguishers should be placed nearby when using solvent cleaning compound. Failure to follow this warning may result in injury or death.
- Cloths or rags saturated with solvent cleaning compound must be disposed of IAW authorized facilities' procedures. Failure to follow this warning may result in injury.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury.

Cleaning and Fording. Clean parts with solvent cleaning compound. Dry before lubricating. After high pressure washing, lubricate all fittings and oil can points outside and underneath the HET Tractor. After fording, lubricate all fittings below fording depth and check submerged gearboxes for water. For corrosion control, refer to TM 9-2320-360-10.

Locators. Points indicated with dotted arrows are lubricated on both sides of the HET Tractor. Reference to the appropriate localized view is given after most lubrication entries. Localized views begin on card 19.

LIST OF EFFECTIVE PAGES

Dates of issue for original and revision are:

Original..... 31 March 1994
Revision..... 31 May 2007

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 34 CARDS CONSISTING OF
THE FOLLOWING:

Page No.	* Change No.
Card 1 of 34 and Card 2 of 34	0
A/ (B blank)	0
Card 2.1 of 34 – Card 34 of 34	0

* Zero In This Column Indicates An Original Page.

A/ (B blank)

Table 1. Lubricants

	Component	Approximate Capacity	Expected Temperatures	Intervals
Lubricating Oil, ICE, Tactical, OE/HDO (MIL-L-2104) or Lubricating Oil, ICE, Arctic, OEA (MIL-L-46167)	Engine	23.5 Qt (22.2 L)	See CHART A.	OC - ON-CONDITION D - DAILY W - WEEKLY M - MONTHLY S - SEMIANNUALLY (6 MONTHS) BI - BIENNIALLY A - ANNUALLY 3 - 3000 MILES 6 - 6000 MILES 9 - 9000 MILES 10 - 10,000 MILES 20 - 20,000 MILES 25 - 25,000 MILES 50 - 50,000 MILES
	Transmission	33 Qt (31 L)	See CHART B.	
	Transfer Case	6.5 Qt (6.1 L)	See CHART C.	
	Power Steering Reservoir	31 Qt (29 L)	See CHART B.	
	Winch Hydraulic Reservoir	178.5 Qt (168.9 L)	See CHART D.	
	Oil Can Points	As required	See CHART A.	
	Lubricating Oil, Gear, Multipurpose, GO (MIL-L-2105)	No. 1 Axle	17 Qt (16 L)	
No. 2 Axle		20 Qt (19 L)	See CHART E.	
No. 3 Axle		19 Qt (18 L)	See CHART E.	
No. 4 Axle		16 Qt (15 L)	See CHART E.	
Planetary Wheel Ends		1.75 Qt (1.65 L)	See CHART E.	
Main Winches Gearboxes		17 Qt (16 L)	See CHART F.	
Auxiliary Winch Gearbox		4 Qt (4 L)	See CHART F.	
Steering Reduction Gearbox		0.5 pt (0.251 L)	See CHART G.	

For arctic operation, refer to FM 9-207.

Table 2. Other Fluids

Fluid	Capacity	Temperature	For arctic operation, refer to FM 9-207.
Dry Cleaning Solvent, SD-2 (P-D-680, Type II)	As required	All Temperatures	
Antifreeze, Ethylene Glycol (MIL-A-46153)	92.5 Qt (87.5 L)	Above -50°F (-46°C)	
Antifreeze, Arctic-Type (MIL-A-11755) (Includes Arctic Kit)	112 Qt (106 L)	Use when extended periods of -40°F (-40°C) or lower are encountered.	

Table 3. Grease, Automotive and Artillery (GAA) (MIL-G-10924)

The following components are lubricated with GAA as required at all temperatures.

Propeller Shafts and U-Joints	For arctic operation, refer to FM 9-207.
Link Kits (King Pin)	
Brake Camshafts and Slack Adjusters	
Spring Eye Pins	
Pintle Hook	
Steering System (Pitman Arms, Steering Gears, Drag Links, Steering Shafts)	
Tire Davit	
Fifth Wheel Plate/Ramps	
Fifth Wheel Lubrication Fittings	
Tie Rod Ends	

Table 4. Total Man-Hours* Required for Service

TRUCK, TRACTOR, M1070	
OC	1.1
D	0.2
W	1.0
S	0.5
A	2.9
BI	0.7
3/S	4.0
6/S	1.2
9/S	0.3
25/S	0.4
9/A	0.3
20/A	4.8
50/A	0.6

* The man-hours shown above have been established on an individual basis and, accordingly, are not applicable at maintenance facilities where production line methods are employed.

LO 9-2320-360-12

CHART A. ENGINE AND OIL CAN POINTS

EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
																OE/HDO-40		
																OE/HDO-15W/40		
				OEA														
LUBRICANTS: OE/HDO LUBRICATING OIL, ICE, TACTICAL (MIL-L-2104) OE/HDO LUBRICATING OIL, ICE, ARCTIC (MIL-L-46167)																		

CHART B. TRANSMISSION AND STEERING RESERVOIR

EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
																OE/HDO-15W/40		
																OE/HDO-10		
				OEA														
LUBRICANTS: OE/HDO LUBRICATING OIL, ICE, TACTICAL (MIL-L-2104) OE/HDO LUBRICATING OIL, ICE, ARCTIC (MIL-L-46167)																		

CHART C. TRANSFER CASE

EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
																OE/HDO-40		
				OEA														
LUBRICANTS: OE/HDO LUBRICATING OIL, ICE, TACTICAL (MIL-L-2104) OE/HDO LUBRICATING OIL, ICE, ARCTIC (MIL-L-46167)																		

CHART D. WINCH HYDRAULIC RESERVOIR

EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
											OE/HDO-30							
					OE/HDO-10													
			OEA															
<p>LUBRICANTS: OE/HDO LUBRICATING OIL, ICE, TACTICAL (MIL-L-2104) OE/HDO LUBRICATING OIL, ICE, ARCTIC (MIL-L-46167)</p>																		

CHART E. AXLES

EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
					GO-80/90													
			GO-75															
<p>LUBRICANT: LUBRICATING OIL, GEAR, MULTIPURPOSE (MIL-L-2105)</p>																		

CHART F. WINCH GEARBOXES

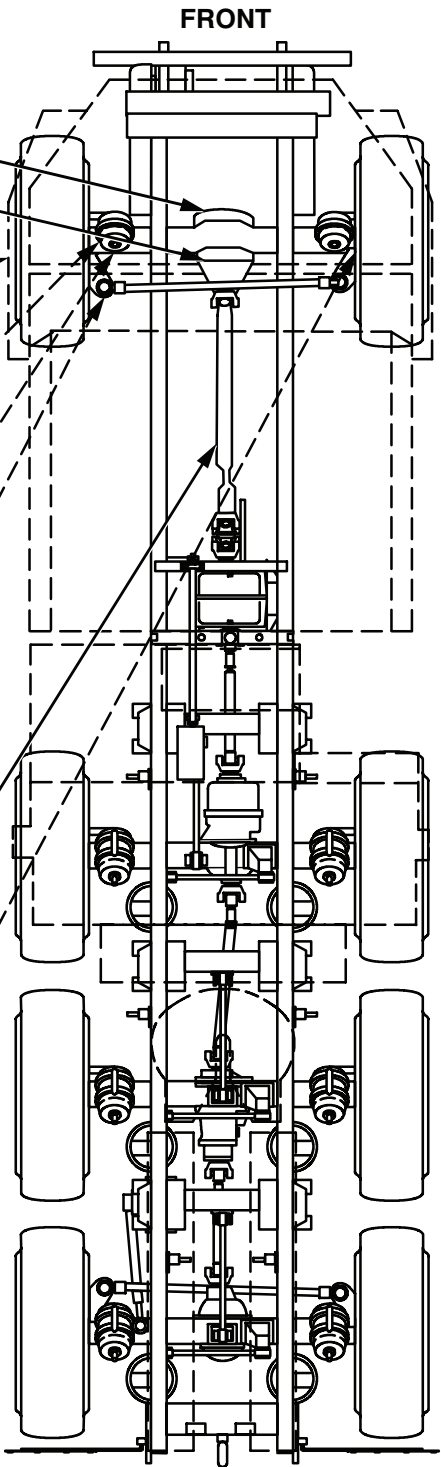
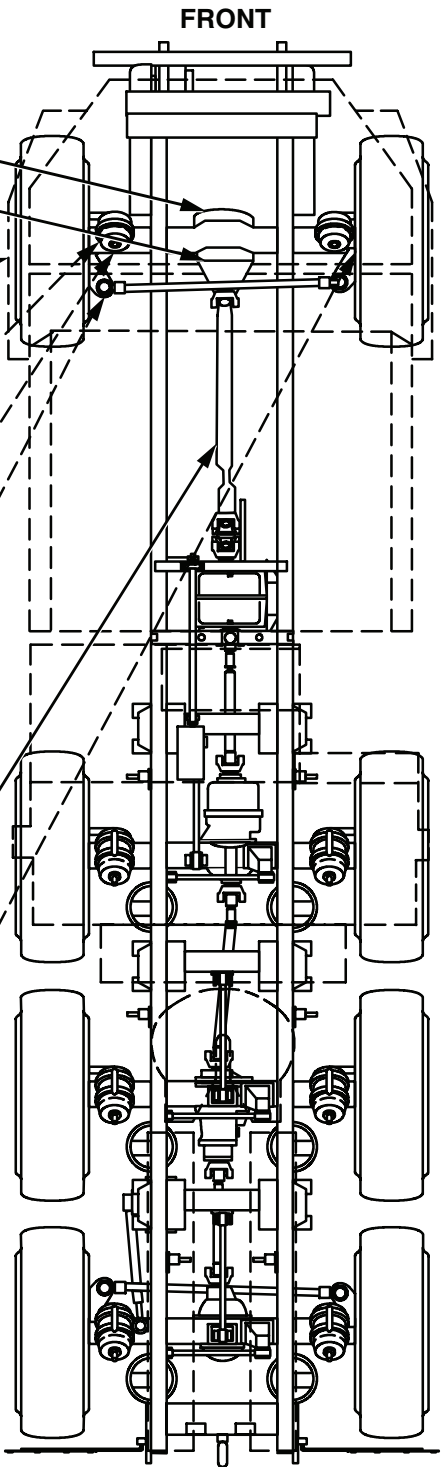
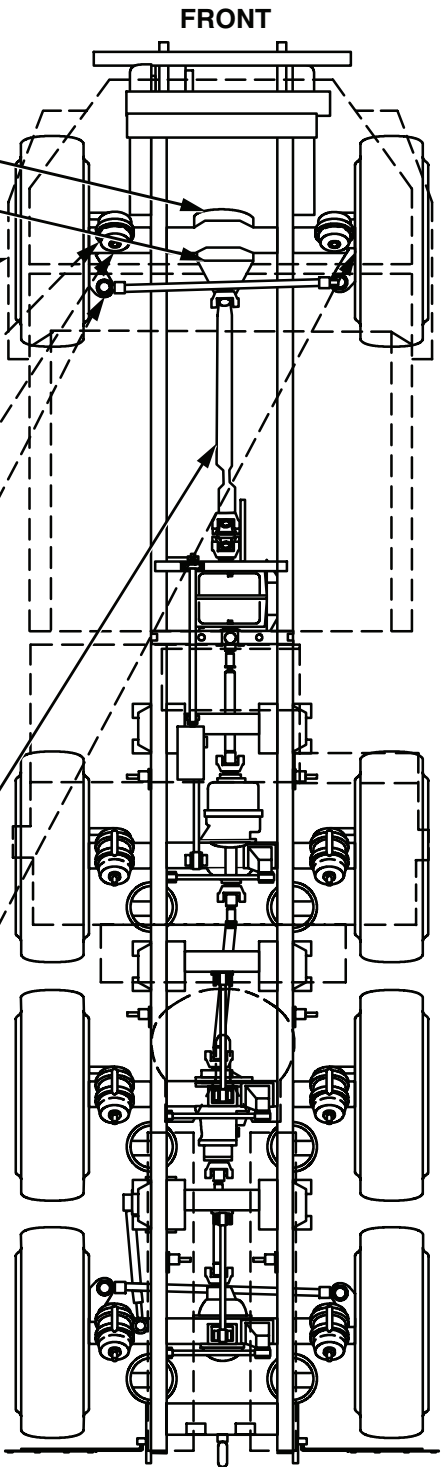
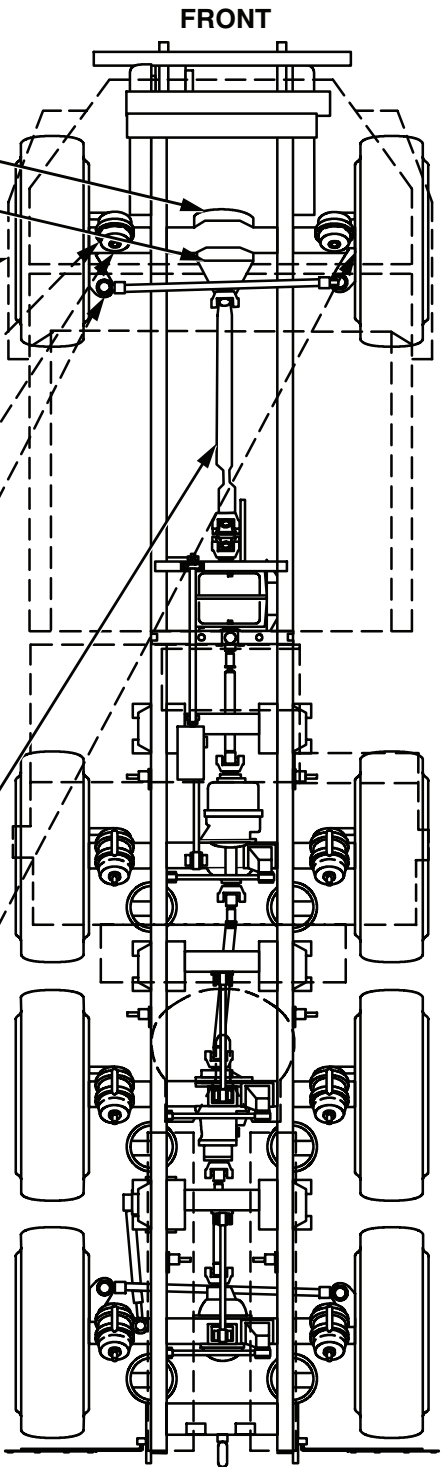
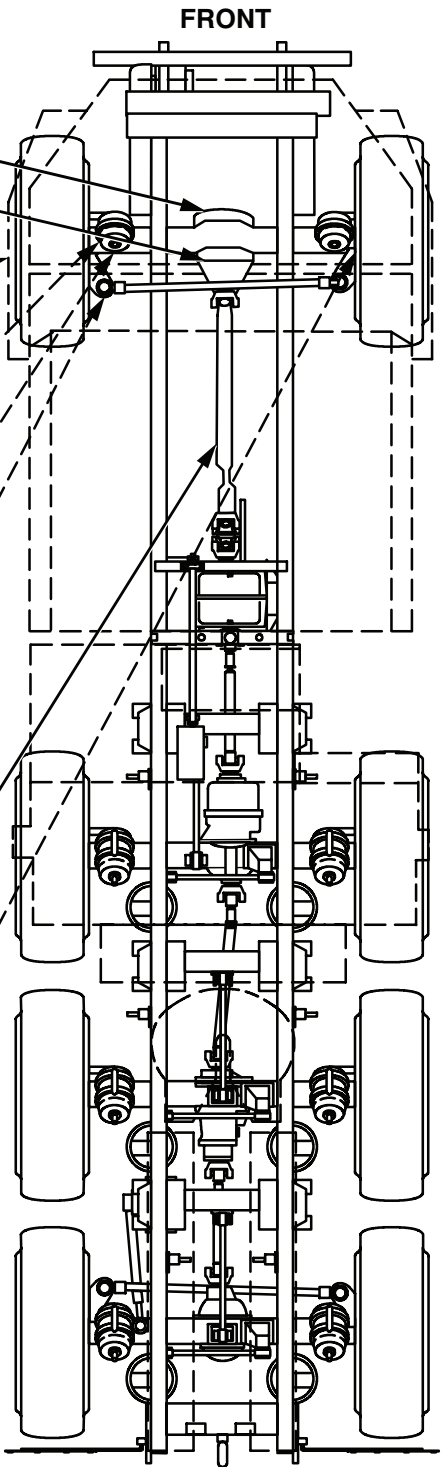
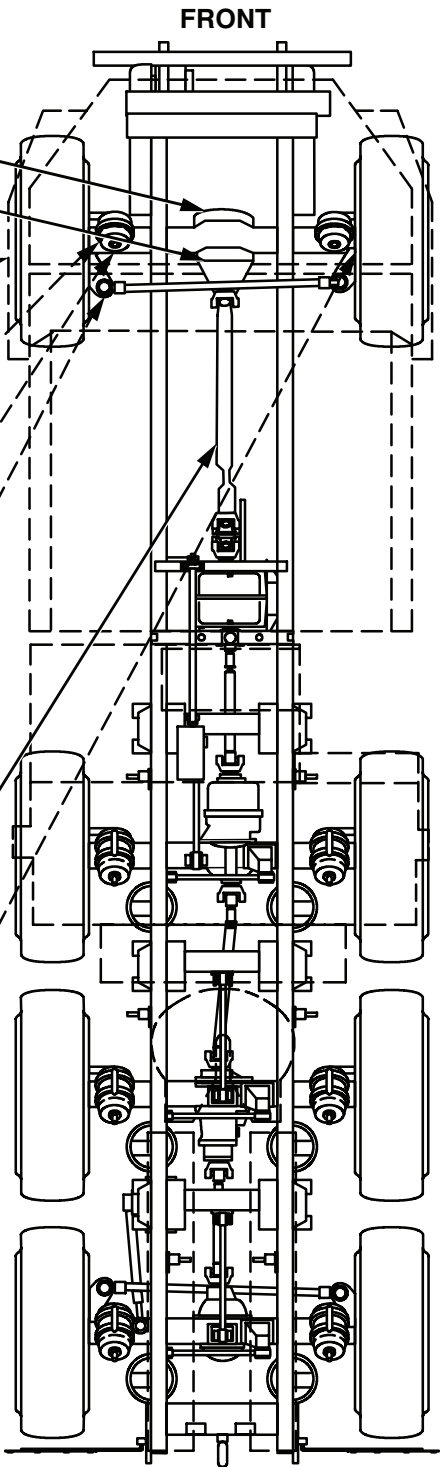
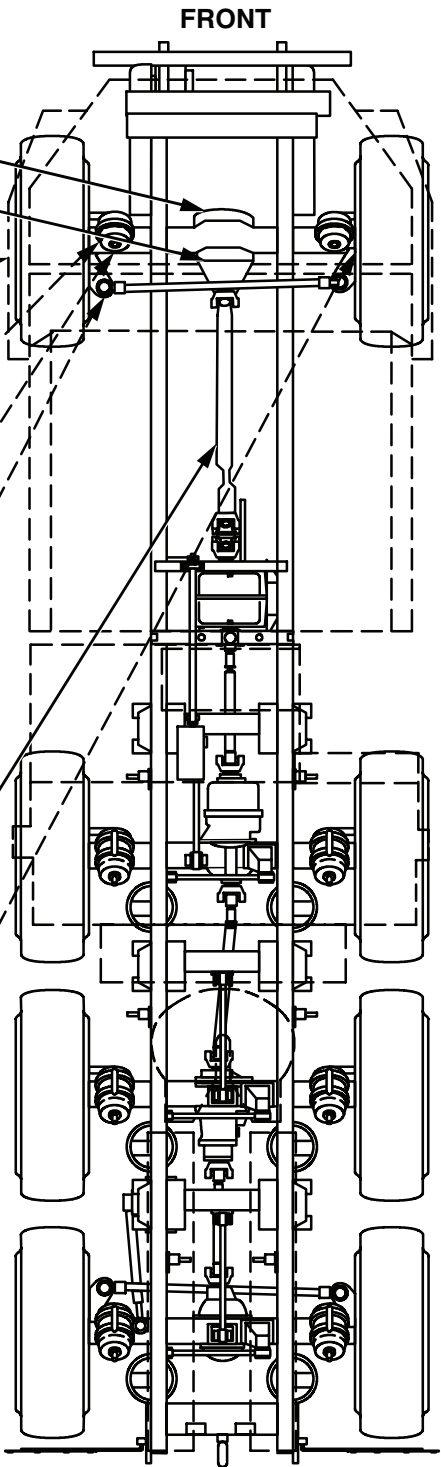
EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						GO-85/140												
					GO-80/90													
			GO-75															
<p>LUBRICANT: LUBRICATING OIL, GEAR, MULTIPURPOSE (MIL-L-2105)</p>																		

LO 9-2320-360-12

CHART G. STEERING REDUCTION GEARBOX

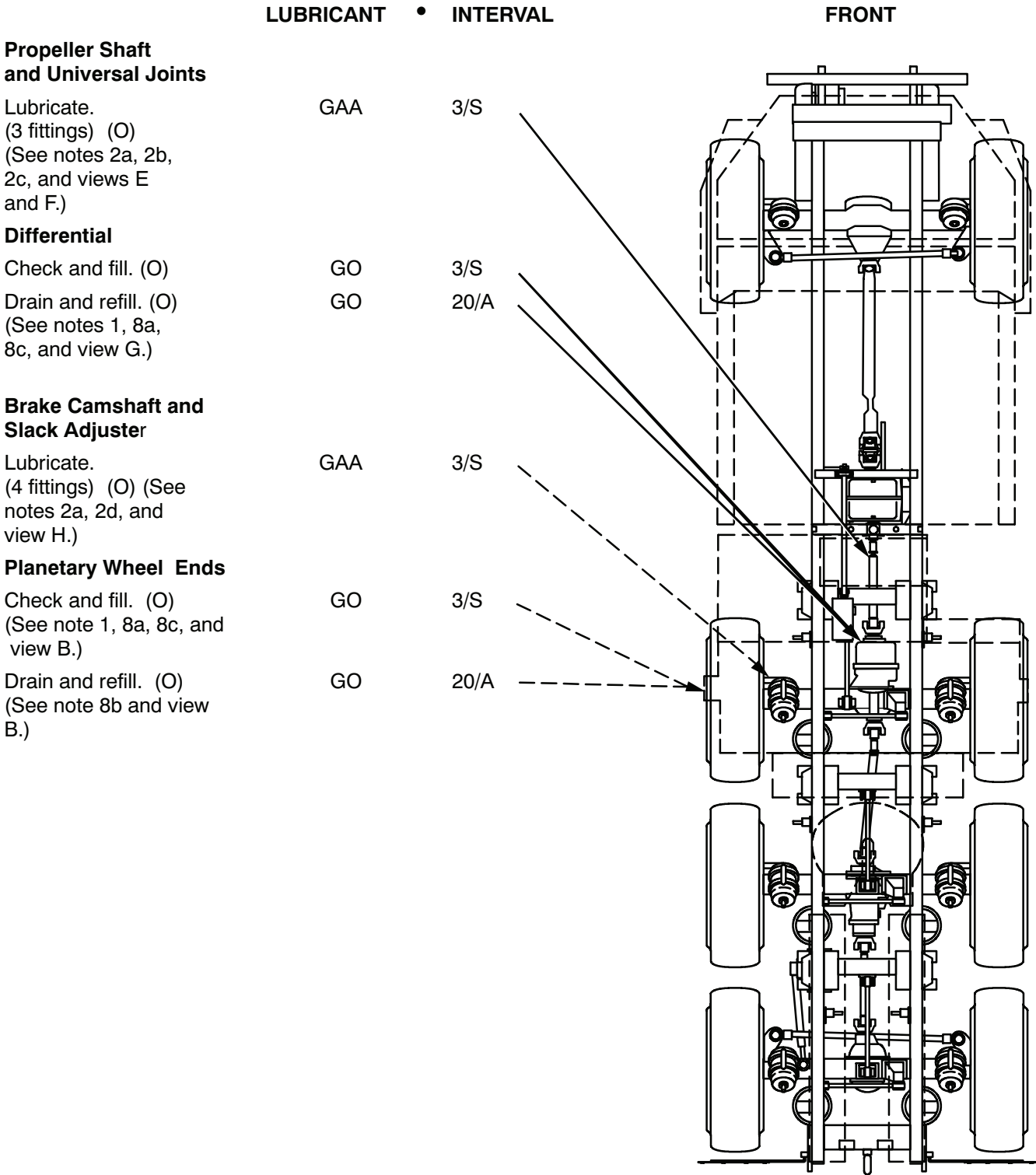
EXPECTED TEMPERATURE																		
°F	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
	GO-75																	
LUBRICANTS: LUBRICATING OIL, GEAR, MULTIPURPOSE (MIL-L-2105)																		

LO 9-2320-360-12

	LUBRICANT	• INTERVAL	
Differential			
Check and fill. (O)	GO	3/S	
Drain and refill. (O) (See notes 1, 8a, and 8b and view A.)	GO	20/A	
Planetary Wheel Ends			
Check and fill. (O)	GO	3/S	
Drain and refill. (See note 1, 8a, 8b, and view B.)	GO	20/A	
Brake Camshaft and Slack Adjuster			
Lubricate. (7 fittings) (O) (See notes 2a and 2d and view C.)	GAA	3/S	
Link Kit (King Pin)			
Lubricate. (1 fitting per kit) (O) (See note 2i and view C.)	GAA	3/S	
Tie Rod Ends			
Lubricate. (1 fitting per tie rod end) (O) (See note 2h and view D.)	GAA	3/S	
Propeller Shaft and Universal Joints			
Lubricate. (3 fittings) (O) (See notes 2a, 2b, and 2c and views E and F.)	GAA	3/S	
Constant Velocity Joints			
Lubricate. (1 fitting per joint) (O) (See notes 2a and 2b and view C.)	GAA	3/S	

NO. 1 AXLE

LO 9-2320-360-12



NO. 2 AXLE

LO 9-2320-360-12

LUBRICANT • INTERVAL

Propeller Shaft and Universal Joints

Lubricate.
(3 fittings) (O)
(See notes 2a, 2b,
2c, and views E and F.)

GAA 3/S

Differential

Check and fill. (O)
Drain and refill. (O)
(See notes 1, 8a, 8c,
and view I.)

GO 3/S

GO 20/A

Brake Camshaft and Slack Adjuster

Lubricate.
(4 fittings) (O) (See
notes 2a, 2d, and
view H.)

GAA 3/S

Planetary Wheel Ends

Check and fill. (O)
Drain and refill. (O)
(See note 1, 8a, 8c, and
view B.)

GO 3/S

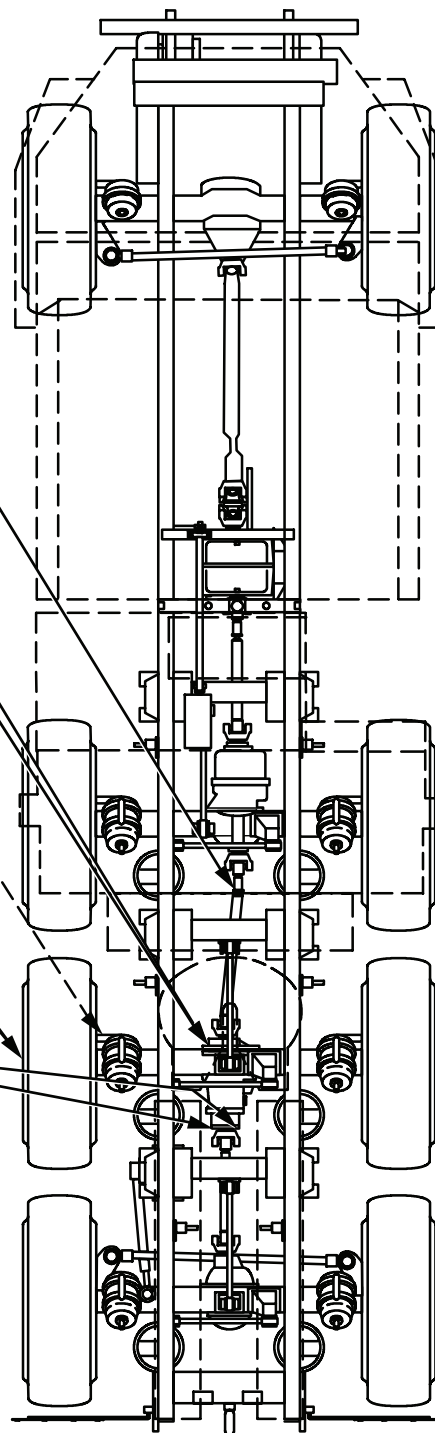
GO 20/A

Output Shaft Bearings

Lubricate.
(2 fittings) (O) (See
view I.)

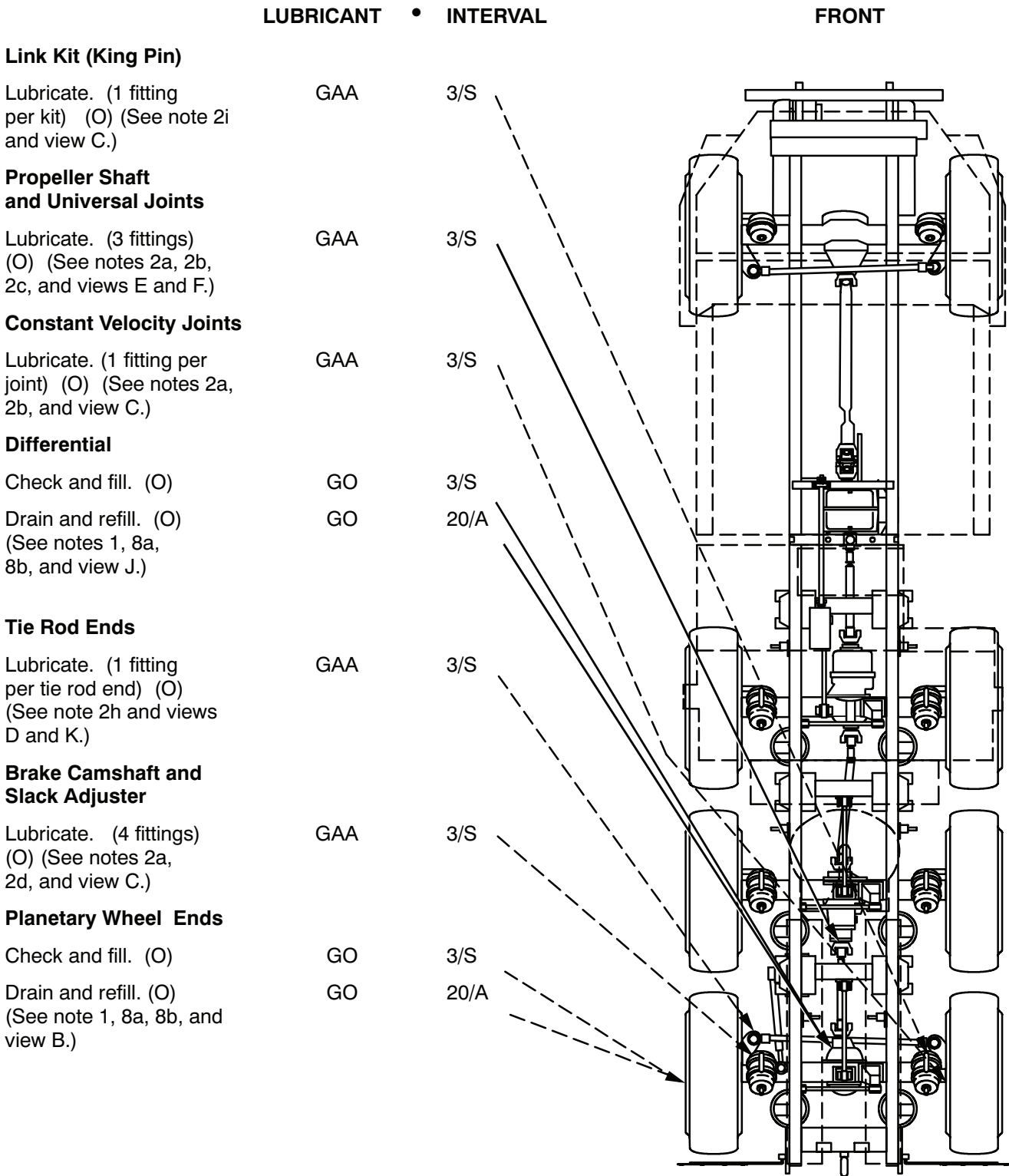
GAA 3/S

FRONT



NO. 3 AXLE

LO 9-2320-360-12



NO. 4 AXLE

LO 9-2320-360-12

LUBRICANT • INTERVAL

Engine Oil Sampling Valve

Take AOAP sample. (O) (See note 5 and view L.)

Engine Oil Filter

Replace. (O) (See note 3d and view O.)

Engine Crankcase

Fill at filler cap. (C) (See note 3c4.)

Drain and refill. (O) (See notes 1, 3c2, 3c3, 5, and view N.)

Check oil level at dipstick. (C) (See note 3c1, 11, views BB and M.)

Transmission

Check oil level at dipstick. (C) (See note 3b1, 11, views BB and M.)

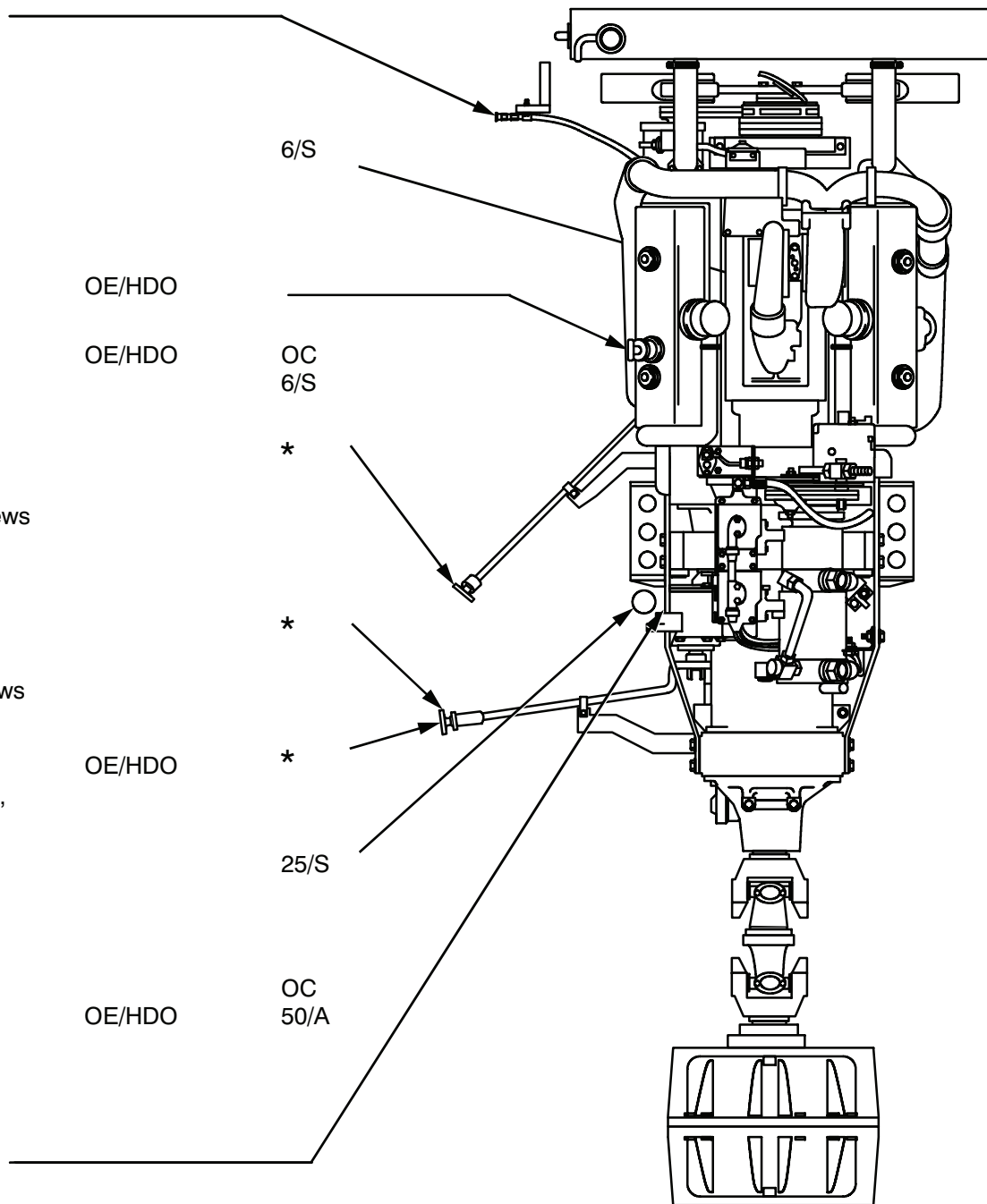
Fill at dipstick tube. (C) (See notes 1, 3b2, and view M.)

Replace external filter. (O) (See note 3b3 and view M.)

Drain and refill. (O) (See notes 1, 5, and views M and P.)

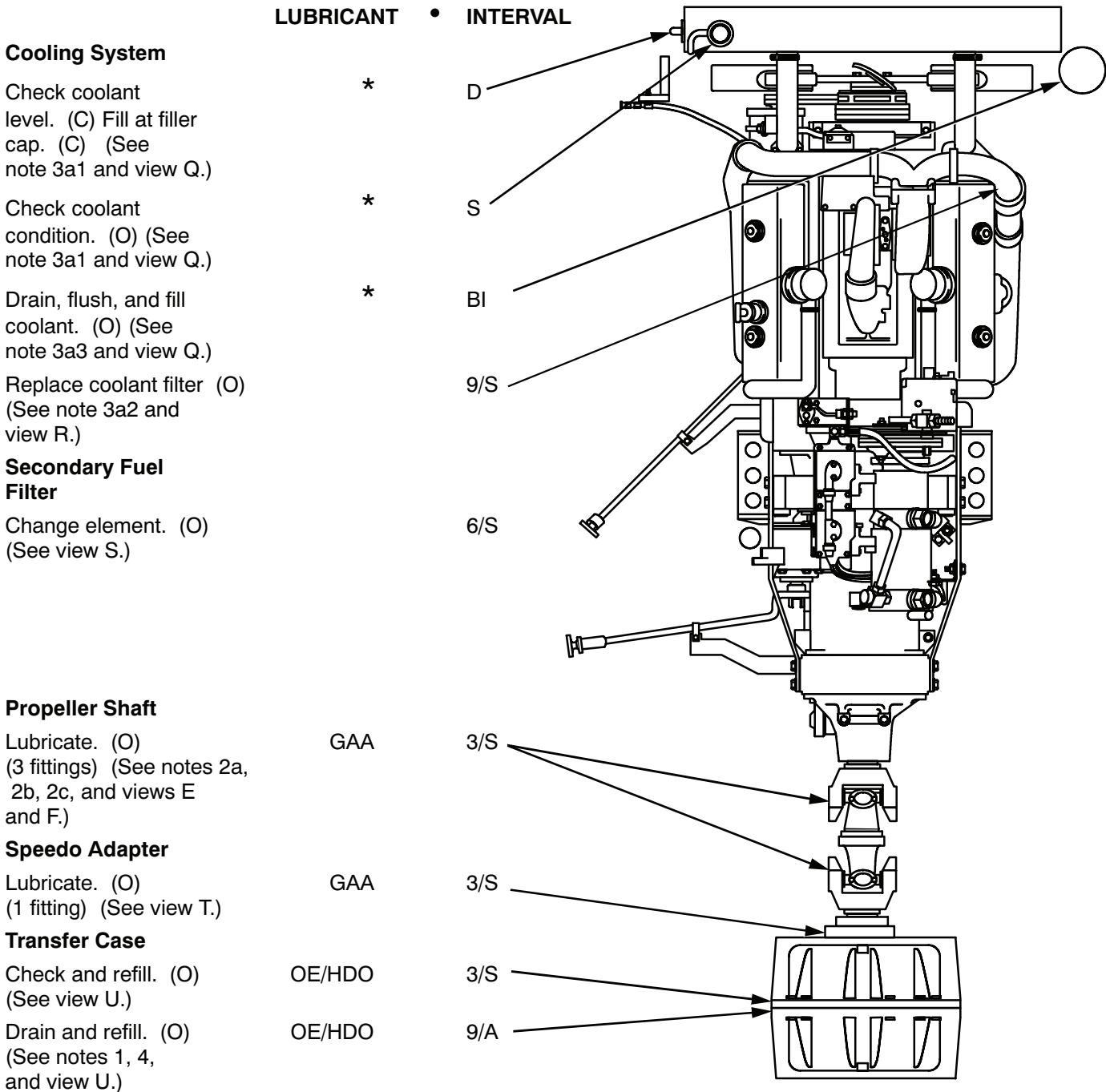
Transmission Oil Sampling Valve

Take AOAP sample. (O) (See note 5 and view M.)



*After operation.

ENGINE, TRANSMISSION, TRANSFER CASE, AND COOLING SYSTEM



* See table 2 for recommended temperature ranges applicable to MIL-A-46153 and MIL-A-11755.

ENGINE, TRANSMISSION, TRANSFER CASE, AND COOLING SYSTEM (CONT)

LO 9-2320-360-12

LUBRICANT • INTERVAL

No. 1 Axle Drag Link

Lubricate. (2 fittings) (O)
(See note 2a and view V.)

GAA 3/S

Front Steering Shaft

Lubricate. (3 fittings) (O)
(See note 2a and view W.)

GAA 3/S

Top Steering Shaft No. 1

Lubricate. (3 fittings) (O)
(See note 2a and view X.)

GAA 3/S

Steering Column Linkage

Lubricate. (1 fitting) (O)
(See note 2a and view Y.)

GAA 3/S

Rear Steering Shaft No. 1

Lubricate. (3 fittings) (O).
(See note 2a and view Z.)

GAA 3/S

Rear Steering Shaft No. 3

Lubricate. (2 fittings) (O)
(See note 2a and view AA.)

GAA 3/S

Rear Steering Shaft No. 4

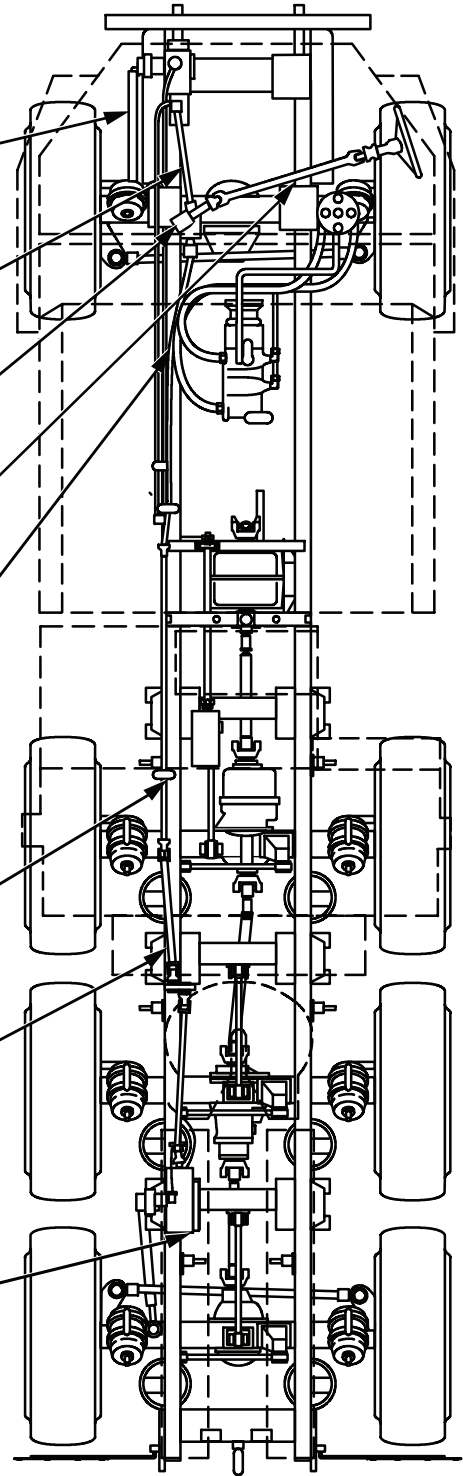
Lubricate. (3 fittings) (O)
(See note 2a and views AB and AX.)

GAA 3/S

Steering Oil Sampling Valve

Take AOAP sample. (O)
(See note 5 and view AD.)

GAA 3/S



STEERING SYSTEM

LUBRICANT • INTERVAL

Front Steering Gear

Lubricate. (O) GAA 3/S
(See note 2a and view AE.)

Steering Reservoir

Check fluid level on dipstick. (C) W
(See note 11, views AF and BB.)
Fill to full level on dipstick. (C) OE/HDO W
Drain reservoir. Replace filter. (O) (See view AG.) OE/HDO A
Refill. (O) (See view AF.) OE/HDO A

Steering Reduction Gearbox

Check and fill. (O) GO 25/S
(See view AZ.)
Drain and refill. (O) GO A
(See view AZ.)

Steering Shaft No. 5

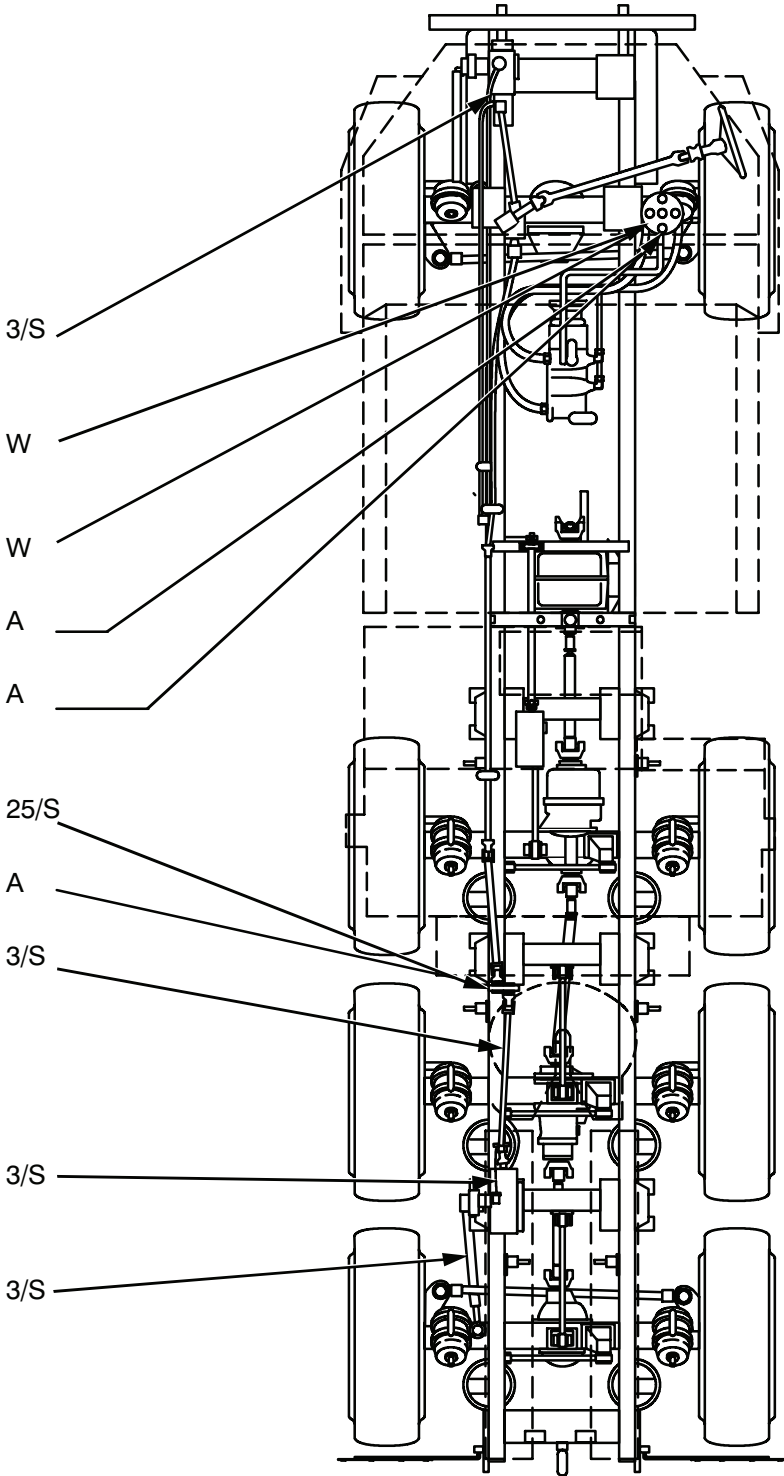
Lubricate. (3 fittings) (O) GAA 3/S
(See note 2a and views AC and AY.)

Rear Steering Gear

Lubricate. (O) GAA 3/S
(See note 2a and view AH.)

No. 4 Axle Drag Link

Lubricate. (2 fittings) (O) GAA 3/S
(See note 2a and view AI.)



STEERING SYSTEM (CONT)

LO 9-2320-360-12

LUBRICANT • INTERVAL

Spring Link

Lubricate. (1 fitting per pivot) (O) (See note 2a and view AJ.)

GAA

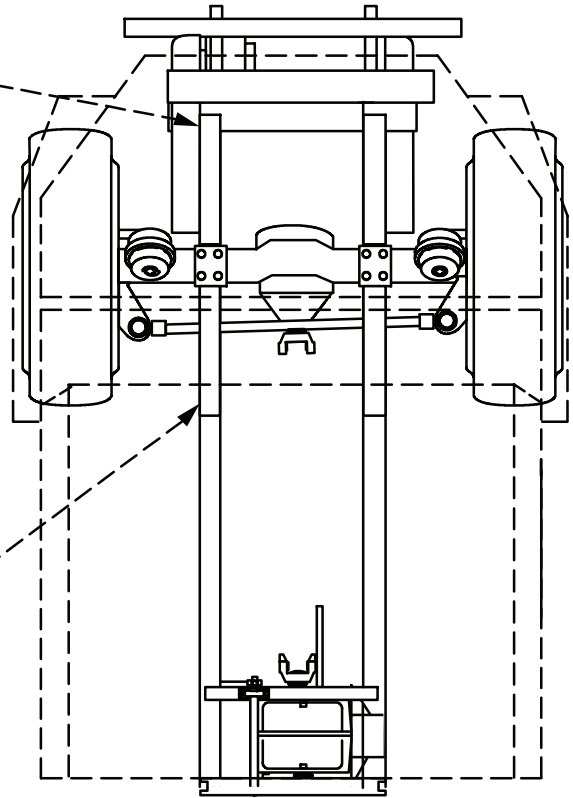
3/S

Spring Hanger

Lubricate. (2 fittings per pivot) (O) (See notes 2a, 2g, and views AK and AL.)

GAA

3/S



FRONT SUSPENSION

LUBRICANT • INTERVAL

Hydraulic Reservoir

Drain and refill. OE/HDO A
Clean reservoir and strainer. (O)
(See notes 1, 9e, and views AN and AO.)

Check fluid level at sight glasses. OE/HDO W (C)
Fill as required to full level on sight glass. (C)
(See and view AM.)

Replace filter. (O) A
(See note 9e and view AM.)

Winch Hydraulic Oil Sampling Valve

Take AOAP sample. (O) (See notes 5, 9a, and view AM.)

Cable Hold Downs

Lubricate. (1 fitting) GAA 3/S (O) (See note 2a and view AP.)

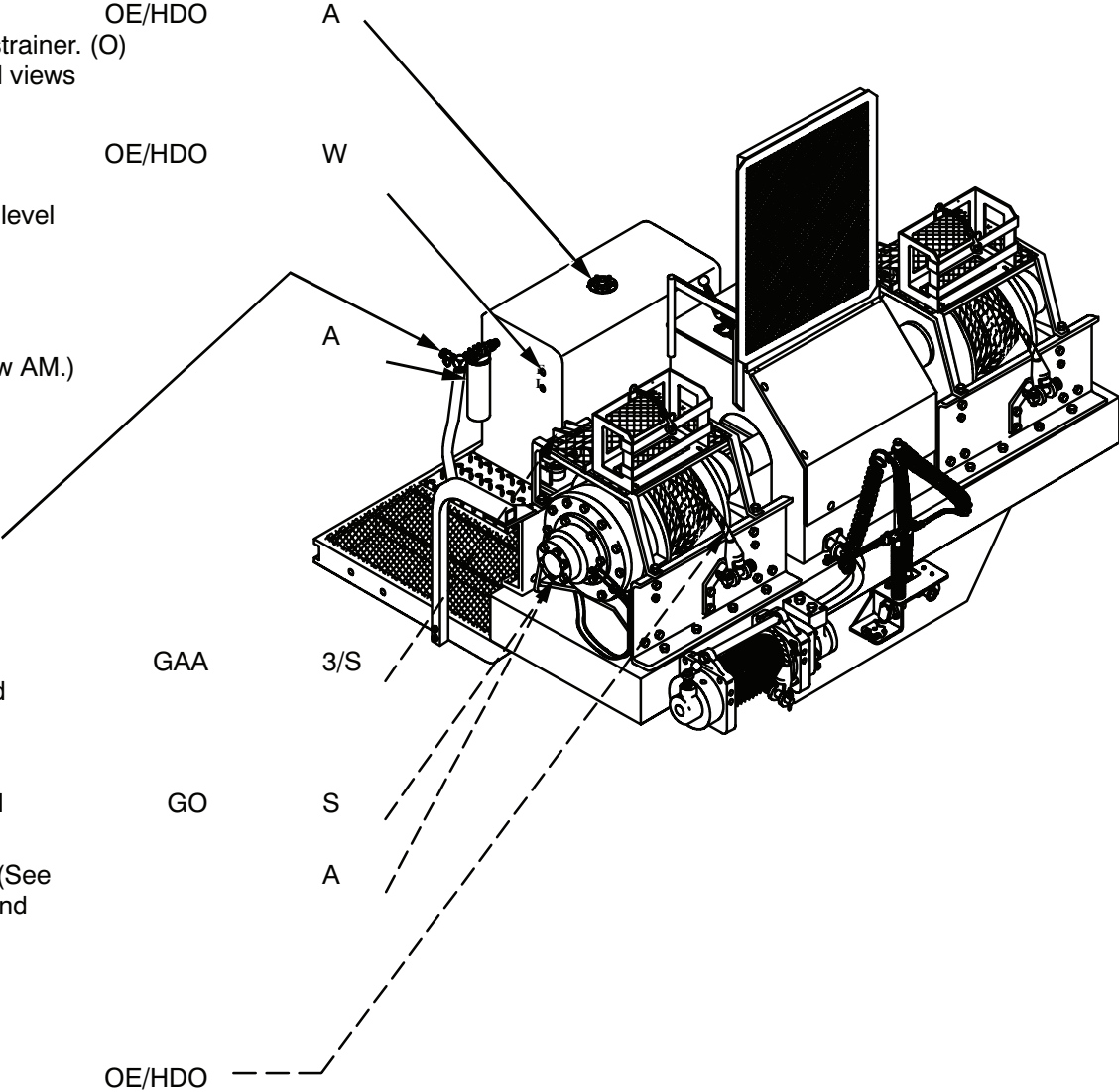
Drum Gearboxes

Check oil level and fill as required. GO S (O)

Drain and refill. (O) (See notes 1, 9b, 9d, 9e, and views AQ and BA.) A

Winch Cables

Clean and oil cables after each use. OE/HDO (C)



WINCH

LO 9-2320-360-12

LUBRICANT • INTERVAL

Manual Kickout Lever

Lubricate pivot point with oil. (C) (See note 7.)

OE/HDO

Auxiliary Winch Cable

Clean and oil cable after each use. (C)

OE/HDO

Auxiliary Winch Drum Gearbox

Check oil level. Fill as required. (O)

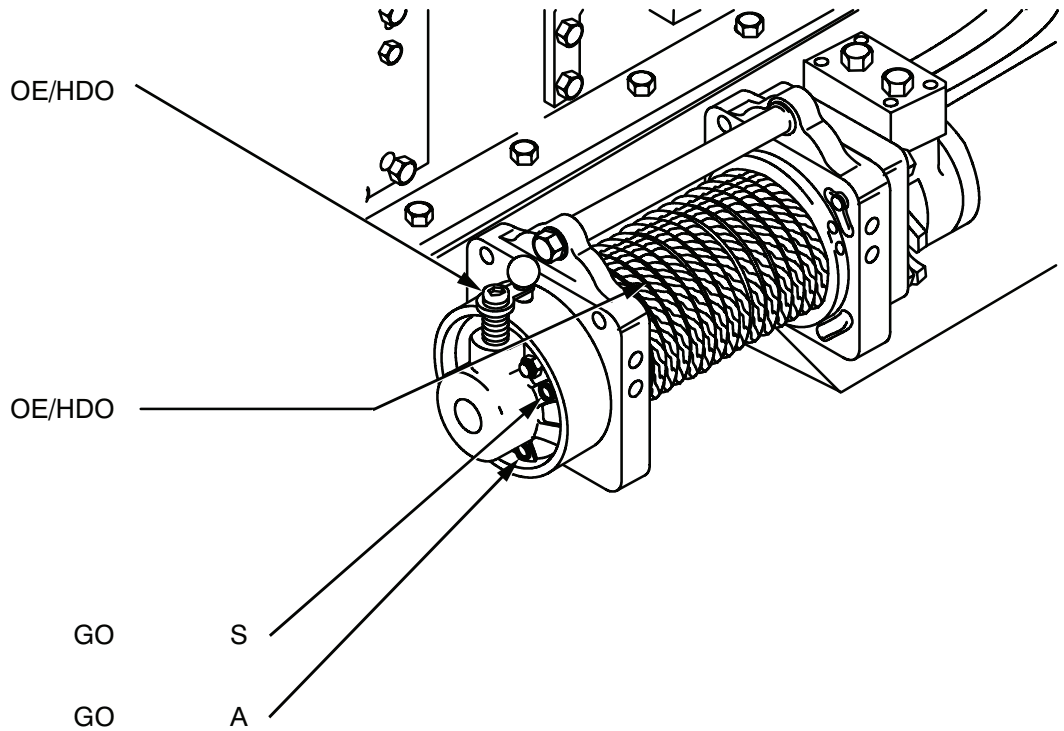
GO

S

Drain and refill at winch fill plug level. (O) (See note 1 and view AR.)

GO

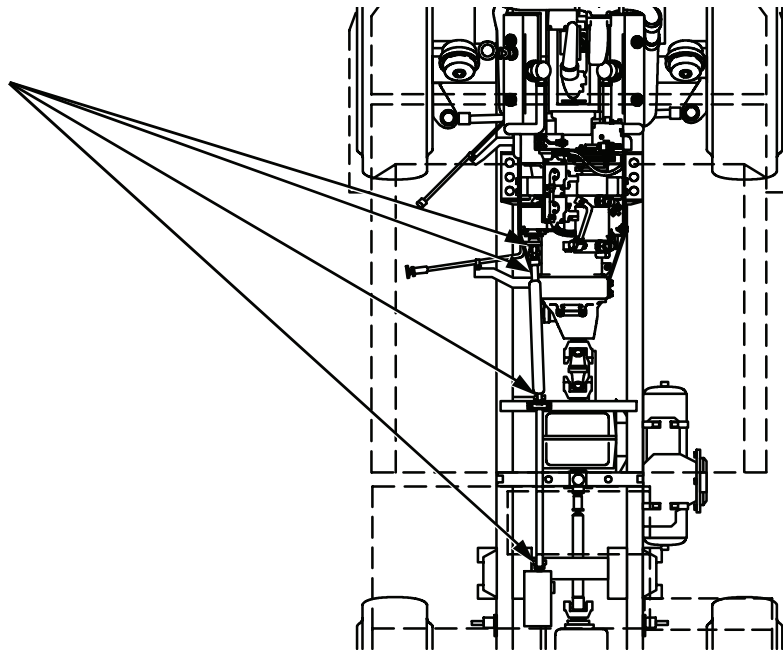
A



AUXILIARY WINCH

PTO Shafts and Universal Joints

(See note 9c.)



WINCH DRIVE

LO 9-2320-360-12

LUBRICANT • INTERVAL

Fifth Wheel Jaws

Clean and coat with grease. (C) (See note 6.)

GAA W

Fifth Wheel Plate

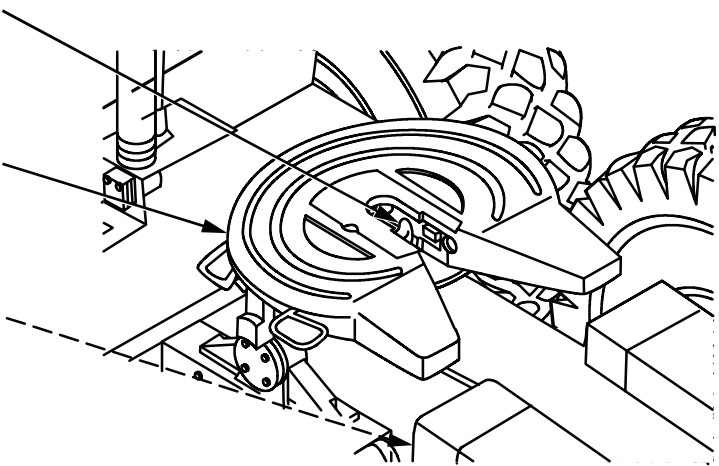
Clean and coat with grease. (C) (See note 6.)

GAA W

Fifth Wheel Ramps

Clean and coat with grease. (C) (See note 6.)

GAA W



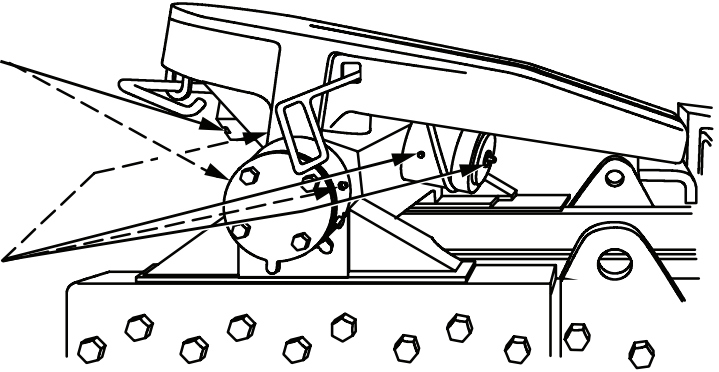
Fifth Wheel Locking Linkage and Lube Fittings

Oil all pivot points, springs, and locking linkage. (C) (See notes 6, 7, and views AS, AT, AU, and AV.)

OE/HDO W

Lubricate. (9 fittings) (C) (See note 6 and views AS, AT, AU, and AV.)

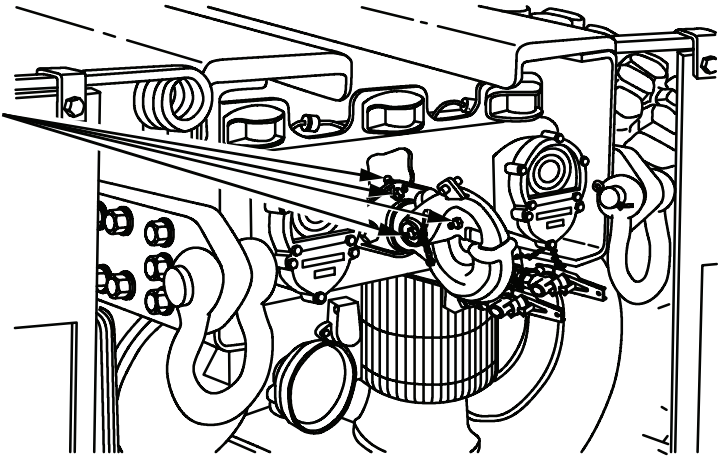
GAA W



Pintle Hook

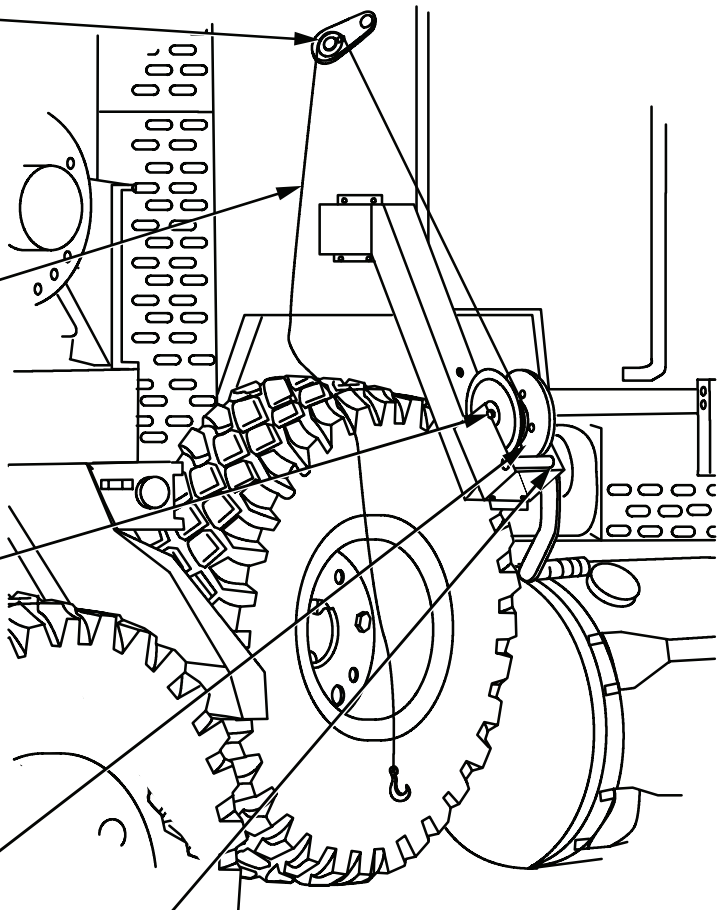
Lubricate. (4 fittings) (O) (See note 2f.)

GAA 3/S

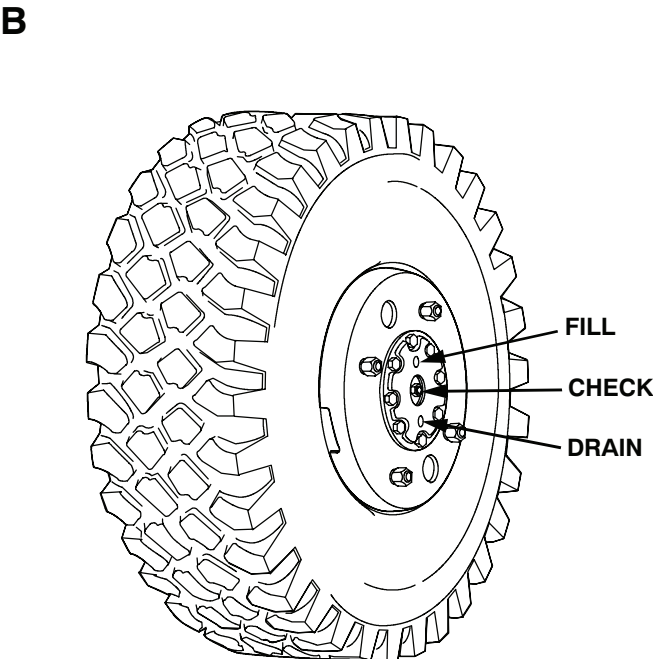
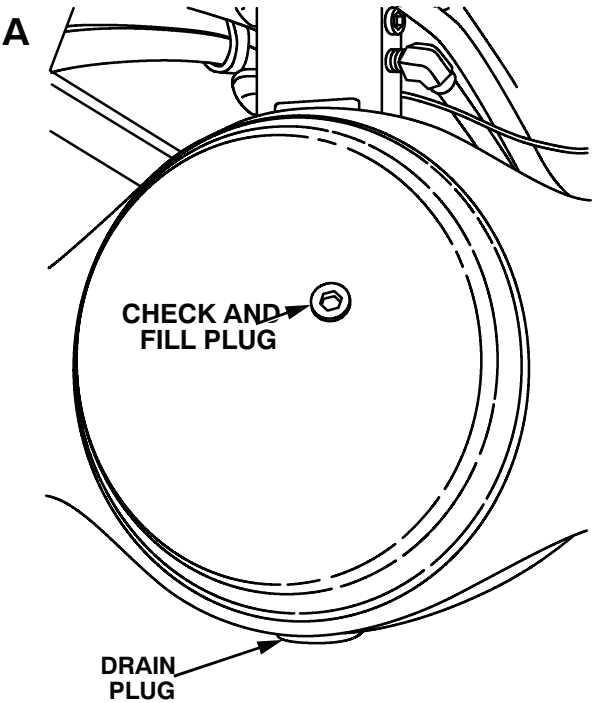


FIFTH WHEEL AND PINTLE

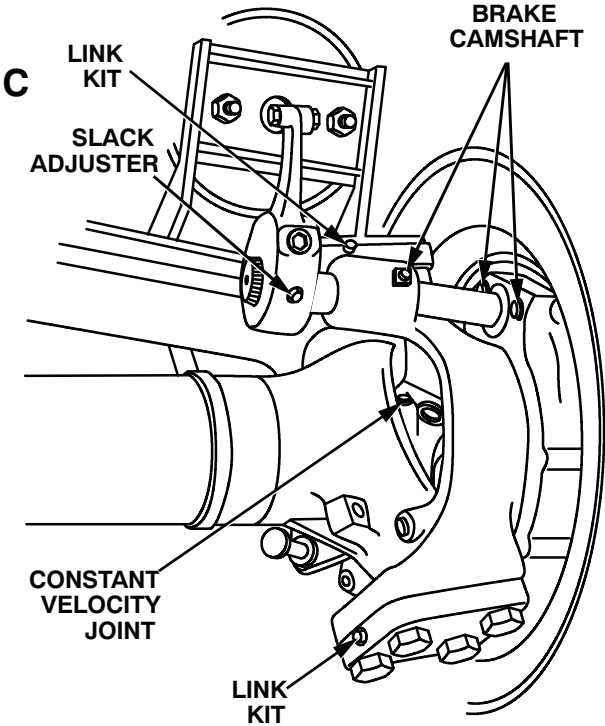
LO 9-2320-360-12

	LUBRICANT	•	INTERVAL	
Pulley Lubricate with oil. (O) (See note 7.)	OE/HDO		S	
Cable Unreel, clean, and apply light coat of oil (O). (See note 10.)	OE/HDO		S	
Reel and Reel Shaft Lubricate with oil. (O) (See notes 7, 10, and view AW.)	OE/HDO		S	
Gears of Reel and Ratchet Apply light coat of grease. (O) (See note 10 and view AW.)	GAA		S	
Bushings of Crank and Ratchet Shaft Lubricate with oil. (O) (See notes 7, 10, and view AW.)	OE/HDO		S	

SPARE TIRE DAVIT

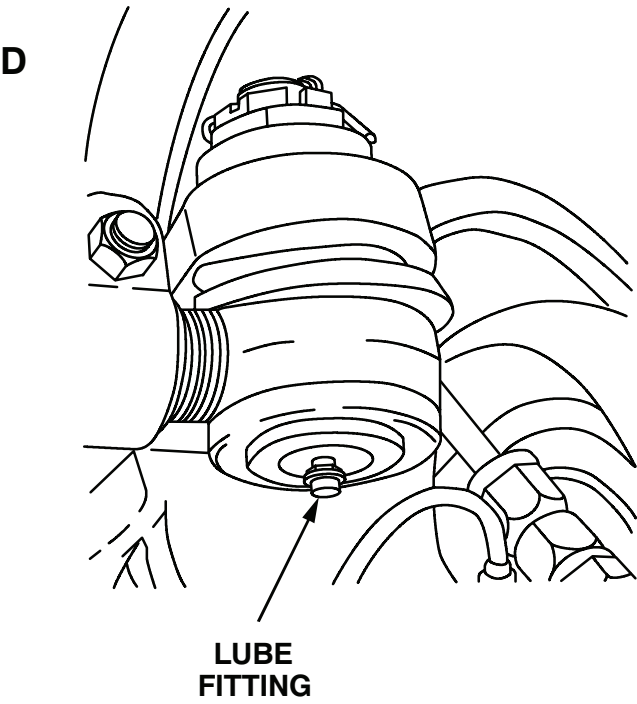


NO. 1 AXLE DIFFERENTIAL



CV JOINT, LINK KIT, BRAKE CAMSHAFT, AND TYPICAL SLACK ADJUSTER

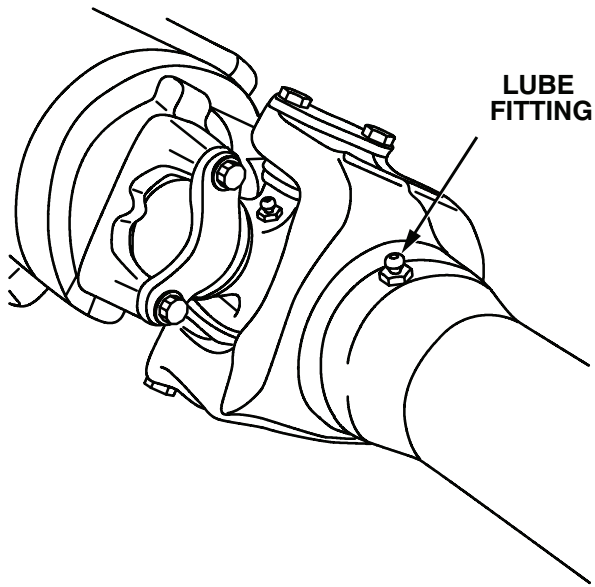
PLANETARY WHEEL END



TYPICAL TIE ROD END

LO 9-2320-360-12

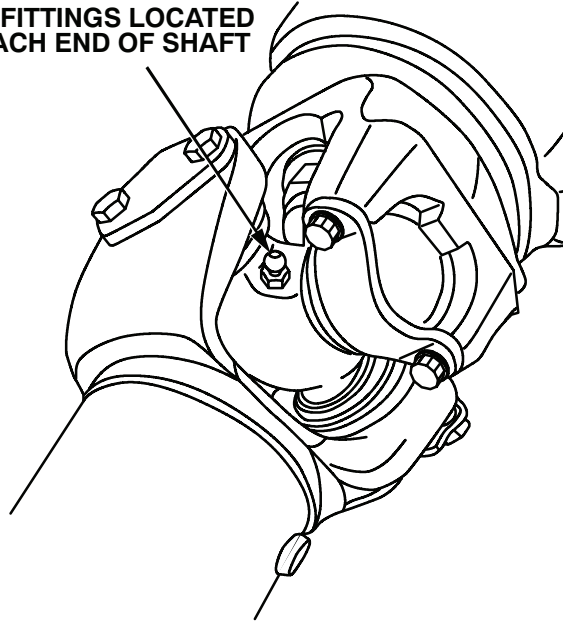
E



TYPICAL PROPELLER SHAFT

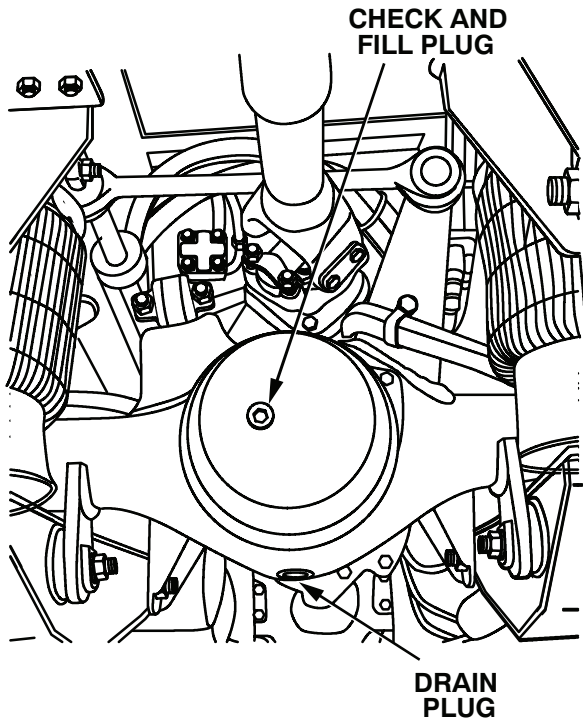
F

LUBE FITTINGS LOCATED ON EACH END OF SHAFT



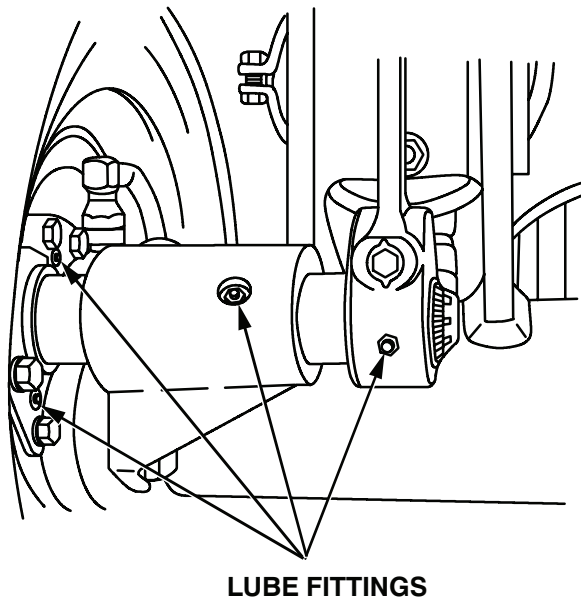
TYPICAL UNIVERSAL JOINT

G



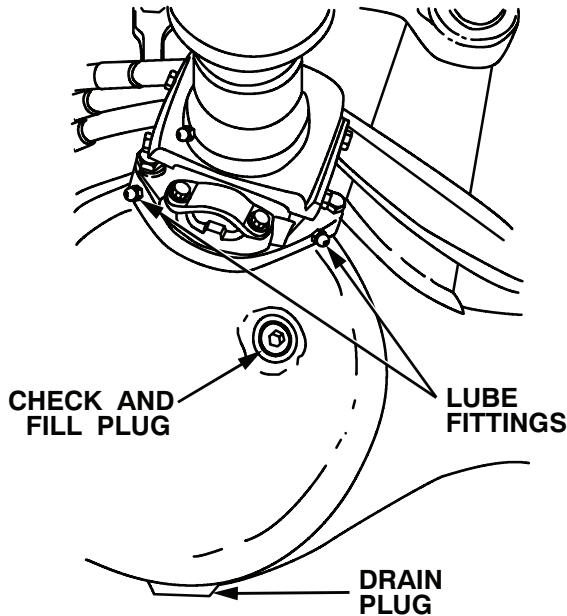
NO. 2 AXLE DIFFERENTIAL

H



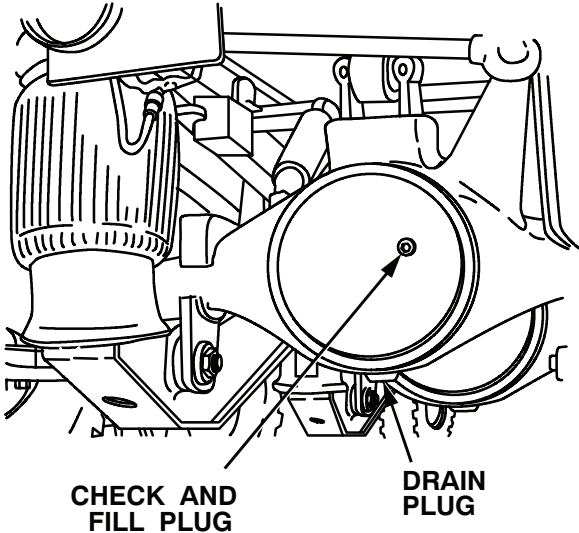
TYPICAL NO. 2 AXLE AND NO. 3 AXLE SLACK ADJUSTER AND BRAKE CAMSHAFT

I



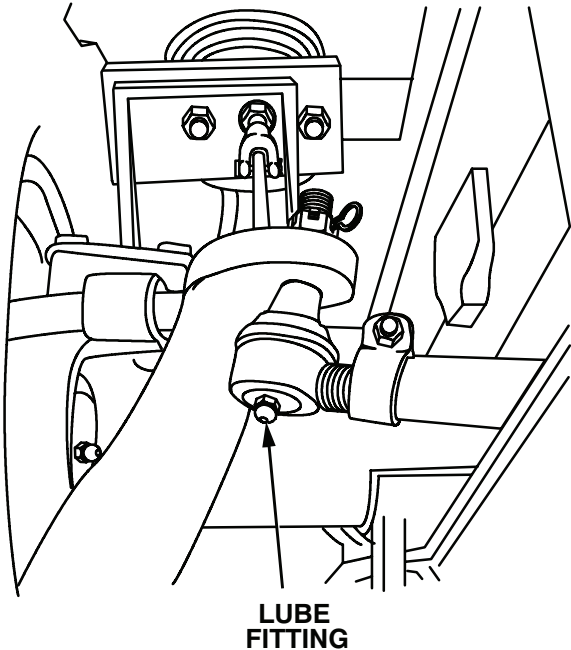
NO. 3 AXLE DIFFERENTIAL

J



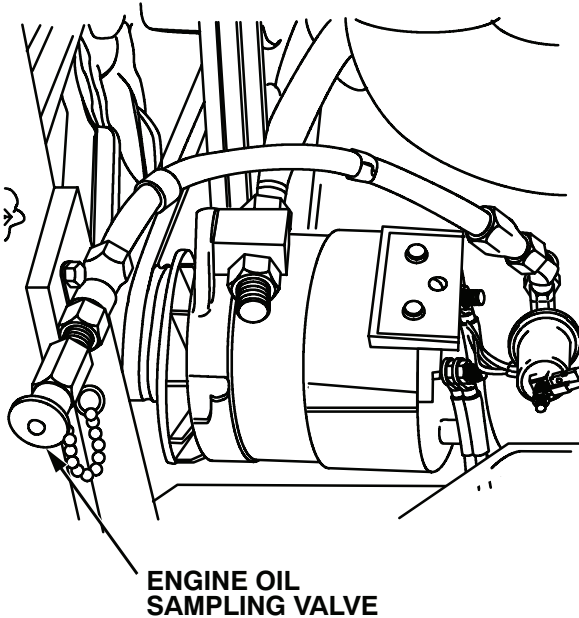
NO. 4 AXLE DIFFERENTIAL

K



NO. 4 AXLE STEERING ARM AND TIE ROD END

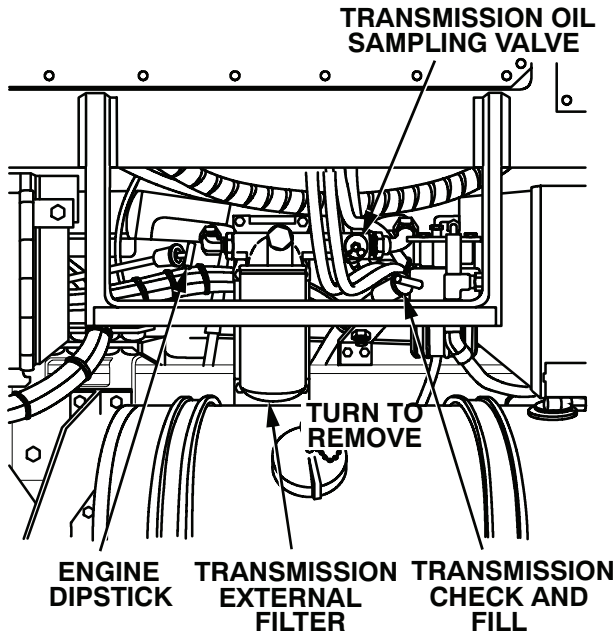
L



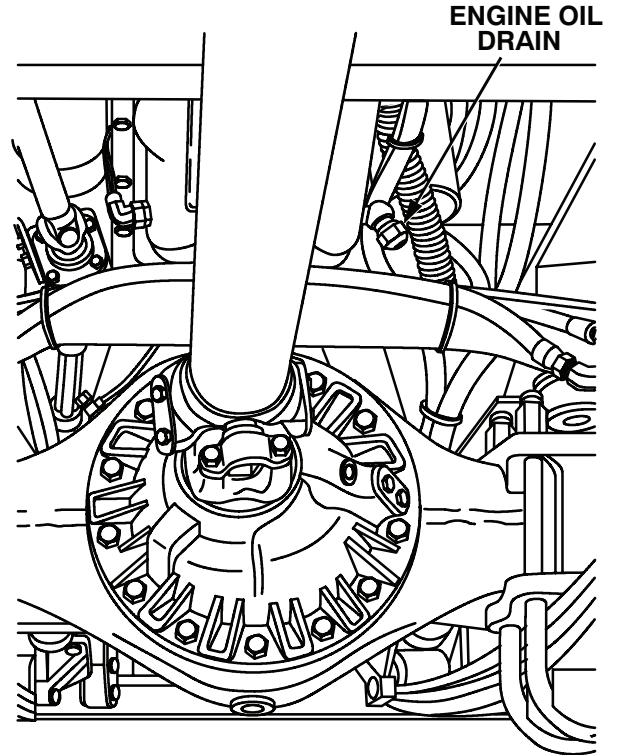
ENGINE OIL SAMPLING VALVE

LO 9-2320-360-12

M



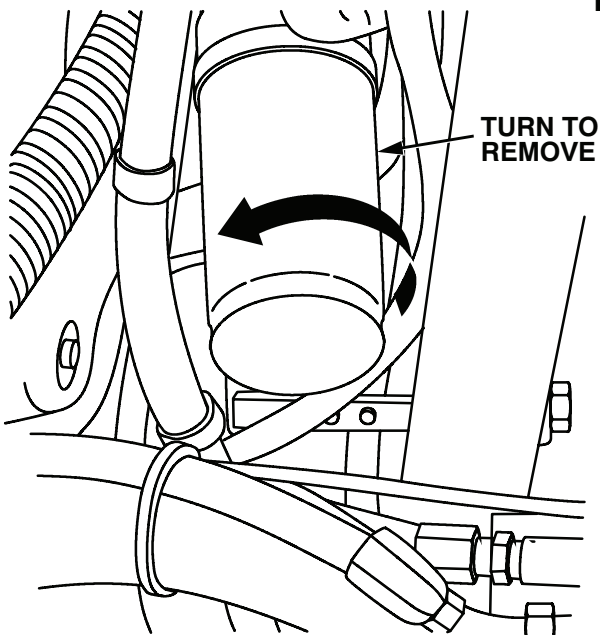
N



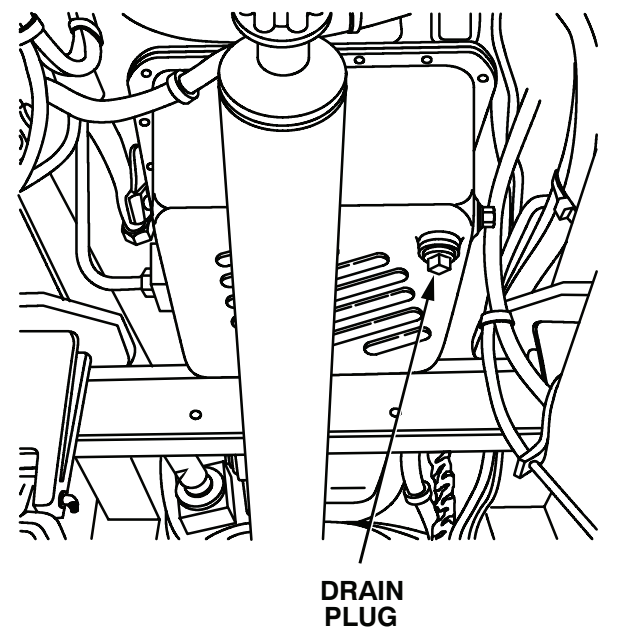
ENGINE DIPSTICK, TRANSMISSION OIL

ENGINE CRANKCASE DRAIN PAN

O

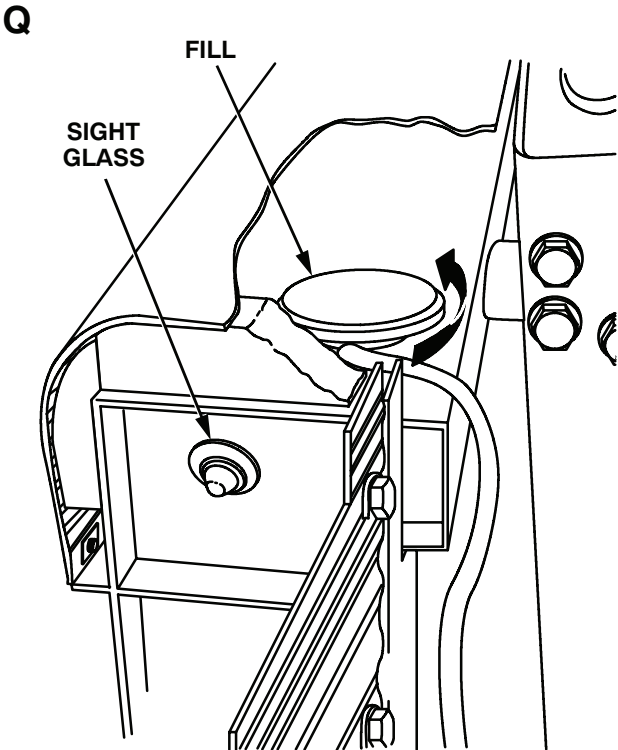


P

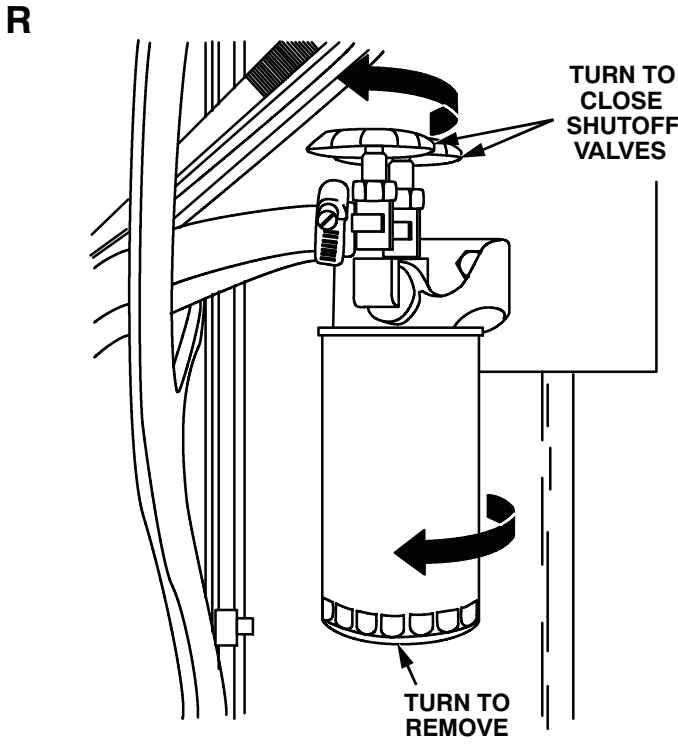


ENGINE OIL FILTER

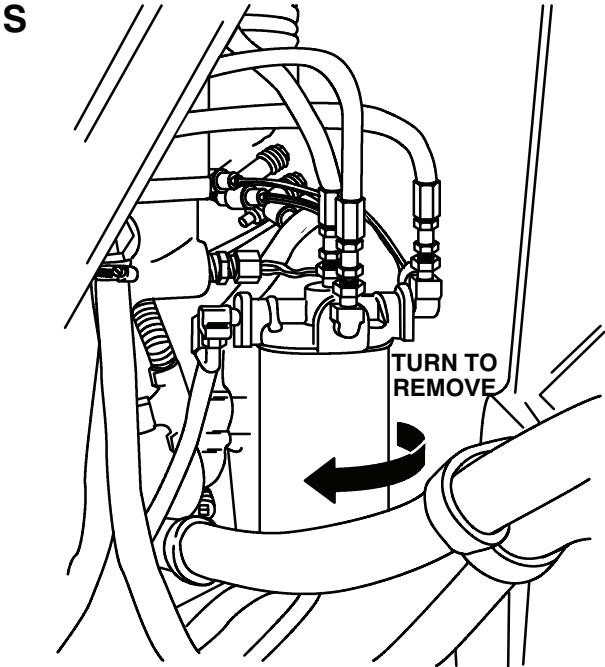
TRANSMISSION DRAIN PLUG



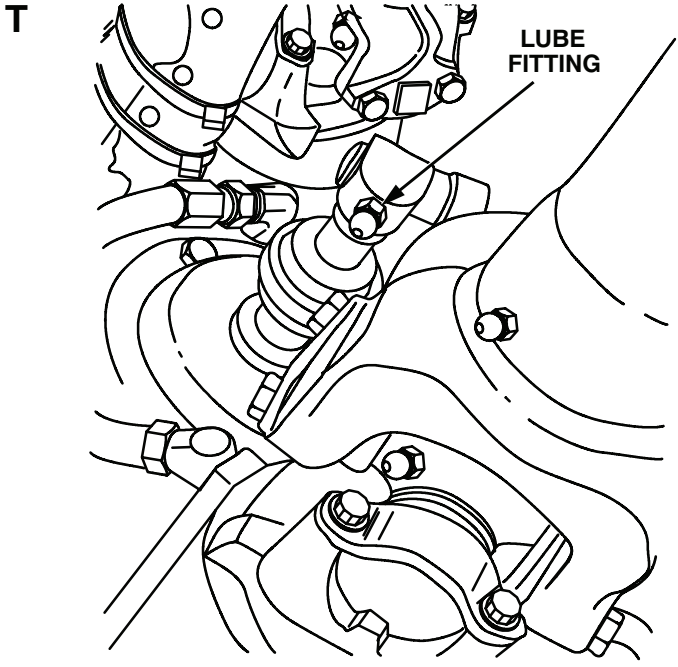
RADIATOR FILLER CAP



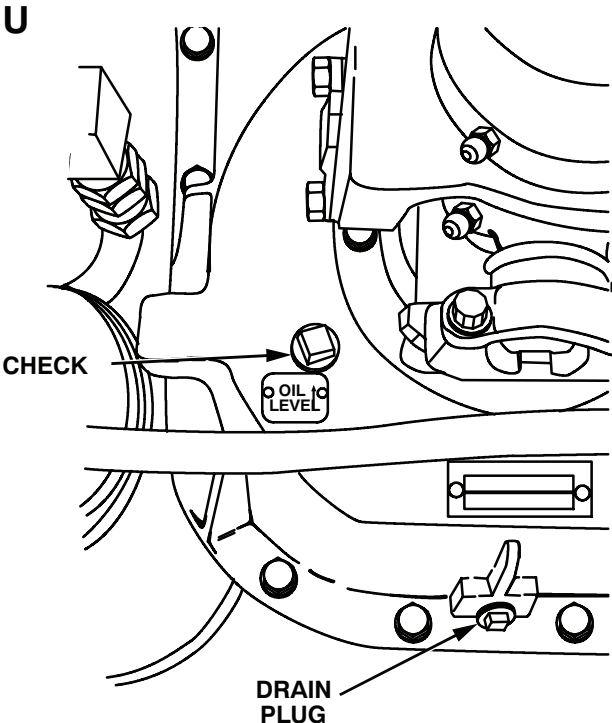
COOLING SYSTEM FILTER



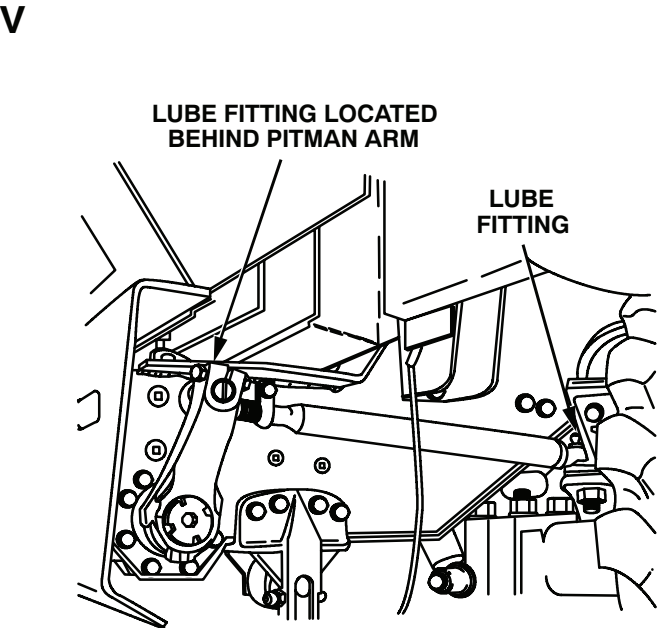
SECONDARY FUEL FILTER



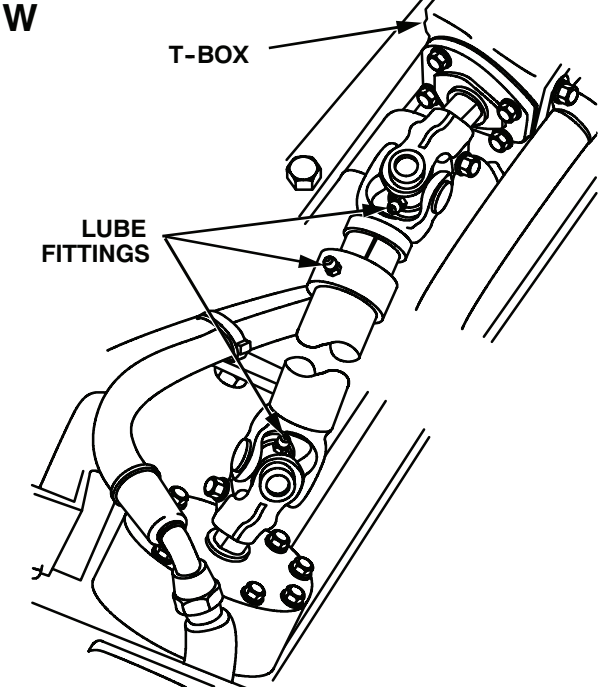
SPEEDO ADAPTER



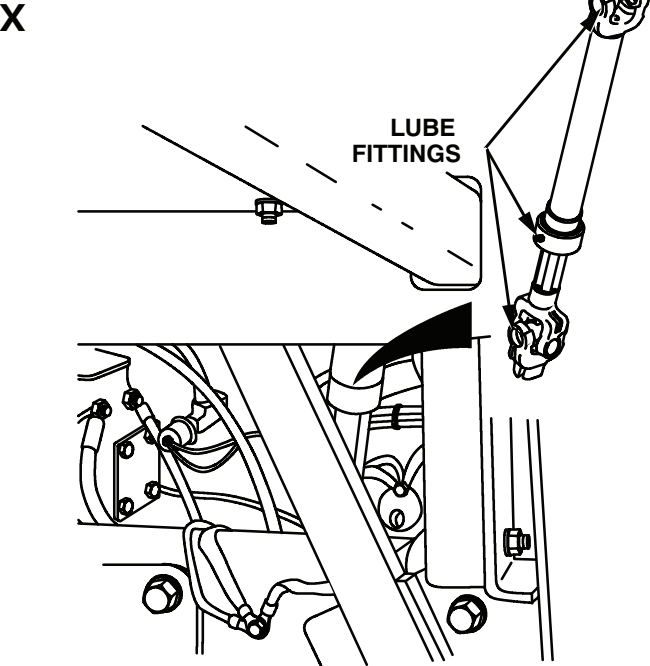
TRANSFER CASE



NO. 1 AXLE DRAG LINK



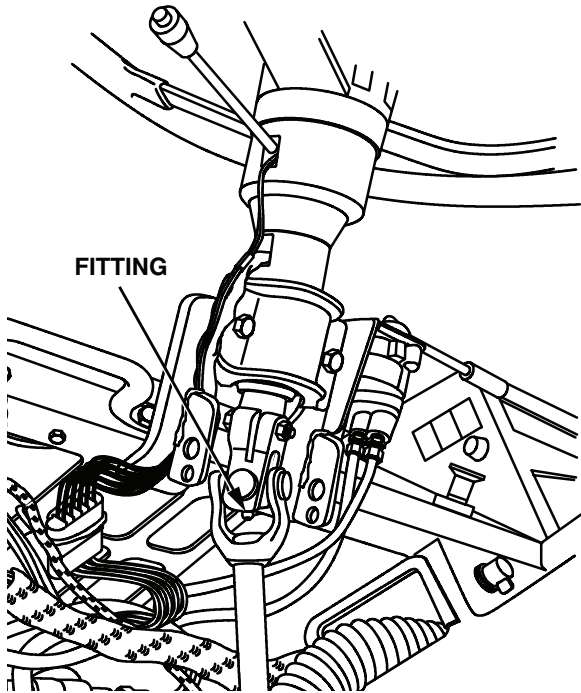
FRONT STEERING SHAFT



TOP STEERING SHAFT NO. 1

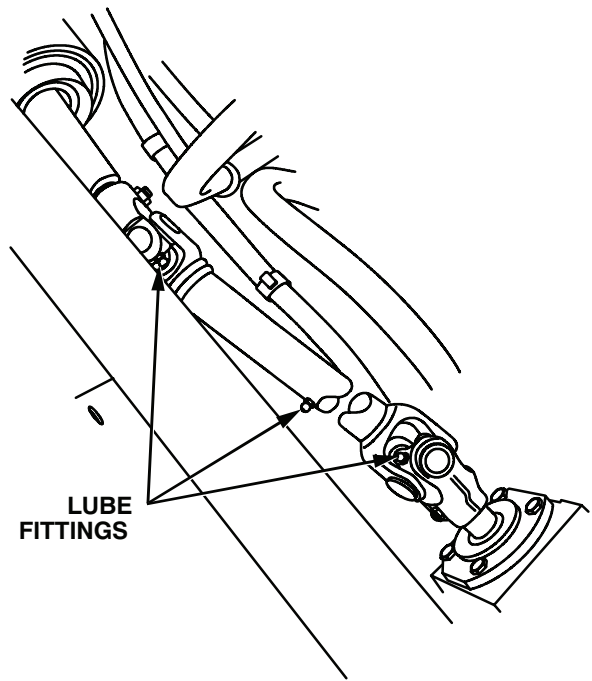
LO 9-2320-360-12

Y



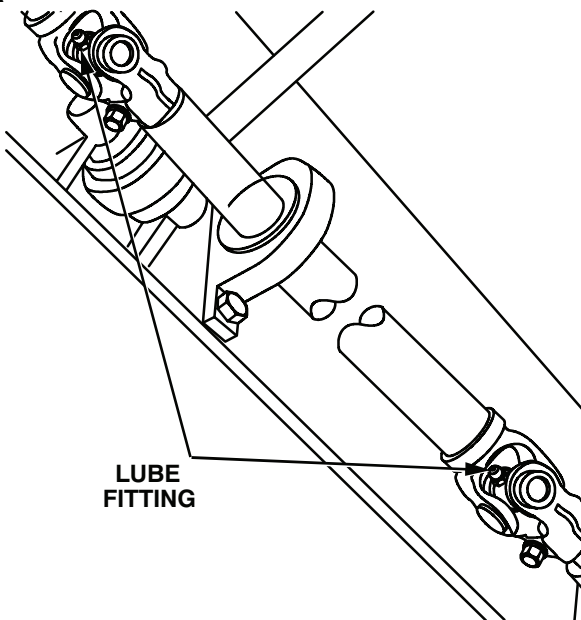
STEERING COLUMN

Z



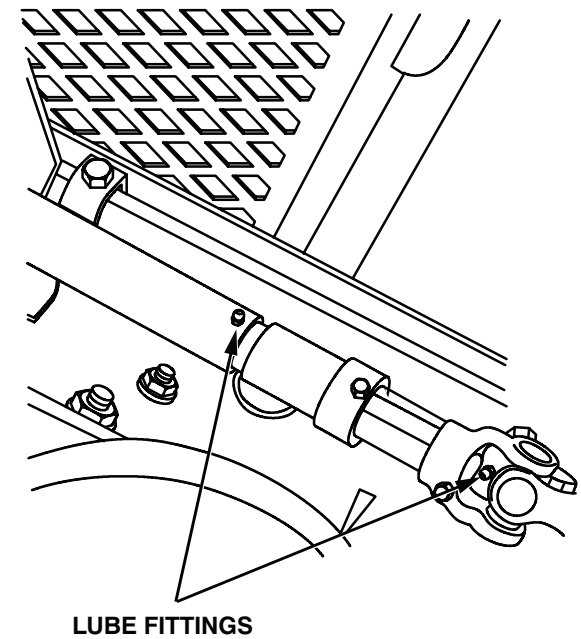
REAR STEERING SHAFT NO. 1

AA



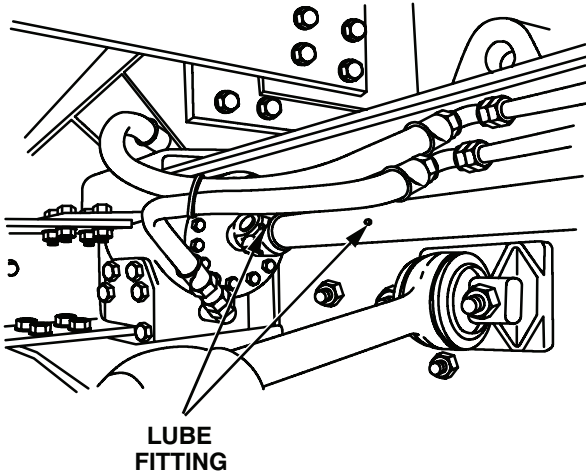
REAR STEERING SHAFT NO. 3

AB



REAR STEERING SHAFT NO. 4

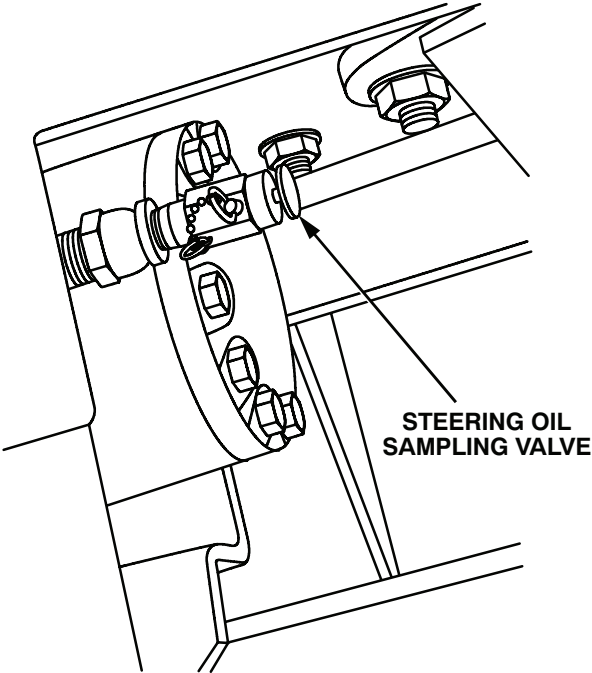
AC



LUBE FITTING

REAR STEERING SHAFT NO. 5

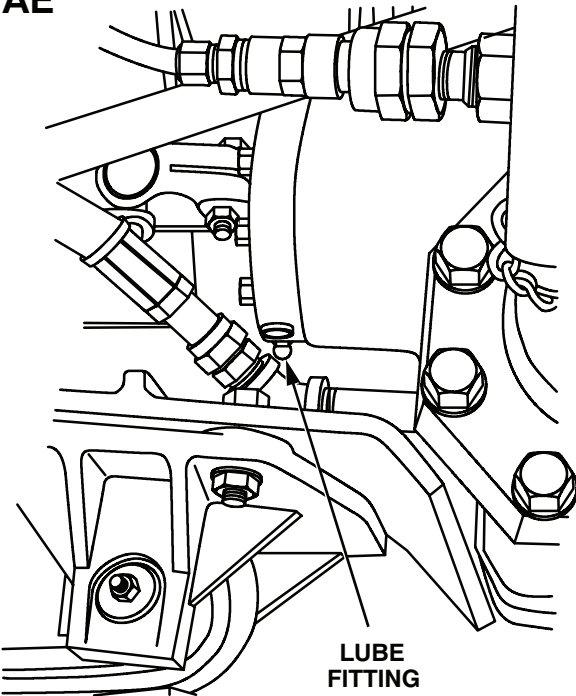
AD



STEERING OIL SAMPLING VALVE

STEERING OIL SAMPLING VALVE

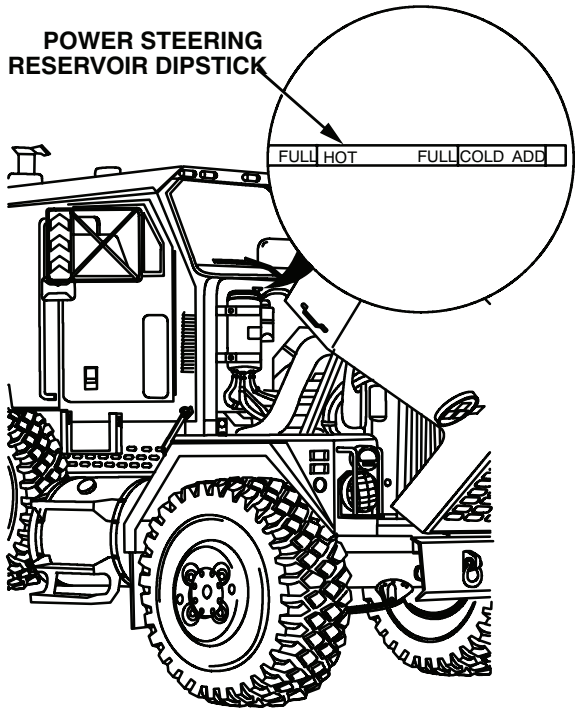
AE



LUBE FITTING

FRONT STEERING GEAR

AF



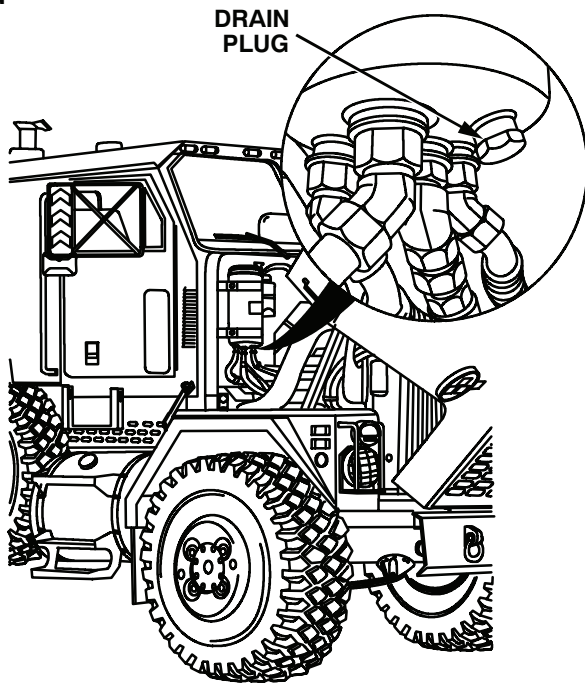
POWER STEERING RESERVOIR DIPSTICK

FULL HOT FULL COLD ADD

STEERING RESERVOIR

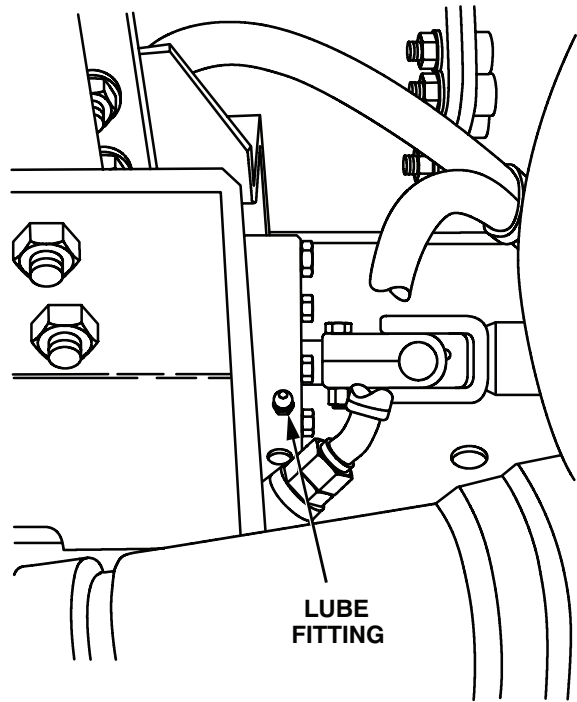
LO 9-2320-360-12

AG



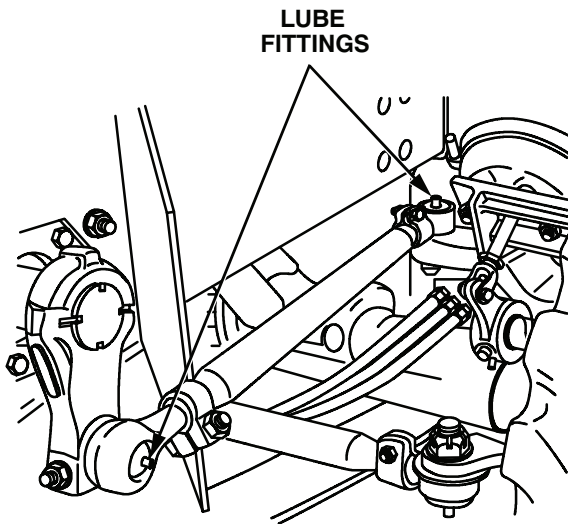
STEERING RESERVOIR

AH



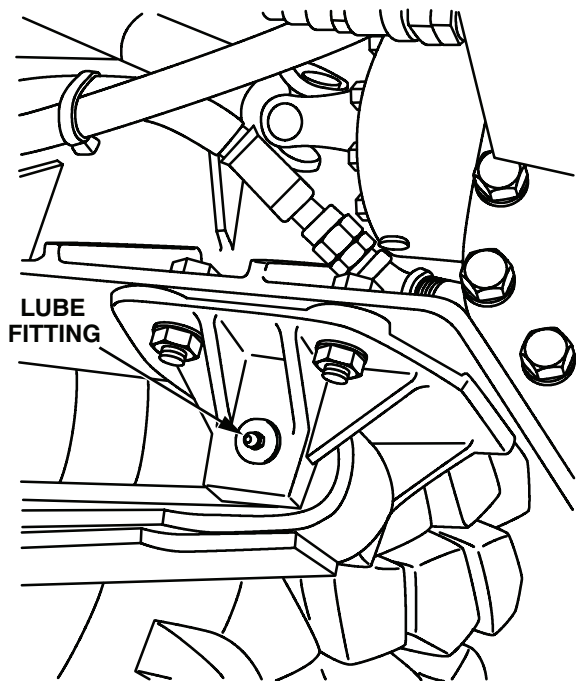
REAR STEERING GEAR

AI



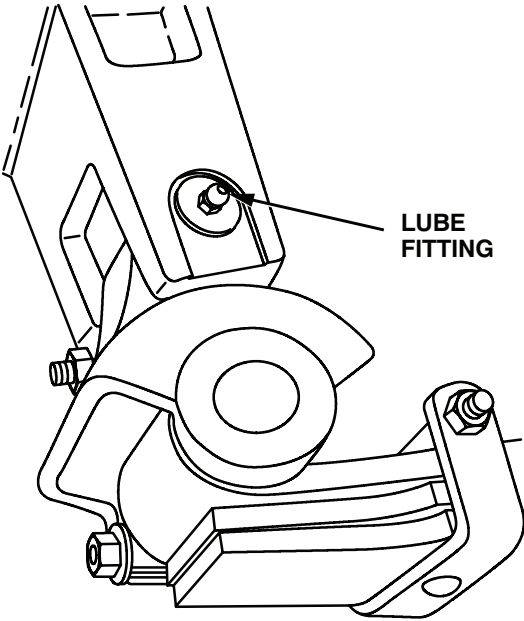
NO. 4 AXLE DRAG LINK

AJ



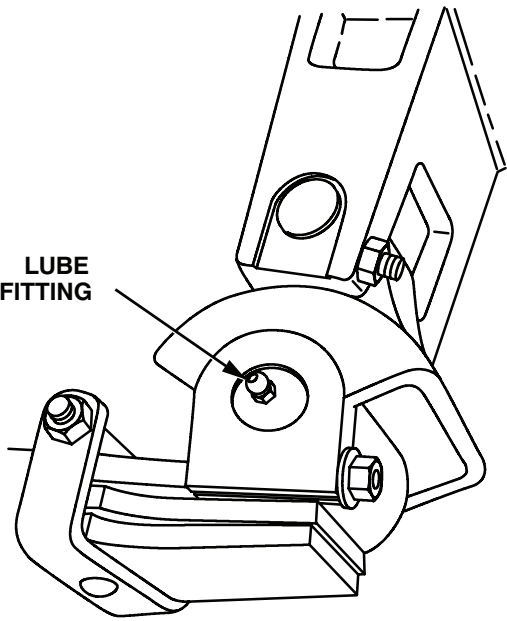
SPRING LINK

AK



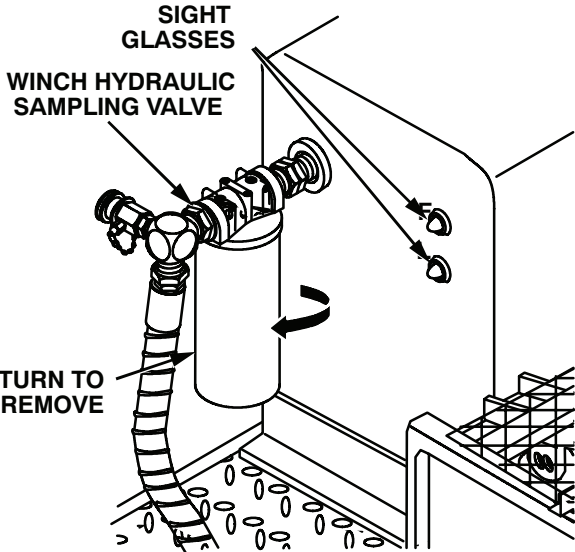
SPRING HANGER

AL



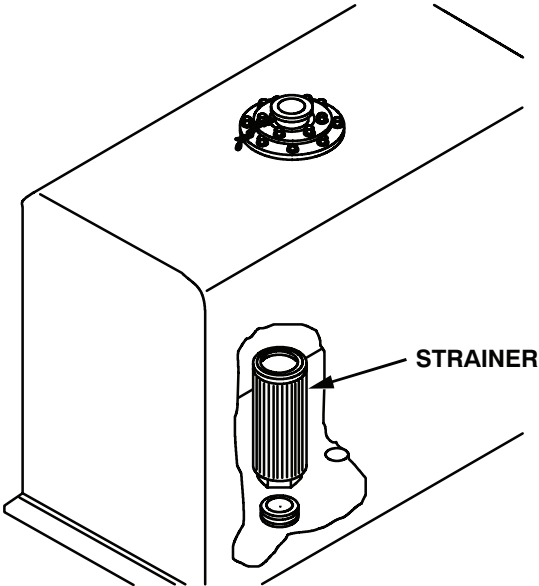
SPRING HANGER

AM



WINCH HYDRAULIC FILTER, SAMPLING VALVE, AND RESERVOIR SIGHT GLASS

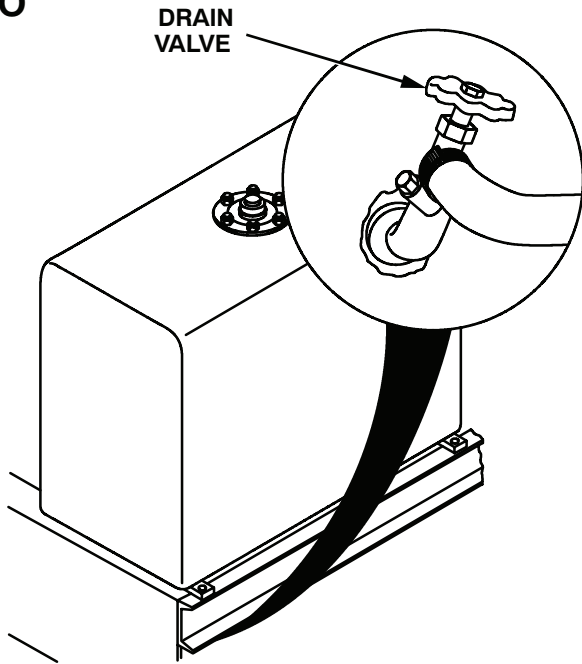
AN



WINCH RESERVOIR STRAINER

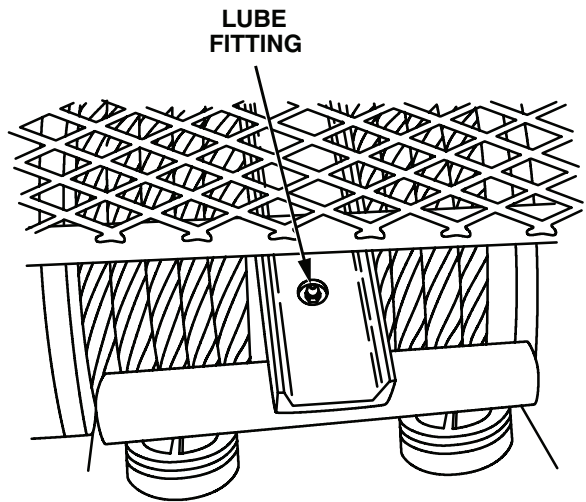
LO 9-2320-360-12

AO



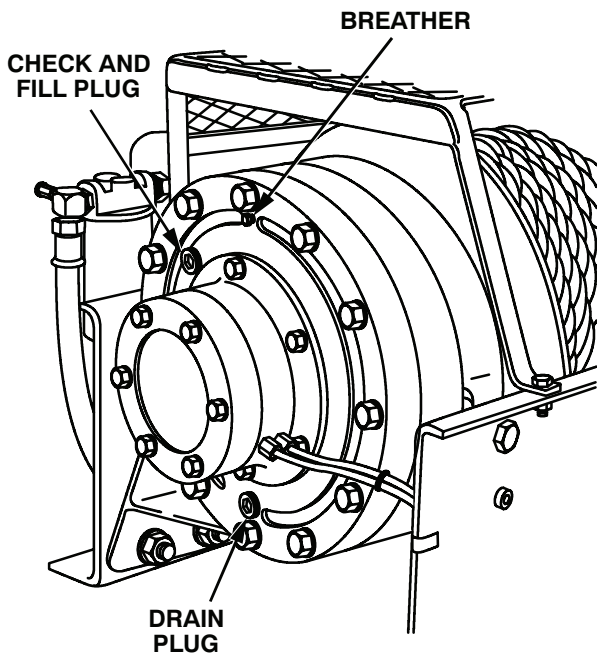
WINCH RESERVOIR

AP



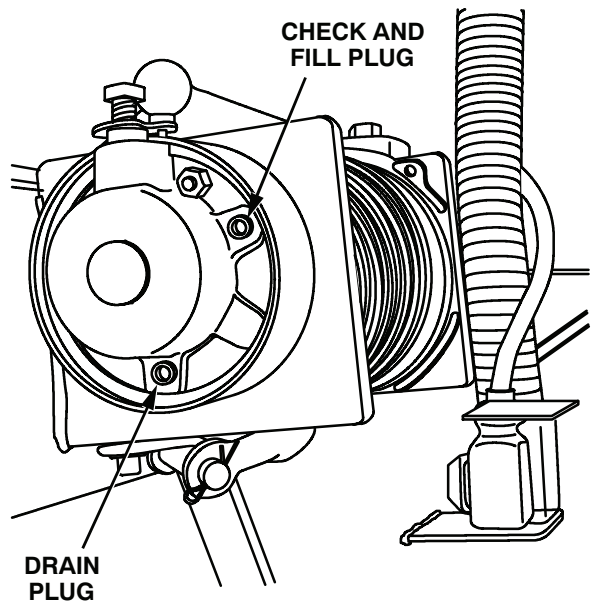
CABLE HOLD DOWNS

AQ



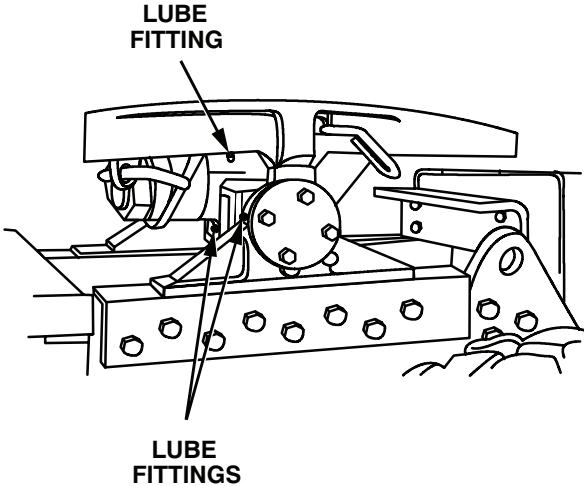
DRUM GEAR BOXES

AR



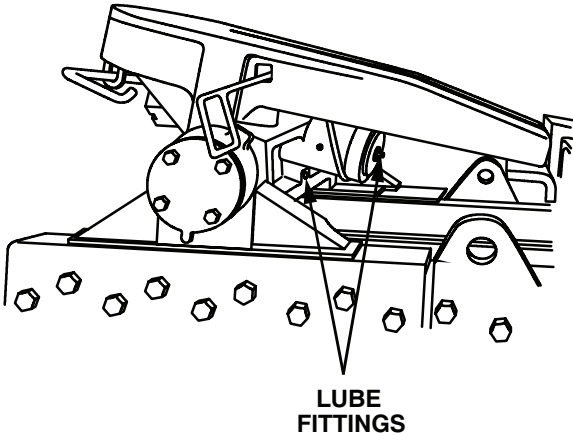
AUXILIARY WINCH

AS



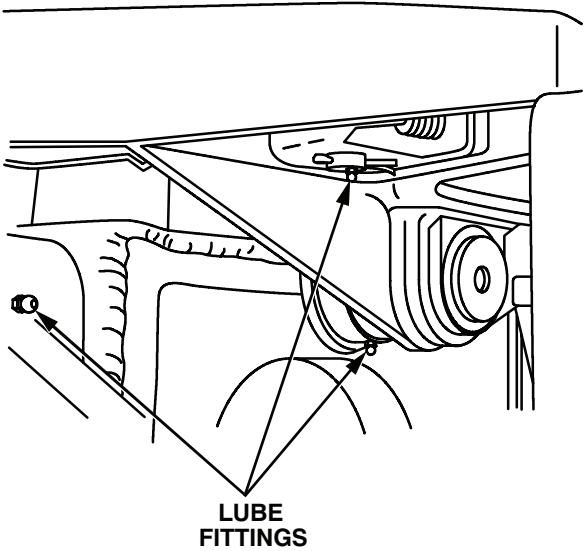
FIFTH WHEEL

AT



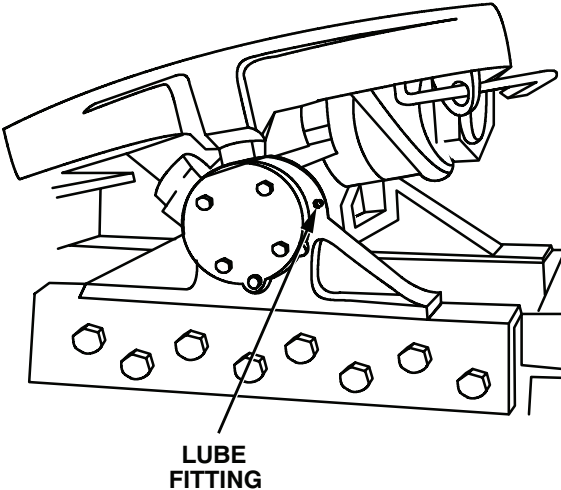
FIFTH WHEEL

AU



FIFTH WHEEL

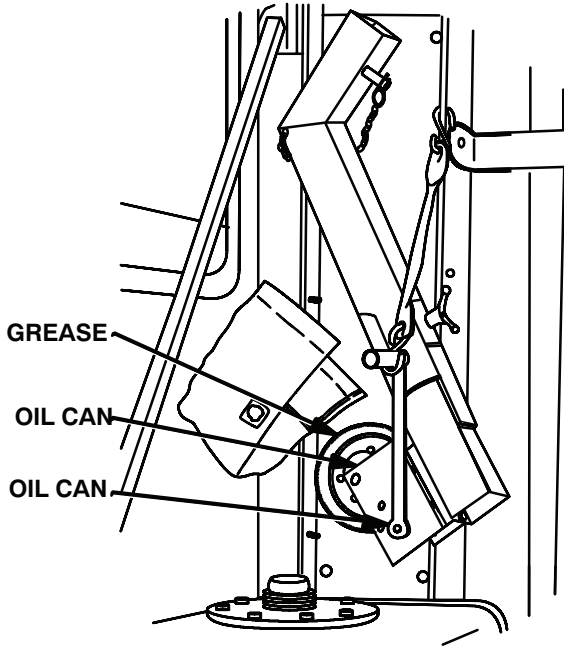
AV



FIFTH WHEEL

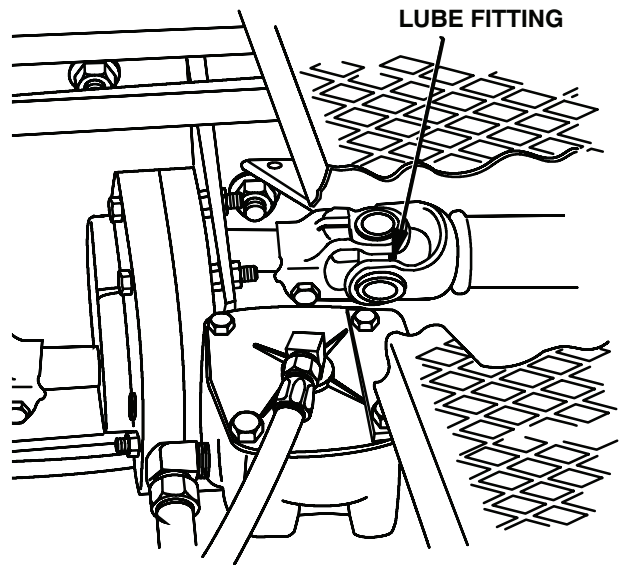
LO 9-2320-360-12

AW



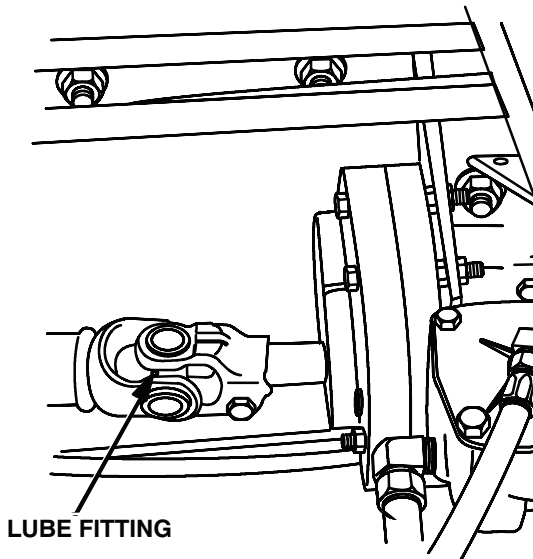
SPARE TIRE DAVIT

AX



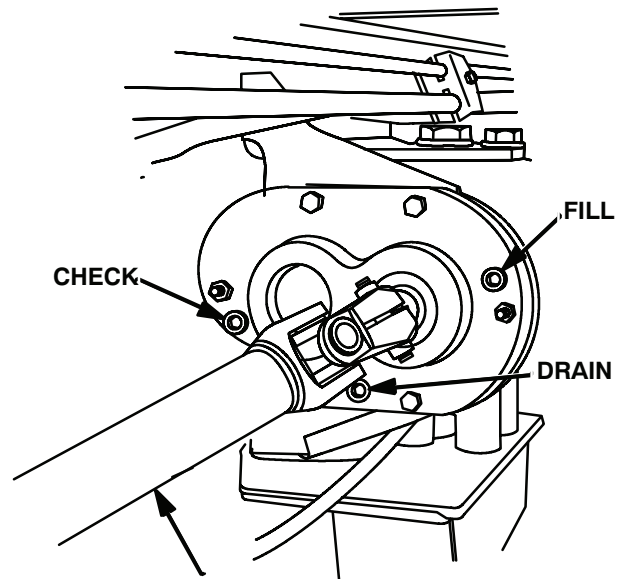
STEERING SHAFT NO. 4

AY



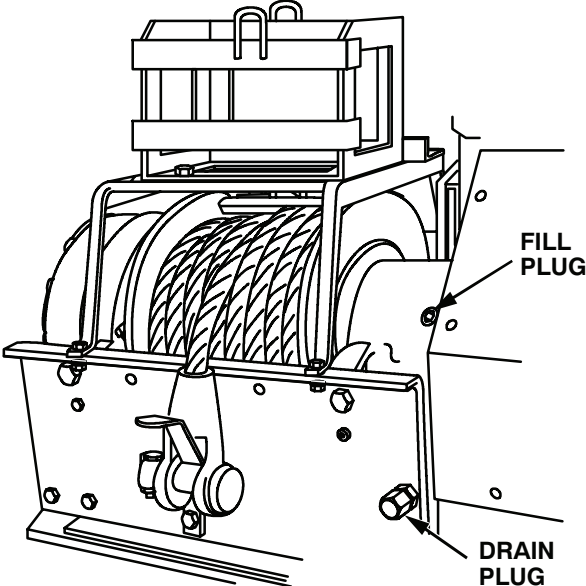
STEERING SHAFT NO. 5

AZ



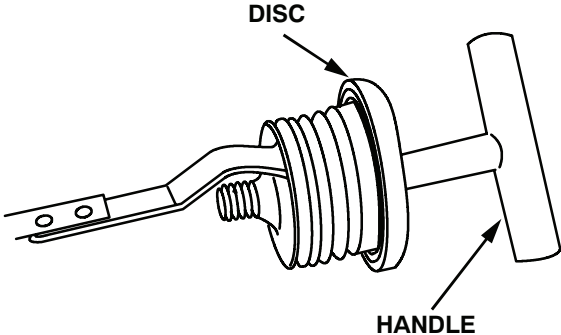
STEERING SHAFT NO. 5
STEERING REDUCTION GEARBOX

BA



MAIN WINCH MOTOR END

BB



TYPICAL DIPSTICK

NOTES

1. COLD TEMPERATURE OPERATION. For operation of equipment in expected temperatures continuously below 0°F (-18°C), remove lubricants prescribed in the key for temperatures above 0°F (-18°C). Relubricate as specified in the key for temperatures 0 to -50°F (-18 to -46°C).

2. CHASSIS.

a. Purging of Lubricant. When using a grease gun, apply lubricant to the fitting until clean lubricant squeezes out of the part being lubricated.

WARNING

Do not start engine or move HET Tractor when anyone is under vehicle or working on brake lines. Severe injury or death could result.

b. Universal Joints. Use the proper lubricant to purge all four bearing seals at each universal joint. Purging flushes abrasive contaminants from each bearing and ensures all four bearings are filled properly. Apply grease until the old grease is expelled from all edges of the universal joint end cap. Then wipe away the excess grease.

If any seal fails to purge, move propeller shaft from side-to-side while applying gun pressure. This allows greater clearance on thrust end of bearing that is not purging. If seals still do not purge, rock HET Tractor by starting engine, releasing parking brakes, putting transmission in D or R, and allowing HET Tractor to roll. This removes the wind up in the drive line and allows for a greater clearance on the thrust end of the universal joint. Because of the design of the universal joint seal, there will occasionally be one or more bearing seals that may not purge. Seal tension then has to be released. The procedure for releasing seal tension is as follows:

NOTE

Universal joint may have one or two grease fittings. If there are two fittings, grease either fitting. It is not necessary to grease both fittings.

Loosen bolts holding bearing assembly that does not purge to release seal tension. It may be necessary to loosen bearing assembly approximately 1/16 in. (0.16 cm) minimum. If loosening does not result in purging, remove bearing assembly to determine cause of blockage.

c. Propeller Shaft Slip Joints. When lubricating spline end of propeller shafts, apply grease to spline fitting until lubricant appears at pressure relief hole. Cover hole with finger and continue adding grease until it appears at sleeve yoke seal.

WARNING

Purged grease must be cleaned from brake camshaft. Failure to comply may cause brake lining contamination and brake failure, resulting in serious injury or death.

d. Camshaft Bushings. Care must be exercised when lubricating camshaft bushings. Grease contacting brake linings will damage linings and cause possible safety problems.

e. Severe Operating Conditions. When HET Tractor is operating under severe conditions, lubricate propeller shafts and universal joints every 50 hours.

f. Pintle Hook Plate Lubrication Fitting. Can be on any side.

g. Spring Hangers. If spring hanger pin does not accept grease, relieve load on spring pin by jacking HET Tractor up by frame rails as close to spring pin as possible. If spring pin still fails to take grease, notify direct support maintenance to remove spring pin and/or bushing and replace if necessary.

h. Tie Rod Ends. Apply grease pressure until new grease is seen purging from the boot area.

i. Link Kit (King Pin). Apply lubricant to fitting until lubricant is visible at inner seal.

3. ENGINE, TRANSMISSION, AND HYDRAULIC SYSTEM.

a. Cooling System Service

(1) See TM 9-2320-360-10. Coolant level should be visible in sight glass.

(2) Close two shutoff valves above coolant filter before replacing coolant filter. Turn two valve handles clockwise to close valve.

(3) Refer to cooling system service (TM 9-2320-360-20) for instructions on draining and flushing of engine coolant.

b. Transmission

(1) Operate engine 1 minute at 1000 RPM, idle until engine temperature reaches 60–120°F (16–49°C). With engine idling, check transmission dipstick.

(2) Add oil If oil level is on or below COLD/ADD line. Approximately 1 qt (0.9 L) of oil is required to bring oil level from bottom of COLD/ADD line to middle of COLD/ADD line. See TM 9-2320-360-20.

(3) Fill oil filter 2/3 full before installing on transmission.

c. Crankcase

(1) Check oil level with HET Tractor parked on level ground and after the engine has been turned off approximately 15 minutes.

WARNING

Use caution when draining hot oil. It may burn exposed skin and cause injury to personnel. If injured, personnel should seek medical attention immediately.

(2) Drain crankcase when hot.

(3) Do not overfill crankcase.

(4) Gradually fill crankcase with oil until oil reaches full mark on dipstick.

NOTE

Oil used to fill oil filter 2/3 full is included in 28 qt approximate capacity of engine.

d. Engine Oil Filter. Fill oil filter 2/3 full before installing on engine. After installing new filter element, fill crankcase, operate engine 5 minutes and check housing for leaks. Shut down engine, check crankcase level and bring to full mark.

4. TRANSFER CASE. Fill transfer case to level even with bottom of fill hole.

5. ARMY OIL ANALYSIS PROGRAM (AOAP). Refer to TB 43-0211 for sampling requirements.

a. After expiration of warranty, active Army units will send an oil sample to an AOAP laboratory for analysis every 3,000 miles or 6 months, whichever comes first. Transmission sampling is every 6,000 miles or 12 months, whichever comes first. Hydraulic systems will be sampled annually. These new sampling intervals apply to active Army, Reserve, and National Guard units.

b. Intervals for sampling as well as draining and refilling lubricants may be changed by an AOAP laboratory.

c. If AOAP laboratory support is not available, drain and refill crankcase oil every 6000 mi (9654 km) or semiannually, whichever comes first. Drain and refill transmission oil every 50,000 mi (80,467 km) or annually, whichever comes first. Drain and refill steering reservoir annually. Drain and refill hydraulic oil reservoir annually.

6. FIFTH WHEEL. Clean and coat more often when HET Tractor is operated in sandy or dusty conditions. Lubricate daily under severe operating conditions.

7. OIL LUBRICATION POINTS. Lubricate doors, side panels, hood hinges, locks, latches, and pivot points every 3000 mi (4800 km) or semiannually.

8. AXLES.

a. Axles. Change lubricant in new or rebuilt axles no sooner than 500 mi (805 km) and no later than 1000 mi (1609 km). Following initial drain, change lubricant every 20,000 mi (32,187 km) or each year of service, whichever comes first. During all lubricant changes, remove metal particles from magnetic drain plugs.

b. Axles no. 1 and 4 (steering axles).

(1) Initial fill of the axle differentials is made at the axle housing plug. Fill differential housing to a level even with the bottom of the fill plug hole.

LO 9-2320-360-12

(2) Initial fill of the planetary wheel end level is made at the planetary fill hole. Fill slowly through the 3/4 in. (19 mm) fill hole until oil runs out the center check location.

(3) Scheduled oil checks will be made at these same locations.

c. Axles no. 2 and 3 (non-steering axles).

(1) The planetary wheel ends should be filled first, then the axle differential.

(2) Initial fill of the planetary wheel end level is made at the planetary fill hole. Fill slowly through the 3/4 in. (19 mm) fill hole until oil runs out the center check location.

(3) Initial fill of the axle differentials is made at the axle housing plug. Fill differential housing to a level even with the bottom of the fill plug hole.

(4) Scheduled oil level checks will be made only at the axle housing and not at the planetary wheel ends. The planetary wheel ends and the axle housing share the same axle lubricant and will seek the same level. As a result, no checks should be made at the wheel end after the initial fill/check.

9. WINCH.

a. If hydraulic system oil becomes contaminated, immediately change oil and filter.

b. Winch kickout controls should be actuated several times during draining and filling of drum gearboxes to allow oil to exchange in kickout cavity.

c. PTO propshafts are permanently lubricated and cannot be lubricated.

d. The motor end and gearbox end must be drained and refilled individually.

e. Change the winch hydraulic oil, filter, and gear oil in new or rebuilt winches after 6 weeks or 6-10 winch pulls.

10. **SPARE TIRE DAVIT.** Spare tire davit should be mounted in operating position to perform lubrication.

11. DIPSTICK REMOVAL/INSTALLATION.

CAUTION

Do not attempt to remove dipstick without first loosening handle. Failure to comply may damage dipstick.

NOTE

Engine, transmission and power steering reservoir dipsticks are removed and installed the same way.

a. Loosen dipstick by turning handle counter-clockwise until disc turns freely.

b. Remove dipstick from dipstick tube.

c. Install dipstick in dipstick tube.

NOTE

Maintain inward pressure on dipstick while tightening.

d. Turn handle clockwise until disc does not turn freely.

e. Turn handle clockwise an additional two turns to secure dipstick in tube.

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

BY ORDER OF THE SECRETARY OF THE ARMY:

Chief of Staff, United States Army

By Order of the Secretary of the Army:

Official:



JOYCE E. MORROW
*Administrative Assistant to the
Secretary of the Army*
0702301

GEORGE W. CASEY, JR.
*General, United States Army
Chief of Staff*

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 380979,
requirements for LO 9-2320-360-12.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR 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

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

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

CUBIC MEASURE

1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches
 1 Cu Meter=1,000,000 Cu Centimeters=35.31 Cu Feet

LIQUID MEASURE

1 Milliliter=0.001 Liters=0.0338 Fluid Ounces
 1 Liter=1000 Milliliters=33.82 Fluid Ounces

TEMPERATURE

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

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
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/Sq Inch.....	Kilopascals.....	6.895
Miles per Gallon.....	Kilometers per Liter.....	0.425
Miles per Hour.....	Kilometers per Hour.....	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters.....	Inches.....	0.394
Meters.....	Feet.....	3.280
Meters.....	Yards.....	1.094
Kilometers.....	Miles.....	0.621
Sq Centimeters.....	Square Inches.....	0.155
Square Meters.....	Square Feet.....	10.764
Square Meters.....	Square Yards.....	1.196
Square Kilometers.....	Square Miles.....	0.386
Sq 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 Sq Inch.....	0.145
Km per Liter.....	Miles per Gallon.....	2.354
Km per Hour.....	Miles per Hour.....	0.621



PIN: 072618-000