

# LUBRICATION ORDER

6 February 1984

# LO 9-2320-211-12

(Supersedes LO 9-2320-211-12,  
dated 31 January 1979)

**TRUCK, CHASSIS: 5-TON, 6X6, M40, M40A1 , M40A1C, M40A2C, M61, M61A1, M61A2, M63, M63A1 , M63A2, M63C, M63A1C, M63A2C, M139, M139A1, M139F, M139A1F, M139A2F; TRUCK, CARGO: M54, M54A1 , M54A2, M54A1C, M54A2C, M55, M55A2; TRUCK, DUMP: MS 1, MS1A1 , M51A2; TRUCK, TRACTOR: M52, M52A1 , M52A2; TRUCK, TRACTOR, WRECKER: M246, M246A1 , M246A2; TRUCK, VAN, EXPANSIBLE: M291A1 , M291A1D; TRUCK, WRECKER, MEDIUM: M62, M543, M543A1, M543A2; TRUCK, STAKE, BRIDGE TRANSPORTING: M328A1; TRUCK, BOLSTER: M748A1**

REFERENCE: TM 9-2320-211-10, TM 9-2320-211-10-1, TM 9-2320-211-10-2, TM 9-2320-211-10-3, TM 9-2320-211-10-4, TM 9-2320-211-20, TM 9-2320-211-20-1, TM 9-2320-211-20-2-1, TM 9-2320-211-20-2-2, TM 9-2320-211-20-3-1, TM 9-2320-211-20-3-2, AND CL9100SL

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. 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 your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The hard time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals will be applied in the event AOAP laboratory support is not available.

Clean fittings before lubricating. Clean parts with drycleaning solvent (SD) type II or equivalent. Dry before lubricating. Dotted arrow points indicate lubrication required 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: Operator/Crew (C); and Organizational Maintenance (O).

Relubricate after fording.

## REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this lubrication order. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, Michigan 48090. A reply will be furnished to you.

TA 094115

—KEY—

LUBRICANTS	CAPACITIES	EXPECTED TEMPERATURES			INTERVALS
		Above 15°F (Above -9°C)	+40° to -15°F (+4° to -26°C)	+40° to -65°F (+4° to -54°C)	
OE/HDO-LUBRICATING OIL, INTERNAL COM- BUSTION ENGINE (MIL-L-2104)					OC-On condition (AOAP)  C/MR-Change gear lubricant only when required by mainte- nance repair action, or if contaminated by water or other foreign materials.  D- Daily  W- Weekly, as required, de- pending upon use; otherwise, during INTER- VAL 3  M- Monthly 1- 1,000 miles** (1,600 km) 3- 3,000 miles (4,800 km) or 3 months, whichever occurs first 3/S- 3,000 miles (4,800 km) or semiannually, whichever occurs first 6- 6,000 miles  6 months, whichever occurs first 12- 12,000 miles (19,000 km) or 12 months, whichever occurs first S- Semiannually (6 months) A- Annually (12 months)
OEA-LUBRICATING OIL, INTERNAL COM- BUSTION ENGINE (ARCTIC) (MIL-L-46167)					
OIL CAN POINTS		OE/HDO 30	OE/HDO 10*	OEA	
CRANKCASE: (GASOLINE)		OE/HDO 30	OE/HDO 10*	OEA	
W/FILTER	20 qt (18.9 l)				
W/O FILTER	18 qt (17 l)				
CRANKCASE (DIESEL)		OE/HDO 30	OE/HDO 10*	OEA	
W/FILTERS	26 qt (24.6 l)				
W/O FILTERS	22 qt (20.8 l)				
CRANKCASE (MULTIFUEL)		OE/HDO 30	OE/HDO 10*	OEA	
W/FILTERS	22 qt (20.8 l)				
W/O FILTERS	18 qt (17 l)				
• DUMP BODY HYDRAULIC RESERVOIR	37 qt (35.0 l)	OE/HDO 10*	OE/HDO 10*	OEA	FOR ARCTIC OPERATION, REFER TO FM 9-207
• CRANE HYDRAULIC TANK	33 gal. (125 l)	OE/HDO 10*	OE/HDO 10*	OEA	
• CRANE HYDRAULIC TANK (M543, M543A1, M543A2)	70 gal. (265 l)	OE/HDO 10*	OE/HDO 10*	OEA	
STEERING AND HYDRAULIC SYSTEMS (INCLUDING STEER- ING GEARBOX)					
STEERING GEAR HYDRAULIC RESERVOIR	8.5 qt (8 l)	OE/HDO 10*	OE/HDO 10*	OEA	
STEERING GEARCASE	2.5 qt (2.4 l)	OE/HDO 10*	OE/HDO 10*	OEA	

\*If OEA lubricant is required to meet the temperature ranges prescribed in the KEY, then the OEA lubricant is to be used in place of OE/HDO 10 lubricant for all temperature ranges.

\*\* See note 1.

- When operating in expected temperatures of 80°F (27°C) or above use OE/HDO 30.

TA094116

—KEY— (Cont'd)

LUBRICANTS	CAPACITIES	EXPECTED TEMPERATURES			INTERVALS	
		Above 15°F (Above -9°C)	+40° to -15°F (+4° to -26°C)	+40° to -65°F (+4° to -54°C)		
<b>GO-LUBRICATING OIL, GEAR MULTIPURPOSE (MIL-L-2105)</b>					FOR ARCTIC OPERATION, REFER TO FM 9-207	
TRANSMISSION	9 qt (8.5 l)	GO 80/90	GO 80/90	GO 75		
W/PTO	11 qt (10.4 l)					
DIFFERENTIAL (3)	12 qt (11.4 l)	GO 80/90	GO 80/90	GO 75		
TRANSFER CASE	5.25 qt (5 l)	GO 80/90	GO 80/90	GO 75		
MIDSHIP WINCH END FRAME HOUSING	1.75 pt (.83 l)	GO 80/90	GO 80/90	GO 75		
MIDSHIP WINCH GEARCASE	2.6 pt (1.2 l)	GO 80/90	GO 80/90	GO 75		
FRONT WINCH GEARCASE	2.6 pt (1.2 l)	GO 80/90	GO 80/90	GO 75		
REAR WINCH GEARCASE	3 pt (1.4 l)	GO 80/90	GO 80/90	GO 75		
<b>GAA-GREASE, AUTOMOTIVE AND ARTILLERY (MIL-G-10924)</b>		ALL TEMPERATURES				
<b>BFS***-BRAKE FLUID, SILI- CONE, AUTOMOTIVE, ALL WEATHER, OPER- ATIONAL AND PRESERVATIVE (MIL-B-46176)</b>		ALL TEMPERATURES				
<b>****BRAKE MASTER CYLINDER</b>						
<b>CW-LUBRICATING OIL, CHAIN WIRE ROPE, EXPOSED GEAR (VV-L-751)</b>		<b>ABOVE +80°F(+27°C)</b>	<b>+80° to +30°F (+27° to -1°C)</b>	<b>+30° to -30°F (-1° to -34°C)</b>	<b>-30° to -65°F (-34° to -54°C)</b>	X
WINCH WIRE ROPE		CW-IIC	CW-IIB	CW-IIA	GO 75	

\*\*\* See TB 43-0002-87 for conversion procedures from HB to BFS.

\*\*\*\* See note 11.

**TOTAL MAN-HOURS**

	OC	D	W	M	1	3	3/S	6	12	C/MR	S	A
TRUCK, CHASSIS: M139, M139F, M40, M61, M63, M63C	1.5	.3		.1	2.5	1.8	1.0	.9	8.0	3.9	.6	1.5
TRUCK, CARGO: M54, M55	1.5	.3		.1	2.5	1.8	1.0	.9	8.0	3.9	.6	1.5
TRUCK, DUMP: M51	1.5	.3	.6	.1	2.5	1.8	1.0	.9	8.0	3.9	1.5	2.1
TRUCK, FLAT BED: M40	1.5	.3		.1	2.5	1.8	1.0	.9	8.0	3.9	.6	1.5
CHASSIS, TRUCK, BRIDGE STAKE TRANSPORTER: M139	1.5	.3		.1	2.5	1.8	1.0	.9	8.0	3.9	.9	1.5
TRUCK, TRACTOR: M52	1.5	.3		.1	3.5	1.8	1.0	.9	8.0	3.9	.6	1.5
TRUCK, TRACTOR WRECKER: M246	1.5	.3	.5	.1	3.5	1.8	1.0	.9	8.0	3.9	3.2	2.5
TRUCK, WRECKER, MEDIUM: M62	1.5	.3	.7	.1	2.5	1.8	1.0	.9	8.0	3.9	4.7	3.5
TRUCK, WRECKER, MEDIUM: M543	1.5	.3	.4	.1	2.5	1.8	1.0	.9	8.0	3.9	6.7	2.7
TRUCK, CHASSIS: M139A1, M139A1F, M40A1, M40A1C, M61A1, M63A1, M63A1C	1.5	.3		.1	2.3	1.8	1.0	1.0	8.0	3.9	.4	1.5
TRUCK, BOLSTER: M748A1	1.5	.3		.1	2.5	1.9	1.0	1.0	10.3	3.9	1.4	2.8
TRUCK, CARGO: M54A1	1.5	.3	.8	.1	2.3	1.8	1.0	1.0	8.0	3.9	.4	1.5
TRUCK, CARGO, DROPSIDE: M54A1C	1.5	.3		.1	2.3	1.8	1.0	1.0	8.0	3.9	.4	1.5
TRUCK, DUMP: M51A1	1.5	.3	.6	.1	2.3	1.8	1.0	1.0	8.0	3.9	1.6	2.2
TRUCK, BRIDGE STAKE TRANSPORTER: M328A1	1.5	.3		.1	2.3	1.8	1.0	1.0	8.0	3.9	.7	1.5
TRUCK, TRACTOR: M52A1	1.5	.3		.1	2.3	1.8	1.0	1.0	8.0	3.9	.4	1.5
TRUCK, VAN, EXPANSIBLE: M291A1, M291A1D	1.5	.3		.1	2.3	1.9	1.0	1.0	8.0	4.9	.7	1.5
TRUCK, TRACTOR, WRECKER: M246A1	1.5	.3	.5	.1	2.3	1.8	1.0	1.0	8.0	3.9	3.0	2.5
TRUCK, WRECKER, MEDIUM: M543A1	1.5	.3	.2	.1	2.3	1.8	1.0	1.0	8.0	3.9	2.0	2.5
TRUCK, CHASSIS: M139A2F, M40A2C, M61A2, M63A2, M63A2C	1.5	.3		.1	1.8	2.3	1.0	1.0	8.0	3.9	.6	1.5
TRUCK, CARGO: M54A2, M55A2	1.5	.3		.1	1.8	2.3	1.0	1.0	8.0	3.9	.6	1.5
TRUCK, CARGO, DROPSIDE: M54A2C	1.5	.3		.1	1.8	2.3	1.0	1.0	8.0	3.9	.6	1.5
TRUCK, DUMP: M51A2	1.5	.3	.2	.1	1.8	2.3	1.0	1.0	8.0	3.9	1.6	2.0
TRUCK, TRACTOR: M52A2	1.5	.3		.1	2.8	2.3	1.0	1.0	8.0	3.9	.6	.6
TRUCK, TRACTOR, WRECKER: M246A2	1.5	.3	.5	.1	2.5	2.3	1.0	1.0	8.0	3.9	3.2	2.5
TRUCK, WRECKER, MEDIUM: M543A2	1.5	.3	.2	.1	1.8	2.3	1.0	1.0	8.0	3.9	2.2	2.5
FRONT, WINCH	1.5				.4		1.0	1.0			1.7	

**NOTE**

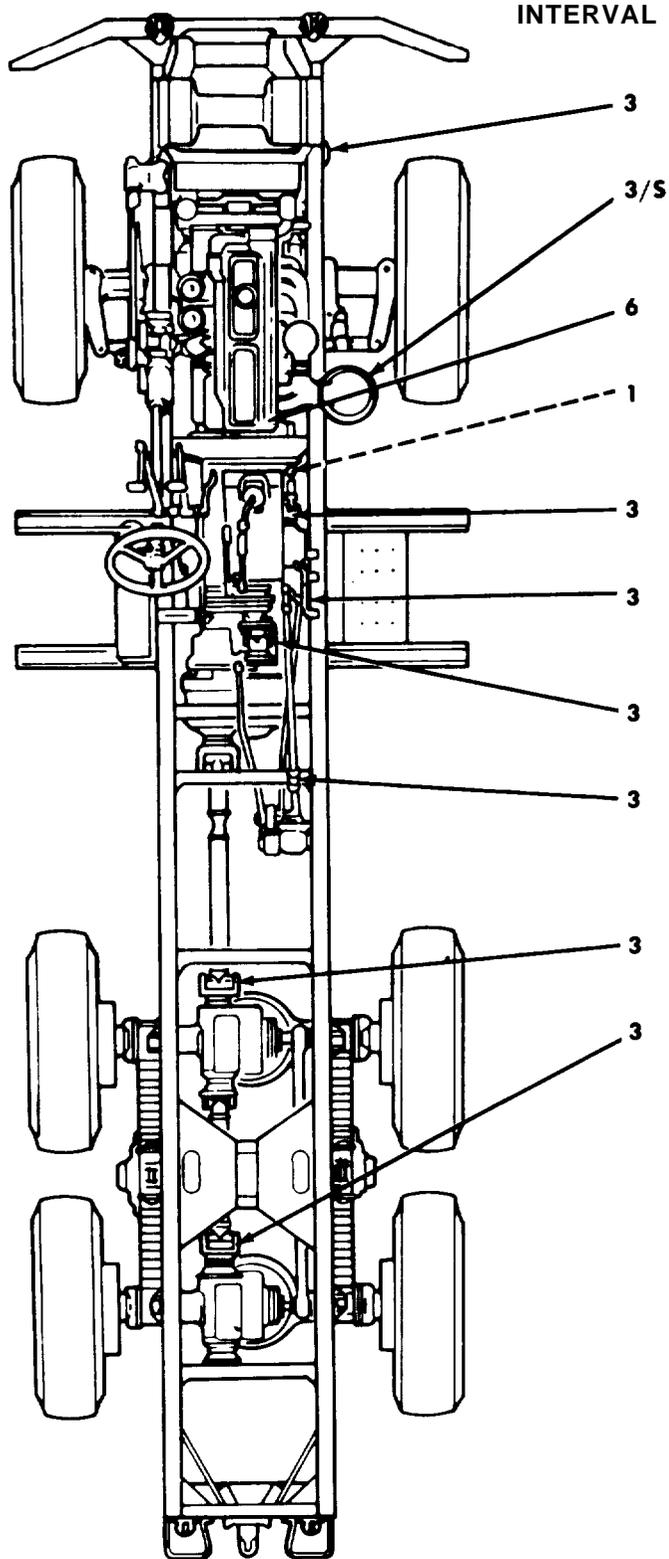
The above man-hours have been established on an individual basis, and hence, are not applicable at maintenance facilities where production line methods are employed.

TA 094118

**NOTE**

See page 11 for diesel and multifuel engines.

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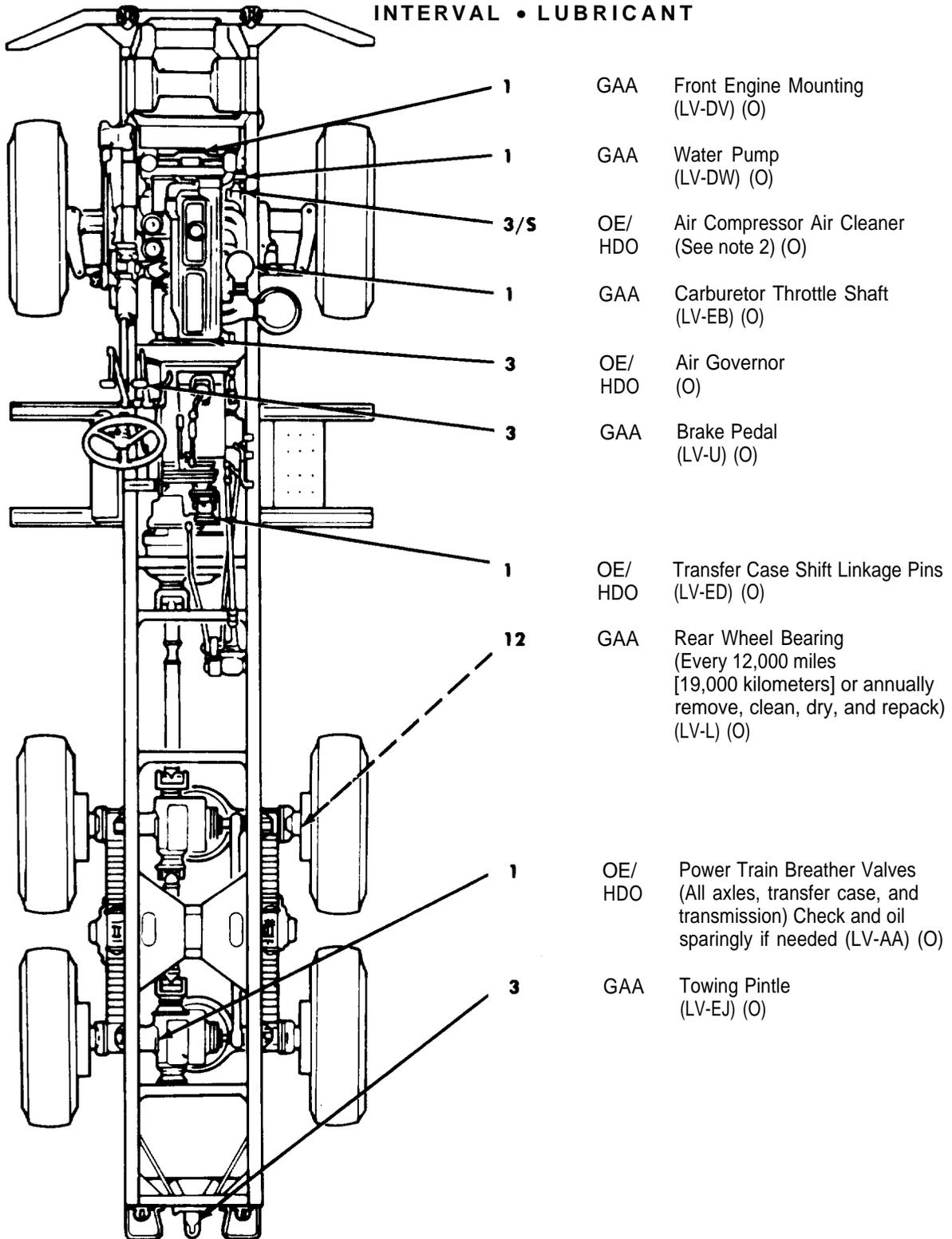
3	GAA	Winch Universal (See note 9) (LV-DR) (O)
3/5	OE/ HDO	Air Cleaner (Gasoline) (Check level) (See note 2) (LV-EA) (O)
6	OE/ HDO	Crankcase Drain and Refill (See note 3) (LV-Q) (O)
1	GAA	Clutch Cross-Shaft (Refill cups, turn one full turn) (LV-EC) (O)
3	GAA	Winch Universal and Slip Joint (See note 9) (LV-DP,DQ) (O)
3	GAA	Power Takeoff, Universal Joint (Some models) (See note 9) (LV-DR) (O)
3	GAA	Universal and Slip Joint (See note 9) (LV-Z) (O)
3	GAA	Power Takeoff Universal and Slip Joint (Some models) (See note 9) (LV-DP, DQ) (O)
3	GAA	Universal Joint (See note 9) (LV-DR) (O)
3	GAA	Universal Joint (See note 9) (LV-DR) (O)

**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (IV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094119

**INTERVAL • LUBRICANT**

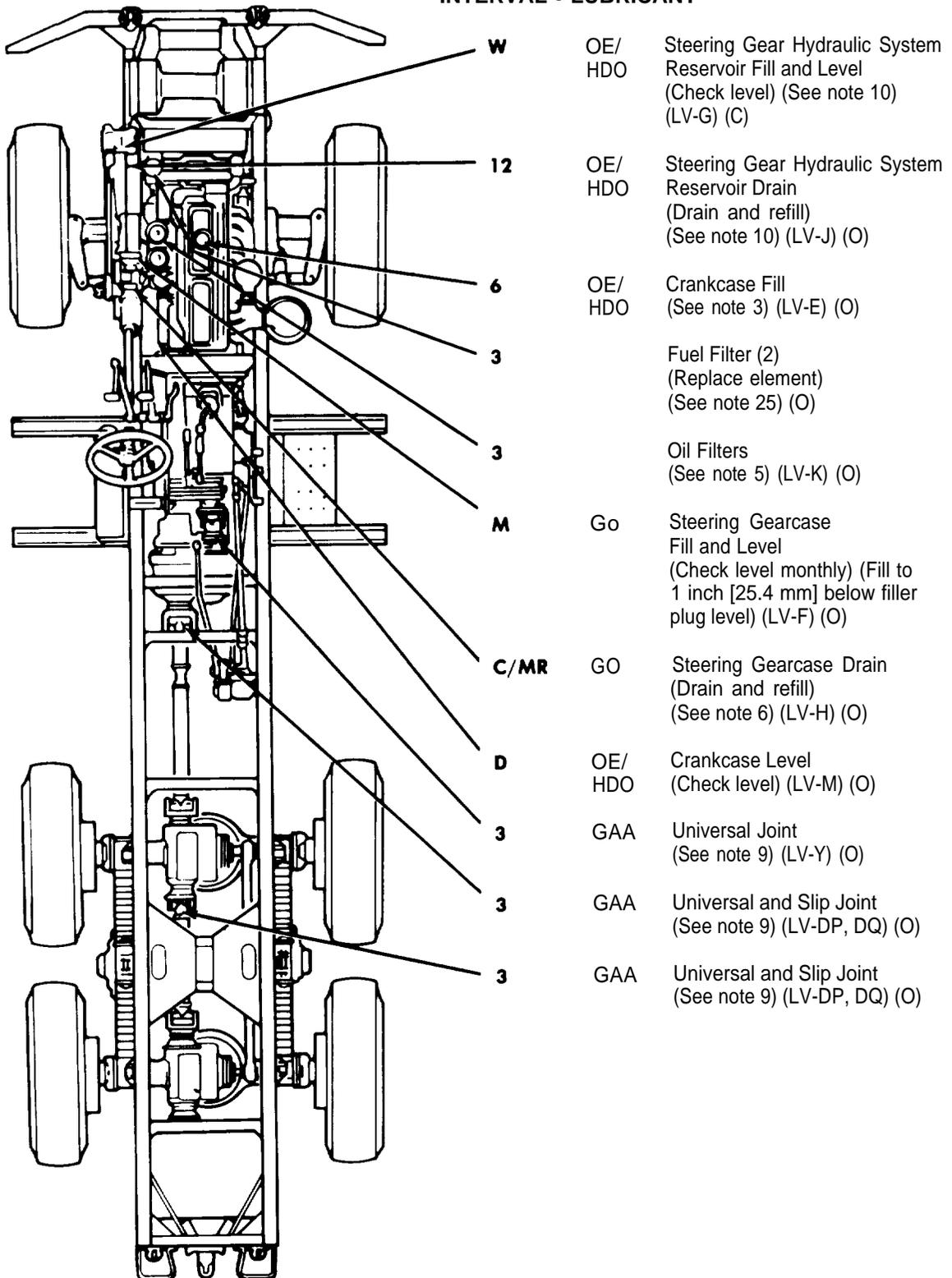


**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094120

### INTERVAL • LUBRICANT

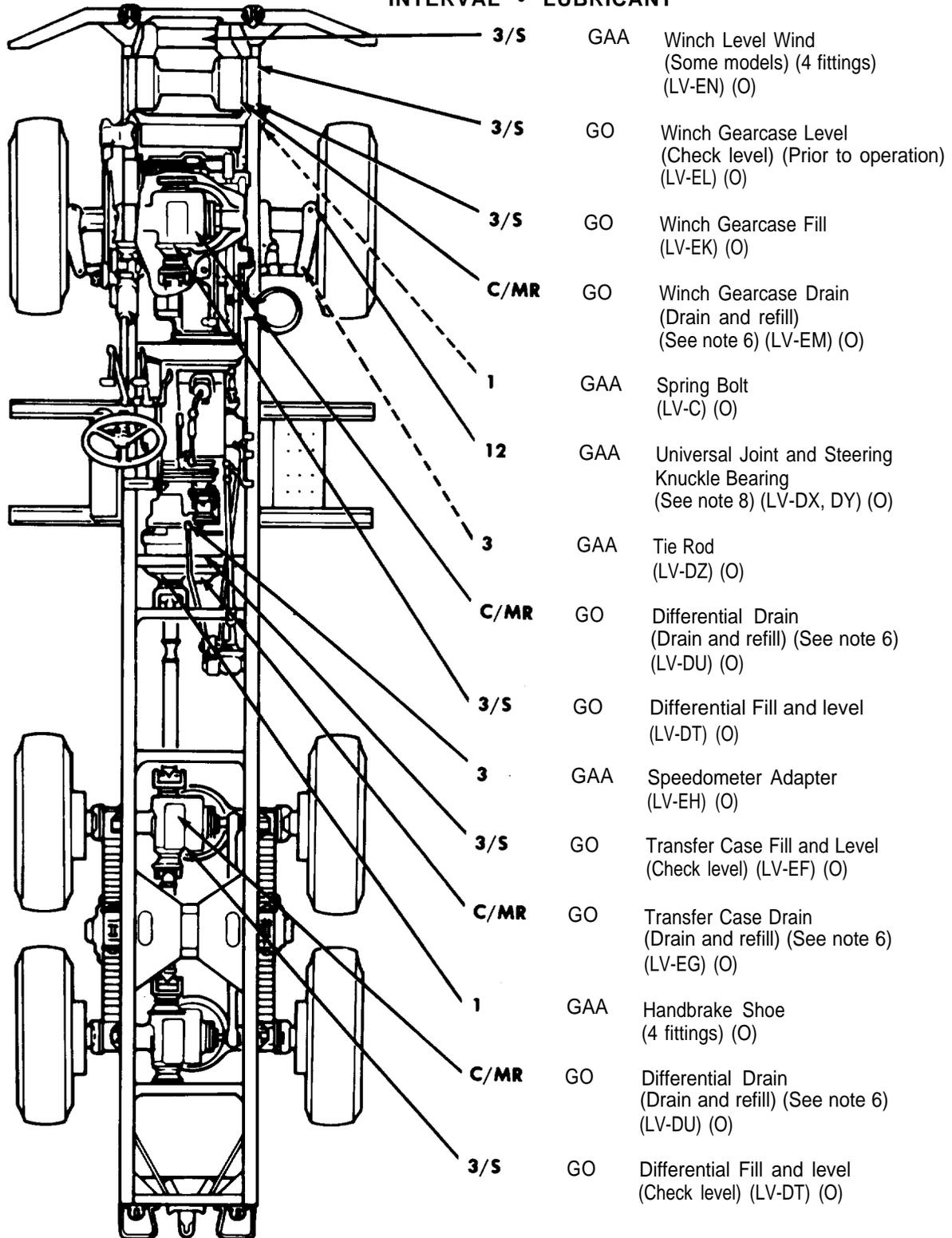


### NOTE

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094121

**INTERVAL • LUBRICANT**

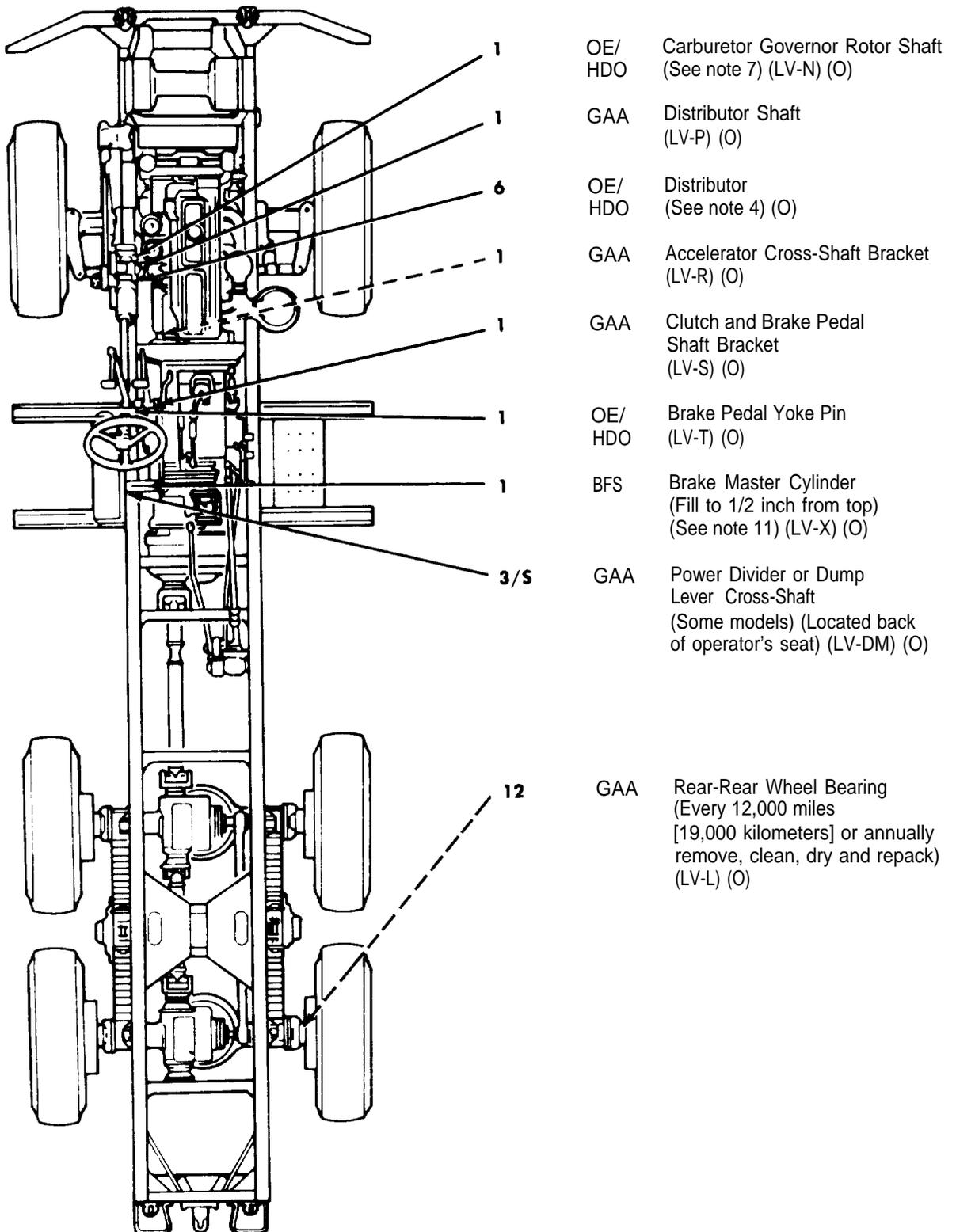


**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094122

INTERVAL • LUBRICANT

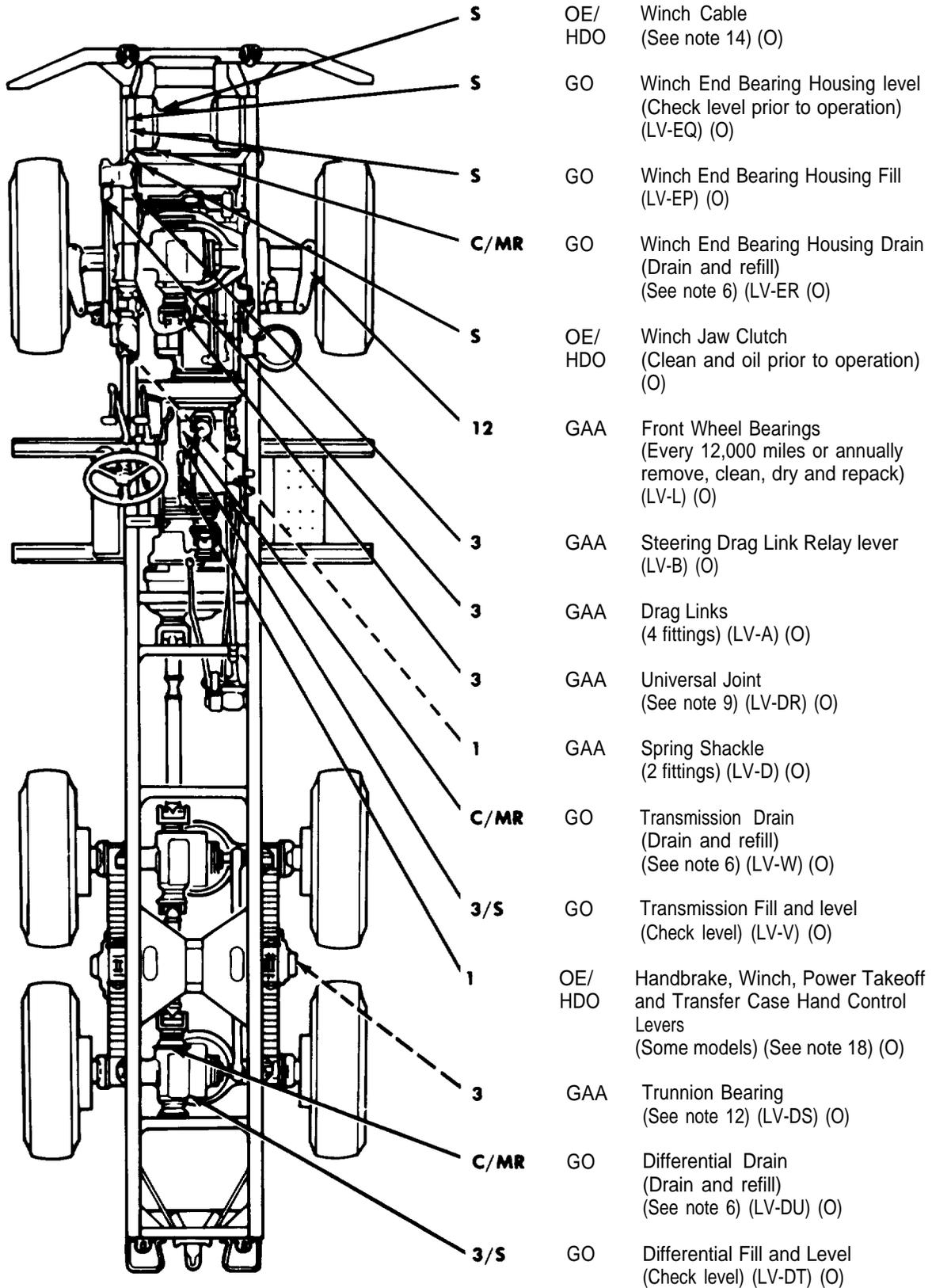


NOTE

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094123

INTERVAL • LUBRICANT

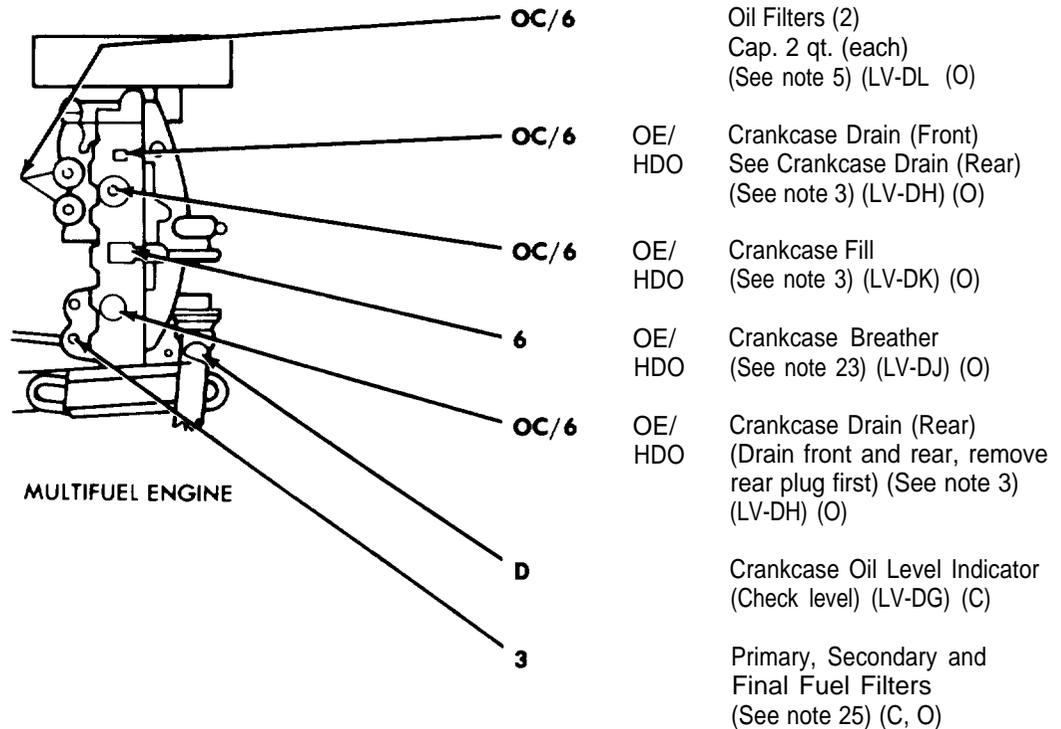


NOTE

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

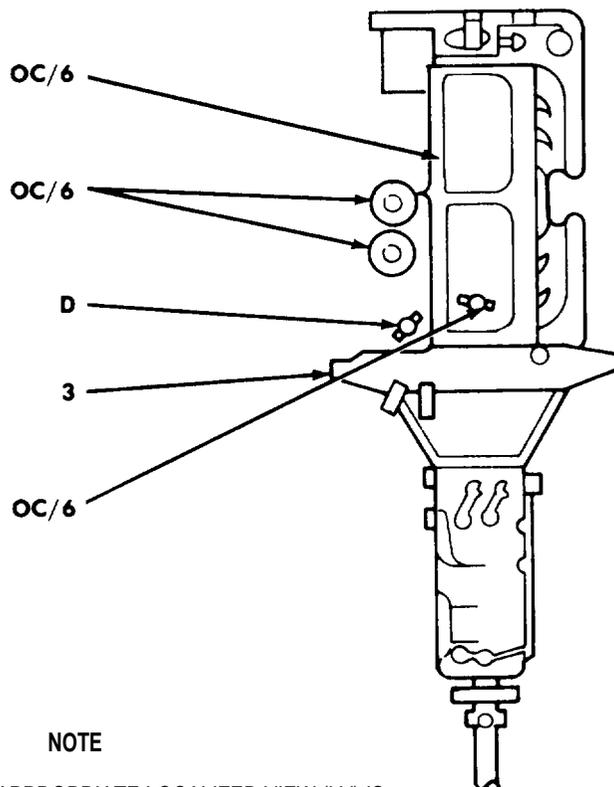
TA 094124

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Engine Crankcase Drains (2) (Change oil) (See note 3) (LV-DC) (O)	OE/ HDO
Oil Filters (2) Cap. 2 qt. (each) (See note 5) (LV-DE) (O)	
Crankcase Oil Level Indicator (Crankcase) (LV-DF) (C)	
Primary and Secondary Fuel Filters (See note 25) (C, O)	
Crankcase Fill (See note 3) (LV-DD) (O)	OE/ HDO

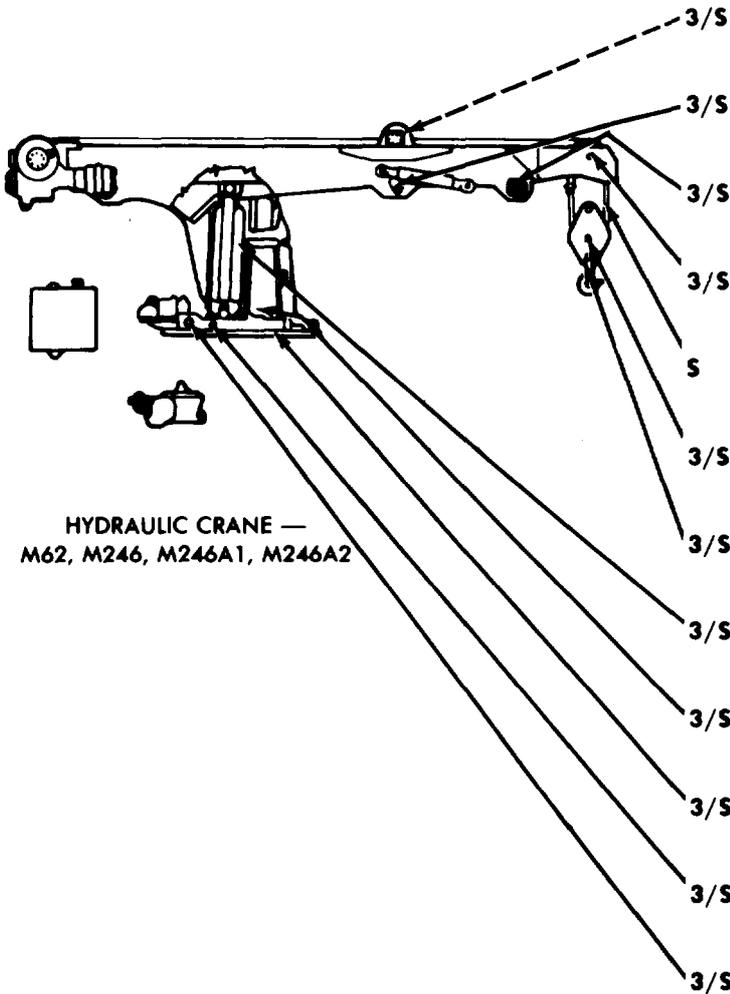


**NOTE**

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**DIESEL ENGINE TA 094125**

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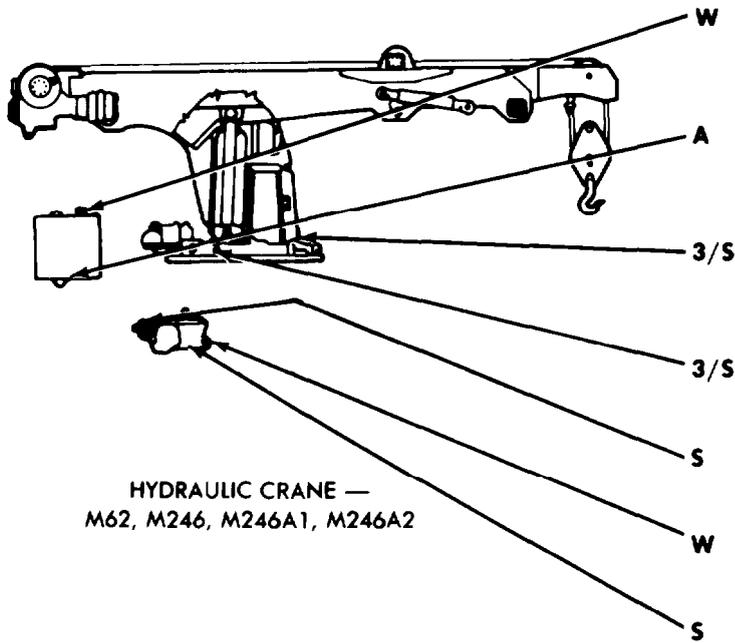
- GAA Upper Roller  
(See note 26) (LV-AR) (O)
- GAA Eccentric Lower Roller  
(See note 26) (LV-AW) (O)
- GAA Front Lower Roller  
(See note 26) (LV-AS) (O)
- GAA Sheave Pin  
(See note 26) (LV-AT) (O)
- OE/  
HDO Hoist Cable  
(See note 14) (O)
- GAA Block Sheave Pin  
(See note 26) (LV-AU) (O)
- OE/  
HDO Hook Swivel  
(See note 26) (O)
- GAA Pivot Post Upper Bearing  
(See note 26) (LV-AH) (O)
- GAA Pivot Post Lower Bearing  
(See note 26) (LV-AQ) (O)
- GAA Ring Gear  
(See notes 17, 26) (LV-AP) (O)
- GAA Idler Gear  
(See note 26) (LV-AM) (O)
- GAA Drive Pinion  
(See note 26) (LV-AN) (O)

**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094126

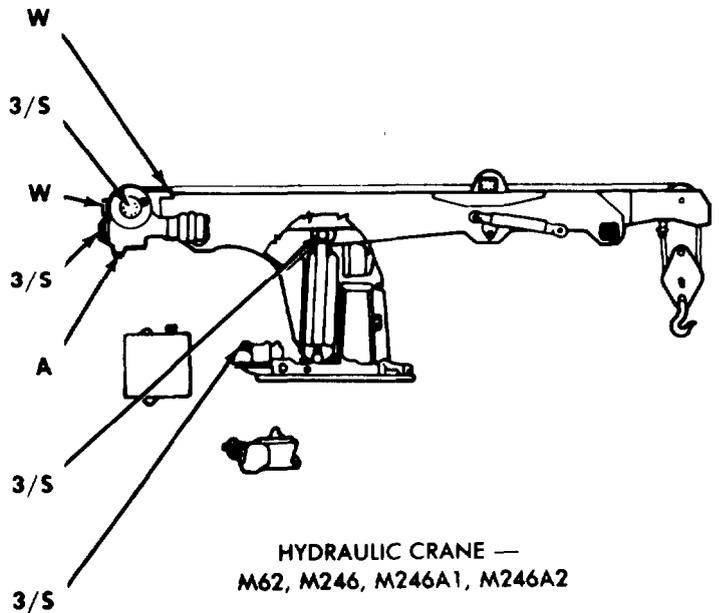
**INTERVAL • LUBRICANT**



- |            |   |
|------------|---|
| OE/<br>HDO | Hydraulic Oil Tank<br>Fill and level<br>(See note 15) (LV-AJ) (0)           |
| OE/<br>HDO | Hydraulic Oil Tank Drain<br>(Drain and refill)<br>(See note 15) (LV-BG) (0) |
| GAA        | Cam Rollers<br>(Coat sparingly)<br>(See note 26) (0)                        |
| GAA        | Drive Pinion Shaft<br>(See note 26) (LV-AL) (0)                             |
| Go         | Swing Motor Gear Housing Fill<br>(M246, M246A2) (0)                         |
| Go         | Swing Motor Gear Housing Level.<br>(o)                                      |
| GO         | Swing Motor Gear Housing Drain<br>(Drain and refill) (0)                    |

**LUBRICANT • INTERVAL**

- |   |     |
|---|-----|
| Hoist Drum Fill<br>(See note 13) (LV-AB) (0)                        | GO  |
| Drum Shaft<br>(See note 26) (LV-AE) (0)                             | GAA |
| Hoist Drum Level<br>(See note 13) (LV-AD) (0)                       | GO  |
| Shipper Pivot Shaft<br>(See note 26) (LV-AF) (0)                    | GAA |
| Hoist Drum Drain<br>(Drain and refill)<br>(See note 13) (LV-AC) (0) | GO  |
| Boom Lift Pivot Pin<br>(3 fittings) (See note 26)<br>(LV-AG) (0)    | GAA |
| Swing Motor Base Pin<br>(See note 26) (LV-AK) (0)                   | GAA |

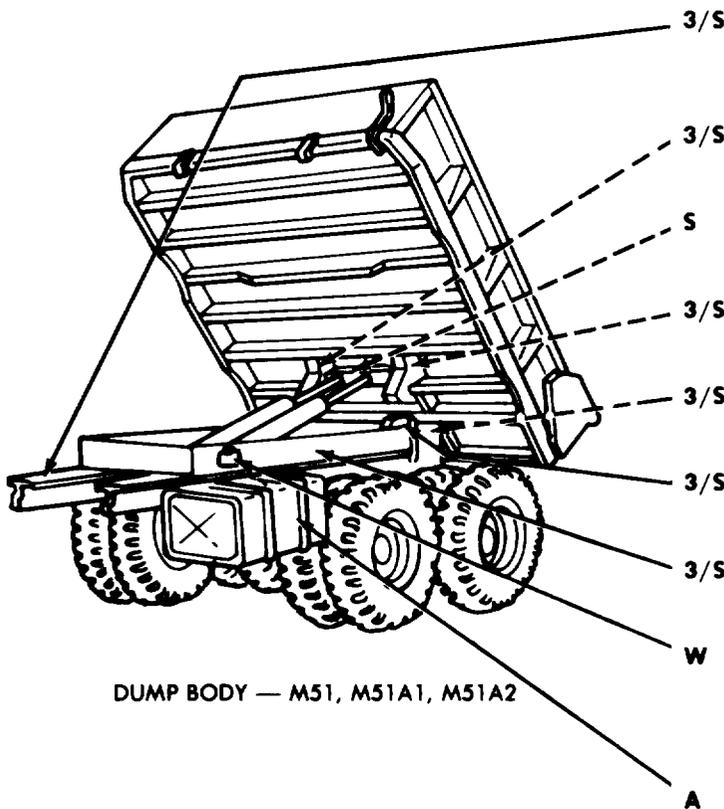


**NOTE**

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TA 094127

**INTERVAL • LUBRICANT**

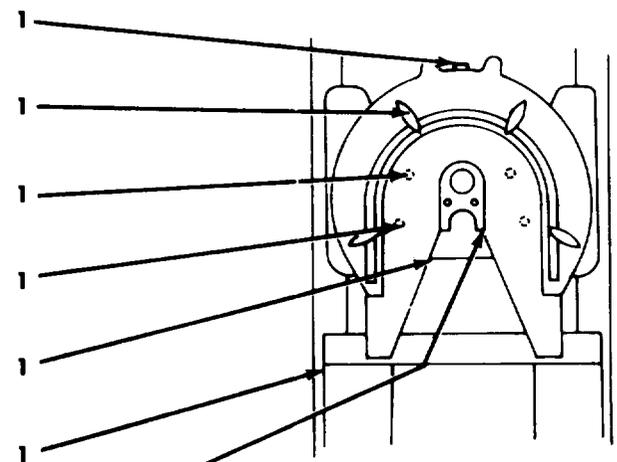


**DUMP BODY — M51, M51A1, M51A2**

- 3/S** GAA Hoist Assembly Control linkage (Some models) (4 fittings) (See note 26) (O)
- 3/S** GAA Hoist Lift Pin (See note 26) (LV-BU) (O)
- S** GAA Hoist Cylinder Crosshead (LV-BV) (O)
- 3/S** GAA Roller Arm Pin (See note 26) (LV-BW) (O)
- 3/S** GAA Body Hinge Pin (See note 26) (LV-BS) (O)
- 3/S** GAA lifting Arm Roller Ramp (See note 26) (LV-BX) (O)
- 3/S** GAA Trunnion Shaft (See note 26) (LV-BT) (O)
- W** OE/HDO Hydraulic Reservoir Fill and level (Check level) (See note 16) (LV-BY) (O)
- A** OE/HDO Hydraulic Reservoir Drain (Drain and refill) (See note 16) (O)

**LUBRICANT • INTERVAL**

- Lock Plunger Shaft and latch (LV-BQ) OE/HDO
- Base Plate (Clean and coat) (LV-BL) (O) GAA
- Coupler Jaw Pin (2 fittings) (LV-BP) (O) GAA
- Rocker Shaft (LV-BM) (O) GAA
- Lateral Shaft (Front and rear) (LV-BN) (O) G M
- Approach Plate (Clean and coat) (LV-BR) (O) GAA
- Jaws (Clean and coat) (O) GAA



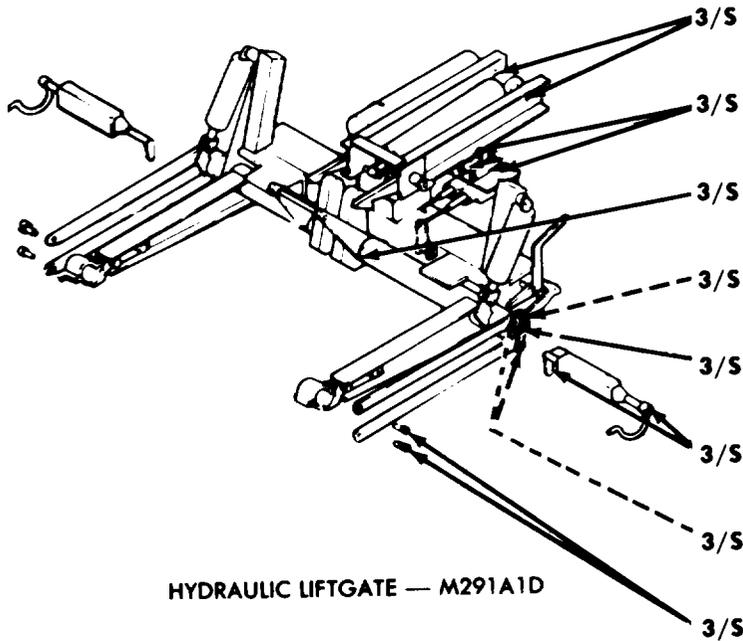
**FIFTH WHEEL — M52, M52A1, M52A2, M246, M246A1, M246A2**

**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094128

**INTERVAL • LUBRICANT**

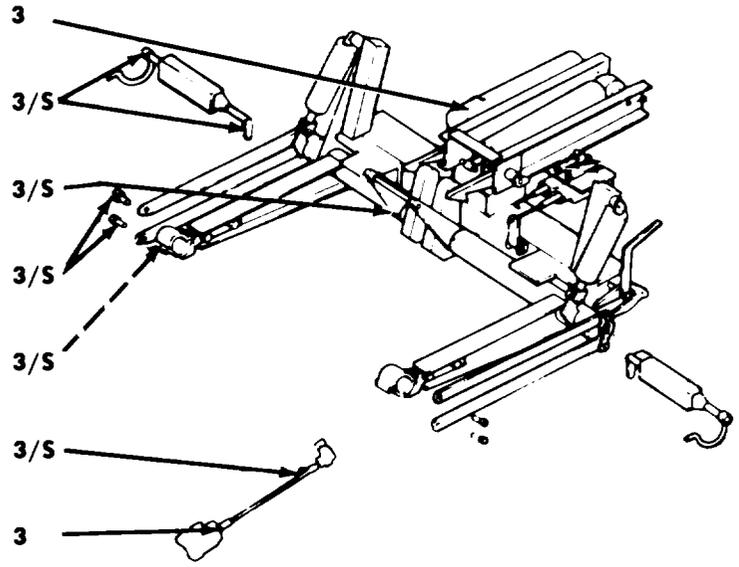


**HYDRAULIC LIFTGATE — M291A1D**

- 3/S GAA Elevating Cylinder Pivot Pin (See note 26) (O)
- 3/S GAA Kickout Valves (See note 26) (O)
- 3/S GAA Center Bearing Assembly (See note 26) (O)
- 3/S GAA Inner Clutch (See note 26) (O)
- 3/S GAA Lift Frame Bearing (See note 26) (O)
- 3/S GAA Elevating Hand Lever Shaft (See note 26) (O)
- 3/S GAA Radius Rod Pivot Pin (See note 26) (O)
- 3/S GAA Radius Rod Pivot Pins (See note 26) (O)

**LUBRICANT • INTERVAL**

- Hydraulic Oil Tank (Drain and refill) (See note 27) (O) OE/ HDO 3
- Elevating Hand Lever Shaft (See note 26) (O) GAA 3/S
- Center Bearing Assembly (See note 26) (O) GAA 3/S
- Radius Rod Pivot Pins (See note 26) (O) GAA 3/S
- Bearing Arm Assembly (See note 26) (O) GAA 3/S
- Hydraulic Pump Universal Joint (See note 26) (O) GAA 3/S
- Power Takeoff Universal Joint (See note 9) (O) GAA 3



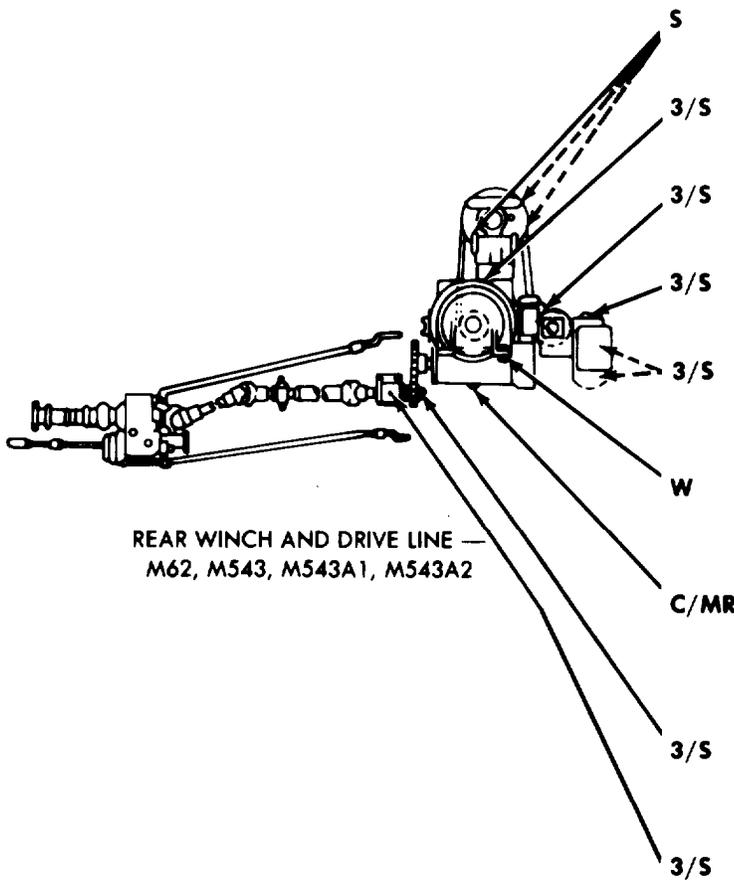
**HYDRAULIC LIFTGATE — M291A1D**

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A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094129

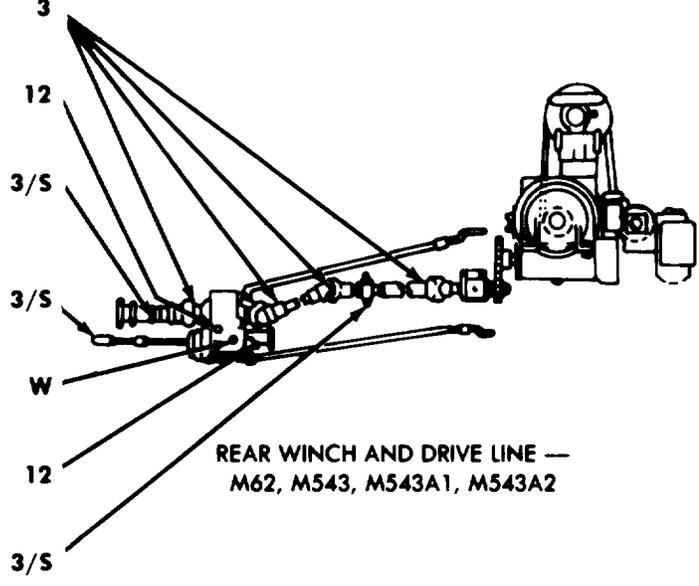
**INTERVAL • LUBRICANT**



- S GAA Winch Level Wind (8 fittings) (LV-AZ) (O)
- 3/S GO Winch Worm and Gearcase Fill (See note 26) (LV-AV) (O)
- 3/S GAA winch End Bearing (See note 26) (LV-BA) (O)
- 3/S GAA Cable Tensioner (See note 26) (LV-AY) (O)
- 3/S GAA Cable Guide Roller (8 fittings) (See note 26) (LV-AX) (O)
- W GO Winch Worm and Gearcase Level (Check level) (LV-BB) (O)
- C/MR GO Winch Worm and Gearcase Drain (Drain and refill) (See note 6) (LV-BD) (O)
- 3/S CW Worm Drive Chain (Coat lightly) (See note 26) (LV-BC) (O)
- 3/S GAA Drive Sprocket Braking Assembly (See note 26) (LV-BE) (O)

**LUBRICANT • INTERVAL**

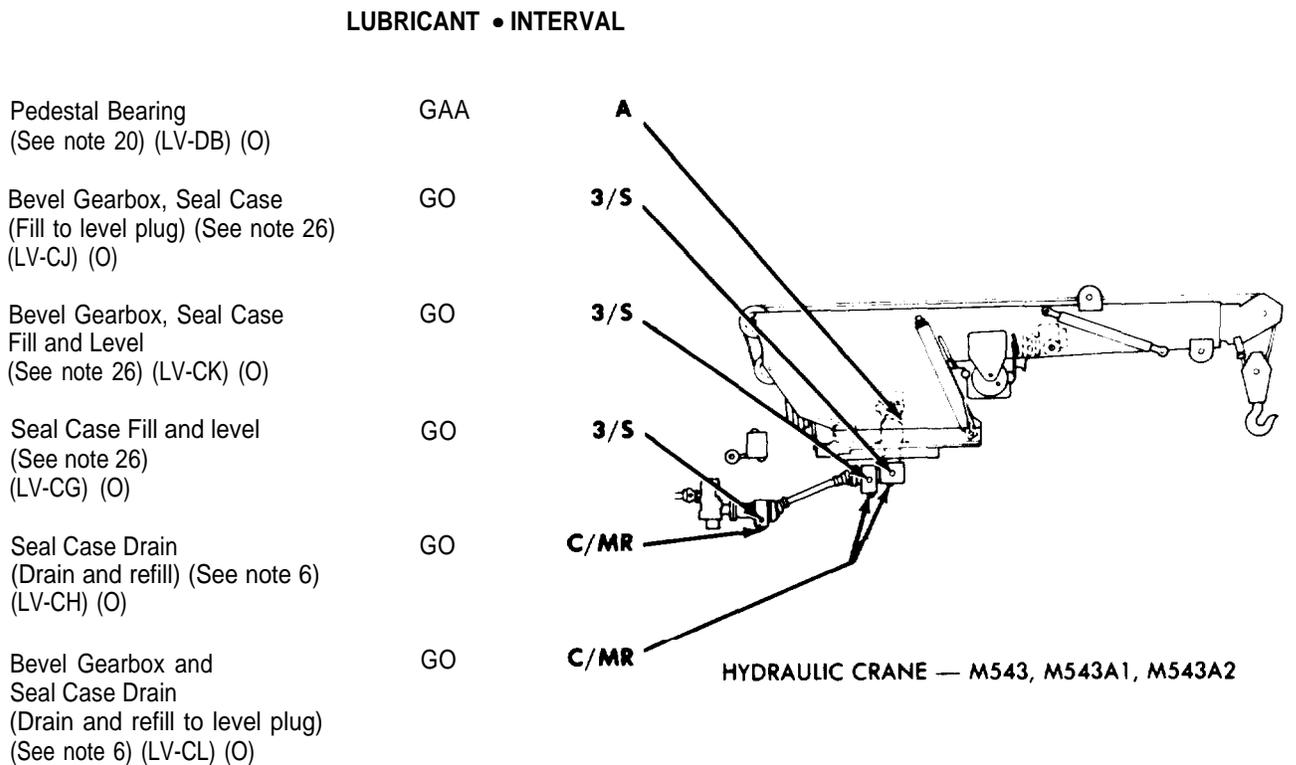
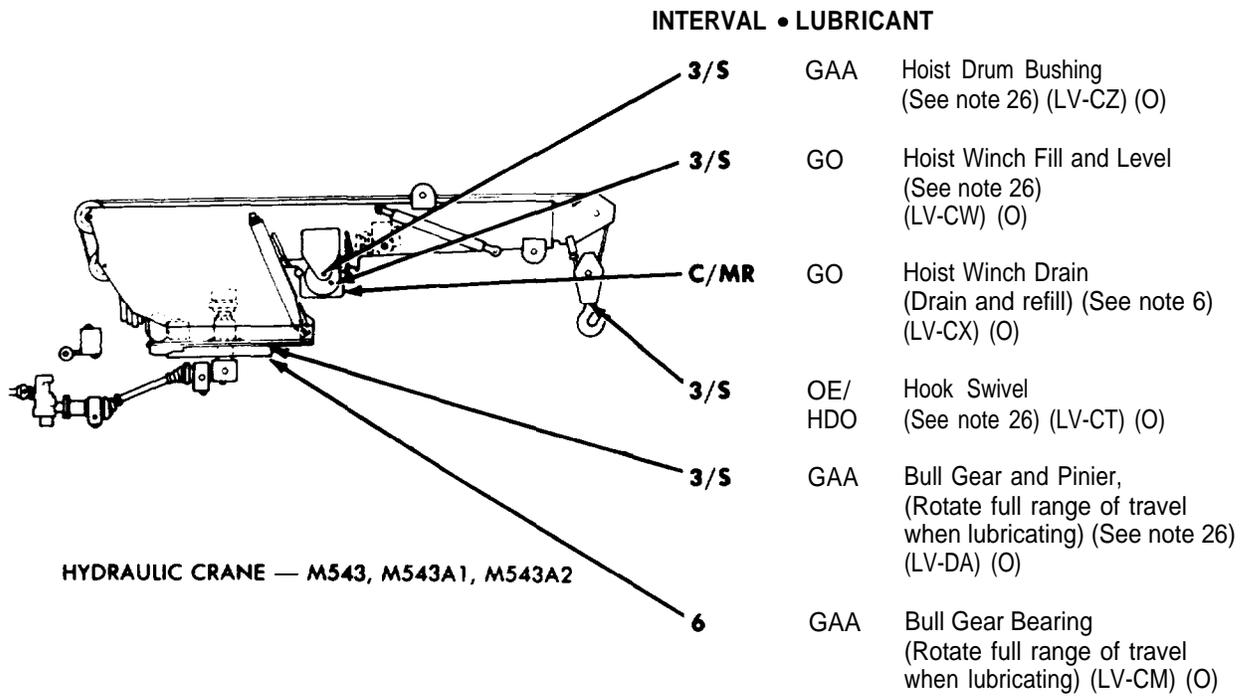
- Propeller Shaft Universal Joints (See note 9) (LV-DP) (O) GAA 3
- Power Divider Fill (LV-BH) (O) GO 12
- Hydraulic Pump Governor Spinner Valve (O) OE/HDO 3/S
- Power Divider Shift Linkage (O) OE/HDO 3/S
- Power Divider level (LV-BJ) (O) GO W
- Power Divider Drain (Drain and refill) (LV-BK) (O) GO 12
- Pillow Block (LV-BF) (O) GAA 3/S



**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094130

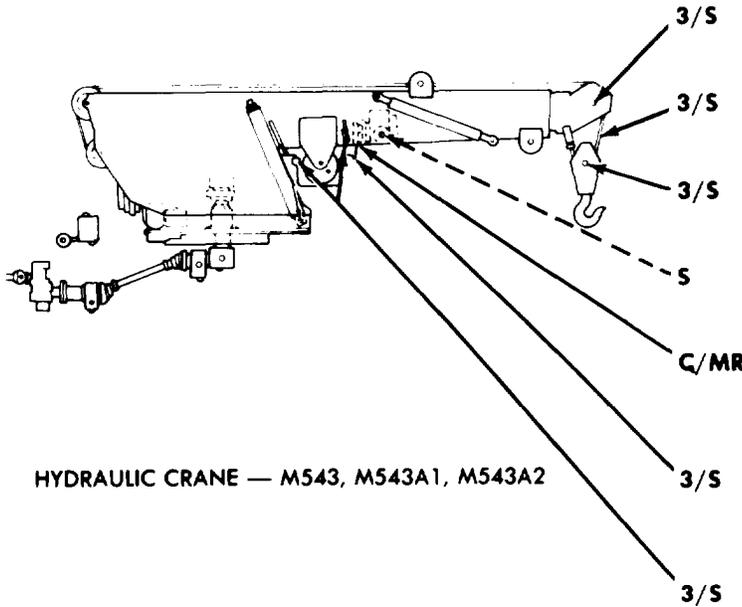


**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

**TA 094131**

**INTERVAL • LUBRICANT**

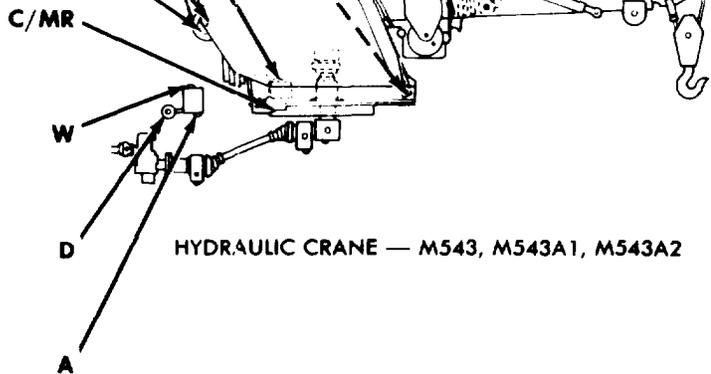


HYDRAULIC CRANE — M543, M543A1, M543A2

- GAA** Sheave Pin  
(See note 26) (LV-CQ) (O)
- OE/  
HDO** Hoist Cable  
(See note 14) (LV-CR) (O)
- GAA** Block Sheave Pin  
(See note 26) (LV-CS) (O)
- GAA** Shaft Boom Roller  
(LV-CP) (O)
- GO** Hoist Gearcase Drain  
(Drain and refill)  
(See note 6) (LV-CV) (O)
- GO** Hoist Gearcase  
Fill and Level  
(See note 26) (LV-CU) (O)
- GAA** Hoist Hanger  
(See note 26) (LV-CY) (O)

**LUBRICANT • INTERVAL**

- Bushing Elevating Cylinder**  
(See note 26) (LV-BZ) (O)
- Swinger Gearcase**  
Fill and Level  
(See note 26) (LV-CF) (O)
- Sheave Pin**  
(See note 26) (LV-CD) (O)
- Sheave Bushings**  
(See note 26) (LV-CC) (O)
- Swinger Gearcase Drain**  
(Drain and refill)  
(See note 6) (LV-CE) (O)
- Hydraulic Oil Tank**  
Fill and Level  
(See note 15) (LV-CB) (O)
- Hydraulic System Filter**  
(Check indicator)  
(See note 22) (C)
- Hydraulic Oil Tank Drain**  
(Drain and refill)  
(See note 15) (LV-CA) (O)



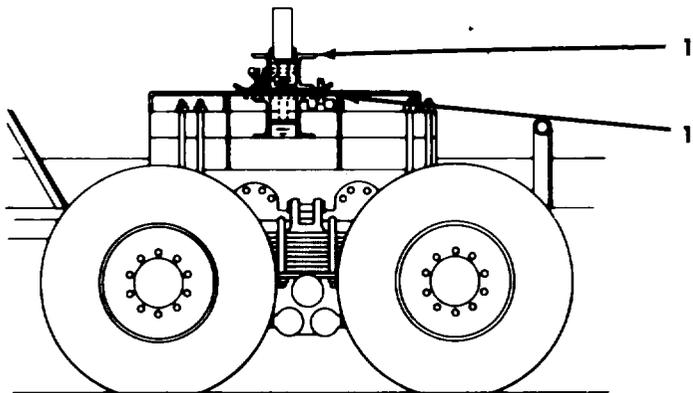
HYDRAULIC CRANE — M543, M543A1, M543A2

**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094132

**INTERVAL • LUBRICANT**



- GAA** King Pin  
(O)
- GAA** Bolster Base  
(O)

**BOLSTER AND FIFTH WHEEL — M748A1 (LEFT SIDE VIEW)**

**LUBRICANT • INTERVAL**

Roller Bearing  
(O)

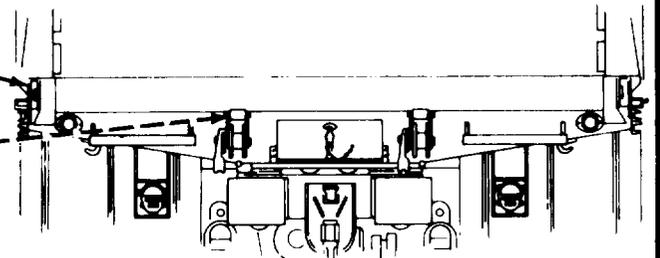
**GAA**

S

Support Roller Pin  
(O)

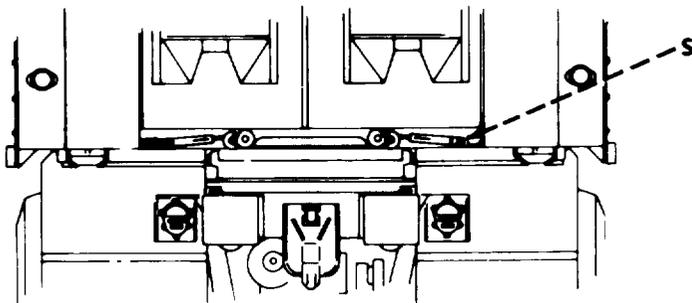
**GAA**

S



**BRIDGE TRANSPORTER BODY — M328A1 (REAR VIEW)**

**INTERVAL • LUBRICANT**



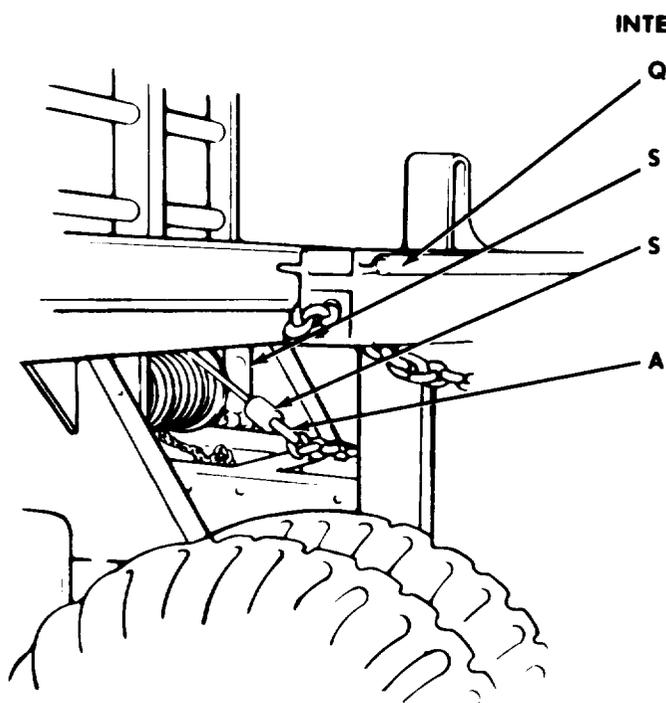
- GAA** Pawl Plunger  
(O)

**VAN BODY — M291A1, M291A1D (REAR VIEW)**

**NOTE**

A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094133



**INTERVAL • LUBRICANT**

- GAA** King Pin (O)
- OE/HDO** Winch Jaw Clutch (Clean and oil) (O)
- GO** Winch End Bearing Housing Level (Check level) (O)
- GO** Winch End Bearing Housing Drain (Drain and refill) (O)

MIDSHIP WINCH — M748A1

Winch Universal and Slip Joint  
(See note 9) (LV-DP, DQ) (O)

Winch Cable  
(See note 14) (O)

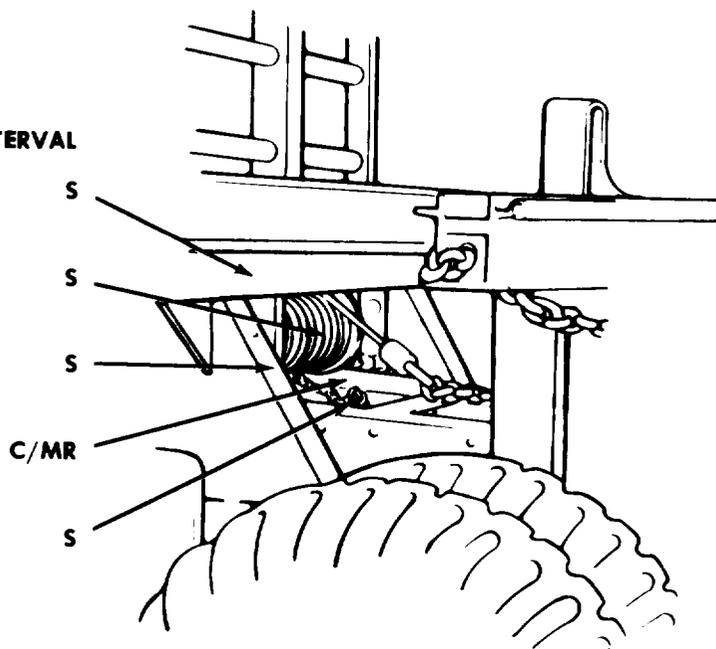
Winch Gearcase Level  
(Check level) (O)

Winch Gearcase Drain  
(Drain and refill) (O)

Worm Drive Chain  
(Coat lightly) (O)

**LUBRICANT • INTERVAL**

- GAA** S
- OE/HDO** S
- GO** S
- GO** C/MR
- CW** S

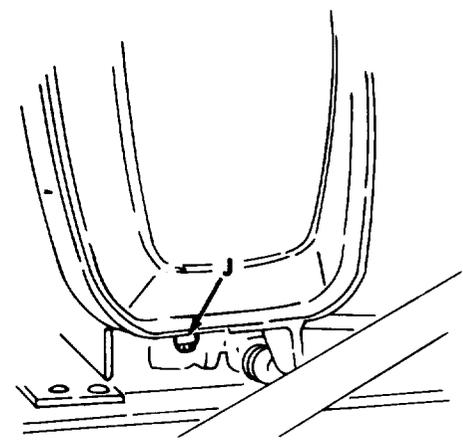
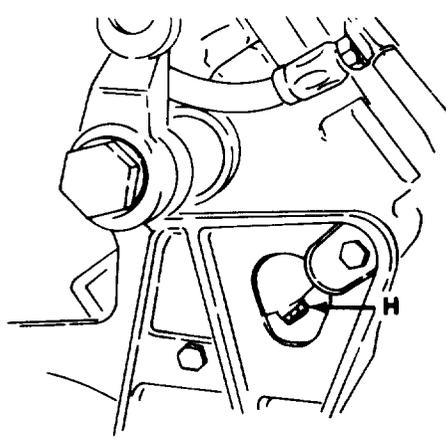
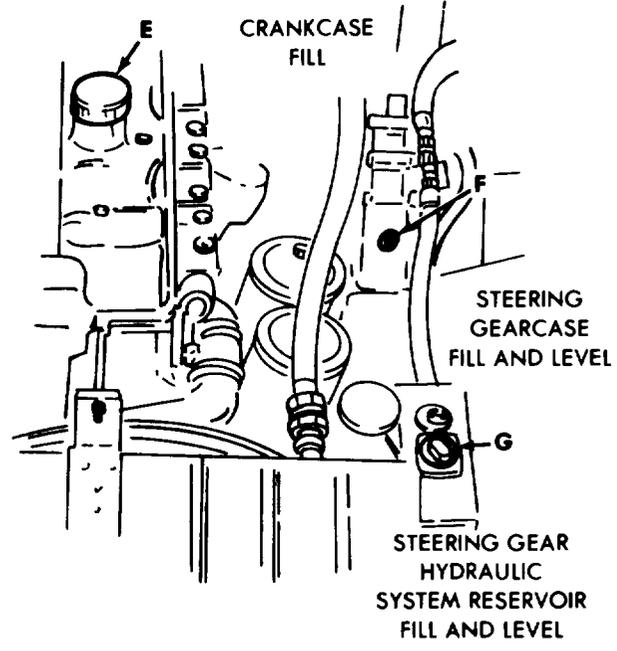
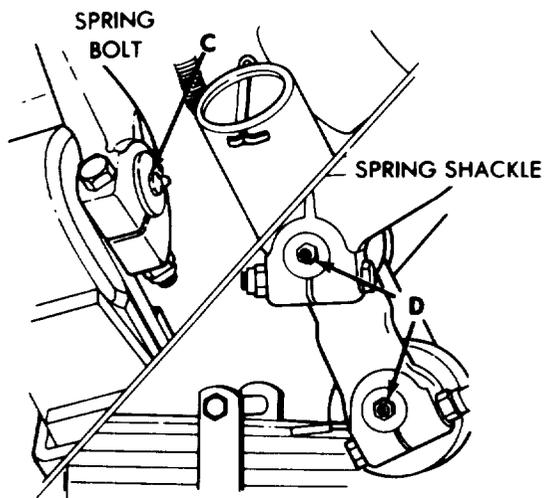
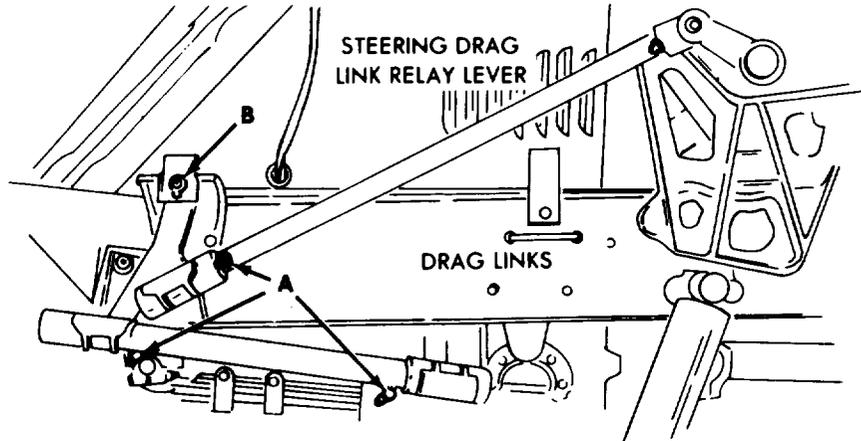


MIDSHIP WINCH — M748A1

**NOTE**

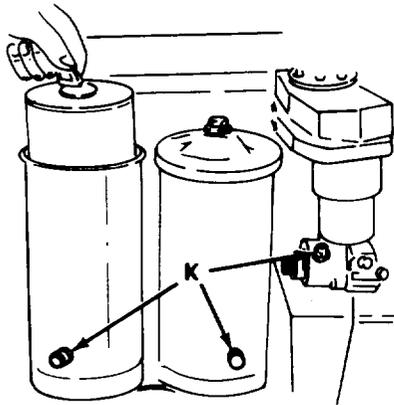
A REFERENCE TO THE APPROPRIATE LOCALIZED VIEW (LV) IS PROVIDED AFTER LUBRICATION POINT ENTRY, IN MOST CASES.

TA 094134

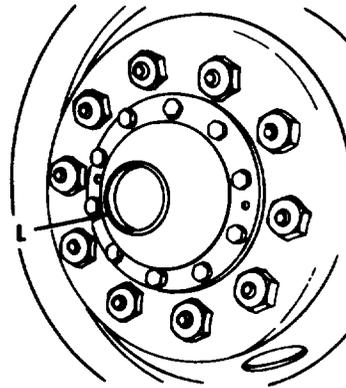


LOCALIZED LUBRICATION POINTS (A THROUGH J)

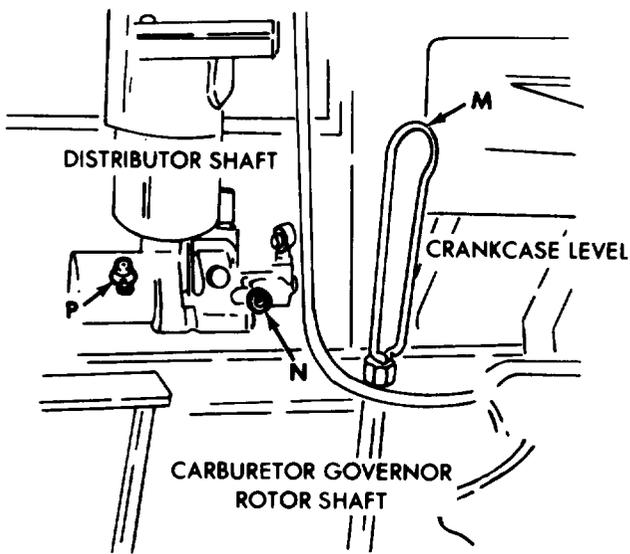
TA 094135



OIL FILTERS



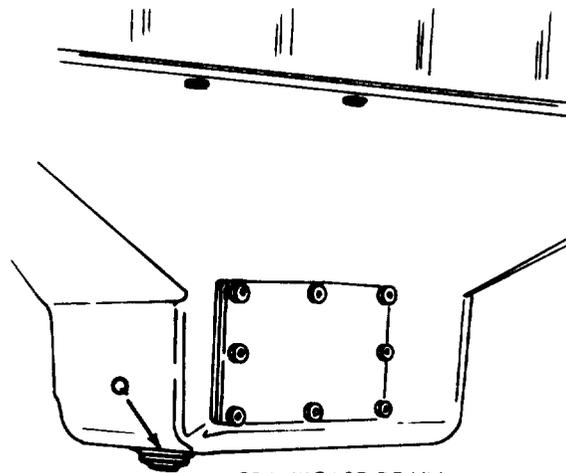
WHEEL BEARINGS



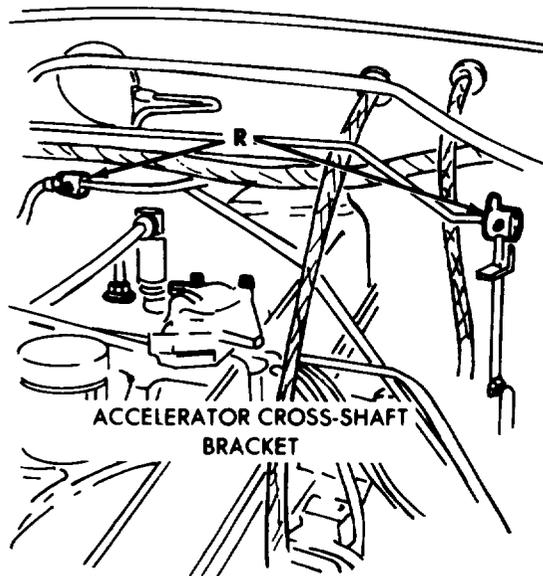
DISTRIBUTOR SHAFT

CRANKCASE LEVEL

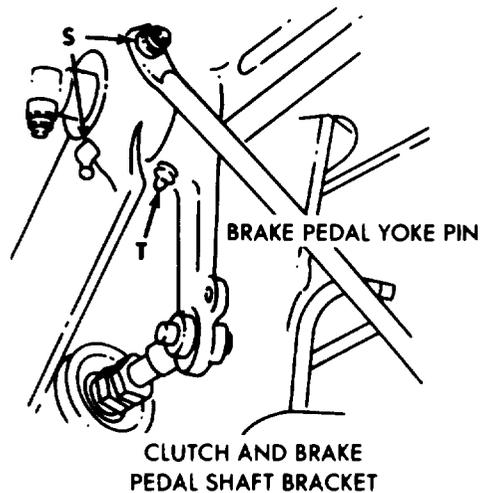
CARBURETOR GOVERNOR  
ROTOR SHAFT



CRANKCASE DRAIN  
(GASOLINE)



ACCELERATOR CROSS-SHAFT  
BRACKET

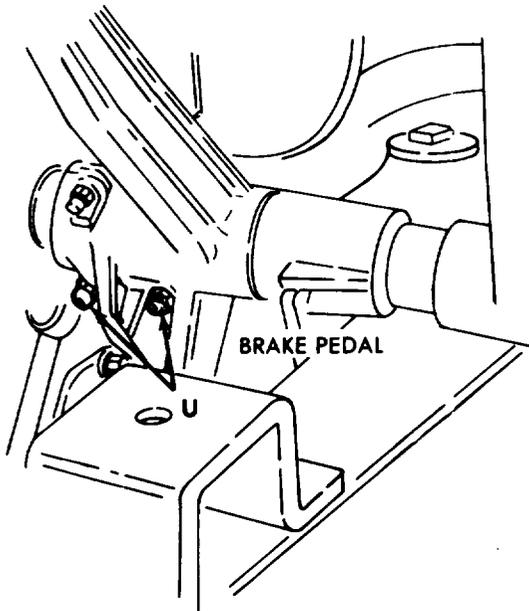


BRAKE PEDAL YOKE PIN

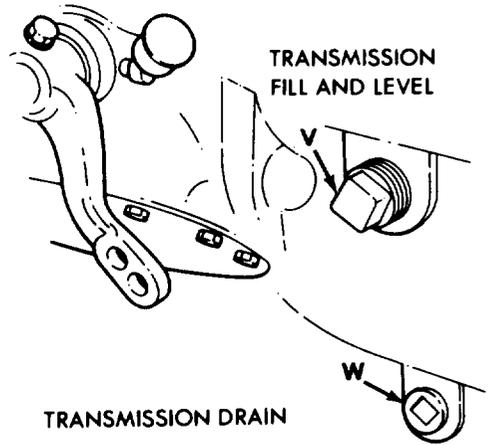
CLUTCH AND BRAKE  
PEDAL SHAFT BRACKET

LOCALIZED LUBRICATION POINTS (K THROUGH T)

TA 094136

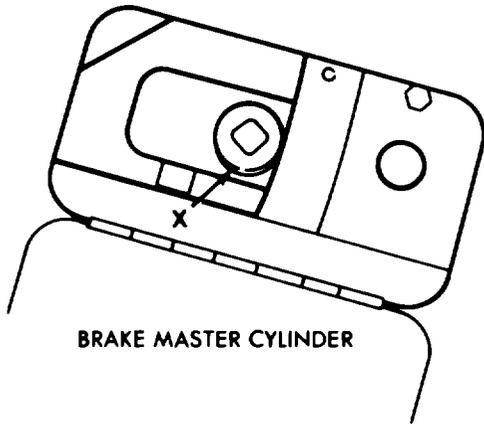


BRAKE PEDAL

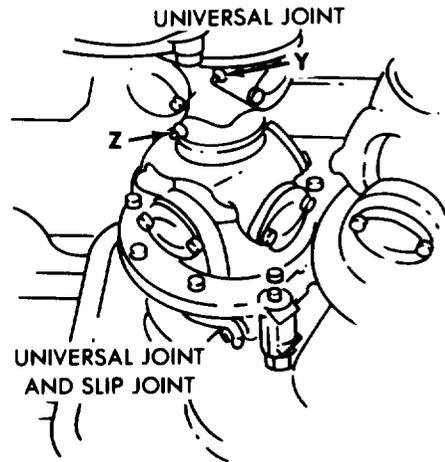


TRANSMISSION  
FILL AND LEVEL

TRANSMISSION DRAIN

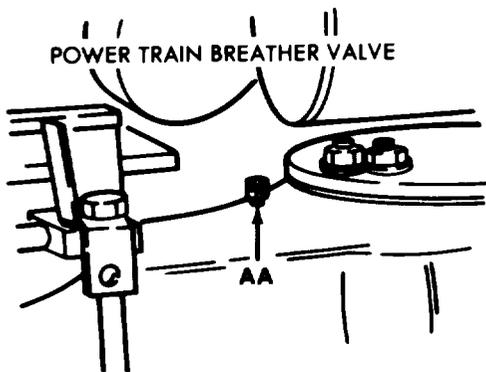


BRAKE MASTER CYLINDER

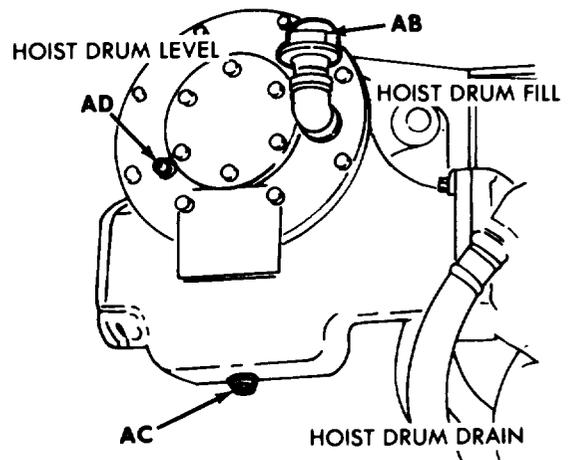


UNIVERSAL JOINT

UNIVERSAL JOINT  
AND SLIP JOINT



POWER TRAIN BREATHER VALVE



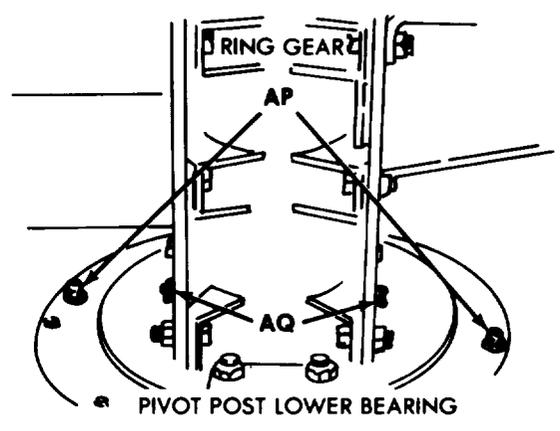
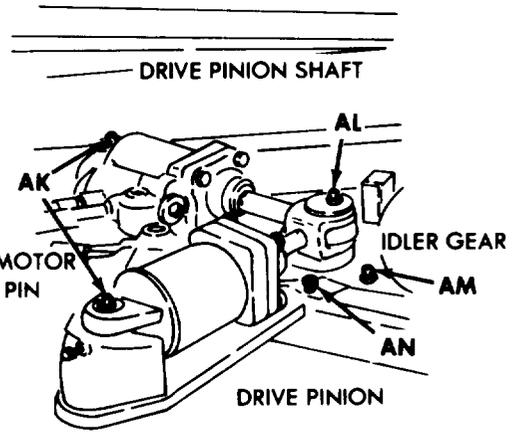
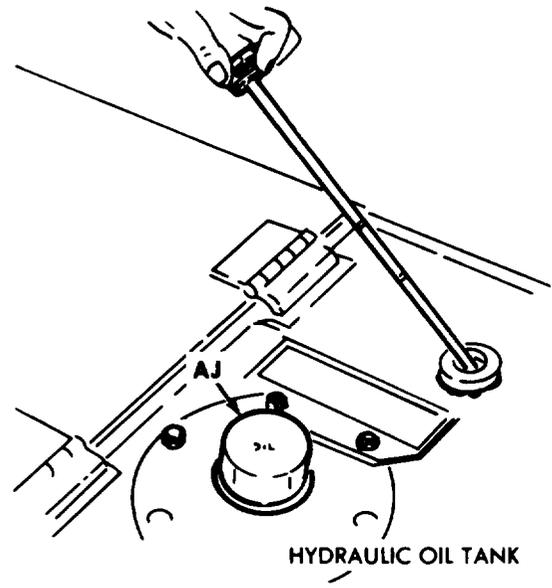
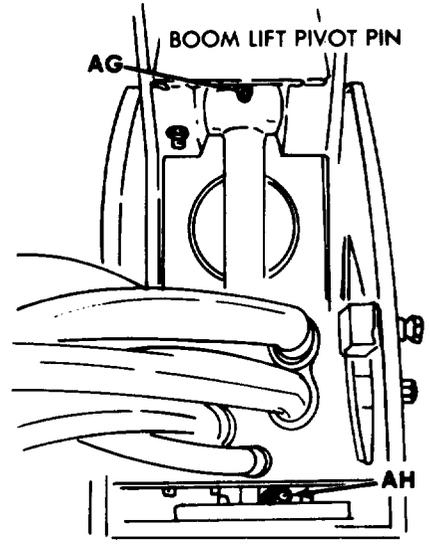
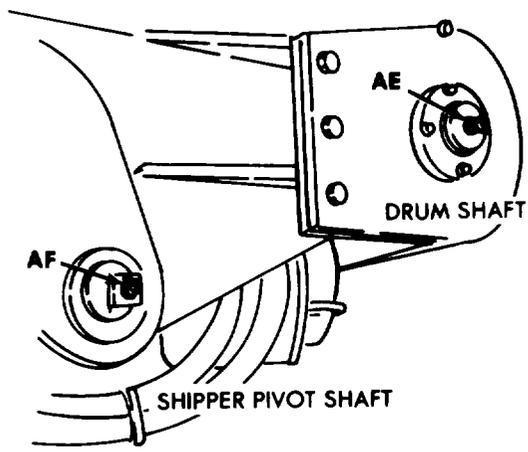
HOIST DRUM LEVEL

HOIST DRUM FILL

HOIST DRUM DRAIN

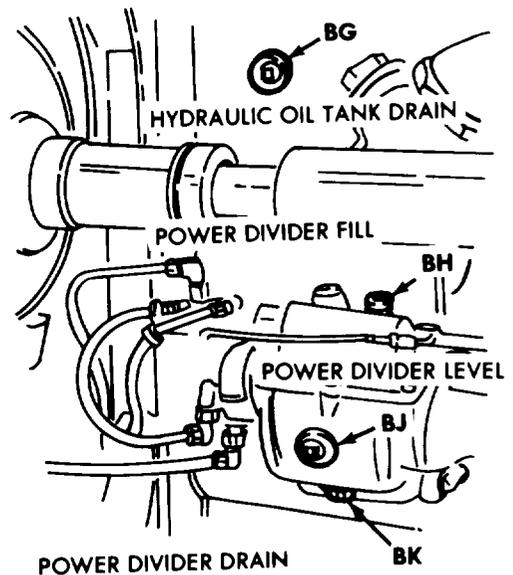
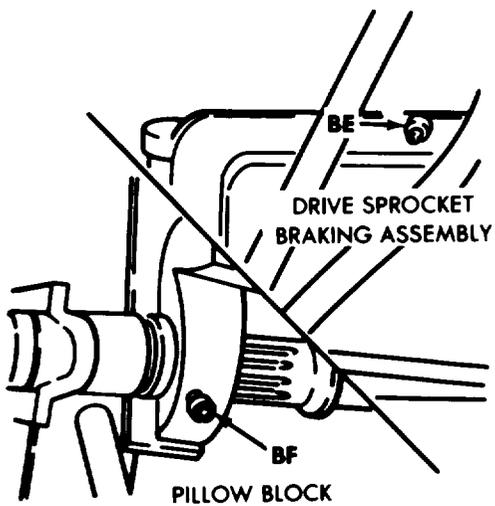
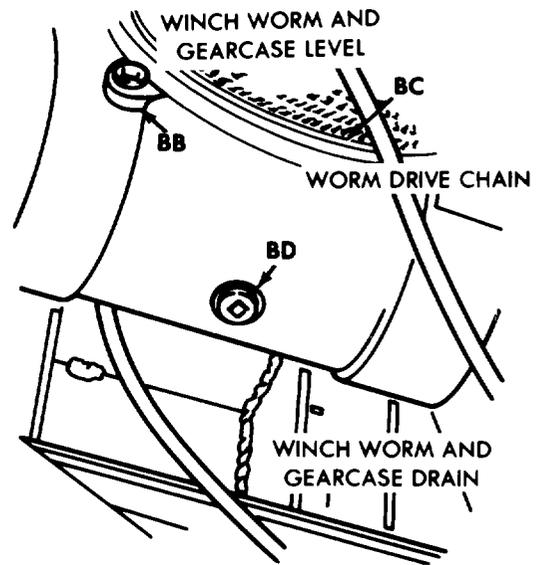
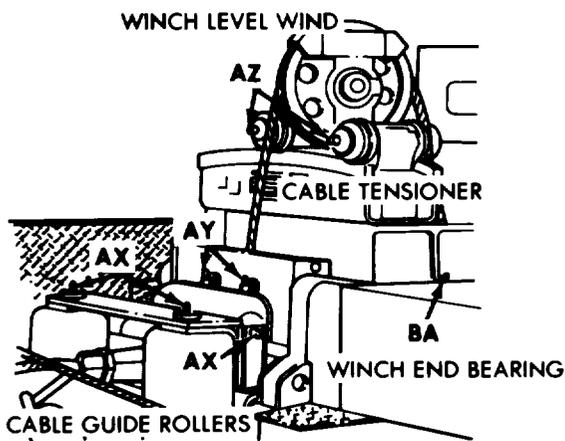
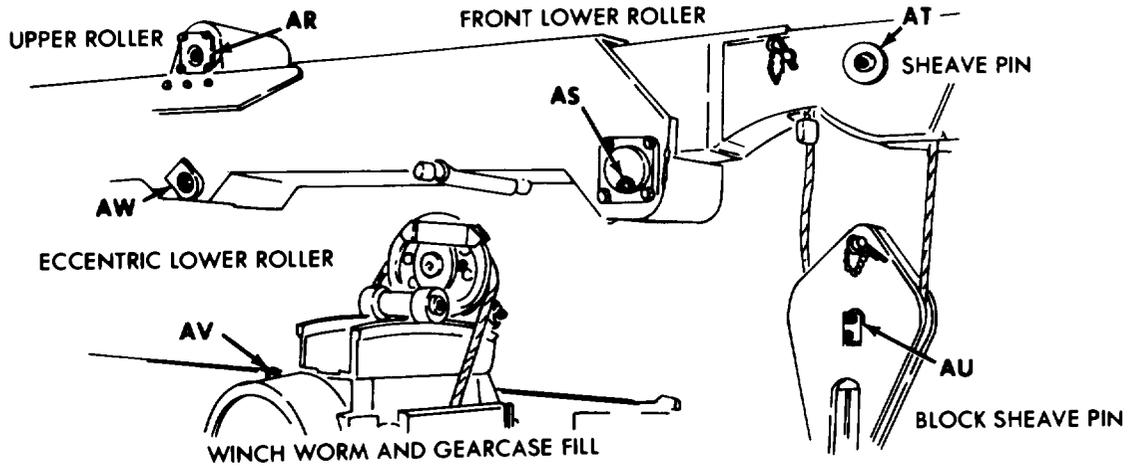
LOCALIZED LUBRICATION POINTS (U THROUGH AD)

TA 094137



LOCALIZED LUBRICATION POINTS (AE THROUGH AQ)

TA 094138

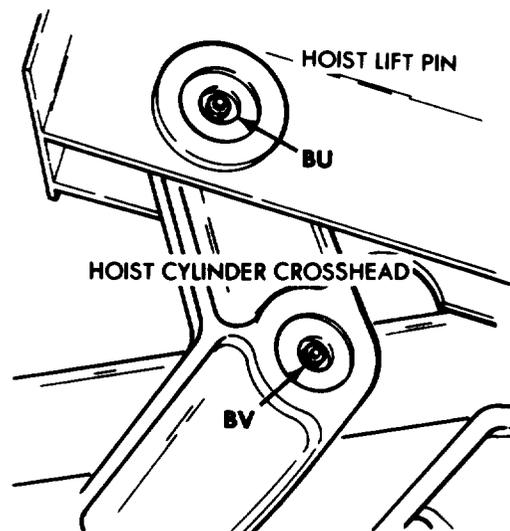
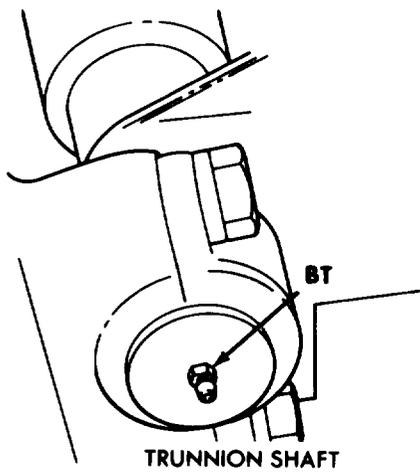
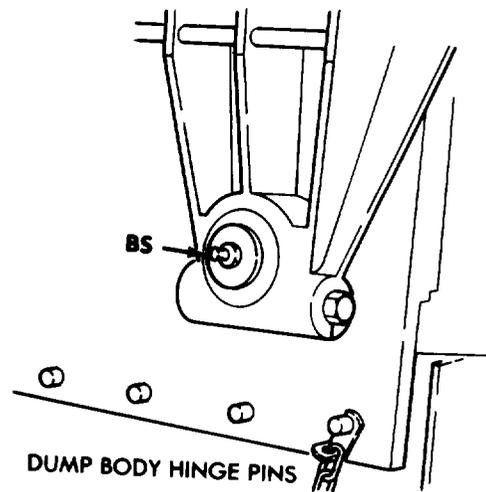
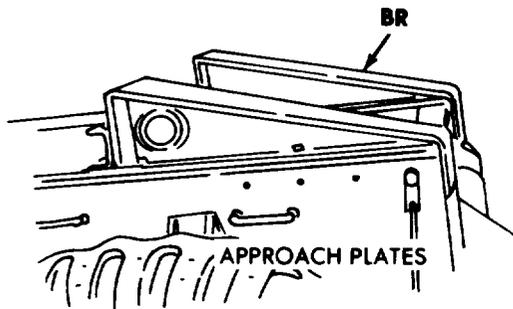
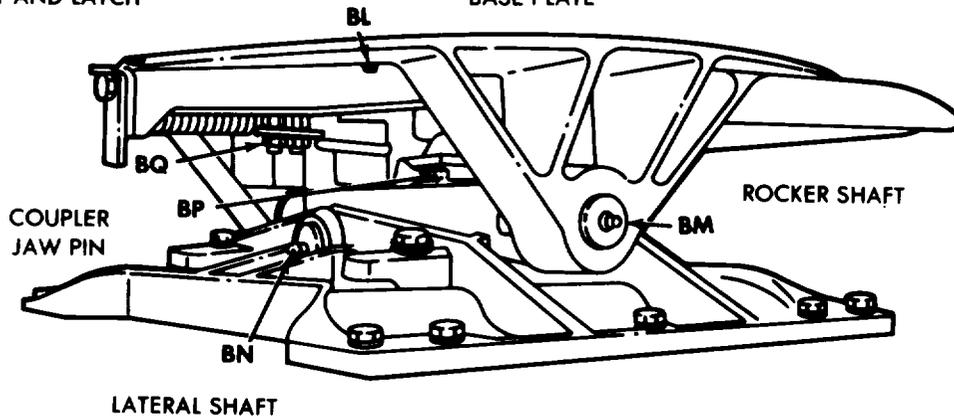


LOCALIZED LUBRICATION POINTS (AR THROUGH BK)

TA 094139

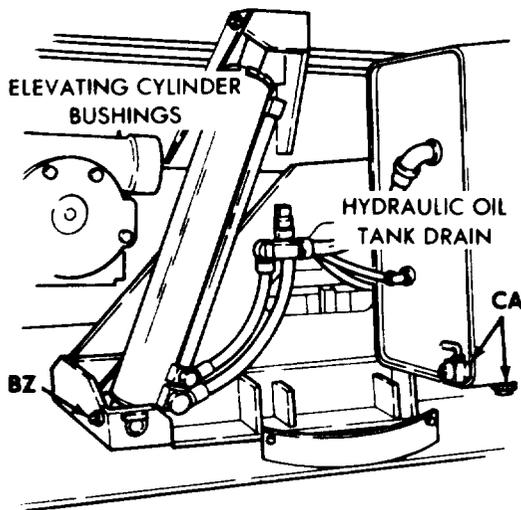
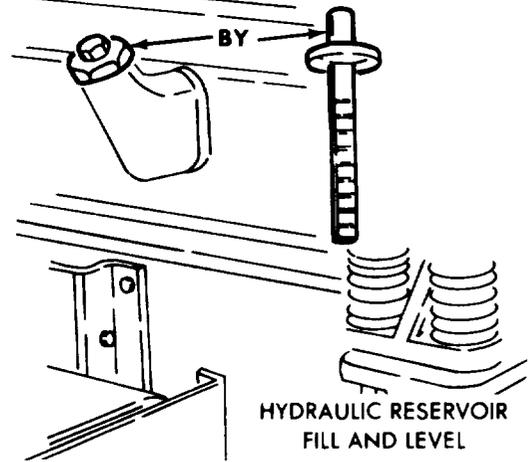
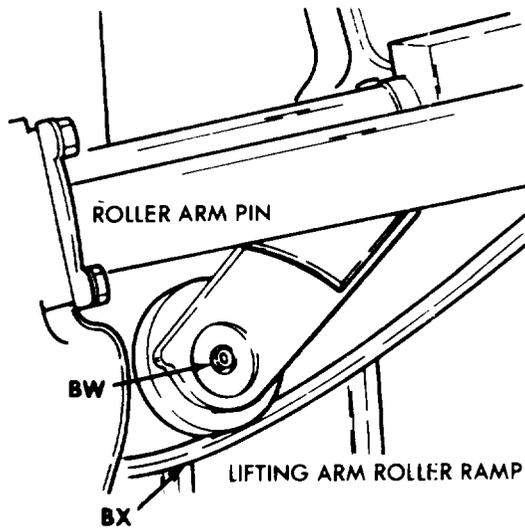
LOCK PLUNGER  
SHAFT AND LATCH

BASE PLATE

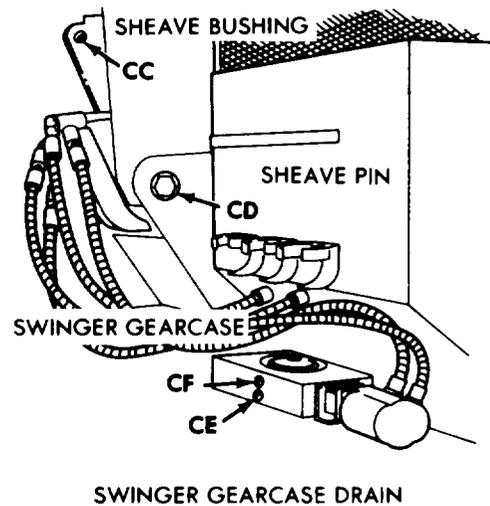
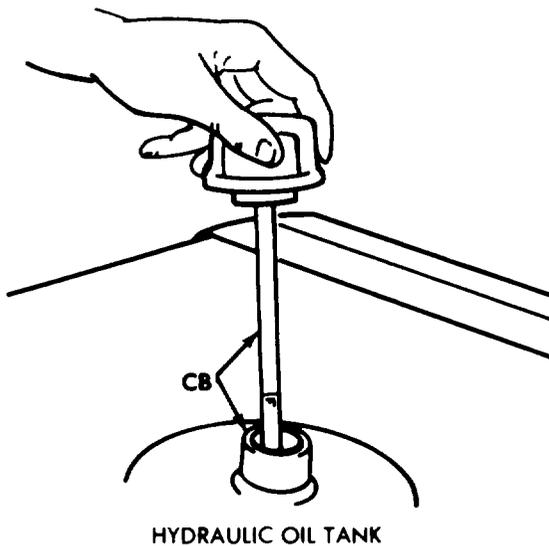


LOCALIZED LUBRICATION POINTS (BL THROUGH BV)

TA 094140

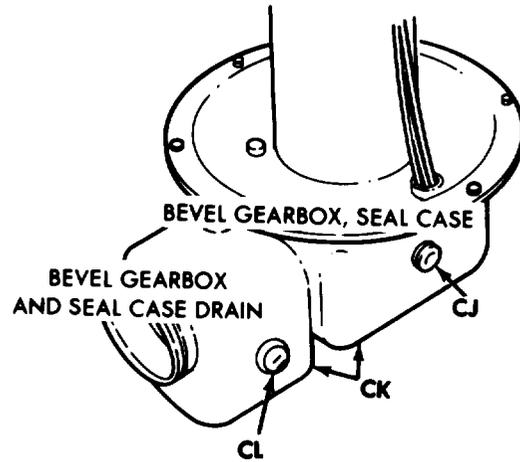
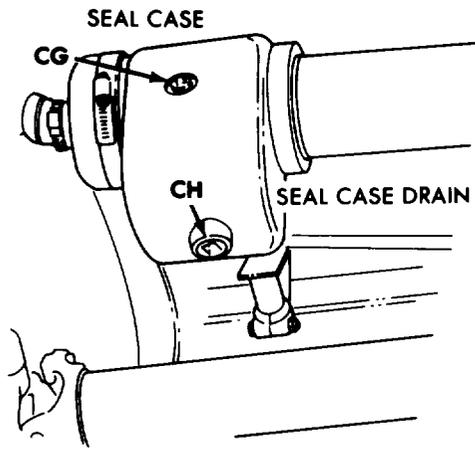


**NOTE:** TO DRAIN, REMOVE PIPE PLUG FROM DRAIN VALVE AND ATTACH HOSE (FURNISHED WITH VEHICLE) AND DRAIN OIL OVERSIDE INTO CONTAINER. REMOVE DRAIN PLUG IN BOTTOM OF TANK TO COMPLETELY DRAIN TANK. ALWAYS REPLACE PLUG IN DRAIN VALVE.

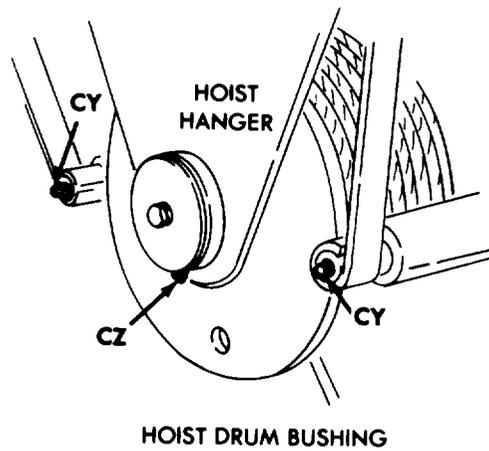
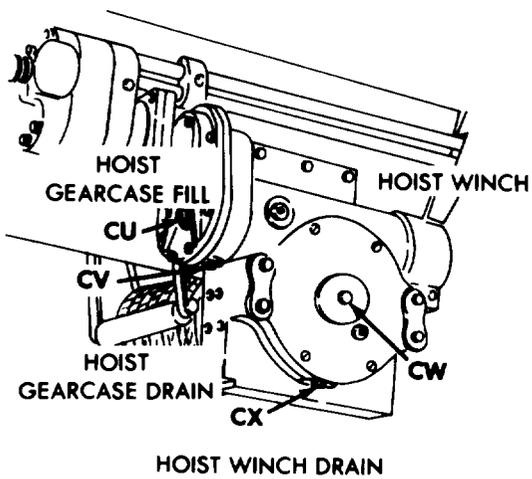
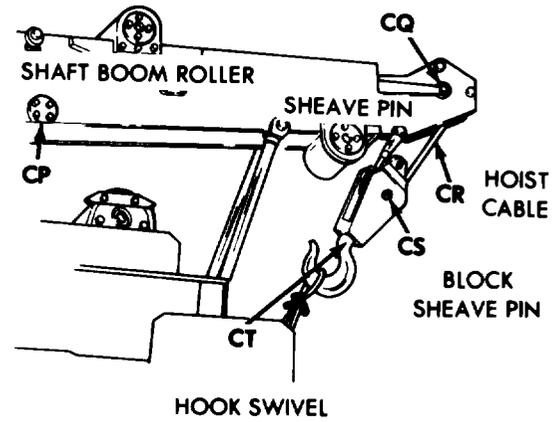
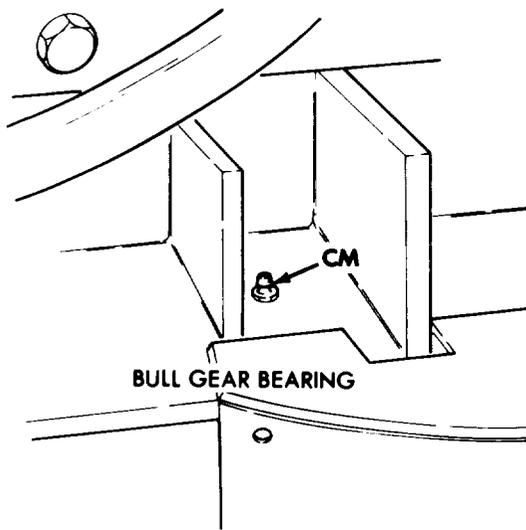


LOCALIZED LUBRICATION POINTS (BW THROUGH CF)

TA 094141

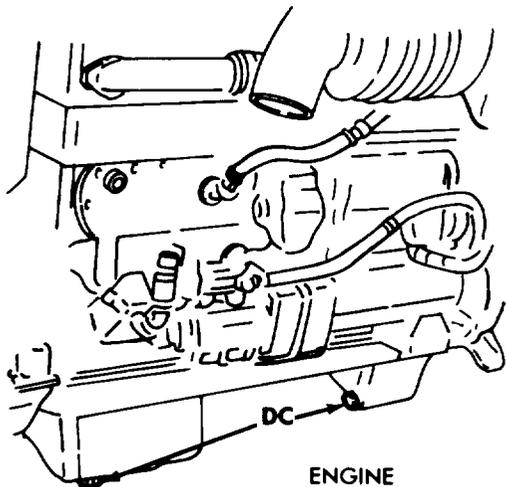
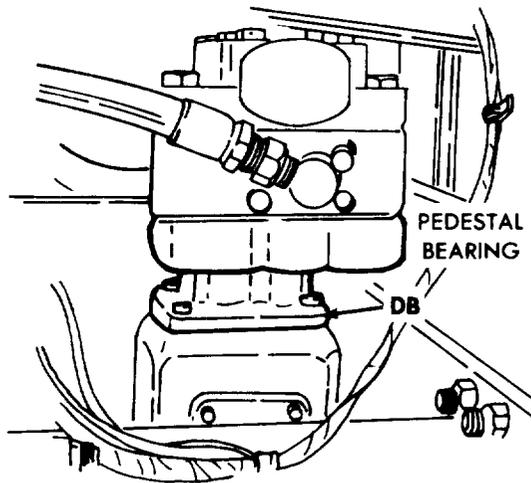
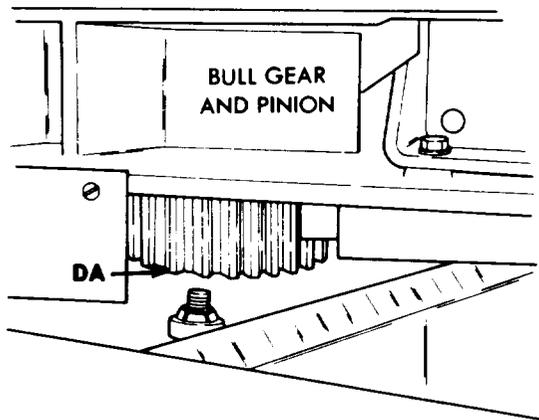


BEVEL GEARBOX, SEAL CASE  
FILL AND LEVEL

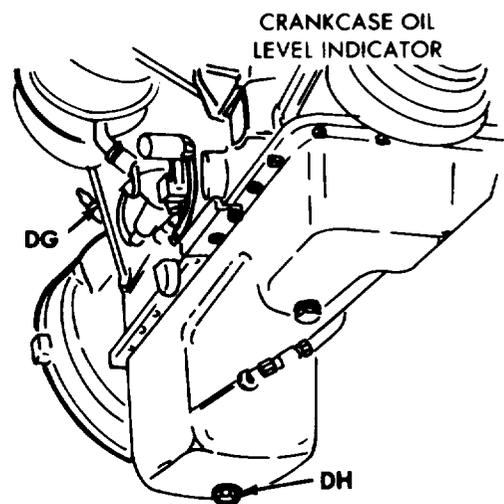
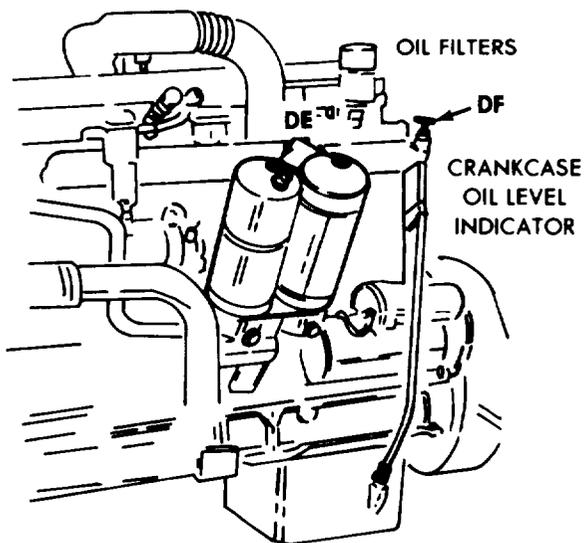
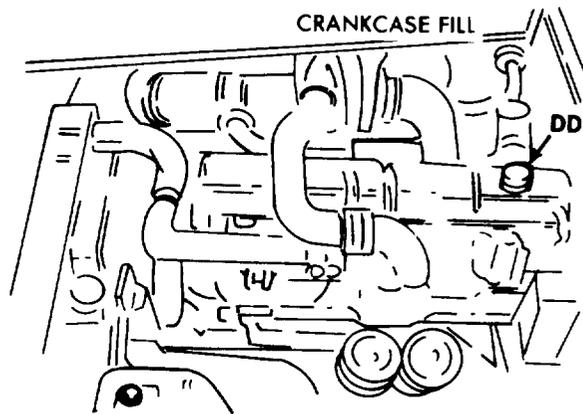


LOCALIZED LUBRICATION POINTS (CG THROUGH CZ)

TA 094142



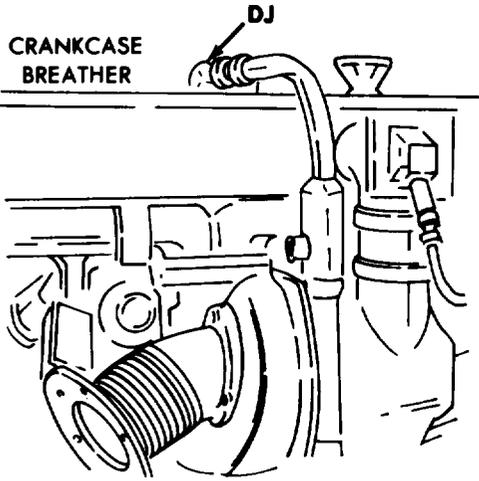
ENGINE  
CRANKCASE DRAINS  
(DIESEL)



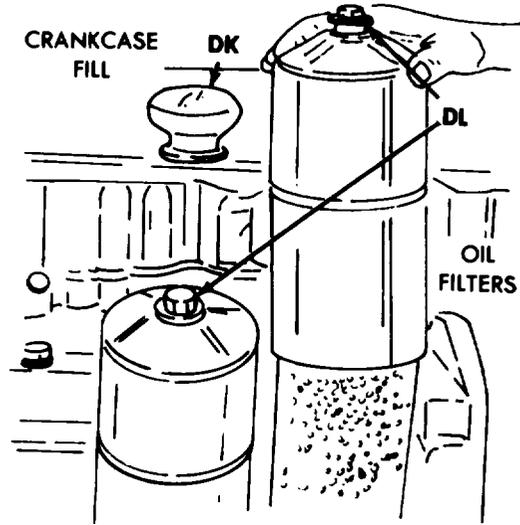
CRANKCASE DRAIN  
(MULTIFUEL)

LOCALIZED LUBRICATION POINTS (DA THROUGH DH)

TA 094143

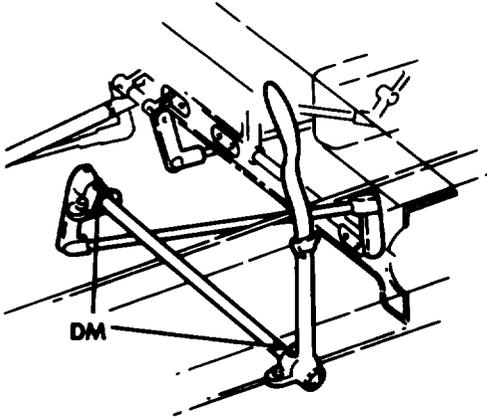


CRANKCASE BREATHER



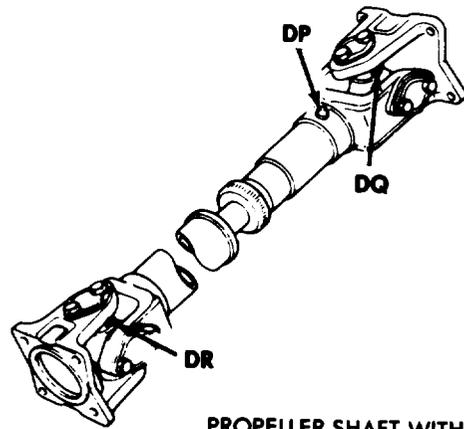
CRANKCASE FILL

OIL FILTERS

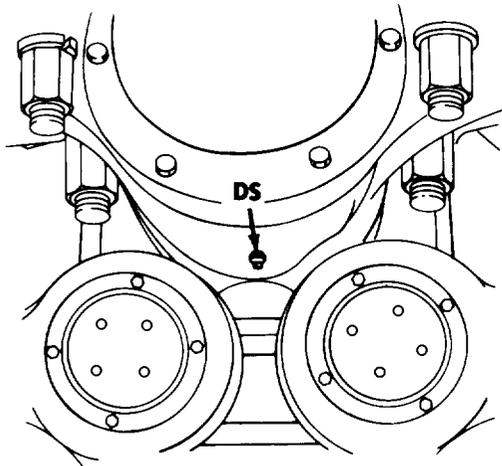


DM

POWER DIVIDER/DUMP CONTROL LEVER CROSS-SHAFT

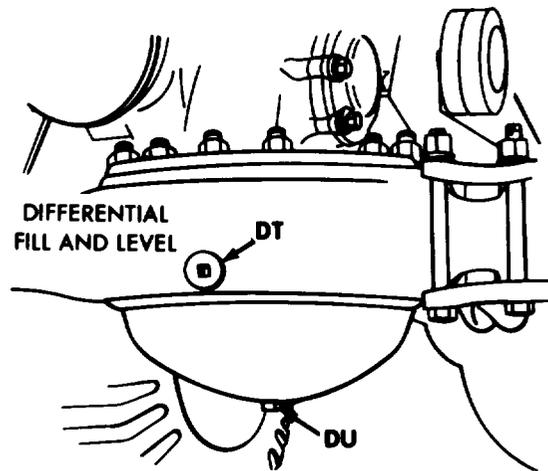


PROPELLER SHAFT WITH SLIP JOINT AND UNIVERSAL



DS

TRUNNION BEARING

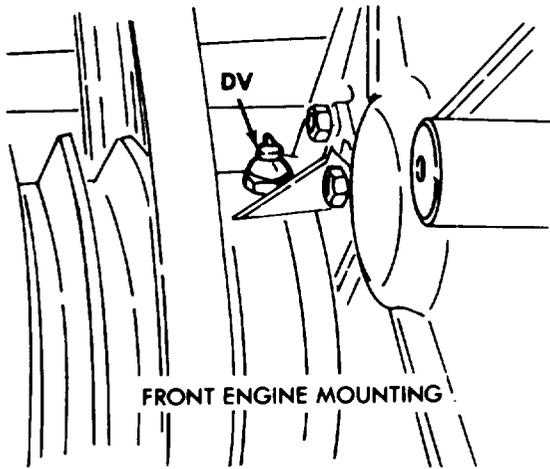


DIFFERENTIAL FILL AND LEVEL

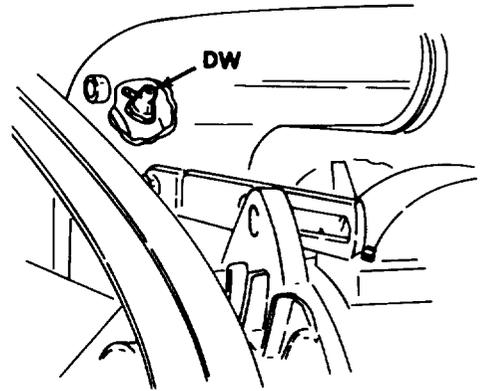
DIFFERENTIAL DRAIN

LOCALIZED LUBRICATION POINTS (DJ THROUGH DU)

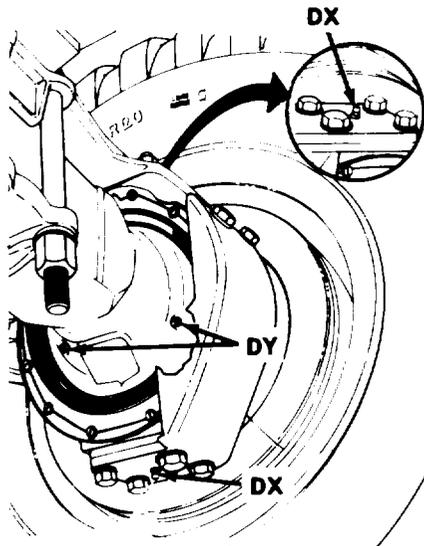
TA 094144



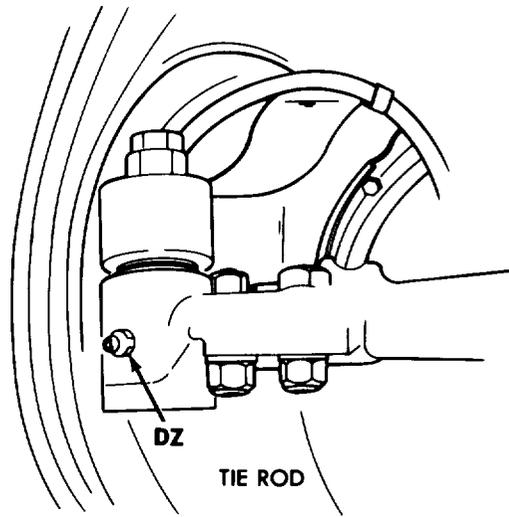
FRONT ENGINE MOUNTING



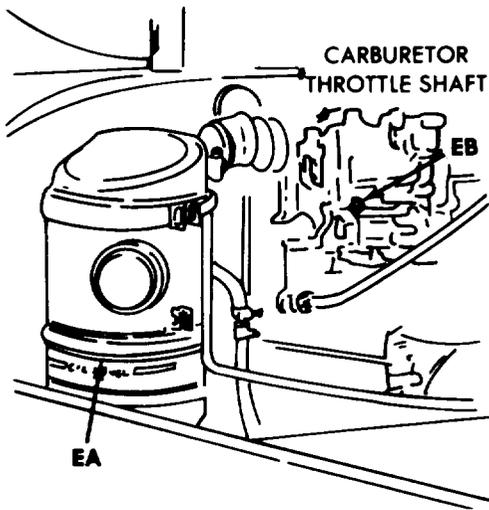
WATER PUMP



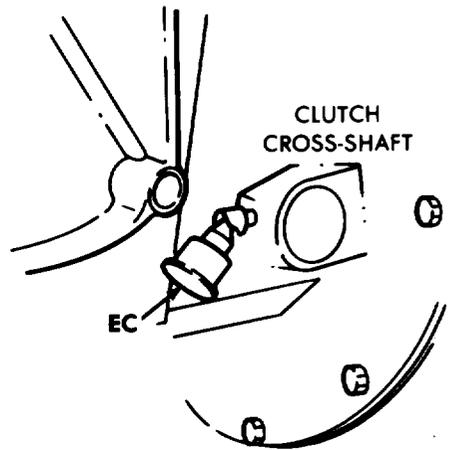
UNIVERSAL JOINT AND STEERING KNUCKLE BEARING



TIE ROD



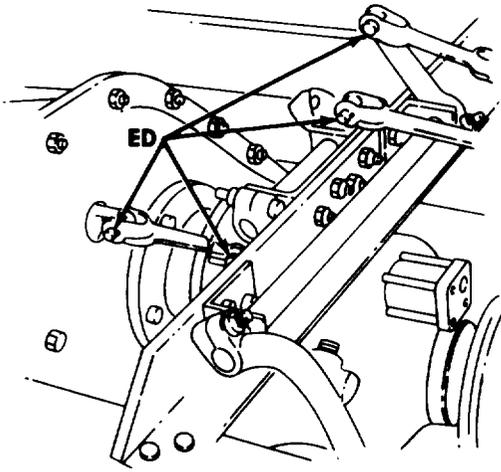
AIR CLEANER (GASOLINE)



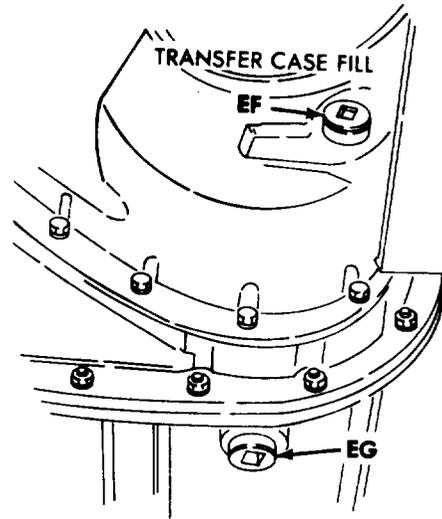
CLUTCH CROSS-SHAFT

LOCALIZED LUBRICATION POINTS (DV THROUGH EC)

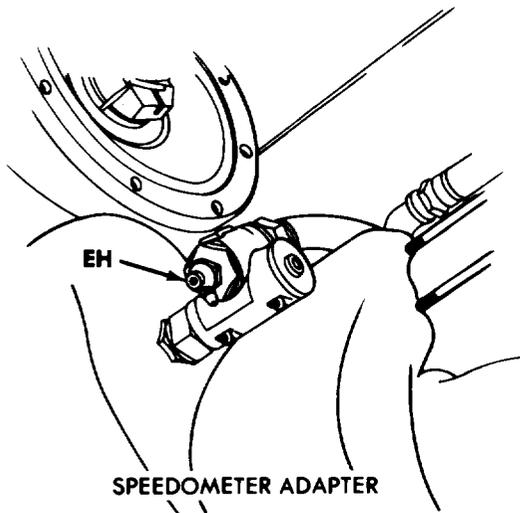
TA 094145



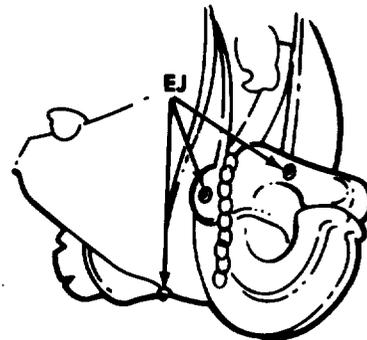
TRANSFER CASE SHIFT LINKAGE PINS



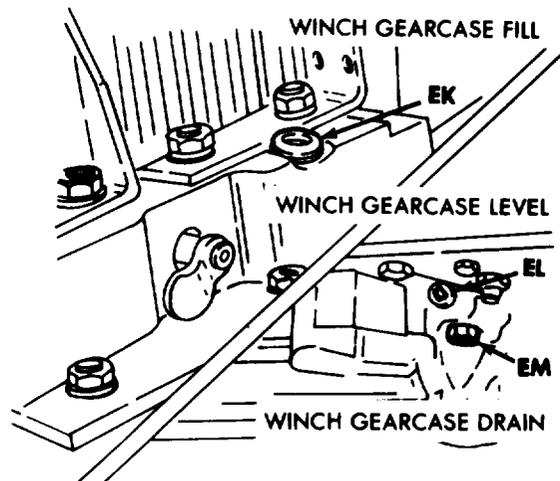
TRANSFER CASE DRAIN



SPEEDOMETER ADAPTER

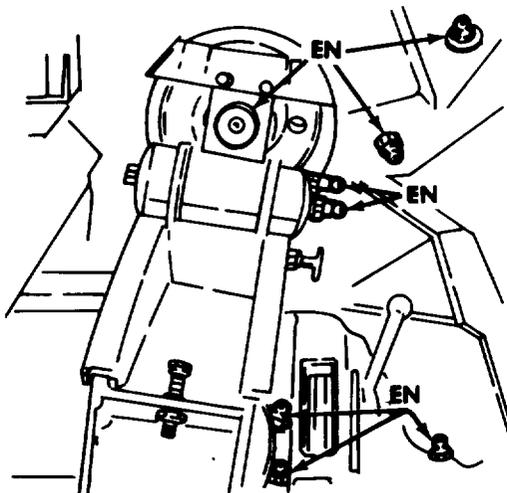


TOWING PINTLE



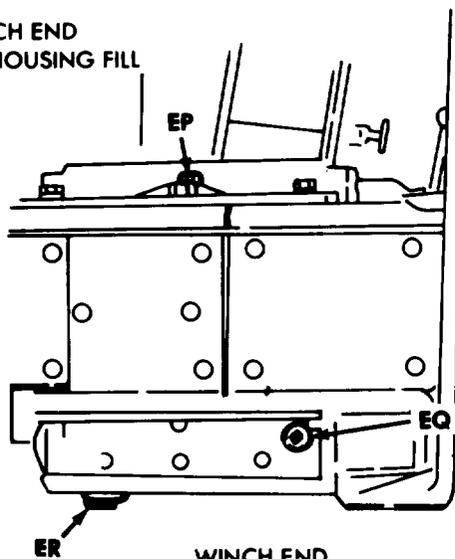
LOCALIZED LUBRICATION POINTS (ED THROUGH EM)

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WINCH LEVEL WIND

WINCH END  
BEARING HOUSING FILL



WINCH END  
BEARING HOUSING LEVEL

WINCH END  
BEARING HOUSING DRAIN

LOCALIZED LUBRICATION POINTS (EN THROUGH ER)

TA 094147

## NOTES

### 1. INTERVALS

This LO has been revised to comply with DA programming to extend intervals and conserve lubricants. When practicable, lubrication services will be made to coincide with the vehicle "S" Preventive Maintenance Service. For this purpose, a 10% tolerance (variation) in specified lubrication point mileage is permissible. Those vehicles not accumulating 1,000 miles (1,600 kilometers) in a 6 month period will be lubricated at time of Preventive Maintenance Service.

### 2. AIR CLEANERS AND BREATHERS (OIL BATH TYPES)

#### WARNING

- NBC contaminated filters must be handled using adequate precaution (FM 21-40) and must be disposed of by trained personnel.
- The oil contained in the reservoir of oil bath type air filters will be taken to a segregation area and disposed of in accordance with TM 3-220.

Every 3,000 miles (4,800 kilometers) or semiannually, whichever occurs first, clean oil reservoir and refill with OE/HDO. Disassemble and clean all parts. Refill with OE/HDO as above, whenever crankcase oil is changed. Far desert or extremely dusty operation, disassemble, clean all parts, and refill once every operating day or more frequently, if required.

### 3. CRANKCASE

#### CAUTION

Be sure pressure gage indicates oil is circulating.

- Gasoline.* Drain every 6,000 miles (9,600 kilometers) or 6 months, whichever comes first. Drain only when hot after operation. Refill to full mark on gage. Run engine a few minutes and recheck oil level. For proper operation with heavy duty oil, engine thermostat must be functioning properly to maintain engine coolant temperature at 140°F (60°C) minimum.
- Multifuel or Diesel,* Sample oil every 60 days or 1,000 miles (1,600 kilometers). Army Reserve units will sample oil every 120 days or 1,000 miles (1,600 kilometers). Oil will be changed only when directed by oil analysis laboratory.

#### NOTE

- If oil analysis laboratory is not available, use the hard time of 6,000 miles (9,600 kilometers), 6 months or 600 engine hours, whichever occurs first.
- Do not hold oil samples. Submit oil samples as soon as they have been taken.
- Seasonal oil changes will be made due to expected temperatures. See the Chart on page 2.

Drain only when hot after operation. To check engine oil level, wait one minute after stopping engine to allow oil to drain into crankcase. Safe operating range is between "add" and "full" marks. Do not overfill.

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## NOTES (Cont'd)

### 4. DISTRIBUTOR

Every 6,000 miles (9,600 kilometers) or semiannually, whichever comes first, remove oil reservoir plug from lower housing and drain. Fill reservoir with OE/HDO, clean and install plug. Wipe breaker cam lightly with GAA and lubricate breaker *arm* pivot and wick under rotor with 1 or 2 drops of OE/HDO.

### 5. OIL FILTER

Drain oil filter on gasoline engines every 3,000 miles (4,800 kilometers) or 3 months, whichever occurs first. Multifuel or Diesel engine oil filters will be changed only when directed by oil analysis laboratory. If oil analysis laboratory is not available, use the hard time of 6,000 miles (9,600 kilometers), 6 months or 600 engine hours, whichever occurs first. Remove filter drain plug, drain oil and remove elements. Clean inside of filter housing and reinstall drain plug and new filter element and gasket. When filling crankcase, add two extra quarts (1.9 liters) of OE/HDO for each filter.

### 6. GEARCASES

#### NOTE

When a safe level of lubricant within a gear housing is indicated at time of scheduled lubrication, the lubricant retaining seal is functional even though the seal may indicate questionable leakage. Questionable leak that may indicate a defective seal will be subject to frequent observation as a potential problem area. When seepage or leakage of lubricant adversely affects the proper function of parts within the area (e.g. brakes), the retaining seal is non-functional regardless of lubricant level.

Change gear lubricant only when required by maintenance repair action, or if contaminated by water or other foreign material. Semiannually, check lubricant for proper level and for contamination. Drain only when hot after operation. Remove, clean, inspect, and install magnetic plugs and strainer located at bottom of transfer case housing. At axle differentials, transfer case, transmission, and power divider (M62, M543, M543A1, M543A2), check that level is within 1/2 inch (12.7 millimeters) of filler plug opening when lubricant is cold, or to plug level when hot. Fill other gearcases to plug level at all times. Clean vents quarterly, and after operation in mud, snow, or water. For steering gear, fill until lubricant is one inch (25.4 millimeters) below filler plug or breather hole.

### 7. CARBURETOR GOVERNOR ROTOR SHAFT

Every 1,000 miles (1,600 kilometers) or 6 months, whichever occurs first, remove plug and lubricate felt with several drops of OE/HDO.

### 8. FRONT AXLE UNIVERSAL JOINTS AND STEERING KNUCKLE BEARINGS

Every 12,000 miles (19,000 kilometers) or 12 months, whichever occurs first, remove plug from universal joint housing, fill to level of plug opening, and reinstall plug. Do not disassemble C.V. joints.

### 9. PROPELLER SHAFT UNIVERSAL AND SLIP JOINTS

Every 3,000 miles (4,800 kilometers) or 3 months, whichever occurs first, on universals equipped with plugs, remove filler plug at each joint and install pressure fittings; fill using low pressure gun. Remove fitting and reinstall plug. If operating conditions are severe or abnormal, service at 1,000 miles (1,600 kilometers).

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## NOTES (Cont'd)

### 10. STEERING GEAR HYDRAULIC SYSTEM RESERVOIR

Fill and maintain 3/4 full. Capacity is 8- 1/2 quarts (8 liters). Do not fill completely. Service every 12,000 miles (19,000 kilometers) or 12 months, whichever occurs first.

### 11. BRAKE MASTER CYLINDER

#### CAUTION

Use only brake fluid silicone BFS (MIL-B-46176).

Check level weekly. Fill to 1/2 inch (12.7 millimeters) from top of master cylinder. Use BFS (MIL-B-46176) for brake master cylinder.

### 12. REAR SPRING TRUNNION BEARINGS

Every 3,000 miles (4,800 kilometers) or 6 months, whichever occurs first, loosen screws on bearing cap, and lubricate through fittings until lubricant appears around cap. Tighten capscrews. Every 6,000 miles (9,600 kilometers) or annually, whichever occurs first, remove, clean, and repack trunnion bearings.

### 13. HOIST DRUM

Weekly, check fluid level and drain only when required by maintenance repair action, or if contaminated by water or other foreign material. Set boom in horizontal position and remove drain plug from case. Remove breather and level plug; fill drum to level of plug hole. Install plug. Clean and install breather.

### 14. WINCH AND CRANE HOIST CABLES

After each operation, clean and oil with new OE/HDO. Every 6 months, if cable is not generally used, unwind entire cable. Clean and soak with new OE/HDO. Wipe off excess and coat cable with CW before rewinding cable on drum.

### 15. CRANE HYDRAULIC OIL TANK

With boom in horizontal position, remove plug from top of tank; if level is below bottom mark on gage, replenish to top mark. Every 12 months, remove plug from bottom of tank and drain. To completely drain system, operate crane several times, disconnect hydraulic lines, and allow to drain. Clean and install plug, and connect hydraulic lines. Refill tank with 33 gallons (125 liters) of oil (M543, M543A1, M543A2 wrecker 70 gallons [265 liters]). Operate crane several times to completely fill system. Check level.

### 16. DUMP BODY HYDRAULIC RESERVOIR

#### WARNING

Rest weight of dump body on safety braces when performing maintenance with dump body in raised position.

#### CAUTION

Remove filler plug slowly to release pressure. Do not overfill.

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## NOTES (Cont'd)

Weekly, remove filler plug, gage and screen. Clean and install screen, and replenish with oil to third mark from top of gage with body down in lowered position. Install gage and plug. Raise and lower body several times slowly and recheck oil. Drain every 12 months. Remove drain plug from tank and drain with dump body in lowered position. Clean and install drain plug. Refill tank with OE/HDO and install screen, gage, and plug. Raise and lower body several times slowly and recheck oil level. Capacity of hydraulic system is 37 quarts (35 liters).

### 17. RING GEAR

Remove pivot post drain plugs located on underside of crane base plate. Remove two pipe plugs on each side of pivot post gear shield and install lubricating fittings. Lubricate through fittings until lubricant appears at underside pivot post drain holes. Install pivot post drain plugs, remove fittings, and install pipe plugs.

### 18. OIL CAN POINTS

Every 1,000 miles (1,600 kilometers) or monthly, whichever occurs first, lubricate hinges and latches, carburetor linkage, transfer case and power takeoff shift linkage, clutch and brake pedal linkage, hand brake control and dump truck tailgate bearings with seasonal grade OE/HDO.

### 19. DO NOT LUBRICATE

Springs, clutch release bearing, alternator, clutch pilot bearing or shock absorbers.

### 20. LUBRICATED AT TIME OF DISASSEMBLY BY DS AND GS PERSONNEL

Clutch release bearing carrier, rear winch swivel sheave frame bearing, pedestal bearing, starter, water pump and fan pulley.

### 21. OPERATOR PARTICIPATION

"D" maintenance is performed by the operator. Operator may assist in lubrication intervals marked "W" or "S" if supervised by qualified personnel.

### 22. CRANE HYDRAULIC SYSTEM FILTER, M543, M543A1, M543A2

#### CAUTION

Do not operate crane when indicator is at "BY-PASSING" position.  
Notify Organizational Maintenance.

To maintain adequate filtering, remove and clean filter element when indicator points to "NEEDS CLEANING". Check indicator with pump running and oil at operating temperature. Stop engine and remove and clean filter if indicated.

### 23. CRANKCASE BREATHER (DIESEL AND MULTIFUEL)

Check and clean crankcase breather and lines every 6,000 miles (9,600 kilometers) under normal operating conditions.

### 24. TEMPERATURE RISES

If ambient temperature rises to +70°F (21°C) for no more than one week, use of OE/HDO 10 is permissible. If ambient temperature rises to +40°F (+4°C) for no more than one week, use of OEA is permissible.

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## NOTES (Cont'd)

### 25. FUEL FILTERS

#### NOTE

Vehicles equipped with scraper type primary fuel filter must be drained only after turning the scraper handle two complete revolutions. This filter element will be replaced only at the time it becomes unserviceable. All other fuel filter elements will be replaced every 3,000 miles (4,800 kilometers) or 3 months, whichever comes first, or at the discretion of the maintenance officer as local conditions warrant.

- a. *Diesel.* Drain each fuel filter daily before starting engine. If primary filter contains large amounts of water and impurities, the element must be cleaned (water type) or replaced. If secondary filter contains water and impurities, the element must be replaced.
- b. *Multifuel.* Drain each fuel filter daily before starting engine. When filters contain large amounts of water and impurities, filter elements must be changed. Change primary and secondary fuel filters every 3,000 miles (4,800 kilometers) or 3 months, whichever occurs first. Change final fuel filter only during engine overhaul/rebuild or during troubleshooting.

### 26. WINCHES, CRANES, LIFTGATE, AND DUMP BODY

Service every 3,000 miles (4,800 kilometers) or semiannually, whichever occurs first. If operation is frequent or continuous, or under severe conditions, service weekly.

### 27. LIFTGATE HYDRAULIC OIL TANK

Every 3 months check hydraulic oil level. Place liftgate in lowered position at ground level and remove filler plug. Oil supply is minimum at 2 inches (5.1 centimeters) and maximum at 3 inches (7.6 centimeters).

When necessary to add oil, operate liftgate several times up and down, open and close with filler plug removed. If there is excessive oil in the system the oil tank will overflow. Replace filler plug.

Copy of this lubrication order will remain with the vehicle at all times. Instructions contained herein are mandatory and supersede all conflicting lubrication instructions dated prior to the date of this lubrication order.

**BY ORDER OF THE SECRETARY OF THE ARMY:**

John A. Wickham, Jr.  
General, United States Army  
Chief of Staff

OFFICIAL:

Robert M. Joyce  
Major General, United States Army  
The Adjutant General

To be distributed in accordance with DA Form 12-38, Block 241, Operator Technical Manual requirements for truck, 5-ton, 6x6, M39 series.

**TA 094152**

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