LUBRICATION ORDER

19 July 1984 (Supersedes LO 5-3810-295-12-1, -2 and -3, 20 July 1976)

CRANE WHEEL MOUNTED;

20-TON AT 10 FOOT RADIUS,

2 ENGINES, DIESEL ENGINE DRIVEN, 4 x 4 AIR

TRANSPORTABLE (HARNISCHFEGER CORP,

MODEL 320 RT) (NSN 3810-00-275-1167)

Reference: TM 5-3810-295-12 and FEDERAL SUPPLY CATALOG C9100-IL.

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.

WARNING

Dry cleaning fluid is flammable. Do not use near a flame or excessive heat. Use only with adequate ventilation. Avoid prolonged breathing of vapors and minimize skin contact.

Clean parts or fittings with dry cleaning solvent (SD), Type II or equivalent. Dry before lubricating. Dotted arrow shafts indicate lubrication on both sides of equipment. A dotted circle indicates a drain below. Relubricate all items found contaminated after fording or washing.

The lowest level of maintenance authorized to lubricate a point is indicated by one of the following symbols as appropriate: Operator/Crew (C); and Organizational Maintenance (O).

Reporting errors and recommending Improvements. You can help improve this manual. 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, US Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, MI 48090. A reply will be furnished to you.

*The time specified is the time required to perform all services at the particular interval (on-condition or hard times).

*TOTAL MAN-HOURS		*TOTAL MAN-HOURS	
INTERVAL	**MAN-HOURS**	**INTERVAL**	**MAN-HOURS**
10	2.3	500	1.2
50	2.3	1000	1.8
100	2.0		

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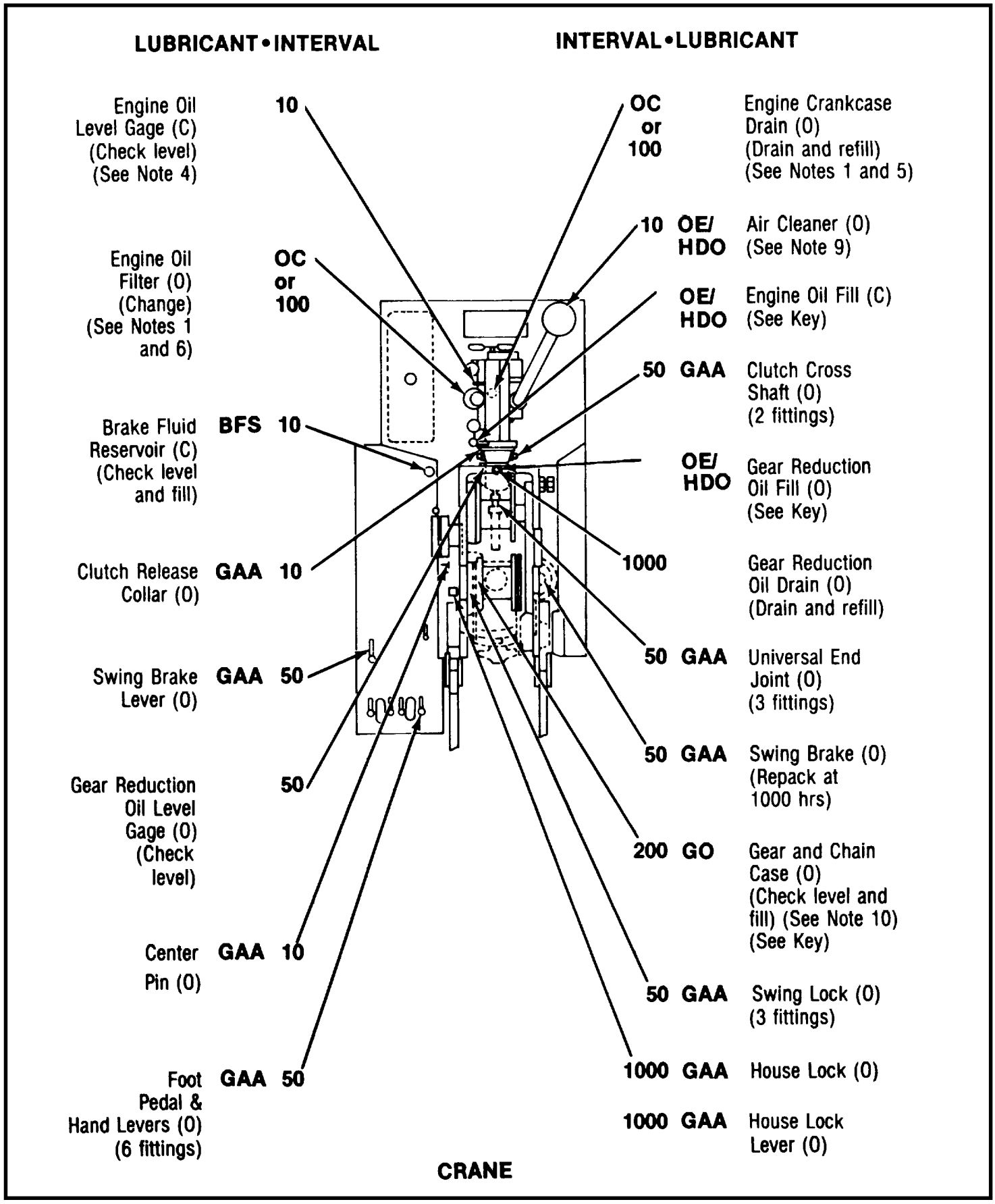

CRANE

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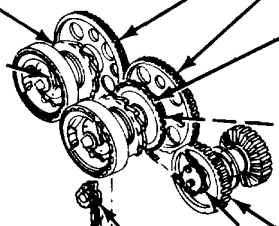
LUBRICANT•INTERVAL **INTERVAL•LUBRICANT**

Horizontal Swing Shaft (0) (2 shots) (2 fittings) (Repack at 1000 hrs) — GAA 10

10 GAA — Swing Clutch Housing (0)

HORIZONTAL SWING SHAFT



Rear Hoist Drum (0) — GAA 50

50 CW — Drive Gears (0) (Clean and coat) (See Key)

Rear Hoist Drum Shaft (0) (4 fittings) (Repack at 1000 hrs) — GAA 50

10 OE/HDO — Chain and Sprocket (0) (Clean and coat sparingly)

50 GAA — Front Hoist Drum Shaft (0) (Repack at 1000 hrs)

Boom Hoist Shaft (0) (Repack) — GAA 1000

50 GAA — Bearing (0)

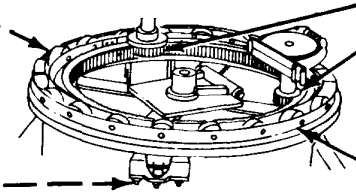
Boom Planetary Pawls (0) (3 fittings) — GAA 50

50 GAA — Reversing Shaft (0) (Repack at 1000 hrs)

10 OE/HDO — Chain and Sprocket (0) (Clean and coat sparingly)

Boom Hoist Planetary (0) — GAA 50

HOIST DRIVE SYSTEM



Live Rollers (0) (28 fittings) (2 shots) — GAA 10

10 CW — Swing Shaft and Gears (0) (Clean and coat) (See Key)

Hook Rollers (0) (Beneath deck) (6 fittings) — GAA 10

50 GAA — Roller Path (0) (Clean and coat)

ROLLER CIRCLE TURNTABLE ASSY

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LUBRICANT • INTERVAL **INTERVAL • LUBRICANT**

Boom Foot Pin (O) (2 fittings) **GAA 10**

10 GAA Gantry Sheave (O) (3 fittings)

50 OE/ HDO Cables (O) (Clean and coat)

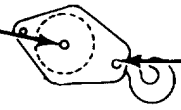
Spreader Sheave Bushing (O) (9 fittings) **GAA 10**

BOOM AND GANTRY

10 GAA Boom Point Sheaves (O) (3 fittings)

10 OE/ HDO Guide Roller Bushings (O) (Oil can points) (See Note 3 and Key)

Hook Block Sheave Bushing (O) (2 fittings) **GAA 10**



10 GAA Swivel (O)

HOOK BLOCK

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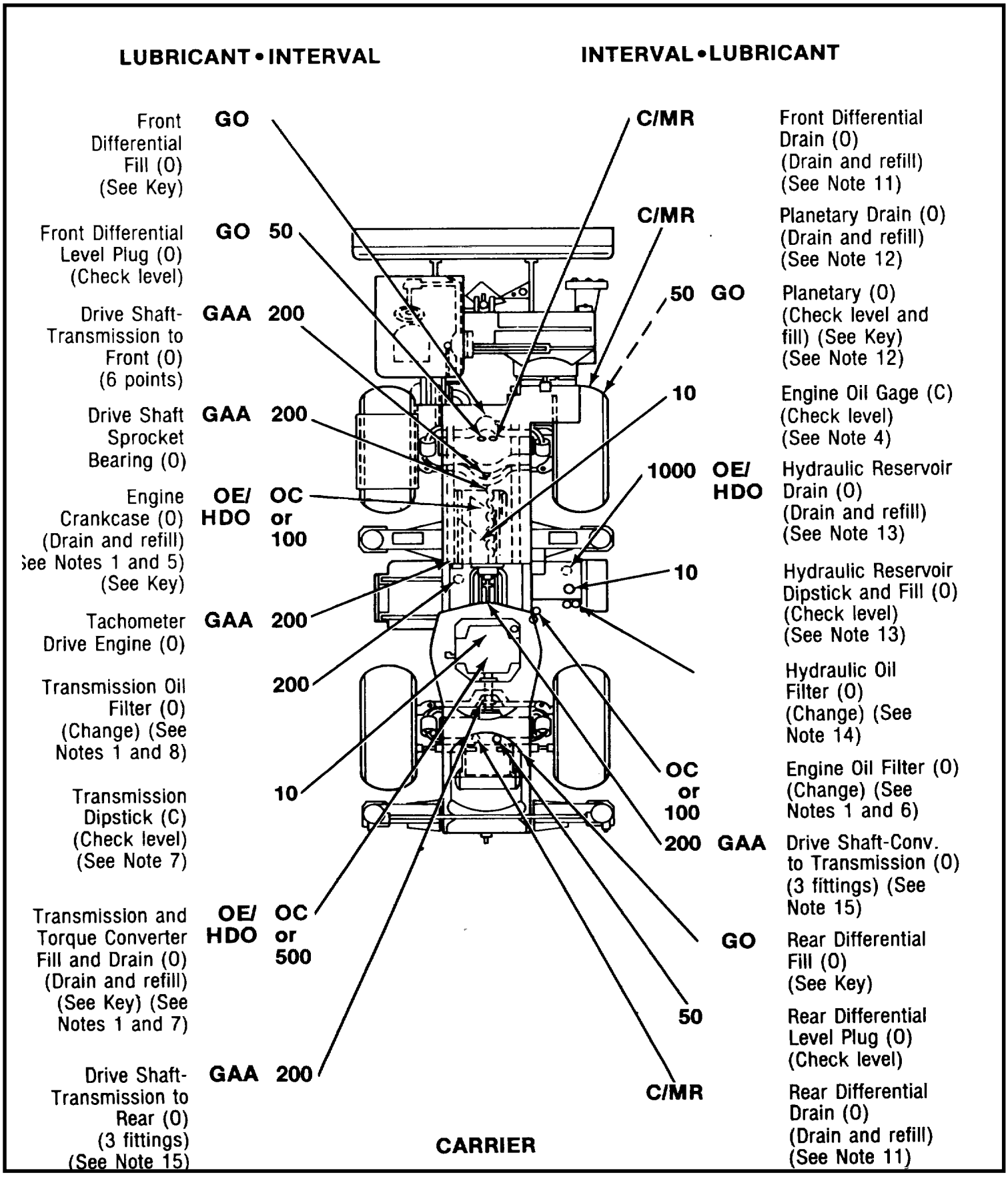
LUBRICANT • INTERVAL
INTERVAL • LUBRICANT
Front Differential Fill (0) (See Key)
GO
Front Differential Level Plug (0) (Check level)
GO 50
Drive Shaft-Transmission to Front (0) (6 points)
GAA 200
Drive Shaft Sprocket Bearing (0)
GAA 200
Engine Crankcase (0) (Drain and refill) (See Notes 1 and 5) (See Key)
OE/HDO OC or 100
Tachometer Drive Engine (0)
GAA 200
Transmission Oil Filter (0) (Change) (See Notes 1 and 8)
200
Transmission Dipstick (C) (Check level) (See Note 7)
10
Transmission and Torque Converter Fill and Drain (0) (Drain and refill) (See Key) (See Notes 1 and 7)
OE/HDO OC or 500
Drive Shaft-Transmission to Rear (0) (3 fittings) (See Note 15)
GAA 200
C/MR
Front Differential Drain (0) (Drain and refill) (See Note 11)
C/MR
Planetary Drain (0) (Drain and refill) (See Note 12)
50 GO
Planetary (0) (Check level and fill) (See Key) (See Note 12)
10
Engine Oil Gage (C) (Check level) (See Note 4)
1000 OE/HDO
Hydraulic Reservoir Drain (0) (Drain and refill) (See Note 13)
10
Hydraulic Reservoir Dipstick and Fill (0) (Check level) (See Note 13)
Hydraulic Oil Filter (0) (Change) (See Note 14)
OC or 100
Engine Oil Filter (0) (Change) (See Notes 1 and 6)
200 GAA
Drive Shaft-Conv. to Transmission (0) (3 fittings) (See Note 15)
GO
Rear Differential Fill (0) (See Key)
50
Rear Differential Level Plug (0) (Check level)
C/MR
Rear Differential Drain (0) (Drain and refill) (See Note 11)
CARRIER

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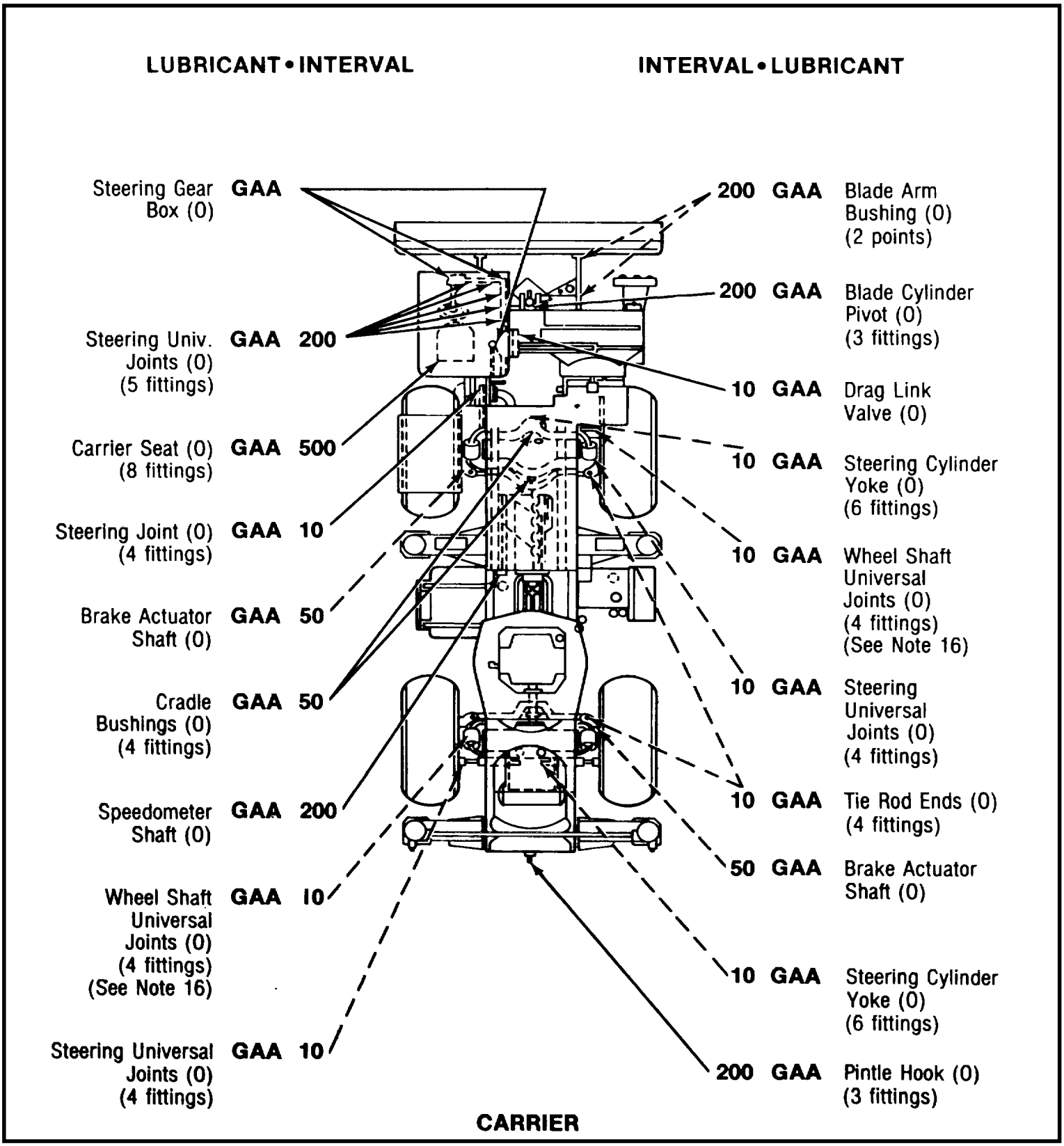
LUBRICANT • INTERVAL
INTERVAL • LUBRICANT
Steering Gear Box (0) GAA
Steering Univ. Joints (0) (5 fittings) GAA 200
Carrier Seat (0) (8 fittings) GAA 500
Steering Joint (0) (4 fittings) GAA 10
Brake Actuator Shaft (0) GAA 50
Cradle Bushings (0) (4 fittings) GAA 50
Speedometer Shaft (0) GAA 200
Wheel Shaft Universal Joints (0) (4 fittings) (See Note 16) GAA 10
Steering Universal Joints (0) (4 fittings) GAA 10
200 GAA Blade Arm Bushing (0) (2 points)
200 GAA Blade Cylinder Pivot (0) (3 fittings)
10 GAA Drag Link Valve (0)
10 GAA Steering Cylinder Yoke (0) (6 fittings)
10 GAA Wheel Shaft Universal Joints (0) (4 fittings) (See Note 16)
10 GAA Steering Universal Joints (0) (4 fittings)
10 GAA Tie Rod Ends (0) (4 fittings)
50 GAA Brake Actuator Shaft (0)
10 GAA Steering Cylinder Yoke (0) (6 fittings)
200 GAA Pintle Hook (0) (3 fittings)
CARRIER

TA221163

± KEY –

LUBRICANTS	CAPACITY	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)	For Arctic operation refer to FM 9-207	
OE/HDO - Lubricating Oil, Internal Combustion Engine, Tactical Service		**OE/HDO** 30	**OE/HDO** 10			C/MR-Condition Monitor
OEA - Lubricating Oil, Internal Combustion, Arctic				**OEA** (See Note 2)		OC - On Condition (AOAP)
- Carrier Engine Crankcase W/Filter	28 qts. (26.48 L)					Intervals given are in hours of normal operation.
- Crane Engine Crankcase	14 qts. (13.24 L)					
- Hydraulic Reservoir	230 qts. (217.58 L)					
- Gear Reduction	1.6 qts. (1.5 L)					
- Oil Can Points (See Note 3)						
- Air Cleaner - Transmission and Torque Converter						
GO - Lubricating Oil, Gear, Multipurpose		**GO** 85W/140	**GO** 80W/90	**GO**75W		
- Gear and Chain Case	72 qts. (68.11 L)					
- Planetaries	12 qts. ea. (11.35 L)					
- Front Axle Differential	18 qts. (17 L)					
- Rear Axle Differential	18 qts. (17 L)					

*See Note 17 for lubricant specification number.

TA221164

* KEY –

LUBRICANTS	CAPACITY	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)	
BFS – Brake Fluid, Silicone, Automotive – Hydraulic Control Reservoir	3 qts. (2.83 L)	ALL TEMPERATURES			
CW – Lubricating Oil, Chain Wire Rope, Exposed Gear		ALL TEMPERATURES (GRADE B)			
GAA – Grease, Automotive and Artillery		ALL TEMPERATURES			

*See Note 17 for lubricant specification number.

NOTES:

1. ARMY OIL ANALYSIS PROGRAM (AOAP). For Active Army units, obtain samples from engine and automatic transmission every 50 hours of operation or 60 days (whichever comes first). Reserve and National Guard activities will use 50 hours or 120 days as the prescribed sample intervals. Reserve and National Guard equipment in frequent use during active training period will adhere to the schedule for Active Army units. As a minimum, one sample from each unit's two week active training period will be submitted for each item of equipment. Send these samples to the nearest AOAP laboratory. Refer to TB 43-0210 for sampling instructions. When or if AOAP laboratory support is unavailable, hard time intervals will apply.

NOTE

- 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 Key.)

2. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW-150F (-260C). Remove lubricants prescribed in Key for temperatures above -150F (-260C). Relubricate with lubricants specified in Key for temperatures below -150F (-260C). If OEA lubricant is required to meet the temperature ranges prescribed in the Key, OEA lubricant is to be used in place of OE/HDO-10 lubricant for all temperature ranges where OE/HDO-10 is specified in the Key.

3. OIL CAN POINTS. Each 10 hours lubricate guide roller bushings with OE/HDO. Each 50 hours lubricate yoke pins, pivot pins, door hinges, latches and fasteners, control linkages, springs and all exposed adjusting threads with OE/H DO.

4. ENGINE OIL LEVEL HOT OR COLD CHECK. Cold engine, oil level should be at high mark on dipstick. Hot engine, oil level must be between high and low marks on dipstick (allow to set 5 minutes before checking).

5 ENGINE. Oil is to be changed each time an engine oil change is directed by AOAP laboratory. When

TA221165

NOTES - CONTINUED:

AOAP laboratory support is not available, change oil each 100 hours. Drain when lubricant is warm.

6. ENGINE OIL FILTER. Filter is to be replaced each time an engine oil change is directed by AOAP laboratory. After installing new filter element, fill crankcase, operate engine 5 minutes, check housing for leaks, check crankcase oil level and bring to "FULL" mark. When AOAP laboratory support is not available, install new filter element each 100 hours.

7. TRANSMISSION AND TORQUE CONVERTER-CARRIER ENGINE. Check level each 10 hours with engine running at idle speed, oil at operating temperature and transmission in neutral. Maintain oil level to "FULL" mark. Oil is to be changed each time a transmission oil change is directed by AOAP laboratory. Drain when lubricant is warm. Fill transmission to low mark. Run engine at idle speed to fill con-verter and lines. Add oil to bring level to low mark. With engine running at idle speed, oil at operating temperature and transmission in neutral, add oil to bring oil level to "FULL" mark. Operate for 5 minutes and check for leaks. When AOAP laboratory support is not available, change transmission oil each 500 hours.

8. TRANSMISSION OIL FILTER-CARRIER ENGINE. Filter elements are to be replaced each time a transmission oil change is directed by AOAP laboratory. Remove filter elements, clean filter housing, install new filter elements and seals. After replacement, fill transmission to low mark. With engine running, oil at operating temperature and transmission in neutral, add oil to bring oil level to "FULL" mark. Operate for 5 minutes, check filter housing for leaks. When AOAP laboratory support is not available, install new filter elements each 200 hours.

9. AIR CLEANER-CRANE ENGINE. Frequency of cleaning service may vary according to local dust conditions. Clean each 500 hours.

10. GEAR AND CHAIN CASE. Check level each 200 hours. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for 5 minutes, check for leaks and bring oil level to level plug opening.

11. FRONT AND REAR DIFFERENTIAL. Check level each 50 hours. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. After refill, operate for 5 minutes, check for leaks and bring oil level to level plug opening.

12. PLANETARY. Each 50 hours rotate wheel until plug is horizontal with centerline of axle. Remove plug, check level and reinstall. Change gear lubricant only when required by maintenance repair action, contamination by water, or other foreign material. To drain, rotate wheel until plug is at bottom center, remove plug and drain. Rotate wheel back to level point, fill and reinstall plug. After refill, operate for 5 minutes, check for leaks and bring oil level to level plug opening.

13. HYDRAULIC RESERVOIR. Check level each 10 hours. Relieve pressure in reservoir before removing dipstick to check level. Each 1000 hours, drain hydraulic system, clean fill cap and screen. Remove filter element, clean filter shell, and install new filter element. Refill hydraulic reservoir with OE/HDO, operate hydraulic system for 5 minutes, check for leaks, check level and bring to "FULL" mark.

14. HYDRAULIC OIL FILTERS. Each time the light on the control panel stays lit after the oil reaches operating temperature replace the filter elements. Remove the filter elements, clean filter shells and install new filter elements and gaskets. After replacement, operate hydraulic system for 5 minutes, check for leaks, check level and bring to "FULL" mark.

NOTES - CONTINUED:

15. DRIVE SHAFTS (Universal joints only). Remove plug and Insert fitting. Lubricate and reinstall plug.

16. WHEEL SHAFT UNIVERSAL JOINTS. Using outriggers, raise machine. Turn front and rear wheels left or right. Rotate until fittings appear.

17. LUBRICANTS. The following is a list of

lubricants with military symbols and applicable specification numbers.

OE/HDO	MIL-L-2104
GO	MIL-L-2105
GAA	MIL-G-10924
OEA	MIL-L-46167
BFS	MIL-B-46176
CW	VV-L-751
(SD), Type II	P-D-680

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:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

OFFICIAL:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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TA221167

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