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**53-71**

# SERVICE MANUAL

**Jeep® UNIVERSAL**

**4-WHEEL DRIVE**

**CJ-3B CJ-5A**

**CJ-5 CJ-6**

**CJ-6A**

**2-WHEEL DRIVE**

**DJ-5 DJ-6**

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### **IMPORTANT DEALER INFORMATION**

This manual, SM-1046, covers current 'Jeep' Universal Series vehicles, and past models, except as noted hereinafter:

SM-1037 should be retained in your service library for information related to the 6-volt electrical system, or the single brake system.

SM-1002-R5 (no longer available) should be retained for information related to the CJ-2A, CJ-3A or DJ-3A models equipped with the L4-134 engine.

The above three manuals provide full service coverage since inception of the 'Jeep' Universal and 'Jeep' Dispatcher model vehicles.

## GENERAL DATA

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#### A-1. GENERAL

This manual is provided for the guidance of all automotive service men, vehicle owners, and service salesmen who repair, maintain, or adjust the 'Jeep' Universal Series vehicles. The information herein was prepared from the service man's viewpoint to give him the accurate and concise data he may need to service the entire vehicle. The information is not elementary as it is intended for automotive service men who are familiar with automotive construction and repair in general. It is not intended, nor would it be possible in such limited space, to cover every possible repair that he may encounter. All specifications are in accord with Engineering Specifications and should be adhered to in all work on the vehicle.

The manual sections follow logical division into major components of the vehicles. The first page of each section has a detailed index of the contents of that section. Subject matter covers all models included in this manual unless an exception for a particular model is specifically mentioned.

Specifications and components covered were for standard production models of 'Jeep' vehicles current at the time the manual was approved for printing. 'Jeep' Corporation reserves the right to discontinue models at any time or change specifications or design of any of its models without notice and without incurring any obligation.

#### A-2. Vehicle Description

This manual covers all standard production 'Jeep' Universal models currently being produced at the time this manual was approved for publication. Significant changes made in each model since it was first produced are included in the manual.

A description of each model follows. General specifications for each model are listed in Par. A-8. Detailed specifications covering major vehicle units are listed at the end of each section of the manual.

CJ-3B — This is a 4-wheel-drive 'Jeep' Universal model, equipped with the four-cylinder Hurricane F4-134 engine. Wheelbase is 80".

CJ-5

CJ-5A — These are 4-wheel-drive 'Jeep' Universal models, equipped with either the Dauntless V-6 engine, or the four-cylinder Hurricane F4-134 engine. Wheelbase is 81".

CJ-6

CJ-6A — These are 4-wheel-drive 'Jeep' Universal models, equipped with either the Dauntless V-6 engine, or the four-cylinder Hurricane F4-134 engine. Wheelbase is 101".

DJ-5

DJ-6 — These are 2-wheel-drive 'Jeep' Universal models, equipped with the four-cylinder Hurricane F4-134 engine. DJ-5 wheelbase is 81". DJ-6 wheelbase is 101".

#### A-3. Vehicle Identification

Each 'Jeep' vehicle model series has one or more serial number prefixes to identify it. Complete identification of a specific vehicle requires the prefix plus the serial number. Serial numbers are consecutive for each prefix grouping. Prefix information following will identify the 'Jeep' models shown by serial number prefix from model inception to date.

**Note:** Vehicles with a serial number prefix of five (5) or more digits that have an S, 5, or 7 as the last digit are equipped with Exhaust Emission Control. A number 1 in the sixth (6th) digit within a seven (7) digit vehicle serial number prefix indicates Left Hand Drive; a 2 indicates Right Hand Drive; a 3 indicates Left Hand Drive California Exhaust Emission Control Engine; a 4 indicates Right Hand Drive California Exhaust Emission Control Engine.

# A

## GENERAL DATA

'Jeep' Model	Serial No. Prefix	'Jeep' Model	Serial No. Prefix
CJ-3B	453-GB2	CJ-6	57648
	454-GB2		8405
	57348		8405A
	8105		8405S
	8105014		8405AS
CJ-5	57548	CJ-6A	8405014
	8305		8405015
	8305A		8405016
	8305S		8405017
	8305AS		8422
	8305014		8422A
	8305015		8422S
	8305016		8422AS
CJ-5A	8322	DJ-6	8605
	8322A		8605A
	8322S		8605S
	8322AS		8605AS
DJ-5	8505		
	8505A		
	8505S		
	8505AS		
	8505014		
	8505015		
	8505016		
	8505017		

Any prefix not given here for one of the listed models indicates a special vehicle whose differences from standard are not covered in this manual.

### A-4. IDENTIFICATION NUMBER LOCATION

All 'Jeep' vehicles and some of their major components have identifying numbers. Paragraphs following will describe the location of identifying numbers.

### A-5. Vehicle Serial Number

The vehicle serial number is stamped on a metal plate located on the dash under the hood. It is on the left side of the vehicle for models CJ-5, CJ-5A, CJ-6, CJ-6A, DJ-5 and DJ-6 as shown in Fig. A-1. It is on the right side of the vehicle for model CJ-3B, as shown in Fig. A-2. Refer to Par. A-3 for specific information on codes.

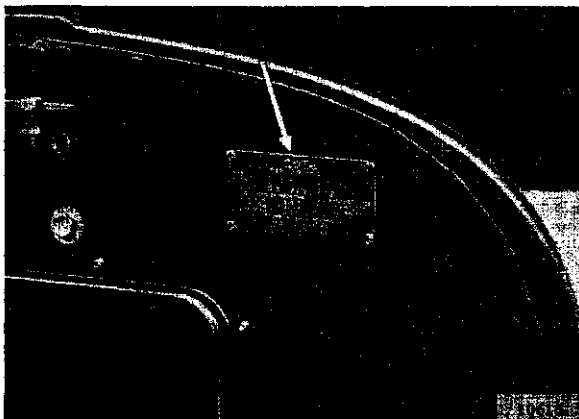


FIG. A-1—CJ-5, CJ-5A, CJ-6, CJ-6A, DJ-5, DJ-6 VEHICLE SERIAL NUMBER LOCATION

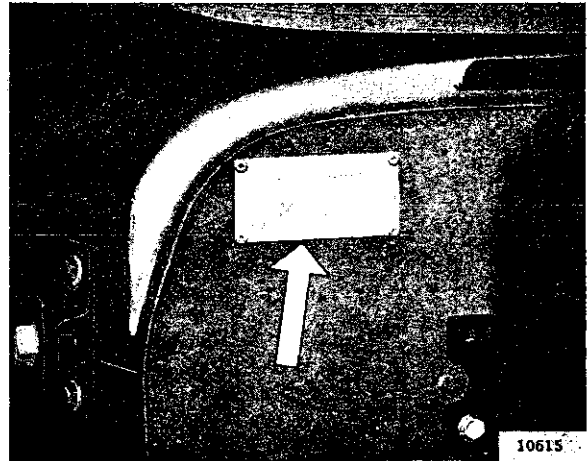


FIG. A-2—CJ-3B VEHICLE SERIAL NUMBER LOCATION

### A-6. Engine Code Number

The engine identification number consists of a prefix followed by a five-digit or six-digit code number. The prefix identifies the particular engine. The F4-134 engine code number is stamped on the

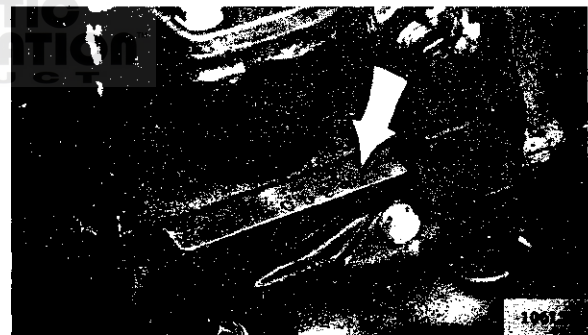


FIG. A-3—ENGINE CODE NUMBER LOCATION HURRICANE F4-134

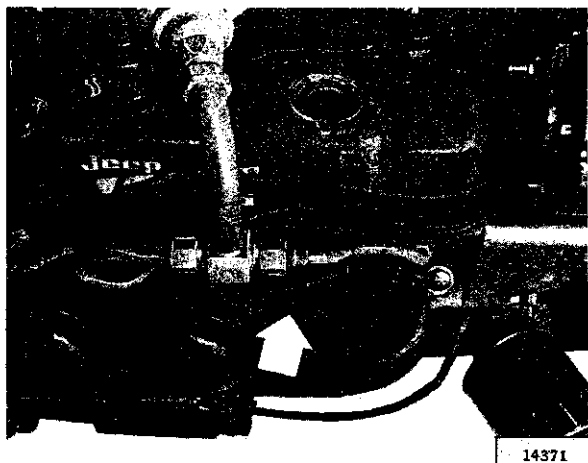


FIG. A-4—ENGINE CODE NUMBER LOCATION DAUNTLESS V-6

water pump boss at the front of the engine, as shown in Fig. A-3. The Dauntless V-6 code number is stamped on the right front face of the cylinder block, just below the rocker arm cover as shown in Fig. A-4.

**A-7. Paint-and-Trim Option Plate**

A Paint-and-Trim Option Plate is installed on late production 'Jeep' vehicles. The paint code on the plate identifies the paint colors. The trim code on the plate identifies the color of all trim parts in the interior of the vehicle.

To identify paint or trim on vehicles manufactured before the Paint-and-Trim Option Plate was installed, see your 'Jeep' dealer.

'Jeep' Universals have the plate located on the right hand side of the dash under the hood, as shown in Fig. A-5.

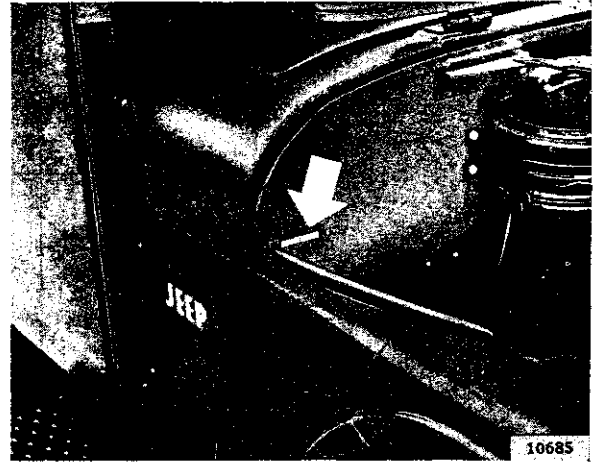


FIG. A-5—PAINT AND TRIM OPTION PLATE LOCATION



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**A-8. GENERAL SPECIFICATIONS**

MODEL:	CJ-3B	CJ-5, CJ-5A DJ-5	CJ-6, CJ-6A DJ-6		
<b>Engine:</b>	<b>F-4</b>	<b>F-4</b>	<b>F-4</b>		
Number of Cylinders	4	4	4		
Bore	3.125 [7,93 cm.]	3.125 [7,93 cm.]	3.125 [7,93 cm.]		
Stroke	4.375 [11,11 cm.]	4.375 [11,11 cm.]	4.375 [11,11 cm.]		
Displacement	134.2 cu. in. [2,20 ltr.]	134.2 cu. in. [2,20 ltr.]	134.2 cu. in. [2,20 ltr.]		
Compression Ratio:					
Late Production — Standard	.....	6.7:1	6.7:1		
— Optional	.....	7.1:1	7.1:1		
— Optional	.....	6.3:1	6.3:1		
Early Production — Standard	7.4:1	7.4:1	7.4:1		
— Optional	7.8:1	7.8:1	7.8:1		
— Optional	6.9:1	6.9:1	6.9:1		
Compression Pressure	120 to 130 psi. [8,4 a 9,2 kg-cm <sup>2</sup> ]	120 to 130 psi. [8,4 a 9,2 kg-cm <sup>2</sup> ]	120 to 130 psi. [8,4 a 9,2 kg-cm <sup>2</sup> ]		
Horsepower (max. Brake)	75 @ 4000 rpm.	75 @ 4000 rpm.	75 @ 4000 rpm.		
Horsepower (SAE)	15.63	15.63	15.63		
Torque (Max. at 2000 rpm.)	114 lb-ft. [15,8 kg-m.]	114 lb-ft. [15,8 kg-m.]	114 lb-ft. [15,8 kg-m.]		
<b>Engine:</b>		<b>V-6</b>	<b>V-6</b>		
Number of Cylinders	.....	6	6		
Bore	.....	3.750" [9,525 cm.]	3.750" [9,525 cm.]		
Stroke	.....	3.400" [8,636 cm.]	3.400" [8,636 cm.]		
Displacement	.....	225 cu. in. [3,69 ltr.]	225 cu. in. [3,69 ltr.]		
Compression Ratio	.....	9.0:1	9.0:1		
Horsepower (max. Brake)	.....	160 @ 4200 rpm.	160 @ 4200 rpm.		
Horsepower (SAE)	.....	33.748	33.748		
Torque (Max. at 2400 rpm.)	.....	235 lb-ft. [32,49 kg-m.]	235 lb-ft. [32,49 kg-m.]		
Wheelbase	80" [2,03 m.]	81" [2,06 m.]	101" [2,57 m.]		
Tread (front and rear)	48 <sup>7</sup> / <sub>16</sub> " [1,23 m.]	48 <sup>7</sup> / <sub>16</sub> " [1,23 m.]	48 <sup>7</sup> / <sub>16</sub> " [1,23 m.]		
Height (Over all)	66 <sup>1</sup> / <sub>2</sub> " [1,68 m.]	67" [1,70 m.]	67" [1,70 m.]		
Length (Over all)	129 <sup>29</sup> / <sub>32</sub> " [3,30 m.]	138 <sup>3</sup> / <sub>16</sub> " [3,51 m.]	158 <sup>3</sup> / <sub>16</sub> " [4,02 m.]		
Width (Over all)	68 <sup>7</sup> / <sub>8</sub> " [1,75 m.]	71 <sup>3</sup> / <sub>4</sub> " [1,82 m.]	71 <sup>3</sup> / <sub>4</sub> " [1,82 m.]		
Ground Clearance	8" [20,32 cm.]	8" [20,32 cm.]	8" [20,32 cm.]		
<b>CAPACITIES:</b>	<b>U.S.</b>	<b>Imperial</b>	<b>Metric</b>		
<b>Fuel Tank (Approximate):</b>					
Early Models	10.5 gal.	8.8 gal.	39,75 ltr.		
Late Models	16 gal.	13.3 gal.	60,57 ltr.		
<b>Cooling System</b>					
F4 Models	12 qt.	10 qt.	11,4 ltr.		
V-6 Models	10 qt.	8 qt.	9,5 ltr.		
Note: If not equipped with heater deduct	1 qt.	.8 qt.	0,9 ltr.		
	<b>CJ-3B</b>	<b>CJ-5</b>	<b>CJ-6</b>	<b>DJ-5</b>	<b>DJ-6</b>
	lb. kg.	lb. kg.	lb. kg.	lb. kg.	lb. kg.
<b>WEIGHTS (Approximate):</b>					
Gross Vehicle Weight (GVW)	3500 1587	3750 1701	3900 1769	3200 1451	3200 1451
Shipping — V6 Engine	— —	2240 1016	2302 1044	1900 862	2033 922
F4 Engine	2132 967	2163 981	2225 1009	1796 814	1858 842
Curb — V6 Engine	— —	2351 1066	2413 1094	2011 912	2144 972
F4 Engine	2243 1017	2274 1031	2336 1060	1907 865	1969 893
For Canvas Half-Top Model, add	35 17	38 17	38 17	38 17	38 17
For Canvas Full-Top Model, add	56 25	56 25	60 27	56 25	60 27
For Hard Top Model, add	— —	340 154	— —	340 154	— —

**LUBRICATION AND PERIODIC SERVICES**

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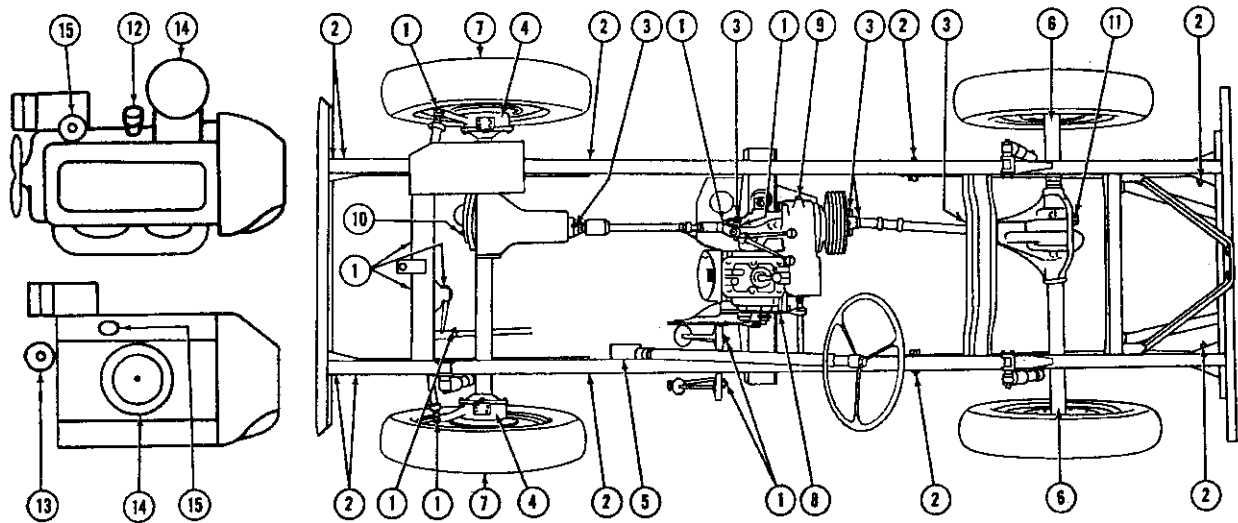
**B-1. GENERAL**

All 'Jeep' Universal vehicles require periodic lubrication and other maintenance services for normal vehicle usage and application to promote satisfactory operation and prevent excessive wear. Under severe operating or atmospheric conditions these services should be performed more often than under normal conditions. It should also be remembered that common short trips and stop-and-go driving are more severe on lubrication points than

constant speed driving on highways, and even more intensified in extreme cold or hot weather; therefore, vehicles driven under these conditions must be lubricated and serviced more often than normally operated vehicles. The specifications of types and amounts of lubricant given in the Lubrication Chart and text of this section should be closely followed. The off-highway operation lubrication notes, given in the last part of the section, should be followed when applicable.

# B

## LUBRICATION



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FIG. B-1—LUBRICATION CHART—4-WHEEL DRIVE VEHICLES

CHART NO.	ITEM TO BE LUBRICATED	FREQUENCY 1000 miles = 1.600 km.	QUANTITY		LUBRICANT		
			U.S. Imperial Metric		TYPE	GRADE	
			Summer	Winter			
1.	Chassis Bearings	Each 2,000 miles	As required		Chassis Lubricant	No. 1	No. 1
2.	Spring Shackles and Pivot Bushings	With Lube Fitting: Each 2,000 miles Without Lube Fittings: No Lubrication	As required		Chassis Lubricant	No. 1	No. 1
3.	Universal Joints	Each 2,000 miles	As required		Chassis Lubricant	No. 1	No. 1
4.	Propeller Shaft Front Axle	Check each 2,000 miles Change each 12,000 miles	As required		GL3	SAE-140	SAE-140
5.	Steering Gear Housing	Check each 2,000 miles	As required		MIL-L-2105-B	SAE-80	SAE-80
6.	Rear Wheel Bearings	With Lube Fittings: Sparingly each 2,000 miles Without Lube Fitting: Disassemble to lubricate each 12,000 miles	As required		Wheel Bearing Lubricant	No. 2	No. 2
7.	Front Wheel Bearings	Disassemble to lubricate each 12,000 miles	As required		Wheel Bearing Lubricant	No. 2	No. 2
8.	Transmission: 3 Speed	Check each 2,000 miles Change each 12,000 miles	2 1/2 pts.	2 pts. 1,2 ltrs.	GL4	SAE-90	SAE-80
	4 Speed	Check each 2,000 miles Change each 12,000 miles	6 1/2 pts.	5 1/2 pts. 3,2 ltrs.	GL4	SAE-90	SAE-80
9.	Transfer Case	Check each 2,000 miles Change each 12,000 miles	3 1/2 pts.	3 pts. 1,5 ltrs.	GL4	SAE-90	SAE-80
	Differentials						
10.	Front	Check each 2,000 miles	2 1/2 pts.	2 pts. 1,2 ltrs.	MIL-L-2105-B	SAE-80	SAE-80
11.	Rear	Change each 12,000 miles	2 1/2 pts.	2 pts. 1,2 ltrs.	MIL-L-2105-B†††	SAE-80	SAE-80
	Speedometer Cable	Disassemble to lubricate each 12,000 miles	As required		Graphite Grease	Light	
12.	Generator — F4	Each 2,000 miles	Several Drops		Engine Oil	Same as engine	
	Distributor — F4						
	Oil	Each 2,000 miles	Several Drops		Engine Oil	Same as engine	
	Wick	Each 2,000 miles	One Drop		Engine Oil	Same as engine	
	Pivot	Each 2,000 miles	One Drop		Engine Oil	Same as engine	
	Cam	Each 2,000 miles	2 c.c.		Cam Lubricant		
13.	Distributor Cam — V6	At each breaker point replacement	As required		Cam Lubricant		
14.	Air Cleaner — F4	Each 2,000 miles	1 1/4 pts.	1 pt. 0,6 ltrs.	Engine Oil	SAE-40 or 50	SAE-20
	— V6	Each 6,000 miles					
15.	Engine — F4	Change each 2,000 miles or 60 days	4 qt. 3 1/2 qt.	3,8 ltrs.	Engine Oil	☐ ☐	
	Engine — V6	Change each 6,000 miles or 60 days	4 qt. 3 1/2 qt.	3,8 ltrs.	Engine Oil	☐ ☐ ☐	

☐ ☐ Above 90°F. use SAE 30 or 10W-30      Between +10°F. and 90°F. use SAE 20W or 10W-30      Between -10°F. and +10°F. use SAE 10W or 10W-20      Below -10°F. use SAE 5W or 5W-20

☐ ☐ ☐ Not lower than 32°F. [0°C.] use SAE 20W or SAE 10W-30      Between 32°F. [0°C.] and 0°F. [-17°C.] use SAE 10W or SAE 10W-30      Below 0°F. [-17°C.] use SAE 5W or SAE 5W-20

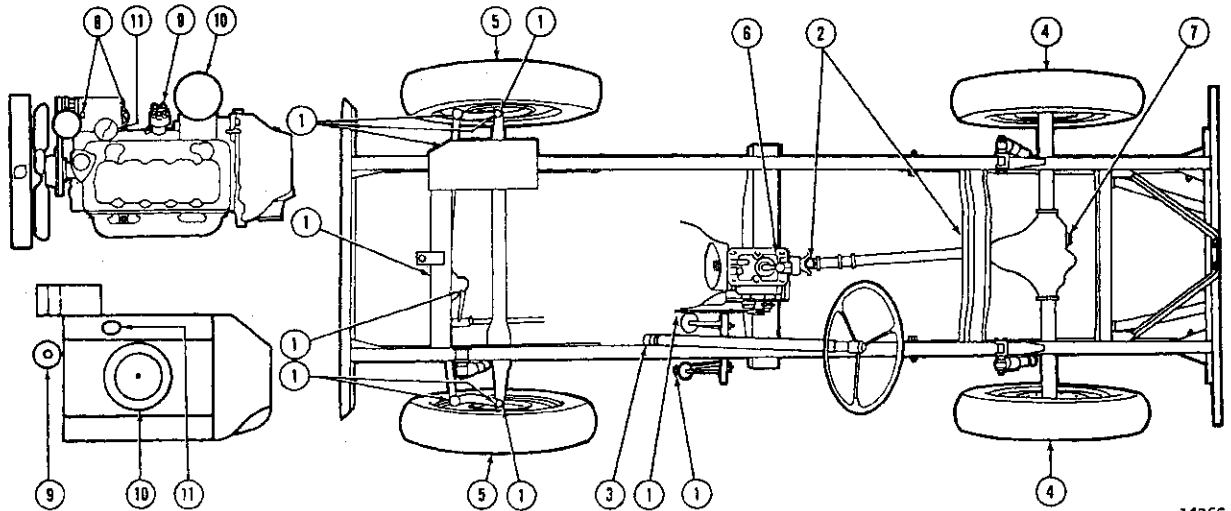
\*4-Speed transmission and transfer case require separate lubrication of each unit.

†††For Powr-Lok and Trac-Lok differential use only 'Jeep' Differential Oil, Part No. 94557.

☐ When filter is changed at the same time, add one quart.

☉ Do not mix lithium and sodium base lubricants. Use lithium base lubricant as specified





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FIG. B-2—LUBRICATION CHART — 2-WHEEL DRIVE VEHICLES

CHART NO.	ITEM TO BE LUBRICATED	FREQUENCY 1000 miles = 1.600 km.	QUANTITY		LUBRICANT		
			U.S.	Imperial Metric	TYPE	GRADE	
						Summer	Winter
1.	Chassis Bearings	Each 2,000 miles	As required		Chassis Lubricant	No. 1	No. 1
2.	Universal Joints	Each 2,000 miles	As required		Chassis Lubricant	No. 1	No. 1
3.	Steering Gear Housing	Check each 2,000 miles	As required		MIL-L-2105-B	SAE-80	SAE-80
4.	Rear Wheel Bearings	With Lube Fittings: Sparingly each 2,000 miles Without Lube Fittings: Disassemble to lubricate each 12,000 miles	As required		Wheel Bearing Lubricant	No. 2	No. 2
5.	Front Wheel Bearings	Disassemble to lubricate each 12,000 miles	As required		Wheel Bearing Lubricant	No. 2	No. 2
6.	Transmission	Check each 2,000 miles Change each 20,000 miles	1 1/2 pts.	1 1/4 pts. 0,7 ltrs.	GL4	SAE-90	SAE-80
7.	Differential	Check each 2,000 miles Change each 12,000 miles	2 pts.	1 3/4 pts. 0,9 ltrs.	MIL-L-2105-B*	SAE-80	SAE-80
	Hand Brake Control Handle Cable	Each 12,000 miles	As required		Graphite Grease	Medium	Medium
	Hand Brake Control Cable Rear	Each 12,000 miles	As required		Graphite Grease	Medium	Medium
8.	Generator — F4	Each 2,000 miles	2 to 4 Drops		Engine Oil	Same as engine	
	Speedometer Cable	Disassemble to lubricate each 12,000 miles	As required		Graphite Grease	Light	
9.	Distributor — F4	Each 2,000 miles	Several Drops		Engine Oil	Same as engine	
	Oil Wick	Each 2,000 miles	One Drop		Engine Oil	Same as engine	
	Pivot	Each 2,000 miles	One Drop		Engine Oil	Same as engine	
	Cam	Each 2,000 miles	2 c.c.		Cam Lubricant	—	
	Distributor Cam — V6	At each breaker point replacement	As required		Cam Lubricant	—	
10.	Air Cleaner — F4	Each 2,000 miles	1 1/4 pts.	1 pt. 0,6 ltrs.	Engine Oil	SAE-40	SAE-20
	— V6	Each 6,000 miles					
11.	Engine — F4	Change each 2,000 miles or 60 days	4 qt.**	3 1/2 qts. 3,8 ltrs.	Engine Oil	Ⓜ	
	Engine — V6	Change each 6,000 miles or 60 days	4 qt.**	3 1/2 qts. 3,8 ltrs.	Engine Oil	Ⓜ	

Ⓜ Above 90°F. use SAE 30 or 10W-30      Between +10°F. and 90°F. use SAE 20W or 10W-20      Between -10°F. and +10°F. use SAE 10W or 10W-20      Below -10°F. use SAE 5W or 5W-20

Ⓜ Ⓜ Not lower than 32°F. [0°C.] use SAE 20W or SAE 10W-30      Between 32°F. [0°C.] and 0°F. [-17°C.] use SAE 10W or SAE 10W-30      Below 0°F. [-17°C.] use SAE 5W or SAE 5W-20

\*For Powr-Lok and Trac-Lok differential use only 'Jeep' Differential Oil, Part No. 94557.

\*\*When oil filter is changed at the same time, add one quart [one ltr.].

Ⓜ Do not mix lithium and sodium base lubricants. Use lithium base lubricants as specified.

### B-2. Special Lubricants

Special lubricants are required for certain lubrication points on the 'Jeep' Universal vehicles. The special lubricants are necessary for proper functioning and maintenance of the vehicle. The Lubrication Chart (Fig. B-1 and B-2) designates the special lubricating points and identifies them by type or part number.

### B-3. Applying Fresh Lubricant

When servicing or lubricating the vehicle, it is important that all old lubricant and dirt be removed from the fitting and/or plugs before servicing and that the recommended type of lubricant be used for the particular item being serviced.

Force lubricant through the lube fittings until the lubricant being forced out of the joint is fresh lubricant, indicating that all old lubricant has been removed.

### B-4. Engine Lubrication System — Hurricane F4 Engine

- Refer to Fig. B-3.

The engine oil pressure system is designed to provide adequate lubrication to all working parts of the engine. The gear-type oil pump is driven from the engine camshaft. The pump is provided with a

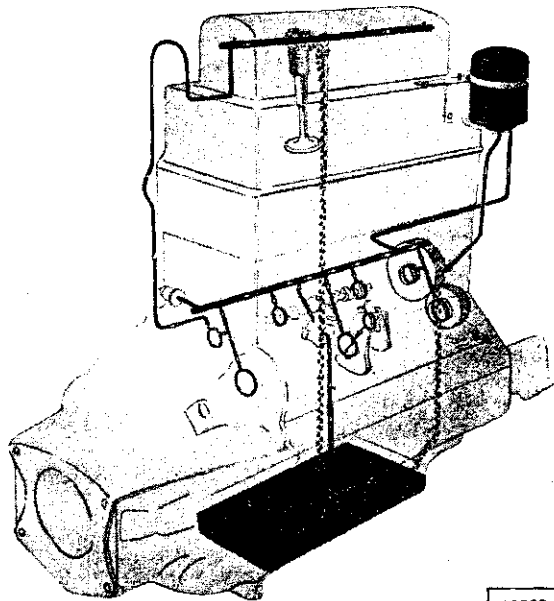


FIG. B-3—ENGINE LUBRICATION SYSTEM — HURRICANE F4 ENGINE

floating, screened intake that prevents the circulation of any sediment that might accumulate in the oil pan. By means of this pump, the main bearing journals and crankpins are efficiently lubricated

through an oil gallery and passages in the cylinder block. Oil is forced under pressure to the main bearings and through the cheeks of the crankshaft to the connecting rod bearings. Oil is also force-fed to the camshaft bearings, timing gears, and intake valve rocker arms. The oil pressure is controlled by relief valve located in the oil pump. The valve is designed to open when excessive pressure develops in the system, relieving the pressure and returning the excess oil to the oil pan. The cylinder walls, piston pins, and tappets are supplied with oil from spurt holes in the connecting rods. A portion of the oil is continually passed through an oil filter which effectively removes any foreign matter suspended in the oil. A flanged section on the rear of the crankshaft acts as an oil slinger and, in combination with the rear main bearing upper and lower oil seal, prevents the leakage of oil from the rear end of the cylinder block. Leakage of oil from the front end of the cylinder block is controlled by the crankshaft oil slinger and the front oil seal installed in the timing gear cover. The oil pressure indicator light in the instrument panel and the oil level gauge or dip stick in the side of the engine provide a means for checking the oil pressure and oil level.

### B-5. Oil Pressure Gauge or Indicator

On early CJ-3B vehicles an oil pressure gauge is mounted on the instrument panel. This gauge indicates the oil pressure within the engine lubricating system.

On Models CJ-5, CJ-5A, CJ-6, CJ-6A, DJ-5, DJ-6 and later production vehicles of Model CJ-3B a red telltale lamp, which operates when the ignition switch is turned on, is lit when there is insufficient oil pressure to properly lubricate the engine. When it goes out, operating pressure is achieved. In normal operation, the light is lit when the ignition is first turned on. It goes out after the vehicle is in motion.

Failure of the gauge or indicator to register normal oil pressure may indicate insufficient supply of oil in the engine crankcase, low or no oil pump pressure, or a fault in the gauge or indicator electrical circuit. The engine must be stopped immediately to prevent possible damage to engine bearings and the fault corrected before restarting the engine.

### B-6. Engine Lubrication System — Dauntless V-6 Engine

The engine lubrication system (Fig. B-4) is the force feed type in which oil is supplied under pressure to the crankshaft, connecting rods, camshaft bearings and valve lifters. Oil is supplied under controlled volume to the rocker arm bearings and push rods. All other moving parts are lubricated by gravity flow or splash.

The supply of oil is carried in the oil pan which is filled through a filter opening in the right rocker arm cover. A removable oil gauge rod on the left side of the crankcase is provided to check oil level. The oil pump is located in the timing chain cover

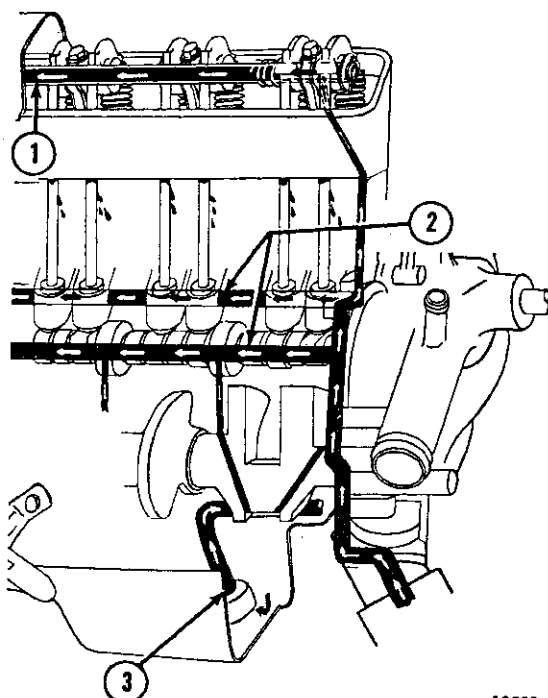


FIG. B-4—ENGINE LUBRICATION SYSTEM—  
DAUNTLESS V-6 ENGINE

- 13330
- 1—Rocker Arm Shaft  
2—Main Oil Line  
3—Oil Inlet

where it is connected by a drilled passage in the cylinder crankcase to an oil screen housing and pipe assembly. The screen is submerged in the oil supply and has ample area for all operating conditions. If the screen should become clogged for any reason, oil may be drawn into the system over the top edge of the screen, which is held clear of the sheet metal screen housing.

Oil is drawn into the pump through the screen and pipe assembly and a drilled passage in the crankcase, which connects to drilled passages in the timing chain cover. All oil is discharged from the pump to the oil pump cover assembly. The cover assembly consists of an oil pressure relief valve, an oil filter bypass valve and a nipple for installation of an oil filter. The spring loaded oil pressure relief valve limits the oil pressure to a maximum of 30 pounds [13.607 kg.] per square inch. The oil filter bypass valve opens when the filter has become clogged to the extent that 4½ to 5 pounds [2.04 a 2.27 kg.] pressure difference exists between the filter inlet and exhaust to bypass the oil filter and channel unfiltered oil directly to the main oil galleries of the engine.

A full flow oil filter is externally mounted to the oil filter cover nipple on the right side of the engine, just below the alternator. Normally, all engine oil passes through the filter element; however, if the element becomes restricted, a spring loaded bypass valve opens as mentioned above. The main oil galleries run the full length of the crankcase and cut into the valve lifter guide holes to supply oil at full pressure to the lifters. Connecting pas-

sages drilled in the crankcase permit delivery of oil at full pressure to all crankshaft and camshaft bearings.

Holes drilled in the crankshaft carry oil from the crankshaft bearings to the connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through a small notch in the bearing parting surface on the connecting rod, which registers with the hole in the crankpin once in every revolution. Piston pins are lubricated by splash.

Drilled holes in the camshaft connect the front camshaft bearing journal to the keyslot in the front of the camshaft. Oil flows from the journal into the keyslot over the woodruff key in the space between the key and the camshaft sprocket and fuel pump eccentric.

The forward end of the fuel pump eccentric incorporates a relief which allows the oil to escape between the fuel pump eccentric and the camshaft distributor gear. The oil stream strikes the distributor shaft gear once each camshaft revolution, and provides ample lubrication of the timing chain and sprockets by splash.

The rocker arms and valves on each cylinder head are supplied with oil from the oil galleries through holes drilled in the front of the cylinder block and cylinder head. The hole drilled in the cylinder head ends beneath the front rocker arm shaft bracket. A notch cast in the base of the rocker arm shaft bracket allows the oil to flow up inside the bracket in the space between the bracket and bolt, to the hollow rocker arm shaft which is plugged at both ends. Each rocker arm receives oil through a hole in the underside of the shaft. Grooves in the rocker arm provide lubrication of the bearing surface. Oil is metered to the push rod seat and valve stem through holes drilled in the rocker arm. Excess oil drains off and returns to the oil pan through passages in the cylinder head and block. Refer to the Lubrication Chart for lubrication frequency and lubrication type and grade.

#### B-7. Chassis Lubrication

Chassis and engine should be serviced at periodic intervals. Most chassis lubricating points, whether long-life or conventional, have standard lubrication fittings. Refer to the Lubrication Specifications and Service Maintenance Schedule for specific points and lubricating time intervals. It is not necessary to disassemble prepacked joints to lubricate them. Merely add new lubricant, as described in Par. B-3, to remove all old lubricant.

At the appropriate interval, clean each lubrication fitting indicated on the Lubrication Chart and Service Maintenance Schedule. Use a pressure gun to lubricate. Be sure the grease channels are open to provide complete lubrication of bearing surfaces. In some cases it may be necessary to disassemble to clear plugged channels.

When vehicles are driven primarily in abnormally dusty or wet areas or when a vehicle is subject to severe operating conditions, perform these services more frequently. Under these conditions, no definite interval can be recommended because of the great variety of uses and conditions of use.

# B

## LUBRICATION

### B-8. SERVICE MAINTENANCE SCHEDULE

Perform the following operations at the mileage shown. Two thousand miles equals 3,200 km.

### SERVICE MAINTENANCE SCHEDULE

OPERATION	VEHICLE MILEAGE IN THOUSANDS							
	2	4	6	8	10	12	24	30
Check Wheel Nut Torque*	X	X	X	X	X	X		
Check Fluid Level in Battery	X	X	X	X	X	X		Continuing each 2,000 miles
Check Fluid Level in Brake Master Cylinder*	X	X	X	X	X	X		" " " " " "
Service Cooling System	X	X	X	X	X	X		" " " " " "
Service Tires	X	X	X	X	X	X		" " " " " "
Lubricate Distributor Cam Lubricator (F4-134)	X	X	X	X	X	X		" " " " " "
Lubricate Steering Linkage	X	X	X	X	X	X		" " " " " "
Lubricate Propeller Shaft Universal Joints	X	X	X	X	X	X		" " " " " "
Lubricate Propeller Shaft Slip Joints	X	X	X	X	X	X		" " " " " "
Lubricate Tie Rod and Drag Link Sockets	X	X	X	X	X	X		" " " " " "
Change Engine Oil and Filter, and Service Air Cleaner (F4 134 Engine)**	X	X	X	X	X	X		" " " " " "
Change Engine Oil and Filter, and Service Air Cleaner (V6-225 Engine)**	X	X	X	X	X	X		" " " " " "
Check Brake Operation and Pedal Free Play	X							Continuing each 6,000 miles
Check Clutch Pedal Free Play	X							" " " " " "
Check all V-Belt Tensions	X							" " " " " "
Check Exhaust Emission System (If so equipped)***	X							" " " " " "
Service Positive Crankcase Vent Valve and Breather	X							" " " " " "
Road Test Including a Check of all Instrument Lights and Controls	X							" " " " " "
Tune-up Engine								" " " " " "
Check Operation of Manifold Heat Control Valve								" " " " " "
Clean Exterior of Radiator								" " " " " "
Align Headlights								" " " " " "
Check Brake Linings								" " " " " "
Check Exhaust System for Leaks								" " " " " "
Replace Canister Air Filter (F. E. E. C. System)								" " " " " "
Check Axle U-Bolt Torque								" " " " " "
Check Lubricant Level of Front Axle Universal Joints								" " " " " "
Check Shock Absorber Mountings and Bushings								" " " " " "
Check Front and Rear Spring Bushings								" " " " " "
Lubricate Distributor (V6-225)								" " " " " "
Replace Spark Plugs								" " " " " "
Check Charging and Starting Circuits								" " " " " "
Lubricate Tailgate Latch, Supports and Hinges								" " " " " "
Lubricate Door and Hood Hinge Pivots								" " " " " "
Lubricate Glove Compartment Door Latch								" " " " " "
Lubricate Heater Controls								" " " " " "
Lubricate Windshield Wiper and Washer Controls								" " " " " "
Clean, Repack and Adjust Wheel Bearings								" " " " " "
Change Transmission and Transfer Lubricant								" " " " " "
Replace Dry-Type Air Cleaner								Continuing each 24,000 miles
Check Lubricant Level of Differential								" " " " " "
Lubricate Transfer Case Shift Lever Control Case								X Continuing each 30,000 miles

\*Check after the first 200 miles (320 km.) of operation.

If wheel or wheels are changed for any reason, have wheel nut torque rechecked after an additional two hundred miles of operation

\*\*Service mileage shown or every 60 days, whichever occurs first.

\*\*\*Maintenance check on emission system must be performed per information in this manual.

\*See text for brakes.

Miles	Kilometers
2,000	3,200
6,000	9,600
12,000	19,200
18,000	28,800
24,000	38,400
30,000	48,000

### B-9. Engine Oil

For maximum engine protection under all driving conditions encountered during the recommended oil change intervals, it is necessary to use only "MS" certified sequence-tested oils. The term "MS" must appear on the oil container singly or in conjunction with other designations. "MS" designated oils are heavy-duty detergent oils that are formulated to withstand all service conditions in modern powerplants. Engine oils designated only as "ML" and/or "MM" are not recommended and should not be used except in an emergency when "MS" oil is not available. Certified sequence-tested engine oils are described on their containers by such phrases as: meets, exceeds, excels, or has proven superior in the test requirements, test sequences, MS Service tests, standards, and service requirements, of automotive manufacturers, auto-makers, or car manufacturers for MS service or Service MS.

It may be necessary to change engine oil more frequently than normally recommended, depending upon the type and quality of oil used, the severity of operation conditions, if the engine is used for short periods in cold weather, or if the engine is allowed to idle for excessive periods.

Always drain the crankcase while the engine is hot since dirt and contaminants are then more likely to be held in suspension and therefore will drain out more completely. Drain the crankcase as follows:

- Position the drain receptacle under the drain plug.
- Remove the drain plug using the correct size wrench. Be careful of hot oil.
- Carefully clean the drain plug. Inspect and replace the gasket, if deteriorated.
- When the oil has drained, replace and tighten the crankcase drain plug.

e. Check for the presence of excess water in the oil that might indicate an internal leak from the cooling system.

f. Pour oil into the oil filler tube. Replace the oil filler cap.

#### **B-10. Engine Oil Filter Service — Hurricane F4 Engine**

The engine oil filter assembly should be replaced at each 2000 miles [3.200 km.] of normal engine use. To remove the filter, use oil filter wrench C-4065. To install a new filter, wipe the gasket—contact surface with engine oil, screw on the unit until gasket contacts the sealing surface, and then tighten at least one half turn more. **DO NOT USE TOOLS.** Turn by hand only. When refilling the engine crankcase after filter has been changed be sure to add one extra quart [1 ltr.] of oil to fill filter and oil passages. Run engine to make sure there is no leak at oil filter.

#### **B-11. Engine Oil Filter Service — Dauntless V-6 Engine**

To replace the oil filter, use oil filter wrench, Tool C-4065, to remove the filter. After the filter has been removed from the oil pump housing located on the right front side of the engine, wipe the housing surface clean and oil the gasket on the base of the new filter to make a good seal. Screw the new filter in position until its gasket contacts the pump housing surface, then tighten at least one-half turn until filter fits snug.

**Note:** Tighten by hand only, do not use a tool to tighten.

Replace oil filter each 6000 miles [9.600 km.] at engine oil change.

#### **B-12. Exhaust Manifold Heat Control Valve — Dauntless V-6 Engine**

A thermally-actuated heat control valve is located at rear of the right exhaust manifold of the Dauntless V-6 engine. This valve has a bimetal thermostatic spring which holds the valve closed when the engine is cold.

Each time the vehicle is lubricated place a few drops of penetrating oil on the valve shaft bushings and then work the valve by hand making sure that the lubricant is worked into the bushings.

**Note:** If the valve shaft does not operate freely penetrating oil should be used to free the shaft.

#### **B-13. Positive Crankcase Ventilation System**

Service the ventilation system of the engine each multiple of 6000 miles [9.600 km.] on the odometer after initial 2000 miles [3.200 km.] service. Replace the ventilation valve each 12,000 miles [19.200 km.].

For information on servicing the positive crankcase ventilation system on the Hurricane F4 engine and the Dauntless V-6 engine, refer to the Tune-up Section.

#### **B-14. Distributor — Hurricane F4 Engine**

The distributor shaft is lubricated through an oiler mounted on the side of the housing. Place three or

four drops of light engine oil in the oiler each 2,000 miles [3.200 km.]. Also place one drop of light engine oil on the wick located on the top of the shaft, which is made accessible by removing the rotor arm. Sparingly apply cam lubricant to the breaker arm cam and place a drop of oil on the breaker arm pivot.

#### **B-15. Distributor — Dauntless V-6 Engine**

The distributor has a lubricant reservoir that carries sufficient lubricant for the life of the distributor. When servicing breaker points, place one drop of light engine oil on the wick located on the top of the shaft. Also, apply cam lubricant sparingly to the breaker arm cam, and place a drop of oil on the breaker arm pivot.

#### **B-16. Generator**

On early production vehicles oilers are provided at each end of the generator, for lubrication purpose. On late production vehicles one oiler is provided at the rear (bushing end) of the generator for lubrication purpose. Place two to four drops of light engine oil in each oiler every 2,000 miles [3.200 km.].

#### **B-17. Spark Plugs**

Replace spark plugs. Refer to Section C.

#### **B-18. Starting Circuit**

Check the starting circuit. Refer to Section H.

#### **B-19. Charging Circuit**

Check the charging circuit. Refer to Section H.

#### **B-20. Engine Tune-Up**

Refer to Section C of this manual.

#### **B-21. Adjust Fan Belt**

Refer to Section C.

#### **B-22. Exhaust Emission Control System or Controlled Combustion System**

- Refer to the appropriate section in this manual.

#### **B-23. Exhaust System**

Check the exhaust system for leaks. Refer to Section F.

#### **B-24. Fuel Evaporative Emission Control Canister Air Filter**

The only service required for the F.E.E.C. system is cleaning the air cleaner filter mounted at the bottom of the canister. The filter requires replacement at 12,000 mile intervals. Refer to Section E, Par. E-9 for service procedure.

#### **B-25. Oil Bath Air Cleaner**

Some 'Jeep' Universal vehicles are equipped with an oil bath type air cleaner. This type air cleaner thoroughly removes all dust from the air before it enters the carburetor, if it is properly serviced. When the vehicle is operated under normal conditions the air cleaner must be serviced at regular intervals as care of the air cleaner is extremely

vital to the life of the engine. When the vehicle is operated under abnormal conditions, (for example when driven on secondary roads or through fields) then service of the air cleaner must be more frequent.

**Note:** Under extreme continually dusty and dirty conditions where the vehicle operates in clouds of dust and dirt, service the air cleaner daily.

a. To service the air cleaner on vehicles equipped with the Hurricane F4 engine (Fig. B-5) unscrew the eye bolt on the oil cup clamp and remove the oil cup from the cleaner body. Remove the oil from the cup and scrape all dirt from the inside, wash cup clean using a cleaning solution if necessary. In summer refill the oil cup with 1½ pints [0,6 ltrs.] of SAE-40 or 50 grade engine oil. In winter refill using grade SAE-20 engine oil. For servicing the air cleaner body (less oil cup), loosen hose clamp and remove hose from the cleaner. Remove the two wing screws and lift the cleaner from the vehicle. Agitate the cleaner body thoroughly in cleaning solution to clean the filtering element. Dry element with low pressure compressed air. Reinstall the cleaner body and replace the oil cup. Service the air cleaner every 2000 miles [3.200 km.].

b. To service the oil bath air cleaner on vehicle equipped with the Dauntless V-6 engine (Fig. B-6), first remove the air cleaner from the carburetor by unscrewing the wing nut. Remove the oil cup

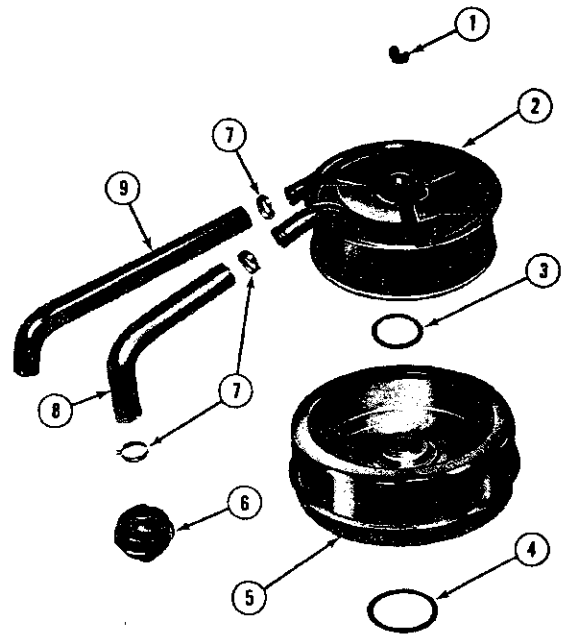


FIG. B-6—OIL BATH AIR CLEANER — DAUNTLESS V-6 ENGINE

- |                 |                 |
|-----------------|-----------------|
| 1—Wing Nut      | 6—Breather      |
| 2—Cover         | 7—Clamp         |
| 3—Rubber Gasket | 8—Vent Tube     |
| 4—Cork Gasket   | 9—Air Pump Hose |
| 5—Oil Cup       |                 |

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from cleaner body and remove the oil from the cup, scrape all dirt from the inside. Clean oil cup thoroughly, wash filter element in a solvent that will leave it clean and dry. Fill oil cup to indicated level with clean S.A.E. 40 or 50 grade engine oil (S.A.E. 20 grade in winter.) Assemble cleaner filter element to oil cup making sure that gasket is in place between the two pieces. Assemble air cleaner assembly to carburetor making sure the gasket between air cleaner and carburetor is in place. Secure air cleaner to carburetor with wing nut. Service the air cleaner every 6000 miles [9.600 km.].

c. Carefully check the hose clamps and fittings on the breather hoses at frequent intervals. Loose connections will affect proper operation of the crankcase ventilating system.

**B-26. Dry-Type Air Cleaner**

Service the air cleaner on Dauntless V-6 engines at each oil change under normal driving conditions. If the vehicle is operated under dusty conditions, check the condition of the air cleaner element more frequently and service if dirty.

Servicing the air cleaner consists of cleaning or replacing the air cleaner element and replacing the crankcase ventilation filter (breather assembly). See Fig. B-7.

The air cleaner element assembly consists of a paper element and a polyurethane element. The paper element cannot be cleaned.

To clean the polyurethane element, first carefully remove it from the paper element. Then wash it in

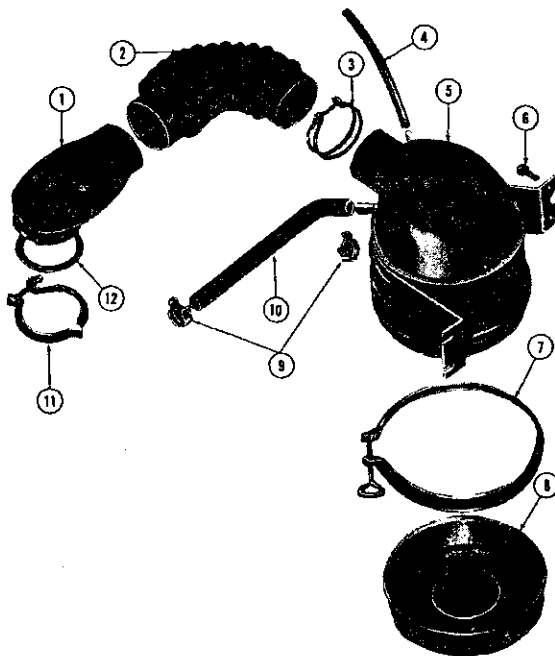


FIG. B-5—OIL BATH AIR CLEANER — HURRICANE F4 ENGINE

- |                         |           |
|-------------------------|-----------|
| 1—Horn                  | 7—Clamp   |
| 2—Flexible Connector    | 8—Oil Cup |
| 3—Hose Clamp            | 9—Clamp   |
| 4—Carburetor Vent Tube  | 10—Hose   |
| 5—Body                  | 11—Clamp  |
| 6—Screw and Lock Washer | 12—Gasket |

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solvent. Wrap the polyurethane element in a clean dry cloth and squeeze to remove all possible solvent. Do not wring the element or it may become torn. After cleaning, oil the polyurethane element liberally with engine oil (SAE 10W30) and squeeze to evenly distribute the oil through the element and to remove excess oil. The element should be damp with oil, not dripping. Install the polyurethane element on the paper element, taking care to have edges of the polyurethane element over the plastic end plates of the paper element.

Replace the complete air cleaner element assembly every 24,000 miles [38,400 km.]. Replace more frequently if there is any apparent damage or evidence of plugging.

The crankcase ventilation filter should be replaced, not cleaned, every 6,000 miles [9,600 km.]. The filter is located inside the air cleaner housing.

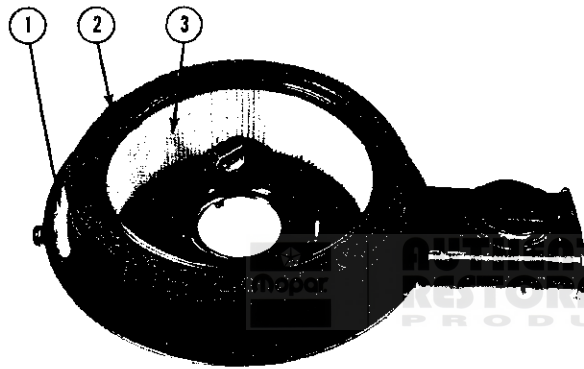


FIG. B-7—DRY-TYPE AIR CLEANER DAUNTLESS V-6 ENGINE

- 1—Crankcase Ventilation Filter
- 2—Polyurethane Element
- 3—Paper Element

**B-27. Steering Gear**

Check that the steering gear lubricant is at the level of the fill-hole. If not, add lubricant to the level of the fill-hole with the lubricant recommended in the Lubrication Specifications. If abnormally low, check the steering gear for possibility of leaks.

**B-28. Cooling System**

Check the coolant level in the radiator. It should be half an inch below the neck. If not, fill the radiator to half inch below the neck with the proper coolant. Refer to Section G.

If the level of the coolant is abnormally low, check the radiator, hoses and water pump for possible leaks. If a leak is suspected, refer to Section G.

**B-29. Clean Exterior of Radiator**

For proper cooling efficiency the radiator should be cleaned of foreign objects. Refer to Section G.

**B-30. Transmission and Transfer Case Lubricant Level Check**

- Refer to Par. B-31 through B-33 as applicable.

**B-31. General**

All transfer cases and transmissions should be serviced separately even though drilled passages are provided for oil circulation between some transmission and the transfer case housings. Procedure from the appropriate Par. below should be followed to check the lubricant level of the various types of transfer cases and transmissions.

If the transfer case or transmission fluid levels are found to be abnormally low, check both units for any possible leaks.

**B-32. Transfer Case**

The transfer case fill-hole is located on the right side of the transfer case housing. To check the lubricant level, remove the fill plug. Lubricant should be level with this fill-hole. If not, bring up to level by adding make-up lubricant as specified in the Lubrication Specifications.

**B-33. Transmission**

The transmission fill-hole is located on the right side of the transmission housing. To check the lubricant level, remove the fill plug. Lubricant should be level with this fill-hole. If not, bring up to level by adding make-up lubricant as specified in the Lubrication Specifications.

**B-34. Transmission and Transfer Case Lubricant Change**

- Refer to Par. B-35 through B-37 as applicable.

**B-35. General**

Transfer case and transmission lubricants should be changed at the same time.

**B-36. Transfer Case**

To drain the transfer case, first remove the transfer case fill-hole plug and then the transfer case drain-hole plug. Let all fluid drain from case. Then install the transfer case drainhole plug, and refill the transfer case through the fill-hole using the correct lubricant as specified in the Lubrication Specifications.

At 30,000 mile [48,000 km.] intervals lube the transfer case shift levers with Lubriplate No. 130AA. Late models have a lube fitting. To lube older models, (without lube fitting) remove the bottom cover of the case, clean thoroughly and pack case full of lubricant.

**B-37. Transmission (3-Speed)**

To change the lubricant on all vehicles equipped with a three speed synchromesh transmission, drain the old fluid by first removing the fill-hole plug and then removing the drainhole plug. Since on some transmissions there are drilled passages between the transmission and transfer case that allow oil to circulate between the two units, the transfer case should be drained before refilling the transmission.

When all the fluid is completely drained, replace the drainhole plugs only. For the correct specifications and quantity, refer to the Lubrication Specifications.

**Note:** Hard shifting of the transmission gear in cold weather is a positive indication that the lubricant is of the wrong viscosity or of poor quality which allows it to congeal.

#### **B-38. Optional 4-Speed Transmission and Transfer Case**

The four-speed transmission and transfer case require separate lubrication for each unit as they have no cross-over oil passage. At each transmission service check, the fill plugs of *both* four-speed transmission and transfer case should be pulled and the lubricant refilled to level if necessary.

#### **B-39. Transfer Case Linkage**

The transfer case shift linkage should be lubricated periodically. All bearing surfaces that are assembled with studs and cotter pins should be disassembled, cleaned, and coated with a good waterproof grease. The bearing surfaces that cannot be disassembled should be lubricated with a lubricant that will penetrate the bearing area. These bearings include the two on the cross shaft assembly and the threaded stud.

The type of penetrating lubricant recommended is DuPont "PM 7", No. 2911, or its equivalent.

#### **B-40. Brake Master Cylinder**

Clean the top of the fill cap and also the housing area around it. Remove the cap and observe the fluid level. It should be half an inch below the top of the fill-hole. If not, add brake fluid to half inch [1,3 cm.] below the top of the fill-hole. Use only heavy-duty brake fluid conforming to specification SAE-J-1703. Be sure to handle the brake fluid in clean dispensers and containers that will not introduce even the slightest amount of other liquids or foreign particles. Replace and tighten the fill cap.

#### **B-41. Adjust Brakes**

Refer to Section P.

#### **B-42. Brake Linings**

Refer to Section P.

#### **B-43. Adjust Clutch**

Refer to Section I.

#### **B-44. Clutch Cross Shaft (Lever Type)**

Lubricate the clutch cross shaft in accordance with specifications given in the Lubrication chart: see Item 1. Chassis Bearings.

#### **B-45. Tie Rod and Drag Link Sockets**

The tie rod and drag link sockets are equipped with lubrication fittings and should be lubricated per specifications given in the Lubrication chart: see Item 1. Chassis Bearings.

#### **B-46. Front and Rear Spring Bushings**

The condition of the spring bushings is indicated by the alignment of the spring pivot and spring

shackle bolts. Check the alignment of these bolts, and check that nuts are tightened securely.

#### **B-47. Spring Shackles**

Rubber bushings are provided on the spring shackles. These rubber bushings have no lubrication fitting and it is very important that they never be lubricated.

#### **B-48. Shock Absorbers**

Visually check for broken mounts or bolts, worn or missing bushings on the shock absorbers. Refer to Section S.

#### **B-49. Front and Rear Axle U-Bolts**

Torque the front and rear axle U-bolts. Refer to Section S.

#### **B-50. Front and Rear Axle Differentials — Lubricant Levels**

The lubricant level of all front and rear differentials should be at the level of the fill-hole.

#### **B-51. Front and Rear Axle Differentials — Changing Lubricant**

#### **B-52. Conventional Differentials**

To remove the lubricant from the front or rear differential, it is necessary to remove the housing cover. Let the lubricant drain out, and then flush the differential with a flushing oil or light engine oil to clean out the housing (except Powr-Lok or Trac-Lok Differentials). Do not use water, steam, kerosene, or gasoline for flushing.

Reinstall the housing cover, replacing the gasket whenever necessary, torquing the cover bolts to 15 to 25 lb-ft. [2,1 a 3,4 kg-m.].

Remove the filler plug, and refill the differential housing as specified in the Lubrication Specifications.

#### **B-53. Powr-Lok or Trac-Lok Differential**

Some vehicles may be equipped with the Powr-Lok or Trac-Lok Differential as optional equipment. Special lubricant and ordinary multipurpose gear lubricants *must not* be used. Use only 'Jeep' Differential Oil, Part No. 94557.

Powr-Lok or Trac-Lok differentials may be cleaned only by disassembling the unit and wiping with clean rags. Do not flush the unit. Refer to Section N.

#### **B-54. Front Axle Universal Joint — Lube**

Check the level of the front axle universal joint lubricant at each front wheel by removing the fill-hole plug. The lubricant should be level with the fill-hole. If required, add lubricant as specified in Lubrication Specifications.

#### **B-55. Front Axle Universal Joint — Service**

On all 4-wheel drive vehicles the front axle universal joint should be serviced by removing the shaft and thoroughly cleaning the universal joints and housing. For the correct procedures, refer to Section M.



Reinstall the axle shafts, and refill the housings to plug level using the universal joint lubricant specified in Lubrication Specifications.

**B-56. Front Axle Wheel Bearings**

To lubricate the wheel bearings, it is necessary to remove, clean, repack, and adjust them. When front wheel hubs and bearings are removed for lubrication, they should be thoroughly washed in a suitable cleaning solvent. The bearings should be carefully dried and then given a thorough cleaning and inspection. Use a clean brush to remove all particles of old lubricant from bearings and hubs. After the bearings are cleaned, inspect them for pitted races and rollers. Also, check the hub oil seals.

**Note:** Wheel bearing lithium base lubricants are used at the factory for initial fill of these bearings. When lithium base and sodium base lubricants are mixed, the result is a thinned-out mixture that can bleed through seals. It is therefore important that lubricants with the correct base be used when lubricating the wheel bearings.

Should leaks occur at wheel bearing seals, the leaks may be caused by a mixture of two types of lubricants. In such cases, the old lubricant should be completely removed before new lubricant is added. Wheel bearings should be thoroughly cleaned, lubricated with lithium base and reinstalled.

Repack the bearing cones and rollers with grease and reassemble hub in the reverse order of the disassembly. Test the bearing adjustment as outlined in Section Q.

**B-57. Rear Axle Wheel Bearings**

The Rear wheel bearings on early models equipped with lubrication fittings with a vent opening through the housings above each fitting should be lubricated sparingly, each 2,000 miles [3,200 km.]. Use a hand compressor and wheel bearing grease, forcing the grease through each lubrication fitting until it flows from the vent. Vent should be kept clear of obstruction or grease will back up into the brakes. Do not add grease after it flows from the vent for it may be forced through the wheel keyway onto the outside of the wheel and possibly onto the brake linings. Rear wheel bearings that do not have lubrication fittings should be removed each 12,000 miles [19,200 km.] and the bearing cleaned, inspected and repacked. Refer to procedure in Par. B-56.

**Note:** When servicing the Flanged Axle Unit Bearing Assembly, refer to Section N, Par. N-5 for proper lubrication procedures.

**B-58. Propeller Shafts and Universal Joints**

The propeller shaft slip joints and universals should be lubricated with a hand compressor grease gun so as to not damage the bearing seals. The units should be lubricated with a good quality grease. Refer to the Lubrication Chart for lubrication frequency and lubricant type and grade.

**B-59. Lights and Controls**

a. Check all interior and exterior lights and light switches for proper operation, including: parking lights, headlamps (high beam and low beam), tail lights, brake lights, directional lights, and instrument panel lights.

b. Check all instrument panel controls and instruments for proper operation.

**B-60. Speedometer Cable**

Remove the speedometer cable from its housing every 12,000 miles [19,300 km.]. Clean it thoroughly and coat it with a good quality light graphite grease.

**B-61. Headlights**

Refer to Section H.

**B-62. Heater Controls**

Apply Lubriplate 130-A to all friction points and pivot points on the heater controls panel unit as well as the pivot points at the dashpot. Apply a few drops of penetrating oil all along the Bowden cable. This oil will penetrate into the center wire.

**B-63. Windshield Wiper and Washer Controls**

Lubricate the friction points and the pivot points on the windshield wiper transmission and linkage arms with a slight amount of Lubriplate 130-A.

**B-64. Rotate Tires**

Refer to Section Q for the correct method of rotating the tires.

**B-65. Body Lube Points**

● Refer to Par. B-66 through B-68.

**B-66. Hood Hinge Pivot Points**

Lubricate the frictional points of the hood hinge pivot points with a few drops of light-weight engine oil.

**B-67. Glove Compartment Door Latch**

Sparingly wipe Lubriplate 130-A on the glove compartment door latch.

**B-68. Tailgate Hinges**

Lubricate the friction points of the tailgate hinges with a few drops of light-weight engine oil.

**B-69. LUBRICATION OF OPTIONAL EQUIPMENT**

**B-70. Pintle Hook**

When lubricating the vehicle, place a few drops of oil on the pintle hook and safety latch pivot pins.

**B-71. Centrifugal Governor**

Check the oil level in the governor housing at each vehicle lubrication. Use the same seasonal grade oil as is used in the engine and change oil at each engine oil change. Do not fill the housing above the level indicating plug opening. Keep the vent in the filler plug open at all times.

# B

## LUBRICATION

### **B-72. Powr-Lok or Trac-Lok Differential**

Refer to Par. B-53.

### **B-73. PARTS REQUIRING NO LUBRICATION**

#### **B-74. Water Pump Bearing, Clutch Release Bearing**

The water pump and clutch release bearings are prelubricated for life when manufactured and cannot be relubricated.

#### **B-75. Starter Motor Bearings**

The starting motor bearings are lubricated at assembly to last between normal rebuild periods.

#### **B-76. Alternator Bearings**

The alternator bearings are lubricated at assembly and require no further lubrication.

#### **B-77. Springs**

The vehicle springs should not be lubricated. At assembly the leaves are coated with a long-lasting special lubricant which is designed to last the life of the springs. Spraying with the usual mixture of oil and kerosene has a tendency to wash this lubricant from between the leaves, making it necessary to relubricate often to eliminate squeaking.

#### **B-78. Shock Absorbers**

Hydraulic direct-action shock absorbers are permanently sealed and require no periodic lubrication service. Shock absorber mounting bushings are not to be lubricated.

### **B-79. LUBRICATION REQUIREMENTS FOR OFF-HIGHWAY OPERATION**

Adequate lubrication becomes increasingly important when vehicles are used in off-highway operation. Under these conditions all operating parts of both the engine and chassis are subjected to unusual pressures. At the same time such operation is usually under abnormal dust and dirt conditions making additional precautions necessary. The importance of correct lubrication for the conditions of operation cannot be overestimated.

#### **B-80. Engine Oil**

It is important, that the oil in a new or rebuilt engine be changed after the first eight or ten hours of operation, and for heavy, dusty work, every 50 hours thereafter. Watch the condition of the oil closely and change it immediately if it appears to be contaminated.

#### **B-81. Engine Oil Filter**

Replace the oil filter at the end of the first 100 hours of service. Under extreme operating conditions, more frequent replacement may be required. The condition of the oil is a reliable indicator of the condition of the filter element.

If the oil becomes discolored and shows evidence of contamination, change the filter without delay. (Refer to Par. B-10, B-11 for the correct procedure for replacing the oil filter.)

#### **B-82. Air Cleaner**

Care of the air cleaner is extremely vital to the life of the engine. Pay particular attention to the amount of dust and dirt in the air taken into the engine through the air cleaner. When dust is not noticeable in the air, service the air cleaner each scheduled maintenance period. Whenever the air is noticeably dusty (for example when the vehicle is driven on secondary roads or through fields) then service the air cleaner more frequently. Under extreme continually dusty and dirty conditions where the vehicle operates in clouds of dust and dirt, service the air cleaner daily. (Refer to Par. B-24 thru B-26 for service procedures.)

#### **B-83. Chassis Lubrication**

The period of lubrication depends entirely upon the type of work being done. Using the specified interval given in the Service Maintenance Schedule as a guide, lubricate at safe intervals required for the particular type of operation. Under extremely dusty conditions lubricate these points daily. Be sure to force enough lubricant into each fitting to force out the old lubricant which might be contaminated with grit and which would cause rapid wear if allowed to remain.

Do not place lubricant on the various ball and socket joints or pivot points of the lift linkage as dirt will accumulate to form an abrasive mixture. It is best to simply wipe these parts clean with a cloth.

#### **B-84. Front Axle Shaft Universal Joints**

For off-highway use remove the universal joints twice yearly, thoroughly clean both the housings and joints with a suitable solvent, and refill the housings to the fill plug opening levels with the correct lubricant as given in the Lubrication Specifications.

#### **B-85. Transmission and Transfer Case**

The combined capacity of the two housings is small for economy, making it important that the lubricant be changed at regular intervals. For off-highway use drain both housings every 300 hours of operation and refill to the fill plug opening levels. Refer to B-35 through B-37 when changing lubricant.

#### **B-86. Front and Rear Axle Differentials**

Because of the higher pressure developed in the axle assemblies with heavy duty operation, drain, flush, and refill the differential assemblies each 300 hours of operation. Use only flushing oil or light engine oil to clean out the housings (except Powr-Lok and Trac-Lok differentials). Refer to Par. B-52 and B-53 for draining and flushing differential.

## TUNE-UP

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### C-1. GENERAL

An engine tune-up should be performed for all Jeep Vehicles each 6000 miles [9.600 km.] or at the end of each 250 hours off-the-road operation, to ensure best possible performance at all times. The tune-up should follow the sequence given in this section.

Because of federal laws limiting exhaust emissions, it is even more important that the engine tune-up is done accurately, using the specifications listed on the tune-up sticker found in each engine compartment.

**Note:** To ensure proper operation and effectiveness of the exhaust emission control system, and to comply with Federal and State requirements, a recheck of ignition timing, idle speed and idle mixture and necessary adjustments must be performed after the first 2,000 miles [3.200 km.] of vehicle operation.

A minor engine tune-up should be performed every 6,000 miles [9.600 km.] or at the end of 250 hours of off-the-road use. Major engine tune-up should be performed every 12,000 miles [19.300 km.].

The parts of units which affect power and performance may be divided into three groups:

- (1) Units affecting compression
- (2) Units affecting ignition
- (3) Units affecting carburetion

The tune-up procedure should cover these groups in the order given. While the items affecting compression and ignition may be handled according to personal preference, correction of items in the carburetion group should not be attempted until all items affecting compression and ignition have been satisfactorily corrected.

**Note:** To make sure hydro-carbon and carbon monoxide emissions will be within limits, it is very important that the adjustments be followed exactly as listed on the sticker found in each engine compartment.

Minor engine tune-up consists of the following.

- Inspect and correct as required:
- Battery cables and connections.
  - Alternator and regulator wiring.
  - Primary—Secondary wiring, distributor cap.
  - Cylinder head torque.
  - Contact point dwell.
  - Vacuum and centrifugal advance.
  - Ignition timing.
  - Spark plugs for correct air gap.
  - Adjust idle speed and idle air mixture.
  - Adjust all drive belt tensions.
  - Clean carburetor air cleaner.
  - Lubricate exhaust manifold damper.

Major engine tune-up includes the following.

- Inspect and correct as required:
- Battery condition and charging circuit. Clean, lubricate and tighten battery cable connections.
  - Ignition system.
  - Spark plugs; replace if necessary or clean and gap.
  - Compression check.
  - Primary—Secondary wiring, distributor cap.
  - Replace contact points and condenser.
  - Lubricate distributor cam with cam grease.
  - Adjust contact points.
  - Check vacuum and centrifugal advance.
  - Set ignition timing.
  - Torque cylinder head.
  - Adjust idle speed and idle air mixture.
  - Replace fuel filter element (every 12,000 miles [19.300 km.]).
  - Adjust all drive belt tensions.

**IMPORTANT: SPECIFICATIONS FOR ENGINE RPM, DISTRIBUTOR POINT DWELL, AND IGNITION TIMING GIVEN IN TUNE-UP SECTION C REFER TO VEHICLES WITH AND WITHOUT EXHAUST EMISSION CONTROL SYSTEMS.**

**FOR VEHICLES EQUIPPED WITH EXHAUST EMISSION CONTROL SYSTEMS ALSO REFER TO SECTION F1 (F4-134 ENGINE) AND F2 (V6-225 ENGINE).**

**C****TUNE-UP****C-2. TUNE-UP SEQUENCE**

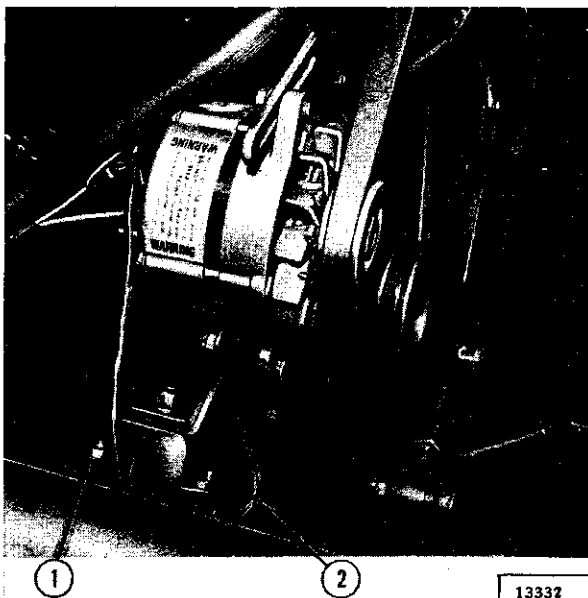
The following Pars. C-3 through C-27 give the sequence and describe the services to be performed when tuning the engine.

**C-3. Clean and Check Battery**

Inspect battery and cables. If the battery is not satisfactory, install a fully-charged battery to allow completion of the tune-up.

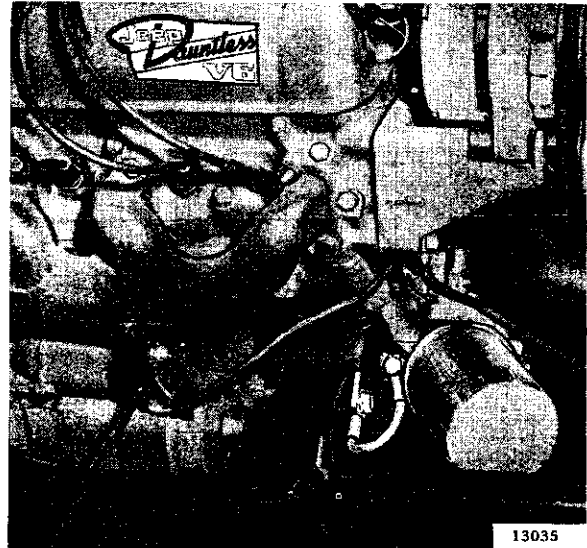
**Note:** If the battery fails any of the following tests, remember that the cause may be other electrical trouble, and not necessarily only a defective battery. Refer to Section H for electrical troubleshooting and tests.

- a. Check the specific gravity of the electrolyte in each cell of the battery. A hydrometer reading of 1.260 indicates that the battery is fully charged. If the reading is 1.225 or below, the battery needs recharging. If one or more cells is 25 "points" (.025) or more lower than the other cells, this indicates that the cell is shorted, the cell is about to fail, or there is a crack in the battery partition in the case. Unless the battery is repaired or replaced, battery trouble will soon be experienced.
- b. Check the electrolyte level in each cell, add distilled water to maintain the solution  $\frac{3}{8}$ " [9.5 mm.] above the plates. Avoid overfilling. Replace the filler caps and tighten securely. It is important to keep the electrolyte level above the plates at all times because plates that are exposed for any length of time will be seriously damaged.
- c. Check the wing nuts on the hold-down frame for tightness. Tighten them only with finger pressure, never with pliers or a wrench. Excessive pressure could damage the battery case.
- d. Clean the battery terminals and cable connec-



**FIG. C-1—FRAME GROUND STRAP — HURRICANE F4**

1—Right Front Engine Mount  
2—Frame Ground Strap



**FIG. C-2—FRAME GROUND CABLE — DAUNTLESS V-6**

tors. Prepare a strong solution of baking soda and water and brush it around the terminals to remove any corrosion that is present. The cell caps must be tight and their vents sealed to prevent cleaning solution entering the cells. After cleaning install cable connectors on terminals and coat the terminals and connectors with heavy grease.

e. Inspect the battery cables and replace if badly corroded or frayed. Check tightness of terminal screws to ensure good electrical connections. Check the tightness of the negative ground cable connection at the engine to ensure a good ground connection.

f. Load test the battery. Connect a voltmeter across the battery. Run the starting motor for 15 seconds. If the voltage does not drop below 10 volts on a 12 volt battery the battery is satisfactory. If the voltage falls below these values, yet the specific gravity is above 1.225, the condition of the battery is questionable.

g. Make sure the engine to frame ground strap or cable connections are tight. If these connections are loose, corroded or dirty, hard starting or failure of the vehicle electrical system may result. Refer to Fig. C-1 for location of the Hurricane F4 engine to frame ground strap and its connections. Refer to Fig. C-2 for location of the Dauntless V-6 engine to frame ground cable.

**C-4. Clean and Adjust Spark Plugs**

Clean, inspect, and gap spark plugs. Do not install spark plugs until completion of compression tests.

a. Use a Spark Cable and Installing Plier Tool, W-274, to remove the leads from the spark plugs.

**Caution:** Pulling on the cables to remove them from the spark plugs can cause internal breaks in the leads that will cause ignition failure.

b. Using a spark plug wrench, loosen each spark plug one or two turns to break loose any carbon deposits on the plug base.