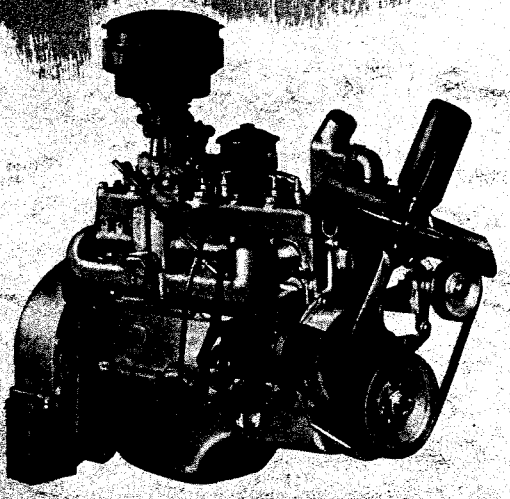
Chrysler

CYLINDER INDUSTRIAL ENGINES



OPERATORS MANUAL

MODELS INDUSTRIAL 30, 31, 32, 33, 908A, 931

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IMPORTANT

For your convenience, fill in the information requested below from your own engine. It will then be readily available when needed for identification purposes, should the replacement of parts ever become necessary.

Model .....

Type .....

Serial Number .....

SD & T
81-770-7517
10M

Litho in U.S.A.
4-66
Rerun

Foreword

This instruction manual is published as a guide and reference to assist in obtaining from the Chrysler Industrial Engine the many hours of low-cost, trouble-free service built into it.

In order to obtain the advantages of these qualities over a long period of time, it is necessary only that the engine be treated with reasonable care, which will insure all your demands for performance, power and dependability.

The following operating instructions, if followed, will ensure long service, dependable operation and satisfaction to the owner. For service procedures, it is suggested that an authorized Industrial Engine Dealer be consulted, as your dealer has proper tools and equipment for servicing your engine, and will provide the best service and attention to insure peak engine performance.

Modifications

Slight modifications in design as dictated by field experience or desire to improve the unit, or changes of materials due to inability to procure those originally specified may become necessary. Such changes in design will be obvious and, wherever possible, parts or assemblies will be interchangeable with the original design.

Illustrations

The illustrations in this manual are intended to show typical construction of the various parts. In some instances the shapes or details of the parts illustrated may not exactly represent their actual appearance; however, they will serve to show the servicing methods explained or help to identify parts performing the same function.

Identification

A name plate is attached to the right (manifold) side of the engine (Figure 1) showing the model, type and serial number of the engine,

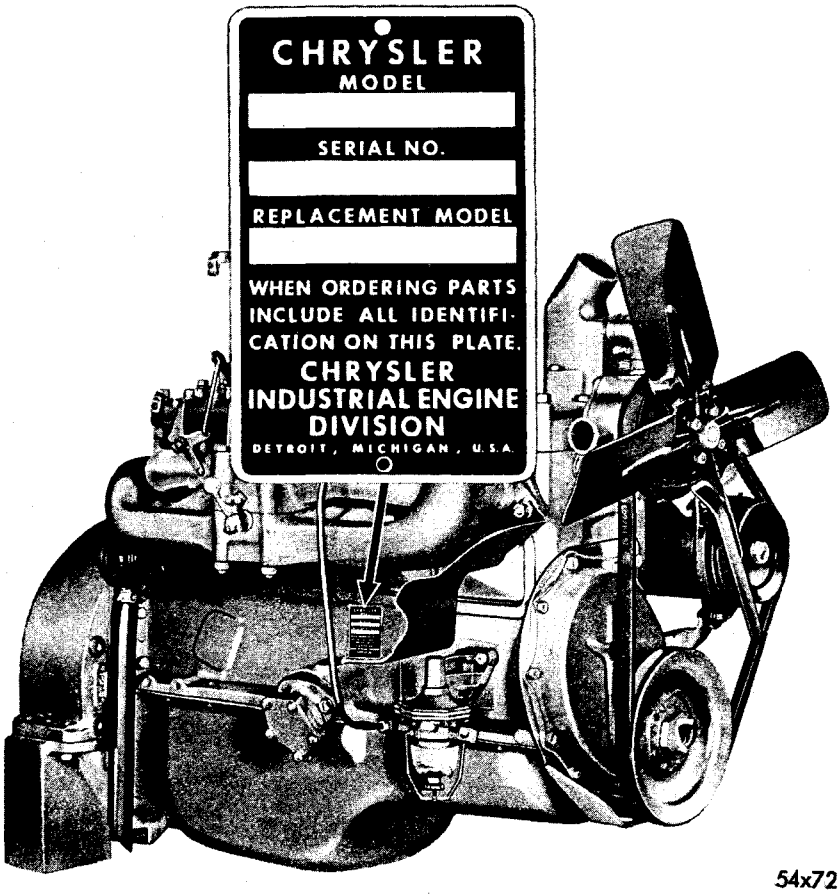

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Figure 1 — Identification Name Plate

on Models Ind. 30, 31, 32 and 33 and Figure 2 shows the name plate attached to the manifold side of the engine on Models Ind 908A and 931.

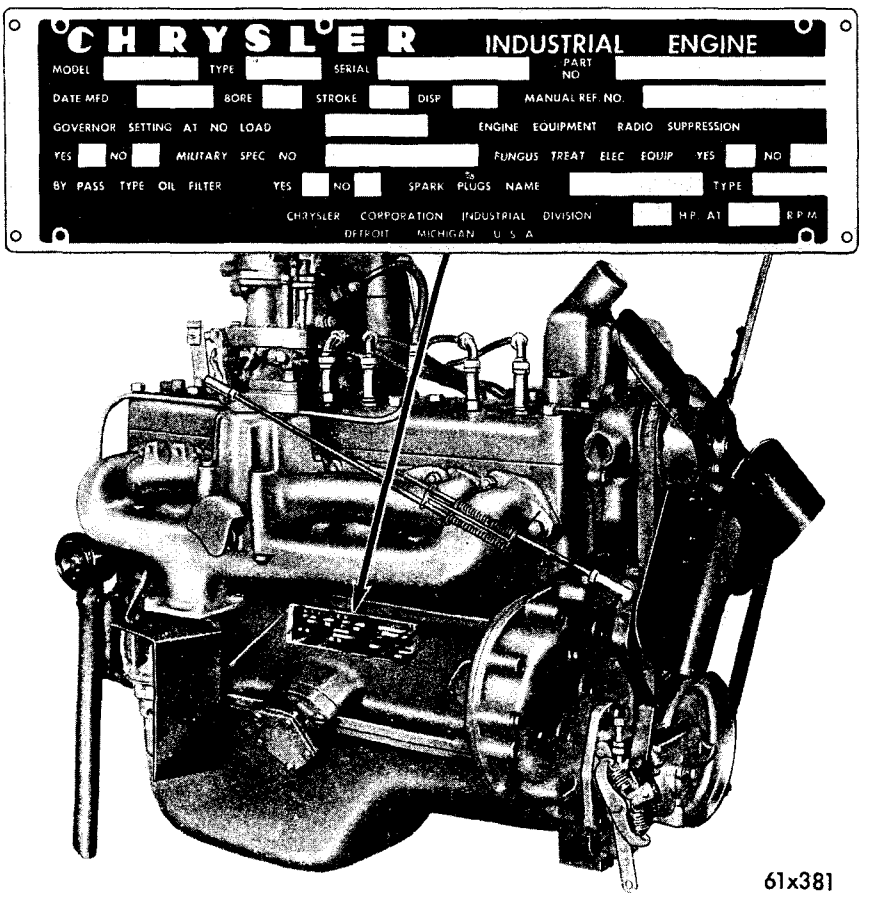

Figure 2 — Identification Name Plate Model 908A

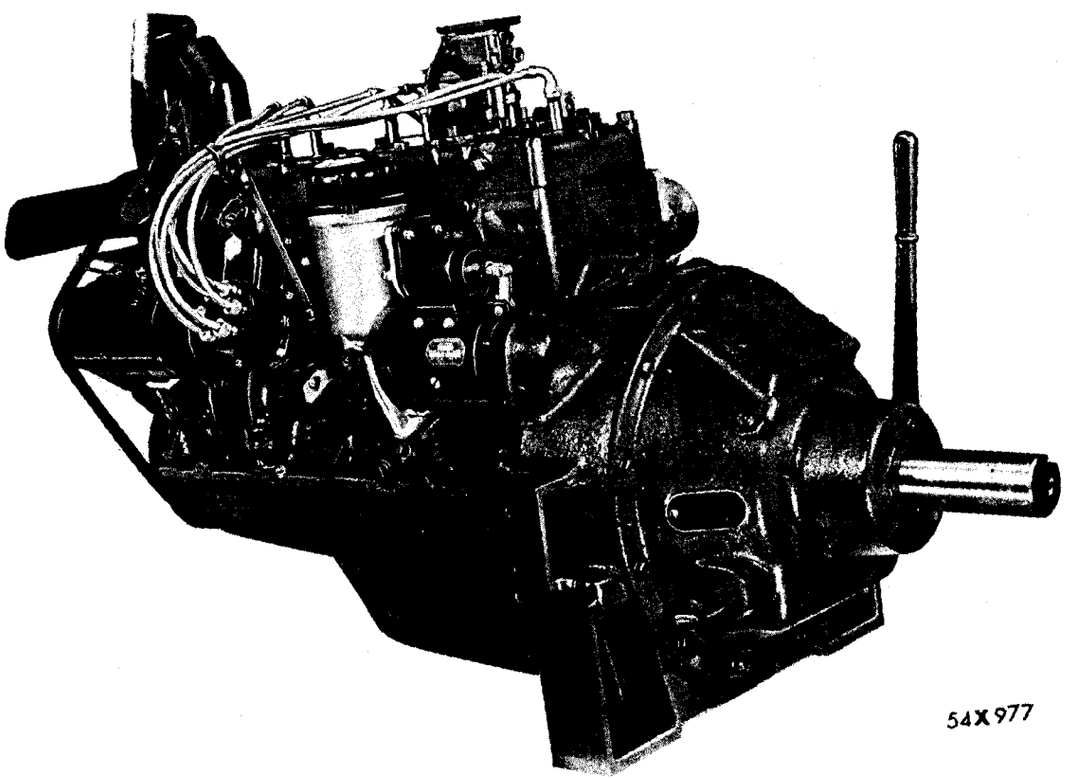

Figure 3 — Chrysler 6-Cylinder Industrial Engine Model Ind. 32 with Radio Shielding

Description

GENERAL DIFFERENCES AMONG MODELS

Chrysler Industrial Engines, Models IND. 30, 31, 32 and 33 (Figures 3, 4 and 5), and the Military standardized engines Models IND. 908A, 931, are supplied in various type for use as power units for mechanical shovels, power winches, road building equipment, welding generators, farm tractors and farm implements, irrigation deep well pumps, truck tractors, air conditioning mobile units, concrete mixers and other mobile agricultural and construction equipment.

When an engine is modified for various adaptations with a particular combination of accessories, it is designated by a separate model and type number, such as Models IND., 30-1026, 31-1043, 32-1058, 33-1078, 908A-2029, 931-1262. Ths is done so it may be readily identified in determining the service parts requirements or where additional accessories are required for various adaptations, such as Hydraulically Operated Power Torque and the Liquid Propane Gas Operation.

ENGINE

The basic engine is a six-cylinder, four cycle, gasoline type with liquid cooling and pressure lubrication. Many moving parts are superinished to provide the maximum in wear-resisting, load-carrying properties in the bearing surfaces. Figures 6 and 7 show the engine parts ompletely disassembled. Figure 8 is a sectional view of the engine.

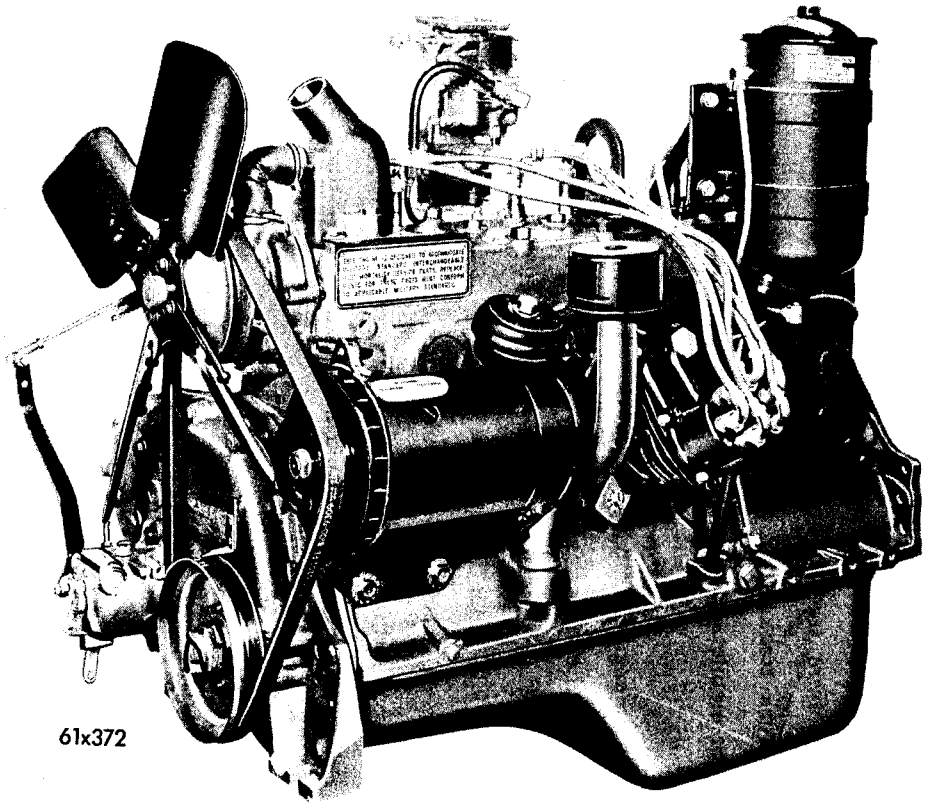

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Figure 4 — Chrysler 6-Cylinder Industrial Engine Model 908A

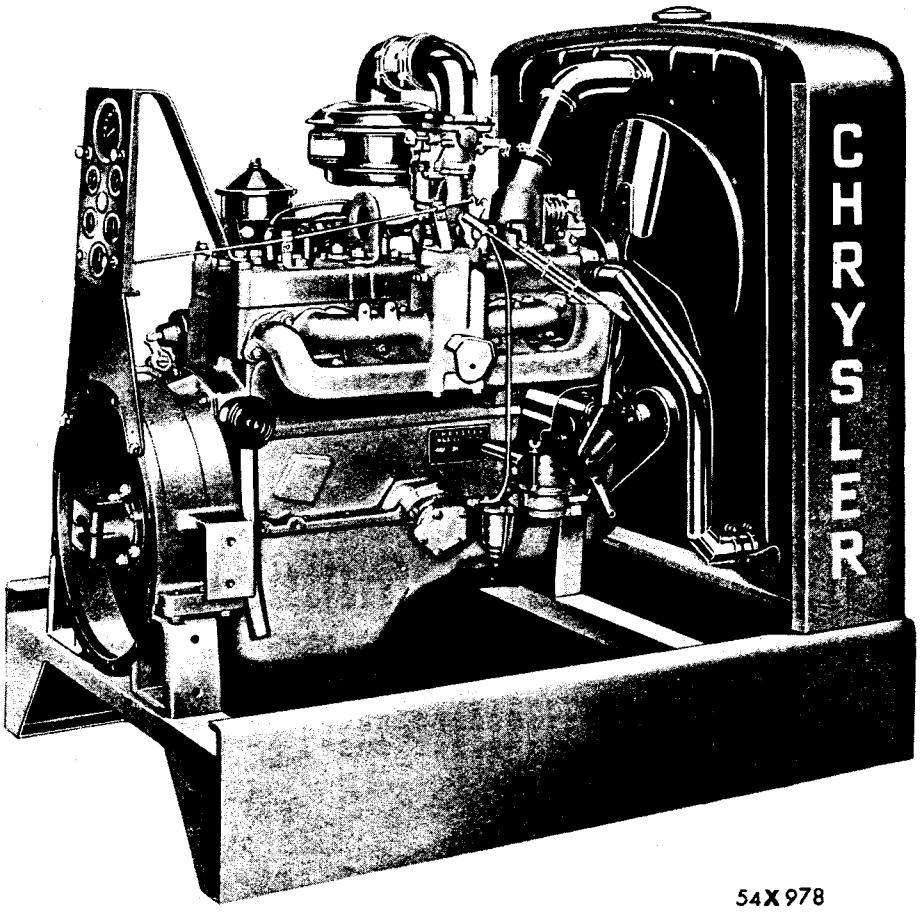

Figure 5 — Chrysler 6-Cylinder Industrial Engine — Open Type Power Unit

Ref. No.	Name	Part Type Code
1	Ventilator	6-12-1
2	Housing	6-09-1
3	Cover	6-11-2
4	Dowel	9-02-7
5	Fork	6-22-1
6	Seal	6-23-3
7	Spring	6-27-5
8	Starter Assembly	8-52-4
9	Reinforcement	6-09-12
10	Bracket	6-09-11
11	Pipe	10-02-15
12	Screw and Washer	10-02-15
13	Gasket	10-02-17
14	Manifold	9-48-6
15	Gasket	9-50-2
16	Manifold	9-48-7
17	Gasket	14-34-2
18	Choke	14-64-2
19	Tube Assembly	8-27-320
20	Tube	10-03-7
21	Cable	8-36-45
22	Carburetor	14-30-1
23	Air Cleaner	14-29-2
24	Filter Kit	10-26-1
25	Tube Assembly	10-27-12
26	Tube Assembly	10-27-1
27	Indicator	10-03-4
28	Elbow	10-27-1
29	Coil	8-35-4
30	Bracket Assembly	8-35-41
31	Spark Plug and Gasket Package	8-36-114
32	Connection	9-05-5
33	Hose	7-14-9
34	Clamp	7-14-16
35	Thermostat Assembly	7-41-4
36	Gasket	9-05-6
37	Air Cleaner	10-01-21
38	Bracket	10-01-44
39	Bolt and Nut	10-01-44
40	Pipe Assembly	10-01-9
41	Head	9-03-4
42	Gasket	9-03-5
43	Chamber Assembly	8-27-309
44	Distributor Assembly	8-27-1
45	Plate	8-27-19
46	Gasket	7-44-4
47	Elbow	7-48-12
48	Plug	7-48-12
49	Generator Assembly	8-28-3
50	Strap	8-28-15
51	Pulley	8-28-297
52	Bracket	8-28-36
53	Gasket	7-48-16
54	Fan	7-02-1
55	Pin	7-45-22
56	Hub	7-05-1
57	Pump Assembly (serviced in pump package)	7-42-1
58	Hose	7-14-5
59	Clamp	7-14-13
60	Pulley	7-06-14
61	Insulator	9-67-4
62	Jaw	9-07-8
63	Washer	9-07-10
64	Damper	9-13-5
65	Pulley	7-06-1
66	Key	9-13-23
67	Plate	9-65-6
68	Cover	9-23-5
69	Gasket	9-23-17
70	Plate	9-24-5
71	Gasket	9-24-7
72	Screw	9-19-3
73	Washer	9-19-3
74	Tube	9-19-3
75	Clip	9-19-3
76	Dowel	9-24-6
77	Block	9-02-5
78	Gasket	9-50-2
79	Gasket	9-50-2
80	Gasket	14-64-9
81	Thermostat	9-58-5
82	Shield	9-58-12
83	Tube	14-85-1
84	Body	10-07-10
85	Cover	10-08-2
86	Screw	10-08-2
87	Gasket	10-24-6
88	Strainer Assembly	10-23-7
89	Pipe Assembly	10-18-4
90	Connector	14-85-1
91	Gasket	10-07-11
92	Shield	14-81-1
93	Gasket	14-74-1
94	Pump	14-73-2
95	Connector	14-89-57
96	Nipple	10-16-9
97	Nut	10-16-4
98	Pipe Assembly	10-16-4
99	Gasket	10-24-5
100	Gasket	10-24-6
101	Gasket	10-24-5
102	Pan	10-24-4
103	Gasket	10-24-38
104	Plug	10-24-37
105	Screw	10-24-4
106	Washer	10-24-4
107	Seal	6-10-10
108	Cover	6-10-15
109	Stud	9-46-10
110	Gear	9-45-2
111	Pan	6-10-2
112	Fluid Drive	9-46-4
113	Key	9-46-23
114	Plate	9-46-19
115	Washer	9-46-22
116	Nut	9-46-20
117	Disc	6-13-1
118	Cover	6-14-1
119	Spring	6-20-14
120	Bearing	6-19-2

Figure 6 — Chrysler 6-Cylinder Industrial Engine — Exploded View

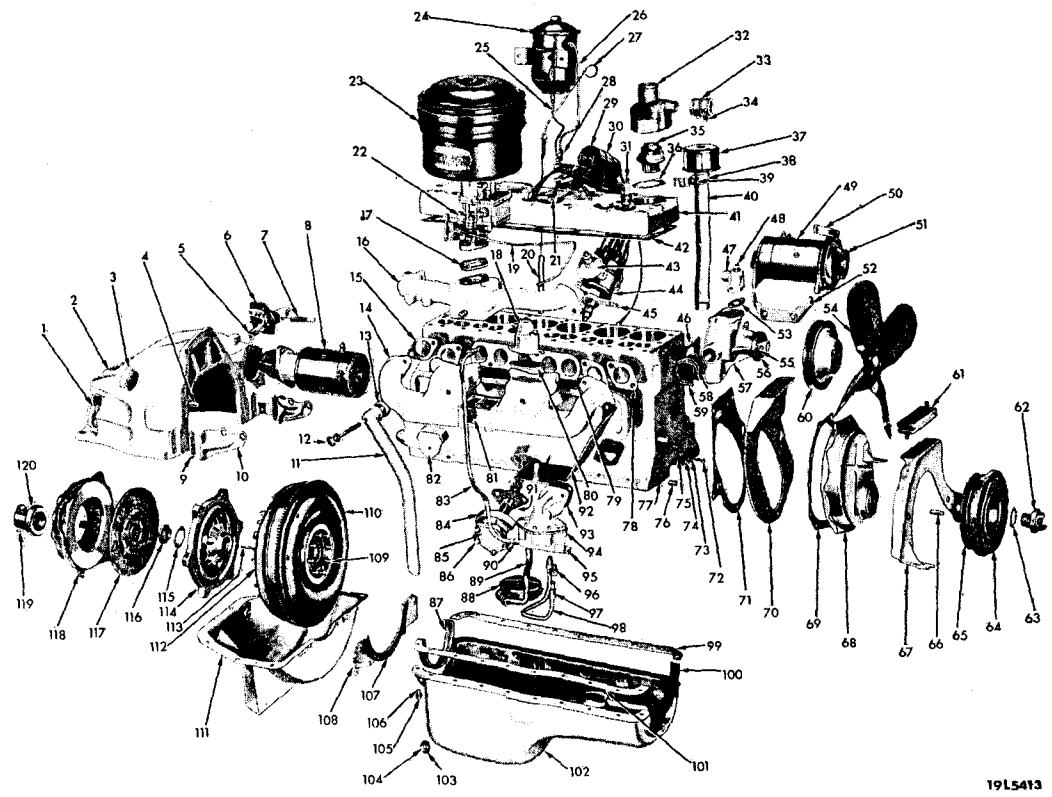

Figure 6 — Chrysler 6-Cylinder Industrial Engine, Exploded View (Typical)

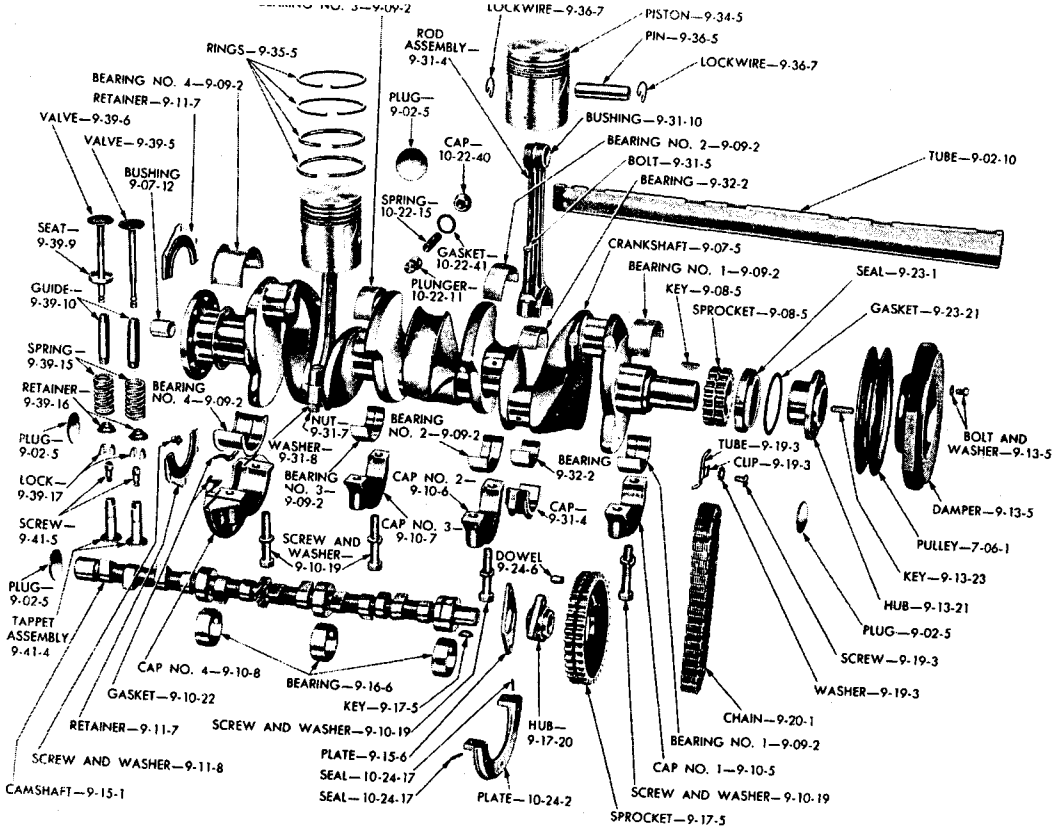

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Figure 7 — Chrysler 6-Cylinder Industrial Engine Internal Parts (Exploded View)

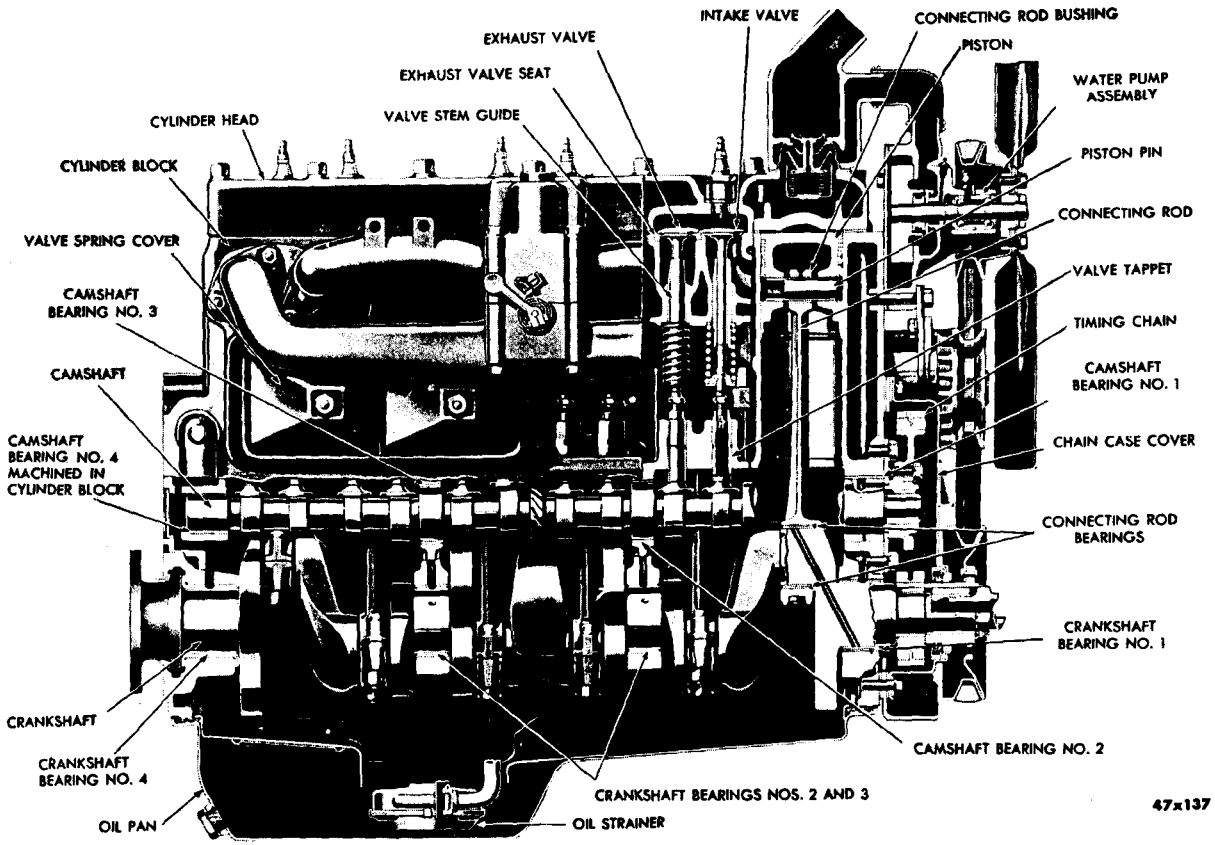

Figure 8 — Chrysler 6-Cylinder Industrial Engine (Sectional View)

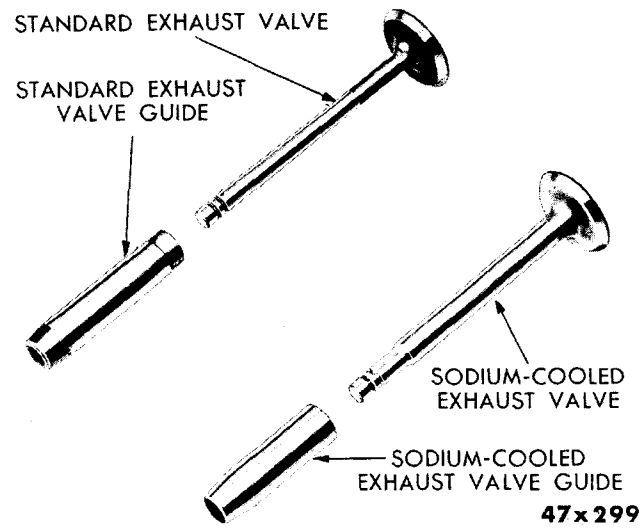

Figure 9 — Valves and Guides

EXHAUST VALVES. One of the outstanding features of Chrysler 6-Cylinder Industrial Engines is sodium-cooled exhaust valves which are available as optional equipment on the 32 and 33 models. They are specified for heavy duty operation (Figure 9). The sodium-cooled valve stem is made hollow and then partially filled with pure metallic sodium, which liquefies at 207° F. In liquid form, the sodium moves up and down with the motion of the valve in operations and helps to transfer heat from the valve head to the engine cooling system. Engines equipped with sodium-cooled valves can be identified by a plate (Figure 10) attached to the right side of the engine near the engine identification name plate.

ADJUSTING VALVE TAPPETS. Valve tappets should be adjusted with engine running at normal operating temperature. The valve tappet screws are of the self-locking type, without lock nuts. Adjust standard valve tappets to: intake .015 inch (engine hot or cold), exhaust .015 inch (engine cold). Adjust sodium-cooled exhaust valve tappets to: .018 inch (engine hot), .020 inch (engine cold).

It is important that the proper clearance be maintained to insure satisfactory engine performance.

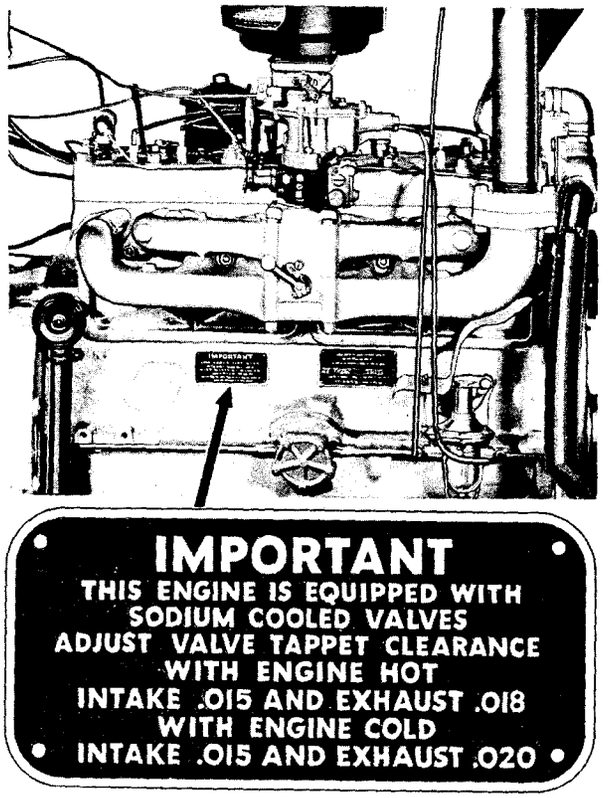

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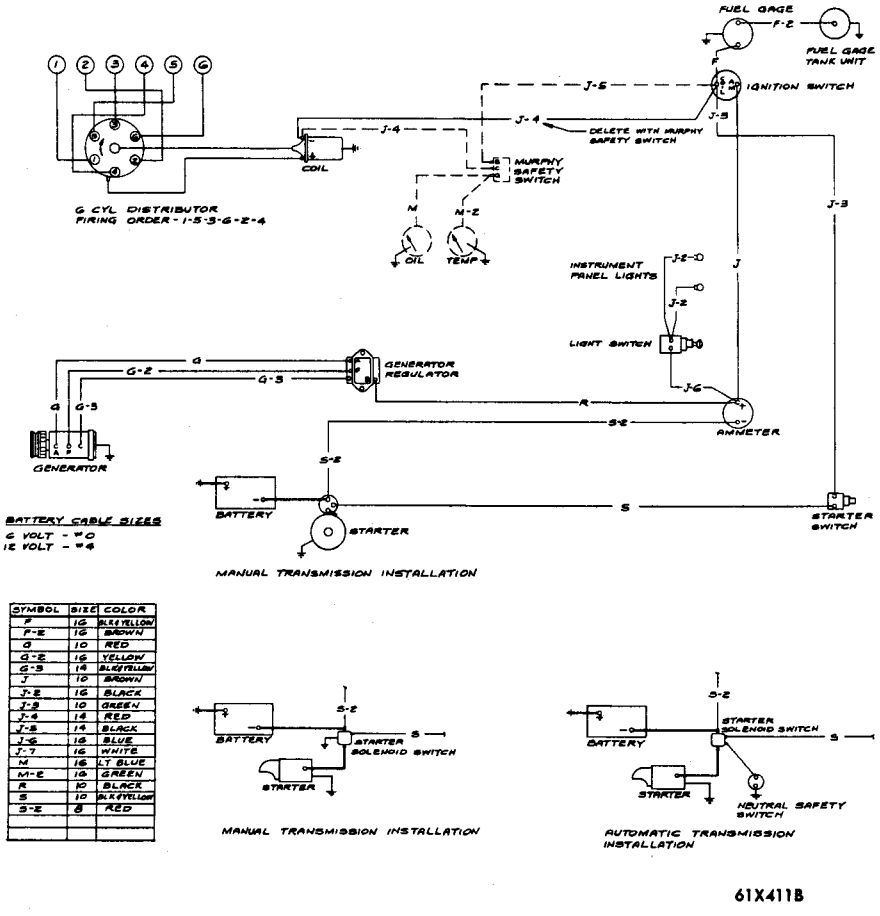
Figure 10 — Sodium Valve Identification Plate

LUBRICATION

The engine is lubricated by oil drawn through a strainer from the oil pan by the oil pump. The pump is mounted on the right side of the engine and is driven by a spiral gear on the camshaft.

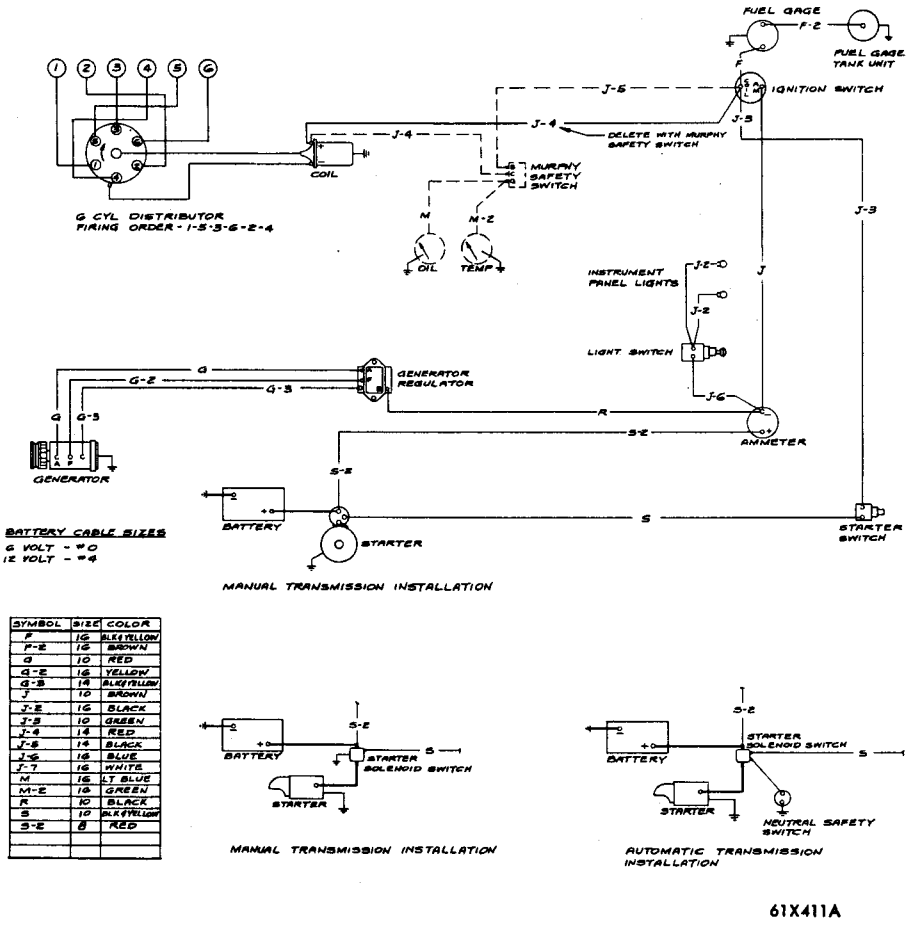
Oil is forced under pressure through drilled passages in the cylinder block to the camshaft bearings, crankshaft and crankshaft bearings. Oil is also forced under pressure through drilled passages in the crankshaft to the connecting rod bearings. Cylinder walls, pistons, piston pins and valve tappets are lubricated by oil spray from crankshaft rotation and metered holes in the connecting rod bearings.

Oil is forced, in a limited quantity, from the front camshaft bearing directly into the timing chain and sprockets. The camshaft thrust plate



SYMBOL	SIZE	COLOR
F	16	BLK/YELLOW
F-2	16	BROWN
G	10	RED
G-2	16	YELLOW
G-3	14	BLK/YELLOW
J	10	BROWN
J-2	16	BLACK
J-3	10	GREEN
J-4	14	RED
J-5	14	BLACK
J-6	16	BLUE
J-7	16	WHITE
M	16	LT BLUE
M-2	16	GREEN
R	10	BLACK
S	10	BLK/YELLOW
S-2	8	RED

Figure 11 — Chrysler 6-Cylinder Industrial Engine Positive Wiring Diagram



SYMBOL	SIZE	COLOR
F	16	BLK/YELLOW
F-2	16	BROWN
G	10	RED
G-2	16	YELLOW
G-3	14	BLK/YELLOW
J	10	BROWN
J-2	16	BLACK
J-3	10	GREEN
J-4	14	RED
J-5	14	BLACK
J-6	16	BLUE
J-7	16	WHITE
M	16	LT BLUE
M-2	16	GREEN
R	10	BLACK
S	10	BLK/YELLOW
S-2	8	RED

Figure 12 — Chrysler 6-Cylinder Industrial Engine Negative Wiring Diagram

is lubricated by oil forced through a passage in the camshaft. Maximum oil pressure is limited by a relief valve located in the main oil passage on the left side of the engine.

ELECTRICAL SYSTEM

Models covered by this manual are equipped with an electrical system consisting of a generator, generator regulator, starting motor, ignition coil, distributor and spark plugs together with the necessary cables, connecting wires and switches. See Figures 11 and 12.

DISTRIBUTOR

The ignition distributor shaft is driven by the camshaft through the oil pump driven gear. The distributor shaft tongue end fits into a slot at the end of the oil pump shaft gear. The distributor times and distributes ignition current.

With the engine running, an electrical current flows from the ignition switch through the primary winding in the coil to the ignition points in the distributor and then to ground. As this circuit is completed, an induced high tension (voltage) circuit is started in the coil. This secondary circuit flows from the tower on the coil to the center tower of the distributor cap and to the rotor under the cap. The rotor distributes the current to the end towers of the cap and the six wires carry the current to the spark plugs.

The ignition points in the distributor constitute an off-and-on switch. This interruption in the circuit also divides the high tension coil output into equal parts for the purpose of igniting the fuel in each combustion chamber. A condenser in the circuit is located in the distributor.

The condenser absorbs the electrical surge which is produced each time that the ignition points break the circuit. The condenser reduces arcing at the points and hastens the collapse of the magnetic field in the coil.

An automatic centrifugal advance built into the distributor provides proper ignition timing in relation to engine speed.

The vacuum advance control (engines so equipped) provides additional spark advance over the centrifugal advance through the engine vacuum. When the engine is running under light load and engine vacuum is high, the contact plate is rotated to the maximum advanced position.

Under heavy load conditions, however, as when the throttle is opened for additional engine R.P.M., the engine vacuum is low, the breaker plate is rotated to the retarded position to prevent fuel detonation or pinging.

Some distributors are equipped with a dust proof metal cap over the ignition points and distributor cam. The plate can be lifted off after the rotor has been removed. Some engines are equipped with a distributor having a tachometer drive pinion.

FUEL SYSTEM

The fuel system includes the fuel lines, fuel pump and filter, carburetor, intake manifold and throttle control. Fuel from the tank passes through the filter into the fuel pump, which is driven by an eccentric on the front end of the camshaft. The fuel pump forces fuel into the carburetor where it is atomized and mixed with air and drawn through the manifold and valves into the combustion chamber.

CARBURETORS (Figures 13, 14, 15, 16 and 17.)

Chrysler 6-Cylinder Industrial Engines are equipped with either a downdraft or updraft carburetor. These carburetors are adapted to use a sandwich type governor and in some instances a dash pot idle control. However, both the downdraft and updraft function similarly. Fuel is supplied through separate circuits in the carburetor for varying requirements of idling, part throttle operation, acceleration and wide open throttle operation. On Carburetor "Algas" No. CM-1404C refer to the Liquid Propane Gas Operation writeup in this manual.

Fuel for the idle system is admitted to the throttle body of the carburetor through a series of drilled passages and an idle orifice tube. The idle system supplies the major portion of the fuel at the lower engine speeds. After the throttle valve has been opened sufficiently, fuel is drawn from the nozzle of the carburetor through the main metering system.

The main metering system consists of a main metering jet, a main vent tube and passages for admitting air to the main vent tube where the fuel is mixed with air before being drawn into the throat of the carburetor. Fuel for all speed ranges above the idle range is supplied through the main discharge nozzle.

An accelerating pump supplies the additional fuel required when

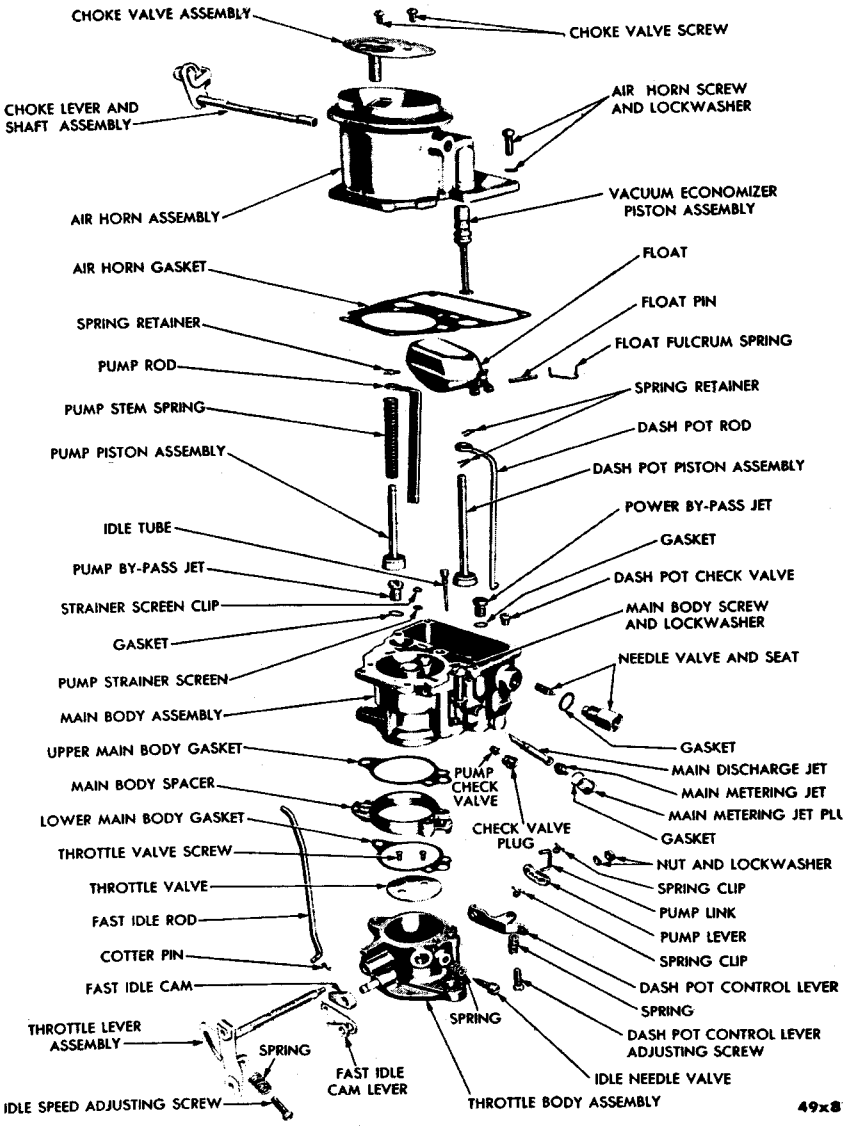


Figure 13 — Downdraft Carburetor Used with Dash Pot and With Fluid Drive (Stromberg Model BXVD 3-99)

1 — Valve attaching screws
2 — Choke control lever and shaft
3 — Body gasket
4 — Pump check plug
5 — Idle orifice tube and plug
6 — Step-up piston, plate and rod
7 — Step-up piston spring
8 — Step-up jet
9 — Step-up piston gasket
10 — Step-up jet gasket
11 — Flange attaching screw
12 — Body
13 — Flange gasket
14 — Not used
15 — Throttle shaft lever
16 — Throttle lever clamp screw
17 — Throttle lever adjusting screw spring
18 — Throttle lever adjusting screw
19 — Not used
20 — Idle adjustment screw spring
21 — Idle adjustment screw
22 — Throttle valve
23 — Valve attaching screw
24 — Choke valve
25 — Air horn
26 — Air horn attaching screw
27 — Pump link
28 — Pump spring retainer
29 — Pump spring
30 — Plunger, spring and rod
31 — Float and lever
32 — Float lever pin retainer
33 — Float lever pin
34 — Pump retainer ring
35 — Pump inlet ball
36 — Main metering jet
37 — Main metering jet gasket
38 — Pump check ball
39 — Gasoline intake needle
40 — Needle seat gasket
41 — Needle seat
42 — Insulator
43 — Flange gasket
44 — Body flange
45 — Pump filter
46 — Pin lock spring
47 — Throttle valve shaft and arm

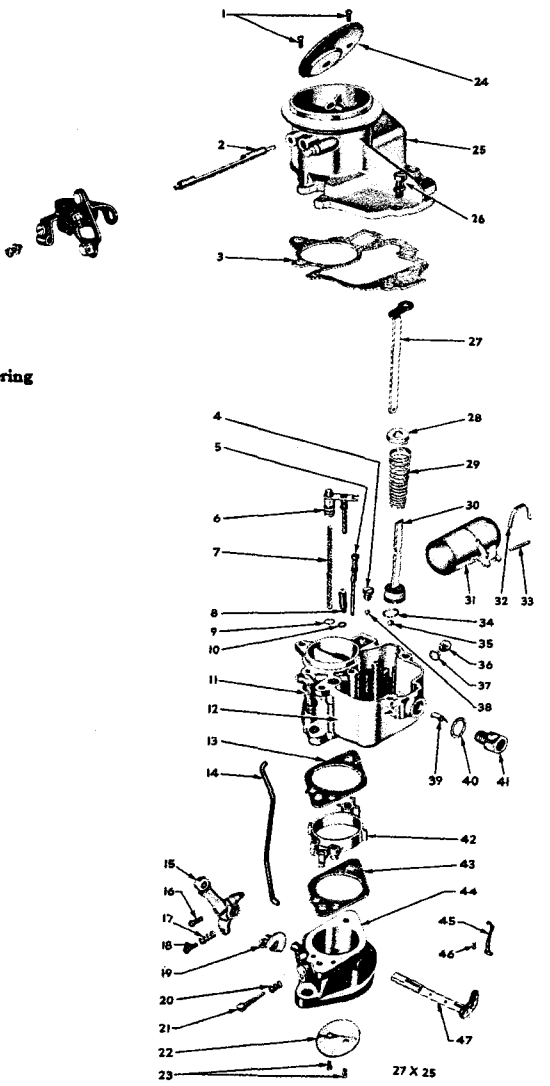


Figure 14 — Downdraft Carburetor Ball and Ball (Model E7T2)

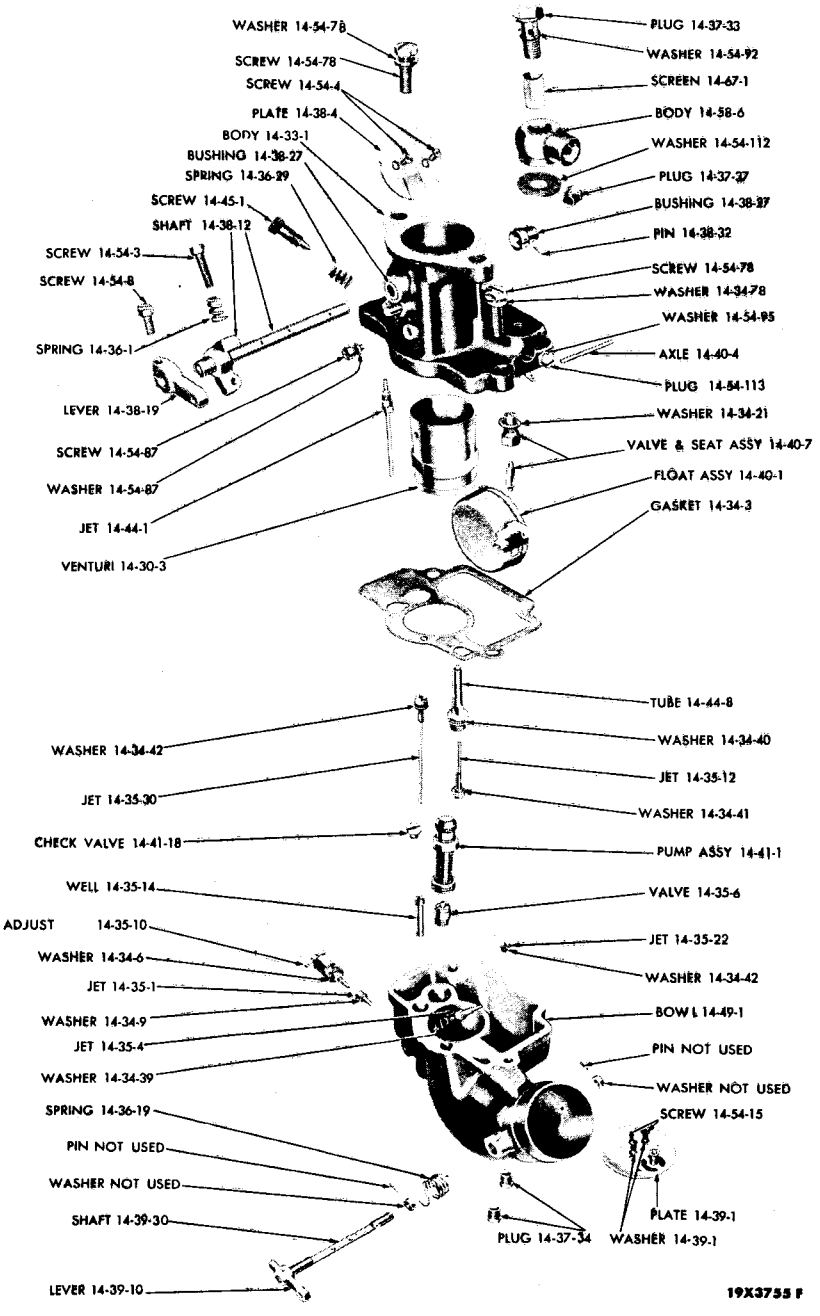


Figure 15 — Zenith Up-Draft Carburetor (Models 0-11000 and 0-11885)

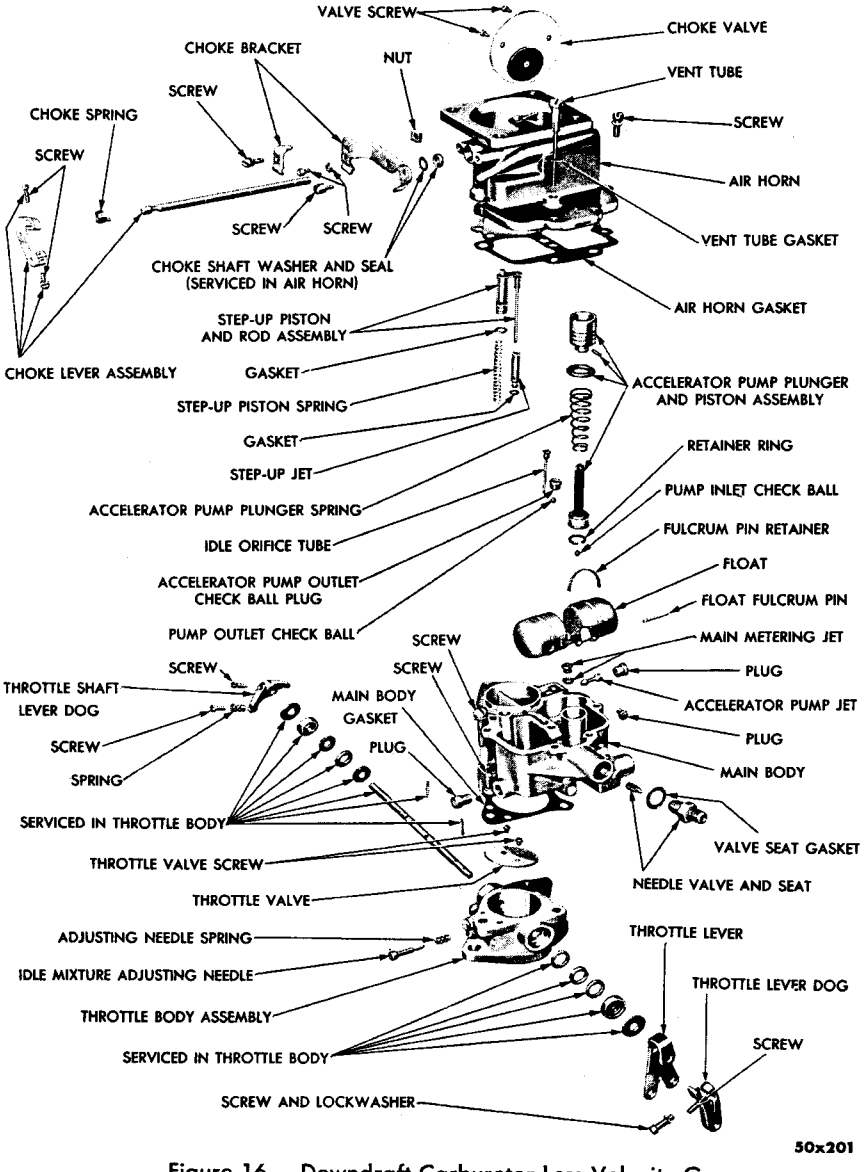


Figure 16 — Downdraft Carburetor Less Velocity Governor
(Ball and Ball Model E7D3)

the throttle valve is opened for acceleration. Fuel flows into the accelerating pump cylinder through the pump inlet valve. When the accelerating pump piston is operated, the inlet valve is closed and fuel is forced out the pump cylinder through the discharge check valve and pump jet. This additional fuel enters the carburetor to supplement the fuel supplied through the main metering system.

The economizer or step-up system provides the extra fuel necessary for maximum power under full load operation and is actuated by manifold vacuum.

A piston, a piston actuating spring, a jet and various drilled passages operate the economizer or step-up system. Vacuum created in the intake manifold (when the throttle valve is not fully opened) causes the step-up piston to overcome the tension of the step-up piston spring, thereby shutting off the step-up fuel. When the vacuum is reduced in the intake manifold, such as in wide open throttle operation, the step-up piston operates the step-up jet. This supplies the fuel required in addition to that supplied by the main metering pump systems.

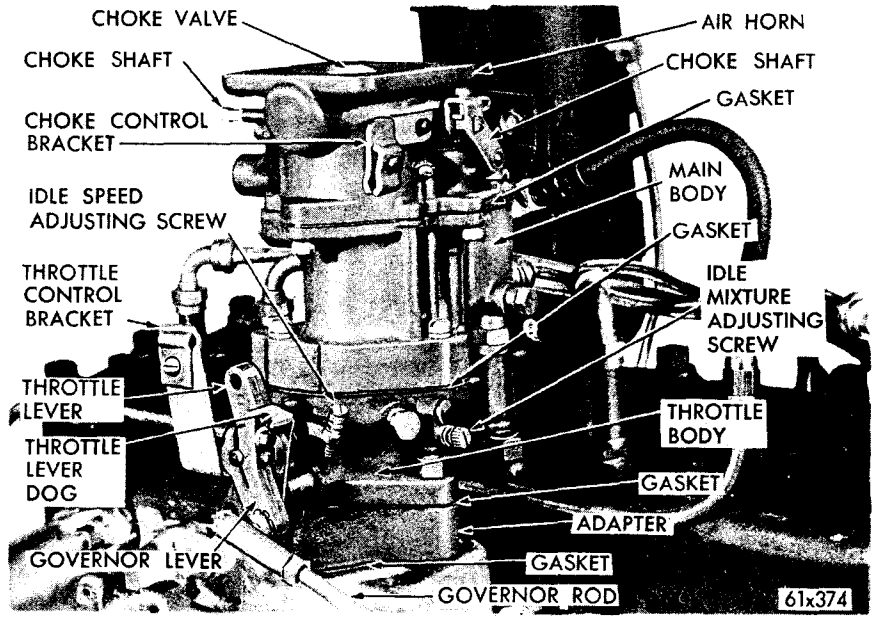


Figure 17 — Carburetor Assembly (Model E7D)

Fuel is supplied for all circuits through the float system. This system consists of a gasoline intake needle and seat assembly, float, float lever pin and float lever pin retainer. The float is set to maintain the level of fuel in the carburetor at a predetermined height. The float chamber vent opens into the air horn of the carburetor ahead of the choke valve. This equalizes the pressure on the fuel in the float chamber with the incoming air in the carburetor air horn, so that restrictions of the air cleaner do not affect the fuel air ratio.

Governors - (Pierce, Hoof, and King Seeley) (Optional Equipment)

PIERCE BELT DRIVEN MECHANICAL AND HOOF GEAR DRIVEN MECHANICAL GOVERNORS. Some engines are equipped with a mechanical type, belt-driven governor. Governor weights revolving with the mainshaft through centrifugal force cause the rocker shaft and operating lever to rotate. The operating lever is connected to the carburetor throttle. A calibrated spring attached to the operating lever opposes the effort exerted by the governor weights. The engine speed is governed by the balance of the two forces. In both governors, speed and sensitivity are set by the end product manufacturer to provide accurate control. Provision is made for adjustment to vary sharpness of control, and to correct surge. The governors may also be adjusted for governed engine speed, within their calibrated speed range. (See "Adjustments" in this Manual.)

KING SEELEY GOVERNOR. The velocity type King Seeley governor is used on some engines. Engine speed is governed by the throttle valve which is closed by the velocity of the fuel-air mixture as it passes through the governor. An accurately calibrated spring system attached to the throttle shaft opposes the velocity and controls the position of the throttle valve and the maximum speed of the engine. When in proper operating condition, the governor does not affect engine performance below the speed at which it begins to control, and does not affect fuel consumption. (See "Adjustments" in this Manual.)

EXHAUST VALVE ROTATORS

Some of the industrial engines are equipped with exhaust valve rotators to provide positive rotation of the exhaust valves each time they open. Their purpose is to prolong the life of exhaust valves.

When rotators are used on the exhaust valves and special valve locks, special valve springs are used, which are not interchangeable with intake valve springs.

CARBURETOR AIR CLEANERS

Chrysler 6-Cylinder Industrial Engines utilize two types of air cleaners, the inverted type and the hat type. Both are heavy duty oil bath type air cleaners whose function is to protect the carburetor against dirt and other foreign matter which might otherwise enter the engine through the carburetor.

EXHAUST SYSTEM

Some Chrysler 6-Cylinder Industrial Engines are equipped with one of two types of manifold heat control valves, which permit faster warm-up of the engine. The exhaust from the combustion chamber passes through the exhaust valve ports into the exhaust manifold and out through the exhaust pipe. This is accomplished by diverting exhaust from the engine through a by-pass port and hot spot chamber in the intake manifold and out through the exhaust manifold.

On engines equipped with a universal type mainfold an automatic heat control valve is employed. (The universal type manifold makes possible up-front or down-front exhaust, as well as up-rear or down-rear exhaust. In addition, up-draft or down-draft carburetion is available.)

AUTOMATIC HEAT CONTROL VALVE

This valve regulates the amount of heat that by-passes around the inlet manifold heater body. An occasional check should be made to insure that the valve and shaft are free and not restricted in their operation. If the shaft is frozen or bushing is damaged, the assembly should be repaired or replaced. The thermostat spring attached to the valve shaft in the manifold should be replaced when it becomes weak. The manifold heat control valve counterweight employed with universal type manifolds can be positioned to meet manufacturers specifications (Figures 18 and 19).

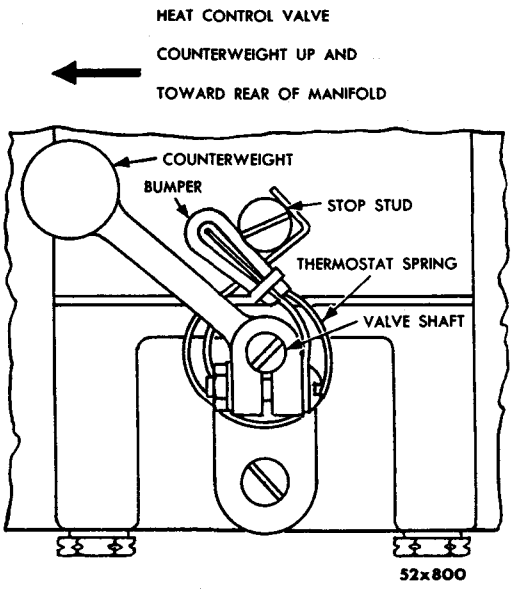


Figure 18 — Position of Universal Manifold Heat control Vavle Counterweight for downdraft Intake and Front Exhaust and Updraft Intake and Rear Exhaust

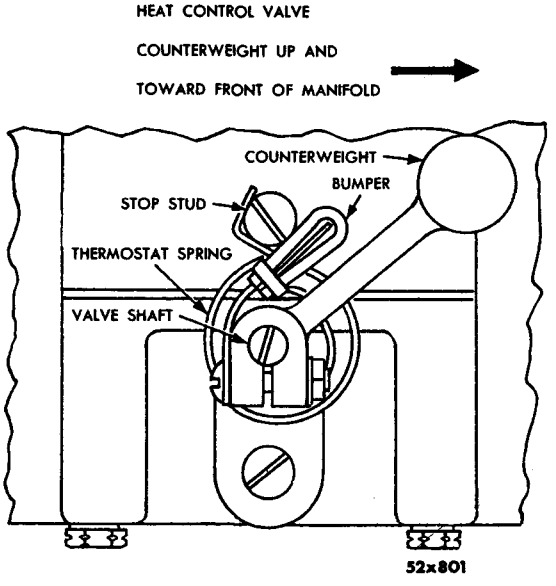


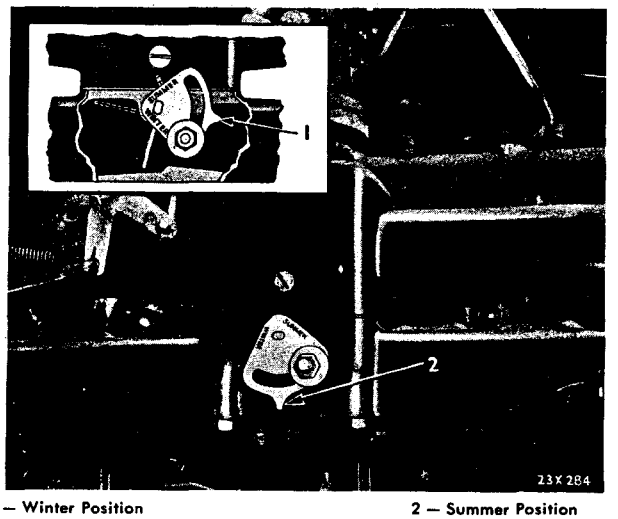
Figure 19 — Position of Universal Manifold Heat Control Valve Counterweight for Downdraft Intake and Rear Exhaust and Updraft Intake and Front Exhaust

ADJUSTABLE HEAT CONTROL VALVE

Other Chrysler 6-Cylinder Industrial Engines are equipped with the adjustable type heat control valve as shown in Figure 20. This type valve requires adjusting for summer and winter or where weather conditions change. The proper setting for this adjusting valve is with the end of the slot marked "winter" at the locking pin (which carries the control plate locking nut) for winter or cold weather, as this deflects more heat from the manifold exhaust against the intake body. The correct summer setting is with the end of the slot marked "summer" at the locking pin. When the heat control valve is adjusted properly, it will help to save fuel and assure proper fuel mixture and even heat to the intake heater body.

COOLING SYSTEM

The engine cooling system automatically maintains the most desirable engine operating temperatures under normal operating conditions. This is accomplished by means of thermostatic control of water circulation. Circulation is maintained by a centrifugal type water pump. When the engine is cold, a thermostat prevents the circulation of water to the radiator and a by-pass allows the water to circulate only in the water



1 — Winter Position 2 — Summer Position

Figure 20 — Adjustable Heat Control Valve

jackets of the engine until normal operating temperature has been reached. When operating temperature is reached the thermostat opens permitting unrestricted radiator circulation.

To drain the cooling system completely:

(1) Open the radiator drain cock.

(2) Remove the cylinder block drain plug (or open the drain cock) at the lower edge of the water jacket on the left side of the engine.

RADIATOR

Drain the cooling system and refill with clean SOFT water and add the contents of one can (No. 1 Top-Compartment) of Mopar Cooling System Cleaner.

Run engine at a fast idle for ½ to ¾ hour.

Drain the cooling system and refill with clean water.

Pour conditioner (No. 2 bottom-compartment) into the radiator and run the engine for at least ten minutes.

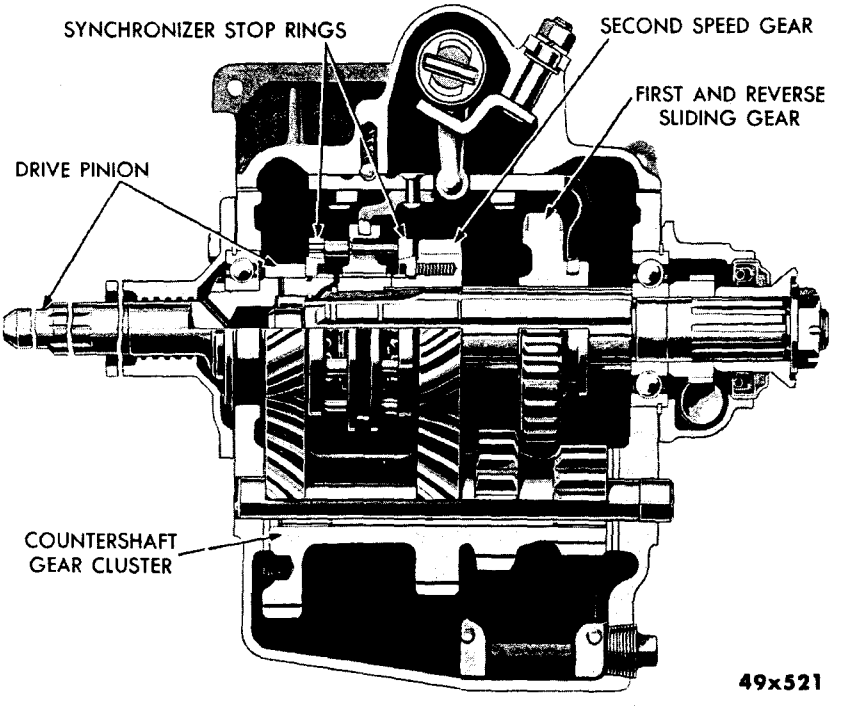


Figure 21 — 3-Speed Transmission

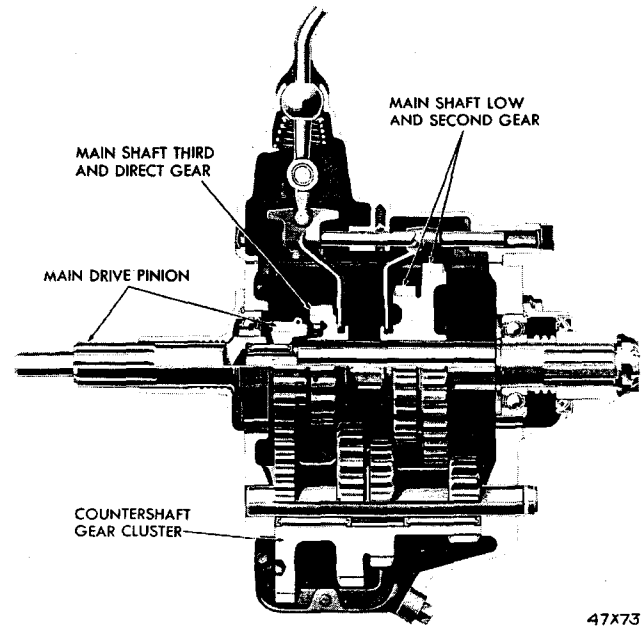


Figure 22 — 4-Speed Transmission

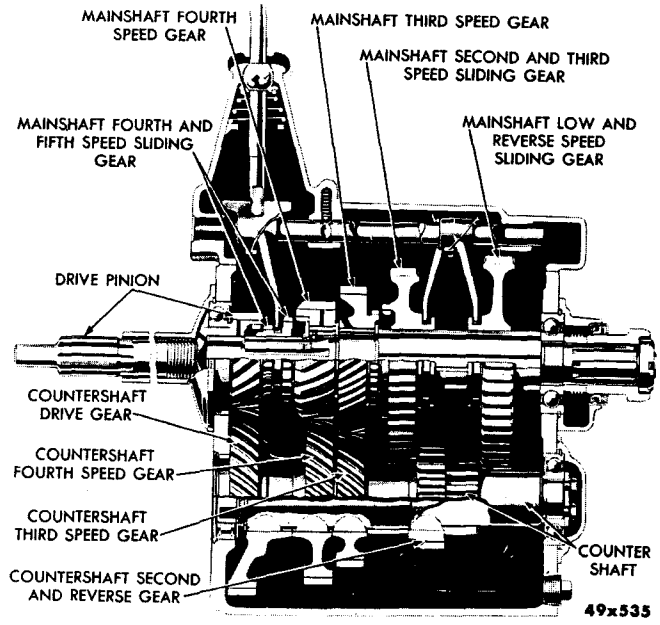


Figure 23 — 5-Speed Transmission

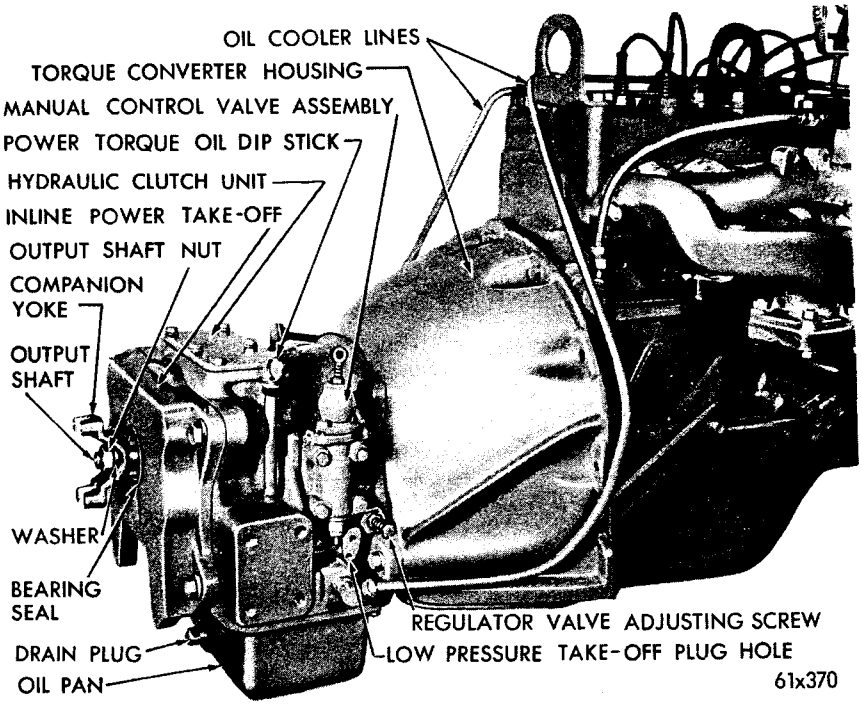


Figure 24 — In-Line Power Take-Off With Power Torque

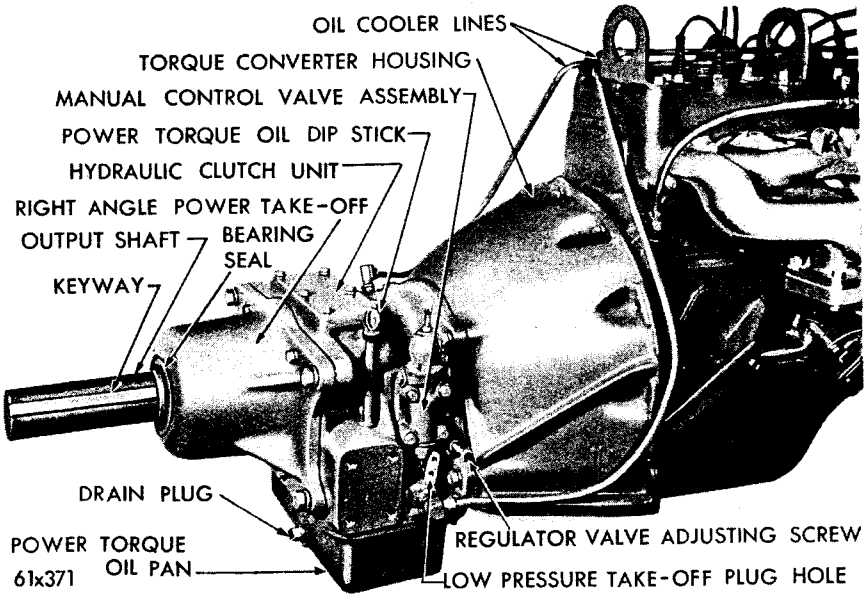


Figure 25 — Right Angle Power Take-off with Power Torque

Flush the entire cooling system until soft water runs clean.
Refill the radiator with clean SOFT water.
Use Mopar Radiator Rust Inhibitor during the summer months.

CLUTCH

The type of clutch used is determined by the type of adaptation. Some engines are equipped with a multiple spring, dry plate type clutch. Coiled springs mounted between the clutch cover and the pressure plate cause the driven disc to be clamped between the pressure plate and the flywheel when the clutch is engaged.

TRANSMISSION

Chrysler 6-Cylinder Industrial Engines use one of the following transmissions (Figs. 21, 22 and 23): (1) 3-Speed; (2) 4-Speed; (3) 5-Speed or (4) a Hydraulically operated power torque.

HYDRAULICALLY OPERATED POWER TORQUE (Optional Equipment)

The Chrysler "Power Torque" is offered in three versions and provides a compact, versatile and economical means of power take-off on all Industrial Engines.

The three phases are:

(1) A straight line PTO (Fig. 24).

(2) A right angle PTO (Fig. 25).

(3) Several transmission adaptations (Fig. 26) covering tower and remote mounted manual transmissions.

Common component parts for all three phases are:

(1) An integral torque converter housing and adapter plate.

(2) A torque converter of 11¾ inch diameter with 2.26 stall ratio.

(3) A hydraulic clutch housing and oil pan containing an oil pump, regulator valve body, manual valve and neutral safety switch.

(4) A wet type hydraulic clutch with four discs (8 surfaces).

(5) An oil cooler.

POWER TORQUE MANUAL CONTROL VALVE

Positioned on the right side of the hydraulic clutch housing (facing the engine from the rear) is the manual control valve. Valve movement is one-half inch from the "off" position (down) to the "on" position (up). A push-pull force of 5-6 lbs. is required to move the valve which remains in the selected position when no force is exerted.

The oil pan dip stick is located on the right side of the hydraulic clutch housing and on the left side of the hydraulic housing is the breather vent cap. There is an oil capacity of 9 quarts "full" and Transmission Fluid Type "A" Suffix "A" is used.

The oil must be changed every 500 hours or 3 months of operation whichever occurs first for normal operation and every 300 or 2 months of operation, whichever occurs first for prolonged heavy loading in hot weather.

The mounting pads is common for all phases and they are on the hydraulic clutch housing.

Phase I—Straight Line PTO (Optional Equipment)

Along with the common component parts to all three phases, Phase I includes the "In-line" output shaft, adapter—output shaft bearing, bearing and companion yoke. Two yokes are available: Cleveland Yoke

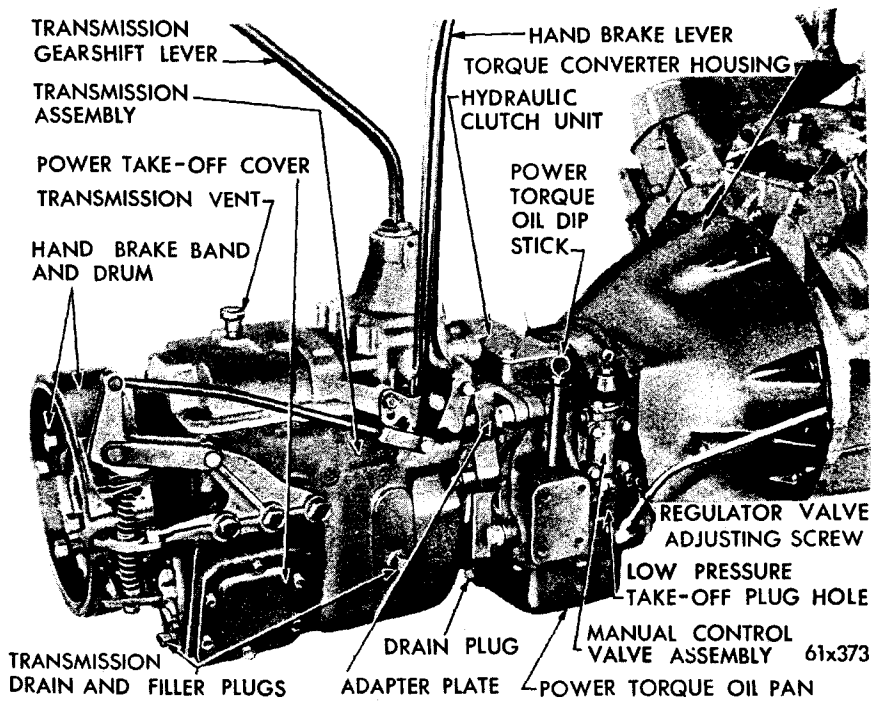


Figure 26 — Transmission Adaptation with Power Torque (Typical)

#555-1-229 and Spicer Yoke #95188. The straight line PTO output shaft bearing requires no special attention as it is lubricated with the transmission fluid from the power torque unit hydraulic clutch housing by means of oil splash and mist lubrication.

Phase II—Right Angle PTO (Optional Equipment)

The right angle PTO Phase II version contains two tapered roller bearings which are assembled in an extension housing and attached to the hydraulic clutch housing. The extension assembly supports the output shaft which has a 2¼ inch diameter shaft end with a ⅝ inch square keyway. Allowable side loads for the PTO are specified in a table along with a procedure and chart for finding the resulting side load of the application.

Lubrication is provided the two tapered roller bearings in the extension housing by means of a drilled passage in the output shaft depositing transmission fluid in the extension housing pump. An oil return hole in the back of the power unit hydraulic clutch housing maintains the required oil level in the extension housing so that the bottom of the two roller bearings are continuously rotating in oil.

No special attention on the part of the operator is required to lubricate the right angle power take-off as oil is pumped to the extension housing and the proper oil level is automatically maintained.

Phase III—Transmission Adaptations (Optional Equipment)

The transmission versions Phase III consist of a modified transmission assembled to the hydraulic clutch housing by an adapter. The transmission contain a special input shaft that assembles to the hydraulic clutch. A tower shift and remote shift New Process Model No. 540-five speed manual transmissions are available as optional equipment.

These transmissions have their own independent lubricant supply and should be lubricated in accordance with the general lubrication recommendations given in this manual for transmission under "General Lubrication."

FLUID DRIVE

Some engines are equipped with a fluid coupling (Fig. 27) which eliminates all mechanical connections between the engine and the clutch. It consists of a driving and a driven member.

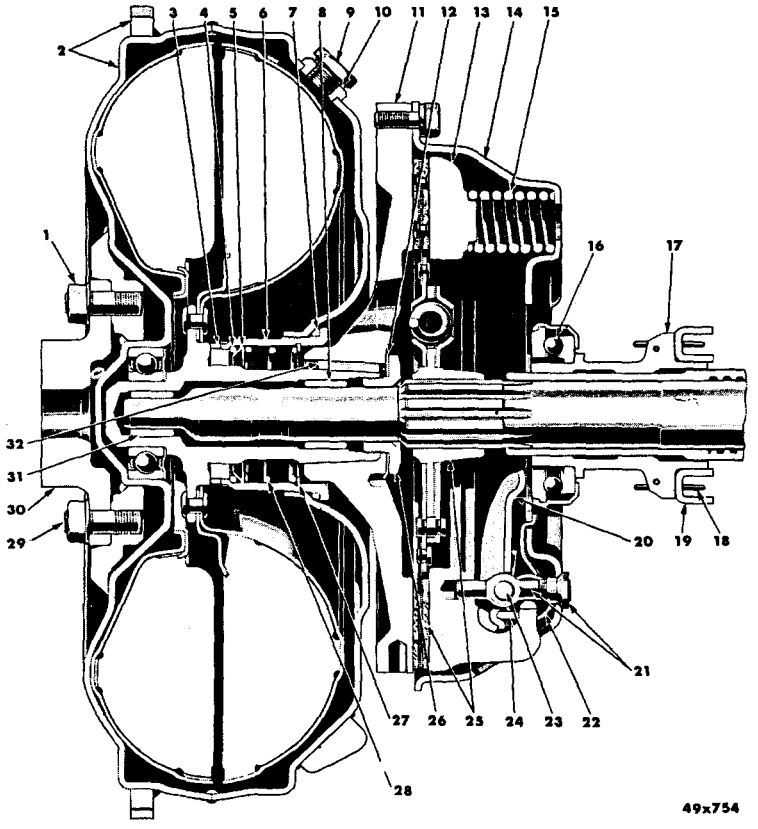


Figure 27 — Clutch and Fluid Drive (Sectional View)

1 — Fluid drive flange stud nut
2 — Fluid drive assembly
3 — Fluid drive floating seal ring
4 — Fluid drive seal ring gasket
5 — Fluid drive seal ring gasket retainer
6 — Fluid drive seal assembly
7 — Fluid drive seal retainer gasket
8 — Fluid drive runner bushing — rear
9 — Fluid drive filler plug
10 — Fluid drive filler plug gasket
11 — Fluid drive clutch driving plate
12 — Fluid drive driving plate lock washer
13 — Clutch pressure plate
14 — Clutch cover
15 — Clutch pressure spring
16 — Clutch release bearing
17 — Clutch release bearing sleeve
18 — Clutch release bearing sleeve pull-back spring
19 — Clutch release fork
20 — Clutch release lever
21 — Clutch release lever eyebolt and nut
22 — Clutch release lever spring
23 — Clutch release lever pin
24 — Clutch release lever strut
25 — Clutch disc assembly
26 — Fluid drive driving plate nut
27 — Fluid drive seal spring retainer snap ring
28 — Fluid drive seal spring
29 — Fluid drive driving flange stud
30 — Crankshaft
31 — Fluid drive runner bushing — front
32 — Fluid drive driving plate key

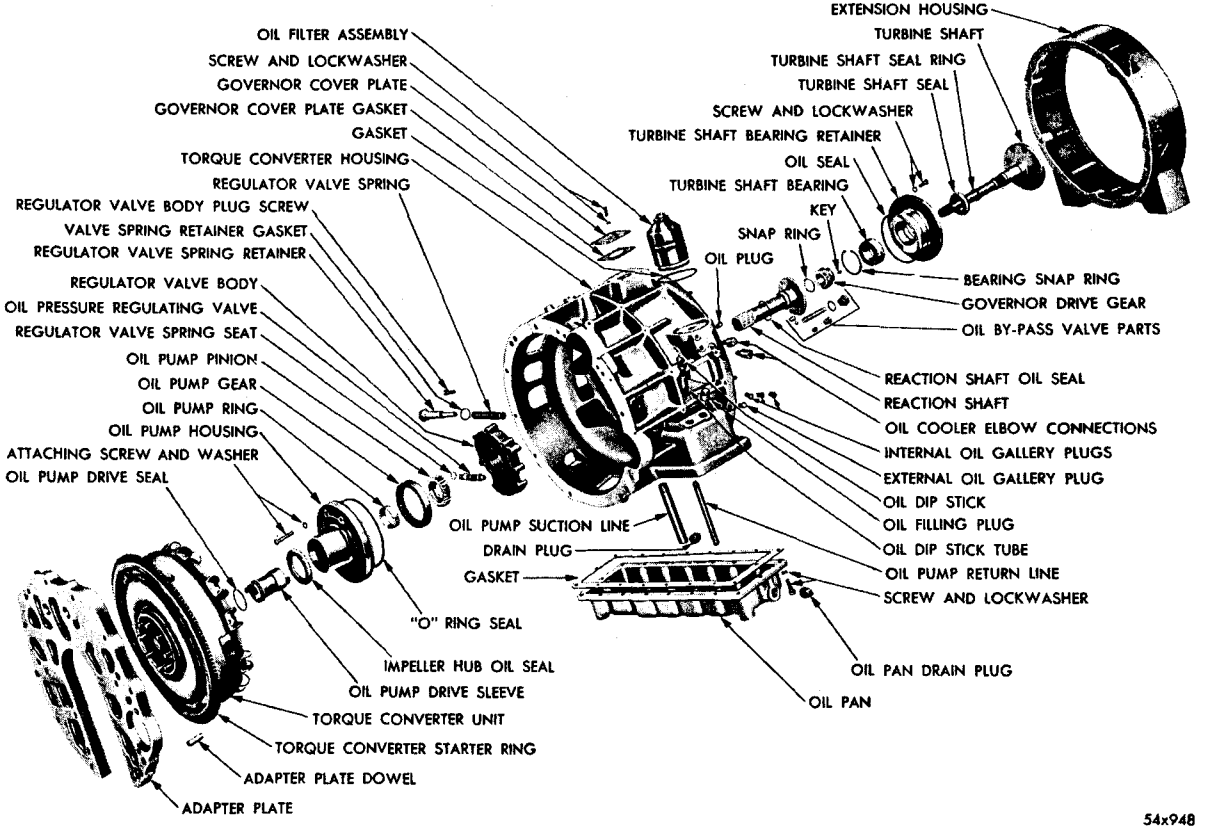


Figure 28 — Torque Converter Housing Assembly (Disassembled View)

The driving member is a steel stamping in which a number of steel fins are welded. This member is mounted on the end of the crankshaft and a cover plate is welded to the member forming a housing which contains a special fluid drive oil. The cover plate and driving member are welded together forming an oil tight seal.

The driven member contains a number of welded steel fins. The stamping is riveted to a hub attached to the clutch driving plate. The hub of the driven member rotates in a bearing submerged in the fluid in the assembly, and therefore requires no other lubrication. The energy set up by the revolving motion of the driving member is transmitted to the driven member through the medium of the fluid in the assembly, acting as a force on the fins of the driven member.

Fluid is maintained within the assembly by a carbon and o-ring type seal. The fluid coupling is filled to about 80 per cent of its total volume with a very light, highly refined petroleum oil which maintains uniform viscosity over a wide range of temperature.

CHRYSLER INDUSTRIAL TORQUE CONVERTER BASIC UNITS (OPTIONAL EQUIPMENT)

The Chrysler Industrial Torque Converter (Fig. 28) consist of the Torque Converter Unit or "Donut," oil cooling and lubrication system, and a governor.

When the torque converter assembly is installed on an Industrial engine it multiplies the torque output to a value of 2.2 times the torque of the engine. The multiplication decreases to a 1.1 ratio as the speed of the turbine increases to the speed of the impeller. When this occurs, the stator begins to rotate freely on the overrunning clutch. An oil cooler which is connected to the cooling system prevents overheating and thinning of the oil.

POWER TAKE-OFF WITH HEAVY DUTY CLUTCH (OPTIONAL EQUIPMENT)

When Chrysler 6-Cylinder Industrial Engines are ordered to include a power take-off assembly (Figure 29) they are equipped with a Rockford Clutch and Power Take-Off Assembly.

CLUTCH. The clutch used in the power take-off is of the heavy-duty, gear-tooth drive type. The housing supports the drive shaft, which is mounted on main bearings in the housing and a pilot bearing in the engine flywheel. The clutch is taper mounted on the drive shaft which is extended to serve as the output shaft for the external drive, and may carry a pulley, gear, sprocket or drive direct.

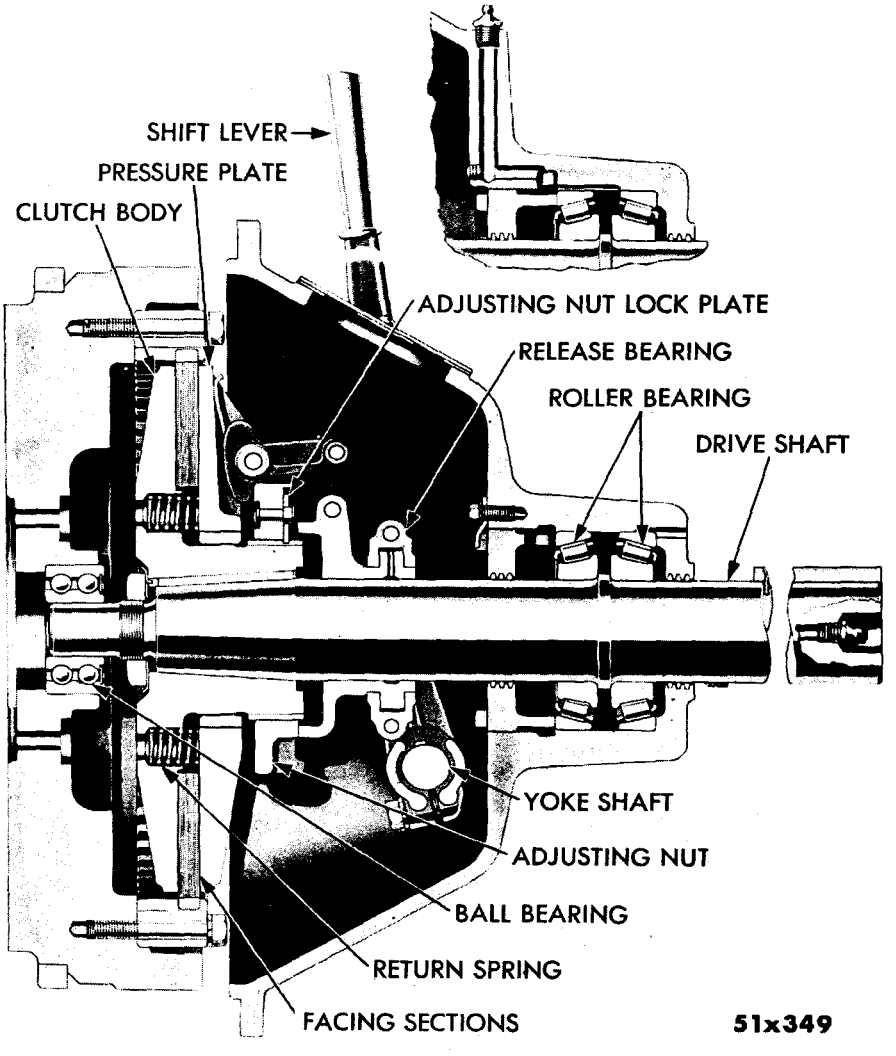


Figure 29 — Power Take-off With Heavy Duty Clutch (Sectional View)

OPERATING INSTRUCTIONS

PREPARATION OF A NEW ENGINE

Before placing a new or rebuilt engine in service, make a thorough inspection for evidence of damage or loose parts.

ENGINE OIL. See that the crankcase contains the correct amount of clean new SAE 10-W Engine Oil. After 25 hours of operation the crankcase may be drained and refilled with oil as recommended in the Lubrication Section.

COOLING SYSTEM. Fill the cooling system with water, using antifreeze solution, if temperature requires it. In warm weather, the use of MOPAR Rust Resistor is recommended.

ENGINE ACCESSORIES. See that all points requiring lubrication are properly supplied. Check storage battery terminals to see that they are tight and clean. Check the electrolyte in the battery.

ELECTRICAL CONNECTIONS. See that all electrical connections are tight and clean. Check each spark plug and tighten to 30 foot-pounds torque.

ATTACHING PARTS. See that all nuts, bolts and screws that attach parts are secure. Tighten cylinder head nuts with torque wrench, 52 to 57 foot-pounds, in sequence as shown in Figure 30.

PRESTARTING INSTRUCTIONS

When the engine is in daily use, inspect it daily and always before starting after a period of idleness.

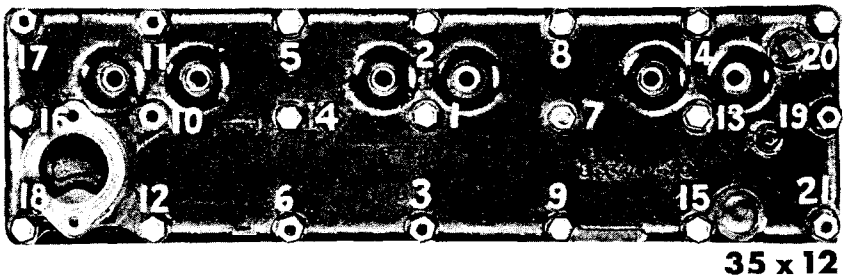


Figure 30 — Cylinder Head Tightening Sequence

ENGINE OIL LEVEL. Inspect the oil level and add oil if required.

FUEL. Check the fuel supply.

COOLING SYSTEM. Inspect the cooling system and add water or anti-freeze as required.

TIPS ON ENGINE CARE

NEW OR REBUILT ENGINES. It is good practice not to operate a new or rebuilt engine at more than ¾ throttle for the first 8 or 10 hours. This low speed will permit the bearings to seat properly, and will allow the operator to familiarize himself with the controls and performance of the engine.

SAE 10-W Engine Oil should be used in the engine during the break-in period because the clearance between moving parts is very small and the lighter oil provides assured lubrication. Keep the oil at the proper level. After 25 hours of operation the crankcase may be drained and refilled with oil as recommended in the Lubrication Section.

COLD ENGINES. When starting a cold engine (whether new or not), avoid unnecessary acceleration during the warm-up period. Keep the throttle at little more than idling speed until normal operating temperature is indicated on the temperature gauge. This simple precaution will assure long life of the engine and maximum efficiency of operation.

STARTING AND STOPPING THE ENGINE

STARTING (Figure 31). Open the throttle at ⅓ opening. See that the clutch, gear shift lever or power take-off lever is in neutral position. Turn on the ignition switch and press the starting motor switch until the engine starts. Do not hold the starting motor switch in for periods longer than 15 seconds if the engine does not start promptly. After the engine starts, watch the oil pressure gauge. If oil pressure does not register after about 10 seconds, stop the engine and investigate.

OIL PRESSURE SAFETY SWITCH

On engines equipped with oil pressure safety switch, the manual starting button on the safety relay must be held in until the engine has started and generated sufficient oil pressure to lock-in the safety relay.

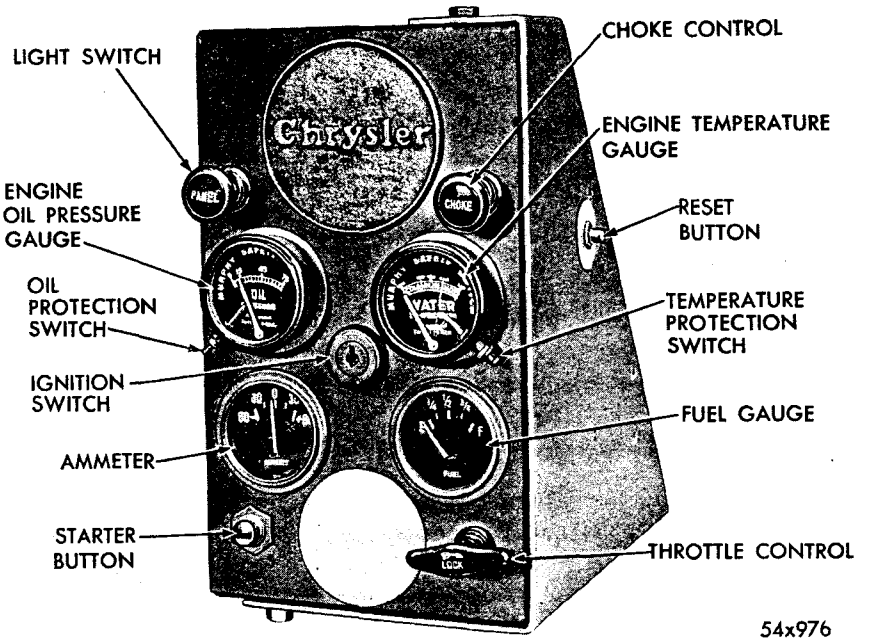


Figure 31 — Engine Mounted Instrument Panel

STOPPING (Figure 31). To stop the engine, close the throttle and disengage the clutch. Allow the engine to run at idle speed for a few minutes; then, with the throttle closed, turn off the ignition.

PRECAUTIONS

WARM-UP PERIOD. After starting a cold engine, operate it at a speed only slightly faster than idle (approximately 700 rpm) for a few minutes to allow the engine to reach normal operating temperature before placing it under full load. This warm-up period will permit oil to reach all bearing surfaces, thus reducing the possibility of scoring and premature wear of internal engine parts.

OIL PRESSURE. With the engine turning at approximately 2000 rpm and the water temperature at 160° F., the oil pressure should be from 45 to 55 pounds, providing there is no abnormal escape of oil from some point. As bearings wear and the increased clearances permit more than the normal escape of oil, there will be a drop in pressure shown on the gauge, particularly at idling speed. A drop in oil pressure may also be the result of a plugged oil filter element. (Full-Flow type filter).

WATER TEMPERATURE. A thermostat in the cylinder block retards the circulation of liquid in the cooling system until the liquid has reached a predetermined temperature, thereby permitting faster warm-up of the engine. Do not operate the engine with the thermostat removed, as this unit is essential to proper circulation and efficient engine performance. Without the thermostat, sludge will form in the crankcase because the low temperature of the engine permits condensation of fumes in the crankcase. The thermostat cannot be repaired; if it fails to operate properly, replace the unit. When installing a thermostat, position it so that the thin bridges which divide the openings, face to the front and rear of engine (Figure 32). When operating in hot climates, the maximum reading of the temperature gauge should not exceed 100° F. above the prevailing atmospheric temperature or not to exceed 210° F.

AIR CLEANERS. Remove and service the carburetor air cleaner, oil filler pipe air cleaner and crankcase ventilator outlet pipe air cleaner every 50 hours or less, depending on the severity of working conditions.

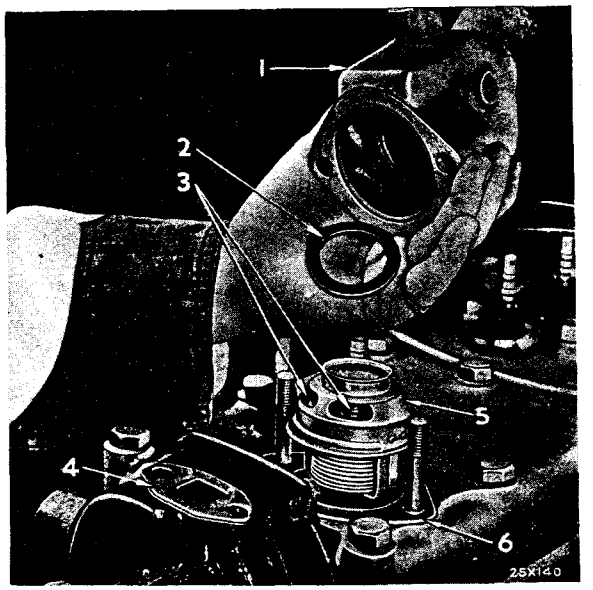


Figure 32 — Installing Thermostat (Typical)

1 — Cylinder Water Outlet Elbow water pump by-pass
2 — Thermostat Gasket
3 — Thermostat Openings
4 — Water Pump By-Pass Elbow Gasket
5 — Thermostat
6 — Cylinder Water Outlet Elbow

IGNITION SYSTEM. Keep the units of the ignition system clean and the distributor properly adjusted.

FUEL SYSTEM. Keep the fuel tank, lines and filters clean. Always use a good grade of fuel.

COOLING SYSTEM. Do not fill the cooling system when the engine is overheated. Allow the engine to cool before adding liquid, in order to prevent cracking the cylinder block. Use a good grade of anti-freeze during cold weather, and MOPAR Radiator Rust Inhibitor during warm weather.

POWER TAKE-OFF AND CLUTCH ASSEMBLY

On engines equipped with the Power Take-Off and Clutch Assembly, avoid unnecessary use of the shifting lever. Frequent engagement and disengagement of the clutch causes rapid wear of clutch facings, necessitating frequent adjustment and replacement of parts. Do not attempt to engage or disengage the clutch while the engine is accelerated. Do not operate the unit when the clutch is slipping. See Adjustment Section.

Trouble Shooting

A good rule to follow when trouble shooting is to make only one adjustment at a time. Locate the cause of failure or irregular operation by the process of elimination.

STARTER WILL NOT TURN ENGINE

Loose or Corroded Battery Terminals—Clean terminals and clamps, replace if necessary. Tighten clamps securely. Apply a light film of vaseline to the battery terminals.

Battery not Fully Charged—Test the electrolyte in the battery. Check for dead cell. Replace or recharge battery, as required.

Starter Switch Defective—Replace switch.

Open Circuit in Wiring—Inspect and test all wiring.

Inoperative Starter—Inspect the starting motor for loose brush holders, worn or corroded brushes or corrosion on the commutator. To test the starting motor, disconnect the battery cable at the solenoid switch and touch it firmly to the solenoid starter terminal, now if the starting motor operates, the trouble is not in the starting motor. If the starting motor fails to operate and a heavy arc occurs when the cable touches the solenoid starter terminal, a mechanical lockup of the motor or pinion, or a grounded condition in the motor may be the cause. Failure of the starting motor to operate and no arc in the preceding test indicates poor brush contact or an open circuit in the motor winding. Repair or replace the starting motor as required.

STARTER TURNS BUT DRIVE PINION DOES NOT ENGAGE

Starter Clutch Slipping—Replace drive.

Wrong Starter Pinion Clearance—On solenoid shift starters, adjust the link screw to give .078 to .125 inch. Push in on solenoid plunger link (at the Fork Lever) until plunger bottoms. Measure the clearance between the end of pinion and pinion stop ring.

Broken Teeth on Flywheel Drive Gear—Replace flywheel ring gear (See Your Chrysler Dealer).

Armature Shaft Rusted, Dirty or Dry, Due to Lack of Lubrication—Clean, test and lubricate (See Your Chrysler Dealer).

SOLENOID PLUNGER VIBRATES BACK AND FORTH WHEN STARTER SWITCH IS ENGAGED

Battery Low—Test specific gravity of battery. Recharge or replace battery.

Faulty Wiring—Test for loose connections at starter switch and solenoid; repair as necessary.

Lead or Connections Broken Inside of Solenoid Switch Cover or Open Hold-in Winding—Test and if necessary replace solenoid.

STARTER OPERATES BUT WILL NOT DISENGAGE WHEN STARTER SWITCH IS RELEASED

Broken Solenoid Plunger Spring or Spring Out of Position—Test and repair.

Defective Starter Switch—Replace switch.

Defective Solenoid—Replace solenoid.

Pinion Clearance Improperly Adjusted—Adjust Pinion Clearance—(See "Starter Turns But Drive Pinion Does Not Engage).

STARTER PINION JAMS OR BENDS

Starter Mounting Loose or Misaligned—Check to see that the nuts that hold the starter on the housing studs are tight. Loose attaching parts will cause misalignment of the starter pinion with the flywheel.

Pinion Clearance Improperly Adjusted—Too little clearance will permit the pinion to travel too far into the flywheel teeth, causing binding. Too much clearance will prevent full engagement of the pinion, causing the pinion to jam and chip the flywheel teeth.

STARTER WILL TURN ENGINE BUT ENGINE WILL NOT START

Dirt and Moisture on Ignition Wires and Distributor Cap—Be sure that the distributor cap and coil is clean especially around the towers. Dirt and grease there can soak up moisture like a sponge, and can easily cause a short. Check for a physically cracked cap, arcing at the distributor cap contacts, burned rotor. If any cable terminals or cap tower inserts are corroded be sure to clean or replace them. Be sure that the spark plug and coil cable terminals are fully seated and that the nipples fit tightly on the cap towers and around the cables. Replace any cracked or shorted cables.

Dirty or Corroded Distributor Contact Points—Clean points and check for excessive pitting and worn surfaces. If blue oxide is present on contacts, this is an indication that oil has reached the contact surfaces. Remove rotor and wipe all the old grease from surface of breaker cam. Apply a light film of new distributor cam grease Number 1473595. Do not over-lubricate, keep oil and grease away from the breaker points. The contact gap should be .018 to .020 inch.

Fouled Spark Plugs—Caused by an over-rich carburetor adjustment or excessive oil consumption—oil entering cylinders due to worn rings or worn valve guides. Improper gap adjustment. Clean and dry plugs and set gap at .035 inch for resistor type plugs and .028 inch for standard type plugs. Adjust carburetor.

Ignition Coil Failure.
Condenser Failure.
Improper Timing—Refer to "Distributor Timing" Page 71.
Dirt or Water in the Fuel Line or Carburetor.
Carburetor Flooded.
Incorrect Float Level Setting.
Faulty Fuel Pump.

Ignition Coil Failure—Voltage regulator setting too high, refer to specifications and make necessary adjustment. Coil damaged by excessive heat from engine. Replace coil and inspect condition of distributor points. Coil case or tower cracked or leak at coil tower; replace coil. Coil tower may have a carbon track from tower to primary terminal; wipe tower clean and test coil.

POOR PERFORMANCE

Poor performance, such as lack of power, stalling, and missing at various speeds may be caused by the following:

(1) An improper grade of fuel.

(2) Over-heating, resulting from low oil level, insufficient liquid in cooling system, a loose fan belt, or an inoperative manifold heat control valve.

(3) Ignition system difficulties.

(4) Fuel system difficulties.

(5) Lack of compression resulting from burned or pitted valves, valve seats, or worn or broken piston rings.

FUEL SYSTEM DIFFICULTIES

FUEL DOES NOT REACH CARBURETOR. Clogged vent in fuel tank, dirty strainer element in fuel pump, restrictions in fuel line, or worn fuel pump valve or ruptured diaphragm. (See your dealer).

FUEL REACHES CARBURETOR, BUT DOES NOT REACH CYLINDERS. Dirt in carburetor channels, float needle valve sticking in valve seat or incorrect float level, or lack of sufficient vacuum in intake manifold. See your Dealer.

CARBURETOR FLOODED. Inoperative automatic choke or incorrect carburetor float setting. See Your Dealer.

FUEL PUMP NOT OPERATING. Loose fuel line fitting between filter and pump, leaking fuel pump valves or diaphragm assembly, or a weak or broken rocker arm spring. Fuel leaks at the fuel pump are an indication of loose fittings, worn or ruptured diaphragm or loose diaphragm mounting screws. See your Dealer.

IGNITION DIFFICULTIES

PRIMARY CIRCUIT. Primary circuit difficulties usually are caused by loose, broken, dirty or corroded connections, a grounded condenser, burned or blued distributor contact points or incorrectly set points or sticking of the contact breaker arm.

SECONDARY CIRCUIT. Secondary circuit difficulties are usually caused by fouled or broken spark plugs, incorrect spark plug gap, wrong type of spark plug, a cracked or wet distributor cap, a faulty coil or a broken distributor rotor contact spring. Repair or replace parts as required.

BURNED OR PITTED DISTRIBUTOR CONTACT POINTS. Dirt or oil on points, incorrect setting of points, a faulty coil or condenser, or high voltage in the system.

COIL FAILURE. Excessively high voltage, moisture formation, engine overheating or an open circuit at soldered connection on primary studs.

CONDENSER FAILURE. Normal fatigue, excessive heat or moisture formation.

FOULED OR BURNED SPARK PLUGS. Incorrect type of spark plug, spark plug not sufficiently tight, incorrect carburetor adjustment, or inoperative automatic choke, incorrect ignition timing, water in combustion chamber, or oil leaking past piston rings or valve guides.

ENGINE NOISES

PISTON NOISES. Broken piston ring or ring land, too tight or too loose piston pins, excessive clearance between pistons and bore, broken pistons or carbon deposits in cylinder head. See your Dealer.

VALVE NOISES. Incorrect tappet clearance, worn tappets or adjusting screws, wear in cam lobes, worn valve guides or excessive runout of valve seat or valve face. See your Dealer.

CONNECTING ROD NOISES. Low oil pressure, low oil level or thin or diluted oil, incorrect rod alignment, excessive bearing clearance or incorrectly fitted bearings or bearing caps. Inspect and correct oil level and pressure or see your Dealer.

MAIN BEARING NOISES. Low oil pressure, low oil level or thin or diluted oil, excessive bearing clearance or end play, eccentric or out of round journals or a sprung crankshaft. A loose flywheel or fluid coupling may be mistaken for main bearing difficulty. See your Dealer.

GENERAL LUBRICATION

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		DAILY		
Oil Level Indicator	.....	.....	.....	Check oil level daily.
Carburetor Air Cleaner	.....	.....	.....	Check oil daily if engine is operated under extremely dusty conditions. If the sump is found to contain a semi-solid mixture of oil and dirt up to the air cleaner shelf, the air cleaner should be serviced as outlined under every 50 hours of operation.
Governor Linkage	Few Drops	Oil Can	Engine Oil	Daily
		EVERY 25 HOURS		
Distributor Bushings	.....	Add 3 to 5 drops to the oiler on side of distributor.	Engine Oil	Every 25 hours
Water Pump	.....	1 fitting on some units	Water Pump Grease Only	Every 25 hours. (Some engines are equipped with permanent packed bearings and do not require lubrication.)

EVERY 25 HOURS (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
Industrial Torque Converter and Power Torque Drive Unit	.....	Remove the dip stick at side of reservoir and inspect level of oil in the torque converter housing or power torque hydraulic clutch housing with engine running.	Automatic Transmission Fluid Type "A" Suffix "A"	Initial inspection after first 25 hours of operation. Thereafter, each 50 hours.
Governor (Mechanical) (Pierce Only)	¼	Unscrew oil level plug and check level of oil. Install oil level plug.	Engine Oil	Every 25 hours

EVERY 50 HOURS

Engine (Oil Pan)	5 qts. 6 qts. if oil filter element is being replaced.	Remove plug in bottom of oil pan to drain oil. Install plug. Add oil through filler pipe to bring to proper level.	Refer to Page 55 for Engine Oil Recommendations	Every 50 hours. Replace oil if engine is idle 30 days or longer.
Carburetor Air Cleaner	1 pint	Remove cover and filter element, rinse element clean in kerosene and drain. Empty dirty oil from reservoir, clean out the sump and refill to indicated level with fresh oil.	Engine Oil SAE 50 above +32° F. SAE 20-W below +32° F.	Every 50 hours. Clean more often if engine is operated under extremely dusty conditions. If SAE 50 Engine Oil is not available, SAE 40 may be used.

EVERY 50 HOURS (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
Oil Filler Pipe Air Cleaner	.....	Remove filler pipe cap, wash filter element in kerosene, dry thoroughly and dip in fresh oil.	Engine Oil SAE 50	Every 50 hours. Clean more often if engine is operated under extremely dusty conditions. If SAE 50 Engine Oil is not available, SAE 40 may be used.
Crankcase Ventilator Outlet Pipe Air Cleaner	.....	Remove filter element and wash element in kerosene. Re-oil with fresh oil.	Engine Oil SAE 50	Every 50 hours. Clean more often if engine is operated under extremely dusty conditions. If SAE 50 Engine Oil is not available, SAE 40 may be used.
Generator	5 or 10 drops	Oil cup at front and rear bearings.	Engine Oil SAE 10-W	Every 50 hours. After oil is applied, be sure the oil cup covers are closed.
Distributor Wick	2 or 3 drops	Remove distributor cap and rotor and oil wick in center of cam.	Engine Oil SAE 10-W	Every 50 hours.
Distributor Cam	.....	Wipe old grease from surface of the breaker cam and apply a light film of new distributor cam grease Mo-Par No. 1473595.	.....	.....
Power Take-Off	.....	Rear fitting on side housing and fitting on end of shaft.	General Purpose Grease	Every 50 hours.

EVERY 50 HOURS (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
Clutch Linkage	.....	Oil Can	Engine Oil	Every 50 hours.
Transmission (Manual)	.....	.....	.....	Check oil level every 50 hours. Replace oil every 500 hours or 6 months as in last item of this table.
Industrial Torque Converter	12 quarts	With engine idling, operating temperature normal and transmission in neutral, remove dip stick and check oil level. If oil level is low, add MoPar Fluid Drive Fluid or Automatic Transmission Fluid Type "A" Suffix "A" until level reaches the "Full" mark on the dip stick.	Automatic Transmission Fluid Type "A" Suffix "A" or MoPar Fluid Drive Fluid	Every 50 hours.

EVERY 100 HOURS

Oil Filter (Full-Flow Type)	.....	Remove cover, gasket and element. Wipe clean, inside of filter casing and install new MOPAR filter element and gasket. Install cover. Then, idle engine for about five minutes and correct oil level in engine oil pan to compensate for oil absorbed by the filter.	.....	Every 100 hours. Service filter more often if engine is operated under extremely dusty conditions.

EVERY 200 HOURS

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
Oil Filter (By-Pass Type)	.....	Replace the filter element after each 200 hours of operation, or as often as necessary to keep the oil clean.	.....	More often under extreme conditions.

EVERY 250 HOURS

Power Torque Drive Unit	9 quarts	Remove the drain plug at the bottom of the hydraulic clutch housing oil pan and drain the fluid. When changing the oil, the engine and the hydraulic clutch housing should be hot, as the oil will drain down into the oil pan more readily, and carry off foreign material and sediment more completely. Drain the Torque Converter by removing the cover from the bottom of the Torque Converter Housing and using a suitable tool turn the flywheel until the converter drain plug is accessible. Tighten both drain plugs after the oil has drained. To refill: remove the vent plug fitting on the opposite side	Automatic Transmission Fluid Type "A" Suffix "A"	Every 250 hours. Do not drain before 250 hours. If oil must be added before this time, add Automatic Transmission Fluid Type "A" Suffix "A".

EVERY 250 HOURS (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		of the hydraulic clutch housing from the dipstick and fill the oil pan with 5 qts. of Automatic Transmission Fluid Type "A", Suffix "A". Start the engine and run at idle speed. After a few minutes of running, add sufficient oil to bring the level up to the full mark on the dip stick. Replace the vent pipe fitting. The oil level should always be checked with the PowerTorque drive unit running as part of the oil in the system from the Torque Converter drains back into the oil pan when the engine is stopped.		

EVERY 250 HOURS (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
Fluid Coupling	13 pints	Allow unit to cool to atmospheric temperature to allow maximum contraction. Rotate fluid coupling until filler plug is opposite the filler hole in the clutch housing. Add fluid if necessary to bring level to bottom of filler hole in the fluid drive unit. This applies to Chrysler Manufactured housings. Should other type housing be used, the fluid drive filler plug should be at a 56 degree angle from top dead center.	MOPAR Fluid Drive Fluid	Inspect every 250 hours. NOTE: Inspect the level of the fluid in a new engine after the first 25 hours of operation if necessary refill to proper level.

EVERY 500 HOURS

Industrial Torque Converter	12 qts.	Remove the drain plug at the bottom of the Torque Converter Housing oil pan and drain the fluid. Drain the Torque Converter by removing the cover from the bottom of the Torque Converter housing, and using a suitable tool turn the fly wheel until the converter drain plug is accessible. When changing the oil, the engine and the Torque Converter should be hot, as the oil will drain down into the oil pan more readily, and carry off foreign material and sediment more completely.	Automatic Transmission Fluid Type "A" Suffix "A"	Every 500 hours Filter 250 hours NOTE: High speed, heavy load and extremely dusty conditions necessitate more frequent changes.

EVERY 500 HOURS (Continued)

Name of Unit	Capacity	How Lubricated	Type of Lubricant	When Required
		Tighten the drain plugs to 50 foot-pounds torque after the oil has drained. To refill: remove the plug next to the dip stick on the top of the oil pan of the Torque Converter Housing, and fill the oil pan with Automatic Transmission Fluid Type "A" Suffix "A" to the level of the filler plug. Start the engine and run at idle speed 500-600 rpm. After a few minutes of running, add sufficient oil to bring the level up to the full mark on the dip stick. Tighten the plug to 50 foot-pounds torque. The oil level should always be checked with the Torque Converter running, since part of the oil in the system drains back into the oil pan when the engine is stopped.		
Transmission 3-Speed 4-Speed 5-Speed	 2¾ pints 5½ pints 9½ pints	Remove drain plug in bottom of case to drain lubricant. Install plug. Fill transmission to bottom of filler plug hole at side of case.	Multi-Purpose Gear Lubricant or Lubricant designed for API Service GL-4 (MIL-L-2105 A or B or the SAE viscosity number. Above +90° F. Use SAE 140 As Low as −10° F. Use SAE 90 Below −10° F. Use SAE 80	Every 500 hours or 6 months. If SAE 80 is not available, SAE 90 blended with 20% SAE 10-W Engine Oil may be used.

LUBRICATION

ENGINE

OIL RECOMMENDATIONS:

For temperature not lower than 32° F.	Use SAE 30
For temperature as low as 10° F.	Use SAE 20-W
For temperature as low as —10° F.	Use SAE 10-W
For temperature below —10° F.	Use SAE 5-W

DILUTION OF ENGINE OIL. If SAE 5W Engine Oil is not available, the oil should be diluted with kerosene to assure proper lubrication and easy starting. To dilute the oil, fill the crankcase with SAE 10-W oil so that the oil level registers at "FULL" on the indicator. Add one pint of kerosene and run the engine for five minutes to mix the oil and kerosene thoroughly. Stop the engine and note the reading on the oil level indicator. Scribe a line on the indicator showing the level after dilution. The dilution of the oil will increase the oil consumption; therefore, the oil level should be checked frequently. While the engine is operating, maintain the level at "FULL" by adding SAE 10-W Engine Oil. If, after four hours of operation, the engine is to be unprotected while idle for a period of five hours or more, redilution will be necessary. For redilution, bring the level to "FULL" on the indicator by adding SAE 10-W oil, then add kerosene to raise the level to the scribe mark previously made.

CHANGING OIL. Frequency of oil change is determined by the type of operation and by operating conditions. Under normal operating conditions, oil should be changed after each 50 hours of operation. High

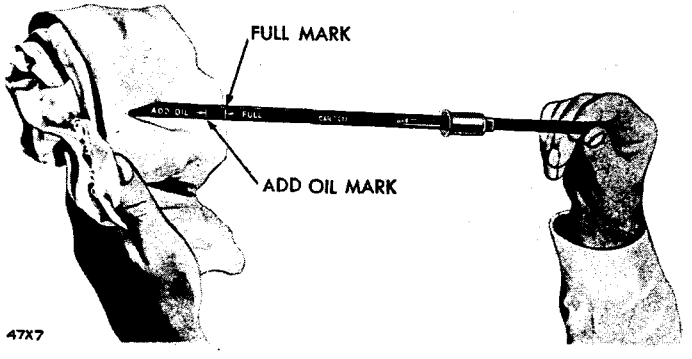


Figure 33 — Oil Level Indicator

speed, heavy load and extremely dusty conditions necessitate more frequent changes. A comparison of the oil on the indicator with fresh oil will usually serve as a guide. Lack of body, the presence of dirt and grit in the oil indicates that fresh oil is needed. The oil capacity is 5 quarts. If the filter element is replaced, add one additional quart. Drain the oil while the engine is hot, as the oil will flow freely and will carry more dirt and other foreign matter with it.

ADDING OIL. Between oil changes, check the oil level daily. The oil level indicator (Figure 33) is of the bayonet type, with two markings, "FULL" and "ADD OIL." After the engine has been standing, the oil level should be at the "FULL" mark. After the engine has started, this level will drop somewhat, due to the filling of oil passages and the oil filter. A quart of oil should be added when the level is at or slightly below the "ADD OIL" mark. Do not run the engine with the oil level below the "ADD OIL" mark.

COLD WEATHER OPERATION. During cold weather, examine the oil daily for evidence of sludge or water resulting from condensation of moisture in the crankcase. Under extreme conditions, the engine may not reach normal operating temperature during a short run, with the result that fumes are not dissipated in the crankcase and sludge forms. This sludge may freeze or clog the oil inlet strainer, retarding lubrica-

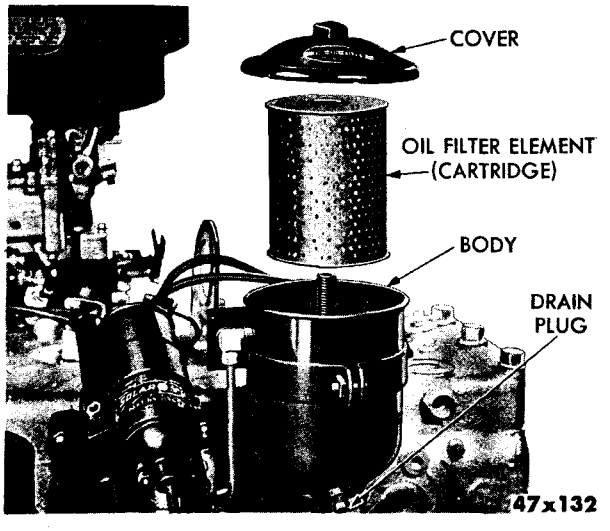


Figure 34 — By-Pass Oil Filter (Exploded View)

tion of internal parts. If there is evidence of sludge, change the oil. If excessive sludge accumulation is evident, remove the oil pan and clean all accessible parts, including the oil inlet strainer, as thoroughly as possible. Use a new oil pan gasket when installing the oil pan.

OIL FILTERS

Chrysler 6-Cylinder Industrial engines are equipped with a "By-Pass" oil filter on Models Ind. 30, 31 (Fig. 34), a heavy duty "By-Pass" Military Senior oil filter on Model Ind. 908A, (Fig. 35), a "By-Pass" Military Junior oil filter on Model Ind. 931 and a "Full-Flow" oil filter on Models Ind. 32 and 33, as shown in Figure 36.

BY-PASS FILTER. When oil passes through the By-Pass type oil filter, the foreign substances are trapped in the filter element, thus helping to keep the oil clean. This process is continuous and the element will continue to trap dirt until the element becomes clogged. The oil will not be filtered, however, it will continue to be pumped through the working parts of the engine at a reduced pressure. Replace the by-pass oil filter

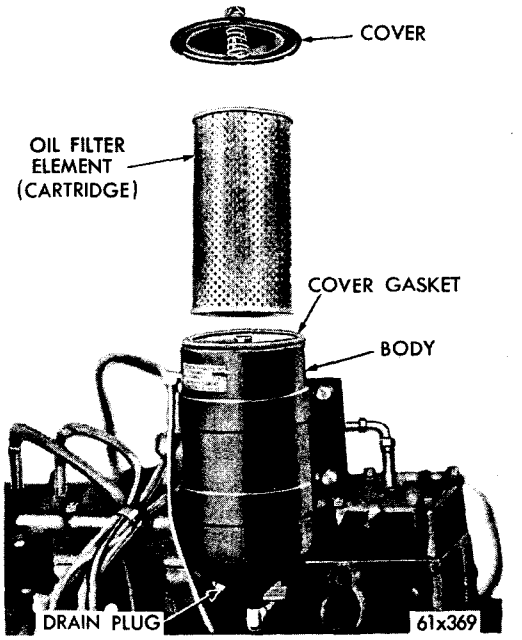


Figure 35 — By-Pass Oil Filter Senior Element (Exploded View)

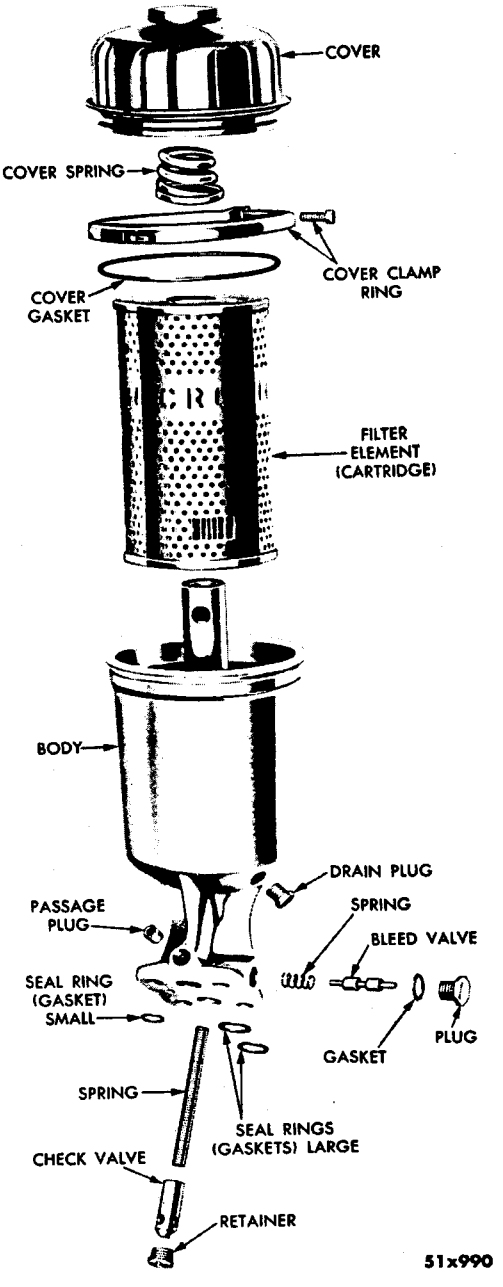


Figure 36 — Full Flow Oil Filter (Exploded View)

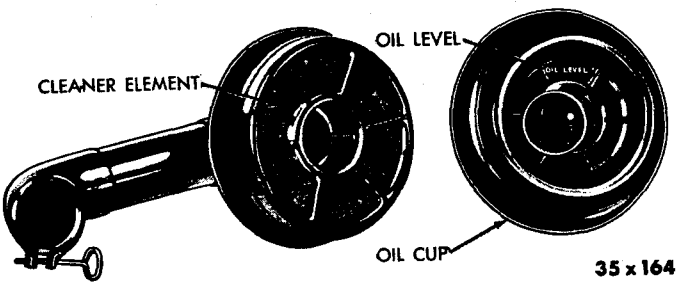


Figure 37 — Inverted Type Carburetor Air Cleaner

element every 200 hours of operation, or as often as necessary to keep the oil clean.

FULL-FLOW FILTER. The full-flow filter cleans the oil as it comes from the oil pump. It is so constructed and installed that it is impossible for the supply of oil to be cut off even though the filter becomes clogged. If the filter becomes clogged, the oil will not be filtered but will be pumped to the working parts of the engine at reduced pressure through the safety by-pass valve in the top of the filter body. When the filter is operating properly, oil pressure indicated on the oil pressure gauge should be 50 to 60 pounds at operating speeds. If this pressure drops to 45 pounds, the filter cartridge may be plugged and should be

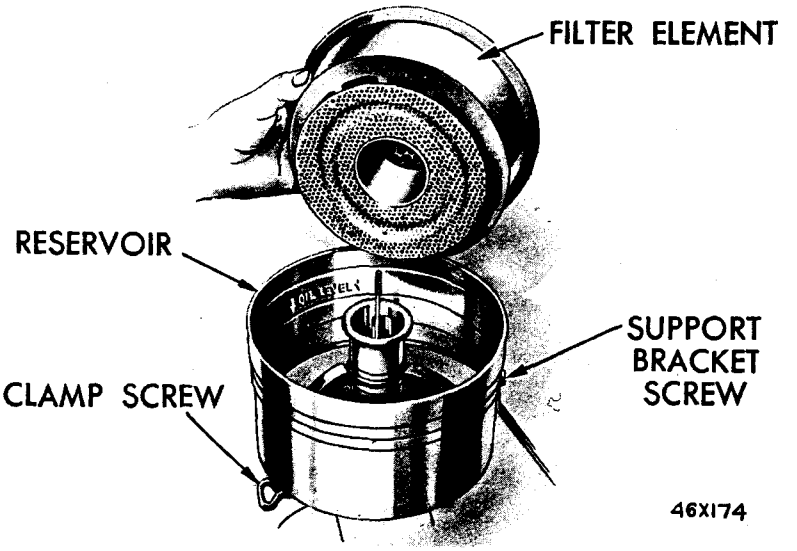


Figure 38 — Hat Type Carburetor Air Cleaner

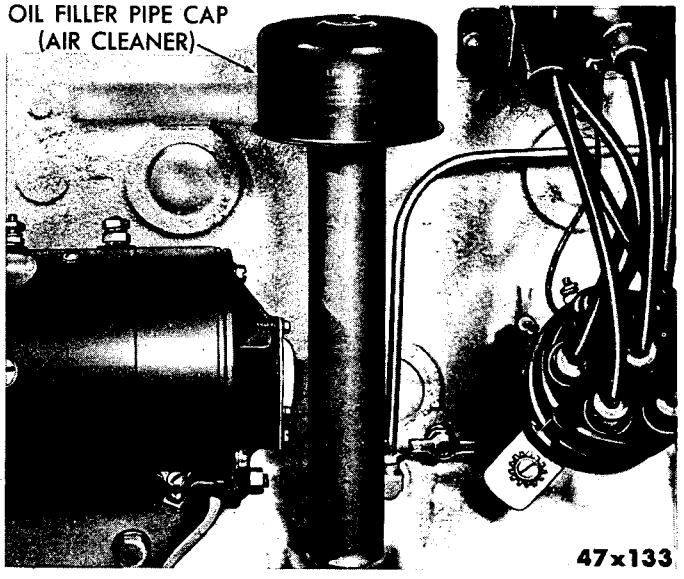


Figure 39 — Oil Filler Pipe Air Cleaner (Typical)

changed. Under normal operating conditions the filter cartridge should be replaced after each 100 hours of operation or more often if conditions demand.

TO REPLACE FULL-FLOW FILTER CARTRIDGE. While the engine is warm, remove the filter drain plug and drain the oil. Loosen the shell retaining nut and lift off the cover remove the filter element and spring. Discard the element. Wipe the housing clean and install the new filter element. Install a new cover gasket and the cover. Be sure the drain plug is in place before starting the engine. Operate the engine for a period of five minutes and check for oil leaks. The oil level in the engine should be corrected to compensate for the oil absorbed by the new filter cartridge.

CARBURETOR AIR CLEANER

Two types of heavy duty oil bath air cleaners are shown in Figures 37 and 38. Normally these carburetor air cleaners should be serviced whenever the engine oil is changed (every 50 hours). Under extremely dusty conditions, however, the air cleaner should be examined daily. If the sump is found to contain a semi-solid mixture of oil and dirt up to the shelf, the air cleaner should be thoroughly cleaned. Remove cover

and filter element, rinse element clean in kerosene and drain. Empty the dirty oil from reservoir, clean out the sump and refill to indicated level with SAE 30 Engine Oil for temperatures above +32° F. or SAE 20-W Engine oil below +32° F. Install air cleaner. Be sure gasket is in place on the carburetor flange.

CRANKCASE VENTILATING AIR CLEANERS

After each 50 hours or more frequently in dusty operation, or with each oil change, remove the air cleaners from the oil filler pipe (Figure 39) and the ventilator outlet pipe (Figure 40), wash in kerosene, dry and reoil with SAE 30 Engine Oil.

WATER PUMP

The water pump used on Chrysler 6-Cylinder Industrial Engines is either a Ball Bearing type which is permanently lubricated or a Bushing

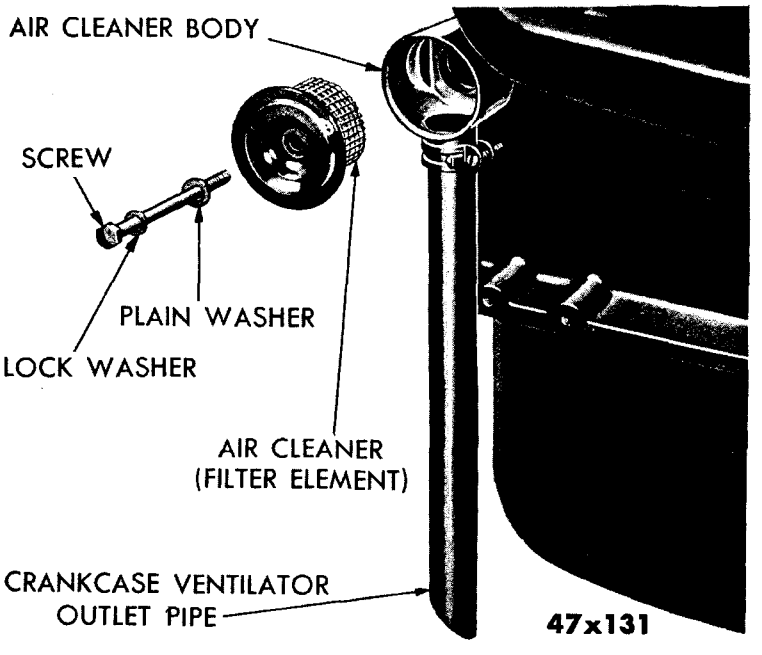


Figure 40 — Crankcase Ventilator Outlet Pipe Air Cleaner

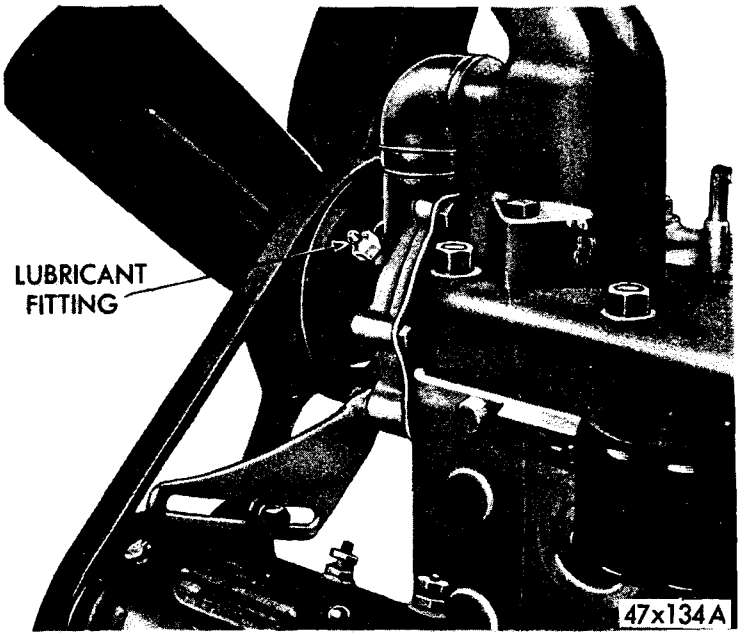


Figure 41 — Water Pump Lubrication Bushing Type

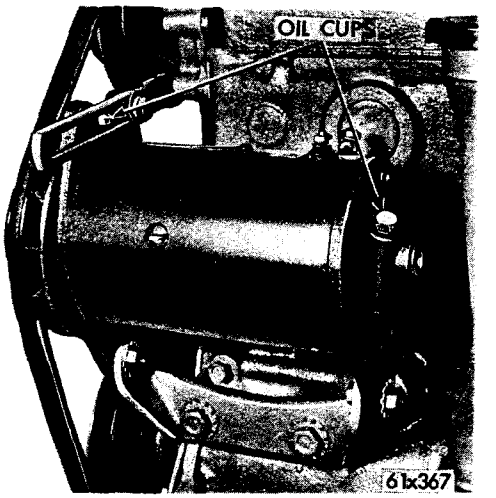


Figure 42 — Generator Lubrication

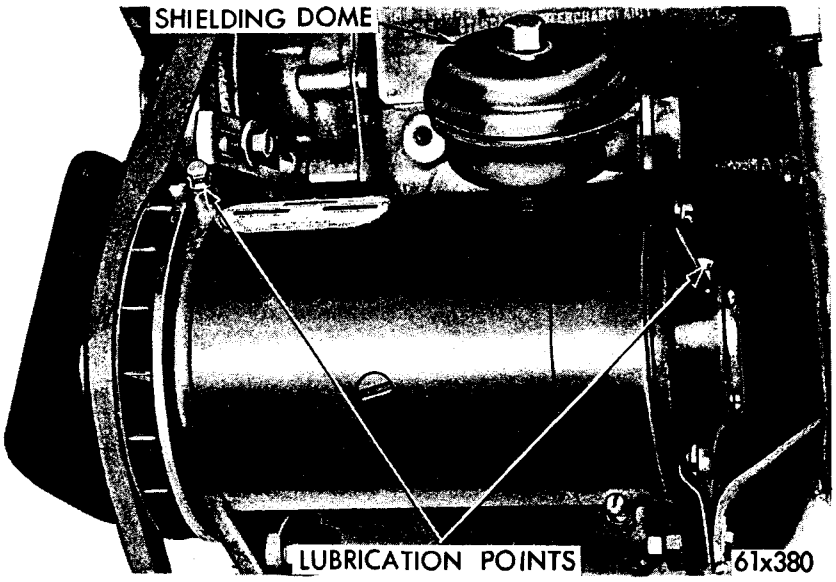


Figure 43 — Generator Lubrication With Shield Dome

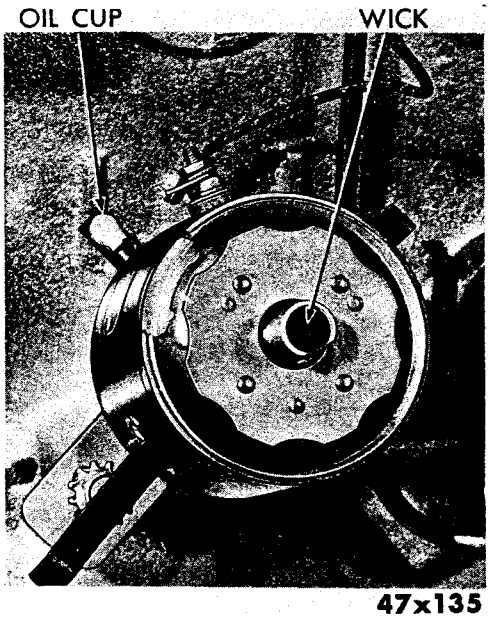


Figure 44 — Distributor Lubrication

type (Figure 41) with one grease fitting. When equipped with a lubricant fitting, lubrication should be performed every 25 hours of operation with Water Pump Grease only.

GENERATOR

The generator (Figures 42 and 43) has two lubrication points: (1) Oil cup at the front bearing; and (2) one cup at the rear bearing. Lubricate each 5 to 10 drops of SAE 10-W Engine Oil After each 50 hours of operation.

DISTRIBUTOR

The distributor (Figure 44) should be lubricated at three points: (1) oil cup on the side of the distributor, (2) wick under the rotor in the center of the cam and (3) distributor cam. Apply a few drops of SAE 10-W Engine Oil to the oil cup after each 25 hours of operation. After 250 hours of operation or when installing new breaker points, remove the distributor cap and rotor and apply two or three drops of SAE 10-W Engine Oil to the felt wick. Wipe old grease from the surface of the breaker cam and apply a light film of new distributor cam grease No. 1473595.

CAUTION: Keep oil away from contact points.

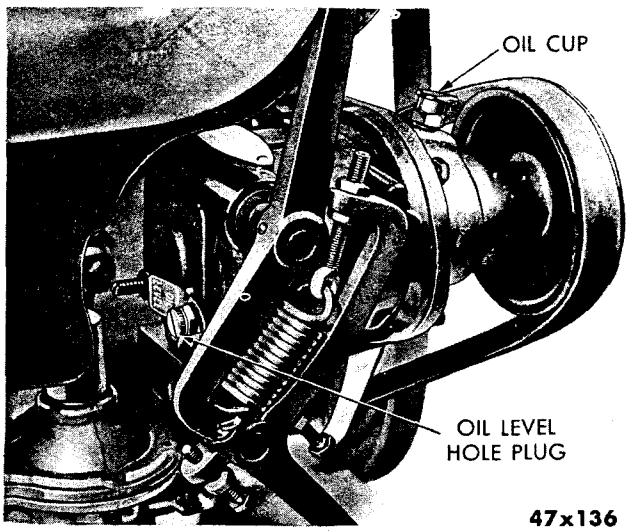


Figure 45 — Mechanical Governor Lubrication

GOVERNOR

Lubrication for the Hoof and Pierce mechanical governors is each 25 hours of operation. Check the oil level in the governor housing daily by removing tne inspection hole plug at the rear of the housing. The level should be even with the lower edge of the inspection hole. To replenish the oil, remove the filler hole plug at the top of the housing and fill with Engine Oil until oil starts to run out of the oil level plug hole (Figure 45). Then, reinstall the oil level plug.

FLUID DRIVE

Inspect the level of the fluid when the engine is cold after the first 25 hours of operation.

After 250 hours of operation check the fluid level in the fluid coupling when the engine is cold. Rotate the fluid coupling until the filler plug is opposite the filler hole in the bottom of clutch housing. Add Mopar Fluid Drive fluid if necessary to bring the level to the bottom of the filler hole in the fluid coupling unit.

TORQUE CONVERTER

With engine at normal operating temperature remove the dip stick at the side of the reservoir and inspect the level of the oil in the torque

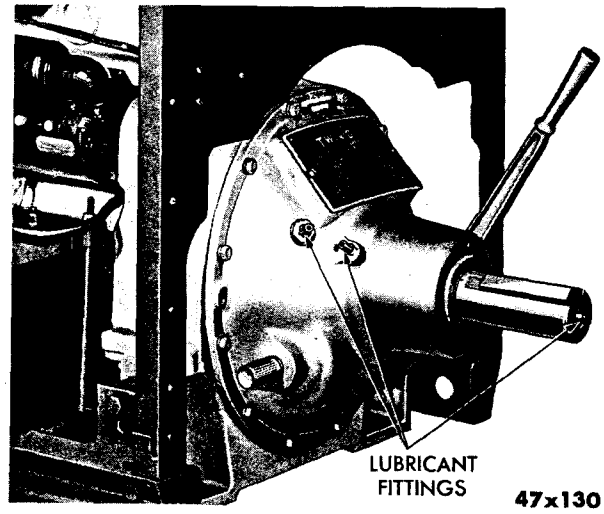


Figure 46 — Power Take-Off Lubrication

converter after 25 hours of operation. If necessary, replenish with Automatic Transmission Fluid Type "A" Suffix "A" until oil level reaches the full mark on the dip stick.

POWER TAKE-OFF WITH HEAVY DUTY CLUTCH

Five lubrication fittings are provided for this assembly (Fig. 46), one or two on the side of the housing and one at the end of the shaft, and one located on each yoke shaft boss. On some units, the fitting for the clutch release is inside the housing, accessible by removing a small plate at the left side of the housing.

The clutch release throwout bearing should be lubricated through the front grease fitting at the clutch housing, or through the fitting located inside of the housing with multi-purpose grease after every 8 hours of operation. Lubricate sparingly to avoid grease on the clutch facing.

For some types of installation, the pilot bearing must be lubricated from the side of the housing rather than the end. In such case, remove the small plug from the shaft and install a grease fitting in its place. Remove the fitting from the end of the shaft after lubrication and replace with the plug.

The drive shaft main bearing, and the pilot bearing should be lubricated through the grease fitting on the housing with multi-purpose grease every 50 hours of operation.

CAUTION: Do not overgrease.

The clutch levers and linkage should be lubricated with engine oil every 500 hours of operation. Remove the inspection hole cover on the clutch housing and lubricate the toggle joints with engine oil to help keep the joints free.

Lubrication of the yoke shaft is as needed.