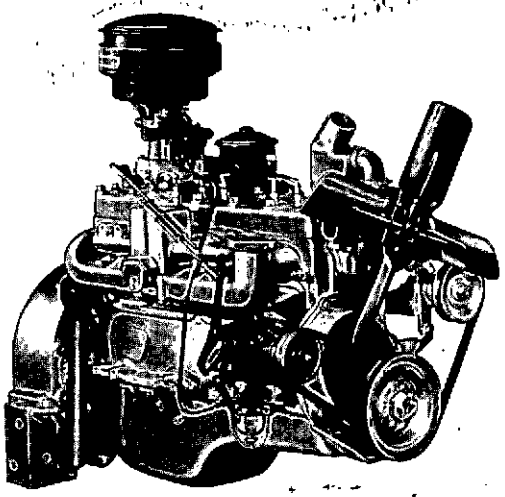
Chrysler

6 CYLINDER INDUSTRIAL ENGINES



OPERATORS MANUAL

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

81-770-7517

CONTENTS

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
5M

Litho in U. S. A.
10-69
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,

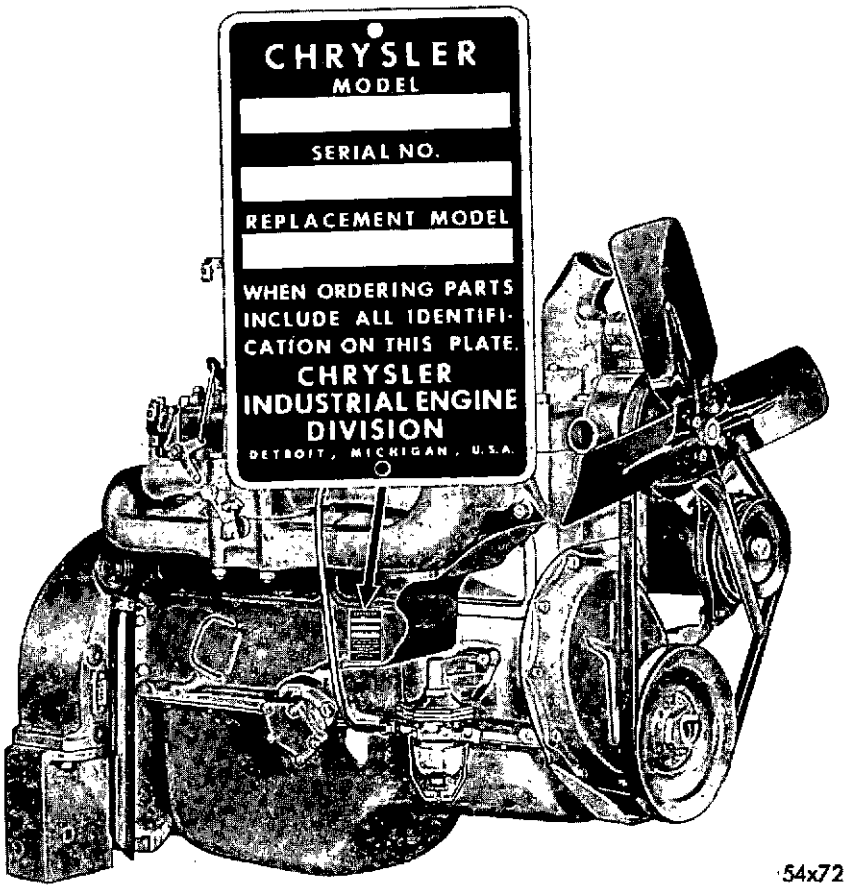


Figure 1 — Identification Name Plate

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.

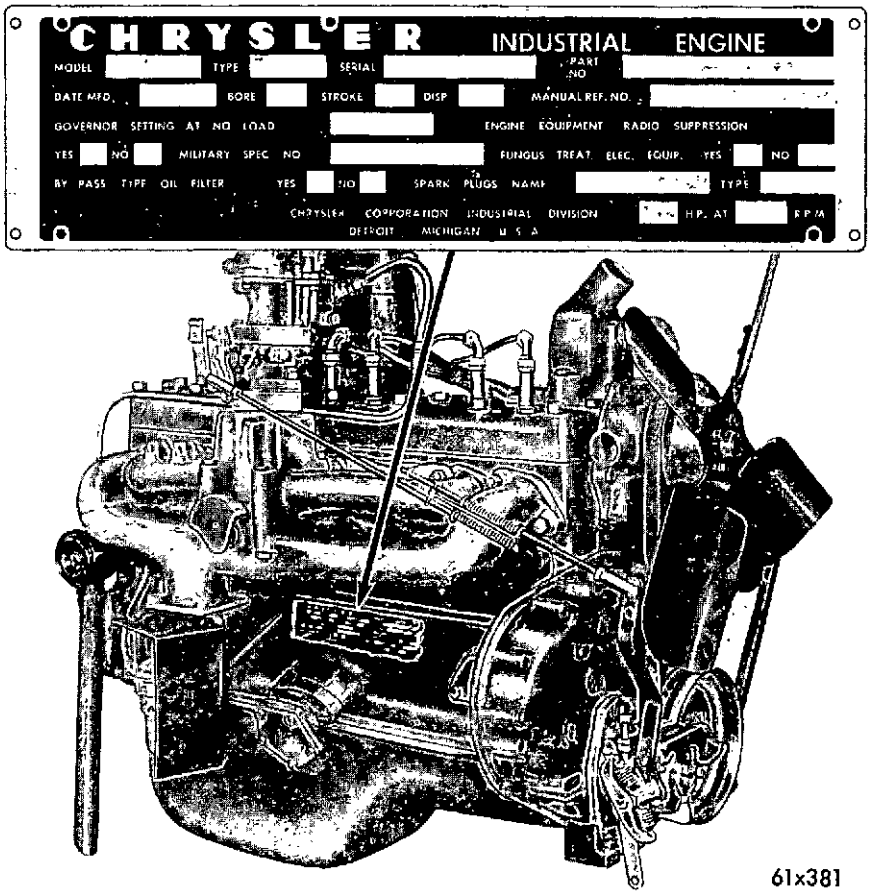


Figure 2 — Identification Name Plate Model 908A

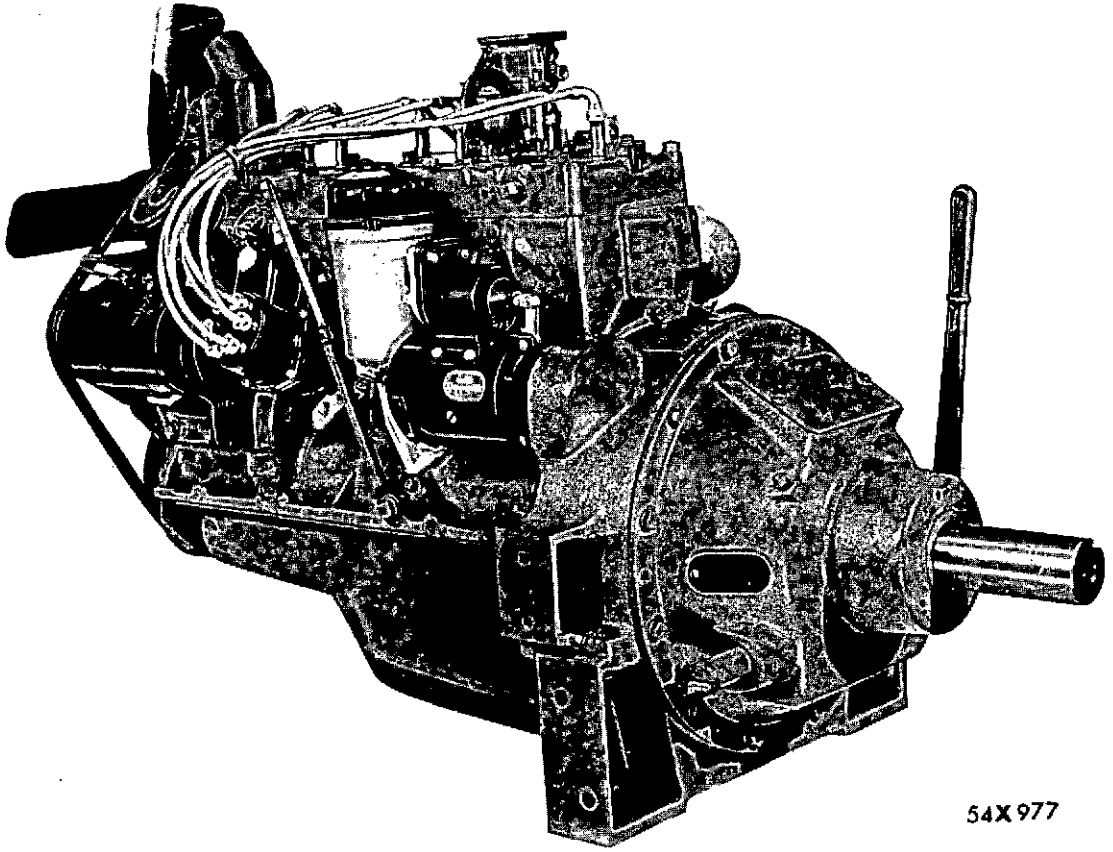


Figure 3 — Chrysler 6-Cylinder Industrial Engine Model Ind. 32 with Radio Shielding

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 superfinished to provide the maximum in wear-resisting, load-carrying properties in the bearing surfaces. Figures 6 and 7 show the engine parts completely disassembled. Figure 8 is a sectional view of the engine.

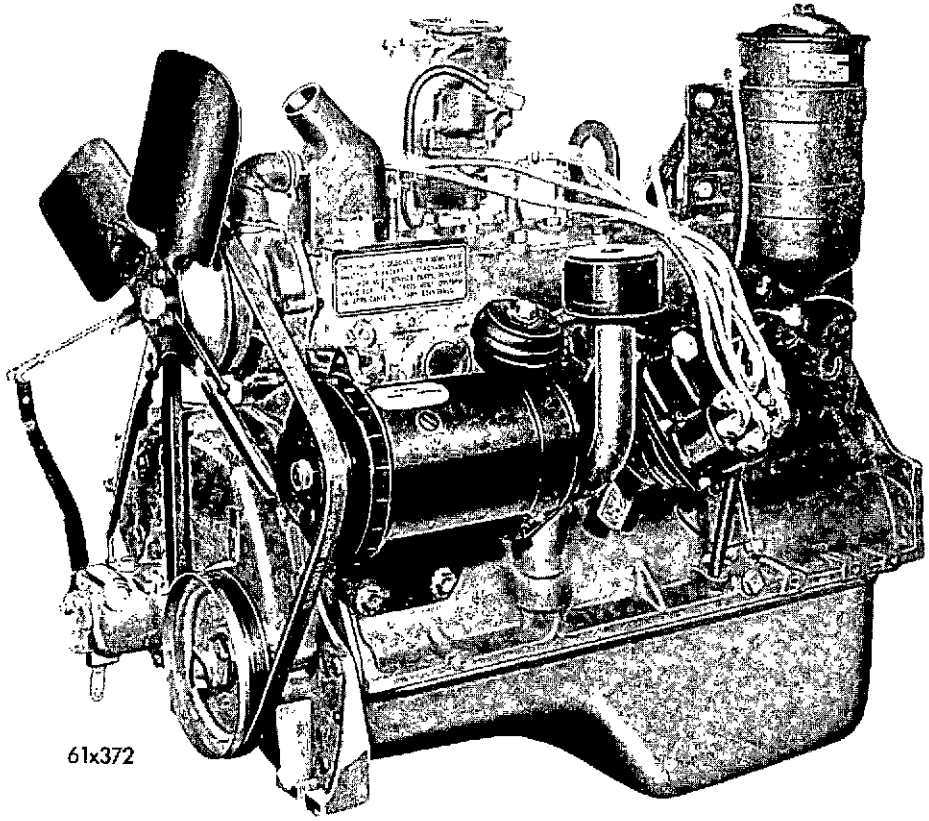


Figure 4 — Chrysler 6-Cylinder Industrial Engine Model 908A

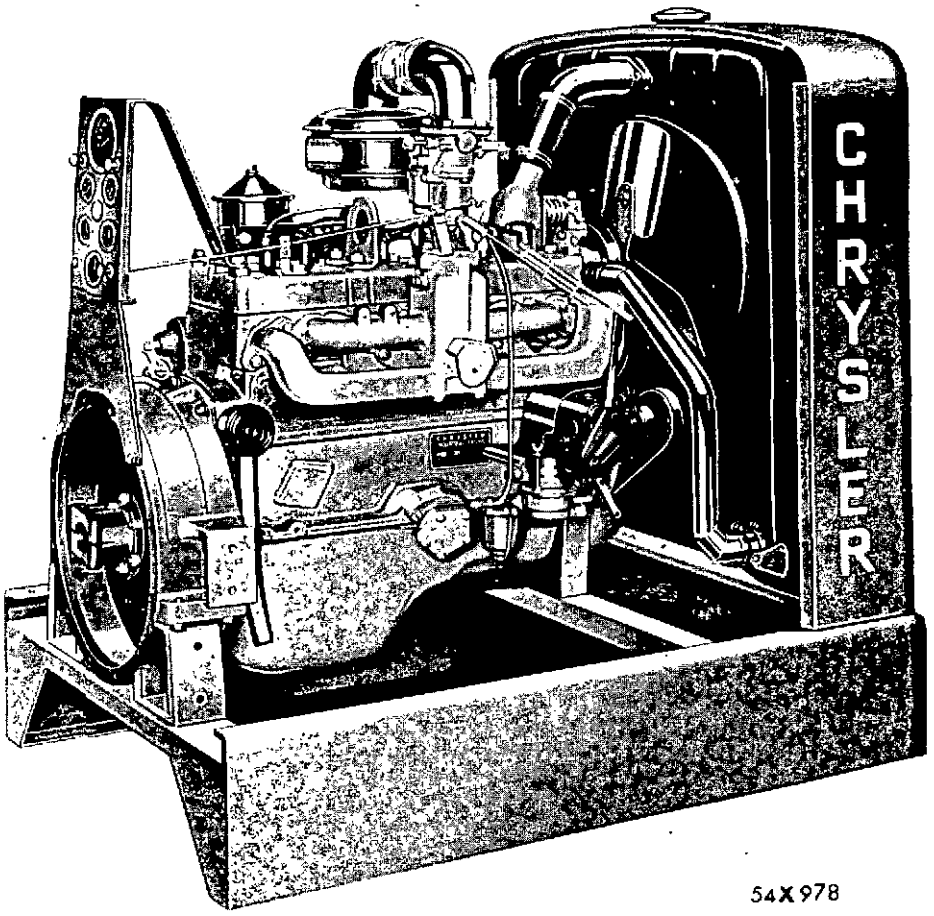


Figure 5 — Chrysler 6-Cylinder Industrial Engine — Open Type Power Unit

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

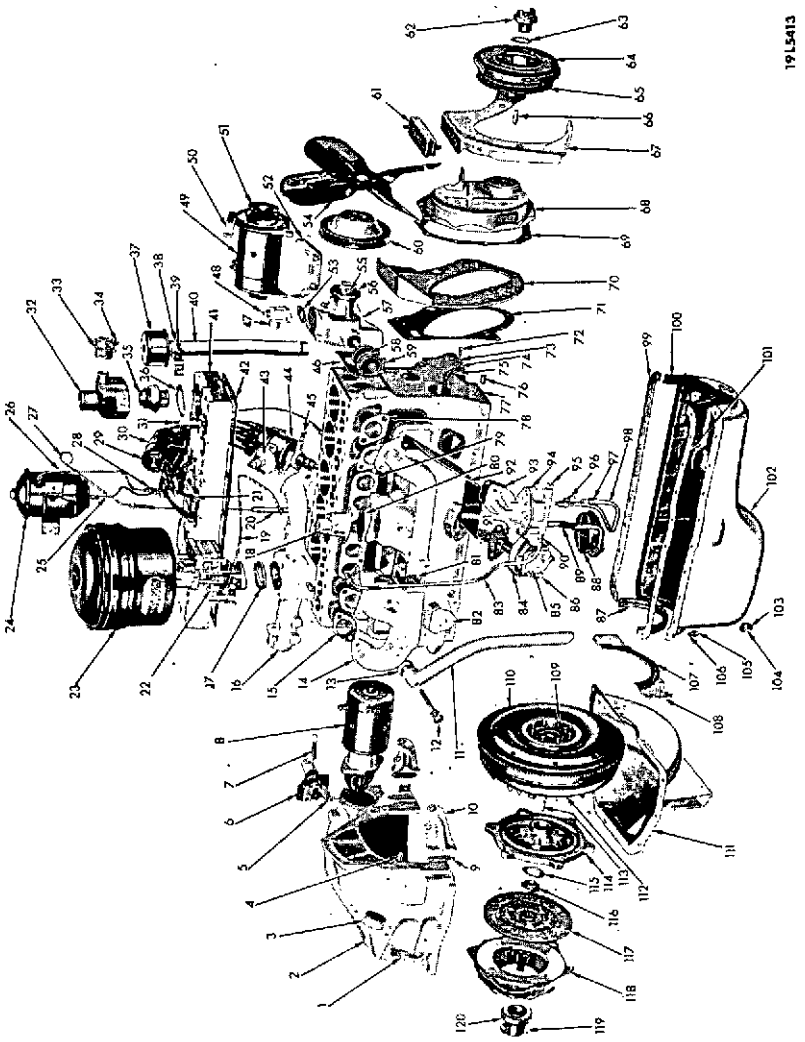
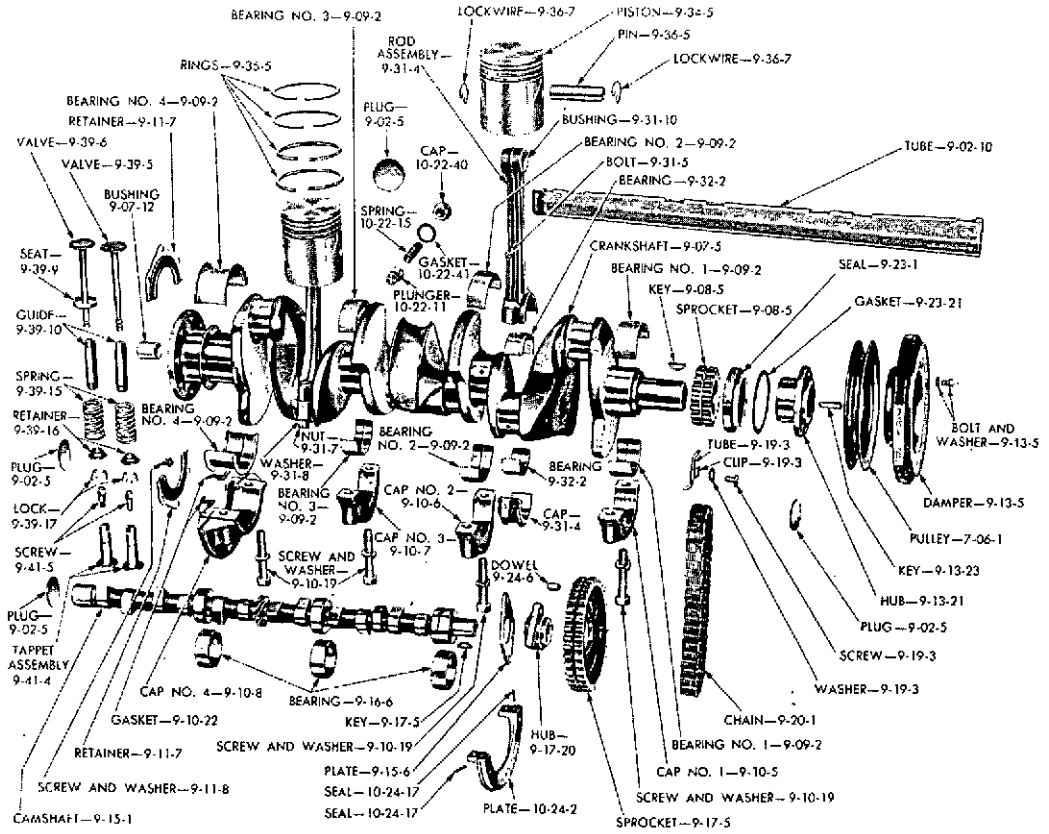


Figure 6 — Chrysler 6-Cylinder Industrial Engine, Exploded View (Typical)



19x5416A

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

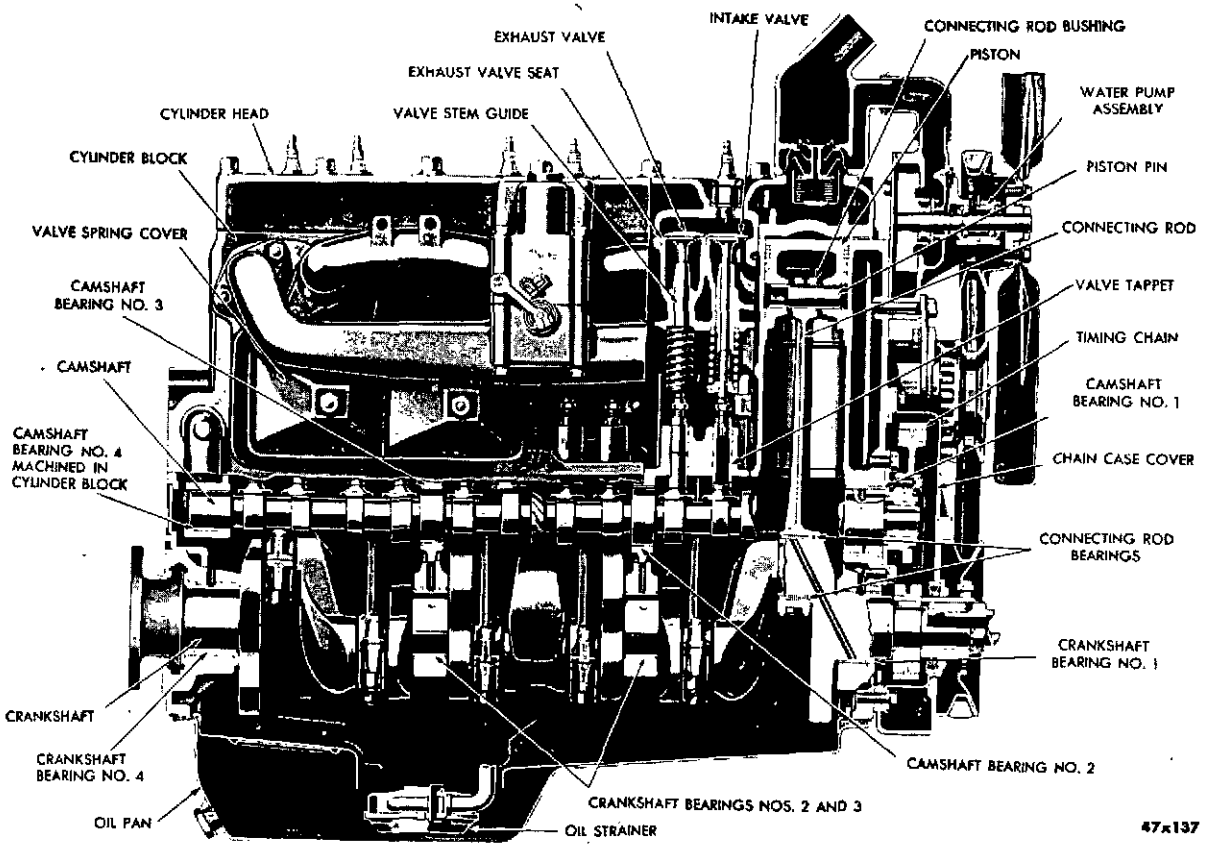


Figure 8 — Chrysler 6-Cylinder Industrial Engine (Sectional View)

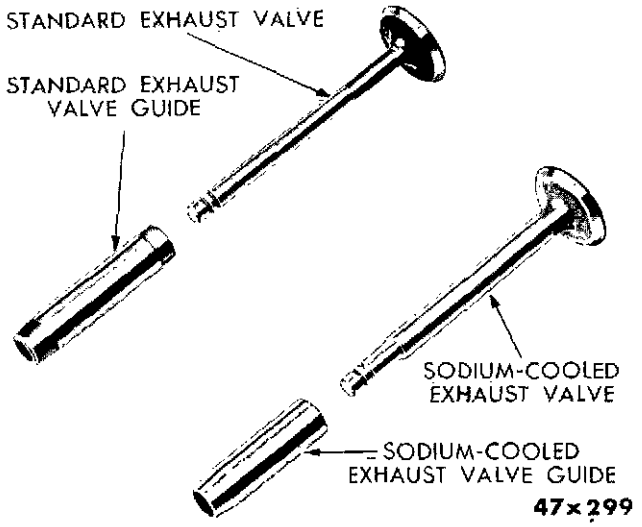


Figure 9 — Valves and Guides

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.

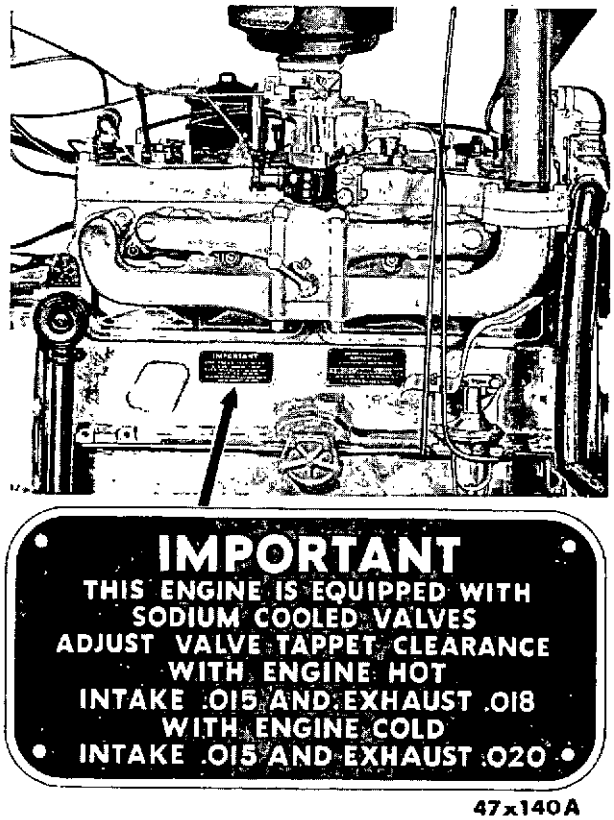


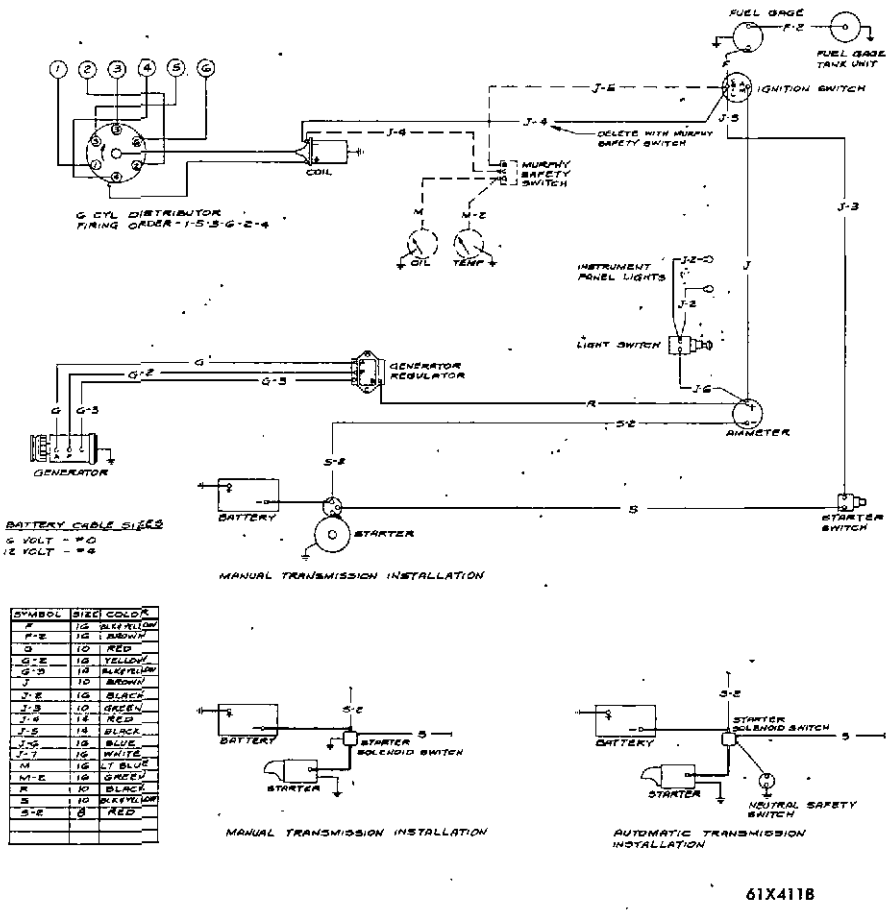
Figure 10 — Sodium Valve Identification Plate

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.

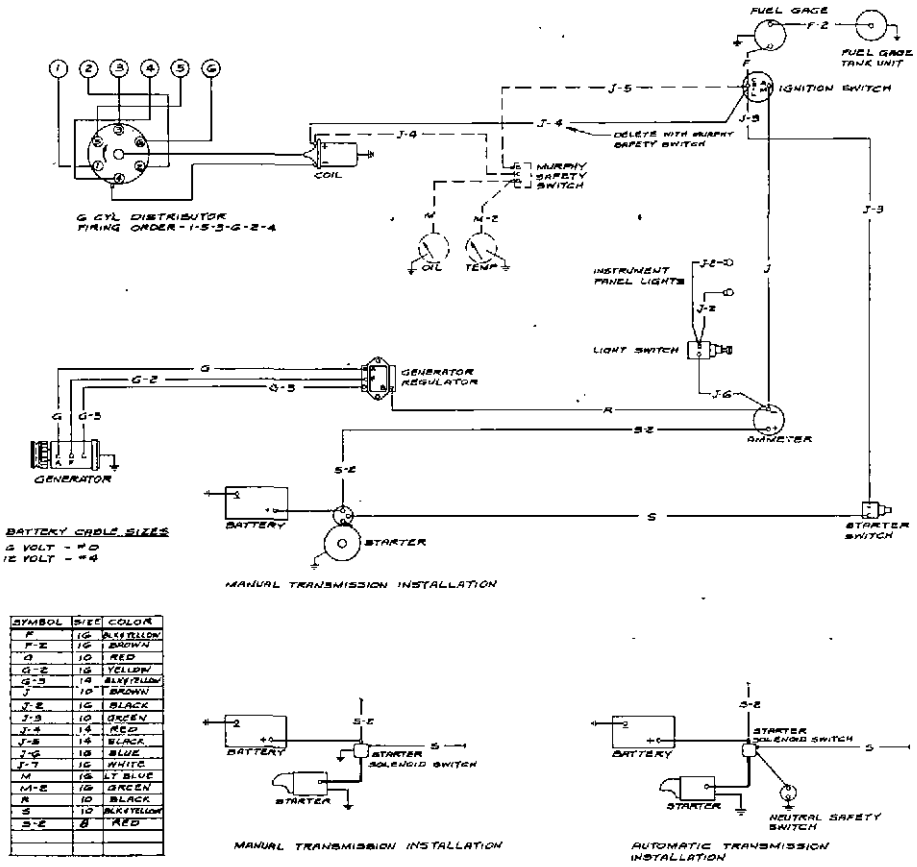
Oil is forced under pressure through drilled passages in the cylinder block to the camshaft bearings, crankshaft and crankshaft bearings. Oil is also forced under pressure through drilled passages in the crankshaft to the connecting rod bearings. Cylinder walls, pistons, piston pins and valve tappets 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	18	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	18	BLUE
J-7	16	WHITE
M	16	LT BLUE
M-2	16	GREEN
R	10	BLACK
S	10	BLK/YELLOW
S-E	8	RED

MANUAL TRANSMISSION INSTALLATION

AUTOMATIC TRANSMISSION INSTALLATION

61X411A

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

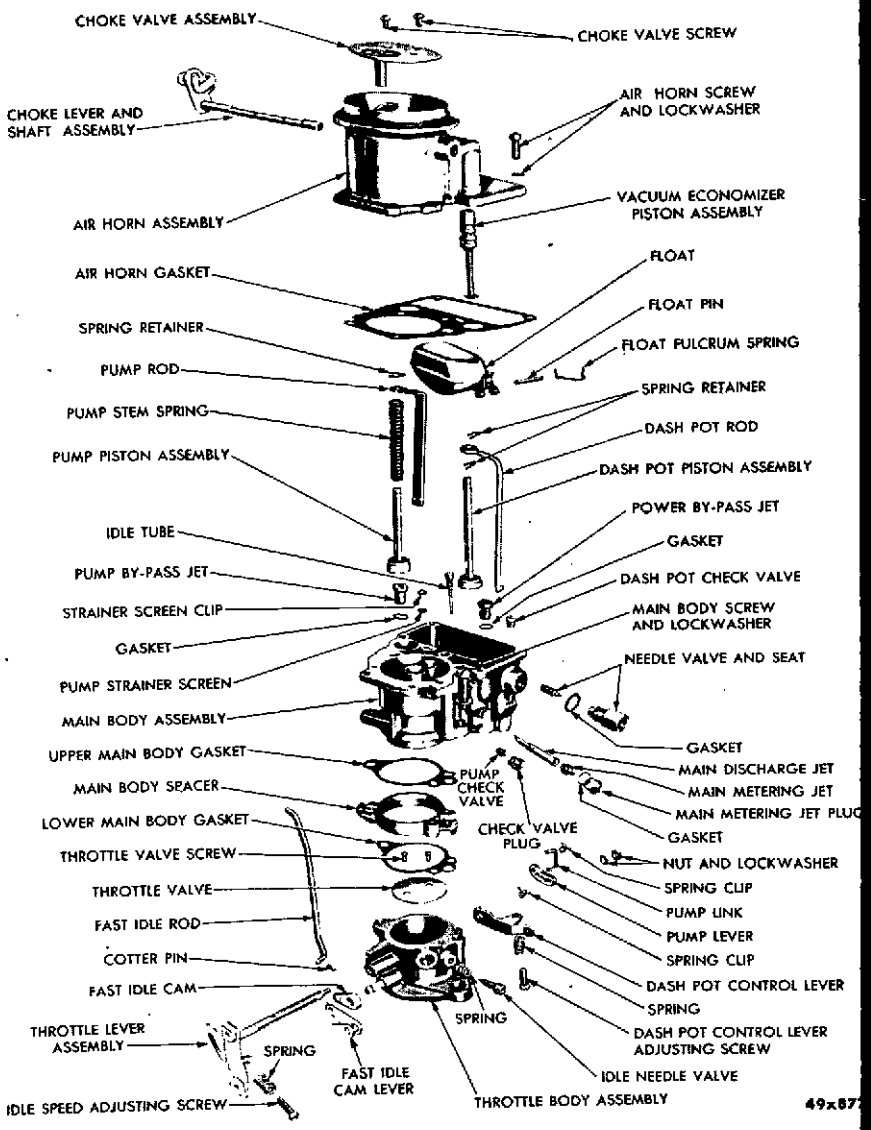


Figure 13 — Downdraft Carburetor Used with Dash Pot and With Fluid Drive (Stromberg Model BXVD 3-99)

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

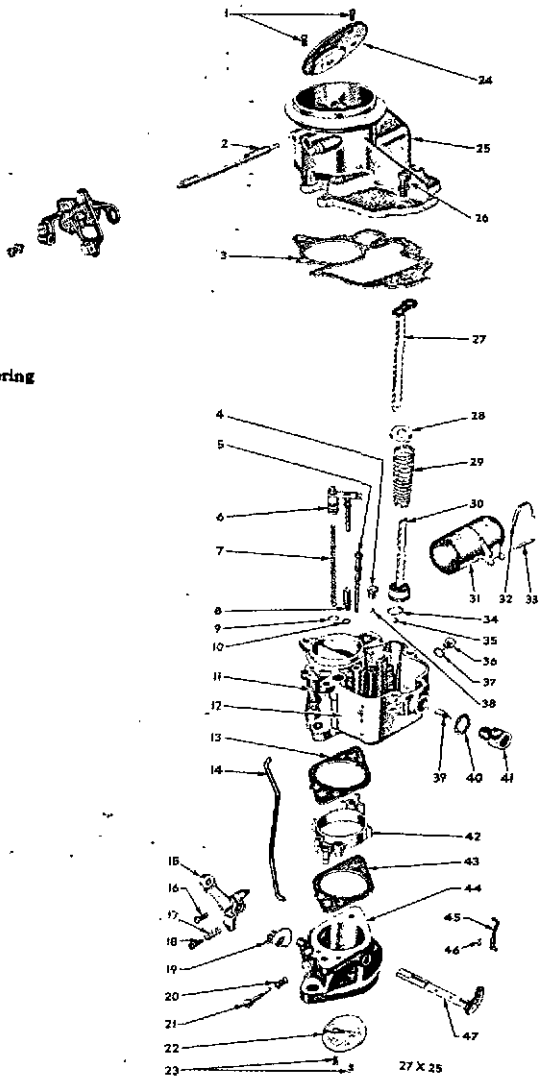


Figure 14 — Downdraft Carburetor Ball and Ball (Model E7T2)

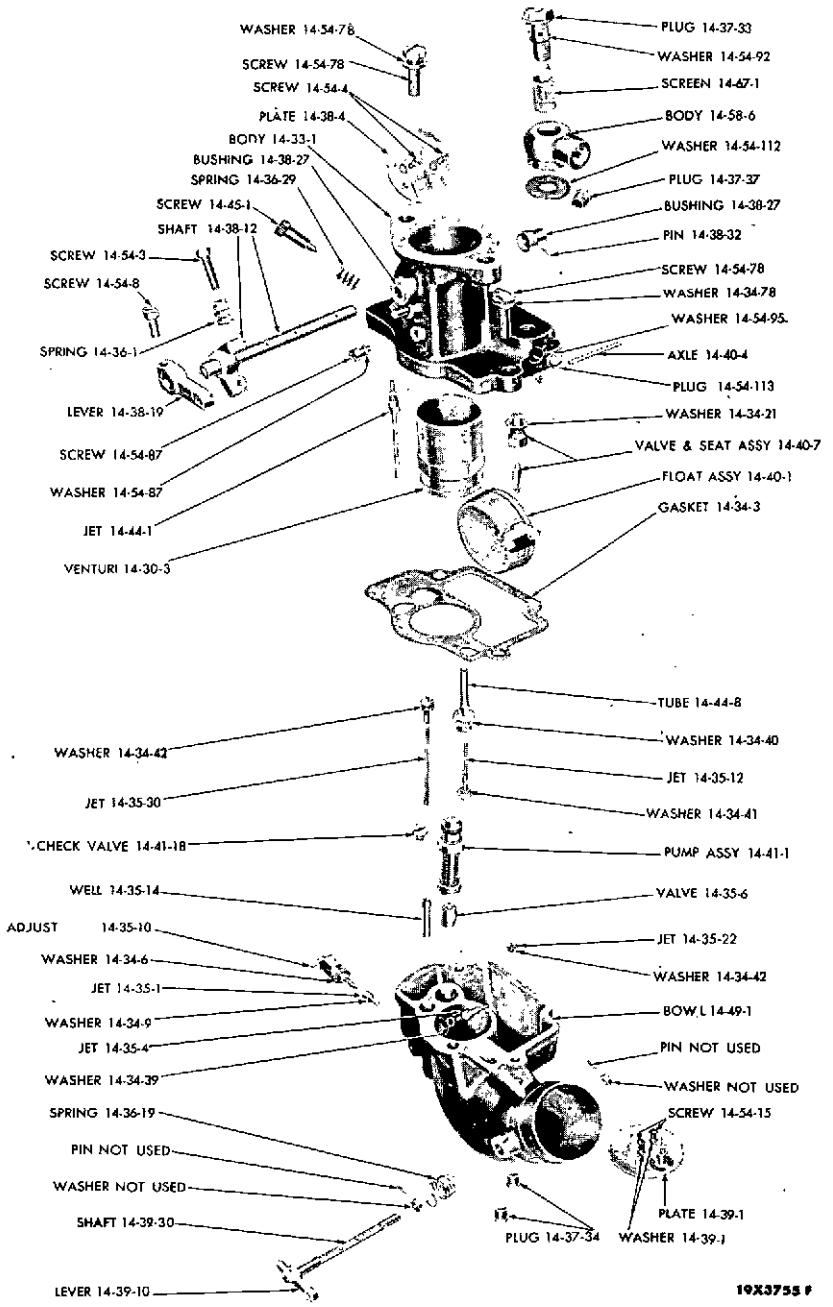


Figure 15 — Zenith Up-Draft Carburetor (Models 0-11000 and 0-11885)

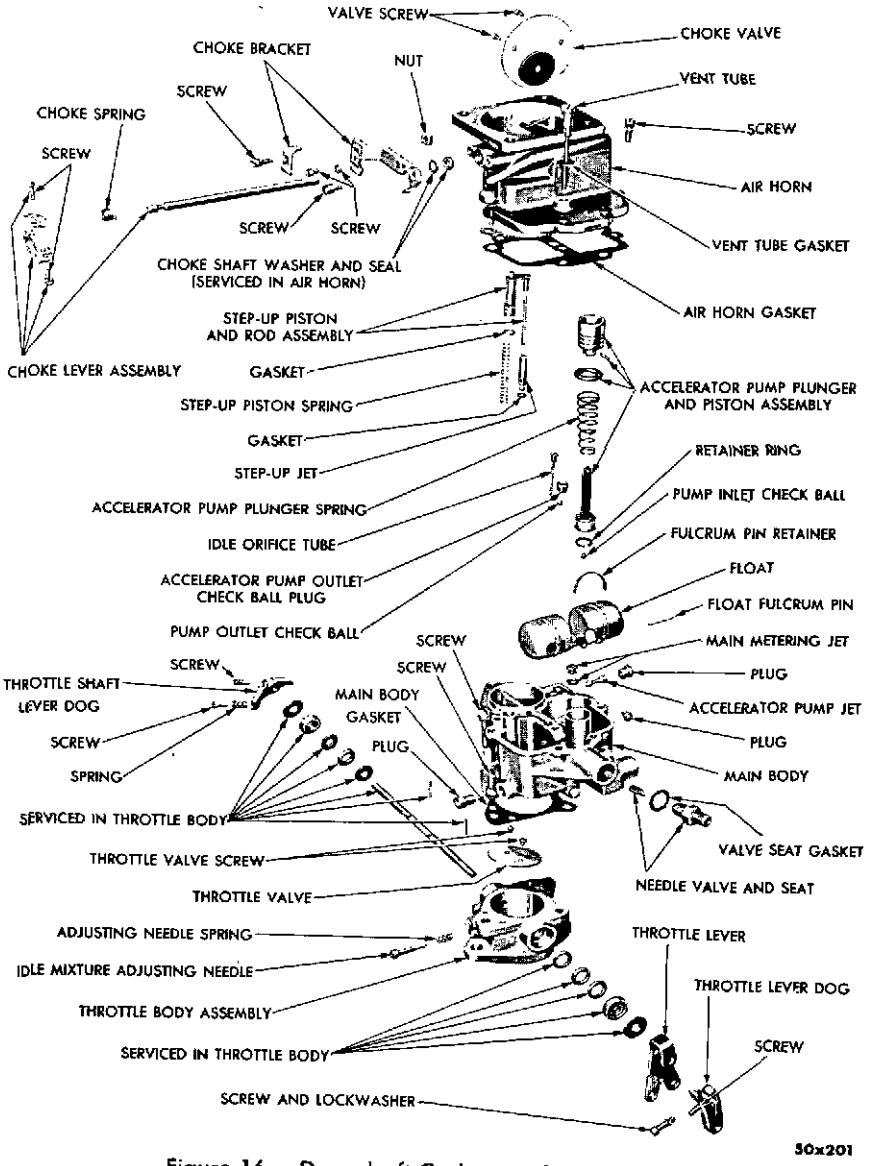


Figure 16 — Downdraft Carburetor Less Velocity Governor
(Ball and Ball Model E7D3)

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.

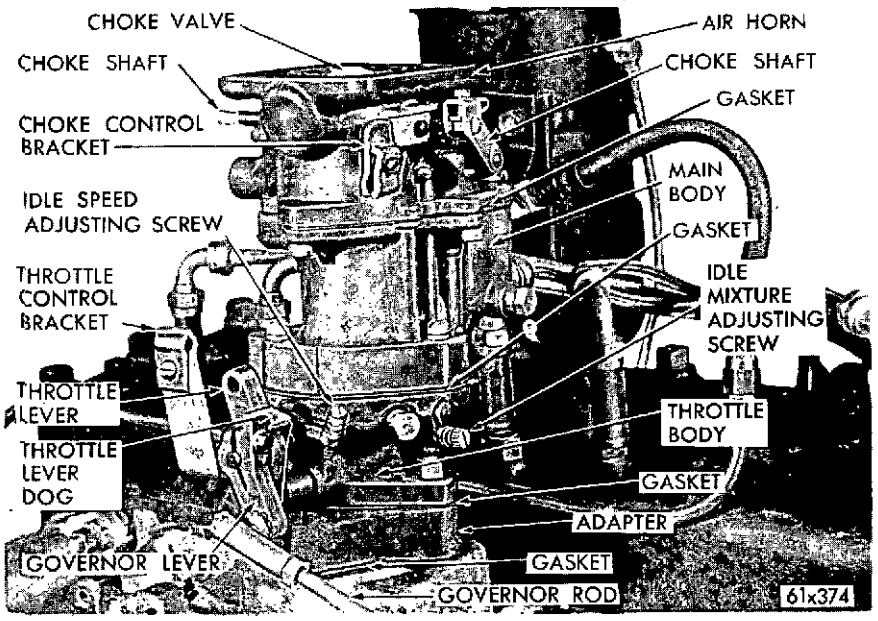


Figure 17 — Carburetor Assembly (Model E7D)

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).

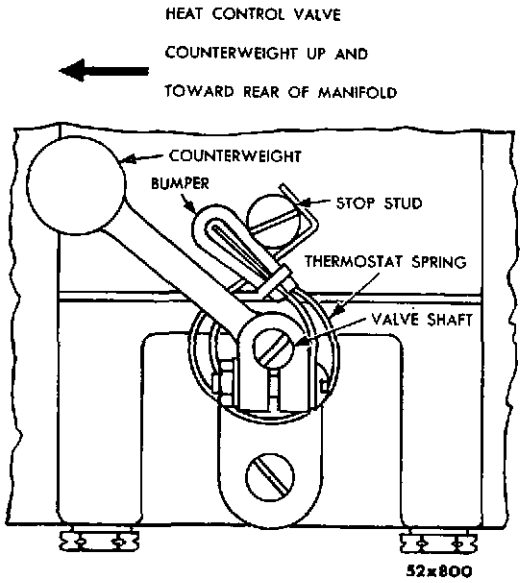


Figure 18 — Position of Universal Manifold Heat control Vavle Counterweight for downdraft Intake and Front Exhaust and Updraft Intake and Rear Exhaust

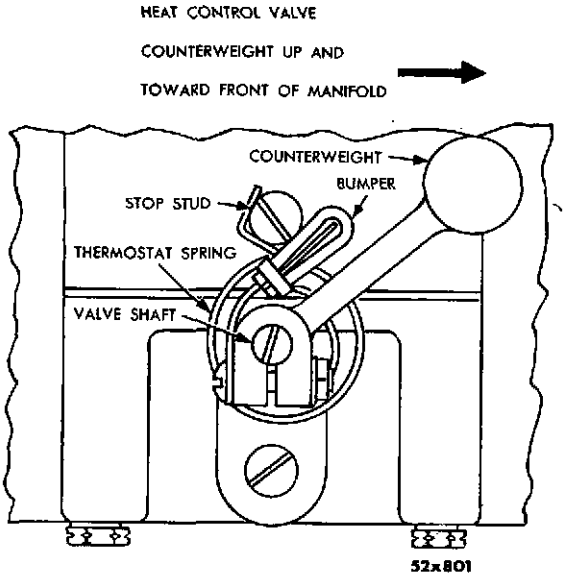


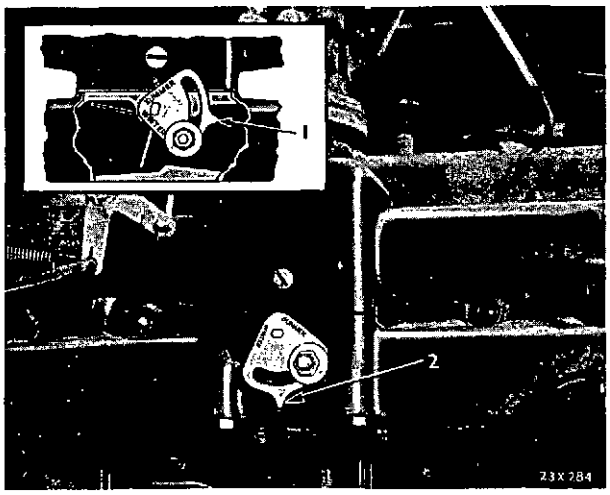
Figure 19 — Position of Universal Manifold Heat Control Valve Counterweight for Downdraft Intake and Rear Exhaust and Updraft Intake and Front Exhaust

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.

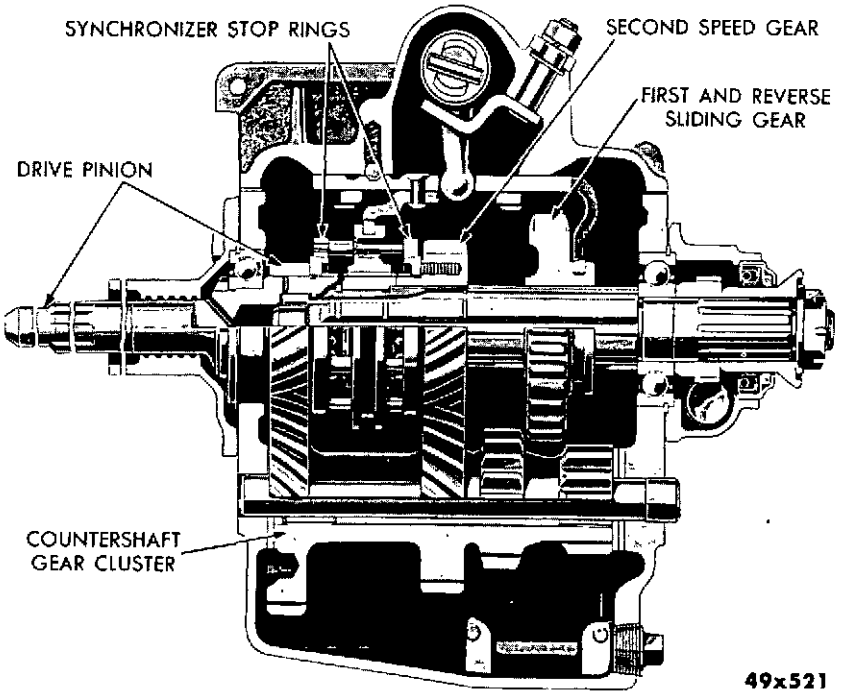


Figure 21 — 3-Speed Transmission

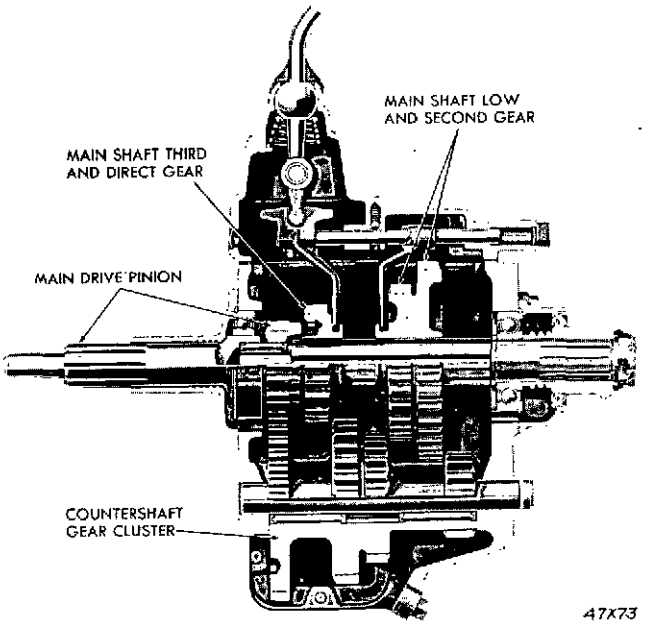


Figure 22 — 4-Speed Transmission

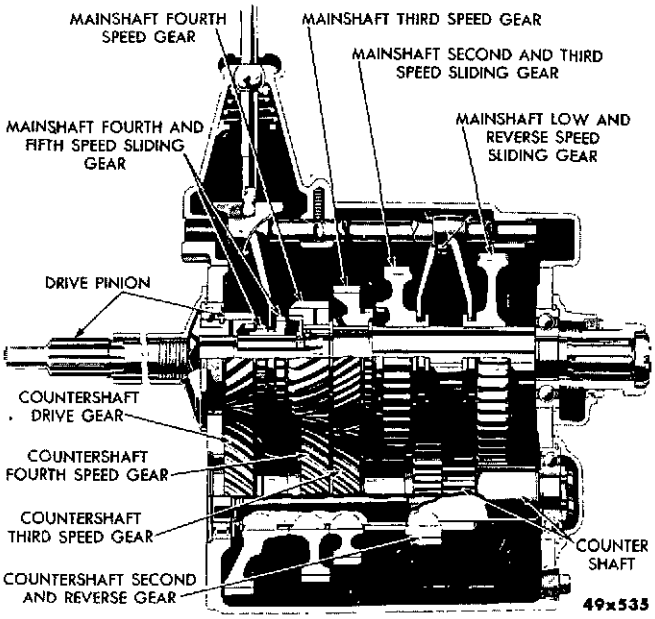


Figure 23 — 5-Speed Transmission

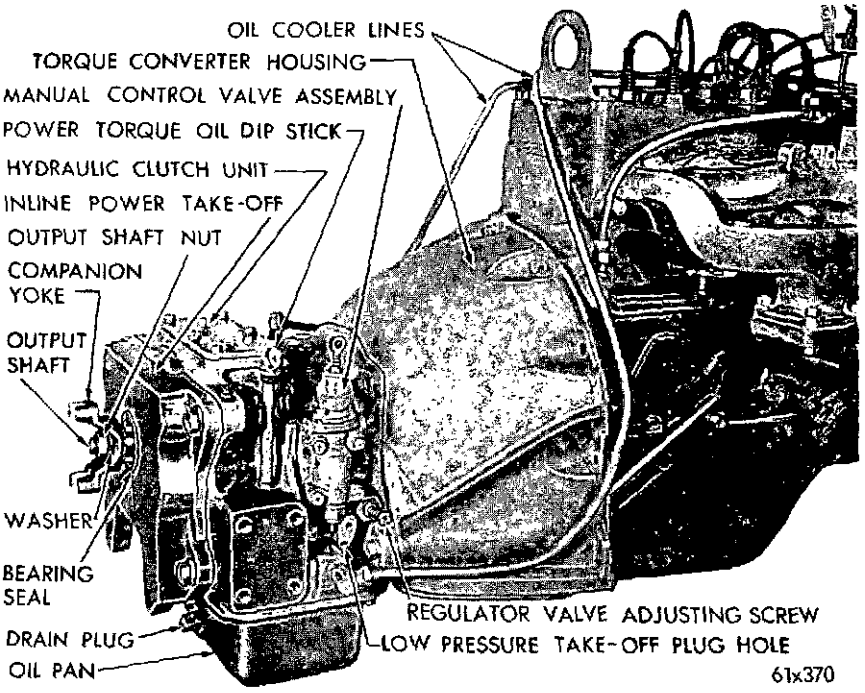


Figure 24 — In-Line Power Take-Off With Power Torque

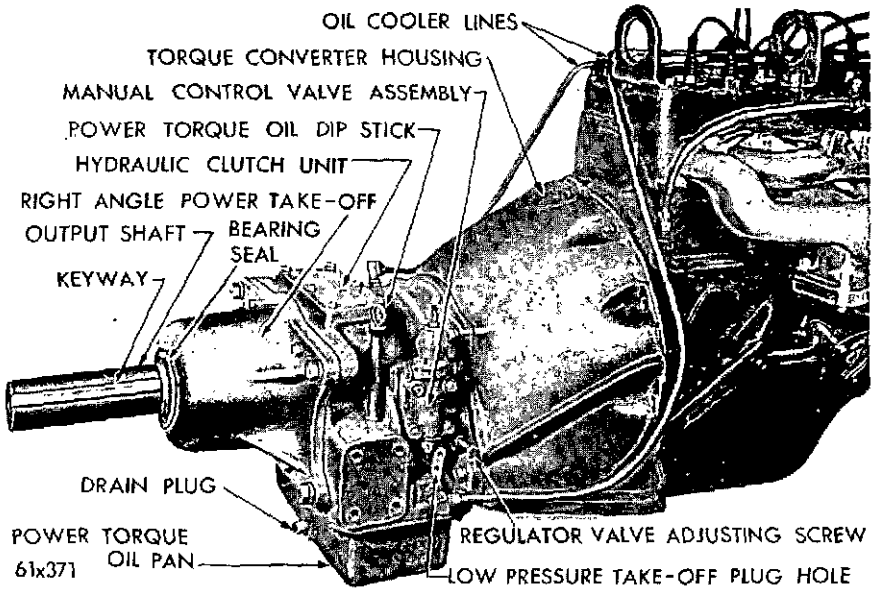


Figure 25 — Right Angle Power Take-off with Power Torque

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

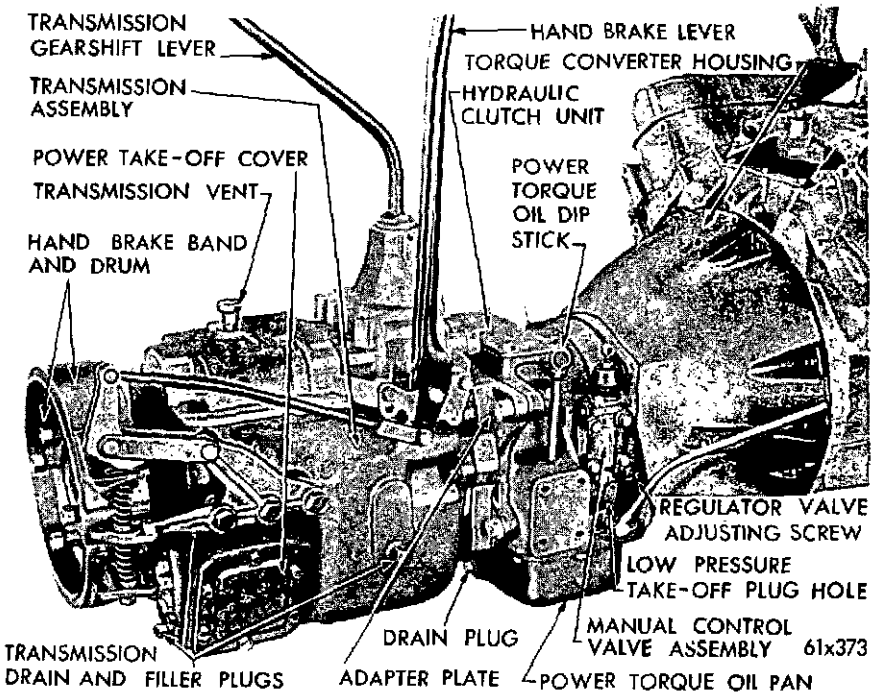


Figure 26 — Transmission Adaptation with Power Torque (Typical)

#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.

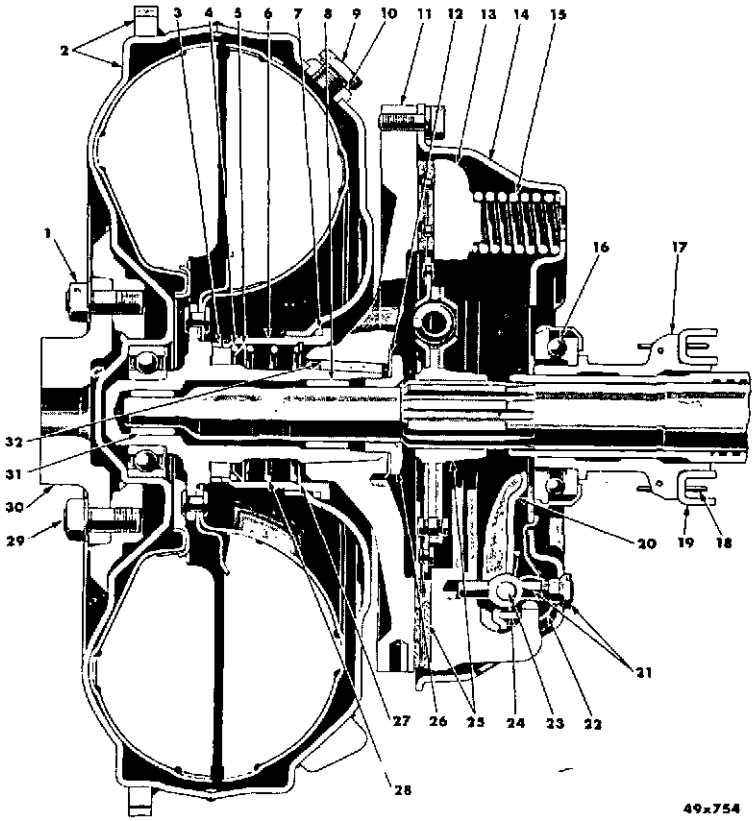


Figure 27 — Clutch and Fluid Drive (Sectional View)

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

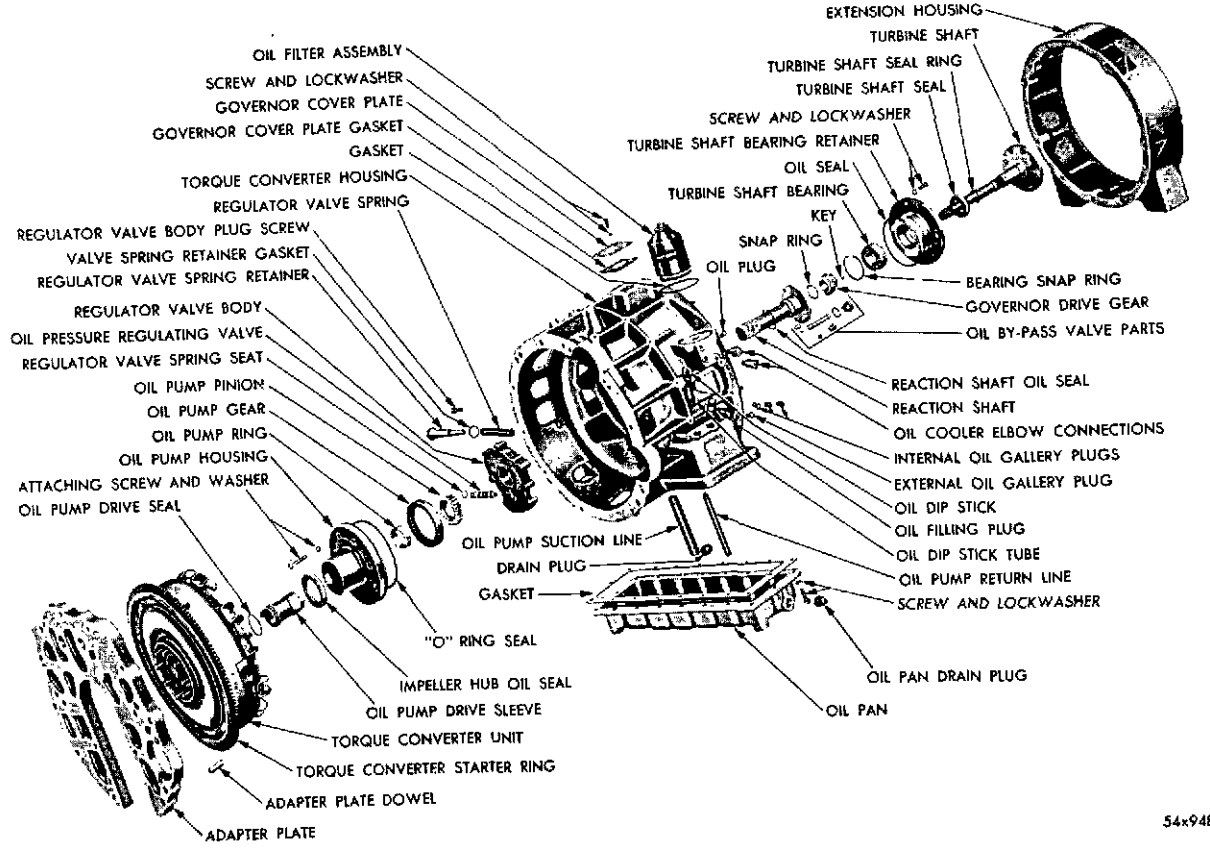


Figure 28 — Torque Converter Housing Assembly (Disassembled View)

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.

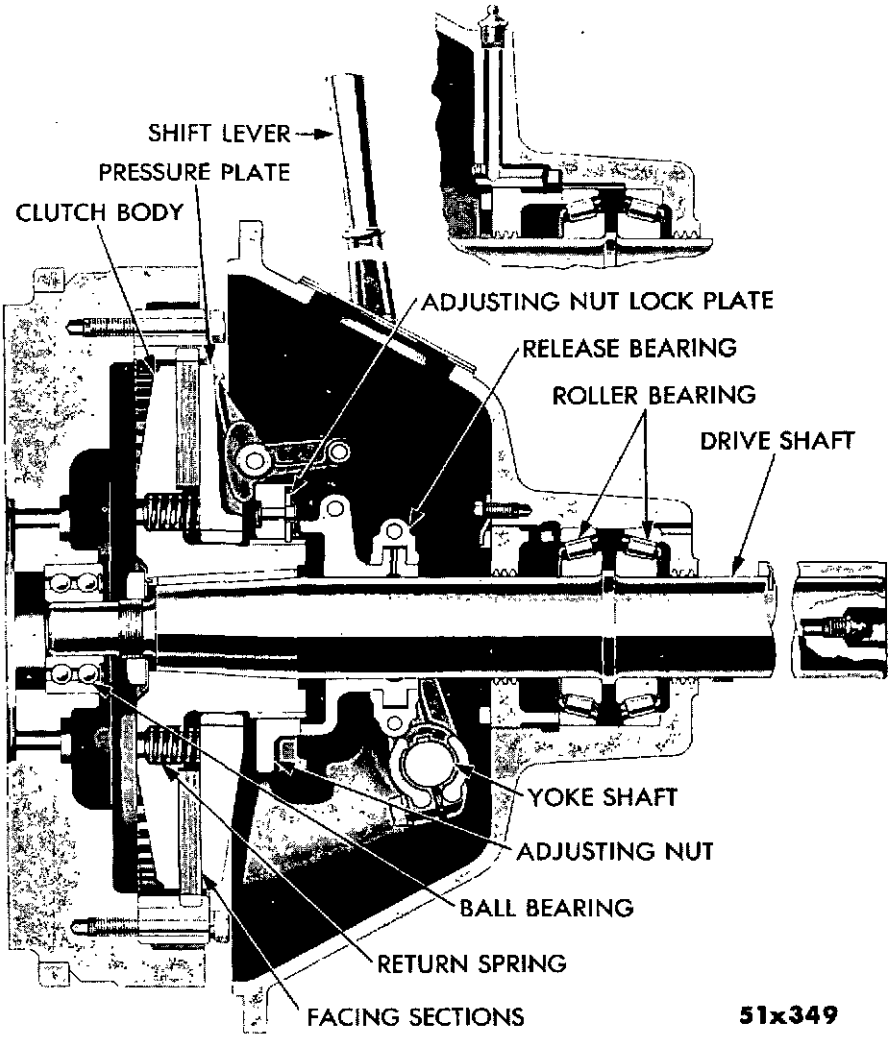


Figure 29 — Power Take-off With Heavy Duty Clutch (Sectional View)

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.

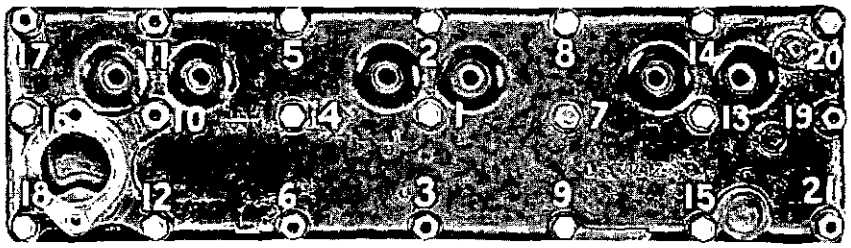


Figure 30 — Cylinder Head Tightening Sequence

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.

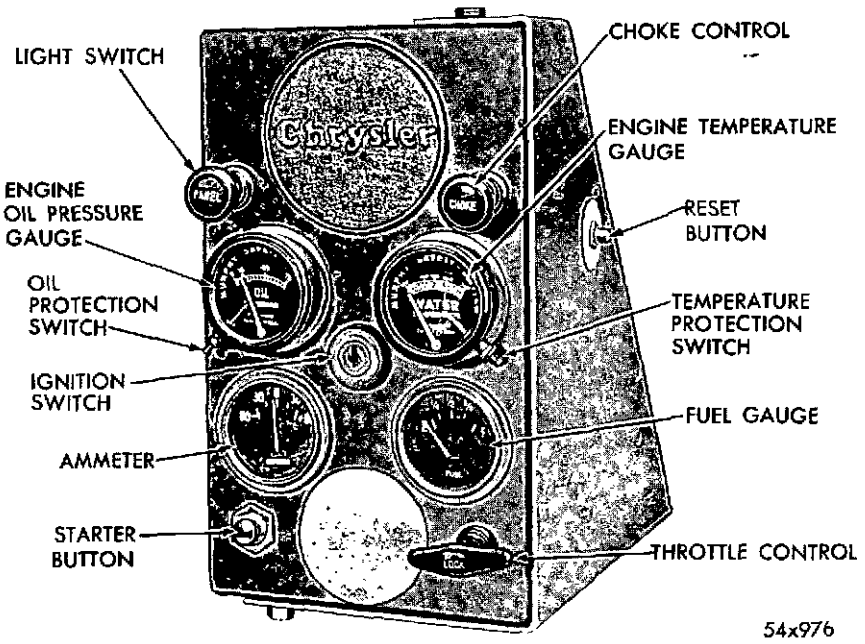


Figure 31 — Engine Mounted Instrument Panel

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.

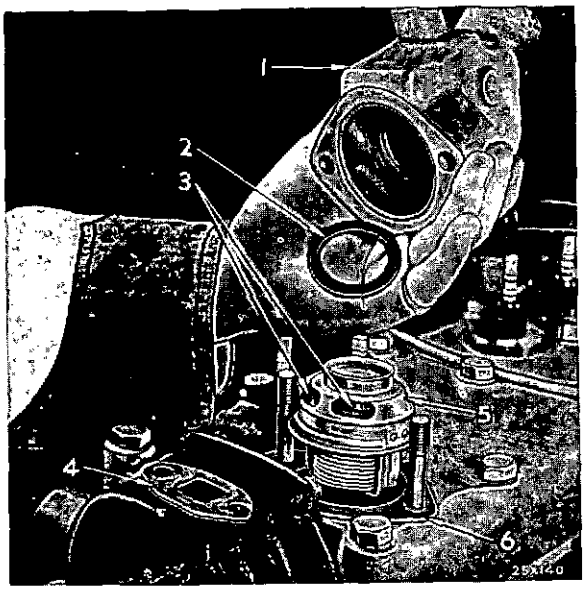


Figure 32 — Installing Thermostat (Typical)

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 (not 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

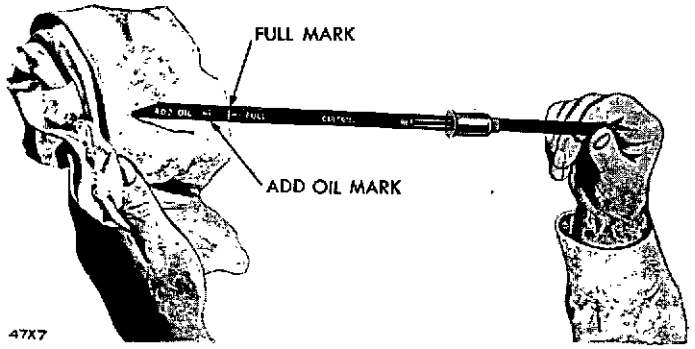


Figure 33 — Oil Level Indicator

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-

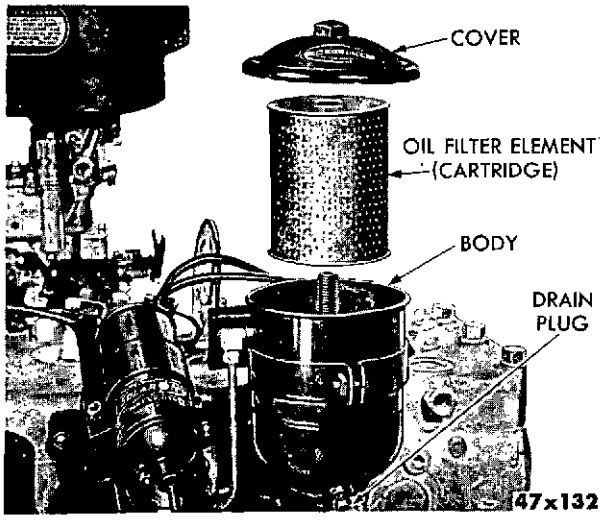


Figure 34 — By-Pass Oil Filter (Exploded View)

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

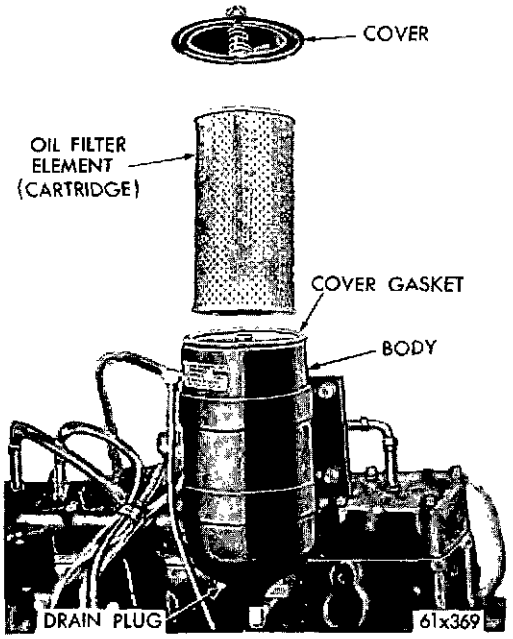


Figure 35 — By-Pass Oil Filter Senior Element (Exploded View)

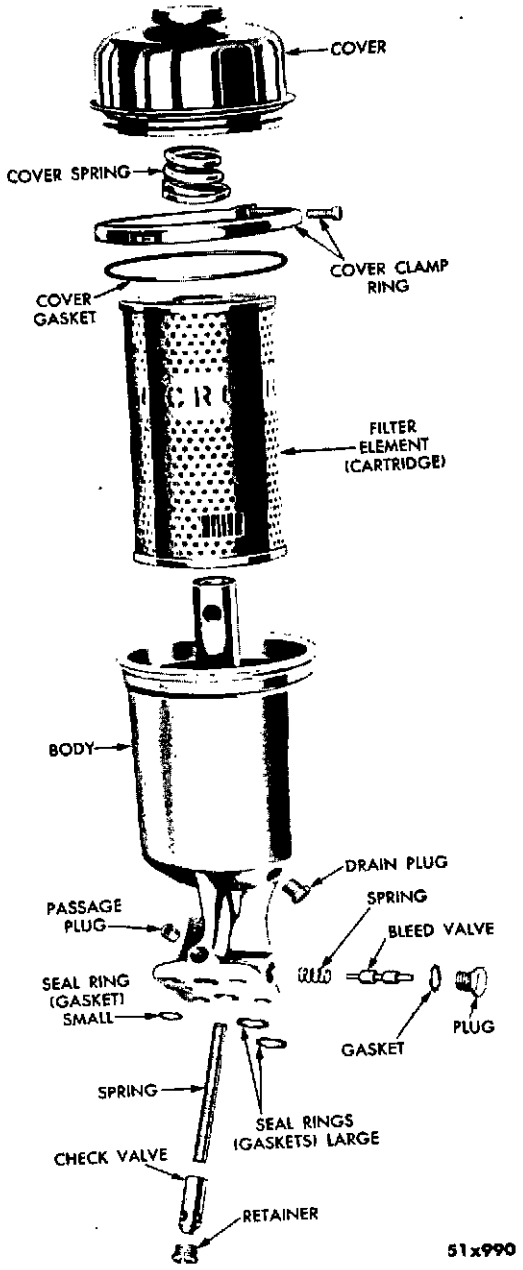


Figure 36 — Full Flow Oil Filter (Exploded View)

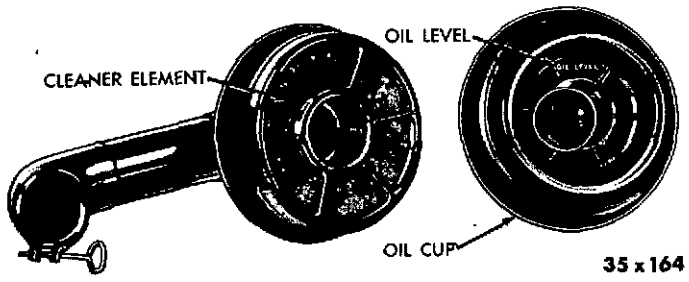


Figure 37 — Inverted Type Carburetor Air Cleaner

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

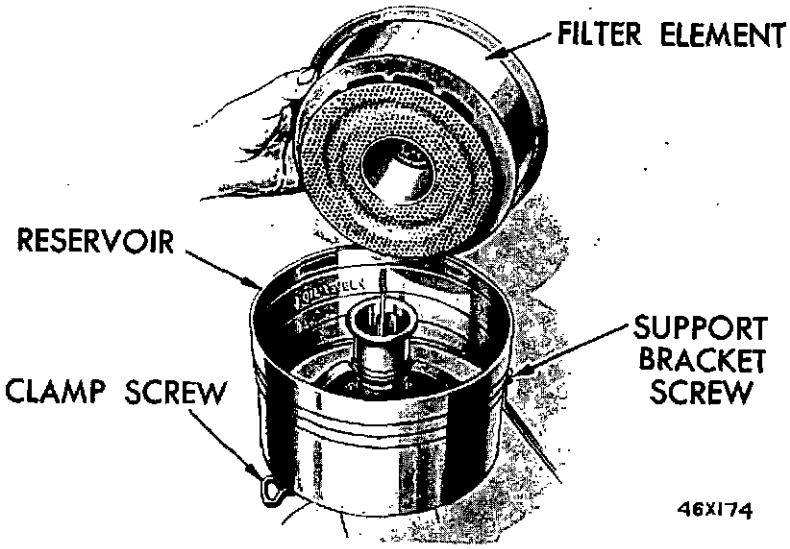


Figure 38 — Hat Type Carburetor Air Cleaner

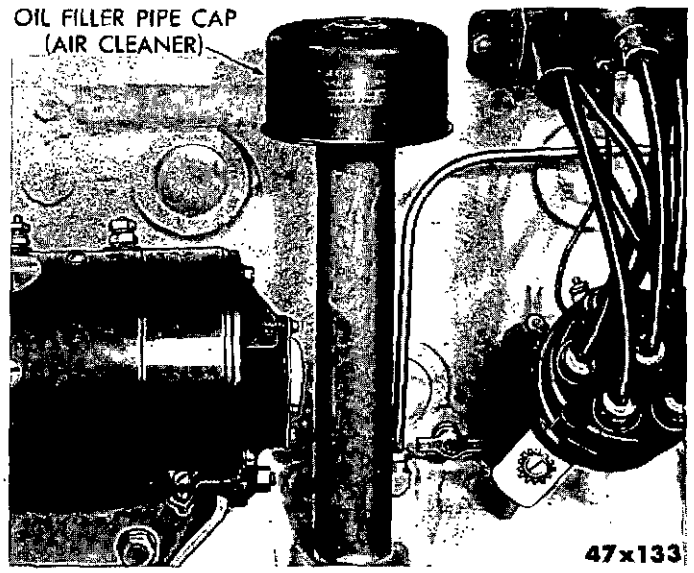


Figure 39 — Oil Filler Pipe Air Cleaner (Typical)

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

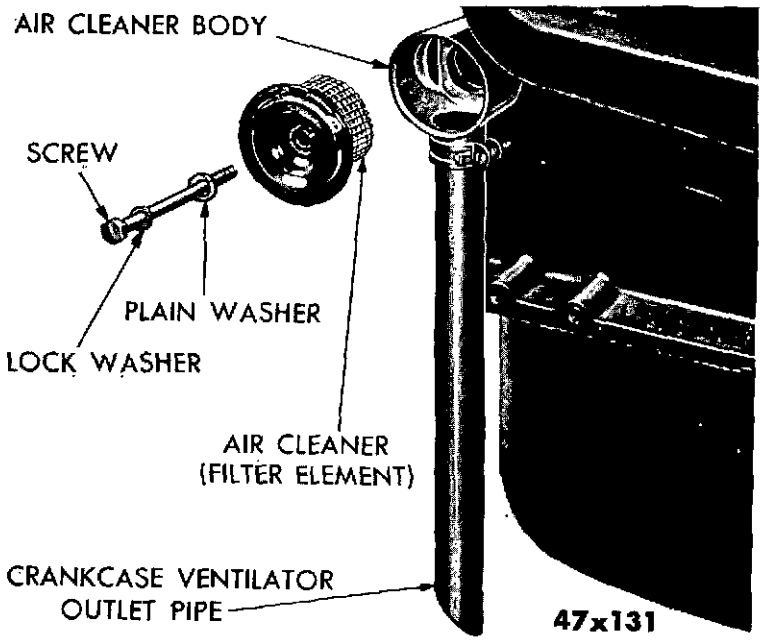


Figure 40 — Crankcase Ventilator Outlet Pipe Air Cleaner

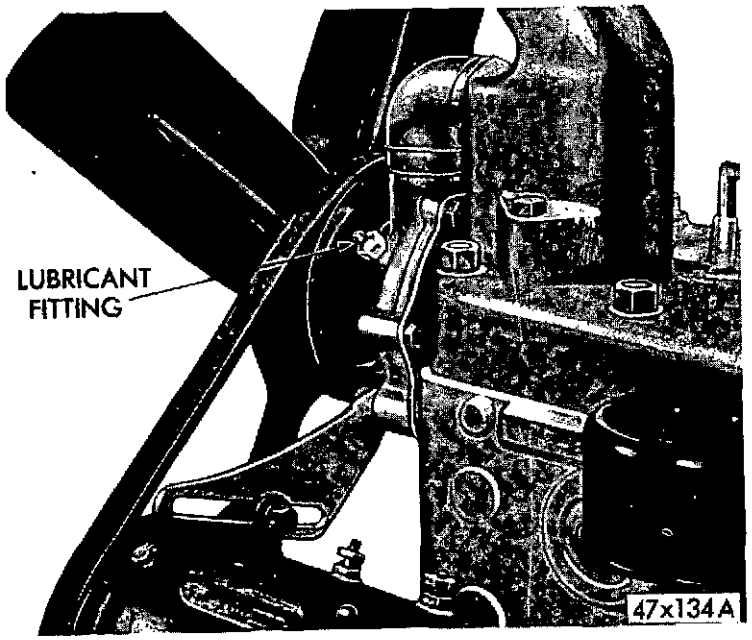


Figure 41 — Water Pump Lubrication Bushing Type

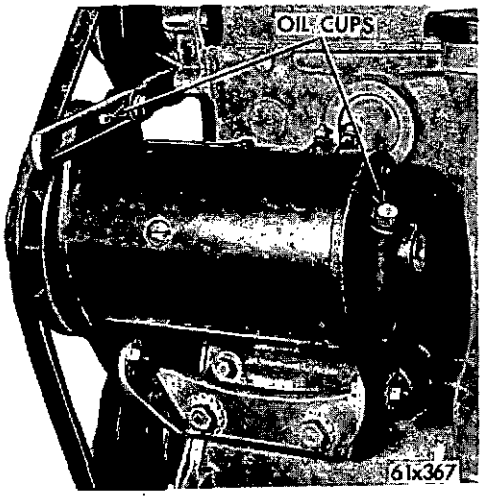


Figure 42 — Generator Lubrication

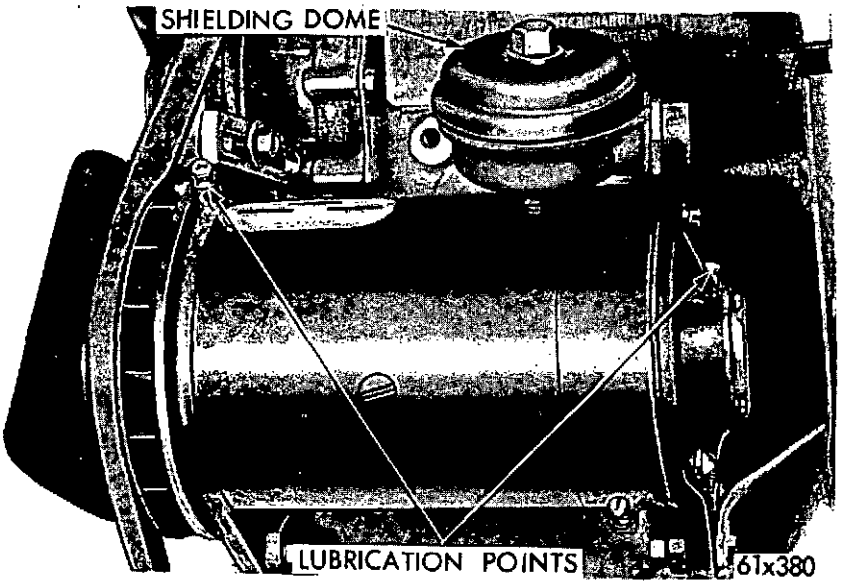


Figure 43 — Generator Lubrication With Shield Dome

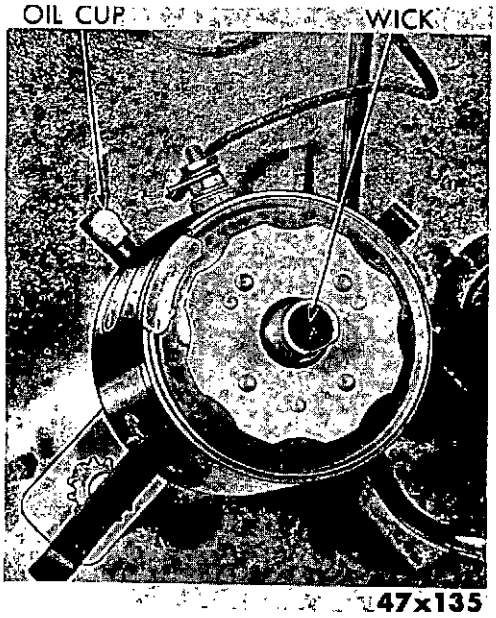


Figure 44 — Distributor Lubrication

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.

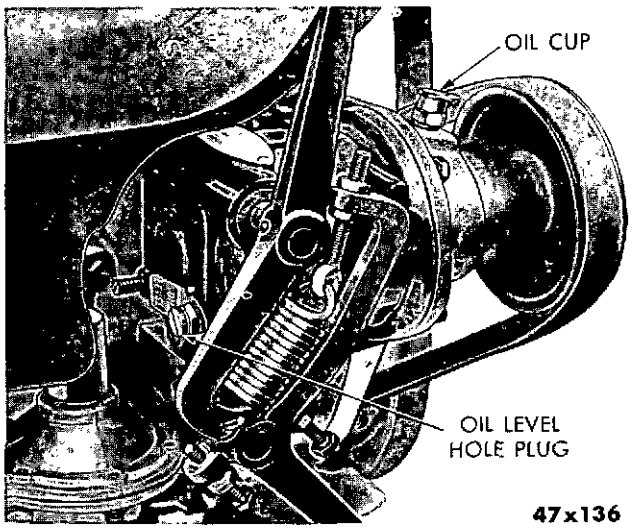


Figure 45 — Mechanical Governor Lubrication

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 the 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

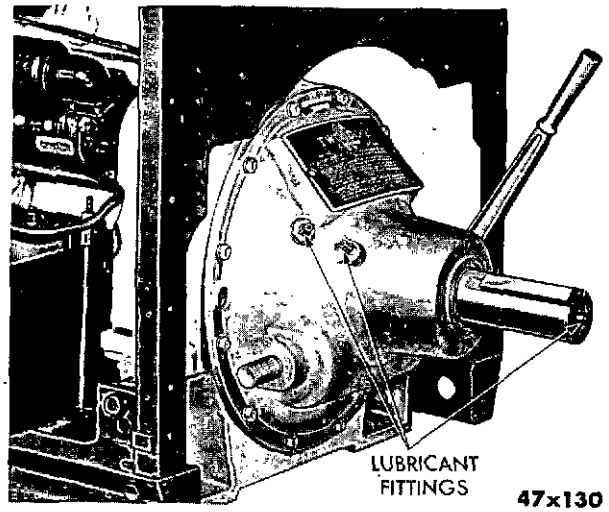


Figure 46 — Power Take-Off Lubrication

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.

MAINTENANCE

MAINTENANCE SCHEDULES

DAILY

1. Check level of oil in crankcase and add oil if necessary to bring level to "FULL" mark on indicator. See Lubrication Section for oil recommendations.

2. Check cooling system and add clean water or anti-freeze as required.

3. If the engine is operated under extremely dusty conditions, check the carburetor air cleaner and the two crankcase ventilation air cleaners for accumulation of oil and dirt and service as required. See Lubrication Section.

4. If the unit is equipped with a power take-off, lubricate the clutch release bearing.

5. Check oil level in governor housing, and replenish, if necessary (Pierce or Hoof governor).

EVERY 25 HOURS OF OPERATION

Lubricate and service as specified for "Daily" and perform the following additional operations:

1. Lubricate the water pump (grease fitting) (if unit so equipped).

2. Check the level of the fluid in the power-torque drive, if engine is so equipped.

3. Check fan and generator belt adjustment.

4. Add 3 to 5 drops of SAE 10W engine oil to the oil cup on the outside of the distributor housing.

EVERY 50 HOURS OF OPERATION

In addition to the operations listed under "Daily" and Every 25 Hours of Operation," perform the following operations:

1. Drain the engine crankcase and refill with recommended grade of oil. See Lubrication Section.

2. Clean and service the carburetor air cleaner and the crankcase ventilation air cleaners as described in the Lubrication Section.

EVERY 50 HOURS OF OPERATION (Continued)

3. Lubricate the generator. See Lubrication Section.
4. Lubricate the distributor (oil cup).
5. Check the lubricant in the transmission (if so equipped).
6. Lubricate the power take-off drive shaft bearings (if so equipped).
7. Check the electrolyte in battery.

EVERY 100 HOURS OF OPERATION

1. Replace filter element in oil filter.

EVERY 250 HOURS OF OPERATION

1. Clean the engine thoroughly.
2. Clean and check adjustments of distributor contact points (.018 to .020 inch).
3. Lubricate distributor cam wick with 3 to 5 drops of SAE 10W engine oil.
4. Check spark plugs for fouling and for proper gap (.035 inch-Resistor type Plugs and .025 to .028 inch-Standard Type Plugs).
5. Check ignition timing. See Adjustment Section.
6. Check carburetor adjustment. See Adjustment Section.
7. Inspect all wiring for loose connections and worn or broken insulation. Clean the battery terminals and coat terminals and clamps with vaseline after the clamps have been tightened.
8. Inspect fluid level in fluid-drive unit and Industrial Torque Converter unit.
9. Drain and refill power torque drive units.
10. Replace filter element in the oil filter of the Industrial torque converter.

EVERY 500 HOURS OF OPERATION

*1. Drain and refill the transmission.
2. Drain and Refill Industrial torque converter unit.

*Drain and refill at approximately 300 hours is recommended if service includes prolonged operation of unusually heavy loading, especially in hot weather.

ADJUSTMENTS

ELECTRICAL SYSTEM

DISTRIBUTOR CONTACT POINTS (Figs. 47 and 48.) In order to maintain efficient operation, the contact points in the distributor must be adjusted properly.

To adjust breaker points, remove the distributor cap and rotor, crank the engine until rubbing block of movable contact rests on the highest point of a cam lobe. Loosen the contact support lock screw just enough to permit the stationary plate to be moved. Insert a screwdriver blade in the triangular space and rotate the blade against the stationary plate to open or close the point gap. Clearance between the points should be from .017 to .023 inch, as measured with a dial indicator (Fig. 49). Tighten the lock screw after each adjustment and measure the breaker point spring tension with an accurate scale (Fig. 50). Hook a spring scale on the breaker arm as close to the breaker point as pos-

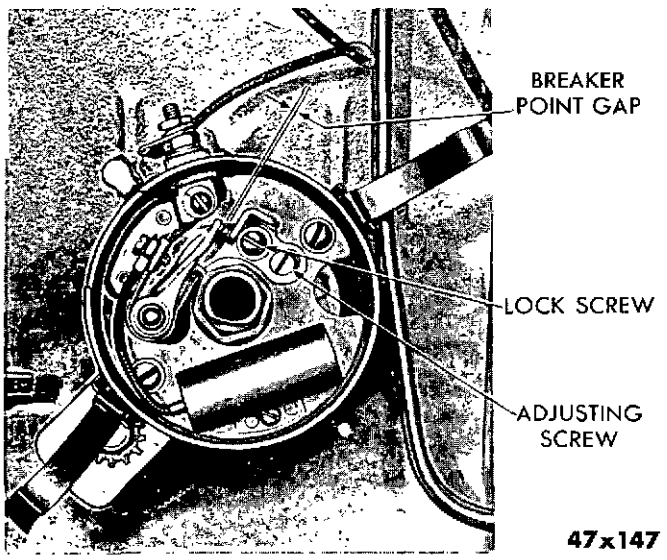


Figure 47 — Distributor Breaker Point Adjustment

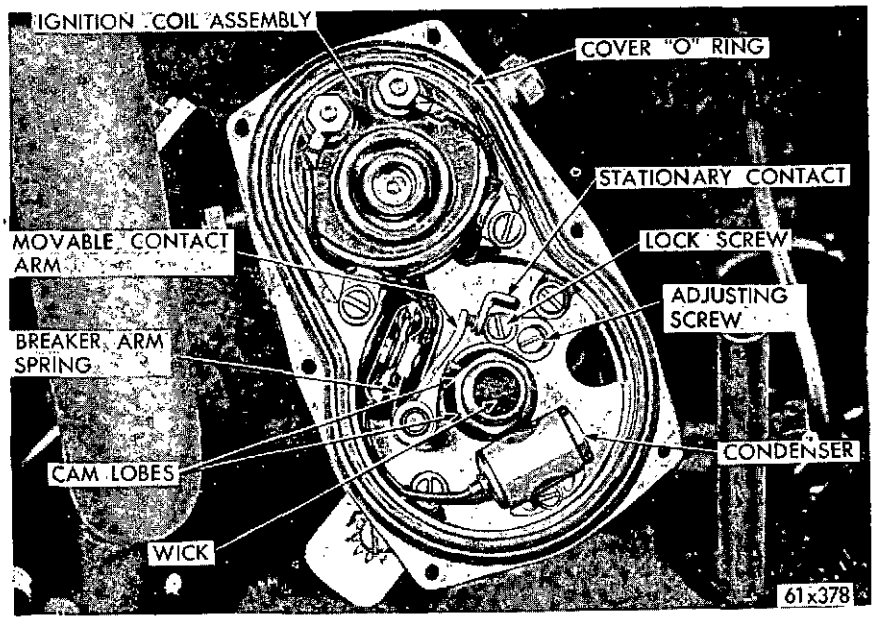


Figure 48 — Ignition Distributor with Cover Removed

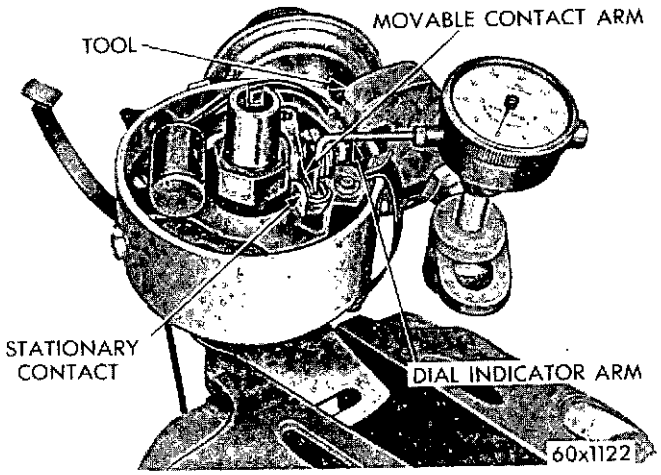


Figure 49 — Checking Point Clearance with Indicator

sible and pull scale gently in a straight line. Take a reading as the points start to separate. Spring tension should be 17 to 21.5 ounces. If not, loosen the screw which holds the end of the point spring and slide the end of the spring in or out as necessary. Retighten screw and recheck spring tension.

Wipe old grease from surface of the breaker cam and apply a light film of MOPAR distributor cam lubricant (Part No. 1473595) to the breaker cam. Do not over-lubricate, keep oil and grease away from the contact points.

IGNITION TIMING

To obtain maximum engine performance, the distributor must be correctly positioned to give proper ignition timing. The ignition timing test will indicate the timing of the spark at the No. 1 piston at idle (only).

Test procedure as follows:

(1) Disconnect the vacuum line at the distributor (on units so equipped).

(2) Connect the secondary lead of the Power Timing Light to the Number 1 spark plug, the red primary lead to the positive terminal of the battery and the black primary lead to the negative battery terminal.

(3) Use chalk to mark the desired degree line (2½° BTC) on the vibration damper to provide better visibility when the degree mark lines up with the timing pointer.

(4) Start engine and set idle to 475-500 r.p.m. (Hydraulic clutch control in "off" position, if so equipped).

(5) Using the timing light (Fig. 51) to observe the position of the timing mark on the crankshaft pulley; as the timing mark and pointer are in alignment.

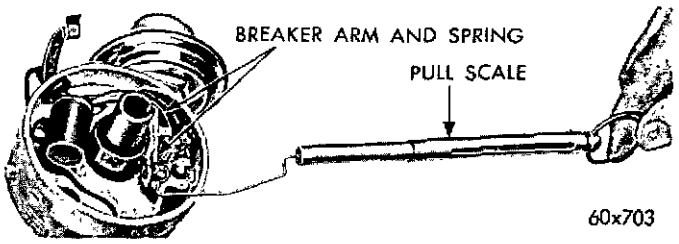


Figure 50 — Testing Breaker Arm Spring Tension

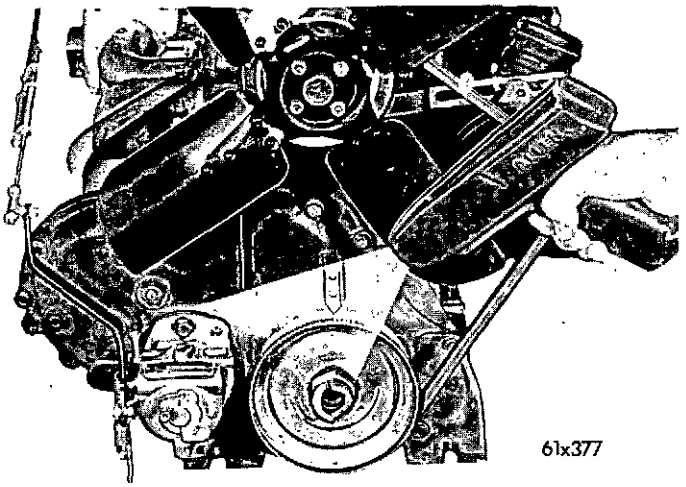


Figure 51 — Checking Timing With Timing Light on Model Ind. 908A

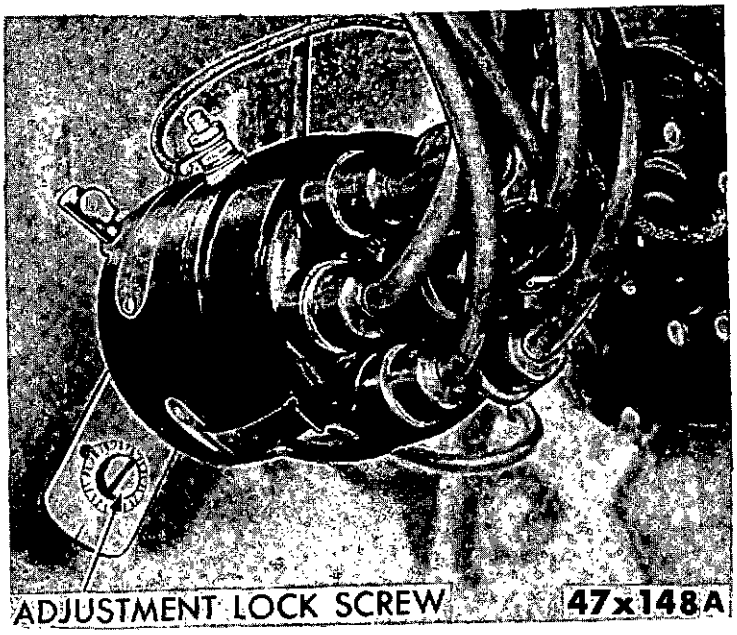


Figure 52 — Ignition Timing Adjustment (Typical)

(6) Loosen distributor clamp screw (Figs. 52 and 53) and rotate distributor housing so that specified timing mark and pointer are in alignment. (Moving distributor housing against shaft rotation, advances timing and with shaft rotation, retards timing).

(7) Tighten distributor clamp screw after timing has been set and recheck timing adjustment with power timing light.

If engine speed is increased, the timing mark should move down on vibration dampener below pointer if advance units are functioning.

(8) If spark timing is correct, connect vacuum line to distributor and remove timing light.

SPARK PLUGS

Spark plugs should be kept clean to insure economical engine operation. Every 250 hours of operation; remove the spark plugs and examine the firing ends of the plugs for evidence of oil fouling, gas fouling, burned or over heating conditions. Clean or replace, and reset plug gaps to .035 inch. Always use new gaskets when installing the spark plugs. Tighten plugs to 30 foot-pounds torque.

The AR-80 spark plug is standard. The AR-51 is a cold plug for high speed, Liquid Propane Gas, natural gas and/or continuous speed operation. The AR-10 is a hot plug for continuous slow speed light load operation. This plug should never be used for high speed heavy load operation. The AR-8S is a special application shielded plug.

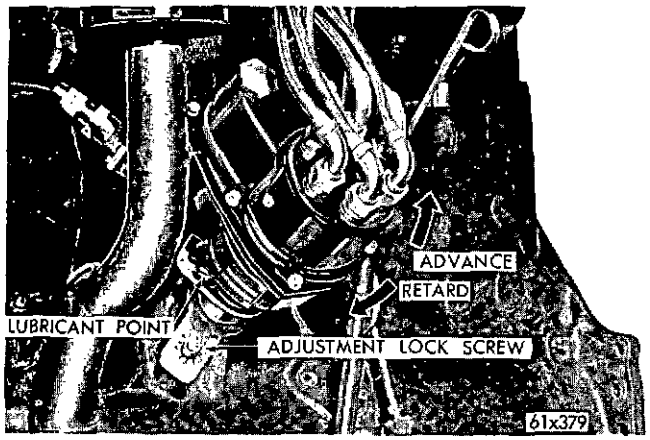


Figure 53 — Ignition Timing Adjustment

CARBURETOR ADJUSTMENT

Before attempting any adjustment of the carburetor, check the following items:

(1) **Spark Plugs.** See that plugs are correct type, clean, and have correct gap of .035 inch.

(2) **Distributor Points.** See that points are clean, in good condition and properly set (.018 to .020).

(3) **All High Tension Terminals.** See that terminals are making good contact at plugs and at distributor cap and the coil towers.

(4) **Compression.** See that compression is approximately even in all cylinders.

(5) **Carburetor.** See that carburetor is clean and in good condition and firmly attached to the manifold with no air leaks.

(6) **Manifold Heat Control Valve.** See that manifold heat control valve is free and functioning correctly. Apply Manifold Heat Control Valve Solvent Mopar Part No. 1879318 to each end of the shaft when the manifold is cool. Work the valve back and forth a few times to distribute the solvent to be sure the valve is free.

GOVERNOR ADJUSTMENT (Figure 54)

DRIVE BELT (Pierce). To tighten the governor drive belt, loosen the

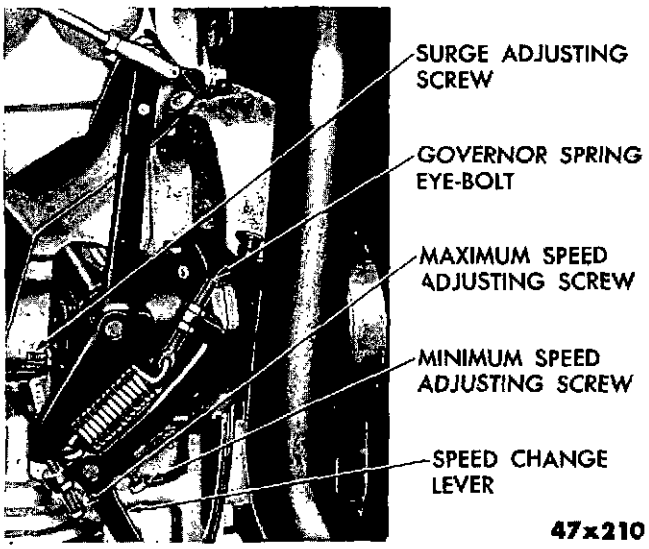


Figure 54 — Governor Adjustments (Pierce Type)

governor mounting bolts and move the governor away from the engine enough to establish tension on the belt, then tighten the mounting bolts.

THROTTLE TO GOVERNOR ROD (Pierce). Install the lower ball joint of the rod in the upper hole of the governor operating lever. Turn the low speed stop screw in to hold the governor lever in the open position, and hold the carburetor throttle lever open against the stop. Adjust the length of the rod so that the upper ball joint just fits into the tapped hole in the throttle lever. Test the operation of the rod for friction or excessive free play, and adjust, if necessary, at the ball joint.

THROTTLE TO GOVERNOR ROD (Hoof). (Fig. 55) Adjust the length of the rod so that the throttle lever on the carburetor contacts the stop just as the governor lever is at the wide open position. Test the operation of the rod for friction or excessive free play and adjust, if necessary, at the ball joint.

ADJUST TO ELIMINATE SURGE (Pierce). Select an engine speed at the low point of the range at which the governor is to operate and set the speed change lever to obtain this speed. If a no-load surge is encountered at this point, turn the surge adjusting screw in slowly until the surge disappears. **Under no circumstances should the surge screw be turned**

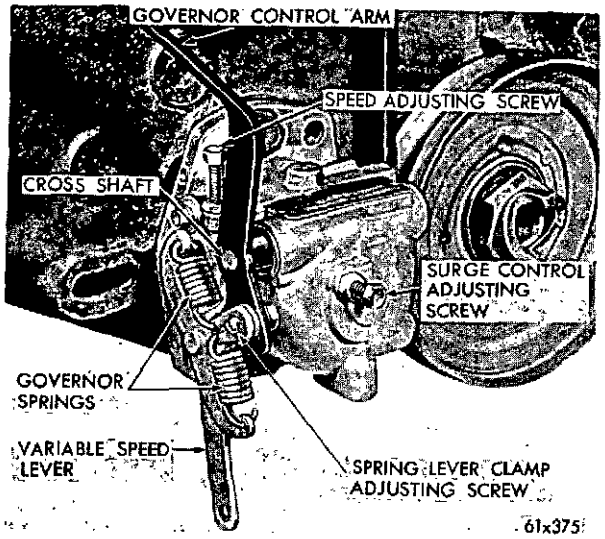


Figure 55 — Governor Adjustments Hoof Type

***in far enough to increase the no-load speed of the engine more than* 25 rpm.**

To correct surge under load, loosen the spring eye-bolt lock nut and turn the eye-bolt to decrease spring tension. Then, tighten the lock nut.

ADJUST TO ELIMINATE SURGE (Hoof). To correct no-load surge, loosen the adjusting screw lock nut and turn the adjusting screw in until the surge disappears, but not far enough to increase no-load engine speed more than a few rpm.

To correct surge under engine load, loosen the spring lever clamp screw and move the spring lever forward until the eye of the lever is clear of the front of the governor lever. Tighten the spring lever clamp screw.

ADJUST GOVERNED SPEED OF ENGINE (Pierce). Move the speed change lever in clockwise direction until an engine speed midway in the desired range is obtained. Load and unload the engine and observe the variation in rpm between no-load and full-load speeds. If variation is excessive, adjust the spring eye-bolt to increase spring tension and move the speed change lever counter-clockwise until the previously selected speed is obtained. Check the results again and repeat the process until the desired regulation is obtained. Next, move the speed change level clockwise until the top load is reached and set the maximum speed adjusting screw to limit lever travel at this point. Then, move the speed change lever counter-clockwise until the lowest speed in the range is reached and set the minimum speed adjusting screw to limit lever travel at this point. Tighten all lock nuts after making the adjustments.

ADJUST VARIABLE SPEED LEVER TRAVEL (Some Hoof Models). Test the engine rpm's at high and low speeds in the desired range and set the adjusting screws to limit travel of the variable speed lever in that range. The maximum speed adjusting screw is located at the right of the lever and the minimum speed adjusting screw is at the left. Both screws are provided with lock nuts to hold the adjustment.

ADJUST CONTROL (Hoof). Sharpness of governor control may be increased by varying the tension of the governor spring. In general, increasing the spring tension sharpens the control. However, for very low speeds, it may be advisable to reduce spring tension. To increase spring tension, loosen the spring lever clamp screw and move the spring lever counter-clockwise. To decrease tension, move the lever clockwise. The position of the lever will be determined by the speed range at which

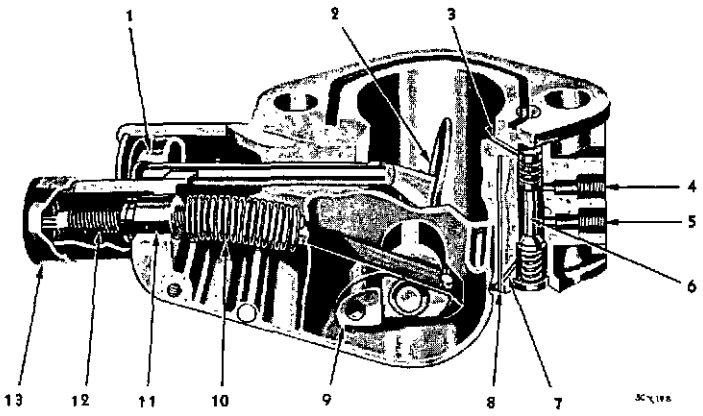


Figure 56 — King Seely (Handy) Governor (Sectional View)

1 — Non-cheating stabilizer piston
2 — Throttle valve
3 — Passage to transfer valve chamber
4 — Carburetor vacuum connection (not used)
5 — Ignition distributor vacuum connection (not used)
6 — Vacuum transfer valve plunger
7 — Vacuum passage
8 — Vacuum by-pass passage
9 — Cam and valve shaft assembly
10 — Control spring and ribbon assembly
11 — Calibrating nut
12 — Adjusting screw
13 — Adjusting screw cap assembly

greatest accuracy is desired. For middle speed ranges, the spring lever should be approximately vertical when the throttle valve is wide open. Tighten the spring lever clamp after adjusting the lever. Check the spring deflection; normal deflection for wide range of speed is ⅜ inch with the throttle wide open and the eye of the spring lever in alignment with the front edge of the operating lever. If spring deflection exceeds ¾ inch when the spring level is vertical, or nearly so, hook the spring in the end hole in the spring clip, or move the spring clip to the next anchor pin hole on the right. (The spring clip is secured to the anchor pin with a cotter pin).

ADJUSTING THE KING SEELEY (HANDY) GOVERNOR (Fig. 56)

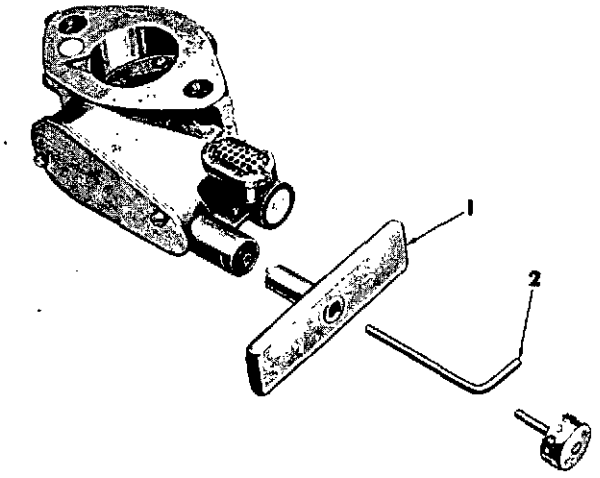
Should the governor become inoperative, or require servicing, or if the correct settings cannot be obtained, the governor should be removed. Replace or take them to the local King-Seeley (Handy) Distributor where facilities are available for proper adjustment.

Leakage of manifold, carburetor, or interconnector gaskets must be corrected before carburetors or governors can be properly set.

It may be apparent after a long period of operation that the governor has become sluggish and is not as responsive as when it was originally installed. Such sluggishness is most generally caused by deposits of carbon and gum on the valve shaft and bearings, stabilizer piston rod or cylinder. The remedy for this condition, is to remove the governor and soak it in a cleaning solvent that will remove the carbon and gum deposits. It is always recommended that a governor that is not functioning properly be soaked in cleaning solvent before any adjustments or repairs are attempted, because in many cases, satisfactory performance can be restored in this manner. Before attempting any adjustment or recalibration of the governor, run the engine until normal operating temperature is reached. Manifold vacuum at sea level, should be at least 16 inches with engine running at full throttle (governor operating), and at least 17 inches at idling speed, with an allowable reduction for altitude.

To adjust governor, refer to Figure 56, and proceed as follows: For a **HIGHER** speed, turn adjusting cap (13) counter-clockwise or to the left; for **LOWER** speeds, turn adjusting cap clockwise or to the right. One turn of the adjusting screw will change the engine speed approximately 300 rpm.

When a more sensitive regulation is desired, or if the governor is too sensitive and inclined to surge at full throttle, correct as follows by means of the calibrating nut (11).



34x165

Figure 57 — Governor Adjusting Wrenches

1 — Hollow Wrench — A24283 2 — Hex Wrench — A25264

SENSITIVITY ADJUSTMENT

If the governor is too sensitive or has a tendency to surge, place the hollow wrench (1) in position on the calibrating nut (11) and insert the special adjusting wrench (2) through the hollow wrench into the adjusting screw and turn the screw clockwise one turn (Figure 57).

With the hollow wrench in the slot of the calibrating nut, turn the nut clockwise about ¼ of a turn. When this adjustment is made the adjusting screw must be held from turning.

Continue this adjustment until the surge is eliminated. However, engines operate most efficiently when the governor is adjusted to the point which just barely eliminates the surge at full throttle.

REACTION ADJUSTMENT

If the governor is slow acting and does not open promptly when a load is applied at the governed speed or cut off promptly at maximum speed, turn the adjusting screw counter-clockwise one turn and while holding the screw in the new position, turn the calibrating nut counter-clockwise ¼ of a turn. Repeat this procedure until the desired regulation is obtained. However, when making this adjustment, it is best to continue until an actual surge is produced, and then, just eliminate the surge.

When the adjustment is completed, tap lightly on the end of the hollow wrench so that the calibrating nut will be properly seated and re-check speed.

The stock numbers of the special wrenches (Figure 57) are as follows:

A-24283 (Item 1 Fig. 57).

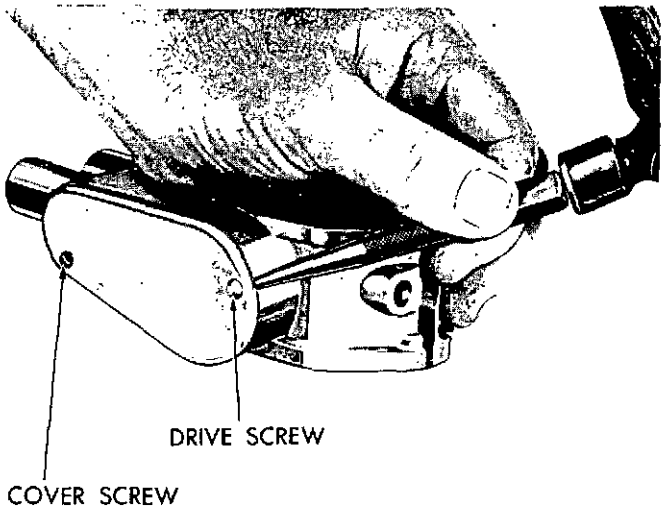
A-25264 (Item 2 Fig. 57).

These wrenches can be obtained from the King-Seeley Corporation, Ann Arbor, Michigan.

CALIBRATION

If the control spring should for any reason be disengaged from the adjusting screw, or the relationship of the adjusting screw and calibrating nut changed by someone not familiar with the governor, it will be necessary to go over the complete calibration for the particular governor to insure efficient control.

Remove seal and adjust screw cap (13). Remove cover screw and



50x204

Figure 58 — Removing Governor Housing Cover

force out the drive screw, as indicated on Figure 58. Do not use a screw driver or similar tool, as it will result in damage to the housing or cover. When the drive screw is out far enough so that side cutting pliers can be applied under the screw head, turn the screw out counter-clockwise.

Position the adjusting screw in the spring until the open coils correspond to the number indicated on the "Calibration Specification" sheets for the particular governor, and it may in some cases be necessary to move the calibrating nut several turns to provide sufficient space between the end of the spring and governor housing to obtain the correct number of open coils.

Referring to Figure 59, the active coils of the control spring end where the spring contacts the thread of the adjusting screw at point "A." Each turn of the adjusting screw adds or subtracts one coil. As an example: To obtain 10¼ coils turn the adjusting screw until there are 10 active coils between zero point and point "A", and then add ¼ coil by turning adjusting screw counter-clockwise ¼ turn.

When the adjusting screw is positioned to provide the correct number of active coils, hold the adjusting screw and turn the calibrating nut in the direction required with the A-24283 wrench until dimension "B" (Fig. 59) indicated on the "Calibration Specification" sheets for the

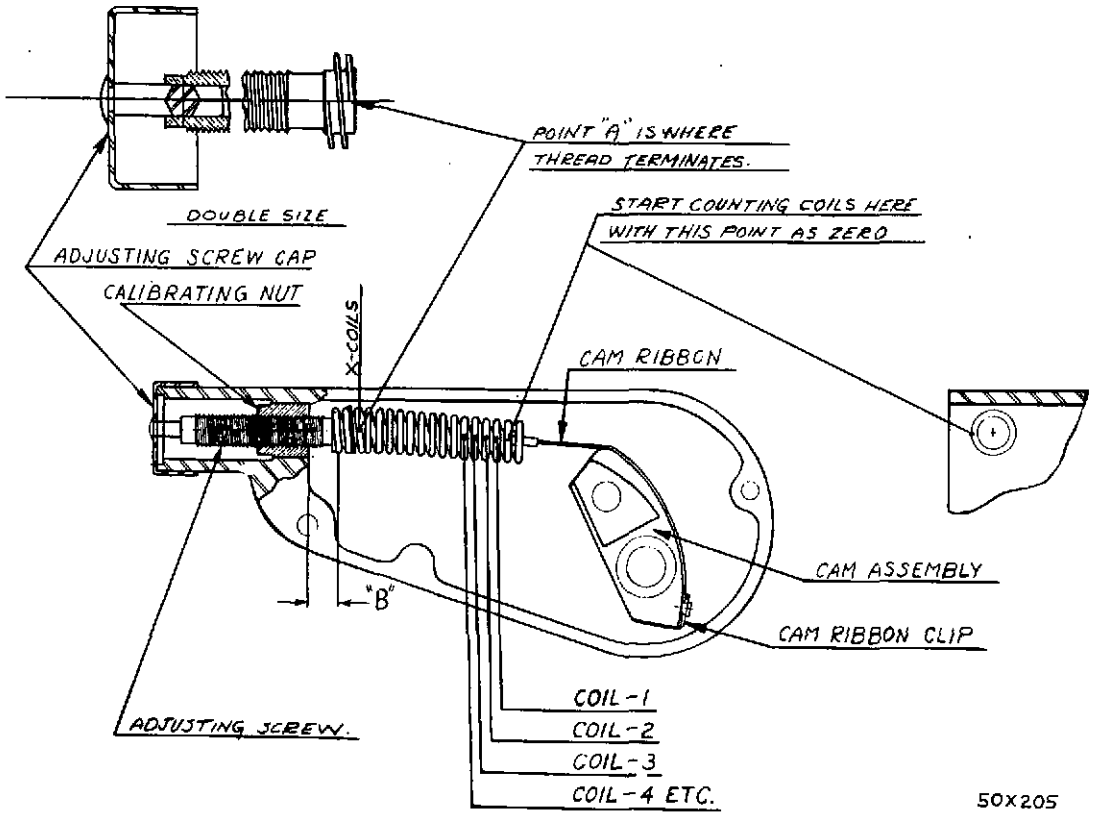


Figure 59 — Control Spring Calibration Detail

particular governor is provided. This measurement is from the center of the last spring coil to the inside of the governor housing, as indicated on Figure 59.

This will usually provide a setting within a few hundred revolutions of the maximum governed engine speed recommended for a particular model. However, further adjustment may be required after the governor is installed on the engine to obtain correct control and governed maximum speed. Perform any changes necessary, according to the instructions outlined under the subject of "Adjustments."

Lead type seals are recommended for the governor adjustment, inasmuch as it is possible to lock the lead type seals with a particular symbol which prevents tampering, as any change in the seal would be readily noticeable. While the patented type seals are easier to use, they offer but little protection, inasmuch as they can be easily purchased, enabling the operator or mechanic to change the adjustment and reseal the governor to avoid detection.

Generally, it is not economical to attempt major governor repairs in the average shop, as mechanics are seldom familiar with this type of work. Moreover, it will usually prove less expensive to replace the governor if necessary, or have it reconditioned in an Authorized Handy Governor Service Station.

STARTER PINION ADJUSTMENT

GENERAL. When the starter solenoid is energized to engage the starter pinion, there should be .078 to .125 inch clearance between the pinion and the pinion stop washer, in order to prevent binding or jamming of the pinion. An accurate measurement of clearance can be made only when the solenoid is holding the pinion in the engaged position. For this reason, do not rely on a measurement made when holding the solenoid plunger in by hand.

PROCEDURE. Remove the starter from the engine. Detach the strap connecting the solenoid to the starting motor terminal. Connect a 6 or 12 volt battery to the frame of the starting motor (ground) and to the starter solenoid battery terminal. Connect a jumper wire from the solenoid relay ground terminal to the starter frame. Connect another jumper wire from the starter switch terminal of the relay to the solenoid battery terminal (this wire energizes the solenoid). Push in on the solenoid plunger link (not on the fork levers) until the plunger bottoms the

energized solenoid will hold the plunger in position. Measure the clearance between the pinion and the pinion stop ring, with the plunger seated and the starter pinion pushed toward the commutator end to take up all end play. If the clearance is not within the specified limits (.078 to .125 inch), remove the cotter pin and link pin that attaches the pinion yoke to the solenoid plunger and turn the plunger stud in or out the required distance to provide proper clearance.

FAN AND GENERATOR BELT ADJUSTMENT (Figure 60). To adjust the fan belt, loosen the generator pivot bracket bolts and the adjustment locking bolt. Pull the generator out until there is ¼ inch deflection in the belt midway between the fan pulley and the generator pulley. Hold the generator in this position and tighten locking bolt and pivot bolts.

POWER TAKE-OFF, WITH HEAVY DUTY CLUTCH

GENERAL. The clutch must be properly adjusted to prevent slippage, which causes rapid wear of the clutch facings and distortion of the plates. Frequency of adjustment is determined by the amount and nature of the load. Heavy or shock loads necessitate frequent clutch adjustment to compensate for wear.

ALIGNMENT OF CLUTCH HOUSING (IF SO EQUIPPED). Replacement of clutch housing or reinstalling the original clutch housing (if removed for any reason), must be correctly aligned when installed. Out-of-round

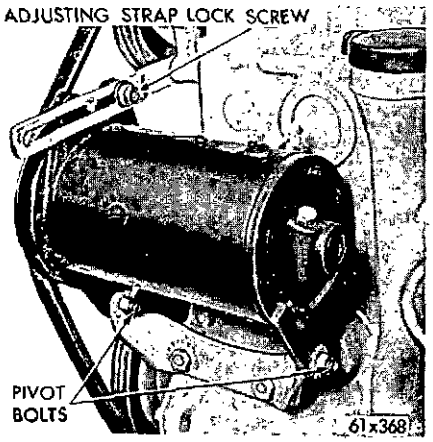


Figure 60 — Generator Belt Adjustment

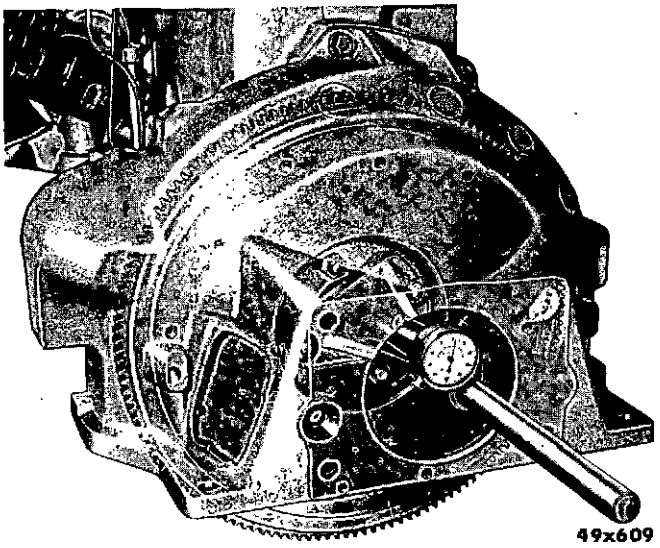


Figure 61 — Method of Attaching Fixture C-870 (Flywheel Type Housing Illustrated)

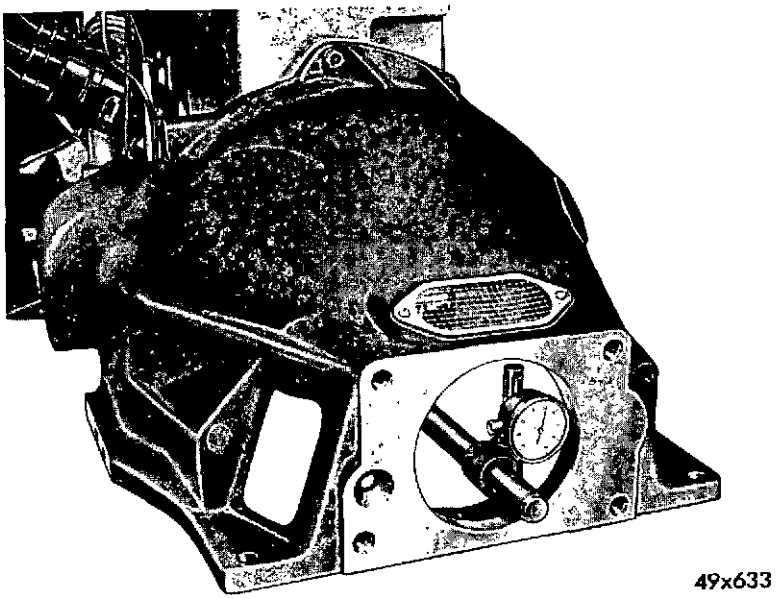


Figure 62 — Checking Clutch Housing Bore (Fluid Coupling Type Housing Illustrated)

of the bore must not exceed .005 inch total indicator reading. To correctly align clutch housing with or without fluid drive, proceed as follows:

1. Inspect the housing face where it contacts the rear of the engine block for particles of dirt and burrs; remove burrs with a file, then clean both surfaces.

2. Start the two dowel pins in the block from the front end so they protrude beyond the machined face of the engine block and install the clutch housing. Install clutch housing to block cap screws, making them just snug enough so that the housing can be shifted if necessary by tapping with a mallet.

3. Install the fixture C-870 to the flywheel attaching bolts (Figure 61) or, if fluid drive unit is to be installed, attach the fixture to the crankshaft flange bolts and install the indicator Tool (C-435 or C-430), as shown in Figure 62. Rotate the crankshaft and check the inside diameter of the housing bore; it should not vary more than .005 inch to one complete revolution of the crankshaft. If alignment is necessary, remove the dowel pins and tap the housing until it comes within the

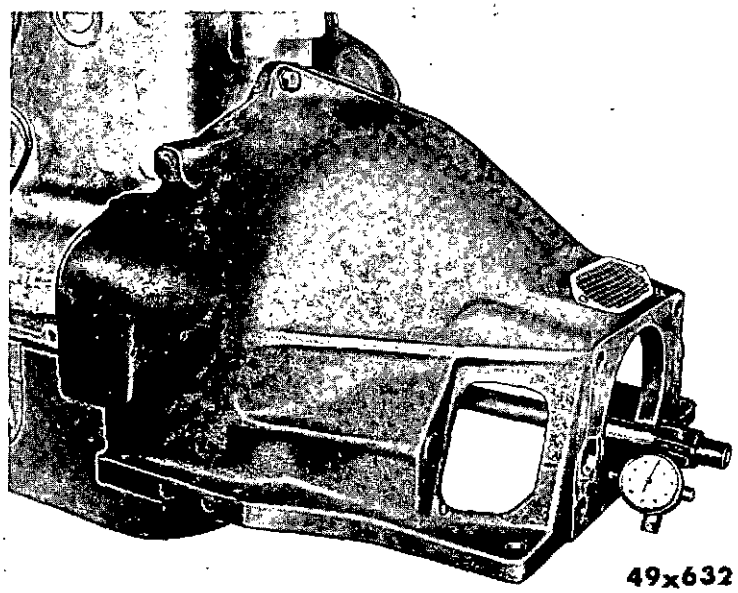


Figure 63 — Checking Rear Face Housing

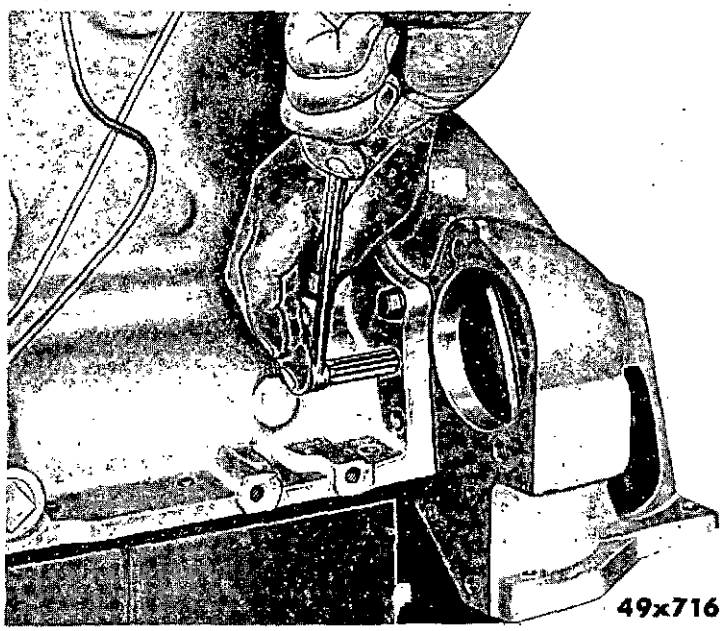


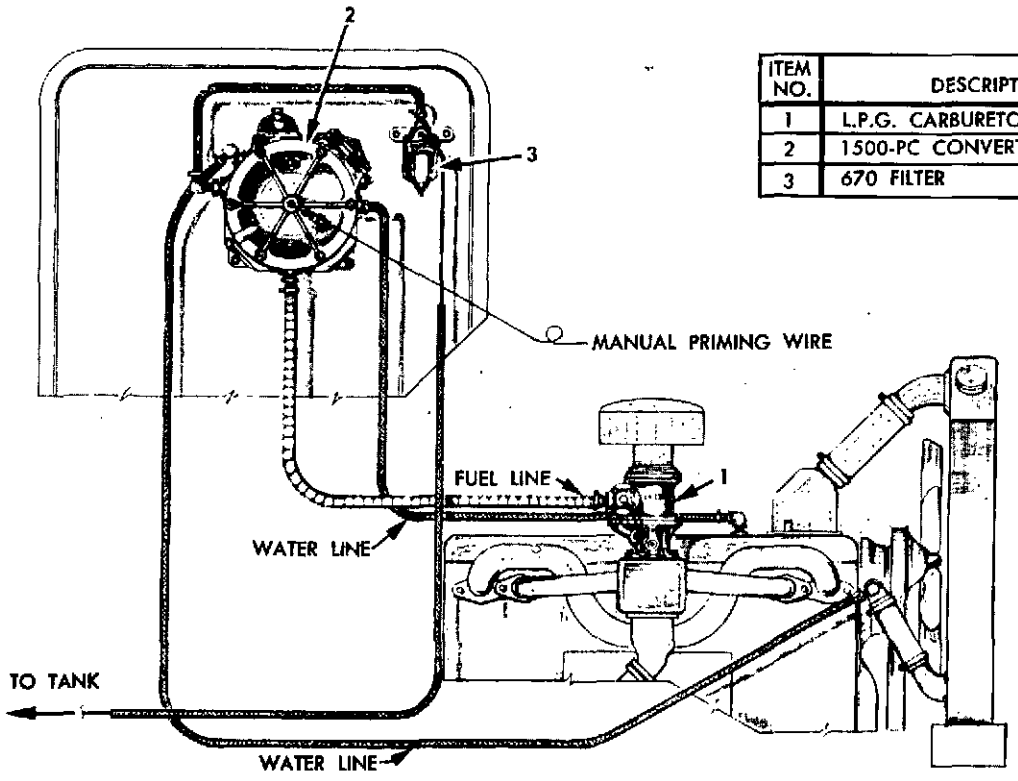
Figure 64 — Reaming Dowel Pin Holes

specified tolerance. After obtaining correct alignment, tighten the housing cap screws 30 to 35 foot-pounds torque.

4. Change the position of the dial indicator and check the rear face of the housing, as shown in Figure 63. This tolerance must be within .002 inch. Assuming that all burrs and dirt has been removed as described in step 1, this tolerance will no doubt be within the specified limits.

If alignment of the housing was necessary as described in step 3, the dowel pin holes will have to be reamed. Ream with Tool C-860 as shown in Figure 64 and install .512 inch oversize dowel pins. Continue to assemble the clutch assembly. **Failure to align clutch housing may result in hard shifting of transmission and the possibility of gear disengagement.**

ROCKFORD. A hand-hole of ample size is provided to permit convenient adjustment of the clutch. Instructions for adjustments and lubrication are shown on the hand-hole cover plate.



ITEM NO.	DESCRIPTION
1	L.P.G. CARBURETOR "ALGAS"
2	1500-PC CONVERTER
3	670 FILTER

Figure 65 — The Liquid Propane Gas System

LIQUID PROPANE GAS

LIQUID PROPANE GAS OPERATION (All Models) (OPTIONAL EQUIPMENT)

Liquid Propane Gas is a high quality petroleum product which can be stored in liquid form under pressure, but will boil or become vapor at normal atmospheric temperatures. Although Liquid Propane gas is a liquid in the tank it can readily be converted to a vapor when entering the carburetor. The Liquid Propane gas system (Figure 65), is composed of three main units, carburetor, converter and filter.

a. **The carburetor** is of venturi principle and so designed to mix Liquid Propane gas vapor fuel and air in the correct proportions for best engine operating efficiency at all engine speeds.

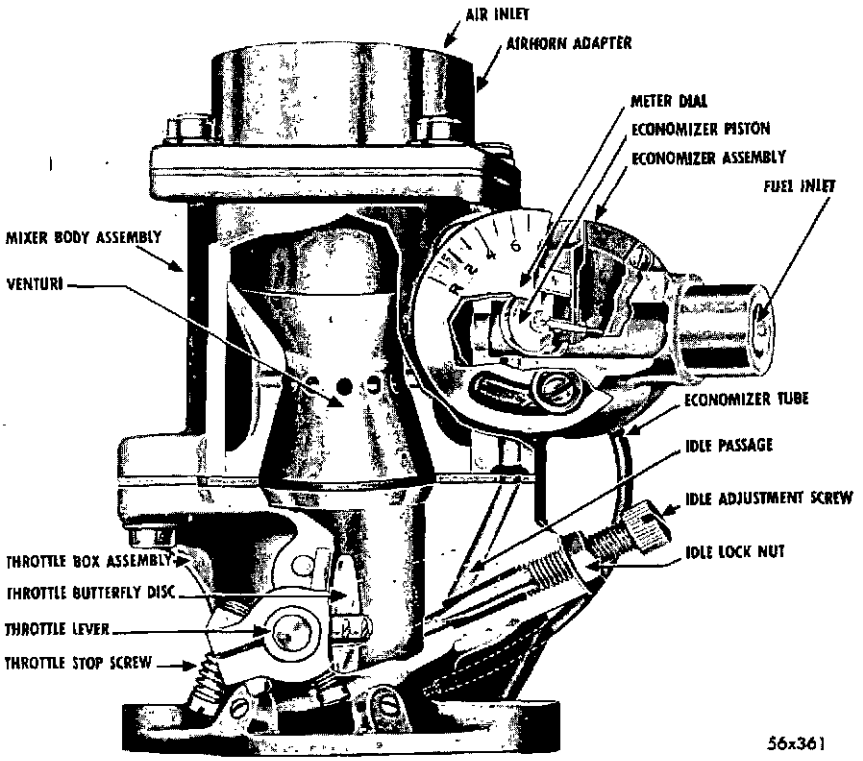


Figure 66 — The Liquid Propane Gas Carburetor

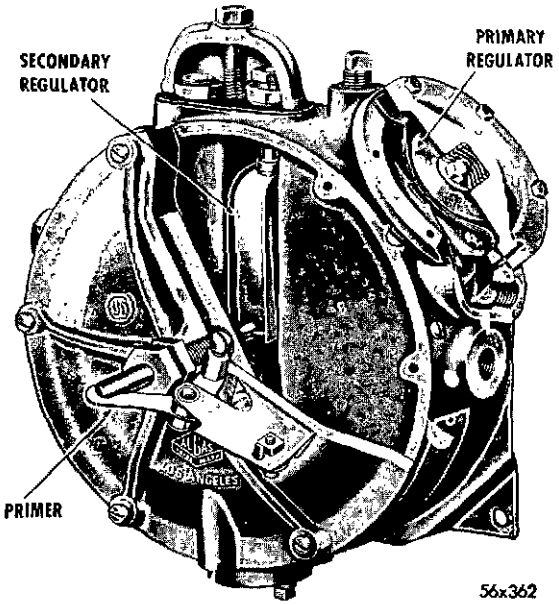


Figure 67 — The Liquid Propane Gas Converter

b. **The converter** is a combination heat exchanger and pressure reducing unit. The converter receives the liquid fuel under tank pressure, converts it to vapor form, reduces pressure to slightly below atmospheric, and regulates the flow of vapor in volume to meet the engine's demand.

c. **The filter's** function is to catch foreign particles of dirt that may be in the tank and fuel line.

d. **To start engine,** open throttle **all the way.** Depress plunger on the propane vaporizer for a short period of time and close the throttle to one-fourth open position. Depress magnetic safety switch and start the engine. Continue to depress safety switch button until oil pressure reaches 40 pounds. When weather is extremely cold, it may be necessary to "choke" the engine occasionally by depressing button on the vaporizer. Warm up the engine at approximately 1400 rpm before putting on the load.

OPERATING AND SERVICE INSTRUCTIONS

When removing or servicing converter or filter, be sure to shut off fuel at the tank and run the engine until all the fuel is out of the lines.

CARBURETOR

The Liquid Propane gas carburetor (Figure 66) replaces and serves the same function as the gasoline carburetor in that it mixes the fuel and air in proper ratio for economical operation under all load conditions. The idle, or no load, adjustment consists of a needle valve at the base of the throttle box, the setting being held by a locknut, as shown in Figure 66. The power adjustment is made by rotating the meter tube dial and is firmly set by a lockscrew. This provides the fuel setting for maximum power and rpm. The economizer varies the fuel input in proportion to engine requirements during part throttle or irregular operation at the engine, such as during cruising or deceleration periods. Adjustment is made by the economizer screw on the opposite side of the meter tube dial.

CONVERTER (Figure 67)

The converter is composed of three parts, as follows:

a. The heat exchanger portion is connected to the cooling system of the engine. The converter furnishes the heat for vaporizing the fuel in the transformation from liquid to vapor.

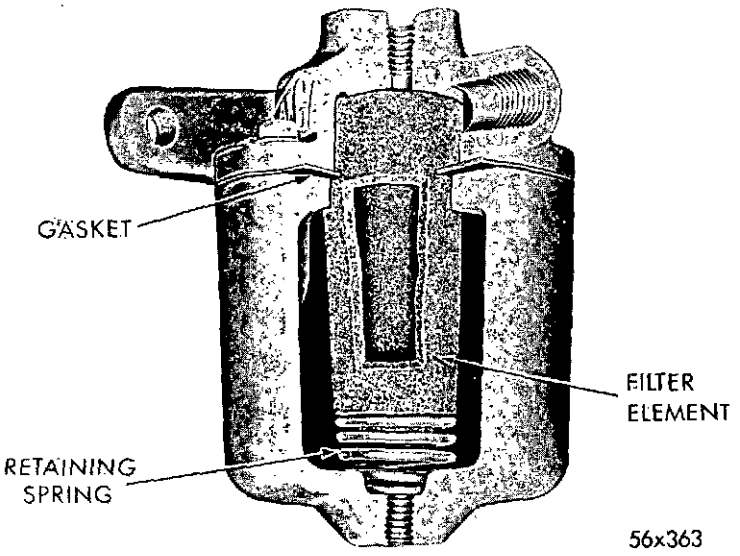


Figure 68 — The Liquid Propane Gas Filter

b. The primary regulator reduces the liquid fuel from existing tank pressure to a lower controllable pressure approximately 5½ to 7 pounds.

c. The secondary regulator is a lockoff device as well as a fuel regulation unit and controls the flow of fuel to the carburetor. It operates by engine suction when the engine is running, and locks off the fuel flow when the engine is stopped. The converter is equipped with a priming device for starting. The primer when depressed causes the secondary regulator to leak thus filling the carburetor lines and manifold with fuel sufficient to start the engine, and suction takes over and operates the secondary regulator to continue the flow of fuel. Both primary and secondary regulators are controlled by spring pressure and do not require adjustment.

FILTER (Figure 68)

Remove the drain plug from bottom of the Filter and drain any particles trapped in filter bowl. By removing the six screws in the cover, the bowl and filtering element may be removed for cleaning or replacing.

ADJUSTING PROCEDURES

The following adjustments are essential to obtain the best performance of the engine operating system. Run engine to reach operating temperature before adjusting. In making adjustments, it is best to use a Tachometer and Fuel Analyzer.

APPROXIMATE IDLE

Screw idler adjustment (Figure 66) in (for lean) or out (for rich) until a good smooth idle is obtained. This may be checked by means of manifold vacuum; the best idle is at the highest vacuum.

POWER ADJUSTMENT

Screw economizer adjustment all the way in. Set engine at 1400 rpm with throttle stop screw. After engine has stabilized at this speed, set power adjustment to read 12.5 on fuel analyzer. Tighten screw on meter tube after adjustment. If fuel analyzer is not available proceed as follows: Set engine at 1400 rpm with throttle stop screw.

After engine has stabilized at this speed, rotate meter tube dial to the lean side until engine rpm starts to fall off, mark this point. Rotate the dial to the rich side until engine rpm again falls off and mark this point. Go halfway between marks and set 2 to 3 serations to the rich side.

ECONOMIZER ADJUSTMENT

With engine running at 1400 rpm after making power adjustment, turn out economizer screw gradually until engine has reached peak rpm at this throttle setting and begins to lose speed. Turn screw back in until peak rpm is reached, and tighten locknut. Fuel analyzer will read between 13.8 and 14.4 with this adjustment.

FINAL IDLE ADJUSTMENT

With main jet and economizer set as above, adjust idle screw for smoothest idle. The throttle stop screw is set for desired idle rpm. Making this final adjustment will not affect the correct power or economizer settings.

PRIMER ADJUSTMENT

Run engine at 700 rpm. Loosen locknut and turn primer out (counter-clockwise) a couple of turns. Press primer button and turn primer in (clockwise) until mixture richens to drop engine 350 to 400 rpms.

CAUTION

Under no circumstances should power settings be made too lean as this will result in poor economy and possible engine damage.

Most analyzers may reverse their reading if they have been subjected to an overly lean or rich condition. If satisfactory reading cannot be attained, check analyzer.

ACCESSORY DRIVE GEAR

REMOVAL OF ACCESSORY DRIVE GEAR CASE COVER

Remove fan and governor (if so equipped), remove crank jaw screws from crankshaft pulley. Install puller (Tool C-3033) (Figure 69) on crankshaft pulley and remove pulley from crankshaft.

Remove hydraulic pump, disconnect oil lines, remove attaching bolts, and remove pump and drive gear assembly from gear case cover.

Disconnect governor linkage. Remove bolts from gear case cover and tap cover from dowel pin with a soft hammer. Remove hydraulic pump adapter from rear side of gear case cover plate.

REMOVING AND INSTALLING THE ACCESSORY DRIVE GEAR CASE COVER OIL SEAL

The accessory drive case cover oil seal prevents leakage of oil at the front of the engine. The seal is a press fit in the gear case cover. A composition gasket is used between the oil seal and the gear case cover to prevent oil leakage around the outer edge of the seal.

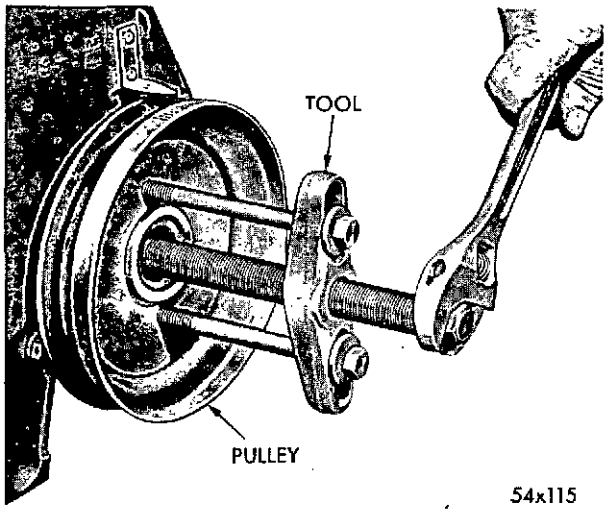


Figure 69 — Removing Crankshaft Pulley with Tool C-3033

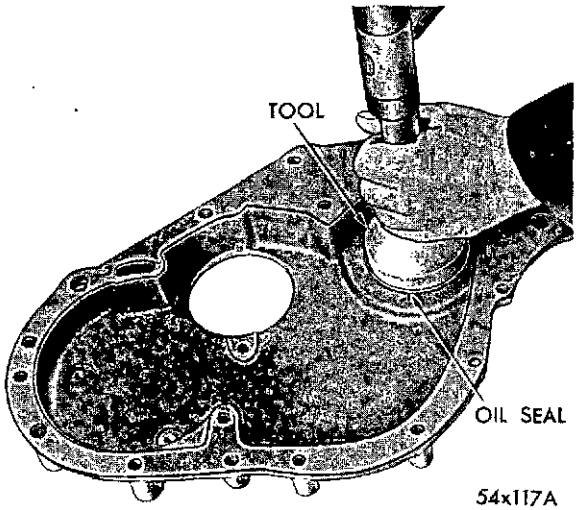


Figure 70 — Removing the Accessory Drive Gear Case Cover Oil Seal with Tool C-3050

To remove and install new oil seal proceed as follows:

Remove the snap ring from the cover seat. Drive out the oil seal from the rear of the gear case cover using Tool C-3050, as shown in Figure 71.

Place a new composition gasket in the gear case cover. Start the oil seal into the gear case cover with the projecting flange facing the inside of the cover.

Drive the oil seal into the cover with an arbor press, or use Tool C-3051. Hold the oil seal down with the press or Tool C-3051 and install a cone shaped snap ring into the cover seat.

INSTALLATION OF THE ACCESSORY DRIVE GEAR CASE COVER

Install a new gasket that has been coated with MoPar gasket seal. Be sure the mating surfaces of the gear case cover and the cylinder block are clean and free from burrs.

Rotate the crankshaft until line stamped on the camshaft gear matches the crankshaft gear timing marks. For hydraulic pump jobs, the crankshaft gear timing mark should be mated with the similar timing mark on the camshaft gear (See Fig. 71).

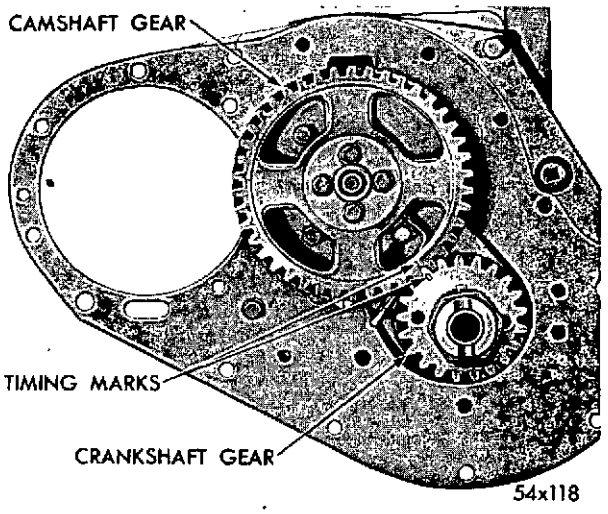


Figure 71 — Mating Timing Marks on Camshaft and Crankshaft Gears

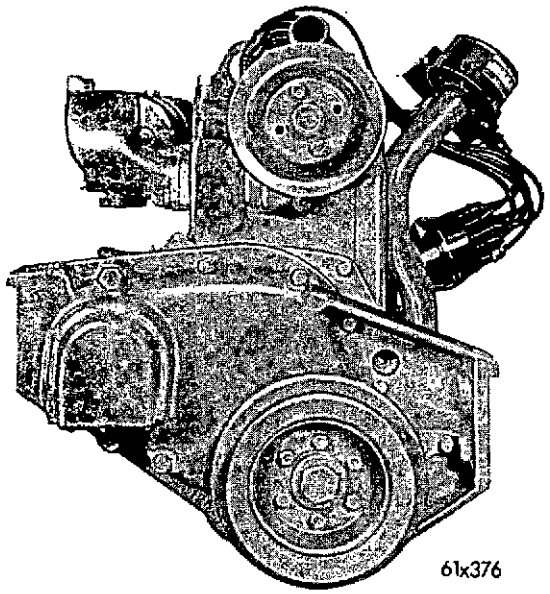


Figure 72 — Special Accessory Drive Gear Front End Case Cover Installed

Place the gear case cover in position and tap the cover on to the dowel pin.

Install copperseal washers on bolts and tighten with a torque wrench, the small screws from 15 to 20 foot-pounds, and the large screws from 30 to 35 foot-pounds torque.

NOTE

Be sure to install new copper washers under the "closed-end" nuts which are used to seal the two retainer cap screws that protrude through the gear case cover. The third screw which does not protrude, is sealed by the governor flange gasket (or governor opening cover plate and gasket where a gear driven governor is not used).

Install governor linkage. Install hydraulic pump, (engine so equipped) reconnect oil lines, and attach the bolts.

Install the crankshaft pulley using Tool C-3033. Attach the crank jaw. Install the fan blades and governor (if so equipped). Figure 72 shows the special accessory gear drive front end installed.

Preparation for Storage

When the engine is to be stored or removed from operation for an extended period of time, the following precautions should be taken to prevent rust accumulation, corrosion of bearing and mating surfaces within the engine, and gum formation in the fuel system:

1. Drain the lubricating oil from the engine and add 2½ quarts of Rust Preventive Oil which may be obtained from a reliable oil company.

2. Drain the cooling system, add **MOPAR RUST RESISTOR** and fill with clean water.

3. Run the engine at idle speed for three or four minutes (avoid overheating) to:

(a) Circulate the Rust Resistor to form a protective film in the water jackets and in the radiator or heat exchanger.

(b) Distribute the Rust Preventive Oil throughout the internal parts of the engine.

4. Remove the top of the carburetor air cleaner and with the engine running at approximately 1000 rpm, pour ½ pint of Rust Preventive Oil through the carburetor air intake. Turn off the ignition as soon as the ½ pint of oil has been drawn into the combustion chamber.

NOTE: If the engine will not run under its own power, turn it over several times with the starting motor to distribute the oil.

5. Drain the Rust Preventive Oil from the crankcase.

6. Remove the spark plugs and pour one ounce of rust preventive oil into each spark plug opening. Turn the engine over four or five revolutions with the starting motor and install the plugs.

7. Drain the cooling system.

8. Drain the fuel system tank, fuel pump and filter and carburetor. Operate the carburetor throttle lever several times to empty the accelerator pump system.

9. Remove the carburetor air cleaner, the oil filler pipe air cleaner and the outlet ventilator pipe air cleaner. Seal the openings with mask-

ing or adhesive tape. Also, seal the exhaust outlet opening in the exhaust manifold or exhaust pipe.

10. Replace the element in the oil filter after cleaning the filter housing.

11. Remove the storage battery and store in a cool, dry place. Replenish the water in the battery cells to cover the plates 3/8 inch. See that the battery is fully charged and keep it fully charged during the idle period.

12. Protect the engine with a waterproof cover if it is exposed to the weather.

13. Make periodic inspections to see that the engine is properly stored and that all seals are intact.

Ordering of Parts

The exploded views shown in this book are intended to enable the operator to better understand the general construction of Chrysler Industrial Engines, and to assist in ordering parts.

The views are helpful in determining the sequence of assembly and function of the various parts; therefore, they will be of considerable assistance when making adjustments or repairs.

Important

Orders for parts should be placed with the nearest Authorized Dealer. Authorized Dealers are in possession of complete parts information and can, in most instances, promptly supply your parts requirements from their inventory. If you do not know the location of your nearest Chrysler Industrial Engine Dealer, a card addressed to the Industrial Engine Division, Chrysler Corporation, 12200 E. Jefferson, Detroit 15, Michigan, will bring you his name and address promptly.

Most important in ordering parts is the proper identification of the engine. *Always* mention the Model, Type and Serial Number. (Sample: Model Ind. 30, Type 140, Serial Number 39540.) This information is stamped on the identification plate (located on the manifold side of engine) and should be mentioned in all parts orders or communications. The number stamped on the front end of the cylinder block just back of the water pump is a manufacturing code and should *not* be used for the purpose of identification.

SPECIFICATIONS

Make	CHRYSLER INDUSTRIAL ENGINES
Type Engine	4 Cycle, Gasoline
No. of Cylinders	6 In-Line
Models	IND. 30, 31, 32, 33 and 908A, 931

Bore:

IND. 30	3¼ in.
IND. 31	3¼ in.
IND. 931	3¼ in.
IND. 908A	3 7/16 in.
IND. 32	3 7/16 in.
IND. 33	3 7/16 in.

Stroke:

IND. 30	4⅝ in.
IND. 31	4⅝ in.
IND. 931	4⅝ in.
IND. 908A	4½ in.
IND. 32	4¾ in.
IND. 33	4¾ in.

Piston Displacement:

IND. 30	230.2 cu. in.
IND. 31	230.2 cu. in.
IND. 931	230.2 cu. in.
IND. 908A	251 cu. in.
IND. 32	265.0 cu. in.
IND. 33	265.0 cu. in.

Compression Ratio:

IND. 30	7.0 to 1
IND. 31	7.0 to 1
IND. 931	7.0 to 1
IND. 908A	6.6 to 1
IND. 32	6.8 to 1
IND. 33	6.8 to 1

Compression Pressure at 125 R.P.M. ..... 110 to 140 lbs.

H. P. Rating:

IND. 30	95 at 3400 R.P.M.
IND. 31	95 at 3400 R.P.M.
IND. 931	95 at 3400 R.P.M.
IND. 908A	116 at 3600 R.P.M.
IND. 32	116 at 3600 R.P.M.
IND. 33	116 at 3600 R.P.M.

Firing Order (All Models) 1-5-3-6-2-4

Oil Pressure at 2000 R.P.M. ..... 45 to 55 lbs.

Cooling System Capacity ..... (Chrysler Power Units) approximately 6 gals.

Oil Crankcase Capacity ..... 5 qts.

(When oil filter element is replaced, add 1 additional qt.)

Warranty

Industrial Products Division warrants its new products to be free from defects in material and workmanship under normal use and service during the periods specified below for the type of products indicated:

INDUSTRIAL ENGINES — for ninety (90) days after delivery to the first user thereof or for fifteen (15) months after delivery to the original purchaser, whichever occurs first;

ENGINE ACCESSORIES (such as ignition system, starting devices, batteries, alternators, carburetors or other trade accessories) in finished form and installed on an Industrial Engine and purchased new from other manufacturers for that purpose — for the greater of either (1) fifteen (15) months after delivery to the original purchaser or ninety (90) days after delivery to the first user thereof, which occurs first, (2) the period specified by such other manufacturer.

ALL OTHER NEW PRODUCTS (not otherwise covered hereby) — for ninety (90) days after delivery to the original purchaser.

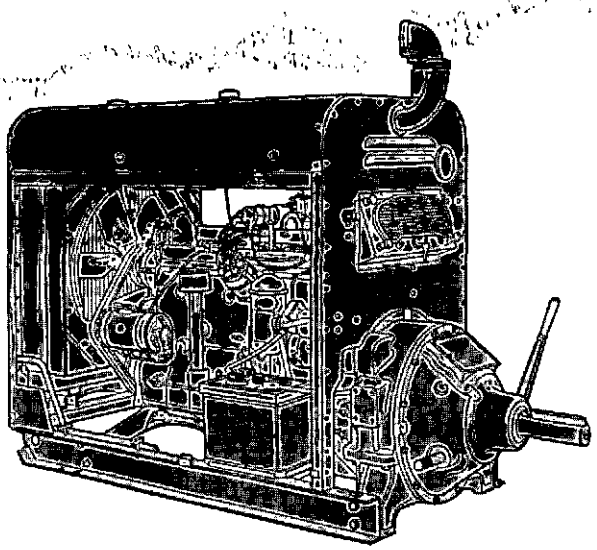
During the warranty periods specified above, Industrial Products Division will make good at its factory any part or parts of such products returned to it, (with transportation charges prepaid) which its examination shall disclose to its satisfaction to have been thus defective; provided it receives written notice of any such claimed defect within thirty (30) days from the date of discovery.

This warranty will not apply to any Industrial Engine which shall have been installed in a passenger vehicle, Industrial Products Division engine or product which has been subject to misuse, negligence or accident, or which shall have been equipped or repaired with any parts not supplied or approved by Industrial Products Division, or which shall have been altered or repaired outside of one of its authorized service stations in any way so as, in the judgment of Industrial Products Division, to affect the stability or reliability of such engine or product.

In the absence of any contrary written agreement signed by an authorized agent of the Industrial Products Division, this express warranty is the only warranty applicable to the Industrial Products Division products and parts described herein and is expressly in lieu of any warranties otherwise implied by law (including, but not limited to, implied warranties of merchantability or fitness for any particular purpose). The remedies available under this express warranty shall be the only remedies available to the purchaser with respect to defects in material or workmanship or otherwise. Industrial Products Division neither assumes, nor authorizes anyone to assume for it, any liability in connection with the sale of its products.

INDUSTRIAL PRODUCTS DIVISION

CHRYSLER CORPORATION



CHRYSLER CORPORATION

INDUSTRIAL PRODUCTS DIVISION

MARYSVILLE, MICHIGAN