

engine lubricating oil through the governor breather tube, crankcase ventilator, or dipstick hole in the cylinder block is indicative of excessive crankcase pressure.

The causes of high crankcase pressure may be traced to excessive blow-by due to worn piston rings, a hole or crack in a piston crown, loose piston pin retainers, worn blower seals, defective blower, cylinder head or end plate gaskets, or excessive exhaust back pressure. Also, the breather tube or crankcase ventilator should be checked for obstructions.

The crankcase pressure may be checked with a manometer connected to the oil level dipstick opening in the cylinder block. Check the readings obtained at various engine speeds with the specifications in Table 4.

Exhaust Back Pressure

A slight pressure in the exhaust system is normal. However, excessive exhaust back pressure seriously affects engine operation. It may cause an increase in the air box pressure with a resultant loss in the efficiency of the blower. This means less air for scavenging, which results in poor combustion and higher temperatures.

Causes of high exhaust back pressure are usually a

CRANKCASE PRESSURE
(Max. In Inches Of Water)

Engine	Speed (rpm)					
	1200	1500	1800	2000	2100	2300
3-71(2V)	1.2	—	1.8	—	2.1	2.1
4-71(2V)	1.8	—	2.5	—	2.8	2.8
6-71(2V)	2.0	—	2.8	—	3.1	3.1
4-71E(2V)	1.8	—	2.5	2.7	—	—
6-71E(2V)	2.0	—	2.8	3.0	—	—
4-71E(4V)	1.8	—	2.5	—	2.8	—
6-71E(4V)	2.0	—	2.8	—	3.1	—
4-71N	1.8	—	2.5	—	2.8	—
6-71N	2.0	—	2.8	—	3.1	—
4-71M	—	—	2.5	—	2.8	2.8
6-71M	—	—	2.8	—	3.1	3.1
† 4-71T	—	0.5	1.0	—	—	—
†† 6-71T	—	0.7	1.3	1.8	2.0	—
†† 6-71T1	—	—	1.3	1.8	2.0	2.4

† TH08A Turbocharger

†† T18A40 Turbocharger

TABLE 4

EXHAUST BACK PRESSURE—NO LOAD
(Max. In Inches Of Mercury)

Engine	Speed (rpm)					
	1200	1500	1800	2000	2100	2300
71(2V)	1.2	—	2.8	—	† 3.5	4.0
71E(2V)	1.2	—	2.8	3.5	—	—
71E(4V)	1.0	—	2.1	—	†† 2.6	—
71N	1.0	—	2.1	—	2.6	—
71M	—	—	2.8	—	4.0	4.0
@ 4-71T	—	1.0	1.4	—	—	—
# 6-71T	—	1.0	1.4	1.8	1.8	—
# 6-71T1	—	—	1.4	1.8	1.8	1.8

† Marine engines only: 4.0 inches of Mercury at 2100 rpm.

†† Marine engines only: 3.0 inches of Mercury at 2100 rpm.

@ TH08A Turbocharger # T18A40 Turbocharger

TABLE 5

result of an inadequate or improper type of muffler, an exhaust pipe which is too long or too small in diameter, an excessive number of sharp bends in the exhaust system, or obstructions such as excessive carbon formation or foreign matter in the exhaust system.

The exhaust back pressure, measured in inches of mercury, may be checked with a manometer or pressure gage connected to the exhaust manifold. Remove the 1/8" pipe plug, which is provided for that purpose, from the manifold. If there is no opening provided, drill an 11/32" hole in the exhaust manifold companion flange and tap the hole for a 1/8" pipe thread.

Check the readings obtained at various speeds (no load) with the specifications in Table 5.

Air Inlet Restriction

Excessive restriction of the air inlet will affect the flow of air to the cylinders and result in poor combustion and lack of power. Consequently, the restriction must be kept as low as possible considering the size and capacity of the air cleaner. An obstruction in the air inlet system or dirty or damaged air cleaners will result in a high blower inlet restriction.

The air inlet restriction may be checked with a water manometer connected to a fitting in the air inlet ducting located 2" above the air inlet housing. When practicability prevents the insertion of a fitting at this point, the manometer may be connected to the engine air inlet housing. The restriction at this point should be checked at a specific engine speed. Then, the air cleaner and ducting should be removed from the air

AIR INTAKE RESTRICTIONS (in inches of water)						
Max. with Dirty Air Cleaner (Oil Bath or Dry)						
Engine	Speed (rpm)					
	1200	1500	1800	2000	2100	2300
71E(4V), 71N	12.4	—	25.0	—	25.0	—
71, 71E(2V)	12.4	—	25.0	25.0	25.0	25.0
71M	—	—	25.0	—	25.0	25.0
†71T, 71T1	—	6.2	8.7	10.8	12.0	12.0
Max. with Clean Air Cleaner (Oil Bath or Dry Type with Precleaner Section)						
71E(4V), 71N	8.7	—	13.4	—	15.9	—
71, 71E(2V)	8.7	—	13.4	15.0	15.9	17.5
71M	—	—	13.4	—	15.9	17.5
Max. with Clean Air Cleaner (Dry Type Less Precleaner)						
71E(4V), 71N	5.2	—	9.1	—	11.5	—
71, 71E(2V)	5.2	—	9.1	10.5	11.5	12.5
71M	—	—	9.1	—	11.5	12.5
†71T, 71T1	—	3.5	5.2	6.6	7.3	7.3

†THO8A or T18A40 Turbocharger

TABLE 6

inlet housing and the engine again operated at the same speed while noting the manometer reading.

The difference between the two readings, with and without the air cleaner and ducting, is the actual restriction caused by the air cleaner and ducting.

Check the normal air intake vacuum at various speeds (at no load) and compare the results with Table 6.

Air Box Pressure

Proper air box pressure is required to maintain sufficient air for combustion and scavenging of the burned gases. Low air box pressure is caused by a high air inlet restriction, damaged blower rotors, an air leak from the air box (such as leaking end plate gaskets), or a clogged blower air inlet screen. Lack of power or black or grey exhaust smoke are indications of low air box pressure.

various speeds with the specifications in Table 7.

AIR BOX PRESSURE (in inches of Mercury)						
Min. with Max. Exhaust Back Pressure (Full Load)						
Engine	Speed (rpm)					
	1200	1500	1800	2000	2100	2300
3,4-71(2V)	4.8	—	10.6	—	14.1	16.4
6-71(2V)	5.2	—	11.4	—	15.1	17.4
71E(2V)	3.5	—	8.4	10.6	—	—
71E(4V)	3.2	—	7.6	—	10.1	—
71N	3.2	—	7.6	—	10.1	—
4-71M	—	—	7.2	—	10.2	11.6
6-71M	—	—	8.0	—	11.2	12.8
4-71T(THO8A):						
N80 Injectors	—	12.0	18.0	—	—	—
N90 Injectors	—	14.0	20.0	—	—	—
6-71T(T18A40):						
N65 or C65 Injectors	—	13.0	19.5	24.0	26.5	—
N70 Injectors	—	14.0	20.5	25.0	27.5	—
N75 Injectors	—	15.0	21.5	26.0	28.5	—
N80 Injectors (Gen. Set)	—	16.5	23.0	—	—	—
N90 Injectors (Gen. Set)	—	22.0	29.5	—	—	—
6-71T1(T18A40):						
N90 Injectors	—	—	19.5	24.0	27.0	32.5
Min. with Zero Exhaust Back Pressure						
3,4-71(2V)	3.3	—	7.3	—	10.0	12.0
6-71(2V)	3.7	—	8.1	—	11.0	13.0
71E(2V)	2.0	—	5.1	6.5	—	—
71E(4V)	1.7	—	4.3	—	6.0	—
71N	1.7	—	4.3	—	6.0	—
4-71M	—	—	4.0	—	5.8	7.2
6-71M	—	—	4.8	—	6.8	8.4
4-71T(THO8A):						
N80 Injector	—	13.5	20.0	—	—	—
N90 Injector	—	15.5	22.0	—	—	—
6-71T(T18A40):						
N65 or C65 Injectors	—	14.5	21.5	26.5	29.0	—
N70 Injectors	—	15.5	22.5	27.5	30.0	—
N75 Injectors	—	16.5	23.5	28.5	31.0	—
N80 Injectors (Gen. Set)	—	18.0	25.0	—	—	—
N90 Injectors (Gen. Set)	—	23.5	31.5	—	—	—
6-71T1(T18A40):						
N90 Injectors	—	—	21.0	26.0	29.0	35.0

TABLE 7

PROPER USE OF MANOMETER

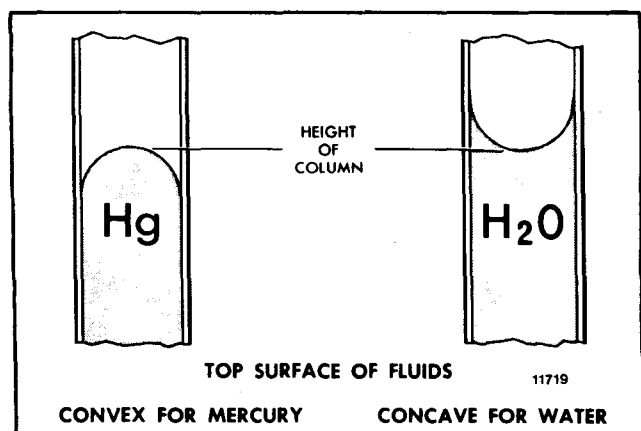


Fig. 5 - Comparison of Column Height for Mercury and Water Manometers

The U-tube manometer is a primary measuring device indicating pressure or vacuum by the difference in the height of two columns of fluid.

Connect the manometer to the source of pressure, vacuum, or differential pressure. When the pressure is imposed, add the number of inches one column of fluid travels up to the amount the other column travels down to obtain the pressure (or vacuum) reading.

ENGINE ELECTRICAL GENERATING SYSTEM

Whenever trouble is indicated in the engine electrical generating system, the following quick checks can be made to assist in localizing the cause.

A fully charged battery and low charging rate indicates normal alternator-regulator operation.

A low battery and high charging rate indicates normal alternator-regulator operation.

A fully charged battery and high charging rate

PRESSURE CONVERSION CHART		
1" water	=	.0735" mercury
1" water	=	.0361 psi
1" mercury	=	.4919 psi
1" mercury	=	13.6000" water
1 psi	=	27.7000" water
1 psi	=	2.0360" mercury

TABLE 8

The height of a column of mercury is read differently than that of a column of water. Mercury does not wet the inside surface; therefore, the top of the column has a convex meniscus (shape). Water wets the surface and therefore has a concave meniscus. A mercury column is read by sighting horizontally between the top of the convex mercury surface (Fig. 5) and the scale. A water manometer is read by sighting horizontally between the bottom of the concave water surface and the scale.

Should one column of fluid travel further than the other column, due to minor variations in the inside diameter of the tube or to the pressure imposed, the accuracy of the reading obtained is not impaired.

The manometer reading may be converted into other units of measurement by use of the pressure conversion chart, Table 8.

condition usually indicates the voltage regulator is set too high or is not limiting the alternator output. A high charging rate to a fully charged battery will damage the battery and other electrical components.

A low battery and low or no charging rate condition could be caused by: Loose connections or damaged wiring, defective battery or alternator, or defective regulator or improper regulator setting.

Contact an authorized *Detroit Diesel Allison Service Outlet* if more information is needed.

STORAGE

PREPARING ENGINE FOR STORAGE

When an engine is to be stored or removed from operation for a period of time, special precautions should be taken to protect the interior and exterior of the engine, transmission and other parts from rust accumulation and corrosion. The parts requiring attention and the recommended preparations are given below.

It will be necessary to remove all rust or corrosion

completely from any exposed part before applying a rust preventive compound. Therefore, it is recommended that the engine be processed for storage as soon as possible after removal from operation.

The engine should be stored in a building which is dry and can be heated during the winter months. Moisture absorbing chemicals are available commercially for use when excessive dampness prevails in the storage area.

TEMPORARY STORAGE (30 days or less)

To protect an engine for a temporary period of time, proceed as follows:

1. Drain the engine crankcase.
2. Fill the crankcase to the proper level with the recommended viscosity and grade of oil.
3. Fill the fuel tank with the recommended grade of fuel oil. Operate the engine for two minutes at 1200 rpm and no load.

NOTE: Do not drain the fuel system or the crankcase after this run.

4. Check the air cleaner and service it, if necessary, as outlined under *Air System*.

5. If freezing weather is expected during the storage period, add a high boiling point type antifreeze solution in accordance with the manufacturer's recommendations. Drain the raw water system and leave the drain cocks open.

6. Clean the entire exterior of the engine (except the electrical system) with fuel oil and dry it with air.

7. Seal all of the engine openings. The material used for this purpose must be waterproof, vaporproof and possess sufficient physical strength to resist puncture and damage from the expansion of entrapped air.

An engine prepared in this manner can be returned to service in a short time by removing the seals at the engine openings, checking the engine coolant, fuel oil, lubricating oil, transmission and priming the raw water pump, if used.

EXTENDED STORAGE (30 days or more)

When an engine is to be removed from operation for an extended period of time, prepare it as follows:

1. Drain and thoroughly flush the cooling system with clean, soft water.
2. Refill the cooling system with clean, soft water.
3. Add a rust inhibitor to the cooling system (refer to *Corrosion Inhibitor* under *Cooling System*).
4. Remove, check and recondition the injectors, if necessary, to make sure they will be ready to operate when the engine is restored to service.
5. Reinstall the injectors in the engine, time them, and adjust the valve clearance.

6. Circulate the coolant through the entire system by operating the engine until normal operating temperature is reached (160-185° F or 71-85° C).

7. Stop the engine.

8. Remove the drain plug and completely drain the engine crankcase. Reinstall and tighten the drain plug. Install new lubricating oil filter elements and gaskets.

9. Fill the crankcase to the proper level with a 30-weight preservative lubricating oil MIL-L-21260, Grade 2 (P10), or equivalent.

10. Drain the engine fuel tank.

11. Refill the fuel tank with enough rust preventive fuel oil such as American Oil Diesel Run-In Fuel

(LF 4089), Mobil 4Y17, or equivalent, to enable the engine to operate 10 minutes.

12. Drain the fuel filter and strainer. Remove the retaining bolts, shells and elements. Discard the used elements and gaskets. Wash the shells in clean fuel oil and insert new elements. Fill the cavity between the element and shell about two-thirds full of the same rust preventive compound as used in the fuel tank and reinstall the shell.

13. Operate the engine for 10 minutes to circulate the rust preventive throughout the engine.

14. Refer to *Air System* and service the air cleaner.

15. MARINE GEAR

- a. Drain the oil completely and refill with clean oil of the proper viscosity and grade as is recommended. Remove, clean or replace the strainer and replace the filter element.
- b. Start and run the engine at 600 rpm for 10 minutes so that clean oil can coat all of the internal parts of the marine gear. Engage the clutches alternately to circulate clean oil through all of the moving parts.

16. TORQMATIC CONVERTER

- a. Start the engine and operate it until the temperature of the converter oil reaches 150°F (66°C).
- b. Remove the drain plug and drain the converter.
- c. Remove the filter element.
- d. Start the engine and stall the converter for twenty seconds at 1000 rpm to scavenge the oil from the converter. *Due to lack of lubrication, do not exceed the 20 second limit.*
- e. Install the drain plug and a new filter element.
- f. Fill the converter to the proper operating level with a commercial preservative oil which meets Government specifications MIL-L-21260, Grade 1. Oil of this type is available from the major oil companies.
- g. Start the engine and operate the converter for at least 10 minutes at a minimum of 1000 rpm. Engage the clutch; then stall the converter to raise the oil temperature to 225°F (107°C).

CAUTION: Do not allow the oil temperature to exceed 225°F (107°C). If the unit does not

have a temperature gage, *do not stall the converter for more than thirty seconds.*

- h. Stop the engine and permit the converter to cool to a temperature suitable to touch.
- i. Seal all of the exposed openings and the breather with moisture proof tape.
- j. Coat all exposed, unpainted surfaces with preservative grease. Position all of the controls for minimum exposure and coat them with grease. The external shafts, flanges and seals should also be coated with grease.

17. POWER TAKE-OFF

- a. Use an all purpose grease such as Shell Alvania No. 2, or equivalent, and lubricate the clutch throwout bearing, clutch pilot bearing, drive shaft main bearing, clutch release shaft, and the outboard bearings (if so equipped).
- b. Remove the inspection hole cover on the clutch housing and lubricate the clutch release lever and link pins with a hand oiler. Avoid getting oil on the clutch facing.
- c. If the unit is equipped with a reduction gear, drain and flush the gear box with light engine oil. If the unit is equipped with a filter, clean the shell and replace the filter element. Refill the gear box to the proper level with the grade of oil indicated on the name plate.

18. HYDROSTARTER SYSTEM

Refer to *Hydraulic Starting System* in the section on *Engine Equipment* for the lubrication and preventive maintenance procedure.

19. Apply a *non-friction* rust preventive compound to all exposed parts. If it is convenient, apply the rust preventive compound to the engine flywheel. If not, disengage the clutch mechanism to prevent the clutch disc from sticking to the flywheel.

CAUTION: Do not apply oil, grease or any wax base compound to the flywheel. The cast iron will absorb these substances which can "sweat" out during operation and cause the clutch to slip.

20. Drain the engine cooling system.

21. The oil may be drained from the engine crankcase if so desired. If the oil is drained, reinstall and tighten the drain plug.

22. Remove and clean the battery and battery cables

with a baking soda solution and rinse them with fresh water. Do not allow the soda solution to enter the battery. Add distilled water to the electrolyte, if necessary, and fully charge the battery. Store the battery in a cool (never below 32° F or 0° C) dry place. Keep the battery fully charged and check the level and the specific gravity of the electrolyte regularly.

23. Insert heavy paper strips between the pulleys and belts to prevent sticking.

24. Seal all of the openings in the engine, including the exhaust outlet, with moisture resistant tape. Use cardboard, plywood or metal covers where practical.

25. Clean and dry the exterior painted surfaces of the

engine. Spray the surfaces with a suitable liquid automobile body wax, a synthetic resin varnish or a rust preventive compound.

26. Cover the engine with a good weather-resistant tarpaulin or other cover if it must be stored outdoors. A clear plastic cover is recommended for indoor storage.

The stored engine should be inspected periodically. If there are any indications of rust or corrosion, corrective steps must be taken to prevent damage to the engine parts. Perform a complete inspection at the end of one year and apply additional treatment as required.

PROCEDURE FOR RESTORING AN ENGINE TO SERVICE WHICH HAS BEEN IN EXTENDED STORAGE

1. Reinstall the valve rocker cover.

2. Remove the covers and tape from all of the openings of the engine, fuel tank and electrical equipment. *Do not overlook the exhaust outlet.*

3. Wash the exterior of the engine with fuel oil to remove the rust preventive.

4. Remove the rust preventive from the flywheel.

5. Remove the paper strips from between the pulleys and the belts.

6. Remove the drain plug and drain the preservative oil from the crankcase. Re-install the drain plug. Then refer to *Lubrication System* in the *Operating Instructions* and fill the crankcase to the proper level with the recommended grade of lubricating oil.

7. Fill the fuel tank with the fuel specified under *Diesel Fuel Oil Specifications*.

8. Close all of the drain cocks and fill the engine cooling system with clean soft water and a rust inhibitor. If the engine is to be exposed to freezing temperatures, add a high boiling point type antifreeze solution to the cooling system (the antifreeze contains a rust inhibitor).

9. Install and connect the battery.

10. Service the air cleaner as outlined under *Air System*.

11. POWER GENERATOR

Prepare the generator for starting as outlined under *Operating Instructions*.

12. MARINE GEAR

Check the Marine gear; refill it to the proper level, as necessary, with the correct grade of lubricating oil.

13. TORQMATIC CONVERTER

a. Remove the tape from the breather and all of the openings.

b. Remove all of the preservative grease with a suitable solvent.

c. Start the engine and operate the unit until the temperature reaches 150° F (66° C). Drain the preservative oil and remove the filter. Start the engine and stall the converter for twenty seconds at 1000 rpm to scavenge the oil from the converter.

CAUTION: A Torqmatic converter containing preservative oil should only be operated enough to bring the oil temperature up to 150° F (66° C).

d. Install the drain plug and a new filter element.

e. Refill the converter with the oil that is recommended under *Lubrication and Preventive Maintenance*.

14. POWER TAKE-OFF

Remove the inspection hole cover and inspect the clutch release lever and link pins and the bearing ends of the clutch release shaft. Apply engine oil sparingly, if necessary, to these areas.

15. HYDROSTARTER

- a. Open the relief valve on the side of the hand pump and release the pressure in the system.
 - b. Refer to the filling and purging procedures outlined in *Hydraulic Starting System*. Then drain, refill and purge the hydrostarter system.
16. After all of the preparations have been completed,

start the engine. The small amount of rust preventive compound which remains in the fuel system will cause a smoky exhaust for a few minutes.

NOTE: Before subjecting the engine to a load or high speed, it is advisable to check the engine tune-up.

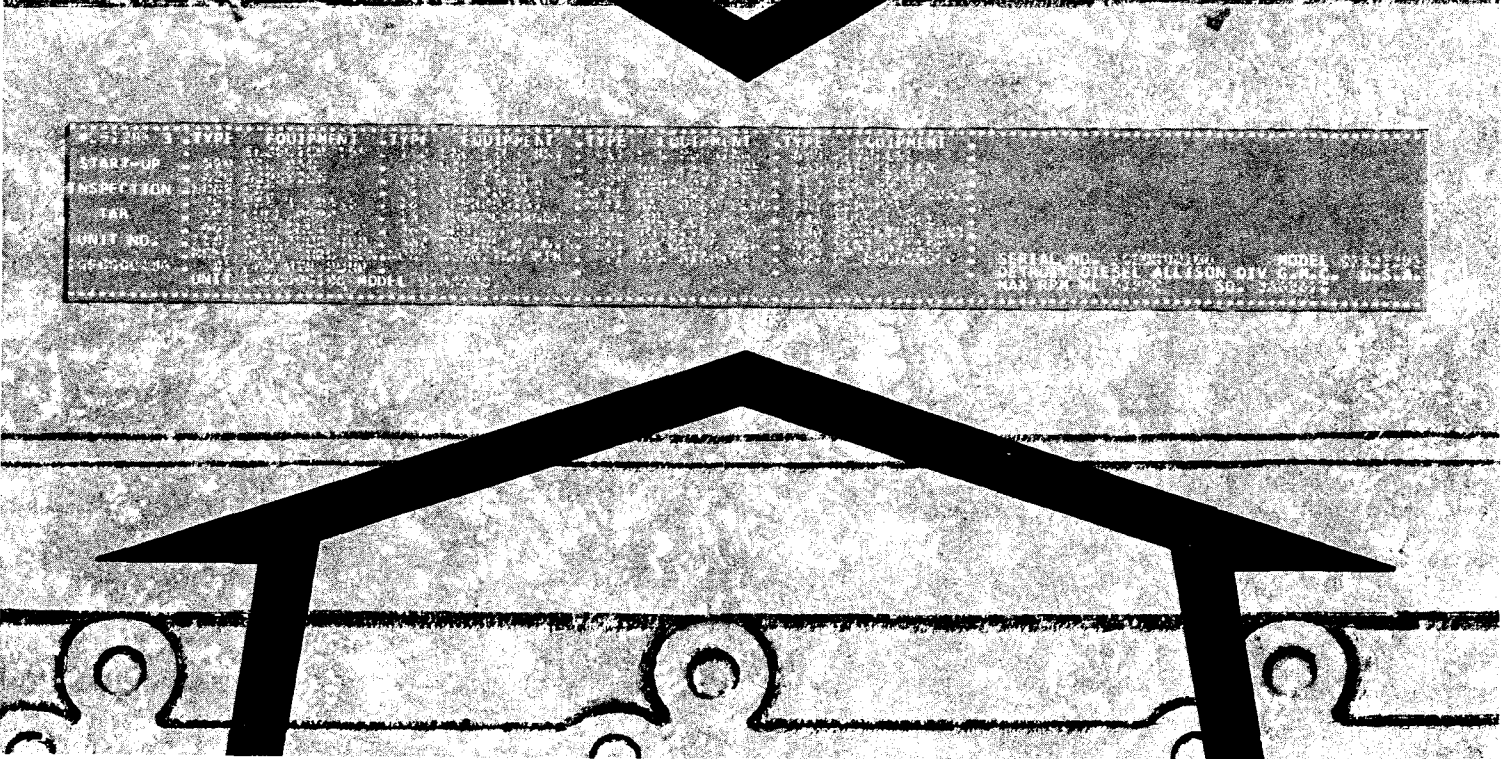
BUILT-IN

PARTS BOOK

for

DETROIT DIESEL

ENGINES



	EQUIPMENT	TYPE	EQUIPMENT	TYPE	EQUIPMENT	TYPE	EQUIPMENT
START-UP	...	...	...	...	...	...	...
INSPECTION	...	...	...	...	...	...	...
TRA	...	...	...	...	...	...	...
UNIT NO.	...	...	...	...	...	...	...
MODEL NO.	...	...	...	...	...	...	...

SERIAL NO. ...
DETROIT DIESEL ALLISON DIV. C.P.E. DESIGN
MAX RPM MIN. 1750 C. 500 14000000

Progress in industry comes at a rapid pace. In order for the engine manufacturer to keep pace with progress he needs a versatile product for the many models and arrangements of accessories and mounting parts needed to suit a variety of equipment. In addition, engine refinements and improvements are constantly being introduced. All of this dynamic action must be documented so that the equipment can be serviced if and when it's needed. It is fully documented in the manufacturer's plant and in dealer Parts Departments with Master Files and adequate supporting records. But, what about YOU the user of this equipment? You have neither the time nor the inclination to ferret out specific part number data. What is the answer?—It is Detroit Diesel's exclusive BUILT-IN PARTS BOOK which is furnished with each engine. It takes the form of an "Option Plate" mounted on the rocker cover of the engine. With it, ordering parts becomes as simple as A, B, C. You have merely to provide the Dealer with . . .

A. The "Model" number

B. The "UNIT" number

C. The "TYPE" number

L11300 1	87	CONN ROD/PSTN.	1	ENG LIFT BKT
START-UP	162	FLYWHEEL	9	OIL PAN
INSPECTION	83	OIL FIL CAP	94	OIL COOLER
TAB	NONE	VENT SYSTEM	10	C/S COVER
UNIT NO.	346	C/S PULLEY	NONE	C/S PUL BELT
6A0246489	118	WAT PUMP CVR	147	WAT MANIFOLD
	363	WAT BY-PASS	199	EXH MFLO
	494	FUEL FILTER	764	FUEL LINES
	121	THROTTLE CONT.	20	INJECTOR CONT.
	571	VENT SYSTEM	1702	BATT CHRG GEN.
	233	MUFFLER CONN	21	INSTRUMENTS
	UNIT	6A0246489	MODEL	10635000
			SPEC	ENG 162

C.

B.

A.

From that much information, the dealer with his complete records on all engine models, can completely interpret your parts requirements.

What is this "built-in" book? It is a photo etched aluminum plate that fits into a holding channel on the engine rocker cover.

```

.....
L11300 1 . 87 CONN ROD/P
          . 162 FLYWHEEL
START-UP . 83 OIL FIL CAP
          . NONE VENT SYSTEM
INSPECTION . 346 C/S PULLEY
          . 118 WAT PUMP CVR
TAB . 363 WAT BY-PASS
          . 494 FUEL FILTER
UNIT NO. . 121 THROTTLE CONT.
          . 571 VENT SYSTEM
6A0246489 . 233 MUFFLER CONN
          UNIT 6A0246489 MODEL
.....

```

ON THE LEFT SIDE of the plate is the Start-up Inspection Tab which is removed by the dealer when he has completed the inspection.

```

.....
STN. 1 ENG LIFT BKT . 145 F/W HOUSING . 3 VIB DAM
      9 OIL PAN . 17 OIL PUMP . 55 OIL FIL
      94 OIL COOLER . 303 DIPSTICK . 51 OIL FIL
      10 C/S COVER . 3 ENGINE MOUNTS . NONE FAN
      . NONE C/S PUL BELT . 26 WATER PUMP . 276 WATER
      147 WAT MANIFOLD . 362 WAT BY-PASS . 204 THERM
      199 EXH MFLO . 126 FUEL PUMP . 97 INJE
      764 FUEL LINES . 444 AIR INLT HSG . 817 SHUT
      20 INJECTOR CONT. . 92 GOVERNOR MECH. . 122 ROCK
      702 BATT CHRG GEN. . 281 STARTING MTR . 3 STA
      21 INSTRUMENTS
      10635000 SPEC ENG 162
.....

```

NEXT is the type number and the equipment description. On the left is the type number. The type number designates all service parts applicable to the equipment. On the right is a brief description of the equipment.

```

.....
PER
ST
TER
.
CONN
STAT
TOR N65
OFF
ER COVER
RTING AID
-CAM-TIMING
SERIAL NO. 6A0246489 MODEL 10635000
DETROIT DIESEL ALLISON DIV G.M.C. U.S.A.
MAX RPM NL 01940 SO. 1A65032
.....

```

ON THE RIGHT SIDE of the plate is shown the model number, serial number and the related governor setting.

All engine components are divided into groups of functionally related parts. A complete listing of the twelve major groups and their many sub-groups is shown below.

GROUP NOMENCLATURE

1.0000 ENGINE (less major assemblies)

- 1.1000 Cylinder Block
- 1.1000A Air Box Drains
- 1.2000 Cylinder Head
- 1.2000A Engine Lifter Bracket
- 1.3000 Crankshaft
- 1.3000A Crankshaft Front Cover
- 1.3000B Vibration Damper
- 1.3000C Crankshaft Pulley
- 1.3000D Crankshaft Pulley Belt
- 1.4000A Flywheel
- 1.5000A Flywheel Housing
- 1.5000B Flywheel Housing Adaptor
- 1.6000 Connecting Rod and Piston
- 1.7000 Camshaft and Gear Train
- 1.7000A Balance Weight Cover
- 1.7000B Accessory Drive
- 1.8000 Valve and Injector Operating Mechanism
- 1.8000A Rocker Cover

2.0000 FUEL SYSTEM

- 2.1000A Fuel Injector
- 2.2000 Fuel Pump
- 2.2000A Fuel Pump Drain
- 2.3000A Fuel Filter
- 2.4000 Fuel Manifold and/or Connections
- 2.5000A Fuel Lines
- 2.6000A Fuel Tank
- 2.7000A Mechanical Governor
- 2.8000A Hydraulic Governor
- 2.9000 Injector Controls
- 2.9000A Throttle Controls

3.0000 AIR SYSTEM

- 3.1000A Air Cleaner and/or Adaptor
- 3.2000A Air Silencer
- 3.3000A Air Inlet Housing
- 3.4000 Blower
- 3.4000A Blower Drive Shaft
- 3.5000A Turbocharger

4.0000 LUBRICATING SYSTEM

- 4.1000A Oil Pump
- 4.1000B Oil Distribution System
- 4.1000C Oil Pressure Regulator
- 4.2000A Oil Filter
- 4.3000A Oil Filter Lines
- 4.4000A Oil Cooler
- 4.5000A Oil Filler
- 4.6000A Dipstick
- 4.7000A Oil Pan
- 4.8000A Ventilating System

5.0000 COOLING SYSTEM

- 5.1000 Fresh Water Pump
- 5.1000A Fresh Water Pump Cover
- 5.2000A Water Outlet Manifold and/or Elbow
- 5.2000B Thermostat
- 5.2000C Water By-pass Tube
- 5.3000A Radiator
- 5.3000B Water Connections
- 5.4000A Fan
- 5.4000B Fan Shroud
- 5.5000A Heat Exchanger or Keel Cooling
- 5.6000A Raw Water Pump
- 5.7000A Water Filter

6.0000 EXHAUST SYSTEM

- 6.1000A Exhaust Manifold
- 6.2000A Exhaust Muffler and/or Connections

7.0000 ELECTRICAL-INSTRUMENTS

- 7.1000A Battery Charging Generator
- 7.2000B Automatic Starting
- 7.3000A Starting Motor
- 7.4000A Instruments
- 7.4000B Tachometer Drive
- 7.4000C Shut-off or Alarm System
- 7.5000A Power Generator
- 7.6000A Control Cabinet
- 7.7000A Wiring Harness
- 7.8000A Air Heater

8.0000 POWER TAKE-OFF

- 8.1000A Power Take-off and/or Clutch
- 8.3000A Torque Converter
- 8.3000B Torque Converter Lines

9.0000 TRANSMISSION AND PROPULSION

- 9.1000A Hydraulic Marine Gear
- 9.3000A Power Transfer Gear
- 9.4000 Transmission-Highway
- 9.7000 Transmission-Off-highway

10.0000 SHEET METAL

- 10.1000A Engine Hood

11.0000 ENGINE MOUNTING

- 11.1000A Engine Mounting and Base

12.0000 MISCELLANEOUS

- 12.2000A Bilge Pump
- 12.3000A Vacuum Pump
- 12.4000A Air Compressor
- 12.5000A Hydraulic Pump
- 12.6000A Gasoline Starter
- 12.6000B Air Starter
- 12.6000C Cold Weather Starting Aid
- 12.6000D Hydraulic Starter
- 12.6000E Hydraulic Starter Accessories

Within each of these sub-groups, various designs of similar equipment are categorized as "Types" and identified by a Type Number.

The Distributor/Dealer has an Index for each engine model. The Index lists all of the "Standard" and "Standard Option" equipment for that model.

DETROIT DIESEL 71 MPC

1064-7000 (RD)

STANDARD AND STANDARD OPTION EQUIPMENT

GROUP NAME	GROUP NO.	TYPE
CYLINDER BLOCK	1.1000	4
AIR BOX DRAINS	1.1000A	1
CYLINDER HEAD	1.2000	17
ENGINE LIFTER BRACKET	1.2000A	2
CRANKSHAFT	1.3000	4
CRANKSHAFT FRONT COVER	1.3000A	2
VIBRATION DAMPER REFER TO OPTION PLATE	1.3000B	NONE
CRANKSHAFT PULLEY	1.3000C	177
CRANKSHAFT PULLEY BELT	1.3000D	245
FLYWHEEL	1.4000A	170
FLYWHEEL HOUSING (SAE #1)	1.5000A	23
CONNECTING ROD AND PISTON	1.6000	101
CAMSHAFT AND GEAR TRAIN	1.7000	18
BALANCE WEIGHT COVER	1.7000A	25
VALVE OPERATING MECHANISM	1.8000	21
ROCKER COVER	1.8000A	122
FUEL INJECTOR N60	2.1000A	78
FUEL PUMP	2.2000	76
FUEL PUMP DRAIN	2.2000A	2
FUEL FILTER	2.3000A	273
FUEL MANIFOLD CONNECTIONS	2.4000	52

NOTE The Distributor/Dealer uses his model index to interpret the standard equipment. The plate, therefore, lists only the non-standard or choice items.

So, from the plate, give the dealer the

A—Model No. _____

B—Unit No. _____

*C—Type No. _____

*(If not shown, indicate "NONE". The dealer knows the "standard" for the model).

FOR READY REFERENCE, Record the information on the Option Plate to this record.

MODEL NO. _____

UNIT NO. _____

EQUIPMENT	TYPE	EQUIPMENT	TYPE	EQUIPMENT	TYPE
Engine Base _____		Water Bypass Tube _____		Battery Chrg. Generator _____	
Engine Lifter Brkt. _____		Thermostat _____		Starter _____	
Flywheel Housing _____		Water Filter _____		Hyd. Starter Acces. _____	
Vibration Damper _____		Exhaust Manifold _____		Starting Aid _____	
Flywheel _____		Air Cleaner or Silencer _____		Marine Gear _____	
Flywheel Hsg. Adptr. _____		Fuel Pump _____		Torque Converter _____	
Oil Pan _____		Injector _____		Torque Converter Lines _____	
Oil Pump _____		Blower _____		Muffler & Conn. _____	
Oil Distribution _____		Blower Drive Shaft _____		Engine Hood _____	
Dipstick _____		Fuel Filter _____		Wiring Harness _____	
Oil Pan Drain Tube _____		Fuel Lines _____		Instruments _____	
Oil Filler Tube or Cap _____		Air Inlet Housing _____		Tach. Drive _____	
Oil Cooler _____		Alarm or Shutoff _____		Radiator _____	
Oil Filter _____		Overspeed Governor _____		Heat Ex. or Keel Cooling _____	
Oil Lines _____		Throttle Controls _____		Raw Water Pump _____	
Ventilating System _____		Injector Controls _____		Power Generator _____	
Crankshaft Cover _____		Governor Mech or Hyd _____		Control Cabinet _____	
Balance Wgt. Cover _____		Engine Mounts _____		Cylinder Head _____	
Fan _____		Power Take-off _____		Conn Rod & Piston _____	
Crankshaft Pulley _____		Hydraulic Pump _____		Valve Mechanism _____	
Crankshaft Pulley Belt _____		Air Compressor _____		Fuel Manifold Conn _____	
Fan Shroud _____		Camshaft & Gear Train _____		_____	
Water Connections _____		Rocker Cover _____		_____	
Water Pump Cover _____		Accessory Drive _____		_____	
Water Manifold _____					

OTHER USEFUL INFORMATION:

Each fuel and lube oil filter on your engine has a decal giving the service package part number for the element. It is advisable to have your own personal record of these part numbers by filling in the chart provided below:

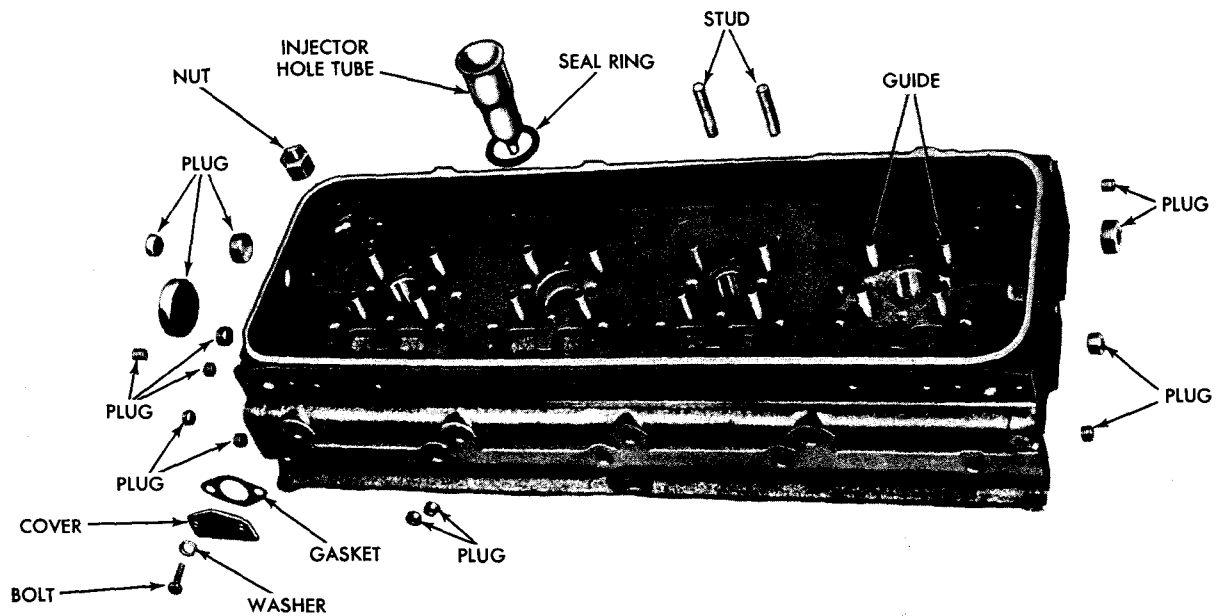
TYPE	LOCATION	PACKAGE PART NO.
Fuel Strainer		
Fuel Filter		
Lube Oil Filter Full-Flo		
Lube Oil Filter By-Pass*		

*Not Standard

AIR CLEANER

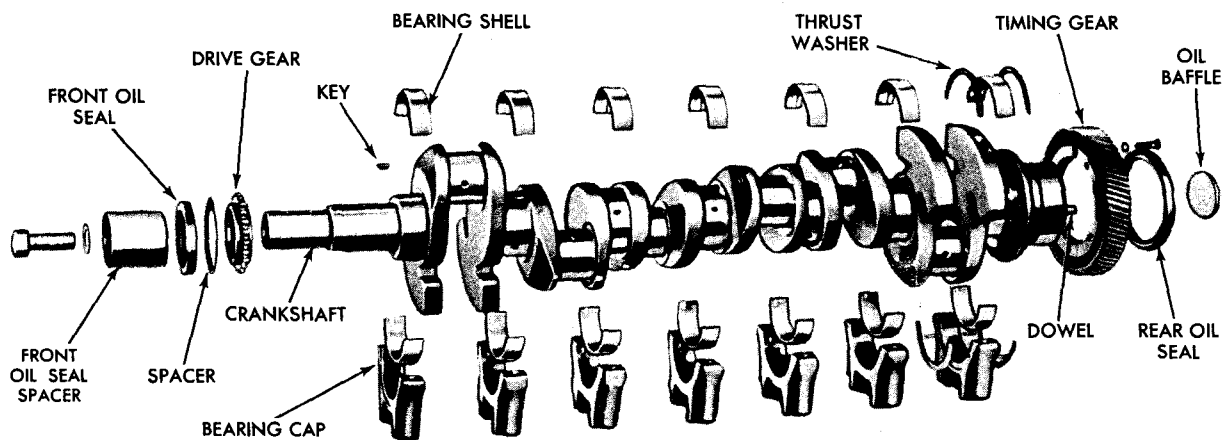
If dry-type, indicate make and number of filter element:

Wet type, indicate capacity _____ qts.



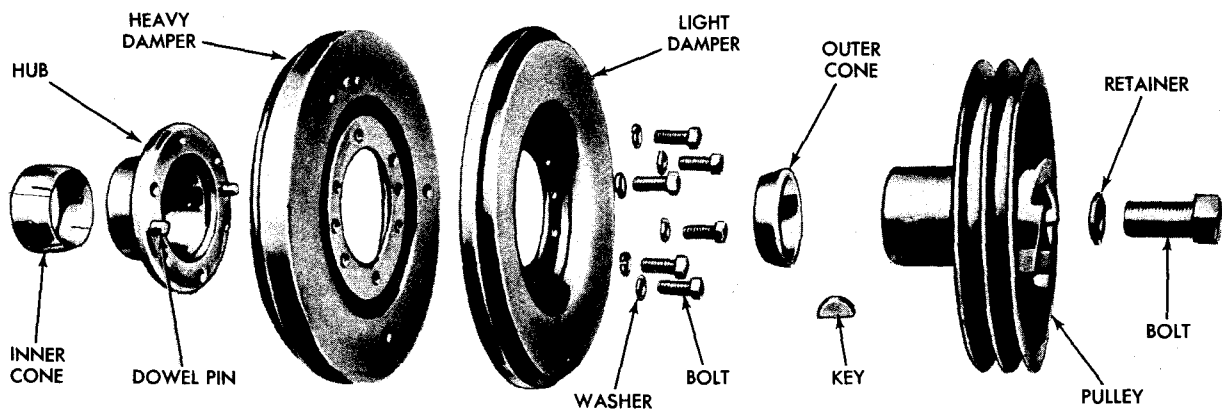
4 VALVE CYLINDER HEAD

P 614B



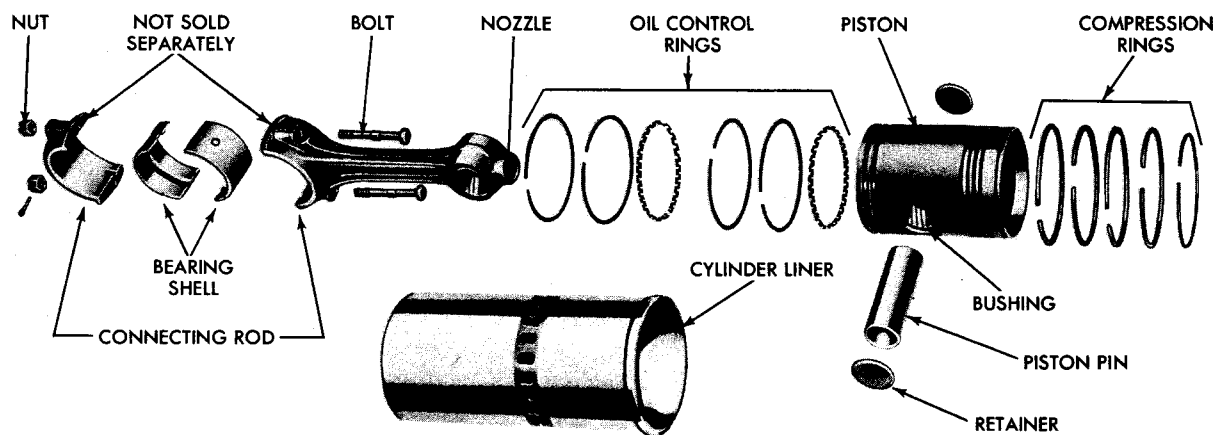
CRANKSHAFT

P 614A



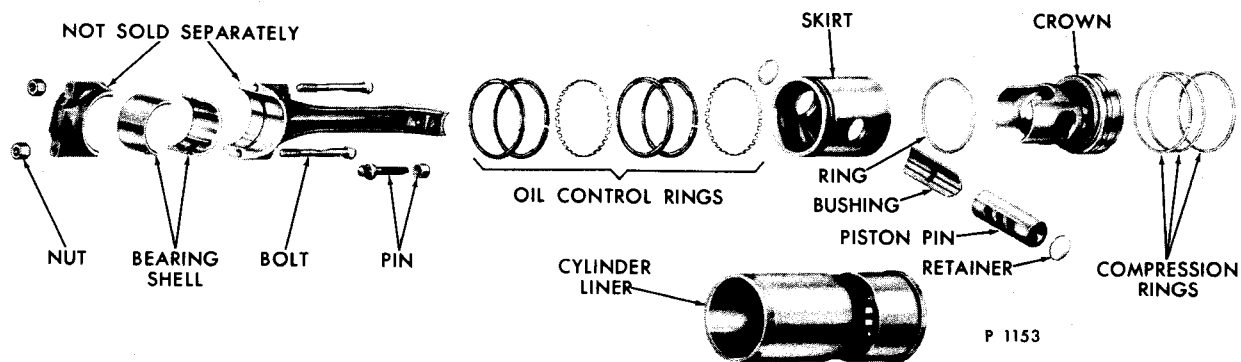
CRANKSHAFT PULLEY, VIBRATION DAMPER AND HUB

P 614



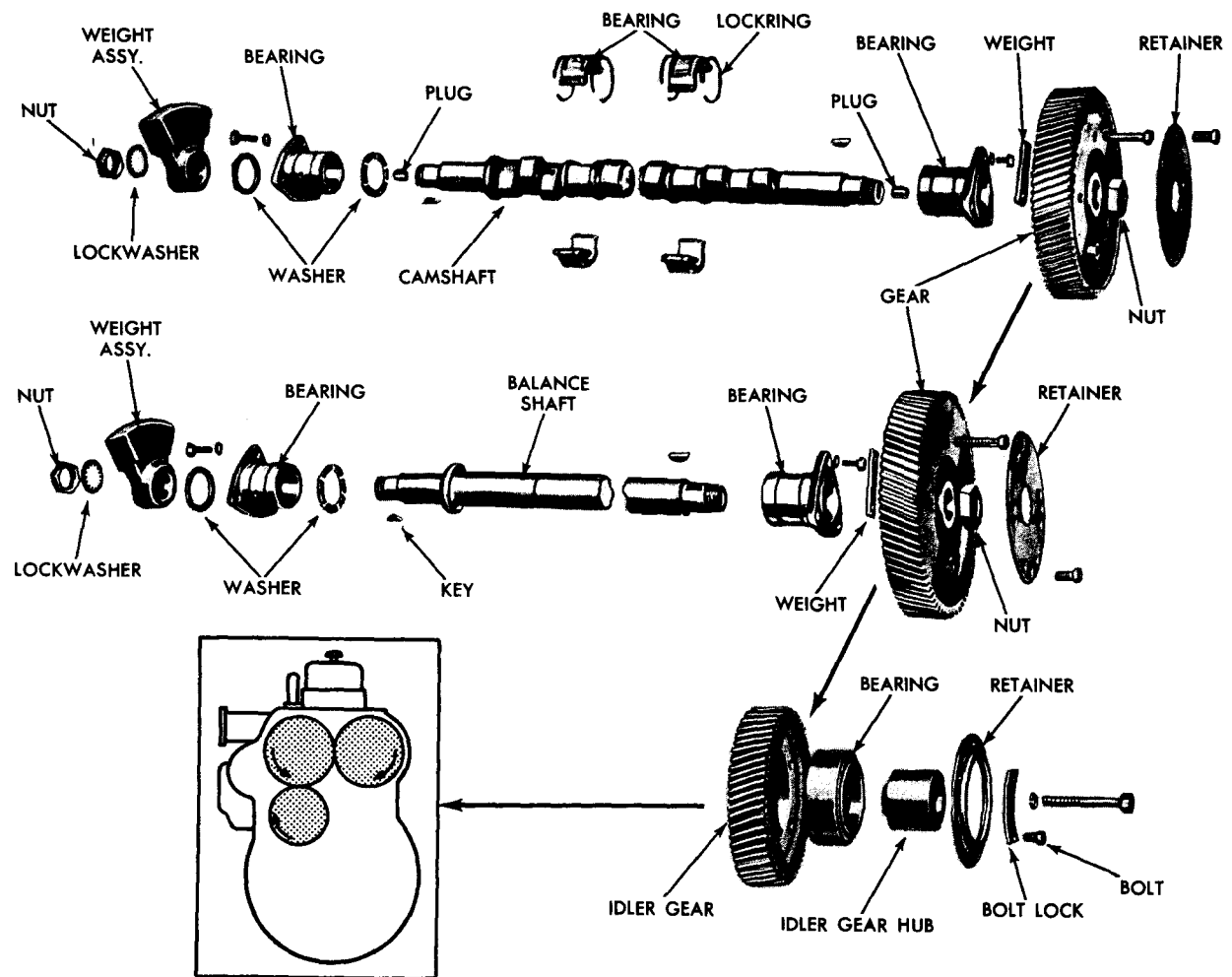
CONNECTING ROD AND PISTON

P 615A



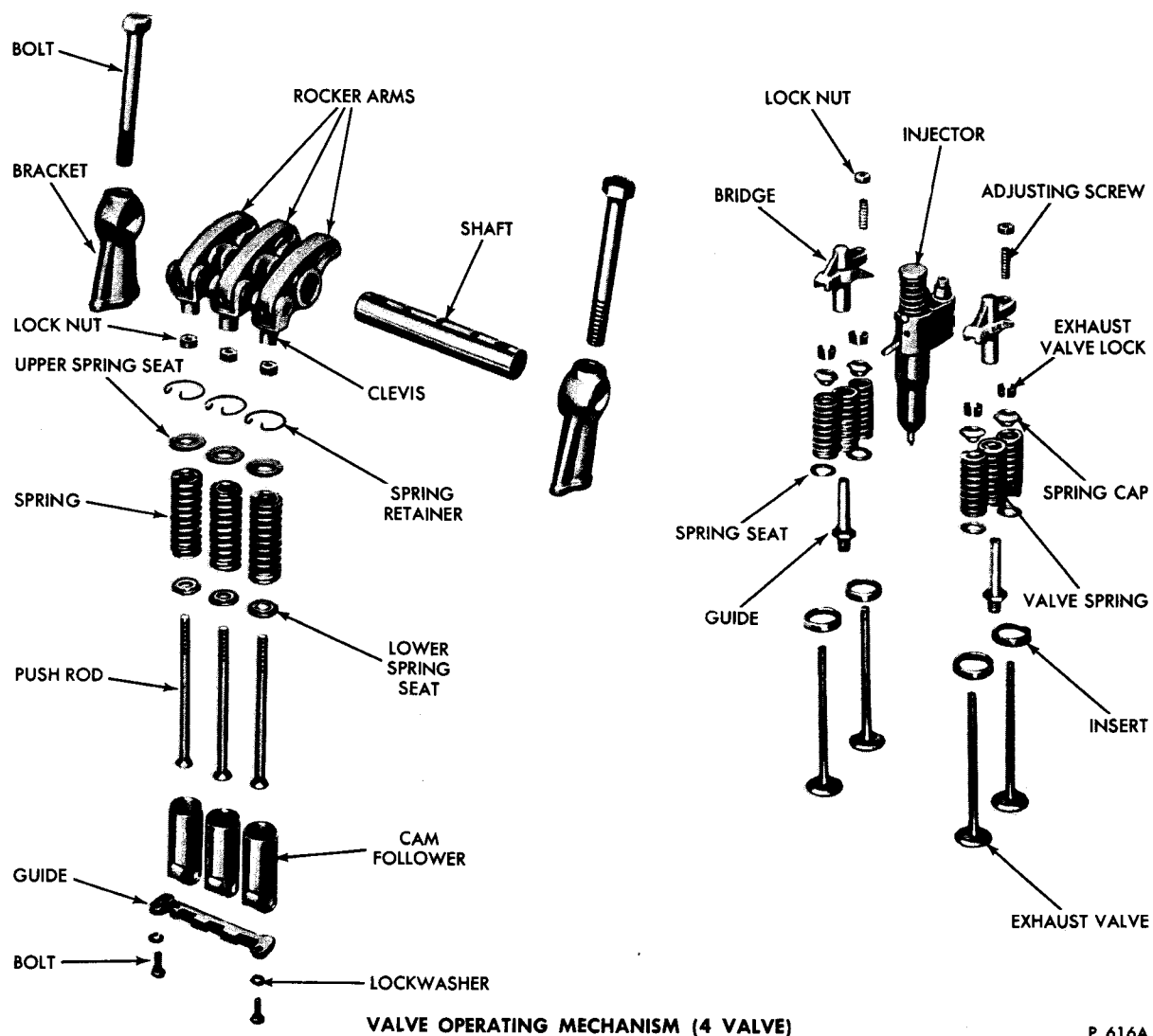
P 1153

CONNECTING ROD AND CROSS-HEAD PISTON

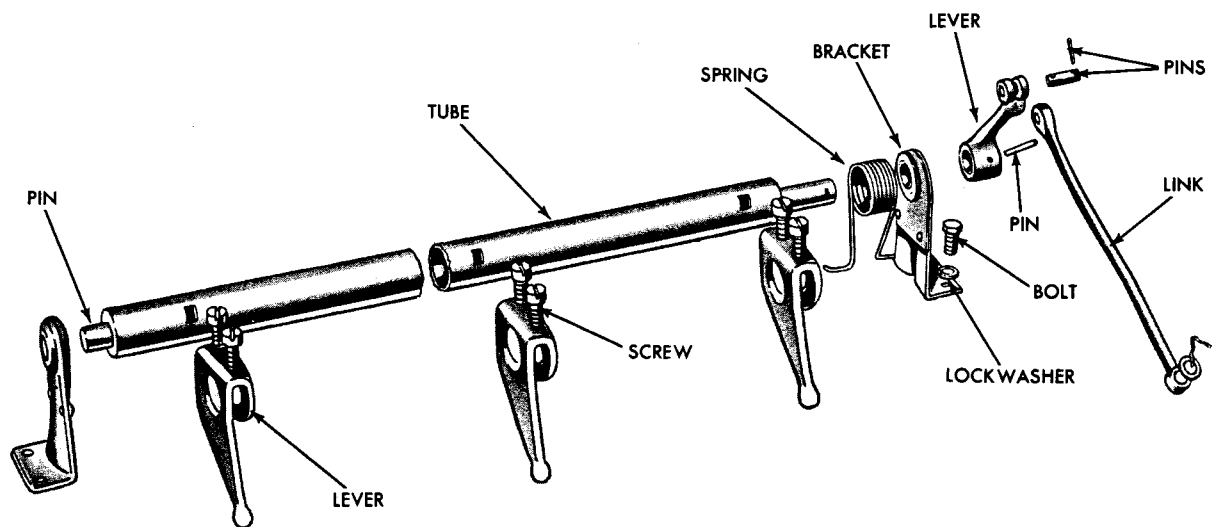


CAMSHAFT AND GEAR TRAIN

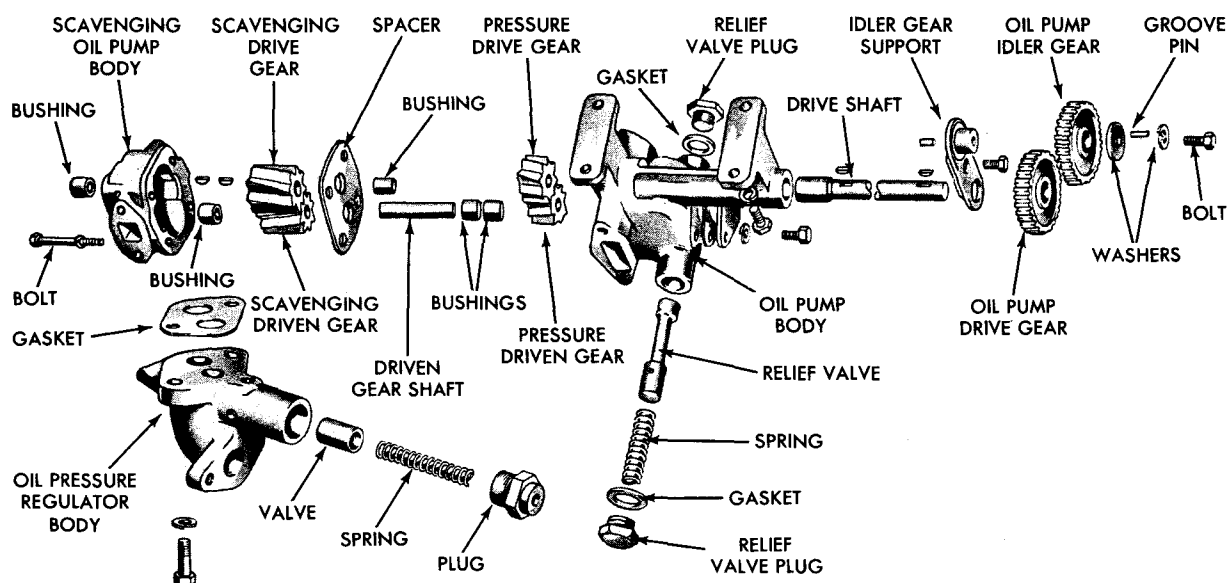
P 615



P 616A

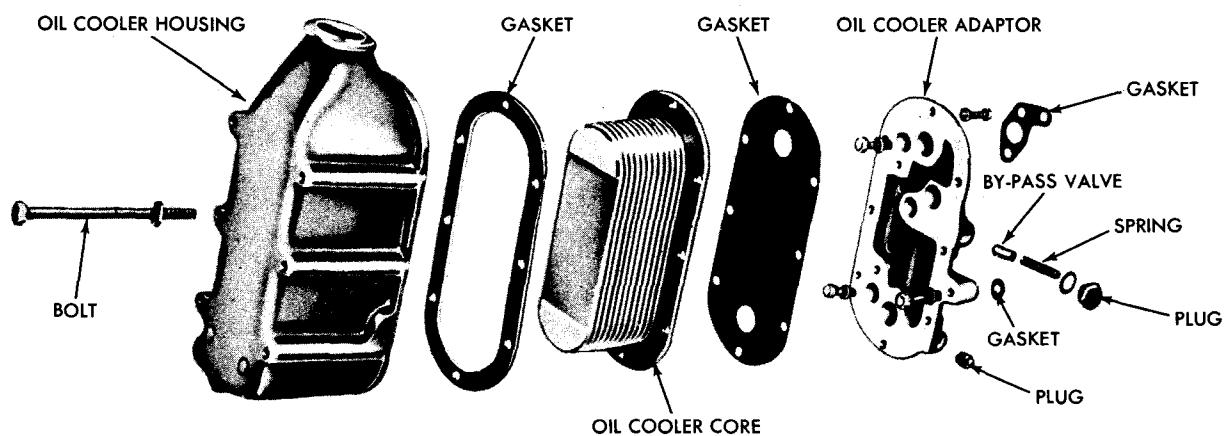


P 616



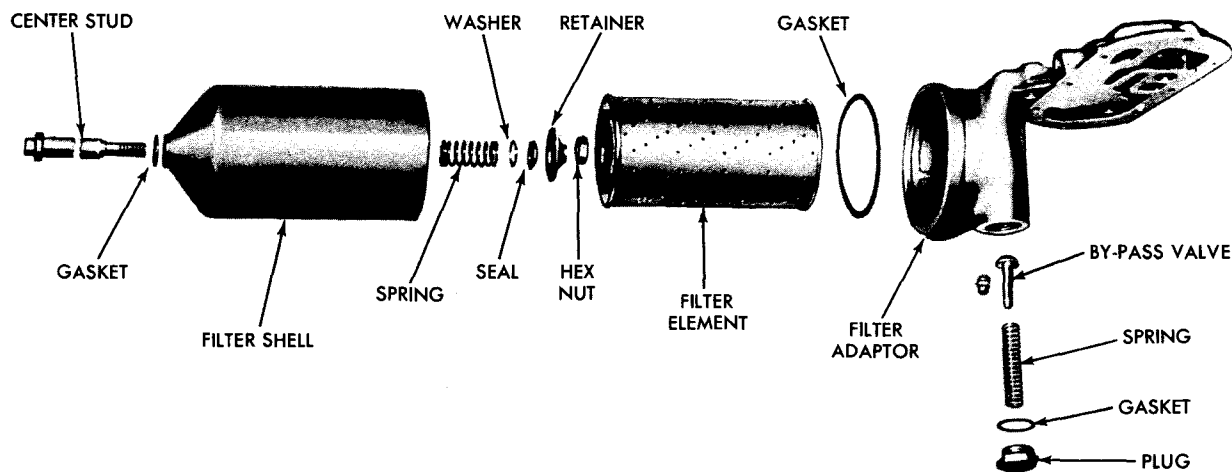
LUBRICATING OIL PUMP

P 622B



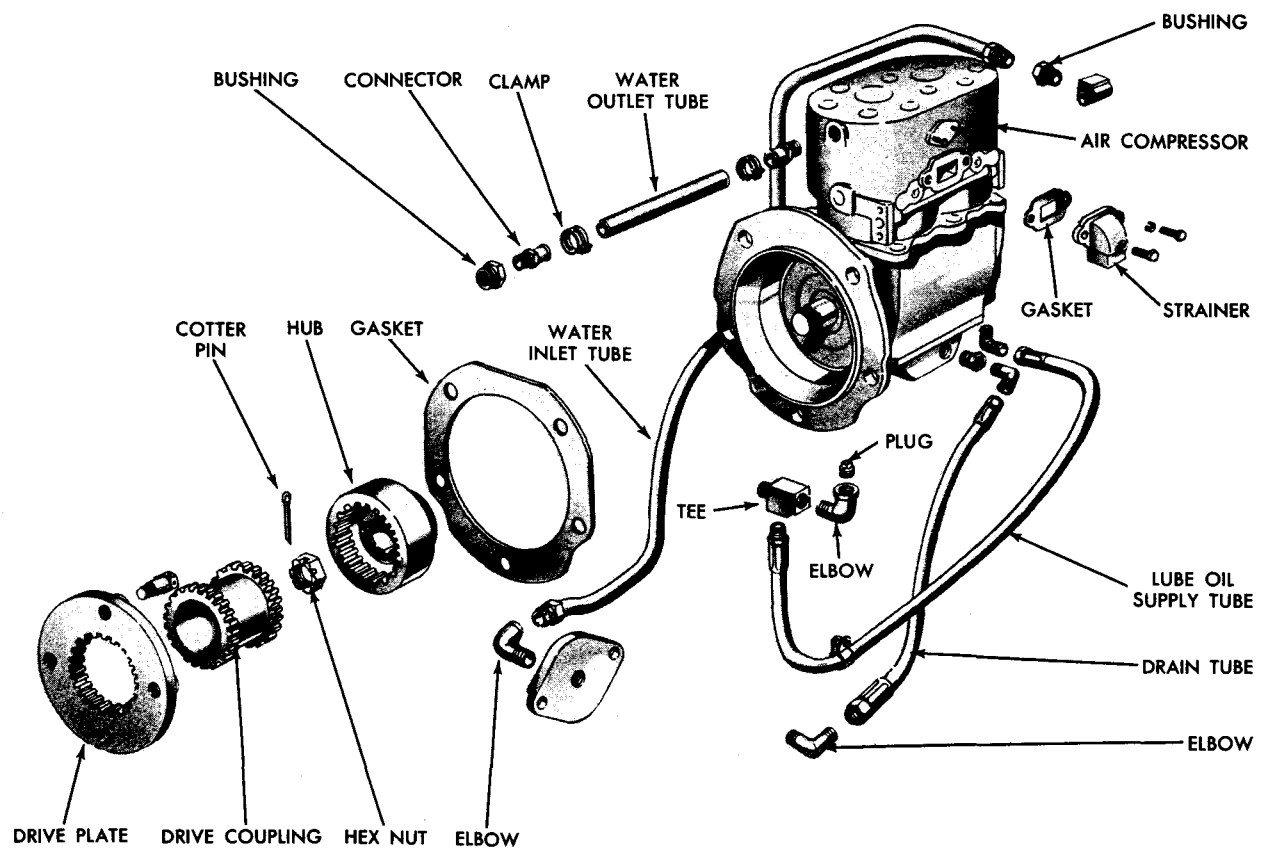
OIL COOLER

P 622A

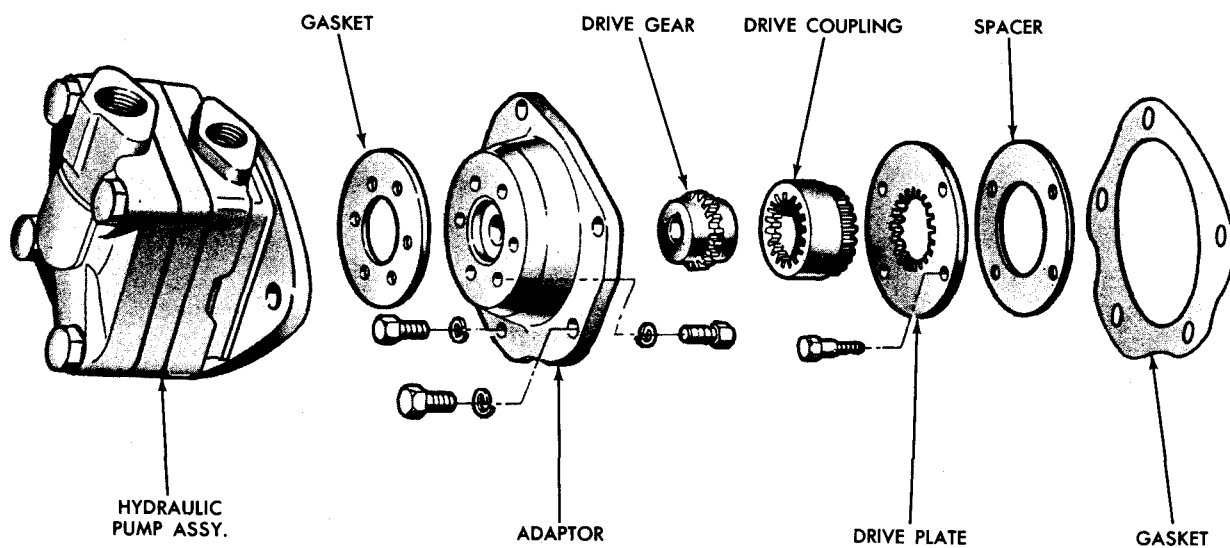


OIL FILTER

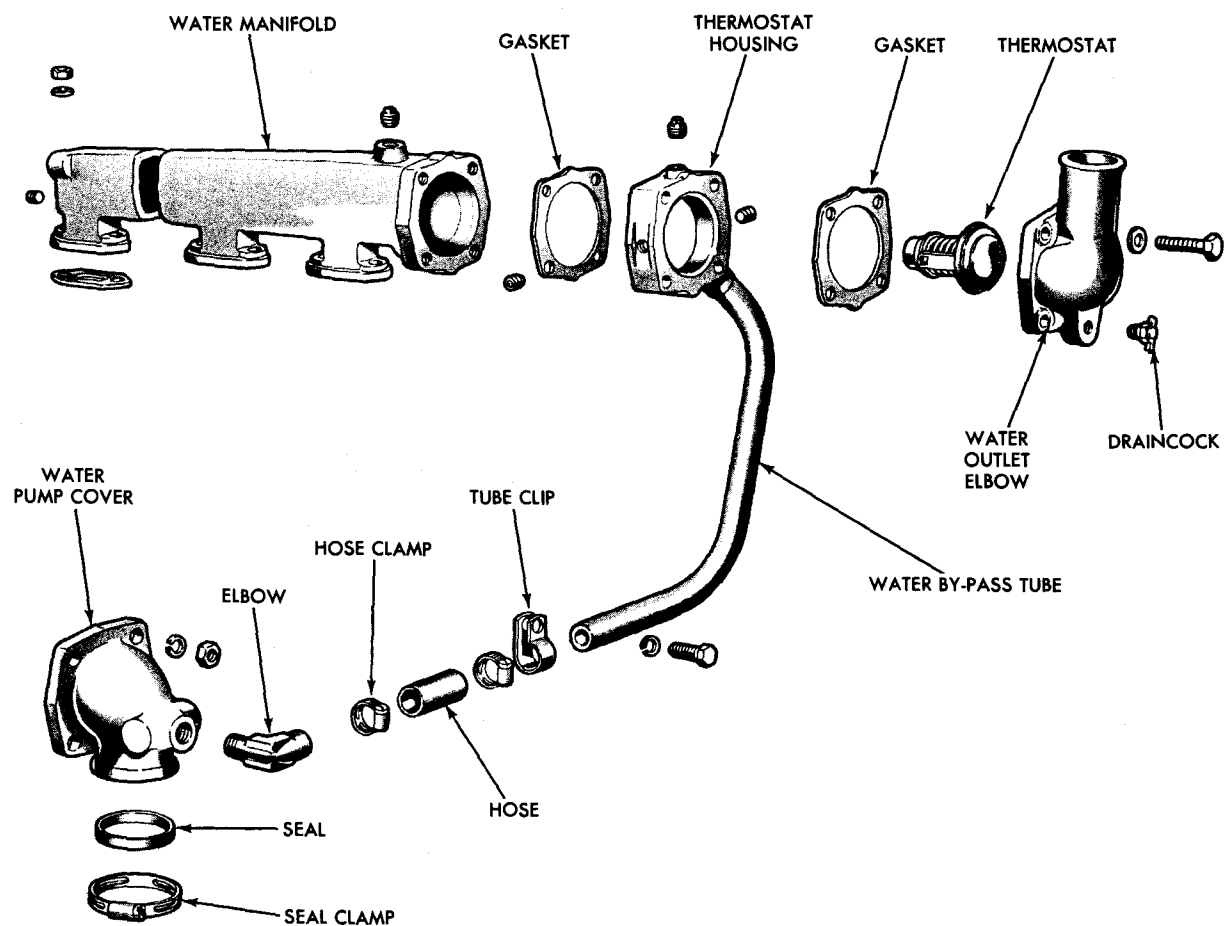
P 622



AIR COMPRESSOR AND DRIVE

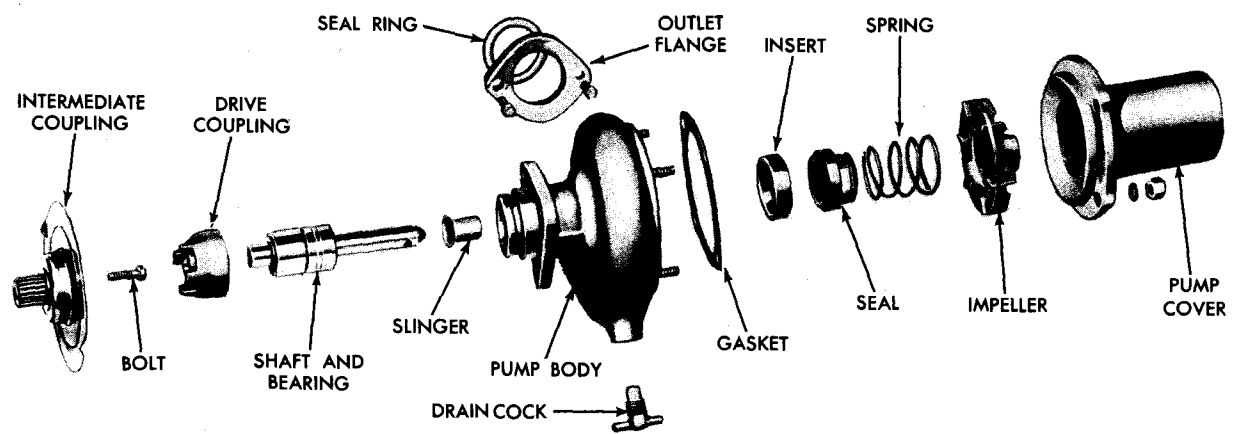


HYDRAULIC PUMP AND DRIVE



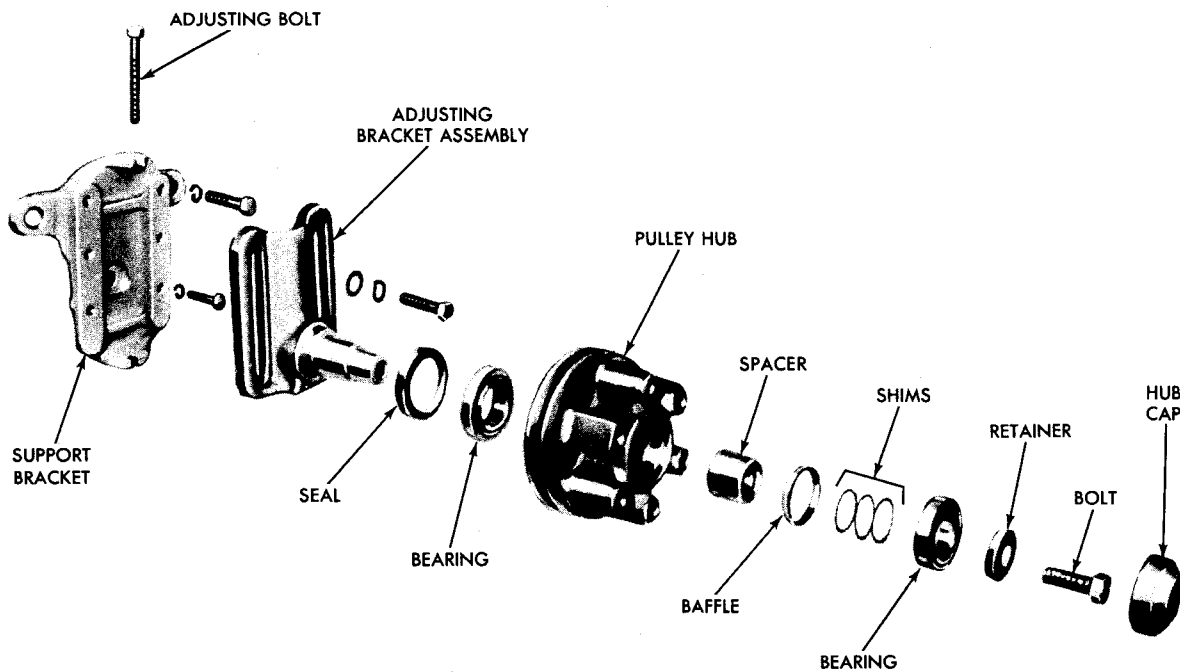
COOLING SYSTEM

P 620A



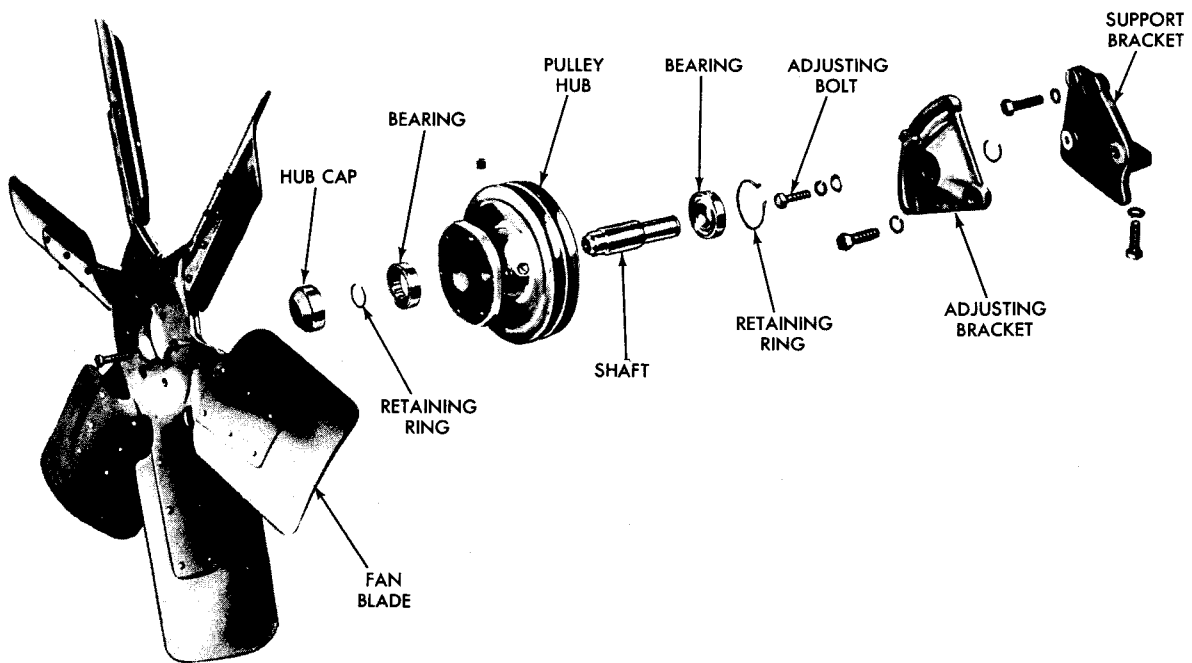
FRESH WATER PUMP

P 620



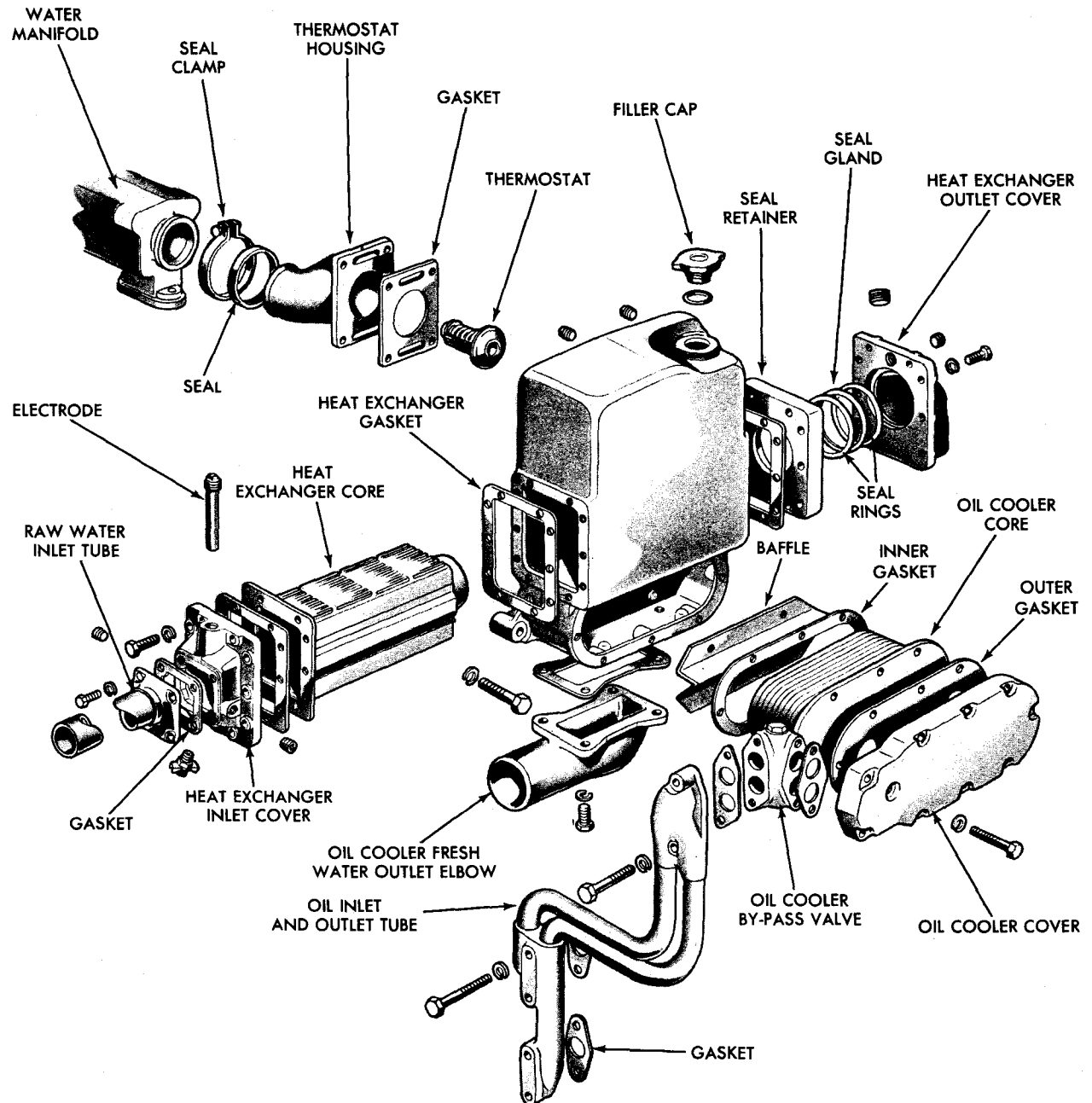
FAN MOUNT

P 619A

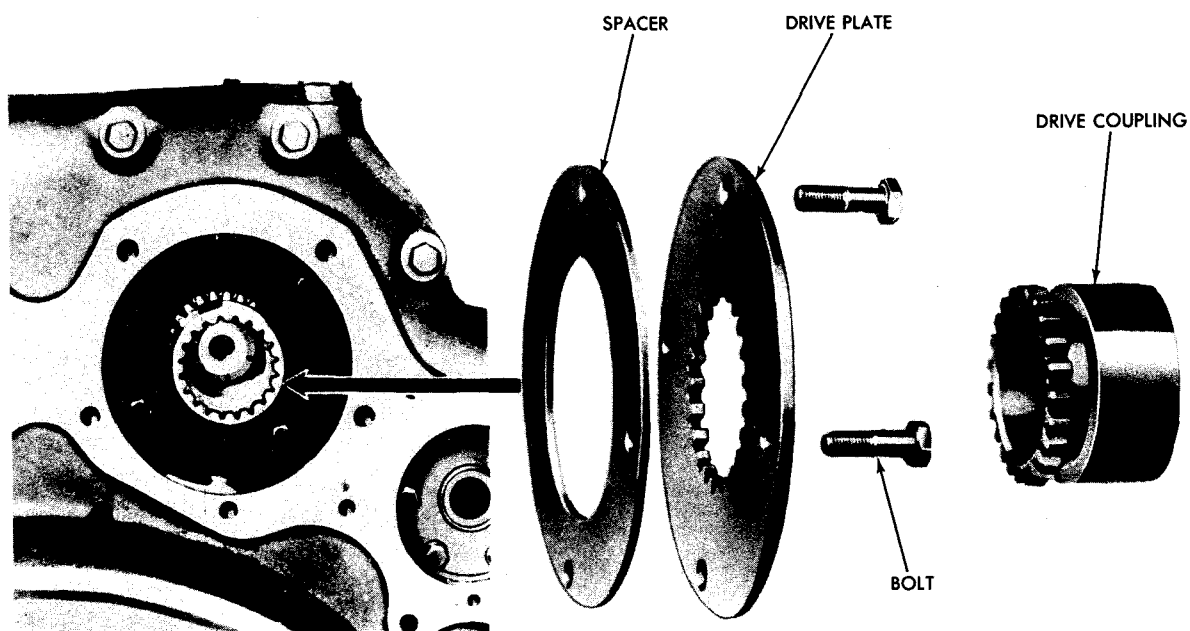


FAN ASSEMBLY

P 619

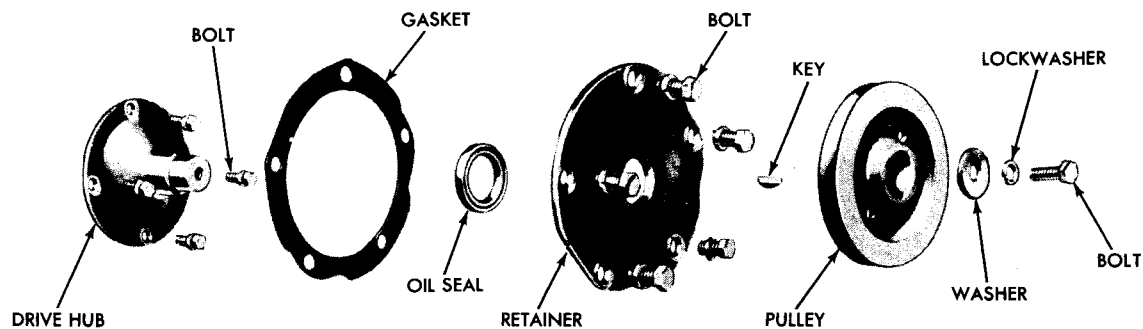


HEAT EXCHANGER



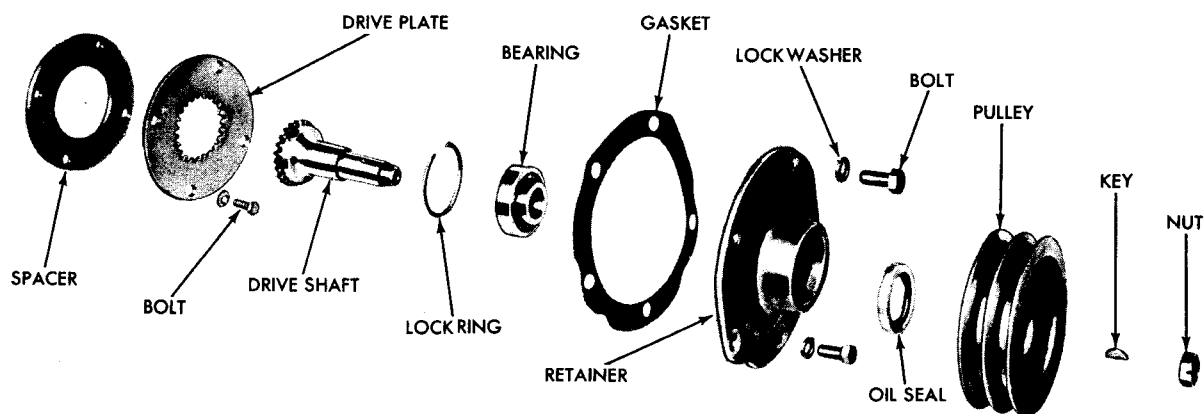
ACCESSORY DRIVE FOR DIRECT DRIVEN ACCESSORY (CAMSHAFT GEAR)

P 617B



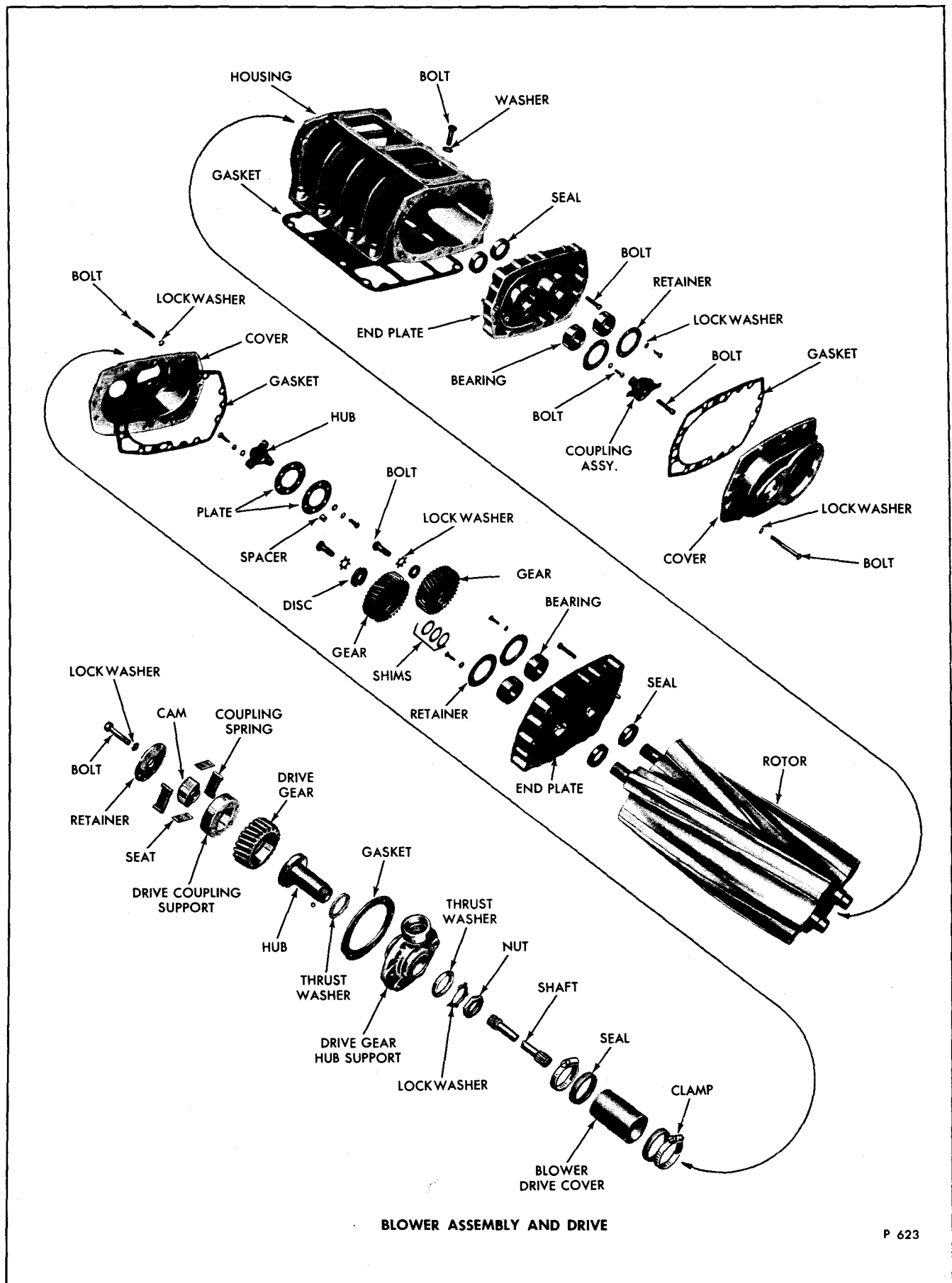
ACCESSORY DRIVE FOR BELT DRIVEN ACCESSORY (DRIVE HUB TYPE)

P 617A



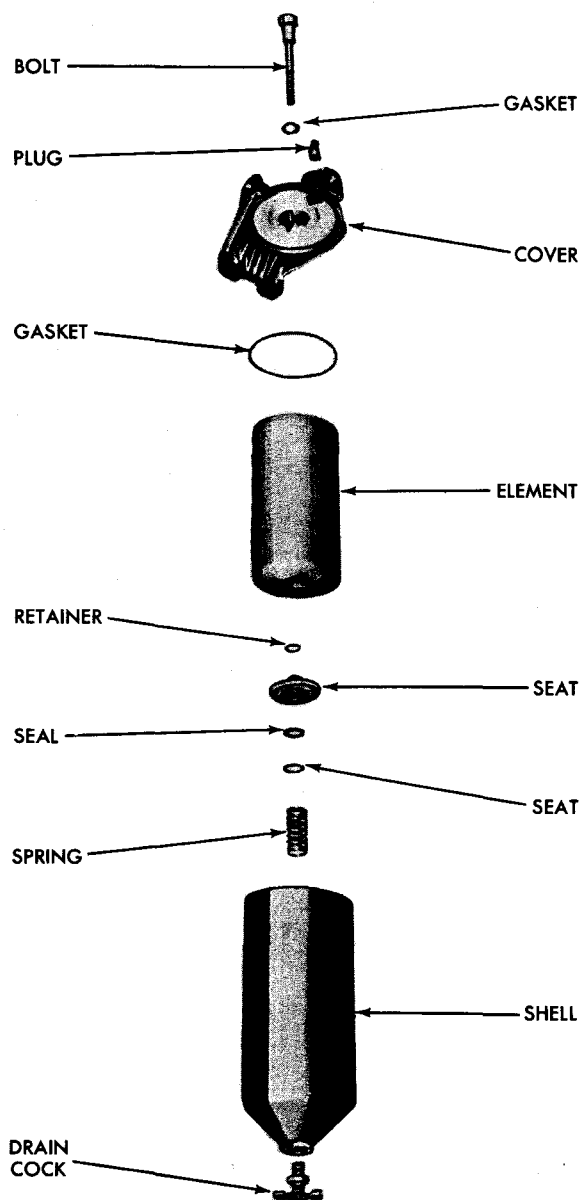
ACCESSORY DRIVE FOR BELT DRIVEN ACCESSORY (DRIVE PLATE TYPE)

P 617

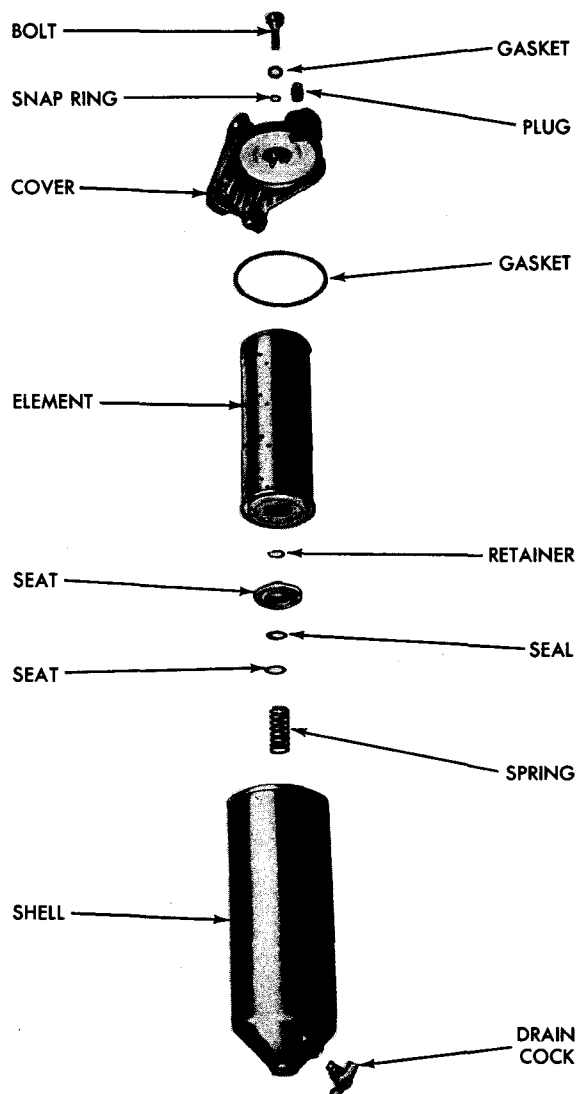


BLOWER ASSEMBLY AND DRIVE

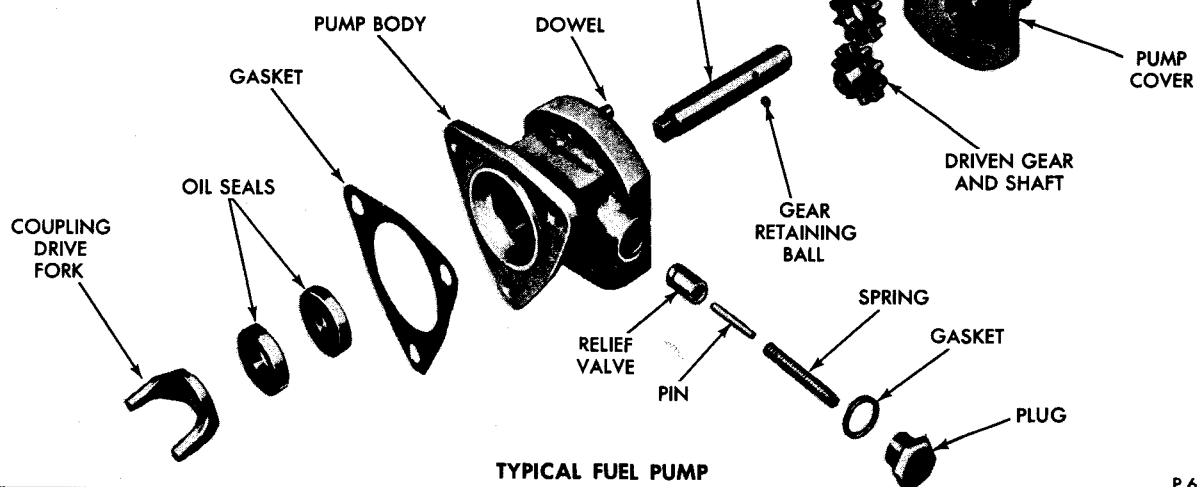
P 623



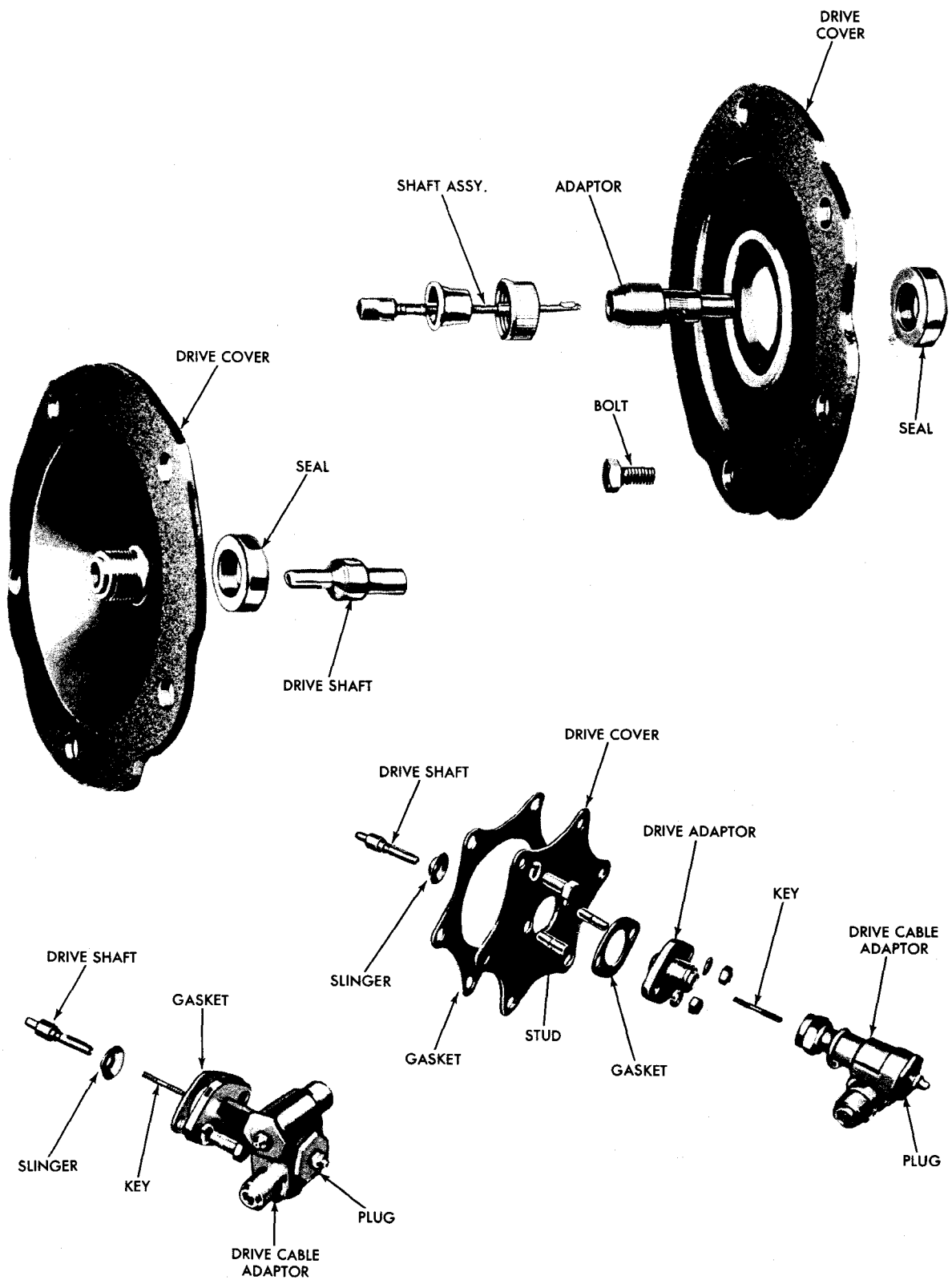
TYPICAL FUEL OIL STRAINER



TYPICAL FUEL OIL FILTER



TYPICAL FUEL PUMP



TACHOMETER DRIVE COVERS AND ADAPTORS

OWNER ASSISTANCE

The satisfaction and goodwill of the owners of Detroit Diesel engines are of primary concern to the Detroit Diesel Allison Division, its distributors and their dealers.

As an owner of a Detroit Diesel engine, you have a complete network of over 2300 Detroit Diesel Allison Distributors and Dealers in the U.S. and Canada, plus many outlets worldwide that are prepared and anxious to meet your parts and service needs:

- Expert service by trained personnel.
- Emergency service 24 hours a day.
- Complete parts support, including reliable components.
- Sales teams to help determine your power requirements.
- Product information and literature.

We recognize, however, that despite the best intentions of everyone concerned, misunderstandings may occur. Normally, any such situation that arises in connection with the sale, operation or service of your engine will be handled by the distributor or dealer in your area (check the Yellow Pages for the Detroit Diesel Allison Service Outlet nearest you).

To further assure your complete satisfaction, we have developed the following three-step procedure to be followed in the event you have a problem that has not been handled satisfactorily.

Step One - Discuss your problem with a member of management from the distributorship or dealership. Frequently complaints are the result of a breakdown in communication and can quickly be resolved by a member of management. If you have already discussed the problem with the Sales or Service Manager, contact the General Manager. If your problem originates with a dealer, explain the matter to a management member of the distributorship with whom the dealer has his service agreement.

Step Two - When it appears that your problem cannot readily be resolved at the distributor level without additional assistance, contact the Detroit Diesel Allison Regional Office nearest you listed below:

Eastern Region

Suite 202
10 Parsonage Road
Edison, New Jersey 08817
Phone: (201) 246-5074
Regional Manager: S. F. Zappia
Service Manager: D. P. Friedrich

Southeastern Region

5730 Glenridge Drive, N.E.
Atlanta, Georgia 30328
Phone: (404) 252-3310
Regional Manager: L. R. Kirby
Service Manager: B. D. Robison, Jr.

Great Lakes Region

Garrison Place
19855 Outer Drive
Dearborn, Michigan 48124
Phone: (313) 565-0411
Regional Manager: A. W. Christy
Service Manager: R. Schwaller

Midwestern Region

Suite 618
2021 Spring Road
Oak Brook, Illinois 60521
Phone: (312) 654-6619
Regional Manager: C. O. Zimmerman
Service Manager: T. F. Chope

Southwestern Region

Suite 130
2655 Villa Creek Drive
Dallas, Texas 75234
Phone: (214) 241-7721
Regional Manager: F. A. Skells
Service Manager: W. C. Kaphengst

Northwestern Region

Suite 250
20380 Town Center Lane
Cupertino, California 95014
Phone: (408) 255-7700
Regional Manager: W. C. Edwards
Service Manager: J. P. Miles

Western Region

Crocker Bank Building

Suite 823

15760 Ventura Blvd.

Encino, California 91436

Phone: (213) 981-7300

Regional Manager: G. J. Dunneback

Service Manager: W. K. Clark, Jr.

Prior to this call, have the following information available:

- Name and location of distributor (or dealer).
- Type and make of equipment.
- Engine model and serial number.
- Engine delivery date and accumulated miles or hours of operation.
- Nature of problem.
- Chronological summary of unit's history.

Step Three - If you are still not satisfied, present the entire matter in writing or by phone to the Home Office:

Diesel Operations - J. E. Fisher, Manager Customer Services, Detroit Diesel Allison, 13400 W. Outer Drive, Detroit, Michigan 48228, Phone (313) 592-5608.

Canada Operations - E. A. Kobe, Manager of Product Service, Diesel Division, General Motors of Canada, Ltd., P.O. Box 5990, 847 Highbury Avenue, London, Ontario N6A 4L6, Phone (519) 455-7110.

If an additional review by the Home Office of all the facts involved indicates that some further action can be taken, the Regional Office will so be instructed.

If at this point your problem is still not resolved to your satisfaction, call or write J. P. Lewis, Manager, Diesel Engine Service, Diesel Operations (313) 592-7279; D. F. Downham, Sales Manager, Diesel Operations (313) 592-7276.

When contacting the Regional or Home Office, please keep in mind that ultimately your problem will likely be resolved at the distributorship or dealership utilizing their facilities, equipment and personnel. Therefore, it is suggested that you follow the above steps in sequence when experiencing a problem.

ALPHABETICAL INDEX

Subject	Page	Subject	Page
A		D	
Accessory Drive	164	Description, General	5
Adjustments:		Diesel Principle	4
Governor Solenoid	104	E	
Injector Timing	83	Engine Accessory Arrangement Chart	6
Power Take-Off	39	Engine Coolant	22, 74
Valve Clearance	80	Engine Cross-Section Views	10
Air Compressor	160	Engine Load Limit Device	99
Air System:		Engine Models	7
Air Box Drains	17	Engine Out of Fuel	141
Air Cleaners	14	Engine Protective Systems	28
Air Silencer	17	Engine Tune-Up	79
Crankcase Ventilation	17	Electrical Starting System	30
Alarm System	29	F	
Assistance, Owner	169	Fan Mounting	162
B		Filters:	
Blower Assembly and Drive	165	Fuel Oil	13, 166
Built-In Parts Book	9, 149	Lubricating Oil	19, 159
C		Water	76
Camshaft and Gears	157	Fresh Water Pump	161
Cold Weather Starting Aids	36	Fuel Oil Specifications	69
Connecting Rod	156	Fuel Shut-Off Air Cylinder Assembly	103
Cooling System	20, 161	Fuel System:	
Antifreeze Solutions	77	Injector	11
Cooling System Capacity	22	Pump	12, 166
Cooling System Cleaners	23	Strainer and Filter	13, 166
Corrosion Inhibitor	74	Tank	14
Drain Cooling System	23	G	
Flushing	23	General Description	5
Fresh Water Pump	24, 161	General Specifications	5
Heat Exchanger Cooling	21	Governors	38, 79
Keel Cooling	21	H	
Radiator and Fan Cooling	20	Heat Exchanger	163
Raw Water Pump	24	Hydraulic Pump	160
Water Filter	76	Hydraulic Starting System	32
Crankshaft	155	I	
Crankshaft Pulley	155	Idle Gear	157
Cylinder Head	155	Injector	11
		Injector Controls	158
		Instruments and Controls	27

Subject **Page**

L

Liner	156
Lubricating Oil Pump	159
Lubricating Oil Specifications	70
Lubricating System	18
Lubrication and Preventive Maintenance	55
Lubrication Chart	56

M

Maintenance, Preventive	55
Marine Gear	41
Model and Serial Number	8

O

Oil Cooler	159
Oil Filter	19, 159
Oil Pump and Regulator	159
Operating Instructions:	
A.C. Power Generator Set	50
D.C. Power Generator Set	52
Engine	45
Option Plate	9
Owner Assistance	169

P

Piston	156
Power Control Device	101
Power Take-Off	39
Preventive Maintenance	55
Principles of Operation	4

Subject **Page**

Pump:

Fresh Water	24
Fuel	12
Raw Water	24

S

Shutdown Systems	28
Specifications:	
Fuel Oil	69
General	5
Lubricating Oil	70
Starting Systems:	
Electrical	30
Hydraulic	32
Storage:	
Preparation	145
Restoration	147

T

Tachometer Drive	167
Thermostat	161
Throttle Adjustment:	
Tandem Twin Units with	
Variable Speed Governors	134
Twin and Quad Units with	
Limiting Speed Governors	128
Twin and Quad Units with	
Variable Speed Governors	130
Throttle Delay	102
Timing Fuel Injector	83
Transmissions:	
Paragon Marine Gear	43
Power Take Off	39
Power Transfer Gear	41
Quad Reduction Gear	41
Torqmatic Converter	43
Torqmatic Marine Gear	42
Twin Reduction Gear	41
Trouble Shooting	139
Tune-Up Procedures	79

V

Valve Operating Mechanism	158
Vibration Damper	155