

OPERATORS MANUAL AND PARTS CATALOG

FOR
ELECTRIC GENERATING SETS

*Page 7
23*

RJC
SERIES

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**PERFORMANCE
CERTIFIED**

We certify that when properly installed and operated this Onan electric plant will deliver the full power and the voltage and frequency regulation promised by its nameplate and published specifications. This plant has undergone several hours of running-in and testing under realistic load conditions, in accordance with procedures certified by an independent testing laboratory.

ONAN 1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432
A DIVISION OF ONAN CORPORATION

IMPORTANT...RETURN WARRANTY CARD ATTACHED TO UNIT

INTRODUCTION

THIS OPERATOR'S MANUAL CONTAINS INFORMATION PERTAINING TO THE INSTALLATION, OPERATION, AND MAINTENANCE OF YOUR ONAN UNIT. A PARTS CATALOG IS ALSO INCLUDED IN THIS MANUAL.

WE SUGGEST THAT THIS MANUAL AND THE WIRING DIAGRAM WHICH ACCOMPANIES EVERY ONAN UNIT BE RETAINED AND REFERRED TO WHEN MAKING EQUIPMENT ADJUSTMENTS OR ORDERING PARTS. ADDITIONAL COPIES ARE AVAILABLE FOR A NOMINAL CHARGE FROM YOUR ONAN DISTRIBUTOR.

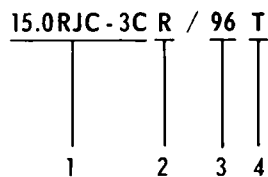
WHEN ORDERING PARTS REMEMBER TO INCLUDE THE ONAN MODEL, SPECIFICATION LETTER, AND SERIAL NUMBER LOCATED ON THE NAMEPLATE OF YOUR ONAN UNIT. THIS IS ESSENTIAL TO ENSURE THE CORRECT PART IS SHIPPED TO YOU.

FOR MAJOR REPAIR SERVICE, CONTACT YOUR ONAN AUTHORIZED DISTRIBUTOR.

GENERAL INFORMATION

When instructions in this manual refer to a specific model of generating set, identify the model by referring to the MODEL and SPECIFICATION NO. as shown on the set nameplate. Electrical characteristics are shown on the lower portion of the set nameplate.

How to interpret MODEL and SPEC NO.



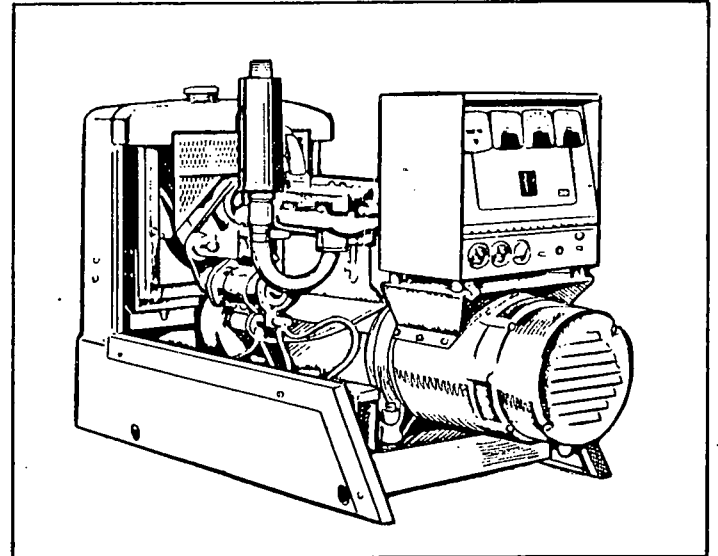
1. Factory code for general identification.
2. Specific Type:
 - E - ELECTRIC.* Electric starting at the set only.
 - R - REMOTE.* Electric starting. For permanent installation, can be connected to optional accessory equipment for remote or automatic control of starting and stopping.
3. Factory code for optional equipment.
4. Specification letter (advances when factory makes production modifications).

CAUTION

Onan uses this symbol throughout the text to warn of possible equipment damage.

WARNING

This symbol is used to warn of any possible personal injury.



TYPICAL MODEL RJC



MANUFACTURER'S GENERAL WARRANTY

Manufacturer extends to the original purchaser of Goods for use, the following warranties, subject to the qualifications indicated:

(a) Manufacturer warrants satisfactory performance for a period of one (1) year from the date each product is placed in service, so long as such product is installed, operated and serviced in accordance with Manufacturer's written instructions. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING FITNESS FOR A PARTICULAR PURPOSE.

(b) Manufacturer's liability and purchasers' sole remedy for a failure of Goods to perform as warranted, and for any and all other claims arising out of the purchase and use of the Goods, including negligence on the part of Manufacturer, shall be limited to the repair or replacement of Goods returned to Manufacturer's factory or one of its Authorized Service Stations, transportation prepaid. The cost of any labor included shall be as specified in Manufacturer's written instructions. MANUFACTURER SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

(c) All claims shall be brought to Manufacturer's attention within Thirty (30) days after discovery that the Goods failed to perform as warranted, but in no event shall a claim be accepted after one (1) year from the date such product is placed in service.

No person is authorized to give any other warranty or to assume any other liability on Manufacturer's behalf unless made or assumed in writing by an Officer of Manufacturer, and no person is authorized to give any warranty or assume any liabilities on the Manufacturer's behalf unless made or assumed in writing by such Manufacturer.

ONAN

1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432

SPECIFICATIONS

Nominal dimensions of set (inches)	
Unhoused (radiator cooled) 12.5RJC, 60 hertz	40-1/8 H x 27 W x 57-3/8 L
12.5RJC, 50 hertz and 15.0RJC, 60 hertz	40-1/8 H x 27 W x 62 L
Housed (radiator cooled)	40-1/8 H x 27 W x 73-13/16 L
City water cooled - 12.5RJC, 60 hertz	32-1/4 H x 20-7/16 W x 46 L
12.5RJC, 50 hertz and 15.0RJC, 60 hertz	32-1/4 H x 20-7/16 W x 50-5/8 L
Number cylinders (vertical inline)	4
Displacement (cubic inch)	120
Cylinder bore	3.25 inch
Piston stroke	6.625 inch
Compression ratio (gasoline fuel)	6.5 to 1
RPM (for 60 hertz)	1800
RPM (for 50 hertz)	1500
Exhaust connection (pipe tapped)	1.5 Inch
Governor	Internal Flyball Type (Externally adjustable)
Ignition (type)	Battery
Battery voltage	12 volt
Battery size (AC set)	
SAE group 1H	2 in Series
Amp/hr, SAE 20 hr (nominal)	105
Starting by starting motor with solenoid shift and over-running clutch	Yes
Battery charge rate amperes (normal)	2
Charge ammeter scale	5-0-5
* Oil capacity in U.S. quarts (refill)	6
Water capacity (radiator cooled)	12 quarts
Ventilation required (cfm at 1800 rpm)	
Engine - radiator cooled	2750
Generator	120
Combustion	64
Cooling water flow - city water cooled sets (gallon per minute - nominal)	
Water temperature 40°F	2.3
Water temperature 60°F	2.8
Water temperature 80°F	3.5
Air cleaner type	Oil Wetter Polyurethane
Oil filter	Full Flow Type
Generator	
Output is rated at unity power factor load on these models	1 phase
Output is rated at 0.8 power factor load on these models	3 phase
Rating (ac output in watts)	
12.5RJC, 60 hertz	12,500
15.0RJC, 60 hertz	15,000
12.5RJC, 50 hertz	12,500

AC voltage regulation	Plus or Minus 3%
AC frequency regulation	5%
Generator type	Revolving Field
120/240-volt single phase model reconnectible	Yes
Excitation	Static Exciter

* Plus 1/2 quart for new filter.

NOTE: New model designations shown, begin during 1969. Previous designations did not use a decimal in the KW rating. EXAMPLE: 12.5RJC was formerly 12RJC and 15.0RJC was formerly 15RJC.

NOTE: Hertz is a unit of frequency equal to one cycle per second.

DIMENSIONS AND CLEARANCES

All clearances given at room temperature of 70°F.
All dimensions in inches unless otherwise specified.

	Minimum	Maximum
CAMSHAFT		
Bearing Journal Diameter, Front	2.2500	2.2505
Bearing Journal Diameter, Rear	1.1875	1.1880
Bearing Journal Diameter, Center	1.2580	1.2585
Bearing Clearance Limit . . . . .	.0012	.0037
End Play, Camshaft . . . . .	.007	.039
Cam Tappet Diameter, Begin Spec P . . . . .	.8725	.8730
Spec A through N . . . . .	.7475	.7480
Cam Tappet Hole Diameter, Begin Spec P . . . . .	.8755	.8765
Spec A through N . . . . .	.7505	.7515
CONNECTING RODS		
Large Bore Diameter	2.1871	2.1876
Small Bore Diameter	1.044	1.045
Clearance, Bearing-to-Crankshaft . . . . .	.001	.003
CYLINDER		
Cylinder Bore	3.2495	3.2505
CRANKSHAFT		
Main Bearing Journal Diameter	2.2427	2.2435
Main Bearing Clearance . . . . .	.0024	.0052
Connecting Rod Journal Diameter	2.0597	2.0605
Rod Bearing Clearance . . . . .	.0001	.0033
End Play, Crankshaft . . . . .	.010	.015
PISTON		
Piston Clearance to Cylinder Wall (Measure 90° to Pin, Just Below Oil Ring Groove) . . . . .	.0012	.0032
PISTON PIN		
Piston Clearance	Thumb Push Fit	
Connecting Rod Bushing Clearance . . . . .	.0002	.0007
PISTON RINGS		
Ring Gap . . . . .	.010	.020
Ring Width, Top . . . . .	.0925	.0935
2nd . . . . .	.0925	.0935
3rd . . . . .	.1860	.1865
VALVE, INTAKE		
Stem Diameter . . . . .	.3405	.3415
Guide Clearance . . . . .	.001	.003
Valve Face		45°
Valve Clearance, Begin Spec D . . . . .		.012
Spec A through C . . . . .		.010
VALVE, EXHAUST		
Stem Diameter . . . . .	.3405	.3415
Guide Clearance . . . . .	.0030	.0050
Valve Face		45°
Valve Clearance, Begin Spec D . . . . .		.015
Spec A through C . . . . .		.013

	Minimum	Maximum
VALVE GUIDE		
Length		1-25/32
Outside Diameter . . . . .	.4690	.4695
Inside Diameter (After Reaming) Exhaust . . . . .	.344	.345
Intake . . . . .	.342	.343
Cylinder Block Bore Diameter . . . . .	.467	.468
VALVE SEATS (Stellite)		
Valve Seat Bore		
Diameter, Intake	1.547	1.548
Exhaust	1.361	1.362
Depth (From Cylinder Head Face) . . . . .	.433	.439
Seat Insert Outside Diameter, Exhaust	1.364	1.365
Intake	1.550	1.551
Seat Width	3/64	1/16
Seat Angle		45°
Available Oversizes . . . . .	.002, .005,	.010, .020
VALVE SPRINGS		
Load, Valve Closed	45	49 lb.
Load, Valve Open, Begin Spec P	87.2	97.2 lb.
Spec A through N	83	93 lb.
SPARK PLUGS		
Spark Plug Gap . . . . .	.025	<u>.035</u>
CENTRIFUGAL SWITCH		
Breaker Point Adjustment . . . . .		.020
BREAKER POINT SETTING		
Gap . . . . .	.018	.022
Distributor Dwell Angle (If Using Dwellmeter)		51°
TAPPETS		
Gasoline, Intake . . . . .		.012
Exhaust . . . . .		.015
Gas and Gas/Gasoline, Intake . . . . .		.013
Exhaust . . . . .		.020
IGNITION TIMING SPARK ADVANCE		
(Running) Gas Fuel		35° BTC
(Stopped) Gas Fuel		*10° BTC
(Running) Gasoline Fuel		
Flywheel Magneto		-
Battery		25° BTC
(Stopped) Gasoline Fuel		
Flywheel Magneto		-
Battery		**0° BTC

* - 20° BTC for units with shielded distributor.
** - 10° BTC for units with shielded distributor.

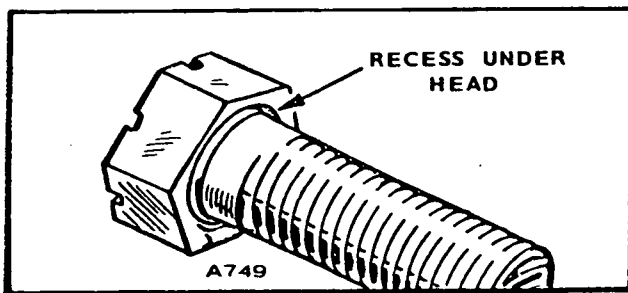
ASSEMBLY TORQUES AND SPECIAL TOOLS

TORQUE SPECIFICATIONS

	FT. - LB.
Center Main Bolt	97 - 102
Connecting Rod Bolt	27 - 29
Cover-Rocker Box	8 - 10
Cylinder Head Bolt	44 - 46
Exhaust Manifold Nuts	13 - 15**
Flywheel Mounting Screw	65 - 70
Hub to Flywheel Screws	17 - 21
Fuel Pump Mounting Screws	15 - 20
Gear Case Cover	18 - 20
Intake Manifold	13 - 15
Oil Base Mounting Screws	45 - 50
Oil Filter Hand Tight Plus 1/4 to 1/2 Turn	
Oil Pump Mounting Screws	15 - 20
Rear Bearing Plate	40 - 45
Rocker Arm Nut	4 - 10*
Rocker Arm Stud	35 - 40
Through-Stud-Nut	
Revolving Armature	30 - 40
Revolving Field	55 - 60
Spark Plug	25 - 30

* This torque is from friction between the threads only and locks the nuts in place. The rocker arm nuts are for adjusting valve lash.

** **CAUTION** Tighten nuts evenly to avoid manifold damage.



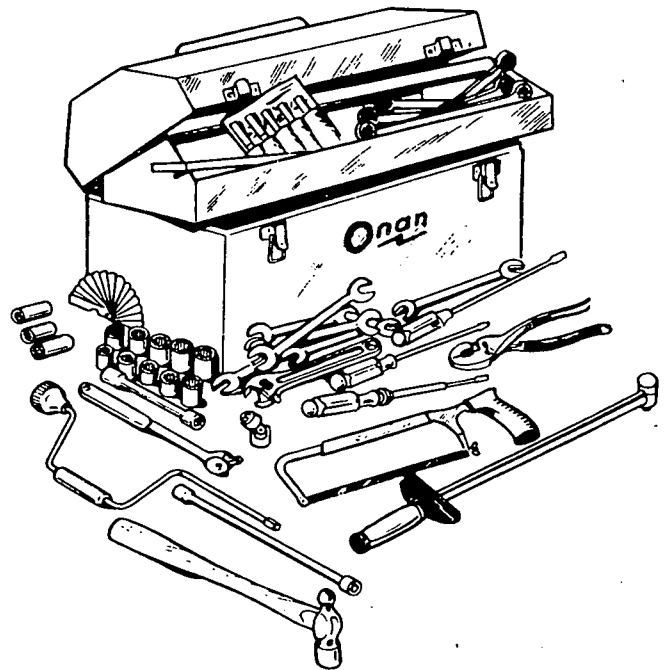
Assembly torques assure proper tightness without danger of stripping threads. If a torque wrench is not available, estimate the degree of tightness. Use reasonable force and a wrench of normal length.

Special Place Bolts do not require lockwashers or gaskets. Never attempt to use a lockwasher with these bolts, it will defeat their purpose. Check all studs, nuts and screws often. Tighten as needed.

SPECIAL TOOLS AND EQUIPMENT

These tools are available from Onan to aid service and repair work.

Connecting Rod Aligning Set	420-0173
Crankshaft Gear Pulling Ring	420-0275
Driver, Front Camshaft Bearing	420-0252
Driver, Rear Camshaft Bearing	420-0251
Driver, Center Camshaft Bearing	420-0254
Driver, Main Bearing Front and Rear	420-0269
Driver, Valve Seat	420-0270
Rear Oil Seal Guide and Driver	420-0250
Front Oil Seal Guide and Driver	420-0281
Ridge Reamer	420-0260
Ring Compressor	420-0214
Valve Spring Compressor Tool	420-0210
Valve Seat Remover	420-0272
Replacement Blades for 420-0272	420-0274



INSTALLATION

GENERAL

Installation points to consider include: adequate engine and generator cooling air; discharge of circulated air; adequate fresh induction air; discharge of exhaust gases; electrical connections; fuel connections; water connections; accessible for operation and servicing; sturdy and level floor.

Installations must be considered individually - use these instructions as a general guide. Meet regulations of local building codes, fire ordinances, etc., which may affect installation details.

LOCATION

Provide a location that is protected from the weather, dry, clean, dust free and well ventilated. If practical install inside a building for protection from extremes in weather conditions, and preferably heated in cold weather.

MOUNTING

For permanent installations, provide a sturdy, level mounting base of concrete, heavy wood or structural steel, and preferably raised to aid oil changing and operation. Sets may be bolted down in position if desired. Allow at least 24 inch clearance on all sides of the set for convenience in servicing.

For mobile applications, as in trucks or trailers, the set must be securely bolted down to prevent shifting in transit. Extra support for the vehicle flooring may be necessary.

On city water cooled installations, carefully assemble the mounting cushions, washers and spacer bushing, Figure 1. The spacer bushing prevents excessive compression of the upper rubber cushion. Space the 7/16 inch diameter mounting bolts in the floor or base. Distances (inches) between hole centers are: ENGINE END 11", GENERATOR END 11" and ENGINE TO GENERATOR 21".

CAUTION *One half inch clearance is required between oil filter and mounting bolt to avoid puncturing filter.*

VENTILATION

Sets create a considerable amount of heat which must be removed by proper ventilation. Outdoor installations can rely on natural air circulation, but *mobile* and *indoor* installations need properly sized and positioned vents for the required air flow. See Specifications for the air needed to

operate with rated load under normal conditions at 1800 rpm.

Cooling air travels from the rear of the set to the front end. Locate the room or compartment air inlet where most convenient, preferably to the rear of the set. The inlet opening should be at least as large as the radiator area.

Engine heat is removed by a pusher fan which blows cooling air out through the front of the radiator. The cooling air outlet should be directly in front of the radiator and as close as is practical. The opening size should be at least as large as the radiator area. A duct of canvas or sheet metal should be used between the radiator and the air outlet opening. The duct will prevent recirculation of heated air.

Generator cooling air is discharged through the engine to generator adapter on the left side of engine.

A means of restricting the air flow in cold weather can be provided to keep the room or compartment temperature at a normal point.

On city water cooled sets the conventional radiator is not used and a constantly changing water flow cools the engine. Ventilation is seldom a problem, but sufficient air movement and fresh air must be available to properly cool the generator and support combustion in the engine. For small compartments a duct of equal or larger than the generator air outlet area is recommended to remove the heated air from the generator to the outside atmosphere. Limit bends and use radius type elbows where needed. A large, well ventilated compartment or room does not require a hot air duct.

CITY WATER COOLING

Engine connections are 3/8 inch pipe. A solenoid shut-off valve and a lock shield supply valve are furnished but not installed. The solenoid valve is coordinated with the ignition system to shut off water supply when the set is not in use. The lock shield valve is hand adjusted to control water rate-of-flow to provide proper cooling with a minimum flow of water. Final adjustments should be made under the maximum load the set will carry, with the set thoroughly warmed up, and water temperature stabilized. Refer to Specifications for water flow data.

EXHAUST

WARNING

Pipe POISONOUS exhaust gas outside - exhaust gas is poisonous.

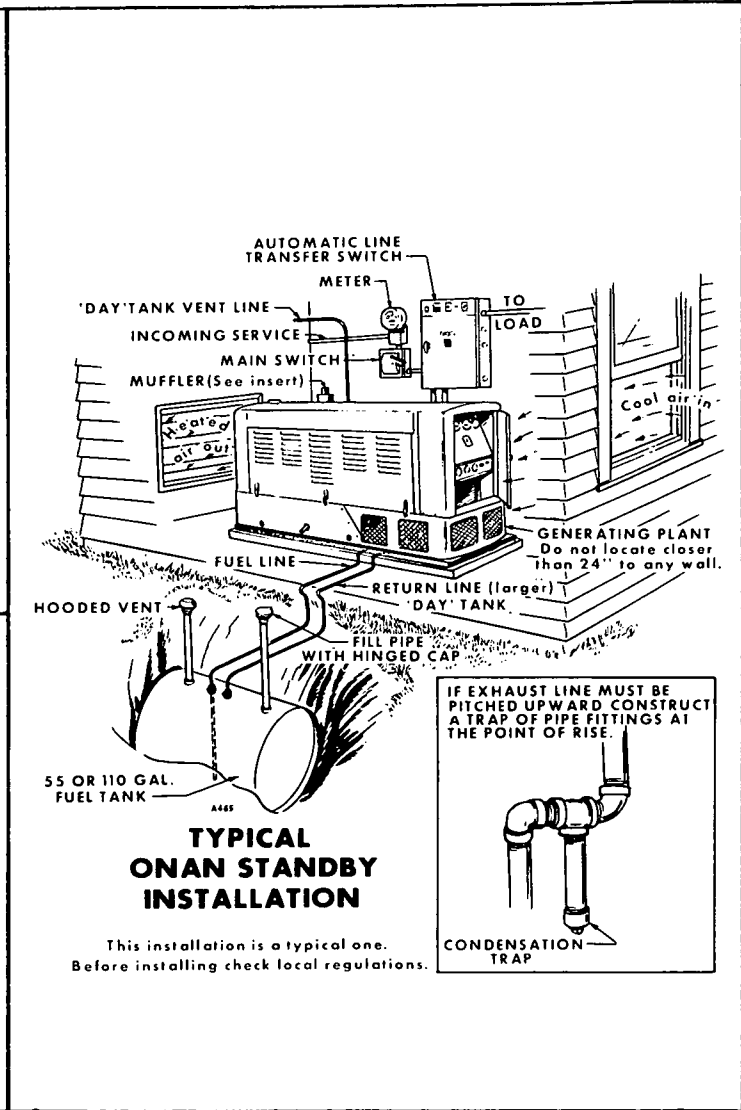
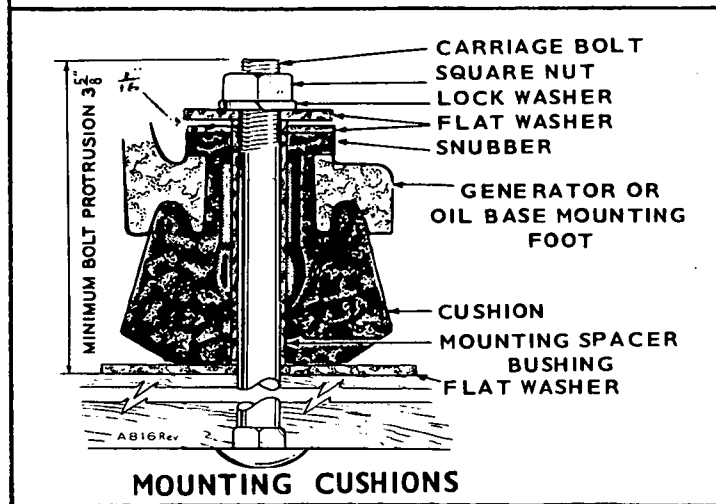
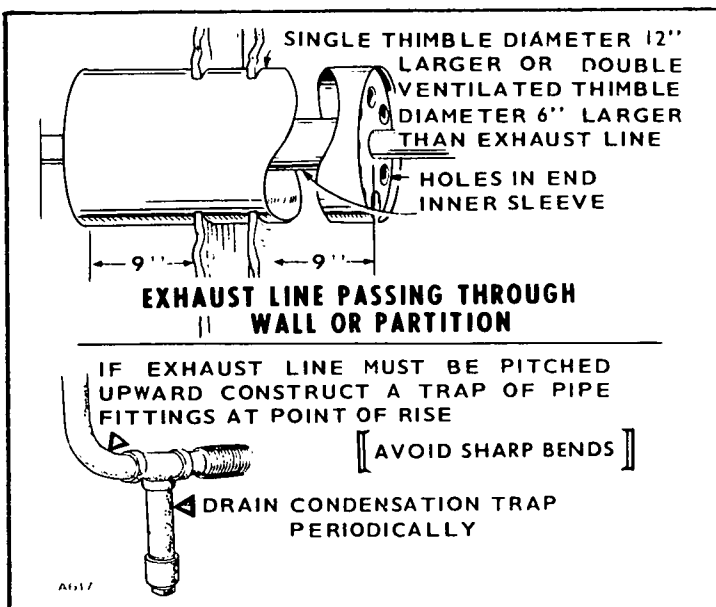


FIGURE 1. TYPICAL INSTALLATION

The exhaust outlet is 1-1/2 inch pipe size. Locate the exhaust outlet far from the air inlet to avoid gases re-entering enclosure. Use flexible tubing to connect between the engine exhaust and any rigid pipe extension. Shield the line if it passes through a combustible wall, Figure 1. If turns are necessary, use sweeping (large radius) elbows. If pitched upward, install a condensation trap at point of rise. Increase one pipe size for each additional 10 feet in length. Permissible maximum exhaust back pressure at the manifold at full load is 27" water column (2" mercury) or at no load is 4.7" water column (1/3" mercury).

GASOLINE TANK

When a separate fuel tank is used, install so that the bottom of the tank will be less than 8 feet below the fuel pump. Horizontal runs of any length will reduce the lift of the fuel pump and may require installing an auxiliary electric fuel pump. The top of the fuel supply tank must be below the fuel pump to prevent siphoning if a system leak occurs. For servicing put a valve at the tank. When fuel tanks are shared, do not connect to an existing line at a point above the fuel supply level. This avoids starving the unit.

WARNING Do not use exhaust heat for heating purposes. Possible leakage of exhaust gases could occur.

FUEL CONNECTION

For gasoline sets, connect the fuel line to the fuel pump inlet. Pump is threaded 1/8-27 NPTF (American Standard Internal Tapered Pipe Thread). **Important:** Connect the

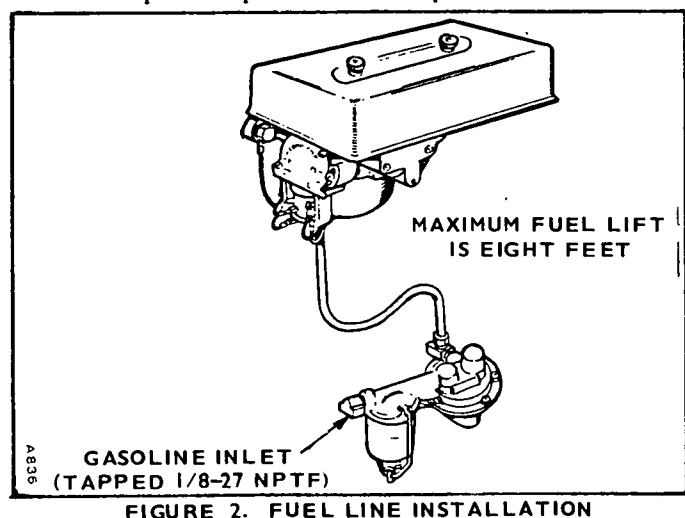


FIGURE 2. FUEL LINE INSTALLATION

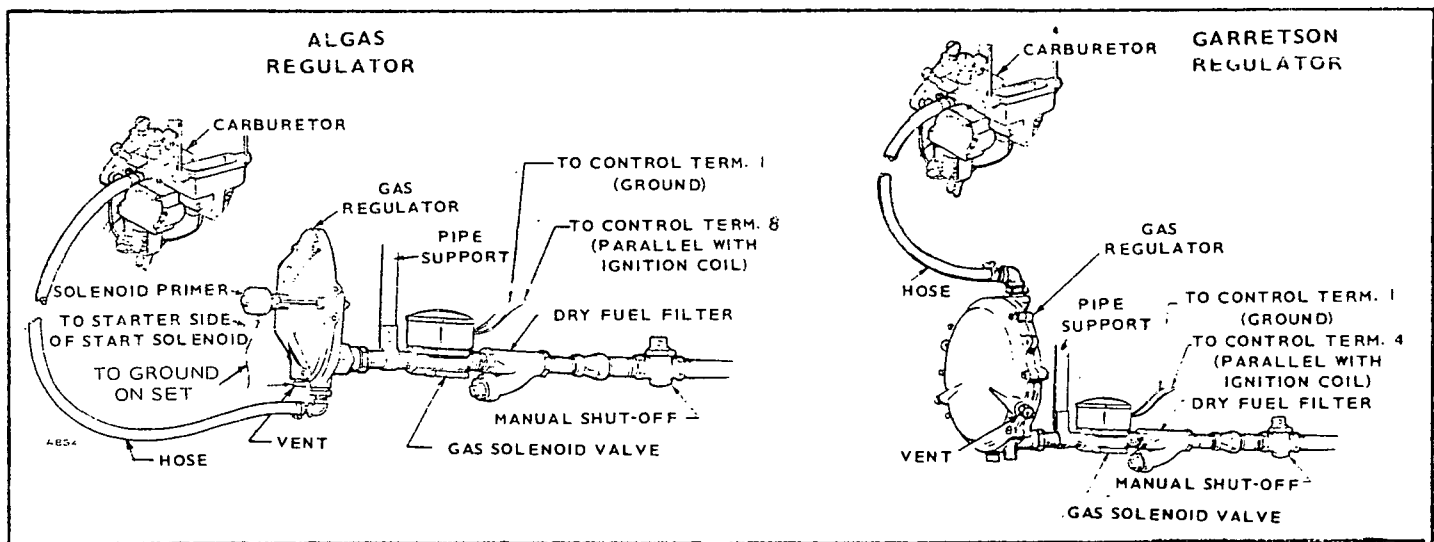


FIGURE 3. GAS INSTALLATION

set to the fuel source with a flexible line to avoid line failure due to vibration.

For gaseous sets (see Fig. 3) check with the local fuel supplier for gas regulations and line pressure. Provide a manual gas valve. A filter in the line may be necessary. Electric solenoid shut-off valves in the supply line are usually required for indoor automatic or remote starting installations. Connect solenoid wires to battery ignition circuit (Fig. 3) to open valve during running. Install a demand type gas regulator according to instructions and position it near the set to aid starting (regulator line pressure must be within 2 to 8 oz.).

Liquid withdrawal fuel systems utilizes heat from the engine cooling system to vaporize liquid fuel (LPG) from the fuel storage tank. The converter (heat exchanger) contains both the primary and secondary regulators required for gaseous fuel pressure control (Fig. 4).

Carburetor adjustments and settings are the same as with gaseous fuels.

Check with the fuel supplier regarding local gas regulations. An electric solenoid shut-off valve in the supply line and manual fuel shut-off valves on the tank and at the engine are usually required for an indoor installation. Connect the gas solenoid wires to the battery ignition circuit so the solenoid is open only during set starting and running. Use only heavy walled seamless brass or copper tubing with an internal diameter not greater than 3/32" and a wall thickness of not less than 3/64" (NFPA Pamphlet 58) unless local regulations require different tubing dimensions.

Important: Always use flexible tubing between engine and the gas demand regulator.

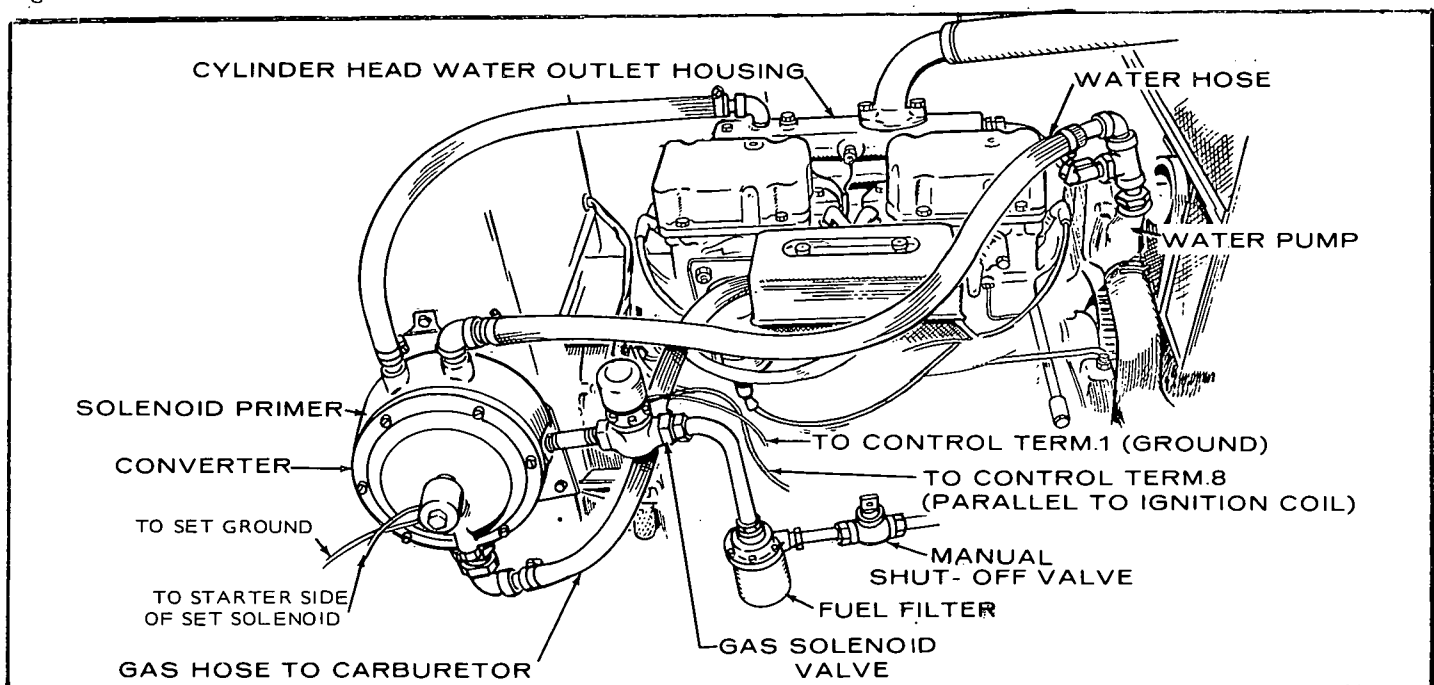


FIGURE 4. CONVERTER INSTALLATION FOR LPG LIQUID WITHDRAWAL

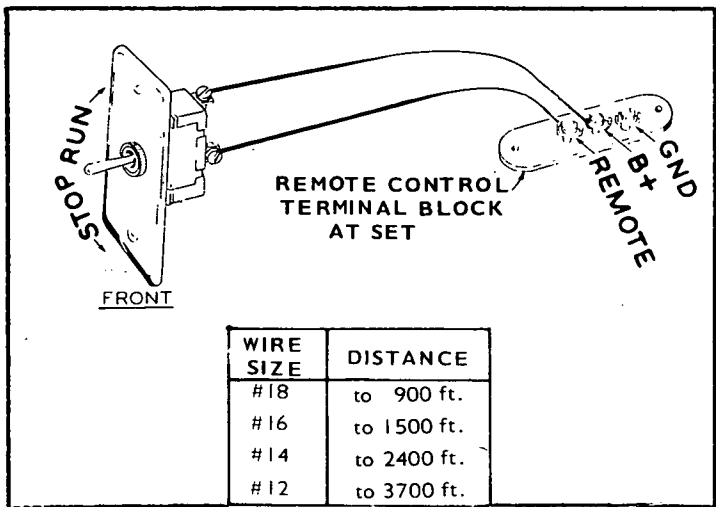


FIGURE 5. REMOTE CONTROL SWITCH

GROUNDING

To prevent shock hazard, ground the unit. For permanent installations, connect a #8 or larger wire between:

- (1) a separate ground pipe or rod penetrating into moist earth,
- (2) and the solderless connector located on the generator (on models not so equipped, to the battery ground stud on the engine).

REMOTE START-STOP SWITCH (Optional)

For remote control starting and stopping, use 2 wires to connect the remote switch to the terminal block marked Remote, B+ and Ground in the set control box, using wire wire sizes listed in Figure 5.

BATTERY CONNECTION

Beginning Spec P, sets are designed for negative (-) ground only (see Figure 7). Penn state units are negative ground only. Spec A through N, battery polarity connections must agree with the rectifier connection located in the control box. If battery ground must be changed, reverse the rectifier connection in the control, Figure 6.

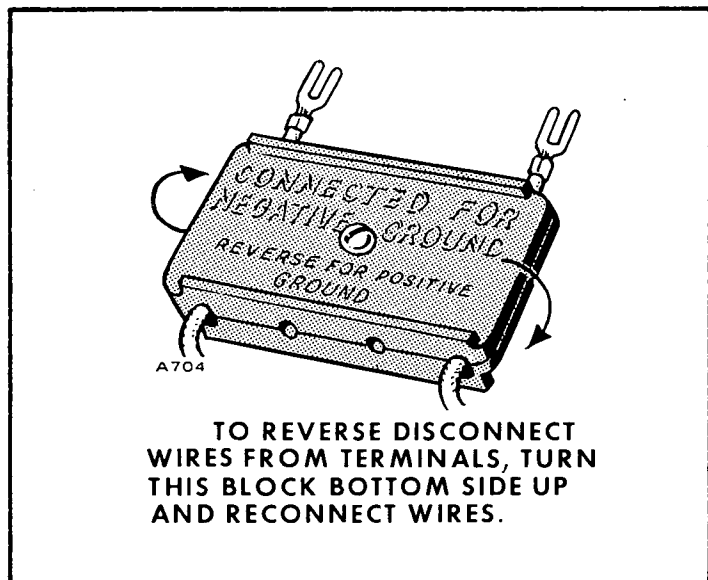


FIGURE 6. POLARITY CONNECTION

CAUTION If battery polarity is wrong, damage will occur within 3 minutes while stopped or 5 seconds while running. Alternator windings will be damaged almost instantly if battery charging circuit is shorted before the resistor.

See Specifications for minimum 12 volt battery requirements. Connect battery positive (+) to starter engaging solenoid terminal post, (Fig. 7). Connect battery negative (-) to a good ground on the engine.

LOAD WIRE CONNECTIONS

Set nameplate shows the electrical output rating in watts, volts, and hertz. The set wiring diagram shows the electrical circuits and connections necessary for the available output voltage. Also see Figure 8.

Meet all applicable electrical code requirements. Work should be done by a qualified serviceman or electrician because the installation will be inspected and approved.

The set control box (junction box) has knockout sections to accommodate load wires. Use flexible conduit and stranded load wires near the set to absorb vibration. Use sufficiently large insulated wires. Strip insulation from wire ends as necessary for clean connections. Connect each load wire to proper generator output lead inside the set control box. Insulate bare ends of ungrounded wires. Use a bolt (through the control box) to connect the grounded (\equiv) generator lead and load wire. Install a fused main switch (or circuit breaker) between the generating set and load. If a test-run indicates wrong rotation of 3 phase motors in the load circuit, switch the connections at any two generator terminals.

Standby: If the installation is for standby service, install a double throw transfer switch (either manual or automatic type) to prevent feeding generator output into the normal

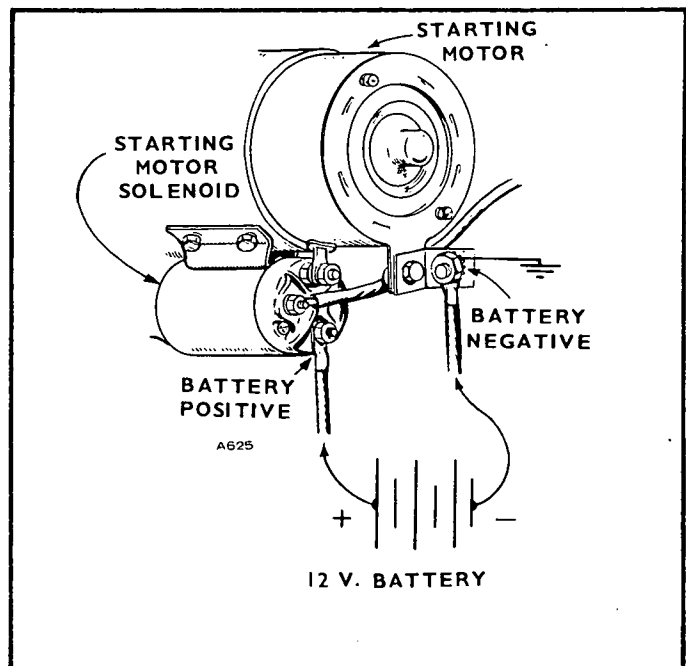


FIGURE 7. BATTERY CONNECTIONS

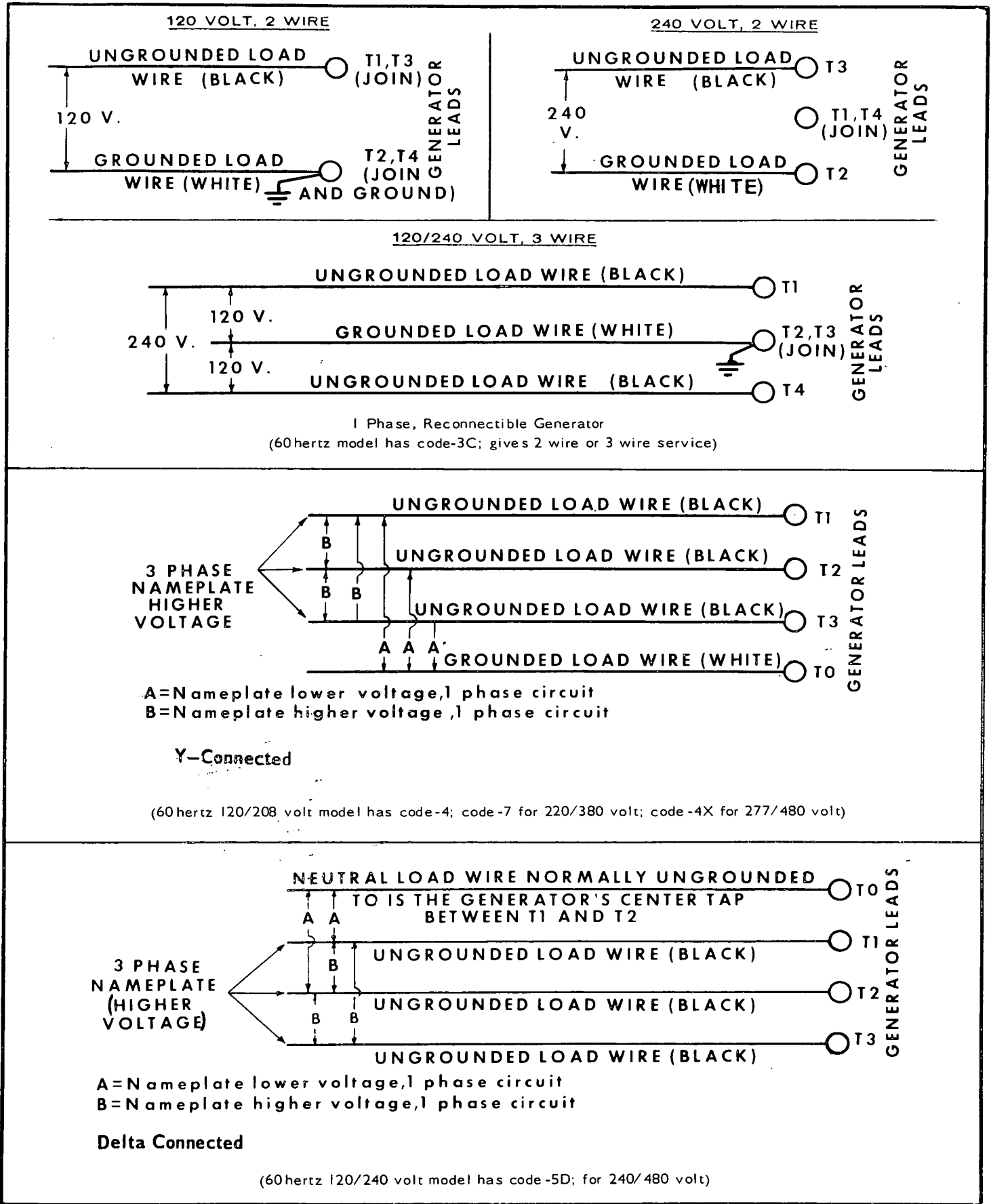


FIGURE 8. LOAD CONNECTIONS

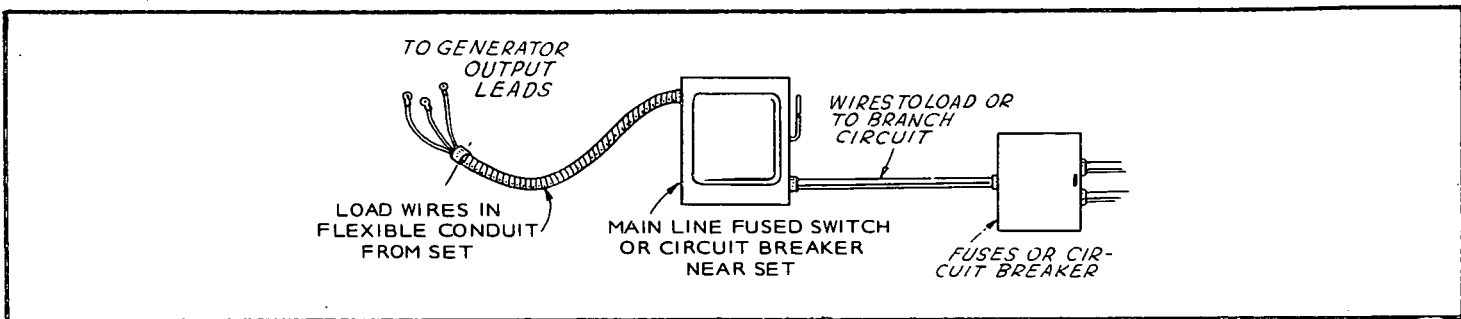


FIGURE 9. EXTERNAL SET CONNECTIONS

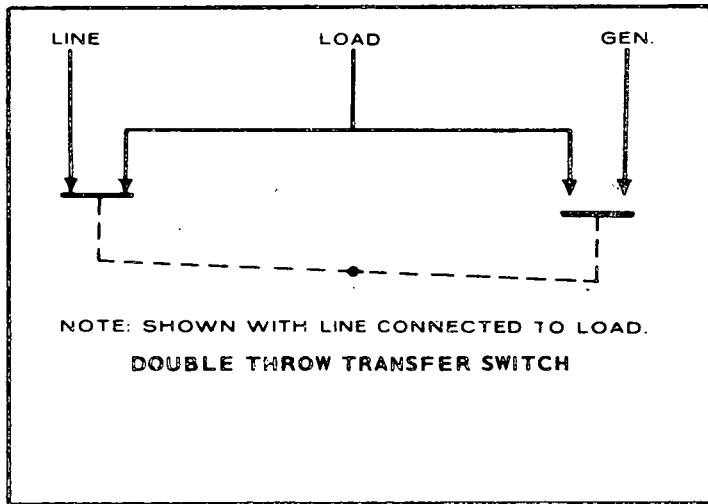


FIGURE 10. LOAD TRANSFER

power source lines and to also prevent commercial power and generator output from being connected *at the same time to the load*. Instructions for connecting an automatic load transfer switch is included with such equipment. See Fig. 10.

BALANCE ALL LOADS

Current for any one output lead must not exceed nameplate rating. Overloading can damage the generator windings. Divide the loads equally between output leads.

Single Phase Loads on Three Phase Generators: Any combination of single phase and three phase loading can be used at the same time as long as the current for any one output lead does not exceed the generator nameplate rating.

Output Lead Markings: Leads on the revolving field generators are marked T1, T2, etc. These identifying marks appear also on the wiring diagram.

Voltage Selection on Reconnectable Single Phase Generators: This does not apply to sets with meter panel, circuit breaker, etc. (all housed sets and unhoused sets with optional meter panel). The four wires on the other single phase models are reconnectable for use as either a 120/240 volt, 3 wire, a 120 volt 2 wire, or a 240 volt 2 wire power source (Figure 8).

Delta Generator: Generator lead T0 is the generator center tap between T1 and T2. The T0 lead is normally not grounded, but can be grounded if required.

Load Connections: Refer to the figure which illustrates the load connection for the output shown on your set's nameplate. See switchboard instructions when a switchboard is used.

Switchboard: When an optional wall mounted switchboard containing ammeters, voltmeters, circuit breakers, is used, these load wire connections apply: Connect to the unused terminal of each ammeter, one ungrounded (hot) generator lead. Connect to the ground stud in the switchboard, generator leads and load wires which are to be grounded - if any. Connect to the unused terminal of each circuit breaker, one ungrounded (hot) load wire. On sets which generate more than one voltage, the voltmeter reads the higher voltage shown on the nameplate. The lower voltage is correct when the higher voltage is correct.

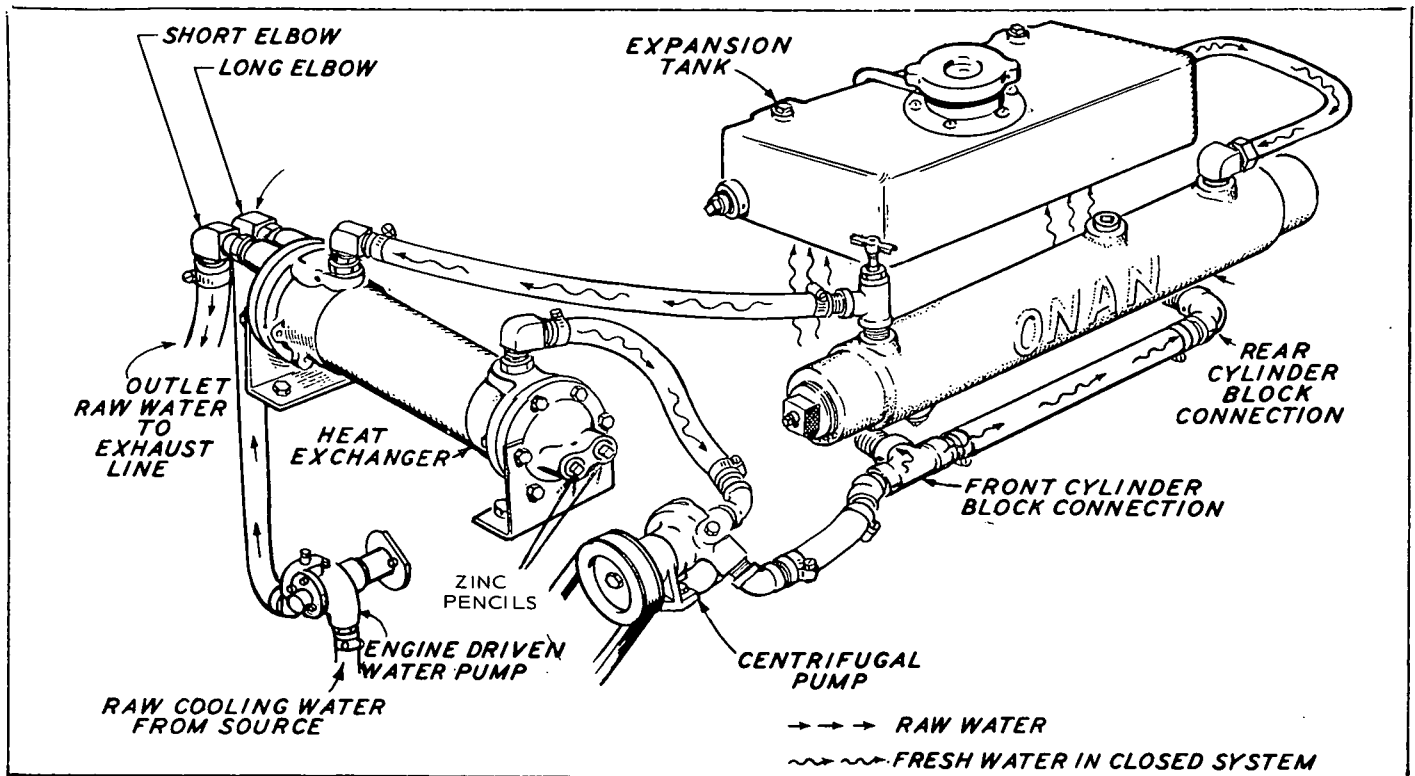


FIGURE 11. HEAT EXCHANGER PLUMBING

HEAT EXCHANGER COOLING (Optional)

This is a closed cooling system commonly referred to as fresh water cooling. Water circulated through the engine is termed fresh water, hot water, jacketed water, etc. Water circulated through the heat exchanger only is called raw water, sea water, cold water, discharged water, etc. This system (with anti-freeze coolant) is recommended where freezing hazards exist or where the owner wants to prevent salt water problems.

Two conditions prevail: (1) Factory installed heat exchanger and (2) Customer installed Onan heat exchanger kit. Get details from Onan.

CAUTION For field installation of heat exchanger kit, do not use existing neoprene impeller water pump for hot water side of cooling system. Heat or soluble oil (in many rust inhibitors and anti-freezes) will damage the impeller.

NOTE: Use an expansion tank in the hot water side.

On early models with heat exchangers, the discharged water leaves at the exhaust manifold. On later models, discharged water leaves at the heat exchanger and then to exhaust system water inlet. Supply line connections in both systems are the same (Figure 11). Refer to the instructions for standard systems in this section.

Fill closed cooling systems with clean, alkali-free water to the proper level in the expansion tank. Add an approved rust inhibitor to the coolant. If the coolant is anti-freeze, test it periodically.

The raw water side of the heat exchanger is protected from corrosion by a zinc pencil mounted on a pipe plug in one end of the heat exchanger. Inspect the pencil at least every two months and replace if deteriorated to less than 1/2 original size.

Improper filling of the heat exchanger can cause overheating of the engine. Therefore, to prevent this possibility, follow these instructions whenever adding coolant to the heat exchanger:

1. Remove fill cap.
2. Open fill vent valve (turn counterclockwise).
3. Remove vent plug.
4. Fill with coolant until vents overflow.
5. Close fill vent valve (turn clockwise).
6. Replace vent plug.
7. Replace fill cap.
8. Run engine until warm. Then recheck coolant level in expansion tank. If necessary, add coolant to bring to proper level.

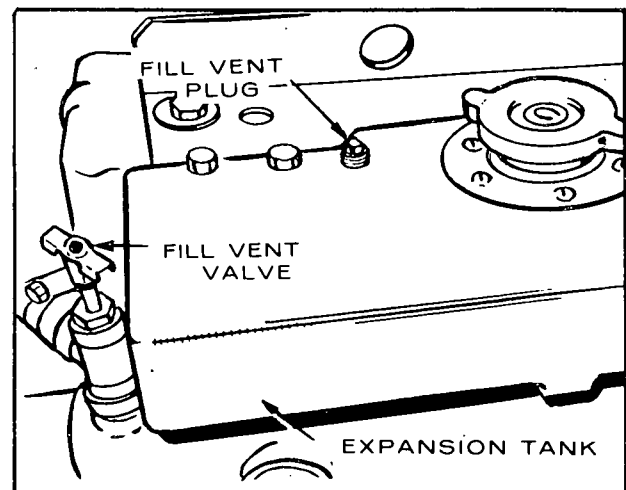


FIGURE 12. FILLING HEAT EXCHANGER

OPERATION

CRANKCASE OIL

Use a good quality heavy duty detergent oil that meets the API (American Petroleum Institute) service designations SE or SE/CC. Recommended SAE oil numbers for expected ambient temperatures are as follows:

32°F and Above	SAE 30
32°F and Below	SAE 5W20 or 5W30

Do not use service DS oil. Do not mix brands or grades. Refer to Maintenance Section for recommended oil changes.

IMPORTANT: Use ashless or low ash content oils with natural gas or propane fueled engines.

RECOMMENDED FUEL

Use clean, fresh *regular* grade, automotive gasoline. For new engines, most satisfactory results could be obtained by using nonleaded gasoline. For older engines that have previously used leaded gasoline, heads must be taken off and all lead deposits removed from engine before switching to nonleaded gasoline.

CAUTION If lead deposits are not removed from engine before switching from leaded to nonleaded gasoline, pre-ignition could occur causing severe damage to the engine.

WARNING Never fill the tank when the engine is running and leave some fuel expansion space.

RADIATOR

See Specifications for water capacity. Check that the radiator drain valve is closed and cylinder block drain plug is tight. Fill the radiator with clean soft (alkali free) water

such as clean rain water. The use of a good rust and scale inhibitor is recommended.

If the set will be exposed to freezing temperatures (below 32°F or 0°C), use a standard anti-freeze solution. Use the correct proportion of anti-freeze as recommended by the anti-freeze manufacturer, to protect at least 10°F below the lowest expected temperature.

INITIAL START

Check the engine to make sure it has been filled with oil, water and fuel. If engine fails to start at first attempt, rust inhibitor oil used at the factory may have fouled the spark plugs – remove, clean in suitable solvent, dry and install. Heavy exhaust smoke when the engine is first started is normal and is caused by the inhibitor oil.

AIR PREHEATER (Late Models)

Air supplied to the air cleaner during cold weather is heated preventing carburetor icing. The air source is automatically selected by the Vernatherm (thermostatic element) which operates a shutter in the induction air stream. Shutter is fully closed at 80°F (just touches bottom), is half open at 90°F, and is fully open to ambient air at 100°F (Fig. 13). For adjustments, see Fig. 13 and Adjustment Section.

Gaseous fueled and city water cooled units do not require preheated air.

STARTING

1. Push the RUN-STOP-REMOTE switch to RUN position.
2. After engine starts, see that oil pressure gauge reads at least 20 psi. Pressure relief valve is not adjustable.

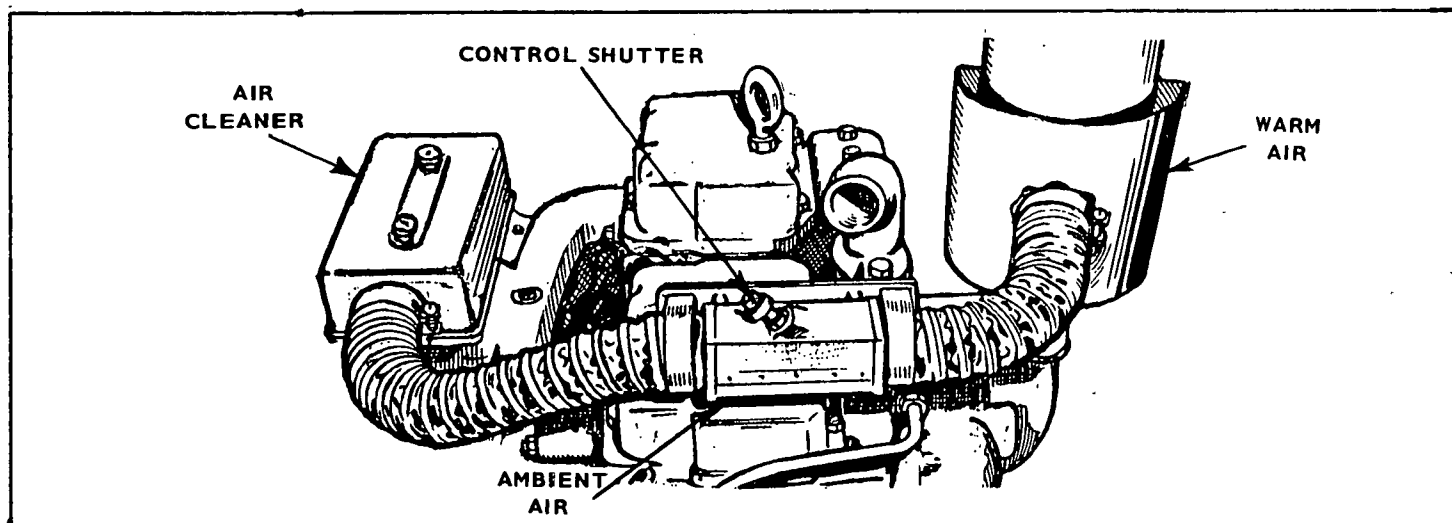


FIGURE 13. CARBURETOR PREHEATER

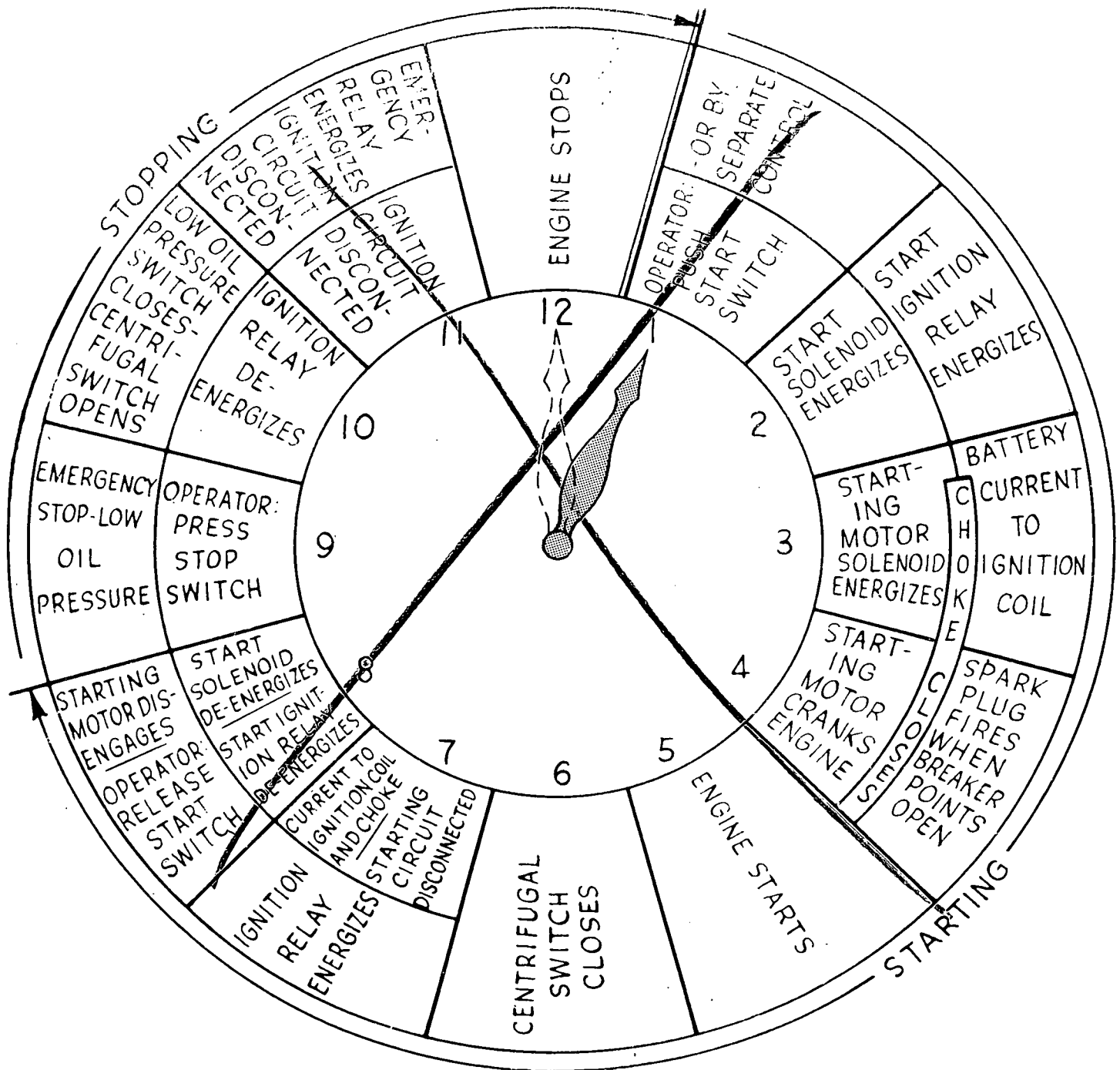


FIGURE 14. SEQUENCE OF OPERATION

NOTE: When starting from a remote station, the set's switch must be in the REMOTE position.

Cranking will automatically stop through the centrifugal switch disconnect relay when the engine comes up to speed. If the engine fails to start in 45 to 120 seconds, the cranking limiter will trip and cranking will stop. If this occurs, remedy the cause. Wait for 1 minute before resetting the cranking limiter and re-attempt to start.

The slide tap on the adjustable resistor in the charging circuit is set to give approximately 2 amperes charging rate. For applications requiring frequent starts, check the battery

charge condition (specific gravity) periodically and if necessary, increase the charging rate slightly (slide tap nearer ungrounded lead on the resistor located in generator adapter) until it keeps the battery charged. Having set stopped when readjusting avoids accidental shorts.

Avoid overcharging. The resistor is located in the generator air outlet.

Extremes in starting temperatures may require adjustment of the electric choke. If engine fails to start quickly, rest before successive attempts, allowing choke to cool and close.

Stopping: Push the RUN-STOP-REMOTE switch to its STOP

position.

NOTE: *If stop circuit fails, hold the throttle closed or close fuel valve to stop the engine.*

Applying Load: If practicable, allow the set to thoroughly warm up before connecting a heavy electrical load. Continuous overloading of the generator will cause its temperature to rise to a point where serious damage to the windings can occur. Generators can safely handle overload temporarily, but for normal operation, keep the load within the nameplate rating.

When practical, connect the load in steps rather than the full load at one time. Most installations use a line switch, which must be closed to connect the load.

Exercise During Standby Service: Infrequent use can result in hard starting. Run the set one 30 minute period each week. Run longer if battery needs charging.

Safety Devices: All sets have a high water temperature cut-off switch; low oil pressure cut-off switch is optional. After emergency shut down from either of these safety devices, remedy the cause and reset the emergency latch relay to permit restarting.

HIGH TEMPERATURES

1. See that nothing obstructs air flow to and from set.
2. Be sure set location is properly ventilated.
3. Keep cooling system clean, radiator filled and see that fan belt tension is properly adjusted.
4. Keep ignition timing properly adjusted.
5. Be sure the fuel-air mixture gives best operation.

LOW TEMPERATURES

1. Use the proper SAE NO. oil for temperature conditions. (See crankcase oil.) Change oil only when warm from running. If an unexpected temperature drop causes an emergency, remove the set to a warm location, or apply heated air (never use open flame) externally until oil will flow freely.
2. Use fresh, regular grade (not "premium") gasoline. Protect against moisture condensation. Below 0°F adjust the carburetor main jet for slightly richer fuel mixture.
3. Keep the ignition system clean and properly adjusted. Keep batteries in a well charged condition.
4. Partially restrict the flow of cooling air; however, use care to avoid overheating.
5. If freezing temperature occurs and engine is not protected with anti-freeze during stopped periods, drain the radiator and engine block. Attach warning tag.

DUSTY AND DIRTY CONDITIONS

1. Keep set clean. Keep cooling system free of dirt, etc.
2. Service air cleaner as frequently as necessary.
3. Change crankcase oil every 50 operating hours.
4. Keep oil and gasoline in dust-tight containers.
5. Keep governor linkage clean.
6. Clean generator brushes, slip rings.

HIGH ALTITUDE

For operation at altitudes of 2500 feet above sea level, close carburetor main jet adjustment slightly to maintain proper air-to-fuel ratio (refer to the *Adjustments Section*). Maximum power will be reduced approximately 4% for each 1000-feet above sea level, after the first 1000 feet.

BREAK-IN PROCEDURE

The unit should be run in the following sequence, using SE or SE/CC oil (see oil requirement for correct viscosity).

1. One half hour at half load.
2. One half hour at three quarter load.
3. Full load.

This method of load application speeds piston ring seating. Continuous running at half (light) load for the first few hundred hours usually results in poor piston ring seating, causing higher than normal oil consumption and blowby.

PROTECTION FOR EXTENDED OUT OF SERVICE PERIOD

Protect a plant that is to be out of service for more than 30 days as follows:

1. Run set until thoroughly warmed up.
2. Turn off fuel supply and run until set stops from lack of fuel.
3. Drain oil from oil base while still warm. Attach a warning to refill before operation.
4. In freezing climates, drain the water from radiator and engine block.
5. Remove each spark plug. Pour 1 oz. (two tablespoons) of rust inhibitor (or SAE #50) oil into the cylinder. Crank the engine over a few times. Leave at top center position. Reinstall each spark plug.
6. Service air cleaner.
7. Plug the exhaust outlet to prevent entrance of moisture or dirt.
8. Wipe generator brushes, slip rings, etc., clean. Do not use any lubricant or preservative.
9. Provide a suitable cover for the entire unit.
10. Disconnect battery and follow standard battery storage procedure.

ADJUSTMENTS

FAN BELT

To adjust the fan belt, loosen the nut on the belt tightener pulley shaft. Move the shaft left or right in the elongated slot in pulley mounting bracket until a deflection of 1/2-inch is obtained when about 15 lb. force is applied at a point midway between the fan pulley and belt tightener pulley. Be sure to tighten nut securely.

CHECK BREAKER POINTS

Refer to Table of Dimensions and Clearances for correct gap distances. Replace burned or faulty points. If only slightly burned, dress smooth with file or fine stone. Measure gap with thickness gauge.

- (1) The centrifugal switch, Fig. 15 is wide open when engine is stopped. Loosen and move stationary contact to correct gap.
- (2) Ignition breaker points. Fig. 16 must be correctly gapped. Crank engine to fully open breaker points. Loosen and move stationary contact to correct the gap at full separation. Retighten contact and re-check gap.

Ignition points should break contact just when timing mark aligns for degree of spark advance (or retard) as specified in Table of Dimensions and Clearances. Final timing is corrected by properly rotating the distributor at its mounting and using a timing light. If specified timing cannot be obtained by rotation of the distributor, check to be sure timing marks on gears are aligned. Timing procedures appear in separate Service Manual.

CARBURETOR (Gasoline)

The carburetor (Fig. 17) has a main fuel (high speed) adjustment (needle A) and an idle fuel adjustment (needle B). Early models have the main adjustment needle on the top of the carburetor. The main adjustment (needle A) affects operation under heavy load conditions. Idle adjustment affects operation at light or no load. Under normal circumstances,

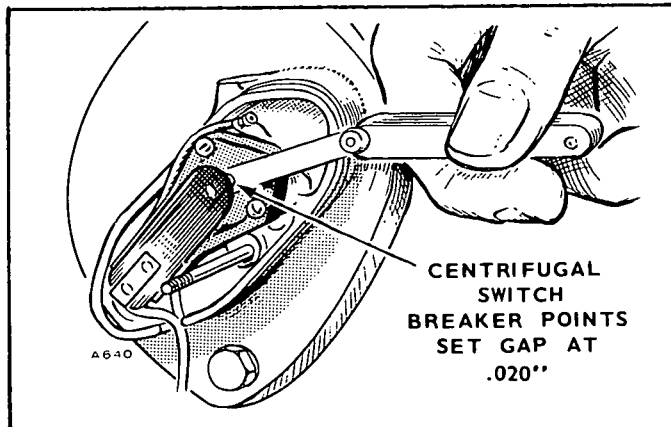


FIGURE 15. CENTRIFUGAL SWITCH

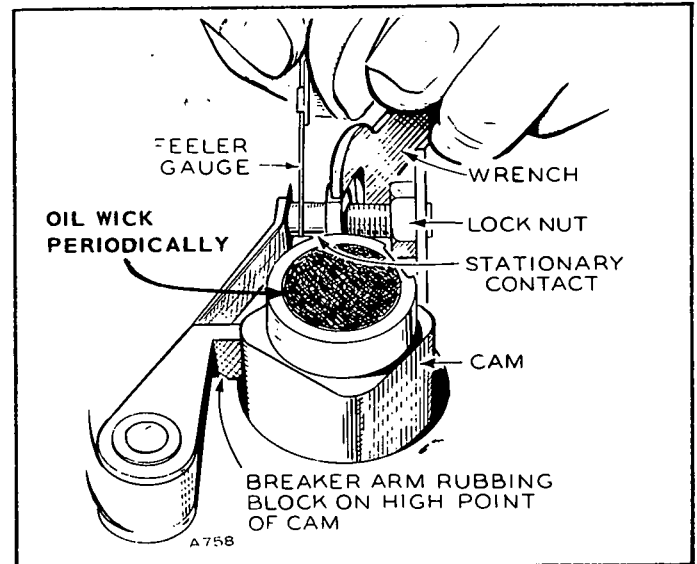


FIGURE 16. BREAKER POINTS

factory carburetor adjustments should not be disturbed. If the adjustments have been disturbed, turn needles off their seats, 1 to 1-1/2 turns to permit starting, then, re-adjust them for smooth operation.

CAUTION

Forcing the needle against its seat will damage it. The needle does not completely shut off when turned fully in.

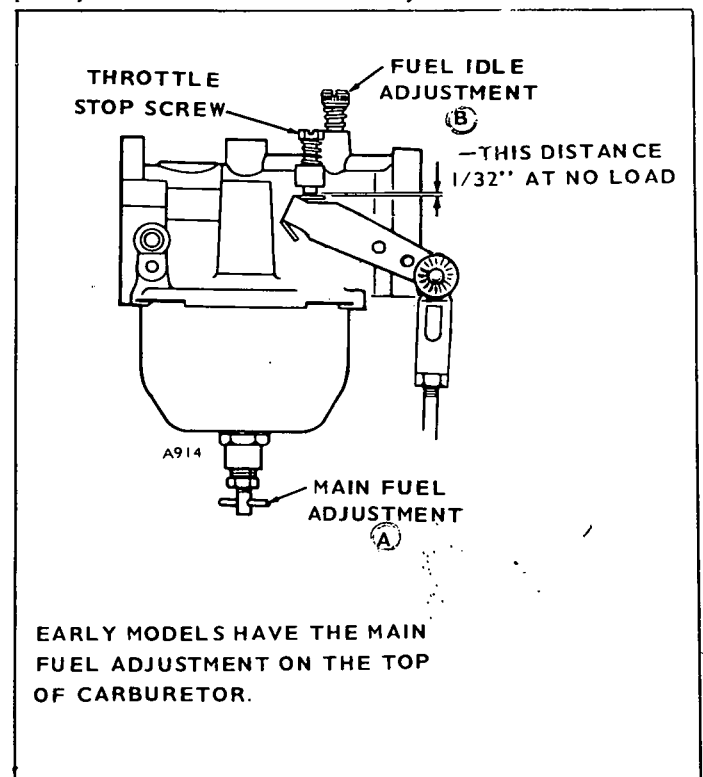


FIGURE 17. CARBURETOR ADJUSTMENTS

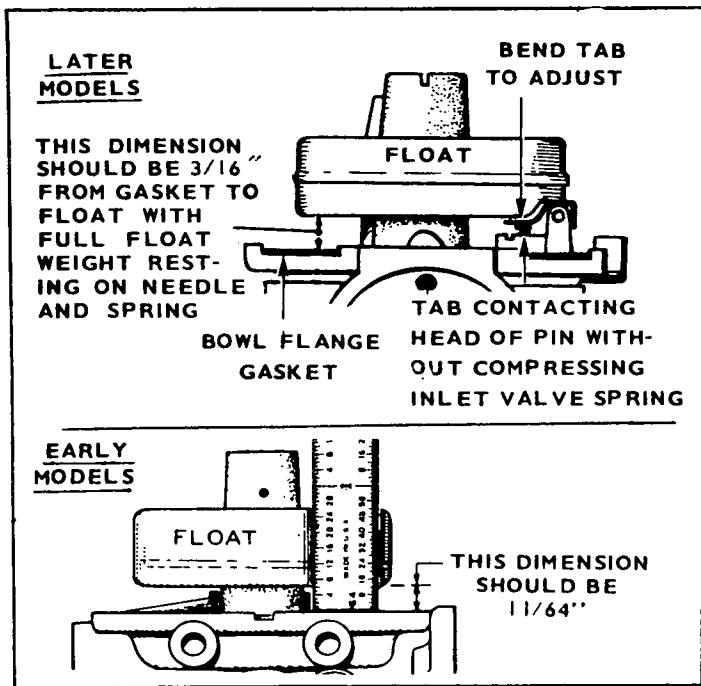


FIGURE 18. CARBURETOR FLOAT ADJUSTMENT

Before final adjustment, allow engine to warm up. To set fuel main adjustment, apply a full electrical load to the generator. Carefully turn main adjustment screw in until engine speed (or output frequency) drops slightly below normal. Then turn needle out until speed (or frequency) returns to normal.

NOTE: Proper carburetor adjustment cannot be assured unless the governor is properly adjusted.

Make idle adjustment with no load connected to the generator. Use a tachometer (or connect a frequency meter to generator output). Slowly turn idle adjustment out until

engine speed (or generator frequency) drops slightly below normal. Then turn needle in until speed (or frequency) returns to normal.

Set throttle stop screw (located on carburetor throttle lever) with no load connected and while running at rated speed. Turn the screw to give 1/32" clearance between the screw and stop. (Figure 17).

For correct carburetor float clearance see Figure 18. Adjustment is made by bending the tab on the float.

CARBURETOR (Gas-Gasoline)

Gas carburetor adjustment procedure is the same as for gasoline. See Fig. 19 for location of adjusting needles.

ONAN THERMO-MAGNETIC CHOKE

This choke uses a heating element and a heat sensitive bimetal spring to open the choke plate. The choke solenoid, actuated during engine cranking only, closes the choke plate according to ambient temperature. During gaseous fuel operation, the choke plate is locked in the full open position by the choke lock wire (Fig. 19).

If adjustment is required, use the following instructions. Choke bimetal spring must be at ambient temperature. Allow engine to cool at least one hour before setting. Adjust choke by turning the choke body, which engages a link connected to a bimetal choke spring. Remove air cleaner and adapter to expose the carburetor throat. Loosen the screw which secures the choke body. Rotate choke body clockwise to increase choke and counterclockwise to decrease choke action (leaner mixture). Refer to Fig. 20 for correct choke setting according to ambient temperature. Use drill rod or shank of drill bit to measure choke opening.

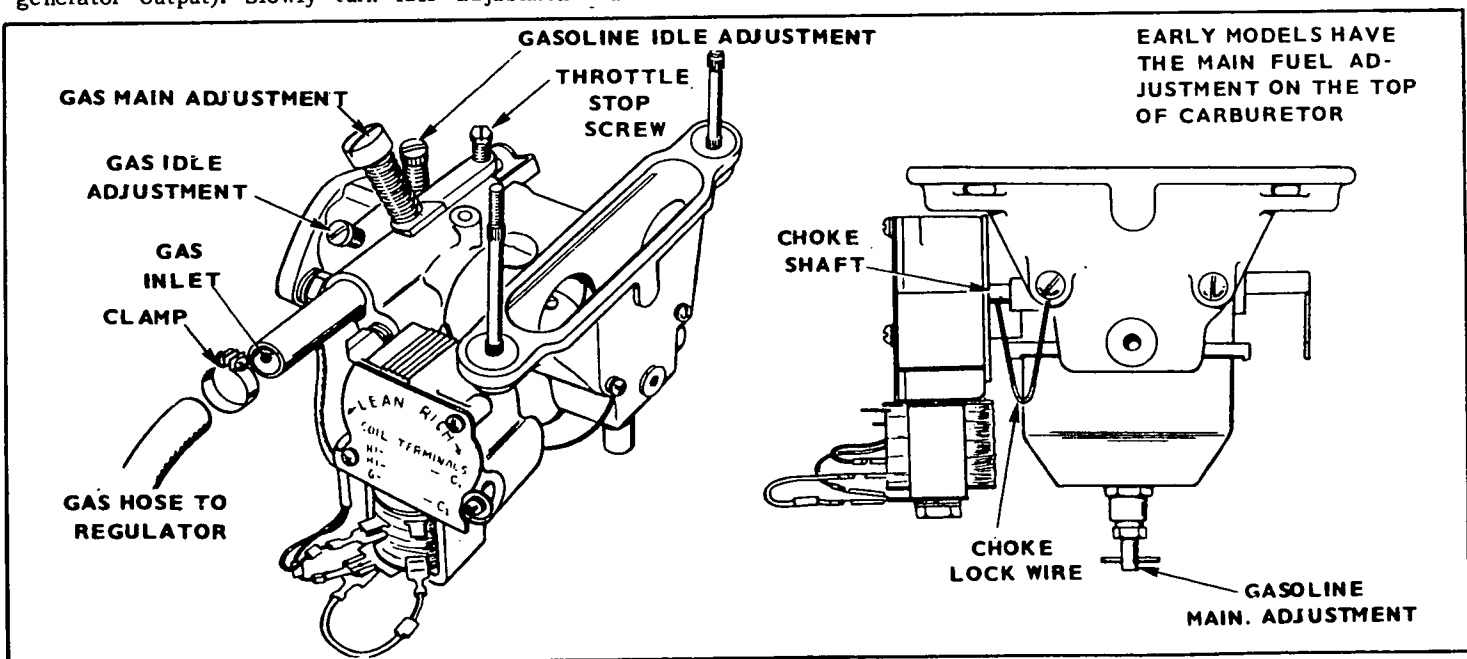


FIGURE 19. CARBURETOR ADJUSTMENT

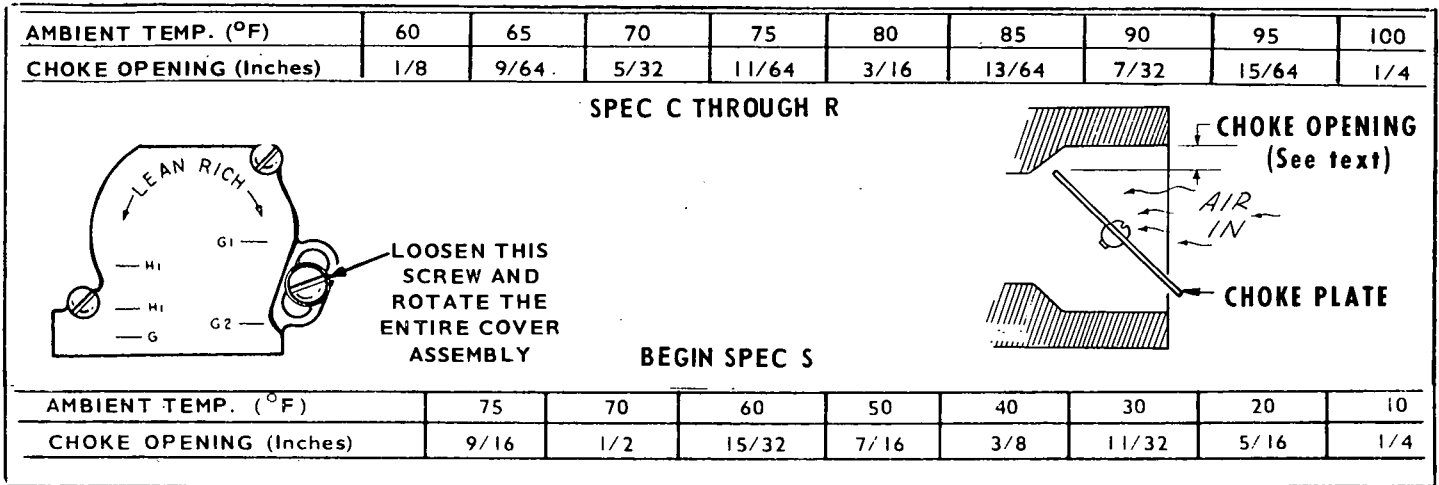


FIGURE 20. CHOKE ADJUSTMENT

GOVERNOR

The governor controls engine speed. Rated speed and voltage appear on the nameplate (see also Specifications). Engine speed equals frequency multiplied by 30 on a 4 pole generator, thus 1800rpm is 60 hertz. The speed should not vary more than 3 hertz from no-load to full-load operation. Be sure throttle, linkage and governor mechanism operate smoothly.

SPEED ADJUSTMENT

To change the governor speed, change the spring tension by turning the governor spring nut (Fig. 21). Turn the nut clockwise (more spring tension) to increase RPM and counterclockwise to reduce governed speed. Hold a tachometer against flywheel cap screw.

SENSITIVITY ADJUSTMENT

To adjust governor sensitivity (no load to full load speed droop) turn the sensitivity adjusting ratchet (Fig. 21). Counterclockwise gives more sensitivity (less speed drop when full load is applied), clockwise gives less sensitivity (more speed drop). If the governor is too sensitive, a rapid hunting condition occurs (alternate increasing and decreasing speed). Adjust for maximum sensitivity without hunting. After sensitivity adjustment, the speed will require readjustment. After adjusting the governor, secure speed stud lock nut. Reset throttle stop screw.

IMPORTANT: Excessive droop may be caused by engine misfiring. Correct this condition before adjusting governor.

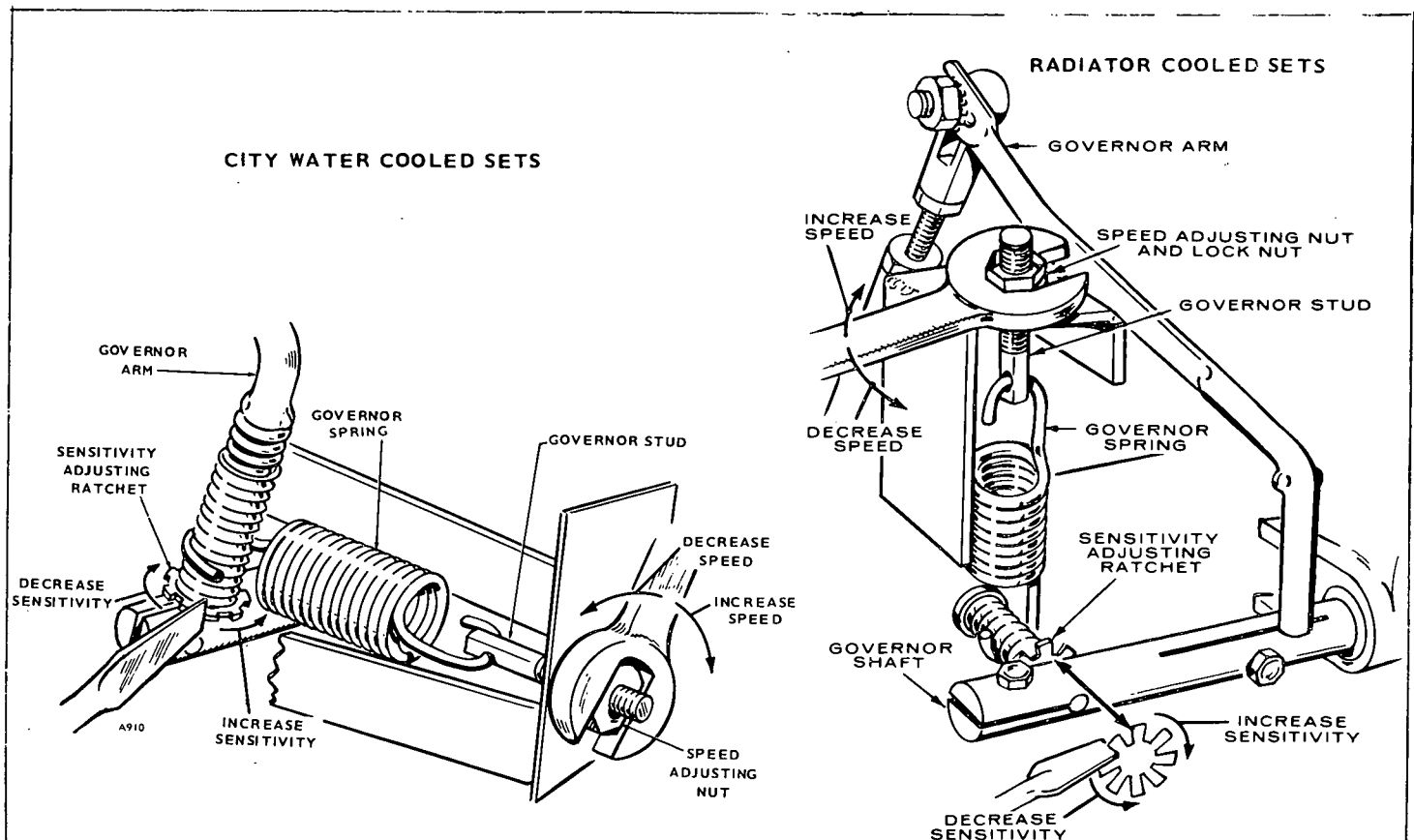


FIGURE 21. GOVERNOR ADJUSTMENT

CHARGE RATE

See *Starting in Operation* Section.

VALVE CLEARANCE

Check valve clearance when engine is at room temperature (about 70°F).

1. Turn the flywheel until #1 cylinder, which is to have its valve clearance adjusted, is on its compression stroke. On engines without a hand crank use a socket wrench on the flywheel screw hex head.

To determine if the cylinder is in its compression stroke, observe the action of the push rods as the engine is rotated in a clockwise direction. The exhaust valve push rod will be in its lowest position and the intake valve push rod will be moving downward. As the piston reaches top dead center, the flywheel timing mark should be aligned with the timing pointer and the valve push rods should be stationary.

2. Now turn the flywheel clockwise for an additional 10 to 45 degrees. There is no timing mark for this position so it must be estimated. With the piston located in this position, it will be in its power stroke with both valves completely closed.
3. To change the setting of valve clearance, adjust the lock nut which secures the rocker arm to the cylinder head (see Figure 22). Loosen the lock nut to increase clearance and tighten it to reduce clearance.

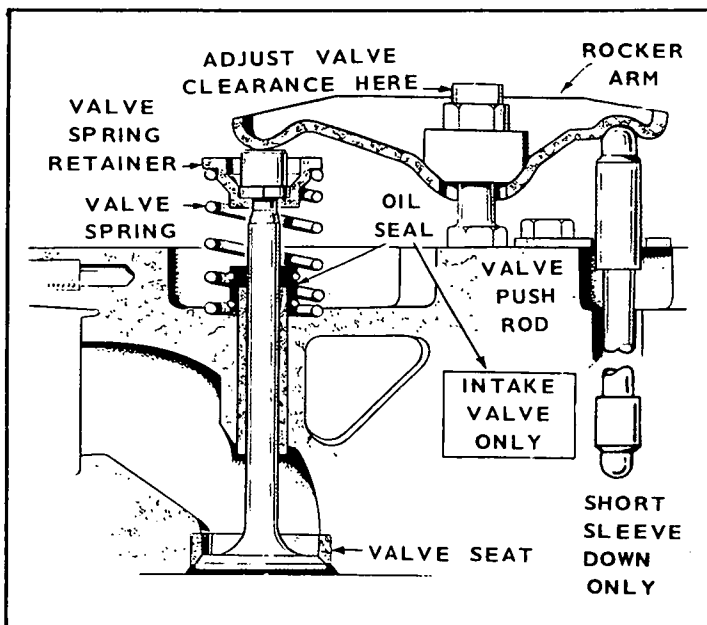


FIGURE 22. VALVE AND PUSH ROD

4. Using a feeler gauge, check the clearance between the rocker arm and the valve (see Figure 23). Increase or reduce the clearance until the proper gap is established. Valve clearances are given in Dimensions and Clearances Section.
5. Always adjust the valve clearances in the firing order (1-2-4-3) sequence. Number one cylinder is nearest the flywheel.
6. To adjust the valve clearance of #2 cylinder, turn the flywheel in a clockwise direction 180 degrees (one-half revolution) from the position used when timing #1 cylinder. The flywheel position should be between 10 and 45 degrees past the BC (bottom center) flywheel mark.

Important: *Early model four-cylinder engines do not have a BC mark on the flywheel.*

7. After timing #2 cylinder, adjust the valve clearance according to steps 3 and 4.
8. To adjust the valve clearance for #4 cylinder, turn the flywheel in a clockwise direction 180 degrees (one-half revolution). The flywheel should be between 10 and 45 degrees past the TC (top center) flywheel mark.
9. After timing #4 cylinder, adjust the valve clearance according to steps 3 and 4.
10. To adjust the valve clearance for #3 cylinder, turn the flywheel in a clockwise direction 180 degrees (one-half revolution). The flywheel should be between 10 and 45 degrees past the BC (bottom center) flywheel mark.
11. After timing #3 cylinder, adjust the valve clearance according to steps 3 and 4.

AIR PREHEATER

Check shutter blade for free operation. If the shutter binds, the blade support tabs can be bent to remedy this. A bolt can be placed in the Tee-nut to aid in leveling the nut to align the vernatherm plunger with the shutter pivot. Adjust the plunger to just touch the shutter at 70°F. Grease points of contact (see Figure 13).

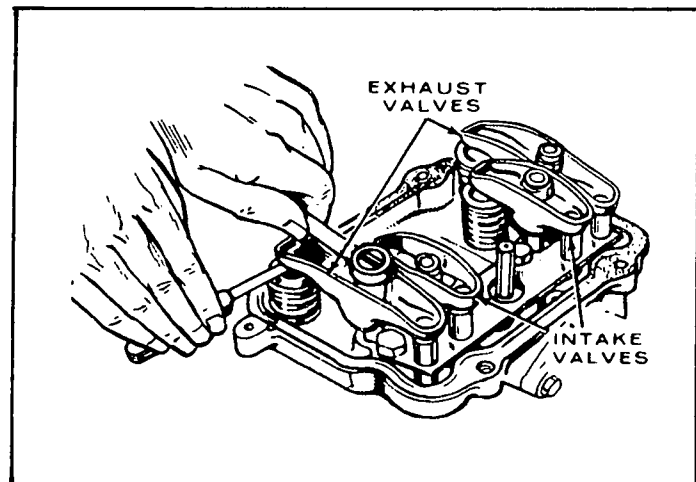
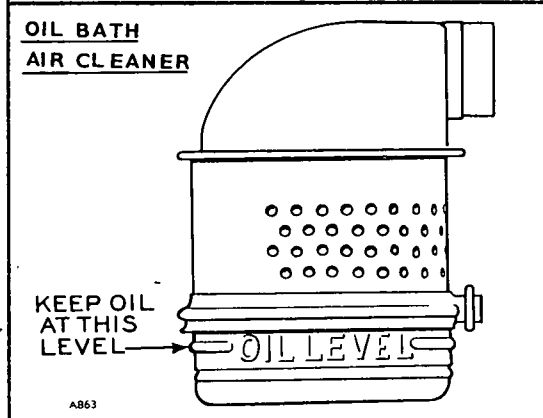
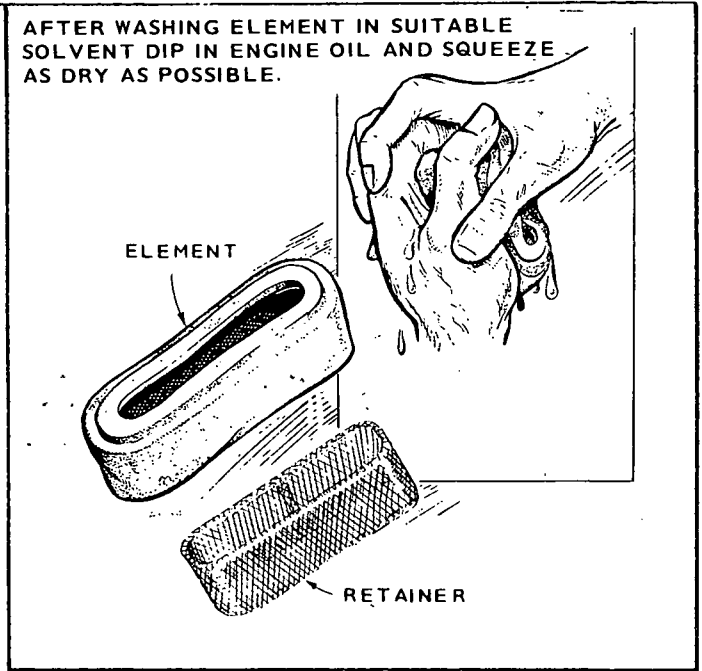
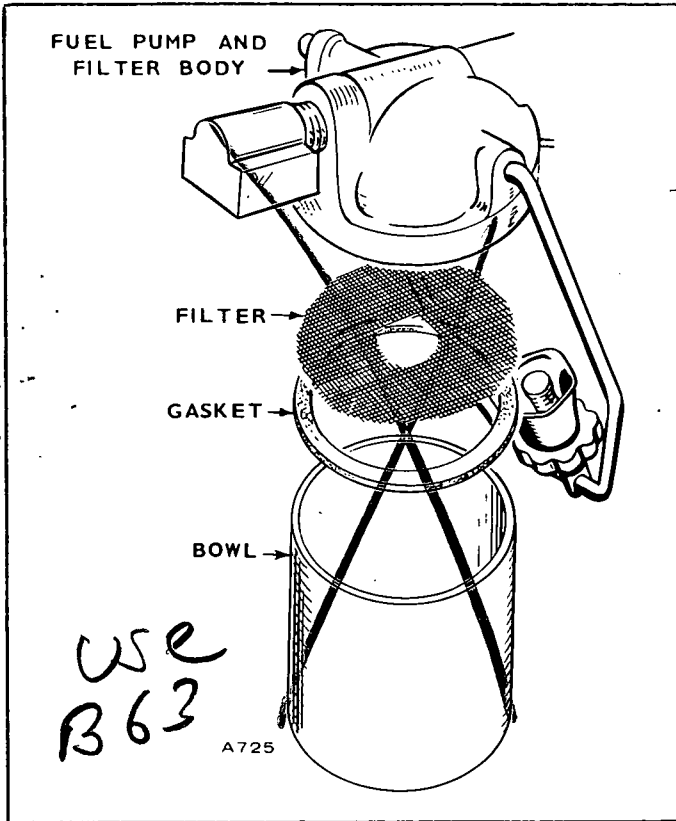


FIGURE 23. VALVE CLEARANCE ADJUSTMENT

MAINTENANCE

PERFORM ALL MAINTENANCE DETAILS AS SPECIFIED IN THE MAINTENANCE SCHEDULE



OIL FILTER CHANGE
(See Schedule)

Place pan under old filter and remove by screwing counter-clockwise. Clean filter mounting area. Install new filter; oil filter gasket and screw filter on clockwise until gasket touches mounting base, then tighten 1/2 turn.

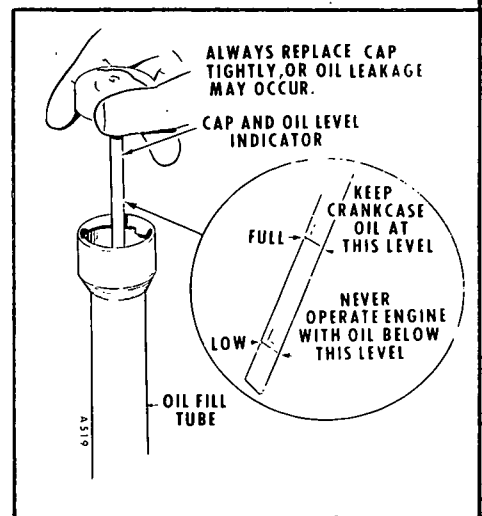
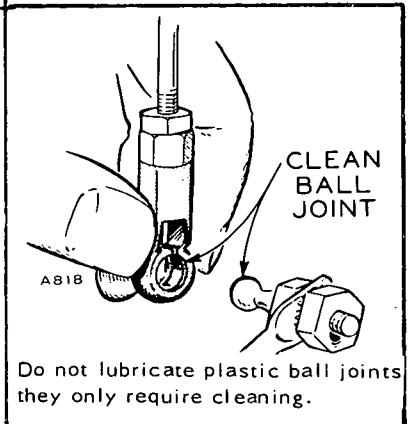
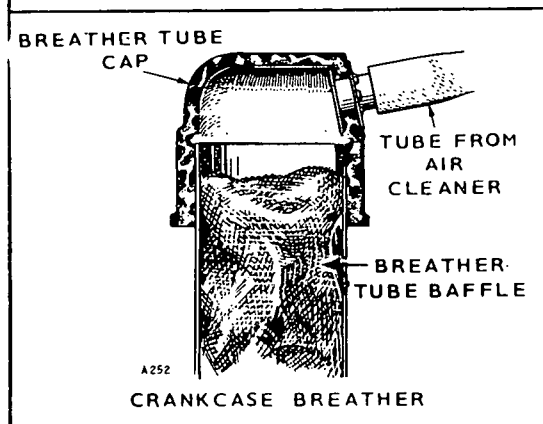
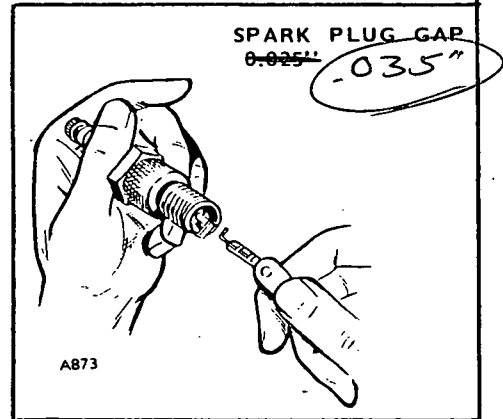


FIGURE 24. SERVICING PROCEDURES
23

MAINTENANCE SCHEDULE

Use this factory recommended maintenance (based on favorable operating conditions) to serve as a guide to get long and efficient set life. Neglecting routine maintenance can result in failure or permanent damage to the set.

Maintenance is divided into two categories: (1) OPERATOR MAINTENANCE – performed by the operator, and (2) CRITICAL MAINTENANCE – performed by qualified service personnel.

OPERATOR MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	OPERATIONAL HOURS			
	8	50	100	200
Inspect Set for Exhaust Leaks, Etc.	x			
Check Water Level (Heat Exchanger Models)	x			
Check Fuel	x			
Check Oil Level	x			
Check Air Cleaner		x1		
Clean Governor Linkage		x1		
Check Spark Plugs			x3	
Change Crankcase Oil			x1	
Clean Crankcase Breather Baffle				x
Clean Fuel System				x
Check Battery				x
Replace Oil Filter				x1

CRITICAL MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	OPERATIONAL HOURS			
	200	500	1000	5000
Check Breaker Points	x			
Clean Collector Rings	x1			
Check Brushes	x2			
Remove Carbon & Lead		x		
Check Valve Clearance	*	x		
Clean Carburetor		x		
Clean Generator			x	
Remove & Clean Oil Base			x	
Grind Valves			x	
Clean Rocker Box Oil Line Holes			x	
General Overhaul	**			x
Drain & Flush Cooling System			x	
Inspect Water Pump & Thermostat			x	

- x Perform as indicated in schedule.
- x1 Perform more often in extremely dusty conditions.
- x2 Replace revolving field collector ring brushes when worn to 5/16" or less.
- x3 Replace spark plugs at least every 250 operating hours.
- * Tighten head bolts and adjust valve clearance after first 50 hours on a new or overhauled engine.
- ** Tighten manifold nuts evenly.

The raw water side of the heat exchanger is protected from corrosion by a zinc pencil mounted on pipe plugs in one end of the heat exchanger. Inspect the pencil at least every 2 months and replace if deteriorated to less than 1/2 original size.

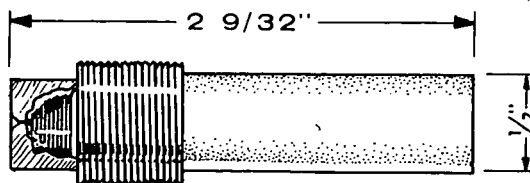


FIGURE 25. SERVICING PROCEDURES

TROUBLE-SHOOTING GUIDE

TROUBLE	Backfire at Carburetor	Bearing Wear	Black Exhaust	Blue Exhaust	Burned Valves	Connecting Rod Wear	Crankshaft Slowly	Cylinder Wear	Engine Stops	Failure to Start	Governor Hunting	High Oil Pressure	Loss of Coolant	Mechanical Knocks	Misfiring	Overheating (Water Cooled)	Overheating (Air Cooled)	Piston Wear	Poor Compression	Ring Wear	Sticking Valves	CAUSE	
STARTING SYSTEM																							
																						Loose or Corroded Battery Connection	
																							Low or Discharged Battery
																							Faulty Starter
																							Faulty Start Solenoid
IGNITION SYSTEM																							
																							Ignition Timing Wrong
																							Wrong Spark Plug Gap
																							Worn Points or Improper Gap Setting
																							Bad Ignition Coil or Condenser
																							Faulty Spark Plug Wires
FUEL SYSTEM																							
																							Out of Fuel - Check
																							Lean Fuel Mixture - Readjust
																							Rich Fuel Mixture or Choke Stuck
																							Engine Flooded
																							Poor Quality Fuel
																							Dirty Carburetor
																							Dirty Air Cleaner
																							Dirty Fuel Filter
																							Defective Fuel Pump
INTERNAL ENGINE																							
																							Wrong Valve Clearance
																							Broken Valve Spring
																							Valve or Valve Seal Leaking
																							Piston Rings Worn or Broken
																							Wrong Bearing Clearance
COOLING SYSTEM (AIR COOLED)																							
																							Poor Air Circulation
																							Dirty or Oily Cooling Fins
																							Blown Head Gasket
COOLING SYSTEM (WATER COOLED)																							
																							Insufficient Coolant
																							Faulty Thermostat
																							Worn Water Pump or Pump Seal
																							Water Passages Restricted
																							Defective Gaskets
																							Blown Head Gasket
LUBRICATION SYSTEM																							
																							Defective Oil Gauge
																							Relief Valve Stuck
																							Faulty Oil Pump
																							Dirty Oil or Filter
																							Oil Too Light or Diluted
																							Oil Level Low
																							Oil Too Heavy
																							Dirty Crankcase Breather Valve
THROTTLE AND GOVERNOR																							
																							Linkage Out of Adjustment
																							Linkage Worn or Disconnected
																							Governor Spring Sensitivity Too Great
																							Linkage Binding

PARTS CATALOG



INSTRUCTIONS FOR ORDERING REPAIR PARTS

For parts or service, contact the dealer from whom you purchased this equipment or refer to your Nearest Authorized Onan Parts and Service Center.

To avoid errors or delay in filling your parts order, please furnish all information requested.

Always refer to the nameplate on your unit:

1. Always give the MODEL and SPEC. NO. and SERIAL NO.

	
ELECTRIC PLANT	
MODEL AND SPEC. NO.	
[REDACTED]	
SERIAL NO. [REDACTED]	
IMPORTANT ALWAYS GIVE ABOVE NOS WHEN ORDERING PARTS	
A.C. VOLTS [REDACTED]	PH [REDACTED]
K.V.A. [REDACTED]	WATTS [REDACTED]
P.F. [REDACTED]	AMPS [REDACTED] HZ [REDACTED]
D.C. VOLTS [REDACTED]	AMPS [REDACTED]
WATTS [REDACTED]	
R.P.M. [REDACTED]	BAT. [REDACTED]
MANUFACTURED BY ONAN	
DIVISION OF ONAN CORPORATION MINNEAPOLIS, MINNESOTA MADE IN U.S.A.	
FOR ELECT. EQUIPMENT ONLY 	
99A444	

For handy reference, insert YOUR SET nameplate information in the spaces above.

2. Do not order by reference number or group number, always use part number and description.
3. Give the part number, description and quantity needed of each item. If an older part cannot be identified, return the part prepaid to your dealer or nearest AUTHORIZED SERVICE STATION. Print your name and address plainly on the package. Write a letter to the same address stating the reason for returning the part.
4. State definite shipping instructions. Any claim for loss or damage to your unit in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

Prices are purposely omitted from this Parts Catalog due to the confusion resulting from fluctuating costs, import duties, sales taxes, exchange rates, etc.

For current parts prices, consult your Onan Dealer, Distributor or Parts and Service Center.

“En esta lista de partes los precios se omiten de proposito, ya que bastante confusion resulto de fluctuaciones de los precios, derechos aduanales, impuestos de venta, cambios extranjeros, etc.”

Consiga los precios vigentes de su distribuidor de productos “ONAN”.

This catalog applies to the standard RJC Generating Sets as listed below. Parts are arranged in groups of related items. Each illustrated part is identified by a reference number corresponding to the same reference number below the illustration. Parts illustrations are typical. Using the MODEL and SPEC NO. from the set nameplate, select the Parts Key No. (1, 2, etc. in the last column) that applies to your set Model and Spec No. This Parts Key No. represents parts that differ between models. Unless otherwise mentioned in the description, parts are interchangeable between models. Right and left generating set sides are determined by FACING the engine end (front).

GENERATING SET DATA TABLE

MODEL & SPEC ‡	COOLING SYSTEM	ELECTRICAL DATA					PARTS KEY NO.
		WATTS	VOLTS	HERTZ	WIRE	PHASE	
10.0RJC-53CR/ *	Radiator	10000	120/240	50	**	1	1
10.0RJC-54R/ *	Radiator	10000	120/208	50	4	3	
10.0RJC-54XR/ *	Radiator	10000	277/480	50	4	3	
10.0RJC-55DR/ *	Radiator	10000	120/240	50	4	3	
12.5RJC-3CR/ *	Radiator	12500	120/240	60	**	1	1
12.5RJC-4R/ *	Radiator	12500	120/208	60	4	3	
12.5RJC-4XR/ *	Radiator	12500	277/480	60	4	3	
12.5RJC-5DR/ *	Radiator	12500	120/240	60	4	3	
12.5RJC-9XR/ *	Radiator	12500	347/600	60	4	3	
12.5RJC-53CR/ *	Radiator	12500	120/240	50	**	1	2
12.5RJC-54R/ *	Radiator	12500	120/208	50	4	3	
12.5RJC-54XR/ *	Radiator	12500	277/480	50	4	3	
12.5RJC-55DR/ *	Radiator	12500	120/240	50	4	3	
15.0RJC-3CR/ *	Radiator	15000	120/240	60	**	1	2
15.0RJC-4R/ *	Radiator	15000	120/208	60	4	3	
15.0RJC-4XR/ *	Radiator	15000	277/480	60	4	3	
15.0RJC-5DR/ *	Radiator	15000	120/240	60	4	3	
15.0RJC-9XR/ *	Radiator	15000	347/600	60	4	3	
10.0RJC-53CR/ *	City Water Cooled	10000	120/240	50	**	1	3
10.0RJC-54R/ *	City Water Cooled	10000	120/208	50	4	3	
10.0RJC-54XR/ *	City Water Cooled	10000	277/480	50	4	3	
10.0RJC-55DR/ *	City Water Cooled	10000	120/240	50	4	3	
12.5RJC-3CR/ *	City Water Cooled	12500	120/240	60	**	1	3
12.5RJC-4R/ *	City Water Cooled	12500	120/208	60	4	3	
12.5RJC-4XR/ *	City Water Cooled	12500	277/480	60	4	3	
12.5RJC-5DR/ *	City Water Cooled	12500	120/240	60	4	3	
12.5RJC-9XR/ *	City Water Cooled	12500	347/600	60	4	3	
12.5RJC-53CR/ *	City Water Cooled	12500	120/240	50	**	1	4
12.5RJC-54R/ *	City Water Cooled	12500	120/208	50	4	3	
12.5RJC-54XR/ *	City Water Cooled	12500	277/480	50	4	3	
12.5RJC-55DR/ *	City Water Cooled	12500	120/240	50	4	3	
15.0RJC-3CR/ *	City Water Cooled	15000	120/240	60	**	1	4
15.0RJC-4R/ *	City Water Cooled	15000	120/208	60	4	3	
15.0RJC-4XR/ *	City Water Cooled	15000	277/480	60	4	3	
15.0RJC-5DR/ *	City Water Cooled	15000	120/240	60	4	3	
15.0RJC-9XR/ *	City Water Cooled	15000	347/600	60	4	3	
Pennsylvania Approved Sets		See special parts list following the main parts list.					

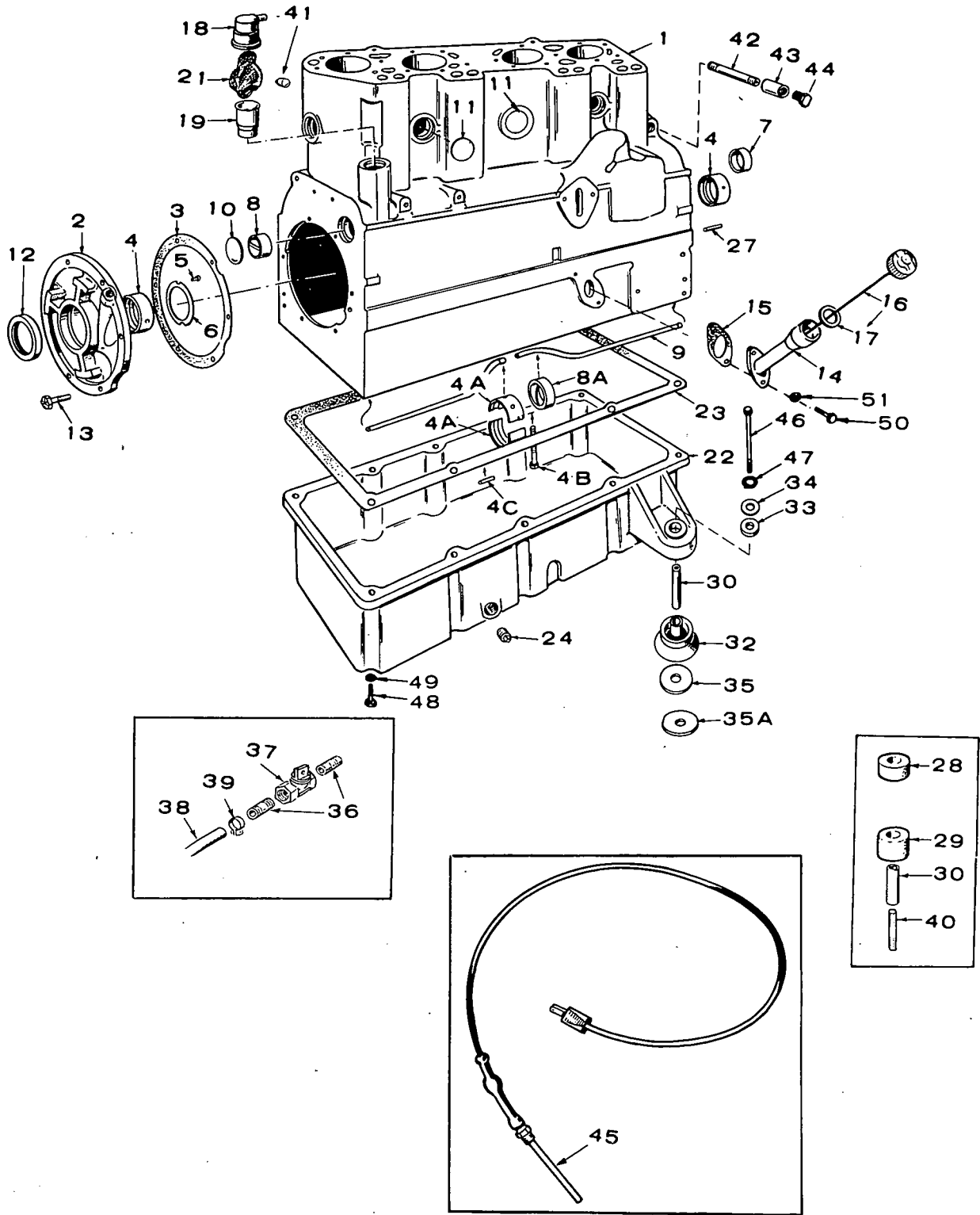
‡ New model designations shown, begin during 1969. Previous designations did not use a decimal in the KW rating. EXAMPLE: 12.5RJC was formerly 12RJC and 15.0RJC was formerly 15RJC. Also previously a number 8 was used in the model to designate unboxed models. **NOTE:** Previously the C designation was not used in the model.

* The Specification Letter Advances (A to B, B to C, etc.) with manufacturing changes.

** Set is reconnectable for 120 volt 2 wire, 240 volt 2 wire or 120/240 volt 3 wire service.

NOTE: Hertz is a unit of frequency equal to one cycle per second.

CRANKCASE AND OIL BASE GROUP

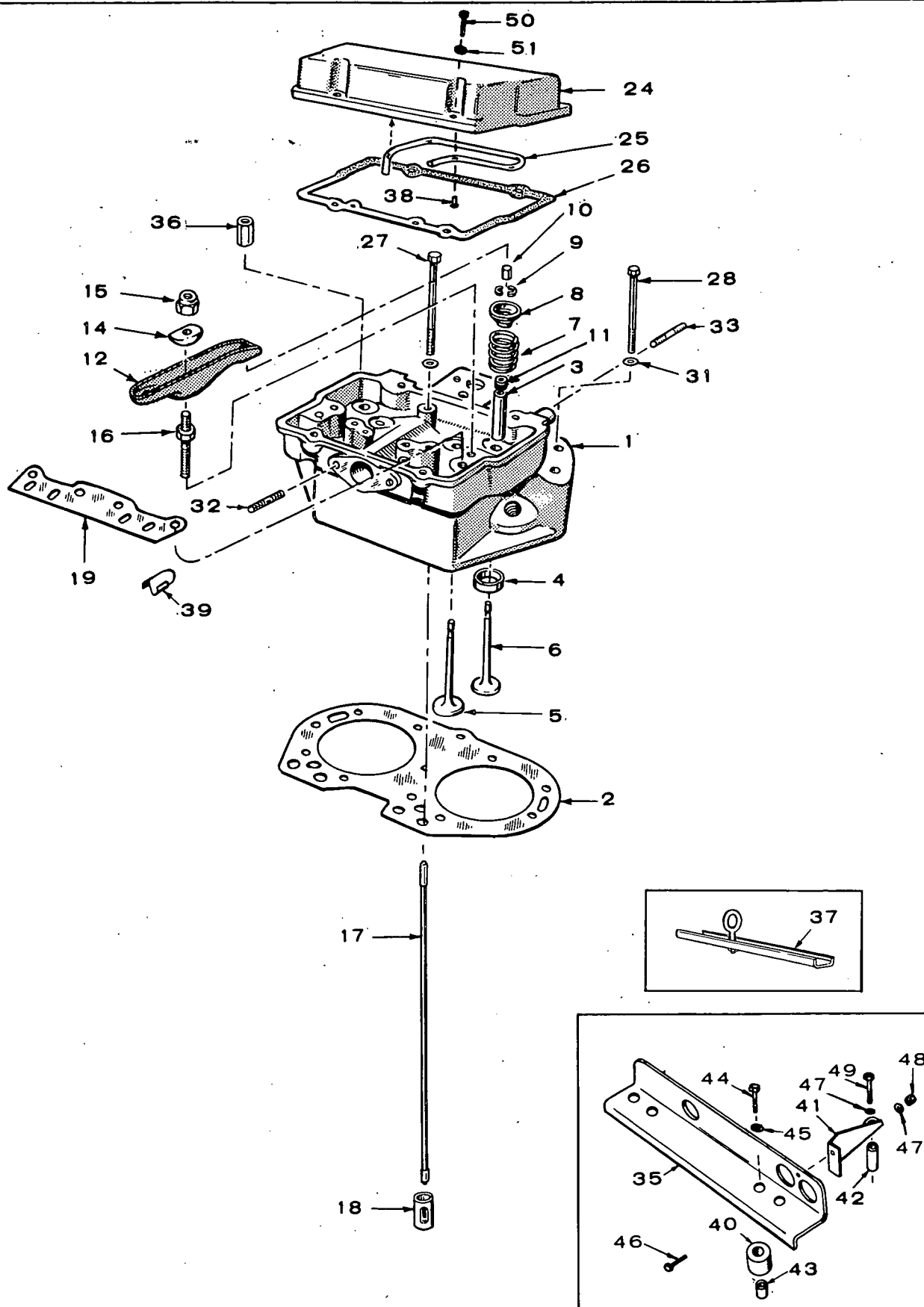


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	BLOCK ASSEMBLY, CYLINDER (Includes Parts Marked *)		
	110-1498	1	Key 1, 2
	110-1361	1	Key 3, 4
2	101-0337	1	*Plate, Rear Bearing (Less Bearing & Pins)
3	101-0386	1	*Gasket Kit, Rear Bearing Plate (Includes Shims)
4	*BEARING, PRECISION MAIN (FRONT OR REAR)		
	101-0359	2	Standard
	101-0359-02	2	.002" Undersize
	101-0359-10	2	.010" Undersize
	101-0359-20	2	.020" Undersize
	101-0359-30	2	.030" Undersize
4A	*BEARING, HALF, PRECISION MAIN - CENTER		
	101-0361	2	Standard
	101-0361-02	2	.002" Undersize
	101-0361-10	2	.010" Undersize
	101-0361-20	2	.020" Undersize
	101-0361-30	2	.030" Undersize
4B	101-0342	2	*Bolt, Center Bearing Housing
4C	516-0149	2	*Pin, Center Bearing Housing
5	516-0072	4	*Pin, Crankshaft Thrust Washer
6	104-0410	2	*Washer, Crankshaft Thrust
7	101-0363	1	*Bearing, Precision Cam Front (Standard Only)
8	101-0365	1	*Bearing, Precision Cam Rear (Standard Only)
8A	101-0364	1	*Bearing, Precision Cam Center (Standard Only)
9	*TUBE, CRANKCASE OIL		
	120-0586	1	Front
	120-0585	1	Rear
10	517-0053	1	*Plug, Expansion Rear Cam Opening
11	*PLUG, CYLINDER BLOCK - EXPANSION		
			Left Side (Accessory)
	517-0096	2	1-9/16" Ends
	517-0097	1	1-3/4" Center
			Right Side
	517-0059	2	1-7/16"
			Rear End
	517-0059	1	1-7/16"
			Front End (City Water Only)
	517-0059	1	1-7/16" Water Pump Hole
12	509-0086	1	*Seal, Crankshaft Rear
13	805-0019	6	*Bolt, Rear Bearing Plate (3/8-16 x 1-1/4")
14	123-0649	1	Tube, Oil Fill
15	123-0667	1	Gasket, Oil Fill Tube
16	123-0698	1	Cap & Indicator
17	123-0191	1	Gasket, Cap
18	123-0787	1	Cap, Breather Tube
19	123-0645	1	Tube, Breather
21	123-0865	1	Baffle, Breather Tube

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
22	BASE, OIL		
	102-0476	1	Spec A Only
	102-0539	1	Begin Spec B
23	102-0475	1	Gasket, Oil Base
24	505-0056	1	Plug (1/2")
27	516-0141	2	*Pin, Dowel Gear Cover Locating
28	402-0036	4	Mount, Vibration, Cylindrical Shaped, Upper, Spec A Only
29	MOUNT, VIBRATION, CYLINDRICAL SHAPED, LOWER - SPEC A ONLY		
	402-0038	2	Engine End
	402-0251	2	Generator End
30	BUSHING, SPACER, VIBRATION MOUNT		
	402-0046	4	Spec A Only
	402-0290	4	*Begin Spec B
32	CUSHION, VIBRATION, CONE SHAPED - BEGIN SPEC B		
	402-0285	2	Engine End
	402-0287	2	Generator End
33	402-0282	4	*Snubber, Shock Mounting - Begin Spec B
34	526-0014	4	*Washer (29/64" I.D. x 1-1/2" O.D. x 1/8") Only with Cone Shaped Cushions
	WASHER, (ONLY WITH CONE SHAPED CUSHIONS)		
35	526-0198	As Req.	*5/8" I.D. x 1-1/2" O.D. x 1/16"
35A	526-0195	4	29/64" I.D. x 3-1/4" O.D. x 1/8"
36	505-0100	2	Nipple, Oil Drain - Key 1, 2
37	504-0011	1	Valve, Oil Drain - Key 1, 2
38	503-0316	1	Hose, Oil Drain - Key 1, 2
39	503-0197	1	Clamp, Oil Drain Hose - Key 1, 2
40	520-0650	4	Stud, Vibration Mount - Key 1, 2 - Spec A Only
41	505-0266	2	Plug, 3/8" Cylinder Block - Key 1, 2
42	NIPPLE, WATER DRAIN		
	505-0071	1	Spec A and B (1/4 x 2")
	505-0449	1	Begin Spec C (1/4 x 6")
43	505-0027	1	Coupling (1/4"), Water Drain
44	502-0153	1	Plug (1/4"), Washer Drain
45	102-0558	1	Heater, Oil Base (Optional)
46	800-0081	4	*Screw, Cap (7/16-14 x 3-1/2") - Cushion Mounting
47	850-0055	4	*Washer, Lock (7/16")
	402-0356	4	Hardware Package, Mounting (Includes Parts Marked +)
48	800-0072	10	Oil Base Mounting Screw
49	850-0055	10	Oil Base Mounting Washer
50	800-0026	2	Oil Fill Tube Mounting Screw
51	850-0045	2	Oil Fill Tube Mounting Washer

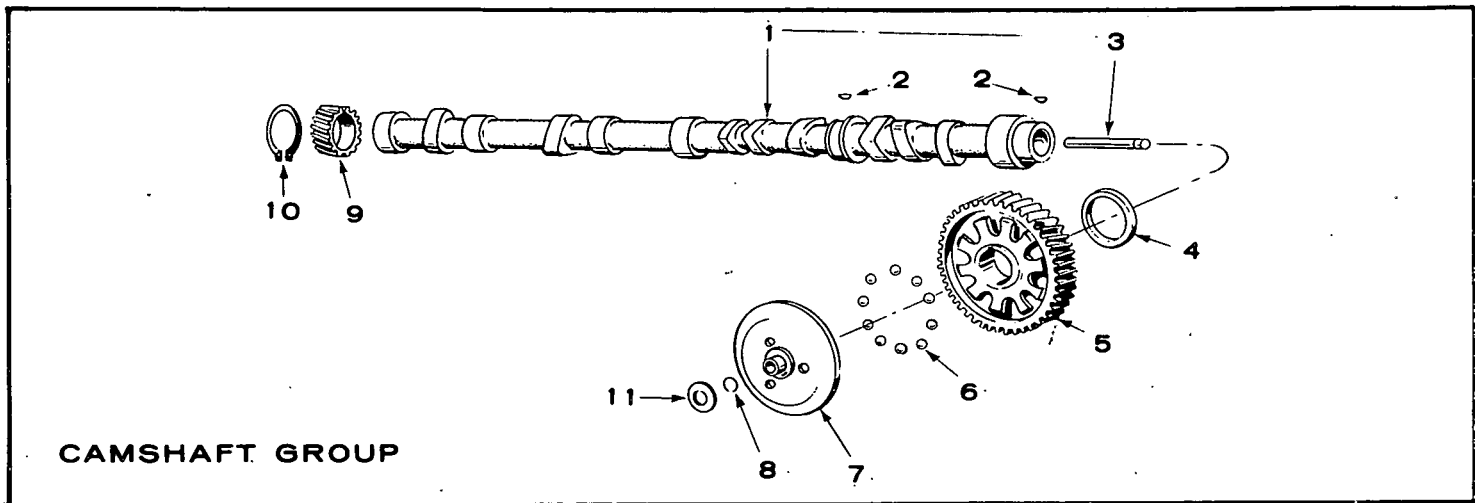
* - Included in Cylinder Block Assembly.

★ - Included in Mounting Hardware Package.



CYLINDER HEAD, VALVE AND ROCKER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	HEAD, CYLINDER			9	110-0858	16	Lock, Valve Spring Retainer
	110-1273	2	Key, 1, 2	10	110-0859	8	Cap, Valve Stem
	110-1399	2	Gasoline Sets	11	509-0090	4	Seal, Oil - Intake Valve, Includes Retainer Rings
	110-1433	2	Gas and Gas-Gasoline Sets Key 3, 4	12	ARM, ROCKER		
	110-1432	2	Gasoline Sets - Without Heat Exchanger		115-0128	4	Exhaust
	110-1626	2	Gas and Gas-Gasoline Sets - Without Heat Exchanger		115-0129	4	Intake
	110-1482	2	Gasoline Sets - With Heat Exchanger	14	115-0127	8	Ball, Rocker Arm
		2	Gas-Gasoline Sets - With Heat Exchanger	15	115-0150	8	Locknut, Rocker Arm
		2	Gasket, Head	16	115-0152	8	Stud, Rocker Arm
2	110-1852	2	Intake & Exhaust, Gasoline Sets	17	115-0154	8	Rod, Valve Push (Steel)
3	GUIDE, VALVE			18	TAPPET, VALVE		
	110-1501	8	Standard		115-0132	8	Spec A thru N
	110-1501-01	8	.001" Oversize		115-0195	8	Begin Spec P
	110-1501	4	Intake, Gas & Gas-Gasoline Sets	19	115-0196	2	Guide, Push Rod
	110-1501-01	4	Standard	24	COVER, ROCKER		
	110-1392	4	.001" Oversize		115-0197	2	Gasoline Sets (Less Oil Line)
	110-1392-01	4	Intake, Gas & Gas-Gasoline Sets		115-0179	2	Gas & Gas-Gasoline Sets (With Oil Line)
4	INSERT, VALVE SEAT			25	120-0628	2	Line, Oil, Rocker Cover, Gasoline Sets Only
	110-1214	4	Standard	26	115-0130	2	Gasket, Rocker Cover
	110-1214-02	4	.002" Oversize	27	110-1225	10	Screw, (3/8-16 x 4-3/4") Cylinder Head
	110-1214-05	4	.005" Oversize	28	800-0501	14	Screw, (3/8-16 x 3-3/8") Cylinder Head
	110-1214-10	4	.010" Oversize	31	526-0174	14	Washer, Cylinder Head
	110-1214-25	4	.025" Oversize	32	520-0338	4	Stud, Intake Manifold
	110-1287	4	Intake, Stellite - Gas & Gas- Gasoline Sets	33	520-0608	8	Stud, Exhaust Manifold
	110-1287-02	4	Standard	35	403-0690	1	Bracket, Lifting - Unhoused Sets
	110-1287-05	4	.002" Oversize	36	403-0620	2	Nut, Extension - Spec A Only
	110-1287-10	4	.005" Oversize	37			Bar Assembly, Lifting, Spec A Only (Order 403-0690, (2) 809-0091, & 850-0060)
	110-1287-25	4	.010" Oversize	38	809-0042	2	Screw, Oil Line, Rocker Cover
	110-1215	4	.025" Oversize	39	110-1312	2	Baffle, Fuel Distributor
	110-1215-02	4	Exhaust	40	402-0361	2	Cushion, Vibration
	110-1215-05	4	Standard	41	403-0890	1	Brace, Lifting Bracket
	110-1215-10	4	.002" Oversize	42	403-0826	1	Spacer, Lifting Bracket
	110-1215-25	4	.005" Oversize	43	402-0362	2	Bushing, Spacer
5	VALVE, INTAKE			44	800-0094	2	Screw, Lifting Bracket Mtg. (1/2-13 x 2")
	110-1218	4	Gasoline Sets	45	526-0100	2	Washer Lock, Lifting Bracket Mounting
	110-1286	4	Gas & Gas-Gasoline Sets	46	800-0025	1	Screw, Brace to Lifting Bracket (5/16-18 x 5/8")
6	110-1219	4	Valve, Exhaust, Stellite	47	850-0045	2	Washer Lock, Brace Mounting
7	110-1221	8	Spring, Valve	48	862-0015	1	Nut, Hex - Brace to Lifting Bracket Mounting
8	110-1220	8	Retainer, Valve Spring	49	800-0038	1	Screw, Brace Mounting (5/16-18 x 3-1/4")
				50	800-0030	8	Screw, Rocker Cover Mounting (5/16-18 x 1-1/4")
				51	850-0045	8	Washer Lock, Rocker Cover Mounting

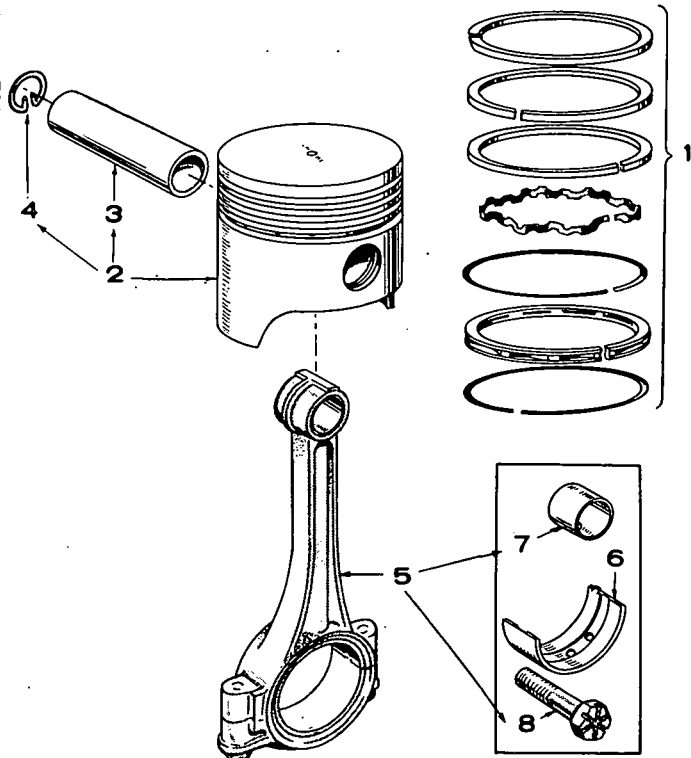


CAMSHAFT GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CAMSHAFT (INCLUDES PIN) 105-0230	1	Spec A thru N
	105-0275	1	Begin Spec P
2	515-0001	2	Key, Camshaft Gear or Distributor Drive Gear
3	150-0075	1	Pin, Camshaft Center
4	105-0205	1	Washer, Thrust

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
5	105-0218	1	Gear, Camshaft (Includes Spacer & Plate)
6	510-0046	10	Ball, Fly - Governor
7	150-0857	1	Cup, Governor
8	150-0078	1	Ring, Center Pin (Snap)
9	166-0302	1	Gear, Distributor Drive
10	518-0195	1	Ring, Distributor Drive Gear
11	150-0859	1	Washer, Thrust, Governor Yoke

PISTON AND CONNECTING ROD GROUP

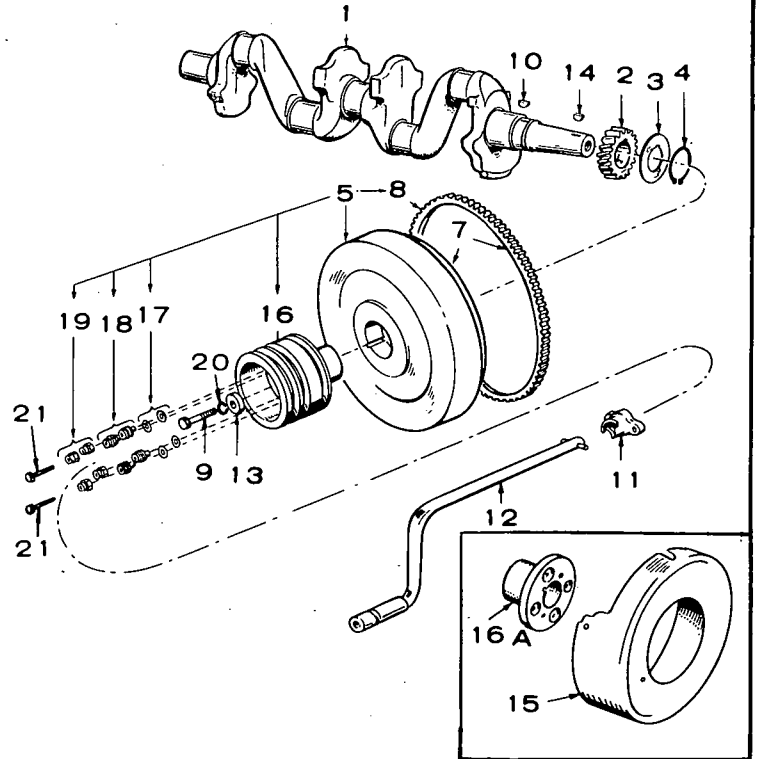


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	RING SET, PISTON		
	113-0107	4	Standard
	113-0107-10	4	.010" Oversize
	113-0107-20	4	.020" Oversize
	113-0107-30	4	.030" Oversize
2	PISTON & PIN, INCLUDES PIN RETAINING RINGS		
			Gasoline & Gas-Gasoline Sets
	112-0092	4	Standard
	112-0092-10	4	.010" Oversize
	112-0092-20	4	.020" Oversize
	112-0092-30	4	.030" Oversize
			Gas Only & LPG Sets - Spec S Only
	112-0106	4	Standard
	112-0106-10	4	.010" Oversize
	112-0106-20	4	.020" Oversize
	112-0106-30	4	.030" Oversize
			Gas Only & LPG Sets - Spec A thru R and Begin Spec T
	112-0092	4	Standard
	112-0092-10	4	.010" Oversize
	112-0092-20	4	.020" Oversize
	112-0092-30	4	.030" Oversize
3	PIN, PISTON		
	112-0086	4	Standard
	112-0086-02	4	.002" Oversize
4	112-0085	8	Ring, Retaining, Pin
5	114-0163	4	Rod Assembly, Connecting (Forged)
6	BEARING HALF, CONNECTING ROD		
	114-0164	8	Standard
	114-0164-02	8	.002" Undersize
	114-0164-10	8	.010" Undersize
	114-0164-20	8	.020" Undersize
	114-0164-30	8	.030" Undersize
7	114-0166	4	Bushing, Piston Pin, Connecting Rod, Semi-Finished
8	805-0012	8	Bolt, Place (5/16-24 x 1-13/16")

CRANKSHAFT AND FLYWHEEL GROUP

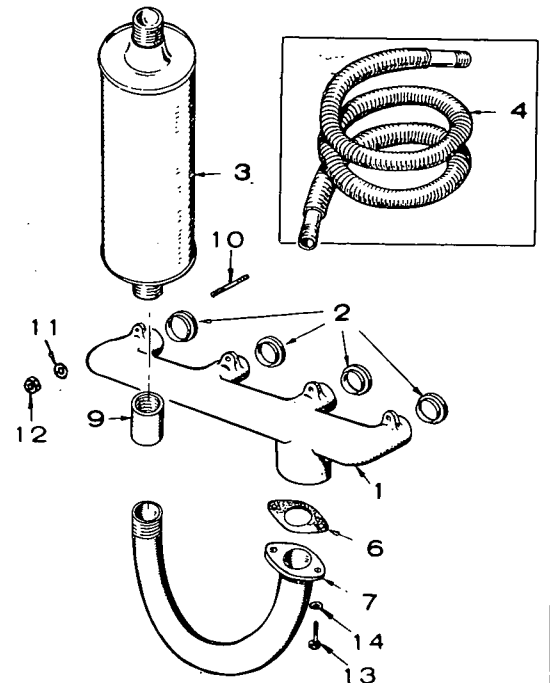
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104-0460	1	Crankshaft
2	104-0418	1	Gear, Crankshaft
3	104-0416	1	Washer, Gear Retainer
4	518-0188	1	Ring, Lock
5	FLYWHEEL (Includes Ring Gear & Hub)		
	104-0549	1	Key 1, 2
	104-0556	1	Key 3, 4
7	104-0547	1	Flywheel (With Ring Gear, Less Hub)
8	104-0423	1	Gear, Ring
9	800-0500	1	Screw (7/16-14 x 5-1/2") Flywheel
10	515-0001	1	Key, Crankshaft Gear
11	104-0429	1	*Crankdog - Key 1, 2
12	192-0004	1	*Crank - Key 1, 2
13	526-0185	1	Washer, Flywheel Mounting
14	515-0153	1	Key, Flywheel to Crankshaft
15	104-0510	1	Guard, Flywheel - Key 3, 4
16	104-0546	1	Hub, Flywheel - Key 1, 2
16A	134-1401	1	Hub, Flywheel - Key 3, 4
17	526-0187	4	Washer (Special), Hub to Flywheel
18	104-0543	4	Spacer & Washer Assembly, Hub to Flywheel
19	115-0150	4	Nut (3/8-24), Hub to Flywheel
20	850-0055	1	Washer, Lock - Flywheel Mounting
21	801-0054	4	Screw, Hex Cap - Flywheel Hub

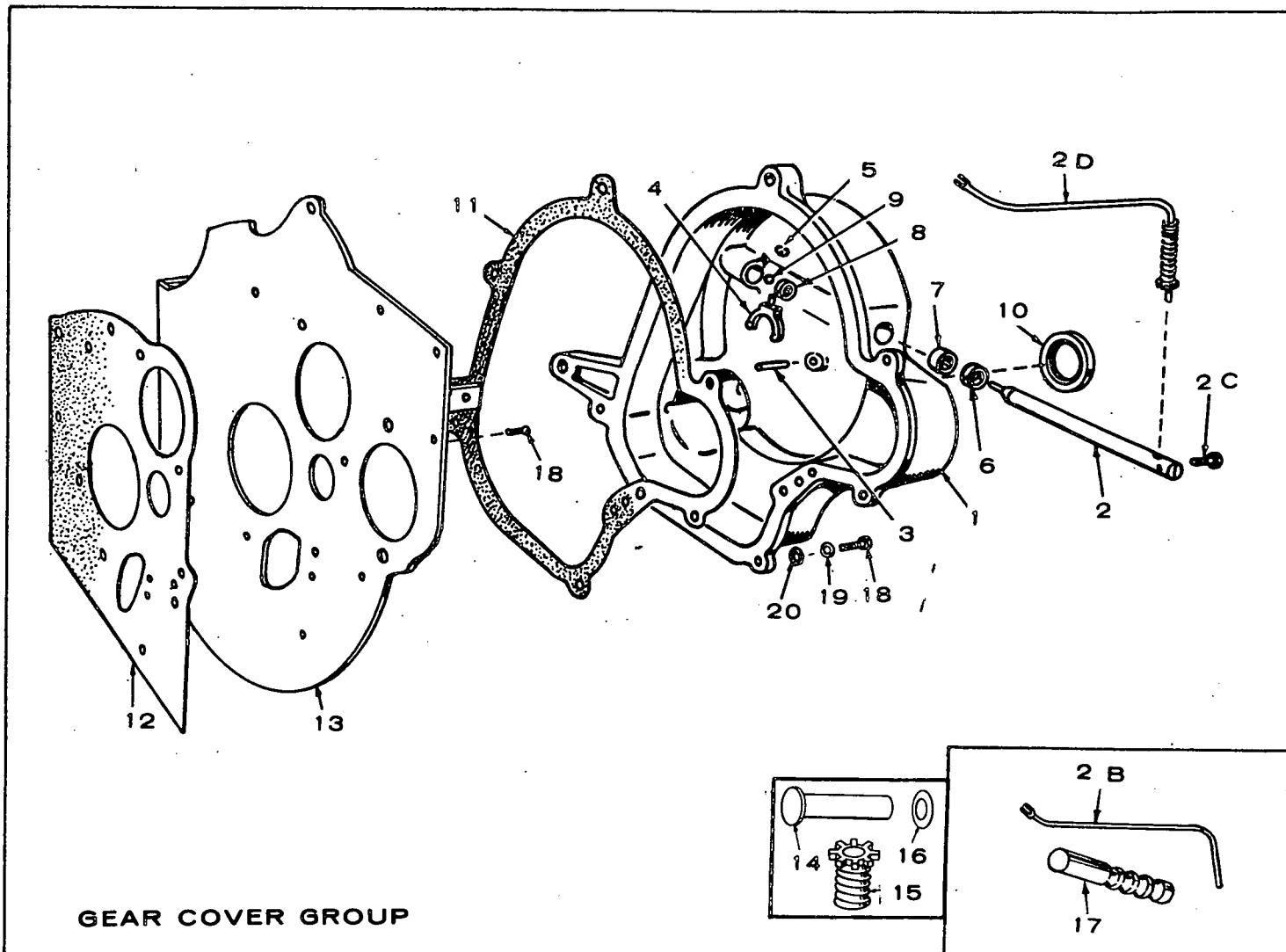
* - Used on Early Models Only



MANIFOLD AND EXHAUST GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	154-0714	1	Manifold, Exhaust - Key 1, 2
2	154-1057	4	Gasket, Exhaust Manifold
3	155-0456	1	Muffler
4	155-0493	1	Tube, Exhaust, Flexible
6	154-0738	1	Gasket, Exhaust Outlet
7	155-0806	1	Tube, Exhaust Outlet
9	505-0032	1	Coupling, Exhaust
10	520-0608	8	Stud, Exhaust Manifold Mtg.
11	526-0045	8	Washer, Flat - Exhaust Manifold Mounting
12	110-0445	8	Nut, Hex - Exhaust Manifold Mounting
13	800-0052	2	Screw, Hex Cap - Exhaust Tube Mounting
14	850-0050	2	Washer, Lock - Exhaust Tube Mounting





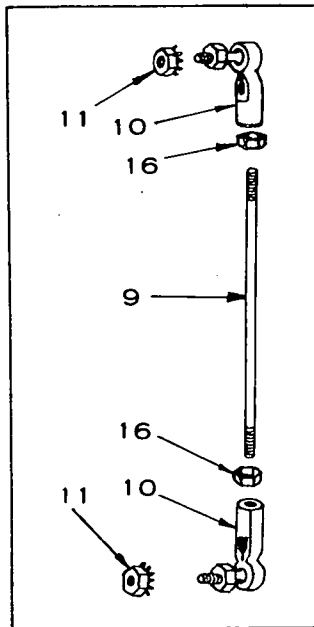
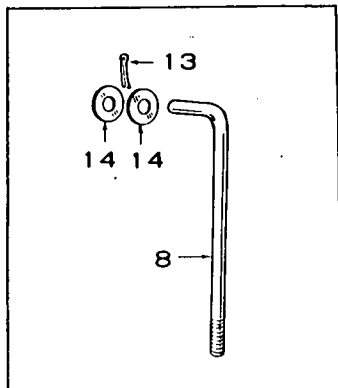
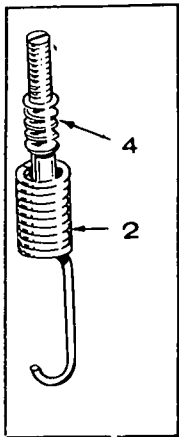
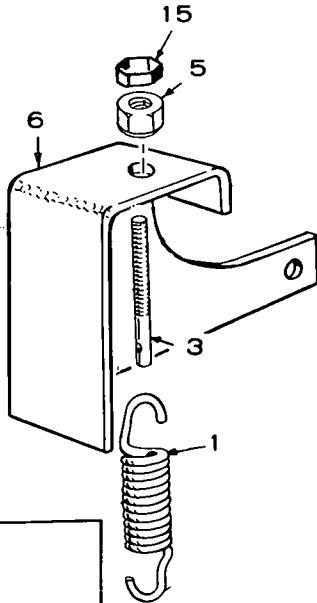
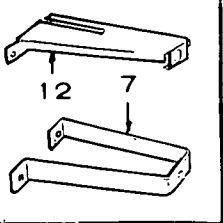
GEAR COVER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	COVER ASSEMBLY, GEAR (Includes parts marked *)		
	103-0278	1	Key 1, 2 - Spec A thru Q
	103-0302	1	Key 1, 2 - Begin Spec R
	103-0277	1	Key 3, 4
2	*SHAFT, GOVERNOR		
	150-0901	1	Key 1, 2
	150-0838	1	Key 3, 4
2B	150-0836	1	Arm, Governor - Spec A thru Q
2C	*SCREW (#8-32 x 1/2")		
	815-0176	2	Key 1, 2
	815-0176	1	Key 3, 4
2D	ARM, GOVERNOR		
	150-1158	1	Key 1, 2 - Begin Spec R
	150-1091	1	Key 3, 4 - Begin Spec R
3	516-0111	1	*Pin, Governor Cup Stop
4	150-0777	1	*Yoke, Governor
5	518-0129	1	*Ring, Yoke Retaining
6	509-0088	1	*Seal, Governor Shaft
7	510-0048	1	*Bearing, 1/2" Shaft
8	510-0082	1	*Bearing, 1/4" Shaft
9	510-0043	1	*Ball, Governor Shaft Thrust

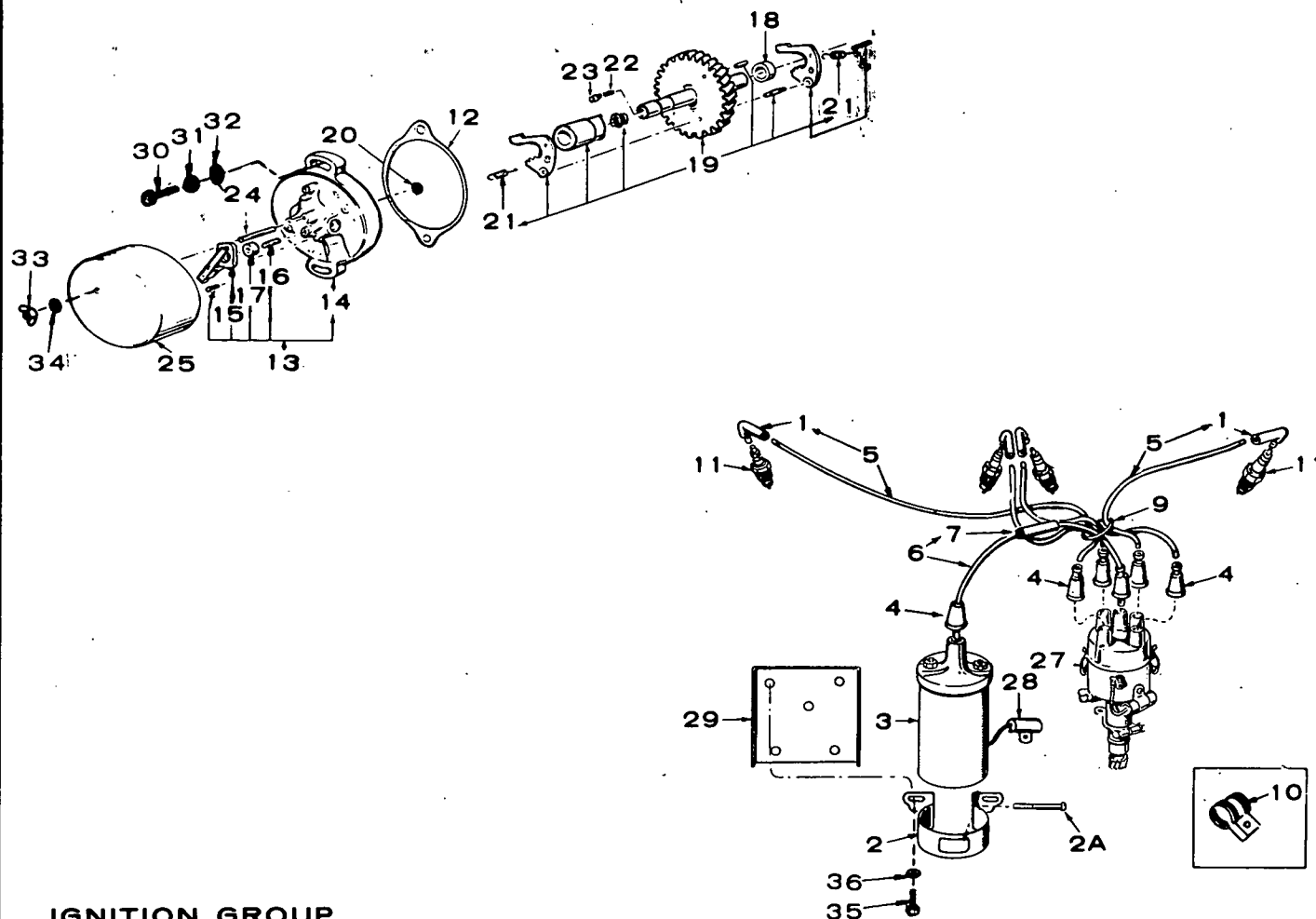
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
10	509-0087	1	*Seal
11	103-0251	1	Gasket, Gear Cover
12	103-0218	1	Gasket, Backplate
13	103-0228	1	Backplate
14	150-1154	1	*Pin, Governor Shaft Hub - Key 1, 2 - Begin Spec R
15	150-1160	1	*Hub, Governor Shaft - Key 1, 2 - Begin Spec R
16	150-1155	1	*Washer, Spring - Governor Shaft - Key 1, 2 - Begin Spec R
17	150-0900	1	*Arm, Governor Spring Control - Key 1, 2 - Spec A through Q
18	SCREW, HEX CAP		
	110-0879	4	Gear Cover Mounting (5/16-18 x 1-1/4")
	800-0028	1	Gear Cover Mounting (5/16-18 x 1")
19	850-0045	5	Washer, Lock
20	526-0115	5	Washer, Flat - Gear Cover Mounting

* - Included in Gear Cover Assembly.

GOVERNOR GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150-1085	1	Spring, Governor - Begin Spec R
2	150-0862	1	Spring, Governor - Spec A through Q
3	150-1082	1	Stud, Governor Adjusting - Begin Spec R
4	150-0863	1	Stud, Governor Adjusting - Spec A through Q
5	NUT, ADJUSTING 104-0091 862-0003	1	Spec A through Q Begin Spec R
6	BRACKET, GOVERNOR ADJUSTMENT - KEY 1, 2 150-0902 150-1105	1	Spec A through Q Begin Spec R
7	BRACKET, GOVERNOR - KEY 3, 4 150-0810 150-1103	1	Spec A through Q Begin Spec R
8	150-0841	1	Link, Governor - Spec A thru Q
9	150-1069	1	Link, Governor - Begin Spec R
10	JOINT, BALL 150-0974 150-1081	1	Spec A through Q Begin Spec R
11	870-0131	2	Nut, Joint (1 used Spec A through Q)
12	150-0823	1	Cover, Governor Spring Control - Key 3, 4 - Spec A through Q
13	516-0036	1	Key, Cotter - Spec A through Q
14	526-0116	2	Washer, Link to Carburetor - Spec A through Q
15	PALNUT, LOCK 870-0130 870-0133	1	Spec A through Q Begin Spec R
16	870-0188	2	Palnut, Lock - Governor Link (1 used Spec A through Q)



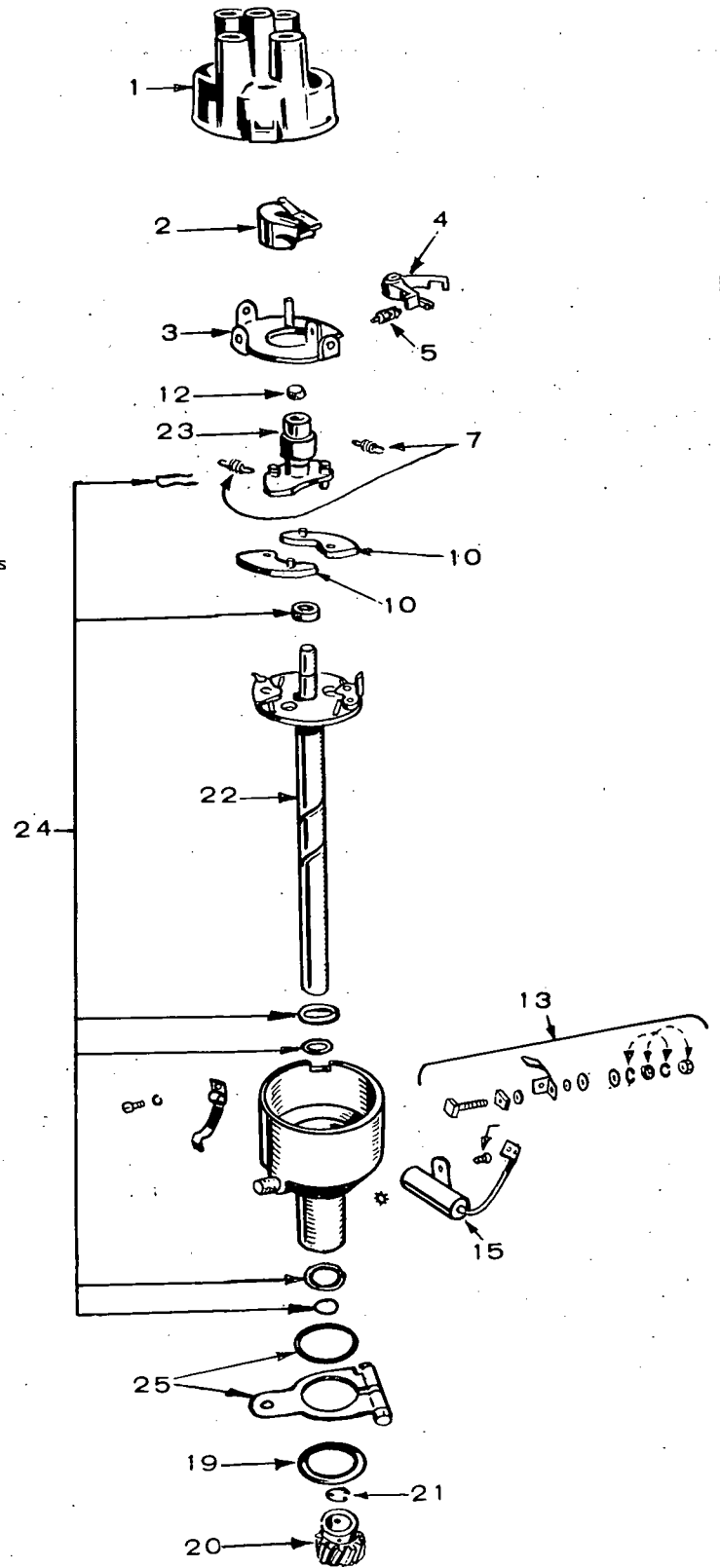
IGNITION GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	314-0032	4	Suppressor, Spark Plug	20	160-0806	1	Disc, Thrust
2	166-0279	1	Clamp, Coil	21	160-0711	2	Spring, Timing Weight
2A	166-0286	1	Screw, Coil Clamp	22	160-0773	1	Spring, Thrust Plunger
3	166-0278	1	Coil, Ignition	23	160-0774	1	Plunger, Thrust
4	160-0558	6	Nipple, Ignition Cables	24	520-0347	1	Stud, Plate Cover
5	CABLE, SPARK PLUG			25	160-0719	1	Cover, Breaker Plate
	167-1409	3	15-1/2" (Includes Suppressor)	27	166-0309	1	**Distributor (Includes Gear)
	167-1410	1	25-1/2" (Includes Suppressor)	28	312-0058	1	Condenser, Ignition Coil
6	167-1425	1	Cable, Coil to Distributor (Includes Suppressor)	29	160-0886	1	Bracket, Coil Mounting
7	314-0006	1	Suppressor, Ignition Coil	30	800-0052	2	Screw, H.H.C. Mtg. Ignition Breaker Plate (3/8-16 x 1-1/2")
9	509-0018	1	"O" Ring (Cables Tie)	31	850-0050	2	Lockwasher, Mtg. Ignition Breaker Plate (3/8)
10	332-0052	1	Clip, Spark Plug Cables	32	526-0026	2	Flatwasher, Mtg. Ignition Breaker Plate (3/8)
11	167-0241	4	Plug, Spark	33	865-0011	1	Nut, Wing Timing Control Cover
12	160-0721	1	Gasket, Breather Plate	34	800-0025	2	Screw, H.H.C. Mtg. Ignition Coil (5/16-18 x 5/8")
13	191-0395	1	Plate Assembly, Start-Disconnect	35	800-0025	2	Screw, H.H.C. Mtg. Ignition Coil (5/16-18 x 5/8")
14	160-0891	1	Plate Only, Start-Disconnect	36	850-0045	3	Lockwasher, Mtg. Ignition Coil (5/16 Med.)
15	309-0134	1	Switch, Assembly, Start-Disconnect				
16	309-0140	1	Plunger, Start-Disconnect				
17	160-1143	1	Diaphragm, Start-Disconnect				
18	160-0720	1	Spacer, Timing Control				
19	160-0707	1	Gear & Shaft Assembly, Timing				

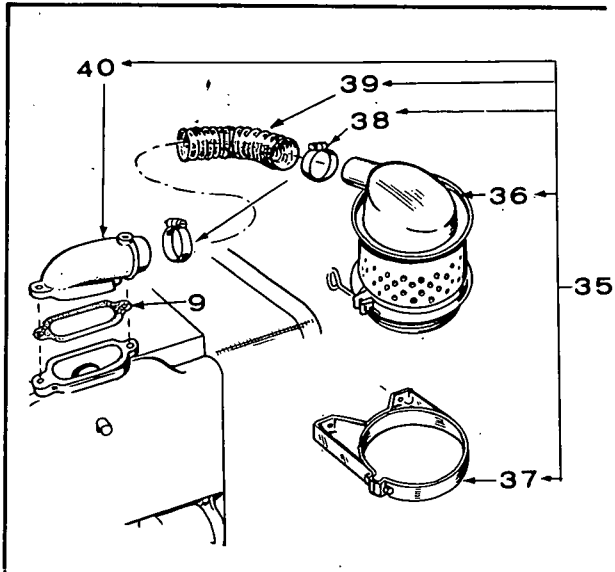
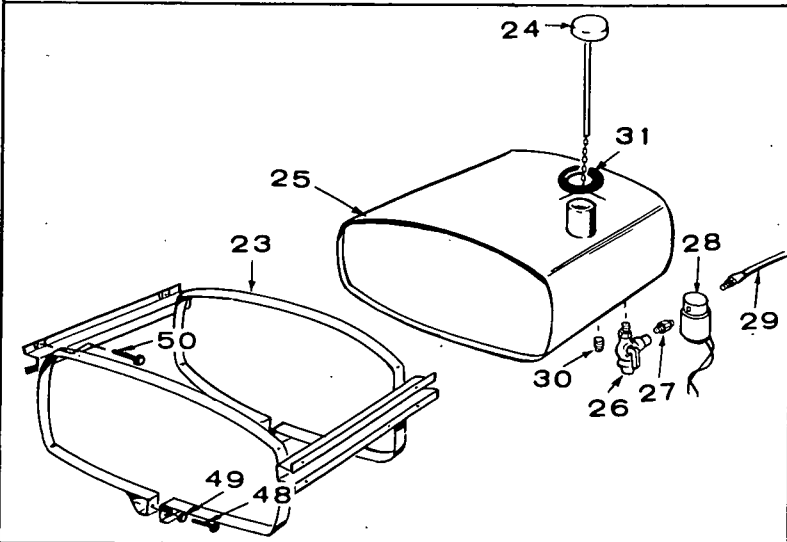
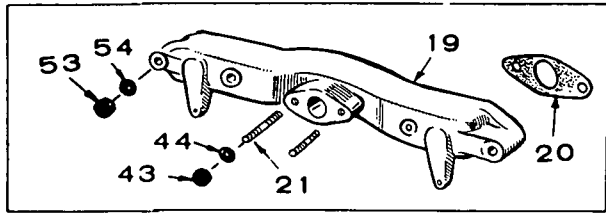
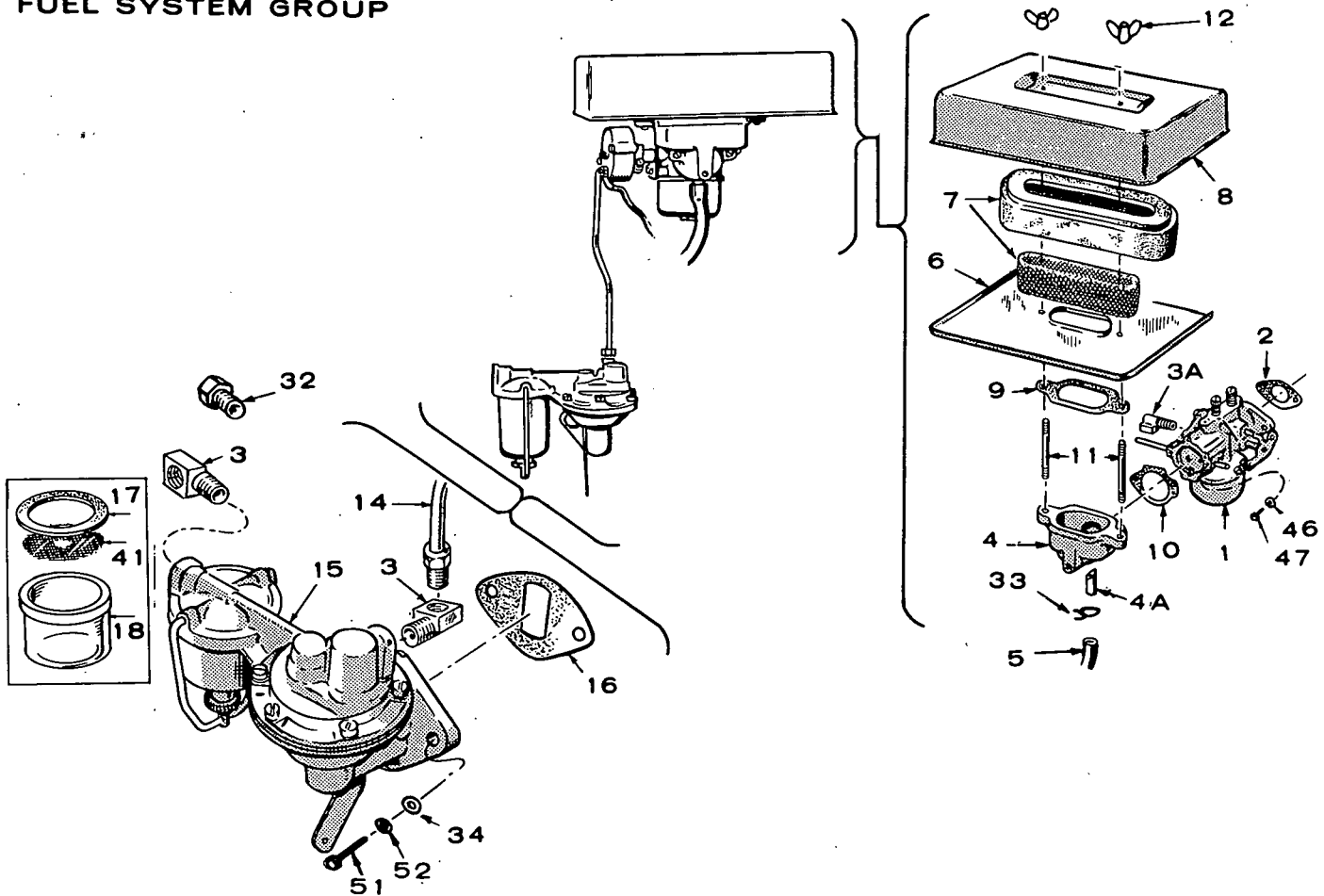
** - See separate group for components.

DISTRIBUTOR PARTS GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	166-0309	1	Distributor Assembly, Includes Gear
1	166-0235	1	Cap
2	166-0234	1	Rotor
3	166-0297	1	Plate, Breaker
4	166-0245	1	Point Set, Breaker
5	166-0061	1	Nut, Lock, Contact Screw
7	166-0606	1	Spring Set, Governor Weight
12	166-0607	1	Wick Package
13	166-0608	1	Terminal Stud & Parts Package
15	166-0310	1	Condenser
17	166-0609	1	Weight Set, Governor
19	509-0096	1	Seal, Base
20	166-0303	1	Gear, Drive
21	518-0216	1	Ring, Retaining
22	166-0610	1	Shaft, Drive
23	166-0611	1	Cam & Stop Plate
24	166-0612	1	Bearing & Parts Package
25	166-0308	1	Bracket, Ring



FUEL SYSTEM GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*CARBURETOR, GASOLINE		
	141-0758	1	Spec A through Q
	141-0685	1	Begin Spec R
2	141-0281	1	Gasket, Carburetor
3	502-0002	2	Elbow, Fuel Pump Inlet & Outlet
3A	502-0065	1	Elbow, Carburetor Inlet
4	ADAPTER, AIR CLEANER (Includes Tube)		
	140-0647	1	Spec A through Q
	140-0933	1	Begin Spec R
4A	123-0732	1	Tube, Nylon
5	503-0416	1	Hose, Breather to Air Cleaner Adapter
6	140-0595	1	Pan, Air Cleaner
7	140-0636	1	Element & Retainer, Air Cleaner
8	140-0594	1	Cover, Air Cleaner
9	140-0584	1	Gasket, Air Cleaner
10	GASKET, ADAPTER TO CARBURETOR		
	140-0585	1	Spec A through Q
	140-0921	1	Begin Spec R
11	520-0621	2	Stud, Air Cleaner
12	865-0020	2	Nut, Wing - Air Cleaner
14	LINE, PUMP TO CARBURETOR		
	159-0744	1	Spec A and B
	159-1016	1	Spec C through Q
	149-1099	1	Begin Spec R
15	149-0803	1	Pump, Fuel
16	149-0792	1	Gasket, Fuel Pump Mounting
17	149-0517	1	Gasket, Fuel Pump Bowl
18	149-0116	1	Bowl, Pump (Glass)
19	154-0749	1	Manifold, Intake
20	154-0733	2	Gakst, Intake Manifold
21	520-0526	2	Stud, Carburetor Mounting
23	159-0640	1	Band, Tank - Housed Sets - Key 1, 2
24	159-0642	1	Cap Assembly - Housed Sets - Key 1, 2
25	159-0639	1	Tank, Fuel - Housed Sets - Key 1, 2
26	504-0004	1	Valve, Shut-off - Housed Sets - Key 1, 2
27	502-0082	1	Nipple, Hex - Brass Pipe - Key 1, 2
28	307-0565	1	Valve, Fuel Solenoid (12 Volt) - Housed Sets - Key 1, 2

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
29	501-0015	1	Line, (16'') - Housed Sets - Key 1, 2
30	505-0057	1	Plug, (1/8'') Shut Off Valve - Housed Sets - Key 1, 2
31	159-0751	1	Gasket, Tank Filler Neck - Key 1, 2
32	502-0003	1	Connector, Pump In - Housed Sets with Mounted Tank - Key 1, 2
33	503-0446	2	Clamp, Breather Hose
34	526-0065	6	Washer, Flat (Copper) - (2) Fuel Pump Mounting (4) Intake Manifold Mounting
35	140-0677	1	Conversion Kit, Oil Bath Air Cleaner - OPTIONAL
36	140-0500	1	★Cleaner, Air, Oil Bath
37	140-0519	1	★Band, Cleaner
38	503-0365	2	★Clamp, Hose
39	503-0396	1	★Hose, Cleaner to Adapter
40	140-0645	1	★Adapter, Oil Bath Air Cleaner
41	149-0463	1	Screen, Fuel Pump
42	149-1048	1	Repair Kit, Fuel Pump
43	868-0002	2	Nut, Carburetor Mounting
44	854-0007	2	Washer, Carburetor Mounting
45	813-0108	2	Screw, Air Cleaner Adapter
46	850-0030	2	Washer, Lock - Air Cleaner Adapter
47	526-1508	2	Washer, Flat - Air Cleaner Adapter
48	812-0168	2	Screw, Round Head (1/4-20 x 3-1/2'')
49	850-0040	2	Washer, Lock (1/4'')
50	821-0010	8	Screw, Clutch Head (1/4-20 x 1/2'')
51	800-0027	2	Screw, H.H.C. Fuel Pump Mtg.
52	149-1307	2	Washer, Fuel Pump Mounting
53	110-0445	4	Nut, Intake Manifold
54	526-0065	4	Washer, Intake Manifold

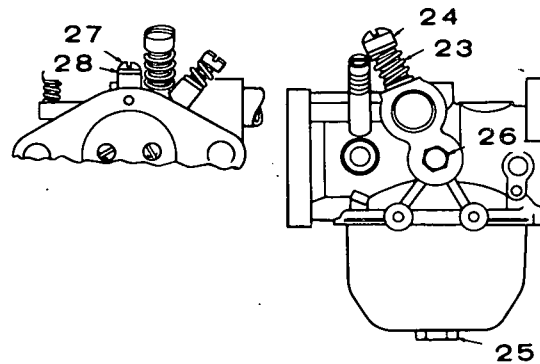
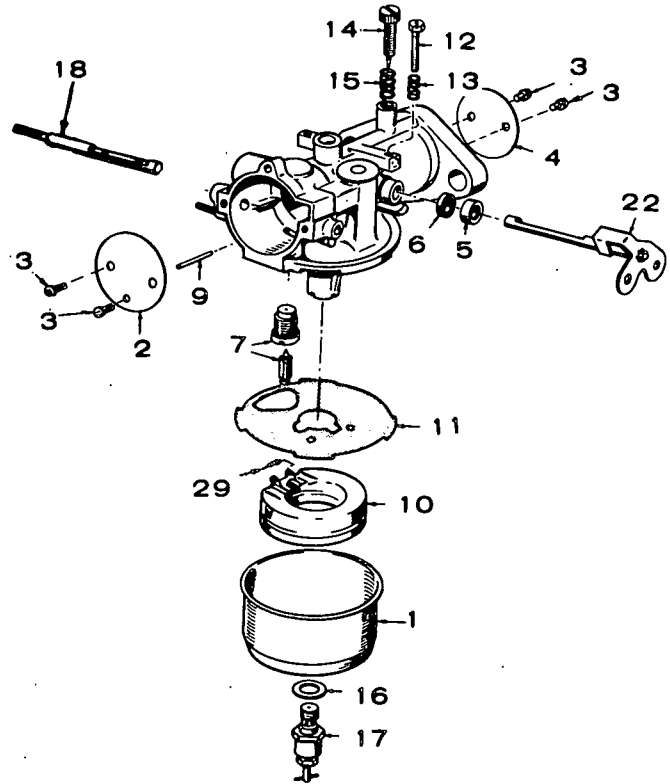
* - See separate group for components and service kits.
★ - Included in OPTIONAL 140-0677 Oil Bath Air Cleaner Conversion Kit (Plus Hardware).

CARBURETOR PARTS GROUP

Begin Spec R

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	141-0685	1	Carburetor, Gasoline
	141-0720	1	Carburetor, Gas-Gasoline (Optional)
	141-0725	1	Carburetor, Gas Only (Optional)
	141-0747	1	Repair Kit (Includes Parts Marked *)
	141-0748	1	Gasket Kit (Includes Parts Marked +)
	141-0281	1	*+Gasket, Carburetor Flange
1	141-0708	1	Bowl, Fuel
2	141-0771	1	Plate, Choke (Not used on Gas Only Sets)
3	141-0698	4	Screw & Washer, Choke and Throttle Plate Mounting (2 used on Gas Only Sets)
4	141-0793	1	Plate, Throttle
5	141-0705	1	*Retainer, Seal
6	141-0661	1	*+Seal, Rubber
7	141-0798	1	*Valve Seat Assembly, Fuel (Not used on Gas Only Sets)
9	141-0703	1	*Shaft, Float (Not used on Gas Only Sets)
10	141-0702	1	Float Assembly, (Not used on Gas Only Sets)
11	141-0701	1	*+Gasket, Bowl to Body
12	141-0700	1	Screw, Throttle Stop
13	141-0711	1	Spring, Throttle Stop
14	NEEDLE, IDLE ADJUSTING		
	141-0713	1	Gasoline and Gas Only Sets
	141-0713	2	Gas-Gasoline Sets
15	SPRING, IDLE NEEDLE		
	141-0710	1	Gasoline and Gas Only Sets
	141-0710	2	Gas-Gasoline Sets
16	141-0077	1	*+Washer, Main Jet Assembly
17	141-0712	1	Jet Assembly, Main (Adjustable) (Not used on Gas Only Sets)
18	SHAFT, CHOKE		
	141-0679	1	Electric Choke Gasoline Sets
	141-0716	1	Electric Choke Gas-Gasoline Sets
22	141-0735	1	Shaft & Lever Throttle
23	141-0733	1	Spring, Main Gas Needle - Gas & Gas-Gasoline Sets
24	141-0734	1	Needle, Main Gas Adjusting - Gas & Gas-Gasoline Sets
25	141-0736	1	Nut, Bowl - Gas Only Sets
26	141-0737	1	Plug, Pipe (1/8") - Gas Only Sets
27	141-0738	1	Screw (#10-32) - Gas Only Sets
28	141-0739	1	Washer, Gas Only Sets
29	141-0799	1	*Spring, Float (Not used on Gas Only Sets)

* - Parts contained in Repair Kit.
+ - Parts contained in Gasket Kit.

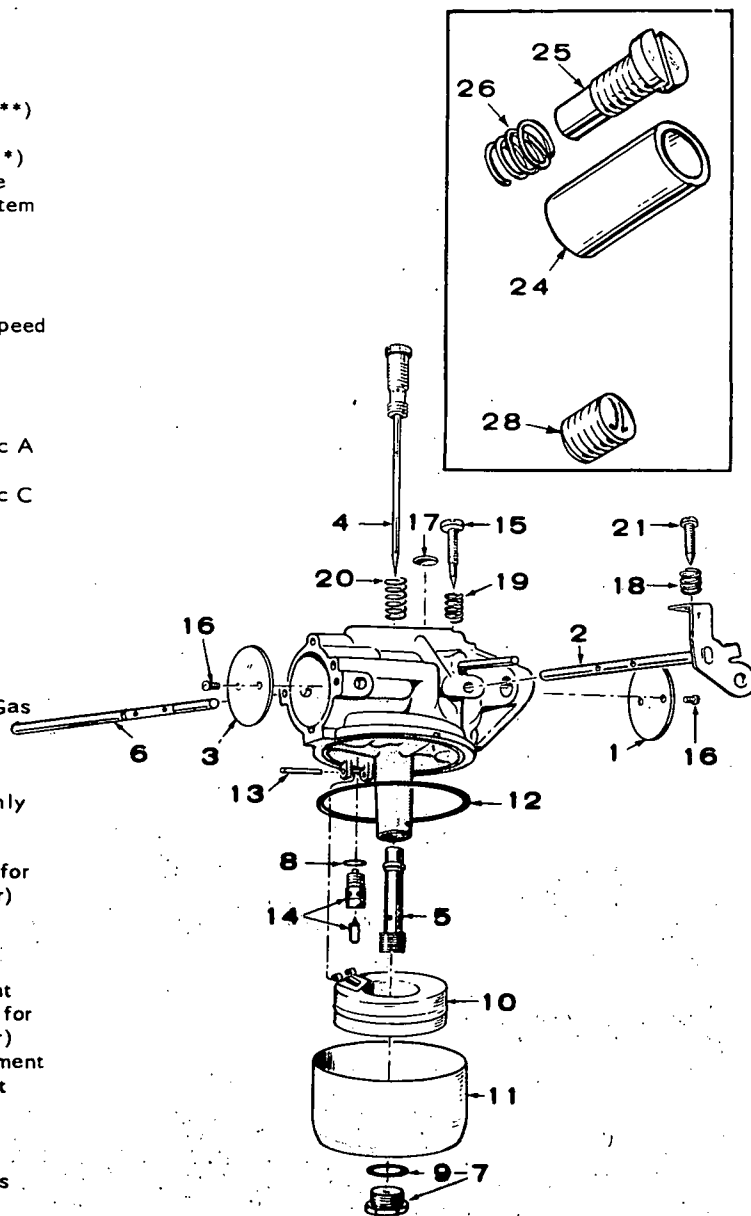


CARBURETOR PARTS GROUP

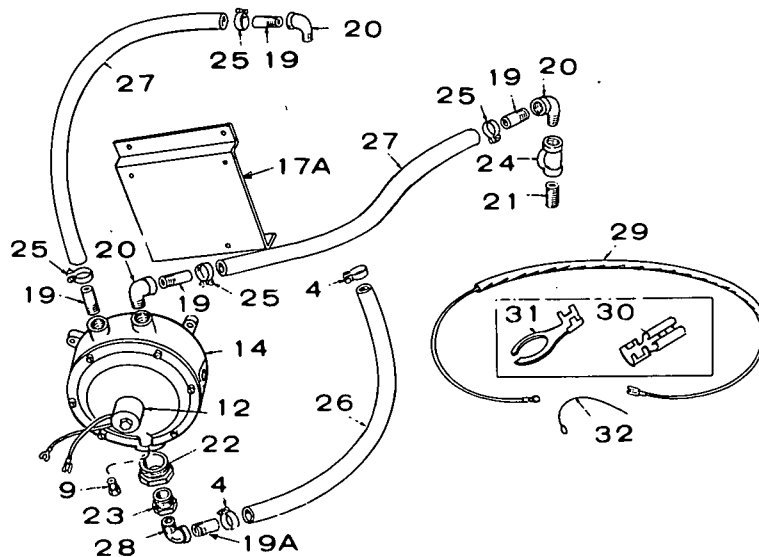
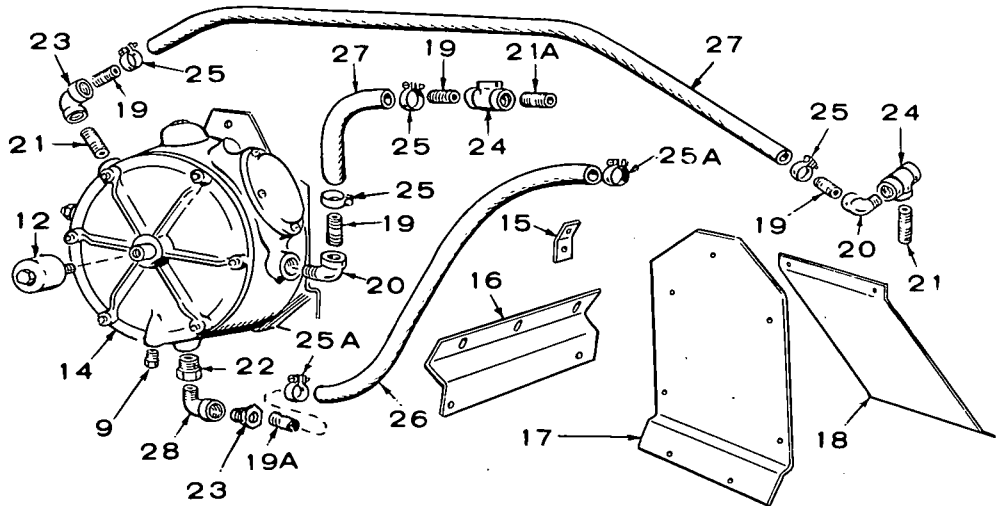
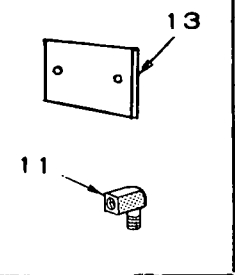
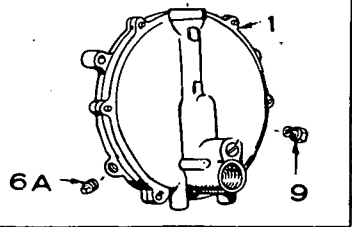
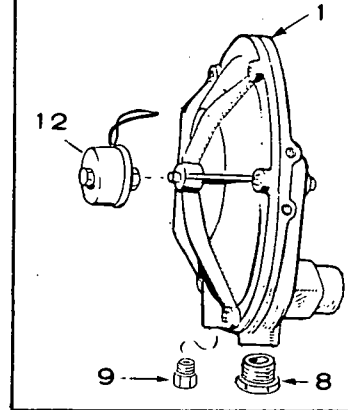
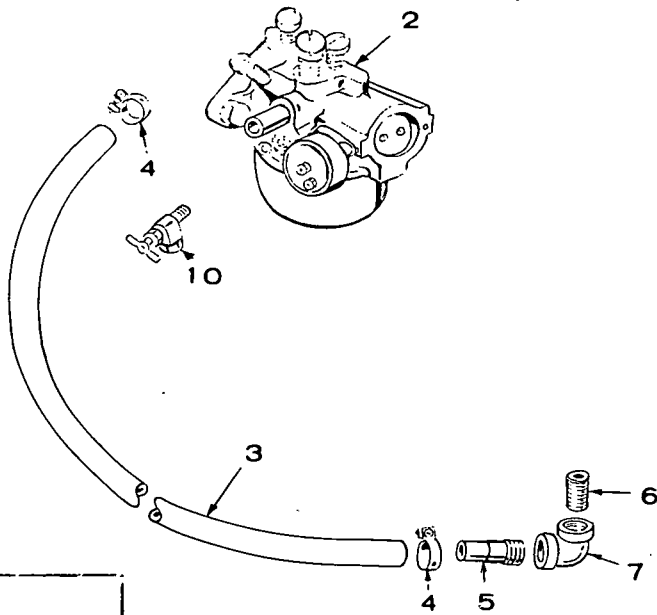
SPEC A THRU Q

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
CARBURETOR			
	141-0759	1	Gasoline
	141-0758	1	Gas-Gasoline (Optional)
	141-0757	1	Gas Only (Optional)
	141-0241	1	Repair Kit, Carburetor (Includes Parts Marked **)
	141-0201	1	**Gasket Kit, Carburetor (Includes Parts Marked *)
	141-0281	1	*Gasket, Carburetor Flange (Illustrated in Fuel System Group)
1	143-0202	1	Valve, Throttle
2	143-0234	1	Shaft & Lever, Throttle
3	143-0204	1	Valve, Choke
4	143-0235	1	**Needle, Idle Jet & High Speed Adjustment
5	143-0237	1	**Nozzle (Not for Gas Only Carburetor)
6	SHAFT, CHOKE		
	143-0207	1	Gasoline Carburetor - Spec A and B
	143-0315	1	Gasoline Carburetor - Spec C thru P
	143-0232	1	Gas-Gasoline Carburetor - Spec A and B
	143-0316	1	Gas-Gasoline Carburetor - Spec C thru P
7	143-0208	1	Screw, & Gasket, Bowl
8	143-0015	1	*Gasket, Fuel Inlet Valve
9	143-0209	1	*Gasket
10	143-0105	1	Float and Lever (Not for Gas Only Carburetor)
11	143-0210	1	Bowl
12	143-0077	1	*Gasket, Bowl Ring
13	143-0212	1	**Pin, Float (Not for Gas Only Carburetor)
14	143-0341	1	**Valve, Fuel Inlet
15	143-0213	1	Screw, Idle Adjustment (2 for Gas-Gasoline Carburetor)
16	812-0014	4	**Screw (#3-48 x3/16)
17	143-0110	1	Plug, Expansion
18	143-0214	1	Spring, Throttle Adjustment
19	143-0112	1	Spring, Idle Adjustment (2 for Gas-Gasoline Carburetor)
20	143-0114	1	Spring, High Speed Adjustment
21	143-0215	1	Screw, Throttle Adjustment
24	145-0308	1	Tube, Gas Inlet - Gas & Gas-Gasoline Sets
25	148-0589	1	Needle, Gas Adjustment - Gas & Gas-Gasoline Sets
26	148-0590	1	Spring, Gas Adjustment - Gas & Gas-Gasoline Sets
28	505-0008	1	Plug, (1/8") Gas Only Sets

* - Contained in Gasket Kit.
 ** - Contained in Repair Kit

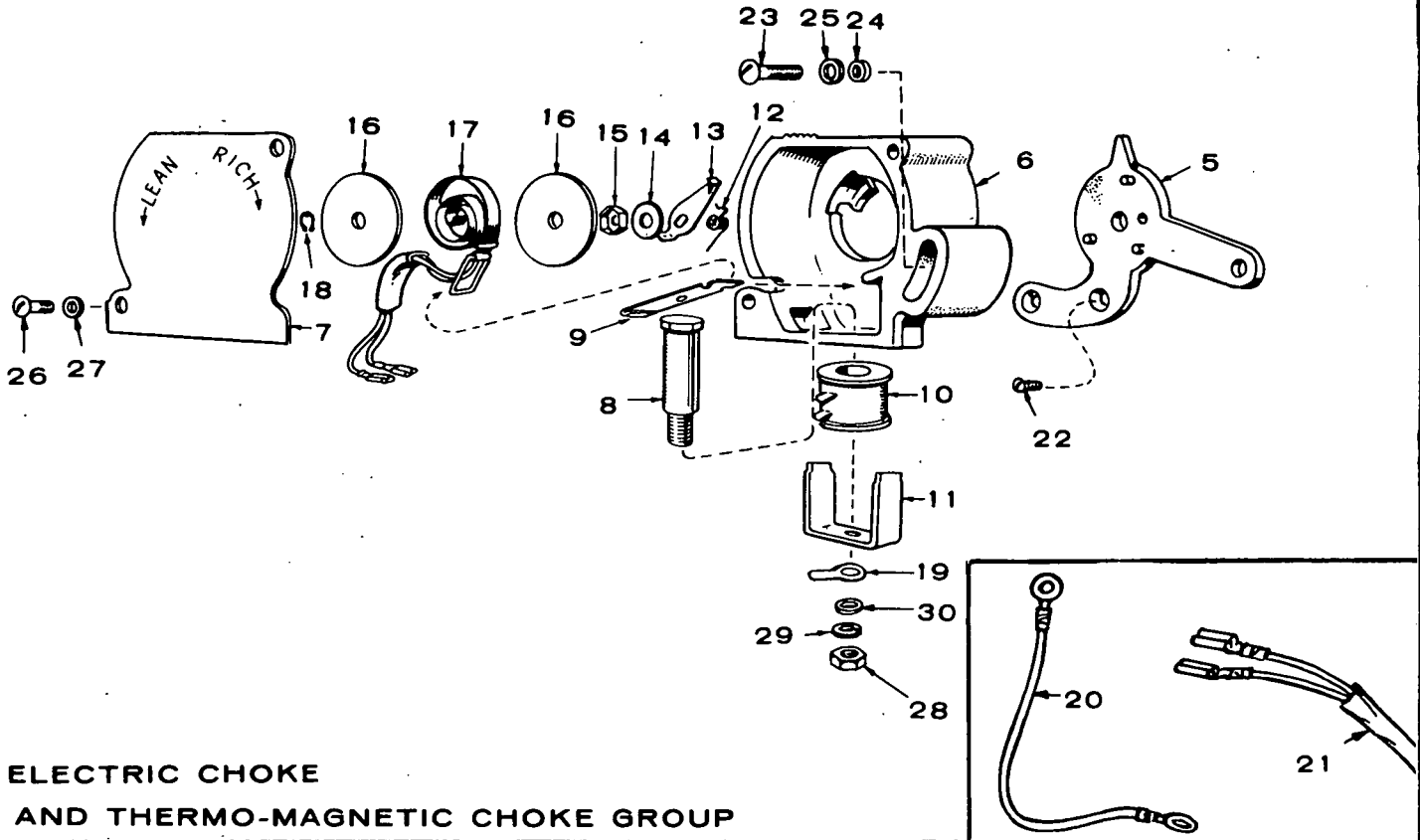
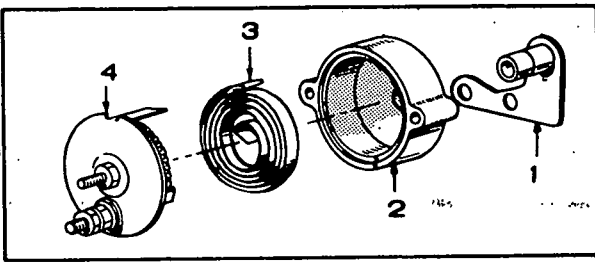


**OPTIONAL FUEL SYSTEM GROUP
(GAS AND COMBINATION GAS-GASOLINE)**



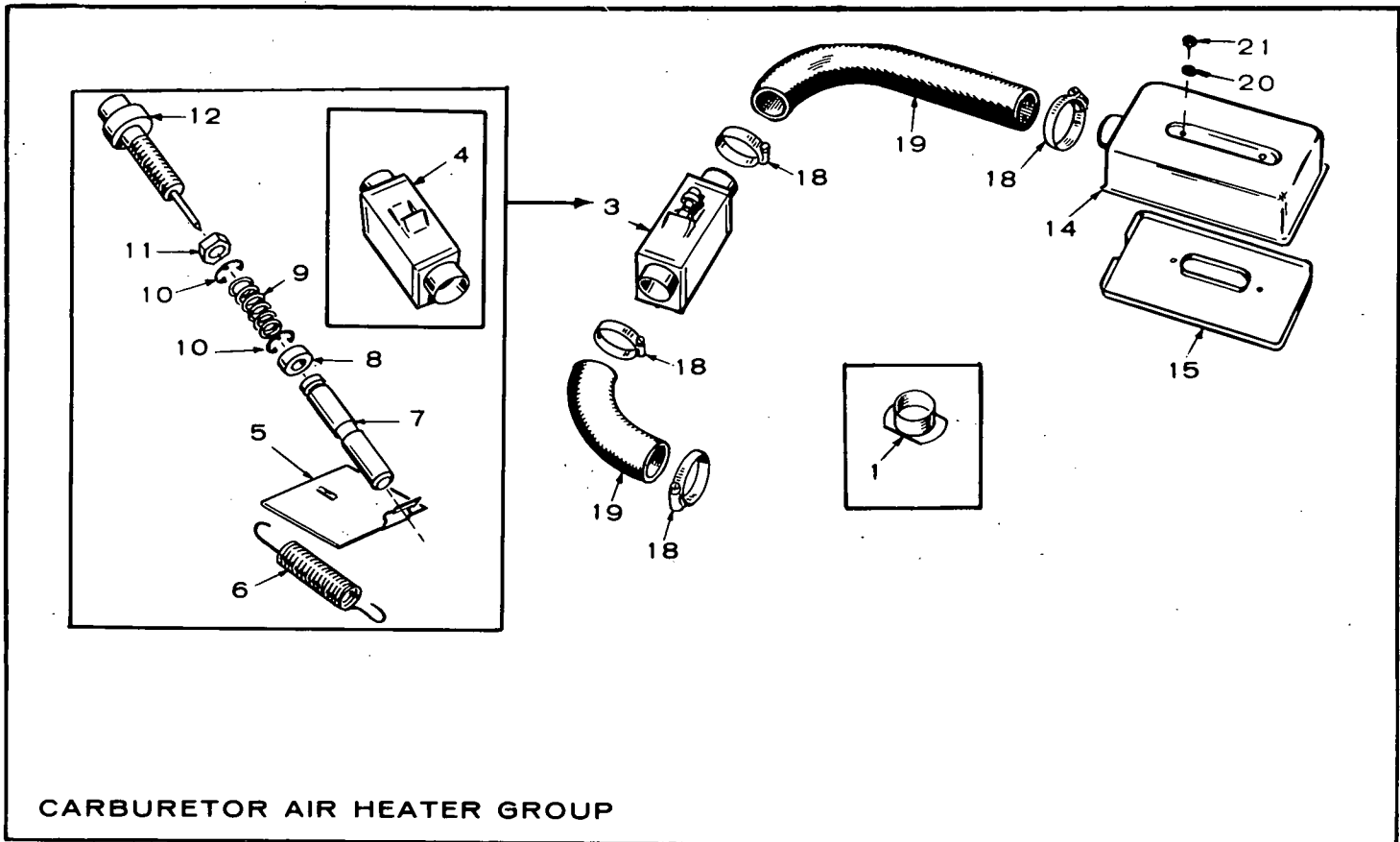
NOTE: Parts for LPG sets built prior to June 1, 1968 (two piece converter mounting brackets and water hoses connected on sides of converter) only are marked with *. Parts for LPG sets built beginning June 1, 1968 (one piece converter mounting bracket and both water hoses connected on the top of converter) only are marked with an £. To order converter for sets built prior to June 1, 1968, also order all parts marked £.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	REGULATOR, GAS	1	Algas Manufacturing - Order 148-0311	19	505-0135	4	Nipple, Half (3/8 x 1-1/2") - Hose Connection - LPG Sets - Key 1, 2
	148-0311	1	Garretson Manufacturing	19A	505-0010	1	Nipple, Half (1/4 x 1") Hose Connection - LPG Sets - Key 1, 2
2	CARBURETOR (See Separate Group for Components and Service Kits)		Gas Fueled Sets	20	ELBOW, STREET - LPG SETS - KEY 1, 2		
	141-0757	1	Spec A thru Q		505-0120	4	*3/8 x 90°
	141-0725	1	Begin Spec R		505-0120	3	£3/8 x 90°
	141-0758	1	Gas-Gasoline Fueled Sets	21	NIPPLE, HOSE CONNECTION - LPG SETS - KEY 1, 2		
	141-0720	1	Spec A thru Q		505-0101	2	*3/8 x 3"
3	503-0159	1	Begin Spec R		505-0101	1	£3/8 x 3"
4	503-0032	2	Hose, Regulator to Carburetor	21A	505-0076	1	*Nipple (3/8 x 3") Hose Connector - LPG Sets - Key 1, 2
5	148-0519	1	Clamp, Gas Hose	22	BUSHING, REDUCER - LPG SETS - KEY 1, 2		
6	505-0101	1	Connector, Hose - Regulator		505-0120	1	*3/4 x 3/8"
6A	505-0057	1	Nipple (3/8 x 1"), Regulator Outlet		505-0022	1	£1 x 1/2"
7	505-0039	1	Plug (1/8") Garretson Regulator	23	BUSHING, REDUCER - LPG SETS - KEY 1, 2		
8	505-0128	1	Elbow (3/8"), Regulator Outlet		505-0017	1	*3/8 x 1/4"
9	148-0107	As Req.	Bushing (1-1/4 x 3/8") Algas Regulator Outlet		505-0018	1	£1/2 x 1/4"
10	504-0007	1	Vent, Regulator & Converter Valve, Shutoff (Mounts at Fuel Pump Inlet) - Gas-Gasoline Sets	24	TEE, PIPE - LPG SETS - KEY 1, 2		
11	502-0020	1	Elbow, Street - Fuel Pump Inlet (Gas-Gasoline Sets)		505-0060	2	*3/8"
12	307-0615	1	Primer, Solenoid		505-0060	1	£3/8"
13	149-0638	1	Plate, Fuel Pump Hole Cover - Gas Only Sets	25	503-0183	4	Clamp, Hose - LPG Sets - Key 1, 2
14	148-0100	1	Converter, LPG Sets - Key 1, 2 (See Above Note)	26		1	Hose, Gas - LPG Sets - Key 1, 2 (Order 34" of Bulk Hose #503-0110)
	BRACKET, CONVERTER MOUNTING - LPG SETS - KEY 1, 2			27		1	Hose, Water - LPG Sets - Key 1, 2 (Order 96" of Bulk Hose #503-0386) Note: Sets Built Prior to June 1, 1968 use 70"
15	148-0546	1	*Top, Unhoused Sets	28	505-0011	1	£Elbow, Street - LPG Sets - Key 1, 2 (1/4 x 90°)
16	148-0547	1	*Bottom, Unhoused Sets	29	336-1844	1	£Lead, 36" - LPG Sets - Key 1, 2
17	148-0551	1	*Housed Sets	30	332-0529	1	£Terminal, Faston - LPG Sets - Key 1, 2
17A	148-0667	1	£Housed & Unhoused Sets	31	332-0881	1	£Terminal, Blade - LPG Sets - Key 1, 2
18	148-0552	1	*Brace, Converter Mounting - Housed Sets - Key 1, 2 - LPG Sets	32	143-0231	1	Wire, Choke Lock - Gas-Gasoline Sets



**ELECTRIC CHOKE
AND THERMO-MAGNETIC CHOKE GROUP**

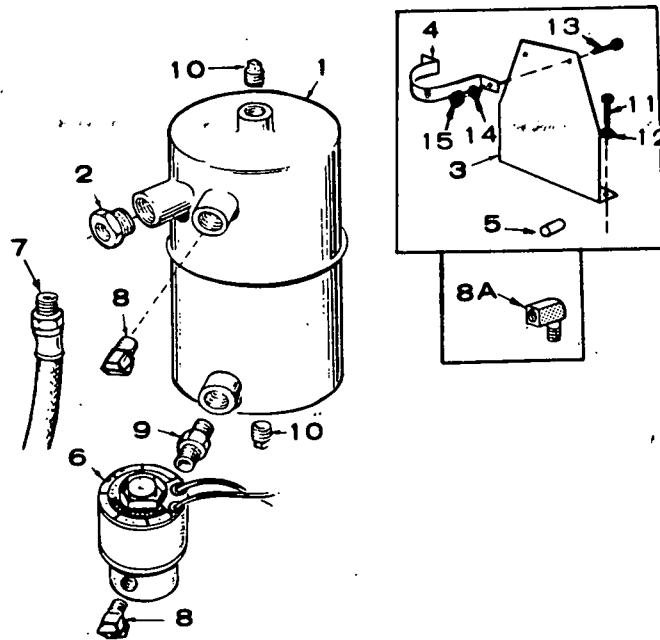
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	153-0315	1	Adapter - Spec A and B	17	HEATER ASSEMBLY	1	
2	153-0324	1	Bracket - Spec A and B	153-0400		1	Spec C thru R
3	153-0321	1	Element - Spec A and B	153-0422		1	Begin Spec S
4	153-0325	1	Cover Assembly, Choke (12 Volt) Spec A and B	18	518-0129	1	Ring, Retaining - Begin Spec C
5	153-0385	1	Plate, Mounting - Begin Spec C	19	332-0876	1	Terminal, Ground - Begin Spec C
6	153-0386	1	Body - Begin Spec C	20	336-1550	1	Lead, Choke Ground - Begin Spec C
7	153-0389	1	Cover - Begin Spec C	20	336-1549	1	Lead, Solenoid to Ground - Begin Spec C
8	153-0391	1	Core, Solenoid - Begin Spec C	21	338-0332	1	Harness, Choke - Begin Spec C
9	153-0395	1	Armature - Begin Spec C	22	815-0161	2	Screw (10-32 x 3/8") - Plate Mounting
10	307-0801	1	Coil, Solenoid Assembly - Begin Spec C	23	813-0107	1	Screw (10-32 x 1-1/4"), Locking - Choke Adjustment
11	153-0392	1	Frame, Solenoid - Begin Spec C	24	526-0008	1	Washer, Flat
12	SPRING	1		25	850-0030	1	Washer, Lock (#10)
	153-0387	1	Spec C thru R	26	812-0076	2	Screw (8-32 x 5/16") - Cover Mounting
	153-0425	1	Begin Spec S	27	854-0007	2	Washer, Lock (#8)
13	153-0390	1	Lever, Thermostat - Begin Spec C	28	864-0002	1	Nut, Jam (5/16-18)
14	526-0018	1	Washer, (17/64" I.D. x 5/8" O.D. x 1/16") - Begin Spec C	29	854-0017	1	Washer, Lock (5/16)
15	870-0134	1	Palnut (1/4-20) - Begin Spec C	30	526-0022	1	Washer, Flat
16	153-0399	1	Insulator - Begin Spec C	153-0430		1	Kit, Choke (Thermo Magnetic), For Plants Originally equipped with this Type Choke



CARBURETOR AIR HEATER GROUP

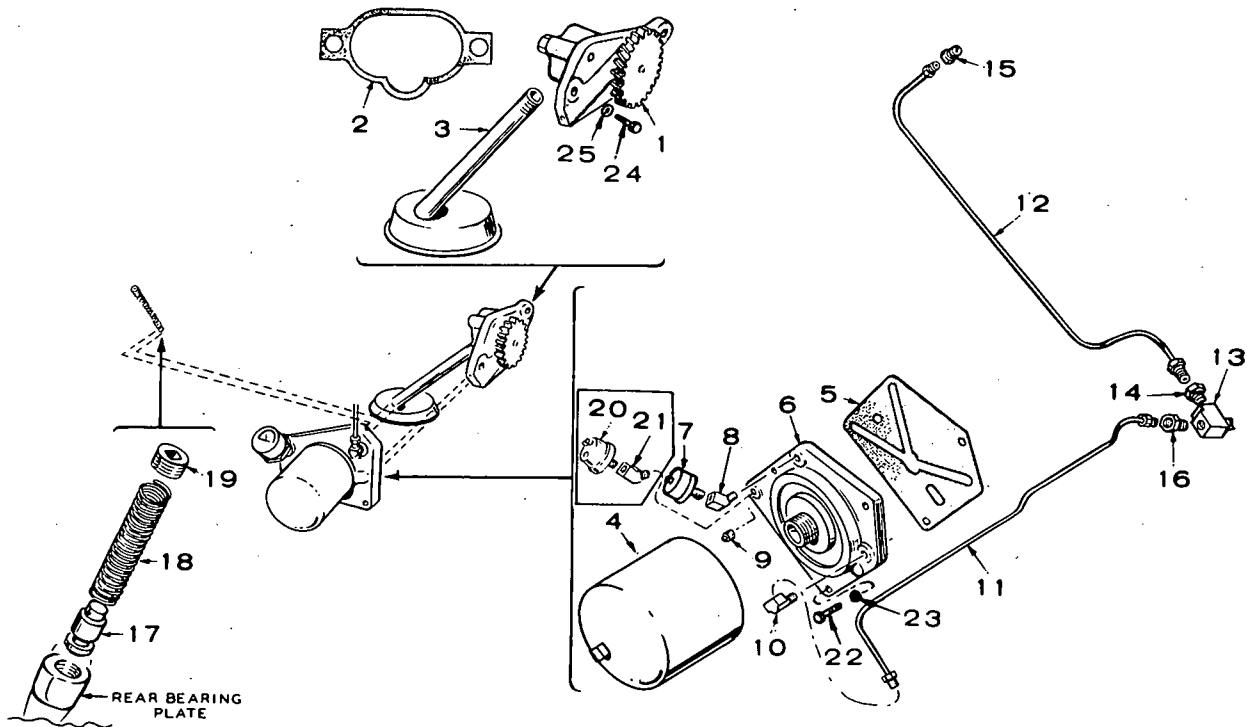
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	140-0895	1	Kit, Air Heater	10	518-0205	2	*Ring, Retaining
1	133-0183	1	Duct, Air Heater	11	870-0195	1	*Nut, Locking - Vernatherm
3	140-0904	1	Control Assembly, Temperature (Includes Parts Marked *)	12	309-0181	1	*Vernatherm, Temperature Control
4	140-0903	1	*Housing, Temperature Control	14	140-0790	1	Cover, Air Cleaner
5	140-0782	1	*Shutter, Temperature Control	15	140-0791	1	Pan, Air Cleaner
6	140-0786	1	*Spring, Shutter Control	18	503-0004	4	Clamp, Hose
7	140-0784	1	*Plunger, Temperature Control	19	503-0507	2	Hose (cut to length) 1-3/4" - Flexible
8	140-0808	1	*Spacer, Vernatherm				
9	140-0787	1	*Spring, Vernatherm				

* - Included in 140-0904 Air Heater Control Assembly.



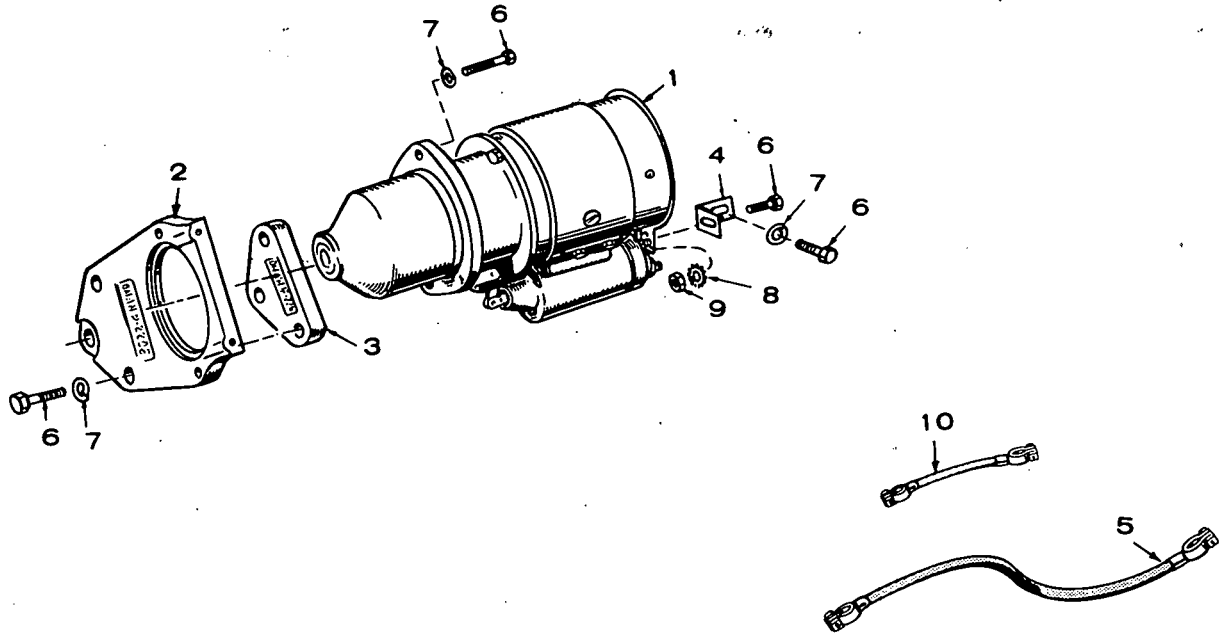
**RESERVOIR (DAY) TANK GROUP
(OPTIONAL EQUIPMENT)**

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	TANK, RESERVOIR			8	802-0053	2	Elbow, 45°, (1) Solenoid Valve to Carburetor Line
	159-0294	1	One Quart				(1) Reservoir Tank to Fuel Pump Line - Two Quart Tank
	159-0746	1	Two Quart	8A	502-0020	1	Elbow, 90° - Reservoir Tank to Fuel Pump Line - One Quart Tank
2	159-0705	1	Reducer, Restricted	9	505-0082	1	Nipple
3	BRACKET, TANK MOUNTING			10	505-0057	2	Plug
	159-0759	1	One Quart Tank	11	800-0039	2	Screw, H.H.C. - Day Tank Bracket Mounting (5/16-18 x 3-1/2")
	159-0826	1	Two Quart Tank	12	850-0045	2	Lockwasher - Day Tank Bracket Mtg. (5/16)
4	BAND, TANK MOUNTING			13	800-0007	2	Screw, H.H.C. - Day Tank Bracket Mtg. (1/4-20 x 1")
	159-0121	1	One Quart Tank	14	850-0040	2	Lockwasher (1/4")
	159-0825	1	Two Quart Tank	15	862-0001	2	Nut, Hex (1/4-20)
5	159-0761	2	Spacer, Mounting Bracket to Rocker Cover				
6	307-0565	1	Valve, Solenoid (12 Volt)				
7	LINE, FUEL						
	501-0005	1	Reservoir Tank to Main Tank				
	501-0008	2	(1) Fuel Pump to Reservoir Tank (1) Reservoir Tank to Carburetor - Two Quart Tank				
	501-0007	1	Fuel Pump to Reservoir Tank - One Quart Tank				
	501-0004	1	Reservoir Tank to Carburetor - One Quart Tank				



OIL SYSTEM GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	120-0547	1	Pump Assembly, Oil	14	502-0097	1	Connector, Inverted Male - Rear Cylinder Head Oil Line to Tee
2	120-0580	1	Gasket Kit, Oil Pump	15	CONNECTOR, INVERTED MALE - REAR CYLINDER HEAD TO OIL LINE		
3	120-0551	1	Cup Assembly, Oil Pump Intake		502-0097	1	Spec A through N
4	122-0185	1	Filter		502-0274	1	Begin Spec P (Restricted)
5	122-0188	1	Gasket, Adapter	16	CONNECTOR, INVERTED MALE - ADAPTER OIL LINE TO TEE		
6	122-0182	1	Adapter, Oil Filter		502-0030	1	Gasoline Sets - Spec A thru N
7	193-0108	1	Sender, Oil Gauge, Pressure		502-0097	1	Gasoline Sets - Begin Spec P
8	502-0094	1	Elbow, Oil Gauge Sender		502-0097	1	Gas & Gas-Gasoline Sets
9	505-0057	1	Plug, 1/8" - Spec A and B	17	120-0539	1	Valve, Oil By-Pass
10	ELBOW, OIL LINE TO FILTER ADAPTER			18	120-0555	1	Spring, By-Pass Valve
	502-0019	1	Gasoline Sets, Spec A through N	19	505-0274	1	Plug (1/8"). Oil By-Pass
	502-0037	1	Gasoline Sets, Begin Spec P	20	SWITCH, LOW OIL PRESSURE		
	502-0037	1	Gas & Gas-Gasoline Sets		309-0169	1	Closes at 14 lbs. pressure (Optional)
11	LINE, FILTER ADAPTER TO CYLINDER HEAD				309-0064	1	Closes at 9 lbs. pressure (Optional)
	120-0562	1	Gasoline Sets, Spec A through N	21	502-0053	1	Elbow (45°), Low Oil Pressure Cutoff Switch (Optional - Spec A and B)
	120-0641	1	Gasoline Sets, Begin Spec P				
	120-0606	1	Gas & Gas-Gasoline Sets, Spec A Only	22	800-0028	3	Screw, (H.H.C.S.) Oil Filter Adapter Mtg. (5/16-18 x 1")
	120-0641	1	Gas & Gas-Gasoline Sets, Begin Spec B	23	850-0045	3	Washer, Lock - Oil Filter Adapter Mounting
12	LINE, TEE TO REAR CYLINDER HEAD			24	800-0030	2	Screw, (H.H.C.S.) Oil Pump Mounting (5/16-18 x 1-1/4")
	120-0575	1	Spec A through N	25	850-0045	2	Washer, Lock - Oil Pump Mtg.
	120-0635	1	Begin Spec P				
13	502-0242	1	Tee, Restricted Front Cylinder Head				

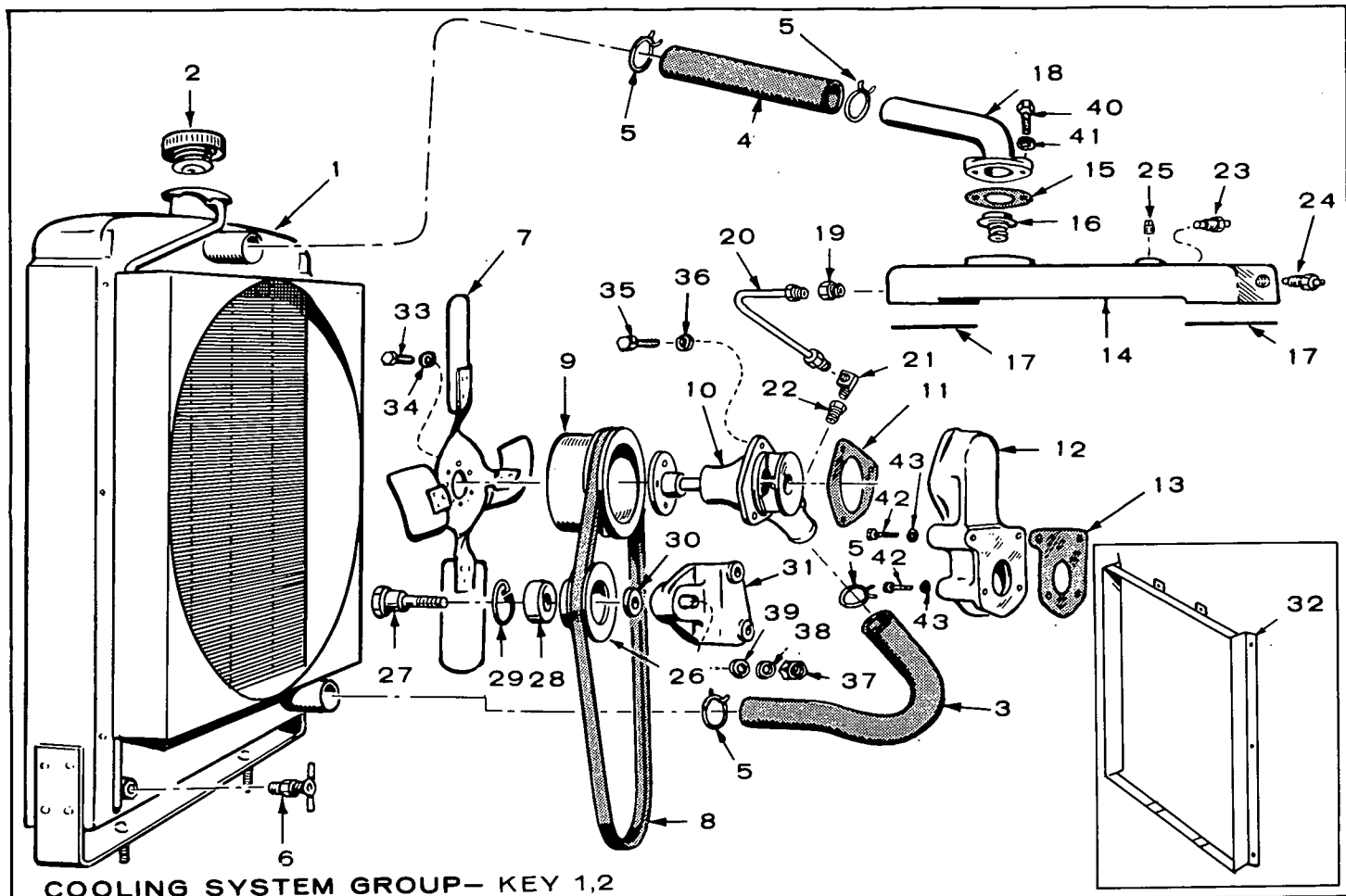


AUTOMOTIVE STARTER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191-0324	1	*Motor, Starter
2	191-0512	1	Flange, Starter Mounting
3	191-0311	1	Spacer, Starter Flange
4	191-0365	1	Bracket, Starter Support
5	416-0021	2	Cable, Battery
6	SCREW, HEX CAP		
	800-0051	2	Starter Motor to Flange
	800-0054	3	Starter Motor Flange Mounting
	800-0046	1	Support Bracket to Starter Motor
	800-0052	2	Support Mounting
7	WASHER, LOCK		
	850-0050	2	Starter Motor to Flange
	850-0050	3	Starter Motor Flange Mounting
	850-0050	2	Support Mounting

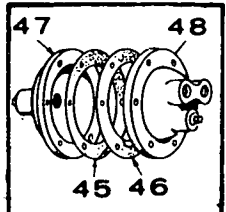
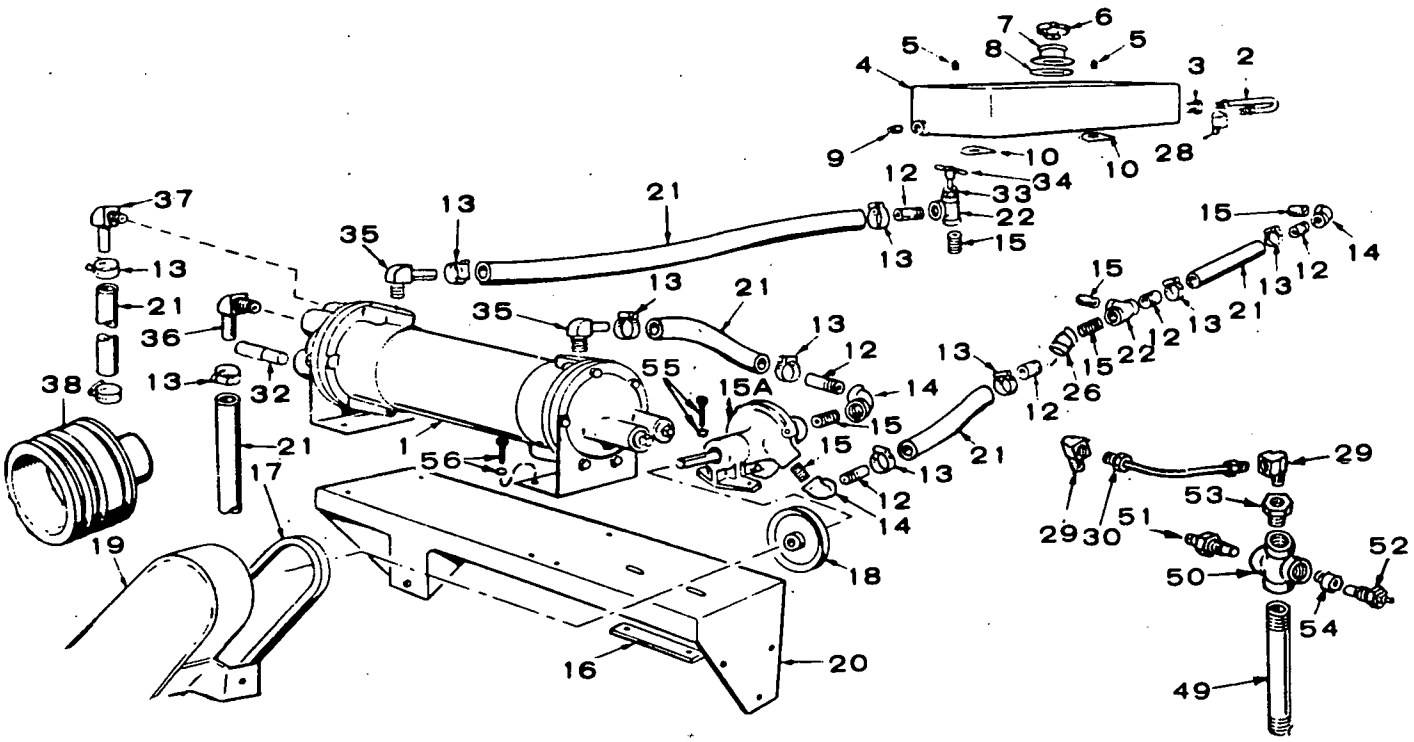
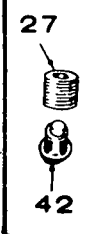
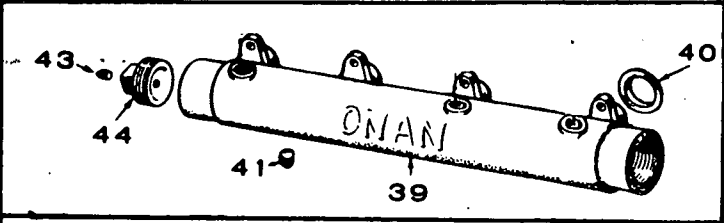
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	856-0010	1	Washer, Shakeproof - Bracket to Starter Motor
9	864-0003	1	Nut, Hex - Support Bracket
10	416-0133	1	Cable, Battery Jumper
	191-0432	1	Clutch, Starter
	191-0433	1	Switch, Starter Solenoid
	191-0434	1	Brush Set, Starter
	191-0712	1	Armature
	191-0497	1	Bearing, Drive End

* - See Separate Group for Components.

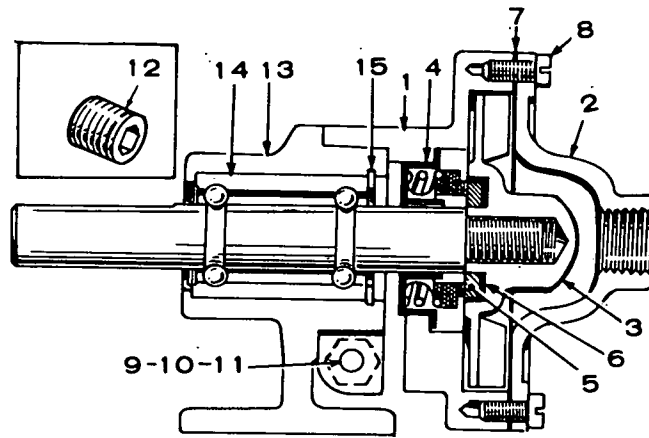


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	130-0569	1	Radiator	25	505-0110	1	Plug (3/8"), Water Outlet Housing (NOTE: Early Models used 1/4" Plug)
2	130-0553	1	Cap, Radiator	26	130-0557	1	Pulley, Idler
3	503-0204	1	Hose, Radiator Inlet - Curved	27	130-0556	1	Shaft, Idler Pulley
4	503-0400	1	Hose, Radiator Outlet	28	510-0025	1	Bearing, Ball
5	503-0129	4	Clamp, Radiator Hose	29	518-0210	1	Ring, Snap
6	504-0003	1	Valve, Radiator Drain	30	130-0560	1	Spacer, Idler Pulley
7	130-0343	1	Fan, Radiator - 4 Blade	31	BRACKET, IDLER PULLEY	1	Spec A through D
8	511-0066	1	Belt, Fan		130-0680	1	Begin Spec E
9	512-0039	1	Pulley, Water Pump	32	405-1157	1	Flange, Air Duct Adapter - Opt.
10	PUMP, WATER			33	800-0027	4	Screw (5/16-18 x 7/8") - Fan to Pulley
	132-0105	1	Spec A through D	34	850-0045	4	Washer, Lock (5/16")
	132-0133	1	Begin Spec E	35	SCREW, WATER PUMP TO HOUSING		
	132-0072	1	Gasket, Water Pump Mounting		800-0031	1	5/16-18 x 1-1/2"
11					800-0027	2	5/16-18 x 7/8"
12	HOUSING, WATER PUMP			36	526-0065	3	Washer (Copper) - 5/16"
			Spec A through D (Order 132-0105 Water Pump Kit)	37	110-0707	1	Nut, Hex (1/2-20) - Idler Pulley Mounting
	131-0186	1	Begin Spec E	38	850-0060	1	Washer, Lock (1/2")
13	131-0139	1	Gasket, Water Pump Housing to Block	39	526-0035	1	Washer, Flat (1/2")
14	131-0137	1	Housing, Water Outlet - Cylinder Head	40	800-0030	2	Screw (5/16-18 x 1-1/4") - Elbow to Housing
15	131-0140	1	Gasket, Water Outlet Elbow	41	526-0065	2	Washer (Copper) - 5/16"
16	309-0054	1	Thermostat		132-0082	1	Repair Kit, Water Pump (Includes Shaft & Bearing Impeller, Fan Hub and Gasket)
17	309-0145	2	Gasket, Water Outlet Housing to Heads		SCREW, H.H.		
18	131-0138	1	Elbow, Water Outlet	42	800-0064	2	Water Pump Housing Mounting (3/8-16 x 4-1/2")
19	502-0036	1	Connector, Inverted Male - By-Pass Line to Water Outlet Housing		800-0057	2	Water Pump Housing Mounting (3/8-16 x 2-3/4")
20	130-0592	1	Line, Water By-Pass	43	526-0066	4	Water Pump Housing Mounting (Copper)
21	502-0043	1	Elbow, Inverted Male - By-Pass Line to Pump				
22	505-0019	1	Bushing, Reducer - 1/2 x 3/8 - By-Pass Line to Pump				
23	309-0179	1	Switch, High Temp. Cut-off				
24	193-0104	1	Sender, Water Temperature Gauge - Engine Unit				

**HEAT EXCHANGER GROUP
OPTIONAL EQUIPMENT - KEY 3,4**



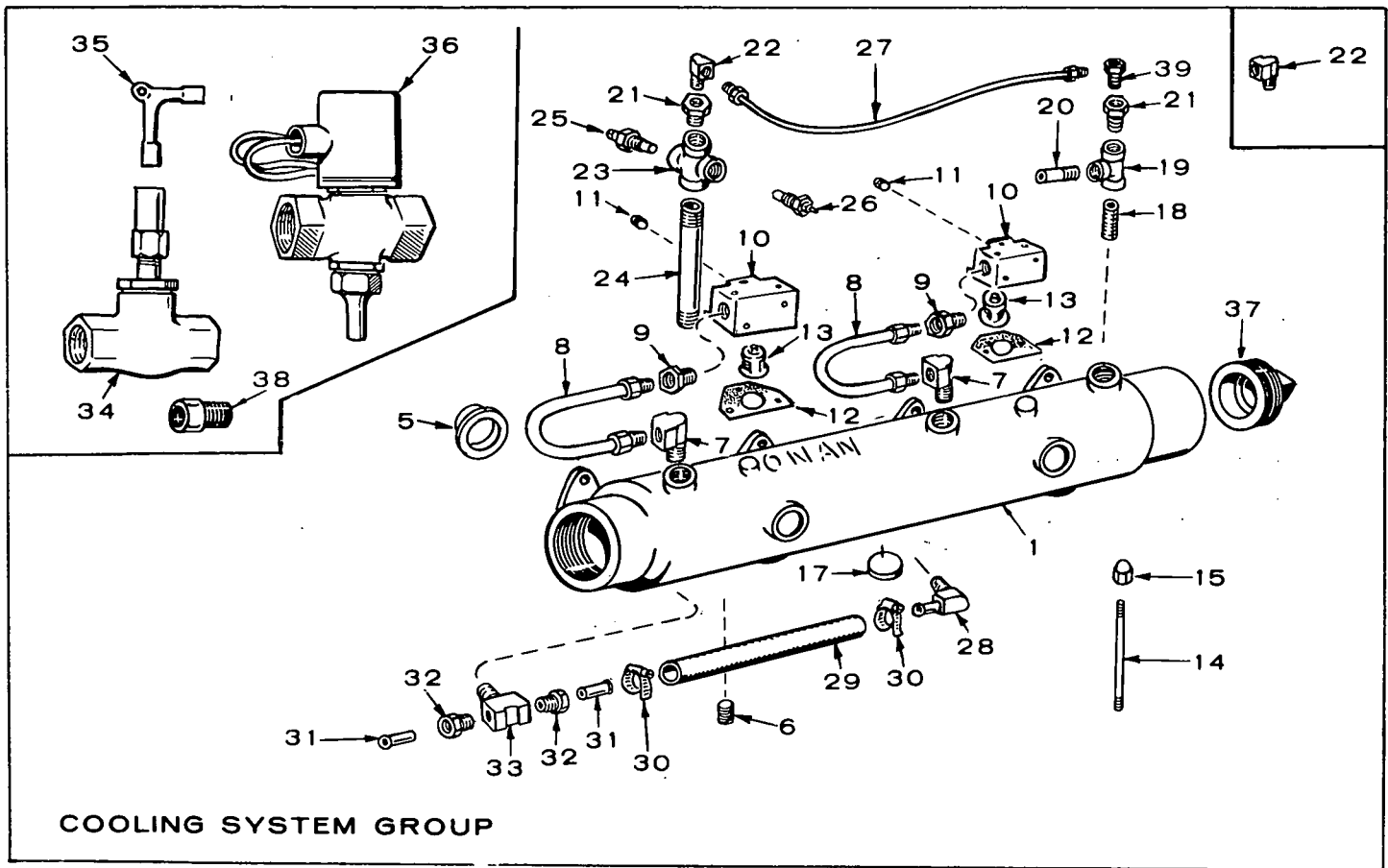
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	130-0624	1	Exchanger, Heat	33	502-0049	1	Bushing, Reducer (3/8 x 1/8")
2	130-0575	1	Line, Water - Expansion Tank to Exhaust Manifold	34	504-0006	1	Valve, Air Bleed - Manifold Outlet
3	502-0103	1	Connector, Inverted Male - Expansion Tank Outlet	35	502-0300	2	Elbow, Heat Exchanger Fresh Water Hoses - Begin Spec C
4	130-0646	1	Tank, Expansion	36	502-0302	1	Elbow, Heat Exchanger Raw Water Inlet Hose - Begin Spec C
5	502-0080	2	Plug, Expansion Tank Fill Vent	37	502-0237	1	Elbow, Heat Exchanger Raw Water Outlet Hose - Begin Spec C
6	130-0589	1	Cap, Pressure	38	104-0546	1	Pulley, Flywheel
7	130-0590	1	Neck & Adapter, Expansion Tank Cap	39	154-0723	1	Manifold, Exhaust - Water Cooled
8	130-0519	1	Gasket, Neck & Adapter	40	154-1057	4	Gasket, Exhaust Manifold to Head
9	502-0155	1	Plug, (3/8")	41	505-0110	1	Plug, Pipe (3/8") - Manifold Water Drain
10	309-0145	2	Gasket, Thermostat Chamber	42	309-0130	2	Thermostat
12	502-0258	6	Nipple (3/8" x 2"), Hose Connector	43	502-0080	1	Plug (1/8"), Square Head Brass - Manifold End Plug
13	503-0183	9	Clamp (1-1/16")	44	505-0489	1	Plug, Exhaust Manifold End
13	503-0446	2	Clamp (25/32")	45	130-0729	1	Gasket, Heat Exchanger - Fresh Water End
14	502-0263	3	Elbow (90° - 3/8")	46	130-0730	1	Gasket, Heat Exchanger - Raw Water End
15	502-0085	6	Nipple (3/8")	47	130-0731	1	Bonnet, Heat Exchanger - Fresh Water End
15A	132-0110	1	Pump, Centrifugal Water - Less Pulley (NOTE: See separate group for components. Repair Kit listed below for early models.)	48	130-0732	1	Bonnet, Heat Exchanger - Raw Water End
16	131-0130	1	Bar, Pump Hold-down	49	505-0224	1	Nipple, Pipe (3/8 x 4-1/2")
17	511-0067	1	Belt, Centrifugal Water Pump	50	505-0475	1	Cross, Pipe (3/8")
18	512-0042	1	Pulley, Centrifugal Water Pump	51	309-0178	1	Switch, High Water Temperature Cut-off
19	130-0591	1	Guard, Belt	52	193-0104	1	Sender Unit - Water Temperature
20	BRACKET, HEAT EXCHANGER & GOVERNOR SPRING			53	505-0016	1	Bushing, Reducer (3/8 x 1/8")
	130-0587	1	Spec A through Q	54	309-0081	1	Extension, Pipe - Temperature Switch
	130-0692	1	Begin Spec R	55	800-0005	2	Screw, H.H. - Water Pump Mtg.
21	503-0217	1	Hose, Rubber (3/4" I.D. x 56" - Total length required for all hoses) (except raw water pump)	56	850-0040	2	Washer, Lock - Water Pump Mtg.
21	503-0285	1	Hose, Rubber (1/2" I.D. x 14") Raw Water Pump to Heat Exchanger	56	800-0004	4	Screw, H.H. - Heat Exchanger Mtg.
22	502-0257	2	Tee (3/8")	56	850-0040	4	Washer, Lock - Heat Exchanger Mounting
26	502-0298	1	Elbow, 45°	57	503-0679	1	Hose, Overflow
27	505-0266	1	Plug (3/8"), Exhaust Manifold	58	130-0892	1	Stiffener - Filler Neck
28	502-0074	1	Elbow, Inverted Male - Manifold Water Line Inlet	59	821-0005	6	Screw, Lock (10-32 x 1/2")
29	502-0037	2	Elbow, Heat Exchanger to Line				REPAIR KIT, WATER PUMP - (EARLY MODELS)
30	130-0633	1	Line, Heat Exchanger to Cylinder Head	132-0080	1	For Oberdorfer No. 50-P11 - Spec A through Q	
32	130-0626	2	Pencil, Zinc (Included in Heat Exchanger)				



**WATER PUMP PARTS GROUP - OPTIONAL EQUIPMENT
KEY 3,4 - BEGIN SPEC R (ONAN 132B110,**

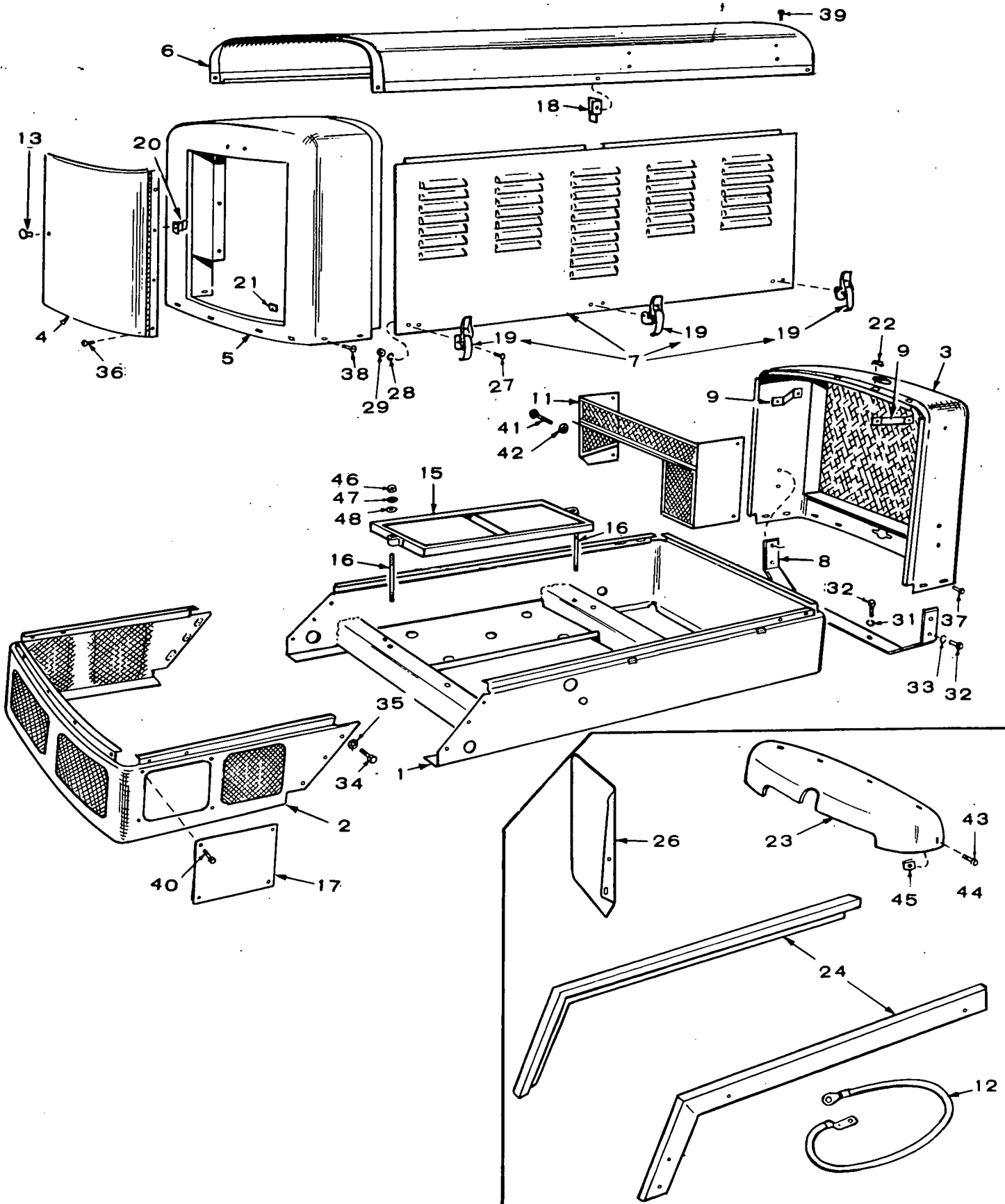
<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
	132-0110	1	Pump, Water - Complete
	132-0111	1	Repair Kit, Includes Parts Marked *
1	132-0136	1	Body, Pump
2	132-0137	1	Cover, Pump
3	132-0114	1	*Impeller
4	132-0101	1	*Seal
5	132-0091	1	*Face, Wear
6	132-0092	1	*Seat, Seal
7	132-0112	1	*Gasket, Cover
8	132-0113	6	*Screw, Cover
9	132-0138	1	Screw, Cap
10	132-0139	1	Lockwasher
11	132-0140	1	Nut, Hex
12	132-0141	1	Plug, Drain
13	132-0142	1	Pedestal
14	132-0089	1	*Shaft & Bearing Assembly
15	132-0132	1	Ring, Snap

* - Parts included in the 132-0111 Repair Kit.



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	154-0723	1	Manifold, Exhaust - Water Cooled (Less End Caps) - (Spec A also order 505-0489 and 502-0080)	21	505-0016	2	Bushing, Reducer (3/8 x 1/8") By-Pass Line
2	154-0709	1	Cap, End - Exhaust Manifold - Plain - Spec A Only	22	FITTING, BY-PASS LINE		
3	154-0743	1	Cap, End - Exhaust Manifold - Threaded - Spec A Only	502-0037	2	Elbow, Inverted Male - Prior to Serial #784000	
4	154-0711	3	Gasket, Exhaust Manifold Cap - Spec A Only	502-0037	1	Elbow, Inverted Male - Begin Serial #784000	
4A	154-0811	1	Plate, Manifold and End Cap Gasket - Spec A Only	502-0097	1	Connector Inverted Male - Begin Serial #784000	
5	143-1057	4	Gasket, Exhaust Manifold to Head	23	505-0475	1	Cross, Pipe (3/8")
6	505-0110	1	Plug, Pipe (3/8") - Manifold Water Drain	24	505-0224	1	Nipple, Pipe (3/8 x 4-1/2")
7	502-0074	2	Elbow, Inverted Male - Manifold Water Line Inlet	25	309-0178	1	Switch, High Water Temperature Cut-off (Not Used on Pennsylvania Approved Plants)
8	130-0510	2	Line, Water - Thermostat Cover to Manifold	26	193-0104	1	Sender Unit - Water Temperature
9	502-0103	2	Connector, Inverted Male - Thermostat Cover Outlet	27	LINE, WATER BY-PASS		
10	309-0160	2	Cover, Thermostat	130-0598	1	Prior to Serial #784000	
11	505-0274	2	Plug, Pipe (1/8") - Countersunk - Thermostat Cover	130-0633	1	Begin Serial #784000	
12	309-0145	2	Gasket, Thermostat Cover	502-0237	1	Elbow, Brass - Water Inlet	
13	309-0130	2	Thermostat	29	503-0394	1	Hose, Rubber (1/2 x 9-5/8") Water Inlet (Tee to Elbow)
14	520-0143	4	Stud, Thermostat Cover Mounting	30	503-0183	2	Clamp, Hose - Water Inlet
15	869-0002	4	Nut, Acron (5/16-24) Thermostat	31	130-0533	2	Adapter, Hose - Water Inlet
17	517-0041	2	Plug, Expansion Exhaust Manifold	32	502-0239	2	Nut, Inverted - Water Inlet
18	505-0101	1	Nipple, Close Pipe (3/8 x 1") Exhaust Manifold	33	502-0247	1	Tee, Male Branch - Water Inlet
19	505-0060	1	Tee, Pipe (3/8") Exhaust Manifold	34	504-0019	1	Valve, Lockshield
20	505-0135	1	Nipple, Pipe (3/8 x 1-1/2") Exhaust Manifold	35	504-0020	1	Key, Lockshield
				36	307-0833	1	Valve, Solenoid
				37	505-0402	1	Plug, Exhaust Manifold End Begin Spec B
				38	309-0081	1	Extension, Water Temperature Sender
				39	502-0097	1	Connector, By-Pass Line

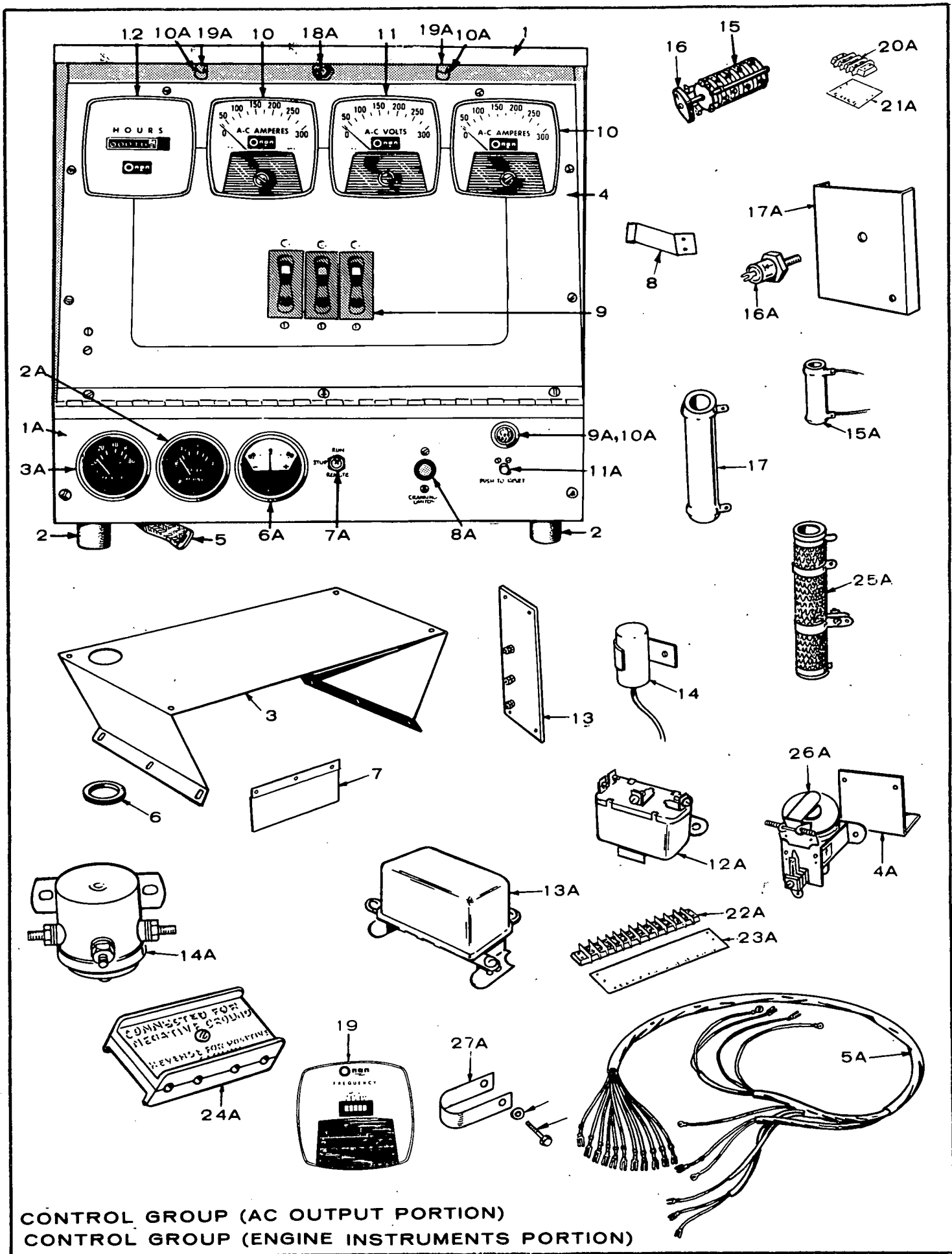
HOUSING GROUP
HOUSED AC PLANTS (OPTIONAL EQUIPMENT)



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	403-0658	1	CHASSIS, MOUNTING - FRONT SECTION Spec A Only
	403-0718	1	Begin Spec B
2	403-0477	1	Chassis, Rear Section - Housed Sets
3	405-1079	1	Panel, Front End (Radiator Grille)
4	405-1080	1	Panel, Rear Door - Housed Sets
5	405-1081	1	Panel, Rear End (Does NOT Include Door) Housed Sets
6	405-1319	1	Panel, Top - Housed Sets
7	405-1084	2	Housing, Side (Includes Fasteners) - Housed Sets
8	130-0396	1	Support, Radiator Mounting
9	130-0397	2	Bracket, Radiator
11	130-0623	1	Guard, Fan
12	336-0476	1	Cable, Ground Strap (NOTE: Qty. of 2 for Unhoused Sets)
13	406-0002	1	Knob, Rear Door Panel - Housed Sets
15	416-0495	1	Frame, Battery Hold-down
16	520-0669	2	Stud, Battery Hold-down Frame
17	403-0373	1	Panel, Chassis - Housed Sets
18	405-1181	2	Stop, Drive - Housing Side Panel - Housed Sets
19	406-0105	6	Fastener, Side Panel - Housed Sets
20	406-0088	1	Catch, Rear Door Panel - Housed Sets
21	870-0106	4	Nut, Speed - Rear Door Panel Mounting - Housed Sets
22	870-0113	As Req.	Nut, Speed Grip - (12) Rear End Panel to Housing Top, Housed Sets (6) Radiator Hood Extension, Unhoused Sets
23	405-1089	1	Extension, Radiator Hood - Unhoused Sets
24	403-0478	1	Edging, Chassis - R.H. - Unhoused Sets
24	403-0479	1	Edging, Chassis - L.H. - Unhoused Sets
26	155-0848	1	Shield, Muffler Heat
27	813-0098	12	Screw, H.H.S.M. Housing Hold-down (10/32 x 3/8") Housed Sets
28	850-0030	12	Lockwasher, Housing Hold-down (#10 Med.) - Housed Sets
29	870-0053	12	Nut, Hex - Housing Hold-down (10-32) - Housed Sets
30	862-0003	2	Nut, Hex Rad. Support (3/8-16) - Housed Sets

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
31	850-0050	2	Lockwasher, Rad. Support (3/8 Med.) - Housed Sets
32	800-0024	4	Screw, H.H.C. Rad. Bracket to Rad. Shell (5/16-18 x 1/2") - Housed Sets
33	850-0045	4	Lockwasher, Rad. Bracket to Rad. Shell (5/16 Med.) - Housed Sets
34	800-0047	6	Screw, H.H.C., Rear Chassis to Front Chassis (3/8-16 x 5/8") - Housed Sets
35	850-0050	6	Lockwasher, Rear Chassis to Front Chassis (3/8) - Housed Sets
36	820-0006	4	Screw, Thruss Hd. Mtg. Control Door to Panel (1/4-14 x 1/2") - Housed Sets
37	821-0014	8	Screw, Thruss Hd. Mtg. Front Panel to Chassis (5/16-18 x 1/2") - Housed Sets
38	821-0014	8	Screw, Thruss Hd. Mtg. Rear Panel to Chassis (5/16-18 x 1/2") - Housed Sets
39	821-0014	12	Screw, Thruss Hd. Mtg. Front & Rear Panel to Top Panel (5/16-18 x 1/2") - Housed Sets
40	800-0024	4	Screw, H.H.C. Mtg. Chassis Panel Door (5/16-18 x 1/2") - Housed Sets
41	800-0048	4	Screw, H.H.C. Fan Guard to Rad. (3/8-16 x 3/4") - Housed Sets
42	850-0050	4	Lockwasher, Fan Guard to Rad. (3/8 Med.) - Housed Sets
43	821-0014	8	Screw, Thruss H. Rad. Hood Ext. (5/16-18 x 1/2") - Unhoused Sets
44	870-0013	6	Nut, Speed Grip Rad. Hood Ext. (5/16-18) - Unhoused Sets
45	517-0019	2	Button Dot Rad. Trim - Unhoused Sets
46	862-0015	4	Nut, Hex Battery Hold-down (5/16-18) - Housed Sets
47	526-0024	2	Flatwasher, Battery Holddown - Housed Sets
48	850-0045	4	Lockwasher, Battery Holddown (5/16 Med.)

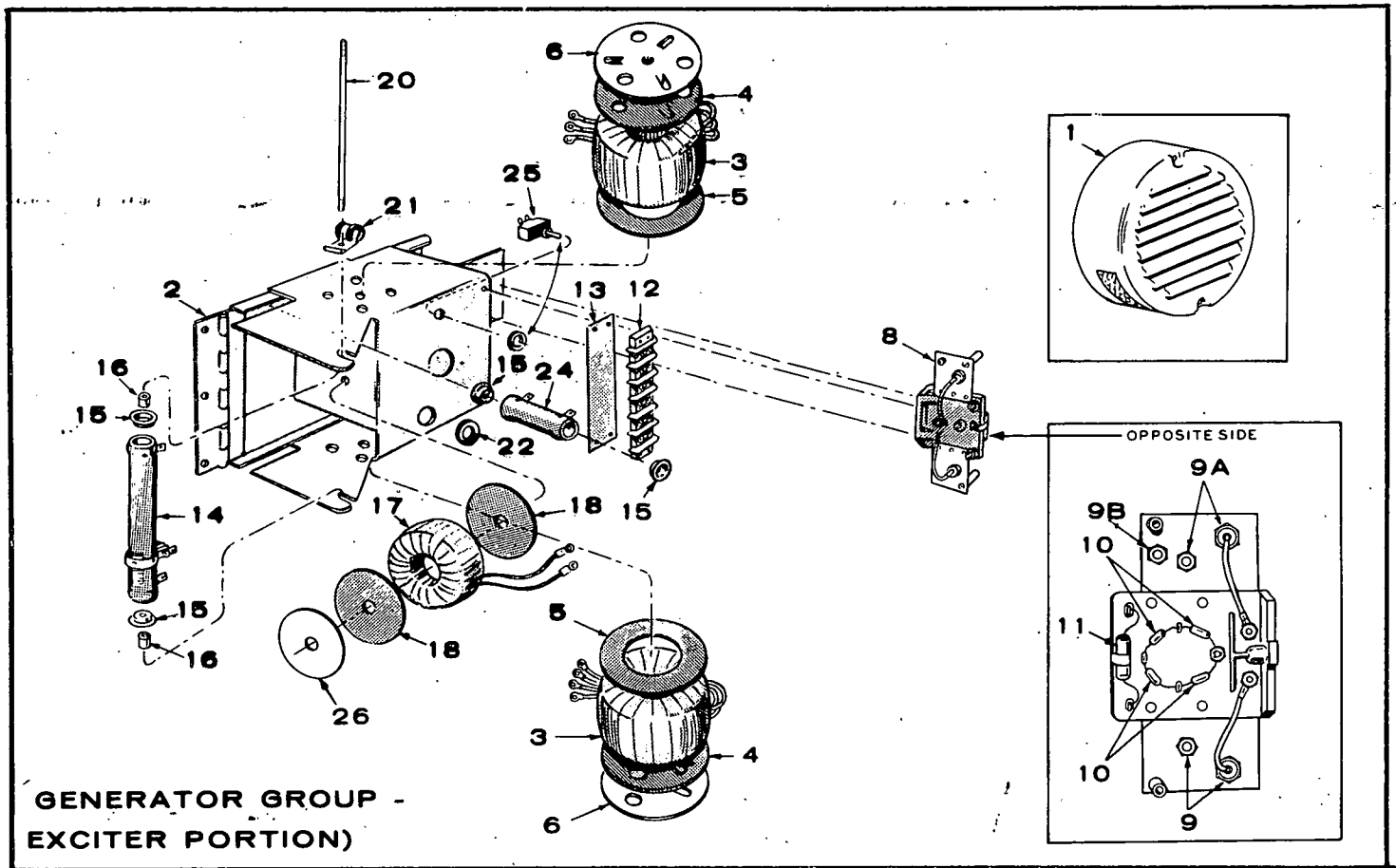
NOTE: Parts in this group are for Parts Key 1, 2, both housed and unhoused sets unless otherwise specified.



CONTROL GROUP (AC OUTPUT PORTION)
 CONTROL GROUP (ENGINE INSTRUMENTS PORTION)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	CONTROL GROUP (AC OUTPUT PORTION)						
1	301-2115	1	Box Only, Control	16	303-0076	1	Knob, Selector Switch - 3 Phase Sets
2	402-0078	4	Rubber, Mounting - Box to Mtg. Bracket - Unhoused Sets	17	304-0536	1	Resistor, Fixed (9000-Ohm, 50 Watt) Off Running Time Meter on 600 Volt Sets)
3	301-2106	1	Bracket, Control Box Mounting - Unhoused Sets	18	301-2727	1	Handle, Control Panel
4	*	1	Panel Only, Upper	19	METER, FREQUENCY (OPTIONAL)		
5	337-0044	1	Strap, Ground - Unhoused Sets	302-0234	1	50 Hertz	
6	508-0063	As Req.	Grommet, Rubber (For 2-3/4" Hole)	302-0213	1	60 Hertz	
7	301-2279	1	Cover, Lead - Unhoused Sets	302-0788	1	50 Hertz (480-600 Volt)	
8	301-1914	1	Bracket, Panel Stop	302-0717	1	60 Hertz (480-600 Volt)	
9	BREAKER, CIRCUIT			CONTROL GROUP (ENGINE INSTRUMENTS PORTION)			
	320-0195	2	Key 1, 3 Single Phase	1A	301-2124	1	Panel Only, Lower
	320-0198	3	120/208 Volt, 3 Phase	2A	193-0106	1	Gauge, Water Temperature
	320-0020	3	120/240 Volt, 3 Phase	3A	193-0107	1	Gauge, Oil Pressure
	320-0151	3	220/380 Volt, 3 Phase	4A	301-1685	1	Bracket, Time Delay Relay Mounting (Only With Low Oil Pressure Cutoff Switch) - Key 3, 4
	320-0150	3	277/480 Volt, 3 Phase	5A	338-0338	1	Harness, Wiring - Engine to Control
	320-0228	3	600 Volt, 3 Phase	6A	302-0446	1	Ammeter, Charge
	320-0148	2	Key 2, 4 Single Phase	7A	308-0138	1	Switch, Run-Stop
	320-0195	3	120/208 Volt, 3 Phase	8A	320-0104	1	Switch, Cranking Limiter
	320-0052	3	120/240 Volt, 3 Phase	9A	322-0069	1	Light, Pilot (Red)
	320-0152	3	220/380 Volt, 3 Phase	10A	322-0004	3	Lamp, Pilot and Panel Lights
	320-0151	3	277/480 Volt, 3 Phase	11A	307-0655	1	Relay, Emergency Latching
	320-0228	3	600 Volt, 3 Phase	12A	307-0052	1	Relay, Start-Disconnect
10	AMMETER, AC (Check Scale - Select According)			13A	307-0597	1	Relay, Ignition
	302-0460	As Req.	Scale Reads 0-20	14A	307-0514	1	Relay, Starter Pilot
	302-0418	As Req.	Scale Reads 0-30	15A	304-0192	1	Resistor (3-Ohm, 10 Watt - 5/16 x 1-3/4")
	302-0444	As Req.	Scale Reads 0-35	16A	305-0235	1	Rectifier (10 Amp - 100 Volt Peak)
	302-0419	As Req.	Scale Reads 0-50	17A	305-0254	1	Bracket, Rectifier Mounting
	302-0458	As Req.	Scale Reads 0-80	18A	308-0002	1	Switch, Panel Light
11	VOLTMETER, AC (Check Scale - Select According)			19A	322-0072	2	Light, Panel
	302-0421	1	Scale Reads 0-300	20A	332-0611	1	Block, Terminal - 3 Place (Remote)
	302-0422	1	Scale Reads 0-600	21A	332-1009	1	Strip, Marker (REMOTE, B+, GND)
	302-0423	1	Scale Reads 0-750	22A	332-0607	1	Block, Terminal (12 Place)
12	METER, RUNNING TIME (Check Meter Face for Part No.)			23A	STRIP, MARKER - FOR 12 PLACE BLOCK		
	302-0465	1	120 Volt, 60 Hertz	332-0642	1	Spec A and B	
	302-0466	1	220 Volt, 60 Hertz	332-0608	1	Begin Spec C	
	302-0467	1	480 Volt, 60 Hertz	24A	332-0750	1	Kit, Polarity Strip - Spec A through N
	302-0468	1	120 Volt, 50 Hertz	25A	304-0500	1	Resistor, Tapped Adj. (Mounts in Generator Air Outlet
	302-0469	1	220 Volt, 50 Hertz	26A	307-0388	1	Relay, Time Delay (Only with Low Oil Pressure Cut-Off Switch)
	302-0470	1	480 Volt, 50 Hertz	27A	416-0096	1	Clip, Harness Support
13	332-0513	1	Block, Terminal - 4 Place (T1, T4, T2, T3)				
14	312-0058	As Req.	Condenser (.1 Mfd.) - Off Terminal Block				
15	308-0012	1	Switch, Selector - Voltmeter, 3 Phase Sets				

* - Order by description, giving Model, Spec & Serial Number.

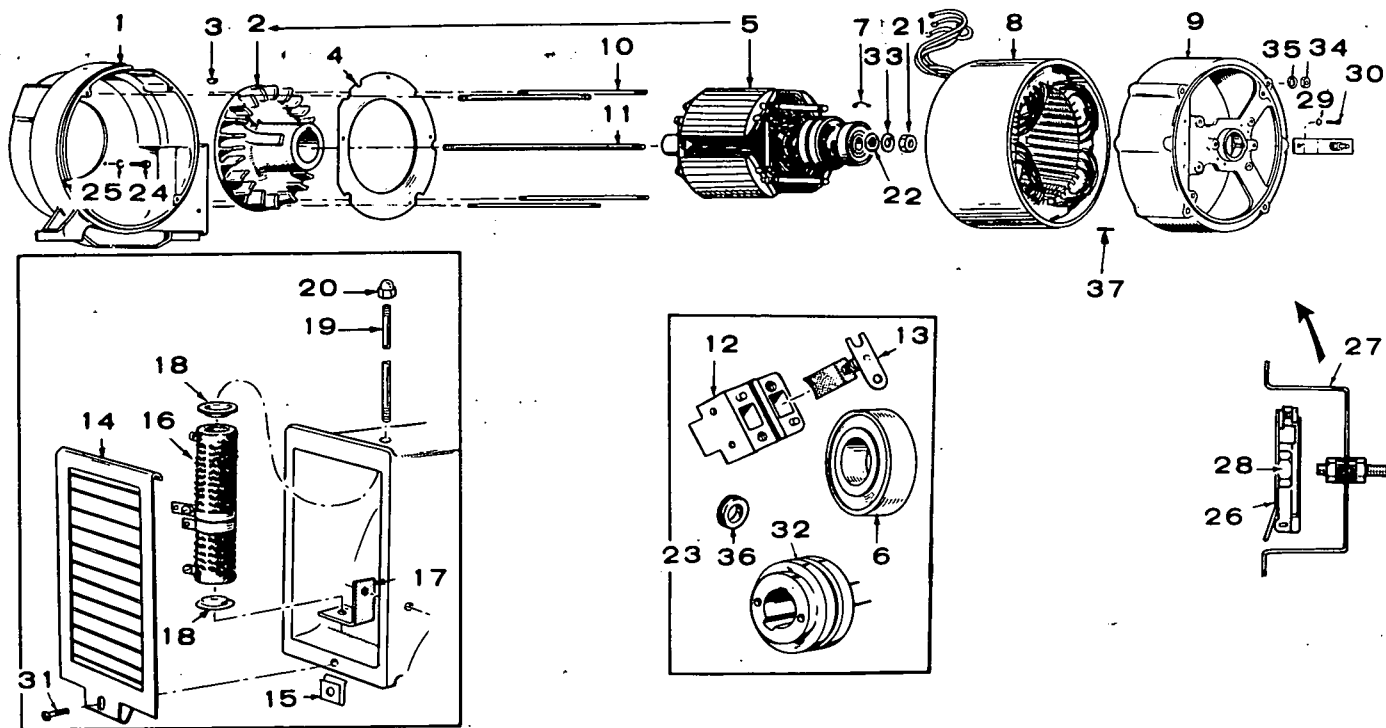


NOTE: 06SXIN1B used on all 60hertz Sets Spec A through N (Penn State Spec A through C).
 06SXIN1B used on 60hertz 120/240 volt, 277/480 volt, and 600 volt 3 phase Sets Begin Spec P (Penn State Begin Spec D).
 06SXIN3B used on all 60hertz Sets except 120/240 volt, 277/480 volt, and 600 volt 3 phase Sets Begin Spec P (Penn State Begin Spec D).
 06SX5IN1B used on all 50hertz Sets Spec A through N (Penn State Spec A through C).
 06SX5IN1B used on 50hertz Sets 120/240 volt, 277/480 volt, and 600 volt 3 phase Sets Begin Spec P (Penn State Begin Spec D).
 06SX5IN3B used on all 50hertz Sets except 120/240 volt, 277/480 volt, and 600 volt 3 phase Sets begin Spec P (Penn State Begin Spec D).

Check Set nameplate for Magneciter number and use correct column.

REF. NO.	QTY. USED	PART DESCRIPTION	PART NUMBER			
			06SX1N1B	06SX1N3B	06SX51N1B	06SX51N3B
	1	Exciter Complete (Less Cover)	209-0008	209-0010	209-0012	209-0013
1	1	Cover, Exciter	234-0185	234-0185	234-0185	234-0185
2	1	Panel Only, Exciter	234-0188	234-0188	234-0188	234-0188
3	2	Reactor, Gate	315-0102	315-0102	315-0104	315-0104
4	2	Gasket, Gate Reactor Mounting, Outer	232-1553	232-1553	232-1553	232-1553
5	2	Gasket, Gate Reactor Mounting, Inner	232-1551	232-1551	232-1551	232-1551
6	2	Retainer, Gate Reactor	232-1552	232-1552	232-1552	232-1552
8	1	Rectifier Assembly, Resistor & Complete	305-0264	305-0388	305-0264	305-0388
9	2	Rectifier Only, Power Field, Negative	305-0238	305-0238 ★	305-0238	305-0238 ★
9A	2	Rectifier Only, Power Field, Positive	305-0239	305-0239	305-0239	305-0239
9B	1	Rectifier, Field Flash		305-0239		305-0239
10	4	Rectifier, Voltage Control	305-0240	305-0240	305-0240	305-0240
11	1	Resistor, Included in Rectifier Assembly (150-Ohm, 5Watt)	304-0512	304-0512	304-0512	304-0512
12	1	Block, Terminal	332-0745	332-0745	332-0745	332-0745
13	1	Strip, Block Marker	332-0746	332-0925	332-0746	332-0925
14	1	Resistor, Tapped, 500-Ohm (425 Fixed, 75 Adj.)	304-0527	304-0527	304-0527	304-0527
15	4	Washer, Resistor Centering	304-0015	304-0015	304-0015	304-0015
16	2	Spacer, Resistor Mounting	232-1474	232-1474	232-1474	232-1474
17	1	Reactor, Voltage Control	315-0100	315-0100	315-0105	315-0105
18	2	Gasket, Voltage Control Reactor	232-1548	232-1548	232-1548	232-1548
20	1	Stud (or Screw), Tapped Resistor Mounting	520-0641	520-0641	520-0641	520-0641
21	1	Clip, Tinnerman	332-0050	332-0050	332-0050	332-0050
22	1	Grommet, Rubber, For 7/8" Hole	508-0008	508-0008	508-0008	508-0008
24	1	Resistor, Fixed (250-Ohm, 25-Watt)	304-0510	304-0510	304-0510	304-0510
25	1	Switch, Residual Reset	308-0175		308-0175	
26	1	Washer, Retainer, Voltage Control Reactor	526-0173	526-0173	526-0173	526-0173

★ - Later models use Quantity of 3.



GENERATOR GROUP - ALTERNATOR PORTION (REVOLVING FIELD TYPE)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	ADAPTER, ENGINE TO GENERATOR			22	232-0200	1	Washer, Tapered - Rotor Through Stud
	231-0096	1	Spec A Only	23	508-0095	1	Grommet, Rubber - Air Baffle
	231-0112	1	Begin Spec B	24	SCREW, HEX CAP - ADAPTER MOUNTING		
2	205-0064	1	Blower, Generator		850-0050	2	3/8-16 x 1"
3	515-0006	1	Key, Blower		800-0051	2	3/8-16 x 1-1/4"
4	234-0162	1	Baffle, Generator Air	25	850-0050	4	Lockwasher, Adapter Mounting (3/8")
5	*	1	Rotor Assembly, Wound (Includes Bearing & Blower)	26	150-0956	1	Switch Assembly, Overspeed
6	510-0047	1	Bearing, Rotor	27	150-0958	1	Bracket & Point Assembly, Overspeed
7	232-0596	1	Clip, Bearing, Stop	28	868-0004	1	Nut, Jam (7/16-20)
8	*	1	Stator Assembly, Wound	29	850-0030	2	Washer, Lock (#10)
9	211-0146	1	Bell, End, Alternator to Exciter	30	813-0100	2	Screw (10-32 x 1/2")
10	STUD, GENERATOR THROUGH			31	812-0102	1	Screw, Round Head - Air Outlet Cover Mounting
	520-0638	4	Key 1, 3	32	204-0061	1	Collector Ring
	520-0640	4	Key 2, 4	33	850-0055	1	Washer, Lock (7/16")
11	STUD, ROTOR THROUGH			34	862-0015	4	Nut, Hex (5/16-18) - Generator Through Stud
	520-0613	1	Key 1, 3	35	850-0045	4	Washer, Lock (5/16")
	520-0615	1	Key 2, 4	36	508-0112	1	Grommet, Rubber - Lead Out
12	212-1064	2	Block, Collector Ring Brush	37	516-0083	2	Pin, Roll (3/16 x 5/8") - Alignment
13	214-0059	4	Brush, Collector Ring				
14	234-0199	1	Cover, Air Outlet				
15	870-0177	1	Clip, Air Outlet Cover				
16	304-0500	1	Resistor, Tapped Adjustable				
17	232-1565	1	Bracket, Resistor Mounting				
18	304-0006	2	Washer, Resistor Centering				
19	520-0620	1	Stud, Resistor Mounting				
20	866-0001	1	Nut, Resistor Mounting				
21	870-0203	1	Nut, Rotor Through Stud				

* - Refer to factory giving complete Model, Spec and Serial Number.

SERVICE KITS & MISCELLANEOUS

NOTE: For other kits, refer to the group for the part in question.

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
	98-1807	1	Decal Kit, Plant
	168-0099	1	Gasket Kit, Plant
	OVERHAUL KIT, SET		
	522-0211	1	Spec A through Q
	522-0236	1	Begin Spec R
	525-0137	1	Paint, Touch-up Enamel (Green) 16 oz. Pressurized Can

SPECIAL PARTS LIST

FOR RJC SERIES

PENNSYLVANIA APPROVED

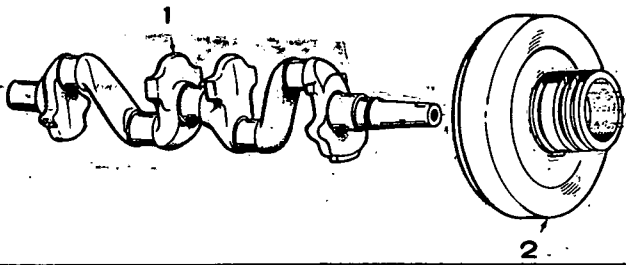
GENERATING SETS

Refer first to this list for Pennsylvania Approved sets. Parts not in this list refer to the main parts list. When referring to the main parts list, reference to Spec letter or voltage also applies to these sets.

These sets are recognized by the numbers 30 (Gasoline Fuel), 31 (Gaseous Fuel), or 131 (Liquid Petroleum Fuel) appearing in the model. These numbers appear just before the diagonal line (/). (Example: 12.5RJC-4R31/1T).

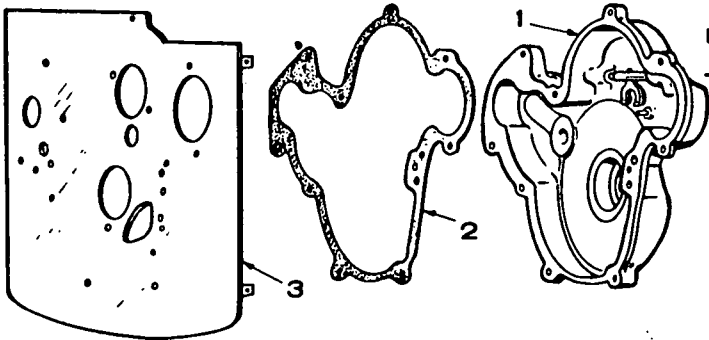
The Specification Letter advances (A to B, B to C, etc.) with manufacturing changes.

CRANKSHAFT AND FLYWHEEL GROUP (SPECIAL LIST) - SPEC A THRU Q



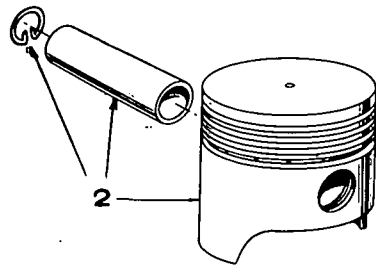
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104-0477	1	Crankshaft
2	104-0591	1	Flywheel

GEAR COVER GROUP (SPECIAL LIST) - SPEC A THRU Q



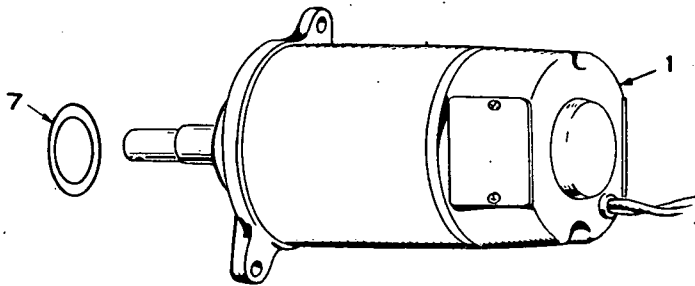
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	103-0279	1	Cover Assembly, Gear - Complete
2	103-0231	1	Gasket, Gear Cover
3	103-0250	1	Backplate, Gear Cover

PISTON AND CONNECTING ROD GROUP (SPECIAL LIST)

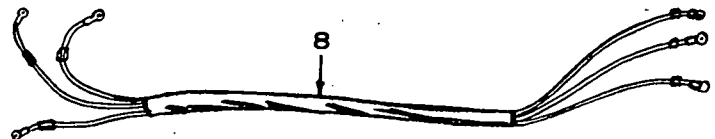
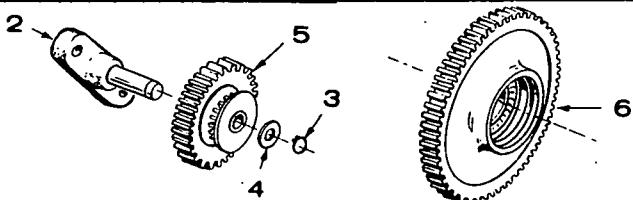


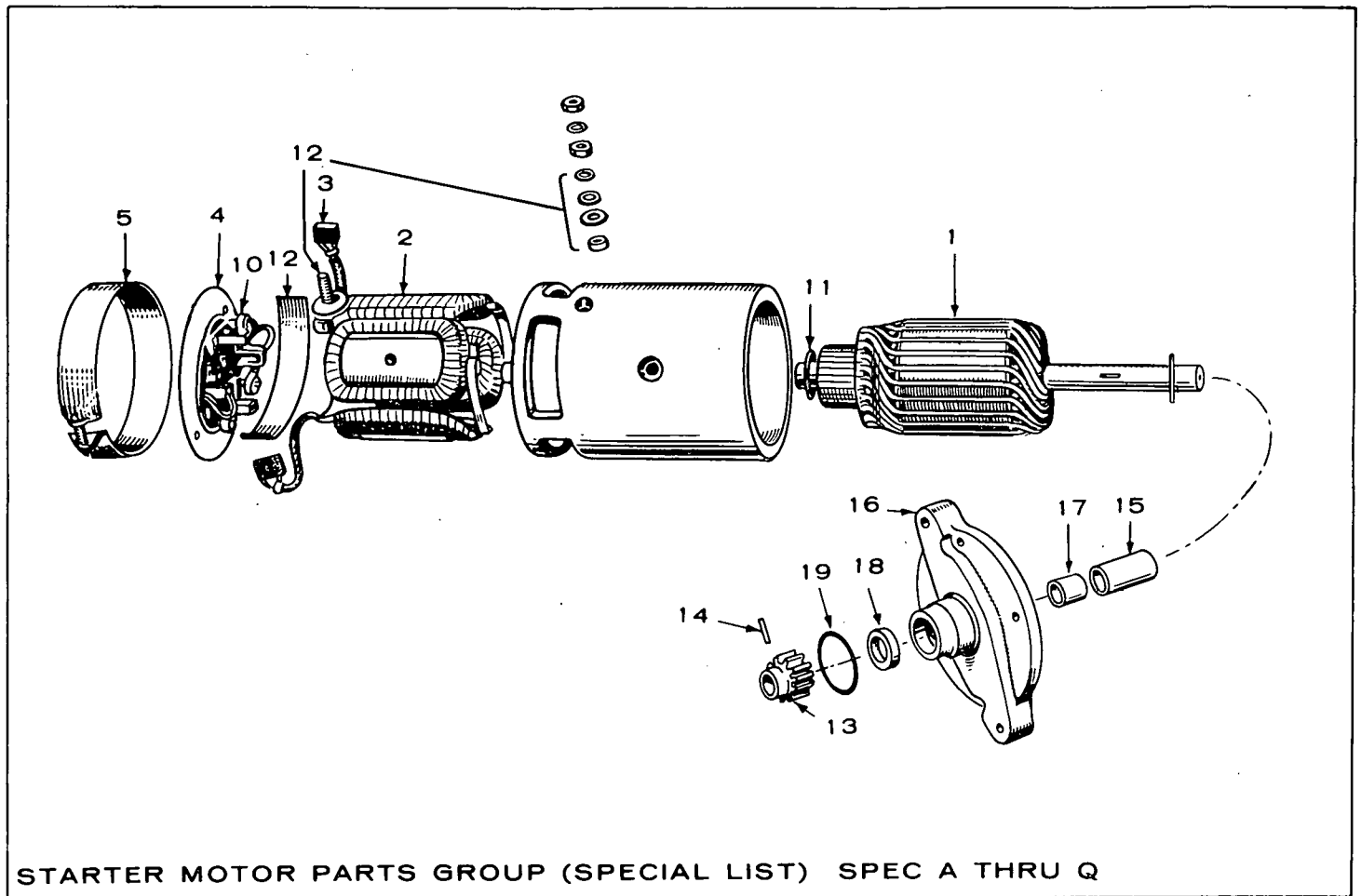
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
2	PISTON AND PIN ASSEMBLY (INCLUDES PIN RETAINING RINGS) - GAS ONLY SETS		
	112-0106	4	Standard
	112-0106-10	4	.010" Oversize
	112-0106-20	4	.020" Oversize
	112-0106-30	4	.030" Oversize

STARTER MOTOR GROUP (SPECIAL LIST) - SPEC A THRU Q



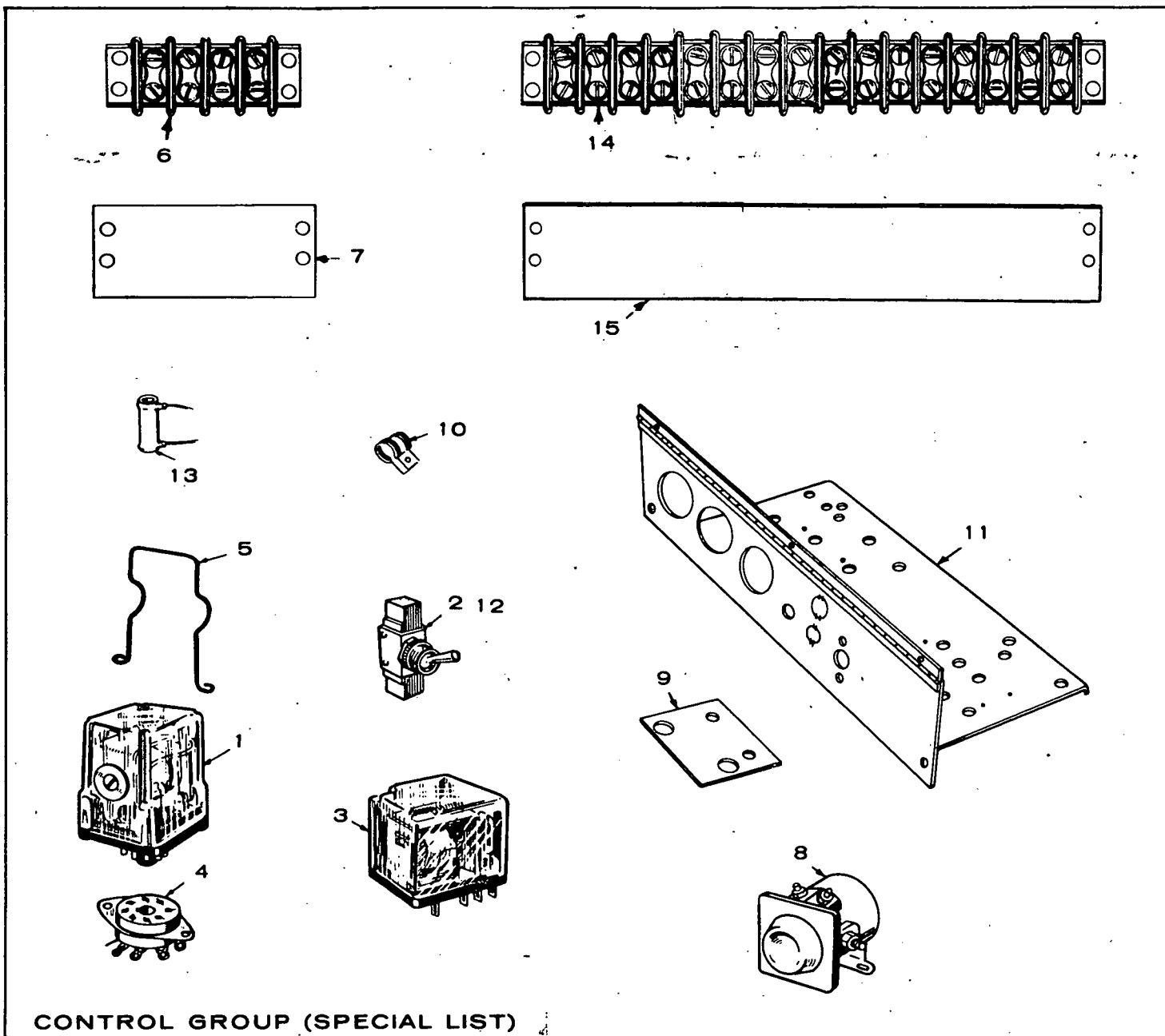
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191-0453	1	Motor, Starter (12 Volt) - Includes Gear & Pin
2	191-0342	1	Base and Shaft, Idler Gear
3	518-0196	1	Ring, Retaining - Idler Gear
4	526-0175	1	Washer, Thrust - Idler Gear
5	191-0457	1	Gear Assembly, Idler
6	191-0354	1	Gear & Clutch Assy., Crankshaft
7	509-0093	1	Seal, "O" Ring - Starter Mtg.
8	336-1199	1	Harness, Starter to Control





STARTER MOTOR PARTS GROUP (SPECIAL LIST) SPEC A THRU Q

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	191-0453	1	Motor, Starting (12 Volt)				
1	191-0452	1	Armature	11	191-1021	1	Washer Armature Thrust (Pkg.) Use as Required
2	191-1017	1	Coil Assembly, Field	12	191-1022	1	Stud, Terminal (Pkg.)
3	191-0513	1	Brush Set, Service	13	191-0450	1	Gear, Pinion
4	191-1018	1	Head Assembly, Commutator End	14	516-0154	1	Pin, Pinion Gear
5		1	Band, Cover (Not Sold Separately)	15	191-0451	1	Spacer, Armature to Adapter
10	191-1020	1	Spring, Brush (Set of 4)	16	191-0446	1	Adapter
				17	191-0329	1	Bushing, Adapter
				18	509-0092	1	Seal, Oil Armature Shaft - Front
				19	509-0093	1	Seal, "O" Ring Starter Motor Mounting



CONTROL GROUP (SPECIAL LIST)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	307-0797	1	Relay, Start-Disconnect and Ignition - Spec A through Q
2	SWITCH, SELECTOR 308-0005	1	Spec A through Q and Begin Spec T
	308-0138	1	Spec R and S
3	307-0860	1	Relay, Field Build-up
4	323-0052	1	Socket, Relay - Spec A through Q
5	307-0778	1	Spring, Hold-down - Relay - Spec A through Q
6	332-0537	1	Block, Terminal (4 Place) - Spec A through Q
7	332-0566	1	Strip, Marker (4 Place) - Spec A through Q

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	307-0845	1	Solenoid, Start - Spec A through Q
9	306-0195	1	Bracket, Solenoid Mounting - Spec A through Q
10	332-0052	1	Clip, Tinnerman
11	PANEL, CONTROL - LOWER 301-1916 301-2895	1	Spec A through Q Begin Spec R
12	308-0154	1	Switch, Start-Stop - Spec A through Q
13	304-0032	1	Resistor, Fixed (15-Ohm, 10 Watt) - Spec A through Q
14	332-0795	1	Block, Terminal (16 Place) - Begin Spec R
15	332-0862	1	Strip, Marker (16 Place) - Begin Spec R

CUSTOMER SERVICES

OWNER'S WARRANTY SERVICE -
ENGINE DRIVEN ELECTRIC GENERATOR SETS,
SEPARATE GENERATORS, INDUSTRIAL ENGINES

QUALITY OF PRODUCT

Onan products are engineered and designed to perform as stated on product nameplate and published specification. With proper installation and operation, regular maintenance and periodic repair service, the equipment will provide reliable service.

GENERAL WARRANTY PRACTICES

All Onan-manufactured engine-driven electric generator sets, separate generators, and industrial engines are sold with a full one-year warranty. This warranty is issued only to the original user and promises satisfactory performance of the product when properly installed, serviced, and operated under normal conditions, according to the manufacturer's instructions. The text of the Onan published warranty appears in the Onan Operator's Manual sent with the product.

Warranty Registration: A Warranty Registration card accompanies each Onan Product. This card must be properly filled out and returned to the Onan Factory in order to qualify for warranty consideration as covered in this bulletin. When requesting warranty repair work you must provide the purchase date, Onan model, and serial number of the equipment.

Warranty Authorization: Warranty service must be performed by Onan Factory or Onan Authorized Distributors or their Approved and Registered Service Dealers. A complete listing of these Onan Authorized Parts and Service Centers is provided in our brochure F-115, a copy of which is supplied with each Onan Product. These Onan Authorized Service Centers have trained service personnel, parts stock, and the necessary facilities and tools for the service and repair of Onan equipment.

Material Allowances: Onan will allow credit or furnish free of charge to the Onan Authorized Service Station or his Approved Service Dealer, all genuine Onan parts used in a warranty repair of these products which fail to perform as warranted.

Labor Allowance: Onan will allow warranty repair credit to the Onan Authorized Parts and Service Center and his Approved Dealer at straight time labor when the cause of failure is determined to be defective material or factory workmanship. This labor allowance will be based on the factory's standard time schedule of published flat rate labor allowances, or, otherwise a time judged reasonable by the factory. Repair work not covered by warranty will be charged to the owner. The Onan's Warranty practice does not provide for allowance of expenses such as start-up charges, communication charges, transportation charges, travel time and/or mileage, unit removal or installation expense, cost of fuel, oil, normal maintenance adjustments, tune-up adjustments or parts maintenance items, and does not cover incidental or consequential damages.

Administration: Warranty of Onan Products is administered through Onan Authorized Distributors in whose territory the equipment is located. These Distributors and their Approved or Registered Onan Service Dealers are authorized to make settlement of all customer warranty claims within the limits of the manufacturer's warranty policy as described herein.

Onan reserves the right to change warranty practices without prior notice.

MAINTENANCE

A Planned Preventive Maintenance Program is extremely important if you are to receive efficient operation and long service life from your Onan unit. Neglecting routine maintenance can result in premature failure or permanent damage to your equipment. The Onan Operator's Manual sent with the product contains recommended maintenance schedules and procedures.

Maintenance is divided into two categories:

1. Operator Maintenance performed by the operator.
2. Critical Maintenance performed only by qualified service personnel.

Regular maintenance will help you avoid sudden and costly repairs in the future. Adequate evidence of this scheduled maintenance must be offered when applying for a warranty claim.

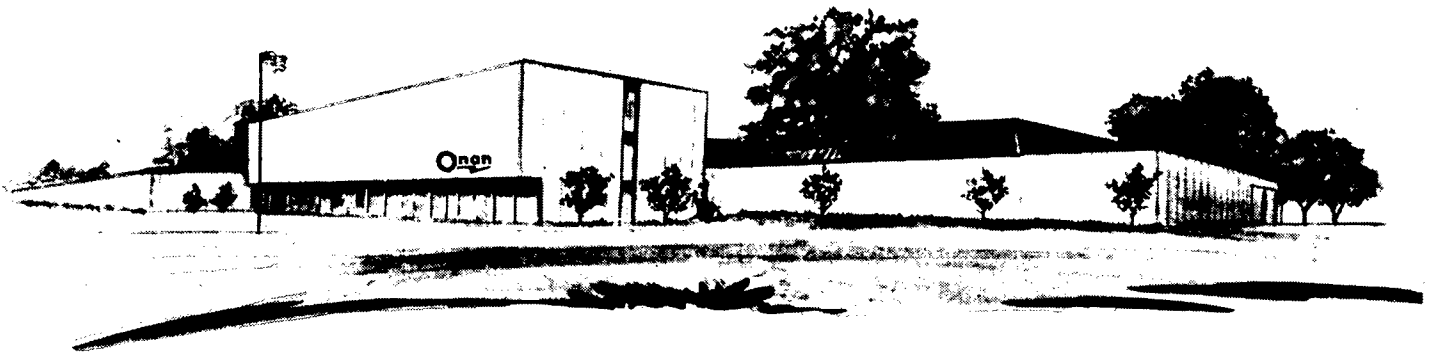
INSTALLATION

Installation is extremely important and all Onan-Products should be installed in accordance with the manufacturer's recommendations. If the owner experiences any difficulty with such items as mounting, ventilation, exhaust location, fuel lines, wiring, etc., he should immediately contact the company from whom he purchased the equipment so that corrective action can be taken. Although the Onan Authorized Distributor and his Approved or Registered Service Dealers may be able to remedy certain installation difficulties, such repair work is not considered Onan warranty and there will be a charge for this service.

Onan

Minneapolis, Minnesota 55432

MSS-22B
Replaces 23B054 and MSS-22A
Rev. 7-2-73



ONAN 1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432
A DIVISION OF ONAN CORPORATION

