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ONAN ELECTRIC GENERATING SETS

JB

6.0JB-53CR/1T

6.0JB-57R/1T

Spec. T

SERIES

Parts Key 4

11AT70

967-320

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, MINN. 55432

A DIVISION OF STUDEBAKER 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.

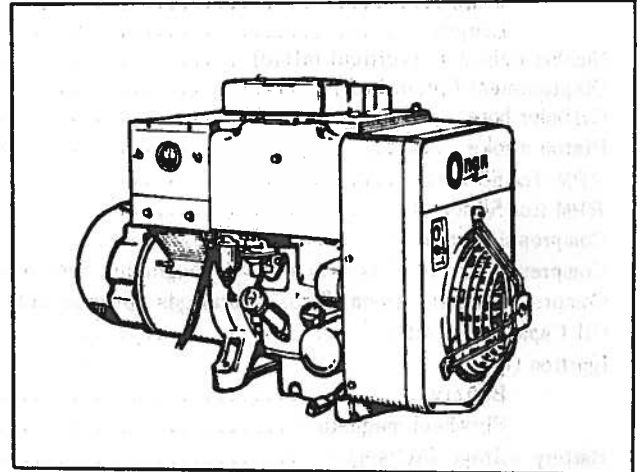
WE SUGGEST THAT THIS MANUAL AND THE WIRING DIAGRAM WHICH ACCOMPANIES EVERY ONAN UNIT BE RETAINED AND REFERRED TO WHEN MAKING EQUIPMENT ADJUSTMENTS OR ORDERING PARTS. ADDITIONAL COPIES ARE AVAILABLE FOR A NOMINAL CHARGE FROM YOUR ONAN DISTRIBUTOR.

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.

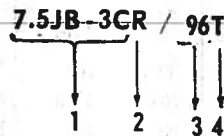
INTRODUCTION

When instructions in this manual refer to a specific model of generating set, identify the model by referring to the MODEL AND SPEC (specification) NO. as shown on the plant nameplate. Electrical characteristics are shown on the lower portion of the set nameplate.



TYPICAL MODEL JB

How to interpret MODEL and SPEC. NO.



1. Factory code for general identification.
2. Specific Type:
 - M* - *MANUAL* type. Manually cranked For permanent or portable installations.
 - E* - *ELECTRIC* start type. Electric starting at the set only.
 - R* - *REMOTE* type. 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 (Spec.) letter (advances when factory makes production modifications).

MANUFACTURER'S WARRANTY

The Manufacturer warrants, to the original user, that each product of its manufacture is free from defects in material and factory workmanship if properly installed, serviced and operated under normal conditions according to the Manufacturer's instructions.

Manufacturer's obligation under this warranty is limited to correcting without charge at its factory any part or parts thereof which shall be returned to its factory or one of its Authorized Service Stations, transportation charges prepaid, within one year after being put into service by the original user, and which upon examination shall disclose to the Manufacturer's satisfaction to have been originally defective. Correction of such defects by repair to, or supplying of replacements for defective parts, shall constitute fulfillment of all obligations to original user.

This warranty shall not apply to any of the Manufacturer's products which must be replaced because of normal wear, which have been subject to misuse, negligence or accident or which shall have been repaired or altered outside of the Manufacturer's factory unless authorized by the Manufacturer. Manufacturer shall not be liable for loss, damage or expense directly or indirectly from the use of its product or from any cause.

The above warranty supersedes and is in lieu of all other warranties, expressed or implied, and of all other liabilities or obligations on part of Manufacturer. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an officer of the Manufacturer.

SPECIFICATIONS

M= manual Start

R= remote start (electric crank)

	Model Series †					
	5.0JB* 6.0JB**		6.1JB* 7.6JB**		6.0JB* 7.5JB**	
	M	R	M	R	M	R
Nominal dimension of set (inches)						
Height	26 ½	26 ½	26 ½	26 ½	26 ½	26 ½
Width	18	18	18	18	18	18
Length	36	36	41-3/8	36	37	37
Number cylinders (vertical inline)	2	2	2	2	2	2
Displacement (cubic inch)	60	60	60	60	60	60
Cylinder bore	3-1/4	3-1/4	3-1/4	3-1/4	3-1/4	3-1/4
Piston stroke	3-5/8	3-5/8	3-5/8	3-5/8	3-5/8	3-5/8
RPM (for 60 hertz)	1800	1800	1800	1800	1800	1800
RPM (for 50 hertz)	1500	1500	1500	1500	1500	1500
Compression ratio	6.5:1	6.5:1	6.5:1	6.5:1	6.5:1	6.5:1
Compression ratio, Gas only and LPG beginning Spec S	9.2:1	9.2:1	9.2:1	9.2:1	9.2:1	9.2:1
Compression ratio, Penn. State natural gas powered sets only	9.2:1	9.2:1	9.2:1	9.2:1	9.2:1	9.2:1
Oil Capacity (quarts)	3 Δ	3 Δ	3 Δ	3 Δ	3 Δ	3 Δ
Ignition (type)						
Battery	No	Yes	No	Yes	No	Yes
Flywheel magneto	Yes	No	Yes	No	Yes	No
Battery voltage (AC set)	None	12 V	None	12 V	None	12 V
Battery size (AC set):						
SAE group 1H	---	two in series	---	two in series	---	---
SAE group 3KMB	---		---		---	One
Amp/hr. SAE rating - 20 hr (nominal)	---	105 ‡	---	105 ‡	---	72
Starting by hand crank only	Yes	No	Yes	No	Yes	No
Starting by exciter cranking	No	Yes	No	Yes	No	No
Starting by starting motor with solenoid shift & over-run clutch	No	No	No	No	No	Yes ‡
Battery charge rate amperes	2	2	2	2	2	2
Ventilation Required (cfm 1800 rpm)						
Engine (Pressure Cooling)	520	520	520	520	520	520
Engine (Vacu-Flo Cooling)	610	610	610	610	610	610
Generator	75	75	75	75	126	126
Combustion	32	32	32	32	32	32
Output rated at unity power factor load	All	All	All	All	1 phase	1 phase
Output rated at 0.8 power factor load	No	No	No	No	3 phase	3 phase
Rating (output in watts)						
*50 hertz AC intermittent service	5000	5000	6100	6100	6000	6000
*50 hertz AC continuous service	4000	4000	6100	6100	6000	6000
**60 hertz AC intermittent service	6000	6000	7600	7600	7500	7500
**60 hertz AC continuous service	5000	5000	7600	7600	7500	7500
AC voltage regulation in ± %	5	5	5	5	3	3
AC frequency regulation in %	5	5	5	5	5	5
Revolving armature generator	Yes	Yes	Yes	Yes	No	No
Revolving field generator	No	No	No	No	Yes	Yes
120/240 volt single phase model reconnectable	No	No	No	No	Yes	Yes
Rotating type exciter	Yes	Yes	Yes	Yes	No	No
Static type exciter (Magneciter)	No	No	No	No	Yes	Yes

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

† New model designations shown, begin during 1969. Previous designations used a zero in place of the decimal in the KW rating. EXAMPLE: 5.0JB was formerly 5JB and 6.1JB was formerly 601JB.

* Basic 50hertz model

** Basic 60hertz model

Δ Add 1/2 quart for filter

‡ Below 0°F use SAE group 1H size batteries in series for 105 amp. hours, 12 volts.

£ Pennsylvania approved models use continuously meshed gear starting motor (Prior to Spec R).

INSTALLATION

GENERAL

Important installation points are: sufficient cooling, exhaust gas discharge, electrical and fuel connections, location and mounting, and protection from road dust and shocks during transit (mobile applications). For additional information on mobile installations, see Onan publication T-012.

Each installation must be considered individually — use these instructions as a general guide. Always check local building codes, fire ordinances, etc., for compliance. Provide a location that is protected from the weather, dry, dust free, and preferably warm in cold weather. The air discharge side of set requires only 3" clearance from wall to permit set to rock on its mounts but at least 24" clearance is required around all other sides for service accessibility.

MOUNTING (See Fig. 2)

A permanent installation needs a sturdy, level, mounting base of concrete, heavy wood or structural steel at least 12" high to aid oil changing and operating. For mobile applications (trucks or trailers) install slide-out rails or some other means (such as doors) to provide service space. (See Fig. 1 and 3).

Carefully assemble the mounting cushions, washers and spacer bushing (Fig. 2). The spacer bushing prevents compression of the snubber (upper rubber cushion). Space the 7/16" mounting bolts as shown in Fig. 2.

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

VENTILATION AND COOLING

Air circulation is needed to dissipate heat produced by the engine and generator in normal operation. *Outdoor* installations can rely on natural circulation, but *mobile, indoor or housed* installations need proper size and positioned vents for required air flow. See specifications for the air requirements at 1800 rpm.

Vent sizes depend on variable conditions: (1) size of enclosure, (2) ambient temperature, (3) electrical load, (4) running time, (5) restrictions imposed by screens, louvers, shutters, or filters, (6) prevailing wind direction. Remember that a required volume of air must reach the set, absorb the heat, and be discharged away from the installation. Pressure cooled sets need an inlet vent with an unrestricted opening of at least 3-1/2 sq. ft. for variables. For discharged air, install separate ducts from the engine and generator (see exception) as follows:

1. The engine discharge duct must be the same size as the engine outlet, 8 x 10". If a screen is used in the duct, increase the duct size in proportion to the restriction. Consider installing the screen diagonally to limit the restriction and increase duct size for runs over 9 feet. If bends are necessary, use larger radius elbows.

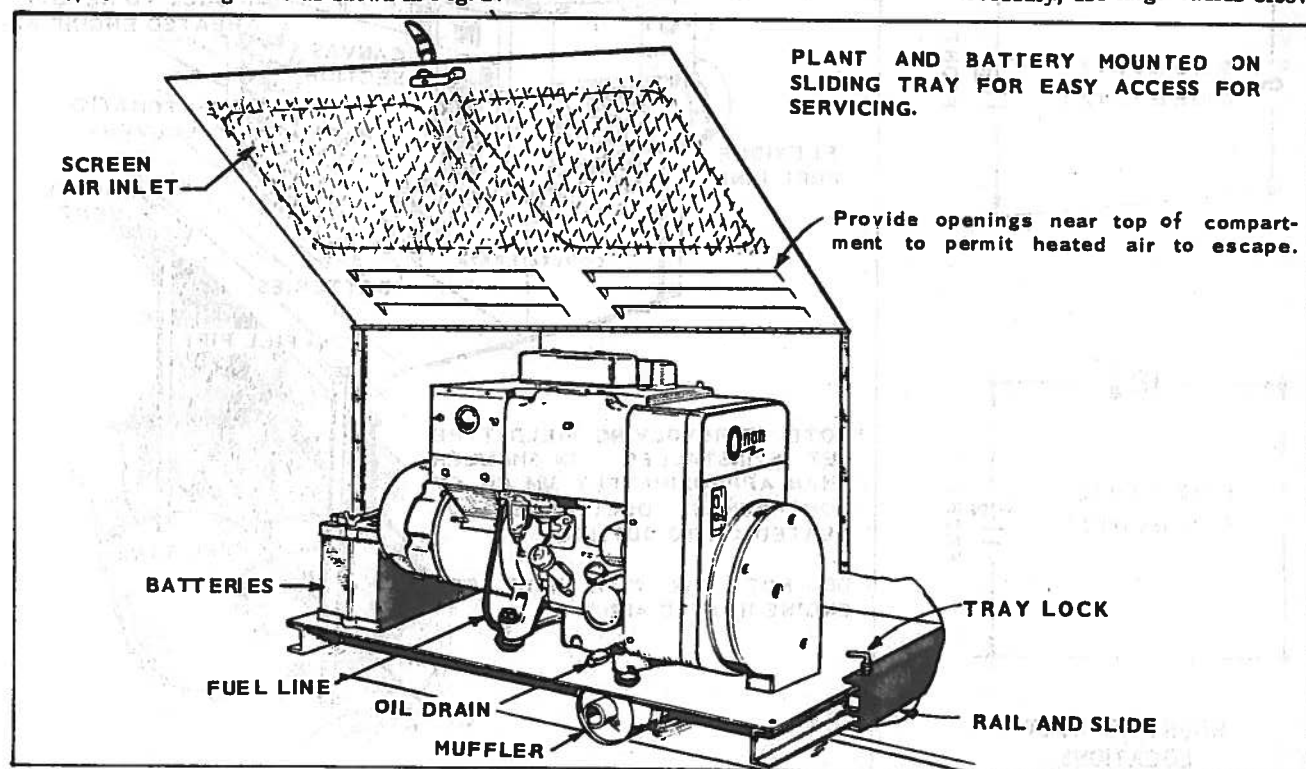
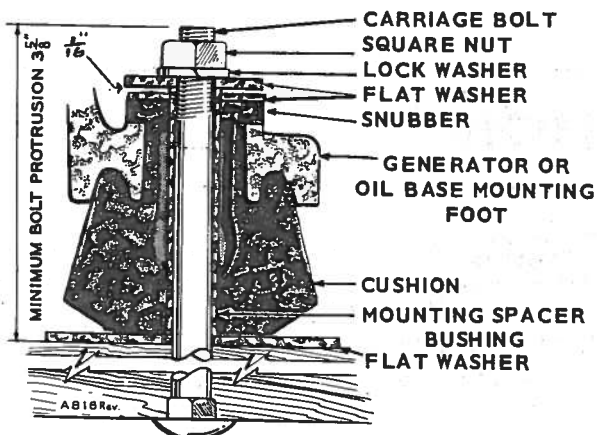
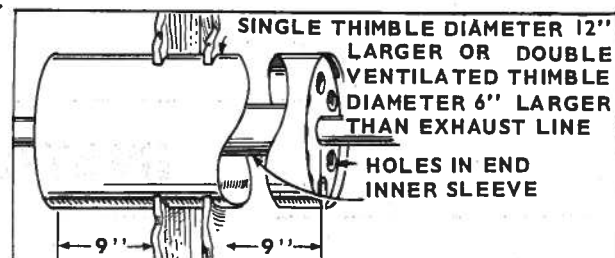


FIG. 1



MOUNTING CUSHIONS



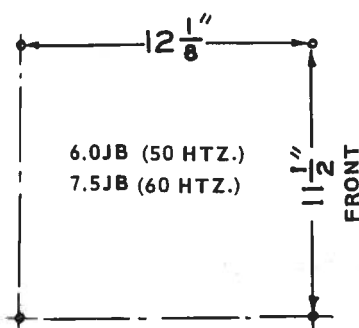
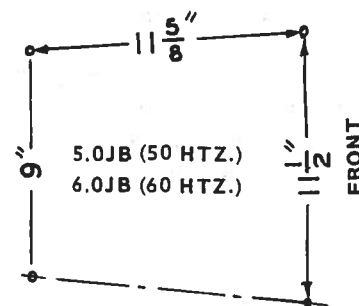
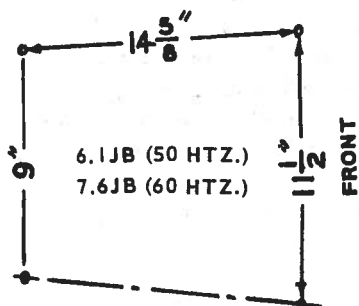
EXHAUST LINE PASSING THROUGH WALL OR PARTITION

IF EXHAUST LINE MUST BE PITCHED UPWARD CONSTRUCT A TRAP OF PIPE FITTINGS AT POINT OF RISE

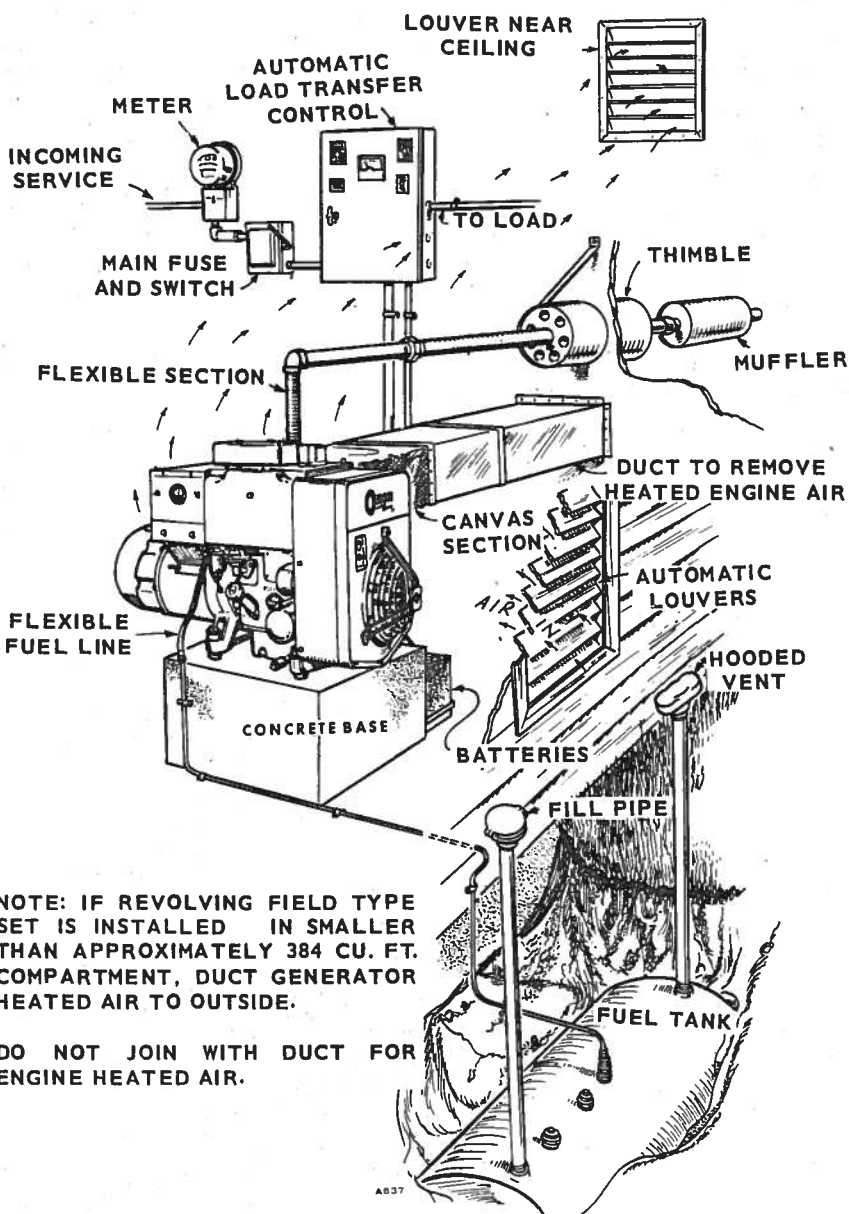
[AVOID SHARP BENDS]

DRAIN CONDENSATION TRAP PERIODICALLY

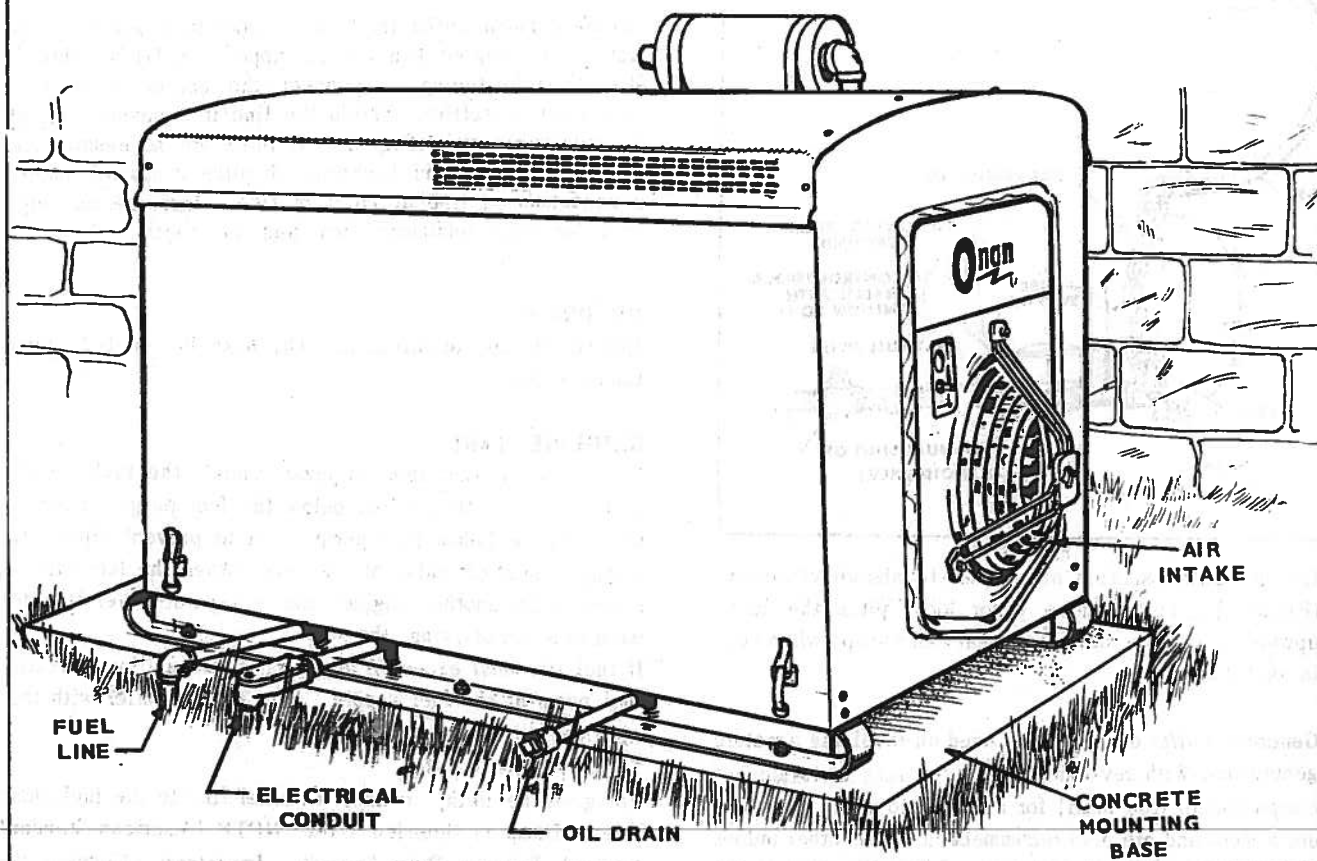
AB17



MOUNTING BOLT LOCATIONS



STANDBY INSTALLATION



MOBILE INSTALLATION

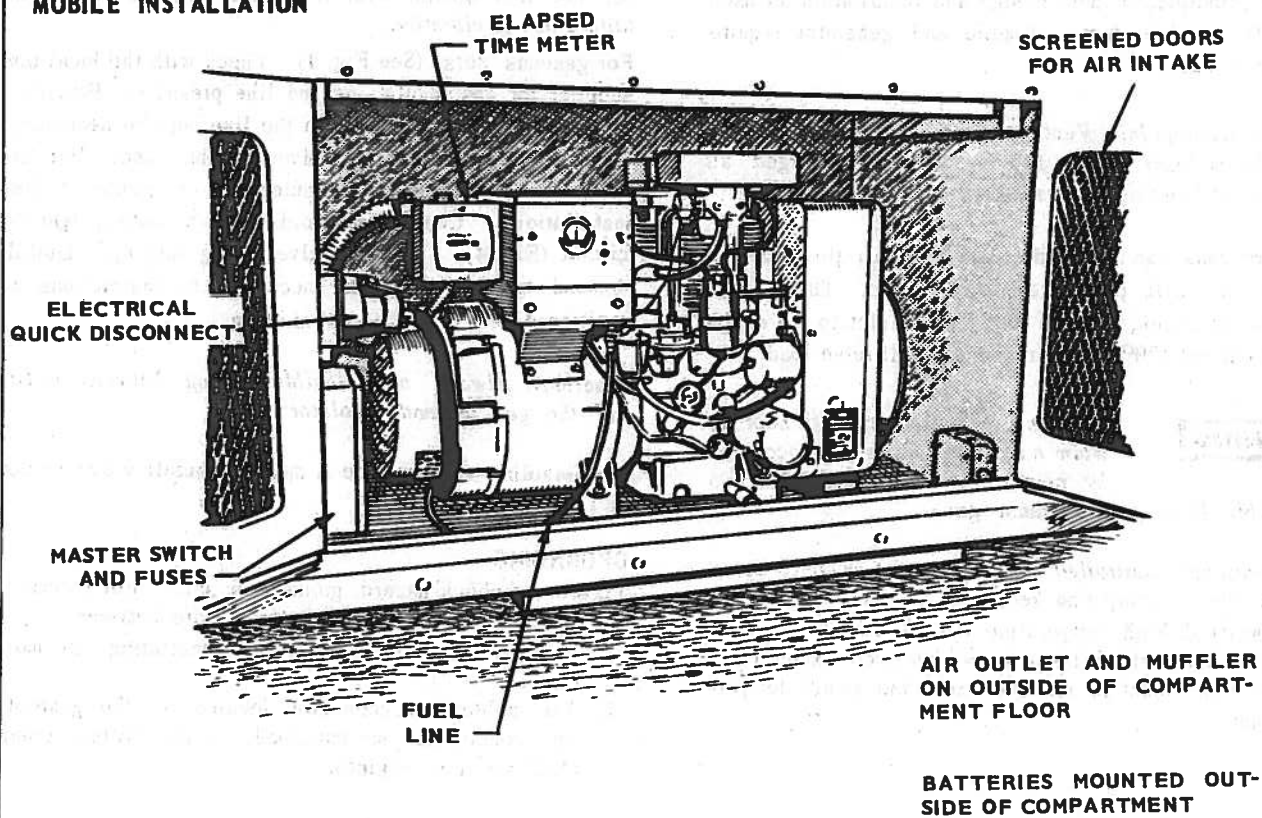


FIG. 3

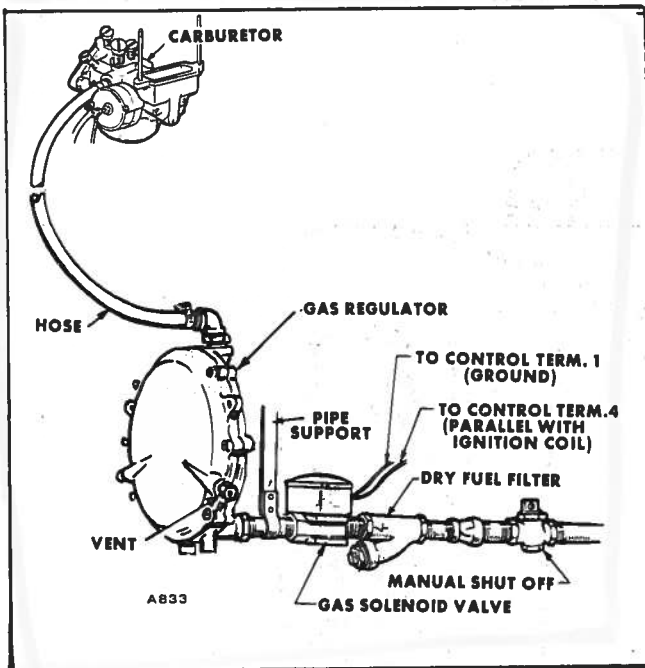


FIG. 4

Use a canvas section at the set to absorb vibration (Figure 2). To minimize vapor lock, pitch the duct upward (toward the outlet) so heat can escape when set is shut down.

2. Generator outlet ducts are not used on revolving armature generators. With revolving field type sets installed in compartments (too small for operator to walk in), ducts are a must and are also recommended for all other indoor installations. The air outlet is 5-5/8 x 3". Follow the same principles of duct design and installation as used for the engine duct. Engine and generator require separate ducts.

Vacu-Flo Cooling Inlet Vent (see specifications for air flow). should be at least 1/3 sq. ft., the duct for discharged air should be at least as large as the scroll outlet.

Auxiliary fans can be used to increase air flow to sets installed in small, poorly ventilated rooms. The fan size and location should be such that the air inlet to the engine doesn't exceed 120°F when running at full rated load.

WARNING

Utilizing exhaust manifold heat to warm a room or compartment occupied by people is not recommended due to possible leaking of exhaust gases.

Thermostatically controlled shutters can be used to speed warm up after starting and keep cold air out during shut-down. Optional high temperature cut-off switch on some sets stops the set if temperature becomes excessively high. The set cannot be restarted until the switch temperature drops.

EXHAUST

WARNING

Pipe **POISONOUS** exhaust gas outside enclosure.

Locate exhaust outlet far from air inlet to avoid recirculation. The engine exhaust is tapped for 1-1/4" thread. Use flexible tubing to connect the engine exhaust to rigid pipe or muffler. Shield the line if it passes through a combustible wall (Fig. 2). 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 ten feet in length.

OIL DRAIN

Extend to suit installation. Oil base has a 1/2" pipe tapped hole.

GASOLINE TANK

If a separate fuel tank is used, install the tank so the bottom is less than 8 feet below the fuel pump. The tank top must be below fuel pump level to prevent siphoning. Install a shut-off valve at the tank. When the fuel tank is shared with another engine, use a separate fuel line for each to avoid starving the set.

If fuel lift *must* exceed 8 feet, install an auxiliary electric fuel pump at the fuel supply. Wire it in parallel with the ignition coil (ahead of resistor).

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

For gaseous sets (See Fig. 4) 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. 4) to open valve during running. Install a demand type gas regulator according to instructions and position it near the set to aid starting.

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

Gas-Gasoline sets provide a manual shutoff valve in both fuel supply lines.

GROUNDING

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

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

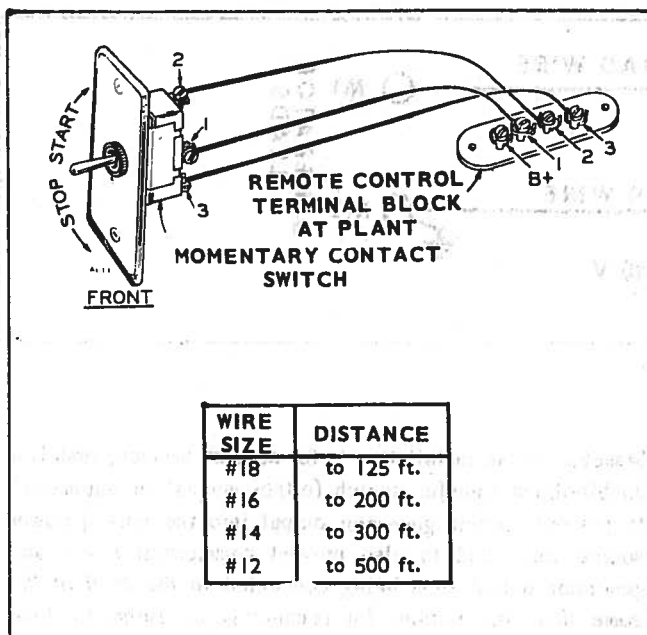


FIG. 5

REMOTE START-STOP SWITCH (Optional)

For remote control starting and stopping, use 3 wires to connect the remote switch (SPDT, momentary contact, center-off type) to the terminal block marked B+, 1, 2 and 3 in the set control box using wire sizes as listed in Figure 5.

BATTERY CONNECTION

Set with Starting Motor: (Begin Spec P) sets are designed for negative (-) battery ground only. (Penn State Sets NEG ground only.) (Prior to Spec P) Battery polarity connection located in the control box. If battery ground must be changed, reverse the rectifier connection in the control, Fig. 6. For Battery Connection see wiring diagram and Figures 7 and 8.

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.

NOT USED ON PENN. STATE APPROVED UNITS



PRIOR TO SPEC. P ONLY

TO REVERSE DISCONNECT WIRES FROM TERMINALS, TURN THIS BLOCK BOTTOM SIDE UP AND RECONNECT WIRES.

FIG. 6

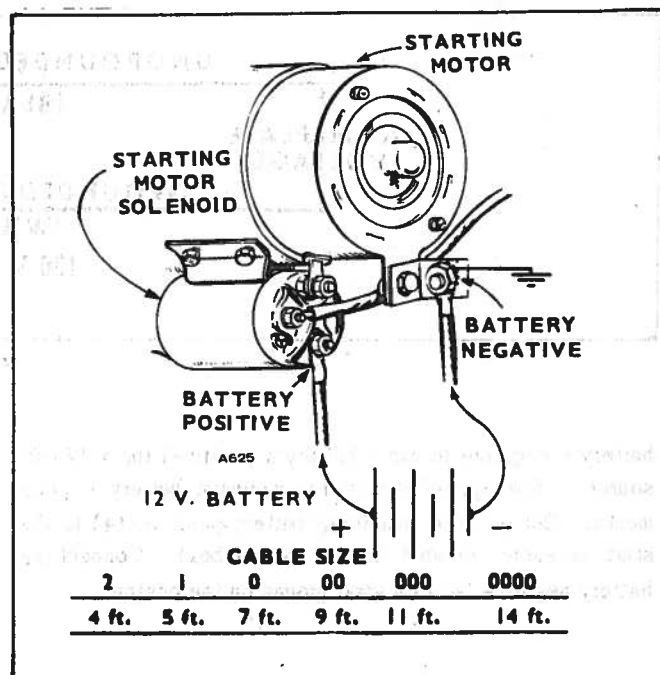


FIG. 7

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.

BATTERY CONNECTION

Exciter Cranked Set: (Begin Spec P) sets are designed for negative (-) battery ground only. (Penn. State Units NEG ground only) Refer to wiring diagram and Fig. -8. (Prior to Spec. P) If battery ground must be changed, reverse the connections to the charge ammeter or re-mark the correct direction of charge. Crank electrically to flash field. Provide two 6 volt batteries connected in series (one

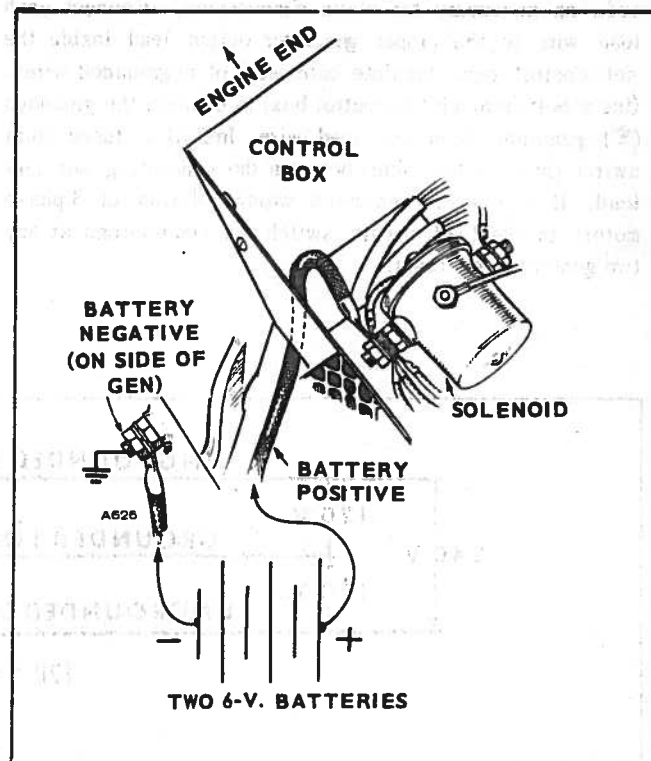


FIG. 8

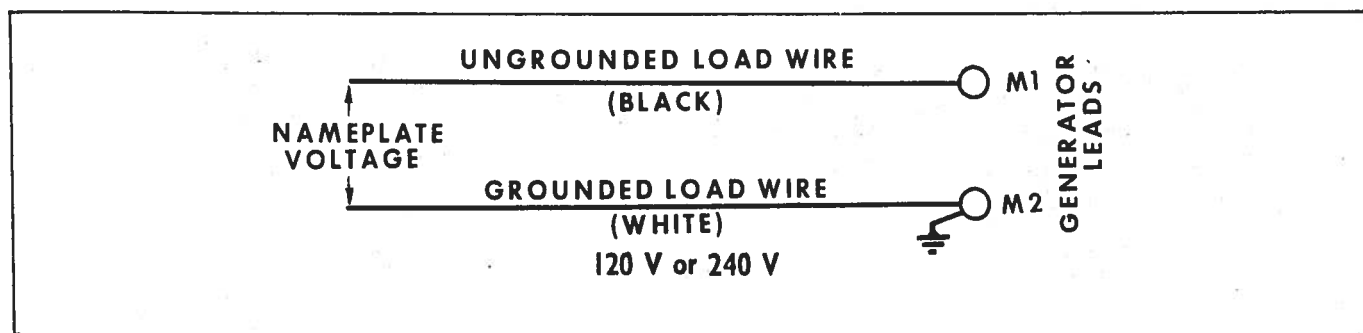


FIG. 9

battery's negative to other battery's positive) for a 12-volt source. See Specifications for minimum battery requirements. Connect the remaining battery positive (+) to the start solenoid (located in the control box). Connect the battery negative (-) to a good ground on the engine.

LOAD WIRE CONNECTIONS

Set nameplate shows the electrical output rating of the plant in watts, volts, and hertz. The set wiring diagram shows the electrical circuits and connections necessary for the available output voltage. Also see Figures 9 thru 14.

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 knock out 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 the 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 (⚡) 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) to prevent feeding generator output into the normal power source lines and to also prevent commercial power and generator output from being connected to the load at the same time. Instructions for connecting an automatic load transfer switch are included with such equipment. See Fig. 2.

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: Revolving armature generator leads are marked M1, M2, etc. Comparable leads on revolving field generators are marked T1, T2, etc. These identifying marks also appear on the wiring diagram.

Voltage Selection on Reconnectable Single Phase Generators: Models 7.6JB-3CR and 7.5JB-3CR (except when optionally equipped with meter panel, circuit breaker, etc.) are reconnectable for use as 120/240 volt 3 wire, 120 volt 2 wire, or 240 volt 2 wire power source (Fig. 11).

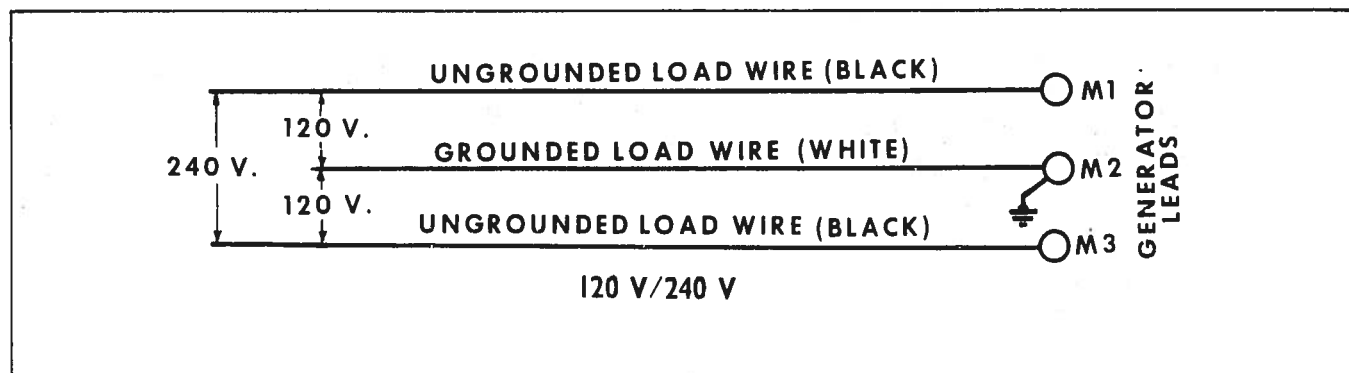


FIG. 10
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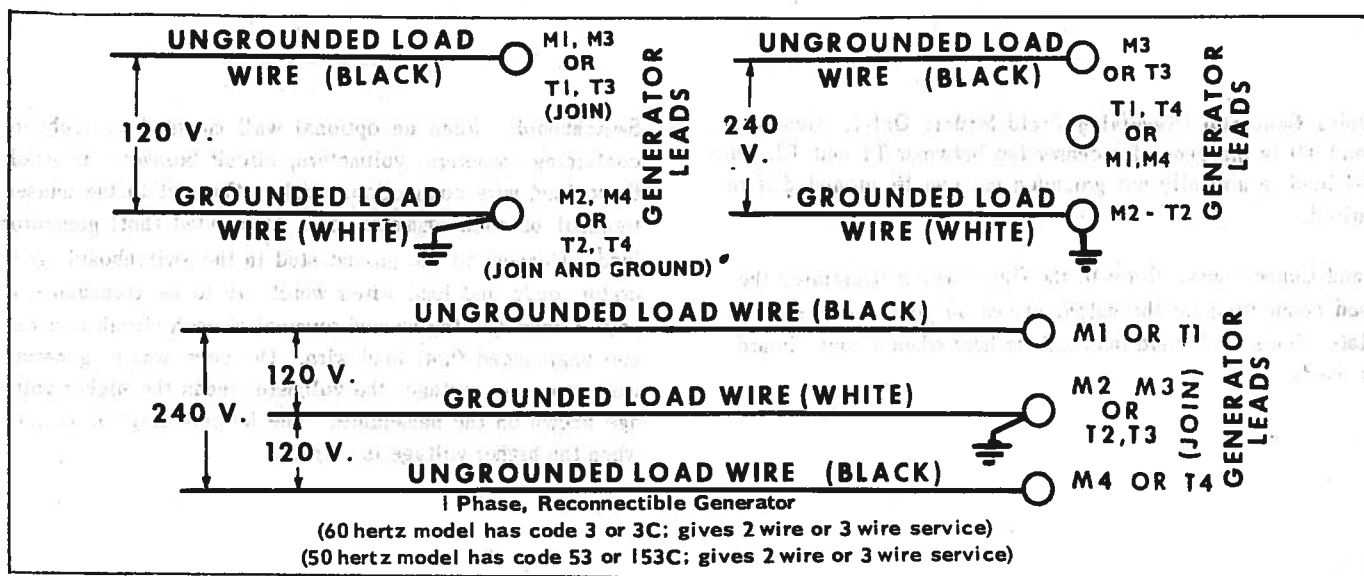


FIG. 11

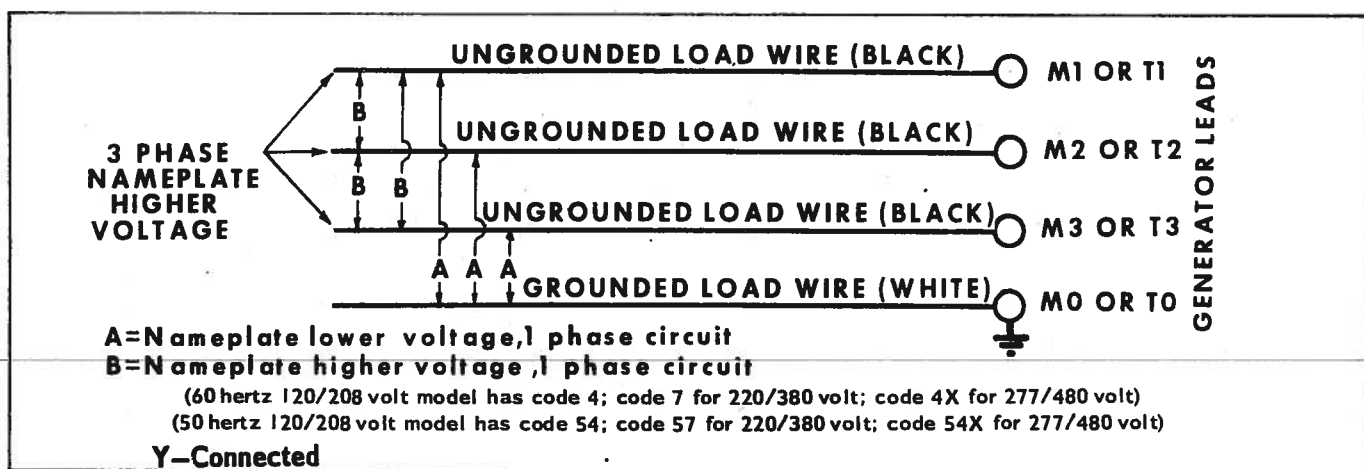


FIG. 12

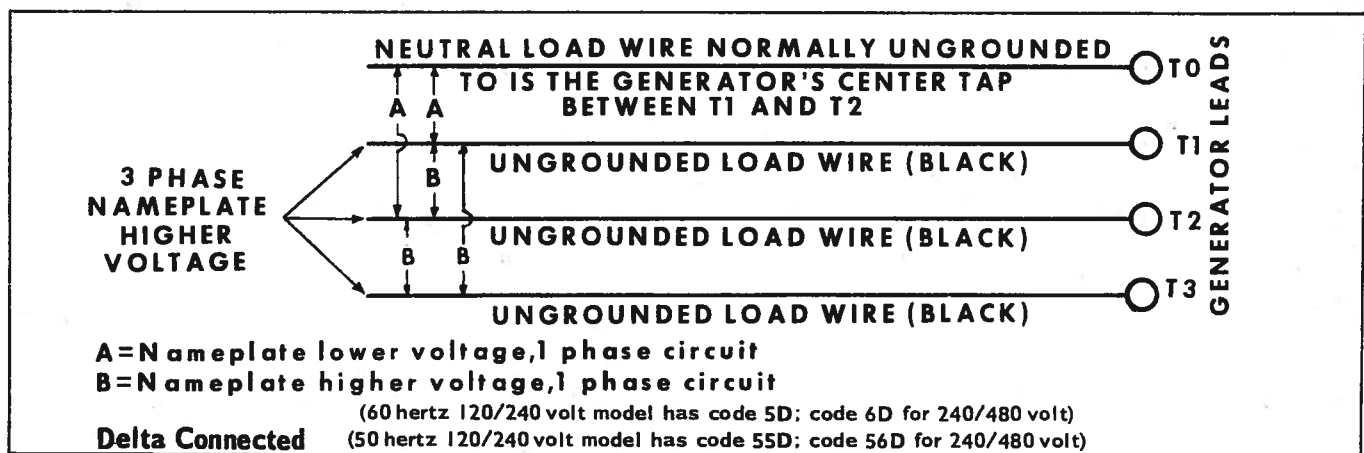


FIG. 13

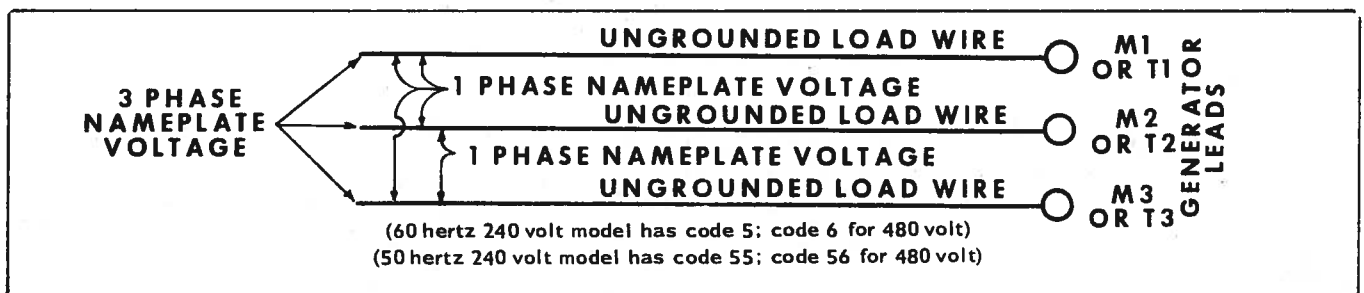


FIG. 14

Delta Generator (Revolving Field Models Only): 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 here 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.

OPERATION

CRANKCASE OIL

Use a good quality detergent oil that meets the API (American Petroleum Institute) service designations MS, MS/DG. Oil should be labeled as having passed the MS sequence tests (also known as the ASTM G-IV sequence tests) and the MIL-L-2104B tests. Recommended SAE oil numbers for expected ambient temperatures are as follows:

TEMPERATURE	GRADE
Above 30°F	SAE 30
0°F to 30°F	SAE 10W
Below 0°F	SAE 5W-20

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

RECOMMENDED FUEL

Use clean, fresh, *regular* grade, automotive gasoline. *Do not* use highly leaded *premium* types. Never fill the tank when the engine is running and leave some fuel expansion space. Open fuel line valve (when used).

INITIAL START

Check the engine to make sure it has been filled with oil and fuel. Cylinder air housing door must be closed. 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 thoroughly and install. Heavy exhaust smoke when the engine is first started is normal and is caused by the inhibitor oil.

STARTING (Electric Crank Models Fig. 15, 17)

- (1) Push *start-stop* switch to *start* position.
- (2) Release the switch after engine starts and reaches speed.
- (3) Oil pressure gage should read at least 20 psi (pressure relief is not adjustable).
- (4) If AC voltage does not build up on revolving field sets (magnetism lost) read Maintenance Diagnosis.

If the set control has a re-set button, push it to re-set *only* after a shutdown resulting from oil pressure failure occurs. Find the cause before re-starting the engine. On early sets, re-set or temporarily switch to *manual* to start after oil filter change.

The adjustable resistor slide tap (in the charging circuit) is set to give approximately 2 ampere charging rate. For applications requiring frequent starts, check battery specific gravity periodically and, if necessary, increase the charging rate slightly (move slide tap nearer ungrounded lead) until it keeps the battery charged. Adjust only when set is stopped. Avoid overcharging. The resistor is located in the generator air outlet of revolving field generators, or on rear of control box of revolving armature generators.

If a separate automatic demand control for starting and stopping is used, adjust the charge rate for its maximum 4.5 amperes. This normally keeps battery charged even if starts occur as often as 15 minutes apart.

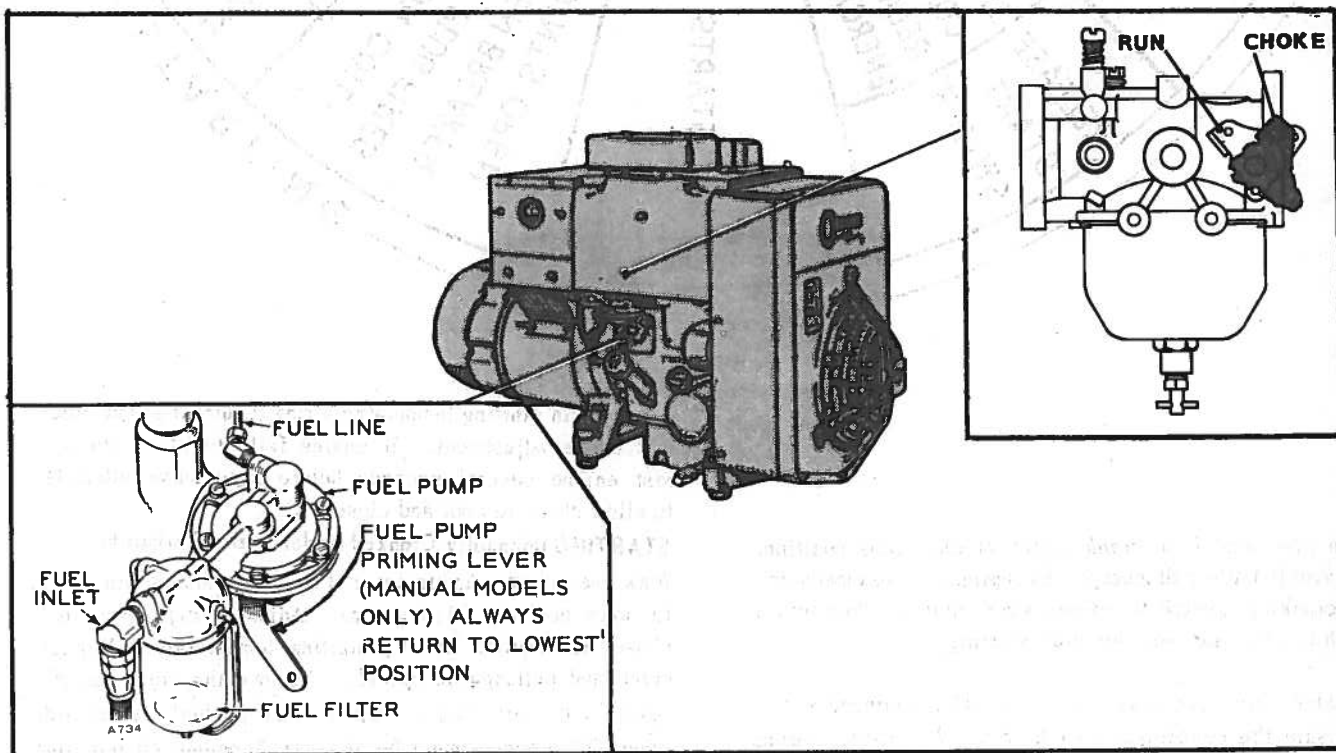


FIG. 15

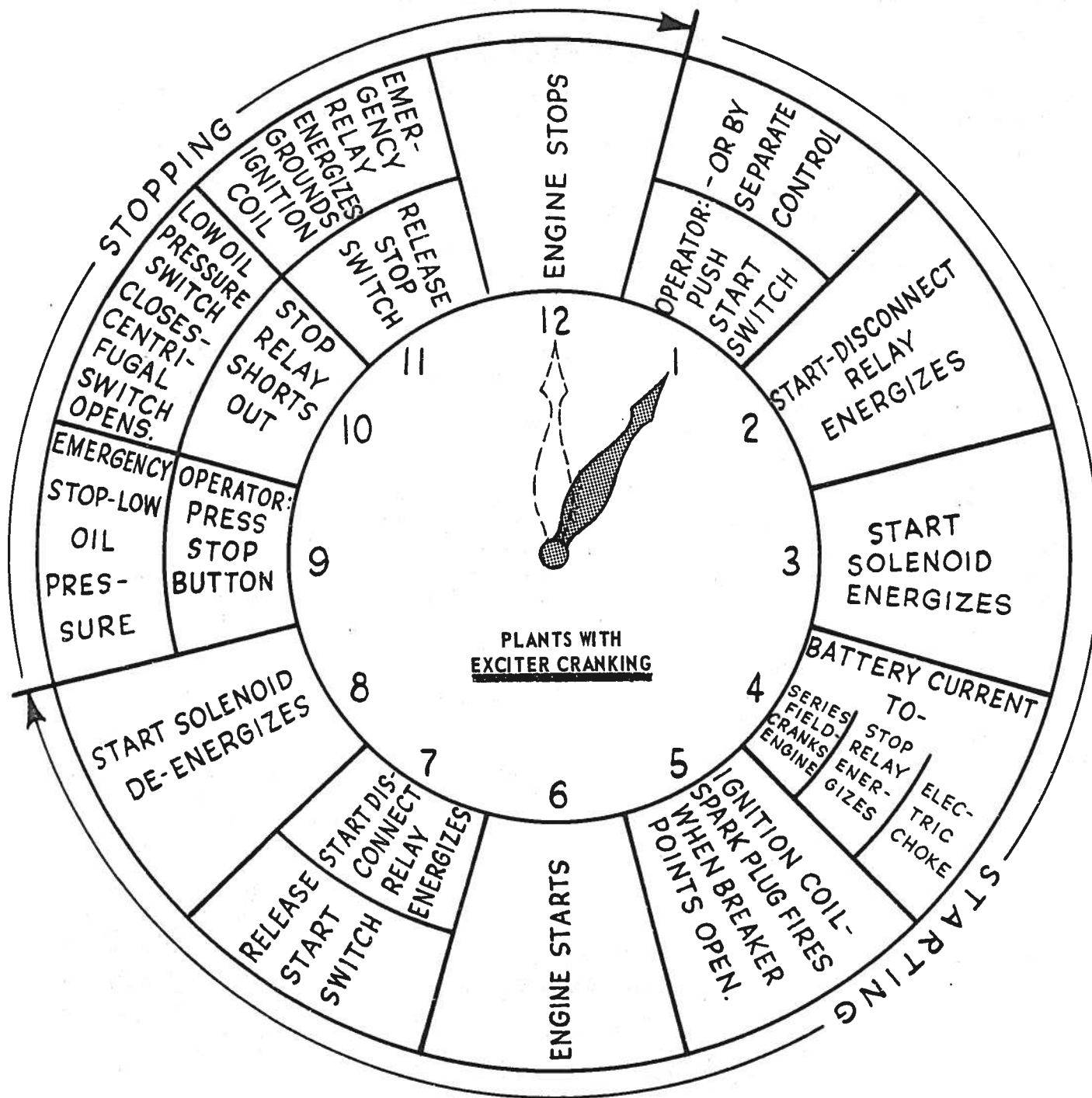


FIG. 16

Leave *elec start-hand crank* switch at *elec start* position. This avoids battery discharge. **Exception:** While emergency hand-cranking, switch to *manual start* position, then return switch to *elec start* position after starting.

If a false start occurs with a starter motor equipped set, make sure the centrifugal switch (Fig. 19) closes during speed build-up.

Extremes in starting temperatures may require a slight electric choke adjustment. If engine fails to start quickly, rest engine several seconds before successive attempts to allow choke to cool and close.

STARTING (Manually Cranked Models) (Dry Carburetor)

Work fuel pump priming lever 15 strokes and return lever to down position (disengaged). Adjust carburetor manual choke as required by the starting temperature. Engage crank and pull upward quickly. Remove the crank immediately when set starts. Open choke gradually until wide open. Oil pressure must be at least 20 pounds-if not, find the cause.

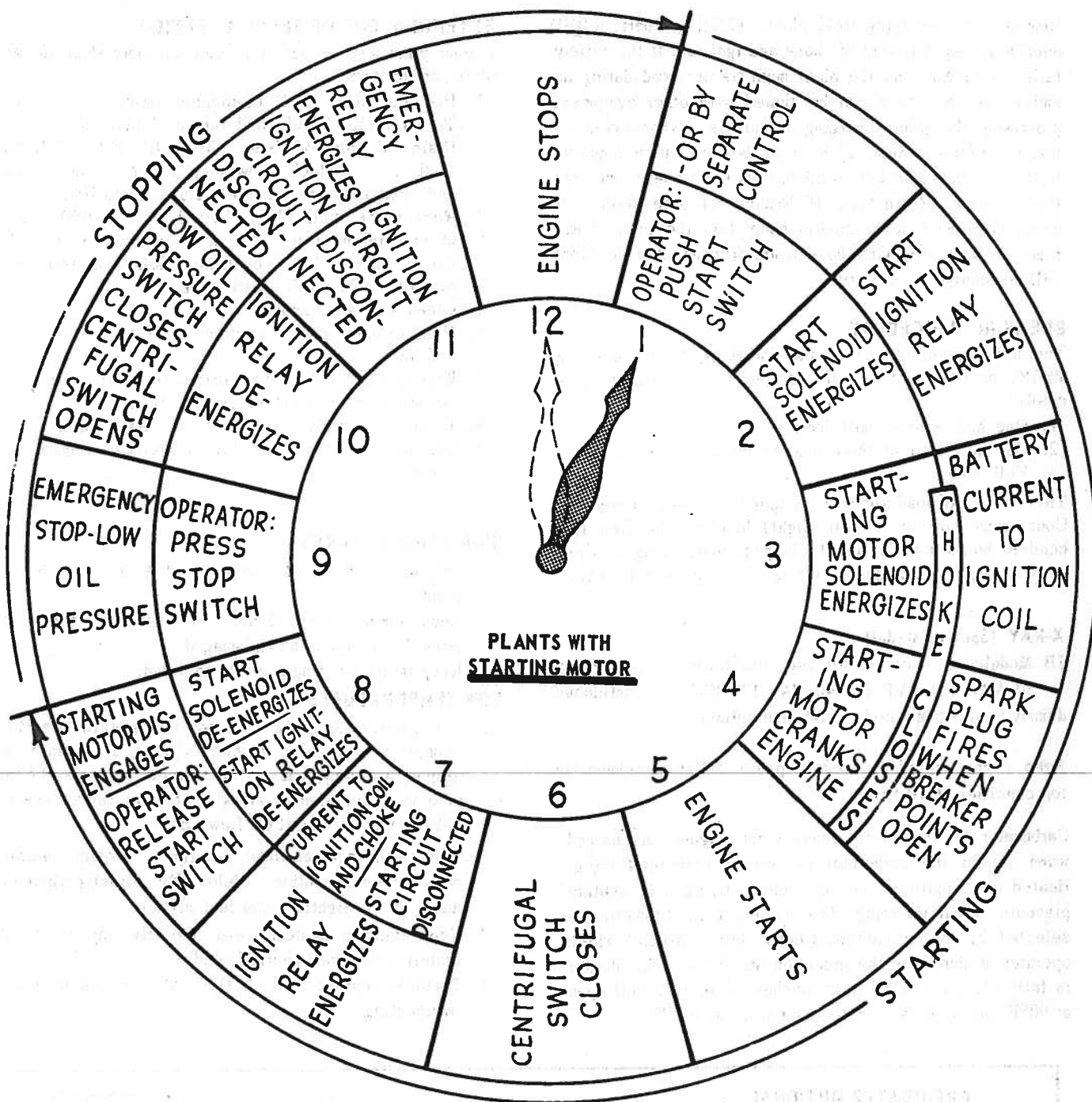


FIG. 17

STOPPING (Electrically Cranked Models)

- (1) Push *start-stop* switch to *stop* position.
- (2) Release switch when set stops. If stop circuit fails, close fuel valve.

STOPPING (Manually Cranked Models)

Hold switch at *stop* position until engine stops.

APPLYING LOAD

If practicable, allow set to warm up before connecting a heavy load. Continuous generator overloading may cause high operating temperatures that can damage the windings. The generator can safely handle an overload temporarily, but for normal operation, keep the load within name-plate rating.

Try to connect the load in steps instead of full load at one time. Most installations use a line switch that must be closed to connect a portion of the load.

EXERCISE STANDBY SETS

Infrequent use results in hard starting. Operate standby sets one 30 minute period each week. Run longer if battery needs charging.

EMERGENCY OPERATION IF BATTERY FAILS

The remote-type revolving-armature set (60 hertz 6.0JB) must always have the battery connected while operating. High voltage will burn relays if battery is disconnected.

Remote type revolving field plants (7.5JB, 50 hertz 6.0JB) need a battery for electric choke and ignition. If the battery fails completely and the plant must be operated during an emergency, a battery can be shared with other equipment providing the plant charging circuit is disconnected as follows: (Prior to Spec. P) Remove the wire which connects to the battery reconnection block from the ammeter and tape the bare end. (Begin Spec. P) Remove the wire which connects to term #8 in the control panel from the ammeter and tape the bare end. With these leads disconnected the plant will not charge the battery.

BREAK-IN PROCEDURE

The unit should be run in the following sequence using MS-DG or DM oil (see oil requirements 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.

X-RAY (Special Model)

JB Models are suitable for use with full-wave X-Rays up to 50 MA, 100 KVP (or 40 MA, 125 KVP). Continuous dummy load not required to stabilize voltage.

Keep generating plant used to power X-Ray equipment in top condition at all times.

Carburetor Air Pre-Heater conveys the engines discharged warm air to the carburetor to prevent carburetor icing. Heated air supplied to the air cleaner during cold weather prevents carburetor icing. The air source is automatically selected by the Vernatherm (thermostatic element) which operates a shutter in the induction air stream. The 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.

EXTENDED OUT-OF-SERVICE PERIOD

If your plant will be out of service for more than 30 days, store as follows:

1. Run the plant until thoroughly warm.
2. Turn off fuel supply and run until plant stops.
3. Drain oil from oil base while still hot. Fill with fresh oil. Attach a warning tag showing oil type and viscosity to assure future operation.
4. Remove the spark plug. Pour 1 oz. (two tablespoons) of rust inhibitor (or SAE #50) oil into the cylinder. Crank engine slowly by hand. Leave at top center position. Reinstall spark plug.
5. Clean the air cleaner.
6. Plug exhaust outlet to prevent entrance of moisture and dirt.
7. Wipe generator brushes, commutator, etc., clean. Do not use any lubricant or preservative.
8. Provide a suitable cover for the entire unit.
9. Disconnect battery and follow standard storage procedure.

HIGH TEMPERATURES

1. See that nothing obstructs air flow to-and-from the plant.
2. Keep cooling fins clean. Air housing should be properly installed and undamaged.
3. Keep ignition timing properly adjusted.

LOW TEMPERATURES

1. Use correct SAE No. oil for temperature conditions. Change oil only when engine is warm. If an unexpected temperature drop causes an emergency move the plant to a warm location or apply heated air (never use open flame) externally until oil flows freely.
2. Use fresh (not *premium*) gasoline. Protect against moisture condensation. Below 0°F adjust carburetor main jet for slightly richer fuel mixture.
3. Keep ignition system clean, properly adjusted, and batteries in a well charged condition.
4. Partially restrict cool air flow but use care to avoid overheating.

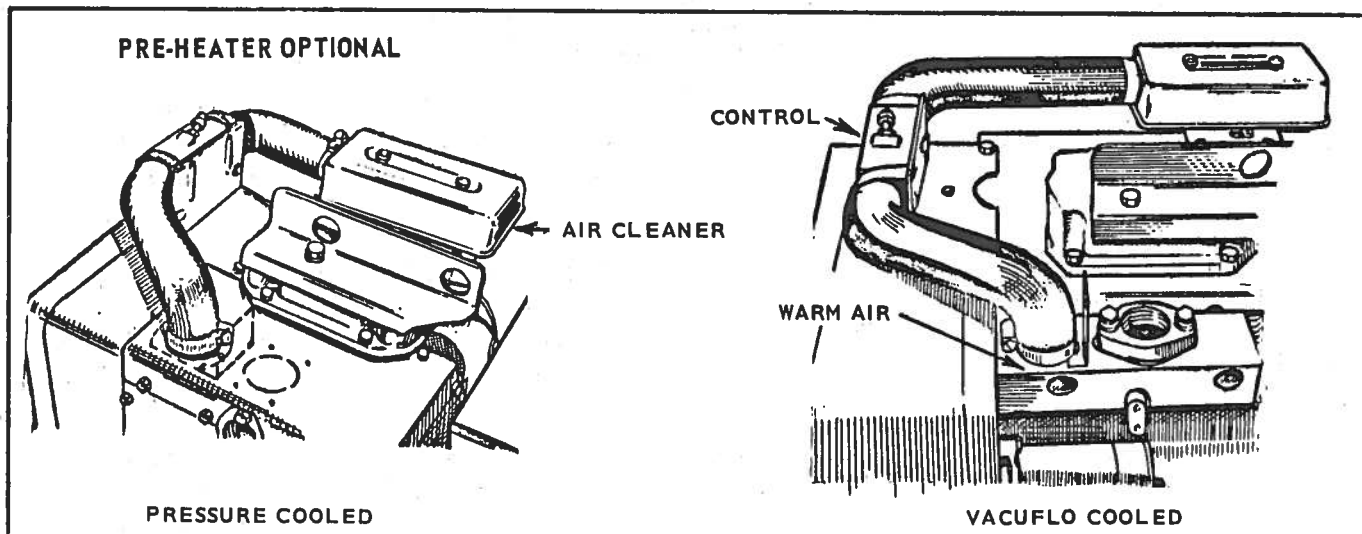


FIG. 18

DUSTY AND DIRTY CONDITIONS

1. Keep set clean. Keep cooling fins free of dirt, etc.
2. Service air cleaner as frequently as necessary.
3. Change crankcase oil every 100 operating hours.
4. Keep oil and gasoline in dust-tight containers.
5. Keep governor linkage clean.
6. Clean generator brushes, slip rings, and commutator.

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.

GAS-GASOLINE OPERATION

Engines having a combination gas-gasoline carburetor can be switched to gasoline operation by the following procedure:

1. Close the manual fuel shutoff valve in supply line (the main fuel adjustment valve is not designed to use as a shutoff valve) for gaseous fuel. Set will not operate smoothly with both fuel supply lines turned on at the same time.
2. Open the gasoline fuel shutoff valve.
3. Set the spark plug gap as given in the Table of Clearances.
4. See that the choke is free and works easily (be sure to release choke lock on sets with electric choke).
5. Start the engine in the manner described. If the engine runs unevenly under half or full load, due to faulty carburetor adjustment, the main jet needs adjusting.

To change back to gaseous fuel, reverse the above procedure and reset the spark plug gap as given in the Table of Clearances. Use all gasoline from the carburetor to avoid stale fuel. If engine is run with one of the fuel supply lines disconnected, plug other outlet to prevent drawing air and dirt.

ADJUSTMENTS

CHECK BREAKER POINTS

Refer to Maintenance Schedule 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. 19 is wide open when engine is stopped. Loosen and move stationary contact to correct gap.
- (2) Ignition breaker points. Fig. 19 must be correctly gapped. Crank engine to fully open breaker points (1/4 turn after top center). 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 Maintenance Schedule. Final timing is corrected by properly rotating the breaker mechanism (plate, distributor, or magneto) at its mounting and using a timing light. If specified timing cannot be obtained by rotation of the breaker plate check to be sure timing marks on gears are aligned. Timing procedures appear in separate Service Manual.

CARBURETOR (Gasoline)

The carburetor (Fig. 20) has a fuel main (high speed) adjustment (needle A) and a fuel idle adjustment (needle B). A nylon rod extends down through the lower shroud span allowing easy access to the main adjustment needle. Early models have the main adjustment needle on the top of carburetor. The main adjustment (needle A) affects operation under heavy load conditions. Idle adjustment affects operation at light or no load. Under normal circumstances, factory carburetor adjustments should not be disturbed. If the

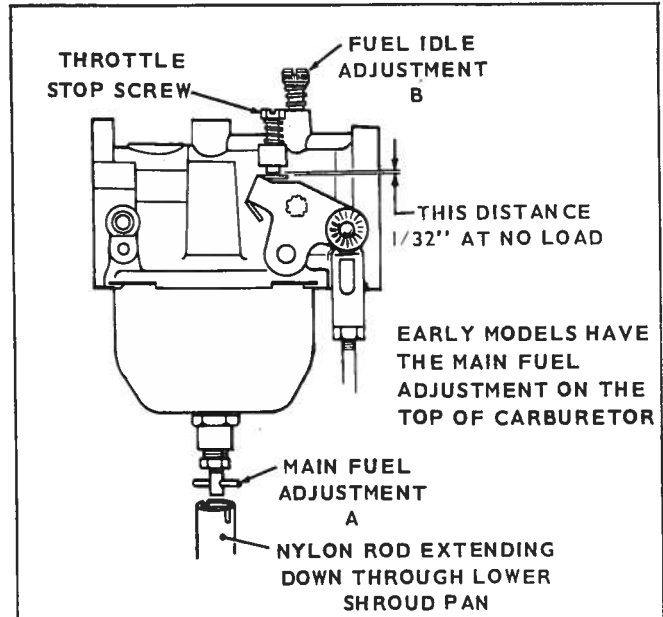


FIG. 20

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.

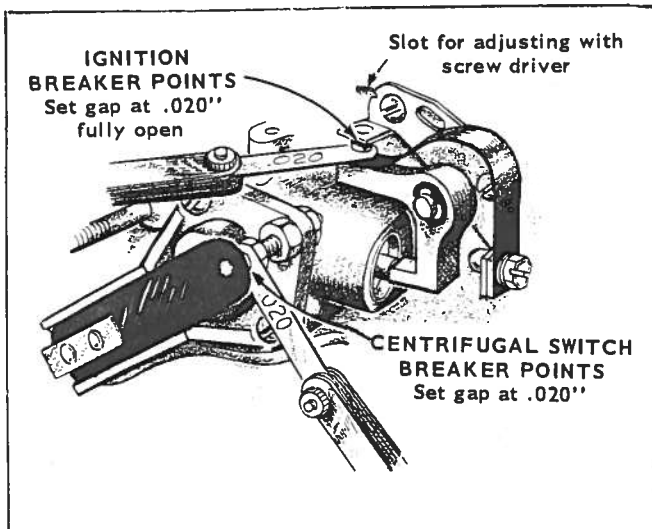


FIG. 19

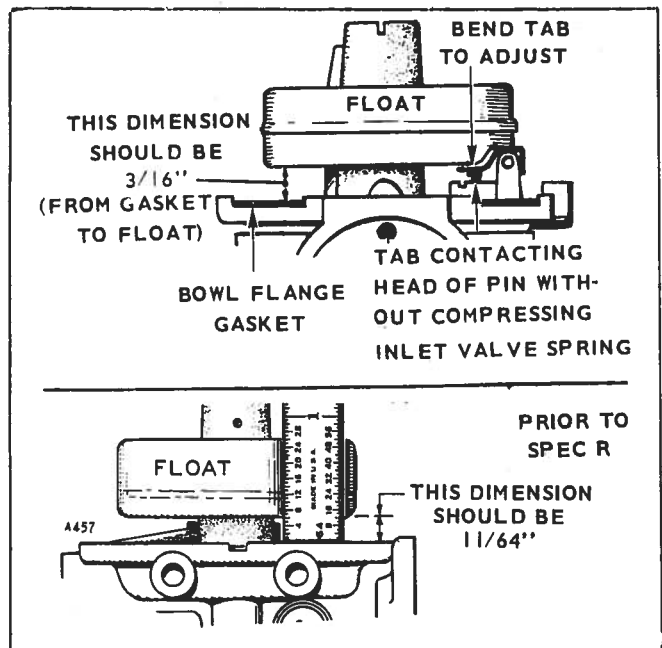


FIG. 21

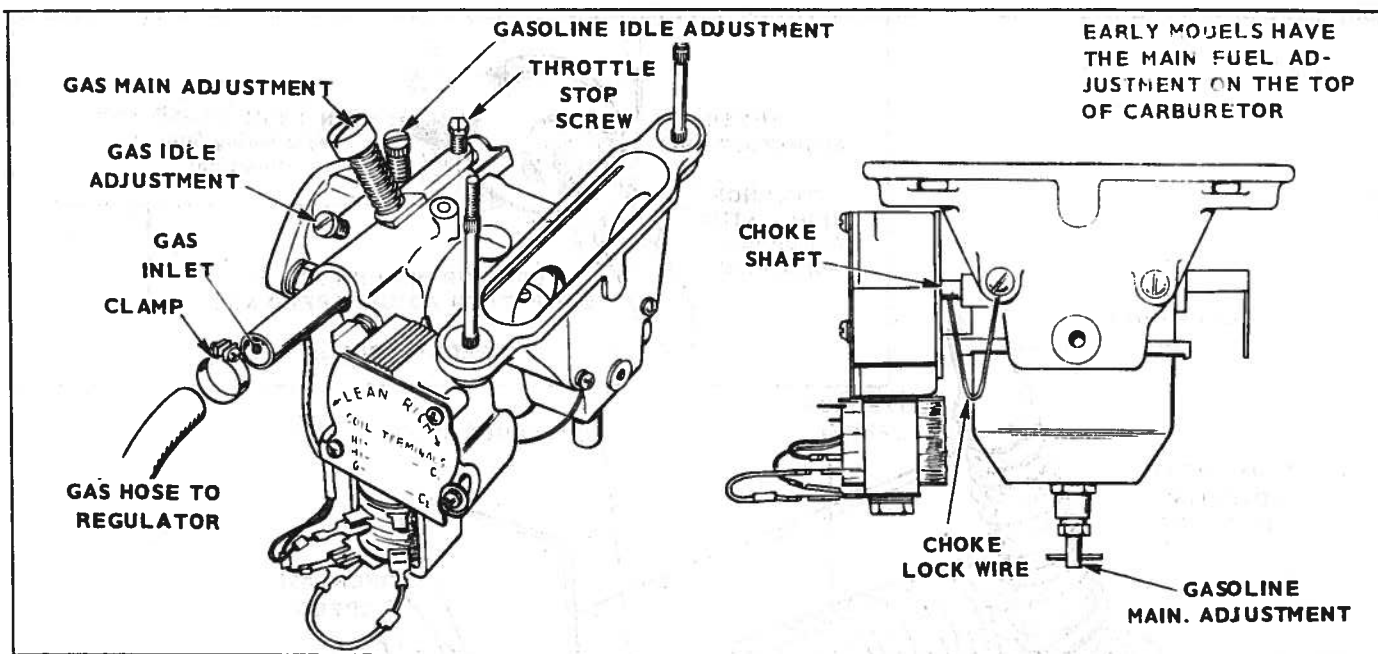


FIG. 22

Before final adjustment, allow engine to warm up. 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.

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

To check float level, remove the entire main fuel adjustment assembly from the float bowl (unscrew large nut from float bowl - Fig. 20). The correct carburetor float is 3/16" (11/64" prior to Spec R) between the free end of the float and the carburetor body (See Fig. 21). Adjustment is made by bending the tab on the float. The float tab should just touch fuel inlet valve and not compress the inlet valve spring. NOTE: Do not apply excessive pressure to float valve.

CARBURETOR (Gas-Gasoline)

Gas carburetor adjustment procedure is the same as for gasoline. See Fig. 22 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. 22).

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. 23 for correct choke setting according to ambient temperature.

CHOKE OPENING FOR PLANTS PRIOR TO SPEC S									
AMBIENT TEMP. (°F)	60	65	70	75	80	85	90	95	100
CHOKE OPENING (Inches)	1/8	9/64	5/32	11/64	3/16	13/64	7/32	15/64	1/4

CHOKE OPENING FOR PLANTS BEGINNING SPEC S									
AMBIENT TEMP. (°F)	10	20	30	40	50	60	70	75	
CHOKE OPENING (Inches)	1/4	5/16	11/32	3/8	7/16	15/32	1/2	9/16	

FIG. 23
19

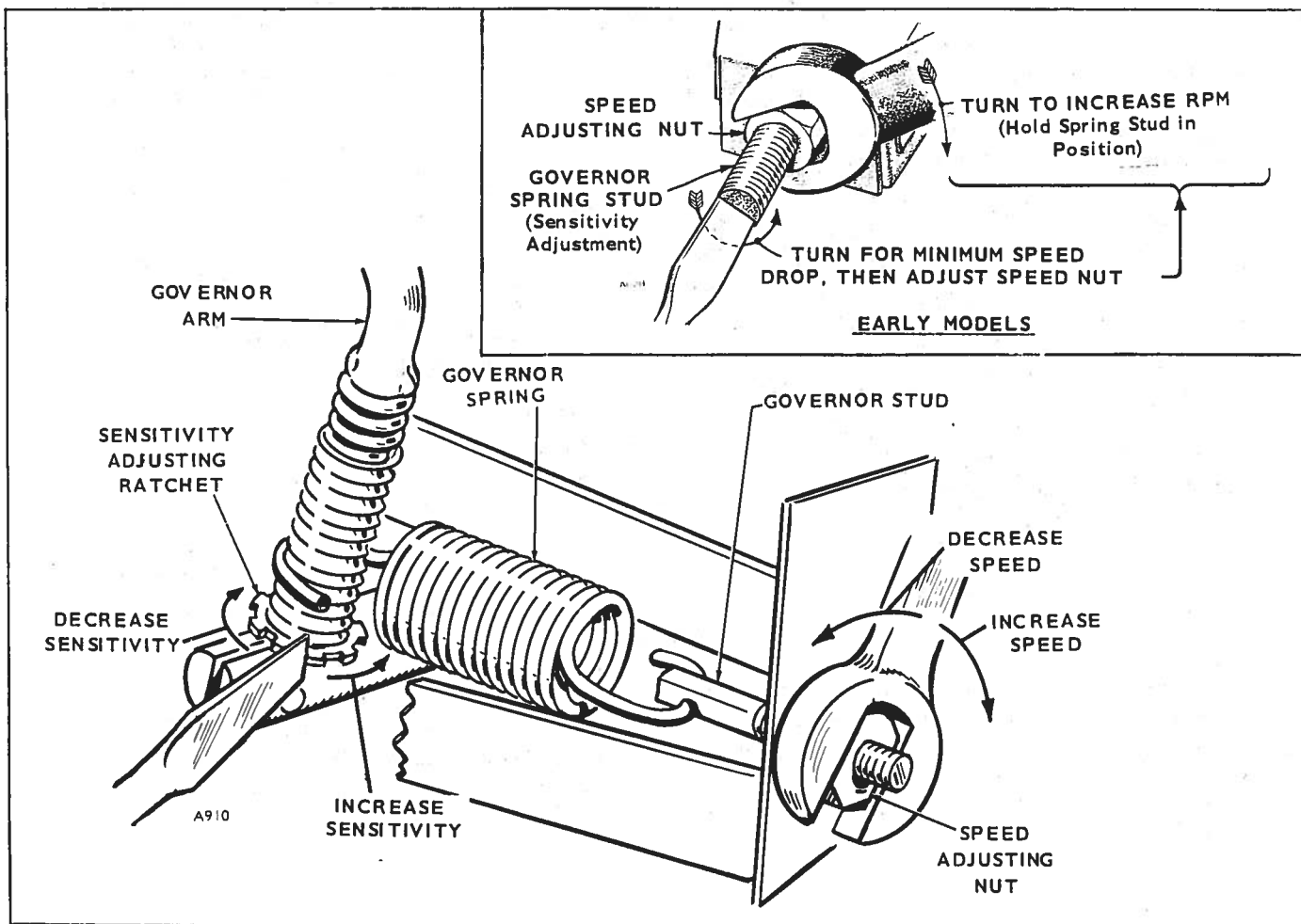


FIG. 24

Use drill rod or shank of drill bit to measure choke opening.

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 1800 rpm give 60 hertz frequency. Preferred speed does 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. 24). 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 accessible through a covered access hole on the side of the blower housing (Fig. 24). 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, replace the dot button in the blower housing and secure speed stud lock nut.

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

CHARGE RATE

See *Starting* in Operation Section.

VALVE CLEARANCE

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

1. Turn the flywheel until the cylinder which is to have its valve 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

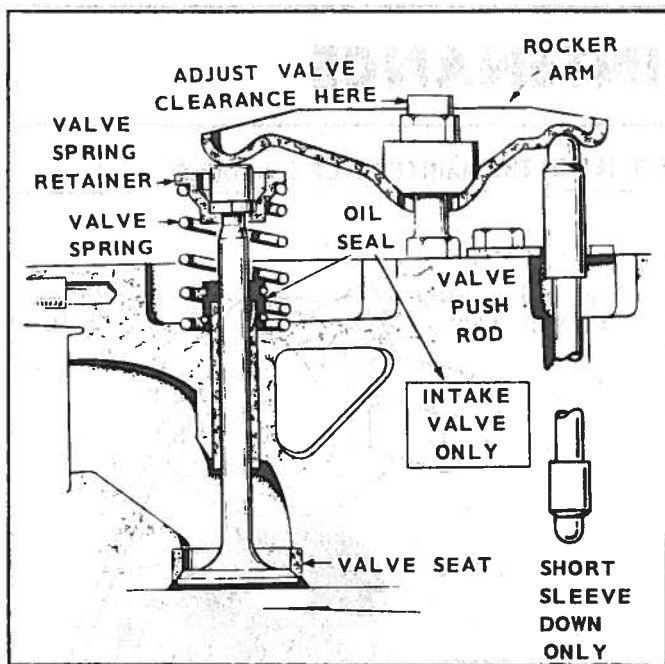


FIG. 25

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 stationary.

2. 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. Check cylinder head-bolt torque prior to valve clearance adjustment. Valve clearance is adjusted with the locknut which secures rocker arm to cylinder head (see Fig. 25). Loosen the locknut to increase clearance and tighten to reduce clearance.

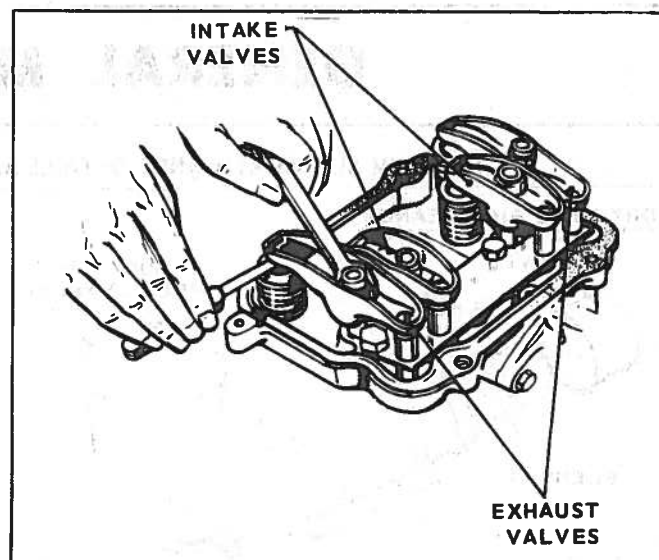


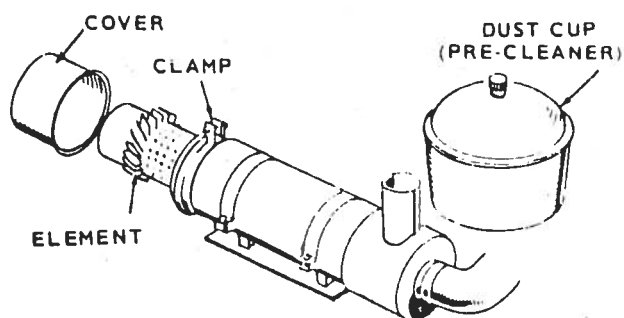
FIG. 26

4. Using a feeler gauge, check the clearance between the rocker arm and the valve (see Fig. 26). Increase or decrease the clearance until the proper gap is established. Valve clearances are given in the Maintenance Section.
5. Always adjust the valve clearances in the firing order (1-2) sequence. After positioning #1 cylinder, adjust the valve clearance according to steps 3 and 4. Refer to Maintenance Section for correct valve clearance.
6. To adjust the valve clearance of #2 cylinder, turn the flywheel in a clockwise direction 360 degrees 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 engines do not have a BC mark on the flywheel.**
7. After positioning #2 cylinder, adjust the valve clearance according to steps 3 and 4.

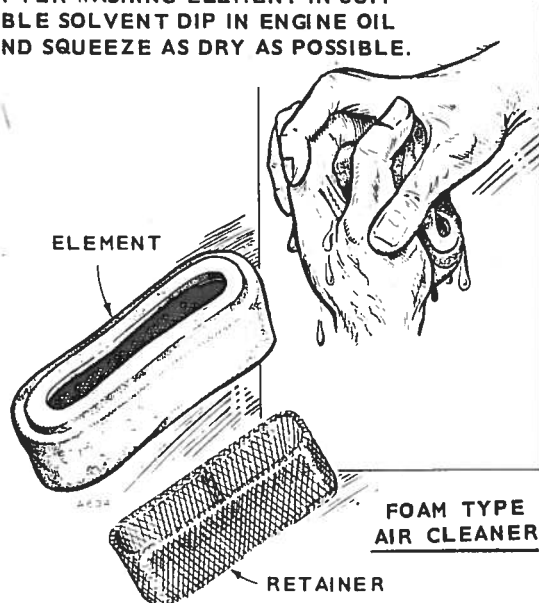
GENERAL MAINTENANCE

PERFORM ALL MAINTENANCE DETAILS AS SPECIFIED IN THE MAINTENANCE SCHEDULE

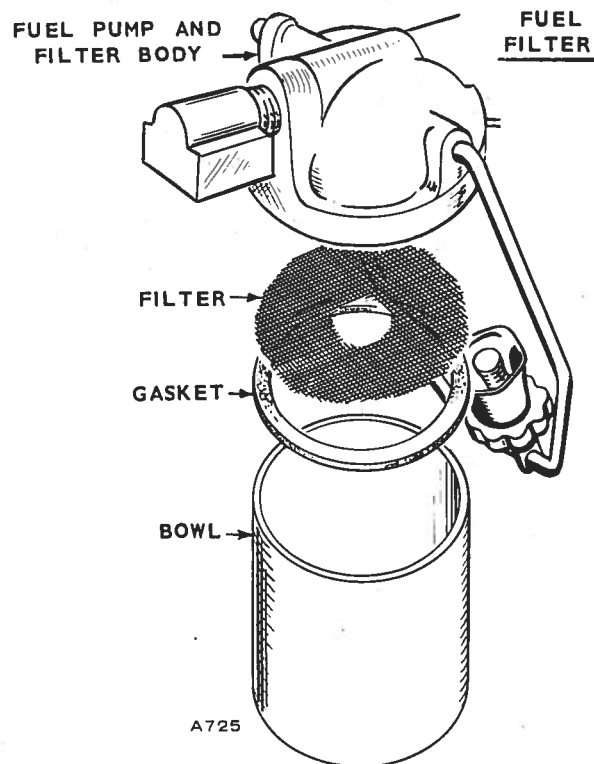
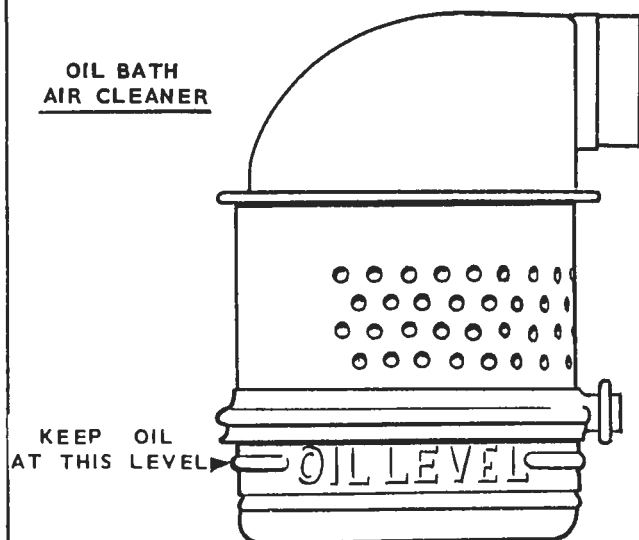
DRY TYPE AIR CLEANER



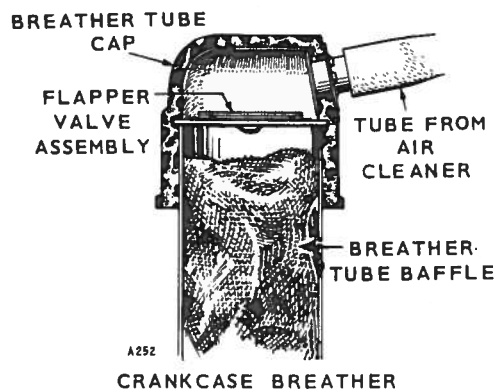
AFTER WASHING ELEMENT IN SUITABLE SOLVENT DIP IN ENGINE OIL AND SQUEEZE AS DRY AS POSSIBLE.



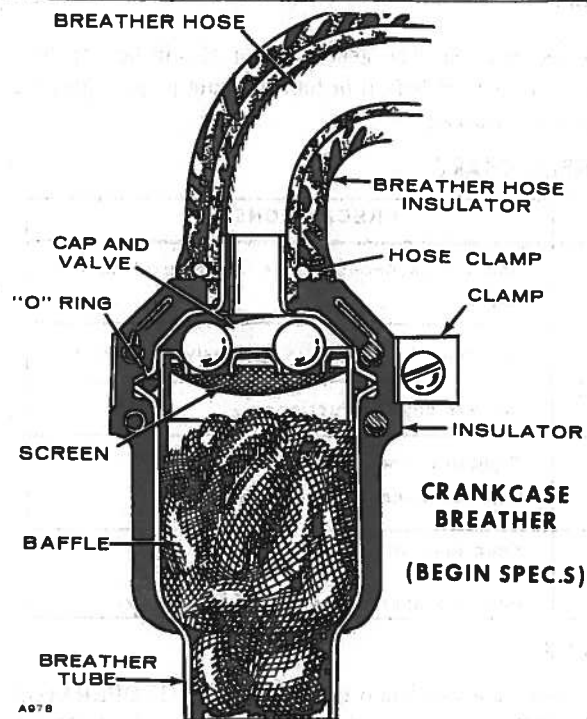
OIL BATH AIR CLEANER



PRIOR TO SPEC S

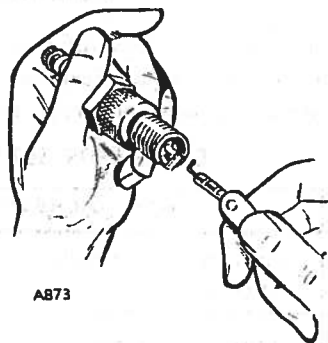


Remove breather cap. Remove valve from cap. Wash valve in suitable solvent. Dry and install with perforated disc. toward engine. If faulty, install new valve.



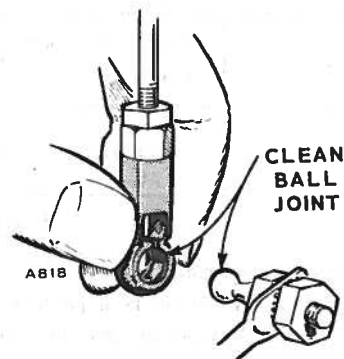
A07B

Remove hose clamp, breather hose, breather cap clamp and insulator halves to release breather cap and valve assembly. Wash cap and valve assembly and the baffle in suitable solvent and reinstall.



A873

SPARK PLUG GAP
0.035" GASOLINE
(BATTERY IGNITION)
0.025" GASOLINE
(MAGNETO IGNITION)
0.018" GAS FUEL



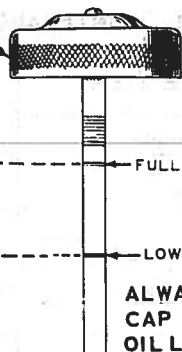
A81B

CLEAN BALL JOINT

CAP AND OIL LEVEL INDICATOR

KEEP OIL AT THIS LEVEL

NEVER OPERATE ENGINE WITH OIL BELOW THIS LEVEL



ALWAYS REPLACE CAP TIGHTLY, OR OIL LEAKAGE MAY OCCUR.

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.

ROUTINE CHECK CHART

Before generator set is put in operation, check all components for mechanical security. If any abnormal condition, defective part, or operating difficulty is detected, repair or

service as required. The generator set should be kept free of dust, dirt, and spilled oil or fuel. Be sure proper operating procedure is followed.

GENERATOR SET ROUTINE CHECK CHART

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
Engine oil	Check level (should be at full mark on oil indicator)	Add oil as necessary to bring level to full mark.
Engine Fuel	Check level in tank.	See that fuel line is properly connected.
Engine ventilation	Check ventilating openings.	Remove any obstructions.
Connecting cables	Check for proper connections. Check for physical damage.	Tighten connections. Replace damaged connectors.
Battery	Check electrolyte level.	Keep level above plates. Add only approved water as necessary.

MAINTENANCE SCHEDULE

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

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	x			
Check Fuel	x			
Check Oil Level	x			
Check Air Cleaner		x1		
Clean Governor Linkage			x1	
Check Spark Plug			x	
Change Crankcase Oil			x1	
Clean Crankcase Breather				x
Clean Fuel System				x
Check Battery				x
Replace Oil Filter				x1

x1 - Perform more often in extremely dusty conditions.

CRITICAL MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	OPERATIONAL HOURS			
	200	500	1000	5000
Check Breaker Points	x			
Clean Commutator and 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 (If required)			x	
Clean Rocker Box Oil Line Holes			x	
General Overhaul (If required)				x

x1 - Perform more often in extremely dusty conditions.

x2 - Replace revolving field collector ring brushes when worn to 5/16" or less – Replace all other brushes when worn to 5/8" or less

* - Tighten head bolts and adjust valve clearance after first 50 hours on a new or overhauled engine.

For any abnormalities in operation, unusual noises from engine or generator, loss of power, overheating, etc., contact your ONAN dealer.

BOLT TORQUES

Spark Plugs	25-30
Cylinder Head	28-30
Oil Base Mounting	45-50

CLEARANCES

Spark Plug Gap	0.025"
Tappets (Intake & Exhaust)	
Gasoline	0.012"
Gas & Gas Gasoline	0.013"
Magneto Pole Shoe Air Gap	0.020"
Ignition Breaker Points Gap	0.020"
Centrifugal Switch Point Gap	0.020"

Ignition Timing

Gaseous Fuel Battery Ignition (Running)	35° BTC
Gasoline Fuel, Battery Ignition (Running)	25° BTC
Flywheel Magneto Ignition (Running)	25° BTC
All (Stopped)	5° BTC

OPERATOR'S TROUBLE-SHOOTING GUIDE for **ONAN GASOLINE ENGINES** (Air Cooled)

		TROUBLE											
		CAUSE											
COOLING SYSTEM	Blown Head Gasket	•											
	Overheating								•	•			
	Dirt on Cooling Fins												
	Inadequate Air Circulation (Ventilation)								•				
FUEL SYSTEM	Out of Fuel, or Shut-off Valve Closed	•											
	Poor Quality Fuel	•	•						•			•	
	Dirty Fuel Filter	•	•										
	Fuel Line Leaks	•	•			•			•				
	Mixture Too Rich	•	•						•		•		
	Mixture Too Lean	•	•								•		
	Engine Flooded	•									•		
	Run for Long Periods of Time at No Load	•	•										
GOVERNOR SYSTEM	Restricted Air Intake, Dirty Air Filter	•	•						•			•	
	Linkage Loose or Disconnected						•						
	Linkage Binding				•	•	•						
	Excessive Wear in Linkage				•	•	•	•					
	Incorrect Governor Adjustment			•	•	•		•					
LUBRICATION SYSTEM	Spring Sensitivity Too Great			•	•								
	Low Oil Supply									•		•	•
	Defective Gauge									•	•		
	Excess Oil in Crankcase								•	•			•
	Oil Leaks From Engine Base or Connections								•				
	Crankcase Oil Too Light or Diluted								•			•	•
STARTING SYSTEM AND IGNITION SYSTEM	Crankcase Oil Too Heavy	•								•			
	Battery Discharged or Defective	•	•										
	Loose Battery Connections	•	•										
	Load Connected When Starting	•											
	Open Solenoid	•	•										
	Defective Starter	•	•										
	Wrong Plug or Point Setting	•		•									
	Incorrect Timing	•	•						•		•	•	•
TROUBLE	Spark Too Far Advanced										•	•	
	Hard Starting or Failure to Start												
	Starter Motor Doesn't Turn												
	Engine Misfires												
	Speed Too High												
	Speed Too Low												
	Hunting Condition												
	No Governor Control												
	Poor Sensitivity												
	Excessive Oil Consumption												
	Excessive Fuel Consumption												
	Low Oil Pressure												
	High Oil Pressure												
	Engine Backfires at Carburetor												
	Engine Overheats												
	Mechanical Knocks												
	Black Smoky Exhaust												
	Blue Smoky Exhaust												

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.

Onan [®]	
ELECTRIC PLANT	
MODEL AND SPEC. NO. _____	
SERIAL NO. _____	
IMPORTANT ALWAYS GIVE ABOVE NOS. WHEN ORDERING PARTS	
STD BY KW _____	KVA _____
CONT. KW _____	KVA _____
A.C. VOLTS _____	PH. _____
A.C. AMPS _____	P.F. _____
CY. _____	RPM _____
D.C. VOLTS _____	AMPS _____
WATTS _____	BAT. _____
MANUFACTURED BY ONAN DIV. OF STUDEBAKER CORPORATION MINNEAPOLIS, MINNESOTA, U.S.A. FOR ELECT. EQUIPMENT ONLY 99A941	

For handy reference, insert YOUR engine 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 JB 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 sides are determined by FACING the engine end (front) of the set.

PLANT DATA TABLE

MODEL & SPEC NO. * ⚡	ELECTRICAL DATA					PARTS KEY NO.
	WATTS	VOLTS	HERTZ	WIRE	PHASE	
REVOLVING ARMATURE						
5.0JB-1M/	5000	120	60	2	1	1
5.0JB-3M/	5000	120/240	60	3	1	1
6.0JB-1M/	6000£	120	60	2	1	1
6.0JB-3M/	6000£	120/240	60	3	1	1
4.0JB-52R/	4000	240	50	2	1	2
4.0JB-57R/	4000	220/380	50	4	3	2
5.0JB-52R/	5000£	240	50	2	1	2
5.0JB-57R/	5000£	220/380	50	4	3	2
5.0JB-1R/	5000	120	60	2	1	2
5.0JB-3R/	5000	120/240	60	3	1	2
5.0JB-3CR/	5000	120/240	60	**	1	2
6.0JB-1R/	6000£	120	60	2	1	2
6.0JB-2R/	6000£	240	60	2	1	2
6.0JB-3R/	6000£	120/240	60	3	1	2
6.0JB-3CR/	6000£	120/240	60	**	1	2
6.0JB-4R/	6000£	120/208	60	4	3	2
6.0JB-5R/	6000£	240	60	3	3	2
6.1JB-51R/	6100	120	50	2	1	3
6.1JB-52R/	6100	240	50	2	1	3
6.1JB-53R/	6100	120/240	50	3	1	3
6.1JB-55R/	6100	240	50	3	3	3
6.1JB-57R/	6100	220/380	50	4	3	3
7.6JB-1R/	7600	120	60	2	1	3
7.6JB-2R/	7600	240	60	2	1	3
7.6JB-3R/	7600	120/240	60	3	1	3
7.6JB-4R/	7600	120/208	60	2	3	3
7.6JB-5R/	7600	240	60	3	3	3
REVOLVING FIELD						
6.0JB-53CR/	6000	120/240	50	**	1	4
6.0JB-54R/	6000	120/208	50	4	3	4
6.0JB-55DR/	6000	120/240	50	4	3	4
6.0JB-57R/	6000	220/380	50	4	3	4
7.5JB-1R/	7500	120	60	2	1	4
7.5JB-3CR/	7500	120/240	60	**	1	4
7.5JB-4R/	7500	120/208	60	4	3	4
7.5JB-4XR/	7500	277/480	60	4	3	4
7.5JB-5DR/	7500	120/240	60	4	3	4
7.5JB-9XR/	7500	347/600	60	3	3	4

‡ New model designations shown, begin during 1969. Previous designations used a zero in place of the decimal in the KW rating. EXAMPLE: 5.0JB was formerly 5JB and 7.6JB was formerly 706JB. Also previously a V was used in the model to designate vacu-flo cooling.

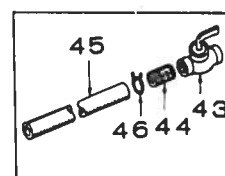
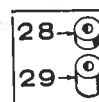
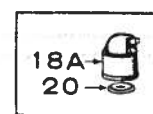
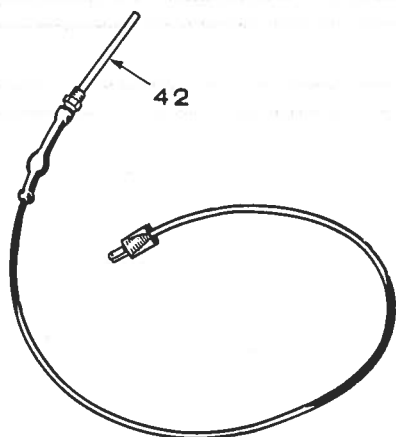
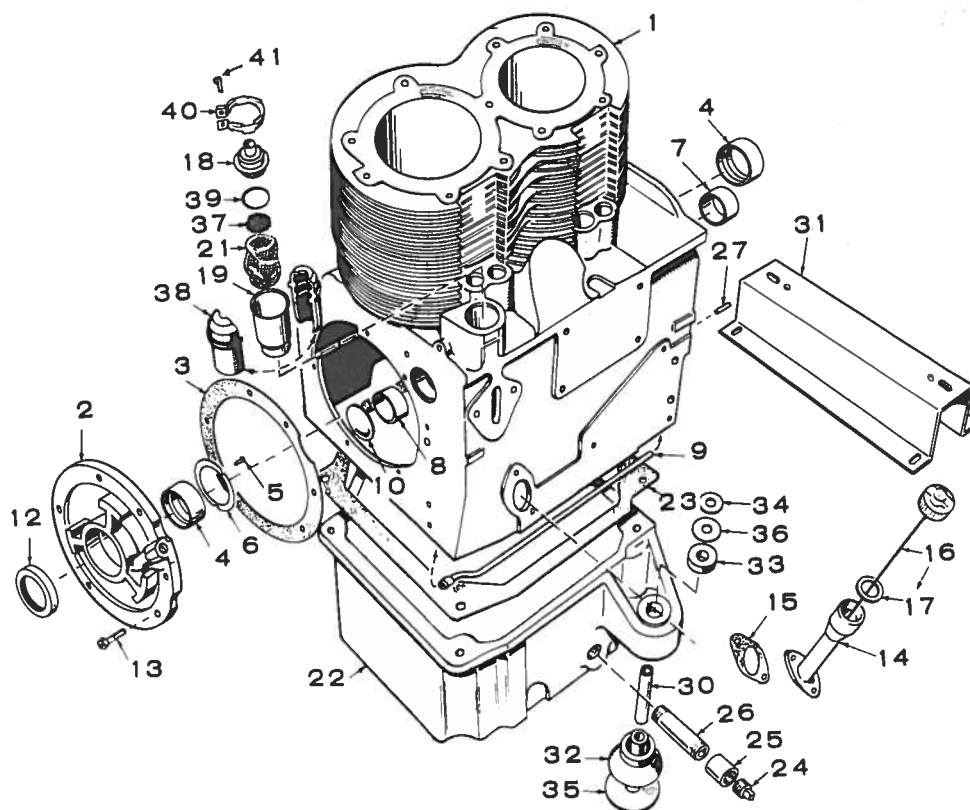
£ Maximum standby rating, continuous rating is also shown on nameplate.

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

** Plant 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.

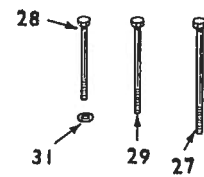
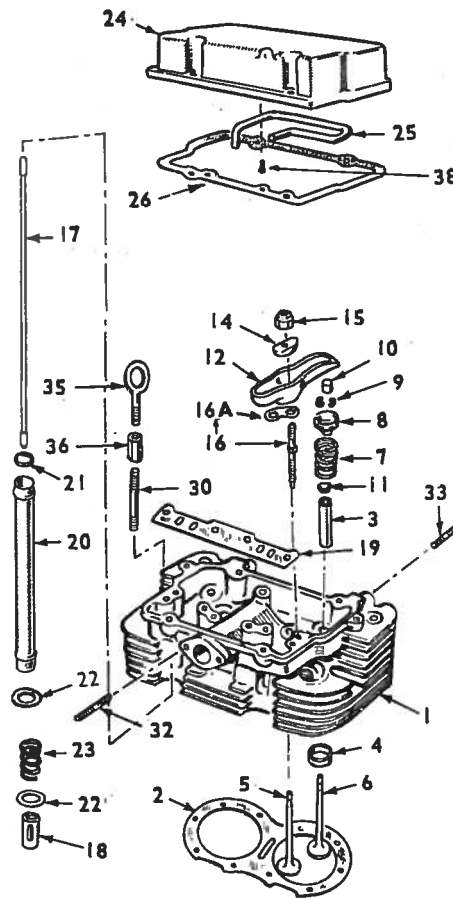
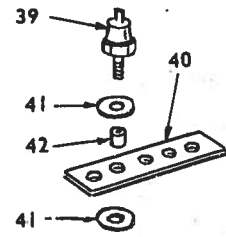
CRANKCASE AND OIL BASE GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110A1324	1	Block Assy., Cylinder (Includes Parts Marked *)
2	101D337	1	*Plate, Bearing (Less Brg. & Pins)
3	101K386	1	*Gasket Kit, Bearing Plate (Includes Steel Shims)
4	*BEARING, CRANKSHAFT - PRECISION		
	101B359	2	Standard
	101B359-02	2	.002" Undersize
	101B359-10	2	.010" Undersize
	101B358-20	2	.020" Undersize
	101B359-30	2	.030" Undersize
5	516A72	4	*Pin, Thrust Washer
6	104B420	2	*Washer, Crankshaft Thrust
7	101B363	1	*Bearing, Precision Cam Front, Std. Only
8	101B365	1	*Bearing, Precision Cam Rear, Std. Only
9	120A553	1	*Tube, Crankcase Oil
10	517-53	1	*Plug, Camshaft Opening
12	509-86	1	Seal, Oil Bearing Plate
13	805-19	6	*Bolt, Place, Plants 3/8-16 x 1-1/4"
14	123A649	1	Tube, Oil Fill
15	123A667	1	Gasket
16	123A651	1	Cap and Indicator
17	123A191	1	Gasket, Cap
18	123A954	1	Cap & Valve, Breather - Begin Spec S
18A	CAP, BREATHER		
	123A458	1	Prior to Spec G
	123A787	1	Spec G through R
19	TUBE, BREATHER		
	123A645	1	Prior to Spec S
	123A952	1	Begin Spec S
20	123A315	1	Valve, Breather - Prior to Spec S
21	123A865	1	Baffle, Breather
22	BASE, OIL		
	102D450	1	Prior to Spec H
	102D540	1	Begin Spec H
23	102B451	1	Gasket, Base
24	505-56	1	Plug, (1/2")
25	505-14	1	Coupling, (1/2")
26	505-2	1	Nipple, (1/2" x 3")
27	516A141	2	*Pin, Dowel, Gear Cover Locating
28	402A36	4	Mount, Vibration, Cylindrical Shaped, Upper - Prior to Spec H

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
29	402A276	4	Mount, Vibration, Cylindrical Shaped, Lower - Prior to Spec H
30	BUSHING, SPACER - VIBRATION MOUNT		
	402A46	4	Prior to Spec H
	402A290	4	Begin Spec H
31	SUPPORT, VACU-FLO COOLED PLANTS		
	403B648	2	Prior to Spec H
	403B710	2	Begin Spec H
32	CUSHION, VIBRATION, CONE SHAPED, BEGIN SPEC H		
	402B284	2	Engine End
	402B285	2	Gen. End, Key 4, 5
	402B286	2	Gen. End, Key 1, 2, 3
33	402A282	4	Snubber, Snock Mounting - Begin Spec H
34	526-14	4	Washer, (29/64" I.D. x 1-1/2" O.D. x 1/8") Only with Cone Shaped Cushion
35	526A195	4	Washer, (29/64" I.D. x 3-1/4" O.D. x 1/8") Only with Cone Shaped Cushion
36	526A198	As Req.	Washer, (5/8" I.D. x 1-1/2" O.D. x 1/16") Only with Cone Shaped Cushion
37	123A958	1	Screen, Breather - Begin Spec S
38	123A998	2	Insulator (Half), Breather - Begin Spec S
39	509-117	1	Seal, "O" Ring - Breather - Begin Spec S
40	518P268	1	Clamp, Breather Insulator - Begin Spec S
41	809-35	1	Screw, Breather Clamp - Begin Spec S
42	102B558	1	Heater, Oil Base (Optional)
43	504-11	1	Valve, Oil Drain (Optional Housed and Skid Mtd. Sets)
44	505-100	1	Nipple, Oil Drain (Optional Housed and Skid Mtd. Sets)
45	503-316	1	Hose, Oil Drain (Optional Housed and Skid Mtd. Sets)
46	503-197	1	Clamp, Oil Drain Hose (Opt. Housed and Skid Mtd. Sets)

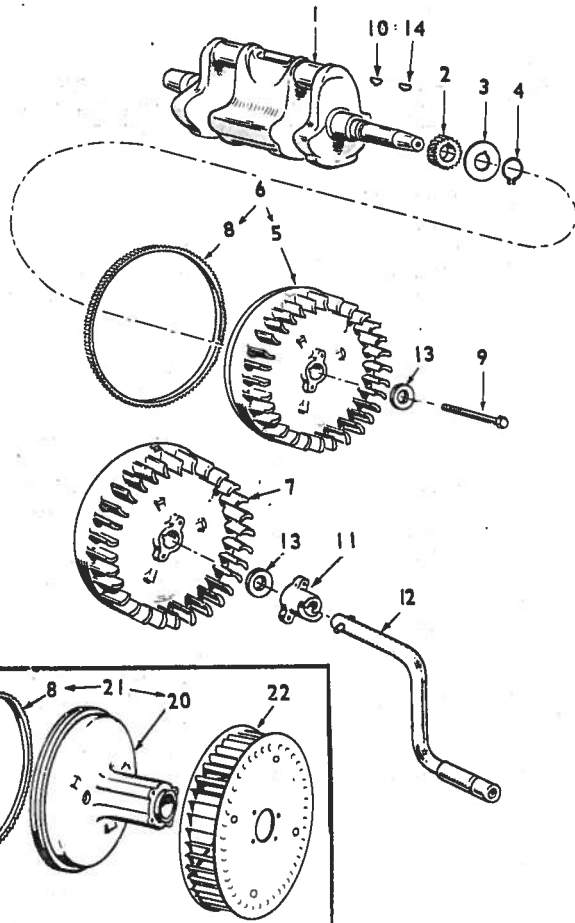
CYLINDER HEAD, VALVE AND ROCKER GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	HEAD, CYLINDER		
	110A1439	1	Gasoline Sets
	110B1440	1	Gas & Gasoline Sets
2	110B1223	1	Gasket, Head
3	GUIDE, VALVE		
	110A1501	4	Intake & Exhaust, Gasoline Sets
	110A1501-01	4	Standard .001" Oversize
	110A1501	2	Intake, Gas & Gas-Gasoline Sets
	110A1501-01	2	Standard .001" Oversize
	110A1392	2	Exhaust, Gas & Gas-Gasoline Sets
	110A1392-01	2	Standard .001" Oversize
4	INSERT, VALVE SEAT		
	110A1214	2	Intake, Gasoline Sets
	110A1214-02	2	Standard
	110A1214-05	2	.002" Oversize
	110A1214-10	2	.005" Oversize
	110A1214-25	2	.010" Oversize .025" Oversize
	110A1287	2	Intake, Stellite - Gas & Gas-Gasoline Sets
	110A1287-02	2	Standard
	110A1287-05	2	.002" Oversize
	110A1287-10	2	.005" Oversize
	110A1287-25	2	.010" Oversize .025" Oversize
	110A1215	2	Exhaust
	110A1215-02	2	Standard
	110A1215-05	2	.002" Oversize
	110A1215-10	2	.005" Oversize
	110A1215-25	2	.010" Oversize .025" Oversize
5	VALVE, INTAKE		
	110B1218	2	Gasoline Sets
	110B1286	2	Gas & Gas-Gasoline Sets
6	110B1219	2	Valve, Exhaust, Stellite
7	110A1221	4	Spring, Valve
8	110B1220	4	Retainer, Valve Spring
9	110A858	8	Lock, Valve Spring Retainer
10	110A859	4	Cap, Valve Stem
11	509A90	2	Seal, Oil - Intake Valve, Includes Retainer Rings

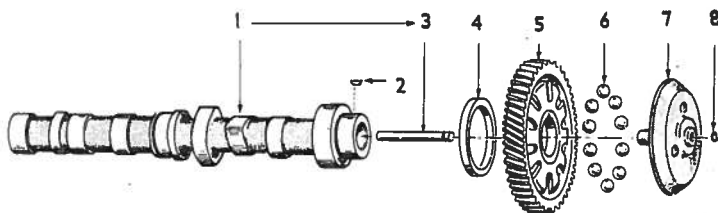
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
12	ARM ROCKER		
	115B128	2	Exhaust
	115B129	2	Intake
14	115B127	4	Ball, Rocker Arm
15	115B150	4	Locknut, Rocker Arm
16	115A189	4	Stud, Rocker Arm (2 Studs & Lock)
16A	115A184	2	Lock, Stud
17	115A145	4	Rod, Valve Push (Aluminum)
18	TAPPET, VALVE		
	115A132	4	Prior to Spec P
	115A185	4	Begin Spec P
19	115B142	1	Guide, Push Rod
20	115A137	4	Shield, Push Rod
21	509-84	8	Seal, Push Rod Shield
22	115A155	8	Washer, Spring Retaining
23	115A146	4	Spring, Shield Retainer
24	COVER, ROCKER		
	115D197	1	Gasoline Sets (Less Oil Line)
	115C173	1	Gas & Gas-Gasoline Sets (With Oil Line)
25	120B628	1	Line, Oil, Rocker Cover, Gasoline Sets Only
26	115B130	1	Gasket, Rocker Cover
27	110A1225	5	Screw, (3/8-16 x 4-3/4") Cylinder Head
28	110A815	4	Screw, (3/8-16 x 2") Cyl. Hd.
29	110A1282	2	Screw, (3/8-16 x 4") Cyl. Hd.
30	520A626	1	Stud, Cyl. Hd. (Only with Eyebolt & Extension Nut)
31	526-174	7	Washer, Cylinder Head
32	520A526	2	Stud, Carburetor
33	520A608	4	Stud, Exhaust Manifold
34		1	Bolt, Lifting (Order 403K707)
35A	403K707	1	Bracket, Lifting - Inc. Hdwe.
36	110A1304	1	Nut, Extension (Only on Models with Lifting Eye)
38	809-42	1	Screw, Oil Line, Rocker Cover
39	309P196	1	Switch, High Air Temperature (Optional)
40	309A195	1	Bracket, High Air Temperature Switch (Optional)
41	508A126	2	Washer, Insulator, Switch Mounting (Optional)
42	508A127	1	Insulator, Sleeving - Air Temp. Switch (Optional)

CRANKSHAFT AND FLYWHEEL GROUP

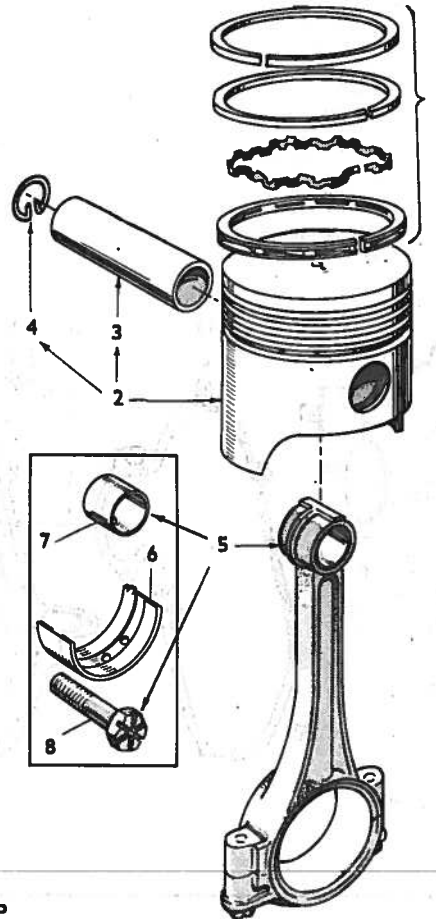


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104D439	1	Crankshaft
2	104B418	1	Gear
3	104A416	1	Washer, Retainer
4	518-188	1	Ring, Lock
5	104B473	1	Flywheel, Key 2, 3
6	104B472	1	Flywheel, Key 4 (Includes Ring Gear)
7	160D692	1	Flywheel, Magneto, Key 1
8	104B423	1	Gear, Ring, Key 4
9	SCREW, FLYWHEEL 800-500	1	Pressure Cooled Sets (7/16-14 x 5-1/2")
	800-82	1	Vacu-Flo Cooled Sets (7/16-14 x 3-3/4")
10	515-1	1	Key, Gear
11	104B429	1	Crankdog
12	192B350	1	Crank
13	526A185	1	Washer, Flywheel
14	KEY, FLYWHEEL TO CRANKSHAFT 515-2	1	Spec A Only
	515-153	1	Begin Spec B
	FLYWHEEL, VACU-FLO COOLED		
20	104B527	1	Key 2, 3
21	104B526	1	Key 4 (Incl. Ring Gear)
22	134C1150	1	Wheel, Blower, Vacu-Flo Cooled - Key 2, 3, 4

CAMSHAFT GROUP



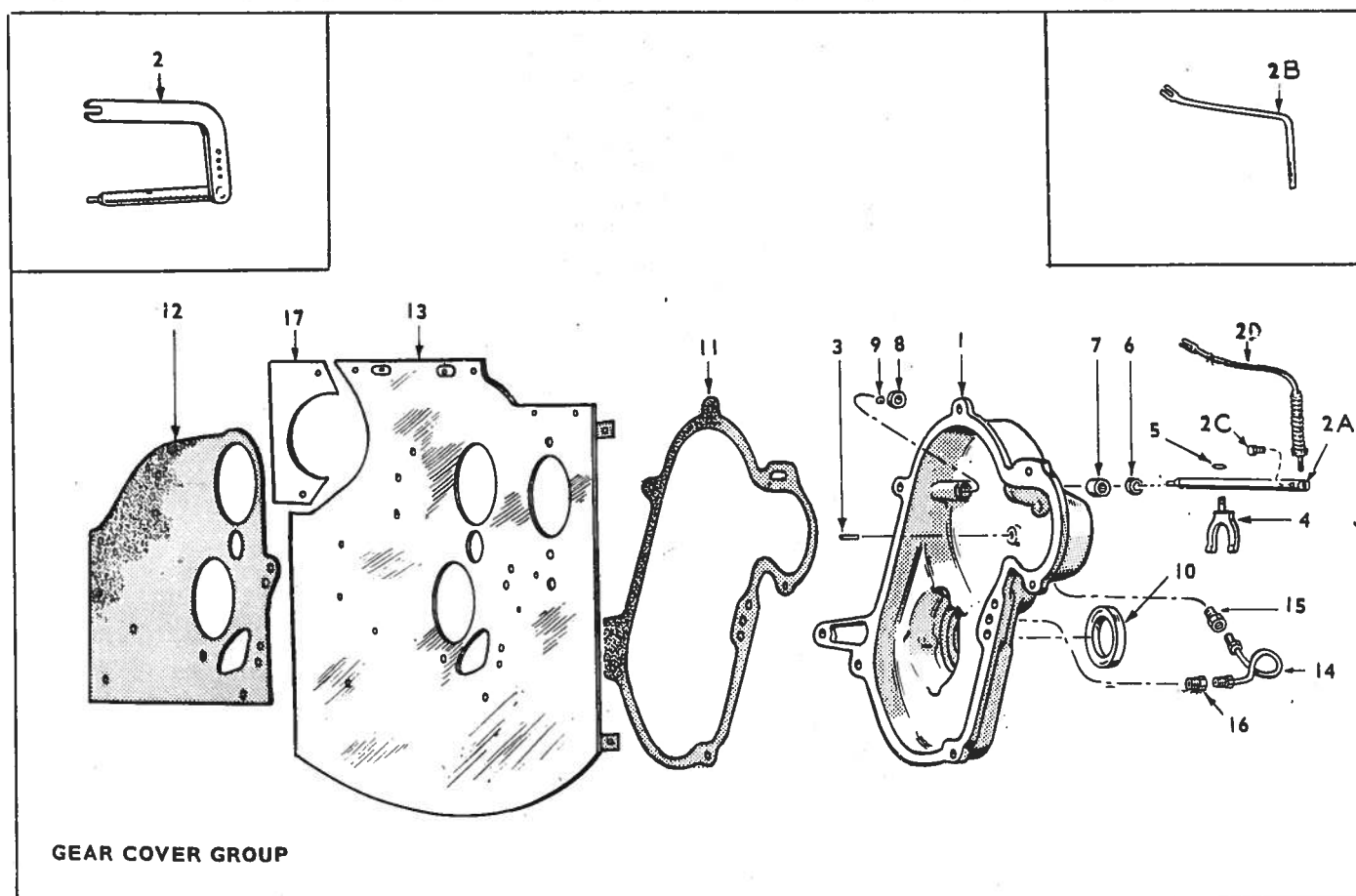
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CAMSHAFT - INCLUDES CENTER PIN		
	105A219	1	Prior to Spec P
	105A272	1	Begin Spec P
2	515-1	1	Key, Cam. Gear or Dist. Gear
3	150A75	1	Pin, Center
4	105A205	1	Washer, Thrust
5	105B218	1	Gear, Includes Flyball Spacer & Plate
6	510-46	10	Ball, Fly - Governor
7	150C775	1	Cup, Governor
8	150A78	1	Ring, Snap, Center Pin



PISTON AND CONNECTING ROD GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	RING SET, PISTON		
			All Prior to Spec S
	113-89	2	Standard
	113-89-10	2	.010" Oversize
	113-89-20	2	.020" Oversize
	113-89-30	2	.030" Oversize
			Gasoline and Gas-Gasoline - Begin Spec S
	113-89	2	Standard
	113-89-10	2	.010" Oversize
	113-89-20	2	.020" Oversize
	113-89-30	2	.030" Oversize
			Gas Only and LPG - Begin Spec S
	113-107	2	Standard
	113-107-10	2	.010" Oversize
	113-107-20	2	.020" Oversize
	113-107-30	2	.030" Oversize
2	PISTON & PIN - INCLUDES PIN RETAINING RINGS		
			All Prior to Spec S
	112-92	2	Standard
	112-92-10	2	.010" Oversize
	112-92-20	2	.020" Oversize
	112-92-30	2	.030" Oversize

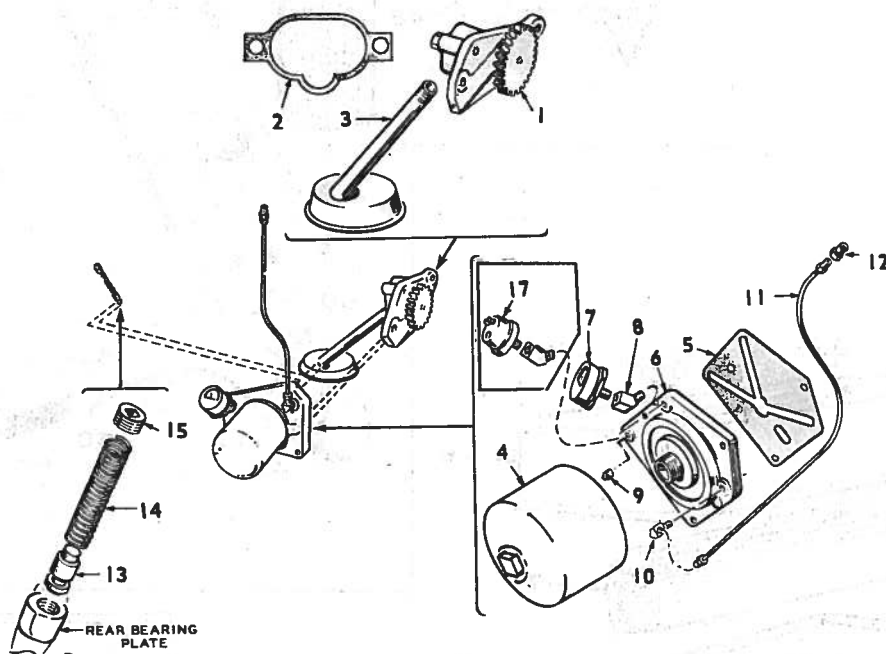
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
			Gasoline and Gas-Gasoline - Begin Spec S
	112-92	2	Standard
	112-92-10	2	.010" Oversize
	112-92-20	2	.020" Oversize
	112-92-30	2	.030" Oversize
			Gas Only and LPG - Begin Spec S
	112A106	2	Standard
	112A106-10	2	.010" Oversize
	112A106-20	2	.020" Oversize
	112A106-30	2	.030" Oversize
3	PIN, PISTON		
	112A86	2	Standard
	112A86-02	2	.002" Oversize
4	112A85	4	Ring, Retaining - Pin
5	114C163	2	Rod Assembly, Connecting (Forged)
6	BEARING HALF, CONNECTING ROD		
	114B164	4	Standard
	114B164-02	4	.002" Undersize
	114B164-10	4	.010" Undersize
	114B164-20	4	.020" Undersize
	114B164-30	4	.030" Undersize
7	114A166	2	Bushing, Piston Pin - Connecting Rod - Semi Finished
8	805A12	4	Bolt, Place (5/16-24 x 1-13/16")



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	COVER ASSEMBLY, GEAR -INCL. PARTS MARKED * 103C277	1	Prior to Serial 692236 (To Replace 103C235 Also Order 150B840 Arm & 103B251 Gasket)
	103C277	1	Begin Serial 692236 Through Spec D (To Replace 103C241, Also Order 103B251 Gasket)
	103C277	1	Begin Spec E
2	150B785	1	Arm & Shaft - Prior to Serial 692236, Order 150B838 Shaft, 150B840 Arm
2A	150B838	1	*Shaft, Governor, Begin Serial 692236
2B	150B840	1	Arm, Governor, Serial 692236 to Spec R
2C	815-176	1	*Screw, #8-32 x 1/2" Begin Serial 692236
2D	150B1093	1	Arm, Governor - Begin Spec R
3	516-111	1	*Pin, Roll - Governor Cup Stop
4	150A777	1	*Yoke, Governor
5	518-129	1	*Ring, Yoke
6	509-88	1	*Seal, Oil
7	510P48	1	*Bearing, 1/2", Governor Shaft

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	510P82	1	*Bearing, 1/4", Governor Shaft
9	*BALL BEARING - GOVERNOR SHAFT THRUST 510-14	1	Prior to Spec E (3/16")
	510-43	1	Begin Spec E (5/16")
10	509-87	1	*Seal, Oil
11	GASKET, GEAR COVER		
	103C219	1	Prior to Spec E (Iron Cover)
	103B251	1	Begin Spec E (Die Cast Cover)
12	103C218	1	Gasket, Backplate
13	BACKPLATE		
	103D226	1	Key 1, 2, 3
	103D271	1	Key 4 (To Replace 103D220 used on early models, also order 134B1532)
14	120A581	1	Line, Cover (Early Models Only)
15	502A235	1	Connector, Restricted, Oil Line (Early Models Only)
16	502-30	1	Connector, Inverted Male, Oil Line (Early Models Only)
17	134B1532	1	Baffle, Backplate

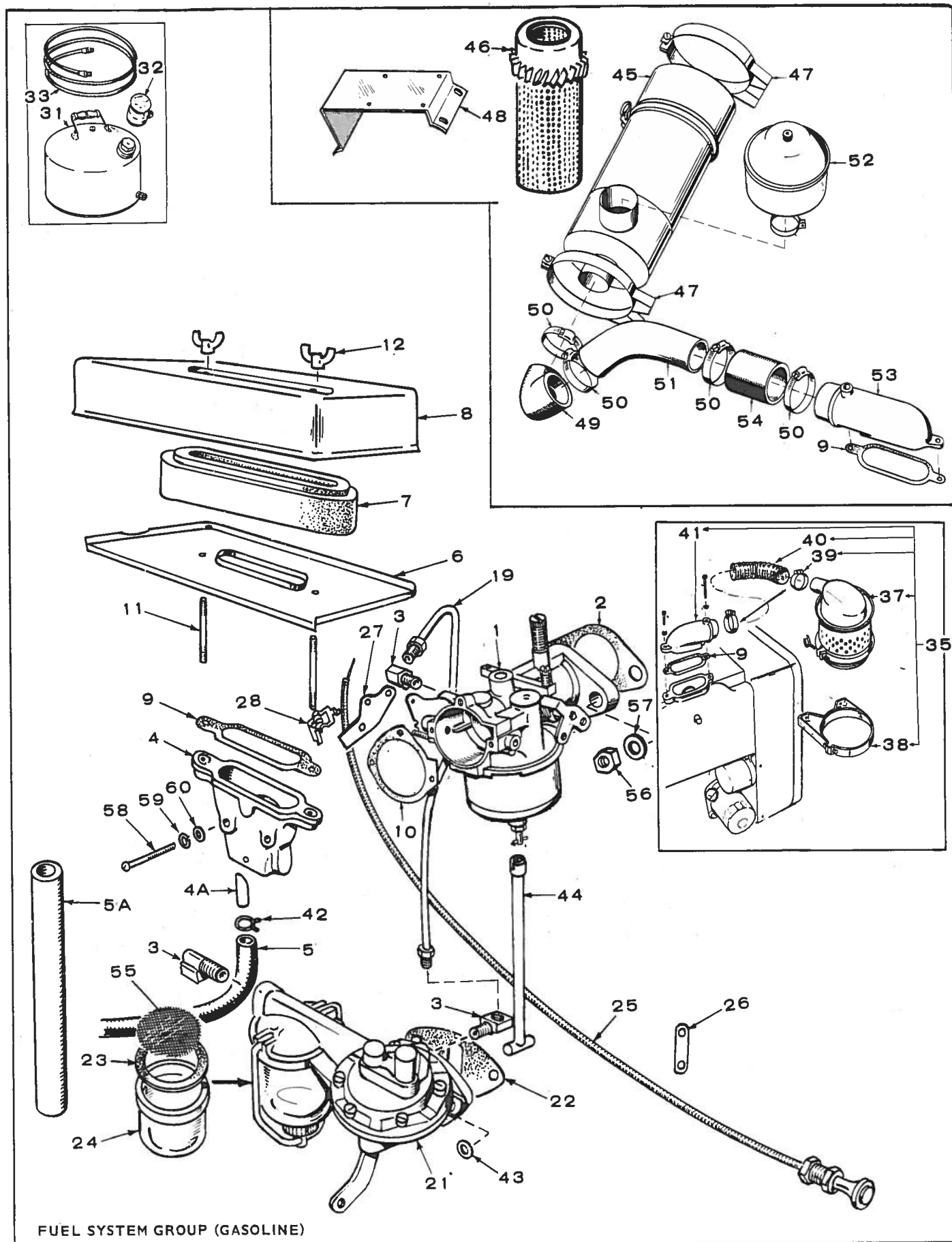
* - Included in Gear Cover Assembly.



OIL SYSTEM GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	120A547	1	Pump Assembly, Oil
2	120K580	1	Gasket Kit, Pump
3	120A551	1	Cup, Oil Intake
4	122A185	1	Filter
5	122A188	1	Gasket, Adapter
6	122A182	1	Adapter, Oil Filter
7	193P6	1	Gauge, Oil Pressure
8	502A53	1	Elbow, Street 45° Oil Gauge (Also (1) Optional Low Oil Pressure Switch)
9	505-57	1	Plug, 1/8", Adapter
10	502-19	1	ELBOW, INVERTED MALE, LINE TO ADAPTER
	502-37	1	Gasoline Sets - Prior to Spec P
	502-19	1	Gasoline Sets - Begin Spec P
	502-37	1	Gas & Gas-Gasoline Sets - Prior to Serial 698178
	502-37	1	Gas & Gas-Gasoline Sets, Begin Serial 698178

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
11	120A562	1	LINE, ADAPTER TO CYLINDER HEAD
	120A672	1	Gasoline Sets - Prior to Spec P
	120A562	1	Gasoline Sets - Begin Spec P
	120A623	1	Gas & Gas-Gasoline Sets, Prior to Serial 698178
	120A623	1	Gas & Gas-Gasoline Sets, Begin Serial 698178
12	502A235	1	CONNECTOR, RESTRICTED, LINE TO CYL. HEAD
	502A274	1	Gasoline Sets - Prior to Spec P
	502A235	1	Gasoline Sets - Begin Spec P
	502A235	1	Gas & Gas-Gasoline Sets - Prior to Serial 698178
	502A274	1	Gas & Gas-Gasoline Sets - Begin Serial 698178
13	120A539	1	Valve, Oil By-Pass
14	120A555	1	Spring, By-Pass Valve
15	505-274	1	Plug, 1/8" Oil By-Pass
17	309B64	1	SWITCH, LOW PRESSURE (OPTIONAL)
	309A169	1	Prior to Spec F
	309A169	1	Begin Spec F



FUEL SYSTEM GROUP (GASOLINE)

149gaser
Gas 141-0726

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	**CARBURETOR		
	141K763	1	Key 1 - Prior to Spec R
	141D693	1	Key 1, Begin Spec R
	141K762	1	Key 2, 3, 4 - Prior to Spec R
	141D692	1	Key 2, 3, 4 Begin Spec R
2	154A733	1	Gasket, Carburetor
3	ELBOW		
	502-2	2	Fuel Pump In. & Outlet
	502-65	1	Carb. Inlet
4	ADAPTER, AIR CLEANER (Incl. Nylon Tube)		
	140A647	1	Prior to Spec R
	140A933	1	Begin Spec R
4A	123A732	1	Tube, Nylon
5	HOSE, BREATHER TO ADAPTER		
	503A384	1	Prior to Spec G
	503A395	1	Spec G through R
	503A543	1	Begin Spec S
5A	503A558	1	Insulator, Breather Hose - Begin Spec S
6	140C595	1	Pan, Air Cleaner
7	140B636	1	Element & Retainer, Air Cleaner
8	140C594	1	Cover, Air Cleaner
9	140A584	1	Gasket, Air Cleaner
10	GASKET, ADAPTER TO CARBURETOR		
	140A585	1	Prior to Spec R
	140A921	1	Begin Spec R
11	520A621	2	Stud, Air Cleaner
12	865-20	2	Nut, Air Cleaner - Self Locking
19	LINE, FUEL PUMP TO CARBURETOR		
	159A739	1	Prior to Spec R
	149A1095	1	Begin Spec R
21	PUMP, FUEL		
	149C805	1	Key 1
	149C803	1	Key 2, 3, 4
22	149A792	1	Gasket, Fuel Pump
23	149P517	1	Gasket, Fuel Pump Bowl
24	149-116	1	Bowl, Fuel Pump
25	153B328	1	Choke, Man., Key 1
26	153A326	1	Arm, Man. Choke, Key 1
27	153A327	1	Bracket, Man. Choke, Key 1

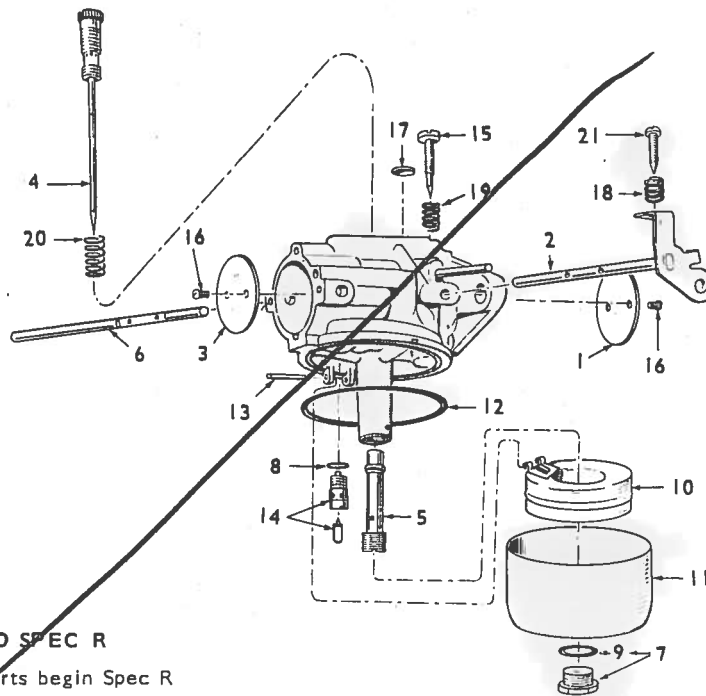
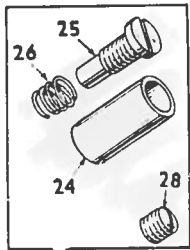
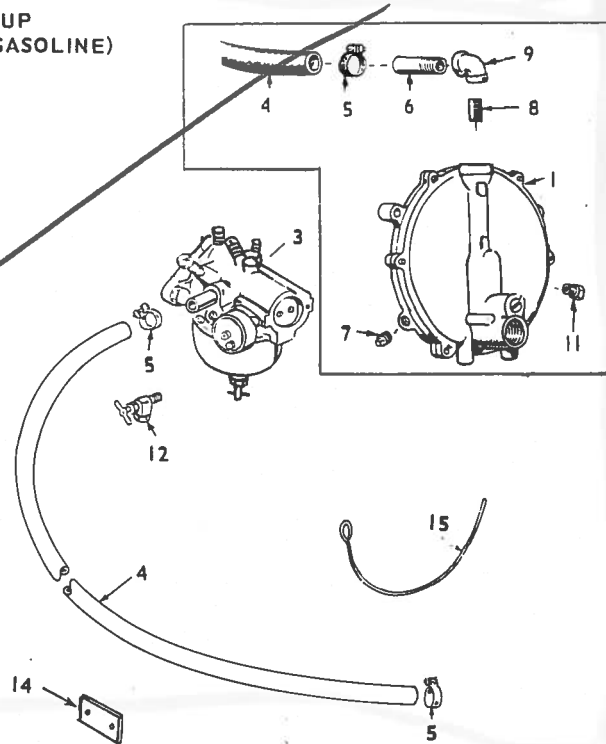
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
28	518P176	1	Clip, Choke Cable, Key 1
31	415A126	1	Tank, Fuel, 5 Gal. - Opt. Equipment
32	415B124	1	Cap, Rain, Fuel Tank
33	501A27	1	Line, Tank to Pump (Flex.)
35	140K677	1	Conversion Kit, Oil Bath Air Cleaner, OPTIONAL
37	140B500	1	*Cleaner, Air Oil Bath
38	140B519	1	*Band
39	503P365	2	*Clamp, Hose
40	503A444	1	*Hose, Air Cleaner
41	140C645	1	*Adapter, Oil Bath Air Cleaner
42	503A171	2	Clamp, Breather Hose
43	526-65	2	Washer, Copper - Fl. pump Mtg.
44	141A727	1	Rod, Carb. Adjusting
45	140P721	1	Cleaner, Air, Incl. Element - Mobile Application
46	140P765	1	Element Only, Air Clnr. - Mobile Application
47	140P722	2	Band, Air Clnr. Mtg. - Mobile Application
48	140B720	1	Bracket, Air Cleaner - Mobile Application
49	503P419	1	Elbow, Air Clnr., Rubber - Mobile Application
50	503P365	4	Clamp, Hose, Air Clnr. - Mobile Application
51	140B741	1	Tube, Air Induction - Mobile Application
52	140P723	1	Pre-Cleaner, Air Clnr., Plastic - Mobile Application
53	140C645	1	Adapter, Air Clnr. Hose - Mobile Application
54	503A396	1	Hose, Air Clnr. Connector - Mobile Application
55	149P463	1	Screen Fuel Pump Bowl
56	868-2	2	Nut, Carburetor Mounting
57	854-7	2	Washer, Carburetor Mounting
58	813-108	2	Screw, Air Cleaner Adapter
59	850-30	2	Washer, Lock-Air Cleaner Adapter
60	526-150R	2	Washer, Fiat-Air Cleaner Adapter
	149P463	1	Repair Kit, Fuel Pump (Inc. Diaphragm Assy., Valves & Gaskets) - Repl. 149K875

- ** - See separate group for components and service kits.
 * - Included in OPTIONAL #140K677 Oil Bath Air Cleaner Conversion Kit.

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

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	148C311	1	Regulator, Gas (Garretson Mfr.)
3	*CARBURETOR, GAS-GASOLINE		
	141K761	1	Key 1 - Prior to Spec R
	141D717	1	Key 1, Begin Spec R
	141K760	1	Key 2, 3, 4 - Prior to Spec R
	141D718	1	Key 2, 3, 4, Begin Spec R
3	CARBURETOR, GAS - KEY 2, 3, 4		
	141K764	1	Prior to Spec R
	141D726	1	Begin Spec R
4	503-159	1	Hose, Regulator to Carb
5	503P32	2	Clamp, Hose
6	148A519	1	Connector, Hose
7	505-57	1	Plug, 1/8", Regulator
8	505-101	1	Nipple, 3/8 x 1", Reg. Out.
9	505-39	1	Elbow, 3/8", Reg. Out
11	148A107	1	Vent, Regulator
12	504-7	1	Valve, Shut-Off (Fuel Pump Inlet)
14	149A638	1	Plate, Fuel Pump Hole Crankcase (Gas Fuel Sets)
15	143A231	1	Wire, Choke Stop, Gas-Gasoline

* - See separate group for components and gasket kit.



CARBURETOR PARTS GROUP - PRIOR TO SPEC R

NOTE: See separate group for carburetor parts begin Spec R

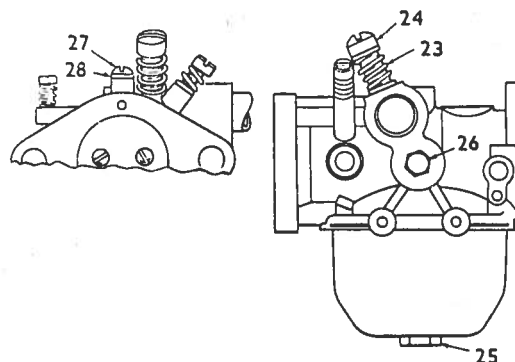
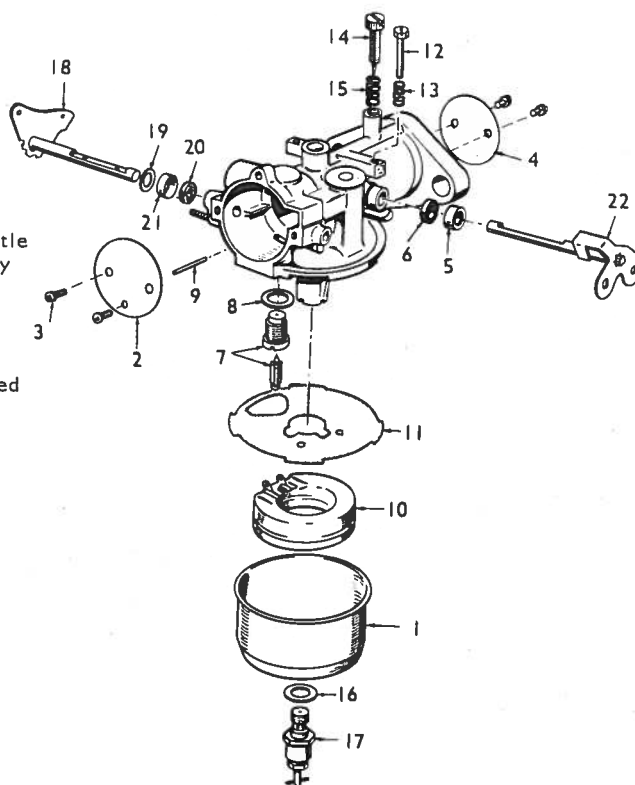
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	CARBURETOR, GASOLINE		
	141K763	1	Key 1
	141K762	1	*Key 2, 3, 4
	CARBURETOR, GAS-GASOLINE, OPTIONAL		
	141K761	1	Key 1
	141K760	1	*Key 2, 3, 4
	141K764	1	Carburetor Gas, Optional Key 1, 2, 3, 4
	143K200	1	Repair Kit - Prior to Spec G

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	143K298	1	Repair Kit, Spec G through P - Includes Parts Marked **
	143K201	1	**Gasket Kit - Includes Parts Marked *
	141A281	1	*Gasket, Carb. Flange
1	143-202	1	Valve, Throttle
2	143-203	1	Shaft & Lever, Throttle
3	143-220	1	Valve, Choke, Key 1
3	143-204	1	Valve, Choke, Key 2, 3, 4
4	143-205	1	**Needle, Idle Jet & High Speed Adj. - Prior to Spec G

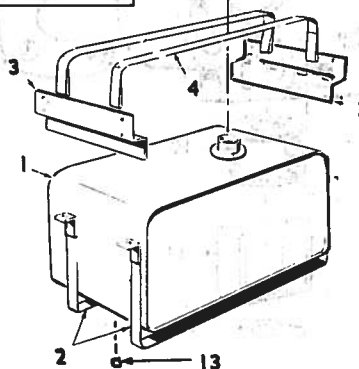
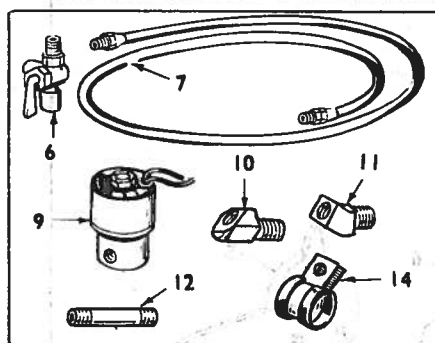
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	CARBURETOR, GASOLINE		
	141D693	1	Manual Choke
	141D692	1	Electric Choke
	CARBURETOR, GAS-GASOLINE (OPTIONAL)		
	141D717	1	Manual Choke
	141D718	1	Electric Choke
	141D726	1	Carburetor, Gas Only (Opt.)
	141P747	1	Repair Kit
	141K748	1	Gasket Kit
	141A281	1	Gasket, Carburetor Flange
1	141P708	1	Bowl, Fuel
2	141P741	1	Plate, Choke (Not used on Gas Only Sets)
3	141P698	4	Screw & Washer, Choke & Throttle Plate Mtg. (2 used on Gas Only Sets)
4	141P706	1	Plate, Throttle
5	141P705	1	Retainer, Seal
6	141-661	1	Seal, Rubber
7	141P704	1	Valve Seat Assy., Fuel (Not used on Gas Only Sets)
8	141P696	1	Washer, Fuel Valve Seat (Not used on Gas Only Sets)
9	141P703	1	Shaft, Float (Not used on Gas Only Sets)
10	141P702	1	Float Assy. (Not used on Gas Only Sets)
11	141P701	1	Gasket, Bowl to Body
12	141P700	1	Screw, Throttle Stop
13	141P711	1	Spring, Throttle Stop
14	NEEDLE, IDLE ADJUSTING		
	141P713	1	Gasoline and Gas Only Sets
	141P713	2	Gas-Gasoline Sets
15	SPRING, IDLE NEEDLE		
	141P710	1	Gasoline and Gas Only Sets
	141P710	2	Gas-Gasoline Sets
16	141A77	1	Washer, Main Jet Assy.
17	141-712	1	Jet Assy., Main (Adjustable) (Not used on Gas Only Sets)
18	SHAFT, CHOKE		
	141-742	1	Manual Choke Sets
	141B679	1	Electric Choke Gasoline Sets
	141B716	1	Electric Choke Gas-Gasoline Sets
19	141P699	1	Washer, Manual Choke Sets
20	141P697	1	Seal, Felt - Manual Choke Sets
21	141P203	1	Retainer, Felt Seal - Manual Choke Sets
22	141P709	1	Shaft & Lever, Throttle
23	141-733	1	Spring, Main Gas Needle - Gas and Gas-Gasoline Sets
24	141-734	1	Needle, Main Gas Adjusting - Gas and Gas-Gasoline Sets
25	141-736	1	Nut, Bowl - Gas Only Sets
26	141-737	1	Plug, Pipe (1/8") - Gas Only Sets
27	141-738	1	Screw, #10-32 - Gas Only Sets
28	141-739	1	Washer, Gas Only Sets

CARBURETOR PARTS GROUP - Begin Spec R

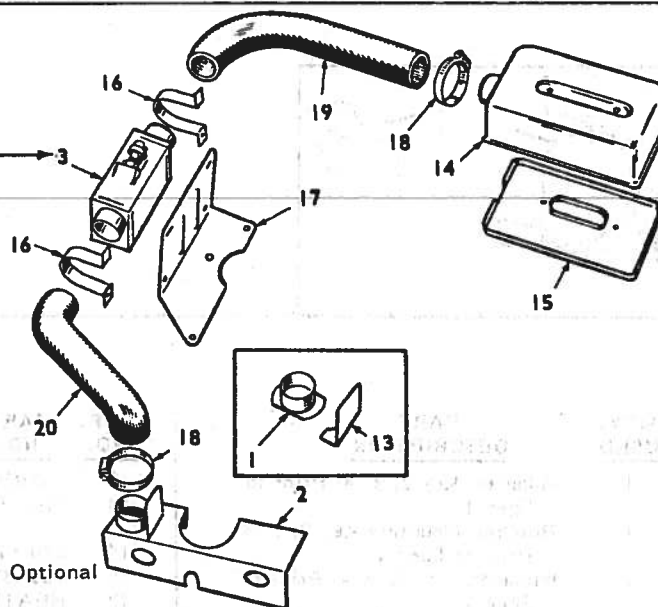
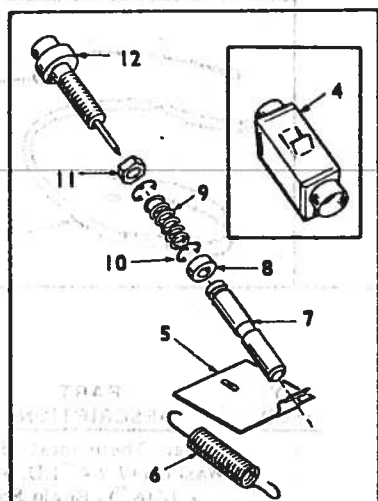
NOTE: See separate group for carburetor parts prior to Spec R



MOUNTED FUEL TANK GROUP (OPTIONAL EQUIPMENT) - HOUSED PLANTS



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	159A802	1	Tank, Fuel (9-Gal.)
2	159A786	2	Strap, Mounting
3	159B789	2	Bracket, Support
4	159A787	2	Strap, Holddown
5	159B512	1	Cap and Indicator
6	504P4	1	Valve, Shut-off
7	501A5	1	Line, Fuel-Flex (18-1/2")
9	307P565	1	Valve, Solenoid (12-V)
10	502-65	1	Elbow, Male (45°) Fuel Pump Inlet
11	502-53	1	Elbow (45°), Solenoid Outlet
12	502-32	1	Nipple (1/8" x 2"), Solenoid Valve
13	505-57	1	Plug (1/8")
14	332-50	1	Clip, Fuel Line Support
15	159-751	1	Gasket, Fuel Tank Cap



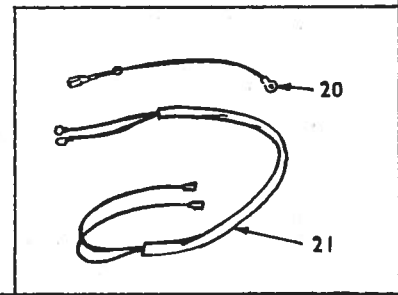
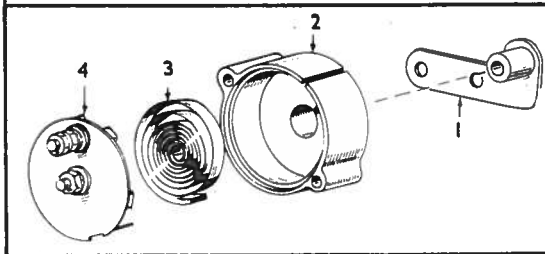
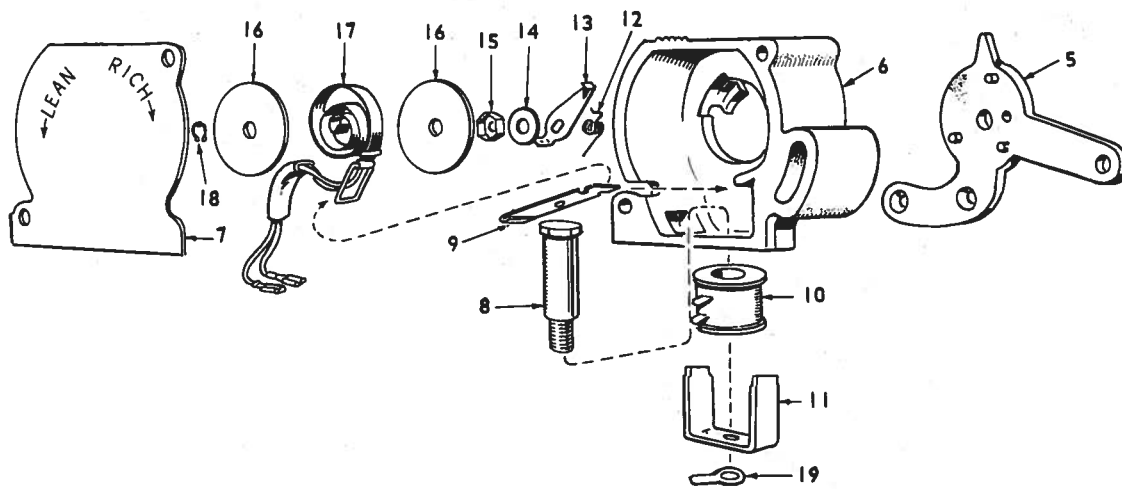
NOTE: Standard Equipment for Parts Key No. 4. Optional for other plants.

CARBURETOR AIR HEATER GROUP (OPTIONAL EQUIPMENT)(LATE MODELS)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
KIT, AIR HEATER			
1	140K890	1	Pressure Cooled Sets with Duct or Duct & Shutter
	140K890	1	Vacu-Flo Cooled Sets
	140K891	1	Pressure Cooled Sets without Duct or Shutter
1	133A187	1	Adapter, Hose-air outlet - Pressure Cooled Plants with Duct or Duct & Shutter and Vacu-Flo Cooled Sets
2	133B191	1	Plenum, Manifold Heater - Pressure Cooled Plants without Duct or Shutters.
3	140B788	1	Control Assembly, Temp. Includes Parts marked *
4	140B785	1	*Housing, Temperature Control
5	140B782	1	*Shutter, Temperature Control
6	140B786	1	*Spring, Shutter Control

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	140A784	1	*Plunger, Temperature Control
8	140A808	1	*Spacer, Vernatherm
9	140A787	1	*Spring, Vernatherm
10	518-205	2	*Ring, Retaining
11	870-195	1	*Nut, Locking - Vernatherm
12	309A181	1	*Vernatherm, Temp. Control
13	140A789	1	Shield, Air Outlet Hose - Pressure Cooled Sets with Duct or Duct & Shutter and Vacu-Flo Cooled Sets
14	140B790	1	Cover, Air Cleaner
15	140C791	1	Pan, Air Cleaner
16	140A821	2	Clamp, Temp. Control Support
17	SUPPORT, TEMPERATURE CONTROL		
	140B822	1	Pressure Cooled
	140B823	1	Vacu-Flo Cooled
	503P458	2	Clamp, Hose
18	503B474	1	Hose, Control to Air Clnr.
20	503B476	1	Hose, Adapter (or plenum) to Control

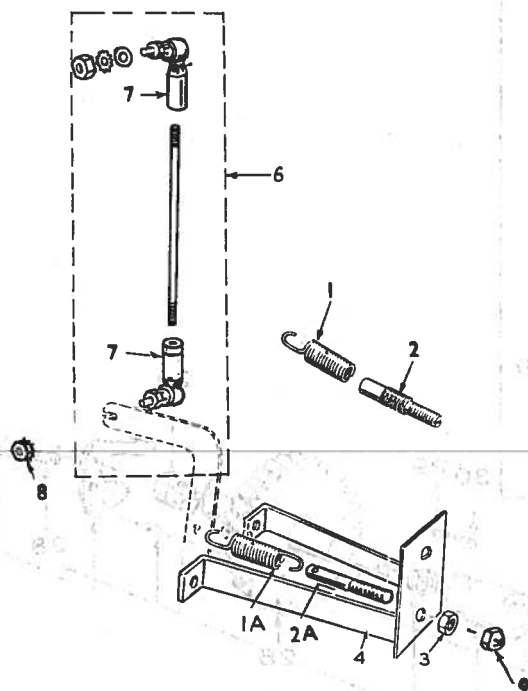
ELECTRIC CHOKE AND THERMO-MAGNETIC CHOKE GROUP



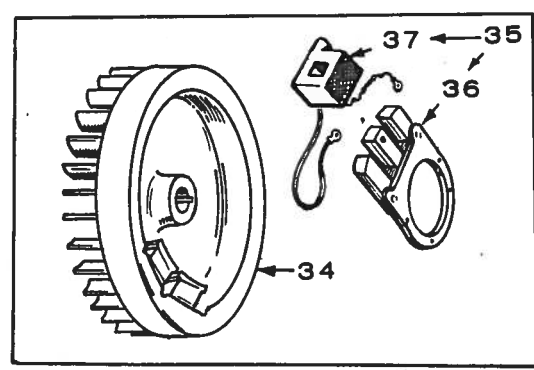
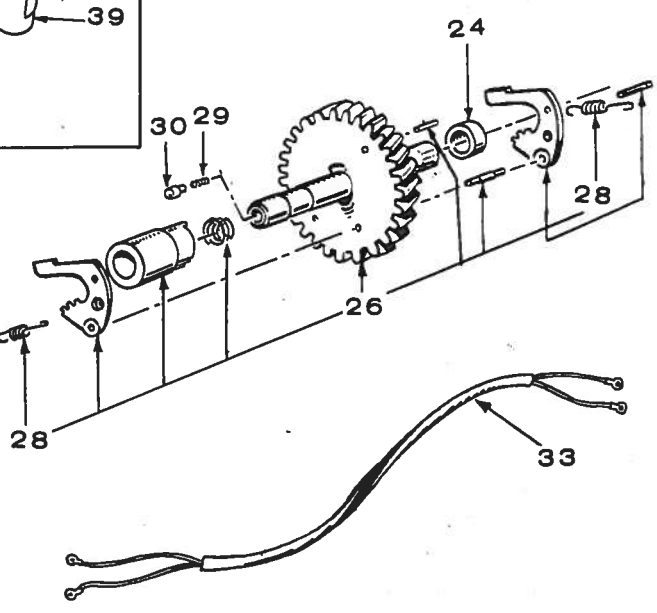
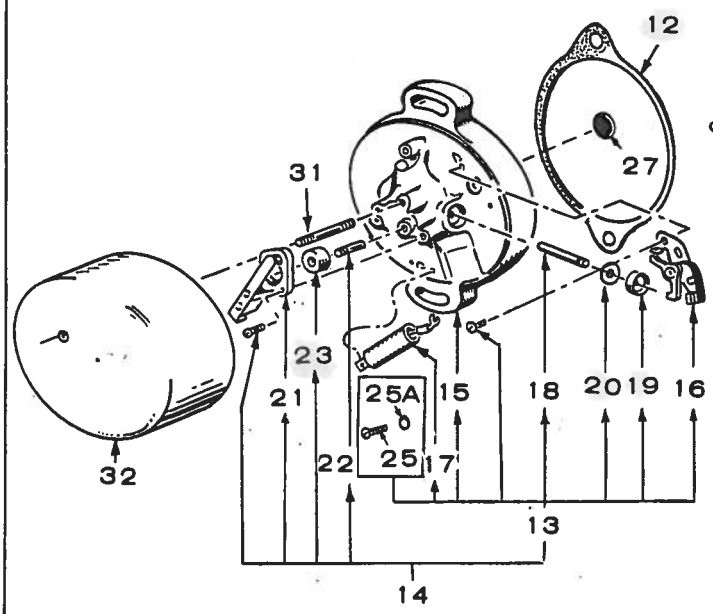
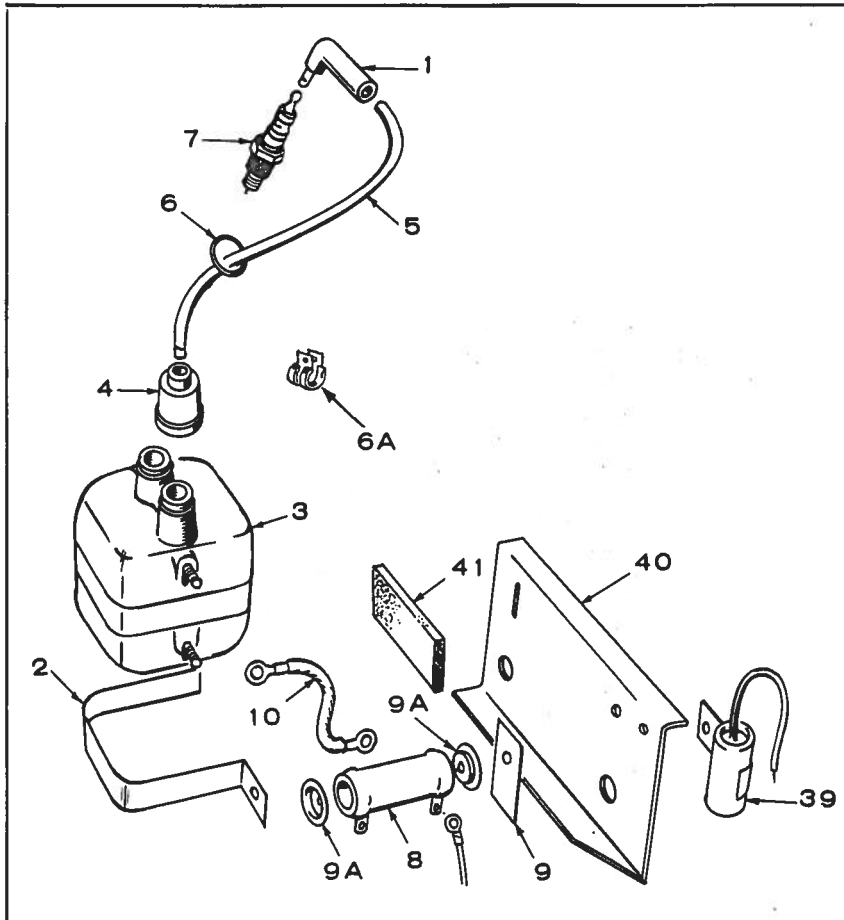
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	153A315	1	Adapter, Key 2, 3, 4 - Prior to Spec J
2	153A324	1	Bracket, Mounting Key 2, 3, 4 - Prior to Spec J
3	153A321	1	Element, Key 2, 3, 4 - Prior to Spec J
4	COVER ASSEMBLY, CHOKE		
	153A325	1	12 Volt, Key 3, 4 - Prior to Spec J
	153A114	1	24 Volt, Key 2, 3 - Prior to Spec J
5	153C385	1	Plate, Mounting - Begin Spec J
6	153D386	1	Body - Begin Spec J
7	153C389	1	Cover - Begin Spec J
8	153B391	1	Core, Solenoid - Begin Spec J
9	153A395	1	Armature - Begin Spec J
10	307B801	1	Coil, Solenoid Assembly - Begin Spec J
11	153B392	1	Frame, Solenoid - Begin Spec J
12	SPRING	1	Spec J through R
	153B387	1	Begin Spec S
	153B425	1	

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
13	153B390	1	Lever, Thermostat - Begin Spec J
14	526-18	1	Washer (17/64" I.D. x 5/8" O.D. x 1/16") - Begin Spec J
15	870-134	1	Palnut (1/4-20) - Begin Spec J
16	153A399	2	Insulator - Begin Spec J
17	HEATER ASSEMBLY		
	153B400	1	Spec J through R
	153B422	1	Begin Spec S
18	518-129	1	Ring, Retaining - Begin Spec J
19	332A876	1	Terminal Ground - Begin Spec J
20	LEAD, CHOKE - BEGIN SPEC J		
	336A1551	1	Choke to Ignition Coil, Key 2, 3
	336A1549	1	Choke to Ground, Key 2, 3, 4
	336A1609	1	Choke to Control, Key 2, 3
21	HARNESS, CHOKE - BEGIN SPEC J		
	338B328	1	Key 2, 3
	338B329	1	Key 4

GOVERNOR GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150A821	1	Spring, Gov. — Prior to Spec R
1A	150A1084	1	Spring, Gov. — Begin Spec R
2	150A822	1	Stud, Adjusting — Prior to Spec R
2A	150A1082	1	Stud, Adjusting — Begin Spec R
3	NUT, ADJUSTING		
	104A91	1	Prior to Spec R
	862-3	1	Begin Spec R
3A	NUT, ADJUSTING - VACU FLO COOLED SETS		
	150A924	1	Prior to Spec R
	150A1113	1	Begin Spec R
4	BRACKET ASSEMBLY		
	150A813	1	Key 1 - Prior to Spec R
	150A1108	1	Key 1, Begin Spec R
	150A812	1	Key 2, 3, 4 - Prior to Spec R
	150A1107	1	Key 2, 3, 4 Begin Spec R
6	LINKAGE ASSEMBLY		
	150A965	1	Prior to Spec R
	150A1076	1	Begin Spec R
7	JOINT, BALL (EARLY SETS 1 ONLY)		
	150A974	2	Prior to Spec R
	150A1081	2	Begin Spec R
8	870-131	1	Nut, Keps. Joint Arm
9	NUT, LOCKING		
	870-130	1	Prior to Spec R (3/8-24")
	870-133	1	Begin Spec R (3/8-16")

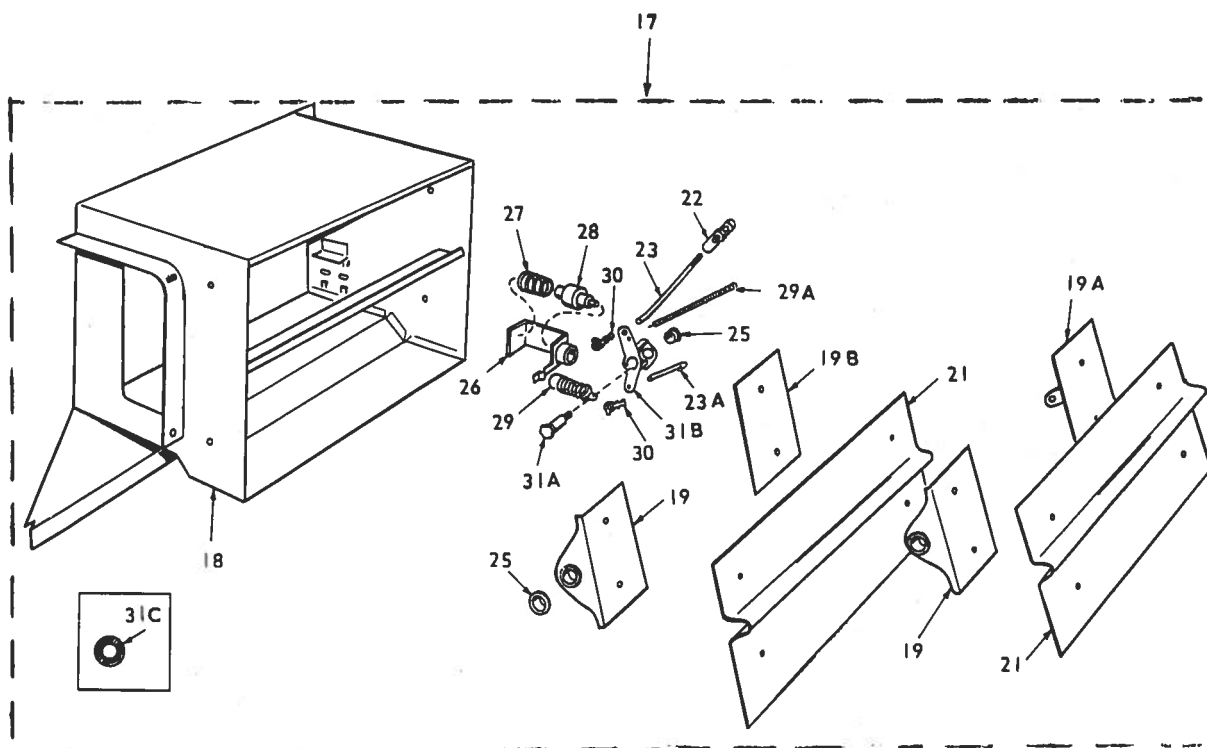
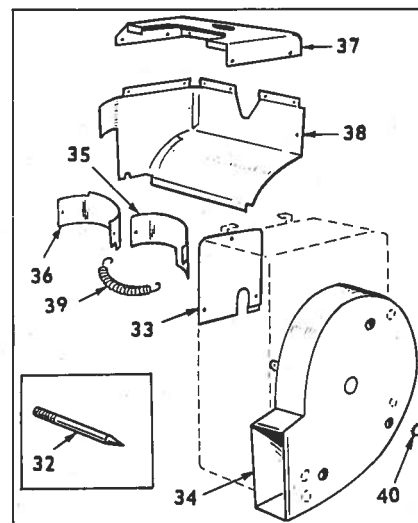
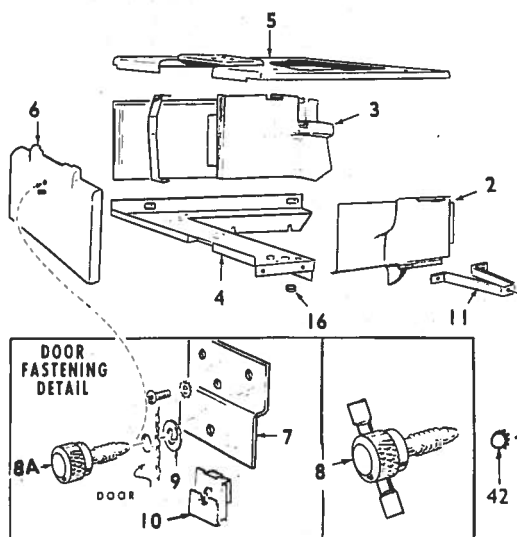
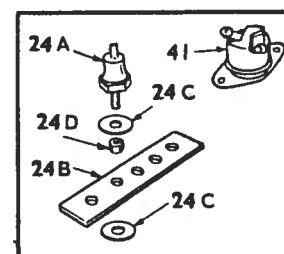
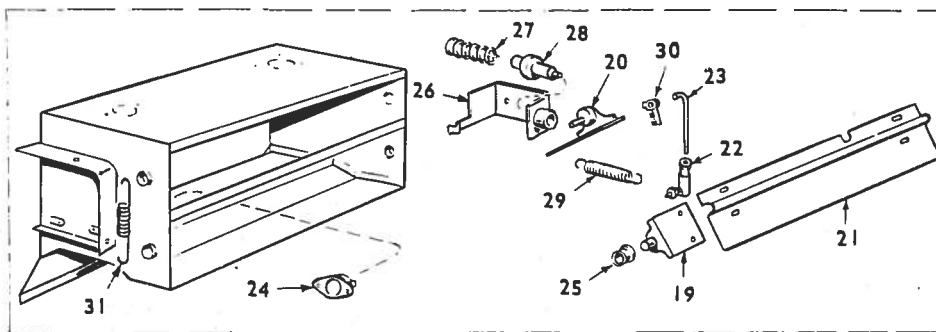


IGNITION GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	314P32	2	*Suppressor, Spark Plug
2	CLAMP, COIL		
	160B682	1	Key 2, 3, 4 - Prior to Spec T
	160B890	1	Key 2, 3, 4 - Vacu-Flo Cooled Plants - Prior to Spec T
	166A556	1	Key 2, 3, 4 - Begin Spec T
3	COIL, IGNITION		
	160C792	1	Key 2, 3, 4 - Prior to Spec T
	166C346	1	Key 2, 3, 4 - Begin Spec T
4	160A558	2	Nipple, Ignition Cables Key 2,3,4,5
5	CABLE, SPARK PLUG		
	167A1384	2	26", Key 1
	167A1387	2	14-1/2", Key 2,3,4
	167A1386	2	10-1/2", Key 2,3,4 Vacu-Flo Sets
6	509-35	1	"O" Ring (Cables) Key 2,3,4
6A	332-51	1	Clip, Leads, Key 1
7	167-4	2	Plug, Spark
8	304A60	1	Resistor, Ignition, Key 2,3,4
9	304A292	1	Insulator, Resistor Mtg. Key 2,3,4
9A	304-14	1	Washer, Resistor (2) for Vacu-Flo Sets)
10	LEAD		
	336A333	1	Coil to Resistor, Key 2,3,4
	336A30	1	Coil to Resistor, Vacu-Flo Cooled Sets, Key 2, 3, 4
	336A179	1	Resistor to Breaker, Vacu-Flo Cooled Sets, Key 2, 3, 4
	336A1347	1	Coil to Control, Vacu-Flo Cooled Sets, Key 2, 3, 4
12	160A721	1	Gasket, Breaker Plate *
13	160B762	1	Plate Assy., Breaker, Key 1,2,3
14	160C714	1	Plate Assy., Breaker, Key 4 (Also with Low Oil Pressure Switch Key 2,3)
15	PLATE ONLY, BREAKER		
	160A891	1	Key 1, 2, 3
	160A1137	1	Key 4(Also With Low Oil Pressure Switch - Key 2, 3)
16	160A2	1	Point Set
17	312A116	1	Condenser
18	160A716	1	Plunger, Ignition Breaker
19	160A717	1	Cup, Plunger, Diaphragm *
20	160A718	1	Diaphragm, Ignition Plunger *
21	SWITCH, ASSEMBLY, CENTRIFUGAL		
	309A134	1	Start-Disconnect, Key 4
	309A134	1	Plants With Low Oil Pressure Switch, Key 2, 3

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
22	PLUNGER, CENTRIFUGAL SWITCH		
	309A140	1	Start-Disconnect, Key 4
	309A140	1	Sets with Low Oil Pressure Switch, Key 2,3 *
X 23	DIAPHRAGM, CENTRIFUGAL SWITCH PLUNGER		
	160A263	1	Start-Disconnect, Key 4
	160A263	1	Sets with Low Oil Pressure Switch, Key 2,3
24	160A720	1	Spacer, Timing Control
25	516A72	1	Screw, Plunger Hole, Key 1,2,3
25A	509-65	1	Seal, Plunger Hole, Key 1,2,3
26	160A707	1	Gear and Shaft Assy., Timing
27	160A806	1	Disc, Thrust, Plunger Brg.
28	160B711	2	Spring, Timing Weight
29	160A773	1	Spring, Thrust Plunger
30	160A774	1	Plunger, Thrust
31	520A347	1	Stud, Cover
32	COVER, BREAKER		
	160A769	1	Key 1
	160A719	1	Key 2,3,4
33	HARNES, WIRING		
	338B280	1	Breaker to Control, Only on Plts. with Low Oil Pressure Switch, Key 2,3
	338B258	1	Breaker to Control, Key 4
34	160D692	1	Flywheel, Magneto, Key 1
35	160A898	1	Backplate Assy., Magneto Complete, Key 1
36	160A697	1	Backplate & Poleshoe, Magneto Key 1
37	160B693	1	Coil, Magneto, Key 1
39	312A58	1	*Condenser, Ignition Coil, (.1 Mfd.)
40	166B295	1	Bracket, Ignition Coil - Vacu-Flo Cooled Sets, Key 2, 3, 4
41	160A887	1	Pad, Ignition Coil, Vacu-Flo Cooled Sets, Key 2, 3, 4

* - Use began during Spec F, will also work on early models.



AIR HOUSING AND OPTIONAL SHUTTER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	134D1050	1	Housing, Blower
1	134D1325	1	Housing, Blower VACU-FLO COOLED, Key 2,3,4
2	134D1048	1	**Housing Cyl. Air - Frt.
3	134C1051	1	**Housing, Cyl. Air - Rear
4	134D1419	1	**Panel, Cyl. Air Hsg. (Bottom)
5	**COVER CYLINDER AIR HOUSING		
	134C1121	1	Prior to Spec R
	134C1787	1	Gasoline Sets - Begin Spec R
	134C1909	1	Gas & Gas-Gasoline Sets - Begin Spec R
6	134D1039	1	**Panel, Air Housing Door
7	134A1554	1	**Bracket, Air Hsg. Door Panel
8	134A1373	1	**Screw, Door
9	134A1180	2	**Washer, Door (Early Models 8 for top cover)
10	870-194	5	***"U" Clip, Door Panel & Cover
10	870-179	6	"J" Clip, Housing ; VACU-FLO COOLED Plts. Only
11	134B1085	1	Support, Blower Hsg. & Grille
12	134D1091	1	**Grille
13	134A1092	3	**Retainer, Grille
16	508A2	2	**Grommet, Bottom Hsg. Panel
17	134C1811	1	Shutter assy., (OPTIONAL) (Std. for X-RAY MODELS) Includes parts marked*
18	134D1804	1	*Duct only, air outlet (NOTE: Cannot be used on early model shutter assembly with external shutter pivot springs)
19	134A1242	3	£Bracket & Pivot, Shutter
19	134A1800	2	*Bracket & Pivot, Shutter
19A	134A1802	1	*Bracket & Pivot, Shutter & Rod
19B	134A1801	1	*Bracket & Pivot, Shutter & Spring
20	134D1238	1	£Bracket Shaft, and pin - Shutter
21	134B1252	2	£Shutter, Air outlet
21	134B1807	2	*Shutter, Air outlet
22	150A998	1	£*Joint, Ball
23	134A1247	1	£Rod, Shutter Control
23	134A1606	1	*Rod, Shutter Control - Upper
23A	134A1607	1	*Rod, Shutter Control - Lower
24	309P162	1	Switch, Hi-temp. (Mts. on Air Duct) - Prior to Spec P
24A	309P196	1	Switch, Hi-temp. (Mts. on Manifold Stud) - Normally closed
24B	309A195	1	Bracket, Hi-temp. Switch - Begin Spec P
24C	508A126	2	Washer, Insul.-High Temp. Switch - Begin Spec P
24D	508A127	1	Insulator, Sleeving-Hi temp. Switch-Begin Spec P
25	134P1248	4	£Bearing, Shutter
25	134A1783	4	*Bearing, Shutter
25	134P1248	2	*Bearing, Actuating Arm
26	134A1244	1	£Bracket & Guide, Vernatherm
26	134A1610	1	*Bracket & Guide, Vernatherm
27	134A656	1	£*Spring, Vernatherm Element
28	309A85	1	£*Element, Vernatherm
29	134A658	1	£* Spring, Shutter Return - Lower

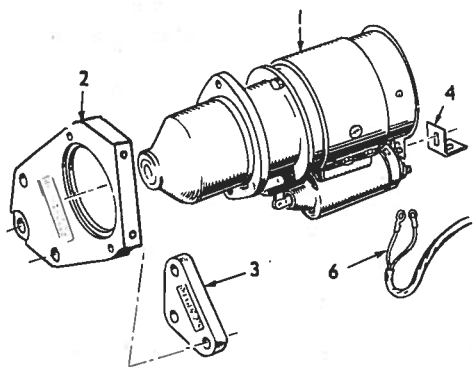
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
29A	134A1817	1	*Spring, Shutter Return - Upper
30	518-4	1	£*Clip, Rod (RH)
30	518-6	2	*Clip, Rod (LH)
31	134A1437	2	£Spring, Shutter Pivot
31A	134A1605	1	*Shaft, Actuating Arm
31B	134B1604	1	*Arm, Actuating
31C	508-2	1	£*Grommet
32	104A528	1	Pointer, Timing, Vacu-Flo Cooled Sets, Key 2, 3, 4
33	134B1415	1	Cover, Governor Accessory, Vacu-Flo Cooled, Key 2, 3, 4
34	134D1369	1	Scroll, Blower, Vacu-Flo Cooled Sets, Key 2, 3, 4
35	134A1109	1	Shroud, Cyl., #1 (Front) Vacu-Flo Cooled Sets, Key 2, 3, 4
36	134A1337	1	Shroud, Cyl., #2 (Rear) Vacu-Flo Cooled Sets, Key 2, 3, 4
37	134D1327	1	Cover, Cyl. Shroud, Vacu-Flo Cooled Sets, Key 2, 3, 4
38	134D1328	1	Wrapper, Shroud, Vacu-Flo Cooled Sets, Key 2, 3, 4
39	134P944	1	Spring, Shroud Wrapper, Vacu-Flo Cooled Sets, Key 2, 3, 4
40	517-21	3	Button, Dot, Scroll, Vacu-Flo Cooled Sets, Key 2, 3, 4
41	309P162	1	Switch, Hi-Temperature (Mounts on Scroll) Vacu-Flo Cooled Sets, (Optional)
42	517-35	1	Plug, Dot Button - Blower Housing

* Included in OPTIONAL (Standard Equipment for X-Ray Models) Air Discharge Shutter

** These parts are for Pressure Cooled Plants only:
£ These parts apply to the early model shutters, with external shutter pivot springs.

AUTOMOTIVE STARTER GROUP

NOTE: Used on plants with Key 3,4.

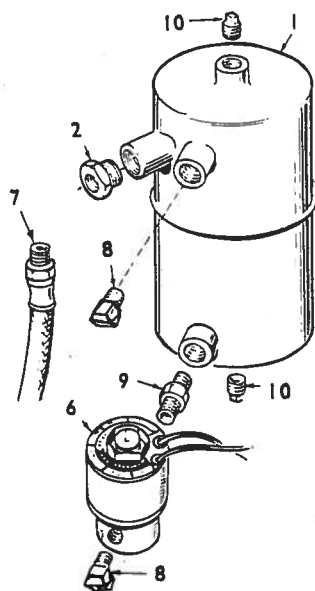


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
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1	*MOTOR, STARTING		
	191C324	1	12 Volt
	191C443	1	24 Volt
2	191C512	1	Flange, Mounting
3	191A311	1	Spacer, Flange
4	191A365	1	Bracket, Support
6	338B255	1	Harness, Starter to Cont., Key 4
	191-432	1	Clutch, Starter
	SWITCH, START SOL.		
	191-433	1	12 Volt
	191P715	1	24 Volt
	BRUSH SET, STARTER		
	191-434	1	12 Volt
	191P714	1	24 Volt
	ARMATURE		
	191P712	1	12 Volt
	191P713	1	24 Volt
	191P497	1	Bearing, Drive, End

* - Check starter nameplate, and order components not listed from your nearest dealer.

RESERVOIR (DAY) TANK GROUP (OPTIONAL EQUIPMENT)

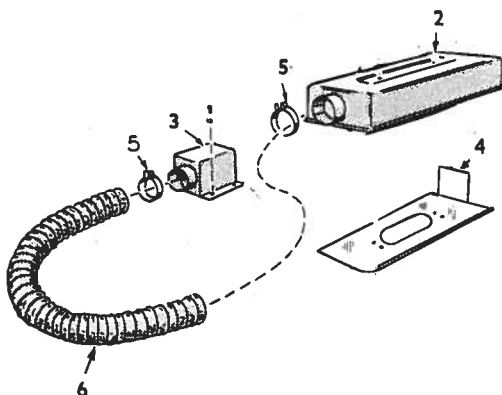


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
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1	TANK, RESERVOIR		
	159B294	1	One Quart
	159B746	1	Two Quart
2	159A705	1	Reducer, Restricted
3	BRACKET, TANK		
	159B759	1	One Quart
	159B826	1	Two Quart
4	BAND, TANK		
	159A121	1	One Quart
	159B825	1	Two Quart
5	159A761	2	Spacer, Brkt. to Rkr. Cover
6	307P565	1	Valve, Solenoid, (12-V)
7	LINE, FUEL		
	501A5	1	To Main Tank
	501A78	1	Fuel Pump to Res. Tank
	501A22	1	To Carburetor
8	ELBOW (45°)		
	502-65	1	Sol. Valve to Carb. Line
	502-53	1	Fuel Pump to Line
9	505-82	1	Nipple, Sol. Valve to Tank
10	505-57	2	Plug

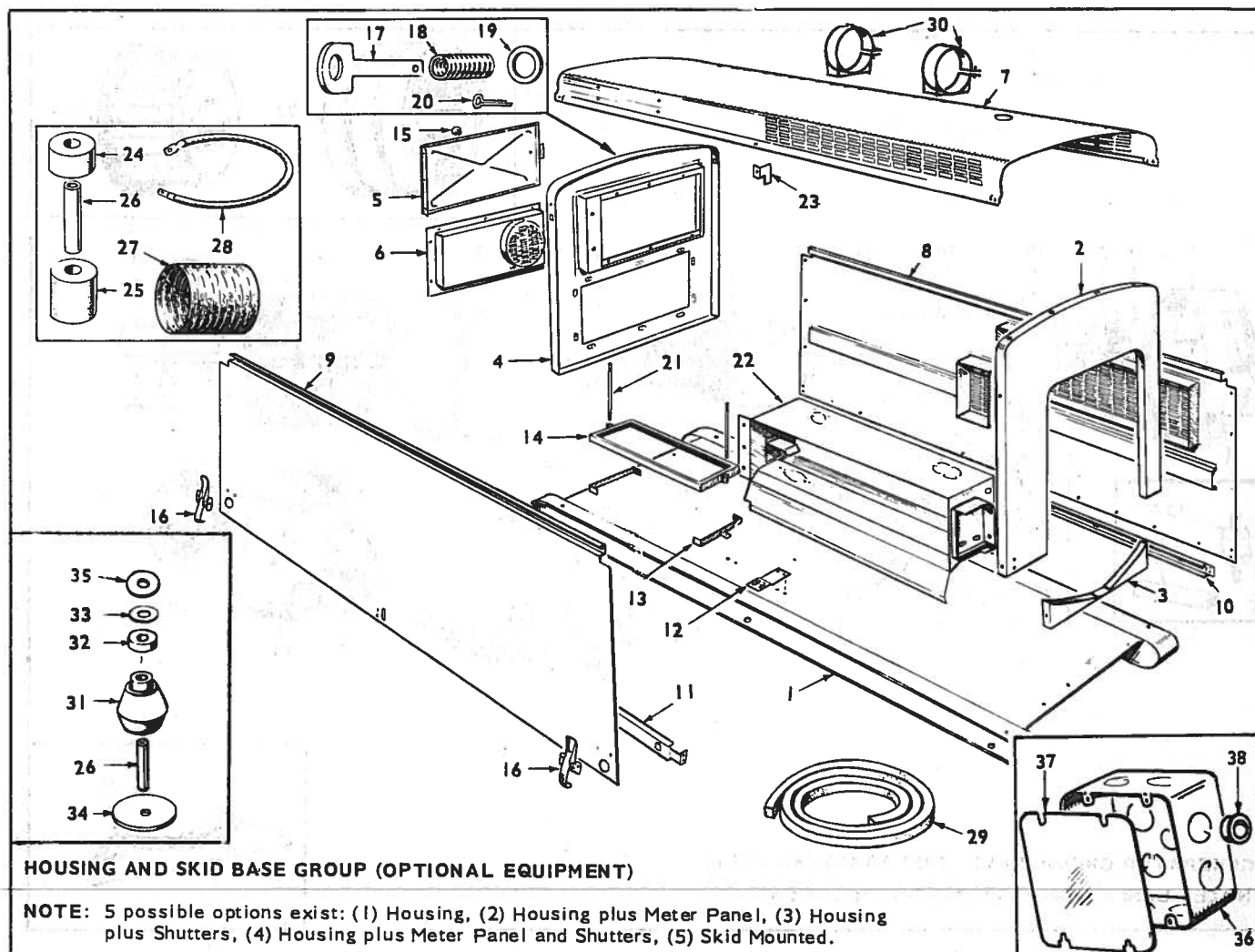
CARBURETOR AIR HEATER GROUP (OPTIONAL EQUIPMENT) (EARLY MODELS)

NOTE: Standard Equipment for Parts Key No. 4. Optional for other plants. See separate group for late models.



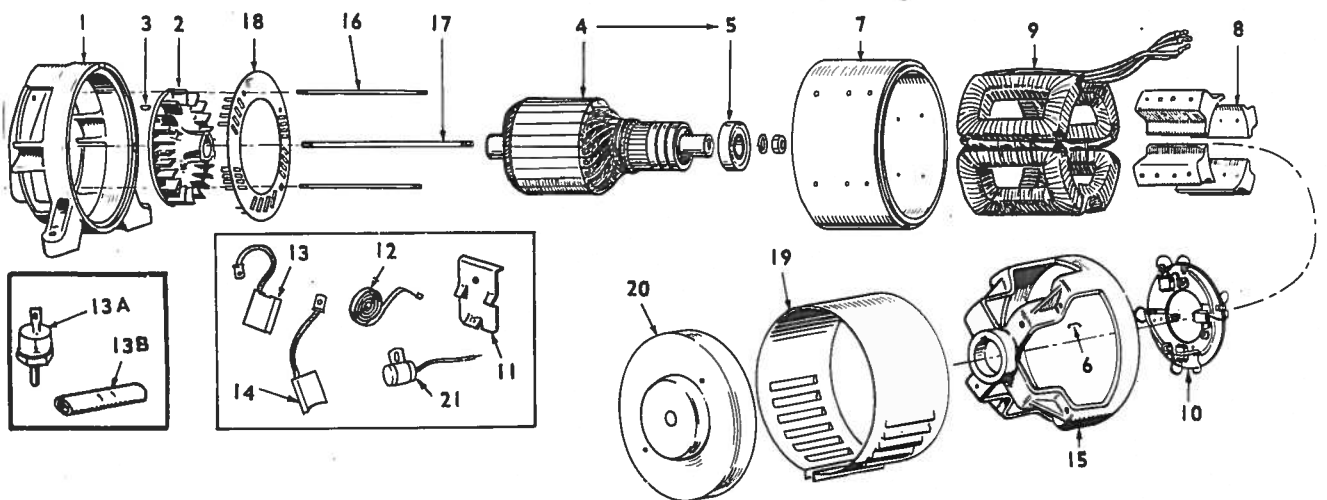
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
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2	140A650	1	*Cover, Air Clnr., Hot Air
3	140B654	1	*Box, Air Out., Shutter
4	140B658	1	*Cover, Air Clnr. Pan
5	503-4	2	*Clamp, Hose
6	503A397	1	*Hose, Air



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	403B679	1	Base
2	405B1323	1	Panel, Upper (Eng. End)
3	405B1333	1	Panel, Lower (Eng. End)
4	PANEL, (GENERATOR END) REAR		
	405B1322	1	Plants WITHOUT Meter Panel
	405C1331	1	Plants WITH Meter Panel
5	PANEL, DOOR - REAR END		
	405B1329	1	Sets Without Meter Panel and
	405B1332	1	Sets With Meter Panel
6	405B1330	1	Panel, Generator Access
7	405B1348	1	Panel, Top
8	PANEL, RIGHT SIDE		
	405B1347	1	Sets Without Shutters
	405B1355	1	Sets With Shutters
9	405B1346	1	Panel, Left Side
10	405B1344	1	Rail, Stiffener Right Side
11	405B1345	1	Rail, Stiffener Left Side
12	405A1341	2	Bracket, Stiffener Rail
13	416A501	2	Bracket, Battery
14	416B502	1	Frame, Battery, Hold-down
15	406-2	1	Knob, Rear Door Panel
16	406A105	2	Fastener, Housing
17	405A1138	2	Pin, Shoulder, Rear Panel
18	405B1139	2	Spring, Shoulder Pin, Rr. Panel
19	526-22	2	Washer, Shoulder Pin, Rr. Panel
20	516-39	2	Pin, Shoulder Pin
21	520A490	2	Stud, Battery Holddown
22	DUCT, AIR OUTLET		
	134D1804	1	Sets Without Shutters
	134C1811	1	Sets With Shutters
23	405A1181	1	Stop, Door

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
24	402A36	4	Mount, Cylindrical Shaped, Upper, Prior to Spec H
25	MOUNT, VIBRATION, CYLINDRICAL SHAPED, LOWER		
	402A276	2	Eng. End - Prior to Spec H
	402A278	2	Gen. End - Prior to Spec H
26	BUSHING, SPACER, VIBRATION MOUNT		
	402A46	4	Prior to Spec H
	402A290	4	Begin Spec H
27	503A423	1	Hose, Flex., Gen. Air Duct
28	336A476	1	Strap, Ground, Eng. to Frame
29	895P104	1	Stripping, Foam Weather (76" Required for Hsg.) Cement in Place
30	140B631	2	Band, Muffler
31	CUSHION, VIBRATION, CONE SHAPED (TAPERED)		
	402B284	2	Eng. End, Begin Spec H
	402B286	2	Gen. End, Key 1,2. Begin Spec H
	402B285	2	Gen. End, Key 3,4 Begin Spec. H
32	402B282	4	Snubber, Shock Mtg., Begin Spec H
33	526-14	4	Washer, (29/64" I.D. x 1-1/2" O.D. x 1/8") Only with Cone Shaped Cushions
34	526A199	4	Washer, (29/64" I.D. x 3-1/4" O.D. x 1/8"), Only with Cone Shaped Cushions
35	526-198	As Req.	Washer, (5/8" I.D. x 1-1/2" O.D. x 1/16") Only with Cone Shaped Cushions
36	330-11	1	Box, Junction
37	330-12	1	Cover, Junction Box
38	331-88	1	Bushing, Junction Box



GENERATOR GROUP (REVOLVING ARMATURE TYPE)

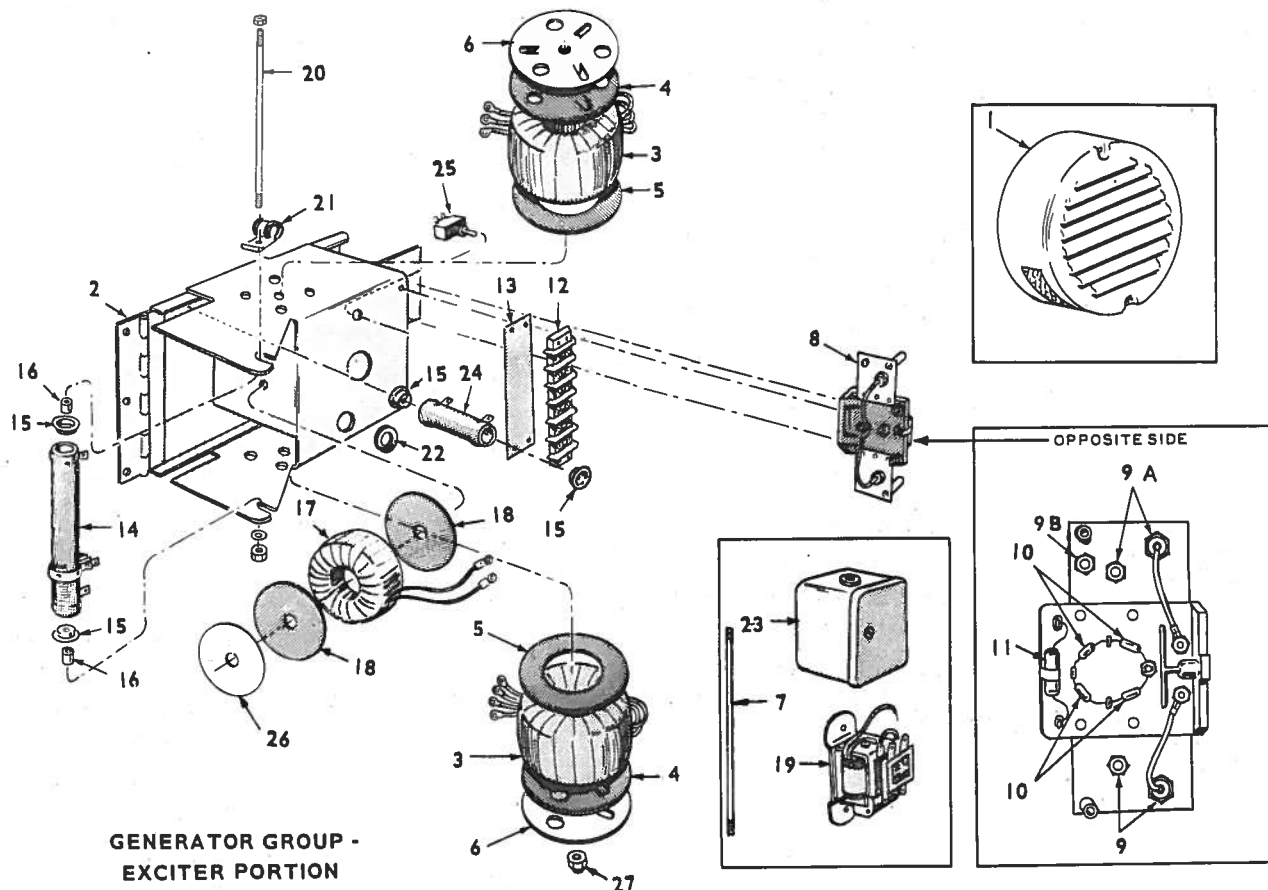
NOTE: Used on plants with Parts Key Nos. 1,2,3

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	ADAPTER		
	231E100	1	Key 1, 2 - Prior to Spec H
	231E113	1	Key 1, 2 - Begin Spec H
	231E120	1	Key 3, Except Mobile Application
	231E112	1	Mobile Application
2	205C65	1	Blower
3	515-6	1	Key, Blower
4	*	1	Armature Assy., Includes Bearing & Blower
5	510A47	1	Bearing
6	232A596	1	Clip, Bearing Stop
7	210D347	1	Frame Only, Less Coils & Pole shoes
8	221A90	4	Shoe, Pole - Field
9	COIL ASSEMBLY, FIELD - SET OF 4 COILS		
	222A1600	1	Key 1 - Prior to Spec P
	222A1658	1	Key 1 - Begin Spec P
	222A1591	1	Key 2, 3 - Prior to Spec P
	222A1639	1	Key 2, 3 - Begin Spec P
10	RIG ASSEMBLY, BRUSH		
			Key 1, 2
	212C293	1	120 V, 1 Phase
	212C295	1	120/240 V, 1 Phase
	212C294	1	240 V, 1 Phase
	212C298	1	120/240 V, 1 Phase Reconnectible and 120/208 V, 3 Phase
	212C297	1	240 V, 3 Phase
			Key 3
	212C317	1	120 V, 1 Phase
	212C329	1	240 V, 1 Phase
	212C318	1	120/240 V, 1 Phase and 240 V, 3 Phase

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	212C316	1	120/208 V, 3 Phase
	*	1	220/380 V, 3 Phase
	SPRING BRUSH		
			Key 1, 2 - Prior to Spec K
11	212B1105	8	120 V & 240 V, 1 Phase (AC & DC)
11	212B1105	4	120/240 V, 1 Phase, Reconnectible (DC)
11	212B1123	4	120/240 V, 1 Phase, Reconnectible (AC)
11	212B1105	4	120/208 V, 3 Phase (DC)
11	212B1123	4	120/208 V, 3 Phase (AC)
11	212B1105	7	240 V, 3 Phase (AC & DC)
12	212B1003	4	120/240 V, Non-Reconnectible, 1 Phase (DC)
			120-240 V, 1 Phase (AC)
11	212A1004	3	Key 1, 2 Begin Spec K
11	212B1105	8	120 V & 240 V, 1 Phase, 120/240 V, 1 Phase, Reconnectible, & 120/208 V, 3 Phase (AC & DC)
11	212B1105	7	240 V, 3 Phase, & 120/240 V, 1 Phase, Non-Reconnectible, (AC & DC)
			Key 3
11	212B1105	12	120 V & 240 V, 1 Phase (AC & DC)
11	212B1105	14	120/240 V, 1 Phase, & 240 V, 3 Phase (AC & DC)
11	212B1105	16	120/208 V, 3 Phase (AC & DC)

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

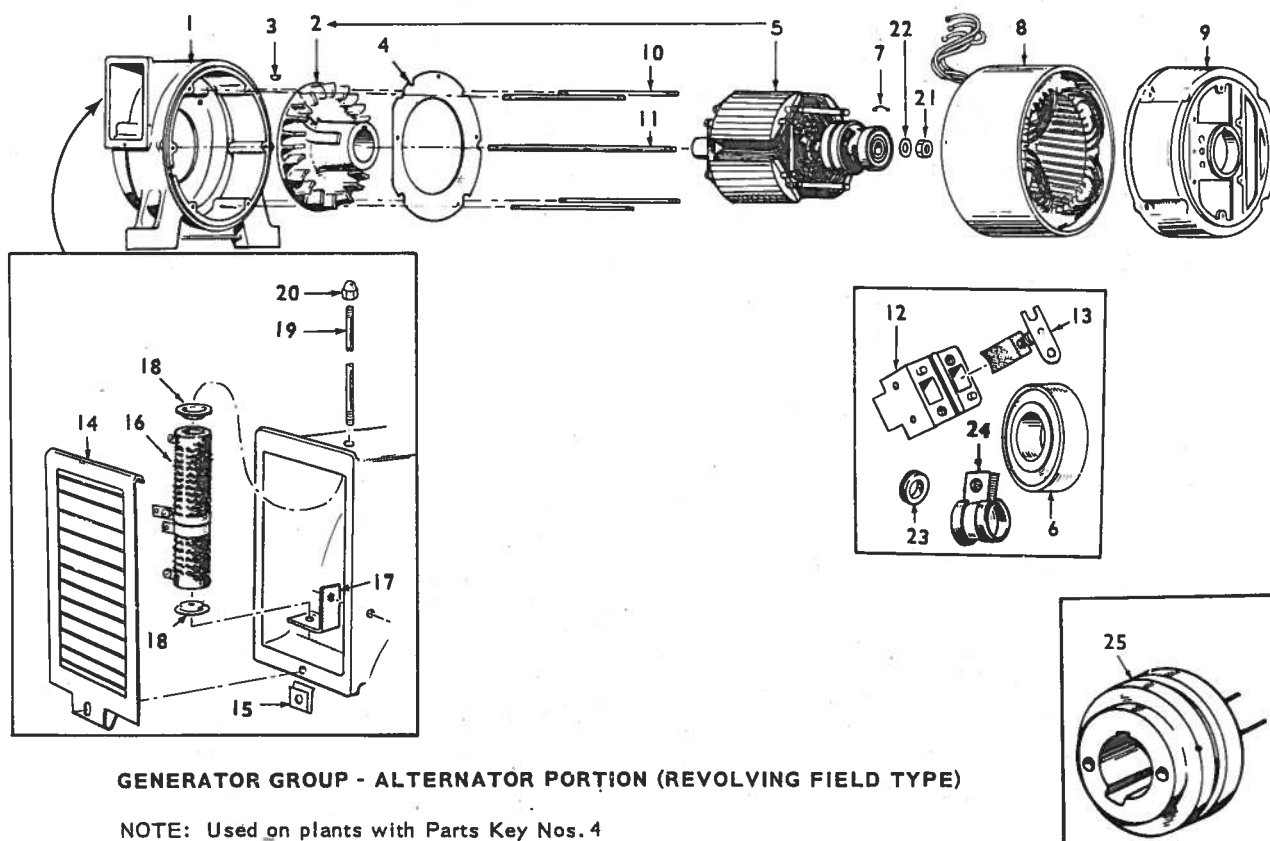
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
13	BRUSH, COMMUTATOR (DC)			19	BAND, END BELL		
	214A61	4	Key 1, 2 - Prior to Spec K 120 V, 240 V, & 120/240 V, (Reconnectible), 1 Phase & 120/208 V & 240 V, 3 Phase		234C2	1	120 V, 60 Hertz, 1 Phase, & 240 V, 50 & 60 Hertz, 1 Phase - Prior to Spec P
	214A30	4	120/240 V, 1 Phase, Non-Re- connectible		234C255	1	120 V, 60 Hertz, 1 Phase, & 240 V, 50 & 60 Hertz, 1 Phase - Begin Spec P
	214A61	4	Key 1, 2 - Begin Spec K - All		234C5	1	120/240 V, 60 Hertz, 1 Phase, 120/208 V, 60 Hertz, 3 Phase, 220/380 V, 50 Hertz, 3 Phase, & 240 V, 60 Hertz, 3 Phase - Prior to Spec P
13A	214A88	8	Key 3, All		234C256	1	120/240 V, 60 Hertz, 1 Phase, 120/208 V, 60 Hertz, 3 Phase, 220/380 V, 50 Hertz, 3 Phase, & 240 V, 60 Hertz, 3 Phase - Begin Spec P
13B	358B7	1	Rectifier, Begin Spec P		234B228	1	Housed Sets Only
13B	332-556	1	Connector, Begin Spec P	20	COVER, END BELL		
14	BRUSH, COLLECTOR RING (AC)				211C99	1	Prior to Spec P (Unhoused Sets)
	214A50	4	Key 1, 2 240 V, 1 Phase & 3 Phase		211C114	1	Begin Spec P (Unhoused Sets)
	214A56	4	120 V, & 120/240 V (Recon- nectible), 1 Phase, and 120/208 V, 3 Phase		211B229	1	Housed Sets Only
	214A62	3	120/240 V, 1 Phase, Non-Re- connectible - Prior to Spec K	21	312A58	As Req.	Condenser .1 Mfd. - AC
	214A56	3	120/240 V, 1 Phase, Non-Re- connectible - Begin Spec K	21	CONDENSER .5 MFD. - DC		
	214A56	4	Key 3 120 V, 1 Phase		312A17	1	120 V, 120/240 V, 1 Phase
	214A50	4	240 V, 1 Phase		312A27	1	120/208 V, 3 Phase
	214A50	6	120/240 V, 1 Phase, & 240 V, 3 Phase	22	232D1811	1	Support, Generator - Key 3
	214A50	8	120/208 V, 3 Phase	23	COLLECTOR RING		
15	BELL, END						Key 1, 2
	211D97	1	120 V, 60 Hertz, 1 Phase, & 240 V, 50 & 60 Hertz, 1 Phase		204A9	1	120 V & 240 V, 1 Phase
	211D98	1	120/240 V, 60 Hertz, 1 Phase, 120/208 V, 60 Hertz, 3 Phase, 220/380 V, 50 Hertz, 3 Phase, & 240 V, 60 Hertz, 3 Phase		204A10	1	120/240 V, 1 Phase, Non- Reconnectible & 240 V, 3 Phase
16	STUD, GENERATOR THROUGH				204A92	1	120/240 V, 1 Phase, Recon- nectible & 120/208 V, 3 Phase & 220/308 V, 3 Ph.
	520A498	2	Key 1, 2				Key 3
	520A487	2	Key 3		204B19	1	120 V & 240 V, 1 Phase
17	STUD, ARMATURE THROUGH				204B20	1	120/240 V, 1 Phase & 240 V, 3 Phase
	520A407	1	Key 1, 2 120 V, & 240 V, 1 Phase		204B79	1	120/208 V, 3 Phase
	520A416	1	120/240 V, 1 Phase and 120/208 V, & 240 V, 3 Phase		204B75	1	220/380 V, 3 Phase
	520A45	1	Key 3 120 V, & 240 V, 1 Phase	24	COMMUTATOR		
	520A516	1	120/240 V, 1 Phase and 120/208 V, & 240 V, 3 Phase		203A127	1	Key 1, 2
18	SCROLL, GENERATOR AIR				203A14	1	Key 3 All Except 120/208 V, 3 Ph., & 220/380 V, 3 Phase
	232C1256	1	Key 1, 2		203A96	1	120/208 V, 3 Phase & 220/380 V, 3 Phase
	232C1815	1	Key 3				



NOTE: 02SXIN1A used on 60 Hertz Sets Prior to Spec C.
 04SXIN1A used on 60 Hertz Sets Spec C through G.
 04SXIN1B used on all 60 Hertz Sets Spec H through M.
 04SXIN1B used on all 60 Hertz Sets (Except 120/240 Volt, 1 Phase and 120/208 Volt, 3 Phase) Begin Spec P.
 04SXIN3B used on all 120/240 V, 1 Phase and 120/208 Volt, 3 Phase, 60 Hertz Sets Begin Spec P.
 06SX51N1B used on all 50 Hertz Sets Prior to Spec P.
 06SX51N1B used on all 50 Hertz Sets (Except 120/240 Volt, 1 Phase and 120/208 Volt, 3 Phase) Begin Spec P.
 06SX51N3B used on 120/240 V, 1 Phase and 120/208 Volt, 3 Phase, 50 Hertz Sets Begin Spec P.

Check plant nameplate for Magneclter number and use correct column.

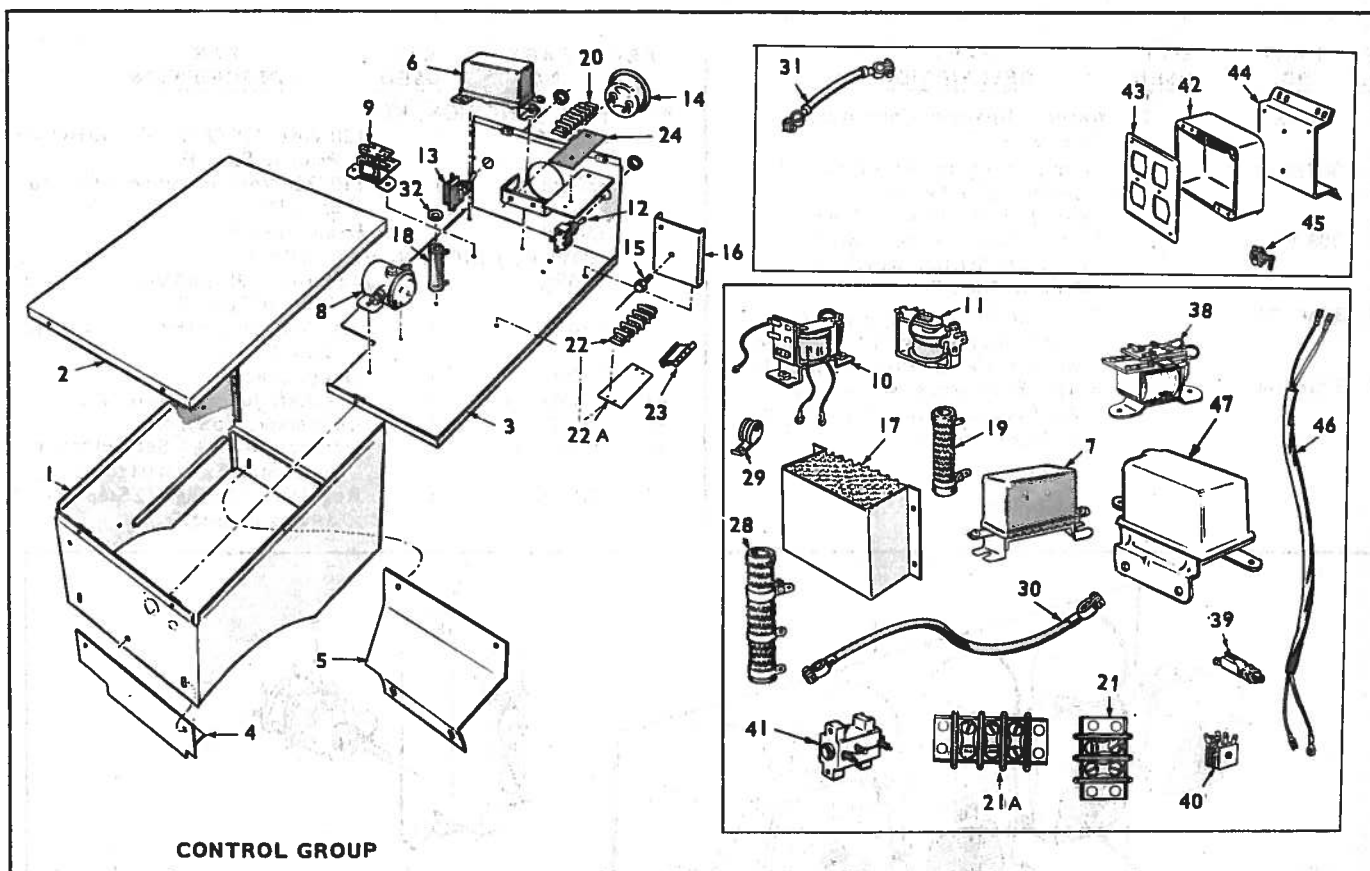
REF. NO.	QTY. USED	PART DESCRIPTIONS	PART NUMBER						
			02SX IN1A	04SX IN1A	04SX IN1B	04SX IN3B	06SX5 IN1B	06SX5 IN3B	
	1	Exciter Complete (Less Cover)	209-1	209-2	209-3	209-5	209-12	209-13	
1	1	Cover, Exciter	234C154	234C154	234B185	234B185	234D185	234D185	
2	1	Panel Only, Exciter	234B153	234B153	234B188	234B188	234B188	234B188	
3	2	Reactor, Gate	315A84	315A99	315A99	315A99	315B104	315B104	
4	2	Gasket, Gate Reactor Mounting, Outer	232A1553	232A1553	232A1553	232A1553	232A1553	232A1553	
5	2	Gasket, Gate Reactor Mounting, Inner	232A1551	232A1551	232A1551	232A1551	232A1551	232A1551	
6	2	Retainer, Gate Reactor	232A1552	232A1552	232A1552	232A1552	232A1552	232A1552	
7	1	Stud, Gate Reactor Mounting	520A211	520A211					
8	1	Rectifier Assy., Resistor and Complete	305C242	305C259	305C259	305C387	305C264	305C388	
9	2	Rectifier Only, Power Field, Negative	305P238	305P238	305P238	305P238	305P238	305P238	
9A	2	Rectifier Only, Power Field, Positive	305P239	305P239	305P239	305P239	305P239	305P239	
9B	1	Rectifier, Field Flash				305P239		305P239	
10	4	Rectifier, Voltage Control	305P240	305P240	305P240	305P240	305P240	305P240	
11	1	Resistor, Included in Rectifier Assy. (150-Ohm, 5-Watt)					304A512	304A512	
11	1	Resistor, Incl. in Rectifier Assy. (500-Ohm, 5 Watt)	304P476	304P476	304P476	304P476			
12	1	Block, Terminal	332A699	332A699	332A745	332A745	332A745	332A745	
13	1	Strip, Block Marker	332A700	332A738	332A746	332A925	332A746	332A925	
14	1	Resistor, Fixed (200-Ohm, 50-Watt)	304A489						
14	1	Resistor, Tapped, 500-Ohm (425 Fixed, 75 Adj.)		304A511					
14	1	Resistor, Tapped, 500-Ohm (425 Fixed, 75 Adj.)							
15	4	Washer, Resistor Centering (Two Only Used for 02SX IN1A)	304A15	304A15	304A527	304A527	304A527	304A527	
16	2	Spacer, Resistor Mounting	232A1550	232A1550	304A15	304A15	304A15	304A15	
17	1	Reactor, Voltage Control	315A85	315A100	315A100	315A100	232A1474	232A1474	
18	2	Gasket, Voltage Control Reactor	232A1548	232A1548	232A1548	232A1548	232A1548	232A1548	
19	1	Relay, Field Build-up	307A584						
20	1	Stud (or Screw), Tapped Resistor Mounting	812-116	812-116	520A641	520A641	520A641	520A641	
21	1	Clip, Tinnerman	332-50	332-50	332-51	332-51	332-51	332-51	
22	1	Grommet, Rubber, For 7/8" Hole	508P8	508P8	508P8	508P8	508P8	508P8	
23	1	Cover, Relay	307A643						
24	1	Resistor, Fixed (250-Ohm, 25 Watt)		304A510	304A510	304A510	304A510	304A510	
25	1	Switch, Residual Reset			308A175		308A175		
26	1	Washer, Retainer, Voltage Control Reactor	526-173	526-173	526-173	526-173	526-173	526-173	



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	ADAPTER, ENGINE TO GENERATOR		
	231E99	1	Prior to Spec H
	231E111	1	Begin Spec H
	231E112	1	Mobile Application
2	205C64	1	Blower, Gen.
3	515-6	1	Key, Blower
4	234B162	1	Scroll, Gen. Air
5	*	1	Rotor Assy., Wound - Includes Brg., & Blower
6	510A47	1	Bearing, Rotor
7	232A596	1	Clip, Bearing
8	*	1	Stator Assy., Wound
9	BELL, END, ALTERNATOR TO EXCITER		
	211E138	1	Prior to Spec H
	211E146	1	Begin Spec H
10	STUD, GEN. THROUGH, KEY 4		
	520A601	4	60 Hertz Sets - Prior to Spec E
	520A636	4	60 Hertz Sets - Begin Spec E
	520A636	4	50 Hertz Sets
10	STUD, GENERATOR THROUGH, X-RAY MODELS		
	520A607	4	Prior to Spec E
	520A638	4	Begin Spec E
11	STUD, ROTOR THROUGH		
	520A612	1	Key 4
	520A613	1	X-RAY MODELS
12	212A1064	2	Block, Coll. Ring Brush Guide
13	214A59	4	Brush, Collector Ring, (AC)
14	234B172	1	Cover, Air Outlet
15	870-177	1	Clip, Air Outlet Cover Fastening
16	304A500	1	Resistor, Tapped Adj.
17	232A1565	1	Bracket, Resistor Mtg.
18	304A6	2	Washer, Resistor Centering

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
19	520A620	1	Stud, Resistor Mtg.
20	866-1	1	Nut, Resistor Mtg.
21	NUT, ROTOR STUD, KEY 4		
	232A1567	1	60 Hertz
	110A67	1	50 Hertz
21	NUT, ROTOR STUD, X-RAY MODELS		
	232A1567	1	Prior to Spec E (7/16-14)
	870P203	1	Begin Spec E (7/16-20)
22	232-200	1	Washer, Rotor Stud
23	GROMMET		
	508P95	1	Through Baffle Plate
	508B112	1	Lead Out
24	332-50	1	Clip, Brush Leads
25	204A61	1	Collector Ring

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

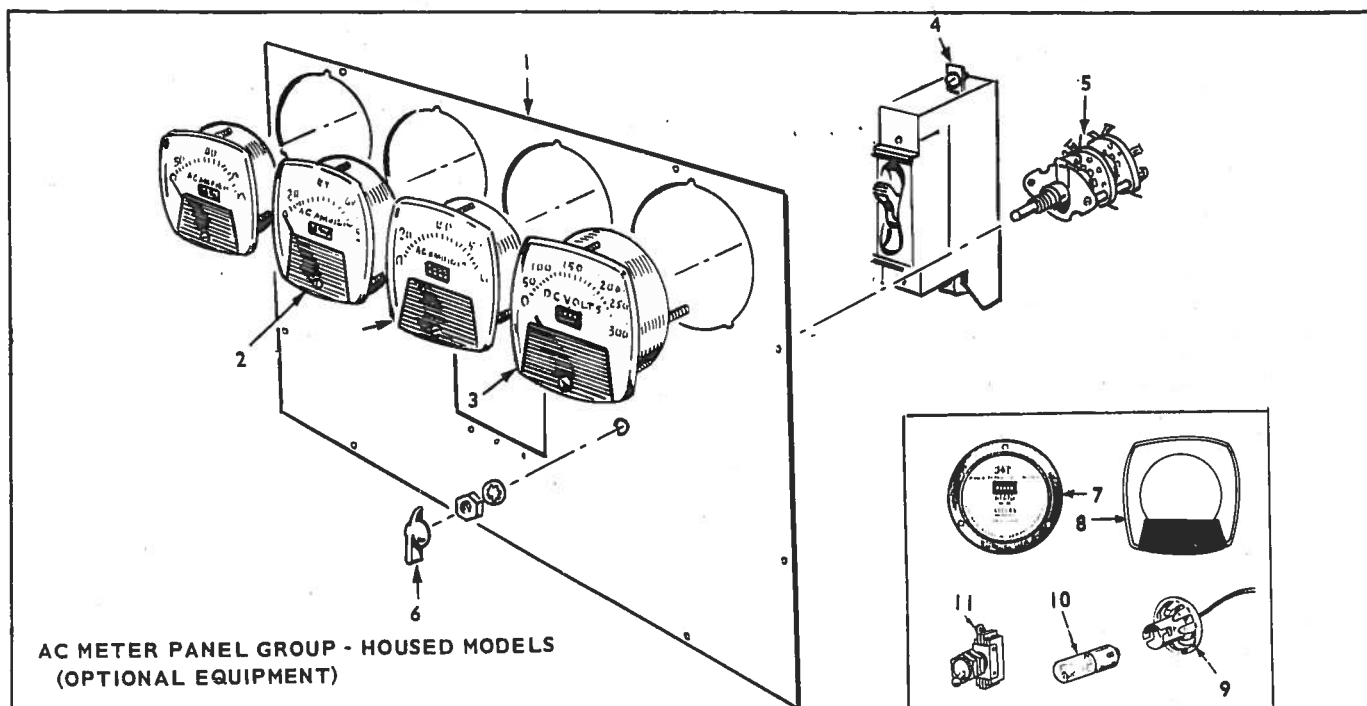


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	BOX, CONTROL		
	301D2008	1	Key 2,3
	301C1962	1	Key 4
2	301B1963	1	Cover, Control, Key 2, 3, 4
3	PANEL, CONTROL		
	301C2009	1	Key 2,3 - Prior to Spec P
	301D2541	1	Key 2,3 - Begin Spec P
	301C1961	1	Key 4
4	BRACKET, CONTROL BOX (R.H.)		
	301C2010	1	Key 2,3
	301B1964	1	Key 4
5	BRACKET, CONTROL BOX (L.H.)		
	301B2011	1	Key 2,3
	301B1965	1	Key 4
6	307B597	1	Relay, Ignition Start, Key 4
7	307B180	1	Relay, Reverse Current, Key 2,3
8	SOLENOID, START		
	307B1046	1	Key 2,3,4 - Prior to Spec M
	307B845	1	Key 2, 3 - Begin Spec M
	307B40	1	Key 4 - Begin Spec M
9	307B623	1	Relay, Ignition, Key 4
10	RELAY, START, DISCONNECT, KEY 2,3		
	306A28	1	Prior to Spec P
	307B642	1	Begin Spec P
11	307B253	1	Relay, Stop, Key 2,3
12	308P154	1	Switch, Start-Stop, Key 2,3,4
13	308P2	1	Switch, Selector (Man. or Elec. Start) Key 2,3,4
14	AMMETER, CHG.		
	302A58	1	Key 2,3
	302A446	1	Key 4
15	RECTIFIER, 10 AMP, 100-VOLT PEAK		
	305A235	1	Key 4 - Prior to Spec P
	305A235	1	Key 2,3,4 - Begin Spec P
16	BRACKET, RECT.		
	305A254	1	Key 4 - Prior to Spec P
	305A254	1	Key 2,3,4 - Begin Spec P
17	301B2012	1	Cover, Res. Key 2,3
18	304A251	1	Resistor, Fixed (30 Ohm, 5 Watt) Key 2, 3

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
18	304A32	1	Resistor, Fixed (15-Ohm, 10 Watt) Key 4
18	304A217	1	Resistor, Fixed (1-Ohm, 10 Watt) Low Oil Press. Switch, Begin Spec F. Key 2,3,4
18	304A631	1	Resistor, Fixed (6-Ohm, 100 Watt) Key 2,3 Begin Spec P
19	304A506	1	Resistor, Adj. (6-Ohm, 150 Watt) Key 2,3 Prior to Spec P
19	304A632	1	Resistor, Adj. (6-Ohm, 100 Watt) Key 2,3 Begin Spec P
20	332A537	1	Block, Terminal, 4 Pl. (Remote) Key 2,3,4
	BLOCK, TERMINAL, LOAD		
21	332A609	1	2-Pl., Key 2,3 (Also WITH Low Oil Press. Switch) - Prior to Spec F
21A	332A611	1	3-Pl., Key 2,3 (WITH Low Oil Press. Switch), Begin Spec F
22	332A706	1	Block, Terminal, 8 Pl., Load, Key 4
22A	332A739	1	Strip, Block Mkr. (4,5,6,7,8,9) Key 4
23	332K750	1	Marker Strip & Holder. Batt. Polarity Key 4 - Prior to Spec P
24	332A566	1	Strip, Block Mkr. (B+, 1, 2, 3), Key 2,3,4
28	304A500	1	Resistor, Tapped Adj. (Mts. in Gen. Air Out.) Key 4
29	332P52	1	Clip, Key 4
30	CABLE, BATTERY KEY 2, 3, 4		
	416A21	2	Pressure Cooled Sets Without Housing or Skid
	416A21	2	Vacu-Flo Cooled Sets with Shutter, Without Housing or Skid
	416A77	2	Vacu-Flo Cooled Sets Without Shutter, Housing or Skid
	416A50	2	Optional Housed and Skid Mounted Sets
31	CABLE, BATTERY JUMPER, KEY 2, 3, 4		
	416A4	1	Sets Without Housing or Skid Base
	416A133	1	Sets With Optional Housing or Skid Base

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
37	304A6	2	Washer, Resistor Centering, Key 2, 3
38	307B614	1	Relay, Latching, With Low Oil Pressure Switch, Key 2, 3, 4 - Prior to Spec F
39	308-91	1	Switch, Reset, With Low Oil Pressure Switch, Key 2, 3 - Prior to Spec F
40	305P197	1	Rectifier, Full Wave, Eyelet Conn. WITH Low Oil Pressure Switch, Key 4 - Prior to Spec F
41	320A104	1	Relay, Emergency, WITH Low Oil Pressure Switch, Key 2, 3, 4 - Begin Spec F

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
42	BOX, JUNCTION, KEY 1		
	330A30	1	120 Volt, 120/240 Volt, 60 Hertz - Prior to Spec P
	330-28	1	120/208 Volt, 60 Hertz - Prior to Spec P
	330-78	1	Begin Spec P
43	COVER, JUNCTION BOX, KEY 1		
	330P2	1	120 Volt, 120/240 Volt, 60 Hertz - Prior to Spec P
	330-6	1	120/208 Volt, 60 Hertz - Prior to Spec P
	330-6	1	Begin Spec P
44	301B2129	1	Bracket, Junction Box, Key 1
45	331-27	1	Connector, Load, Key 1
46	338A305	1	Harness, Wiring - Set Control to Start-Stop Switch (Hsd. Only)
47	305B383	1	Regulator, Voltage (2 Step) Key 2, 3 - Begin Spec P



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*	1	Panel
2	AMMETER, AC (CHECK SCALE, SELECT ACCORDING TO RATING)		
	302P418		Scale Reads 0-30
	302P444	As	Scale Reads 0-35
	302P419	Req.	Scale Reads 0-50
	302P458		Scale Reads 0-80
3	VOLTMETER, AC (CHECK SCALE, SELECT ACCORDING TO RATING)		
	302P421	1	Scale Reads 0-300
	302P422	1	Scale Reads 0-600
4	BREAKER, CIRCUIT (CHECK ORIGINAL PART, SELECT ACCORDING TO AMP & VOLT - 120/240 V IS 1" WIDE, 480 VOLTS, 1-1/2" WIDE)		
	320B150		20 Amp, 480 Volt
	320B151		25 Amp, 480 Volt
	320B20		35 Amp, 120/240 Volt
	320B153		40 Amp, 120/240 Volt
	320B198	As	45 Amp, 120/240 Volt
	320B52	Req.	50 Amp, 120/240 Volt
	320B195		55 Amp, 120/240 Volt
	320B148		70 Amp, 120/240 Volt
5	308-12	1	Switch, Voltmeter Selector, 3 Phase Only
6	303-76	1	Knob, Selector Switch, 3 Phase Only

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	METER, FREQUENCY		
	302-213	1	60 Hertz
	302-234	1	50 Hertz
8	302B448	1	Plate, Meter Face
9	322P72	2	Receptacle, Panel Lights
10	322-4	2	Bulb, Panel Light
11	308-2	1	Switch, Panel Light

* - Order by description, giving complete Model and Serial Number (ONAN Nameplate).

SERVICE KITS & MISCELLANEOUS

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

98C1100	1	Decal Kit
168K83	1	Gasket Kit Set
OVERHAUL KIT, PLANT (DOES NOT APPLY FOR PENNSYLVANIA APPROVED SETS)		
522K198	1	Prior to Spec R
522K230	1	Begin Spec R
525P137		Paint, Touch-up Enamel, Green, 16 Ounce Pressurized Can

SPECIAL PARTS LIST

FOR JB SERIES

PENNSYLVANIA APPROVED

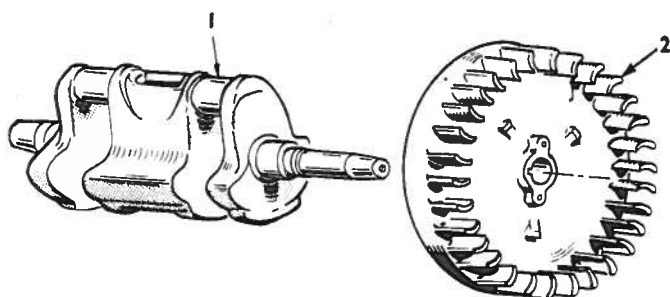
GENERATING SETS

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: 7.5JB-4R31/1P).

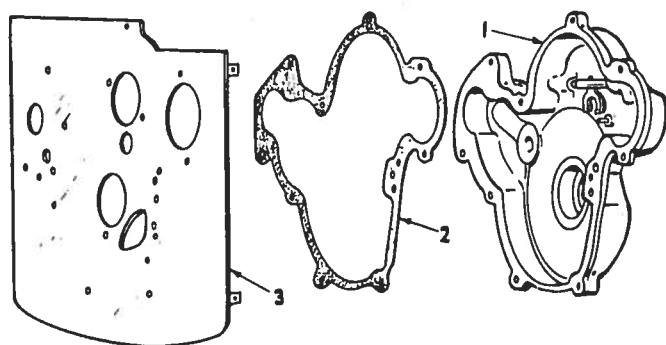
The Specification Letter advances (A to B, B to C, etc.) with manufacturing changes.

CRANKSHAFT AND FLYWHEEL GROUP (SPECIAL LIST) - PRIOR TO SPEC R



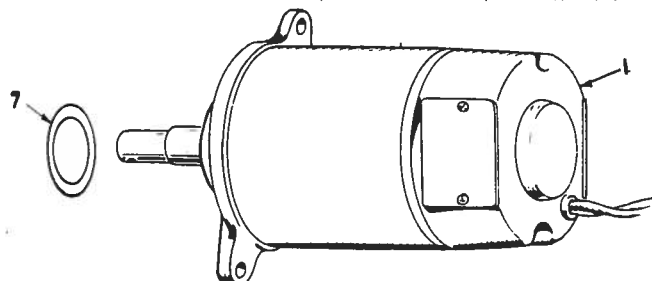
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104D430	1	Crankshaft
2	104B473	1	Flywheel

GEAR COVER GROUP (SPECIAL LIST) - PRIOR TO SPEC R

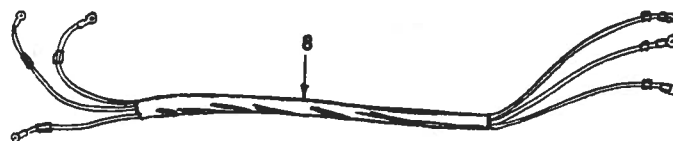
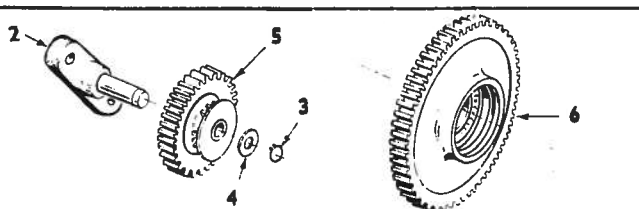


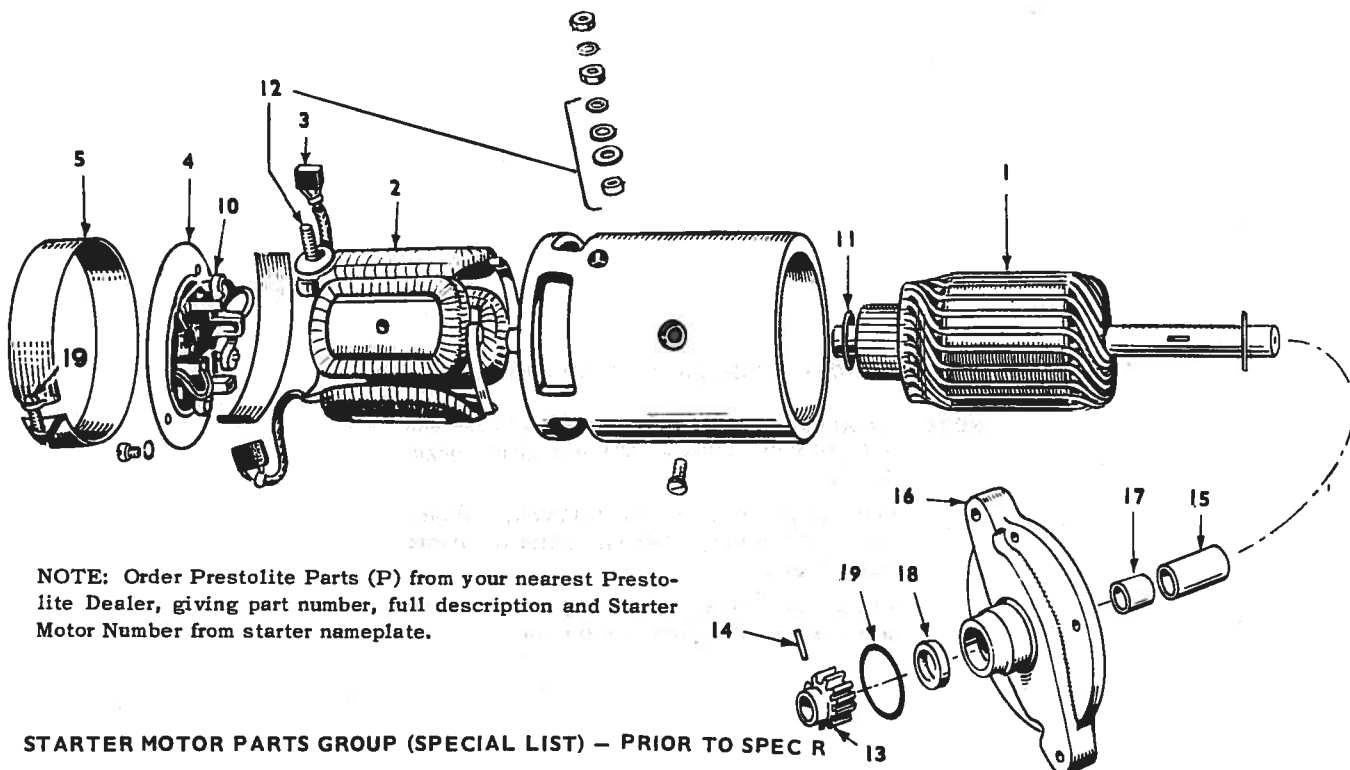
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	103C252	1	Cover Assembly, Gear-Complete
2	103B231	1	Gasket, Gear Cover
3	103D225	1	Backplate, Gear Cover

STARTER MOTOR GROUP (SPECIAL LIST) - PRIOR TO SPEC R



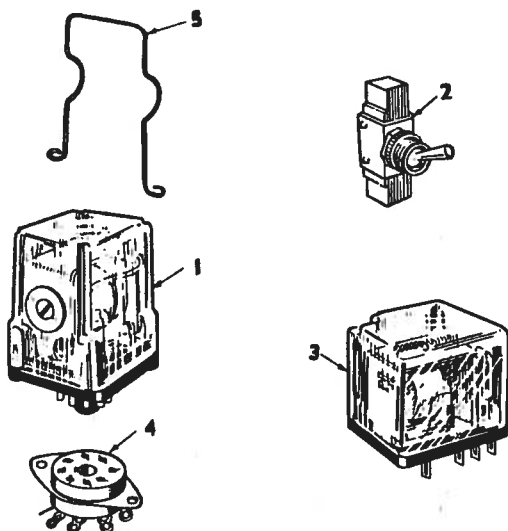
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191B453	1	Motor, Starter (12 V) Incl. Gear & Pin
2	191A342	1	Base and Shaft, Idler Gr.
3	518-196	1	Ring, Retaining - Idler Gr.
4	526-175	1	Washer, Thrust - Idler Gr.
5	191A457	1	Gear Assy., Idler
6	191B354	1	Gear & Clutch Assy., Crankshaft
7	509-93	1	Seal, "O" Ring - Starter Mtg.
8	338B327	1	Harness, Starter to Control



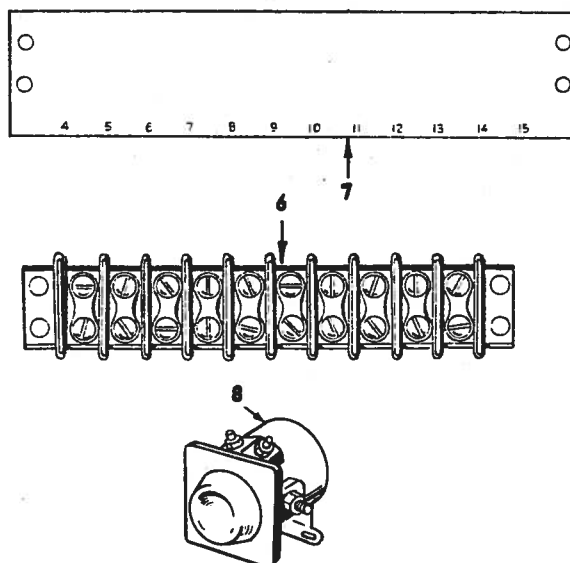


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191B453	1	Motor, Starting (12 V)
2	191A452	1	Armature
3	(P)20-14	1	Coil Assy., Field
4	191-513	1	Brush Set, Service
4	(P)19-27	1	Head Assy., Commutator End
5	(P)36-321	1	Band, Cover
10	(P)50-263	1	Spring, Brush (Set of 4)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
11	(P)90-263	1	Washer Armature Thrust (Pkg.) Use as required.
12	(P)90-333	1	Stud, Terminal (Pkg.)
13	191A450	1	Gear, Pinion
14	516A154	1	Pin, Pinion Gear
15	191A451	1	Spacer, Armature to Adapter
16	191A446	1	Adapter
17	191P326	1	Bushing, Adapter
18	509-92	1	Seal, Oil Armature Shaft - Front
19	509-93	1	Seal, "O" Ring Starter Motor Mtg.



CONTROL GROUP (SPECIAL LIST)



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	307P773	1	Relay-Start Disconnect & Ign.
2	308P5	1	Switch
3	307B860	1	Relay, Field Build-up
4	323-52	1	Socket, Relay

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
5	307P778	1	Spring, Holddown - Relay
6	332A751	1	Block, Terminal
7	332A608	1	Strip, Marker
8	307B845	1	Solenoid, Start - Begin Spec L

GENERATOR GROUP, EXCITER PORTION (SPECIAL LIST)

NOTE: 04SX1N3B used on 120/240 Volt, 1 Phase and 120/208 Volt, 3 Phase, 60 Hertz plants begin Spec L.

06SX51N3B used on 120/240 Volt, 1 Phase and 120/208 Volt, 3 Phase 50 Hertz plants begin Spec L.

Check plant nameplate for Magneciter number and use correct column in main list.