

OPERATOR'S MANUAL AND PARTS CATALOG

FOR
ELECTRIC GENERATING SETS

*File
Literature
Section*
Pg. 9
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967
0340

JC
SERIES

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(SPEC A 7A1 A2)
8A A74
(Replaces 3AU73)

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INTRODUCTION

THIS OPERATOR'S MANUAL CONTAINS INFORMATION PERTAINING TO THE OPERATION AND MAINTENANCE OF YOUR UNIT.

WE SUGGEST YOU KEEP THE MANUAL AND THE WIRING DIAGRAM WHICH ACCOMPANIES EVERY UNIT AND REFER TO IT WHEN MAKING EQUIPMENT ADJUSTMENTS OR ORDERING PARTS. ADDITIONAL COPIES ARE AVAILABLE FOR A NOMINAL CHARGE FROM YOUR DISTRIBUTOR.

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

FOR REPAIR SERVICE, CONTACT YOUR AUTHORIZED SERVICE REPRESENTATIVE.

WARNING

TO AVOID POSSIBLE PERSONAL INJURY OR EQUIPMENT DAMAGE, A QUALIFIED ELECTRICIAN OR AN AUTHORIZED SERVICE REPRESENTATIVE MUST PERFORM INSTALLATION AND ALL SERVICE.

ONAN GENERATING SETS

JC SERIES

967-0340

8A,AA74

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SAFETY PRECAUTIONS

The following symbols in this manual signal potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Then, take necessary steps to protect personnel as well as equipment.

WARNING Onan uses this symbol throughout this manual to warn of possible serious personal injury.

CAUTION This symbol refers to possible equipment damage.

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

- **Use Extreme Caution Near Gasoline, Gaseous Fuel And Diesel Fuel. A constant potential explosive or fire hazard exists.**

Do not fill fuel tank near unit with engine running. Do not smoke or use open flame near the unit or the fuel tank.

Be sure all fuel supplies have a positive shutoff valve.

Fuel lines must be of steel piping, adequately secured and free from leaks. Do not use copper piping on flexible lines as copper becomes hardened and brittle. Use black pipe on natural gas or gaseous fuels, not on gasoline or diesel fuels. Piping at the engine should be approved flexible line.

Have a fire extinguisher nearby. Be sure extinguisher is properly maintained and be familiar with its proper use. Extinguishers rated ABC by the NFPA are appropriate for all applications. Consult the local fire department for the correct type of extinguisher for various applications.

- **Guard Against Electric Shock**

Remove electric power before removing protective shields or touching electrical equipment. Use rubber insulative mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin

surfaces to be damp when handling electrical equipment.

Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

Use extreme caution when working on electrical components. High voltages cause injury or death.

Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

- **Do Not Smoke While Servicing Batteries**

Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

- **Exhaust Gases Are Toxic**

Provide an adequate exhaust system to properly expell discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

Be sure the unit is well ventilated.

- **Keep The Unit And Surrounding Area Clean.**

Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and may present a potential fire hazard.

Dispose of oily rags. Keep the floor clean and dry.

- **Protect Against Moving Parts.**

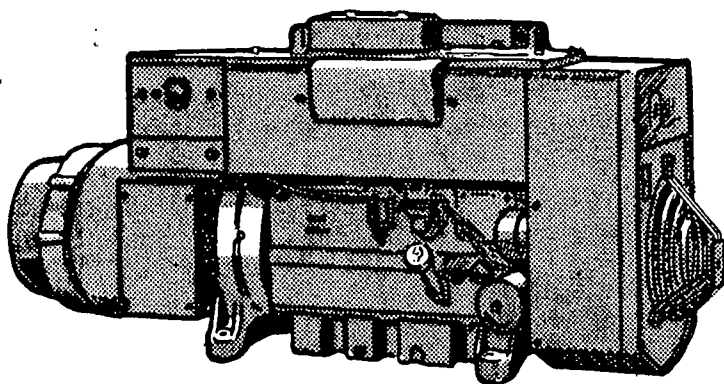
Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be permitted because of the danger of becoming caught in moving parts.

Make sure all nuts and bolts are secure. Keep power shields and guards in position.

If adjustments *must* be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

Do not work on this equipment when mentally or physically fatigued.

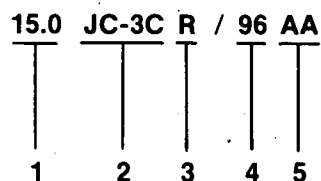
GENERAL INFORMATION



TYPICAL MODEL JC

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

How to interpret MODEL and SPEC NO.





MANUFACTURER'S GENERAL WARRANTY

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

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

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

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

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

ONAN 1400 72ND AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432
a division of Onan Corporation

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

SPECIFICATIONS

	MODEL SERIES	
	10.0JC* 12.5JC**	12.5JC* 15.0JC**
Nominal dimension of set (inches)		
Height	25	25
Width	19	19
Length	51	55
Number of cylinders (vertical in line)	4	4
Displacement (cubic inch)	120	120
Cylinder bore	3-1/4	3-1/4
Piston stroke	3-5/8	3-5/8
RPM (60 hertz)	1800	1800
RPM (50 hertz)	1500	1500
Compression ratio	6.5:1§	6.5:1§
Oil capacity (quarts)	6★	6★
Ignition (type)		
Battery	Yes	Yes
Flywheel magneto	No	No
Battery voltage (AC set)	12 volts	12 volts
Battery size (AC set)		
Amp/hr. SAE rating - 20 hr (nominal)	72	72
†SAE group 3KMB	One†	One†
Starting by starting motor with solenoid shaft and over-run clutch	Yes‡	Yes‡
Battery charge rate (amperes)	2	2
Ventilation required (cfm 1800 rpm)		
Engine (pressure cooling)	890	890
Engine (Vacu-Flo cooling)	1600	1600
Generator	120	126
Combustion	64	64
Output rated at unity power factor load	1 Phase	1 Phase
Output rated at 0.8 power factor load	3 Phase	3 Phase
Rating (output in watts)		
50 hertz AC	10,000	12,500
60 hertz AC	12,500	15,000
AC voltage regulation in ±%	3	3
AC frequency regulation in %	5	5
Revolving field generator	Yes	Yes
120/240 volt single phase model reconnectable	Yes	Yes
Static exciter (Magneciter)	Yes	Yes

* - Basic 50 hertz model.

** - Basic 60 hertz model.

§ - Penn State (gas) 9.2:1.

★ - Add 1/2 quart for filter.

† - Remote models - below 0°F use two SAE group 1H size batteries in series for 105 ampere hours, 12 volts.

‡ - Pennsylvania approved models use continuously meshed gear starting motor.

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

TUNE-UP SPECIFICATIONS

Cylinder head bolt torque (lbs. ft.)	28-30
Spark plug gap ^{JB}	.025
Centrifugal switch, breaker point adjustment ^{JE}	.020 ^{0.35}
Breaker point setting gap	.020
Tappets	
Gasoline	
Intake	.012
Exhaust	.015
Gas and Gas/Gasoline	
Intake	.013
Exhaust	.020
Ignition timing spark advance	
(Running) Gas Fuel	35° BTC
(Stopped) Gas Fuel	*10° BTC
(Running) Gasoline Fuel	
Flywheel magneto	—
Battery	25° BTC
(Stopped) Gasoline Fuel	
Flywheel magneto	—
Battery	**0° BTC

* - 20° BTC for units with shielded distributor.

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

DESCRIPTION

GENERAL

The Onan JC Series electric generating set consists of a four-cylinder, in-line gas or gasoline engine and an alternating current generator with standard or optional equipment as ordered. Generator output in watts is as specified on the unit nameplate.

ENGINE

The JC engine has a 120-cubic-inch piston displacement, 6.5:1 (9.2:1 for gas) compression ratio and is air-cooled. See *Specifications* for basic measurements and other details.

AC GENERATOR

The YD generators beginning with Spec AA (Figure 1) are four-pole, revolving field, brushless exciter models of drip-proof construction. Generator design includes both single and three-phase, 60 and 50 hertz type generators. The generator rotor connects direct-

ly to the engine crankshaft with a tapered shaft and key. The generator is fastened to the engine by the rotor-through-stud which passes through the rotor shaft; it has a nut on the outside of the end bell. A centrifugal blower, on the front end of the rotor shaft, circulates the generator cooling air which is drawn in through the end bell cover, over the rotor, and discharged through an outlet at the blower end.

A ball bearing in the end bell supports the outer end of the rotor shaft. The end bell and generator stator housing are attached by four through-studs which pass through the stator assembly to the engine-generator adapter. The brushless exciter stator mounts in the end bell while the exciter rotor and its rotating rectifier assemblies mount on the generator rotor shaft.

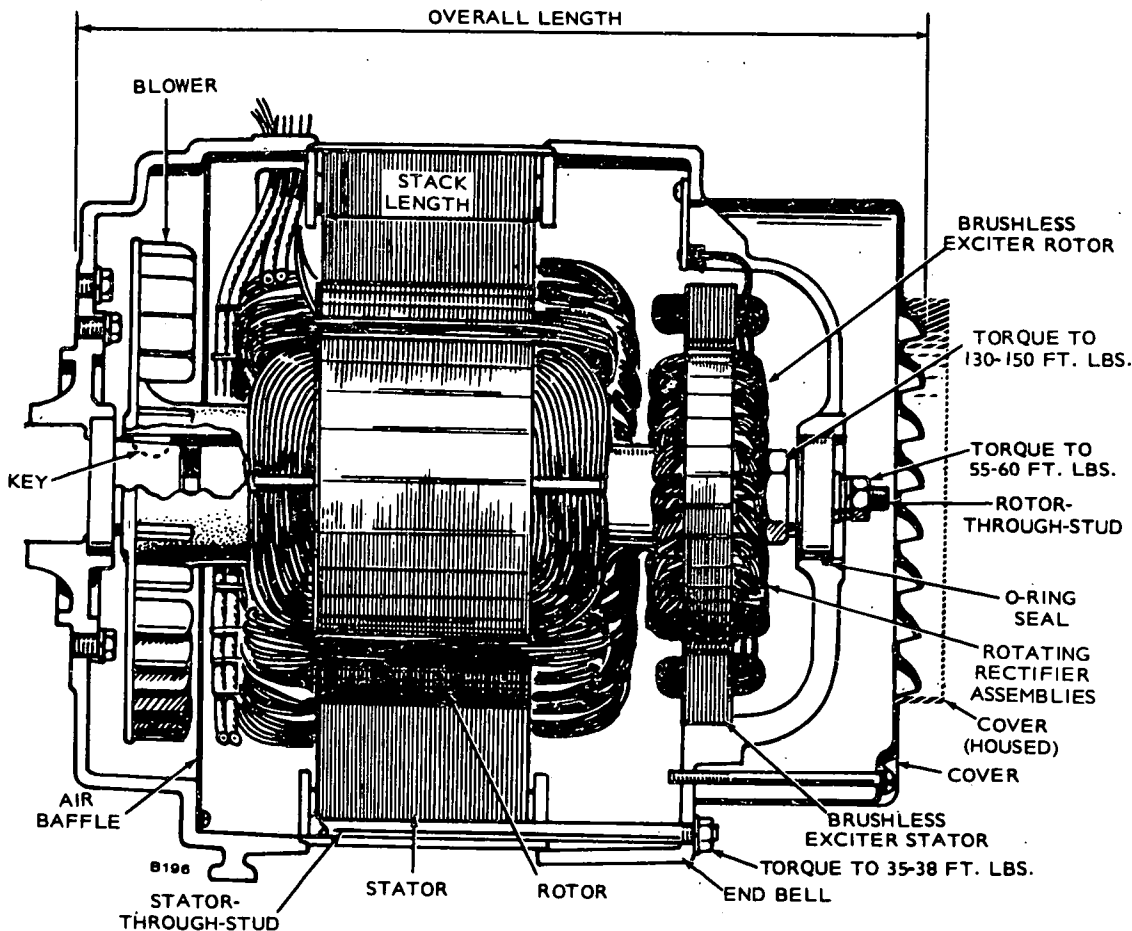


FIGURE 1. GENERATOR (CUTAWAY VIEW)

The basic operation of the generator and voltage regulator involves the stator, voltage regulator, exciter field and armature, a full wave bridge rectifier, and the generator rotor. Residual magnetism in the generator rotor and a permanent magnet embedded in one exciter field pole begin the voltage build-up process as the generator set starts running. Single-phase AC voltage, taken from one of the stator windings, is fed to the voltage regulator as a reference voltage for maintaining the generator output voltage. The AC reference voltage is converted to DC by a silicon controlled rectifier bridge on the voltage regulator printed circuit board and fed into the exciter field windings. The exciter armature produces three-phase AC voltage that is converted to DC by the rotating rectifier assembly. The resultant DC voltage excites the generator rotor winding to produce the stator output voltage for the AC load.

The generator rotor also produces AC voltage (19 to 21 volts) in the charging winding of the stator which is converted to direct current for battery charging.

VOLTAGE REGULATOR (Spec AA)

The line-voltage regulator on the J-series generator sets is an all solid state device; that is, no relays or tubes are needed. Basic components of the voltage regulator are:

- Printed circuit board VR21
- Voltage reference transformer T21
- Commutating reactor CMR21
- Field circuit breaker CB21
- Voltage adjust rheostat R22 (optional)

Figure 2 shows the above components in a typical control box, on standard air-cooled electric generating sets.

CONTROLS

The standard control box has a battery charge rate ammeter, a START-STOP switch, and field circuit breaker on the control panel, Figure 3. Optional controls that may be added on the standard panel include a fault lamp, a frequency meter, a running time meter, an overspeed indicator, a high temperature indicator, a volt adjust knob, a phase selector, and AC voltmeters.

The following is a brief description of typical controls and instruments on the face of the panels; these may vary according to the customer ~~purchase order~~ *requirements*.

Standard

Remote Start-Stop Terminal: Provides connections for start-stop switch.

Oil Pressure Gauge: Indicates pressure of lubricating oil in engine; unit located on the engine.

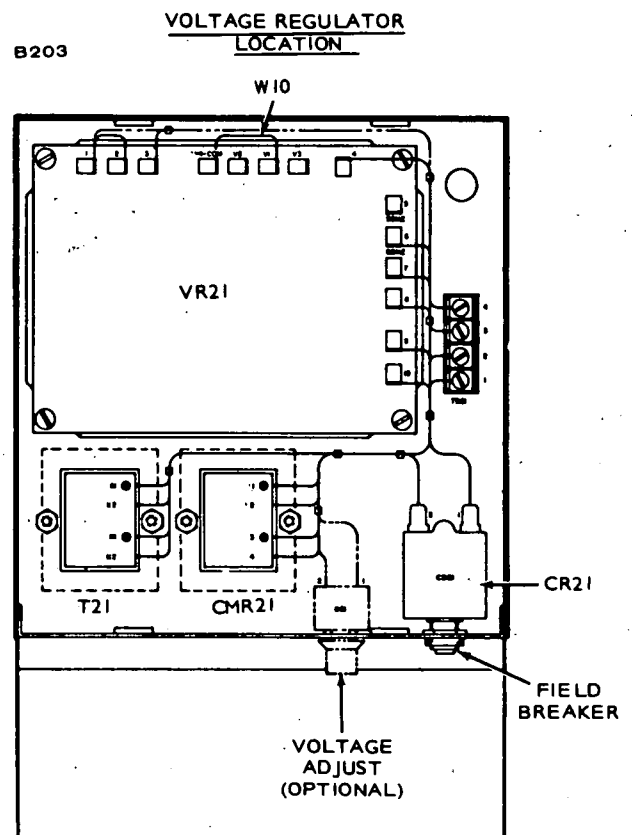
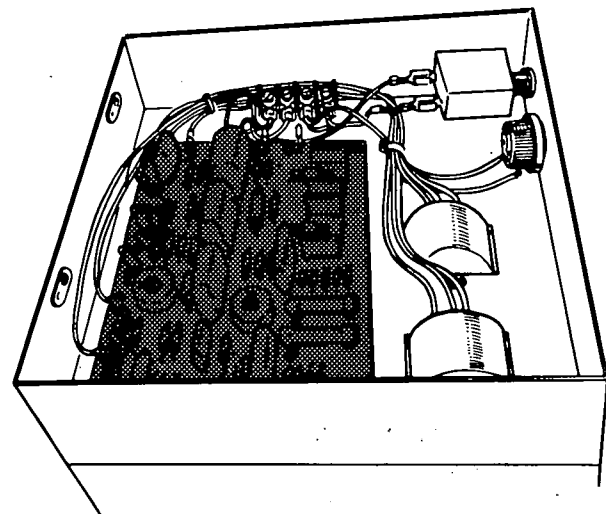


FIGURE 2. VOLTAGE REGULATOR ASSEMBLY

Voltage Adjust Rheostat: Provides approximately plus or minus 5 percent adjustment of the rated output voltage (optional).

Optional (On Housed Units):

AC Voltmeter: Indicates AC generator output voltage.

Voltmeter Phase Selector Switch: Selects the phases of the generator output to be measured by the AC voltmeter.

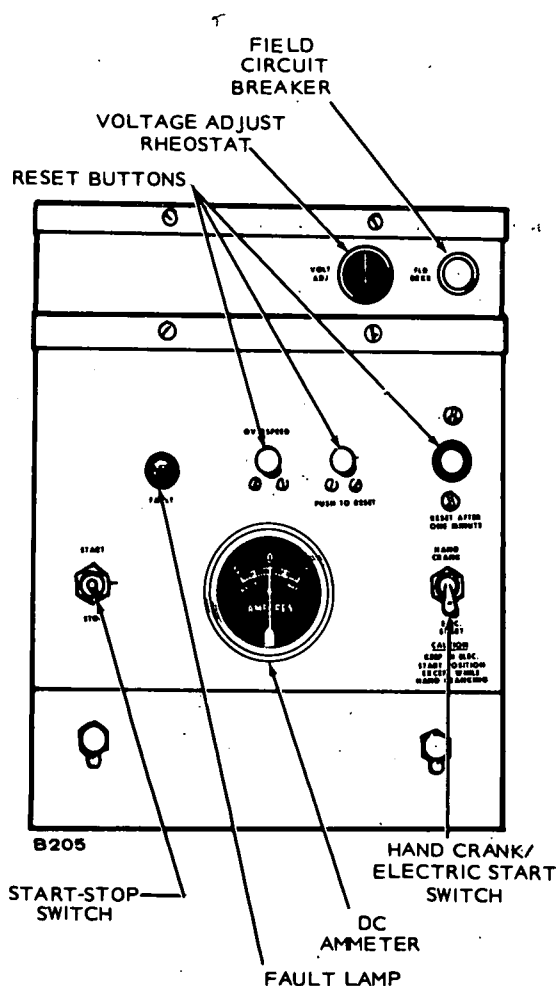


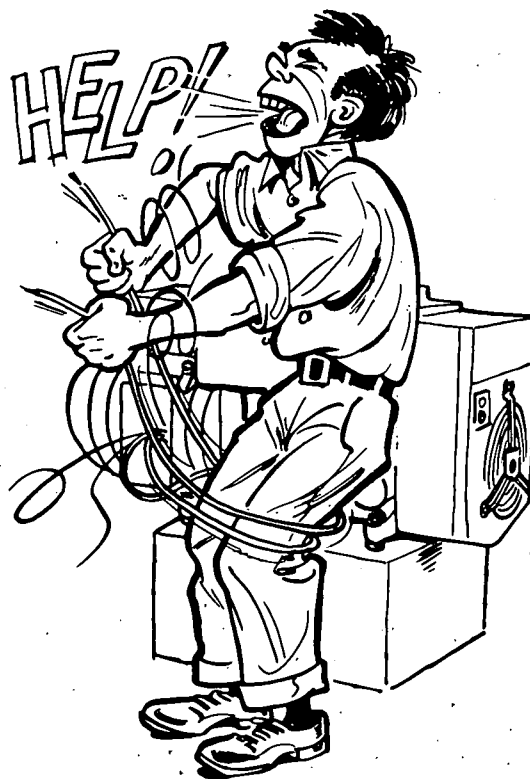
FIGURE 3. TYPICAL CONTROL PANEL

VOLTAGE RECONNECTION WITH OPTIONAL INSTRUMENTS

The optional AC instruments on the control panel (such as voltmeters, ammeters, and running time meters) are installed for use with specific nameplate voltages. Control components may have to be changed to match new current ratings when field reconnection for other voltages are made.

CAUTION

To prevent instrument damage, contact your Onan Service Center for required instrument changes, new wiring diagrams, proper specification number, and voltage before attempting to reconnect a generator with instruments on the control panel.



Voltage Adjust Rheostat: Provides approximately plus or minus 5 percent adjustment of the rated output voltage.

Running Time Meter: Registers the total number of hours, to 1/10th that the unit has run. Use it to keep a record for periodic servicing. Time is accumulative, meter cannot be reset.

Frequency Meter: Indicates the frequency of the generator output in hertz. It can be used to check engine speed. (Each hertz equals 30 rpm.)

Warning Lights: Four red indicator lights give warning of:

Three

- Overspeed
- Low oil pressure
- High engine temperature

Three reset pushbuttons permit restarting after trouble is corrected.

Line Circuit Breaker: Protects generator from line overloads.

INSTALLATION

GENERAL

Installations must be considered individually. Use these instructions as a general guide. Meet regulations of local building codes, fire ordinances, etc., which may affect may installation details. See Figure 4.

Installation requirements include:

1. Level mounting surface.
2. Adequate cooling air.
3. Adequate fresh induction air.
4. Discharge of circulated air.
5. Discharge of exhaust gases.
6. Electrical connections.
7. Fuel connections.
8. Accessibility for operation and servicing.
9. Vibration isolation.
10. Noise levels.

LOCATION

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

The air discharge side of set requires 3 inches clearance from wall to permit set to rock on its mounts; at least 24 inches clearance is required around all other sides for service accessibility.

MOUNTING

A permanent type installation needs a sturdy, level, mounting base of concrete, a heavy wood or structural steel at least 12 inches high to aid oil changing and operating. Place the 7/16-inch mounting bolts as shown in Figure 4.

Carefully assemble the mounting cushions, washers and spacer bushing on the mounting bolts. The spacer bushing prevents compression of the snubber (upper rubber cushion).

CAUTION

One-half inch clearance is required between oil filter and mounting bolts to avoid puncturing filter.

For mobile applications (trucks or trailers) install slide-out rails or some other means (such as doors) to provide service space. See Figure 5.

VENTILATION AND COOLING

Air circulation is needed to dissipate heat produced by the engine and generator in normal operation. Outdoor installation (Figure 4) can rely on natural circulation, but *mobile, indoor or housed* installations need proper size and positioned vents for required air flow, Figure 5. 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, and (6) prevailing wind direction.

A required volume of air must reach the unit, absorb the heat, and be discharged away from the installation.

Pressure cooled units need an inlet vent with an unrestricted opening of at least 5 square feet 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 inches. 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 large radius elbows. Use a canvas section at the set to absorb vibration and noise.
2. *Generator outlet ducts* must be used when units are installed in compartment too small for operator to walk. Ducts are recommended for all other indoor installations. The air outlet is 5-5/8 x 3 inches. Follow the same principles of duct design and installation as used for the engine duct. Engine and generator require separate ducts.

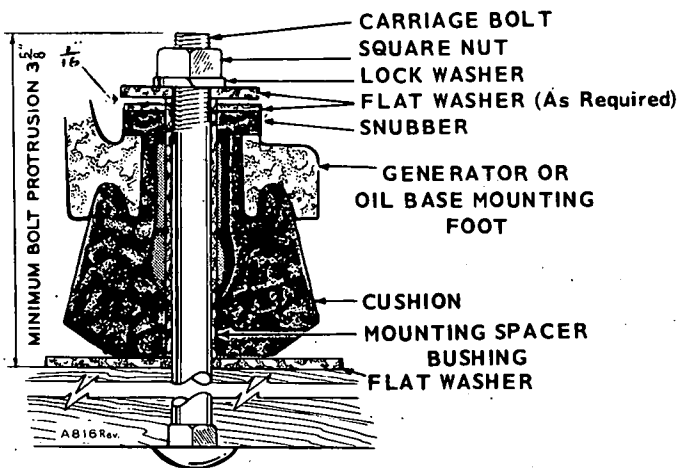
Vacu-Flo Cooling Inlet Vent should be at least 1/3 square foot; the duct for discharged air should be at least as large as the scroll outlet. (See *Specifications* for airflow.)

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

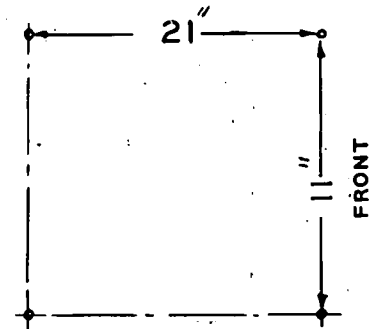
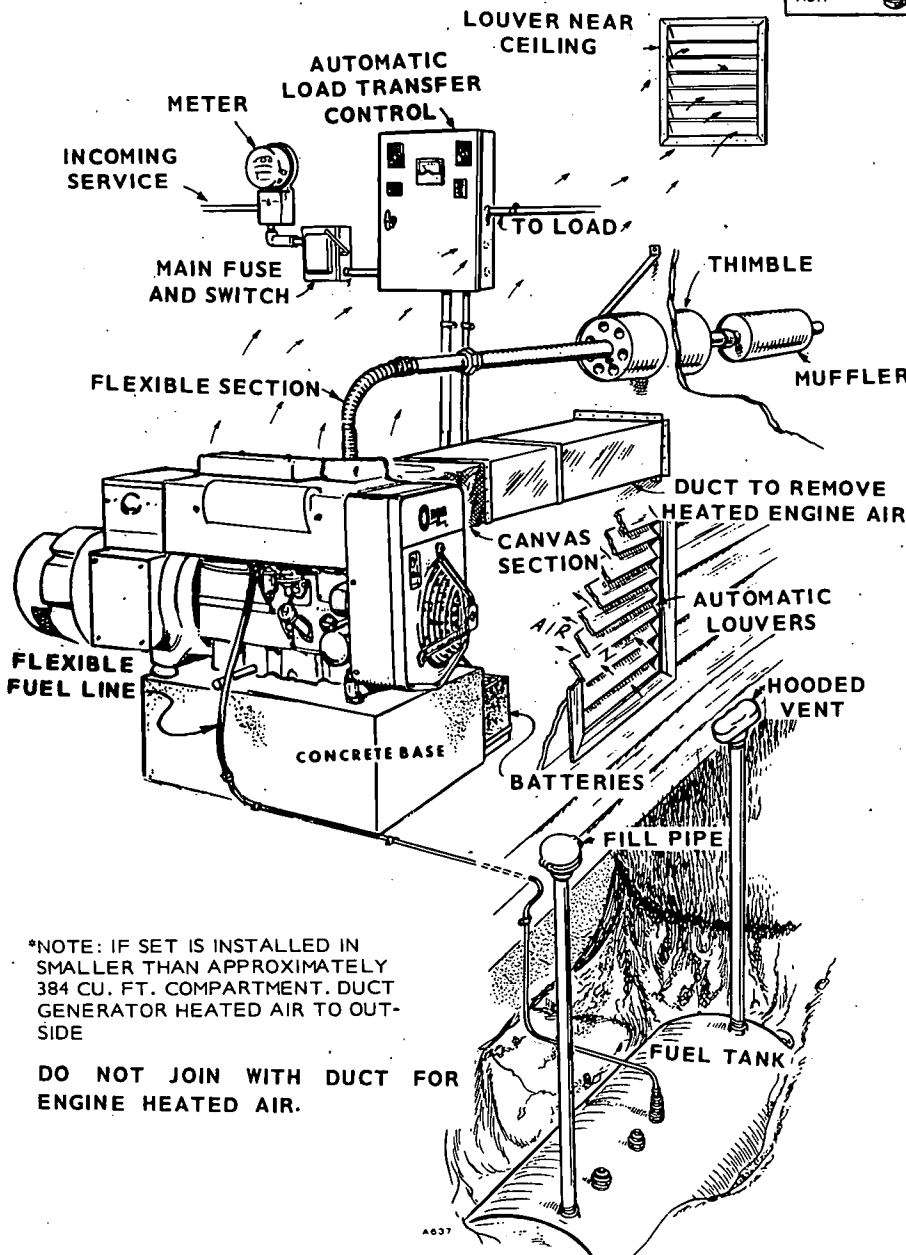
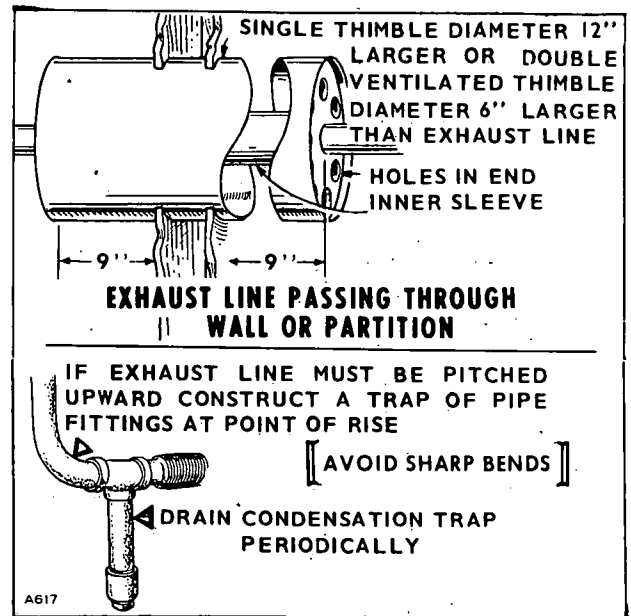
WARNING

Do not use exhaust heat to warm a room or compartment occupied by people due to possible leakage or harmful exhaust gases.

exhaust



MOUNTING CUSHIONS



MOUNTING BOLT LOCATIONS

*NOTE: IF SET IS INSTALLED IN SMALLER THAN APPROXIMATELY 384 CU. FT. COMPARTMENT. DUCT GENERATOR HEATED AIR TO OUTSIDE

DO NOT JOIN WITH DUCT FOR ENGINE HEATED AIR.

FIGURE 4. MOUNTING AND VENTILATION

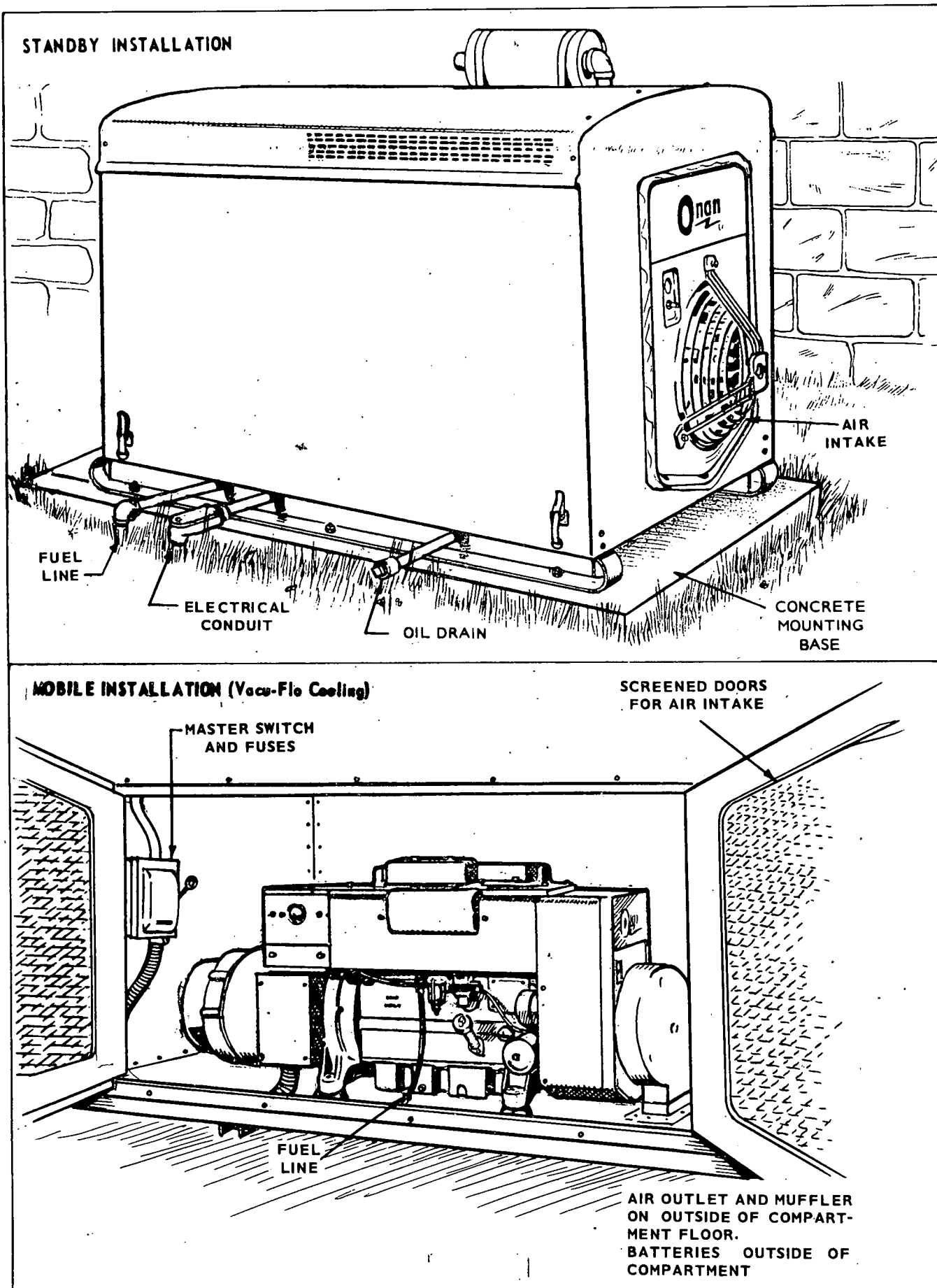


FIGURE 5. TYPICAL INSTALLATIONS

EXHAUST GASES ARE DEADLY POISONOUS!

EXHAUST

Vent exhaust gases outside. Use flexible tubing between the engine exhaust outlet and rigid piping to accommodate vibration.

Shield the line if it passes through a combustible wall or partition. If turns are necessary, use long sweeping type elbows. Use one pipe size larger for each ten feet in length. Position the exhaust outlet away from the engine air intake.

WARNING

Check exhaust system for leaks every 8 hours of operation. Pipe POISONOUS exhaust gas outside enclosure. Inhalation of exhaust gases can result in serious personal injury or death.

OIL DRAIN

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

FUEL 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.

FUEL CONNECTION

Connect the fuel line to the fuel pump inlet. Pump is threaded 1/8-27 NPTF (American Standard Internal Tapered Pipe Thread).

Always use flexible tubing between engine and the fuel supply to avoid line failure due to vibration.

For gaseous sets (see Figure 6), check 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 to open valve during running. Install a demand type gas regulator according to instructions and position it near the set to aid starting.

CAUTION

The fuel system should meet applicable codes. Always use flexible tubing between engine and fuel supply and between engine and gas demand regulator to avoid line failure and leaks due to vibration.

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

Do not use galvanized lines, fittings, or fuel tanks in the fuel system. Carefully clean all fuel system components before putting the set into operation.

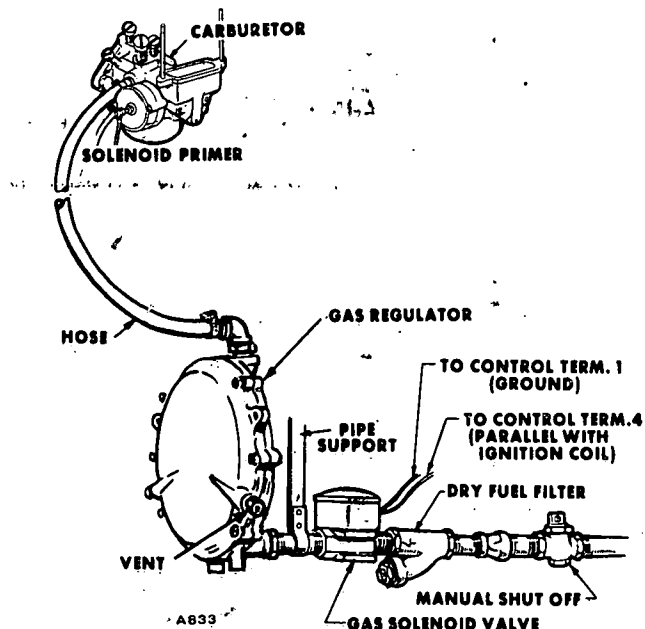


FIGURE 6. GAS REGULATOR

Any dirt or contamination may cause major damage to the fuel injection system.

ELECTRICAL CONNECTIONS

The nameplate on the generator set shows the electrical output rating of the generator in watts, volts, and hertz. The wiring diagram, shipped with the generator set, shows the electrical circuits and connections needed during installation.

All electrical connections should be done by a qualified serviceman or electrician to meet the electrical code requirements in your area.

LOAD WIRES

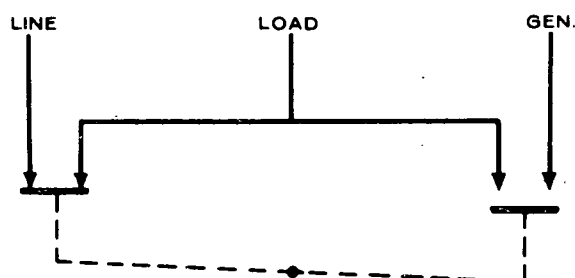
The control box (junction box) has knock out sections to accommodate load wires. Use flexible conduit and stranded load wires near the set to absorb vibration. Use sufficiently large insulated wires. Strip insulation from wire ends as necessary for clean connections. Connect each load wire to the proper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

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

NAMEPLATE VOLTAGE CODE	VOLTAGE	PHASE	FREQUENCY	CONNECT W10 JUMPER WIRE FROM V4 TO:	GENERATOR CONNECTION	GENERATOR CONNECTION SCHEMATIC DIAGRAM	LOAD TO GENERATOR CONNECTION WIRING DIAGRAM
3C	120/240	1	60	V1		A	CONNECT X1 TO VR21-5 FOR 50 HERTZ AND X1 TO VR21-6 FOR 60 HERTZ GENERATORS.
53C	120/240	1	50	V1		B	
	115/230	1	50	V2		C	
	110/220	1	50	V3			
18	120/208	3	60	V1	PARALLEL WYE		
518	110/190	3	50	V1			
	115/200	3	50	V2			
	120/208	3	50	V3			
	127/220	3	50	V4			
18	240/416	3	60	V1	SERIES WYE		
518	220/380	3	50	V1			
	230/400	3	50	V2			
	240/416	3	50	V3			
	254/440	3	50	V4			
18	120/240	3	60	V1	SERIES DELTA		
518	110/220	3	50	V1			
	115/230	3	50	V2			
	120/240	3	50	V3			
18	120/240	1	60	V1	DOUBLE DELTA		
518	110/220	1	50	V1			
	115/230	1	50	V2			
	120/240	1	50	V3			
18	120	1	60	V1	PARALLEL DELTA		
518	110	1	50	V1			
	115	1	50	V2			
	120	1	50	V3			
9X	347/600	3	60	V1	WYE		
B200							

FIGURE 7. GENERATOR WIRING AND CONNECTION DIAGRAMS

SPE



NOTE: SHOWN WITH LINE CONNECTED TO LOAD.

FIGURE 8. LOAD TRANSFER SWITCH

transfer switch is included with such equipment. See Figure 8.

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

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 output lead does not exceed the generator nameplate rating.

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

SWITCHBOARD

A wall mounted switchboard containing ammeters, a voltmeter, and circuit breakers is optional. When used, the following connections apply:

1. Connect one ungrounded (hot) generator lead to the unused terminal on each ammeter.
2. Connect the generator lead and load wires which are to be grounded to the ground stud on the switchboard.
3. Connect one ungrounded (hot) load wire to the unused terminal on each circuit breaker.
4. On sets that generate more than one voltage (example: 120/240), the voltmeter should be wired to indicate the higher of the two voltage.

RECONNECTIBLE GENERATORS, BEGIN SPEC AA

The factory ships all special order sets with instruments on the control panels completely wired for the voltage code or voltage specified on the customers purchase order. Standard sets without instruments are shipped with the T¹-T⁴ or T¹-T¹² output leads separated in the output box. These single phase and broad range generators are connectible or later reconnectible to provide any of the output voltages shown in Figure 7.

Code 3C or 53C Reconnectible Generators: The single phase, 60 and 50 hertz generators have output leads T¹, T², T³, and T⁴ available for making the single-phase voltage and load connections shown in Figure 7 at the installation site. Grounding procedure should comply with local codes.

Code 18R or 518R Reconnectible Generators: The three-phase, broad range, 60 and 50 hertz, 12-lead generators have output leads T¹ through T¹² available for making several single and three-phase voltage load connections shown in Figure 7. Grounding procedure should comply with local codes.

When connecting the output leads, be sure to connect jumper W10 on the voltage regulator printed circuit board between terminal V⁴ (common) and V¹, V², or V³ as listed on the reconnection diagram.

A broad range generator is capable of generating numerous different output voltages as indicated by the reconnection diagram.

Code 9XR Generators: These special order three-phase, 60 hertz, 4-wire generators are prewired at the factory to provide 347/600 VAC. Output leads T¹, T², T³, and T⁰ are available for connection to the load wires. See connection diagram. Grounding procedure should comply with local electrical codes.

GENERATORS PRIOR TO SPEC AA

Revolving field generators, used with the JC Series prior to Spec AA, have four leads. Connections for these generators are shown in Figure 9.

Reconnectible Single Phase Generators: Code 3C models, such as JC-3C are reconnectible for use as 120/240 volt, 3-wire; 120 volt two-wire; or 240 volt 2-wire units except when optionally equipped with a meter panel.

Delta Generators: On these generators, T⁰ is the center tap between T¹ and T², T⁰ is normally not grounded but may be grounded if required.

Grounding: A number 8 or larger wire should be used to connect the generator housing to a rod or pipe that penetrates into moist earth. If a solderless connector is not provided on the generator, connect the ground wire at the battery ground stud on the engine.

BATTERY CONNECTIONS

The battery is connected for negative (—) ground, Figure 10. Be sure all battery connections are secure.

Battery polarity must agree with the rectifier located in the control box. If battery ground must be changed, reverse the rectifier connection in the control box.

CAUTION If battery polarity is reversed, 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 between resistor R21 and the B1 end of the charging winding.

See Specifications for minimum 12-volt battery re-

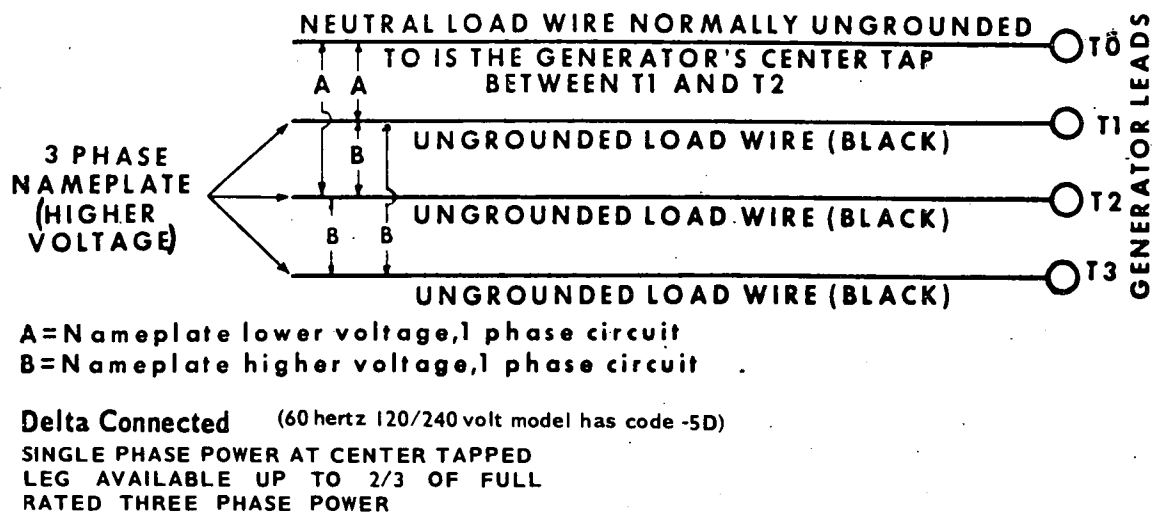
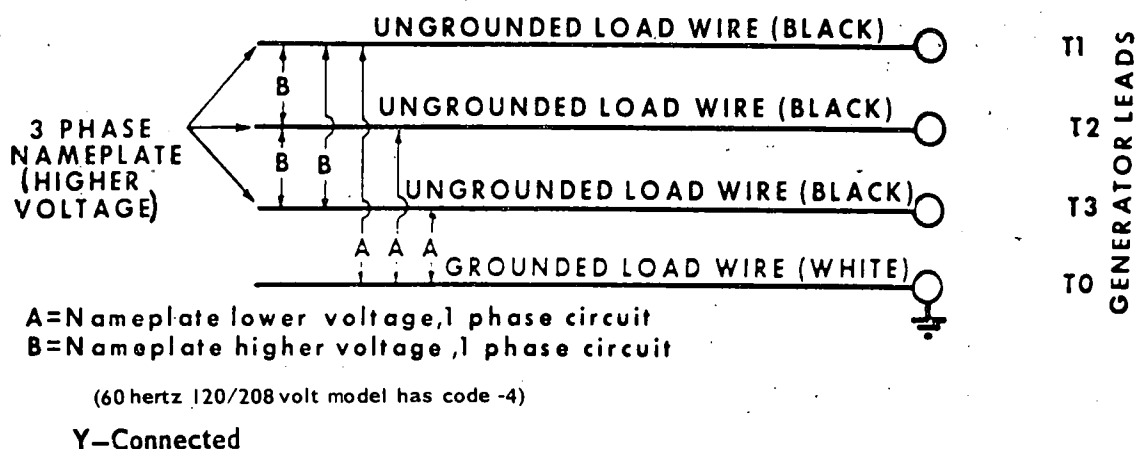
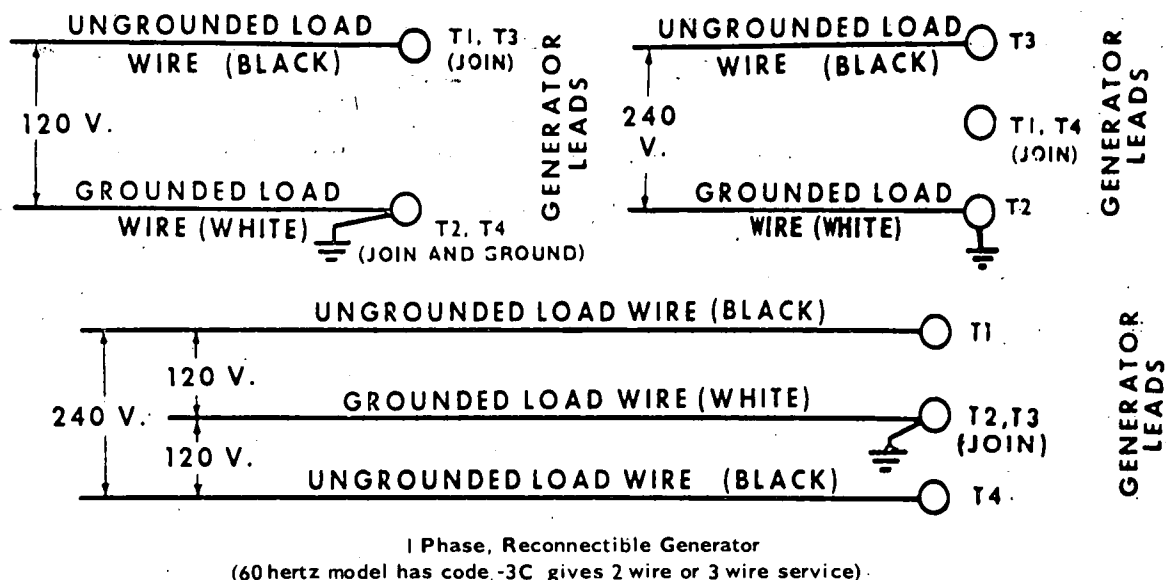


FIGURE 9. GENERATOR CONNECTIONS

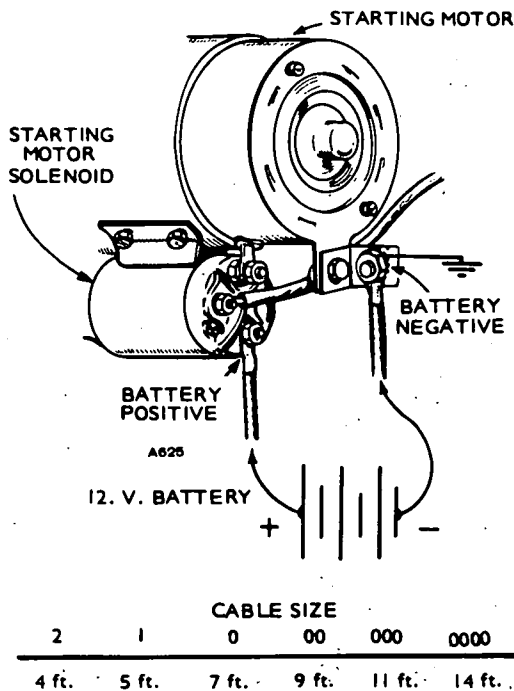


FIGURE 10. BATTERY CONNECTIONS

quirements. Connect battery positive (+) to starter engaging solenoid terminal post, Figure 10. Connect battery negative (—) to a good ground on the engine.

Sets may be equipped for 24 volt cranking and battery charging circuit. Battery connections are similar to 12-volt connections. Provide two 12-volt batteries connected in series (one battery negative to the other battery positive).

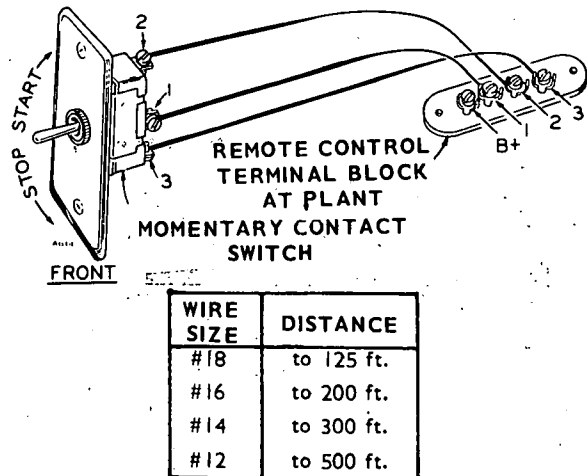


FIGURE 11. REMOTE START-STOP SWITCH

REMOTE START-STOP SWITCH (OPTIONAL)

For remote control starting and stopping, use 3 wires to connect the remote switch (single pole, double throw, momentary contact, center-off type) to the terminal block marked B+, 1, 2, 3, in the set control box using wire sizes as listed in Figure 11.

OPERATION

PRE-STARTING

Preparations for the initial and each additional starting operation include careful checks of the oil, fuel, cooling, and electrical systems. Close the cylinder air housing door with all air shrouds in place.

Before generator set is put in operation, check all components for mechanical security. If an abnormal condition, defective part, or operating difficulty is detected, repair or service as required. Keep the generator set free of dust, dirt, and spilled oil or fuel. Be sure proper operating procedure is followed.

CRANKCASE OIL

Use a heavy duty detergent oil that meets the API (American Petroleum Institute) service designations MS, MS/DG, SE or SE/CC. Oil should be labeled as having passed the MS Sequence Tests (also known as the ASTMG-IV Sequence Tests) and the MIL-L-2104B Tests. Recommended SAE oil numbers for expected ambient temperatures are as follows:

Above 30° F	SAE 30
0° F to 30° F	SAE 10W or 5W-30
Below 0° F	SAE 5W-30

When adding oil between oil changes, it is preferable to use the same brand as various brands of oil may not be compatible when mixed together.

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

RECOMMENDED FUEL

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

CAUTION

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

WARNING

Never fill the tank when the engine is running. Engine fuels are highly flammable. Leave some fuel expansion space.

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.

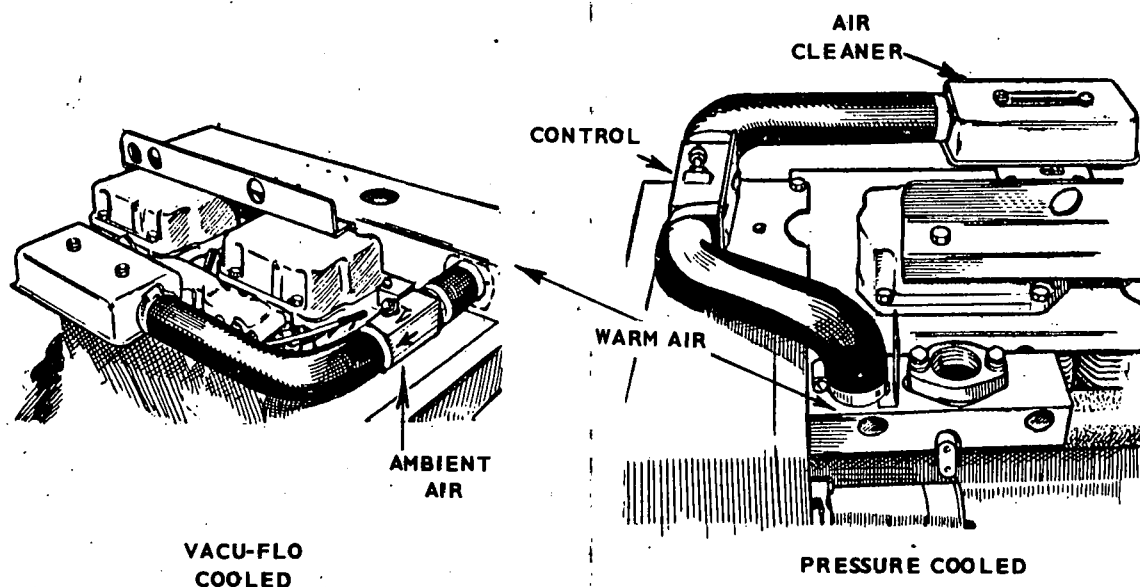


FIGURE 12. CARBURETOR AIR PRE-HEATER

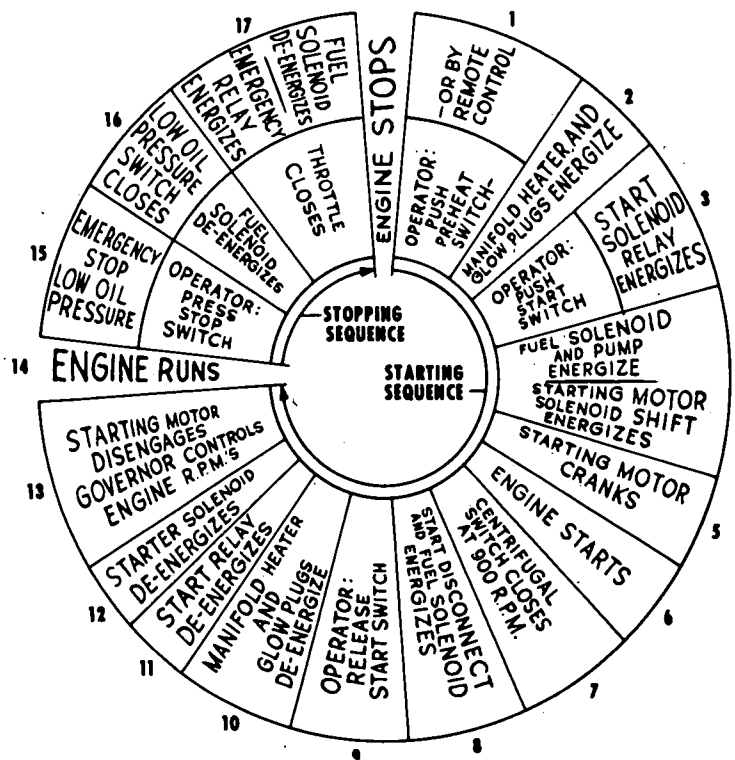


FIGURE 13. OPERATING SEQUENCE

Carburetor Air Pre-Heater, Figure 12: 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.

STARTING SEQUENCE

The starting and stopping (Figure 13) sequence shows the manual, mechanical, and electrical events required for satisfactory start, run and stop cycles.

STARTING

1. Push *start-stop* switch to *start* position.
2. Release the switch after engine starts and reaches speed.
3. Oil pressure gauge should read at least 20 psi (pressure relief is not adjustable).

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

CAUTION Do not apply overvoltage to the starting circuit at any time. Overvoltage will destroy the glow plugs and air heater in 2 to 3 seconds. If it becomes

necessary to use an additional source of power to start the set — use a 12-volt battery connected in parallel.

Leave Electric Start-Hand Crank switch at Electric Start position. This avoids battery discharge. Exception: While emergency hand-cranking, switch to manual start position, then return switch to electric start position after engine starts.

If a false start occurs, make sure the centrifugal switch 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 bimetal element to cool and close the choke.

STOPPING

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

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 nameplate rating. The exhaust system may form carbon deposits during operation at light loads; apply full load occasionally before shutdown to prevent excessive carbon accumulations.

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 UNITS

Infrequent use results in hard starting. Operate standby sets at least 30 minutes each week. Run longer if battery needs charging.

EMERGENCY OPERATION IF BATTERY FAILS

If the battery fails completely and the set must be operated during an emergency, a battery can be shared with other equipment providing the set 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 set will not charge the battery.

X-RAY (Special Model)

JC models are suitable for use the full-wave X-rays up to 100MA, 100KVP. Continuous dummy load not required to stabilize voltage.

BREAK-IN PROCEDURE

The unit should be run in the following sequence:

1. One half hour at 1/2 load.
2. One half hour at 3/4 load.
3. Full load.

Continuous running under one-half load during the first few hundred hours usually results in poor piston ring seating, causing higher than normal oil consumption and blowby.

Drain and replace the crankcase oil after the first 50 hours of operation; drain while the engine is still hot.

OUT-OF-SERVICE PROTECTION

To protect a set that will be out of service for more than 30 days, proceed as follows:

1. Run set until thoroughly warm; generator under at least 50 percent load.
2. Shut down engine and drain oil base while still warm. Refill and attach a warning tag indicating viscosity of oil used.
3. Remove spark plugs. Pour 1-ounce of rust inhibitor (or SAE #10 oil) into each cylinder. Crank engine over several times. Install injectors.
4. Service air cleaner.
5. Clean throttle and governor linkage and protect by wrapping with a clean cloth.
6. Plug exhaust outlets to prevent entrance of moisture, bugs, dirt, etc.
7. Clean and wipe entire unit. Coat parts susceptible to rust with a light coat of grease or oil.

8. Disconnect battery and follow standard battery storage procedure.
9. Provide a suitable cover for the entire unit.

Returning a Unit to Service

1. Remove cover and all protective wrapping. Remove plug from exhaust outlet.
2. Check warning tag on oil base and verify that oil viscosity is still correct for existing ambient temperature.
3. Clean and check battery. Measure specific gravity (1.260 at 77° F [25° C]) and verify level to be at split ring. If specific gravity is low, charge until correct value is obtained. If level is low, add distilled water and charge until specific gravity is correct. DO NOT OVERCHARGE.

WARNING

Do not smoke while servicing batteries. Explosives gases are emitted from batteries in operation. Ignition of these gases can cause severe personal injury.

4. Check that fuel filter and fuel lines are secure, with no leaks.
5. Check carburetor, adjust if necessary.
6. Connect batteries.
7. Verify that no loads are connected to generator.
8. Start engine.
After engine has started, excessive blue smoke will be exhausted until the rust inhibitor oil has burned away.
9. After start, apply load to at least 50 percent of rated capacity.
10. Check all gauges to be reading correctly. Unit is ready for service.

HIGH TEMPERATURES

1. See that nothing obstructs air flow to and from the set.
2. Keep cooling fans clean. Air housing should be properly installed and undamaged.

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 set to a warm location or apply heated air (never use open flame) externally until oil flows freely.
2. Use fresh fuel. Protect against moisture condensation.
3. Keep fuel system clean, and batteries in a well charged condition.
4. Partially restrict cool air flow but use care to avoid overheating.
5. Use additional preheating during cold starts.

DUST AND DIRT

1. Keep set clean. Keep cooling fins free of dirt, etc.
2. Service air cleaner as frequently as necessary.

3. Change crankcase oil every 50 operating hours.
4. Keep oil and fuel in dust-tight containers.
5. Keep governor linkage clean.

HIGH ALTITUDE

Maximum power will be reduced approximately 4 percent 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 manual fuel shutoff valve in supply line (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 gasoline fuel shutoff valve.
3. Set spark plug gap from .018 inch to .025 inch.
4. See that choke is free and works easily (be sure to release choke lock on sets with electric choke).
5. Start engine. If engine runs unevenly under half or full load, due to faulty carburetor adjustment, main jet needs adjusting.

To change back to gaseous fuel, reverse the above procedure. Use all gasoline from 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 into intake manifold.

ADJUSTMENTS

CHECK BREAKER POINTS

Replace burned or faulty points. If only slightly burned, dress smooth with file or fine stone. Measure gap with thickness gauge, Figure 14.

1. The centrifugal switch is wide open when engine is stopped. Loosen and move stationary contact to correct gap.
2. Ignition breaker points 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. Tighten contact and recheck gap.

Ignition points should break contact just when timing mark aligns for degree of spark advance (or retard) as specified. Final timing is corrected by properly rotating the breaker plate 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 (Figure 15) has a main fuel (high speed) adjustment and an idle fuel adjustment. Early models have the main adjustment needle on the top of the carburetor. The main adjustment 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 adjustments have been disturbed, turn needles off their seats 1 to 1-1/2 turns

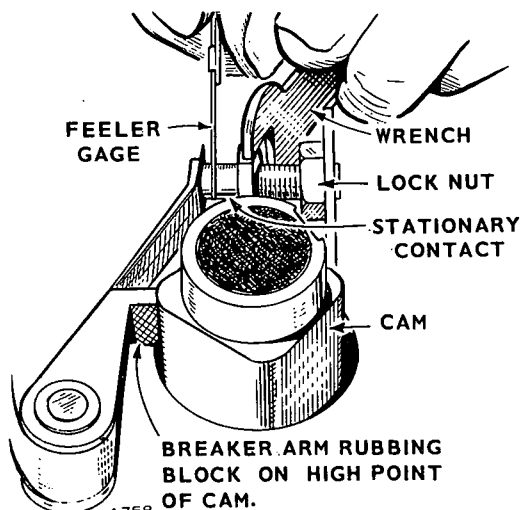


FIGURE 14. BREAKER POINTS

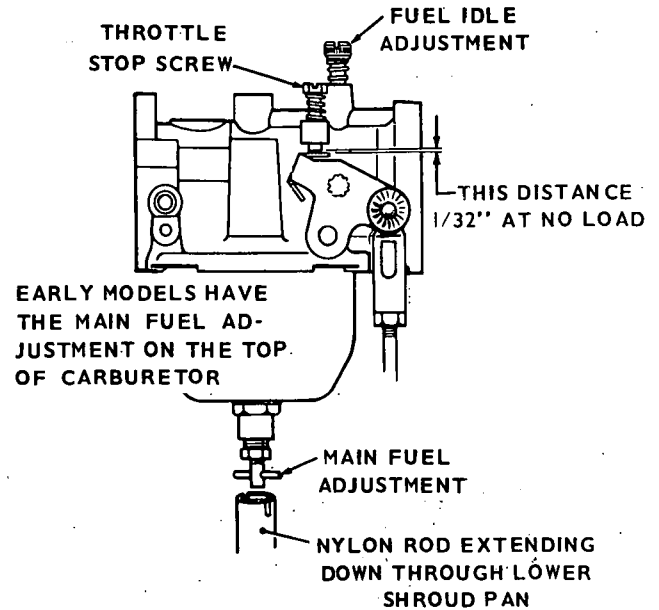


FIGURE 15. CARBURETOR ADJUSTMENTS

to permit starting, then readjust 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.

Before final adjustment, allow the engine to warm up. To set the main fuel 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. Turn screw back out (richer) approximately 1/4 turn or until engine speed (frequency) returns to normal.

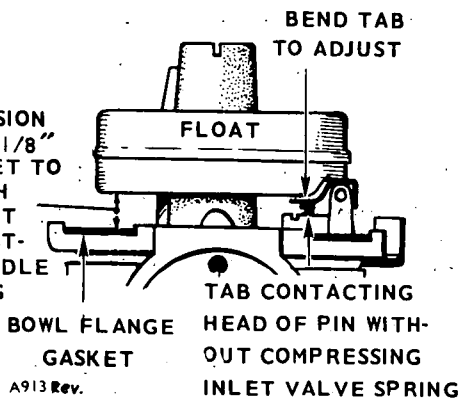
Carburetor adjustment should be made after the governor is properly adjusted.

Make idle adjustment with no load connected to the generator. Use a tachometer (or connect a frequency meter) to generator output. Slowly turn idle adjustment out until engine speed (or generator frequency) drops slightly below normal. Then turn needle in until speed (or frequency) returns to normal.

Set throttle stop screw (located on carburetor throttle lever) with no load connected and while running at rated speed. Turn stop screw to give 1/32 inch clearance between the screw and pin (Figure 15).

LATER MODELS

THIS DIMENSION SHOULD BE 1/8" FROM GASKET TO FLOAT WITH FULL FLOAT WEIGHT RESTING ON NEEDLE AND SPRING



EARLY MODELS

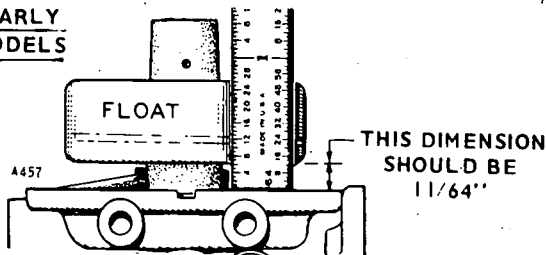


FIGURE 16. FLOAT ADJUSTMENT

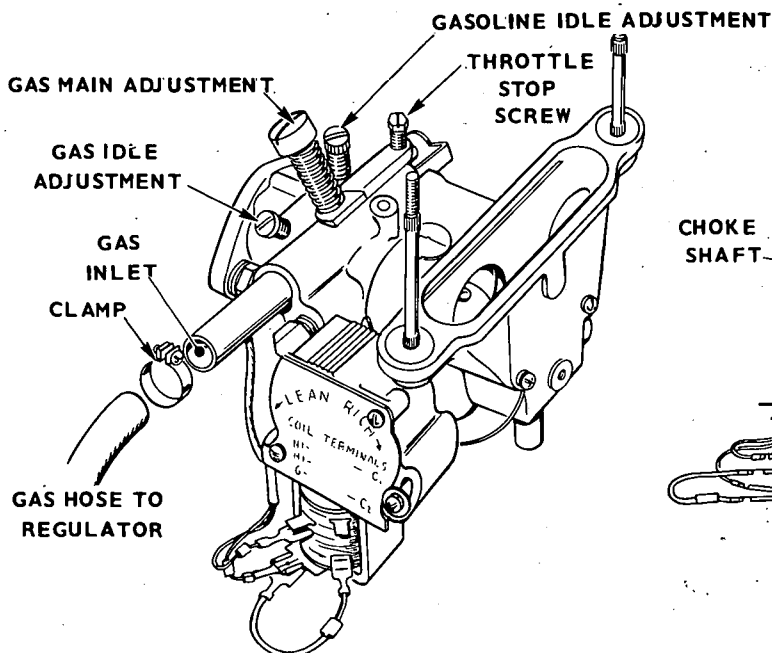
For correct carburetor float clearance, see Figure 16. Adjustment is made by bending the tab on the float.

CARBURETOR (Gas-Gasoline)

Gas carburetor adjustment procedure is the same as for gasoline. See Figure 17 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. The choke solenoid, actuated during engine cranking only, closes the choke according to ambient temperature.



EARLY MODELS HAVE THE MAIN FUEL ADJUSTMENT ON THE TOP OF CARBURETOR

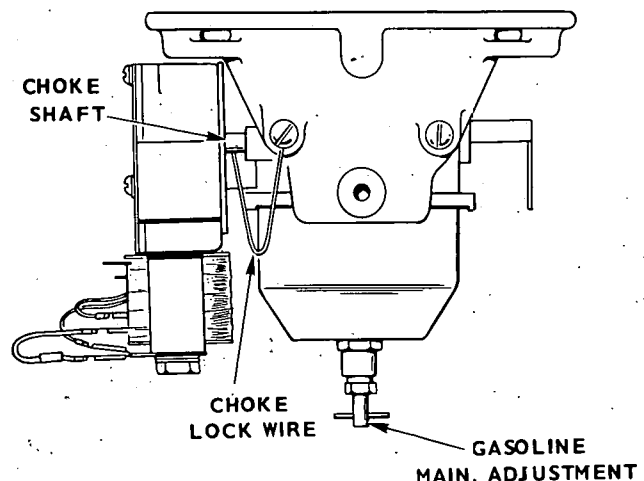


FIGURE 17. GAS-GASOLINE CARBURETOR ADJUSTMENT

During gaseous fuel operation, the choke is locked in the full open position by the choke lock wire, Figure 17.

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 Figure 18 for correct choke setting according to ambient temperature. 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 *Specification*). 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 (Figure 19). 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

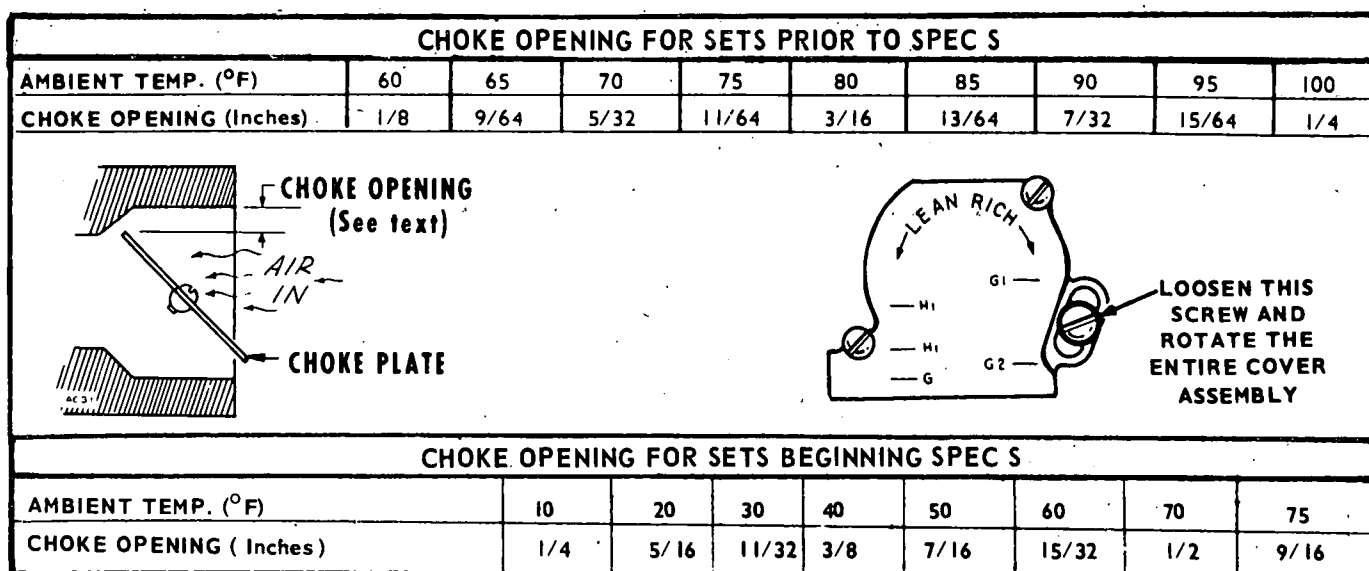


FIGURE 18. THERMO-MAGNETIC CHOKE SETTING

access hole on the side of the blower housing. 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 knockout plug in the blower housing and secure speed stud lock nut.

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

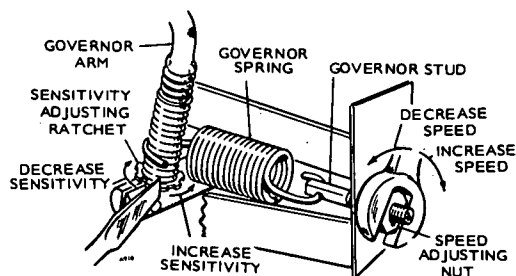
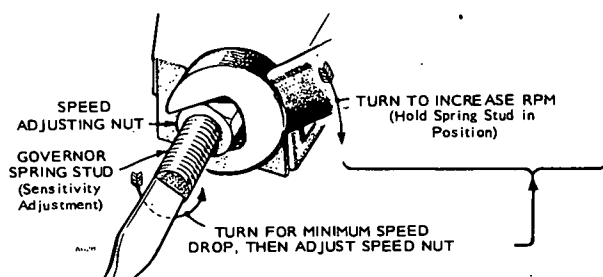


FIGURE 19. GOVERNOR ADJUSTMENT

CHARGE RATE ADJUSTMENT

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

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.

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 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.

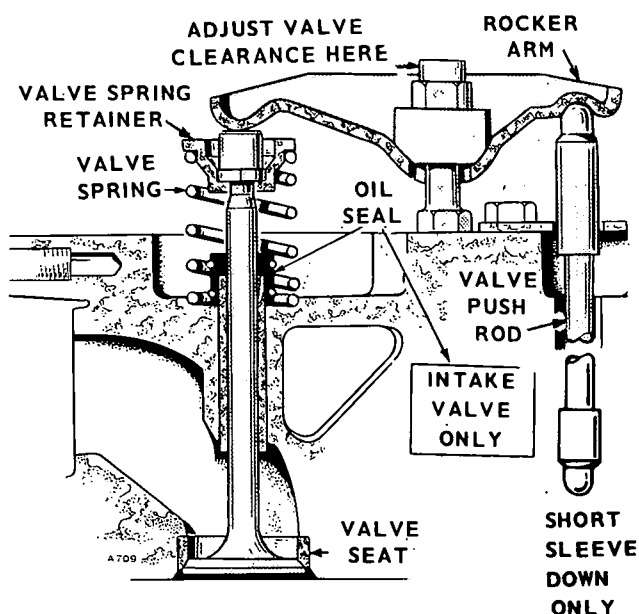


FIGURE 20. VALVE CLEARANCE ADJUSTMENTS

3. Check cylinder head-bolt torque prior to valve clearance adjustment. Torque should be 28 to 30 foot-pounds. Valve clearance is adjusted with the locknut which secures rocker arm to the cylinder head (see Figure 20). Loosen the locknut to increase clearance and tighten to reduce clearance.
4. Using a feeler gauge, check the clearance between the rocker arm and the valve (see Figure 21). Increase or decrease the clearance until the proper gap is established. Valve clearances are given in the *Specifications* section.
5. Always adjust the valve clearances in the firing order (1-2-4-3) sequence. After positioning #1 cylinder, adjust the valve clearance according to steps 3 and 4.
6. To adjust the valve clearance of #2 cylinder, turn the flywheel in a clockwise direction 180 degrees

(one-half revolution) from the position used when timing #1 cylinder. The flywheel position should be between 10 and 45 degrees past the BC (bottom center) flywheel mark.

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

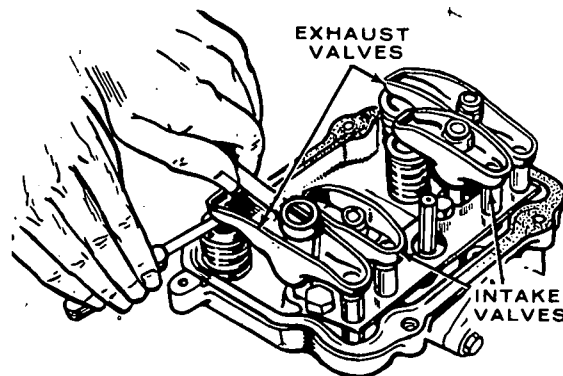


FIGURE 21. CHECK VALVE CLEARANCE

GENERAL MAINTENANCE

GENERAL

Follow a definite schedule of inspection and servicing, based on operating hours (Table 1). Keep an accurate logbook of maintenance, servicing, and operating time. Use the running time meter (optional equipment) to keep a record of operation and servicing. Regular service periods are recommended for normal service and operating conditions. For continuous duty, extreme temperature, etc., service more frequently. For infrequent use, light duty, etc., service periods can be lengthened accordingly.

WARNING

Before beginning any maintenance work on the engine, generator, control panel, automatic transfer switch or associated wiring, disconnect batteries. Failure to do so could result in damage to equipment serious personal injury in the event of inadvertent starting.

Operator should periodically make a complete visual inspection with set running at rated load. Some of the things to check for are as follows:

1. Check all fuel and oil lines for possible leakage.
2. Inspect exhaust lines and mufflers for possible leakage and cracks.
3. Periodically or daily, drain moisture from condensation traps.
4. Inspect air shrouds for leaks and security. Be sure cooling fins are clean.
5. Inspect electrical wires and connections for security and fray damage.

If generator requires major repair or servicing, contact an authorized Onan dealer or distributor.

AC GENERATOR

Periodic inspections that coincide with engine oil changes will ensure good performance.

BEGIN SPEC AA

When inspecting the rotating rectifier assembly, make sure diodes are free of dust, dirt and grease. Excessive foreign matter on these diodes and heat sinks will cause the diodes to overheat and will result in their failure. Blow out the assembly periodically, with filtered, low pressure air. Also check to see that diodes and leadwires are properly torqued. The diodes should be torqued to 25 in. lb. or finger tight plus a quarter turn. See Figure 1.

BATTERIES

Check the condition of the starting batteries at least every two weeks. See that connections are clean and tight. A light coating of non-conductive grease will retard corrosion at terminals. Keep the electrolyte at

the proper level above the plates by adding distilled water. Check specific gravity; recharge if below 1.260.

WARNING

Discharged batteries are subject to severe damage if exposed to freezing temperatures. Store all batteries in a fully charged condition and maintain charge during storage.

OIL FILTER CHANGE

Place pan under old filter and remove by screwing counterclockwise. 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.

TABLE 1.
OPERATOR AND SERVICE MAINTENANCE SCHEDULE

HOURS OF OPERATION	MAINTENANCE TASK
8	• Inspect generator set • Check fuel supply • Check oil level, see Figure 22.
50	• Check air cleaner, see Figure 22, see Note 1.
100	• Clean governor linkage, see Figure 22. • Change crankcase oil.
200	• Check breaker points. • Clean crankcase breather, see Figure 22. • Clean fuel filter. • Replace oil filter. • Check battery condition.
500 Call Onan service personnel	• Check start-disconnect circuit. • Check generator slip rings and brushes (prior to Spec AA) on older sets; replace if worn to 5/16", see Note 2. • Check valve clearances.
1000 Call Onan service personnel	• Grind valves (if required). • Clean holes in rocker box oil line. • Clean generator • Remove and clean oil base.
5000 Call Onan service personnel	• Generator overhaul (if required) see Note 3.

NOTE 1. Perform more often in extremely dusty conditions.

2. Replace revolving field collector ring brushes when worn to 5/16" or less. Replace all other brushes when worn to 5/8" or less.
3. Tighten head bolts and adjust valve clearance after first 50 hours on a new or overhauled engine.

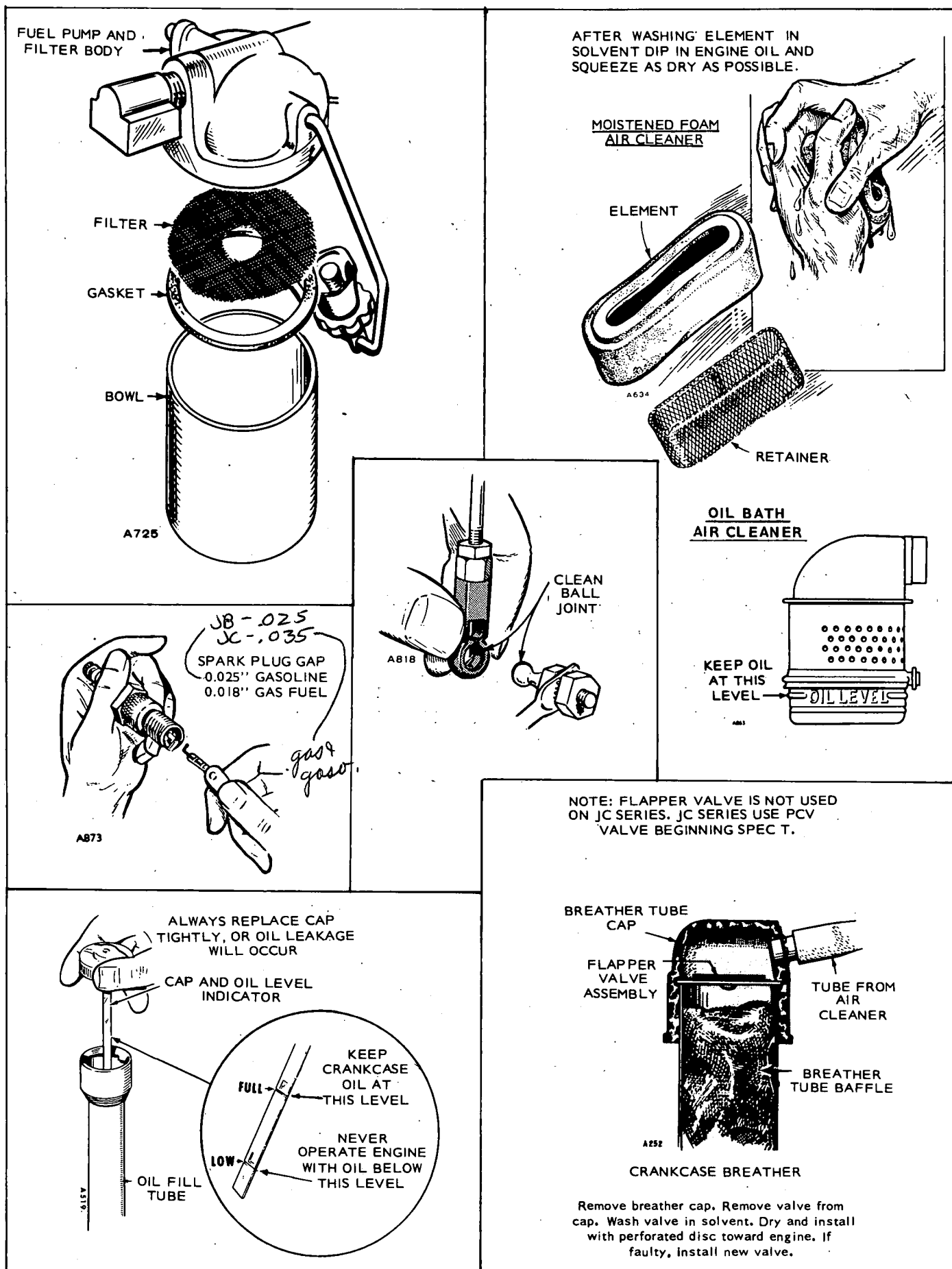


FIGURE 22. OIL LEVEL, GOVERNOR, AND CRANKCASE BREATHER MAINTENANCE

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

PARTS CATALOG

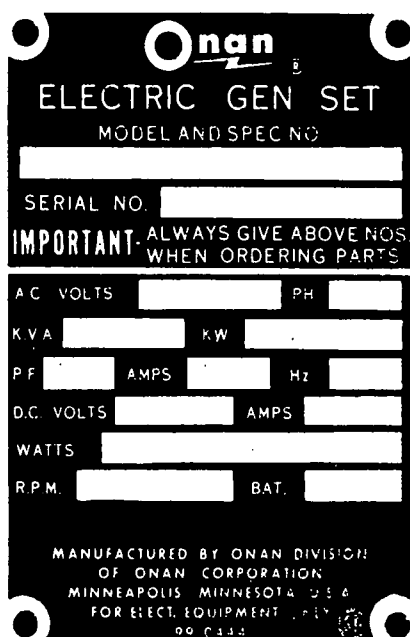
INSTRUCTIONS FOR ORDERING REPAIR PARTS

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

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

Always refer to the nameplate on your unit:

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



The image shows a rectangular nameplate form for an Onan Electric Gen Set. At the top, the Onan logo is centered. Below it, the text "ELECTRIC GEN SET" is printed. Underneath, there is a line for "MODEL AND SPEC NO." followed by a blank space. Below that is a line for "SERIAL NO." followed by a blank space. A bolded section labeled "IMPORTANT" contains the text "ALWAYS GIVE ABOVE NOS. WHEN ORDERING PARTS". Below this, there are several lines for technical specifications: "A.C. VOLTS" and "PH." with blank spaces; "K.V.A." and "K.W." with blank spaces; "P.F." and "AMPS" with blank spaces; "Hz" with a blank space; "D.C. VOLTS" and "AMPS" with blank spaces; "WATTS" with a blank space; "R.P.M." and "BAT." with blank spaces. At the bottom, there is a block of text: "MANUFACTURED BY ONAN DIVISION OF ONAN CORPORATION MINNEAPOLIS, MINNESOTA U.S.A. FOR ELECT. EQUIPMENT".

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

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

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

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

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

Consiga los precios vigentes de su distribuidor de productos "ONAN".

This catalog applies to the standard JC Generating Sets as listed below. Parts are arranged in groups of related items and are identified by a reference. Part 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. Right and left sides are determined by FACING the engine end (front) of the unit.

GENERATING SET DATA TABLE

MODEL & SPEC £	ELECTRICAL DATA					PARTS KEY NO.
	WATTS	VOLTS	HERTZ	WIRE	PHASE	
10.0JC-3CR/*	10000	120/240	60	**	1	1
10.0JC-4R/*	10000	120/208	60	4	3	1
10.0JC-4XR/*	10000	277/480	60	4	3	1
10.0JC-5DR/*	10000	120/240	60	4	3	1
12.5JC-3CR/*	12500	120/240	60	**	1	1
12.5JC-4R/*	12500	120/208	60	4	3	1
12.5JC-4XR/*	12500	277/480	60	4	3	1
12.5JC-5DR/*	12500	120/240	60	4	3	1
12.5JC-18R/*	12500	+	60	12	3	1
12.5JC-53CR/*	12500	120/240	50	**	1	2
12.5JC-57R/*	12500	230/380	50	4	3	2
12.5JC-518R/*	12500	+	50	12	3	2
15.0JC-3CR/*	15000	120/240	60	**	1	2
15.0JC-4R/*	15000	120/208	60	4	3	2
15.0JC-4XR/*	15000	277/480	60	4	3	2
15.0JC-5DR/*	15000	120/240	60	4	3	2
15.0JC-9R/N*	15000	600	60	3	3	2
15.0JC-9XR/*	15000	347/600	60	4	3	2
15.0JC-18R/*	15000	+	60	12	3	2
X-Ray Models †	10000	120/240	50	**	1	3
	12500	120/240	60	**	1	3
Pennsylvania Approved Sets	See special parts list following the main parts list.					

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

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

NOTE: Previously the C designation was not used in the models.

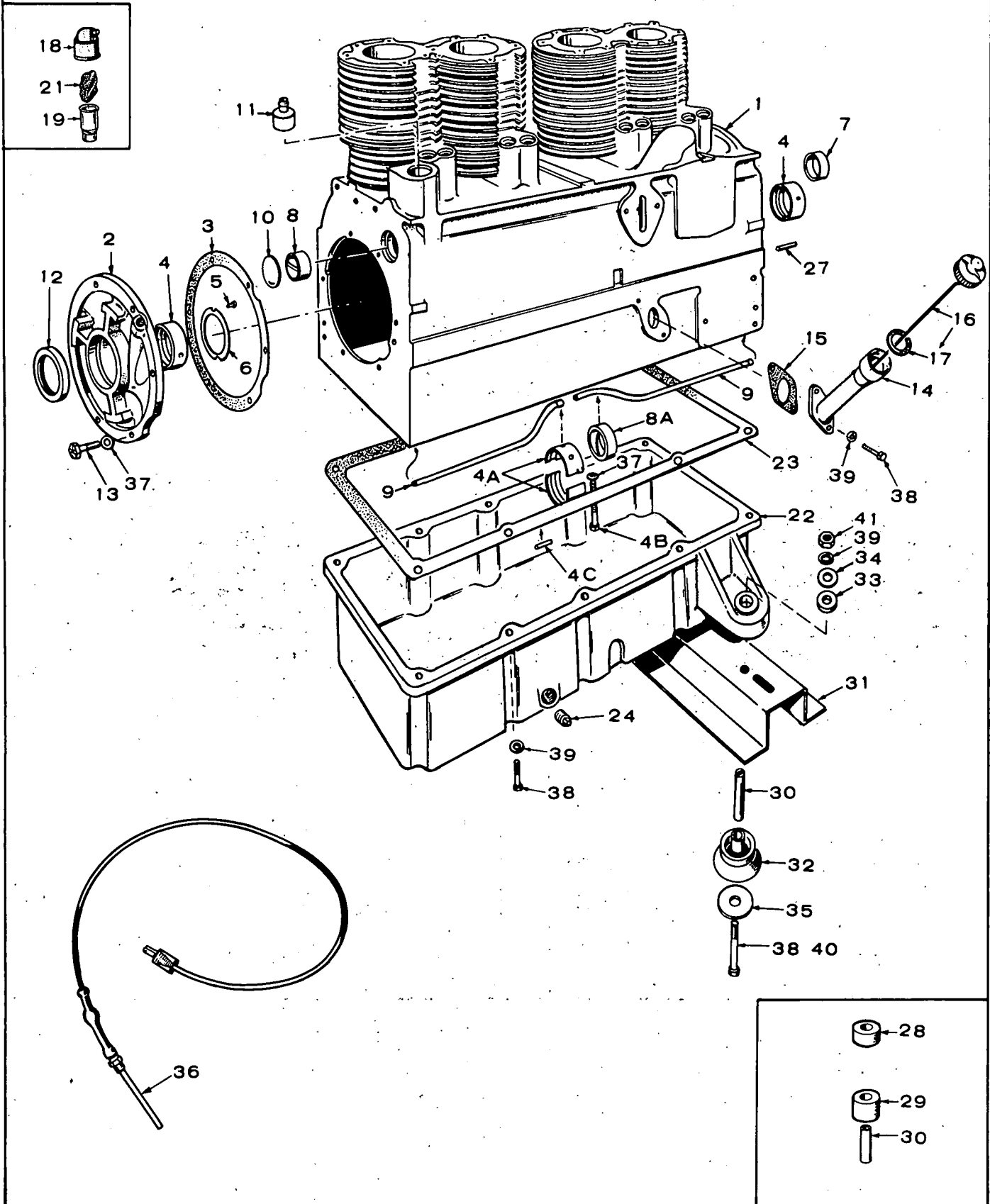
+ - Reconnectable sets beginning Spec AA, refer to AC Voltages Table (*Installation* section).

£ - New model designations shown, begin during 1969. Previous designations did not use a decimal in the KW rating. EXAMPLE: 12.5JC was formerly 12JC (12-1/2 KW) and 15.0JC was formerly 15JC. Previously a V was used in the model to designate Vacu-Flo cooling.

† - X-Ray models were formerly designated by the number 17 in the model (EXAMPLE: 12JC-3R17/1R).

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

CRANKCASE AND OIL BASE GROUP



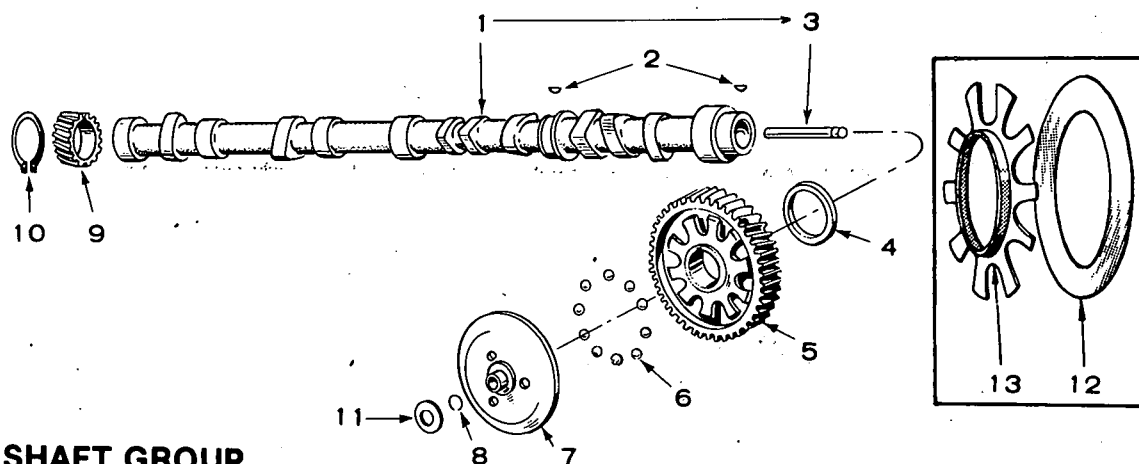
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110-1328	1	Block Assembly (Includes Parts Marked * plus Tappets)
2	101-0337	1	*Plate, Rear Bearing (Less Bearing & Pins)
3	101-0386	1	*Gasket Kit, Rear Bearing Plate (Includes Shims)
4	BEARING, PRECISION MAIN - FRONT OR REAR		
	101-0359	2	*Standard
	101-0359-02	2	.002" Undersize
	101-0359-10	2	.010" Undersize
	101-0359-20	2	.020" Undersize
	101-0359-30	2	.030" Undersize
4A	BEARING, HALF - PRECISION MAIN - CENTER		
	101-0361	2	*Standard
	101-0361-02	2	.002" Undersize
	101-0361-10	2	.010" Undersize
	101-036120	2	.020" Undersize
	101-0361-30	2	.030" Undersize
4B	101-0342	2	*Bolt, Center Bearing Housing
4C	516-0149	2	*Pin, Center Bearing Housing
5	516-0072	4	*Pin, Thrust Washer
6	104-0420	2	*Washer, Crankshaft Thrust
7	101-0363	1	*Bearing, Precision Cam Front (Standard Only)
8	101-0365	1	*Bearing, Precision Cam Rear (Standard Only)
8A	101-0364	1	*Bearing, Precision Cam Center (Standard Only)
9	*TUBE, CRANKCASE OIL		
	120-0586	1	Front
	120-0585	1	Rear
10	517-0053	1	*Plug, Expansion Rear Camshaft Opening
11	123-1168	1	*Cap, Breather - Begin Spec T
12	509-0086	1	*Seal, Crankshaft Rear
13	805-0019	6	*Bolt (3/8-16 x 1-1/4") - Rear Bearing Plate
14	123-0649	1	Tube, Oil Fill
15	123-0667	1	Gasket
16	123-0698	1	Cap & Indicator
17	123-0191	1	Gasket, Cap
18	CAP, BREATHER TUBE		
	123-0458	1	Spec A through H
	123-0787	1	Spec J through S
19	123-0645	1	*Tube, Breather - Spec A through S
21	123-0865	1	Baffle, Breather Tube - Spec A through S
22	BASE, OIL		
	102-0476	1	Spec A through H
	102-0539	1	Begin Spec K
	102-0549	1	For Optional Oil Base Heater - Begin Spec K
23	102-0475	1	Gasket, Oil Base
24	505-0056	1	Plug (1/2")
27	516-0141	2	*Pin, Gear Cover Locating
28	402-0036	4	Mount, Upper Vibration (Cylindrical Shaped) - Spec A through H

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
29	MOUNT, LOWER VIBRATION, CYLINDRICAL SHAPED - SPEC A THROUGH H		
	402-0038	2	Engine End
	402-0251	2	Generator End
30	BUSHING, VIBRATION MOUNT SPACER		
	402-0046	4	Spec A through H
	402-0290	4	††Begin Spec K
31	SUPPORT, SET - VACU-FLO COOLED SETS		
	403-0706	1	Engine End - Spec A through H
	403-0648	1	Generator End - Spec A through H
	403-0710	2	Begin Spec K
32	CUSHION, VIBRATION (Cone Shaped) - BEGIN SPEC K		
	402-0285	2	Engine End
	402-0287	2	Generator End - Spec A through F
	402-0286	2	Generator End - Begin Spec AA
33	402-0282	4	††Snubber, Shock Mounting - Begin Spec K
34	526-0014	4	††Washer (29/64" I.D. x 1-1/2" O.D. x 1/8") Only with Cone Shaped Cushions
35	WASHER (Only With Cone Shaped Cushions)		
	526-0195	4	††29/64" I.D. x 3-1/4" O.D. x 1/8"
	526-0198	As Req.†	5/8" I.D. x 1-1/2" O.D. x 1/16"
36	102-0558	1	Heater, Oil Base - Optional Equipment
37	WASHER, FLAT		
	526-0245	6	Bearing Plate Mounting
	526-0035	2	*Center Main Bearing Housing
38	SCREW, HEX CAP		
	800-0072	10	Oil Base Mounting (7/16-14 x 1-1/4")
	800-0026	2	Oil Fill Tube Mounting (5/16-18 x 3/4")
	800-0082	4	†Set Mounting (7/16-14 x 3-3/4") - Vacu-Flo Cooled Sets
39	WASHER, LOCK		
	850-0055	10	Oil Base Mounting
	850-0055	4	††Set Mounting
	850-0045	2	Oil Fill Tube Mounting
40	816-0212	4	†Bolt, Carriage - Set Mounting - Standard
41	862-0004	4	††Nut, Hex - Set Mounting - Key 2
	HARDWARE SET, SET MOUNTING		
	402-0291	4	Standard (Includes Parts Marked †)
	402-0364	1	Vacu-Flo Sets - Set consists of Hardware for four mounts (Includes Parts Marked †)

* - Parts included in the Cylinder Block Assembly.

† - Parts included in Set Mounting Set (402-0291).

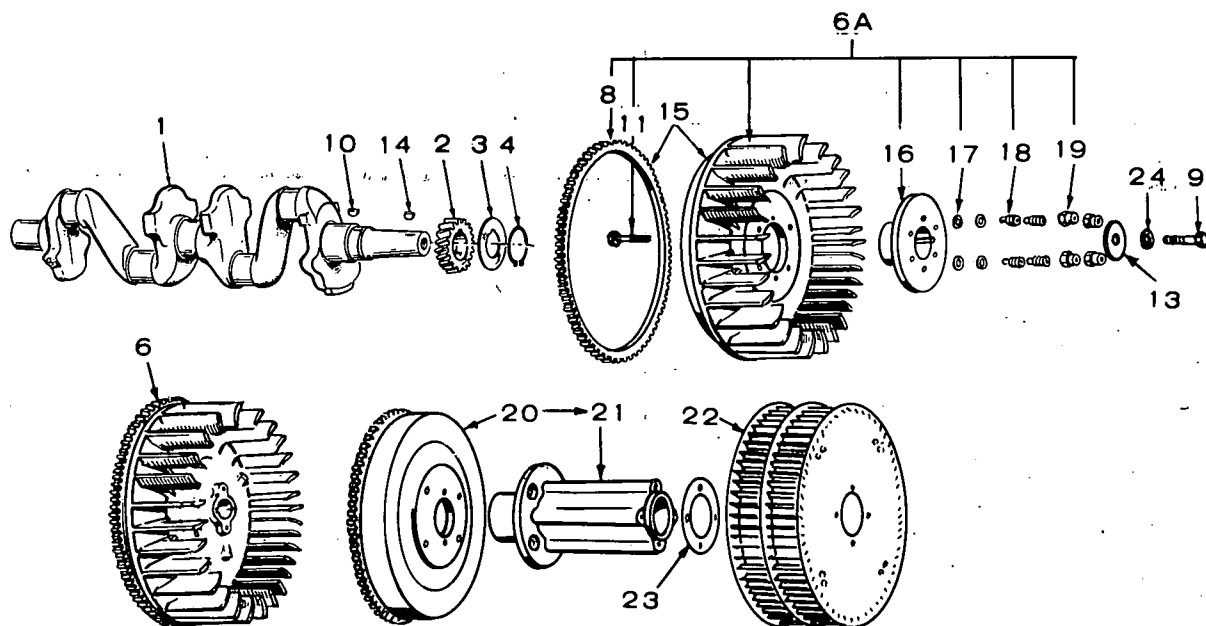
†† - Parts included in Set Mounting Set (402-0364).



CAMSHAFT GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CAMSHAFT - INCLUDES PIN		
	105-0240	1	Spec A through N
	105-0275	1	Begin Spec P
2	515-0001	2	Key, Camshaft Gear and Distributor Drive Gear
3	150-0075	1	Pin, Camshaft Center
4	105-0205	1	Washer, Thrust
5	GEAR, CAMSHAFT (Includes Spacer and Plate)		
	105-0223	1	Spec A Only
	105-0218	1	Begin Spec B
6	FLYBALL, GOVERNOR		
	510-0046	12	Spec A Only
	510-0046	10	Begin Spec B

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	CUP, GOVERNOR		
	150-0833	1	Spec A Only
	150-0857	1	Begin Spec B
8	150-0078	1	Ring, Center Pin
9	166-0302	1	Gear, Distributor Drive
10	518-0195	1	Ring, Distributor Drive Gear
11	150-0859	1	Washer, Thrust - Governor Yoke - Begin Spec B
12	150-0773	1	Plate, Governor Flyball
13	SPACER, GOVERNOR FLYBALL		
	150-0832	1	Spec A Only
	150-0779	1	Begin Spec B

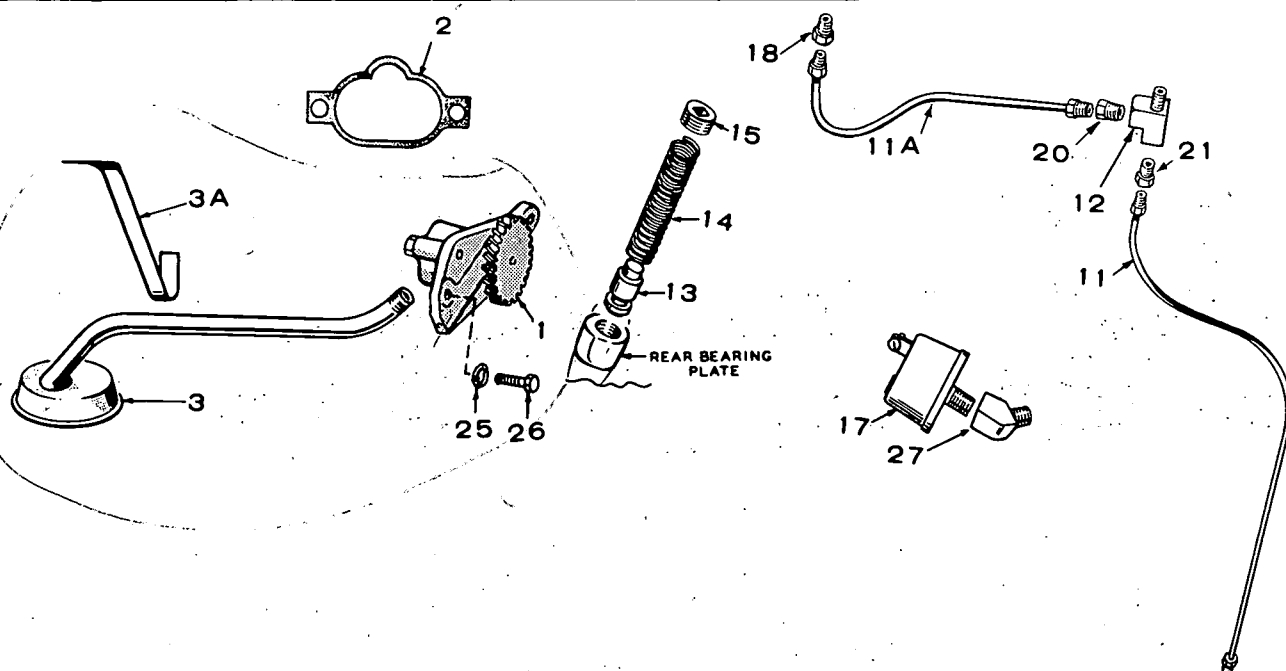
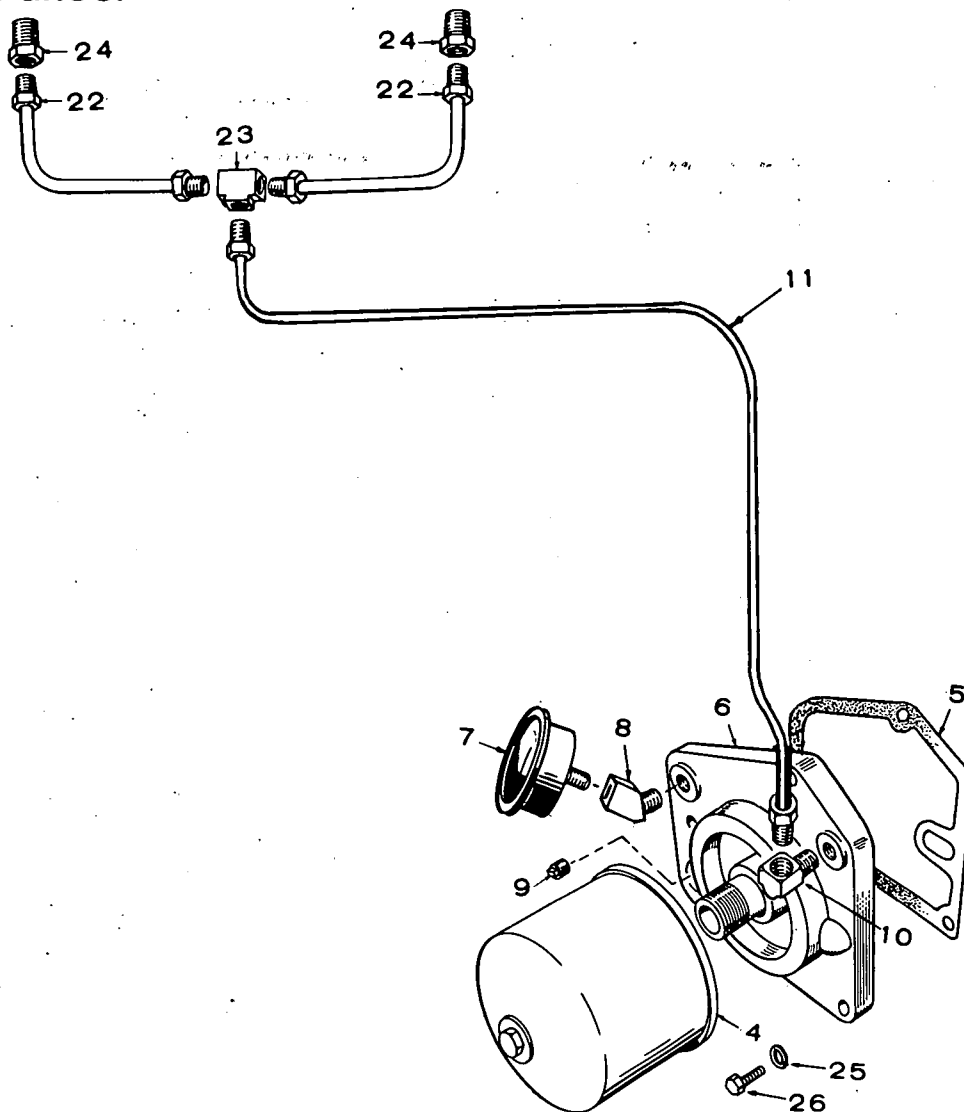


CRANKSHAFT AND FLYWHEEL GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104-0460	1	Crankshaft
2	104-0418	1	Gear, Crankshaft
3	104-0416	1	Washer, Gear Retainer
4	518-0188	1	Ring, Lock
6	FLYWHEEL	1	Spec A through G (Order #134-1406)
6A	134-1406	1	Begin Spec H (Includes Ring Gear and Hub Assembly)
8	104-0423	1	Gear, Ring
9	800-0500	1	Screw (7/16-14 x 5-1/2") - Flywheel Mounting
10	515-0001	1	Key, Crankshaft Gear
11	801-0054	4	Screw (3/8-24 x 2"), Hub to Flywheel - Begin Spec H
13	526-0185	1	Washer, Flywheel Mounting
14	515-0153	1	Key, Flywheel to Crankshaft
15	134-1404	1	Flywheel (Includes Ring Gear less Hub) - Begin Spec H

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
16	134-1401	1	Hub, Flywheel - Begin Spec H
17	526-0187	4	Washer (Special), Hub to Flywheel - Begin Spec H
18	104-0543	4	Spacer & Washer Assembly, Hub to Flywheel - Begin Spec H
19	115-0150	4	Nut (3/8-24), Hub to Fly- wheel - Begin Spec H
20	104-0572	1	Flywheel, Vacu-Flo Cooled Sets (Includes Ring Gear & Hub)
21	104-0557	1	Hub, Flywheel - Vacu-Flo Cooled Sets
22	134-1431	1	Wheel, Blower - Vacu-Flo Cooled Sets
23	134-0988	1	Plate, Blower Wheel - Vacu-Flo Cooled Sets
24	850-0055	1	Washer, Lock - Flywheel Mounting

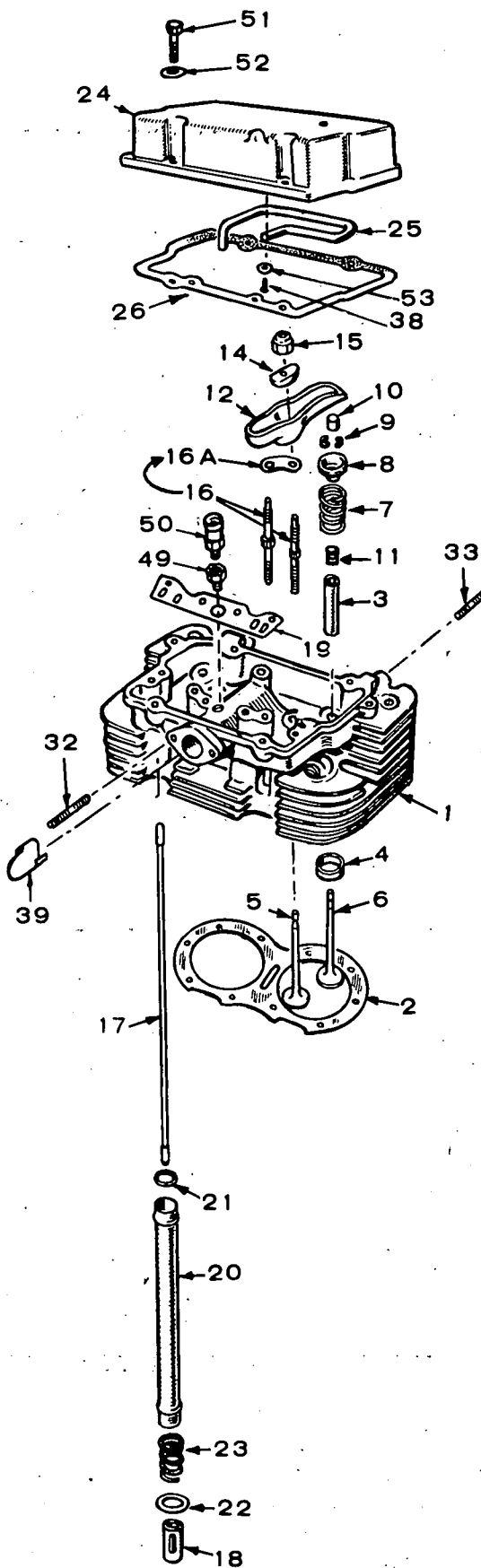
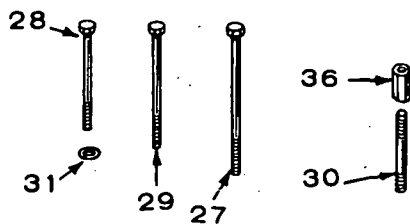
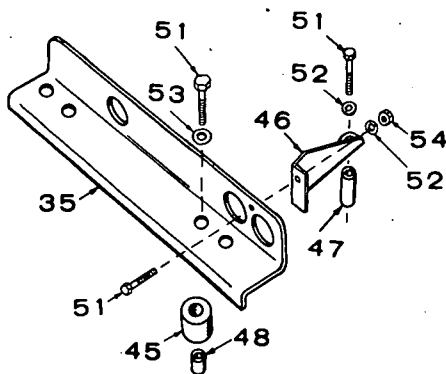
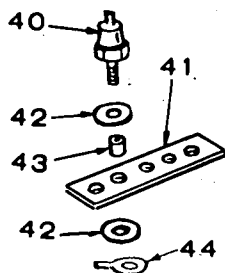
OIL SYSTEM GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	120-0547	1	Pump Assembly, Oil
2	120-0580	1	Gasket Kit, Oil Pump
3	CUP ASSEMBLY, OIL PUMP INTAKE		
	120-0551	1	Spec A through G
	120-0601	1	Begin Spec H
3A	120-0602	1	Bracket, Intake Cup - Begin Spec H
4	122-0185	1	Filter
5	122-0188	1	Gasket, Adapter
6	122-0182	1	Adapter, Oil Filter
7	193-0006	1	Gauge, Oil Pressure
8	502-0053	1	Elbow, Oil Gauge
9	505-0057	1	Plug (1/8")
10	ELBOW, OIL LINE TO FILTER ADAPTER		
	502-0019	1	Gasoline Sets - Spec A through N
	502-0037	1	All Sets - Begin Spec P
	502-0019	1	Gas & Gas-Gasoline Sets - Spec A through Serial #698178
	502-0037	1	Gas & Gas-Gasoline Sets - Begin Serial #698178
11	LINE, FILTER ADAPTER TO CYLINDER HEAD		
	120-0562	1	Gasoline Sets - Spec A through N
	120-0637	1	Gasoline Sets - Spec P through S
	120-0562	1	Gas & Gas-Gasoline Sets - Spec A through Serial #698178
	120-0606	1	Gas & Gas-Gasoline Sets - Serial #698178 through Spec P
	120-0707	1	Begin Spec T
11A	LINE, TEE TO REAR CYLINDER HEAD		
	120-0575	1	Spec A through N
	120-0635	1	Spec P through S
12	502-0242	1	Tee, Restricted - Front Cylinder Head - Spec A through S
13	120-0539	1	Valve, Oil By-Pass
14	120-0555	1	Spring, By-Pass Valve
15	505-0274	1	Plug (1/8"), Oil By-Pass
17	SWITCH, LOW OIL PRESSURE (Optional)		
	309-0064	1	Spec A through F
	309-0169	1	Begin Spec G

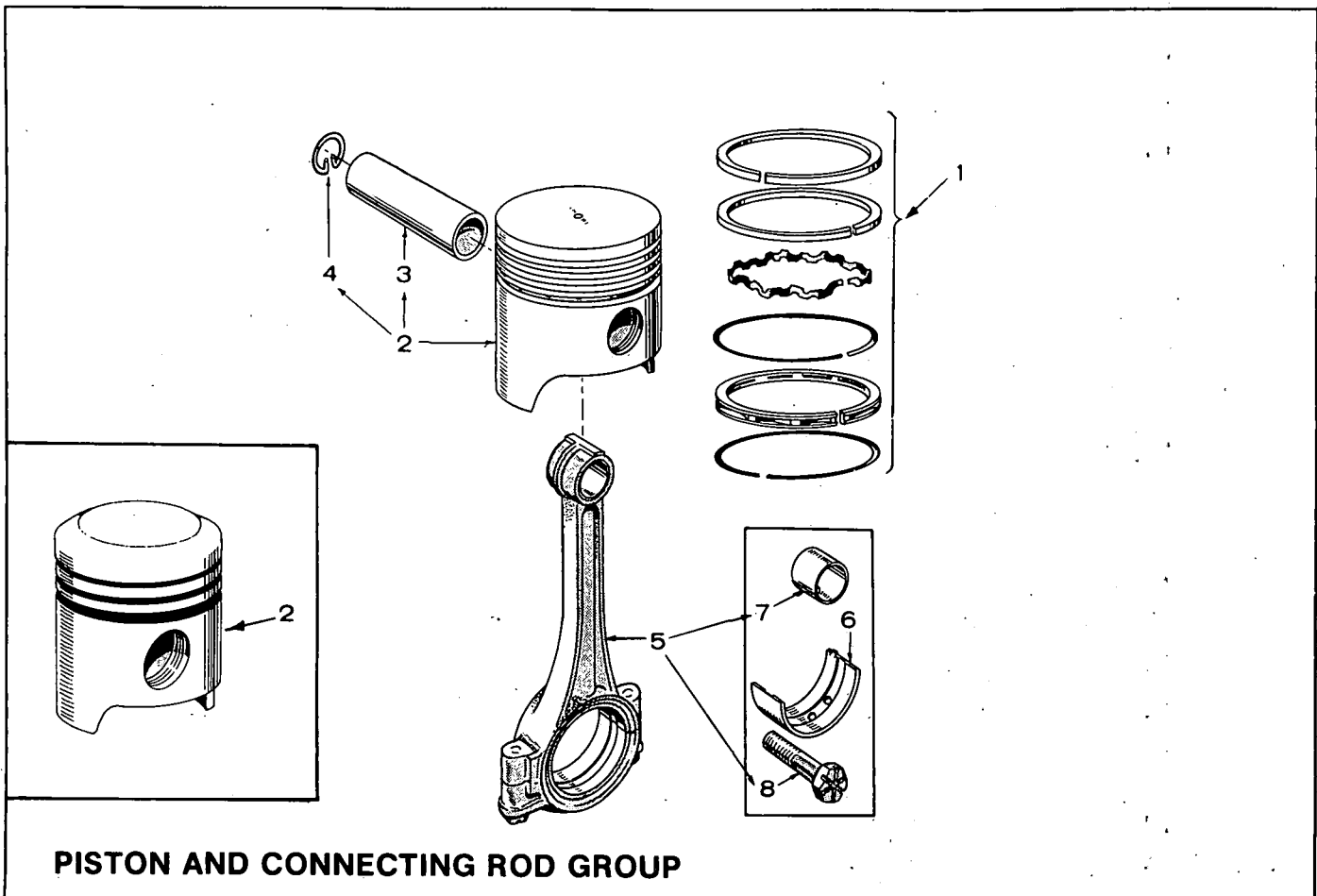
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
18	CONNECTOR, INVERTED MALE - REAR CYLINDER HEAD		
	502-0097	1	Gasoline Sets - Spec A through N
	502-0097	1	Gas & Gas-Gasoline Sets - Spec A through Serial #698178
	502-0274	1	Gasoline Sets - Spec P through S (Restricted)
	502-0274	1	Gas & Gas-Gasoline Sets - Serial #698178 through Spec S (Restricted)
20	502-0097	1	Connector, Inverted Male - Tee to Rear Cylinder Head Oil Line - Spec A through S
21	CONNECTOR, INVERTED MALE - ADAPTER OIL LINE TO TEE		
	502-0030	1	Gasoline Sets - Spec A through N
	502-0097	1	Gasoline Sets - Spec P through S
	502-0030	1	Gas & Gas-Gasoline Sets - Spec A through Serial #698178
	502-0097	1	Gas & Gas-Gasoline Sets - Serial #698178 through Spec S
22	120-0695	2	Line, Oil - Cylinder Head - Begin Spec T
23	502-0373	1	Tee, Inverted Flare - Begin Spec T
24	502-0394	2	Connector, Inverted Male - Cylinder Head - Begin Spec T
25	WASHER, LOCK		
	850-0045	2	Oil Pump Mounting (5/16")
	850-0045	3	Oil Filter Adapter Mounting (5/16")
26	SCREW, HEX CAP		
	800-0030	2	Oil Pump Mounting (5/16-18 x 1-1/4")
	800-0028	3	Oil Filter Adapter Mounting (5/16-18 x 1")
27	502-0053	1	Elbow (45°) - Low Oil Pressure Switch (Optional)

CYLINDER HEAD, VALVE AND ROCKER GROUP

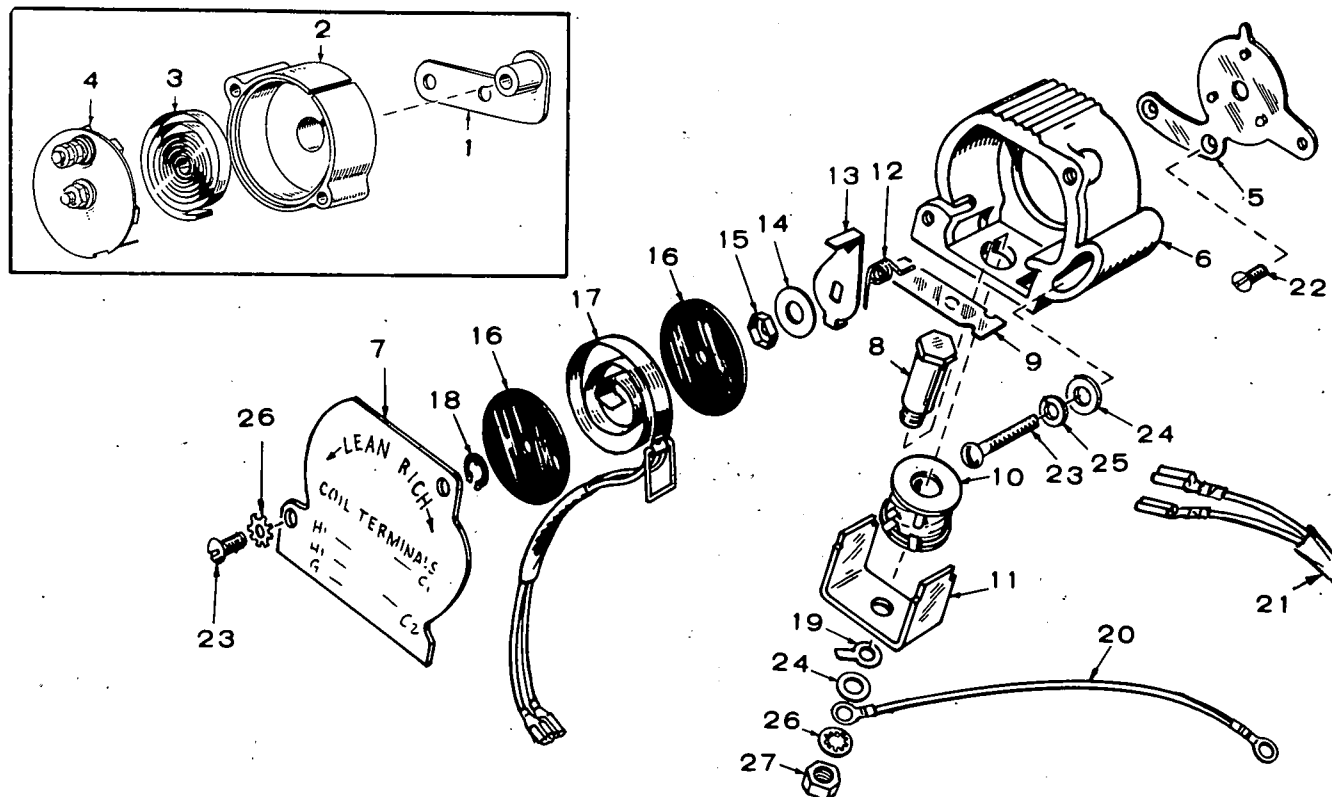


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	HEAD, CYLINDER		
	110-1439	2	Gasoline Sets
	110-1440	2	Gas & Gas-Gasoline Sets
2	110-1223	2	Gasket, Head
3	GUIDE, VALVE		
	110-1501	8	Intake & Exhaust, Gasoline Sets Standard
	110-1501-01	8	.001" Oversize
	110-1501-05	8	.005" Oversize
	110-1501	4	Intake, Gas & Gas-Gasoline Sets Standard
	110-1501-01	4	.001" Oversize
	110-1501-05	8	.005" Oversize
	110-1392	4	Exhaust, Gas & Gas-Gasoline Sets Standard
	110-1392-01	4	.001" Oversize
	110-1392-05	4	.005" Oversize
4	INSERT, VALVE SEAT		
	110-1214	4	Intake, Gasoline Sets Standard
	110-1214-02	4	.002" Oversize
	110-1214-05	4	.005" Oversize
	110-1214-10	4	.010" Oversize
	110-1214-25	4	.025" Oversize
	110-1287	4	Intake, Stellite - Gas & Gas-Gasoline Sets Standard
	110-1287-02	4	.002" Oversize
	110-1287-05	4	.005" Oversize
	110-1287-10	4	.010" Oversize
	110-1287-25	4	.025" Oversize
	110-1215	4	Exhaust Standard
	110-1215-02	4	.002" Oversize
	110-1215-05	4	.005" Oversize
	110-1215-10	4	.010" Oversize
	110-1215-25	4	.025" Oversize
5	VALVE, INTAKE		
	110-1218	4	Gasoline Sets
	110-1286	4	Gas & Gas-Gasoline Sets
6	110-1219	4	Valve, Exhaust - Stellite
7	110-1221	8	Spring, Valve
8	110-1220	8	Retainer, Valve Spring
9	110-0858	16	Lock, Valve Spring Retainer
10	110-0859	8	Cap, Valve Stem
11	509-0090	4	Seal, Oil Intake Valve (Includes Retaining Rings)
12	ARM, ROCKER		
	115-0128	4	Exhaust
	115-0129	4	Intake
14	115-0127	8	Ball, Rocker Arm
15	115-0150	8	Locknut, Rocker Arm
16	115-0189	4	Stud, Rocker Arm (2 Studs & Lock)
16A	115-0184	4	Lock, Stud
17	115-0145	8	Rod, Valve Push (Aluminum)
18	TAPPET, VALVE		
	115-0132	8	Spec A through N
	115-0195	8	Begin Spec P
19	115-0196	2	Guide, Push Rod
20	115-0137	8	Shield, Push Rod
21	509-0084	16	Seal, Push Rod Shield
22	115-0155	16	Washer, Spring Retaining
23	115-0146	8	Spring, Shield Retainer

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
24	115-0197	2	Cover, Rocker
25	120-0628	2	Line, Oil - Rocker Cover
26	115-0130	2	Gasket, Rocker Cover
27	110-1225	10	Screw (3/8-16 x 4-3/4"), Cylinder Head
28	110-0815	8	Screw (3/8-16 x 2"), Cylinder Head
29	110-1282	4	Screw (3/8-16 x 4"), Cylinder Head
30	520-0626	2	Stud, Cylinder Head - Spec A through H
31	526-0174	12	Washer, Cylinder Head
32	520-0338	4	Stud, Intake Manifold
33	520-0608	8	Stud, Exhaust Manifold
35	403-0690	1	Bracket, Lifting
36	403-0620	2	Nut, Extension - Spec A through H
37			Bar Assembly, Lifting - Spec A through H (Order 403-0690, (2) 800-0009 & (2) 850-0060)
38	809-0042	2	Screw, Oil Line - Rocker Cover
39	110-1312	2	Baffle, Fuel Distributing
40	309-0196	1	Switch, High Air Temperature (Optional)
41	309-0195	1	Bracket, High Air Temperature Switch (Optional)
42	508-0126	4	Washer, Insert - High Temperature Switch (Optional)
43	508-0127	1	Insulator, Sleeve - High Temperature Switch (Optional)
44	332-0876	1	Terminal, High Temperature Switch (Optional)
45	402-0361	2	Cushion, Vibration (Not Used on Early Models)
46	403-0890	1	Brace, Lifting Bracket (Not Used on Early Models)
47	403-0826	1	Spacer, Lifting Bracket (Not Used on Early Models)
48	402-0362	2	Bushing, Spacer (Not Used on Early Models)
49	123-1169	2	Adapter, PCV Valve - Begin Spec T
50	123-1170	2	Valve, PCV (Positive Crankcase Ventilator) - Begin Spec T
51	SCREW, HEX CAP		
	800-0030	8	Rocker Cover Mounting (5/16-18 x 1-1/4")
	800-0094	2	Lifting Bracket Mounting (1/2-13 x 2")
	800-0025	1	Brace to Lifting Bracket (5/16-18 x 5/8")
	800-0038	1	Brace Mounting (5/16-18 x 3-1/4")
52	WASHER, LOCK		
	850-0045	8	Rocker Cover Mounting
	850-0045	2	Brace Mounting
53	WASHER, FLAT		
	526-0100	2	Lifting Bracket Mounting
	526-0130	2	Oil Line Mounting
54	862-0015	1	Nut, Hex - Brace to Lifting Bracket Mounting



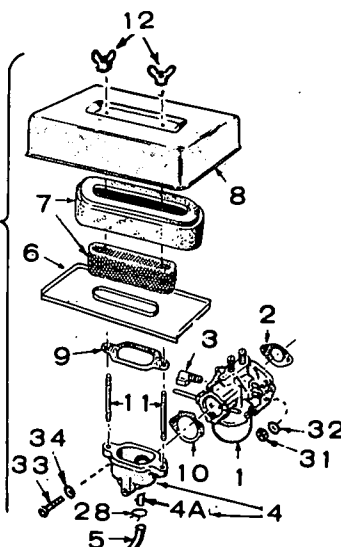
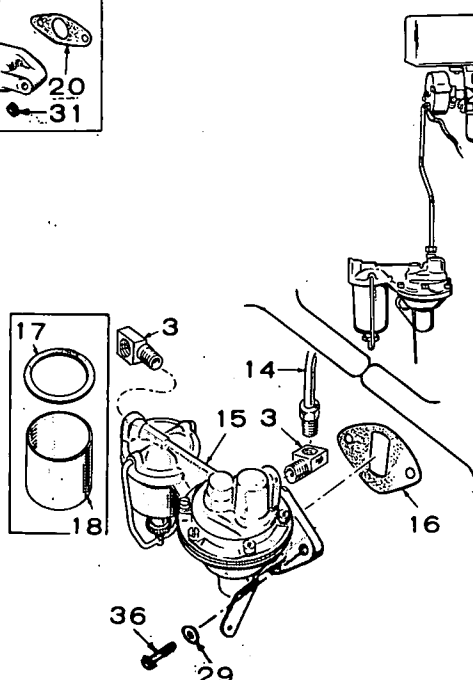
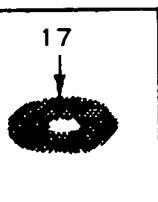
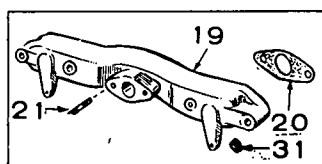
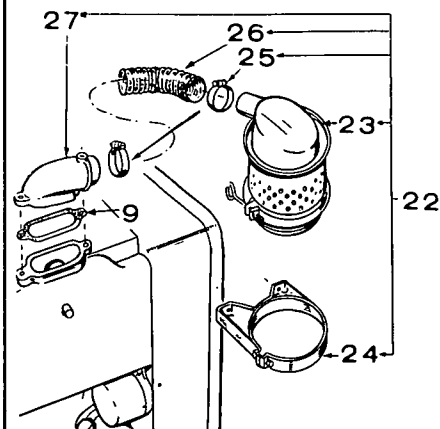
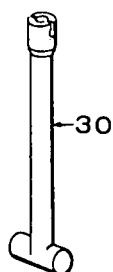
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	RING SET, PISTON		
	113-0107	4	Standard
	113-0107-10	4	.010" Oversize
	113-0107-20	4	.020" Oversize
	113-0107-30	4	.030" Oversize
2	PISTON AND PIN (Includes Pin Retaining Rings)		
	Gasoline, Gas-Gasoline, LPG & Standard Natural Gas Sets		
	112-0092	4	Standard
	112-0092-10	4	.010" Oversize
	112-0092-20	4	.020" Oversize
	112-0092-30	4	.030" Oversize
	Natural Gas Only (High Compression Piston) - Optional		
	112-0106	4	Standard
	112-0106-10	4	.010" Oversize
	112-0106-20	4	.020" Oversize
	112-0106-30	4	.030" Oversize
3	112-0086	4	Pin, Piston
4	112-0085	8	Ring, Retaining - Pin
5	114-0163	4	Rod Assembly, Connecting (Forged)
6	BEARING HALF, CONNECTING ROD		
	114-0164	8	Standard
	114-0164-02	8	.002" Undersize
	114-0164-10	8	.010" Undersize
	114-0164-20	8	.020" Undersize
	114-0164-30	8	.030" Undersize
7	114-0170	8	Bushing, Piston Pin (Half) - Connecting Rod
8	805-0012	8	Bolt (5/16-24 x 1-13/16")



ELECTRIC CHOKE AND THERMO-MAGNETIC CHOKE GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	153-0315	1	Adapter - Spec A through K
2	153-0324	1	Bracket - Spec A through K
3	153-0321	1	Element - Spec A through K
4	153-0325	1	Cover Assembly, Choke - Spec A through K
5	153-0385	1	Plate, Mounting - Begin Spec L
6	153-0386	1	Body - Begin Spec L
7	153-0389	1	Cover - Begin Spec L
8	153-0391	1	Core, Solenoid - Begin Spec L
9	153-0395	1	Armature - Begin Spec L
10	307-1203	1	Coil, Solenoid Assembly - Begin Spec L
11	153-0392	1	Frame, Solenoid - Begin Spec L
12	SPRING 153-0387 153-0425	1	Spec L through R Begin Spec S
13	153-0390	1	Lever, Thermostat - Begin Spec L
14	526-0018	1	Washer (17/64" I.D. x 5/8" O.D. x 1/16") - Begin Spec L
15	870-0134	1	Palnut (1/4-20) - Begin Spec L
16	153-0399	2	Insulator - Begin Spec L
17	HEATER ASSEMBLY 153-0400 153-0422	1	Spec L through R Begin Spec S
18	518-0129	1	Ring, Retaining - Begin Spec L

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
19	332-0876	1	Terminal Ground - Begin Spec L
20	LEAD 334-0028 334-0028	1	Choke to Coil - Spec A through K Choke Solenoid to Ground - Begin Spec L
21	338-0332	1	Harness, Choke - Begin Spec L
22	SCREW, FLAT HEAD - CHOKE PLATE MOUNTING 815-0161 815-0266	2	Late Models (#10-32 x 3/8") Early Models (#8-32 x 3/8")
23	SCREW, ROUND HEAD 813-0107 812-0076	1	Choke Body Mounting (#10-32 x 1-1/4") Choke Cover Mounting (#8-32 x 5/16")
24	WASHER, FLAT 526-0008 526-0022	1	Choke Body Mounting Ground Terminal
25	850-0030	1	Washer, Lock - Choke Body Mounting (#10)
26	WASHER, SHAKEPROOF 854-0007 854-0017	2	Choke Cover Mounting (#8) Ground Terminal (5/16")
27	864-0002 153-0430	1	Nut, Hex - Ground Terminal (5/16-18) Choke Kit, Complete (For Units Originally Equipped With This Type Choke)



FUEL SYSTEM (GASOLINE) AND AIR INTAKE GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*CARBURETOR, GASOLINE		
	141-0759	1	†Spec A through Q
	141-0685	1	Begin Spec R
2	141-0281	1	Gasket, Carburetor
3	502-0002	2	Elbow, Fuel Pump Inlet and Outlet
3	ELBOW, CARBURETOR INLET		
	502-0002	1	Spec A through K (90°)
	502-0065	1	Begin Spec L (45°)
4	ADAPTER, AIR CLEANER		
	140-0647	1	Spec A through Q
	140-0933	1	Begin Spec R
4A	123-0732	1	Tube, Nylon
5	HOSE, BREATHER TO AIR CLEANER ADAPTER		
	503-0389	1	Spec A through K
	503-0416	1	Spec J through S
	503-0471	1	Begin Spec T
6	PAN, AIR CLEANER		
	140-0595	1	Spec A through N
	140-0791	1	Begin Spec P and Sets with Air Pre-heater
	140-0595	1	Gas and Gas-Gasoline Sets

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	140-0636	1	Element and Retainer
8	COVER, AIR CLEANER		
	140-0594	1	Spec A through N
	140-0790	1	Begin Spec P and Sets with Air Pre-heater
	140-0594	1	Gas and Gas-Gasoline Sets
9	140-0584	1	Gasket, Air Cleaner
10	GASKET, ADAPTER TO CARBURETOR		
	140-0585	1	Spec A through Q
	140-0921	1	Begin Spec R
11	520-0621	2	Stud, Air Cleaner
12	865-0020	2	Nut, Air Cleaner
14	LINE, PUMP TO CARBURETOR		
	159-0744	1	Spec A through K
	149-1016	1	Spec L through Q
	149-1099	1	Begin Spec R
15	149-0803	1	Pump, Fuel
16	149-0792	1	Gasket, Fuel Pump

* - See separate group for components.

† - Spec A through K also order 153-0378 Thermo Magnetic Choke Kit.

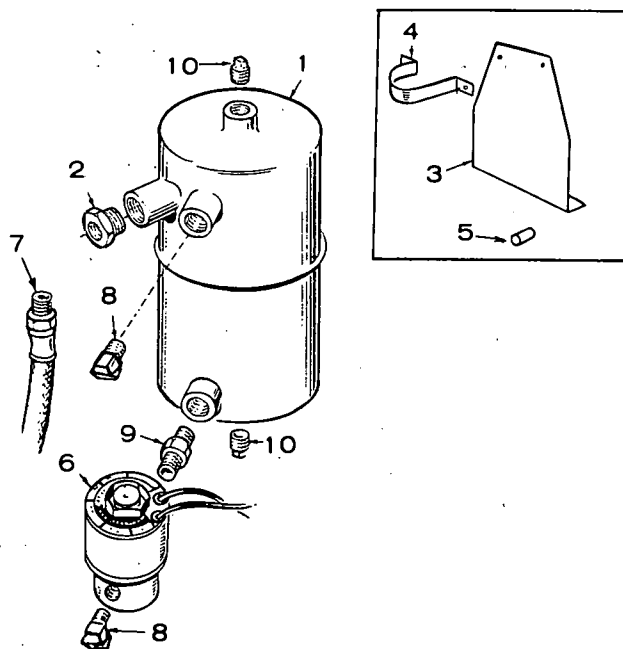
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
17	149-0463	1	Screen, Fuel Pump
17	149-0517	1	Gasket, Bowl
18	149-0116	1	Bowl, Pump
19	MANIFOLD, INTAKE		
	154-0724	1	Spec A Only
	154-0749	1	Begin Spec B
20	154-0733	2	Gasket, Intake Manifold
21	520-0526	2	Stud, Carburetor Mounting
22	140-0677	1	**Conversion Kit, Oil Bath Air Cleaner - Optional
23	140-0500	1	£Cleaner, Oil Bath Air
24	140-0519	1	£Band, Air Cleaner
25	503-0365	2	£Clamp, Hose
26	503-0444	1	£Hose, Cleaner to Adapter
27	140-0645	1	£Adapter, Oil Bath Air Cleaner
28	503-0171	2	Clamp, Breather Hose
29	149-1307	2	Washer, Flat - Fuel Pump Mounting

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
30	141-0727	1	Rod, Carburetor Adjusting
31	NUT, HEX		
	868-0002	2	Carburetor Mounting
	870-0137	4	Intake Manifold
32	854-0017	2	Washer, Carburetor Mounting
33	813-0108	2	Screw, Air Cleaner Adapter
34	850-0030	2	Washer, Lock - Air Cleaner Adapter
35	526-1508	2	Washer, Flat - Air Cleaner Adapter
36	800-0027	2	Screw, Hex Cap - Fuel Pump Mounting
	149-1048	1	Repair Kit, Fuel Pump

£ - Included in OPTIONAL 140-0677 Oil Bath Air Cleaner Conversion Kit (Plus Hardware).

** - Not applicable to Housed Sets.

RESERVOIR (DAY) TANK GROUP (OPTIONAL EQUIPMENT)



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	TANK, RESERVOIR		
	159-0294	1	One Quart
	159-0746	1	Two Quart
2	159-0705	1	Reducer, Restricted
3	BRACKET, TANK MOUNTING		
	159-0759	1	One Quart Tank
	159-0826	1	Two Quart Tank
4	BAND, TANK MOUNTING		
	159-0121	1	One Quart Tank
	159-0825	1	Two Quart Tank
5	159-0761	2	Spacer, Mounting Bracket to Rocker Cover
6	307-0565	1	Valve, Solenoid (12 Volt)
7	LINE, FUEL		
	501-0005	1	Reservoir Tank to Main Tank
	501-0008	2	(1) Fuel Pump to Reservoir Tank (1) Reservoir Tank to Carburetor
8	502-0053	2	Elbow, 45°, (1) Solenoid Valve to Carburetor Line, (1) Reservoir Tank to Fuel Pump Line
9	505-0082	1	Nipple
10	505-0057	2	Plug

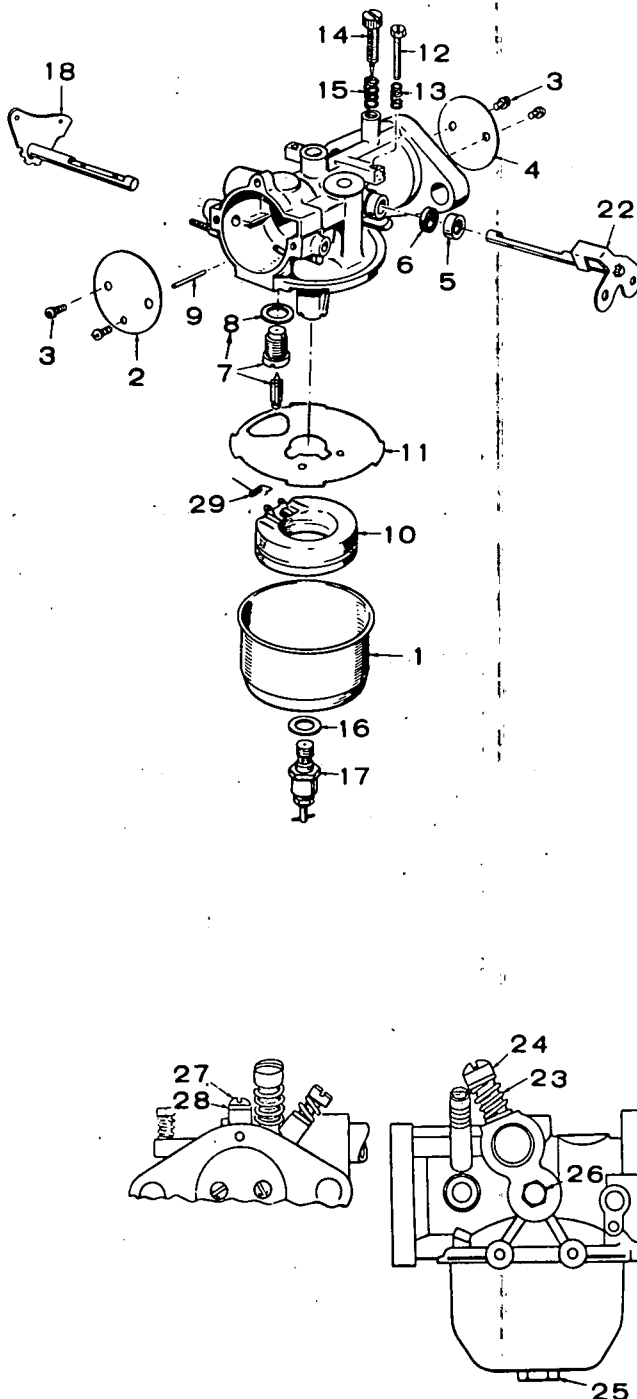
CARBURETOR PARTS GROUP - BEGIN SPEC R

NOTE: See separate group for carburetor parts
Spec A through Q.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	141-0685	1	Carburetor, Gasoline
	141-0720	1	Carburetor, Gas-Gasoline (Optional)
	141-0725	1	Carburetor, Gas Only (Optional)
	141-0747	1	Repair Kit (Includes Parts Marked *)
	141-0748	1	Gasket Kit (Includes Parts Marked †)
	141-0281	1	†*Gasket, Carburetor Flange
1	141-0708	1	Bowl, Fuel
2	141-0771	1	Plate, Choke (Not used on Gas only units)
3	141-0698	4	Screw and Washer, Choke and Throttle Plate Mounting (2 used on Gas only units)
4	141-0793	1	Plate, Throttle
5	141-0705	1	*Retainer, Seal
6	141-0661	1	†*Seal, Rubber
7	141-0798	1	*Valve Seat Assembly, Fuel (Not used on Gas only units)
8	141-0811	1	†*Washer, Fuel Valve Seat (Not used on Gas only units)
9	141-0703	1	*Shaft, Float (Not used on Gas only units)
10	141-0702	1	Float Assembly (Not used on Gas only units)
11	141-0701	1	†*Gasket, Bowl to Body
12	141-0700	1	Screw, Throttle Stop
13	141-0711	1	Spring, Throttle Stop
14	NEEDLE, IDLE ADJUSTING		
	141-0713	1	Gasoline & Gas only Units
	141-0713	2	Gas-Gasoline Units
15	SPRING, IDLE NEEDLE		
	141-0710	1	Gasoline & Gas Only Units
	141-0710	2	Gas-Gasoline Units
16	141-0077	1	†*Washer, Main Jet Assembly
17	141-0712	1	Jet Assembly, Main (Adjustable) (Not used on Gas only units)
18	SHAFT, CHOKE		
	141-0679	1	Electric Choke Gasoline Units
	141-0716	1	Electric Choke Gas-Gasoline Units
22	141-0735	1	Shaft and Lever, Throttle
23	141-0733	1	Spring, Main Gas Needle - Gas & Gas-Gasoline Units
24	141-0734	1	Needle, Main Gas Adjusting - Gas & Gas-Gasoline Units
25	141-0736	1	Nut, Bowl - Gas Only Units
26	141-0737	1	Plug (1/8"), Pipe - Gas Only Units
27	141-0738	1	Screw (#10-32) - Gas Only Units
28	141-0739	1	Washer, Gas Only Units
29	141-0799	1	*Spring, Float

* - Parts included in 141-0747 Repair Kit.

† - Parts included in 141-0748 Gasket Kit.



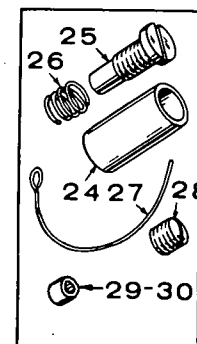
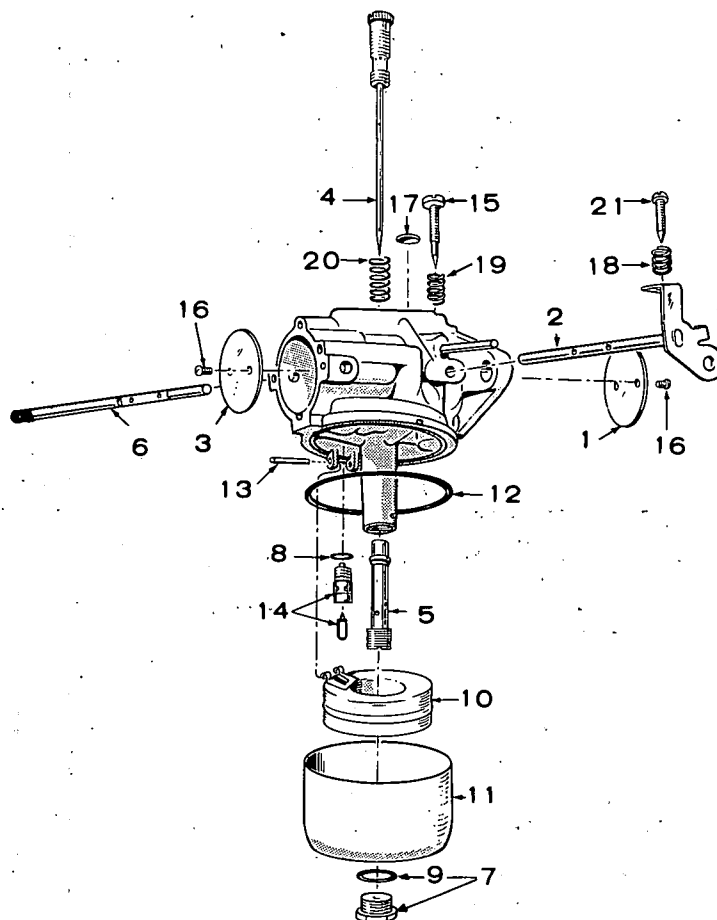
CARBURETOR PARTS GROUP - SPEC A THROUGH Q

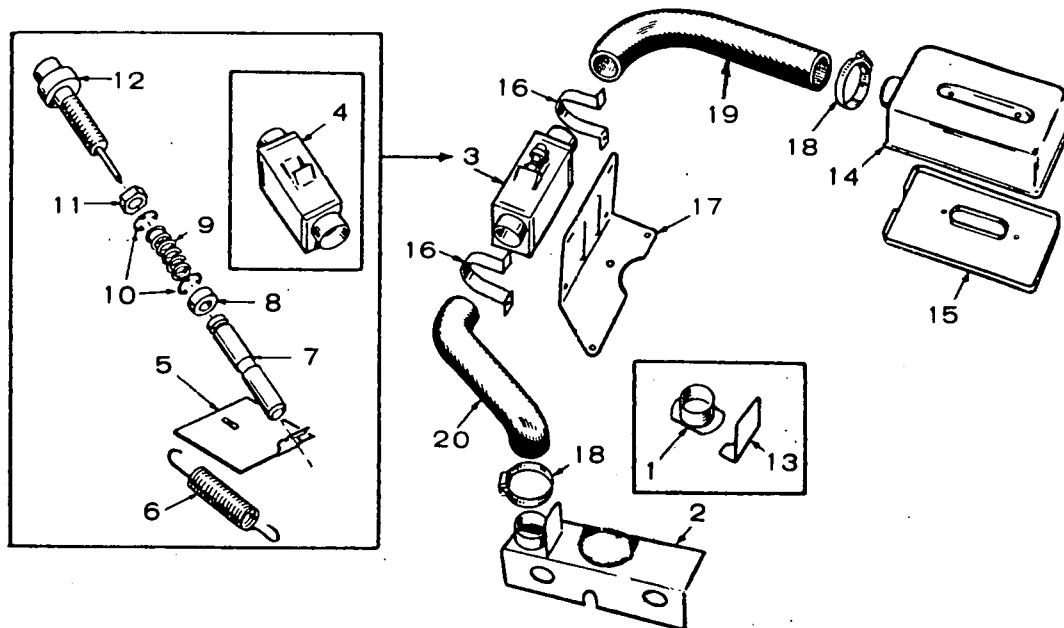
NOTE: See separate group beginning Spec R.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	141-0759	1	Gasoline
	141-0758	1	Gas-Gasoline (Optional)
	141-0757	1	Gas (Optional)
	143-0241	1	Repair Kit, Carburetor
	143-0201	1	**Gasket Kit, Carburetor
	141-0281	1	*Gasket, Carburetor Flange (Illustrated in Fuel System Group)
1	143-0202	1	Valve, Throttle
2	SHAFT AND LEVER, THROTTLE		
	145-0301	1	Spec A Only
	143-0234	1	Begin Spec B
3	143-0204	1	Valve, Choke
4	143-0235	1	**Needle, Idle Jet and High Speed Adjusting
5	143-0237	1	**Nozzle (Not for Gas Only Carburetor)
6	SHAFT, CHOKE		
	143-0207	1	Gasoline Carburetor - Spec A through K
	143-0315	1	Gasoline Carburetor - Spec L through P
	143-0232	1	Gas-Gasoline Carburetor - Spec A through K
	143-0316	1	Gas-Gasoline Carburetor - Spec L through P
7	143-0208	1	Screw and Gasket, Bowl
8	143-0015	1	*Gasket, Fuel Inlet Valve
9	143-0209	1	*Gasket
10	143-0105	1	Float and Lever (Not for Gas Only Carburetor)
11	143-0210	1	Bowl
12	143-0077	1	*Gasket, Bowl Ring
13	143-0212	1	**Pin, Float (Not for Gas Only Carburetor)
14	143-0341	1	**Valve, Fuel Inlet
15	143-0213	1	Screw, Idle Adjusting (2 for Gas-Gasoline Carburetor)
16	812-0014	4	**Screw (#3-48 x 3/16)
17	143-0110	1	Plug, Expansion
18	143-0214	1	Spring, Throttle Adjusting
19	143-0112	1	Spring, Idle Adjusting (2 for Gas-Gasoline Carburetor)
20	143-0114	1	Spring, High Speed Adjusting
21	143-0215	1	Screw, Throttle Adjusting
24	145-0308	1	Tube, Gas Inlet - Gas and Gas-Gasoline Sets
25	145-0309	1	Needle, Gas Adjusting - Gas and Gas-Gasoline Sets
26	148-0010	1	Spring, Gas Adjusting - Gas and Gas-Gasoline Sets
27	143-0231	1	Wire, Choke Lock - Gas- Gasoline Sets
28	505-0008	1	Plug (1/8") - Gas Sets
29	510-0075	1	Bearing, Needle - Throttle Shaft - Spec A Only
30	510-0076	1	Bearing, Needle - Throttle Shaft - Spec A Only

* - Contained in Gasket Kit.

** - Contained in Repair Kit.





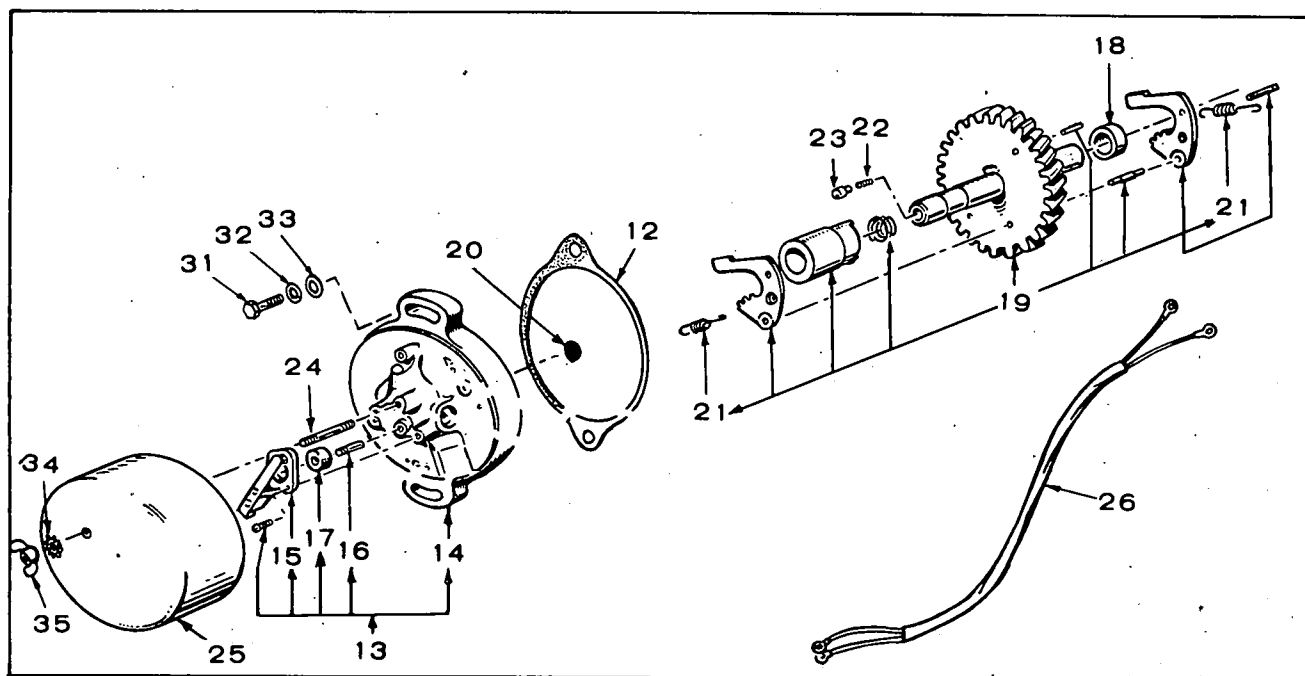
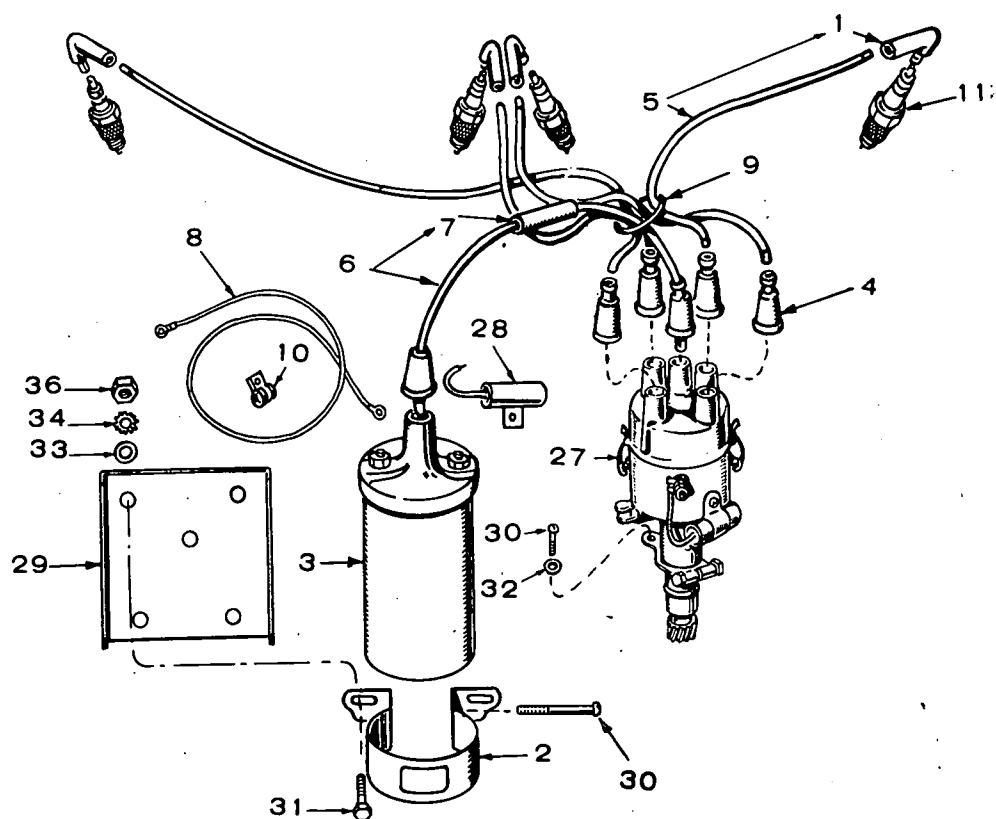
CARBURETOR AIR HEATER GROUP (LATE MODELS)

NOTE: Standard equipment, all models, begin Spec P (except gas and gas-gasoline sets) and parts key no. 3 Spec A through N. Optional for other sets Spec A through N. See separate group for early models.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	KIT, AIR HEATER			12	309-0181	1	*Vernatherm, Temperature Control
	140-0893	1	Pressure Cooled Sets with Duct or Duct & Shutter	13	140-0789	1	Shield, Air Outlet Hose - Pressure Cooled Sets with Duct or Duct & Shutter and Vacu-Flo Cooled Sets
	140-0892	1	Vacu-Flo Cooled Sets	14	140-0790	1	Cover, Air Cleaner
	140-0894	1	Pressure Cooled Sets Without Duct or Shutter	15	140-0791	1	Pan, Air Cleaner
1	133-0187	1	Adapter, Hose - Air Outlet - Pressure Cooled Sets with Duct or Duct & Shutter and Vacu-Flo Cooled Sets	16	140-0821	2	Clamp, Temperature Control Support - Pressure Cooled Sets
2	133-0192	1	Plenum, Manifold Heater - Pressure Cooled Sets without Duct or Shutters	17	140-0822	1	Support, Temperature Control - Pressure Cooled Sets
3	140-0788	1	Control Assembly, Temperature (Includes Parts Marked *)	18	CLAMP, HOSE		
4	140-0785	1	*Housing, Temperature Control	503-0311		2	Pressure Cooled Sets
5	140-0782	1	*Shutter, Temperature Control	503-0311		4	Vacu-Flo Cooled Sets
6	140-0786	1	*Spring, Shutter Control	19	HOSE, CONTROL TO AIR CLEANER		
7	140-0784	1	*Plunger, Temperature Control	503-0475		1	Pressure Cooled Sets
8	140-0808	1	*Spacer, Vernatherm	503-0477		1	Vacu-Flo Cooled Sets
9	140-0787	1	*Spring, Vernatherm	20	HOSE, ADAPTER (or Plenum) TO CONTROL		
10	518-0205	2	*Ring, Retaining	503-0476		1	Pressure Cooled Sets
11	870-0195	1	*Nut, Locking - Vernatherm	503-0039		1	Vacu-Flo Cooled Sets

* - Included in 140-0788 Temperature Control Assembly.

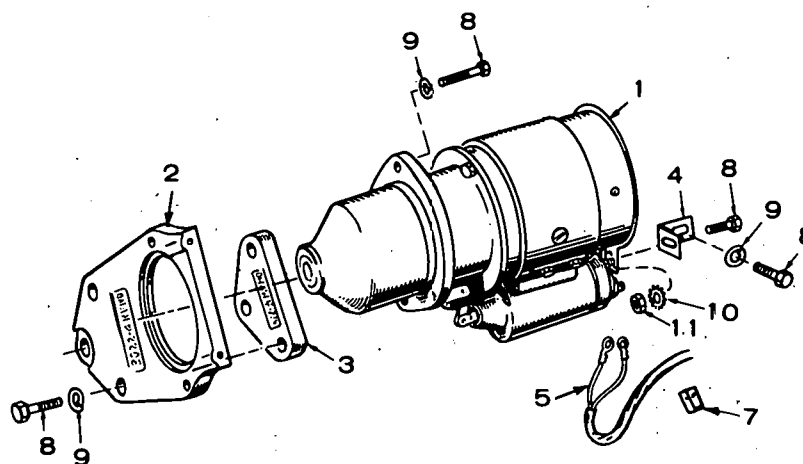
IGNITION GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	314-0032	4	*Suppressor, Spark Plug
2	166-0279	1	Clamp, Coil
3	166-0278	1	Coil, Ignition
4	160-0558	6	Nipple, Ignition Cables
5	CABLE, SPARK PLUG		
	167-1409	3	(15-1/2") Includes Suppressor
	167-1410	1	(25-1/2") Includes Suppressor
6	CABLE, COIL TO DISTRIBUTOR (Includes Suppressor)		
	167-1426	1	Pressure Cooled Sets
	167-1425	1	Vacu-Flo Cooled Sets
7	314-0006	1	*Suppressor, Ignition Coil
8	336-0333	1	Lead, Coil to Distributor
9	509-0096	1	"O" Ring
10	332-0052	1	Clip, Spark Plug Cables
11	167-0241	4	Plug, Spark
12	160-0721	1	Gasket, Breaker Plate
13	191-0395	1	Plate Assembly, Start-Disconnect
14	160-1083	1	Plate Only, Start-Disconnect
15	309-0134	1	Switch Assembly, Start-Disconnect
16	309-0140	1	Plunger, Start-Disconnect
17	160-0263	1	Diaphragm, Start-Disconnect
18	160-0720	1	Spacer, Timing Control
19	160-0707	1	Gear and Shaft Assembly, Timing
20	160-0806	1	Disc, Thrust
21	160-0711	2	Spring, Timing Weight
22	160-0773	1	Spring, Thrust Plunger
23	160-0774	1	Plunger, Thrust
24	520-0347	1	Stud, Plate Cover
25	160-0719	1	Cover, Breaker Plate
26	338-0261	1	Harness, Distributor to Control

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
27	**DISTRIBUTOR, INCLUDES GEAR		
	166-0307	1	Pressure Cooled Sets
	166-0515	1	Vacu-Flo Cooled Sets
28	312-0193	1	*Condenser, Ignition Coil
29	160-0886	1	Bracket, Coil Mounting - Vacu-Flo Cooled Sets
30	SCREW, ROUND HEAD		
	166-0286	1	Coil Clamp
	812-0148	1	Distributor Mounting (1/4-20 x 1/2")
31	SCREW, HEX CAP		
	800-0002	2	Coil Mounting (1/4-20 x 3/8")
	800-0052	2	Start-Disconnect Plate Mounting (3/8-16 x 1-1/2")
32	WASHER, LOCK		
	850-0040	1	Distributor Mounting (1/4")
	850-0050	2	Start-Disconnect Plate Mounting (3/8")
33	WASHER, FLAT		
	526-0015	2	Coil Mounting
	526-0026	2	Start-Disconnect Plate Mounting
34	WASHER, SHAKEPROOF		
	854-0014	2	Coil Mounting
	853-0008	1	Breaker Plate Cover Mounting
35	865-0011	1	Nut, Wing - Breaker Plate Cover Mounting
36	854-0014	2	Nut, Hex - Coil Mounting

- Use begin Spec G. Will also work on early models.
 ** - See separate group for components.



AUTOMOTIVE STARTER GROUP

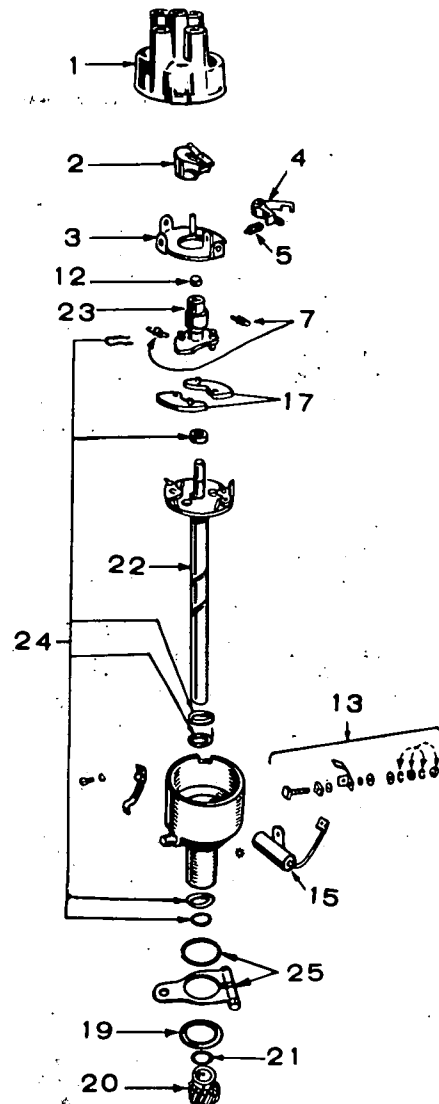
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191-0324	1	*Motor Starter (12 Volt)
2	191-0512	1	Flange, Starter Mounting
3	191-0311	1	Spacer, Starter Flange
4	191-0365	1	Bracket, Starter
5	338-0262	1	Harness, Starter to Control
7	416-0096	2	Clamp, Harness
8	SCREW, HEX CAP		
	800-0051	2	Starter Motor to Flange (3/8-16 x 1-1/4")
	800-0054	3	Starter Motor Flange Mounting (3/8-16 x 2")
	800-0046	1	Support Bracket to Starter Motor (3/8-16 x 1/2")
	800-0052	2	Support Mounting (3/8-16 x 1-1/2")

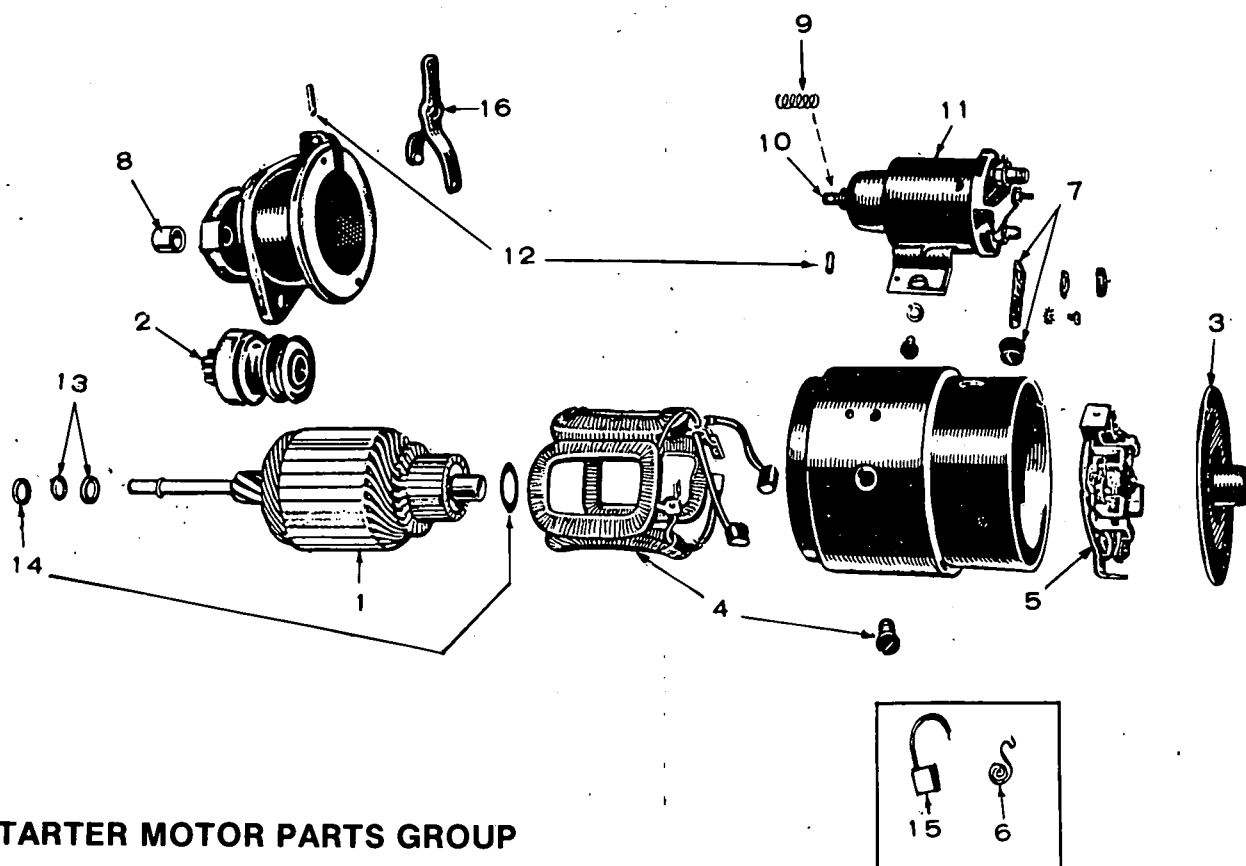
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
9	WASHER, LOCK		
	850-0050	2	Starter Motor to Flange (3/8")
	850-0050	3	Starter Motor Flange Mounting (3/8")
	850-0050	2	Support Mounting (3/8")
10	856-0010	1	Washer, Shakeproof - Bracket to Starter Motor
11	864-0003	1	Nut, Hex - Support Bracket to Starter Motor

* - See separate group for components.

DISTRIBUTOR PARTS GROUP

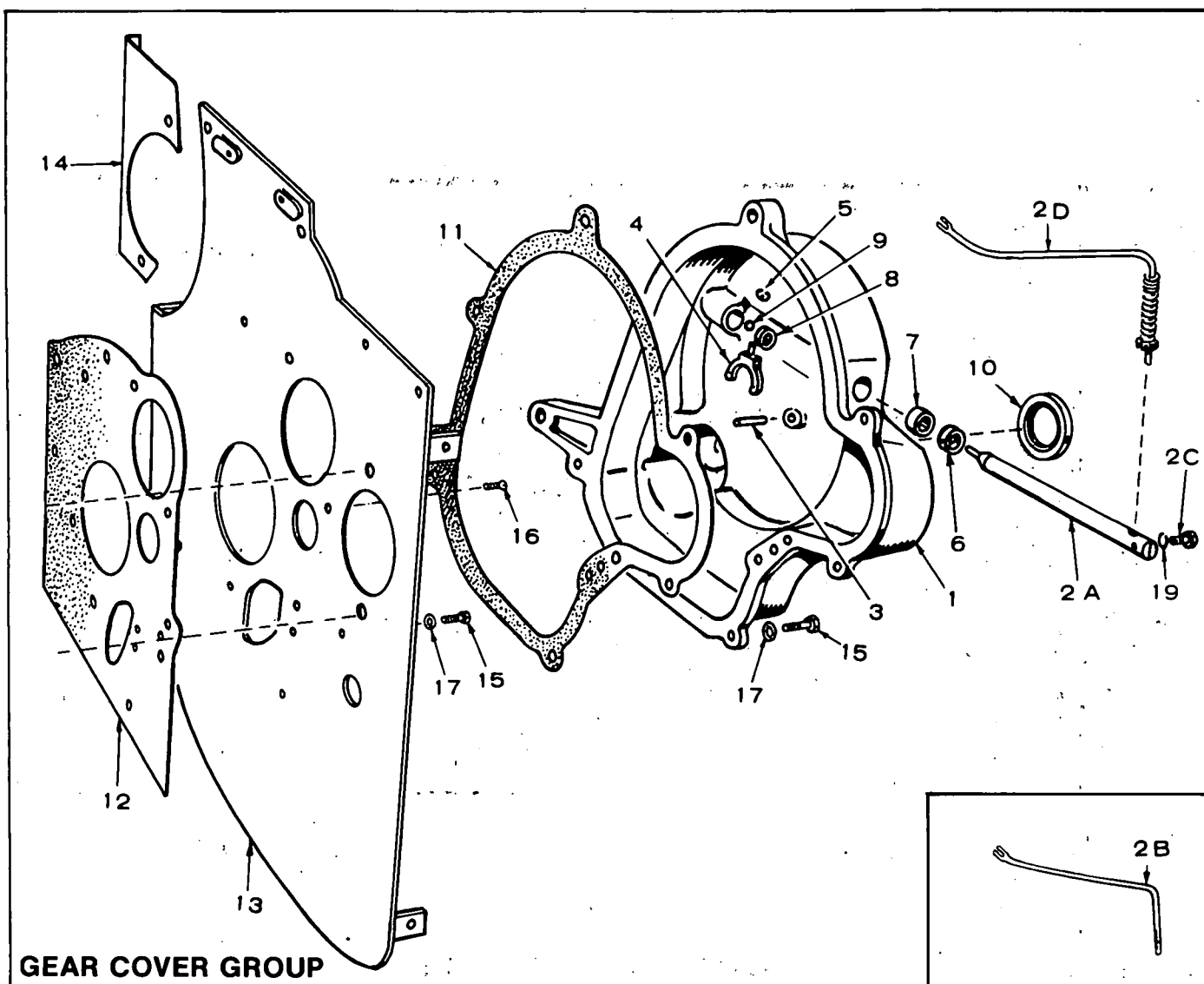
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	DISTRIBUTOR ASSEMBLY, INCLUDES GEAR		
	166-0307	1	Pressure Cooled Sets
	166-0515	1	Vacu-Flo, Cooled Sets
1	166-0235	1	Cap
2	166-0234	1	Rotor
3	166-0297	1	Plate, Breaker
4	166-0245	1	Point Set, Breaker
5	166-0061	1	Nut, Lock, Contact Screw
7	166-0606	1	Spring Set, Governor Weight
12	166-0607	1	Wick Package
13	166-0608	1	Terminal Stud and Parts Package
15	166-0310	1	Condenser
17	166-0609	1	Weight Set, Governor
19	509-0096	1	Seal, Base
20	166-0303	1	Gear, Drive
21	518-0216	1	Ring, Retaining
22	166-0610	1	Shaft, Drive
23	166-0611	1	Cam and Stop Plate
24	166-0612	1	Bearing and Parts Package
25	166-0623	1	Arm, Ignition Advance





STARTER MOTOR PARTS GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	MOTOR, STARTER		
	191-0324	1	12 Volt
	191-0443	1	24 Volt
1	ARMATURE		
	191-0712	1	12 Volt
	191-0713	1	24 Volt
2	191-0432	1	Clutch
3	191-1023	1	Head Assembly, Commutator End
4	COIL PACKAGE, FIELD		
	191-1024	1	12 Volt
	191-1043	1	24 Volt
5	PLATE ASSEMBLY, BRUSH		
	191-1025	1	12 Volt
	191-1042	1	24 Volt
6	191-1020	1	Spring Set, Brush (Set of 4)
7	191-1026	1	Connector Package
8	191-0497	1	Bearing (Bronze), Drive End
9	191-1027	1	Spring, Plunger
10	191-1028	1	Core Assembly, Moving
11	SWITCH, SOLENOID		
	191-0433	1	12 Volt
	191-0715	1	24 Volt
12	191-1029	1	Yoke Parts Package
13	191-1030	1	Stop and Lock Ring Package, Pinion
14	191-1031	1	Thrust Washer Package, Armature (Use as Required)
15	BRUSH SET, SERVICE		
	191-0434	1	12 Volt
	191-0714	1	24 Volt
16	191-1032	1	Yoke



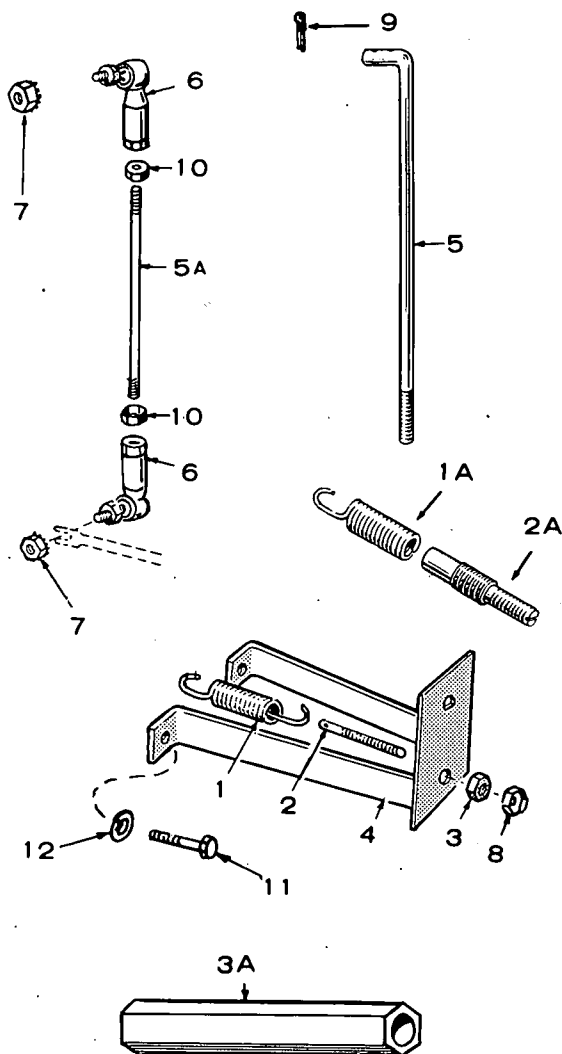
GEAR COVER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	COVER ASSEMBLY, GEAR (Includes Parts Marked *)		
	103-0277	1	Spec A through E, Also Order 103-0251 Gasket
	103-0277	1	Begin Spec F
2A	150-0838	1	*Shaft, Governor
2B	150-0836	1	Arm, Governor - Spec A through Q
2C	815-0176	1	*Screw (#8-32 x 1/2")
2D	150-1091	1	Arm, Governor - Begin Spec R
3	516-0117	1	*Pin, Governor Cup Stop
4	150-0777	1	*Yoke, Governor
5	518-0129	1	*Ring, Yoke Retaining
6	509-0088	1	*Seal, Governor Shaft
7	510-0048	1	*Bearing (1/2") - Shaft
8	510-0082	1	*Bearing (1/4") - Shaft
9	*BALL, GOVERNOR SHAFT THRUST		
	510-0014	1	Spec A through E (3/16")
	510-0043	1	Begin Spec F (5/16")
10	509-0087	1	*Seal
11	GASKET, GEAR COVER		
	103-0219	1	Spec A through E (Cast Iron Cover)
	103-0251	1	Begin Spec F (Die Cast Cover)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
12	103-0218	1	Gasket, Backplate
13	103-0271	1	Backplate (To Replace 103-0220 Also Order 134-1532)
14	134-1532	1	Baffle, Backplate (Not used on early models)
15	SCREW, HEX CAP 110-0879	4	Gear Cover Mounting (5/16-18 x 1-1/4")
	800-0028	1	Gear Cover Mounting (5/16-18 x 1")
	800-0026	1	Backplate Mounting (5/16-18 x 3/4")
16	815-0347	2	Screw, Flat Head - Backplate Mounting
17	WASHER, LOCK 850-0045	1	Backplate Mounting
	850-0045	5	Gear Cover Mounting
18	526-0115	5	Washer, Flat - Gear Cover Mounting
19	850-0025	1	*Washer (#8), Lock

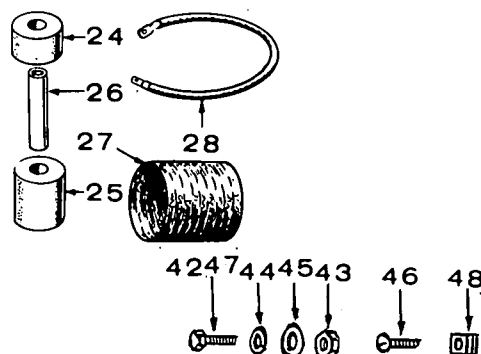
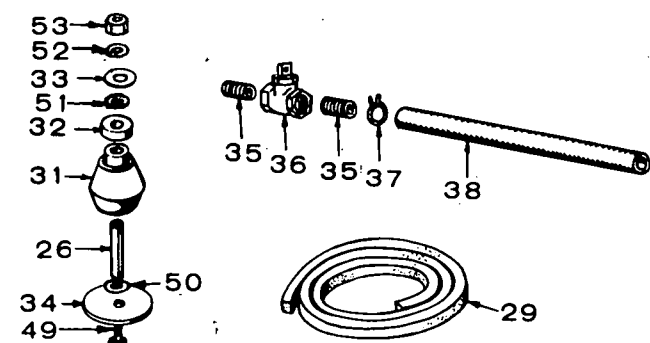
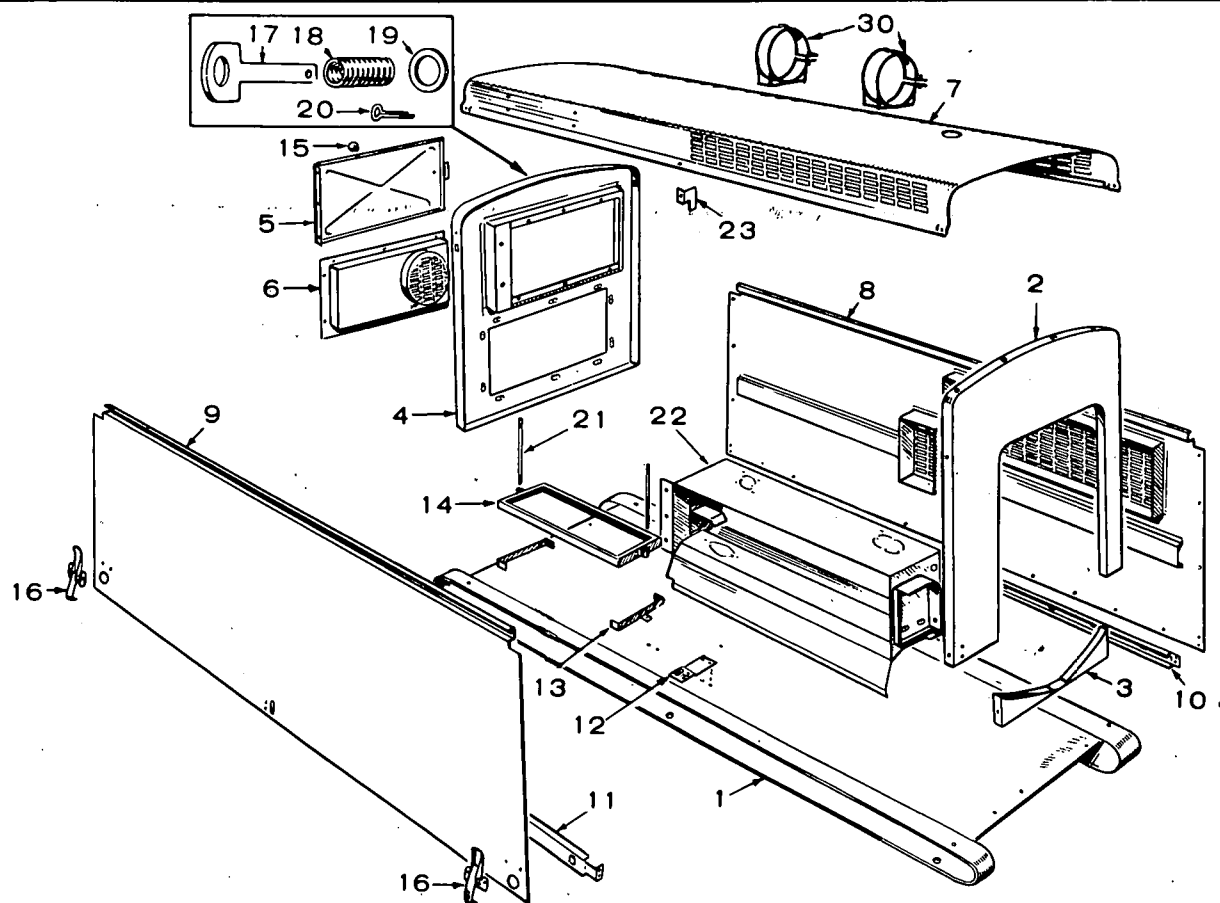
* - Included in Gear Cover Assembly.

GOVERNOR GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150-1085	1	Spring Governor - Begin Spec R
1A	SPRING, GOVERNOR		
	150-0837	1	Spec A Only
	150-0861	1	Spec B through P
	150-0862	1	Vacu-Flo Cooled Sets - Spec A through Q
2	STUD, GOVERNOR ADJUSTING - BEGIN SPEC R		
	150-1199	1	Pressure Cooled
	150-1082	1	Vacu-Flo Cooled
2A	STUD, GOVERNOR ADJUSTING		
	150-0851	1	Spec A Only
	150-0863	1	Spec B through P
3	NUT, ADJUSTING - PRESSURE COOLED		
	104-0091	1	Spec A through Q
	862-0003	1	Begin Spec R
3A	NUT, ADJUSTING - VACU-FLO COOLED		
	150-0937	1	Spec A through Q
	150-1112	1	Begin Spec R
4	BRACKET, GOVERNOR		
	150-0814	1	Pressure Cooled Sets - Spec A through Q
	150-1110	1	Pressure Cooled Sets - Begin Spec R
	150-0812	1	Vacu-Flo Cooled Sets - Spec A through Q
	150-1107	1	Vacu-Flo Cooled Sets - Begin Spec R
5	150-0841	1	Link, Governor - Spec A through Q
5A	150-1069	1	*Link, Governor - Begin Spec R
6	JOINT, BALL		
	150-0974	1	Spec A through Q
	150-1081	2	*Begin Spec R
7	870-0131	2	Nut, Joint
8	PALNUT, LOCK (Not used on Vacu-Flo Cooled Sets)		
	870-0130	1	Spec A through Q
	870-0133	1	Begin Spec R
9	516-0036	1	Key, Cotter - Spec A through Q
10	870-0053	2	*Nut, Lock Governor Link - Begin Spec R
11	800-0005	2	Screw, Hex Cap - Governor Bracket Mounting
12	850-0040	2	Lockwasher - Governor Bracket Mounting
13	150-1070	1	Linkage Assembly, Governor (Includes Parts Marked *) - Begin Spec R

* - Included in 150-1070 Linkage Assembly.



HOUSING GROUP - HOUSED AC SETS (OPTIONAL EQUIPMENT)

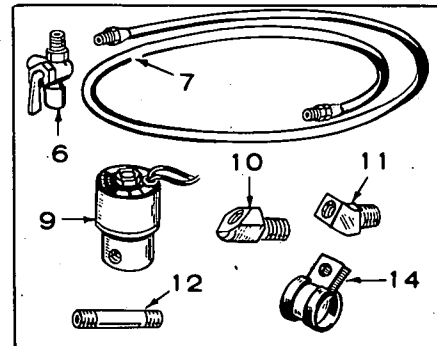
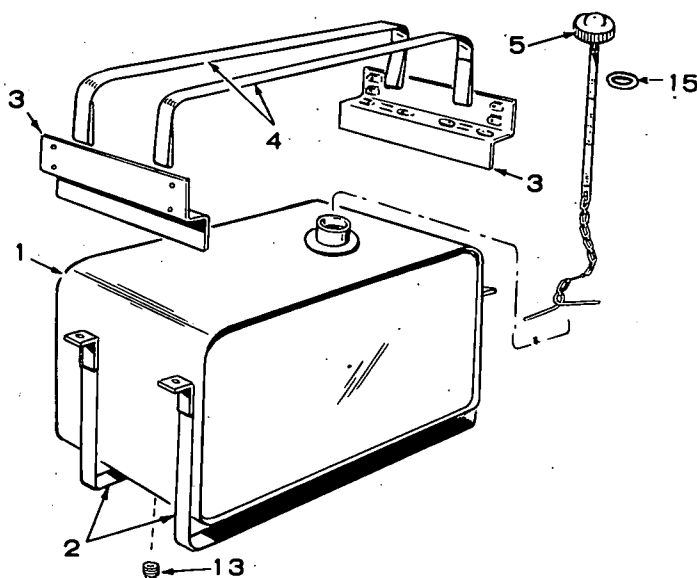
NOTE: Four possible options exist: (1) Housing, (2) Housing plus meter panel, (3) Housing plus shutters, (4) Housing plus meter panel and shutters.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	403-0661	1	Base, Skid
2	405-1323	1	Panel, Front - Upper (Engine End)
3	405-1333	1	Panel, Front - Lower (Engine End)
4	PANEL, REAR (Generator End)		
	405-1322	1	Sets WITHOUT Meter Panel
	405-1331	1	Sets WITH Meter Panel
5	PANEL, DOOR - REAR END		
	405-1329	1	Sets WITHOUT Meter Panel
	405-1332	1	Sets WITH Meter Panel
6	405-1330	1	Panel, Generator Access
7	405-1326	1	Panel, Top
8	PANEL, RIGHT SIDE		
	405-1342	1	Sets WITHOUT Shutters
	405-1352	1	Sets WITH Shutters
9	405-1325	1	Panel, Left Side
10	405-1327	1	Rail, Stiffener - Right Side

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
11	405-1328	1	Rail, Stiffener - Left Side
12	405-1341	2	Bracket, Stiffener Rail
13	416-0501	2	Bracket, Battery Support
14	416-0502	1	Frame, Battery Hold-down
15	406-0002	1	Knob, Rear End Door Panel
16	406-0105	2	Fastener, Housing Hold-down
17	405-1138	2	Pin, Shoulder - Rear End Panel
18	405-1139	2	Spring, Shoulder Pin - Rear End Panel
19	526-0115	2	Washer, Shoulder Pin - Rear End Panel
20	516-0039	2	Pin, Cotter - Shoulder Pin
21	520-0490	2	Stud, Battery Hold-down
22	DUCT, EXHAUST MANIFOLD		
	134-1805	1	Sets WITHOUT Shutters
	134-1613	1	Sets WITH Shutters
23	405-1181	2	Stop, Door

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
24	402-0036	4	Mount, Cylindrical Shaped Upper. - Spec A through J
25	MOUNT, CYLINDRICAL SHAPED LOWER		
	402-0038	2	Engine End - Spec A thru J
	402-0251	2	Generator End - Spec A through J
26	BUSHING, MOUNT SPACER		
	402-0046	4	Spec A through J
	402-0290	4	Begin Spec K
27	503-0423	1	Hose, Flexible - Generator Air Duct
28	336-0476	1	Strap, Ground - Engine to Frame
29	895-0104	1	Stripping, Foam Weather (76")
30	140-0631	2	Band, Muffler
31	CUSHION, CONE SHAPED (Tapered)		
	402-0285	2	Engine End - Begin Spec K
	402-0286	2	Generator End - Begin Spec K
32	402-0282	4	Snubber, Shock Mounting - Begin Spec K
33	526-0014	4	Washer (29/64" I.D. x 1-1/2" O.D. x 1/8") Only with Cone Shaped Cushions
34	526-0199	4	Washer (29/64" I.D. x 3-1/4" O.D. x 1/8") Only With Cone Shaped Cushion

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
35	505-0100	2	Nipple, Oil Drain
36	504-0011	1	Valve, Oil Drain
37	503-0197	1	Clamp, Oil Drain
38	503-0316	1	Hose, Oil Drain
42	SCREW, HEX CAP		
	800-0025	12	5/16-18 x 5/8"
	800-0003	5	1/4-20 x 1/2"
43	860-0015	18	Nut (5/16-18), Hex
44	WASHER, LOCK		
	850-0045	14	5/16"
	850-0040	5	1/4"
	850-0030	20	#10
45	526-0115	10	Washer, Flat
46	813-0098	20	Screw (#10-32 x 3/8"), Round Head
47	821-0010	32	Screw (1/4-20 x 1/2"), Self Locking
48	870-0110	24	Nut (1/4-20), Speed Grip
49	800-0082	4	Screw (7/16-14 x 3-3/4")
50	526-0195	As Req.	Washer (29/64" I.D. x 3-1/4" O.D. x 1/8")
51	526-0198	As Req.	Washer (5/8" I.D. x 1-1/2" O.D. x 1/16") Only with Cone Shaped Cushions
52	850-0055	4	Washer (7/16"), Lock
53	862-0004	4	Nut (7/16-14)

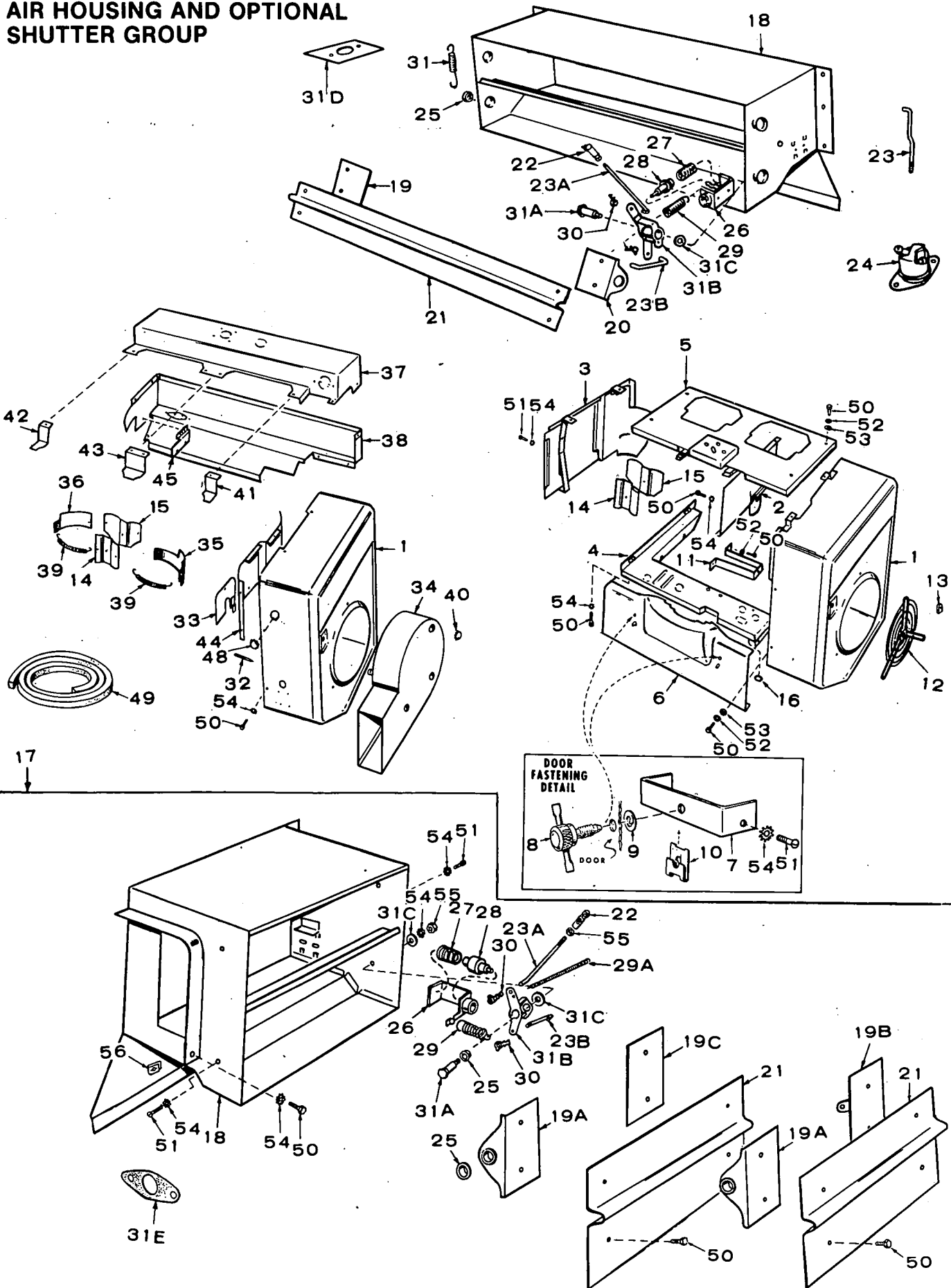


MOUNTED FUEL TANK - HOUSED MODELS (OPTIONAL EQUIPMENT)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	159-0788	1	Tank, 15 Gallon
2	159-0786	2	Strap, Mounting
3	159-0789	2	Bracket, Support
4	159-0787	2	Strap, Hold-down
5	159-0512	1	Cap and Indicator
6	504-0004	1	Valve, Shut-Off
7	501-0005	1	Line (18-1/2"), Flexible
9	307-0565	1	Valve (12 Volt), Solenoid

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
10	502-0065	1	Elbow (45°), Male - Fuel Pump Inlet
11	502-0053	1	Elbow (45°) - Solenoid Outlet
12	502-0032	1	Nipple (1/8 x 2") - Solenoid Valve
13	505-0057	1	Plug (1/8")
14	332-0050	2	Clip, Fuel Line
15	159-0751	1	Gasket, Fuel Tank Cap

AIR HOUSING AND OPTIONAL SHUTTER GROUP



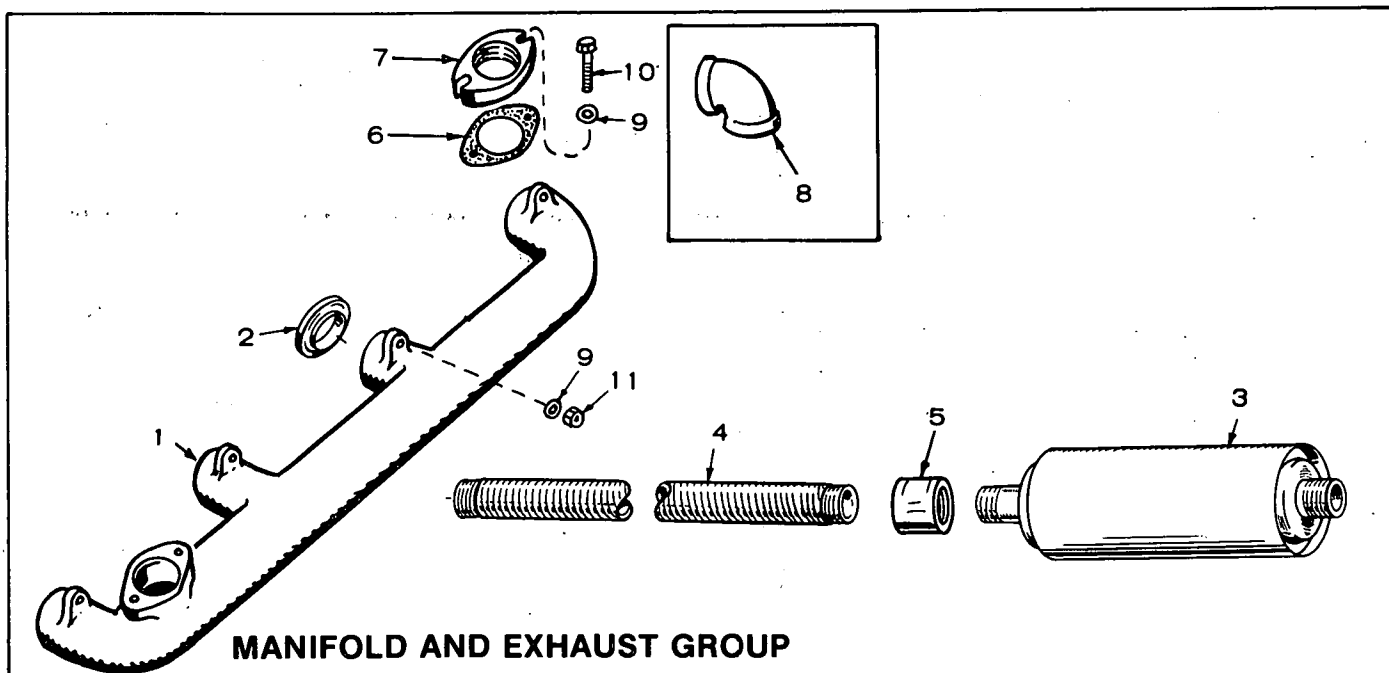
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	HOUSING, BLOWER		
	134-1087	1	Pressure Cooled Sets
	134-1433	1	Vacu-Flo Cooled Sets
2	134-1048	1	Housing, Cylinder Air - Front - Pressure Cooled Sets
3	134-1051	1	Housing, Cylinder Air - Rear - Pressure Cooled Sets
4	134-1418	1	Panel, Cylinder Air Housing (Bottom) - Pressure Cooled Sets
5	COVER, CYLINDER AIR HOUSING - PRESSURE COOLED SETS		
	134-1119	1	Spec A Only
	134-1201	1	Spec B through P
	134-1785	1	Begin Spec R - Gasoline Sets
	134-1910	1	Begin Spec R - Gas and Gas-Gasoline Sets
6	PANEL, AIR HOUSING DOOR - PRESSURE COOLED SETS		
	134-1096	1	Spec A Only
	134-1202	1	Begin Spec B
7	134-1089	2	Bracket, Air Housing Door Panel - Pressure Cooled Sets
8	134-1373	2	Screw, Door Panel - Pressure Cooled Sets
9	134-1180	4	Washer, Door Panel (Early Models, 8 for top cover) - Pressure Cooled Sets
10	870-0194	6	U-Clip, Door Panel & Cover - Pressure Cooled Sets
10	870-0179	8	J-Clip, Housing - Vacu-Flo Cooled Sets
11	SUPPORT, BLOWER HOUSING		
	134-1088	1	Pressure Cooled Sets
	134-1085	1	Vacu-Flo Cooled Sets
12	134-1178	1	Grille - Pressure Cooled Sets
13	134-1092	3	Retainer, Grille - Pressure Cooled Sets
14	134-1097	1	Baffle, Cylinder (Carburetor Side)
15	134-1098	1	Baffle, Cylinder (Opposite Carburetor Side)
16	508-0002	2	Grommet, Bottom Housing Panel
17	134-1810	1	Shutter Assembly - Optional (Standard for Key 3) - Includes parts marked *
18	134-1805	1	*Duct only, Air Outlet (*NOTE: Cannot be used on early model shutter assembly with external shutter pivot springs)
19	134-1242	3	+Bracket & Pivot Assembly, Shutter
19	134-1242	2	£Bracket & Pivot Assembly, Shutter
19	134-1612	1	£Bracket & Pivot Assembly, Shutter
19A	134-2411	2	*Bracket and Pivot Assembly, Shutter
19B	134-1802	1	*Bracket & Pivot Assembly, Shutter & Rod
19C	134-1801	1	*Bracket & Pivot Assembly, Shutter & Spring
20	134-1238	1	+Bracket, Shaft & Pin Assembly, Shutter
20	134-1611	1	£Bracket, Shaft & Pin Assembly, Shutter
21	134-1237	2	+Shutter, Air Outlet
21	134-1614	2	*£Shutter, Air Outlet
22	150-1358	1	*£Joint, Ball
23	134-1247	1	+Rod, Shutter Control
23A	134-1606	1	*£Rod, Shutter Control (Upper)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
23B	134-1607	1	*£Rod, Shutter Control (Lower)
24	309-0162	1	+Switch, Hi-Temperature - Spec A through K
25	134-1248	4	+Bearing, Air Shutter
25	134-1248	6	£Bearing, Air Shutter
25	134-1783	4	*Bearing, Shutter
25	134-1248	2	*Bearing, Actuating Arm
26	134-1244	1	+Bracket & Guide, Vernatherm
26	134-1610	1	*£Bracket & Guide, Vernatherm
27	134-0656	1	*£+Spring, Vernatherm Element
28	309-0085	1	*£+Element, Vernatherm
29	134-0658	1	*£+Spring, Shutter Return
29A	134-1817	1	*Spring, Shutter Return - Upper
30	*£+CLIP, ROD END		
	518-0004	1	Right Hand
	518-0006	2	Left Hand - Begin Spec L
31	134-1437	2	£+Spring, Shutter Pivot (External)
31A	134-1605	1	*£Shaft, Actuating Arm
31B	134-1604	1	*£Arm, Actuating
31C	526-0045	1	£Washer, Actuating Shaft
31C	526-0213	1	*Washer, Actuating Shaft
31D	134-1375	1	*£Plate, Exhaust Outlet Cover
31E	154-0738	1	*£Gasket, Exhaust Outlet
32	104-0528	1	Pointer, Timing - Vacu-Flo Cooled Sets
33	134-1415	1	Cover, Governor Access - Vacu-Flo Cooled Sets
34	134-1521	1	Scroll, Blower - Vacu-Flo Cooled Sets
35	134-1109	1	Shroud, Cylinder #1 (Front) - Vacu-Flo Cooled Sets
36	134-1337	1	Shroud, Cylinder #4 (Rear) - Vacu-Flo Cooled Sets
37	134-1434	1	Cover, Cylinder, Shroud - Vacu-Flo Cooled Sets
38	134-1435	1	Wrapper, Cylinder Shroud - Vacu-Flo Cooled Sets
39	134-0944	4	Spring, Cylinder Shroud Wrapper - Vacu-Flo Cooled Sets
40	517-0021	1	Button, Dot, Scroll - Vacu-Flo Cooled Sets
41	134-1427	1	Baffle, Front - Vacu-Flo Cooled Sets
42	134-1428	1	Baffle, Rear - Vacu-Flo Cooled Sets
43	134-1430	1	Baffle, Center - Vacu-Flo Cooled Sets
44	134-1472	1	Panel, Blower Housing - Vacu-Flo Cooled Sets
45	134-1429	1	Bracket, Cylinder Shroud Mounting - Vacu-Flo Cooled Sets
48	517-0035	1	Plug, Dot Button - Governor Accessory - Begin Spec R
49		1	Stripping, Weather (Order 4 ft. of Bulk Stripping #895-0098)
50	SCREW, HEX CAP		
	800-0004	4	Cylinder Air Housing Cover Mounting (1/4-20 x 5/8")
	815-0235	2	Bottom Cylinder Air Housing Mounting (1/4-20 x 5/8")
	815-0235	1	Front Cylinder Air Housing Mounting (1/4-20 x 5/8")
	800-0024	2	Blower Housing Support Mounting (5/16-18 x 1/2")
	800-0007	3	Grille Mounting (1/4-20 x 1")
	815-0235	6	Blower Housing Mounting (1/4-20 x 5/8")
	815-0361	8	*Shutter Mounting (#10-32 x 5/16") - Optional
	815-0235	3	Shutter Assembly Mounting (1/4-20 x 5/8") - Optional

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
51	SCREW, ROUND HEAD		
	813-0097	2	Rear Air Housing Mounting (#10-32 x 5/16")
	813-0098	2	Air Housing Door Bracket Mounting (#10-32 x 3/8")
	812-0165	1	Center Baffle Mounting (1/4-20 x 4-1/2")
	813-0097	2	*Vernatherm Bracket and Guide Mounting (#10-32 x 5/16")
	812-0148	4	*Bracket & Pivot Mounting (1/4-20 x 1/2")
52	WASHER, LOCK		
	850-0040	4	Cylinder Air Housing Cover Mounting (1/4")
	850-0045	2	Blower Housing Support Mounting (5/16")
	850-0040	3	Grille Mounting (1/4")
53	WASHER, FLAT		
	526-0021	4	Cylinder Air Housing Cover Mounting
	526-0115	3	Grille Mounting
	526-0113	1	*Actuating Arm Bearing - Optional
54	WASHER, SHAKEPROOF		
	854-0010	2	Rear Air Housing Mounting (#10 I.T.)
	853-0013	1	Front Air Housing Mounting (1/4" E.T.)
	854-0014	6	Blower Housing Mounting (1/4" I.T.)
	854-0014	1	Center Baffle Mounting (1/4" I.T.)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	854-0013	2	Bottom Air Housing Mounting (#12 I.T.)
	853-0008	2	Air Housing Door Bracket Mounting (#8 E.T.)
	853-0008	2	*Vernatherm Bracket Mounting (#8 E.T.) - Optional
	853-0016	1	*Actuator Bearing Mounting (5/16" E.T.) - Optional
	853-0013	3	*Shutter Assembly Mounting (1/4" E.T.) - Optional
	856-0006	4	*Bracket & Pivot Mounting (1/4" E.I.T.) - Optional
55	NUT, HEX		
	870-0131	1	*Ball Joint (#10-32) - Optional
	864-0002	1	*Actuator Bearing Mounting (5/16-18) - Optional
56	870-0178	3	*Nut, Speed (1/4-20) - Optional
	VACU-FLO COOLING CONVERSION KIT		
	134-1832	1	Spec A through Q
	134-0939	1	Begin Spec R

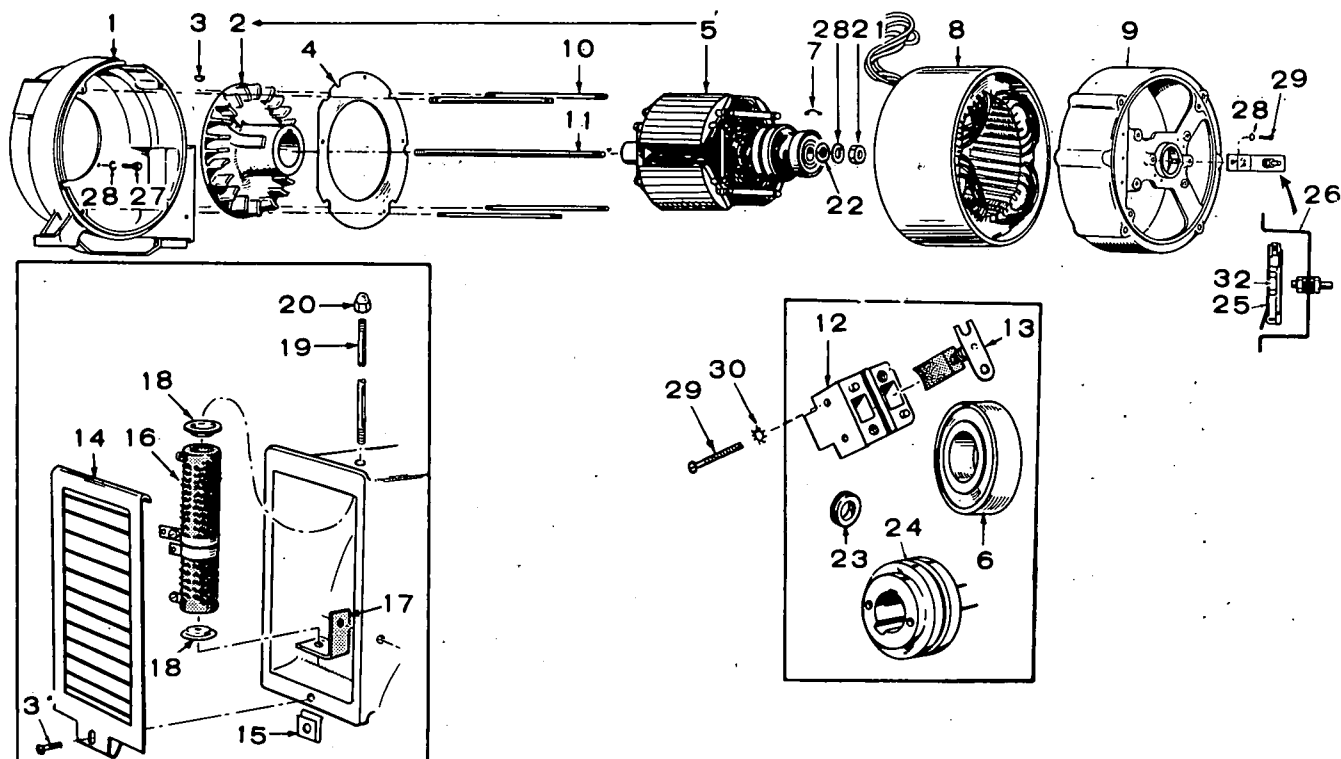
- * - Included in OPTIONAL (Standard for Key 3) Air Discharge Shutter used on late model sets (has internal shutter springs).
- £ - These parts apply to OPTIONAL (Standard for Key 3) Air Discharge Shutter (External Shutter Pivot Springs) used Spec L until the use of shutter assembly with internal shutter springs.
- + - These parts apply to OPTIONAL (Standard for Key 3) Air Discharge Shutter (External Shutter Pivot Springs) used Spec A through K.



MANIFOLD AND EXHAUST GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	154-0714	1	Manifold, Exhaust
2	154-0463	4	Gasket, Exhaust Manifold
3	MUFFLER		
	155-0077	1	Unhoused Sets
	155-0456	1	Housed Sets
4	TUBE, EXHAUST, FLEXIBLE		
	155-0493	1	Unhoused Sets (36")
	155-0841	1	Housed Sets (9-3/4")
5	505-0032	1	Coupling - Unhoused Sets

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
6	154-0738	1	Gasket, Exhaust Outlet
7	155-0782	1	Flange, Exhaust Outlet
8	505-0043	2	Elbow (Housed Sets Only)
9	WASHER, FLAT		
	526-0046	8	Manifold Mounting
	526-0174	2	Outlet Flange Mounting
10	800-0052	2	Screw (3/8-16 x 1-1/2'') - Outlet Flange Mounting
11	110-0445	8	Nut, Hex - Manifold Mounting

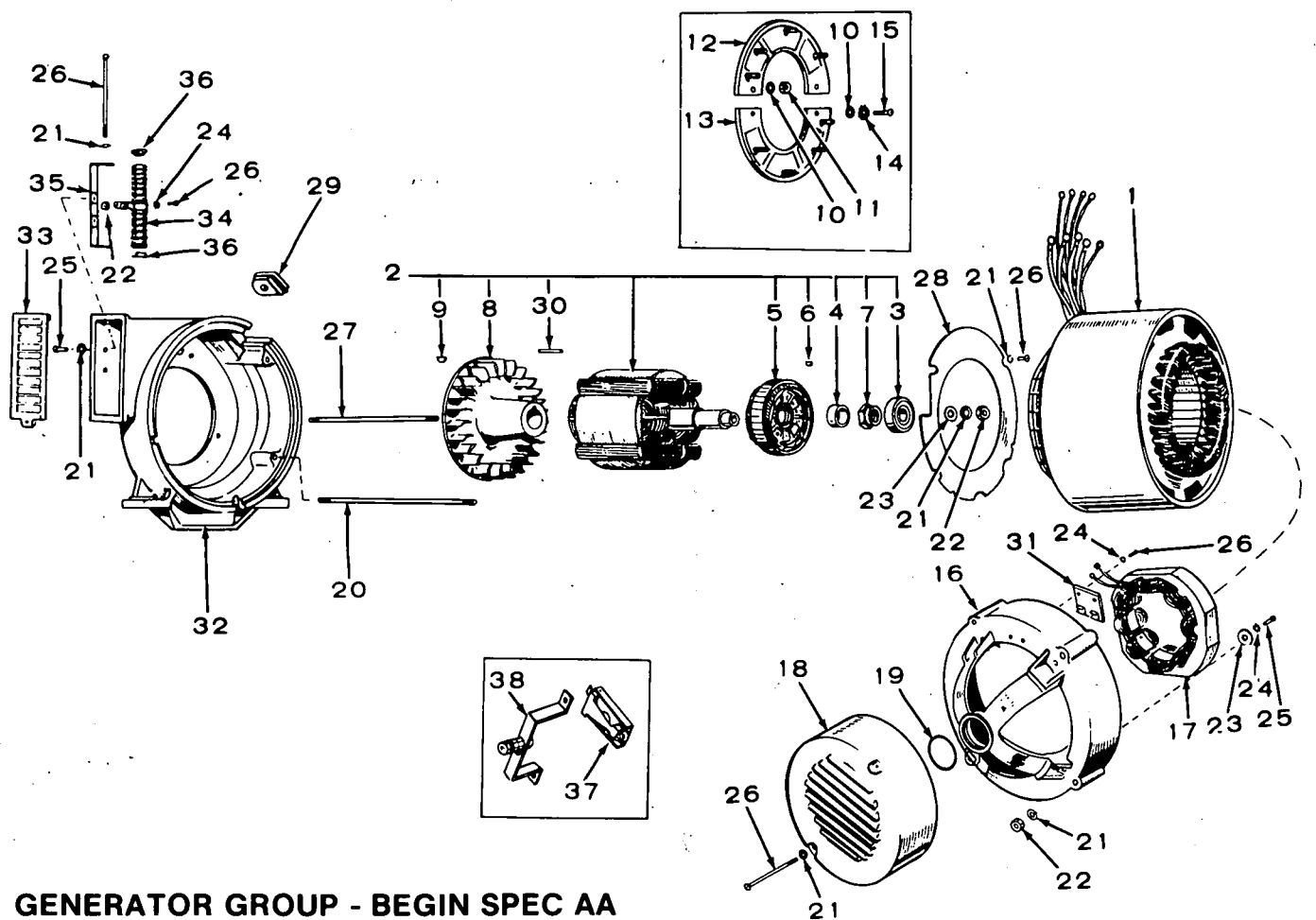


GENERATOR GROUP - ALTERNATOR PORTION (REVOLVING FIELD TYPE) - SPEC A THROUGH Z

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	ADAPTER, ENGINE TO GENERATOR		
	231-0099	1	Spec A through J
	231-0111	1	Begin Spec K
	231-0112	1	Mobile Electric Power Plants
2	205-0064	1	Blower, Generator
3	515-0006	1	Key, Blower
4	234-0162	1	Baffle, Generator Air
5		1	Rotor Assembly, Wound (Includes Bearing & Blower)
6	510-0047	1	Bearing, Rotor
7	232-0596	1	Clip, Bearing Stop
8		1	Stator Assembly, Wound
9	BELL, END - ALTERNATOR TO EXCITER		
	211-0138	1	Spec A through D
	211-0146	1	Begin Spec E
10	STUD, GENERATOR THROUGH - KEY 1		
	520-0607	4	Spec A through D
	520-0638	4	Begin Spec E
10	STUD, GENERATOR THROUGH - KEY 2,3		
	520-0460	4	Spec A through D
	520-0640	4	Begin Spec E
11	STUD, ROTOR THROUGH		
	520-0613	1	Key 1
	520-0615	1	Key 2, 3
12	212-1064	2	Block, Collector Ring Brush
13	214-0059	4	Brush, Collector Ring
14	234-0172	1	Cover, Air Outlet
15	870-0177	1	Clip, Air Outlet Cover
16	304-0500	1	Resistor, Tapped Adjusting
17	232-1565	1	Bracket, Resistor Mounting
18	304-0006	2	Washer, Resistor Centering
19	520-0620	1	Stud, Resistor Mounting
20	866-0001	1	Nut, Resistor Mounting

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
21	NUT, ROTOR THROUGH STUD		
	232-1567	1	Spec A through D (7/16-14")
	870-0203	1	Begin Spec E (7/16-20")
22	232-0200	1	Washer, Rotor through Stud
23	508-0095	1	Grommet (For 7/16" Hole)
24	204-0061	1	Ring, Collector
25	150-0956	1	Switch Assembly, Overspeed - Optional
26	150-0958	1	Bracket & Point, Overspeed - Optional
27	SCREW, HEX CAP - ADAPTER MOUNTING		
	800-0050	2	3/8-16 x 1"
	800-0051	2	3/8-16 x 1-1/4"
28	WASHER, LOCK		
	850-0050	4	Adapter Mounting (3/8")
	850-0055	1	Armature Through (7/16")
	850-0030	2	Overspeed Bracket & Point Mounting (#10)
29	SCREW, ROUND HEAD		
	813-0100	2	Overspeed Bracket and Point Mounting (#10-32 x 1/2")
	812-0086	4	Brush Block Mounting (#8-32 x 1-1/4")
30	856-0002	4	Washer, Shakeproof - Brush Block Mounting (#8)
31	809-0046	1	Air Outlet Cover Mounting (#10 x 3/4")
32	868-0004	1	Nut, Jam - Overspeed Switch Mounting (7/16-20)

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



GENERATOR GROUP - BEGIN SPEC AA

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1		1	Stator, Wound
2	ROTOR ASSEMBLY, WOUND (Includes Parts Marked +)		
	201-2157	1	12.5JC - 60 Hertz
	201-2158	1	12.5JC - 50 Hertz, 15.0JC
3	510-0112	1	+Bearing, Rotor
4	232-2392	1	+Spacer, Bearing
5	201-2151	1	+Rotor, Exciter - Wound
6	515-0094	1	+Key, Exciter Rotor
7	870-0284	1	+Nut, Exciter Rotor Locking
8	205-0105	1	+Fan, Generator
9	515-0103	1	+Key, Fan
10	526-0008	12	+Washer, Flat
11	870-0131	8	+Nut (10-32), Hex
12	358-0069	1	+Rectifier Assembly (Positive)
13	358-0070	1	+Rectifier Assembly (Negative)
14	853-0008	4	+Washer (#10), Shakeproof
15	813-0100	4	+Screw (10-32 x 1/2"), Round Head
16	211-0237	1	Bell, End
17	220-2009	1	Stator, Exciter - Wound
18	COVER, END BELL		
	234-0185	1	Unhoused Sets
	234-0223	1	Housed Sets
	234-0498	1	Housed and Unhoused Sets with Overspeed Switch
19	509-0094	1	Seal, Bearing ("O" Ring)
20	STUD, GENERATOR THROUGH		
	520-0797	1	12.5JC - 60 Hertz
	520-0798	1	12.5JC - 50 Hertz, 15.0JC
21	WASHER, LOCK		
	850-0050	4	Generator Through Stud (3/8")
	850-0040	2	End Bell Cover Mounting (1/4")
	850-0040	2	Resistor Bracket Mounting (1/4")
	850-0055	1	Rotor Through Stud (7/16")
	850-0040	1	Resistor Through Screw (1/4")
	850-0030	4	Air Baffle Mounting (#10)

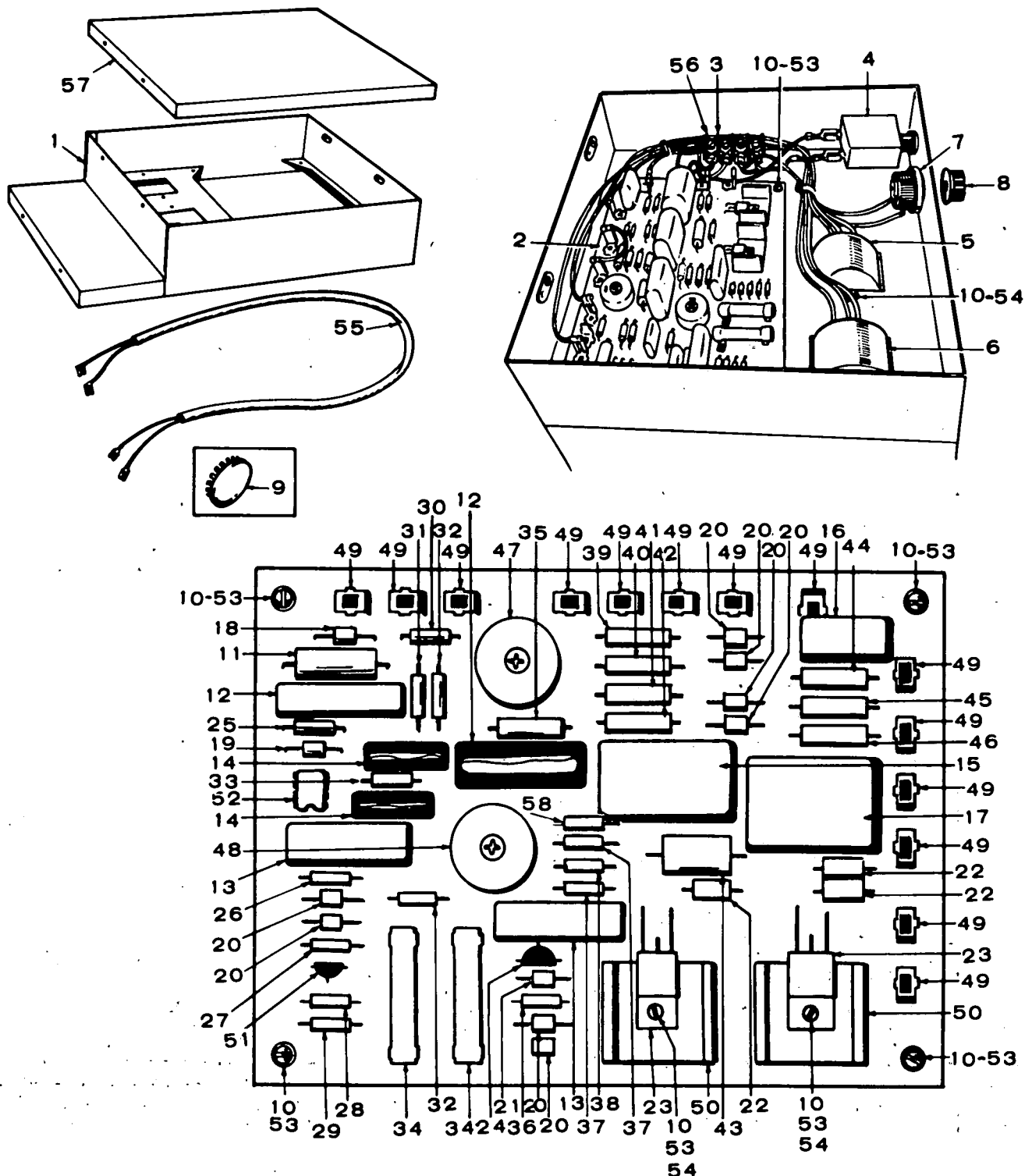
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
22	NUT, HEX		
	862-0011	4	Generator Through Stud (3/8-16)
	870-0203	1	Rotor Through Stud (7/16-20)
	871-0010	1	Resistor Tap (10-32)
23	WASHER, FLAT		
	526-0260	2	Exciter Stator Mounting
	232-0200	1	Rotor Through Stud
24	WASHER, SHAKEPROOF		
	853-0013	2	Exciter Stator Mounting (1/4")
	853-0008	2	End Bell Cover Mounting (#10)
	856-0003	1	Resistor Tap (#10)
25	800-0004	4	Screw (1/4-20 x 5/8") - (2) Exciter Stator Mounting (2) Resistor Bracket Mounting
26	SCREW, ROUND HEAD		
	812-0165	2	End Bell Cover (1/4-20 x 4-1/2")
	813-0100	2	End Bell Cover Mounting (10-32 x 1/2")
	813-0098	4	Baffle Mounting (10-32 x 3/8")
	812-0169	1	Resistor Through (1/4-20 x 5-1/2")
	811-0098	1	Resistor Tap (10-32 x 3/8")
27	STUD, ROTOR THROUGH		
	520-0789	1	12.5JC - 60 Hertz
	520-0790	1	12.5JC-50 Hertz, 15.0JC
28	234-0462	1	Baffle, Air
29	GROMMET, RUBBER		
	508-0112	1	2-3/4 x 1-7/8" (Lead Outlet)
	508-0095	1	25/32 x 21/32"
30	515-0006	1	+Key, Fan
31	232-2418	1	Board, Connection
32	231-0161	1	Adapter, Generator

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
33	234-0491	1	Cover, Air Outlet
34	RESISTOR, TAPPED (Adjustable)		
	304-0500	1	For Sets with 12 or 24 Volt DC
	304-0534	1	For Sets with 32 Volt DC
35	232-2399	1	Bracket, Resistor Mounting
36	304-0006	2	Washer, Centering - Resistor Mounting

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
37	150-0956	1	Switch Assembly - Overspeed (Optional)
38	150-1446	1	Bracket and Point Assembly, Overspeed (Optional)

* - Refer to Factory giving complete Model and Spec.
+ - Included in the Rotor Assembly.

VOLTAGE REGULATOR GROUP - BEGIN SPEC AA

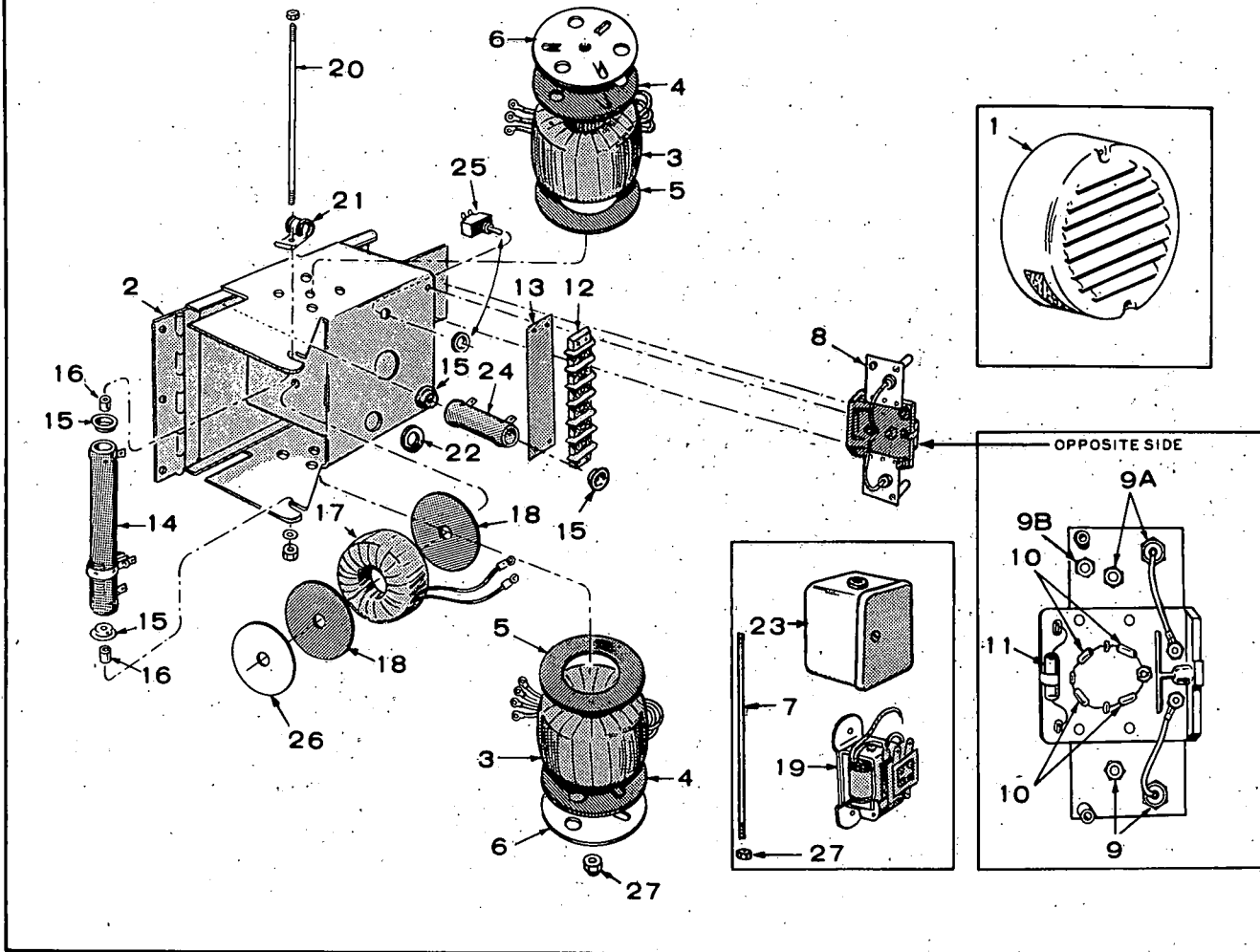


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	REGULATOR ASSEMBLY, VOLTAGE (Complete)		
	305-0532	1	Without Voltage Adjustment (Includes Parts Marked †)
	305-0533	1	With Voltage Adjustment (Includes Parts Marked •)
1	301-3713	1	†Panel, Voltage Regulator Mounting
2	300-1006	1	†Board Assembly, Regulator (Includes Parts Marked *)
3	332-1647	1	†Strip, Terminal
4	320-0505	1	†Breaker, Circuit
5	315-0386	1	†Transformer, Voltage Reference
6	315-0391	1	†Reactor
7	303-0103	1	•Rheostat - Units with Voltage Adjustment
8	303-0194	1	Knob, Rheostat - Units with Voltage Adjustment
9	517-0045	1	†Plug, Dot Button - Units Without Voltage Adjustment
10	SCREW, ROUND HEAD		
	815-0190	4	†Regulator Board Mounting (#8-32 x 3/8")
	812-0068	4	†Reactor and Transformer Mounting (#6-32 x 1")
	812-0036	2	*†Heat Sink Mounting on Regulator Board (#6-32 x 3/8")
11	356-0039	1	*†Capacitor, Electrolytic (100 Mfd., 10 Volt)
12	355-0006	2	*†Capacitor (.47 Mfd., 100 Volt)
13	355-0005	2	*†Capacitor (.22 Mfd., 200 Volt)
14	355-0015	2	*†Capacitor (.1 Mfd., 200 Volt)
15	355-0016	1	*†Capacitor (1 Mfd., 100 Volt)
16	355-0031	1	*†Capacitor (.39 Mfd., 100 Volt)
17	355-0017	1	*†Capacitor (.47 Mfd., 400 Volt)
18	359-0036	1	*†Diode (5.6 Volt)
19	359-0025	1	*†Diode, Zener (20 Volt)
20	357-0004	8	*†Rectifier, Diode (400 Milliamp, 400 Volt)
21	359-0026	1	*†Diode, Zener (18 Volt)
22	357-0021	3	*†Rectifier, Diode
23	365-0002	2	*†Rectifier, Gate - Control
24	361-0006	1	*†Transistor, Unijunction
25	350-0423	1	*†Resistor (33,000-Ohm, 1/2 Watt)
26	350-0443	1	*†Resistor (220,000-Ohm, 1/2 Watt)
27	350-0447	1	*†Resistor (330,000-Ohm, 1/2 Watt)
28	350-0398	1	*†Resistor (3,000-Ohm, 1/2 Watt)
29	350-0466	1	*†Resistor (2 Megohm, 1/2 Watt)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
30	351-0744	1	*†Resistor, Film (1,740-Ohm, 1/4 Watt)
31	350-0445	1	*†Resistor (270,000-Ohm, 1/2 Watt)
32	350-0435	2	*†Resistor (100,000-Ohm, 1/4 Watt)
33	350-0459	1	*†Resistor (1 Megohm, 1/2 Watt)
34	353-0048	2	*†Resistor, Wire Wound (4,000-Ohm, 5 Watt)
35	351-0521	1	*†Resistor, Film (12,100-Ohm, 1/4 Watt)
36	350-0397	1	*†Resistor (2,700-Ohm, 1/2 Watt)
37	350-0351	2	*†Resistor (33-Ohm, 1/2 Watt)
38	350-0409	1	*†Resistor (8,200-Ohm, 1/2 Watt)
39	351-0332	1	*†Resistor, Film (28,000-Ohm, 1/4 Watt)
40	351-0240	1	*†Resistor, Film (3,090-Ohm, 1/4 Watt)
41	351-0211	1	*†Resistor, Film (1,530-Ohm, 1/4 Watt)
42	351-0234	1	*†Resistor, Film (2,670-Ohm, 1/4 Watt)
43	350-0973	1	*†Resistor (270-Ohm, 2 Watt)
44	350-0512	1	*†Resistor (10-Ohm, 1/2 Watt)
45	351-0353	1	*†Resistor, Film (46,400-Ohm, 1/4 Watt)
46	351-0349	1	*†Resistor, Film (42,200-Ohm, 1/4 Watt)
47	303-0168	1	*†Potentiometer (2,500-Ohm)
48	303-0164	1	*†Potentiometer (8,000-Ohm)
49	332-1511	13	*†Terminal, Stake Tab
50	363-0069	2	*†Sink, Heat
51	362-0017	1	*†Transistor, NPN
52	367-0005	1	*†Circuit, Integrated
53	WASHER, SHAKEPROOF		
	853-0003	2	*†Heat Sink Mounting (#6)
	853-0005	4	*†Regulator Board Mounting (#8)
54	NUT, HEX		
	860-0006	2	*†Heat Sink Mounting (#6-32)
	870-0183	6	*†Reactor and Transformer Mounting (#6-32)
55	HARNESS, WIRING - VOLTAGE REGULATOR TO EXCITER STATOR		
	338-0744	1	Unhoused Sets
	338-0755	1	Housed Sets
56	812-0063	2	*†Screw, Round Head
57	301-3714	1	Cover, Voltage Regulator
58	350-0355	1	*†Resistor (47-Ohm, 1/2 Watt)

- † - Included in 305-0532 Voltage Regulator Assembly.
• - Included in 305-0533 Voltage Regulator Assembly.
* - Included in 300-1006 Regulator Board Assembly.

GENERATOR GROUP - EXCITER PORTION - SPEC A THROUGH Z



NOTE: 02SX1N1A used on all 60 hertz sets Spec A and B.
 06SX1N1A used on all 60 hertz sets Spec C and D.
 06SX1N1B used on all 60 hertz sets Spec E through M.
 06SX1N1B used on 120/240 volt, 120/208 volt and 600 volt, 3 phase, 60 hertz sets
 begin Spec P.
 06SX1N3B used on all 60 hertz sets (except 120/240 volt, 120/208 volt and 600 volt,
 3 phase sets) begin Spec P.
 06SX51N1A used on all 50 hertz sets Spec A through D.
 06SX51N1B used on all 50 hertz sets Spec E through M.
 06SX51N1B used on 120/240 volt, 120/208 volt and 600 volt, 3 phase, 50 hertz sets
 begin Spec P.
 06SX51N3B used on all 50 hertz sets (except 120/240 volt, 120/208 volt and 600 volt,
 3 phase sets) begin Spec P.

Check your set nameplate for correct magneciter number. Select the correct Part Number
 column that applies to your set.

GENERATOR GROUP — EXCITER PORTION

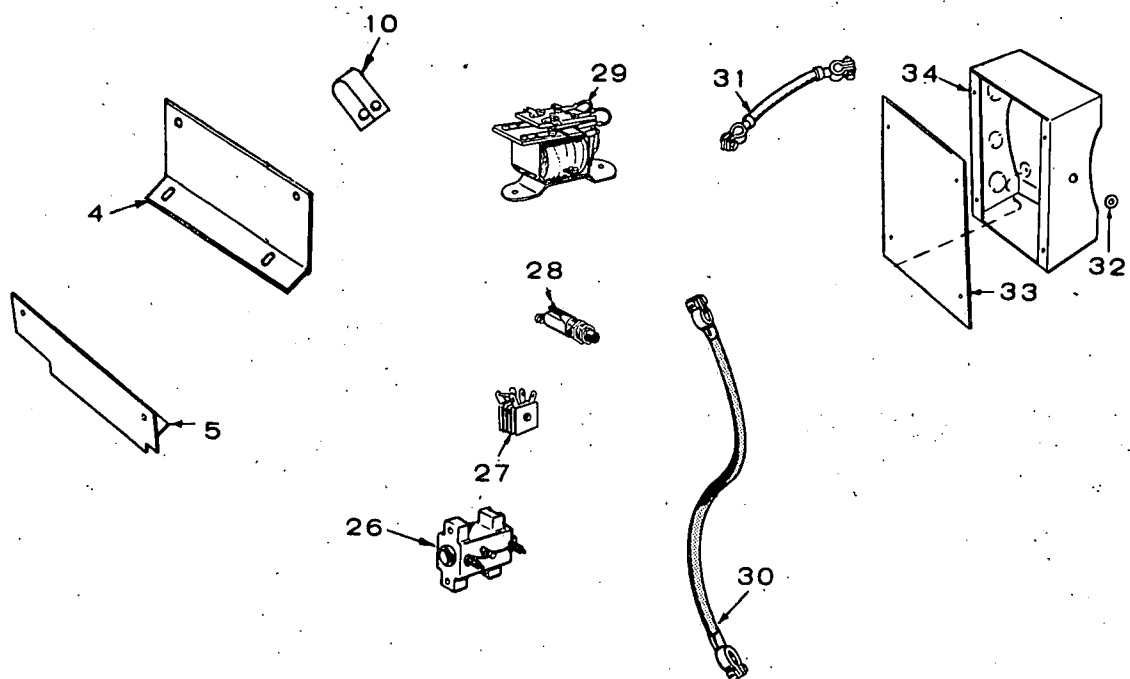
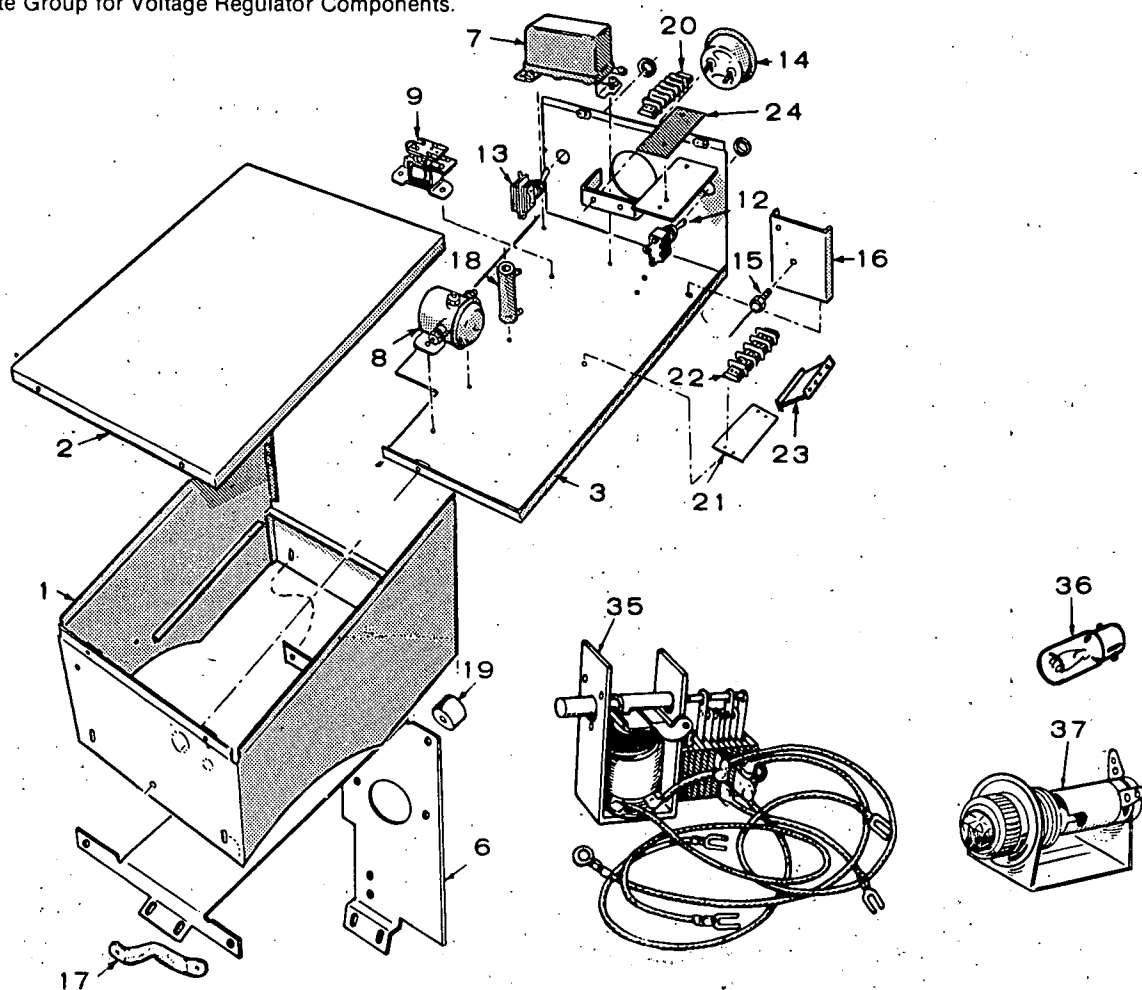
REF. NO.	QTY. USED	PART DESCRIPTION	PART NUMBER						
			02SX1N1A	06SX1N1A	06SX1N1B	06SX1N3B	06SX51N1A	06SX51N1B	06SX51N3B
	1	Exciter Complete (Less Cover)	209-0001	209-0007	209-0008	209-0010	209-0011	209-0012	209-0013
1	1	Cover, Exciter	*234-0154	234-0154	234-0185	234-0185	234-0154	*234-0185	234-0185
2	1	Panel Only, Exciter	234-0153	234-0153	234-0188	234-0188	234-0153	234-0188	234-0188
3	2	Reactor, Gate	315-0084	315-0102	315-0102	315-0102	315-0104	315-0104	315-0104
4	2	Gasket, Gate Reactor Mounting, Outer	232-1553	232-1608	232-1553	232-1553	232-1608	232-1553	232-1553
5	2	Gasket, Gate Reactor Mounting, Inner	232-1551	232-1551	232-1551	232-1551	232-1551	232-1551	232-1551
6	2	Retainer, Gate Reactor	232-1552	234-0191	232-1552	232-1552	234-0191	232-1552	232-1552
7	1	Stud, Gate Reactor Mounting	520-0211	520-0211			520-0211		
8	1	Rectifier Assembly, Resistor & Complete	305-0242	305-0264	305-0264	305-0388	305-0264	305-0264	305-0388
9	2	Rectifier Only, Power Field, Negative	305-0238	305-0238	305-0238	•305-0238	305-0238	305-0238	•305-0238
9A	2	Rectifier Only, Power Field, Positive	305-0239	305-0239	305-0239	305-0239	305-0239	305-0239	305-0239
9B	1	Rectifier, Field Flash				305-0239			305-0239
10	4	Rectifier, Voltage Control	305-0240	305-0240	305-0240	305-0240	305-0240	305-0240	305-0240
11	1	Resistor, Included in Rectifier Assembly (150-Ohm, 50-Watt)			304-0512	304-0512		304-0512	304-0512
11	1	Resistor, Included in Rectifier Assembly (500-Ohm, 5-Watt)	304-0476						
12	1	Block, Terminal	332-0699	332-0699	332-0745	332-0745	332-0699	332-0745	332-0745
13	1	Strip, Block Marker	332-0700	332-0738	332-0746	332-0925	332-0738	332-0746	332-0925
14	1	Resistor, Fixed (200-Ohm, 50-Watt)	304-0489						
14	1	Resistor, Tapped, 500-Ohm (425-Fixed, 75-Adj.)		304-0511			304-0511		
14	1	Resistor, Tapped, 500-Ohm (425-Fixed, 75-Adj.)			304-0527	304-0527		304-0527	304-0527
15	4	Washer, Resistor Centering (Two Only Used for 02SX1N1A)	304-0015	304-0015	304-0015	304-0015	304-0015	304-0015	304-0015
16	2	Spacer, Resistor Mounting	232-1550	232-1550	232-1474	232-1474	232-1550	232-1474	232-1474
17	1	Reactor, Voltage Control	315-0085	315-0100	315-0100	315-0100	315-0100	315-0105	315-0105
18	2	Gasket, Voltage Control Reactor	232-1548	232-1548	232-1548	232-1548	232-1548	232-1548	232-1548
19	1	Relay, Field Build-up	307-0584						
20	1	Stud (or Screw) Tapped Resistor Mounting	812-0116	812-0116	520-0641	520-0641	520-0641	520-0641	520-0641
21	1	Clip, Tinnerman	332-0050	332-0050	332-0050	332-0050	332-0050	332-0050	332-0050
22	1	Grommet, Rubber, 7/8" Hole	508-0008	508-0008	508-0008	508-0008	508-0008	508-0008	508-0008
23	1	Cover, Relay	307-0643						
24	1	Resistor, Fixed (250-Ohm, 25-Watt)		304-0510	304-0510	304-0510	304-0510	304-0510	304-0510
25	1	Switch, Residual Reset			308-0175			308-0175	
26	1	Washer, Retainer, Voltage Control Reactor	526-0173	526-0173	526-0173	526-0173	526-0173	526-0173	526-0173

* - Use cover 234-0223 for housed plants.

• - Later Models use a quantity of 3.

CONTROL GROUP

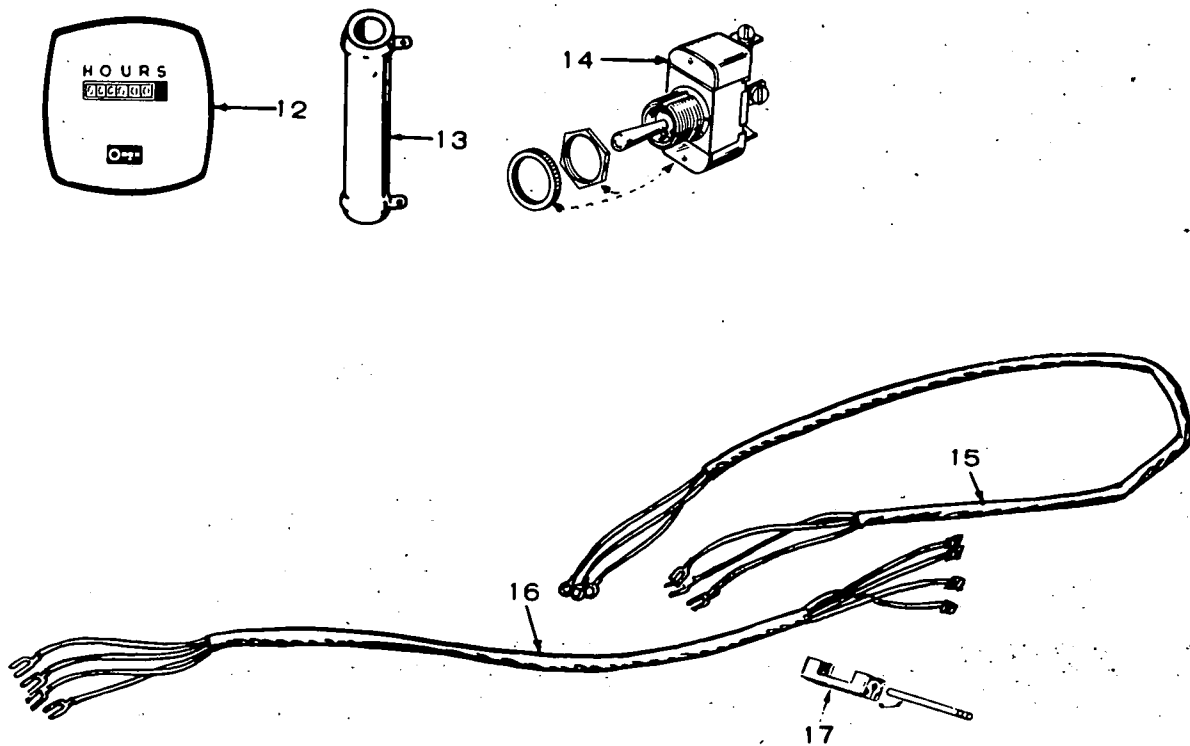
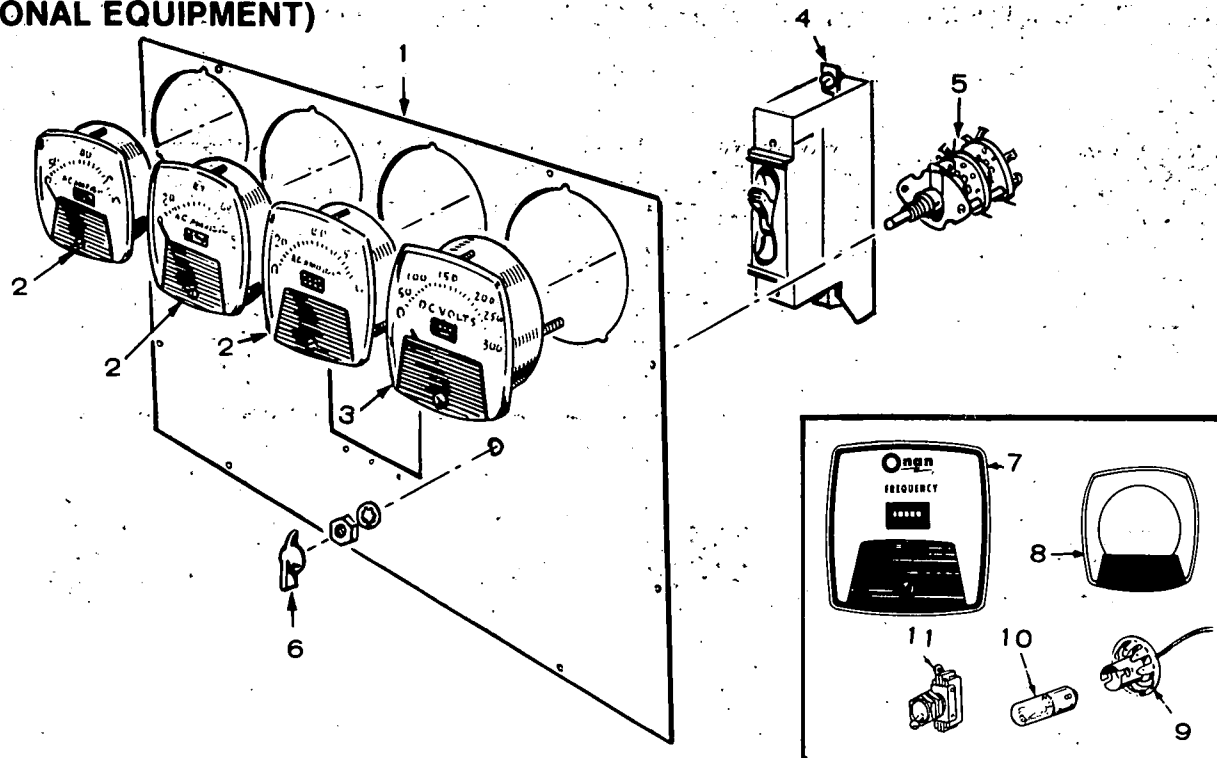
NOTE: See Separate Group for Voltage Regulator Components.



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	301-1962	1	Box, Control
2	301-1963	1	Cover, Control Box - Spec A through Z
3	PANEL, CONTROL		
	301-1961	1	Standard Units
	301-2376	1	Units with Overspeed Cut-Off Indicator Lamp
4	BRACKET, CONTROL BOX MOUNTING (Left Hand) - Spec A through Z		
	301-1979	1	Standard
	301-1965	1	Unhoused Models with Switchboard
5	301-1964	1	Bracket, Control Box Mounting (Right Hand) - Spec A through Z
6	301-3683	1	Saddle, Control Box - Begin Spec AA
7	307-0597	1	Relay, Ignition Start - Spec A through Z
8	SOLENOID, START		
	307-1046	1	Spec A through Z
	307-0845	1	12 and 24 Volt DC - Begin Spec AA
	307-0875	1	32 Volt DC - Begin Spec AA
9	307-0623	1	Relay, Ignition
10	416-0096	2	Clamp, Harness
12	308-0154	1	Switch, Start-Stop
13	308-0002	1	Switch, Selector (Manual or Electric Start)
14	302-0446	1	Ammeter (5-0-5), Charge
15	RECTIFIER		
	305-0235	1	For 12 and 24 Volt DC (10 Amp, 100 Volt)
	305-0015	1	For 32 Volt DC (12 Amp, 300 Volt)
16	305-0254	1	Bracket, Rectifier
17	337-0036	1	Strap, Ground - Control Box - Begin Spec AA
18	RESISTOR, FIXED		
	304-0032	1	15-Ohm, 10 Watt
	304-0217	1	Units with Low Oil Pressure Switch (1-Ohm, 10 Watt) - Begin Spec G
19	402-0078	4	Mount, Rubber - Control Box

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
20	BLOCK, TERMINAL		
	332-0537	1	Spec A through Z (4 Place)
	332-0604	1	Begin Spec AA (5 Place)
21	332-0739	1	Strip, Marker (4, 5, 6, 7, 8, 9)
22	332-0706	1	Block, Terminal (8 Place) - Load
23	332-0750	1	Marker Strip and Holder Kit; Polarity - Earlier Models Only
24	STRIP, BLOCK MARKER		
	332-0566	1	Spec A through Z (B+, 1, 2, 3)
	332-0616	1	Begin Spec AA (B+, 1, 2, 3, H)
26	RELAY, LOW OIL PRESSURE - OPTIONAL		
	320-0104	1	Spec G through Z
	320-0221	1	Begin Spec AA
27	305-0197	1	Rectifier, Full Wave - Units with Low Oil Pressure Switch - Spec A through F
28	308-0091	1	Switch, Reset - Units with Low Oil Pressure Switch - Spec A through F
30	CABLE, BATTERY		
	416-0221	2	Unhoused Units (20-1/2")
	416-0037	2	Housed Units (48")
31	416-0133	1	Cable, Battery Jumper
32	GROMMET, RUBBER		
	508-0117	1	For 1-3/8" Hole
	508-0009	1	For 1-5/16" Hole - Spec A through Z
	508-0183	1	For 1-3/4" Hole - Begin Spec AA
33	301-0856	1	Cover, Output Box
34	BOX, OUTPUT		
	301-1978	1	Spec A through Z
	301-3682	1	Begin Spec AA
35	307-1129	1	Relay, Overspeed - Optional
36	322-0004	2	Lamp, Indicator (Low Oil Pressure and Overspeed) - Optional
37	322-0069	2	Holder, Indicator Lamps - Optional

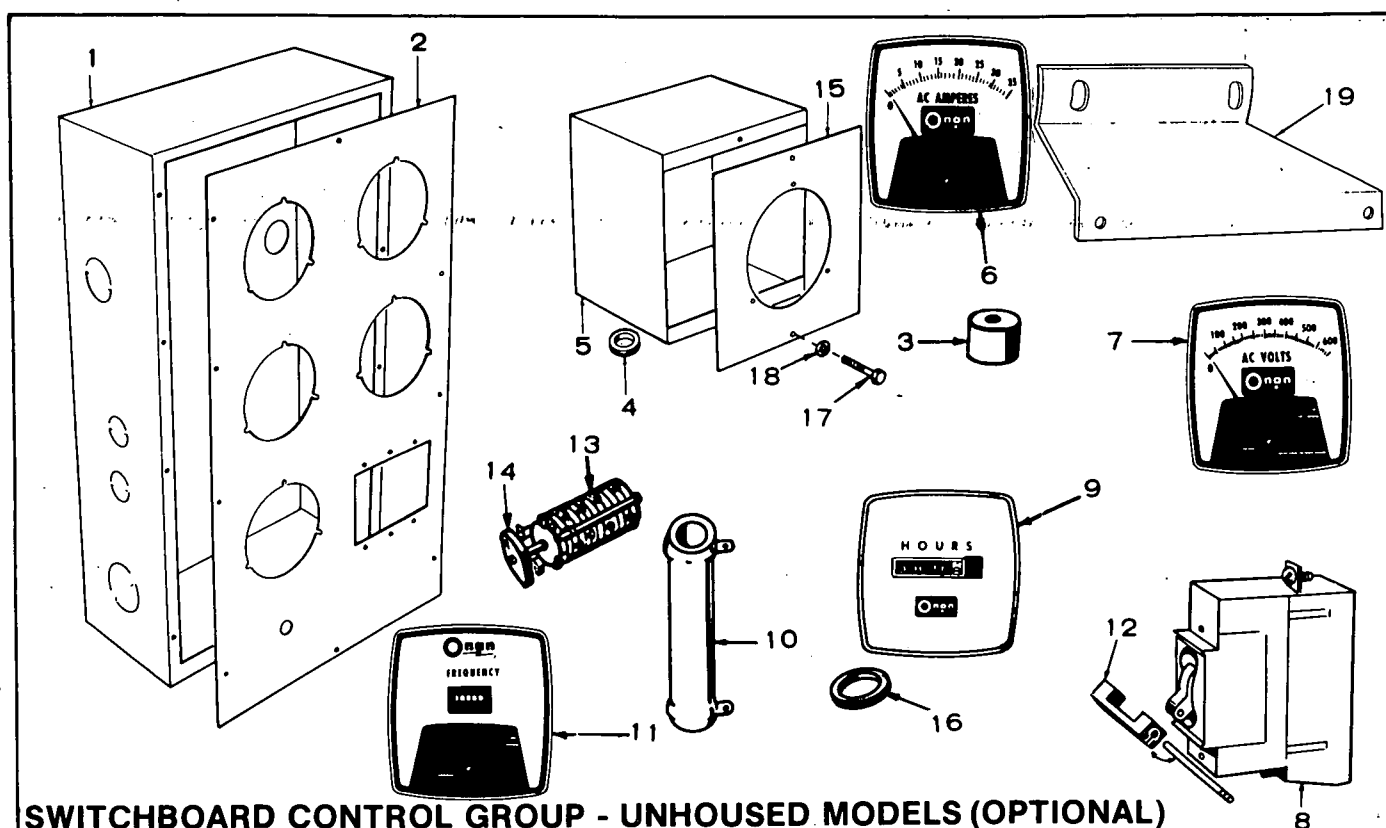
AC METER PANEL GROUP - HOUSED MODELS (OPTIONAL EQUIPMENT)



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*	1	Panel
2	AMMETER, AC (Check Scale, Select According to Rating)		
	302-0460	As Req.	Scale Reads 0-20
	302-0418	As Req.	Scale Reads 0-30
	302-0444	As Req.	Scale Reads 0-35
	302-0419	As Req.	Scale Reads 0-50
	302-0458	As Req.	Scale Reads 0-80
	302-0410	As Req.	Scale Reads 0-150
3	VOLTMETER, AC (Check Scale, Select According to Rating)		
	302-0420	1	Scale Reads 0-150
	302-0421	1	Scale Reads 0-300
	302-0422	1	Scale Reads 0-600
	302-0423	1	Scale Reads 0-750
	302-0612	1	Scale Reads 0-500
4	BREAKER, CIRCUIT (Check Original Part, Select According to Amperage and Voltage)		
	320-0150	As Req.	20 Amp., 480 Volt (Single Pole)
	320-0151	As Req.	25 Amp., 480 Volt (Single Pole)
	320-0020	As Req.	35 Amp., 120/240 Volt (Single Pole)
	320-0153	As Req.	40 Amp., 240 Volt (Single Pole)
	320-0198	As Req.	45 Amp., 240 Volt (Single Pole)
	320-0052	As Req.	50 Amp., 240 Volt (Single Pole)
	320-0195	As Req.	55 Amp., 240 Volt (Single Pole)
	320-0021	As Req.	60 Amp., 240 Volt (Single Pole)
	320-0366	As Req.	65 Amp., 240 Volt (Single Pole)
	320-0148	As Req.	70 Amp., 240 Volt (Single Pole)
	320-0367	As Req.	75 Amp., 240 Volt (Single Pole)
	320-0251	As Req.	100 Amp., 240 Volt (Single Pole)
	320-0486	As Req.	20 Amp., 480 Volt (3 Pole Companion)
	320-0487	As Req.	25 Amp., 480 Volt (3 Pole Companion)
	320-0488	As Req.	30 Amp., 480 Volt (3 Pole Companion)
	320-0514	As Req.	15 Amp., 600 Volt (3 Pole Companion)
	320-0459	As Req.	20 Amp., 600 Volt (3 Pole Companion)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
5	308-0012	1	Switch, Voltmeter Selector (3 Phase Only)
6	303-0076	1	Knob, Selector Switch (3 Phase Only)
7	METER, FREQUENCY (Check Meter Face for Part Numbers)		
	302-0213	1	100 through 150 Volt, 60 Hertz
	302-0221	1	200 through 250 Volt, 60 Hertz
	302-0716	1	480 Volt, 60 Hertz
	302-0717	1	600 Volt, 60 Hertz
	302-0234	1	100 through 150 Volt, 50 Hertz
	302-0256	1	200 through 250 Volt, 50 Hertz
	302-0825	1	480 Volt, 50 Hertz
	302-0788	1	600 Volt, 50 Hertz
8	302-0488	1	Plate, Meter Face
9	322-0072	2	Receptacle, Panel Lights
10	LAMP, PANEL LIGHT		
	322-0004	2	12 Volt
	322-0017	2	24 Volt
11	308-0002	1	Switch, Panel Lights
12	METER, RUNNING TIME		
	302-0465	1	120 Volt, 60 Hertz
	302-0466	1	240 Volt, 60 Hertz
	302-0467	1	480 Volt, 60 Hertz
	302-0468	1	120 Volt, 50 Hertz
	302-0469	1	240 Volt, 50 Hertz
	302-0470	1	480 Volt, 50 Hertz
13	304-0536	1	Resistor, Dropping. (Fixed) Running Time Meter - 600 Volt Sets (9000-Ohm, 50 Watt)
14	308-0154	1	Switch, Start-Stop
15	338-0305	1	Harness, Wiring - Start-Stop
16	338-0495	1	Harness, Wiring - Remote
17	BAR, CIRCUIT BREAKER TIE		
	320-0187	1	For 3 Circuit Breakers
	320-0202	1	For 2 Circuit Breakers

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



SWITCHBOARD CONTROL GROUP - UNHOUSED MODELS (OPTIONAL)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	301-2027	1	Box, Instrument
2		1	Panel, Instrument
3	402-0078	1	Mount, Rubber
4	508-0009	1	Grommet, Rubber
5	BOX, METER OR CIRCUIT BREAKER (Not Used on All Models)		
	301-0778	1	For Single Meter
	301-1027	1	For Two Meters
	320-0458	1	Circuit Breaker Enclosure
6	AMMETER, AC (Check Scale, Select According to Rating)		
	302-0410	As Req.	Scale Reads 0-150
	302-0418	As Req.	Scale Reads 0-30
	302-0419	As Req.	Scale Reads 0-50
	302-0444	1	Scale Reads 0-35
	302-0458	1	Scale Reads 0-80
	302-0460	1	Scale Reads 0-20
7	VOLTMETER, AC (Check Scale, Select According to Rating)		
	302-0420	1	Scale Reads 0-150
	302-0421	1	Scale Reads 0-300
	302-0422	1	Scale Reads 0-600
	302-0423	1	Scale Reads 0-750
	302-0612	1	Scale Reads 0-500
8	BREAKER, CIRCUIT (Check Original Part, Select According to Amperage and Voltage)		
	320-0020	As Req.	35 Amp., 240 Volt (Single Pole)
	320-0153	As Req.	40 Amp., 240 Volt (Single Pole)
	320-0198	As Req.	45 Amp., 240 Volt (Single Pole)
	320-0052	As Req.	50 Amp., 240 Volt (Single Pole)
	320-0195	As Req.	55 Amp., 240 Volt (Single Pole)
	320-0021	As Req.	60 Amp., 240 Volt (Single Pole)
	320-0366	As Req.	65 Amp., 240 Volt (Single Pole)
	320-0148	As Req.	70 Amp., 240 Volt (Single Pole)
	320-0367	As Req.	75 Amp., 240 Volt (Single Pole)
	320-0251	As Req.	100 Amp., 240 Volt (Single Pole)
	320-0486	As Req.	20 Amp., 480 Volt (3 Pole Companion)
	320-0487	As Req.	25 Amp., 480 Volt (3 Pole Companion)
	320-0488	As Req.	30 Amp., 480 Volt (3 Pole Companion)
	320-0514	As Req.	15 Amp., 600 Volt (3 Pole Companion)
	320-0459	As Req.	20 Amp., 600 Volt (3 Pole Companion)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
9	METER, RUNNING TIME (Check Meter Face for Part Numbers)		
	302-0465	1	120 Volt, 60 Hertz
	302-0466	1	240 Volt, 60 Hertz
	302-0467	1	480 Volt, 60 Hertz
	302-0468	1	120 Volt, 50 Hertz
	302-0469	1	240 Volt, 50 Hertz
	302-0470	1	480 Volt, 50 Hertz
10	304-0536	1	Resistor, Dropping (Fixed) Running Time Meter - 600 Volt Sets (9000-Ohm, 50 Watt)
11	METER, FREQUENCY (Check Meter Face for Part Number)		
	302-0213	1	100 through 150 Volt, 60 Hertz
	302-0221	1	200 through 250 Volt, 60 Hertz
	302-0716	1	480 Volt, 60 Hertz
	302-0717	1	600 Volt, 60 Hertz
	302-0234	1	100 through 150 Volt, 50 Hertz
	302-0256	1	200 through 250 Volt, 50 Hertz
	302-0825	1	480 Volt, 50 Hertz
	302-0788	1	600 Volt, 50 Hertz
12	BAR, CIRCUIT BREAKER TIE		
	320-0187	1	For 3 Circuit Breakers
	320-0202	1	For 2 Circuit Breakers
13	308-0012	1	Switch, Selector - Voltmeter (3 Phase Sets)
14	303-0076	1	Knob, Selector Switch (3 Phase Sets)
15	COVER, METER BOX (Not Used on All Models)		
	301-0779	1	For Single Meter
	301-1026	1	For Two Meters
16	508-0008	1	Grommet, Meter Box (Not Used on All Models)
17	811-0098	2	Screw (10-32 x 3/8"), Round Head - Meter Box Cover
18	850-0030	2	Washer (#10), Lock
19	301-2076	1	Bracket, Instrument Box Mounting (Bottom) - Spec A through Z

SERVICE KITS AND MISCELLANEOUS

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

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
	98-1100	1	Decal Kit
	168-0084	1	Gasket Kit, Generator Set
	OVERHAUL KIT, GENERATOR SET		
	522-0199	1	Spec A through Q
	522-0235	1	Begin Spec R
	TOUCH-UP PAINT (Pressurized Can)		
	525-0137	1	Metallic Green (16 oz.)
	525-0305	1	Non-Metallic Green (13 oz.)

SPECIAL PARTS LIST FOR JC SERIES PENNSYLVANIA APPROVED GENERATING SETS

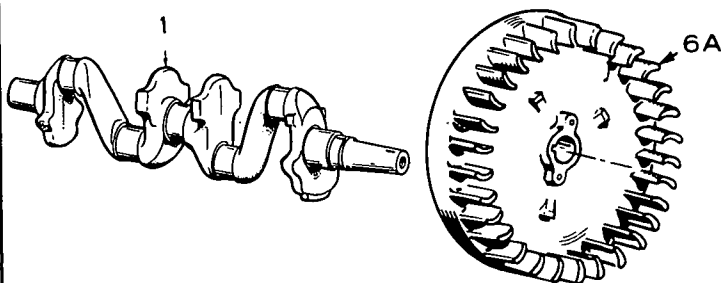
Refer first to this list for Pennsylvania Approved sets. Parts not in this list refer to the main parts list. When referring to the main parts list, reference to Spec letter or voltage also applies to these sets.

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: 15.0JC-18R31/1AA.

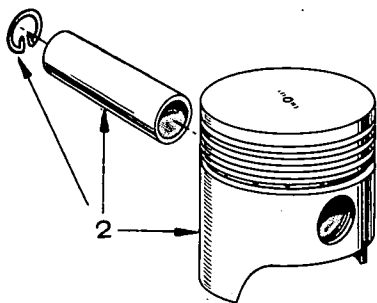
The Specification Letter advances (A to B, B to C, etc.) with manufacturing changes.

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



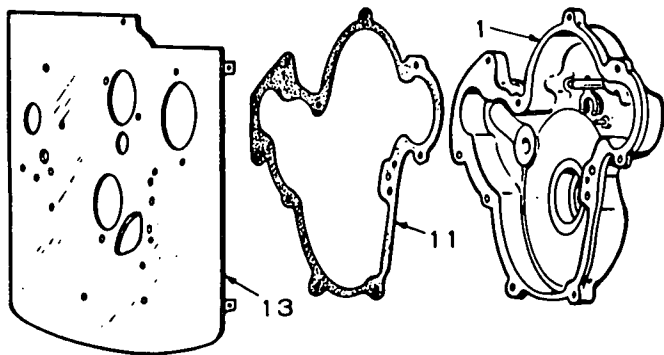
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104-0477	1	Crankshaft
6A	104-1446	1	Flywheel (Includes Hub Assembly)

PISTON AND CONNECTING ROD GROUP (SPECIAL LIST)



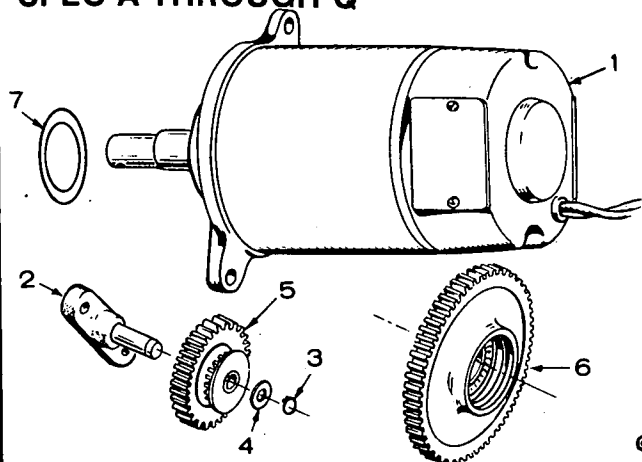
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
2	PISTON AND PIN ASSEMBLY (Includes Pin Retaining Rings)		
			Gas Fueled Sets (15.0 KW)
	112-0106	4	Standard
	112-0106-10	4	.010" Oversize
	112-0106-20	4	.020" Oversize
	112-0106-30	4	.030" Oversize
			LPG Fueled Sets - Begin Spec U
	112-0092	4	Standard
	112-0092-10	4	.010" Oversize
	112-0092-20	4	.020" Oversize
	112-0092-30	4	.030" Oversize

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

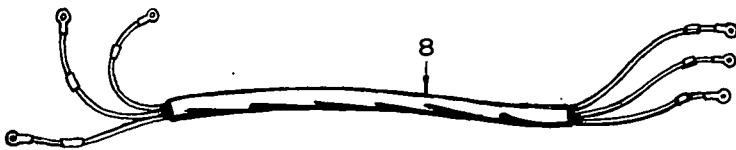


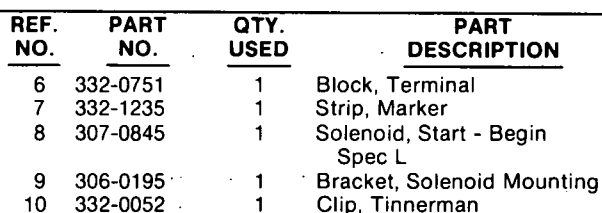
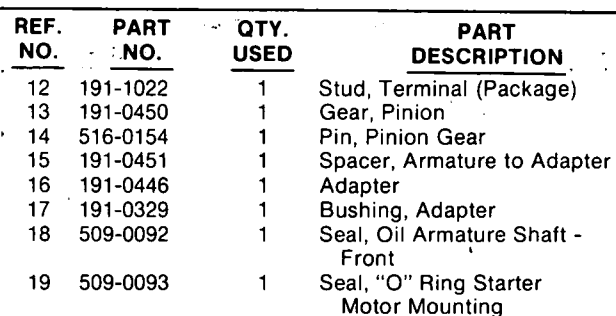
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	103-0252	1	Cover Assembly, Gear - Complete (Includes Parts Marked *)
11	103-0231	1	Gasket, Gear Cover
13	103-0225	1	Backplate, Gear Cover

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



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191-0453	1	Motor, Starter (12 Volt) - Includes Gear and Pin
2	191-0342	1	Base and Shaft, Idler Gear
3	518-0196	1	Ring, Retaining - Idler Gear
4	526-0175	1	Washer, Thrust - Idler Gear
5	191-0457	1	Gear Assembly, Idler
6	191-0354	1	Gear and Clutch Assembly, Crankshaft
7	509-0093	1	Seal, "O" Ring - Starter Mounting
8	338-0335	1	Harness, Starter to Control





CUSTOMER SERVICES

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

QUALITY OF PRODUCT

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

GENERAL WARRANTY PRACTICES

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

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

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

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

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

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

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

MAINTENANCE

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

Maintenance is divided into two categories:

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

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

INSTALLATION

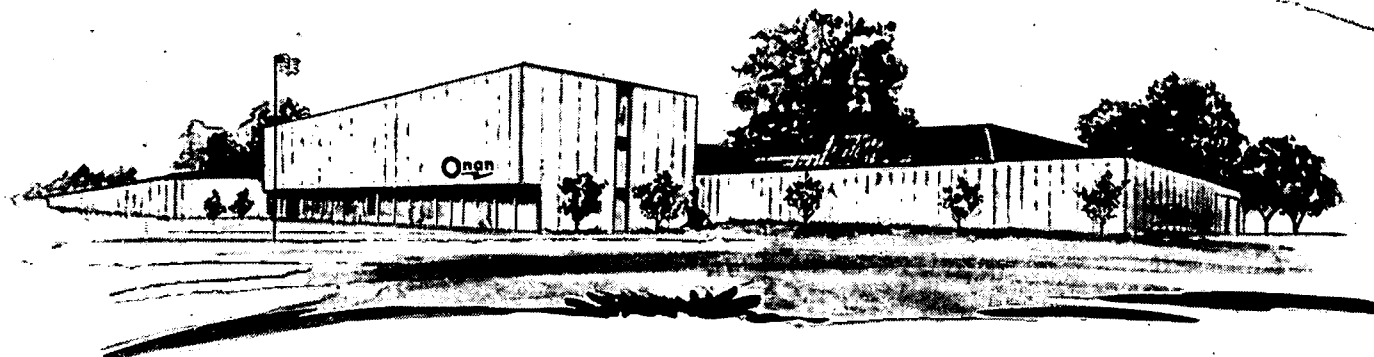
Installation is extremely important and all Onan Products should be installed in accordance with the manufacturer's recommendations. If the owner experiences any difficulty with such items as mounting, ventilation, exhaust location, fuel lines, wiring, etc., he should immediately contact the company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

Onan

Minneapolis, Minnesota 55432

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

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