Onan®

OPERATORS MANUAL AND PARTS CATALOG

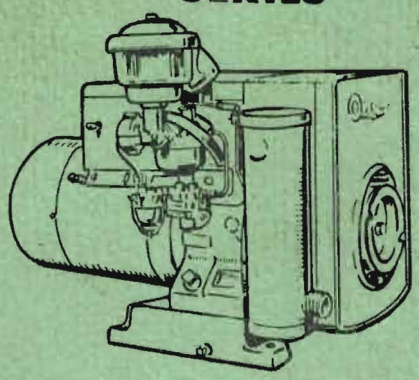
FOR

Onan®

ELECTRIC GENERATING SETS

AJ

SERIES



Dear Customer

Onan has revised its warranty form in accordance with the recently enacted Magnuson-Moss Warranty Act. The revised warranty covering all Onan products has been inserted in this manual and replaces the warranty which is printed in the manual.

If you have any questions concerning this revision, please contact the Onan Service Department or a local Onan Authorized Service Distributor or Dealer.

Onan Corporation

924-0300

2AL75
(Replaces 3AL74)
Printed in U.S.A.

INTRODUCTION

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

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

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

FOR MAJOR REPAIR SERVICE, CONTACT YOUR ONAN AUTHORIZED DISTRIBUTOR.

THIS MANUAL DONATED BY ED S.
THANK YOU ED.

WARNING

ONAN RECOMMENDS THAT ALL SERVICE INCLUDING INSTALLATION OF REPLACEMENT PARTS BE DONE BY QUALIFIED ELECTRICAL AND/OR MECHANICAL SERVICEMEN. FROM THE STANDPOINT OF POSSIBLE INJURY AND/OR EQUIPMENT DAMAGE IT IS IMPERATIVE THAT THE SERVICEMAN IS QUALIFIED.

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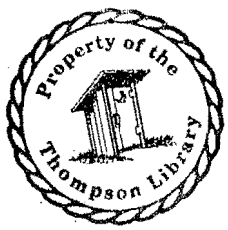


PERFORMANCE CERTIFIED

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

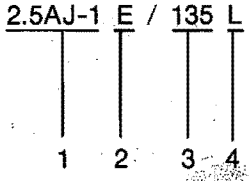
ONAN 1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432
A DIVISION OF ONAN CORPORATION

IMPORTANT! RETURN WARRANTY CARD ATTACHED TO UNIT.

GENERAL INFORMATION

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

How to interpret MODEL and SPEC. NO.



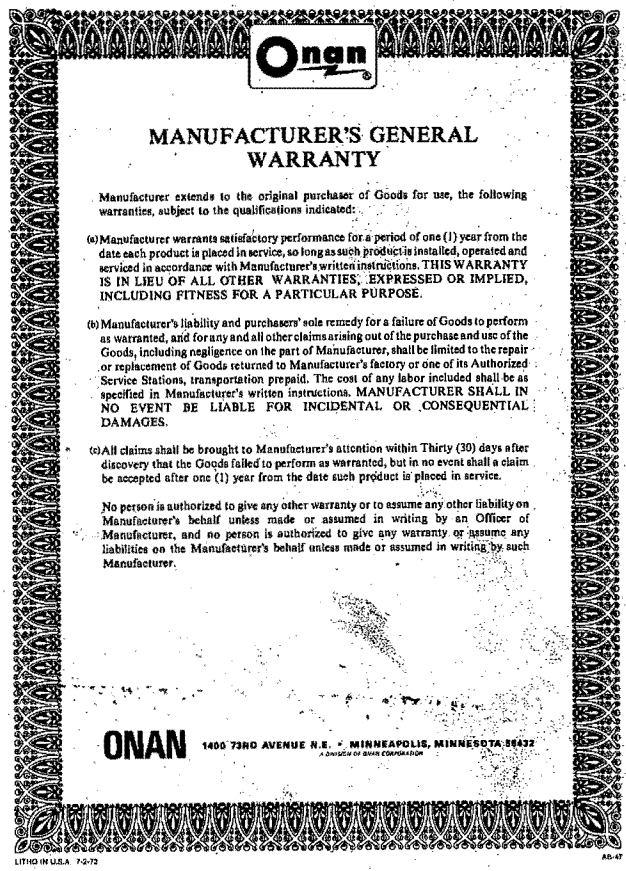
1. Factory code for general identification.
2. Specific Type:

   M — MANUAL. Pull rope starting. For permanent or portable installations.

   P — PORTABLE. Pull rope starting. Mounted in carrying frame for portable use.

   R — REMOTE. Electric starting. For permanent installation, can be connected to optional accessory equipment for remote or automatic control of starting and stopping.

   E — ELECTRIC. Electric starting at the set only.
3. Factory code for optional equipment.
4. Specification (Spec) letter (advances when factory makes production modifications).



Onan

MANUFACTURER'S GENERAL WARRANTY

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

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

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

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

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

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LITHO IN U.S.A. 7-2-72

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SPECIFICATIONS

ENGINE

Manufacturer	ONAN
Design	Four-Cycle, L Head, Air Cooled
Cylinders	One
Bore	2-3/4 inch (69.85 mm)
Stroke	2-1/2 inch (63.50 mm)
Displacement	14.9 cu. in. (268.63 cc)
Compression Ratio	
Gasoline	6.25:1*
Gas	7:1
Battery Voltage (No Battery used on Portable Models)	12 Volts
Battery Size	
SAE group 1H	Two 6-Volt in series
Amp/hr. rating, SAE	105 (378 kC)
Starting System	Generator Cranking

GENERATOR

Manufacturer	ONAN
Design	
1.0AJ (60 Hertz)	Four Pole, 1800 rpm
2.5AJ (60 Hertz)	Two Pole, 3600 rpm
Rating	
1.0AJ	1000 Watts (1 kW)
2.5AJ	2500 Watts (2.5 kW)
Voltage	120 or 120/240
Current Rating	
120 Volt (2.5AJ)	20.8 Amperes
240 Volt (2.5AJ)	10.4 Amperes
Phase	Single
Wire	Two
Output Rating	1.0 PF

CAPACITIES AND REQUIREMENTS

Oil Capacity	3.5 pints (1.65 litres)
	Portable Models 2.5 pints (1.18 litres)
Total Ventilation Required (cfm @ 1800 rpm)	
Pressure cooled	115 (3.26 m^3/min)
Vacu-Flo cooled	180 (5.10 m^3/min)
Total Ventilation Required (cfm @ 3600 rpm)	
Pressure cooled	224 (6.34 m^3/min)
Vacu-Flo cooled	370 (10.48 m^3/min)

TUNE-UP SPECIFICATIONS

Spark Plug Gap	
Gasoline	.025 inch (0.64 mm)
Gas	.018 inch (0.46 mm)
Breaker Point Gap	.020 to .022 inch (0.51 - 0.56 mm)
Ignition Timing	
3000 RPM and 3600 RPM	25° BTC
1800 RPM	19° BTC
Tappet Adjustment (Engine Cold)	
Intake and Exhaust	.010 to .012 inch (0.25 mm to 0.30 mm)
Carburetor Float Adjustment	11/64 inch (4.37 mm)
Cylinder Head Torque	24 to 26 ft. lb. (32.54 to 35.26 N•m)

* - Nonleaded or low lead regular grade gasoline recommended.

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

INSTALLATION

COOLING AIR

Pressure cooled sets require an air inlet opening of one square foot and an air outlet of two square feet. Position the outlet opening above and to the rear of the set, the inlet opening just opposite the blower housing.

VACU-FLO COOLED

Air flow through Vacu-Flo units is reversed. Provide an air inlet of at least 41 square inches for 3000 or 3600 rpm units. Duct the heated air outside. An optional automatic air shutter and air duct is available for use in cold weather.

EXHAUST

WARNING **Pipe POISONOUS exhaust gas outside — exhaust gas is poisonous.**

Use flexible tubing between the set exhaust outlet and rigid piping. 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 set air intake.

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

LOCATION

Provide a protected location that is dry, dust-free, and preferably heated in cold weather. For service convenience, provide at least 24 inch clearance around set.

OIL DRAIN

For convenience in draining oil, remove the oil drain plug and install an extension pipe and coupling.

FUEL CONNECTION

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

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

For gaseous sets (see Figure 2), check with the local fuel supplier for gas regulations and line pressure. Provide a manual gas shutoff valve. A filter in the line may be necessary. Electric solenoid shutoff valves in the supply line are usually required for indoor automatic or remote starting installations (see Figure 2). A special wiring diagram is supplied with 2000 or 2500 watt sets. Manual start sets cannot use a solenoid valve. Be sure fuel line pressure is within the 3 to 8 ounce limits of the regulator.

Always use flexible tubing between engine and gas demand regulator.

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

GASOLINE TANK

If a separate fuel tank is used, install the tank so the bottom is less than four 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 four feet,* install an auxiliary electric fuel pump at the fuel supply. If an auxiliary reservoir fuel tank is used for a *standby* installation, note that fuel line connections must be changed (Figure 3).

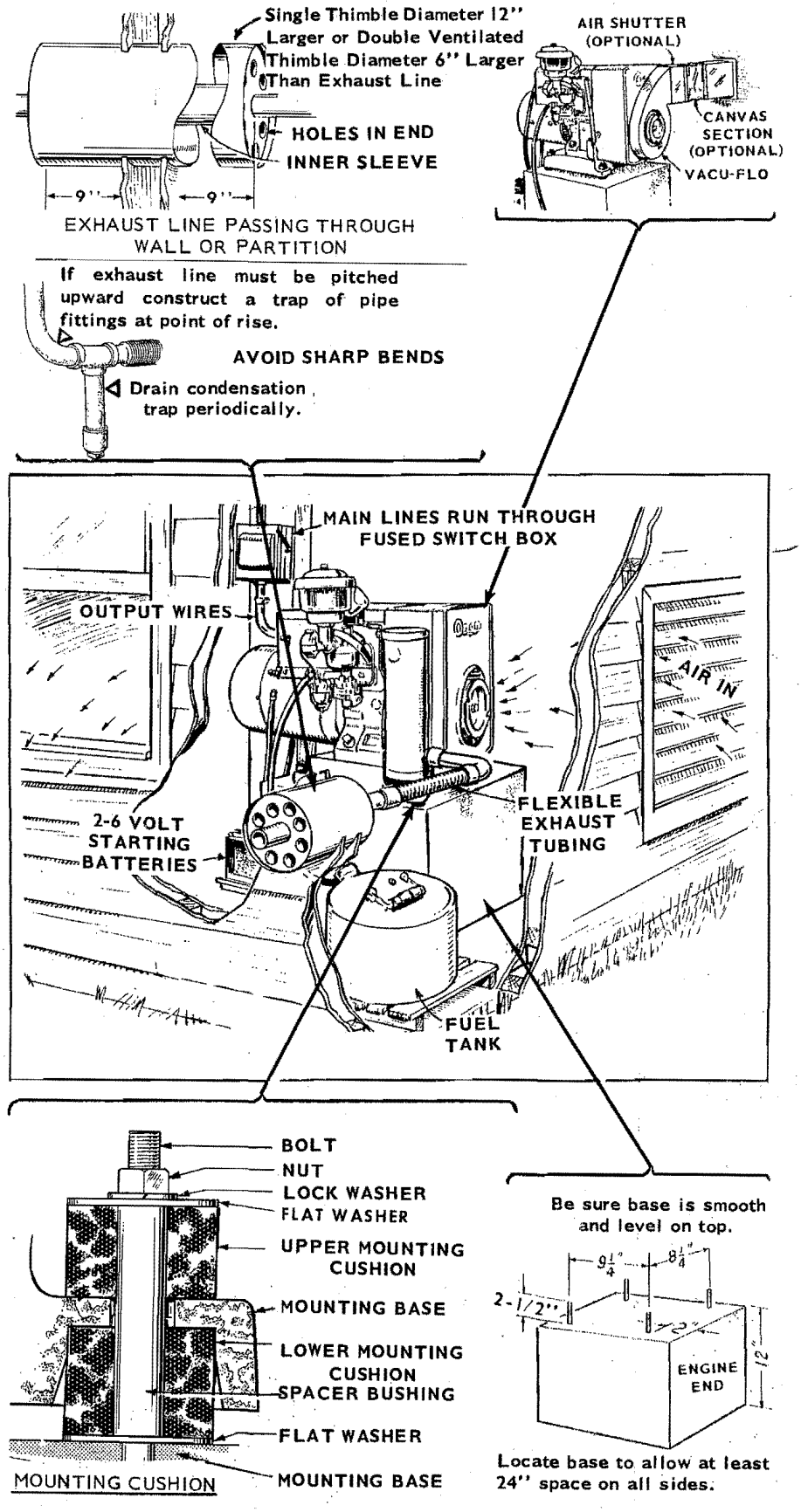


FIGURE 1. TYPICAL INSTALLATION

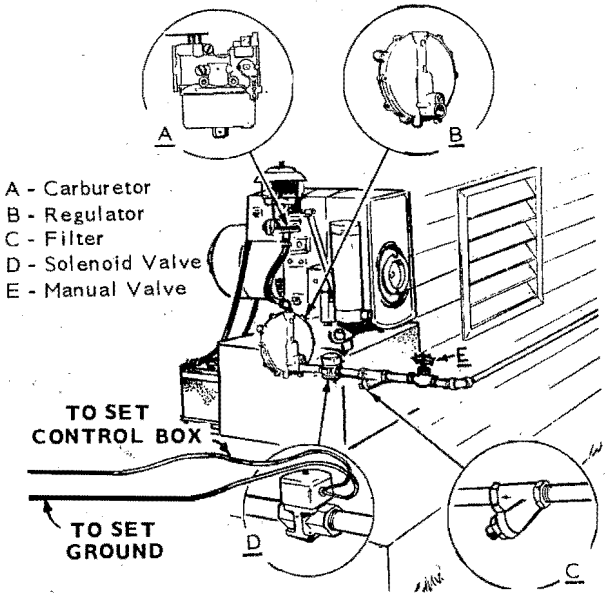


FIGURE 2. GAS INSTALLATION

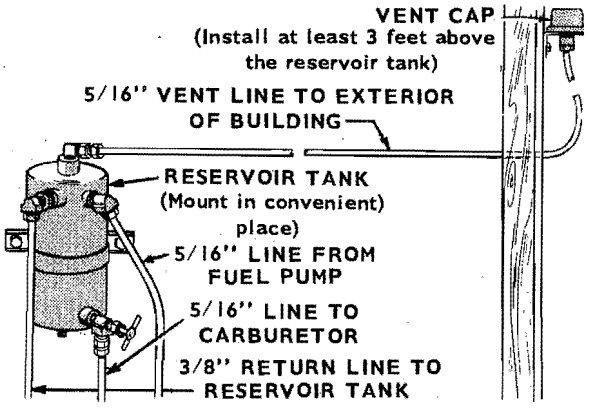


FIGURE 3. AUXILIARY FUEL TANK

BATTERY

Connect battery as shown in Figure 4, according to the set specification letter.

CAUTION **Refer to OPERATION section if it is necessary to run an AC "R" type set with the battery disconnected. Never operate an "E" type battery charging set with the battery disconnected.**

On Fire Department Models, a 12 volt polarized plug is furnished with the unit. Connect plug to cables shown below (according to distance), and use with vehicle battery. This generator set can be used with the vehicle battery regardless of positive (+) or negative (-) ground.

Beginning with Spec L on 24 volt and 32 volt battery charging models, the 12 volt battery circuit has a silicon diode to prevent reverse current.

CAUTION **Battery connections must be made with a negative ground. An incorrect connection (positive ground) will cause instant damage to the diode in the battery charge circuit.**

To start, plug into receptacle on control, and push start switch. With the set running, batteries can be left connected or they can be disconnected without damaging the circuit.

RECOMMENDED WIRE SIZE (TO BATTERY) ON FIRE DEPARTMENT MODELS

If one-way distance is:

Under 3 feet (0.91 m) ..... Use #6 wire
4 to 5 feet (1.22 m to 1.52 m) ..... Use #4 wire
6 to 8 feet (1.83 m to 2.44 m) ..... Use #2 wire
9 to 12 feet (2.74 m to 3.66 m) ..... Use #1/0 wire
13 to 19 feet (3.96 m to 5.79 m) ..... Use #4/0 wire

LOAD CONNECTIONS

For units with output receptacles, plug directly into the receptacles. Loose leads are provided on REMOTE sets. Connect the flexible wire (enclosed in Greenfield shielding or as required by local regulations) between the set and nearest support point. Beginning on Spec H models (rated at 2500 watts) full output of 120 volts is available from M1-M2 generator leads. The generator output lead connections for output voltages are indicated on the unit.

For 2 wire models, connect the load neutral wire (white color code) to the generator M2 lead. Connect the "hot" load wire (black color code) to the generator M1 lead. For 3 wire models, use leads M1-M2 for 120 volt output. Use leads M1-M3 for 240 volt output. Leads M1-M2-M3 are for 120/240 volt output.

WARNING **If the installation is for standby service, a double throw transfer switch must always be used. Connect this switch (either automatic or manual) so that it is impossible for commercial power and generator current to be connected to the load at the same time. Instructions for connecting an automatic load transfer control are included with such equipment.**

WARNING **Personnel connecting the generator and any such auxiliary equipment must be fully qualified and understand wiring diagrams, circuits, etc.**

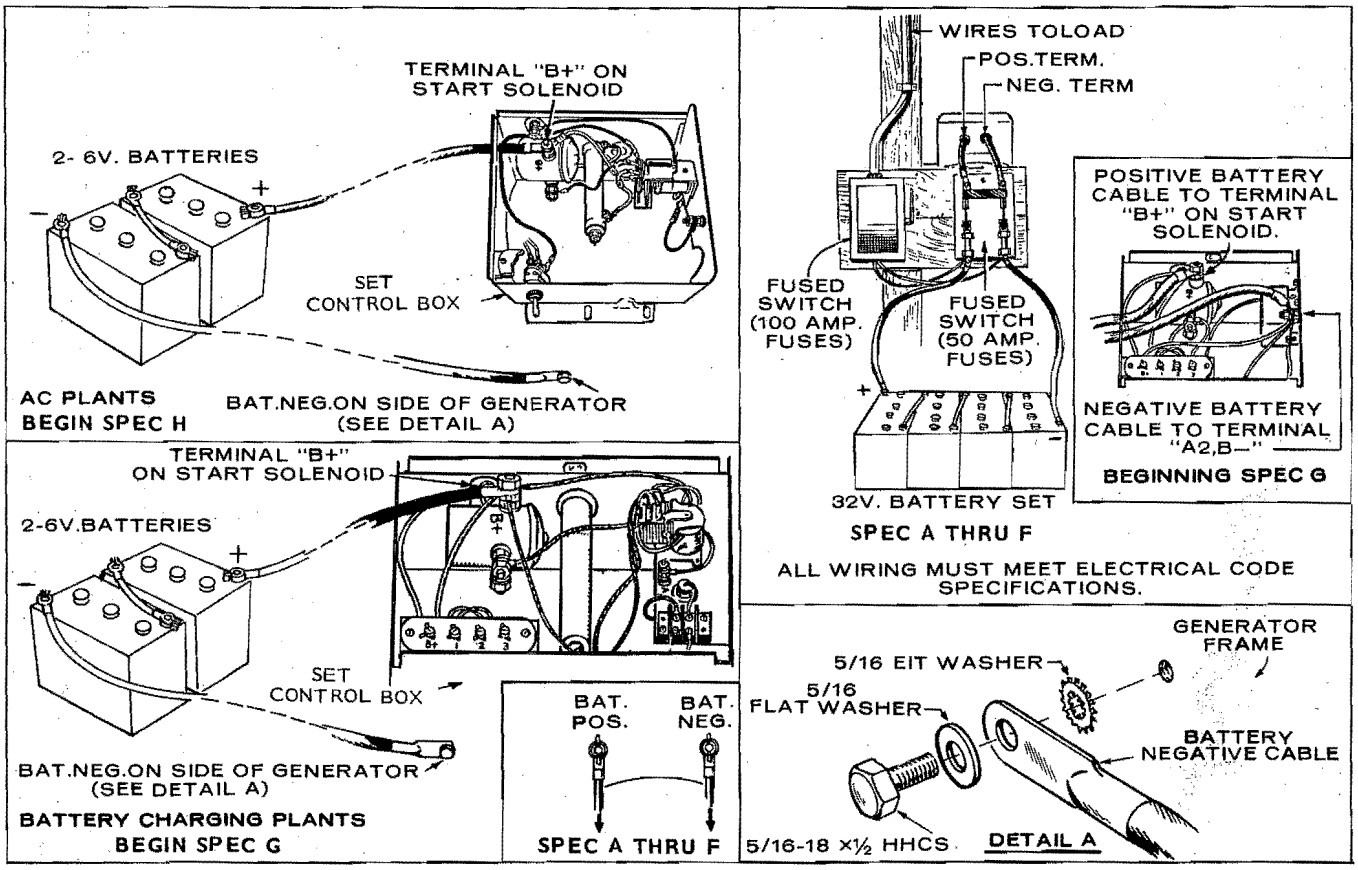
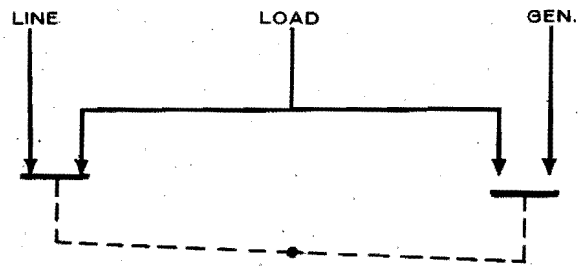


FIGURE 4. BATTERY CONNECTIONS

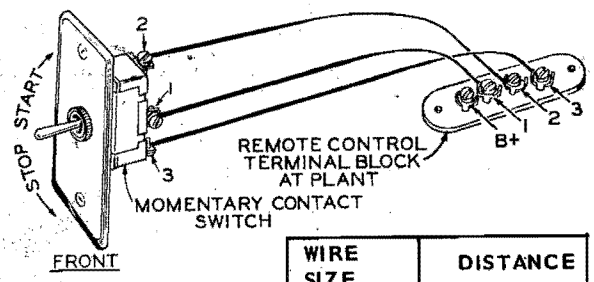


NOTE: SHOWN WITH LINE CONNECTED TO LOAD.

FIGURE 5. DOUBLE THROW TRANSFER SWITCH

REMOTE START-STOP SWITCH (Optional)

For remote control of starting and stopping, use three wires to connect a remote switch (SPDT, momentary contact, center-off type) to the terminal block marked B+, 1, 2, 3 in the set control box (Figure 6). Use correct wire size according to switch distance from set.



WIRE SIZE	DISTANCE
#18	to 250 ft.
#16	to 400 ft.
#14	to 630 ft.

FIGURE 6. REMOTE CONTROL WIRING

GROUNDING, AC GENERATOR SET

A terminal is provided for connecting a ground wire. For permanent installations, connect to a separate ground pipe or rod penetrating into moist earth.

UTILITY TRUCK MODEL

This model supplies 12 volt DC and 115 volt AC power.

1. **Battery Connection:** Use #2 cables for distances up to 8 feet, larger cables for longer distances. There must be at least 9 volts at the set during cranking. If the truck uses a positive ground system, reverse the cable connections to the unit. The set ammeter will read in reverse. Either reverse the wire connections at the ammeter, or mark the panel to indicate the reversed charge direction of the meter needle. Connect #18 or larger wire from the truck *arm* terminal to the unused C terminal on the set charge-disconnect-relay (on units Spec A through F, connect to the B on the terminal block). This connection is not used when truck battery is alternator charged (see wiring diagram).

2. **Remote Start-Stop Switch:** For starting and stopping from truck cab or other point, install a switch as described for a standard unit (see Figure 6).

3. **AC Load Wiring:** Mount receptacles on the truck and run permanent wiring to the set output leads M1 (hot) and M2 (grounded). If grounded receptacles are used, connect the ground wire to the set ground terminal.

GAS FUEL

Connect the electric fuel solenoid shut-off valve so it is open when the unit is running. See Figure 7 and wiring diagram.

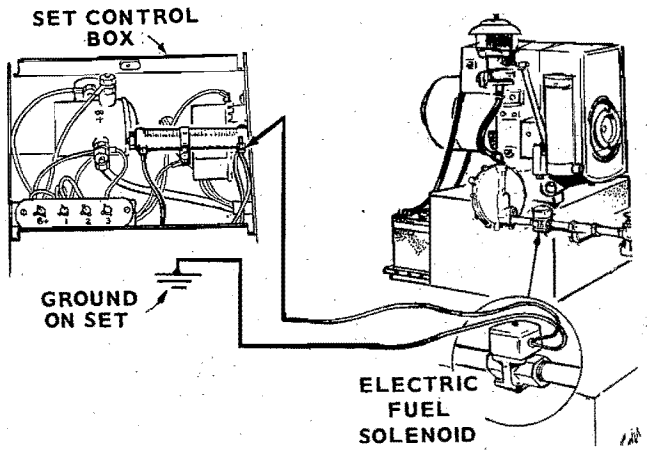


FIGURE 7. FUEL SOLENOID SHUTOFF VALVE

OPERATION

GENERAL

Rust inhibitor oil used at the factory may foul the spark plug. Clean plug in a suitable solvent, dry and install. After priming a "dry" fuel system, leave the fuel pump hand lever in its down position (see Figure 8).

MANUAL STARTING (PORTABLE UNIT)

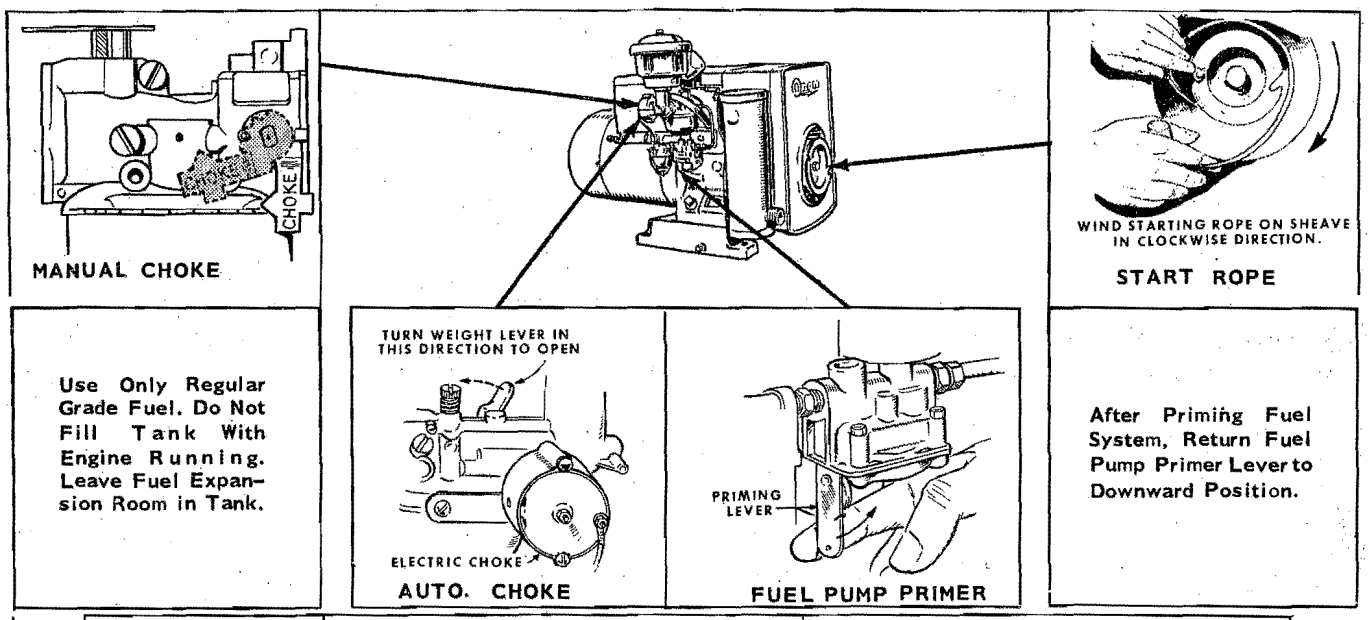
1. Adjust carburetor choke according to starting temperature conditions.
2. Pull starting rope slowly until piston passes over compression.
3. Rewind the rope to starting position.
4. Pull rope with a fast, steady pull to crank engine. Do not jerk.
5. As the set warms up, slowly adjust choke to its full open position.

ELECTRIC-STARTING REMOTE-CONTROL AC SET

1. Push *start-stop* switch to *start* position.
2. Release the switch when unit starts.
3. If the set is gas fueled (with solenoid valve in fuel supply line) and has a *hi-lo* battery charge toggle switch, position switch at its *hi* position for each start. The switch can be returned to *lo* for normal operation.

BATTERY CHARGING UNIT

1. Adjust carburetor manual choke according to starting temperature conditions.
2. Push *start* switch to crank the engine.
3. Release *start* switch when the set starts.
4. As the set warms up, slowly adjust choke to full open position.



SET TYPE	STARTING 1	STARTING 2	SET RUNNING 3	SET RUNNING 4
Manual	Adjust Choke	Pull Start Rope	- - - - - - - - -	Adjust Choke
Remote	- - - -	Push START Switch	Release START Switch	HI Rate * Battery Charge
▲ Battery Charger	Adjust Choke	Push START Switch	Release START Switch	Adjust Choke

▲ DO NOT START OR RUN SET WITHOUT BATTERY CONNECTED INTO LOAD CIRCUIT.

* Gaseous fueled sets with electric solenoid valve in fuel supply line only. Switch may be returned to LO rate for normal operation.

FIGURE 8. STARTING PROCEDURE

Never start or run battery charging sets unless the battery is connected. Be sure the set battery switch is closed and fuses are good.

GASOLINE FUEL

Capacity of the mounted tank (manual starting models) is two U.S. gallons. Some models are supplied with a separate 5 gallon tank.

Use "regular" grade automobile gasoline. DO NOT use highly leaded "premium" types. For new engines, most satisfactory results will be obtained by using nonleaded gasoline. For older engines that have previously used leaded gasoline, heads must be taken off and all lead deposits removed from engine before switching to nonleaded gasoline.

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

WARNING **Never fill the tank when the engine is running. Leave some tank space for fuel expansion.**

MANUAL EMERGENCY START (REMOTE CONTROL, AC SET)

1. If the starting battery is connected, follow the Manual Starting procedure (ignore choking instructions).
2. If the starting battery is disconnected, certain wires inside the control box must also be disconnected, depending upon the model (see Figure 9). Spec H and Spec K can be operated with batteries disconnected.
   a. **2500 and 2000 Watt Models:** For Spec G models, disconnect generator lead A1 from terminal A1 and resistor wire 4 from the small terminal block. For models Spec A through F, disconnect generator leads A1 from terminal A1 and S1 from start solenoid terminal S1. Disconnect the electric choke wire at the choke. *Tape all disconnected wires.*
   b. **1000 and 800 Watt Models:** Disconnect the wire from the slide charge resistor clip. Disconnect electric choke wire at the choke. *Tape both disconnected wires.*
   c. Mark the electric choke original setting (see ADJUSTMENT section) and readjust for full open position. Operate the choke manually while the battery is disconnected (Figure 8).
   d. Follow the Manual Set starting procedure.

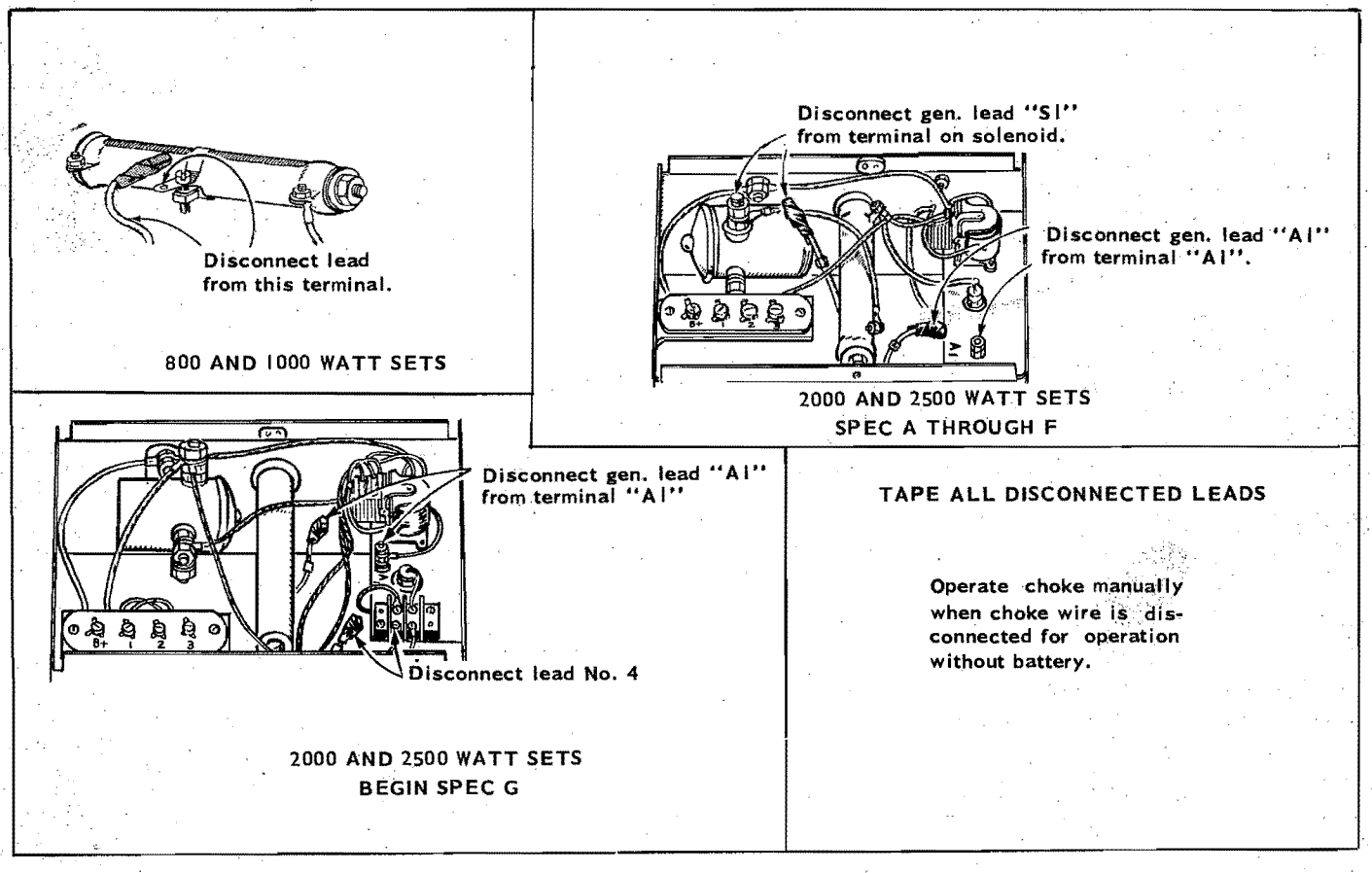


FIGURE 9. LOAD WIRE CONNECTIONS

STOPPING

Press *stop* switch on the blower housing of manual starting models (on control box of other models) until the unit comes to a complete stop. If the switch is released too soon, the unit will continue to run.

LOAD OPERATION

Warm up the set before connecting a heavy electrical load. Continuous overloading of the generator may cause overheating and serious damage to the windings. The generator safely handles overloads temporarily, but for normal operation, keep the load within nameplate rating.

BREAK-IN PROCEDURE

Controlled break-in with the proper oil and a conscientiously applied maintenance program will help to assure satisfactory service from your Onan electric set.

When operating engine for the first time, use the following sequence:

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

ALTERNATING CURRENT UNITS

Connect the load to manual start plants by inserting load plugs into the output receptacles. Remote control units are normally installed with a line switch which must be closed to connect the load.

Battery Charge Rate, AC Models: Some sets have a charge rate ammeter and *hi-lo* toggle switch. Use the *lo* position (approximately 1-1/2 amps) for normal operation. Use the *hi* position if frequent starts and short operating periods cause the battery charge condition to decline.

Utility Truck Model: When the truck engine stops, the generating set DC output can supply the DC load demands (radio, etc.) or recharge the truck battery. The rated DC output is 30 amps. The set ammeter may read 45 amps when the unit is first started, but as the generator warms up and battery charge condition rises to normal, the reading will drop. Continuous high charge rate indicates a defective battery or improper set speed (governor) adjustment. If the truck engine is running, the set ammeter should read zero (a relay in the set circuit prevents harmful interaction between the two systems).

The amount of AC output available for flood lights, power tools, etc., varies with DC requirements. Overloading (indicated by dimming flood lights, slowing of power tools) can usually be avoided by alternating the use of power tools. If more AC power is required, let the truck motor take over the DC load for the period of increased AC demand.

Idle-matic Model: The automatic idle device slows engine speed from its normal 3600 rpm to 1800 rpm when load is removed. Application of a 100 watt load (200 watts for 240 volt models) or more, will cause the engine to resume its normal speed. Do not leave a load of less than 100 watts (200 watts for 240 volt model) connected, as voltage and frequency drop to about 1/2 their rated values during idle operation.

A toggle switch on the outlet box controls idle operation. For automatic idle, set the switch to its *on* position. For continuous high speed operation (no idle when load is disconnected) set the switch to its *off* position.

BATTERY CHARGING UNIT

The battery charge rate depends on engine speed. Regulate by turning the governor adjusting nut (see ADJUSTMENT section). Follow recommendations of battery manufacturer for rate of charge, when to charge, etc. *Never operate set without battery connected to set.*

INFREQUENT SERVICE

If the set is used infrequently (as in standby service for commercial power) extended shutdown periods can result in difficult starting. Run the set at least 30 minutes every week to eliminate hard starting.

EXTENDED OUT-OF-SERVICE PROTECTION — GASOLINE ENGINES

Generator sets removed from service for extended periods of time (over 30 days) should be protected from rust and corrosion. Onan recommends the following protective procedure:

1. Run set until thoroughly warm with generator under at least 50% load. Stop engine by shutting off fuel supply to allow engine to drain fuel lines and carburetor.
2. Drain oil base while still warm. Refill and attach a tag indicating viscosity of oil used.
3. Remove spark plug. Pour 1-ounce of rust inhibiting oil into cylinder. Crank engine over several times. Install spark plug.
4. Service air cleaner.
5. Clean throttle and governor linkage; protect by wrapping with a clean cloth.
6. Plug exhaust outlet to prevent entrance of moisture, bugs, dirt, etc.
7. Clean off dirt and dry entire unit. Coat parts likely to rust with a light film of oil or grease.
8. Disconnect battery and follow standard battery storage procedure. Apply a film of non-conductive grease (e.g. vaseline) to battery cable terminal lugs.
9. Provide a suitable protective cover for the entire unit.

RETURNING UNIT TO SERVICE

1. Remove cover and all protective wrapping. Remove plug from exhaust outlet.
2. Check 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 25°C [77°F]) 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. Explosive gases are emitted from batteries in operation. Ignition of these gases can cause severe personal injury.**

4. Connect batteries.
5. Verify that no loads are connected to the generator.
6. Start engine.

After engine has started, excessive blue smoke will be exhausted and the engine will run rough until the rust inhibitor or oil has burned away.

7. After start, apply load to at least 50% of rated capacity.

HIGH TEMPERATURES

See that nothing obstructs air flow to and from the unit. Keep the cooling fins clean. See that air housings are properly installed and undamaged. Keep ignition timing properly adjusted.

LOW TEMPERATURES

1. Use the proper SAE No. oil for the temperature conditions. Change oil only when engine is hot. If an unexpected temperature drop causes an emergency, move the unit to a warm location or apply heated air (do not use open flame) externally until oil flows freely.
2. Use fresh, winter grade (not *premium* type) gasoline. Protect against moisture condensation. Below 0°F, open the carburetor main jet one additional turn. Keep the spark plug and magneto breaker points clean and properly adjusted. Keep batteries in a well charged condition.
3. Partially restrict the flow of cooling air; however, use care to avoid overheating.

DUSTY OR DIRTY CONDITIONS

1. Keep the set clean. Do not allow cooling fins to become coated or obstructed with debris.
2. Service the air cleaner as frequently as necessary.
3. Change crankcase oil every 50 operating hours.

HIGH ALTITUDE

For altitudes of 1500 feet or more above sea level, close the carburetor main jet adjustment slightly to maintain proper air-to-fuel ratio. Refer to the ADJUSTMENTS section. Maximum power drops approximately 4% for each 1000 feet after the first 1000 feet above sea level.

FIRE DEPARTMENT MODELS

These electric start models can be operated with batteries connected or disconnected.

GAS-GASOLINE CONVERSION

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

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

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

ADJUSTMENTS

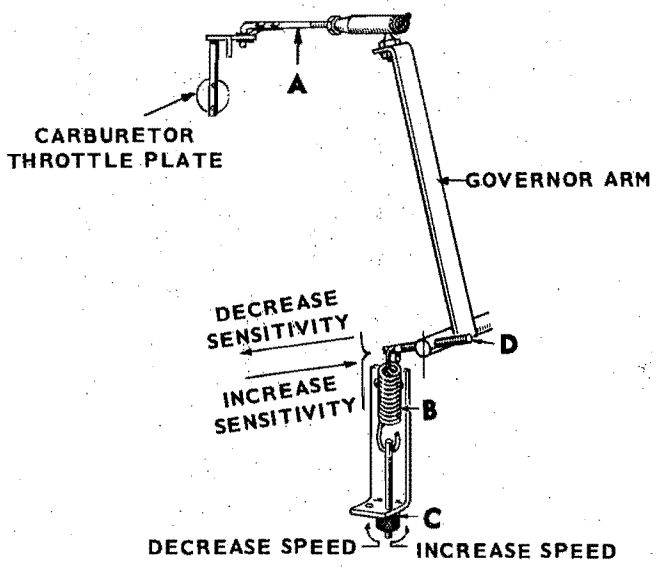


FIGURE 10. GOVERNOR ADJUSTMENT

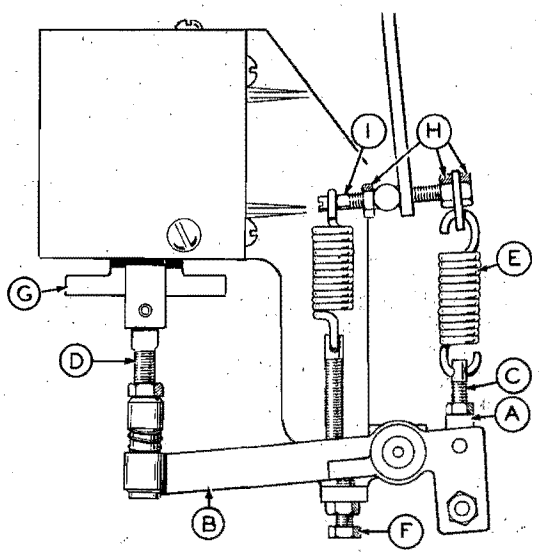


FIGURE11. AUTOMATIC IDLE ADJUSTMENT

GOVERNOR

The governor controls engine speed and engine speed determines the voltage and frequency of the generator current. On battery charging units, engine speed also determines battery charge rate. Binding at any point of the governor, linkage, or carburetor throttle, causes slow governor action. Loose or worn parts cause erratic governor action.

With the set stopped, the length of linkage "A" must (with tension on spring "B") allow the carburetor throttle stop lever to just clear (maximum 1/32 inch) the carburetor body (Figure 10). Alter linkage length by turning the ball joint on the threaded rod. Run the set (under load) to thoroughly warm it up.

1. **Alternating Current Set:** Connect a voltmeter across the generator output. With the set operating at no-load, adjust the speed nut "C" (Figure 10) for a voltmeter reading of 126 volts for 120 volt sets (252 volts for 240 volt sets). Voltage should not fall below 108 volts for a 120 volt set (216 volts for a 240 volt set) under full rated load.

   If voltage drop from no-load is too great, turn sensitivity screw "D" clockwise. If voltage drop is within the above limits, but is unsteady with a tendency to alternately increase and decrease, turn the sensitivity screw counterclockwise. Any change in the sensitivity screw "D" setting requires a compensating change in the speed adjustment nut "C".

2. **Automatic Idle Set:** The special idle device drops engine speed to approximately 1800 rpm when the set is operating at no-load (without an electrical load connected). The idle device automatically restores operating speed when an electrical load (100 watts or more for 120 volt models) is connected.

   Set the idle control switch at the *off* position, and no tension on its spring "E", Figure 11. Be sure the carburetor is properly adjusted. Temporarily disconnect flexible joint "A" from lever "B". Its socket slips off the ball. Adjust the governor for normal 3600 rpm operation under no-load to full-load conditions, with nuts "H" loosened. Tighten lock nuts "H", with spring "E" as close to the end of the sensitivity screw as possible. Reconnect joint "A" to lever "B". Turn stop adjusting screw "F" down for maximum lever movement.

   Set the idle control switch to *on* position. With all electrical load removed, the solenoid should pull up and provide sufficient tension on spring "E" to over-ride the tension of the regulating governor spring and reduce engine speed to about 1800 rpm. Output at 1800 rpm should be about 55 volts. If idle speed and output voltage are too high, linkage "C" or "D" is too long. If idle speed and output voltage are too low, linkage "C" or "D" is short. With a full electrical load connected, the solenoid plunger should drop downward. Adjust screw "F" so spring "E" is firm but not stretched. Tighten all lock nuts.

CAUTION **Never operate set with solenoid plunger "G" removed (unless control toggle switch is OFF).**

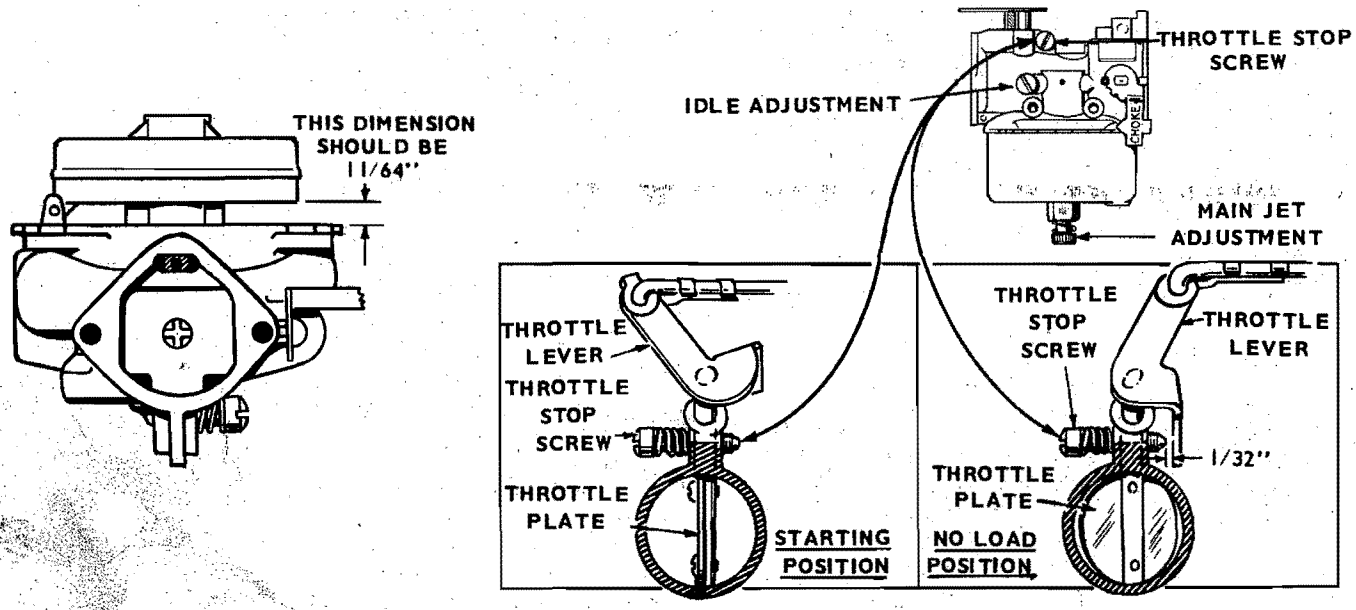


FIGURE 12. CARBURETOR ADJUSTMENT

3. **Battery Charging Set:** Turn speed nut "C" (Figure 10) to give the desired charge rate. Normal speed, as specified on the nameplate, is approximately 2400 rpm. If the charge rate tends to "taper off" too soon, turn the sensitivity screw "D" clockwise. If the charge rate is unsteady, turn the sensitivity screw "D" counterclockwise.

4. **"Utility Truck" Set:** Adjust the governor for proper sensitivity as instructed for a standard AC unit. With the set stopped, disconnect generator lead A1 from the *"Gen"* terminal of the reverse current relay (inside control box). Connect a DC voltmeter between lead A1 and ground. Start the set and (no AC load connected) adjust the speed nut to deliver 15 volts DC. Remove voltmeter and connect A1 lead to the relay.

CARBURETOR ADJUSTMENT

If the carburetor is completely out of adjustment, turn the idle adjustment (Figure 12) and main adjustment needle "B" in gently onto their seats. Do not use force — tight seating causes damage. Spec A through J, the main adjustment needle was located on the top of carburetor. Back off idle needle "A" one turn and main needle "B" 2-1/2 turns to permit starting the set.

Start the set and allow it to warm up. With full rated load connected, turn main needle "B" in slowly until the set begins to lose speed (or voltage drops). Then turn the needle back out to the point where the set will carry the full load. Check operation under various loads. If there is any tendency to hunt, turn the needle "B" (out) to the point where operation is steady. Do not turn out more than 1/2 turn past the point of smooth full-load operation. Continuous unstable operation may be due to improper governor adjustment. Adjust idle needle "A" with no AC load connected (or at the lowest possible charge rate if unit is a battery charging set). Turn the needle in slowly until the set loses speed. Then turn the needle out to the point of smooth operation. With the set still running under no-load, turn the throttle lever stop screw "D" so it just touches the stop lever, then back off one full turn.

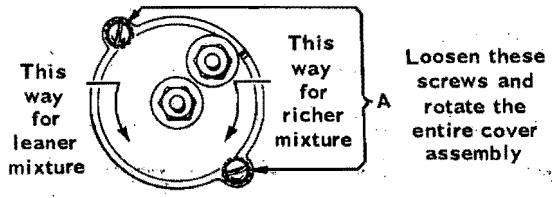
To check float level, remove the entire main fuel adjustment assembly from the float bowl (unscrew large nut from float bowl). The correct carburetor float level is 11/64 inch between the free end of the float and the carburetor body (see Figure 12). Adjustment is made by bending the tab on the float. The float tab should just touch fuel inlet valve.

Do not apply excessive pressure to float valve.

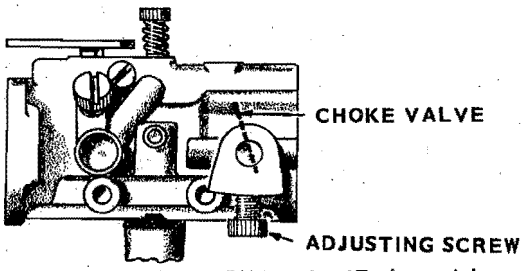
AUTOMATIC CHOKE

Gasoline Fuel: Normal choke setting is approximately 1/8 inch from its closed position at 70°F. If temperature changes require choke adjustment, loosen two screws at "A" (Figure 13). Turn the cover assembly counterclockwise to decrease choking. To increase choke turn clockwise. Tighten both screws to lock cover in place.

Gas Fuel: Late model sets with Walbro carburetor have no choke. For early model sets with Carter carburetors, the normal choke setting is fully closed with engine not running. Turn adjusting screw (Figure 13) in for less choking, out for more choking.



GASOLINE CARBURETOR



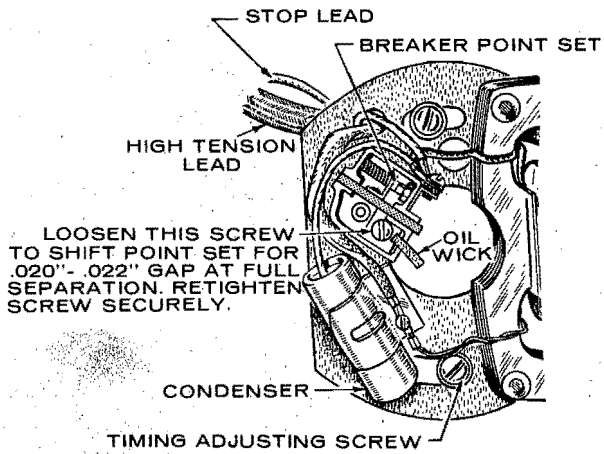
GAS CARBURETOR (Early models with Carter carburetor)

FIGURE 13. CHOKE ADJUSTMENT

TIMING THE IGNITION

Proper ignition timing is important for good engine operation. Refer to the SPECIFICATION section for the correct degree of spark advance before top center (TC) position of piston travel. If available, use a series type test lamp for accuracy.

See that the point gap is properly adjusted. Install the flywheel loosely with its key in place, and turn the flywheel with rotation direction to the position where the mark on the edge of the flywheel is in alignment with the proper degree on the gear cover. The points should just separate at this point. If they do not, remove the flywheel and loosen the magneto backplate mounting screws slightly. If the points separate too soon, shift the entire backplate assembly slightly in a counterclockwise direction. If the points do not separate soon enough, shift the entire backplate assembly clockwise. Tighten the backplate mounting screws and recheck the work for accuracy. When replacing the flywheel, always make sure the key is properly in place on the crankshaft.



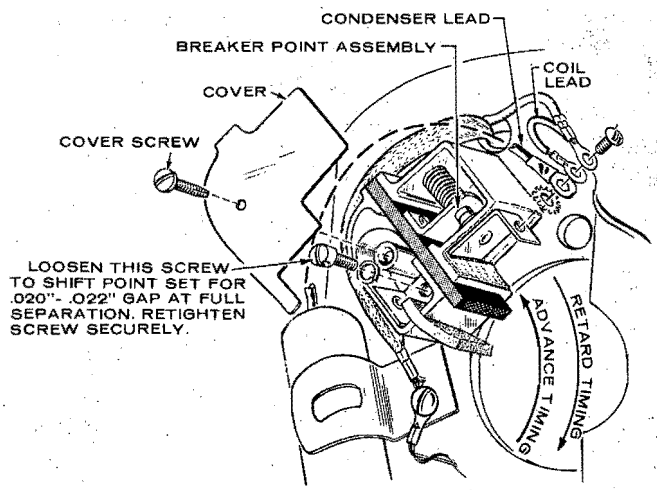


FIGURE 13A. BREAKER POINTS

MAINTENANCE

AIR CLEANER

Use the same type and viscosity oil as used for crankcase lubrication.

Oil Bath Type: Remove cup and clean before dirt level reaches shelf in cup. Fill cup with oil to the indicated oil level.

Dry Type: Remove filter element and clean in suitable solvent. Dip element in lubricating oil. Drain excess oil from element and replace on engine.

GOVERNOR LINKAGE

Lubricate the linkage at the carburetor and ball joint ends with powdered graphite (preferably), or a light, sewing machine type oil. Do not lubricate plastic ball joints; they only require cleaning.

CRANKCASE OIL

Oil capacity is 3-1/2 U.S. pints (2-1/2 pints for portables). Fill to the top threads of the oil fill hole. Use a good quality detergent oil with the designation SE, SE/CC (former designation was MS, MS/DG). Oil should be labeled as having passed the MS Sequence Tests (also known as the ASTM G-IV Sequence Tests) and the MIL-L-2104B Tests. Do not use service DS oil at any time. Use the proper SAE number of oil for the expected temperature conditions. Do not mix brands or grades. Extremely dusty or low temperature conditions require oil change at 50 hours.

Above 32°F	SAE 30
0°F to 32°F	SAE 10W-30, 5W-30
Below 0°F	SAE 5W-30

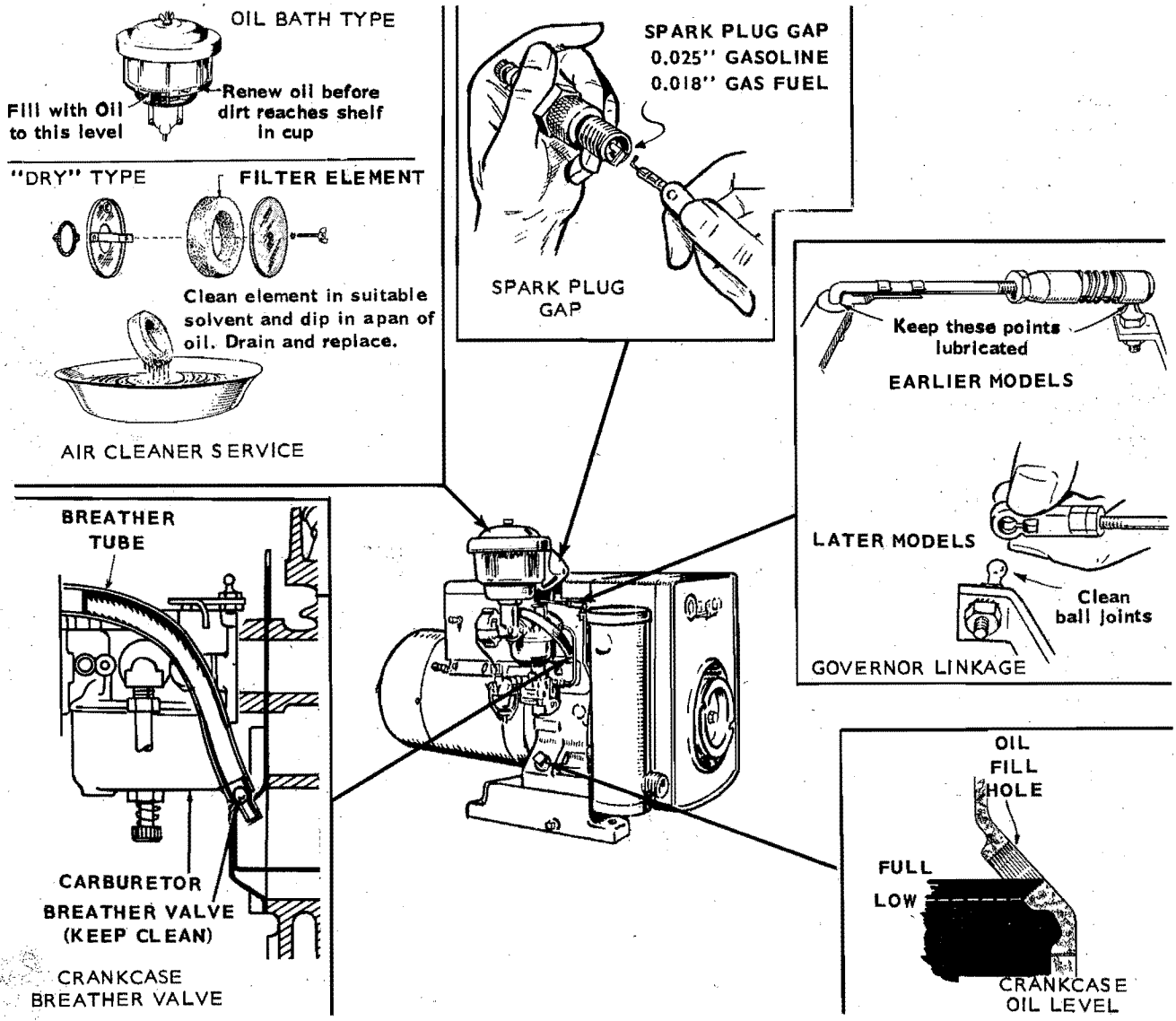


FIGURE 14. PERIODIC MAINTENANCE

PERIODIC SERVICE GUIDE

Regularly scheduled maintenance is the key to lower operating costs and longer service life for the unit. The following schedule can be used as a guide. However, actual operating conditions under which a unit is run should be the determining factor in establishing a maintenance schedule. When operating in very dusty or dirty conditions, some of the service periods may have to be reduced. Check the condition of the crankcase oil, the filters, etc. frequently until the proper service time periods can be established.

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

SERVICE THESE ITEMS	AFTER EACH CYCLE OF INDICATED HOURS						
	8	50	100	200	500	1000	5000
Inspect Set	x1						
Check Fuel Supply	x						
Check Oil Level	x						
Check Governor Linkage		x2					
Change Spark Plug				x			
Change Crankcase Oil			x2				
Clean Crankcase Breather			x				
Check Battery Electrolyte Level				x			
Inspect Magneto Breaker Points				x			
Clean Commutator Collector Rings				x			
Check Brushes				x3			
Check Valve Clearance					x		
Remove Carbon and Lead					x		
Clean Generator						x	
Remove and Clean Oil Base						x	
Grind Valves (If Required)						x	
Clean Carburetor						x	
Complete Reconditioning							x

x1 - With set running, visually and audibly check exhaust system for leaks.
x2 - Perform more often under extremely dusty conditions.
x3 - Replace commutator brushes when worn to 5/8".

SPECIAL UTILITY SECTION

RATED OUTPUT — UTILITY TRUCK MODELS

Alternating current and direct current are produced at the same time.

Combined AC and DC rated output	1,000 Watts
Maximum DC amperes (automatically limited)	30 Amps
Maximum DC watts (maximum 30 amps x nominal 13 volts)	390 Watts
Available AC output (1000 watts less watts of DC charging current. Minimum (while full load DC connected — truck stopped)	610 Watts
Maximum (while truck running or battery charged and no DC load connected)	1,000 Watts
Open circuit DC voltage (12 volt battery charging)	15 Volts
Nominal AC voltage (power for tools, etc.)	115 Volts

This section applies specifically to the "Utility Truck" models of the AJ series generating sets. These supplementary instructions are to be used, where they apply, instead of the instructions for the standard generating sets.

For instructions not covered in this section, refer to the appropriate section for the standard sets.

The utility set is designed to supply 12 volt DC output for radio, etc., while the truck is stopped at a service job. At the same time, AC power is available for flood lights, power tools, etc. Thus, the generating set eliminates the necessity of running the truck engine to prevent battery run down at a service job. The generating set can also be used to recharge a low truck battery if AC power requirements are sufficiently reduced. In normal operation, the set supplies DC and AC current for the load, but does not recharge the battery.

The utility set has a relay which opens the charging circuit in the generator set when the truck engine is running, to prevent the battery from being charged from both sources at the same time. This is necessary to prevent damage to the reverse current relays in both the truck and generator set charging systems as a result of interaction between them.

CHARGE RATE

Rated DC output is 30 amperes. A circuit breaker opens the charge circuit to protect the generator if DC output is high. Equal time is consumed by the breaker to cut-in and cut-out and it may go through this cycle several times, each succeeding cycle becoming more rapid, until it acts and sounds like a buzzer, during an over-load on the DC output. Generally, the battery will warm up and the charge rate will drop so that the breaker will not reach the buzzing stage.

As the battery reaches a charge condition, its terminal voltage approaches that of the generating set, resulting in a desirable tapering off charge rate. After the battery becomes fully charged, the charge rate equals the DC load (radio, lights, etc.) connected.

The set's charge ammeter reads zero while the truck engine is running.

AC OVER-LOADING

It is not expected that men on the job will determine available load each time before plugging in tools, etc. Overloading is apt to occur especially during night work when both lights and tools are used. If the set speed drops, AC lights will dim, and part of the load must be disconnected. If more AC power is required, simply run the truck's motor to take over the DC load for that interval, and make the full rating available in AC output.

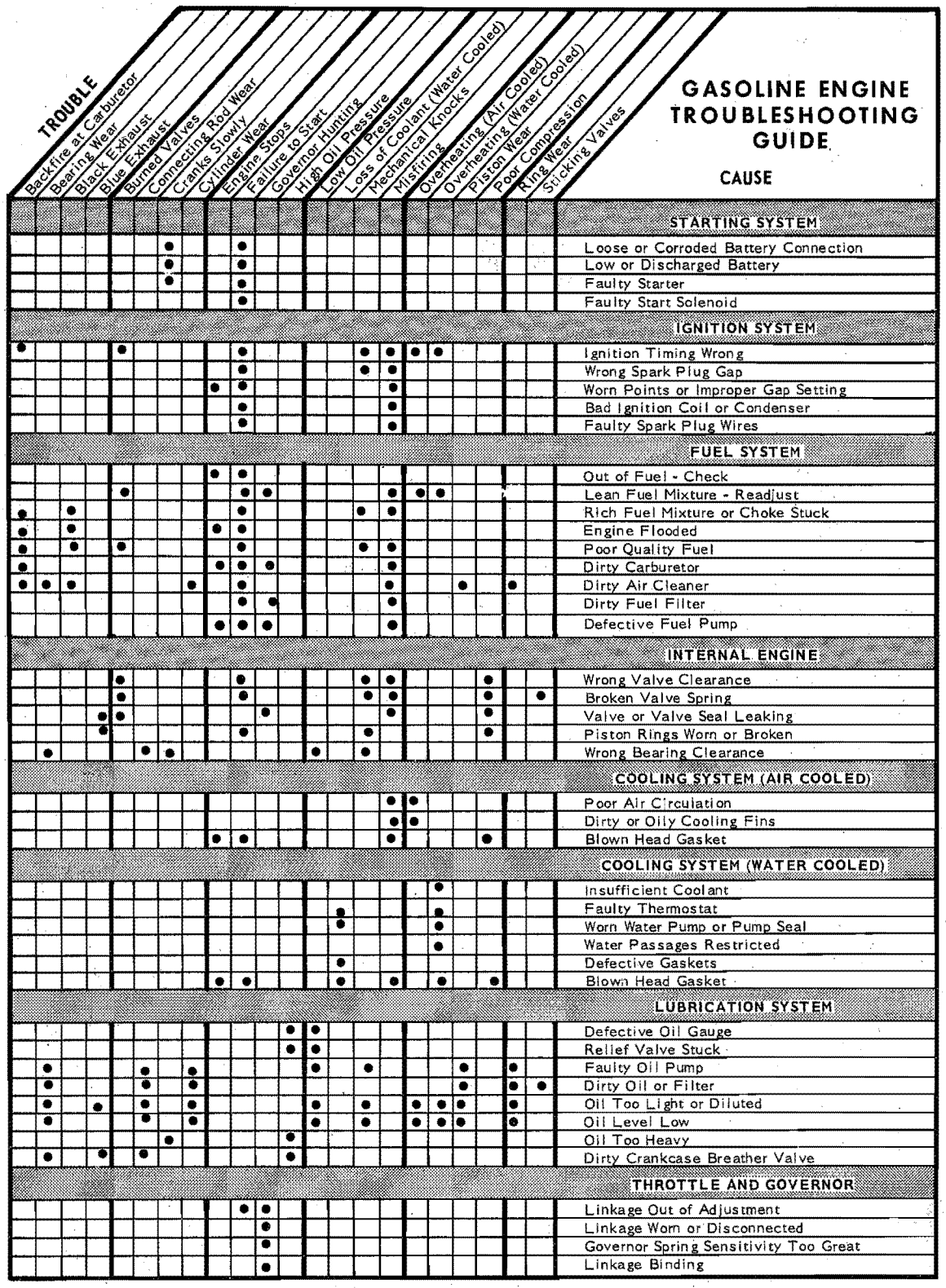
A short circuit across the AC terminals will collapse the field to protect the generator.

GOVERNOR ADJUSTMENT

To check or correct the engine speed, a DC voltmeter is required. The set must be warm and all load disconnected. Proceed as follows:

1. Run plate with full AC load connected for at least 1/2 hour to reach operating temperature.
2. With the load alternately removed and connected, adjust the governor sensitivity screw, if necessary, to attain a minimum drop in speed from no-load to full-load operation with no hunting condition.
3. Remove the AC load and stop the set, then disconnect the generator lead A1 at the relay in the set control.
4. Connect the DC voltmeter across lead A1 and ground.
5. Run the set and adjust the speed to deliver 15 volts DC.
6. Remove the voltmeter, reconnect the A1 lead to the relay and replace other parts removed.

ENGINE TROUBLESHOOTING



PARTS CATALOG

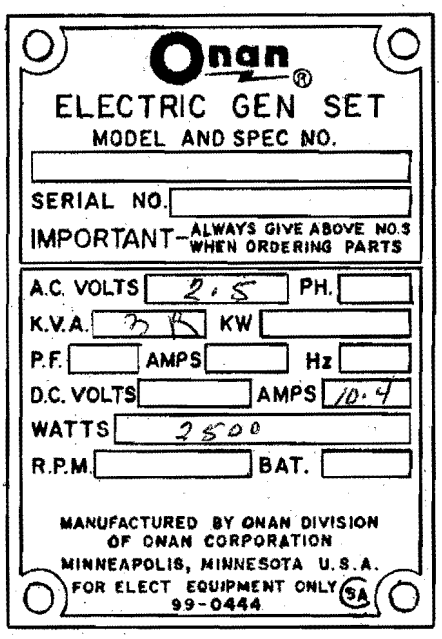
INSTRUCTIONS FOR ORDERING REPAIR PARTS

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.



For handy reference, insert "YOUR" 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 AJ generating sets as listed below. Parts are arranged in groups of related items. Each illustrated part is identified by a reference number corresponding to the same reference number below the illustration. Parts illustrations are typical. Using the MODEL and SPEC NO. from the set nameplate, select parts from this catalog that apply to your unit. Unless otherwise mentioned in the description, parts are interchangeable between models. Right and left sides are determined by FACING the engine end (front) of the set.

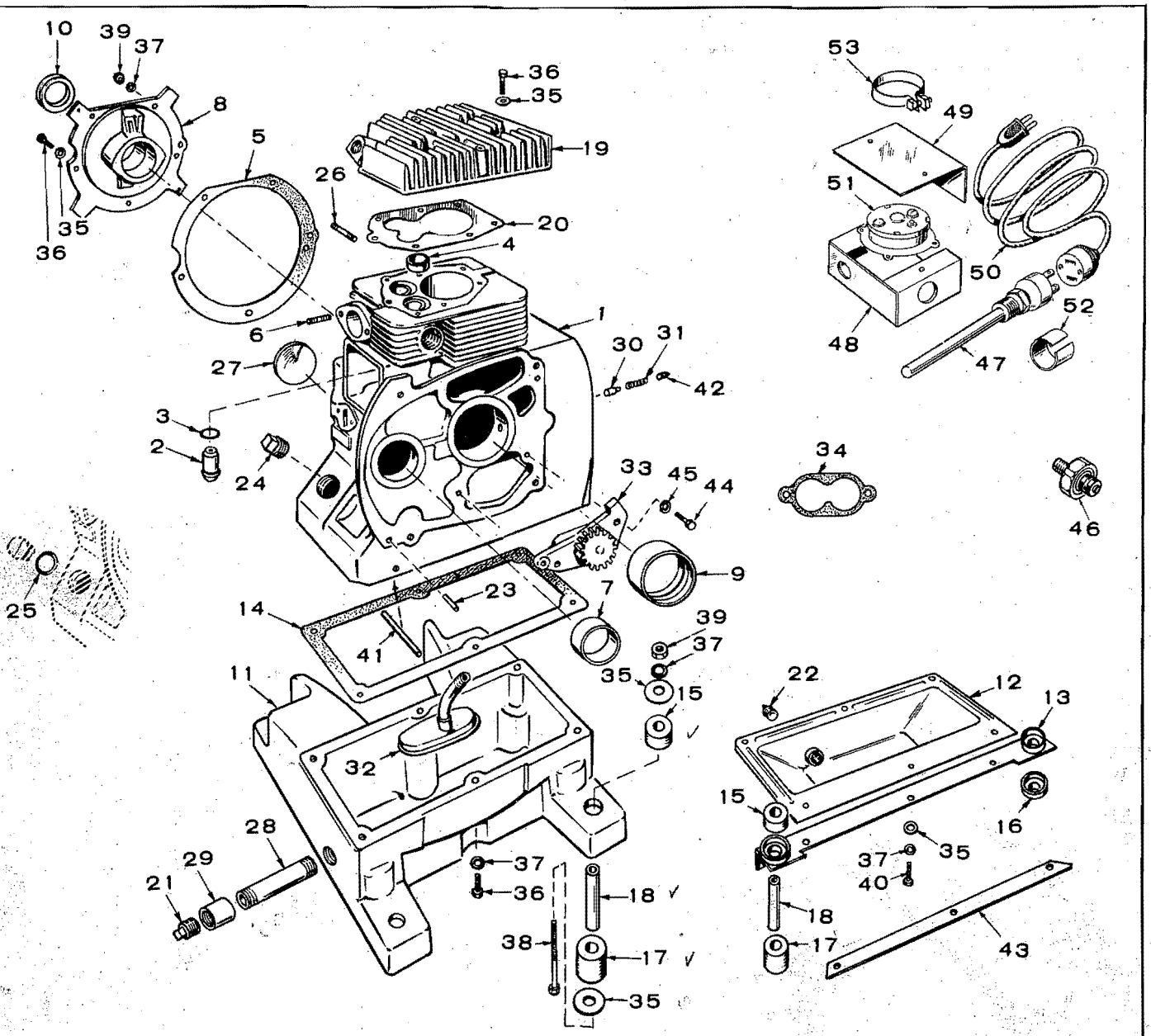
GENERATOR SET DATA TABLE

MODEL AND SPEC NO. *	TYPE**	ELECTRICAL DATA				PARTS KEY NO.
		WATTS	VOLTS †	HERTZ	RPM	
.8AJ-51M/	Manual	800	120AC	50	1500	
.8AJ-52M/	Manual	800	240AC	50	1500	1
1.0AJ-1M/	Manual	1000	120AC	60	1800	
1.0AJ-2M/	Manual	1000	240AC	60	1800	
.8AJ-51R/	Remote	800	120AC	50	1500	
.8AJ-52R/	Remote	800	240AC	50	1500	
1.0AJ-1R/	Remote	1000	120AC	60	1800	2
1.0AJ-2R/	Remote	1000	240AC	60	1800	
1.5AJ-224E/	Battery	1500	24	DC	2400	
1.5AJ-232E/	Charger	1500	32	DC	2400	3
2.0AJ-51M/	Manual	2000	120AC	50	3000	
2.0AJ-52M/	Manual	2000	240AC	50	3000	
2.5AJ-1M/	Manual	2500	120AC	60	3600	4
2.5AJ-2M/	Manual	2500	240AC	60	3600	
2.0AJ-51P/	Portable	2000	120AC	50	3000	
2.0AJ-52P/	Portable	2000	240AC	50	3000	
2.5AJ-1P/	Portable	2500	120AC	60	3600	5
2.5AJ-2P/	Portable	2500	240AC	60	3600	
2.0AJ-53M/	Manual	2000	120/240AC	50	3000	
2.5AJ-3M/	Manual	2500	120/240AC	60	3600	6
2.0AJ-53P/	Portable	2000	120/240AC	50	3000	
2.5AJ-3P/	Portable	2500	120/240AC	60	3600	7
2.0AJ-51R/	Remote	2000	120AC	50	3000	
2.0AJ-52R/	Remote	2000	240AC	50	3000	
2.5AJ-2R/	Remote	2500	240AC	60	3600	8
2.5AJ-1R/	Remote	2500	120AC	60	3600	
2.0AJ-53R/	Remote	2000	120/240AC	50	3000	
2.5AJ-3R/	Remote	2500	120/240AC	60	3600	9
1.5AJ-115M/	Manual	1500	115	DC	2600	10
"UTILITY" (or "Mobile Communications") (Formerly designated by number 1330 in model) - SEE SPECIAL GROUP.						
STATE OF PENNSYLVANIA APPROVED UNITS - SEE SPECIAL GROUP.						
FIRE DEPARTMENT MODELS - SEE SPECIAL GROUPS. (Formerly designated by number 114 or 4114 in model)						

* - Spec Letter advances with manufacturing changes (A to B, B to C, etc.)

** - Manual type units are suitable for stationary or portable service (pull rope cranking only). Portable units are designed for easy mobility (pull rope cranking). Remote units are primarily designed for permanent installations. Batteries are required for electric starting at the set or from a remote switch.

† - Reference to 120, 240, and 120/240 volt also applies to 115, 230, and 115/230 volt.



CYLINDER BLOCK, OIL BASE AND OIL PUMP GROUP

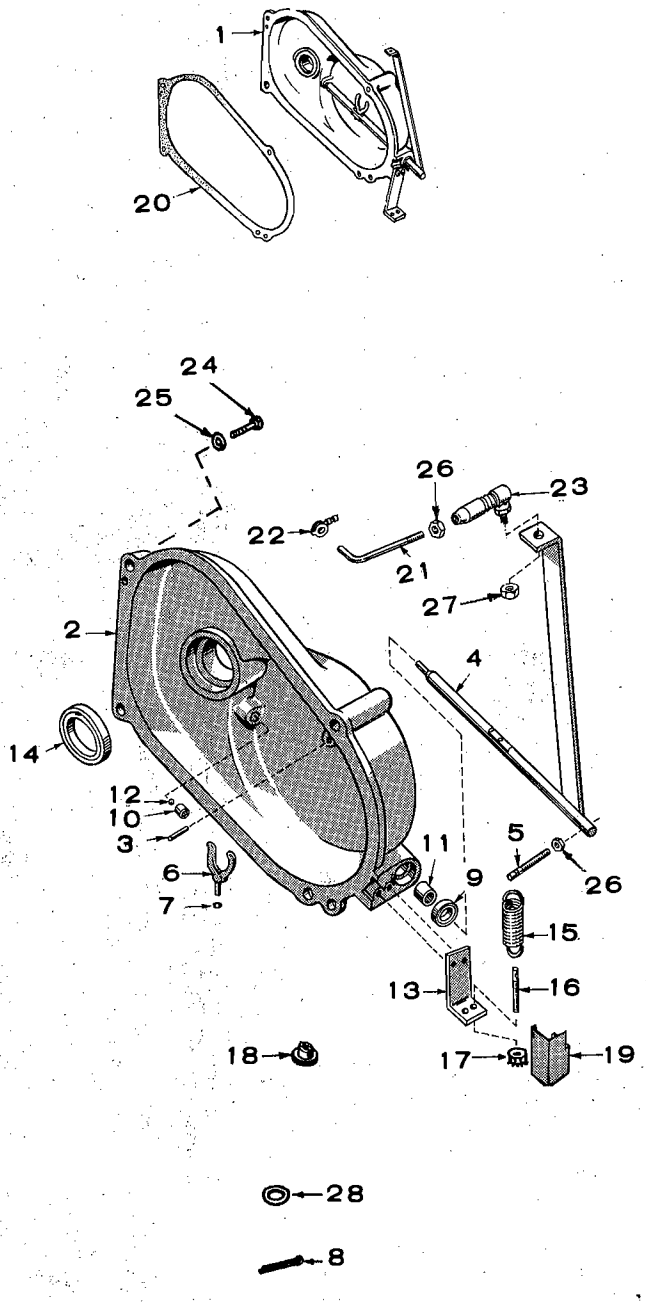
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	BLOCK ASSEMBLY, CYLINDER (Includes Parts Marked *)		
	110-0876	1	Key 1, 2, 10
	110-0876	1	Key 3 (24 Volt Output) - Spec A through H
	110-0877	1	Key 3 (24 Volt Output) - Begin Spec J
	110-0876	1	Key 3 (32 Volt Output)
	110-0877	1	Key 4 through 9
2	110-0441	2	*Guide, Valve
3	110-0068	1	*Gasket, Valve Guide - Intake
4	INSERT, EXHAUST VALVE SEAT		
	110-0826	1	*Standard
	110-0826-02	1	.002" Oversize
	110-0826-05	1	.005" Oversize
	110-0826-10	1	.010" Oversize
	110-0826-25	1	.025" Oversize
5	101-0257	1	*Gasket Kit, Bearing Plate to Engine
6	STUD		
	520-0363	2	Carburetor Mounting - Spec A through J
	520-0632	2	Carburetor Mounting - Begin Spec K
7	101-0367	2	*Bearing, Precision Camshaft
8	*PLATE, REAR BEARING GENERATOR TO ENGINE (Less Bearing)		
	101-0233	1	Key 1, 2, 10 (Also Key 3, 24 Volt Output Spec A through H)
	101-0252	1	Key 4, 5, 6, 7, 8, 9 - (Also Key 3, 24 Volt Output, Begin Spec J)
9	BEARING, PRECISION CRANKSHAFT (Front or Rear)		
	101-0290	2	*Standard
	101-0290-02	2	.002" Undersize
	101-0290-10	2	.010" Undersize

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	101-0290-20	2	.020" Undersize
	101-0290-30	2	.030" Undersize
10	509-0041	1	Seal, Oil - Crankshaft Rear
11	BASE, OIL (Cast Iron) - Key 1, 2, 3, 4, 6, 8, 9, 10		
	102-0439	1	Standard Units
	102-0452	1	Units With Oil Base Heater
12	102-0319	1	Pan, Oil - Key 5, 7
13	403-0381	1	Bracket, Engine Mounting - (2 End Cups Attached) Key 5, 7
14	102-0018	1	Gasket, Oil Base or Pan
15	CUSHION, RUBBER MOUNTING - UPPER		
	402-0044	4	Key 1, 2, 3, 4, 6 - Spec A through E
	402-0076	4	•Key 1, 2, 3, 4, 6, 8, 9, 10 - Begin Spec F
	402-0076	4	Key 5, 7
16	402-0140	2	Cup, Centering, Lower Cushions (Generator End) Key 5, 7
17	CUSHION, RUBBER MOUNTING (Lower)		
	402-0045	4	•Key 1, 2, 3, 4, 6, 8, 9, 10
	402-0045	2	Key 5, 7 (Generator End)
	402-0144	2	Key 5, 7 (Engine End)
18	BUSHING, CUSHION SPACING		
	402-0048	4	Key 1, 2, 3, 4, 6, 8, 9, 10 - Spec A through E
	402-0141	4	•Key 1, 2, 3, 4, 6, 8, 9, 10 - Begin Spec F
	402-0141	2	Key 5, 7 (Generator End)
	402-0142	2	Key 5, 7 (Engine End)
19	HEAD, CYLINDER		
	110-1778	1	Standard Compression (Gasoline Sets)
	110-1779	1	High Compression (Gaseous Sets)
20	110-0836	1	Gasket, Cylinder Head
21	505-0110	1	Plug (3/8"), Oil Drain - Key 1, 2, 3, 4, 6, 8, 9, 10
22	505-0054	1	Plug (1/4") - Oil Drain - Key 5, 7
23	516-0012	2	*Pin, Dowel - Gear Cover Alignment
24	505-0130	1	Plug (3/4") - Oil Fill (Cast Iron)
25		1	Gasket, Fill Plug - Order 505-0130 Plug
26	520-0526	4	*Stud, Rear Bearing Plate
27	517-0048	1	*Plug, Expansion Rear Cam Bearing Opening
28	505-0076	1	Nipple, Pipe (3/8" x 3") - Oil Drain Extension (Optional)
29	505-0028	1	Coupling, Pipe (3/8") - Oil Drain Extension (Optional)
30	120-0012	1	Plunger, Oil By-Pass - Key 4, 5, 6, 7, 8, 9 (Also Key 3, 24 Volt Output, Begin Spec J)
31	120-0140	1	Spring, Oil By-Pass Plunger - Key 4, 5, 6, 7, 8, 9 (Also Key 3, 24 Volt Output, Begin Spec J)
32	CUP AND PIPE, OIL PUMP INTAKE (Includes Screen)		
	120-0571	1	Key 3 (24 Volt Output) - Begin Spec J
	120-0389	1	Key 4 through 7 - Spec A through E
	120-0571	1	Key 4 through 9 - Begin Spec F
33	PUMP ASSEMBLY, OIL		
	120-0394	1	Key 3 (24 Volt Output) - Begin Spec J
	120-0200	1	Key 4 through 7 - Spec A through E
	120-0394	1	Key 4 through 9 - Begin Spec F
34	120-0161	1	Gasket Kit, Oil Pump - Key 4, 5, 6, 7, 8, 9 (Also Key 3, 24 Volt Output, Begin Spec J
35	WASHER, FLAT		
	526-0122	7	Cylinder Head Mounting
	526-0127	3	Oil Pan Mounting - Key 5, 7
	526-0065	1	*Bearing Plate Mounting (Bottom)
	526-0041	8	•Set Mounting (21/64" I.D. x 1" O.D. x 1/16")
36	SCREW, HEX CAP		
	110-0879	4	Cylinder Head Mounting (5/16-18 x 1-1/4")
	110-0284	3	Cylinder Head Mounting (5/16-18 x 1-1/2")
	800-0028	1	*Gear Cover Mounting (Bottom)
	800-0051	3	Oil Base Mounting (3/8-16 x 1-1/4") - Key 1, 2, 3, 4, 6, 8, 9, 10
	800-0053	3	Oil Base Mounting (3/8-16 x 1-3/4") - Key 1, 2, 3, 4, 6, 8, 9, 10
	806-0027	6	Oil Pan Mounting (3/8-16 x 3/4") - Key 5, 7
37	WASHER, LOCK		
	850-0045	4	*Bearing Plate Mounting
	850-0050	6	Oil Base Mounting - Key 1, 2, 3, 4, 6, 8, 9, 10
	850-0048	3	Oil Pan Mounting - Key 5, 7
	850-0050	3	Oil Pan Mounting - Key 5, 7
	850-0046	4	•Set Mounting (5/16")
38	BOLT, CARRIAGE - SET MOUNTING		
	816-0114	4	•Key 1, 2, 3, 4, 6, 8, 9, 10
	816-0110	2	Key 5, 7 (5/16-18 x 3-1/2")
	816-0111	2	Key 5, 7 (5/16-18 x 3-3/4")
39	NUT, HEX		
	862-0015	4	•Set Mounting (5/16-18)
	110-0445	4	*Bearing Plate Mounting
40	806-0027	6	Screw (Counter Bore) - Oil Pan Mounting - Key 5, 7
41	120-0387	1	*Tube, Crankcase (Pressed in Block) - Key 4, 5, 6, 7, 8, 9 (Also Key 3, 24 Volt Output, Begin Spec J)
42	505-0274	1	Plug, Oil By-Pass (1/8" x 1/4) - Key 4, 5, 6, 7, 8, 9 (Also Key 3, 24 Volt Output, Begin Spec J)
43	102-0689	1	Stiffener, Oil Pan - Key 5, 7
44	800-0007	2	Screw (1/4-20 x 1") - Oil Pump Mounting
45	850-0040	2	Washer, Lock (1/4)
46	309-0237	1	Switch, Low Oil Pressure - Optional
47	333-0100	1	Heater, Oil Base - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional
48	333-0012	1	Box, Heater - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional
49	333-0013	1	Cover, Box - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional
50	333-0017	1	Cord, Heater (6 ft.) - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
51	309-0029	1	Thermostat, Heater - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional
52	133-0003	1	Guard, Heater Terminal - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional
53	503-0019	1	Clamp, Guard - Key 1, 2, 3, 4, 6, 8, 9, 10 - Optional
	402-0229	4	Cushion Assembly, Mounting - Key 1, 2, 3, 4, 6, 8, 9, 10 (Includes Parts Marked •)

* - Parts in Cylinder Block Assembly.
• - Included in Mounting Cushion Assembly.

GEAR COVER GROUP

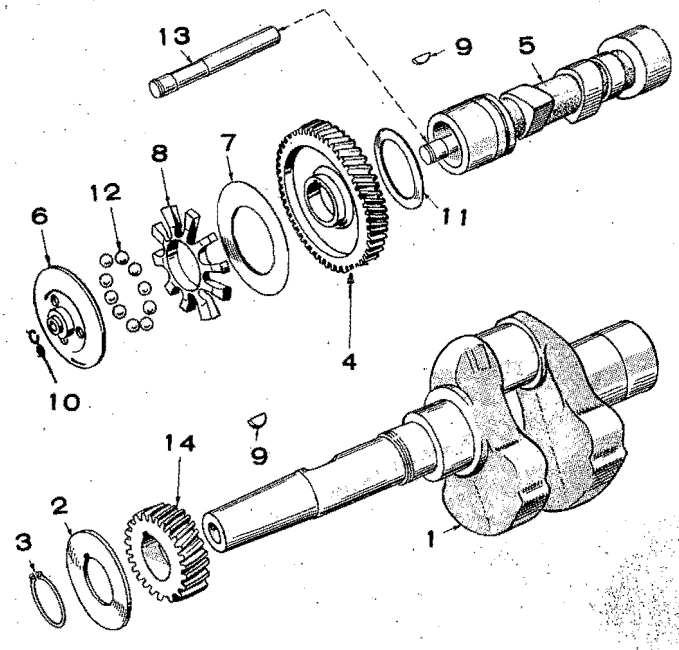


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	COVER ASSEMBLY, GEAR (Includes Parts Marked *)		
	103-0141	1	Spec A through F
	103-0222	1	Begin Spec G
2		1	*Cover, Gear - Not Sold Separately
3	516-0117	1	*Pin, Roll (3/16 x 13/16") - Governor Cup Stop
4	*ARM AND SHAFT, GOVERNOR		
	150-0575	1	Spec A through F
	150-0789	1	Begin Spec G
5	150-0177	1	*Stud, Governor Sensitivity Adjustment
6	150-0620	1	*Yoke, Governor Shaft - Includes Retainer Ring 518-0129 **(NOTE:** During Spec A the hole for cotter pin was replaced by Retaining Ring Groove)
7	518-0129	1	*Ring, Governor Yoke Retainer (Only Models with grooved Yoke)
8	516-0036	1	Pin, Cotter - Governor Yoke, (1/16 x 3/8") - Spec A Only
9	509-0008	1	*Seal, Oil - Governor Shaft
10	510-0008	1	*Bearing, Governor Shaft - Lower
11	510-0013	1	*Bearing, Governor Shaft - Upper
12	510-0014	1	*Ball, Governor Shaft Thrust
13	150-0156	1	*Bracket, Governor Spring
14	509-0012	1	*Seal, Crankshaft Oil, Front
15	150-0098	1	Spring, Governor
16	150-0213	1	Stud, Governor Spring Tension Adjustment
17	870-0131	1	Nut, Governor Adjusting Key 1, 2, 4, 5, 6, 7, 8, 9, 10 (10-32) - External Shakeproof
18	150-0033	1	Nut, Governor Adjusting Key 3 (10-32)
19	150-0198	1	Cover, Governor Spring - Spec A through F
20	103-0013	1	Gasket, Gear Cover
21	LINK, GOVERNOR ARM TO CARBURETOR		
	150-0578	1	Spec A through F
	150-0786	1	Begin Spec G
22	518-0004	1	Clip, Governor Link
23	150-0974	1	Joint, Ball
24	SCREW, HEX CAP - GEAR COVER MOUNTING		
	800-0031	2	5/16-18 x 1-1/2"
	800-0034	2	5/16-18 x 2-1/4"
25	850-0045	4	Washer, Lock - Gear Cover Mounting
26	870-0053	2	Nut, Hex (10-32)
27	870-0131	1	Nut, Lock (10-32)
28	526-0140	1	Washer, Governor Yoke - Spec A Only

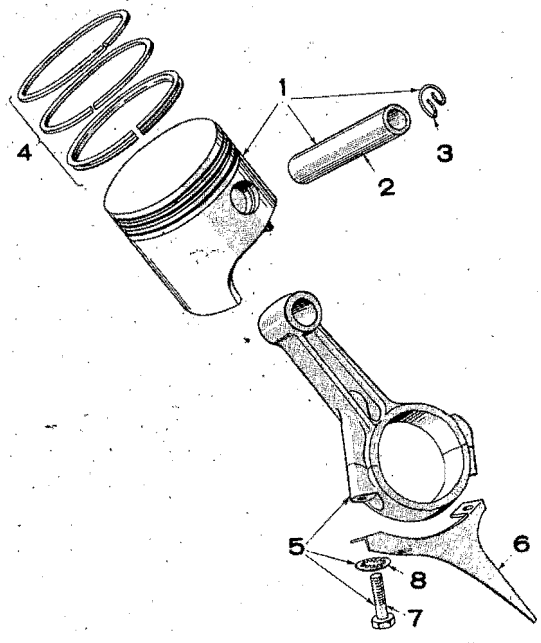
* - Included in Gear Cover Assembly.

CRANKSHAFT, CAMSHAFT AND GOVERNOR CUP GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	104-0265	1	Crankshaft
2	104-0050	1	Washer, Crankshaft Gear
3	518-0012	1	Ring, Lock - Crankshaft Gear Washer
4	105-0377	1	Gear, Camshaft (Includes Flyball Spacer & Plate)
5	105-0139	1	Camshaft and Pin Assembly
6	150-1116	1	Cup, Governor
7	150-0077	1	Plate, Governor Flyball - Prior to Serial #668253 and Begin Serial #370369, During Spec L
8	SPACER, GOVERNOR FLYBALL		
	150-0085	1	Prior to Serial #668253
	150-1257	1	Begin Serial #370369, During Spec L
9	515-0001	2	Key, Gear
10	150-0078	1	Ring, Lock - Camshaft Center Pin
11	105-0004	1	Washer, Camshaft Thrust
12	BALL, FLY - GOVERNOR		
	510-0015	10	Key 1, 2, 3, 10
	510-0015	5	Key 4 through 9
13	150-0075	1	Pin, Camshaft Center
14	104-0048	1	Gear, Crankshaft



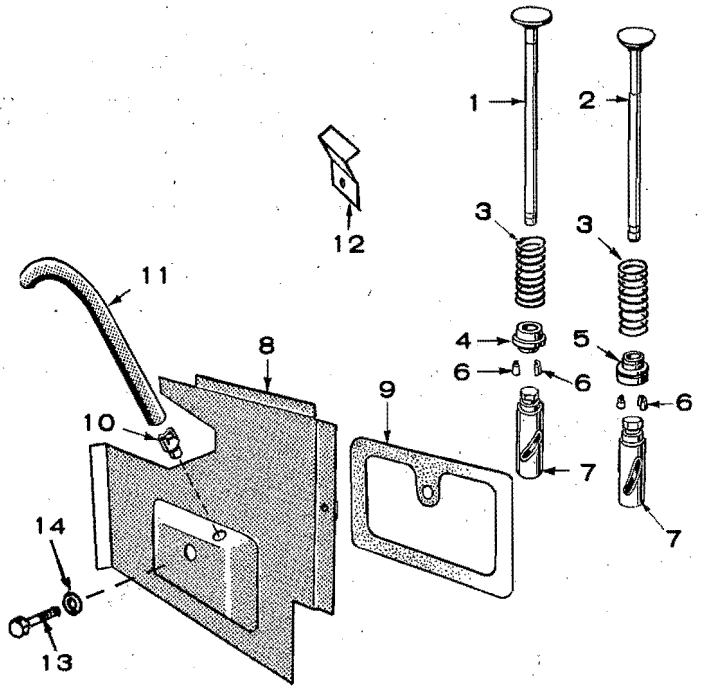
PISTON AND CONNECTING ROD GROUP



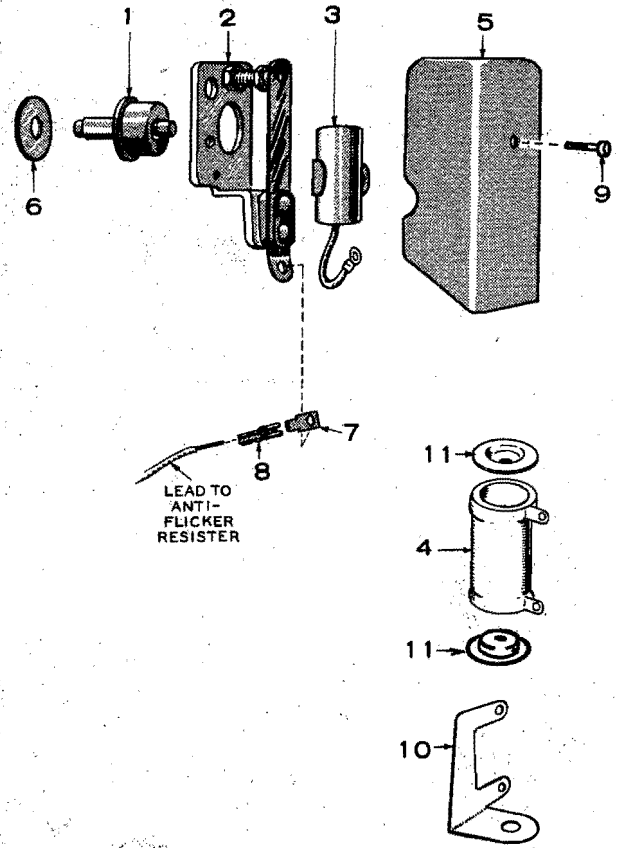
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	PISTON AND PIN ASSEMBLY		
	112-0074	1	Standard
	112-0074-05	1	.005" Oversize
	112-0074-10	1	.010" Oversize
	112-0074-20	1	.020" Oversize
	112-0074-30	1	.030" Oversize
	112-0074-40	1	.040" Oversize
2	112-0063	1	Pin, Piston
3	112-0013	2	Clip, Piston Pin
4	RING SET		
	113-0084	1	Standard
	113-0084-10	1	.010" Oversize
	113-0084-20	1	.020" Oversize
	113-0084-30	1	.030" Oversize
	113-0084-40	1	.040" Oversize
5	ROD, CONNECTING		
	114-0095	1	Standard
	114-0095-10	1	.010" Undersize
	114-0095-20	1	.020" Undersize
	114-0095-30	1	.030" Undersize
6	DIPPER		
	114-0089	1	Key 1, 2, 10
	114-0089	1	Key 3 (24 Volt Output) - Spec A through H
	114-0089	1	Key 3 (32 Volt Output)
7	114-0023	2	Screw, Rod Cap (Hardened)
8	854-0014	2	Washer, Lock (I.T. Shakeproof)

VALVE AND BREATHER GROUP

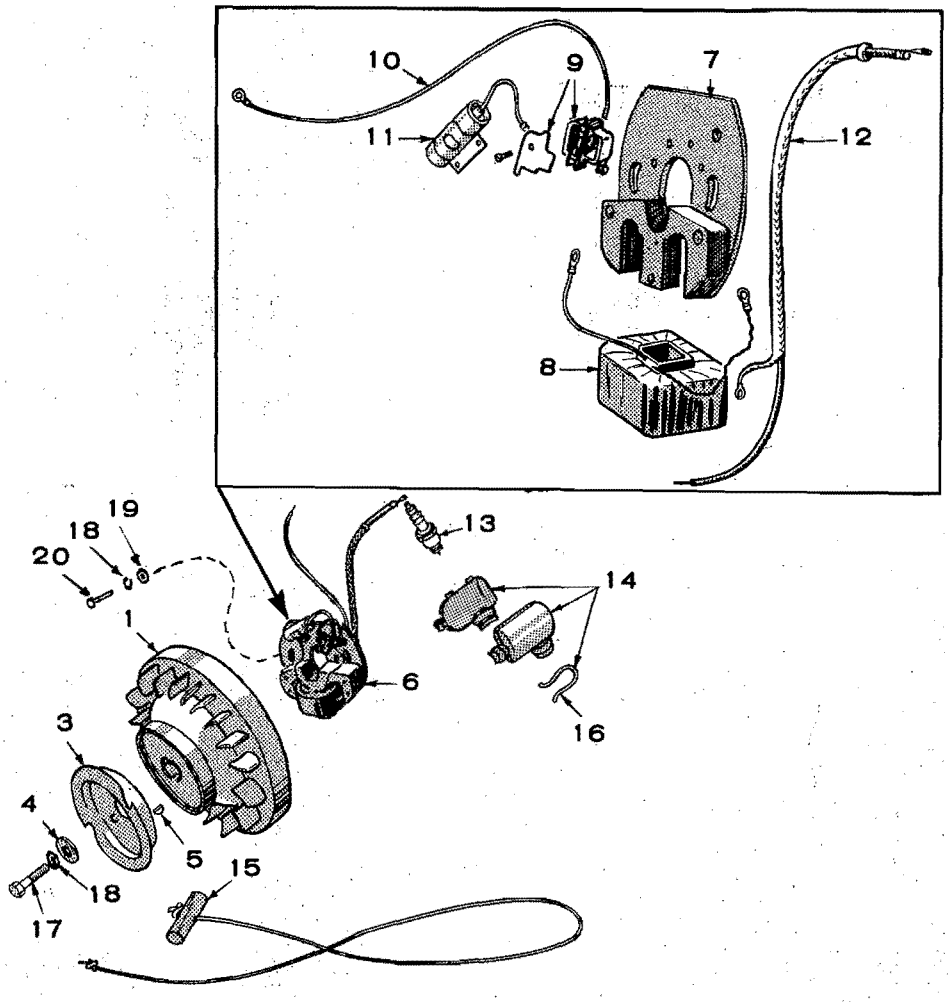
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110-0828	1	Valve, Intake
2	110-0827	1	Valve, Exhaust (Stellite)
3	110-0609	2	Spring, Valve
4	110-0558	1	Retainer, Intake Valve Spring - (Exhaust also for gas sets)
5	110-0540	1	Rotocap, Valve - Exhaust (None on gas sets)
6	110-0008	4	Lock, Valve Spring Retainer
7	TAPPET, VALVE		
	115-0006	2	Standard
	115-0006-05	2	.005" Oversize
8	110-0840	1	Cover, Valve
9	110-0832	1	Gasket, Valve Cover
10	123-0486	1	Valve, Breather (5/16" Ball)
11	503-0271	1	Hose, Breather (7/16" x 5-1/4")
12	123-0788	1	Baffle, Breather - Key 3 (24 Volt Output) - Begin Spec J
13	800-0015	1	Screw, Cap (1/4 x 20 x 3") - Valve Cover
14	526-0063	1	Washer (Copper), Valve Cover Screw

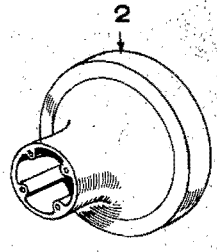


ANTI-FLICKER GROUP - KEY 1 AND 2



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	160-0447	1	Plunger Assembly (Includes plunger, guide, diaphragm)
2	160-0478	1	Point Set
3	312-0019	1	Condenser, 0.5 Mfd.
4	RESISTOR, FIXED (Mounted in Generator) - LISTED ALSO IN GENERATOR GROUP		
			For 60 Hertz Sets
	304-0321		2.5 Ohm, 25 Watt - Spec A through F
	304-0012	1	1.5 Ohm, 25 Watt - Begin Spec G
			For 50 Hertz Sets
	304-0315	1	3 Ohm, 25 Watt - Spec A through F
	304-0120	1	2 Ohm, 25 Watt - Begin Spec G
5	166-0254	1	Cover, Contact Points
6	160-0461	1	Gasket, Plunger Guide
7	332-0527	1	Terminal, Solderless (Male)
8	332-0529	1	Terminal, Solderless (Female)
9	815-0187	1	Screw, Self Tapping (#10-32 x 1-1/4") - Cover Mounting
10	304-0304	1	Bracket, Resistor Mounting - Listed also in Generator Group
11	304-0014	2	Washer, Resistor Centering (9/16" O.D.) - Listed also in Generator Group



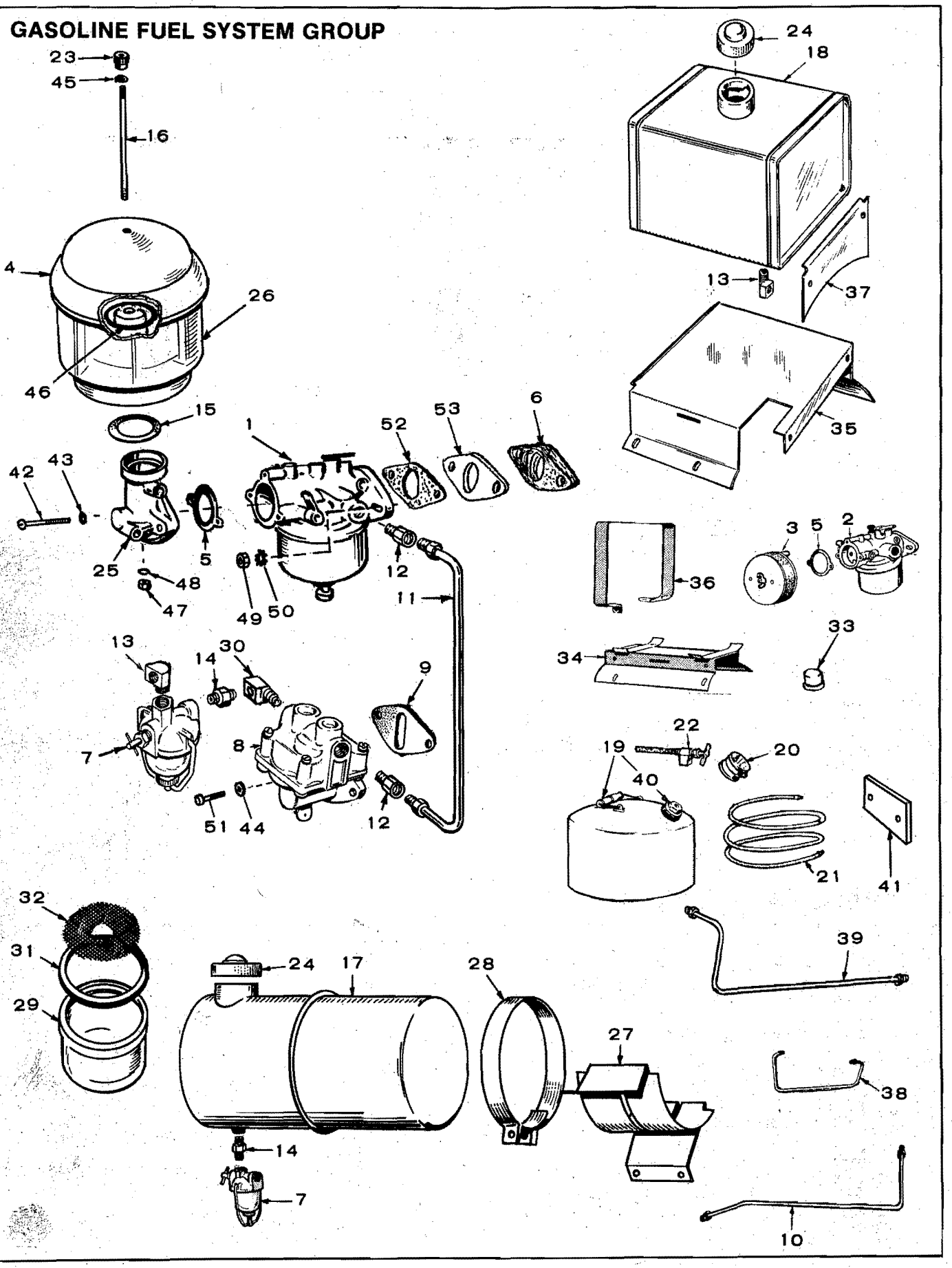


MAGNETO IGNITION GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	FLYWHEEL, MAGNETO (Pressure Cooled Sets)		
	160-0460	1	Key 4 through 9
	160-0459	1	Key 1, 2, 3, 10
2	FLYWHEEL (Vacu-Flo Cooled Sets)		
			Key 1, 2, 3, 10
	160-0470	1	Spec A through F
	160-0672	1	Begin Spec G
			Key 4 through 9
	160-0466	1	Spec A through F
	160-0729	1	Begin Spec G
3	192-0261	1	Sheave
4	526-0141	1	Washer, Flywheel
5	515-0113	1	Key, Flywheel
6	160-0487	1	Backplate Assembly, Magneto
7	160-0454	1	Backplate and Poleshoe
8	160-0155	1	Coil
9	160-0540	1	Point Set

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
10	LEAD, STOP		
	336-1263	1	Key 1, 4, 5, 6, 7, 10
	336-0345	1	Key 2, 3, 8, 9
11	312-0033	1	Condenser
12	167-1272	1	Lead, Spark Plug
13	167-0241	1	Plug, Spark
14	167-0067	1	Shield & Clamp, Spark Plug
15	192-0023	1	Rope & Handle, Manual Starting
16	167-0064	1	Clamp, Spark Plug Shield
17	104-0237	1	Screw, Flywheel Mounting
18	WASHER, LOCK		
	850-0055	1	Flywheel Mounting
	850-0040	2	Magneto Backplate Mounting
19	526-0214	2	Washer, Flat - Magneto Backplate Mounting
20	812-0150	2	Screw, Magneto Backplate Mounting

GASOLINE FUEL SYSTEM GROUP

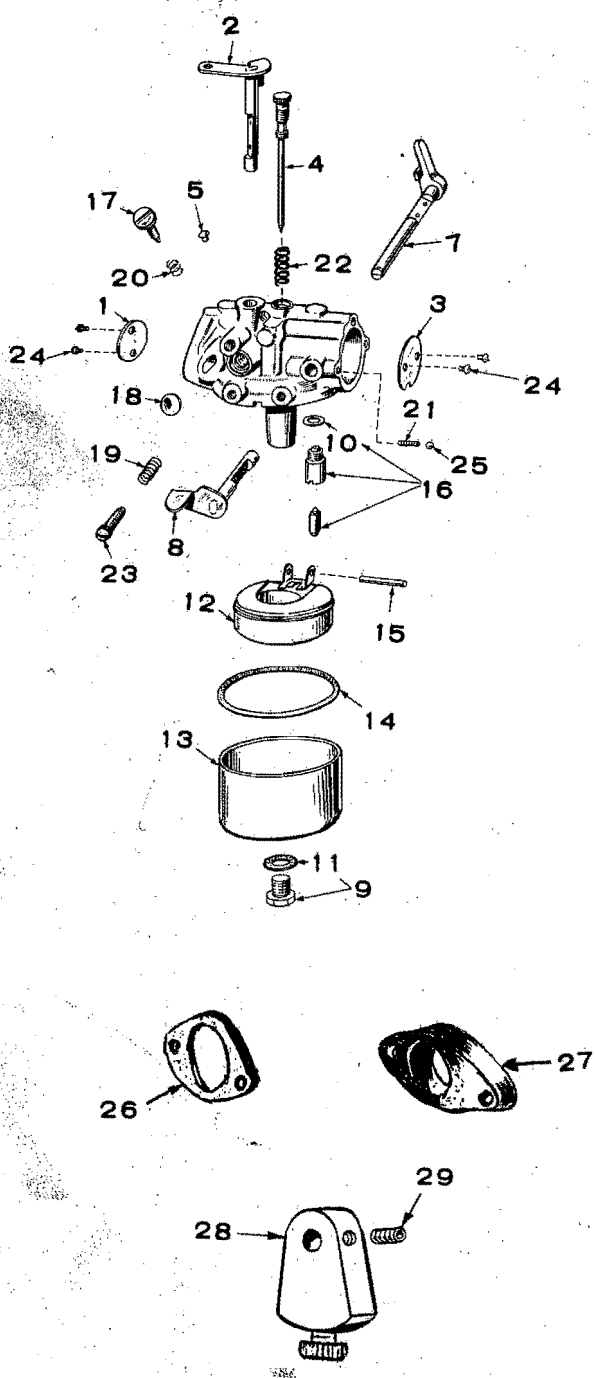


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CARBURETOR - Begin Spec K (See Walbro Carburetor Parts Group for Component Parts)		
	146-0092	1	Gasoline (Manual Choke) - Key 1, 3, 4, 5, 7, 10 - Includes parts marked #
	146-0093	1	Gasoline (Electric Choke) - Key 2, 8, 9 - Includes parts marked #
2	CARBURETOR - Spec A through J (See Carter or Walbro Carburetor Parts Group for Component Parts)		
	—	1	Gasoline - Carter (Manual Choke) Key 1, 3, 4, 5, 7, 10 (Not Available order Kit 146-0125)
	146-0125	1	Kit, Gasoline - Walbro (Manual Choke) Key 1, 3, 4, 5, 7, 10 (Includes Carburetor 146-0092 and parts marked £)
	—	1	Gasoline-Carter (Electric Choke) Key 2, 8, 9 (Not Available order Kit 146-0126)
	146-0126	1	Kit, Gasoline - Walbro (Electric Choke) Kit 2, 8, 9 (Includes parts marked £)
3	140-0369	1	Dry Type, Complete, Prior to Serial 566319 - Also Used All Housed Models
4	140-0441	1	Oil Bath Type - Begin Serial 566319 (Optional Prior to Cut-off) - Includes Parts Marked +
5	145-0111	1	#Gasket, Air Cleaner to Carburetor
6	145-0110	1	#Spacer, Carburetor Mounting
7	149-0079	1	Filter, Fuel (Includes Parts Marked *)
8	149-0693	1	Pump, Fuel
9	149-0003	1	Gasket, Pump Mounting
10	159-0504	1	Line, Fuel - Tank to Filter - Key 2, 3, Spec A through F - Optional
11	LINE, FUEL PUMP TO CARBURETOR		
	149-0561	1	Spec A through J
	149-1110	1	£Begin Spec K; Spec A through J Replacement Kit Installations
12	CONNECTOR		
	502-0003	2	Carburetor Inlet and Pump Outlet
	502-0003	1	Tank Outlet - Key 2, 3 - Spec A through F
	502-0003	1	Filter Inlet - Optional
13	ELBOW, INVERTED MALE		
	502-0002	1	Filter Inlet - Also see 12 and 30
	502-0002	1	Tank Outlet - Key 1, 4, 5, 6, 7, 10
14	502-0082	1	Nipple, Filter Mounting
15	140-0443	1	Gasket, Oil Bath to Adapter - Begin Serial 566319
16	520-0538	1	Stud, Air Cleaner to Adapter (3/16" x 7-3/8") - Begin Serial 566319
	TANK, FUEL		
17	159-0488	1	Key 2, 3 (1.4 Gal.) - Mounted - Optional
18	159-0234	1	Key 1, 4, 5, 6, 7, 10 (2 Gal.) Mounted
19	415-0126	1	Separate (5 Gal.) - Optional (Includes Cap)
20	415-0124	1	Cap, Rain - Dome Type Tank - Optional
21	501-0027	1	Line, Flexible - Tank to Filter (48") - Optional
22	504-0013	1	Valve, Shut-off (With Strainer)
23	140-0587	1	Knob, Plastic - Oil Bath Mounting - Begin Serial 566319
24	159-0007	1	Cap, Fuel Tank
25	140-0446	1	Adapter, Oil Bath - Begin Serial 566319
26	140-0469	1	+Cup, Oil Bath (Plastic) - Begin Serial 566319
27	159-0486	1	Bracket, Tank Mounting - Key 2, 3 - Spec A through F - Optional
28	159-0154	2	Band, Tank Mounting - Key 2, 3 - Spec A through F - Optional
29	149-0150	1	*Bowl, Fuel Filter
30	502-0020	2	Elbow, Street - (1) Filter Inlet - Optional (1) Pump Inlet - Key 8, 9
31	149-0149	1	*Gasket, Fuel Filter
32	149-0202	1	*Screen, Fuel Filter
33	505-0001	1	Cap, Pipe (1/8") - Air Cleaner Adapter - Key 3 (24 Volt Output), Begin Spec J
	BRACKET, MOUNTING - KEY 1, 4, 5, 6, 7, 10		
34	159-0485	1	Spec A through F
35	159-0717	1	Begin Spec G
36	159-0487	2	Band - Spec A through F - Key 1, 4, 5, 6, 7, 10
37	159-0718	1	Bracket - Key 1, 4, 5, 6, 7, 10
	LINE, FUEL - KEY 1, 4, 5, 6, 7, 10		
38	159-0505	1	Spec A through F
39	159-0728	1	Begin Spec G
40	415-0313	1	Cap, Fuel Tank
41	149-0136	1	Cover, Fuel Pump Hole (Sets Without Fuel Pump)
42	812-0082	2	Screw (8-32 x 3/4") - Air Cleaner Adapter Mounting
43	850-0025	2	Washer, Lock (#8)
44	526-0063	2	Washer, Flat - Fuel Pump Mounting
45	850-0030	1	Washer, Lock (#10)
46	509-0135	1	+Seal, "O" Ring
47	870-0053	2	Nut, Hex (10-32) - Air Cleaner Stud
48	854-0010	1	Washer, Lock (#10)
49	868-0001	2	Nut, Hex (1/4-28) - Carburetor Mounting
50	853-0013	2	Washer, Shakeproof (1/4)
51	815-0111	2	Screw (1/4-20 x 5/8") - Fuel Pump Mounting
52	141-0078	1	# Gasket, Carburetor Mounting - Used on Spec L Beginning 12-1-74
53	145-0469	1	#Plate, Carburetor Mounting - Used on Spec L Beginning 12-1-74

+ - Included in Oil Bath Air Cleaner Assembly.
* - Included in #149-0079 Fuel Filter Assembly.
# - Included with replacement carburetors and kits.
£ - Included with replacement kits.

NOTE: See Separate Group for Gas or Gas-Gasoline Fuel Systems.

CARBURETOR PARTS GROUP - CARTER

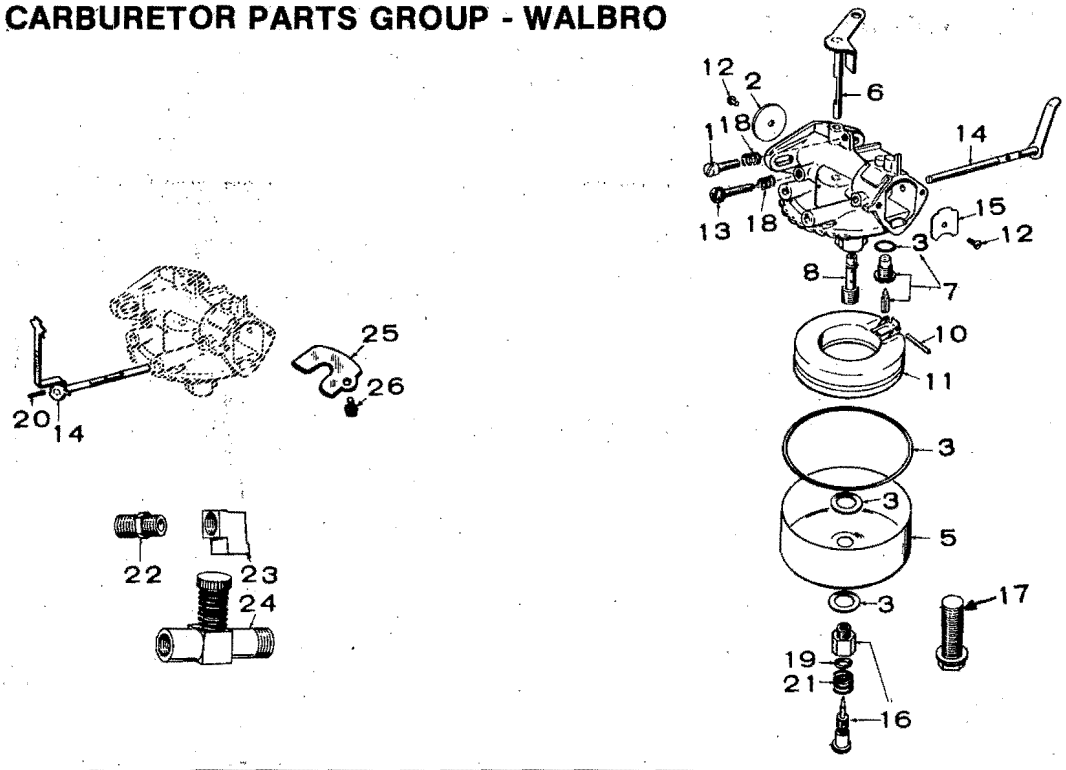


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
£	CARBURETOR BREAKDOWN, CARTER		
1	143-0097	1	Valve, Throttle
2	143-0098	1	Shaft and Lever, Throttle
3	VALVE, CHOKE		
	143-0099	1	Electric Choke
	143-0267	1	Manual Choke
	148-0269	1	Gas Carburetor Only
4	VALVE, NEEDLE		
	143-0078	1	+Gasoline Carburetor
	148-0268	1	Gas Carburetor Only
5	143-0030	1	Plug, Idle Passage
7	143-0100	1	Shaft and Weight, Choke (Electric Choke)
8	143-0101	1	Shaft and Lever, Choke (Manual Choke)
9	143-0118	1	Screw and Gasket, Bowl
10	143-0015	1	+*Gasket, Fuel Inlet Valve
11	143-0036	1	+*Gasket, Bowl Screw
12	143-0105	1	Float
13	143-0119	1	Bowl
14	143-0077	1	+*Gasket, Bowl Ring
15	143-0212	1	Pin, Float
16	143-0039	1	+Valve, Fuel Inlet
17	143-0109	1	Screw, Idle Adjustment
18	143-0110	1	Plug, Welsh
19	143-0111	1	Spring, Throttle Lever Adjusting Screw
20	143-0112	1	Spring, Idle Adjusting Screw
21	143-0113	1	Spring, Choke Shaft (Manual Choke)
22	143-0114	1	Spring, High Speed Adjusting Needle
23	143-0115	1	Screw, Throttle Lever Adjustment
24	812-0014	4	+Screw, 3-48 x 3/16, Choke and Throttle Valve Attaching
25	143-0117	1	Ball, Choke Shaft (Manual Choke)
26	145-0111	1	+*Gasket, Air Cleaner to Carburetor
27	145-0110	1	+*Spacer, Carburetor Mounting
28	148-0412	1	Counterweight, Choke Shaft - Gas Carburetor only
29	815-0230	1	Set Screw
	143-0081	1	Repair Kit, Carburetor (Includes Parts Marked +)
	143-0080	1	+Gasket Kit, Carburetor (Includes Parts Marked *)
	145-0111	1	Gasket, Air Cleaner to Carburetor (Illustrated in Fuel System Group)
	145-0110	1	+*Gasket, Spacing, Carburetor Flange (Illustrated in Fuel System Group)

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

£ - Order repair parts, for Carter Carburetors per breakdown; for complete replacement order applicable Walbro unit.

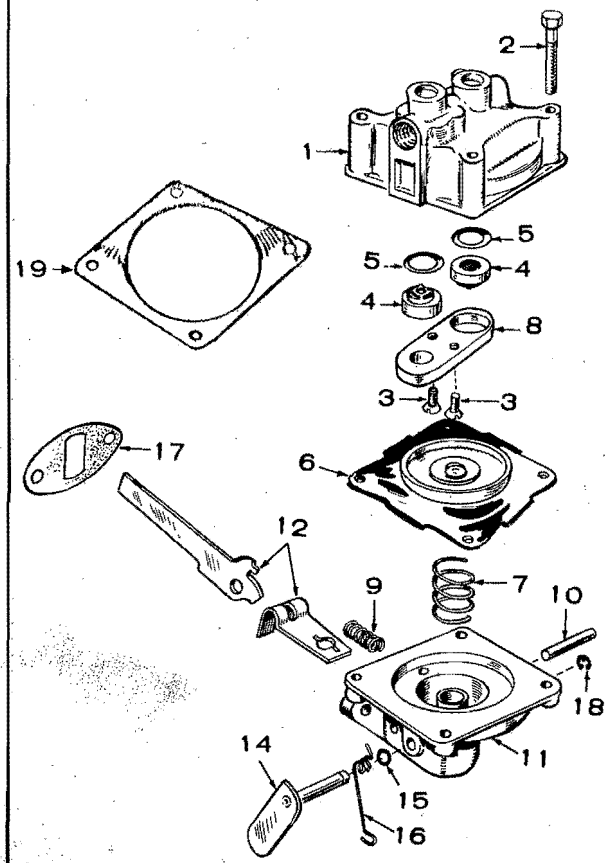
CARBURETOR PARTS GROUP - WALBRO



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	CARBURETOR - WALBRO		
	146-0091	1	Gas Only
	146-0092	1	Gasoline (Manual Choke)
	146-0093	1	Gasoline (Electric Choke)
	146-0094	1	Gas-Gasoline (Manual Choke)
	146-0095	1	Gas-Gasoline (Electric Choke)
	146-0140	1	Gasoline (Electric Choke) - Rough Service
1	146-0122	1	Screw, Throttle Stop
2	146-0119	1	Valve, Throttle
3	146-0124	1	*Gasket Kit, Carburetor
5	146-0118	1	Bowl, Fuel
6	146-0112	1	Shaft Assembly, Throttle
7	146-0115	1	*Float Valve, Seat & Gasket Assembly (Gasoline & Gas-Gasoline Carb.) - Not used on Rough Service Carburetors
7	146-0145	1	Float Valve, Seat, Spring & Gasket Assembly - For Rough Service Carburetors
8	146-0113	1	Nozzle (Gasoline & Gas-Gasoline Carburetors)
10	146-0111	1	*Shaft, Float (Gasoline & Gas-Gasoline Carburetors)
11	146-0110	1	Float Assembly (Gasoline & Gas-Gasoline Carburetors)
12	146-0109	2	Screw & Washer (One only for Gas Carburetors)
13	146-0116	1	*Needle, Idle (Gasoline & Gas-Gasoline Carburetors)
14	SHAFT ASSEMBLY, CHOKE (Gasoline & Gas-Gasoline Carburetors)		
	146-0108	1	Manual Choke (Gas-Gasoline Carburetor)
	146-0107	1	Electric Choke (Gasoline Carburetor)
	146-0106	1	Electric Choke (Gas-Gasoline Carburetor)
15	VALVE, CHOKE (Gasoline and Gas-Gasoline Carburetors)		
	146-0105	1	Manual Choke
	146-0104	1	Electric Choke
16	146-0102	1	*Needle Assembly, Power (Gasoline & Gas-Gasoline Carburetor)
17	146-0103	1	Screw, Bowl Retainer (Gas Carburetor)
18	146-0121	2	Spring, Throttle Stop Screw and Idle Screw
19	146-0120	1	Seal, "O" Ring - High Speed Needle (Gasoline & Gas-Gasoline Carburetor)
20	146-0114	1	Spring, Choke Stop (Gasoline & Gas-Gasoline Carburetors with Manual Choke)
21	146-0117	1	Spring, High Speed Needle (Gasoline & Gas-Gasoline Carburetor)
22	502-0082	1	Nipple, Gas (Gas or Gas-Gasoline Carburetor)
23	502-0055	1	Elbow, Gas (Gas or Gas-Gasoline Carburetor)
24	148-0178	1	Adjustment Assembly, Gas (Gas or Gas-Gasoline Carburetor)
25	146-0143	1	Baffle, Splash - Rough Service Carburetor
26	146-0142	1	Screw and Washer, Splash Baffle - Rough Service Carburetor
	146-0123	1	Repair Kit, Carburetor (**NOTE:** This Kit does not apply to Gas Carburetor and Rough Service Carburetor) - Includes parts marked *

* - Included in Repair Kit.
† - Order by description, giving complete model, Spec and Serial Number.

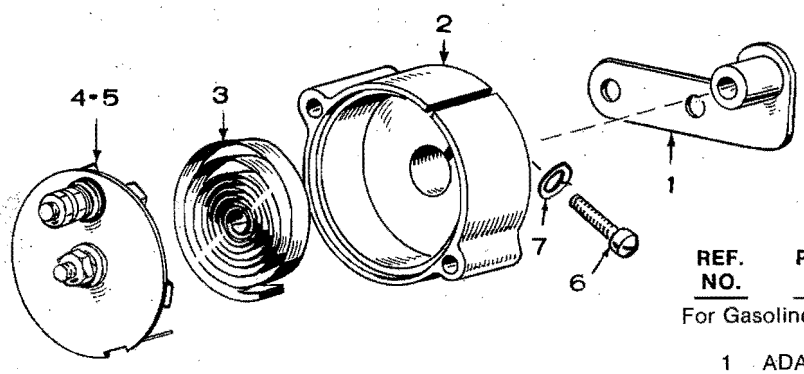
FUEL PUMP PARTS GROUP



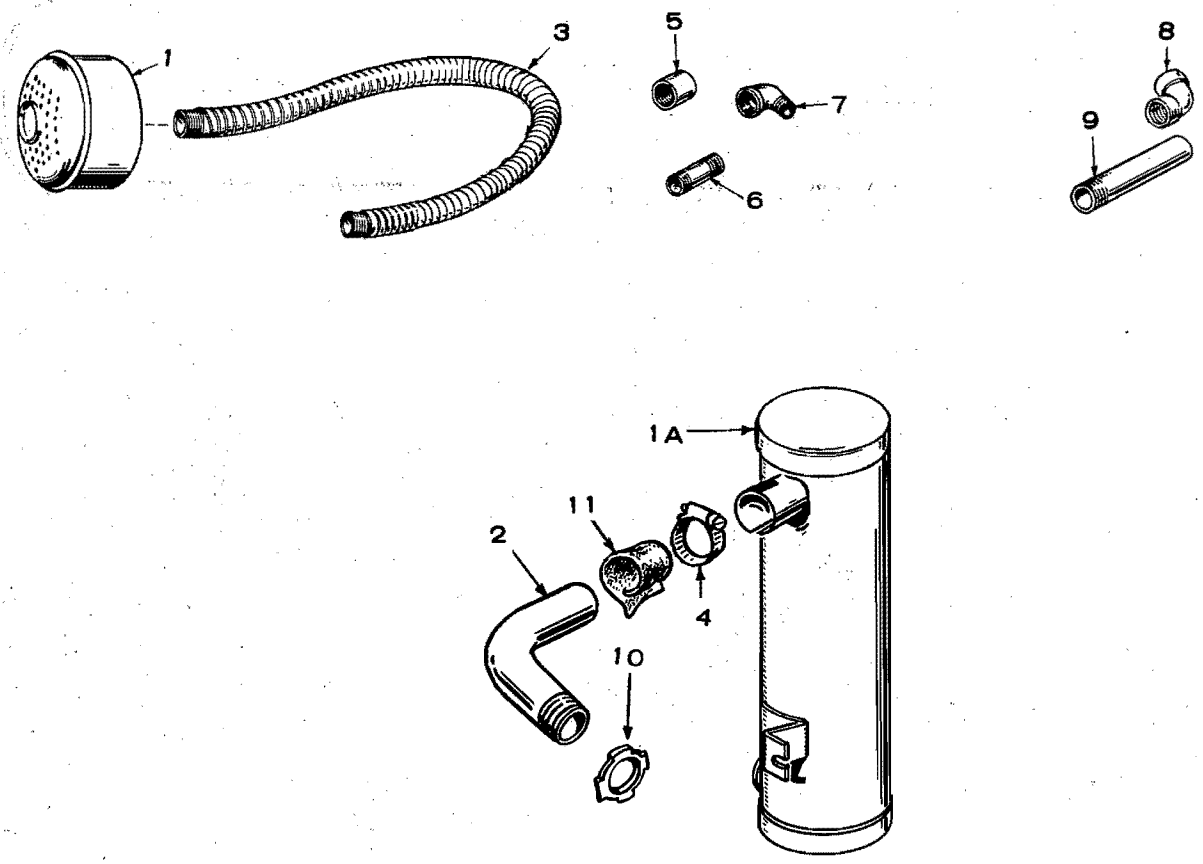
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	149-0693	1	Pump, Fuel (Illustrated in Fuel System Group)
	149-0526	1	Repair Parts Kit (Includes Parts Marked *)
1		1	Body, Not Sold Separately
2	815-0148	4	Screw (#8-32 x 7/8")
3	815-0147	2	Screw, Phillips Self Tapping (#6-32 x 5/8") - Valve Retainer
4	149-0096	2	*Valve and Cage
5	149-0095	2	*Gasket, Valve
6	149-0582	1	*Diaphragm Assembly
7	149-0672	1	*Spring
8	149-0539	1	Retainer, Valve Cage
9	149-0675	1	*Spring
10	516-0113	1	Pin, Rocker Arm
11		1	Body, Not Sold Separately
12	149-0710	1	Link and Arm, Rocker (Sold only as a set)
14	149-0551	1	Lever, Primer
15	509-0065	2	Seal, "O" Ring
16	149-0404	1	Spring, Primer Lever
17	149-0003	1	*Gasket, Pump Mounting
18	518-0129	1	Ring, Retainer - Primer Lever
19	149-0858	1	†*Gasket, Diaphragm - Lower Side (Optional)

* - Included in Repair Kit.
† - Used on some models to prevent air lock.

ELECTRIC CHOKE GROUP



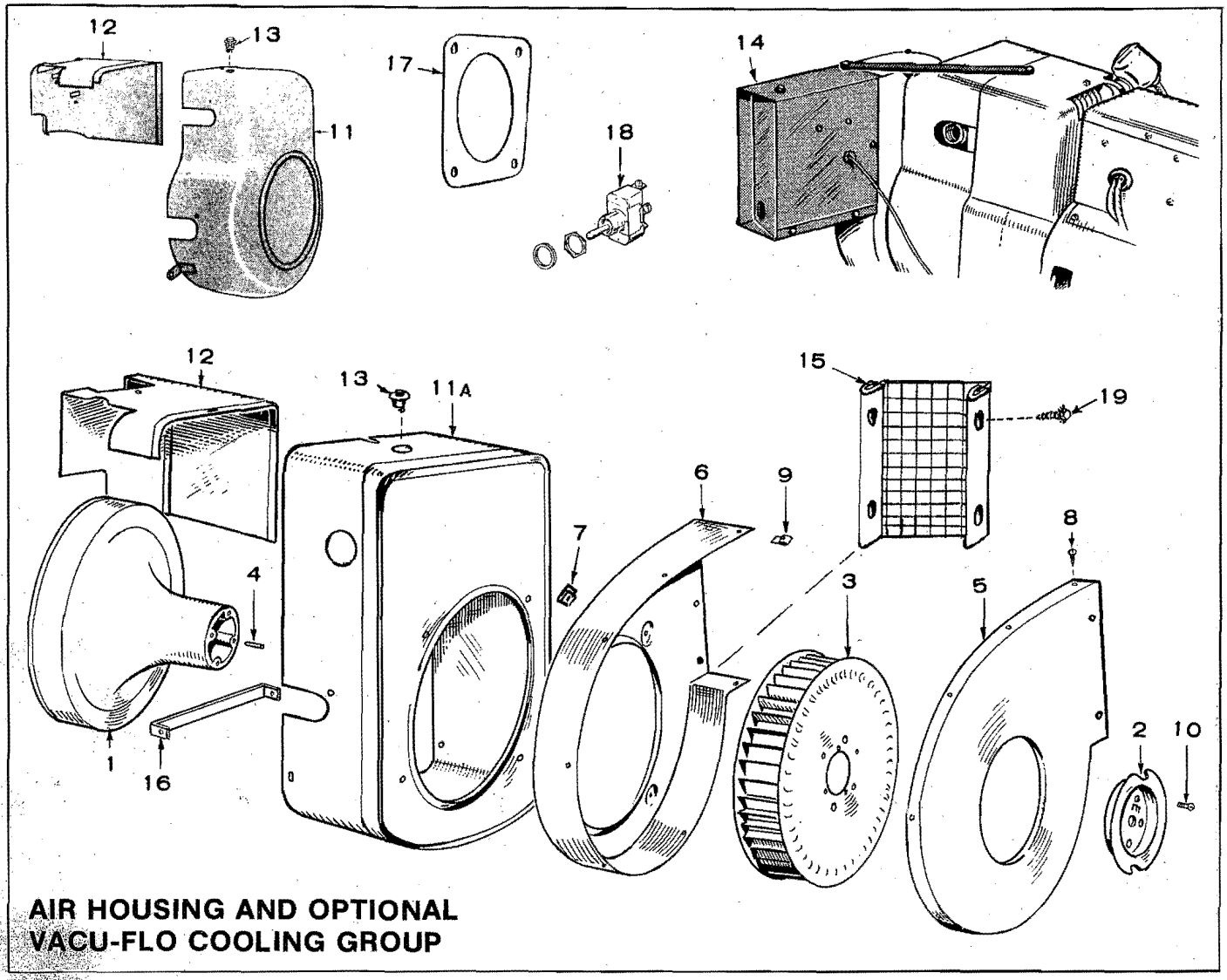
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
For Gasoline Fuel Sets - Key 2, 8 and 9.			
1	ADAPTER, CHOKE TO CARBURETOR		
	153-0196	1	Spec A through J
	153-0420	1	Begin Spec K
2	153-0058	1	Bracket, Housing
3	153-0017	1	Element, Bimetal
4	153-0114	1	Cover Assembly (Includes 24 Volt Element) - Key 2 (Also Key 8, 9 Begin Spec H)
5	153-0115	1	Cover Assembly (Includes 32 Volt Element) - Key 8, 9 Spec A through G
6	815-0110	1	Screw (#10-32 x 7/8") - Choke Mounting
7	850-0030	1	Washer (#10), Lock



EXHAUST GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	MUFFLER, EXHAUST - SPEC A THROUGH F		
	155-0488	1	Key 1, 2, 3 and 10
	155-0487	1	Key 4, 5, 6, 7, 8 and 9
1A	MUFFLER, EXHAUST - BEGIN SPEC G		
	155-0692	1	For Pressure Cooled Models
	155-0696	1	For Vacu-Flo Cooled Models
2	155-0691	1	Tube, Muffler - Exhaust - Pressure Cooled Models, Begin Spec G
3	TUBE, EXHAUST (FLEXIBLE) - KEY 2, 3, 8, 9		
	155-0490	1	Spec A through F (3/4" x 36")
	155-0727	1	Begin Spec G (1" x 36")
4	503-0189	1	Clamp, Muffler - Begin Spec G
5	505-0029	1	Coupling, Exhaust (3/4") - Key 2, 3, 8, 9, Spec A through F

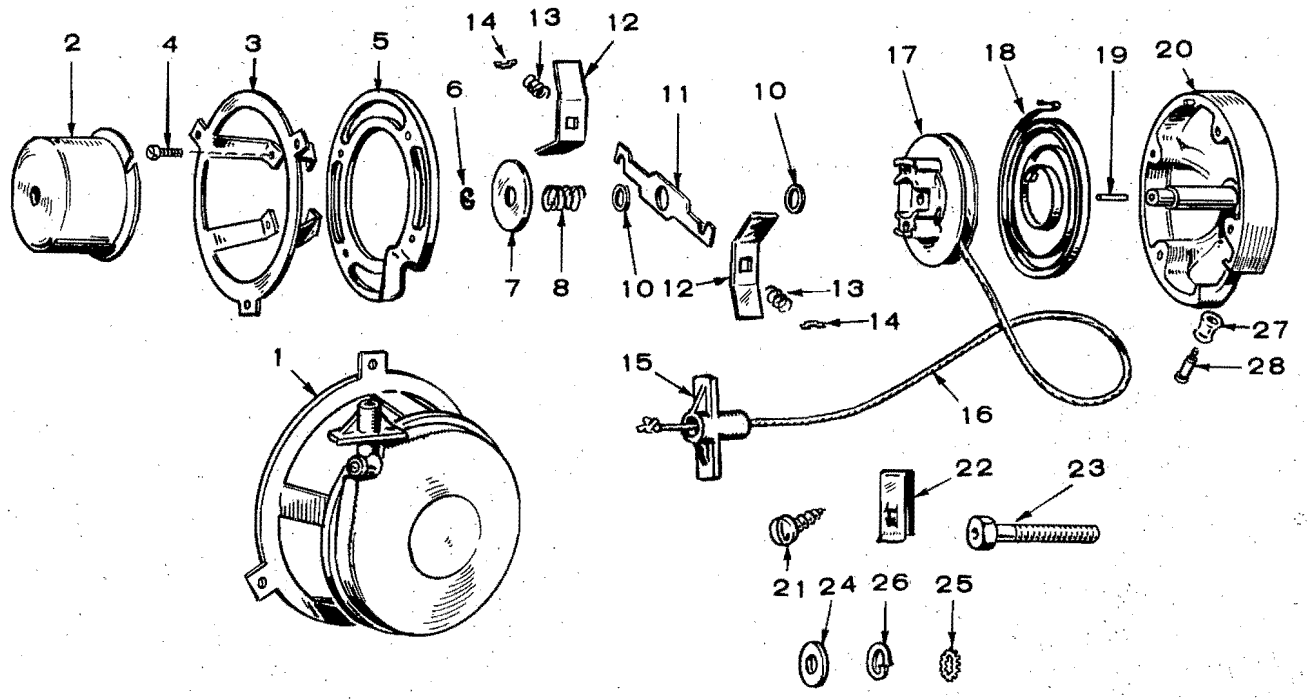
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
6	NIPPLE, PIPE - EXHAUST		
	505-0332	1	For Pressure Cooled Models - Spec A through F (3/4 x 3")
	505-0341	1	For Vacu-Flo Models - Spec A through F (3/4 x 5")
	505-0102	1	For Vacu-Flo Models - Begin Spec G (3/4 x close)
7	505-0051	1	Elbow, Street (3/4" x 90°) - Spec A through F
8	505-0132	1	Elbow, Pipe (3/4" x 90°) - Exhaust - Spec A thru F
9	505-0431	1	Nipple, Half (3/4") - Begin Spec G, Vacu-Flo Cooled Models
10	331-0038	1	Locknut, Chase, (3/4") - Exhaust
11	895-0096	1	Asbestos Strip (1 x 8") - Begin Spec G



AIR HOUSING AND OPTIONAL VACU-FLO COOLING GROUP

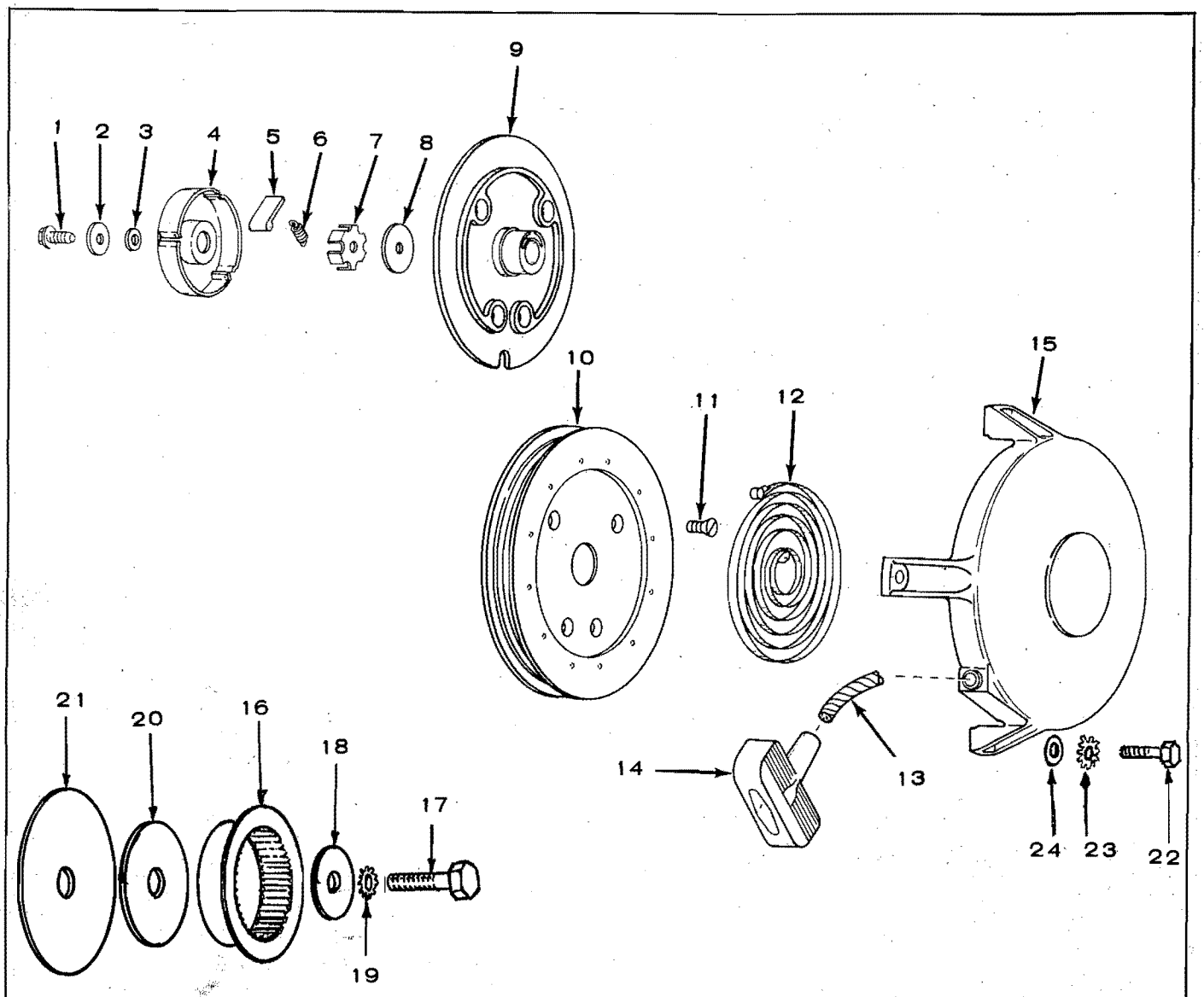
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	FLYWHEEL, MAGNETO - VACU-FLO COOLED Key 1, 2, 3, 10		
	160-0470	1	Spec A through F
	160-0672	1	Begin Spec G
1	FLYWHEEL, MAGNETO - VACU-FLO COOLED Key 4, 5, 6, 7, 8, 9		
	160-0466	1	Spec A through F
	160-0729	1	Begin Spec G
2	192-0261	1	Sheave, Rope
3	134-0563	1	Wheel, Blower - Vacu-Flo Cooled
4	516-0091	2	Pin, Groove - Sheave and Blower Wheel-to-Flywheel - Vacu-Flo Cooled
5	134-0570	1	Scroll, Air - Front - Vacu-Flo Cooled
6	SCROLL, AIR (Rear) - VACU-FLO COOLED		
	134-0571	1	Spec A through F
	134-1015	1	Begin Spec G
7	NUT, SPEED (U-Type) - SCROLL TO BLOWER HOUSING - VACU-FLO COOLED		
	870-0119	3	Spec A through F
	870-0126	3	Begin Spec G
8	809-0043	11	Screw, Sheet Metal (#10 x 3/8") - Scroll - Vacu-Flo Cooled
9	870-0120	8	Nut, Speed (J-Type) Scroll - Vacu-Flo Cooled
10	812-0150	2	Screw, Round Head (1/4-20 x 5/8") - Sheave and Blower - Vacu-Flo Cooled
	HOUSING, BLOWER		
			Spec A through F
11	134-0519	1	Pressure Cooled
	134-0609	1	Vacu-Flo Cooled
			Begin Spec G
11A	134-1016	1	Pressure Cooled
	134-1698	1	Pressure Cooled Units Using Heavy Duty Recoil Starter - Optional
	134-1101	1	Vacu-Flo Cooled
12	SHROUD, CYLINDER AIR		
	134-0518	1	Spec A through F
	134-1018	1	Begin Spec G
13	313-0018	1	Button, Stop - Key 1, 4, 5 6, 7, and 10
14	134-0955	1	Shutter Kit, Air Discharge (Automatic) - OPTIONAL ACCESSORY for Unhoused Sets (Vacu-Flo Cooled Sets Beginning 2/1/59)
15	134-3080	1	Guard, Outlet

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
16	BRACKET, BLOWER HOUSING MOUNTING - BEGIN SPEC G		
	134-1014	1	Standard Units
	134-1697	1	Units using Heavy Duty Recoil Starter - Optional
17	134-1438	1	Plate, Air Restriction - Key 3, 24 Volt, Begin Spec J
18	308-0097	1	Switch, Momentary - Low Oil Pressure Switch - Optional
19	815-0421	4	Screw, Hex Head, Sheet Metal, with external Lockwasher (10-16 x 1/2")
	405-1058	1	Anti-Vibration Package (Canvas Section to fit 3-1/4" x 10" Ducts) - Vacu-Flo Cooled Sets



RECOIL ROPE STARTER GROUP
(Starter for pressure cooled sets only)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	STARTER KIT (Complete) - INCLUDES CUP AND MOUNTING RING		
	192-0270	1	Spec A through F
	192-0343	1	Begin Spec G
2	192-0273	1	Cup, Starter Engaging
3	RING, ADAPTER - STARTER TO ENGINE HOUSING		
	192-0269	1	Spec A through F
	192-0341	1	Begin Spec G
4	815-0191	4	Screw, Machine (Self-Tapping)
5	192-0274	1	Flange, Middle
6	518-0205	1	Ring, Retainer
7	526-0142	1	Washer, Brake Retainer
8	192-0275	1	Spring, Brake
10	192-0279	2	Washer, Friction
11	192-0277	1	Lever, Brake
12	192-0278	2	Plate, Friction Shoe
13	192-0280	2	Spring, Friction Shoe
14	192-0281	2	Plate, Spring Retainer
15	192-0282	1	Handle (Includes Washer)
16	192-0283	1	Cord Only, Rewind Starter
17	192-0284	1	Rotor (Rope Sheave)
18	192-0285	1	Spring, Rewind
19	192-0287	1	Pin, Centering
20	192-0286	1	Cover, Starter
21	809-0044	3	Screw, Sheet Metal (10-32 x 1/2") - Spec A through F
21	815-0179	4	Screw, Round Head (#10-32 x 3/8") - Begin Spec G
22	870-0119	3	Nut, Tinnerman (U-Type) - Spec A through F
23	104-0237	1	Screw, Cup Mounting (With Pilot)
24	526-0141	1	Washer, Flat - Cup Mounting
25	856-0003	4	Washer - Starter Ring to Engine Housing - Quantity of 3 used - Spec A through F
26	850-0055	1	Washer, Lock - Cup Mounting
27	192-0339	1	Roller, Rope
28	192-0340	1	Screw, Roller

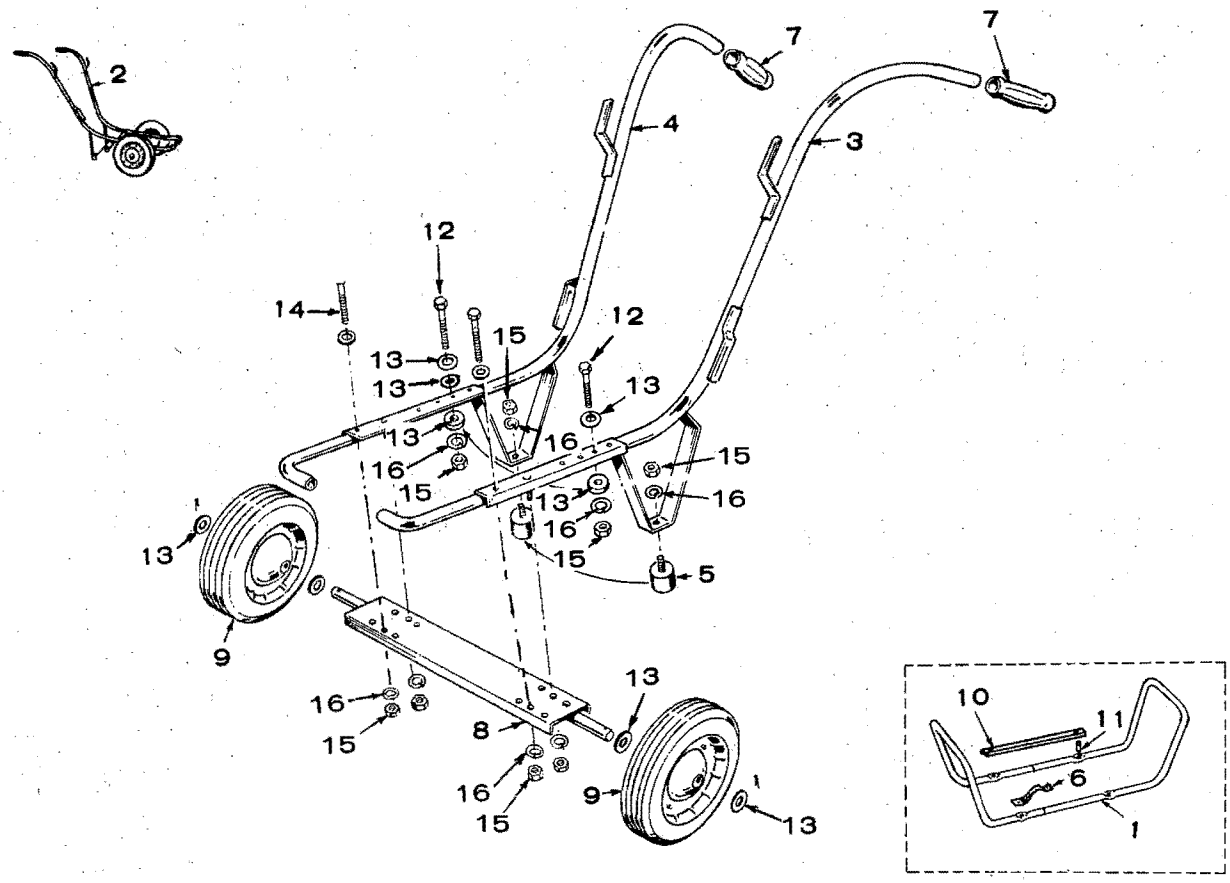


HEAVY DUTY RECOIL STARTER PARTS GROUP — PRESSURE COOLED UNITS (OPTIONAL EQUIPMENT)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	192-0363	1	Starter, Recoil - Heavy Duty (Includes Parts Marked *)
1	192-0371	1	*Screw, Retainer
2	192-0372	1	*Washer, Brake
3	192-0373	1	*Washer, Spacer
4	192-0374	1	*Retainer
5	192-0375	3	*Dog, Starter
6	192-0376	1	*Spring, Retainer
7	192-0377	1	*Brake
8	192-0378	1	*Washer, Thrust
9	192-0379	1	*Pulley
10	192-0380	1	*Sheave Assembly, Starter
11	192-0381	4	*Screw, S.T., Flat Head (10-32 x 1/2)
12	192-0382	1	*Spring, Starter
13	192-0224	1	*Rope, Starter
14	192-0282	1	*Handle, Starter
15	192-0383	1	*Housing, Starter

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
16	192-0364	1	Cup, Starter Engaging
17	800-0080	1	Screw, Flywheel Cup Mounting (7/16-14 x 3-1/4")
18	526-0141	1	Washer (15/32" I.D. x 1-1/4" O.D. x 1/8" Thick)
19	856-0012	1	Washer, Shakeproof (7/16")
20	526-0172	1	Washer, Spacer (1/2" I.D. x 2-1/4" O.D. x 1/4" Thick)
21	526-0195	1	Washer, Spacer (29/64" I.D. x 3-1/4" O.D. x 1/8" Thick)
22	800-0005	4	Screw (1/4-20 x 3/4") - Starter to Blower Housing
23	856-0006	4	Washer, Shakeproof (1/4)
24	526-0021	4	Washer, Flat (1/4)

* - Included in #192-0363 Starter Assembly.

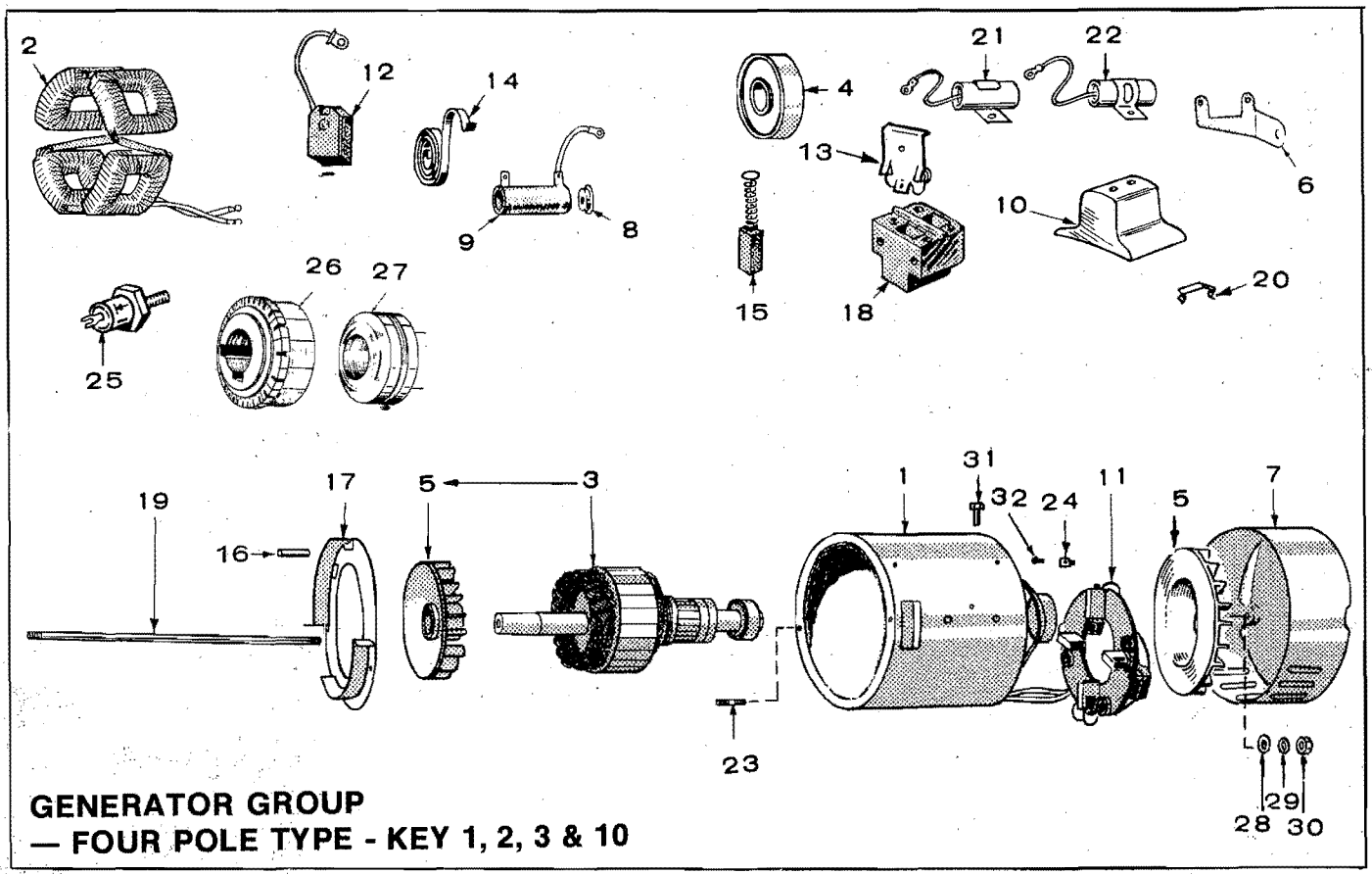


CARRYING FRAME AND DOLLY GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
NOTE: Dolly equipment is OPTIONAL for sets with Key 1, 4, 6, 10. Dolly equipment is NOT designed for Portable Models (Key 5, 7).			
1	FRAME, CARRYING		
	403-0365	1	Key 1, 4, 6, 10 (Includes Hardware) - Optional
	403-0606	1	Key 8, 9 (Includes Hardware) - Optional
	403-0744	1	Key 5, 7 (Standard Equipment) Complete assembly with mounting cushions, channel supports, etc. (29" long).
2	410-0219	1	Dolly, Complete (2 Wheel) - Includes parts marked * plus hardware
3	410-0216	1	*Base and Handle, Right, Less Grip
4	410-0215	1	*Base and Handle, Left, Less Grip (Carburetor Side)
5	402-0040	2	*Cushion, Rubber (5/16-18 Stud)
6	STRAP, GROUND - BLOWER HOUSING TO CARRYING FRAME		
	337-0044	1	Key 1, 4, 6, 10 (6" Long) Optional Equipment
	337-0051	1	Key 5, 7 (3" Long) Standard Equipment
	337-0051	1	Key 8, 9 (3" Long) - Optional Equipment
7	403-0205	2	*Grip, Rubber
8	410-0222	1	*Axle
9	410-0223	2	*Wheel & Tire (10 x 2.50")
10	402-0170	2	**Channel, Engine Mounting (Not Used on Some Early Models)
11	402-0171	4	**Support, Engine Mounting Channel (Not Used on Some Early Models)
12	800-0058	4	*Screw, Hex Cap
13	WASHER, FLAT		
	526-0123	4	1-1/4" O.D. - Mounting Axle
	526-0030	4	7/8" O.D. - Mounting Axle
	526-0112	4	1-3/8" O.D. - Wheel, Mounting
14	814-0204	2	Screw, Flat Head
15	NUT, HEX		
	860-0015	2	Rubber Mounting Feet
	860-0017	8	Frame to Axle
16	WASHER, LOCK		
	850-0045	2	Rubber Mounting Feet
	850-0050	8	Frame to Axle

* - Parts in Dolly Assembly.

** - Two types of Carrying Frames were used: (a) Obsolete type 403-0392 used on some early models had ROUND mounting holes in the frame and used CAPSCREWS: (b) Superseding type 403-0454 and 405-0744 have SQUARE mounting holes in the underside of the frame for CARRIAGE BOLTS and uses (2) Engine Mounting channels 402-0170 and (4) Channel Support 402-0171.



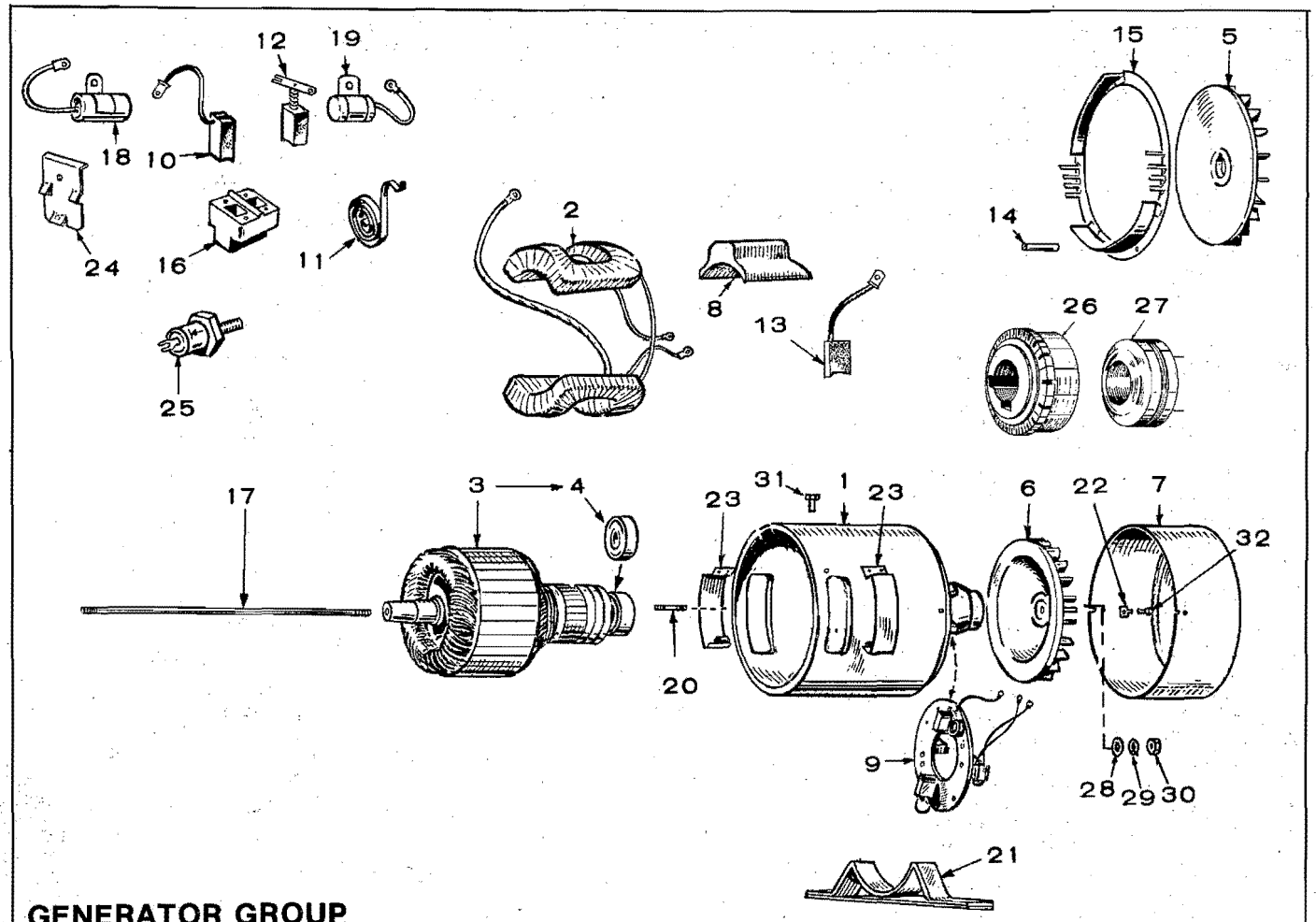
GENERATOR GROUP — FOUR POLE TYPE - KEY 1, 2, 3 & 10

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	FRAME ONLY, GENERATOR (Machined & Drilled) - Less Coils and Poleshoes		
			Key 1 and 2
	210-1449	1	Spec A through D
	210-1593	1	Spec E Only
	210-1739	1	Begin Spec G
			Key 3
	210-0349	1	24 Volt, Spec A through G
	210-0336	1	24 Volt, Begin Spec H
	210-0240	1	32 Volt, Spec A through D
	210-0279	1	32 Volt, Spec E and F
	210-1638	1	32 Volt, Begin Spec G
	210-1717	1	Key 10
2	COIL ASSEMBLY, FIELD (4 Coils Wired Together)		
			Key 1
	222-1407	1	Spec A through F
	222-1574	1	Spec G through J
	222-1689	1	Begin Spec K
			Key 2
	222-1400	1	Spec A through F
	222-1573	1	Begin Spec G
			Key 3
	222-1592	1	24 Volt, Spec A through G
	222-1605	1	24 Volt, Begin Spec H
	222-1411	1	32 Volt
	222-1583	1	Key 10
3		1	Armature Assembly - Includes Blower and Bearing
4	510-0047	1	Bearing, Ball - Armature
5	BLOWER, ARMATURE		
			Key 1 and 2
	205-0047	1	Spec A through F (Mounts at Engine End)
	205-0056	1	Begin Spec G (Mounts at Brush Rig End)
			Key 3
	205-0047	1	24 Volt, Spec A through G (Also 32 Volt Models, Spec A through F)
	205-0056	1	24 Volt, Begin Spec H (Also 32 Volt Models, Begin Spec G)
	205-0056	1	Key 10
6	304-0304	1	Bracket, Resistor Mounting - Key 1, 2
7	COVER, GENERATOR END		
			Key 1 and 2
	232-1214	1	Spec A through D
	234-0041	1	Spec E and F
	234-0127	1	Begin Spec G
			Key 3
	234-0041	1	24 Volt, Spec A through G
	234-0127	1	24 Volt, Begin Spec H
	232-1214	1	32 Volt, Spec A through D
	234-0041	1	32 Volt, Spec E and F
	234-0127	1	32 Volt, Begin Spec G
	234-0127	1	Key 10
8	304-0014	2	Washer, Resistor Centering - Key 1, 2
9	RESISTOR, FIXED, ANTI-FLICKER (Listed Also in Anti-Flicker Group) - Key 1, 2		
			60 Hertz Sets
	304-0321	1	2.5-Ohm, 25 Watt - Spec A through F
	304-0012	1	1.5-Ohm, 25 Watt - Begin Spec G
			50 Hertz Sets
	304-0315	1	3-Ohm, 25 Watt - Spec A through F
	304-0120	1	2-Ohm, 25 Watt - Begin Spec G

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
10	SHOE, POLE		
	221-0110	4	Key 1, 2
	221-0114	4	Key 3
	221-0125	4	Key 10
11	RIG ASSEMBLY, BRUSH (Includes Brushes and Springs)		
	212-0209	1	Spec A through J - Key 1, 2
	212-0209	1	Begin Spec K - Key 2
	212-0292	1	Begin Spec K - Key 1
	212-0221	1	24 Volt, Spec A thru G - Key 3
	212-0251	1	24 Volt, Begin Spec H - Key 3
	212-0245	1	Key 10
12	BRUSH, COMMUTATOR		
	214-0041	4	Spec A thru J - Key 1, 2
	214-0041	4	Begin Spec K - Key 2
	214-0072	2	Brush, Collector Ring - Begin Spec K - Key 1
	214-0047	4	24 Volt, Spec A thru G - Key 3
	214-0009	4	24 Volt, Begin Spec H - Key 3
	214-0047	4	32 Volt, Spec A thru F - Key 3
	214-0009	4	32 Volt, Begin Spec G - Key 3
	214-0039	4	Key 10
	SPRING, BRUSH		
13	212-1105	2	Begin Spec K - Key 1
13	212-1106	4	24 Volt, Spec A through G (Also 32 Volt, Spec A through F - Key 3)
14	212-1003	4	Spec A thru J - Key 1, 2
14	212-1003	4	Begin Spec K - Key 2
14	212-1003	4	24 Volt, Begin Spec H (Also 32 Volt Begin Spec G - Key 3)
14	212-1003	4	Key 10
15	214-0059	4	Brush and Spring, Collector Ring, Spec A through J - Key 1, 2 (Also Begin Spec K - Key 2)
16	SPACER (3/8" O.D. Tubing) - MOUNTING SCROLL		
	232-1197	2	Spec A thru F - Key 1, 2
	232-1197	2	24 Volt, Spec A through G (Also 32 Volt Spec A through F - Key 3)
17	SCROLL, AIR		
	234-0007	1	Spec A thru F - Key 1, 2
	234-0007	1	24 Volt Spec A through G (Also 32 Volt Spec A through F - Key 3)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
18	212-1064	2	Guide, Slip Ring Brush - Spec A through J - Key 1, 2 (Also Begin Spec K - Key 2)
	STUD, ARMATURE		
			Key 1 and 2
19	520-0274	1	Spec A through F
	520-0056	1	Begin Spec G
			Key 3
	520-0275	1	24 Volt, Spec A thru G
	520-0279	1	24 Volt, Begin Spec H
	520-0275	1	32 Volt, Spec A thru F
	520-0279	1	32 Volt, Begin Spec G
	520-0056	1	Key 10
20	232-0596	1	* Clip, Armature Bearing Stop 24 Volt, Spec A thru G (Also 32 Volt, Spec A through F - Key 3)
21	CONDENSER, DC - 0.5 MFD.		
	312-0027	1	Spec A thru J - Key 1, 2 (Also Begin Spec K - Key 2)
	312-0027	1	Key 3, 10
22	CONDENSER, AC - 0.1 MFD.		
	312-0058	1	Spec A thru J - Key 1, 2 (Also Begin Spec K - Key 2)
	312-0058	3	Begin Spec K - Key 1
23	520-0363	2	Stud, Generator Frame to Engine
24	232-1557	2	Clip, Generator End Cover
25	305-0473	1	Rectifier - Begin Spec K - Key 1
26	COMMUTATOR		
	203-0059	1	Spec A thru J - Key 1, 2
	203-0111	1	Spec A thru J - Key 3
	203-0053	1	Begin Spec K - Key 3
	203-0071	1	Key 10
27	COLLECTOR RING		
	204-0087	1	Spec A thru J - Key 1, 2
	204-0097	1	Begin Spec K - Key 1, 2
28	526-0029	1	Washer (3/8")
29	850-0050	1	Washer (3/8"), Lock
30	104-0091	1	Nut (3/8-24)
31	800-0030	8	Screw (5/16-18 x 1-1/4") - Pole Shoe Mounting
32	815-0181	2	Screw (10-32 x 1/2") - Clip Mounting

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



GENERATOR GROUP
— TWO POLE TYPE - KEY 4, 5, 6, 7, 8 & 9

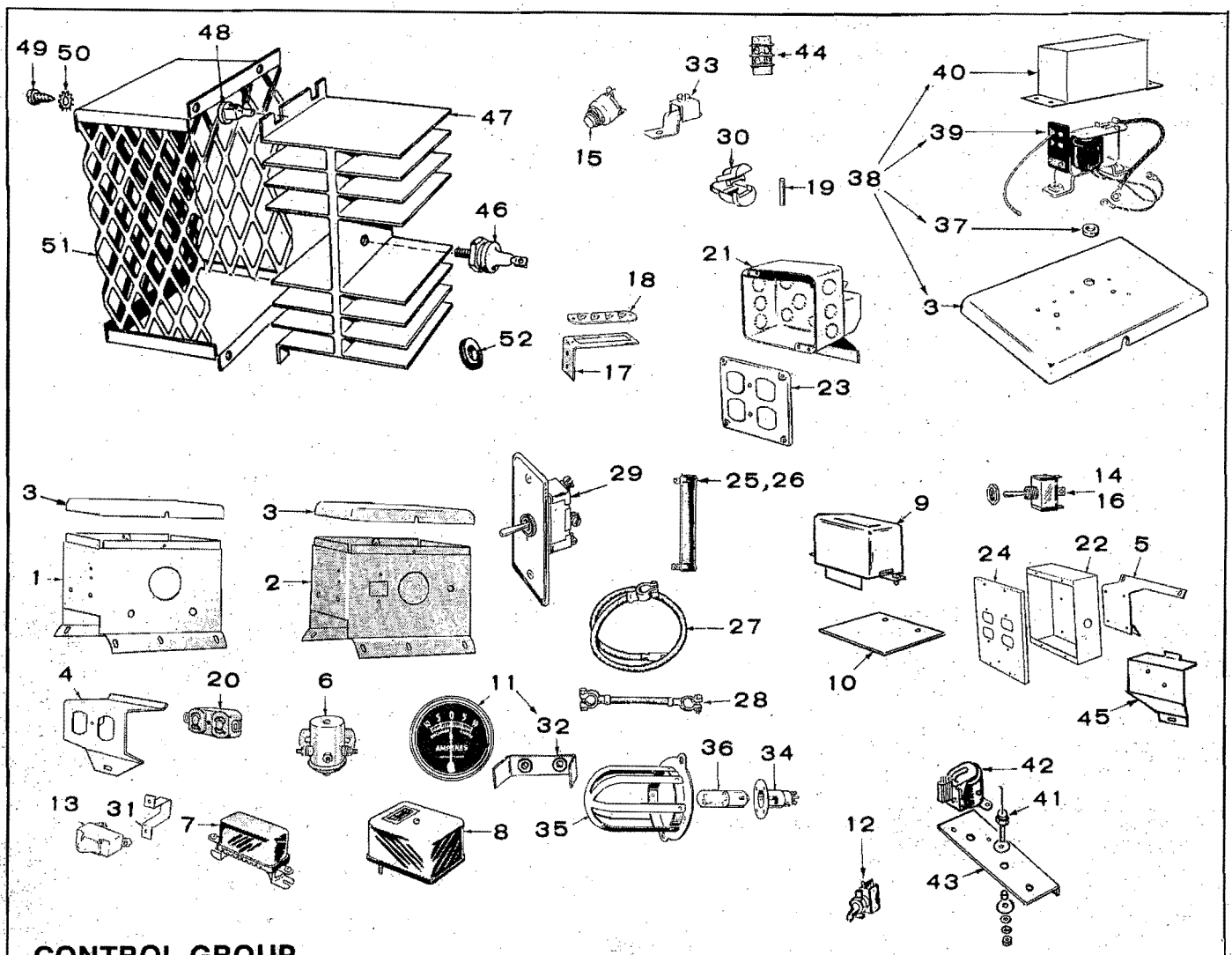
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	FRAME & BEARING SUPPORT, MACHINED & DRILLED, LESS COILS & POLESHOES		
	210-1464	1	Spec A Only - Key 4, 5
	210-1522	1	Spec B Only - Key 4, 5
	210-1532	1	Spec C and D - Key 4, 5
	210-1562	1	Spec E and F - Key 4, 5
	210-1716	1	Begin Spec G - Key 4, 5
	210-1543	1	Spec A thru F - Key 6, 7
	210-1718	1	Begin Spec G - Key 6, 7
	210-1704	1	Spec A thru F - Key 8
	210-1719	1	Begin Spec G - Key 8
	210-1701	1	Spec A thru F - Key 9
	210-1720	1	Begin Spec G - Key 9
2	COIL ASSEMBLY, FIELD (2 Coils Wired Together)		
	222-1419	1	Spec A thru G - Key 4, 5, 6, 7
	222-1643	1	120 Volt, Begin Spec H - Key 4, 5
	222-1644	1	240 Volt, Begin Spec H - Key 4, 5
	222-1643	1	Begin Spec H - Key 6, 7
	222-1561	1	Spec A thru G - Key 8, 9
	222-1598	1	Begin Spec H - Key 8, 9
3	*	1	Armature Assembly (Includes Bearing)
4	510-0047	1	Bearing, Ball, Armature
	BLOWER, ARMATURE		
5	205-0047	1	Spec A (Mounts at Engine End) - Key 4, 5
6	205-0056	1	Begin Spec B (Mounts at Brush Rig End) - Key 4, 5
6	205-0056	1	All - Except Key 4, 5

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	COVER, GENERATOR END		
	232-1214	1	Spec A Only - Key 4, 5
	234-0004	1	Spec B, C, and D - Key 4, 5
	234-0034	1	Spec E and F - Key 4, 5 (Also Spec A thru F - Key 8)
	234-0127	1	Begin Spec G - Key 4, 5, 8
	234-0031	1	Spec A thru F - Key 6, 7, 9
	234-0129	1	Begin Spec G - Key 6, 7, 9
8	SHOE, POLE		
	221-0112	2	Key 4, 5, 6, 7
	221-0135	2	Key 8, 9
9	RIG ASSEMBLY, BRUSH (Includes Brushes & Springs)		
	212-0215	1	Spec A thru G - Key 4, 5
	212-0292	1	120 Volt Models, Begin Spec H - Key 4, 5
	212-0305	1	240 Volt Models, Begin Spec H - Key 4, 5
	212-0230	1	Spec A thru G - Key 6, 7
	212-0308	1	Begin Spec H - Key 6, 7
	212-0262	1	Spec A thru G - Key 8
	212-0277	1	Begin Spec H - Key 8
	212-0261	1	Spec A thru G - Key 9
	212-0273	1	Begin Spec H - Key 9
10	BRUSH, COMMUTATOR		
	214-0070	2	Key 8, 9
	214-0001	2	Spec A thru G - Key 4, 5, 6, 7
11	SPRING, COMMUTATOR BRUSH		
	212-1003	2	Spec A thru G - Key 4, 5, 6, 7
	212-1011	2	Key 8, 9

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
12	BRUSH & SPRING, COLLECTOR		
	214-0059	4	Spec A thru G - Key 4, 5, 8
	214-0059	6	Spec A thru G - Key 6, 7, 9
13	BRUSH, COLLECTOR RING		
	214-0072	2	Begin Spec H - Key 4, 5, 8
	214-0072	3	Begin Spec H - Key 6, 7, 9
14	232-1197	2	Spacer (3/8 O.D. Tubing) - Mounting Scroll, Spec A - Key 4, 5
15	234-0007	1	Scroll, Air - Generator Ventilating - Spec A - Key 4, 5
16	GUIDE, BRUSH - SPEC A THROUGH G		
	212-1064	2	Key 4, 5, 8
	212-1162	2	Key 6, 7, 9
17	STUD, ARMATURE THROUGH		
	520-0280	1	Spec A Models - Key 4, 5
	520-0056	1	Begin Spec B - Key 4, 5
	520-0536	1	Key 6, 7
	520-0285	1	Key 8
	520-0563	1	Key 9
18	CONDENSER - DC		
	312-0017	1	(0.5 Mfd.) - Spec A thru G - Key 4, 5, 6, 7
	312-0017	1	(0.5 Mfd.) - Key 9
	312-0027	1	(1.5 Mfd.) - Key 8
19	CONDENSER - AC		
	312-0058	1	(0.1 Mfd.) - Key 4, 5, 8
	312-0058	2	(0.1 Mfd.) - Key 6, 7, 9
20	STUD, GENERATOR FRAME TO ENGINE		
	520-0363	2	Key 4, 5, 6, 7
	520-0363	4	Key 8, 9
21	232-1282	1	Bracket, Generator Mounting - Key 5, 7
22	CLIP, GENERATOR END COVER		
	232-1557	2	Begin Spec G - Key 4, 5, 6, 7
	232-1557	2	Key 8, 9

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
23	COVER, GENERATOR AIR OPENING		
	234-0169	2	Key 4, 5, 6, 7
	234-0124	2	Spec A thru F - Key 8, 9
	234-0119	2	Begin Spec G - Key 8, 9
24	SPRING, COLLECTOR RING BRUSH - BEGIN SPEC H		
	212-1105	2	Key 4, 5, 8
	212-1105	3	Key 6, 7, 9
25	RECTIFIER - BEGIN SPEC H		
	358-0024	2	120 Volt Models - Key 4, 5
	305-0474	2	240 Volt Models - Key 4, 5
	358-0024	3	Key 6, 7
26	COMMUTATOR		
	203-0117	1	Spec A thru G - Key 4, 5, 6, 7
	203-0133	1	Key 8, 9
27	COLLECTOR RING		
	204-0087	1	Spec A thru G - Key 4, 5
	204-0097	1	Begin Spec H - Key 4, 5
	204-0089	1	Spec A thru G - Key 6, 7
	204-0101	1	Begin Spec H - Key 6, 7
	204-0087	1	Key 8
	204-0089	1	Key 9
28	526-0029	1	Washer (3/8")
29	850-0050	1	Washer (3/8"), Lock
30	104-0091	1	Nut (3/8-24)
31	800-0051	4	Screw (3/8-16 x 1-1/4") - Pole Shoe Mounting
32	815-0181	2	Screw (10-32 x 1/2") - Clip Mounting

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

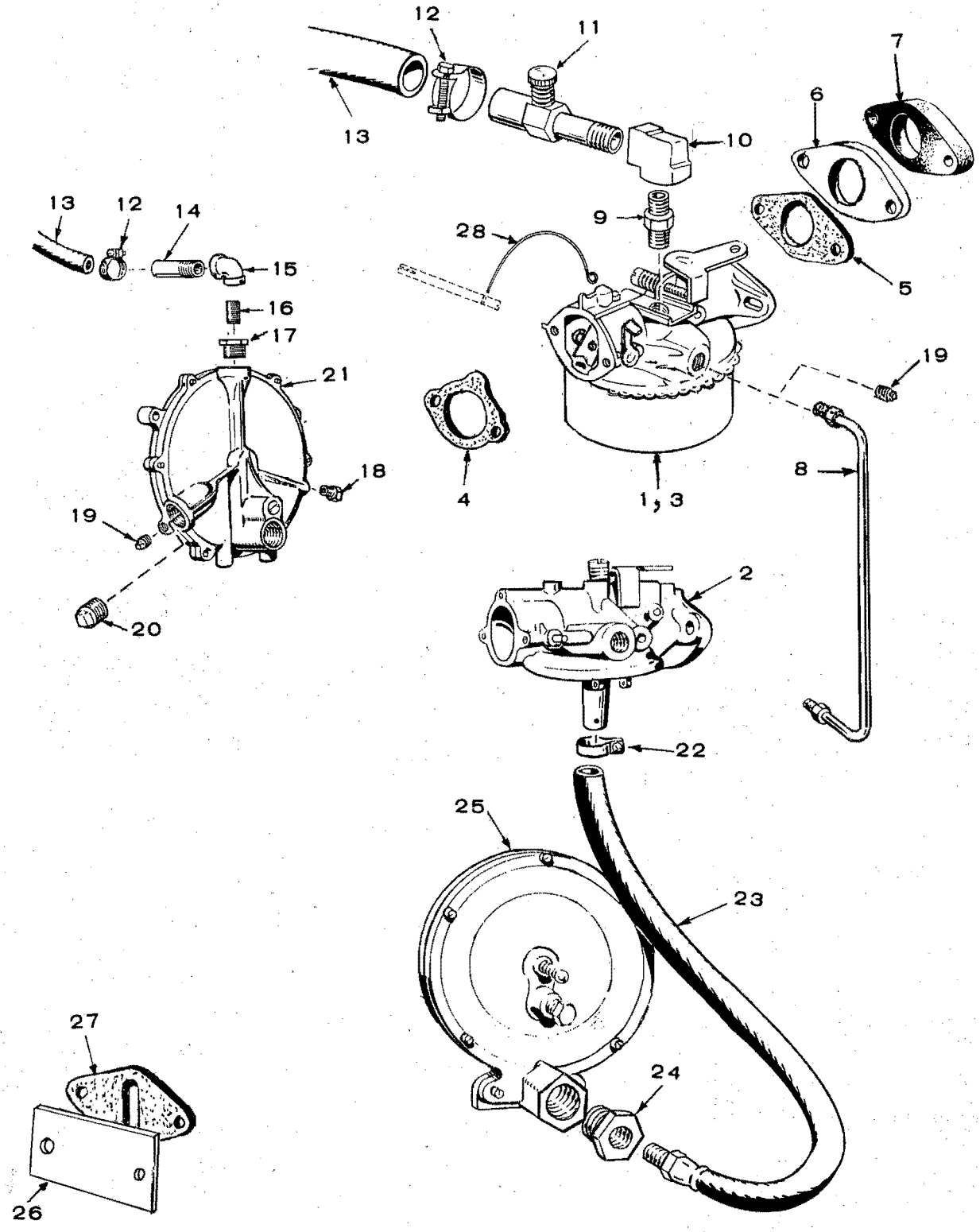


CONTROL GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	BOX, ONLY, CONTROL		
1			Key 3
	301-2104	1	24 Volt Models - Spec A through K
	301-1127	1	32 Volt Models - Spec A through E
	301-1128	1	32 Volt - Spec F Only
	301-1868	1	32 Volt - Spec G through K
	301-3408	1	24 Volt and 32 Volt - Begin Spec L
2			Key 2
	301-1059	1	Spec A through F
	301-1859	1	Begin Spec G
			Key 8 and 9
	301-1823	1	Spec A through F
	301-1867	1	Spec G Only
	301-2082	1	Begin Spec H
3	COVER, CONTROL BOX		
	301-1060	1	Key 2, 3, 8, 9 - Spec A thru F (See also next entry)
	301-1492	1	Key 2, with Load Transfer Control Only
	301-1858	1	Key 2, 3, 8, 9 - Begin Spec G
	BRACKET, RECEPTACLE BOX		
4	301-1146	1	Key 1, 4, 5, 6, 7 - Spec A and B
5	301-1372	1	Key 4, 5, 6, 7 - Spec C through F
5	301-1870	1	Key 4, 5, 6, 7, 10 - Begin Spec G
6	SWITCH, START SOLENOID		
	307-1046		Key 2, 8, 9
	307-0061		Key 3
	RELAY, REVERSE CURRENT		
7	307-0180	1	Key 2
8	307-0077	1	Key 3, 24 Volt - Spec A through K
8	307-0185	1	Key 3, 32 Volt - Spec A through E
9	307-0496	1	Key 3, 32 Volt - Spec F through K
10	301-0592	1	Insulator (Use with 307-0496 Relay) - Begin Spec F
11	AMMETER, CHARGE (Includes Bracket)		
	302-0058	1	Key 2
	302-0063	1	Key 3, 24 Volt
	302-0062	1	Key 3, 32 Volt
12	308-0002	1	Switch, Hi-Lo Charge Rate - Key 2
	SWITCH, START-STOP - KEY 2, 8, 9		
13	308-0166	1	Spec A through F
14	308-0154	1	Begin Spec G
	SWITCH, START OR STOP - KEY 3		
15	308-0029	2	Spec A through F
16	308-0155	2	Begin Spec G

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
17	332-0198	1	Bracket, Terminal Block - Key 2, 3, 8, 9
18	332-0222	1	Block, Terminal - Key 2, 3, 8, 9
19	332-0125	1	Stud, Brass (1/4-20 x 1-3/4") - Key 3
20	RECEPTACLE, DUPLEX		
			Key 1 –
	323-0048	1	120 Volt - 2 Prong (Early Models Only)
	323-0184	1	120 Volt - 3 Prong (2 Parallel Blades, 1 Grounding Pin) - Spec A and B
	323-0213	1	240 Volt, 3 Prong (2 Tandem Blades, 1 Grounding Pin)
			Key 4 –
	323-0048	1	120 Volt, 2 Prong (Early Models Only)
	323-0184	1	120 Volt, 3 Prong (2 Parallel Blades, 1 Grounding Pin) - Spec A and B
	323-0184	2	120 Volt, 3 Prong (2 Parallel Blades, 1 Grounding Pin) - Begin Spec C
	323-0213	1	240 Volt, 3 Prong (2 Tandem Blades, 1 Grounding Pin) - Spec A and B
	323-0213	2	240 Volt, 3 Prong (2 Tandem Blades, 1 Grounding Pin) - Begin Spec C
			Key 5 –
	323-0213	2	120 Volt, 3 Prong (2 Parallel Blades, 1 Grounding Pin)
	323-0213	2	240 Volt, 3 Prong (2 Tandem Blades, 1 Grounding Pin)
			Key 6 and 7 –
	323-0184	1	All Models, 3 Prong (2 Parallel Blades, 1 Grounding Pin)
	323-0213	1	All Models, 3 Prong (2 Tandem Blades, 1 Grounding Pin)
			Key 10 –
	323-0184	2	All Models, 3 Prong (2 Parallel Blades, 1 Grounding Pin)
21	330-0044	1	Box and Bracket, Receptacle - Key 5, Spec B Only
22	BOX, RECEPTACLE - KEY 4, 5, 6, 7, 10		
	301-1373	1	Spec C through F
	330-0028	1	Begin Spec G
	COVER, RECEPTACLE BOX		
23	330-0042	1	Key 4, 5, 6, 7, 10, Begin Spec G (Key 5, Spec B)
24	301-1392	1	Key 4, 5, 6, 7, Spec C through F
25	RESISTOR, CHARGE (Adjustable) - KEY 2		
	304-0066	1	10-Ohm, 50 Watt (3/4 x 4") - Spec A through F
	304-0268	1	5-Ohm, 50 Watt (3/4 x 4") - Begin Spec G
26	RESISTOR, CHARGE (Fixed) - KEY 8, 9		
	304-0002	1	15 Ohm, 50 Watt - Spec A through G
	304-0046	1	10-Ohm, 50 Watt - Begin Spec H
27	416-0077	2	Cable, Battery (28") - Key 2, 8, 9
28	416-0004	1	Cable, Battery Jumper (6-3/4") - Key 2, 8, 9
29	308-0165	As Req.	Switch and Plate, Remote Start-Stop (Optional) - Key 2, 8, 9
30	508-0098	1	Bushing, Insulating - Load Conductor
31	301-0974	1	Bracket, Start-Stop Switch - Key 2, 8, 9, Spec A thru F (Use with 308-0090 switch)
32	302-0270	1	Bracket, Meter - Key 2, 3
33	332-0142	1	Terminal, Solderless - Generator Set Ground - Key 1 through 10
34	322-0021	1	Receptacle, Pilot Light - Key 4, 5, 6, 7, Spec C through F
35	322-0022	1	Guard, Pilot - Key 4, 5, 6, 7, Spec C through F
36	BULB, PILOT LIGHT		
	322-0059	1	240 Volt - Key 4, 5, Spec C through F
	322-0011	1	120 Volt - Key 4, 5, Spec C through F
	322-0011	1	All Models - Key 6, 7, Spec A through F
37	508-0002	1	Grommet, Start-Disconnect Relay Cover - Key 2, Spec A thru F (Use with load transfer only)
38	300-0224	1	Relay Assembly, Start-Disconnect (Complete) Key 2, Spec A thru F (Use with load transfer only)
39	306-0028	1	Relay, Start-Disconnect - Key 2, Spec A thru F (Use with load transfer only)
40	301-1493	1	Cover, Start-Disconnect Relay - Key 2, Spec A thru F (Use with load transfer only)
41	305-0235	1	Rectifier (10 Amp, 100 Volt Peak) - Key 8, 9, Spec A through G
42	RELAY, START-DISCONNECT - KEY 8, 9		
	307-0566	1	Spec A through G
	307-0642	1	Begin Spec H
43	301-1829	1	Bracket, Relay and Rectifier - Key 8, 9 (Use with 305-0235 Rectifier)
44	332-0609	1	Block, Terminal (2 Place) - Key 8, 9 (Use with 305-0235 Rectifier)
45	301-1983	1	Bracket, Receptacle Box - Key 1, Begin Spec G
46	358-0038	1	Diode - 24 Volt and 32 Volt Models - Begin Spec L
47	363-0057	1	Sink, Heat - Diode Mounting - 24 Volt & 32 Volt Models - Begin Spec L
48	870-0196	4	Nut, Insulating - Heat Sink Mounting - 24 Volt & 32 Volt Models - Begin Spec L
49	809-0035	4	Screw, Sheet Metal - Heat Sink Mounting - 24 Volt & 32 Volt Models - Begin Spec L
50	853-0005	4	Washer, Lock - Heat Sink Mounting - 24 Volt & 32 Volt Models - Begin Spec L
51	301-3395	1	Box, Heat Sink Mounting - 24 Volt & 32 Volt Models - Begin Spec L
52	508-0109	1	Grommet, Diode Leads - 24 Volt & 32 Volt Models - Begin Spec L

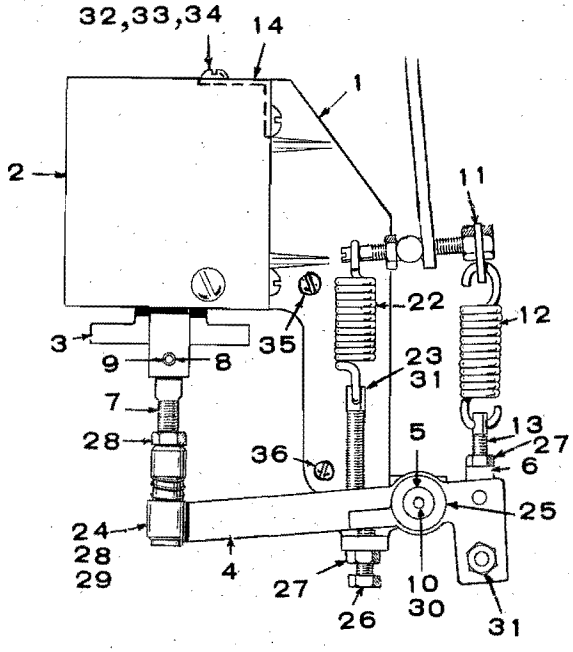
GAS AND GAS-GASOLINE FUEL SYSTEM GROUP - OPTIONAL

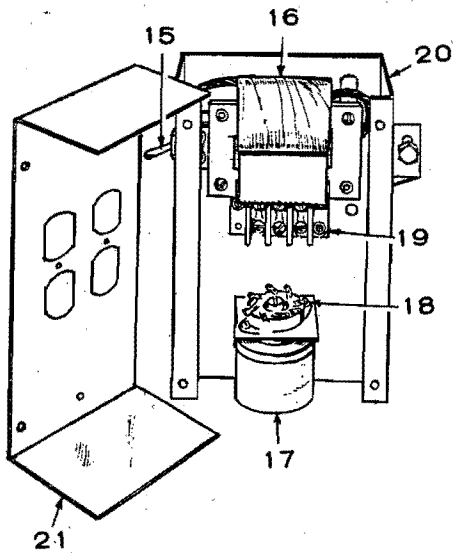


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CARBURETOR - BEGIN SPEC K (See WALBRO Carburetor Parts Group for Components)		
	146-0091	1	Gas Only (Includes Parts Marked *)
	146-0094	1	Gas-Gasoline - Key 1, 3, 4, 5, 6, 7, 10 (Manual Choke) - Includes Parts Marked *
	146-0095	1	Gas-Gasoline - Key 2, 8, 9 (Electric Choke) Includes Parts Marked *
2	CARBURETOR - SPEC A THROUGH J (See CARTER Carburetor Parts Group for Components)		
		1	Gas Only - Not Available, Order 146-0127
		1	Gas-Gasoline (Manual Choke) - Not Available, Order 146-0147
		1	Gas-Gasoline (Electric Choke) - Not Available, Order 146-0195
3	CARBURETOR - SPEC A THROUGH J (Replaces CARTER Units) - (See Walbro Carburetor Parts Group for Components)		
	146-0127	1	Kit, Replacement - Gas Only (Includes Carburetor 146-0091 and Parts Marked £)
	146-0147	1	Kit, Replacement - Gas-Gasoline, Manual Choke, Key 1, 3, 4, 5, 6, 7, 10 (Includes Carburetor 146-0094 and Parts Marked £ & #)
	146-0195	1	Kit, Replacement - Gas-Gasoline, Electric Choke, Key 2, 8, 9 (Includes Carburetor 146-0095 and Parts Marked £ & #)
4	145-0111	1	*Gasket, Carburetor to Air Cleaner
5	141-0078	1	*Gasket, Carburetor Mounting
6	145-0469	1	*Plate, Carburetor Mounting
7	145-0110	1	*Spacer, Insulating - Carburetor
8	149-1110	1	#Line, Fuel - Pump to Carburetor
9	502-0082	1	£Nipple, Pipe
10	502-0055	1	£Elbow, Pipe - 90°
11	148-0178	1	£Adjusting Assembly, Gas
12	503-0032	2	Clamp, Hose
13	503-0315	1	Hose - Regulator to Carburetor
14	505-0302	1	Nipple, Half (1/4" x 1-1/2")
15	505-0038	1	Elbow, Pipe - 90° (1/4")
16	505-0099	1	Nipple, Close (1/4" x 7/8")
17	505-0017	1	Reducer, Pipe (3/8" x 1/4")
18	148-0107	1	Vent, Atmospheric
19	505-0057	2	Plug, Pipe (1/8")
20	505-0130	1	Plug, Pipe (3/4")
21	148-0311	1	Regulator, Gas Pressure - Garretson
22	503-0027	1	Clamp, Hose
23	501-0027	1	Hose, Regulator to Carburetor
24	505-0021	1	Reducer, Pipe (3/4 x 1/2)
25	148-0428	1	Regulator, Gas Pressure - Ensign
26	149-0136	1	Cover, Fuel Pump Opening
27	149-0003	1	Gasket, Fuel Pump
28	153-0319	1	Pin, Lock - Choke Shaft (Used with Gas-Gasoline Carburetor)
	148-0510	1	Kit, Gas Conversion - Contains Regulator 148-0311, Carburetor 146-0091 and associated parts
	148-0390	1	Kit, Repair - Gas Regulator (Garretson)
	148-0300	1	Kit, Repair - Gas Regulator (Ensign Model F)
	148-0522	1	Kit, Repair - Gas Regulator (Ensign Model F1)

* - Included with all replacement carburetors and kits.
£ - Included with carburetor (Walbro) replacement Kits - Gas and/or Gas-Gasoline.
- Included with carburetor (Walbro) replacement kits - Gas-Gasoline only.

IDLEMATIC CONTROL GROUP (OPTIONAL)





REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150-0792	1	*Bracket, Solenoid
2	150-0795	1	Cover, Solenoid
3	SOLENOID, IDLE		
	307-0604	1	120 Volt Models
	307-0669	1	240 Volt Models
4	150-0794	1	*Lever, Idle
5	510-0073	1	Bearing, Idle Lever
6	150-0639	1	Joint, Ball - Idle Lever to Spring
7	145-0241	1	Link, Solenoid
8	508-0091	2	Bushing, Solenoid Plunger
9	516-0125	1	Pin, Link-to-Solenoid
10	815-0231	1	Bolt, Stripper (1/4-20 x 3/4") - Idle Lever
11	150-0793	1	Link, Idle Control
12	150-0115	1	Spring, Idle Control
13	150-0796	1	Stud, Idle Control
14	518-0192	3	Clip, Angle - Solenoid Mounting
15	308-0002	1	Switch, Idle Solenoid
16	302-0147	1	Transformer
17	307-0062	1	Relay, Idle Control
18	323-0052	1	Socket Relay - Idle Control
19	332-0406	1	Block, Terminal (3 Place)
20	301-1898	1	Box, Receptacle
21	301-1899	1	Cover, Receptacle Box
22	150-0098	1	Spring, Governor
23	150-0213	1	Stud, Governor
24	150-0638	1	Joint, Ball - Idle Lever to Solenoid
25	526-0115	1	Washer, Flat
26	815-0178	1	Screw (10-32 x 5/8")
27	870-0053	2	Nut, Hex (10-32)
28	115-0025	2	Nut, Hex (1/4-28)
29	850-0040	1	Washer, Lock (1/4)
30	860-0013	1	Nut, Hex (1/4-20)
31	870-0131	2	Nut, Lock (10-32)
32	812-0100	8	Screw (10-24 x 1/2")
33	860-0011	2	Nut, Hex (10-24)
34	850-0030	2	Washer, Lock (#10)
35	813-0102	2	Screw (10-32 x 5/8") - Bracket Mounting
36	813-0103	1	Screw (10-32 x 3/4") - Bracket Mounting

* - Prior to Serial 740,000 Order 150-0972.

SPECIAL PARTS GROUP FOR FIRE DEPARTMENT (ELECTRIC START) MODEL
(Formerly Designated By Number 4114 in Model Number)

Parts not listed here, use Key 8 in Standard Groups.

PART NO.	QTY. USED	PART DESCRIPTION
403-0748	1	Frame, Carrying (Complete with Mounting Cushions, etc.) - Begin Spec J
BUSHING, CUSHION SPACING		
402-0141	2	Generator End - Begin Spec J
402-0075	2	Engine End - Begin Spec J
526-0127	3	Washer, Oil Pan Mounting - Begin Spec J
102-0319	1	Pan, Oil - Begin Spec J
403-0381	1	Bracket, Engine Mounting (End Cups Attached) - Begin Spec J
402-0140	2	Cup, Centering - Lower Cushion - Generator End - Begin Spec J
505-0054	1	Plug, Oil Drain - Begin Spec J
CUSHION, MOUNTING (Lower)		
402-0045	2	Generator End - Begin Spec J
402-0144	2	Engine End - Begin Spec J
CARBURETOR		
146-0125	1	Spec A through J
146-0092	1	Begin Spec K
313-0018	1	Button, Stop
159-0234	1	Tank, Fuel
159-0717	1	Bracket, Fuel Tank Mounting
159-0718	1	Bracket, Fuel Tank Holddown
159-0007	1	Cap, Fuel Tank
502-0002	1	Elbow, Inverted Male - Fuel Tank
159-0840	1	Line, Fuel - Tank to Filter
210-1720	1	Frame and Bearing Support (Machined & Drilled) Less Coils and Pole Shoes - 120/240 Volt Sets

PART NO.	QTY. USED	PART DESCRIPTION
COIL ASSEMBLY, FIELD (2 Coils)		
222-1621	1	120 Volt Sets
222-1622	1	120/240 Volt Sets
234-0129	1	120/240 Volt Sets
402-0357	2	Channel, Engine Mounting - Later Models
RIG ASSEMBLY, BRUSH (Includes Brushes and Springs)		
212-0290	1	120 Volt Sets
212-0291	1	120/240 Volt Sets
214-0072	3	Brush, Collector Ring, 120/240 Volt Sets
520-0563	1	Stud, Through - Armature - 120/240 Volt Sets
312-0017	1	Condenser, DC (0.5 Mfd.) - 120/240 Volt Sets
232-1282	1	Bracket, Generator Mounting
312-0058	2	Condenser, AC (0.1 Mfd.) - 120/240 Volt Sets
301-2410	1	Box, Control
301-2411	1	Cover, Control Box
301-1870	1	Bracket, Control Box
301-2404	1	Spacer, Box Bracket
308-0028	1	Switch, Start
149-0234	1	Guard, Pilot Lamp
322-0011	1	Lamp, Pilot
322-0021	1	Receptacle, Pilot Lamp
149-0156	1	Gasket, Lamp Guard
301-1902	1	Clamp, Lamp Guard
323-0195	1	Receptacle, 3 Prong (2 Tandem Blades, 1 Grounding Pin)
RECEPTACLE, TWISTLOCK (2 Prong)		
323-0140	3	120 Volt Sets
323-0140	1	120/240 Volt Sets
323-0011	1	Receptacle, Twistlock, 3 Prong (120/240 Volt Sets)
323-0367	1	Socket, Battery Connection
323-0368	1	Plug, Battery Connection

OPTIONAL RESERVOIR (DAY) TANK GROUP
(Not Illustrated)

PART NO.	QTY. USED	PART DESCRIPTION
505-0028	1	Coupling (3/8") - Reservoir Tank Vent Line
502-0002	1	Elbow, Inverted - Reservoir Tank Side
502-0004	1	Elbow, Inverted - Reservoir Tank Top
159-0566	1	Line, Carburetor to Reservoir Tank
159-0569	1	Line, Pump to Reservoir Tank
505-0057	1	Plug, Drain (1/8") - Reservoir Tank
159-0294	1	Tank, Reservoir (1 Quart)
159-0345	1	Tubing, Copper Vent Line (12 ft. x 5/16" O.D.)
159-0121	1	Band, Reservoir Tank

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
159-0567		1	Bracket, Reservoir Tank Mounting
415-0055		1	Bracket, Reservoir Tank Vent Line Cap
502-0050		1	Bushing, Pipe Reducer (3/8" to 1/4") - Reservoir Tank Side
505-0016		1	Bushing, Reducer (3/8" x 1/8") - Reservoir Tank Vent Line
159-0041		1	Cap, Reservoir Tank Vent
504-0013		1	Cock, Fuel Shut-Off - Reservoir Tank
502-0116		1	Connector, Compression (Includes Nut and Sleeve - 1/8" Pipe Thread) - Vent Line

SPECIAL PARTS GROUP FOR STATE OF PENNSYLVANIA APPROVED MODELS (Not Illustrated)
Model Number Contains: Spec 30 for Gasoline, Spec 31 for Natural Gas, Spec 131 for LPG

For parts not listed here, use Standard Groups. Select appropriate Key (2, 8 or 9) by comparing characteristics in the Generator Set Data Table.

PART NO.	QTY. USED	PART DESCRIPTION
146-0127	1	**Carburetor (See also Optional Gas Fuel Group)
301-1492	1	*Cover, Control Box - Spec A through F
301-1493	1	*Cover, Start-Disconnect Relay - Spec A through F
508-0002	1	*Grommet, Rubber, 3/8" Control Box Cover - Spec A through F
415-0007	1	+Line Kit, Fuel (25 ft. of 5/16" Copper Tubing with Fittings) Underground Tank
415-0045	1	+Line Kit, Fuel (25 ft. of 3/8" Copper Tubing with Fittings) Underground Tank
300-0224	1	*Relay Assembly, Start-Disconnect - Complete - Includes Control Box Cover - Spec A through F

PART NO.	QTY. USED	PART DESCRIPTION
306-0028	1	*Relay, Start-Disconnect (Included in 300-0224 Relay Assembly) - Spec A through F
149-0558	1	**Strainer, Fuel - Supply Line
415-0003	1	+Tank Kit, Underground Fuel Supply - 55 Gallon
159-0294	1	+Tank, Reservoir (1 Quart) - See also Optional Reservoir Tank Group
307-0312	1	**Valve, Electric Fuel Solenoid - Supply Line
307-0081	1	**Relay, Electric Fuel Solenoid Valve (For 3600 RPM Models)

* - For 1800 rpm models with Line Transfer Control (3600 rpm models require no modification with Line Transfer Control).
** - Gaseous Fuel Models Only.
\+ - Gasoline Fuel Models Only.

SPECIAL PARTS GROUP FOR UTILITY OR MOBILE COMMUNICATIONS PURPOSE MODELS
(Formerly Designated By Number 1330 in Model Number)

Parts not listed in this group, use Key 2 in Standard Group.

PART NO.	QTY. USED	PART DESCRIPTION
222-1532	1	Coil Assembly, Generator Field, (4 Coils)
153-0113	1	Cover Assembly, Electric Choke (Includes 12 Volt Heating Element)
501-0009	1	Line, Fuel (36" - Flexible)
307-0495	1	Relay, Reverse Current
307-0454	1	Relay, Charge-Disconnect

PART NO.	QTY. USED	PART DESCRIPTION
302-0062	1	Ammeter, Charge (45-0-45)
320-0158	1	Breaker, Circuit
304-0132	1	Resistor (1-Ohm, 25 Watt) - Spec A through F
BOX ONLY, CONTROL		
301-1628	1	Spec A through F
301-1874	1	Begin Spec G

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 expel 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.**

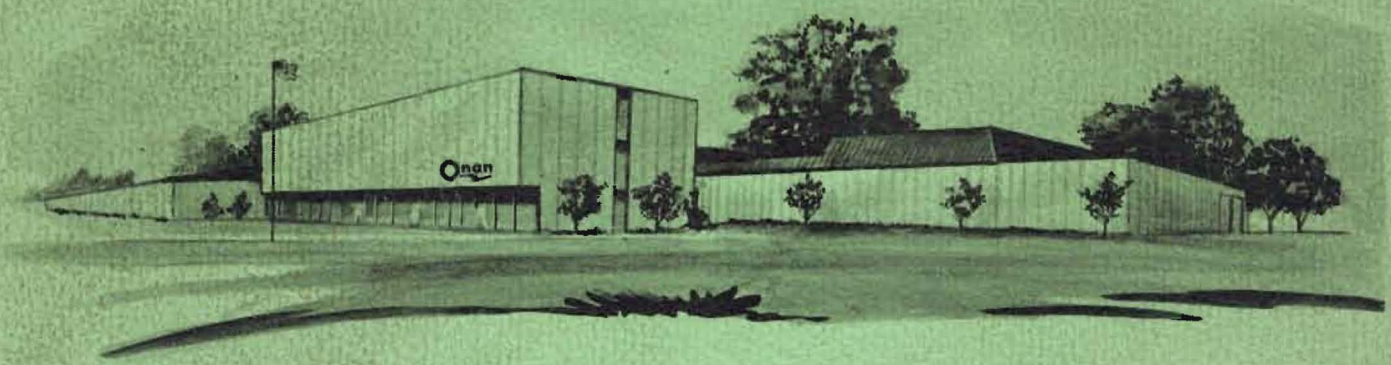
  Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be permitted because of the danger of becoming caught in moving parts.

  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.

If you need help with your old Onan, visit the “Smart Guys” at The Stak. They have many years of experience and they are happy to help.
http://www.smokstak.com/forum/forumdisplay.php?f=1



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