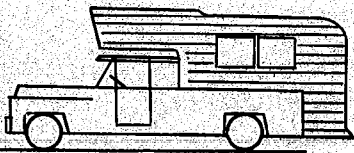


**OPERATOR'S MANUAL
AND
PARTS CATALOG**



**ELECTRIC
POWER
PLANTS**



FOR RECREATIONAL VEHICLES

SERIES NH

ONAN

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

A DIVISION OF ONAN CORPORATION

INTERNATIONAL OFFICE: EMPIRE STATE BUILDING, NEW YORK, N.Y.

ONAN MOBILE
ELECTRIC GENERATING PLANTS
NH
SERIES

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INTRODUCTION

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

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

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

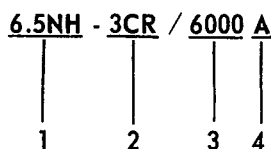
FOR MAJOR REPAIR SERVICE, CONTACT YOUR ONAN AUTHORIZED DISTRIBUTOR.

GENERAL INFORMATION

INTRODUCTION

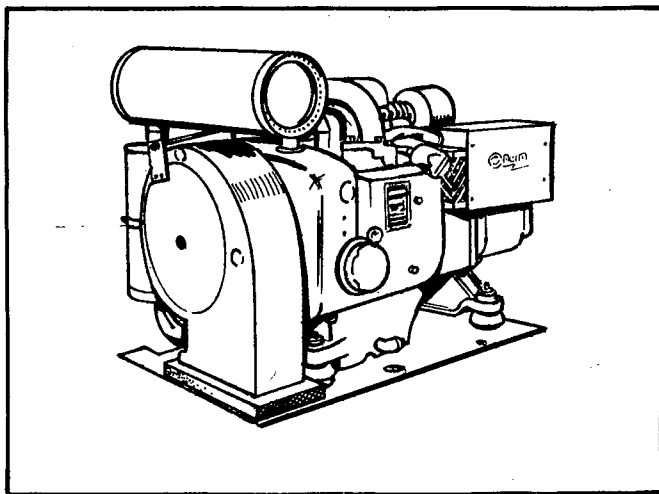
This manual contains instructions for installation, operation, and maintenance of the NH generating sets used for mobile applications. Identify the model of your unit by referring to the model and specification number shown on the Onan nameplate. Electrical specifications are shown on the lower portion of the nameplate.

How to interpret the MODEL and SPEC NO.



1. Factory code indicating capacity and series.
2. Combines with number 1 to identify model. Indicates model, output voltage, method of starting:
E - ELECTRIC starting, R - REMOTE electric starting.
3. Factory code for designating optional equipment.
4. Specification letter (Advances when factory makes production modifications.)

Onan electric plants are given a complete running test under various load conditions and are thoroughly checked before leaving the factory. Upon receipt of your unit check it thoroughly for any damage that may have occurred during shipping. Tighten loose parts, replace missing parts, and repair any damage before putting the unit into operation.



TYPICAL NH GENERATOR SET FOR MOBILE OPERATIONS

MANUFACTURER'S WARRANTY

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

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

This warranty shall not apply to any of the Manufacturer's products which must be replaced because of normal wear, which have been subject to misuse, negligence or accident or which shall have been repaired or altered outside of the Manufacturer's factory unless authorized by the Manufacturer.

Manufacturer shall not be liable for loss, damage or expense directly or indirectly from the use of its product or from any other cause.

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

SPECIFICATIONS

Nominal dimensions of plant (inches)	
Height	20-13/16
Width	20-9/16
Length	29-9/16
Number of cylinders (horizontally opposed)	2
Cubic inch displacement	60
Cylinder bore (inches)	3.562
Piston stroke (inches)	3.00
RPM (60 cycle)	1800
Compression ratio	7:1
Oil capacity (quarts)	4
with filter	4.5
Ignition	
Remote starting	Battery
Electric starting	Flywheel magneto
Battery voltage	12
Battery size	72 AH
Battery charge rate (amperes)	5-Hi
AC voltage regulation in \pm %	7
AC frequency regulation in %	5
Rating (output in watts)	
60 cycle	6500
Spark Plug Gap - Gasoline	0.025
Ventilation Required (Vacu-Flo Cooling - 1800 rpm)	500cfm

FEATURES

- Exciter Cranking
- Rotating Exciter
- Revolving Armature
- Output rated at unity power factor load
- Vacu-Flo Cooling

TROUBLE-SHOOTING GUIDE

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

INSTALLATION

GENERAL

To ensure the most efficient operation of your unit it must be properly installed. This section contains some important aspects of generator installation. For detailed mobile installation information see Onan Technical Bulletin No. T-012.

VENTILATION

This unit must have enough cool air to operate safely and efficiently. Heated air must be disposed of to keep the engine from overheating, which is a common cause of power loss.

The Onan NH generator set is equipped with Vacu-Flo cooling which is especially designed to adapt your unit for small compartment operation. Vacu-Flo cooling uses a centrifugal fan to pull cool air into the unit compartment and over the cooling fins and surfaces of the engine. Heated air is expelled through a discharge port away from the unit and installation area.

An area of 120 square inches of unrestricted area must be provided for the air inlet.

LOCATION

The generator set compartment should be vapor tight and completely isolated from the living quarters. Sheet metal could be used as a liner for a typical compartment. The compartment door must be large enough to allow removal of the generating set for service.

The most suitable place for the compartment location is determined by the physical size of the unit, easy access to the unit, and the area of the vehicle which provides the best physical support for the unit. Allow 2 inches on all sides of the unit for vibration on the mounts. See Figure 1 for a typical mounting installation featuring a slide out tray.

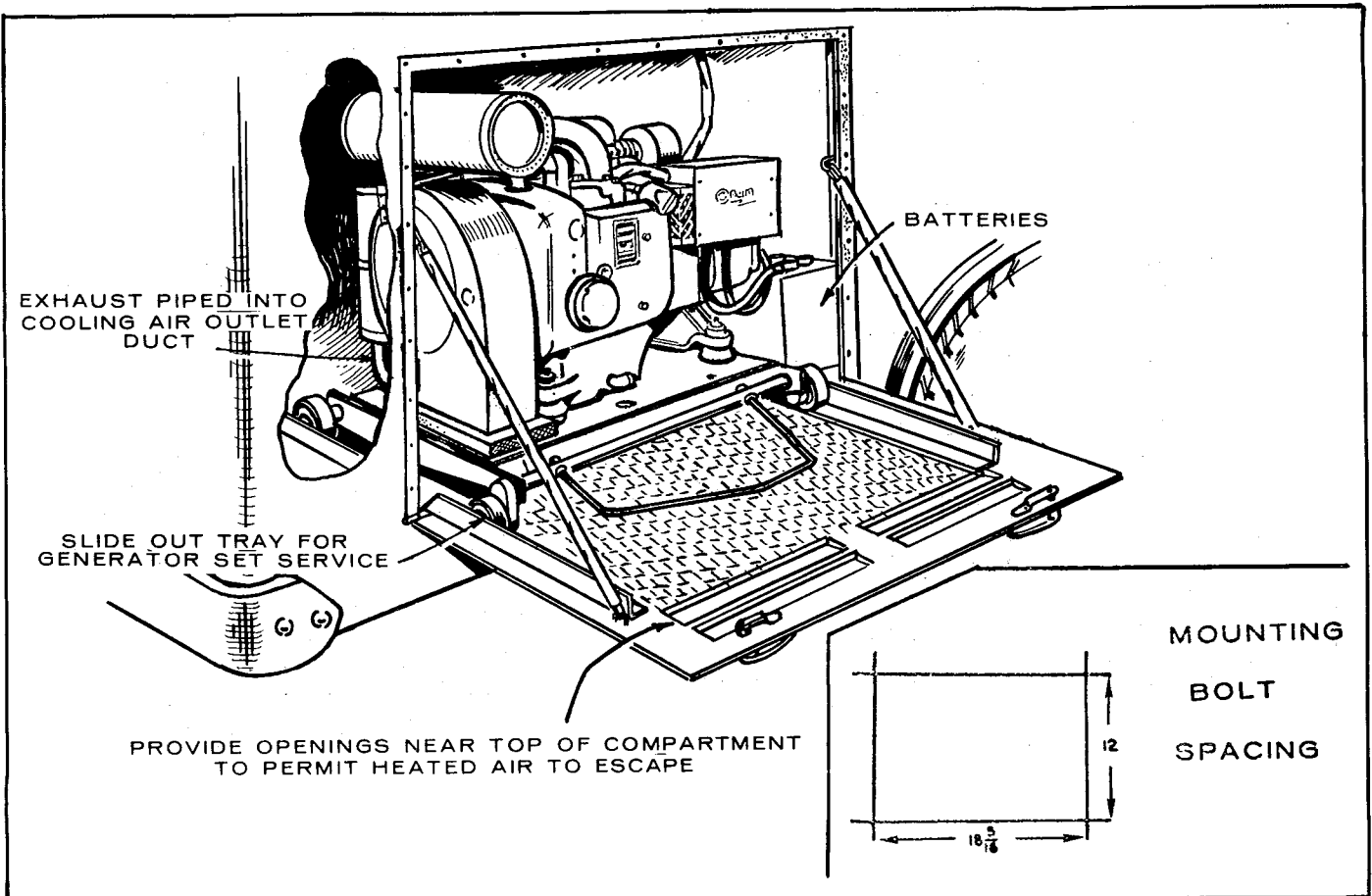


FIGURE 1. TYPICAL "SLIDE OUT" TRAY FOR COMPARTMENT MOUNTING

POSITIONING

When mounting the plant in its compartment be sure to keep the operating instructions and nameplate visible. If this is not practical obtain copies of the instructions and nameplate from your Onan distributor and mount them in the most convenient and usable spot.

Remember when positioning your Onan unit:

1. Make air discharge duct as short as possible, so nothing restricts the air flow. Position so exhaust heated air is not drawn into cool air inlet.
2. Air cleaner should be easy to remove and service.
3. Battery or batteries must be accessible for service.
4. Oil fill tube cap should be easy to reach.
5. The control box switch should be visible.
6. Oil drain should be readily accessible.
7. Cylinder head readily accessible for service.

MOUNTING

Mount your generator plant to its mounting platform using Onan vibrator isolator mounts (Figure 2). Onan mounts are "fail-safe" because of mounting bolts that prevent the unit from breaking loose from the platform if the rubber portion of the mount becomes damaged.

The mounting base should be fastened directly to the supporting frame. Channel, box or angle iron can be used for a mounting base frame. This will provide the

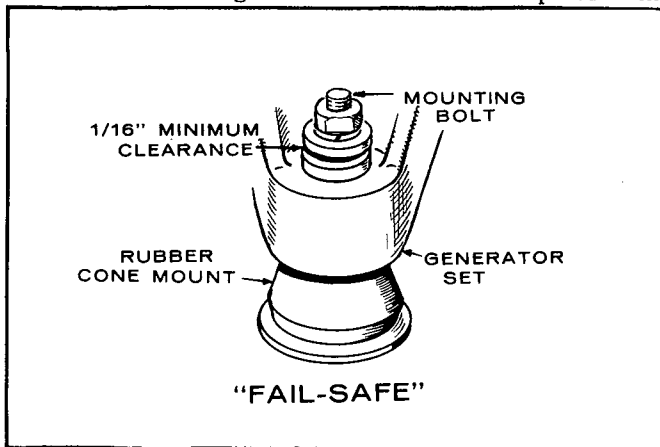


FIGURE 2. ONAN VIBRATION ISOLATORS

greatest support plus a base sealed against air, dirt and sound. Do not use sheet metal or thin plate without a supporting frame. Plywood of sufficient thickness for strength can be used, but unless it is suitably sealed, it is vulnerable to climatic elements, will tend to become oil soaked, and is not fireproof.

The supporting base or platform must be strong enough to withstand the shock from sharp turns, bumps, holes, etc. which accompany mobile applications. Brace the mounting platform to eliminate any chance of the platform bowing or bending.

If it is desirable to mount the unit on a pullout tray to facilitate service and repair. The load wires, control wires and fuel lines must have enough slack and be flexible so the unit can slide out without disconnecting them. When using a pull-out tray, pipe the exhaust

gases into the air outlet. The air outlet duct may face the bottom or either side of the enclosure, depending on how the unit is installed.

If the unit is permanently mounted and the exhaust gases must be separated from the cooling air outlet make the connection from the unit muffler to the tail pipe with flexible tubing. Flexible tubing used between the unit muffler and tail pipe absorbs unit vibration. If the unit is mounted on a slide out tray vent the exhaust through the air discharge duct. If the exhaust line passes through a flammable floor or partition insulate the contact area with asbestos backed metal collars.

If an exhaust system other than the one furnished with the unit is used the portion of the system within the engine compartment may be asbestos wrapped to reduce heat radiation. If flexible exhaust sections are wrapped care should be exercised to ensure that the flexible sections maintain their flexibility.

FUEL SUPPLY (GASOLINE)

Install a separate fuel tank for the unit. If the plant has to be connected to the vehicle supply tank, do not tee off the vehicle supply line. The generating unit must have a separate fuel line because the more powerful vehicle fuel pump will starve the generating unit for gasoline.

If a separate fuel tank is used, install the tank so the bottom is less than 4 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

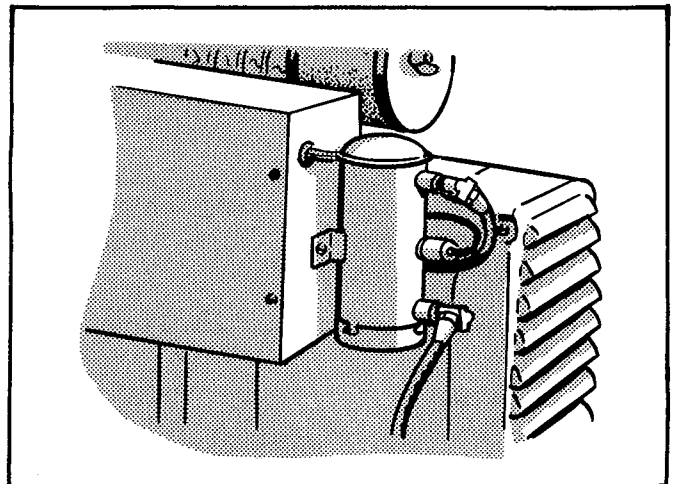


FIGURE 3. ELECTRIC FUEL PUMP

is shared with another engine, use a separate fuel line for each to avoid starving the plant.

The NH mobile electric generating set uses an electric fuel pump (Figure 3).

FUEL LINES

Use annealed copper or seamless steel tubing and flared connections. Install lines so they are accessible at all times and protected from mechanical injury. Use nonferrous metal straps, without sharp edges to secure the fuel lines.

EXHAUST

WARNING Exhaust gases are poisonous!

If the unit is permanently mounted, pipe the exhaust to a muffler mounted under the floor. If the unit is mounted on a slide-out tray, vent the exhaust through the air discharge duct. Flexible exhaust tubing (used between the unit and the muffler) absorbs unit vibration. If the exhaust line passes through a flammable floor or partition, insulate with asbestos backed metal collars where it passes through these barriers. Exhaust lines may be asbestos wrapped to reduce heat radiation within the compartment. However, care should be taken to see that flexible exhaust sections that are wrapped still retain their flexibility.

When installing muffler systems other than those manufactured by Onan, or if the exhaust system is excessively complicated, the exhaust back pressure should be checked. Exhaust back pressure at rated load, measured at the exhaust manifold, should not exceed 18 inches of water (water column). Where a tapped hole is not provided the manifold and/or a pipe coupling may be drilled and tapped. After measurement is made, plug the hole with an ordinary pipe plug.

WARNING Do not use discharged Vacu-Flo air for heating since it may contain carbon monoxide or other poisonous gases.

BATTERY CONNECTION

Connect the positive battery cable to the start solenoid (located in the control box). See Figure 4. Connect the negative battery cable to the generator stud marked battery ground.

CAUTION Do not disconnect the starting batteries while the engine is running. The resulting overvoltage will damage the electric choke and other control components.

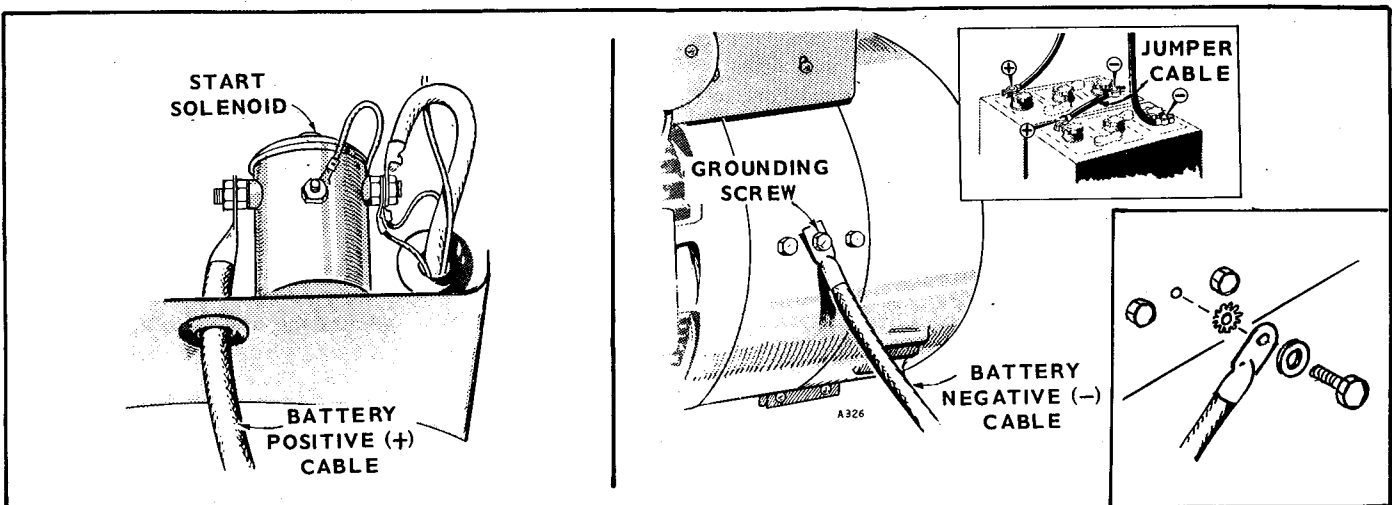


FIGURE 4. BATTERY CONNECTION

In mobile applications where the generator is normally operated in ambient temperatures above 0°F and the battery is kept charged by frequent running of the unit, a single 12 volt battery of 72 amp/hr capacity minimum is sufficient.

LOAD WIRE CONNECTIONS

The plant nameplate shows the electrical output rating of the plant in watts, volts and cycles. The plant wiring diagram shows the electrical circuits and connections necessary for the available output voltage. Also see Figure 5.

Meet all applicable code requirements. Work should be done by a qualified serviceman or electrician and the installation inspected and approved. The plant AC output box has provisions to accommodate load wires. Use flexible conduit and stranded load wires near the plant to absorb vibration. Use sufficiently large insulated wires. Strip the insulation from the wire ends as necessary for clean connections. Connect each load wire to the proper generator output lead inside the AC output box. Insulate bare ends of ungrounded wires. Connect the grounded generator lead and load wire to the ground terminal on the side of the generator. Install a fused main switch (or circuit breaker) between the generating plant and the load.

Output Lead Markings: Generator leads are marked, M1, M2, etc. These identifying marks also appear on the wiring diagram.

Voltage Selection on Reconnectable Single Phase Generators: Model 6.5NH-3C is reconnectable for use as 120/240 volt 3 wire, 120 volt 2 wire or 240 volt 2 wire power source (see Figure 5). Use the connection for two wire service when one load exceeds 1/2 the rated

capacity. Balance the load when connected for three-wire service.

Balancing the Load: Current for any one output lead must not exceed nameplate rating. Serious overloading can damage the generator windings. When two or more single phase circuits are available, divide the load equally between them.

Load Connections: Refer to the figure which illustrates the load connection for the output shown on your plant's nameplate.

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

REMOTE START-STOP CONTROLS

Standard remote start-stop controls for Onan remote starting electric plants consist of a single pole, double throw momentary contact switch, connected by three wires to the plant remote control terminal block. Pushing the switch up engages the starter, the center position is for running, and pushing it down stops the plant.

To control the plant from several locations, install

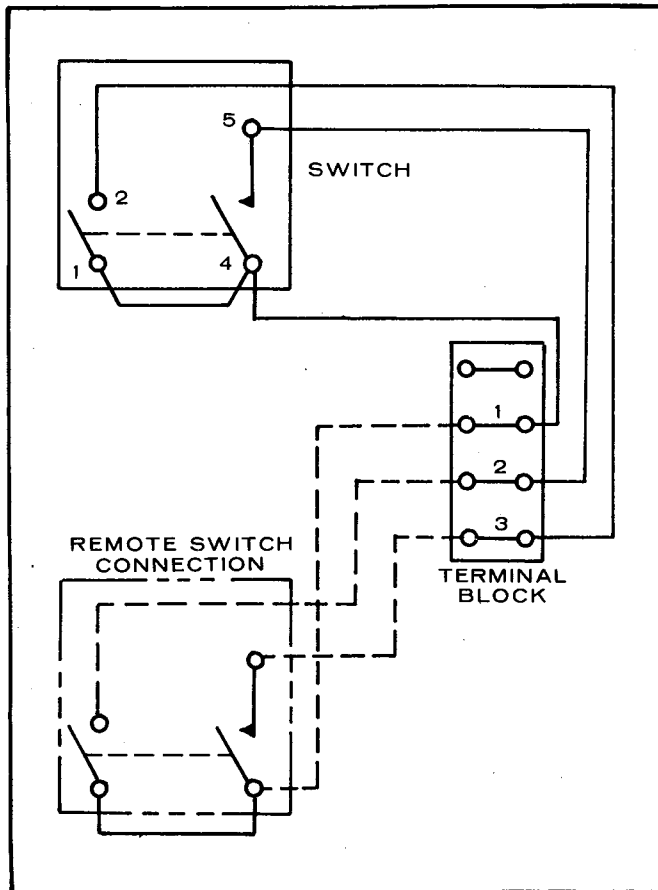
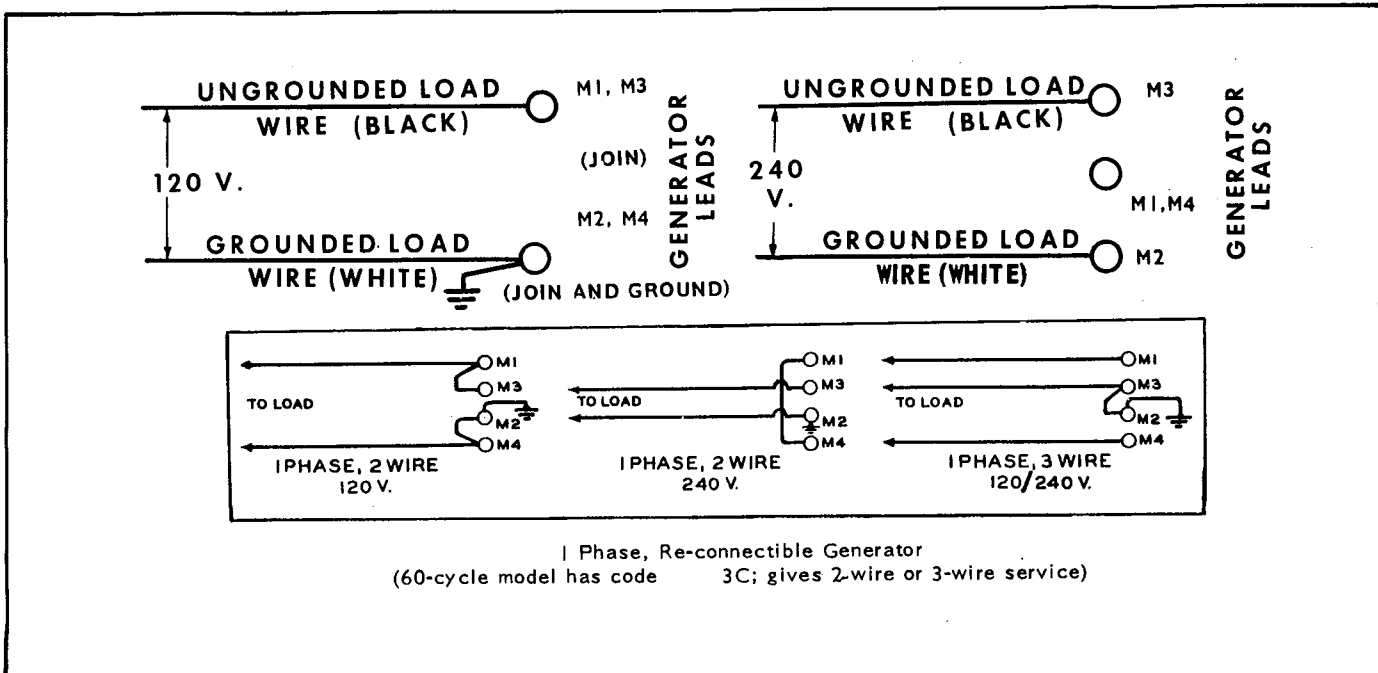


FIGURE 6. REMOTE SWITCH CONNECTIONS

separate switches and wire them in parallel (Figure 6). Any number of switches may be used.



1 Phase, Re-connectible Generator
(60-cycle model has code 3C; gives 2-wire or 3-wire service)

FIGURE 5. LOAD CONNECTIONS

OPERATION

BEFORE STARTING

Be sure the crankcase has been filled with oil to the "FULL" mark on the oil level indicator. Refer to the *Maintenance Section* for the recommended oil changes and complete lubricating oil recommendations.

ELECTRIC STARTING

Push the START-STOP switch to its "START" position. Release the switch as soon as the engine starts.

If at first the engine fails to start, inhibitor oil used at the factory may have fouled the spark plug. Remove the plug, clean in a suitable solvent, dry thoroughly and install. Heavy exhaust smoke when the engine is first started is normal and is caused by the inhibitor oil.

APPLYING LOAD

If practical, allow plant to warm up before connecting a heavy load. Continuous generator overloading may cause high operating temperatures that can damage the windings. Keep the load within nameplate rating.

STOPPING

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

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 plant.

When operating engine for the first time, use the following sequence using MS/DG oil:

1. One half hour at 1/2 load.
2. One half hour at 3/4 load.
3. Full load.
4. Change crankcase oil after the first 50 hours of operation.

BATTERY CHARGING

The battery charge rate is automatically controlled by a voltage regulator. The high charge rate was set at the factory for average operating conditions. If frequent starts and short operating periods require an increased charge rate, adjust by moving the slide clip on the adjustable resistor in the control box.

INFREQUENT SERVICE

If the plant is used infrequently, extended shutdown

periods can result in difficult starting. Run the plant at least 30 minutes every week to eliminate hard starting.

HIGH TEMPERATURES

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

LOW TEMPERATURES

1. Use correct SAE No. oil for temperature conditions. Change oil only when engine is warm. If an unexpected temperature drop causes an emergency, move the plant to a warm location.
2. Use fresh, regular grade gasoline. Protect against moisture condensation. Below 0°F adjust carburetor main jet for slightly richer fuel mixture.
3. Keep ignition system clean, properly adjusted and batteries in a well charged condition.
4. Partially restrict cool air flow, but use care to avoid overheating.

OUT-OF-SERVICE PROTECTION

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

1. Run the plant until thoroughly warm.
2. Turn off fuel supply and run until plant stops.
3. Drain oil from oil base while still warm. Refill and attach a warning tag stating oil viscosity used.
4. Remove each spark plug. Pour 1 oz. (two tablespoons) of rust inhibitor (or SAE #50 oil) into each cylinder. Crank engine slowly (by hand) several times. Install spark plugs.
5. Service air cleaner.
6. Clean governor linkage and protect by wrapping with a clean cloth.
7. Plug exhaust outlet to prevent entrance of moisture, dirt, bugs, etc.
8. Wipe generator brushes, slip rings, etc. Do not apply lubricant or preservative.
9. Wipe entire unit. Coat rustable parts with a light film of grease or oil.
10. If battery is used, disconnect and follow standard battery storage procedure. (See Service Bulletin - Eng. 19).

SEQUENCE OF OPERATION

See Table 1 for a typical sequence of operation for your Onan generator set.

HIGH ALTITUDE

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

DUST AND DIRT

1. Keep plant clean. Keep cooling surfaces clean.
 2. Service air cleaner as frequently as necessary.
 3. Change crankcase oil every 50 operating hours.
 4. Keep oil and gasoline in dust-tight containers.
 5. Keep governor linkage clean.
 6. Clean generator brushes, slip rings and commutator.
- Do not remove normal (dark brown) file. Do not polish.

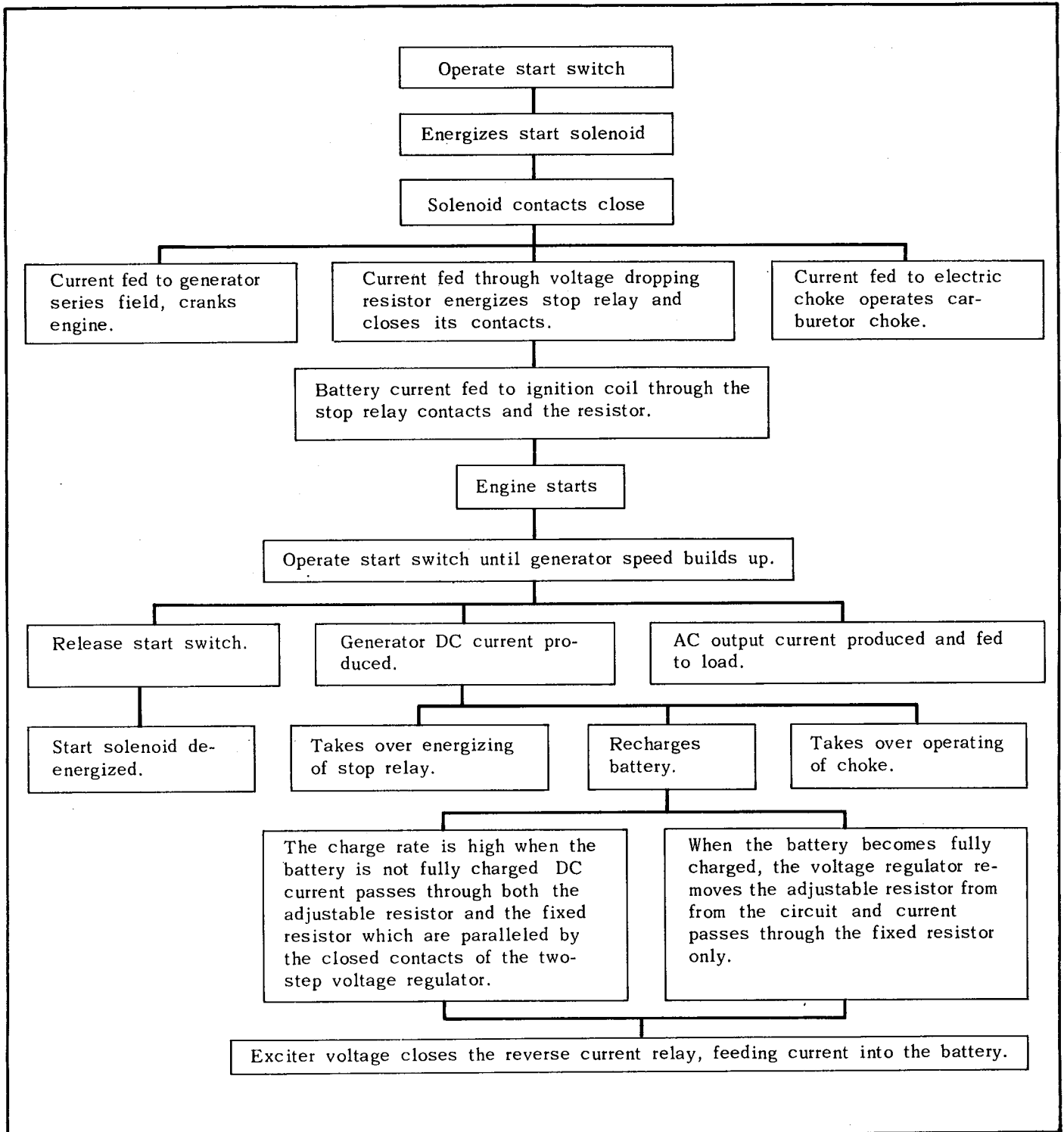


TABLE 1. SEQUENCE OF OPERATION

SERVICE AND MAINTENANCE

OPERATOR MAINTENANCE SCHEDULE (Performed by Owner)

MAINTENANCE ITEMS	OPERATIONAL HOURS				
	8	50	100	200	500
Inspect Plant Generally	x				
Check Fuel Supply	x				
Check Oil Level	x				
Clean Governor Linkage		x	x		
Service Air Cleaner			x		
Change Crankcase Oil			x*		
Check Battery			x		
Clean or Replace Fuel Filter			x		
Check Spark Plugs			x		
Replace Oil Filter				x	
Replace Air Cleaner Element					x

* Change every 50 hours when operating at high ambient temperatures (100°F and above).

CRITICAL MAINTENANCE SCHEDULE (Performed by Onan Dealer)

MAINTENANCE ITEMS	OPERATIONAL HOURS		
	100	500	1000
Check Breaker Points	x		
Clean Commutator and Collector Rings			x
Check Brushes		x	
Remove Deposits From Combustion Chamber		x	
Check Valve Clearance		x	
Clean Generator			x
Inspect Valves, Grind If Necessary			x

PERIODIC MAINTENANCE SCHEDULE

Regularly scheduled maintenance is the key to lower operating costs and longer service life for the unit. The above 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.

When any abnormalities occur in operation – unusual noises from engine or accessories, loss of power, overheating, etc. – contact your Onan dealer.

CRANKCASE OIL

The oil capacity is four U.S. quarts (4-1/2 with a filter change). Fill to the "FULL" mark on the oil level indicator. Use a good quality heavy duty oil with the API designation MS or MS/DG. Do not use an oil with the API designation DS. When adding oil between changes, always use the same brand that is in the crankcase. Various brands of oil may not be compatible when mixed together.

Oil consumption may be higher with a multi-grade oil than with a single grade oil if both oils have comparable viscosities at 210°F. Therefore, single grade oils are generally more desirable, unless anticipating a wide range of temperatures. Use the proper grade oil for the expected conditions.

TEMPERATURE	GRADE
Below 0°	5W or 5W-30
0° to 30°	10W or 10W-40
30° to 90°	30
Above 90°	50

Check oil level daily. Change oil every 100 hours under normal operating conditions. When operating in extremely dusty or dirty conditions, change oil every 50 hours or sooner (see Figure 7).

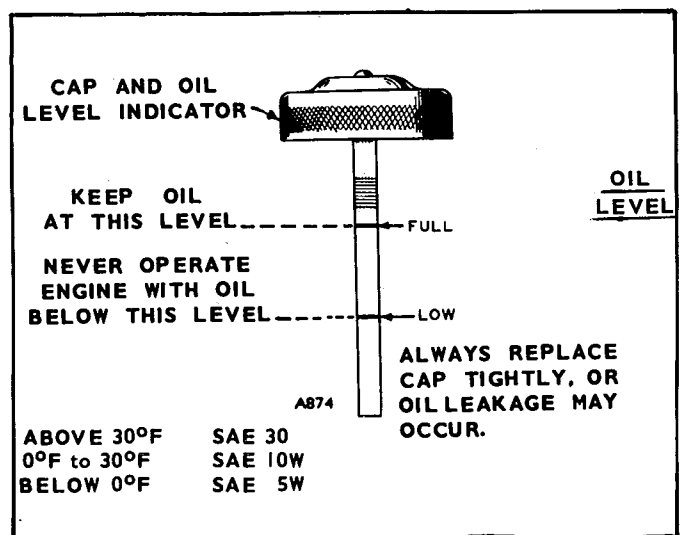


FIGURE 7. OIL LEVEL INDICATOR

Change the crankcase oil filter every 200 hours. Remove the filter by turning counterclockwise, using a filter wrench. Add the foam strip provided with the filter to prevent air loss in the area indicated. It is advisable to wipe dry the drip pan located below the filter. Install the filter finger tight plus 1/4 to 1/2 turn. If oil becomes so dirty that the markings on the oil level indicator cannot be seen, change the filter and shorten the filter service period (see Figure 8).

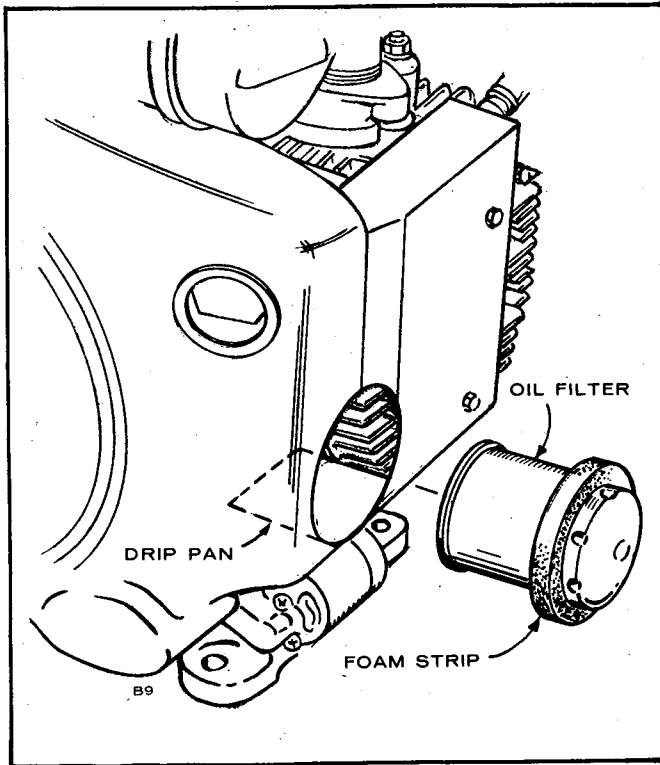


FIGURE 8. OIL FILTER

AIR CLEANER

Proper maintenance of the air cleaner is extremely important. Negligence of regular routine maintenance will result in reduced engine life.

Allowing the element to become plugged with dirt will restrict the intake of air into the engine. Inspect the element for tiny holes or tears which would permit particles of dust or dirt to enter the engine.

Remove the paper element every 100 operating hours (see Figure 9) and clean by removing foam wrapper tapping element against a flat, solid object to loosen dust and dirt accumulation. The dirt can be blown out from the clean to the dirty side, but be sure to use less than 100psi air pressure. The element and foam wrapper can be washed in a solution of warm water and mild detergent if additional cleaning seems necessary.

The element will normally require replacement every 500 operating hours and more often under severe operating conditions.

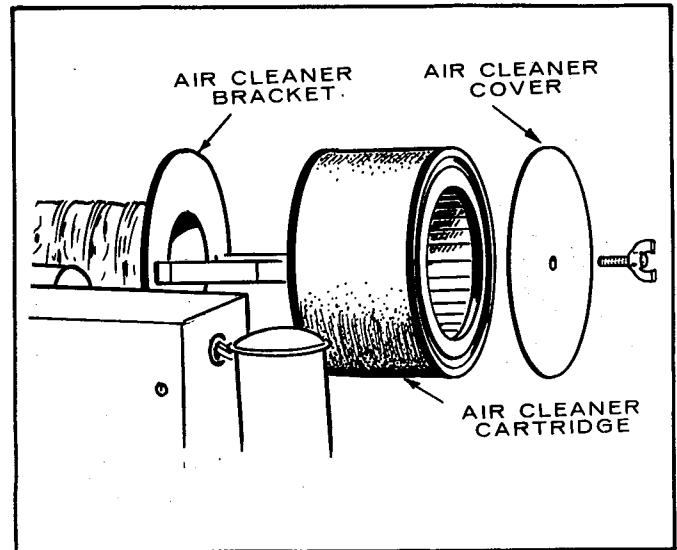


FIGURE 9. AIR CLEANER

CRANKCASE BREATHER

Lift off rubber breather cap. Carefully pry valve from cap. Otherwise press hard with both of your thumbs on top of cap and fingers below to release valve from rubber cap. Wash this fabric flapper type check valve in a suitable solvent. Dry and install. Position perforated disc toward engine.

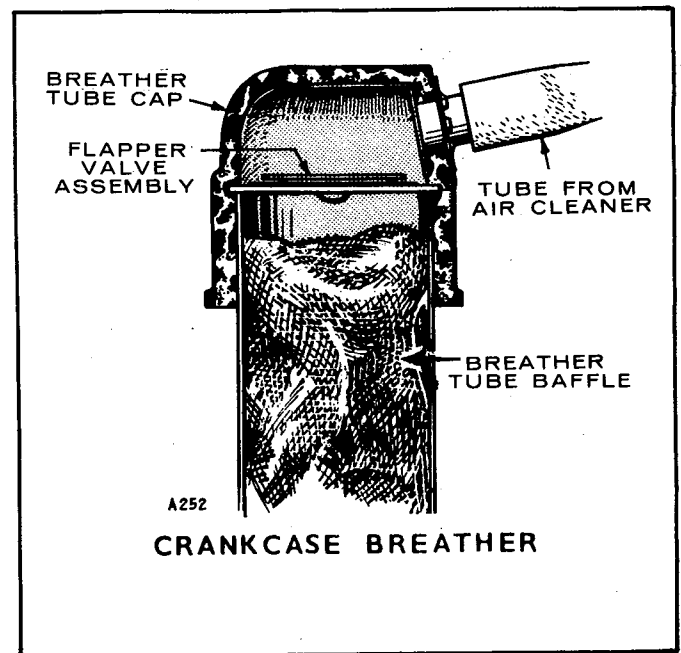


FIGURE 10. CRANKCASE BREATHER

FUEL SYSTEM

Empty the carburetor and sediment bowls of any accumulated sediment. Clean the filter screen thoroughly. Reassemble and check for leaks.

SPARK PLUG GAP

Gap spark plug to 0.025" using a spark plug gapping tool. See Figure 11.

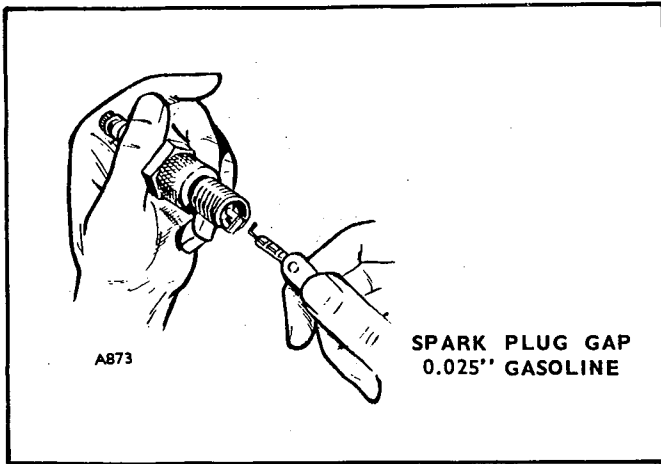


FIGURE 11. SPARK PLUG GAP

GENERATOR MAINTENANCE

The generator normally needs little care other than a periodic check of the brushes, commutator and collector rings. If a major repair job on the generator should become necessary, have the equipment checked by a competent electrician who is thoroughly familiar with the operation of electric generating equipment.

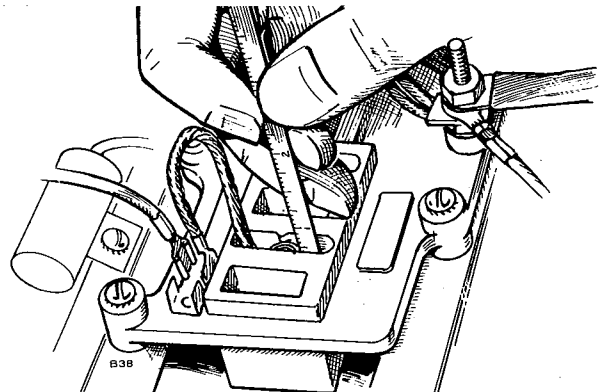
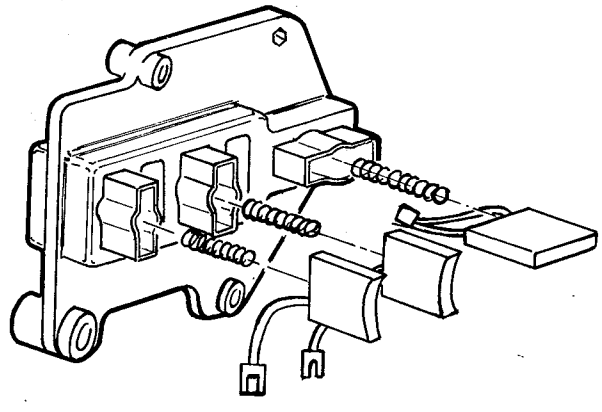
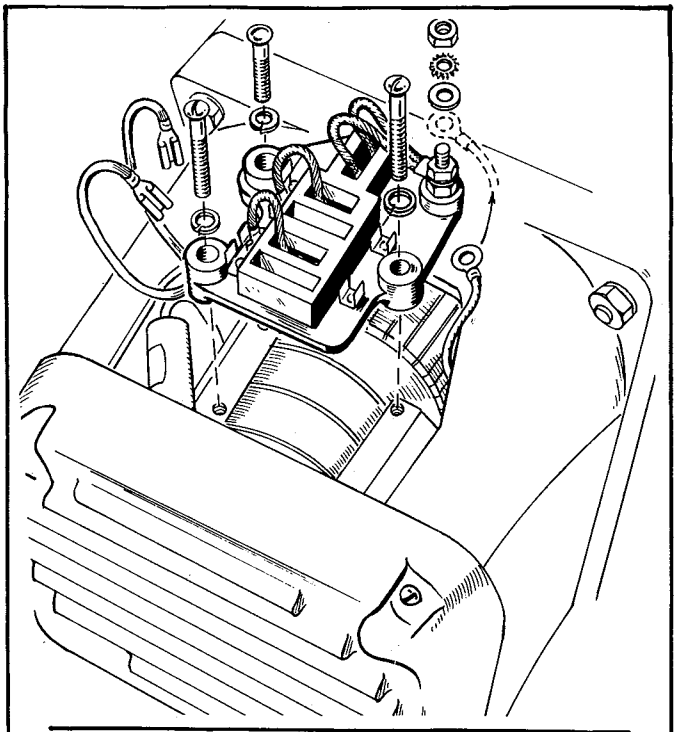
BRUSH REPLACEMENT

Install new brushes when the old ones are worn to the dimensions shown in Figure 12. Remove the end bell band and the end cover to expose the brush holders. Remove the three screws holding each brush holder in place. Remove the old brushes and clean the holders so the new brushes can move easily in their holders. Install the new brushes in the same manner as the old ones. Always use the correct brush as listed in the Parts Catalog Section. Never substitute a brush which may appear to be the same, for it may have different characteristics. New brushes are shaped to fit and seldom need sanding to seat properly. If some brush sparking occurs after replacing brushes, run the plant under a light load until the brushes wear to a good seat.

Collector rings acquire a glossy brown finish in normal operation. Do not attempt to maintain a bright newly machined appearing surface. Ordinary cleaning with a dry, lint free cloth is usually sufficient. Very fine sandpaper (#00) may be used to remove slight roughness. Use only light pressure on the sandpaper, while the plant is operating. Do not use emery or carborundum paper or cloth. Clean out all carbon dust from the generator.

SPEED BOOSTER

Use a fine wire to clean the small hole in the short vacuum tube which fits into the hole in the top of the engine intake manifold. Do not enlarge this hole.



	DC	AC
NEW	5/8"	11/16"
1/2 WEAR	13/16"	7/8"
REPLACE	1"	1 1/16"

FIGURE 12. GENERATOR BRUSHES

If there is tension on the external spring when the plant is operating at no load or light load, it may be due to improper adjustment, restricted hole in the small vacuum tube, or a leak in the booster diaphragm or gasket. See Figure 13.

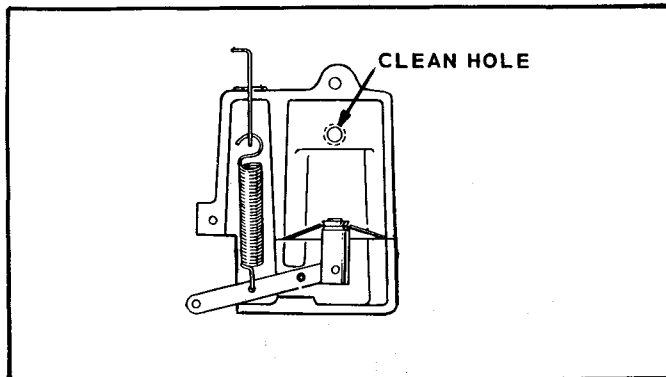


FIGURE 13. VACUUM SPEED BOOSTER

CRITICAL SPECIFICATIONS

Spark Plug Gap	Gasoline—0.025"
Tappets (Intake & Exhaust)	.003" - .010"
Ignition Breaker Points Gap	0.020"
Ignition Timing	19° BTC

BOLT TORQUES	FT-LB
Spark Plug	15-20
Cylinder Head	18
Oil Base Mounting	18-23

GOVERNOR LINKAGE

The linkage must be able to move freely through its entire travel. Every 50 hours of operation, clean the joints (do not lubricate) as shown in Figure 14. Also inspect the linkage for binding, excessive slack and wear.

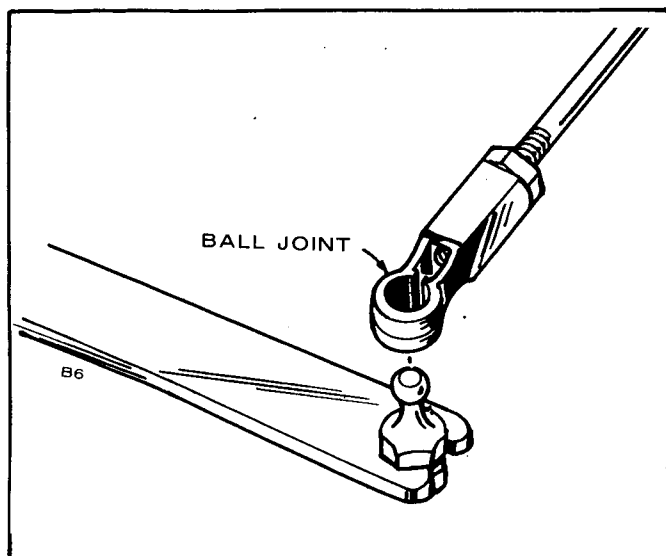


FIGURE 14. GOVERNOR BALL JOINTS

ADJUSTMENTS

GENERAL

Satisfactory engine performance is largely dependent upon correct adjustments. However, adjustments cannot fully compensate for low engine power due to wear, etc. If trouble develops, follow an orderly procedure to determine the cause before making any adjustment. Refer to the Troubleshooting Chart for help in checking causes of troubles which may occur.

BREAKER POINTS

Badly burned breaker points should be replaced. Slightly burned points may be dressed smooth with a file or fine stone.

To adjust breaker point gap see Figure 15 and:

1. Measure the gap with a thickness gauge.
2. Set the gap at 0.020".
3. Crank the engine fully opening the breaker points.
4. Loosen and move the stationary point to the correct gap at full point separation (0.020").
5. Secure the points and recheck for the correct gap.

Ignition points should break contact just when the timing mark (22°BTC on electric start models) aligns with the flywheel timing mark. Final timing is corrected by shifting the breaker point box on its mounting base and using a timing light.

CARBURETOR ADJUSTMENT

The carburetor (Figure 16) has a high speed fuel main adjustment (needle A) and a fuel idle adjustment (needle B).

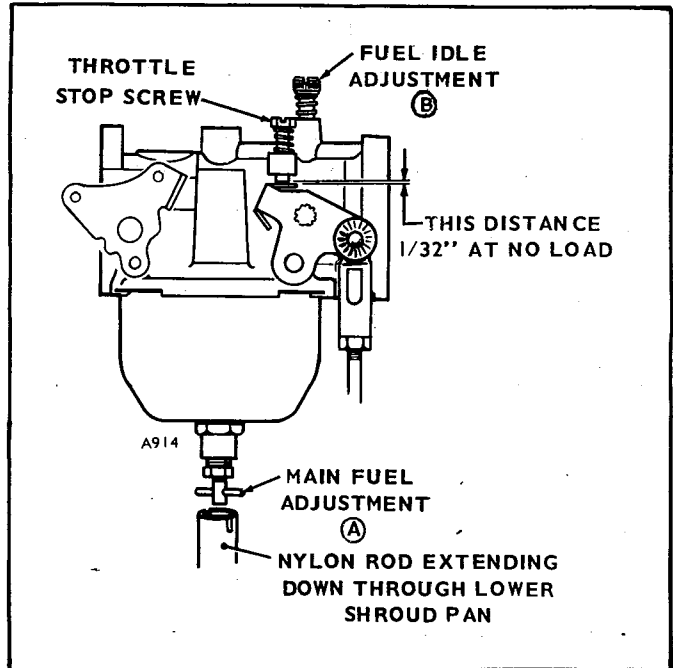


FIGURE 16. CARBURETOR ADJUSTMENTS

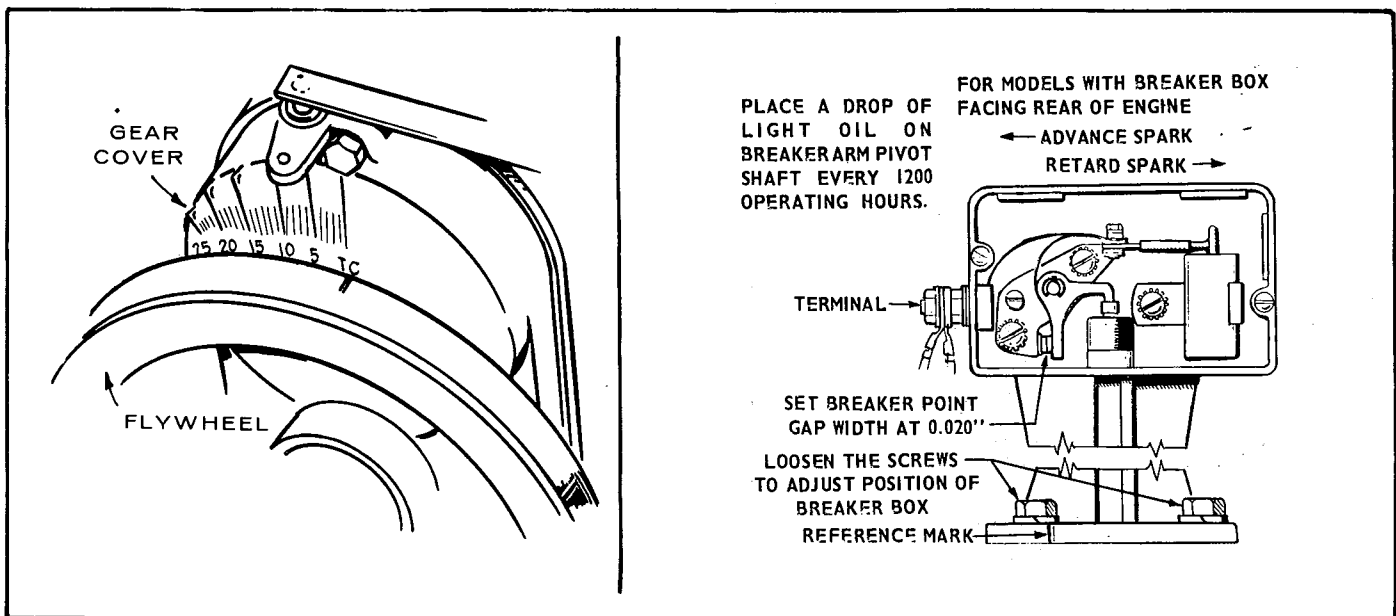


FIGURE 15. IGNITION TIMING

Adjust the carburetor to obtain the correct fuel-to-air mixture for smooth, efficient operation. The carburetor should be adjusted in two steps – first the load adjustment and then the idle adjustment.

IMPORTANT: *If the carburetor is completely out of adjustment so the engine will not run, open both needle valves 1 to 1-1/2 turns off their seats to permit starting. Do not force the needle valves against their seats. This will bend the needle.*

Before adjusting the carburetor, be sure the ignition system is working properly and the governor is adjusted. Then allow the engine to warm up.

1. Apply a full load to the engine.
2. Carefully turn the main adjustment in until speed drops slightly below normal. Then turn needle out until speed returns to normal.
3. With no load, turn the idle adjustment out until the engine speed drops slightly below normal. Then turn the needle in until the engine speed returns to normal.

Alternate Method: Use When There is No Load Adjustment Possible.

1. Start the engine and allow it to warm up.
2. Push in on the governor mechanism to slow the unit down to about 800-900rpm.
3. Set the idle adjustment screw for even operation (so the engine is firing on all cylinders and running smoothly).
4. Release the governor mechanism to allow the engine to accelerate. If the engine accelerates evenly and without a lag, the main adjustment is correct. If not, adjust the needle outward about 1/2 turn and again slow down the engine and release the mechanism. Continue until the engine accelerates evenly and without a time lag after releasing the governor.

With the carburetor and governor adjusted, set the throttle stop screw, Figure 16, to allow 1/32 inch clearance to the stop pin with the engine operating at no load. This prevents excessive hunting when a large load is suddenly removed.

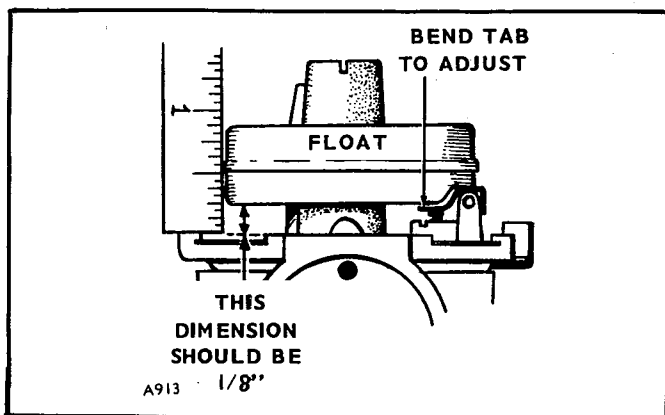


FIGURE 17. ZENITH CARBURETOR FLOAT ADJUSTMENT

To check float level, remove the entire main fuel adjustment assembly from the float bowl (unscrew large nut from the float bowl). The proper distance from the float to the carburetor body is 1/8 inch. The float tab should just touch the fuel inlet valve. Adjust by bending the tab on the float. See Figure 17.

SISSON CHOKE

This choke uses a heat sensitive bimetal element to control the choke plate position. In addition to this, a solenoid is actuated during engine cranking, closing the choke all the way. The bimetal is factory set to position the choke to the proper opening under any ambient condition.

If adjustment of the bimetal is needed, it must be made at ambient temperature. Do not attempt adjustments until engine has been shut down for at least one hour. Loosen the screw which secures the choke actuating arm to the linkage. Refer to Figure 18. Shortening the actuating arm makes the fuel mixture richer. Lengthening the arm makes the fuel mixture lean. For ambient temperatures above 85°F, the choke should be fully opened. For ambient temperatures below 25°F, the choke should be opened 1/4 inch with the solenoid not engaged. Tighten the screw that secures the choke actuating arm to the linkage.

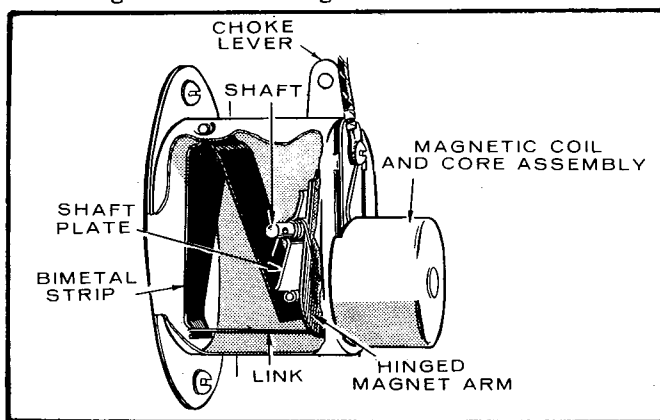


FIGURE 18. SISSON CHOKE

GOVERNOR ADJUSTMENT

Where engine speed is governor controlled, the governor is set at the factory to allow a nominal engine speed of 1875rpm at no load operation. Proper governor adjustment is one of the most important factors in maintaining the power and speed desired from the engine.

Before making governor adjustment, run the engine about 15 minutes to reach normal operating temperature. It is difficult to determine if, after long usage, the governor spring has become fatigued. If, after properly making all other adjustments, the regulation is still erratic, install a new spring (Figure 19).

A tachometer for checking engine speed is required for accurate governor adjustment.

Check the governor arm, linkage, throttle shaft and lever for binding or excessive wear at connecting

points. A binding condition at any point will cause the governor to act slowly and regulation will be poor. Excessive looseness will cause a hunting condition and regulation will be erratic. Work the arm back and forth several times by hand while the engine is idle. If either of these conditions exist, determine the cause and adjust or replace parts as needed.

PROCEDURE

1. Adjust the carburetor main jet for the best fuel mixture while operating the plant with a full rated load connected.
2. Adjust the carburetor idle needle with no load connected.
3. Adjust the length of the governor linkage.
4. Check the governor linkage and throttle shaft for binding or excessive looseness.
5. Adjust the governor spring tension for rated speed at no load operation (booster temporarily disconnected).

6. Adjust the governor sensitivity.
7. Recheck the speed adjustment.
8. Set the carburetor throttle stop screw.
9. Adjust booster (where used).

Linkage: The engine starts at wide open throttle. The length of the linkage connecting the governor arm to the throttle arm is adjusted by rotating the ball joint housing. Adjust the length so that with the engine stopped and tension on the governor spring, the stop on the carburetor throttle lever is 1/32 inch from the carburetor stop boss. This setting allows immediate control by the governor after starting and synchronizes travel of the governor arm and the throttle shaft.

Speed Adjustment: The speed at which the engine operates is determined by the tension applied to the governor spring. Increasing spring tension increases engine speed. Decreasing tension decreases engine

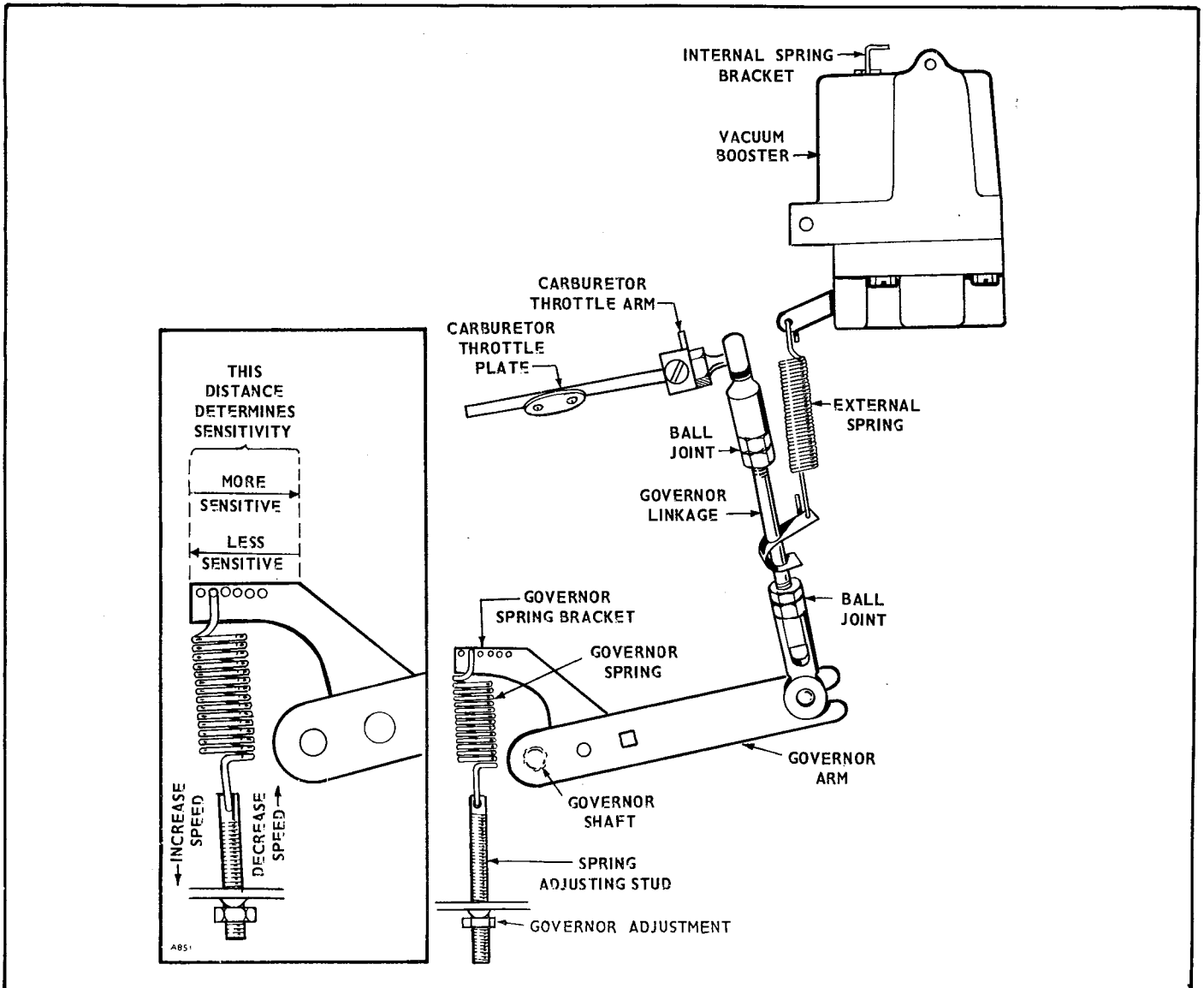


FIGURE 19. GOVERNOR ADJUSTMENTS

speed. The no-load speed of the engine should be slightly higher than the speed requirements of the connected load.

For Example: If the connected load is to turn at 1800 rpm, set the no-load speed of the engine at 1875 rpm (approx.). Check the speed with a tachometer.

If a speed adjustment is needed, turn the speed adjusting nut in to increase the speed or out to decrease the speed. See Figure 19.

SENSITIVITY ADJUSTMENT

The engine speed drop from no-load to full-load should not be less than 60rpm. Check the engine speed with no-load connected and again after connecting full-load.

The sensitivity of the governor depends upon the position of the arm end of the governor spring. A series of holes in the governor arm provides for adjustment. To increase sensitivity, move the spring toward the governor shaft. To decrease sensitivity, move the spring toward the linkage end of the governor arm.

If the setting is too sensitive, a hunting condition (alternate increase and decrease in engine speed) will result. If the setting is not sensitive enough, the speed variation between no-load and full-load conditions will be too great. Therefore, the correct sensitivity will result in the most stable speed regulation without causing a surge condition.

Always recheck the speed adjustment after a sensitivity adjustment. Increasing sensitivity will cause a

slight decrease in speed and will require a slight increase in the governor spring tension.

SPEED BOOSTER ADJUSTMENT

After satisfactory performance under various loads is attained by governor adjustments without the booster, connect the booster. Connect the external booster spring to the bracket on the governor linkage. With the plant operating at no-load, slide the bracket on the governor linkage to a position where there is no tension on the external spring.

Apply a full rated electrical load to the generator. The output voltage should stabilize at nearly the same reading at full-load as for no-load operation. The speed may remain about the same or increase when the load is applied, resulting in 1 or 2 cycles higher than the no-load frequency (1 cycle is equal to 60rpm). If the rise in frequency is more than 2 cycles, lessen the internal spring tension. If there is a drop in frequency, increase the internal booster spring tension. To increase the tension, pull out the spring bracket and move the pin to a different hole.

With the booster disconnected, a maximum drop of 5 cycles from no-load to full-load is normal. With the booster in operation, a maximum increase of 2 cycles from no-load to 2/3 load is normal. A drop of 1 cycle at 1/4 load is permissible, giving an overall spread of 3 cycles maximum.

TAPPET ADJUSTMENT

The engine is equipped with adjustable tappets. To

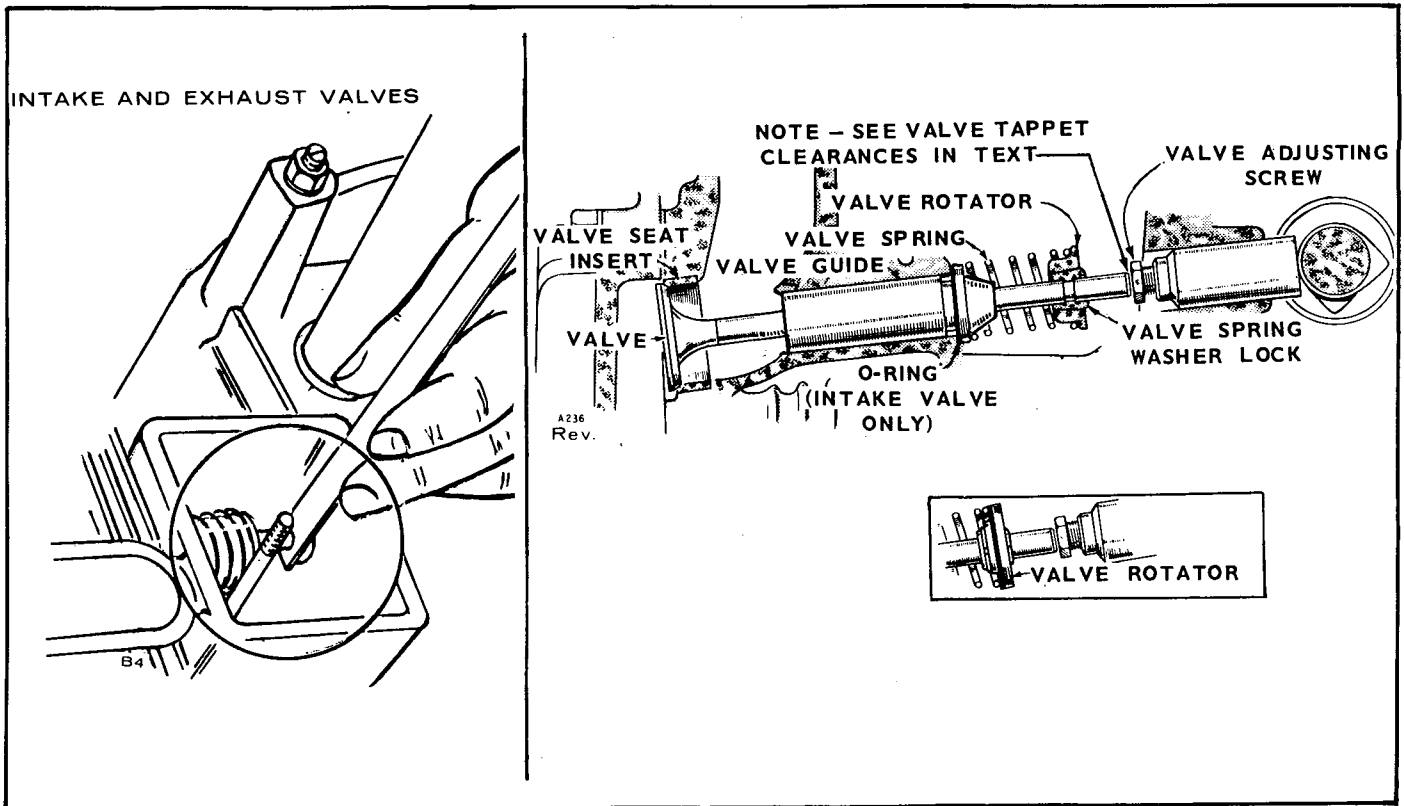


FIGURE 20. TAPPET ADJUSTMENT

make a valve adjustment, remove the valve covers. Crank the engine slowly by hand until the left hand intake valve, when facing the flywheel, opens and closes. Continue about 1/4 turn until the mark on the flywheel and the TC mark on the gear cover are in line. This should place the left hand piston in the necessary position to obtain correct valve adjustment.

Correct valve clearances are .003 for intake and .010 exhaust. For each valve, the gauge should just pass between the valve stem and valve tappet (Figure 20).

To correct the valve clearance, turn the adjusting screw as needed to obtain the right clearance. The screw is self-locking.

To adjust the valves on the right hand cylinder, crank the engine over one complete revolution and again line up the mark on the flywheel and the TC mark on the gear cover. Then follow the adjustment given for the valves of the left hand cylinder.

OIL PRESSURE RELIEF VALVE ADJUSTMENT

Engine oil pressure is adjusted by means of the slotted stud and locknut located near the breather tube. See Figure 21. Oil pressure readings, when the engine is thoroughly warmed up, should be between 30 and 35 lbs. To increase oil pressure, loosen the locknut and turn the stud inward. To decrease oil pressure, loosen the locknut and turn the stud outward. Be sure to tighten the locknut securely after making an adjustment. The spring and plunger can be removed and cleaned.

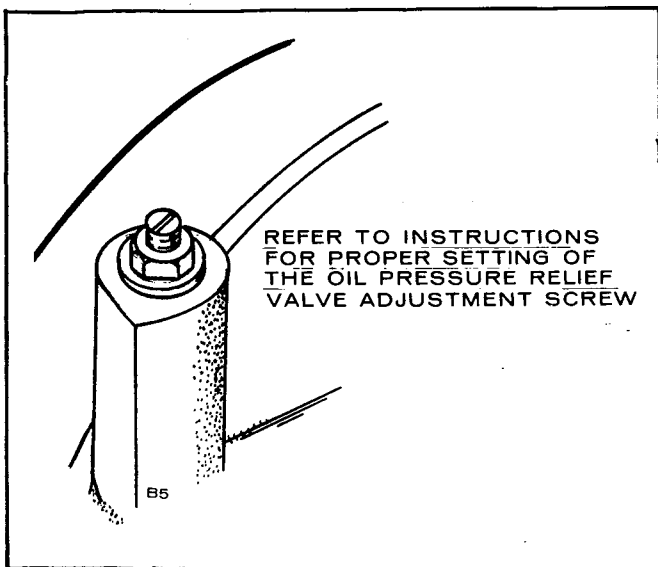


FIGURE 21. OIL PRESSURE RELIEF VALVE ADJUSTMENT

Low oil pressure may indicate worn main or connecting rod bearings, improper clearance at these points, a weak or broken bypass spring, an improperly adjusted bypass or a defective gauge. Check the oil pressure gauge before making any other test; it may be defective.

PARTS CATALOG

INSTRUCTIONS FOR ORDERING REPAIR PARTS

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

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

Always refer to the nameplate on your unit:

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

Onan [®]	
ELECTRIC PLANT	
MODEL AND SPEC. NO.	
[]	
SERIAL NO.	
[]	
IMPORTANT - ALWAYS GIVE ABOVE NOS WHEN ORDERING PARTS	
A.C. VOLTS	PH. []
K.V.A.	WATTS []
P.F.	AMPS [] CY. []
D.C. VOLTS	AMPS []
WATTS []	
GEN. DATA []	
R.P.M.	BAT. []
MANUFACTURED BY ONAN	
<small>DIVISION OF STUDEBAKER CORPORATION MINNEAPOLIS, MINNESOTA MADE IN U.S.A.</small>	
FOR ELECT. EQUIPMENT ONLY	

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

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

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

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

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

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

This catalog applies to the standard NH Mobile Plants 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 plant nameplate, select parts from this catalog that apply to your plant. Unless otherwise mentioned in the description, parts are interchangeable between models. Right and left plant sides are determined by FACING the engine end (front) of the plant.

PLANT DATA TABLE

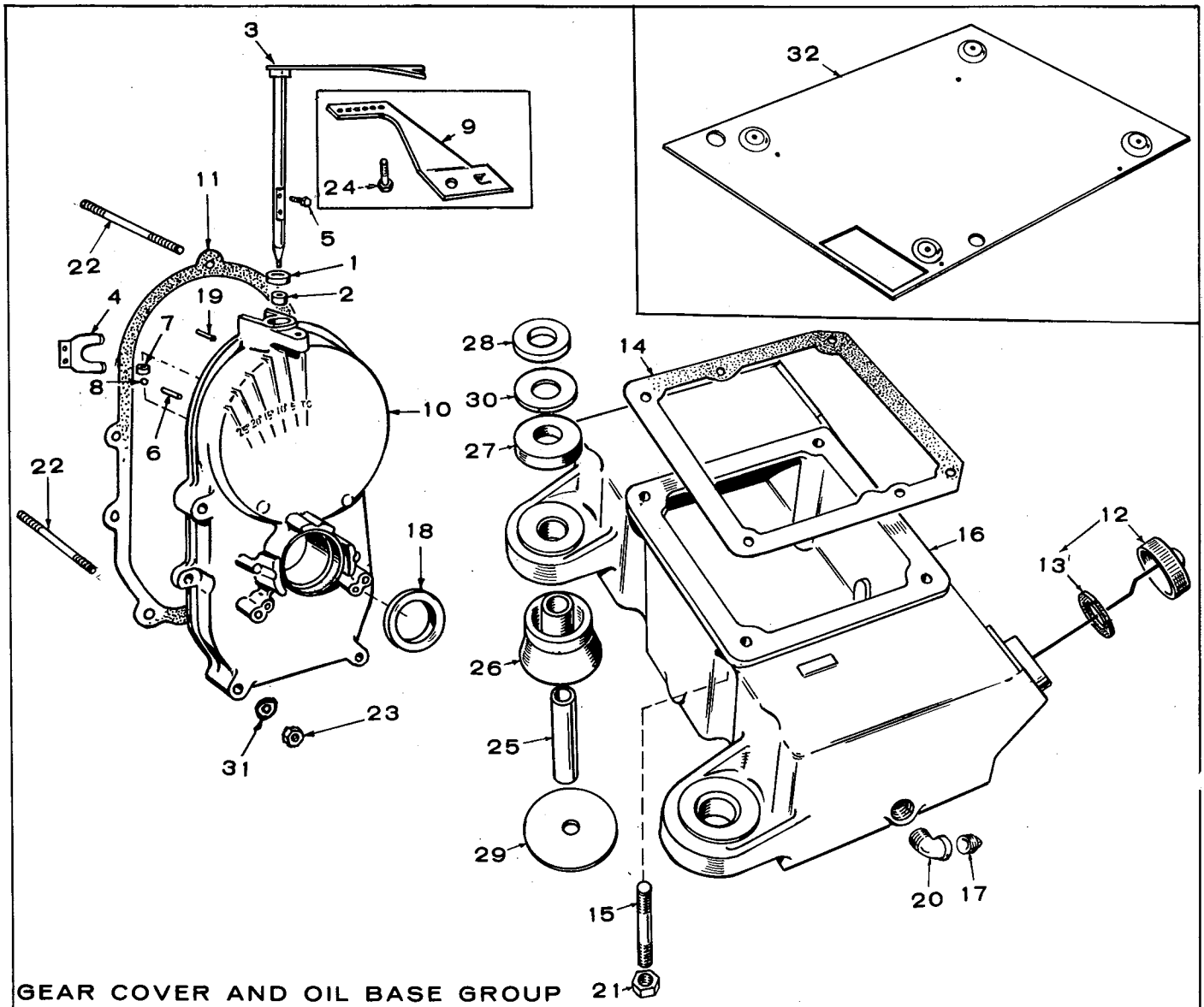
MODEL AND SPEC	ELECTRICAL DATA				
	WATTS	VOLTS	HERTZ	WIRE	PHASE
6.5NH-3CR/*	6500‡	120/240	60	**	1
6.5NH-5DR/*	6500‡	120/240	60	4	3

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

** Plant is reconnectible for 120 volt, 2 wire; 240 volt, 2 wire or 120/240 volt, 3 wire service.

‡ Maximum standby rating is shown. Continuous rating also shown on nameplate.

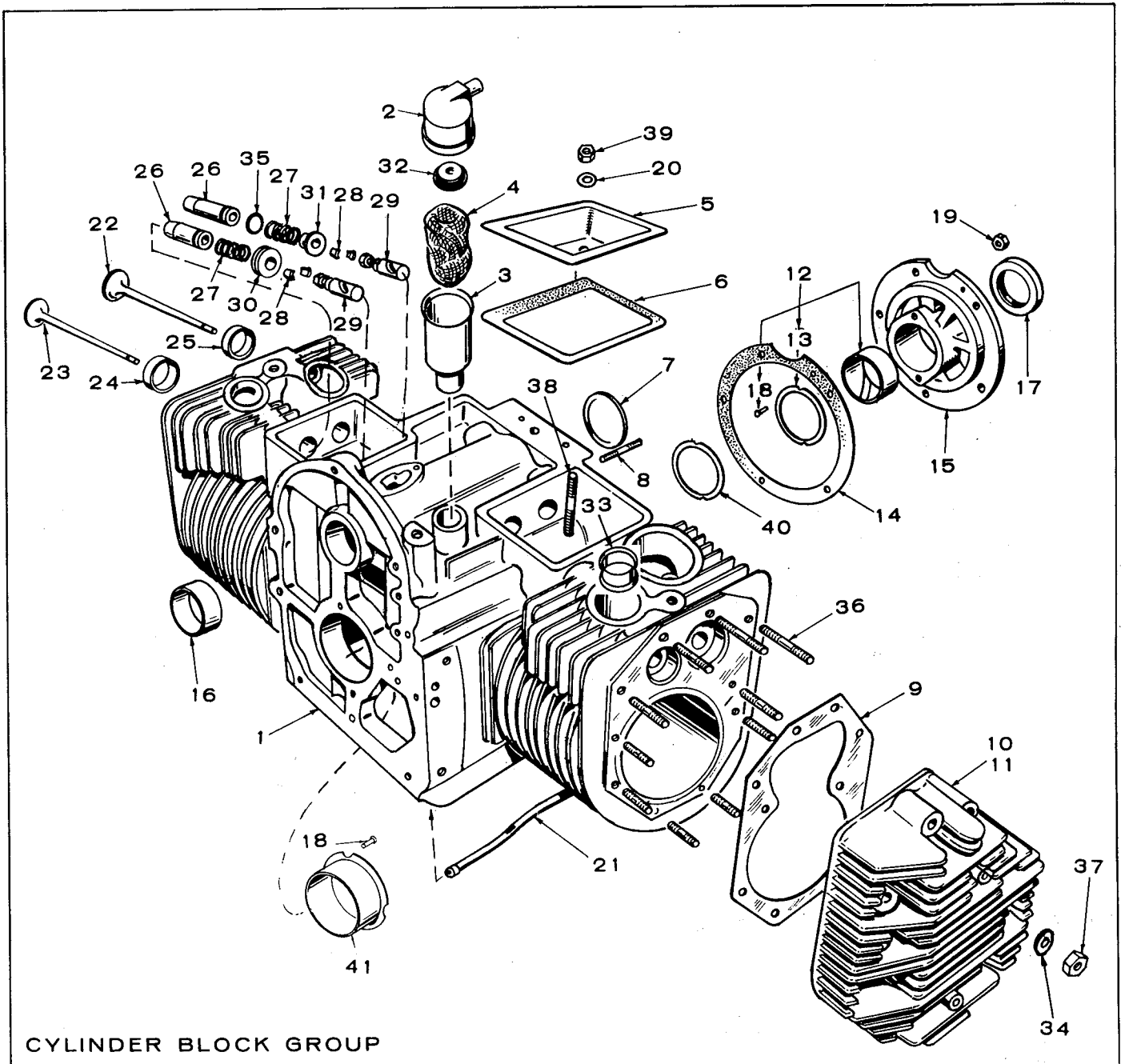
NOTE: Hertz is a unit of frequency equal to one cycle per second.



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	509P8	1	★Seal, Oil - Governor Shaft
2	510P13	1	★Bearing, Governor Shaft (Upper)
3	150B1260	1	★Shaft & Arm, Governor
4	150B1187	1	★Yoke, Governor Shaft
5	815-46	2	★Screw, Yoke Mounting (8-32 x 3/8")
6	516-130	1	★Pin, Governor Cup Stop (In Gear Cover)
7	510A8	1	★Bearing, Governor Shaft (Lower)
8	510P14	1	★Ball, Bearing, Governor Shaft
9	150B1073	1	Extension, Governor Arm
10	103B329	1	Cover Assembly, Gear (Incl. Parts Marked ★)
11	103B11	1	Gasket, Gear Cover
12	123A489	1	Cap & Indicator, Oil Fill
13	123A191	1	Gasket, Oil Fill Cap
14	102B646	1	Gasket, Oil Base Mounting
15	520A712	4	Stud, Oil Base to Block
16	102A672	1	Base, Oil
17	505-56	1	Plug, Oil Drain
18	509A40	1	★Seal, Gear Cover
19	516A11	2	Pin, Gear Cover (5/16 x 1-1/8")

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
20	505-50	1	Elbow, Street - Oil Drain
21	104A91	4	Nut, Hex - Oil Base Stud
22	STUD, GEAR COVER TO BLOCK		
	520A710	4	5/16 x 2-1/8"
	520A711	1	5/16 x 3-11/16"
23	110A445	5	Nut, Gear Cover Mounting Stud
24	815-181	1	Screw, Extension Arm Mtg. (10-32 x 1/2")
25	402A290	4	Bushing, Spacer, Vibration Mount
26	402B284	4	Cushion, Vibration (Front & Rear)
27	402A282	4	Snubber, Shock Mounting
28	526-14	4	Washer (29/64" I.D. x 1-1/2" O.D. x 1/8")
29	526A195	4	Washer (29/64" I.D. x 3-1/4" O.D. x 1/8")
30	526A198	As Req.	Washer (5/8" I.D. x 1-1/2" O.D. x 1/16")
31	526-65	5	Washer (Copper) - Gear Cover Mounting
32	403B958	1	Plate, Mounting - Optional

★ Included in Gear Cover Assembly.

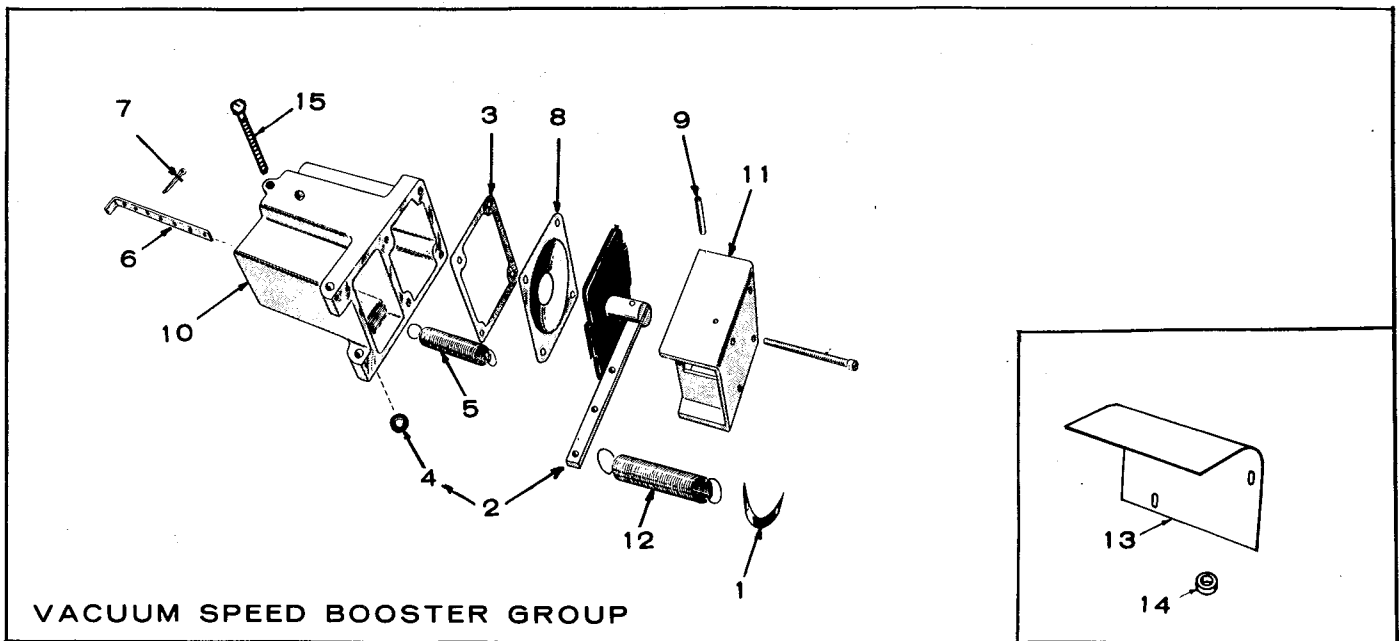


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110A1835	1	Block Assembly, Cylinder (Includes Parts Marked *)	13	104A575	2	*Washer, Crankshaft Bearing Thrust
2	123A787	1	Cap, Breather	14	101B415	1	*Gasket, Bearing Plate
3	123A645	1	Tube, Breather	15	101D407	1	*Plate, Rear Bearing (Excludes Bearing - Includes Pins)
4	123P865	1	Baffle, Breather Tube	16	101B405	2	*Bearing, Camshaft Front & Rear (Precision)
5	110A1624	2	Cover, Valve Compartment	17	509A41	1	Seal, Bearing Plate
6	110B1720	2	Gasket, Valve Cover	18	516A72	4	*Pin, Main Bearing Stop
7	517-48	1	*Plug, Camshaft Expansion	19	104A91	5	*Nut, Bearing Plate Stud
8	520A736	5	*Stud, Rear Bearing Plate Mtg.	20	526-63	2	Washer (Copper), Valve Compartment Cover
9	110C1731	2	Gasket, Cylinder Head	21	120B680	1	Tube, Crankcase Oil
10	110B1905	1	Head, Cylinder - (#2) RH	22	110B1718	2	Valve, Intake
11	110B1906	1	Head, Cylinder - (#1) LH	23	110B1719	2	Valve, Exhaust (Stellite)
12	*BEARING, CRANKSHAFT - REAR			24	*INSERT, EXHAUST VALVE SEAT (STELLITE)		
	101K420	1	Standard		110A1716	2	Standard
	101K420-02	1	.002" Undersize		110A1716-02	2	.002" Oversize
	101K420-10	1	.010" Undersize				
	101K420-20	1	.020" Undersize				
	101K420-30	1	.030" Undersize				

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	110A1716-05	2	.005" Oversize
	110A1716-10	2	.010" Oversize
	110A1716-25	2	.025" Oversize
25	*INSERT, INTAKE VALVE SEAT		
	110A1717	2	Standard
	110A1717-02	2	.002" Oversize
	110A1717-05	2	.005" Oversize
	110A1717-10	2	.010" Oversize
	110A1717-25	2	.025" Oversize
26	*GUIDE, VALVE		
	110A1762	4	Standard
	110A1762-01	4	.001" Oversize
27	110A539	4	Spring, Valve
28	110A639	8	Lock, Valve & Spring Retaining
29	TAPPET, VALVE		
	115A6	4	Standard
	115A6-05	4	.005" Oversize
30	110A904	2	Rotocap, Exhaust Valve
31	110A893	2	Washer, Retainer - Intake Valve Spring
32	123A315	1	Valve, Breather
33	154A1424	2	Insert, Exhaust Port
34	526A250	20	Washer, Flat - Cylinder Head Stud
35	110A68	2	*Gasket, Valve Guide (Intake)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
36	STUD, CYLINDER HEAD MOUNTING		
	520A717	8	3/8" x 1-7/8"
	520A715	8	3/8" x 2-3/4"
	520A716	4	3/8" x 2-1/2"
37	104A91	20	Nut, Flange - Cylinder Head Stud
38	520A714	2	Stud, Valve Box Cover
39	115A25	2	Nut, Hex - Valve Box Cover Stud
40	104A776	As Req.	*Shim (.005"), Crankshaft Thrust
41	*BEARING, CRANKSHAFT - FRONT		
	101K432	1	Standard
	101K432-02	1	.002" Undersize
	101K432-10	1	.010" Undersize
	101K432-20	1	.020" Undersize
	101K432-30	1	.030" Undersize
	800-46	2	Screw, Hex Head Cap (3/8-16 x 1/2) - Cyl. Block
	526-66	2	Washer (3/8 Copper) - Cylinder Block

* Included in Cylinder Block Assembly.

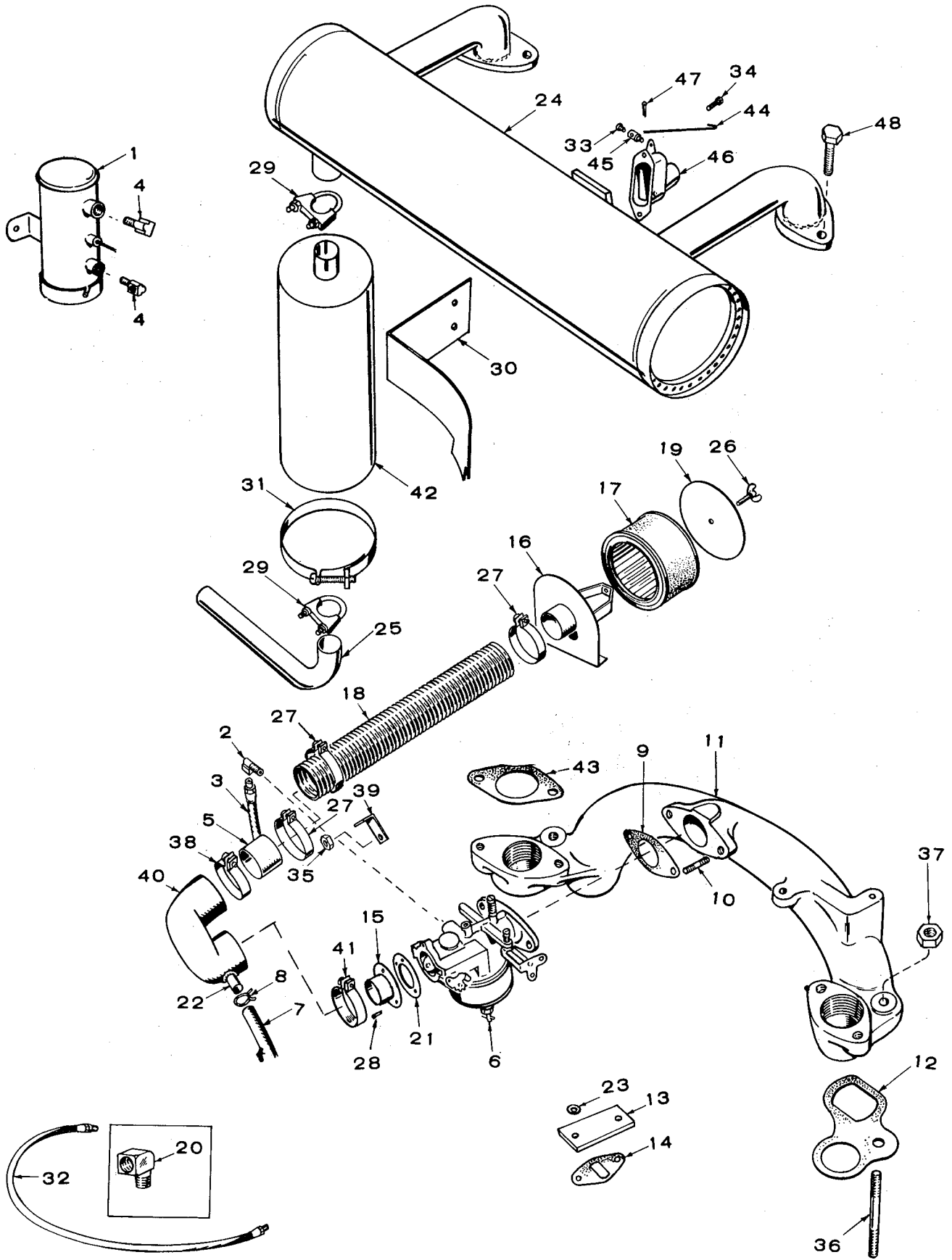


VACUUM SPEED BOOSTER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	150K1030	1	Kit, Vacuum Speed Booster Replacement, Includes External Spring & Mounting Gasket
1	150A430	1	Bracket, Spring to Governor Link
2	150K1031	1	Kit, Diaphragm Replacement, Includes Gaskets
3	150A668	1	Gasket, Diaphragm Plate
4	150A425	1	Gasket, Booster to Manifold
5	150A475	1	Spring, Internal
6	150A376	1	Bracket, Internal Spring Adjustment
7	516-39	1	Pin, Cotter (3/32 x 5/8") Adjusting Bracket

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	150A666	1	Plate, Diaphragm
9	516A85	1	Pin (3/32 x 3/4") Diaphragm Lever Pivot
10		1	Housing, Vacuum Booster (Not Sold Separately)
11		1	Cover, Vacuum Booster Housing (Not Sold Separately)
12	150A471	1	Spring, External
13	150A1332	1	Shield, Heat
14	526A196	2	Washer, Spacer - Shield Mtg.
15	813-111	2	Screw (10-32 x 2-1/4") - Booster Mtg.

FUEL SYSTEM AND EXHAUST GROUP

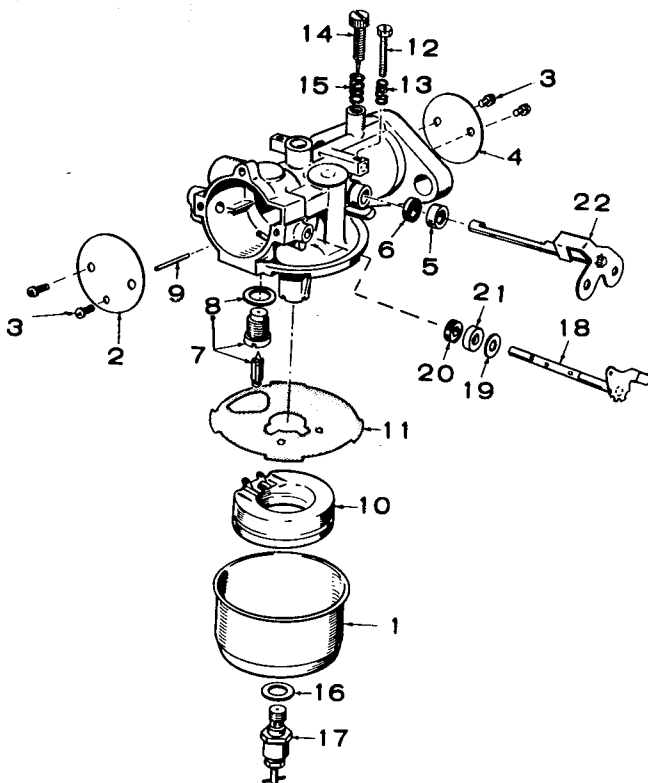


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	149P650	1	Pump, Fuel (Electric)
2	502-2	1	Elbow (90°), Carburetor Inlet
3	501A122	1	Line, Fuel Pump to Carburetor
4	502-2	2	Elbow, Fuel Pump - Inlet & Outlet
5	140A1151	1	Tube, Air Inlet
6	141A801	1	*Carburetor, Gasoline (Sisson Choke)
7	503A486	1	Hose, Breather
8	503-170	2	Clamp, Breather Hose
9	141A281	1	Gasket, Carburetor Mounting
10	520A526	2	Stud, Carburetor Mounting
11	154C1385	1	Manifold, Intake
12	154A1250	2	Gasket, Intake Manifold to Cylinder Block
13	149A136	1	Plate, Fuel Pump Hole Cover
14	149A3	1	Gasket, Fuel Pump Hole Cover Plate
15	145A398	1	Adapter, Carburetor Air Inlet
16	140B1152	1	Bracket, Air Cleaner
17	140B495	1	Cartridge, Air Cleaner
18	503A628	1	Hose, Air Inlet
19	140A1153	1	Cover, Air Cleaner
20	502-20	1	Elbow, Street - Fuel Supply Line
21	140A921	1	Gasket, Adapter to Carburetor
22	123A733	1	Tube, Adapter to Breather Hose
23	526A63	2	Washer (Copper), Hole Cover Plate Mounting
24	MUFFLER, EXHAUST		
	155C1186	1	L.H. Outlet
	155C1178	1	R.H. Outlet - Optional

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
25	155A1189	1	Elbow, Exhaust
26	518-56	1	Screw, Wing - Air Cleaner Cover
27	503-4	3	Clamp, Air Inlet Hose
28	815-199	3	Screw (10-32 x 5/16'') - Adapter Mounting
29	155P1015	2	Clamp, Pipe - Exhaust
30	155B1188	1	Support, Muffler
31	503-622	1	Clamp, Muffler Support
32	501A5	1	Line, Fuel, Flexible (18-1/2'')
33	815-104	1	Screw, Set (8-32 x 5/16'')
34	800-98	2	Screw (10-32 x 3/8'') - Choke Mounting
35	868-2	2	Nut (5/16-24) - Carburetor Mtg.
36	520A713	2	Stud, Intake Manifold Mounting
37	104A91	2	Nut, Intake Manifold Stud
38	503-311	1	Clamp, Hose - Air Cleaner
39	140-1150	1	Bracket, Air Inlet Hose
40	140A1157	1	Elbow, Carburetor Air Inlet
41	503-4	1	Clamp, Hose - Air Inlet Elbow to Adapter
42	155P1181	1	Muffler, Exhaust
43	154A1383	2	Gasket, Exhaust Manifold
44	153A443	1	Linkage, Choke
45	152A155	1	Swivel, Choke Linkage
46	153A223	1	Choke, Sisson
47	516-59	1	Pin, Cotter - Choke
48	800-28	4	Screw (5/16-18 x 1'') - Muffler Mounting

* See separate group for components and service kits.

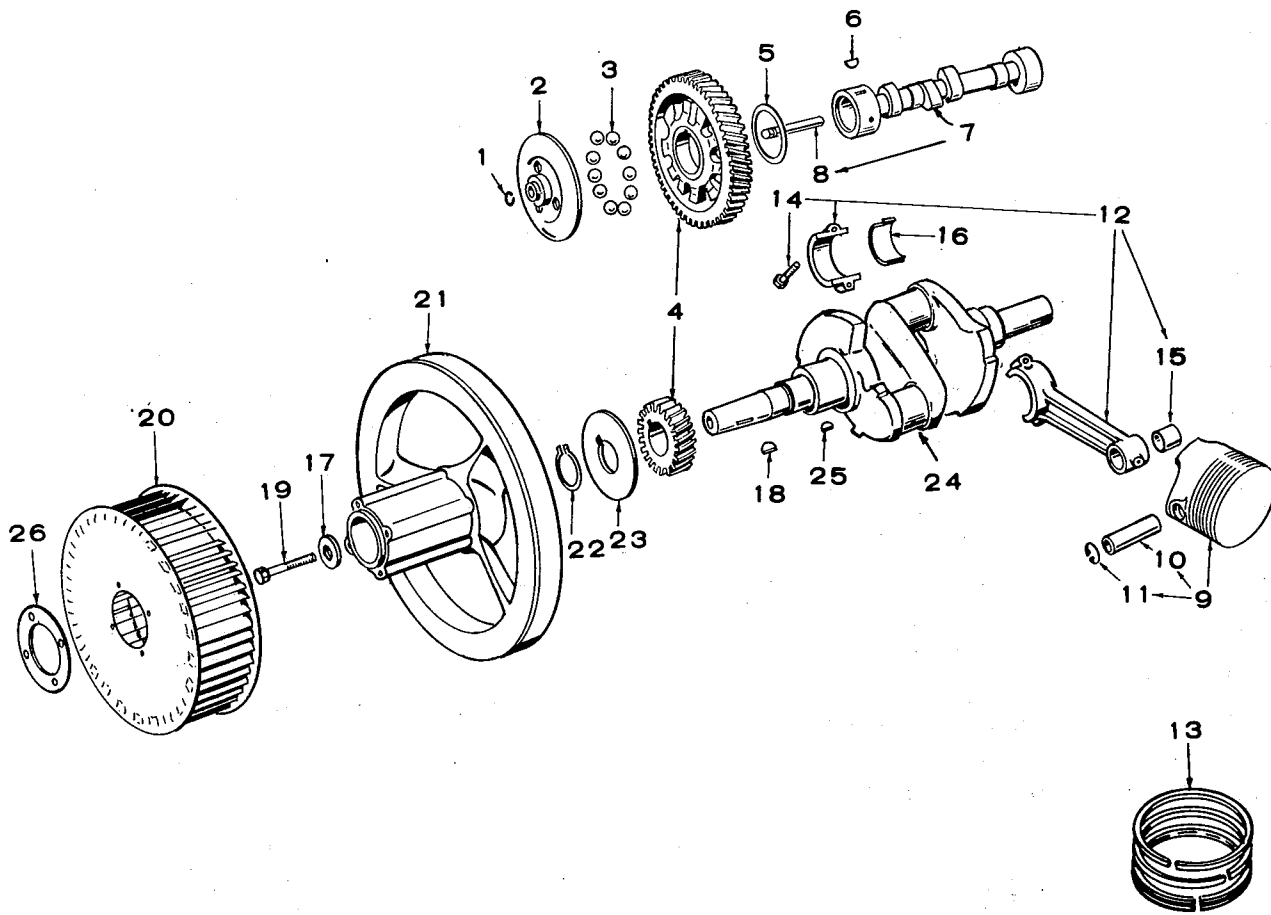
CARBURETOR PARTS GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	141A801	1	Carburetor, Gasoline
	141P747	1	Repair Kit (Includes Parts Marked *)
	141K748	1	Gasket Kit (Includes Parts Marked ★)
	141A281	1	*★Gasket, Carburetor Flange
1	141P708	1	Bowl, Fuel
2	141P741	1	Plate, Choke
3	141P698	4	Screw & Washer, Choke & Throttle Plate Mounting
4	141P793	1	Plate, Throttle
5	141P705	1	*Retainer, Seal
6	141-661	1	*★Seal, Rubber
7	141P704	1	*Valve Seat Assembly, Fuel
8	141P696	1	*Washer, Fuel Valve Seat
9	141P703	1	*Shaft, Float
10	141P702	1	Float Assembly
11	141P701	1	*★Gasket, Bowl to Body
12	141P700	1	Screw, Throttle Stop
13	141P711	1	Spring, Throttle Stop
14	141P713	1	Needle, Idle Adjusting
15	141P710	1	Spring, Idle Needle
16	141A77	1	*★Washer, Main Jet Assembly
17	141P712	1	Jet Assembly, Main (Adjustable)
18	141-742	1	Shaft, Choke
19	141P699	1	Washer, Choke Shaft
20	141P697	1	Seal, Felt
21	141P203	1	Retainer, Felt Seal
22	141P709	1	Shaft & Lever, Throttle

* Parts contained in Repair Kit.

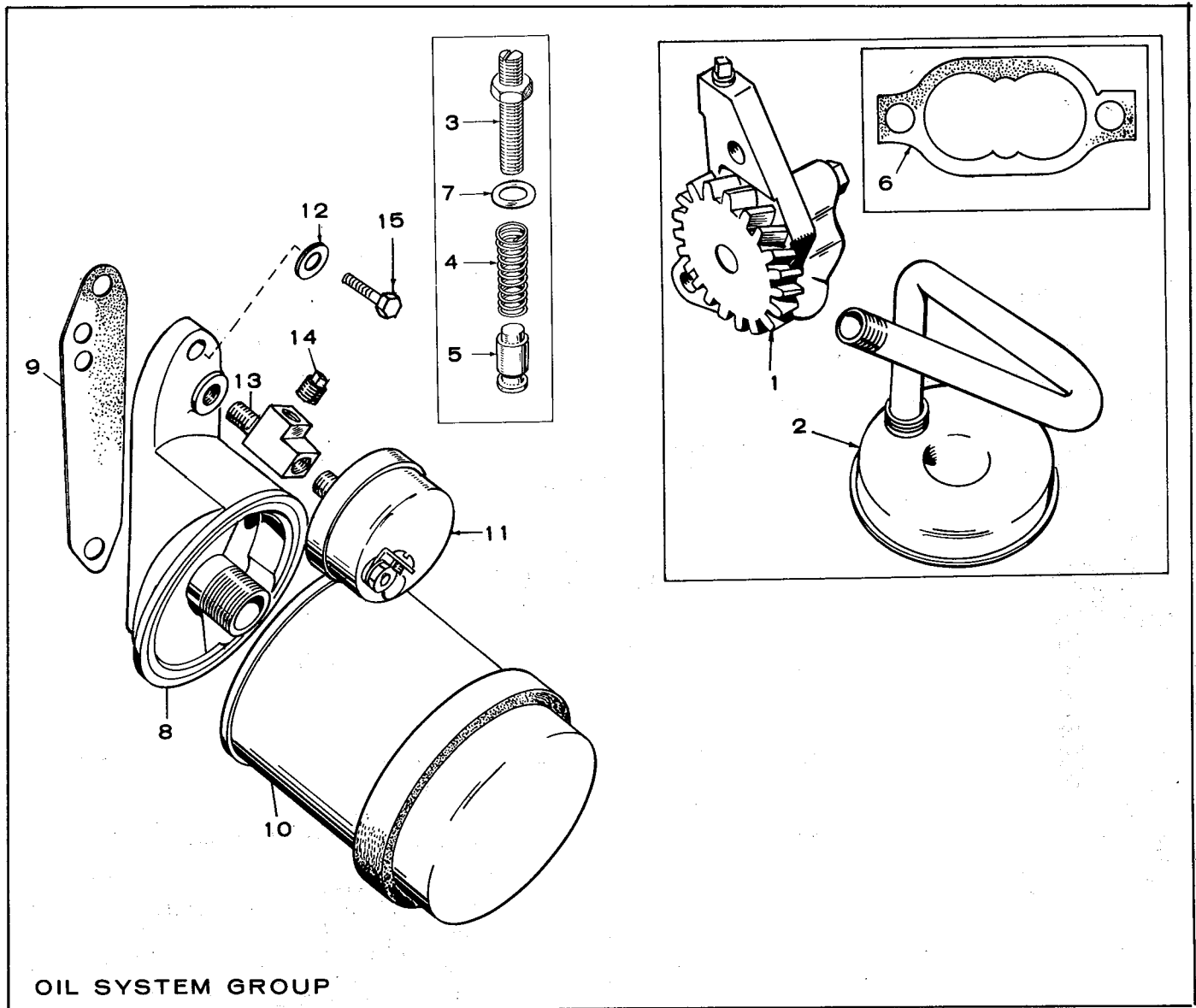
*★ Parts contained in Gasket Kit.



CRANKSHAFT, FLYWHEEL, CAMSHAFT AND PISTON GROUP

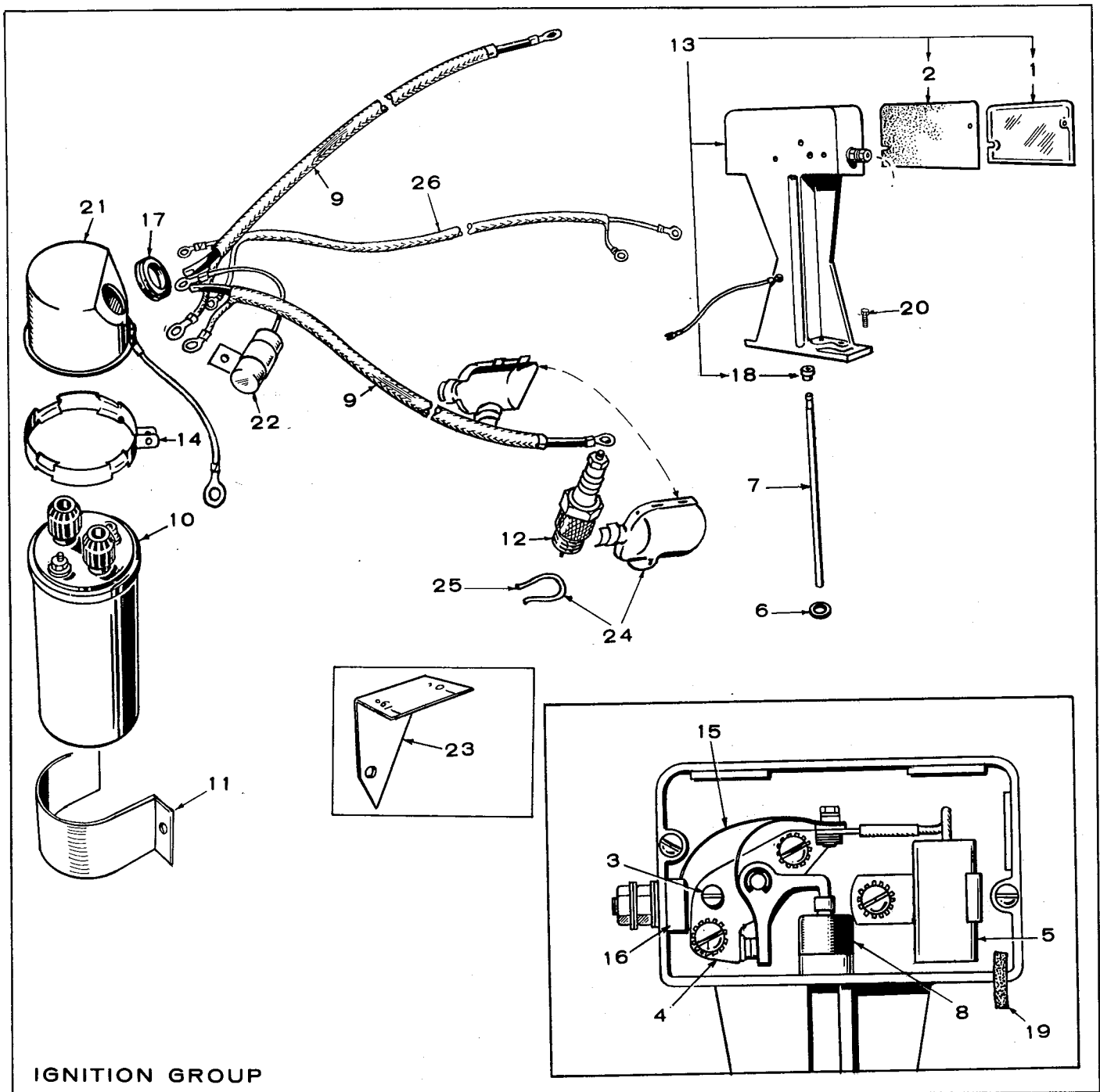
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150A78	1	Ring, Camshaft Center Pin
2	150B1116	1	Cup, Governor
3	510PI5	10	Ball, Fly - Governor
4	105A353	1	Gear Set, Timing - Includes 1 each Crankshaft & Camshaft Gears (Includes Flyball Spacer & Plate)
5	105A4	1	Washer, Camshaft Gear Thrust
6	515PI	1	Key, Camshaft Gear Mounting
7	105B309	1	Camshaft (Includes Center Pin)
8	150A75	1	Pin, Center - Camshaft
9	PISTON AND PIN (INCLUDES RETAINING RINGS)		
	112-111	2	Standard
	112-111-05	2	.005" Oversize
	112-111-10	2	.010" Oversize
	112-111-20	2	.020" Oversize
	112-111-30	2	.030" Oversize
	112-111-40	2	.040" Oversize
10	PIN, PISTON		
	112A112	2	Standard
	112A112-02	2	.002" Oversize
11	518P294	4	Ring, Piston Pin Retaining
12	114C203	2	Rod, Connecting (Includes Bushing & Bolts)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
13	RING SET, PISTON		
	113A142	2	Standard
	113A142-05	2	.005" Oversize
	113A142-10	2	.010" Oversize
	113A142-20	2	.020" Oversize
	113A142-30	2	.030" Oversize
	113A142-40	2	.040" Oversize
14	805A10	4	Bolt, Place - Connecting Rod Cap
15	114A36	2	Bushing, Piston Pin - Connecting Rod
16	BEARING HALF, CONNECTING ROD		
	114B188	4	Standard
	114B188-02	4	.002" Undersize
	114B188-10	4	.010" Undersize
	114B188-20	4	.020" Undersize
	114B188-30	4	.030" Undersize
17	526A17	1	Washer, Wheel Mounting
18	515-2	1	Key, Wheel Mounting
19	104A170	1	Screw, Wheel Mounting
20	134C2130	1	Wheel, Blower
21	104D739	1	Flywheel
22	518PI4	1	Lock, Crankshaft Gear Washer
23	104A43	1	Washer, Crankshaft Gear Retaining
24	104D731	1	Crankshaft
25	515PI	1	Key, Crankshaft Gear Mounting
26	134A911	1	Plate, Blower Wheel



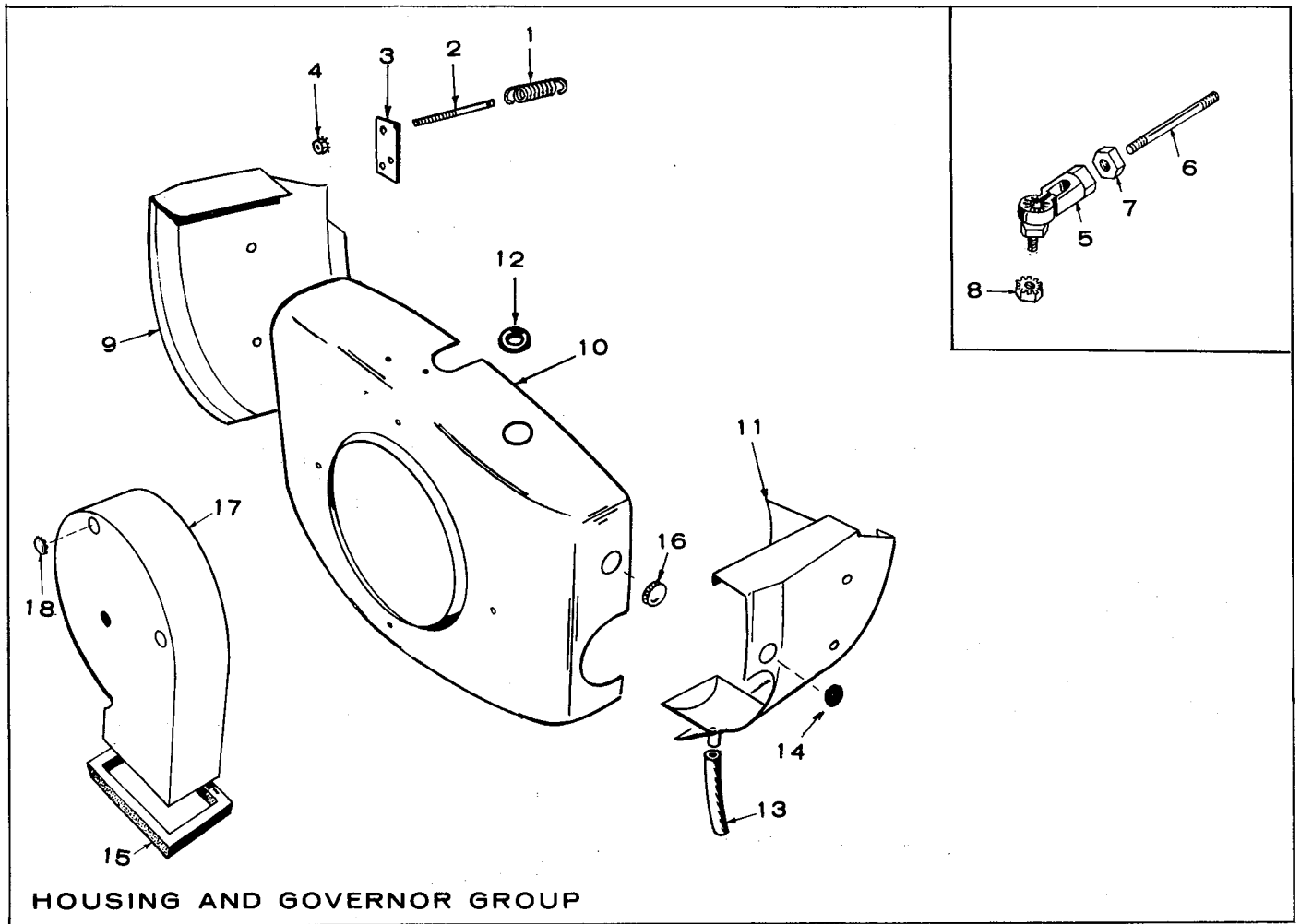
OIL SYSTEM GROUP

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
1	120A491	1	Pump, Oil (Components Not Sold Separately)
2	120B400	1	Intake, Oil Pump - Includes Cup, Screen & Pipe
3	120A187	1	Stud Assembly, By-Pass Adjusting (Includes Nut)
4	120A140	1	Spring, By-Pass Valve
5	120A398	1	Valve, By-Pass
6	120K161	1	Gasket Kit, Oil Pump
7	526-66	1	Washer, Oil Pressure Relief Valve Adjusting Screw
8	122D320	1	Adapter, Oil Filter
9	122A321	1	Gasket, Adapter
10	122B323	1	Filter, Oil
11	309A10	1	Switch, Low Oil Pressure
12	526-65	2	Washer (Copper), Adapter Mounting
13	502-58	1	Tee, Low Oil Pressure Switch
14	505-57	1	Plug (1/8)
15	800-28	2	Screw (5/16-18 x 1") - Adapter Mounting



IGNITION GROUP

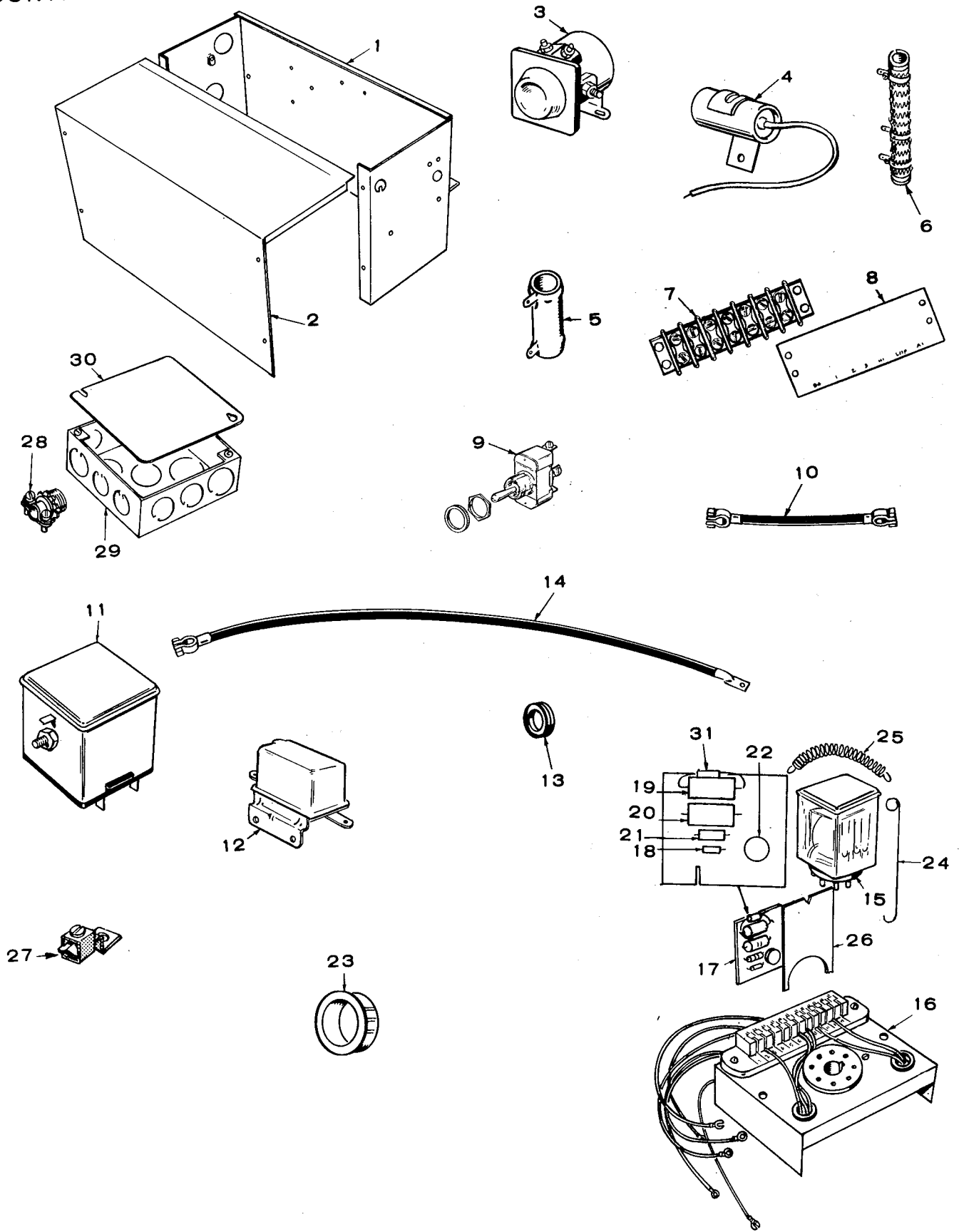
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	160A930	1	Cover, Breaker Box	14	166A541	1	Clamp, Coil Cover
2	160A150	1	Gasket, Breaker Box Cover	15	160A428	1	Strap, Point Set to Terminal Block
3	160A75	1	Cam, Point Gap Adjusting	16	160A349	1	Block & Terminal Assembly
4	160A2	1	Point Set, Breaker	17	508PI	1	Grommet, Ignition Coil Cover
5	312A69	1	Condenser, Breaker Points	18	160A1041	1	Bushing, Breaker Box (Bottom)
6	160A1040	1	Gasket, Breaker Box Mounting	19	160A261	1	Wick, Breaker Box
7	160A723	1	Plunger	20	815-313	2	Screw, Mounting - Breaker Box
8	160A263	1	Diaphragm, Breaker Box	21	166A563	1	Cover, Ignition Coil
9	167A1553	2	Cable, Spark Plug	22	312A27	1	Condenser (.5Mfd.), Ignition Coil Suppression
10	166B535	1	Coil, Ignition	23	166B519	1	Bracket, Timing
11	166B577	1	Clamp, Coil	24	167A67	2	Shield, Spark Plug (Includes Clamp & Shield)
12	167-28	2	Plug, Spark	25	167A64	2	Clamp, Spark Plug Shield
13	160A1135	1	Box, Breaker (Includes Points, Condenser, Cover, Gasket & Bushing)	26	336A2080	1	Lead Assy., Shielded



HOUSING AND GOVERNOR GROUP

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
1	150A731	1	Spring, Governor
2	150A1331	1	Stud, Speed Adjustment
3	134A2321	1	Bracket, Speed Stud
4	870-131	1	Nut, Speed Adjustment
5	150A939	2	Joint, Ball
6	520A623	1	Link, Throttle
7	870P188	2	Palnut, Locking
8	870-131	2	Nut, Keps
9	134D2141	1	Housing, Cylinder Air - Left
10	134C2330	1	Housing, Blower
11	134B2142	1	Housing, Cylinder Air - Right
12	508P166	1	Grommet, Rubber
13	503-391	1	Hose, Oil Drain
14	508-162	1	Grommet, Rubber
15	134A2231	1	Seal, Air Scroll
16	517-35	1	Plug, Dot Button (1-1/16")
17	134A2324	1	Scroll, Air
18	517-21	2	Plug, Dot Button (7/8") - Air Scroll

CONTROL GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	301C3404	1	Box, Control
2	301B3405	1	Cover, Control Box
3	307B845	1	Solenoid, Start
4	312A57	1	Condenser (1.0 Mfd.) Start Solenoid Suppression
5	RESISTOR, FIXED		
	353A6	1	6-Ohm, 50 Watt
	304A251	1	30-Ohm, 5 Watt
6	304A632	1	Resistor, Adjustable (6-Ohm, 100 Watt)
7	332A745	1	Block, Terminal, Remote Control
8	332A1412	1	Strip, Marker
9	308P154	1	Switch, Start-Stop
10	416A4	1	Cable, Battery Jumper
11	307B1052	1	Relay, Stop
12	305B383	1	Relay, Voltage Regulator
13	508-4	1	Grommet, For 5/8" Hole
14	416A77	2	Cable, Battery (28")

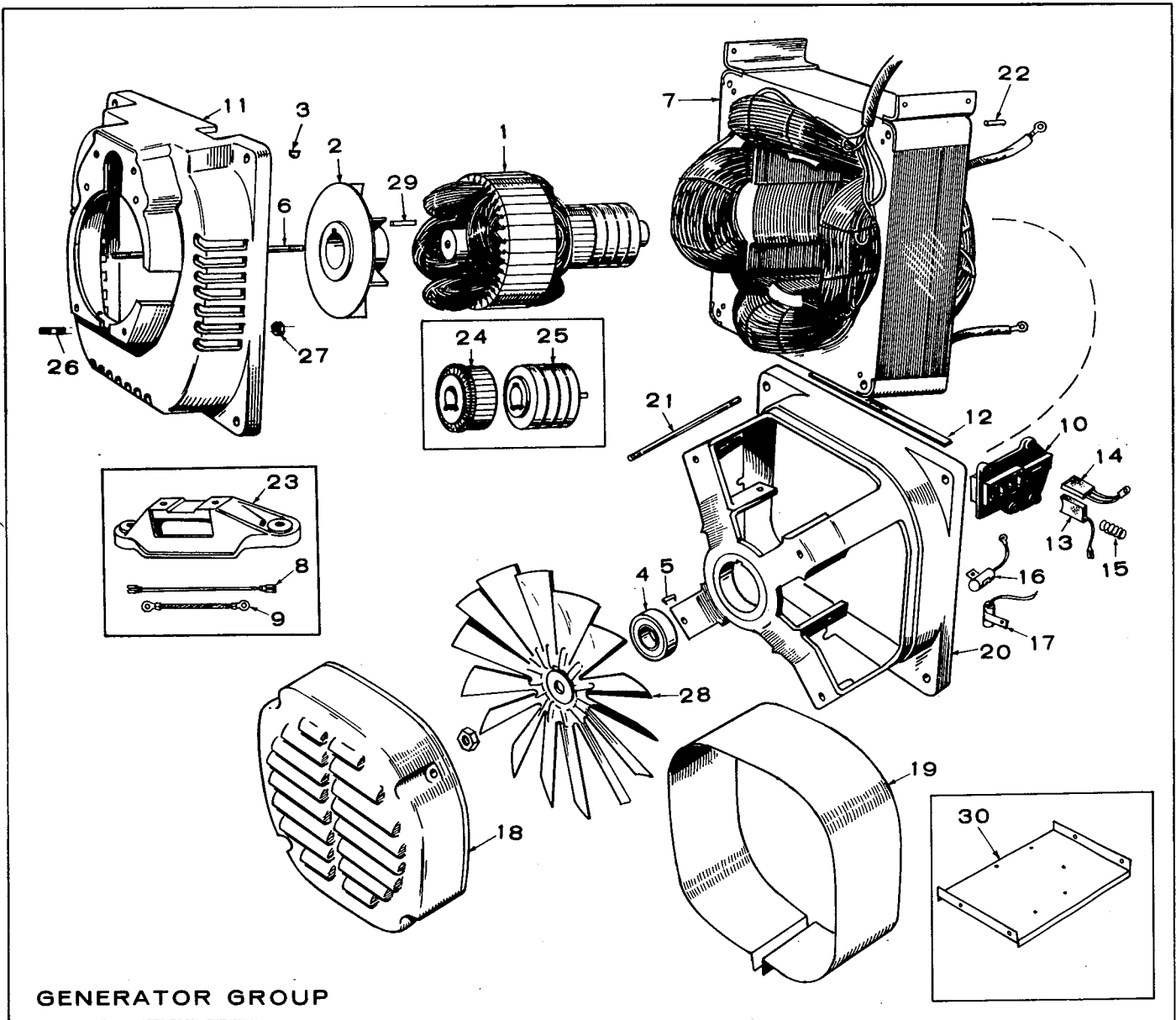
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
15	307B1070	1	Relay, Start-Disconnect
16	323B818	1	Socket & Chassis Assembly, Start-Disconnect (Includes Leads)
17	300A734	1	Amplifier Assembly, Start-Disconnect (Includes Parts Marked *)
18	359-28	1	*Diode, Zener
19	350-979	1	*Resistor, 470-Ohm, 2 Watt
20	350-985	1	*Resistor, 820-Ohm, 2 Watt
21	350-397	1	*Resistor, 2700-Ohm, 1/2 Watt
22	362A10	1	*Transistor
23	331A88	2	Bushing (Nylon)
24	301A3305	2	Hook, Hold-down Spring
25	301A3306	1	Spring, Relay Hold-down
26	301A3307	1	Spacer, Relay to Amplifier
27	332-142	As Req.	Terminal, Solderless
28	331-27	1	Connector, Output Box
29	330B28	1	Box, AC Output
30	330-6	1	Cover, Output Box
31	350-536	1	*Resistor, 1000-Ohm, 1/2 Watt

* Included in Amplifier Assembly

SERVICE KITS AND MISCELLANEOUS

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

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	98C1100	1	Decal Kit
	168K115	1	Gasket Kit, Carbon Removal
	168K113	1	Gasket Kit, Complete Engine
	160K836	1	Ignition Tune-up Kit
	522K262	1	Overhaul Kit, Engine



GENERATOR GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*	1	Rotor Assembly, Wound	16	312A17	2	Condenser (.5 Mfd.) DC
2	232C2108	1	Hub, Drive	17	312A58	3	Condenser (.1 Mfd.) AC
3	515-6	1	Key, Rotor to Crankshaft	18	232D2107	1	Cover, Generator Fan
4	510A47	1	Bearing (Ball), Rotor	19	234C362	1	Wrapper, End Bell
5	232A596	1	Clip, Bearing Stop	20	211E187	1	Bell, End
6	520A733	1	Stud, Rotor Through	21	520A730	4	Stud, Generator Through
7	*	1	Stator Assembly, Wound	22	516-182	8	Pin, Roll, Generator Frame (1/4 x 3/4")
	LEAD ASSEMBLY, BRUSH			23	232D2109	1	Support, Generator
8	336A1891	4	Blade Type Terminals (9")	24	COMMUTATOR		
8	336A1890	1	Blade Type & Round Type Terminal (4")	203A150	1	120/240 Volt, 1 Phase	
9	336A186	2	Ground, Jumper (3-1/2")	203A151	1	120/240 Volt, 3 Phase	
10	BLOCK ASSEMBLY, BRUSH			25	204B107	1	Collector Ring
	212C345	2	Lower & Right	26	520A737	4	Stud, Generator Adapter Mounting (3/8 x 2")
	212C346	2	Upper & Left	27	104A91	4	Nut, Generator Adapter Mounting (3/8)
11	231E150	1	Adapter, Generator to Engine	28	205C90	1	Fan, Generator
12	232A2149	1	Seal, End Bell to Stator Assembly	29	515A142	1	Key, Drive Hub
13	214A95	4	Brush, Commutator	30	232B2216	1	Bracket, Stator Cover
14	214A96	8	Brush, Collector Ring				
15	212A1232	12	Spring, Brush				

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

OWNER'S WARRANTY SERVICE
ENGINE DRIVEN ELECTRIC GENERATOR
SEPARATE GENERATORS, INVERTERS

CUSTOMER SERVICE

MAINTENANCE

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

Maintenance is divided into two categories:

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

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

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

Onan
Minneapolis, Minnesota 55432

MSS-22

Replaces 23B054

Rev. 12-1-69



CUSTOMER SERVICES

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

QUALITY OF PRODUCT

Onan products are engineered and designed to perform as stated on product nameplate and published specification. Only quality material and workmanship are used in the manufacture of this product. With proper installation, regular maintenance and periodic repair service, the equipment will provide many enjoyable hours of service.

GENERAL WARRANTY PRACTICES

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

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

Warranty Authorization: Warranty service must be performed by Onan Factory or Onan Authorized Parts and Service Centers or their Approved Service Dealer. A complete listing of Onan Authorized Parts and Service Centers is provided in our brochure F-115, a copy of which is shipped with each Onan Product. The company names which appear in bold face, capital letters, are the Onan Authorized Service Centers responsible for handling parts, service and warranty adjustments of Onan Products. These organizations have Onan factory-trained service personnel, parts stock, and the necessary facilities and tools for the service and repair of Onan equipment. The company names which appear in bold face, small letters, are Approved Service Dealers under the Onan Authorized Parts and Service Center. They have Onan factory-trained personnel and also handle parts, service and warranty.

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

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

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

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

ONAN

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A DIVISION OF ONAN CORPORATION

INTERNATIONAL OFFICE: EMPIRE STATE BUILDING, NEW YORK, N.Y.

