

# **OPERATORS MANUAL AND PARTS CATALOG**



**ONAN**

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

*A DIVISION OF STUDEBAKER CORPORATION*

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# ONAN ELECTRIC GENERATING SETS NH SERIES

940-301

12AC71

## 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**

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**IMPORTANT...RETURN WARRANTY CARD ATTACHED TO UNIT**

## **INTRODUCTION**

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

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

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

FOR MAJOR REPAIR SERVICE, CONTACT YOUR ONAN AUTHORIZED DISTRIBUTOR.

# GENERAL INFORMATION

This manual contains installation and operation instructions as well as information required for proper maintenance, adjustment and repair of the unit. Since the first and most important part of repair work is the correct diagnosis of the trouble, a troubleshooting chart is included.

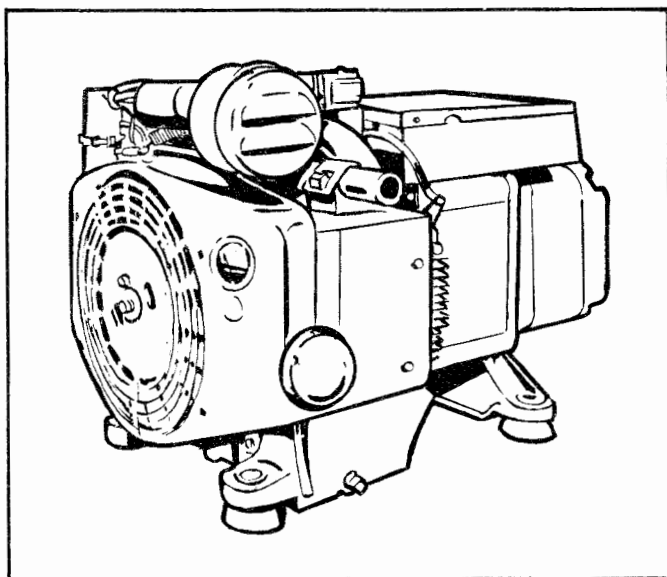
Study and follow the instructions carefully. Proper service and maintenance will result in longer unit life and better performance.

## How to interpret MODEL and SPEC NO.

6.5 NH - 3CR / 1 C

1      2      3 4

1. Factory code for SERIES identification.
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.)



TYPICAL MODEL NH



## MANUFACTURER'S WARRANTY

Onan 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 Onan's instructions.

Onan will, under this warranty, repair or replace, as Onan may elect, any part which on examination shall disclose to Onan's satisfaction to have been defective in material and workmanship; provided that such part shall be returned to Onan's factory or one of its Authorized Service Stations, transportation charges prepaid, not later than one (1) year after the product is first placed in service. Such defective part will be repaired or replaced free of charge, including labor (in accordance with rates approved by Onan) during the stated one (1) year coverage under this warranty.

THIS WARRANTY AND ONAN'S OBLIGATION THEREUNDER IS IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES, INCLUDING LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGE.

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

**ONAN** 1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55422  
A DIVISION OF ONAN CORPORATION

## NOTES

# SPECIFICATIONS

Nominal dimensions of set (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 hertz) .....	1800
RPM (50 hertz) .....	1500
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
Ventilation Required (cfm 1800rpm)	
Engine (Pressure Cooling) .....	570
Engine (Vacu-Flo Cooling) .....	650
Generator .....	100
Combustion .....	25
AC voltage regulation in $\pm$ % .....	7
AC frequency regulation in % .....	5
Rating (output in watts)	
50 hertz .....	5500
60 hertz .....	6500
Spark Plug Gap - Gasoline .....	0.025
Spark Plug Gap - Gaseous Fuel .....	0.018

## FEATURES

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

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



# TROUBLE-SHOOTING GUIDE

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

		TROUBLE													
		CAUSE													
COOLING SYSTEM	Blown Head Gasket	●	●												
	Overheating								●	●			●	●	
	Dirt on Cooling Fins												●		
	Inadequate Air Circulation (Ventilation)								●				●		
FUEL SYSTEM	Out of Fuel, or Shut-off Valve Closed	●													
	Poor Quality Fuel	●	●						●					●	
	Dirty Fuel Filter	●	●												
	Fuel Line Leaks	●	●		●				●						
	Mixture Too Rich	●							●				●		
	Mixture Too Lean	●	●										●		
	Engine Flooded	●											●		
	Run for Long Periods of Time at No Load		●												
GOVERNOR SYSTEM	Restricted Air Intake, Dirty Air Filter	●	●						●					●	
	Linkage Loose or Disconnected						●								
	Linkage Binding				●	●	●								
	Excessive Wear in Linkage				●	●	●								
	Incorrect Governor Adjustment			●	●	●	●								
LUBRICATION SYSTEM	Spring Sensitivity Too Great			●	●										
	Low Oil Supply										●		●	●	
	Defective Gauge										●	●			
	Excess Oil in Crankcase								●		●				●
	Oil Leaks From Engine Base or Connections								●						
	Crankcase Oil Too Light or Diluted								●		●		●	●	●
STARTING SYSTEM AND IGNITION SYSTEM	Crankcase Oil Too Heavy	●									●				
	Battery Discharged or Defective	●	●												
	Loose Battery Connections	●	●												
	Load Connected When Starting	●													
	Open Solenoid	●	●												
	Defective Starter	●	●												
	Wrong Plug or Point Setting	●	●												
	Incorrect Timing	●	●						●				●	●	●
	Spark Too Far Advanced												●	●	

# INSTALLATION

## GENERAL

Each installation must be considered individually. Use these instructions as a general guide. Be sure to comply with local building codes, fire ordinances etc. Some important points to consider for installation are:

- Location and mounting
- Sufficient ventilation and cooling
- Electrical and fuel connections
- Exhaust gas discharge

## LOCATION AND MOUNTING

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

A permanent installation needs a sturdy, level mounting base of concrete, heavy wood or structural steel at least 12" high to aid oil changing and operating.

Carefully assemble the mounting cushions, washers and spacer bushing. See Figure 1. The spacer bushing prevents compression of the snubber (upper rubber cushion). Space the 7/16" mounting bolts as shown in Figure 1.

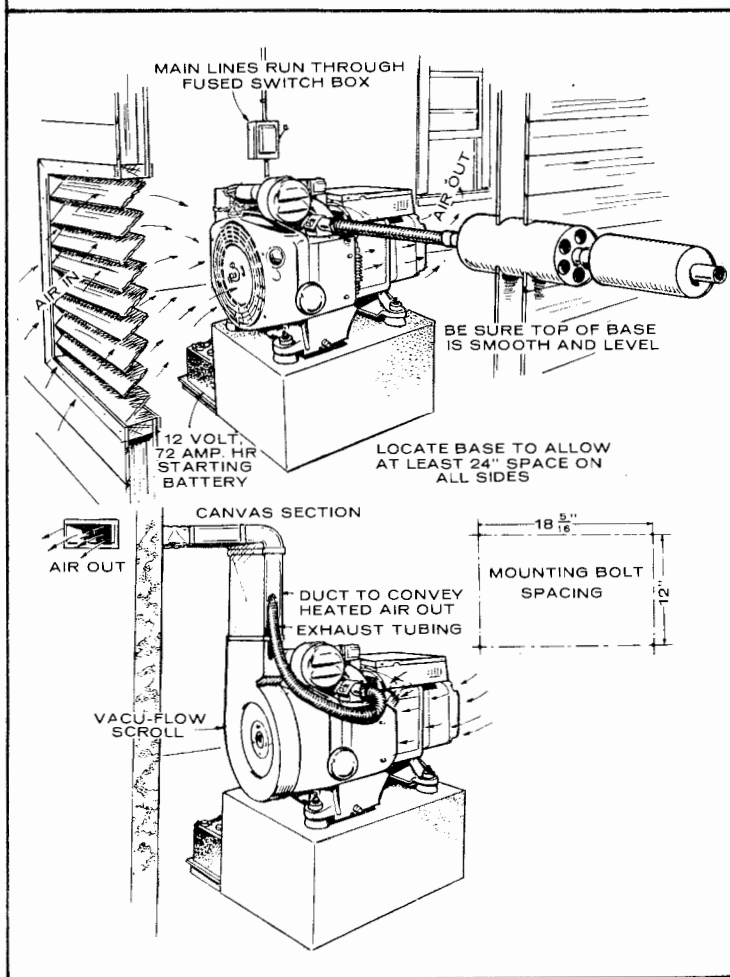
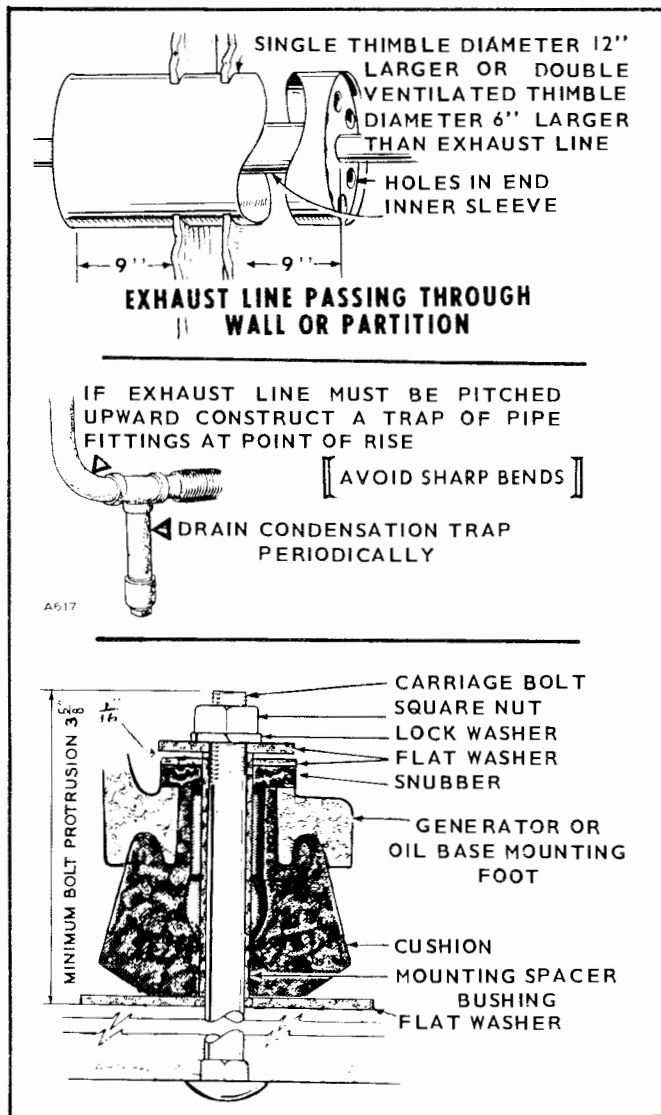


FIGURE 1. TYPICAL INSTALLATION



## VENTILATION AND COOLING

Air circulation is needed to dissipate heat produced by the engine and generator in normal operation. Outdoor installations can rely on natural circulation, but indoor or housed installations need properly sized and positioned vents for required air flow. See Specifications for the air requirements.

Vent sizes depend on variable conditions:

1. Size of enclosure
2. Ambient temperature
3. Electrical load
4. Running time
5. Restrictions imposed by screens, louvers, shutters or filters
6. Prevailing wind direction

Remember that a required volume of air must reach the unit, absorb the heat, and be discharged away from the installation. Pressure cooled units need an inlet vent with an unrestricted opening of at least two square feet.

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

## VACU-FLO COOLING

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

### WARNING

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

## EXHAUST

### WARNING

**EXHAUST GASES ARE DEADLY POISONOUS!**

Vent exhaust gases outside. Use flexible tubing between the plant 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 plant air intake.

## GASOLINE TANK

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.

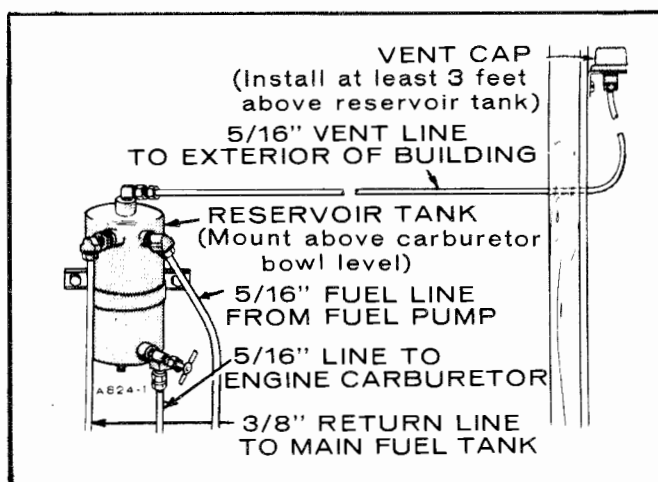


FIGURE 2. AUXILIARY FUEL TANK

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 plant.

If fuel lift exceeds 4 feet, install an auxiliary electric fuel pump to the fuel supply. Remove the engine mounted pump and use cover 149A136 and gasket 149A3 to seal the fuel pump opening. Connect to control terminal marked IGN and to ground. If an auxiliary reservoir fuel tank is used for a standby installation note that the fuel line connections must be changed (Figure 2).

## FUEL CONNECTION

Connect the fuel line to the fuel pump inlet. A short length of flexible line is provided on the fuel pump to help prevent line failure due to vibration.

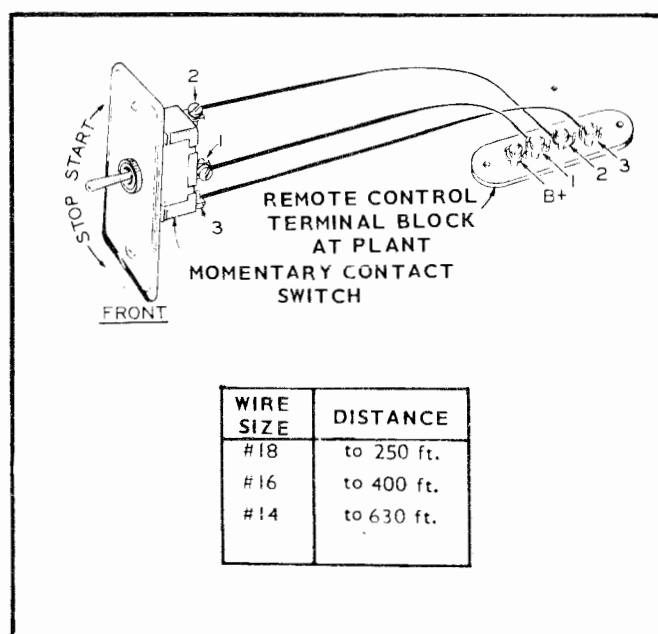


FIGURE 3. REMOTE SWITCH CONNECTIONS

## REMOTE START-STOP CONTROLS

Standard 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 separate switches and wire them in parallel (Figure 3). Any number of switches may be used.

## BATTERY CONNECTION

Connect battery positive (+) to the start solenoid (located in the control box). Connect the battery negative (-) to a good ground on the generator frame. Enter control box side to install battery cable.

### CAUTION

*Do not disconnect starting batteries while plant is running. The resulting overvoltage condition will damage electric choke and may damage control components.*

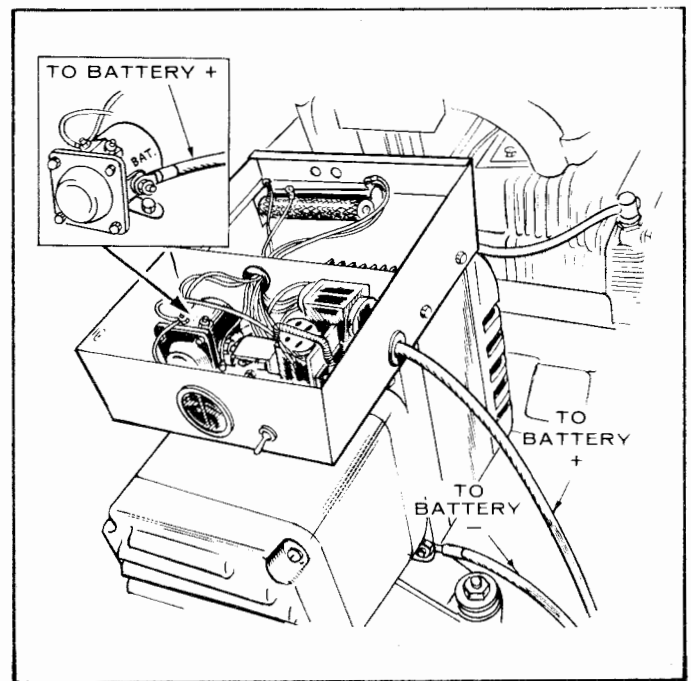


FIGURE 4. BATTERY CONNECTIONS

## LOAD WIRE CONNECTIONS

The plant nameplate shows the electrical output rating of the plant in watts, volts and hertz. 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 control box has knockout sections to accommodate load wires. Use flexible conduit and stranded load wires near the plant to absorb vibration. Use sufficiently large insu-

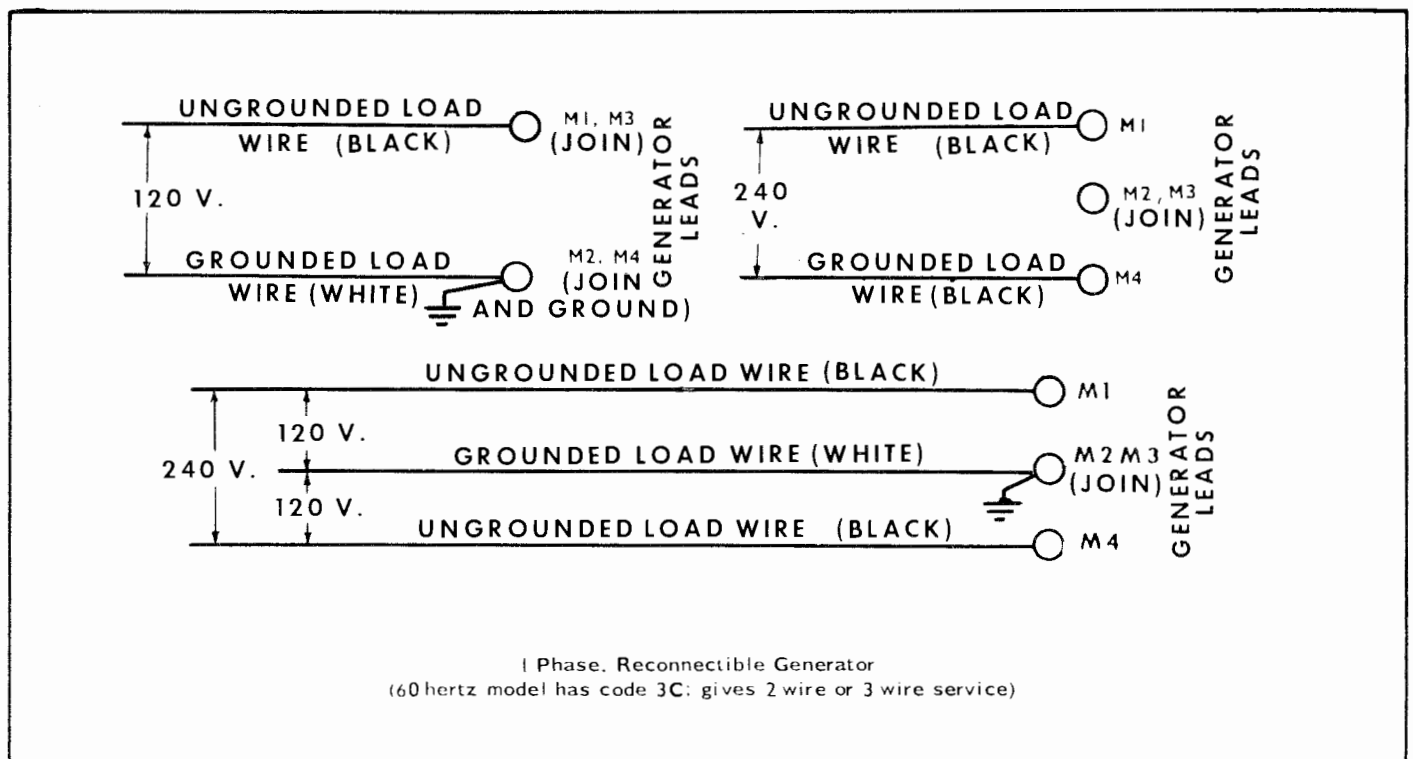


FIGURE 5. LOAD CONNECTIONS

lated 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 control box. Insulate bare ends of ungrounded wires. Connect the grounded generator lead and load wire to the ground terminal on the side of the control box. Install a fused main switch (or circuit breaker) between the generating plant and the load.

If a test run indicates wrong rotation of 3 phase motors in the load circuit, switch the connections at any two generator terminals.

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

**Voltage Selection on Reconnectible Single Phase Generators:** Model 6.5NH-3C is reconnectible 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.

**Standby:** If the installation is for standby service, install a double-throw transfer switch (either manual or automatic) to prevent feeding generator output into the normal power source lines and to also prevent commercial power and generator output from being connected to the load at the same time. Instructions for connecting an automatic load transfer switch are included with such equipment.

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# OPERATION

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## BEFORE INITIAL START

Be sure the crankcase has been filled with oil. Fill to the "FULL" mark on the oil level indicator. Use a good quality heavy duty oil with the API designation MS, MS/DG, SD or SD/CC. Do not use an oil with the API designation DS only. Use the proper grade oil for the expected temperatures.

Refer to the Maintenance Section for recommended oil changes and complete lubricating oil recommendations.

Fill the fuel tank with clean, fresh, regular grade automotive gasoline. Do not use highly leaded premium types.

### **WARNING**

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

## ELECTRIC STARTING

**Remote Control:** Push the start-stop switch to its "start" position. Release the switch as soon as the plant starts.

## APPLYING LOAD

If practicable, 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.

## BREAK-IN PROCEDURE

The unit should be run in the following sequence using MS-DG, DM, SD-CC oil (see oil requirements for correct viscosity).

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

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

## STOPPING THE ENGINE

Where practical, disconnect all load before stopping the engine. Engines equipped with battery ignition are stopped by momentary contact of the ignition switch to the "OFF" position.

## BATTERY CHARGING

The battery charge rate is controlled by a charge regulator. The regulator is set to allow the proper rate of charge at operating speed. Do not attempt to change this adjustment.

## EMERGENCY OPERATION IF BATTERY FAILS

The remote-type revolving armature plant needs a battery for electric choke and ignition. If the battery fails completely and the plant must be operated during an emergency, a battery can be shared with other equipment.

## 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.

## LOW TEMPERATURES

1. Use correct SAE No. oil for temperature conditions. Change oil only when engine is warm.
2. Use fresh fuel. Protect against moisture condensation.
3. Keep fuel system clean and batteries in a well charged condition.
4. Partially restrict cool air flow, but use care to avoid overheating.

## DUSTY AND DIRTY CONDITIONS

1. Keep unit clean. Keep cooling system clean.
2. Service air cleaner as frequently as required.
3. Change crankcase oil and oil filter according to schedule or more often if conditions require.
4. Keep oil and gasoline in dust tight containers.
5. Keep governor linkage clean.

## 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.

### **OUT-OF-SERVICE PROTECTION**

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

1. Run unit 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 one ounce (two tablespoons) of rust inhibitor (or SAE #50 oil) into each cylinder. Crank engine slowly (by hand) several times. Install spark plug.
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 entire unit. Coat rustable parts with a light film of grease or oil.
9. Provide a suitable cover for the entire unit.
10. If battery is used, disconnect and follow standard battery storage procedure.

### **EXERCISE STANDBY PLANTS**

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

# 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			
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

## 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, MS/DG, SD or SD/CC. 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. 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

Above 90°F

SAE 50

30°F to 90°F

SAE 30

0°F to 30°F

SAE 10W-40, 5W-30

Below 0°F

SAE 5W-30

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.

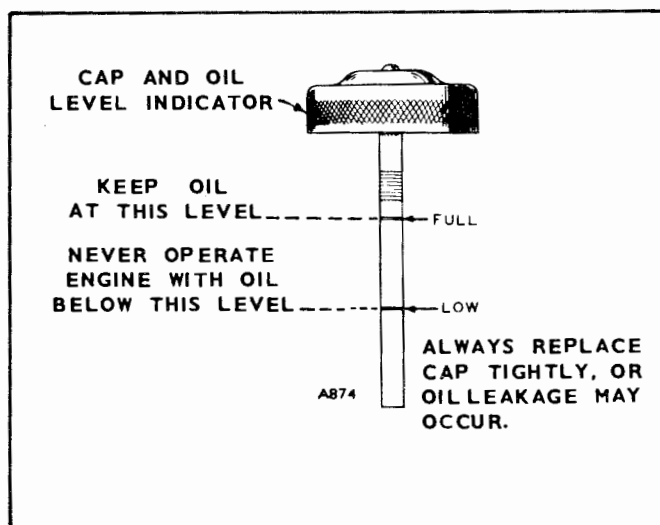


FIGURE 6. OIL LEVEL INDICATOR



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.

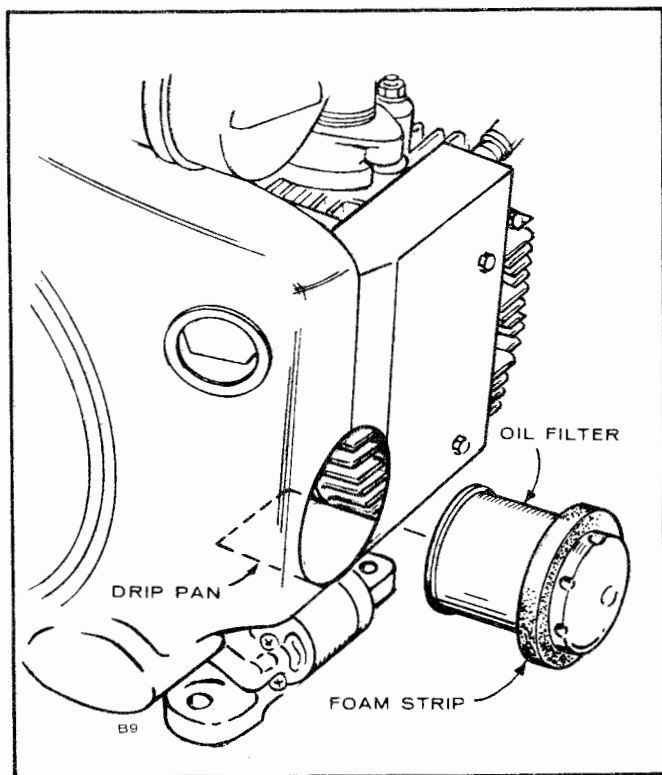


FIGURE 7. OIL FILTER

### 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 and clean by tapping 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 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.

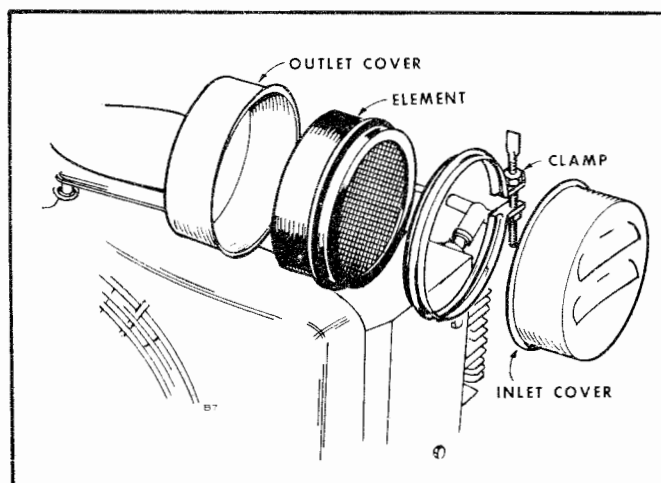


FIGURE 8. AIR CLEANER

### CRANKCASE BREATHER

The engine is equipped with a ball check valve for maintaining crankcase vacuum. No maintenance is generally required. Should the crankcase become pressurized, as evidenced by oil leaks at the seals or around the cap of the oil level indicator, clean the baffle in suitable solvent.

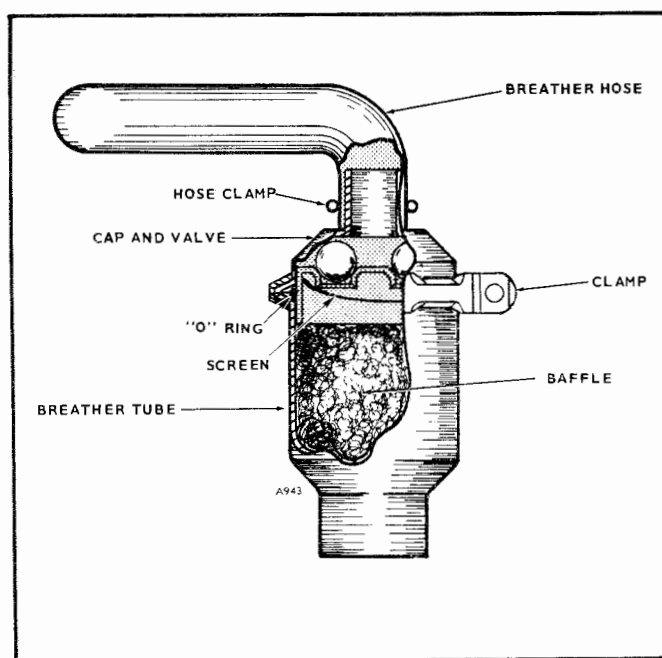


FIGURE 9. CRANKCASE BREATHER

### FUEL SYSTEM

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

### GOVERNOR LINKAGE

The linkage must be able to move freely through its entire travel. Every 50 hours of operation clean the plastic joints (do not lubricate) as shown in Figure 10. Also inspect the linkage for binding, excessive slack and wear.

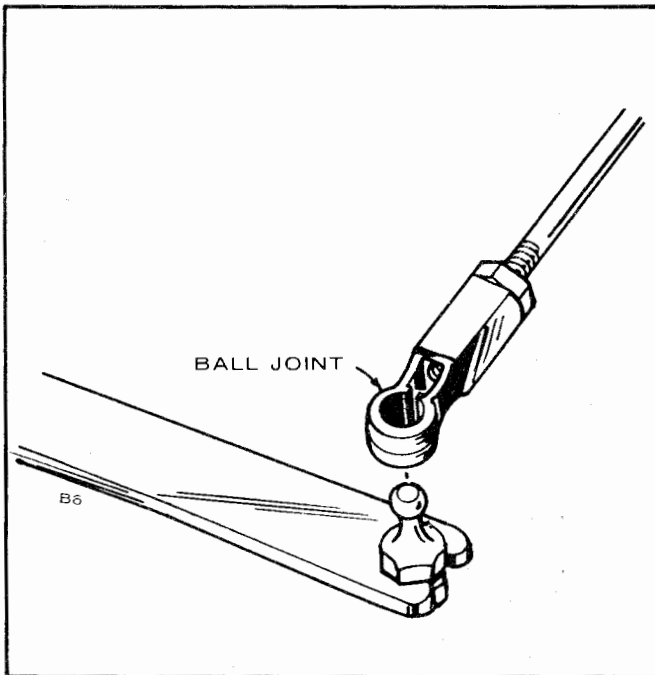


FIGURE 10. GOVERNOR LINKAGE

### 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. 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.

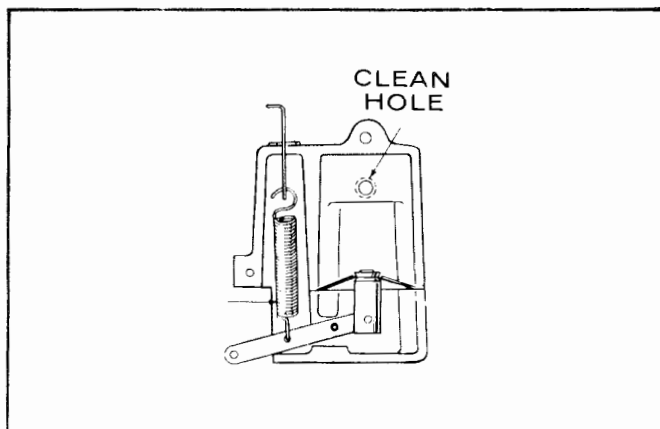


FIGURE 11. SPEED BOOSTER

### GENERATOR MAINTENANCE

The generator normally requires little care other than a periodic check of the brushes, commutator and the collector rings. Check the brushes every 500 hours of operation to be sure they can move easily in their holders. Remove any dust or dirt which may prevent movement.

Install new brushes when the old ones are worn to 5/8" (see 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.

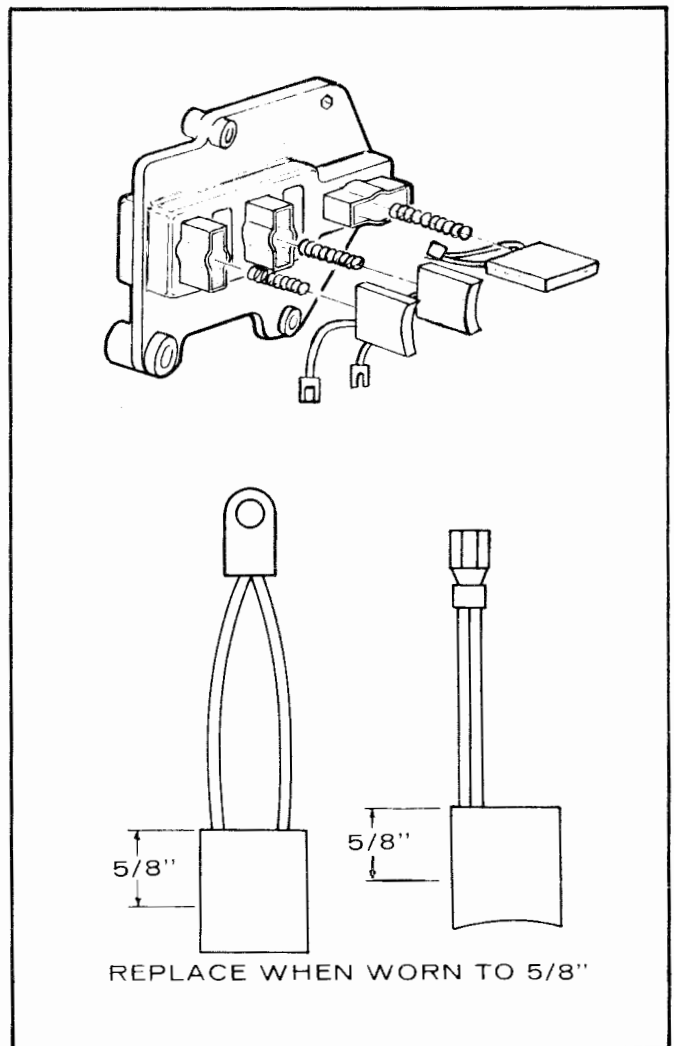


FIGURE 12. GENERATOR BRUSHES

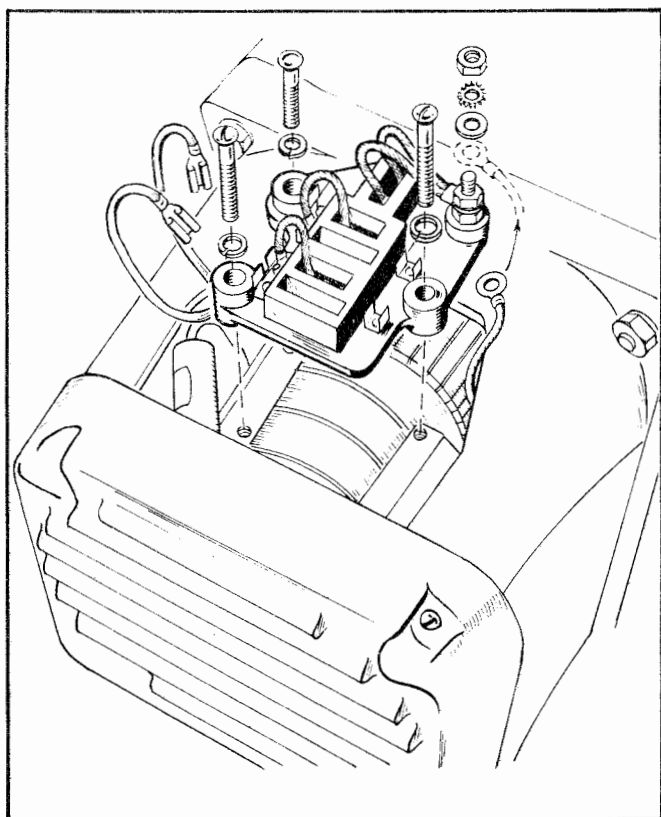


FIGURE 13. BRUSH HOLDER REMOVAL

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.

## TORQUES

Assembly torques as given here require the use of a torque wrench. These assembly torques will assure proper tightness without danger of stripping the threads. If a torque wrench is not available, you will have to estimate the degree of tightness necessary for the stud, nut or screw being installed and tighten accordingly. Be careful not to strip the threads. Check all studs, nuts and screws often with the engine cold. Tighten as needed to prevent them from working loose.

## TORQUE SPECIFICATIONS

FT.-LB.

Cylinder Head Nuts	17-19
Rear Bearing Plate	25-27
Connecting Rod Bolt	27-29
Flywheel Capscrew	35-40
Gear Case Cover	8-10
Oil Pump	7-9
Other 3/8 Cylinder Block Nuts	18-23
Manifold Screws	16-23

## CLEARANCES

Spark Plug Gap	Gasoline - 0.025"
	Gas - 0.018"
Tappets	Intake - 0.003"
	Exhaust - 0.010"
Ignition Breaker Points Gap	0.020"
Ignition Timing	
Without Automatic Spark Advance	22°BTC
Stopped (With Automatic Spark Advance)	3°ATC
Running (With Automatic Spark Advance)	22°BTC
Magneto Pole Shoe Air Gap	0.010" - 0.015"

# 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.

## CARBURETOR ADJUSTMENT

The carburetor (Figure 14) has a high speed fuel main adjustment (needle A) and a fuel idle adjustment (needle B).

**Gasoline:** 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 valve 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 400 - 500 rpm.
3. Set the idle adjustment screw for even operation.
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 14, 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.

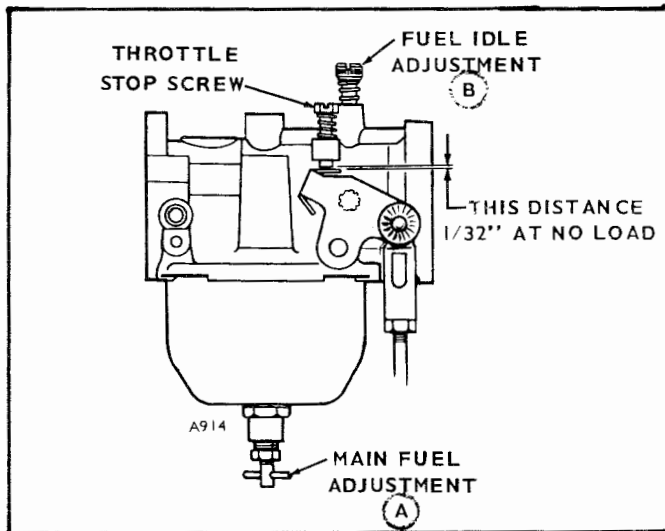


FIGURE 14. CARBURETOR ADJUSTMENTS

To check float level, remove the entire main fuel adjustment assembly from the float bowl (unscrew large nut from float bowl (Figure 14). Invert the carburetor cover and float. With the float then hanging, the top of the float should be 1/16 - 1/8 from the cover gasket. Adjust by bending the tab on the float (Figure 15).

**NOTE:** Do not apply excessive pressure to float valve.

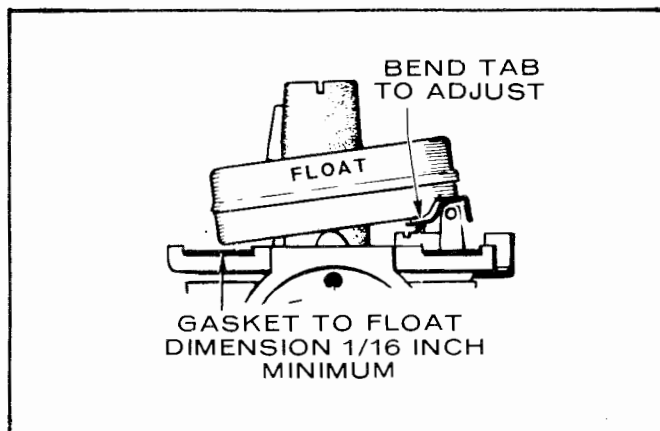


FIGURE 15. FLOAT LEVEL ADJUSTMENT

### THERMO-MAGNETIC CHOKE (Optional)

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

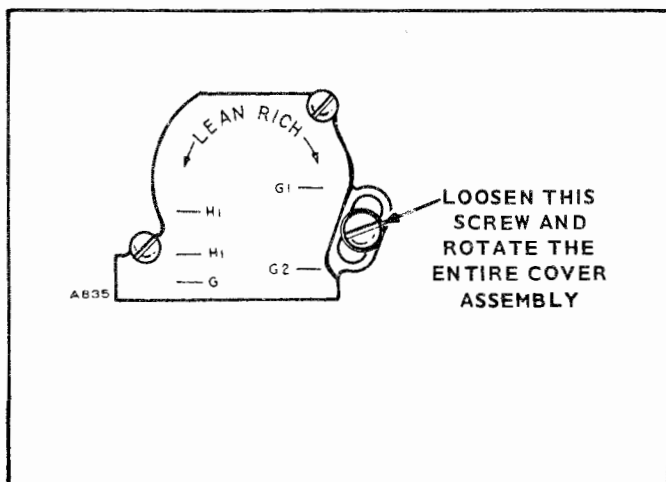


FIGURE 16. THERMO-MAGNETIC CHOKE

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 body assembly. Refer to Figure 16. Rotating the choke body clockwise richens and counterclockwise leans the choking effect. 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 body.

### BREAKER POINTS

Replace burned or faulty points. If only slightly burned, dress smooth with file or fine stone. Measure gap with thickness gauge. Set point gap at .020 inch.

Ignition breaker points (Figure 17) must be correctly gapped. Crank the engine to fully open breaker points (1/4 turn after top center). Loosen and move the stationary contact to correct the gap at full point separation. Secure points and check for correct gap.

Ignition points should break contact just when the 22° timing mark 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. (Refer to CLEARANCES for sets With Automatic Spark Advance Mechanism).

**NOTE:** For NH engines with optional Vacu-Flo cooling, the timing plate, located just above the oil filter, can be seen by removing the dot button plug.

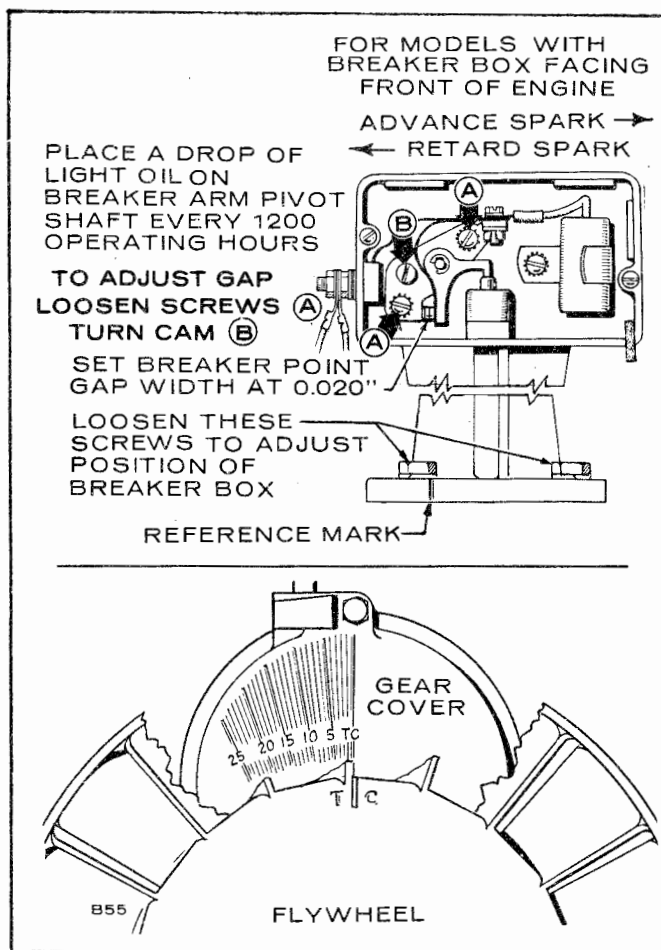


FIGURE 17. IGNITION TIMING

### GOVERNOR ADJUSTMENT

When engine speed is governor controlled, the governor is set at the factory to allow a nominal engine speed of 1875 rpm 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 18).

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 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 18.

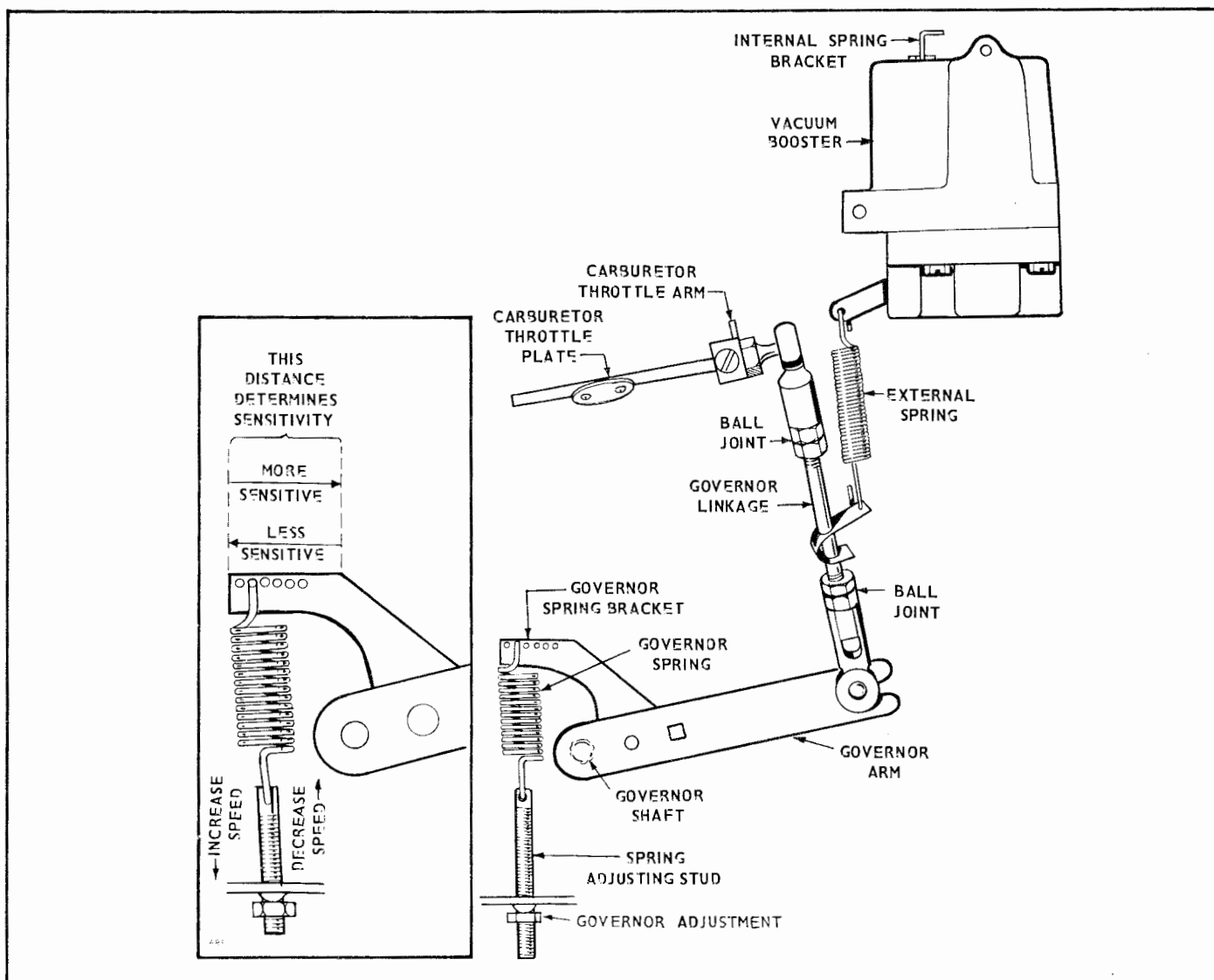


FIGURE 18. GOVERNOR ADJUSTMENTS



## SENSITIVITY ADJUSTMENT

The engine speed drop from no-load to full-load should be not less than 60 rpm. 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 hertz higher than the no-load frequency (1 hertz is equal to 60 rpm). If the rise in frequency is more than 2 hertz, 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 hertz from no-load to full-load is normal. With the booster in operation, a maximum increase of 2 hertz from no-load to 2/3 load is normal. A drop of 1 hertz at 1/4 load is permissible, giving an overall spread of 3 hertz maximum.

## TAPPET ADJUSTMENT

The engine is equipped with adjustable tappets. To 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 19).

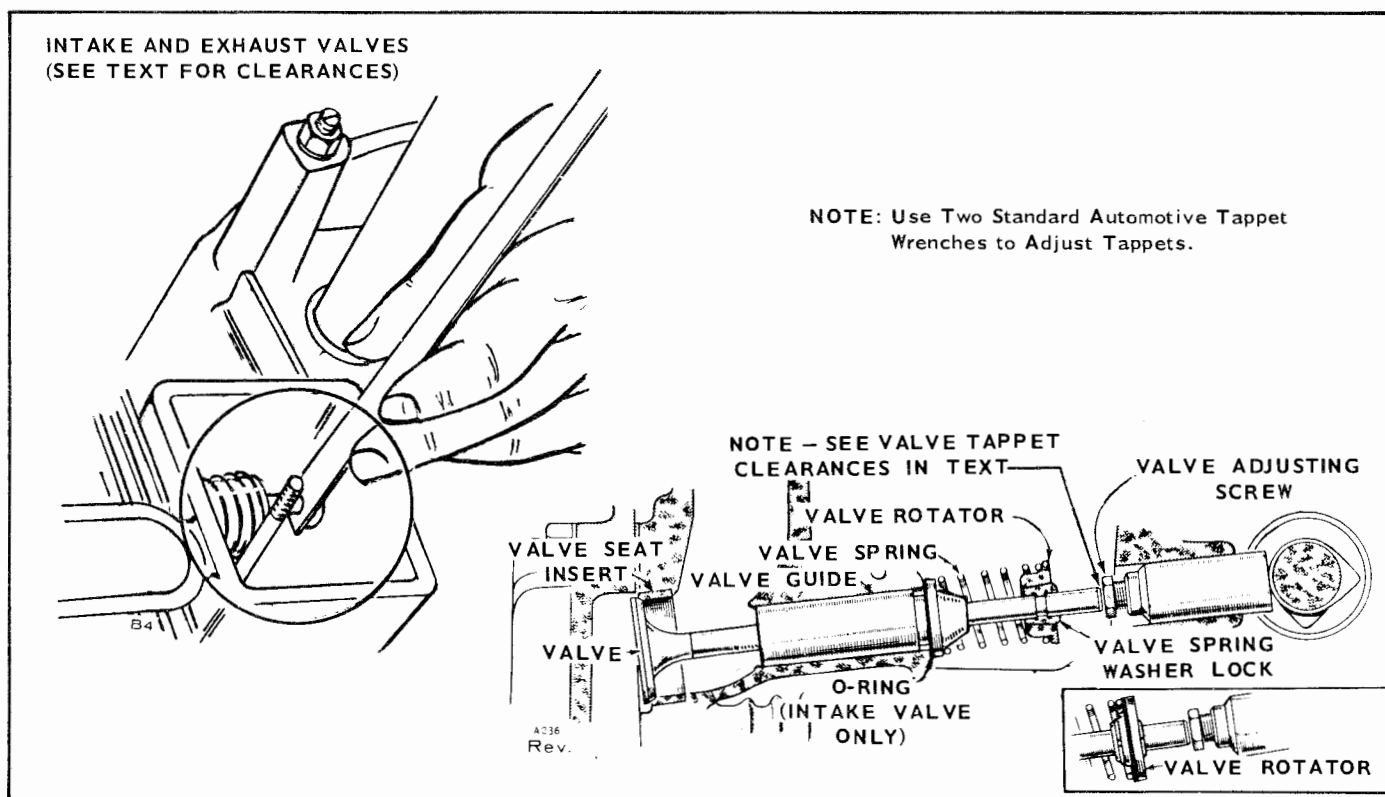


FIGURE 19. TAPPET ADJUSTMENT

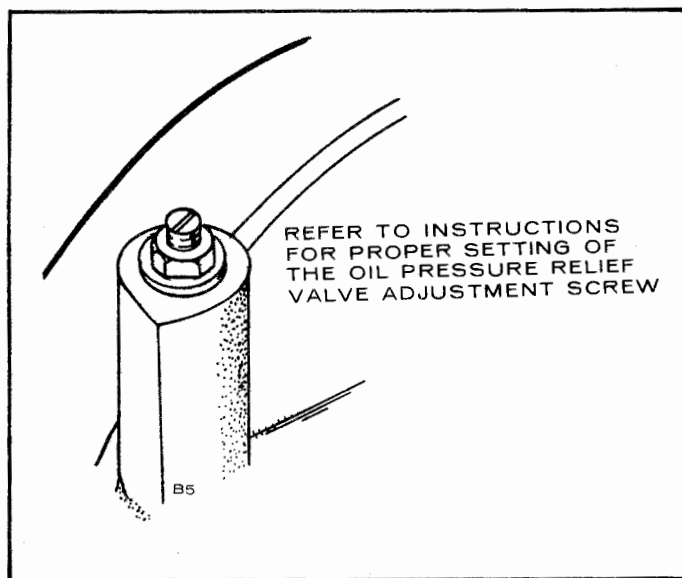
To correct the valve clearance, turn the adjusting screw as needed to obtain the right clearance. The screw is self-locking.

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 20. 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 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.

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.



**FIGURE 20. OIL PRESSURE RELIEF VALVE ADJUSTMENT**

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# PARTS CATALOG

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## 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 \_\_\_\_\_ HZ. \_\_\_\_\_  
D.C. VOLTS \_\_\_\_\_ AMPS \_\_\_\_\_  
WATTS \_\_\_\_\_  
R.P.M. \_\_\_\_\_ BAT. \_\_\_\_\_  
MANUFACTURED BY  
**ONAN**  
DIVISION OF ONAN CORPORATION  
MINNEAPOLIS, MINNESOTA  
MADE IN U.S.A.  
FOR ELECT. EQUIPMENT ONLY   
00A444

For handy reference, insert YOUR plant 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 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 noted in the listing. 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.

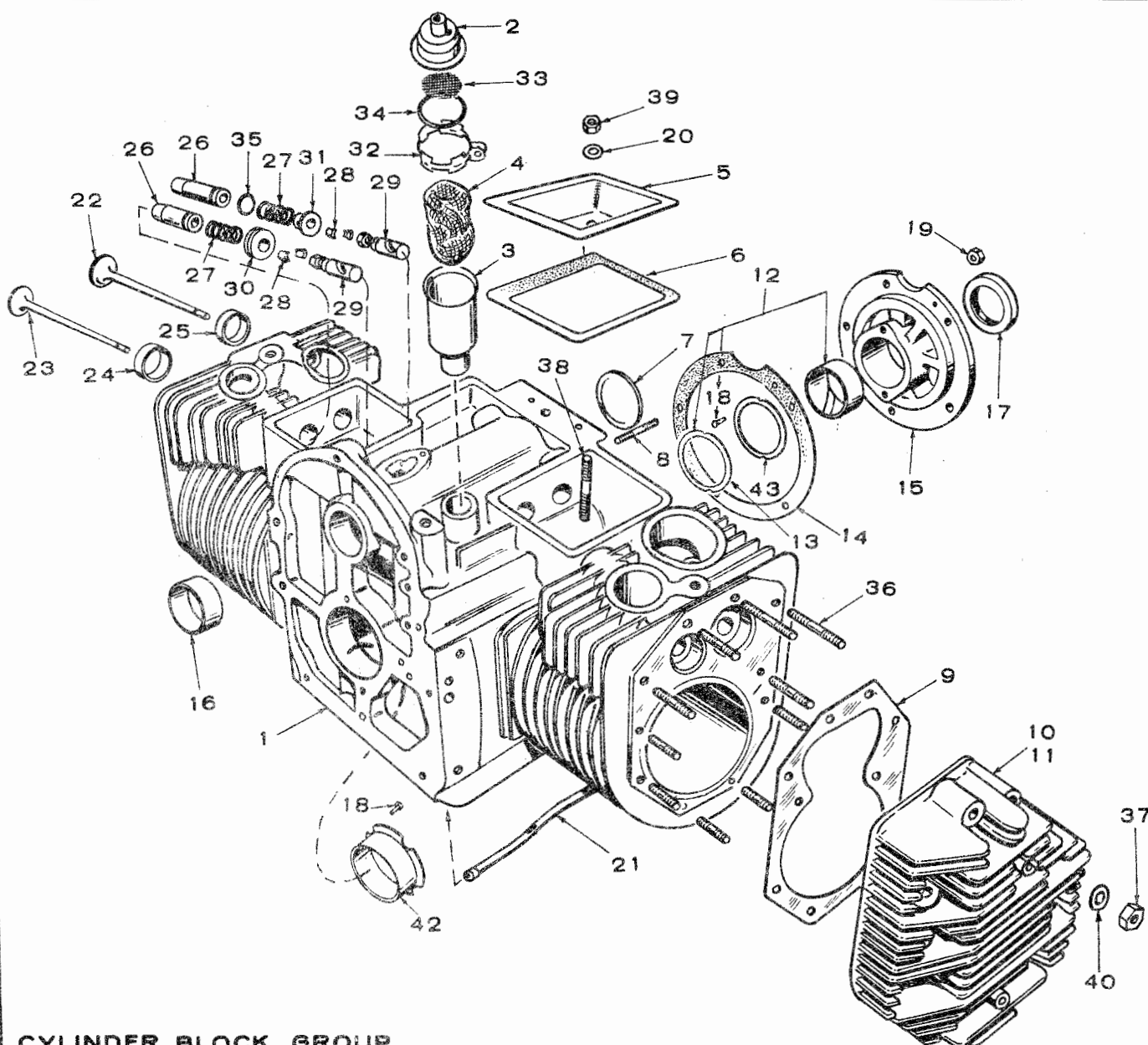
**PLANT DATA TABLE**

MODEL & SPEC NO.	ELECTRICAL DATA				
	WATTS	VOLTS	HERTZ	WIRE	PHASE
6.5NH-3CR/*	6500	120/240	60	**	1
6.5NH-4R/*	6500	120/208	60	4	3
6.5NH-5DR/*	6500	120/240	60	4	3
5.5NH-53CR/*	5500	120/240	50	**	1
Contractor Models	See Special Parts List Following Standard Parts List.				

\* 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.

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



### CYLINDER BLOCK GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110A1835	1	Block Assembly, Cylinder (Includes Parts Marked *)
2	123A954	1	Cap & Valve, Breather
3	123A952	1	Tube, Breather
4	123P865	1	Baffle, Breather Tube
5	110A1624	2	Cover, Valve Compartment
6	110B1720	2	Gasket, Valve Cover
7	517-48	1	*Plug, Camshaft Expansion
8	520A736	5	*Stud, Rear Bearing Plate Mtg.
9	110C1731	2	Gasket, Cylinder Head
10	HEAD, CYLINDER (#2) - RH		
	110D1732	1	Prior to Spec C
	110B1905	1	Begin Spec C
11	HEAD, CYLINDER (#1) - LH		
	110D1733	1	Prior to Spec C
	110B1906	1	Begin Spec C
12	*BEARING, CRANKSHAFT - REAR MAIN		
	101K420	1	Standard
	101K420-02	1	.002" Undersize

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	101K420-10	1	.010" Undersize
	101K420-20	1	.020" Undersize
	101K420-30	1	.030" Undersize
13	104A575	2	*Washer, Crankshaft, Bearing Thrust
14	101B415	1	*Gasket, Bearing Plate
15	101C407	1	*Plate, Rear Bearing (Excludes Bearing - Includes Pins)
16	101B405	2	*Bearing, Camshaft Front & Rear (Precision)
17	509A41	1	Seal, Bearing Plate
18	516A72	4	*Pin, Main Bearing Stop
19	104-91	5	*Nut, Bearing Plate Stud
20	526-63	2	Washer (Copper), Valve Compartment Cover
21	120B680	1	Tube, Crankcase Oil
22	110B1718	2	Valve, Intake
23	110B1719	2	Valve, Exhaust (Stellite)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
24	*INSERT, EXHAUST VALVE SEAT (STELLITE)		
	110A1716	2	Standard
	110A1716-02	2	.002 " Oversize
	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	123A951	1	Clamp, Breather Tube Cap
33	123A958	1	Screen, Breather Tube
34	509-117	1	Seal, "O" Ring, Breather Tube
35	110A68	2	*Gasket, Valve Guide (Intake)

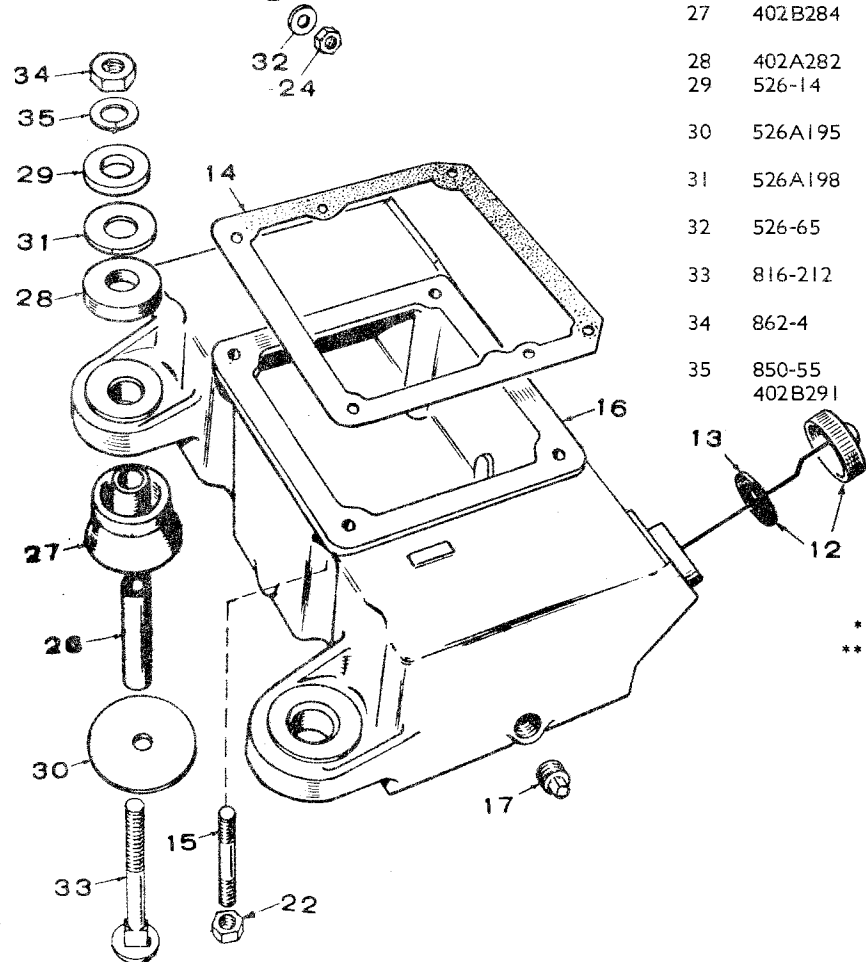
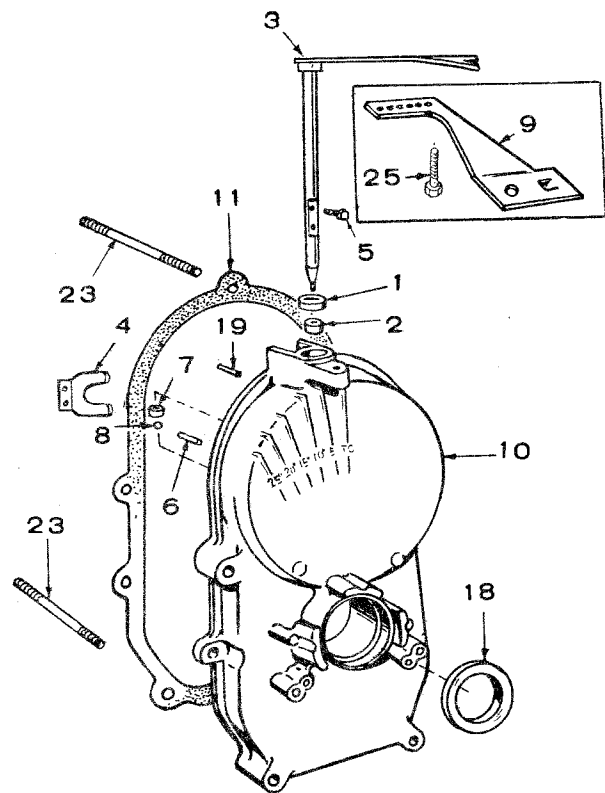
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
36	STUD, CYLINDER HEAD MOUNTING		
	520A717	8	3/8 " x 1-7/8 "
	520A715	8	3/8 " x 2-3/4 "
	520A716	4	3/8 " x 2-1/4 "
37	NUT, FLANGE - CYLINDER HEAD STUD		
	870-248	20	Prior to Spec C
	104A91	20	Begin Spec C
38	520A714	2	Stud, Valve Box Cover
39	115A25	2	Nut, Hex - Valve Box Cover Stud
40	526A250	20	Washer, Flat - Cylinder Head Stud - Begin Spec C
41	154A1424	2	Insert, Exhaust Port - Begin Spec C
42	*BEARING, CRANKSHAFT - FRONT MAIN		
	101K432	1	Standard
	101K432-02	1	.002 " Undersize
	101K432-10	1	.010 " Undersize
	101K432-20	1	.020 " Undersize
	101K432-30	1	.030 " Undersize
43	104A776	As Req.	*Shim (.005 ") - Crankshaft Thrust
	800-46	2	Screw, Hex Head Cap (3/8-16 x 1/2) - Cylinder Block
	526-66	2	Washer (3/8 Copper) - Cylinder Block

\* Included in Cylinder Block Assembly.

£ Use one only with rear bearing on units with flange type front bearing.

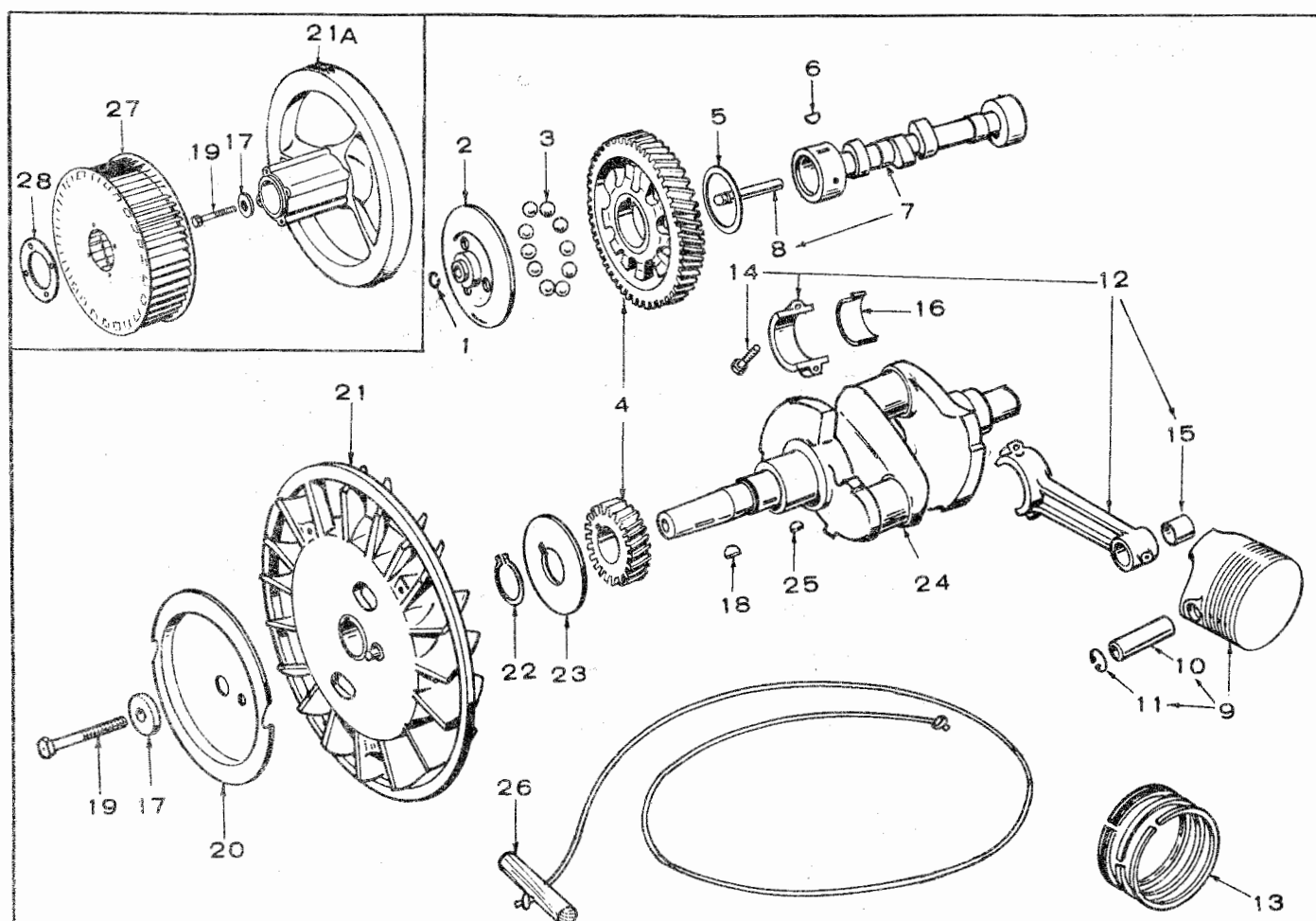


# GEAR COVER AND OIL BASE GROUP



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 (Includes 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")
22	104A91	4	Nut, Hex - Oil Base Stud
23	STUD, GEAR COVER TO BLOCK		
	520A710	4	5/16 x 2-1/8"
	520A711	1	5/16 x 3-11/16"
24	110A445	5	Nut, Gear Cover Mtg. Stud
25	815-181	1	Screw, Ext. Arm Mtg. (10-32 x 1/2")
26	402A290	4	*Bushing, Spacer, Vibration Mount
27	402B284	4	Cushion, Vibration (Front & Rear)
28	402A282	4	*Snubber, Shock Mounting
29	526-14	4	*Washer (29/64" I.D. x 1-1/2" O.D. x 1/8")
30	526A195	4	*Washer (29/64" I.D. x 3-1/4" O.D. x 1/8")
31	526A198	As Req.	*Washer (5/8" I.D. x 1-1/2" O.D. x 1/16")
32	526-65	5	Washer, Copper - Gear Cover Mounting
33	816-212	4	*Bolt, Carriage (7/16-14 x 5-1/2") - Cushion Mounting
34	862-4	4	*Nut, Hex (7/16") - Cushion Mounting
35	850-55	4	*Washer, Lock (7/16")
	402B291	4	Hardware Package, Mounting (Includes Parts Marked *)

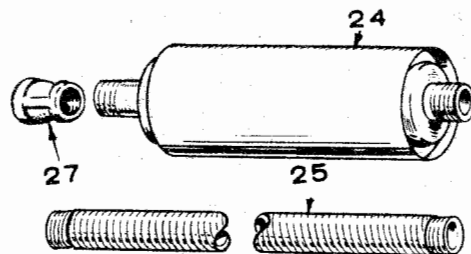
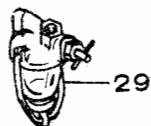
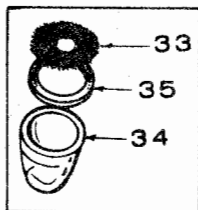
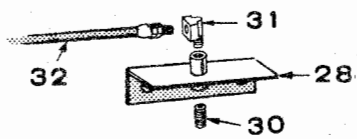
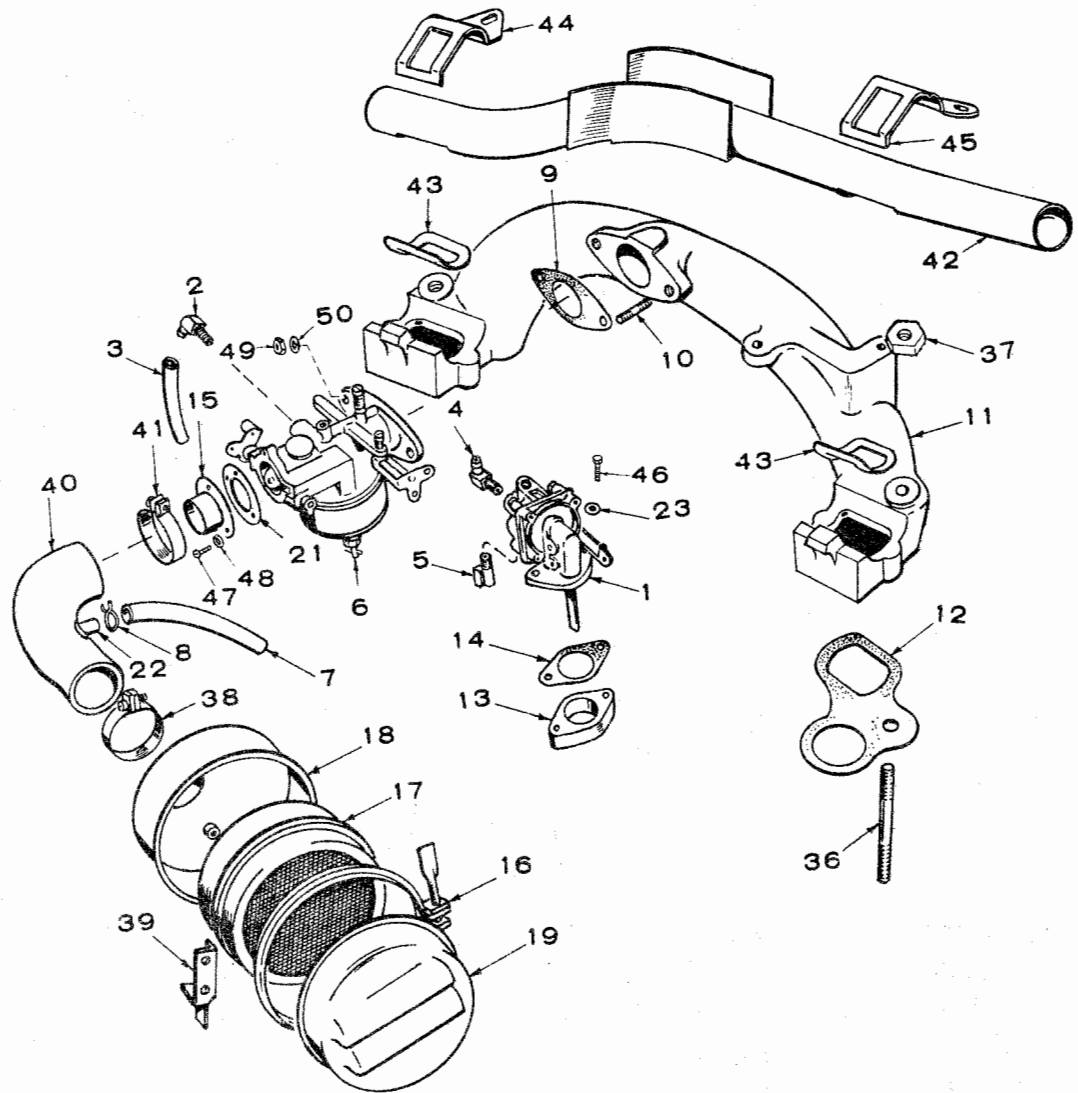
\* Included in Mounting Hardware Package.  
 \*\* Included in Gear Cover Assembly.



### CRANKSHAFT, FLYWHEEL, CAMSHAFT AND PISTON GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150A78	1	Ring, Camshaft Center Pin	14	805A10	4	Bolt, Place - Connecting Rod Cap
2	150B1116	1	Cup, Governor	15	114A36	2	Bushing, Piston Pin - Connecting Rod
3	510P15	10	Ball, Fly - Governor	16	BEARING HALF, CONNECTING ROD		
4	105A353	1	Gear Set, Timing - Includes (1) ea. Crankshaft & Camshaft Gears (Includes Flyball Spacer & Plate)	114B188	4	Standard	
5	105A4	1	Washer, Camshaft Gear Thrust	114B188-02	4	.002" Undersize	
6	515P1	1	Key, Camshaft Gear Mounting	114B188-10	4	.010" Undersize	
7	105B309	1	Camshaft (Includes Center Pin)	114B188-20	4	.020" Undersize	
8	150A75	1	Pin, Center - Camshaft	114B188-30	4	.030" Undersize	
9	PISTON AND PIN (Includes Retaining Rings)			17	WASHER, WHEEL MOUNTING		
112-111	2	Standard		526A128	1	Pressure Cooled Units	
112-111-05	2	.005" Oversize		526A17	1	Vacu-Flo Cooled Units - Opt.	
112-111-10	2	.010" Oversize		18	515-2	1	Key, Wheel Mounting
112-111-20	2	.020" Oversize		19	104A170	1	Screw, Wheel Mounting
112-111-30	2	.030" Oversize		20	192B308	1	Sheave, Starter Rope
112-111-40	2	.040" Oversize			FLYWHEEL		
10	PIN, PISTON			21	134D1903	1	Pressure Cooled Units
112A112	2	Standard		21A	104D739	1	Vacu-Flo Cooled Units - Opt.
112A112-02	2	.002" Oversize		22	518P14	1	Lock, Crankshaft Gear Washer
11	518P294	4	Ring, Piston Pin Retaining	23	104A43	1	Washer, Crankshaft Gear Retaining
12	114C203	2	Rod, Connecting (Includes Bushing & Bolts)	24	104D731	1	Crankshaft
13	RING SET, PISTON			25	515P1	1	Key, Crankshaft Gear Mounting
113A142	2	Standard		26	192A83	1	Rope, Manual Starting
113A142-05	2	.005" Oversize		27	134C2130	1	Wheel, Blower - Vacu-Flo Cooled Units - Optional
113A142-10	2	.010" Oversize		28	134A911	1	Plate, Blower Wheel - Vacu-Flo Cooled Units - Optional
113A142-20	2	.020" Oversize					
113A142-30	2	.030" Oversize					
113A142-40	2	.040" Oversize					

# FUEL SYSTEM AND EXHAUST GROUP

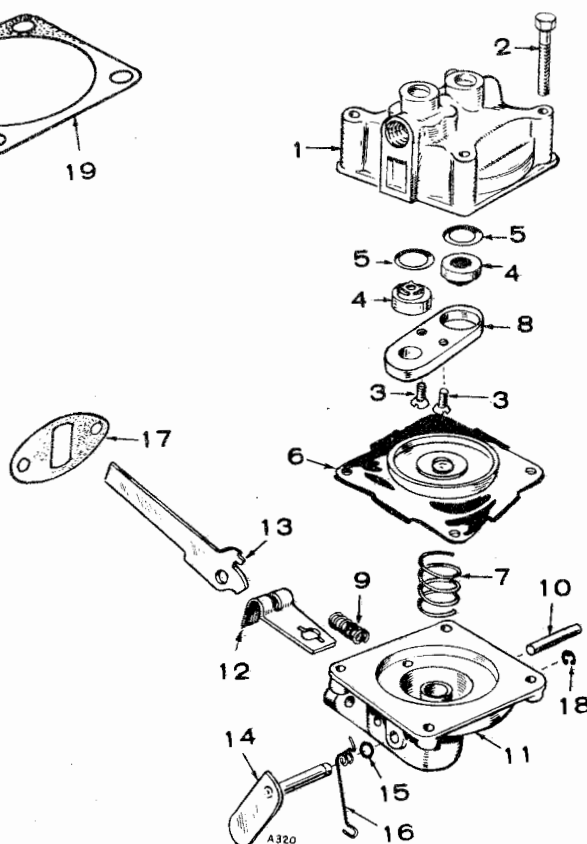
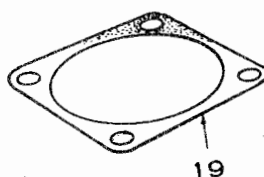


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	149K526	1	Repair Kit, Fuel Pump	27	505-36	1	Coupling, Reducer (1-1/2 x 1-1/4)
2	149D1223	1	Pump, Fuel	28	149A616	1	Bracket, Fuel Filter
3	502-313	1	Elbow, Carburetor Inlet	29	149B79	1	Filter, Fuel
4	149A1228	1	Line, Fuel Pump to Carburetor	30	502-46	1	Nipple, Brass - Bracket to Filter Inlet
5	502-313	1	Elbow, Fuel Pump Outlet	31	502-20	1	Elbow, Street, Filter Bracket
6	502-2	1	Elbow, Fuel Pump Inlet	32	501A5	1	Line, Fuel, Filter to Fuel Pump
	CARBURETOR, GASOLINE (SEPARATE GROUP FOR COMPONENTS)			33	149-202	1	Screen, Fuel Filter
	141A808	1	Manual Choke	34	149-150	1	Bowl, Fuel Filter
	141D807	1	Electric Choke	35	149-149	1	Gasket, Fuel Filter Bowl
7	503A582	1	Hose, Breather	36	520A713	2	Stud, Intake Manifold Mounting
8	503-170	2	Clamp, Breather Hose	37	104A91	2	Nut, Intake Manifold Stud
9	141A281	1	Gasket, Carburetor Mounting	38	503-4	1	Clamp, Hose - Air Cleaner
10	520A526	2	Stud, Carburetor Mounting	39	140B1067	1	Bracket, Air Cleaner Mounting
11	154C1237	1	Manifold, Intake	40	140A1075	1	Elbow, Carburetor Air Inlet
12	154A1250	2	Gasket, Intake Manifold to Cylinder Block	41	503-311	1	Clamp, Hose - Air Inlet Elbow to Adapter
13	149A45	1	Spacer, Fuel Pump Mounting	42	155B1069	1	Tube, Exhaust
14	149A3	2	Gasket, Fuel Pump Mounting	43	155A1070	2	Gasket, Exhaust Manifold
15	145A398	1	Adapter, Carburetor Air Inlet	44	155B1052	1	Clamp, Exhaust Tube, L.H.
16	140B1073	1	Clamp, Air Cleaner	45	155B1053	1	Clamp, Exhaust Tube, R.H.
17	140B1071	1	Element, Air Cleaner	46	815-222	2	Screw (1/4-20 x 1-1/4") - Pump Mounting
18	140C1066	1	Cleaner, Air	47	815-199	3	Screw (10-32 x 5/16") - Adapter Mounting
19	140C1061	1	Cover, Air Cleaner	48	850-30	3	Washer, Lock (#10)
21	140A921	1	Gasket, Adapter to Carburetor	49	868-2	2	Nut (5/16-24) - Carburetor Mounting
22	123A733	1	Tube, Adapter to Breather Hose	50	854-17	2	Washer, Lock
23	526A63	2	Washer (Copper), Pump Mtg.				
24	155B77	1	Muffler, Exhaust				
25	155B1094	1	Tube, Exhaust, Flexible				
26	155P1015	1	Clamp, Exhaust Tube				

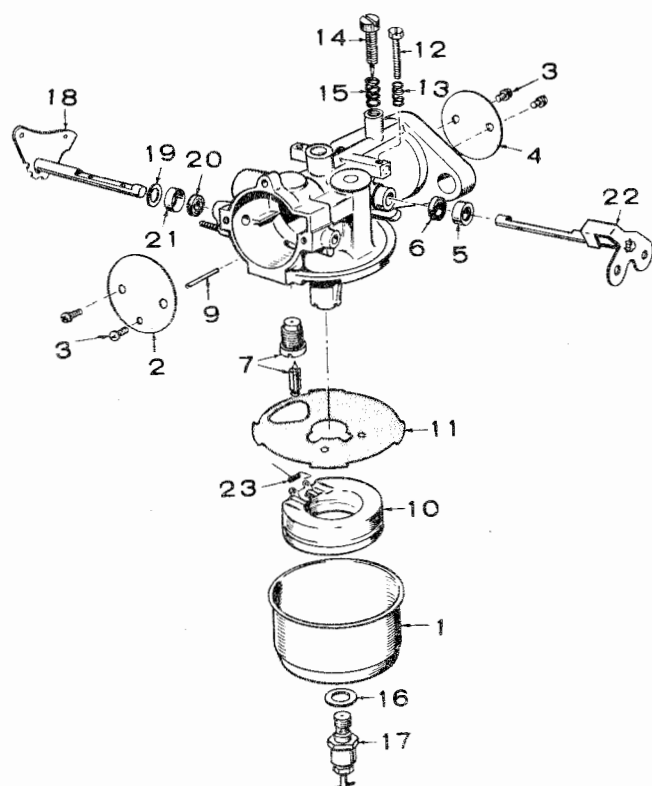
## FUEL PUMP PARTS GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	149D1223	1	Pump, Fuel (Illustrated in Fuel System Group)
	149K526	1	Repair Parts Kit- Includes Parts Marked *
1		1	Body, Not Sold Separately
2	815-148	4	Screw, Machine, #8-32 x 7/8"
3	815-147	2	Screw, Phillips Self Tapping, #6-32 x 5/8", Valve Retainer
4	149-96	2	*Valve & Cage
5	149A95	2	*Gasket, Valve
6	149A582	1	*Diaphragm Assembly
7	149A672	1	*Spring
8	149A539	1	Retainer, Valve Cage
9	149A675	1	*Spring
10	516A113	1	Pin, Rocker Arm
11		1	Body, Not Sold Separately
12	149A670	1	Link, Rocker Arm
13	149B1148	1	Arm, Rocker
14	149A1042	1	Lever, Primer
15	509-65	2	Seal, "O" Ring
16	149A1044	1	Spring, Primer Lever
17	149A3	1	*Gasket, Pump Mounting
18	518P129	1	Ring, Retainer, Primer Lever
19	149A858	1	*Gasket, Diaphragm - Lower Side

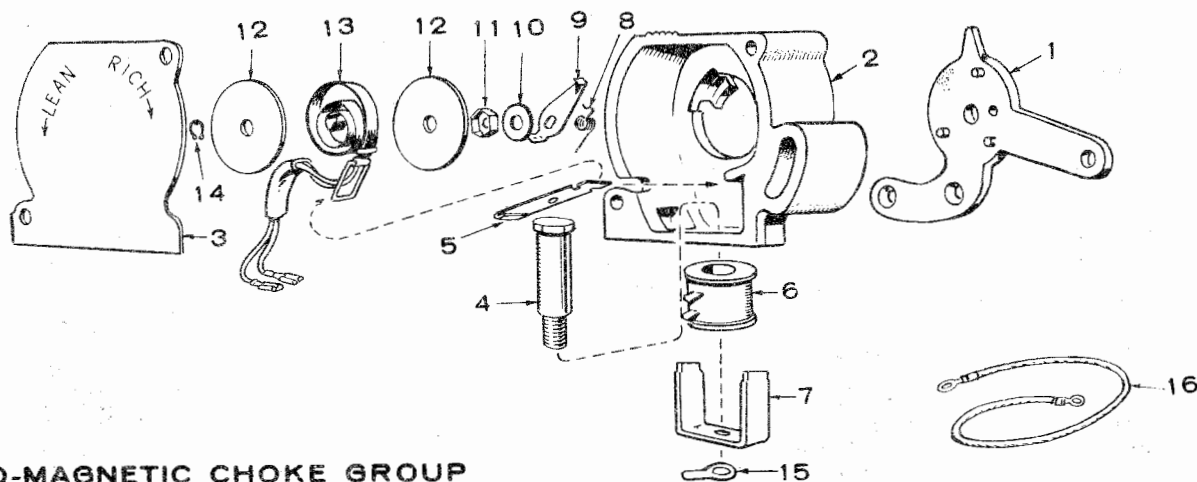
\* Parts in Repair Kit



## CARBURETOR PARTS GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
CARBURETOR, GASOLINE			
	141A808	1	Manual Choke
	141D807	1	Electric Choke
	141P747	1	Repair Kit
	141K748	1	Gasket Kit
	141A281	1	Gasket, Carburetor Flange
1	141P708	1	Bowl, Fuel
2	141P741	1	Plate, Choke
3	141P698	4	Screw & Washer, Choke and Throttle Plate Mounting
4	141P793	1	Plate, Throttle
5	141P705	1	Retainer, Seal
6	141-661	1	Seal, Rubber
7	141P798	1	Valve Seat Assembly, Fuel
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	SHAFT, CHOKE		
	141-742	1	Manual Choke Units
	141B679	1	Electric Choke Units
19	141P699	1	Washer, Manual Choke Units
20	141P697	1	Seal, Felt - Manual Choke Units
21	141P203	1	Retainer, Felt Seal - Manual Choke Units
22	141P709	1	Shaft & Lever, Throttle
23	141-799	1	Spring, Float



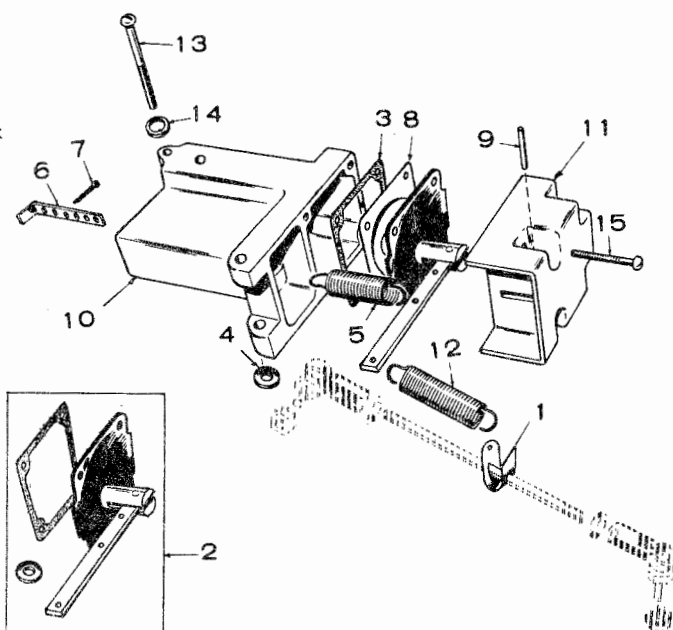
## THERMO-MAGNETIC CHOKE GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	153K429	1	Replacement Kit (Includes complete Choke - Less Leads)
1	153C385	1	Plate, Mounting
2	153D386	1	Body
3	153C389	1	Cover
4	153B391	1	Core, Solenoid
5	153A395	1	Armature
6	307B801	1	Coil, Solenoid Assembly
7	153B392	1	Frame, Solenoid
8	153B387	1	Spring
9	153B390	1	Lever, Thermostat

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
10	526-18	1	Washer (17/64" I.D. x 5/8" O.D. x 1/16")
11	870-134	1	Palnut (1/4 - 20)
12	153A399	2	Insulator
13	153B400	1	Heater Assembly
14	518P129	1	Ring, Retaining
15	332A876	1	Terminal Ground
16	LEAD, CHOKE		
	336A1550	1	Choke to Ground
	336A1549	1	Choke Solenoid Ground

## VACUUM SPEED BOOSTER GROUP

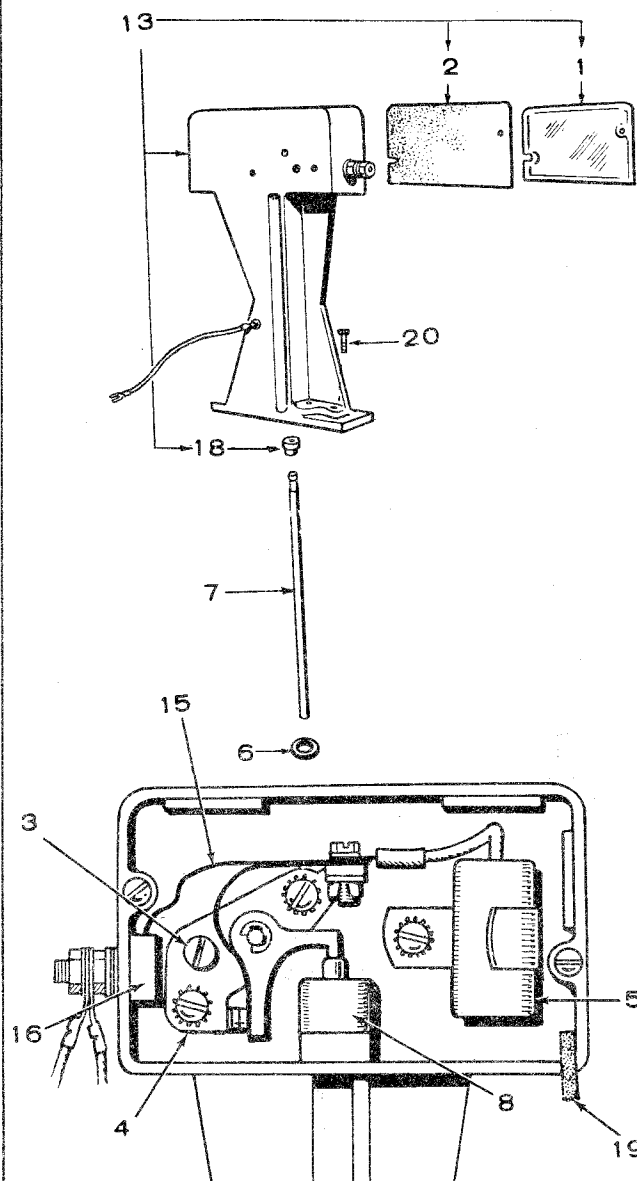
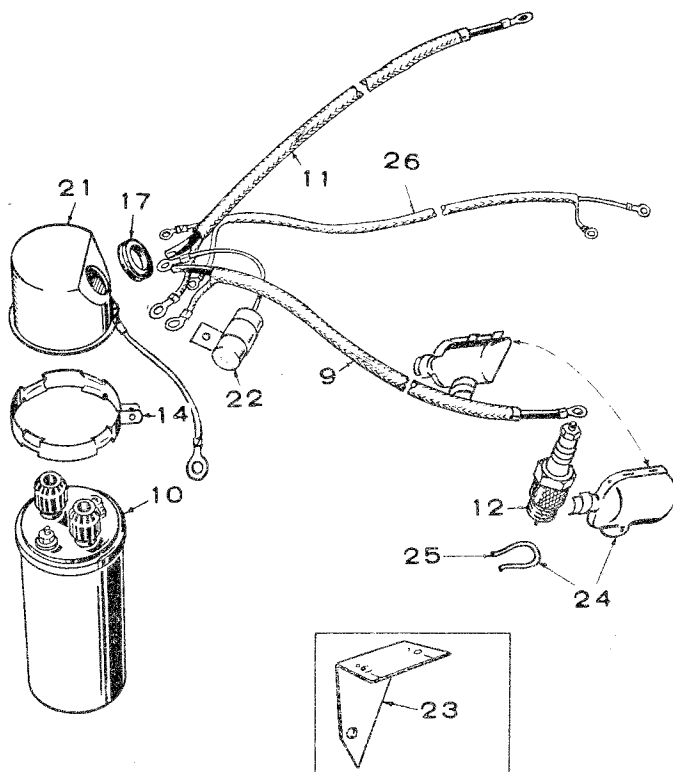
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	150K1030	1	Kit, Vacuum Speed Booster Replacement Includes External Spring & Mounting Gasket
1	150A430	1	Bracket, Spring to Governor Link
2	150K1031	1	Kit, Diaphragm Replacement, Includes Gaskets
3	150A668	1	Gasket, Diaphragm Plate
4	150A425	1	Gasket, Booster 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
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	813-110	2	Screw (10-32 x 2") - Booster Mounting
14	853-8	2	Washer, Lock
15	815-148	4	Screw (8-32 x 7/8")



## OIL SYSTEM GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	120A491	1	Pump, Oil (Components Not Sold Separately)	8	122D320	1	Adapter, Oil Filter
2	120B400	1	Intake, Oil Pump - Includes Cup, Screen & Pipe	9	122A321	1	Gasket, Adapter
3	120A187	1	Stud Assembly, By-Pass Adjusting (Includes Nut)	10	122B323	1	Filter, Oil
4	120A140	1	Spring, By-Pass Valve	11	309A10	1	Switch, Low Oil Pressure
5	120A398	1	Valve, By-Pass	12	526-65	2	Washer (Copper), Adapter Mtg.
6	120K161	1	Gasket Kit, Oil Pump	13	502-58	1	Tee, Low Oil Pressure Switch Plug (1/8)
7	526-66	1	Washer, Oil Pressure Relief Valve Adjusting Screw	14	505-57	1	Screw (1/4-20 x 1") - Oil Pump Mounting
				15	800-7	2	Washer, Lock (1/4)
				16	850-40	2	Screw (5/16-18 x 1") - Adapter Mounting
				17	800-28	2	

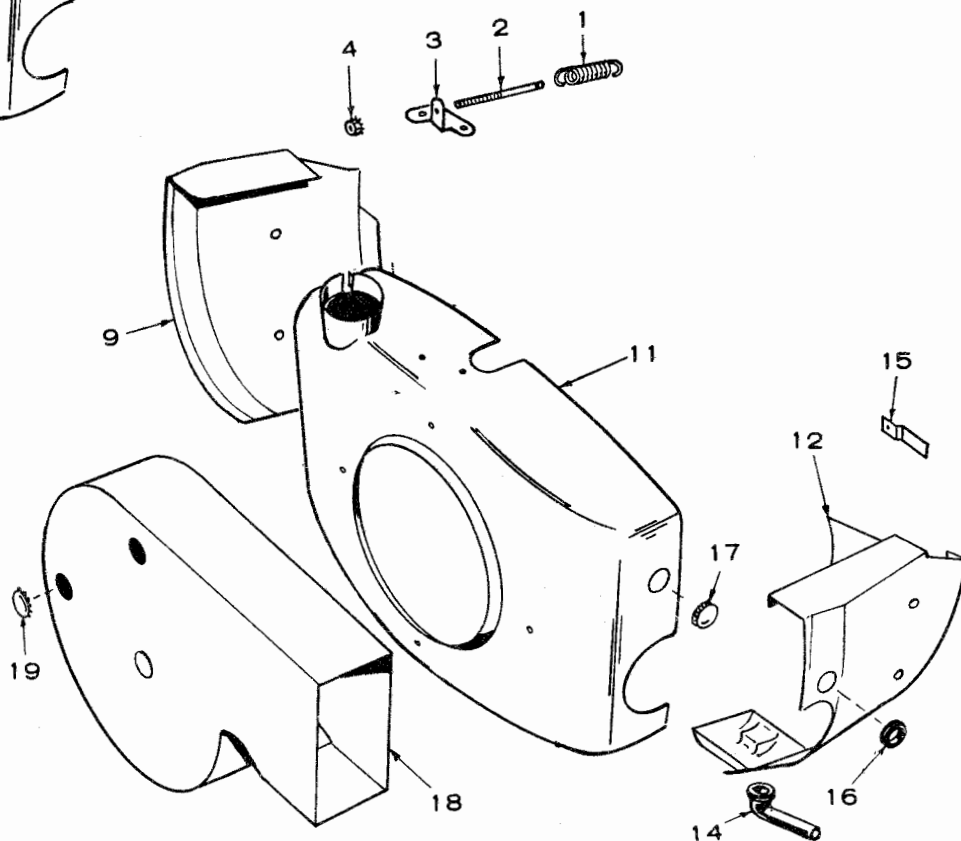
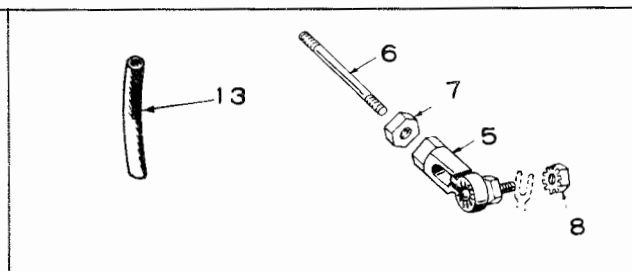
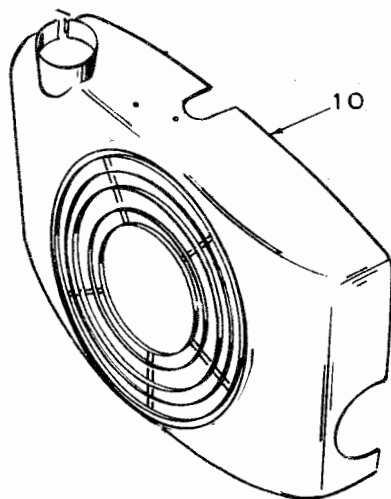




## IGNITION GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	160A930	1	Cover, Breaker Box
2	160A150	1	Gasket, Breaker Box Cover
3	160A75	1	Cam, Point Gap Adjusting
4	160A2	1	Point Set, Breaker
5	312A69	1	Condenser, Breaker Points
6	160A1040	1	Gasket, Breaker Box Mounting
7	160A723	1	Plunger
8	160A263	1	Diaphragm, Breaker Box
9	167A1537	1	Cable, Spark Plug - R.H. (22-1/4")
10	166B535	1	Coil, Ignition
11	167A1536	1	Cable, Spark Plug - L.H. (15-3/4")
12	167-28	2	Plug, Spark
13	160A1135	1	Box, Breaker (Includes Points, Condenser, Cover, Gasket & Bushing)

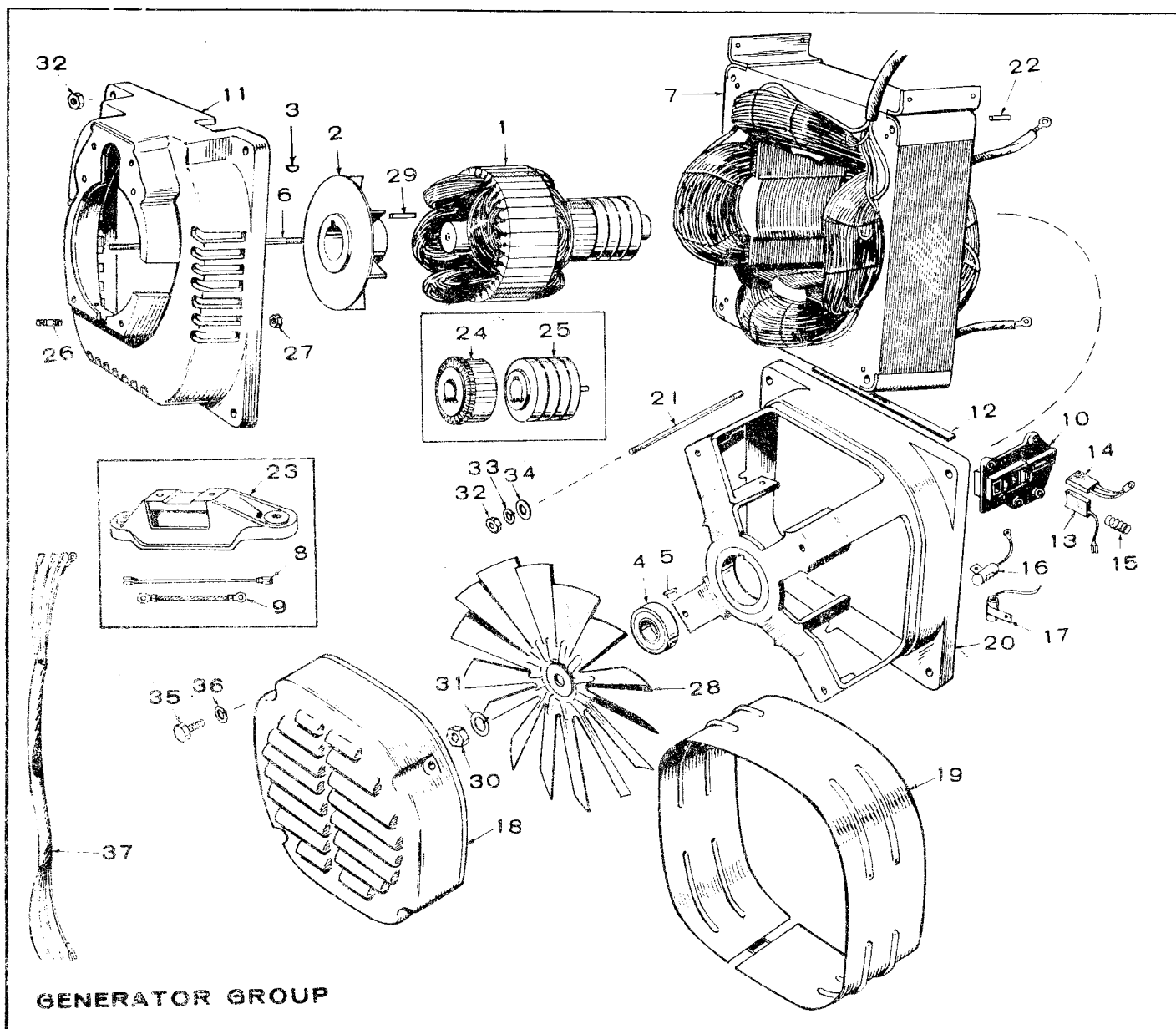
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
14	166A541	1	Clamp, Coil Cover
15	160A428	1	Strap, Point Set to Terminal Block
16	160A349	1	Block & Terminal Assembly
17	508P1	1	Grommet, Ignition Coil Cover
18	160A1041	1	Bushing, Breaker Box (Bottom)
19	160A261	1	Wick, Breaker Box
20	815-313	2	Screw, Mounting - Breaker Box
21	166A563	1	Cover, Ignition Coil
22	312A27	1	Condenser (.5 Mfd.). Ignition Coil Suppression
23	166B519	1	Bracket, Timing - Vacu-Flo Cooled Units - Opt.
24	167A67	2	Shield, Spark Plug (Includes Clamp & Shield)
25	167A64	2	Clamp, Spark Plug Shield
26	336A1899	1	Lead Assy., Shielded



# HOUSING AND GOVERNOR GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150A731	1	Spring, Governor
2	150A96	1	Stud, Speed Adjustment
3	150A1262	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	HOUSING, CYLINDER AIR - LEFT		
	134D1986	1	Prior to Spec C
	134D2141	1	Begin Spec C
10	HOUSING, BLOWER		
	134C2076	1	Pressure Cooled Units
11	134C2127	1	Vacu-Flo Cooled Units

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
12	HOUSING, CYLINDER AIR - RIGHT		
	134D1990	1	Prior to Spec C
	134B2142	1	Begin Spec C
	HOSE, OIL DRAIN		
13	503-391	1	Early Models
14	122B345	1	Later Models
15	134A599	1	Clip, Cylinder Air Housing
16	508-162	1	Grommet, Rubber
17	517-35	1	Plug, Dot Button (1-1/16") - Vacu-Flo Cooled Units - Optional
18	134C2367	1	Scroll, Air - Vacu-Flo Cooled Units - Optional
19	517-21	2	Plug, Dot Button (7/8") - Air Scroll - Vacu-Flo Cooled Units - Optional



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*	1	Rotor Assembly, Wound
2	232C2108	1	Hub, Drive
3	515-6	1	Key, Rotor to Crankshaft
4	510A47	1	Bearing (Ball), Rotor
5	232A596	1	Clip, Bearing Stop
6	520A733	1	Stud, Rotor Through
7	*	1	Stator Assembly, Wound
<b>LEAD ASSEMBLY, BRUSH</b>			
8	336A1891	4	Blade Type Terminals (9")
8	336A1890	1	Blade Type & Round Type Terminal (4")
9	336A186	2	Ground Jumper (3-1/2")
10	<b>BLOCK ASSEMBLY, BRUSH (Includes Parts Marked *)</b>		
	212C345	2	Lower & Right
	212C346	2	Upper & Left
11	231E150	1	Adapter, Generator to Engine
12	232A2149	1	Seal, End Bell to Stator Assy.
13	214A95	4	*Brush, Commutator
14	214A96	8	*Brush, Collector Ring
15	212A1232	12	*Spring, Brush
16	312A17	2	Condenser (.5 Mfd.) DC

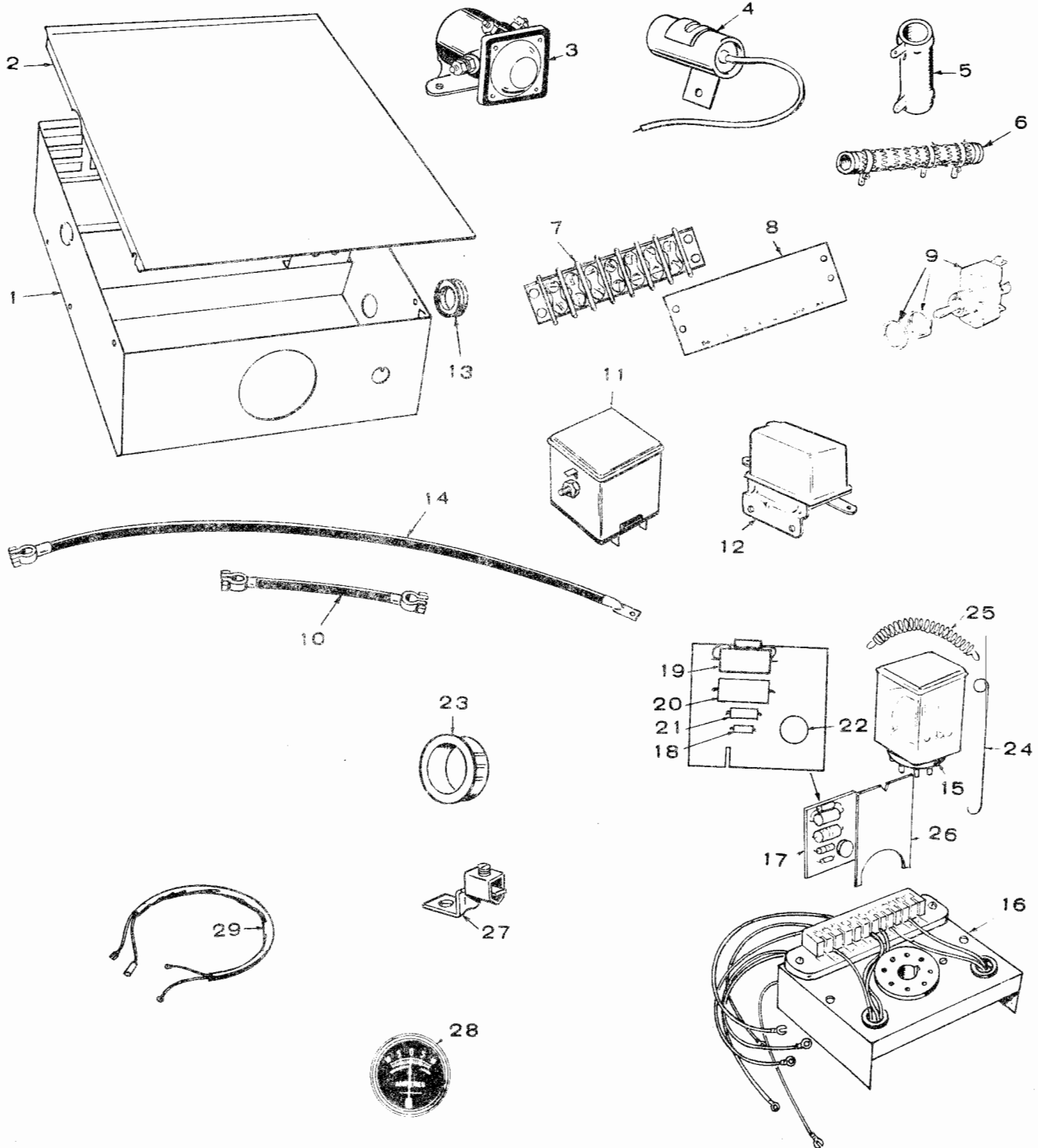
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
17	312A58	3	Condenser (.1 Mfd.) AC
18	232D2107	1	Cover, Generator Fan
19	234C362	1	Wrapper, End Bell
20	211E187	1	Bell, End
21	520A730	4	Stud, Generator Through
22	516-182	8	Pin (Roll), Generator Frame, 1/4 x 3/4"
23	232D2109	1	Support, Generator
24	COMMUTATOR		
	203A150	1	120/240 Volt, 1 Phase
	203A151	1	120/240 Volt, 3 Phase & 120/208 Volt, 3 Phase
25	204B107	1	Collector Ring
26	520A737	4	Stud, Generator Adapter Mtg. (3/8 x 2")
27	104A91	4	Nut, Generator Adapter Mtg. (3/8)
28	205C90	1	Fan, Generator
29	515-7	1	Key, Drive Hub
30	867-4	1	Nut, Hex (7/16-20)
31	850-55	1	Washer, Lock (7/16)

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
32	862-15	8	Nut, Hex (5/16-18) - Generator Through Stud
33	850-45	4	Washer, Lock (5/16)
34	526-115	4	Washer, Flat (5/16)
35	812-156	4	Screw (1/4-20 x 1-1/2") - Cover Mounting
36	850-40	4	Washer, Lock (1/4)

<u>REF. NO.</u>	<u>PART NO.</u>	<u>QTY. USED</u>	<u>PART DESCRIPTION</u>
37	HARNESS ASSEMBLY, WIRING		
	338B592	1	120/240 Volt, 1 Phase
	338B591	1	120/240 Volt, 3 Phase and 120/208 Volt, 3 Phase

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

# CONTROL GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	301D3301	1	Box, Control
2	301B3302	1	Cover, Control Box
3	307B845	1	Solenoid, Start
4	312A57	1	Condenser (1.0 Mfd.) - 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	332A1321	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	508-1	1	Grommet, For 1-1/16" Hole
14	416A77	2	Cable, Battery (28")
15	307B1070	1	Relay, Start-Disconnect

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
16	323B803	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	BUSHING (NYLON)		
	331A88	2	1-3/32" Mounting Hole
	508P160	1	1/2" Mounting Hole
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	302A58	1	Ammeter, Charge (10-0-10)
29	338B561	1	Harness, Wiring

\* Included in 300A734 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
	522K256	1	Overhaul Kit, Engine
	525P137	1	Paint, Touch-up Enamel (Green)
			16 ounce Pressurized Can
	168K115	1	Carbon Removal Gasket Kit

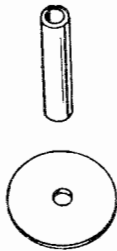
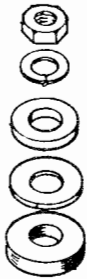
## SPECIAL PARTS SECTION

FOR

### CONTRACTOR MODELS

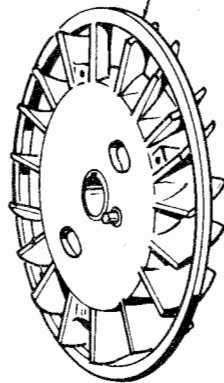
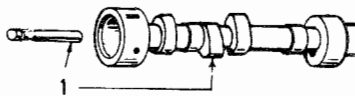
Parts not listed in this section, refer to the standard parts groups. Exception: Overhaul Kits do not apply.

#### GEAR COVER AND OIL BASE GROUP

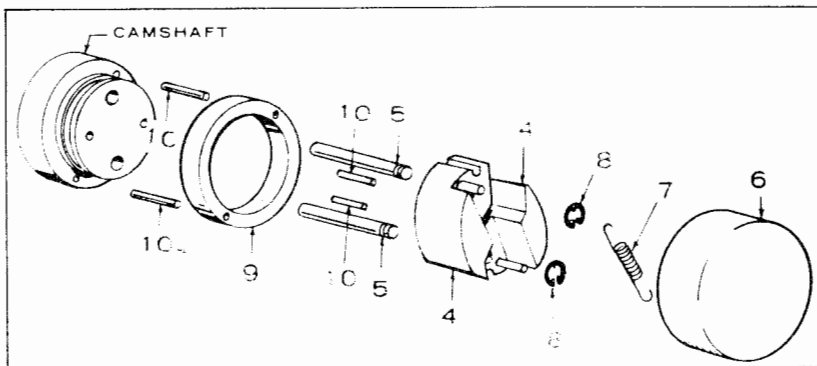


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	402B379	4	Hardware Package, Mounting (Excludes Mounting Bolt)

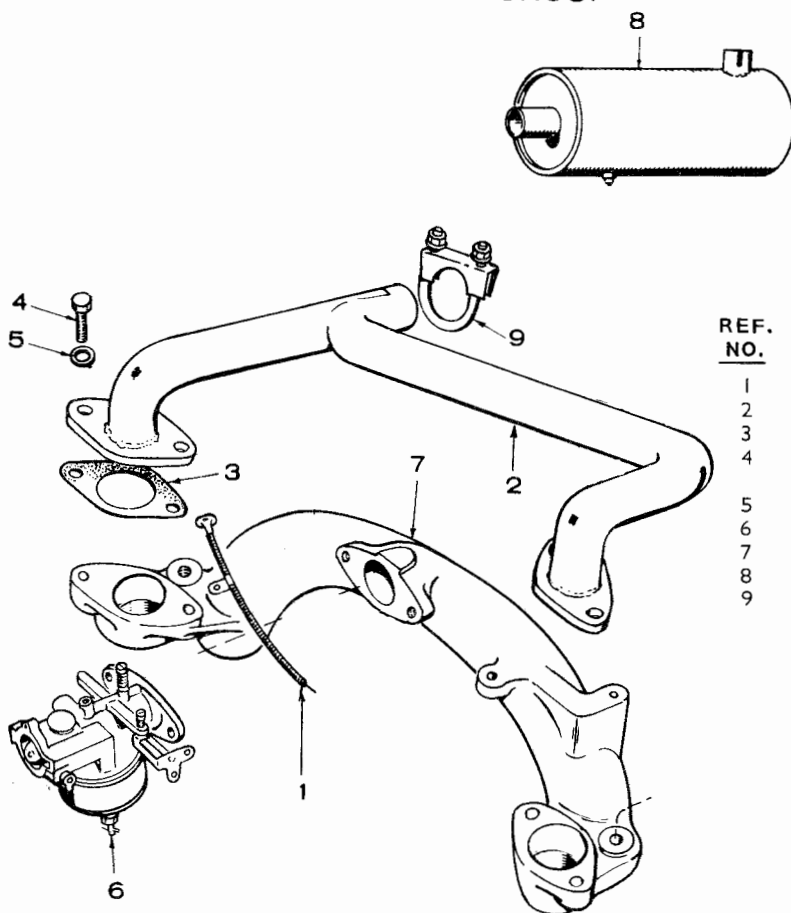
#### CRANKSHAFT, FLYWHEEL, CAMSHAFT AND PISTON GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	105B317	1	Camshaft (Includes Center Pin & Spark Advance Mechanism Pins)
2	526A17	1	Washer, Wheel Mounting
3	160E1080	1	Flywheel
4	160A1049	2	Weight Assembly, Timing Control - Includes Pins
5	516P172	2	Pin, Groove (1-1/16") Timing Control
6	110A1283	1	Cover, Timing Control
7	160A1051	1	Spring, Timing Control
8	518P129	2	Ring, Timing Control Retainer
9	160A791	1	Cam, Timing Control
10	516-144	4	Pin, Roll (7/16") Camshaft & Timing Control Cam

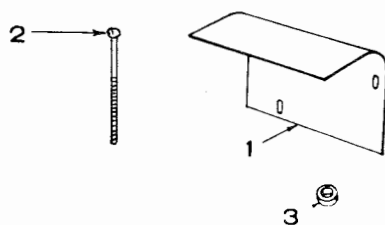


## FUEL SYSTEM AND EXHAUST GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	149A1024	1	Rod, Fuel Pump Primer
2	154D1401	1	Manifold, Exhaust
3	154A1383	2	Gasket, Exhaust Manifold
4	800-28	4	Screw (5/16-18 x 1'') - Exhaust Manifold Mounting
5	850-45	4	Washer, Lock (5/16'')
6	141D776	1	Carburetor
7	154C1385	1	Manifold, Intake
8	155A1173	1	Muffler, Exhaust
9	155P1135	1	Clamp, Exhaust Tube

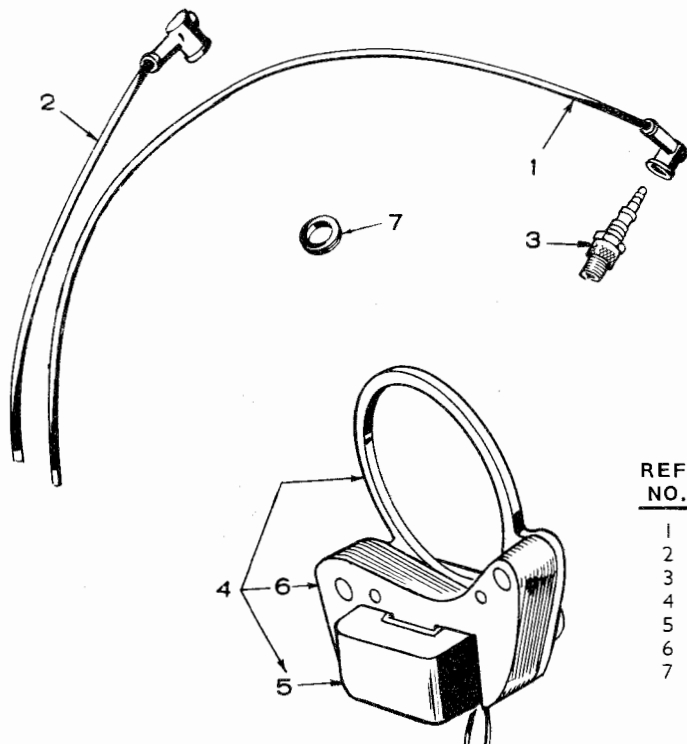
## VACUUM SPEED BOOSTER GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150A1071	1	Shield, Heat
2	813-111	2	Screw (10-32 x 2-1/4'') - Booster Mounting
3	526A196	2	Washer, Spacer - Heat Shield Mounting

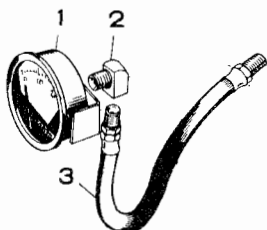


## IGNITION GROUP



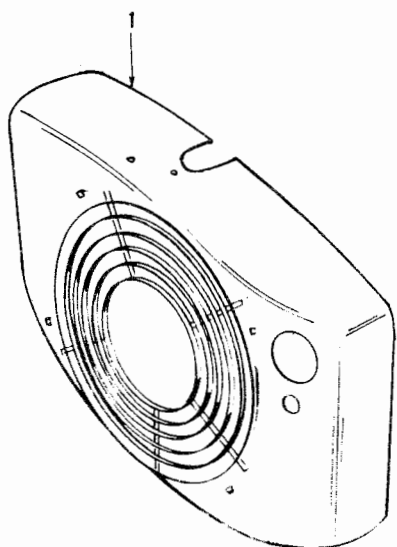
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	167A1548	1	Cable, Spark Plug - R.H. (21")
2	167A1463	1	Cable, Spark Plug - L.H. (19")
3	167-4	2	Plug, Spark
4	160B1121	1	Stator Assembly, Magneto
5	160D1124	1	Coil, Magneto Stator
6	160B1118	1	Pole Shoe, Magneto Stator
7	508P95	2	Grommet, Spark Plug Cables

## OIL SYSTEM GROUP



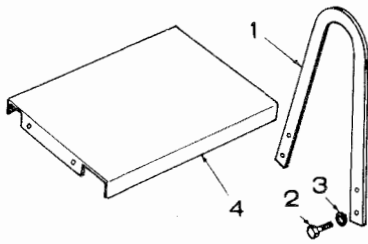
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	193P5	1	Gauge, Oil Pressure
2	502-5	1	Elbow, Oil Line to Gauge
3	501-3	1	Line, Oil

## HOUSING AND GOVERNOR GROUP



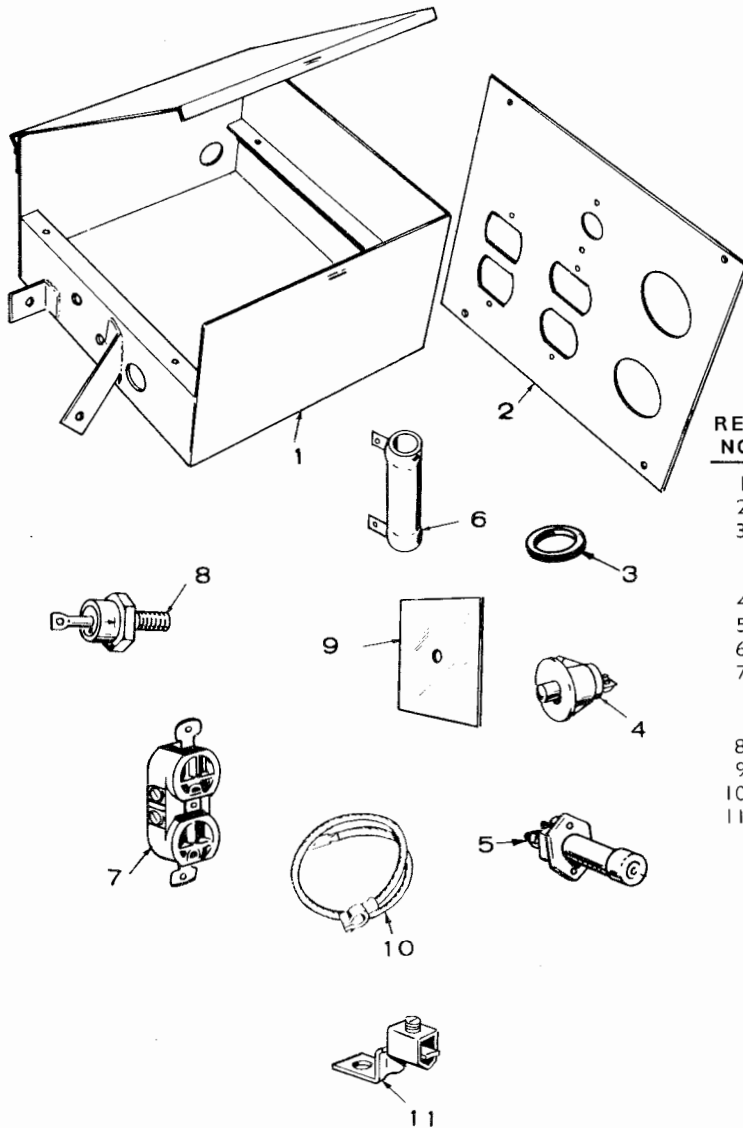
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	134C1988	1	Housing, Blower

## GENERATOR GROUP



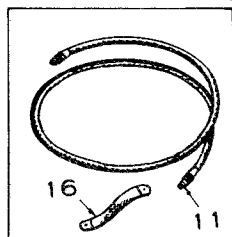
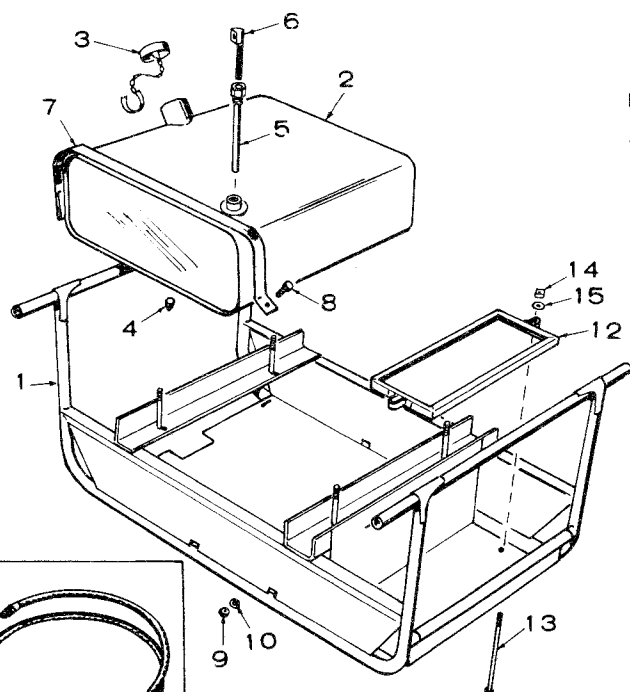
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	403B934	1	Bracket, Lifting
2	800-29	4	Screw (5/16-18 x 1-1/8") - Lifting Bracket Mounting
3	850-45	4	Washer, Lock (5/16")
4	232C2207	1	Cover, Generator Stator

## CONTROL GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	301D3336	1	Box, Control
2	301B3337	1	Panel, Control Box
3	GROMMET, CONTROL BOX		
	508A2	1	For 1/2" Hole
	508-8	1	For 13/16" Hole
4	313P18	1	Switch, Stop
5	308A28	1	Switch, Start
6	304A46	1	Resistor (10-Ohm, 50 Watt)
7	RECEPTACLE, DUPLEX		
	323-184	1	120 Volt
	323-111	1	240 Volt
8	305P235	1	Rectifier
9	305A256	1	Bracket, Rectifier
10	416-14	2	Cable, Battery (15")
11	332P517	1	Terminal, Ground

# CARRYING FRAME AND FUEL TANK GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	403E930	1	Frame, Carrying
2	159C690	1	Tank, Fuel (7.35 Gal.)
3	159B20	1	Cap, Tank
4	505-8	1	Plug, Pipe (1/8)
5	159A695	1	Tube & Bushing
6	149A773	1	Strainer & Elbow Assembly
7	159A692	2	Band, Tank Mounting
8	800-9	2	Screw (1/4-20 x 1-1/2") - Tank Mounting
9	862-1	2	Nut, Hex (1/4-20) - Tank Mtg.
10	850-40	2	Washer, Lock (1/4)
11	501A122	1	Line, Fuel - Tank to Pump
12	416B612	1	Frame, Battery Hold-down
13	816-123	2	Bolt (5/16-18 x 9") - Battery Hold-down (Includes Nut)
14	863-14	2	Nut (5/16), Square
15	526A41	2	Washer (5/16) - Battery Hold-down
16	337-56	1	Strap, Bond - Grounding

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

**Material Allowances:** Onan will allow credit or furnish free of charge to the Onan Authorized Service Station or his Approved Service Dealer, all genuine Onan parts used in a warranty repair of these products which fail 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 Distributors in whose territory the equipment is located. These Distributors and their Approved or Registered Onan Service Dealers are authorized to make settlement of all customer warranty claims within the limits of the manufacturer's warranty policy as described herein.

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

## **MAINTENANCE**

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

Maintenance is divided into two categories:

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

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

## **INSTALLATION**

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

Onan

Minneapolis, Minnesota 55432

MSS-22A  
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