HOME STANDBY ELECTRIC GENERATING SET

MODEL NO. MX-27129A

FORM NO. 89M-619B*



owner's guide and PARTS LIST

RETURN TO FILE ENGINEERING DEPT.



READ THIS MANUAL COMPLETELY BEFORE BEGINNING INSTALLATION

SAFETY PRECAUTIONS

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

WARNING This symbol is used throughout this manual to warn of possible serious personal injury.

CAUTION This symbol refers to possible equipment damage.

Listed below are some general precautions of potential hazards which could result in serious, personal injury. Take care in following recommended procedures.

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

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

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

Guard Against Electric Shock

Disconnect all power and remove starting battery cables before attempting any maintenance or service.

DO NOT TOUCH electrical equipment while on damp or well-grounded surfaces. Use rubber insulative mats placed on dry wood platforms when working around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling electrical equipment.

Jewelry is a good electrical conductor and should be removed when working on electrical equipment. Use extreme caution when working on electrical components. High voltages cause injury or death. Follow all state and local codes during installation, operation and service. Have all electrical installations and service performed by a qualified

electrician or authorized service representative.

• Do Not Smoke While Servicing Batteries.

Lead acid batteries emit a highly-explosive hydrogen gas which can be ignited by electrical arcing, any flame, smoking, etc.

• Keep the Unit Clean.

Remove all oil deposits from the compartment base and the unit. Accumulated grease and oil on the unit can cause overheating (and subsequent engine damage) and may present a potential fire hazard. Dispose of oily rags.

Keep leaves, grass or weeds mowed around the compartment area. Obstructed air inlets or outlet can cause unit overheating and increase the potential hazard of a fire.

Periodically check screens to ensure they are securely attached to prevent entry of small animals, debris, and hands and feet of children.

Protect Against Moving Parts of Unit

Avoid moving parts of the unit. Do not wear loose jackets, shirts or sleeves due to danger of becoming caught in moving parts.

Make sure all nuts and bolts on the unit are secure. Tighten all supports and clamps periodically.

If you must make adjustments while the unit is running, use extreme caution when close to hot manifolds, moving parts, etc.

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

Keep housing locked at all times.

Guard Against Carbon Monoxide

Do not operate unit near an open window or door. Carbon monoxide may cause sickness or death.

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WARNING

TO AVOID POSSIBLE PERSONAL INJURY OR EQUIPMENT DAMAGE, A QUALIFIED ELECTRI-CIAN OR AN AUTHORIZED SERVICE REPRESENTATIVE MUST PERFORM IN-STALLATION AND ALL SERVICE.

1



SPECIFICATIONS

Dimensions - MX-27129A Width 33-13/16 in. (859 mm) Compression Ratio 7.0 to 1 Engine Power (1800 rpm) 10.2 BHP (7.61 Kilowatts) Lubrication Oil Capacity 4 U.S. quarts (3.8 lit) **Fuel System** Downdraft Carburetor (Combination Gas-Gasoline) Choke Electric Fuel Tank Capacity (where used) 18.9 lit) Starting Electric Battery Recommended SAE Group 60 360 Cold Cranking Amps (74 A/Hr) Generator Basic Design Revolving armature, 4-pole Battery Charge Rate (Fixed Two Step) 2 Amp & 5 Amp Frequency Regulation (no load to full load) 5 percent **TUNE-UP SPECIFICATIONS** Breaker Point Gap (full separation) 0.020 in. (0.51 mm)

Spark Plug Gap	
Gasoline	0.025 in. (0.64 mm)
Gaseous	0.018 in. (0.46 mm)
Ignition Timing	19° BTC
Carburetor Float Clearance (between float bowl gasket and float)	. 1/4 in. (6.35 mm)
Intake	in. (0.15 to 0.20 mm)
Exhaust 0.015 to 0.017	in. (0.38 to 0.43 mm)

TORQUE SPECIFICATIONS*

Cylinder Head Bolts		29-31 ft-lb (39.4 to 42.2 N•m)
Manifold Screws	Intake	15-20 ft-lb (20.4 to 27.2 N•m)
	Exhaust	14-17 ft-lb (19.0 to 23 N●m)

* Torque when engine is cold. Be careful not to strip threads.

GENERAL INFORMATION

HOME STANDBY GENERATING SET

This unit is designed for home standby applications. 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.

Identify the model of your unit by referring to the model and specification number shown on the nameplate. Electrical specifications are shown on the lower portion of the nameplate. The nameplate is on the right cylinder air housing shroud.

YOUR MANUAL

This manual gives you operation and maintenance instructions which can help you to keep your unit running like new. Read it carefully. Remember ... any machine, regardless of design or type, will perform only in relation to the services it gets.

Throughout this manual, engine end is considered front of the generating set. Left and right are determined while facing the engine end.

Where applicable, metric equivalent appears in parentheses following U.S. customary unit.

OPTIONAL ACCESSORY ITEMS

EXPLANATION OF THE MODEL NUMBER

Following is a typical model number with an explanation of the various parts.

5.0	MX-27129	3C R /	21929	۷.
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1	2	3 4	5 (6

- 1. Kilowatt rating of the generating set.
- 2. Identification of generating set series.
- 3. Voltage code of generator. Number 3 is code for 120/240 volts, single phase. "C" indicates the generator can be connected for 120 volts, 2 wire; 240 volts, 2 wire; or 120/240 volts, 3 wire.
- Indicates type of starting.
 R—Remote electric starting, at the generating set or remote starting from remote location.
- 5. Factory code for identifying optional equipment.
- 6. Specification letter which advances with factory production modifications.

Montgomery Ward carries two types of transfer switches for use with your MX-27129 standby generating set. A manual transfer switch (order article no. 89-27134) or an automatic transfer switch (order article no. 89-27135) are available to complete your home standby generating system. The manual transfer switch kit enables the owner/operator to switch, up to four possible circuits, to emergency power during a utility power outage. The total circuit load requirements must not exceed the nameplate rating of the MX-27129 emergency power generator set which is 5000 watts. The manual transfer switch kit is designed for indoor wall mounting preferably near the main power distribution panel. The automatic transfer switch is also designed for indoor wall mounting near the main power distribution panel. The automatic transfer switch will automatically start the emergency standby generator set and assume the load (preselected by the home owner prior to installation) of the transfer switch. Maximum current rating of the automatic transfer switch is 30 amperes. Both switches come with complete installation and operating instructions.

WARNING Installation of the manual switch kit and optional cable kit must be performed by a qualified licensed electrician and inspected according to all local and state electrical codes.

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INSTALLATION

A QUALIFIED ELECTRICIAN, ELECTRICAL CONTRACTOR OR AUTHORIZED SERVICE REPRESENTATIVE SHOULD INSTALL HOME STANDBY GENERAT-ING SET.

GENERAL

The MX-27129 home standby generating set is a completely self-contained unit, enclosed in a compartment. Observe safety precautions and local electrical codes during installation, operation and service.



Do not sit, stand, or place ladder or other equipment on housing. Housing may break

causing serious injury.

CAUTION Replace housing if cracked. Excessive moisture, dirt, etc., may accumulate within housing causing damage to engine-generator. LOCATION

Choose an installation area near the building and as close as possible to the transfer switch. The area must be level, dry and accessible for service. Refer to local codes for distance from the building, distance from windows, or doors, etc. See Figure 1.

wARNING or death.

Do not operate unit near an open window or door. Carbon monoxide may cause sickness

Shrubs, bushes, trees or grass must not obstruct the air inlets or outlet on the generating set compartment. Figure 1 shows a typical installation.

1. Although the compartment base is designed to rest directly on the ground, you might prefer to



FIGURE 1. TYPICAL HOME STANDBY GENERATING SET INSTALLATION



FIGURE 2. LOAD CONNECTIONS AVAILABLE

make a base of concrete, rock, gravel, etc., to prevent grass or weeds from growing around the compartment. If so, make the base at least 4 inches (100 mm) larger in perimeter than the unit. See the SPECIFICATIONS section for unit dimensions.

- 2. Unlatch the housing latch on the rear side of the housing panel (wood). See the OPERATION section for unlatching and opening housing.
- 3. Slide the housing forward and off the unit.

Sliding the housing off the unit is much easier than trying to lift off the housing.

4. With sufficient manpower or a mechanical lift, set the generating set compartment on the base of concrete, crushed rock, gravel, etc.

If other than a concrete base, be sure 4×4 inch (102 x 102 mm) compartment redwood base pieces rest squarely on the base material.

5. Remove the shipping blocks under each side of the generating set before starting is attempted.

CAUTION If shipping blocks are not removed before generating set operation, damage could occur to the unit mounts.

LOAD WIRING

The generating set nameplate located on the right cylinder air housing shroud gives rated output in watts, volts, phase, kVA and power factor, amperes, and hertz. Generator Code "3C" means you can connect the generator for 120 volt, 2 wire; or 120/240 volts, 3 wire. Figure 2 shows the generator load connections available.

All load wiring and electrical connections must be inspected by a qualified serviceman or electrician.

Load connections are located on the side of the generator behind the control box. Remove control box cover for access to load connections. See Figure 3. Load wires can exit through the rear or the floor of the compartment. Connect each wire to the correct generator output wire. Leads are marked M1, M2, M3, and M4. Each corresponds to marked leads on the wiring diagram and those shown in Figure 2. Insulate bare ends of the wires.

We recommend using water tight, flexible conduit between the building connection and the generating set. If rigid conduit is used, a minimum of 1 foot (305 mm) flexible conduit at the generating set must be used.



FIGURE 3. GENERATING SET LOAD CONNECTIONS

This home standby generating set is inherently protected by design against damage to the generator, transfer switch and feeder conductors (if properly sized). If a short circuit or large overload occurs, generator output drops to zero and no damage results.

GROUNDING

WARNING

Failure to ground the generating set could result in serious electrical shock.

Connect a #8 wire or larger (following applicable codes) between:

- 1. A separate ground pipe or rod penetrating into moist earth, and
- 2. the solderless connector which is located on top of the generator for the remote start models and on the start-stop control box for the electric start models.

WARNING The National Electrical Code (NEC) requires that all separately derived AC systems be grounded per Article 250-26. Manufacturer has added a bonding jumper per article 250-26 (a) from the noncurrent carrying metal parts to the conductor to be grounded. Manufacturer does not supply the required grounding conductor or grounding electrode because it would be impossible to cover every exception and all local code requirements. See your local codes and the NEC manual for the proper grounding for your application.

As a general rule, do not use electrical equipment in wet or damp areas. For construction sites, additional rules apply to portable alternators when used on construction sites, from NEC, OSHA and state codes. It is the responsibility of the consumer to meet these requirements.

GASOLINE TANK, HOLDER AND HOOD

Instructions for installation and connections for gaseous fuel are included with the gaseous fuel package.

The remote start gas-gasoline model includes a gasoline tank bracket and tank hood for mounting the gasoline tank on the rear of the compartment. Use the following instructions.

- 1. Facing the rear of the compartment, remove the bottom, middle lag bolt and washer. See Figure 4. Do not discard the bolt or washer.
- 2. Mount the gasoline can bracket with the one lag bolt and washer just removed (from Step 1) and two hex head 5/16-18 screws, flat washers, lock washer and nuts as shown in Figure 4. Holes in the panel are already drilled for the top screws.
- 3. Place the gasoline tank in the tank bracket so the tank cap is on the left as you face the rear of the compartment.
- 4. Connect the female connector on the end of the supplied fuel line to the tank cap male connector. Pull the female connector sleeve back, insert and





hold over the male connector and release. See Figure 5.

Be sure to connect the female connector on the fuel line to the tank cap before routing fuel line to fuel pump. Otherwise, you might accidentally place the connector on the inside of the compartment.



FIGURE 5. CONNECTION OF FEMALE CONNECTOR TO TANK CAP

- 5. Run the loose end of the fuel line (opposite connector end) through the small hole on the rear of the compartment. Figure 6 shows where line enters inside compartment.
- 6. Slip the hose clamp over the loose end of the fuel line (now inside the compartment). See Figure 6.
- 7. Connect the end of the line to the unused connector on the fuel pump (Figure 6). Move the clamp near the end of the fuel line (over fuel pump connector).
- 8. Install the gasoline tank hood with four 1/4-20 screws, flat washers, lock washers and nuts. Mount the hood so the hinges face down and will



FIGURE 6. FUEL PUMP CONNECTIONS

be covered when the hood is down. See Figure 7. Holes are pre-drilled in the panel.

9. To lock the gasoline tank shield, push down on the shield and slide the barrel bolt lock, on the inside of the compartment panel, through the hole of the shield part which extends through the panel. See Figure 7.

REMOTE START-STOP CONNECTIONS

The remote start, home standby model has provisions for remote start and stop connections. Locate the remote switch in the house, garage or other convenient location for starting and stopping the generating set.

For remote connections to an automatic transfer switch which automatically starts and stops the generating set, refer to instructions furnished with the automatic transfer switch.

For the remote switch, use a single-pole, doublethrow, momentary contact, center-off type switch. You can use #18 wire for distances up to 250 feet (76 meters) from the generating set. Several remote switches can be used in different locations if they are wired in parallel.

Use a momentary-contact, start-stop switch only. Otherwise, the exhaust blower used for the gas/gasoline model runs continuously during the entire operation period (after remote starting).

Remote connections to the generating set are made according to Figure 8. A wiring harness runs from the connector located on the side of the control box to the time delay control located on the rear panel of the housing (Figure 13). Customer wiring is from time delay control to the remote momentary contact switch.



FIGURE 7. FUEL TANK HOOD INSTALLATION



FIGURE 8. REMOTE CONNECTION ON REMOTE START MODEL

BATTERY INSTALLATION AND CONNECTIONS

The battery cables, battery hold-down frame and hardware are shipped loose with the generating set.

Battery Cables

Remove and set the gasoline tank along the edge of the compartment (it is not necessary to disconnect fuel or vent lines) for ease of connections.

- 1. Remove control box cover.
- 2. Insert the eyelet terminal of the long battery cable (positive +) through the grommet on the bottom of the control. See Figure 9.
- 3. Remove the right nut and washer from the start solenoid.
- 4. Connect the eyelet terminal of the long battery cable to this terminal and reinstall the nut and washer.
- 5. Reinstall the control box cover.
- 6. Set and secure the gasoline tank back in the compartment.
- Remove the through bolt from the generator shown in Figure 10 and connect the short battery cable (negative -) eyelet terminal. Be sure connection is clean and tight after reinstalling the through bolt.



FIGURE 9. POSITIVE BATTERY CABLE CONNECTION



H NEGATIVE BATTERY (GROUND) BATTERY BATTERY TRAY POSITIVE BATTERY CABLE HOLD DOWN STUD, WASHERS AND NUTS

FIGURE 11. BATTERY INSTALLATION AND CONNECTIONS

FINAL CHECKS BEFORE OPERATION

After installation is complete, perform the following checks. Then read the OPERATION and PERIODIC MAINTENANCE sections completely before starting your generator set.

- 1. Check oil level of engine and air cleaner. Oil for engine should show full on oil level indicator.
- 2. Check fuel supply (gasoline fuel).
- Check load, and remote wiring connections. See Figures 2 and 8.
- Check battery connections for correct polarity (negative ground only) and check battery electrolyte level.
- 5. Refer to the OPERATION section. Test the generating set for starting, running and stopping.
- 6. Close the compartment.
- With a good padlock (one which will resist corrosion and freezing), lock the housing latch hinge to the hasp on the rear wall of the compartment.

WARNING The generator set owner should become thoroughly familiar with the start-stop controls, manual or automatic transfer switch operation and routine periodic maintenance items to ensure the set's operation in the event of a power outage. Read your owner's manual and take note of the recommendations regarding the use of light-weight oil for cold weather operation, importance of periodically running (exercising) the unit to keep the battery charged and prevent stale fuel (varnish build-up) in carburetor. Also keep all leaves, grass and weeds or shrubs from obstructing any air inlets and outlets and keep the unit fueled and ready for immediate operation at all times.

Battery

Set the battery in the battery tray on the compartment base (see SPECIFICATIONS section for recommended battery). See Figure 11. Hook the two battery hold-down studs into the battery tray. Install the top battery hold-down frame onto the top edges of the battery, with the hold-down studs up through the holes of the top frame. Secure the battery frame with the two 5/16-inch flat washers, lockwashers and nuts.

FIGURE 10. NEGATIVE BATTERY CABLE CONNECTION

Battery Connections

Before making the battery connections, add the electrolyte and charge the battery following the manufacturer's instructions. Make sure you have the battery terminal contact areas clean. Connect the battery cables as shown in Figure 11 positive (+) battery cable to the positive battery terminal, and the negative (-) battery cable to the negative battery terminal. Coat the terminal connections with mineral grease or petroleum.

If the battery cables are accidentally reversed, the engine will start and run, but battery will discharge.

OPERATION

TO OPEN THE UNIT

If you are going to start the generating set and there is a remote start-stop switch in the house, garage, etc., it is unnecessary to open the compartment.

With an automatic transfer switch for remote start models, the generating set is automatically started when a power outage occurs, and the load is automatically transferred to the set. When normal power returns, the load is automatically transferred back to the utility power source and the generating set is stopped. You can open the unit and start the generating set using these instructions for exercising, testing, etc., If you desire.

- 1. Remove the lock from the lock hasp on the rear of the housing (Figure 12).
- 2. After the lock is removed, set the hasp so it rests on top of housing. Do not open housing by pulling on hasp.





3. Stand directly in front of the housing, grasping it between the top vent and housing top. See Figure 13. Pull it toward you in a level plane (but not all the way off). Rest the front of the housing on the ground, leaving the sides of the housing still in the guides (trim molding).

BEFORE STARTING

Before starting, read these helpful measures and reminders.

1. Be sure the crankcase has been filled with oil to the FULL mark on the oil fill indicator (see *To Check Oil Level* on page 13) and has a full fuel tank, if gasoline fueled (see *Gasoline Fuel*).



WARNING Remove gasoline tank from set before filling. Never open or fill tank when set is running or hot. Possible personal injury or death may result.

Both procedures are described near the end of this section.

2. Be sure the air inlets and outlet around compartment are not obstructed by grass, leaves, etc. See Figure 14.





Obstructed air inlets or outlet can cause unit overheating.

3. Operate the generating set with the compartment fully in place.



If compartment is not closed completely during operation, the unit does not receive enough cooling air and could overheat.

4. Operation with Gasoline: An initial full fuel tank should enable the generating set to operate from 5 to 8 hours before refilling is needed. Always refill the tank after an operation cycle.

TO START THE UNIT

Starting and stopping instructions vary for the two basic starting methods. If your home standby unit has a remote start-stop switch in the house, garage, etc., as shown in Figure 15, proceed to instructions given under Remote Starting.

If your home standby unit start-stop control in the compartment is like that shown in Figure 16, proceed to instructions given under Starting at Compartment.

Once you determine which instructions apply to your model, put a check mark (/) by those instructions.

When starting is attempted using the following instructions, crank the unit for about 15 seconds at one time. If it does not start, walt a half minute and try another start. If the unit is new or has not operated for some time, starting might not occur immediately due to lack of gasoline at the carburetor. After starting, let the generating set run without load a few minutes to warm up, if possible (reduces engine wear).

Remote Starting (remote switch in house, garage, etc.):

1. Depress the remote start-stop switch to START. Hold down switch until the generating set starts. Then release immediately. See Figure 15.



FIGURE 15. TYPICAL REMOTE **START-STOP SWITCH**

For units which operate on gasoline, it is necessary to hold the start switch down for about 15 seconds before cranking occurs (due to a time delay for the compartment exhaust fan). 2. Apply the load to the generating set using instructions To Apply Load below.

Starting at Compartment:

- 1. Open the housing using instructions To Open the Unit on page 10.
- 2. Depress the start-stop switch on the control (Figure 16 to START. Release as soon as the generating set starts.
- 3. Close the housing using instructions To Close the Unit.
- 4. Transfer the load to the generating set using instructions To Apply Load below.



FIGURE 16. GENERATING SET CONTROL

TO CLOSE THE UNIT

- 1. Stand directly in front of the housing (Figure 13). Lift the housing slightly so the housing back sides only are in contact with the slides (trim molding).
- 2. Push the housing straight back letting the housing sides rest in the slides.
- 3. Close the lock hasp and lock unit (if lock used).

TO APPLY LOAD

- 1. If possible, let the generating set run a few minutes without load to allow for engine warm-up.
- 2. Table 1 shows typical appliances and their approximate wattage demands. Do not operate too many large appliances at once (freezer, refrigerator, electric water heater, clothes dryer, etc.). Starting requirements are often four times greater than running requirements.

Do not operate air conditioning systems CAUTION with the generating set. Power requirements of these systems will overload the generating set.

- 3. Transfer the load to the generating set with the manual or automatic transfer switch used. See the appropriate instructions included with the transfer switch.
- 4. If the generating set is overloaded, you should notice a flicker in your lights. If a large overload develops no generating set output results. In this case:
 - a. Remove some appliance loads.
 - b. Switch the transfer switch to the utility power source (the generating set won't start under load).

- c. Restart the generating set.
- d. Switch the transfer switch back to the generating set (unit now supplies power to the load).

TABLE 1. TYPICAL APPLIANCE LOADS

APPLIANCE OR TOOL	WATTAGE
Refrigerator	600-1000
Vacuum cleaner	250-800
Coffee percolator	550-700
Electric frying pan	
Hair dryer	350-500
Dishwasher	
Electric iron	500-1200
Radio	50-200
Electric water heater	
Space heater	
Electric blanket	50-200
Television	200-600
Electric drill	250-750
Battery charger	Up to 800
Electric water pump	450-1000
Microwave oven	
Toaster	500-1200
Range top (per element)	800-1500
Range oven	
Freezer	

TO REMOVE LOAD

After normal power returns, transfer the load from the generating set to the commercial power source with your manual or automatic transfer switch. See the instructions supplied with the transfer switch. To stop the generating set, see *To Stop the Unit* below.

TO STOP THE UNIT

Before stopping the unit, let it run a few minutes without load to cool. At your earliest convenience after stopping the unit, check the engine oil level and gasoline supply, if used.

If your home standby unit has a remote start-stop switch in the house, garage, etc., as shown in Figure 15, proceed to instructions given under *Remote Stopping*.

If your home standby unit start-stop switch in the compartment is like that shown in Figure 16, proceed to instructions given under *Stopping the Unit at Compartment.*

Remote Stopping (remote switch in house, garage, etc.): Depress and hold the remote start-stop switch to STOP. Release after the generating set stops.

Stopping the Unit at Compartment:

- 1. Open the compartment housing using instructions To Open the Unit on page 10.
- 2. Depress and hold the start-stop switch on the control to STOP. Release after the generating set stops.
- 3. Close the compartment housing using instructions *To Close the Unit* on page 11.

LOW TEMPERATURE CONDITIONS

1. Use a light weight oil as shown in the *PERIODIC MAINTENANCE* section. Change oil only when the engine is warm.

Failure to use a lighter weight oil in cold weather results in hard cranking and a chance the unit won't start.

- 2. Gasoline Only: Use fresh fuel and keep the fuel tank full. A full tank prevents moisture condensation.
- 3. Keep the fuel system clean.
- 4. Exercise the generating set frequently (see *Exercising*).

EXERCISING

Infrequent use of units can result in the following: Water condensing in engine fuel and lubrication system causing contamination and/or rust, loss of protective oil film on moving engine parts, loss of engine fuel prime due to drain-back and/or evaporation, battery discharge due to internal and external current leakage, and breakdown of generator insulation due to water absorption.

Proper exercising does the following: Elevates engine oil temperature to 180° F (82.2° C) evaporating water from engine lubrication system and generator windings, re-establishes a protective oil film on engine parts, recharges battery to full normal potential, and brings generator up to normal operating temperature through actual application of load. The engine oil temperature should be held at 180° F (82.2° C) for at least 20 minutes and the unit should be exercised at least once each month.

Proper exercising can usually be accomplished by observing the following procedures: Perform all specified maintenance checks, starting unit and applying load by creating a simulated power failure. This exercises the control and switchgear systems. Applying not less than 50 percent load to heat up engine and generator as described above; exercising unit long enough to provide at least 20 minutes running time at normal operating temperatures. This will require at least 60 minutes total running time. Provide approximately 1 minute of operation at no load to allow the engine to cool down. Improper exercising may cause more damage than no exercising at all, because of the following: Significant amounts of water and raw fuel will remain in the lubrication oil if the unit is not at the specified operating temperature; operating engine at no load or at temperatures below those specified causes carbon build-up, spark plug and exhaust system fouling and inadequate charging of battery. Continued operation in this manner may cause starting failure and/or engine damage. Exercising a generator set without exercising associated controls and switchgear does not ensure operating integrity of the controls and switchgear. If the associated equipment is not fully functional, the system may fail to provide power when required.

After each exercise period, refill fuel tank and check engine for leaks and general condition. Locate cause of leaks (if any) and correct.

HIGH TEMPERATURE CONDITIONS

- 1. See that nothing obstructs airflow to and from the unit compartment.
- 2. Housing should be properly installed and undamaged.

DUSTY OR DIRTY CONDITIONS

- 1. Keep generating set clean. Keep cooling surfaces clean.
- 2. Service air cleaner as frequently as necessary (see PERIODIC MAINTENANCE section).
- 3. Reduce oil change schedule (see *PERIODIC MAINTENANCE* section).
- 4. Keep governor linkage clean (see *PERIODIC MAINTENANCE* section).
- 5. Clean generator brushes, slip rings and commutator. Do not remove normal (dark brown) film. Do not polish. (see *PERIODIC MAINTENANCE* section).

TO CHECK THE OIL

WARNING Do NOT check oil while the engine is operating. Hot oil could cause burns by blowing out of oil fill due to crankcase pressure.

- 1. Open the unit housing using instructions *To Open the Unit* on page 10.
- 2. Remove the oil level indicator shown in Figure 17 by turning counterclockwise and lifting straight out.
- 3. Wipe the end of the indicator with a clean rag or paper towel.
- 4. Install indicator back in engine by turning clockwise.
- 5. Remove the indicator and observe if engine oil level reached full mark ("F"). If not, add oil through oil base opening until it reaches full

mark. See *PERIODIC MAINTENANCE* section for recommended oil.

6. Reinstall oil level indicator.

After the first 50 hours of operation of a new or reconditioned generating set, change the crankcase oil. Afterwards, change oil every 100 hours of operation.



FIGURE 17. ENGINE OIL LEVEL INDICATOR

RECOMMENDED FUEL

Use clean, fresh, unleaded or regular grade gasoline. Do not use highly leaded premium fuels. Using unleaded gasoline results in reduced valve and carbon cleanout maintenance.

If the use of unleaded gasoline is desired, use regular gasoline for the first 25 hours to allow the rings to seat well for best performance. Then use unleaded gasoline thereafter.

If regular gasoline is used continuously, carbon and lead deposits must be removed from the cylinder heads as required to prevent engine power loss. Unleaded gasoline may be used safely only after lead deposits have been removed.



WARNING vent possibility of explosion.

Never fill the tank when the engine is running and leave some fuel expansion space to pre-

Filling the Gasoline Tank

WARNING Because of fire hazard, never fill the gasoline tank while the generating set is running. Because of gasoline fumes; sparks, flames, etc., should not be used near the fuel system without great caution.

- 1. Unlock and open the compartment. See To Open the Unit on page 10.
- 2. Units with tank outside compartment:
 - a. On the inside, rear compartment panel, lift and slide the barrel boltlock so the gasoline tank



FIGURE 18. ACCESS TO GASOLINE TANK OUTSIDE COMPARTMENT

shield on the compartment rear panel is released. See Figure 18.

- b. Lift the hinged, gasoline tank shield to expose the gasoline tank.
- 3. Disconnect the fuel line connector from the gasoline tank cap. Pull up the disconnect sleeve to release the connector as shown in Figure 18a.



FIGURE 18a. CONNECTOR ASSEMBLY AT FUEL TANK CAP FOR FUEL LINE

4. Remove the gasoline tank from set.

WARNING Do not transport fuel tank with vented cap. Use only sealed cap supplied with tank. Personal injury may otherwise result.

- 5. Remove gasoline tank cap by turning counterclockwise.
- 6. Fill fuel tank so that fuel level is approximately 1 inch (25.4 m) below the fuel tank opening (this allows for expansion).
- 7. Replace the tank cap by turning clockwise.
- 8. Put the full fuel tank back in the compartment or in the tank holder, whichever applies. Secure the

tank with the tank hold-down strap (applicable if tank is located inside compartment).

- 9. Reconnect the fuel line. Pull the connector sleeve back on the female connector which is attached to line. Insert connector onto male connector (on tank cap) and release sleeve.
- 10. Lower the tank shield over the gasoline tank and lock the shield down with the barrel bolt lock on the inside, rear compartment panel (Figure 18).
- 11. Close the compartment using instructions To Close the Unit on page 11.

GAS-GASOLINE CONVERSION

The combination gas-gasoline carburetor can be switched to gasoline operation by the following procedure:

- 1. Close the manual fuel shutoff valve in supply line for natural gas or propane-butane vapor, wherever located.
- 2. Open the gasoline fuel shutoff valve, wherever located.
- 3. Set the spark plug gap as given in the SPECIFI-CATIONS section.
- 4. See that the choke is free and works easily (applies to electric choke only).
- 5. Start the unit. If it runs unevenly under load due to faulty carburetor adjustment, the main jet needs adjusting. This is not the same main adjusting screw used for gaseous fuel. Another adjusting screw is provided for this purpose (refer to *ADJUSTMENTS* section).

To change back to natural or propane-butane operation, reverse the above procedure and reset the spark plug gap.

PERIODIC MAINTENANCE

Regularly scheduled maintenance is the key to lower operating costs and longer service life for the unit. Use the following schedule 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, reduce some of the service periods. Check the condition of the crankcase oil, the filters, etc. frequently until you can establish the proper service time periods.

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

		AFTER	EACH CY	CLE OF IN	DICATED	HOURS
SERVICE THESE ITEMS		8	50	100	200	400
General Inspection	See Page 9	x1				
Check Oil Level	13	x				
Check Battery Electrolyte Level	8		x			
Change Crankcase Oil	16			x2		
Check Spark Plugs	18			x4		
Check Breaker Points	22			x3		
Clean Breather Valve	16			. x		
Clean Governor Linkage	18			×		
Replace Air Cleaner Element	16				x2	
Replace Breaker Points	22				X4	
Clean Crankcase Breather	16				x	
Adjust Tappets						x3
Check Generator Brushes (Replace if Nec	essary)			As Require	d	

PERIODIC MAINTENANCE SCHEDULE

x¹ - Always check fuel supply, oil level and give unit a general inspection after power outage even if unit runs fewer hours than shown above.

x² - Make sure air inlets and outlets are unobstructed. Check for fuel leaks, proper mounting, exhaust leaks, etc.

x³ - For detailed maintenance, contact your nearest, authorized Wards service center.

x⁴ - Change oil every 100 hours of operation or 3 months, which ever occurs first. Reduce schedule if operating in dusty or dirty conditions.

WARNING

Do NOT check oil while the engine is operating. Hot oil could cause burns by blowing out of oil due to crankcase pressure.

CRANKCASE OIL

Oil capacity of the generating set is four U.S. quarts (3.78 litres). Fill the crankcase until the oil reaches the full ("F") mark on the oil level indicator (Figure 19).



FIGURE 19. ENGINE OIL LEVEL INDICATOR

Use an oil with the API (American Petroleum Institute) designation SE or SE/CC. Oil should be labeled as having passed MS Sequence Test (also known as ASTMG-IV Sequence Test). Refer to oil chart below for recommended viscosity according to temperature.

Use ashless or low-ash oll for gaseous fuel operation.



*Not recommended for gaseous fuel operation.

operating hours or 3 months, whichever occurs first. If operating in extremely dusty or dirty conditions, the oil might have to be changed sooner. When adding oil between changes, use the same brand as in the crankcase. Various brands of oil might 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 (99°C). Therefore, singlegrade oils are generally more desirable unless anticipating a wide range of temperatures. Use the proper grade oil for the expected conditions.

The oil drain is located on the right side of the engine.

WARNING Do NOT check oil while the engine is operating. Hot oil could cause burns by blowing out of oil fill due to crankcase pressure.

AIR CLEANER

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

Remove the oil cup on the bottom of the air breather (Figure 20), empty the existing oil, and thoroughly clean the cup and screen in a petroleum-base solvent. Dry the cup and screen, fill cup with oil (same weight oil as in crankcase) to oil level mark.

WARNING

Use extreme care when cleaning with a petroleumbase cleanser due to fire hazard.



CRANKCASE BREATHER

Lift off the rubber breather cap and carefully pry valve from cap (Figure 21). If valve doesn't come out easily, press hard with both your thumbs on top of the cap

Check oil level after each operation (or 8 hours operation, whichever occurs first) and change oil every 100 and fingers below to release the valve from the cap. Wash and rinse the whole valve in a petroleum-base solvent. Dry the valve and re-install. Be sure the perforated disc is toward the engine.



Use extreme care when cleaning with a petroleum-base cleanser due to fire hazard.



FIGURE 21. CRANKCASE BREATHER

FUEL SYSTEM

WARNING

Because of fire hazard, never expose fuel system to sparks, flame, etc.

Fuel Filters

Every 100 operating hours or sooner, clean the fuel filter elements. Remove the gas tank cap and fuel pickup assembly. Inspect the ball check and valve (Figure 22) and clean with compressed air.



FIGURE 22. FUEL CAP AND PICKUP ASSEMBLY

Electric Fuel Pump

Every 100 operating hours or sooner, drain the fuel pump and check the filter (Figure 23). To gain access to the filter, turn the base hex nut counterclockwise (facing bottom of pump). If the element appears dirty, replace with a new one. Be sure to replace the gaskets during reassembly.



FIGURE 23. ELECTRIC FUEL PUMP

VACUUM 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 (Figure 24). Do not enlarge this hole.

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



FIGURE 24. VACUUM SPEED BOOSTER



FIGURE 25. CLEANING GOVERNOR LINKAGE JOINT

GOVERNOR LINKAGE

The linkage must be able to move freely through its entire travel. Every 50 hours of operation, clean the joints and lubricate as shown in Figure 25. Also inspect the linkage for binding, excessive slack and wear.

SPARK PLUGS

Each time the spark plugs are removed, inspect, clean and regap (Figure 26). If the plug looks discolored or has fouled, replace it.



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 27. Remove the end bell



MEASURE FROM TOP FACE OF BRUSH BLOCK TO TOP OF BRUSH

	COMMUTATOR BRUSHES	COLLECTOR RING BRUSHES
NEW	5/8" (15.8 mm)	11/16" (17.5 mm)
1/2 WEAR	13/16" (20.6 mm)	7/8" (22.2 mm)
REPLACE	1" (25.4 mm)	1-1/16" (26.9 mm)

FIGURE 27. MEASURING BRUSH WEAR

FIGURE 26. CHECKING 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 band and the end cover to expose the brush holders. Remove the three screws holding each brush holder in place (Figure 28). 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, because 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 generating set 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. Do not use emery or carborundum paper or cloth. Clean out all carbon dust.





FIGURE 28. REMOVING GENERATOR BRUSHES

ADJUSTMENTS

Satisfactory generating set performance relies mostly on correct adjustments. If trouble does develop, follow an orderly procedure to determine the cause before making adjustments. Also refer to ENGINE TROUBLESHOOTING and PERIODIC MAINTEN-ANCE sections for help.

CARBURETOR

The generating set has a carburetor with two fuel mixture adjustments, an idle mixture which affects operation mainly at no load and a main adjustment which affects mixture for maximum load (Figure 29). If your generating set has a "hunting" (sudden surges and drops in speed) condition at no load or full load and cannot be corrected by carburetor adjustments, check governor linkage and adjustments (see GOVERNOR). A hunting condition at no load can often be corrected by an idle fuel adjustment.

When operating on gaseous fuel, follow the same procedure given for gasoline operation except for using the gas fuel adjustment screws. Always be sure the choke is locked in its wide open position.

CAUTION When determining fuel mixture settings, never force the fuel mixture adjustment needles against their seats, as this damages the seats and needles.



FIGURE 29. CARBURETOR FUEL MIXTURE ADJUSTMENTS

Main Fuel Adjustment (With Load)

- 1. Start generating set and allow the engine to warm up for a minimum of 10 minutes.
- 2. With main adjustment needle two full turns off its seat, slowly turn in (clockwise) until engine loses speed.

3. Turn main adjustment needle out (clockwise) until the engine runs smoothly at full power and speed.

If the engine develops a slight hunting (sudden surges and drops in speed) condition, open the main needle a little more (not more than 1/2 turn beyond maximum power point).

Idle Fuel Adjustment (No Load)

- 1. Start the generating set and allow set to warm up for a minimum of 10 minutes.
- 2. Turn out idle adjustment screw (counterclockwise) until the engine loses speed. Note this position.
- 3. Slowly turn in idle needle (clockwise) past the point where the engine is running smoothly and starts losing speed. Note this position.
- Turn out adjustment screw midway between the preceding two positions. The engine should run smoothly.

Carburetor Float Adjustment

- 1. Disconnect throttle control, choke cable and fuel line from carburetor.
- 2. With a screwdriver, remove the three screws on the top of the carburetor and lift off.
- 3. With the carburetor casting inverted and the float resting lightly against the needle and seat, there should be 5/16-inch clearance (7.94 mm) between the bowl cover gasket and the free end of the float (side opposite needle and seat). See Figure 30.



FIGURE 30. CARBURETOR FLOAT SETTING

4. If it is necessary to reset the float level, bend the float near the shaft to obtain the correct level.

Throttle Stop Screw

The throttle stop screw is located on the throttle shaft lever (side of carburetor by ignition coil). It must be adjusted and set for 1/32-inch clearance (0.79 mm) over the manifold surface when the generating set is running with no load. See Figure 31.



SET THIS DISTANCE AT 1/32¹¹ (0.79 mm) WHEN GENERATING SET IS RUNNING AT NO LOAD.



ELECTRIC CHOKE

If extremes in starting temperatures require a readjustment of the choke, loosen slightly the two cover retaining screws. See Figure 32. For less choking action, turn the cover assembly a few degrees in a clockwise direction. For more choking action, turn counterclockwise. Retighten the cover screws.



FIGURE 32. ELECTRIC CHOKE

GOVERNOR

Before making any governor adjustments, run the generating set for at least 10 minutes to allow the engine to come up to operating temperature. Be sure the carburetor is adjusted before attempting to adjust governor. Also be sure to clean, check and lubricate the governor linkage before making any adjustments. Binding in the linkage joints can cause erratic operation.

If carburetor and the following governor adjustments have already been made and the governor action is still erratic, replace the governor spring (Figure 33) with a new one and readjust the governor. Springs lose their calibrated tension through fatigue after long usage.



FIGURE 33. GOVERNOR AND SPEED ADJUSTMENT

Speed Adjustment

- 1. Start generating set and allow to warm up without load.
- 2. Remove the speed booster external spring from the bracket slide on the governor link (Figure 33).
- 3. Refer to the voltage and speed charts. If needed, increase the speed by increasing tension on the governor spring (Figure 33). Decrease tension on the governor spring to reduce speed.

SPEED CHART FOR CHECKING GOVERNOR REGULATION

AC GENERATING SETS	60 HERTZ	50 HERTZ
Maximum No-Load Speed RPM Hertz (Frequency)	1890 63	1560 52
Minimum Full-Load Speed (Without Booster) RPM Hertz (Frequency)	1770 59	1490 49

VOLTAGE CHART FOR CHECKING GOVERNOR REGULATION

AC GENERATING SETS	120 VOLT (1 PH, 2 W) OR 120/240 V (1 PH, 3 W)	240 VOLT (1 PH, 2 W) OR 240 VOLT (3 PH, 3 W)
Maximum No-Load Volts	126	252
Minimum Full-Load Volts (Without Booster)	110	220

NOTE: Output rating is at UNITY power factor load.

- 4. Add a full-rated load to the generating set and compare lower speed and voltage with those shown in the charts. If operation does not remain in these limits, check governor linkage and governor spring, and, if necessary, follow preceding procedure again.
- 5. Check and, if necessary, adjust governor sensitivity (Sensitivity Adjustment).

Sensitivity Adjustment

- 1. Start generating set and allow to warm up.
- 2. Check voltage and speed, first without load and then with a full load. See voltage and speed charts.
- Increase sensitivity (closer regulation) by shifting adjusting clip toward governor shaft (Figure 33). Move clip away from governor shaft to decrease sensitivity.

Too much sensitivity causes the engine to hunt. Too little sensitivity results in too much speed difference between noload and full-load conditions.

4. A change in sensitivity adjustment usually requires a compensating speed adjustment (spring tension). Then proceed to Speed Booster.

Speed Booster

- 1. After sensitivity adjustment, connect booster external spring to slide on governor link (Figure 33).
- 2. With generating set running at no load, move adjustable slide to point where there is no tension on spring.
- 3. Apply full-rated load to generating set.
- 4. If the speed increases more than the no-load frequency when the load is applied, lessen the speed booster's internal spring tension. To change tension, pull out the spring bracket and move the pin to a different hole (Figure 33). If speed decreases when the load is applied, increase the booster's internal spring tension.

BREAKER POINTS

- 1. Remove the two screws and the cover on the breaker box.
- 2. Remove the two spark plugs so engine can be easily rotated by hand.
- 3. Turn flywheel in a clockwise direction approximately 1/4 turn after top center (TC).
- To adjust gap, refer to Figure 34. Loosen screws (A) and turn cam (B) until point gap measures 0.020 inch (0.508 mm) with a flat thickness gauge. Retighten screws (A) and recheck gap.
- 5. If points are slightly burned, dress smooth with a file or fine stone. If points appear to be burned and pitted, replace with a new set.
- 6. Replace spark plugs and breaker box cover.



FIGURE 34. SETTING BREAKER POINTS

IGNITION TIMING

Both spark plugs fire simultaneously, thus the need for a distributor is eliminated. Spark advance is set at 19° BTC (before top center) and should be maintained for best engine performance. See Figure 35. Always check timing after replacing ignition points or if noticing poor engine performance. Proceed as follows:

Timing Procedure—Engine Running

1. To accurately check the ignition timing, use a timing light when the engine is running. Connect the timing light according to its manufacturer's



FIGURE 35. IGNITION TIMING MARK

instructions. Either spark plug can be used as they fire simultaneously.

- 2. Remove the plug from the timing hole.
- 3. Start the engine and check the timing. The mark on the flywheel should line up with the 19° BTC mark on the cover.
- 4. If timing needs adjustment, loosen the mounting screws on breaker box and move left to advance or right to retard the timing.
- 5. Start engine to be sure mark on flywheel lines up with 19 degree mark on cover.
- 6. Tighten all screws, replace timing plug.

Timing Procedure—Engine Not Running

- Connect a continuity test lamp set across the ignition breaker points. Touch one test prod to the breaker box terminal to which the coil lead is connected and touch the other test prod to a good ground on the engine.
- 2. Turn crankshaft against rotation (counterclockwise) until the points close. Then slowly turn the crankshaft with rotation (clockwise).
- 3. The lamp should go out just as the points break which is the time at which ignition occurs (19° BTC).
- 4. If timing needs adjustment, loosen the mounting screws on the breaker box and move left to advance or right to retard the timing.

ENGINE TROUBLESHOOTING



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INTRODUCTION

This catalog applies to the Home Standby Generating Set. Parts are arranged in groups of related items. Each illustrated part is identified by a reference number corresponding to the same reference number in the parts list for that group. Parts illustrations are typical. Right and left sides are determined by *facing* the blower end (front) of the engine.

GENERATING SET DATA TABLE

			ELEC		ATA	
MODEL AND SPEC	CARBURETION	WATTS	VOLTS	HERTZ	WIRE	PHASE
MX-27129A	Gas-Gasoline	5000	120/240	60	**	1

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

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CYLINDER BLOCK

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110-0915	1	Block Assembly, Cylinder (Includes Parts Marked *)
2	123-0293	1	Cap, Breather Tube (Rubber)
3	123-0129	1	Tube, Breather (Includes Steel Baffles)
4	110-0666	2	Cover, Valve Compartment
5	110-0667	2	Gasket, Valve Cover
6	517-0048	1	*Plug, Camshaft Expansion
7	800-0512	5	*Screw, Cap - Hex Head (5/16-18 x 1″)
8	526-0122	18	Washer, Flat (11/32" ID x 23/32" OD x 10 Gauge)
9	110-0892	2	Gasket, Cylinder Head
10	110-0884	1.	Head, Cylinder - Right
11	110-0883	1	Head, Cylinder - Left
12	BEARING, CR	ANKSH	AFT - FRONT OR REAR
	101-0450	2	*Standard
	101-0450-02	2	.002" Undersize
	101-0450-10	2	.010" Undersize
	101-0450-20	2	.020" Undersize
	101-0450-30	2	.030" Undersize
13	104-0575	2	*Washer, Crankshaft Bearing Thrust
14	101-0115	1	*Gasket Kit, Bearing Plate
15	101-0316	1	*Plate, Bearing (Excluding Bearing)
16	101-0367	2	*Bearing, Camshaft Front or Rear (Precision)
17	509-0041	1	Seal, Bearing Plate
18	516-0072	4	*Pin, Main Bearing Stop
19	800-0012	2	Screw, Cap - Hex Head (1/4-20 x 2-1/4")

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
20	123-0104	1	Valve, Breather Tube
21	526-0063	2	Washer, Flat - Copper
			(17/64″ ID x 7/16″ OD x 1/32″)
22	850-0045	5	*Washer, Lock - Spring (5/16")
23	120-0386	1	*Tube, Crankcase Oil
24	110-0881	2	Valve, Intake (Steel)
25	110-0880	2	Valve, Exhaust (Chrome Cobalt)
26	INSERT, EXHA	UST V/	ALVE SEAT (Chrome Cobalt)
	110-0872	2	*Standard
	110-0872-02	2	.002" Oversize
	110-0872-05	2	.005" Oversize
	110-0872-10	2	.010" Oversize
	110-0872-25	2	.025" Oversize
27	110-0902	4	*Guide, Valve
28	110-0539	4	Spring, Valve
2 9	110-0893	4	Washer, Valve Spring Retainer
30	110-0639	8	Lock, Valve & Spring Retainer
31	TAPPET, VALV	E	
	115-0006	4	Standard
	115-0006-05	4	.005" Oversize
32	SCREW, CAP -	HEX H	EAD (Special)
	110-0879	8	(5/16-18 x 1-1/4")
	114-0022	10	(5/16-18 x 1-3/4")

* - Included in 110-0915 Block Assembly.



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GEARCASE AND GOVERNOR

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	103-0519	1	Gearcase, Assembly (Includes Parts Marked &)	18	526-0196	1	Washer, Flat (7/32" ID x 7/16" OD x 1/8")
2	509-0040	1	&Seal, Oil - Crankshaft	19	870-0131	1	Nut, Hex - Locking (1/4-20)
3	150-1187	1	&Yoke, Governor Shaft	20	149-0003	· 1	Gasket, Fuel Pump Hole
4	815-0046	2	&Screw, Machine - Pan Head				Cover
•			(#8-32 x 3/8")	21	150-0098	1	Spring, Governor
5	509-0008	1	&Seal, Oil - Governor Shaft	22	150-0096	1	Stud, Governor Speed
6	510-0013	1	&Bearing, Needle - Upper	00	150 1577	4	Reachet Covernor
7	510-0014	1	&Ball, Bearing	23	150-1577		Nut Llow Looking (1/4-20)
8	516-0130	1	&Pin, Roll - Yoke Stop	24	870-0131	. 1	Nut, Hex - Locking (1/4-20)
9	150-0678	1	&Clip, Adjustment - Sensitivity	25	800-0004	2	Screw, Cap - Hex Head
10	510-0013	1	&Bearing, Needle - Lower				(1/4-20 x 5/8")
11	150-1564	1	&Arm and Shaft, Governor (Includes Clip)	26	526-0063	2	Washer, Flat - Copper (17/64" ID x 7/16" OD x
12	800-0034	1	Screw, Cap - Hex Head				1/32")
			(5/16-18 x 2-1/4″)	27	518-0006	1.	Clip, Hetaining
13	800-0032	• 4	Screw, Cap - Hex Head (5/16-18 x 1-3/4")	28	150-0629	1	Rod, Governor Arm to Carburetor
14	850-0045	5	Washer, Lock - Spring (5/16")	29	870-0053	1	Nut, Hex (#10-32)
15	103-0011	1	Gasket, Gearcase	30	150-0639	1	Ball, Joint
16	516-0141	2	Pin. Alignment				
17	815-0261	1	Screw, Cap - Hex Head (1/4-20 x 1/2")	& - Pa	rts Included i	n 103-0519	9 Gearcase Assembly.



REF. NO.	NO.	QTY. USED	PART DESCRIPTION .	
1	104-0960	1	Crankshaft	
2	515-0001	1	Key, Crankshaft Gear	
3	134-0565	1	Wheel, Blower	
4	104-0170	1	Screw, Flywheel Mounting (Special)	
5	850-0055	1	Washer, Lock - Spring (7/16")	
6	526-0017	1	Washer, Flat (15/32" ID x 1-1/4" OD x 1/4")	
7	104-0499	1	Flywheel	
8	518-0014	1	Lock, Crankshaft Gear Washer	
9	104-0043	1	Washer, Crankshaft Gear Retainer	
10	104-0032	1	Gear, Crankshaft	
11	515-0227	1	Key, Flywheel	



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	800-0007	2	Screw, Cap - Hex Head (1/4-20 x 1")
2	850-0040	2	Washer, Lock - Spring (1/4")
3	120-0400	1	Cup, Oil Pump Intake
4	120-0491	1	Pump, Oil (Internal Parts Not Sold Separately)
5	120-0161	1	Gasket, Kit - Oil Pump
6	801-0048	1	Screw, Cap - Hex Head (3/8-24 x 3/4")
7	526-0066	1	Washer, Flat - Copper (25/64" ID x 9/16" OD x 1/16")
8	120-0140	1	Spring, Oil By-Pass Valve
9	120-0398	1	Valve - Oil By-Pass
10	505-0057	1	Plug, Pipe (1/8")
11	309-0319	1	Switch, Low Oil Pressure
12	505-0056	1	Plug, Pipe (1/2")
13	102-0158	1	Gasket, Oil Base
14	123-0489	1	Cap and Indicator, Oil Fill
15	123-0191	1	Gasket, Oil Fill Cap
16	505-0050	1	Elbow, Pipe - Street (1/2")
17	800-0084	4	*Screw, Cap - Hex Head
			$(7/16 - 14 \times 4 - 1/2'')$

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
18	862-0004	4	*Nut, Hex (7/16-14)
19	850-0055	4	*Washer, Lock - Spring (7/16")
20	526-0014	4	*Washer, Flat (29/64" ID x 1-1/2" OD x 1/8")
21	526-0198	8	*Washer, Flat (5/8" ID x 1-1/2" OD x 1/16")
22	402-0282	4	*Snubber, Rubber
23	402-0290	4	*Bushing, Sleeve
24	402-0283	4	*Cushion, Vibration
25	526-0182	8	*Washer, Flat (17/32" ID x 2-7/8" OD x 1/4")
26	526-0032	4	*Washer, Flat (29/64" ID x 7/8" OD x 1/16")
27	102-057 9	1	Base, Oil
28	850-0050	4	Washer, Lock - Spring (3/8")
29	102-0455	4	Screw, Cap - Hex Head (3/8-16 x 1-1/4")
	402-0405	1	Hardware Package, Mounting (Includes Parts Marked *)

* - Parts Included in 402-0405 Mounting Hardware Package.



EF. 0.	PART NO.	QTY. USED	PART DESCRIPTION
1	PISTON (Inclu	udes Pin	& Retaining Rings)
	112-0136	2	Standard
	112-0136-05	2	.005" Oversize
	112-0136-10	2	.010" Oversize
	112-0136-20	2	.020" Oversize
	112-0136-30	2	.030" Oversize
	112-0136-40	2	.040" Oversize
2	112-0069	2	Pin, Piston
3	112-0003	4	Ring, Retaining
4	RING SET, PI	STON	•
	113-0152	2	Standard
	113-0152-05	2	.005" Oversize
	113-0152-10	2	.010" Oversize
	113-0152-20	2	.020" Oversize
	113-0152-30	2	.030" Oversize
	113-0152-40	2	.040" Oversize
5	ROD, CONNE	CTING (Includes Screw and Lock)
	114-0098	2	Standard
	114-0098-10	2	.010" Undersize
	114-0098-20	2	.020" Undersize
	114-0098-30	2	.030" Undersize
6	800-0548	4	Screw, Connecting Rod Cap
7	114-0059	4	Washer, Connecting Rod Cap Screw Lock

CAMSHAFT



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150-0078	1	Ring, Camshaft Center Pin	7	105-0004	1	Washer, Camshaft Gear Thrust
2	150-1695	- 1	Kit, Governor Cup	8	515-0001	1	Key, Camshaft Gear Mounting
3	510-0015	10	Ball, Fly - Governor	9	105-0140	1	Camshaft (Includes Center Pin)
4	150-1257	1	Spacer, Governor Fly Ball	10	150-0075	1	Pin. Camshaft Center
5	150-0077	1 ·	Plate, Governor Fly Ball	11	150-1519	1.	Hub, Governor Cup
6	105-0332	1	Gear, Camshaft (Includes Flyball Spacer & Plate)	12	150-1520	1	Cup, Governor



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	815-0110	1	Screw, Machine - Fillister Head (#10-32 x 7/8")	. 16	800-008	2	Screw, Cap - Hex Head (1/4-20 x 1-1/4")
2	850-0030	1	Washer, Lock - Spring (#10)	17	853-0013	2	Washer, Lock - ET (1/4")
3	815-0285	2	Screw, Machine - Round Head	18	862-0001	2	Nut, Hex (1/4-20)
-			(#10-32 x 5/16")	19	503-0301	3	Clamp, Hose
4	526-0062	2	Washer, Flat - Brass	20	502-03 9 5	1	Connector
-			(.2" ID x 1/2" OD x 1/16")	21	149-1541	1	Pump, Fuel (See Separate
5	332-0527	1	Terminal, Spade			_	Group for Components)
6	153-0114	1	Cover, Choke	22	502-0196	1	Elbow
7	153-0017	1	Exhaust, Choke	23	800-0054	2	Screw, Cap - Hex Head (3/8-16 x 2")
0	100-0000	1	Line Evel Burne to	24	850-0050	2	Washer Lock - Spring (3/8")
9	503-0728	I	Carburetor	24	154-0013	2	Gasket, Intake Manifold
10	800-0009	2	Screw Cap - Hex Head	26	154-0383	1	Manifold, Intake
		-	(1/4-20 x 1-1/2")	27	813-0110	2	Screw, Machine - Round Head
11	850-0040	2	Washer, Lock - Spring (1/4")				(#10-32 X Z)
12	141-0078	1	Gasket, Carburetor	28	853-0008	2	Washer, Lock - ET (#10)
13	142-0366	1	Carburetor (Includes Mounting Gasket) - See Separate Group for Components	29	150-0433	1	Booster, Vacuum Speed (Includes External Spring and Gasket) (Refer to
14	336-2386	1	Lead, Assembly				separate group for
15	502-0313	2	Elbow, Fuel Pump			J	components)

FUEL PUMP PARTS (ELECTRIC)



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	149-1541	1	Pump, Fuel - Complete
1	149-1445	1	Filter
2	149-1447	1	Magnet
3	149-1446	1	Gasket, Cover
4	149-1453	1	Cover
5	149-1452	1	Plunger
6	149-0767	1	Spring, Plunger Return
7	149-1451	1	Spring Cup & Valve
8	149-1450	1	Gasket, Spring Cup
9	149-1449	1	Washer, Cup Gasket
10	149-1448	1	Retainer, Cup & Plunger

EXHAUST



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	155-1218	1	Muffler, Exhaust
2	155-1195	1	Connector, Exhaust Tube
3	155-1015	1	Clamp, Muffler
4	154-0360	2	Gasket, Exhaust Manifold
5	821-0016	4	Screw, Cap - Hex Head (5/16-18 x 3/4")
6	155-1252	1	Gasket, Air Seal



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	150-0433	1	Kit, Vacuum Speed Booster	8	150-0666	1	Plate, Diaphragm
			Replacement (Includes External Spring & Mounting	9	516-0085	1	Pin (3/32 x 3/4") - Diaphragm Lever Pivot
			Gasket)	10		1	Housing, Vacuum Booster
1	150-0430	1	Bracket, Spring to Governor				(Not Sold Separately)
۰.			Link	11		1	Cover, Vacuum Booster
2	150-0434	1	Kit, Diaphragm Replacement				Housing (Not Sold Separately)
			(Includes Gaskets)	12	815-0148	4	Screw, Machine - Hex Head,
3	150-0668	1	Gasket, Diaphragm Plate				Slotted (#8-32 x.7/8")
4	150-0425	1	Gasket, Booster to Manifold	13	150-1352	1	Pin, Vent
5	150-0366	2	Spring, Internal & External	. 14	813-0110	2	Screw, Machine - Round Head
6	150-0376	1	Bracket, Internal Spring				(#10-32 x 2")
			Adjustment	15	853-0008	2	Washer, Lock - External
7	516-0039	1	Pin, Cotter (3/32 x 5/8") - Adjustment Bracket				Tooth (#10)

FUEL SYSTEM (GAS)

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NOTE: Parts Not Shown in this Illustration Refer to Gasoline Fuel System.



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	148-0311	1	Regulator, Gas	10	505-0139	1	Nipple (3/8 x 2"), Pipe
2	505-0057	1	Plug, Square Head	11	505-0131	1	Bushing (3/4 x 3/8"),
3	148-0107	1	Vent, Regulator				Reducer
4	862-0001	2	Nut, Hex (1/4-20)	12	307-0312	1	Valve, Magnetic
5	850-0045	2	Washer, Lock - Spring (5/16")	13	505-0020	1	Bushing (3/4 x 1/4").
6	800-0010	2	Screw, Cap - Hex Head				Reducer
			(1/4-20 x 1-3/4")	14	505-0302	1	Nipple (1/4 x 1/2" La).
7	526-0015	2	Washer, Flat (9/32" ID x				Half
			9/16" OD x 1/16")	15	503-0726	1	Hose, Fuel
8	505-0101	1	Nipple (3/8 x 1" Lg),	16	503-0032	2	Clamp, Hose
			Close	17	148-0147	1	Pipe, Fuel - Carburetor
9	505-0039	1	Elbow (3/8"), Pipe				• •



AIR CLEANER

	REF NO 1 2 3 4 5 6 7 8
8 7 7	

=.).	PART NO.	QTY. USED	PART DESCRIPTION
	140-0399	1	Cleaner, Air
	503-0280	3	Clamp, Hose
	503-0107	1	Clamp, Hose
	503-0286	· 1	Hose, Rubber (Molded)
	140-0211	1	Sleeve, Hose
	145-0080	1	Inlet, Carburetor Air
	140-0403	1	Cup Assembly (Includes Screen) (Part of Air Cleaner)
	140-0068	1	Screen, Air Cleaner (Part of Air Cleaner)

FUEL TANK

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	159-1022	1	Tank, 5 Gallon Fuel
2	159-1029	1	Cap & Pickup Assembly, Fuel (Includes Parts Marked *)
3	159-1000	1	*Gasket, Fuel Tank Cap
4	502-0003	1	*Connector, Inverted Male
5	159-1030	1	*Vent
6	502-0398	1	*Coupling, Male
7.	503-0656	1	*Hose, Fuel
8	502-0399	1	*Filter, Ball Check
9	159-0997	1	Line, Fuel - Tank to Pump

 Parts Included in 159-1029 Fuel Cap & Pickup Assembly.



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CARBURETOR PARTS





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CARBURETOR PARTS

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	142-0366	1	Carburetor, Gas-Gasoline	22	142-0046	1	Retainer, Main Adjusting
4	SODEW M		(Includes Mounting Gasket)	23	142-0206	1	Packing, Main Adjusting
•	SCREW, WIA			04	140.0045		
	815-0103	2	10-24 x 1/2" 10-24 x 5/8"	24	142-0045	1	Needle Packing
2	815-0091	2	**Screw Machine - Fillister	25	516-0027	1	Pin, Main Adjusting Needle
-	010 0001	-	Head (4-40 x 3/16")	26	142-0041	1	**Needle. Main Adjusting
3	142-0037	1	Fly. Choke	27		1	Body Assembly (Not Sold
4	142-0205	1	Sleeve Assembly, Choke (Cover)				Separately)
5	142-0183	1	Shaft Assembly, Choke	28	505-0008	· 1	Plug, Gas Inlet
6	142-0039	1	**Shaft, Float	29	142-0042	1	Needle Assembly (Includes
7	142-0031	1	*Gasket, Body to Bowl				Packing, Nut & Retainer)
8	148-0017	2	*Gasket - (1) Float Valve Seat	30	142-0343	2	Bushing, Throttle Shaft
			(1) Main Adjusting Needle	31	870-0053	1	Nut, Throttle Stop
			Retainer	32	813-0103	1	Screw (10-32 x 3/4"),
9	142-0049	1	**Valve & Seat Assembly				Throttle Stop Clamp
1Ò	142-0032	1	*Gasket, Nozzle	33	148-0126	1	Adapter, Carburetor
11	142-0285	1	Nozzle Assembly	34	509-0091	1	Gasket, Adapter Mounting
12	142-0361	1	Float & Lever Assembly	35	148-0131	1	Screw, Adapter Adjusting
13	145-0008	1	Lever, Idle Stop	36	148-0010	1	Spring, Adapter Adjusting
14	142-0040	2	**Needle, Idle Adjusting	37	502-0034	1	Elbow, Idle Line to Adapter
15	142-0282	2	Spring, Idle Needle Adjusting	38	149-0030	1	Line, Idle Fuel
16	142-0035	1	Spring, Throttle Stop	39	502-0074	1	Elbow, Inverted
			Adjusting Screw		141-0078	1	*Gasket, Carburetor Mounting
17	812-0063	1	Screw, Machine - Round Head (6-32 x 1/2")		142-0033	1	**Gasket Kit, Carburetor (Includes Parts Marked *)
18	815-0072	2	**Screw, Machine - Oval Head (4-40 x 1/4") - Throttle Fly		142-0371	1	Repair Kit, Carburetor (Includes Parts Marked **)
19	142-0369	1	Fly, Throttle				. ,
20	142-0368	1	**Shaft Assembly, Throttle	* - Pa	rts Included in	n Gasket	Kit 142-0033.
21	142-0370	1	Nut & Jet, Nozzle	** - Pa	irts Included in	n Repair I	Kit 142-0371.



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	160-0257	1	Box Assembly, Breaker (See separate group for components)
2	160-0043	1	Gasket, Breaker Box
3	CABLE, SPAR	K PLUG	
	167-1595	1	16-3/4" Lg
	167-1596	1	12" Lg
4	334-0028	1	Lead (4 foot piece of Wire)
5	PLUG, SPARK		
	167-0241	2	Non-Resistor Type
	167-0237	2	Resistor Type
6	166-0643	1	Coil, Ignition
7	815-0350	1	Screw, Cap - Hex Head (#10-32 x 3/8")
8	312-0027	1	Condenser, Ignition Coil Suppression
9	166-0588	1	Clamp, Coil
10	160-0558	2	Nipple, Rubber - Coil
11	166-0519	1	Bracket, Timino

BREAKER BOX

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	160-0257	1	Box Assembly, Breaker - Complete
1	160-0930	1	Cover, Breaker Box
2	160-0150	1	Gasket, Cover
3	160-0002	1	Point Set
4	160-0428	1	Strap, Point Set to Terminal
5	160-0349	1	Terminal and Block Assembly
6	160-0075	1	Cam Point Adjusting
7	812-0077	2	Screw, Machine - Round Head (#8-32 x 3/8")
8	850-0025	2	Washer, Lock - Spring (#8)
9	160-0262	1	Guide, Plunger
10	312-0069	1	Condenser
11	850-0040	2	Washer, Lock - Spring (1/4")
12	802-0034	2	Screw, Machine - Socket Head (1/4-20 x 3/4")
13	518-0049	3	Screw, Machine - Round Head W/ET Washer (#8-32 x 1/4")
14	160-0043	1	Gasket, Breaker Box Mounting







REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	134-0589	1	Housing, Cylinder Air - Left Side
2	134-2522	· 1	Housing, Blower
3	134-0588	1	Housing, Cylinder Air - Right Side
4	134-3916	1	Scroll, Blower Housing
5	517-0035	1	Plug, Dot Button (1-1/16")
6	517-0021	2	Plug, Dot Button (7/8")
7	821-0008	4	Screw, Cap - HWH (1/4-20 x 5/16")
8	134-2956	1	Guard, Scroll Outlet
9	815-0421	4	Screw, Tapping - Hex Head W/FT (#10 x 1/2")

GENERATOR



GENERATOR

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	
1	201-2503	1	Rotor Assembly, Wound	24	203-0152	1	*Commutator	
•		-	(Includes Parts Marked *)	25	204-0110	1	*Collector Ring	
4	510-0047	1	*Bearing, Rotor (Ball)	26	800-0050	• 4	Screw, Cap - Hex Head	
5	232-0596	1	Clip. Bearing Stop				(3/8-16 x 1″)	
6	520-0733	1	Stud. Rotor Through	27	850-0050	4	Washer, Lock - Spring (3/8")	
7	220-1821	1	Stator Assembly, Wound	28	205-0090	1	Fan, Generator	
8	LEAD ASSE	MBLY, BF	RUSH	. 29	515-0007	1	*Key, Drive Hub	
-	336-1891	4	Blade Type Terminals (9")	30	870-0203	1	Nut, Hex (7/16-20)	
	336-1890	3	Blade Type & Round Type	31	850-0055	1	Washer, Lock - Spring (7/16")	
			Terminals (4")	32	862-0015	· 4	Nut, Hex (5/16-18)	
	336-2110	1	Blade Type & Round Type	33	850-0045	- 4	Washer, Lock - Spring (5/16")	
			Terminals (6")	34	526-0115	4	Washer, Flat (11/32" ID x	
9	336-0186	2	Jumper, Ground (3-1/2")				11/16" OD x 1/16")	
10	BLOCK ASSEMBLY, BRUSH (Includes Parts		BRUSH (Includes Parts	35	812-0156	4	Screw, Machine - Round Head (1/4-20 x 1-1/2")	
	212-0352	1	Bottom	36	850-0040	4	Washer, Lock - Spring (1/4")	
	212-0345	1	Right Side	37	338-0946	1	Harness Assembly, Wiring	
	212-0346	1	Тор	38	353-0047	1	Resistor, Tapped	
	212-0353	. 1	Left Side	39	304-0015	2	Washer, Centering	
11	231-0164	1	Adapter, Generator to	40	304-0706	2	Bracket, Resistor Mounting	
10	000 0051	0	Engine Sereny Can Hay Hoad	41	812-0118	. 1	Screw, Machine - Round Head (#10-24 x 5")	
12	800-0051	2	3/9 + 16 = 1 + 1/4''	42	850-0030	1	Washer Lock - Spring (#10)	
10	214 0005	4	+Bruch Commutator	43	860-0011	1	Nut Hex (#10-24)	
13	214-0095	4	+Brush, Collector Bing	40	357-0020	1	Rectifier Diode	
14	214-0090	12	+Soring Brush	45	853-0008	8	Washer, Lock - ET (#10)	
10	212-1232 850-0050	2	Washer Lock - Spring (3/8")	46	871-0010	8	Nut. Hex (#10-32)	
17	526-0030	· 2	Washer, Flat (13/32" ID x 7/8" OD x 1/8")	47	526-0049	4	Washer, Flat (.20" ID x 7/16" OD x 1/32")	
18	232-2107	1	Cover, Fan	48	815-0341	4	Screw, Machine - Hex Head	
19	234-0362	1	Wrapper, End Bell				Brass (#10-32 x 1")	
20	211-0187	Ť	Bell, End	49	815-0359	17	Screw, Tapping - HWH	
21	800-0044	4	Screw, Cap - Hex Head (5/16-18 x 7-1/2")				(#10-32 x 7/8")	
22	516-0182	8	Pin, Roll (1/4 x 3/4")	+ - Pa	rts Included in	n Brush Bl	ock Assembly.	
23	232-2321	1	Support, Generator	 Parts Included in Rotor Assembly. 				





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CONTROL

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	518-0056	1	Screw, Wing (#10-32 x 1/2")	16	508-0015	1	Insulator, Washer
2	821-0004	1	Screw, Self-locking - HWH (#10-32 x 5/16")	17	870-0221	4	Nut, Hex - With External Tooth Lockwasher (#8-32)
3 4	301-4545 FUSE	1	Cover, Control Box	18	352-0161	1	*Resistor, Fixed, Wirewound (100-Ohm, 5 Watt)
	321-0146	1	10 Ampere	19	301-4442	1	Panel, Control
	321-0174	1	5 Ampere	20	357-0030	.1	*Diode, Rectifier
5	821-0004	4	Screw, Self-locking - HWH (#10-32 x 5/16")	21	821-0008	2	Screw, Self-locking - HWH (1/4-20 x 5/16")
6	321-0175	2	Fuseholder	22	508-0208	1	Insulator, Bushing
7	308-0383	1	Switch, Toggle - Start/Stop	23	508-0191	1	Insulator, Bushing
8	821-0004	2	Screw, Self-locking - HWH (#10-32 x 5/16")	24	821-0004	2	Screw, Self-locking - HWH (#10-32 x 5/16")
9	870-0131	2	Nut, Hex - With External Tooth Lockwasher (#10-32)	25	870-0131	2	Nut, Hex - With External Tooth Lockwasher (#10-32)
10	307-1575	2	*Relav	26	305-0383	1	Regulator, Voltage
11	821-0008	2	Screw, Self-locking - HWH (1/4-20 x 5/16)	27	301-4441	1	Plate, Mounting - Relay and Regulator
12	307-1617	1	Solenoid	28	301-4634	1	Box. Control
13	331-0088	1	Insulator, Bushing	29	338-1292	1.	Harness, Wiring
14	812-0087	1	Screw, Machine - Round Head (#8-32 x 1-1/2")				(Includes Parts Marked *)
15	304-0580	1	Insulator Mounting	* - Par	ts Included in	338-1292	Wiring Harness



HOUSING

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	405-1928	1	Housing Assembly, Unit	16	815-0062	5	Bolt, Lag (3/8 x 3")
			(Includes Parts Marked *)	17	406-0360	1	Plate, Hasp
2	405-2170	1	Panel, Rear Housing	18	815-0362	4	Screw, Wood (#8 x 3/4")
3	403-1000	1	Base, Mounting	19	406-0359	1	*Hinge, Hasp
4	403-1001	2	Molding, Trim	20	405-1925	1	*Duct, Air Housing
5	813-0105	8	Screw, Machine - Round Head (10-32 x 1-1/4")	21	526-0013	5	Washer, Flat (25/64" ID x 1" OD x 1/16")
6	870-0131	8	Nut, Hex (#10-32)	22	526-0009	8	Washer, Flat (7/32" ID x
9	CABLE BATTERY						1/2" OD x 1/16")
	416-0049	1	Negative	23	159-1031	· 1	Bracket, Gas Can
	416-0549	1	Positive	24	405-2175	1	Hood, Gas Can
10	416-0638	1	Tray, Battery	25	800-0008	4	Screw, Cap - Hex Head
11	416-0612	1	Frame, Battery Hold-down				(1/4-20 x 1-1/4″)
12	416-0541	2	Stud (5/16-18 x 7-1/2") -	26	850-0040	4	Washer, Lock - Spring (1/4")
. —			Battery Hold-down	27	526-0015	4	Washer, Flat (9/32" ID x
13	862-0015	2	Nut, Hex (5/16-18)				9/16" OD x 1/16")
14	526-0054	2	Washer, Flat (21/64" ID x 3/4" OD x 1/16")	28	862-0001	. 4	Nut, Hex (1/4-20)
15	850-0045	2	Washer, Lock - Spring (5/16")	* - Pai	rts Included in	n 405-1928	B Housing Assembly.

CONTROL (REMOTE STARTING)



RE	:F. 0.	PART NO.	USED	PART DESCRIPTION
	1	300-0985	• 1	Control, Start (Includes Parts Marked *)
	2	308-0341	1	*Switch, Rocker
:	3	301-3566	1	*Panel, Control

EXHAUST BLOWER AND REMOTE CONTROL





REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	
	300-1819	1	Remote Control (Includes	11	301-3910	1	&Box, Control	
			Parts Marked &)	12	313-0016 [.]	4	&Spacer	
1	815-0350	4	&Screw, Tapping - Hex Head	13	399-0092	1	Blower, Exhaust	
			(#10-32 x 3/8")	14	405-2172	1	Screen, Exhaust Blower	
2	301-3911	1	&Cover, Control	15	812-0156	2	Screw, Machine - Round Head	
3	812-0066	4	&Screw, Machine - Round Head				(1/4-20 x 1-1/2")	
-			(#6-32 x 5/8")	. 16	526-0015	2	Washer, Flat (9/32" ID x	
4	332-2264	1	&Circuit Board Assembly				9/16" OD x 1/16")	
			(Includes Parts Marked §)	17	850-0045	2	Washer, Lock - Spring (1/4")	
5	332-1450	1	§Terminal Block	18	862-0001	2	Nut, Hex (1/4-20)	
7	307-1347	1	Selay, Time Delay					
8	508-0008	2	&Grommet, Rubber	& - Pa	rts Included i	n 300-181	9 Remote Control Assembly.	
9	307-0597	1	&Relay - Start/Stop	§ - Parts Included in 332-2264 Circuit Board Assembly.				
10	338-1276	1	&Harness, Wiring	-				

SERVICE KITS AND MISCELLANEOUS

REF.	PART NO.	QTY. USED	PART DESCRIPTION
	98-1100	1	Decal Kit
	160-0836	1	Ignition Tune-Up Kit
	168-0103	1	Gasket Kit, Set
	168-0095	1	Gasket Kit, Carbon Removal
	522-0164	1	Overhaul Kit, Engine
	TOUCH-UP PAINT (Pressurized Can)		
	525-0137	1	Metallic Green (16-oz.)
	525-0305	1	Non-Metallic Green (13 oz.)

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

HARDWARE IDENTIFICATION

Illustrated hardware items are only for identification purposes. All hardware items listed throughout this parts catalog are steel SAE grade five (5) or lower (zinc plated with clear chromate dip) unless parts description indicates differently. All dimensions are in inches.



FILLISTER HEAD FLAT HEAD BINDER HEAD PAN HEAD HEXAGON HEAD CARRIAGE BOLT TRUSS HEAD SLOTTED SOCKET HEXAGON WASHER OVAL HEAD SQUARE HEAD SOCKET HEAD TWELVE POINT ROUND HEAD SET SET CAP HEAD **ATTERNATION** ARRESS COLUCTORISE COLUCT L - Measure length between these points. INTERNAL DRIVE TYPES Nominal size (fractional diameter or screw number) Number of threads per inch Length in inches SIX POINT TWELVE POINT CROSS RECESSED SLOTTED SOCKET SOCKET (PHILLIPS) 1/4-20 x 3/4 **NUT TYPES**





HOW TO OBTAIN REPLACEMENT PARTS AND SERVICE

The merchandise you have purchased from us has been carefully engineered and manufactured under Wards rigid quality standards and should give you satisfactory and dependable operation. However, like all mechanical merchandise, it may occasionally require adjustment, replacement parts or maintenance. Should you ever need technical assistance or parts, please contact or write your nearest. Wards Retail Store, Central Service Center, Catalog Store or Catalog House.

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provide the following:

1. Model, serial number and all of the other data shown on the model plate.

2. The date and the Wards branch from which you purchased your merchandise.

3. State briefly the trouble you are having.

4. Also give the part number or numbers as shown in the parts list that came with the product.

Replacement Parts will be made available at current prices. If requested, prices will be quoted in advance when not listed.

If you order parts by mail, you will pay the transportation charges from the shipping point.