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Portable Generators

G 2.5A

G 3.7A

G 5.6A

GS 5.6A

GS 8.5V

GS 9.7V

REPAIR MANUAL



0 1 1 2 0 1 3

This manual covers machines with Item Number:
0007188, 0007189, 0007190, 0007191, 0007661, 0007662

Operating / Parts Information

You must be familiar with the operation of this machine before you attempt to troubleshoot or make any repairs to it. Basic operating and maintenance procedures are described in the operator's / parts manual supplied with the machine. The operator's / parts manual should be kept with the machine. Use it to order replacement parts when needed. If this manual becomes lost, please contact Wacker Corporation to order a replacement.

Damage caused by misuse or neglect of the unit should be brought to the attention of the operator, to prevent similar occurrences from happening in the future.

This manual provides information and procedures to safely repair and maintain this Wacker model. For your own safety and protection from injury, carefully read, understand and observe the safety instructions described in this manual. THE INFORMATION CONTAINED IN THIS MANUAL WAS BASED ON MACHINES IN PRODUCTION AT THE TIME OF PUBLICATION. WACKER CORPORATION RESERVES THE RIGHT TO CHANGE ANY PORTION OF THIS INFORMATION WITHOUT NOTICE.

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CALIFORNIA

Proposition 65 Warning:



Engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

1. Foreword

This manual provides information and procedures to safely operate and maintain this Wacker model. For your own safety and protection from injury, carefully read, understand and observe the safety instructions described in this manual.

Keep this manual or a copy of it with the machine. If you lose this manual or need an additional copy, please contact Wacker Corporation. This machine is built with user safety in mind; however, it can present hazards if improperly operated and serviced. Follow operating instructions carefully! If you have questions about operating or servicing this equipment, please contact Wacker Corporation.

The information contained in this manual was based on machines in production at the time of publication. Wacker Corporation reserves the right to change any portion of this information without notice.

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2. Safety Information

This manual contains DANGER, WARNING, CAUTION, and NOTE callouts which must be followed to reduce the possibility of personal injury, damage to the equipment, or improper service.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION: Used without the safety alert symbol, CAUTION indicates a potentially hazardous situation which, if not avoided, may result in property damage.

2.1 Laws Pertaining to Spark Arresters

Notice: State Health Safety Codes and Public Resources Codes specify that in certain locations spark arresters be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose.

In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

2.2 Operating Safety



BACKFEED FROM THE GENERATOR INTO THE PUBLIC POWER DISTRIBUTION SYSTEM CAN CAUSE SERIOUS INJURY OR DEATH TO UTILITY WORKERS!

Improper connection of generator to a building's electrical system can allow electrical current from the generator to backfeed into utility lines. This may result in electrocution of utility workers, fire, or explosion. Connections to a building's electrical system must be made by a qualified electrician and comply with all applicable laws and electrical codes.

If connected to a building's electrical system the generator must meet the power, voltage, and frequency requirements of the equipment in the building. Differences in power, voltage, and frequency requirements may exist and improper connection may lead to equipment damage, fire, and personal injury or death.



Familiarity and proper training are required for the safe operation of equipment! Equipment operated improperly or by untrained personnel can be dangerous! Read the operating instructions contained in both this manual and the engine manual and familiarize yourself with the location and proper use of all controls. Inexperienced operators should receive instruction from someone familiar with the equipment before being allowed to operate the machine.

- 2.2.1 NEVER operate generator when open containers of fuel, paint, or other flammable liquids are near.
- 2.2.2 NEVER operate generator, or tools attached to the generator, with wet hands.
- 2.2.3 NEVER use worn electrical cords. Severe electrical shock and equipment damage may result.
- 2.2.4 NEVER run electrical cords under the generator, or over vibrating or hot parts.
- 2.2.5 NEVER enclose or cover generator when in use or when hot.
- 2.2.6 NEVER overload generator. The total amperage of the tools and equipment attached to the generator must not exceed the load rating of the generator.
- 2.2.7 NEVER operate machine in snow, rain, or standing water.
- 2.2.8 NEVER allow untrained personnel to operate or service the generator. The generator set should be set up by a trained electrician.
- 2.2.9 ALWAYS store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children.
- 2.2.10 ALWAYS be sure machine is on a firm, level surface and will not tip, roll, slide, or fall while operating.

- 2.2.11 ALWAYS transport generator in an upright position.
- 2.2.12 ALWAYS keep machine at least one meter (three feet) away from structures, buildings and other equipment during use.
- 2.2.13 ALWAYS keep the area immediately surrounding the generator clean, neat and free of debris. Make sure that the area overhead is clear of debris that could fall onto or into the generator, or exhaust compartment.
- 2.2.14 ALWAYS remove all tools, cords, and other loose items from generator before starting it.
- 2.2.15 ALWAYS make certain machine is well-grounded and securely fastened to a good earthen ground per national and local regulations.

2.3 Operator Safety while using Internal Combustion Engines



DANGER

Internal combustion engines present special hazards during operation and fueling! Read and follow warning instructions in engine owner's manual and safety guidelines below. Failure to follow warnings and safety guidelines could result in severe injury or death.

- 2.3.1 DO NOT run machine indoors or in an enclosed area such as a deep trench unless adequate ventilation, through such items as exhaust fans or hoses, is provided. Exhaust gas from the engine contains poisonous carbon monoxide gas; exposure to carbon monoxide can cause loss of consciousness and may lead to death.
- 2.3.2 DO NOT smoke while operating machine.
- 2.3.3 DO NOT smoke when refueling engine.
- 2.3.4 DO NOT refuel hot or running engine.
- 2.3.5 DO NOT refuel engine near open flame.
- 2.3.6 DO NOT spill fuel when refueling engine.
- 2.3.7 DO NOT run engine near open flames.
- 2.3.8 DO NOT start engine if fuel has spilled or an odor of fuel is present. Move generator away from the spill and wipe generator dry before starting.
- 2.3.9 ALWAYS refill fuel tank in well-ventilated area.
- 2.3.10 ALWAYS replace fuel tank cap after refueling.
- 2.3.11 ALWAYS check fuel lines and fuel tank for leaks and cracks before starting engine. Do not run machine if fuel leaks are present or fuel lines are loose.

2.4 Service Safety

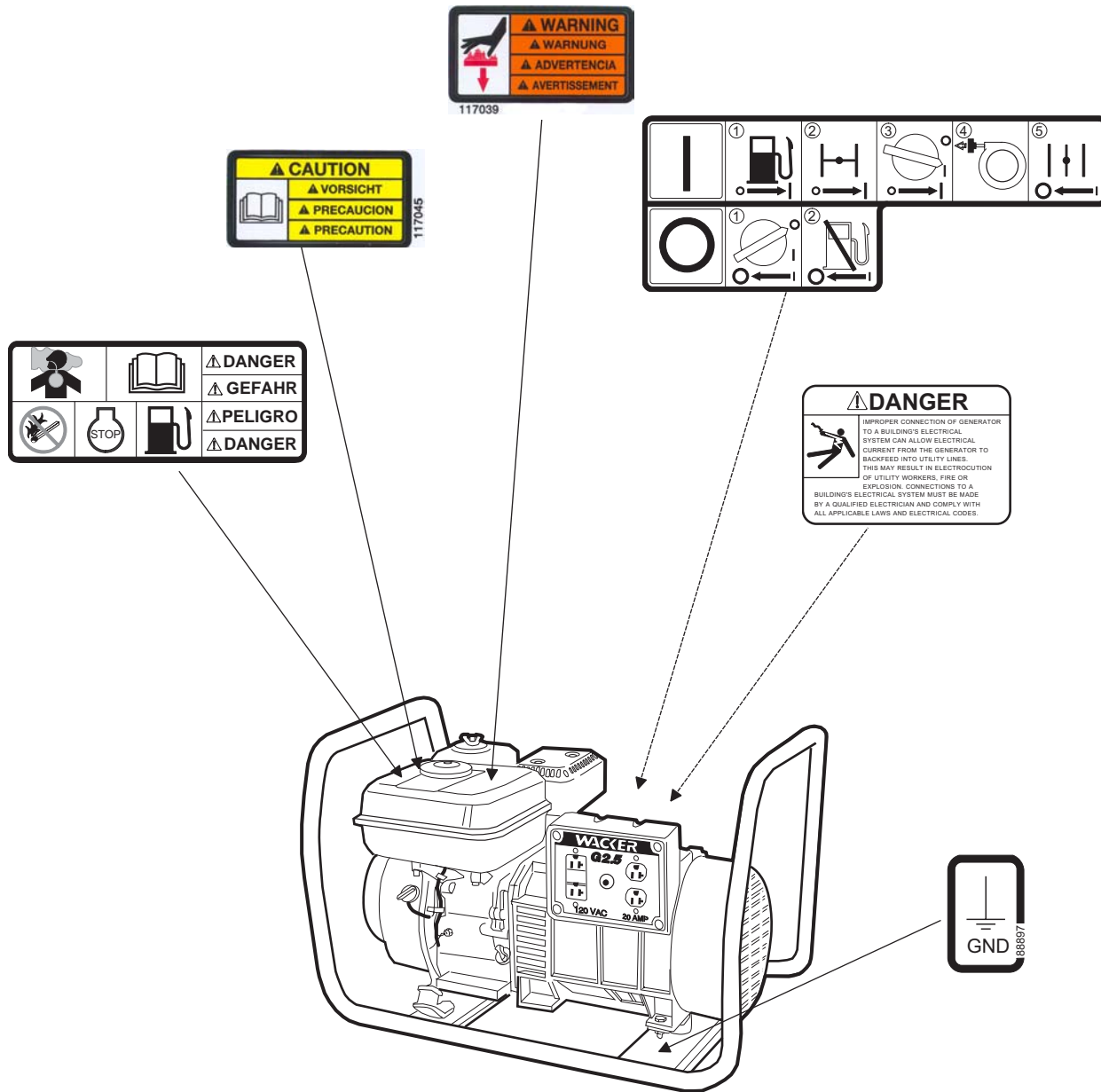


Poorly maintained equipment can become a safety hazard! In order for the equipment to operate safely and properly over a long period of time, periodic maintenance and occasional repairs are necessary. If the generator is experiencing problems or is being serviced, attach a "DO NOT START" sign to the control panel to notify other people of its condition.

- 2.4.1 DO NOT use gasoline or other types of fuels or flammable solvents to clean parts, especially in enclosed areas. Fumes from fuels and solvents can become explosive.
- 2.4.2 DO NOT attempt to clean or service machine while it is running.
- 2.4.3 DO NOT modify the equipment without express written approval of the manufacturer.
- 2.4.4 DO NOT allow water to accumulate around the base of the machine. If water is present, move the machine and allow it to dry before servicing.
- 2.4.5 DO NOT service machine if clothing or skin is wet.
- 2.4.6 DO NOT allow untrained personnel to service this equipment. Only trained electrical technicians should be allowed to service the electrical components of this equipment.
- 2.4.7 ALWAYS keep machine clean and labels legible. Replace all missing and hard-to-read labels. Labels provide important operating instructions and warn of dangers and hazards.
- 2.4.8 ALWAYS replace safety devices and guards after repairs and maintenance.
- 2.4.9 ALWAYS let engine cool before transporting or servicing.
- 2.4.10 ALWAYS keep hands, feet, and loose clothing away from moving parts on generator and engine.
- 2.4.11 ALWAYS turn engine off before servicing generator. If the engine has electric start, disconnect negative terminal on battery
- 2.4.12 ALWAYS keep fuel lines in good condition and properly connected. Leaking fuel and fumes are extremely explosive.

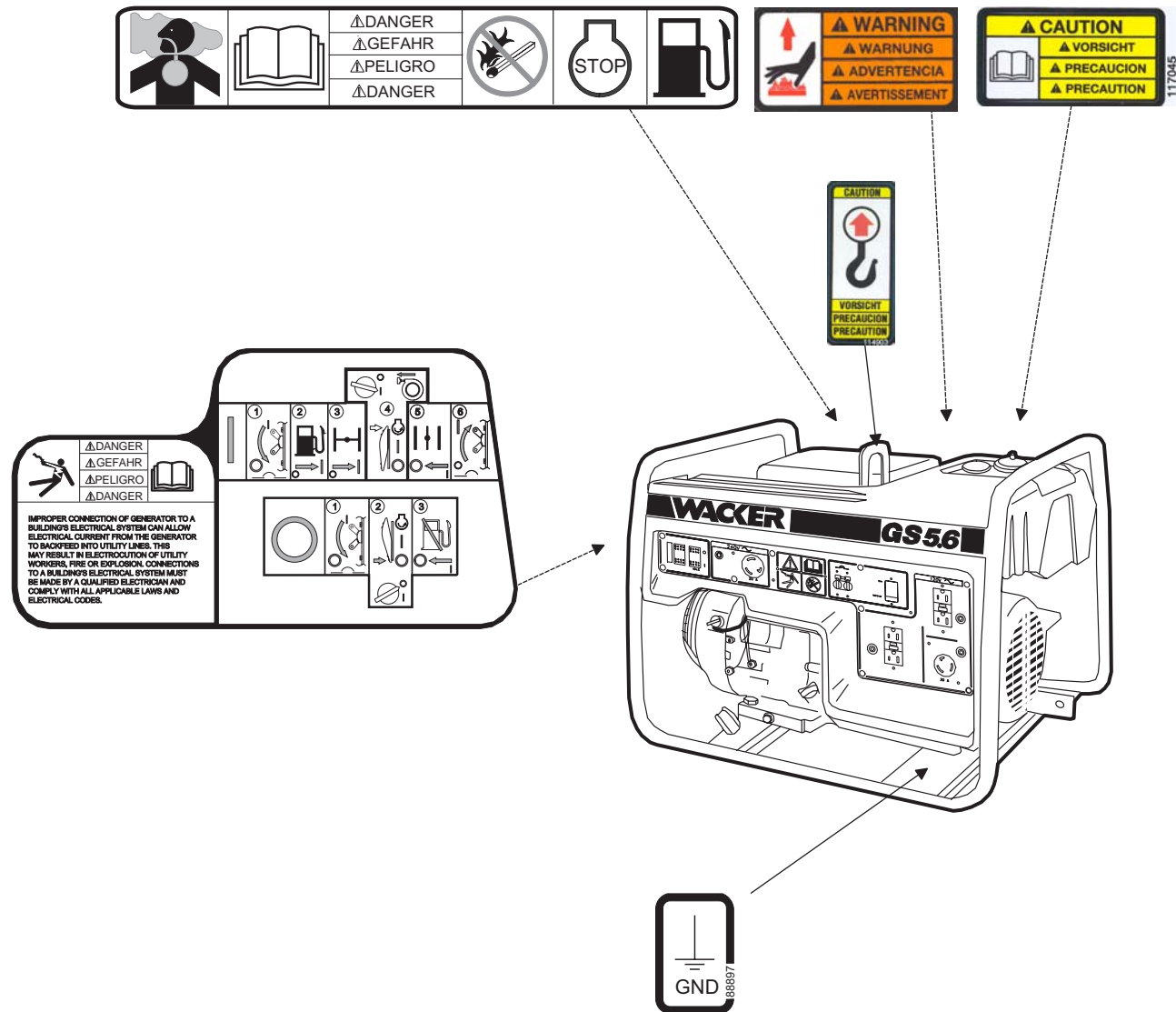
2.5 Label Locations

G 2.5A



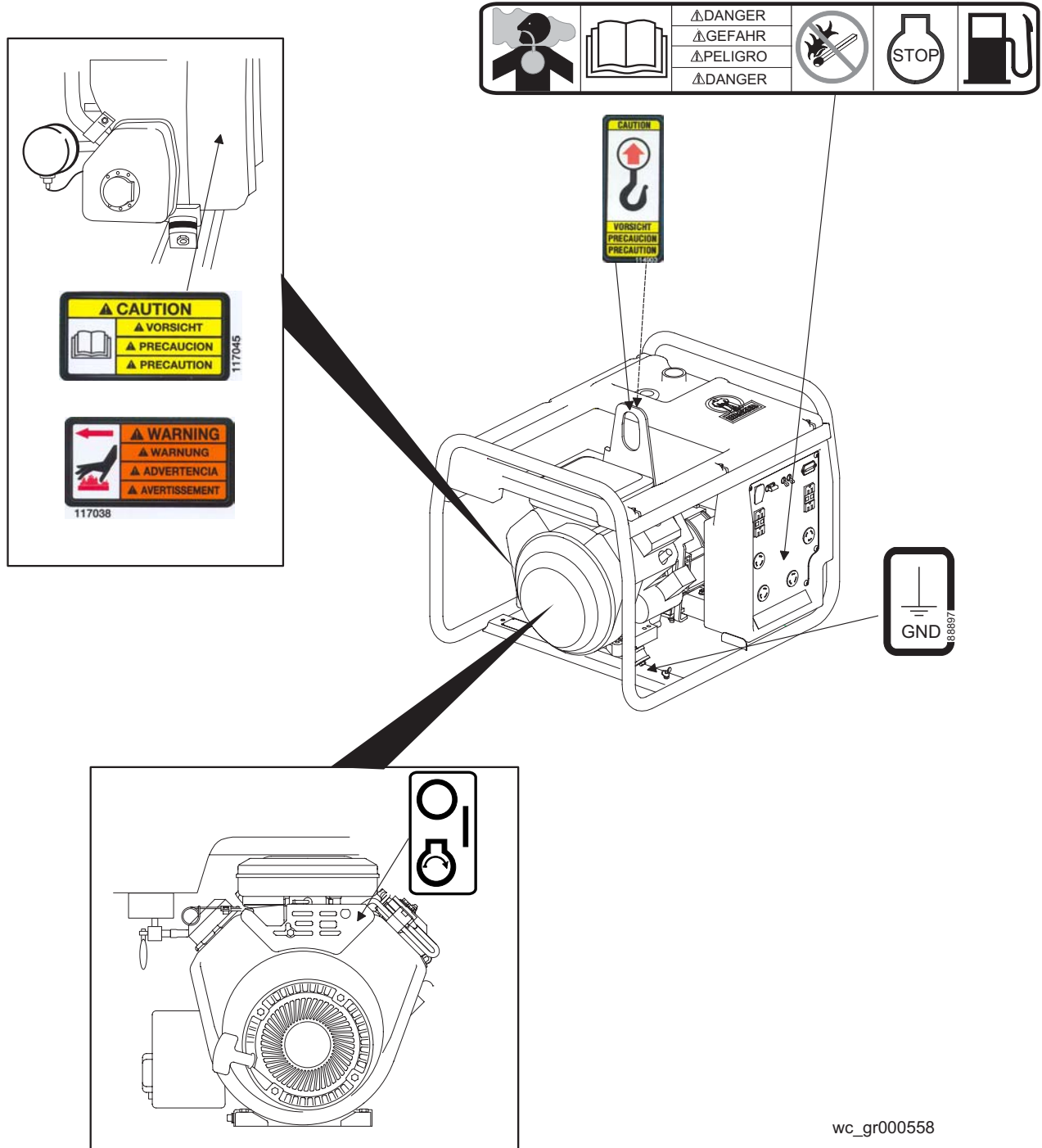
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G 3.7A, G 5.6A, and GS 5.6A



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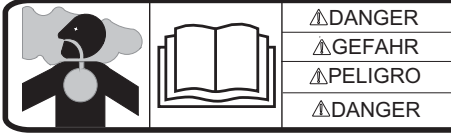
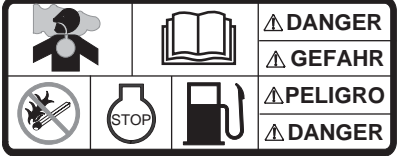

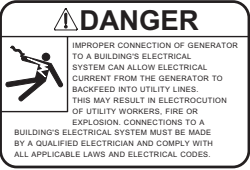



GS 8.5V and GS 9.7V


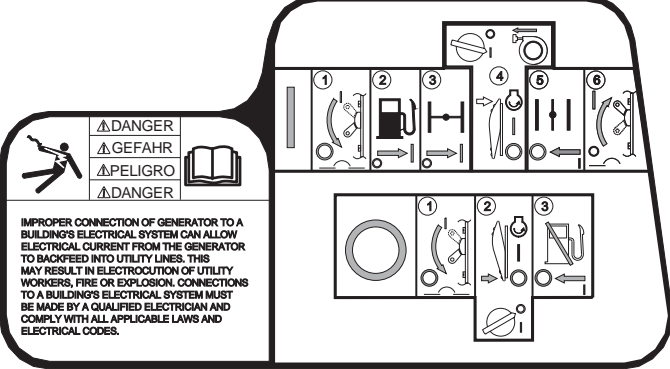
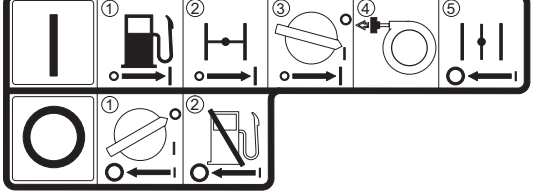
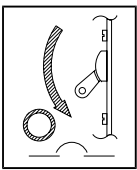
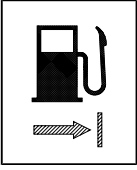
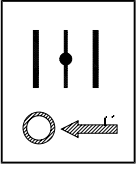
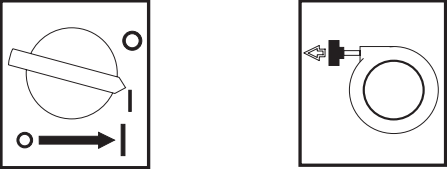
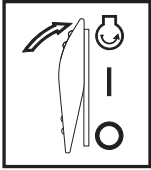


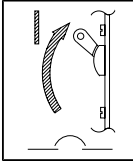

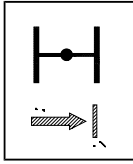
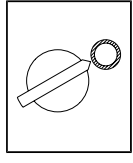
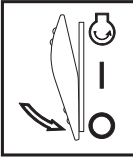

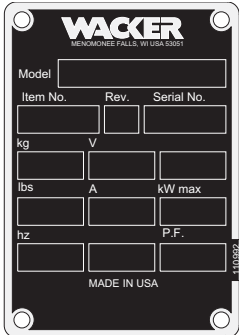
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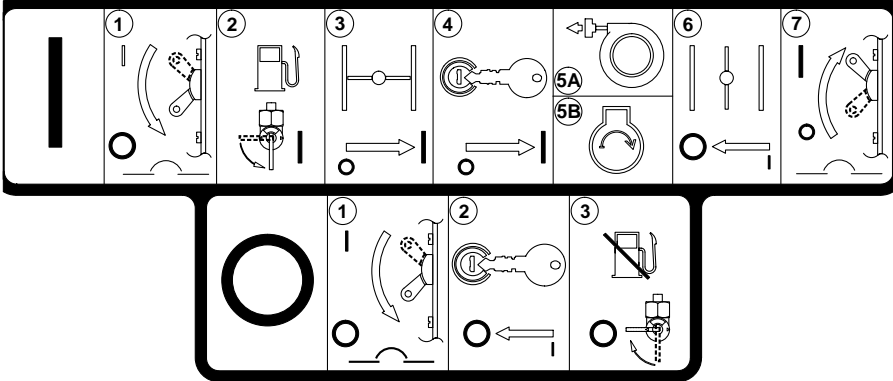
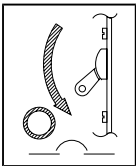
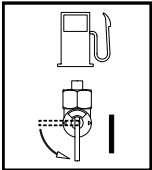
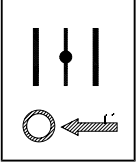
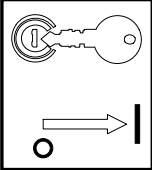
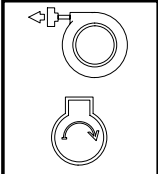
2.6 Safety and Operating Labels

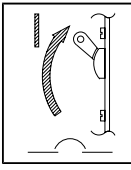
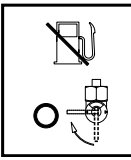
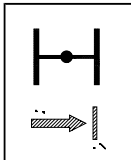
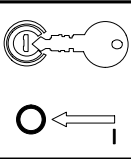
Wacker machines use international pictorial labels where needed. These labels are described below:

Label	Meaning
	 <p>DANGER! Engines emit carbon monoxide; operate only in well ventilated area. Read the operator's manual. No sparks, flames or burning objects near machine. Shut off engine before refueling.</p>
	 <p>DANGER! Electric shock hazard. Read operator's manual for instructions.</p>
	<p>WARNING! Hot surface.</p>
	<p>CAUTION! Read and understand the supplied operator's manual before operating this machine. Failure to do so increases the risk of injury to yourself or others.</p>
	<p>CAUTION! Lifting point</p>

Label	Meaning
	<p>Electrical ground.</p>
 <p>IMPROPER CONNECTION OF GENERATOR TO A BUILDING'S ELECTRICAL SYSTEM CAN ALLOW ELECTRICAL CURRENT FROM THE GENERATOR TO BACKFEED INTO UTILITY LINES. THIS MAY RESULT IN ELECTROCUTION OF UTILITY WORKERS, FIRE OR EXPLOSION. CONNECTIONS TO A BUILDING'S ELECTRICAL SYSTEM MUST BE MADE BY A QUALIFIED ELECTRICIAN AND COMPLY WITH ALL APPLICABLE LAWS AND ELECTRICAL CODES.</p>	
	<p>Open main circuit breaker.</p>
	<p>Open fuel flow valve.</p>
	<p>Open choke.</p>
	<p>Push or turn engine switch to ON position.</p> <p>Pull rewind starter.</p>
	<p>Press engine crank switch to "CRANK" position.</p>

Label	Meaning
	Close main circuit breaker.
	Close fuel flow valve.
	Close choke.
	Push or turn engine switch to OFF position.
	Press engine crank switch to "OFF" position.
	Key switch: off on start
	A nameplate listing the Model Number, Item Number, Revision, and Serial Number is attached to each unit. Please record the information found on this plate so it will be available should the nameplate become lost or damaged. When ordering parts or requesting service information, you will always be asked to specify the model, item number, revision number, and serial number of the unit.

Label	Meaning
	<p>This machine may be covered by one or more patents.</p>
	
	<p>Open main circuit breaker.</p>
	<p>Open fuel flow valve.</p>
	<p>Open choke.</p>
	<p>Turn engine key switch to "ON" position.</p>
	<p>Pull rewind starter or turn engine key switch to crank starter.</p>

Label	Meaning
	Close main circuit breaker.
	Close fuel flow valve.
	Close choke.
	Turn engine key switch to "OFF" position.

3. Technical Data

3.1 Generator

Item No.	G 2.5A 0007188	
Generator		
Maximum Output	W	2500
Continuous Output	W	2250
Type	Single voltage, single phase, brushless system	
AC Voltages Available	volts phase	120 1ø
Frequency	Hz	60
Power Factor		1.0
AC receptacles: 120V GFI duplex	amp	20
120V duplex (also protected by GFI)	amp	20
Main Circuit Breaker	amp	20
L x W x H	mm (in.)	685 x 445 x 435 (27 x 17.5 x 17)
Weight (dry)	Kg (lbs.)	43 (94)

Item No.	G 3.7A 0007189	
Generator		
Maximum Output	W	3700
Continuous Output	W	3320
Type	Dual voltage, single phase, Auto voltage regulator system	
AC Voltages Available	volts phase	120 / 240 1∅
Frequency	Hz	60
Power Factor		1.0
AC receptacles:		
120V GFI duplex	amp	20
120V GFI duplex	amp	20
120V twist lock	amp	30
240V twist lock	amp	20
Main Circuit Breaker	amp	32 (2-pole, 16 amp each pole)
L x W x H	mm (in.)	685 x 585 x 530 (27 x 23 x 21)
Weight (dry)	Kg (lbs.)	68 (150)

Item No.		G 5.6A 0007190	GS 5.6A 0007191
Generator			
Maximum Output	W	5600	
Continuous Output	W	5350	
Type		Dual voltage, single phase, Auto voltage regulator system	
AC Voltages Available	volts phase	120 / 240 1∅	
Frequency	Hz	60	
Power Factor		1.0	
AC receptacles:			
120V GFI duplex	amp	20	
120V GFI duplex	amp	20	
120V twist lock	amp	30	
240V twist lock	amp	20	
Main Circuit Breaker	amp	48 (2-pole, 24 amp each pole)	
L x W x H	mm (in.)	685 x 585 x 530 (27 x 23 x 21)	
Weight (dry)	Kg (lbs.)	76 (168)	79 (175)

Item No.		GS 8.5V 0007661	GS 9.7V 0007662
Generator			
Maximum Output	kW / kVA	8.5 / 8.5	9.7 / 9.7
Continuous Output	W	8.2	9.3
Type		Dual voltage, single phase, brush-type system	
AC Voltages Available	volts phase	120 / 240 1∅	
Frequency	Hz	60	
Power Factor		1.0	
AC receptacles:			
120V GFI duplex	amp	20	
120V GFI duplex	amp	20	
120V twist lock	amp	20	
120V twist lock	amp	30	
240V twist lock	amp	20	
120/240V twist lock	amp	30	
Continuous Current at 120V	amp	68.3	77.5
L x W x H	mm (in.)	800 x 635 x 603 (31.5 x 25 x 23.75)	
Weight (dry)	Kg (lbs.)	97 (214)	99 (218)

3.2 Engine

Item No.	G 2.5A 0007188	
Engine		
Engine Type	Single cylinder, 4-cycle, air-cooled, gasoline engine	
Engine Make	Honda	
Engine Model	GX 160 K1VX	
Rated Power	kW (Hp)	4.1 (5.5)
Spark Plug	BPR6ES / W20EPR-U	
Electrode Gap	mm (in.)	0.7 - 0.8 (0.028 - 0.031)
Engine Speed - full load	rpm	3600 ± 100
Engine Speed - no load	rpm	3700 ± 100
Air Cleaner	type	Dry type with oil-wetted foam pre-cleaner
Engine Lubrication	oil grade	SAE 10W30 service class SF, SE, SD or SC
Engine Oil Capacity	l (oz.)	0.6 (21)
Fuel	type	Regular unleaded gasoline
Fuel Tank Capacity	l (qt.)	3.7 (3.9)
Fuel Consumption	l (qts.)/hr.	1.7 (1.8)
Running Time	hrs.	2.1

Item No.	G 3.7A 0007189	
Engine		
Engine Type	Single cylinder, 4-cycle, air-cooled, gasoline engine	
Engine Make	Honda	
Engine Model	GX 240 K1	
Rated Power	kW (Hp)	5.9 (8)
Spark Plug	BPR6ES / W20EPR-U	
Electrode Gap	mm (in.)	0.7 - 0.8 (0.028 - 0.031)
Engine Speed - full load	rpm	3600 ± 100
Engine Speed - no load	rpm	3700 ± 100
Auto Idle Speed	rpm	2200 ± 50
Air Cleaner	type	Dry type with oil-wetted foam pre-cleaner
Engine Lubrication	oil grade	SAE 10W30 service class SF, SE, SD or SC
Engine Oil Capacity	l (qts.)	1.1 (1.2)
Fuel	type	Regular unleaded gasoline
Fuel Tank Capacity	l (gal.)	19.5 (5.2)
Fuel Consumption	l (qts.)/hr.	2.6 (2.8)
Running Time	hrs.	7.4

Item No.		G 5.6A 0007190	GS 5.6A 0007191
Engine			
Engine Type		Single cylinder, 4-cycle, air-cooled, gasoline engine	
Engine Make		Honda	
Engine Model		GX 340 K1	
Rated Power	kW (Hp)	8.2 (11)	
Spark Plug		BPR6ES / W20EPR-U	
Electrode Gap	mm (in.)	0.7 - 0.8 (0.028 - 0.031)	
Engine Speed - full load	rpm	3600 ± 100	
Engine Speed - no load	rpm	3700 ± 100	
Auto Idle Speed	rpm	2200 ± 50	
Air Cleaner	type	Dry type with oil-wetted foam pre-cleaner	
Battery	type V/capacity Size (in.)	N/A	Y50-N18L-A or C50-N18L-A 12V - 20 Amp-hour 8- ¹ / ₈ x 3- ⁹ / ₁₆ x 6- ⁷ / ₁₆
Engine Lubrication	oil grade	SAE 10W30 service class SF, SE, SD or SC	
Engine Oil Capacity	l (qts.)	1.1 (1.2)	
Fuel	type	Regular unleaded gasoline	
Fuel Tank Capacity	l (gal.)	19.5 (5.2)	
Fuel Consumption	l (qts.)/hr.	3.6 (3.8)	
Running Time	hrs.	5.4	

Item No.		GS 8.5V 0007661	GS 9.7V 0007662
Engine			
Engine Type		2 cylinder, 4-cycle, air-cooled, gasoline engine	
Engine Make		Briggs and Stratton	
Engine Model		Vanguard 303447	Vanguard 350447
Rated Power	kW (Hp)	11.9 (16)	13.4 (18)
Displacement	cm ³ (in ³)	480 (29.3)	570 (34.75)
Spark Plug		Champion RC12YC	
Electrode Gap	mm (in.)	0.76 (0.030)	
Starter	type / V	Electric / 12	
Alternator	amp	16	
Engine Speed - full load	rpm	3600	
Auto Idle Speed	rpm	2200	
Valve Clearance (cold)	mm (in.)	0.10–0.16 (0.004–0.006)	
Air Cleaner	type	Dual element	
Battery	V/size/CCA	12 / 22NF / 230	
Engine Lubrication	oil grade service class	SAE 10W30 SG, SF, or SE	
Engine Oil Capacity	l (qts.)	1.6 (1.7)	
Fuel	type	Regular unleaded gasoline	
Fuel Tank Capacity	l (gal.)	28 (7.4)	
Fuel Consumption	l (gal.)/hr.	5.03 (1.33)	6.21 (1.64)

4. Power Requirements

4.1 Determining Power Requirements

These generators are designed to operate single-phase, 60 hertz appliances or tools running at a selectable voltage of 120 VAC or 240 VAC for the G 3.7A, G 5.6A, GS 5.6A, GS 8.5V and GS 9.7V models, and a single voltage of 120 VAC for the G 2.5A model. Check the nameplate or label provided on tools and appliances to make sure their power requirements match the power output of the generator.

Some appliances and tools require a surge of current when starting. This means that the amount of power needed to initially start the equipment is larger than the power required to keep it running. The generator must be capable of supplying this “surge” current. Other types of appliances require more power than is actually stated on their nameplates.

The information in “Approximate Starting Power Requirements” is offered only as a general guideline to help you in determining power requirements for different types of equipment. Check with your nearest Wacker Dealer, or contact the manufacturer or dealer of the tool or appliance, with questions regarding power requirements.

If the wattage is not given for a particular tool or appliance, it can be calculated by multiplying its voltage and amperage requirements:

$$\text{VOLTS} \times \text{AMPS} = \text{WATTS}$$

CAUTION: If a tool or appliance does not reach full speed within a few seconds when switched on, turn it off immediately to avoid damage.

CAUTION: When starting loads, DO NOT exceed two (2) times the given Continuous Current rating for model G 2.5A, or one-and-one-half (1½) times for all other models, as damage to the generator may occur. See *Generator Specifications*.

- Incandescent lights and appliances such as irons and hot plates, which use a resistive-type heating element, require the same wattage to start and run as is stated on their nameplates.
- Fluorescent and mercury lamps require 1.2–2 times their stated wattage to start.
- Electrical motors and many types of electrical tools often require a large starting current. The amount of starting current depends on the type of motor and its use.
- Most electrical tools require 1.2–3 times their stated wattage for running.

- Loads such as submersible pumps and air compressors require a very large force to start. They need as much as 3–5 times the wattage stated on the nameplate in order to start.

If the wattage is not given for a particular tool or appliance, it can be calculated by multiplying its voltage and amperage requirements:

$$\text{VOLTS} \times \text{AMPS} = \text{WATTS}$$

-

4.2 Outdoor Installation

Place the generator in an area where it will not be exposed to rain, snow or direct sunlight. Make sure it is positioned on firm, level ground so it will not slide or shift. Position engine exhaust away from areas where people may be present.

If operating the generator inside a tunnel or deep trench, make sure there is adequate ventilation. Precautions similar to those required when operating indoors may be necessary.

The surrounding area must be free from water and moisture. All components must be protected from excessive moisture.

4.3 Indoor Installation

If the generator must be installed indoors, adequate ventilation or exhaust hoses must be provided. When venting exhaust fumes, make sure the exhaust piping is large enough to prevent excessive back pressure to the engine. Back pressure reduces engine efficiency and may cause the engine to overheat.



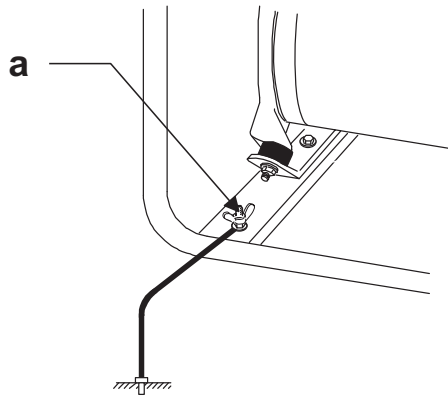
Exhaust gas from the engine contains poisonous carbon monoxide gas; exposure to carbon monoxide can cause loss of consciousness and may lead to death. Never run generator indoors or in an enclosed area unless adequate ventilation, through such items as exhaust hoses or fans, is provided.

When installed indoors, steps to prevent fire and explosion such as providing a good earthen ground, removing all flammable materials near generator, and using only electrical cables in good condition, must be observed. See *Operating Safety*.

4.4 Grounding the Generator

The generator should be grounded to a good ground source in compliance with National Electric Code standards and local regulations.

Use #8 wire and secure one end to the ground terminal **(a)** provided on the generator frame and the other end to a suitable ground source.



wc_gr000544

4.5 Use of Extension Cords

When a long extension cord is used to connect an appliance or tool to the generator, a voltage loss occurs—the longer the cord, the greater the voltage loss. This results in less voltage being supplied to the appliance or tool and increases the amount of current draw or reduces performance. A heavier cord with a larger wire size will reduce the voltage loss.



Damaged extension cords can cause electrical shock, resulting in serious injury or death. DO NOT use worn, bare, or frayed cords. Replace damaged cords immediately.

Use the chart below as a guide for selecting proper cable size.

Current (Amps)	Load in Watts		Maximum Cable Length in Feet			
	120V	240V	#10	#12	#14	#16
2.5	300	600	1000 ft.	600	375	250
5	600	1200	500	300	200	125
7.5	900	1800	350	200	125	100
10	1200	2400	250	150	100	-
15	1800	3600	150	100	65	-
20	2400	4800	125	75	50	-

Use only extension cords rated for outdoor use and equipped with a third-wire ground.

CAUTION: Operating equipment at low voltage can cause it to overheat.

5. G 2.5A

5.1 Theory of Operation – Capacitor Generators

See Graphic: *wc_gr000933*

Basic Generator Theory

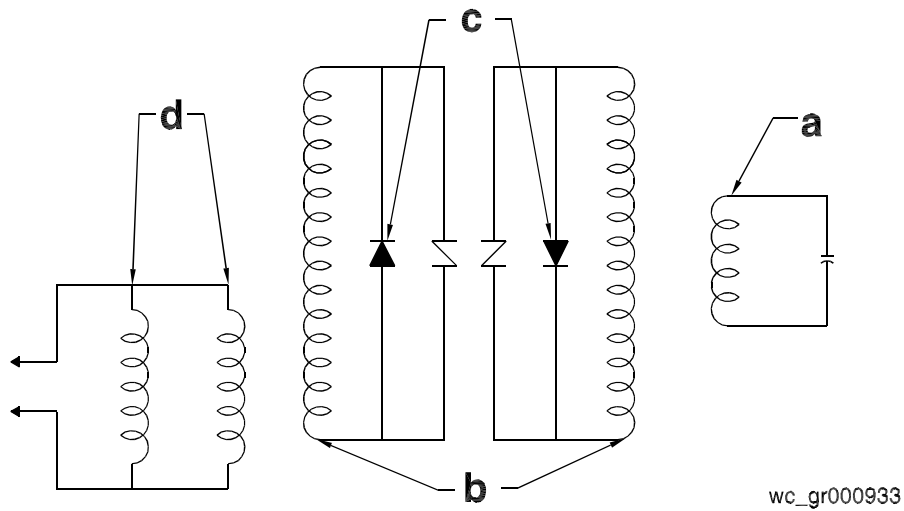
Wacker air-cooled generators work on the principle of electromagnetic induction i.e., the cutting of magnetic lines of force by a coil of wire to produce an electric voltage in the coil of wire.

The two main components of the generator, the rotor and stator, are the key. The rotor acts as the magnet and the stator acts as the coil of wire. As the rotor rotates, its magnetic lines of force are cut by the coils of wire in the stationary stator. The voltage induced in the windings of the stator is tapped off and available at the receptacles.

Brushless Generator

This model generator uses a brushless design to generate and regulate power. It consists of a rotor, stator, diodes, and an auxiliary winding. The brushless generator also contains a capacitor that is connected to the auxiliary winding. Its purpose is to regulate the voltage in the main windings and prevent a voltage drop when a load is applied.

This generator is designed to operate with single phase loads at or near a power factor of 1.0. The principle of operation is schematically represented and a cross-sectional view is shown. The auxiliary winding **(a)**, in conjunction with the capacitor, provide excitation by inducing current in the rotor windings **(b)** which is rectified by the diodes **(c)** to produce direct current. The main stator winding **(d)** is designed for parallel connection to give a voltage output with no voltage adjustment possible.



5.2 Rotor

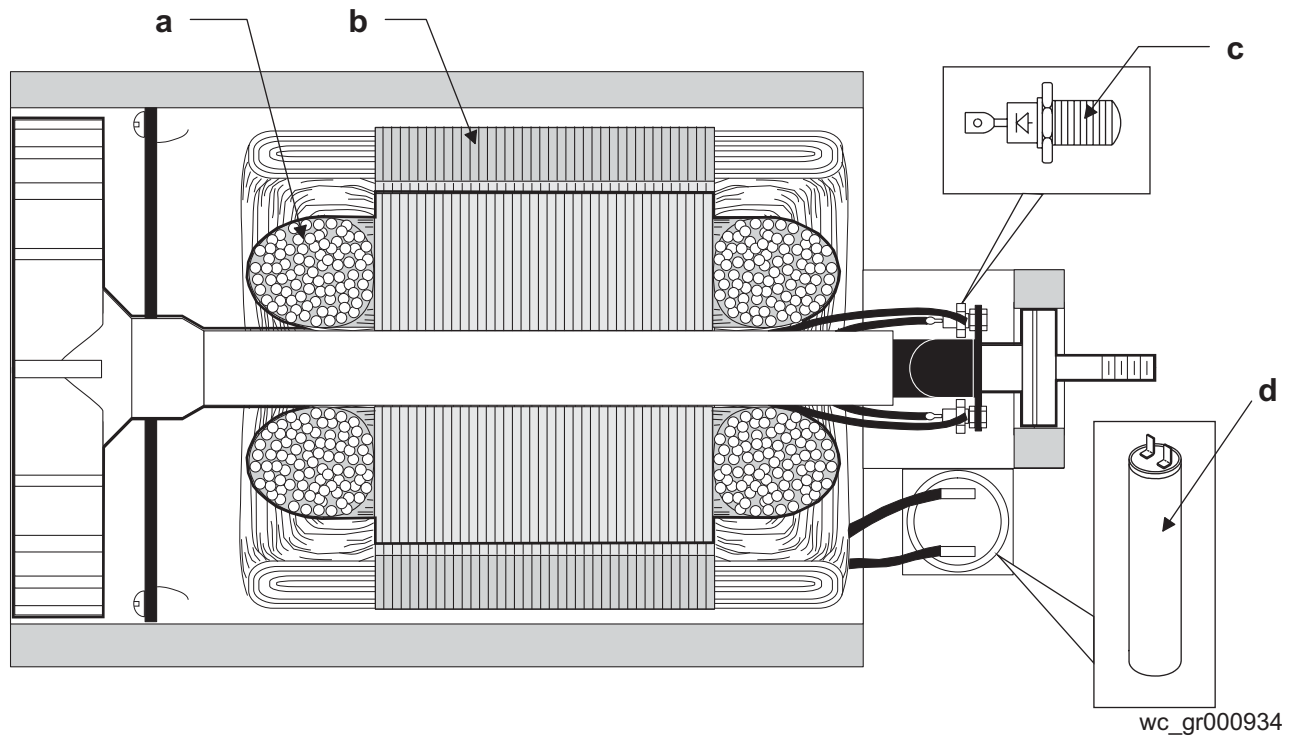
See Graphic: *wc_gr000934*

The inside of the rotor shaft (**a**) is tapered and connected directly to the taper on the engine crankshaft. This end is supported by the engine crankshaft bearing. The opposite end of the rotor is supported by a bearing installed in the generator housing. This end also contains the two diodes mounted on the diode bracket assembly. There are two individual coils wound on the rotor. When the engine is running, these two windings create the magnetic field for the main stator windings.

5.3 Stator

See Graphic: *wc_gr000934*

The stator (**b**) houses both the main windings and auxiliary winding. The main windings are connected directly to the main circuit breaker to supply power to the output receptacles. The auxiliary winding induces the initial voltage in the field windings of the rotor and regulates the voltage. It is connected directly to the main capacitor.



5.4 Capacitor

See Graphic: *wc_gr000934*

A capacitor (**c**) is connected in series with the auxiliary winding. Its purpose is to regulate the voltage when a load is applied.

5.5 Diodes

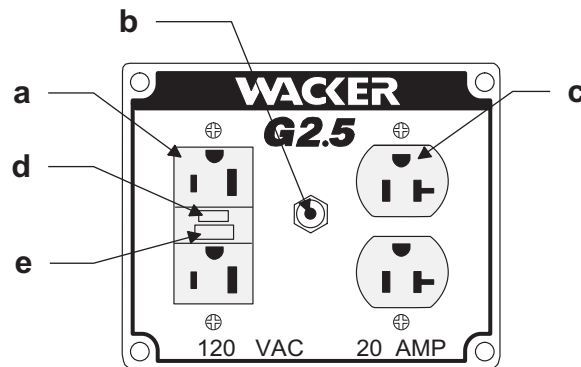
See Graphic: *wc_gr000934*

Two diodes (**d**) are located on the rotor. These diodes form a half-wave rectifier to convert the induced AC voltage in the rotor windings to DC voltage.

5.6 Circuit Breaker

See Graphic: wc_gr000553

This generator is protected by a 20 amp thermal circuit breaker (b) located on the panel. When the circuit breaker opens, the breaker button will pop out. To reset the circuit breaker, push the button in.



wc_gr000553

Control Panel

Ref.	Description	Ref.	Description
a	GFI Duplex receptacle - 120V	d	GFI Test button
b	Circuit Breaker -20 Amp.	e	GFI Reset button
c	Duplex receptacle - 120V		

5.7 Ground Fault Interruptor

See Graphic: wc_gr000553

GFI's differ from circuit breakers, which only react to high current conditions. GFI's sense very small current changes in the "HOT" and "NEUTRAL" lines in a circuit. They react immediately to open the circuit if a current leak is detected. All current for this generator flows through the GFI duplex outlet.

The GFI should be tested for proper operation each time the generator is used.

To test GFI:

Start generator. Place main circuit breaker in the closed position. Push test button **(d)** on receptacle in. The RESET button **(e)** will pop out. Power is now off at the receptacle. If the RESET button does not pop out, the GFI is not working. Do not run generator until this problem can be corrected. To restore power to the receptacles, push the RESET button in.

If the RESET button pops out during operation, stop the generator and check generator and equipment for defects.

5.8 Capacitors

See Graphic: *wc_gr000935*

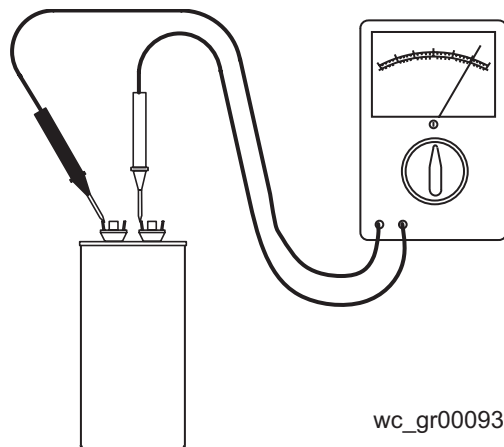


ALWAYS handle or test capacitors with the engine stopped. Extremely high voltage is present at the capacitor terminals while the generator is in use.

Although the capacitors used in this generator are designed to discharge when the engine is stopped, it is still a good idea to discharge them manually before handling. To discharge a capacitor, place a conductor, such as a screwdriver with an insulated handle, across the capacitor terminals. Be sure to touch only the insulated handle. This will short out across the terminals and discharge the capacitor.

Testing Capacitor

- 5.8.1 Discharge the capacitor as described above, then disconnect all wire leads from the terminals.
- 5.8.2 Check the capacitor charge and discharge readings using an ohmmeter as described below or use a capacitor checker.
 - Set Ohmmeter on R x 10k scale.
 - Set meter leads on capacitor terminals. The meter should deflect momentarily towards zero (fully discharged) and then slowly climb up to infinity (charging).
 - Reverse meter leads and repeat procedure. Results should be the same.
- 5.8.3 If meter does not deflect toward zero, or deflects to zero and remains there, the capacitor is open or shorted and must be replaced.



5.9 Engine Speed

See Graphic: wc_gr000114

All generators require a fixed engine speed to maintain the correct voltage output. Engine speed is controlled by a governor which automatically adjusts to varying loads on the engine to maintain a constant speed of 3600 – 3700 rpm.

Testing Engine Speed

Measure the engine speed using a tachometer with no load applied to the generator. The engine must be running at 3700 ± 50 rpm. Voltage output is directly related to engine speed. A slow engine will reduce voltage. Refer to the Operator's Manual for engine speed adjustment.

The generator is designed to produce no output if engine rpm falls 10% or more below the required speed (approximately 3200 – 3400 rpm).

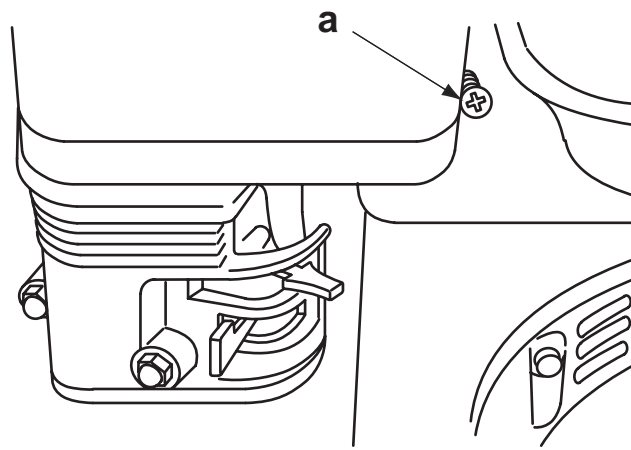
Setting Engine Speed

Setting the engine speed requires the adjustment to the governor.

To set the engine to the proper speed:

Turn the engine speed adjusting screw (**a**) in or out to obtain a **no-load** speed of 3700 rpm.

CAUTION: Setting the engine speed too high or too low may damage tools and other appliances attached to the generator.



wc_gr000114

5.10 Loss of Residual Magnetism

See Graphic: *wc_gr000936*

If the rotor has been removed, or the generator has been stored over six months, the rotor's magnetism may be lost. Loss of magnetism will prevent the generator from building voltage.



Contact with exposed connections inside the control box or while handling battery leads can cause severe electrical shocks. Be extremely careful to avoid touching any exposed connections. Never wear jewelry or use tools or metal items that may make contact across exposed connections. Review safety rules at beginning of this manual.

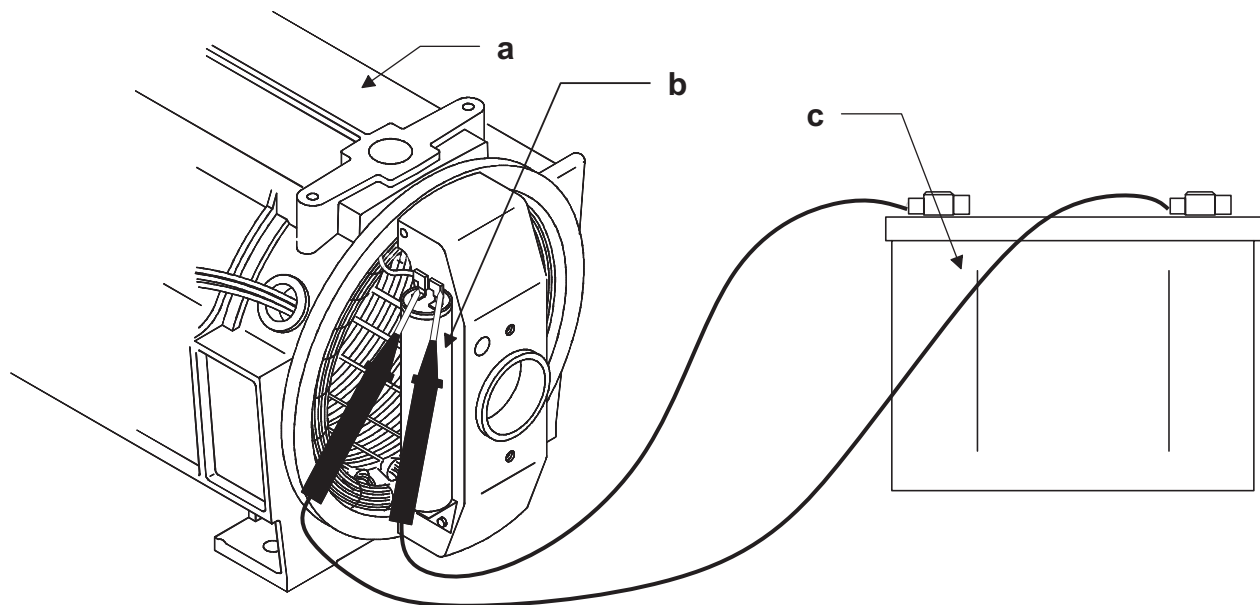
To restore magnetism to the rotor, "flash" it as follows:

- 5.10.1 Remove the two screws and the end cover. Locate the capacitor **(b)** that is attached to the stator housing **(a)**.
- 5.10.2 Run generator at normal no-load speed – 3700 rpm, auto-idle off.
- 5.10.3 **Briefly** touch a 12 VDC battery **(c)** across the two capacitor connections to pulse the auxiliary winding. The leads should remain attached to capacitor. The polarity of the battery leads is not important.

CAUTION: DO NOT hold battery leads on connection longer than two seconds.

The output voltage should quickly come up to normal levels. Repeat if necessary.

- 5.10.4 Stop engine and replace end cover.



wc_gr000936

5.11 Receptacle Panel Wiring

Remove receptacle panel from control box and inspect the wiring for worn or loose wires. Make sure all wire connections are secure and tight at the screws. DO NOT allow wires to be pinched, kinked or damaged in any way. Inspect for tight connections at circuit breakers, capacitors, switches and receptacles. Replace any broken or damaged parts.

5.12 Rotor Diode Testing

See Graphic: *wc_gr000937*

To check diode:

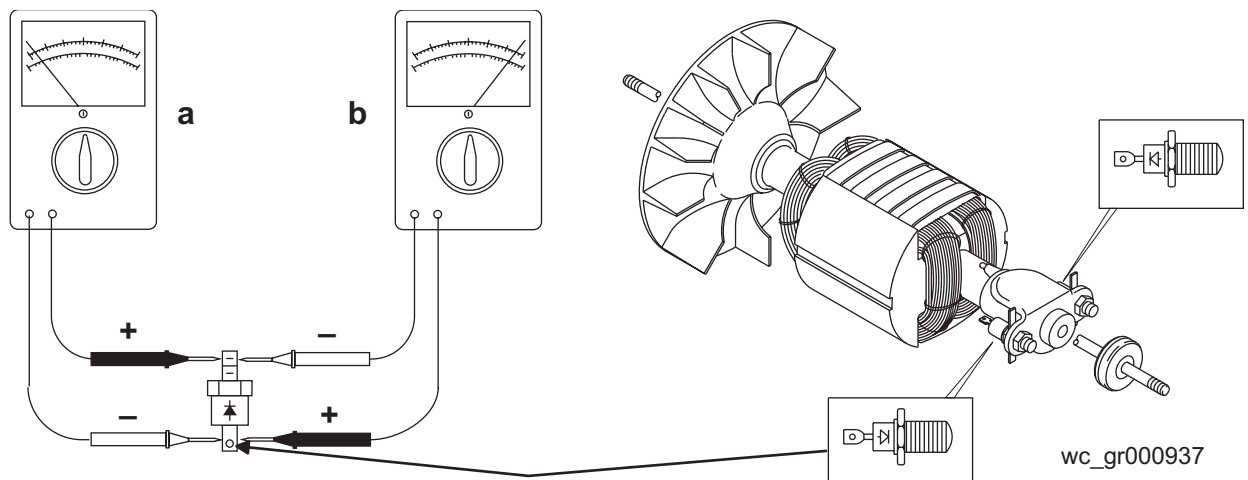
- 5.12.1 Disassemble generator and remove rotor. See *Generator Disassembly*.
- 5.12.2 Set ohmmeter in lowest scale. Test diode in forward position. Meter should read low or close to zero **(a)**.
- 5.12.3 Reverse meter leads and test diode in reverse position. Meter should read high or close to infinity **(b)**.

A zero reading in both directions indicates a shorted diode. A reading of Infinity in both directions indicates an open diode. The diode must be replaced in either case.

If one diode is defective it is recommended that both diodes be replaced since the remaining diode may have been weakened.

To remove diode, use a soldering iron to soften solder and remove wires.

When soldering on wires do not allow soldering iron to remain on diodes longer than 10 seconds or diode may be damaged.



5.13 Stator Winding Test

See Graphic:wc_gr000938

The stator includes the main winding and the auxiliary winding.

To check stator windings:

- 5.13.1 Unplug stator connector at control box.
- 5.13.2 Disconnect ground wire.
- 5.13.3 Set ohmmeter to lowest scale. Place meter leads on connector terminals **(b)** and record resistance values.

Check resistance values with those listed on table.

A high or low reading indicates an open or shorted winding and the stator must be replaced.

- 5.13.4 Test for grounded windings by checking for continuity between winding and metal frame.

If continuity exists, winding is grounded and stator assembly must be replaced.

Note: Make sure stator is completely disconnected from generator. The main winding is intentionally grounded to the generator to form a neutral and will give a false reading.

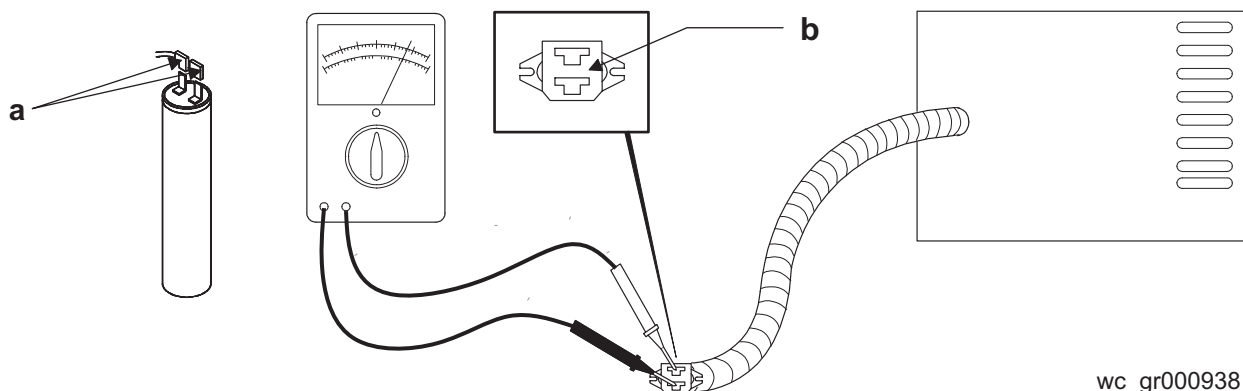
- 5.13.5 Check for continuity between auxiliary winding **(a)** and main winding. If continuity exists, the auxiliary winding has a short to the main winding and stator must be replaced.

Resistance Values (Ohms)

Main Winding	Auxiliary Winding	Rotor Winding
0.56	1.0	8.12

Resistance values are very small and require a good quality meter with the ability to be zeroed out. Using a poor quality meter may not provide accurate readings.

All resistance values are approximate.



wc_gr000938

5.14 Rotor Winding Test

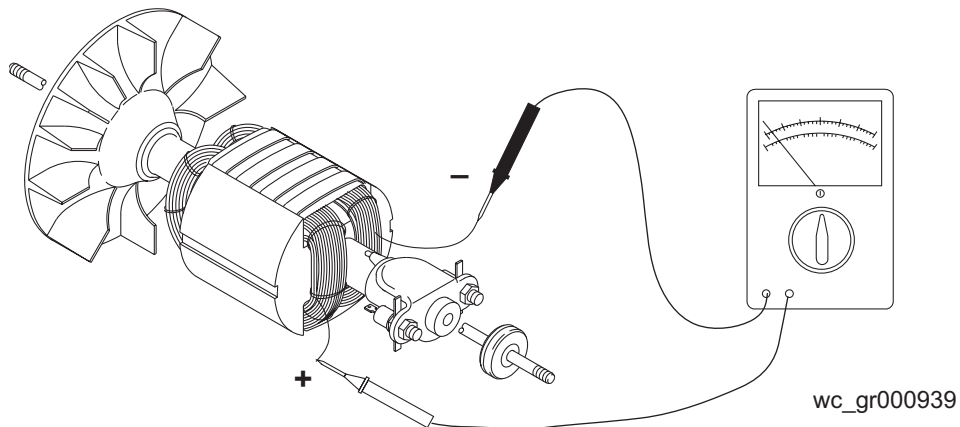
See Graphic: *wc_gr000939*

Before testing rotor, visually inspect windings for dark streaks which indicate a burned or shorted winding. Rotate ball bearing by hand. Replace it if it is rough or noisy.

To check rotor:

- 5.14.1 Remove end cover, locknut, stator and rotor from generator. See *Generator Disassembly*.
- 5.14.2 Unsolder wires from diodes, being careful not to break wires.
- 5.14.3 Measure rotor resistance as shown.
- 5.14.4 Record resistance values of both windings and compare them with values listed in table of *Resistance Values*.
- 5.14.5 Check for grounded windings by holding one meter lead to winding and other lead to metal frame on rotor.

Replace rotor if windings are open, shorted internally or shorted to metal frame.



5.15 Generator Disassembly

See Graphic: *wc_gr000940*

Capacitor

- 5.15.1 Remove the two end cover screws **(h)** and the end cover **(g)**.
- 5.15.2 Disconnect the leads from the capacitor **(j)**, cut the nylon tie wrap, and remove the capacitor mounting screw.

Stator

- 5.15.1 Remove the control panel, unscrew the ground wire **(m)** and unplug the stator wire **(n)** from the back of the panel.
- 5.15.2 Remove the shaft securing nut **(e)**.
- 5.15.3 Remove the four nuts **(l)** securing the generator frame **(k)** to the engine adapter flange.
- 5.15.4 Remove the two bolts and nuts that secure the stator **(k)** to the shock mount bracket.
- 5.15.5 With a block of wood and a mallet, tap stator frame away from the engine. Withdraw stator frame assembly **(k)** over the rotor **(a)** carefully to avoid damage to windings in the stator or rotor.

Note: *If the rotor comes out with the stator, skip step 6.*

- 5.15.6 Support the rotor weight with a sling or place a block between the rotor and base.

Rotor

Rotor **(a)** removed with stator:

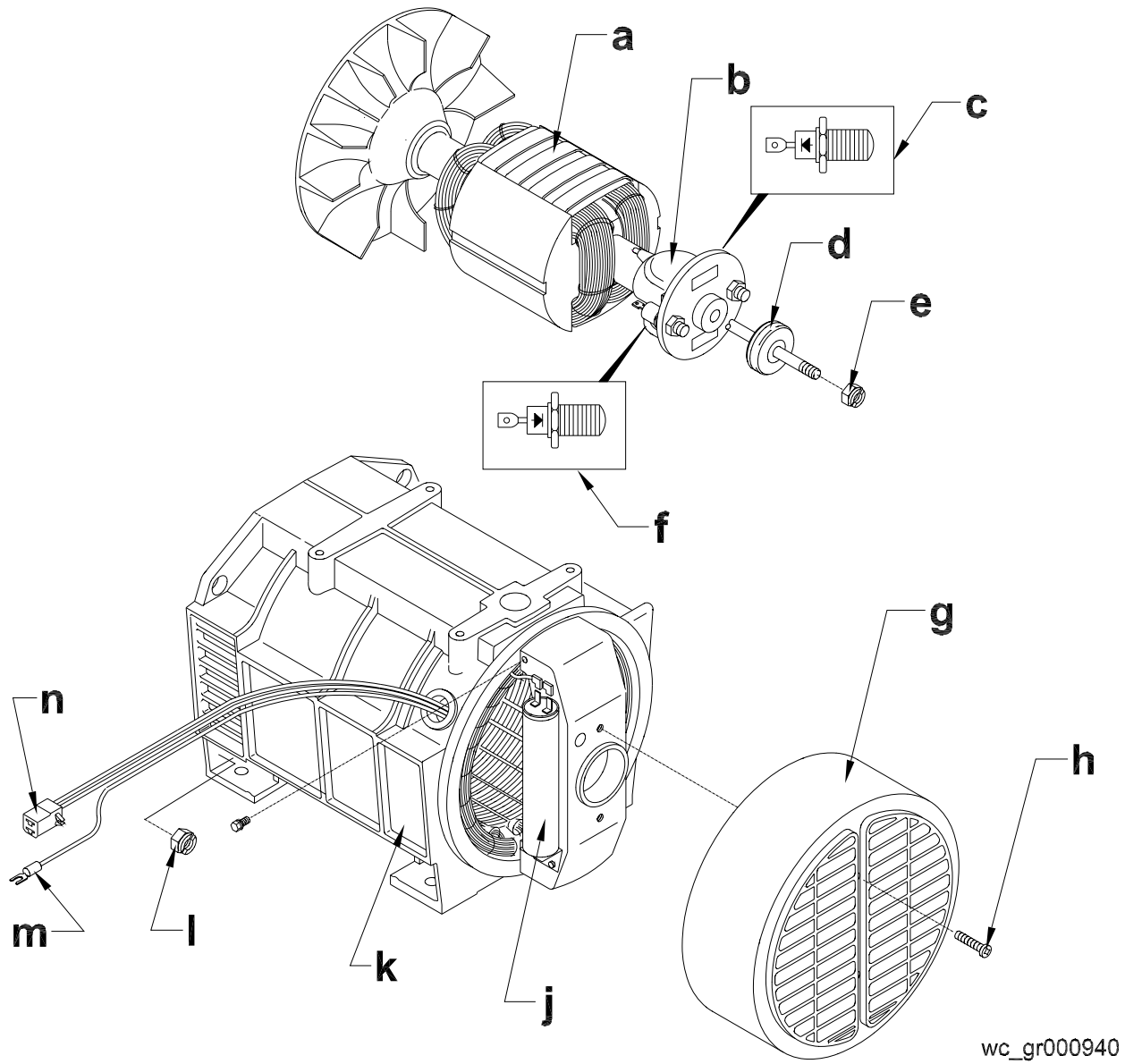
- 5.15.1 Place stator on flat surface with bearing **(d)** end up. Elevate the stator **(k)** by placing two blocks of wood on the edge of the stator frame to allow the rotor to drop.
- 5.15.2 Partially screw one of the frame mounting bolts into the bearing and tap screw with a mallet. The rotor should drop out of the stator.

Rotor **(a)** still attached to the engine:

- 5.15.1 Remove stator per instructions above.
- 5.15.1 Release the rotor **(a)** from the engine shaft by supporting rotor in one hand and with a mallet, striking firmly on a pole face.

Diode and/or Varistor

- 5.15.1 Unsolder leads from the diodes **(c)** and **(f)** and unscrew diode stud.
- 5.15.2 Unsolder varistor lead from the solder tag on the diode stud.
- 5.15.3 Remove the silicon sealant supporting the varistor from the diode bracket **(b)**.



wc_gr000940

5.16 Generator Assembly

See Graphic:wc_gr000940

When assembling the generator be sure to observe the following:

- 5.16.1 Install diodes **(c,f)** to the diode bracket **(b)** assembly on the rotor, by placing the solder tags on the diode stud and tighten to the diode base.
- 5.16.2 Insert varistor leads first, and push varistor well down into the diode bracket assembly recess. Solder leads to the diode pin and the solder tag on the diode stud. Reseal varistor with silicon sealant.
- 5.16.3 Make sure inner taper on rotor and outer taper on the engine crankshaft are clean and free of rust and oil.
- 5.16.4 Install the rotor **(b)** on crankshaft.
- 5.16.5 Slide stator **(k)** over the rotor carefully to avoid hitting and damaging windings. Tap the frame onto the rotor bearing.
- 5.16.6 Attach the four nuts **(l)** to secure frame to the engine adapter flange.
- 5.16.7 Install the shaft securing nut **(e)**. Tighten to 17.5 Nm (13 ft. lbs.).
- 5.16.8 Install the capacitor **(j)** using the mounting screw and a new nylon tie wrap. Re-attach the two leads.
- 5.16.9 Install the end cover **(g)** and two mounting screws **(h)**.
- 5.16.10 Reconnect the ground wire **(m)** and the stator wire **(n)** to the control panel, and reinstall panel.

5.17 Troubleshooting

Problem / Symptom	Reason / Remedy
Engine Does Not Start	<ul style="list-style-type: none"> • Engine switch is in "OFF" position. Move engine switch to "START" position. • Fuel valves under fuel tank and on engine are closed. Open fuel valves. • Fuel tank is empty. Fill fuel tank. • Choke lever is in wrong position. Move choke lever to correct position. (Close choke lever when starting a cold engine). • Spark plug is in poor condition. Replace spark plug. • Spark plug cap is loose. Tighten spark plug cap. • Engine oil level is low. Refill oil.
No Output Voltage	<ul style="list-style-type: none"> • Engine speed too slow. Increase engine speed to 3700 rpm, no-load. • Circuit breaker open. Reset breaker. • GFI open. Test and reset GFI. Replace if defective. Tool or appliance defective, leaking current. • Loss of residual magnetism. Flash rotor fields. • Defective receptacle or switch. Inspect wiring and components and repair. • Rotor diodes open or shorted. Test diodes and replace. • Open or shorted stator windings. Test stator and replace. • Open or shorted rotor windings. Test rotor and replace. • Connector from generator to control panel is loose or disconnected. Install tightly.
Low Voltage	<ul style="list-style-type: none"> • No-load voltage between 70 – 100 volts, engine operating at correct speed. One diode on rotor open or shorted. Replace all diodes. • Engine slightly below operating speed, but not enough to collapse all output. Increase engine speed to 3700 rpm, no-load. • Capacitor is defective. Test capacitor and replace if necessary. • Rotor winding wire broken off at diode. Resolder wire to diode. • Rotor winding partially shorted. Test rotor winding resistance. Replace rotor. • Rotor slipping on engine crankshaft. Rotor winding partially shorted.
High Voltage	<ul style="list-style-type: none"> • Engine speed too high. Reduce engine speed to 3700 rpm, no-load.
No-load Voltage Normal but Falls when Load is Applied	<ul style="list-style-type: none"> • Engine lugging down under load. Refer to engine repair manual to restore engine power.

5.18 Periodic Maintenance Schedule

	Daily before starting	After first 20 hrs.	Every 50 hrs.	Every 100 hrs.	Every 300 hrs.
Check fuel level.	•				
Check engine oil level.	•				
Inspect air filter. Replace as needed.	•				
Check and tighten external hardware.	•				
Clean air cleaner elements.*			•		
Inspect shockmounts for damage.				•	
Change engine oil.*		•		•	
Clean sediment cup.*				•	
Check and clean spark plug.				•	
Check and adjust valve clearance.					•
Clean fuel tank.*					•
Check condition of fuel line. Replace when necessary.					•

*Service more frequently in dusty conditions.

5.19 Engine Service

Normal servicing of the engine such as cleaning the air cleaner, sediment cup, carburetor adjustments, auto idle speed and engine speed can be located in the Operator's manual. In depth engine service should be performed by qualified personnel or by the nearest Honda dealer.

5.20 Storing / Transporting

Before storing generator for a long period of time:

- 5.20.1 Close the fuel valve and remove and empty sediment cup under carburetor.
- 5.20.2 Disconnect the fuel line from the carburetor. Place open end of fuel line into a suitable container and open fuel valve to drain fuel from tank.



WARNING

Gasoline is extremely flammable. Drain fuel tank in a well ventilated area. DO NOT drain tank in an area with flames or sparks.

- 5.20.3 Loosen the drain screw on the carburetor and drain any remaining fuel from carburetor.
- 5.20.4 Change the engine oil.
- 5.20.5 Remove the spark plug and pour approximately 30 ml (1 ounce) of clean engine oil into the cylinder. Crank the engine a few turns to distribute the oil to the inside of the cylinder walls.
- 5.20.6 Pull the starter rope slowly until resistance is felt and leave handle in this position. This ensures that the intake and exhaust valves are closed.
- 5.20.7 Store generator in a clean, dry area.



WARNING

Let the engine cool before transporting the generator or storing indoors, to avoid burns or fire hazards.

When transporting the generator:

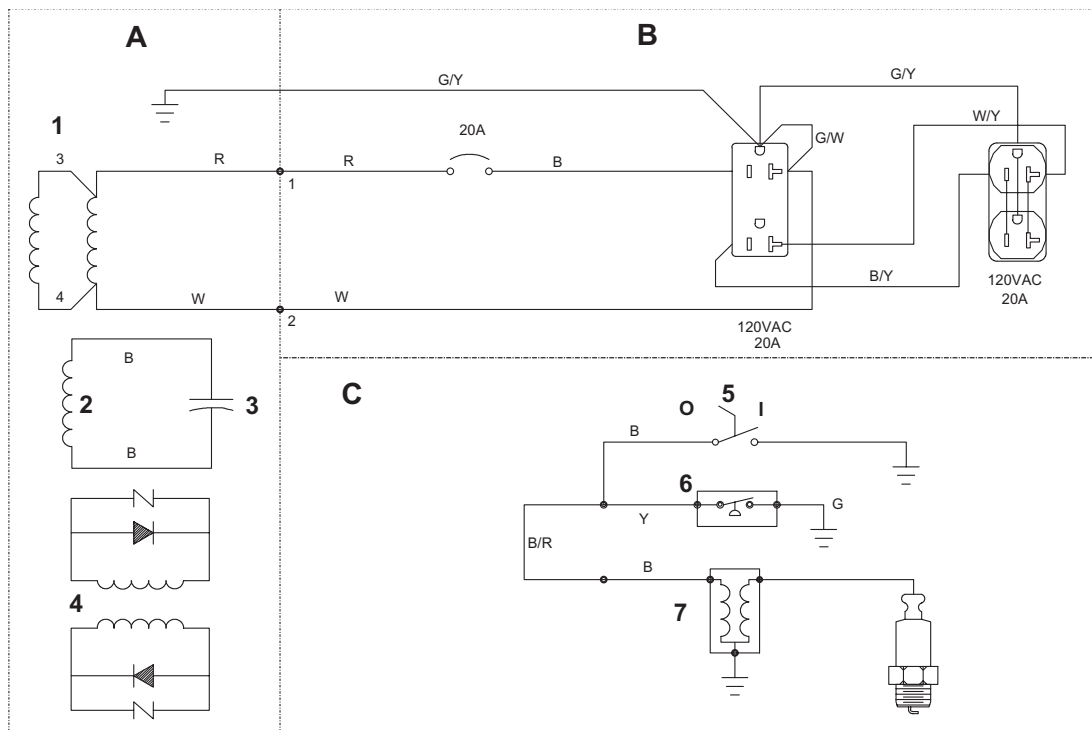
- 5.20.1 Turn the engine fuel valve to the OFF position.
- 5.20.2 Position the generator level to prevent fuel from spilling.
- 5.20.3 Secure the generator by tying it down with a suitable rope.

5.21 Wiring Schematic

See Graphic: wc_gr000767

Ref.	Description	Ref.	Description	Ref.	Description
A	Generator	B	Control Box	C	Engine

Ref.	Description	Ref.	Description
1.	Main Windings	5.	Ignition Switch
2.	Aux Winding	6.	Oil Level Switch
3.	Capacitor 25 μ F 400 V	7.	Coil
4.	Rotor Windings		



wc_gr000555

Wire Colors							
B	Black	R	Red	Y	Yellow	Or	Orange
G	Green	T	Tan	Br	Brown	Pr	Purple
L	Blue	V	Violet	Cl	Clear	Sh	Shield
P	Pink	W	White	Gr	Gray	LL	Light Blue

6. G 3.7A;G/GS 5.6A;GS 8.5V;GS 9.7V

6.1 Theory of Operation – Brush Generators

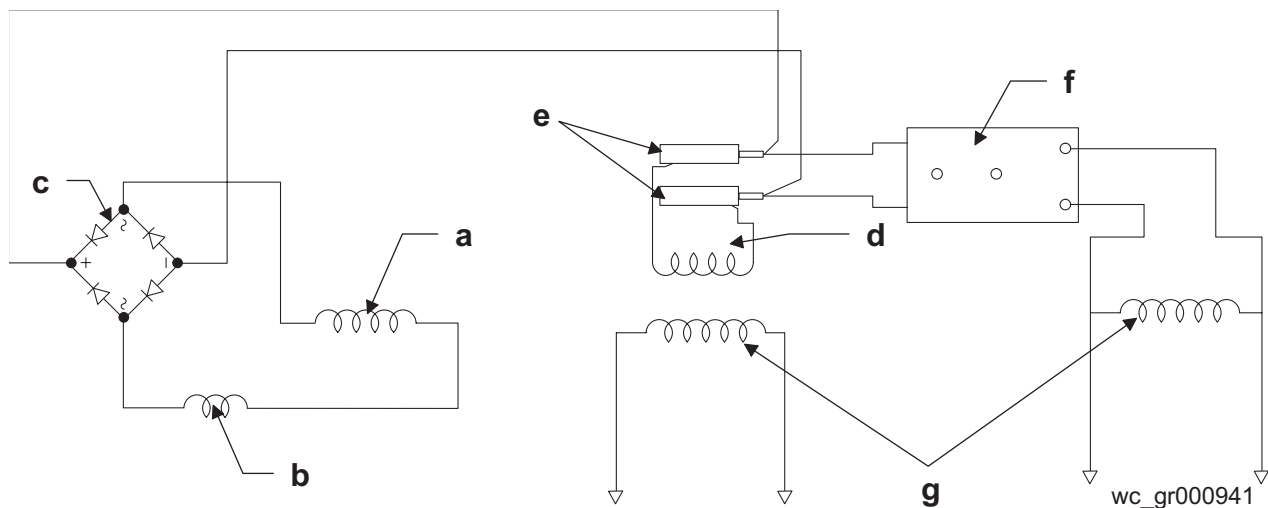
See Graphic: *wc_gr000941*

Basic Generator Theory

These generator models use a brush/slip ring design to generate and regulate power and consist of a rotor, stator, diode bridge, and an auxiliary winding. They also incorporate a choke that is connected in series with the auxiliary winding. The choke's purpose is to bring the current in the auxiliary winding "in phase" with the main windings. The current from the auxiliary winding is carried to the rotor via the brushes and slip rings (**g**).

The generators also contain an Automatic Voltage Regulator (AVR) that maintains a specific voltage output regardless of load. The voltage regulator accomplishes this by regulating DC current from the auxiliary winding. When the load on the generator increases, the voltage regulator allows additional DC current into the main rotor. The additional DC current allows the generator to increase output and maintain the desired output voltage.

These models are designed to operate with close regulation when supplying single phase loads. The principle of operation is schematically represented and a cross-sectional view is shown. The auxiliary winding (**a**) provides excitation power through a choke (**b**) and bridge rectifier (**c**) into the rotor winding (**d**) via slip rings and brushes (**e**). The AVR (**f**) diverts excess excitation to maintain the stator winding (**g**) output voltage within close limits. The main stator winding is designed for series/parallel connection to give a dual voltage output.



6.2 Rotor

See Graphic: wc_gr000942

The inside of the rotor shaft is tapered and connected directly to the taper on the engine crankshaft. This end is supported by the engine crankshaft bearing. The opposite end of the rotor is supported by a bearing housed in the generator housing. This end also contains the two slip rings. There are two individual coils wound on the rotor **(a)**. When the engine is running, these two windings create the magnetic field for the main stator windings.

6.3 Stator

See Graphic: wc_gr000942

The stator **(b)** houses both the main windings and auxiliary winding. The main windings are connected directly to the main circuit breaker and voltage selector switch to supply power to the output receptacles. The auxiliary winding induces the initial current in the field windings of the rotor. It is connected directly to the choke and the AC input to the bridge rectifier.

6.4 Automatic Voltage Regulator

See Graphic: wc_gr000942

The Automatic Voltage Regulator (AVR) **(c)** provides the generator with a means of maintaining a specific voltage regardless of load. The AVR accomplishes this by regulating DC current from the auxiliary winding. When the load on the generator increases, the AVR allows additional DC current into the rotor. The additional DC voltage allows the generator to increase output and maintain volta

6.5 Choke

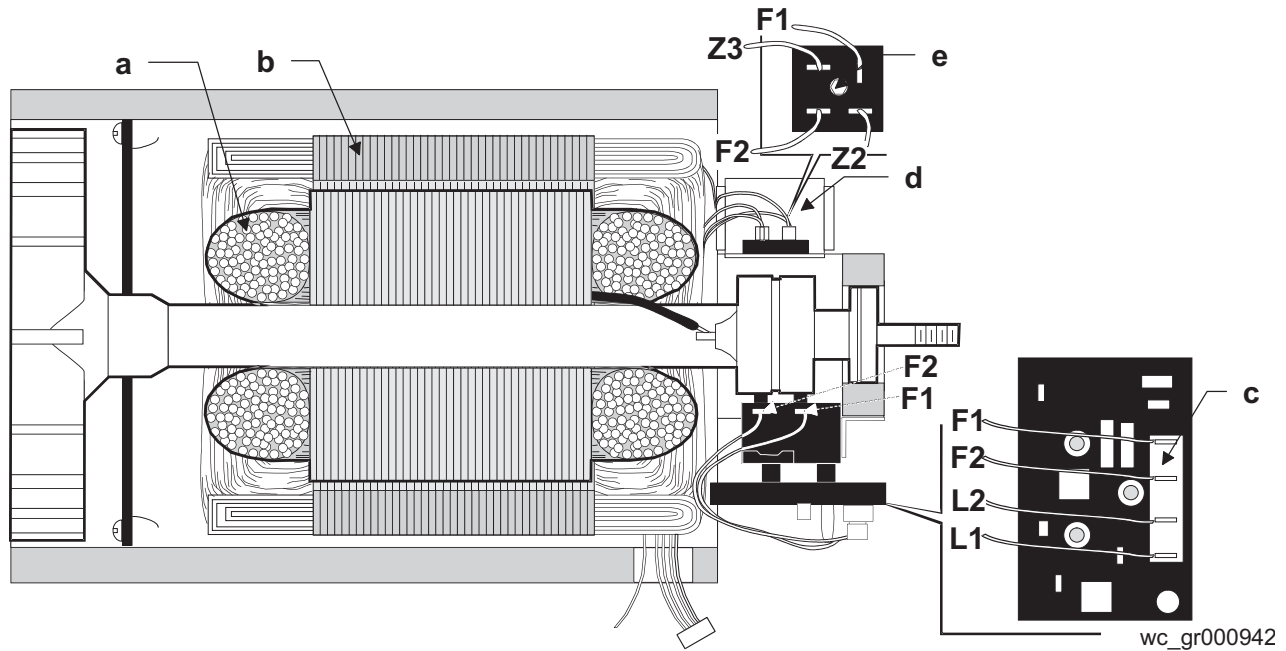
See Graphic:wc_gr000942

The purpose of the choke **(d)** is to bring the auxiliary winding “in phase” with the main windings.

6.6 Bridge Rectifier

See Graphic:wc_gr000942

The bridge rectifier (e) is located on the stator housing and is placed in a cooling air flow of the rotor. This bridge rectifier forms a full wave rectifier to convert induced AC current in the auxilliary winding to DC current.



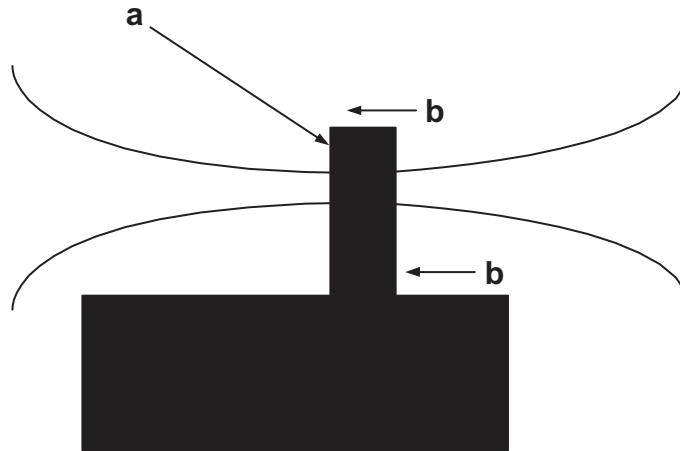
6.7 Engine Auto Idle Module (G 3.7A, G 5.6A and GS 5.6A Models)

See Graphic: *wc_gr000943*

The plunger positioning is accomplished by loosening the clamping screws, and turning the threaded plunger. Turning the plunger clockwise shortens the travel distance of the governor which increases the speed and turning it counter-clockwise reduces the speed.

The module senses current draw. When no current demand is sensed, a signal is sent to the module. The module then controls the throttle-actuator. When the generator is not under load, the module automatically reduces engine speed 7 seconds after all appliances or tools attached to the generator have been turned off. The engine automatically returns to full speed when a tool or appliance is turned back on.

Ref.	Description	Ref.	Description
a	Induction Coil	b	Current Flow



wc_gr000943

6.8 Engine Auto Idle Module (GS 8.5A and GS 9.7A Models)

These two models are equipped with an electronic governor control module system. The advantage of this electronic governor is that it provides more responsive governing than a mechanical governor system. This governor consists of an electronic control module, wiring, current sensing coil, and a throttle actuator.

The current sensing coil senses current draw. When no current demand is sensed, no voltage is sent to the controller. The module then controls the throttle-actuator. When the generator is not under load, the module automatically reduces engine speed 5 seconds after all appliances or tools attached to the generator have been turned off. The engine automatically returns to full speed when a tool or appliance is turned back on.

Note: *The battery must be installed and have the appropriate voltage (nine volts minimum) for the generator electronic control governor to perform properly. If the generator starts but will not run at speed, check battery voltage.*

6.9 Voltage Selector Switch (G 3.7A, G 5.6A and GS 5.6A Models)

The voltage selector switch allows the generator to operate in either single (120 VAC) or dual voltage (120/240 VAC) mode.

In single voltage mode only the 120 VAC twist lock and duplex receptacles are powered. The full rated power of the generator is shared between the three receptacles.

In dual voltage mode both the 120 VAC and 240 VAC receptacles are powered; however, only half the rated power is available at the 120 VAC duplex receptacles and the 120 VAC twist lock receptacle. Full power is available at the 240 VAC twist lock receptacle.

CAUTION: NEVER switch the voltage selector switch with the main breaker on! This can cause arcing and can damage the generator. Turn all tools and appliances off and place the main breaker in the "OFF" position (open) before changing voltage switch position.

6.10 Checking the Voltage Selector Switch Functional Output (G 3.7A, G 5.6A and GS 5.6A Models)

See Graphic: *wc_gr000944*

Functional Output

- 6.10.1 Confirm that the voltage selector switch is in the 120V position.
- 6.10.2 Measure the three receptacles labeled 120V and confirm that voltage.
- 6.10.3 Measure the 240 Volt labeled receptacle and confirm that the voltage is zero.
- 6.10.4 Turn the main breaker off and switch the voltage selector switch to 120/240 Volt position.
- 6.10.5 Turn the main breaker on and verify 240V at the labeled receptacle and 120V at the three 120V labeled receptacles.

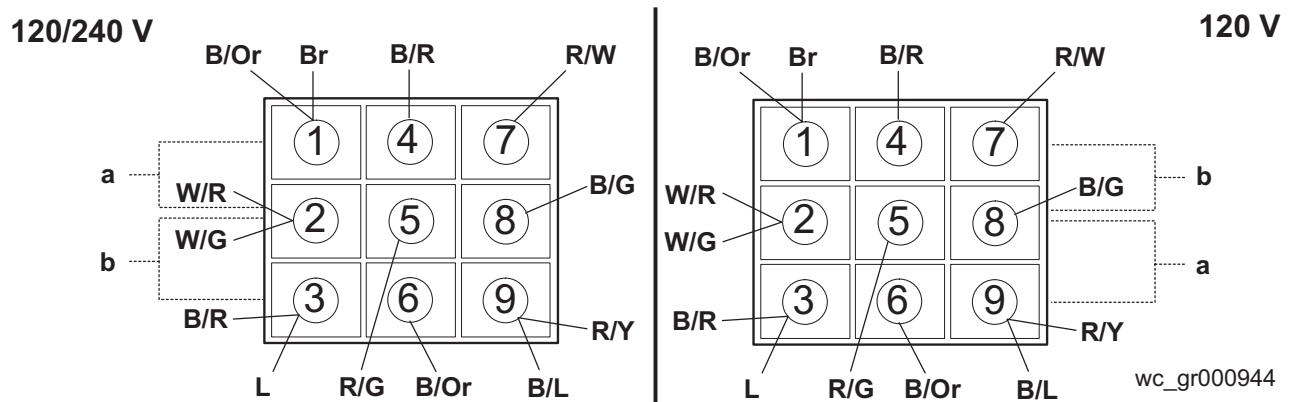
Switch Output

Worn, dirty, or damaged contacts can affect the operation of the voltage selection switch and result in no, or low, voltage at receptacles.

Test the selector switch using an ohmmeter.

- 6.10.1 Remove all wires from switch, then open main circuit breaker and check for continuity across switch terminals as shown.
- 6.10.2 Measure from middle terminal to terminal on either side. Meter should indicate continuity **(a)** (contacts closed) to one side and no continuity **(b)** (contacts open) to the other side.
- 6.10.3 Repeat for each of the three center terminals.
- 6.10.4 Change switch position and repeat the check.

Replace switch if testing shows terminals on each side are either both open or both closed.



6.11 Main Circuit Breaker

See Graphic: wc_gr000545 and wc_gr000559

The main breaker protects the generator from severe overloads or short circuits. If the circuit breaker opens, turn the engine off immediately and determine the cause before restarting. Check the appliances and tools attached to the generator for defects and make sure their power requirements do not exceed the power rating of the generator or the current limit of the receptacles.

When the circuit breaker opens, the breaker lever will snap down. To reset the circuit breaker, lift lever up.

6.12 Ground Fault Interrupt

See Graphic: wc_gr000545 and wc_gr000559

GFI's differ from circuit breakers, which only react to high current conditions. GFI's sense very small current changes in the "HOT" and "NEUTRAL" lines in a circuit. They react immediately to open the circuit if a current leak is detected.

Each GFI should be tested for proper operation every time the generator is used.

To test GFI:

6.12.1 Start generator.

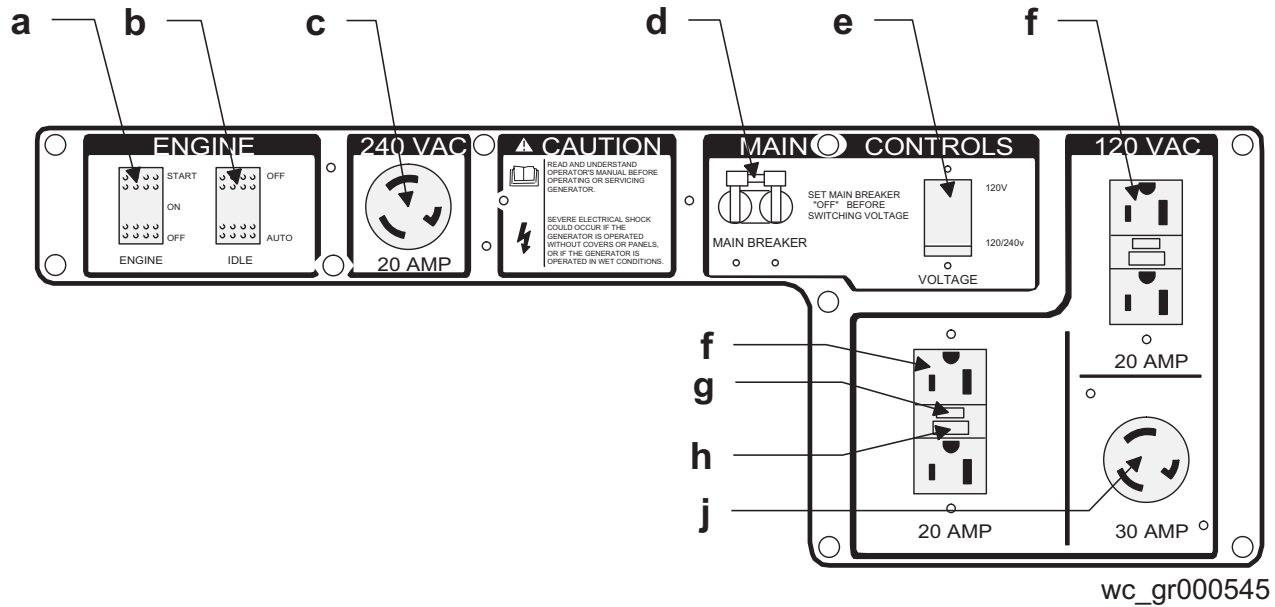
6.12.2 Place main circuit breaker in the closed position.

6.12.3 Push test button **(a)** on receptacle in. The RESET button **(b)** will pop out. Power is now off at the receptacle. If the RESET button does not pop out, the GFI is not working. Do not run generator until this problem can be corrected.

6.12.4 To restore power to the receptacles, push the RESET button in.

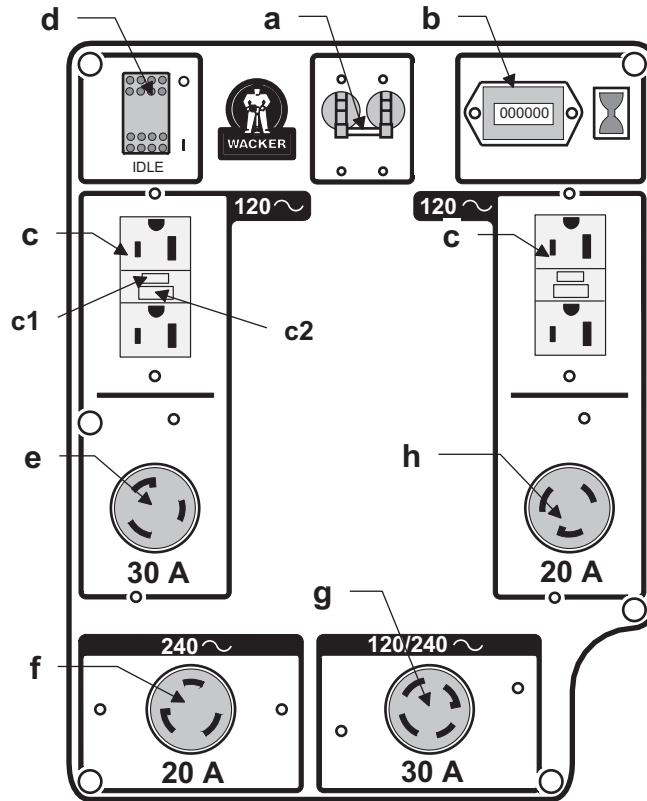
If the RESET button pops out during operation, stop the generator and check equipment for defects.

Portable Generator Repair G 3.7A;G/GS 5.6A;GS 8.5V;GS 9.7V



Control Panel (G 3.7A, G 5.6A and GS 5.6A Models)

Ref.	Description	Ref.	Description
a	Engine Switch (GS 5.6A only)	f	GFI Duplex receptacle - 120V
b	Auto Idle Switch	g	GFI test button
c	Twist-lock receptacle - 240V	h	GFI reset button
d	Main Breaker	j	Twist-lock receptacle - 120V
e	Voltage Selector Switch		



wc_gr000559

Control Panel (GS 8.5V and GS 9.7V models)

Ref.	Description	Ref.	Description
a	Main Circuit Breaker	d	Auto Idle Switch
b	Hour meter	e	120V 30A Twist-lock Receptacle
c	120V GFI Duplex Receptacle	f	240V 20A Twist-lock Receptacle
c1	GFI test button	g	120/240V Twist-lock Receptacle
c2	GFI reset button	h	120V 20A Twist-lock Receptacle

6.13 Choke Test

The resistance value of the choke is 7.5 ohms. To check the choke carefully remove wires Z1 and Z3 from the choke assembly and measure across choke tabs.

6.14 Engine Speed (G 3.7A, G 5.6A and GS 5.6A Models)

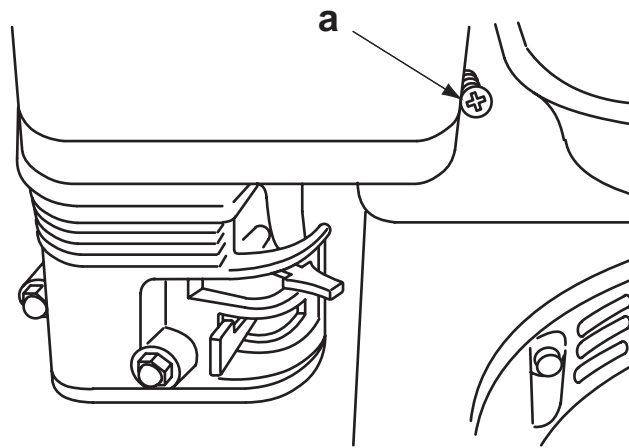
See Graphic: *wc_gr000114*

Generators require a fixed engine speed to maintain the correct voltage. Engine speed is controlled by a governor which automatically adjusts to varying loads on the engine to maintain a constant speed of 3600 rpm. There is no throttle control.

To set the engine to the proper speed:

Turn the speed adjusting screw **(a)** in or out to obtain a no-load speed of 3700 rpm.

CAUTION: Setting the engine speed too high or too low may damage tools and other appliances attached to the generator.



wc_gr000114

6.15 Auto Idle Switch

See Graphic: wc_gr000548

The auto idle switch automatically reduces engine speed 5 – 7 seconds after all appliances or tools attached to the generator have been turned off. The engine automatically returns to full speed when a tool or appliance is turned back on.

To turn auto idle feature on, push auto idle switch to “AUTO”. AUTO is recommended while the generator is running to minimize fuel consumption. To avoid extended engine warm-up periods, keep switch “OFF” when starting the engine and until engine reaches operating temperature.

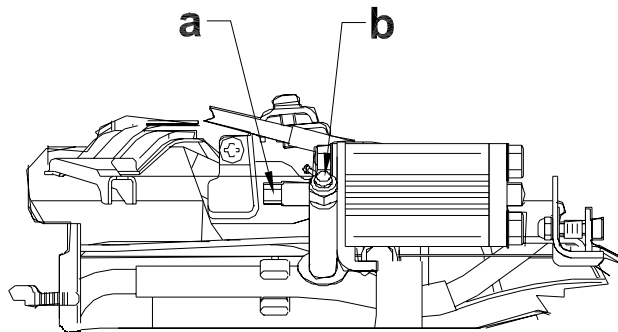
Setting Engine Auto Idle Speed (G 3.7A, G 5.6A, and GS 5.6A Models)

To set the auto idle speed do the following:

- 6.15.1 Adjust pilot screw on carburetor as described in the operation manual of your generator.
- 6.15.2 Loosen clamping nut **(a)** on auto idle magnet bracket.
- 6.15.3 Start engine and set auto idle switch to “AUTO”.
- 6.15.4 Turn magnet pin **(b)** in or out to adjust idle speed to 2200 ± 50 rpm.

Note: To avoid excessive vibration and to maintain adequate cooling ability, do not set engine auto idle speed lower than 2200 rpm.

- 6.15.5 Retighten clamping screw.



wc_gr000548

6.16 Checking Engine Electronic Governor Speed (GS 8.5V and GS 9.7V models)

Note: *The battery must be installed and have the appropriate voltage (nine volts minimum) for the generator electronic control governor to perform properly. If the generator starts but will not run at speed, check battery voltage.*

Running Check

To check the performance of the electronic governor perform the following steps in order.

- 6.16.1 Start engine and check rpm. Top governed speed should be 3600 rpm.
- 6.16.2 Manually move throttle link to wide open throttle. Engine should not exceed 4000 rpm (approximately).
- 6.16.3 With engine running at top governed speed, attach one end of a jumper wire to the BLUE wire from the control module and attach other end to a good ground. After 4 – 6 seconds engine speed should return to idle (approximately 2200 rpm).
- 6.16.4 Remove jumper wire from ground. Engine should return to top governed speed.

If engine does not slow to idle speed or does not return to top governed speed, replace engine module.

Static Check

To determine whether a governor problem is being caused by the control module or the actuator, perform the following static check.

A pair of jumper wires and a known good 12 volt battery are required. Perform static check exactly in order shown.

- 6.16.1 Disconnect RED and GREEN wires from control module to actuator.
- 6.16.2 Attach jumper wires from battery to RED and GREEN wires of actuator.
- 6.16.3 Attach 12 + (positive) to RED wire.
Attach 12 volt – (negative) to GREEN wire.
- 6.16.4 Actuator should move throttle lever to wide open position.

If actuator does not move, it is defective. Replace. If actuator moves throttle to wide open position, the module is defective. Replace.

Running Generator

Follow instructions below and read starting and stopping instructions found in Engine Owner's Manual.

- 6.16.1 Disconnect all loads from the generator and place the main circuit breaker in the open position. Place auto-idle switch to OFF position (G 3.7A, G 5.6A, GS 5.6A, GS 8.5V, and GS 9.7V models).
- 6.16.2 Open fuel valve.
- 6.16.3 If engine is cold, pull choke control out. If engine is hot, push choke control in.
- 6.16.4 For electric start models, turn "Key Switch" to start position, and hold until engine starts.

CAUTION: Do not crank engine longer than 15 seconds at a time. Extended cranking can damage starter motor.

To start engine using manual start, turn key switch to the run position. Pull starter rope rapidly to start engine.

Leave key in run position while engine is running.

Note: *The engine is equipped with a low oil protection system. If the oil level is low, the engine will not start. Check engine oil level if engine does not start.*

- 6.16.5 Push choke in as engine warms.
- 6.16.6 Place main circuit breaker in closed position and place auto idle switch in ON position. Allow engine to warm up and check function of GFI circuit breakers before attaching loads to generator.

6.17 Removing and Installing Electronic Governor (GS 8.5V and GS 9.7V Models)

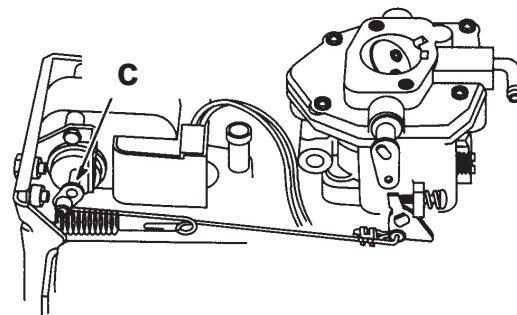
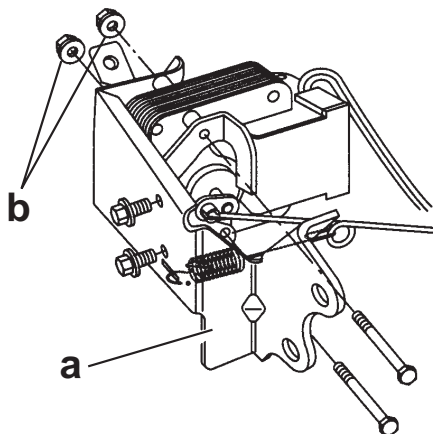
See Graphic: *wc_gr000945*

Removing

- 6.17.1 Disconnect RED and GREEN wires from control module to actuator.
- 6.17.2 Remove air cleaner assembly.
- 6.17.3 Disconnect governor link at carburetor.
- 6.17.4 Remove governor control bracket with actuator.
- 6.17.5 Disconnect governor link from actuator and remove throttle return spring.
- 6.17.6 Remove screws, nuts and actuator from control bracket.

Installing

- 6.17.1 Assemble actuator to governor control bracket **(a)**.
Torque screws and nuts to 3.4 Nm (30 in. lbs.) **(b)**.
Note: Hold the long screws with a ¼-inch wrench when torquing nuts. Screws must NOT turn while torquing nuts.
- 6.17.2 Assemble governor link to actuator. Make sure link snaps into hole in actuator grommet.
- 6.17.3 Assemble throttle return spring through slot in governor control bracket with open end spring facing out and through small hole in governor bracket.
- 6.17.4 Assemble governor control bracket assembly to engine.
 - Torque four 8mm screws to 17.0 Nm (150 in. lbs.).
 - Torque two 6mm screws to 10.0 Nm (70 in. lbs.).
- 6.17.5 Rotate the actuator lever to position shown **(c)** and connect governor link to carburetor.
- 6.17.6 Connect RED and GREEN wires from the control module to actuator.



wc_tx000945

6.18 Receptacle Panel Wiring

Remove receptacle panel from control box and inspect the wiring for worn or loose wires. Make sure all wire connections are secure and tight at the screws. DO NOT allow wires to be pinched, kinked or damaged in any way. Inspect for tight connections at circuit breakers, capacitors, switches and receptacles. Replace any broken or damaged parts.

6.19 Loss of Residual Magnetism in Rotor

See Graphic: wc_gr000946

General

If the rotor has been removed, the generator stored for a considerable time, or the rotor (field) connections reversed during service, the residual magnetism may have been destroyed. Loss of magnetism will prevent the generator from building voltage.

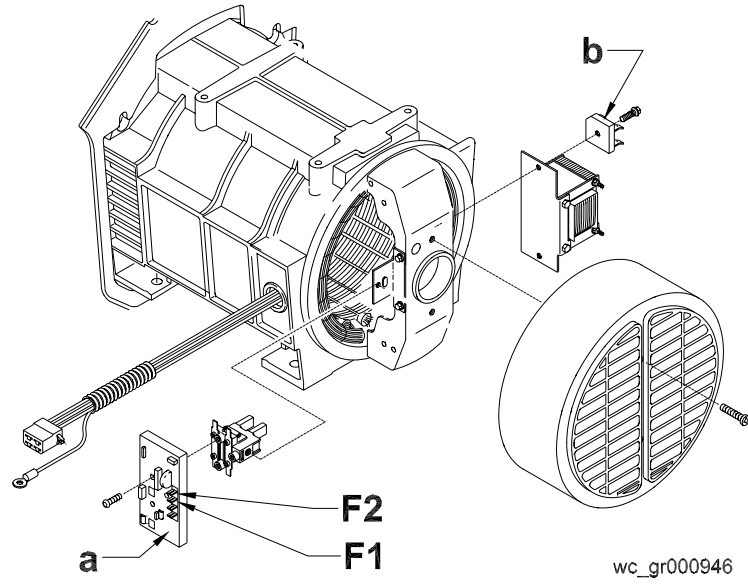
To check residual voltage, run the generator at normal no-load speed and measure the voltage at 120 VAC receptacles. This voltage should be at least 1.5 volts. If the voltage is less than 1.5 volts, the residual magnetism must be restored by “flashing” with a 12 volt battery.

Restoring Residual Magnetism to the Brush Type Generators

Disconnect wires F1 and F2 from the AVR (**a**). Run the generator at its normal speed and apply 12 volts from a battery to the wires F1 and F2 for approximately 3 seconds. Ensure the positive battery lead is applied to the red wire F1. The output voltage of the generator, with the 12 volt supply connected, should be approximately normal voltage.

Stop the generator and reconnect leads F1 – F2.

CAUTION: Ensure the battery leads are connected to the wires F1 and F2 with the correct polarity, and that the wires are isolated from each other and ground. Loss of residual magnetism will result if wires touch ground, each other, or wrong polarity.



6.20 Diode Bridge

See Graphic: *wc_gr000946*, *wc_gr000947*, and *wc_gr000948*

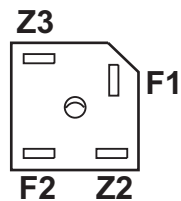
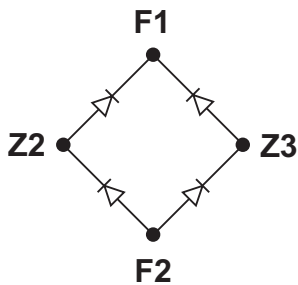
Accessing Diode Bridge

- 6.20.1 Remove generator cover.
- 6.20.2 Remove leads Z2 and Z3 from the diode bridge **(a)**, and leads F1 and F2 that route to the brush assembly.

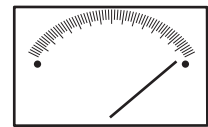
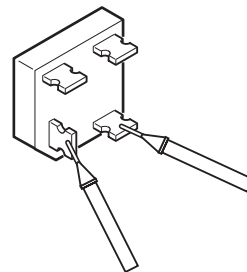
Checking Diode Bridge

To check the full wave rectifier, follow these steps:

- 6.20.1 Set multi-meter on R x 1000 range.
- 6.20.2 Remove all wires connected to rectifier.
- 6.20.3 Place the meter probes on two adjacent rectifier terminals and check resistance value.
- 6.20.4 Reverse the probes and recheck.
- 6.20.5 The meter should indicate low resistance in one direction and a high resistance in the other direction.
- 6.20.6 Repeat this procedure for each adjacent set of terminals on the rectifier until all four diodes have been checked.



wc_gr000947



wc_gr000948

6.21 Stator Windings

See Graphic: *wc_gr000949*

The stator includes the two main power windings and the auxiliary winding.

To check stator windings:

6.21.1 Unplug stator connector at control box.

6.21.2 Set ohmmeter to lowest scale. Place meter leads on connector terminals as shown and record resistance values.

Check resistance values with those listed in *Resistance Values*.

Note: *Readings within 2-3 ohms of table values are acceptable.*

If very high ohm values or "open" then replace stator.

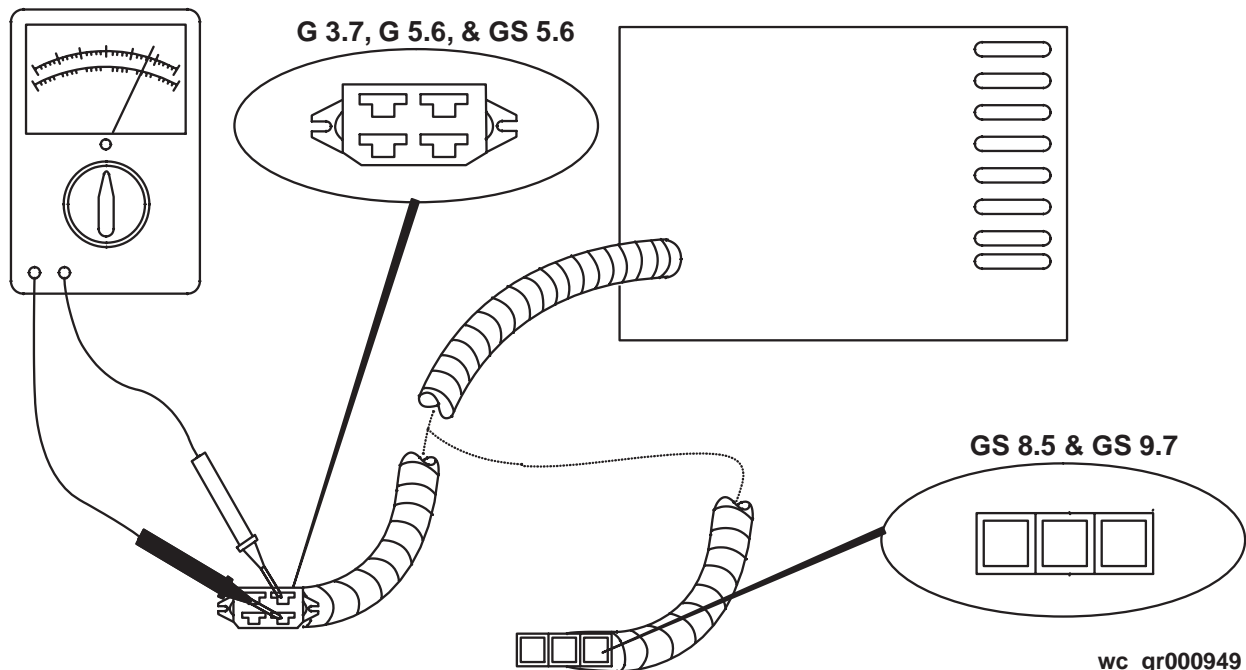
Low readings are not normal and may indicate a shortened winding. Stator may have to be replaced.

6.21.3 Test for grounded windings by checking for continuity between winding and metal frame.

If continuity exists, winding is grounded and stator assembly must be replaced.

Note: *Make sure stator is completely disconnected from control panel. The main windings are intentionally grounded to neutral and will give a false reading.*

6.21.4 Check for continuity between auxiliary winding and main windings. If continuity exists, the auxiliary winding has made contact with the main winding and stator must be replaced.



wc_gr000949

Resistance Values

Generator Model	Main Winding	Auxiliary Winding	Rotor Winding	Choke Winding
G 2.5A	0.56	1.00	8.12	N/A
G 3.7A	0.66	3.18	12.2	7.50
G 5.6A	0.43	2.16	10.8	7.50
GS 5.6A	0.43	2.16	10.8	7.50
GS 8.5V	0.21	1.62	11.9	7.50
GS 9.7V	0.20	1.74	11.9	7.50

Note: Resistance values are very small and require a good quality meter with the ability to be zeroed out. Using a poor quality meter may not provide accurate readings.

All figures are approximate values in ohms.

6.22 Rotor Windings

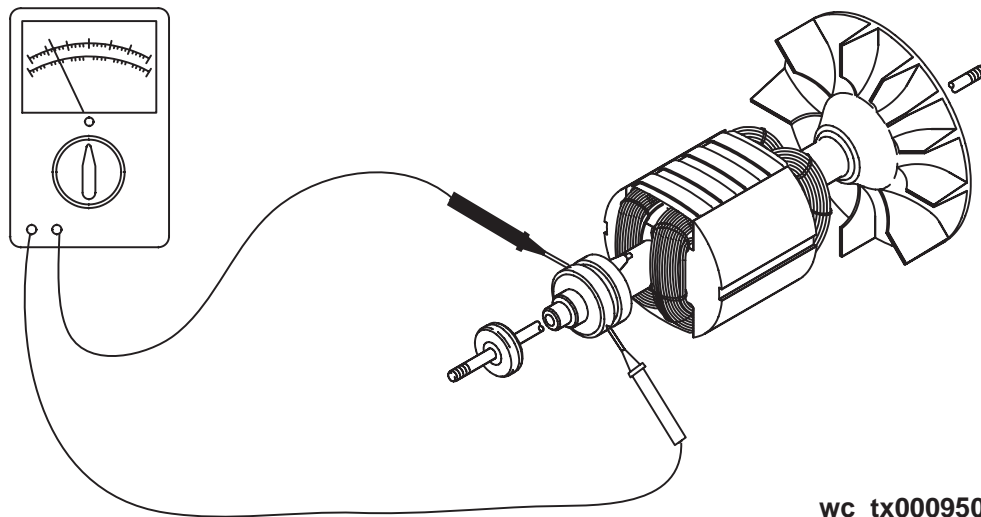
See Graphic: *wc_gr000950*

Before testing rotor, visually inspect windings for dark streaks which indicate a burned or shorted winding. Rotate ball bearing by hand. Replace it if it is rough, noisy or dry.

Checking Rotor

- 6.22.1 Remove end cover and brush assembly.
- 6.22.2 Measure resistance as shown in the illustration, by measuring the winding at the slip rings.
- 6.22.3 Record resistance values of both windings and compare them with values listed in *Resistance Values*. See Note in *Stator Windings* for resistor readings.
- 6.22.4 Check for grounded windings by holding one meter lead to a slip ring and other lead to metal frame on rotor.

Replace rotor if windings are open, shorted internally or shorted to metal frame.



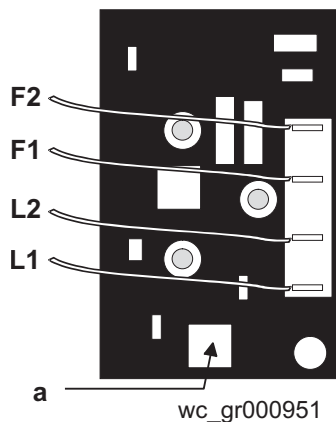
wc_tx000950

6.23 Automatic Voltage Regulator

See Graphic: *wc_gr000951*

To check the regulator: Unplug the generator from the control panel.

- If the generator has low voltage, approximately 2 – 5 VAC as measured at the 120 VAC receptacles, remove F1, F2, L1 and L2 from the regulator. Start and run the generator. If voltage output is approximately 150 VAC measured at L1 and L2 and engine speed is 3600 rpm, replace regulator.
- If the generator has low voltage, approximately 65 VAC measured at the 120 VAC receptacles, remove F1, F2, L1 and L2 from the regulator. Start and run the generator. If voltage output is approximately 150 VAC measured at L1 and L2, and engine speed is 3600 rpm, replace regulator.
- If the generator has high voltage, approximately 150 VAC as measured at the 120 VAC receptacles, and the engine speed is 3600rpm, replace regulator.
- When replacing the regulator, adjust the voltage to 120 VAC at receptacles with the Voltage Adjustment Pot (**a**) on the regulator



6.24 Slip Rings and Brushes

Slip Rings

Inspect the slip rings for dirt or damage. If the slip rings are dirty, use an eraser or non-metallic mild abrasive pad to clean the rings and then retry the generator.

Brushes

Inspect the brushes for damage, dirt, freedom of movement, or brush length. Brushes less than 8 mm in length should be replaced. Also replace damaged brushes.

6.25 Generator Disassembly

See Graphic: *wc_gr000947* and *wc_gr000952*

Diode Bridge Rectifier

- 6.25.1 Remove the two end cover screws **(o)** and the end cover **(p)**.
- 6.25.2 Remove the four leads **F1**, **F2**, **Z2**, and **Z3** from the bridge rectifier **(j)** confirming lead markings.
- 6.25.3 Remove the choke/rectifier mounting screw **(k)**.

Choke

- 6.25.1 Remove the bottom mounting screw **(m)** and carefully pull choke assembly **(n)** away from stator **(i)**.
- 6.25.2 Disconnect the two leads **Z1** & **Z3**.

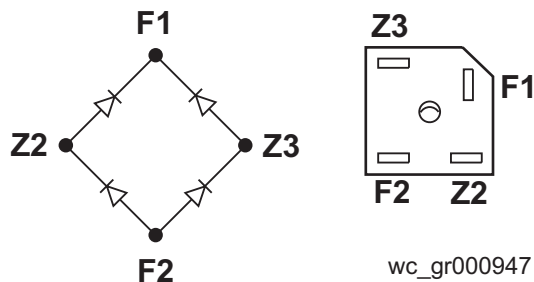
Fuel Tank and Control Box

- 6.25.1 Remove the fuel tank mounting bolts and tilt the tank to gain access to the gas line and shut off valve.
- 6.25.2 Close the fuel valve and disconnect the fuel line. Remove the fuel tank.
- 6.25.3 Remove the screws that mount the control panel to the control box, and disconnect the harnesses and ground wire from the control panel. Set the control panel aside.
- 6.25.4 Remove the screws that mount the control box to the generator and set control box aside.

Automatic Voltage Regulator (AVR) and Brush Assembly

Disconnect the leads from the AVR **(s)** and brush holder **(r)**.

- 6.25.1 Remove the mounting screw **(q)**, AVR **(s)** and brush holder **(r)**.
- 6.25.2 Remove 3 mounting screws **(t)**.
- 6.25.3 If brushes **(u)** are to be changed, remove the brush terminal plate and withdraw springs and brushes. New brushes must be seated using a medium grade abrasive cloth.



Stator

- 6.25.1 Remove the shaft securing nut **(e)**.
- 6.25.2 Remove the four nuts **(h)** from the four studs **(b)** securing the generator frame **(i)** to the engine adapter flange **(a)**.
- 6.25.3 For units with electric start:
 - Disconnect the negative lead from the battery terminal first, and then the positive lead.
 - Loosen battery mounting bracket nuts and slide mounting bracket off the battery.
 - Remove battery and store in cool dry place.
- 6.25.4 Remove the two bolts **(w)** and nuts **(v)** that mount the stator **(i)** to the lifting bracket **(g)**. Remove the two bolts **(w)** and nuts **(v)** that mount the other end of the stator **(i)** to the shock mounted support.
- 6.25.5 With a block of wood and a mallet, tap stator frame away from the engine. Withdraw stator frame assembly **(i)** over the rotor **(c)** carefully to avoid damage to windings in the stator or rotor.

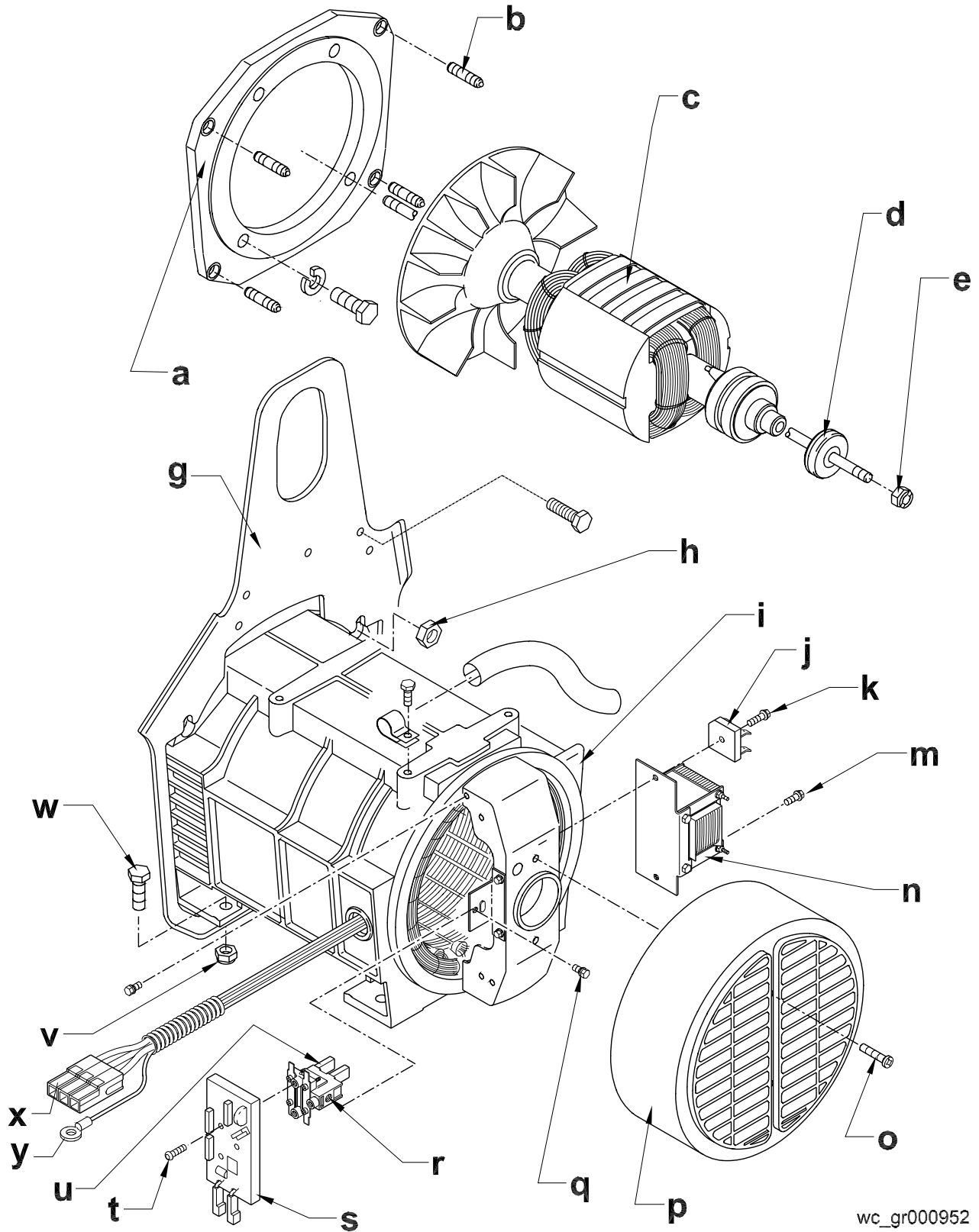
Note: *On some occasions, the rotor may come out with the stator. If it does, skip step 6.*
- 6.25.6 Support the rotor weight with a sling or place a block between the rotor and base.

Rotor

Rotor **(c)** removed with stator:

- 6.25.1 Place stator **(i)** on flat surface with bearing **(d)** end up. Elevate the stator by placing two blocks of wood on the edge of the stator frame to allow the rotor to drop.
 - 6.25.2 Partially screw one of the frame mounting bolts into the bearing and tap screw with a mallet. The rotor should drop out of the stator.
- Rotor **(c)** still attached to the engine:
- 6.25.1 Remove stator per instructions above.
 - 6.25.2 Release the rotor **(c)** from the engine shaft by supporting rotor in one hand and with a mallet, striking firmly on a pole face.

G 3.7A;G/GS 5.6A;GS 8.5V;GS 9.7V Portable Generator Repair



wc_gr000952

6.26 Generator Assembly

See Graphic: *wc_gr000947* and *wc_gr000952*

When assembling the generator be sure to observe the following:

- 6.26.1 Make sure inner taper on rotor and outer taper on the engine crankshaft are clean and free of rust and oil.
- 6.26.2 Install the rotor **(c)** on crankshaft.
- 6.26.3 Slide stator **(i)** over the rotor carefully to avoid hitting and damaging windings. Tap the frame onto the rotor bearing.
- 6.26.4 Attach the four nuts **(h)** to secure frame to the adapter studs **(b)**.
- 6.26.5 Install the washer and shaft securing nut **(e)**. Tighten to 17.5 Nm (13 ft. lbs.).
- 6.26.6 If brushes were changed, reinstall the brushes, springs and terminal plate.
Note: *New brushes must be seated using a medium grade abrasive cloth.*
- 6.26.7 Attach AVR **(s)** to brush holder **(r)** using three mounting screws **(t)**.
- 6.26.8 Reattach the two leads **Z1** and **Z3** to the choke. Using the two mounting screws **(k)** and **(m)**, install the diode bridge rectifier **(j)** and choke **(n)**.
- 6.26.9 Reattach lead to bridge rectifier **(j)**.
- 6.26.10 Install the end cover **(p)** and two mounting screws **(o)**.
- 6.26.11 Reconnect the stator wires **(x)** and **(y)** to the control panel and reinstall panel.

6.27 Troubleshooting

Problem / Symptom	Reason / Remedy
Engine Does Not Start	<ul style="list-style-type: none"> • Engine switch is in “OFF” position. Move engine switch to “START” position. • Fuel valves under fuel tank and on engine are closed. Open fuel valves. • Fuel tank is empty. Fill fuel tank. • Choke lever is in wrong position. Move choke lever to correct position. (Close choke lever when starting a cold engine). • Spark plug is in poor condition. Replace spark plug. • Spark plug cap is loose. Tighten spark plug cap. • Engine oil level is low. Refill oil.
No Output Voltage	<ul style="list-style-type: none"> • Circuit breaker open. Reset breaker. • GFI open. Test and reset GFI. Replace if defective. Tool or appliance defective, leaking current. • Loss of residual magnetism. Flash rotor fields. • Defective receptacle or switch. Inspect wiring and components and repair. • Open or shorted stator windings. Test stator and replace. • Open or shorted rotor windings. Test rotor and replace. • Connector from generator to control panel is loose or disconnected. Install tightly.
Low Voltage	<ul style="list-style-type: none"> • Engine speed too low. Reset engine speed to 3600-3750 rpm. • Automatic voltage regulator defective. Test AVR and replace. • AVR voltage pot set low. Adjust voltage pot to correct voltage. • Defective choke. Test choke and replace. • Defective diode bridge rectifier. Test rectifier and replace. • Brushes damaged or broken. Inspect for damage. • Rotor winding partially shortened. Test rotor winding resistance. Replace rotor. • Slip rings damaged or broken. Inspect for damage or dirt. clean rings or replace rotor
High Voltage	<ul style="list-style-type: none"> • AVR voltage pot set too high. Adjust voltage pot. • Automatic voltage regulator defective. Test AVR and replace. • Wire to AVR broken. Repair or replace wire. • Engine speed too high. Adjust engine speed to 3600-3750 rpm.
No-load Voltage Normal but Falls when Load is Applied	<ul style="list-style-type: none"> • Idle speed too low, governor hunting. Adjust idle speed to 2650 rpm. • 1.6 Amp fuse blown. Replace fuse. • Auto idle switch defective. Test and replace switch. • Wire harness disconnected. Reconnect. • Auto idle module defective. Test and replace auto idle module. • Defective auto idle actuator. Test and replace. (550 Ohm - G 3.7, G/ GS 5.6) • Unit will not come up to speed (GS 9.7 / GS 8.5 only). Check battery for proper voltage.

6.28 Periodic Maintenance Schedule (G 3.7A, G 5.6A, and GS 5.6A Models)

	Daily before starting	After first 20 hrs.	Every 50 hrs.	Every 100 hrs.	Every 300 hrs.
Check fuel level.	•				
Check engine oil level.	•				
Inspect air filter. Replace as needed.	•				
Check and tighten external hardware.	•				
Clean air cleaner elements.*			•		
Inspect shockmounts for damage.			•		
Change engine oil.*		•		•	
Clean sediment cup.*				•	
Check and clean spark plug.				•	
Check and adjust valve clearance.					•
Clean fuel tank.*					•
Check condition of fuel line. Replace when necessary.					•
Check condition of brushes** and slip rings					•

* Service more frequently in dusty conditions.

** Brushes should not be less than 8 mm long.

6.29 Engine Service (G 3.7A, G 5.6A, and GS 5.6A Models)

Normal servicing of the engine such as cleaning the air cleaner, sediment cup, carburetor adjustments, auto idle speed and engine speed can be located in the Operator's manual. In depth engine service should be performed by qualified personnel or by the nearest Honda dealer.

G 3.7A;G/GS 5.6A;GS 8.5V;GS 9.7V Portable Generator Repair

6.30 Periodic Maintenance Schedule (GS 8.5V and GS 9.7V Models)

	Daily before starting	After first 5 hrs.	Every 50 hrs.	Every 100 hrs.	Every 500 hrs.
Check fuel level.	•				
Check engine oil level.	•				
Inspect fuel lines.	•				
Inspect air filter. Clean as needed.	•				
Check and tighten external hardware.	•				
Inspect shockmounts for damage.			•		
Change engine oil.*		•	•		
Replace oil filter.				•	
Check and clean spark plug.				•	
Replace air cleaner.				•	
Replace in-line fuel filter					•
Check and adjust valve clearance.					•
Check condition of brushes** and slip rings					•

* Service more frequently in dusty conditions.

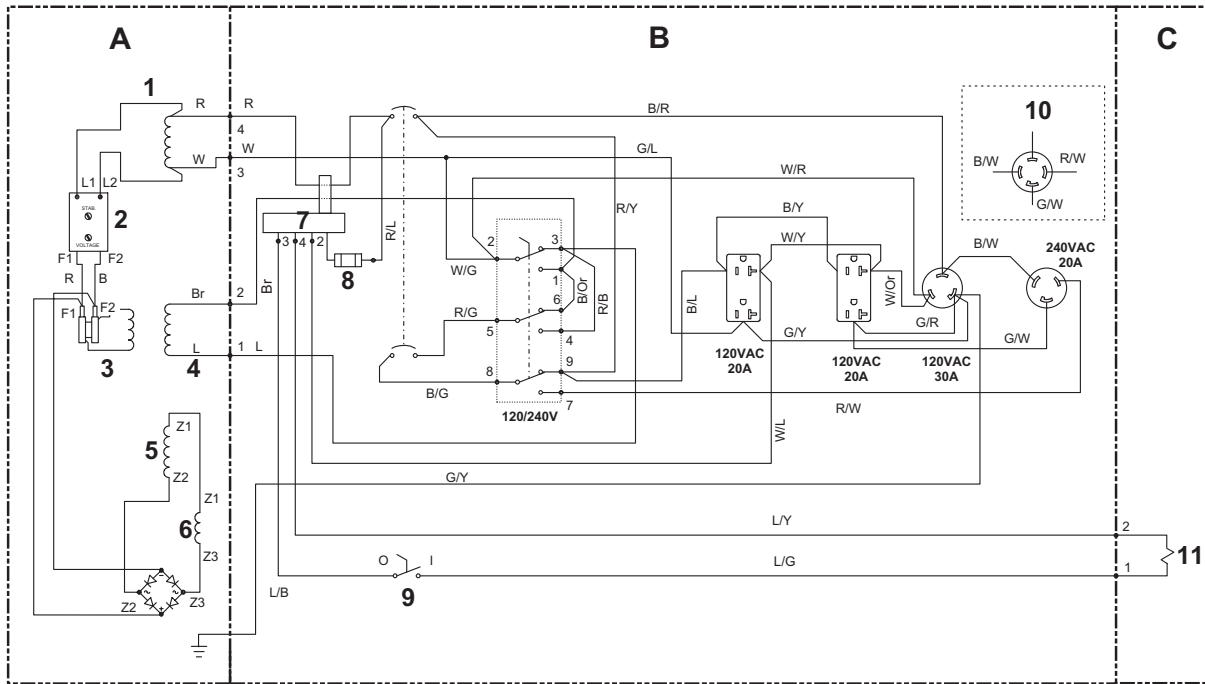
** Brushes should not be less than 8 mm long.

6.31 Engine Service (GS 8.5V and GS 9.7V Models)

Normal servicing of the engine such as cleaning the air cleaner, sediment cup, carburetor adjustments, auto idle speed and engine speed can be located in the Operator's manual. In depth engine service should be performed by qualified personnel or by the nearest Briggs and Stratton "Vanguard" dealer.

6.32 Generator Wiring Schematic (G 3.7A, G 5.6A, and GS 5.6A Models)

**(G 3.7A S/N 718901707 and higher)
 (G 5.6A S/N 719101533 and higher)
 (GS 5.6A S/N 719101173 and higher)**



wc_gr000556

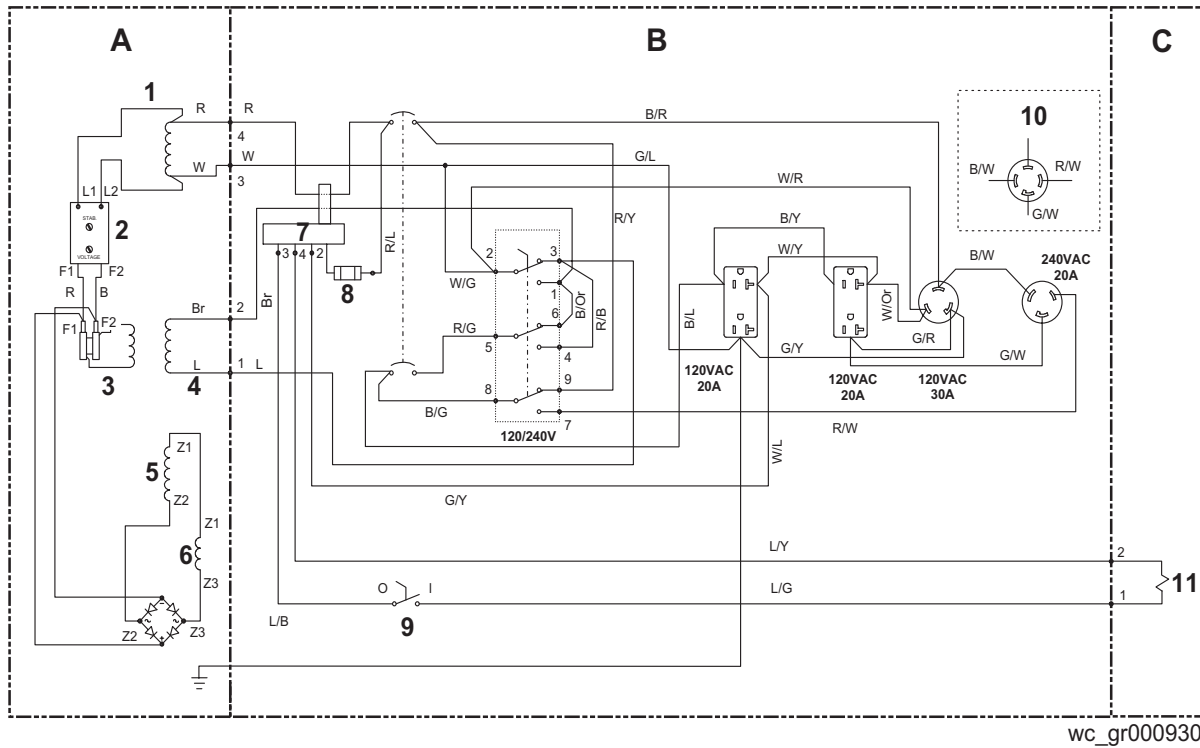
Ref.	Description	Ref.	Description	Ref.	Description
A	Generator	B	Control Box	C	Engine

Ref.	Description	Ref.	Description
1.	Main Stator Winding	7.	Auto Idle
2.	Automatic Voltage Regulator	8.	1 Amp Fuse
3.	Rotor Winding	9.	Auto Idle Switch
4.	Main Stator Winding	10.	120/240V 30A Kit*
5.	Auxiliary Stator Winding	11.	Electromagnet
6.	Choke		

*W/B (Extra wire included in kit. Terminate at 120V 30A receptacle.)

G 3.7A;G/GS 5.6A;GS 8.5V;GS 9.7V Portable Generator Repair

(G 3.7A S/N 718901706 and lower)
 (G 5.6A S/N 719101532 and lower)
 (GS 5.6A S/N 719101172 and lower)

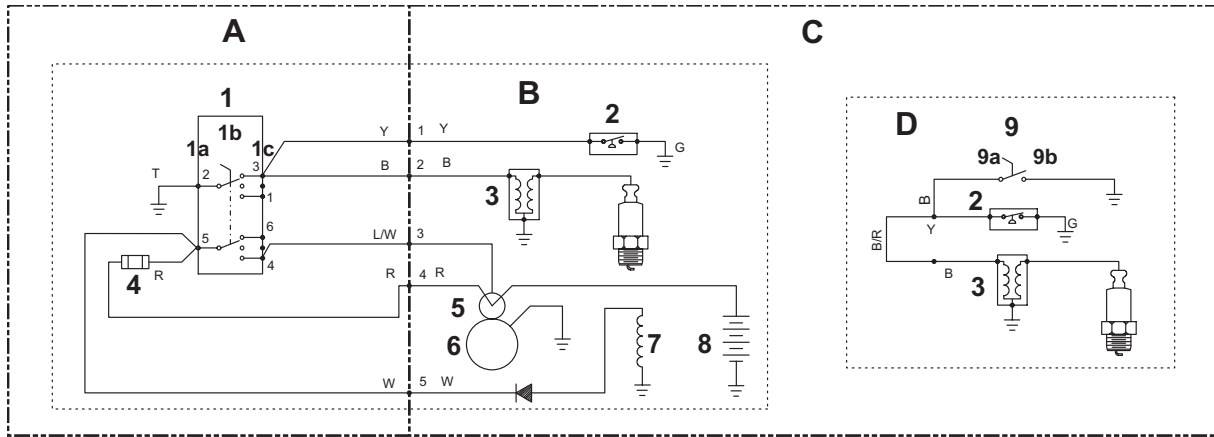


Ref.	Description	Ref.	Description	Ref.	Description
A	Generator	B	Control Box	C	Engine

Ref.	Description	Ref.	Description
1.	Main Stator Winding	7.	Auto Idle
2.	Automatic Voltage Regulator	8.	1 Amp Fuse
3.	Rotor Winding	9.	Auto Idle Switch
4.	Main Stator Winding	10.	120/240V 30A Kit*
5.	Auxiliary Stator Winding	11.	Electromagnet
6.	Choke		

*W/B (Extra wire included in kit. Terminate at 120V 30A receptacle.)

6.33 Engine Wiring Schematic (G 3.7A, G 5.6A, and GS 5.6A Models)



wc_gr000557

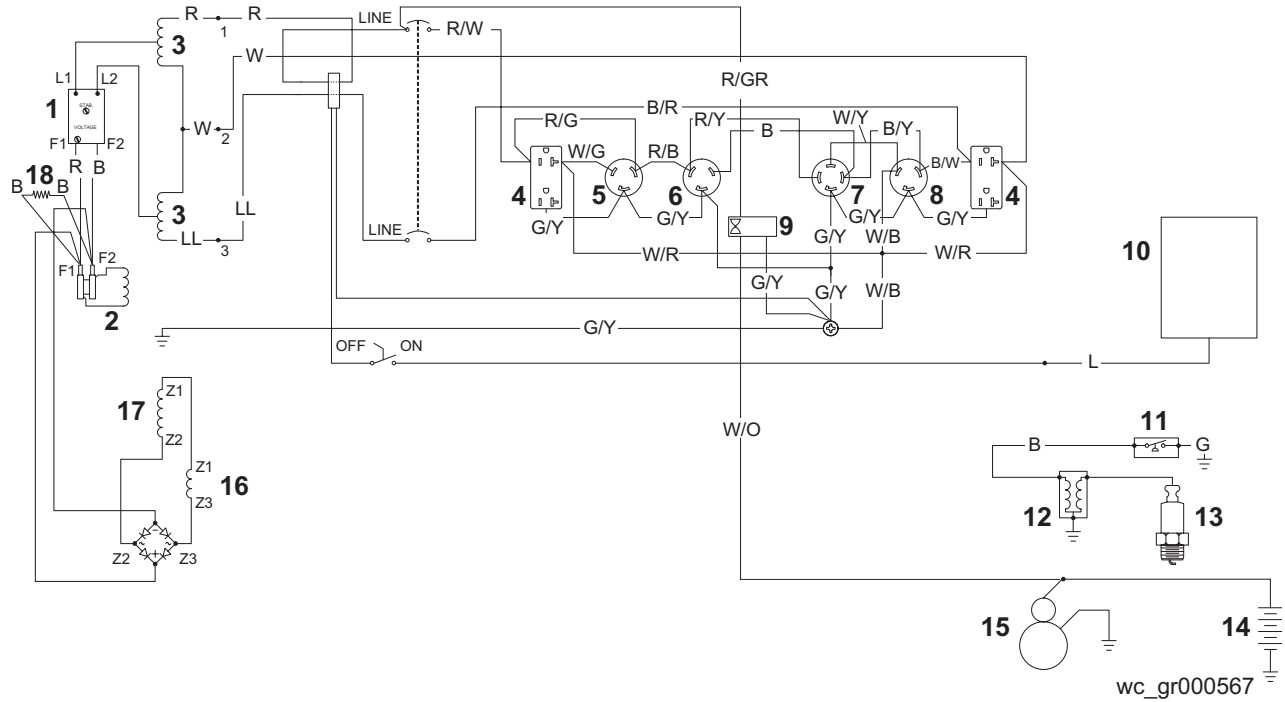
Ref.	Description	Ref.	Description
A	Control Box	C	Engine
B	Electric Start Engines	D	Manual Start Engines

Ref.	Description	Ref.	Description
1.	Engine Crank Switch	5.	Solenoid
1a.	OFF	6.	Starter
1b.	RUN	7.	Charging Coil
1c.	START	8.	Battery
2.	Oil Level Switch	9.	Ignition Switch
3.	Coil	9a.	ON
4.	15 Amp Fuse	9b.	OFF

Wire Colors							
B	Black	R	Red	Y	Yellow	Or	Orange
G	Green	T	Tan	Br	Brown	Pr	Purple
L	Blue	V	Violet	Cl	Clear	Sh	Shield
P	Pink	W	White	Gr	Gray	LL	Light Blue

6.34 Generator Wiring Schematic (GS 8.5V and GS 9.7V Models)

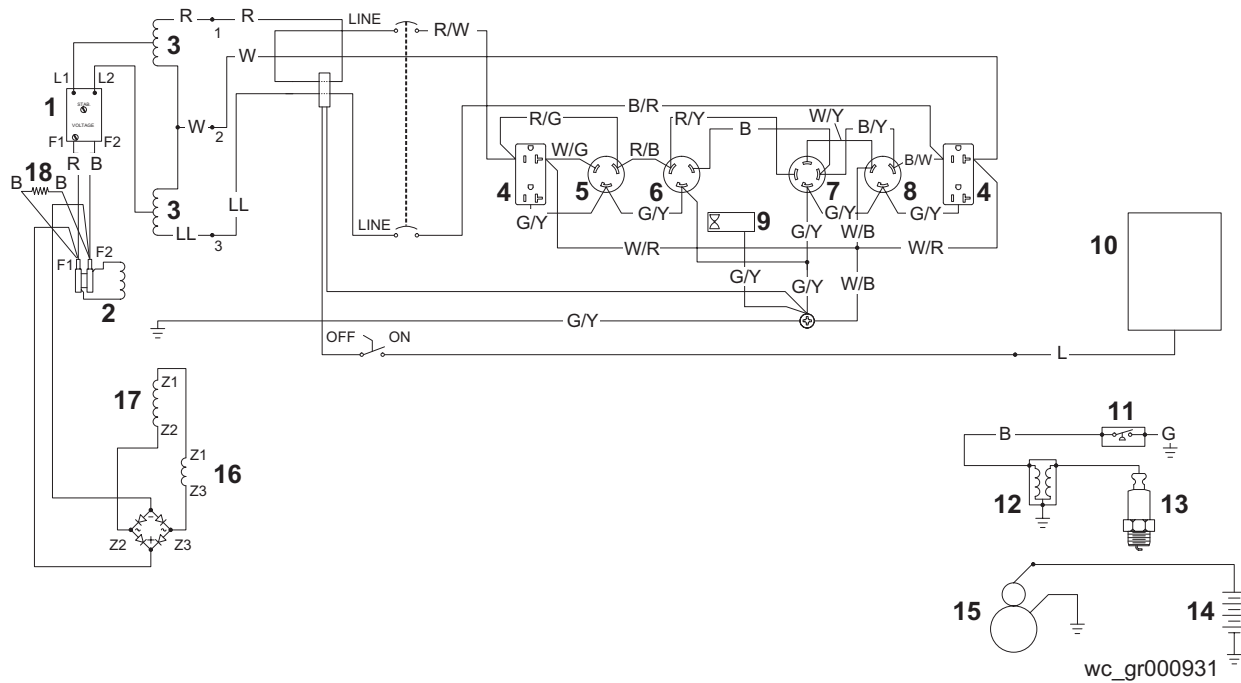
GS 8.5V and GS 9.7V, Rev. 103 and above



Ref.	Description	Ref.	Description
1.	Automatic voltage regulator	10.	Engine module
2.	Rotor winding	11.	Oil level switch
3.	Main stator winding	12.	Coil
4.	120V, 20A GFI receptacle	13.	Spark plug
5.	120V, 30A twist-lock receptacle	14.	Battery
6.	240V, 20A receptacle	15.	Starter
7.	120V/240V, 30A receptacle	16.	Choke
8.	120V, 20A twist-lock receptacle	17.	Auxiliary stator winding
9.	Hour meter	18.	Resistor 390 Ohms 50W (GS 9.7 only)

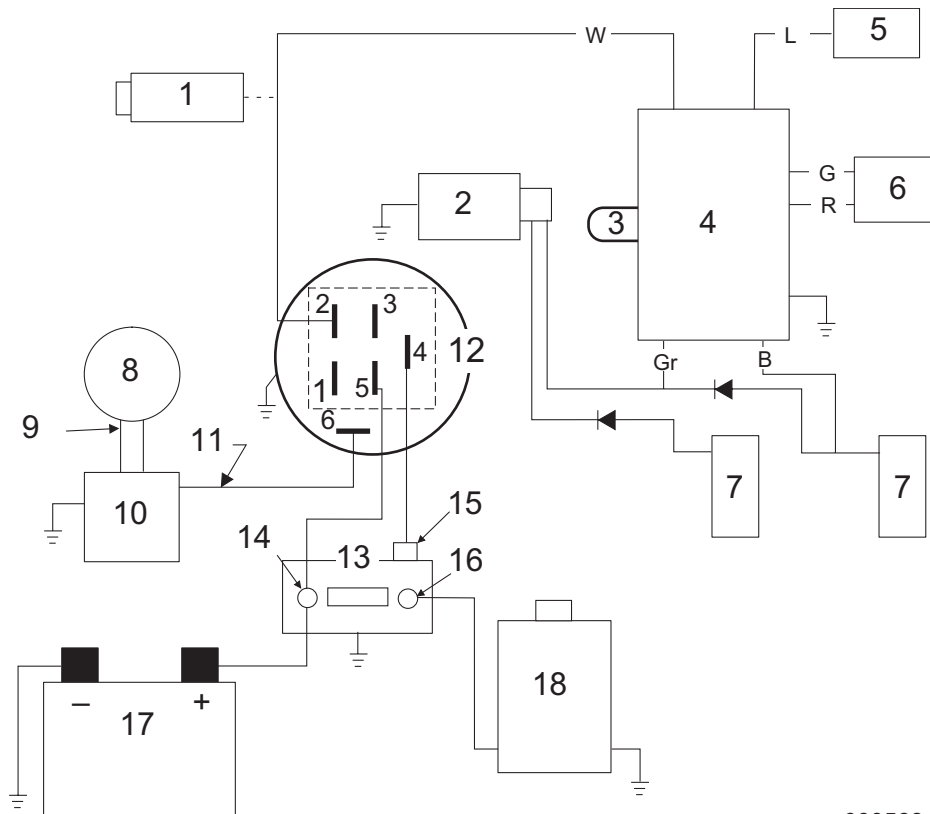
G 3.7A;G/GS 5.6A;GS 8.5V;GS 9.7V Portable Generator Repair

GS 8.5V and GS 9.7V, Rev. 102 and below



Ref.	Description	Ref.	Description
1.	Automatic voltage regulator	10.	Engine module
2.	Rotor winding	11.	Oil level switch
3.	Main stator winding	12.	Coil
4.	120V, 20A GFI receptacle	13.	Spark plug
5.	120V, 30A twist-lock receptacle	14.	Battery
6.	240V, 20A receptacle	15.	Starter
7.	120V/240V, 30A receptacle	16.	Choke
8.	120V, 20A twist-lock receptacle	17.	Auxiliary stator winding
9.	Hour meter	18.	Resistor 390 Ohms 50W (GS 9.7 only)

6.35 Vanguard Engine Wiring Schematic (GS 8.5V and GS 9.7V Models)



wc_gr000568

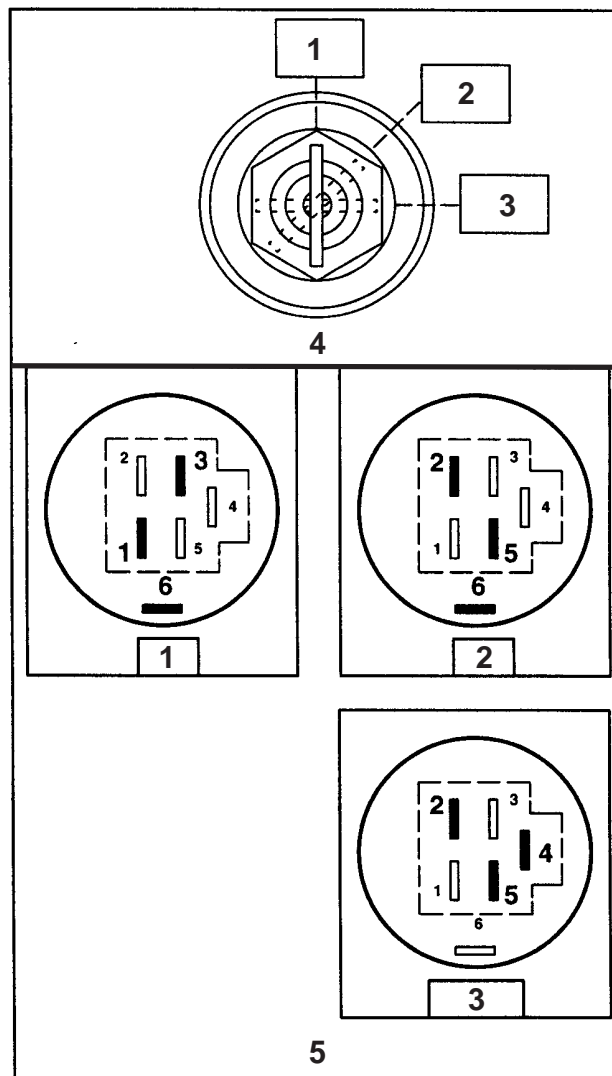
Ref.	Description	Ref.	Description
1.	Carburetor solenoid	10.	Regulator rectifier
2.	Stop switch terminal	11.	DC output wire
3.	50 Hz. loop (GS 8.5=yellow, GS 9.7=red)	12.	Key switch
4.	Module	13.	Solenoid
5.	Idle down device	14.	Battery terminal
6.	Actuator	15.	Solenoid tab terminal
7.	Ignition coils	16.	Starter terminal
8.	Alternator	17.	Battery
9.	AC output wires	18.	Starter motor

6.36 Vanguard Key Switch

See Graphic: wc_gr000953

Ref.	Switch Position	Continuity
1.	Off	1 + 3 + 6
2.	Run	2 + 5 + 6
3.	Start	2 + 4 + 5
4.	Key Switch Positions	N/A
5.	Terminal Positions	N/A

Note: Terminal 1 grounded internally to switch case. Meter must also indicate continuity between terminal 1 and switch case.



wc_gr000953

6.37 Storing

Before storing generator for a long period of time:

- 6.37.1 Close the fuel valve and remove and empty sediment cup under carburetor.
- 6.37.2 Disconnect the fuel line from the carburetor. Place open end of fuel line into a suitable container and open fuel valve to drain fuel from tank.



WARNING

Gasoline is extremely flammable. Drain fuel tank in a well ventilated area. DO NOT drain tank in an area with flames or sparks.

- 6.37.3 Loosen the drain screw on the carburetor and drain any remaining fuel from carburetor.
- 6.37.4 Change the engine oil.
- 6.37.5 Remove the spark plug and pour approximately 30 ml (1 ounce) of clean engine oil into the cylinder. Crank the engine a few turns to distribute the oil to the inside of the cylinder walls.
- 6.37.6 Pull the starter rope slowly until resistance is felt and leave handle in this position. This ensures that the intake and exhaust valves are closed.
- 6.37.7 Store generator in a clean, dry area.

6.38 Transporting



WARNING

Let the engine cool before transporting the generator or storing indoors, to avoid burns or fire hazards.

When transporting the generator:

- 6.38.1 Turn the engine fuel valve to the OFF position.
- 6.38.2 Position the generator level to prevent fuel from spilling.
- 6.38.3 Secure the generator by tying it down with a suitable rope.

Threadlockers and Sealants

Threadlockers and Sealants

Threadlocking adhesives and sealants are specified throughout this manual by a notation of "S" plus a number (S#) and should be used where indicated. Threadlocking compounds normally break down at temperatures above 175°C (350°F). If a screw or bolt is hard to remove, heat it using a small propane torch to break down the sealant. When applying sealants, follow instructions on container. The sealants listed below are recommended for use on Wacker equipment.

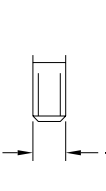
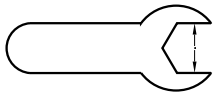

TYPE () = Europe	COLOR	USAGE	PART NO. - SIZE
Loctite 222 Hernon 420 Omnifit 1150 (50M)	Purple	Low strength, for locking threads smaller than 6 mm (1/4"). Hand tool removable. Temp. range, -54 to 149 ° C (-65 to 300 ° F)	73287 - 10 ml
Hernon 423 Omnifit 1350 (100M)	Blue	Medium strength, for locking threads larger than 6 mm (1/4"). Hand tool removable. Temp. range, -54 to 149 ° C (-65 to 300 ° F)	29311 - .5 ml 17380 - 50 ml
Loctite 271/277 Hernon 427 Omnifit 1550 (220M)	Red	High strength, for all threads up to 25 mm (1"). Heat parts before disassembly. Temp. range, -54 to 149 ° C (-65 to 300 ° F)	29312 - .5 ml 26685 - 10 ml 73285 - 50 ml
Loctite 290 Hernon 431 Omnifit 1710 (230LL)	Green	Medium to high strength, for locking preassembled threads and for sealing weld porosity (wicking). Gaps up to 0.13 mm (0.005") Temp. range, -54 to 149 ° C (-65 to 300 ° F)	28824 - .5 ml 25316 - 10 ml
Loctite 609 Hernon 822 Omnifit 1730 (230L)	Green	Medium strength retaining compound for slip or press fit of shafts, bearings, gears, pulleys, etc. Gaps up to 0.13 mm (0.005") Temp. range, -54 to 149 ° C (-65 to 300 ° F)	29314 - .5 ml
Loctite 545 Hernon 947 Omnifit 1150 (50M)	Brown	Hydraulic sealant Temp. range, -54 to 149 ° C (-65 to 300 ° F)	79356 - 50 ml
Loctite 592 Hernon 920 Omnifit 790	White	Pipe sealant with Teflon for moderate pressures. Temp. range, -54 to 149 ° C (-65 to 300 ° F)	26695 - 6 ml 73289 - 50 ml
Loctite 515 Hernon 910 Omnifit 10	Purple	Form-in-place gasket for flexible joints. Fills gaps up to 1.3 mm (0.05") Temp. range, -54 to 149 ° C (-65 to 300 ° F)	70735 - 50 ml
Loctite 496 Hernon 110 Omnifit Sicomet 7000	Clear	Instant adhesive for bonding rubber, metal and plastics; general purpose. For gaps up to 0.15 mm (0.006") Read caution instructions before using. Temp. range, -54 to 82 ° C (-65 to 180 ° F)	52676 - 1 oz.

Threadlockers and Sealants

TYPE () = Europe	COLOR	USAGE	PART NO. - SIZE
Loctite Primer T Heron Primer 10 Omnifit VC Activator	Aerosol Spray	Fast curing primer for threadlocking, retaining and sealing compounds. Must be used with stainless steel hardware. Recommended for use with gasket sealants.	2006124 - 6 oz.

Torque Values

Metric Fasteners (DIN)

	TORQUE VALUES (Based on Bolt Size and Hardness)						WRENCH SIZE			
	8.8		10.9		12.9					
Size	ft.lb.	Nm	ft.lb.	Nm	ft.lb.	Nm	Inch	Metric	Inch	Metric
M3	*11	1.2	*14	1.6	*19	2.1	7/32	5.5	-	2.5
M4	*26	2.9	*36	4.1	*43	4.9	9/32	7	-	3
M5	*53	6.0	6	8.5	7	10	5/16	8	-	4
M6	7	10	10	14	13	17	-	10	-	5
M8	18	25	26	35	30	41	1/2	13	-	6
M10	36	49	51	69	61	83	11/16	17	-	8
M12	63	86	88	120	107	145	3/4	19	-	10
M14	99	135	140	190	169	230	7/8	22	-	12
M16	155	210	217	295	262	355	15/16	24	-	14
M18	214	290	298	405	357	485	1-1/16	27	-	14
M20	302	410	427	580	508	690	1-1/4	30	-	17

1 ft.lb. = 1.357 Nm.

* = in.lb.

1 Inch = 25.4 mm

Torque Values

Inch Fasteners (SAE)

Size	SAE 5		SAE 8		SAE 1929		SAE 1931		SAE 1932	
	ft.lb.	Nm	ft.lb.	Nm	ft.lb.	Nm	Inch	Metric	Inch	Metric
No.4	*6	0.7	*14	1.0	*12	1.4	1/4	5.5	3/32	-
No.6	*12	1.4	*17	1.9	*21	2.4	5/16	8	7/64	-
No.8	*22	2.5	*31	3.5	*42	4.7	11/32	9	9/64	-
No.10	*32	3.6	*45	5.1	*60	6.8	3/8	-	5/32	-
1/4	6	8.1	9	12	12	16	7/16	-	3/32	-
5/16	13	18	19	26	24	33	1/2	13	1/4	-
3/8	23	31	33	45	43	58	9/16	-	5/16	-
7/16	37	50	52	71	69	94	5/8	16	3/8	-
1/2	57	77	80	109	105	142	3/4	19	3/8	-
9/16	82	111	115	156	158	214	13/16	-	-	-
5/8	112	152	159	216	195	265	15/16	24	1/2	-
3/4	200	271	282	383	353	479	1-1/8	-	5/8	-

1 ft.lb. = 1.357 Nm.

* = in.lb.

1 Inch = 25.4 mm

