



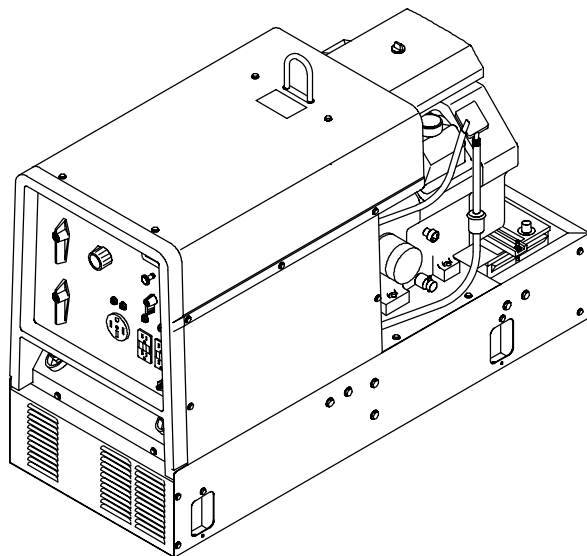
June 1996

Form: TM-175 104

Effective With Serial No. KG061736

# TECHNICAL MANUAL

## Service And Parts



### Bobcat™ 225G *plus* (Kohler-Powered)

CC/CV AC/DC Welding Generator For SMAW, FCAW, GMAW, GTAW Welding

Welding Mode	Weld Output Range	Rated Welding Output	Maximum Open-Circuit Voltage	Auxiliary Power Rating	Fuel Capacity	Engine
CC/AC	50 – 225 A	225 A, 25 V, 100% Duty Cycle	80	Single-Phase, 8 kVA/kW, 70/35 A, 120/240 V AC, 60 Hz	8.5 gal (32 L) Tank	Kohler CH18 Air-Cooled, Two-Cylinder, Four-Cycle, 18 HP Gasoline Engine
CC/DC	50 – 210 A	210 A, 25 V, 100% Duty Cycle	72			
CV/DC	17 – 28 V	200 A, 20 V, 100% Duty Cycle	33			

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## WHO DO I CONTACT FOR HELP?



■ **CALL:**  
Miller Customer Service  
Department at  
414-735-4505



■ **FAX:**  
800-637-2348 (in USA),  
or  
414-735-4136 (outside USA)











■ **WRITE:**  
Miller Electric Mfg. Co.  
P.O. Box 1079  
Appleton, WI 54912 USA

Always provide Model Name and Serial or Style Number








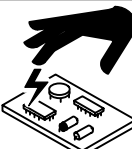


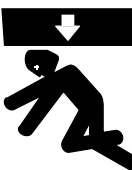
# SECTION 1 – SAFETY PRECAUTIONS FOR SERVICING

safety\_rtm1 4/95

## 1-1. Symbol Usage

	Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.		Marks a special safety message.
			Means NOTE; not safety related.
			
This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.			

## 1-2. Servicing Hazards

<div> <b>WARNING</b></div>			
<p>The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard.</p> <p>Only qualified persons should service, test, maintain, and repair this unit.</p> <p>During servicing, keep everybody, especially children, away.</p>			
	<p><b>ELECTRIC SHOCK can kill.</b></p> <ol style="list-style-type: none"><li>Do not touch live electrical parts.</li><li>Stop engine before testing or repairing unit unless the procedure specifically requires an energized unit.</li><li>Insulate yourself from ground by standing or working on dry insulating mats big enough to prevent contact with the ground.</li><li>Do not leave live unit unattended.</li><li>When testing live unit, use the one-hand method. Do not put both hand inside unit. Keep one hand free.</li></ol>		<p><b>ENGINE FUEL can cause fire or explosion.</b></p> <ol style="list-style-type: none"><li>Stop engine before fueling.</li><li>Do not fuel while smoking or near sparks or flames.</li><li>Do not overfill tank; clean up any spilled fuel.</li></ol>
	<p><b>MOVING PARTS can cause injury.</b></p> <ol style="list-style-type: none"><li>Keep away from moving parts such as fans, belts, and rotors.</li><li>Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.</li><li>Keep hands, hair, loose clothing, and tools away from moving parts.</li><li>Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.</li><li>Block flywheel so that it will not turn while working on generator components.</li><li>Reinstall panels or guards and close doors when servicing is finished and before starting engine.</li></ol>		<p><b>BATTERY EXPLOSION can BLIND and INJURE.</b></p> <ol style="list-style-type: none"><li>Always wear a face shield when working on a battery.</li><li>Stop engine before disconnecting or connecting battery cables.</li><li>Do not allow tools to cause sparks when working on a battery.</li><li>Do not use welder to charge batteries or jump start vehicles.</li><li>Observe correct polarity (+ and -) on batteries.</li></ol>
	<p><b>FLYING PIECES OF METAL or DIRT can cause injury.</b></p> <ol style="list-style-type: none"><li>Always wear safety glasses with side shields or face shield during servicing.</li><li>Be careful not to short metal tools, parts, or wires together during testing and servicing.</li></ol>		<p><b>BATTERY ACID can BURN SKIN.</b></p> <ol style="list-style-type: none"><li>Do not tip.</li><li>Replace damaged battery.</li><li>Flush eyes and skin immediately with water.</li></ol>
	<p><b>STATIC ELECTRICITY can damage parts on circuit boards.</b></p> <ol style="list-style-type: none"><li>Put on grounded wrist strap BEFORE handling boards or parts.</li><li>Use proper static-proof bags to store, move, or ship PC boards.</li></ol>		<p><b>STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.</b></p> <ol style="list-style-type: none"><li>Check coolant level when engine is cold to avoid scalding.</li><li>If the engine is warm and checking is needed, follow steps 3 and 4.</li><li>Wear safety glasses and gloves and put a rag over cap.</li><li>Turn cap slightly and let pressure escape slowly before completely removing cap.</li></ol>
	<p><b>ENGINE EXHAUST GASES can kill.</b></p> <ol style="list-style-type: none"><li>Do not breathe exhaust fumes.</li><li>Use in open, well-ventilated areas, or vent exhaust outside and away from any building air intakes.</li></ol>		<p><b>FALLING EQUIPMENT can cause serious personal injury and equipment damage.</b></p> <ol style="list-style-type: none"><li>Use equipment of adequate capacity to lift components.</li><li>Use a lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.</li><li>Securely attach components to lifting equipment.</li></ol>










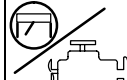

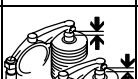












	<b>HOT PARTS can cause severe burns.</b> <ol style="list-style-type: none"> <li>1. Allow cooling period before servicing.</li> <li>2. Wear protective gloves and clothing when working on a hot engine.</li> </ol>		<b>HIGH-FREQUENCY RADIATION can interfere with radio navigation, safety services, computers, and communications equipment.</b> <ol style="list-style-type: none"> <li>1. Have only qualified persons familiar with electronic equipment perform this installation.</li> <li>2. The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.</li> <li>3. If notified by the FCC about interference, stop using the equipment at once.</li> <li>4. Have the installation regularly checked and maintained.</li> <li>5. Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.</li> </ol>
	<b>ELECTRIC SHOCK HAZARD from incorrect use of test equipment.</b> <ol style="list-style-type: none"> <li>1. Stop engine before making or changing meter lead connections.</li> <li>2. At least one meter lead should be a self-retaining spring clip such as an alligator clamp.</li> <li>3. Read instructions for test equipment.</li> </ol>		
	<b>MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.</b> <ol style="list-style-type: none"> <li>1. Pacemaker wearers keep away from servicing areas until consulting your doctor.</li> </ol>		
	<b>UNCONTROLLED TILTING OR TIPPING OF UNIT can result in personal injury and equipment damage.</b> <ol style="list-style-type: none"> <li>1. Do not put any body part under unit while lifting.</li> <li>2. Use adequate blocks to support components as needed during job.</li> </ol> <b>PINCH POINTS can injure.</b> <ol style="list-style-type: none"> <li>1. Be careful when working on stator and rotor assemblies.</li> </ol>		<b>READ INSTRUCTIONS.</b> <ol style="list-style-type: none"> <li>1. Use MILLER Testing Booklet (Part No. 150 853) when servicing this unit.</li> <li>2. Consult the Owner's Manual for welding safety precautions.</li> <li>3. Use only genuine MILLER replacement parts.</li> <li>4. Reinstall injectors and bleed air from fuel system according to engine manual.</li> </ol>

### 1-3. EMF Information

<p>Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields</p> <p>The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, <i>Biological Effects of Power Frequency Electric &amp; Magnetic Fields – Background Paper</i>, OTA-BP-E-53 (Washington, DC: U.S. Government Printing Office, May 1989): "... there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields can interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."</p>	<p>To reduce magnetic fields in the workplace, use the following procedures:</p> <ol style="list-style-type: none"> <li>1. Keep cables close together by twisting or taping them.</li> <li>2. Arrange cables to one side and away from the operator.</li> <li>3. Do not coil or drape cables around the body.</li> <li>4. Keep welding power source and cables as far away as practical.</li> <li>5. Connect work clamp to workpiece as close to the weld as possible.</li> </ol> <p><b>About Pacemakers:</b></p> <p>The above procedures are also recommended for pacemaker wearers. Consult your doctor for complete information.</p>
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## SECTION 2 – DEFINITIONS

### 2-1. Symbol Definitions

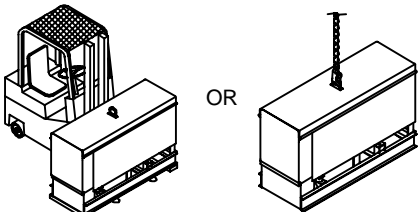
	Stop Engine		Fast (Run, Weld/Power)		Fast/Slow (Run/Idle)		Slow (Idle)
	Start Engine		Read Operator's Manual	<b>A</b>	Amperes	<b>V</b>	Volts
	Engine Oil		Fuel		Battery (Engine)		Engine
	Engine Choke		Check Valve Clearance		Do not switch while welding		Work Connection
<b>+</b>	Positive	<b>—</b>	Negative		Alternating Current (AC)		Output
	Welding Arc (Electrode)		Gas Metal Arc Welding (GMAW), Wire		Shielded Metal Arc Welding (SMAW), Stick		Gas Tungsten Arc Welding (TIG)
<b>h</b>	Hours	<b>s</b>	Seconds		Time		Protective Earth (Ground)
			Temperature		Circuit Breaker		

# SECTION 3 – INSTALLATION

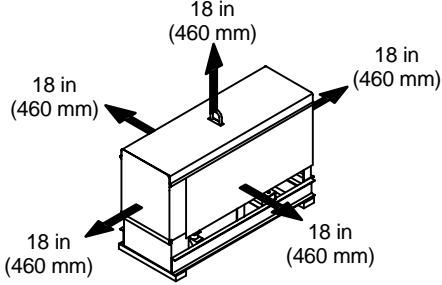
## 3-1. Installing Welding Generator



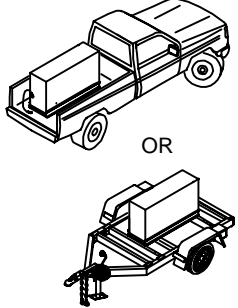
**Movement**



**Airflow Clearance**

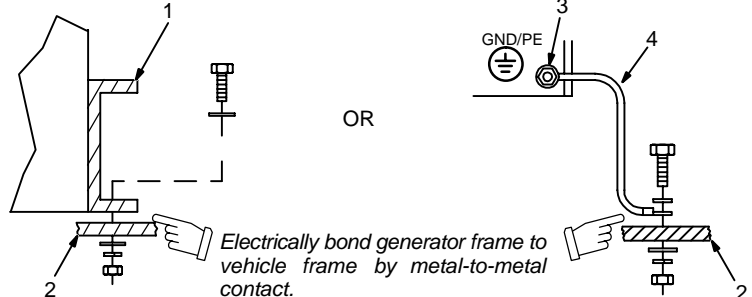


**Location**



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**Grounding**



OR

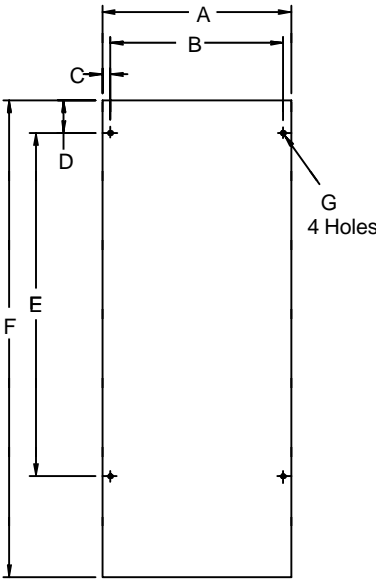
Electrically bond generator frame to vehicle frame by metal-to-metal contact.

- 1 Generator Base
- 2 Metal Vehicle Frame
- 3 Equipment Grounding Terminal
- 4 Grounding Cable

Use #10 AWG or larger insulated copper wire.

install\* 3/96 – Ref. ST-800 652 / Ref. ST-800 477-A / ST-158 936-A / S-0854


## 3-2. Dimensions, Weights, And Operating Angles



Engine End

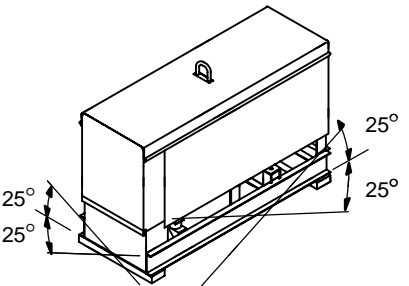
ST-800 426

Dimensions	
Height	31 in (787 mm)
Width	18-3/4 in (476 mm)
Depth	46 in (1164 mm)
A	18 in (457 mm)
B	16-1/2 in (419 mm)
C	3/4 in (19 mm)
D	3-1/8 in (79 mm)
E	32-3/4 in (832 mm)
F	45-1/2 in (1156 mm)
G	13/32 in (10 mm) Dia.



▲ Do not exceed operating angles while running or engine damage will occur.

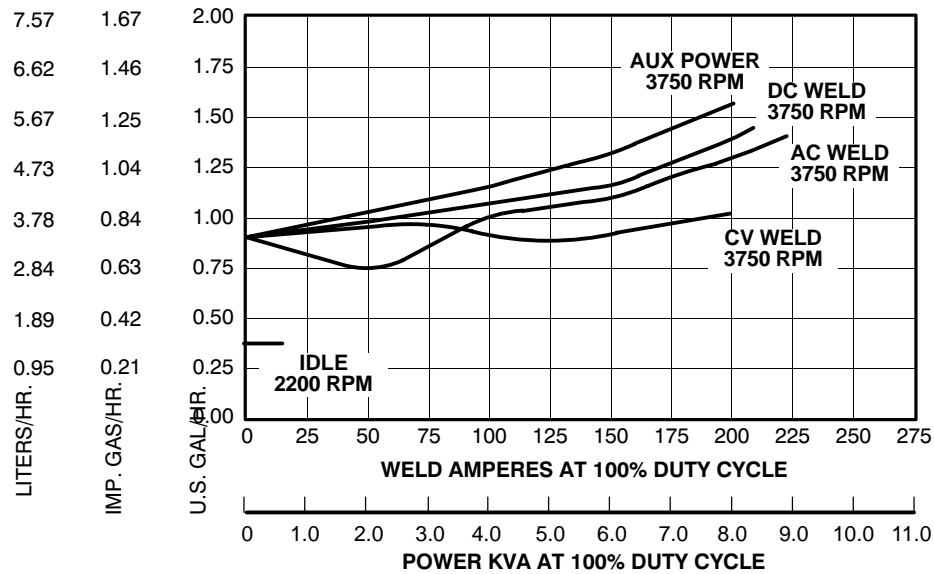
▲ Do not move or operate unit where it could tip.



angles\_1 3/96

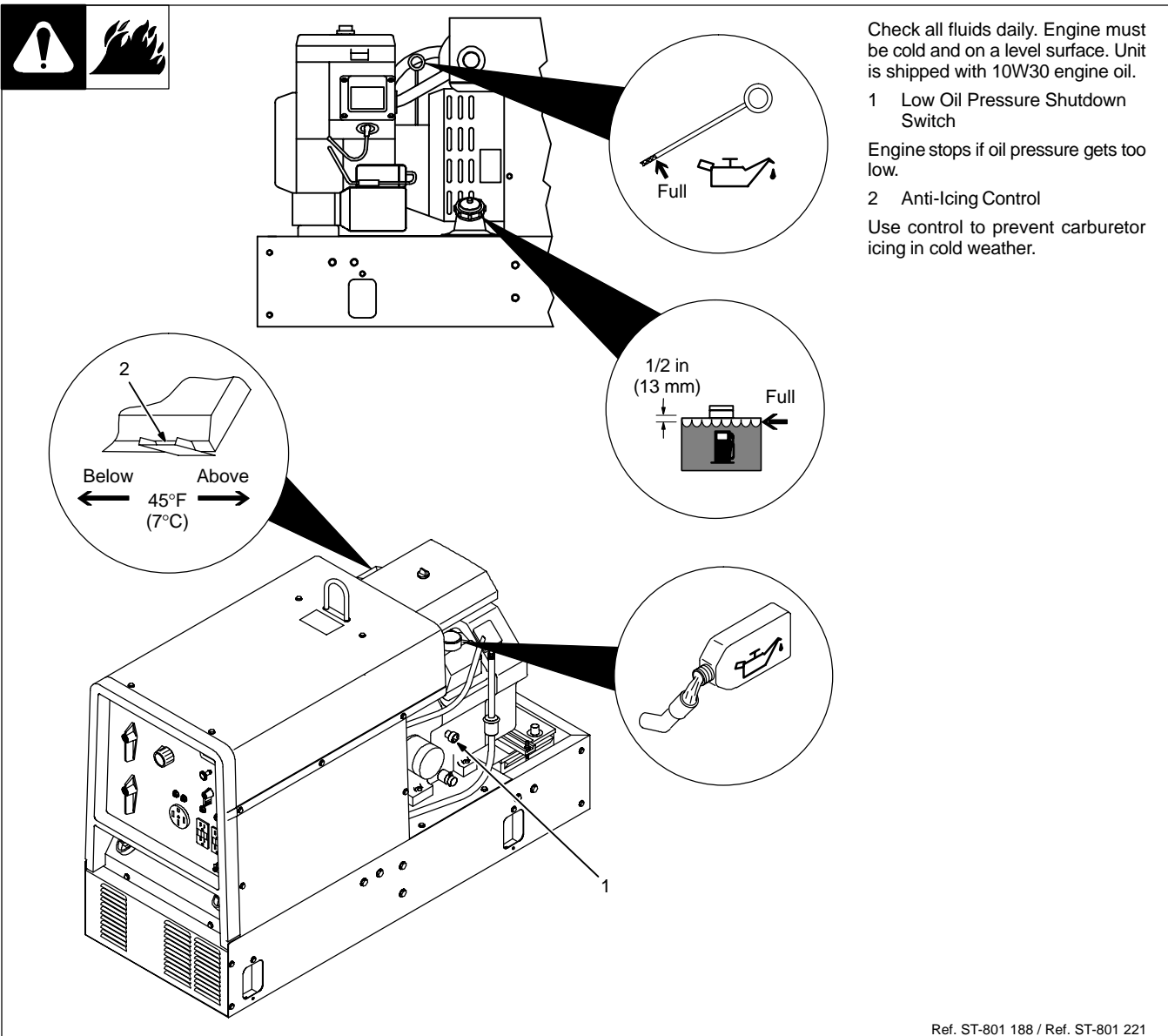
Weight	
Net:	567 lb (258 kg)
Ship:	608 lb (276 kg)

### 3-3. Fuel Consumption



Ref. SB-179 939

### 3-4. Engine Prestart Checks



Ref. ST-801 188 / Ref. ST-801 221

### 3-5. Connecting The Battery

▲ Connect (-) cable last.

Tools Needed:

3/8, 1/2 in

Ref. ST-800 394-B / Ref. ST-178 079-A / Ref. S-0756-D

### 3-6. Weld Output Terminals And Selecting Cable Sizes

▲ **ARC WELDING** can cause **Electromagnetic Interference**.

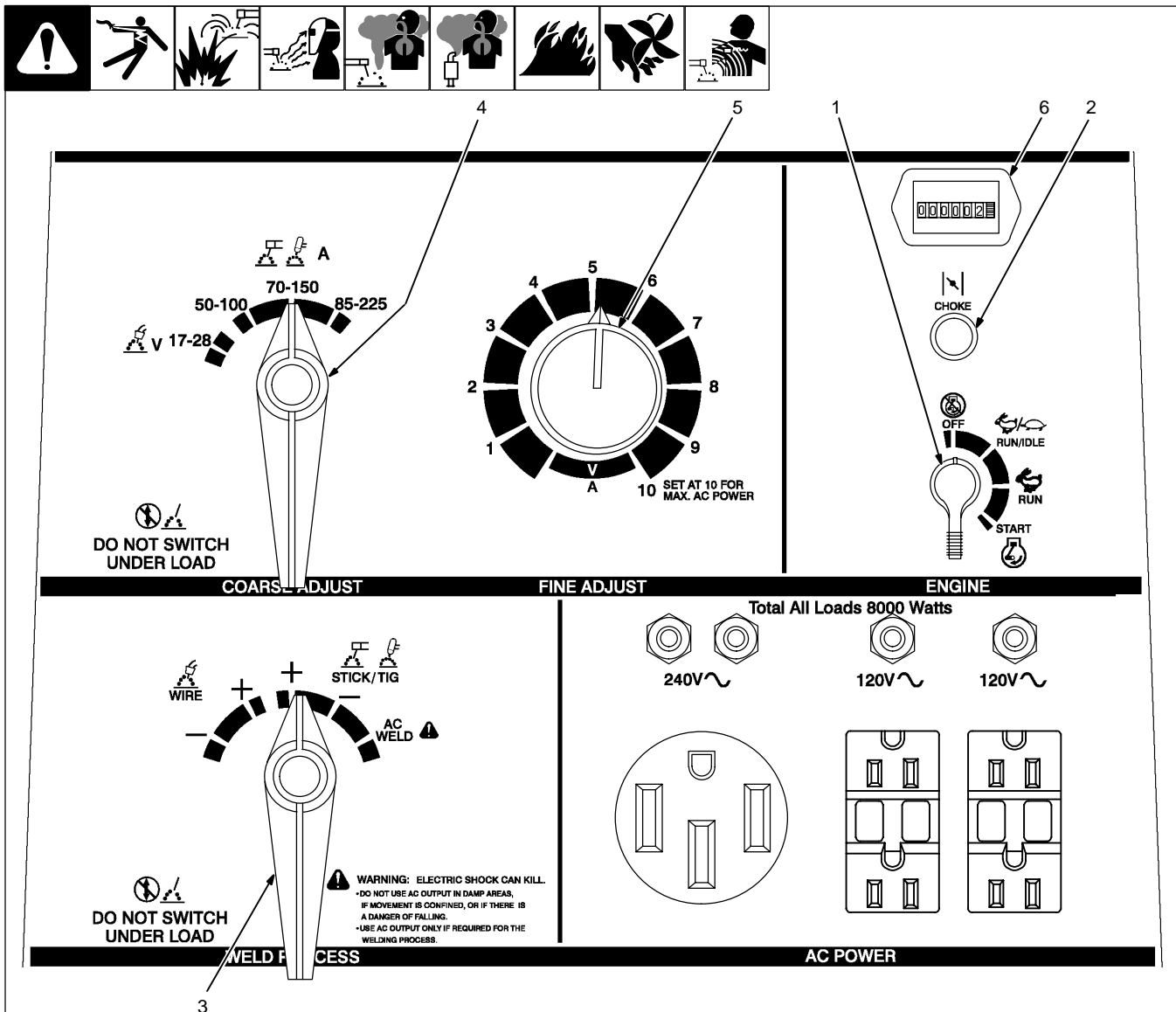
To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor. Locate welding operation 100 meters from any sensitive electronic equipment. Be sure this welding machine is installed and grounded according to this manual. If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

<div style="text-align: center;">   <b>Weld Output Terminals</b> </div>		Total Cable (Copper) Length In Weld Circuit Not Exceeding							
		100 ft (30 m) Or Less		150 ft (45 m)	200 ft (60 m)	250 ft (70 m)	300 ft (90 m)	350 ft (105 m)	400 ft (120 m)
		10 – 60% Duty Cycle	60 – 100% Duty Cycle	10 – 100% Duty Cycle					
 <small>ST-800 396-A</small>	Welding Amperes								
	100	4	4	4	3	2	1	1/0	1/0
	150	3	3	2	1	1/0	2/0	3/0	3/0
	200	3	2	1	1/0	2/0	3/0	4/0	4/0
	250	2	1	1/0	2/0	3/0	4/0	2-2/0	2-2/0
	300	1	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0
	350	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0	2-4/0
Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.									



# SECTION 4 – OPERATING WELDING GENERATOR

## 4-1. Front Panel Controls



Ref. ST-178 079-A

### 1 Engine Control Switch

Use switch to start engine, select speed, and stop engine. In Run/Idle position, engine runs at idle speed at no load, and weld/power speed under load. In Run position, engine runs at weld/power speed.

Place switch in Run position to operate most GMAW equipment.

### 2 Engine Choke Control

Use control to change engine air-fuel mix.

**To Start:** pull out choke and turn Engine Control switch to Start position. Release switch and slowly push choke in when

engine starts. Do not crank engine if engine is still turning. Set anti-icing control (see Section 3-4).

**To Stop:** turn Engine Control switch to Off position.

### 3 Weld Process Selector Switch

Use switch to select type of weld output.

Use a positive (+) position for Direct Current Electrode Positive (DCEP) and a negative (–) position for Direct Current Electrode Negative (DCEN). Use AC position for alternating current.

### 4 Coarse Adjust Switch

Use switch to select weld amperage range when Weld Process Selector switch is in Stick/Tig position, or voltage range when switch is in Wire position.

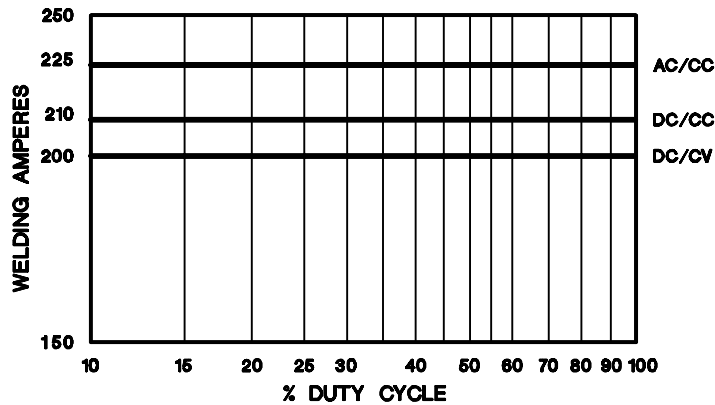
For best arc starts, use lowest amperage range possible.

### 5 Fine Adjust Control

Use control to select weld amperage (Stick/Tig) or voltage (Wire) within the range selected by the Coarse Adjust switch. Control may be adjusted while welding. Weld output would be 110 A DC based on control settings shown (50% of 70 to 150 A).

### 6 Engine Hour Meter

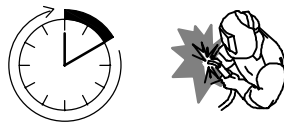
## 4-2. Duty Cycle



Duty cycle is the percentage of 10 minutes that unit can weld at rated load without overheating.

▲ Exceeding duty cycle can damage unit and void warranty.

100% Duty Cycle at 225 Amperes AC, 210 Amperes CC/DC, 200 Amperes CV/DC

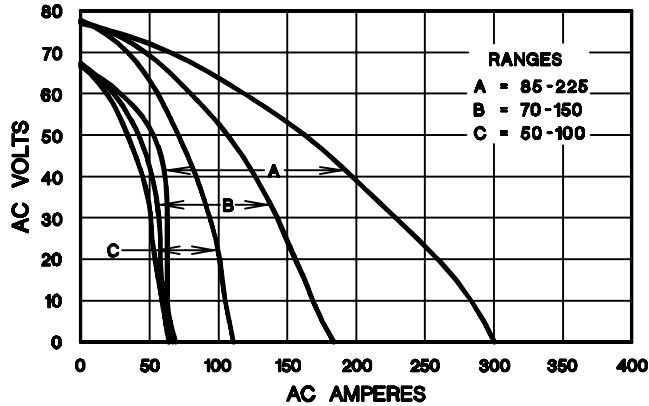


Continuous Welding

SB-119 454-A

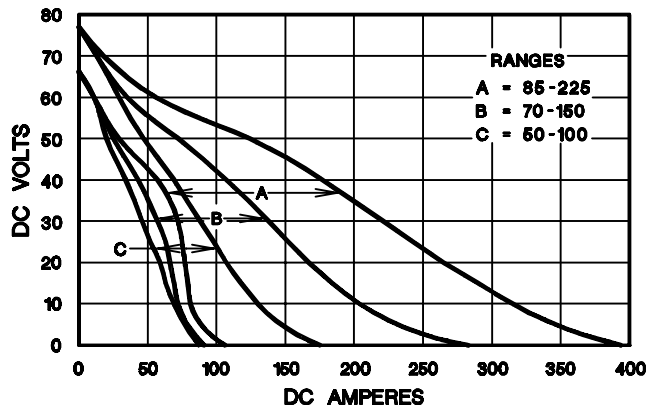
## 4-3. Volt-Ampere Curves

A. For CC/AC Mode

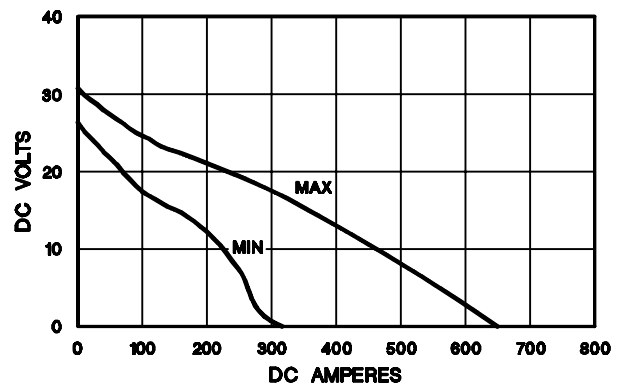


The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welding generator. Curves of other settings fall between the curves shown.

B. For CC/DC Mode



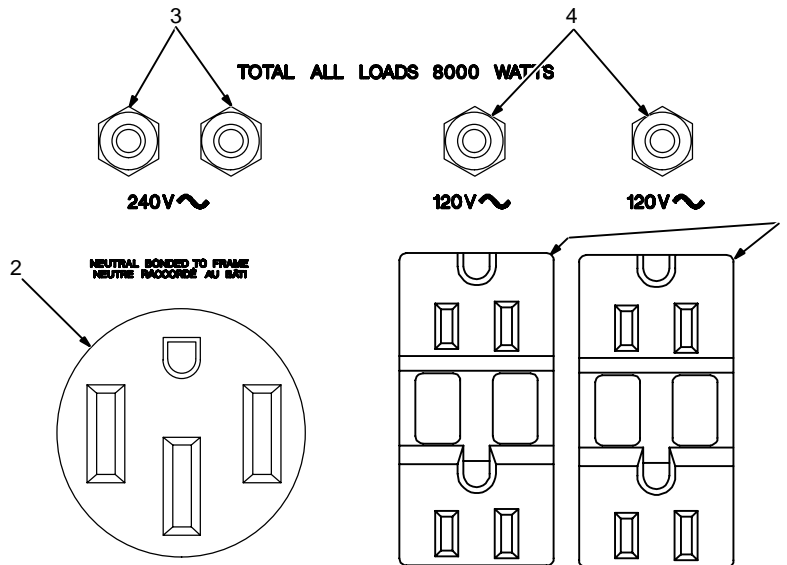
C. For CV/DC Mode



SB-166 024-A / SB-166 025-A / SB-166 026-A

# SECTION 5 – OPERATING AUXILIARY EQUIPMENT

## 5-1. Standard Receptacles



### AC POWER

☞ Auxiliary power decreases as weld current increases.

Set Fine Adjust control R1 at 10 for full auxiliary power.

- 120 V 15 A AC Receptacles GFCI-2 And GFCI-3

GFCI-2 and GFCI-3 supply 60 Hz single-phase power at weld/power speed. Maximum output from each receptacle is 2.4 kVA/kW (CSA: 1.8 kVA/kW).

If a ground fault is detected, Reset button pops out and the circuit opens to disconnect the faulty equipment. Check for faulty tools, cords, etc. connected to the receptacle. Press reset button to resume operation.

☞ At least once a month, run engine at weld/power speed and press Test button to verify GFCI is working properly.

- 240 V 50 A AC Receptacle RC1

RC1 supplies 60 Hz single-phase power at weld/power speed. Maximum output is 8 kVA/kW.

- Circuit Breakers CB1 And CB2

CB1 and CB2 protect RC1 from overload. If CB1 or CB2 opens, RC1 and one of the 120 volt receptacles does not work. 120 volts may still be present at RC1.

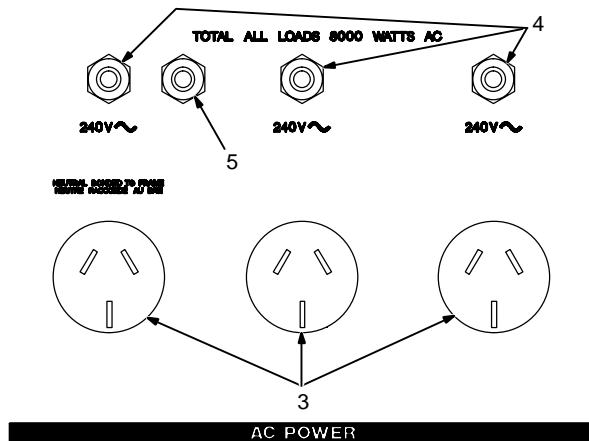
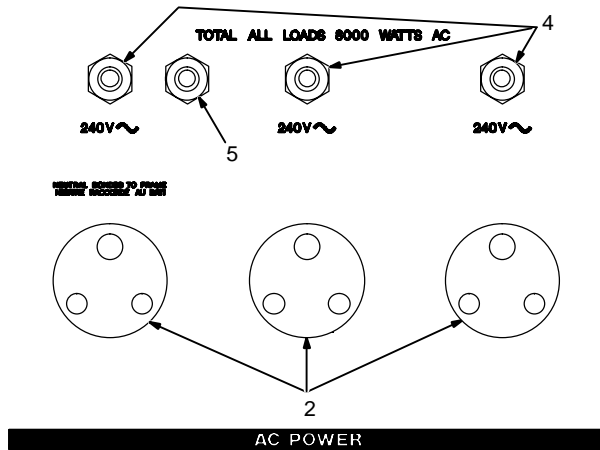
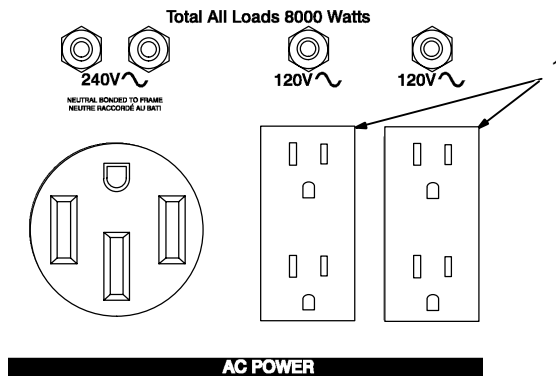
- Circuit Breakers CB3 And CB4

CB3 and CB4 protect GFCI-2 and GFCI-3 from overload. If CB3 or CB4 opens, the receptacle does not work.

Total output of receptacles limited to 8 kVA/kW. Example: If 20 A is drawn from GFCI-2 and GFCI-3, only 13 A is available at RC1:

$$2 \times (120 \text{ V} \times 20 \text{ A}) + (240 \text{ V} \times 13 \text{ A}) = 7.9 \text{ kVA/kW}$$

## 5-2. Optional Auxiliary Power Receptacles



▲ If unit does not have GFCI receptacles, use GFCI-protected extension cord.

☞ Auxiliary power decreases as weld current increases.

Set Fine Adjust control R1 at 10 for full auxiliary power.

Combined output of all receptacles limited to 8 kVA/kW rating of the generator.

### 120 Volt Receptacle Option

- 120 V 15 A AC Receptacles RC2 And RC3

RC2 and RC3 supply 60 Hz single-phase power at weld/power speed. Maximum output from RC2 or RC3 is 2.4 kVA/kW (CSA: 1.8 kVA/kW). Circuit breaker protection is the same as standard receptacles.

### South African And Australian Receptacle Options

- 240 V 16 A AC South African Receptacles RC1, RC2, And RC3
- 240 V 15 A AC Australian Receptacles RC1, RC2, And RC3

Receptacles supply 60 Hz single-phase power at weld/power speed. Maximum output from each receptacle is 3.6 kVA/kW.

- Circuit Breakers CB1, CB2, CB3

CB1, CB2, and CB3 protect RC1, RC2, and RC3 from overload. If a circuit breaker opens, the receptacle does not work. Press button to reset breaker.

- Circuit Breaker CB4

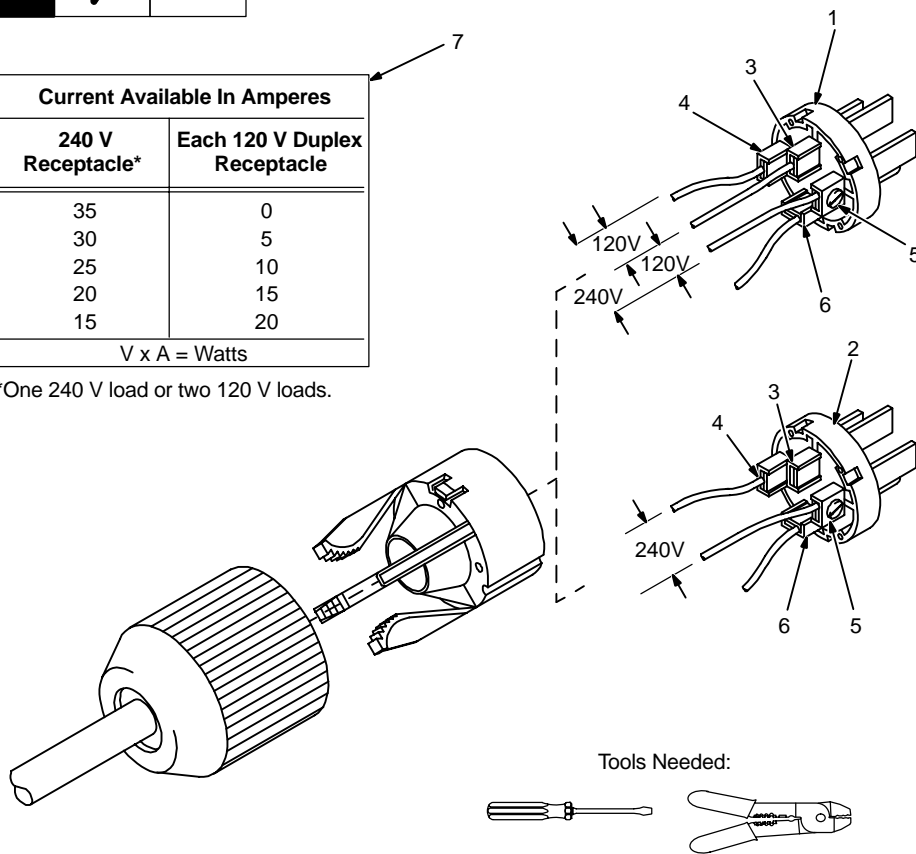
CB4 protects all the receptacles from overload. If CB4 opens, none of the receptacles work.

### 5-3. Wiring Optional 240 Volt Plug

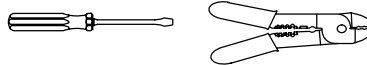


Current Available In Amperes	
240 V Receptacle*	Each 120 V Duplex Receptacle
35	0
30	5
25	10
20	15
15	20
V x A = Watts	

\*One 240 V load or two 120 V loads.



Tools Needed:



The plug can be wired for a 240 V, 2-wire load or a 120/240V, 3-wire load. See circuit diagram.

1 Plug Wired For 120/240 V, 3-Wire Load

When wired for 120 V loads, each duplex receptacle shares a load with one half of 240 V receptacle.

2 Plug Wired For 240 V, 2-Wire Load

3 Neutral (Silver) Terminal

4 Load 1 (Brass) Terminal

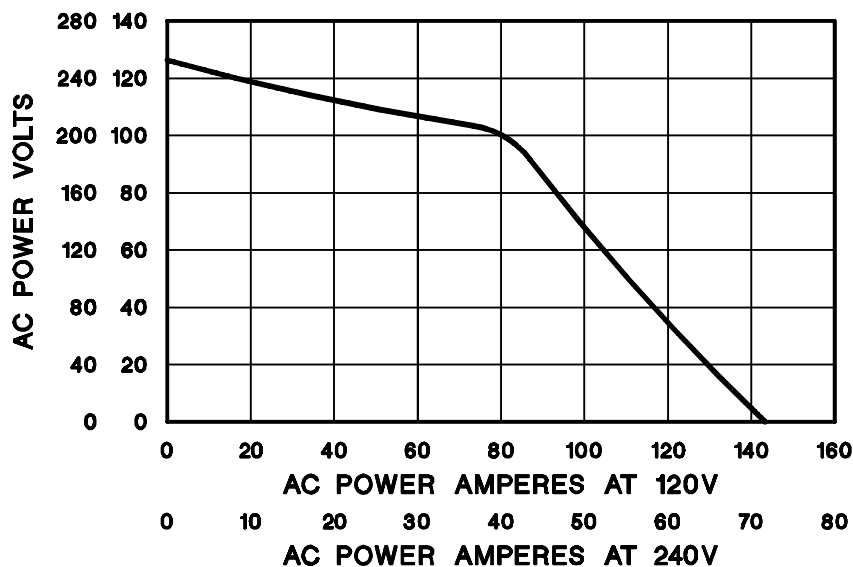
5 Load 2 (Brass) Terminal

6 Ground (Green) Terminal

7 Amperes Available Using 120/240 V Plug

ST-120 813-D

### 5-4. AC Auxiliary Power Curve



The ac power curve shows the auxiliary power in amperes available at the 120 and 240 volt receptacles.

SB-166 023-A

# SECTION 6 – THEORY OF OPERATION

## 1 Engine

Supplies force to turn revolving field.

## 2 Revolving Field

Turns at 3700 rpm maximum for weld and power. The speed and excitation current of the field coils determine voltages in stator windings.

## 3 Stator Windings

Supply power to exciter, auxiliary power, and weld circuits.

## 4 Integrated Rectifier SR2

Changes ac output from stator winding to dc to supply excitation current to revolving field.

## 5 Fine Adjust Control R1, Resistor R2

Changes output of stator weld windings by adjusting field current level in revolving field.

## 6 Current Transformer CT1

Senses output from either auxiliary power or weld windings, and signals PC1 to increase to or maintain weld speed (3700 rpm).

## 7 Idle Module PC1

Controls engine speed. Without a signal from CT1, engine runs at weld/power speed (3700 rpm).

## 8 Throttle Solenoid TS1

Decreases engine speed to 2200 rpm when energized.

## 9 Auxiliary Power Circuit Breakers CB1 Thru CB4

Protect auxiliary power receptacles from overload.

## 10 Auxiliary Power Receptacles RC1, GFCI-2, GFCI-3

Provide connection points and power for auxiliary equipment.

## 11 Reactor AC-Z

Tapped reactor limits weld output and provides coarse ranges.

## 12 Coarse Adjust Switch S3

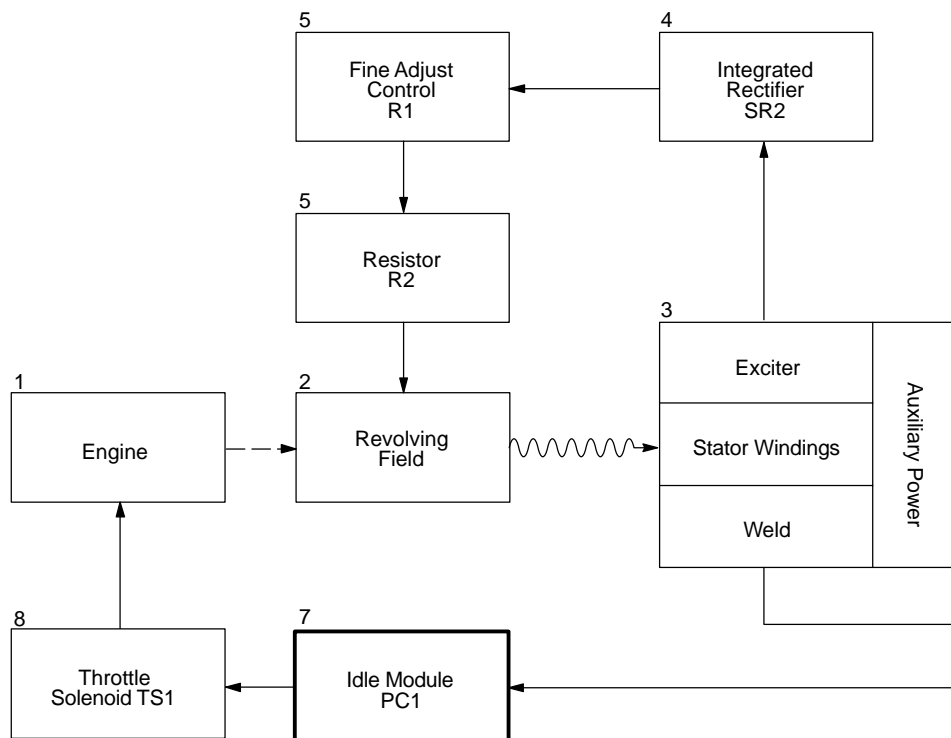
Selects coarse range of weld output from AC-Z.

## 13 Main Rectifier SR1

Changes ac weld current to dc.

## 14 Stabilizer DC-Z

Smooths out dc current to weld output terminals.

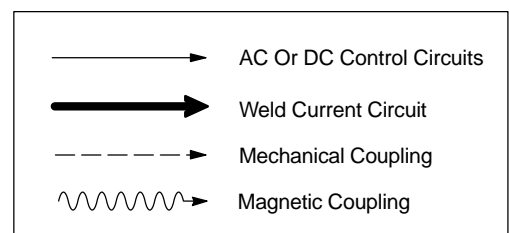
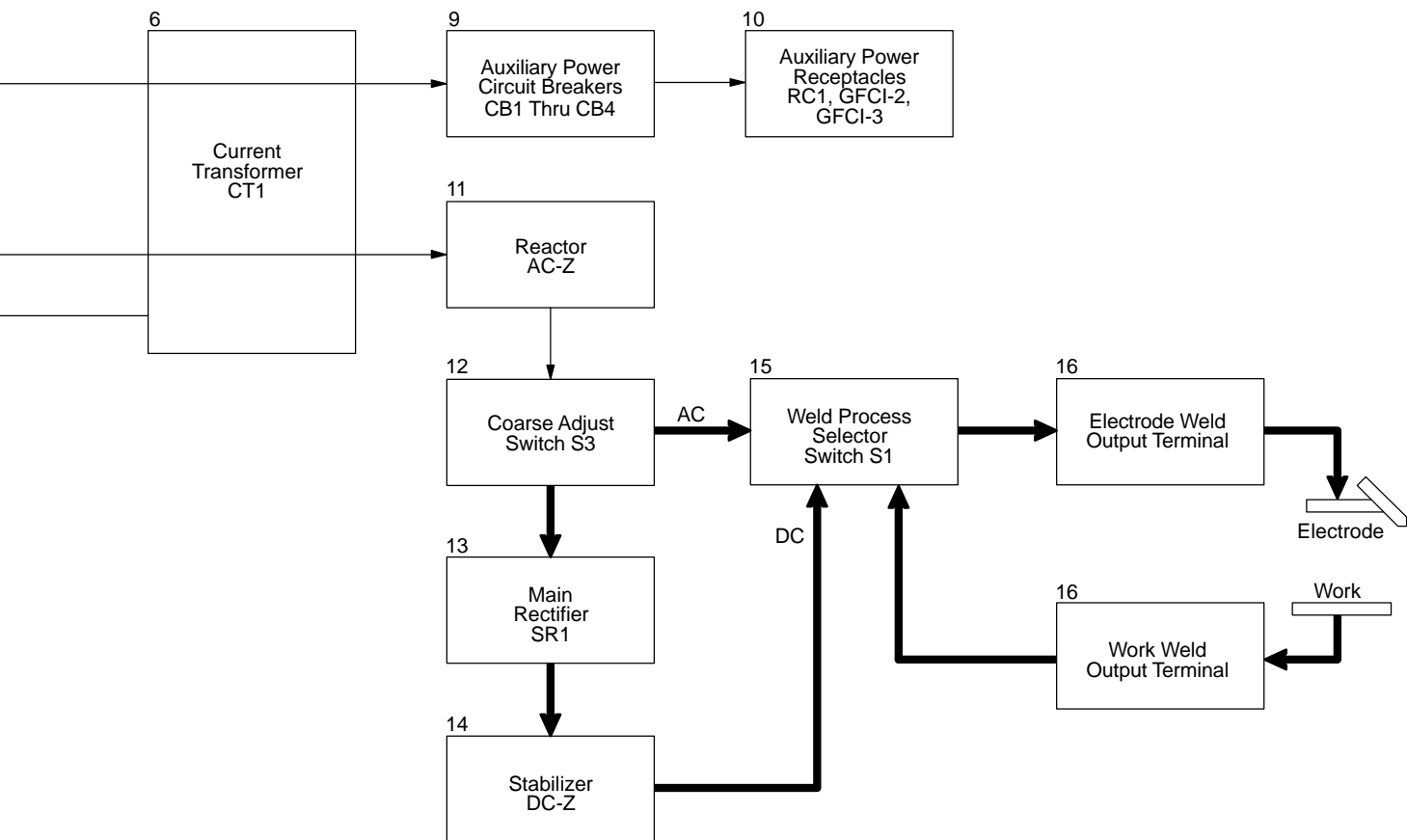


15 Weld Process Selector Switch S1

Selects type and polarity of weld output.

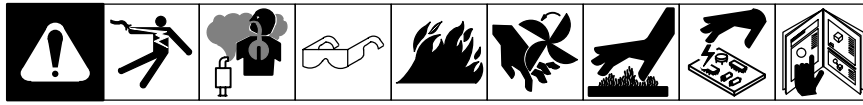
16 Weld Output Terminals

Provide ac or dc weld output.



# SECTION 7 – TROUBLESHOOTING

## 7-1. Troubleshooting Tables



See Section 7-2 for test points and values and Section 11 for parts location.

### A. Welding

Trouble	Remedy
No weld output.	Check control settings.
	Check weld connections.
	Check fuse F1, and replace if open (see Section 9-6).
	Be sure all equipment is disconnected from auxiliary power receptacles when starting unit.
	Check plug PLG6 connection.
	Check resistance and connections of resistor R2; R2 is 6 ohms $\pm 10\%$ . Replace R2 if necessary. Adjust R2 if replaced (see Section 7-7).
	Check diode D4, and replace if necessary.
	Check integrated rectifier SR2, and replace if necessary.
	Disconnect leads 24 and 33 from brushes, and check continuity across slip rings. Replace rotor if necessary.
	Clean slip rings, and install new brushes if necessary (see Section 7-6).
	Check main rectifier SR1, and replace if necessary.
	Check reactor AC-Z for signs of failure. Check continuity across windings, and check for proper connections. Replace AC-Z if necessary.
	Check capacitor C1 for a short or open, and check for proper connections. Replace C1 if necessary.
Low weld output.	Check control settings.
	Increase Fine Adjust control R1 setting.
	Check fuse F1, and replace if open (see Section 9-6).
	Clean air cleaner (see Section 9-3).
	Check and adjust engine speed (see Section 9-5).
	Clean slip rings, and install new brushes if necessary (see Section 7-6).
	Check integrated rectifier SR2, and replace if necessary.
	Check capacitor C1 for a short or open, and check for proper connections. Replace C1 if necessary.
	Check resistance and connections of resistor R2; R2 is 6 ohms $\pm 10\%$ . Replace R2 if necessary. Adjust R2 if replaced (see Section 7-7).
	Check reactor AC-Z for signs of failure. Check continuity across windings, and check for proper connections. Replace AC-Z if necessary.
	Check main rectifier SR1, and replace if necessary.
	Disconnect stator leads 28 and 29 and check for continuity between leads. Replace stator if necessary.
	Disconnect leads 24 and 33 from brushes, and check continuity across slip rings. Replace rotor if necessary.



Trouble	Remedy
High weld output.	Decrease Fine Adjust control R1 setting.
	Check and adjust engine speed (see Section 9-5).
	Check reactor AC-Z for signs of failure. Check continuity across windings, and check for proper connections. Replace AC-Z if necessary.
	Check resistance and connections of suppressor R3, VR1 if high open-circuit voltage is present. R3 is 1000 ohms $\pm 10\%$ . Replace R3, VR1 if necessary.
	Adjust resistor R2 (see Section 7-7).
Erratic weld output.	Check control settings.
	Be sure electrode is dry and proper type for SMAW and GTAW.
	Tighten and/or clean connections to electrode and workpiece.
	Remove excessive coils from weld cables.
	Check internal and external connections to weld output terminals.
	Check leads and connections at Weld Process Selector switch S1, Coarse Adjust switch S3, and Fine Adjust control R1.
	Check integrated rectifier SR2, and replace if necessary.
	Clean slip rings, and install new brushes if necessary (see Section 7-6).
	Check main rectifier SR1, and replace if necessary.
	Check stabilizer DC-Z for signs of failure. Check continuity across windings, and check for proper connections. Replace DC-Z if necessary.
	Check reactor AC-Z for signs of failure. Check continuity across windings, and check for proper connections. Replace AC-Z if necessary.

## B. Auxiliary Power

Trouble	Remedy
No auxiliary power output.	Reset circuit breakers CB1, CB2, CB3, or CB4 (see Section 5-1).
	Press GFCI receptacle reset button (see Section 5-1).
	Check fuse F1, and replace if open (see Section 9-6).
	Check plug PLG6 connection.
	Check resistance and connections of resistor R2; R2 is 6 ohms $\pm 10\%$ . Replace R2 if necessary. Adjust R2 if replaced (see Section 7-7).
	Check diode D4, and replace if necessary.
	Check integrated rectifier SR2, and replace if necessary.
	Clean slip rings, and install new brushes if necessary (see Section 7-6).
	Check capacitor C1 for a short or open, and check for proper connections. Replace C1 if necessary.
	Disconnect leads 24 and 33 from brushes, and check continuity across slip rings. Replace rotor if necessary.
	Disconnect stator leads 28 and 29 and check for continuity between leads. Replace stator if necessary.
	Disconnect power leads 51 and 53 and check for continuity between leads. Replace stator if necessary.

<b>Trouble</b>	<b>Remedy</b>
Low or high power output.	Increase Fine Adjust control R1 setting if low power output.
	Check and adjust engine speed (see Section 9-5).
	Check resistance and connections of resistor R2; R2 is 6 ohms $\pm 10\%$ . Replace R2 if necessary. Adjust R2 if replaced (see Section 7-7).
Erratic power output.	Check fuel level (see Section 3-4).
	Check receptacle wiring and connections.
	Clean slip rings, and install new brushes if necessary (see Section 7-6).
	Check governor according to engine manual.

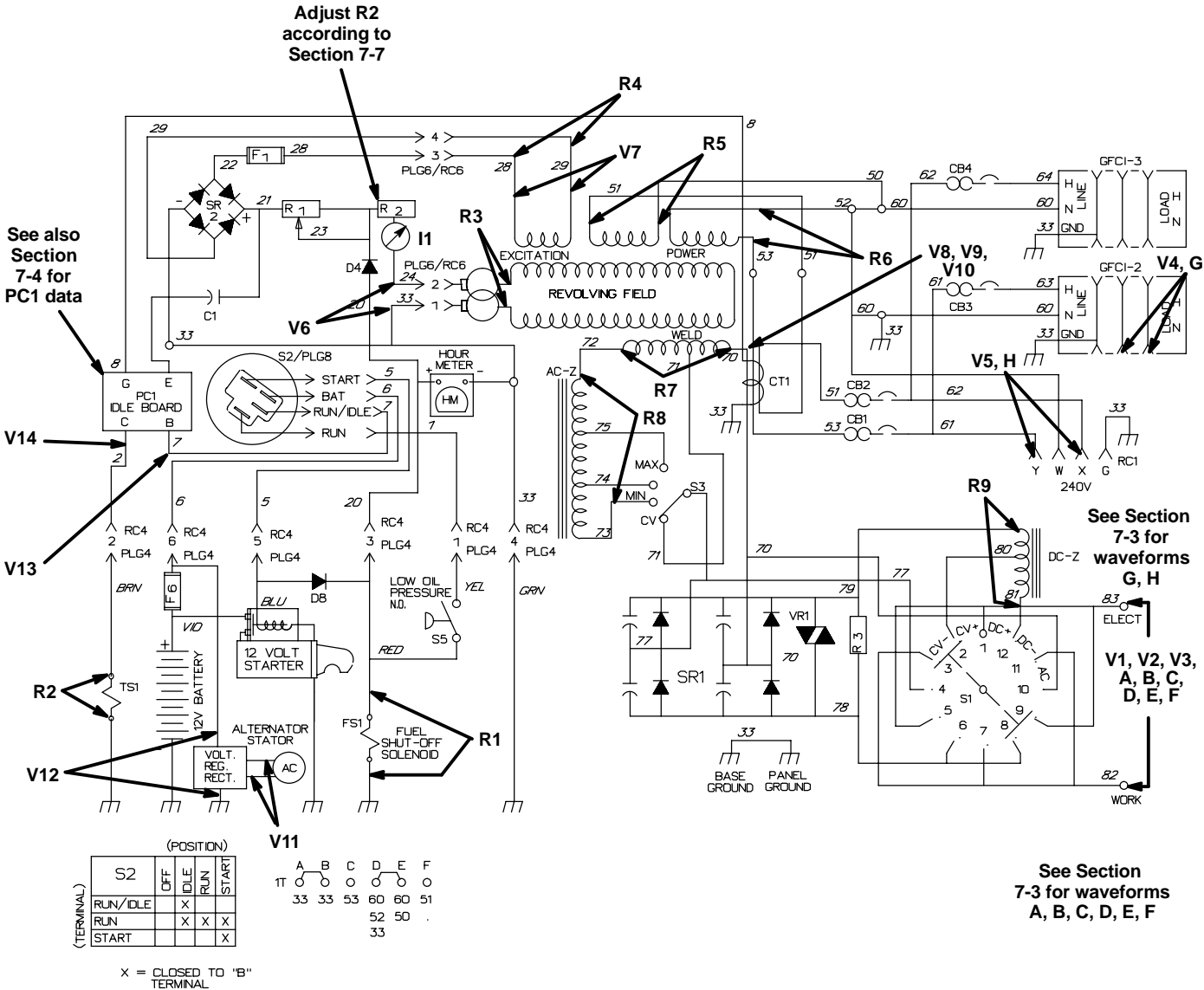
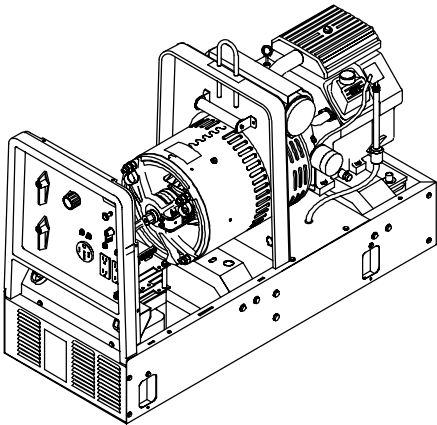
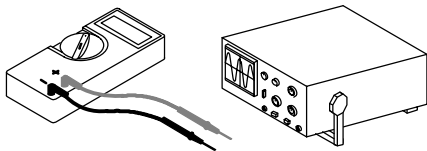
### C. Engine

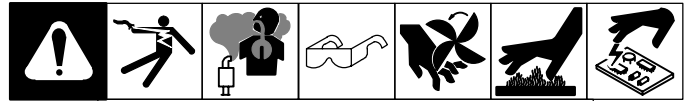
<b>Trouble</b>	<b>Remedy</b>
Engine will not crank.	Check fuse F6, and replace if open (see Section 9-6).
	Check plug PLG4 connection and, effective with Serial No. KG160360, plug PLG8 connection.
	Check battery voltage.
	Check battery connections, and tighten if necessary.
	Check continuity and connections of Engine Control switch S2, and replace if necessary.
Engine will not start.	Check fuel level (see Section 3-4). Check fuel system components.
	Check battery and engine charging system.
	Check oil level (see Section 3-4). Check Low Oil Pressure Shutdown switch S5 (see engine manual for location).
	Check continuity and connections of Engine Control switch S2, and replace if necessary.
	Effective with Serial No. KG160360, check diode D8 and replace if necessary.
	Check fuel shutoff solenoid FS1 for proper coil voltage and connections. Check continuity of coil. Replace FS1 if necessary (see engine manual for location).
Engine starts, but stops when Engine Control switch S2 returns to Run position.	Check oil level. Check Low Oil Pressure Shutdown switch S5 (see engine manual for location).
	Check continuity and connections of Engine Control switch S2, and replace if necessary.
Starter stays energized after Engine Control switch S2 is released.	Effective with Serial No. KG160360, check diode D8 and replace if necessary.
Battery discharges between uses.	Clean battery terminals and posts with baking soda solution; rinse with clear water.
	Periodically recharge battery (approximately every three months).
	Check battery, and replace if necessary.
	Check Voltage Regulator according to engine manual.
Unstable or sluggish engine speeds.	Check fuel level (see Section 3-4). Check fuel system components.
	Check throttle linkage for smooth, non-binding operation.
	Tune engine according to engine manual.

Trouble	Remedy
Engine stops during normal operation.	Check fuel level (see Section 3-4). Check fuel system components.
	Check oil level. Check Low Oil Pressure Shutdown switch S5 (see engine manual for location).
	Periodically recharge battery.
	Check battery, and replace if necessary.
	Check voltage regulator and connections according to engine manual.
	Check continuity of Engine Control switch S2, and replace if necessary.
	Check fuel shutoff solenoid FS1 for proper coil voltage and connections. Check continuity of coil. Replace FS1 if necessary (see engine manual for location).
Engine idles but does not reach weld speed.	Check continuity of Engine Control switch S2, and replace if necessary.
	Check current transformer CT1, and replace if necessary.
	Check idle module PC1 and connections, and replace if necessary.
Engine does not return to idle speed.	Remove weld and auxiliary power loads.
	Check continuity of Engine Control switch S2, and replace if necessary.
	Check idle module PC1 and connections, and replace if necessary (see Section 7-4).
	Check throttle solenoid TS1 for proper coil voltage and connections. Check continuity of coil. Replace TS1 if necessary.
	Check throttle linkage for smooth, non-binding operation.

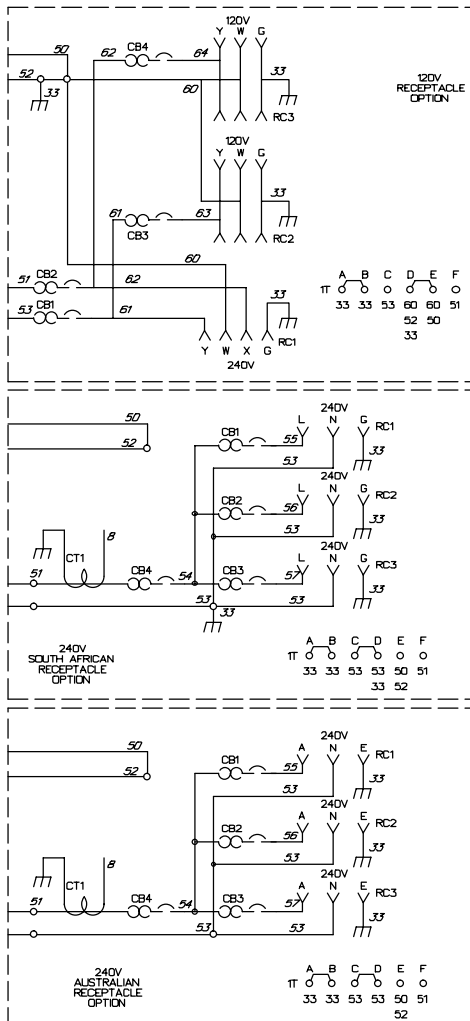
7-2. Troubleshooting Circuit Diagram For Welding Generator

Test Equipment Needed:





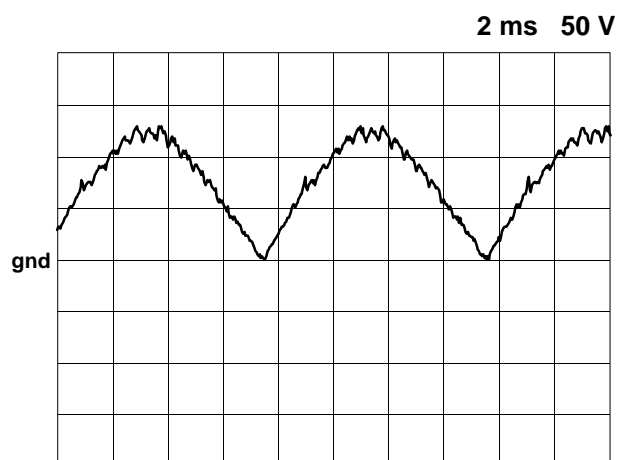
Resistance Values	
a) Tolerance – $\pm 10\%$ unless specified	
b) Condition – 70°F (21°C); cold machine (no warm-up)	
c) Wiring Diagram – see Section 10	
d) Stop engine before checking resistance	
R1	44 ohms
R2	26.5 ohms
R3	3.6 ohms
R4 thru R9	Less than 1 ohm



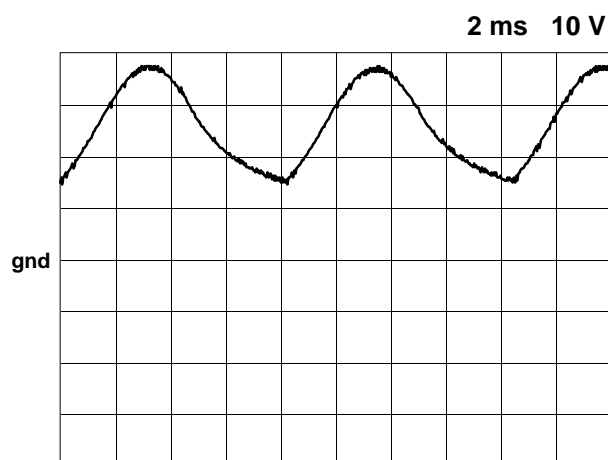
Voltage Readings	
a) Tolerance – $\pm 10\%$ unless specified	
b) Condition – 70°F (21°C); cold machine (no warm-up); no load	
c) Reference – to circuit common (lead 33) unless noted	
d) Wiring Diagram – see Section 10	
V1	AC/CC OCV at weld/power rpm: 65 volts ac (R1 at min.) 80 volts ac (R1 at max.)
V2	DC/CC OCV at weld/power rpm: 58 volts dc (R1 at min.) 72 volts dc (R1 at max.)
V3	DC/CV OCV at weld/power rpm: 25 volts dc (R1 at min.) 32 volts dc (R1 at max.)
V4	At GFCI-2 at weld/power rpm: 108 volts ac (R1 at min.) 132 volts ac $\pm 5\%$ (R1 at max.) Do not exceed 132 volts ac.
V5	At RC1 at weld/power rpm: 220 volts ac (R1 at min.) 264 volts ac $\pm 5\%$ (R1 at max.) Do not exceed 264 volts ac.
V6	DC output to revolving field: 6.5 – 10.5 volts dc (idle rpm) 13 – 29.5 volts dc (weld/power rpm)
V7	43 – 50 volts ac
V8	No weld load: 0 volts ac Rated dc weld load: 3.5 volts ac or greater
V9	No power load: 0 volts ac 15 ampere power load: 3.5 volts ac or greater
V10	At weld/power rpm and 100 watt light bulb load applied: 1 volt ac $\pm 20\%$
V11	AC input to regulator: 29 volts ac (idle rpm) 46 volts ac (weld/power rpm)
V12	DC output from regulator (from center terminal on regulator to ground): 14 volts dc $\pm 5\%$ at idle or weld/power rpm
V13	12 – 14.5 volts dc (S2 in Idle/Run position)
V14	No load and S2 in Idle/Run position: 10 volts dc; No load and S2 in Run position: 0 volts dc

Amperage Readings	
a) Tolerance – $\pm 5\%$ unless specified	
b) Condition – 70°F (21°C); cold machine (no warm-up); no load	
I1	3 amps dc (R1 at min.) 7.3 amps dc (R1 at max.)

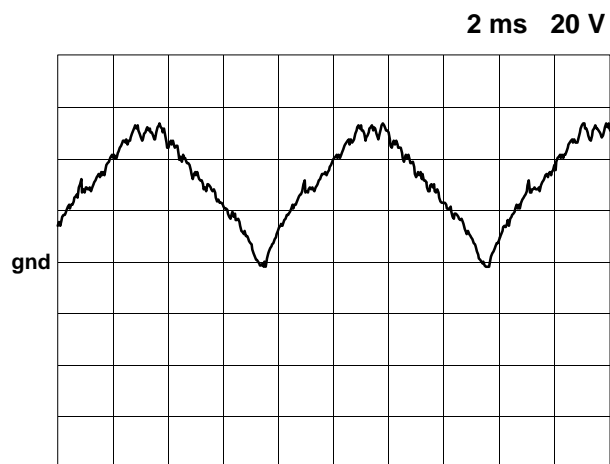
### 7-3. Waveforms For Section 7-2



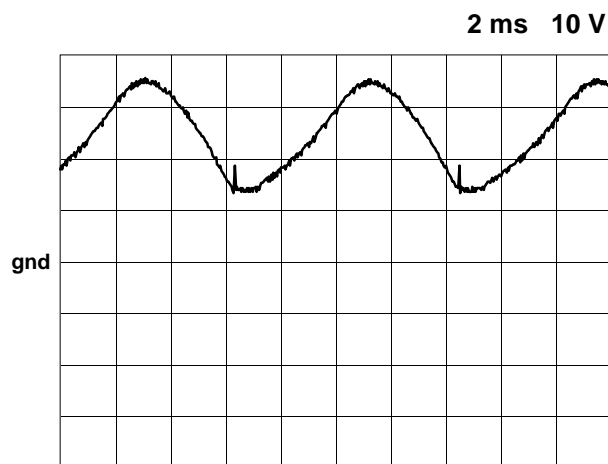
**A. DC/CC Open-Circuit Voltage, Fine Adjust Control R1 At Maximum**



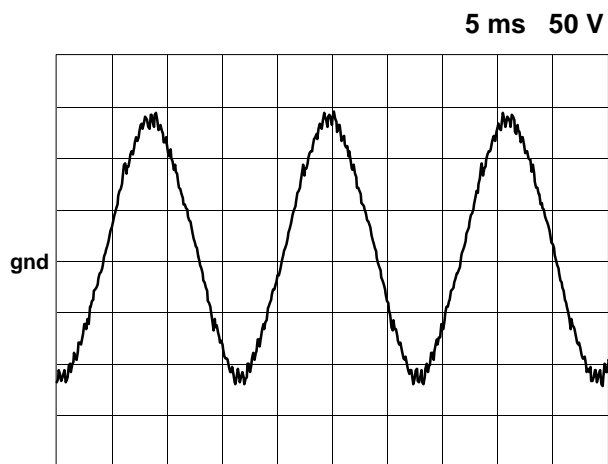
**B. DC/CC Output, 25 Volts, 100 Amperes (Resistive Load), Coarse Adjust Switch S3 At 70-150 Position**



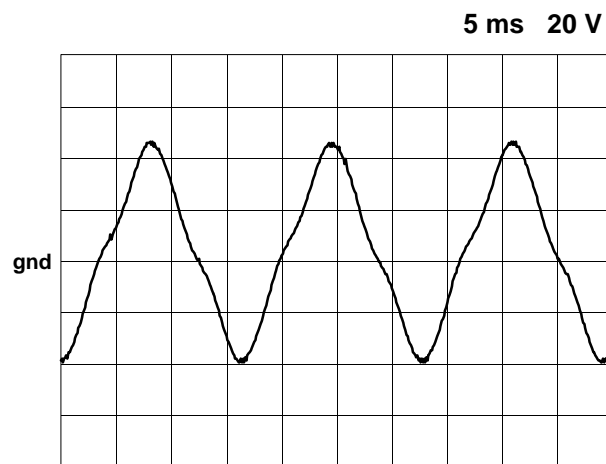
**C. DC/CV Open-Circuit Voltage, Fine Adjust Control R1 At Maximum**



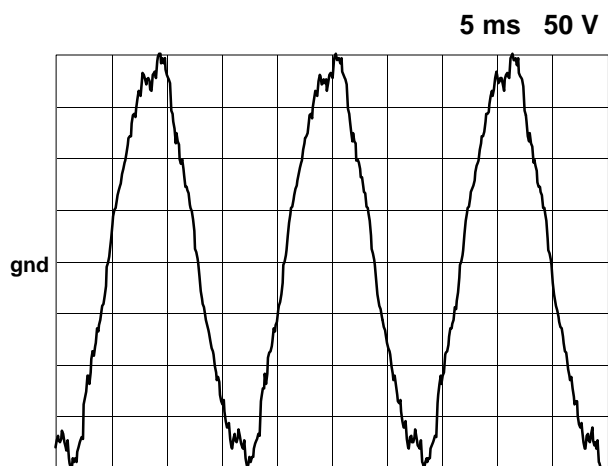
**D. DC/CV Output, 25 Volts, 100 Amperes (Resistive Load)**



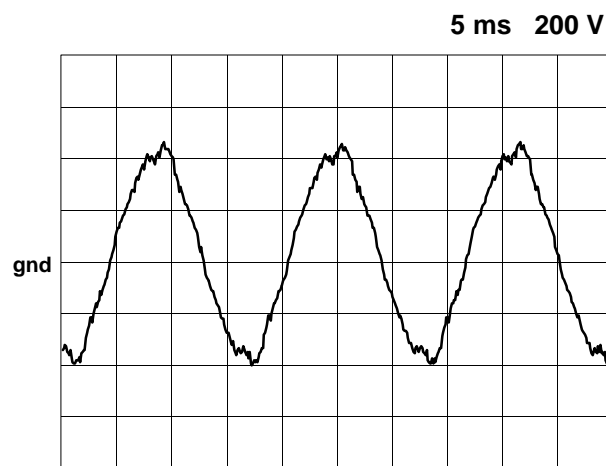
**E. AC/CC Open-Circuit Voltage, Fine Adjust Control R1 At Maximum**



**F. AC/CC Output, 25 Volts, 100 Amperes (Resistive Load)**



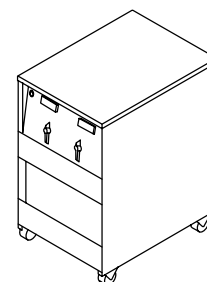
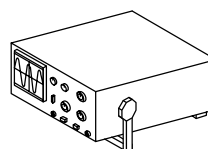
**G. AC Open-Circuit Voltage At 120 Volt Receptacle GFCI-2, Fine Adjust Control R1 At Maximum**



**H. AC Open-Circuit Voltage At 240 Volt Receptacle RC1, Fine Adjust Control R1 At Maximum**



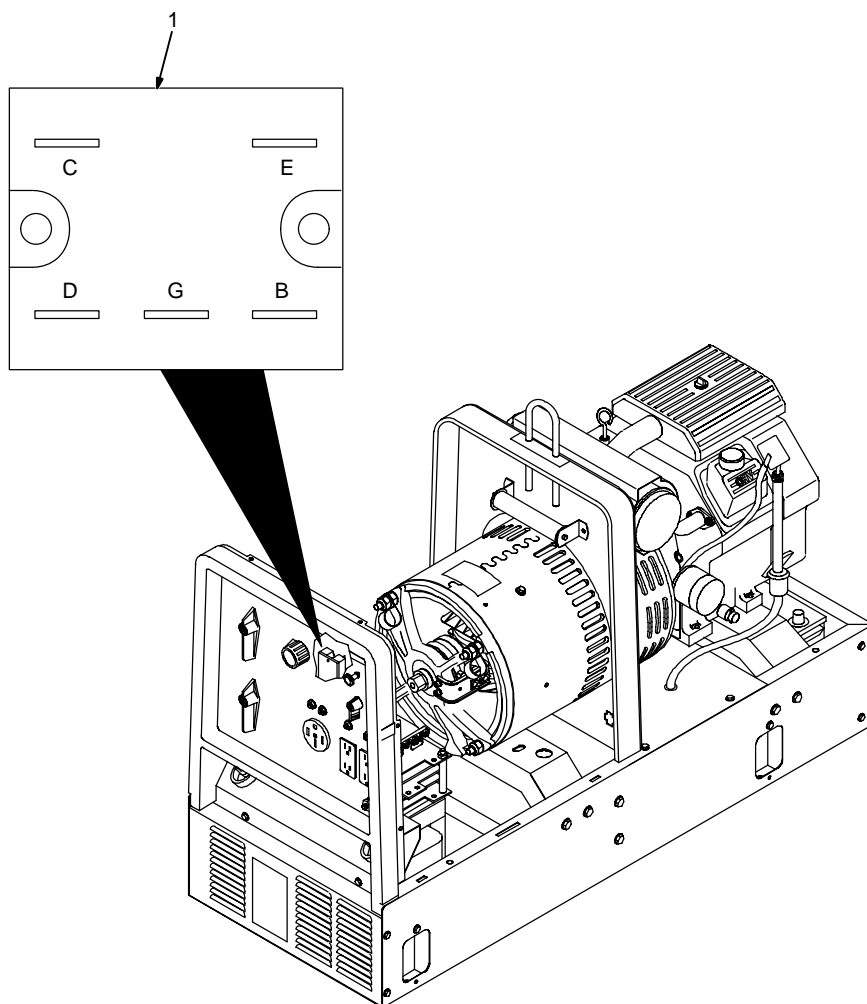
Test Equipment Needed:



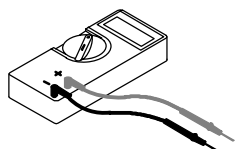
## 7-4. Idle Module PC1 Testing Information

Be sure plugs are secure before testing. See Section 7-5 for specific values during testing.

1 Idle Module PC1



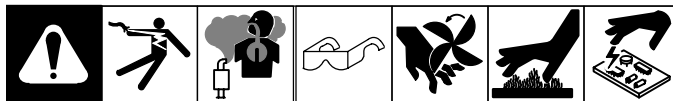
Test Equipment Needed:



ST-801 496 / S-0781

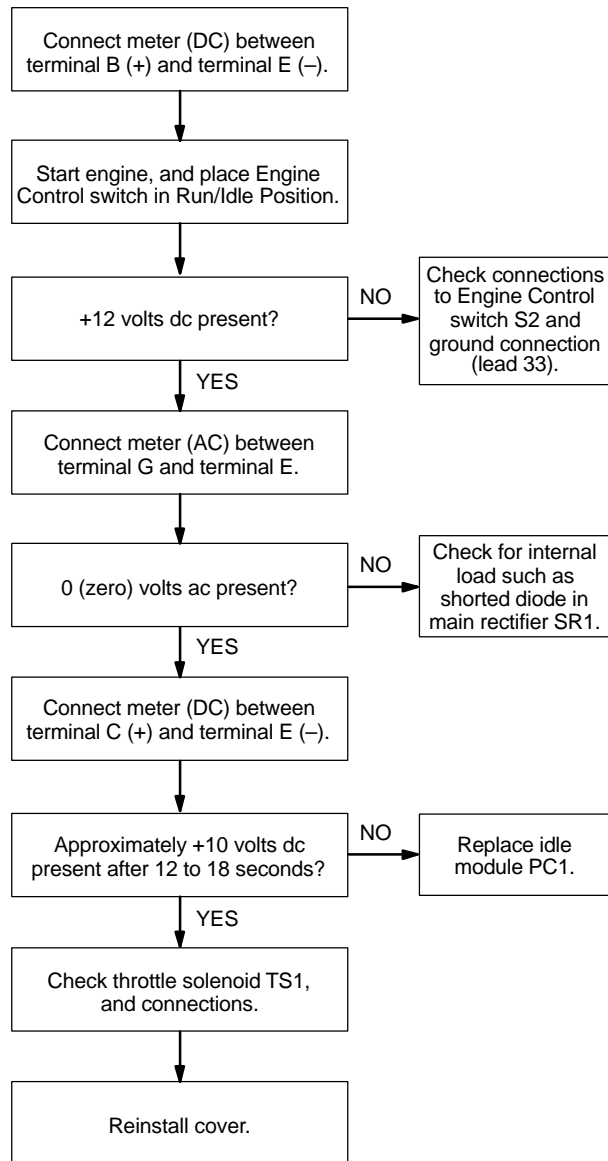


## 7-5. Troubleshooting Flowcharts For Idle Module PC1

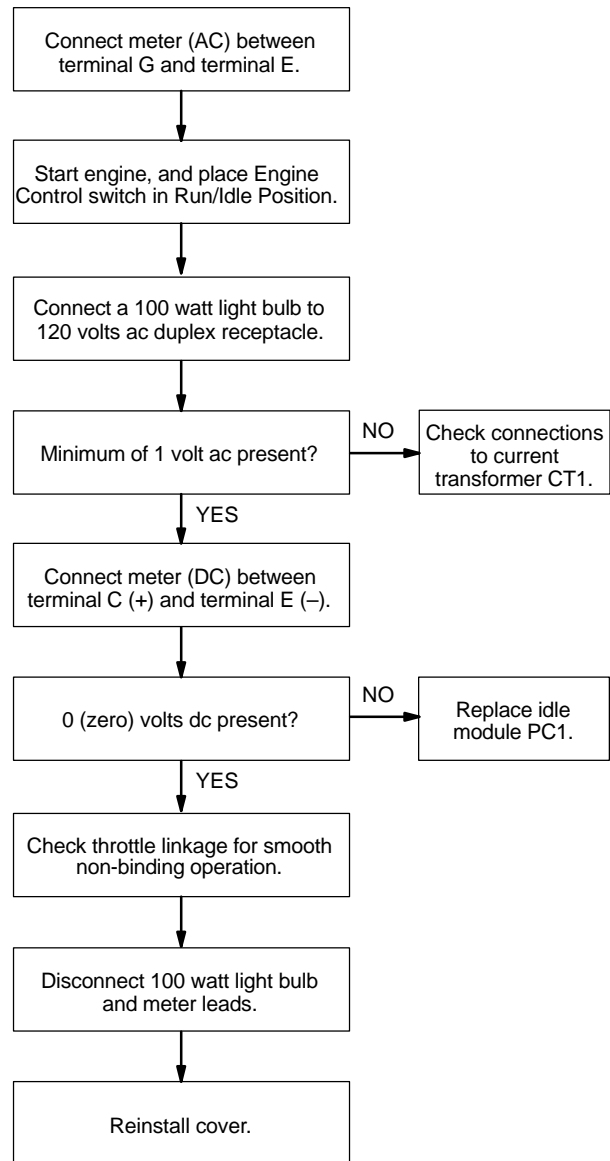


▲ Stop engine before connecting or changing meter leads and before replacing any parts.

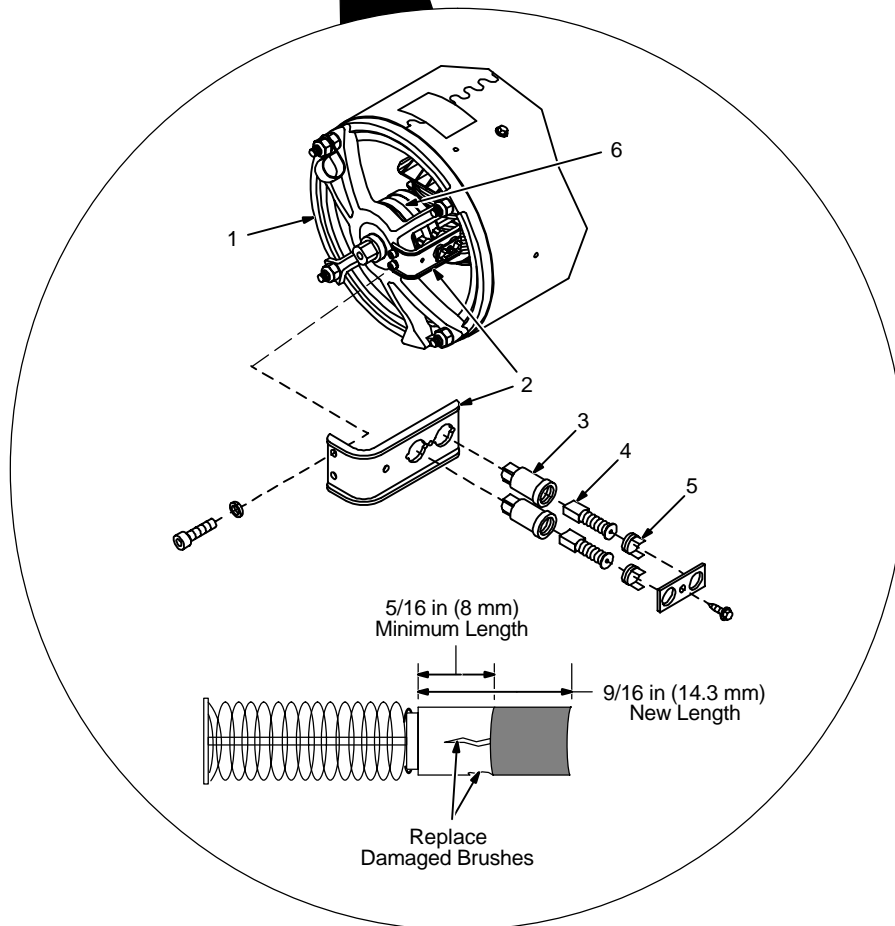
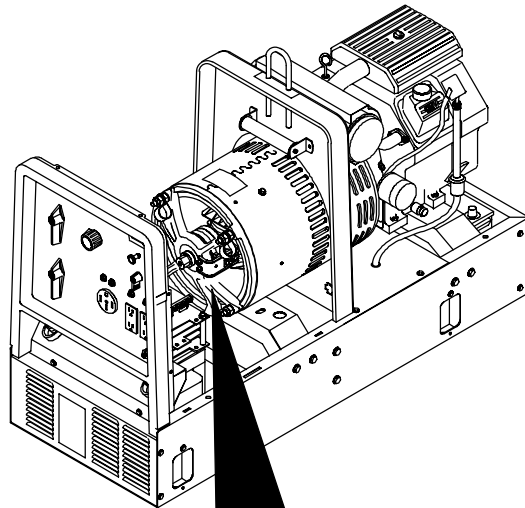
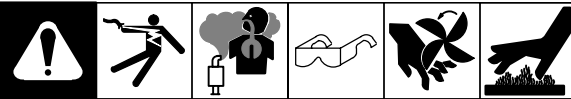
**Engine does not go to idle speed (2200 rpm) with no load applied.**



**Engine does not go to weld/power speed (3700 rpm) with load applied.**



## 7-6. Replacing Brushes And Cleaning Slip Rings



### ▲ Stop engine and let cool.

- 1 Endbell
- 2 Brush Holder Bracket

Remove brush holder bracket. Keep hardware for reinstallation.

- 3 Brush Holder
- 4 Brush With Spring
- 5 Brush Holder Cap

Mark and disconnect leads at caps, and remove brushes from bracket.

Replace brushes if damaged, or if brush is at or near minimum length.

### 6 Slip Rings

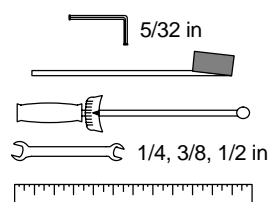
Inspect slip rings. Under normal use, rings turn dark brown.

If slip rings are corroded or surface is uneven, insulate brush leads, start engine, and clean rings with a commutator stone. Remove as little material as possible. Stop engine.

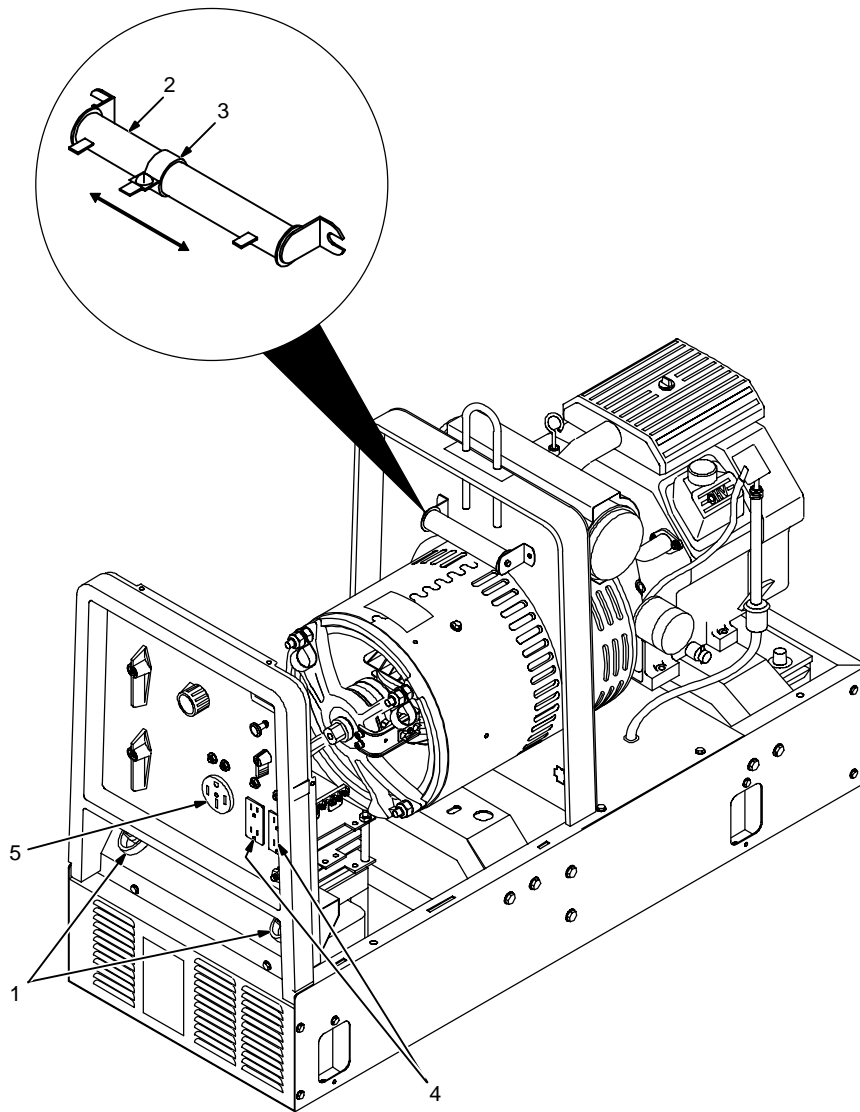
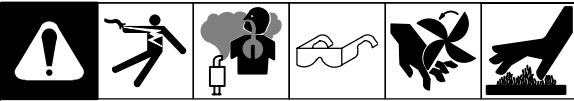
Install brushes, bracket, and remaining generator parts (see Section 8-2 for torque values).

Reinstall side panels and cover.

### Tools Needed:



## 7-7. Checking Unit Output After Servicing



Check and adjust engine speeds, if necessary (see Section 9-5).

Set Fine Adjust control at 10.

### 1 Weld Output Terminals

Check open-circuit voltages between terminals (see Section 7-2, voltages V1, V2 and V3).

If correct voltages are not present, proceed as follows:

### ▲ Stop engine before adjusting resistor R2.

### 2 Resistor R2

### 3 Slider

Adjust slider on R2 until open-circuit voltages are okay. Do not exceed maximum amperage in revolving field (see Section 7-2, Amperage I1).

Run engine at weld/power speed (3700 rpm).

### 4 120 V 15 A AC Duplex Receptacles GFCI-2 And GFCI-3

Check voltage at each receptacle. With no load applied, there should be 125 – 132 volts ac present.

### 5 240 V 50 A AC Receptacle RC1

Check voltage at receptacle. With no load applied, there should be 258 – 264 volts ac present.

If correct voltages are not present, repeat troubleshooting procedures in Section 7-1.

### ▲ Stop engine.

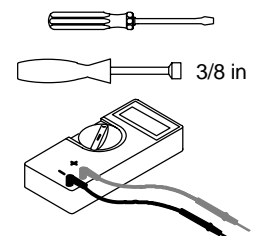
Allow engine to cool, and then complete pre-operational checks in table.

Reinstall cover and side panels.

### Pre-Operational Checks

- |   |
|---|
| Wipe engine surfaces clean.   |
| Check labels; replace labels that are unreadable or damaged (see Parts List). |
| Check fuel and oil.   |
| Check and correct any fluid leaks.  |
| Clean weld output and battery terminals. Tighten connections.                 |
| Clean outside of entire unit.   |

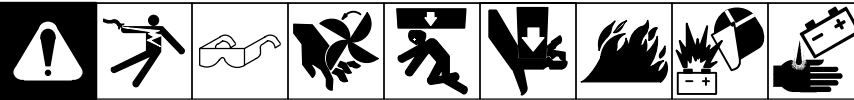
### Tools Needed:



Ref. ST-801 496 / Ref. ST-154 094-A

# SECTION 8 – DISASSEMBLY AND REASSEMBLY

## 8-1. Disassembly Of Unit



▲ Do not damage rotor or stator windings.

### Disassembly

Disconnect battery cables, fuel line, choke cable, and base ground cable. Remove spark plugs.

Mark and disconnect leads from resistor R2. Mark and disconnect stator leads.

Disassemble in sequence shown.

- 1 Rotor Removal Tool (Miller Part No. 147 551)
- 2 Rotor Removal Tool (Miller Part No. 177 126)

Install tools on flywheel. Loosen rotor before removing engine/generator assembly. Remove tools from flywheel.

Use hoist and lifting strap to remove the engine/generator assembly.

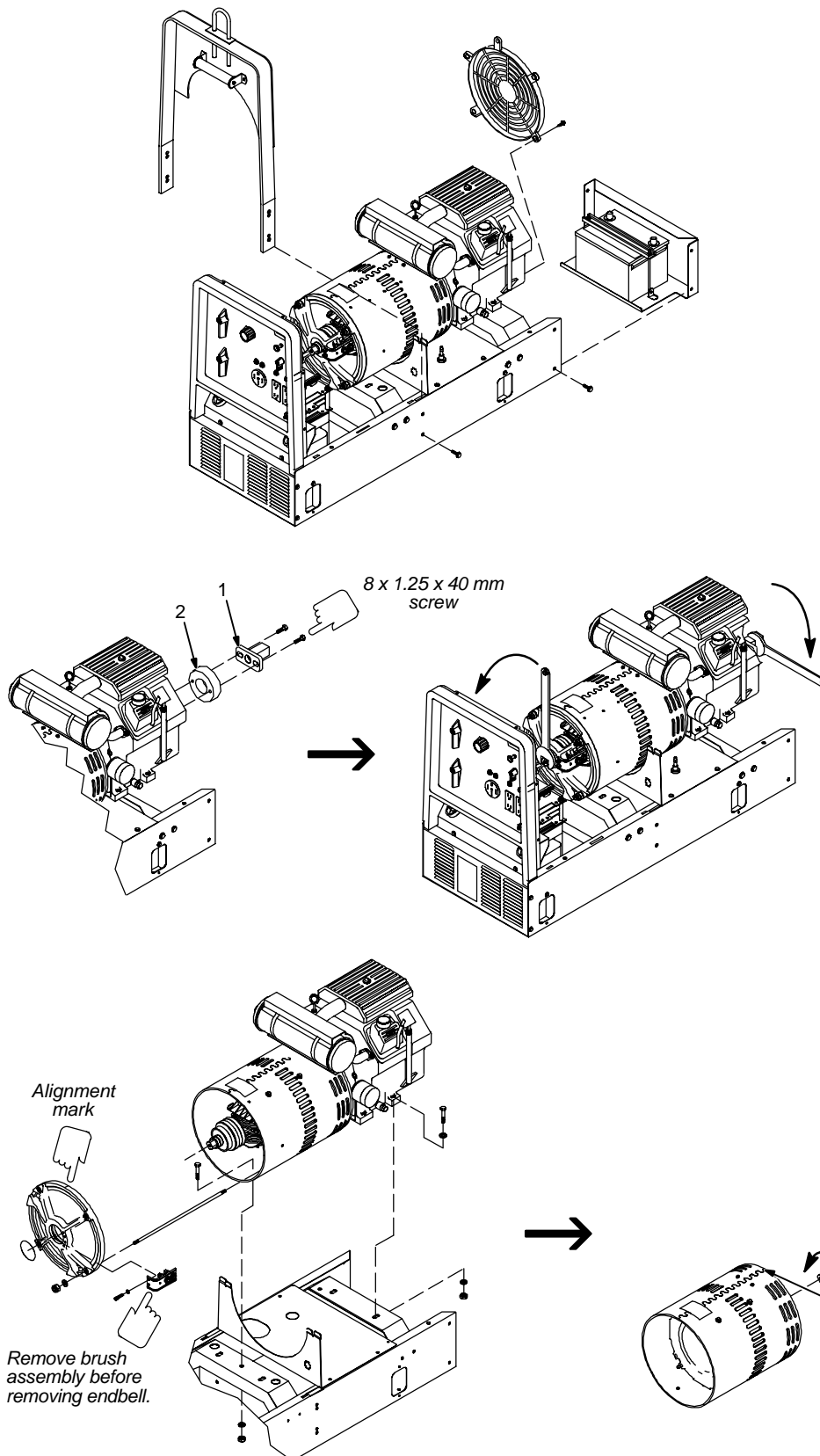
### Reassembly

Reassemble unit in reverse order of disassembly. Apply anti-seize compound (Loctite 767 or equivalent) to rotor threads.

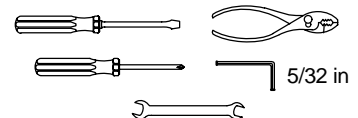
Apply 30W oil to stator studs before installing endbell. Torque hardware as specified in Section 8-2.

Reconnect leads as marked. Use cable ties to keep leads from sharp edges, and hot or moving parts.

Reconnect fuel line, choke cable, and base ground cable. Reinstall spark plugs, battery and tray, panels, and cover. Reconnect battery cables.

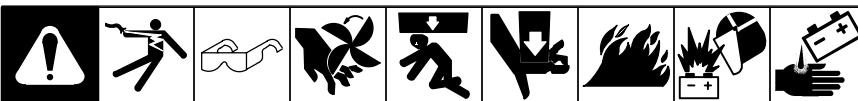


### Tools Needed:



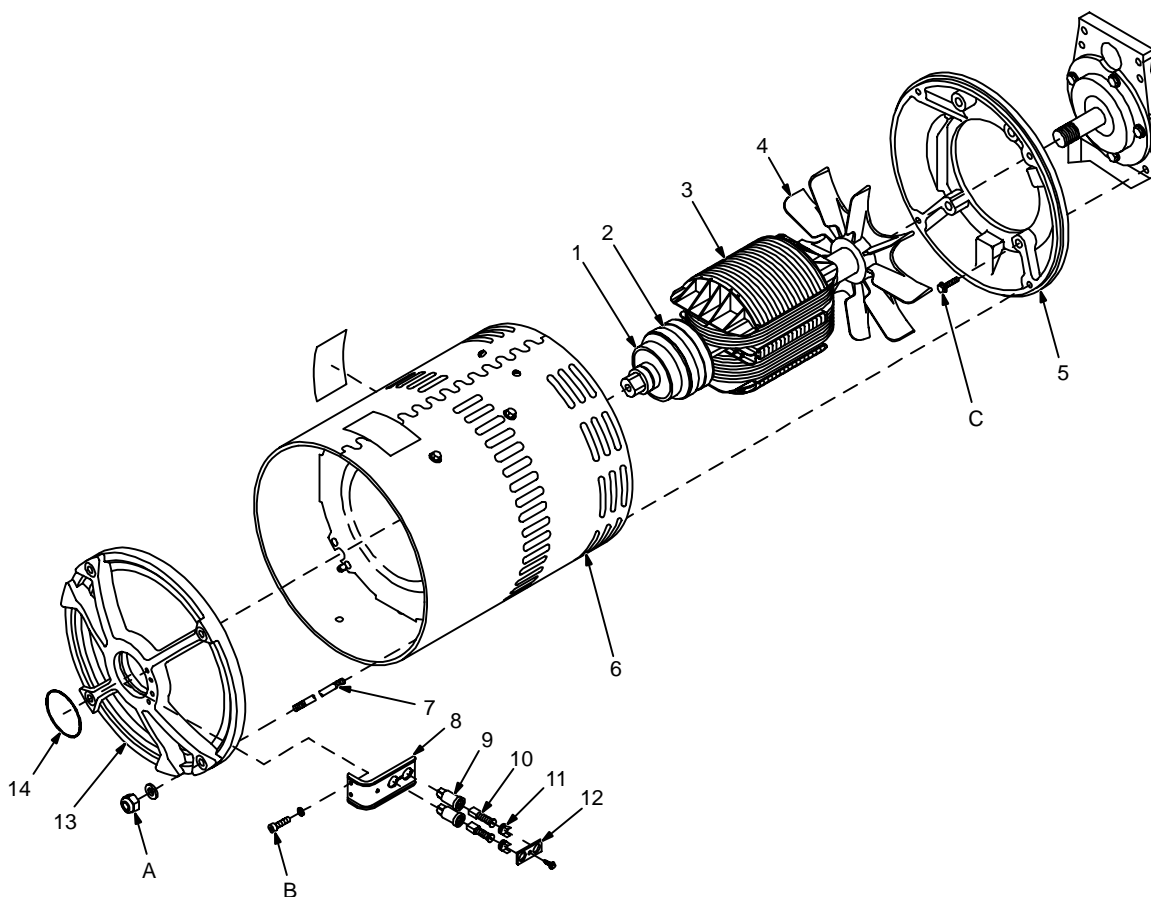
ST-801 500 / ST-801 501 / ST-801 502

## 8-2. Disassembly Of Generator



- 1 Bearing
- 2 Slip Rings
- 3 Rotor
- 4 Generator Fan
- 5 Engine Adapter
- 6 Stator
- 7 Stud
- 8 Brush Holder Bracket
- 9 Brush Holder
- 10 Brush With Spring
- 11 Brush Holder Cap
- 12 Brush Holder Bar
- 13 Endbell
- 14 O-Ring

















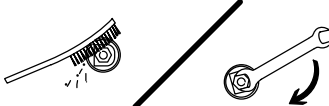

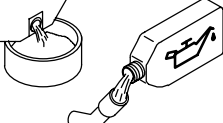
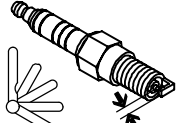
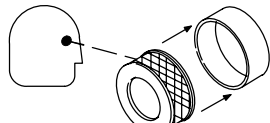
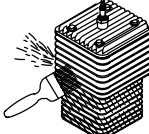
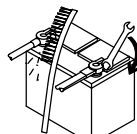

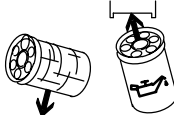
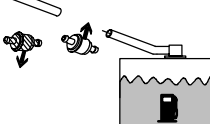


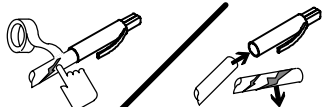

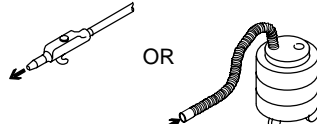
Torques:		
A	10 ft lb	14 N·m
B	60 in lb	7 N·m
C	40 ft lb	54 N·m






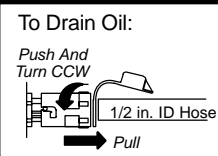
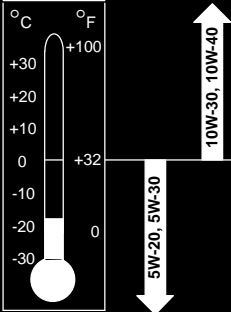





ST-800 798

# SECTION 9 – MAINTENANCE

## 9-1. Routine Maintenance




      				 Recycle engine fluids.		 <b>Stop engine before maintaining.</b>	
 <b>8 h</b>							
 Wipe Up Spills.				 Check Fluid Levels. See Section 3-4.			
 <b>20 h</b>							
 Check And Clean Optional Spark Arrestor Screen. See Section 9-7.				 Service Air Cleaner Foam Element. See Section 9-3.			
 <b>50 h</b>							
 Clean And Tighten Weld Terminals.							
 <b>100 h</b>							
 Change Oil. See Section 9-4 And Maintenance Label.		 Check Spark Plugs.		 Check Air Cleaner Paper Element. See Section 9-3.			
 Clean Cooling System. See Engine Manual.				 Clean And Tighten Battery Connections.			
 <b>200 h</b>							
 Change Oil Filter. See Section 9-4 And Maintenance Label.		 Replace Fuel Filter. See Section 9-4.		 Replace Unreadable Labels.			
 <b>500 h</b>							
 Repair Or Replace Cracked Cables.							
 <b>1000 h</b>							
 Blow Out Or Vacuum Inside. During Heavy Service, Clean Monthly.							

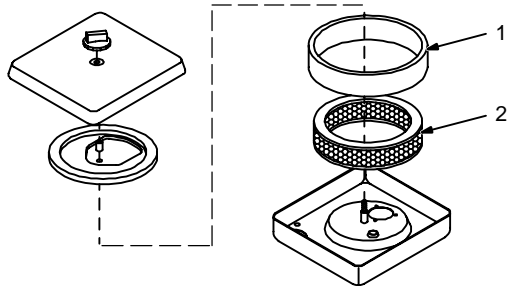
## 9-2. Maintenance Label

KOHLER CH18 GAS ENGINE	
 <p>See Engine Manual for complete engine care. Give engine Specification and Serial Number when ordering parts.</p>	 <p>Air Filter Service . . . . . 100 hours or less – see Owner's Manual            Air Filter Element . . . . MILLER 067 272, Kohler 4708303            Air Filter Wrapper . . . . MILLER 067 273, Kohler 2408302</p>
 <p><b>Check daily.</b></p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><b>To Drain Oil:</b></p>  </div> 	 <p>12 Volt Battery . . . . . BCI Group 58            Cranking Performance at 0°F (-18°C) . . . . 430 Amps min.</p>
<p>Recommended Oil . . . API Service Classification SF-SG/CC-CD            Oil Change 100 hours            Oil Filter Change . . . . . 200 hours            Oil Filter . . . . . MILLER 066 698, Kohler 1205001            Oil Capacity . . . . . 1.75 qt (1.7 L) or 2 qt (1.9 L) with filter change</p>	 <p>Engine RPM – No Load            Weld/Power . . 3700            Idle . . . . . 2200</p>
 <p>Fuel Capacity . . . . . 8.5 gal (32.2 L)            Fuel Grade . . . . . Unleaded, 87 Octane min.            Fuel Filter . . . . . MILLER 066 113, Kohler 2505003</p> <p><i>Gasoline</i></p>	 <p>Spark Plug Gap . . . . . 0.040 in. (1.02 mm)            Spark Plug . . . . . Champion RC-12YC  <i>Use only resistor spark plugs and wires.</i></p>
	 <p>Spark Arrester Inspection And Service . . . . . 20 operating hours - see Owner's Manual</p>

S-173 088

## 9-3. Servicing Air Cleaner

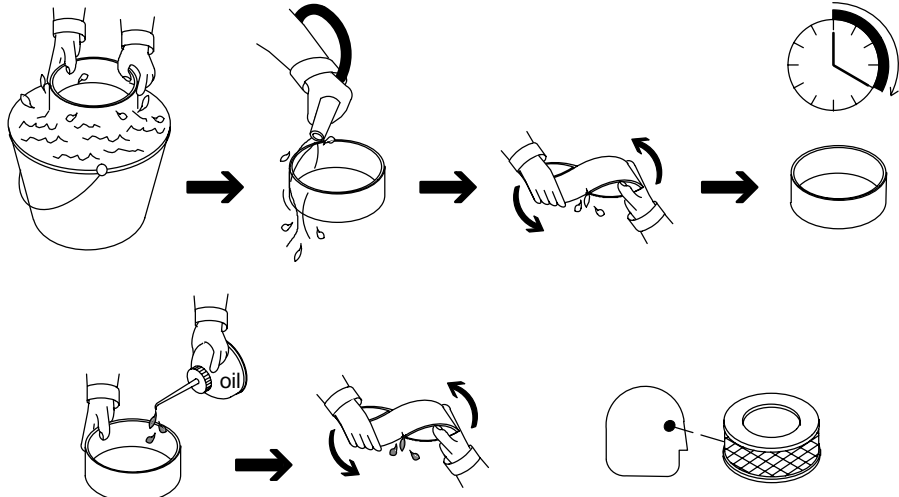






**▲ Stop engine.**  
**▲ Do not run engine without air cleaner or with dirty element.**

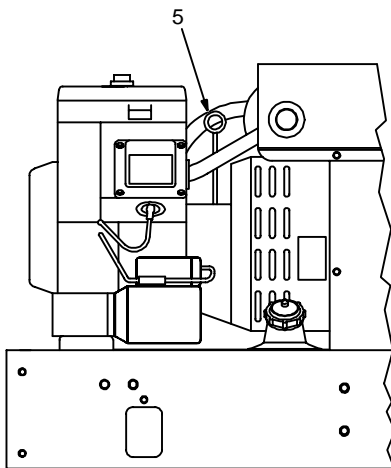
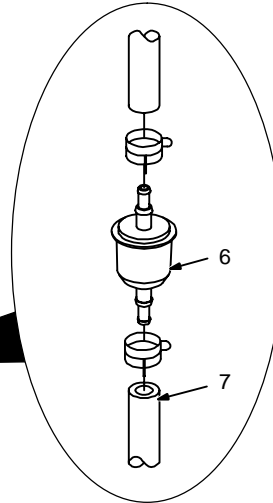
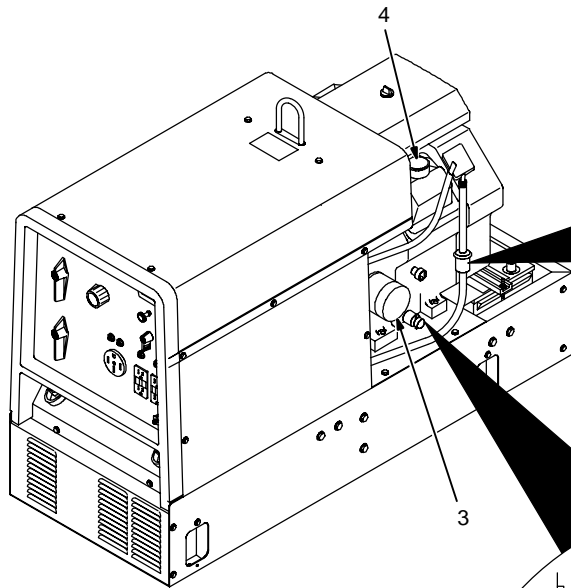
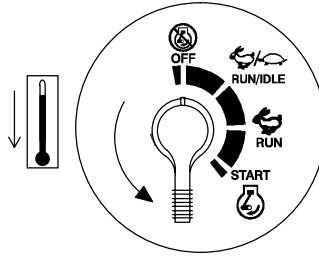
1 Precleaner  
 Wash precleaner with soap and water solution. Allow precleaner to air dry completely.  
 Spread 1 tablespoon SAE 30 oil evenly into precleaner. Squeeze out excess oil.

2 Element  
 Replace element if dirty or oily.



aircleaner3 4/96 – ST-156 852 / S-0759

## 9-4. Changing Engine Oil, Oil Filter, And Fuel Filter



### ▲ Stop engine and let cool.

- 1 Oil Drain Valve
- 2 1/2 ID x 12 in Hose
- 3 Oil Filter
- 4 Oil Fill Cap
- 5 Oil Dipstick

Change engine oil and filter according to engine owner's manual.

### ▲ Close valve and valve cap before adding oil and running engine.

Fill crankcase with new oil to full mark on dipstick (see Section 9-2).

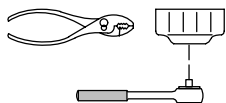
- 6 Fuel Filter
- 7 Fuel Line

Replace line if cracked or worn. Install new filter. Wipe up any spilled fuel.

Start engine, and check for fuel leaks.

### ▲ Stop engine, tighten connections as necessary, and wipe up fuel.

#### Tools Needed:

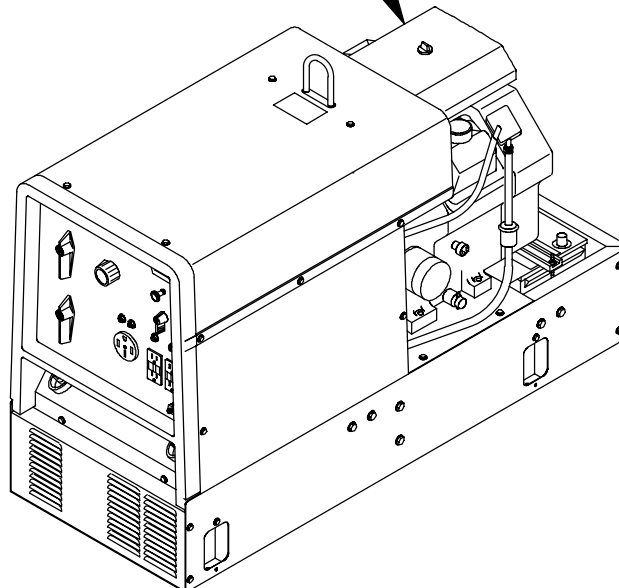
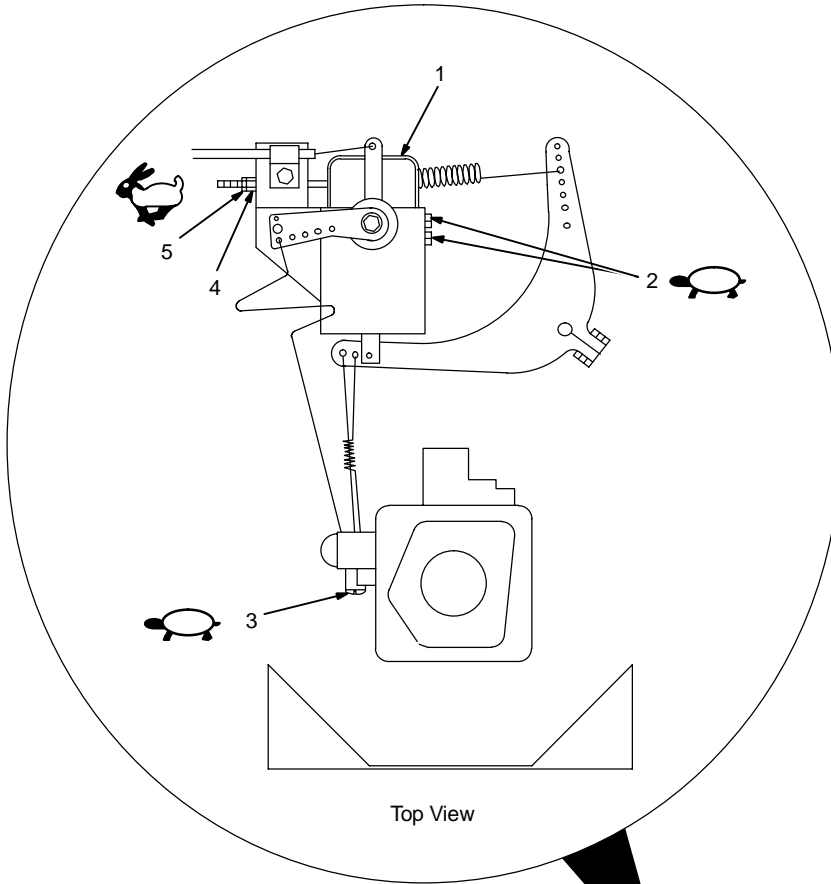




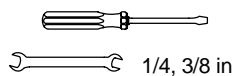
## 9-5. Adjusting Engine Speed



	2200 ± 50 rpm
	3700 ± 50 rpm



Tools Needed:



After tuning engine, check engine speeds with a tachometer (see table). If necessary, adjust speeds as follows:

Start engine and run until warm. Turn Fine Adjust control to 10.

### Idle Speed Adjustment

Move Engine Control switch to Run/Idle position.

- 1 Throttle Solenoid
- 2 Mounting Screws
- 3 Idle Speed Screw

Loosen mounting screws. Adjust solenoid position so engine runs at idle speed. If necessary, back out idle speed screw so solenoid can be moved to correct position. Tighten mounting screws. Be sure solenoid linkage works smoothly.

Turn idle speed screw for fine adjustments.

### Weld/Power Speed Adjustment

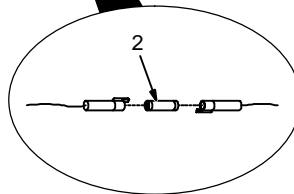
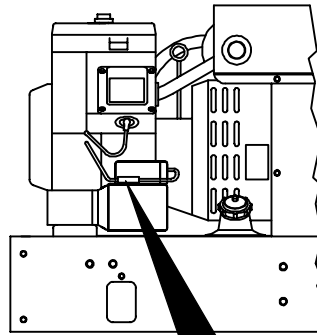
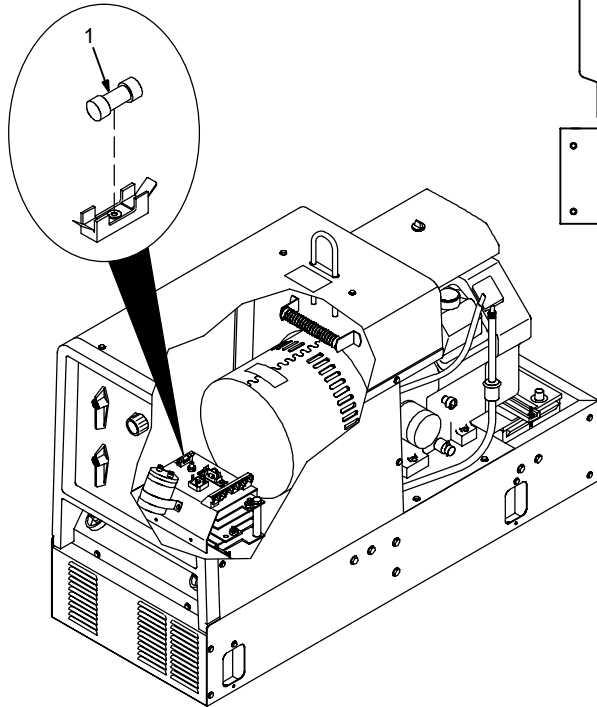
Move Engine Control switch to Run position.

- 4 Weld/Power Speed Adjustment Nut
- 5 Lock Nut

Loosen lock nut. Turn adjustment nut until engine runs at weld/power speed. Tighten lock nut.

▲ Stop engine.

## 9-6. Overload Protection



### ▲ Stop engine.

#### 1 Fuse F1 (See Parts List)

F1 protects the generator excitation circuit. If F1 opens, there will be no/low weld and auxiliary power output.

If F1 continues to open, check integrated rectifier SR2, capacitor C1, and the rotor.

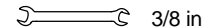
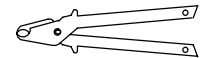
#### 2 Fuse F6 (See Parts List)

F6 protects the engine wiring harness. If F6 opens, the engine does not crank.

If F6 continues to open, check the engine wiring harness, switch S2, diode D4, and voltage regulator.

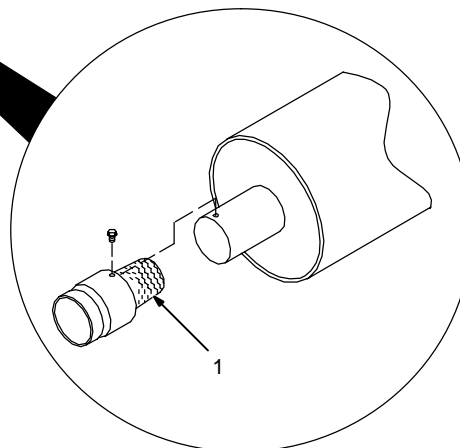
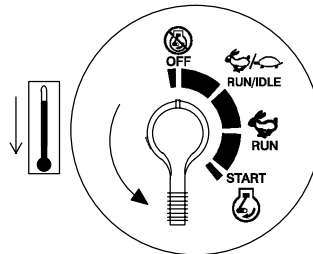
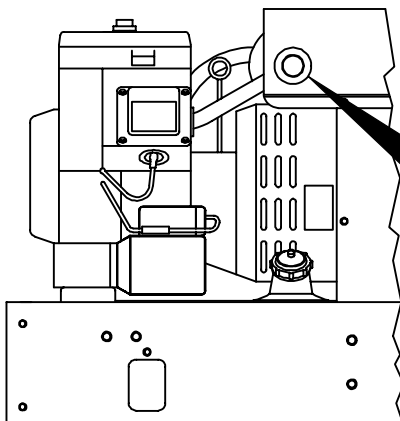
Replace any open fuses. Reinstall panel before operating unit.

#### Tools Needed:



ST-801 226 / Ref. ST-801 221

## 9-7. Inspecting And Cleaning Optional Spark Arrestor

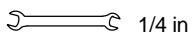


### ▲ Stop engine and let cool.

#### 1 Spark Arrestor Screen


Clean and inspect screen. Replace spark arrestor if screen wires are broken or missing.

#### Tools Needed:



ST-801 206 / Ref. ST-801 221 / Ref. ST-178 079-A

# SECTION 10 – ELECTRICAL DIAGRAMS

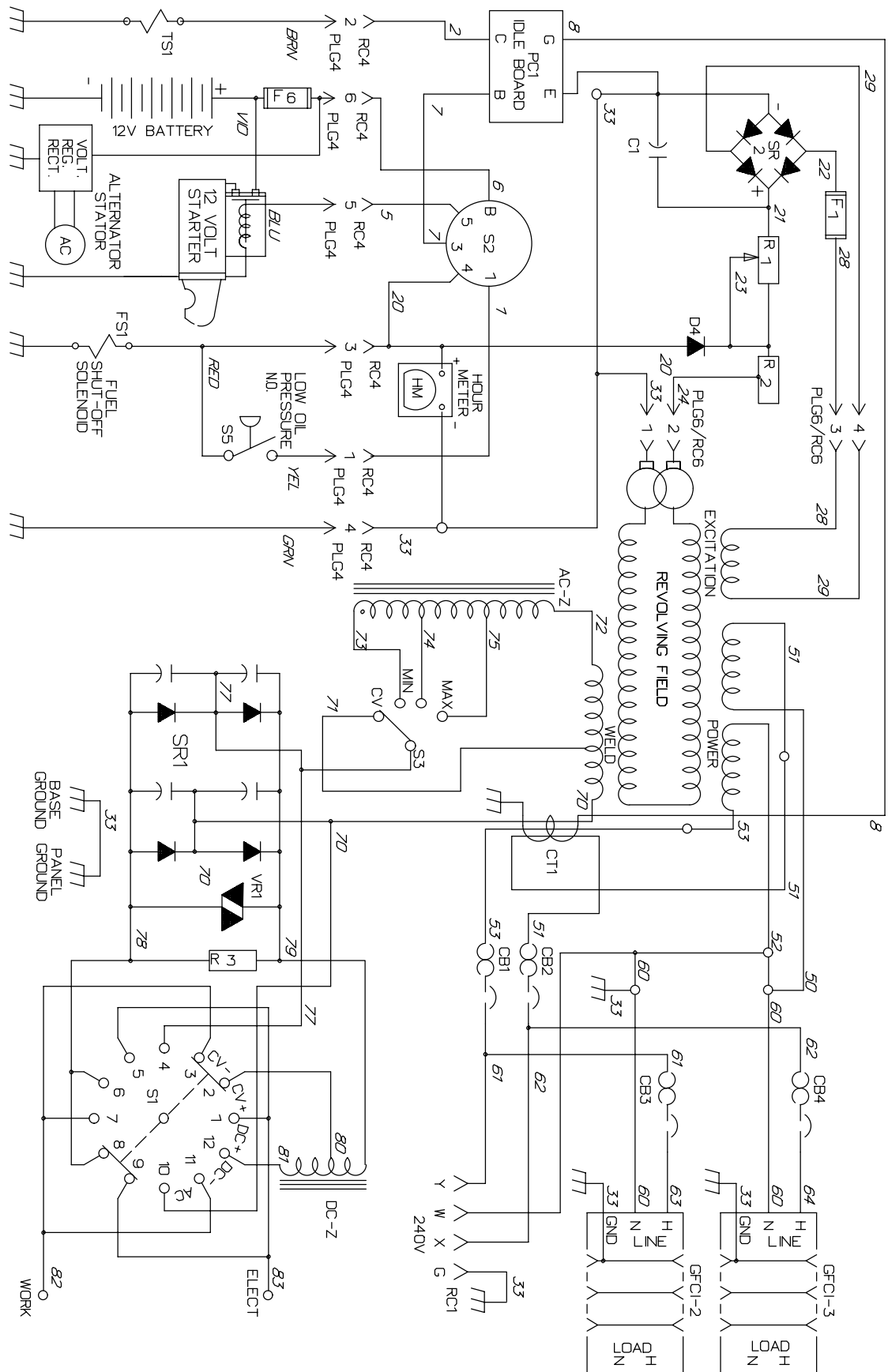
 The circuits in this manual can be used for troubleshooting, but there might be minor circuit differences from your machine. Use circuit inside machine case or contact factory for actual circuit, if needed.

The following is a list of all diagrams for models covered by this manual. To order a copy, proceed as follows:

- 1 Know unit Model and Serial or Style Number.
- 2 Use this list to find diagram number.
- 3 Include your FAX number or mailing address with your request.
- 4 FAX Technical Publications Department at 414-735-4011 or call 414-735-4356.

Model	Serial Or Style Number	Circuit Diagram	Wiring Diagram	Main Reason For Change
Bobcat 225G Plus (Kohler)	KG061736 thru KG160359	SB-179 497	D-179 498 ♦ ♦	
	KG160360 and following	SB-180 690-A	SD-180 691-A	New switch S2. Added D8 and optional receptacles.

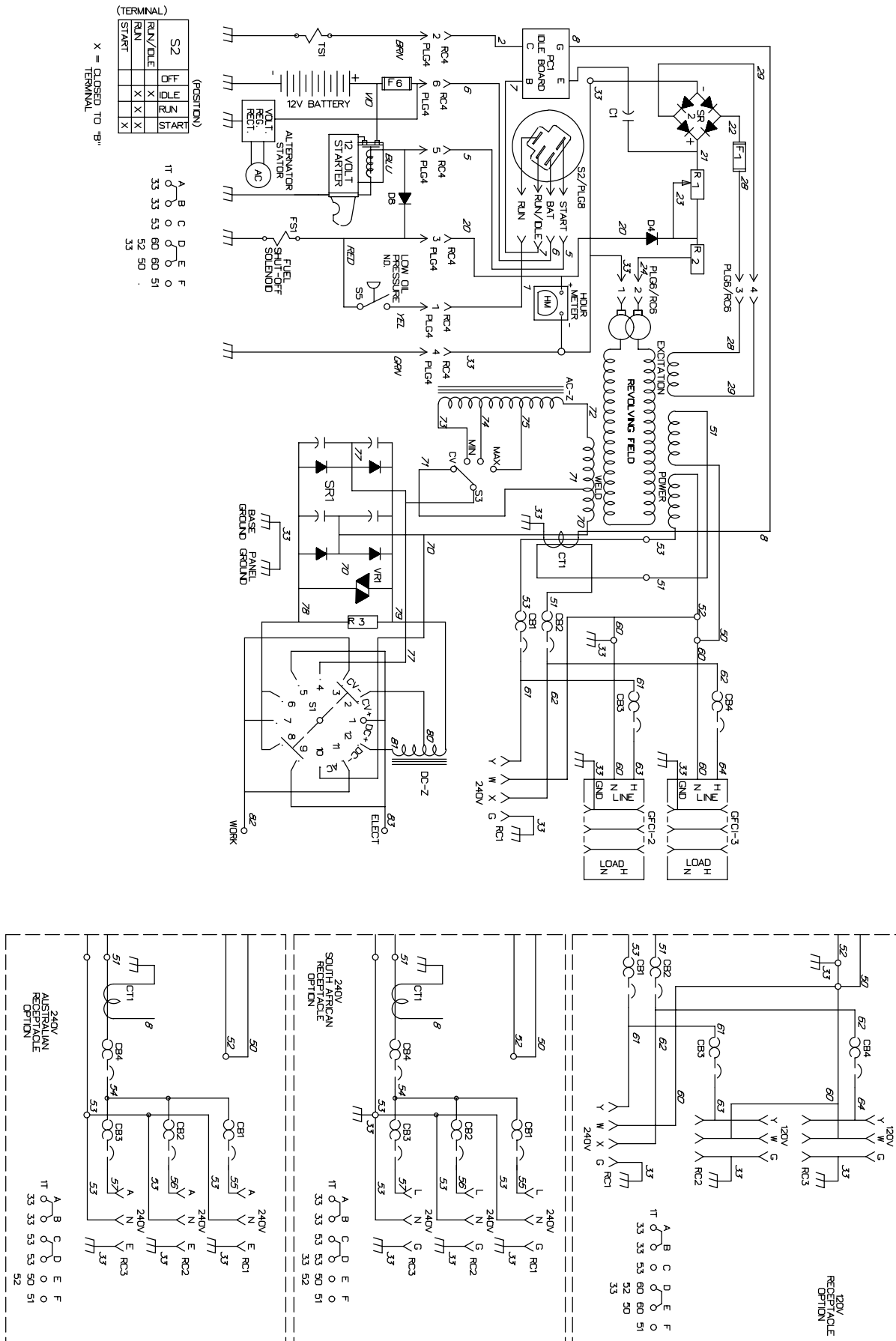
♦ ♦ Not included in this manual



S2	OFF	IDLE	AUX.	START
1		X	X	X
2		X	X	X
3		X	X	X
4		X	X	X
5		X	X	X

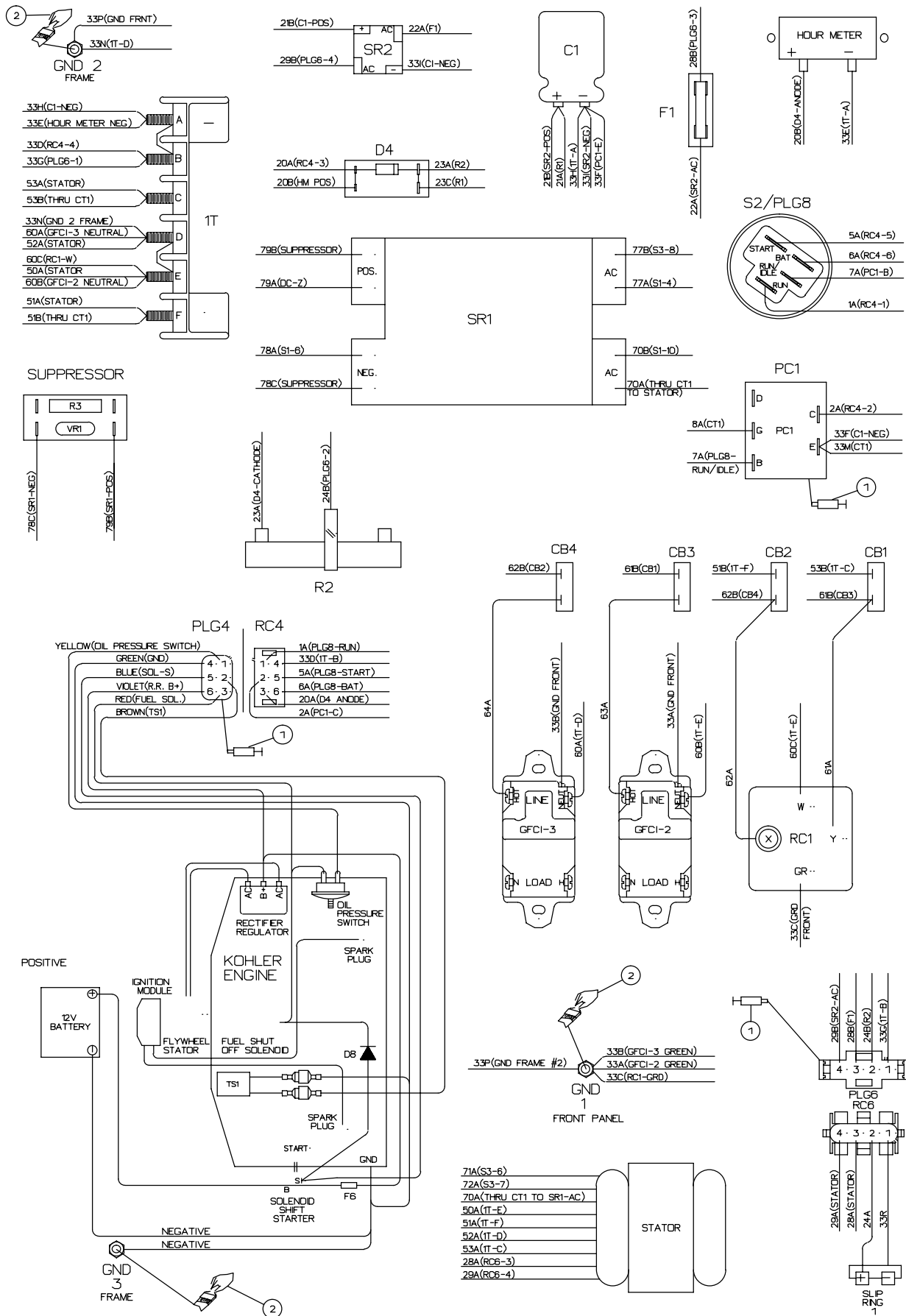
X = CLOSED TO "B"  
 TERMINAL

**Figure 10-1. Circuit Diagram For Bobcat 225G Plus (Kohler)  
 Effective With Serial No. KG061736 Thru KG160359**

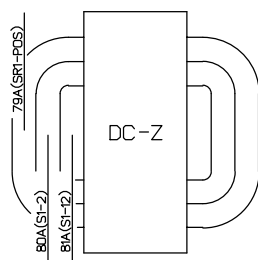
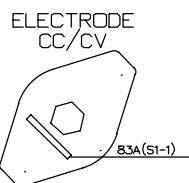
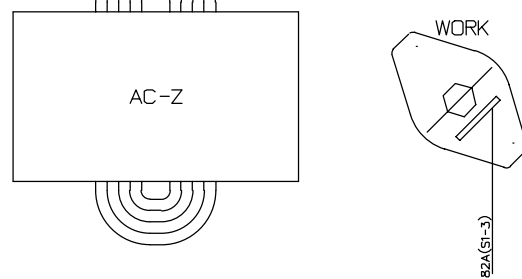
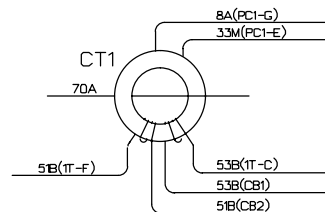
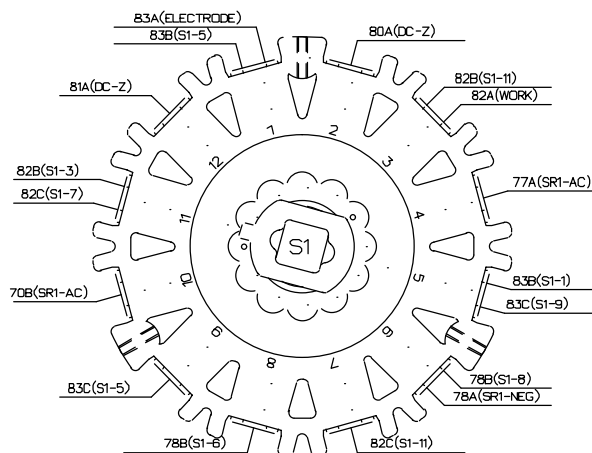
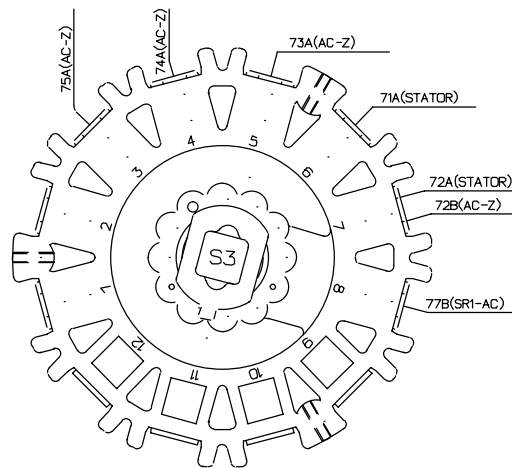
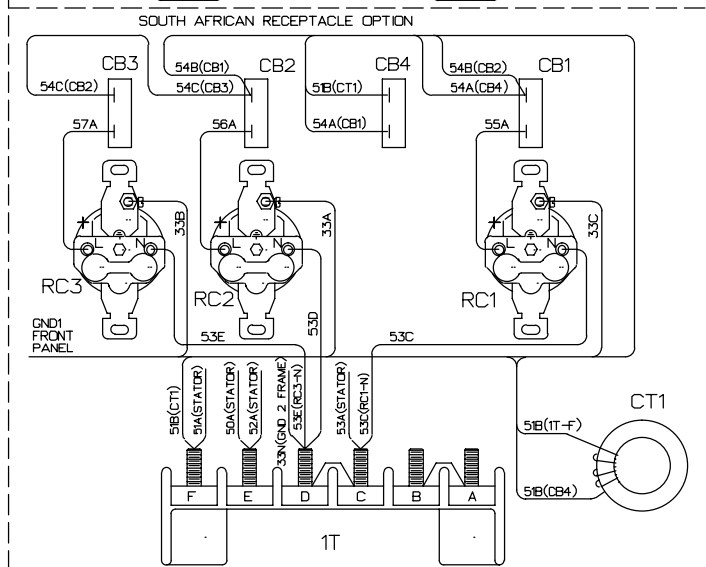
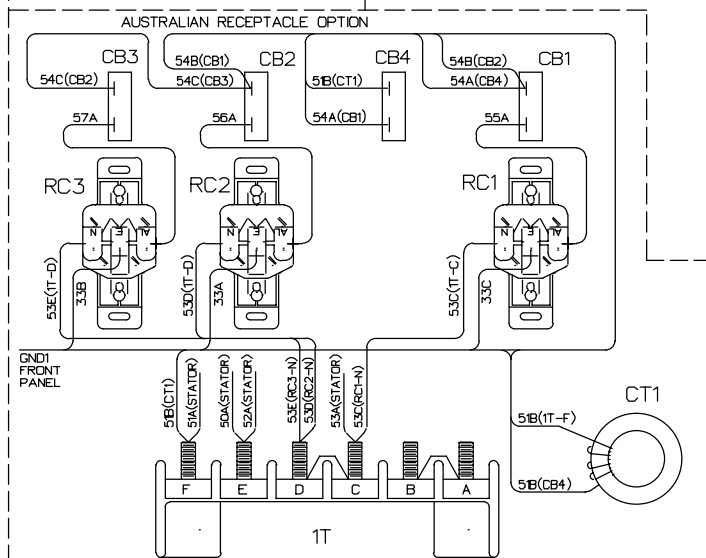
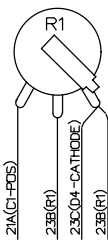
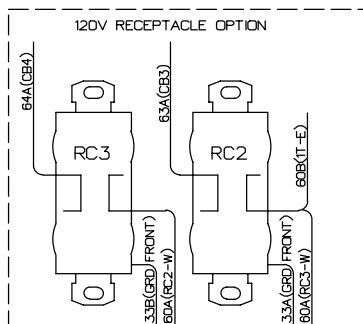


SB-180 690-A

**Figure 10-2. Circuit Diagram For Bobcat 225G Plus (Kohler)  
Effective With Serial No. KG160360 And Following**



**Figure 10-3. Wiring Diagram For Bobcat 225G Plus (Kohler) Effective With Serial No. KG160360 And Following**



Coat terminals with conductive electric compound (Miller Part No. 603 978) or equivalent.



Coat terminals with dielectric grade, nonconductive, electric grease (MILLER Part No. 146 557) or equivalent.

SD-180 691-A

# NOTES



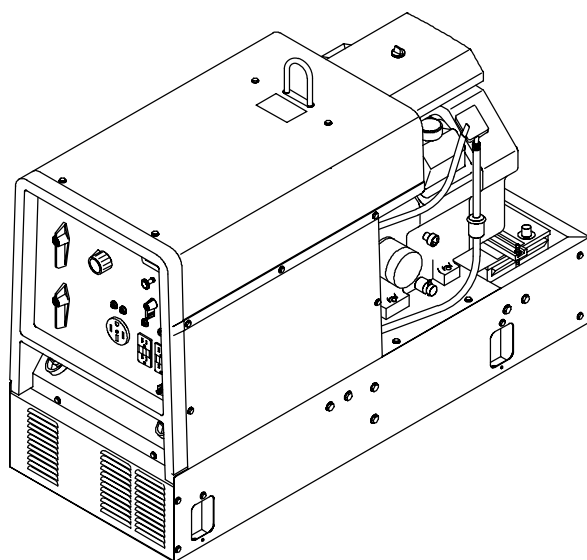


June 1996

Form: TM-175 104

Effective With Serial No. KG061736

## SECTION 11 – PARTS LIST



### **Bobcat™ 225G *plus*** **(Kohler-Powered)**

CC/CV AC/DC Welding Generator For SMAW, FCAW, GMAW, GTAW Welding

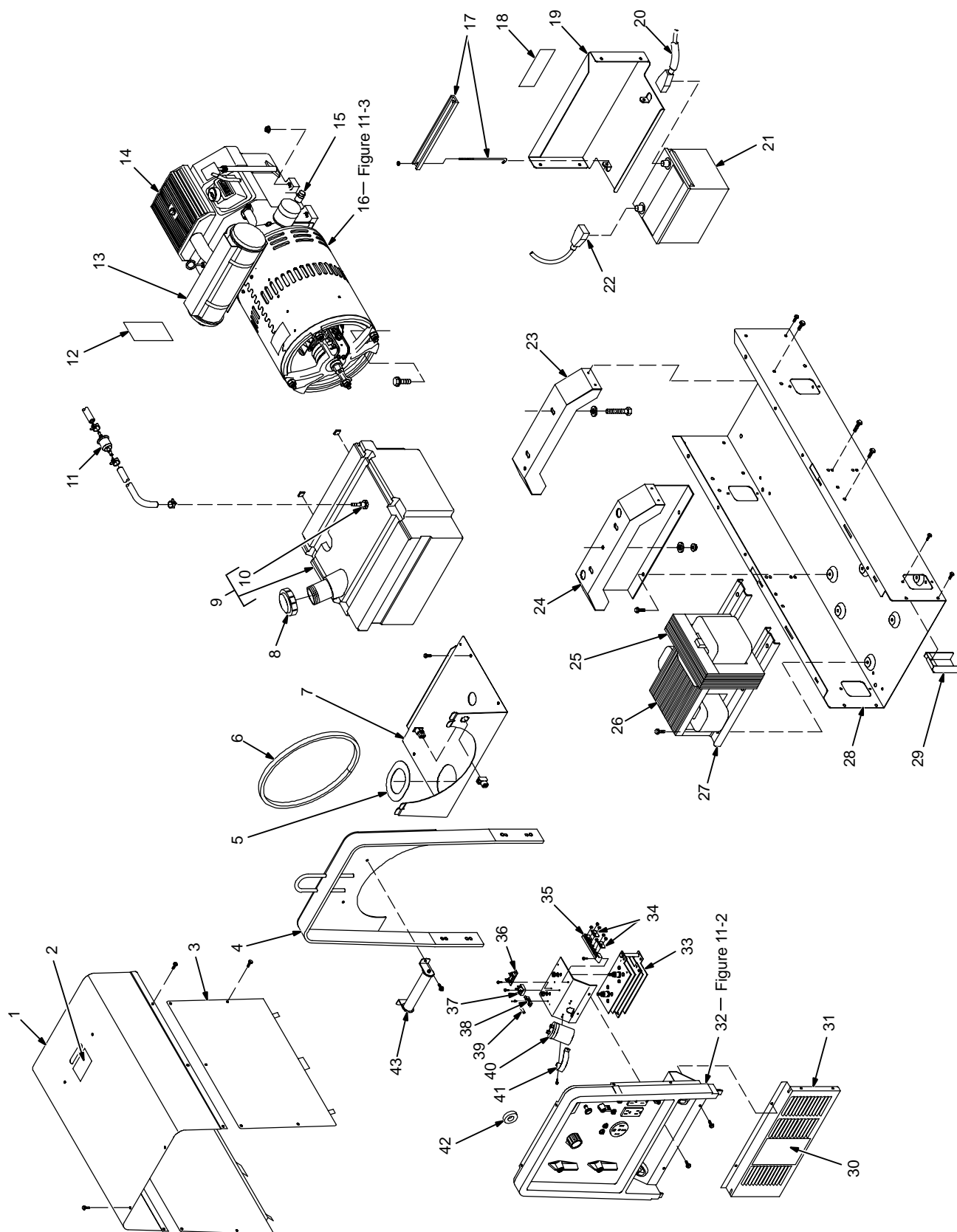


Figure 11-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>Figure 11-1. Main Assembly</b>				
... 1		+159 907	COVER, top	1
... 1	◆	+169 441	COVER, top	1
... 2		108 487	LABEL, warning: falling equipment can cause serious injury	1
... 3		169 329	PANEL, side	2
... 3	◆	169 442	PANEL, side	2
... 4		159 914	UPRIGHT, base	1
... 5		168 640	SEAL, tank fuel filler neck	1
... 6		164 928	SEAL, barrel 11.78 ID x .378thk	1
... 7		178 497	PANEL, rear lower	1
... 8		147 601	CAP, tank screw-on w/vent	1
... 9		178 498	TANK, fuel 8.5gal (consisting of)	1
... 10		178 632	FITTING, stand pipe hose .250 x 7.325 lg	1
... 11		121 652	FILTER KIT, fuel w/clamps	1
... 12		173 088	LABEL, engine maintenance	1
... 13		173 065	MUFFLER, exhaust engine w/heat shield	1
... 14		+173 042	ENGINE, gas elec start (consisting of)	1
... 15		165 271	VALVE, oil drain 3/8-18NPTF	1
...	TS1		SOLENOID, 14VDC .53A (see engine parts list)	1
...			BRACKET, mtg solenoid (see engine parts list)	1
...		180 096	TUNE-UP & FILTER KIT, (consisting of)	1
...		066 698	OIL FILTER	1
...		121 652	FILTER/CLAMPS, fuel	1
...		067 272	ELEMENT, air cleaner	1
...		067 273	AIR FILTER, wrapper	1
...		067 007	SPARK PLUG	2
... 16		Fig 11-3	GENERATOR	1
... 24		182 361	KIT, holddown battery	1
... 18		168 385	LABEL, warning battery explosion can blind	1
... 19		+159 917	DOOR, access battery	1
... 20		173 921	CABLE, bat pos (included w/engine)	1
... 21		168 037	BATTERY, stor 12V 430crk 75rsv GP58 dry	1
... 22		082 319	CABLE, bat neg	1
...		172 669	CABLE, bat neg	1
... 23		173 043	BRACKET, mtg engine	1
... 24		165 660	BRACKET, mtg generator	1
... 25	DC-Z	165 578	STABILIZER	1
... 26	AC-Z	176 301	REACTOR	1
... 27		164 920	BRACKET, mtg stab/reactor	2
... 28		159 906	PAN, base	1
... 29		160 844	COVER, base	4
... 30		165 817	LABEL, warning general precautionary	1
... 31		+159 911	PANEL, front lower	1
... 32		Fig 11-2	PANEL, front w/components	1
... 33	SR1	142 503	RECTIFIER, si 1 ph 300A 400PIV	1
... 34		173 734	LINK, jumper	2
... 35	1T	172 661	BLOCK, stud connection 6 position	1
... 36	D4	135 184	DIODE BOARD	1
... 37	SR2	035 704	RECTIFIER, integ 40A 800V	1
... 38		172 731	HOLDER, fuse mintr	1
... 39	F1	*169 296	FUSE, mintr gl 25A 125V	1
... 40	C1	176 719	CAPACITOR, elctlt 1000uf 75VDC	1
... 41		177 136	CLAMP, capacitor 2.500dia clip	1
... 42	CT1	179 494	TRANSFORMER, current sensing	1
... 43	R2	165 599	RESISTOR, WW adj 225W 0-6 ohm	1
...	RC4	116 045	CONNECTOR & PINS	1
...	PLG6	136 810	CONNECTOR & PINS	1
...	PLG4		CONNECTOR, (see engine parts list)	1
...	RC6	168 844	CONNECTOR, rect 4 pin/skt rcpt	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

◆ Part of Optional 043 051 Stainless Steel kit.

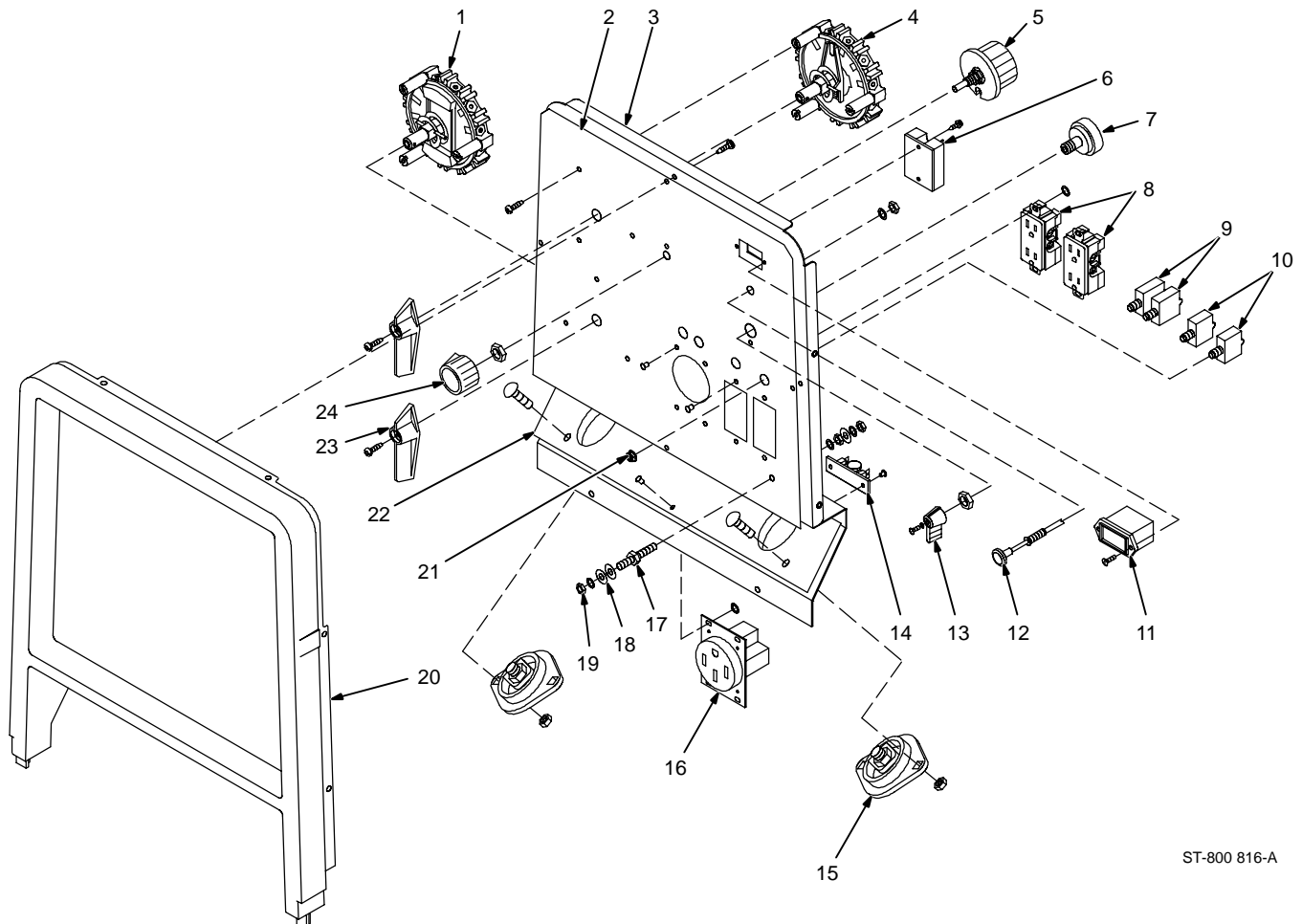
\*Recommended Spare Parts.

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
----------	------------	----------	-------------	----------

**Figure 11-2. Panel, Front w/Components (Fig 11-1 Item 44)**

...	1	S1	162 671	..	SWITCH, polarity 5 position	1
...	2				NAMEPLATE, (order by model and serial number)	1
...	3		165 602	..	PANEL, front	1
...	4	S3	165 487	..	SWITCH, selector 4 position	1
...	5	R1	117 243	..	RHEOSTAT, WW 100W 10 ohm	1
...	6	PC1	142 724	..	MODULE, pull to idle 5 pin	1
...	7	S2	176 606	..	SWITCH, ignition 4 position w/out handle (Eff w/KG160360)	1
...	7	S2	172 070	..	SWITCH, ignition 5 position w/out handle (Prior to KG160360)	1
...	8	GFCI2,3	147 939	..	RECEPTACLE, str dx grd 2P3W 15A 125V	2
...	9	CB1,2	117 501	..	CIRCUIT BREAKER, man reset 1P 40A 250VAC	2
...	10	CB3,4	093 996	..	CIRCUIT BREAKER, man reset 1P 20A 250VAC	2
...	11	HM	145 247	..	METER, hour 12-24VDC	1
...	12		175 010	..	CONTROL, push/pull	1
...	13		119 014	..	LEVER, switch	1
...	14	R3,VR1	046 819	..	SUPPRESSOR	1
...	15	Work, Elect	099 255	..	TERMINAL, pwr output neutral	2
...	16	RC1	164 704	..	RECEPTACLE, str 3P4W 50A 125/250V	1
...	17		083 030	..	STUD, brs .250-20 x 1.750	1
...	18		010 915	..	WASHER, flat .250 ID brs	3
...	19		601 836	..	NUT, .250-20 brs	3
...	20		159 921	..	BEZEL	1
...	21		147 195	..	NUT, .375-27 nyl	4
...	22		148 956	..	HANDLE, switch	2
...	23		097 924	..	KNOB, pointer	1



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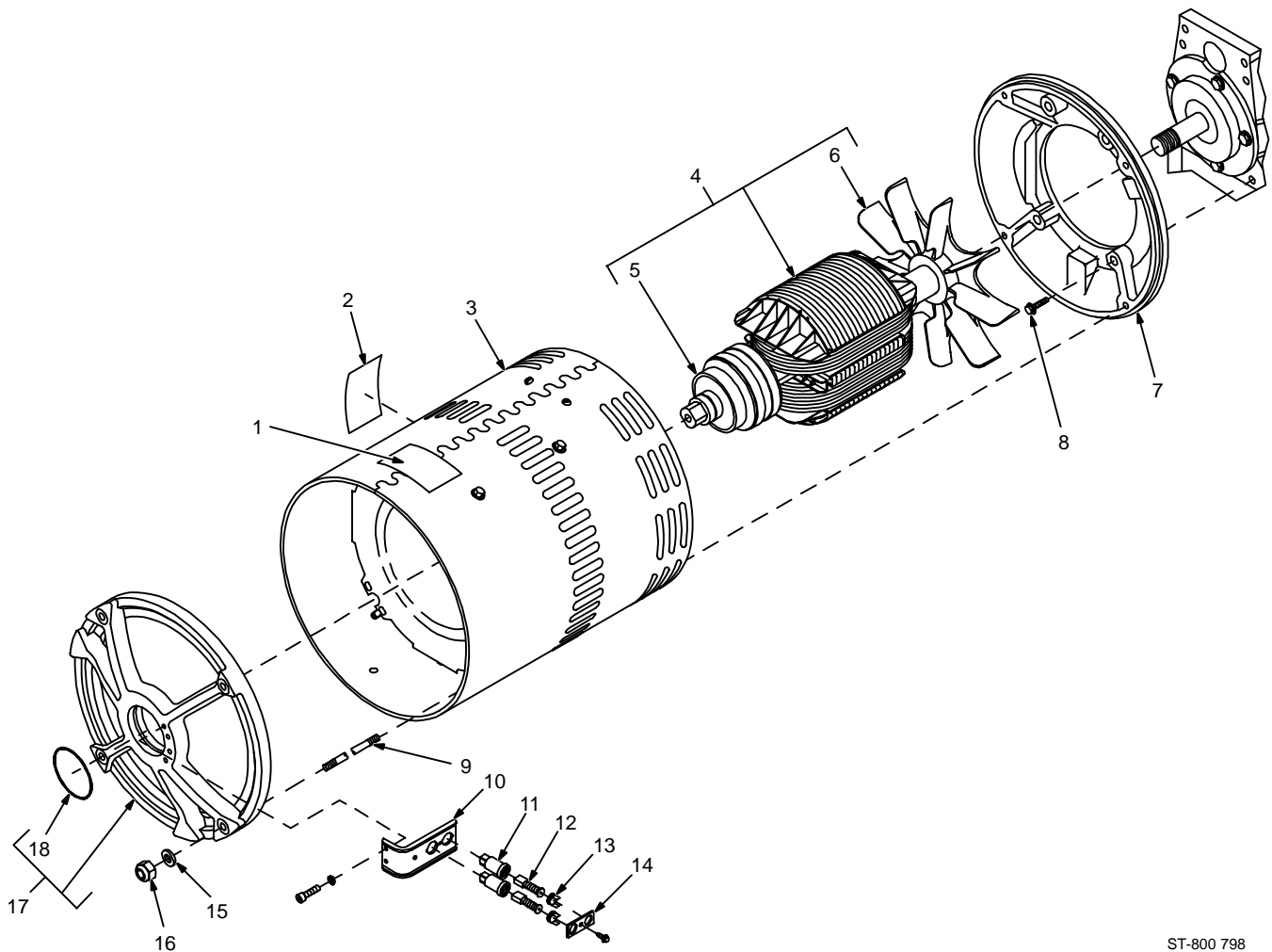
**Figure 11-2. Panel, Front w/Components**

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

Item No.	Part No.	Description	Quantity
----------	----------	-------------	----------

**Figure 11-3. Generator (Fig 11-1 Item 21)**

...	1	...	013 367	..	LABEL, warning moving parts can cause serious injury	...	1
...	2	...	165 818	..	LABEL, warning engine fuel can cause fire	...	1
...	3	...	+179 500	..	STATOR, generator	...	1
...	4	...	159 909	..	ROTOR, generator (consisting of)	...	1
...	5	...	053 390	...	BEARING, ball rdl sgl row 1.370 x 2.830 x .6	...	1
...	6	...	160 566	...	FAN, rotor	...	1
...	7	...	172 683	..	ADAPTER, engine	...	1
...	8	...	142 156	..	SCREW, .375-16 x 1.750hexhd	...	4
...	9	...	160 573	..	STUD, stl .375-16 x 17.125	...	4
...	10	...	125 548	..	HOLDER, brush elect	...	1
...	11	...	005 614	..	HOLDER, brush	...	2
...	12	...	*126 984	..	BRUSH w/SPRING	...	2
...	13	...	161 306	..	CAP, brushholder	...	2
...	14	...	047 879	..	BAR, retaining brushholder	...	1
...	15	...	010 910	..	WASHER, flat .406 ID stl	...	4
...	16	...	010 909	..	NUT, .375-16 stl	...	4
...	17	...	160 943	..	ENDBELL, (consisting of)	...	1
...	18	...	143 220	...	O-RING, 2.859 ID x .139CS	...	1



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**Figure 11-3. Generator**

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

\*Recommended Spare Parts.

**BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.**

## Notes

## Notes

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