



TM-4414K

2013-01

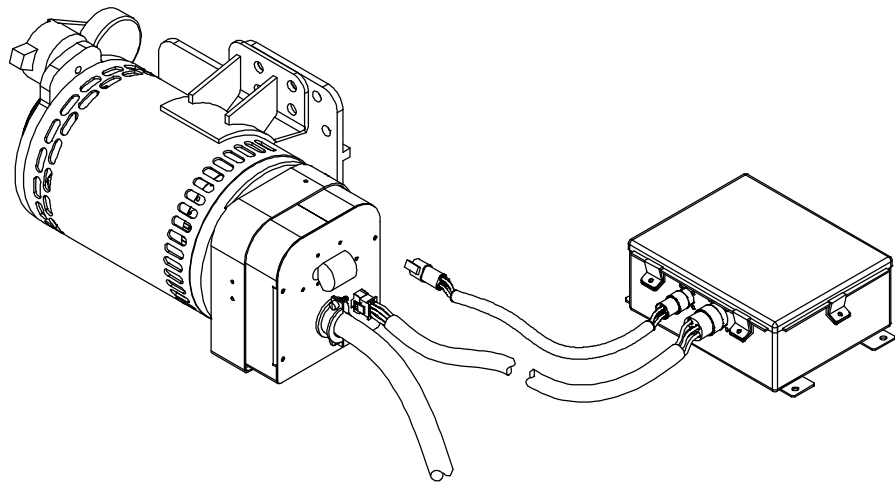
Eff. w/LC199488

Description



Belt/Hydraulic-Driven Generator For
Welding Power Sources

Belt-Drive Generator Hydraulic-Drive Generator



Visit our website at
www.MillerWelds.com

TECHNICAL MANUAL

INFORMATION ON OLDER UNITS


 This manual includes operating information for current units. To obtain specific operating information for older models, contact JLG Service at 1-877-554-5438.

TABLE OF CONTENTS

SECTION 1 – SAFETY PRECAUTIONS FOR SERVICING	1
1-1. Symbol Usage	1
1-2. Servicing Hazards	1
1-3. California Proposition 65 Warnings	3
1-4. EMF Information	3
SECTION 2 – DEFINITIONS	4
2-1. Symbol Definitions	4
SECTION 3 – SPECIFICATIONS	4
3-1. Description	4
3-2. Specifications	4
3-3. Generator Dimensions And Weight	5
3-4. Controller Dimensions And Weight	5
3-5. AC Power Curve	6
SECTION 4 – MAINTENANCE	7
4-1. Maintenance Schedule	7
4-2. Overload Protection	7
SECTION 5 – THEORY OF OPERATION	8
SECTION 6 – TROUBLESHOOTING	9
6-1. Troubleshooting Table	9
6-2. Troubleshooting Circuit Diagram For Welding Generator	12
6-3. Waveforms For Section 6-2	14
6-4. Power Board PC1 Testing Information	15
6-5. Power Board PC1 Test Point Values	15
6-6. Control Board PC2 Testing Information	16
6-7. Control Board PC2 Test Point Values	16
6-8. Inspecting Brushes, Replacing Brushes, And Cleaning Slip Rings	17
6-9. Setting Control Board PC2 For 50 Hz Operation	18
6-10. Checking Unit Output After Servicing	19
SECTION 7 – DISASSEMBLY AND REASSEMBLY	20
7-1. Disassembling/Reassembling Generator	20
SECTION 8 – ELECTRICAL DIAGRAMS	21
SECTION 9 – PARTS LIST FOR LC199488 AND FOLLOWING	28

SECTION 1 – SAFETY PRECAUTIONS FOR SERVICING

 Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.

1-1. Symbol Usage

OM-4414L - 2013-01, safety_rtm 2011-10



DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE – Indicates statements not related to personal injury.

1-2. Servicing Hazards



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.



Only qualified persons should test, maintain, and repair this unit.



During servicing, keep everybody, especially children, away.



ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Stop engine and remove input power plug from receptacle (if applicable) before testing or repairing unit unless the procedure specifically requires an energized unit.
- Insulate yourself from ground by standing or working on dry insulating mats big enough to prevent contact with the ground.
- Do not leave live unit unattended.
- If this procedure requires an energized unit, have only personnel familiar with and following standard safety practices do the job.
- When testing live unit, use the one-hand method. Do not put both hands inside unit. Keep one hand free.

SIGNIFICANT DC VOLTAGE exists in inverter power sources AFTER stopping engine.

- Stop engine on inverter and discharge input capacitors according to instructions in Troubleshooting Section before touching any parts.

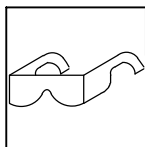


MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep away from pinch points such as drive rolls.
- Have only qualified people remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- Keep hands, hair, loose clothing, and tools away from moving parts.



- Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.
- Block flywheel so that it will not turn while working on generator components.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.



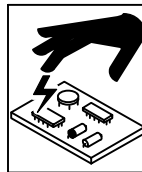
FLYING METAL or DIRT can injure eyes.

- Wear safety glasses with side shields or face shield during servicing.
- Be careful not to short metal tools, parts, or wires together during testing and servicing.

 Indicates special instructions.

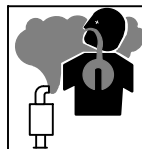


This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



Using a generator indoors CAN KILL YOU IN MINUTES.

- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- NEVER use inside a home or garage, EVEN IF doors and windows are open.
- Only use OUTSIDE and far away from windows, doors, and vents.

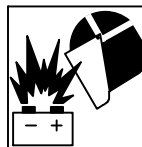


FUEL can cause fire or explosion.

- Stop engine and let it cool off before checking or adding fuel.
- Do not add fuel while smoking or if unit is near any sparks or open flames.
- Do not overfill tank; clean up any spilled fuel.

FIRE OR EXPLOSION hazard.

- Do not place unit on, over, or near combustible surfaces.
- Do not service unit near flammables.



BATTERY EXPLOSION can BLIND.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles.
- Observe correct polarity (+ and -) on batteries.
- Disconnect negative (-) cable first and connect it last.



BATTERY ACID can BURN SKIN and EYES.

- Do not tip battery.
- Replace damaged battery.
- Flush eyes and skin immediately with water.



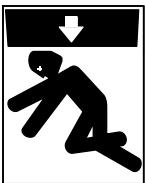
STEAM AND HOT COOLANT can burn.

- If possible, check coolant level when engine is cold to avoid scalding.
- Always check coolant level at overflow tank, if present on unit, instead of radiator.
- If the engine is warm, checking is needed, and there is no overflow tank, follow the next two statements.
- Wear safety glasses and gloves and put a rag over radiator cap.
- Turn cap slightly and let pressure escape slowly before completely removing cap.



ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away from servicing areas until consulting their doctor and the device manufacturer.



FALLING EQUIPMENT can injure.

- Use lifting eye to lift unit and properly installed accessories only, NOT gas cylinders. Do not exceed maximum lift eye weight rating (see Specifications).
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94-110) when manually lifting heavy parts or equipment.



HOT PARTS can burn.

- Do not touch hot engine parts bare-handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

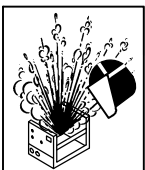


TILTING OR TIPPING can injure.

- Do not put any body part under unit while lifting.
- Always use proper equipment (hoists, slings, chains, blocks, etc.) of adequate capacity to lift and support components (stator, rotor, engine, etc.) as needed during job.

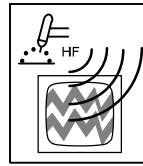
PINCH POINTS can injure.

- Be careful when working on stator and rotor assemblies.



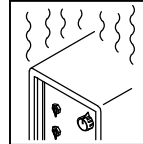
EXPLODING PARTS can injure.

- Failed parts can explode or cause other parts to explode when power is applied to inverters.
- Always wear a face shield and long sleeves when servicing inverters.



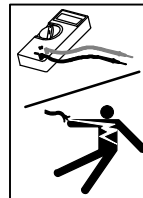
H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- 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.



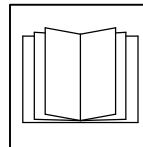
OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



SHOCK HAZARD from testing.

- Stop engine or turn Off welding power source (if applicable) before making or changing meter lead connections.
- Use at least one meter lead that has a self-retaining spring clip such as an alligator clip.
- Read instructions for test equipment.



READ INSTRUCTIONS.

- Use Testing Booklet (Part No. 150 853) when servicing this unit.
- Consult the Owner's Manual for welding safety precautions.
- Use only genuine replacement parts from the manufacturer.
- Read and follow all labels and the Technical Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Reinstall injectors and bleed air from fuel system according to engine manual.



HYDRAULIC EQUIPMENT can injure or kill.

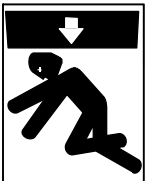
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Do not work on hydraulic system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter hydraulic pump or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the hydraulic system.
- Keep away from potential pinch points or crush points created by equipment connected to the hydraulic system.
- Do not work under or around any equipment that is supported only by hydraulic pressure. Properly support equipment by mechanical means.



HYDRAULIC FLUID can injure or kill.

- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting hydraulic lines.
- Check hydraulic system components and all connections and hoses for damage, leaks, and wear before operating unit.
- Wear protective equipment such as safety glasses, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on hydraulic system.

- Use a piece of paper or cardboard to search for leaks—never use bare hands. Do not use equipment if leaks are found.
- HYDRAULIC FLUID is FLAMMABLE—do not work on hydraulics near sparks or flames; do not smoke near hydraulic fluid.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.

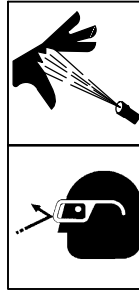


COMPRESSED AIR EQUIPMENT can injure or kill.

- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.

- Do not work on compressed air system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter compressor or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the compressed air system.

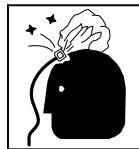
- Keep away from potential pinch points or crush points created by equipment connected to the compressed air system.
- Do not work under or around any equipment that is supported only by air pressure. Properly support equipment by mechanical means.



COMPRESSED AIR can injure or kill.

- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting air lines.
- Check compressed air system components and all connections and hoses for damage, leaks, and wear before operating unit.

- Do not direct air stream toward self or others.
- Wear protective equipment such as safety glasses, hearing protection, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on compressed air system.
- Use soapy water or an ultrasonic detector to search for leaks—never use bare hands. Do not use equipment if leaks are found.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY air is injected into the skin or body seek medical help immediately.



TRAPPED AIR PRESSURE AND WHIPPING HOSES can injure.

- Release air pressure from tools and system before servicing, adding or changing attachments, or opening compressor oil drain or oil fill cap.

1-3. California Proposition 65 Warnings

- ⚠ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**
- ⚠ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**
- ⚠ **This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. Wash hands after use.**

For Gasoline Engines:

- ⚠ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

For Diesel Engines:

- ⚠ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

1-4. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). Welding current creates an EMF field around the welding circuit and welding equipment. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passers-by or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.


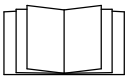








4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – DEFINITIONS

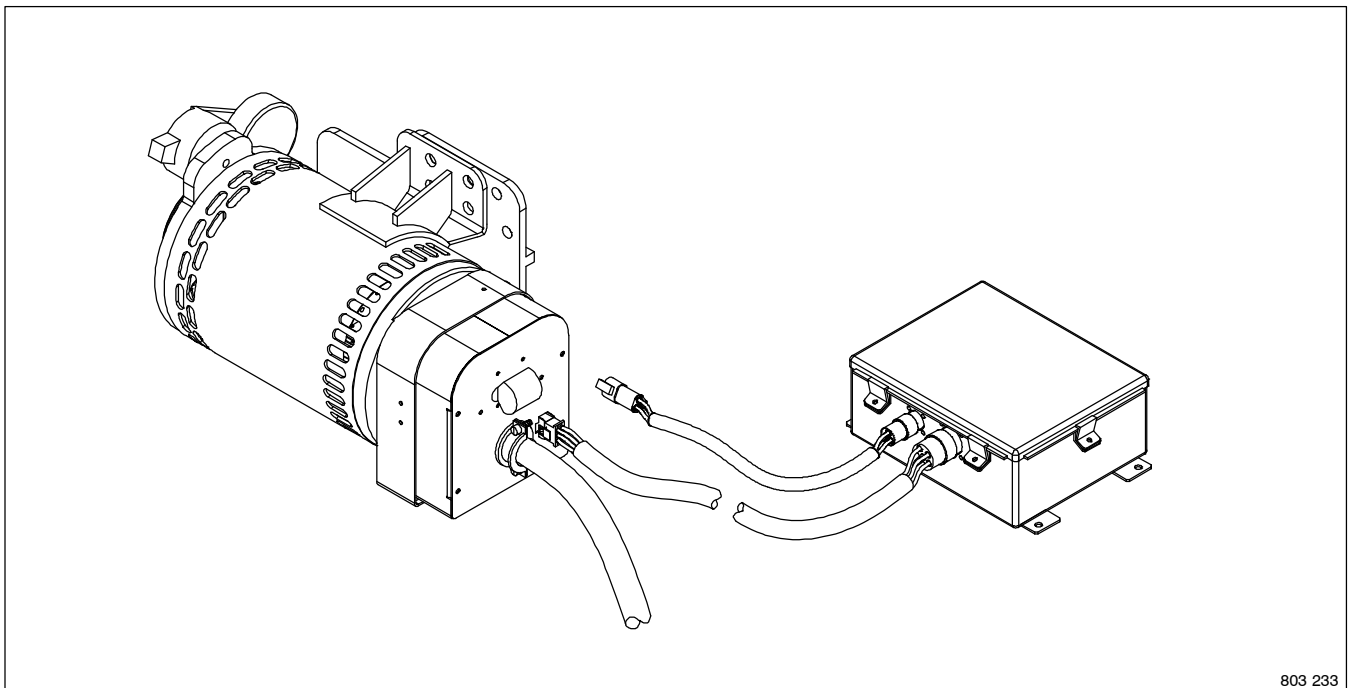
2-1. Symbol Definitions

	Circuit Breaker		Read Operator's Manual	A	Amperes	V	Volts
+	Positive	—	Negative		Alternating Current (AC)		Output
	Time	h	Hours		Temperature		Protective Earth (Ground)
			Welding Arc (Electrode)		Work Connection		Voltage Input

SECTION 3 – SPECIFICATIONS

3-1. Description

This belt or hydraulically-driven generator supplies ac power to the platform to run tools through an ac receptacle, and also operate lights, and cutting and welding equipment. All power regulation components are located in a water-tight box that is connected by cable to the generator. The generator supplies power when running at the specified speed with the Power switch on (switch is located on platform). A 3-pole, 30 Amp circuit breaker protects the generator from overload.

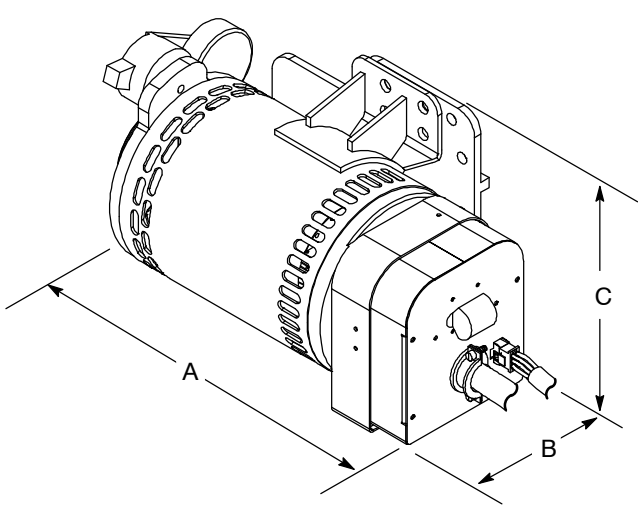


803 233

3-2. Specifications

Drive-Type	Output	Generator Speed
Belt-Drive/Pulley	Single-Phase, 6 kVA/kW, 25 A, 120/240 V, 50/60 Hz 1.0 Power Factor 100% Duty Cycle	3000 rpm (50 Hz) 3600 rpm (60 Hz)
Hydraulic	Three-Phase 7.5 kVA/kW, 18 A, 240 V, 50/60 Hz, 1.0 Power Factor 100% Duty Cycle	

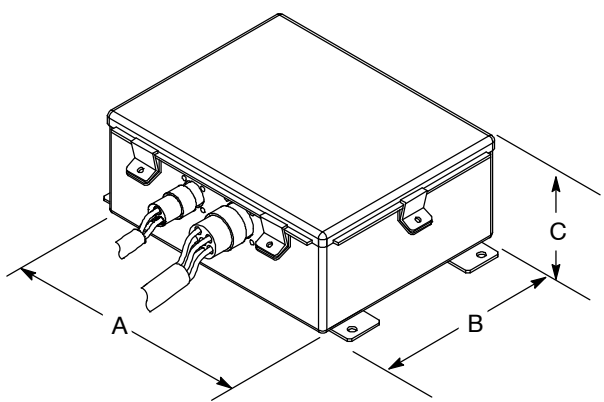
3-3. Generator Dimensions And Weight

Dimensions		
A	20-1/2 in (521 mm)	
B	9 in (229 mm)	
C	13 in (330 mm)	
Weight		
110 lb (50 kg)		

A belt-driven model is shown.

803 233

3-4. Controller Dimensions And Weight

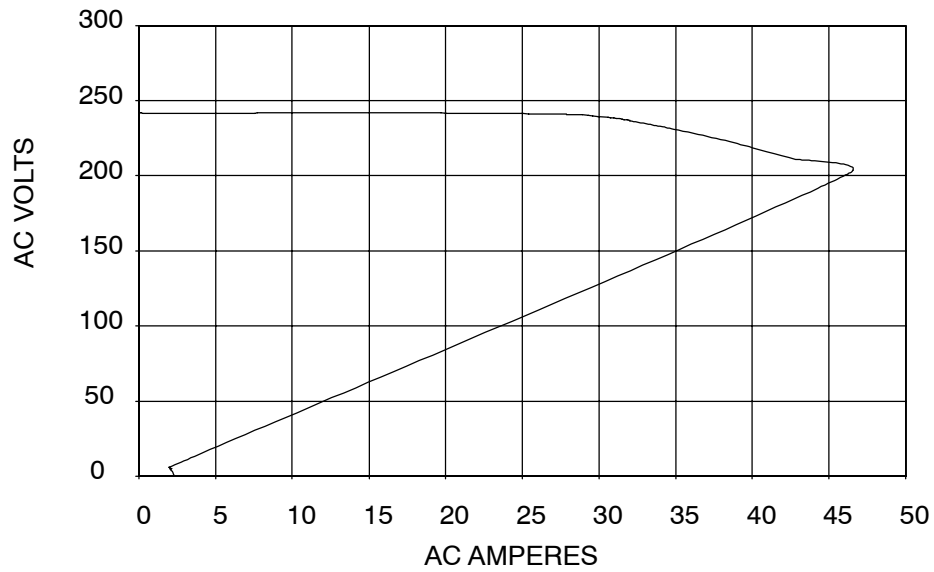
Dimensions		
A	11-1/2 in (292 mm)	
B	9-1/2 in (241 mm)	
C	4-1/2 in (114 mm)	
Weight		
10 lb (5 kg)		

803 233

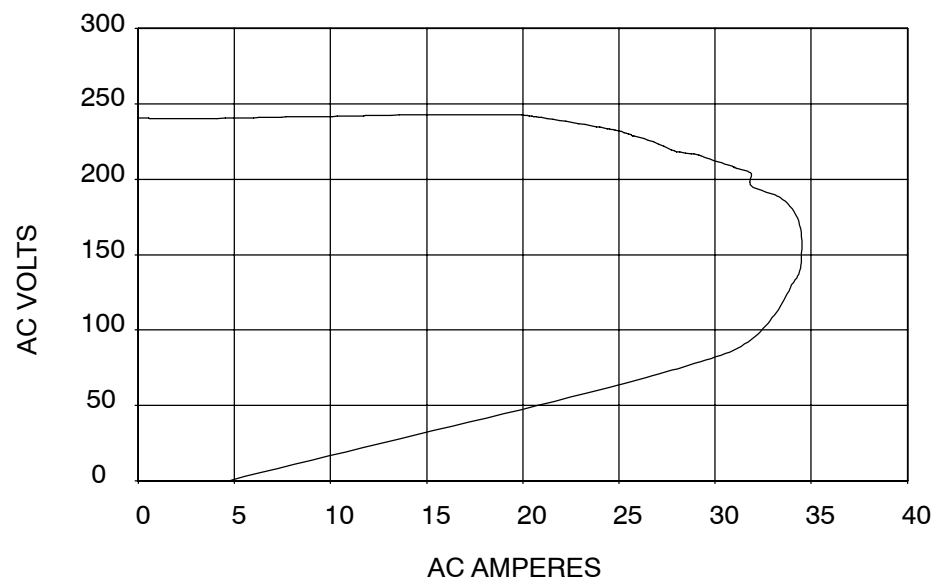
3-5. AC Power Curve

The ac power curve shows the power in amperes available from the generator.

A. 6 kVA/Kw Single-Phase Output



B. 7.5 kVA/kW Three-Phase Output



SECTION 4 – MAINTENANCE

4-1. Maintenance Schedule

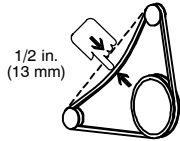


⚠ Stop engine before maintaining.

☞ *Service more often if used in severe conditions.*

* To be done by Factory Authorized Service Agent.

🕒 Every 250 h



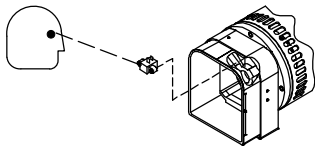
1/2 in.
(13 mm)

Check Belt
Tension
(Belt-Driven
Models Only)

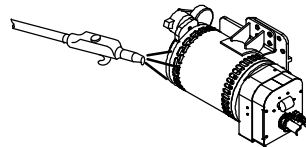


Replace
Unreadable
Labels.

🕒 Every 500 h



Service Welding Generator
Brushes And Slip Rings. Service
More Often In Dirty Conditions.*



Blow Out Inside Of
Generator.
During Heavy Service,
Clean Monthly.

4-2. Overload Protection



⚠ Stop engine.

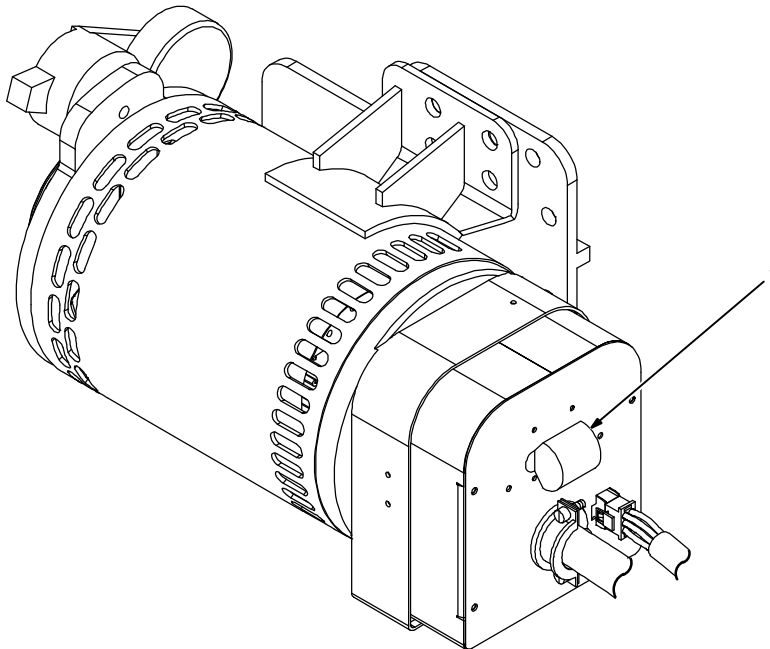
☞ *When a circuit breaker opens, it usually indicates a more serious problem exists. Contact Factory Authorized Service Agent.*

Open cover to access generator.

1 Circuit Breaker CB1

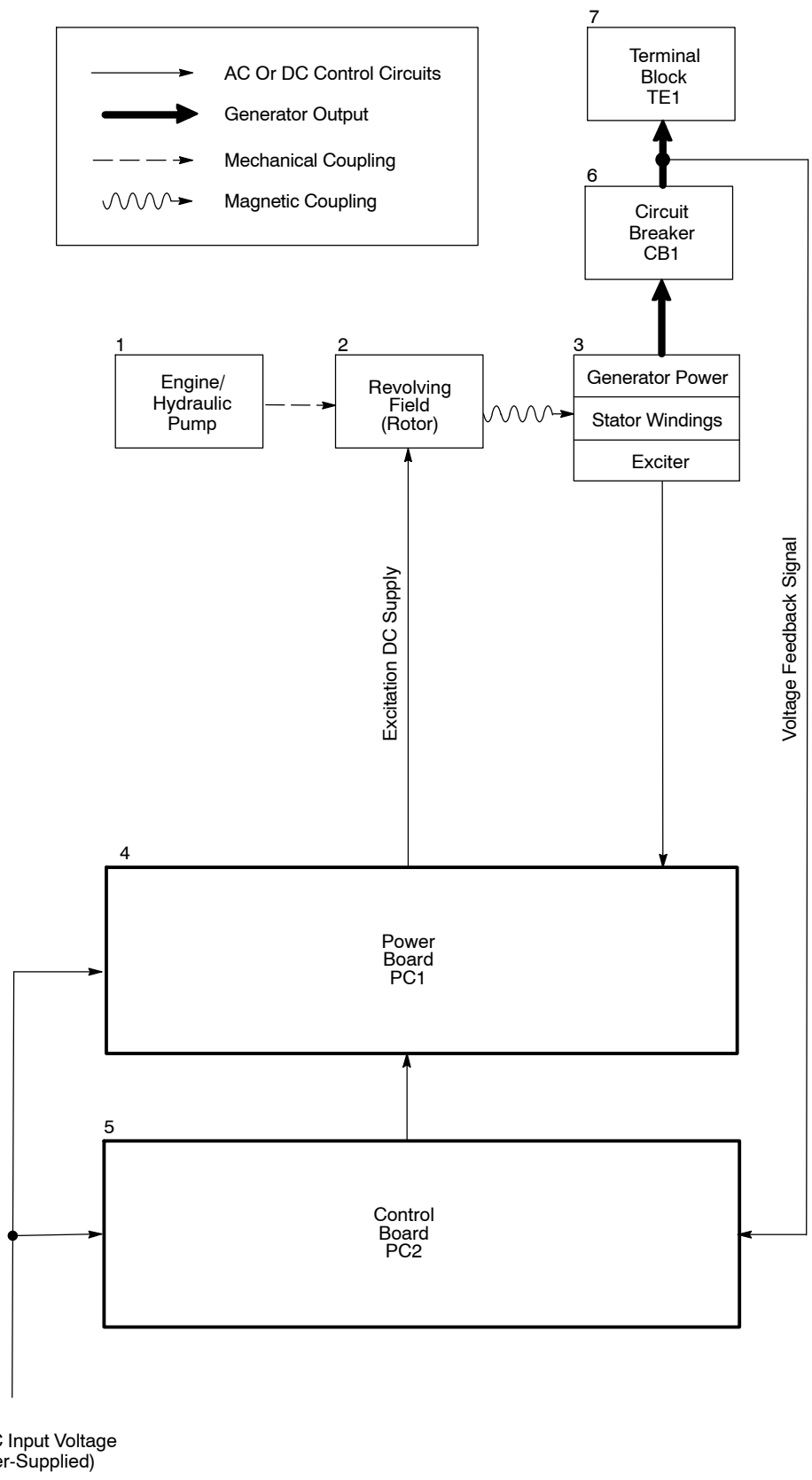
CB1 protects the generator windings from overload. If CB1 opens, generator output stops.

Close covers before operating unit.



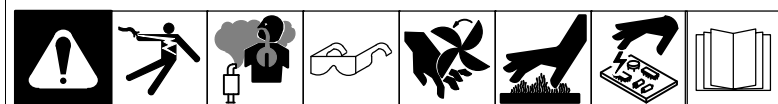
SECTION 5 – THEORY OF OPERATION

- 1 Engine/Hydraulic Pump
Supplies force to turn revolving field (rotor).
- 2 Revolving Field (Rotor)
Turns at 3000 rpm (50 Hz) or 3600 rpm (60 Hz). The speed and excitation current of the field coils determine voltages in stator windings.
- 3 Stator Windings
Supply power to exciter and generator power circuits.
- 4 Power Board PC1
Works with PC2 to adjust output by changing revolving field current after comparing feedback from PC2 to generator open-circuit voltage.
Uses current feedback signal for current limiting circuit to prevent rotor failure from overheating.
- 5 Control Board PC2
Works with PC1 to regulate revolving field current. The PWM (pulse width modulation) signal originates on PC2 and is sent to PC1.
- 6 Generator Power Circuit Breaker CB1
Protects the generator windings from overload.
- 7 Terminal Block TE1
Provides connection point for customer supplied equipment and receptacles.



SECTION 6 – TROUBLESHOOTING

6-1. Troubleshooting Table



☞ See Section 6-2 for test points and values and Section 9 and following for parts location.

☞ Use MILLER Testing Booklet (Part No. 150 853) when servicing this unit.

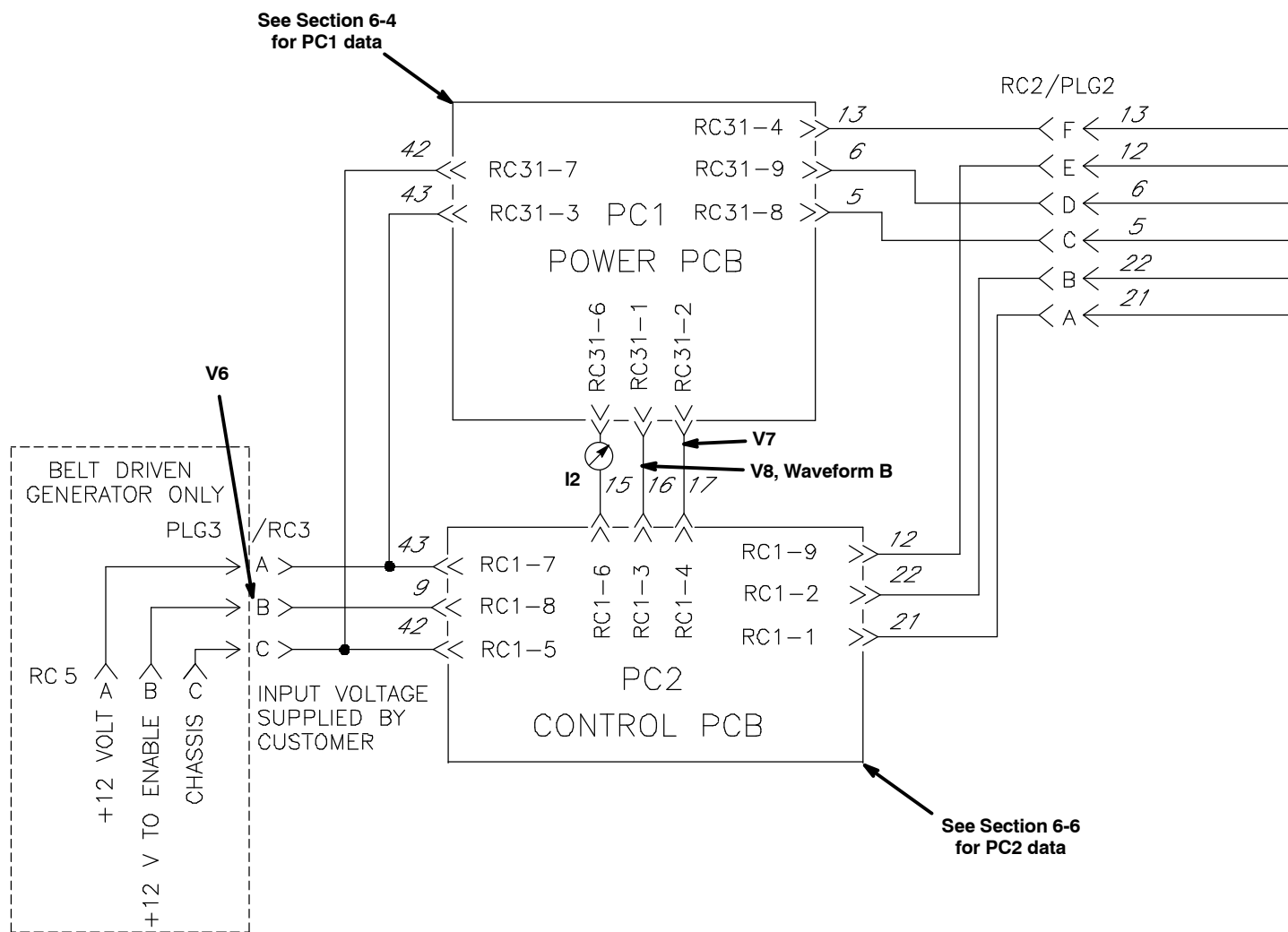
☞ To avoid charges that are not covered under warranty, troubleshoot and replace components as described. Warranty requests on equipment that could have been repaired in the field or are misdiagnosed may be denied. Do not return the generator unless indicated by the troubleshooting guide and factory authorized service agent. Do not return the control box. Troubleshoot to the circuit board level.

Trouble	Remedy
No generator output at platform AC receptacles.	Be sure generator control switch is turned on at platform.
	Check and secure electrical connections at platform, generator, and control box.
	Be sure all equipment is turned off when starting unit.
	Reset circuit breaker CB1 (see Section 4-2).
	Check plug PLG3 connection and/or connections at receptacles RC3 and RC5.
	Be sure +12 volts DC input voltage is being supplied to control box.
	Check slip rings, wiring to brushes, and brush position on slip rings. Install new brushes if necessary. See Section 6-8.
	Disconnect leads 12 and 13 from brushes, and check continuity across slip rings (nominal reading is 26 ohms). Replace generator if rotor is open.
	Disconnect stator weld leads 1, 2, and 3 from circuit breaker CB1, and check continuity between leads. Replace generator if necessary.
	Disconnect plug PLG4 and check continuity between exciter leads 5 and 6. Replace generator if necessary.
	Check power board PC1 and connections, and replace if necessary (see Section 6-4).
Check control board PC2 and connections, and replace if necessary (see Section 6-4).	
Low generator output at platform AC receptacles.	Verify generator is running at 3600 rpm (60 Hz) or 3000 rpm (50 Hz).
	Check slip rings, wiring to brushes, and brush position on slip rings. Install new brushes if necessary. See Section 6-8.
	Disconnect leads 12 and 13 from brushes, and check continuity across slip rings nominal reading is 26 ohms). Replace generator if rotor is open.
	Disconnect stator weld leads 1, 2, and 3 from circuit breaker CB1, and check continuity between leads. Replace generator if necessary.
	Disconnect plug PLG4 and check continuity between exciter leads 5 and 6. Replace generator if necessary.
	Check power board PC1 and connections, and replace if necessary (see Section 6-4).
	Check control board PC2 and connections, and replace if necessary (see Section 6-4).
High generator output at platform AC receptacles.	Verify generator is running at 3600 rpm (60 Hz) or 3000 rpm (50 Hz).
	Check slip rings, wiring to brushes, and brush position on slip rings. Install new brushes if necessary. See Section 6-8.
	Check power board PC1 and connections, and replace if necessary (see Section 6-4).
	Check control board PC2 and connections, and replace if necessary (see Section 6-4).

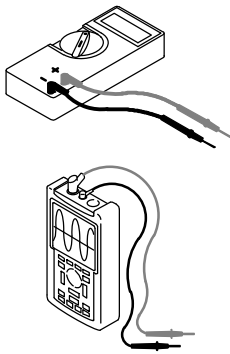
Trouble	Remedy
Erratic generator output at platform AC receptacles.	Check and secure electrical connections at platform, generator, and control box.
	Verify generator is running at 3600 rpm (60 Hz) or 3000 rpm (50 Hz).
	Check slip rings, wiring to brushes, and brush position on slip rings. Install new brushes if necessary. See Section 6-8.
	Disconnect leads 12 and 13 from brushes, and check continuity across slip rings nominal reading is 26 ohms). Replace generator if rotor is open.
	Check power board PC1 and connections, and replace if necessary (see Section 6-4).
	Check control board PC2 and connections, and replace if necessary (see Section 6-4).

6-2. Troubleshooting Circuit Diagram For Welding Generator

Resistance Values	
a) Tolerance	- ±10% unless specified
b) Condition	- 70°F (21°C); cold machine (no warm-up)
c) Wiring Diagram	- see Section 8
d) Stop generator before checking resistance	
R1	26 ohms
R2	1 ohm
R3 thru R5	Less than 1 ohm



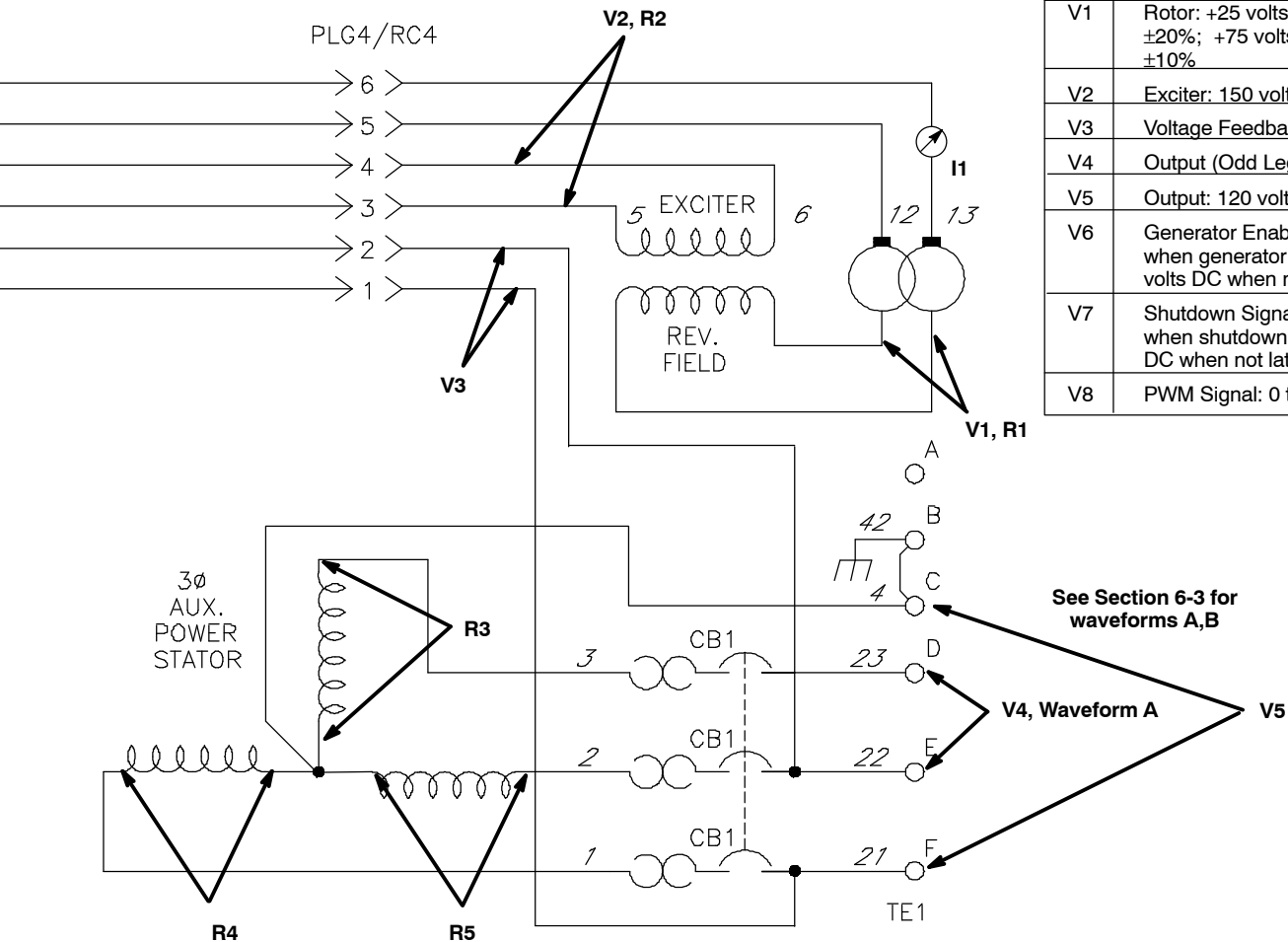
Test Equipment Needed:




Amperage Readings	
a) Tolerance – $\pm 5\%$ unless specified	
b) Condition – 70°F (21°C); cold machine (no warm-up); no load	
I1	1 amps DC (60 Hz) No greater than 3.5 amps DC under load
I2	1 amps DC (60 Hz) No greater than 3.5 amps DC under load



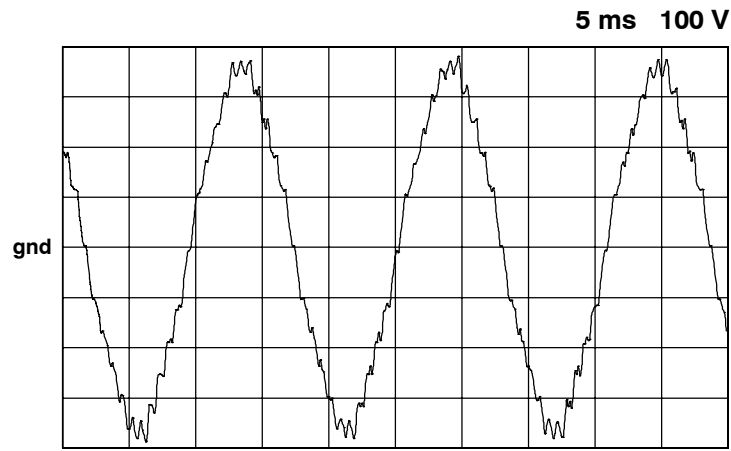
Voltage Readings	
a) Tolerance – $\pm 10\%$ unless specified	
b) Condition – 70°F (21°C); cold machine (no warm-up); no load	
c) Weld/power rpm unless specified	
d) Reference – single arrow: reference to circuit common (lead 42); double arrow: reference to points indicated	
e) Wiring Diagram – see Section 8	
V1	Rotor: +25 volts DC at no load $\pm 20\%$; +75 volts DC at full load $\pm 10\%$
V2	Exciter: 150 volts AC
V3	Voltage Feedback: 240 volts AC
V4	Output (Odd Leg): 245 volts AC
V5	Output: 120 volts AC
V6	Generator Enable: +12 volts DC when generator is enabled (On); 0 volts DC when not enabled (Off)
V7	Shutdown Signal: +12 volts DC when shutdown is latched; 0 volts DC when not latched
V8	PWM Signal: 0 to +15 volts DC



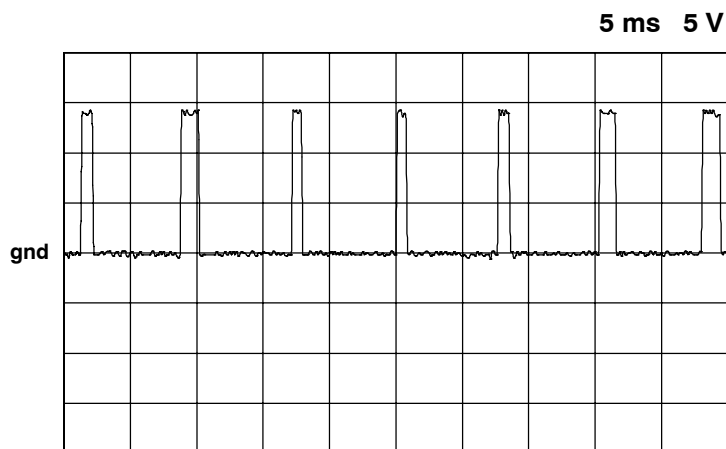
6-3. Waveforms For Section 6-2

 The waveforms represent the output of the generator. When operating properly, the generator waveforms match those shown here.

Waveforms shown are for 60 Hertz models; waveforms for 50 Hertz models are similar



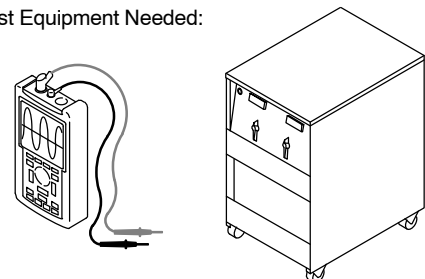
A. Generator Open-Circuit Voltage, No Load, 60 Hz



B. Pulse Width Modulation (PWM) Signal Between Power Board PC1 And Control Board PC2



Test Equipment Needed:



6-4. Power Board PC1 Testing Information

Be sure plugs are secure before testing. See Section 6-5 for specific values during testing.

- 1 Power Board PC1
- 2 Receptacle RC31

Receptacle RC31 was previously labeled RC14.

Test Equipment Needed:

803 236 / Ref. 209 400

6-5. Power Board PC1 Test Point Values

PC1 Voltage Readings

- a) **Tolerance** - $\pm 10\%$ unless specified
- b) **Condition** - no load; generator running at 3000 (50 Hz) or 3600 rpm (60 Hz)
- c) **Reference** - to circuit common (RC31-7) unless noted

Receptacle	Pin	Value
RC31	1	Pulse Width Modulation (PWM) Signal: 0 to +15 volts DC at no load; voltage increases with generator load
	2	Shutdown Signal: +12 volts DC when shutdown is latched; 0 volts DC when shutdown is not latched
	3	+12 volts DC
	4	Revolving field (rotor): +25 volts DC at no load with respect to RC31-6; +75 volts DC at full load with respect to RC31-6
	5	Not used
	6	Revolving field (rotor): +25 volts DC at no load with respect to RC31-4; +75 volts DC at full load with respect to RC31-4
	7	Circuit common
	8	Exciter: 150 volts AC with respect to RC31-9
	9	Exciter: 150 volts AC with respect to RC31-8

6-6. Control Board PC2 Testing Information

Be sure plugs are secure before testing. See Section 6-5 for specific values during testing.

- 1 Power Board PC2
- 2 Receptacle RC1

Test Equipment Needed:

803 236 / 207 883-D

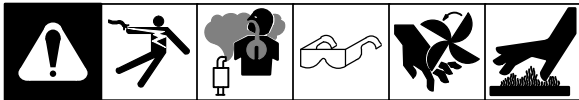
6-7. Control Board PC2 Test Point Values

PC2 Voltage Readings

- Tolerance** - $\pm 10\%$ unless specified
- Condition** - no load; generator running at 3000 (50 Hz) or 3600 rpm (60 Hz)
- Reference** - to circuit common (RC1-5) unless noted

Receptacle	Pin	Value
RC1	1	Voltage Feedback: 240 volts AC with respect to RC1-2
	2	Voltage Feedback: 240 volts AC with respect to RC1-1
	3	Pulse Width Modulation (PWM) Signal: 0 to +15 volts DC at no load; voltage increases with generator load
	4	Shutdown Signal: +12 volts DC when shutdown is latched; 0 volts DC when shutdown is not latched
	5	Circuit common
	6	Revolving field (rotor): +25 volts DC at no load with respect to power board PC1 RC31-4; +75 volts DC at full load with respect to power board PC1 RC31-4
	7	+ 12 volts DC
	8	Enable Line: +12 volts DC when generator is enabled (On); 0 volts DC when generator is not enabled (Off)
	9	Revolving field (rotor): +25 volts DC at no load with respect to power board PC1 RC31-4; +75 volts DC at full load with respect to power board PC1 RC31-4

6-8. Inspecting Brushes, Replacing Brushes, And Cleaning Slip Rings



⚠ Stop generator.

- 1 Brush Holder Assembly
- 2 Brushes
- 3 Slip Rings

Inspecting Brush Position

Inspect brush alignment with slip rings. View brush alignment through air vents in stator barrel. Brushes must ride completely on slip rings.

Inspecting Brushes

Remove end panel. Inspect wires. Remove brush holder assembly. Pull brushes from holders.

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

Cleaning Slip Rings

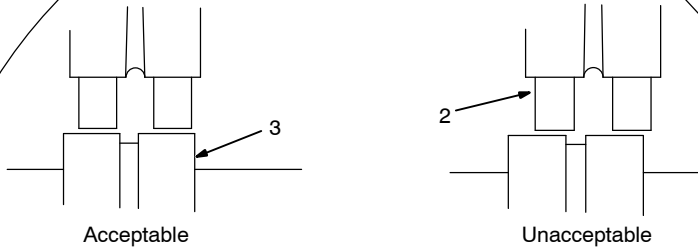
Visually inspect slip rings. Under normal use, rings turn dark brown.

If slip rings are corroded or surface is uneven, remove belt to turn shaft by hand for cleaning.

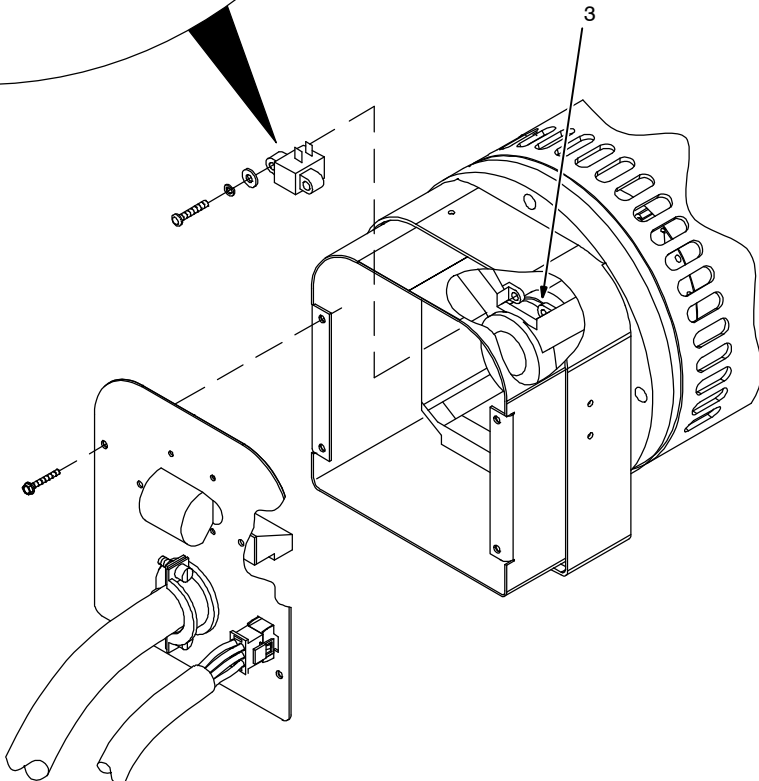
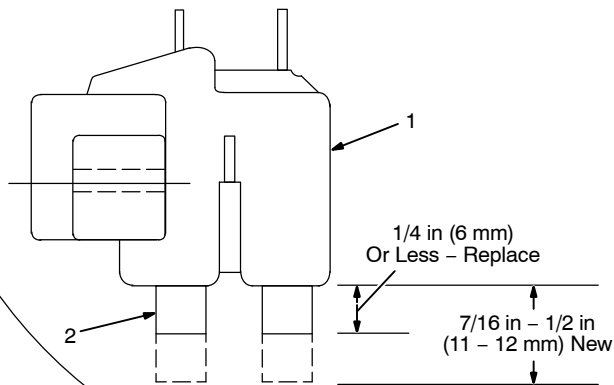
Clean rings with 220 grit emory paper. Remove as little material as possible. If rings are deeply pitted and do not clean up, consult generator factory service.

Reinstall belt, brush holder assembly, and end panel.

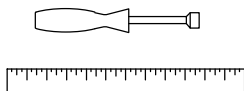
Brush Position On Slip Rings



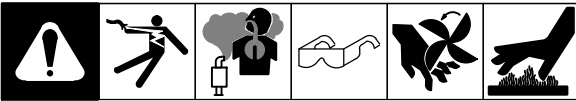
Brushes must ride completely on slip rings



Tools Needed:

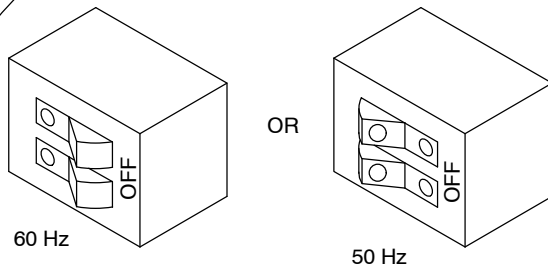


6-9. Setting Control Board PC2 For 50 Hz Operation

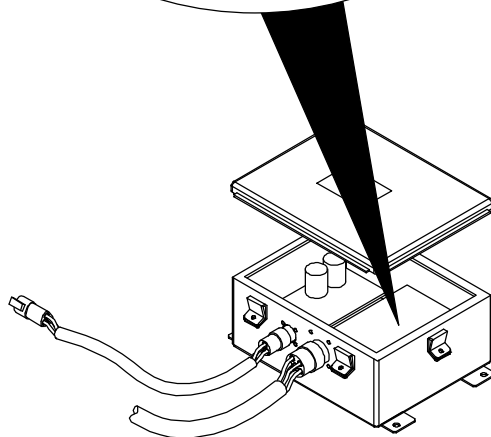
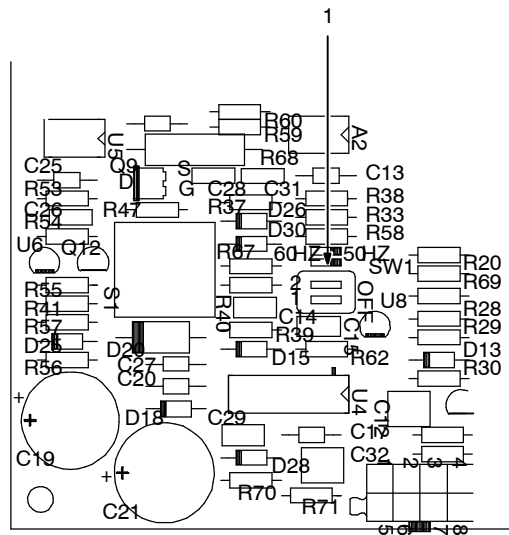


1 DIP Switch SW1

Switch SW1 is factory set for 60 Hz operation. Change switch position if unit is run at 50 Hz.

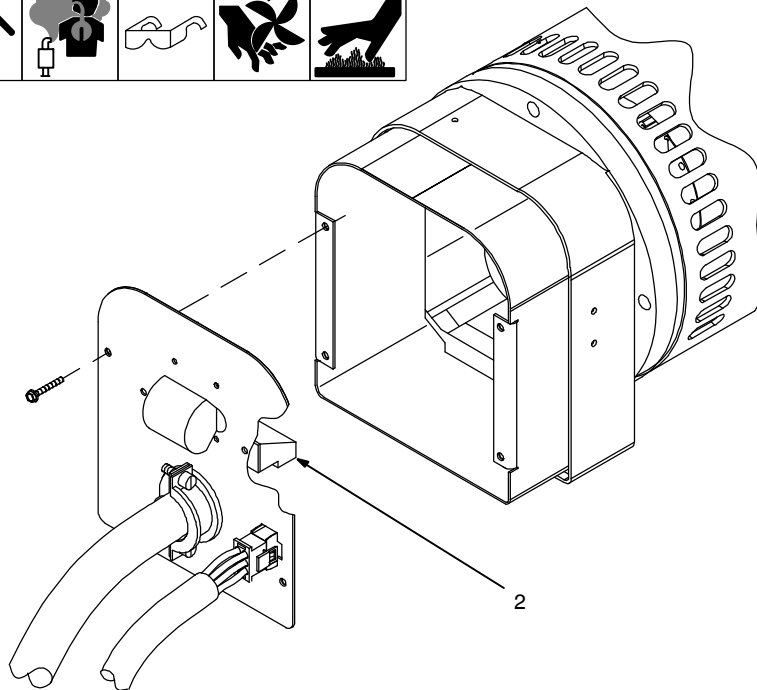
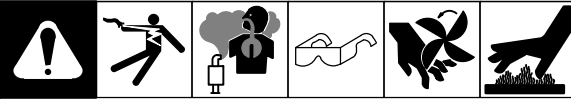


	1	2
60 Hz	ON	ON
50 Hz	OFF	OFF



803 236 / 804 080-A

6-10. Checking Unit Output After Servicing



Pre-Operational Checks

- | |
|--|
| Wipe surfaces clean. |
| Check labels; replace labels that are unreadable or damaged. |
| Clean battery terminals. Tighten connections. |
| Clean outside of entire unit. |

☞ Also use output waveforms to check unit output after servicing (see Section 6-3).

Start generator.

- 1 Platform AC Receptacles (Not Shown)
- 2 Terminal Block TE1

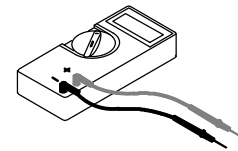
Check open-circuit voltage at platform receptacles. With no load applied, voltage should be 10% above receptacle rating.

If output voltage is low or not present at platform receptacles, check voltages at generator terminal block TE1 (see Section 6-2). If TE1 voltages are correct, check wiring to platform. If TE1 voltages are incorrect, repeat troubleshooting procedures in Section 6-1.

⚠ Stop unit.

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

Test Equipment Needed:



803 275

SECTION 7 – DISASSEMBLY AND REASSEMBLY

7-1. Disassembling/Reassembling Generator



Use Section 6-2 to determine if trouble is in stator, rotor, control box, or combination of these components.

1 Rotor

2 Stator Assembly

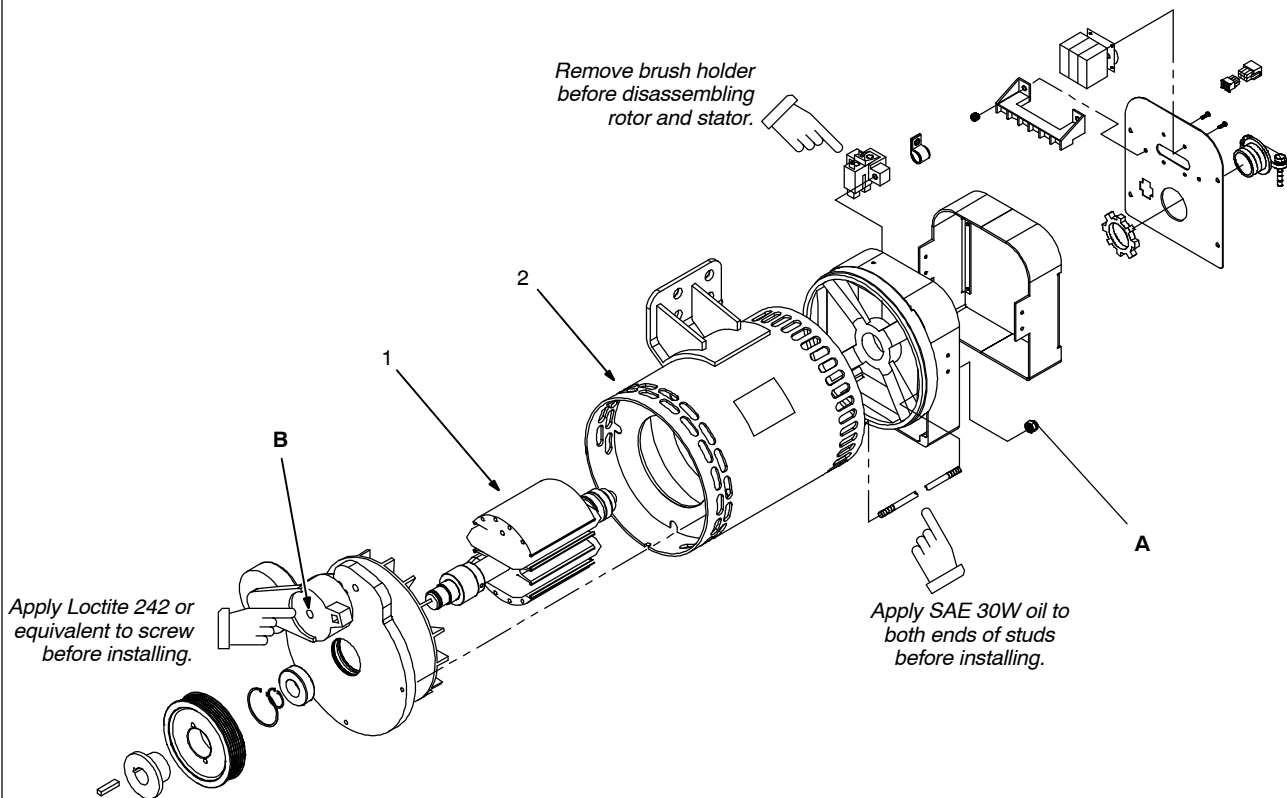
⚠ Use hoist and lifting strap to carefully disassemble/reassemble generator.

⚠ Do not damage rotor or stator windings during this procedure.

📄 Mark electrical leads and remove brush holder assembly before disassembling unit.

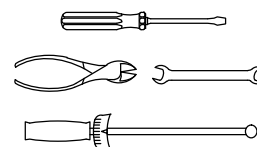
Reassemble generator parts using torque values in table.

Reconnect all leads. Use cable ties to secure leads away from moving or hot parts.



803 235


Tools Needed:



Torques:

	Torque
A	95 in lb (10.7 N-m)
B	38 ft lb (52 N-m) (Belt Tensioner)

SECTION 8 – 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 distributor for more information.

The following is a list of all diagrams for models covered by this manual.

Model	Serial Or Style Number	Circuit Diagram	Wiring Diagram
Belt/Hydraulic Drive Generator	LC199488 thru LE266271 LE266272 and following	210 193-B 210 193-C	See Table 8-1
Circuit Board PC1 (Power board)	LC199488 and following	203 132-A	
Circuit Board PC2 (Control Board)	LC199488 and following	207 884-C	

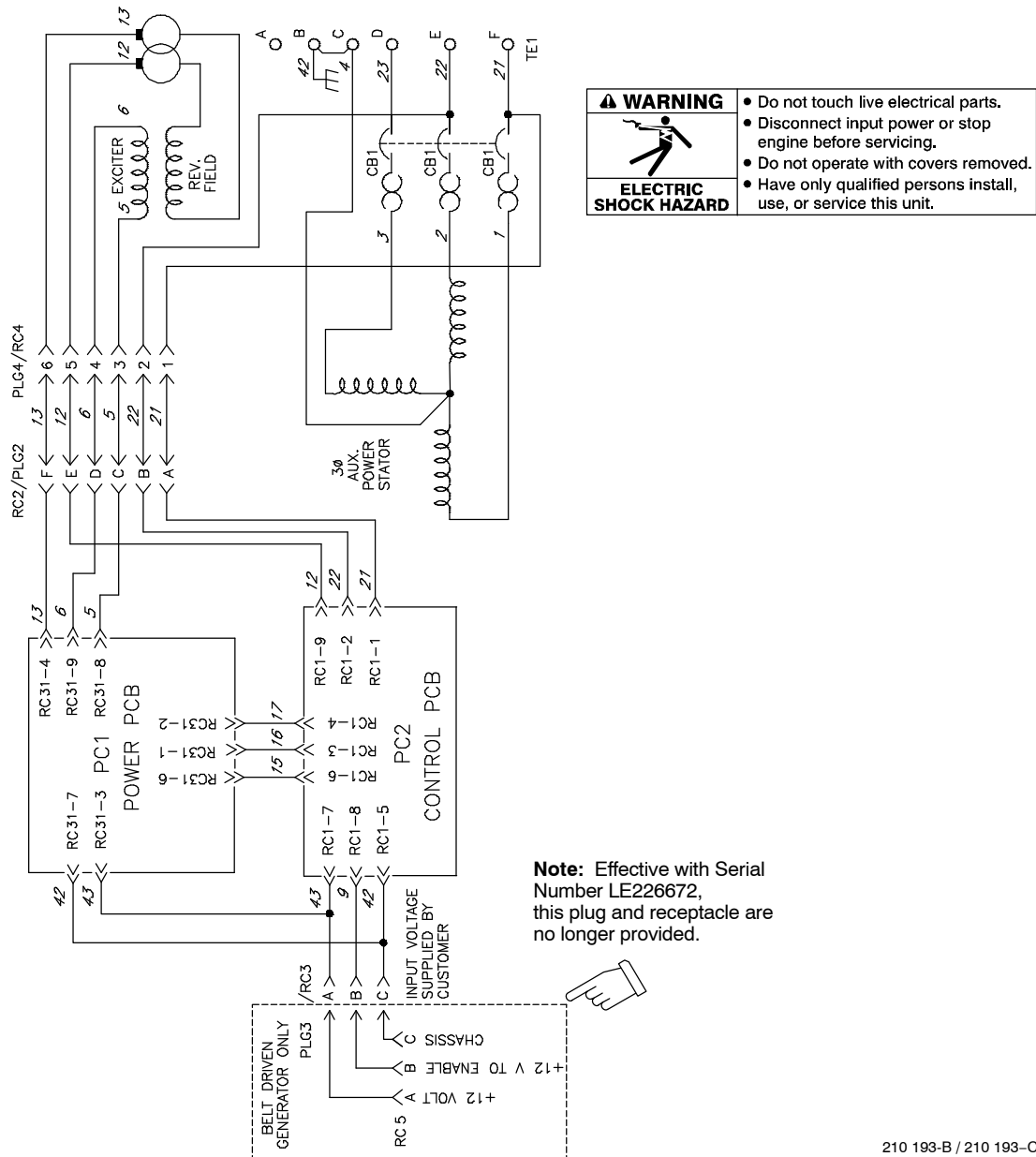



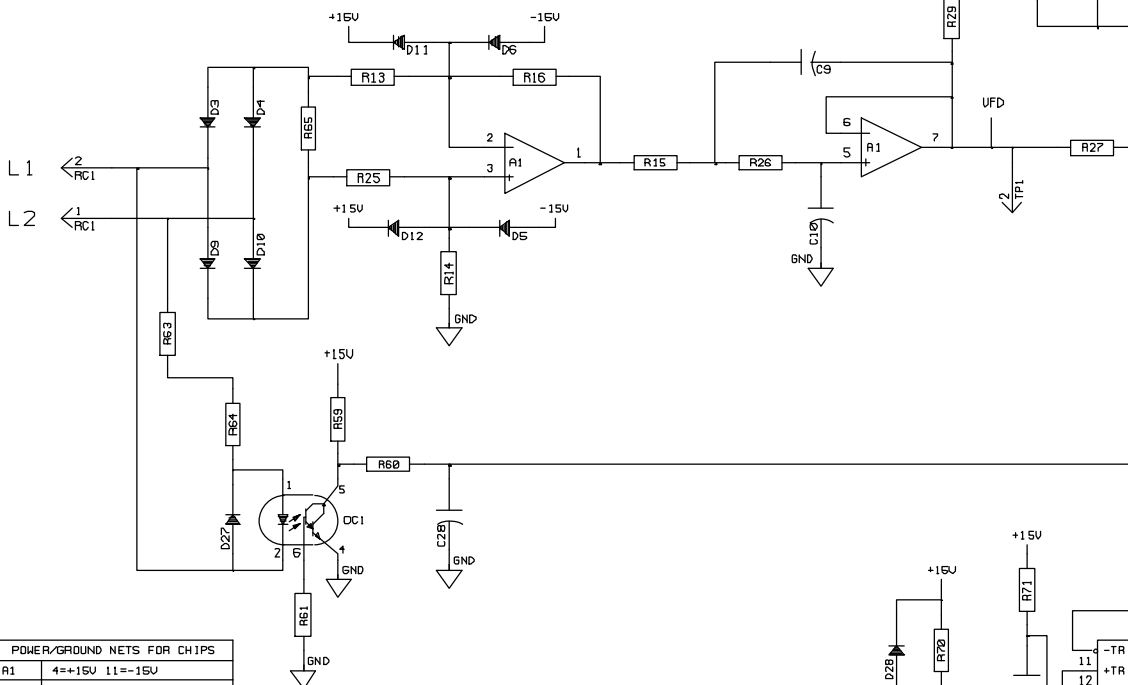
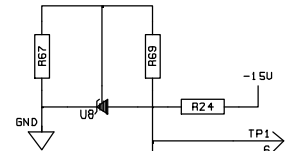
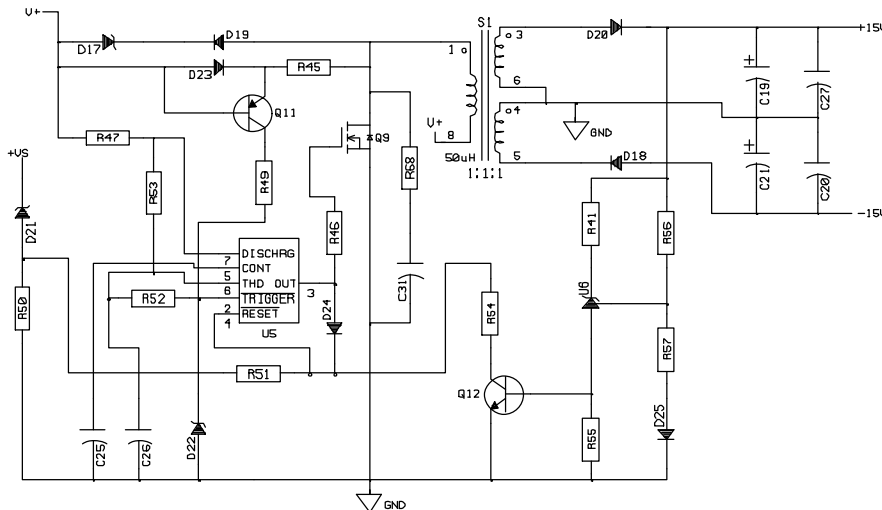
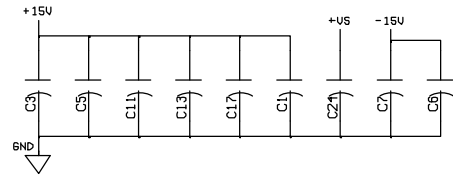
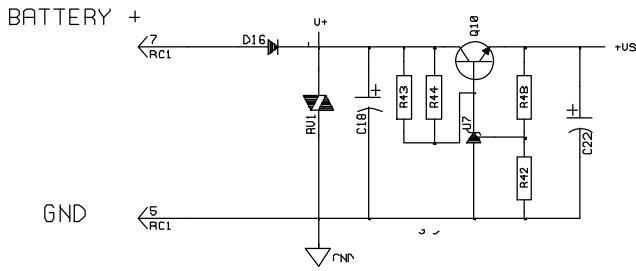
Figure 8-1. Circuit Diagram For Belt/Hydraulic Drive Generator Eff. w/ LC199488 And Following

⚠ WARNING



- Do not touch live electrical parts.
- Disconnect input power or stop engine before servicing.
- Do not operate with covers removed.
- Have only qualified persons install, use, or service this unit.

ELECTRIC SHOCK HAZARD



POWER/GROUND NETS FOR CHIPS	
R1	4=+15V 11=-15V
R2	4=GND 8=+15V
U1	1=+15V 2=-15V 4=GND
U2	1=GND 6=+15V
U3	4=GND 8=+15V
U4	8=GND 16=+15V
U5	1=GND 8=+US

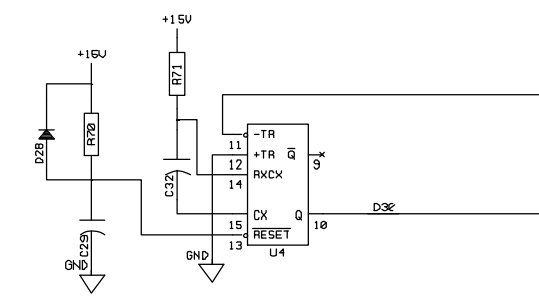
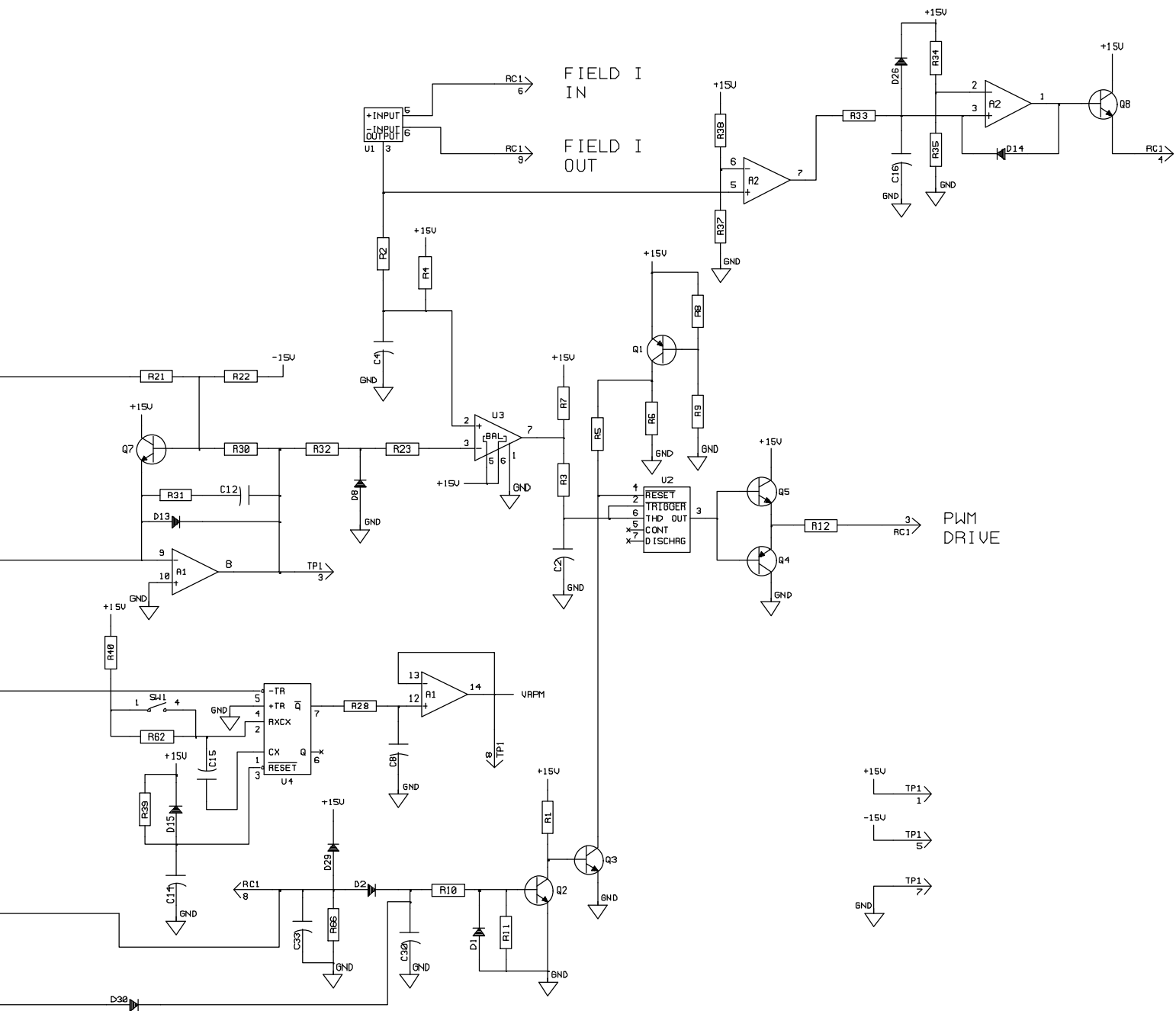


Figure 8-2. Circuit Diagram For Control Board PC2 Eff. w/ Serial No. LC199488 And Following

SW1 SETTINGS
 CLOSED = 60 HZ
 OPEN = 50 HZ



WARNING



ELECTRIC SHOCK HAZARD

- Do not touch live electrical parts.
- Disconnect input power or stop engine before servicing.
- Do not operate with covers removed.
- Have only qualified persons install, use, or service this unit.

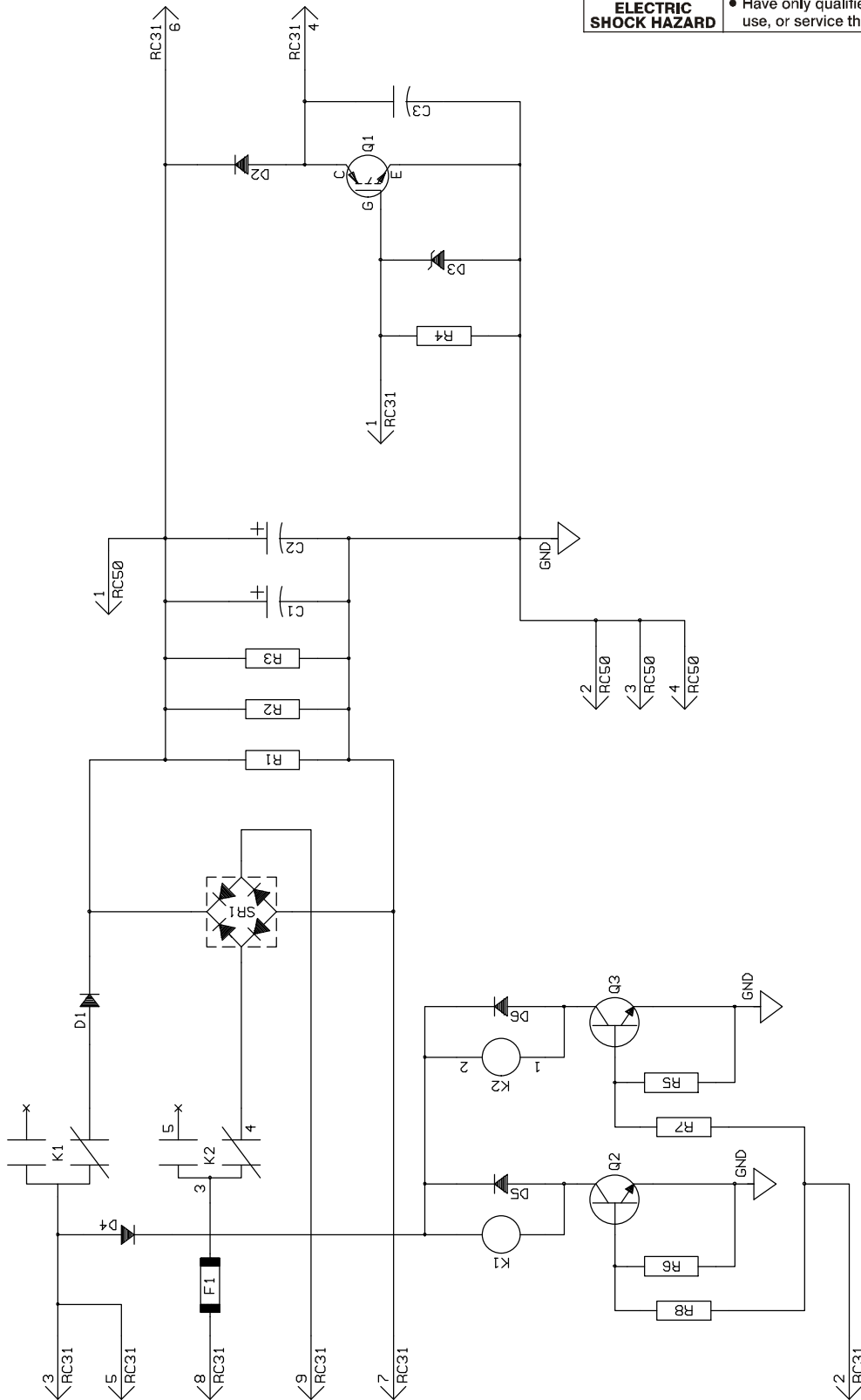





Figure 8-3. Circuit Diagram For Power Board PC1 Eff. w/ Serial No. LC199488 And Following

Table 8-1. Lead List Summary For Belt/Hydraulic Drive Generator Eff w/LC199488 And Following

 Table shows physical lead connections and should be used with circuit diagram (table replaces wiring diagram).

 Plug PLG31 was previously labeled PLG14.

 Apply *small* amount of dielectric grade, nonconductive electric grease (Miller Part No. 146 557) to connectors where factory-applied grease had been present.

Lead	Connections	Lead	Connections
1A	STATOR TO CB1	17A	PLG1 (4) TO PLG31 (2)
2A	STATOR TO CB1	21A	CB1 TO TE1 (F)
3A	STATOR TO CB1	21B	PLG2 (A) TO PLG4 (1)
4A	STATOR TO TE1 (C)	21C	PLG1 (1) TO RC2 (A)
5A	STATOR TO RC4 (3)	21D	RC4 (1) TO CB1
5B	PLG2 (C) TO PLG4 (3)	22A	CB1 TO TE1 (E)
5C	RC2 (C) PLG31 (8)	22B	PLG2 (B) TO PLG4 (2)
6A	STATOR TO RC4 (4)	22C	PLG1 (2) TO RC2 (B)
6B	PLG2 (D) TO PLG4 (4)	22D	RC4 (2) TO CB1
6C	RC2 (D) PLG31 (9)	23A	CB1 TO TE1 (D)
9A	RC5 (B) TO PLG3 (B) (Customer Supplied)	42A	RC5 (C) TO PLG3 (C) (Customer Supplied)
9B	RC3 (B) PLG1 (8)	42B	RC3 (C) TO CONNECTION POINT 1
12A	PLG2 (E) TO PLG4 (5)	42C	PLG31 (7) TO CONNECTION POINT 1
12B	RC2 (E) PLG1 (9)	42D	PLG1 (5) TO CONNECTION POINT 1
12C	RC4 (5) TO BRUSH	42F	END BELL SHROUD TO ENGINE MOUNT
13A	PLG2 (F) TO PLG4 (6)	42G	CHASSIS TO TE1 (B)
13B	RC2 (F) PLG31 (4)	43A	RC5 (A) TO PLG3 (A) (Customer Supplied)
13C	RC4 (6) TO BRUSH	43B	RC3 (A) TO CONNECTION POINT 2
15A	PLG1 (6) TO PLG31 (6)	43C	PLG31 (3) TO CONNECTION POINT 2
16A	PLG1 (3) TO PLG31 (1)	43D	PLG1 (7) TO CONNECTION POINT 2

Description

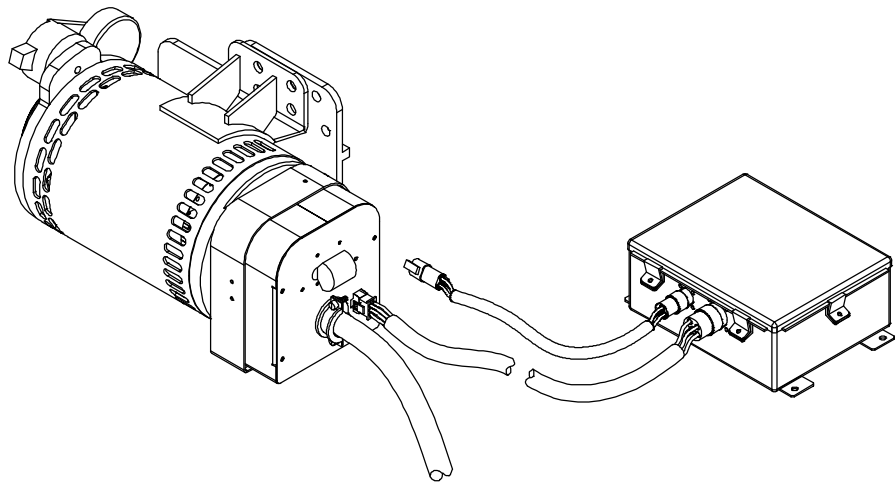
Belt/Hydraulic-Driven Generator For
Welding Power Sources

Belt-Drive Generator Hydraulic-Drive Generator

PARTS LIST

Eff w/LC199488 And Following

For OM-4414 (209 141) Revisions * Thru L



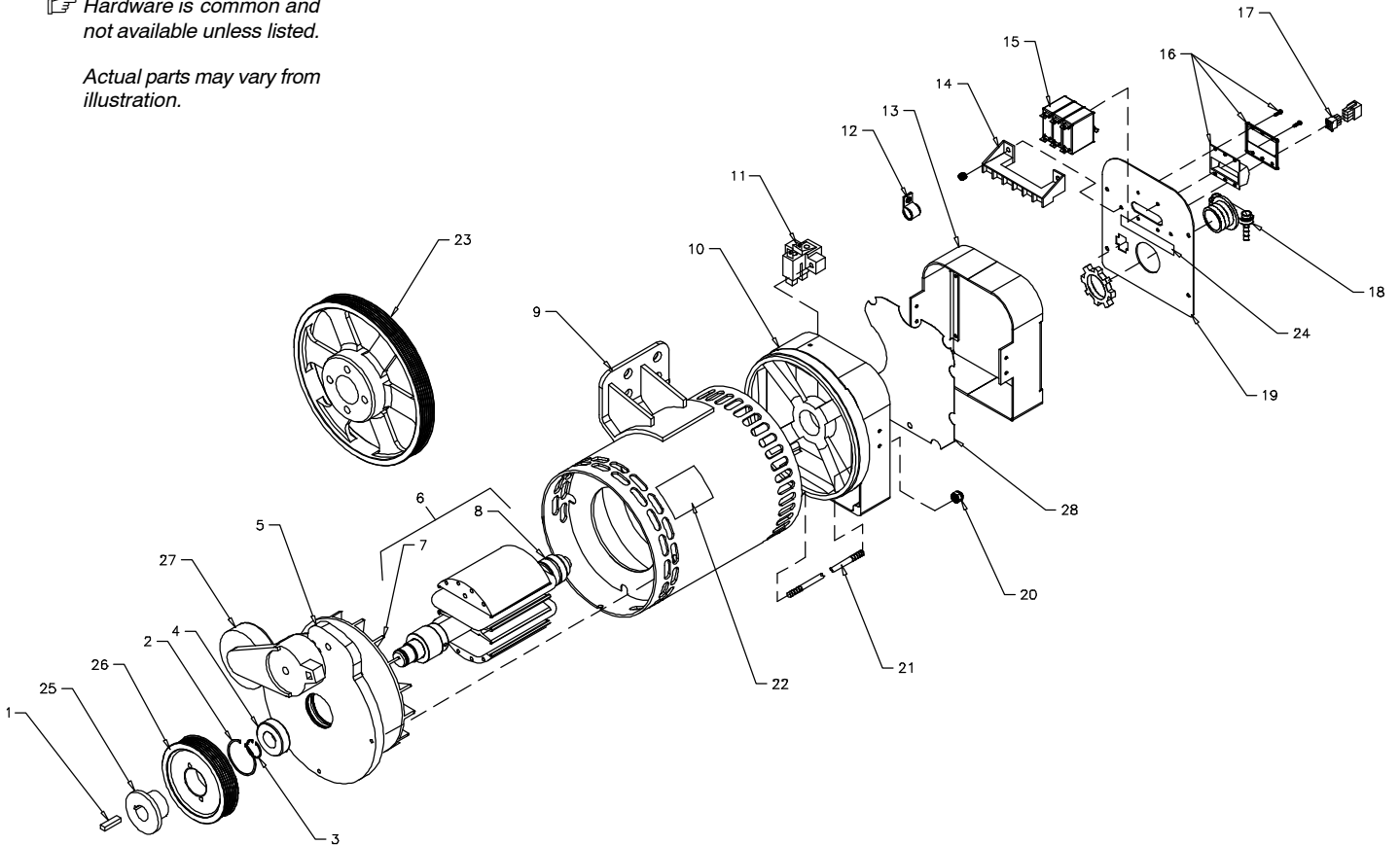
Visit our website at

www.MillerWelds.com

SECTION 9 – PARTS LIST FOR LC199488 AND FOLLOWING

☞ Hardware is common and not available unless listed.

Actual parts may vary from illustration.



803 235-C

Figure 9-1. Generator Assembly

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

Figure 9-1. Generator Assembly

.....	216606	..	Generator Assy, Belt-Drive, Cat (Mitsubishi) (includes)	1
.....	215780	..	Generator Assy, Belt-Drive, Deutz, Ford, Cat (Perkins) (includes)	1
.....	209429	..	Generator Assy, Hydraulic-Drive (includes)	1
.....	222229	..	Generator Assy, Belt-Drive, Turbo (includes) (Prior to MB260001R)	1
.....	249888	..	Generator Assy, Belt-Drive, Cat (Turbo) (includes) (Eff w/MB260001R)	1
... 1	026206	....	Key, Stl .250 X .250 X 1.750 (Belt-Drive Only)	1
... 2	207323	....	Ring, Rtnng Int 2.000 Groove Dia X .064 Thk	1
... 3	073301	....	Ring, Rtnng Ext 1.000 Shaft X .042 Thk	1
... 4	181143	....	Bearing, Ball Rdl Sgl Row .984 X 2.047 X .591	1
... 5	209426	....	Endbell, Gen Belt-Drive	1
... 5	209427	....	Endbell, Gen Hydraulic-Drive Only	1
... 5	221799	....	Endbell, Gen Belt-Drive, Turbo (Prior to MB260001R)	1
... 5	209426	....	Endbell, Gen Belt-Drive, Cat (Turbo) (Eff w/MB260001R)	1
... 6	212035	....	Rotor, Generator (includes)	1
... 7	209004	....	Fan, Rotor Gen	1
... 8	495154	....	Bearing, Ball Radial	1
... 9	+216574	....	Stator, Generator Belt-Drive, Cat (Mitsubishi)	1

Eff w/LC199488 And Following

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-1. Generator Assembly (Continued)				
...	9	+207153	Stator, Generator Belt-Drive, Deutz, Ford, Cat (Perkins)	1
...	9	+209430	Stator, Generator Hydraulic-Drive	1
...	9	+221506	Stator, Generator Belt-Drive, Turbo (Prior to MB260001R)	1
...	9	+248394	Stator, Generator Belt-Drive, Cat (Turbo) (Eff w/MB260001R)	1
...	10	207911	Endbell, Gen Brush Block	1
...	11	493509	Brushholder Assy, Generator	1
...	12	010311	Clamp, Nyl .750 Clamp Dia X.500 Wide .203 Mtg Hole	1
...	13	207442	Shroud Assy, Endbell	
...	13	216576	Belt/Hydraulic-Drive Deutz, Ford, Cat (Perkins) (Turbo)	1
...	13	216576	Shroud Assy, Endbell	
...	13	220620	Belt-Drive, Cat (Mitsubishi) (LC199488 thru LE266271)	1
...	13	220620	Shroud Assy, Endbell	
...	13	220620	Belt-Drive, Cat (Mitsubishi) (Eff w/LE266272)	1
...	13	220620	Shroud Assy, Endbell	
...	13	220620	Belt-Drive, Cat (Turbo) (Eff w/MB260001R)	1
...	14	TE1 172661	Block, Stud Connection 6 Position	1
...	15	CB1 192565	Circuit Breaker, Man Reset 3p 30a 250vac	1
...	16	230275	Boot, Circuit Breaker 3 Pole w/Bezel And Hardware	1
...	17	210196	Connector, W/Leads (includes)	1
...	RC4	116045	Housing Plug+Pins, (Service Kit)	1
...	18	010467	Conn, Clamp Cable 1.250	1
...	19	207447	Panel, End Shroud	1
...	19	220618	Panel, End Shroud	
...	19	220618	Belt-Drive, Cat (Mitsubishi) (Eff w/LE266272)	1
...	19	248395	Panel, End Shroud	
...	19	248395	Belt-Drive, Cat (Turbo) (Eff w/MB260001R)	1
...	20	604318	Nut, 250-20 .50hex .39h Stl Pld Elastic Stop Nut	4
...	21	208043	Stud, Stl .250-20 X 12.875	4
...	22	209660	Label, Warning Moving Parts Can Cause Serious Injury	1
...	23	215793	Pulley, Drive 1.694 In Bore, 4 Bolt Pat Belt-Drive, Deutz	1
...	23	215794	Pulley, Drive 1.688 In Bore, 3 Bolt Pat Belt-Drive, Cat/Perkins	1
...	23	216564	Pulley, Drive 1.688 In Bore, 4 Bolt Pat	
...	23	216564	(Belt-Drive Only) Mitsubishi, Turbo	1
...	24	209120	Label, Label, Term Mkg Connections	1
...	25	*215789	Bushing, Stl .938 Id X 1.625 Od X 1.000 Lg (Belt-Drive Only)	1
...	26	*215791	Pulley, Generator 4.88 Dia (60 Hz Belt-Drive Only)	
...	26	*215791	Deutz, Mitsubishi, Turbo	1
...	26	*215792	Pulley, Generator 5.63 Dia 50 Hz Belt-Drive, Deutz	1
...	26	*215790	Pulley, Generator 3.00 Pitch Dia 50 Hz Belt-Drive, Ford	1
...	27	*208040	Tensioner, Belt W/Pully Belt-Drive Only	1
...	28	221362	Protector, Lead Mylar	1

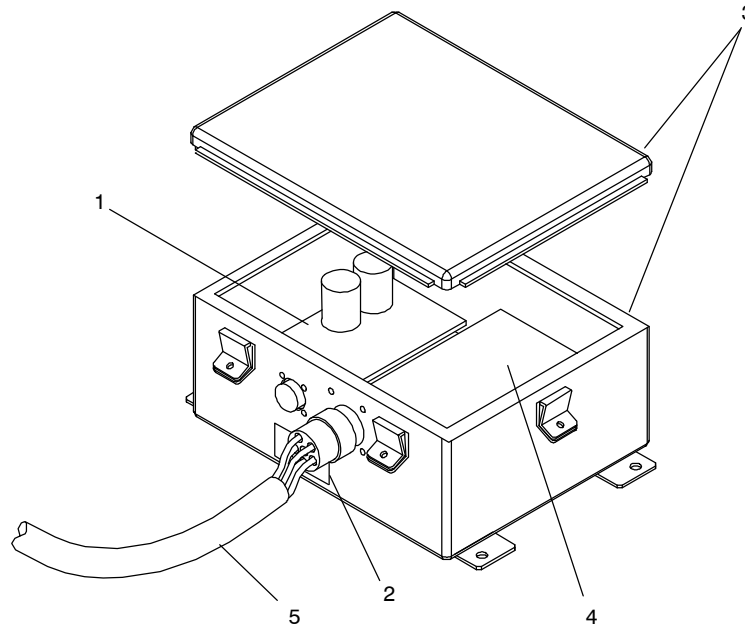
* Not included in generator assembly.

+ When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Eff w/LC199488 And Following

☞ Hardware is common and not available unless listed.



Ref. 803 236

Figure 9-2. Controller Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-2. Controller Assembly				
		215783	.. Control Box, Assy 60 Hz (includes)	1
		215784	.. Control Box, Assy 50 Hz (includes)	1
1	PC1	209399	.... Circuit Card Assy, Gen Power	1
	F1	027660	.... ⋄Fuse, Mintr Cer 20. Amp 250 Volt	1
2		210569	.... Label, 60 Hz	1
		210570	.... Label, 50 Hz	1
3		+207446	.... Control Box, Belt/Hydraulic-Driven Generator	1
		134201	.... Stand-off Support, PC Card .312/.375w/Post&lock .43 Qty 8 Prior to LJ380166R, Qty 5 Eff w/LJ380166R	
		070026	.... Stand-off, No 6-32 X .437 Lg .250 Hex Al Fem (Eff w/LJ380166R)	3
4	PC2	207882	.... Circuit Card Assy, Control	1
		207441	.... Panel, Mtg PC Card (Prior to LJ380166R)	1
		241282	.... Panel, Mtg PC Card (Eff w/LJ380166R)	1
		210198	.... Harness, Wrg Control Box (Not Shown) (includes)	1
	RC1, RC14	135134	.... Conn, Rect Univ 084 9p/S 3row Plug Cable Lkg	2
	RC2	207351	.... Conn, Circ 6 Skt Rcpt Pushin Panel	1
	RC3	207352	.... Conn, Circ 3 Skt Rcpt Pushin Panel	1
		202660	.... Conn, Push 4 Wire 12-16strnd 12-18sld 16-22tinstrnd	2
		207355	.... Gasket, Connector	1
		207356	.... Gasket (Seal), Connector	1
5		215796	.. Harness, Wrg Inter Gen/Control (Belt-Drive Only) (includes)	1
	PLG4	066104	.... Conn, Rect Univ 084 6p/S 3row Plug Cable Lkg	1
		188512	.... Seal, Wire Univ 6p/S 3row	1
	PLG2	207350	.... Conn, Circ 6 Skt Plug Pushin Cable	1
		209691	.... Seal, Interface Univ 6p/3Row	1

Eff w/LC199488 And Following

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-2. Controller Assembly				
... 5		210318	.. Harness, Wrg Inter Gen/Control (Hydraulic-Drive Only) (includes)	.... 1
	PLG4	066104	.... Conn, Rect Univ 084 6p/S 3row Plug Cable Lkg	.... 1
		188512	.... Seal, Wire Univ 6p/S 3row	.... 1
	PLG2	207350	.... Conn, Circ 6 Skt Plug Pushin Cable	.... 1
		209691	.... Seal, Interface Univ 6p/3Row	.... 1

◇ Recommended Spare Parts

+ When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Miller Electric Mfg. Co.

An Illinois Tool Works Company
1635 West Spencer Street
Appleton, WI 54914 USA

International Headquarters—USA

USA Phone: 920-735-4505 Auto-Attended
USA & Canada FAX: 920-735-4134
International FAX: 920-735-4125

For International Locations Visit
www.MillerWelds.com

