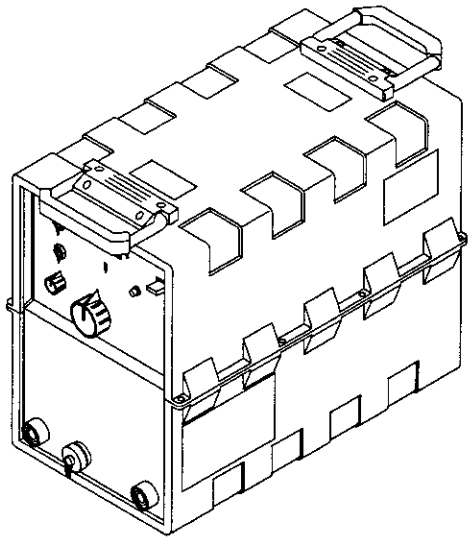
Miller®

November 1993 Form: OM-146 741B

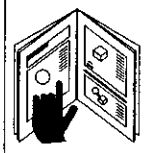
Effective With Serial No. KD521777

OWNER'S MANUAL

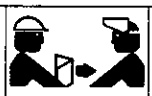


XMT® 300 CC 50 Hz

- CC/DC Welding Power Source
- For GTAW, GTAW-P, And SMAW Welding
- 300 Amperes, 32 Volts DC At 60% Duty Cycle
- Uses Three-Phase Input Power
- Control Circuitry, 24 VAC, And Overheating Protection
- 14-Pin Remote Control Receptacle



- Read and follow these instructions and all safety blocks carefully.
- Have only trained and qualified persons install, operate, or service this unit.
- Call your distributor if you do not understand the directions.



- Give this manual to the operator.

- For help, call your distributor
- or: MILLER Electric Mfg. Co., P.O. Box 1079, Appleton, WI 54912 414-734-9821

PRINTED IN USA

MILLER'S TRUE BLUE™ LIMITED WARRANTY

Effective January 1, 1992
(Equipment with a serial number preface of "KC" or newer)

This limited warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, MILLER Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new MILLER equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by MILLER. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, MILLER will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. MILLER must be notified in writing within thirty (30) days of such defect or failure, at which time MILLER will provide instructions on the warranty claim procedures to be followed.

MILLER shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to the distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Robots
3. 2 Years — Parts and Labor
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer for a period of two years.)
   * Air Compressors
4. 1 Year — Parts and Labor
   * Motor Driven Guns
   * Process Controllers
   * Water Coolant Systems
   * HF Units
   * Grids
   * Spot Welders
   * Load Banks
   * SDX Transformers
   * Running Gear/Trailers
   * Field Options

   (NOTE: Field options are covered under True Blue™ for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
5. 6 Months — Batteries
6. 90 Days — Parts and Labor
   * MIG Guns/TIG Torches
   * Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts

MILLER'S True Blue™ Limited Warranty shall not apply to:

1. Items furnished by MILLER, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any
2. Consumable components; such as contact tips, cutting nozzles, contactors and relays or parts that fail due to normal wear.
3. Equipment that has been modified by any party other than MILLER, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at MILLER'S option: (1) repair; or (2) replacement; or, where authorized in writing by MILLER in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized MILLER service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. MILLER'S option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a MILLER authorized service facility as determined by MILLER. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier**. Assistance for filing or settling claims may be obtained from distributor and/or equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide Model Designation and Serial or Style Number.

Use the following spaces to record Model Designation and Serial or Style Number of your unit. The information is located on the rating label or nameplate.

Model _____

Serial or Style No. _____

Date of Purchase _____

ERRATA SHEET

July 19, 1994 OM-146 741B

Use above FORM number when ordering extra manuals.

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

CHANGES TO SECTION 6 – ELECTRICAL DIAGRAMS

Replace Figure 6-1. Circuit Diagram For Welding Power Source (see Pages 2 and 3 on this Errata Sheet)

Replace Figure 6-2. Wiring Diagram For Welding Power Source (see Pages 4 and 5 on this Errata Sheet)

CHANGES TO SECTION 8 – PARTS LIST

Change Parts List as follows:

**	Dia. Mkgs.	Part No.	Replaced With	Description	Quantity
.. 25-		137 197	161 136	.. NUT, .312-18 stl insert (Eff w/KE623992)	4
.. 25-		137 198	161 135	.. NUT, 10-32 stl insert (Eff w/KE623992)	4
.. 25-		601 836	Deleted	.. Eff w/KE577648	
. 25-10		134 838	168 579	.. CABLE, pwr No. 6mm 4/c 600V rbr jkt 4M lg	1
. 25-11	PLG11 ..	158 719	158 719	.. CONNECTOR & SOCKETS, (dia mkg chg was PLG17) (Eff w/KE577648)	1
. 25-12	RC11 ..	165 404	165 404	.. CONNECTOR & PINS, (dia mkg chg was RC17) (Eff w/KE577648)	1
. 25-16	T1	146 287	166 780	.. TRANSFORMER, HF (Eff w/KE577648)	1
. 25-21		136 190	148 297	.. NUT, 10-32 push-on stl	4
. 25-29	CT1 ...	149 418	167 238	.. TRANSFORMER, current (Eff w/KE577648)	1
.. 25-		Added	169 772	.. SPACER, case (Eff w/KE679384)	8
.. 27-		042 418	042 418	.. CONNECTOR KIT, Dinse male 50 series (consisting of)	1
			134 746	... WRENCH, hex 5mm short	1
. 27-15	PL1 ...	135 199	157 958	.. LIGHT, ind wht lens 28V (Eff w/KE577648)	1
. 29-6	PC1	155 311	167 245	.. CIRCUIT CARD, control	1
. 29-32	C1,2 ...	152 101	163 770	.. CAPACITOR, polyp film .34uf 700VDC (Eff w/KE581846)	2
. 29-40		136 190	148 297	.. NUT, 10-32 push-on stl (Eff w/KE581846)	3
. 30-44		158 371	166 777	.. BUS BAR, capacitor (Eff w/KE577648)	1
. 30-49		158 668	133 968	.. RECTIFIER, si diode RH (Eff w/KE581846) (consisting of)	1
	C44-47		031 689	... CAPACITOR	4
	D13-16		149 209	... KIT, diode fast recovery	4
			072 253	... STUD, connection single 10-32 x .500 x 1.250	4
			133 290	... HEAT SINK, rect	1
.. 30-		Added	006 426	.. CLAMP, capacitor 2.000dia (Eff w/KE581846)	1

**First digit represents page no – digits following dash represent item no.

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

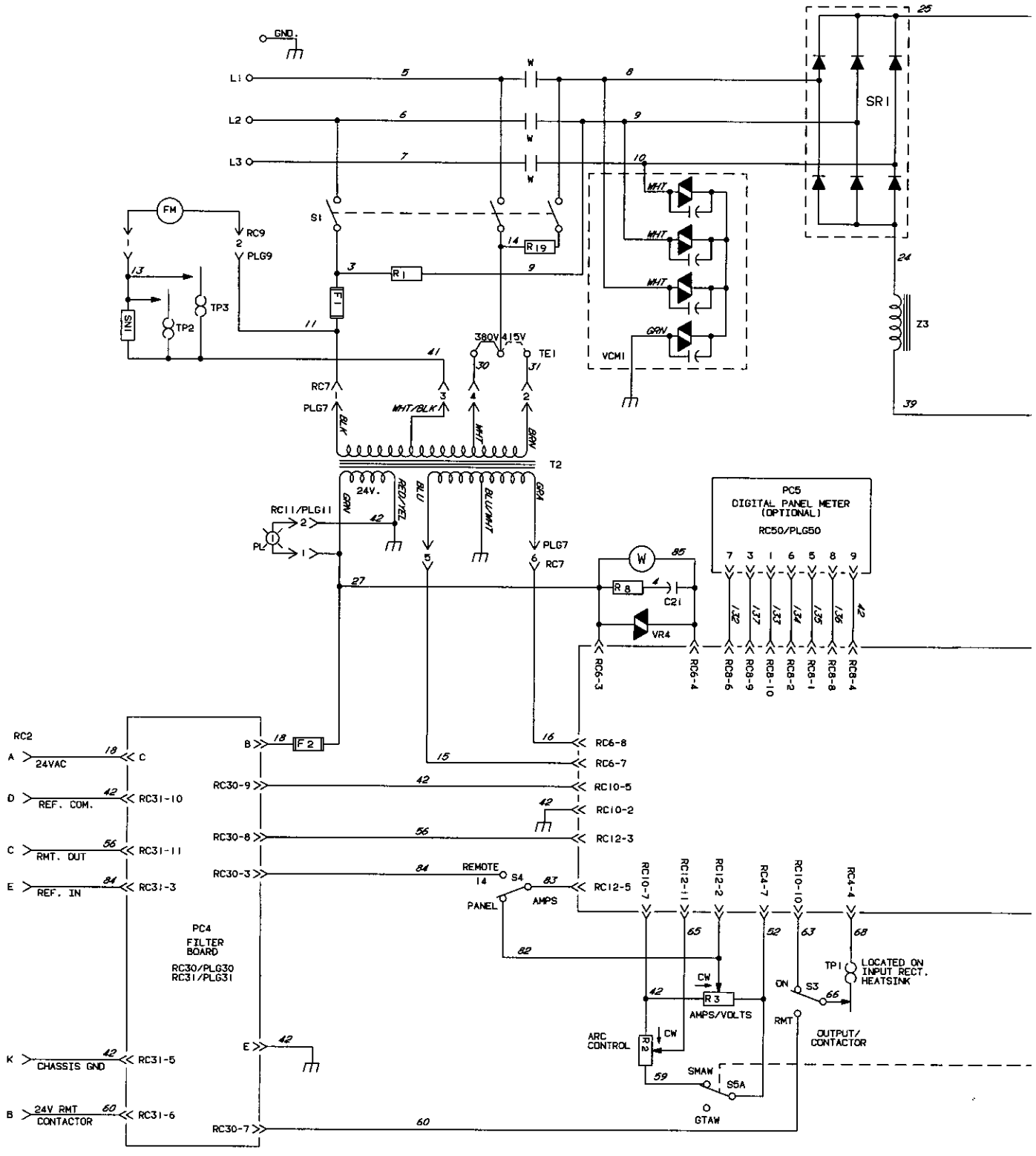
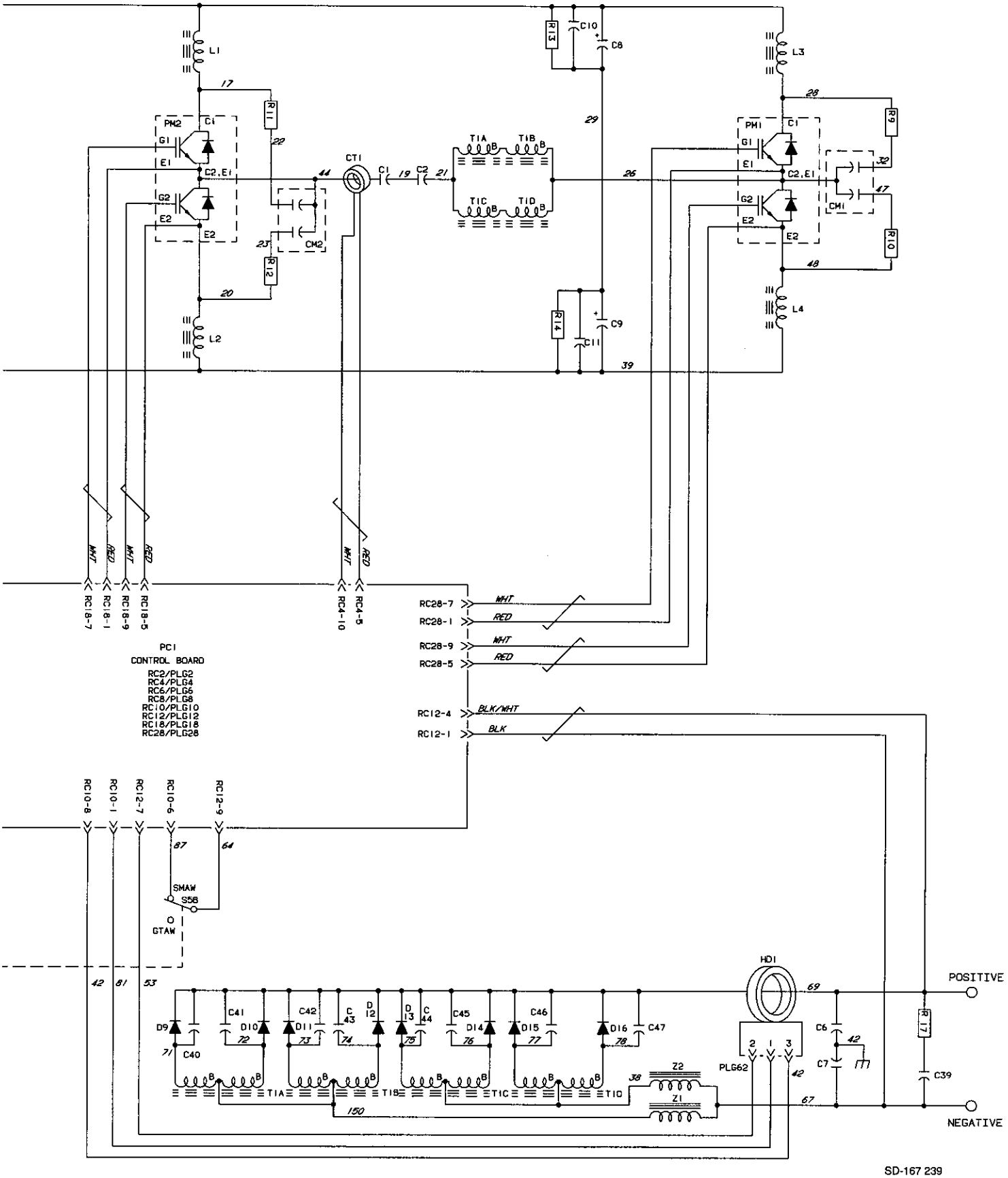


Figure 6-1. Circuit Diagram For Welding Power Source Effective With Serial No. KE581846


L1
L2
L3
L4
PM2
PM1
CM2
CM1
CT1
TIA
TIB
TIC
TID
R11
R12
R13
R14
R9
R10
C8
C9
C10
C11
RC18-7
RC18-1
RC18-9
RC18-5
RC4-10
RC4-5
WHT
RED
PC1
CONTROL BOARD
RC2/PLG2
RC4/PLG4
RC6/PLG6
RC8/PLG8
RC10/PLG10
RC12/PLG12
RC18/PLG18
RC28/PLG28
RC28-7
RC28-1
RC28-9
RC28-5
RC12-4
RC12-1
BLK/WHT
BLK
RC10-8
RC10-1
RC12-7
RC10-6
RC12-9
SMAW
S58
GTAW
HD1
POSITIVE
NEGATIVE
PLG62
Z1
Z2
C39
C40
C41
C42
C43
C44
C45
C46
C47
C6
C7
D9
D10
D11
D12
D13
D14
D15
D16
R17
SD-167 239

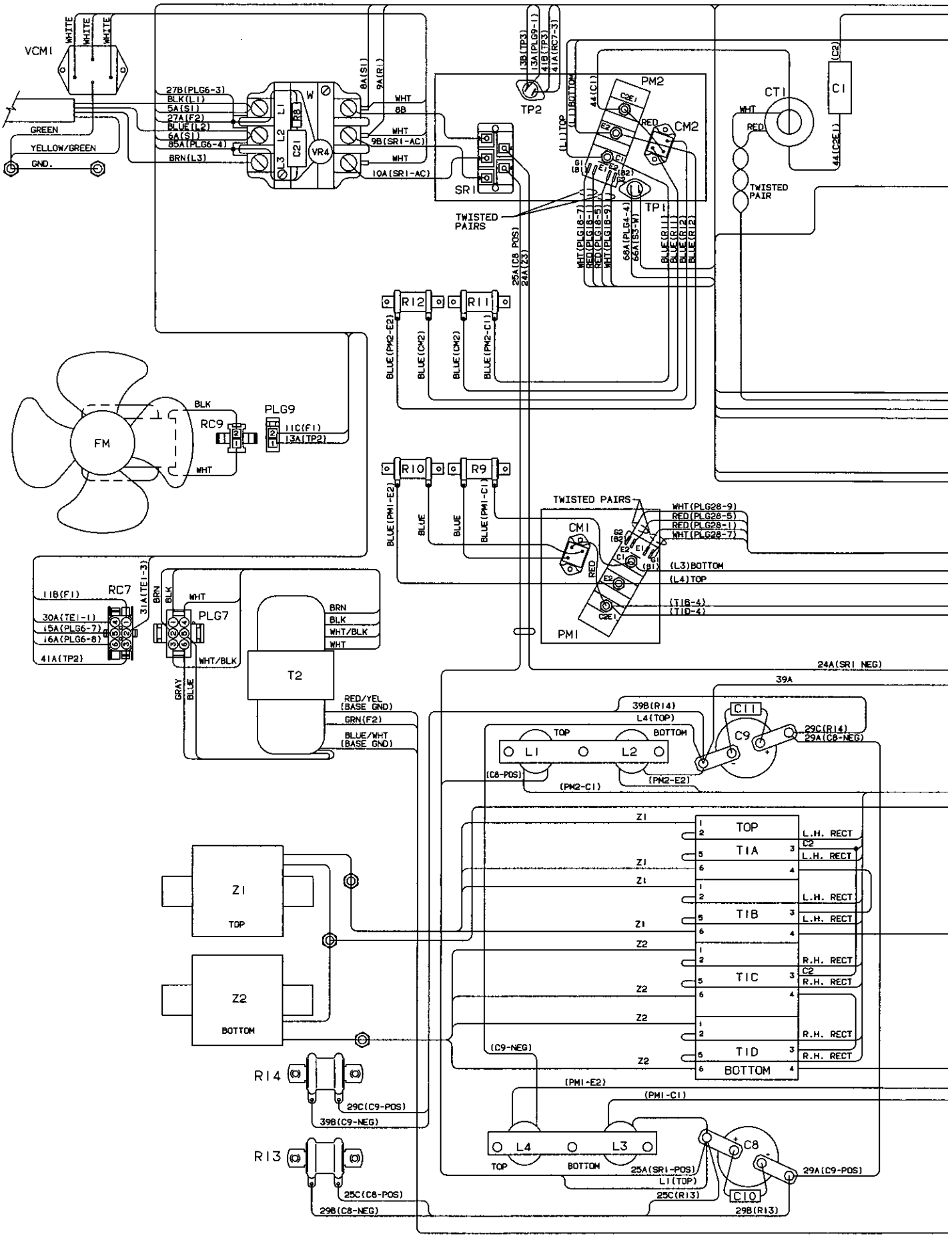
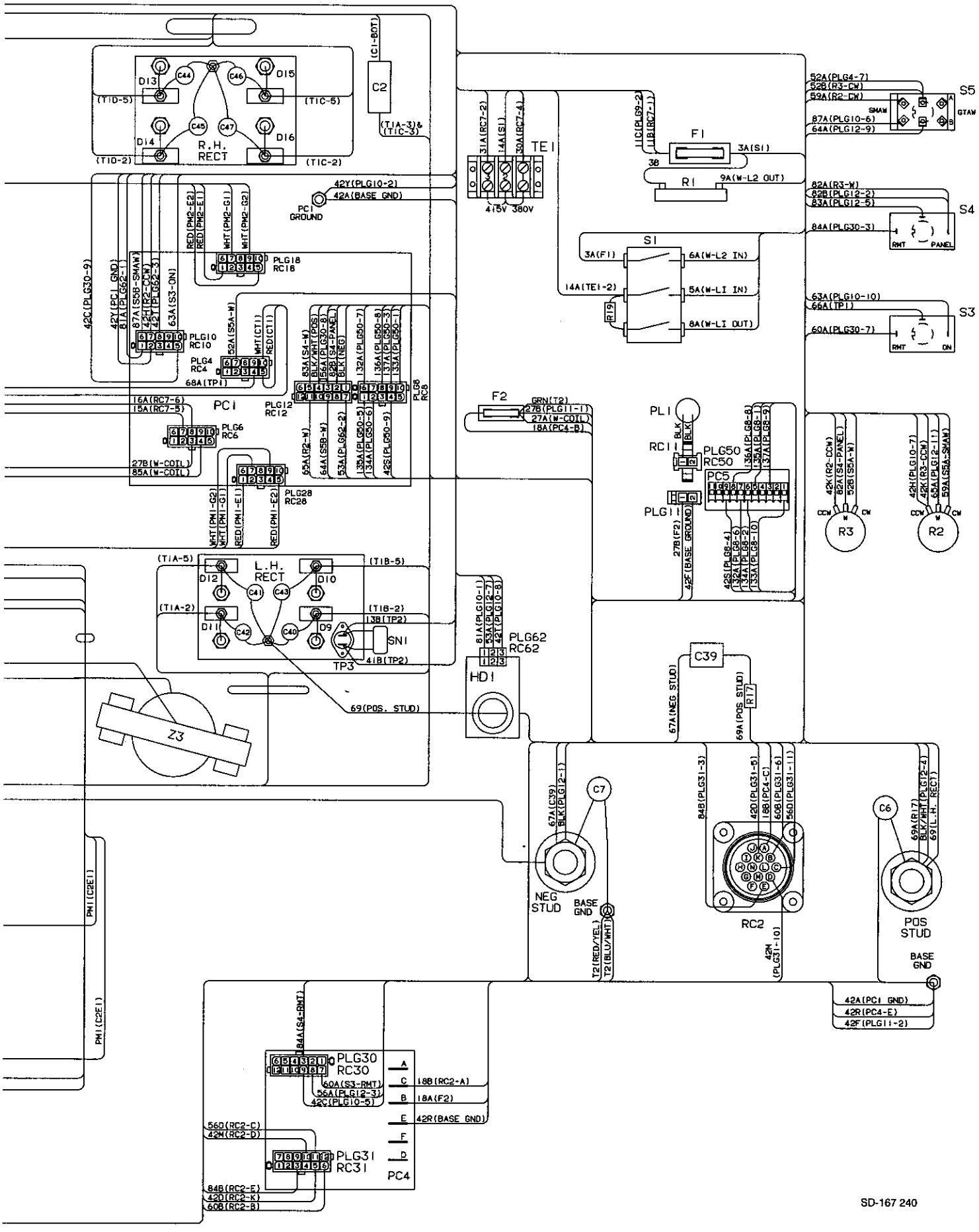


Figure 6-2. Wiring Diagram For Welding Power Source Effective With Serial No. KE581846


R.H. RECT
L.H. RECT
PC1
PC4
PC5
TE1
F1
F2
S1
S3
S4
S5
R1
R2
R3
HD1
SN1
Z3
C2
C6
C7
C39
RC2
NEG STUD
POS STUD
BASE GND
PC1 GROUND
TP3
PLG10 RC10
PLG18 RC18
PLG4 RC4
PLG12 RC12
PLG6 RC6
PLG28 RC28
PLG62 RC62
PLG30 RC30
PLG31 RC31
PLG50 RC50
PLG11
415V 380V
SD-167 240

ARC WELDING SAFETY PRECAUTIONS

⚠ WARNING

ARC WELDING can be hazardous.

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR.

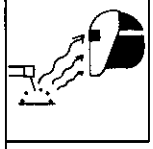
In welding, as in most jobs, exposure to certain hazards occurs. Welding is safe when precautions are taken. The safety information given below is only a summary of the more complete safety information that will be found in the Safety Standards listed on the next page. Read and follow all Safety Standards.

HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. When making input connections, attach proper grounding conductor first.
7. Turn off all equipment when not in use.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode if in contact with the work or ground.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. Wear a safety harness if working above floor level.
14. Keep all panels and covers securely in place.



ARC RAYS can burn eyes and skin; NOISE can damage hearing.

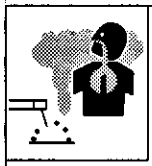
Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

NOISE

1. Use approved ear plugs or ear muffs if noise level is high.

ARC RAYS

2. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
3. Wear approved safety glasses. Side shields recommended.
4. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
5. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.



FUMES AND GASES can be hazardous to your health.

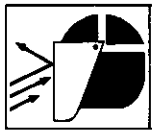
Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breathe the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
11. Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.



FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.

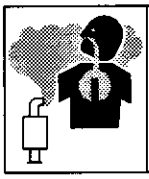
CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

⚠ WARNING

ENGINES can be hazardous.



ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.

ENGINE FUEL can cause fire or explosion.

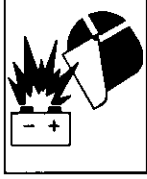
Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank – allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (–) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.



SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and –) on batteries.

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.

PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

EMF INFORMATION

NOTE ☞ *Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields*

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, *Biological Effects of Power Frequency Electric & Magnetic Fields – Background Paper*, 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."

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around the body.
4. Keep welding power source and cables as far away as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

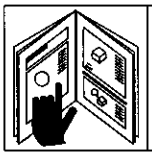
The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

mod10.1 4/93

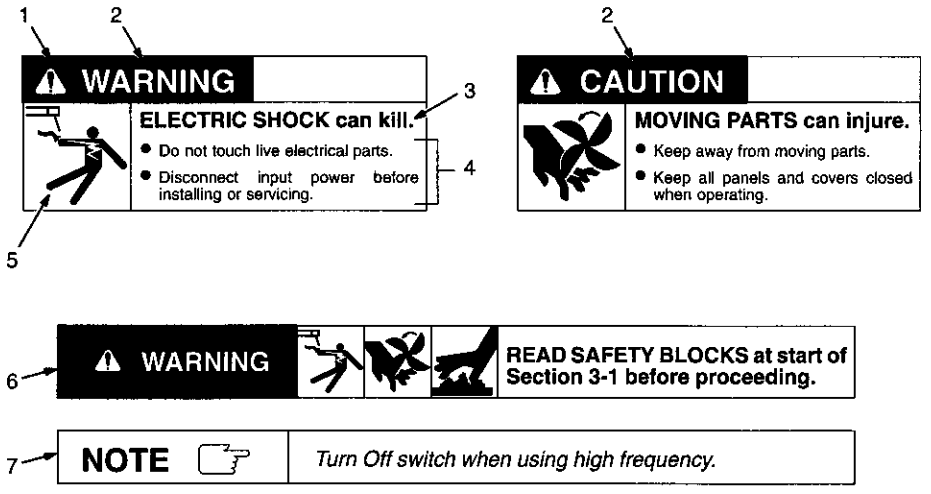
TABLE OF CONTENTS

SECTION 1 – SAFETY INFORMATION

mod1.1 2/93



- Read all safety messages throughout this manual.
- Obey all safety messages to avoid injury.
- Learn the meaning of WARNING and CAUTION.



1 Safety Alert Symbol

2 Signal Word

WARNING means possible death or serious injury can happen.

CAUTION means possible minor injury or equipment damage can happen.

3 Statement Of Hazard And Result

4 Safety Instructions To Avoid Hazard

5 Hazard Symbol (If Available)

6 Safety Banner

Read safety blocks for each symbol shown.

7 NOTE

Special instructions for best operation – not related to safety.

Figure 1-1. Safety Information

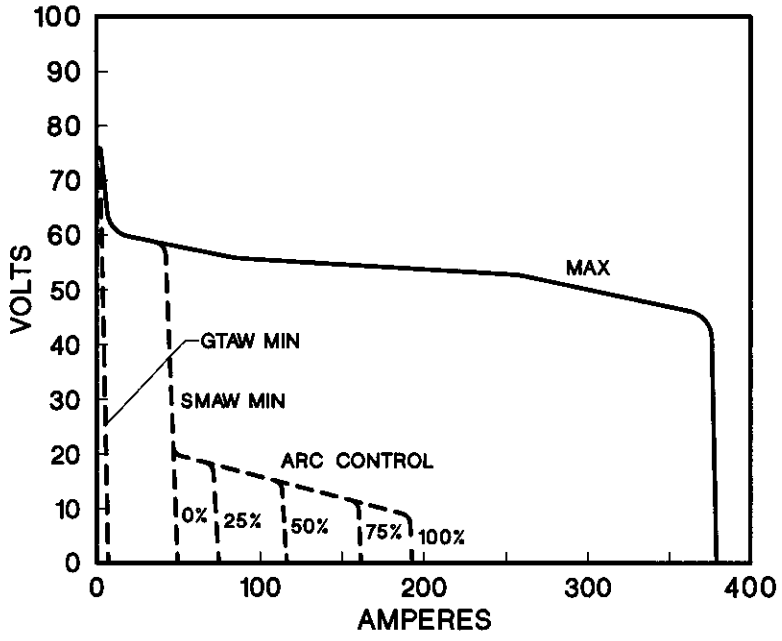
SECTION 2 – SPECIFICATIONS

Table 2-1. Welding Power Source

Specification	Description
Type Of Output	Constant Current (CC), Direct Current (DC)
Rated Weld Output	300 Amperes, 32 Volts DC At 60% Duty Cycle; 232 Amperes, 28 Volts DC At 100% Duty Cycle (See Section 2-2)
Type Of Input	380 Or 415 Volts AC; 50 Hz; Three Phase
Input Amperes At Rated Output	60% Duty Cycle: 25.0 A At 380 V, 23.2 A At 415 V 100% Duty Cycle: 17.2 A At 380 V, 16.7 A At 415 V
KVA/KW Used At Rated Output	16.4 kVA/11.3 kW
Amperage Range	5-375 A
Max. Open-Circuit Voltage	80 Volts DC
Welding Processes	Scratch Start Gas Tungsten Arc (GTAW), Scratch Start Gas Tungsten Arc - Pulsed (GTAW-P), Shielded Metal Arc (SMAW) Welding
Input Power Cord	13.1 ft (4 m)
Overall Dimensions	Length: 21-3/4 in (522 mm); Width: 12 in (305 mm); Height: 17-3/8 in (441 mm)
Weight	Net: 77 lb (35 kg); Ship: 82 lb (37 kg)
Options	See Rear Cover

2-1. Volt-Ampere Curves

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



ssb1.1 10/91 – SB-146 679-C

Figure 2-1. Volt-Ampere Curves

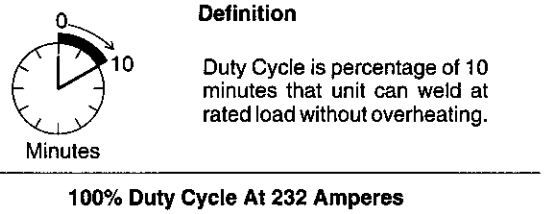
2-2. Duty Cycle

⚠ CAUTION

WELDING LONGER THAN RATED DUTY CYCLE can damage unit and void warranty.

- Do not weld at rated load longer than shown below.

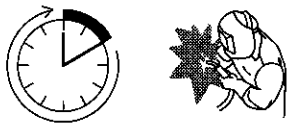
warn7.1 8/93



Definition

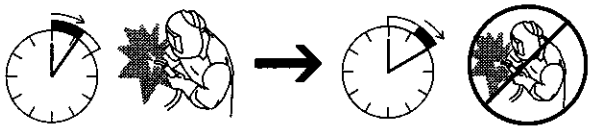
Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

100% Duty Cycle At 232 Amperes



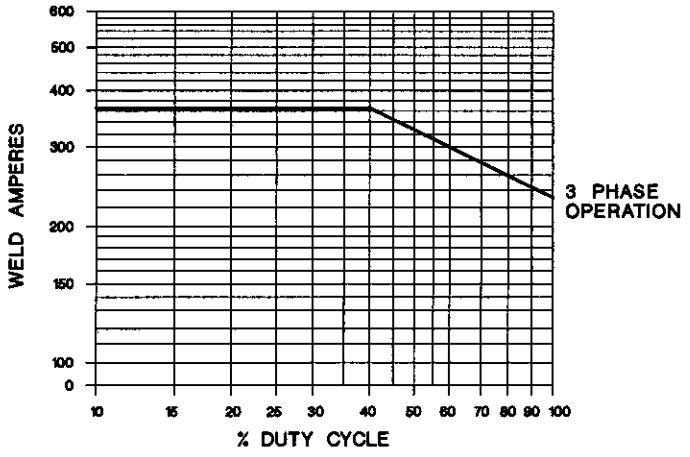
Continuous Welding

60% Duty Cycle At 300 Amperes



6 Minutes Welding — 4 Minutes Resting

Chart



sb1.4 8/93 – SB-153 970

Figure 2-2. Duty Cycle Chart

SECTION 3 – INSTALLATION

3-1. Typical Process Connections

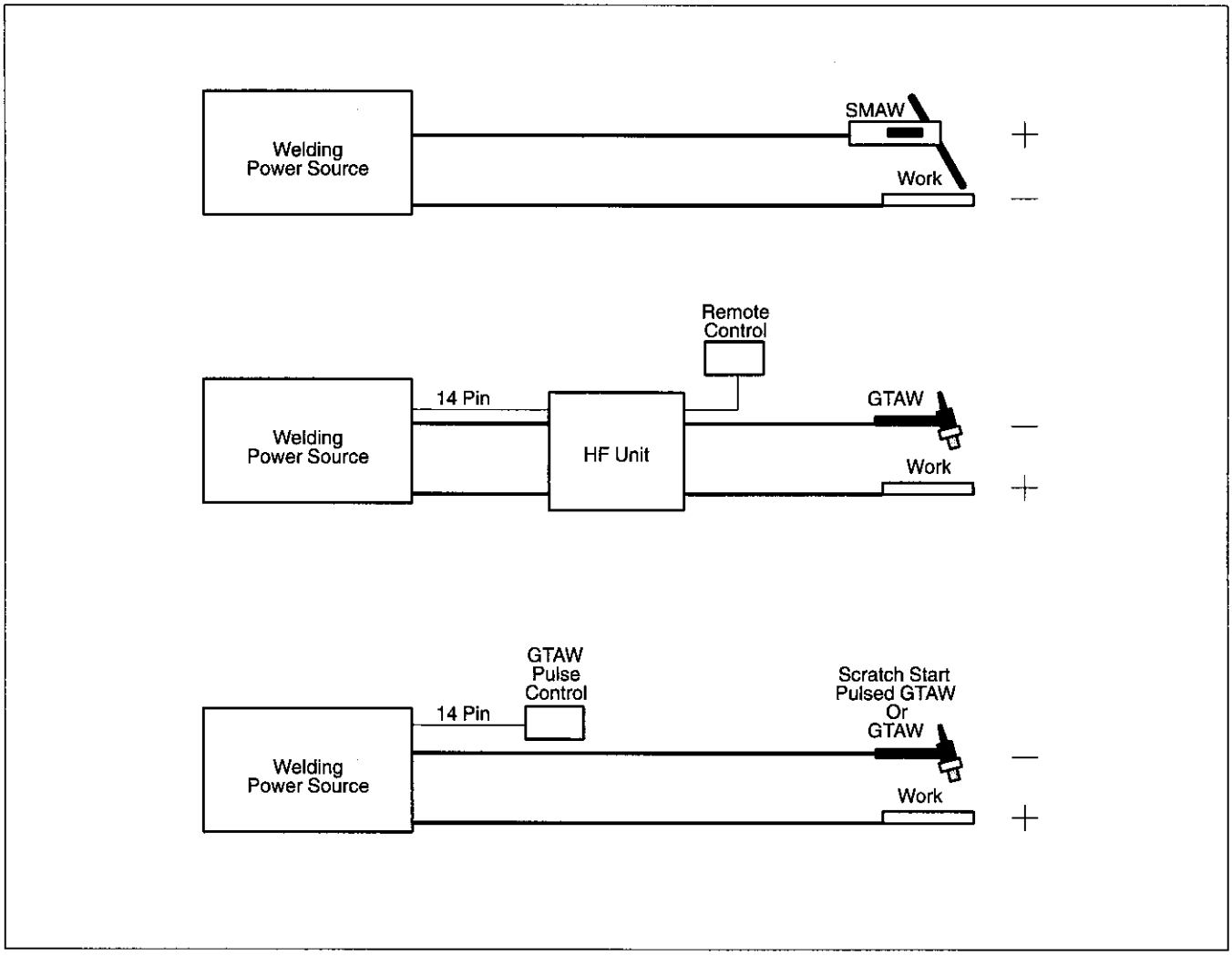


Figure 3-1. Typical Process Connections

3-2. Selecting A Location And Moving Welding Power Source

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Disconnect input power conductors from de-energized supply line BEFORE moving welding power source.

FIRE OR EXPLOSION can result from placing unit on, over, or near combustible surfaces.

- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.

BLOCKED AIRFLOW causes overheating and possible damage to unit.

- Do not block or filter airflow.

Warranty is void if any type of filter is used.

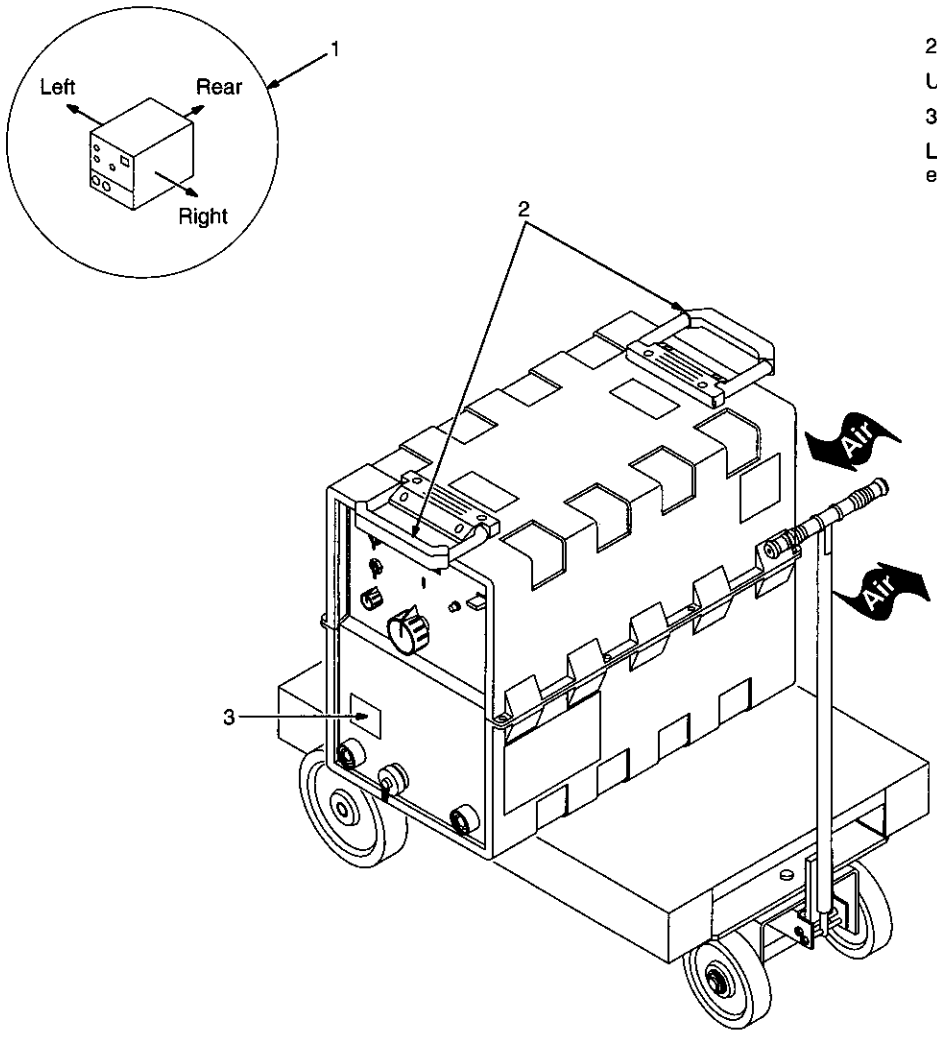
FUMES can be hazardous; LACK OF FRESH AIR AND PROPER VENTILATION can be harmful.

- Do not breathe welding fumes.
- Place unit only where there is a good fresh air supply and proper ventilation.

FALLING EQUIPMENT can cause serious personal injury and equipment damage.

- Lift unit at handles.
- Have two persons of adequate physical strength lift unit.
- Move unit with hand cart or similar device of adequate capacity.
- If using a fork lift vehicle, secure unit on a proper skid before transporting.

swarn11.1* 3/93



1 3 in (78 mm) Open Space At Sides, 6 in (156 mm) At Rear For Good Airflow

2 Lifting Handles

Use handles to move unit.

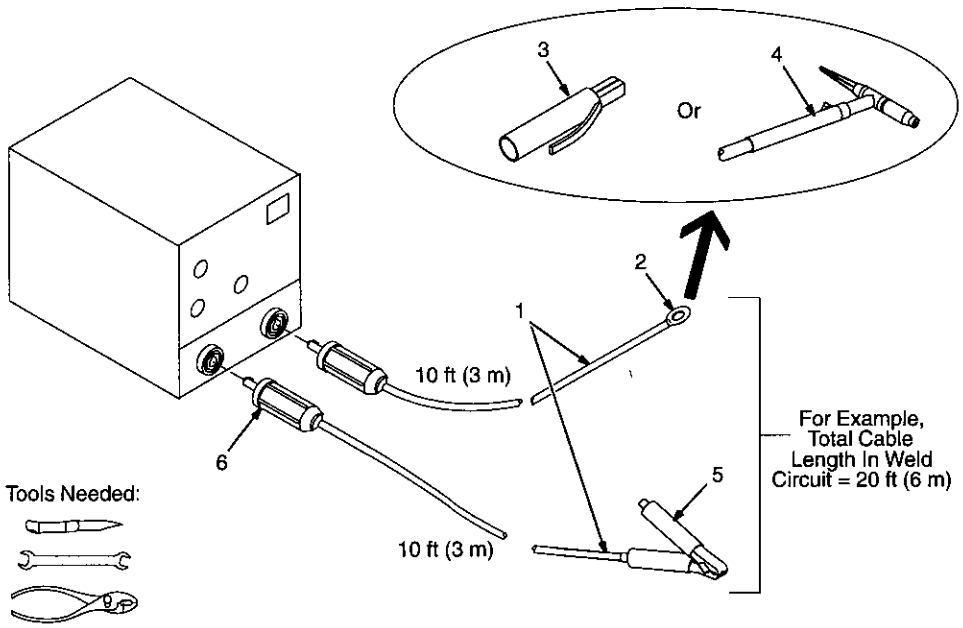
3 Rating Label

Locate unit near correct input power supply.

ST-152 303-A / Ref. ST-151 556

Figure 3-2. Location And Movement Of Welding Power Source

3-3. Selecting And Preparing Weld Output Cables



1 Weld Output Cable

Determine total cable length in weld circuit and maximum welding amperes. Use Table 3-1 to select proper cable size.

Use shortest cables possible.

Do not use damaged cables.

2 Terminal Lug

Use lugs of proper amperage capacity and hole size for connecting to work clamp or electrode holder.

3 Insulated Electrode Holder

4 GTAW Torch

Install according to manufacturer's instructions.

5 Work Clamp

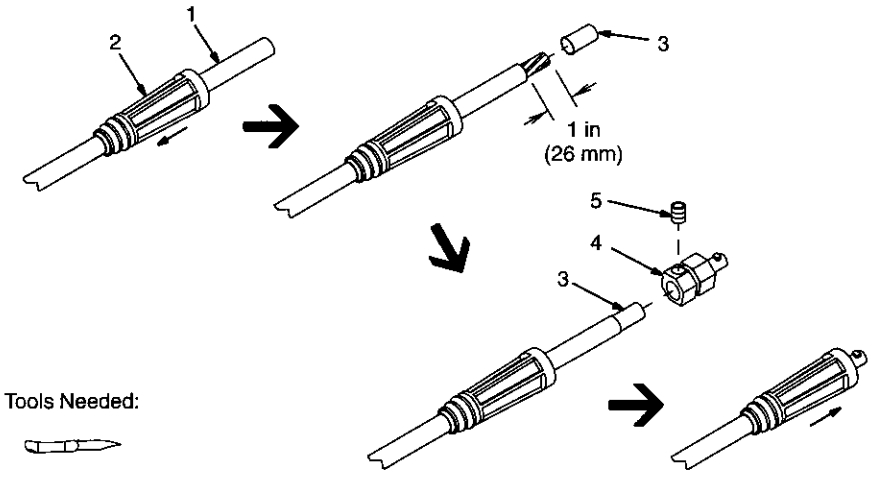
Install onto work cable.

6 Dinse-Type Connector

Install onto weld cable as shown in Figure 3-4.

sb6.2* 11/92 – S-0656

Figure 3-3. Selecting And Preparing Weld Output Cables



1 Weld Output Cable

2 Handle

3 Sleeve

Slide handle onto cable; strip cable and install sleeve.

4 Connector Body

5 Setscrew

Insert cable with sleeve fully into connector body, tighten setscrew, and slide handle over connector.

If job requires cable larger than 3/0 AWG, use 2 ft (610 mm) or shorter piece of 3/0 AWG cable for Dinse-Type connector installation. Connect other end of short cable to the 4/0 or larger weld cable.

ST-156 496

Figure 3-4. Dinse-Type Connector Assembly

Table 3-1. Weld Cable Size*

Welding Amperes	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 To 60% Duty Cycle	60 Thru 100% Duty Cycle	10 Thru 100% Duty Cycle					
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
400	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-4/0	2-4/0
500	2/0	3/0	4/0	2-2/0	2-3/0	2-4/0	3-3/0	3-3/0

*Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of not more than 300 circular mils per ampere. S-0007-C

3-4. Connecting To Weld Output Receptacles

⚠ WARNING

ELECTRIC SHOCK can kill; ARCING can burn skin or damage electrical equipment.

- Do not touch live electrical parts.
- Turn Off welding power source before making any weld output connections.
- Do not change position of welding cable connectors while welding.
- Be sure connectors are secure in receptacles before welding.

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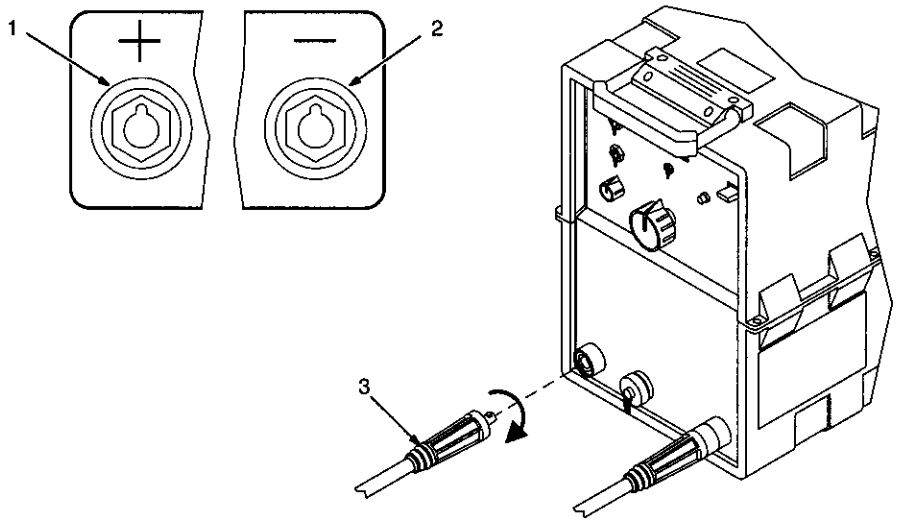


1 Positive (+) Weld Output Receptacle

2 Negative (–) Weld Output Receptacle

3 Connector

For DC Electrode Positive (DCEP), connect work cable connector to negative (–) receptacle and electrode holder cable connector to positive (+) receptacle.

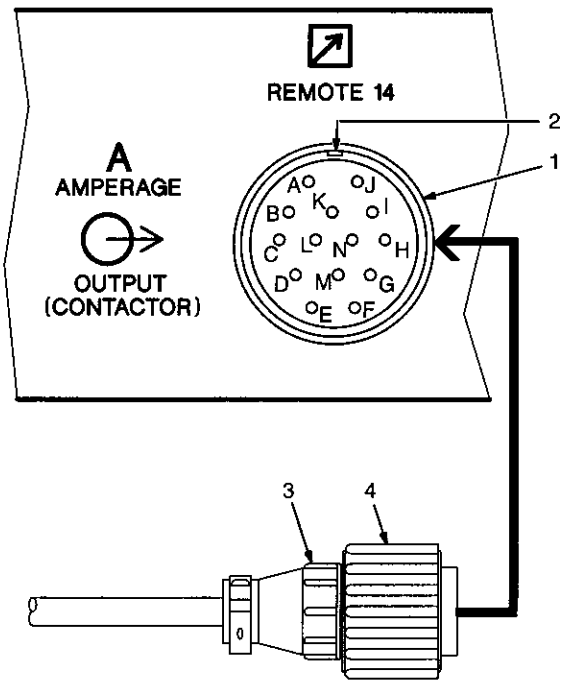
For DC Electrode Negative (DCEN), reverse the cable connections.

To connect to receptacle, align keyway, insert connector, and turn clockwise until tight.

Ref. ST-158 311 / Ref. ST-152 223

Figure 3-5. Connecting To Weld Output Receptacles

3-5. Remote 14 Receptacle Information And Connections



1 Remote 14 Receptacle RC2

2 Keyway

3 Plug

4 Threaded Collar

To connect to this receptacle, align keyway, insert plug, and tighten threaded collar.

Socket Information:

Remote Contactor

A 24 volts ac. Protected by fuse F2.

B Contact closure to pin A completes 24 volts ac contactor control circuit.

Remote Amperage Control

C Command reference; +10 volts dc.

D Control circuit common.

E Input command signal (potentiometer wiper or 0 to +10 volts dc).

K Chassis common.

The remaining sockets are not used.

sb7.1* 3/93 – Ref. ST-158 311 / Ref. S-0004-A / S-0750

Figure 3-6. Remote 14 Connections

3-6. Connecting Input Power

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Turn Off welding power source, and disconnect input power before inspecting or installing.
- Have only qualified persons install unit.
- Installation must meet National Electrical Code and all other codes.

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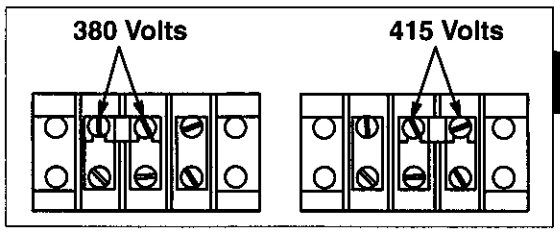
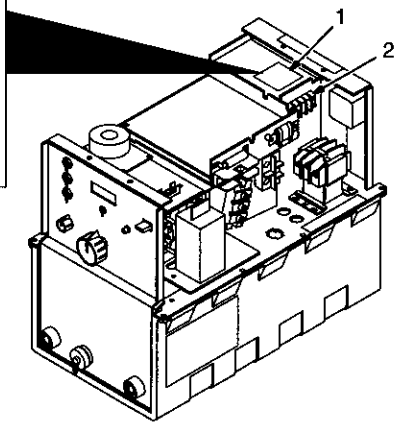
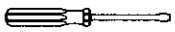
A. Positioning Jumper Links





Tools Needed:



Jumper links allow operation on different input voltages and are factory set for 380 volts input power.

Check input voltage available at site.

Remove top of case according to Section 5-2.

1 Input Voltage Label

Look at jumper links and compare link position with unit label.

2 Input Voltage Jumper Links

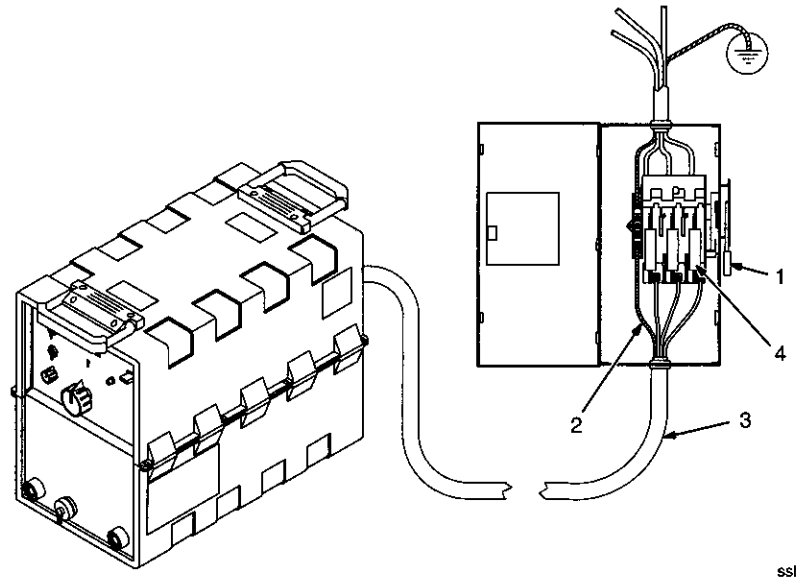
Move links to match input voltage. For example, use 415 volts position when 415 volts input power is available.

Reinstall top of case.

ssb5.1* 2/92 – ST-152 225-A / Ref. S-145 063

Figure 3-7. Input Voltage Jumper Links Location

B. Connecting To Input Power



Have only qualified persons make this installation.

1 Line Disconnect Device Of Proper Rating

2 Grounding Conductor – Green Or Green With Yellow Stripe(s)

3 Input Conductors

Install grounding conductor and input conductors from unit to deenergized line disconnect device.

Be sure grounding conductor goes to an earth ground.

4 Overcurrent Protection

Select type and size using Table 3-2. Install into deenergized line disconnect device (fused disconnect switch shown).

ssb2.3 7/93 – Ref. ST-144 221 / ST-152 303-A / Ref. S-0092C

Figure 3-8. Location And Input Power Connections

Table 3-2. Electrical Service Requirements*

Input Voltage	380	415
Input Amperes At Rated Output	25	23
Recommended Standard Fuse Or Circuit Breaker Rating In Amperes[1]	35	35

* These values are calculated from the 1993 edition of the National Electrical Code (NEC).

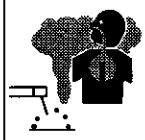
1 Recommended fuse or circuit breaker size is that closest to 150% of rated input amperage of the welding power source. Article 630-12(a) of NEC allows fuse or circuit breaker sizing up to 200% of rated input amperage.

SECTION 4 – OPERATION

⚠ WARNING

ELECTRIC SHOCK can kill.

- Always wear dry insulating gloves.
- Insulate yourself from work and ground.
- Do not touch live electrical parts.
- Keep all panels and covers securely in place.



FUMES AND GASES can be hazardous to your health.

- Keep your head out of the fumes.
- Ventilate area, or use breathing device.
- Read Material Safety Data Sheets (MSDSs) and manufacturer's instructions for material used.

WELDING can cause fire or explosion.

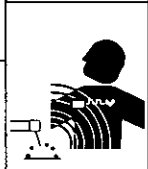
- Do not weld near flammable material.
- Watch for fire; keep extinguisher nearby.
- Do not locate unit over combustible surfaces.
- Do not weld on closed containers.
- Allow work and equipment to cool before handling.

ARC RAYS can burn eyes and skin; NOISE can damage hearing.

- Wear welding helmet with correct shade of filter.
- Wear correct eye, ear, and body protection.

MOVING PARTS can cause injury.

- Keep away from moving parts.
- Keep all doors, panels, covers, and guards closed and securely in place.



MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

See Safety Precautions at beginning of manual for basic welding safety information.

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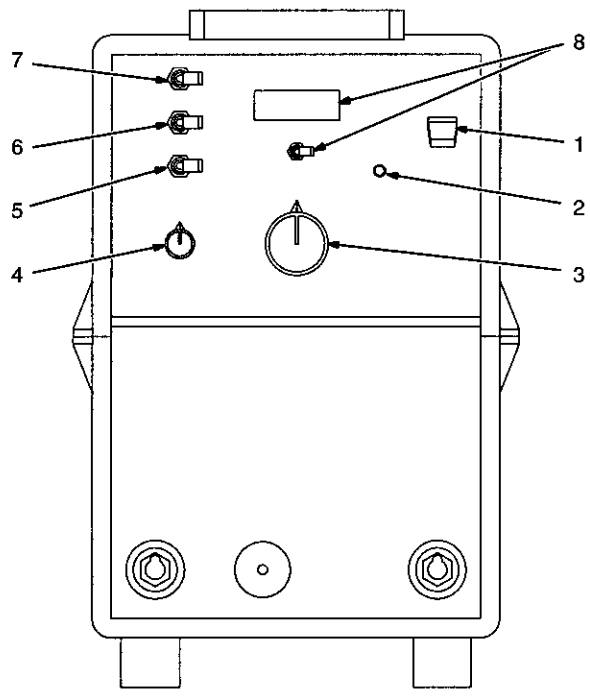
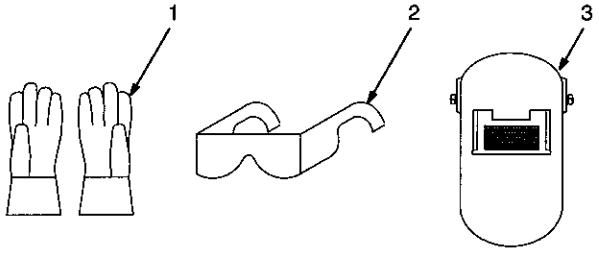


1 Power Switch
2 Pilot Light
3 Amperage Control
4 Arc Force (Dig) Control
5 Output (Contactor) Switch
6 Amperage Control Switch
7 Process Selector Switch
8 Optional Amperage/Voltage Meter And Switch

ST-152 224

Figure 4-1. Controls



1 Insulating Gloves
2 Safety Glasses With Side Shields
3 Welding Helmet

Wear dry insulating gloves, safety glasses with side shields, and a welding helmet with a correct shade of filter (see ANSI Z49.1).

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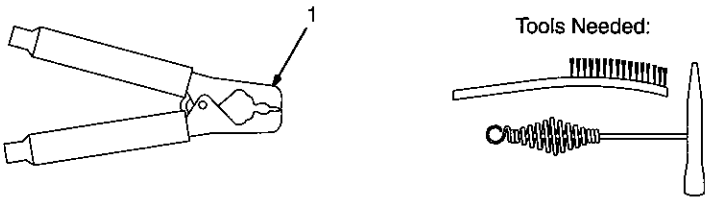
Figure 4-2. Safety Equipment



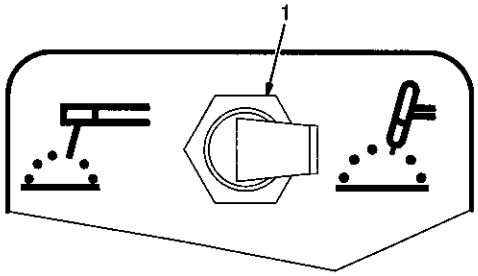
1 Work Clamp

Connect work clamp to a clean, paint-free location on workpiece, as close to weld area as possible.

Use wire brush or sandpaper to clean metal at weld joint area. Use chipping hammer to remove slag after welding.

sb4.1 2/93

Figure 4-3. Work Clamp



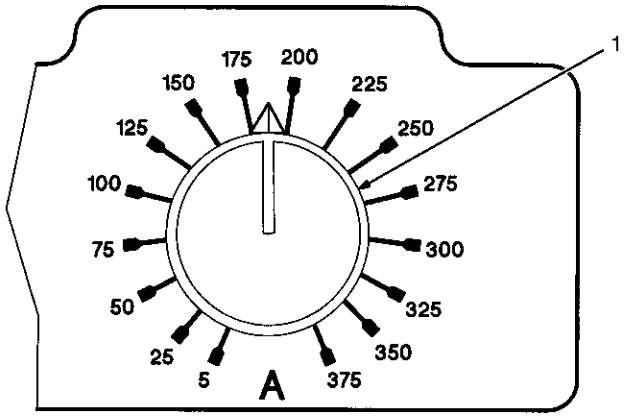
1 Process Selector Switch

Use switch to select type of weld output. Use SMAW position for Shielded Metal Arc Welding. Use GTAW position for Gas Tungsten Arc Welding.

Switch position determines the operation of the Arc Force (Dig) control (see Figure 4-6).

Ref. ST-158 311

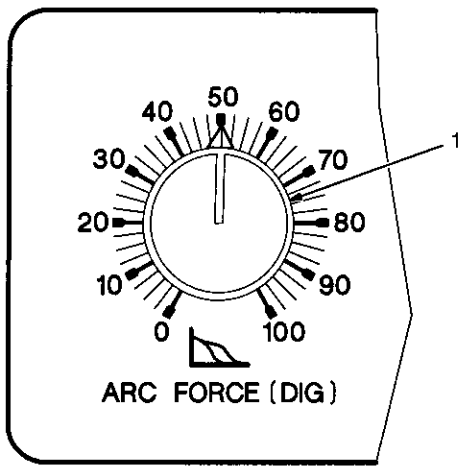
Figure 4-4. Process Selector Switch



1 Amperage Control

Use control to select weld amperage. Amperage may be adjusted while welding.

Figure 4-5. Amperage Control



1 Arc Force Control (Dig)

This control is used for SMAW welding and only works when Process Selector switch (see Figure 4-4) is in the SMAW position.

Use control to help start an arc or make vertical or overhead welds (control increases short-circuit amperage).

When set at 0, short-circuit amperage is the same as normal welding amperage.

When set at 100, short-circuit amperage increases to help arc starting.

Select setting best suited for application. Numbers around control are for reference only.

Set control at 0 for GTAW welding.

Figure 4-6. Arc Control (Dig) Control

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Do not touch weld output terminals when contactor is energized.
- Do not touch electrode and work clamp at the same time.

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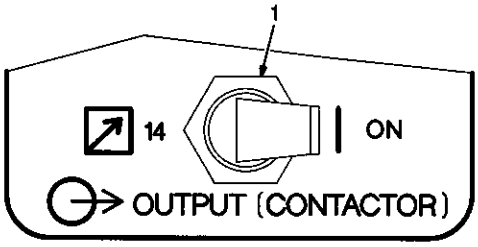


Weld output terminals are energized when switch is On and Power is On.

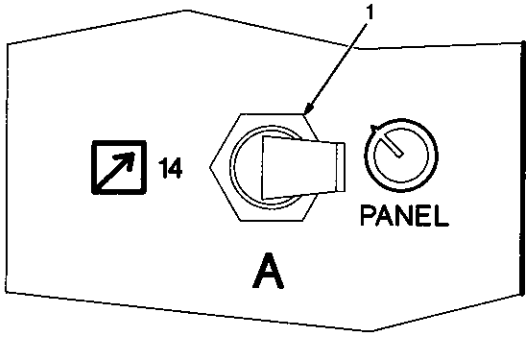
1 Output (Contactor) Switch

Use switch to select way of controlling output.

For front panel control, place switch in On position.

For remote control, place switch in Remote 14 position (see Section 3-5).

Figure 4-7. Output (Contactor) Switch



1 Amperage Control Switch

Use switch to select way of controlling amperage.

For front panel control, place switch in Panel position.

For remote control, place switch in Remote 14 position (see Section 3-5).

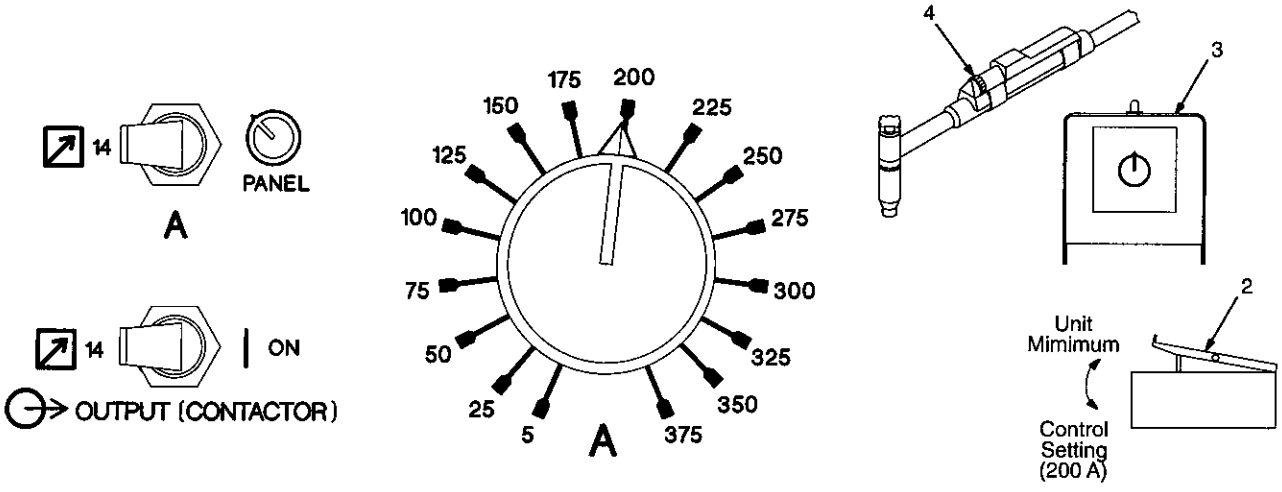
Remote control at Remote 14 is percent of front panel control setting. See Example below.

2 Remote Foot Control

3 Remote Hand Control

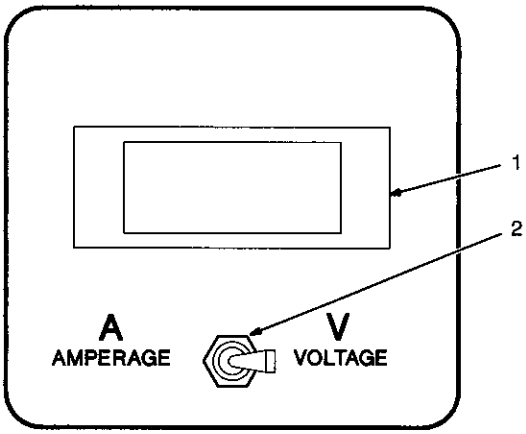
4 Fingertip Control

Example Of Combination Remote Amperage Control



ST-159 059 / S-0769 / S-0774

Figure 4-8. Amperage Control Switch



1 Amperage/Voltage Meter

Use meter to read amperage and voltage output. The preset value is displayed when not welding. The actual value is displayed while welding and is held for 15 seconds after welding stops (see Section 5-4).

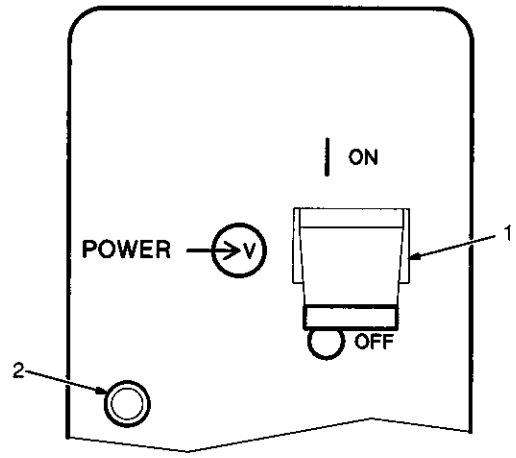
See table for the values displayed for A/V switch settings.

2 Meter Switch

Use switch to select amperage or voltage display.

A/V Switch Positions	Meter Display	
	When Not Welding	When Welding
A	Preset Amps	Actual Amps
V	Preset Amps	Actual Volts

Figure 4-9. Amperage/Voltage Meter And Switch (Optional)



1 Power Switch

Use this switch to turn unit and pilot light On and Off.

There is a 5 second time delay before the unit is ready to weld.

Fan motor is thermostatically controlled and only runs when cooling is needed.

2 Pilot Light

Figure 4-10. Power Switch And Pilot Light

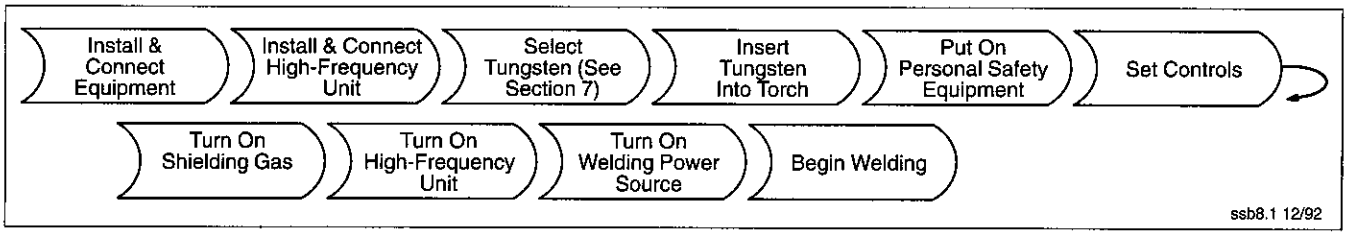


Figure 4-11. Sequence Of Gas Tungsten Arc Welding (GTAW)

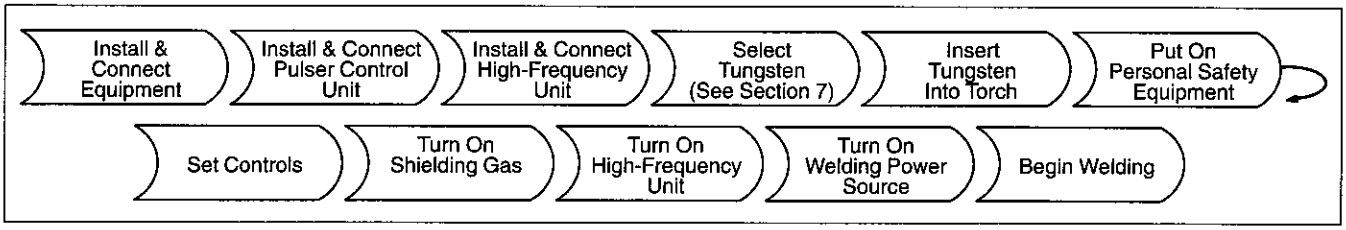


Figure 4-12. Sequence Of Gas Tungsten Arc Welding – Pulsed (GTAW-P)

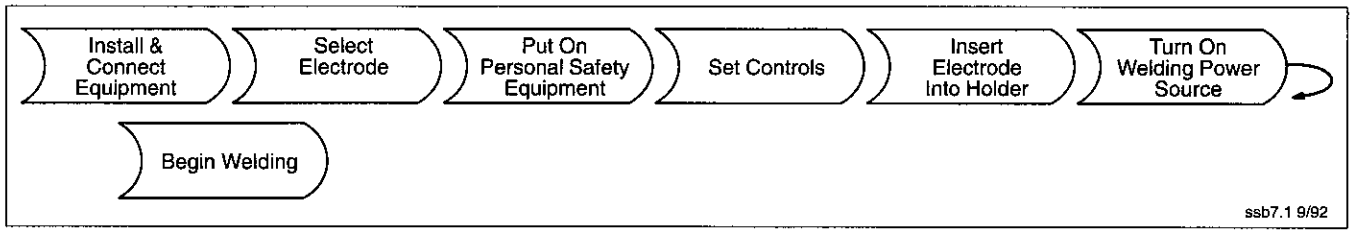
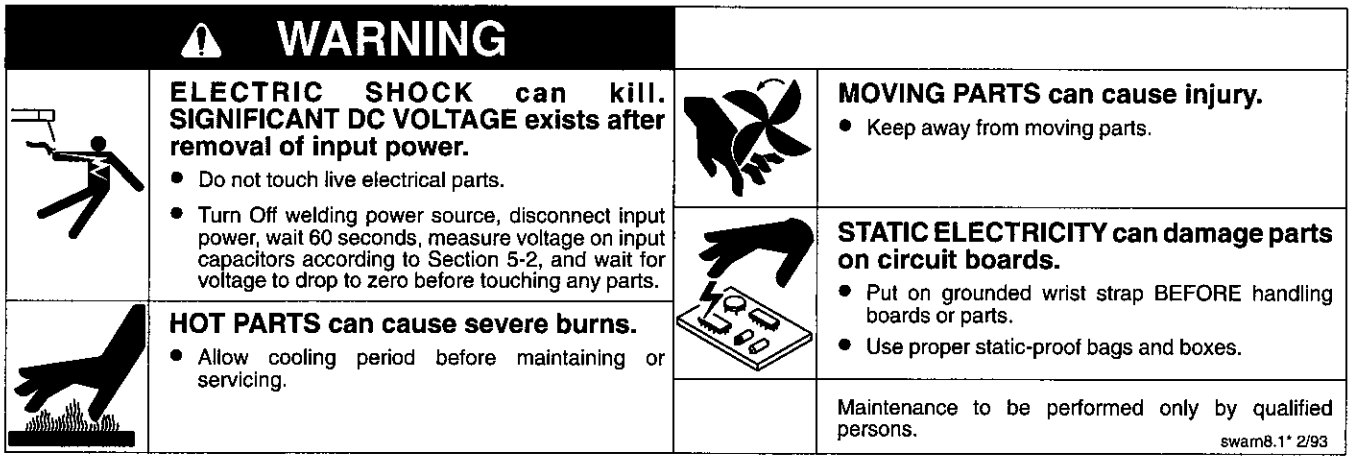


Figure 4-13. Sequence Of Shielded Metal Arc Welding (SMAW)

SECTION 5 – MAINTENANCE & TROUBLESHOOTING



5-1. Routine Maintenance

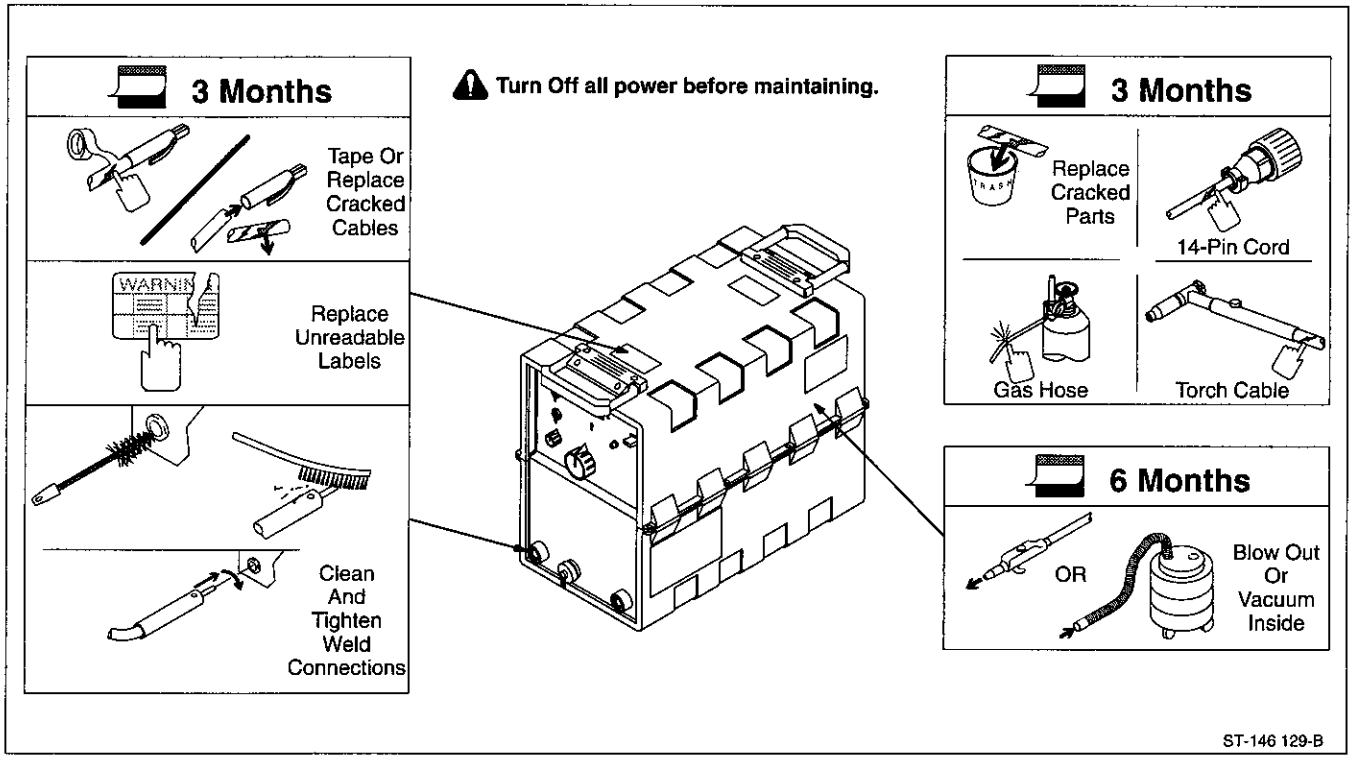
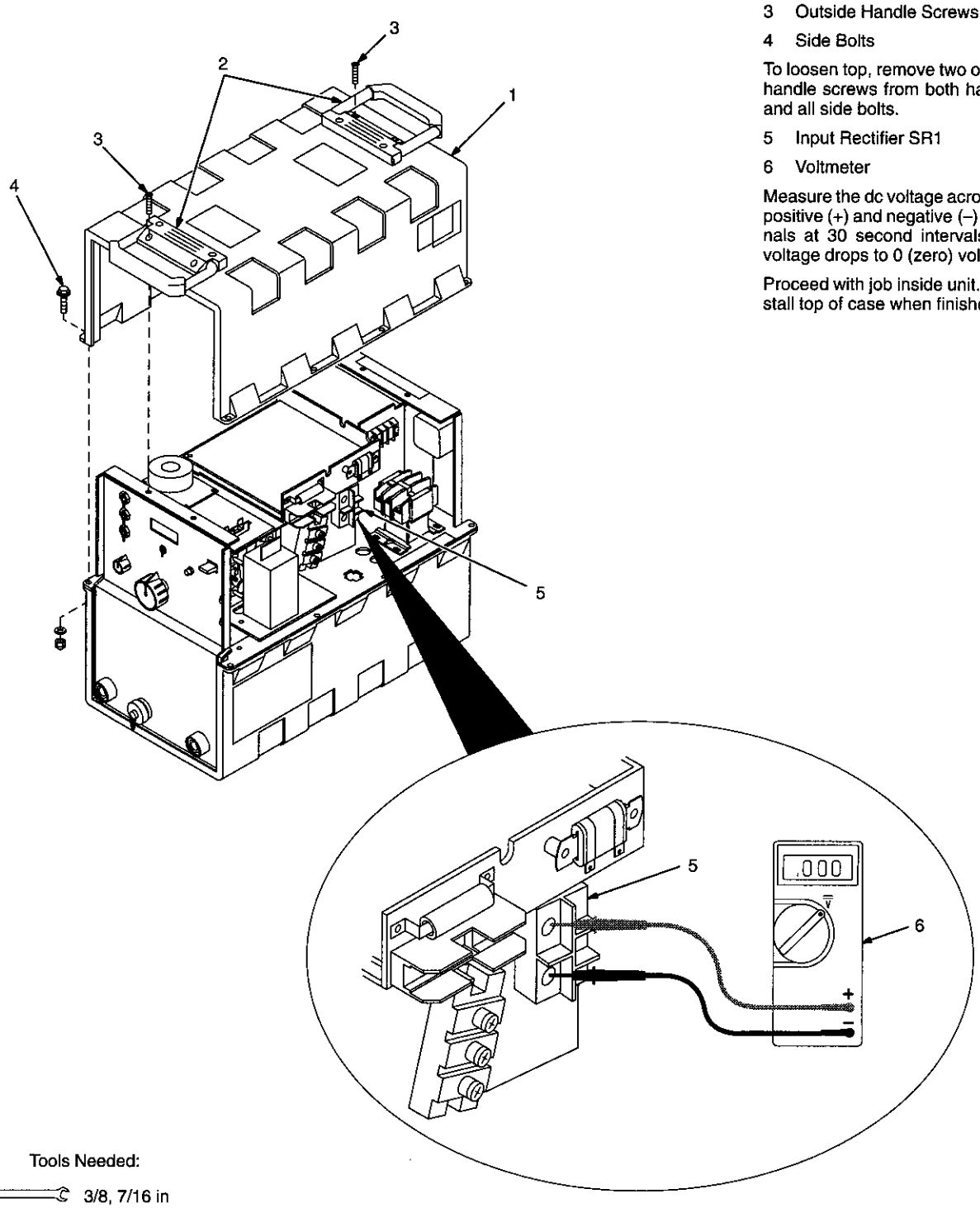


Figure 5-1. Maintenance Schedule

5-2. Removing Top Of Case And Measuring Input Capacitor Voltage

⚠ WARNING | **READ SAFETY BLOCKS at start of Section 5 before proceeding.**

⚠ Significant DC voltage can remain on capacitors after unit is Off. Always check capacitors as shown to be sure they have discharged before working on unit.



Turn Off welding power source and disconnect input power.

1 Top Of Case

2 Handles

3 Outside Handle Screws

4 Side Bolts

To loosen top, remove two outside handle screws from both handles and all side bolts.

5 Input Rectifier SR1

6 Voltmeter

Measure the dc voltage across the positive (+) and negative (–) terminals at 30 second intervals until voltage drops to 0 (zero) volts.

Proceed with job inside unit. Reinstall top of case when finished.

Tools Needed:

3/8, 7/16 in

5/32 in

ST-153 512-B

Figure 5-2. Removing Top Of Case And Measuring Input Capacitor Voltage

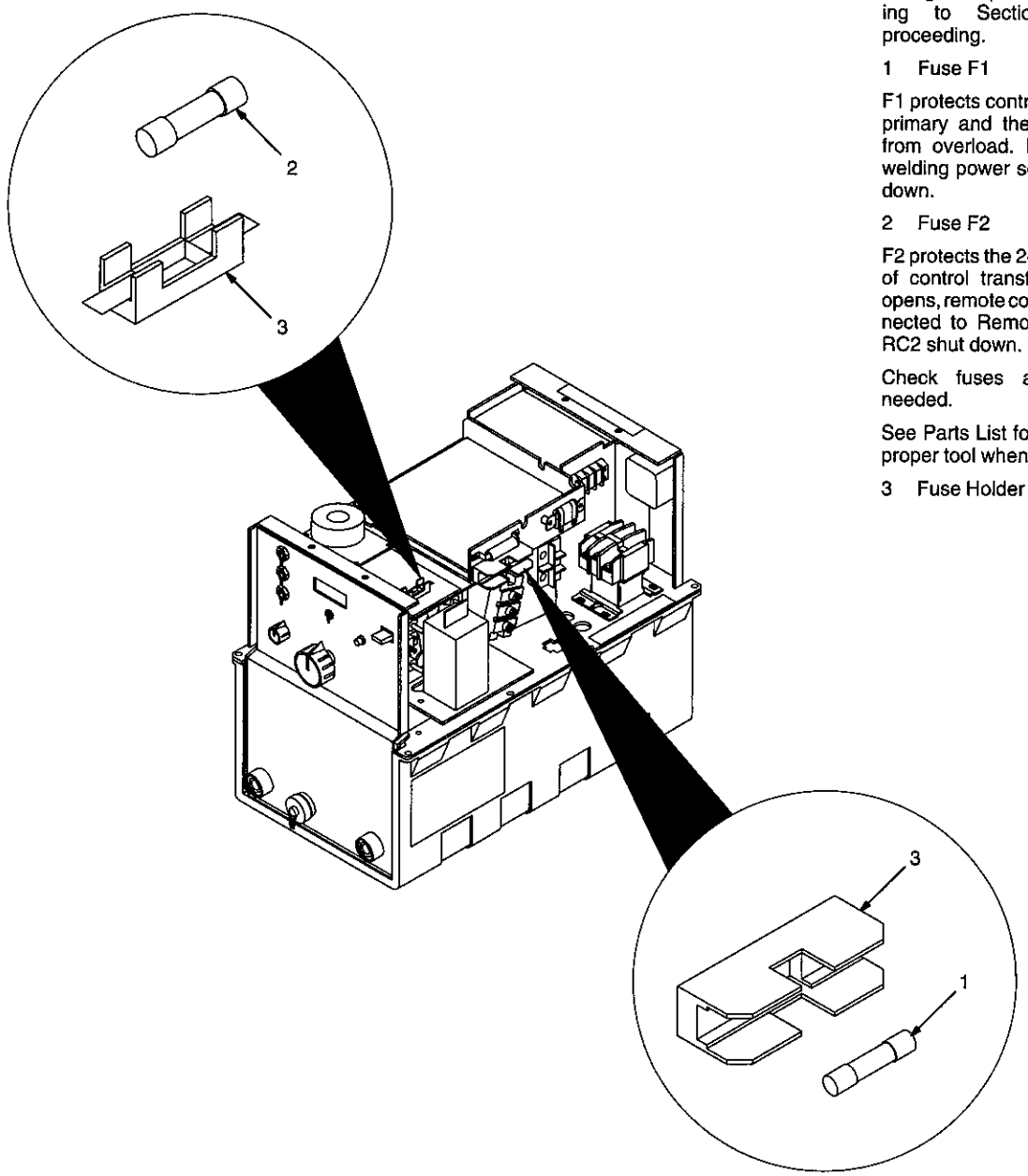
5-3. Overload Protection

⚠ WARNING	READ SAFETY BLOCKS at start of Section 5 before proceeding.

A. Overheating

Thermostat TP1 protects the unit from damage due to overheating. If power module PM2 gets too hot, TP1 opens and weld output stops. The pilot light stays on, and the fan keeps running to cool the power module. Wait several minutes before trying to weld.

B. Fuses



Turn Off welding power source, disconnect input power, and check voltage on input capacitors according to Section 5-2 before proceeding.

1 Fuse F1

F1 protects control transformer T2 primary and the control circuitry from overload. If F1 opens, the welding power source would shut down.

2 Fuse F2

F2 protects the 24 volts ac winding of control transformer T2. If F2 opens, remote control devices connected to Remote 14 receptacle RC2 shut down.

Check fuses and replace as needed.

See Parts List for fuse sizes. Use proper tool when removing fuses.

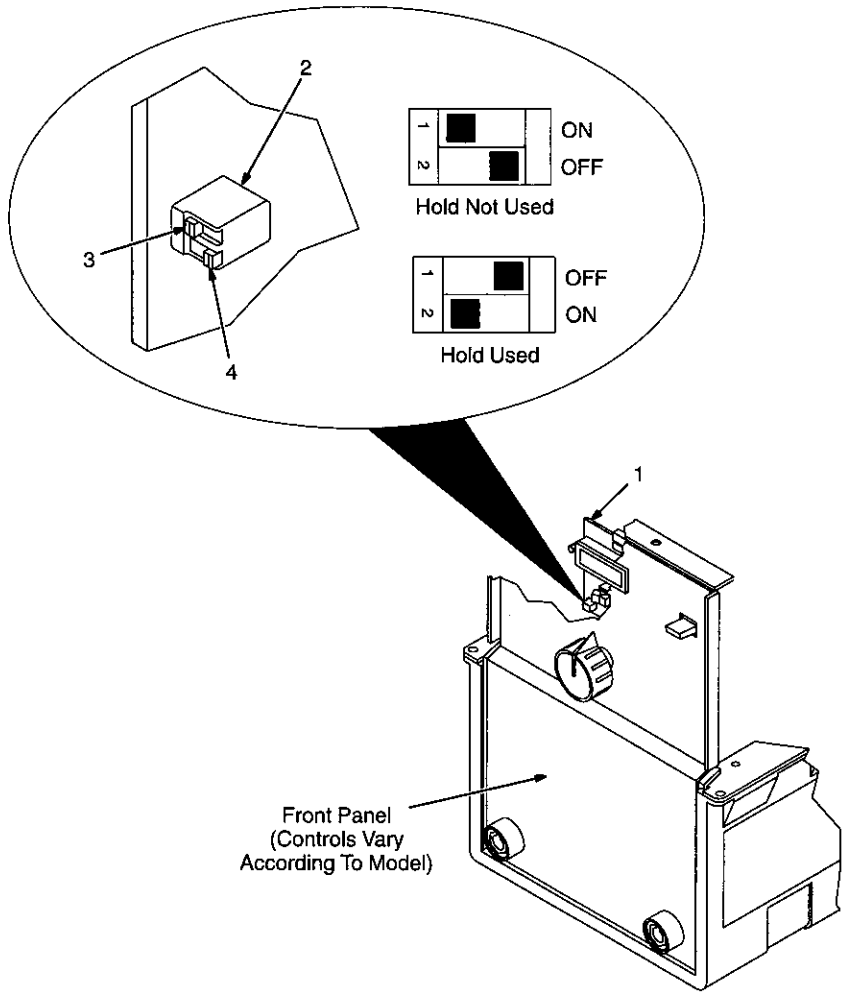
3 Fuse Holder

Ref. ST-152 211 / ST-152 225-A

Figure 5-3. Overload Protection

5-4. Changing Amperage/Voltage Meter Hold Function

⚠ WARNING  **READ SAFETY BLOCKS at start of Section 5 before proceeding.**



The Amperage/Voltage meter is able to hold the displayed weld output value for 15 seconds after welding stops. This procedure allows the hold function to be turned On or Off.

If the hold function is not used, the displayed value leaves when welding stops.

Turn Off welding power source, disconnect input power, and check voltage on input capacitors according to Section 5-2 before proceeding.

1 A/V Meter Board PC5

2 DIP Switch S2

S2 is accessible from the left side of the unit.

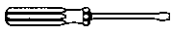
3 Toggle 1

4 Toggle 2

Set both toggles in desired position.

Reinstall top of case.

Tools Needed:



ST-159 050-A

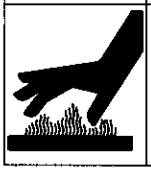
Figure 5-4. Changing Amperage/Voltage Meter Hold Function

5-5. Troubleshooting

⚠ WARNING

ELECTRIC SHOCK can kill. SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.
- Turn Off welding power source, disconnect input power, wait 60 seconds, measure voltage on input capacitors according to Section 5-2, and wait for voltage to drop to zero before touching any parts.



HOT PARTS can cause severe burns.

- Allow cooling period before servicing.

MOVING PARTS can cause injury.

- Keep away from moving parts.

STATIC ELECTRICITY can damage parts on circuit boards.

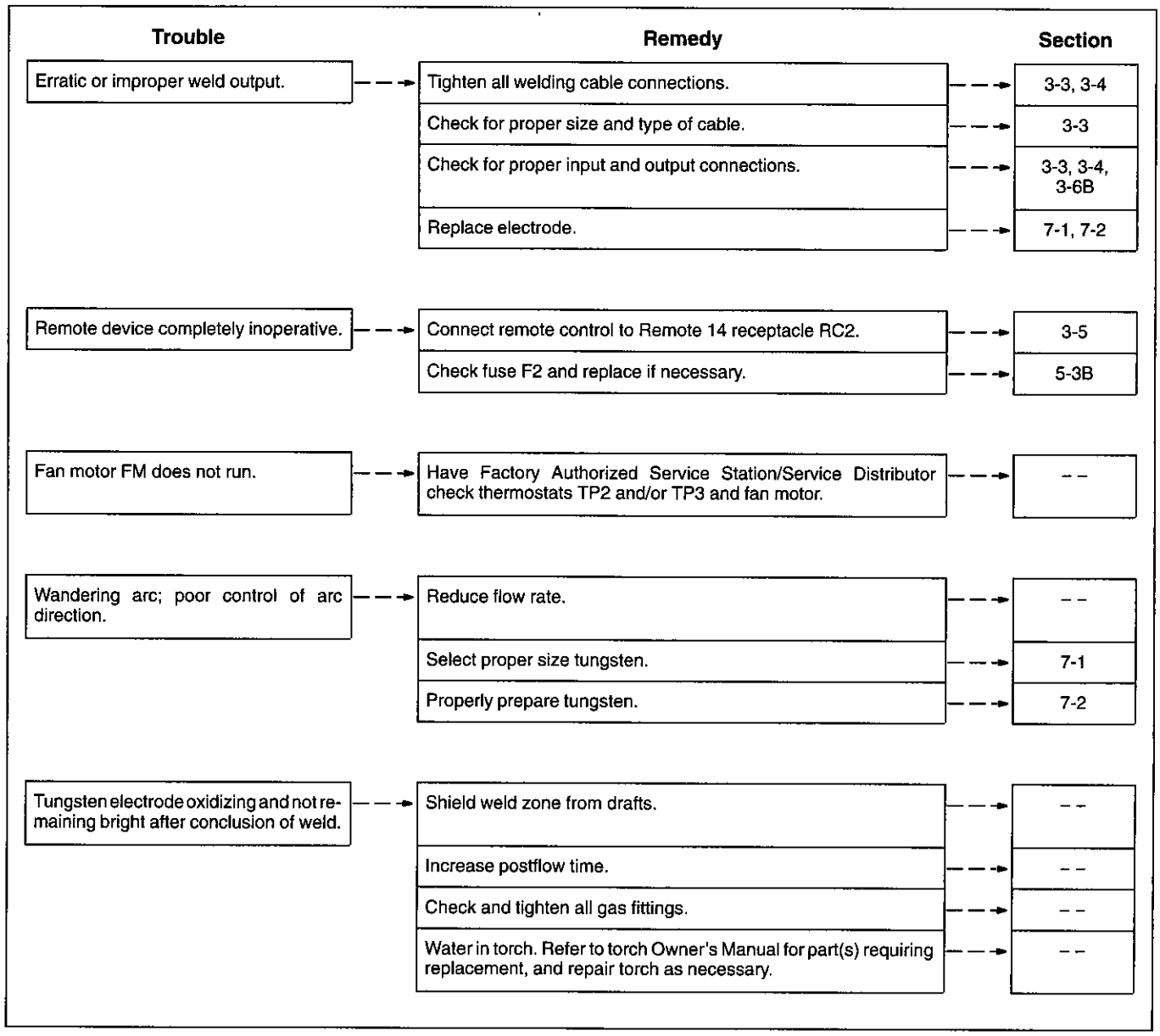
- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes.

Troubleshooting to be performed only by qualified persons.

swarn9.1* 2/93

Table 5-1. Welding Trouble

Trouble	Remedy	Section
No weld output; unit completely inoperative.	Be sure Power switch is On.	Figure 4-10
	Be sure line disconnect switch is On.	3-6B
	Check line fuse(s) and replace if necessary. Reset circuit breakers.	3-6B
	Check for proper input connections.	3-6B
	Check position of input voltage jumper links.	3-6A
	Check fuse F1 and replace if necessary.	5-3B
No weld output; fan motor FM running and pilot light on.	Check position of Output (Contactor) switch.	Figure 4-7
	Thermostat TP1 open (overheating). Allow fan to run; thermostat closes when unit has cooled.	5-3A
Low weld output with no control.	Check position of Amperage Control switch.	Figure 4-8
	Have Factory Authorized Service Station/Service Distributor check control board PC1.	- -
Limited output and low open-circuit voltage.	Check incoming power for correct voltage. Replace line fuse if open or reset circuit breaker.	3-6B
	Check position of input voltage jumper links.	3-6A
	Check for proper input and output connections.	3-3, 3-4, 3-6B



Trouble	Remedy	Section
Erratic or improper weld output.	Tighten all welding cable connections.	3-3, 3-4
	Check for proper size and type of cable.	3-3
	Check for proper input and output connections.	3-3, 3-4, 3-6B
	Replace electrode.	7-1, 7-2
Remote device completely inoperative.	Connect remote control to Remote 14 receptacle RC2.	3-5
	Check fuse F2 and replace if necessary.	5-3B
Fan motor FM does not run.	Have Factory Authorized Service Station/Service Distributor check thermostats TP2 and/or TP3 and fan motor.	– –
Wandering arc; poor control of arc direction.	Reduce flow rate.	– –
	Select proper size tungsten.	7-1
	Properly prepare tungsten.	7-2
Tungsten electrode oxidizing and not remaining bright after conclusion of weld.	Shield weld zone from drafts.	– –
	Increase postflow time.	– –
	Check and tighten all gas fittings.	– –
	Water in torch. Refer to torch Owner's Manual for part(s) requiring replacement, and repair torch as necessary.	– –

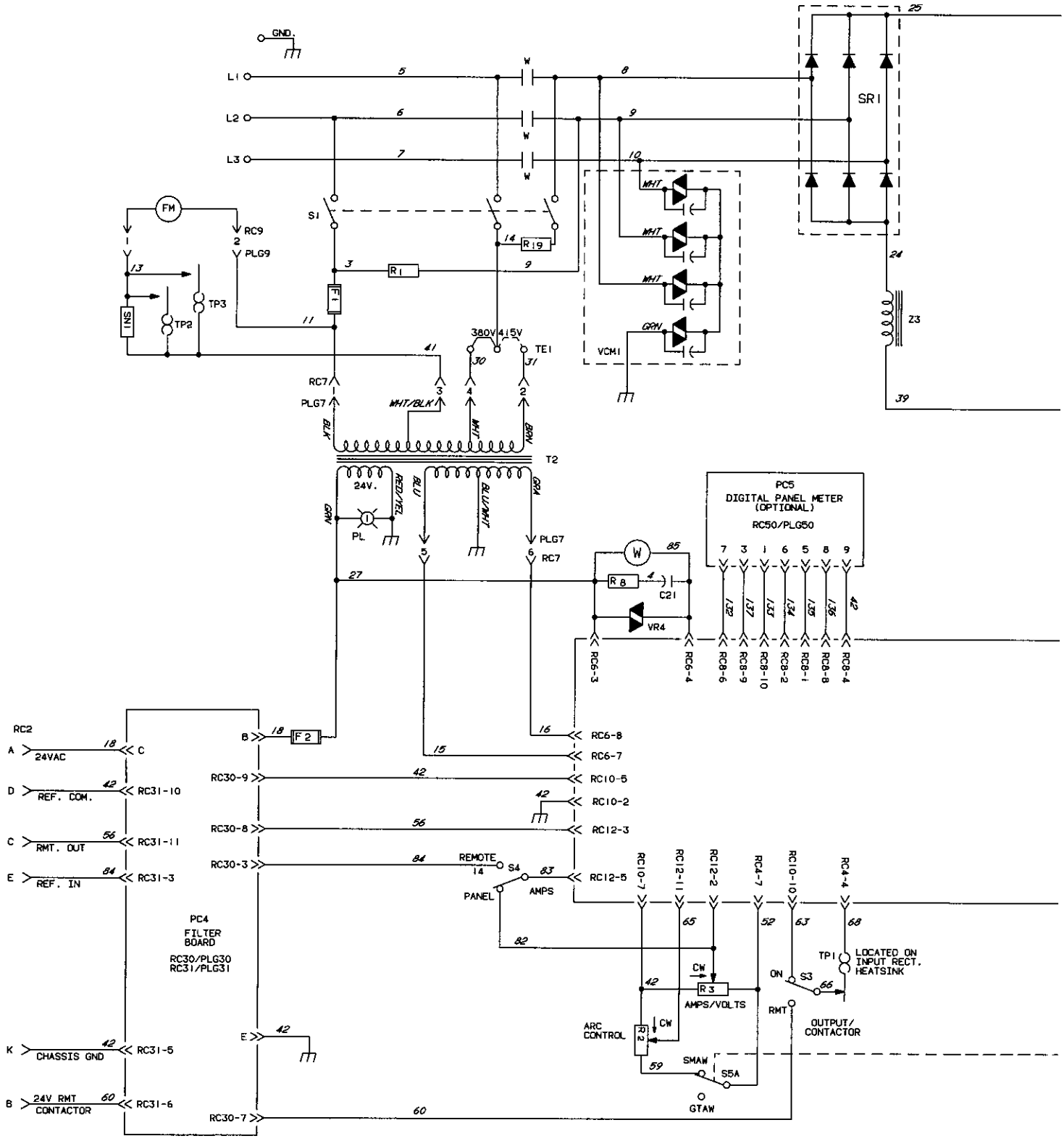
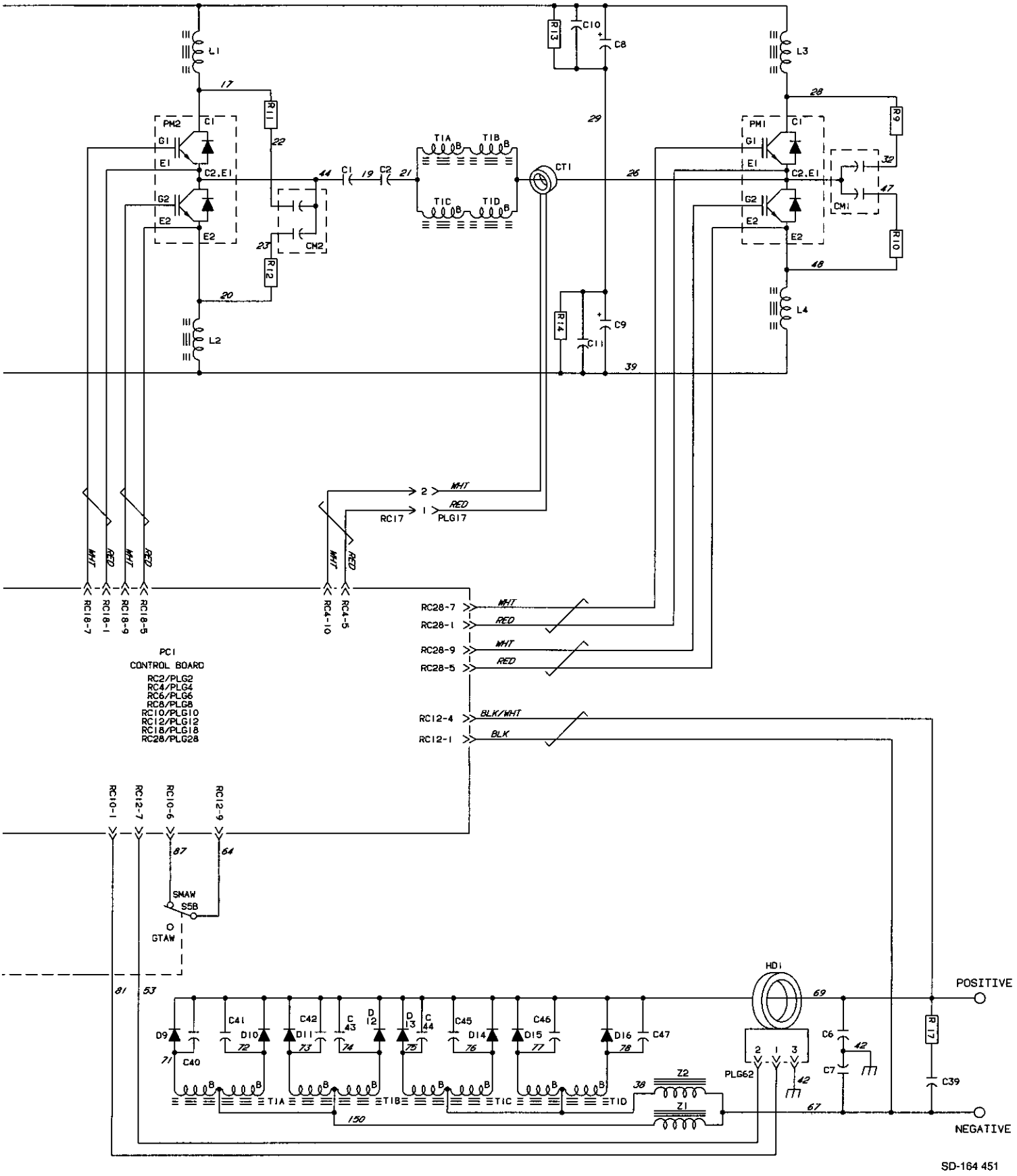


Figure 6-1. Circuit Diagram For Welding Power Source


L1
L2
L3
L4
PM2
PM1
CM2
CM1
CT1
C8
C9
C10
C11
R11
R12
R13
R14
R9
R10
R17
C39
C40
C41
C42
C43
C44
C45
C46
C47
C6
C7
D9
D10
D11
D12
D13
D14
D15
D16
HD1
Z1
Z2
TIA
TIB
TIC
TID
PLG62
SMAW
GTAW
S5B
RC17
PLG17
RC18-7
RC18-1
RC18-9
RC18-5
RC4-10
RC4-5
RC28-7
RC28-1
RC28-9
RC28-5
RC12-4
RC12-1
RC10-1
RC12-7
RC10-6
RC12-9
WHT
RED
BLK/WHT
BLK
POSITIVE
NEGATIVE
PC1
CONTROL BOARD
RC2/PLG2
RC4/PLG4
RC6/PLG6
RC8/PLG8
RC10/PLG10
RC12/PLG12
RC18/PLG18
RC28/PLG28

SD-164 451

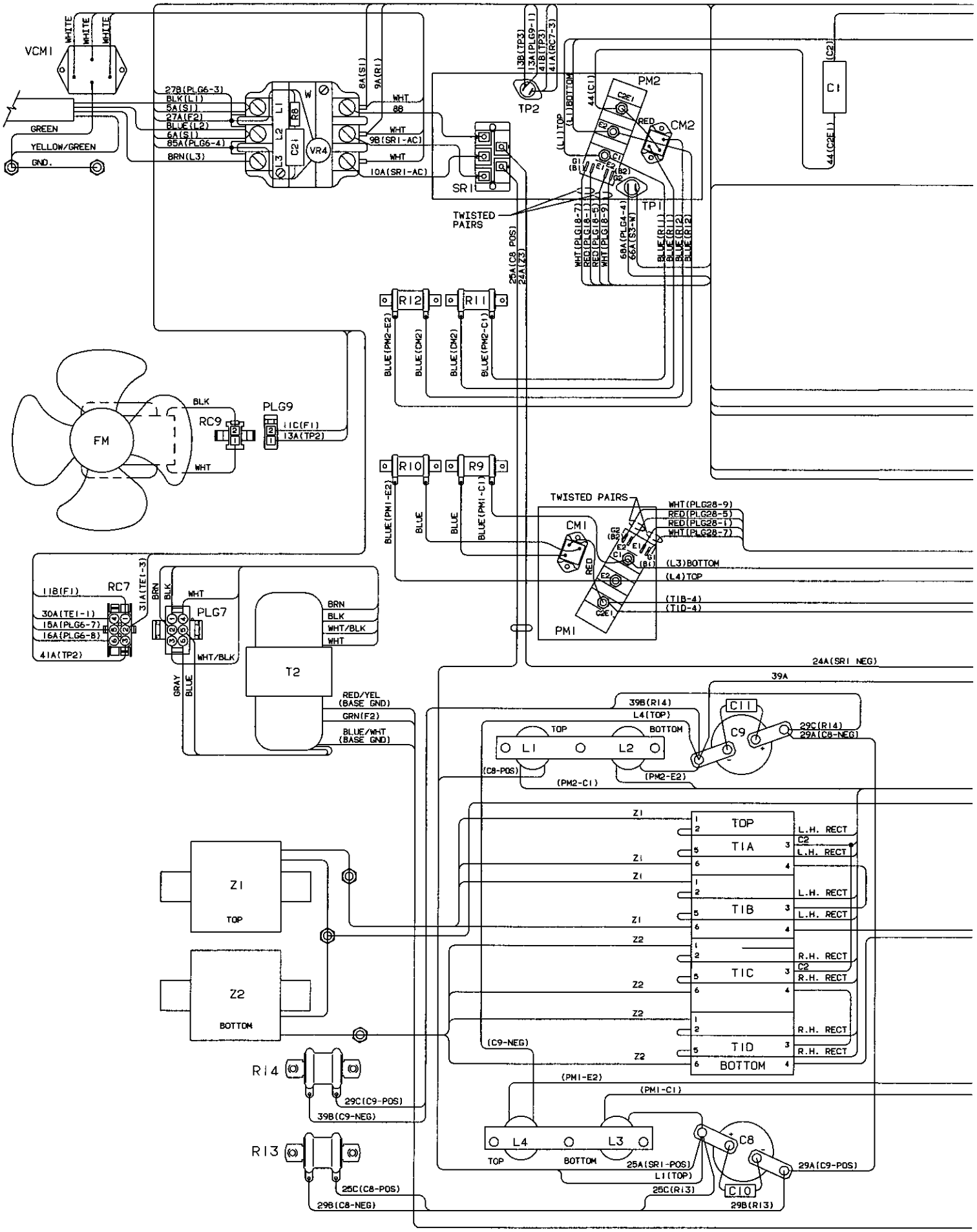
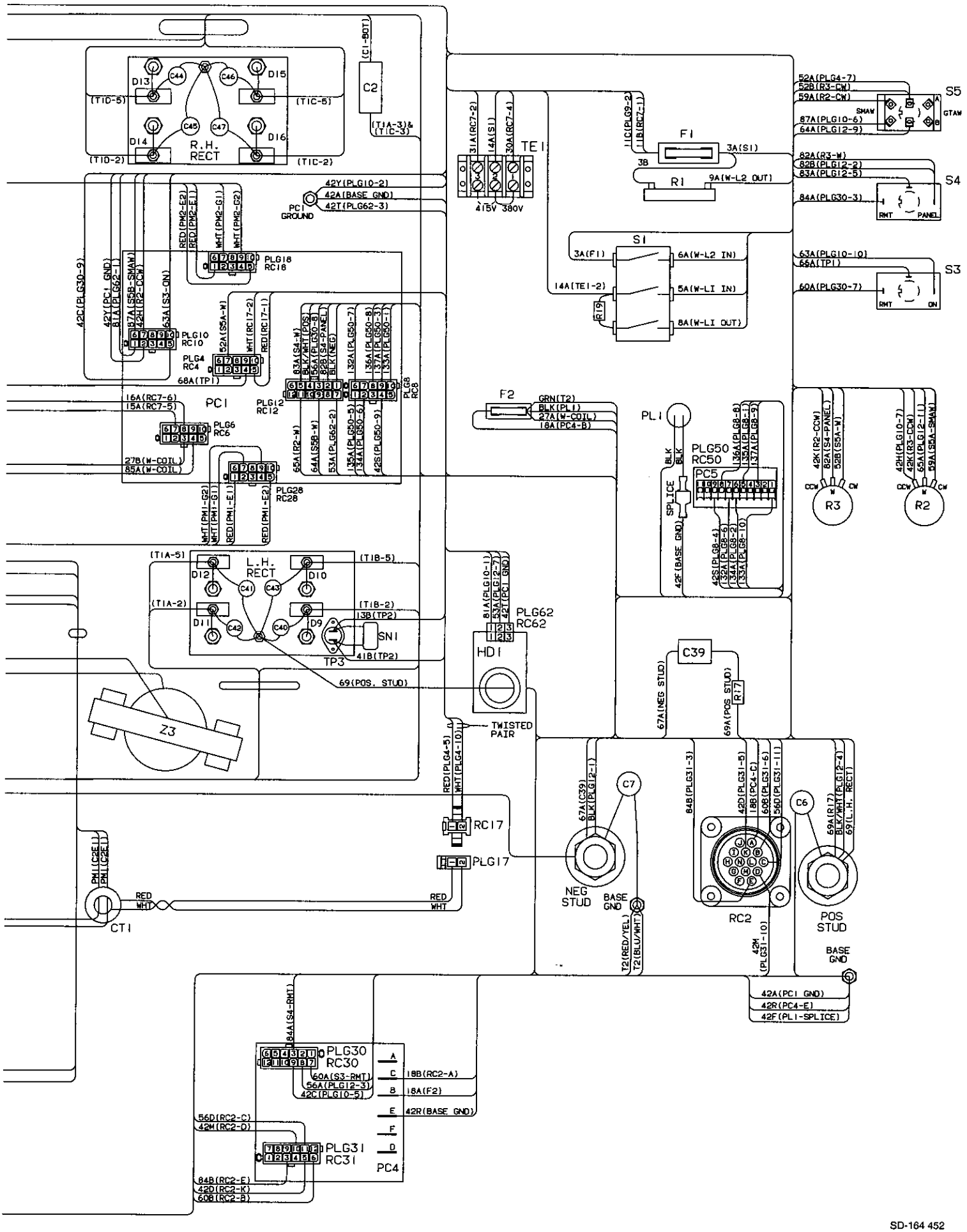


Figure 6-2. Wiring Diagram For Welding Power Source


R.H. RECT
L.H. RECT
TE1
F1
3A(S1)
R1
9A(W-L2 OUT)
S1
6A(W-L2 IN)
5A(W-LI IN)
8A(W-LI OUT)
S5
S4
S3
PC1
PC4
PC5
PL1
PLG50 RC50
PLG62 RC62
PLG18 RC18
PLG10 RC10
PLG4 RC4
PLG12 RC12
PLG6 RC6
PLG28 RC28
PLG8 RC8
PLG30 RC30
PLG31 RC31
PLG17
RC17
HD1
SN1
TP3
Z3
CT1
R2
R3
C2
C39
C6
C7
NEG STUD
POS STUD
BASE GND
RC2
TWISTED PAIR
SPLICE
SMAW
GTAW
RMT
PANEL
ON
CW
CCW
SD-164 452

SECTION 7 – TUNGSTEN ELECTRODE

NOTE ☞

For additional information, see your distributor for a handbook on the Gas Tungsten Arc Welding (GTAW) process.

Wear clean gloves to prevent contamination of tungsten electrode.

7-1. Selecting Tungsten Electrode

Table 7-1. Tungsten Size

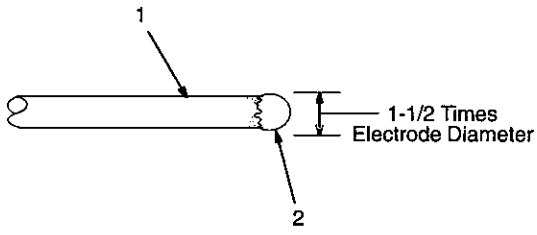
Electrode Diameter	Amperage Range - Gas Type♦ - Polarity			
	DC – Argon – Electrode Negative/Straight Polarity	DC – Argon – Electrode Positive/Reverse Polarity	AC – Argon – Using High Frequency	AC – Argon – Balanced Wave Using High Freq.
Pure Tungsten (Green Band)				
.010"	Up to 15	*	Up to 15	Up to 10
.020"	5-20	*	5-20	10-20
.040"	15-80	*	10-60	20-30
1/16"	70-150	10-20	50-100	30-80
3/32"	125-225	15-30	100-160	60-130
1/8"	225-360	25-40	150-210	100-180
5/32"	360-450	40-55	200-275	160-240
3/16"	450-720	55-80	250-350	190-300
1/4"	720-950	80-125	325-450	250-400
2% Thorium Alloyed Tungsten (Red Band)				
.010"	Up to 25	*	Up to 20	Up to 15
.020"	15-40	*	15-35	5-20
.040"	25-85	*	20-80	20-60
1/16"	50-160	10-20	50-150	60-120
3/32"	135-235	15-30	130-250	100-180
1/8"	250-400	25-40	225-360	160-250
5/32"	400-500	40-55	300-450	200-320
3/16"	500-750	55-80	400-500	290-390
1/4"	750-1000	80-125	600-800	340-525
Zirconium Alloyed Tungsten (Brown Band)				
.010"	*	*	Up to 20	Up to 15
.020"	*	*	15-35	5-20
.040"	*	*	20-80	20-60
1/16"	*	*	50-150	60-120
3/32"	*	*	130-250	100-180
1/8"	*	*	225-360	160-250
5/32"	*	*	300-450	200-320
3/16"	*	*	400-550	290-390
1/4"	*	*	600-800	340-525

♦ Typical argon shielding gas flow rates are 15 to 35 cfh (cubic feet per hour).

*Not Recommended.

The figures listed are intended as a guide and are a composite of recommendations from American Welding Society (AWS) and electrode manufacturers. S-0009

7-2. Preparing Tungsten



1 Tungsten Electrode

2 Balled End

Ball end of tungsten before welding by applying either an ac amperage slightly higher than what is recommended for a given electrode diameter (see Table 7-1), or a dc electrode positive amperage.

Ref. S-0161

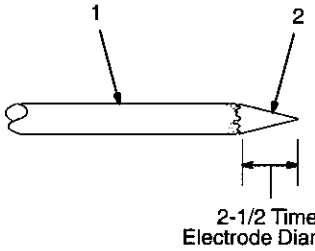
Figure 7-1. Preparing Tungsten For AC Or DC Electrode Positive (DCEP) Welding

⚠ CAUTION

FLYING SPARKS AND HOT METAL can cause injury and start fires.

- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Keep flammables away.

warn2.1 9/91

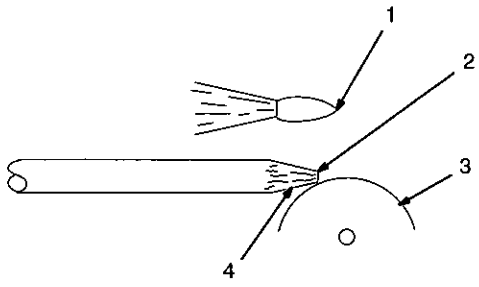


1 Tungsten Electrode

2 Tapered End

Grind end of tungsten on fine grit, hard abrasive wheel before welding. Do not use wheel for other jobs or tungsten can become contaminated causing lower weld quality.

Ref. S-0161



Ideal Tungsten Preparation – Stable Arc

1 Stable Arc

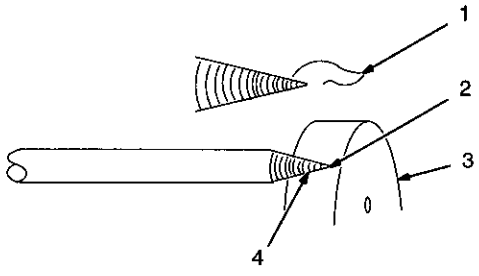
2 Flat

Diameter of this flat determines amperage capacity.

3 Grinding Wheel

4 Straight Ground

Ref. S-0162



Wrong Tungsten Preparation – Wandering Arc

1 Arc Wander

2 Point

3 Grinding Wheel

4 Radial Ground

Ref. S-0162

Figure 7-2. Preparing Tungsten For DC Electrode Negative (DCEN) Welding

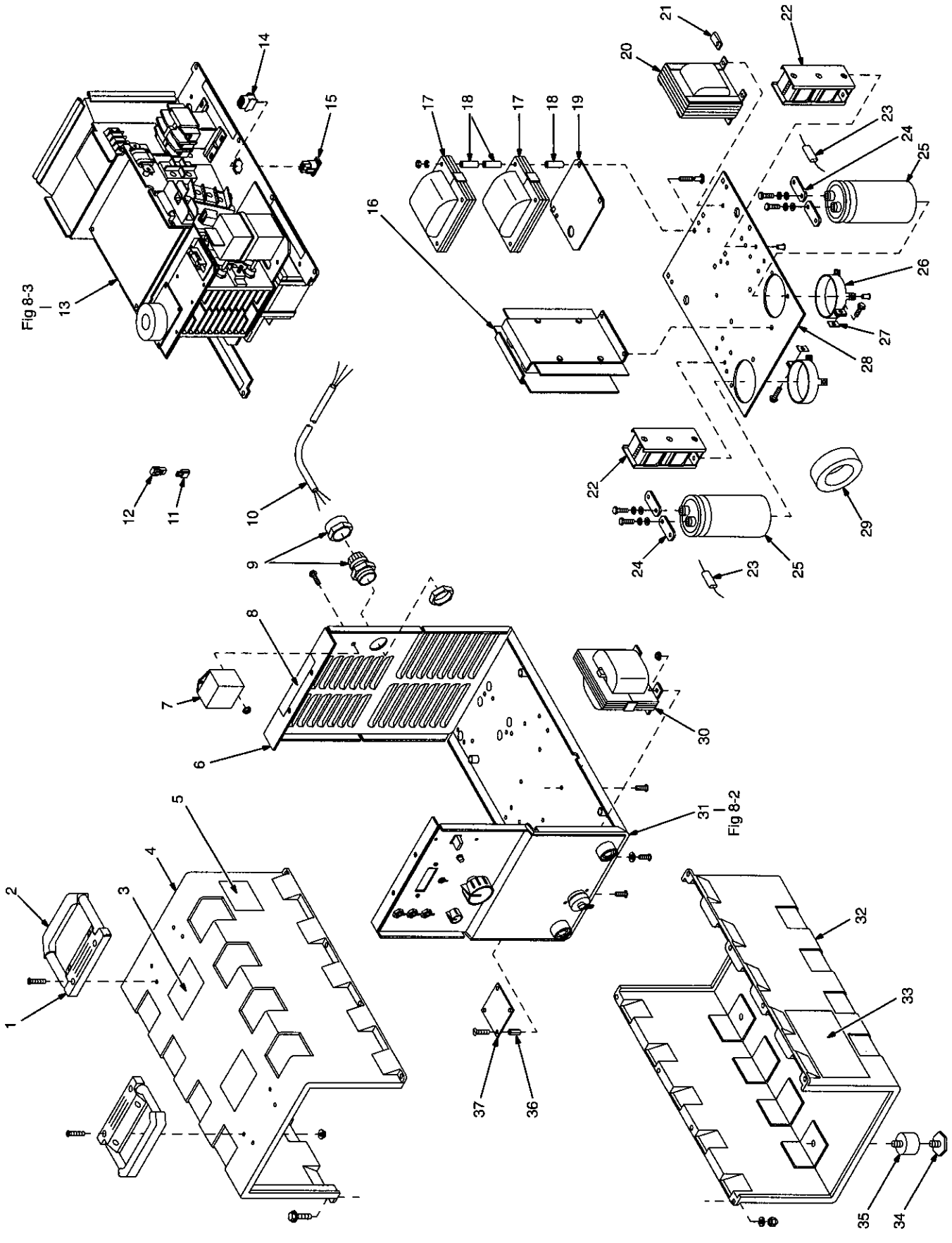


Figure 8-1. Main Assembly

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

Figure 8-1. Main Assembly

1		126 415	CLAMP, saddle	2
2		126 416	HANDLE	2
3		138 442	LABEL, caution falling equipment can cause injury	2
4		+141 350	CASE	1
5		149 194	LABEL, warning electric shock can kill	1
6		+146 727	CASE SECTION, front/bottom/rear (consisting of)	1
		137 197	NUT, insert .312-18	4
		137 198	NUT, insert No. 10-24	4
		601 836	NUT, brs hex .250-20 jam hvy	1
7	VCM1	164 849	MODULE, varistor/capacitor 4 400 joule 1620-1980VDC	1
8		126 026	LABEL, warning electric shock can kill	1
9		139 041	BUSHING, strain relief .455/.629 ID x 1.115mtg hole	1
10		134 838	CABLE, pwr No. 6mm 4/c 600V rbr jkt 4M lg	1
11	PLG17	158 719	CONNECTOR & SOCKETS, (consisting of)	1
		147 995	CONNECTOR, rect skt 22-18ga Amp 770904-3	2
12	RC17	165 404	CONNECTOR & PINS, (consisting of)	1
		147 996	CONNECTOR, rect pin 22-18ga Amp 770903-3	2
13		Fig 8-3	CHASSIS, mid	1
14	RC7	116 045	CONNECTOR & PINS, (consisting of)	1
		113 633	CONNECTOR, rect pin 20-14ga Amp 350218-1	6
15	PLG7	135 556	CONNECTOR & SOCKETS, (consisting of)	1
		114 066	CONNECTOR, rect skt 20-14ga Amp 350536-1	6
16	T1	146 287	TRANSFORMER, HF	1
17	Z1,2	139 219	STABILIZER	2
18		138 515	SPACER, plstc .257 ID x .500 OD x 1.375 high	9
19		139 658	INSULATOR, stabilizer	1
20	T2	146 402	TRANSFORMER, control	1
21		136 190	NUT, speed U type 10-32	4
22	L1-4	145 426	CHOKE, DVDT	2
23	C10,11	164 812	CAPACITOR	2
24		141 357	BUS BAR, capacitor	4
25	C8,9	139 151	CAPACITOR, elctlt 2700uf 350VDC	2
26		108 105	CLAMP, capacitor 2.500dia	2
27		133 405	NUT, speed 10-24 flat type rectangular	2
28		151 226	PANEL, mtg stab/transformer/cmpts	1
29	CT1	149 418	TRANSFORMER, current	1
30	Z3	164 450	INDUCTOR	1
31		Fig 8-2	PANEL, front w/components	1
32		+141 574	CASE, bottom	1
33		134 327	LABEL, warning general precautionary	2
34		152 196	FOOT, mtg	4
35		143 915	MOUNT, sgl stud 1.5dia x 1.000 lg .312-18 stud	4
36		115 440	STAND-OFF, 6-32 x .637 lg	4
37	PC4	151 154	CIRCUIT CARD, receptacle bypass	1
	PLG30,31	158 720	CONNECTOR & SOCKETS, (consisting of)	2
		147 995	CONNECTOR, rect skt 22-18ga Amp 770904-3	12

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

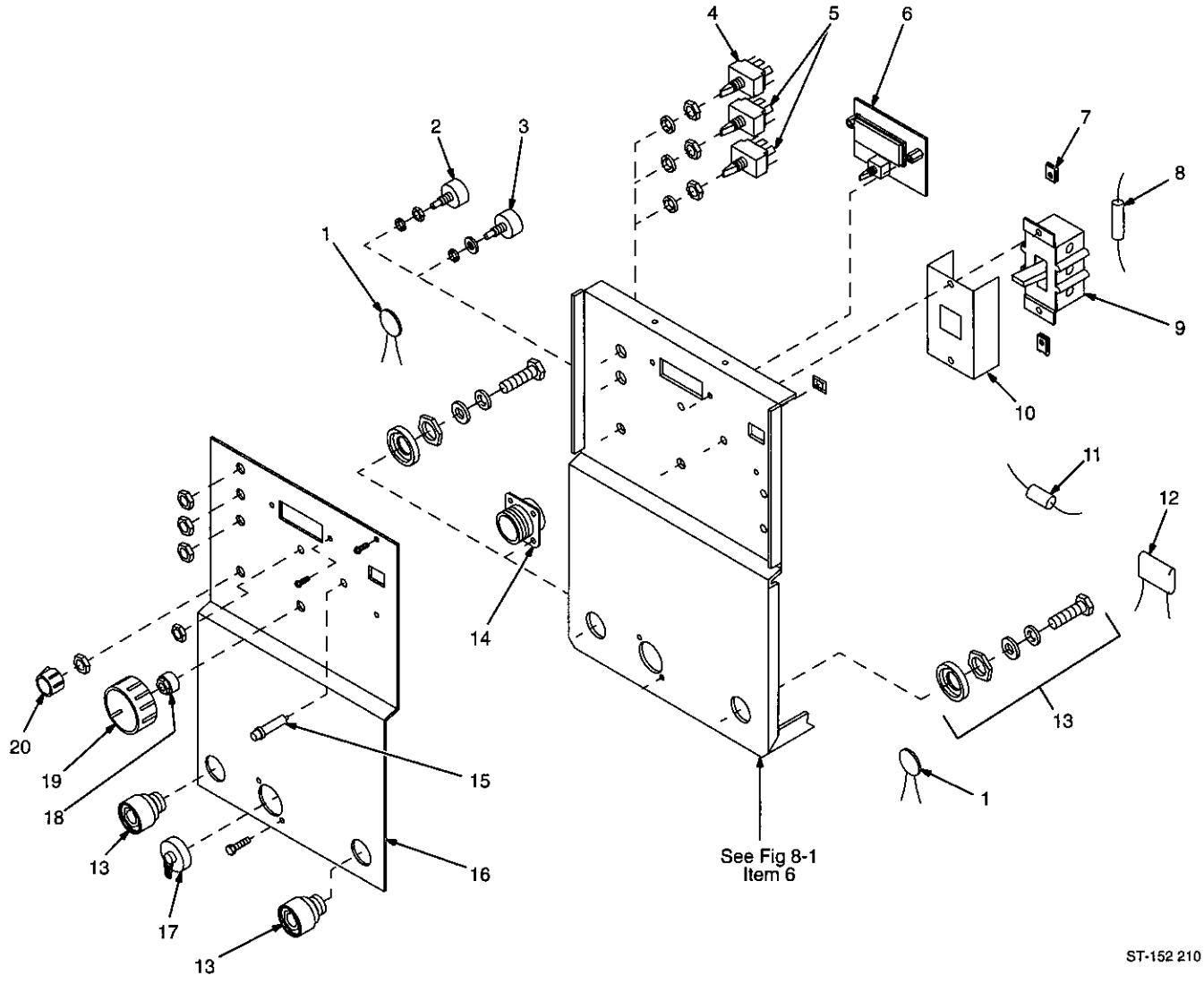


Figure 8-2. Panel, Front w/Components

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

Figure 8-2. Panel, Front w/Components (Fig 8-1 Item 31)

1	C6,7	138 115	CAPACITOR	2
2	R2	073 562	POTENTIOMETER, C sltd sft 1/T 2W 10K ohm	1
3	R3	035 897	POTENTIOMETER, C sltd sft 1/T 2W 1K ohm	1
4	S5	134 848	SWITCH, tgl DPDT 15A 125VAC	1
5	S3,4	134 847	SWITCH, tgl SPDT 15A 125VAC	2
6	PC5	♦157 011	CIRCUIT CARD, meter	1
	PLG50	♦089 222	CONNECTOR, rect 11skt plug Amp 1-640440-1	1
		136 339	COVER, opening meter	1
		120 304	BLANK, snap-in nyl .250mtg hole	1
7		148 297	NUT, speed U type 10-32	2
8	R19	139 200	RESISTOR	1
9	S1	128 756	SWITCH, tgl 3PST 40A 600VAC	1
10		146 684	INSULATOR, switch pwr	1
11	R17	604 178	RESISTOR, C 2W 100 ohm	1
12	C39	035 561	CAPACITOR, polye MF 4uf 200V	1
13	Pos,Neg	129 525	RECEPTACLE, twlk insul fem (Dinse type) 50/70 series	2
		131 605	TERMINAL, connector friction	2
		042 418	CONNECTOR KIT, Dinse male 50 series	2
14	RC2	143 976	CONNECTOR w/SOCKETS, (consisting of)	1
		079 534	CONNECTOR, circ skt push-in 14-18ga Amp 66358-6	14
		134 734	CONNECTOR, circ 14 pin plug Amp 213571-2	
		134 731	CONNECTOR, circ pin push-in 14-18ga Amp 213603-1	
		079 739	CONNECTOR, circ clamp str rlf sz 17-20 Amp 206322-2 (or)	
		143 922	CONNECTOR, circ clamp str rlf sz 17-20 Amp 206070-3	
15	PL1	135 199	LIGHT, ind red lens 28V	1
16			NAMEPLATE, (order by model and serial number)	1
17		039 885	CONNECTOR, circ protective cap Amphenol 9760-20	1
18		135 299	LOCK, shaft pot .375-32 x .250dia shaft	1
19		097 924	KNOB, pointer 1.625dia x .250 ID	1
20		097 922	KNOB, pointer .875dia x .250 ID	1

♦Part of 042 805 Meter Kit Option

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

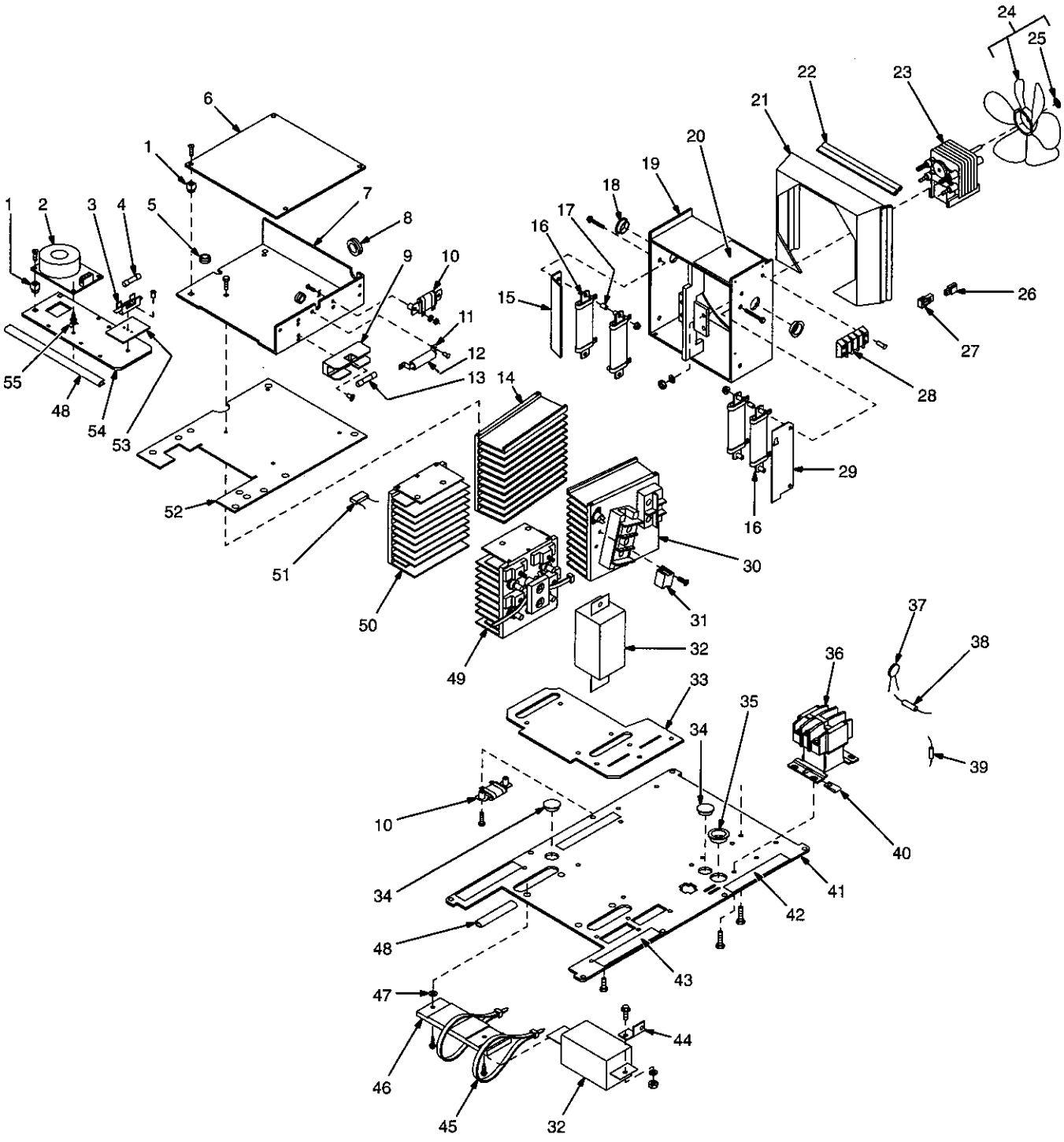


Figure 8-3. Chassis, Mid

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

Figure 8-3. Chassis, Mid (Fig 8-1 Item 13)

1		083 147	GROMMET, scr No. 8/10 panel hole .312sq .500 high	6
2	HD1	156 313	TRANSDUCER, current 300A	1
	PLG62	130 204	CONNECTOR & SOCKETS, (consisting of)	1
		114 066	CONNECTOR, rect skt 20-14ga Amp 350536-1	3
3		012 571	HOLDER, fuse mintr .250 x 1.250 clip	1
4	F2	*012 654	FUSE, mintr gl 2A 250V	1
5		010 116	GROMMET, rbr .375 ID x .500mtg hole	2
6	PC1	155 311	CIRCUIT CARD, control	1
	PLG4,6,8, 10,18,28	♦148 439	CONNECTOR & SOCKETS, (consisting of)	6
		147 995	CONNECTOR, rect skt 22-18ga Amp 770904-3	10
	PLG12	158 720	CONNECTOR & SOCKETS, (consisting of)	1
		147 995	CONNECTOR, rect skt 22-18ga Amp 770904-3	12
7		162 096	TRAY, mtg PC card	1
8		137 768	GROMMET, rbr .750 ID x .875mtg hole	1
9		095 847	HOLDER, fuse crtg 30A 600V	1
10	R13,14	139 203	RESISTOR, WW fxd 30W 8K ohm	2
11		605 741	CLIP, mtg resistor .312 ID core	2
12	R1	079 781	RESISTOR, WW fxd 25W 50 ohm	1
13	F1	*162 312	FUSE, crtg 5A 600V time delay	1
14		146 673	IGBT, LH (consisting of)	1
	PM1	150 913	KIT, transistor IGBT module	1
		146 613	HEAT SINK, IGBT LH	1
15		152 780	BAFFLE, air wind tunnel LH	1
16	R9-12	145 084	RESISTOR, WW fxd 55W 35 ohm	4
17		143 797	SPACER, nyl .312 OD x .194 ID x .437 lg	4
18		154 408	BUSHING, snap-in nyl .562 ID x .875mtg hole	2
19		+146 581	WIND TUNNEL, 6.500 in	1
20		145 063	LABEL, warning electric shock can kill	1
21		133 295	CHAMBER, plenum 6.500 in	1
22		135 661	EDGE TRIM, style 3100-1/16 (order by ft)	2ft
23	FM	132 232	MOTOR, fan 220/230V 50/60 Hz 3000RPM .250dia shaft	1
24		155 426	KIT, fan blade (consisting of)	1
25		134 209	NUT, speed push-on-type .250	1
26	PLG9	131 054	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	2
27	RC9	135 635	CONNECTOR & PINS, (consisting of)	1
		114 656	CONNECTOR, rect pin 24-18ga Molex 39-00-0040	2
28	TE1	038 861	BLOCK, term 20A 3P	1
		601 219	LINK, jumper term blk 20A	1
29		146 689	BAFFLE, air wind tunnel RH	1
30		165 311	IGBT, RH (consisting of)	1
	PM2	150 913	KIT, transistor IGBT module	1
	SR1	149 208	KIT, diode pwr module	1
	TP1	006 334	THERMOSTAT, NC	1
	TP2	155 053	THERMOSTAT, NO	1
		145 742	HEAT SINK, IGBT RH	1
31	CM1,2	151 198	MODULE, capacitor 2 polye met film .0047uf 1600V	2
32	C1,2	152 101	CAPACITOR, polyp film .34uf 700VAC	2
33		139 743	INSULATOR, heat sink lower	1
34		000 527	BLANK, snap-in nyl .875mtg hole	2
35		030 170	BUSHING, snap-in nyl .750 ID x 1.000mtg hole	1
36	W	132 889	CONTACTOR, def prp 40A 3P 24VAC	1
37	VR4	139 218	VARISTOR	1
38	C21	028 294	CAPACITOR, polye met film 1uf 250VDC	1
39	R8	028 280	RESISTOR, C .5W 10 ohm	1
40		136 190	NUT, speed U type 10-32	2
41		+148 296	PANEL, center	1
42		153 178	LABEL, warning exploding parts can seriously injure	2

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

Figure 8-3. Chassis, Mid (Fig 8-1 Item 13) (Continued)

.. 43		126 026 ..	LABEL, warning electric shock can kill	2
.. 44		158 371 ..	BUS BAR, capacitor	1
.. 45		605 538 ..	CABLE TIE, 0-4.500 bundle	2
.. 46		149 917 ..	BRACKET, mtg capacitor lower	1
.. 47		145 053 ..	WASHER, shldr nyl .298 OD x .203 ID x 1.000	4
.. 48		099 037 ..	EDGE TRIM, style 62-1/16 black w/clips (order by ft)	1ft
.. 49		158 668 ..	RECTIFIER, si diode RH (consisting of)	1
.....	C44-47 ...	031 689	CAPACITOR	4
.....	D13-16 ...	149 209	KIT, diode fast recovery	4
.....		133 290	HEAT SINK, rect	1
.....		072 253	STUD, connection single 10-32 x .500 x 1.250	4
.....		149 801	SPACER, nyl .500 OD x .194 ID x .437 lg	2
.....		149 918	BRACKET, mtg capacitor upper	1
.....		605 538	CABLE TIE, 0-4.500 bundle	1
.. 50		158 308 ..	RECTIFIER, si diode LH (consisting of)	1
.....	C40-43 ...	031 689	CAPACITOR	4
.....	D9-12 ...	149 209	KIT, diode fast recovery	4
.....	TP3	155 053	THERMOSTAT, NO	1
.....		133 290	HEAT SINK, rect	1
.....		072 253	STUD, connection single 10-32 x .500 x 1.250	4
.....		010 913 ..	WASHER, flat brs .218 ID x .460 OD x .031thk	8
.....		601 835 ..	NUT, brs hex 10-32	8
.. 51	SN1	152 776 ..	SUPPRESSOR	1
.. 52		158 443 ..	INSULATOR, heat sink upper	1
.. 53		154 702 ..	INSULATOR, fuse holder	1
.. 54		158 444 ..	STRIP, bus rectifier	1
.. 55		134 058 ..	STAND-OFF SUPPORT, PC card .156dia	2
.....		010 140 ..	CLAMP, nyl .187 clamp dia	2
.....		010 141 ..	CLAMP, nyl .250 clamp dia	1

*Recommended Spare Parts.

♦PLG8 is part of 042 805 Meter Kit Option.

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

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