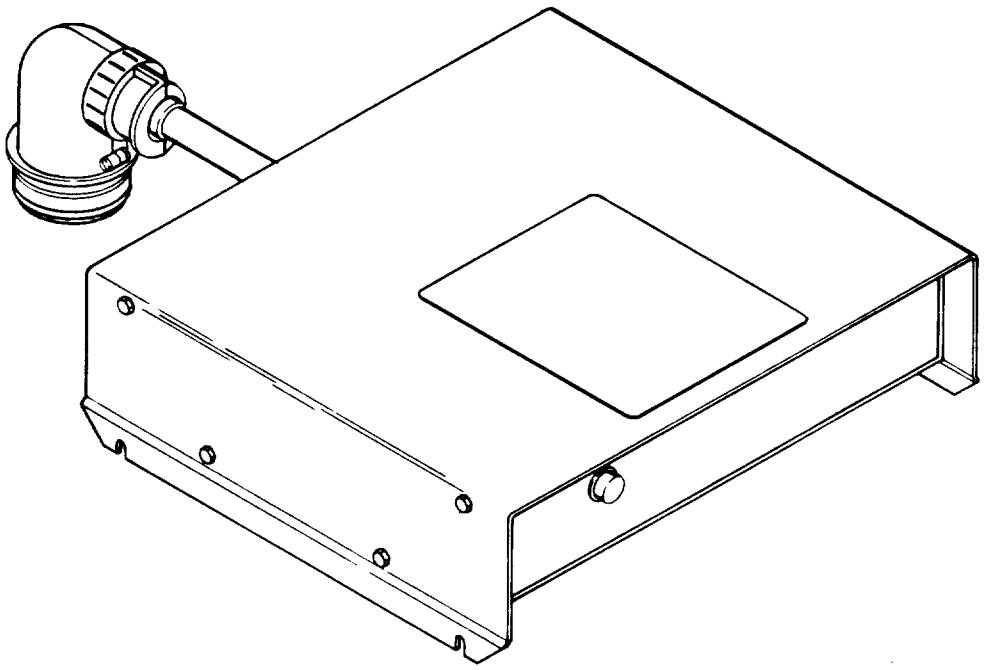
Nov. 1987 FORM: OM-875B

Effective With Style No. JH-42

Miller®

MODEL
INTELLIMATE™ DW



OWNER'S MANUAL

IMPORTANT: Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

Miller Electric Mfg. Co.

P.O. Box 1079
Appleton, WI 54912 USA
Tel. 414-734-9821

PRINTED IN U.S.A.

LIMITED WARRANTY

EFFECTIVE: OCTOBER 1, 1986

This 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 hereof, Miller Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any . All engines are warranted by their manufacturer for one year from date of original purchase, except Tecumseh engines which have a two year warranty.

Except as specified below, Miller's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

Miller shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources, robots, and components . 1 year
2. Load banks ..... 1 year
3. Original main power rectifiers ..... 3 years (labor - 1 year only)
4. All welding guns, feeder/guns and plasma torches ... 90 days
5. All other Millermatic Feeders ..... 1 year
6. Replacement or repair parts, exclusive of labor . 60 days
7. Batteries ..... 6 months

provided that Miller is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, Miller may honor claims submitted by the original user within the foregoing periods.

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore 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, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

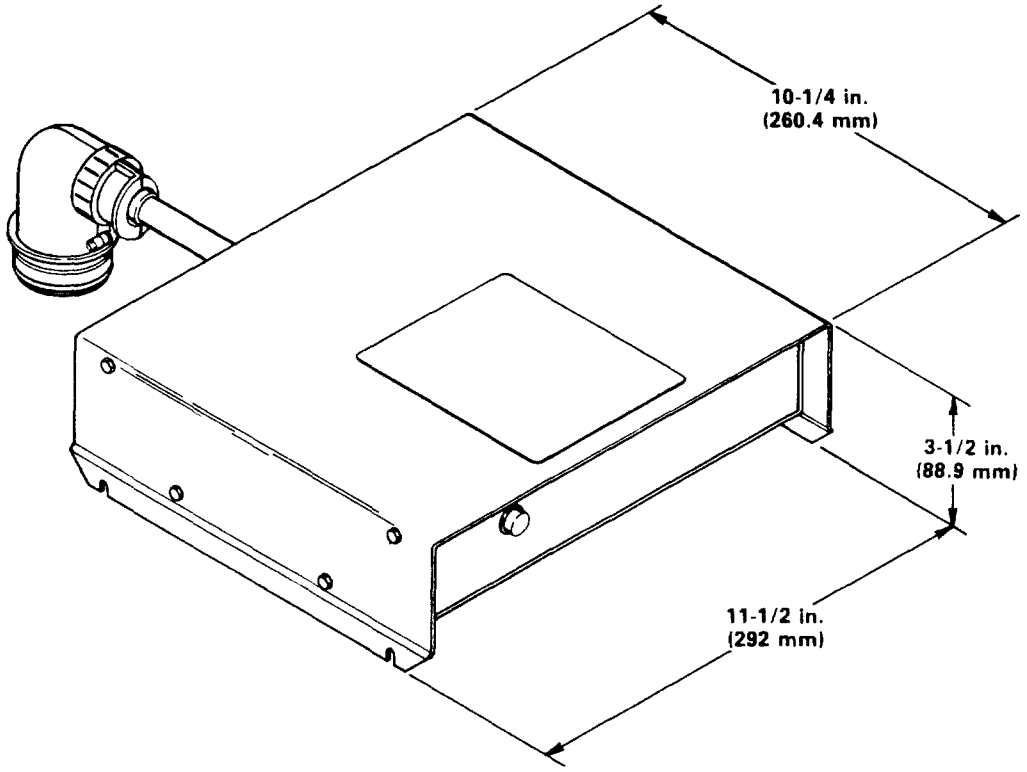
ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY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

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND *NOT* FOR CONSUMERS OR CONSUMER USE. MILLER'S WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

TABLE OF CONTENTS

Input Power	Weight	
	Net	Ship
115 Volts AC 50/60 Hz 3 Amperes	11.4 lbs. (5.2 kg)	12 lbs. (5.4 kg)

Figure 1 - 1. Specifications



TC-099 816

Figure 1 - 2. Dimensions

1 - 1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe and effective use of this equipment.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 - Safety Rules For Operation Of Arc Welding Power Source in the welding power source Owner's Manual.

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by the signal words **WARNING** and **CAUTION** which identify different levels of hazard.

WARNING statements include installation, operation, and maintenance procedures or practices which if not carefully followed could result in serious personal injury or loss of life.

CAUTION statements include installation, operation, and maintenance procedures or practices which if not carefully followed could result in minor personal injury or damage to this equipment.

A third signal word, **IMPORTANT**, highlights instructions which need special emphasis to obtain the most efficient operation of this equipment.

1 - 2. RECEIVING-HANDLING - Before installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed **by the purchaser with the carrier**. A copy of the bill of lading will be furnished by the manufacturer on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and Style Number of the equipment be supplied.

1 - 3. DESCRIPTION - This unit is an interface control that allows an INTELLIMATIC S-52M, S-54M, D-52M, or D-54M wire feeder, or SS-12M, SS-16M, DS-12M, or DS-16M SWINGARC to be used with a DELTAWELD series welding power source.

SECTION 2 - INSTALLATION

2 - 1. CHANGING DIP SWITCH POSITIONS INSIDE INTELLIMATIC WIRE FEEDER (Figure 2-1) - It is necessary to change some DIP switch positions inside INTELLIMATIC wire feeder before installing the interface control so that proper operation will occur. To change switch positions, proceed as follows:

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down wire feeder and welding power source and disconnect welding power source input power employing "lockout/tagging procedures" before inspecting or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

1. Remove wrapper from wire feeder.

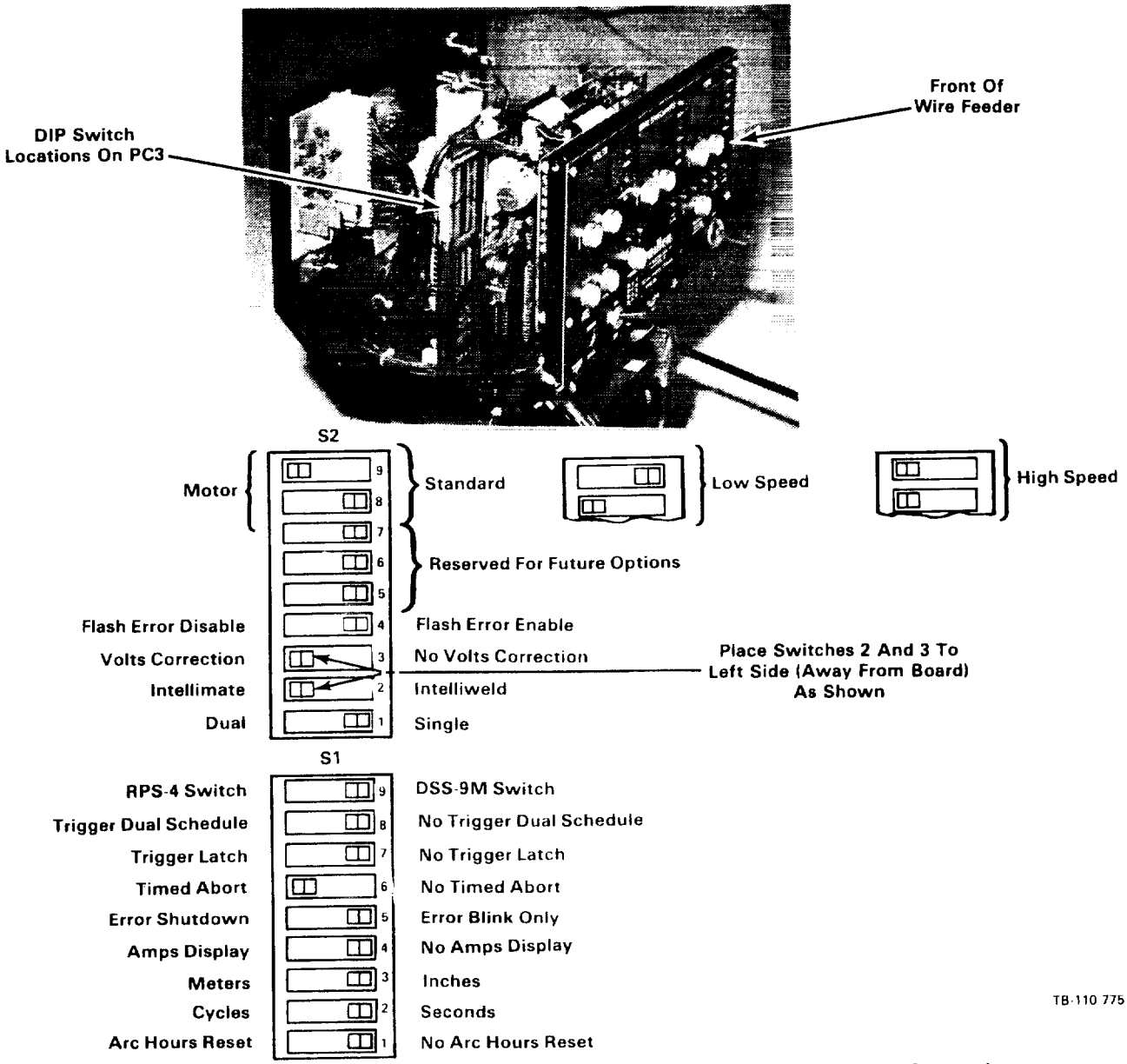


Figure 2 - 1. Typical DIP Switch Location And Placement (Model S-52M Shown)

2. Locate DIP switches on rear left side of Interface (I/O) Board PC3 (see Figure 2-1).

3. Place switches 2 and 3 on DIP switch S2 to positions away from circuit board (see Figure 2-1).

4. Reinstall wrapper onto wire feeder, but do not secure top four screws at this time.

2 - 2. INSTALLATION OF INTERFACE CONTROL (Figure 2-2) - This interface control mounts on top of the INTELLIMATIC wire feeder control box. To install the interface control, proceed as follows:

1. Place interface control on top of control box with front panels facing same direction.

2. Position control so that the wrapper slots correspond to feeder control box screws (4).

3. Slide control down onto screws.

4. Tighten wrapper screws.

2 - 3. INTERFACE CABLE CONNECTIONS (Figure 2-2) - Connect large 26-socket Amphenol plug from rear of interface control to matching receptacle on rear of wire feeder, and rotate threaded collar clockwise.

2 - 4. 115 VOLTS/CONTACTOR CONTROL CONNECTIONS (Figure 2-2)

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*

The control will be electrically hot internally and ready to operate as soon as the 115 volts power plug is connected to the 115 volts ac source and the welding power source is energized.

IMPORTANT: *All directions, such as left or right, are with respect to the operator facing the unit rear panel.*

1. Locate supplied 10 ft. (3.1 m) long 115 volts ac power and contactor control interconnecting cord, and connect the 4-pin Amp plug to matching receptacle on rear of interface control directly to right of interface cord (see Figure 2-2). Rotate threaded collar clockwise.

2. Route remaining end of cord with 3-prong twistlock and 2-socket plugs attached to the welding power source. Insert the 3-prong plug into the 115 VOLTS AC receptacle on the welding power source, and rotate plug clockwise. Insert the 2-socket plug into the REMOTE CONTACTOR receptacle on the welding power source, and rotate plug clockwise.

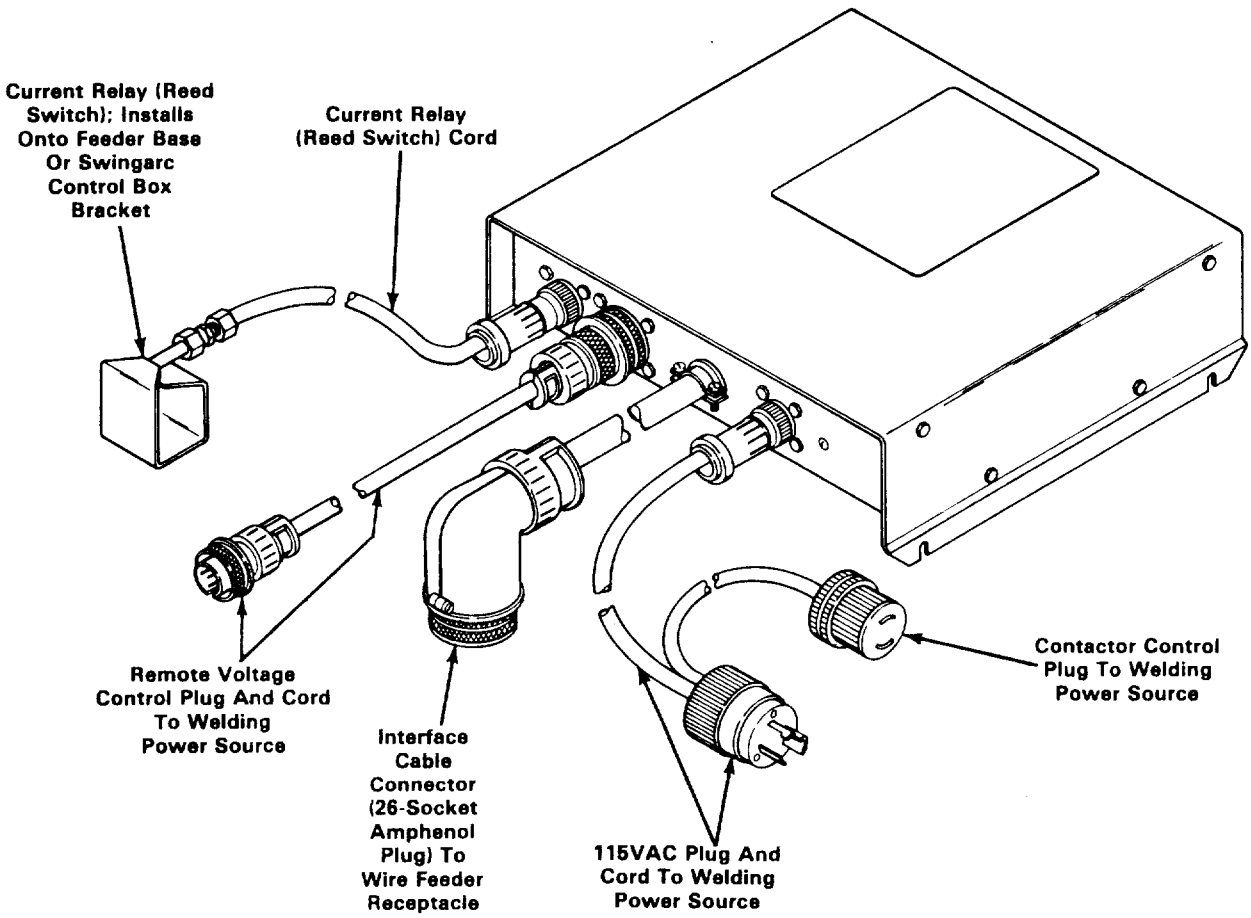


Figure 2 - 2. Interface Connections And Information

3. Place welding power source REMOTE CONTACTOR switch in the ON position.

2 - 5. VOLTAGE CONTROL CONNECTION (Figure 2-2)

IMPORTANT: *All directions, such as left or right, are with respect to the operator facing the unit rear panel.*

1. Locate supplied 10 ft. (3.1 m) long interconnecting cord with 6-socket Amphenol plug on one end and 5-pin Amphenol plug on other end.

2. Connect 6-socket Amphenol plug to matching receptacle on rear of interface control directly to left of interface cable (see Figure 2-2), and rotate threaded collar clockwise.

3. Route and connect remaining end of cord with 5-pin Amphenol plug attached to REMOTE VOLTAGE/CONTACTOR control receptacle on front of welding power source, and rotate threaded collar clockwise.

4. Place welding power source REMOTE VOLTAGE switch in the ON position.

2 - 6. CURRENT RELAY (REED SWITCH) CONNECTIONS AND INSTALLATION (Figure 2-2)

IMPORTANT: *All directions, such as left or right, are with respect to the operator facing the unit rear panel.*

1. Locate the supplied 22 in. (559 mm) long cord with current relay on one end and 4-pin Amp plug on other end (see Figure 2-2).

2. Install current relay as follows:

   a. For INTELLIMATIC S-52M, S-54M, D-52M, or D-54M wire feeders: Install current relay onto feeder base at provided location approximately 4 in. (102 mm) directly to rear of drive roll housing so that relay cord points toward opposite side of base (toward control box), and secure relay with supplied 10-32 x 3/4 in. screws, lock washers, and nuts.

   b. For INTELLIMATIC SS-12M, SS-16M, DS-12M, or DS-16M SWINGARCS: Install current relay onto provided location on control box bracket between box and boom so that relay cord points toward control box, and secure relay with supplied 10-32 x 3/4 in. screws, lock washers, and nuts.

3. Route and connect remaining end of cord with 4-pin Amp plug attached to far left receptacle on rear of interface control (see Figure 2-2), and rotate threaded collar clockwise.

WARNING: **ELECTRIC SHOCK can kill.**
- *Do not touch live electrical parts.*
- *Shut down welding power source and disconnect input power employing "lockout/tagging procedures" before routing and connecting weld cable.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

4. Route weld cable through current relay, and connect cable to proper terminal on drive roll housing (see wire feeder Owner's Manual for location of terminal). If weld cable is already connected to feeder, disconnect cable, route through current relay, and reconnect to drive roll housing terminal.

SECTION 3 - OPERATION

WARNING: **ELECTRIC SHOCK can kill; MOVING PARTS can cause serious injury; IMPROPER AIR FLOW AND EXPOSURE TO ENVIRONMENT can damage internal parts.**
- *Do not touch live electrical parts.*
- *Keep clear of pinch points.*
- *Keep all covers and panels in place while operating.*

Warranty is void if the wire feeder is operated with any portion of the outer enclosure removed.

ARC RAYS, SPARKS, AND HOT SURFACES can burn eyes and skin; NOISE can damage hearing.
- *Wear correct eye, ear, and body protection.*

FUMES AND GASES can seriously harm your health.
- *Ventilate to keep from breathing fumes and gases.*
- *If ventilation is inadequate, use approved breathing apparatus.*

WELDING WIRE can cause puncture wounds.
- *Do not point gun(s) toward any part of the body, any conductive surface, or other personnel.*

HOT METAL, SPATTER, AND SLAG can cause fire and burns.
- *Watch for fire.*
- *Have a fire extinguisher nearby and know how to use it.*
- *Allow work and equipment to cool before handling.*

MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.
- *Wearers should consult with their doctor before going near arc welding, gouging, or spot welding operations.*

See Section 1 - Safety Rules For Operation Of Arc Welding Power Sources in the welding power source Owner's Manual for basic welding safety information.

3 - 1. PILOT LIGHT - The pilot light on the interface control front panel turns on and off as the welding power source is energized and deenergized and therefore indicates the condition of the welding power source (on or off). It DOES NOT indicate the on or off status of the wire feeder.

3 - 2. OPERATION

WARNING: *Read and follow safety information at beginning of entire Section 5 before proceeding.*

1. Install and connect unit according to Section 2 of this manual.
2. Turn on shielding gas at the source, if applicable.
3. Energize welding power source and wire feeder.
4. Begin welding.

3 - 3. SHUTTING DOWN

1. Shut down welding power source and wire feeder.
2. Turn off shielding gas supply at the source.

WARNING: HIGH CONCENTRATION OF SHIELDING GASES can harm health or kill.
- *Shut off gas supply when not in use.*

SECTION 4 - MAINTENANCE & TROUBLESHOOTING

IMPORTANT: *Every six months inspect the labels on this unit for legibility. All precautionary labels must be maintained in a clearly readable state and replaced when necessary. See the Parts List for part number of precautionary labels.*

4 - 1. INSPECTION AND UPKEEP - Usage and shop conditions will determine the frequency and type of maintenance. At minimum, inspect equipment every three months as follows:

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Shut down wire feeder and welding power source and disconnect input power employing "lockout/tagging procedures" before inspecting, maintaining, or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Troubleshooting of internal parts to be performed only by qualified persons.

1. Inspect all interconnecting cords for damage to or breaks in the insulation jacket, particularly at the plugs. Repair or replace the cord(s) as necessary.
2. Remove grease and grime from components; moisture from electrical parts and cable.

4 - 2. OVERLOAD PROTECTION - This unit is equipped with a fuse F1 located inside the unit for overload protection (see Parts List view for location). If this fuse should open, the unit would be completely inoperative. If F1 opens repeatedly, contact the nearest Factory Authorized Service Station. To replace fuse F1, proceed as follows:

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Shut down wire feeder and welding power source and disconnect welding power source input power employing "lockout/tagging procedures" before inspecting, maintaining, or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Maintenance to be performed only by qualified persons.

1. Remove wrapper.
2. Check F1, and replace if necessary.

CAUTION: INCORRECT FUSE can damage unit.
- *Be sure replacement fuse is same size, type, and rating.*

3. Reinstall wrapper.

4 - 3. TROUBLESHOOTING

WARNING: ELECTRIC SHOCK can kill; WELDING WIRE can cause puncture wounds; HOT SURFACES can burn skin.
- *Do not touch live electrical parts.*
- *Shut down wire feeder and welding power source and disconnect input power employing "lockout/tagging procedures" before inspecting, maintaining, or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Troubleshooting to be performed only by qualified persons.

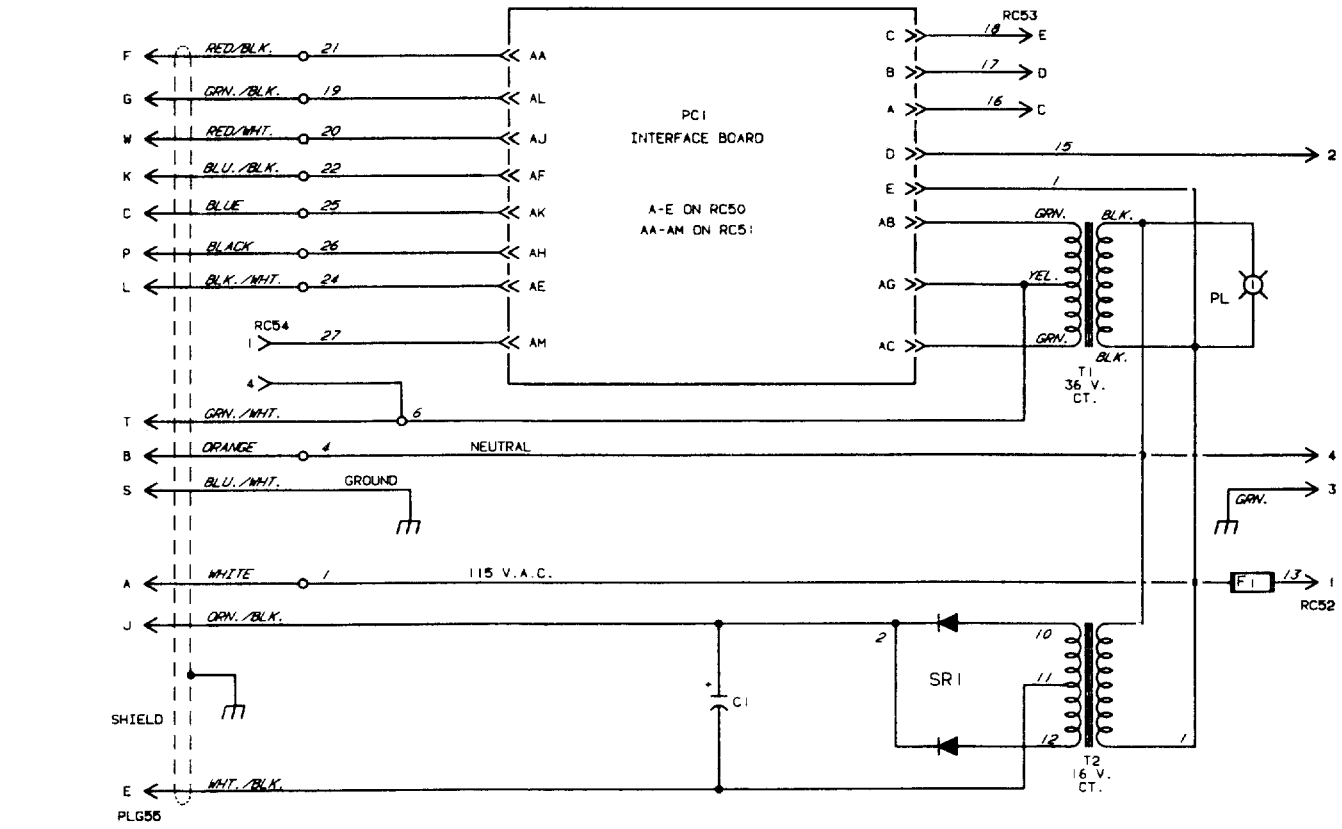
It is assumed that proper installation has been made, according to Section 2 of this manual, and that the unit has been functioning properly until trouble developed.

IMPORTANT: *Check large 26-socket interface plug PLG55 connection from rear of unit to wire feeder and be sure it is secure in feeder receptacle before beginning troubleshooting procedures.*

The following chart is designed to diagnose and provide remedies for some of the troubles that may develop in this unit.

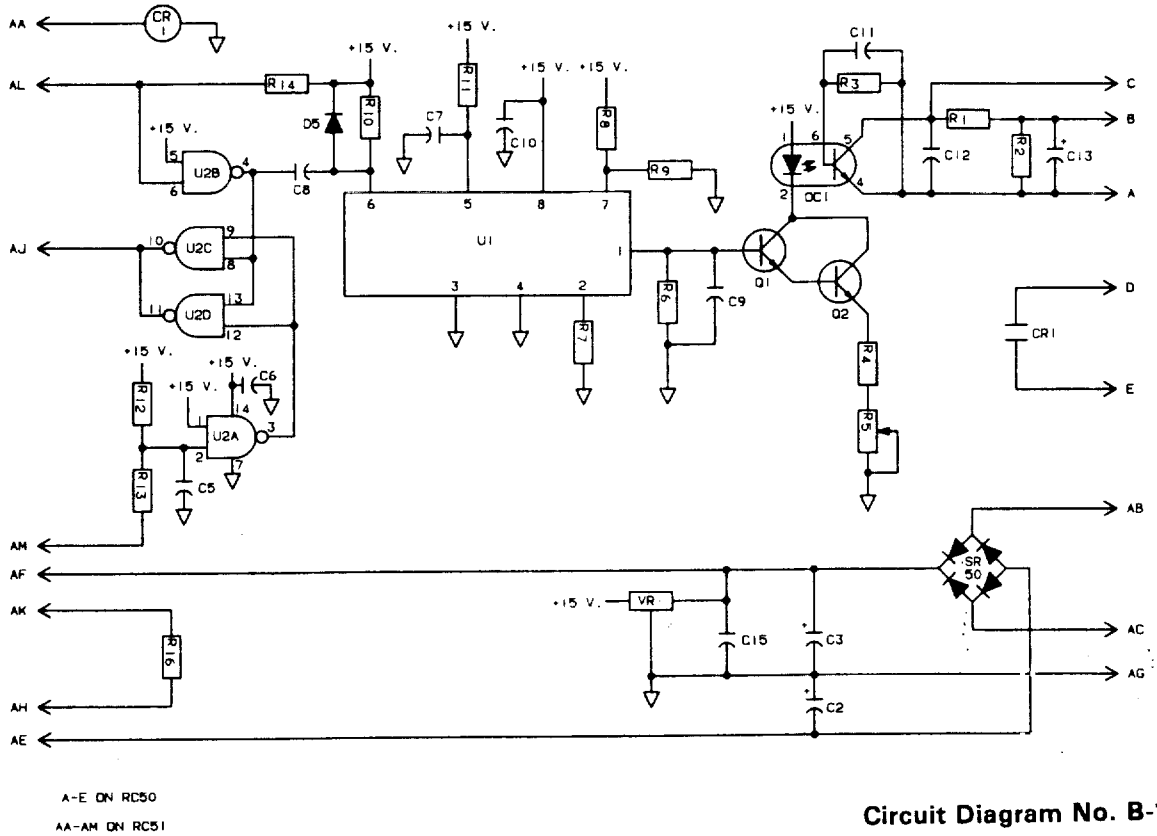
Use this chart in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, the nearest Factory Authorized Service Station should be contacted. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly followed.

TROUBLE	PROBABLE CAUSE	REMEDY
Completely inoperative.	Fuse F1.	Check and replace F1 if necessary (see Section 4-2).
	115 volts/contactor control plug not secure in rear receptacle RC52 on interface control.	Secure 4-pin Amp plug to RC52 (see Section 2-4).
	115 volts 3-prong plug not secure in 115 VOLTS AC receptacle on welding power source.	Secure 3-prong plug to 115 VOLTS AC receptacle on welding power source (see Section 2-4).
	Welding power source.	See welding power source Owner's Manual, and correct 115 volts ac supply problem.
Wire feeder remains in Run-In and will not advance to the weld sequence.	Current (reed) relay plug not secure in rear receptacle RC54 on interface control.	Secure relay plug to RC54 (see Section 2-6).
	Weld cable not routed through reed relay.	Check and reroute weld cable (see Section 2-6).
	Using less than 50 amperes of welding current.	Increase welding current to above 50 amperes if possible (50 amperes flowing in weld circuit required for proper reed relay operation).
Voltage control operation incorrect or erratic.	Welding power source REMOTE VOLTAGE switch not in ON position.	Place REMOTE VOLTAGE switch on welding power source in the ON position (see Section 2-5).
	Voltage control plug not secure in rear receptacle RC53 on interface control.	Secure 6-socket Amphenol plug to RC53 (see Section 2-5).
	5-pin Amphenol plug not secure in REMOTE VOLTAGE/CONTACTOR control receptacle on welding power source.	Secure 5-pin Amphenol plug to REMOTE VOLTAGE/CONTACTOR receptacle on welding power source.
No contactor control.	Welding power source REMOTE CONTACTOR switch not in ON position.	Place REMOTE CONTACTOR switch on welding power source in the ON position (see Section 2-4).
	115 volts/contactor control plug not secure in rear receptacle RC52 on interface control.	Secure 4-pin Amp plug to RC52 (see Section 2-4).
	2-socket plug not secure in REMOTE CONTACTOR receptacle on welding power source.	Secure 2-socket plug to REMOTE CONTACTOR receptacle on welding power source (see Section 2-4).



Circuit Diagram No. B-115 287

Figure 4 - 1. Circuit Diagram



Circuit Diagram No. B-115 288

Figure 4 - 2. Circuit Diagram For Interface Board PC1

Nov. 1987 FORM: OM-875B

Effective With Style No. JH-42

PARTS LIST

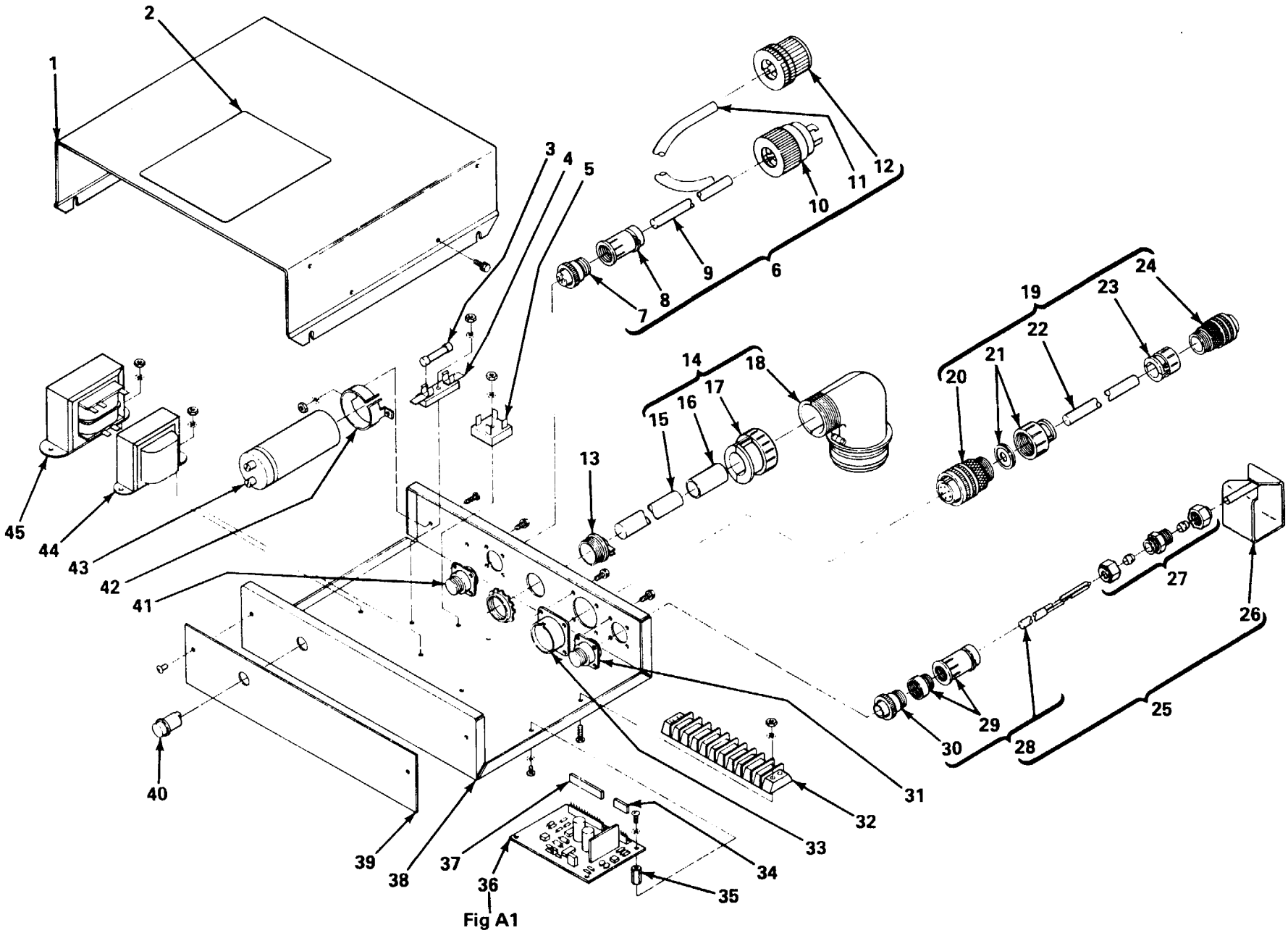
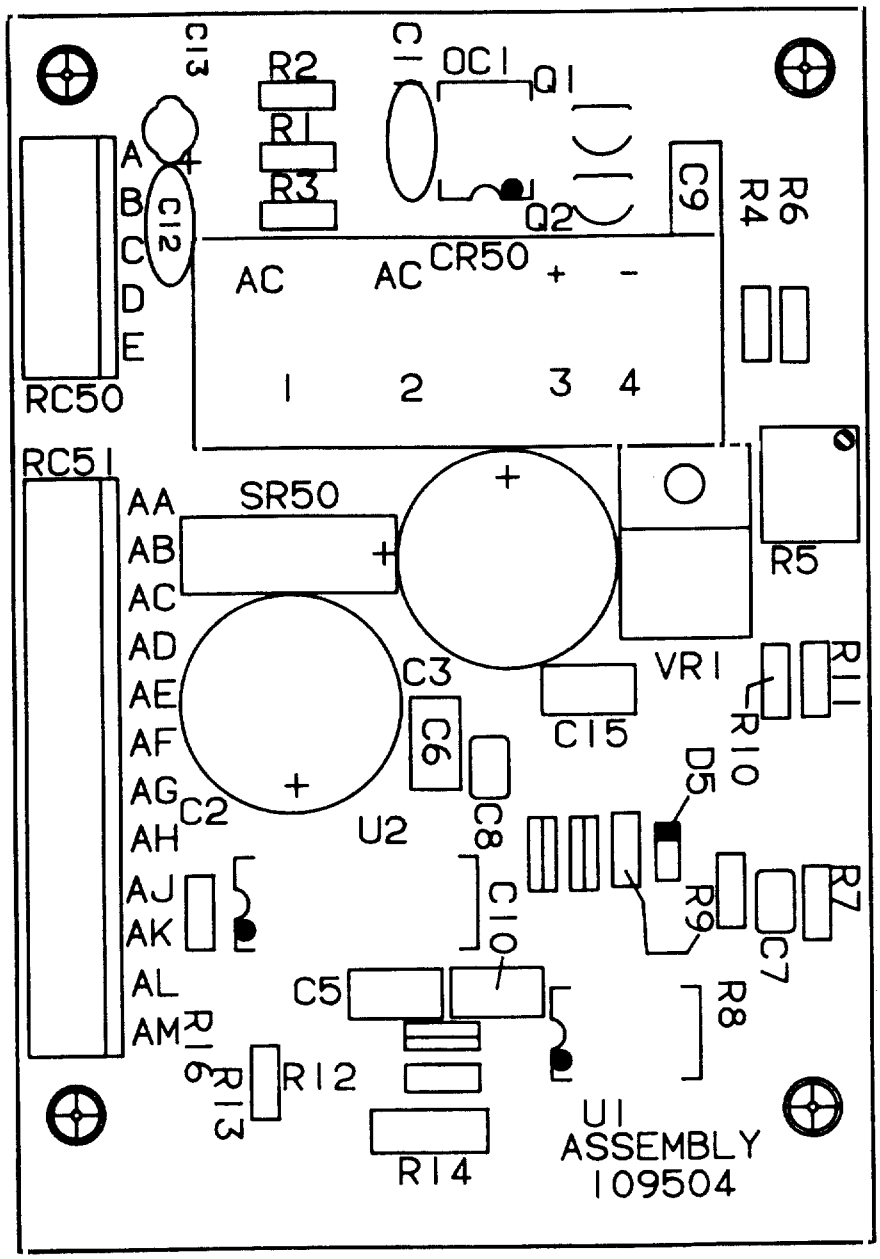


Figure A - Main Assembly

TD-099 818-A

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure A			**Main Assembly**	
1		+098 486	WRAPPER	1
2		070 634	LABEL, warning electric shock can kill etc	1
3	F1	*012 633	FUSE, miniature-glass slo blo 3 amp	1
4		012 571	HOLDER, fuse	1
5	SR1	035 704	RECTIFIER, integrated 30 amp 600 volts	1
6		081 964	CORD, control-interconnecting (consisting of)	1
7		048 284	. HOUSING PLUG & SOCKETS (consisting of)	1
		079 534	. . TERMINAL, female	4
8		079 531	. CLAMP, cable	1
9		604 571	. CORD, No. 18 4/c (order by ft)	10ft
10		039 687	. CAP, twistlock-grounded 2P3W 15 amp 277 volts	1
11		049 455	. CORD, No. 18 2/c (order by ft)	1
12		039 635	. CONNECTOR BODY, twistlock 2P2W 20 amp 250 volts	1
13		010 610	CONNECTOR, clamp-cable 1/2 inch	1
14		098 513	CORD, interconnecting (consisting of)	1
15		098 578	. CABLE, power 18 ga 15/c 300 volts (order by ft)	2ft
16		082 726	. TUBING, No. 11 (order by ft)	1ft
17		091 100	. CLAMP, cable	1
18	PLG55	091 099	. PLUG, 26 socket MS-3108B-28-12S	1
19		098 565	CORD, voltage/contactor control (consisting of)	1
20		073 507	. PLUG, 6 socket MS-3106A-18-12S	1
21		073 331	. CLAMP, cable	2
22		604 910	. CABLE, power 20 ga 5/c (order by ft)	10ft
23		039 685	. CLAMP, cable	1
24		039 273	. PLUG, 5 pin MS-3106A-16S 8P	1
25		049 260	RELAY, current (consisting of)	1
26		057 087	. CORE, relay-current	1
27		010 487	. FITTING, brass-compression union 1/4 TBG	1
28		047 365	. SWITCH, reed (consisting of)	1
29		079 531	. . CLAMP, cable	1
30		079 878	. . HOUSING PLUG & PINS (consisting of)	1
		079 535	. . . TERMINAL, male	4
31	RC54	048 282	RECEPTACLE W/SOCKETS (consisting of)	1
		079 534	. TERMINAL, female	4
32	1T	038 782	BLOCK, terminal 20 amp 10 pole	1
33	RC53	073 505	RECEPTACLE, 6 pin MS-3102A-18-12P	1
34	PLG50	094 449	HOUSING, terminal header 5 socket	1
35		073 756	STAND-OFF, No. 6-32 x 5/8	4
36		109 504	CIRCUIT CARD, interface (Fig A1 Pg 4)	1
37	PLG51	079 760	HOUSING, terminal header 12 pin	1
38		098 487	CASE SECTION, front/bottom/rear	1
39			NAMEPLATE (order by model & serial number)	1
40	PL1	074 188	LIGHT, neon-red lens	1
41	RC52	048 283	RECEPTACLE W/PINS (consisting of)	1
		079 535	. TERMINAL, male	4
42		601 375	CLAMP, capacitor 1-3/8	1
43	C1	048 504	CAPACITOR, electrolyte 5000 uf 50 volts	1
44	T1	098 510	TRANSFORMER, control	1
45	T2	084 199	TRANSFORMER, signal 16VCT 3.5 amp	1

*Recommended Spare Parts
+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.



COMPONENTS TO BE REPLACED BY QUALIFIED PERSONNEL ONLY

Ref. C-109 502

Figure A1 - Circuit Card, Interface

Dia. Mkgs.	Part No.	Description	Quantity
Figure A1	**109 504**	**Circuit Card, Interface (Fig A Pg 2 Item 36)**	
C2,3	083 973	CAPACITOR, electrolyte 1000 uf 35 volts dc	2
C5,6,9,10,15	073 739	CAPACITOR, ceramic 0.1 uf 50 volts dc	5
C7,8	089 025	CAPACITOR, ceramic 470 pf 100 volts dc	2
C11,12	000 340	CAPACITOR, ceramic 0.01 uf 50 volts	2
C13	000 348	CAPACITOR, tantalum 0.47 uf 35 volts	1
CR50	095 542	RELAY, solid state 3-15 volts dc	1
D5	028 351	DIODE, signal 0.020 amp 75 volts SP	1
OC1	047 034	IC, interface 4N26	1
Q1,2	037 200	TRANSISTOR, 200MA 40 volts NPN	2
R1	039 331	RESISTOR, carbon film 0.25 watt 4.7K ohm	1
R2,10	035 888	RESISTOR, carbon film 0.25 watt 2.2K ohm	2
R3	081 833	RESISTOR, carbon film 2.7 meg ohm	1
R4	078 431	RESISTOR, carbon film 0.25 watt 330 ohm	1
R5	082 178	POTENTIOMETER, cermet 25 turn 0.5 watt 10K ohm	1
R6	044 789	RESISTOR, carbon film 0.25 watt 100K ohm	1
R7	089 173	RESISTOR, carbon film 0.25 watt 4.99K ohm	1
R8,12	035 827	RESISTOR, carbon film 0.25 watt 10K ohm	2
R9	035 885	RESISTOR, carbon film 0.25 watt 68K ohm	1
R11	089 172	RESISTOR, metal film 0.25 watt 6.81K ohm	1
R13	035 825	RESISTOR, carbon film 0.25 watt 1K ohm	1
R14	035 820	RESISTOR, carbon film 0.50 watt 470 ohm	1
R16	039 334	RESISTOR, carbon film 0.25 watt 27K ohm	1
	092 648	RESISTOR, carbon film 0.25 watt zero ohm	3
RC50	093 707	TERMINAL, header 5 pin	1
SR50	035 841	RECTIFIER, integrated 1.5 amp 200 volts	1
U1	089 068	IC, interface 331	1
U2	090 597	IC, digital 4093	1
VR1	081 832	IC, linear 78M15	1

Optional Equipment

Part No.	Description	Quantity
099 308	CORD, voltage/contactor control (consisting of)	1
039 273	. PLUG, 5 pin MS-3106A-16S-1P	1
052 654	. RECEPTACLE, 5 socket MS-3101A-16S-8S	1
039 685	. CLAMP, cable	2
604 910	. CABLE, power 20 ga 5/c (order by ft)	25ft
047 813	EXTENSION CABLE, 25ft (consisting of)	1
046 958	. RECEPTACLE W/PINS (consisting of)	1
079 535	. . TERMINAL, male	4
079 531	. CLAMP, cable 29/64	2
604 571	. CORD, No. 18 4/C (order by ft)	25ft
048 284	. HOUSING PLUG & SOCKETS (consisting of)	1
079 534	. . TERMINAL, female	4
048 471	TOOL, extraction pin	1

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