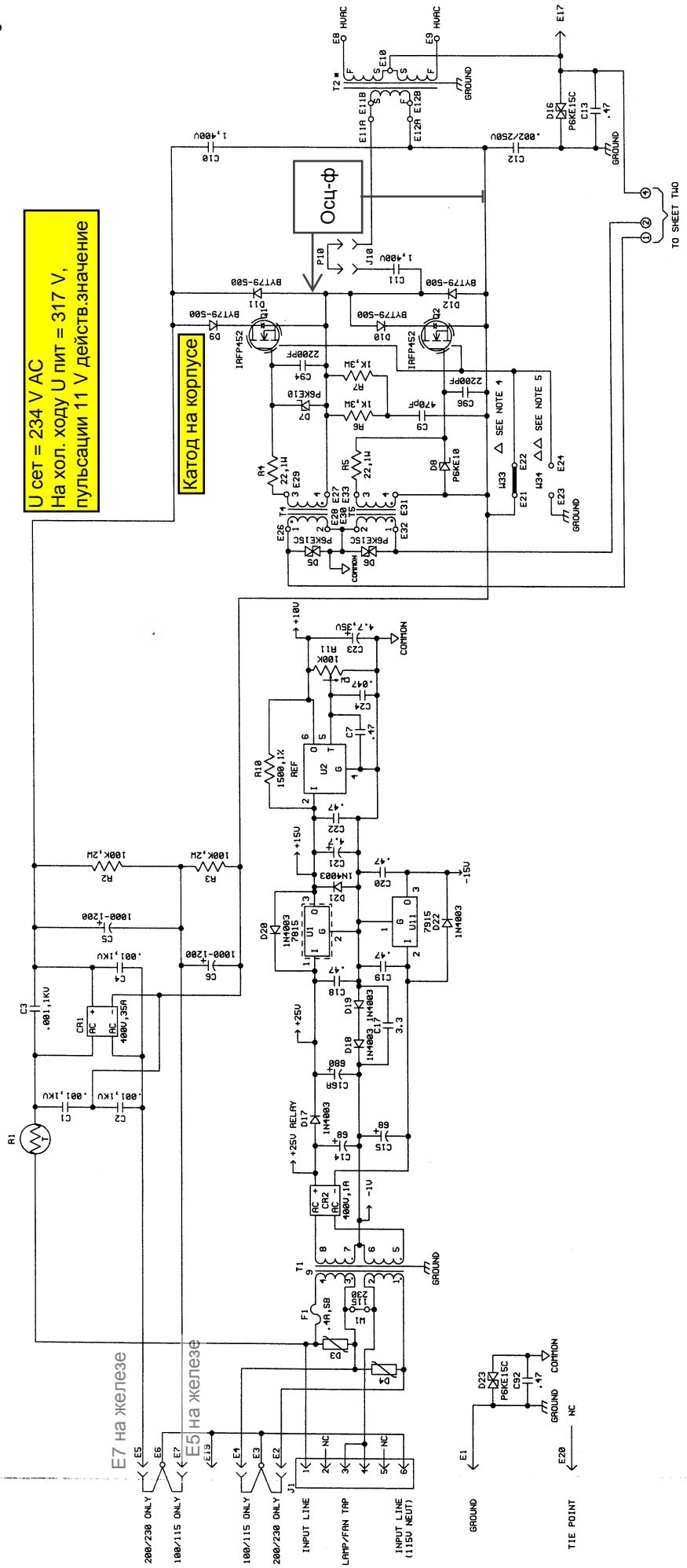


**U сет = 234 V AC**  
**На хол. ходу U лит = 317 V,**  
**пульсации 11 V действ. значение**

**Катод на корпусе**

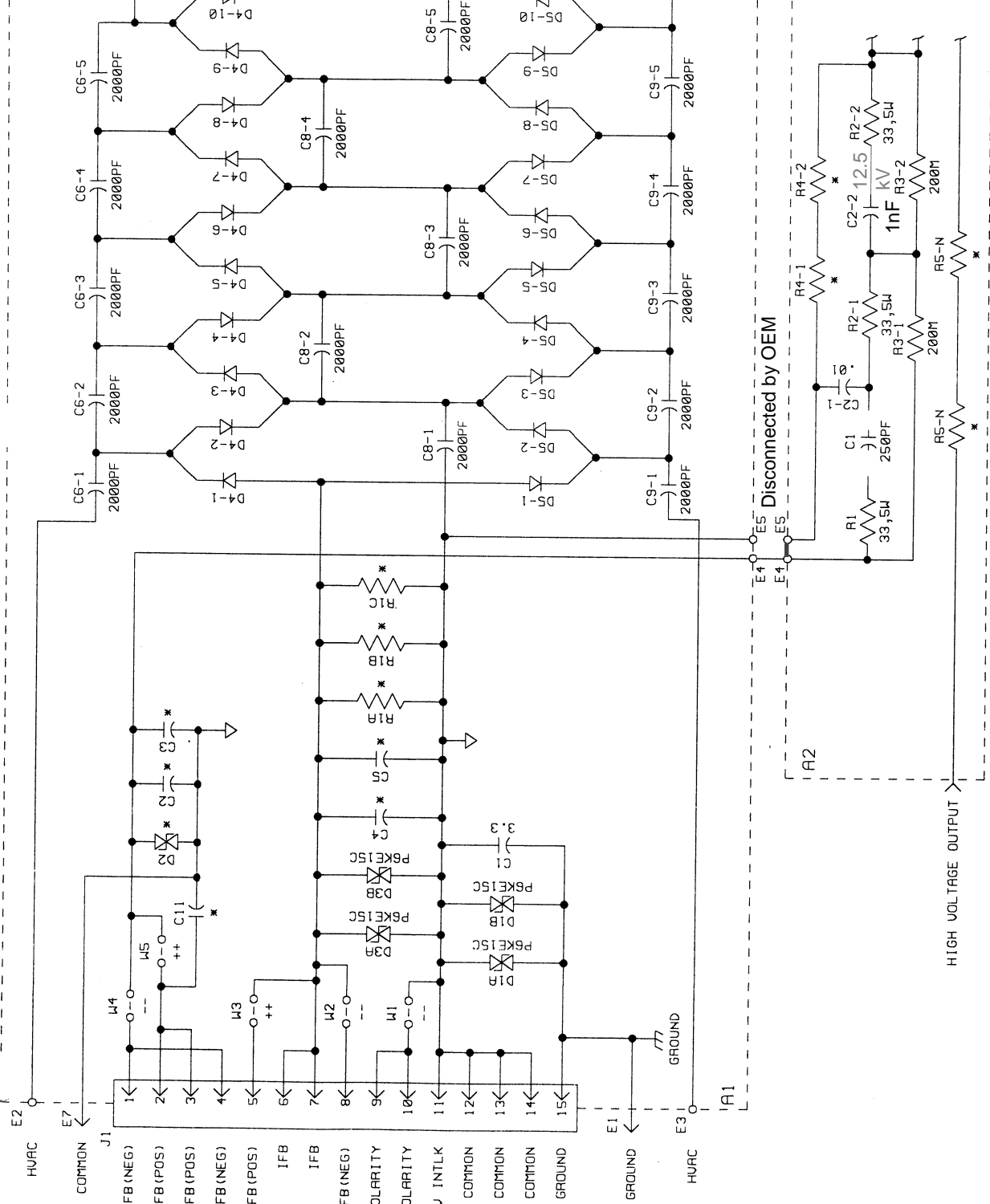


- NOTES:**
- 1 - # VALUE AND/OR INSTALLATION SELECTED PER MODEL.
  - 2 - THE FOLLOWING ALSO GO TO SHEET T10.
  - +25U RELAY
  - +10U
  - 1.2U
  - 15U
  - (COMMON)
  - 3 - ADDED ON 011 OPTION MODELS.
  - △ 4 - INSTALLED ON 200/230 URC MODELS.
  - △△ 5 - INSTALLED ON 100/115 URC MODELS.

G. H. U. , INC. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

ISSUE REVISION SPECIFICATION	FILE NO.	EXTENSION
TOLERANCES ARE IN INCHES UNLESS SHOWN OTHERWISE	\2001\23007\1.SCH	
DATE	APPROVALS	TITLE
08/22/95	JRG	SCHEMATIC DIAGRAM
CHECKED SD 08/22/95	RELEASED	APP-ER
FINISH	DWG. NO.	200123-007
DO NOT SCALE DRAWING	SCALE	NONE
	SHEET	1 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED
A		ECN 2323: D2 WRS P6KE30C	011150	J.M.
B		ECN 3846: C7 & C10 OUT	022795	JJC111
B-1	MDS	2C2-2 WRS 2C1-2	032356	DAS
C	MDS	2R1 & 2R2 S WERE 2H	060657	EJM
C-1	MDS	2R5-N'S VALUE	111897	WAS



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	FILE NO.	EXTENSION	TITLE
DEC. XXX	\3000\64002C1.SCH		SCHEMATIC DIAGRAM
DEC. XX			HIGH VOLTAGE ASSEMBLY
DEC. X			AHV-ER 20-60KV
			REV. C-1

APPROVALS	DATE	SCALE	SHEET	OF
DRAWN MES	021089	NONE	1	1
CHECKED J.M.	021489			
RELEASED				

REDUCED ONLY

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(908) 534-9007 FAX (908) 534-5672

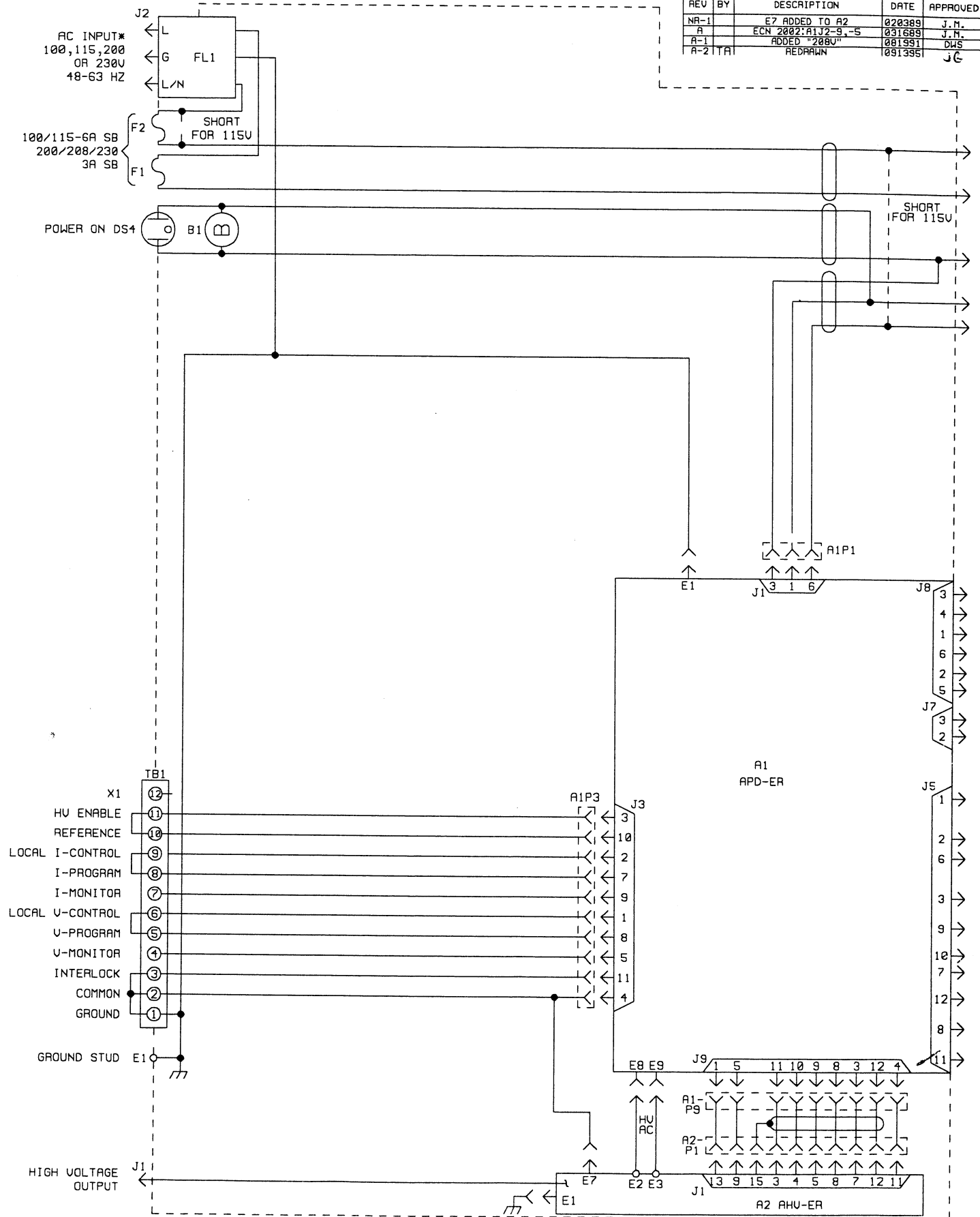
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:  
DEC. XXX  
DEC. XX  
DEC. X

DO NOT SCALE DRAWING


NOTES:  
1 - D4 AND D5 ARE SHOWN FOR POSITIVE POLARITY, REVERSE FOR NEGATIVE POLARITY.  
2 - G.H.U., INC. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.  
3 - \* = SELECTED PER MODEL.

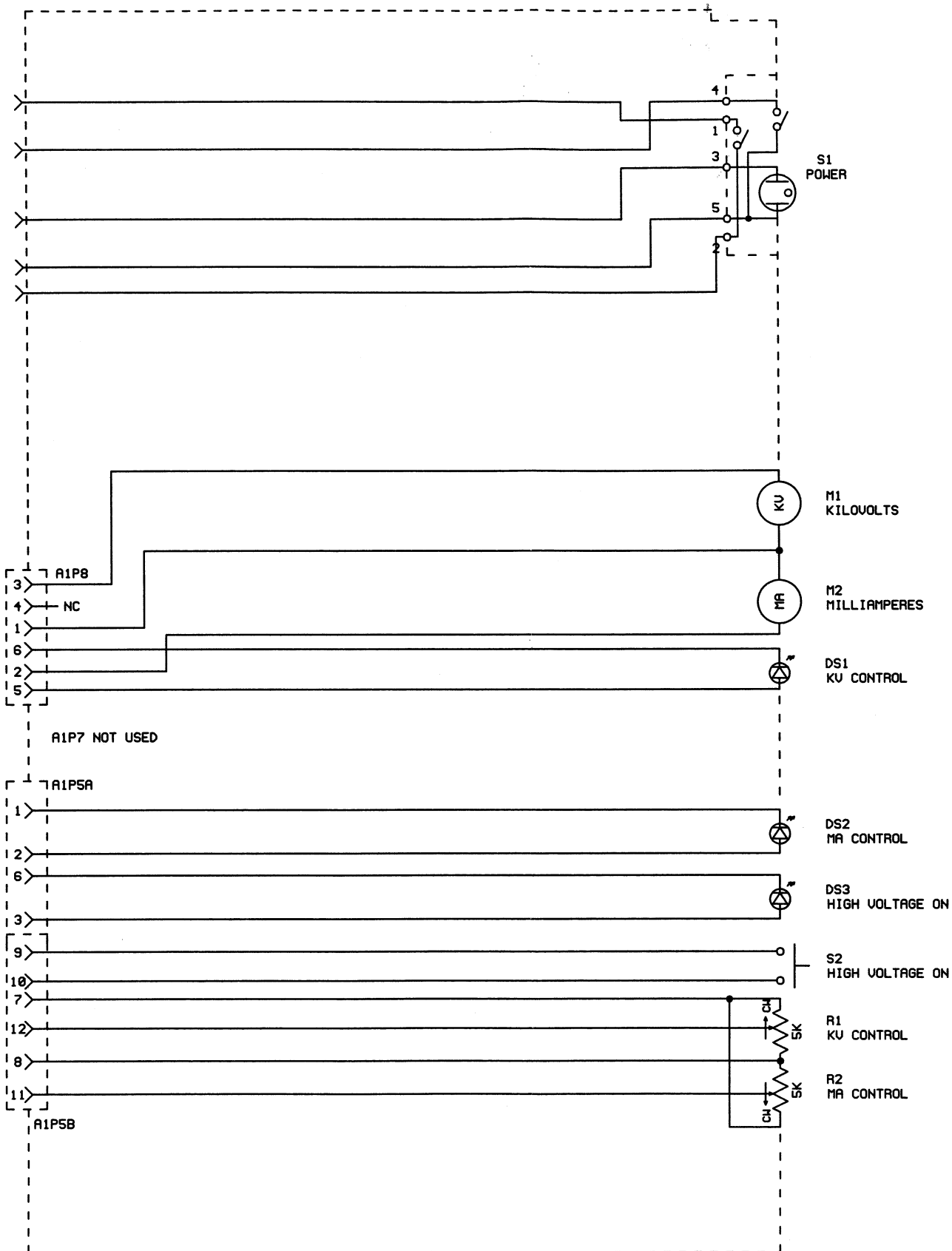


REV	BY	DESCRIPTION	DATE	APPROVED
NR-1		E7 ADDED TO A2	020389	J.M.
A		ECN 2002:A1J2-9,-S	031689	J.M.
A-1		ADDED "200V"	081991	DWS
A-2	TAI	REDRAWN	091395	J.C.



\* REFER TO REAR PANEL LABEL FOR SPECIFIC INPUT VOLTAGE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX±      XX± DEG.    %	FILE NO.	EXTENSION	 GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08089 (908) 534-9007 FAX (908) 534-5672
	300061001A2.SCH		
MATERIAL	APPROVALS	DATE	TITLE
FINISH	DRAWN	MES 011989	SCHEMATIC DIAGRAM
	CHECKED	JJC111 011989	MAIN ASSEMBLY
	RELEASED		AM3-ER-1
DO NOT SCALE DRAWING			DWG. NO. 300061-001
			REV. A-2
			SCALE NONE SHEET 1 OF 1



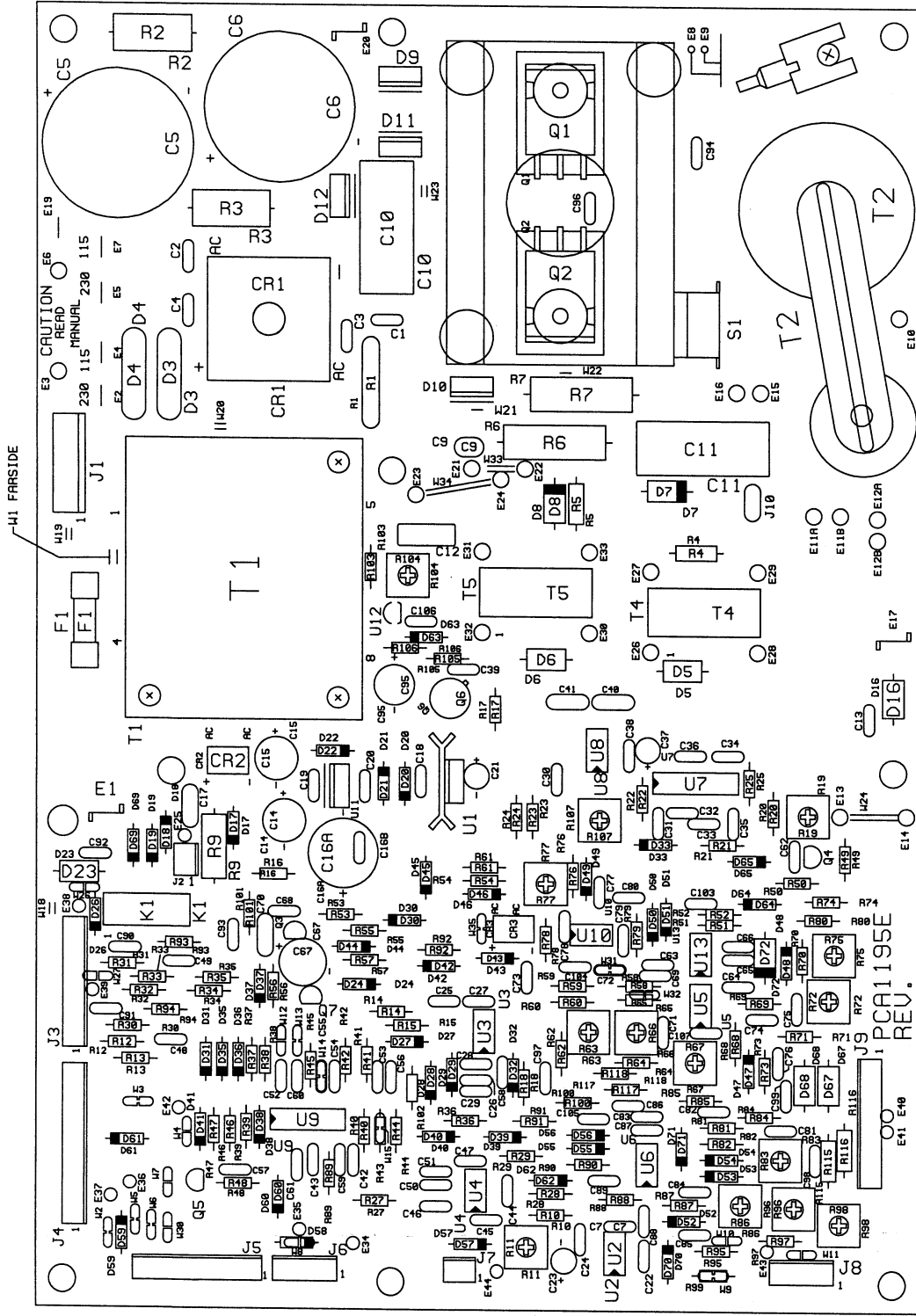
NOTES:

1. ALL ITEMS SHOWN ARE PREFIXED BY "1".  
EXAMPLE: 1S1.
2. G.H.U., INC. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. .000 ± .001 DEC. % .001 ± .001	FILE NO.	EXTENSION	GLASSMAN HIGH VOLTAGE, INC.	
	300062005		P.O. BOX 317, HIGH BRIDGE, N.J. 08028 (908) 638-3800 FAX (908) 638-3700	
MATERIAL	APPROVALS	DATE	TITLE	
FINISH	DRAWN	JAG	SCHEMATIC FRONT PANEL AFP-ER-1-A	
DO NOT SCALE DRAWING	CHECKED	DA	DWG. NO.	REV. NR
	RELEASED		300062-005	1
			SCALE NONE	SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED

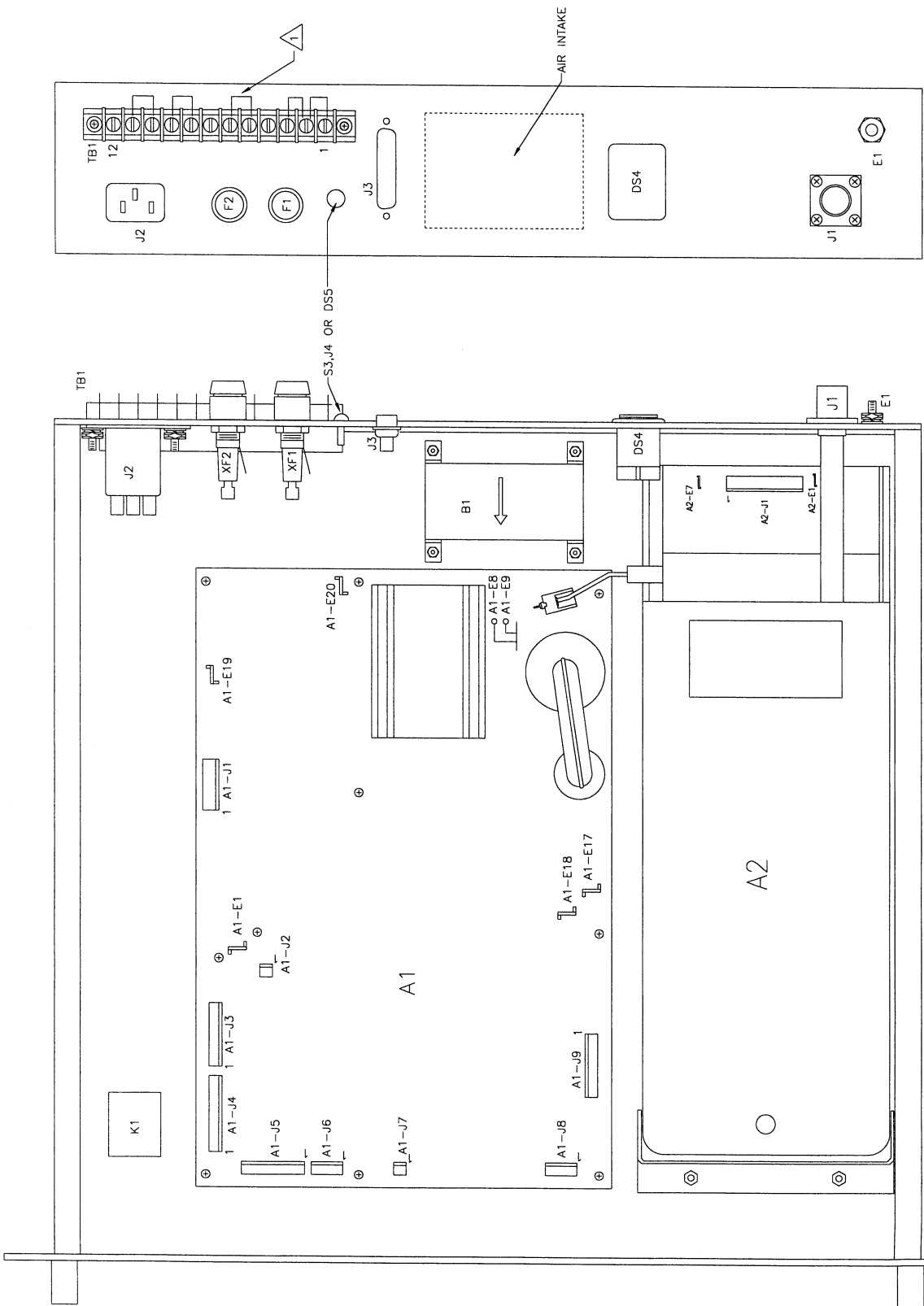


REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. .XXX ± DEG. +	FILE NO.	EXTENSION
	VPCAI1195049#.PCB	
THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	APPROVALS	DATE
	DRAWN	JHK 063005
	CHECKED	07/05
	RELEASED	
TITLE	PARTS PLACEMENT	
DWG. NO.	PCA1195-049	
SCALE	NONE	SHEET 1 OF 1
REV.	NR	

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REV	BY	DESCRIPTION	DATE	APPROVED
A	ECN 2025		03/27/89	JMC
B	ECN 2009	A1 CHANGES	04/25/89	DWS
B-1	JIM	ADDED NOTE 1.	08/27/89	DWS
B-2	JIM	ENTERED INTO CAD.	08/27/89	DWS
C-1	MOS	ECN 2009 A1-E1	12/23/87	JAM
C-2	JAM	A2 SHOWN	12/23/87	JAM
C-2	JAM	FIXED TYPO.	12/28/87	DWS



NOTES:  
 ▲ THIS POSITION NOT USED ON "BLANK FRONT PANEL" MODELS.

**REDUCED ONLY**

FILE NO.	EXTENSION	DATE
401211002C2.DWG		
APPROVALS	DRAWN	CHECKED
JHK 020659	JIM	JIM
RELEASED		

UNLESS OTHERWISE SPECIFIED  
 DIMENSIONS ARE IN INCHES  
 DEC. XXX ± .005  
 DEC. ± .01

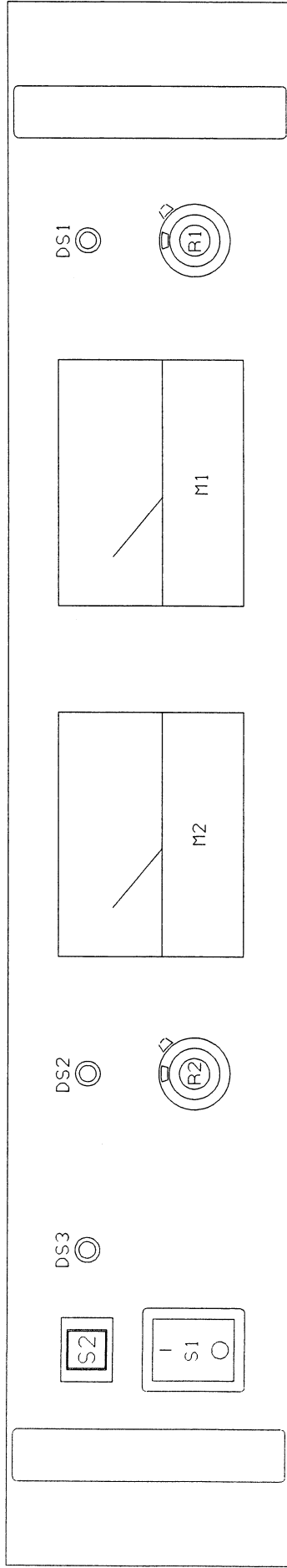
THIRD ANGLE PROJECTION  
 DO NOT SCALE DRAWING

GLASSMAN HIGH VOLTAGE, INC.  
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 (609) 538-3000 FAX (609) 538-3700

TITLE  
 PARTS PLACEMENT  
 10KV THRU 75KV  
 AM-ER

DWG. NO. 401211-002 REV. C-2  
 SCALE NONE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
A	-	ECN 2003	031689	PL
A-1	JHK	REDRAWN IN CAD	051600	<i>JHK</i>



NOTES:

1. ALL ITEMS SHOWN ARE PREFIXED BY "1". EXAMPLE: 1S1.

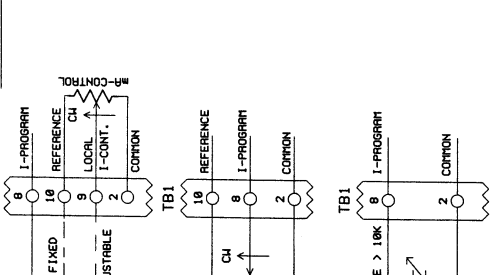
REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX ± .XX DEC. ±		FILE NO. EXTENSION \3011\15002A1.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08089 (908) 534-9007 FAX (908) 534-5672	
APPROVALS	DATE	TITLE		
DRAWN JHK	020889	PARTS PLACEMENT FRONT PANEL SERIES ER STANDARD		
CHECKED JHK	021589	DWG. NO.	301115-002	REV. A-1
RELEASED		C		
THIRD ANGLE PROJECTION		SCALE		
DO NOT SCALE DRAWING		SHEET 1 OF 1		



REV	BY	DESCRIPTION	DATE	APPROVE
1	MR-1	MOVED TO SERIES NOTE TO FIG 4 & FIG 2 SIB	1/28/78	JJC111
2	MR-2	TYPO ERROR FIG 7	8/28/81	J.N.
3	MR-3	EDC 2943; FIG 9	9/26/81	L.B.
4	MR-4	EDC 2943; FIG 2, 8, 9	8/12/82	DM
5	MR-5	EDC 2943; FIG 2, 8, 9	8/12/82	DM
6	MR-6	EDC 2943; FIG 2, 8, 9	8/12/82	DM
7	MR-7	EDC 2943; FIG 2, 8, 9	8/12/82	DM
8	MR-8	EDC 2943; FIG 2, 8, 9	8/12/82	DM
9	MR-9	EDC 2943; FIG 2, 8, 9	8/12/82	DM
10	MR-10	EDC 2943; FIG 2, 8, 9	8/12/82	DM

FIGURE 4



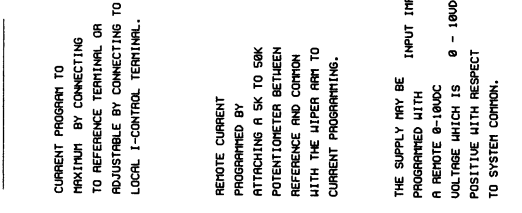
**CURRENT PROGRAM**

CURRENT PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL OR ADJUSTABLE BY CONNECTING TO LOCAL I-CONTROL TERMINAL.

REMOTE CURRENT PROGRAMMED BY ATTACHING A SK TO SKK POTENTIOMETER BETWEEN REFERENCE AND COMMON WITH THE WIPER ARM TO CURRENT PROGRAMMING.

THE SUPPLY MAY BE INPUT IMPEDANCE > 10K I-PROGRAM PROGRAMMED WITH A REMOTE 0-100C VOLTAGE WHICH IS POSITIVE WITH RESPECT TO SYSTEM COMMON.

FIGURE 3



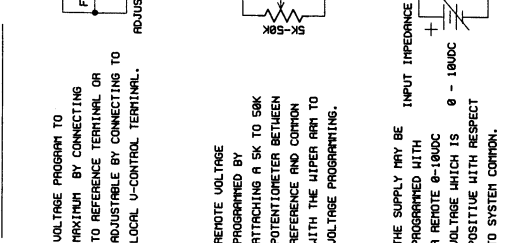
**VOLTAGE PROGRAMMING**

VOLTAGE PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL OR ADJUSTABLE BY CONNECTING TO LOCAL U-CONTROL TERMINAL.

REMOTE VOLTAGE PROGRAMMED BY ATTACHING A SK TO SKK POTENTIOMETER BETWEEN REFERENCE AND COMMON WITH THE WIPER ARM TO VOLTAGE PROGRAMMING.

THE SUPPLY MAY BE INPUT IMPEDANCE > 10K U-PROGRAM PROGRAMMED WITH A REMOTE 0-100C VOLTAGE WHICH IS POSITIVE WITH RESPECT TO SYSTEM COMMON.

FIGURE 2



**REMOTE HV ENABLE**

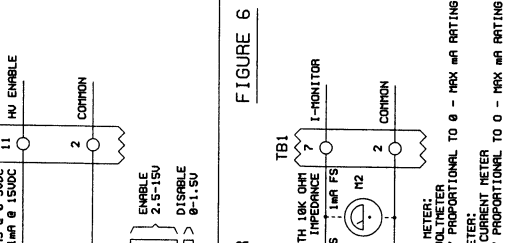
INPUT CHARACTERISTICS: 250K OHMS @ 1500C

CONTROL SIGNAL

ENABLE: 2.5-15V

DISABLE: 0-1.5V

FIGURE 1



**REMOTE INTERLOCK**

VOLTAGE SOURCE: +25V, 2.5K OHMS

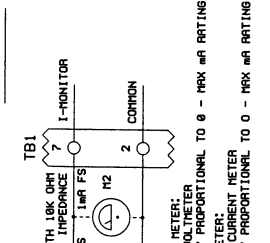
EXTERNAL SWITCH OR SET OF CONTACTS

CLOSED = SUPPLY ENABLE

OPEN = SUPPLY DISABLE

(REFER TO INSTRUCTION MANUAL)

FIGURE 6



**CURRENT MONITOR**

0-10U WITH 10K OHM SOURCE IMPEDANCE

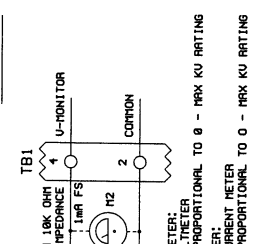
1.0V FS

I-MONITOR

I-MONITOR OPTIONS:

- M1 - RECOMMENDED TYPE METER: 0 - 100C DIGITAL VOLTMETER
- M2 - ALTERNATE TYPE METER: 0 - 10U IS DIRECTLY PROPORTIONAL TO 0 - MAX HV RATING
- M3 - FULL SCALE CURRENT METER: 0 - 10A IS DIRECTLY PROPORTIONAL TO 0 - MAX HV RATING

FIGURE 5



**VOLTAGE MONITOR**

0-10U WITH 10K OHM SOURCE IMPEDANCE

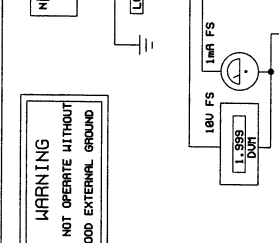
1.0V FS

U-MONITOR

U-MONITOR OPTIONS:

- M1 - RECOMMENDED TYPE METER: 0 - 100C DIGITAL VOLTMETER
- M2 - ALTERNATE TYPE METER: 0 - 10U IS DIRECTLY PROPORTIONAL TO 0 - MAX HV RATING
- M3 - FULL SCALE CURRENT METER: 0 - 10A IS DIRECTLY PROPORTIONAL TO 0 - MAX HV RATING

FIGURE 7



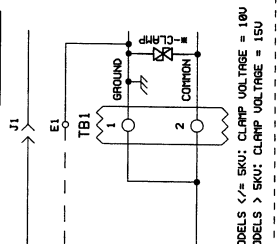
**COMMON AND GROUND**

SYSTEM COMMON AND GROUND ARE NORMALLY TERMINATED TOGETHER. IN THIS CONFIGURATION, SIGNAL RETURNS AND LOAD RETURN CAN BE CONNECTED EITHER TO GROUND OR COMMON.

MODELS <= SKU: CLAMP VOLTAGE = 18V

MODELS > SKU: CLAMP VOLTAGE = 15V

FIGURE 8



**A TYPICAL ER OR EW INSTALLATION**

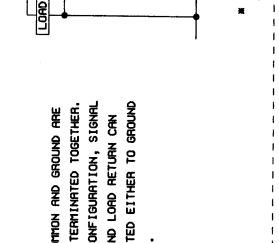
MINIMUM NUMBER OF CONNECTIONS IN ORDER TO COMPLETELY ENABLE THE ER OR EW SUPPLY.

NOTE: CONNECTIONS BETWEEN ADJACENT TERMINALS ON TB1 CAN BE MADE USING THE METAL LINKS SUPPLIED. CONNECTIONS SHOULD BE THE SAME AS SHIPPED FROM FACTORY.

THIS INSTALLATION USES:

- REMOTE U & I MONITOR
- REMOTE U-PROGRAM (10K POT)
- LOCAL ADJUSTABLE CURRENT PROGRAM
- LOCAL HV ENABLE
- REMOTE INTERLOCK CONTACT OR SWITCH
- HIGH VOLTAGE RETURN GROUND
- GROUND CONNECTED TO COMMON

FIGURE 9



**MINIMUM NUMBER OF CONNECTIONS**

IN ORDER TO COMPLETELY ENABLE THE ER OR EW SUPPLY.

NOTE: CONNECTIONS BETWEEN ADJACENT TERMINALS ON TB1 CAN BE MADE USING THE METAL LINKS SUPPLIED. CONNECTIONS SHOULD BE THE SAME AS SHIPPED FROM FACTORY.

MINIMUM CONNECTIONS:

- LOCAL ADJUSTABLE CURRENT PROGRAMMING
- LOCAL HV ENABLE
- LOCAL U-PROGRAMMING
- INTERLOCK ENABLE BY JUMPER TO COMMON

NOTE: TERMINATE COMMON TO GROUND UNLESS COMMON NEEDS TO "FLORIT" FOR ISOLATION OR METERING PURPOSES.

UNLESS OTHERWISE SPECIFIED FILE NO. EXTENSION  
DIMENSIONS ARE IN INCHES  
DEC. 2002  
FINISH  
DO NOT SCALE DRAWING

REMOVED ONLY



## EMC Directive Addendum

For Models: ER, WR

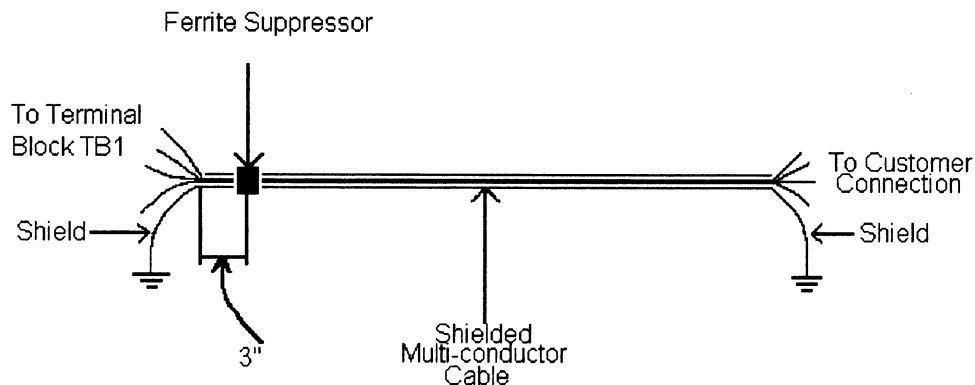
Your high voltage power supply has been designed and tested to ensure compliance with the European Community's EMC directives, when used as described in the instruction manual. However, as we do not supply as standard a remote interface cable, the following precautions must be followed in order to ensure continued compliance with EMC directive radiated emissions requirements, as specified in the harmonized standard EN55011 Group 1, Class B.

1. The interface cable must be of a shielded type with the shield terminated at both ends to an adequate ground source. At the power supply end, position 1 of TB1 can be used to make the ground connection (see drawing below).
2. A ferrite suppressor must be placed at the power supply end of the cable over the shield. This suppressor must be located within 3" of the terminations of the cable (see drawing below). The ferrite suppressor should have an impedance of greater than 200 ohms at 100MHz.

For your convenience, we have made available a kit that contains the required ferrite suppressors and assembly instructions. Contact your Glassman representative for further information.

If your power supply is a modified standard, and contains any additional interface connectors, each additional interface cable must follow the same precautions as stated above


If your power supply has the Digital Meter (DM) option, please note that if the meters are subjected to radiated EMC fields in excess of 3V/m, the display value may read incorrectly. However, the actual HV output remains stable and the true HV output level can be read from the Voltage Monitor.



## AHV-ER, J90 OPTION

This assembly is the same as AHV-ER 20-60 kV (schematic # 300064-002), with the following schematic modifications:

1. The connection from A1-E5 to A2-E5 is removed.
2. A2-E4 is wired to A2-E5.
3. A2-C1 is removed.
4. A2-C2's are changed to .001, 12.5 kV.
5. A2-R1 is removed.


REVISIONS				 <b>GLASSMAN HIGH VOLTAGE, INC.</b> PO Box 317, High Bridge, NJ USA 08829 – www.GlassmanHV.com	
DESCRIPTION	CHK	DATE	LTR	FILE:	SCHEMATIC MODIFICATION HIGH VOLTAGE ASSEMBLY <u>AHV-ER, J90 OPT</u>
				3000\64002\109#.doc	REFER TO DWG 300064-002
				DRAWN BWB	DATE 101207
				CHECK <i>[Signature]</i>	DATE <i>10/12/07</i>
				DWG NO	300064-002-109
				REV	NR
SHEET 1 OF 1					

## SPECIFICATION CONTROL

**Model: PS/ER60P05.0J90**

This model is in full accordance with the standard catalog specifications for the ER series, except as follows:

1. The nominal input voltage is 220 VAC.
2. The HV output time constant is increased to approximately 200 ms.
3. The power supply is designed to be operated with an external resistance of approximately 3.3k ohms in series with the output.
4. The rated output ripple is  $\leq 0.1\%$  RMS.

REVISIONS				 <b>GLASSMAN HIGH VOLTAGE, INC.</b> PO Box 317, High Bridge, NJ USA 08829 – www.GlassmanHV.com				
DESCRIPTION	CHK	DATE	LTR	FILE:	SPEC CONTROL PS/ER60P05.0J90			
				/1020/07J90#.doc				
				DRAWN BWB	DATE 083107	DWG NO <b>102007-J90</b>		REV <b>NR</b>
				CHECK <i>llw</i>	DATE <i>08/31/07</i>			SHEET 1 OF 1

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## SECTION II - GENERAL INFORMATION

### UNPACKING AND INSPECTION

First inspect package exterior for evidence of rough handling in transit. If none, proceed to unpack ... carefully. After removing the supply from its shipping container, inspect it thoroughly for damage.

**IMPORTANT!** In cases of damage due to rough handling in transit, notify the carrier immediately if damage is evident from appearance of package. Do not destroy or remove any of the packing material used in a damaged shipment. Carrier companies will usually not accept claims for damaged material unless they can inspect the damaged item and its associated packing material. Claims must be made promptly - certainly within five days of receipt of shipment.

**WARNING!** To avoid the risk of shock and personal injury, Wait at least 5 minutes after disconnecting the AC mains power before removing top cover to gain access to analog meters

### CORRESPONDENCE

Each Glassman power supply has an identification label on the chassis that bears its model and serial number. When requesting engineering or applications information, reference should be made to this model and serial number. If specific components or circuit sections are involved in the inquiry, also indicate the component symbol number(s) shown on the applicable schematic diagram.

#### GLASSMAN HIGH VOLTAGE, INC.

PO Box 317  
124 West Main Street  
High Bridge, NJ 08829

TEL. 908-638-3800

FAX. 908-638-3700

E-MAIL [Support@GlassmanHV.com](mailto:Support@GlassmanHV.com)

[www.GlassmanHV.com](http://www.GlassmanHV.com)

## SAFETY



This symbol, wherever it appears on the supply, alerts you to the presence of uninsulated dangerous voltages - voltages that may be sufficient to constitute a risk of electrical shock.



This symbol, wherever it appears on the supply, alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual.

## TERMS IN THIS MANUAL

**CAUTION!** statements identify conditions or practices that could result in damage to the equipment or other property.

**WARNING!** statements identify conditions or practices that could result in injury or loss of life.

## WARNING!

To avoid the risk of shock or fire do not attempt to service the supply beyond that described in these instructions.

To avoid the risk of shock and personal injury, do not remove the product covers while the unit is operating or connected to the AC mains. Wait at least 5 minutes after disconnecting the AC mains power before removing any covers or panels. Wait at least 15 seconds before disconnecting the HV cable.

Upon loss of protective ground connection(s), all accessible conductive parts can render an electric shock.

Use only a power cord rated greater than the input current rating of the unit. Use only a cord in good condition.

To avoid fire hazard, use only fuses of the correct type, voltage rating, and current rating as specified.

To avoid explosion, do not operate this product in an explosive atmosphere.

If liquid is spilled on the supply, shut it off immediately and disconnect it from the AC mains.

Always maintain adequate supply ventilation. All ventilation openings must remain free from obstruction.



## CONNECTIONS AND CONTROLS

### REAR PANEL ELEMENTS

#### J2 AC POWER INPUT

**WARNING! The ground (center) terminal of this input should be connected to the AC outlet ground or other good earth ground.**

J2 is a standard IEC receptacle. A mating line cord is provided with a plug for a standard NEMA 5-15 (NEMA 6-15 for OPTION "220") North American grounded outlet. In other regions, the appropriate plug or IEC cord set should be substituted. If the plug is removed from the cord provided, the wires should be connected as follows:

Green/Yellow - Ground

Brown - Line

Blue - Line or Neutral

Check to see that your input line voltage matches the rating of the supply before applying power (see Figures 8 and 9).

**For CE compliant supplies used in Europe:**  
Please refer to the Declaration of Conformity located elsewhere in this manual for installation environment conditions required to conform to 73/23/EEC (Low Voltage Directive).

#### POWER ON INDICATOR

**WARNING! When this lamp is illuminated, AC power is present. Do not apply or remove any connections to this unit until AC power is removed and the DC output has discharged.**

#### J1 HIGH VOLTAGE OUTPUT

**WARNING! Do not insert or remove the output cable from this connector until AC power is off and the DC output has discharged.**



This is the high voltage output of the supply (see figures 8 and 9). Engage the connector as follows:

UNITS > 6kV: Insert the high voltage cable provided into the receptacle. Screw the threaded barrel onto the receptacle.

UNITS ≤ 6kV: Align plug, push in, and rotate 1/2 turn to engage.

## **E1    GROUND STUD**

**WARNING! Do not operate unit without good external earth ground connected to this point.**

This is the main grounding terminal for the supply (see Figures 8 and 9).

## **TB1    REMOTE CONTROL CONNECTOR**

**WARNING! Do not make or remove connections to this connector or any other connector until power is off and the output has discharged.**

This connector provides inputs and outputs for the remote control functions. For a description of each of these signals and their application see Figures 1-9 and the remote control interface section.

## FRONT PANEL ELEMENTS

### **POWER Switch/Indicator**

Applies AC power to the unit when in the on ("1") position (as long as power is present at J2). The integral lamp will illuminate when power is present.

**WARNING! Do not apply or remove any connections to this unit when power is on.**

*"NC" OPTION USERS: The front panel elements that follow, are not present on "NC" option supplies.*

### **HIGH VOLTAGE ON Push-button**

Enables the high voltage output when depressed. This switch will not activate the high voltage if the interlock is open.

### **HIGH VOLTAGE ON Indicator**

Illuminates after the HV ENABLE push-button is depressed (if the INTERLOCK signal is closed). If this indicator is on and the HV ENABLE signal is present, the supply will generate high voltage. If the INTERLOCK signal is opened, even temporarily, the high voltage will be disabled and the HIGH VOLTAGE ON indicator will extinguish. Once the interlock is closed, the HIGH VOLTAGE ON push-button must again be depressed to restart the supply.

### **Local KILOVOLTS & MILLIAMPERES CONTROL**

10-turn controls provide a 0-10V signal for local MILLIAMPERE and KILOVOLT programming. Clockwise rotation increases output. A 10- turn dial with brake is provided to secure the settings, if desired.

### **KILOVOLT & MILLIAMPERE CONTROL Indicator**

These indicators are located above their respective controls. If the KILOVOLTS CONTROL indicator is lit, the supply is operating as a constant voltage supply with an output voltage determined by the local KILOVOLTS CONTROL or remote V-PROGRAM signal. If the MILLIAMPERES CONTROL lamp is illuminated, the supply is operating as a constant current supply with the output current determined by the local MILLIAMPERES CONTROL or remote I-PROGRAM signal.

### **Output Meters**

**WARNING! To avoid the risk of shock and personal injury, Wait at least 5 minutes after disconnecting the AC mains power before removing top cover to gain access to analog meters**

Analog meters display output voltage and current with an accuracy of +/- 2% (Note: Meters operational only when power is applied to the unit. See **WARNING!** statement below.)

***DM OPTION USERS:*** 3-1/2 digit digital panel meters are provided in place of the analog meters.

**WARNING!** When system is powered down under light or no load conditions, the output may retain a charge even after power is removed. This charge may not show on the kilovoltmeter. Discharge the output to ground or use an external meter to determine if output has discharged. Or, wait at least 15 seconds before making or removing any connections to the supply.

### **POLARITY Indicators ("DM" OPTION ONLY)**

Indicates the output polarity of the supply with respect to ground.

## **INSTALLATION AND OPERATION**

### **WARNING!**

**NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE GROUND STUD, "E1", ON THE REAR PANEL. THE GROUND WIRE OF THE AC LINE CORD MUST ALSO BE GROUNDED.**

**READ AND FULLY UNDERSTAND THE OPERATING INSTRUCTIONS BEFORE APPLYING POWER TO THIS UNIT.**

**THIS EQUIPMENT EMPLOYS VOLTAGES THAT ARE DANGEROUS. EXTREME CAUTION MUST BE EXERCISED WHEN WORKING WITH THIS EQUIPMENT.**

**DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN**

**DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 15 SECONDS TO FULLY DISCHARGE.**

**ALWAYS MAKE CERTAIN THAT THE RETURN SIDE OF THE LOAD IS CONNECTED TO COMMON OR GROUND.**

## INITIAL TURN ON

The following procedure, to connect and operate this equipment, should be carried out only after the unit has been placed or mounted in position.

1. Check the input voltage rating on the rear panel nameplate of the power supply and make certain that this is the rating of the available power source.
2. Check to see that the POWER switch is in the off ("0") position.
3. Check to see that the jumpers are present on TB1 and are connected for local operation (see Figure 9).

*USERS WITH "NC" OPTION SUPPLIES: Connect external pot or control signal to V- PROGRAM terminal.*

4. Connect the high voltage output cable and ground the return lead of the load as shown in Figures 7. Connect the high voltage cable to the receptacle on the rear panel.

*"NC" OPTION USERS: Connect an external kilovoltmeter to the high voltage output or monitor the V-MONITOR terminal with a DVM (0 - 10VDC = 0 - rated kV output).*

5. Connect the AC input cable provided to J2 and to the power source.
6. Rotate KILOVOLTS CONTROL to the fully counterclockwise position (set external pot or control signal on "NC" option units for zero volts programming). This is optional, but desirable so as to prevent damage to external equipment caused by inadvertent overvoltage setting. Not required if correct setting has already been established.

*“NC” OPTION USERS: skip step 7*

7. Rotate the MILLIAMPERES CONTROL clockwise to a level that is greater than the amount that the connected load will require (any setting above zero if no load is connected).
8. Apply input power to the supply by setting POWER switch to the on (“1”) position.

*“NC” OPTION USERS: Skip step 9*

9. Depress HIGH VOLTAGE ON push-button. The HIGH VOLTAGE ON indicator should illuminate.
10. Rotate KILOVOLT CONTROL (or increase external V-PROGRAM signal) until kilovoltmeter indicates desired output voltage.
11. To shut down supply, set POWER SWITCH to the off (“0”) position.

**WARNING!**

**DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 15 SECONDS TO FULLY DISCHARGE.**

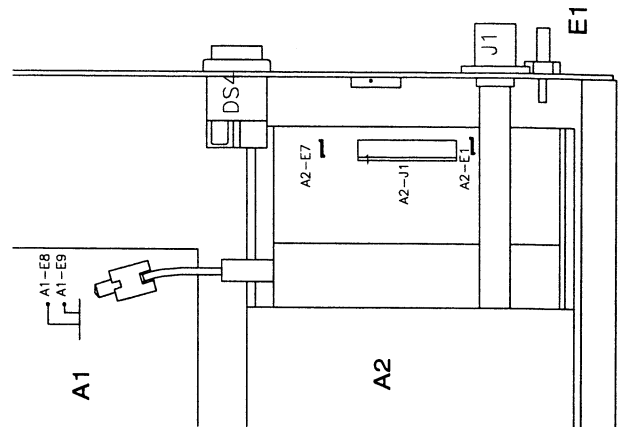
## **POLARITY REVERSAL - MODELS > 6kV**

For reversible polarity models, the power supply has been shipped with two high voltage assemblies, one positive and one negative. One module is mounted in the chassis, the other one is shipped separately. A label on each high voltage assembly indicates its polarity. To reverse the polarity of the power supply, it is necessary to interchange the high voltage modules.

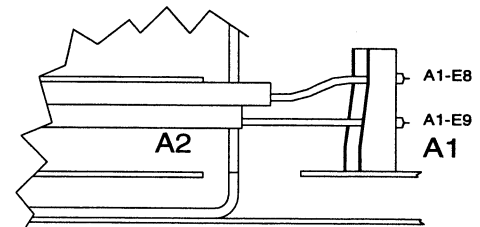
**WARNING! To avoid the risk of shock and personal injury, Wait at least 5 minutes after disconnecting the AC mains power before removing any covers or panels.**

1. Remove the top cover from the unit. **BE SURE AC POWER IS DISCONNECTED AND HV IS DISCHARGED!**

- Remove the electrical connector A2-P1 and the push lugs A2-E7 & A2-E1 which are connected to the high voltage assembly presently installed. Disconnect the two high voltage wires connected to A1-E8 & 9 on the main board A1 (APD-ER).



- Tip the unit on its side to expose the four countersunk screws used to mount the high voltage module to the chassis basepan. Remove these screws, interchange the two high voltage modules and reinstall the screws.



- Reconnect A2-P1, A2-E7 & A2-E1 to the high voltage module and connect the high voltage wires to A1-E8 & 9 of A1.

**WARNING! For continued safety A2-E7 & A2-E1 must be reinstalled!**

- Replace the top cover.

## POLARITY REVERSAL - MODELS 6kV OR LESS

A polarity card has been provided, internal to the unit, to reverse the output polarity of the supply. If it is desired to determine the present setting of the polarity or to change the polarity, follow this procedure:

**WARNING! To avoid the risk of shock and personal injury, Wait at least 5 minutes after disconnecting the AC mains power before removing any covers or panels.**

- Remove the top cover from the unit. **BE SURE AC POWER IS DISCONNECTED AND HV IS DISCHARGED!**

2. Locate the high voltage board on the right hand side of the chassis (as viewed from the front).
3. Locate the polarity card plugged into the high voltage board and observe that the card is labeled to indicate the installed polarity.
4. If it is desired to change the polarity of the supply, simply unplug the card, flip it over, and reinstall carefully.
5. Replace the top cover.

## **REMOTE CONTROL INTERFACE**

### **TB1-1 GROUND**

This is the instrumentation ground connection. This terminal should not be used as the main connection to earth ground. Use the main ground terminal, "E1", for that purpose. TB1-1 is normally connected to the adjacent COMMON terminal unless a floating common is desired (see TB1-2). If a floating common is employed, this connection (or E1) should be used as the load return (see Figure 7).

### **TB1-2 COMMON**

This terminal is the instrumentation/measurement return. Normally, COMMON is at ground potential because of a jumper to the GROUND terminal. In this configuration, instrument returns and load return may be connected to either COMMON or GROUND. If desired, the user may remove this jumper and allow the COMMON to "float". This may be done for isolation or for the purpose of inserting a current monitoring device.

When common is floating, it is clamped internally by a bi-directional zener diode. Thus, the inserted drop should not exceed 5.0V or erroneous readings may be obtained. In this configuration, the load return must be connected to GROUND and all instrument/ programming returns must be connected to COMMON. In addition, instrument returns to COMMON must be isolated from GROUND (see Figures 7, 8 & 9).

**TB1-3 INTERLOCK**

This terminal must be connected to COMMON to enable the supply. If desired, the jumper may be removed and replaced by an external switch which must be closed for the supply to operate. If the external switch is opened, the supply output will drop to zero. When the switch is again closed, the front panel HIGH VOLTAGE ON push-button must be depressed to re-enable the supply (except on "NC" option supplies which will re-enable immediately) (see Figure 1).

**TB1-4 V-MONITOR**

A 0-10V positive signal (with respect to COMMON), in direct proportion to the output voltage, is available at this terminal. An internal 10k ohm, 1%, limiting resistance protects the circuitry. Therefore, it is recommended that a digital voltmeter be used to monitor this output. It is also acceptable to use a 1mA DC full scale instrument (i.e. analog meter) for monitor purposes (see Figure 5).

**TB1-5 V-PROGRAM****TB1-6 LOCAL V-CONTROL ("NC" OPTION: No Connection)**

A positive 0-10V signal (with respect to COMMON) at TB1-5 will program the output voltage proportionally from zero to rated output. This input can be programmed in several ways (see Figures 3, 8 & 9):

- \* A user supplied 0 - +10V signal.
- \* A user supplied potentiometer (5-50k ohms, 10k nominal) can be connected between the 10V REFERENCE and COMMON, with the wiper connected to the V-PROGRAM terminal.
- \* The 0 - +10V signal available at TB1-6, and adjusted by the local (front panel) KILOVOLTS CONTROL (except on "NC" option supplies).
- \* The V-PROGRAM input may be jumpered to the REFERENCE voltage terminal(s) for a fixed output at the maximum voltage.



**TB1-7 I-MONITOR**

A 0-10V signal, positive with respect to COMMON, and in direct proportion to the output current, is available at this terminal. An internal 10k ohm, 1%, limiting resistance protects the circuitry. Therefore, it is recommended that a digital voltmeter be used to monitor this output. It is also acceptable to use a 1mA DC full scale instrument (i.e. analog meter) for monitor purposes (see Figure 6).

**TB1-8 I-PROGRAM****TB1-9 LOCAL I-CONTROL ("NC" OPTION: REFERENCE)**

A 0-10V positive signal (with respect to COMMON) at TB1-8 will program the output current proportionally from zero to full output. This input can be programmed in several ways (see Figures 4, 8 & 9):

- \* A user supplied 0 - +10V signal.
- \* A user supplied potentiometer (5-50k ohms, 10k nominal) can be connected between the 10V REFERENCE and COMMON, with the wiper connected to the I-PROGRAM terminal.
- \* The 0 - +10V signal available at TB1-9, adjusted by the local (front panel) MILLIAMPERES CONTROL.

*"NC" OPTION USERS: No local control is provided;  
an extra REFERENCE is provided at TB1-9.*

- \* The I-PROGRAM input may be jumpered to the REFERENCE voltage terminal(s) for a fixed current limit at the maximum rated current.

**TB1-10 REFERENCE**

The output of this terminal is an ultra-stable, positive, 10V reference voltage (with respect to common) that is supplied for user programming applications. Maximum current drain from this point should be limited to 4mA.

*"NC" OPTION USERS: An additional REFERENCE is  
available on TB1-9.*

**TB1-11**      **HV ENABLE**

This terminal must be connected to a positive 2.5-15V source (with respect to common) to enable the supply. A 0-1.5V signal at this input will disable the supply. When no external control is required this input can be jumpered to the 10V REFERENCE terminal (see Figure 2).

**TB1-12**      **X1**

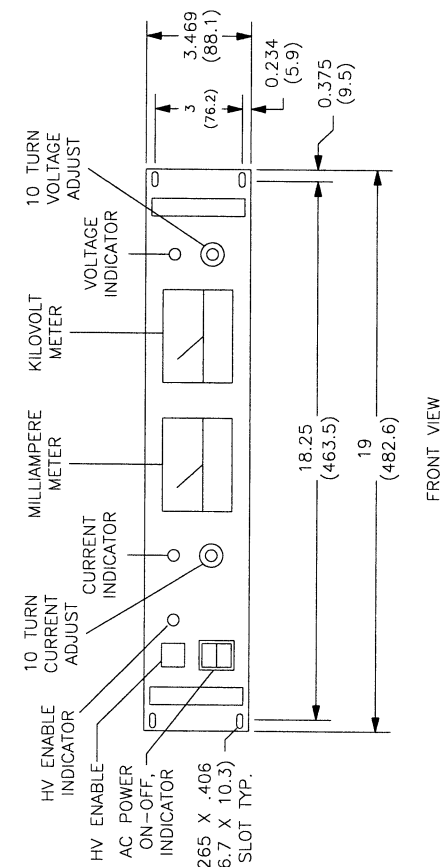
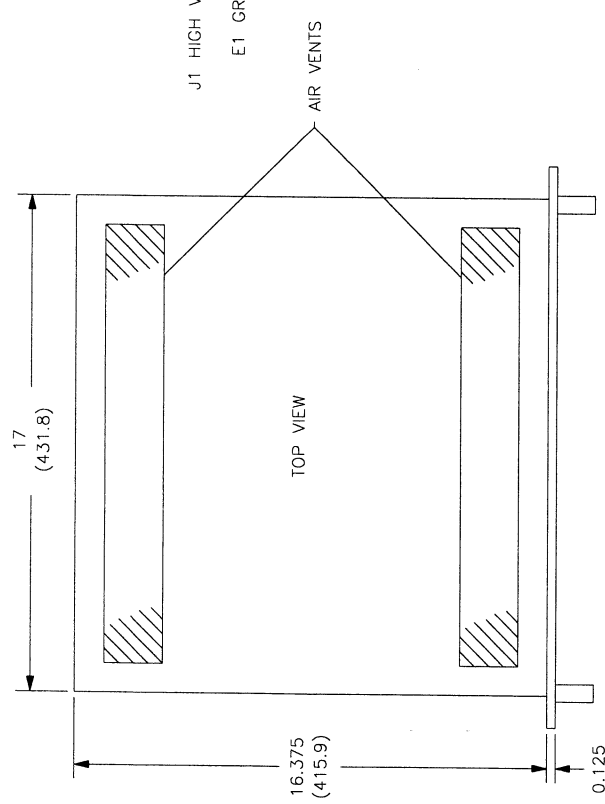
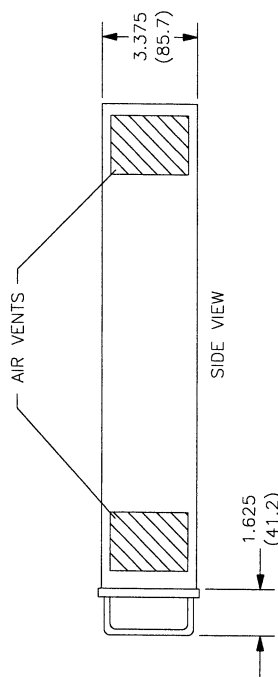
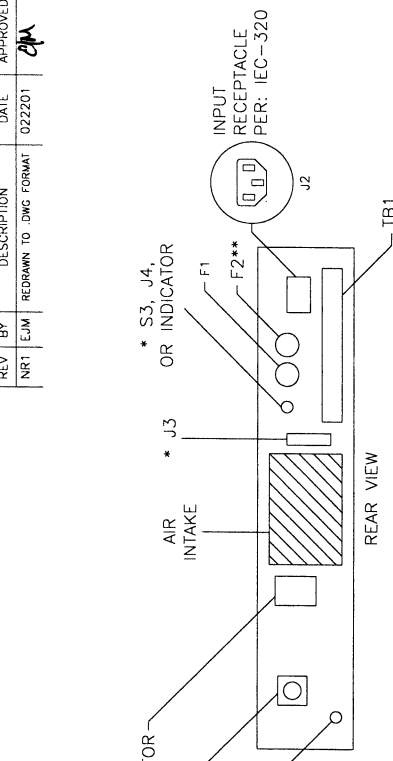
This terminal is reserved for special options or future expansion of features.

**NOTE:**

Figure 8 is just one example of the many possible interface configurations.

Figure 9 shows the minimum number of connections to completely enable the supply. In this configuration, output voltage and current are controlled by the front panel controls (except on "NC" option units which have no front panel controls). No external interlock or TTL signals are required.

REV	BY	DESCRIPTION	DATE	APPROVED
NRT	EJM	REDRAWN TO DWG FORMAT	02/22/01	<i>[Signature]</i>



TB1 LEGEND

1 GROUND	5 V-PROGRAM	9 LOCAL I-CONTROL
2 COMMON	6 LOCAL V-CONTROL	10 REFERENCE
3 INTERLOCK	7 I-MONITOR	11 HV ENABLE
4 V-MONITOR	8 I-PROGRAM	12 X1

NET WEIGHT: 18 POUNDS; 8kg

\* OPTIONAL

\*\* NOT USED ON 115V INPUT UNITS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		FILE NO. EXTENSION	
DEC. XXX ±	XX ±	\2011\03039-1.DWG	
DEC. ±		APPROVALS	DATE
		DRWN JHK	11/01/95
		CHECKED JMC	11/02/95
		RELEASED	
THIRD ANGLE PROJECTION		TITLE	
		GLASSMAN HIGH VOLTAGE, INC.	
		P.O. BOX 317, HIGH BRIDGE, NJ 08879	
		(908) 638-3800 FAX (908) 638-3700	
		SERIES ER	
		OUTLINE AND INSTALLATION	
		DWG NO.	REV.
		201103-039	NR-1
		SCALE	SHEET 1 OF 1
		NONE	

## WARRANTY

Glassman High Voltage, Inc. (Glassman) warrants standard power supplies it manufactures to be free from defect in materials and factory workmanship, and agrees to repair or replace any standard power supply that fails to perform as specified within three years after date of shipment. OEM and modified standard power supplies are warranted, as stated above, for one year from date of shipment. This Warranty shall not apply to any power supply that has been:

- i) repaired, worked on, or altered by persons unauthorized by Glassman in such a manner as to injure, in Glassman's sole judgment, the performance, stability, or reliability of the power supply;
- ii) subjected to misuse, negligence, or accident; or
- iii) connected, installed, adjusted, or used otherwise than in accordance with instructions furnished by Glassman.

Glassman reserves the right to make any changes in the design or construction of its power supply at any time, without incurring any obligation to make any change whatever in units previously delivered.

Glassman's sole liabilities, and buyer's sole remedies, under this agreement shall be limited to a refund of the purchase price, or at Glassman's sole discretion, to the repair or replacement of any power supply that proves, to Glassman's satisfaction, to be defective, when returned to the Glassman factory, transportation prepaid by the buyer, within the warranty period. Glassman shall in no way be liable for damages consequential or incidental to defects in any power supply, for failure of delivery in whole or in part, for injuries resulting from its use, or for any other cause.

THIS WARRANTY IS EXCLUSIVE AND IS GIVEN AND ACCEPTED IN LIEU OF (1) ANY AND ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND (2) ANY OBLIGATION, LIABILITY, RIGHT, CLAIM OR REMEDY IN CONTRACT OR TORT.

This Warranty and the writing attached constitute the full understanding of the manufacturer and buyer, and no terms, conditions, understanding, or agreement purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing and signed by an authorized official of Glassman High Voltage Inc.

CE Check the specs... and compare

# ER Series 300 Watt Regulated High Voltage DC Power Supplies

## Laboratory Performance...

## High Power Density...

## Enhanced Features

Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC.



Models from 0 to 1kV through 0 to 75kV, 3.5 inch panel height 18 pounds.

The ER Series models are sophisticated, medium power, high voltage power supplies. The "designed in" versatility of this standard product line finds itself at home in most applications/environments. With three control panel configurations... analog, digital or blank... and a full complement of standard remote controls, you might think high price. Not in Glassman's case, just high quality.

### Features:

**Air Insulated.** As in all standard Glassman power supplies, the ER Series features "air" as the primary dielectric medium. No oil or encapsulation to impede serviceability or increase weight.

**Constant Voltage/Constant Current Operation.** Automatic crossover from voltage or current regulated mode dependent on the load conditions.

**Low Ripple.** Better than 0.02% of rated voltage at full load.

**Tight Regulation.** Voltage regulation better than 0.005% line or load; current regulation better than 0.05% from short circuit to rated voltage.

**Fast Transient Response.** Less than 3 milliseconds for a 50% load transient.

**Front Panel Controls (Analog and Digital Versions).** Ten-turn voltage and current controls with locking vernier dials. AC power ON/OFF and high voltage enable switches.

**Remote Control Facilities.** As standard, all ER Series power supplies provide output voltage and current program/monitor terminals, TTL high voltage enable/disable, safety interlock terminals, and a +10 volt reference source.

**Small Size and Weight.** ER Series power supplies consume only 3.5" of vertical panel height. Total weight is 18 pounds.

**Warranty.** Standard power supplies are warranted for three years; OEM and modified power supplies are warranted for one year. A formal warranty statement is available.



Designing Solutions for High Voltage Power Supply Applications

## GLASSMAN HIGH VOLTAGE INC.

124 West Main Street, PO Box 317, High Bridge, NJ 08829-0317  
(908) 638-3800 • Fax (908) 638-3700 • [www.glassmanhv.com](http://www.glassmanhv.com)

**GLASSMAN EUROPE Limited (UK)**  
+44 1256 883007 FAX +44 1256 883017  
E-mail: [Glassman\\_europe@glassmanhv.com](mailto:Glassman_europe@glassmanhv.com)

**GLASSMAN JAPAN High Voltage Limited**  
+81 45 902 9988 FAX +81 45 902 2268  
E-mail: [Glassman\\_japan@glassmanhv.com](mailto:Glassman_japan@glassmanhv.com)

# Specifications

(From 5% to 100% rated voltage.

All units operate down to zero output with very slight degradation of performance.)

**Input:** 105-125 V RMS, 48-63 Hz single phase, <6 A. Connector per IEC 320 with mating line cord.

**Efficiency:** Typically 85% at full load.

**Output:** Continuous, stable adjustment, from 0 to rated voltage or current by panel mounted 10-turn potentiometers with 0.05% resolution, or by external 0 + 10V signals is provided. Voltage accuracy is 0.5% of setting, 0.2% of rated. Repeatability is <0.1% of rated.

**Stored Energy:** 20 kV model, 1.5 joules; 60 kV model, <4 joules.

**Voltage Regulation:** <0.005% +1mV/mA, line and load.

**Ripple:** <0.02% RMS of rated voltage +0.5V at full load; models 1.5kV and lower, 400mV (500mV Japan).

**Current Regulation:** <0.1% from short circuit to rated voltage at any set current.

**Voltage Monitor:** 0 to +10 V DC for zero to rated current. Accuracy, 0.5% of reading + .2% of rated voltage.

**Current Monitor:** 0 to + 10 V DC for zero to rated current. Accuracy, 1% of reading + .05% of rated current. Reversible models, 1% of reading and 0.1% of rated.

**Stability:** 0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours.

**Voltage Rise/Decay Time Constant:** Typically 50 ms rise or decay time constant (300 ms for 75 kV model) using HV (on/off) or remote voltage control with 75% resistive load.

**Temperature Coefficient:** 0.01%/°C.

**Ambient Temperature:** -20 to +40°C operating, -40 to +85°C storage.

**Polarity:** Positive, negative, or reversible with respect to chassis ground.

**Protection:** Automatic current regulation protects against all overloads, including arcs and short circuits. Fuses, surge-limiting resistors, and low-energy components provide ultimate protection.

**Accessories:** Detachable 8-foot shielded HV cable (see Model Chart for cable type) and 6 foot detachable line cord provided.

**Remote Controls:** Common, +10 V reference, interlock, current monitor, current program, voltage monitor, voltage program, TTL, and ground, provided on a rear panel mounted terminal block.

**External Interlock:** Open off, closed on. Normally latching except for blank front

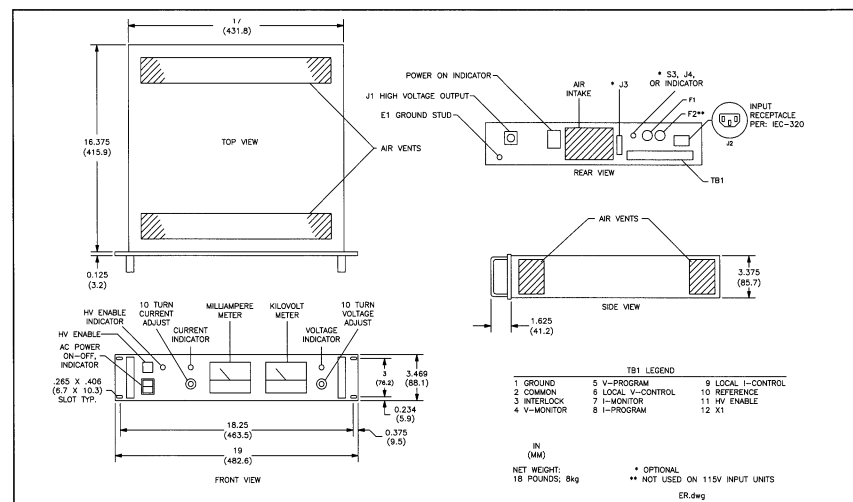
panel version where it is non-latching.  
**HV Enable/Disable:** 0-1.5 V off, 2.5-15 V on.

# Options

Symbol	Description
100	100 V input, rated 90-110 V RMS, 48-63 Hz.
220	220 V input, rated 200-264 V R MS, 48-63 Hz.
400	48-420 Hz, available on standard model and options 100 and 220.
DM	3-1/2 digit LCD panel meters.
NC	Blank front panel (power switch only).
CT	Current trip. Power supply trips off when the load current reaches the programmed level. This option has a rear panel switch that selects either "trip" operation or current limiting.
ZR	Zero start interlock. Voltage control must be at zero before accepting an enable signal.
SS	Slow start ramp of up to 30 seconds available. Specify time.
5VC	0-5 V voltage and current program/monitor.
GE9	RS-232 control and monitor.

# Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable
Reversible Polarity Only		ER1R300	0-1kV	0-300mA	RG-59
		ER1.5R200	0-1.5kV	0-200mA	RG-59
		ER2R150	0-2kV	0-150mA	RG-59
		ER3R100	0-3kV	0-100mA	RG-59
		ER5R60	0-5kV	0-60mA	RG-59
		ER6R50	0-6kV	0-50mA	RG-58
ER10P30	ER10N30	ER10R30	0-10kV	0-30mA	RG-8U
ER15P20	ER15N20	ER15R20	0-15kV	0-20mA	RG-8U
ER20P15	ER20N15	ER20R15	0-20kV	0-15mA	RG-8U
ER25P12	ER25N12	ER25R12	0-25kV	0-12mA	RG-8U
ER30P10	ER30N10	ER30R10	0-30kV	0-10mA	RG-8U
ER40P7.5	ER40N7.5	ER40R7.5	0-40kV	0-7.5mA	RG-8U
ER50P6	ER50N6	ER50R6	0-50kV	0-6mA	RG-8U
ER60P5	ER60N5	ER60R5	0-60kV	0-5mA	RG-8U
ER75P4	ER75N4	ER75R4	0-75kV	0-4mA	DS2124



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