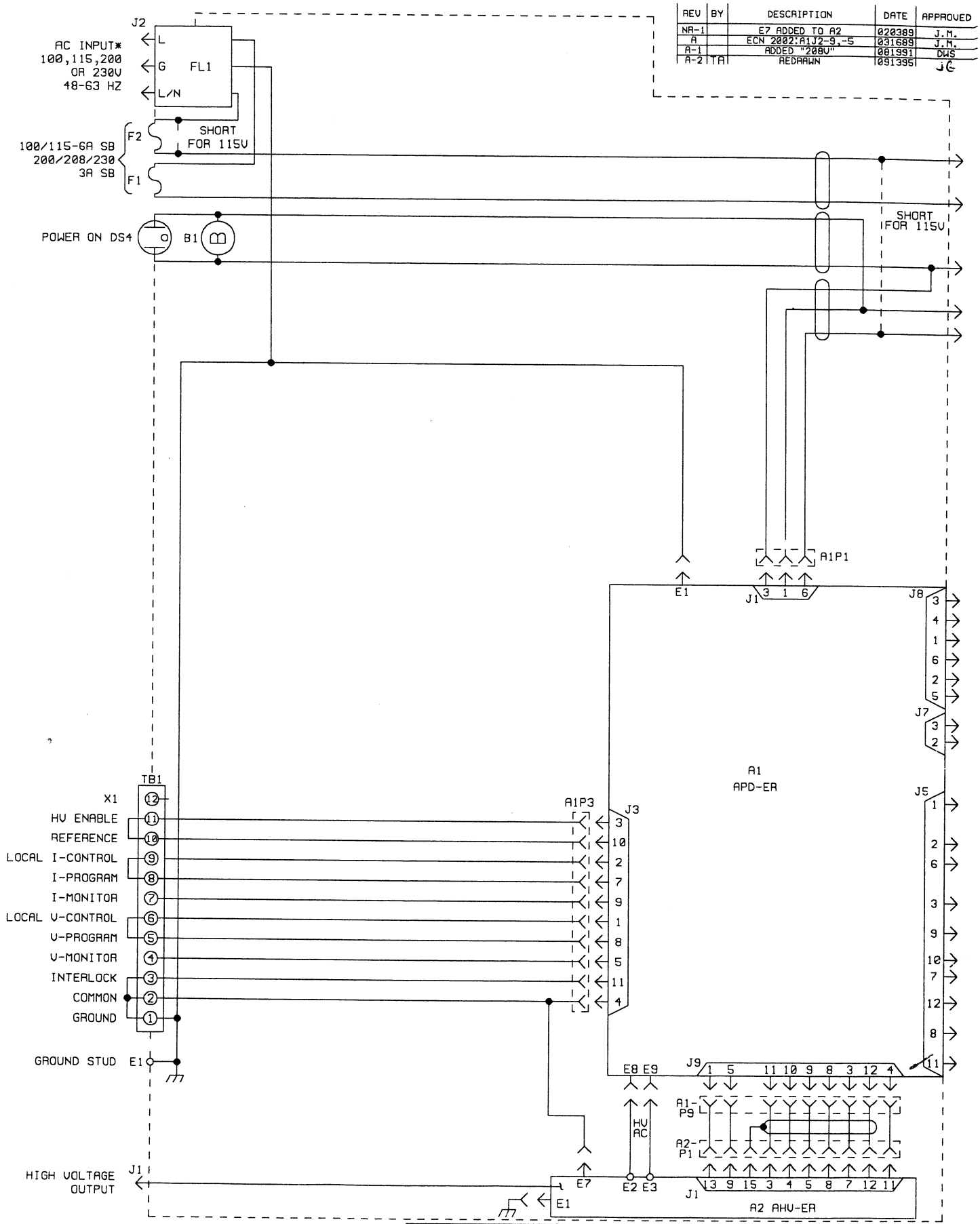
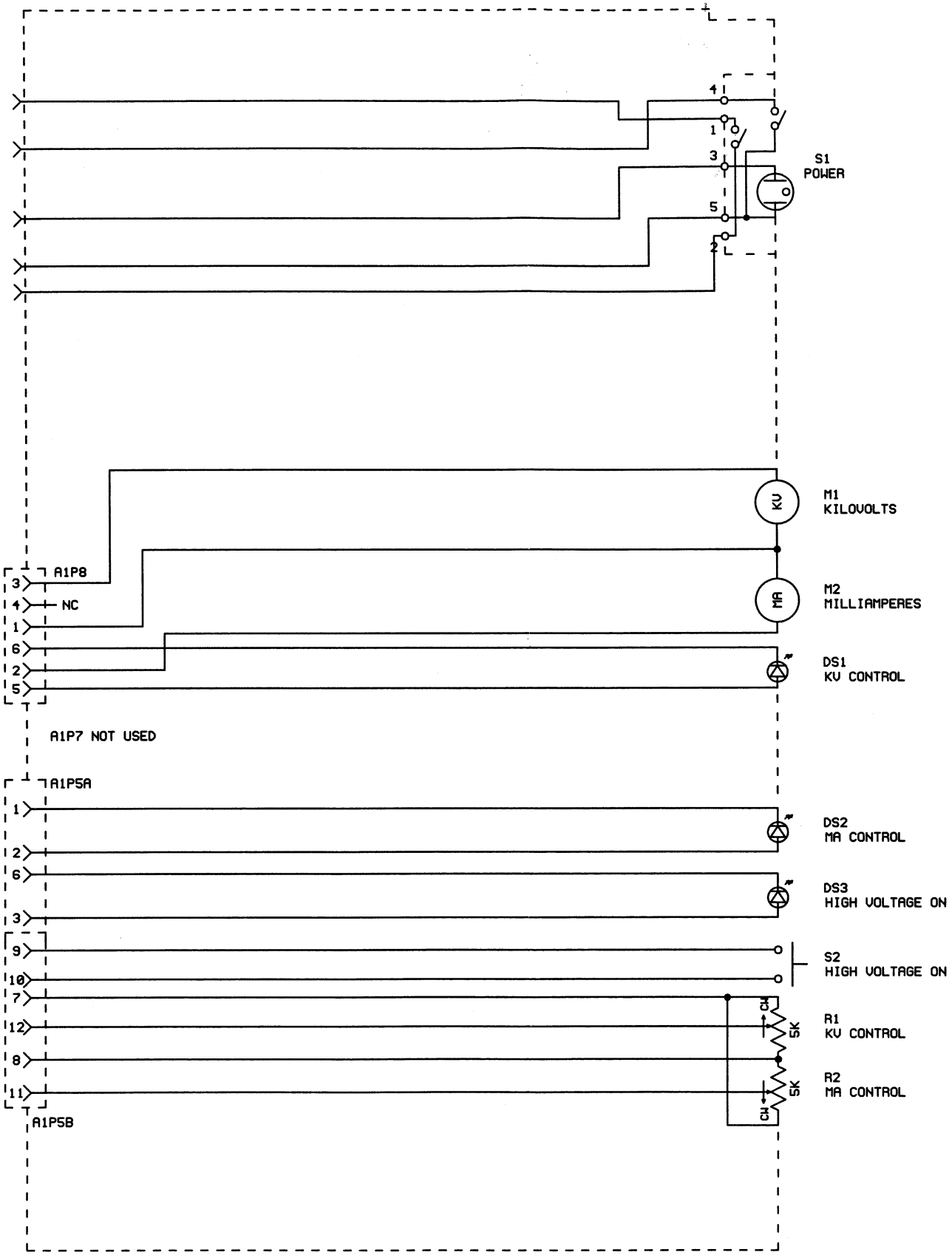
REV	BY	DESCRIPTION	DATE	APPROVED
NR-1		E7 ADDED TO A2	020389	J.M.
A		ECN 2002:A1J2-9,-5	031689	J.M.
A-1		ADDED "208V"	081991	DWS
A-2	TA	REDRAWN	091395	JG



* 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 \3000\61001A2.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672
MATERIAL	APPROVALS / DATE	TITLE SCHEMATIC DIAGRAM MAIN ASSEMBLY AM3-ER-1
FINISH	DRAWN MES 011989	
DO NOT SCALE DRAWING	CHECKED JC 111 011989	C DWG. NO. 300061-001 REV. A-2
	RELEASED	SCALE NONE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED



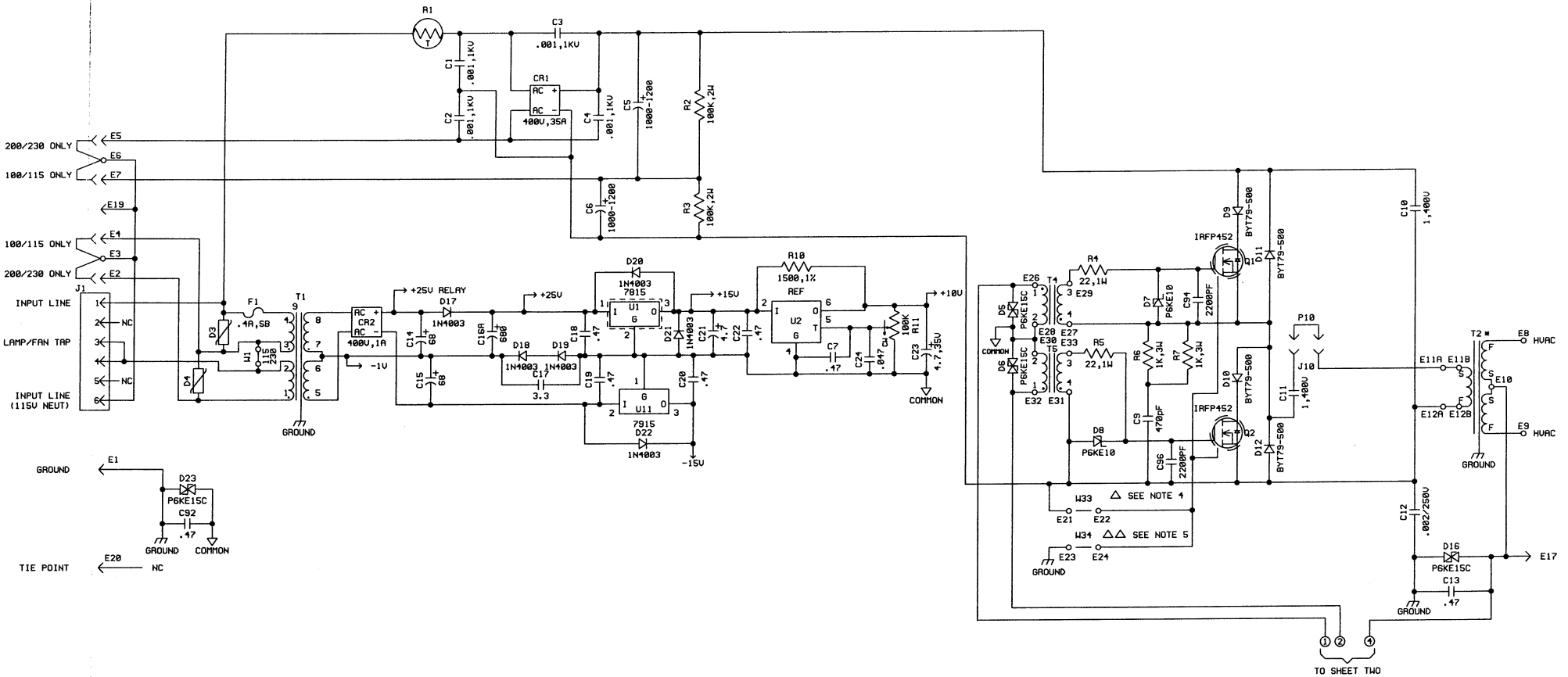
REDUCED ONLY

NOTES:

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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \3000\S2005#.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
MATERIAL	APPROVALS / DRAWN JAG 053007	TITLE SCHEMATIC FRONT PANEL AFP-ER-1-A
FINISH	CHECKED 053107	D DWG. NO. 300062-005 REV. NR
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1	JAG	US WAS CA3210AE (TYPO)	102505	

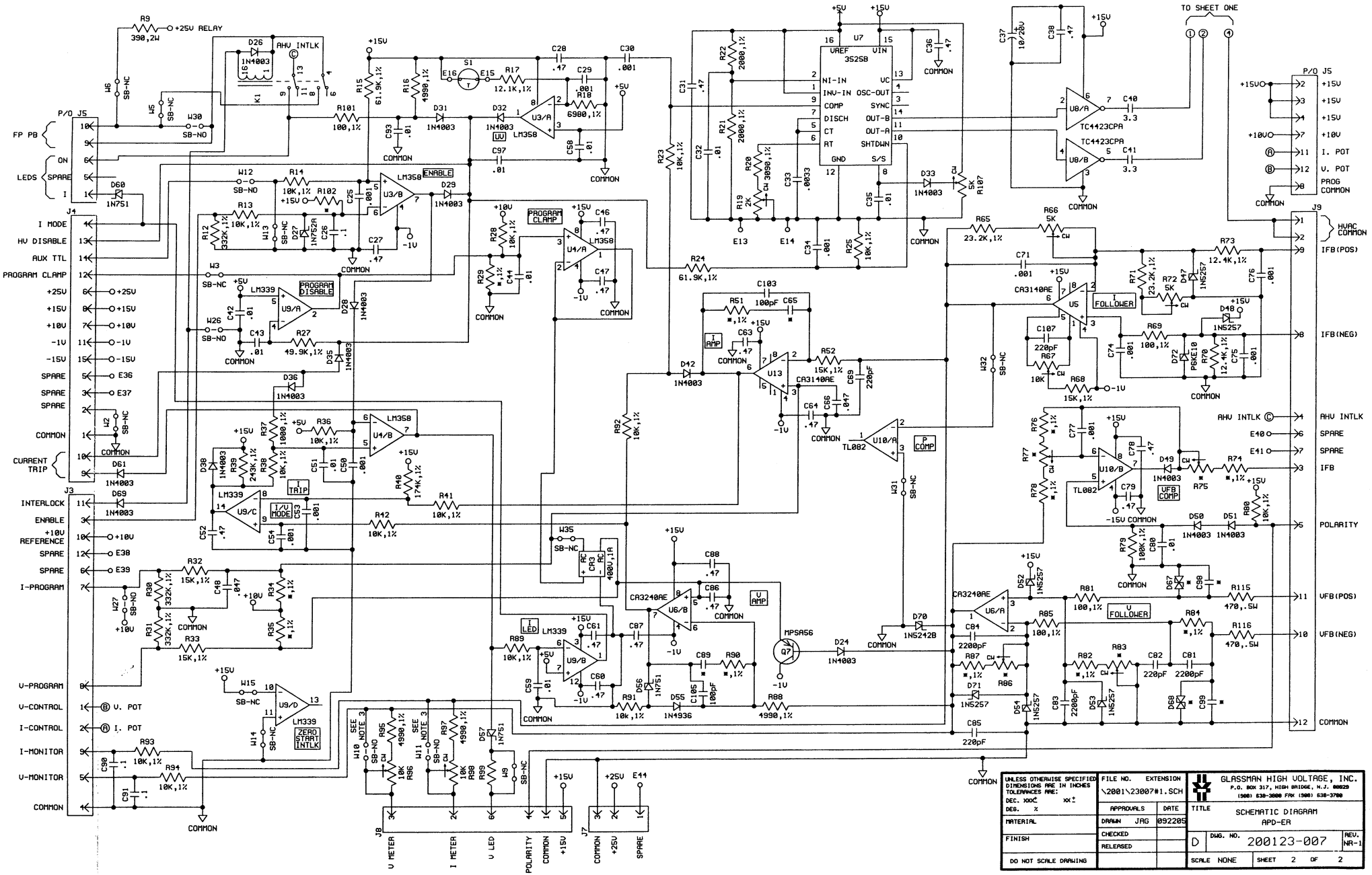


NOTES:

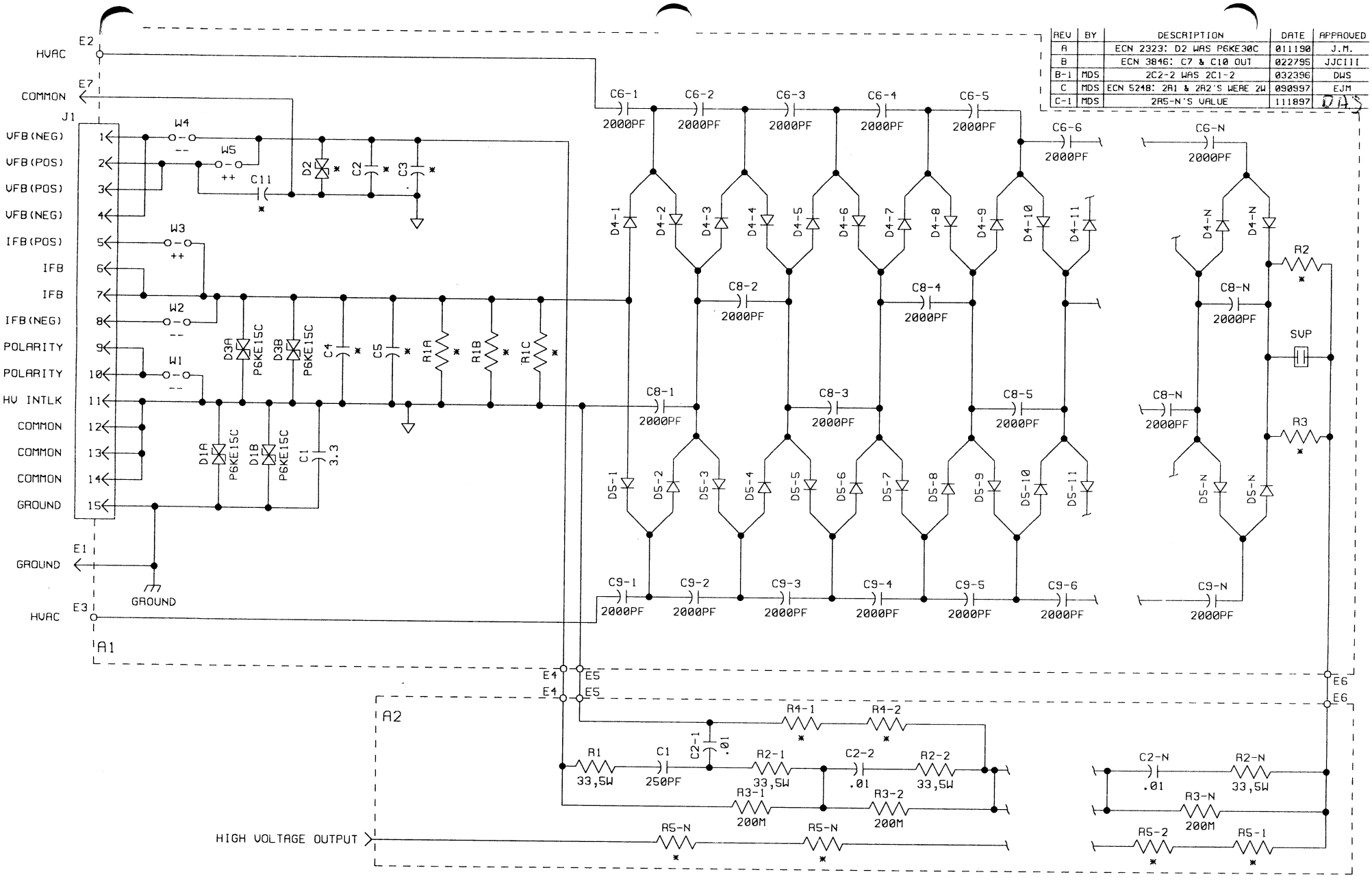
1 - * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
2 - THE FOLLOWING ALSO GO TO SHEET TWO:
+25V
+25V RELAY
+15V
+10V
-1.2V
-15V
⏚ (COMMON)
3 - ADDED ON DM OPTION MODELS.
△ 4 - INSTALLED ON 200/230 VAC MODELS.
△△ 5 - INSTALLED ON 100/115 VAC MODELS.

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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \2001\23007#1.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700
	APPROVALS DATE	TITLE SCHEMATIC DIAGRAM APD-ER
MATERIAL	DRAWN JAG 092205	
FINISH	CHECKED SD 092605	D DWG. NO. 200123-007 REV. NR-1
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 2



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \2001\23007#1.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700	
	APPROVALS / DATE	TITLE	SCHEMATIC DIAGRAM APD-ER
MATERIAL	DRAWN JAG 092205		
FINISH	CHECKED	D	DWG. NO. 200123-007 REV. NR-1
DO NOT SCALE DRAWING	RELEASED	SCALE NONE	SHEET 2 OF 2



REV	BY	DESCRIPTION	DATE	APPROVED
A		ECN 2323: D2 WAS P6KE30C	011190	J.M.
B		ECN 3846: C7 & C10 OUT	022795	JJCIII
B-1	MDS	2C2-2 WAS 2C1-2	032396	DWS
C	MDS	ECN 5248: 2R1 & 2R2'S WERE 2W	090997	EJM
C-1	MDS	2R5-N'S VALUE	111897	DWS

REDUCED ONLY

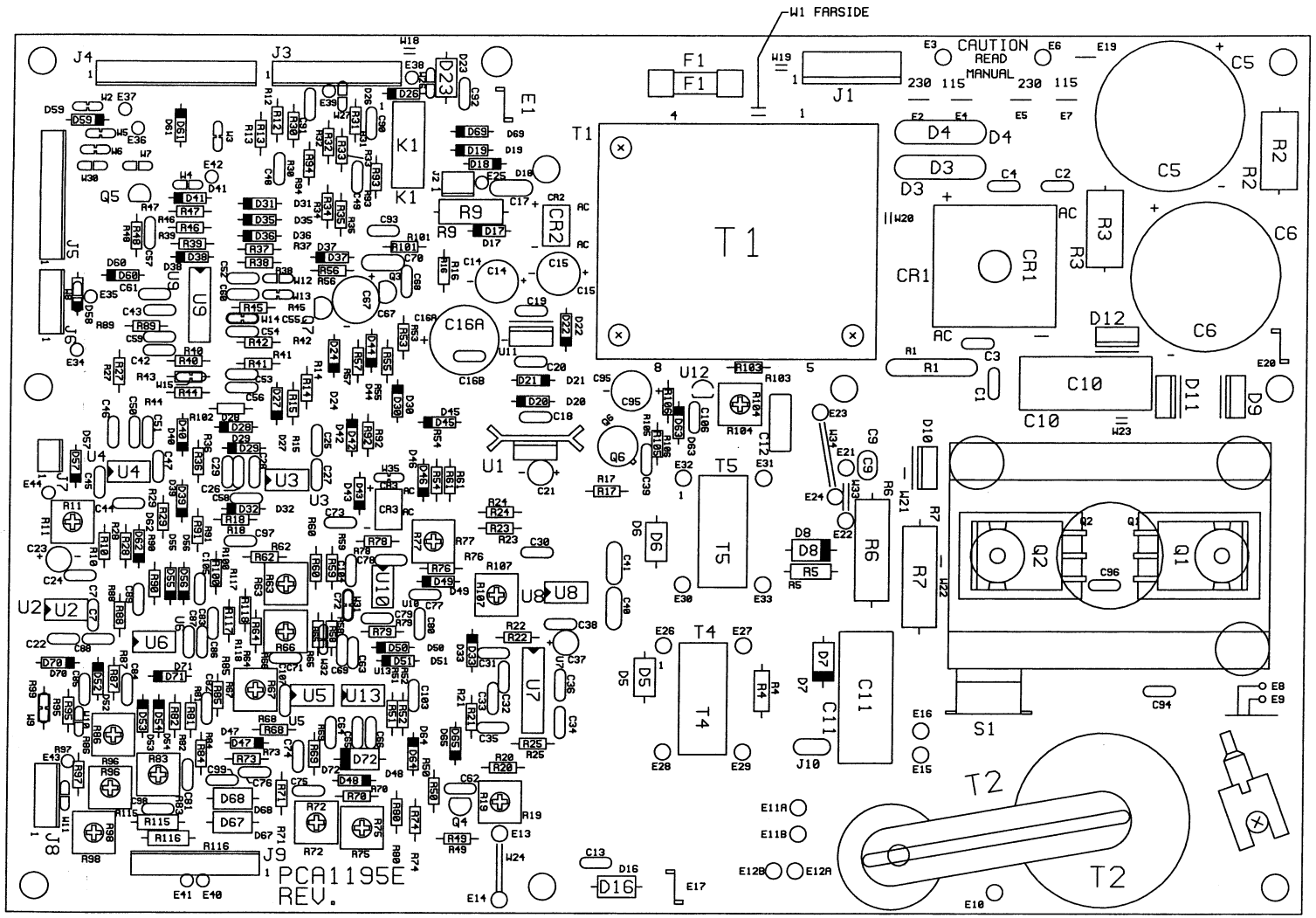
NOTES:

1 - D4 AND D5 ARE SHOWN FOR POSITIVE POLARITY, REVERSE FOR NEGATIVE POLARITY.

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

3 - * = SELECTED PER MODEL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \3000\64002C1.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672
MATERIAL	APPROVALS / DATE: DRAWN MES 021089	TITLE SCHEMATIC DIAGRAM HIGH VOLTAGE ASSEMBLY AHV-ER 20-60KV
FINISH	CHECKED J.M. 021489	C DWG. NO. 300064-002 REV. C-1
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1

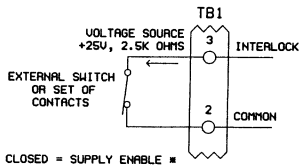


REV	BY	DESCRIPTION	DATE	APPROVED

REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\195049#.PCB	GLASSMAN HIGH VOLTAGE, INC P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
	APPROVALS / DATE	TITLE: PARTS PLACEMENT APD-ER/WR,CE,IEC
THIRD ANGLE PROJECTION	DRAWN JHK 063005	
	CHECKED 070305	B DWG.NO. PCA1195-049 REV. NR
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1
	SSF	

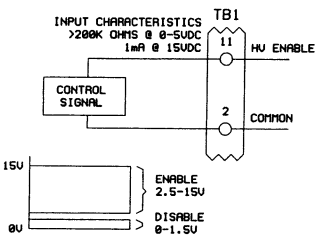
REMOTE INTERLOCK — FIGURE 1



CLOSED = SUPPLY ENABLE *
OPEN = SUPPLY DISABLE

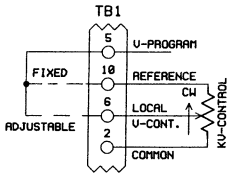
* (REFER TO INSTRUCTION MANUAL)

REMOTE HV ENABLE — FIGURE 2

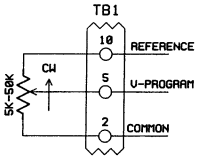


VOLTAGE PROGRAMMING — FIGURE 3

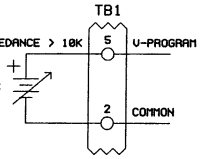
VOLTAGE PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL OR ADJUSTABLE BY CONNECTING TO LOCAL V-CONTROL TERMINAL.



REMOTE VOLTAGE PROGRAMMED BY ATTACHING A 5K TO 50K POTENTIOMETER BETWEEN REFERENCE AND COMMON WITH THE WIPER ARM TO VOLTAGE PROGRAMMING.



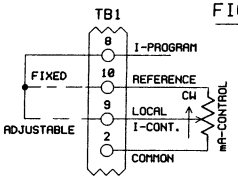
THE SUPPLY MAY BE PROGRAMMED WITH A REMOTE 0-10VDC VOLTAGE WHICH IS POSITIVE WITH RESPECT TO SYSTEM COMMON.



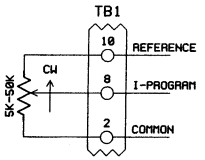
CURRENT PROGRAM — FIGURE 4

REV	BY	DESCRIPTION	DATE	APPROVE
NR-1		ADDED EW SERIES, NOTE TO FIG 7 & FIG 2 SIG HAS .5mA @ 10VDC	120790	JJCIII
NR-2		TYPO ERROR FIG 7	040991	J.M.
A		ECN 2949: FIG 6	030591	LB
B		ECN3041:FIG'S 2,8 & 9	012292	DWS
C		ECN 3082: FIG 5	030592	DWS
C-1	AH	UPDATED ADDRESS	061603	AWS

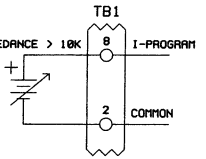
CURRENT PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL OR ADJUSTABLE BY CONNECTING TO LOCAL I-CONTROL TERMINAL.



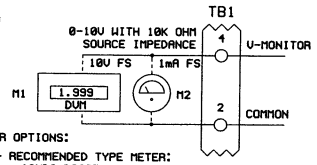
REMOTE CURRENT PROGRAMMED BY ATTACHING A 5K TO 50K POTENTIOMETER BETWEEN REFERENCE AND COMMON WITH THE WIPER ARM TO CURRENT PROGRAMMING.



THE SUPPLY MAY BE PROGRAMMED WITH A REMOTE 0-10VDC VOLTAGE WHICH IS POSITIVE WITH RESPECT TO SYSTEM COMMON.

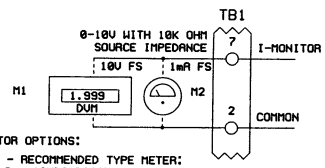


VOLTAGE MONITOR — FIGURE 5



V-MONITOR OPTIONS:
- M1 - RECOMMENDED TYPE METER:
  - 0 - 10VDC DIGITAL VOLTMETER
  - 0 - 10V IS DIRECTLY PROPORTIONAL TO 0 - MAX KV RATING
- M2 - ALTERNATE TYPE METER:
  - 0 - 1mA FULL SCALE CURRENT METER
  - 0 - 1mA IS DIRECTLY PROPORTIONAL TO 0 - MAX KV RATING

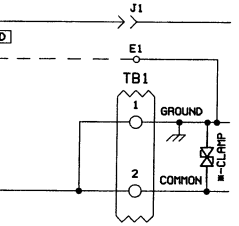
CURRENT MONITOR — FIGURE 6



I-MONITOR OPTIONS:
- M1 - RECOMMENDED TYPE METER:
  - 0 - 10VDC DIGITAL VOLTMETER
  - 0 - 10V IS DIRECTLY PROPORTIONAL TO 0 - MAX mA RATING
- M2 - ALTERNATE TYPE METER:
  - 0 - 1mA FULL SCALE CURRENT METER
  - 0 - 1mA IS DIRECTLY PROPORTIONAL TO 0 - MAX mA RATING

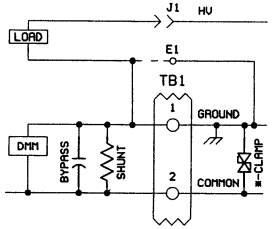
COMMON AND GROUND — FIGURE 7

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 </= 5KV: CLAMP VOLTAGE = 10V
MODELS > 5KV: CLAMP VOLTAGE = 15V

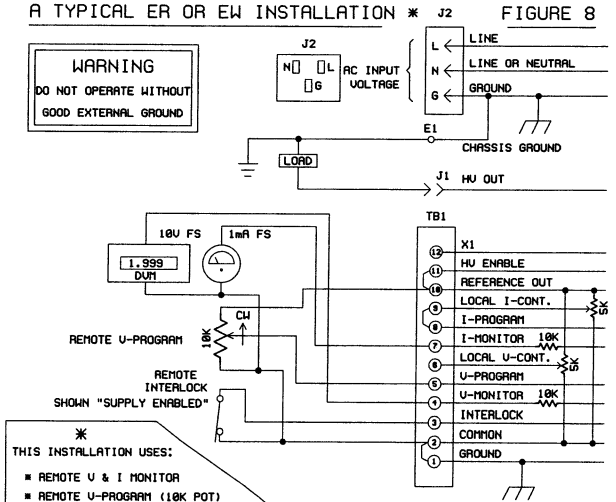
TO "FLOAT" COMMON FOR ISOLATION OR MEASUREMENT PURPOSES, REMOVE COMMON AND GROUND CONNECTION ON TB1. FOR THIS CONFIGURATION INSTRUMENT RETURNS MUST BE TIED TO COMMON, AND LOAD RETURN MUST BE CONNECTED TO GROUND. INSTRUMENT RETURNS MUST BE FLOATING WITH RESPECT TO GROUND. SINCE COMMON IS INTERNALLY CLAMPED TO GROUND WITH A BIDIRECTIONAL ZENER, THE DROP ACROSS THE SHUNT SHOULD BE < 5.0 V TO MAINTAIN ACCURACY.



* MODELS </= 5KV: CLAMP VOLTAGE = 10V
MODELS > 5KV: CLAMP VOLTAGE = 15V

A TYPICAL ER OR EW INSTALLATION * — FIGURE 8

WARNING
DO NOT OPERATE WITHOUT
GOOD EXTERNAL GROUND

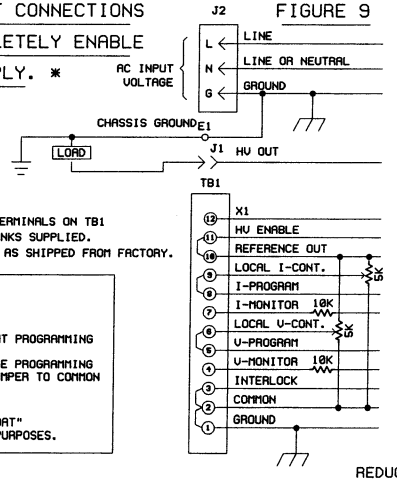


* THIS INSTALLATION USES:
- REMOTE V & I MONITOR
- REMOTE V-PROGRAM (10K POT)
- LOCAL ADJUSTABLE CURRENT PROGRAM
- LOCAL HV ENABLE
- REMOTE INTERLOCK CONTACT OR SWITCH
- HIGH VOLTAGE RETURN GROUNDED
- GROUND CONNECTED TO COMMON

NOTE:
CONNECTIONS BETWEEN ADJACENT TERMINALS ON TB1 CAN BE MADE USING THE METAL LINKS SUPPLIED.

MINIMUM NUMBER OF CONNECTIONS IN ORDER TO COMPLETELY ENABLE THE ER OR EW SUPPLY. * — FIGURE 9

WARNING
DO NOT OPERATE WITHOUT
GOOD EXTERNAL GROUND



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

*
MINIMUM CONNECTIONS:
- LOCAL ADJUSTABLE CURRENT PROGRAMMING
- LOCAL HV ENABLE
- LOCAL ADJUSTABLE VOLTAGE PROGRAMMING
- INTERLOCK ENABLED BY JUMPER TO COMMON

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

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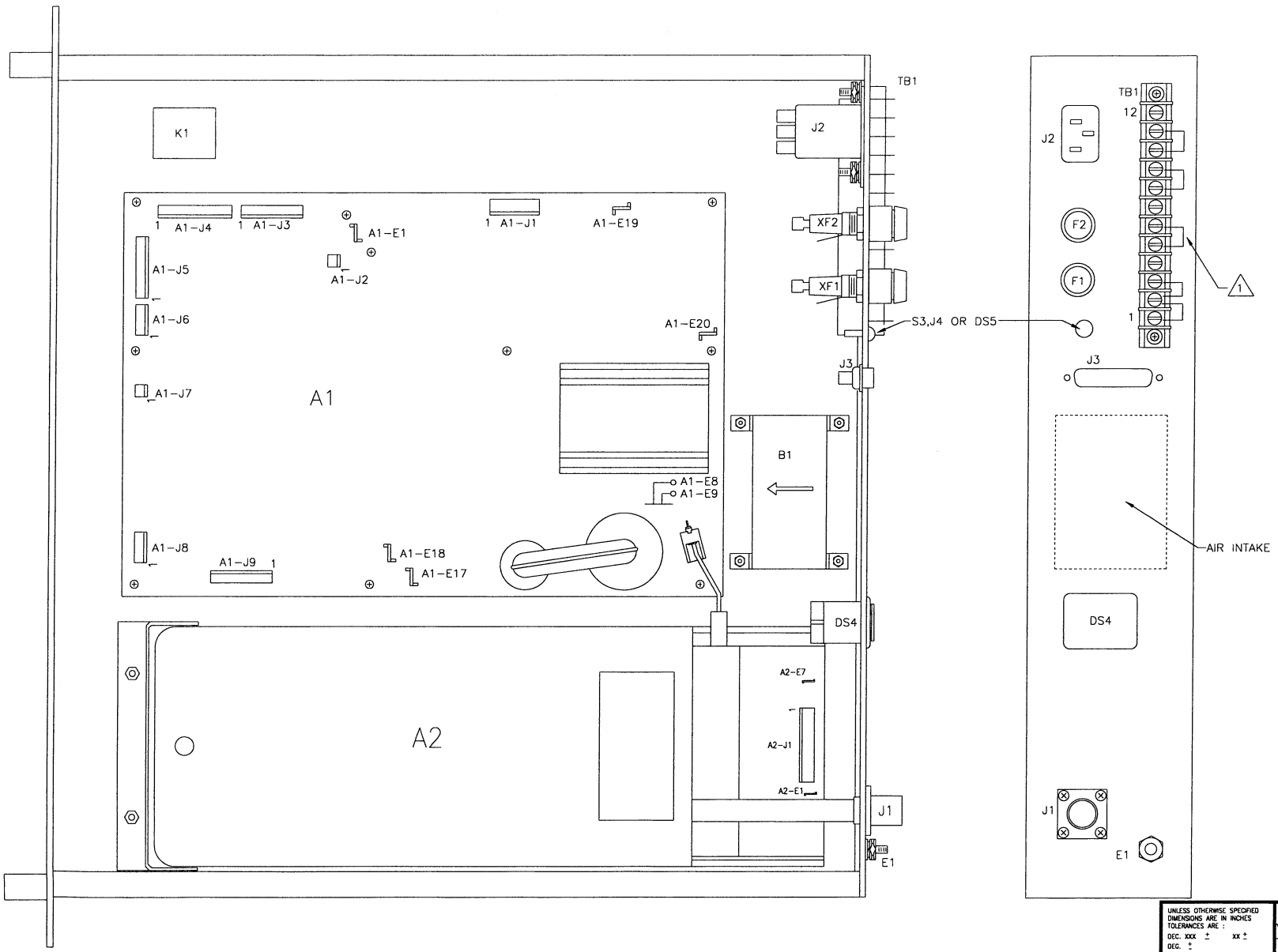
	APPROVALS / DATE	TITLE	INTERFACE DIAGRAM ER & EW SERIES
MATERIAL	DRAWN JJC III 050189		
FINISH	CHECKED JJC III 050189	D DWG. NO.	400041-004 REV. C-1
DO NOT SCALE DRAWING	RELEASED	SCALE NONE	SHEET 1 OF 1



REV	BY	DESCRIPTION	DATE	APPROVED
A		ECN 2025	032789	JMC
B		ECN 2009: A1 CHANGES.	042589	DWS
B-1		ADDED NOTE 1.	062789	DWS
B-2	TJM	ENTERED INTO CAD.	082196	DWS
C	TLR	ECN 5048: ROTATE A1-E1	052897	JMC
C-1	MDS	A2 SHOWN	122397	EJM
C-2	AH	FIXED TYPO.	120800	DWS

NOTES:

1. THIS POSITION NOT USED ON "BLANK FRONT PANEL" MODELS.

REDUCED ONLY

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

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\4012\11002C2.DWG

APPROVALS		DATE
DRAWN	JHK	020689
CHECKED	JM	021789
RELEASED		

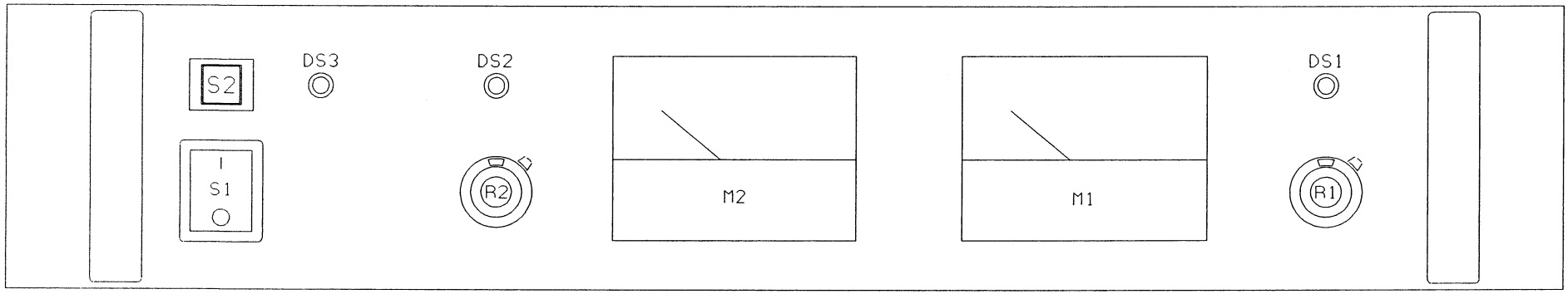
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(908) 638-3800 FAX (908) 638-3700

TITLE: PARTS PLACEMENT
10KV THRU 75KV
AM-ER

D | 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	



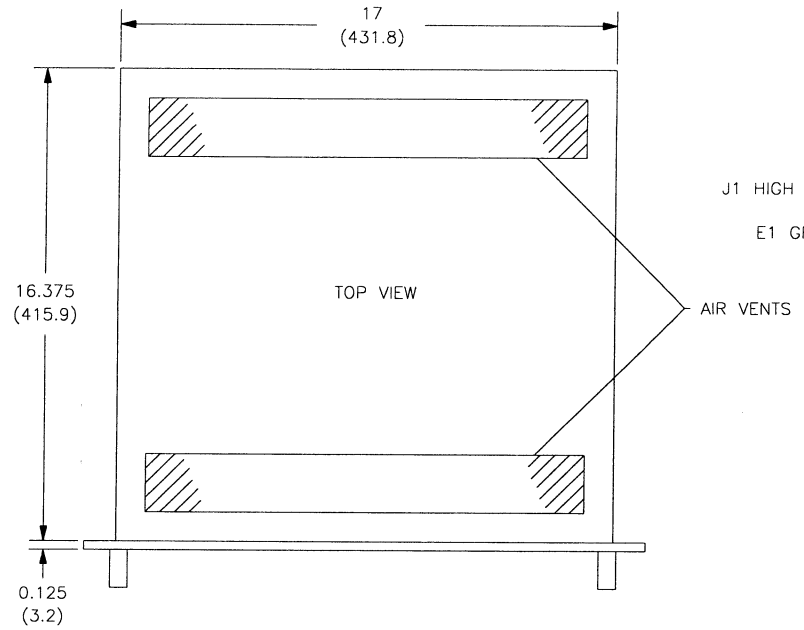
NOTES:

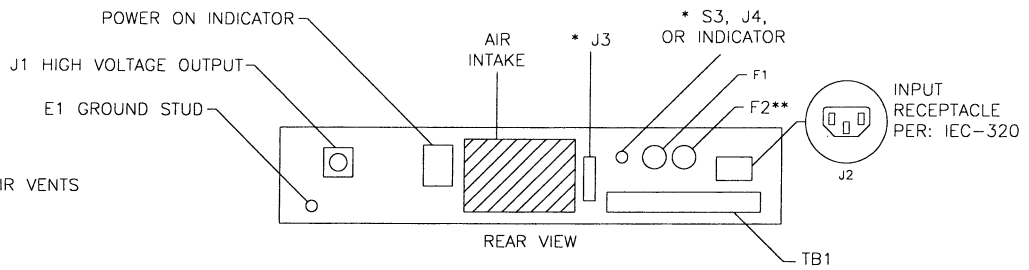
1. ALL ITEMS SHOWN ARE PREFIXED BY "1". EXAMPLE: 1S1.

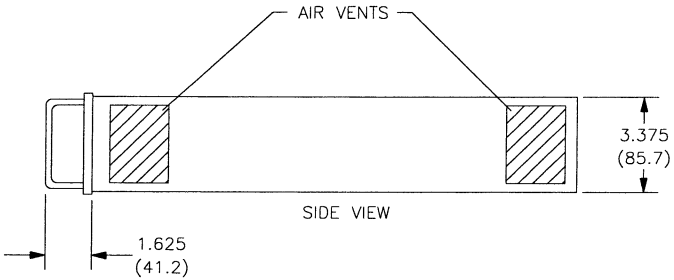
REDUCED ONLY

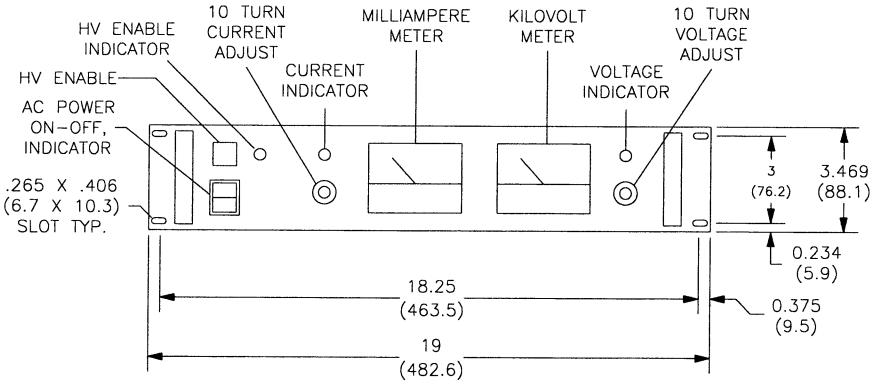
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \3011\15002A1.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672
	APPROVALS / DATE	TITLE: PARTS PLACEMENT FRONT PANEL SERIES ER STANDARD
THIRD ANGLE PROJECTION	DRAWN JHK 020889	
	CHECKED JHK 021589	C DWG.NO. 301115-002 REV. A-1
DO NOT SCALE DRAWING	RELEASED	SCALE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
NR1	EJM	REDRAWN TO .DWG FORMAT	022201	









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

IN
(MM)

NET WEIGHT:
18 POUNDS; 8kg

* OPTIONAL
** NOT USED ON 115V INPUT UNITS

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

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\2011\03039-1.DWG

APPROVALS		DATE
DRAWN	JHK	110195
CHECKED	JMC	110295
RELEASED		

GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, NJ 08829
(908) 638-3800 FAX (908) 638-3700

TITLE
OUTLINE AND INSTALLATION
SERIES ER

B DWG.NO. 201103-039 REV. NR-1

SCALE NONE SHEET 1 OF 1

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				GLASSMAN HIGH VOLTAGE, INC.	
				PO Box 317, High Bridge, NJ USA 08829 – www.GlassmanHV.com	
DESCRIPTION	CHK	DATE	LTR	FILE: 3000\64002\109#.doc	SCHEMATIC MODIFICATION HIGH VOLTAGE ASSEMBLY AHV-ER, J90 OPT
				DRAWN BWB / DATE 101207	REFER TO DWG 300064-002
				CHECK / DATE 10/12/07	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 </= 0.1% RMS.

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

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.

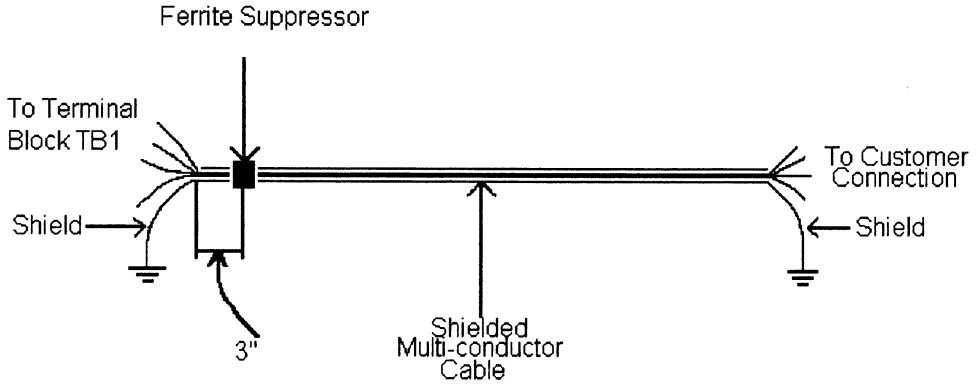
1. The interface cable must be of a shielded type with the shield terminated at both ends to an adequate ground source. At the power supply end, position 1 of TB1 can be used to make the ground connection (see drawing below).

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.



EMC Directive Addendum

For Models: EK, ER, EW, MR, WR & WK

This high voltage power supply is classified as professional equipment and as such it has been designed and manufactured for industrial and commercial use only. It is not intended to be connected to a residential mains circuit.

Some commercial and/or industrial power supply authorities may require permission before connecting this supply to the mains. We have AC mains input characteristic data available upon request to assist you in obtaining this permission. Please contact our European representative for more information.

Glassman Europe Limited
21 Campbell Court
Campbell Road
Bramley
Tadley
Hampshire RG265EG
England

Telephone: (011) 44-1256-883-007
Fax: (011) 44-1256-883-017

TABLE OF CONTENTS

ER SERIES

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.
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124 West Main Street
High Bridge, NJ 08829

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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.

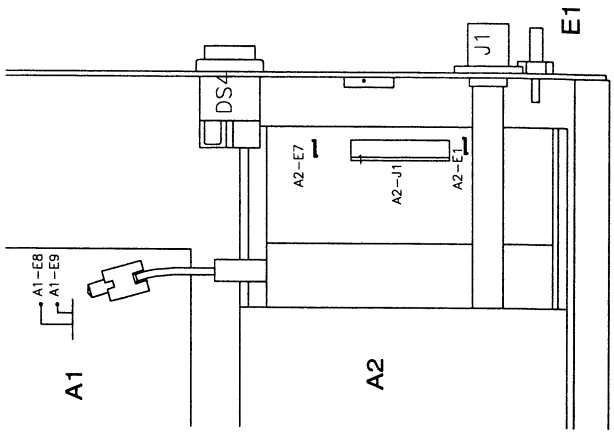
POLARITY REVERSAL - MODELS > 6kV

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.

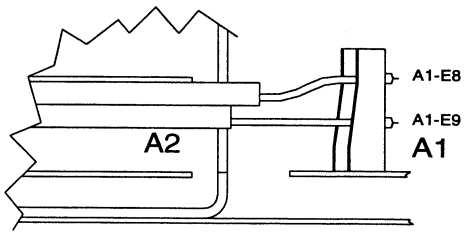
WARNING! To avoid the risk of shock and personal injury, Wait at least 5 minutes after disconnecting the AC mains power before removing any covers or panels.

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

2. 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).



3. 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.



4. 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!

5. 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, <u>Wait at least 5 minutes</u> 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!**

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.

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 performace, 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.

Rev. 6/1/86

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.

CE Check the specs... and compare

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.

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Printed in the U.S.A. B 12/17/2003

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.

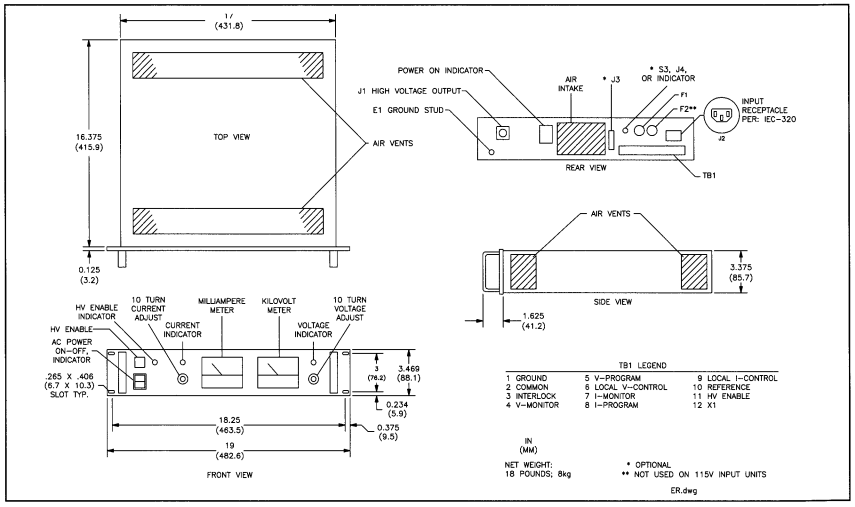
HV Enable/Disable: 0-1.5 V off, 2.5-15 V on.

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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