

INSTRUCTION MANUAL

Model: PS/EW40P15.0Y15

Serial: M791202-04

Date: 09-26-95



Innovations in high voltage power supply technology

GLASSMAN HIGH VOLTAGE INC.

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EW SERIES

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LIMITED WARRANTY

Glassman High Voltage, Inc. ("Glassman") provides a limited warranty in lieu of all other warranties. Buyer's exclusive remedies in the event of a defect are limited to repair, replacement, or at Glassman's discretion, refund of the purchase price. The terms of the limited warranty and the Buyer's remedies are described below.

Glassman warrants its standard power supplies to be free from defect in material and workmanship, and Glassman agrees to repair or replace any power supply which fails to perform in accordance with Glassman's written specification within three years after date of shipment from Glassman. OEM and modified standard power supplies are warranted to be free from defect in materials and workmanship for one year from date of shipment from Glassman.

This limited warranty shall not apply to any power supply which has been:

- (1) Repaired, worked on, or altered by persons unauthorized by Glassman, which in Glassman's sole judgement, adversely affects the performance, stability, or reliability of the power supply.
- (2) Subject to misuse, negligence, or accident; or
- (3) Connected, installed, adjusted, or used otherwise than in accordance with instructions furnished by Glassman.

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

LIMITATION ON REMEDIES. Buyer's exclusive remedy in the event of a defect in a power supply is limited to the repair or replacement of any defective power supply or to refund of the purchase price at Glassman's sole discretion. Buyer must return the power supply to the Glassman factory, transportation prepaid by the Buyer, within the warranty period for the warranty claim to be effective. **Glassman is not liable to Buyer or to any third party for consequential or incidental damages** under any circumstances, whether due to defect in the power supply, due to delay or failure of delivery, due to a failure of the power supply to perform as specified, or for any other reason or cause. Buyer and Glassman agree that Buyer's sole remedy and Glassman's sole liability to Buyer is limited to repair, replacement, or refund of the purchase price of the power supply as described herein, whether Buyer's claim arises out of contract or tort.

DISCLAIMER OF IMPLIED WARRANTIES. This limited warranty excludes all other warranties and is offered and accepted in lieu of any and all other warranties, whether express or implied, including without limitation the implied warranties of merchantability and fitness for a particular purpose.

The entire contract concerning warranty rights and obligations and concerning Buyer's remedies is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement. No statements or understanding, purporting to modify or vary the terms hereof, shall be binding and cannot be relied upon by Buyer.

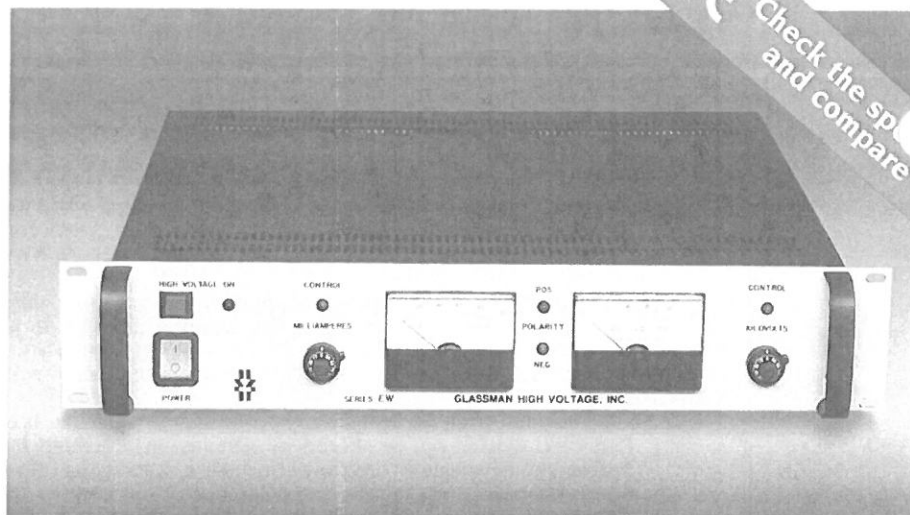
EW Series Extended Current* 500 Watt Regulated High Voltage DC Power Supplies

Up to 60kV...
3.5 Inch
Panel Height
Less than
18 pounds

Laboratory
Performance

Enhanced
Features

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



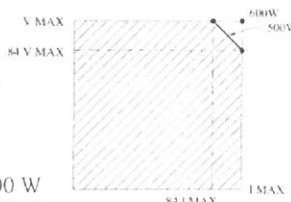
Models from 0 to 1 kV through 0 to 60 kV

The EW Series is a 500 watt regulated high voltage DC power supply with an important difference... maximum current ratings are equivalent to a 600 W supply! This maximum current, which is available for all output voltages up to 84% of rated voltage, should be of significant interest for many applications. The EW is offered with dual analog voltage and current meters or, optionally, with dual digital meters or a blank panel for OEM/systems applications.

Features:

***Extended Current.** EW Series models have maximum current ratings that are equivalent to a 600 W supply. These currents are available up to 84% of rated output voltage.

Above this point, current is linearly derated to maintain a constant 500 W maximum output.



Pulse-Width Modulation. Off-the-line pulse-width modulation provides high efficiency and a reduced parts count for improved reliability.

Air Insulated. The EW Series features "air" as the primary dielectric medium. No oil or encapsulation is used to impede serviceability or increase weight.

Constant Voltage/Constant Current Operation. Automatic crossover from constant-voltage to constant-current regulation provides protection against overloads, arcs, and short circuits.

Low Ripple. Ripple is typically less than 0.02% of rated voltage at full load.

Tight Regulation. Voltage regulation is better than 0.005% for allowable line and load variations. Current regulation is better than 0.5% from short circuit to rated voltage.

Front Panel Controls (Analog and Digital Versions.) Separate 10-turn controls with locking vernier dials are used to set voltage and current levels. A high voltage enable switch and an AC power on/off switch complete the panel controls. L.E.D.'s indicate when high voltage is on, the output polarity, and whether the supply is operating in a voltage or current regulating mode. For the blank panel version, only a power on/off switch is provided on the panel.

Remote Control Facilities. As standard, all EW Series supplies 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. EW Series power supplies occupy only 3.5 inches of panel height. Net weight is less than 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

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Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

Input: 102-132 V RMS, single-phase, 48-63 Hz, <10A. Connector per IEC 320 with mating line cord, terminated with NEMA 5-15 plug.

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 to 10V signals is provided. Linearity is < 1% of rated. Voltage accuracy is 0.5% of setting, 0.2% of rated. Repeatability is <0.1% of rated.

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

Voltage Regulation: Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.

Ripple: <0.02% of rated voltage + 0.5 V RMS at full load.

Current Regulation: Better than 0.1% from short circuit to rated voltage at any load condition.

Voltage Monitor: 0 to + 10 V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.2% rated.

Current Monitor: 0 to + 10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.

Stability: 0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

Voltage Rise/Decay Time Constant: 50 ms typical with a 30% resistive load using either HV on/off or remote programming control.

Temperature Coefficient: 0.01% per degree C.

Ambient Temperature: -20 to +40 degree C, operating; -40 to +85 degree C, storage.

Polarity: Available with either positive, negative, or reversible polarity with respect to chassis ground.

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

Remote Controls: Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control, provided on a rear panel terminal block.

External Interlock: Open off, closed on. Normally latching except for blank panel version where it is non-latching.

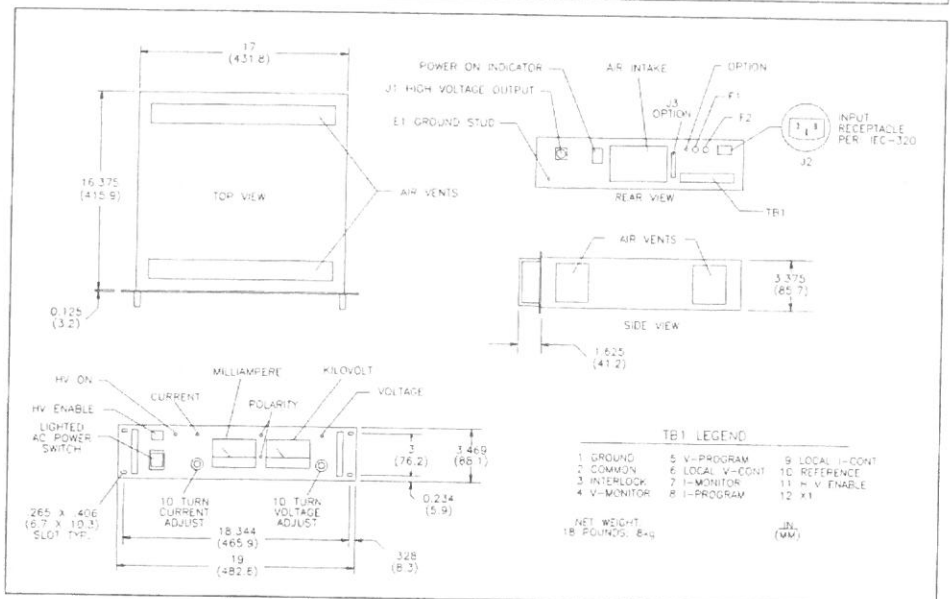
HV Enable/Disable: 0-1.5 V off, 2.5-15 V on.

Options

Symbol	Description
100	90-116 V input, 48-63 Hz. NEMA 5-15 plug.
200	180-232 V input, 48-63 Hz. NEMA 6-15 plug.
220	200-264 V input, 48-63 Hz. NEMA 6-15 plug.
400	48-420 Hz input.
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, local or remote, must be at zero before accepting an enable signal.
SS	Slow start ramp. Specify standard times of 1, 2, 3, 5, 10, 15, 20, or 30s +/- 20%.
5VC	0-5 V voltage and current program/monitor.
GE9	RS-232 control and monitor.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage (kV)	Output Current (mA)	Output Cable	Panel Height (in)	
Reversible only			EW1R600	0-1	0-600	RG-59	3.5
			EW1.5R400	0-1.5	0-400	RG-59	3.5
			EW2R300	0-2	0-300	RG-59	3.5
			EW3R200	0-3	0-200	RG-59	3.5
			EW5R120	0-5	0-120	RG-59	3.5
EW7P85	EW7N85	EW7R85	0-7	0-85	RG-8U	3.5	
EW10P60	EW10N60	EW10R60	0-10	0-60	RG-8U	3.5	
EW15P40	EW15N40	EW15R40	0-15	0-40	RG-8U	3.5	
EW20P30	EW20N30	EW20R30	0-20	0-30	RG8U	3.5	
EW25P24	EW25N24	EW25R24	0-25	0-24	RG-8U	3.5	
EW30P20	EW30N20	EW30R20	0-30	0-20	RG-8U	3.5	
EW40P15	EW40N15	EW40R15	0-40	0-15	RG-8U	3.5	
EW50P12	EW50N12	EW50R12	0-50	0-12	RG-8U	3.5	
EW60P10	EW60N10	EW60R10	0-60	0-10	RG-8U	3.5	



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SPECIFICATION CONTROL

SLOW START (SS) OPTION

The Slow Start option installed in this model controls upon turn on, the rate of increase of the output voltage. The times specified below indicate the total time (+/-20%) required to obtain the maximum output voltage of the supply.

Standard power supplies equipped with this option have a suffix code, "S??", affixed to their part number. The chart below may be used to correlate these suffix codes to the specified rise times.

CODE	TIME (sec)
S01.....	1
S02.....	2
S03.....	3
S05.....	5
S10.....	10
S15.....	15
S20.....	20
S30.....	30


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ded S01 & S02 ded S03, S15 & S30 Rewritten & Retyped Retyped Converted to word	DWS DWS DWS DWS JC	112998 112190 102291 031898 032908	NR1 NR2 NR3 NR4 NR5	FILE: 1020\ 05SS#5.doc DRAWN DWS CHECK MV	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"> SPECIFICATION CONTROL <u>SLOW START OPTION</u> </td> </tr> <tr> <td style="width: 80%;"> DWG NO 102005-SS </td> <td style="width: 20%;"> REV NR-5 </td> </tr> <tr> <td colspan="2" style="text-align: center;"> SHEET 1 OF 1 </td> </tr> </table>	SPECIFICATION CONTROL <u>SLOW START OPTION</u>		DWG NO 102005-SS	REV NR-5	SHEET 1 OF 1	
SPECIFICATION CONTROL <u>SLOW START OPTION</u>											
DWG NO 102005-SS	REV NR-5										
SHEET 1 OF 1											
				DATE 050189							

SPECIFICATION CONTROL

Model: PS/EW40P15.0Y15

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

1. Includes the standard SS (Slow Start ramp) option, with a delay time of 30 seconds (+/- 20%). For more information on the SS option, refer to the corresponding specification control document normally provided with the instruction manual text.
2. The standard TTL enable/disable function is accessed via an insulated BNC connector (JX1), mounted on the rear panel. Pin 11 of TB1 is disconnected. When reviewing the remainder of the documentation provided with this power supply, the "center pin of JX1" is to be substituted for all references to "pin 11 of TB1". The connector shell is wired to COMMON (TB1-2 on the rear panel of the power supply).
3. The front panel mounted HIGH VOLTAGE ON pushbutton switch is bypassed. Switch bypass configures the power supply to generate HV DC output directly upon the application of the AC input power. (This assumes that the INTERLOCK terminal is wired to COMMON and that the center pin of JX1 is wired to a "high" signal. Refer to the instruction manual text.).
4. This power supply is approved and labeled for use within the guidelines of the European Community's EMC and Low Voltage directives. However, to ensure compliance, it is the responsibility of the user to refer to the CE addendum sheets normally included with the instruction manual text for specific installation and operation requirements.
5. The standard AC input line cord is not provided. A line cord retainer clip, Schurter model 4700.0006, is added to secure the users specific line cord.
6. The HV output cable is not provided with this unit. It is the responsibility of the user to order this cable separately.

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DESCRIPTION	CHK	DATE	LTR	FILE:	SPECIFICATION CONTROL <u>Y15 OPTION</u>
ECN 7376: Add CE compliance	DWS	121701	A	1020\	PS/EW40P15.0Y15 DWG NO
ECN 8322: Line cord removed	JJC3	061305	B	07Y15C1.doc	
ECN 8426: AC cord clip added	JJC3	100605	C	DRAWN	102007-Y15 REV
Converted to word	<i>HNS</i>	<i>101207</i>	C1	DAS	
				CHECK	SHEET 1 OF 1
				DWS	

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 3 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.

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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 3 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 "200" & "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 > 5kV: Insert the high voltage cable provided into the receptacle. Screw the threaded barrel onto the receptacle.

UNITS <= 5kV: 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 Pushbutton

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 pushbutton 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 pushbutton 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 Indicators

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 it means one of the following:

1. The supply is operating as a constant current supply with the output current determined by the local MILLIAMPERES CONTROL or remote I-PROGRAM signal.
2. The supply is limiting its' output power to 500 watts. Reduce MILLIAMPERE or KILOVOLTS CONTROL or remote program signals so that the output is less than 500 watts.

Output Meters

WARNING! To avoid the risk of shock and personal injury, Wait at least 3 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

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 pushbutton. 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 > 5kV

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.

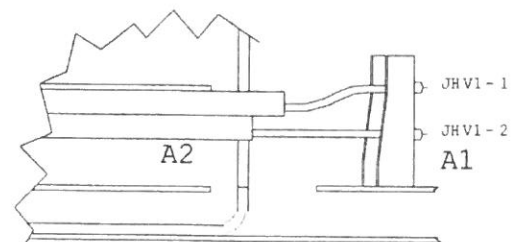
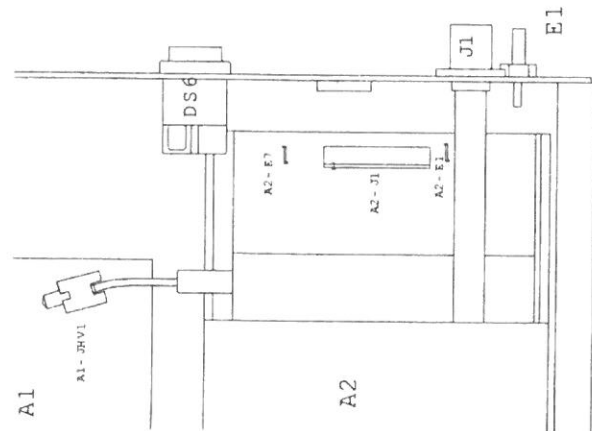
WARNING!: To avoid the risk of shock and personal injury, Wait at least 3 minutes after disconnecting the AC mains power before removing any covers or panels.

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-JHV1 on the main board A1 (APD-EW).

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-P2, A2-E7, A2-E1 to the high voltage module and connect the high voltage wires to JHV1 of A1.



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

5. Replace the top cover.

POLARITY REVERSAL - MODELS 5kV 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 3 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. 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 pushbutton 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

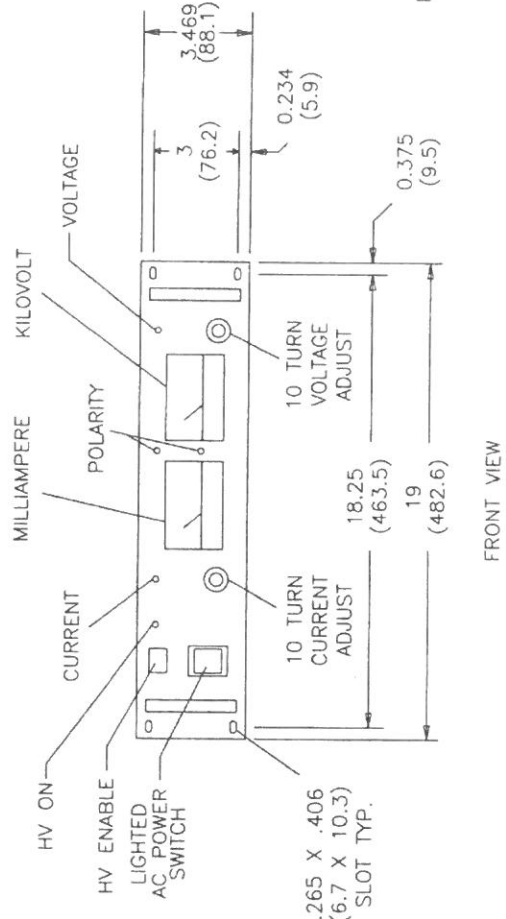
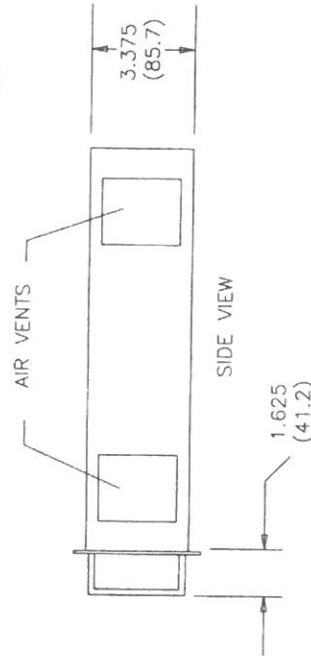
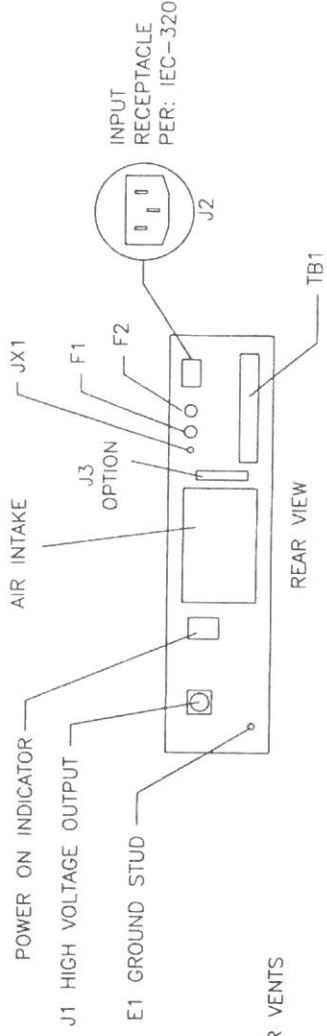
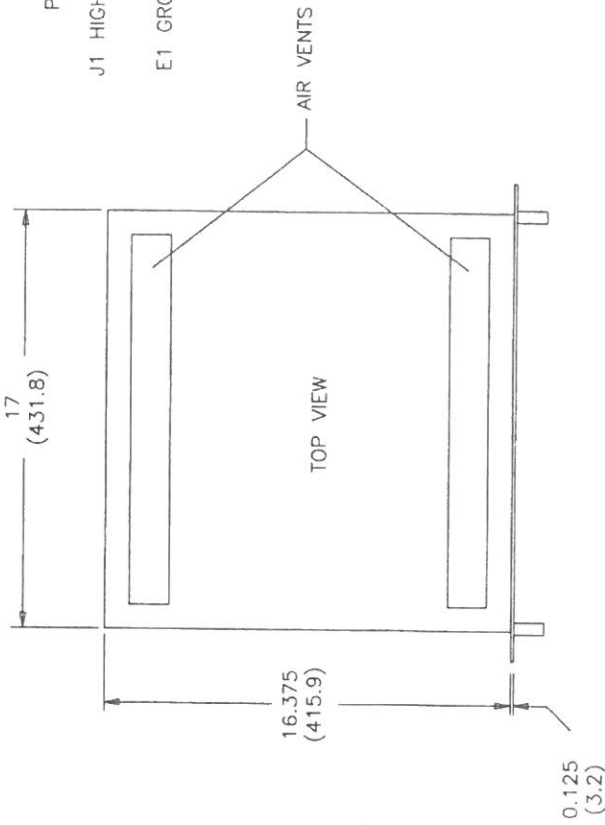
This terminal is reserved for special options or future expansion of features.

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
NR-1	AH	DFX INTO .DWG	022601	



JX1 LEGEND

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

TB1 LEGEND

- 1 CENTER PIN - HV ENABLE
- 2 SHELL - COMMON

NET WEIGHT: 18 POUNDS; 8kg

FILE NO.	EXTENSION	TITLE	OUTLINE & INSTALLATION
2011\800006-1.DWG		SERIES EW	
APPROVALS	DATE	AM3-EW, ANALOG, Y15 OPTION	
DRAWN EJM	030994	DWG. NO. 201180-006	REV. NR-1
CHECKED DWS	030994		
RELEASED			

GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(201) 638-3800 FAX (201) 638-3700


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FRONT VIEW

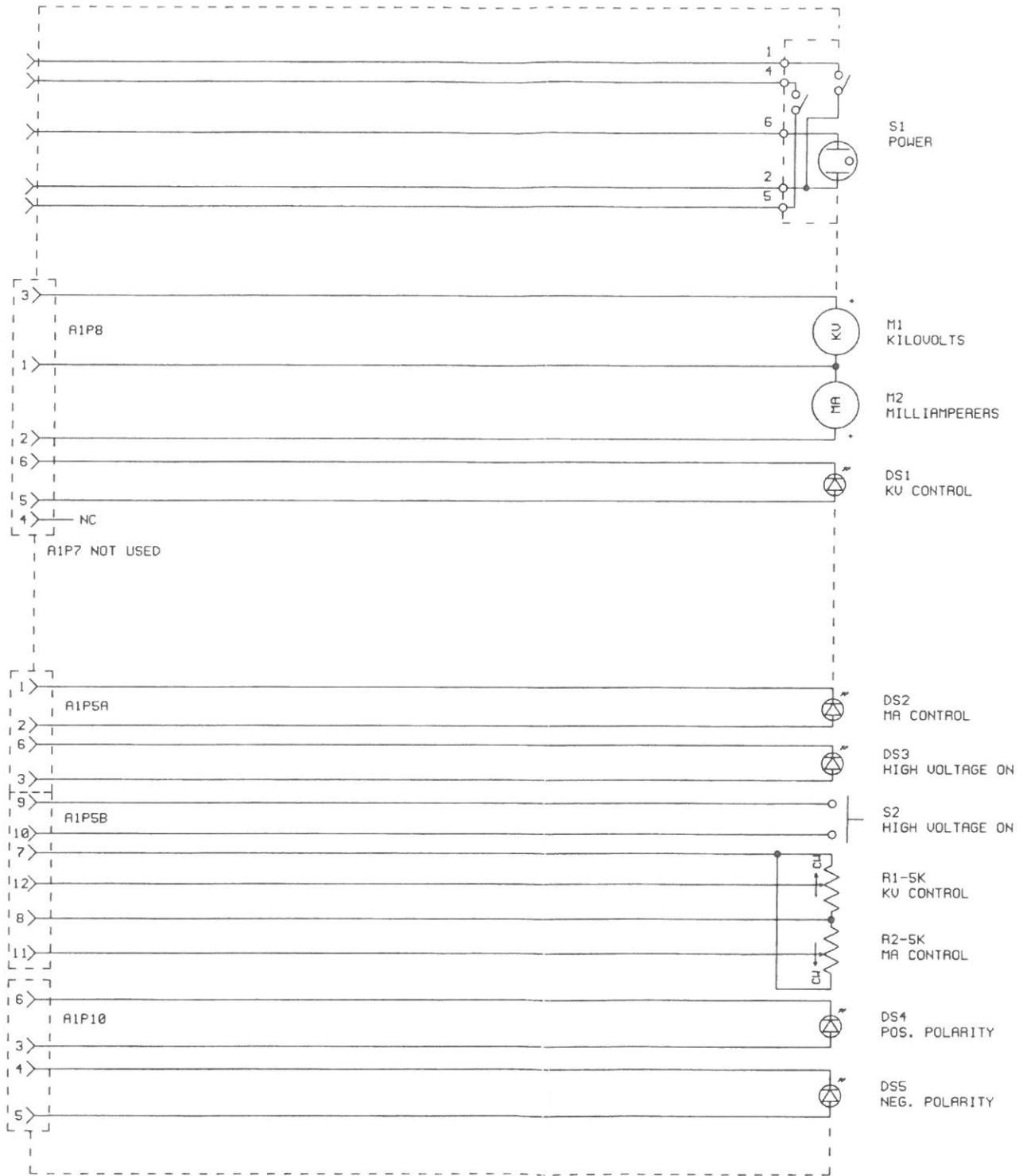
AM3-EW-1, Y15 OPTION

This assembly is the same as AM3-EW-1 (schematic # 300086-001), with the following schematic modifications:

1. The connection from TB1-10 to TB1-11 is broken.
2. The connection from TB1-11 to A1P3-3 is broken. TB1-11 is re-designated "NO CONNECTION".
3. JX1, an insulated BNC connector, is added to the rear panel and is wired as follows:
 - a) Center pin is wired to A1P3-3.
 - b) Connector shell is wired to COMMON.

REVISIONS				 GLASSMAN HIGH VOLTAGE, INC. PO Box 317, High Bridge, NJ USA 08829 – www.GlassmanHV.com			
DESCRIPTION	CHK	DATE	LTR	FILE:	SCHEMATIC MODIFICATION MAIN ASSEMBLY AM3-EW-1, Y15 OPTION REFER TO DWG 300086-001		
				3000\86001\105#1.doc			
				DRAWN		DATE	
AS	5/3/08	NR1		DAS	030894	DWG NO	REV
converted to word				CHECK	DATE	300086-001-105	NR-1
				DWS	030894	SHEET 1 OF 1	

ZONE	REV	DESCRIPTION	DATE	APPROVED
	NR-1	ADDED WK SERIES	112791	J.M.
	NR-2	ADDED "REDUCED ONLY"	012492	DWS
	NR-3	REMU'D WK SERIES	030592	DWS
	NR-4	ADDED WK SERIES	063093	DWS
	NR-5	CAD CONVERSION	071995	

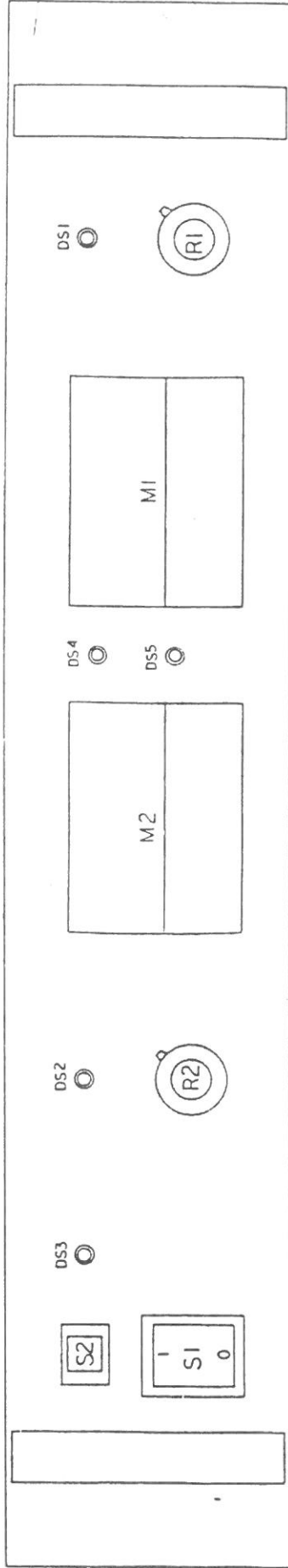


REDUCED ONLY

NOTES:

- ALL ITEMS SHOWN ARE PREFIXED BY "1".
EXAMPLE: 1S1.
- G.H.U., 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	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672		
	APPROVALS		DATE	TITLE	
MATERIAL	DRAWN	MES	102690	SCHEMATIC FRONT PANEL, ANALOG AFP-EW-1-A, AFP-WK-1-A	
FINISH	CHECKED	J.M.	103190	C	DWG. NO. 300087-001
	RELEASED				
DO NOT SCALE DRAWING				SCALE NONE	SHEET 1 OF 1



NOTE

△ ALL ITEMS SHOWN ARE PREFIXED BY '1'. EXAMPLE: 1S1.

REDUCED

REVISIONS		GLASSMAN HIGH VOLTAGE, INC.	
DESCRIPTION	CHE	DATE	LTR

PARTS PLACEMENT		FRONT PANEL SERIES EV	
STANDARD		STANDARD	
Drawn	Checked	Drawn	Checked
TA/ROB/90		301124-002	
JMC/10/90		SCALE	1" = 1"

Hand

FIGURE 1 REMOTE INTERLOCK

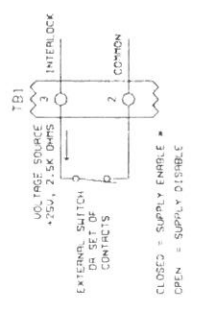


FIGURE 2 REMOTE HV ENABLE

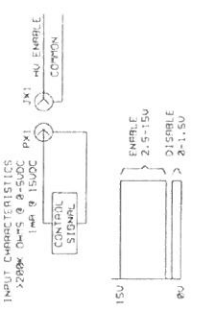


FIGURE 3 VOLTAGE PROGRAMMING

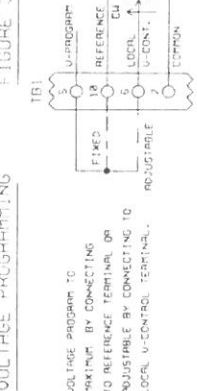


FIGURE 4 CURRENT PROGRAM

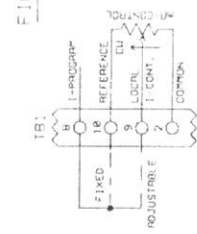


FIGURE 5 VOLTAGE MONITOR

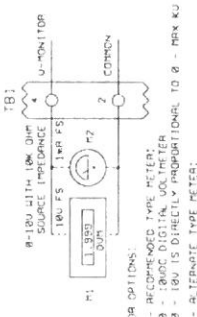
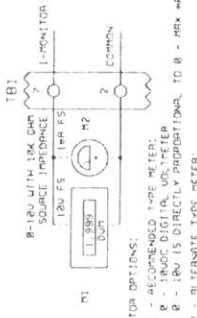


FIGURE 6 CURRENT MONITOR



COMMON AND GROUND

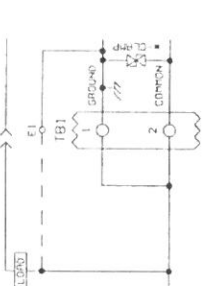


FIGURE 7 A TYPICAL EN-Y15 INSTALLATION

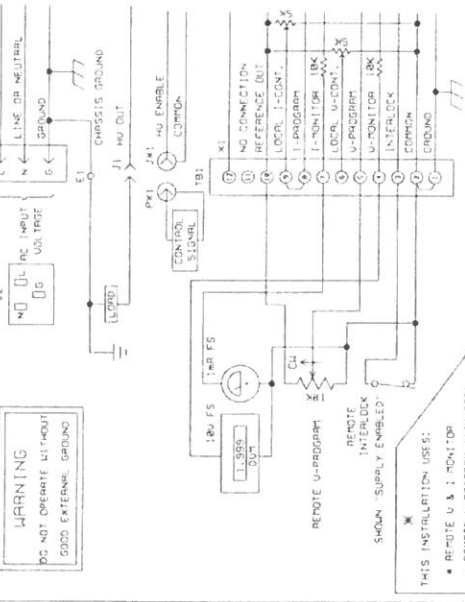


FIGURE 8 MINIMUM NUMBER OF CONNECTIONS IN ORDER TO COMPLETELY ENABLE THE EN-Y15 SUPPLY

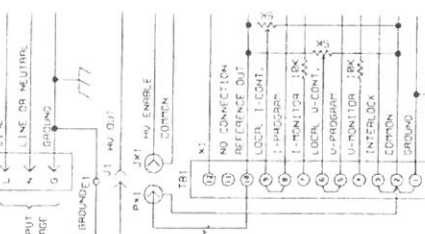
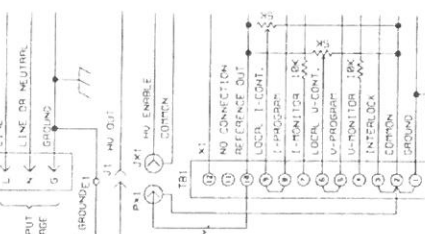


FIGURE 9

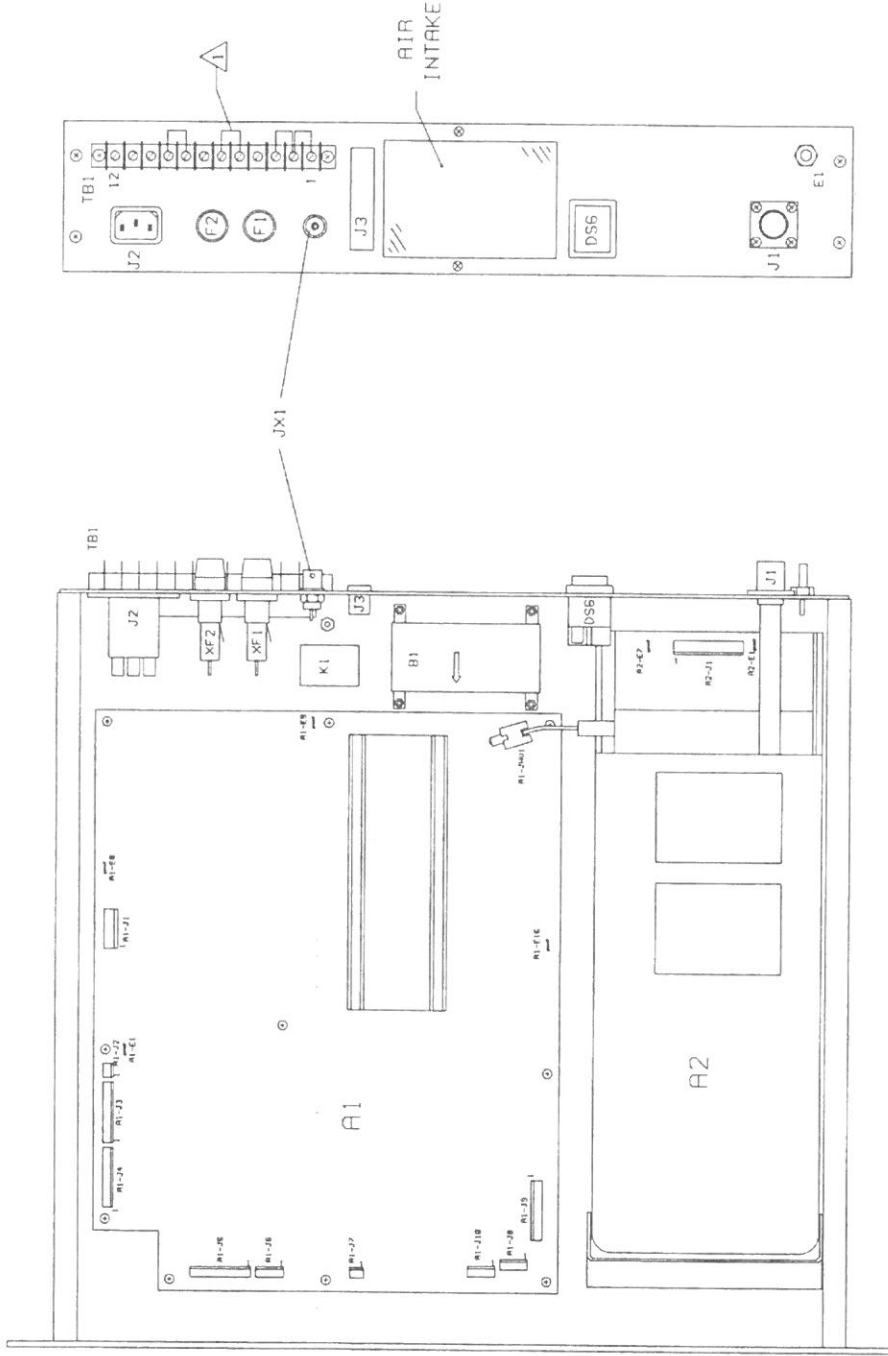


DESIGNATION	DATE	APPROVED BY
UNLIMITED ADDRESS	10/78	Hand

FILE NO.	EXTENSION
1801-430-300-500	1801-430-300-500
DATE	DATE
1801-430-300-500	1801-430-300-500
REVISION	REVISION
1801-430-300-500	1801-430-300-500
TITLE	TITLE
1801-430-300-500	1801-430-300-500
DESIGNED BY	DESIGNED BY
1801-430-300-500	1801-430-300-500
CHECKED BY	CHECKED BY
1801-430-300-500	1801-430-300-500
APPROVED BY	APPROVED BY
1801-430-300-500	1801-430-300-500
DATE	DATE
1801-430-300-500	1801-430-300-500
SCALE	SCALE
1801-430-300-500	1801-430-300-500

REDUCED ONLY

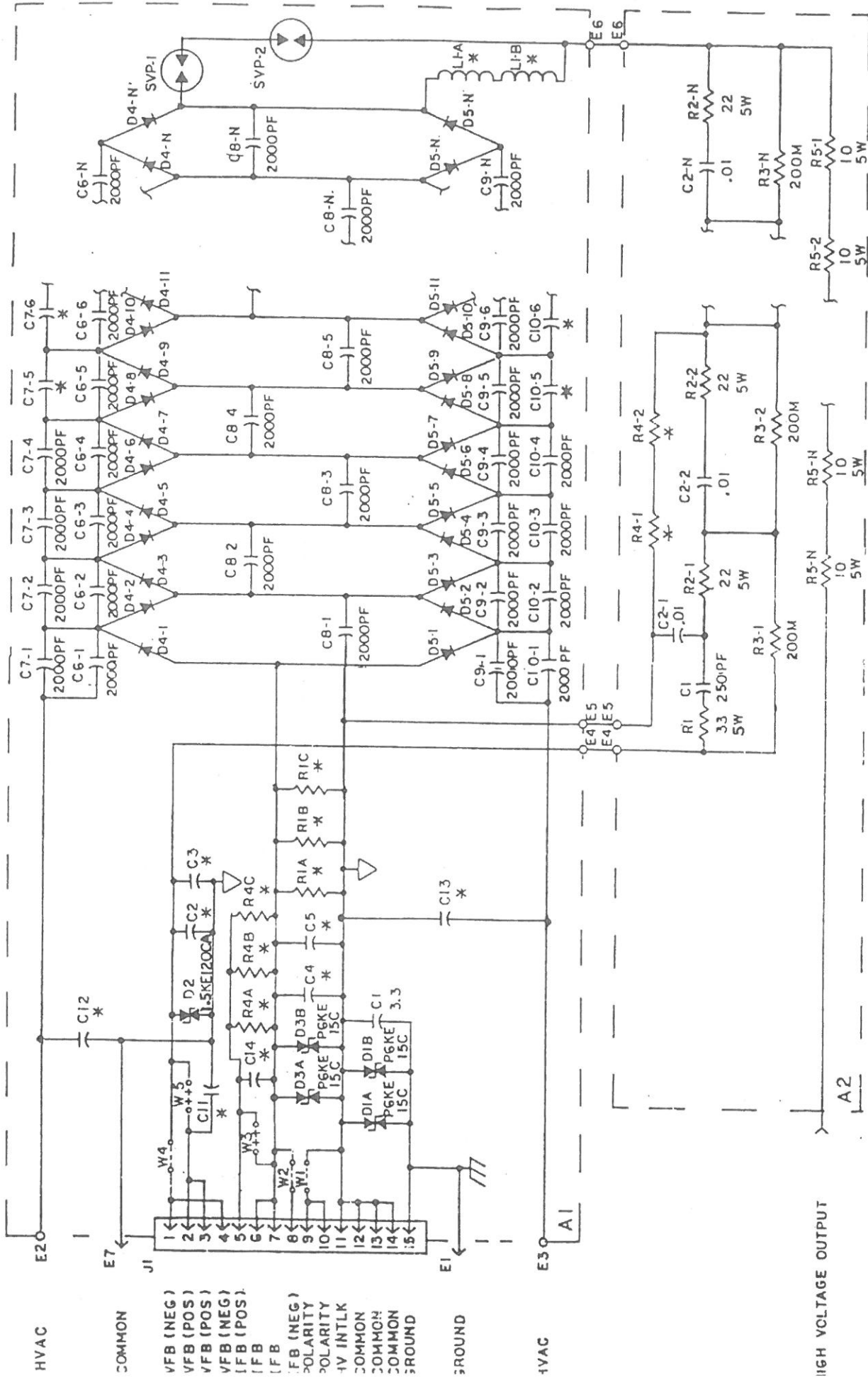
ZONE	REV	DESCRIPTION	DATE	APPROVED



NOTE:

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

PARTS LIST		EXTENSION		TITLE	
FILE NO.	4812A2888B-SCH	DATE	03-10-72	TITLE	PART PLACEMENT
DESCRIPTION	12 INCHES	APPROVALS		DRAWN	EJH
DESIGNED BY		CHECKED		RELEASED	
DWG. NO.	401229-008	SCALE	1 OF 1		



NOTE

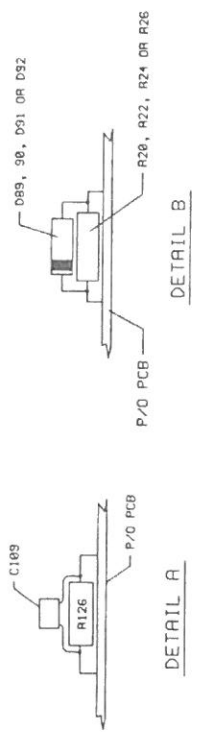
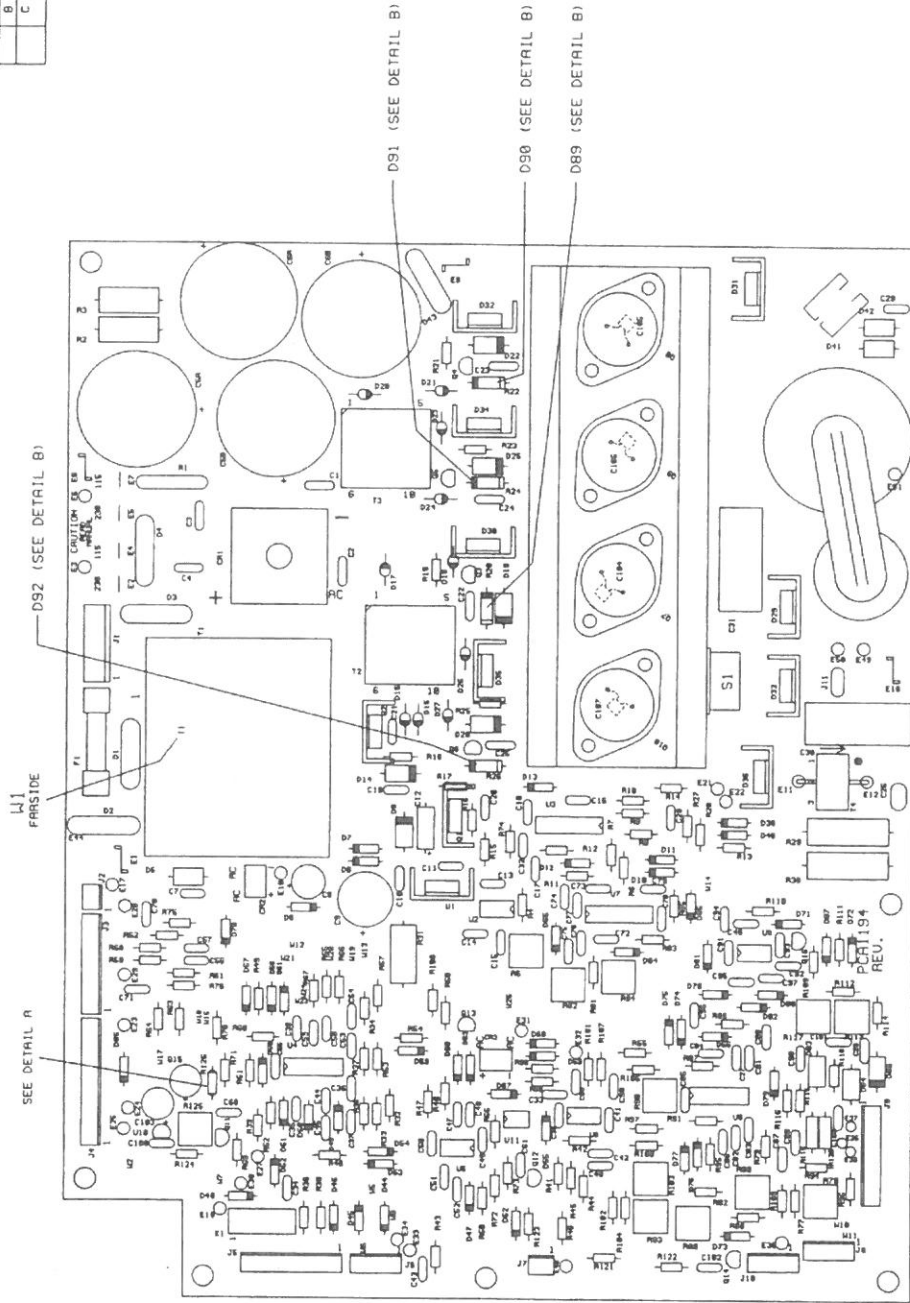
- 1 * = SELECTED PER MODEL
- 2 D4 AND D5 SHOWN FOR POSITIVE POLARITY. REVERSE DIRECTION FOR NEGATIVE POLARITY.
- 3 3. H.V., INC. RESERVES THE RIGHT TO SUBSTITUTE WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

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REVISIONS		TOLERANCES	
DESCRIPTION	CHEK DATE LTR	DEC 200 1	DEC 200 1
IC7 & IC10 VALUES	11-26-92	NR1	
ECN 5248: R1 WAS ZW	11-26-92	CA	
ECN 5165: R2 WAS	11-26-92	CA	
PKK120C.			

GLASSMAN HIGH VOLTAGE, INC.
SCHEMATIC
 HIGH VOLTAGE ASSEMBLY
 AHV-EW 20-60KV
 DRAWING # 3000-002
 REV. B
 SCALE 1/4" = 1"

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	ECN 3395	08/07/33	DHS
	B	ECN 4016: C180 ADDED	06/14/95	EJM
	C	ECN 065,089,098,091, & D92 ADDED	072695	

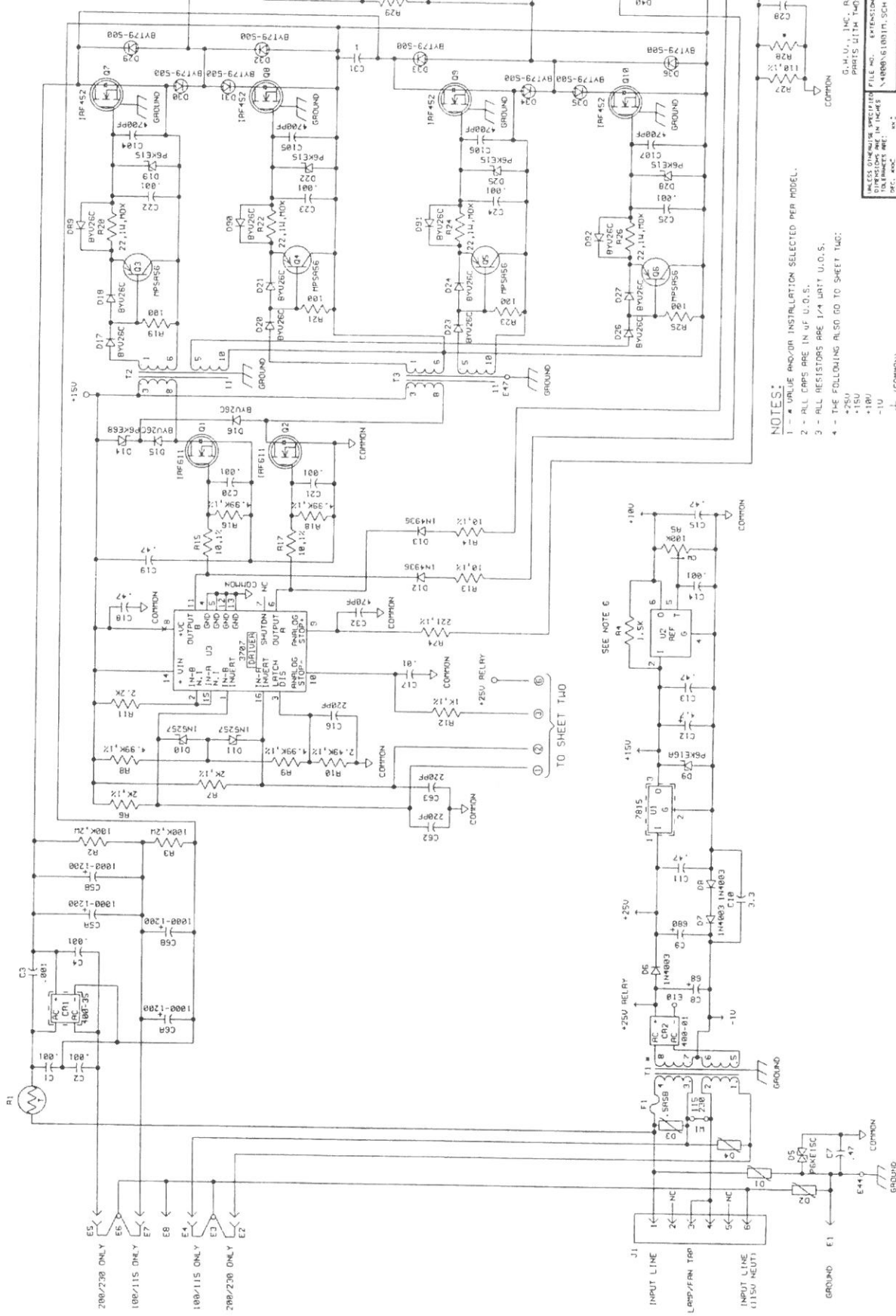


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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. .XXX ± DEG. ±		EXTENSION	
FILE NO.	APCAIN194002C.PCB	FILE NO.	APCAIN194002C.PCB
APPROVALS	DATE	DATE	DATE
DRAWN JHK	09/14/92	DRAWN JHK	09/14/92
CHECKED JMC	10/09/92	CHECKED JMC	10/09/92
RELEASED		RELEASED	
THIRD ANGLE PROJECTION		THIRD ANGLE PROJECTION	
DO NOT SCALE DRAWING		DO NOT SCALE DRAWING	
TITLE PARTS PLACEMENT		TITLE PARTS PLACEMENT	
APD-EW-01		APD-EW-01	
C Dwg. NO. PCA1194-002		C Dwg. NO. PCA1194-002	
SCALE		SCALE	
SHEET 1 OF 1		SHEET 1 OF 1	

GLASSMAN HIGH VOLTAGE, INC.
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(908) 534-9087 FAX (908) 534-5672

ZONE	REV	DESCRIPTION	DATE	APPROVED
A	1	CONCEPTUAL DESIGN TO PROTOTYPE	11/29/58	JM
B	1	NEW BOARD DESIGN	12/15/58	JM
C	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
D	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
E	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
F	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
G	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
H	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
I	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
J	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
K	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
L	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
M	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
N	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
O	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
P	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
Q	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
R	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
S	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
T	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
U	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
V	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
W	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
X	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
Y	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB
Z	1	ECN 2718: 250 MA, 250V, 1000	02/18/59	LB

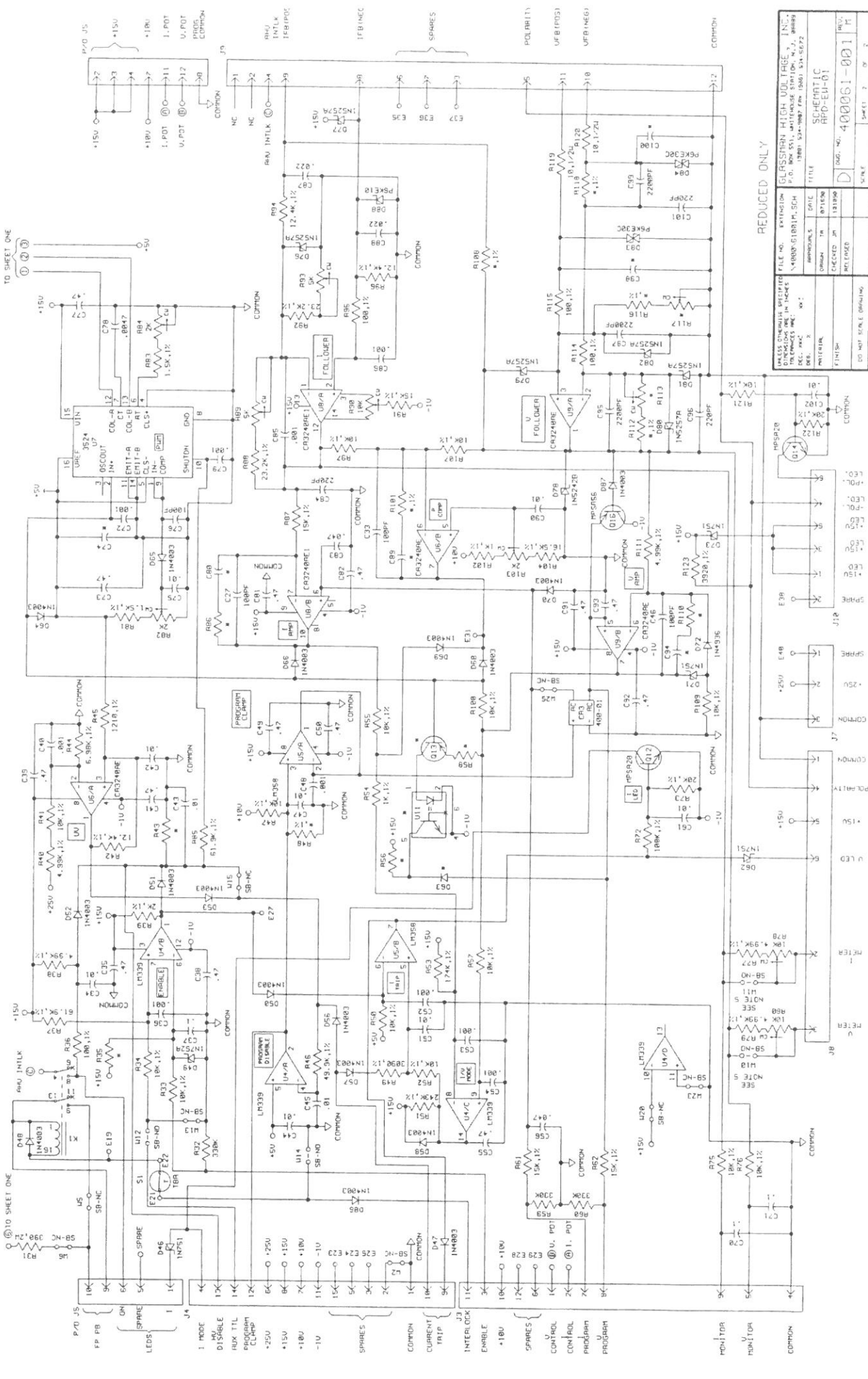


- NOTES:
- 1 - ALL VALUES AND/OR INSTALLATION SELECTED PER MODEL.
 - 2 - ALL CAPS ARE IN U.S.S.
 - 3 - ALL RESISTORS ARE 1/4 WATT U.S.S.
 - 4 - THE FOLLOWING ALSO GO TO SHEET TWO:
- *250V
 - *150V
 - *100V
 - 1U
 - (COMMON)
- 5 - MODED ON ON OPTION MODELS.
6 - REMOVED ON BLANK FRONT PANEL AND SUC OPTION MODELS.

RAYCO, INC. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF BETTER OR SIMILAR PERFORMANCE.	FILE NO. GLASSMAN HIGH VOLTAGE, INC.
DRAWING NO. 14806100101, SCH.	P. O. BOX 551, WASHINGTON, N. J., 08045
DATE:	TITLE: SCHEMATIC
CHECKED BY:	APPROVED BY:
FINISH:	RELEASED:
DO NOT SCALE DRAWING	SCALE:
SHEET 1 OF 2	00061-001

REDUCED ONLY

11E POINT E9



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DESIGNER	DATE	SCALE	SHEET	OF	TOTAL
FILE NO.	EXTENSION	PROJECT NO.	DATE	REVISION	DESCRIPTION
14000-610014-SCH	GLASSMAN HIGH VOLTAGE INT.	14000-610014-SCH	1/27/59	1	SCHEMATIC
DATE	BY	REVIEWED	BY	DATE	DESCRIPTION
1/27/59	WJ	1/27/59	WJ	1/27/59	SCHEMATIC
1/27/59	WJ	1/27/59	WJ	1/27/59	SCHEMATIC
DRAWING NO. 400061-001 SHEET 2 OF 2					

TO SHEET ONE

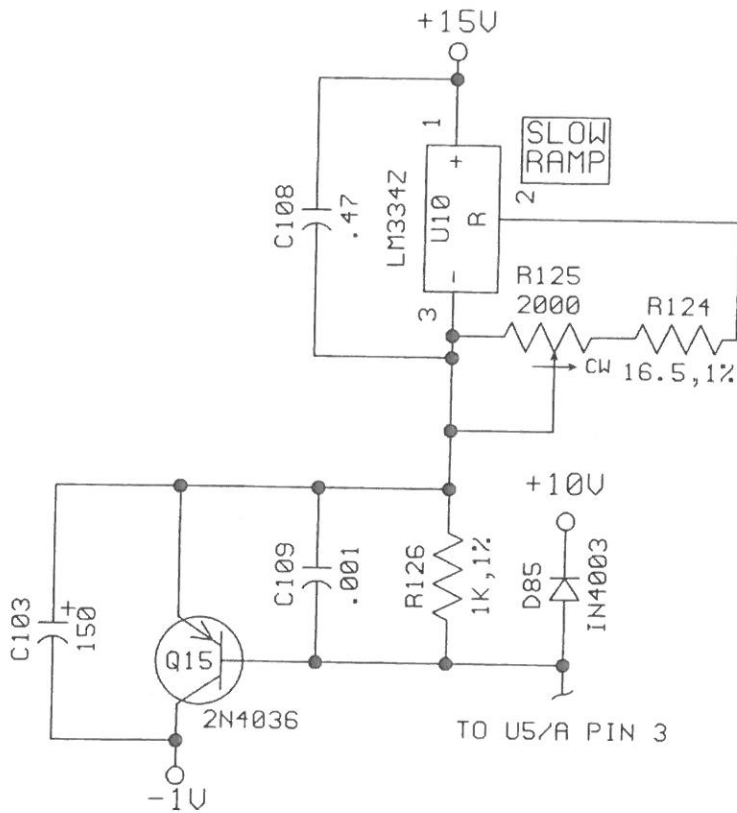
(B) TO SHEET ONE

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	ECN 4016: C109 ADDED	061495	

APD-EW-1-E1Y15

This assembly is the same as APD-EW (schematic # 400061-001), with the following schematic modifications:

1. C47 is changed to 0.47.
2. C103, C108, C109, D85, Q15, R124, R125, R126, and U10 are added as shown below.
3. J5-9 is wired to J5-10.
4. R47 is removed.



FILE NO. EXTENSION 400061001113A.SCH		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672	
APPROVALS	DATE	TITLE SCHEMATIC MODIFICATION	
DRAWN EJM	030994	APD-EW-1-E1Y15	
CHECKED DWS	031594	(REFER TO DWG 400061-001)	
RELEASED		DWG. NO. A 400061-001-113	REV. A
SCALE		SHEET 1 OF 1	