INSTRUCTION MANUAL

MJ SERIES

Innovations in high voltage power supply technology.

GLASSMAN HIGH VOLTAGE INC.

124 West Main Street, PO Box 317

High Bridge, NJ 08829

*(908) 638-3800 * FAX (908) 638-3700 * www.GlassmanHV.com*

TABLE OF CONTENTS

MJ Series 15 Watt Regulated High Voltage DC Modules

Premium Performance... Low Cost

Small Size and Weight

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

Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

CE Check the specs... and compare

Models from 0-3kVDC through 0-30kVDC; weight < 7.5 lbs.

Features:

Current Regulation Unequalled in a Module of This Price Range. For example, the regulation from short circuit to rated voltage for the 15 kV, 1 mA model is ± 500 nanoamperes.

Glassman's "Air Insulated" designs are completely serviceable; this module is not an epoxy block "throw away".

AC Input: Eliminates the need, and expense of an auxiliary DC power source.

Standard Accessories: Detachable 8' shielded output cable, and mating control connector.

Constant Voltage/Current Operation - Standard

Low Stored Energy: Less than 200 millijoules for most models.

"Multi-Mode" operation permits maximum user flexibility.

- Local voltage or current control, user selectable.
- Remote voltage and/or current control via 0 - +10 volt signal.
- Remote voltage and/or current control via potentiometers.

Protection: Overload, short circuit, and arc protection is provided by automatic current regulation and by careful surge limiting design.

External Interlock Terminals

TTL Enable/Disable

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

Designing Solutions for High Voltage Power Supply Applications

GLASSMAN HIGH VOLTAGE INC.

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

GLASSMAN EUROPE Limited (UK)
+44 1256 883007 FAX +44 1256 883017
E-mail: Glassman_europe@glassmanhv.com

GLASSMAN JAPAN High Voltage Limited
+81 45 902 9988 FAX +81 45 902 2268
E-mail: Glassman_japan@glassmanhv.com

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: 105-125V RMS or 210-250V RMS (must be specified when ordering), 48-420HZ single phase, 0.25 amperes. 3 position terminal block with cover provided. (DC input available for quantity orders - contact factory)

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

Stored Energy: 15kV model, < 200 millijoules; 30kV model, < 400 millijoules.

Voltage Regulation: Better than 0.005% line and load.

Ripple: < 0.05% RMS of rated voltage at full load. Ripple is proportional to load and decreases linearly to approximately 0.01% at no load.

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

Voltage Monitor: Zero to + 10V DC signal is provided for zero to rated voltage. Accuracy is 0.5% of reading + 0.2% of rated.

Current Monitor: Zero to +10V DC signal is provided for zero to rated current. Accuracy, 1% of reading +0.05% of rated current.

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

Voltage Rise/Decay Time Constant: Using either the HV on/off or remote voltage control, with a 50% load, the output voltage will rise or decay with a typical time constant of 50 milliseconds (100 mS maximum).

Temperature Coefficient: 0.01% per degree C.

Ambient Temperature: -20 degree C to +60 degree C, operating; -40 degree C to + 85 degree C storage.

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

Protection: Automatic current regulation protects the power supply against all overload conditions, including arcs and short circuits. Fuses, surge limiting resistors, and low energy components provide the ultimate protection.

Output Cable: Detachable, 8 foot. RG8U shielded high voltage coaxial cable is provided.

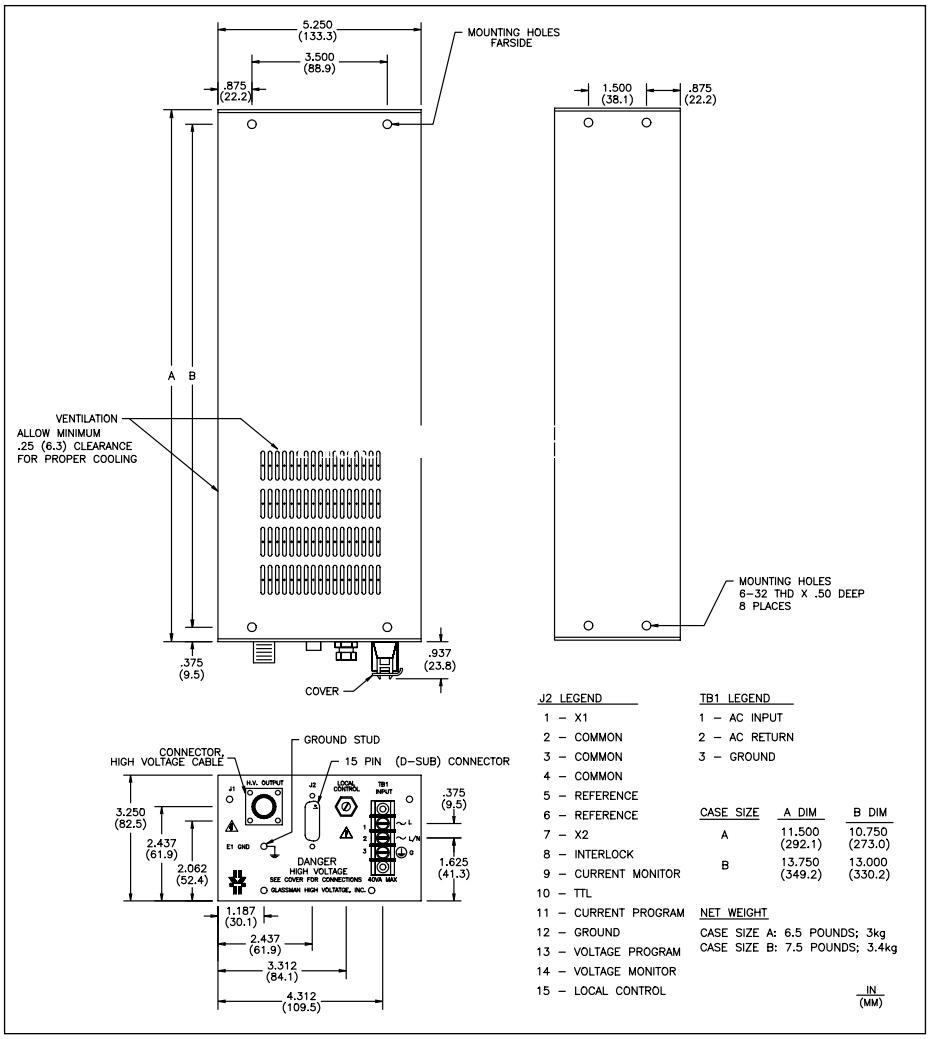
Controls: A DB15S D-subminiature connector, and mating plug, is provided for all control input functions. These include common, + 10 volt reference, interlock, current monitor, current program, voltage monitor, voltage program, TTL, ground, and local control.

External Interlock: Open off, closed on.

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

Models:

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable	Case Size
MJ3P5000	MJ3N5000	0-3 kV	0-5 mA	RG-8U	A
MJ5P3000	MJ5N3000	0-5 kV	0-3 mA	RG-8U	A
MJ10P1500	MJ10N1500	0-10 kV	0-1.5 mA	RG-8U	A
MJ15P1000	MJ15N1000	0-15 kV	0-1 mA	RG-8U	A
MJ20P700	MJ20N700	0-20 kV	0-0.7 mA	RG-8U	B
MJ30P400	MJ30N400	0-30 kV	0-0.4 mA	RG-8U	B



Designing Solutions for High Voltage Power Supply Applications

GLASSMAN HIGH VOLTAGE INC.

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

Declaration of Conformity

Declaration of Conformity
according to EMC Directive 2004/108/EC

Manufacturers Name: Glassman High Voltage, Inc.
Manufacturers Address: PO Box 317
124 West Main Street
High Bridge, NJ 08829
USA

Manufacturer declares that the **MJ Series** Power Supplies conform to the following Product Specifications:

EMC:

EN 61000-6-4:2006, class A	EN 61000-6-2:2005
CISPR 11, class A	EN 61000-4-2:2005 - 4kV CD, 8kV AD
EN61000-4-3:2005- 10V/m	EN61000-4-6:2008 - 10V, 80% mod
EN 61000-4-5:2005 - +/2kV	EN 61000-4-4:2005 - 1kV Signal Cable,
EN61000-4-11:2005 – 30/60/90%	2kV AC Mains

Means Of Conformity: The product herewith complies with the requirements of the EMC Directive 2004/108/EC based on the use of a Technical Construction File (TCF) in accordance with Article 10.2 of the Directive.

Technical Construction File:

Prepared by: Mike Ruduski
Function: Compliance Engineer
Company: AT&T Global Compliance Labs.
PO Box 3030
101 Crawfords Corner Road
Holmdel, NJ 07733-3030

TCF number: TCF 95-1077MJ
Date: December 20, 1995

Updated by: Steve DeClario
Function: Chief Engineer

Company: Glassman High Voltage, Inc.
PO Box 317
124 West Main Street
High Bridge, NJ 08829-0317
USA

TCF number: TCF 95-1077MJ

EMC Compliance Reports:	41643-10-MJ-.GHV, Revision 1
Date:	September 27, 2010
	MJ15N1000-22EMC
Date:	October 04, 2010
Test Labs:	NTS 36 Gilbert Street South Tinton Falls, NJ 07701
Notified Body:	TUV Rheinland EPS B.V. PO Box 15 9822 ZG Niekerk The Netherlands
Signature:	
Function:	Staff Engineer
Date:	November 19, 2010

EC Representative: Glassman Europe Limited, 21 Campbell Court, Campbell Road, Bramley, Tadley, Hampshire RG265EG, England.

Declaration of Conformity

Declaration of Conformity
according to Low Voltage Directive 73/23/EEC

Manufacturers Name: Glassman High Voltage, Inc.
Manufacturers Address: PO Box 317
124 West Main Street
High Bridge, NJ 08829
USA

Manufacturer declares that the **MJ Series** Power Supplies conform to the following Product Specifications:

EN 61010-1:
Environmental conditions: Indoor use
Altitude up to 2000 meters
Temperature 5 deg C to 40 deg C
Humidity 80% maximum
Input Mains Fluctuations +/-10%
Installation Category II per IEC1010-1, paragraph 1.4 & annex J
Pollution Degree 2 per IEC1010-1, paragraph 3.7.3

Means Of Conformity: The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC based on design analysis and testing in accordance with Article 13, Annex IV of Directive 93/68/EEC, amending Directive 73/23/EEC.

Signature:

Function: Staff Engineer
Date: February 10, 1997

EC Representative: Glassman Europe Limited, 21 Campbell Court, Campbell Road, Bramley, Tadley, Hampshire RG265EG, England.

EMC Directive Addendum

For Models: MJ & MR

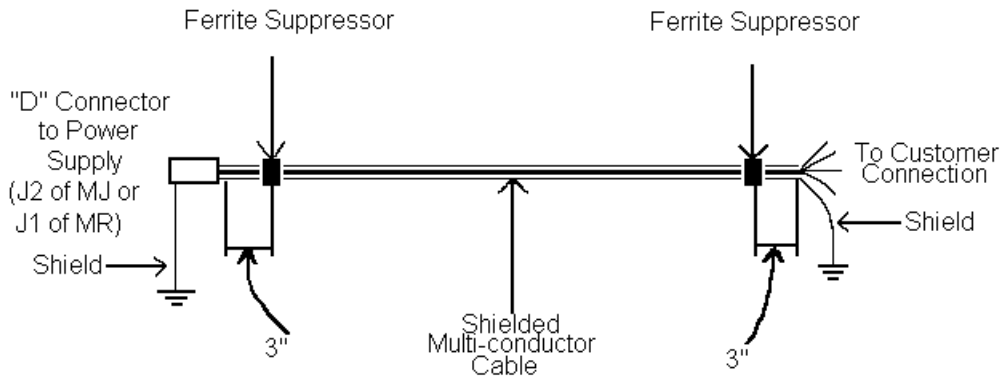
Your high voltage power supply has been designed and tested to ensure compliance with the European Community's EMC directives, when used as described in the instruction manual. However, as we do not supply as standard an interface cable, the following precautions must be followed in order to ensure continued compliance with EMC directive requirements, as specified in the harmonized standards EN61000-6-2:2005 & EN61000-6-4:2006, Class B.

1. The interface cable must be of a shielded type with the shield and connector housings terminated at both ends to an adequate ground source.

2. A ferrite suppressor must be placed at each end of the cable over the shield. These suppressors must be located within 3" of the terminations of each end of the cable (see drawing below). The ferrite suppressors should each 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



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.

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, as well as to the component symbol number(s) shown on the applicable schematic diagram, if specific components or circuit sections are involved in the inquiry.

GLASSMAN HIGH VOLTAGE, INC.
PO Box 317
124 West Main Street
High Bridge, NJ 08829

TEL. 908-638-3800
FAX. 908-638-3700
E-MAIL Support@GlassmanHV.com
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, wait at least 15 seconds before disconnecting the HV cable from the supply.

To avoid the risk of shock and personal injury, do not remove the product covers. No user serviceable components inside.

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 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.

CONNECTORS, CONTROLS, & INDICATORS (Refer to the Interface Diagram in Section III for Figures 1-10)

TB1 AC POWER INPUT

WARNING! The ground terminal of TB1 should always be connected to the AC mains ground or other good earth ground.

This unit is a component type of power supply, and as such, is designed for permanent mounting within an equipment enclosure that will provide adequate fire and shock protection. This supply is not designed for "bench top" operation. Check to see that your input line voltage and frequency matches the rating of the supply before applying power. The line cord wires should be connected as follows (see Figures 8 & 9):

TB1-1 Line (Brown)
TB1-2 Line/Neutral (Blue)
TB1-3 Ground (Green/Yellow)

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).

J1 HIGH VOLTAGE OUTPUT CONNECTOR

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

This is the high voltage output of the supply (see Figures 7, 8, & 9). Engage the connector as follows: Insert the high voltage output cable provided into the receptacle; spring action should be felt as the probe reaches the bottom. Hold the cable pressed down against the spring and screwthe locking nut onto the receptacle.

J2 REMOTE CONTROL CONNECTOR

WARNING! Do not make or remove connections to this connector or any other connector until AC power is off and the DC 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 the Control Connector Interface portion of Section II (page 7) and Figures 1-10 of the INTERFACE DIAGRAM in Section III. Pin-outs are as follows:

1	X1 (NOT USED ON STANDARD MODELS)
2	COMMON
3	COMMON
4	COMMON
5	+10V REFERENCE
6	+10V REFERENCE
7	X2 (NOT USED ON STANDARD MODELS)
8	INTERLOCK
9	CURRENT MONITOR
10	HV (TTL) ENABLE
11	CURRENT PROGRAM
12	GROUND
13	VOLTAGE PROGRAM
14	VOLTAGE MONITOR
15	LOCAL CONTROL

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 7, 8, & 9).

LOCAL PROGRAM CONTROL

This 10-turn control provides a 0 to +10V signal for local current or voltage programming. Clockwise rotation increases output. A locking nut is provided to secure the setting.

INSTALLATION

This unit is a component type of power supply, and as such, is designed for permanent mounting within an equipment enclosure that will provide adequate fire and shock protection. This supply is not designed for "bench top" operation.

Refer to the OUTLINE AND INSTALLATION drawing in Section III for mechanical mounting specifications and dimensions. Care should be taken when mounting this supply not to block or otherwise impede airflow at inlet and exhaust areas.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE GROUND STUD, E1. THE GROUND TERMINAL OF THE LINE CORD CONNECTED TO TB1 SHALL 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.

SUGGESTED INITIAL TURN ON PROCEDURE (Refer to the Interface Diagram in Section III for Figures 1-10)

WARNING: This procedure should only be attempted by qualified personnel who are knowledgeable in methods of safely testing and operating high voltage power supplies and related high voltage equipment.

1. Check the AC input ratings of the power supply as indicated on the model label located on the side of the unit. Make certain that the AC power source is adequate and fusing is provided.

2. Make connections to plug P2 as shown in Figure 9. Connect high impedance

digital voltmeters or 1mA movement analog meters to the CURRENT and VOLTAGE MONITOR outputs (0 to +10V = 0 to supply rating). Connect P2 to J2.

3. Be sure the supply is properly grounded. Connect the high voltage output cable and a grounded return lead to a load as shown in Figure 9. Use a grounded resistive load of known value with adequate voltage and power capability for the supply under test. Isolate the load from possible contact with other objects and personnel.

4. Rotate the LOCAL CONTROL fully counter-clockwise.

5. Connect the AC input cable to TB1 and the power source. Apply AC input power to the supply.

6. Rotate the LOCAL CONTROL clockwise until the VOLTAGE MONITOR indicates the desired output voltage. The CURRENT MONITOR should indicate expected output current as calculated by I=E/R.

7. Remove the AC input power to shut down the supply.

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.

CONTROL CONNECTOR INTERFACE (Refer to the Interface Diagram in Section III for Figures 1-10)

J2-8 INTERLOCK

This terminal must be connected to COMMON to enable the supply. If an external interlock is desired, a switch can be connected between the INTERLOCK pin and any COMMON pin. This switch must be closed to make the supply operable. When the external switch is open, the supply is disabled. If no external interlock is required, this pin can be connected directly to COMMON with a wire jumper (see Figures 1, 8, & 9).

J2-10 HV (TTL) ENABLE

This terminal must be connected to a 2.5 - 10V source, positive 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 any +10V REFERENCE pin (see Figures 2, 8, & 9).

J2-13 VOLTAGE PROGRAM
J2-15 LOCAL CONTROL

A 0 - 10V positive signal, with respect to COMMON, will program the output voltage proportionally from zero to full 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 any +10V REFERENCE pin and any COMMON pin, with the wiper connected to the VOLTAGE PROGRAM pin.

* The 0 - +10V signal supplied by the LOCAL CONTROL pin and adjusted by the LOCAL CONTROL.

* The VOLTAGE PROGRAM input may be jumpered to any +10V REFERENCE pin for a fixed output at the maximum rated voltage.

J2-11 CURRENT PROGRAM
J2-15 LOCAL CONTROL

A 0-10V positive signal, with respect to COMMON, will program the maximum output current proportionally from zero to full rated 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 any +10V REFERENCE pin and any COMMON pin, with the wiper connected to the CURRENT PROGRAM pin.

* The 0 - +10V signal supplied by the LOCAL CONTROL pin and adjusted by the LOCAL CONTROL.

* The CURRENT PROGRAM input may be jumpered to any +10V REFERENCE pin for a fixed output at the maximum rated current.

~~J2411~~ **VOLTAGE MONITOR**

A 0-10V signal, positive with respect to COMMON, and in direct proportion to the output current, is available at this pin. A 10k ohm, 1% resistance is in series with this output to protect the internal circuitry. An instrument with a high input impedance (>10M), such as a digital voltmeter, should be used to monitor this output. This will minimize the voltage drop across the 10k resistance. Alternately, a 1mA analog meter can be used, since the 10k resistor provides the proper impedance to drive the meter to full scale at 10V (see Figure 5).

J2-9 **CURRENT MONITOR**

A 0-10V signal, positive with respect to COMMON, and in direct proportion to output current, is available at this pin. A 10k ohm, 1% resistance is in series with this output to protect the internal circuitry. An instrument with a high input impedance (>10M), such as a digital voltmeter, should be used to monitor this output. This will minimize the voltage drop across the 10k resistance. Alternately, a 1mA analog meter can be used, since the 10k resistor provides the proper impedance to drive the meter to full scale at 10V (see Figure 6).

J2-2, 3 & 4 **COMMON**

These pins are for instrumentation/measurement return. Normally, the COMMON is operated at ground potential by means of a jumper to GROUND. In this condition, instrument returns and the 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 bidirectional zener diode. Thus the inserted drop should not exceed 15.0V or erroneous readings will 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).

J2-12 **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. This terminal is normally connected one of the COMMON pins unless a floating COMMON is required (see J1- 5, 8, etc.). If a floating COMMON is employed, this connection (or E1) can be used as the load return (see Figures 7, 8, & 9).

J2-5 & 6 +10V REFERENCE

The signal available at these pins is an ultra-stable, positive with respect to COMMON, 10V reference voltage, supplied for user programming applications. The combined maximum current drawn should be limited to 5mA (see Figures 3, 4, 8, & 9).

J2-1 X1
J2-7 X2

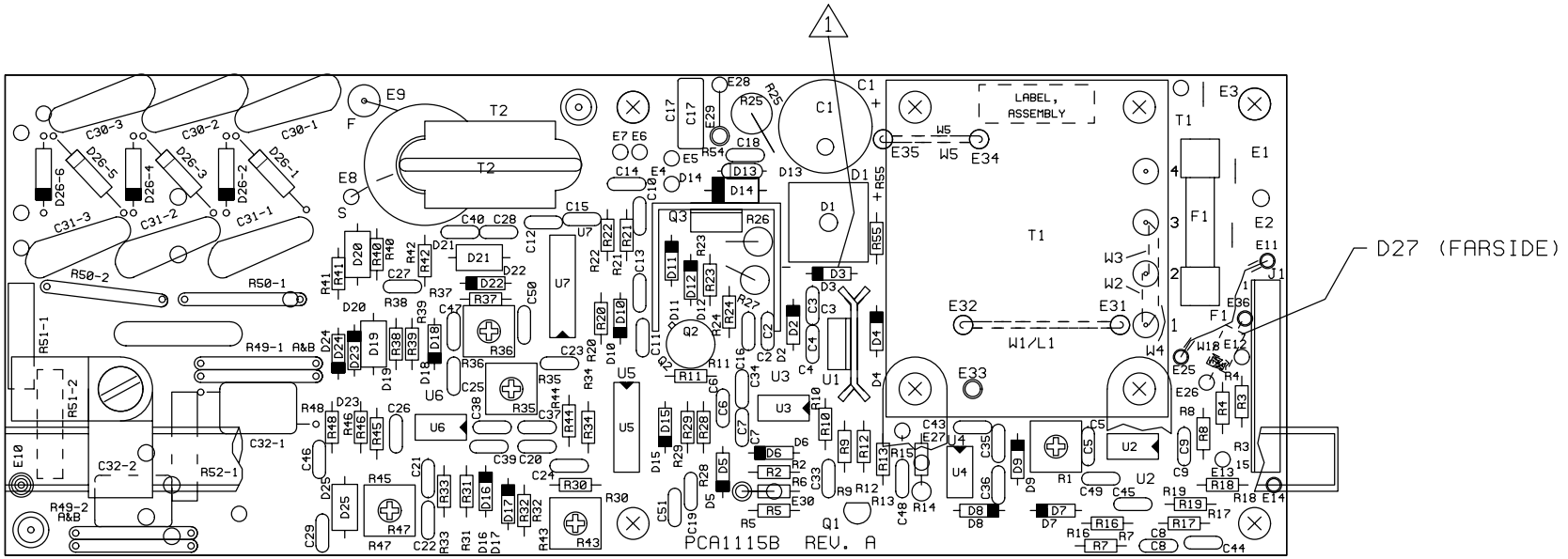
These terminals are reserved for special options or future expansion of features.

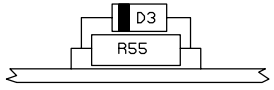
NOTE REGARDING INTERFACE DIAGRAM:

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

Figure 9 shows the minimum number of connections to completely enable the supply. In this configuration, the output voltage is adjusted by the LOCAL CONTROL and the current limit is fixed at the maximum rated output current. No external INTERLOCK or HV ENABLE signals are required.

REV	BY	DESCRIPTION	DATE	APPROVED
A	JAG	ECN 8450: ADDED E36 SILCKSCREEN MARKING	100505	JMC
B	JAG	ECN 9170: ADDED D27 (FARSIDE).	112907	





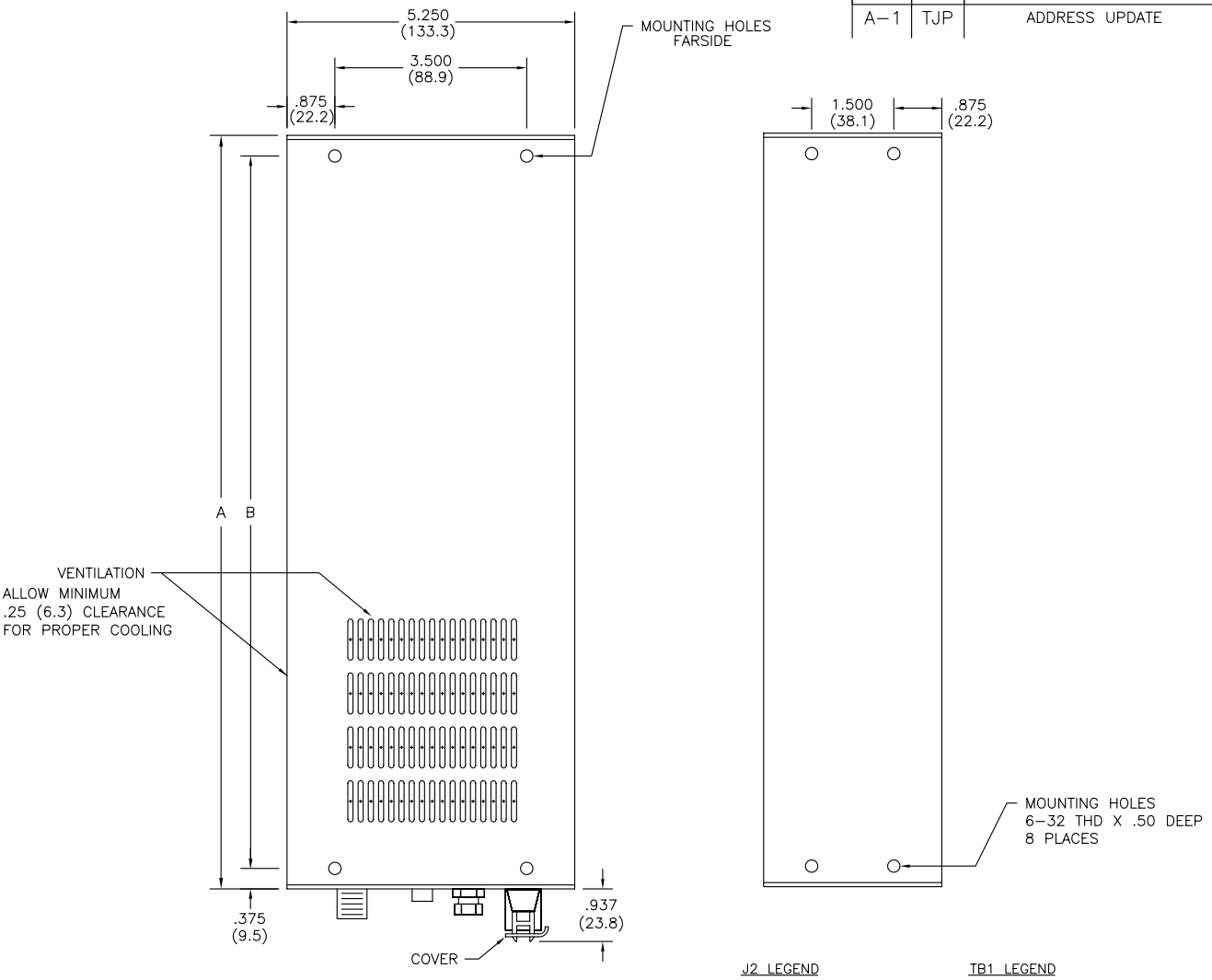
DETAIL A

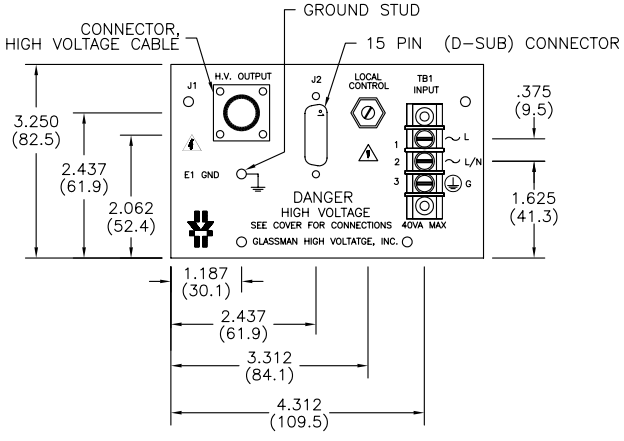
NOTES:

1 – D3 & R55 ARE INSTALLED AS SHOWN IN DETAIL A.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\115018B.PCB	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DATE: DRAWN JAG 082505; CHECKED JMC 083105; RELEASED	TITLE: PARTS PLACEMENT AH14, 15KV MAX
DO NOT SCALE DRAWING	SSF	B; DWG.NO. PCA1115-018; REV. B
		SCALE —— ; SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
A	MDS	ECN 4835: ADDED CE MARKINGS & REDRAWN	021297	JMO
A–1	TJP	ADDRESS UPDATE	113010	





J2 LEGEND

1 – X1
2 – COMMON
3 – COMMON
4 – COMMON
5 – REFERENCE
6 – REFERENCE
7 – X2
8 – INTERLOCK
9 – CURRENT MONITOR
10 – TTL
11 – CURRENT PROGRAM
12 – GROUND
13 – VOLTAGE PROGRAM
14 – VOLTAGE MONITOR
15 – LOCAL CONTROL

TB1 LEGEND

1 – AC INPUT
2 – AC RETURN
3 – GROUND

CASE SIZE	A DIM	B DIM
A	11.500 (292.1)	10.750 (273.0)
B	13.750 (349.2)	13.000 (330.2)

REDUCED ONLY

IN
(MM)

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

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\3011\00001A1.DWG

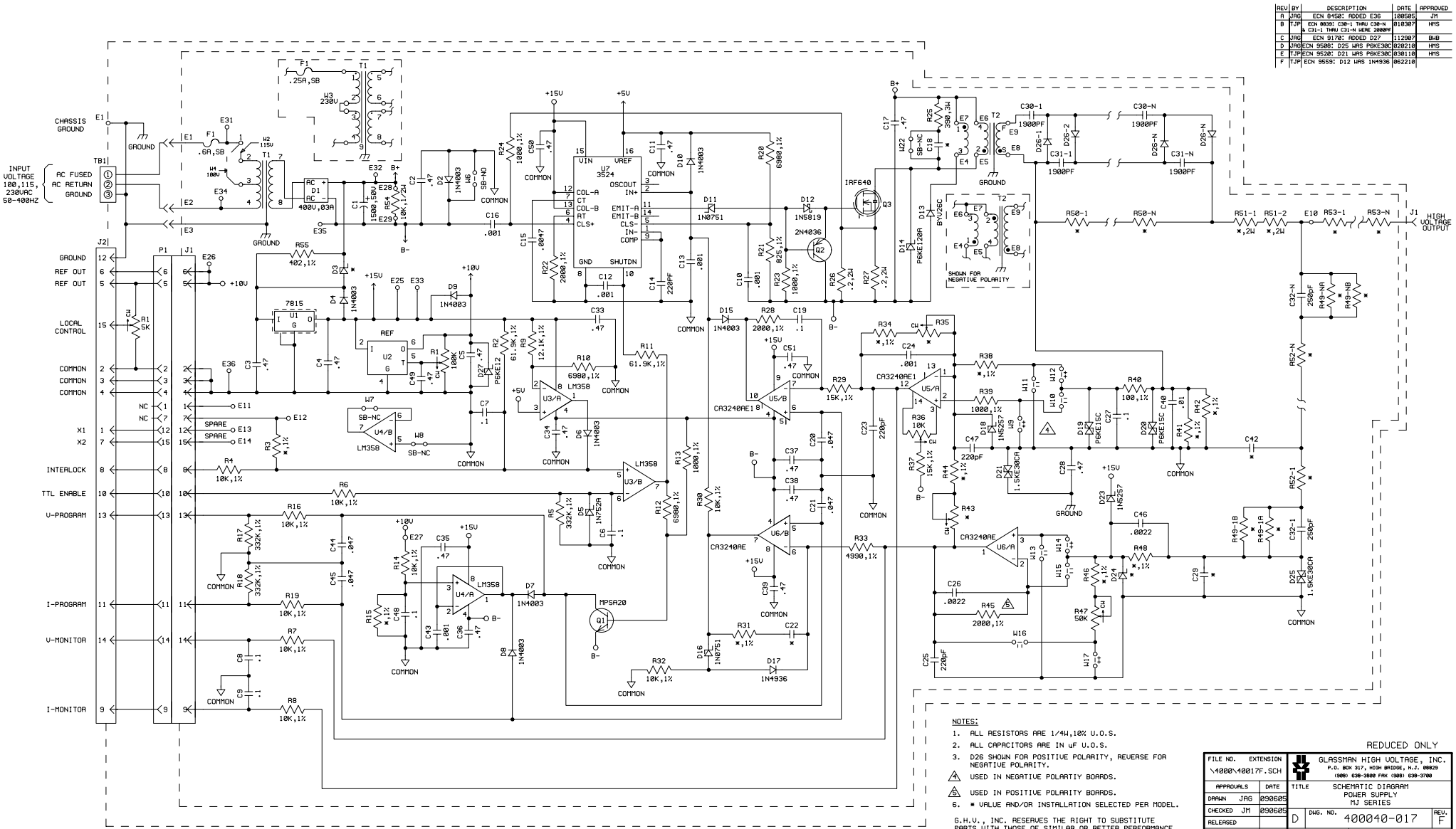
APPROVALS		DATE
DRAWN	JMC	080687
CHECKED	JMC	080687
RELEASED		

GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, NJ 08829
(098)–638–3800 FAX (908)–638–3700

TITLE
OUTLINE & INTERFACE
SERIES MJ

A | DWG.NO. 301100–001 | REV. A–1

SCALE NONE | SHEET 1 OF 1



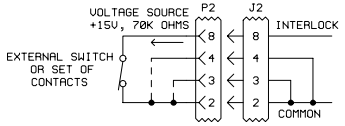
REV	BY	DESCRIPTION	DATE	APPROVED
A	JAG	ECN 8450: ADDED E36	100505	JM
B	TJP	ECN 8839: C30-1 THRU C30-N & C31-1 THRU C31-N WERE 2000PF	010307	HMS
C	JAG	ECN 9170: ADDED D27	112907	BWB
D	JAG	ECN 9508: D25 WAS P6KE30C	020210	HMS
E	TJP	ECN 9520: D21 WAS P6KE30C	030110	HMS
F	TJP	ECN 9559: D12 WAS 1N4936	062210	

REDUCED ONLY

FILE NO. EXTENSION	GLASSMAN HIGH VOLTAGE, INC.
\4000\400017F.SCH	P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700
APPROVALS / DATE	TITLE: SCHEMATIC DIAGRAM POWER SUPPLY MJ SERIES
DRAWN JAG 090605	
CHECKED JM 090605	
RELEASED	D — DWG. NO. 400040-017 — REV. F
	SCALE NONE — SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1		"COM & GRD" WAS "GRD & INTLK", FIG 4 (CENTER) P2 WAS P3	101987	DWS
A		ECN 1671	050488	DWS
B		ECN 3039	012292	DWS
B-1		REDRAWN	020592	DWS
B-2	TA	CAD CONVERSION	091395	JMC
B-3	AH	UPDATED ADDRESS	061603	

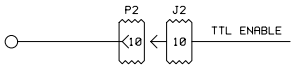
REMOTE INTERLOCK — FIGURE 1



CLOSED = SUPPLY ENABLE
OPEN = SUPPLY DISABLE

USE COMMON CONNECTION
ON P2-2, -3 OR -4

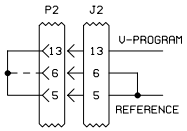
REMOTE TTL ENABLE — FIGURE 2



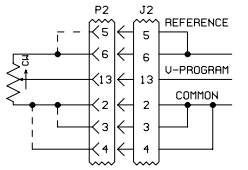
TTL COMPATIBLE
1 - HIGH VOLTAGE ENABLE (MIN 2.5VDC, MAX 10VDC)
0 - HIGH VOLTAGE DISABLE (MIN 0V, MAX 1.5VDC)
INPUT CHARACTERISTICS >200K OHMS (0-5V); 0.5mA @ 10VDC

VOLTAGE PROGRAM — FIGURE 3

VOLTAGE PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL.

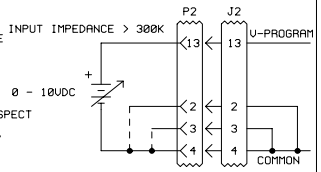


REMOTE VOLTAGE PROGRAMMED BY ATTACHING A 5K TO 50K POTENTIOMETER BETWEEN REFERENCE AND COMMON, WITH THE WIPER ARM TO VOLTAGE PROGRAMMING.



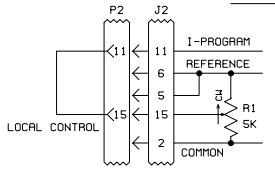
COMMON CONNECTION - P2-2, -3 OR -4

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

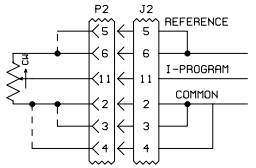


CURRENT PROGRAM — FIGURE 4

LOCAL ADJUSTABLE CURRENT PROGRAMMING.

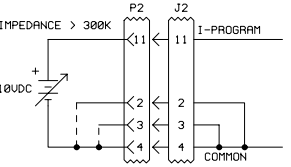


REMOTE CURRENT PROGRAMMED BY ATTACHING A 5K TO 50K POTENTIOMETER BETWEEN REFERENCE AND COMMON, WITH THE WIPER ARM TO CURRENT PROGRAMMING.

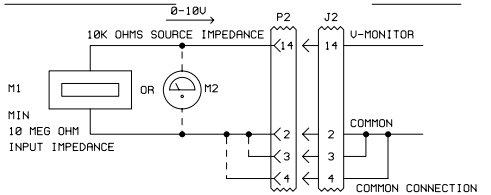


COMMON CONNECTION - P2-2, -3 OR -4

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



VOLTAGE MONITOR — FIGURE 5

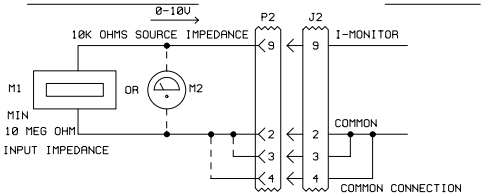


V-MONITOR OPTIONS:

M1 - RECOMMENDED TYPE METER:
0 - 10VDC VOLTMETER >/= 10 MEG OHM IMPEDANCE
0 - 10V IS DIRECTLY PROPORTIONAL TO 0 - MAX KV MODULE RATING

M2 - ALTERNATE TYPE METER:
0 - 1mA CURRENT METER
0 - 1mA IS DIRECTLY PROPORTIONAL TO 0 - MAX KV MODULE RATING

CURRENT MONITOR — FIGURE 6



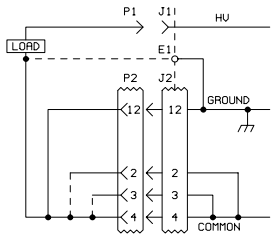
I-MONITOR OPTIONS:

M1 - RECOMMENDED TYPE METER:
0 - 10VDC VOLTMETER >/= 10 MEG OHM IMPEDANCE
0 - 10V IS DIRECTLY PROPORTIONAL TO 0 - MAX OUTPUT CURRENT MODULE RATING

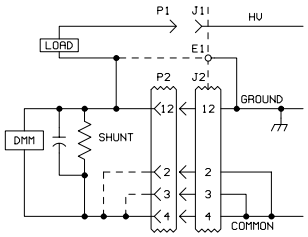
M2 - ALTERNATE TYPE METER:
0 - 1mA CURRENT METER
0 - 1mA IS DIRECTLY PROPORTIONAL TO 0 - MAX OUTPUT CURRENT MODULE RATING

COMMON AND GROUND — FIGURE 7

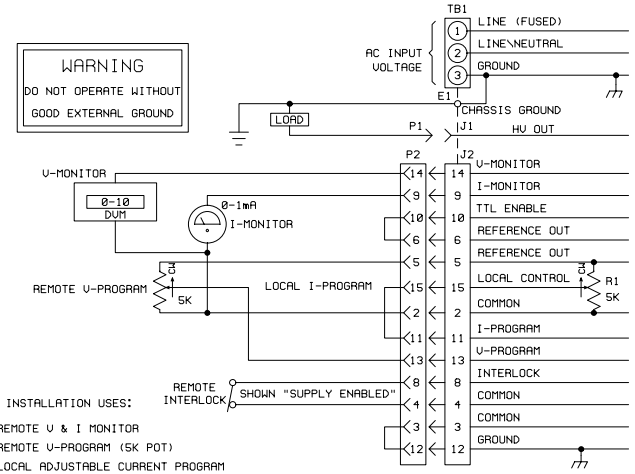
SYSTEM COMMON AND GROUND ARE NORMALLY TERMINATED TOGETHER. IN THIS CONFIGURATION, SIGNAL RETURNS AND LOAD RETURN CAN BE CONNECTED EITHER TO GROUND OR COMMON.



TO "FLOAT" COMMON FOR ISOLATION OR MEASUREMENT PURPOSES, REMOVE COMMON TO GROUND CONNECTION ON P2. 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 BI-DIRECTIONAL ZENER DIODE, THE DROP ACROSS THE SHUNT SHOULD BE < 15V TO MAINTAIN ACCURACY.



A TYPICAL MJ INSTALLATION * — FIGURE 8

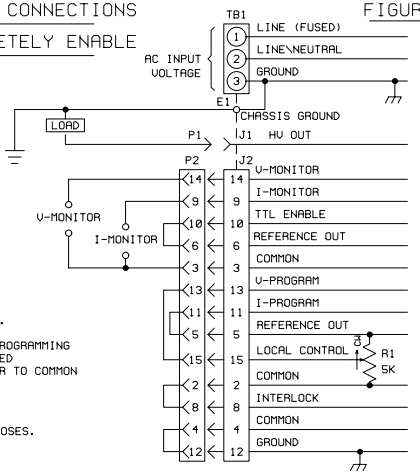


* THIS INSTALLATION USES:

* REMOTE V & I MONITOR
* REMOTE V-PROGRAM (5K POT)
* LOCAL ADJUSTABLE CURRENT PROGRAM
* LOCAL TTL ENABLED BY REFERENCE
* REMOTE INTERLOCK CONTACTS OR SWITCH
* HIGH VOLTAGE RETURN GROUNDED
* GROUND CONNECTED TO COMMON

MINIMUM NUMBER OF CONNECTIONS IN ORDER TO COMPLETELY ENABLE THE MJ SUPPLY * — FIGURE 9

WARNING
DO NOT OPERATE WITHOUT
GOOD EXTERNAL GROUND



*

MINIMUM CONNECTIONS:

* FIXED CURRENT LIMIT AT MAX.
* TTL ENABLED BY REFERENCE
* LOCAL ADJUSTABLE VOLTAGE PROGRAMMING
* HIGH VOLTAGE RETURN GROUNDED
* INTERLOCK ENABLED BY JUMPER TO COMMON

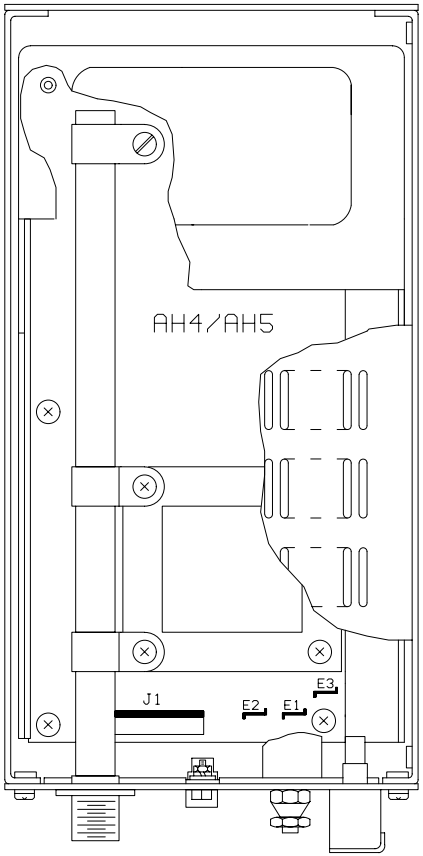
NOTE:

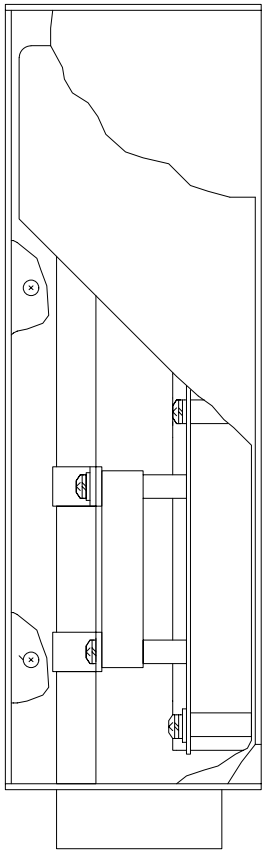
TERMINATE COMMON TO GROUND UNLESS COMMON NEEDS TO "FLOAT" FOR ISOLATION OR METERING PURPOSES.

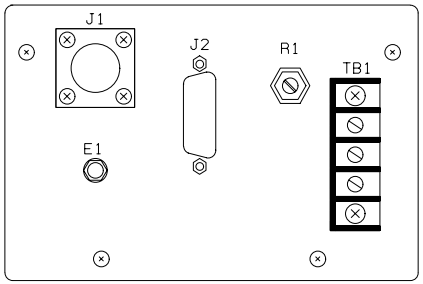
REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \4000\4100B3.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
MATERIAL	APPROVALS / DATE	TITLE: INTERFACE DIAGRAM MJ SERIES
FINISH	DRAWN MES 082487	
DO NOT SCALE DRAWING	CHECKED JJCIII 082487	D DWG. NO. 400041-001 REV. B-3
	RELEASED	SCALE NONE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1		OUTPUT TUBE CLAMP	051392	DWS
NR-2	MDS	REDRAWN IN CAD	021097	JMO
A	JAG	ECN 8498: FIXED WIRE CLAMP VIEW	120105	







REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \4011\91002A.SCH	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 MJ SERIES
THIRD ANGLE PROJECTION	DRAWN MES 072487	
	CHECKED JMC 072787	D DWG.NO. 401191-002 REV. A
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1