INSTRUCTION MANUAL

OS SERIES

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

TABLE OF CONTENTS
OS SERIES

LIMITED WARRANTY

XP Power LLC ("XP Power") 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 XP Power's discretion, refund of the purchase price. The terms of the limited warranty and the Buyer's remedies are described below.

XP Power warrants its standard power supplies to be free from defect in material and workmanship, and XP Power agrees to repair or replace any power supply which fails to perform in accordance with XP Power's written specification within three years after date of shipment from XP Power.

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

(1) Repaired, worked on, or altered by persons unauthorized by XP Power, which in XP Power'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 XP Power.

XP Power 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 XP Power's sole discretion. Buyer must return the power supply to the XP Power factory, transportation prepaid by the Buyer, within the warranty period for the warranty claim to be effective. **XP Power 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 XP Power agree that Buyer's sole remedy and XP Power'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.

EMC Directive Addendum

For Model: OS

Your high voltage power supply has been designed and tested to ensure compliance with the European Community's EMC directives and the UK EMC regulations, 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 radiated and conducted immunity requirements, as specified in the harmonized standard EN 61000-6-4 (CISPR 11 Class A) & EN 61000-6-2 (IEC 61000-4-3, 4-4 & 4-6) and THE UK ELECTROMAGNETIC COMPATIBILITY REGULATIONS 2016, SI 2016 NO. 1091.

The interface cables must be of a shielded type with the shields terminated to an adequate ground source at both ends of the cable. At the power supply end, pin 1 of the customer interface terminal strip provides a ground connection for the interface cable shield.

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.

Please note that if the digital meters are subjected to radiated EM fields in excess of 3V/m or conducted RF in excess of 3VRMS is applied to the AC input line, 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.

Because of the requirements of the very high voltage that these supplies provide, the design precludes the incorporation of an enclosure around the HV stack. This could result in electrostatic radiation from the HV components at approximately 40kHz. In order to ensure continued compliance with EMC directive radiated emissions requirements, the stack/driver assembly must be externally shielded by placing it within a shielded enclosure, area or building. However, since the HV output is exposed, enough distance must be maintained between the stack and the shielding to eliminate the possibility of corona or arc over.

Shielding may consist of a conductive or semi conductive material placed around the unit and connected to ground or may consist of similar material placed on the surrounding walls in which the unit is housed. The distance between the HV output and the surrounding shielding is recommended to be not less than the following:

100kV - 11" (280mm)
150kV - 16" (406mm)
200kV - 24" (610mm)
250kV - 31' (787mm)
300kV - 38" (965mm)
350kV - 45" (1143mm)
400kV - 52" (1321mm)
450kV - 60" (1727mm)

If a cable is connected to the HVDC output terminal of the stack, that cable need not be contained in a shielded area since the signal at the cable is predominantly DC with a very small AC "ripple" voltage which will not produce significant radiated EMI.

SECTION II - GENERAL INFORMATION

UNPACKING AND INSPECTION

First inspect package exterior(s) 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.

CAUTION. The power supply Driver is equipped with two front handles. The cabinet which contains the Driver is equipped with two handles, one on each side. Due to the weight of the unit, always lift or carry using a minimum of two handles. Because of potential overbalancing, the cabinet containing the driver should not be lifted or carried with the HV Open Stack Assembly mounted to it.

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 XP Power HV 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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ACCESSORIES (provided)

QTY	ITEM
4	Driver to HV Stack HV AC Power Cables, (W1 & W2). Two short & two long per Driver/HV Stack Group.
2	Driver to HV Stack Interconnect Cable, (W3). One short & one long per Driver/HV Stack Group.
2	Driver to HV Stack Ground Cable, (W4). One short & one long per Driver/HV Stack Group.
1	Driver to Remote Control Power Cable, (W5).
1	Driver to Remote Control Interconnect Cable, (W6).

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!

If this equipment is used in a manner not specified herein, the protection provided by the equipment may be impaired.

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.

Do not handle exposed high voltage terminations or attempt to make or remove any connections to the supply until load and/or supply has been fully discharged (grounded). An unloaded supply may take up to 2 minutes to discharge.

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

Use only a NRTL listed power cord with a separable mains plug of the proper voltage, rated greater that the input current rating of the unit. For CE and UKCA compliant supplies used in Europe or the UK, the protective conductor/ground wire on the cord must be green/yellow. 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.

Equipment Maintenance

There is no regular maintenance required to be performed on this equipment. Contact the factory if the HV STACK/DRIVER ASSEMBLY performance becomes compromised due to exposure from airborne containments.

User Serviceable Components

Designator: F1 & F2
Located: On Driver rear panel.
Glassman P/N: F005-20
Description: Fuse, cartridge, 20A, 250V, Type T, ¼" x 1 ¼".

WARNING! BEFORE REPLACING ANY FUSES, THE POWER SUPPLY MUST BE DISCONNECTED FROM THE MAINS.

TO DISCONNECT THE POWER SUPPLY FROM THE MAINS, THE POWER SUPPLY CORD MUST BE UNPLUGGED OR THE EXTERNAL DISCONNECT SWITCH/BREAKER MUST BE TURNED TO THE OFF (0) POSITION.

(For instructions on changing the polarity in reverse polarity models see POLARITY REVERSAL Section elsewhere in this manual).

CONNECTIONS AND CONTROLS

DRIVER REAR PANEL ELEMENTS

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

TB1 AC POWER INPUT

OS units operate off 230 VAC nominal (198-263VAC), 1 phase, 48-63Hz. (Unless ordered with 200V option. See option spec control provided).

WARNING! The TB1-3 ground terminal should always be connected to the AC mains ground.

TB1 is an NRTL approved terminal block rated for 300V, 20 A & 105 Deg. C. For 200 & 230VAC supplies, the power cord provided by the user should be an NRTL approved, 3/C, 14awg, 300VAC, 15 A, 60 Deg. C. **minimum rating**.

The line cord wires should be connected as follows (See OUTLINE & INSTALLATION drawings):

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

Colors indicated are for CE and UKCA compliant supplies.

It is recommended that an NRTL approved Separable Plug be installed on the power cord to connect & disconnect from the Mains.

CAUTION
Check to see that your input line voltage and frequency matches the rating of the supply before applying power.

For CE and UKCA compliant supplies used in Europe or the UK:
Permanently connected equipment or equipment where the line cord plug is not readily accessible is required to have a Safety Disconnect switch or circuit-breaker from the supply source. This should be installed in the MAINS SERVICE connected to the unit and meet the following requirements:

- The switch or circuit breaker must meet the relevant requirements of IEC60947-1 & IEC60947-3.
- The switch or circuit breaker should be rated for the load requirements of the supply or supplies connected to it.
- The Disconnect must be in close proximity to the supply and within easy reach of the operator.
- It must be marked as the disconnecting device for the supply or supplies.

Please refer to the Declaration of Conformity located elsewhere in this manual for installation environment conditions required to conform to 2014/35/EU (Low Voltage Directive) ***and The Electrical Equipment (Safety) Regulations 2016, SI 2016 No. 1101.***

POWER ON INDICATOR

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

The AC POWER ON indicator lamp will illuminate when power is present and the Remote Control Assembly Power Switch is on.

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 and **must** be connected to a good external earth ground! This terminal **must** also be used as the ground connection point from the High Voltage Stack Assembly (via W4). See SCHEMATICS, OUTLINE & INSTALLATION and SYSTEM INSTALLATION drawings.

F1
F2 AC MAINS FUSES

Replace only with correct size and rating. See User Serviceable Components section elsewhere in this manual.

J1 SIGNAL INTERFACE CONNECTOR

This connector and associated cable (W3) carry the current and voltage feedback, polarity, and interlock signals from the HV Stack Assembly to the Driver Assembly. See SCHEMATICS, OUTLINE & INSTALLATION and SYSTEM INSTALLATION drawings.

TB2 CUSTOMER INTERFACE TERMINAL STRIP

WARNING! Do not use TB2 connections for main earth ground, High Voltage Stack Assembly or Remote Control Assembly ground connections! E1 ground stud on the rear panel is provided for this purpose.

TB2-1 GROUND **TB2-2** COMMON **TB2-3** INTERLOCK

TB1-4 thru TB1-12 RESERVED

(Explained in greater detail in REMOTE CONTROL AND MONITOR SIGNALS section).

JHV1
JHV2 HVAC CONNECTORS

CAUTION
All HVAC interconnect cable plugs must be fully seated properly in JHV1 & JHV2 before applying power to the system. Faulty installation may damage the supply.

These connectors and wires (W1 & W2) deliver the high voltage AC power generated in the Driver Assembly to the High Voltage Stack Assembly. See SCHEMATICS & and SYSTEM INSTALLATION drawings.

J2 CONNECTOR (OPTIONAL)

DRIVER FRONT PANEL ELEMENTS

(Refer to the Driver Outline & Installation & System Installation Drawings).

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

POWER ON INDICATOR

WARNING! When this lamp is illuminated, AC power is on.

The AC POWER ON indicator lamp will illuminate when power is present, and the Remote Control Assembly Power Switch is on.

J3 AC INTERFACE CONNECTOR

This connector and associated cable (W5), carry the AC power between the Driver Assembly and the Remote Control Assembly.

J4 REMOTE INTERFACE CONNECTOR

This connector and associated cable (W6) carry the low voltage control signals between the Driver Assembly and the Remote Control Assembly.

REMOTE CONTROL ASSEMBLY REAR PANEL ELEMENTS

(Refer to the Outline & Installation, System Installation and Interface Drawings).

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

POWER INDICATOR

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

The AC POWER ON indicator lamp will illuminate when power is present and the Remote Control Assembly Power Switch is on.

E1 GROUND STUD

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

WARNING! Do not use this as the power supplies main ground terminal or the load return point.

This is the main grounding terminal for the Remote Control Assembly and MUST be connected to a good earth ground. Connecting it back to E1 of the Driver Assembly is recommended.

J1 AC INTERFACE CONNECTOR

This connector and associated cable (W5), carry the AC power between the Driver Assembly and the Remote Control Assembly.

J2 DRIVER INTERFACE CONNECTOR

This connector and associated cable (W6), carry the low voltage control signals between the Driver Assembly and the Remote Control Assembly.

J3
J4 CONNECTOR (OPTIONAL)

S4 CT/CL SWITCH

Selects current trip or current limit operating modes. Normally, when the output current of the supply reaches the MILLIAMPERE CONTROL set point, a crossover occurs and the supply becomes a current, rather than voltage regulating supply. When S4 is set to the CT (current trip) position, an over current condition will disable the high voltage. The MILLIAMPERE CONTROL indicator will remain lit, and the unit will remain in a current trip condition until either the HIGH VOLTAGE OFF/RESET button is pressed, or the supply is reset by toggling the AC POWER switch off and on.
Note: UNITS SHIP WITH THE S4 SWITCH SET TO CL MODE.

TB1 CUSTOMER INTERFACE TERMINAL STRIP

Provides customer interface connections as follows:

TB1-1	GROUND	**TB1-7**	I MONITOR
TB1-2	COMMON	**TB1-8**	I PROGRAM
TB1-3	RESERVED	**TB1-9**	LOCAL I CONTROL
TB1-4	KV MONITOR	**TB1-10**	+10 V REFERENCE
TB1-5	KV PROGRAM	**TB1-11**	HV ENABLE
TB1-6	LOCAL KV CONTROL	**TB1-12**	HV STATUS

(Explained in greater detail in REMOTE CONTROL AND MONITOR SIGNALS section).

REMOTE CONTROL ASSEMBLY FRONT PANEL ELEMENTS

(Refer to the Outline & Installation Drawing)

POWER SWITCH/INDICATOR

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

Turns the supply power on and off (1 = ON, 0 = OFF). The integral indicator will illuminate when the switch is ON and the AC input power is present.

HIGH VOLTAGE ON PUSH BUTTON

WARNING! Enables the high voltage output when actuated. This push-button will NOT activate when one or more of the following conditions are present:

- There is an open interlock (INTERLOCK indicator is illuminated).
- Unit is in CURRENT TRIP mode

HIGH VOLTAGE OFF/RESET PUSH BUTTON

Turns off the high voltage output and resets the following latching faults:

- CURRENT TRIP (if enabled by rear panel switch. See S4 description for an explanation of CURRENT TRIP).

HIGH VOLTAGE ON INDICATOR

Illuminates when the high voltage is enabled (if the INTERLOCK signal is closed).

WARNING! 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.

INTERLOCK INDICATOR

Illuminates when an open is/was present in the customer interlock circuit. The high voltage output is disabled and cannot be enabled until the open interlock is corrected (closed) and the system is reset.

KILOVOLTS CONTROL

10-turn control provide a 0-10V signal for KILOVOLT programming. Clockwise rotation increases the output voltage regulation point. A 10- turn dial with brake is provided to secure the settings, if desired.

- 0.00 = 0.00kV
- 10.00 = Maximum rated output voltage.

KILOVOLT CONTROL INDICATOR

This indicator is located above the kV control. If the KILOVOLTS CONTROL indicator is illuminated, the supply is operating in voltage regulation mode with an output voltage determined by the KILOVOLTS CONTROL or remote V-PROGRAM signal.

KILIVOLT DIGITAL PANEL METER

Displays output voltage in kilovolts (unless otherwise specified).
Note: Meter is operational only when power is applied to the unit.

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 kilovolt meter. Discharge the output to ground or use an external meter to determine if output has discharged. Or wait at least 2 minutes before making or removing any connections to the supply.

MILLIAMPERE CONTROL

10-turn control provide a 0-10V signal for MILLIAMPERE programming. Clockwise rotation increases output current regulation or current trip point. A 10- turn dial with brake is provided to secure the settings, if desired.

- 0.00 = 0.00mA
- 10.00 = Maximum rated output current.

MILLIAMPERE CONTROL INDICATOR

This indicator is located above the mA control. If the MILLIAMPERE CONTROL indicator is illuminated, the supply is operating in current regulation mode with an output current determined by the MILLIAMPERE CONTROL or remote I-PROGRAM signal, or a current trip has occurred. (See S4 description for an explanation of CURRENT TRIP).

MILLIAMPERE DIGITAL PANEL METER

Displays output current in milliamperes (unless otherwise specified).
Note: Meter is operational only when power is applied to the unit.

POLARITY (POS & NEG) INDICATORS

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

HV STACK ASSEMBLY ELEMENTS

WARNING!
DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL AC POWER IS OFF AND THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 2 MINUTES TO FULLY DISCHARGE.

E1 GROUND STUD

WARNING! Do not attempt to operate unit without good earth ground connected to this point on the High Voltage Stack!

This is the main grounding terminal for the High Voltage Stack Assembly and MUST be connected (via W4) back to E1 of the Driver Module. E1 must also be used as the main connection point for the users load return. See SCHEMATICS and OUTLINE & INSTALLATION drawings.

E2 HIGH VOLTAGE DC OUTPUT

Located on top of the HV Stack Assembly, this is the high voltage output terminal for the users load connection. See the SCHEMATICS and OUTLINE & INSTALLATION drawings.

JHV1
JHV2 HVAC CONNECTORS

CAUTION
All HVAC interconnect cable plugs must be fully seated properly in JHV1 & JHV2 before applying power to the system. Faulty installation may damage the supply.

These connectors and wires (W1 & W2) deliver the high voltage AC power generated in the Driver Assembly to the HV Stack Assembly. See SCHEMATICS & and OUTLINE & INSTALLATION drawings.

J1 SIGNAL INTERFACE CONNECTOR

This connector and associated cable (W3) carry the current and voltage feedback, polarity, and interlock signals from the HV Stack Assembly to the Driver Assembly. See SCHEMATICS and OUTLINE & INSTALLATION drawings.

J2 CONNECTOR (OPTIONAL)

This is an unused “Reserved” connector location.

W1
W2
W3 OPEN STACK INTERCONNECT CABLES

An additional set of interface cables is provided for the open stack. Use of this longer set of cables facilitates operating the power supply with the HV Open Stack Assembly located safely away from the Driver chassis (e.g. for test purposes).

INSTALLATION AND OPERATION

This unit is a component type of power supply, and as such, is designed for permanent mounting within equipment that will provide adequate fire and shock protection. This supply might in some cases be used for "TEST" operations with the HV Open Stack Assembly located safely away from the Driver chassis.

WARNING!
If configured as a "TEST" operation supply, all user controls & monitoring should continue to be accessed via the Remote Control Assembly which MUST be located a safe distance from the HV Open Stack Assembly. Using the extra set of longer interconnect cables, the HV Open Stack Assembly must also be positioned a safe distance from the Driver Assembly. Safety precautions should be taken during the installation to prevent the connections on the Driver rear panel from becoming "Operator Accessible" when power is applied. ALL HV Open Stack connections & ANY part of the HV Open Stack Assembly or the users load must be located a safe distance from the "Operator"!

Refer to the SYSTEM SCHEMATIC, OUTLINE AND INSTALLATION and SYSTEM OUTLINE & INSTALLATION drawings located in Section III for assembly instructions as well as mechanical mounting specifications and dimensions.

CAUTION
This power supply Driver is equipped with two front handles. The cabinet which contains the Driver is equipped with two handles, one on each side. Due to the weight of the unit, always lift or carry using a minimum of two handles. Because of potential overbalancing, the cabinet containing the driver should not be lifted or carried with the HV Open Stack Assembly still mounted to it.

Care should be taken when mounting this supply not to block or otherwise impede airflow at inlet and exhaust areas.

The High Voltage Stack/Driver Assembly should not be installed in a location where it would be prone to exposure by conductive dust or airborne containments.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE DRIVER CHASSIS GROUND STUD E1.

THE GROUND WIRE OF THE AC LINE CORD SHALL BE GROUNDED FROM THE MAINS AC GROUND TO TB1-3 GROUND.

PER EN61010-1 THE DISCONNECTING DEVICE MUST BE READILY IDENTIFIABLE AND EASILY REACHED BY THE USER. THE EXTERNAL SAFETY DISCONECT (CIRCUIT BREAKER OR SWITCH) INSTALLED BY THE USER, IS THE POWER SUPPLY DISCONNECTING DEVICE. TO DISCONNECT THE POWER SUPPLY FROM THE MAINS, THE CIRCUIT BREAKER OR SWITCH MUST BE TURNED OFF. ALTERNATIVLY (IF SAFELY ACCESSIBLE) THE POWER CORD MAY BE UNPLUGGED.

MAKE SURE THAT ALL INTERCONNECT CABLES AND GROUNDS ARE PROPERLY INSTALLED BETWEEN THE HV OPEN STACK ASSEMBLY AND DRIVER CHASSIS & BETWEEN THE DRIVER CHASSIS AND REMOTE CONTROL ASSEMBLY.

THE REMOTE CONTROL ASSEMBLY AND ALL REMOTE USER CONTROLS AND MONITORING MUST BE LOCATED A SAFE OPERATING DISTANCE FROM THE DRIVER/HV STACK ASSEMBLY. ALL PARTS OF THE DRIVER/HV STACK ASSEMBLY AND THE USER LOAD CANNOT BE "OPERATOR ACCESSIBLE" WHEN IN OPERATION.

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 2 MINUTES TO FULLY DISCHARGE.

THE LOAD RETURN SHALL BE CONNECTED TO E1 OF THE HV STACK ASSEMBLY.

INITIAL TURN ON

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

It is suggested that the operator become familiar with the operation of the unit under local control via the Remote Panel Assembly and then add the other remote functions as desired. Thus, the initial turn on sequence described below assumes that there are no signals applied to the customer interface connector TB1 of the Remote Assembly and that the , I-PROGRAM, V-PROGRAM, and HV ENABLE jumpers on TB1 are installed for local operation (as shipped from the factory).
The COMMON/GROUND jumper and the INTERLOCK jumper must be installed from TB2-1 to TB2-2 and TB2-2 to TB2-3 of the Driver chassis.

WARNING!

PLEASE VERIFY THE FOLLOWING:

1. That the AC power is disconnected from the unit, either by the disconnecting of the appropriate line cord plug/receptacle combination or by setting the External Safety Disconnect (circuit breaker or safety switch) to OFF.

2. That a good earth ground is connected to the ground stud, E1, as described in the WARNING! statement that follows.

3. That all inter-chassis wires and cables have been installed in accordance with the schematic/interface drawings supplied.

4. That the Remote Control Assembly switches and controls are set as follows:

POWER ON Switch	Off / 0 (REMOTE CONTROL (ASSEMBLY)
KILOVOLT CONTROL	Counterclockwise
MILLIAMPERE/AMPERE CONTROL	As required for load, 1.00 = 10 % of rating 5.00 = 50 % of rating, etc.

5. That the rear Remote Control Assembly switches/jumpers are set as follows:

V-PROGRAM JUMPER	LOCAL (TB1-5 TO TB1-6)
I-PROGRAM JUMPER	LOCAL (TB1-8 TO TB1-9)
HV ENABLE JUMPER	LOCAL (TB1-10 TO TB1-11)
CURRENT SWITCH	LIMIT (up)

6. That the Driver rear panel jumpers are set as follows:

COMMON/GROUND JUMPER	LOCAL (TB2-1 TO TB2-2)
INTERLOCK JUMPER	LOCAL (TB2-2 TO TB2-3)

ATTACH LOAD AS FOLLOWS (optional):

1. Connect the load return to the ground stud E1 on the HV Stack Assembly.
2. Connect the HV end of the load to the “push to insert” connector E2, located on the top toroid of the HV Open Stack Assembly.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE DRIVER GROUND STUD E1.

POWER UP SEQUENCE:

1. **CAUTION: Check the input voltage rating on the rear or side panel nameplate of the power supply and make certain that this is the rating of the available power source.**

2. Make appropriate line cord connections to the power source.

3. Set the POWER switch on the Remote Control Assembly to the ON / 1 position. The following indicators should be illuminated:

    - POWER
    - KILOVOLT CONTROL
    - POS or NEG POLARITY

4. Activate the high voltage output by depressing HIGH VOLTAGE ON button. The HIGH VOLTAGE ON lamp will illuminate.

5. Rotate KILOVOLT CONTROL clockwise until the KILOVOLT digital panel meter indicates the desired voltage. If the MILLIAMPERE/AMPERE CONTROL indicator illuminates before the desired voltage is achieved, the supply has gone into constant current mode (current limit) and the setting of the MILLIAMPERE/AMPERE CONTROL will have to be increased to supply the required current to the load, at the desired kV level.

6. The high voltage can be turned off by depressing the HIGH VOLTAGE OFF push-button. The supply will go into the standby mode (HIGH VOLTAGE ON lamp off). The high voltage can also be turned off by shutting down the supply with the POWER switch. When the supply is again powered up, the unit will go into the standby mode.

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 2 MINUTES TO FULLY DISCHARGE.

REVERSE POLARITY SUPPLIES

Two separate HV Stack Assemblies - one for each polarity - are shipped with the power supply. A label affixed to each high voltage indicates its polarity. Connect the HV Stack Assembly of the desired polarity as shown in the SYSTEM INSTALLATION drawing and OUTLINE & SYSTEM WIRING diagram.

REMOTE CONTROL AND MONITOR SIGNALS

***NOTE**: It is recommended that shielded cable(s) be used for these connections and that the shield be terminated to ground.*

For CE and UKCA compliant supplies used in Europe or the UK:** Please refer to the EMC addendum located elsewhere in this manual for shielding, terminating filtering conditions required to conform to **2014/30/EU and The Electromagnetic Compatibility Regulations 2016, No. 1091.

WARNING! Do not make or remove connections to any REMOTE CONTROL/MONITOR connector until AC power is off and the output has discharged.

DRIVER CHASSIS TB2 CONNECTIONS: (Refer to Interface drawings)

WARNING! Do not use TB2 connections for main earth ground, High Voltage Stack Assembly or Remote Control Assembly ground connections! E1 ground stud on the rear panel is provided for this purpose.

TB2-1 GROUND

This is a ground connection which can be used to ground the shield of a shielded interlock cable if used. This terminal should not be used as the main connection to earth ground. Use the main ground terminal, "E1", for that purpose.

TB2-2 COMMON

This terminal is the INTERLOCK return. COMMON is internally wired to GROUND. This terminal must be connected to INTERLOCK for the high voltage to be enabled.

TB2-3 INTERLOCK

This INTERLOCK terminal must be connected to COMMON for the high voltage to be enabled. The supply is shipped with this terminal tied to the adjacent COMMON terminal by means of a terminal jumper. This jumper may be removed and a pair of wires may be installed in its place, which then may be connected to a switching device, such as a door interlock switch.

When the unit is in the standby mode, an open circuit at the INTERLOCK terminal will cause the INTERLOCK lamp to light. The interlock circuit will not allow the high voltage to be activated by the front panel HIGH VOLTAGE ON button on the Remote Control Assembly. When the INTERLOCK terminal is again connected to COMMON, the system will revert back to the normal standby condition. If the high voltage is already enabled, an open circuit at the INTERLOCK terminal will disable the high voltage. Even if the open interlock is reconnected, the high voltage will remain off until a HIGH VOLTAGE ON command is received by the front panel HIGH VOLTAGE ON button on the Remote Control Assembly.

REMOTE CONTROL ASSEMBLY TB1 CONNECTIONS: (Refer to Interface and Remote Control O & I drawings)

WARNING! Do not use the TB1 ground connection as the power supplies main ground terminal, the load return point or as the ground connection between the Remote Control Assembly & the Driver.

TB1-1 GROUND

This is an instrumentation GROUND connection. This terminal should not be used for the main GROUND connection between the Remote Control Assembly and the Driver. Use E1 on the rear panel for that purpose.

TB1-2 COMMON

This is a signal COMMON and can be used for any signal or monitor returns.

TB1-3 RESERVED

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

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.

TB1-5 V-PROGRAM
TB1-6 LOCAL V-CONTROL

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:

* A user supplied 0 to +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 to +10V signal available at TB1-6, and adjusted by the local (front panel) KILOVOLTS control.

* The V-PROGRAM input may be jumpered to the REFERENCE voltage terminal 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.

TB1-8 I-PROGRAM
TB1-9 LOCAL I-CONTROL

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:

* A user supplied 0 to +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 to +10V signal available at TB1-9, adjusted by the local (front panel) MILLIAMPERES control.

* The I-PROGRAM input may be jumpered to the REFERENCE 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.

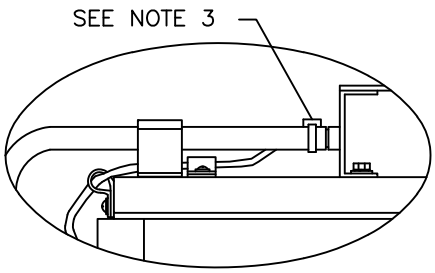
TB1-11 HV ENABLE

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.

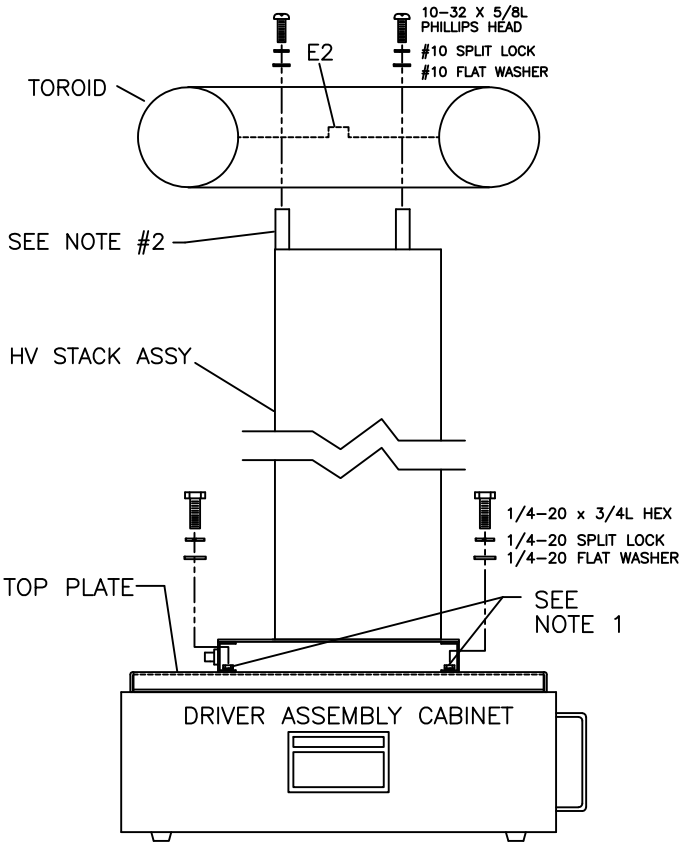
TB1-12 SIGNAL HV STATUS

This signal reflects the status of the high voltage output. A "high" signal indicates that the high voltage is on. A "low" indicates that the high voltage is off. This signal is an open drain output with a 1k pull-up resistor to +5V. Sink current should be limited to 50mA @ 0.4V.

REV	BY	DESCRIPTION	DATE	APPROVED
A	MDS	ECN 5633: CHASSIS DESCRIPTION	041398	JJC
B	TJM	ECN 5741: ADDED MULTI SECTION DETAILS.	071598	JMC
C	MDS	ECN 5817: UPDATED TO PROTOTYPE	092298	DWS
SEE PAGE 2 FOR ALL OTHER REVISIONS				



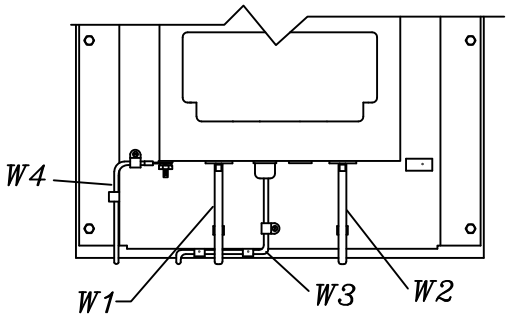
DETAIL A

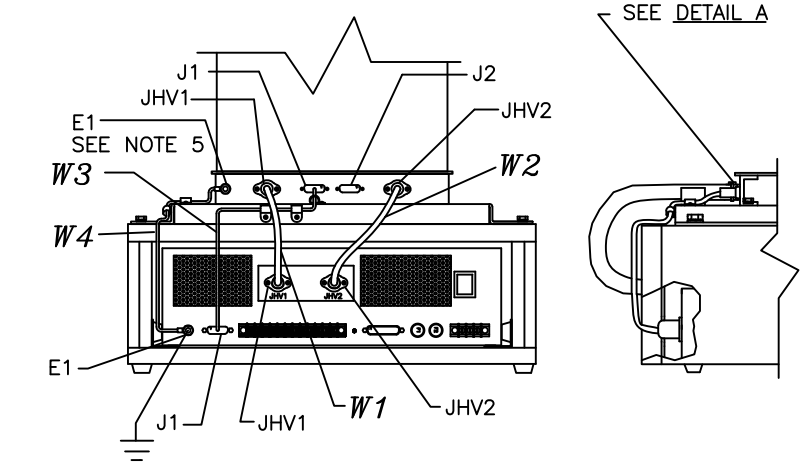


STACK AND DRIVER MECHANICAL ASSEMBLY (100-300KV)

NOTES:

1. MOUNT HV STACK ASSEMBLY TO TOP PLATE OF DRIVER ASSEMBLY CABINET WITH 1/4-20 HARDWARE PROVIDED. (4 PLACES)
2. MOUNT TOROID TO HV STACK ASSEMBLY WITH 10-32 HARDWARE PROVIDED. (4 PLACES)
3. CAUTION: DO NOT SCRATCH OR DAMAGE TOROID.





SAFETY EARTH GROUND
SEE NOTE 4

STACK AND DRIVER WIRING INSTRUCTIONS (100-450KV)

NOTES:

1. CONNECT INTERFACE CABLE (*W3*) AS SHOWN. SECURE WITH 5/16" CLAMPS PROVIDED.
2. CONNECT GROUND CABLE (*W4*) AS SHOWN. SECURE WITH 7/16" CLAMPS PROVIDED.
3. CONNECT HIGH VOLTAGE CABLES (*W1 & W2*) AS SHOWN. SECURE CABLES AT EACH END WITH RECLOSABLE TIE WRAPS PROVIDED. SEE DETAIL A.
   - **CAUTION:** HIGH VOLTAGE CABLE PLUGS MUST BE FULLY SEATED IN JHV1 & JHV2.
   - **CAUTION:** HIGH VOLTAGE CABLES MUST BE KEPT AWAY FROM INTERFACE CABLE (*W3*).
4. **WARNING!** PROVIDE ADEQUATE GROUND TO DRIVER ASSEMBLY GROUND STUD (E1).
5. **WARNING!** PROVIDE ADEQUATE LOAD RETURN TO HV OPEN STACK GROUND STUD (E1).

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
\1013\19001F.DWG

APPROVALS	DATE
DRAWN TLR	012298
CHECKED JMC	012298
RELEASED	

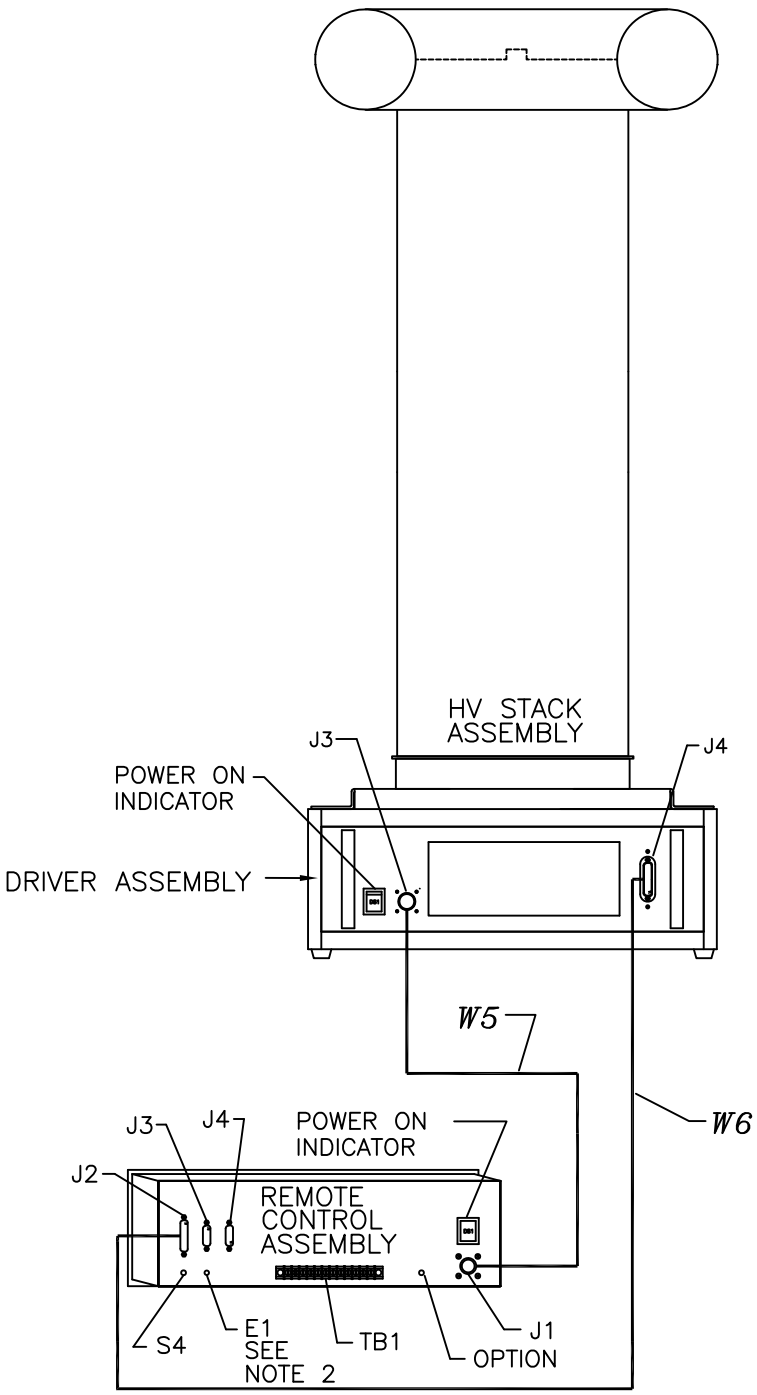
XP GLASSMAN HIGH VOLTAGE
124 West Main Street, PO Box 317, High Bridge, NJ 08829-317
(908) 638-3800 Fax (908) 638-3700

TITLE
OUTLINE & INSTALLATION
SYSTEM - SERIES OS

A | DWG.NO. 101319-001 | REV. F

SCALE NONE | SHEET 1 OF 4

REV	BY	DESCRIPTION	DATE	APPROVED
C–1	TJP	ADDRESS UPDATE	030612	HMS
D	TJP	ECN 10781: ADDED SAFETY EARTH GROUND	050916	JM
E	TJP	ECN 10883: ADDED "TO CORONA RING" TO PLATE DETAIL	100316	JMC
F	BB	ECN 12035: UPDATED HARDWARE IN PLATE DETAIL	021022	DLB



FRONT VIEW OF HV STACK ASSEMBLY AND REAR VIEW OF REMOTE CONTROL ASSEMBLY

REMOTE AND DRIVER WIRING INSTRUCTIONS (100–450KV)

NOTE:

1. CONNECT CABLES (*W5 & W6*) AS SHOWN.
2. PROVIDE ADEQUATE GROUND TO REMOTE CONTROL UNIT GROUND STUD (E1). RECOMMENDED CONNECTION IS TO (E1) OF THE DRIVER ASSEMBLY

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
\1013\19001F.DWG

APPROVALS	DATE
DRAWN TLR	012298
CHECKED JMC	012298
RELEASED	

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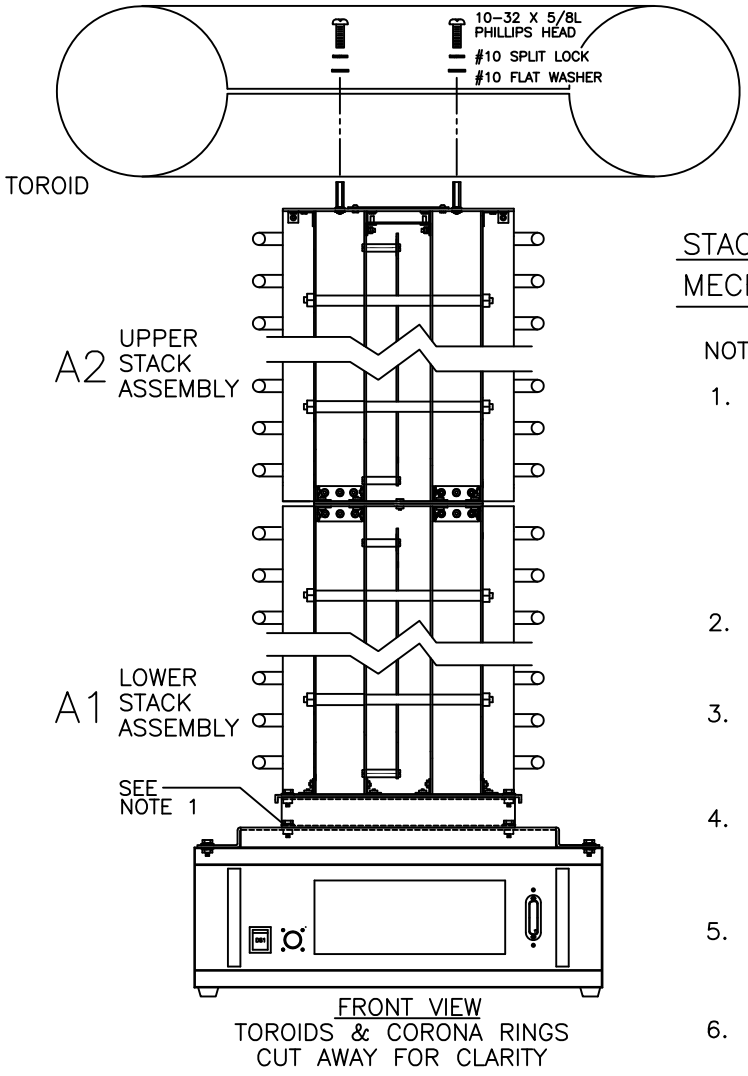
SYSTEM – SERIES OS

A | DWG.NO. 101319–001 | REV. F

SCALE NONE | SHEET 2 OF 4

REV	BY	DESCRIPTION	DATE	APPROVED



FRONT VIEW
TOROIDS & CORONA RINGS
CUT AWAY FOR CLARITY

STACK TO STACK
MECHANICAL & WIRING INSTRUCTIONS (350-450KV)

NOTES:

1. MOUNT LOWER SECTION (A1) OF HV STACK TO TOP PLATE OF DRIVER ASSEMBLY CABINET AND WIRE AS PER SHEET 1.

   DETAILS FOR NOTES 2 THRU 6 ARE LOCATED ON SHEET 4 OF 4.

2. MOUNT UPPER SECTION (A2) TO LOWER SECTION (A1) WITH HARDWARE AS SHOWN IN A2 TO A1 DETAIL.
3. TO CONNECT E3-A2, DRESS WIRE STRAIGHT THRU THE CENTER OF THE CUTOUT. MOUNT WITH HARDWARE SHOWN IN E3 DETAIL.
4. TO CONNECT E1-A2, DRESS WIRES STRAIGHT THRU THE CENTER OF THE CUTOUT. MOUNT WITH HARDWARE AS SHOWN IN DETAIL E1.
5. SECURE A1 TO A2 WITH MOUNTING PLATES AND HARDWARE AS SHOWN IN PLATE DETAIL.
6. CONNECT W1 (P/O A2) WITH HARDWARE AS SHOWN IN W1 DETAIL.
7. MOUNT TOROID TO UPPER SECTION (A2) OF HV STACK WITH 10-32 HARDWARE PROVIDED AS SHOWN. (4 PLACES)
8. **CAUTION:** DO NOT SCRATCH OR DAMAGE TOROID.
9. E1 AND E3 CONNECTION WIRES MUST NOT TOUCH ANY METAL EDGES. MAKE SURE THEY ARE DRESSED STRAIGHT THRU THE PROPER CUTOUTS AND ARE SECURE.

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
\1013\19001F.DWG

APPROVALS		DATE
DRAWN	TLR	012298
CHECKED	JMC	012298
RELEASED		

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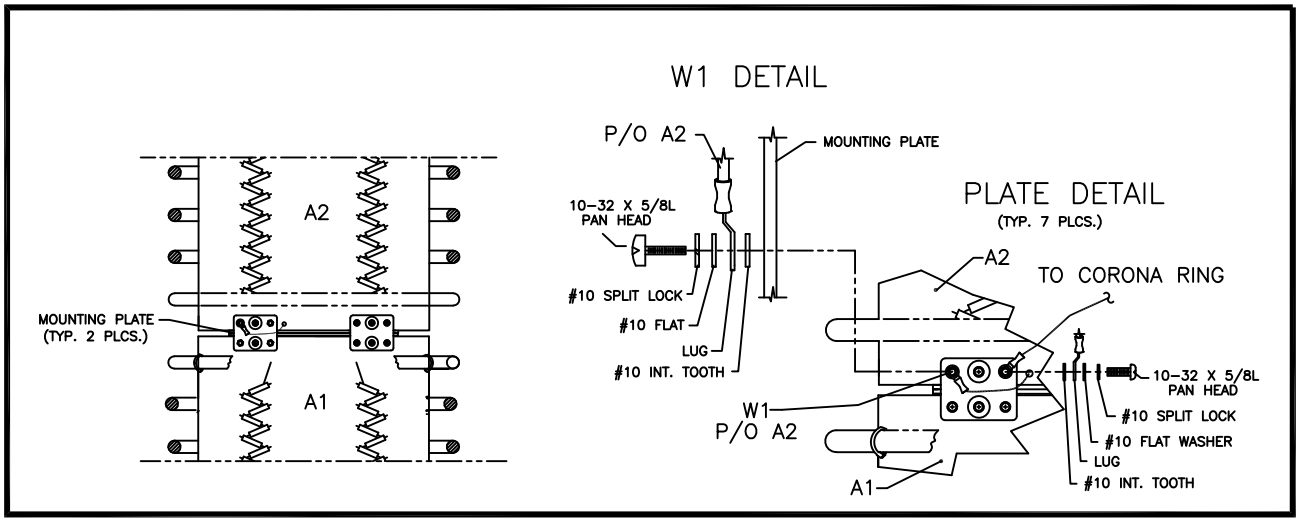
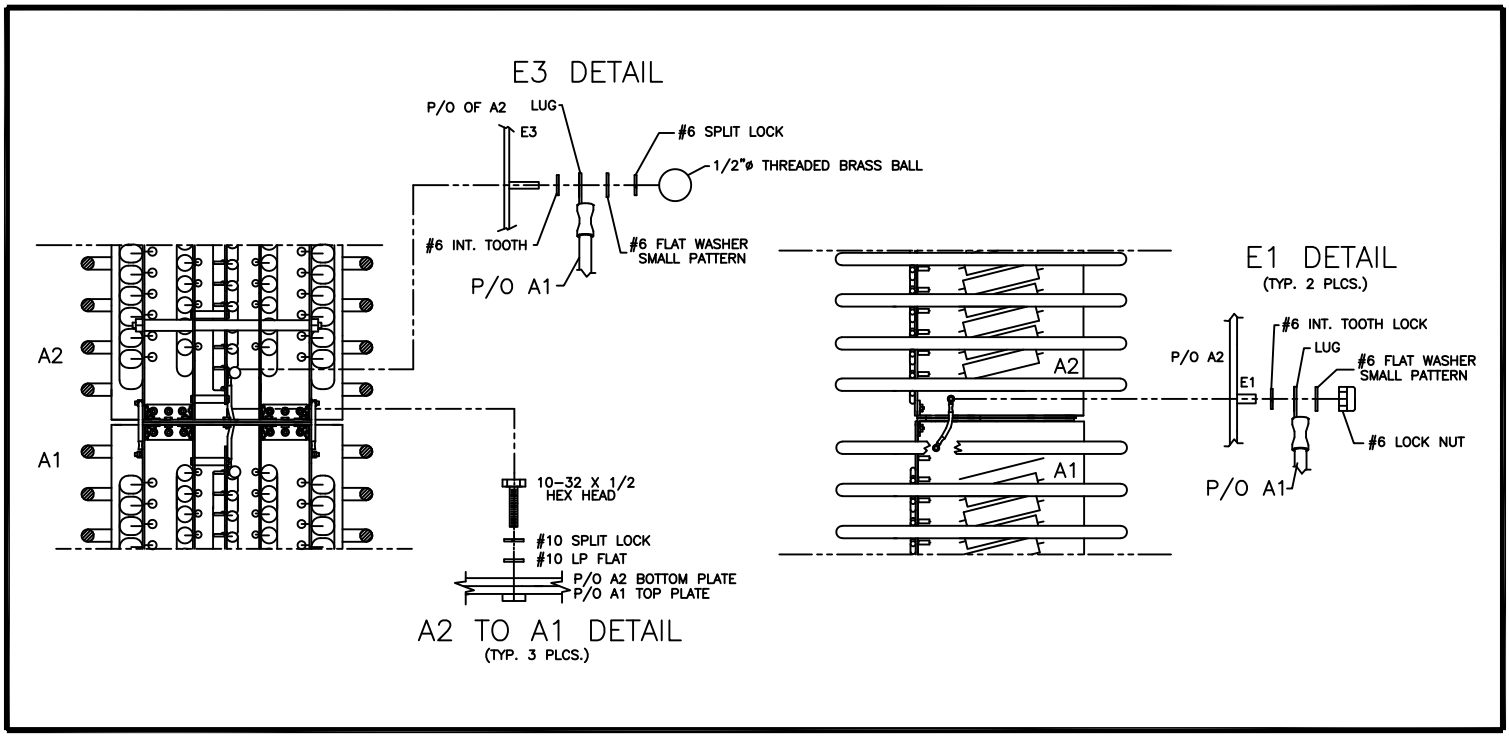
TITLE OUTLINE & INSTALLATION
SYSTEM - SERIES OS
OPEN STACK

A | DWG.NO. 101319-001 | REV. F

SCALE NONE | SHEET 3 OF 4

REV	BY	DESCRIPTION	DATE	APPROVED





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

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\1013\19001F.DWG

APPROVALS		DATE
DRAWN	TLR	012298
CHECKED	JMC	012298
RELEASED		

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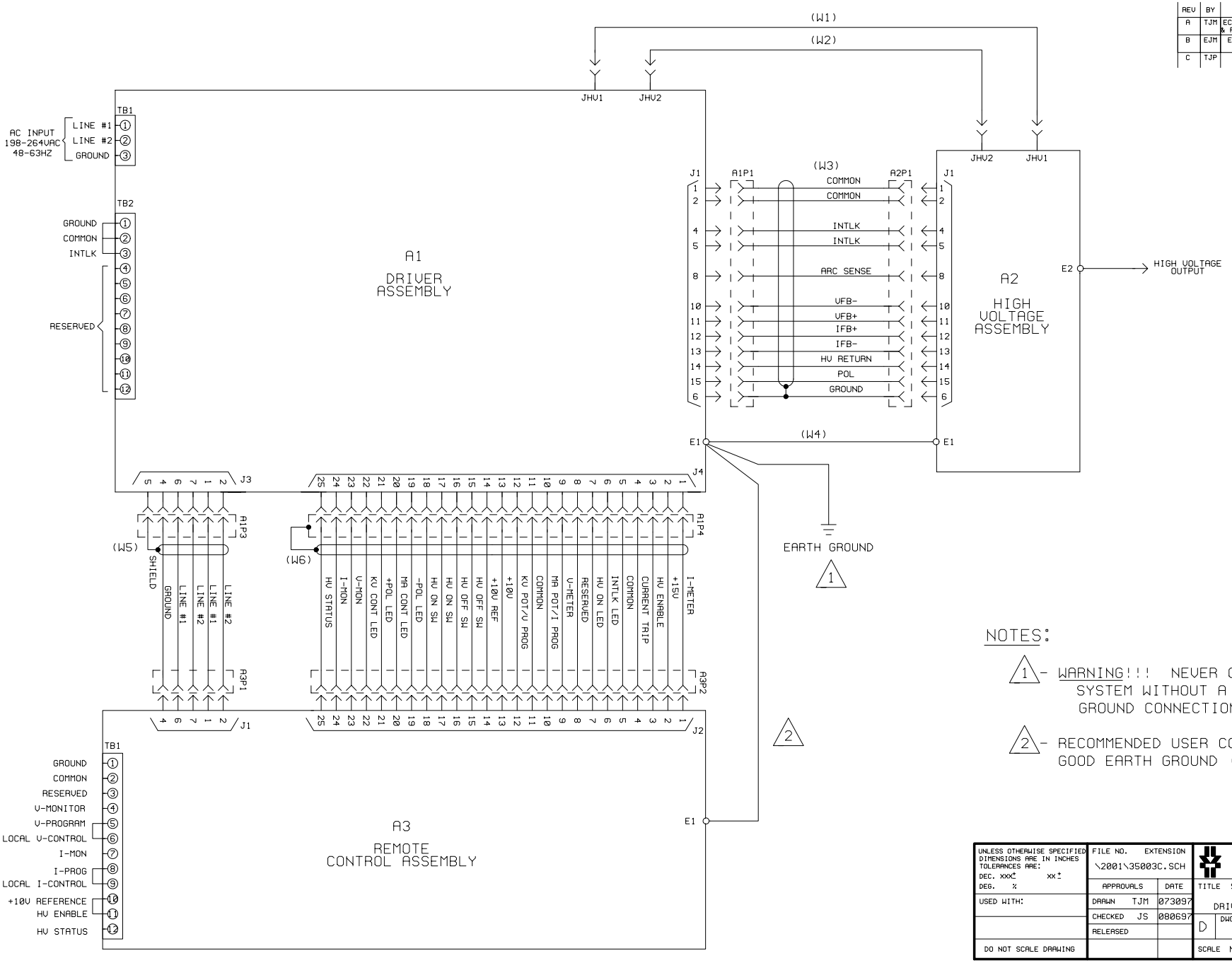
(908) 638-3800 Fax (908) 638-3700

TITLE OUTLINE & INSTALLATION
SYSTEM – SERIES OS
OPEN STACK

A | DWG.NO. 101319-001 | REV. F

SCALE NONE | SHEET 4 OF 4

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 5524: FIXED TEXT & REMOVED EXTRA PINS.	032598	JS
B	EJM	ECN 5999: AC INPUT WAS 187-253VAC	021999	SD
C	TJP	ECN 10781: ADDED NOTES 1 & 2	050916	



NOTES:

1 - WARNING!!! NEVER OPERATE THIS SYSTEM WITHOUT A GOOD EARTH GROUND CONNECTION AS SHOWN.

2 - RECOMMENDED USER CONNECTION TO GOOD EARTH GROUND (A1-E1).

REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. °	FILE NO. EXTENSION \2001\35003C.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, NJ 08829 (908)-638-3800 FAX (908)-638-3708
USED WITH:	APPROVALS / DATE DRAWN TJM 073097 CHECKED JS 080697 RELEASED	TITLE SYSTEM SCHEMATIC DIAGRAM PS/OS SERIES DRIVER, STACK, REMOTE ASSEMBLY
DO NOT SCALE DRAWING		D DWG. NO. 200135-003 REV. C
		SCALE NONE SHEET 1 OF 1