

## OS Series 2 kW Regulated High Voltage DC Power Supplies

200 kV to 450 kV,  
Open Stack  
CE Compliant

Power Factor  
Corrected  
to > .995

Harmonics  
Well Below  
EN61000-3-2

Fully RoHS  
Compliant

The OS family of power supplies are sophisticated 2 kW, open stack, power supplies with extremely low ripple and noise. They are air insulated fast response units with tight regulation. They are designed to meet the growing demands from both users and electric utilities for switching supplies with excellent input power factors that draw harmonic currents below those specified in EN61000-3-2.

OS series models consist of a rack style driver chassis, a high voltage stack assembly, and a remote control unit. The driver chassis is provided in a cabinet which is 8.43" H X 22.56" D, onto which the high voltage stack is mounted. The dimensions of the stack vary with the output voltage rating and are given in the specifications. The rack mountable remote control provides all interface functions and is connected to the driver chassis with the 25 ft. long cables provided. The remote control unit is 5.25" H X 5.0" D.

Please refer to Technology > Applications page on our web site for typical applications.

The OS Series, are fully compliant with the following European Directives:

- EN61010/ IEC61010, Safety
- EN61000-6-4, Conducted and Radiated Emissions
- EN61000-6-2:2005, Conducted and Radiated Immunity
- 2011/65/EU, Restriction of the use of Hazardous Substances (RoHS).



Models from 0-200 kV through 0-450 kV.

### Features:

**Power Factor Corrected.** Active correction circuitry achieves an input line current harmonic content well below the maximum specified in EN61000-3-2.

**Arc Quench.** The HV output is inhibited for a short period after each load arc to help extinguish the arc.

**Arc Count.** Internal circuitry constantly senses and integrates arcs that occur over a given time. In the event a system or load arcing problem develops and exceeds factory-set parameters, the power supply will cycle off in an attempt to clear the fault and then automatically restart after a preset "off dwell time".

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

**Air Insulated.** The OS 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.

**Current Trip.** This feature may be substituted for constant-current operation by a remote control chassis rear panel selector switch.

**Low Ripple.** Typically, ripple is less than 0.05% peak to peak 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 0.1% from short circuit to rated voltage.

**Warranty.** All power supplies are warranted for three years. A formal warranty statement is available.

## Specifications

(Specifications apply from 5% to 100% rated voltage. Operation is guaranteed down to zero voltage with a slight degradation of performance.)

**Input:** 198-264 V RMS single phase, 48-63 Hz, 2600 VA maximum at full load. A three position terminal block with protective cover is provided on the rear panel of the driver chassis.

**Efficiency:** Typically 80% at full load. Power factor >0.995.

**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 10 V signals is provided. Repeatability better than 0.1% of setting. Voltage accuracy is 0.5% of setting + 0.2% of rated.

**Voltage Regulation:** Better than +/- 0.005% for specified line variations and 0.005% for no load to full load variations.

**Current Regulation:** Better than +/- 0.005% for specified line variations and 0.1% from short circuit to rated voltage at any load condition, when in current regulation mode.

When in current trip mode the HV output will disable and latch off when the load current reaches the programmed current level. Reset is accomplished by either cycling the AC power or HV ON/OFF buttons or by toggling the HV enable signal. A switch located on the rear panel of the remote control chassis allows the selection of current limit or current trip operation.

**Voltage monitor:** 0 to 10 V equivalent to 0 to rated voltage. Accuracy: 0.5% of reading + 0.2% of rated. Impedance is 10 K $\Omega$ .

**Current monitor:** 0 to 10 V equivalent to 0 to rated current. Accuracy: 1% of reading + 0.05% of rated. Reverse polarity models: 1% of reading + 0.1% of rated. Impedance is 10 K $\Omega$ .

**Stored Energy:** Stored energy varies with output voltage and is tabulated in the models chart.

**Ripple:** Ripple consists of two major components, inverter switching frequency components and line frequency related components. The inverter frequency component is dependent on the amount of load current drawn. The line frequency related component is determined by the amount of power delivered to the load. The maximum values for both components are specified in the models chart.

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

**Voltage Rise/Decay Time Constant:** 400 ms typical using either the HV ON switch or remote programming with a minimum 1.7 mA resistive load.

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

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

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

**Arc Quench:** An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 0.25 seconds after each arc.

**Arc Count:** Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for 5 arcs, the supply will turn off for approximately 5 seconds to allow clearance of the fault. After this period the supply will automatically return to the programmed kV value with the rise time constant indicated. If the load fault still exists the above cycle will repeat.

**Remote Control Unit:** A separate control panel chassis is provided which contains all the control functions.

The front panel of this assembly contains: separate 10-turn controls with locking vernier dials used to set the voltage and current levels, High Voltage ON switch, High voltage OFF/Reset switch and an AC power on/off switch and indicator. LED's indicate when the high voltage is on, output polarity, interlock status and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters.

The rear panel of this assembly contains: AC power on indicator, ground stud, driver/control chassis interface connectors, current limit/current trip selector switch, and remote user interface terminal strip.

The signals provided on the remote user interface terminal strip are as follows:

**Inputs:** Output voltage and current program signals, and high voltage enable.

**Outputs:** Output voltage and current monitor signals, a +10 V reference source, and a high voltage status signal.

Signal common and ground reference terminals are also provided.

**Remote HV Enable:**  
0 - 1.5 V = OFF,  
2.5 - 15 V = ON.

**External Interlock:** Open = off, closed = on. Latching with reset via the HV ON switch or HV enable signal. The front panel indicator is illuminated when the interlock is open. Interlock connections are provided on a terminal strip on the rear panel of the driver chassis.

**HV Status:** TTL level signal.  
High = HV On, low = HV Off.

**Accessories:** 25 feet of detachable interconnection cables are provided.

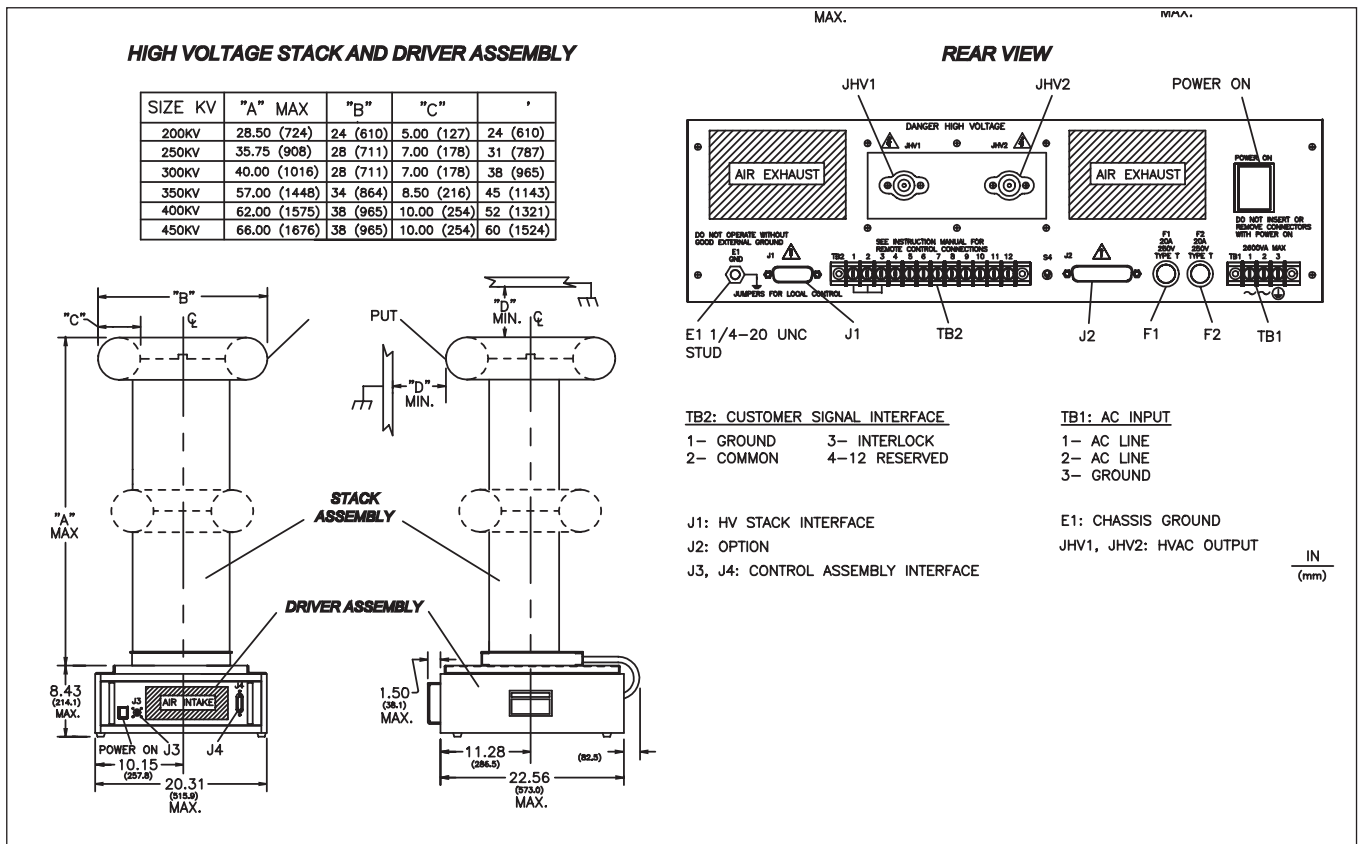
## Options

Symbol Description

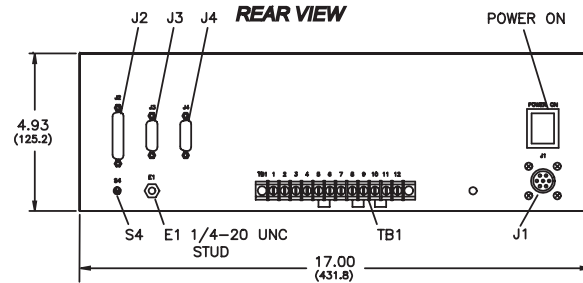
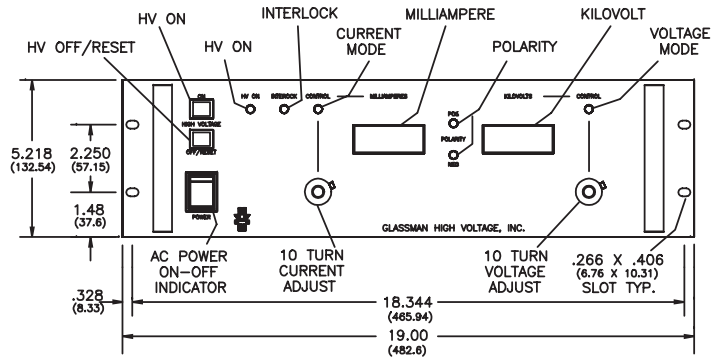
- ZR Zero start interlock. Voltage control, local or remote, must be at zero before HV will enable.
- SS Slow start ramp. Specify standard times of 5, 10, 15, 20, or 30 seconds ± 20% .
- 5VC 0-5 V voltage and current program/monitor.
- 200 180 - 220 VAC input 48 - 63 Hz. Derate output current by 10%.
- K01 RS-232/USB control and monitor
- K02 RS-232/USB/Ethernet control and monitor

## Models

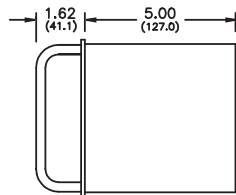
| Positive Polarity | Negative Polarity | Reversible Polarity | Output Voltage | Output Current | Stored Energy (J) | High Freq. Ripple (P-P) | Line Freq. Ripple(P-P) |
|-------------------|-------------------|---------------------|----------------|----------------|-------------------|-------------------------|------------------------|
| OS200P10          | OS200N10          | OS200R10            | 0 - 200 kV     | 0 - 10 mA      | 70                | 100V                    | 10V                    |
| OS250P8           | OS250N8           | OS250R8             | 0 - 250 kV     | 0 - 8 mA       | 81                | 125V                    | 12.5V                  |
| OS300P6           | OS300N6           | OS300R6             | 0 - 300 kV     | 0 - 6 mA       | 100               | 150V                    | 15V                    |
| OS350P4.5         | OS350N4.5         | OS350R4.5           | 0 - 350 kV     | 0 - 4.5 mA     | 112               | 175V                    | 17.5V                  |
| OS400P3.5         | OS400N3.5         | OS400R3.5           | 0 - 400 kV     | 0 - 3.5 mA     | 131               | 200V                    | 20V                    |
| OS450P3           | OS450N3           | OS450R3             | 0 - 450 kV     | 0 - 3 mA       | 150               | 225V                    | 22.5V                  |



## CONTROL ASSEMBLY



### SIDE VIEW



### TB1: REMOTE CONTROL INTERFACE

- |                 |                 |
|-----------------|-----------------|
| 1- GROUND       | 7- I MON        |
| 2- COMMON       | 8- I PROG       |
| 3- RESERVED     | 9- LOCAL I CONT |
| 4- V MON        | 10- +10V        |
| 5- V PROG       | 11- HV ENABLE   |
| 6- LOCAL V CONT | 12- HV STATUS   |

J1, J2: DRIVER INTERFACE E1: CHASSIS GROUND

J3, J4: OPTION

S4: CURRENT LIMIT/CURRENT TRIP SWITCH

OS.DWG