

# FX Series 300 Watt Regulated High Voltage DC Power Supplies

1 to 60kV,  
1.75" Panel

## CE Compliant

The FX Series are sophisticated, 300 Watt, high voltage power supplies in a small and lightweight package. They are air insulated, fast response units with tight regulation.

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

With the PFC option, line harmonics are within the European harmonized standard, EN61000-3-2 specifications.



Models from 0 to 1kV through 0 to 60kV, 1.75" H x 19" W x 20.25" D, 14 lbs.

## Features

**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".

**Low Stored Energy.** Most models exhibit less than 3 joules of stored energy.

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

**Air Insulated.** The FX 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 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 0.05% from short circuit to rated voltage.

**Front Panel Controls.** Separate 10-turn controls with locking vernier dials are used to set voltage and current levels. A high voltage enable (on) 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 FX Series supplies provide output voltage and current program/monitor signals, high voltage enable, safety interlock terminals, and a +10 volt reference source.

**Small Size and Weight.** FX Series power supplies occupy only 1.75 inches of panel height. Net weight is less than 14 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

(Specifications apply from 5 to 100% rated voltage. Operation is guaranteed down to 0% of rated voltage with a slight degradation in performance.)

**Input:** 102-132V RMS, single-phase, 48-400 Hz, <6 A. 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. Voltage accuracy is 0.5% of setting +0.2% of rated. Repeatability is <0.1% of rated.

**Stored Energy:** See Models chart.

**Static Voltage Regulation:** Better than 0.005% for specified line variations and 0.005% + 0.5 mV/mA for load variations.

**Dynamic Voltage Regulation:** For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 μs and to 0.1% in 1 ms.

**Ripple:** <0.02% of rated voltage plus 500mV 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% of reading +0.2% rated.

**Current Monitor:** 0 to +10 V equivalent to 0 to rated current. Accuracy, 1% of reading +0.05% rated except reversible models: 1% of reading + 0.1% of rated.

**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 50% resistive load using either HV on/off or remote programming control.

**Temperature Coefficient:** 0.01% per degree C.

**Ambient Temperature:** -20 to +40 degrees C, operating; -40 to +85 degrees 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.

**Arc Quench:** An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc. Standard on 8 - 60 kV models; optional on 1- 6 kV models.

**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 five seconds, 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. Standard on 8 - 60 kV models; optional on 1- 6 kV models.

**Remote Controls:** A three position terminal block and a 15 Pin "D" connector are provided for all remote functions, including common,

+10 V reference, interlock, voltage and current program/monitor, HV enable, ground, and local control. A rear panel toggle switch selects either local or remote operation.

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

# Options

Symbol	Description
100	90 to 110VRMS input, 48-400Hz. NEMA 5-15 Plug.
200	180 to 220VRMS, 48-63Hz, NEMA 6-15 plug. Derate output current by 10% when combined with PFC option.
220	198 to 264VRMS input, 48-400Hz. NEMA 6-15 Plug.
PFC	Power Factor Corrected. AC Input line rated for 198 to 264VAC, 48-63Hz, 400VA maximum. Active correction circuitry achieves an AC input line current harmonic content well below the maximum specified in EN61000-3-2.
NC	Blank front panel, power switch only.
5VC	0-5 V voltage and current program/monitor.

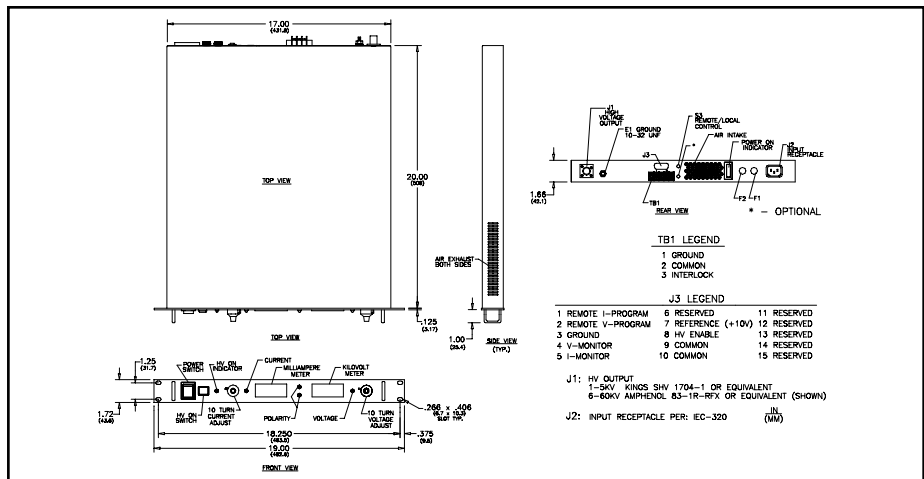
**Remote HV Enable:** 0-1.5 V off, 2.5-15 V on.  
**Accessories:** Detachable 8 foot shielded high voltage coaxial cable (see Models chart for cable type), 6 foot detachable line cord, and mating 15 Pin "D" connector and shell are provided.

Symbol	Description
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 HV will enable.
SS	Slow start ramp. Specify standard times of 1, 2, 3, 5, 10, 15, 20, or 30 s +/-20%.
HVS	High voltage status indicator. Open drain with 5k pullup to +15V. High signal = HV on.
ARC	Arc count and quench as described in the specifications for 1 - 6 kV models.
G09	RS-232 control and monitor.

Please consult factory for special requirements.

# Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
FX1P300	FX1N300	FX1R300	0 - 1kV	0 - 300mA	0.35J	RG - 58
FX1.5P200	FX1.5N200	FX1.5R200	0 - 1.5kV	0 - 200mA	0.5J	RG - 58
FX2P150	FX2N150	FX2R150	0 - 2kV	0 - 150mA	0.3J	RG - 58
FX3P100	FX3N100	FX3R100	0 - 3kV	0 - 100mA	0.7J	RG - 58
FX5P60	FX5N60	FX5R60	0 - 5kV	0 - 60mA	0.4J	RG - 58
FX6P50	FX6N50	FX6R50	0 - 6kV	0 - 50mA	0.55J	RG - 8U
FX8P37	FX8N37	FX8R37	0 - 8kV	0 - 37mA	0.4J	RG - 8U
FX10P30	FX10N30	FX10R30	0 - 10kV	0 - 30mA	0.6J	RG - 8U
FX12P25	FX12N25	FX12R25	0 - 12kV	0 - 25mA	0.85J	RG - 8U
FX15P20	FX15N20	FX15R20	0 - 15kV	0 - 20mA	0.75J	RG - 8U
FX20P15	FX20N15	FX20R15	0 - 20kV	0 - 15mA	1.2J	RG - 8U
FX25P12	FX25N12	FX25R12	0 - 25kV	0 - 12mA	1.3J	RG - 8U
FX30P10	FX30N10	FX30R10	0 - 30kV	0 - 10mA	1.8J	RG - 8U
FX40P7.5	FX40N7.5	FX40R7.5	0 - 40kV	0 - 7.5mA	2.4J	RG - 8U
FX50P6	FX50N6	FX50R6	0 - 50kV	0 - 6mA	3.0J	RG - 8U
FX60P5	FX60N5	FX60R5	0 - 60kV	0 - 5mA	3.5J	RG - 8U



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