



- **2.5kV~30kV ISOLATION**
- **REMOTE, GROUND REFERENCED VOLTAGE PROGRAMMING**
- **+24Vdc GROUND REFERENCED SUPPLY**
- **HIGH STABILITY, (TEMPERATURE COEFFICIENT<200ppm/°C)**
- **VOLTAGE MONITOR**
- **ARC & SHORT CIRCUIT PROTECTED**
- **CUSTOMIZATION AVAILABLE**

## INTRODUCTION

PF series are isolated input/output, High Stability and low ripple HV modules. PF intended to power microchannel plate and imaging detectors, that are isolated by many kV from Ground. They give 0 to 3.5 kV and can be floated on voltages up to  $\pm 2.5$  kV (PFxx2.5),  $\pm 10$  kV (PFxx010),  $\pm 20$  kV (PFxx020) &  $\pm 30$  kV (PFxx030). These units use differential feedback techniques to allow the +24Vdc power, control and monitor signals to be at ground potential.

## TYPICAL APPLICATIONS

Microchannel plates for Mass Spectrometers & Electron Microscopes, Floating grid & bias voltages, Medical, chemical Applications, Science, Laboratory Applications Industrial Applications.

## PF SELECTION TABLE

kV	Output Voltage	mA	P(W)	MODEL	Isolated kV	Ripple at full load	Injected Ripple <sup>1</sup>
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F2.5	X= $\pm 2.5$ kV <sup>2</sup>	<50mV(pk-pk)	<50mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F2.5L	X= $\pm 2.5$ kV <sup>2</sup>	<50mV(pk-pk)	<25mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F 5	X= $\pm 5$ kV <sup>2</sup>	<50mV(pk-pk)	<50mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F 5L	X= $\pm 5$ kV <sup>2</sup>	<50mV(pk-pk)	<25mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F10	X= $\pm 10$ kV <sup>3</sup>	<75mV(pk-pk)	<75mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F10L	X= $\pm 10$ kV <sup>3</sup>	<75mV(pk-pk)	<35mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F15	X= $\pm 15$ kV <sup>3</sup>	<75mV(pk-pk)	<75mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F15L	X= $\pm 15$ kV <sup>3</sup>	<75mV(pk-pk)	<35mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F 20	X= $\pm 20$ kV <sup>3</sup>	<100mV(pk-pk)	<150mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F 20L	X= $\pm 20$ kV <sup>3</sup>	<100mV(pk-pk)	<75mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F25	X= $\pm 25$ kV <sup>3</sup>	<150mV(pk-pk)	<150mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F25L	X= $\pm 25$ kV <sup>3</sup>	<150mV(pk-pk)	<75mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F30	X= $\pm 30$ kV <sup>3</sup>	<150mV(pk-pk)	<200mV(pk-pk)
3.5	50V ~ 3.5kV	1	3.5	PF3.5*3.5F30L	X= $\pm 30$ kV <sup>3</sup>	<150mV(pk-pk)	<100mV(pk-pk)

- 1) Ripple injected into the power supply providing the floating voltage, measured assuming load capacitance of 1000 pF.
- 2) Resistance to ground 400 M $\Omega$  on each output.
- 3) Resistance to ground 600 M $\Omega$  on each output.

## PF SELECTION EXAMPLE

PF	3.5	*	3.5	F15	LIR	VP	10	VM	10	LS	/	M1	LX
Series Number	Maximum Output Voltage (kV)	Output polarity P:Positive Polarity N:Negative Polarity	Maximum Output Power(W)	OPTION Maximum Float voltage 15kV	OPTION Low Injected Ripple	OPTION VP:Voltage Programming	OPTION 10:0~10Vdc=0 to maximum output 5:0~5Vdc=0 to maximum output	OPTION VM: Voltage Monitor	OPTION 10:0~10Vdc=0 to maximum output 5:0~5Vdc=0 to maximum output	OPTION Low Start	OPTION PIN information: M1:simulation M2:Rs485 M3:RS232	OPTION L:Unshield cable LC:Shield cable X=Wirelength	



**PF SPECIFICATIONS**

PARAMETER	DESCRIBE
Input Voltag/Currente	+24Vdc±10%,maximum input current 0.7A.
Output	20V~5kV,5W
Stability	0.1% per hour after 1 hour warm up.
Temperature Coefficient	<0.02% / °C
Voltage Programming	0~+10Vdc for 0~100% ±3%,(Zout = 10MΩ).
Voltage Monitor	0~+10Vdc for 0~100% ±3%,(Zin = 10kΩ).
Voltage Line Regulation	<0.1% for 1Vdc change in input voltage.
Load regulation	<0.1% for 100uA to maximum load change.
Protection (all outputs)	Protected against intermittent arcing and continued short circuit to ground.
Operating Temperature	+10 °C~+50 °C.
Storage Temperature	-35 °C~+85 °C.
Operating Altitude	Up to 2,000m
Humidity	<31°C,80% maximum,>30°C,Decrease linearly to 50°C.
Storage Altitude	Up to 18,000m.
Dimensions	8.07" D×3.94" W×1.69" H (205mm×100mm×43mm) .
Weight	1.5kg.

**M1 PIN INFORMATION**

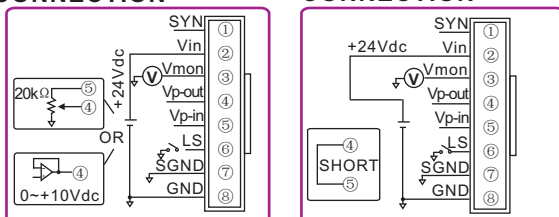
PIN	PARAMETER	DESCRIBE
1	NC	NC
2	+24Vdc Input	+24Vdc Input, <0.7A
3	Voltage Monitor	0 ~+10Vdc=0~100%±3%,Zout = 10kΩ
4	Voltage Program Out	0 ~+10Vdc=0~100%±3%,Zin= 100kΩ
5	Voltage Program In	0 ~+10Vdc=0~100%±3%,Zin = 100kΩ
6	LS	Low Start(ON=GND,OFF=OPEN)
7	Power Ground	Power Ground
8	Power Ground	Power Ground

**M2/M3 DIGITAL PIN INFORMATION <sup>D</sup>**

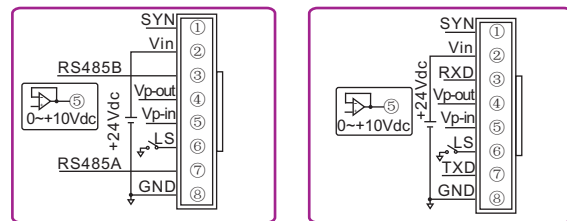
PIN	PARAMETER	DESCRIBE
1	NC	NC
2	+24Vdc Input	+24Vdc Input,<0.7A
3	RS485B/RXD	RS485B/RXD
4	kV Program Out	0 ~+10Vdc=0~100%±3%,Zin= 100kΩ
5	kV Program In	0 ~+10Vdc=0~100%±3%,Zin =100kΩ
6	LS	Low Start(ON=GND,OFF=OPEN)
7	RS485A/TXD	RS485A/TXD
8	Power Ground	Power Ground

**CONNECTION INFORMATION**

**PF EXTERNAL PROGRAMING CONNECTION      PF INTERIOR PROGRAMING CONNECTION**



**PF CONNECTION RS485 <sup>D</sup>      PF CONNECTION RS232 <sup>D</sup>**

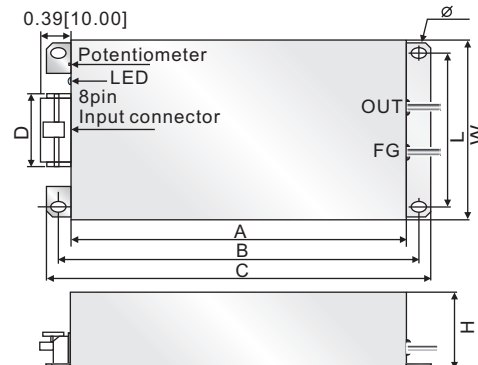


**OUTPUT PIN INFORMATION**

PIN	PARAMETER	DESCRIBE
1	FG	Floating Ground
2	OUT	High Voltage Output

**DIMENSIONS : inch [mm]**

	A	B	C	W	L	H	D	φ	Weight
Float voltage ≤5kV	4.33 [110]	4.65 [118]	4.96 [126]	1.97 [50]	1.57 [40]	0.98 [25]	0.94 [24]	0.14x0.19 [3.5x5]	300g
Float voltage >5kV	7.28 [185]	7.67 [195]	8.07 [205]	3.94 [100]	3.54 [90]	1.69 [43]	1.44 [36.6]	0.18x0.24 [4.5x6]	1.5kg



CUSTOM APPLICATION