FL SERIES

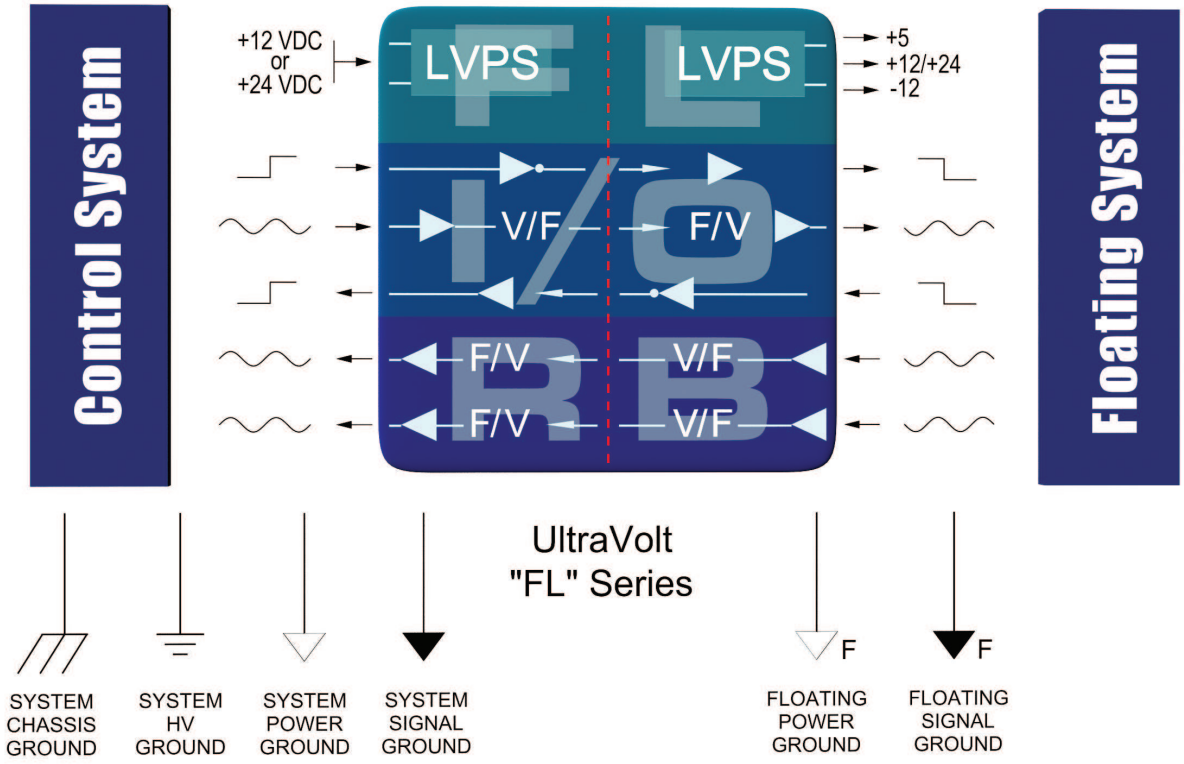
Floating Hot Deck LVPS With Isolated Digital and Analog I/O

The FL Series of floating-hot-deck, low-voltage power supplies offers an integrated solution for systems requiring LV power & controls with high-voltage isolation. Combining a highly isolated, DC-to-DC, multi-output low-voltage power supply (LVPS) with an advanced isolated digital & analog I/O topology, the FL sub-system provides both power and controls to floating-hot-deck circuitry. This solution, when combined with one or more UV HVPS or other circuitry, can provide high-performance solutions for applications such as:

Floating/Stacked Ion or E-Beam Biases	Floating Filament Bias
Floating Pulsers & Gated Grids	Floating Capacitance Meters
Floating High Side Current Monitors	Floating Leakage Testers

Please contact UltraVolt's customer service department for an analysis of your requirements.

- Isolated up to 15kV
- DC leakage current of <10nA
- AC leakage capacitance of <40pF
- 3 regulated floating LV power outputs
- Isolated digital I/O to and from floating hot deck
- Isolated analog I/O to and from floating hot deck
- UL, cUL, IEC-60950-1, and Demko Recognized



Specifications subject to change without notice.

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PARAMETER	CONDITIONS	MODELS		UNITS
INPUT POWER:		**12V MODELS**	**24V MODELS**	
Voltage Range	Full Power	+12 ± 5%	+24 ± 5%	VDC
Voltage Range	Derated Power Range	+10.8 to +16	+21.6 to +30	VDC
Current	Standby (Disabled)	< 90	< 50	mA
Current	No Load	< 0.15	< 0.15	A
Current	Max Load	< 1.60	< 1.40	A
AC Ripple Current	Nominal Input, Full Load	< 80	< 100	mA p-p
LOCAL CONTROLS: REFERENCE		**ALL TYPES**		
Output Voltage	T = +25°C, Initial value	+5.1 ± 1%		VDC
Output Impedance	T = +25°C	464 ± 1%		Ω
Stability	Over full temperature range	0.2		mV/°C
LOCAL CONTROLS: LVPS ENABLE / DISABLE		**ALL TYPES**		
Power supply on	Open, or a voltage above TTL high	+2.4 to 32		VDC
Power supply off	Grounded, or a voltage below TTL low	0 to + 0.7 ± 0.2 (Isink 1mA minimum)		VDC
INPUT / OUTPUT ISOLATION:		**12V MODELS**	**24V MODELS**	
Isolation Voltage	Continuous	15	15	kV
Leakage Current	All inputs to all outputs	< 10 std, < 100 "-E"	< 10 std, < 100 "-E"	nA
Leakage Capacitance	All inputs to all outputs	< 40 std, < 50 "-E"	< 50 std or "-E"	pF
ISOLATED POWER OUTPUTS:		**15FL12-12W**	**15FL24-24W**	
Output #1 Power	Nominal input, max Iout	12	24	W
Output #1 Voltage	Nominal input voltage range	+12 ± 2%	+24 ± 2%	VDC
Output #1 Current	Minimum to Maximum	0 to 1	0 to 1	A
Output #1 Line Regulation	Nominal input range, full load	< 0.1%	< 0.1%	VDC
Output #1 Load Regulation	No load to full load	< 0.1%	< 0.1%	VDC
Output #1 Ripple	Full load	< 2%	< 1%	V p-p
Output #2 Voltage	Nominal input voltage range	-15 ± 1	-15 ± 1	VDC
Output #2 Current	Minimum > Maximum	0 to 10	0 to 10	mA
Output #2 Line Regulation	Nominal input range, full load	< 0.1%	< 0.1%	VDC
Output #2 Load Regulation	No load to full load	< 2%	< 2%	VDC
Output #2 Ripple	Full load	< 2%	< 2%	V p-p
Output #3 Voltage	Nominal input voltage range	+5.6 ± 6%	+5.6 ± 6%	VDC
Output #3 Current	Minimum > Maximum	0 to 10	0 to 10	mA
Output #3 Line Regulation	Nominal input range, full load	< 1 %	< 1 %	VDC
Output #3 Load Regulation	No load to full load	< 1 %	< 1 %	VDC
Output #3 Ripple	Full load	< 1 %	< 1 %	V p-p
ISOLATED CONTROLS: TTL CHANNEL "UP"		**ALL TYPES WITH "-I/O" OPTION**		
Local input	Source voltage, sink current	10MΩ internal pull up to +15V <1V low, >2.5V high		VDC
Isolated output	Inverted & buffered TTL	Open collector with internal 1kΩ pull up to +5V Can sink 10mA max		VDC
Baud Rate	Varying duty cycle	DC to >300		kHz
ISOLATED CONTROLS: ANALOG CHANNEL "UP"		**ALL TYPES WITH "-I/O" OPTION**		
Local input voltage	Range	0 to + 5		VDC
Local input impedance		10 Meg		Ω
Isolated output voltage	Range	0 to + 5		VDC
Isolated output impedance		Buffered low impedance		-
Initial offset error		< ± 1%		mV
Gain error	Full scale	< ± 2%		VDC
Linearity error	0 to full scale	< ± 1%		VDC
Stability	30 min. warm-up, per 8 hrs / per day	< 0.01% / < 0.02%		VDC
Temperature Coefficient	0 to +55°C	< ± 50		ppm/°C
Bandwidth	Symmetric or asymmetric signal	DC to 30 (-3dB point is 47 Hz)		Hz

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'-RB' ISOLATED CONTROLS: TTL CHANNEL "DOWN"				
PARAMETER	CONDITIONS	ALL TYPES WITH "-I/O-R/B" OPTION		UNITS
Isolated 'Hot Deck' Input	Source voltage, sink current	10MΩ internal pull up to +15V <1V low, >2.5V high		VDC
Local output	Inverted & Buffered TTL	Open collector with internal 1kΩ pull up to +5V Can sink 10mA max		VDC
Bandwidth	Varying duty cycle	DC to >300		kHz
ISOLATED CONTROLS: ANALOG CHANNELS #1 & #2 "DOWN"				
PARAMETER	CONDITIONS	ALL TYPES WITH "-I/O-R/B" OPTION		UNITS
Isolated 'Hot Deck' +Input	Range	0 to +5, 0 to +10 with >+15VDC input power		VDC
Isolated 'Hot Deck' -Input	Range	0 to –5, 0 to -10 with >+15VDC input power		VDC
Isolated 'Hot Deck' + or - Input impedance	Signal source	> 10 Meg		Ω
Local output +voltage	Range	0 to +5, 0 to +10 with >+15VDC input power		VDC
Local output -voltage	Range	0 to –5, 0 to -10 with >+15VDC input power		VDC
Local output impedance	Signal source	Buffered low impedance		Ω
Initial offset error	Signal source	< ± 5		mVDC
Gain error	Full scale	< ± 1%		VDC
Linearity error	0 to full scale	< ± 1%		VDC
Stability	30 min. warm-up, per 8 hrs / per day	< 0.01% / < 0.02%		VDC
Temperature Coefficient	-20 °C to +55 °C	< ± 50		ppm/°C
Bandwidth	Symmetric or asymmetric signal	DC to 30 (-3dB point is 47Hz)		Hz
TEMPERATURE:	CONDITIONS	ALL TYPES		
Operating	Full load, case measurement	-20 to +55		°C
Storage	Non-operating, case measurement	-55 to +85		°C
Thermal shock	Mil-Std-810, Method 503-4, Proc. II	-20 to +55		°C
ALTITUDE:		ALL TYPES		
Operating	All operating conditions	Sea level to Vacuum		
Storage	Non-operating	Sea level to Vacuum		
SHOCK & VIBRATION:		STANDARD	- R/B OPTION	
Shock	Mil-Std-810, Method 516.5, Proc IV	20	20	G's
Vibration	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10	10	G's

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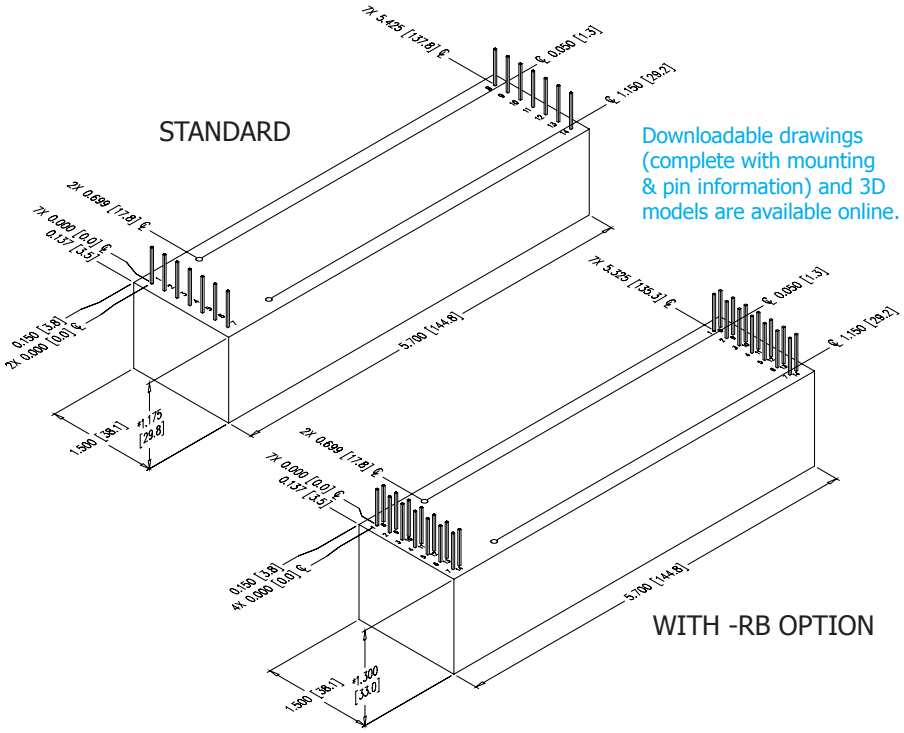

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948

SIZE

Volume: Standard: 10 in³ (163.9cc)
-R/B Option: 11.1 in³ (182cc)

Weight: Standard: 12.0 oz (340.2g)
-R/B Option: 13.3 oz (377.1g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole locations ±0.025" (0.64)

NOTES

24-watt versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) in height.
Contact UV Customer Service for drawings of models equipped with -E options.

IEC-60950-1

Non-RoHS compliant units are available. Please contact the factory for more information.

LOCAL CONNECTIONS	
PIN	FUNCTION
1	Input Power Ground Return
2	Positive Power Input
3	LVPS Enable/Disable Input
4	TTL Up/HVPS Enable/Disable (-I/O Only)
5	Signal Ground Return
6	Analog Up/ HVPS Remote Programming Input (-I/O Only)
7	+5V Reference Output

ISOLATED/FLOATING CONNECTIONS	
PIN	FUNCTION
8	Floating PWR Ground Return
9	Floating +12VDC or +24VDC Output
10	Floating -15VDC Output
11	Floating TTL Up/HVPS Enable/Disable (-I/O Only)
12	Floating Signal Ground Return
13	Floating Analog Up/HVPS Remote Programming Input (-I/O Only)
14	Floating +5.6V Reference Output

ADDITIONAL LOCAL CONNECTIONS (-R/B OPTION)	
PIN	FUNCTION
8	+Iout monitor output (Analog Down Channel 1)
9	-Iout monitor output (Analog Down Channel 1)
10	+Eout monitor output (Analog Down Channel 2)
11	-Eout monitor output (Analog Down Channel 2)
12 & 13	N/C (reserved for future use)
14	TTL output (Digital Down Channel 1)

ADDITIONAL ISOLATED CONNECTIONS (-R/B ONLY)	
PIN	FUNCTION
1	Floating +Iout monitor input (Analog Down Channel 1)
2	Floating -Iout monitor input (Analog Down Channel 1)
3	Floating +Eout monitor input (Analog Down Channel 2)
4	Floating -Eout monitor input (Analog Down Channel 2)
5 & 6	N/C (reserved for future use)
7	Floating TTL input (Digital Down Channel 1)

ORDERING INFORMATION		
Type	15kV Isolation	15FL
Input Voltage	12VDC Nominal	12
	24VDC Nominal	24
Power	Watts Output (12 V Only)	-12W
	Watts Output (24 V Only)	-24W
Options	(1) Digital Up Channel & (1) Analog Up Channel	-I/O
	(1) Digital Down Channel & (2) Analog Down Channels	-RB
	Partial Mu-Metal Shield	-M
Case	Plastic Case - Diallyl Phthalate	Standard
	'Eared' Chassis Mounting Plate	-E

PROUDLY

MADE IN THE USA

Example: 15FL12-12W-I/O

Type — Isolation — Model — Input — Power — Option

Rev. N 9/12

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