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GFR1K5 series

XP Power

1.5kW Fan cooled

AC-DC power supplies

The GFR1K5 is a 1U 1.5kW AC-DC front end with market leading power density that is designed for use in communications applications such as networking, broadcast, data storage, power over ethernet, power amplifiers and other applications that require bulk power and/or need redundant or hotswap power supplies.

The GFR1K5 delivers 1.2kW at Low Line and 1.5kW at High Line with four output models 12V, 24V, 48V and 56V. The 56V model meets the requirements of the IEEE 802.3.AF for power over ethernet. All four models have the same form factor making it easy to design a system that needs to combine output voltages.



Features

- Programmable output voltage (0-105%)
- 1.5kW high line 1.2kW low line fan cooled
- 299.7mm x 101.6mm footprint, 43.33mm profile
- Regulated single outputs 12 to 56VDC
- Input range 85 to 264VAC
- 1U blind mate, hotswap, redundancy
- 1U 19" subrack accepts up to 4 x GFR's (6kW)
- 56VDC Power over Ethernet compatible model
- AC OK, DC OK, inhibit, enable, 5VDC standby
- Current share & I²C interface
- 3 year warranty

Applications

IoT/Industry 4.0

Robotics / Industrial Electronics

Semiconductor Manufacturing

Dimensions

299.7 x 101.6 x 43.3mm (11.80" x 4.00" x 1.70")

More resources

Click the link or scan the code

xppower.com

Models & ratings

Model number	Output voltage V1	Voltage Adjust V1	Output current		Standby Supply V2	Output power
			90-264VAC	>180VAC		
GFR1K5PS12	12.0VDC	11-14V	100A	100A	5VDC/1A	1.2kW
GFR1K5PS24	24.0VDC	22-28V	50A	63A	5VDC/1A	1.5kW
GFR1K5PS48	48.0VDC	45-52V	25A	31A	5VDC/1A	1.5kW
GFR1K5PS56	56.0VDC	54-59V	22A	27A	5VDC/1A	1.5kW

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage	85		264	VAC	See derating curve
Input frequency	47		63	Hz	
Power factor		>0.9			
Input current		13/6.5		A	115/230VAC
Inrush current			35	A	264VAC
Earth leakage current			1.5	mA	264VAC/60Hz
Input protection	T20A/250VAC fuse in line and neutral				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	12		56	VDC	See models & ratings table
Output trim	By potentiometer, see models & ratings table				
Minimum load	No minimum load required				
Start up delay		1		s	
Line regulation			±0.5	%	
Load regulation			±0.5	%	V1
			±5.0	%	V2
Transient response		4		%	Deviation, recovery to within 2% in 500µs for 50-75-50% load change
Ripple & noise			1	% pk-pk	24-56VDC models, 20MHz bandwidth
			2		12VDC models, 20MHz bandwidth
			3		V standby, 20MHz bandwidth
Overvoltage protection	115		140	%	V1 nominal, recycle input AC to reset
Overtemperature protection	Protects the unit against overtemperature, auto restart.				
Overcurrent protection	110		140	%	V1, V standby power limited
Short circuit protection	Continuous, trip and restart (hiccup mode)				
Temperature coefficient		±0.02		%/°C	After 20 minute warm up
Remote sense	Compensates for 0.5VDC total drop				
Current share	Share up to 8 units maximum, units share current within 10% of each other at full load.				

General

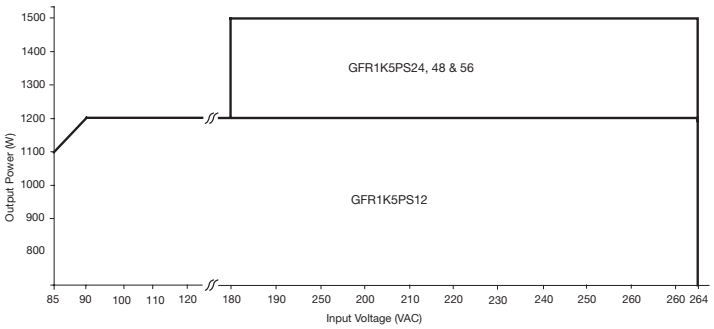
Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		90		%	
Isolation: input to output	3000			VAC	
input to output	4000			VAC	48-56V
input to ground	1500			VAC	
output to ground	500				
output to ground	1500				48-56V
Switching frequency		70		kHz	PFC converter
		130			Main converter
Power density		18		W/in^3	
Signals and controls	AC OK, DC OK, Inhibit, Enable, I^{2}C (see signals)				
Mean time between failure		470		khrs	TELECORDIA SR-332, 25°C, GB
Weight		2.35 (5.2)		kg (lb)	

Environmental

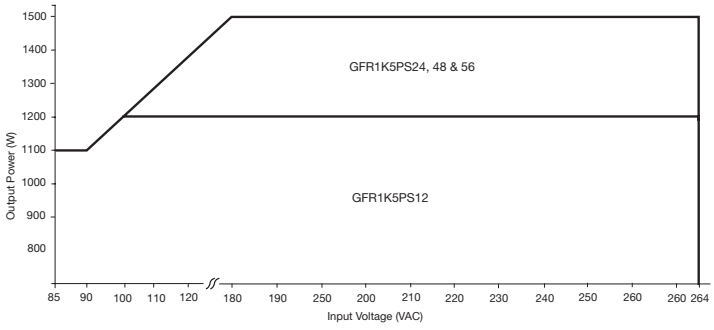
Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-20		+70	°C	Derate linearly from +50°C at 2.5%/°C to 50% load at +70°C
Storage temperature	-40		+85	°C	
Cooling	Internal load dependant variable speed fans				
Humidity		95		%RH	Non-condensing
Shock	±3 shocks in each axis (total 18 shocks) 30g 11ms (half sine). Compliant with EN60068-2-27				
Vibration	2g 10-500Hz 10 sweeps. Compliant with EN60068-2-6				

Derating curves

Input derating curve



Thermal derating curve



EMC: emissions

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	Class A	Contact sales for class B conducted emissions performance
Radiated	EN55032	Class A	
Harmonic currents	EN61000-3-2	Class A	
	EN61000-3-2	Class C	For loads >20%
Voltage flicker	EN61000-3-3		

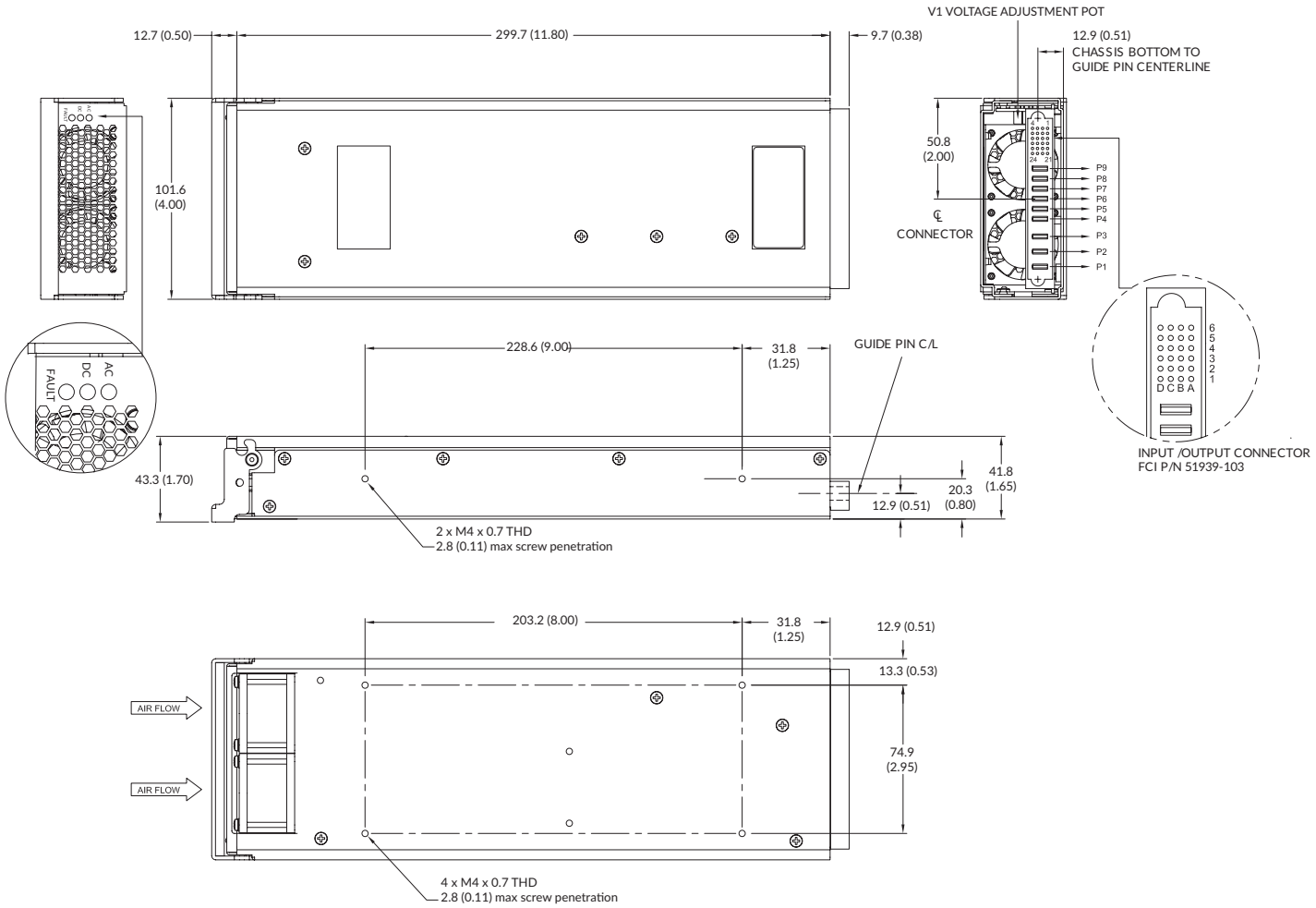
Emissions - immunity

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2	Level 3	A	
Radiated	EN61000-4-3	Level 3	A	
EFT/burst	EN61000-4-4	Installation class 3	A	
Surges	EN61000-4-5	Level 3	A	
Conducted	EN61000-4-6	Level 3	A	
Dips and interruptions	EN61000-4-11	30%10ms	A	Semi F47 compliant
		60%100ms	B	
		100% 500ms	B	

Safety approvals

Certification	Standard	Notes & conditions
CB	IEC62368, IEC60950	
UL	UL62368	
EN	EN62368	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Mechanical details



Pin	Function
P1	AC NEUTRAL
P2	AC LINE
P3	CHASSIS GND
P4	-VOUT
P5	-VOUT
P6	-VOUT
P7	+VOUT
P8	+VOUT
P9	+VOUT

Pin	Function	Pin	Function
A6	SIGNAL GND	A3	GA1 (I^2C)
B6	DC OK	B3	GA0 (I^2C)
C6	INHIBIT	C3	I^2C GND
D6	FAULT	D3	PMB SDA (DATALINE)
A5	AC OK/POWER FAIL	A2	PMB SCL (CLOCK)
B5	ENABLE (48-56V models)	B2	PWR ID
C5	NC	C2	V TRIM
D5	CURRENT MONITOR	D2	ENABLE (12-24V models)
A4	NC	A1	CURRENT SHARE
B4	5V STANDBY RETURN	B1	NC
C4	5V STANDBY	C1	-SENSE
D4	GA2 (I^2C)	D1	+SENSE

Notes:

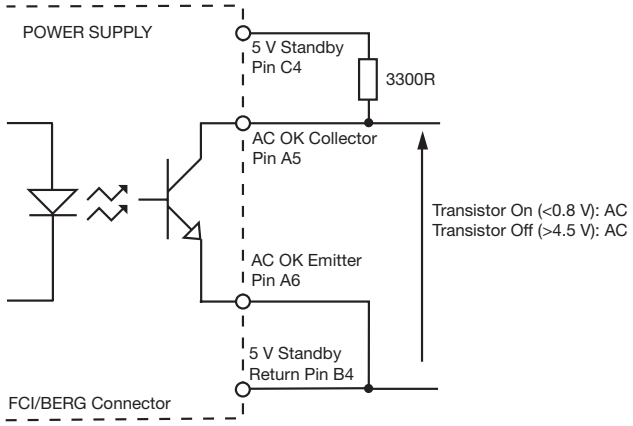
1. All dimensions are in mm (inches).
   Tolerance X.XX = 0.50 (±0.02); X.XXX = 0.25 (±0.01)
2. Weight 2.35kg (5.2lb).
3. Output connector: BERG/FCI P/N 51939-103LF
   Mating connector: BERG/FCI P/N 51866-025LF right-angle PCB receptacle

Signals

AC OK/Power Fail

AC OK is an isolated signal providing a minimum of 5ms warning of loss of output regulation. The signal is fully isolated and the collector and emitter must be connected externally.

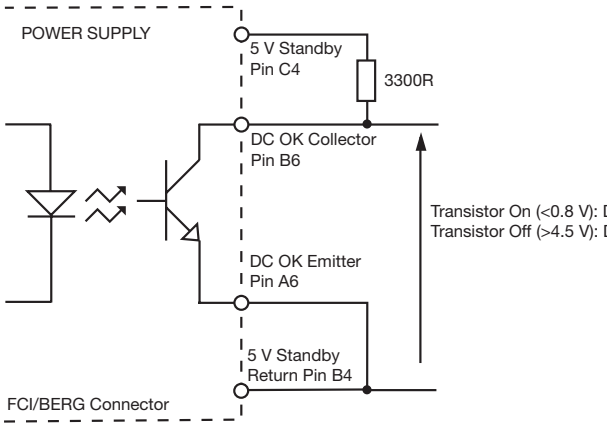
Maximum sink current 2mA, maximum voltage 20V.



DC OK

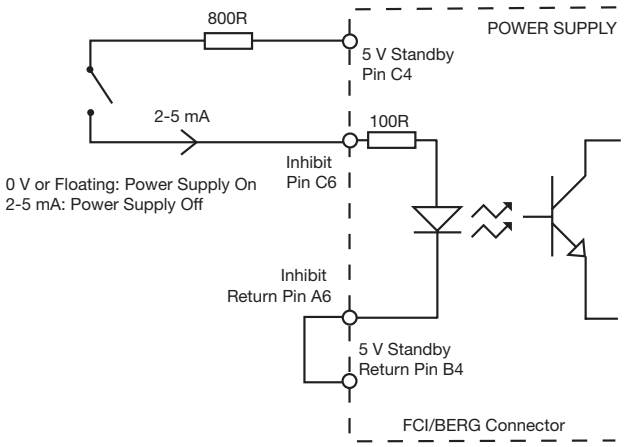
DC OK is an isolated signal providing warning that the output voltage has fallen below 90% of nominal. The signal is fully isolated and the collector and emitter must be connected externally.

Maximum sink current 2mA, maximum voltage 20V.



Inhibit

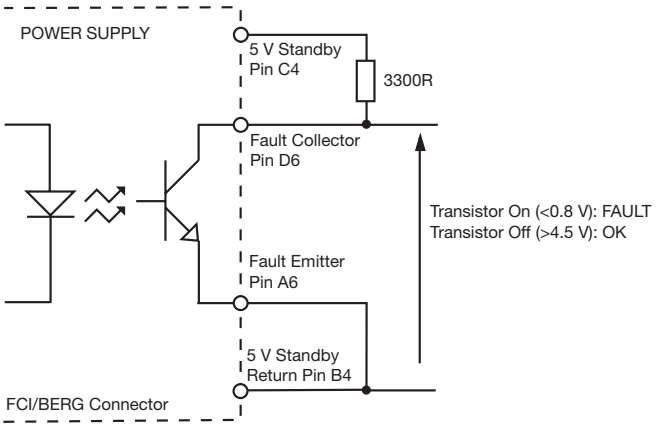
Inhibit is an isolated control signal which can turn the power supply off by supplying 2 to 5mA into the pin.



Fault

Fault is an isolated signal providing warning of either Power Fail, DC Fail or Fan Fault. The signal is fully isolated and the collector and emitter must be connected externally.

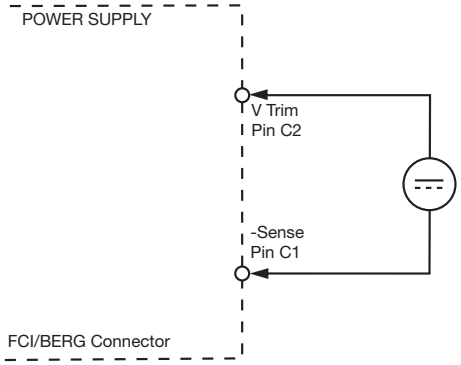
Maximum sink current 2mA, maximum voltage 20V.



Signals

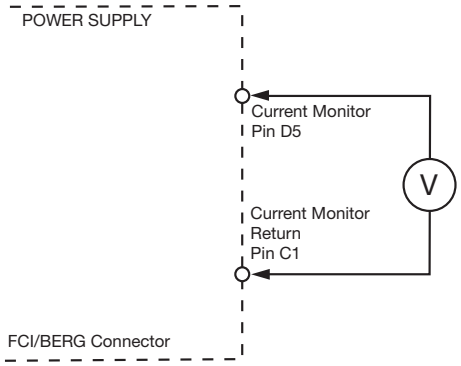
V Program

V Program allows remote voltage adjustment within the range ±10%



V Program	V Output
0V	-10%
5V	+10%
Open Circuit	Factory Set Voltage

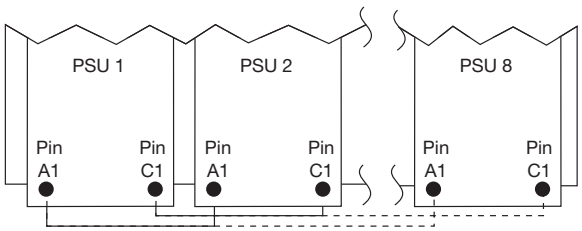
Current Monitor



Model	Current Monitor	Approx Output Current
GFR1K5PS12	1.5V	0%
	4.5V	100%
GFR1K5PS48	0.3V	0%
	4.5V	100%

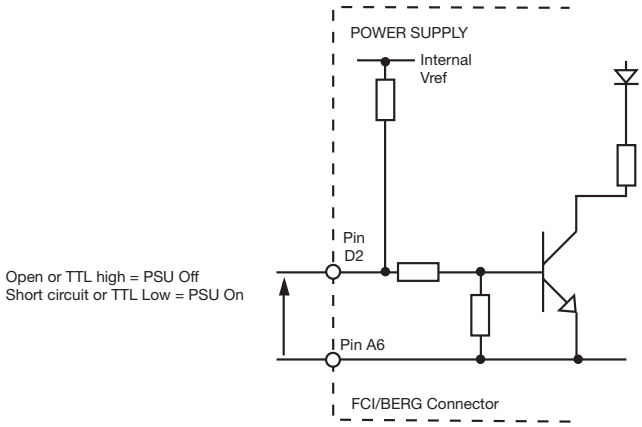
Current Share

Connecting pins A1 and C1 of like voltage units (16 maximum) will force the current to share between the outputs. Units share current within 10% of each other at full load. Derate output to 90% of total combined load.



Enable

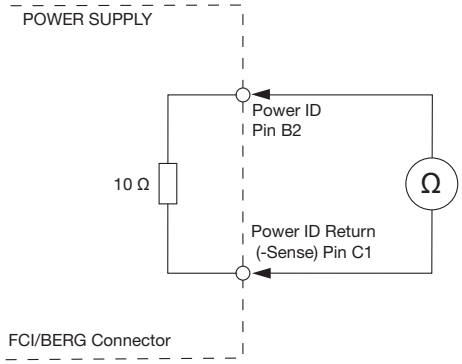
The enable pin D2 (12-24V models) or B5 (48-56V models) is shorter than the other pins and mates last, so that the unit does not power up until the connector is mated correctly connecting pin D2 to -Sense pin C1 thus avoiding connector arcing and premature ageing.



Signals

Power ID

The power ID pin B2 can be used to detect the presence of the unit when fitted in a rack.



I²C Interface

The I²C PMBus compatible interface can be used for monitoring the output voltage, current, internal temperature and run time. It can also be utilized to turn the unit on and off, detect faults along with identification of the unit model number and serial number.

A separate handbook detailing the use of this interface including comprehensive application notes is available, please contact sales for details.

GFR1K5 Rack

A standard 1U 19" Rack is also available which has space for 4 GFR's (6kW) along with I/O connections for power, signals & control.

The standard rack is easily customized to suit customer specific requirements.

Consult handbook for full information.



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