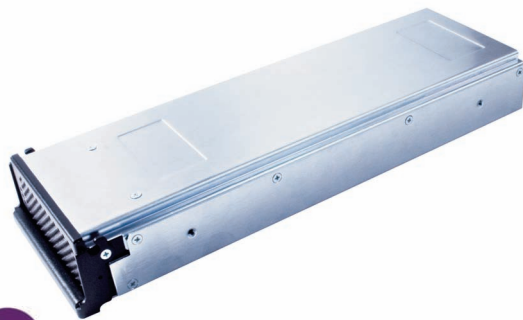


1500 Watts

GFR Series



- 1U Blind-Mate, Hotswap, Redundant
- All Models Share Same Compact Size
- 56 V Power Over Ethernet Compatible Model
- Up to 6 kW in 1U (Rack Available)
- AC OK, DC OK, Inhibit, Enable, 5 V Standby
- Current Share & I²C Interface
- 3 Year Warranty

Specification

Input

| | |
|-----------------------|---|
| Input Voltage | • 85-264 VAC, see derating curve |
| Input Frequency | • 47-63 Hz |
| Input Current | • 13 A/6.5 A typical at 115/230 VAC |
| Inrush Current | • 35 A maximum at 264 VAC |
| Power Factor | • >0.9 |
| Earth Leakage Current | • 1.5 mA max 264 VAC 60Hz |
| Input Protection | • Internal T20 A/250 V fuse in line and neutral |

Output

| | |
|----------------------------|--|
| Output Voltage | • See model table |
| Output Voltage Trim | • Via potentiometer, see model table |
| Initial Set Accuracy | • ±1% of nominal with 50% load |
| Minimum Load | • No minimum load required |
| Line Regulation | • ±0.5% maximum |
| Load Regulation | • V1: ±0.5%, V2: ±5% |
| Start Up Delay | • 1 s typical |
| Over/Undershoot | • 0.5% typical |
| Transient Response | • 4% deviation, recovery to within 2% in 500 µs for 50-75-50% load change |
| Ripple & Noise | • 24-56 V models: 1% max pk-pk 12 V models: 2% max pk-pk V Standby: 3% max pk-pk, 20 MHz bandwidth |
| Overshoot Protection | • 115-140% of 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 0.5V total drop |
| Current Share | • Share up to 8 units maximum, units share current within 10% of each other at full load. |

General

| | |
|---------------------|---|
| Efficiency | • 90% typical |
| Isolation | • 3000 VAC Input to Output, 4000 VAC Input to Output (48-56 V) 1500 VAC Input to Ground, 500 VDC Output to Ground 1500 VAC Output to Ground (48-56 V) |
| Switching Frequency | • 70 kHz PFC typical, 130 kHz main converter typical |
| Power Density | • 18 W/in ³ |
| Signals | • AC OK, DC OK, Inhibit, Enable, I ² C (see Signals page 3 & 4) |
| MTBF | • 470 Khrs to TELECORDIA SR-332, 25 °C, GB |

Environmental

| | |
|-----------------------|---|
| Operating Temperature | • -20 °C to +70 °C, derate linearly from +50 °C at 2.5 %/°C to 50% load at +70 °C |
| Cooling | • Internal load dependant variable speed fans |
| Operating Humidity | • 95% RH, non-condensing |
| Storage Temperature | • -40 °C to +85 °C |
| Operating Altitude | • 3000 m |
| Shock | • ±3 shocks in each axis (total 18 shocks) 30 g 11 ms (half sine). Compliant with EN60068-2-27. |
| Vibration | • 2 g 10-500 Hz 10 sweeps. Compliant with EN60068-2-6. |

EMC & Safety

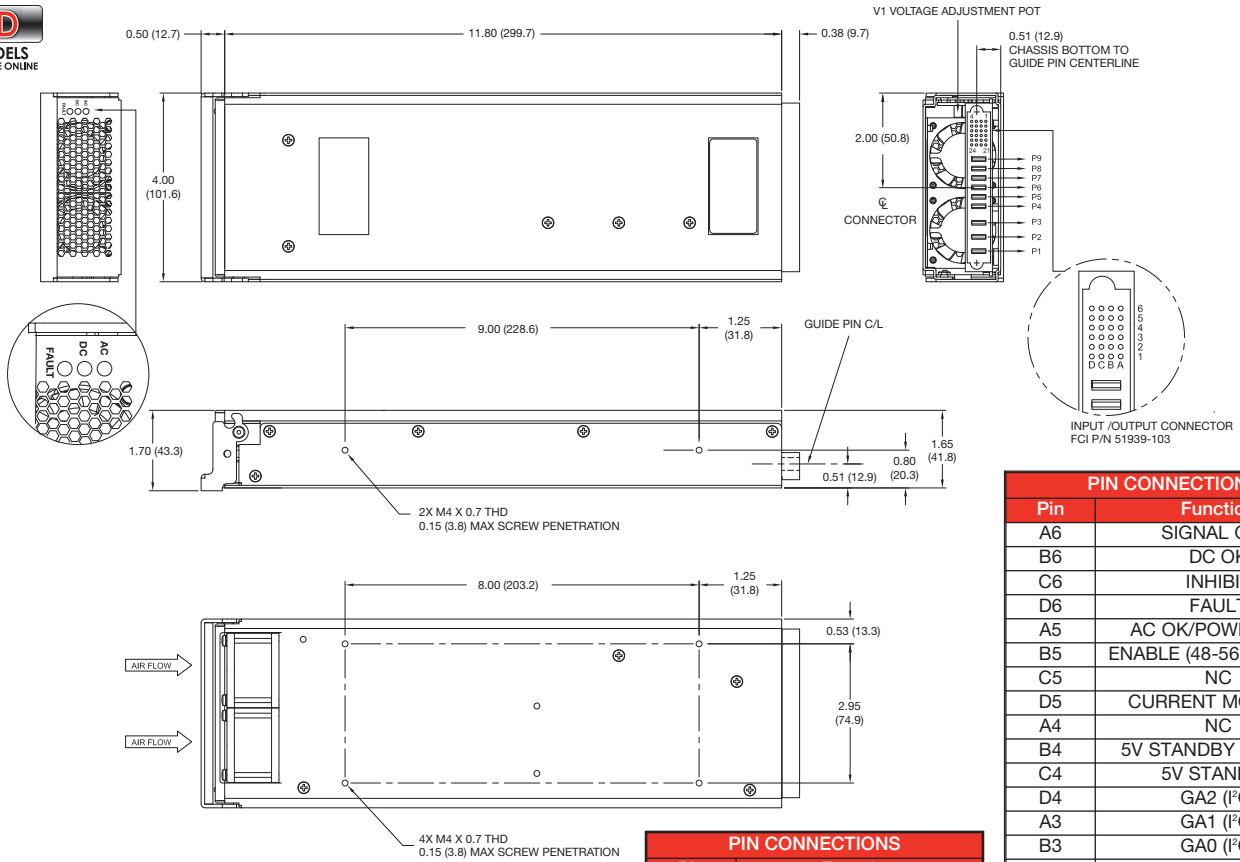
| | |
|----------------------|---|
| Emissions | • EN55022 class A conducted & radiated ⁽¹⁾ |
| Immunity | • Compliant with EN61204-3:2000 high severity levels |
| Harmonic Currents | • EN61000-3-2 class A EN61000-3-2 class C for loads >20% |
| Voltage Flicker | • EN61000-3-3 |
| ESD Immunity | • EN61000-4-2, level 3, Perf Criteria A |
| Radiated Immunity | • EN61000-4-3, level 3 Perf Criteria A |
| EFT/Burst | • EN61000-4-4, installation class 3, Perf Criteria A |
| Surge | • EN61000-4-5, level 3 Perf Criteria A |
| Conducted Immunity | • EN61000-4-6, level 3, Perf Criteria A |
| Dips & Interruptions | • EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B. Semi F47 Compliant. |
| Safety Approvals | • IEC60950-1: CB Report, CSA-C22.2 No. 60950-1-05, UL60950-1, TUV EN60950-1. |

Notes

1. Contact sales for class B conducted emissions performance.

| Output Power | Output Voltage V1 | Voltage Adj V1 | Output Current V1 | | Standby Supply V2 | Model Number |
|--------------|-------------------|----------------|-------------------|----------|-------------------|--------------|
| | | | 90-264 VAC | >180 VAC | | |
| 1200 W | 12.0 VDC | 11-14 V | 100 A | 100 A | 5 V/1 A | GFR1K5PS12 |
| 1500 W | 24.0 VDC | 22-28 V | 50 A | 63 A | 5 V/1 A | GFR1K5PS24 |
| 1500 W | 48.0 VDC | 45-52 V | 25 A | 31 A | 5 V/1 A | GFR1K5PS48 |
| 1500 W | 56.0 VDC | 54-59 V | 22 A | 27 A | 5 V/1 A | GFR1K5PS56 |

Mechanical Details



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

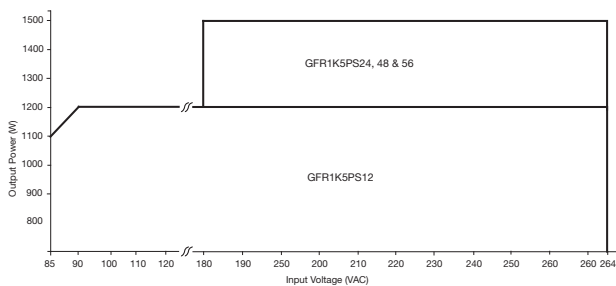
| PIN CONNECTIONS | |
|-----------------|-------------|
| Pin | Function |
| P1 | AC NEUTRAL |
| P2 | AC LINE |
| P3 | CHASSIS GND |
| P4 | -VOUT |
| P5 | -VOUT |
| P6 | -VOUT |
| P7 | +VOUT |
| P8 | +VOUT |
| P9 | +VOUT |

Notes

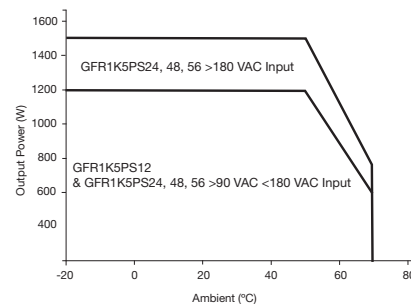
- All dimensions are in inches (mm).
Tolerance X.XX = ±0.02 (0.50); X.XXX = ±0.01 (0.25)
- Weight 5.2 lb (2.35 kg).
- Output connector: BERG/FCI P/N 51939-103LF
Mating connector: BERG/FCI P/N 51866-025LF right-angle PCB receptacle

Derating Curves

Input Derating Curve



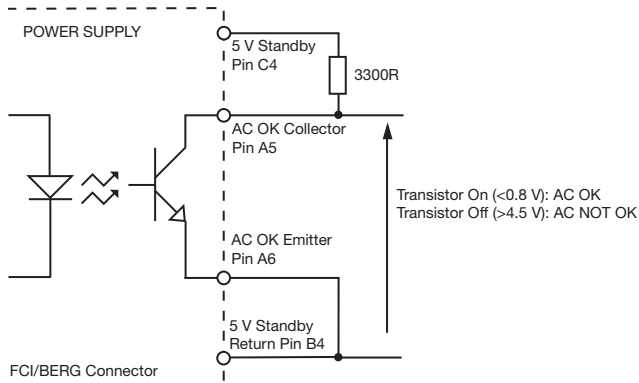
Thermal Derating Curve



AC OK/Power Fail

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

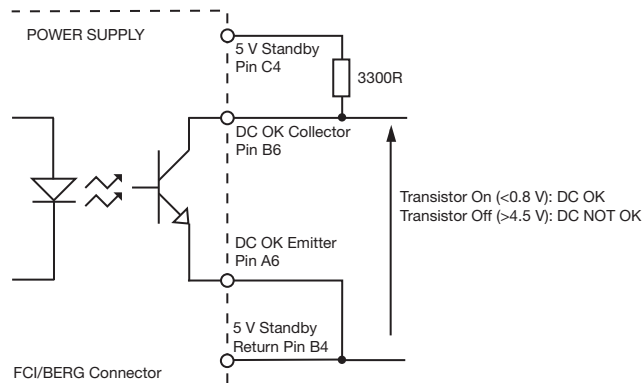
Maximum sink current 2 mA, maximum voltage 20 V.



DC OK

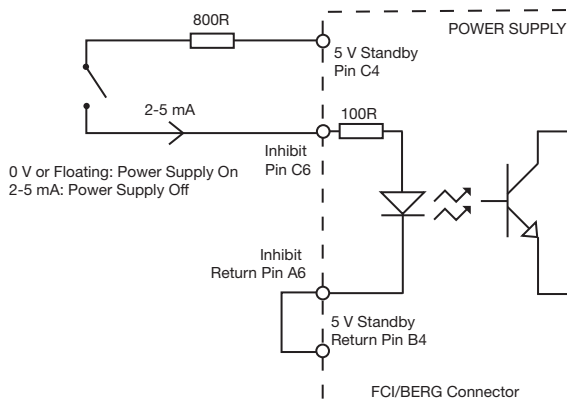
DC OK is an isolated signal providing warning that the output voltage has fallen below 90% of nominal. The signal is fully isolated and the collector and emitter must be connected externally.

Maximum sink current 2 mA, maximum voltage 20 V.



Inhibit

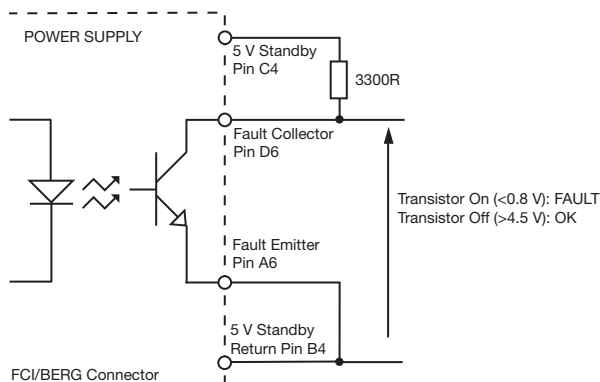
Inhibit is an isolated control signal which can turn the power supply off by supplying 2 to 5 mA into the pin.



Fault

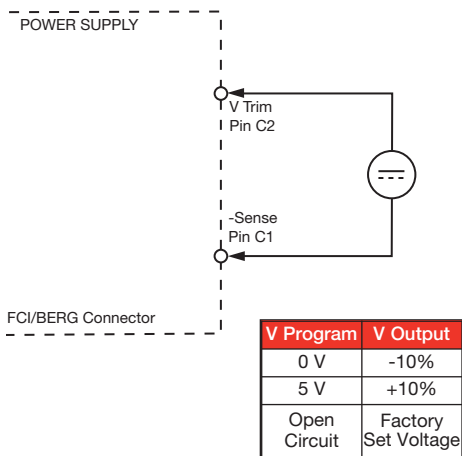
Fault is an isolated signal providing warning of either Power Fail, DC Fail or Fan Fault. The signal is fully isolated and the collector and emitter must be connected externally.

Maximum sink current 2 mA, maximum voltage 20 V.

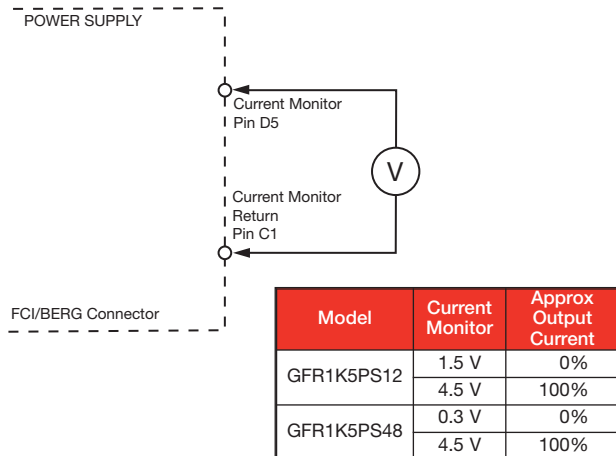


V Program

V Program allows remote voltage adjustment within the range $\pm 10\%$

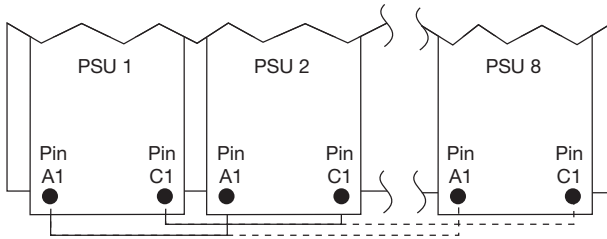


Current Monitor



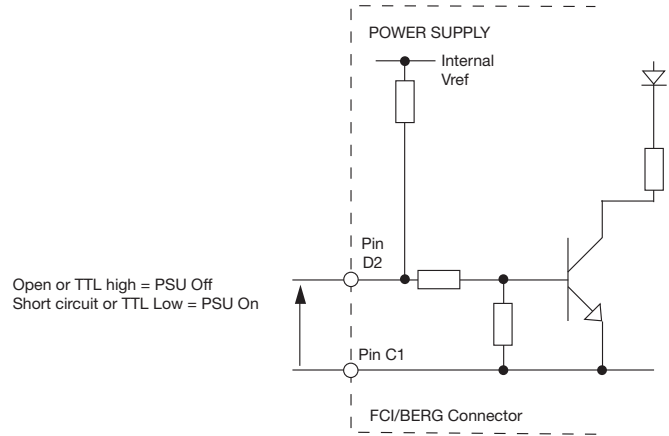
Current Share

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.



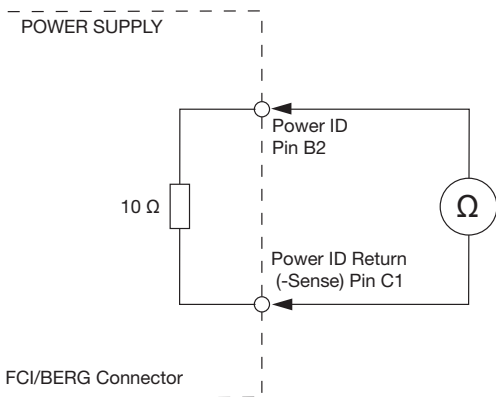
Enable

The enable pin D2 (12-24 V models) or B5 (48-56 V 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.



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 (6 kW) 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.