



FEATURES

- RoHS compliant
- 2000W (220Vac), 1200W (110Vac) Output Power
- 48V Main output, 3.3V, 5V or 12V standby output
- 1U sized; dimensions 12" x 4.75" x 1.6"
- 21.9 Watts per cubic inch density
- N+1 redundancy capable, including hot-docking
- Active current sharing on main output
- Over-voltage, over-current, over-temperature protection
- Internal cooling fans
- I²C Bus interface with status indicators
- Optional 1U x 19" power-shelf

DESCRIPTION

The D1U-W-2000 is a 2000 Watt, power-factor-corrected (PFC) front-end power supply for hot-swapping redundant systems. The main output is 48V and standby output of either 12V, 5V or 3.3V. Packaged in 1U low profile, it is designed to deliver reliable bulk power to servers, workstations, storage systems or any 48V distributed power architecture systems requiring high power density. The highly efficient electrical and thermal design with internal cooling fans supports reliable operation conditions. The D1U-W-2000 is designed to auto-recover from over-temperature faults. Status information is provided with front panel LEDs, logic signals and I²C management interface. Three units can be packaged into an optional 19" 1U power shelf to provide up to 6.0kW of power.

SELECTION GUIDE

| Model Number | Power Output High Line AC | Power Output Low Line AC | Main Output | Standby Output | Airflow |
|--------------------|---------------------------|--------------------------|-------------|----------------|---------------|
| D1U-W-2000-48-HC2C | 2000W | 1200W | 48V | 3.3V | Back to front |
| D1U-W-2000-48-HA2C | 2000W | 1200W | 48V | 5V | Back to front |
| D1U-W-2000-48-HB2C | 2000W | 1200W | 48V | 12V | Back to front |

INPUT CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-------------------------------|------------|------|------|------|-------|
| Input Voltage Operating Range | | 90 | | 264 | Vac |
| Input Frequency | | 47 | 55 | 63 | Hz |
| Turn-on Input Voltage | Ramp up | 78.5 | | 86.5 | Vac |
| Turn-off Input Voltage | Ramp down | 70.5 | | 78 | |
| Maximum Input Current | | | | 15 | Arms |
| Inrush Current | | | | 90 | Apk |

OUTPUT VOLTAGE CHARACTERISTICS

| Output Voltage | Parameter | Conditions | Min. | Typ. | Max. | Units |
|----------------|-------------------------------------|-----------------|-------|------|-------|--------|
| 48V | Voltage Set Point Accuracy | | | 48 | | Vdc |
| | Line and Load Regulation | | 46.54 | | 49.44 | |
| | Ripple Voltage & Noise ¹ | 20MHz Bandwidth | | | 480 | mV p-p |
| | Output Current | | 2 | | 41.3 | A |
| 3.3Vsb | Voltage Set Point Accuracy | | | 3.3 | | Vdc |
| | Line and Load Regulation | | 3.2 | | 3.4 | |
| | Ripple Voltage & Noise ¹ | | | | 50 | mV p-p |
| | Operating Range | | 0 | | 4.5 | A |
| 5Vsb | Voltage Set Point Accuracy | | | 5 | | Vdc |
| | Line and Load Regulation | | 4.85 | | 5.15 | |
| | Ripple Voltage & Noise ¹ | | | | 50 | mV p-p |
| | Operating Range | | 0 | | 4 | A |
| 12Vsb | Voltage Set Point Accuracy | | | 12 | | Vdc |
| | Line and Load Regulation | | 11.2 | | 12.4 | |
| | Ripple Voltage & Noise ¹ | | | | 120 | mV p-p |
| | Operating Range | | 0 | | 1.7 | A |

OUTPUT CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|--|-------------------|------|------|-------|-------|
| Remote Sense | | | 240 | | mV |
| Efficiency | 220Vac | | 90.6 | | % |
| Start-up Time | AC ramp up | | 1.5 | | s |
| | PS_On activated | | 150 | | ms |
| Transient Response | 48V Ramp 1A/μs | | | ±2700 | mV |
| | 12Vsb Ramp 1A/μs | | | ±600 | |
| | 5Vsb Ramp 1A/μs | | | ±250 | |
| | 3.3Vsb Ramp 1A/μs | | | ±165 | |
| Current sharing accuracy (up to 3 in parallel) | At 100% load | | | ±10 | % |
| Hold-up Time | | 17 | | | ms |

¹ Ripple and noise are measured with 0.1 uF of ceramic capacitance and 10 uF of tantalum capacitance on each of the power supply outputs. The output noise requirements apply over a 0 Hz to 20 MHz bandwidth. A short coaxial cable with 50ohm scope termination is used.



| GENERAL CHARACTERISTICS | | | | | |
|-----------------------------|---|------|------|------|-------|
| Parameter | Conditions | Min. | Typ. | Max. | Units |
| Storage Temperature Range | Non-condensing | -40 | | 70 | °C |
| Operating Temperature Range | | 0 | | 50 | |
| Operating Humidity | Non-condensing | 10 | | 90 | % |
| Storage Humidity | | 5 | | 90 | |
| Shock | 30G non operating | | | | |
| Sinusoidal Vibration | 0.5G, 5 – 500 Hz | | | | |
| MTBF | Calculated per Bellcore at Ta=30°C | 200 | | | Khrs |
| | Demonstrated | 200 | | | Khrs |
| Safety Approvals | c-CSA-us (CSA 60950-1-03/UL 60950-1, First Edition) | | | | |

| PROTECTION CHARACTERISTICS | | | | | | |
|----------------------------|------------------|--------------|------|------|------|-------|
| Output Voltage | Parameter | Conditions | Min. | Typ. | Max. | Units |
| 48V | Over-temperature | Auto-restart | 55 | | 65 | °C |
| | Over Voltage | Latching | 54 | | 59 | V |
| | Over Current | Latching | 44 | | 50 | A |
| 12Vsb | Over Voltage | Latching | 13 | | 14 | V |
| | Over Current | Latching | 2.5 | | 3 | A |
| 3.3Vsb | Over Voltage | Latching | 3.57 | | 4.02 | V |
| | Over Current | Latching | 6.5 | | 8 | A |
| 5Vsb | Over Voltage | Latching | 5.6 | | 6 | V |
| | Over Current | Latching | 5 | | 7 | A |

| ISOLATION CHARACTERISTICS | | | | | |
|---|------------------------------|------|------|------|-------|
| Parameter | Conditions | Min. | Typ. | Max. | Units |
| Insulation Safety Rating / Test Voltage | Input to Output - Reinforced | 3000 | | | Vrms |
| | Input to Chassis - Basic | 1500 | | | Vrms |
| Isolation | Output to Chassis | | | | |
| | Output to Output | | | | |
| Material Flammability | UL 94V-0 | | | | |

| CONTROL SIGNALS | | |
|----------------------------|-----------------|--|
| Status | Conditions | Description |
| LED | Off | No AC input to all PS |
| | Flashing Yellow | Power Supply Failure |
| | Flashing Green | Main Output Absent |
| | Green | Power Supply Good |
| I ² C Registers | Status | PS-ON, PGOOD, ACOK, PS_BAD, FANFAIL, OT Warning & shutdown, AC Range |
| | Output Fault | 48V OV, 48V UV, 48V OC, Vsb Fail, Fan1 Fail, Fan2 Fail |
| | 48V Output | 8 bit scaled output voltage |
| | 48V | 8 bit scaled output current |
| | Fan1 Monitor | 8 bit scaled output current |
| | Fan2 Monitor | 8 bit scaled output current |

EMISSIONS AND IMMUNITY

| Characteristic | Description | Criteria |
|----------------------------------|--------------------------------------|---|
| Harmonics | IEC/EN 61000-3-2 | |
| Voltage Fluctuation and Flicker | IEC/EN 61000-3-3 | |
| Emission Conducted | FCC 47 CFR Parts 15/CISPR 22/EN55022 | Class A, 6dB margin |
| Emission Radiated | FCC 47 CFR Parts 15/CISPR 22/EN55022 | Class A, 6dB margin |
| ESD | IEC/EN 61000-4-2 | 4kV contact discharge |
| | | 8kV operational air discharge |
| | | 15kV non-operational air discharge |
| Electromagnetic Field | IEC/EN 61000-4-3 | |
| Electrical Fast Transients/Burst | IEC/EN 61000-4-4 | |
| Surge | IEC/EN 61000-4-5 | 1kV/2kV, Performance Criteria B |
| RF Conducted Immunity | IEC/EN 61000-4-6 | 3 Vac, 80% AM, 1kHz, Performance Criteria A |
| Magnetic Immunity | IEC/EN 61000-4-8 | 3 A/m |
| Voltage dips, interruptions | IEC/EN 61000-4-11 | |

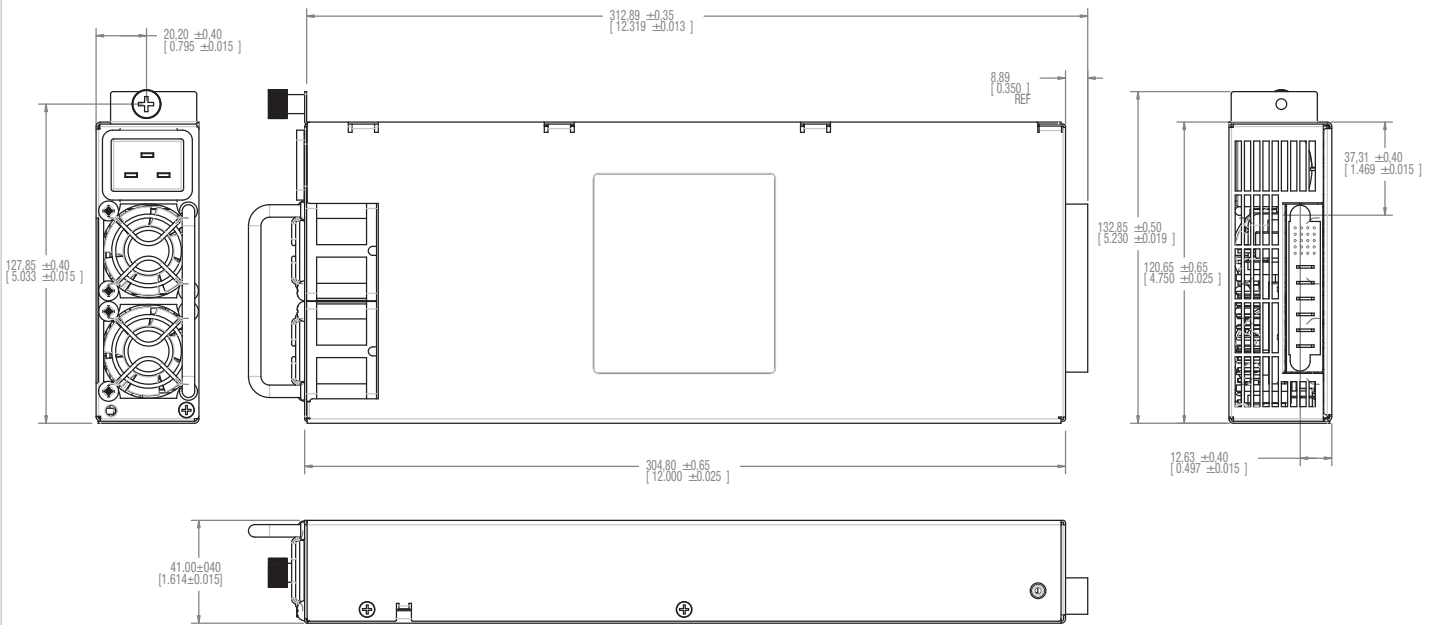
OUTPUT CONNECTOR AND SIGNAL SPECIFICATION

DC and Signal Connector: Tyco Part # 1-6450332-7, or FCI PowerBlade # 51732-028

| P1 | P2 | P3 | P4 | P5 | P6 | x1 | x2 | x3 | x4 | x5 | |
|------------------|------------------|------------------|------------------|------------------|------------------|---------|-------------------------|-------------------------|------------------------|------------------------|---|
| V _{OUT} | V _{OUT} | V _{OUT} | V _{RTN} | V _{RTN} | V _{RTN} | AC_OK | P_GOOD | V _{SB} +OUT | V _{SB} RETURN | V _{SB} RETURN | D |
| | | | | | | PS_ON | V _{SB} +OUT | V _{SB} +OUT | V _{SB} RETURN | V _{SB} RETURN | C |
| | | | | | | I_SHARE | I ² C ADRO | I ² C ADR1 | I ² C ADR2 | PS_PRESENT | B |
| | | | | | | PS_KILL | V _{OUT} SENSE+ | V _{OUT} SENSE- | I ² C DATA | I ² C CLOCK | A |

| Pin Assignment | Signal Name | Description | High Level Low Level | I Max |
|----------------|------------------------|---|---|---------------|
| P1, P2, P3 | V _{OUT} | Main output voltage | | |
| P4, P5, P6 | V _{RTN} | Main output voltage, return | | |
| A2 | V Sense + | V _{OUT} remote sense, positive node input | | |
| A3 | V Sense - | V _{OUT} remote sense, negative node input | | |
| C2, C3, D3 | V _{SB} | Standby voltage output | | |
| C4, C5, D4, D5 | V _{SB} Return | Standby voltage, return | | |
| B1 | I_Share | Active load sharing bus | 0 – 8V | -4 mA / +5 mA |
| D1 | AC_OK | Input AC Voltage “OK” signal output (Internal pull up is 10kΩ to Vsb for the 3.3V/5V aux. models and 10kΩ to 5V for the 12V aux. model) | >2.4V (active, OK) <0.4V | -2 mA +4 mA |
| D2 | P_Good | Power good signal output (Internal pull up is 10kΩ to Vsb for the 3.3V/5V aux. models and 10kΩ to 5V for the 12V aux. model) | >2.4V (active, Good) <0.4V | -2 mA +4 mA |
| A1 | PS_Kill | Floating pin will turn off P/S (short pin for hot plugging) | >2.1V (open, or Vsb) <0.7V (active, PS:On) | N/A |
| B5 | PS_Present | Internally tied to Vsb return | 0 V | |
| C1 | PS_On | Internal 1K ohm pull-up to Vsb, (accepts open collector/drain drive) | >2.1V (open, or Vsb) <0.7V (active, PS:On) | -1 mA -4 mA |
| A4 | I ² C Data | I ² C serial data bus | Vsb | |
| A5 | I ² C Clock | I ² C serial clock bus | Vsb | |
| B2 | I ² C ADR0 | Address input 0, internal pull-up to Vsb | >2.1V, < Vsb <0.8V | ±1 mA |
| B3 | I ² C ADR1 | Address input 1, internal pull-up to Vsb | >2.1V, < Vsb <0.8V | ±1 mA |
| B4 | I ² C ADR2 | Address input 2, internal pull-up to Vsb | >2.1V, < Vsb <0.8V | ±1 mA |

MECHANICAL DIMENSIONS



AC Input Connector: The AC input connector is standard IEC C20 20A.

Dimensions: 12.00"L x 4.75" W x 1.6" H (40.7H x 120.6W x 304.90mm)

D1U MATING CONNECTORS

48V D1U mating connector

| | Press Fit | | Solder ² | |
|------|--------------------|--------------------|---------------------|--------------------|
| | Straight | Right Angle | Straight | Right Angle |
| MPS | N/A | Pending | N/A | 36-0440026-0 |
| FCI | 51742-10602000CALF | 51762-10602000CBLF | 51742-10602000AALF | 51762-10602000ABLF |
| Tyco | TBD | TBD | TBD | TBD |

² Solder connector recommended for board thickness of <0.090

OPTIONAL ACCESSORIES

| Description | Part Number |
|-------------------------------|-------------|
| 48V D1U Output Connector Card | D1U-48-CONC |