

HPS3000 Series

3000 Watts

Data Sheet

**Distributed Power Bulk Front-End
Single Output**

SPECIAL FEATURES

- 3000 W output power
- 40 W/cu-in
- Optional customer provided air
- 1U x 3U form factor
- N+1 redundant
- Internal OR-ing
- 5 V housekeeping
- High efficiency 89% @ 200 Vac, 100% load
- Variable speed "smart fans"
- Two year warranty

COMPLIANCE

- EMI Class A - EN55022
- EN61000 Immunity

SAFETY

- UL/cUL 60950
- CSA 60950
- Nemko TUV
- CB Report

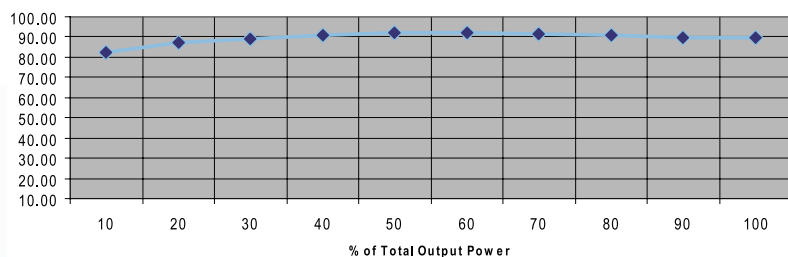


Electrical Specifications

| Input | | |
|-------------------------|----------------------------------|---|
| Input range (operating) | 180 - 264 Vac 90 - 140 Vac | |
| Nominal input | 200 Vac 110 Vac | Input through Card Edge Connection on same end as DC output |
| Frequency | 47 to 63 Hz | |
| Input fusing | Internal 25 A fuses | Both lines fused |
| Inrush current | ≤40 A peak | Either hot or cold start |
| Power factor | 0.97 typical | Meets EN61000-3-2 |
| Harmonics | Meets IEC 61000-3-2 requirements | @ 50% load |
| Input current | 19 A max input current | |
| Holdup time | 10 ms minimum | At full rated load |
| Leakage current | 1.4 mA | At 240 Vac |
| Power line transient | MOV directly after the fuse | |

Note: HPS3000-9-001 variant available for applications with higher airflow requirements

230 Vac Efficiency



Output

| | | |
|------------------------------|--|---|
| Output rating | 48 V @ 62.0 A 5 Vsb @ 3.0 A | 180 - 264 Vac |
| | 48 V @ 29.4 A 5 Vsb @ 3.0 A | 90 - 140 Vac |
| Set point | 48 V | Programmable 96-117% through I ² C serial bus |
| Total regulation range | 48 V \pm 5% 5 Vsb \pm 4% | Line/load/transient when measured at output connection |
| Rated load | 3000 W maximum @ 200 Vac Input 1500 W maximum @ 110 Vac Input | No derating over operating temp range |
| Minimum load | 48 V @ 0.0 A 5 Vsb @ 0.0 A | No loss of regulation |
| Output noise | 480 mV max P-P 100 mV max P-P | 48 V output 5 Vsb output Measured with a 0.1 μ F Ceramic and 10 μ F Tantalum capacitor on any input |
| Output voltage overshoot | \pm 5% maximum | Nominal Voltage Setting |
| Transient response | 5% maximum deviation | 50% load step @ 1 A/us Step load valid between 10% to 100% of output rating. |
| Max units in parallel | Up to 4 | Total power in 1U 19" rack is 12 KW |
| Short circuit protection | 120% - 130% of rated output | Output to return |
| Forced load sharing | Within \pm 6.25 A of all shared outputs | Digital sharing control |
| Overcurrent protection (OCP) | 120% to 130% 110% to 140% | 48 V output 5 Vsb output |
| Overvoltage protection (OVP) | 110% to 133% 110% to 125% | 48 V output 5 Vsb output |
| Overtemperature protection | 10 - 15 deg C above safe operating area | Both PFC and output converter monitored 5 Vsb will operate under overtemperature condition. Built in hysteresis |

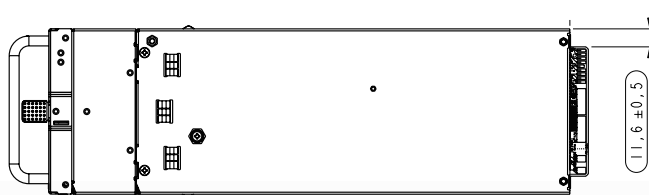
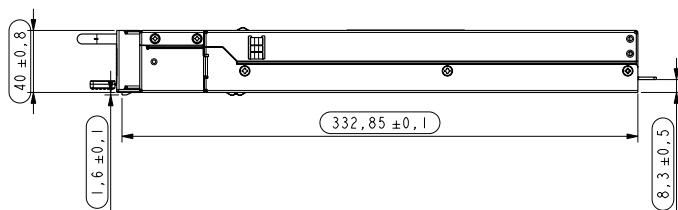
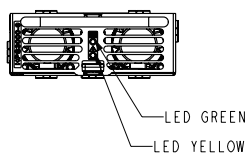
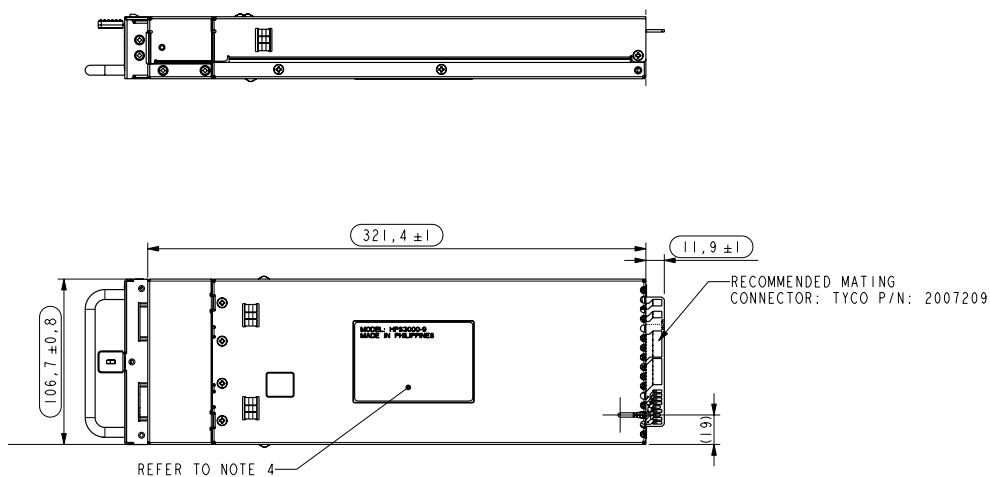
Environmental Specifications

| | |
|-----------------------------|---|
| Vibration/Shock | Non-operational 5G Sine sweep from 5 Hz to 500 Hz, dwelling at resonant frequencies for 1 hour each |
| Operating temperature | - 10 ° to +40 °C |
| Storage temperature | - 40 ° to +85 °C |
| Cooling | External fans with Fan Fail and Fan Speed control |
| Operating relative humidity | 5% to 95% non-condensing |
| Storage relative humidity | 5% to 95% non-condensing |
| Operating altitude | Up to 10,000 feet above sea level |
| Storage altitude | Up to 30,000 feet above sea level |
| RoHS compliant | Yes |

Module Information

(All units in mm)

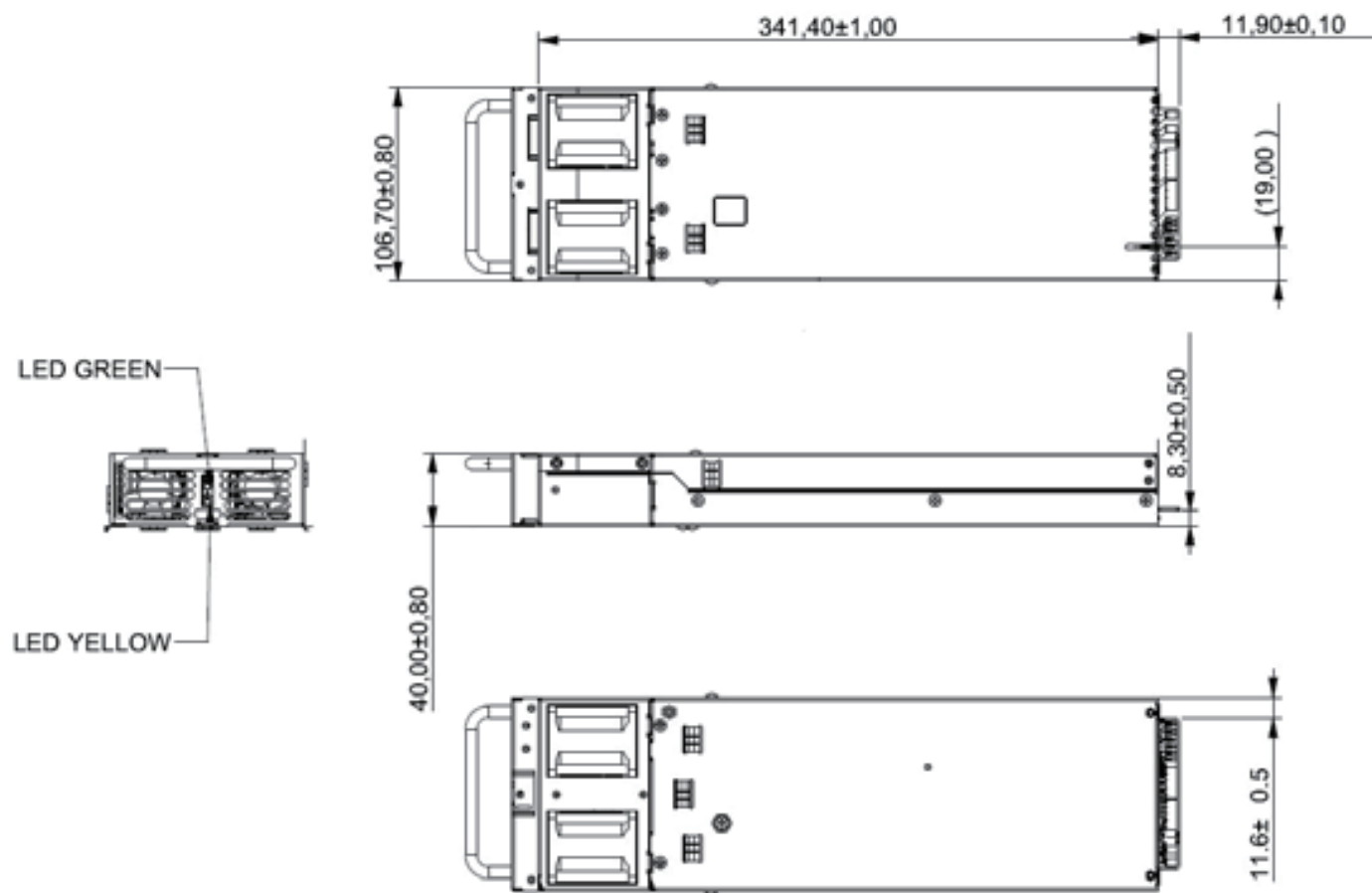
HPS3000-9



Module Information

(All units in mm)

HPS3000-9-001



Pin Assignments

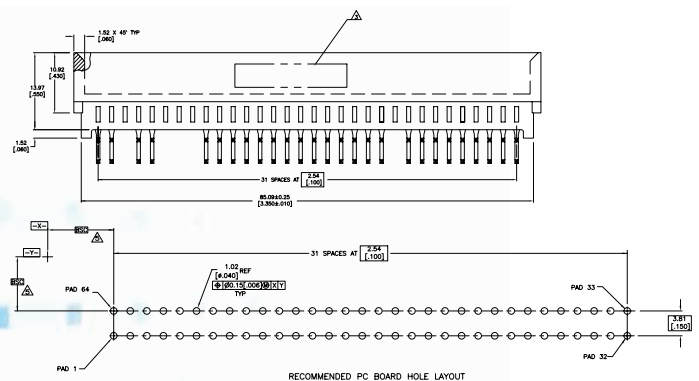
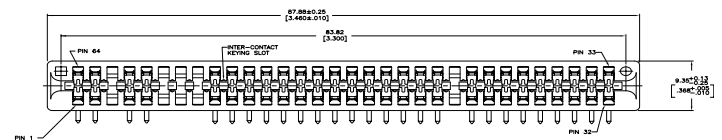
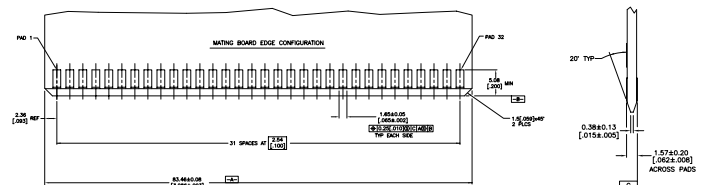
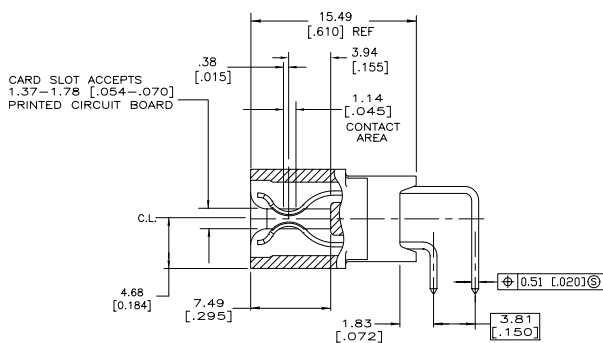
Bottom

| Pin | | | | | | | |
|-----|------------|----|-------------|----|-------------|----|------------|
| 1 | AC LINE | 9 | +48 Vdc out | 17 | +48 Vdc RTN | 25 | Reserved |
| 2 | AC LINE | 10 | +48 Vdc out | 18 | +48 Vdc RTN | 26 | PRESENT# |
| 3 | n.c. | 11 | +48 Vdc out | 19 | +48 Vdc RTN | 27 | DCOK/PWOK# |
| 4 | AC NEUTRAL | 12 | +48 Vdc out | 20 | +48 Vdc RTN | 28 | SDA |
| 5 | AC NEUTRAL | 13 | +48 Vdc out | 21 | +48 Vdc RTN | 29 | HVCC |
| 6 | n.c. | 14 | +48 Vdc out | 22 | +48 Vdc RTN | 30 | PSON# |
| 7 | n.c. | 15 | +48 Vdc out | 23 | n.c. | 31 | #ALERT |
| 8 | n.c. | 16 | +48 Vdc RTN | 24 | V_STBY | 32 | ISHARE |

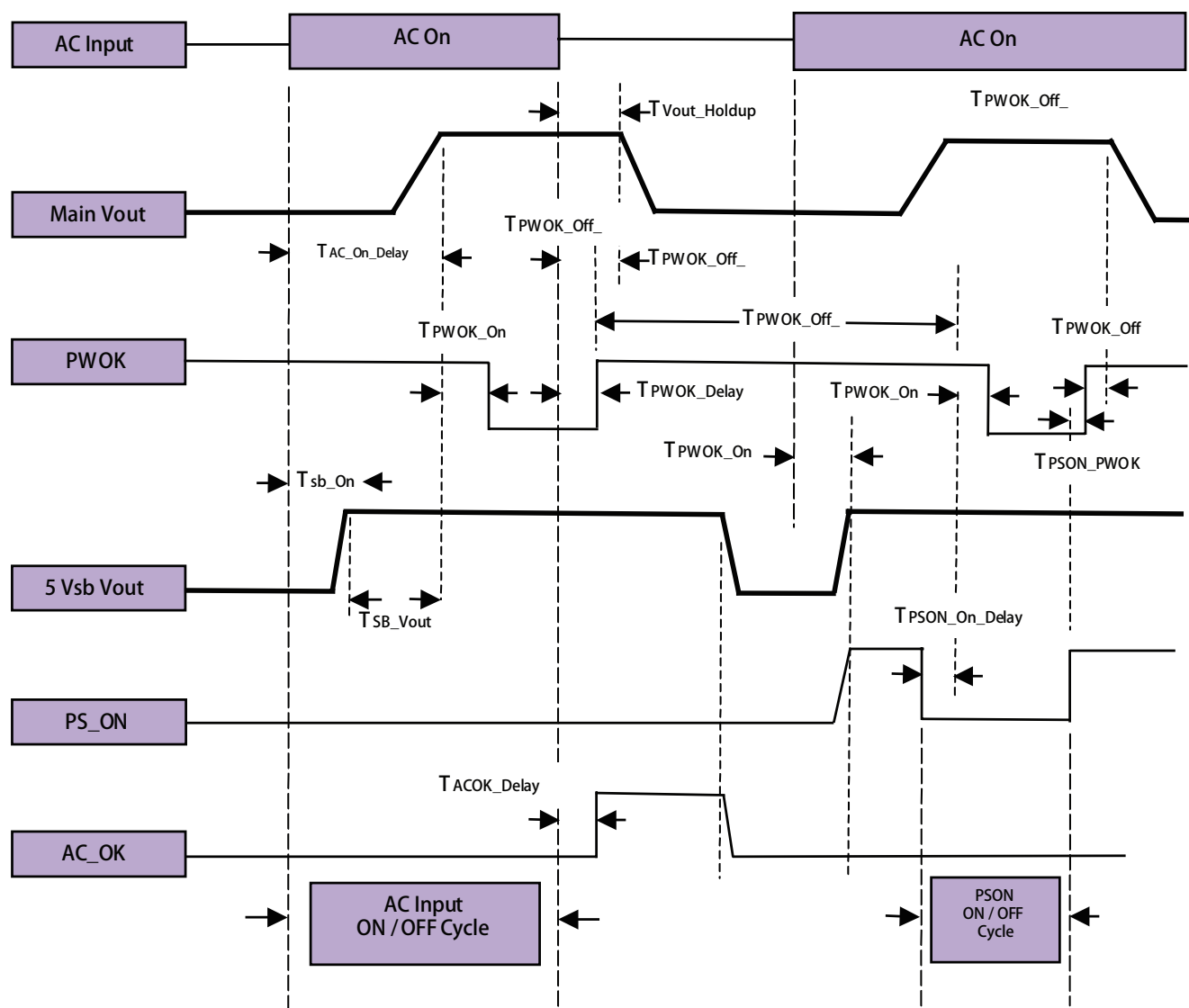
Pin Assignments

Top

| Pin | | | | | | | |
|-----|------------|----|-------------|----|-------------|----|-----------------|
| 64 | AC LINE | 56 | +48 Vdc out | 48 | +48 Vdc RTN | 40 | Reserved |
| 63 | AC LINE | 55 | +48 Vdc out | 47 | +48 Vdc RTN | 39 | ACOK# |
| 62 | n.c. | 54 | +48 Vdc out | 46 | +48 Vdc RTN | 38 | SMBUS_ALERT_OUT |
| 61 | AC NEUTRAL | 53 | +48 Vdc out | 45 | +48 Vdc RTN | 37 | SCL |
| 60 | AC NEUTRAL | 52 | +48 Vdc out | 44 | +48 Vdc RTN | 36 | A2 |
| 59 | n.c. | 51 | +48 Vdc out | 43 | +48 Vdc RTN | 35 | PSKILL |
| 58 | n.c. | 50 | +48 Vdc out | 42 | n.c. | 34 | A1 |
| 57 | n.c. | 49 | +48 Vdc RTN | 41 | SYS_GND | 33 | A0 |



Timing Diagram



Timing Signal Definitions

Turn ON/OFF Timing

| Item | Description | Min | Max | Units |
|----------------|--|-----|------|-------|
| Tvout_rise | 48 V Output rise time | 5 | 300 | msec |
| Tsb_on_delay | Delay from AC being applied to 5 Vsb being within regulation. | | 1500 | msec |
| Tac_on_delay | Delay from AC being applied to all output voltages being within regulation. | | 2000 | msec |
| Tvout_holdup | Time all output voltages, including 5 Vsb, stay within regulation after loss of AC. | 10 | | msec |
| Tpwok_holdup | Delay from loss of AC to de-assertion of PWOK | 5 | | msec |
| Tpson_on_delay | Delay from PSON# active to output voltages within regulation limits. | 5 | 400 | msec |
| Tpson_pwok | Delay from PSON# de-active to PWOK being de-asserted. | | 50 | msec |
| Tacok_delay | Delay from loss of AC input to de-assertion of ACOK#. | 10 | | msec |
| Tpwok_on | Delay from output voltages within regulation limits to PWOK asserted at turn on. | 100 | 1000 | msec |
| Tpwok_off | Delay from PWOK de-asserted to 48 V dropping out of regulation limits. | 1 | 1000 | msec |
| Tpwok_low | Duration of PWOK being in the de-asserted state during an off/on cycle using AC or the PSON# signal. | 100 | | msec |
| Tsb_vout | Delay from 5 Vsb being in regulation to 48 V being in regulation at AC turn on. | 50 | 2000 | msec |

Signals and Controls - All Models

PSON#

The PSON# signal is required to remotely turn on/off the power supply. PSON# is an active low signal that turns on the 48 V power rail. When this signal is not pulled low by the system, or left open, the 48 V output turns off. The 5 Vsb output remains on. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply. The power supply fan(s) shall operate at the lowest speed.

PSON# Signal Characteristic

| | | |
|-------------------------------------|--|----------|
| Signal Type | Accepts an open collector/drain input from the system. Pulled-up to the 5 Vsb located in power supply. | |
| PSON# = Low | ON | |
| PSON# = Open | OFF | |
| | MIN | MAX |
| Logic level low (power supply ON) | 0 V | 0.4 V |
| Logic level high (power supply OFF) | 2.40 V | 3.40 V |
| Source current, Vpson = low | -- | 4 mA |
| Power up delay: Tpson_on_delay | 5 msec | 400 msec |

Signals and Controls - All Models

PWOK# (Power Good)

PWOK# is a power good signal and will be pulled LOW by the power supply to indicate that both the outputs are above the regulation limits of the power supply. When any output voltage falls below regulation limits or when AC power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PWOK will be de-asserted to a HIGH state. The start of the PWOK# delay time shall be inhibited as long as the 48 V output is in current limit or the 5 Vsb output is below the regulation limit.

PSON# Signal Characteristic

| | | |
|--|--|---------------------|
| Signal Type | Open collector/drain output from power supply. Pullup to 5 Vsb external to the power supply. | |
| PWOK = High | ON | |
| PWOK = LOW | OFF | |
| | MIN | MAX |
| Logic level low voltage, $I_{\text{sink}}=4\text{mA}$ | 0 V | 0.8 V |
| Logic level high voltage, $I_{\text{source}}=200\mu\text{A}$ | 2.0 V | 4.80 V |
| Sink current, PWOK = low | | 4 mA |
| Source current, PWOK = high | | 2 mA |
| PWOK delay: $T_{\text{pwok on}}$ | 100 msec | 1000 msec |
| PWOK rise and fall time | | 100 μsec |
| Power down delay: $T_{\text{pwok off}}$ | 1 msec | 1000 msec |

Power Supply Present Indicator (PRESENT#)

The PRESENT# signal is primarily used to provide a mechanism by which the host system can sense the number of power supplies physically present (operational or not). This pin is connected to the standby ground in the power supply.

AC INPUT Present Indicator (ACOK#)

The AC OK# signal is used to indicate presence of AC input to the power supply. This signal shall be connected to 5 Vsb through a resistor on the host system side. A logic "Low" level on this signal shall indicate AC input to the power supply is present. A Logic "High" on this signal shall indicate a loss of AC input to the power supply.

Table 12 ACOK# Signal Characteristics

| | | |
|---|---|------------------|
| Signal Type | Pull-up to 5 Vsb through a resistor in the host system. | |
| PRESENT# = Low | Present | |
| PRESENT# = High | Not present | |
| | MIN | MAX |
| Logic level low voltage, $I_{\text{sing}}=4\text{ mA}$ | 0 V | 0.8 V |
| Logic level high voltage, $I_{\text{sink}}=50\text{ }\mu\text{A}$ | 2.0 V | 4.80 V |
| Sink current, PRESENT# = Low | | 4 mA |
| Source current, PRESENT# = High | | 50 μA |

Signals and Controls - All Models

LED INDICATORS

There will be a green POWER LED (PWR) to indicate that AC is applied to the PSU and standby voltage is available when blinking. This same LED should go solid when the 48 V output is enabled and operational.

There will be an Amber Power Supply Fail LED (FAIL) to indicate that the power supply has failed and a replacement of the unit is necessary. Faults including UVP, OVP, OTP, or Fan Fail when PSON# is asserted "Logic Low" shall cause the amber LED to turn on. The LED can be turned off by recycling PSON# signal or by an AC power interruption more than 1 second. The LED shall be off when PSON# is not asserted "Logic Low". Refer to table 13 for conditions of the LED's:

Table 13 LED Indicators

| Power Supply Condition | Power LED (GREEN) | Fail LED (AMBER) |
|--|-------------------|------------------|
| No AC power to PSU | OFF | OFF |
| AC present / Standby Output On | Blinking | OFF |
| Power supply 48 V output ON and OK | ON | OFF |
| Power supply failure (includes overvoltage, overtemperature) | OFF | ON |
| Current limit | ON | Blinking |

MTBF

The power supply has a minimum MTBF of 300K hours using the Bell core 332, issue 6 specification @ 25 °C and 40 °C, ambient, at full load. With the power supply installed in a system in a 25 °C ambient environment and operating at full load, capacitor life shall be 10 years, minimum for ALL electrolytic capacitors contained within this power supply. The power supply shall demonstrate a MTBF level of > 500,000 hours.

Quality Assurance

Full QAV testing shall be conducted in accordance with Artesyn Embedded Technologies Standards with reports available upon request.

Warranty

Artesyn Embedded Technologies shall warrant the power supply to be free of defects in materials and workmanship for a minimum period of two years from the date of shipment, when operated within specifications. The warranty shall be fully transferable to the end owner of the equipment powered by the supply.

Ordering Information

| Model Number | Main Output | Main Output Current | Standby Output | Standby Current |
|---------------|-------------|---------------------|----------------|-----------------|
| HPS3000-9 | 48 Vdc | 62.0 A | 5.0 V | 3.0 A |
| HPS3000-9-001 | 48 Vdc | 62.0 A | 5.0 V | 3.0 A |

Note: HPS3000-9-001 version is recommended for applications where higher airflow is required.

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