

3000 Watts

- High Efficiency up to 93%
- High Power Density
- Programmable Output Voltage (0-105%)
- Programmable Output Current (0-105%)
- Parallel Operation
- Fully Featured Signals & Controls
- 3 Year Warranty



The HDS3000 series offers users both output voltage and output current programming (0 – 105%) via resistance, voltage or I²C bus in a very high efficiency, high power density 3 kW chassis mount package. Measuring just 5" x 5" x 14.41", the HDS3000 also features active current sharing, remote on/off, remote sense and a power OK signal. The standby output is available whenever the mains supply is present and can be user selected as either 5 V at 0.5 A or 9V at 0.3 A.

Dimensions:

HDS3000:
14.41 x 5.00 x 5.00" (366 x 127 x 127 mm)

Models & Ratings

| Output Power | Output Voltage V1 | Output Current | | Ripple & Noise | Efficiency ⁽¹⁾ | Model Number |
|--------------|-------------------|----------------|---------|----------------|---------------------------|--------------|
| | | Min | Max | | | |
| 3000 W | 12.0 VDC | 0.0 A | 250.0 A | 150 mV | 89% | HDS3000PS12 |
| 3000 W | 15.0 VDC | 0.0 A | 200.0 A | 150 mV | 90% | HDS3000PS15 |
| 3000 W | 24.0 VDC | 0.0 A | 125.0 A | 200 mV | 91% | HDS3000PS24 |
| 3000 W | 30.0 VDC | 0.0 A | 100.0 A | 200 mV | 91% | HDS3000PS30 |
| 3000 W | 36.0 VDC | 0.0 A | 83.5 A | 200 mV | 92% | HDS3000PS36 |
| 3000 W | 48.0 VDC | 0.0 A | 62.5 A | 200 mV | 92% | HDS3000PS48 |
| 3000 W | 60.0 VDC | 0.0 A | 50.0 A | 300 mV | 93% | HDS3000PS60 |

Notes

1. Measured with 230 VAC input and full load.

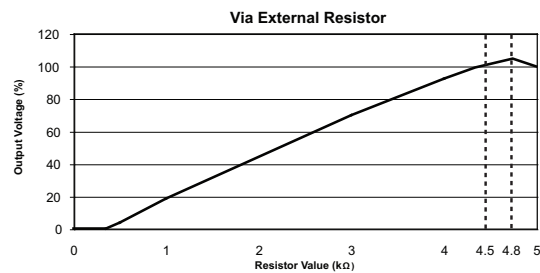
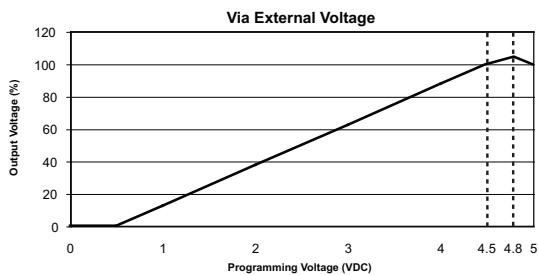
Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|-------------------------------|-----------|-----------|-------|-----------------------|
| Input Voltage | 90 | | 264 | VAC | See derating curve |
| Input Frequency | 47 | | 63 | Hz | |
| Power Factor | | 0.99/0.98 | | | 115/230 VAC full load |
| Input Current | | | 36.0/18.0 | A | 115/230 VAC |
| Inrush Current | | | 60.0/90/0 | A | 115/230 VAC |
| Earth Leakage Current | | | 2.5 | mA | 264 VAC/60 Hz |
| Input Protection | 2 x F20 A/250 V internal fuse | | | | |

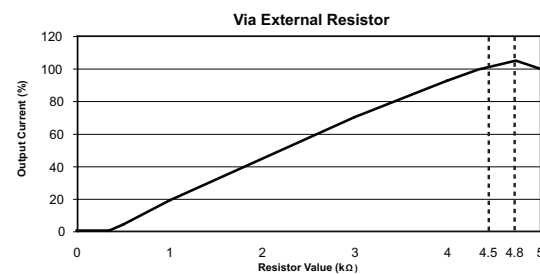
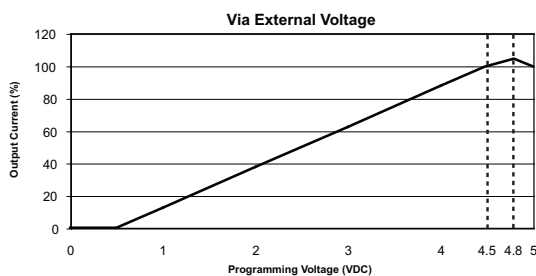
Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|----------------------------|--|---------|------------------------|----------|---|
| Output Voltage | 12 | | 60 | VDC | See Models and Ratings table |
| Output Trim | | ±5.0 | | % | By potentiometer |
| Output Voltage Program | 0 | | 105 | % | Of rated output |
| Output Current Program | 0 | | 105 | % | Of rated output |
| Initial Set Accuracy | | | ±1 | % | |
| Minimum Load | 0 | | | A | |
| Start Up Delay | | | 2 | s | |
| Start Up Rise Time | | | 150 | ms | At full load |
| Hold Up Time | 8 | | | ms | |
| Line Regulation | | | ±1.0 | % | |
| Load Regulation | | | ±1 ^(V1) /±3 | % | 0-100% load. V1/5V Standby |
| Transient Response | | <1 | | % | For a 25% step load change |
| Ripple & Noise | 150 | | 300 | mV pk-pk | See models and ratings table. Measured with 20 MHz bandwidth and using 12" twisted pair wire terminated with 0.1 µF ceramic capacitor and 47 µF electrolytic. |
| Overvoltage Protection | | | | | Tracks output voltage, see application notes Recycle AC to reset |
| Overtemperature Protection | | | | | Primary and secondary heatsinks, monitored Output shuts down, auto recovers |
| Overload Protection | | 105 | | % | Rated power, constant current |
| Short Circuit Protection | | | | | Auto recovery |
| Temperature Coefficient | | ±0.02 | | %/°C | 0-50 °C |
| Remote Sense | Compensates for 0.5 V max voltage drop, if remote sense is not required, local sense must be used | | | | |
| Enable | Output must be enabled, see application notes, power supply is shipped with enable links fitted | | | | |
| Current Share | 5 supplies can share within 5% | | | | |
| Standby Output | 5 V at 0.5 A, present whenever AC is applied (9 V at 0.3 A, user selectable, by connecting 'VSET', Pin 18 of CN2 to GND) | | | | |

Output Voltage Programming



Output Current Programming



General

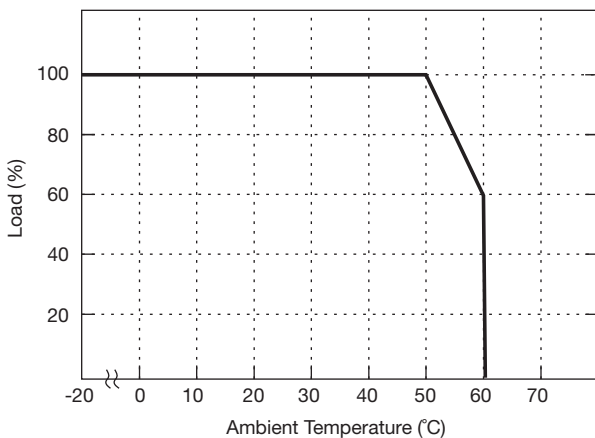
| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---------|--------------|---------|-------------------|--|
| Efficiency | 89 | | 93 | % | See Models and Ratings table |
| Isolation: Input to Output Input to Ground Output to Ground | 3000 | | | VAC | |
| | 1500 | | | VAC | |
| | 500 | | | VAC | |
| Switching Frequency | | 65 | | kHz | PFC |
| | 40 | | 200 | kHz | PWM, variable |
| Power Density | | | 8.1 | W/in ³ | |
| Signals and Controls | | | | | Enable, Current Share, V Program, I Program, 5 V Standby, Power OK |
| Mean Time Between Failure | | 90 | | kHrs | MIL-HDBK-217F, 25 °C GB |
| Weight | | 11.57 (5.25) | | lb (kg) | |

Environmental

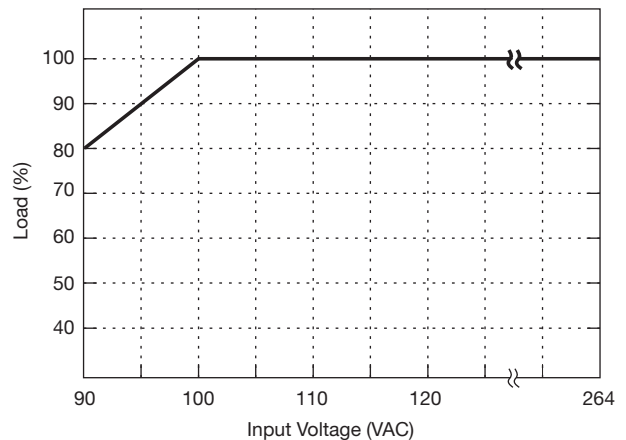
| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---------|---------|---------|-------|--|
| Operating Temperature | -25 | | 60 | °C | Derate linearly from 100% load at 50 °C to 60% load at 60 °C |
| Storage Temperature | -40 | | +85 | °C | |
| Cooling | | | | | Internal fan fitted, speed increases with load and internal temperature |
| Humidity | 20 | | 90 | %RH | |
| Vibration | | | 2 | g | 10-500 Hz, 10 min/cycle, 60 min period for each axis, compliant to IEC68-2-16, IEC 68-2-64 |

Derating Curve

Thermal Derating Curve



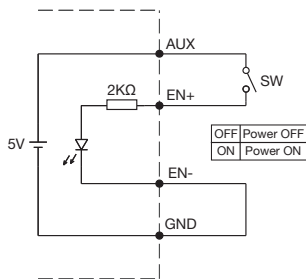
Input Derating Curve



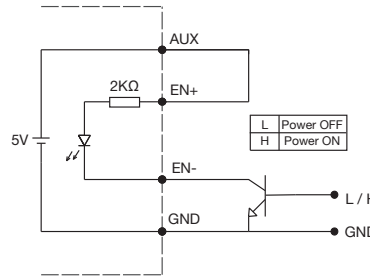
Signals & Controls

| LED Status | Output Status |
|--------------------------|-------------------------------------|
| Solid (Green) | DC Output OK |
| Solid (Orange) | DC Output OK in remote control mode |
| Slow Blink (Green) | Output Not Enabled |
| Fast Blink (Red) | Over Voltage |
| Solid (Red) | Over Loaded |
| Slow Blink (Red) | Over Temperature |
| Intermittent Blink (Red) | Fan Fail |
| Short & Long Blink (Red) | AUX Standby Failure |

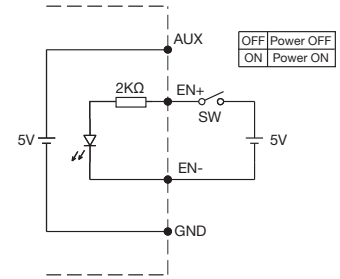
Remote Enable



(A) Using internal 5 V standby



(B) Using external transistor



(C) Using external voltage source

EMC: Emissions

| Phenomenon | Standard | Test Level | Notes & Conditions |
|-------------------|-------------|------------|--------------------|
| Conducted | EN55022 | Class A | |
| Radiated | EN55022 | Class A | |
| Harmonic Currents | EN61000-3-2 | Class A | |
| Voltage Flicker | EN61000-3-3 | | |

EMC: Immunity

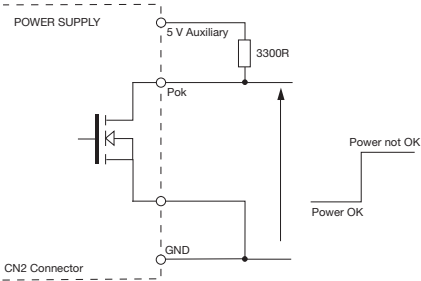
| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|------------------------|-------------|----------------------|----------|-------------------------------------|
| ESD Immunity | EN61000-4-2 | 2 / 3 | A | ±4 kV contact / ±8 kV air discharge |
| Radiated Immunity | EN61000-4-3 | 3 | A | |
| EFT/Burst | EN61000-4-4 | 3 | A | 10 V/m |
| Surge | EN61000-4-5 | Installation class 3 | A | |
| Conducted | EN61000-4-6 | 3 | A | 10 V/m |
| Magnetic Field | EN61000-4-8 | 3 | A | 30 A/m |
| Dips and Interruptions | EN55024 | DIP: 30% 500 ms | A/B | High Line/Low Line |
| | | INT: >95% 10 ms | A | |
| | | INT: >95% 5000 ms | B | |

Safety Approvals

| Safety Agency | Safety Standard | Notes & Conditions |
|---------------|------------------|--------------------|
| UL | UL60950-1 | |
| CSA | C22.2 No.60950-1 | |
| TUV | EN60950-1 | |

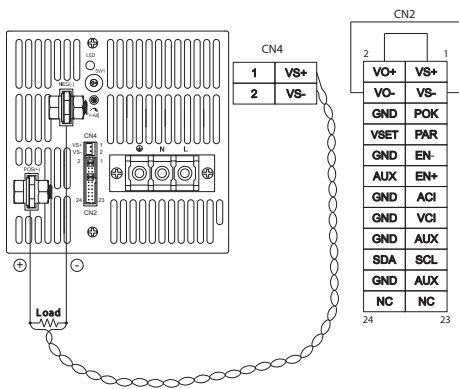
Application Notes

POK Signal

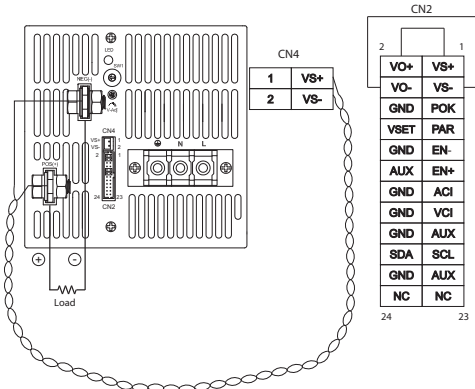


Open drain signal, low when PSU turns on
 Maximum sink current: 20 mA
 Maximum drain voltage: 40 V

Remote Sense

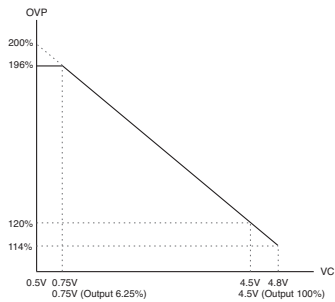


Local Sense

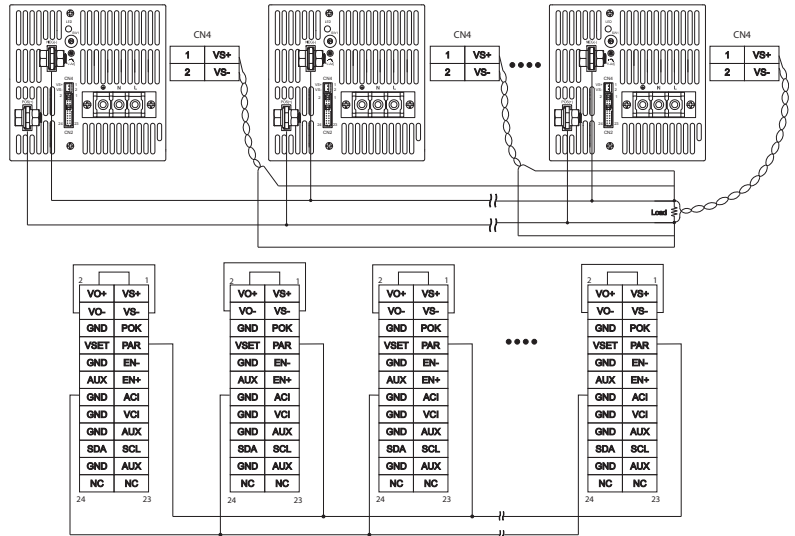


Must be used if remote sense is not required.

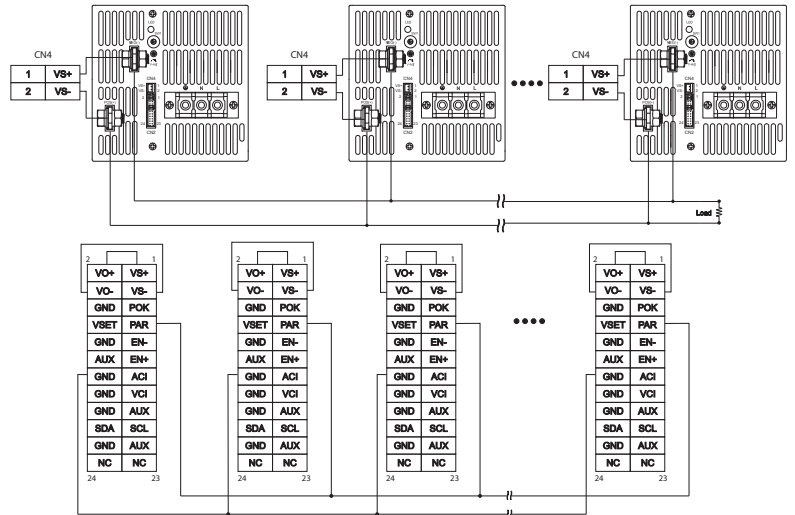
OVP Setting



Current Sharing with Remote Sense



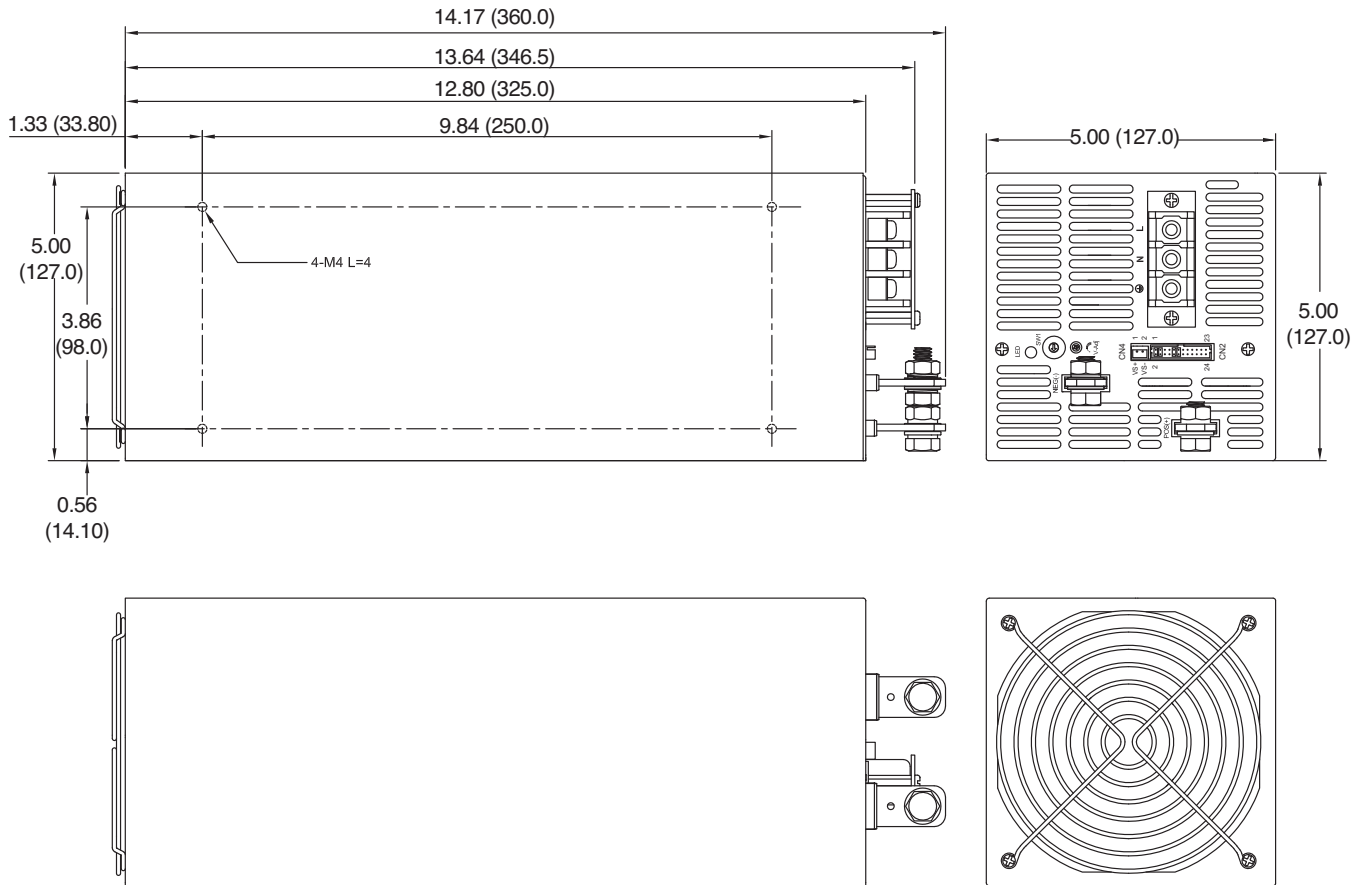
Current Sharing with Local Sense



Notes

In parallel operation, it is possible that only one unit will operate if the load is less than 5% of the combined rated output load.

Mechanical Details



| CN2 Control Pin Connections | | | | | | | | |
|-----------------------------|----------|----------------------------------|-----|----------|--------------------------------------|-----|----------|--------------------------------------|
| Pin | Function | Description | Pin | Function | Description | Pin | Function | Description |
| 1 | VS+ | Remote sense (+) | 9 | EN- | Inhibit On/Off(-) | 17 | AUX | +5V/0.5 A or +9V/0.3 A Standby power |
| 2 | VO+ | Positive Output Voltage | 10 | GND | Ground | 18 | GND | Ground |
| 3 | VS- | Remote Sense (-) | 11 | EN+ | Inhibit On/Off (+) | 19 | SCL | I ² C Serial Clock |
| 4 | VO- | Negative Output Voltage | 12 | AUX | +5V/0.5 A or +9V/0.3 A Standby power | 20 | SDA | I ² C Serial Data |
| 5 | POK | Power OK | 13 | ACI | I Program | 21 | AUX | +5V/0.5 A or +9V/0.3 A power |
| 6 | GND | Ground | 14 | GND | Ground | 22 | GND | Standby Ground |
| 7 | PAR | Parallel Operation Current Share | 15 | VCI | V Program | 23 | N.C. | RS232 Receive |
| 8 | VSET | Aux Output Setting | 16 | GND | Ground | 24 | N.C. | RS232 Transmit |

| Pin | Function |
|-----|----------|
| 1 | ACL |
| 2 | ACN |
| 3 | |

Notes

- Dimensions shown in inches (mm).
- Weight: 11.57 lb (5.25 kg)

- Mating Connector: CN2 JST PHDR-24VS Housing, SPHD-002T-P0.5 Contact