# D1U54T-M-2500-12-HxxC Series

## 54mm Width 2500 W AC-DC and HVDC-DC Power Module

Murata Power Solutions

Typical unit shown for illustration purposes only

## DEVELOPMENT OVERVIEW

D1U54T-M-2500-12-HxxC is a series of 2500 W 54.5 mm wide highly efficient AC and HVDC input front end power modules that provide a 12Vdc main output and a standby output. The high power density low-profile packaging achieves >58 W/in$^3$ and provides active current sharing capability, a multifunction status LED, hardware logic signals, PMBus™ digital communications. This power module is ideal for delivering reliable power to servers, workstations, storage systems and other 12 V distributed power architectures.

## FEATURES

- 2500 W continuous main 12 Vdc output power[1]
- 96% minimum efficiency at 50% load, 80 PLUS® certified Titanium
- Anderson Saf-D-Grid Input Connector for full HVDC range
- Compact high power density of >58 W/in$^3$
- 3.3 / 5.0 / 12 Vdc Standby Output Options
- 54.5 mm x 321.5 mm x 40.0 mm (<1U height)
- Comprehensive Temperature, Current & Voltage fault protection
- N+1 redundancy, hot pluggable
- Active ISHARE for main output includes ORing isolation for both outputs
- PMBus™1.2 digital communications
- RoHS Compliant
- Two Year Warranty

**For full details visit our website:**
www.murata-ps.com/rohs

Low voltage Directive

## ORDERING GUIDE

| Part Number | Total Output Power at Nominal Input Voltage[1,2] | | Main Output | Standby Output | Airflow Direction |
|---|---|---|---|---|---|
| | 200-277 Vac, 190-400 Vdc | 100-120 Vac | | | |
| D1U54T-M-2500-12-HA3C | 2515 W | 1275 W | 12 Vdc | 5.0 Vdc | F→B |
| D1U54T-M-2500-12-HA4C | | | | | F←B |
| D1U54T-M-2500-12-HB3C | 2536 W | 1296 W | 12 Vdc | 12 Vdc | F→B |
| D1U54T-M-2500-12-HB4C | | | | | F←B |
| D1U54T-M-2500-12-HC3C | 2509.9 W | 1269.9 W | 12 Vdc | 3.3 Vdc | F→B |
| D1U54T-M-2500-12-HC4C | | | | | F←B |

## INPUT CHARACTERISTICS

| Parameter | Conditions | | Min. | Nom. | Max. | Units |
|---|---|---|---|---|---|---|
| Input Voltage Range [1,3] | | | 90 | 100-120 | 132 | Vac |
| | | | 180 | 200-277 | 305 | Vac |
| | | | 190 | 190-400 | 400 | Vdc |
| Input AC Source Frequency | | | 47 | 50 / 60 | 63 | Hz |
| Turn-on Input Voltage | Ramp up | | 74 | | 84 | Vac |
| | | | 185 | | 192 | Vdc |
| Turn-off Input Voltage | Ramp down | | 70 | | 80 | Vac |
| | | | 180 | | 190 | Vdc |
| Maximum Input Current | 100-120/200-277 Vac, 50 / 60 Hz | | | | 16 | A |
| | 190-400 Vdc | | | | 15 | A |
| Inrush Current | Cold start; <200 ms, 264 Vac 25 °C; excludes effects of x-caps | | | | 50 | Apk |
| Power Factor | 230 Vac / 60 Hz; 100% load | | | 0.99 | | % |
| Parameter | Conditions | | Min. | Typ. | Max. | Units |
| Efficiency | 230 Vac/230 Vdc, 25 °C Excluding fan load | @ 10% load | 90.0 | 90.5 | | % |
| | | @ 20% load | 94.0 | 94.1 | | % |
| | | @ 50% load | 96.0 | 96.1 | | % |
| | | @ 100% load | 91.0 | 93.3 | | % |

## OUTPUT VOLTAGE CHARACTERISTICS

| Output | Parameter | Conditions | Min. | Nom. | Max. | Units |
|---|---|---|---|---|---|---|
| 12 V | Voltage Set Point | 230Vac; 50% load; 25 °C; measured at remote sense | 11.94 | 12.00 | 12.06 | Vdc |
| | Line and Load Regulation[5] | Measured at power module side of connector | -1 | | +1.5 | % |
| | Ripple Voltage & Noise[4,5] | 20MHz bandwidth | | | 120 | mV p-p |
| | Output Current[1] | 180-305 Vac; 190-400 Vdc | | | 208.3 | Adc |
| | | 90-132 Vac | | | 105 | |
| | Load Capacitance | | | | 30,000 | µF |
| 3.3 Vsb | Voltage Set Point | 230 Vac; 50% load; Tamb =25 °C, at remote sense | 3.28 | 3.30 | 3.32 | Vdc |
| | Line and Load Regulation[6] | Measured at power module side of connector | 3.14 | 3.30 | 3.46 | Vdc |
| | Ripple Voltage & Noise[4,6] | 20 MHz Bandwidth | | | 75 | mV p-p |
| | Output Current | | | | 3 | Adc |
| | Load Capacitance | | | | 3,000 | µF |
| 5 Vsb | Voltage Set Point | 230 Vac; 50% load; Tamb =25 °C, Measured at remote sense | 4.98 | 5.00 | 5.03 | |
| | Line and Load Regulation[6] | Measured at power module side of connector | 4.76 | 5.00 | 5.24 | Vdc |
| | Ripple Voltage & Noise[4,6] | 20 MHz Bandwidth | | | 75 | mV p-p |
| | Output Current | | | | 3 | Adc |
| | Load Capacitance | | | | 3,000 | µF |
| 12 Vsb | Voltage Set Point | 230 Vac; 50% load; Tamb =25 °C, Measured at remote sense | 11.94 | 12.00 | 12.06 | Vdc |
| | Line and Load Regulation[6] | Measured at power module side of connector | 11.70 | 12.00 | 12.30 | Vdc |
| | Ripple Voltage & Noise[4,6] | 20MHz Bandwidth | | | 120 | mV p-p |
| | Output Current | | | | 3 | Adc |
| | Load Capacitance | | | | 1,000 | µF |

1. De-rating applies to certain models, input voltage and temperature conditions; refer to De-rating tables for details
2. Includes standby output at 100% FL
3. Insert power supply into mating connector prior to applying input voltage
4. Measured with 0.1 µF of ceramic capacitance and 10 µF of tantalum capacitance on each of the power supply outputs. A short coaxial cable to scope is used.
5. Minimum Load of 8.5 A applied to meet these limits.
6. Minimum Load of 0.25 A applied to meet these limits

## OUTPUT CHARACTERISTICS

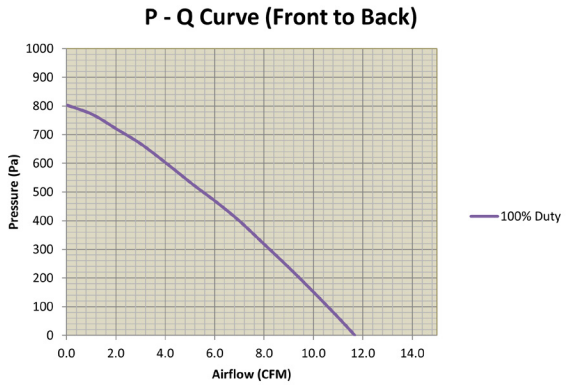
| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Startup Time | AC ramp up | | | 3 | s |
| Transient Response | 12 V Main 50% load change step (max.), ≥10%; 1 A/µs slew rate; 2,000 µF output capacitance | -5 | | +5 | % nom |
| | Recovery Time to within output regulation limits | | 2 | | ms |
| | Vsb, 50% load change step (max.), ≥10%; 1 A/µs slew rate | -5 | | +5 | % nom |
| | Recovery Time to within Vsb output regulation limits | | 2 | | ms |
| Current sharing accuracy | Main output; 30% -100% full load | -5 | | +5 | % |
| Hot Swap Transients | All outputs remain in regulation | -5 | | +5 | % |
| Holdup Time | 230-240 Vac / 240-400 V HVDC input voltage ranges, 2500 W load, main output dropping to 10.8V | 10 | | | ms |
| | 115-240 Vac / 190-400 V HVDC input voltage ranges, 1200 W load, main output dropping to 10.8 V | 20 | | | ms |

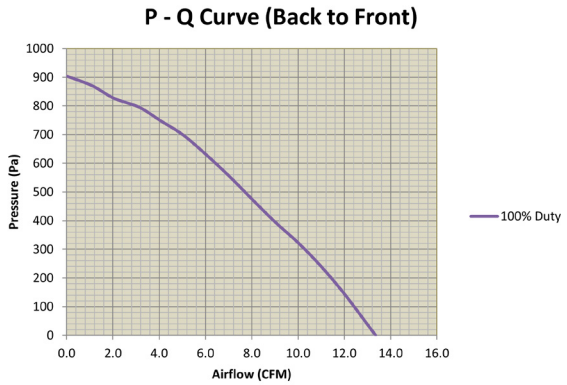
## ENVIRONMENTAL CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Storage Temperature Range | | -40 | | 70 | °C |
| Operating Temperature Range[1,2] | Refer to De-rating curves for details | -5 | | 50 | |
| Operating Humidity | Non-condensing | 5 | | 90 | % |
| Storage Humidity | Non-condensing | 5 | | 95 | |
| Altitude [1,2,3] | De-rating applies ≥40 °C intake temperature | | | 4000 | m |
| Shock | 30G non-operating | | | | |
| MTBF | Per Telcordia SR-332 M1C3 @40 °C, 230 Vac, 100% full load | 540K | | | Hrs. |
| Safety Approval Standards (Pending) | IEC 60950-1:2005, IEC 60950-1:2005/AMD1:2009, IEC 60950-1:2005/AMD2:2013 [CSA]<br>IEC 62368-1:2014 [CSA]<br>CAN/CSA-C22.2 No. 62368-1:14 [CSA]<br>UL 62368-1 2nd Ed. [CSA]<br>EN 62368-1:2014+A11 [TÜV SUD]<br>IS 13252(Part 1):2010/ IEC 60950-1:2005 (BIS)<br>CNS13438 (095/06/01), CNS14336-1 (099/09/30), CNS 15663 5 (102) [BSMI]<br>GB17625.1-2012, GB4943.1-2011, GB/T9254-2008 (Class A) [CQC]<br>K60950-1 (2011-12) [KCC] | | | | |
| Input Fuse | Dual 20A/420VAC/420DC fuse provided as a series protective element in both input “line” and “neutral” connection | | | | |
| Weight | Approximately 1.324 kg | | | | |

1. Meets NEBS abnormal requirements of 55 °C (Sea Level), adjusted to 65°C (@ 1 °C/1,000 ft) to approximate the effects of altitude of 1800M
2. Based on a power supply operating in a free air environment. Performance within end user's system may be impacted due to the effects of back-pressure imposed by the end use system design. Power module is protected from OTP faults by internal OTP sensors. Refer to PMBus ACAN for additional details. It is incumbent upon the end-user to ensure sufficient access to airflow when designing the system in which these modules will be installed.
3. Meets China safety spacing requirements

## AIRFLOW CHARACTERISTICS




Based on test report dated 5/11/2021, sample serial NF2105S2000J; fan model PFB0412EN-E#11

## PROTECTION CHARACTERISTICS

| Output Voltage | Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| - | Over temperature [2] | Auto restart | 76 | 80 | 84 | °C |
| 12V | Overvoltage | Latching [1] | 13.0 | 14 | 16.0 | V |
| | Overcurrent (180-264 Vac) | Hiccup mode, 5 retries before Latch-off [1]. Protection is delayed 100 ms to accommodate Peak Power | 220 | | 250 | |
| | Overcurrent (90-150 Vac) | Hiccup mode, 5 retries before Latch-off [1] | 105 | | 120 | A |
| 12Vsb | Overvoltage | Latching [1] | 13.0 | | 16.0 | V |
| | Overcurrent | Hiccup | 3.1 | | 4.5 | A |
| 5.0Vsb | Overvoltage | Latching [1] | 5.4 | | 6.2 | V |
| | Overcurrent | Hiccup | 3.1 | | 5.0 | A |
| 3.3Vsb | Overvoltage | Latching [1] | 3.6 | | 4.4 | V |
| | Overcurrent | Hiccup | 3.1 | | 5.0 | A |

## EMISSIONS AND IMMUNITY

| Parameter | Conditions | Units |
|---|---|---|
| Input Current Harmonics | IEC/EN 61000-3-2 | Complies with Class A limits |
| Voltage Fluctuation and Flicker | IEC/EN 61000-3-3 | Complies |
| Conducted Emissions | FCC 47 CFR Part15/CISPR22/EN55032 | Class A with 6 dB margin |
| ESD Immunity | IEC/EN 61000-4-2 | ±8KV Contact; ±15KV air discharge; Criteria A |
| Radiated Field Immunity | IEC/EN 61000-4-3 | 3V/m, 1 KHz, 80% AM, 80 MHz to 1 GHz Criteria A [4] |
| Electrical Fast Transients/Burst Immunity | IEC/EN 61000-4-4 | Level 3 (2 kV), criteria A [4] |
| Surge Immunity | IEC/EN 61000-4-5 | Level 3 (2 kV Line-Earth, 1 kV Line-Line), Criteria A [3] |
| RF Conducted Immunity | IEC/EN 61000-4-6 | Level 2 (3 V/m) Criteria A [4] |
| Voltage Dips, Interruptions | IEC/EN 61000-4-11 | 230 Vin, 100% load, Phase 0°, Dip 100% Duration 10 ms (A)<br>230 Vin, 50% load, Phase 0°, Dip 100% Duration 20 ms (Vsb:A, V1:B)<br>230 Vin, 100% load, Phase 0°, Dip 100% Duration > 20 ms (Vsb, V1:B) |

## STATUS INDICATOR (SINGLE BICOLOUR LED )

| Condition | LED Status |
|---|---|
| Standby Mode: Main output = OFF; AC PRESENT | Blinking green 1 Hz |
| Standby Mode: Main output = ON; No faults detected | Solid green |
| Fault Detected [5] ;Main output, Vsb output, Fan, overtemperature, input OVP | Solid Amber |
| AC input power absent or no I2C slave address detected (See ADDR signal for configuration details); Vsb OVP | Off |
| Power Supply Warning Event [5] | Blinking Amber |
| Cold Redundant mode – "COLD_STANDBY" / "FORCED STANDBY" MODE | Blinking green 2 Hz |

## ISOLATION CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Insulation Safety Rating / | Input to Output - Reinforced | 5000 | | | Vdc |
| Test Voltage | Input to Chassis - Basic | 2500 | | | Vdc |
| Isolation | Output to Chassis (functional isolation only) | 500 | | | Vdc |

1. Latch-off requires recycling either the input power or toggling PS_ON to resume operation
2. As detected by the internal air intake PMBus reporting sensor. Warning indication (PMbus status register bits and Amber LED status) occurs at 95 °C nominal and recovers at 90 °C nominal; fault indication and shutdown engages at 100 °C nominal and recovers at 95 °C nominal. Operating above the maximum specified operating temperature is consider abnormal and prolonged operation under such conditions may negatively impact power supply and is not recommended. Should airflow through the power module be inadequate or restricted, the power module's internal hot-spot sensors may act to self-protect by shutting down the main output regardless of the intake airflow temperature. Refer to PMBus ACAN for additional details such as reading temperature and fault thresholds.
3. Measured at power supply's input connector
4. Contingent upon final system design
5. LED Indication is concurrent with the PMbus™ Status_XX Register fault/warn bit flags. LED fault/warn state clears upon removal of fault/warn stimulus however associated PMBus™ set fault/warn bit flags and SMBALERT# signal (faults only) can only be cleared by writing "CLEAR_FAULTS" PMBus command or recycling the input power, or toggling PS_ON signal. Refer to PMBus™ ACAN for further details including fault/warn thresholds, supported register bits and masking capability

| STATUS AND CONTROL SIGNALS | | | |
|---|---|---|---|
| Signal Name | I/O | Description | Interface Details |
| INPUT_OK<br>Link to:<br>Pin_Table | Output | INPUT_OK signal is driven high when input source is present and within acceptable limits and driven low to indicate loss of input power. This signal deasserts ≥ 5 ms before loss of main output and provides an accurate indication of loss of AC input voltage. | Pulled up via 511R to internal house-keeping supply voltage [2] and pulled down to DC Return via 10 kΩ resistor |
| PW_OK (Output OK)<br>Link to:<br>Pin_Table | Output | The signal is asserted, driven high, by the power supply to indicate 12V main output is valid. Should a 12v main output fault occur, the PW_OK signal will de-assert + driven low.<br>PW_OK output is driven low to indicate that the main output is outside of lower limit of regulation. | Pulled up internally via 10 kΩ to internal house-keeping supply voltage [2].<br>A logic high >2.0Vdc<br>A logic low <0.8Vdc<br>Driven low by internal CMOS buffer (open drain output) |
| SMBALERT#<br>(FAULT)<br>Link to:<br>Pin_Table | Output | SMBALERT# is driven low to alert the system that the power supply has detected a fault condition as defined in the PMBus ACAN, supported STATUS_XX Register fault bits [1].<br>This alert asserts when any of the supported STATUS_XX register fault bits are set. This signal is driven high to indicate normal operation.<br>SMBAERT# is de-asserts (fault indication cleared) by either of the following, provided the fault condition is removed:<br>1) recycling input power<br>2) Issuing "clear_faults" PMBus command<br>3) toggling the PS_ON signal<br><br>The LED fault indication reflects the SMBALERT# status | Pulled up internally via 10 kΩ to house-keeping supply voltage [2].<br>A logic high >2.0Vdc<br>A logic low <0.8Vdc<br>Driven low by internal CMOS buffer (open drain output) |
| PRESENT_L<br>(Power Supply Absent)<br>Link to:<br>Pin_Table | Output | The signal is used to detect the presence (installed) of a Power module by the host system and is connected to power module's logic SGND within the power module. | Passive connection to +VSB_Return.<br>A logic low <0.8 Vdc |
| PS_ON (Main Out Enable/Disable) | Input | This signal [18] is pulled up, within the power supply, to the internal housekeeping supply. The power supply main 12V output will be enabled when this signal is pulled low (to output return).<br>In the low state the signal input shall not source more than 1mA of current. The 12V main output will be disabled when the input is driven higher than 2.4 V, or open circuited.<br>Cycling this signal shall clear latched fault conditions. | Pulled up internally to internal bias supply [2]. A logic high >2.0 Vdc<br>A logic low <0.8 Vdc<br>Input is via CMOS Schmitt trigger buffer |

**STATUS AND CONTROL SIGNALS**

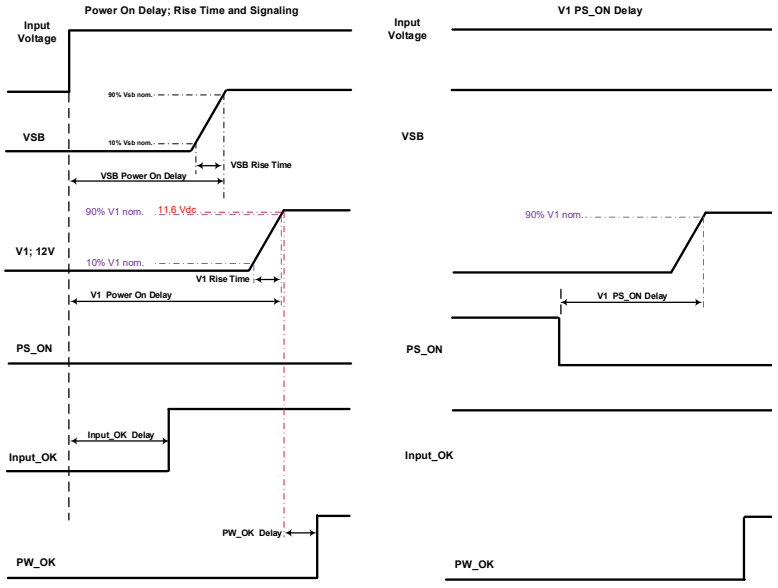
<table>
<tr><th>Signal Name</th><th>I/O</th><th>Description</th><th>Interface Details</th></tr>
<tr><td>ADDR (Address )<br>Link to:<br>Pin_Table<br>LED Table</td><td>Input</td><td>An external pull-down resistor ≤180 kΩ must be placed on the system/host side between the ADDR pin and +12V Main / VSB_Return to enable/turn-on the main output.<br>This same resistor also sets the slave addresses as defined in the following table:
<table>
<tr><th>External Resistor Value (K-ohm, ≤+/5%) Pin D2</th><th>INTERNAL CONTROLLER</th><th>EXTERNAL EEPROM</th></tr>
<tr><td>0.82</td><td>0xB0</td><td>0xA0</td></tr>
<tr><td>2.7</td><td>0xB2</td><td>0xA2</td></tr>
<tr><td>5.6</td><td>0xB4</td><td>0xA4</td></tr>
<tr><td>8.2</td><td>0xB6</td><td>0xA6</td></tr>
<tr><td>15</td><td>0xB8</td><td>0xA8</td></tr>
<tr><td>27</td><td>0xBA</td><td>0xAA</td></tr>
<tr><td>56</td><td>0xBC</td><td>0xAC</td></tr>
<tr><td>180</td><td>0xBE</td><td>0xAE</td></tr>
</table></td><td>DC voltage between the limits of 0 and +3.3 Vdc<br>System side pull-down resistor required, ≤180 kΩ</td></tr>
<tr><td>SCL (Serial Clock)<br>Link to:<br>Pin_Table</td><td>Both</td><td>A serial clock[2] line compatible with PMbus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.2.<br>No additional internal capacitance is added that would affect the speed of the bus.<br>The signal is provided with a series isolator device to disconnect the internal power supply bus in the event that the power module is unpowered.</td><td>VIL is 0.8 V maximum<br>VOL is 0.4 V maximum when sinking 3 mA<br>VIH is 2.1 V minimum</td></tr>
<tr><td>SDA (Serial Data)<br>Link to:<br>Pin_Table</td><td>Both</td><td>A serial data[2] line compatible with PMbus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.2.<br>The signal is provided with a series isolator device to disconnect the internal power supply bus in the event that the power module is unpowered.</td><td>VIL is 0.8 V maximum<br>VOL is 0.4 V maximum when sinking 3 mA<br>VIH is 2.1 V minimum</td></tr>
<tr><td>V1_SENSE & V1SENSE_RTN<br>Link to:<br>Pin_Table<br>Pin_Table</td><td>Input</td><td>Remote sense connections intended to be connected at and sense the voltage at the point of load.<br>The voltage sense will interact with the internal module regulation loop to compensate for voltage drops due to connection resistance between the output connector and the load.<br>If remote sense compensation is not required then the voltage can be configured for local sense by:<br>1. V1_SENSE directly connected to main output<br>2. V1_SENSE_RTN directly connected to +12V Main/VSB_Return</td><td>Compensation for up to 0.12 Vdc total connection drop (output and return connections).</td></tr>
<tr><td>ISHARE<br>Link to:<br>Pin_table</td><td>Both</td><td>This signal is connected between sharing units forming an ISHARE bus. It is a bi-directional analog bus voltage controls the current share between sharing units. The power module responds to change in bus voltage and also can change the bus voltage based on the load drawn from it. For single Power module, the voltage on the pin/ISHARE bus would read approximately 8 Vdc at 100% load. For two identical units sharing the same 100% load this would read approximately 4 Vdc for perfect current sharing (i.e. 50% module load capability per unit). This signal is also used by cold redundant enabled power supplies to determine Main output on/off state.</td><td>Analogue voltage:<br>+8 V maximum; 10 kΩ to +12V_RTN</td></tr>
</table>

1. PMBus command SMBAERT_MASK write transactions are support; the system/host can configure the specific fault bits that effect SMBALERT#
2. Approximately 3.1 Vdc for 3.3 / 12Vsb models or 4.8 Vdc for 5Vsb models, internal reference "STBY_PULL"

## TIMING SPECIFICATIONS

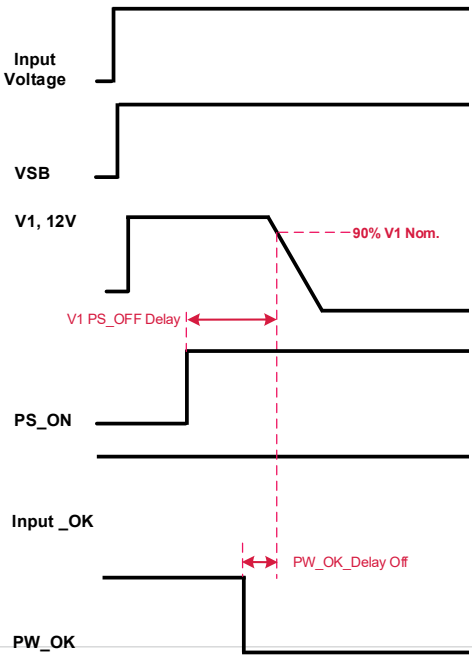
Unless otherwise specified, the following notes apply to all timing specifications:
1. Ta= 25 °C, Vin & Vin nom. = 200-240 Vac
2. Resistive load, 100% full load, both outputs

### Turn-On Delay & Output Rise Time




| Time | Min | Max |
|---|---|---|
| Vsb Rise time; see Fig. 1 | 3 ms | 9 ms |
| V1 Rise time; see Fig. 2 | 7 ms | 15 ms |
| Vsb Power-on-delay; see Fig. 3 | | 2700 ms |
| V1 Power-on-delay; see Fig. 4 | | 3000 ms |
| V1 PS_ON delay; see Fig. 5 | 100 ms | 400 ms |
| V1 PW_OK delay; see Fig. 6 | 100 ms | 400 ms |
| Input_OK detect; see Fig. 7 | 100 ms | 1500 ms |

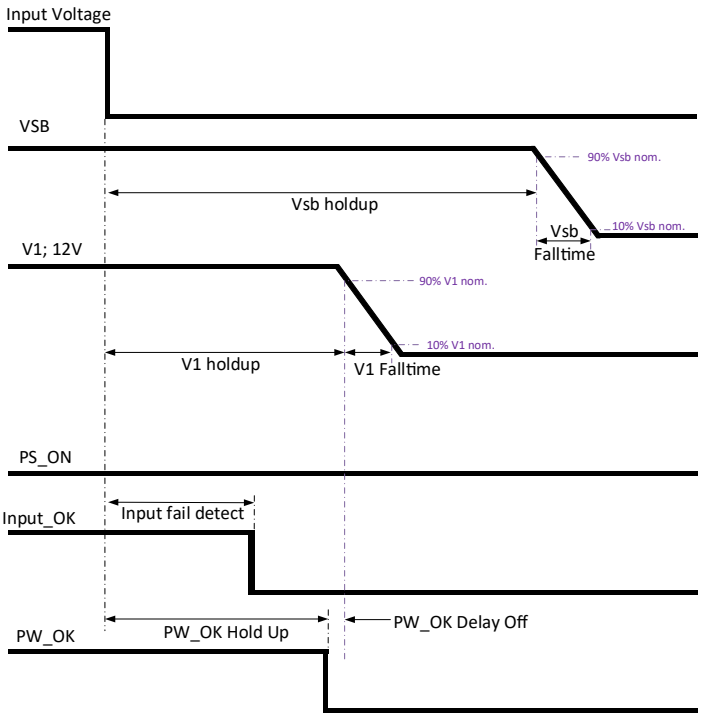
### Shutdown by PS_ON. Fall Time and Signaling




| Turn-Off Timing | Min | Max | Notes |
|---|---|---|---|
| V1 PS_OFF delay | 0 ms | 5 ms | |
| PW_OK delay off | 1 ms | | |

## TIMING SPECIFICATIONS

Power Removal Holdup and Signaling




| Power Removal Timing | Min | Typ. | Max | Notes |
|---|---|---|---|---|
| Vsb holdup; see Fig. 8 | 40 ms | | - | |
| V1 holdup; see Fig. 9 | 10 ms | | - | Full load (2500 W) |
| Input Fail Detect; see Fig. 10 | 3 ms | | - | Min input /Min load conditions |
| PW_OK delay off; see Fig. 11 | 1 ms | | - | Full load (2500 W) |
| Vsb Fall time | - | | - | Must be monotonic |
| V1 Fall time | - | | - | |
| PW_OK Hold Up time | 9 ms | | | |

## TYPICAL PERFORMANCE DATA

### TIMING CHARACTERISTICS

The following terms may be used interchangeably throughout this section:
"Enable" = "PS_ON" signal; "V1" = 12V Main output; "V2" = Vsb output; "PGOOD" = PW_OK

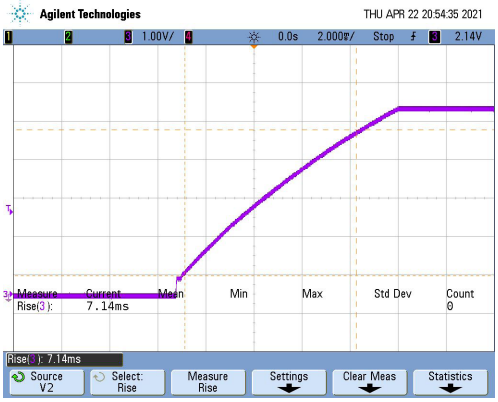



Fig. 1
Vsb output risetime; 25C 230Vac in, 100% load

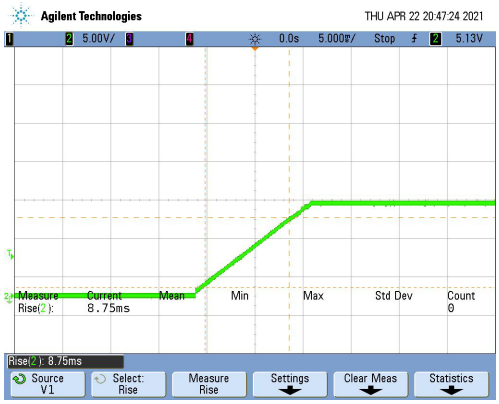



Fig. 2
12V main output rise-time; 25C 230Vac in, 100% load

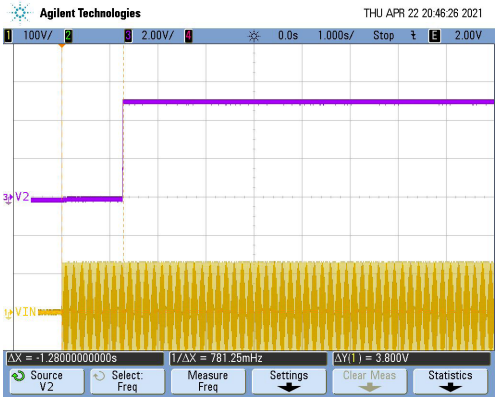



Fig. 3
Vsb power on delay; 25C 230Vac in, 100% load

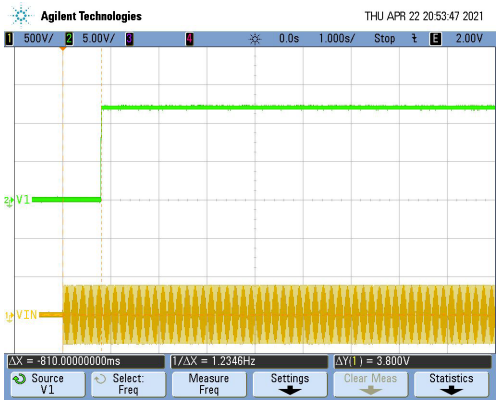



Fig. 4
12V main power on delay; 25C 230Vac in, 100% load

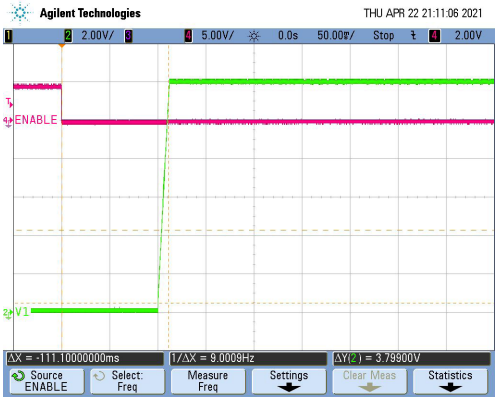



Fig. 5
12V main PS_ON delay; 25C 230Vac in, 100% load


Fig. 6
V1 PW_OK delay; 25C 230Vac in, 100% load

## TYPICAL PERFORMANCE DATA

TIMING CHARACTERISTICS

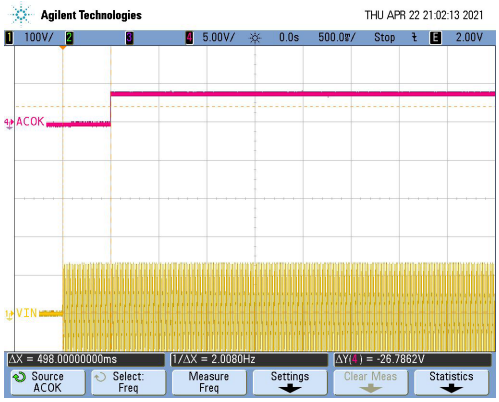



Fig. 7

Vin Detect, 90vrms (60hz) input, 25C 230Vac in, Min. load

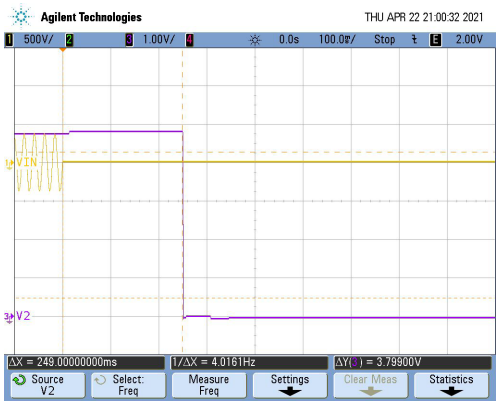



Fig. 8

Vsb hold-up; 25C 230Vac in, 100% load


Fig. 9

V1 holdup; 25C 230Vac in, 100% load

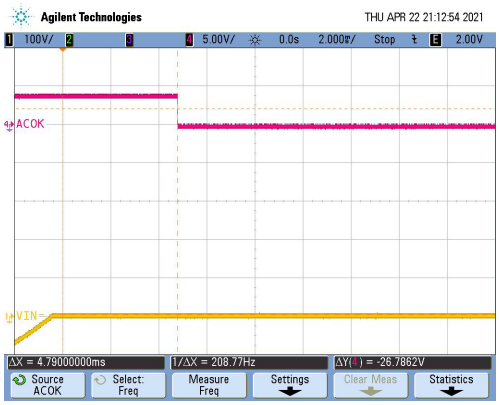



Fig. 10

Input Fail detect; 25C; 90Vac input; Min. Load


Fig. 11

PW_OK delay off; 25C 230Vac in, 100% load

## TYPICAL PERFORMANCE DATA

### Efficiency Performance

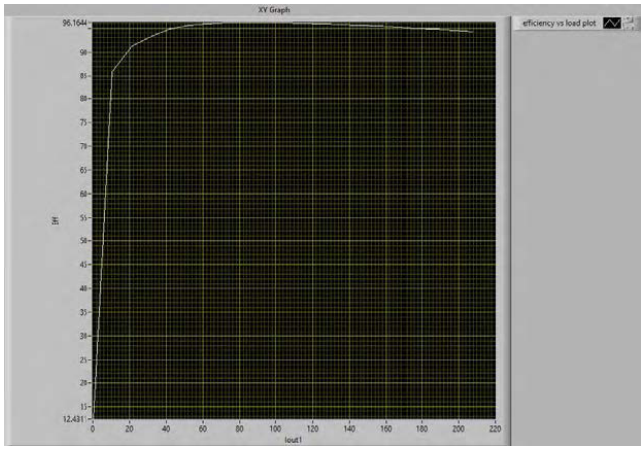



Fig. 12
Efficiency; 230Vac input 25C

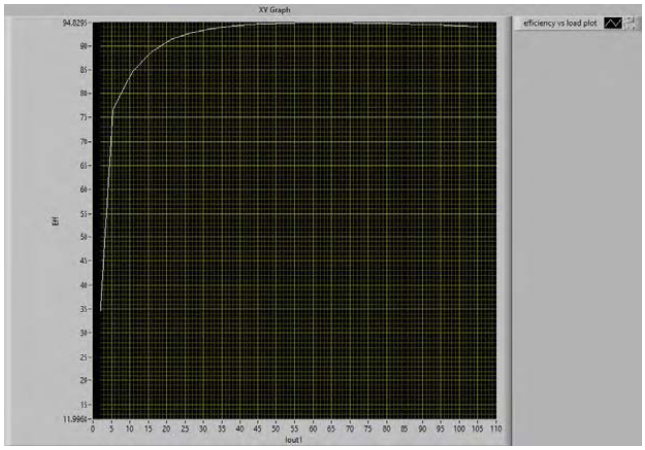



Fig. 13
Efficiency; 115Vac input 25C

### POWER DE-RATING VS TEMPERATURE & INPUT VOLTAGE

The following tables illustrate the maximum Main 12V output power and current vs air intake temperature and nominal input voltage. The standby output may be loaded up to 100% FL without further impact to De-rating.

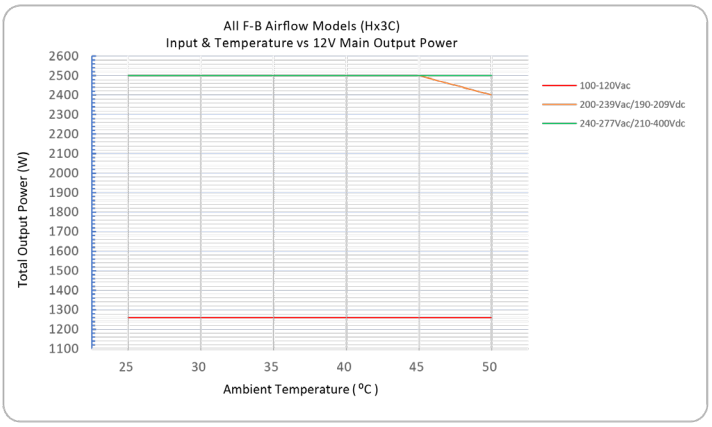



Fig. 14
Main Output Power De-rating table Front to Back airflow models (Hx3C)

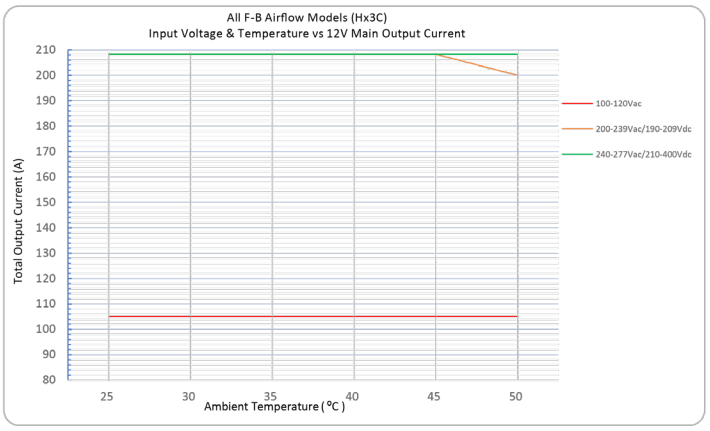



Fig. 15
Main Output Current De-rating table Front to Back airflow models (Hx3C)

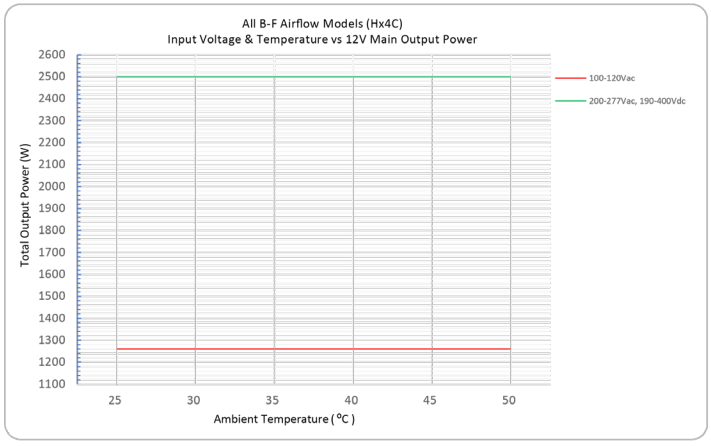



Fig. 16
Main Output Power De-rating table Back to Front airflow models (Hx4C)

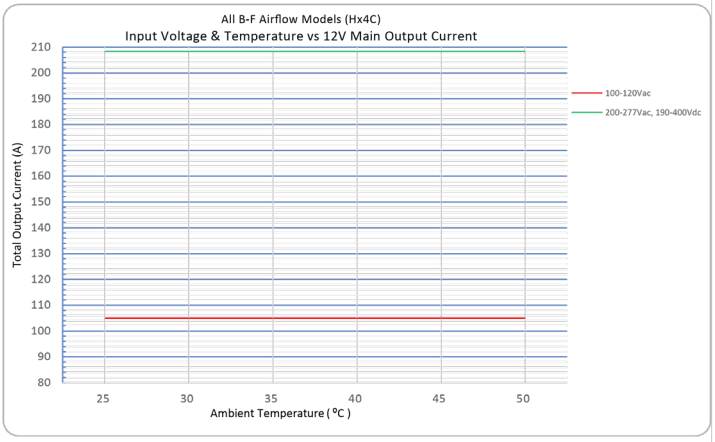
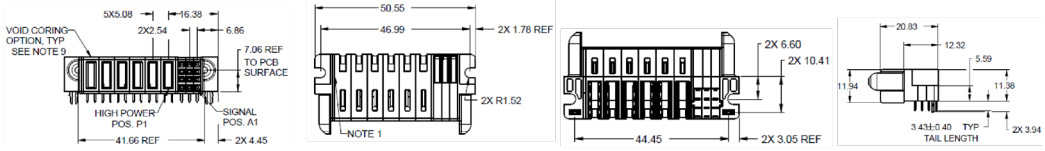



Fig. 17
Main Output Current De-rating table Front to Back airflow models (Hx4C)

Link back to front page

## DC OUTPUT & SIGNAL INTERFACE CONNECTOR

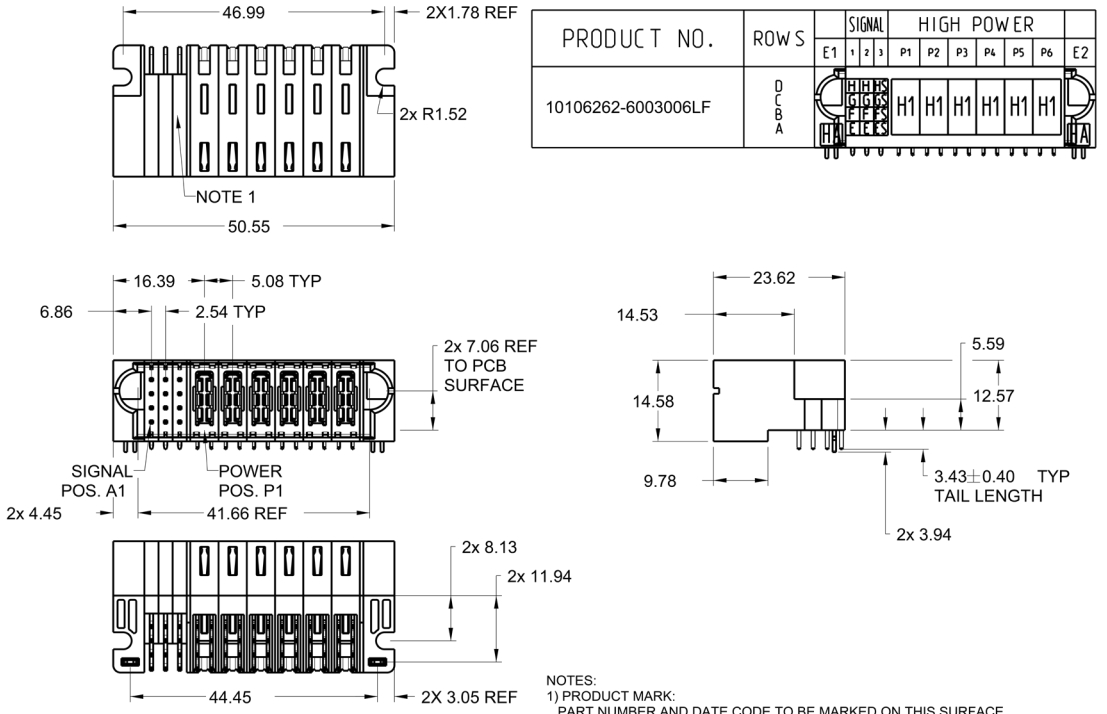
**System Side:** FCI/Amphenol 10106264-6003003LF




| PRODUCT NO. | ROWS | HP | | | | | | S | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E1 | P6 | P5 | P4 | P3 | P2 | P1 | 3 | 2 | 1 | E2 |
| 10106264-6003003LF | D | | H3 | H3 | H3 | H1 | H1 | H1 | | | | |
| | C | | | | | | | | G | G | G | |
| | B | | | | | | | | F | F | F | |
| | A | | | | | | | | E | E | E | |

| CODE | DESCRIPTION |
|---|---|
| E | SID SIGNAL CONTACT, ROW A |
| F | SID SIGNAL CONTACT, ROW B |
| G | SID SIGNAL CONTACT, ROW C |
| H | SID SIGNAL CONTACT, ROW D |
| H1 | MFBL HIGH POWER CONACT(3.43) |
| H3 | SID HIGH POWER CONNACT(3.43) |
| HA | METAL HOLD DOWN |

**Power Module Side:** FCI/Amphenol 10106262-6003006LF




| PRODUCT NO. | ROWS | SIGNAL | | | HIGH POWER | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E1 | 1 | 2 | 3 | P1 | P2 | P3 | P4 | P5 | P6 | E2 |
| 10106262-6003006LF | D | | H | H | HS | | | | | | | |
| | C | | G | G | GS | H1 | H1 | H1 | H1 | H1 | H1 | |
| | B | | F | F | FS | | | | | | | |
| | A | HA | E | E | ES | | | | | | | HA |

| CODE | DESCRIPTION |
|---|---|
| E | MLBF SIGNAL CONTACT, ROW A (3.43) |
| ES | MLBF2 SIGNAL CONTACT, ROW A (3.43) |
| F | MLBF SIGNAL CONTACT, ROW B (3.43) |
| FS | MLBF2 SIGNAL CONTACT, ROW B (3.43) |
| G | MLBF SIGNAL CONTACT, ROW C (3.43) |
| GS | MLBF2 SIGNAL CONTACT, ROW C (3.43) |
| H | MLBF SIGNAL CONTACT, ROW D (3.43) |
| H1 | STD HIGH POWER CONTACT (3.43) |
| HA | METAL HOLD DOWN |
| HS | MLBF2 SIGNAL CONTACT, ROW D (3.43) |

NOTES:
1) PRODUCT MARK:
PART NUMBER AND DATE CODE TO BE MARKED ON THIS SURFACE .
THE MARK CAN BE OMITTED IF THERE IS NOT ENOUGH SPACE ON THIS SURFACE.
2) MATERIALS:
-HOUSING : HIGH TEMP THERMOPLASTIC WITH GLASS FIBER, UL94V-0, BLACK.
-POWER CONTACT : HIGH CONDUCTIVITY COPPER ALLOY.
-SIGNAL CONTACT : COPPER ALLOY.
3) PLATING SPECIFICATION : 10116351
4) DENOTES CONNECTOR KEEP OUT ZONE.
5) DATUM AND BASIC DIMENIONS ARE ESTABLISHED BY CUSTOMER.
6) ALL HOLE DIAMETERS ARE FINISHED HOLE SIZES.
7) 1.15+/-0.025MM DRILLED HOLE PLATED WITH 0.00762MM MIN SN
OVER 0.0254-0.0762MM CU PLATING TO ACHIEVE A 1.02+/-0.07MM HOLE.
8) THE HOUSING WILL WITHSTAND EXPOSURE TO 265 °C PEAK TEMPERATURE
FOR 10 SECONDS IN A WAVE SOLDER APPLICATION.
9) THIS PRODUCT MEETS EUROPEN UNION DIRECTIVES AND OTHER COUNTRY
REGULATIONS AS DESCRIBED IN GS-47-0004.
10)PRODUCT SPECIFICATION : GS-12-658.
APPLICATION SPECIFICATION : GS-20-141.
PRODUCT PACKAGE SPECIFICATION: GS-14-1502.

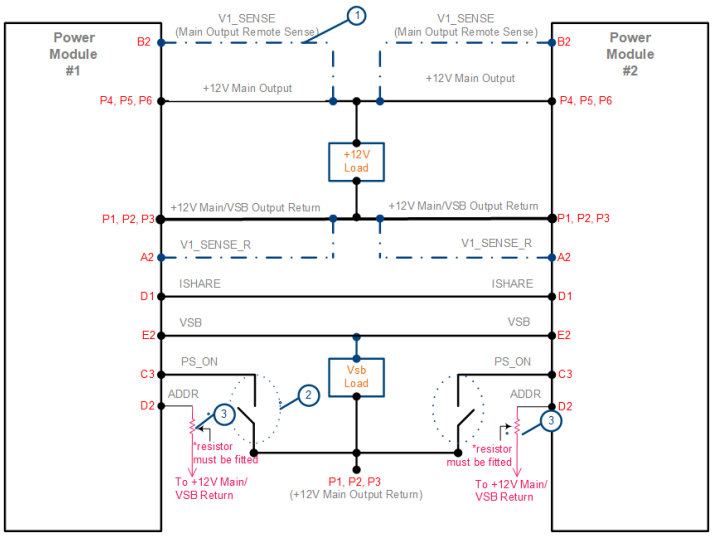
## *(CONTINUED)* DC OUTPUT & SIGNAL INTERFACE CONNECTOR

### PIN ASSIGNMENTS

| Pin | Signal Name | Comments |
|---|---|---|
| P4, P5, P6 | V1 | + 12V main output |
| P1, P2, P3 | V1 & V2 RETURN | +12V Main/VSB output_Return |
| A3 | SDA | Short Pin1 I2C data signal line; shorter MLFB pin; Link to signal details |
| B3 | SCL | Short Pin1 I2C clock signal line; shorter MLFB pin; Link to signal details |
| C3 | PS_ON | Short Pin1 Remote on/off Short; shorter MLFB pin |
| D3 | SMBALERT# | Short Pin1 2C alert signal; shorter MLFB pin; Link to signal details |
| A2 | V1_SENSE_R | - Remote Sense/ return; Link to signal details |
| B2 | V1_SENSE | + Remote Sense; Link to signal details |
| C2 | PW_OK | Power OK; Link to signal details |
| D2 | ADDR | Address Selection (select by external pull down resistor); Link to signal details |
| A1 | PRESENT_L | PS Present; Link to signal details |
| B1 | Vsb | Standby output |
| C1 | INPUT_OK | Indicates input power status; Link to signal details |
| D1 | ISHARE | Current share bus; Link to signal details |

## WIRING DIAGRAM

1 + 1 WIRING EXAMPLE

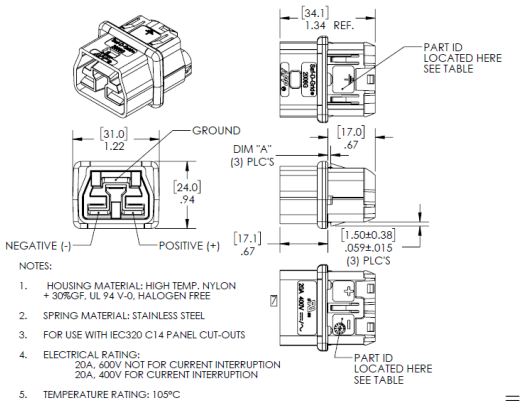



① Dotted lines show optional remote sense connections. Optional remote sense lines can be attached to a load that is a distance away from the power supply to improve regulation at the load.
② FET, BJT, wire or switch (debounced) to turn on +12V Main Output
③ ≤180K External resistor must be fitted between the ADDR pin and +12V/VSB return in order to enable power supply. This resistor value also sets the PMBus Slave Addressing. Refer to the signal table for address options

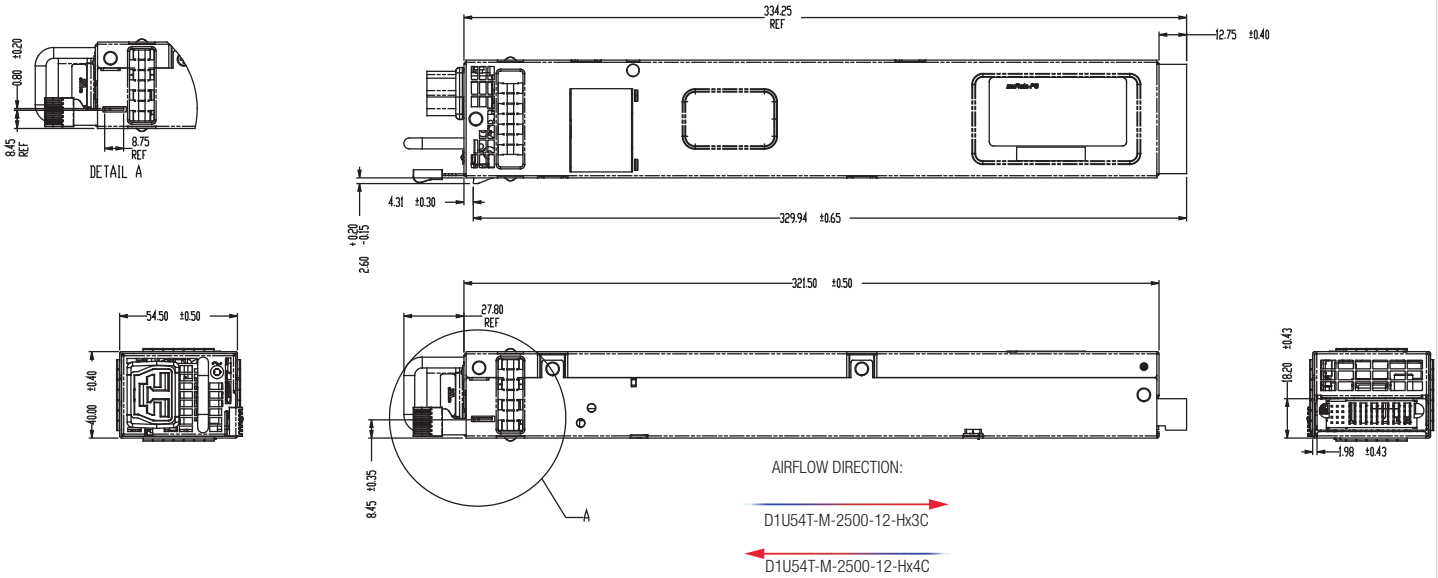
CURRENT SHARING NOTES

1. Main Output current sharing is achieved using the active current share method.
2. Current sharing can be achieved with or without the remote (V_SENSE) connected to the common load.
3. +Vsb Outputs can be tied together for redundancy but total combined output power must not exceed the rated standby power of a single unit. The +Vsb output has an internal ORing MOSFET for additional redundancy/internal short protection.
4. Main output power of units sharing must not exceed the rated power of a single unit during power up.
5. The current sharing pin D1 is connected between sharing units (forming an ISHARE bus). It is an input and/or an output (bi-directional analog bus) as the voltage on the line controls the current share between sharing units. A power supply will respond to a change in this voltage but a power supply can also change the voltage depending on the load drawn from it. On a single unit the voltage on the pin (and the common ISHARE bus would read approximately 8VDC at 100% load (power module capability). For two units sharing the same load this would read approximately 4 Vdc for perfect current sharing (i.e. 50% power capability per unit).
6. The load for both the main 12V and the Vsb outputs at initial startup shall not be allowed to exceed the capability of a single unit. The load can be increased after a delay of 3 sec (minimum), to allow all sharing units to achieve steady state regulation

## CONNECTOR; AC/HVDC INPUT, POWER MODULE

| Part Number | Description | Outline |
|---|---|---|
| Anderson Saf-D-Grid ®<br>2006G1-NC-BK<br>Receptacle | This power module provides a panel-mounted, two-position receptacle for application of input power.<br><br>The internal connections from the receptacle to the PCB utilize highly flexible wires and solder terminals to ensure ample float for the end-user's mating power cable (not provided).<br><br>The internal connections are comprised of the following items<br><br>Solder Terminal: QTY 3 Anderson 2016G1-LPBK<br>Line (+) Wire: 14AWG (41x30 stranding)<br>Neutral (-) Wire: 14AWG (41x30 stranding)<br>Ground Wire: 16AWG (26x30 stranding) |  |

## MECHANICAL OUTLINE




- This drawing is a graphical representation of the product and may not show all fine details. Please contact Murata for 3D model for details
- Reference File: D75090020161_R1_14APR2020
- Dimensions in mm, Material: 0.80mm hot dipped galvanized steel, Grade G60 minimum spangle finished with a CR(6+) free corrosion resistant coating

## OPTIONAL ACCESSORIES

| Description | Part Number |
|---|---|
| Connector Card | D1U54P-12-CONC2K |
| AC Line Cord①, Adapts Saf-D-Grid® 400V to IEC 320 C14 or C20 | Anderson Power Products (Saf-D-Grid® To IEC 320 cable configurations):<br><br>2050KN1-BK: C14, 1M Length, 14 AWG SJT<br>2050KN2-BK: C14 2M Length, 14 AWG SJT<br>2050KN3-BK: C14, 3M Length, 14 AWG SJT<br>2050KH1-BK: C20, 1M Length, 14 AWG SJT<br>2050KH2-BK: C20, 2M Length, 14 AWG SJT<br>2050KH3-BK: C20 3M Length, 14 AWG SJT<br>2058KN1-BK: C20, 1M Length, 12 AWG SJT<br>2058KN2-BK: C20, 2M Length, 12 AWG SJT<br>2058KN3-BK: C20 3M Length, 12 AWG SJT<br><br>Contact your Anderson Power Products distributor for additional options, pricing and availability. |

① It is incumbent upon the end user to ensure operation with an input cable system that complies with the electrical code and safety requirements of the country, or region of deployment.

## APPLICATION NOTES

| Document Number | Description | URL Link to Document |
|---|---|---|
| ACAN-82 | D1U54P-12-CONC2K , Output Connector Card | Click to open ACAN-82 |
| ACAN-122 | D1U54T-M-2500-12-HxxC PMBus™ Protocol | Click to open ACAN-122 |

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