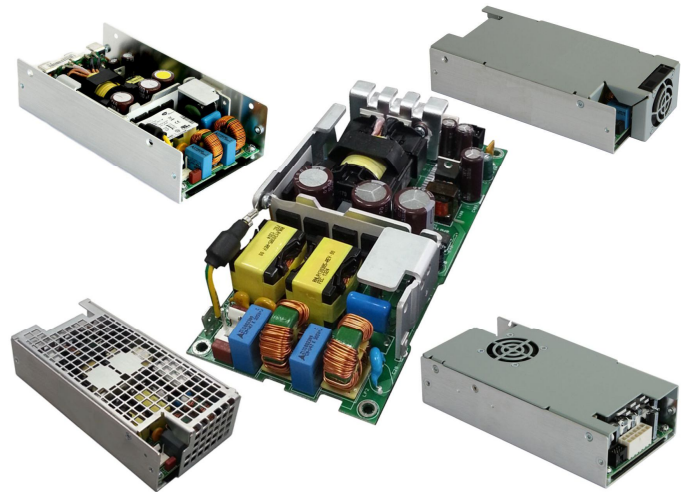


MAIN FEATURES

- Universal input voltage range (90 – 264 V_{AC})
- Active PFC, EN 61000-3-2 Class C, D compliant
- Steady 400 W output power (440 W peak)
- High efficiency (94% typical)
- Low stand by power consumption (<0.5 W)
- 12, 24, 28, 36 or 48 V_{DC} standard output voltages
- +5 V stand by, 2 A and 12 V auxiliary, 1 A outputs
- Low earth/touch leakage currents (<300/100 μA)
- Fan speed control function (Off at <50 W)
- Over temperature protection
- Input under voltage, output over voltage protections
- Over current and short circuit protection
- Remote On/Off and power good signal
- 5 available packages all fit 1U installation
- IEC/EN/UL 60950-1 and 62368-1 compliance
- EN55032, FCC Class B, conducted radiated emissions.
- EN55024 immunity
- 4000 m operation without de-rating
- RoHS 3 compliant (Directive EU 2015/863)



DESCRIPTION

The DDP400 series of IT rated AC-DC power supplies feature a compact form factor and a high conversion efficiency. The series provides a steady 400 W of regulated DC power through the full 90 to 264 V_{AC} input voltage range. Based on an open frame, 3.00" x 6.50" x 1.46" form factor, the series is available in five different low-profile packages to enable designers to integrate into 1U applications.

By converting energy at 94% typical efficiency, the DDP400 series generate less heat facilitating thermal management in space constrained systems and offering high reliability.

The DDP400 series is available in five standard output voltages – 12, 24, 28, 36 or 48 V_{DC} – offer an auxiliary 12 V_{DC} and 5 V_{DC} stand-by outputs. Available control signals include Power Good (P_OK), Remote On/Off (PS_ON) and remote sense compensation on the (+) load line.

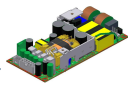
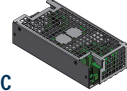
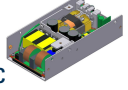

Boxed and vented open frame models can deliver full output power up to 50 °C, can operate up to 70 °C with de-rating and are capable of start up from -30 °C. A built-in speed controlled fan, to ensure the required airflow while maintaining minimal operational noise, which ultimately enhances the power supply service life time.

The DDP400 range complies with the IEC/EN/UL/CSA 60950-1 and 62368-1 safety standards for Audio Video and IT equipment. It also complies with the Class B limits of the standards EN55011, EN55032 and FCC for conducted and radiated emissions, IEC/EN 61000-3 Class C for harmonic content and EN 55024 for EMC immunity.

MARKET SEGMENTS AND APPLICATIONS

- Video Wall Display & Entertainment
- Industrial and Process Control
- Telecommunications
- Test & Measurement Equipment
- Industrial Laser applications
- 3D Printing and ATM

MODEL CODING AND OUTPUT RATINGS

| Model and Output Power | Output Nominal Voltage | Package Option |
|------------------------|----------------------------|--|
| ITE 400W: DDP400 | 12 V _{DC} : -US12 | Open Frame: -OF  |
| | 24 V _{DC} : -US24 | |
| | 28 V _{DC} : -US28 | Punched Cover: -PC  |
| | 36 V _{DC} : -US36 | |
| | 48 V _{DC} : -US48 | Vented Cover: -VC  Front Fan: -FF  |

MODEL CODING AND OUTPUT RATINGS

| Model Number | V1 [V] | I1 ¹ Convection [A] | I1 ² Forced air [A] | V1 ³ Ripple [mV] | V2 [V] | I2 ¹ Rated [A] | V2 ³ Ripple [mV] | 5V _{SB} [V] | I5V _{SB} ¹ Convection [A] | I5V _{SB} ² Forced air [A] | 5V _{SB} ³ Ripple [mV] |
|----------------------|-----------|--------------------------------------|--------------------------------------|-----------------------------------|-----------|---------------------------------|-----------------------------------|-------------------------|---|---|---|
| DDP400-US12-OF/UC/PC | 12 | 20.8 | 33.3 | 120 | 12 | 1 | 240 | 5 | 1.5 | 2 | 50 |
| DDP400-US24-OF/UC/PC | 24 | 10.4 | 16.7 | 240 | 12 | 1 | 240 | 5 | 1.5 | 2 | 50 |
| DDP400-US36-OF/UC/PC | 36 | 6.9 | 11.1 | 360 | 12 | 1 | 240 | 5 | 1.5 | 2 | 50 |
| DDP400-US48-OF/UC/PC | 48 | 5.2 | 8.3 | 480 | 12 | 1 | 240 | 5 | 1.5 | 2 | 50 |
| DDP400-US12-VC/FF | 12 | - | 33.3 | 120 | 12 | 1 | 240 | 5 | - | 2 | 50 |
| DDP400-US24-VC/FF | 24 | - | 16.7 | 240 | 12 | 1 | 240 | 5 | - | 2 | 50 |
| DDP400-US36-VC/FF | 36 | - | 11.1 | 360 | 12 | 1 | 240 | 5 | - | 2 | 50 |
| DDP400-US48-VC/FF | 48 | - | 8.3 | 480 | 12 | 1 | 240 | 5 | - | 2 | 50 |
| DDP400-US28-UC | 28 | 8.9 | 14.3 | 280 | 12 | 1 | 240 | 5 | 1.5 | 2 | 50 |

¹ The combined output power of V1, V2 and 5 V_{SB} for "-OF", "-UC" and "-PC" packages, must not exceed 400 W when cooled by 400 LFM air flow, and 250 W when natural convection cooled, up to 50 °C. Above 50 °C output de-rating applies. See de-rating curves below. In any case, the heat sink maximum temperature should not exceed +110 °C at 50 °C ambient temperature.

² The combined output power of V1, V2 and 5 V_{SB} for "-VC" and "-FF" packages, must not exceed 400 W up to 50 °C, and 280 W at 70 °C ambient temperature. See de-rating curves below.

³ Peak-to-Peak measured at 20 MHz Bandwidth.

INPUT SPECIFICATIONS

| Specification | Test Conditions / Notes | Min. | Nominal | Max. | Units |
|--------------------------|--|------|----------------------|------------|-----------------|
| AC Input Voltage | PS starts and operates at 90 V _{AC} at all load conditions | 90 | 100-240 | 264 | V _{AC} |
| DC Input Voltage | | 170 | - | 270 | V _{DC} |
| Input Frequency | | 47 | 50/60 | 440 | Hz |
| Input Current | RMS at 180 V _{AC} , maximum load RMS at 90 V _{AC} , maximum load | - | - | 2.5 5 | A |
| Inrush Current (peak) | 265 V _{AC} , 25 °C ambient, cold start. 24, 28, 36, 48 V _{DC} , no damage 12 V _{DC} | - | - | - 20 | A |
| Fusing | 2x Time Lag 6.3 A, 250 V on both L and N | - | - | 6.3 | A |
| Efficiency | At 230 V _{AC} : 20% rated load 50 – 100 % rated load At 115 V _{AC} : 20% rated load 50 – 100 % rated load | - | 90 94 90 92 | - | % |
| Input Power Consumption | Power on, 115-230 V _{RMS} , no load Stand by, 115-230 V _{RMS} , no load | - | 1 0.4 | 1.5 0.5 | W |
| Power Factor | At full rated load, 115 V _{AC} , 60 Hz and 230 V _{AC} , 50 Hz input voltages | 0.95 | - | - | - |
| Harmonic Current | Complies with EN-61000-3-2 Class C at 230 V _{AC} 50 Hz, load >50 W. | | | | |
| Fluctuations and Flicker | Complies with EN-61000-3-3 at nominal voltages and full load. | | | | |
| Earth Leakage Current | Normal conditions, 240 V _{RMS} , 60 Hz. | - | - | 300 | µA |

OUTPUT SPECIFICATIONS

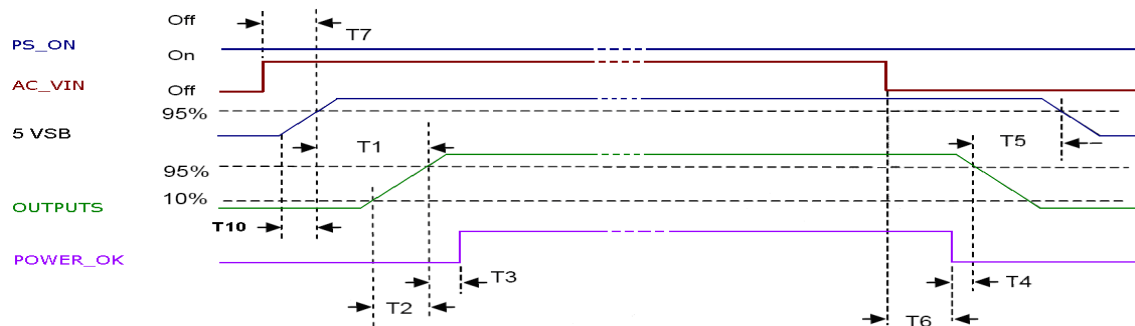
| Specification | Test Conditions / Notes | Min. | Nom. | Max. | Units |
|---|--|-------|------|-----------|--------------------------|
| V1 Output Voltage | 0.5% set point accuracy for all voltage variants | - | 12 | - | V |
| | | - | 24 | - | |
| | | - | 28 | - | |
| | | - | 36 | - | |
| | | - | 48 | - | |
| V1 Output Power Rating | All voltages, OF/UC/PC, convection cooling | - | - | 250 | W |
| | All voltages, VC/FF, and OF/UC/PC forced air cooling (> 400 LFM) | - | - | 400 | |
| | All models, peak power (≤ 10 s) | - | - | 440 | |
| V2 Output Voltage (*) | All models. Load on V2: from 5 to 1000 mA Load on V1: from 0.1 to I1 rated | 11.35 | 11.5 | 12.65 | V |
| V2 Output Current (I2) | Convection / forced air cooling | - | - | 1 | A |
| 5V_{SB} Output Voltage | 3% set point accuracy | - | 5 | - | V |
| 5V_{SB} Output Current (I5V_{SB}) | OF/UC/PC, natural convection cooling | - | - | 1.5 | A |
| | VC/FF, OF/UC/PC forced air cooling (> 400 LFM) | - | - | 2 | |
| V1 Voltage Adjustment Range | | - | - | ± 5 | %V1 |
| V1 Load-Line-Cross Regulation | V _{AC} : 90 – 264 V _{RMS} | - | - | ± 2 | %V1 |
| | V1 Load: 0 – 33.3 A (12 V _{DC}) | | | | |
| | 0 – 16.7 A (24 V _{DC}) | | | | |
| | 0 – 14.3 A (28 V _{DC}) | | | | |
| | 0 – 13.9 A (36 V _{DC}) | | | | |
| | 0 – 8.3 A (48 V _{DC}) | | | | |
| V2 Load: 0 – 1 A | | | | | |
| 5 V _{SB} Load: 0 – 2 A | | | | | |
| 5V_{SB} Load-Line-Cross regulation | V _{AC} : 90 – 264 V _{RMS} | - | - | ± 5 | %5V _{SB} |
| | V1 Load: 0 – 33.3 A (12V) | | | | |
| | 0 – 16.7 A (24V) | | | | |
| | 0 – 14.3 A (28V) | | | | |
| | 0 – 13.9 A (36V) | | | | |
| | 0 – 8.3 A (48V) | | | | |
| V2 Load: 0 – 1 A | | | | | |
| 5 V _{SB} Load: 0 – 2 A | | | | | |
| V1 Line Regulation | V _{AC} : 90 – 264 V _{RMS} | - | - | ± 0.1 | %V1 |
| Transient Response (Voltage Deviation) V1, 5V_{SB} | 25 % load changes at 1 A/ μ s | - | - | ± 5 | %V1 %5V _{SB} |
| | 12 V _{DC} at 2200 μ F Load / I _{OUT} > 0.5 A | | | | |
| | 24 V _{DC} at 1000 μ F Load / I _{OUT} > 0.5 A | | | | |
| | 28 V _{DC} at 1000 μ F Load / I _{OUT} > 0.5 A | | | | |
| | 36 V _{DC} at 820 μ F Load / I _{OUT} > 0.5 A | | | | |
| | 48 V _{DC} at 560 μ F Load / I _{OUT} > 0.5 A | | | | |
| 5 V _{SB} at 560 μ F Load / I _{OUT} > 0.1 A | | | | | |
| V1 Ripple and Noise | All models, Peak-to-peak, 20 MHz BW. 100 nF ceramic and 10 μ F tantalum caps at the load. | - | - | 1 | %V1 |
| Start-up Rise Time | 90 < V _{IN} < 264, any load conditions. | 5 | - | 85 | ms |
| Start-up Delay | V1 in regulation after PS_ON is asserted | - | - | 200 | ms |
| | V1 in regulation after AC is applied | - | - | 750 | |
| | 5V _{SB} in regulation after AC is applied | - | - | 500 | |
| Turn-on Overshoot | At I1 = 500 mA, V1 in regulation within 50 ms. | - | 10 | - | %V1 |
| | | - | 10 | - | %V2 |
| | | - | 10 | - | %V _{SB} |
| Hold-up Time | At nominal V _{IN} , 400 W, for all models | - | 16 | - | ms |
| | At nominal V _{IN} , 365 W, for all models | - | 20 | - | |
| | At nominal V _{IN} , 200 W, for all models | - | 35 | - | |
| Minimum Load (*) | All models; V1, V2 and 5V _{SB} | 0 | - | - | A |
| Maximum Load Capacitance | At nominal V _{IN} , 25 °C ambient | - | - | 33.000 | μ F |
| | 12 V _{DC} | - | - | 16.000 | |
| | 24 V _{DC} | - | - | 14.300 | |
| | 28 V _{DC} | - | - | 10.000 | |
| | 36 V _{DC} | - | - | 7.000 | |
| 48 V _{DC} | - | - | - | | |
| Temperature Drift | | -1.2 | - | +1.2 | mV/°C |

(*) when the load on the main output is less than 100 mA, V2 output voltage might regulate below its minimum value. Contact ENEDO for details.

SIGNALS / CONTROLS

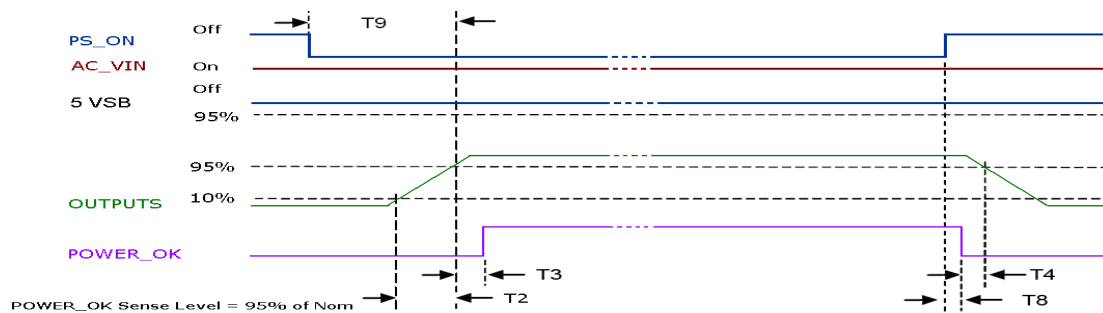
| Signal | Notes | Min | Typ | Max | Unit |
|-------------------------|---|------|-----|-----|------|
| PS_ON | Active low, +5 V TTL signal compatible. Input low voltage | 0 | - | 2.0 | V |
| | Input high voltage ($I_{IN} = 200 \mu A$) | 3.0 | - | - | V |
| | V1 and V2 disabled when PS_ON is open | | | | |
| P_OK | 5 V _{SB} not affected by PS_ON | | | | |
| | V1 and V2 enabled with PS_ON connected to RTN | | | | |
| P_OK | +5 V TTL compatible | | | | |
| | Logic level low (<10 mA sinking) | - | - | 0.7 | V |
| | Logic level high (100 μA sourcing) | 2.4 | - | 5 | V |
| | Low to high time after V1 in regulation | 0.05 | - | 0.1 | s |
| | Power down warning time | 1 | - | - | ms |
| 5V _{SB} output | Active and in regulation after a $90 < V_{AC} < 264$ is applied | - | - | 200 | ms |
| | 5 V _{SB} not affected by PS_ON | | | | |

SIGNALS TIMING



Above waveforms are expected with AC Input ON/OFF:

| | |
|--|---|
| Standby on - Main outputs on | $50 \text{ ms} \leq T1 \leq 250 \text{ ms}$ |
| Main output Rise Time | $5 \text{ ms} \leq T2 \leq 85 \text{ ms}$ |
| 5 VSB Rise Time | $4 \text{ ms} \leq T10 \leq 20 \text{ ms}$ |
| Main outputs On - P_OK delay | $40 \text{ ms} \leq T3 \leq 100 \text{ ms}$ |
| Power down warning ¹ | $T4 \geq 1 \text{ ms}$ |
| Main Output off - Standby off ² | $T5 \geq 1.2 \text{ s}$ |
| Hold-up time (AC off - P_OK low) | $T6 \geq 15 \text{ ms} (115/230 V_{AC})$ |
| AC_ON - Standby turn on time | $T7 \leq 500 \text{ ms}$ |



Above waveforms are expected with PS_ON Signal ON/OFF state change:

| | |
|----------------------------------|---|
| Main Output Rise Time | $5 \text{ ms} \leq T2 \leq 85 \text{ ms}$ |
| Main Outputs on - P_OK delay | $50 \text{ ms} \leq T3 \leq 100 \text{ ms}$ |
| Power down warning ¹ | $1 \text{ ms} \leq T4 \leq 5 \text{ ms}$ |
| PS_ON - Main Output (off) Timing | $T8 \leq 1 \text{ ms}$ |
| PS_ON - Main Output (on) Timing | $T9 \leq 200 \text{ ms}$ |

¹ T4 parameter measurement setup will assume at least 10% of the maximum load on each output.

² T5 parameter measurement setup will assume at least 50% of the maximum load on main output.

PROTECTION FEATURES

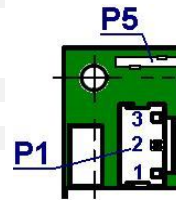
| Specification | Test Conditions / Notes | Min. | Nominal | Max. | Units |
|---|--|------|---------|------|-------------------|
| Input Under Voltage Lockout | Auto recovery, Hiccup Mode | 60 | 75 | - | V _{AC} |
| Input Fuse | 2x Time Lag 6.3 A, 250 V on L1 and L2 | - | - | 6.3 | A |
| Over Current | At nominal input voltages. V1: Hiccup mode, auto-recovering. V2: PTC limiting, auto-recovering. 5 V _{SB} : Hiccup mode, auto-recovering. | 110 | - | 150 | %I _{MAX} |
| Short Circuit | At nominal input voltages. V1: Hiccup mode, auto-recovering. V2: PTC limiting, auto-recovering 5 V _{SB} : Hiccup mode, auto-recovering. | - | - | - | |
| Over Voltage | 12 V _{DC} 24 V _{DC} 28 V _{DC} 36 V _{DC} 48 V _{DC} 5 V _{SB} | 110 | - | 136 | %V _{NOM} |
| Over Temperature (on primary stage) | Unit shut down and latch off Shut down, latch off. | - | - | - | |
| Over Temperature (on secondary side) | Hiccup mode, auto-recovering. | - | - | - | |
| Isolation Primary-to-Secondary | Reinforced | 4000 | - | - | V _{AC} |
| Isolation Input-to-PE | Basic | 1500 | - | - | V _{AC} |
| Isolation V1-to-V2 | | 100 | - | - | V _{DC} |
| Isolation Output-to-PE | Basic | 1500 | - | - | V _{AC} |

ENVIRONMENTAL SPECIFICATIONS

| Specification | Test Conditions / Notes | Min | Nominal | Max | Units |
|---|--|---------|---------|----------|--------|
| Operating Temperature Range | No de-rating up to 50 °C PS starts up at -30 °C | -20 | - | 50 | °C |
| De-rated Operating Temperature Range | Natural convection cooling: Linearly de-rate from 250W at 50 °C, to 100 W at 70 °C Forced air cooling: Linearly de-rate from 400 W at 50 °C, to 280 W at 70 °C. See graphs below. | - | - | 70 | °C |
| Storage Temperature Range | | -40 | - | 85 | °C |
| Humidity | RH, Non-condensing Operating Non-operating | - | - | 90 95 | % % |
| Operating Altitude | | - | - | 4000 | m |
| Shock | EN 60068-2-27 Operating: Half sine, 30 g, 18 ms, 3 axes, 6x each (3 positive and 3 negative). Non-Operating: Half sine, 50 g, 11 ms, 3 axes, 6x each (3 positive and 3 negative). | | | | |
| Vibration | EN 60068-2-64 Operating: Sine, 10 – 500 Hz, 1 g, 3 axes, 1 oct/min., 60 min. Random, 5 – 500 Hz, 0.02 g ² /Hz, 1 g _{RMS} , 3 axes, 30 min. Non-Operating: 5 – 500 Hz, 2.46 g _{RMS} (0.0122 g ² /Hz), 3 axes, 30 min. | | | | |
| MTBF | Full Load, 120 V _{AC} , 40 °C ambient 80 % Duty cycle, Telcordia SR-332 Issue 2 | 400.000 | - | - | Hours |
| Useful Life | Low line range, 200 W, 40 °C ambient, natural convention. | - | 4 | - | Years |
| Thermal Considerations | The output power de-rating curves are herein provided. These curves can be used as a guideline to assess the limit in performance of a power supply once installed in a system providing controlled air flow at a certain input voltage and ambient temperature. | | | | |

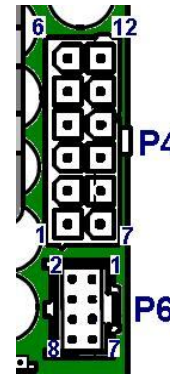
OUTLINE DRAWING AND CONNECTIONS – OPEN FRAME (OF)

| Connector | Manufacturer and Part Number |
|--------------------------------------|---|
| AC Input Connector P1 | Molex 26-60-4030 or equivalent |
| P1 Mating Connector | Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG) |
| Protection Earth Connector P5 | Tyco 63849-1 equivalent |
| P5 Mating Connector | Any tin finished 6.35x0.81 mm receptacle |
| Output Connector P4 | Molex 39-28-8120 or equivalent |
| P4 Mating Connector | Molex 39-01-2120 (Crimp Terminal Housing) Molex 39-00-0039 (Crimp Terminal, 18-24 AWG) |
| Signals Connector P6 | Molex 90130-1108 or equivalent |
| P6 Mating Connector | Molex 90142-0008 (Crimp Terminal Housing) Molex 90119-0109 (Crimp Terminal, 22-24 AWG) |



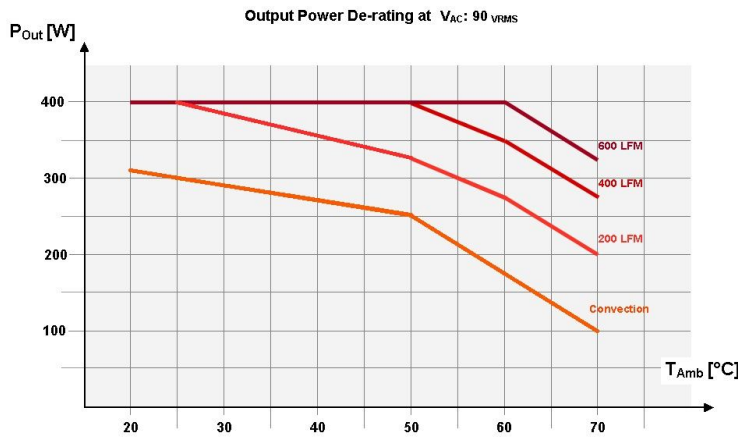
| AC Input P1 | |
|-------------|-------------|
| Pin | Function |
| 1 | Line 1 |
| 2 | Not Present |
| 3 | Line 2 |

| Protection Earth P5 | |
|---------------------|-----------|
| Pin | Function |
| GND | AC Ground |



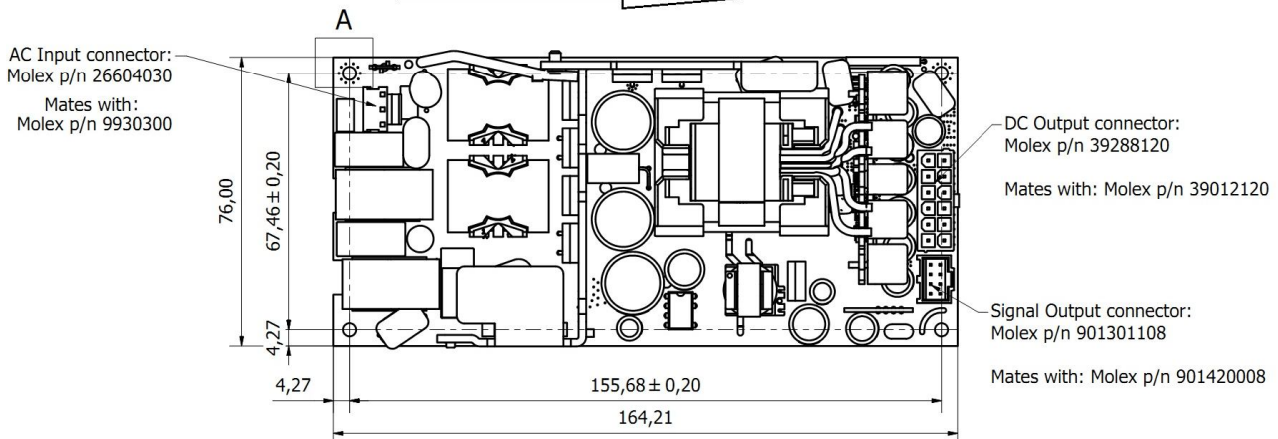
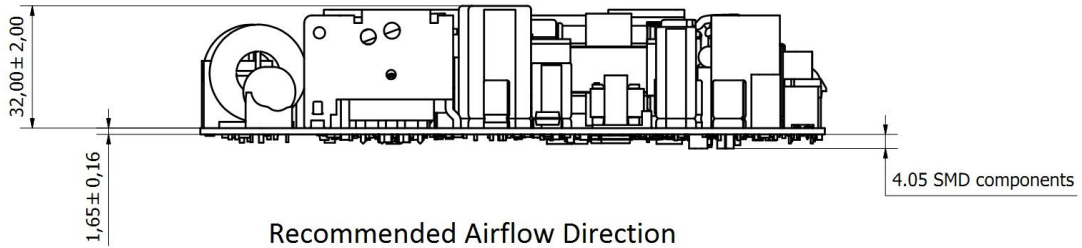
| Output Connector P4 | |
|---------------------|-----------|
| Pin | Function |
| 1-6 | V1 |
| 7-12 | DC Return |

| Signal Connector P6 | |
|---------------------|-------------------|
| Pin | Function |
| 1 | +5V _{SB} |
| 2 | P_OK |
| 3 | -V2 |
| 4 | PS_ON |
| 5 | RS+ |
| 6 | RTN |
| 7 | +V2 |
| 8 | RTN |



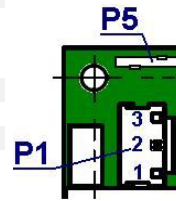
Overall dimensions: 76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)

Weight: 410 g (0.90 lb)



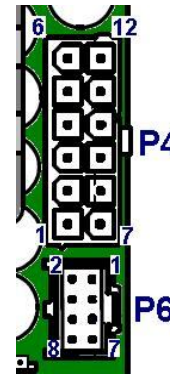
OUTLINE DRAWING AND CONNECTIONS – U-CHASSIS (UC)

| Connector | Manufacturer and Part Number |
|--------------------------------------|---|
| AC Input Connector P1 | Molex 26-60-4030 or equivalent |
| P1 Mating Connector | Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG) |
| Protection Earth Connector P5 | Tyco 63849-1 equivalent |
| P5 Mating Connector | Any tin finished 6.35x0.81 mm receptacle |
| Output Connector P4 | Molex 39-28-8120 or equivalent |
| P4 Mating Connector | Molex 39-01-2120 (Crimp Terminal Housing) Molex 39-00-0039 (Crimp Terminal, 18-24 AWG) |
| Signals Connector P6 | Molex 90130-1108 or equivalent |
| P6 Mating Connector | Molex 90142-0008 (Crimp Terminal Housing) Molex 90119-0109 (Crimp Terminal, 22-24 AWG) |



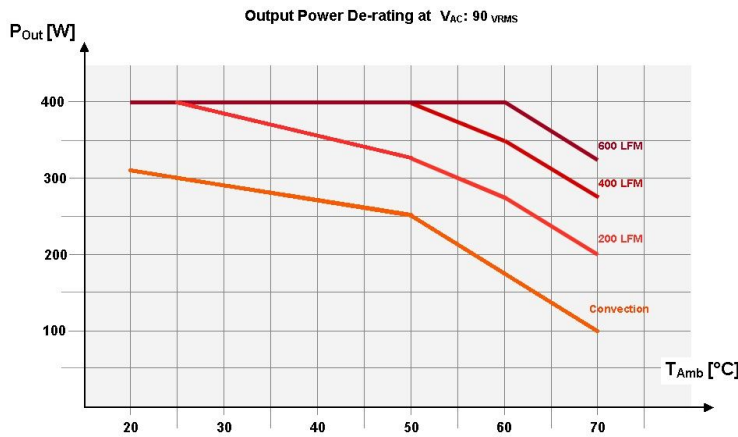
| AC Input P1 | |
|-------------|-------------|
| Pin | Function |
| 1 | Line 1 |
| 2 | Not Present |
| 3 | Line 2 |

| Protection Earth P5 | |
|---------------------|-----------|
| Pin | Function |
| GND | AC Ground |



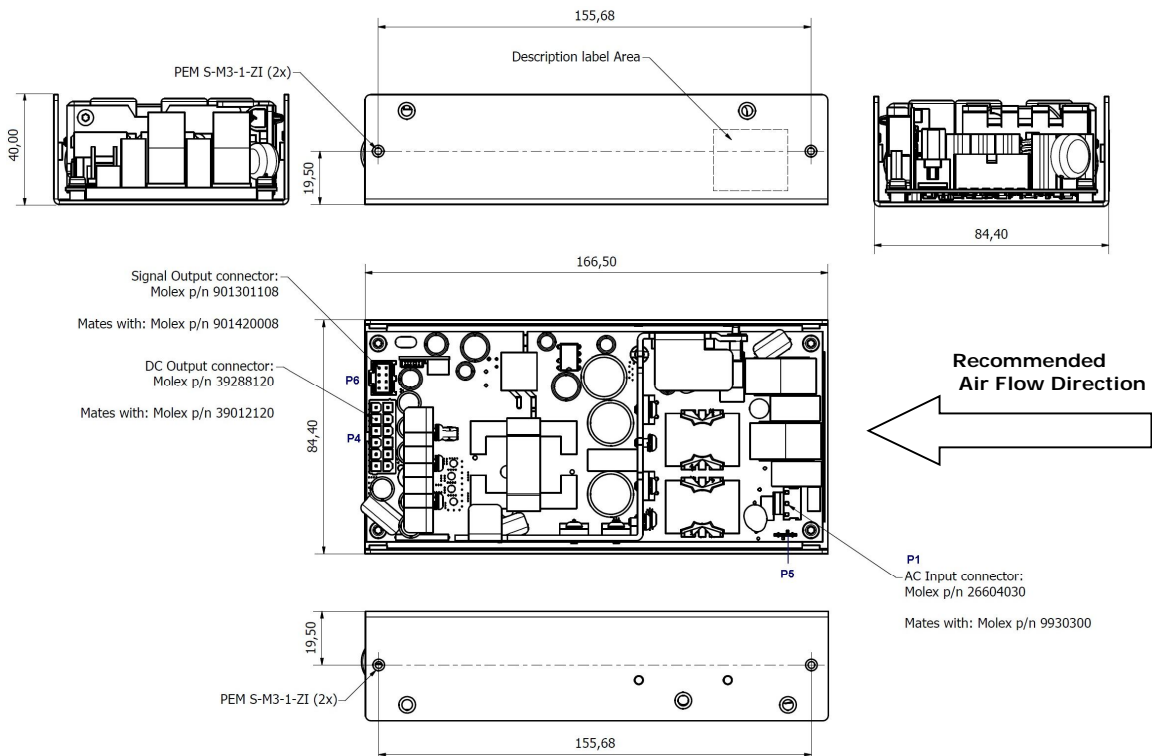
| Output Connector P4 | |
|---------------------|-----------|
| Pin | Function |
| 1-6 | V1 |
| 7-12 | DC Return |

| Signal Connector P6 | |
|---------------------|-------------------|
| Pin | Function |
| 1 | +5V _{SB} |
| 2 | P_OK |
| 3 | -V2 |
| 4 | PS_ON |
| 5 | RS+ |
| 6 | RTN |
| 7 | +V2 |
| 8 | RTN |



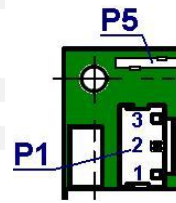
Overall dimensions: 84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)

Weight: 525 g (1.16 lb)



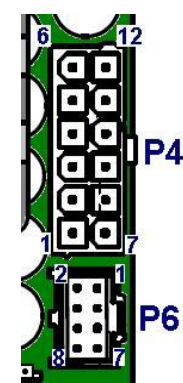
OUTLINE DRAWING AND CONNECTIONS – PUNCHED COVER (PC)

| Connector | Manufacturer and Part Number |
|--------------------------------------|---|
| AC Input Connector P1 | Molex 26-60-4030 or equivalent |
| P1 Mating Connector | Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG) |
| Protection Earth Connector P5 | Tyco 63849-1 equivalent |
| P5 Mating Connector | Any tin finished 6.35x0.81 mm receptacle |
| Output Connector P4 | Molex 39-28-8120 or equivalent |
| P4 Mating Connector | Molex 39-01-2120 (Crimp Terminal Housing) Molex 39-00-0039 (Crimp Terminal, 18-24 AWG) |
| Signals Connector P6 | Molex 90130-1108 or equivalent |
| P6 Mating Connector | Molex 90142-0008 (Crimp Terminal Housing) Molex 90119-0109 (Crimp Terminal, 22-24 AWG) |



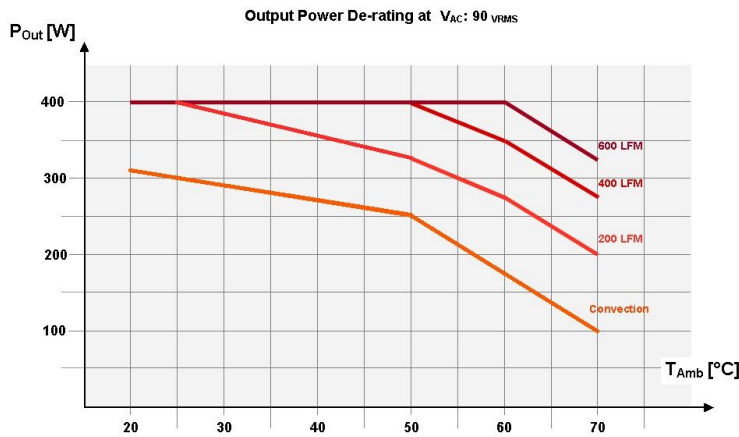
| AC Input P1 | |
|-------------|-------------|
| Pin | Function |
| 1 | Line 1 |
| 2 | Not Present |
| 3 | Line 2 |

| Protection Earth P5 | |
|---------------------|-----------|
| GND | AC Ground |
| | |



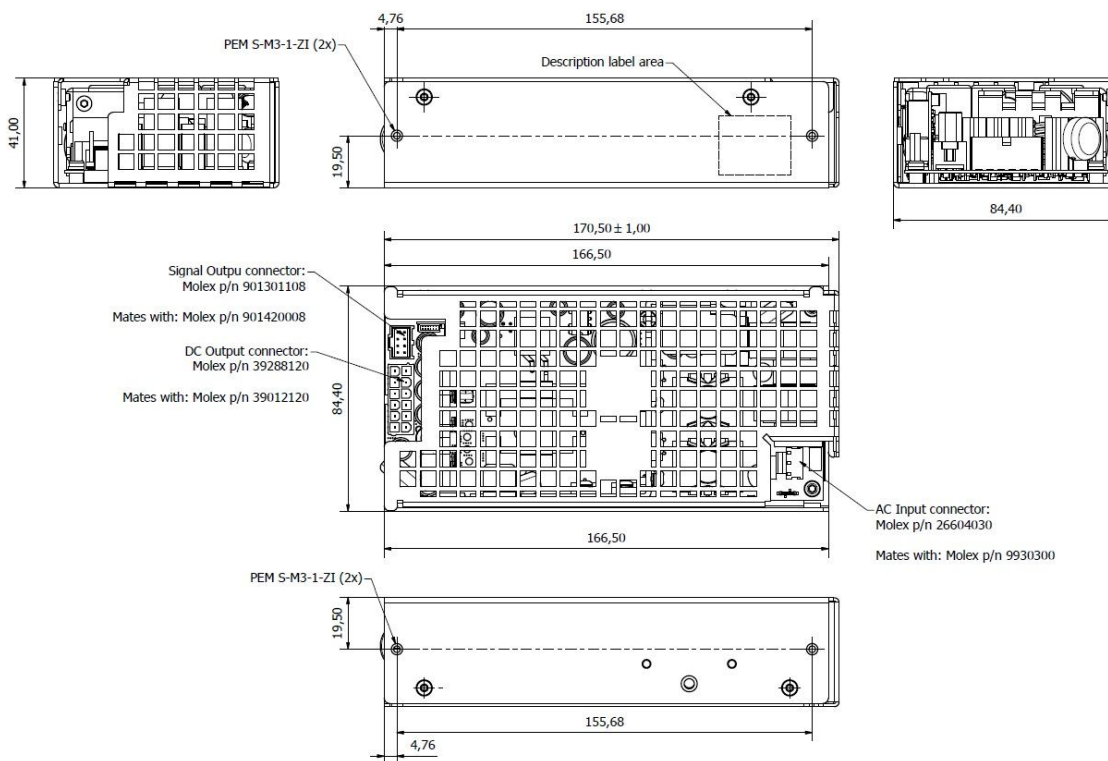
| Output Connector P4 | |
|---------------------|-----------|
| Pin | Function |
| 1-6 | V1 |
| 7-12 | DC Return |

| Signal Connector P6 | |
|---------------------|-------------------|
| Pin | Function |
| 1 | +5V _{sb} |
| 2 | P_OK |
| 3 | -V2 |
| 4 | PS_ON |
| 5 | RS+ |
| 6 | RTN |
| 7 | +V2 |
| 8 | RTN |



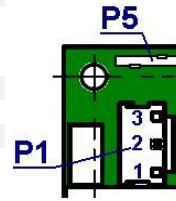
Overall dimensions: 84.4 x 170.5 x 41.0 mm (3.32 x 6.71 x 1.61 in)

Weight: 575 g (1.43 lb)



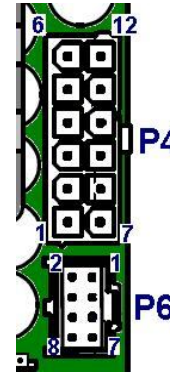
OUTLINE DRAWING AND CONNECTIONS – VENTED COVER (VC)

| Connector | Manufacturer and Part Number |
|--------------------------------------|---|
| AC Input Connector P1 | Molex 26-60-4030 or equivalent |
| P1 Mating Connector | Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG) |
| Protection Earth Connector P5 | Tyco 63849-1 equivalent |
| P5 Mating Connector | Any tin finished 6.35x0.81 mm receptacle |
| Output Connector P4 | Molex 39-28-8120 or equivalent |
| P4 Mating Connector | Molex 39-01-2120 (Crimp Terminal Housing) Molex 39-00-0039 (Crimp Terminal, 18-24 AWG) |
| Signals Connector P6 | Molex 90130-1108 or equivalent |
| P6 Mating Connector | Molex 90142-0008 (Crimp Terminal Housing) Molex 90119-0109 (Crimp Terminal, 22-24 AWG) |



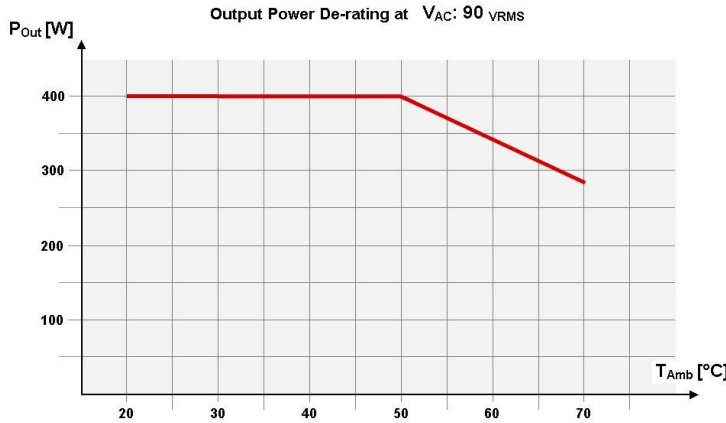
| AC Input P1 | |
|-------------|-------------|
| Pin | Function |
| 1 | Line 1 |
| 2 | Not Present |
| 3 | Line 2 |

| Protection Earth P5 | |
|---------------------|-----------|
| Pin | Function |
| GND | AC Ground |



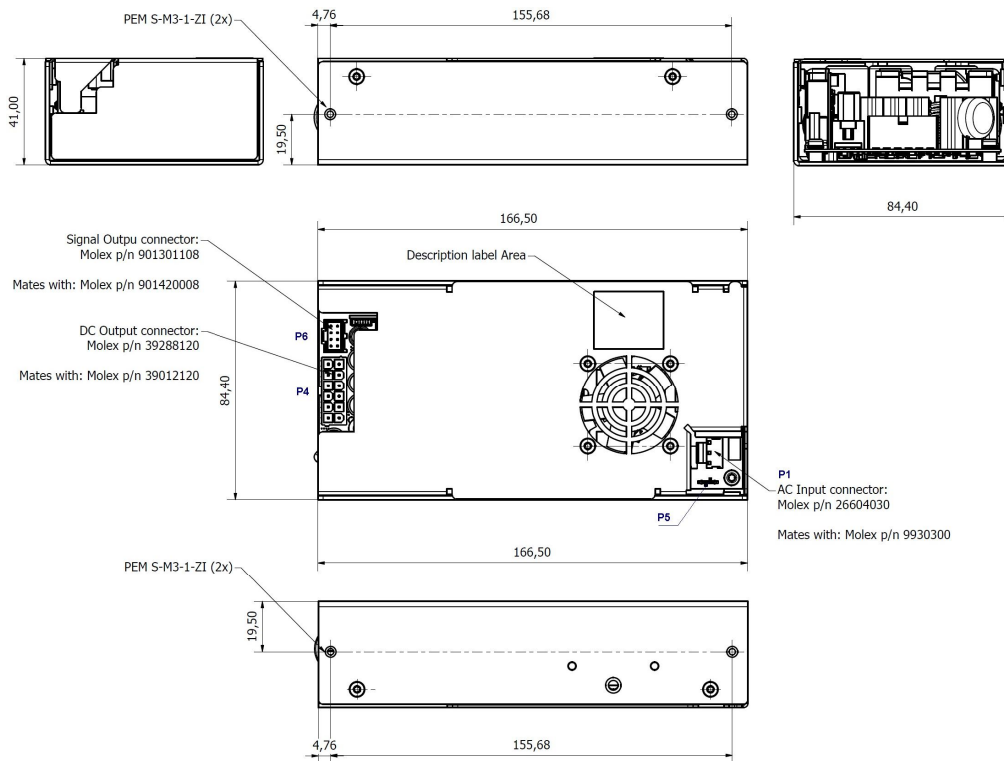
| Output Connector P4 | |
|---------------------|-----------|
| Pin | Function |
| 1-6 | V1 |
| 7-12 | DC Return |

| Signal Connector P6 | |
|---------------------|-------------------|
| Pin | Function |
| 1 | +5V _{SB} |
| 2 | P_OK |
| 3 | -V2 |
| 4 | PS_ON |
| 5 | RS+ |
| 6 | RTN |
| 7 | +V2 |
| 8 | RTN |



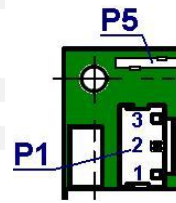
Overall dimensions: 84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)

Weight: 670 g (1.48 lb)



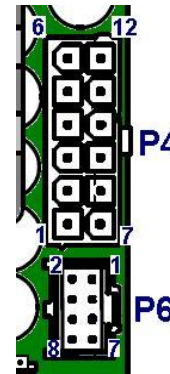
OUTLINE DRAWING AND CONNECTIONS – FRONT FAN (FF)

| Connector | Manufacturer and Part Number |
|--------------------------------------|---|
| AC Input Connector P1 | Molex 26-60-4030 or equivalent |
| P1 Mating Connector | Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG) |
| Protection Earth Connector P5 | Tyco 63849-1 equivalent |
| P5 Mating Connector | Any tin finished 6.35x0.81 mm receptacle |
| Output Connector P4 | Molex 39-28-8120 or equivalent |
| P4 Mating Connector | Molex 39-01-2120 (Crimp Terminal Housing) Molex 39-00-0039 (Crimp Terminal, 18-24 AWG) |
| Signals Connector P6 | Molex 90130-1108 or equivalent |
| P6 Mating Connector | Molex 90142-0008 (Crimp Terminal Housing) Molex 90119-0109 (Crimp Terminal, 22-24 AWG) |



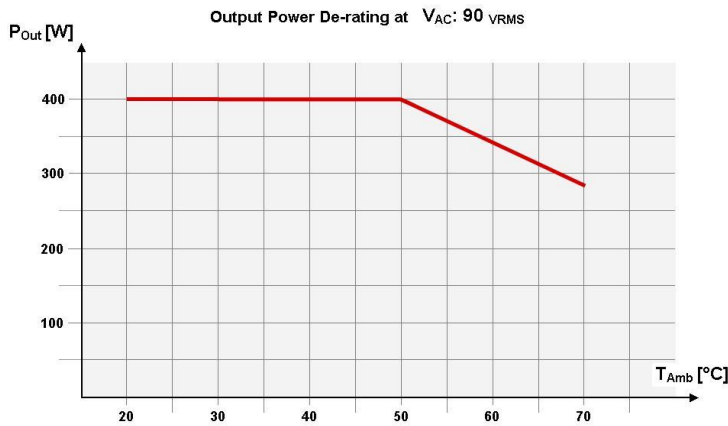
| AC Input P1 | |
|-------------|-------------|
| Pin | Function |
| 1 | Line 1 |
| 2 | Not Present |
| 3 | Line 2 |

| Protection Heart P5 | |
|---------------------|-----------|
| Pin | Function |
| GND | AC Ground |



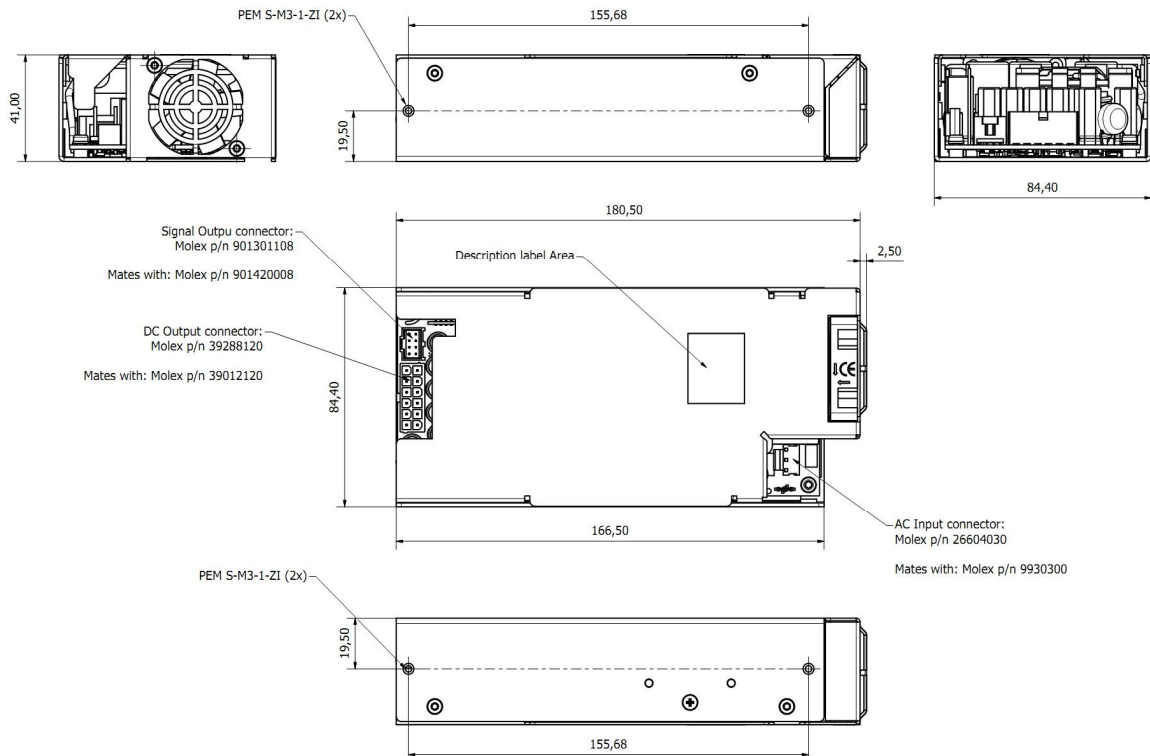
| Output Connector P4 | |
|---------------------|-----------|
| Pin | Function |
| 1-6 | V1 |
| 7-12 | DC Return |

| Signal Connector P6 | |
|---------------------|-------------------|
| Pin | Function |
| 1 | +5V _{SB} |
| 2 | P_OK |
| 3 | -V2 |
| 4 | PS_ON |
| 5 | RS+ |
| 6 | RTN |
| 7 | +V2 |
| 8 | RTN |



Overall dimensions: 84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)

Weight: 685 g (1.51 lb)



ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

| Phenomenon | Conditions / Notes | Standard | Equipment Performance Class |
|---|---|----------------|-----------------------------|
| Conducted | 115 V _{RMS} , 230 V _{RMS} . Maximum load 4 dB minimum margin | EN 55032 (ITE) | B |
| Radiated | At 10 m distance | EN 55032 (ITE) | B |
| Line Voltage Fluctuation and Flicker | At 20 %, 50 % and 100 % maximum load Nominal input voltages | EN 61000-3-3 | |
| Harmonic Current Emission | Nominal input voltages Output load > 50 W | EN 61000-3-2 | C |

ELECTROMAGNETIC COMPATIBILITY (EMC) – IMMUNITY

| Phenomenon | Conditions / Notes | Standard | Test Level | Performance criteria |
|--|---|--|------------|----------------------|
| Reference standard for IT equipment: EN 55024 | | | | |
| ESD | 15 kV air discharge, 8 kV contact, at any point of the system. | EN 61000-4-2 | 4 | A |
| Radiated Field | 3 V/m, 80-1000 MHz, 1 KHz 80% AM. Dwell time is 3 sec for 2 Hz modulation Dwell time is 1 sec for 1KHz modulation | EN 61000-4-3 | 3 | A |
| Electric Fast Transient | ±2 kV on AC power port for 1 minute; ±1 kV on signal/control lines | EN 61000-4-4 | 3 | A |
| Surge | ± 2 kV line to line; ± 4 kV line to earth; on AC power port. | EN 61000-4-5 | 3 | A B |
| Conducted RF Immunity | 3 V _{RMS} , 0,15-80 MHz, 1 KHz/2 Hz 80% AM 100 - 240V _{AC} | EN 61000-4-6 | 3 | A |
| Dips and Interruptions | Drop-out to 5% for 0.5 cycles (10 ms) Dip to 70% for 25 cycles (500 ms) Interrupts > 95% for 5 s | EN61000-4-11 EN61000-4-11 EN61000-4-11 | | A B B |

SAFETY AGENCIES APPROVALS

| Certification Body | Safety Standards and file numbers | Category |
|---------------------------------------|---|--|
| CSA/UL | CSA C22.2 No. 60950-1, UL 60950-1 and UL 62368-1 | Audio Video and Information Technology Equipment |
| IEC IECCE CB Certification | IEC/EN 60950-1 and IEC/EN 62368-1 | Audio Video and Information Technology Equipment |
| CE | Directive 2014/35/EU: Electrical Safety: Low Voltage electrical equipment (LVD) Directive 2014/30/EU: Electromagnetic Compatibility (EMC) Directive EU 2015/863: RoHS 3 | Audio Video and Information Technology Equipment |

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