

# ABC401 Series

## 400 W AC-DC Power Supplies



The ABC401 Series of AC-DC power supplies provides up to 400 W of regulated output power through wide input voltage range 90 – 264 VAC in single outputs of 12, 24, 28, 36 or 48 VDC.

The ABC401 Series comes in five different low-profile packages, offering 12 and 5 VSB standby outputs and a full set of protection features. Available control signals include Power Good (P\_OK), Remote On/Off (PS\_ON) and remote sense compensation on the (+) load line.

The ABC401 Series complies with the latest international safety standards for IT equipment and displays the CE-Mark for the European Low Voltage Directive (LVD).

### Key Features & Benefits

- Universal input voltage range (90 – 264 VAC)
- 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, 48 VDC standard output voltages
- +5V stand by, 2 A and 12 V auxiliary, 1 A outputs
- Low earth/touch leakage currents (<300/100  $\mu$ A)
- 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
- UL 60950-1 and 62368-1 compliance
- EN 55032, FCC Class B, conducted radiated emissions.
- EN 55024 immunity
- 4000 m operation without de-rating
- RoHS 3 compliant (Directive EU 2015/863)

### Applications

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

RoHS  
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## 1. MODEL SELECTION

| MODEL NUMBER   | PACKAGE & COOLING                        | INPUT VOLTAGE RANGE [VAC] | NOM. OUTPUT VOLTAGE [VDC] | MAX. OUTPUT POWER [W] | MAX. OUTPUT CURRENT [A] | DIMENSIONS                                        |
|----------------|------------------------------------------|---------------------------|---------------------------|-----------------------|-------------------------|---------------------------------------------------|
| ABC401-1012    | Open Frame Convection / Forced Air       | 90 - 264                  | 12                        | 400                   | 33.3                    | 76.0 x 164.2 x 37.7 mm<br>(2.99 x 6.46 x 1.48 in) |
| ABC401-1012-UC | U-Chassis Convection / Forced Air        | 90 - 264                  | 12                        | 400                   | 33.3                    | 84.4 x 166.5 x 40.0 mm<br>(3.32 x 6.55 x 1.57 in) |
| ABC401-1012-PC | Perforated Cover Convection / Forced Air | 90 - 264                  | 12                        | 400                   | 33.3                    | 84.4 x 166.5 x 41.0 mm<br>(3.32 x 6.55 x 1.61 in) |
| ABC401-1012-T  | Vented Cover Top Fan                     | 90 - 264                  | 12                        | 400                   | 33.3                    | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1012-S  | Enclosed Front Mounted Fan               | 90 - 264                  | 12                        | 400                   | 33.3                    | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1024    | Open Frame Convection / Forced Air       | 90 - 264                  | 24                        | 400                   | 16.7                    | 76.0 x 164.2 x 37.7 mm<br>(2.99 x 6.46 x 1.48 in) |
| ABC401-1024-UC | U-Chassis Convection / Forced Air        | 90 - 264                  | 24                        | 400                   | 16.7                    | 84.4 x 166.5 x 40.0 mm<br>(3.32 x 6.55 x 1.57 in) |
| ABC401-1024-PC | Perforated Cover Convection / Forced Air | 90 - 264                  | 24                        | 400                   | 16.7                    | 84.4 x 166.5 x 41.0 mm<br>(3.32 x 6.55 x 1.61 in) |
| ABC401-1024-T  | Vented Cover Top Fan                     | 90 - 264                  | 24                        | 400                   | 16.7                    | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1024-S  | Enclosed Front Mounted Fan               | 90 - 264                  | 24                        | 400                   | 16.7                    | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1028-UC | U-Chassis Convection / Forced Air        | 90 - 264                  | 28                        | 400                   | 14.3                    | 84.4 x 166.5 x 40.0 mm<br>(3.32 x 6.55 x 1.57 in) |
| ABC401-1036    | Open Frame Convection / Forced Air       | 90 - 264                  | 36                        | 400                   | 11.1                    | 76.0 x 164.2 x 37.7 mm<br>(2.99 x 6.46 x 1.48 in) |
| ABC401-1036-UC | U-Chassis Convection / Forced Air        | 90 - 264                  | 36                        | 400                   | 11.1                    | 84.4 x 166.5 x 40.0 mm<br>(3.32 x 6.55 x 1.57 in) |
| ABC401-1036-PC | Perforated Cover Convection / Forced Air | 90 - 264                  | 36                        | 400                   | 11.1                    | 84.4 x 166.5 x 41.0 mm<br>(3.32 x 6.55 x 1.61 in) |
| ABC401-1036-T  | Vented Cover Top Fan                     | 90 - 264                  | 36                        | 400                   | 11.1                    | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1036-S  | Enclosed Front Mounted Fan               | 90 - 264                  | 36                        | 400                   | 11.1                    | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1048    | Open Frame Convection / Forced Air       | 90 - 264                  | 48                        | 400                   | 8.3                     | 76.0 x 164.2 x 37.7 mm<br>(2.99 x 6.46 x 1.48 in) |
| ABC401-1048-UC | U-Chassis Convection / Forced Air        | 90 - 264                  | 48                        | 400                   | 8.3                     | 84.4 x 166.5 x 40.0 mm<br>(3.32 x 6.55 x 1.57 in) |
| ABC401-1048-PC | Perforated Cover Convection / Forced Air | 90 - 264                  | 48                        | 400                   | 8.3                     | 84.4 x 166.5 x 41.0 mm<br>(3.32 x 6.55 x 1.61 in) |
| ABC401-1048-T  | Vented Cover Top Fan                     | 90 - 264                  | 48                        | 400                   | 8.3                     | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |
| ABC401-1048-S  | Enclosed Front Mounted Fan               | 90 - 264                  | 48                        | 400                   | 8.3                     | 84.4 x 183.0 x 41.0 mm<br>(3.32 x 7.20 x 1.61 in) |

## 2. INPUT SPECIFICATIONS

| PARAMETER                | DESCRIPTION / CONDITION                                                                                       | MIN                   | NOM     | MAX        | UNIT             |
|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|---------|------------|------------------|
| AC Input Voltage         | PS starts and operates at 90 V <sub>AC</sub> at all load conditions                                           | 90                    | 100-240 | 264        | V <sub>RMS</sub> |
| DC Input Voltage         |                                                                                                               | 170                   | -       | 270        | V <sub>DC</sub>  |
| Input Frequency          |                                                                                                               | 47                    | 50/60   | 440        | Hz               |
| Input Current            | RMS at 180 V <sub>AC</sub> , maximum load, 50 / 60 Hz<br>RMS at 90 V <sub>AC</sub> , maximum load, 50 / 60 Hz | -                     | -       | 2.5<br>5.0 | A                |
| Inrush Current           | 265 V <sub>AC</sub> , 25 °C ambient, cold start.<br>24, 28, 36, 48 V, no damage<br>12 V                       | -                     | -       | -<br>20    | A                |
| Fusing                   | 2x Time Lag 6.3 A, 250 V on both L and N                                                                      | -                     | -       | 6.3        | A                |
| Efficiency               | At 115 V <sub>AC</sub>                                                                                        | 20% rated load        | 90      | -          | %                |
|                          |                                                                                                               | 50 – 100 % rated load | 92      | -          |                  |
|                          | At 230 V <sub>AC</sub>                                                                                        | 20% rated load        | 90      | -          |                  |
|                          |                                                                                                               | 50 – 100 % rated load | 94      | -          |                  |
| Input Power Consumption  | Power on, 115-230 V <sub>RMS</sub> , no load                                                                  | -                     | 1       | 1.5        | W                |
|                          | Stand by, 115-230 V <sub>RMS</sub> , no load                                                                  | -                     | 0.4     | 0.5        |                  |
| Power Factor             | At full rated load, 115 VAC, 60 Hz and 230 VAC, 50 Hz input voltages                                          | 0.95                  | -       | -          | -                |
| Harmonic Current         | Complies with EN-61000-3-2 Class C at 230 VAC 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 <sub>RMS</sub> , 60 Hz.                                                              |                       |         | 300        | μA               |



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### 3. OUTPUT SPECIFICATIONS

| PARAMETER                                                       | DESCRIPTION / CONDITION                                                                                                                                                                                                                                                                                                                             |                                                                               | MIN   | NOM            | MAX        | UNIT                           |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------|----------------|------------|--------------------------------|
| V1 Output Voltage                                               | 0.5% set point accuracy for all voltage variants                                                                                                                                                                                                                                                                                                    |                                                                               | -     | 12             | -          | V                              |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     |                                                                               | -     | 24             | -          |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     |                                                                               | -     | 28             | -          |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     |                                                                               | -     | 36             | -          |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     |                                                                               | -     | 48             | -          |                                |
| V1 Output Power Rating                                          | All voltages, convection cooled models,                                                                                                                                                                                                                                                                                                             |                                                                               |       | 250            | W          |                                |
|                                                                 | All voltages, fan cooled + forced air cooled (> 400 LFM) models                                                                                                                                                                                                                                                                                     |                                                                               |       | 400            |            |                                |
| V1 Output Current                                               |                                                                                                                                                                                                                                                                                                                                                     | All models, peak power (≤ 10 s)                                               |       |                | 440        | A                              |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | V1: 12 V <sub>DC</sub>                                                        |       |                | 33.3       |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | V1: 24 V <sub>DC</sub>                                                        |       |                | 16.7       |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | V1: 28 V <sub>DC</sub>                                                        |       |                | 14.3       |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | V1: 36 V <sub>DC</sub>                                                        |       |                | 11.1       |                                |
| V1 Voltage Adjustment Range                                     |                                                                                                                                                                                                                                                                                                                                                     | V1: 48 V <sub>DC</sub>                                                        |       |                | 8.3        | %V1                            |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     |                                                                               | -     | -              | ±5         |                                |
| V1 Load-Line-Cross Regulation                                   | V <sub>AC</sub> : 90 – 264 V <sub>RMS</sub>                                                                                                                                                                                                                                                                                                         | V1 Load: 0 – 33.3 A (12 V)                                                    |       |                |            | %V1                            |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 16.7 A (24 V)                                                             |       |                |            |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 14.3 A (28 V)                                                             |       |                |            |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 13.9 A (36 V)                                                             | -     | -              | ±2         |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 8.3 A (48 V)                                                              |       |                |            |                                |
| V1 Line Regulation                                              | V <sub>AC</sub> : 90 – 264 V <sub>RMS</sub>                                                                                                                                                                                                                                                                                                         | V2 Load: 0 – 1 A                                                              |       |                |            | %V1                            |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 5V <sub>SB</sub> Load: 0 – 2 A                                                |       |                |            |                                |
| Transient Response (Voltage Deviation) V1, 5V <sub>SB</sub>     | 25% load changes at 1 A/μs<br>12V at 2200 μF Load / I <sub>OUT</sub> > 0.5 A<br>24 V at 1000 μF Load / I <sub>OUT</sub> > 0.5 A<br>28 V at 1000 μF Load / I <sub>OUT</sub> > 0.5 A<br>36 V at 820 μF Load / I <sub>OUT</sub> > 0.5 A<br>48V at 560 μF Load / I <sub>OUT</sub> > 0.5 A<br>5V <sub>SB</sub> at 560 μF Load / I <sub>OUT</sub> > 0.1 A |                                                                               | -     | -              | ±5         | %V1<br>%5V <sub>SB</sub>       |
| V1 Ripple and Noise                                             | All models, Peak-to-peak, 20 MHz BW.<br>100 nF ceramic and 10 μF tantalum caps at the load.                                                                                                                                                                                                                                                         |                                                                               | -     | -              | 1          | %V1                            |
| Start-up Rise Time                                              | 90<V <sub>IN</sub> <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<br>5V <sub>SB</sub> in regulation after AC is applied                                                                                                                                                                                                                                                          |                                                                               | -     | -              | 750<br>500 |                                |
| Turn-on Overshoot                                               | At I <sub>L</sub> = 500 mA, V1 in regulation within 50 ms.                                                                                                                                                                                                                                                                                          |                                                                               | -     | 10<br>10<br>10 | -          | %V1<br>%V2<br>%V <sub>SB</sub> |
| Hold-up Time                                                    | At nominal V <sub>IN</sub> , 400 W, for all models                                                                                                                                                                                                                                                                                                  |                                                                               | -     | 16             | -          | ms                             |
|                                                                 | At nominal V <sub>IN</sub> , 365 W, for all models                                                                                                                                                                                                                                                                                                  |                                                                               | -     | 20             | -          |                                |
|                                                                 | At nominal V <sub>IN</sub> , 200 W, for all models                                                                                                                                                                                                                                                                                                  |                                                                               | -     | 35             | -          |                                |
| Minimum Load *                                                  | All models; V1, V2 and 5 V <sub>SB</sub>                                                                                                                                                                                                                                                                                                            |                                                                               | 0     | -              | -          | A                              |
| Maximum Load Capacitance                                        | At nominal V <sub>IN</sub> , 25 °C ambient                                                                                                                                                                                                                                                                                                          | 12 V                                                                          |       | -              | 33000      | μF                             |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 24 V                                                                          | -     | -              | 16000      |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 28 V                                                                          | -     | -              | 14300      |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 36 V                                                                          | -     | -              | 10000      |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 48 V                                                                          | -     | -              | 7000       |                                |
| Temperature Drift                                               |                                                                                                                                                                                                                                                                                                                                                     |                                                                               | -1.2  | -              | +1.2       | mV/°C                          |
| V2 Output Voltage (*)                                           | All models.                                                                                                                                                                                                                                                                                                                                         | Load on V2: from 5 to 1000 mA<br>Load on V1: from 0.1 to I <sub>L</sub> rated | 11.35 | 11.5           | 12.65      | V                              |
| V2 Output Current (I <sub>2</sub> )                             | Convection / forced air cooling                                                                                                                                                                                                                                                                                                                     |                                                                               | -     | -              | 1          | A                              |
| 5V <sub>SB</sub> Output Voltage                                 | 3% set point accuracy                                                                                                                                                                                                                                                                                                                               |                                                                               | -     | 5              | -          | V                              |
| 5V <sub>SB</sub> Output Current (I <sub>5V<sub>SB</sub></sub> ) | Convection cooled models                                                                                                                                                                                                                                                                                                                            |                                                                               | -     | -              | 1.5        | A                              |
|                                                                 | Fan cooled + forced air cooled (> 400 LFM) models                                                                                                                                                                                                                                                                                                   |                                                                               | -     | -              | 2          |                                |
| 5V <sub>SB</sub> Load-Line-Cross regulation                     | V <sub>AC</sub> : 90 – 264 V <sub>RMS</sub>                                                                                                                                                                                                                                                                                                         | V1 Load: 0 – 33.3 A (12 V)                                                    |       |                |            | %5V <sub>SB</sub>              |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 16.7 A (24 V)                                                             |       |                |            |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 14.3 A (28 V)                                                             |       |                |            |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 13.9 A (36 V)                                                             | -     | -              | ±5         |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 0 – 8.3 A (48 V)                                                              |       |                |            |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | V2 Load: 0 – 1 A                                                              |       |                |            |                                |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                     | 5V <sub>SB</sub> Load: 0 – 2 A                                                |       |                |            |                                |

### 3.1 OUTPUT POWER DE-RATING CURVES



Figure 1. Power Derating Curves for Open Frame, U-Chassis and Perforated Cover Models

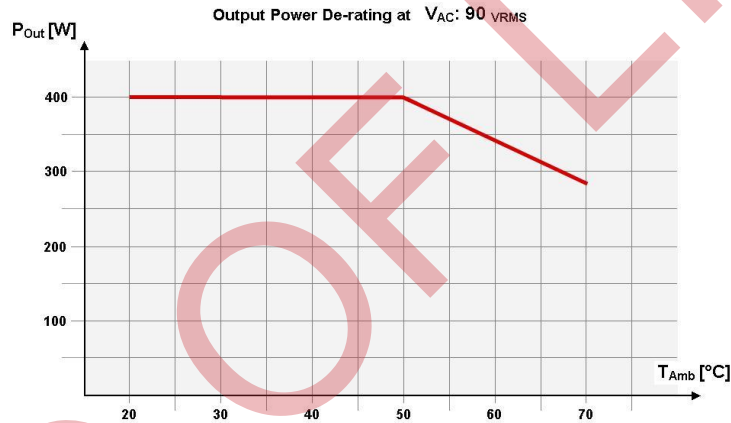
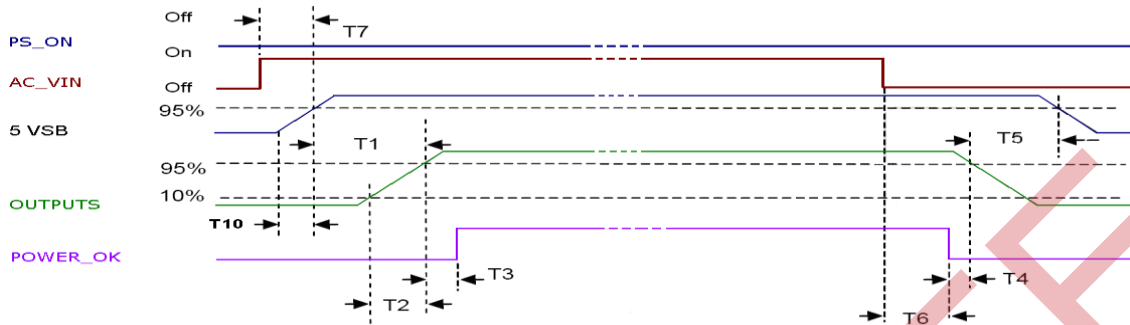


Figure 2. Power Derating Curves for Top Fan and Front Mounted Fan Models

## 4. SIGNALS, CONTROLS & TIMING SPECIFICATIONS

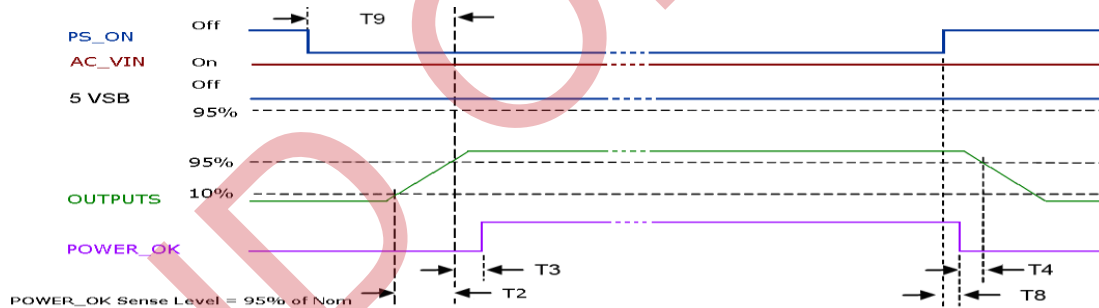
Base signals and controls are accessible from signal connector P204.

| SIGNAL                  | DESCRIPTION / CONDITION                                         | MIN  | NOM | 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                           |      |     |     |      |
|                         | 5 V <sub>SB</sub> not affected by PS_ON                         |      |     |     |      |
| P_OK                    | V1 and V2 enabled with PS_ON connected to RTN                   |      |     |     |      |
|                         | +5 V TTL compatible                                             |      |     |     |      |
|                         | Logic level low (<10 mA sinking)                                | -    | -   | 0.7 | V    |
|                         | Logic level high (100 $\mu A$ sourcing)                         | 2.4  | -   | 5   | V    |
|                         | Low to high time after V1 in regulation                         | 0.05 | -   | 0.1 | s    |
| 5V <sub>SB</sub> output | Power down warning time                                         | 1    | -   | -   | ms   |
|                         | Active and in regulation after a $90 < V_{AC} < 264$ is applied | -    | -   | 200 | ms   |
|                         | 5 V <sub>SB</sub> not affected by PS_ON                         |      |     |     |      |



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 <sup>1</sup>            | $T4 \geq 1 \text{ ms}$                      |
| Main Output off - Standby off <sup>2</sup> | $T5 \geq 1.2 \text{ s}$                     |
| Hold-up time (AC off - P_OK low)           | $T6 \geq 15 \text{ ms (115/ 230 VAC)}$      |
| 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 <sup>1</sup>  | $1 \text{ ms} \leq T4 \leq 5 \text{ ms}$    |
| PS_ON - Main Output (off) Timing | $T8 \leq 1 \text{ ms}$                      |
| PS_ON - Main Output (on) Timin   | $T9 \leq 200 \text{ ms}$                    |

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

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

## 5. PROTECTION SPECIFICATIONS

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

## 6. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER                            | DESCRIPTION / CONDITION                                                                                                                                                                                                                                                      | MIN    | NOM | MAX      | UNIT   |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|----------|--------|
| Operating Temperature Range          | No de-rating up to 50 °C<br>PS starts up at -30 °C                                                                                                                                                                                                                           | -20    | -   | 50       | °C     |
| De-rated Operating Temperature Range | Natural convection cooling: Linearly de-rate from 250 W at 50 °C, to 100 W at 70 °C<br>Forced air cooling: Linearly de-rate from 400 W at 50 °C, to 280 W at 70 °C.<br>See graphs below.                                                                                     | -      | -   | 70       | °C     |
| Storage Temperature Range            |                                                                                                                                                                                                                                                                              | -40    | -   | 85       | °C     |
| Humidity                             | RH, Non-condensing Operating<br>Non-operating                                                                                                                                                                                                                                | -      | -   | 90<br>95 | %<br>% |
| Operating Altitude                   |                                                                                                                                                                                                                                                                              | -      | -   | 4000     | m      |
| Shock                                | <b>EN 60068-2-27</b><br>Operating: Half sine, 30 g, 18 ms, 3 axes, 6x each (3 positive and 3 negative).<br>Non-Operating: Half sine, 50 g, 11 ms, 3 axes, 6x each (3 positive and 3 negative).                                                                               |        |     |          |        |
| Vibration                            | <b>EN 60068-2-64</b><br>Operating: Sine, 10 – 500 Hz, 1 g, 3 axes, 1 oct/min., 60 min.<br>Random, 5 – 500 Hz, 0.02 g <sup>2</sup> /Hz, 1 g <sub>RMS</sub> , 3 axes, 30 min.<br>Non-Operating: 5 – 500 Hz, 2.46 g <sub>RMS</sub> (0.0122 g <sup>2</sup> /Hz), 3 axes, 30 min. |        |     |          |        |
| MTBF                                 | Full Load, 120 V <sub>AC</sub> , 40 °C ambient<br>80% Duty cycle, Telcordia SR-332 Issue 2                                                                                                                                                                                   | 400000 | -   | -        | 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.             |        |     |          |        |



## 7. ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

| PARAMETER                            | DESCRIPTION / CONDITION                                                           | STANDARD       | PERFORMANCE CLASS |
|--------------------------------------|-----------------------------------------------------------------------------------|----------------|-------------------|
| Conducted                            | 115 V <sub>RMS</sub> , 230 V <sub>RMS</sub> . Maximum load<br>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<br>Nominal input voltages                       | EN 61000-3-3   |                   |
| Harmonic Current Emission            | Nominal input voltages<br>Output load > 50 W                                      | EN 61000-3-2   | C                 |

## 8. ELECTROMAGNETIC COMPATIBILITY (EMC) – IMMUNITY

| PARAMETER               | DESCRIPTION / CONDITION                                                                                                               | STANDARD                                     | TEST LEVEL | CRITERIA    |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------|-------------|
|                         | Reference standards for ITE equipment                                                                                                 | EN 55024                                     |            |             |
| ESD                     | 15 kV air discharge, 8 kV contact,<br>at any point of the system.                                                                     | EN 61000-4-2                                 | 4          | A           |
| Radiated Field          | 3 V/m, 80-1000 MHz, 1 KHz 80% AM.<br>Dwell time is 3 sec for 2 Hz modulation<br>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;<br>±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                                 | 4          | A           |
| Conducted RF Immunity   | 3 V <sub>RMS</sub> , 0,15-80 MHz, 1 KHz/2 Hz 80% AM                                                                                   | EN 61000-4-6                                 | 3          | A           |
| Dips and Interruptions  | 100 - 240V <sub>AC</sub><br>Drop-out to 5% for 0.5 cycles (10 ms)<br>Dip to 70% for 25 cycles (500 ms)<br>Interruptions > 95% for 5 s | EN61000-4-11<br>EN61000-4-11<br>EN61000-4-11 |            | A<br>A<br>B |

## 9. SAFETY AGENCIES APPROVALS

| CERTIFICATION BODY            | SAFETY STANDARDS                                                                                                                                                              | CATEGORY                     |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| CSA/UL                        | CSA C22.2 No. 60950-1, UL 60950-1 and UL 62368-1                                                                                                                              | Audio Video and IT equipment |
| IEC IECCE<br>CB Certification | IEC/EN 62368-1                                                                                                                                                                | Audio Video and IT equipment |
| CE                            | Directive 2014/35/EU: Electrical Safety: Low Voltage electrical equipment (LVD)<br>Directive 2014/30/EU: Electromagnetic Compatibility (EMC)<br>Directive EU 2015/863: RoHS 3 | Audio Video and IT equipment |

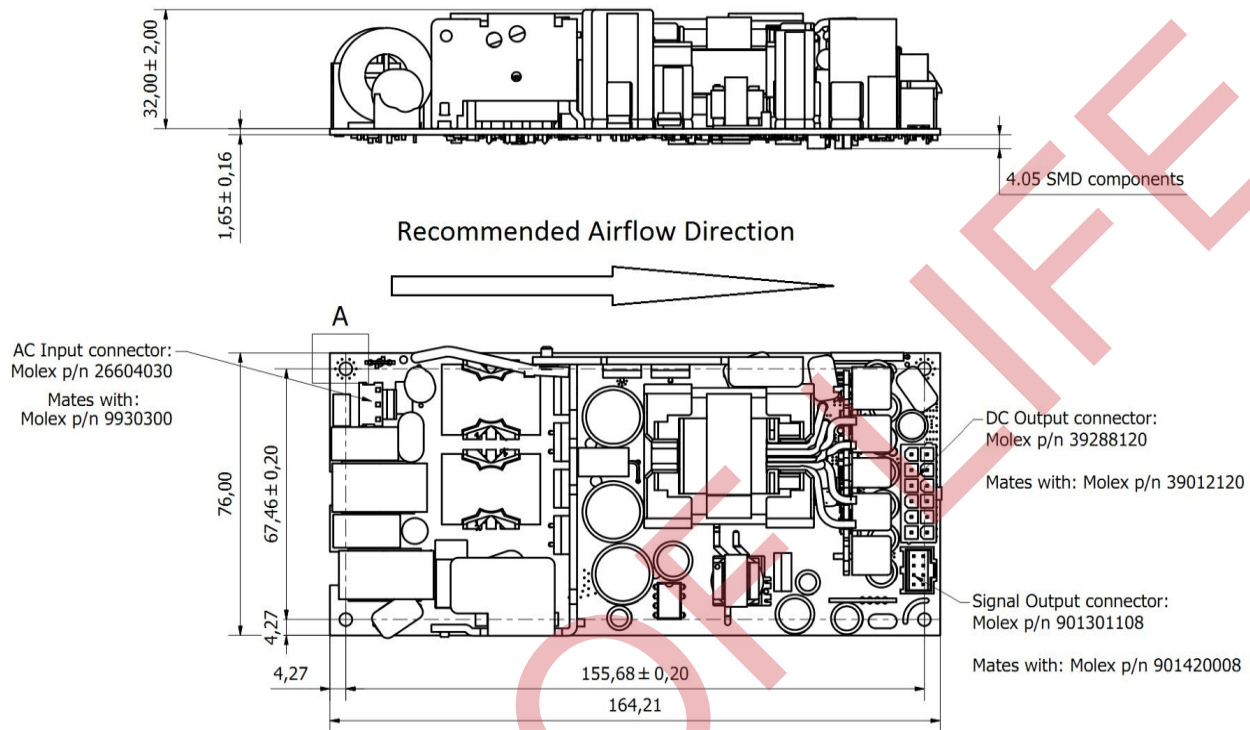
## 10. MECHANICAL SPECIFICATIONS

| PARAMETER          | DESCRIPTION / CONDITION                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight             | 410 g (0.90 lb)<br>525 g (1.16 lb) – UC model<br>575 g (1.43 lb) – PC model<br>670 g (1.48 lb) – T model<br>525 g (1.16 lb) – S model                                                                                                                                                            |
| Overall Dimensions | 76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)<br>84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in) – UC model<br>84.4 x 170.5 x 41.0 mm (3.32 x 6.71 x 1.61 in) – PC model<br>84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in) – T model<br>84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in) – S model |



## 10.1 OUTLINE DRAWING & CONNECTIONS – OPEN FRAME MODEL

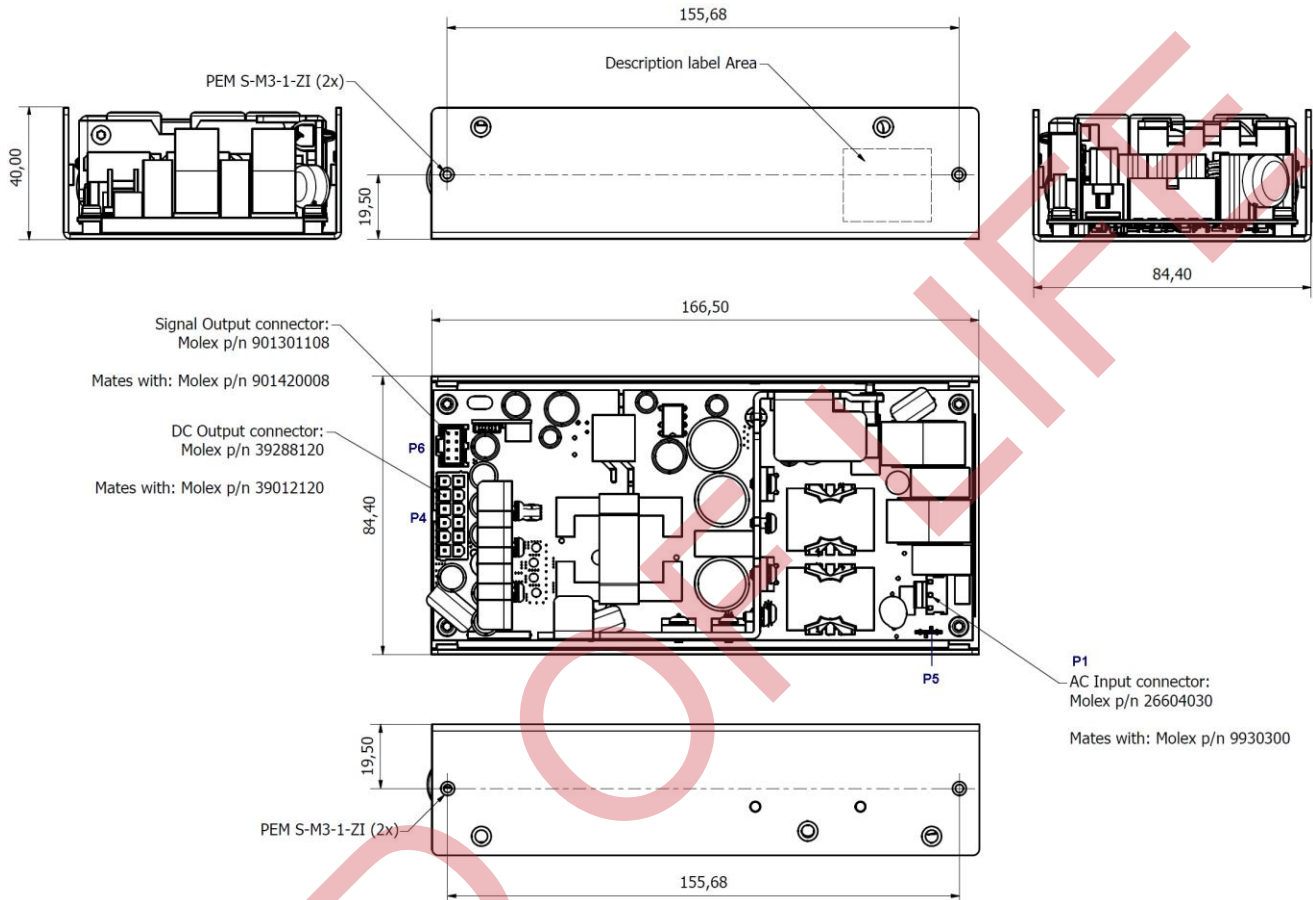
Overall Dimensions: 76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)  
Weight: 410 g (0.90 lb)



## 10.2 OUTLINE DRAWING & CONNECTIONS – U-CHASSIS MODEL (-UC)

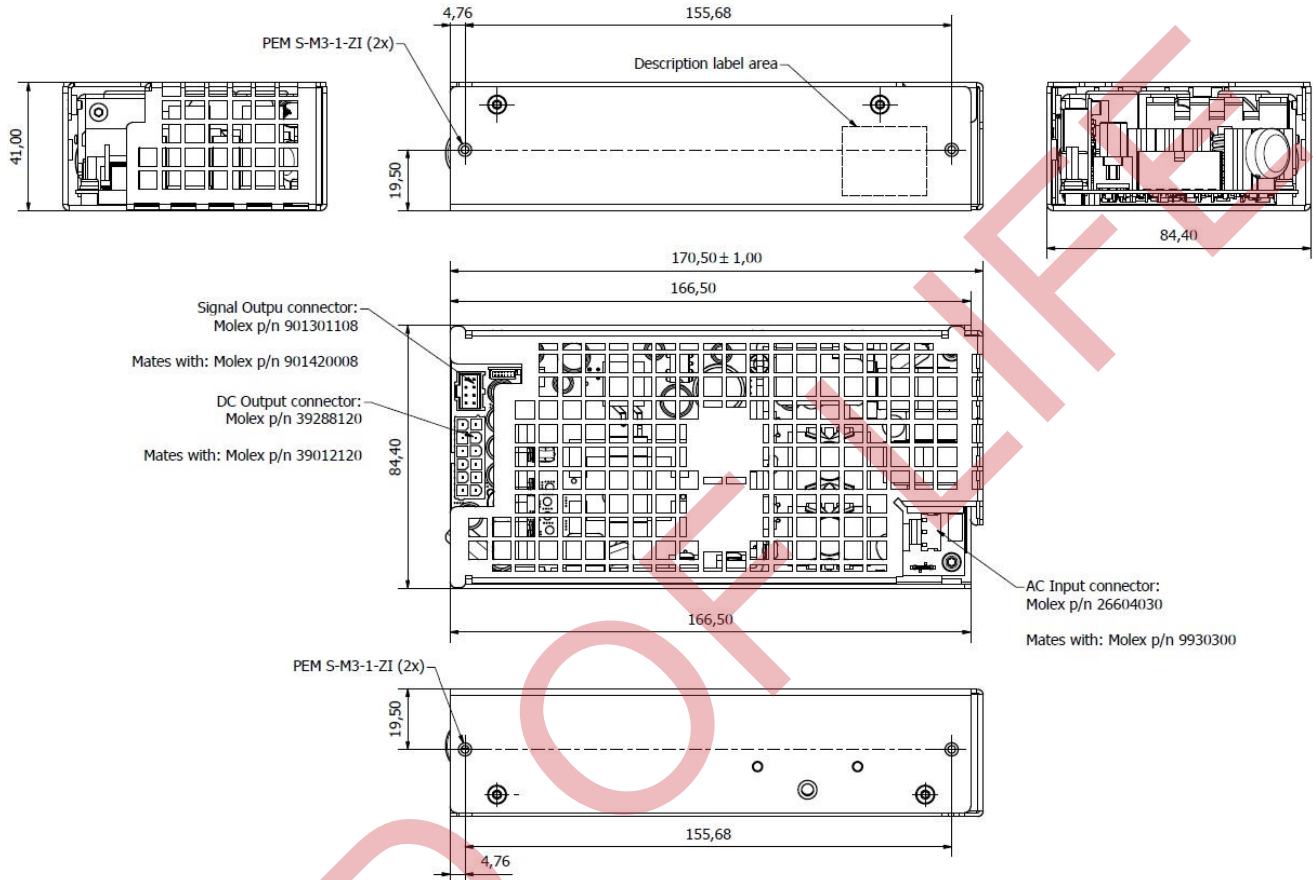
Overall Dimensions: 84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)

Weight: 525 g (1.16 lb)



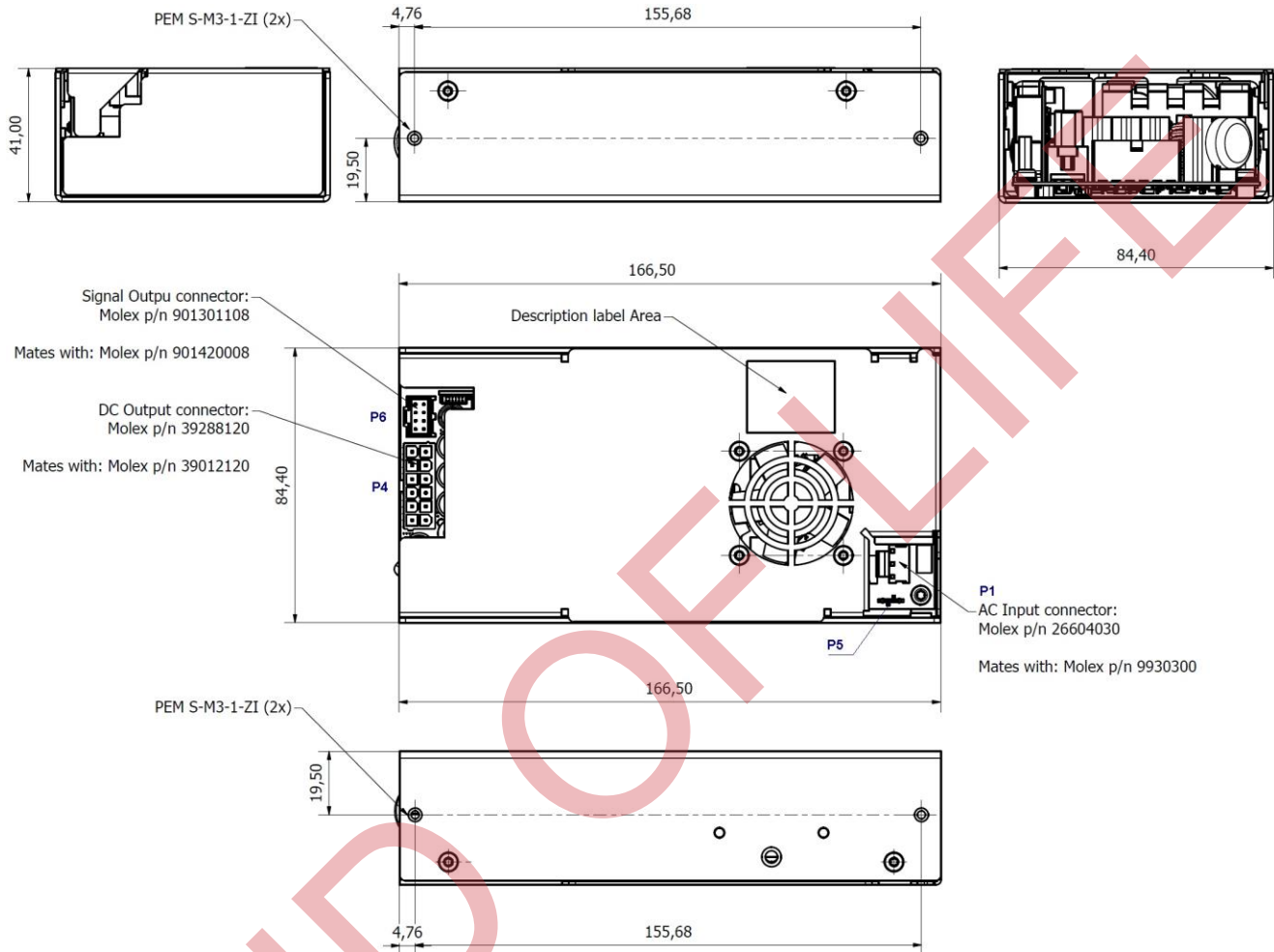
## 10.3 OUTLINE DRAWING & CONNECTIONS – PERFORATED MODEL (-PC)

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)



## 10.2 OUTLINE DRAWING & CONNECTIONS – VENTED COVER MODEL (-T)

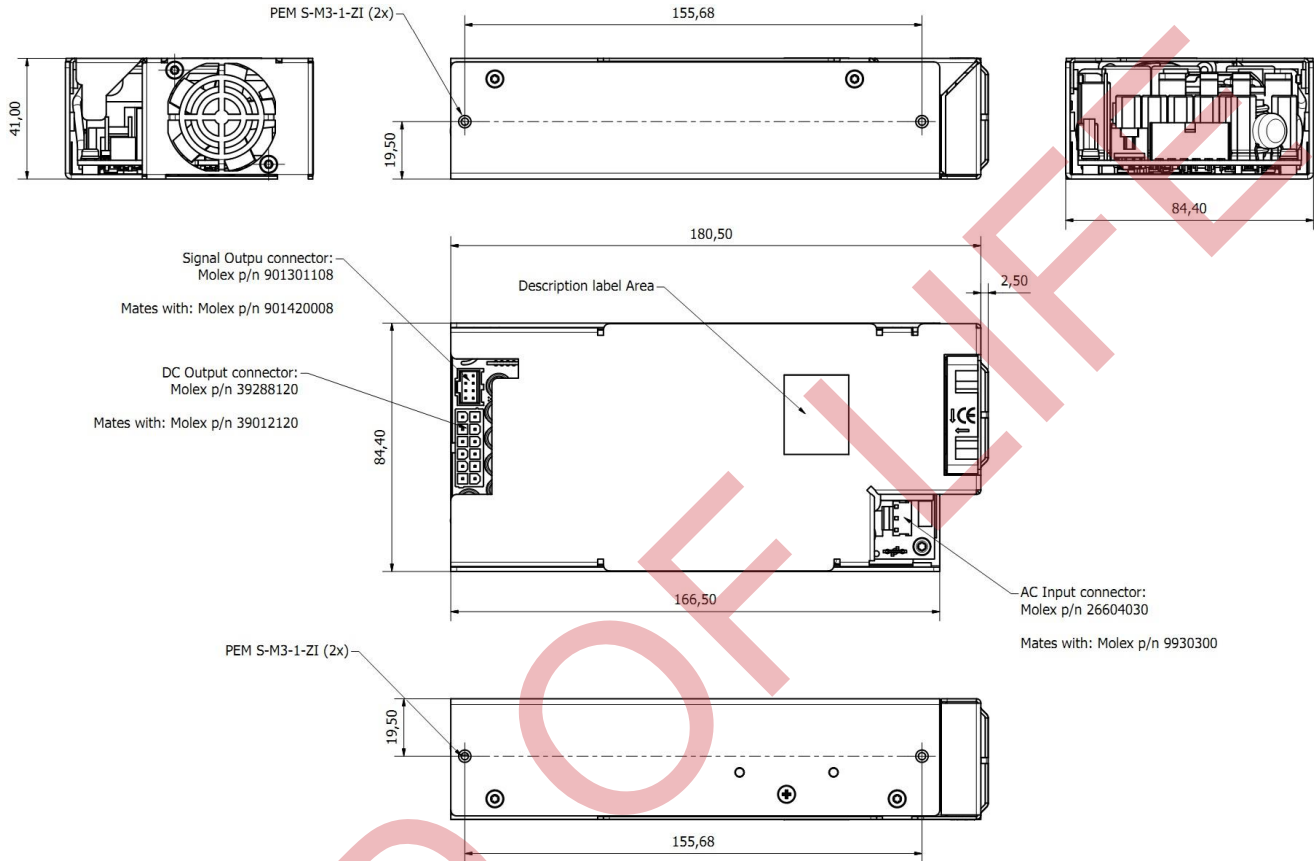
Overall Dimensions: 84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)  
Weight: 670 g (1.48 lb)



## 10.2 OUTLINE DRAWING & CONNECTIONS – FRONT FAN MODEL (-S)

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

Weight: 625 g (1.416lb)



## 11. CONNECTIONS AND PIN DESCRIPTION

### AC INPUT CONNECTOR – P1

**Molex 26-60-4030** or equivalent

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

Mating Connector:  
Any tin finished 6.35 x 0.81 mm receptacle

### DC OUTPUT CONNECTOR – P4

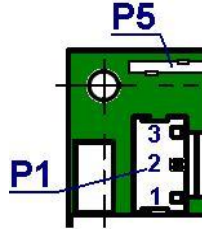
**Molex 39-28-8120** or equivalent

Mating Connector:  
Molex 39-01-2120 (Crimp Terminal Housing)  
Molex 39-00-0039 (Crimp Terminal, 18-24 AWG)

### SIGNAL CONNECTOR – P6

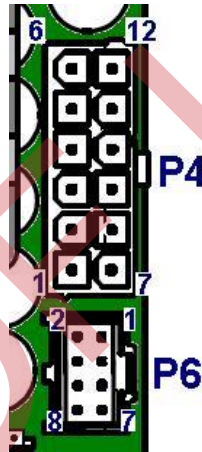
**Molex 90130-1108** or equivalent

Mating Connector:  
Molex 90142-0008 (Crimp Terminal Housing)  
Molex 90119-0109 (Crimp Terminal, 22-24 AWG)



| PIN REF. | FUNCTION    |
|----------|-------------|
| 1        | Line 1      |
| 2        | Not Present |
| 3        | Line 2      |

| PIN REF. | FUNCTION  |
|----------|-----------|
| 1        | AC Ground |



| PIN REF. | FUNCTION  |
|----------|-----------|
| 1 – 6    | V1        |
| 7 – 12   | DC Return |

| PIN REF. | FUNCTION          |
|----------|-------------------|
| 1        | +5V <sub>SB</sub> |
| 2        | P_OK              |
| 3        | -V2               |
| 4        | PS_ON             |
| 5        | RS+               |
| 6        | RTN               |
| 7        | +V2               |
| 8        | RTN               |

**For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)**

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