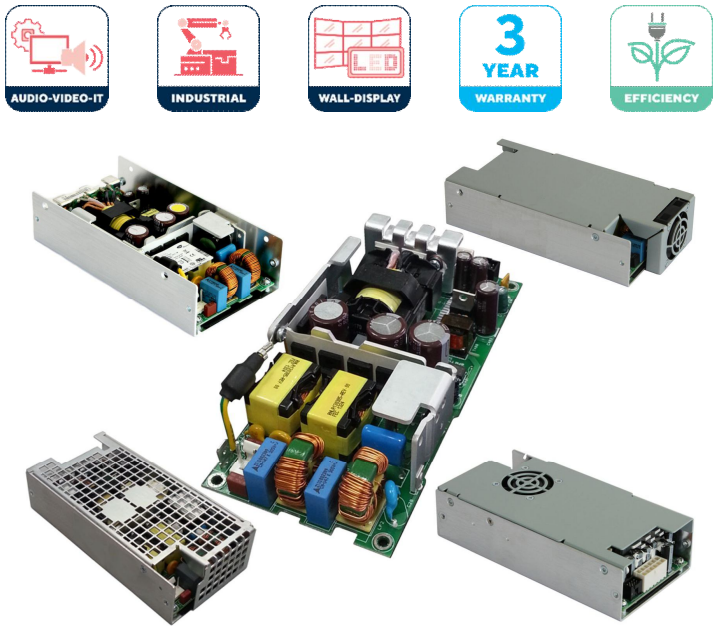
400 W AC-DC COMPACT, EFFICIENT POWER SUPPLY

DDP400 SERIES

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

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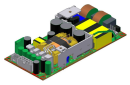
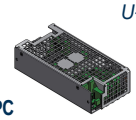
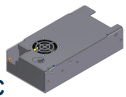
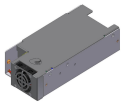
MODEL CODING AND OUTPUT RATINGS

Model and Output Power	Output Nominal Voltage	Package Option
ITE 400W: **DDP400**	*12 V_{DC}:* **-US12**	*Open Frame:* **-OF**  *U-Chassis:* **-UC** 
	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

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OUTPUT SPECIFICATIONS

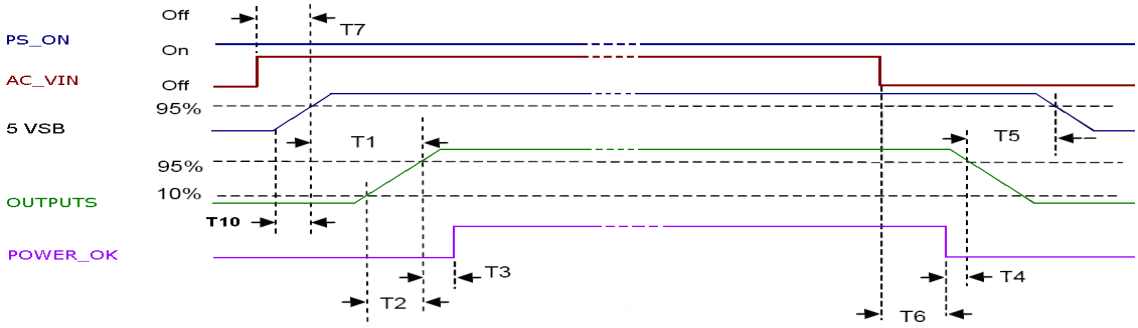
Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
V1 Output Voltage	0.5% set point accuracy for all voltage variants	- - - - -	12 24 28 36 48	- - - - -	V
V1 Output Power Rating	All voltages, OF/UC/PC, convection cooling All voltages, VC/FF, and OF/UC/PC forced air cooling (> 400 LFM) All models, peak power (≤ 10 s)	- - -	- - -	250 400 440	W
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 VC/FF, OF/UC/PC forced air cooling (> 400 LFM)	- -	- -	1.5 2	A
V1 Voltage Adjustment Range		-	-	±5	%V1
V1 Load-Line-Cross Regulation	V_{AC}: 90 – 264 V_{RMS} 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	-	-	±2	%V1
$5V_{SB}$ Load-Line-Cross regulation	V_{AC}: 90 – 264 V_{RMS} 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	-	-	±5	%$5V_{SB}$
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/µs 12 V_{DC} at 2200 µF Load / I_{OUT}> 0.5 A 24 V_{DC} at 1000 µF Load / I_{OUT}> 0.5 A 28 V_{DC} at 1000 µF Load / I_{OUT}> 0.5 A 36 V_{DC} at 820 µF Load / I_{OUT}> 0.5 A 48 V_{DC} at 560 µF Load / I_{OUT}> 0.5 A 5 V_{SB} at 560 µF Load / I_{OUT}> 0.1 A	-	-	±5	%V1 %$5V_{SB}$
V1 Ripple and Noise	All models, Peak-to-peak, 20 MHz BW. 100 nF ceramic and 10 µF 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 V1 in regulation after AC is applied $5V_{SB}$ in regulation after AC is applied	-	-	200 750 500	ms
Turn-on Overshoot	At I1 = 500 mA, V1 in regulation within 50 ms.	-	10 10 10	-	%V1 %V2 %V_{SB}
Hold-up Time	At nominal V_{IN}, 400 W, for all models At nominal V_{IN}, 365 W, for all models At nominal V_{IN}, 200 W, for all models	- - -	16 20 35	- - -	ms
Minimum Load (*)	All models; V1, V2 and $5V_{SB}$	0	-	-	A
Maximum Load Capacitance	At nominal V_{IN}, 25 °C ambient 12 V_{DC} 24 V_{DC} 28 V_{DC} 36 V_{DC} 48 V_{DC}	- - - - -	- - - - -	33.000 16.000 14.300 10.000 7.000	µF
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

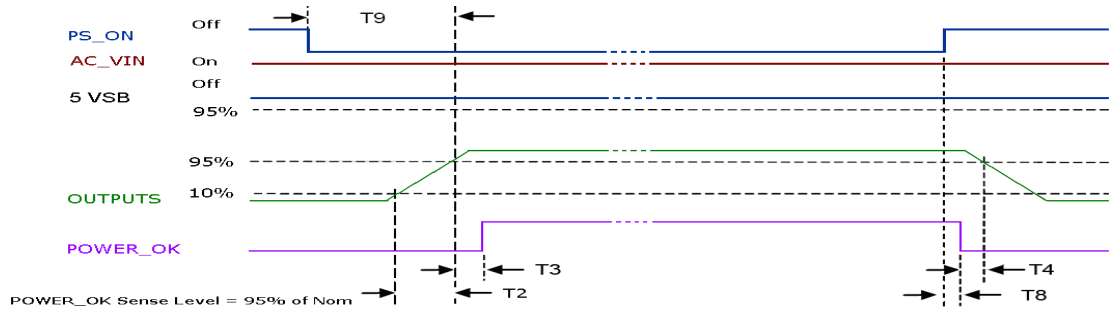
Signal	Notes	Min	Typ	Max	Unit
PS_ON	Active low, +5 V TTL signal compatible. Input low voltage	0	-	2.0	V
	Input high voltage (I_{IN}= 200 µA)	3.0	-	-	V
	V1 and V2 disabled when PS_ON is open				
	5 V_{SB} not affected by PS_ON				
	V1 and V2 enabled with PS_ON connected to RTN				
P_OK	+5 V TTL compatible				
	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 ms ≤ T1 ≤ 250 ms
Main output Rise Time	5 ms ≤ T2 ≤ 85 ms
5 VSB Rise Time	4 ms ≤ T10 ≤ 20 ms
Main outputs On – P_OK delay	40 ms ≤ T3 ≤ 100 ms
Power down warning[1]	T4 ≥ 1 ms
Main Output off – Standby off[2]	T5 ≥ 1.2 s
Hold-up time (AC off – P_OK low)	T6 ≥ 15 ms (115/ 230 V_{AC})
AC_ON - Standby turn on time	T7 ≤ 500 ms



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

Main Output Rise Time	5 ms ≤ T2 ≤ 85 ms
Main Outputs on – P_OK delay	50 ms ≤ T3 ≤ 100 ms
Power down warning1	1 ms ≤ T4 ≤ 5 ms
PS_ON - Main Output (off) Timing	T8 ≤ 1 ms
PS_ON - Main Output (on) Timing	T9 ≤ 200 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.

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PROTECTION FEATURES

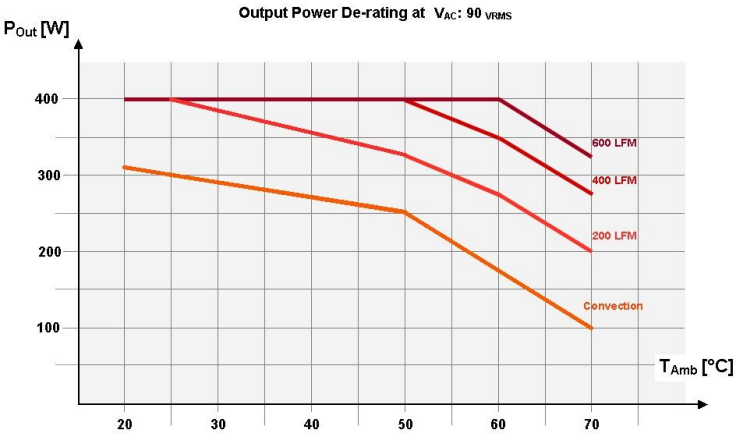
Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Input Under Voltage Lockout	Auto recovery, Hiccup Mode	60	75	-	V_{AC}
Input Fuse	2x Time Lag 6.3 A, 250 V on L1 and L2	-	-	6.3	A
Over Current	At nominal input voltages. V1: Hiccup mode, auto-recovering. V2: PTC limiting, auto-recovering. 5 V_{SB}: Hiccup mode, auto-recovering.	110	-	150	$\%I1_{MAX}$
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} Unit shut down and latch off	110	-	136	$\%V_{NOM}$
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_{AC}
Isolation Input-to-PE	Basic	1500			V_{AC}
Isolation V1-to-V2		100	-	-	V_{DC}
Isolation Output-to-PE	Basic	1500	-	-	V_{AC}

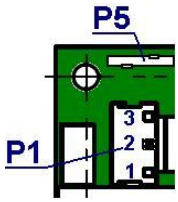
ENVIRONMENTAL SPECIFICATIONS

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)

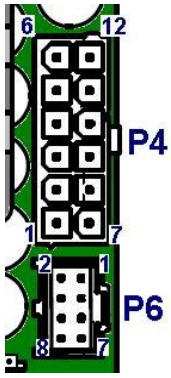
Connector	Manufacturer and Part Number
AC Input Connector P1	Molex 26-60-4030 or equivalent
P1 Mating Connector	Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG)
Protection Earth Connector P5	Tyco 63849-1 equivalent
P5 Mating Connector	Any tin finished 6.35x0.81 mm 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 Heart P5	
GND	AC Ground

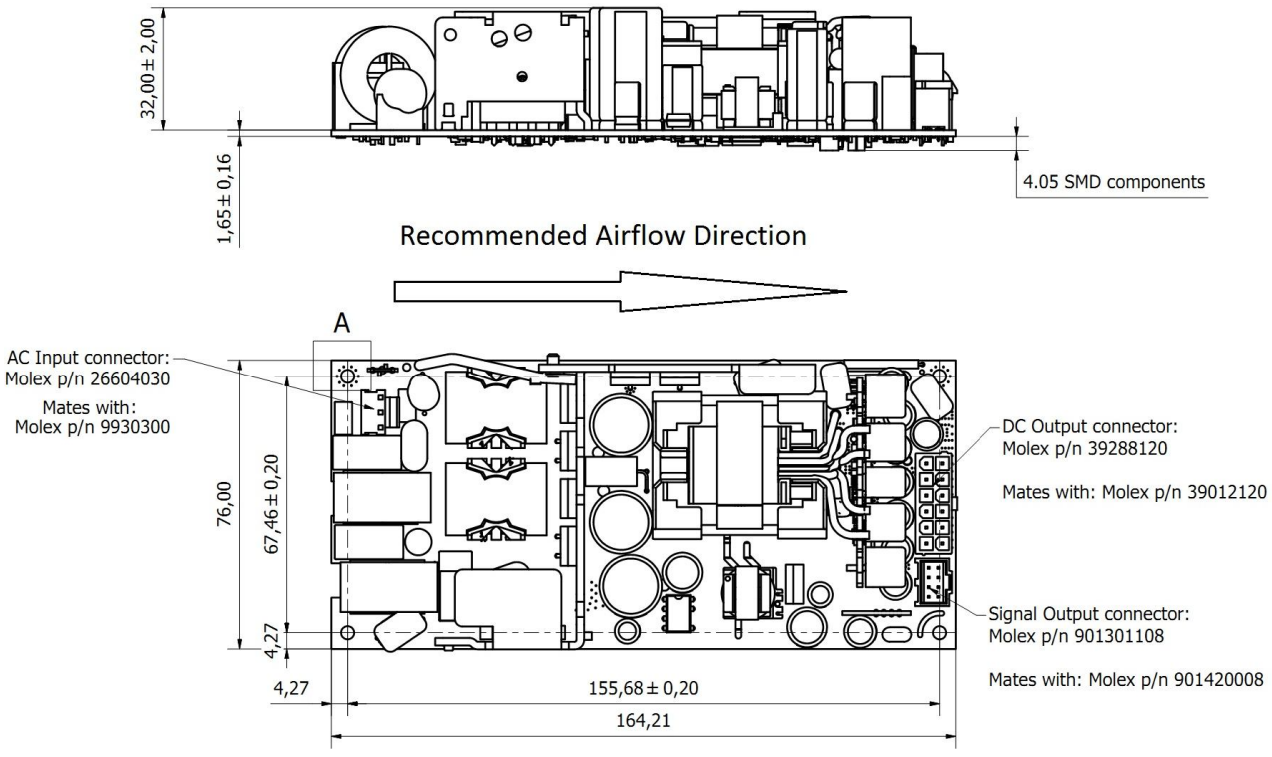


Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

Signal Connector P6	
Pin	Function
1	+5VSB
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)



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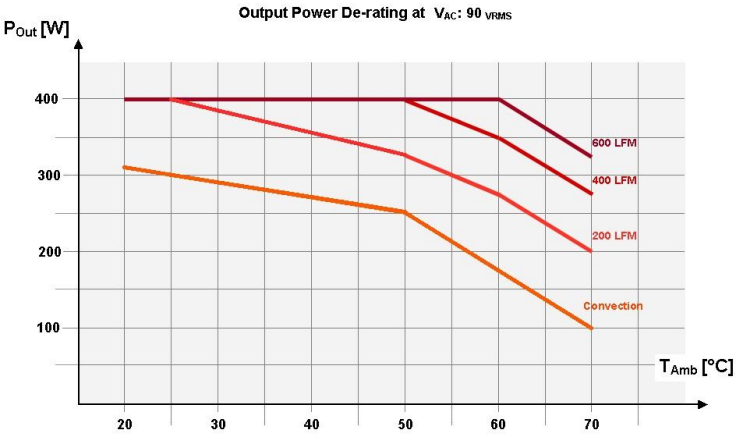
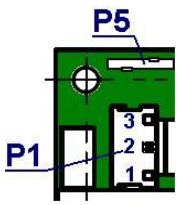
OUTLINE DRAWING AND CONNECTIONS – U-CHASSIS (UC)

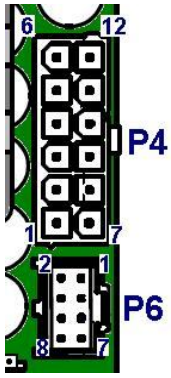
Connector	Manufacturer and Part Number
AC Input Connector P1	Molex 26-60-4030 or equivalent
P1 Mating Connector	Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG)
Protection Earth Connector P5	Tyco 63849-1 equivalent
P5 Mating Connector	Any tin finished 6.35x0.81 mm 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 Heart P5	
GND	AC Ground

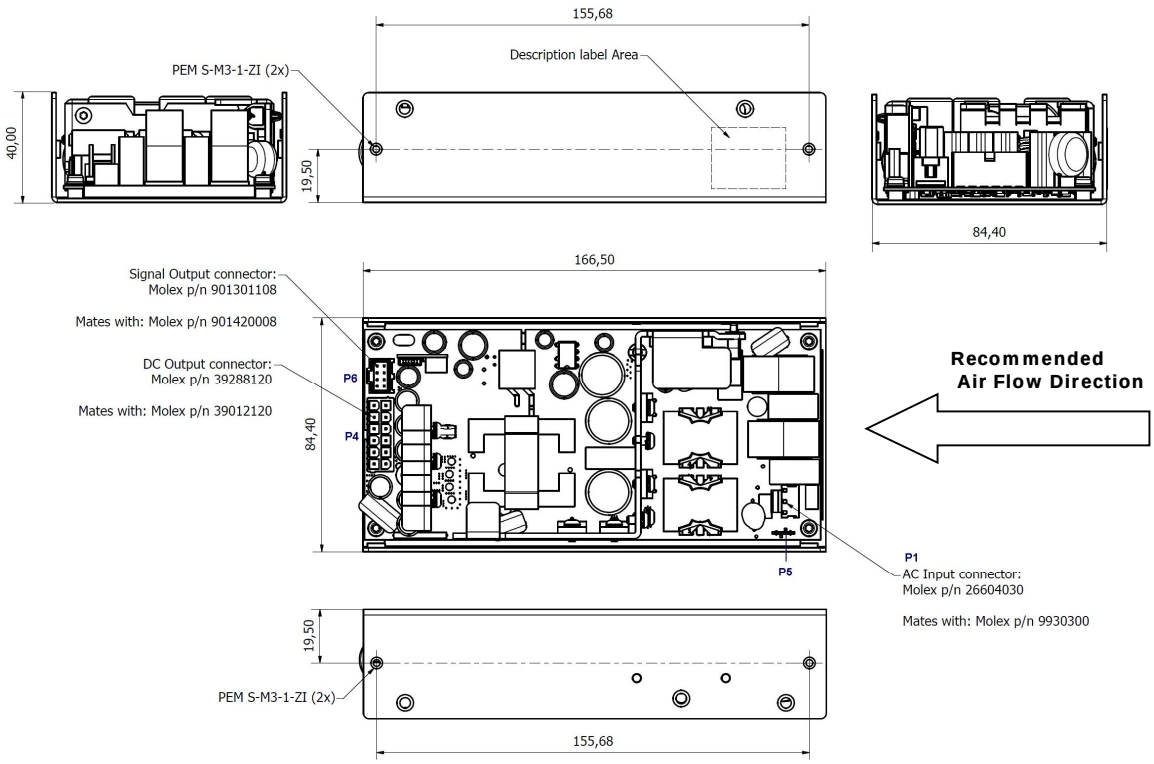


Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)

Weight: 525 g (1.16 lb)



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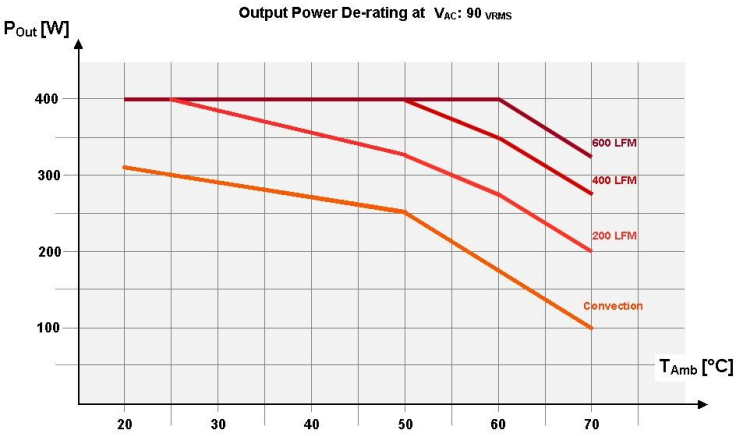
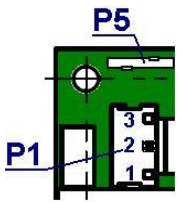
OUTLINE DRAWING AND CONNECTIONS – PUNCHED COVER (PC)

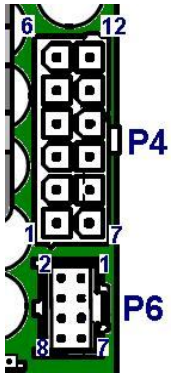
Connector	Manufacturer and Part Number
AC Input Connector P1	Molex 26-60-4030 or equivalent
P1 Mating Connector	Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG)
Protection Earth Connector P5	Tyco 63849-1 equivalent
P5 Mating Connector	Any tin finished 6.35x0.81 mm 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 Heart P5	
GND	AC Ground

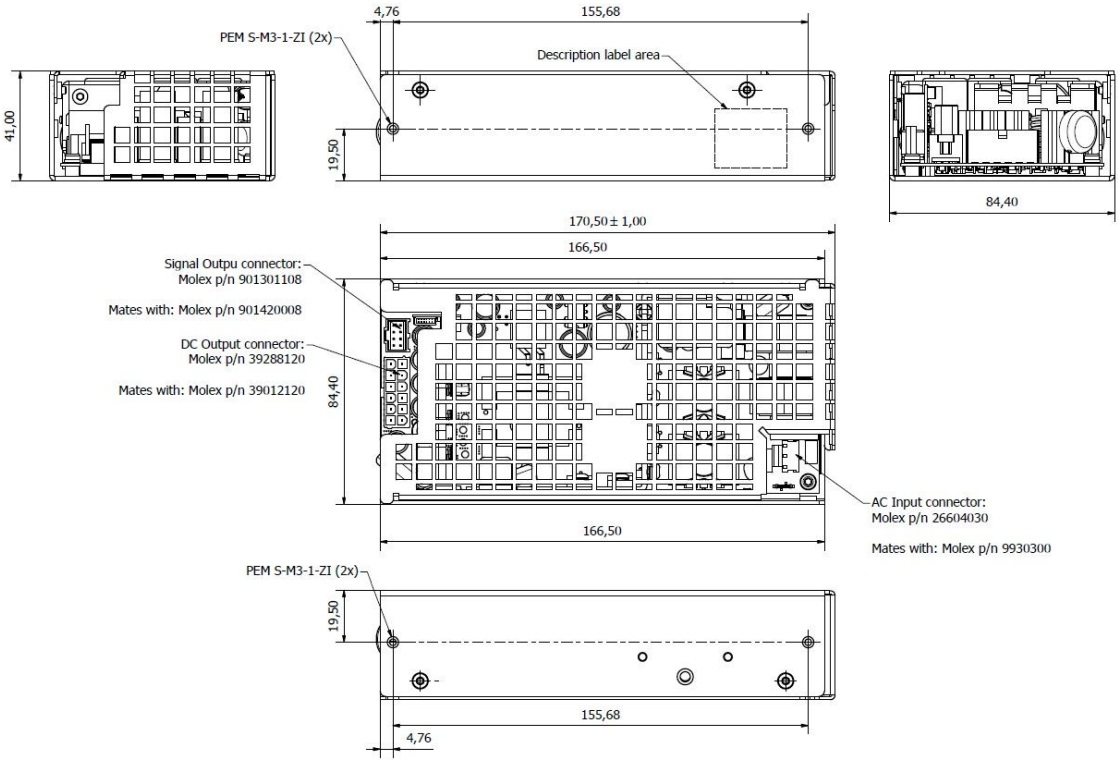


Output Connector P4	
Pin	**Function**
1-6	V1
7-12	DC Return

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)



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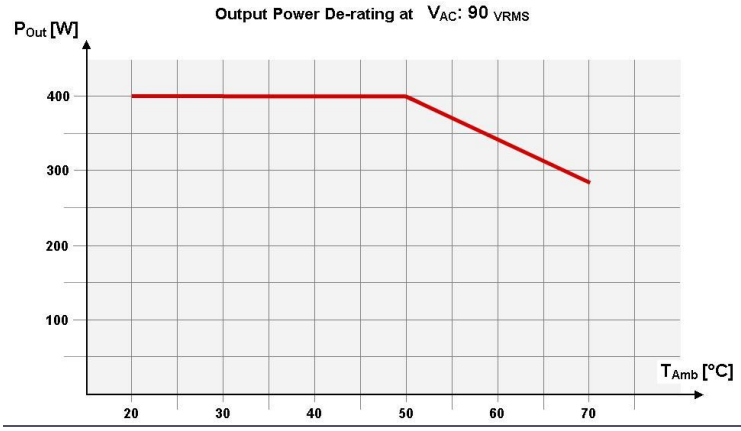
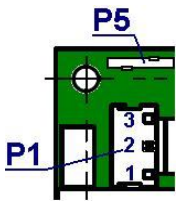
OUTLINE DRAWING AND CONNECTIONS – VENTED COVER (VC)

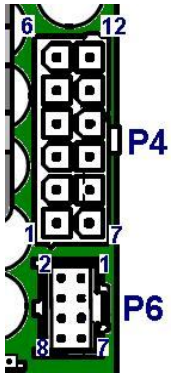
Connector	Manufacturer and Part Number
AC Input Connector P1	Molex 26-60-4030 or equivalent
P1 Mating Connector	Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG)
Protection Earth Connector P5	Tyco 63849-1 equivalent
P5 Mating Connector	Any tin finished 6.35x0.81 mm 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 Heart P5	
GND	AC Ground

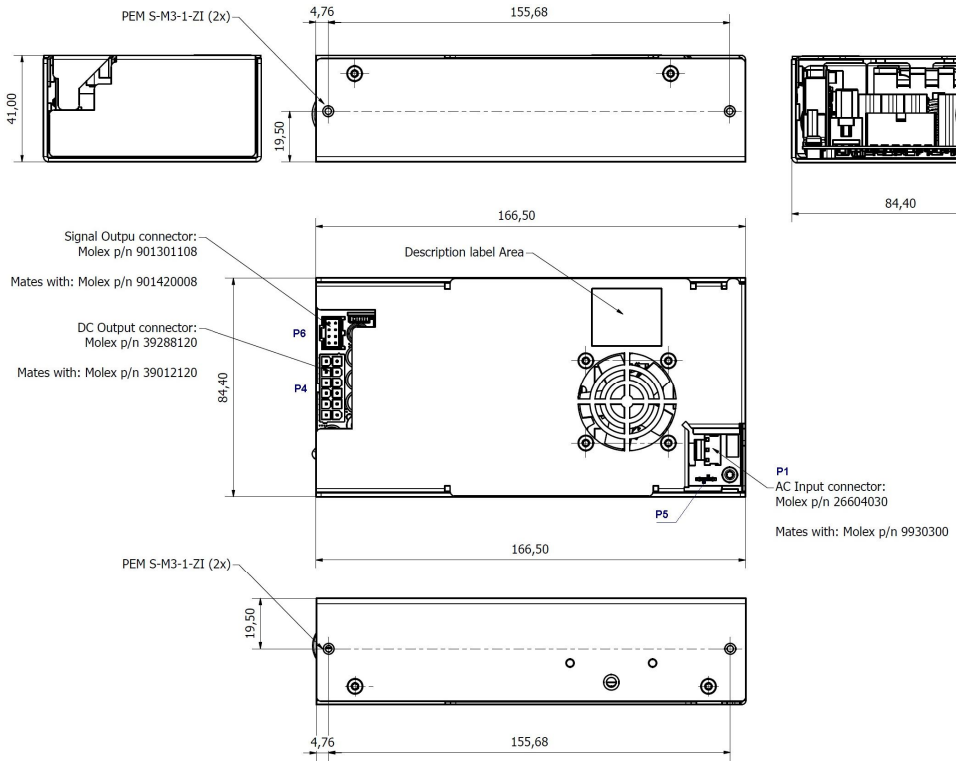


Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)

Weight: 670 g (1.48 lb)



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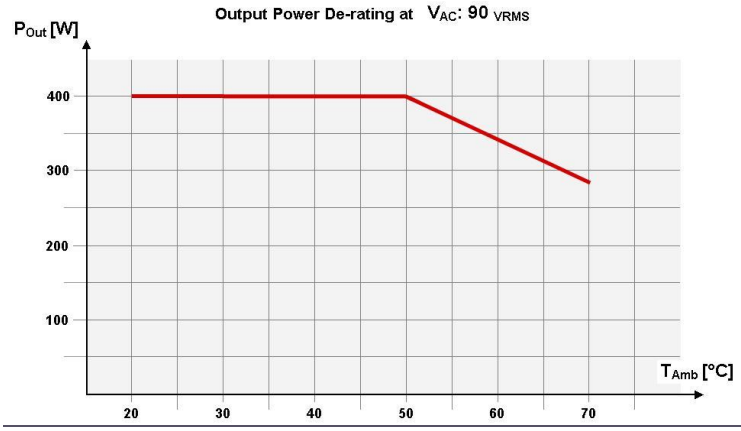
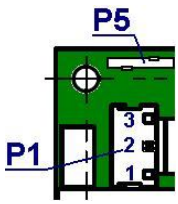
OUTLINE DRAWING AND CONNECTIONS – FRONT FAN (FF)

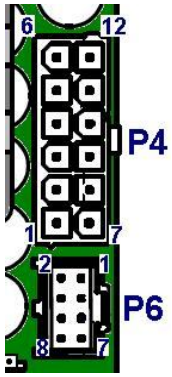
Connector	Manufacturer and Part Number
AC Input Connector P1	Molex 26-60-4030 or equivalent
P1 Mating Connector	Molex 09-93-0300 (Crimp Terminal Housing) Molex 08-50-0105 (Crimp Terminal, 18-24 AWG)
Protection Earth Connector P5	Tyco 63849-1 equivalent
P5 Mating Connector	Any tin finished 6.35x0.81 mm 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	
GND	AC Ground

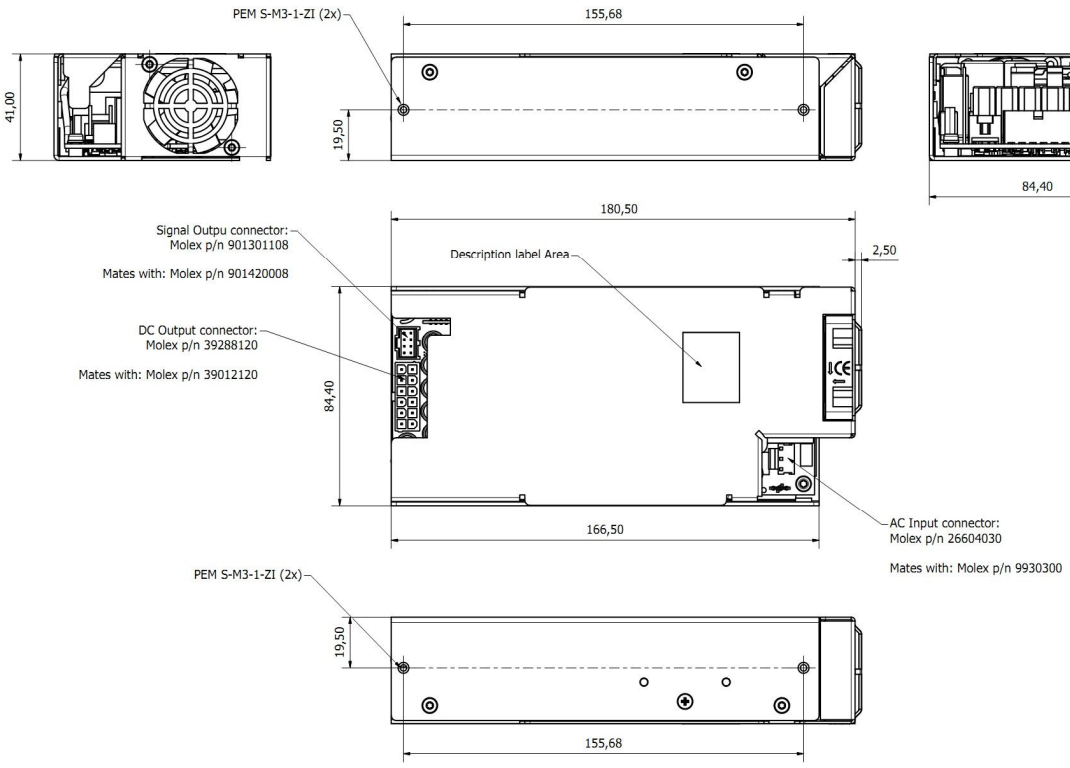


Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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)



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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	EN 61000-4-6	3	A
Dips and Interruptions	100 - 240V_{AC} 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 IECEE 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)	Audio Video and Information Technology Equipment
	Directive 2014/30/EU: Electromagnetic Compatibility (EMC)	
	Directive EU 2015/863: RoHS 3	

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