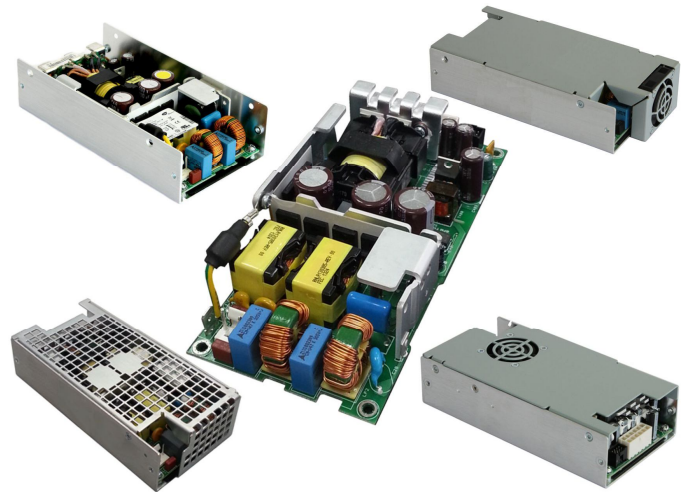


MAIN FEATURES

- 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.

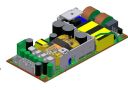
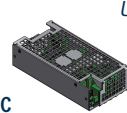
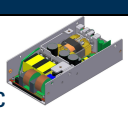
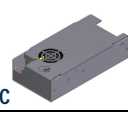
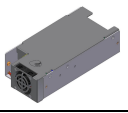
Boxed and vented open frame models can deliver full output power up to 50 °C, can operate up to 70 °C with de-rating and are capable of start up from -30 °C. A built-in speed controlled fan, to ensure the required airflow while maintaining minimal operational noise, which ultimately enhances the power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

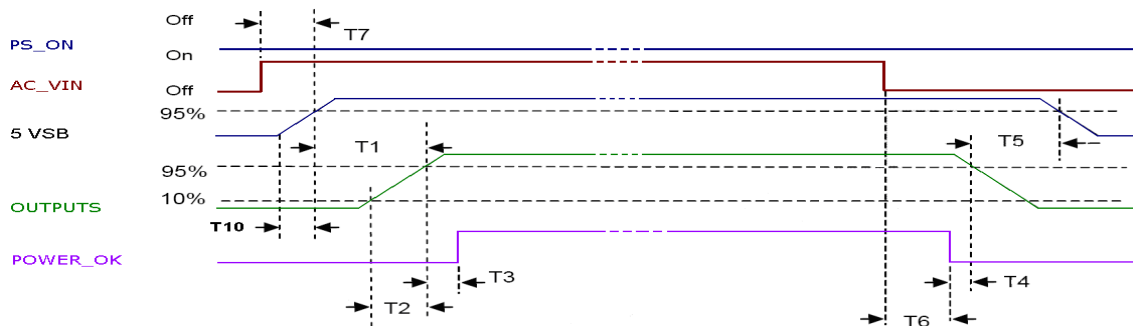
Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
V1 Output Voltage	0.5% set point accuracy for all voltage variants	-	12	-	V
		-	24	-	
		-	28	-	
		-	36	-	
		-	48	-	
V1 Output Power Rating	All voltages, OF/UC/PC, convection cooling	-	-	250	W
	All voltages, VC/FF, and OF/UC/PC forced air cooling (> 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	
	48 V _{DC}	-	-	7.000	
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

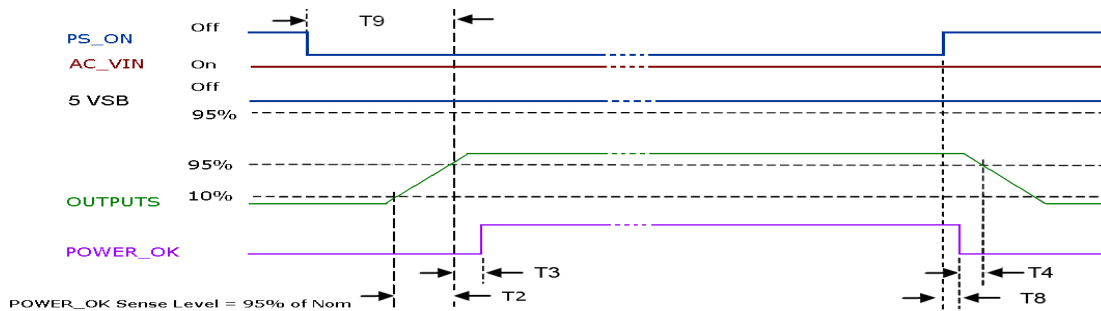
Signal	Notes	Min	Typ	Max	Unit
PS_ON	Active low, +5 V TTL signal compatible. Input low voltage	0	-	2.0	V
	Input high voltage ($I_{IN} = 200 \mu A$)	3.0	-	-	V
	V1 and V2 disabled when PS_ON is open				
	5 V _{SB} not affected by PS_ON				
P_OK	V1 and V2 enabled with PS_ON connected to RTN				
	+5 V TTL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

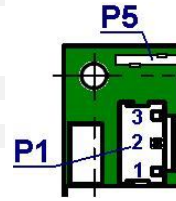
Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Input Under Voltage Lockout	Auto recovery, Hiccup Mode	60	75	-	V _{AC}
Input Fuse	2x Time Lag 6.3 A, 250 V on L1 and L2	-	-	6.3	A
Over Current	At nominal input voltages. V1: Hiccup mode, auto-recovering. V2: PTC limiting, auto-recovering. 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.				

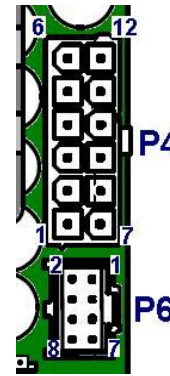
OUTLINE DRAWING AND CONNECTIONS – OPEN FRAME (OF)

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)



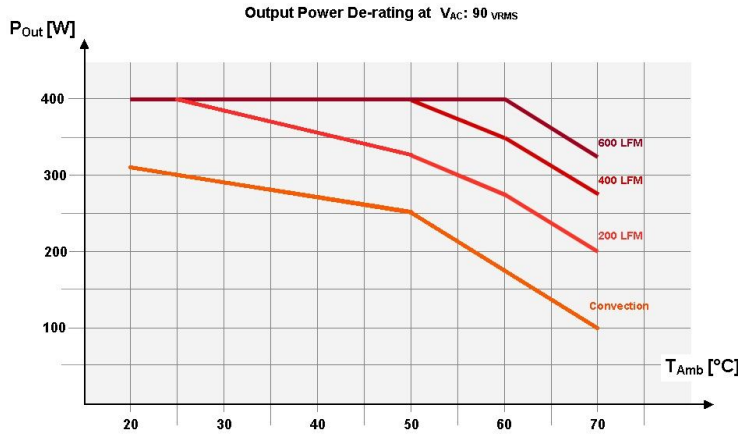
AC Input P1	
Pin	Function
1	Line 1
2	Not Present
3	Line 2

Protection Earth P5	
Pin	Function
1	GND AC Ground



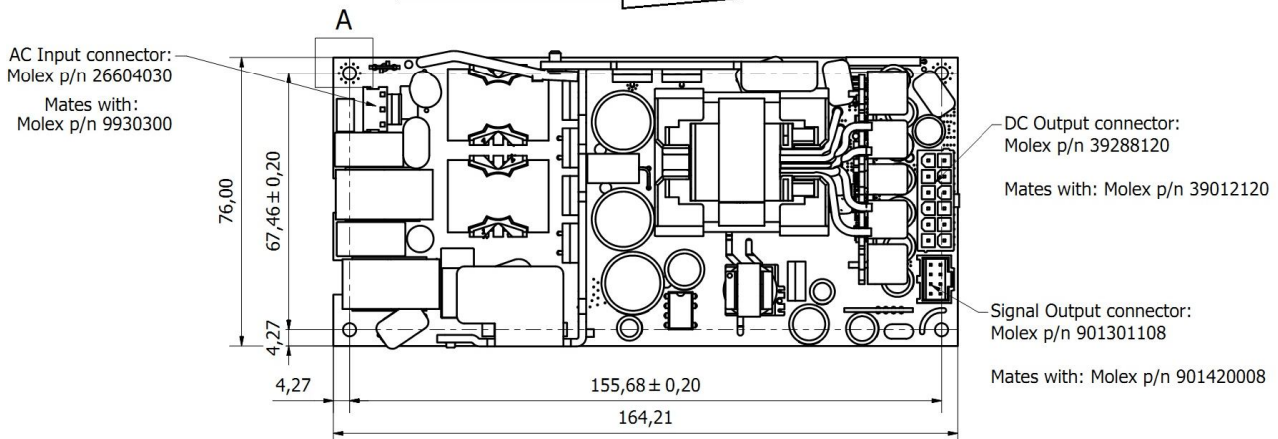
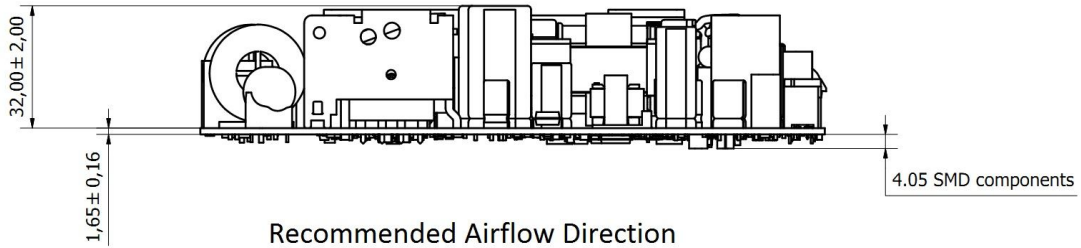
Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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



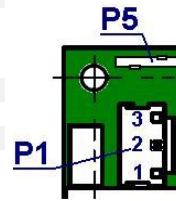
Overall dimensions: 76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)

Weight: 410 g (0.90 lb)



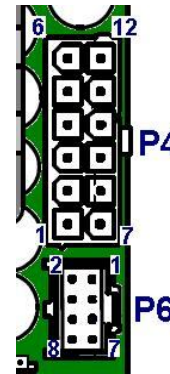
OUTLINE DRAWING AND CONNECTIONS – U-CHASSIS (UC)

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)



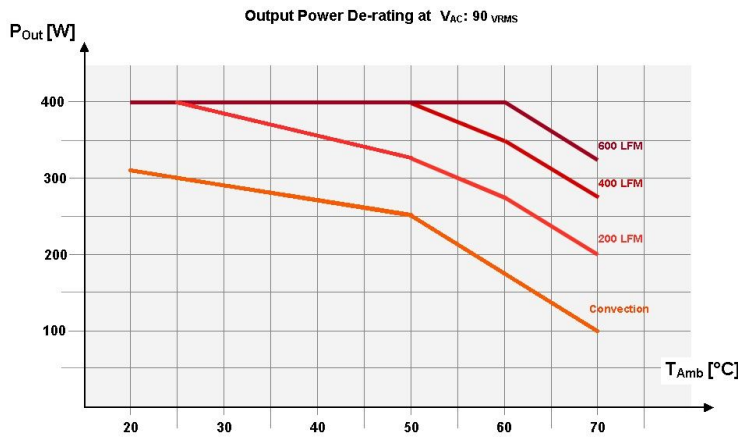
AC Input P1	
Pin	Function
1	Line 1
2	Not Present
3	Line 2

Protection Earth P5	
Pin	Function
GND	AC Ground



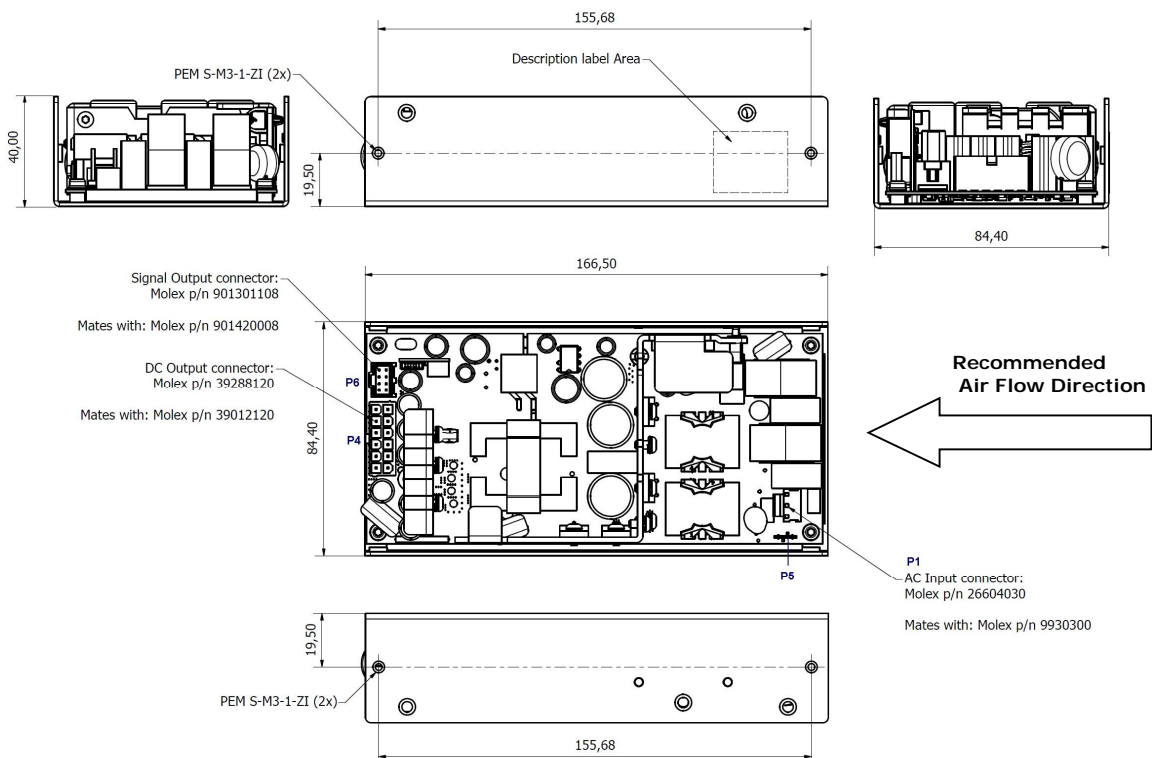
Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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



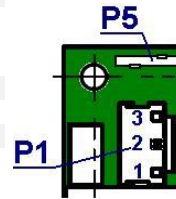
Overall dimensions: 84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)

Weight: 525 g (1.16 lb)



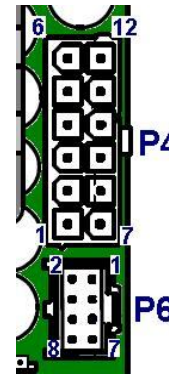
OUTLINE DRAWING AND CONNECTIONS – PUNCHED COVER (PC)

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)



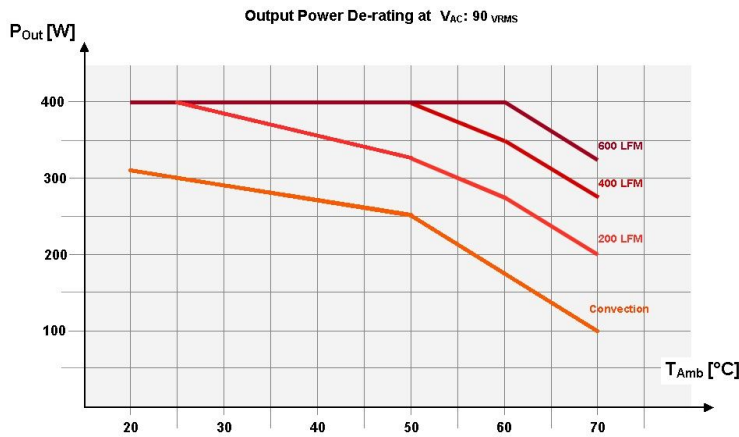
AC Input P1	
Pin	Function
1	Line 1
2	Not Present
3	Line 2

Protection Earth P5	
Pin	Function
GND	AC Ground



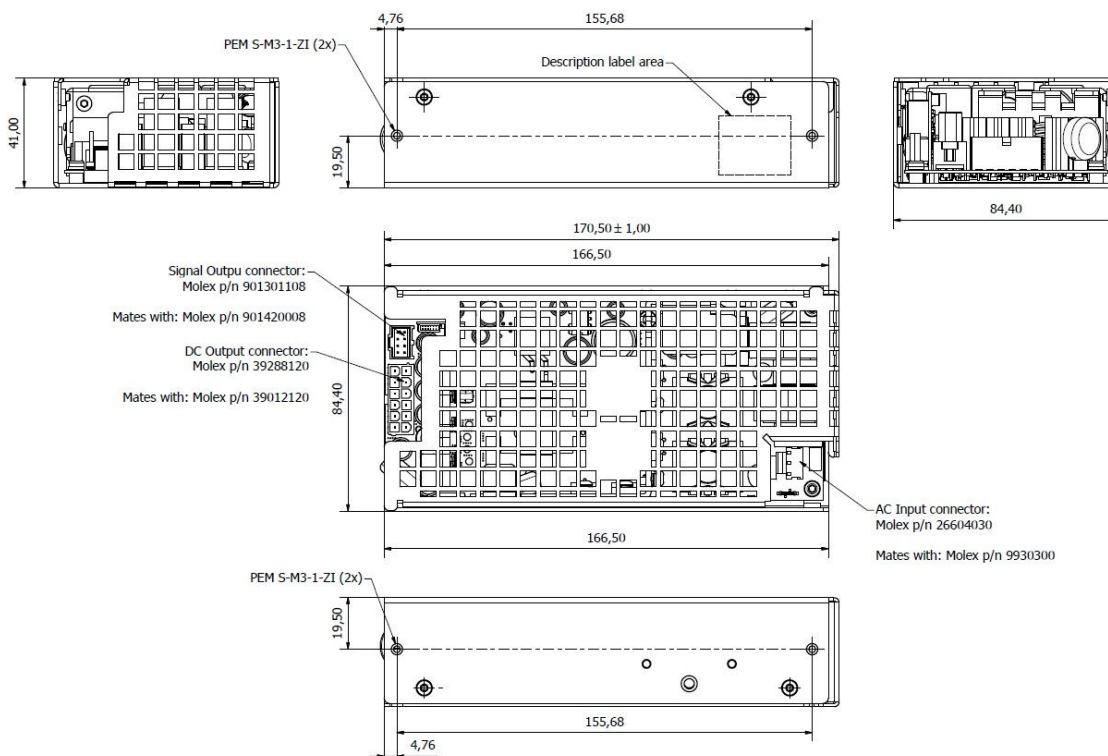
Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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



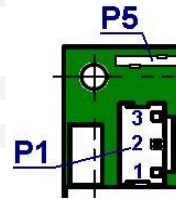
Overall dimensions: 84.4 x 170.5 x 41.0 mm (3.32 x 6.71 x 1.61 in)

Weight: 575 g (1.43 lb)



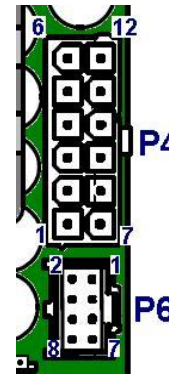
OUTLINE DRAWING AND CONNECTIONS – VENTED COVER (VC)

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)



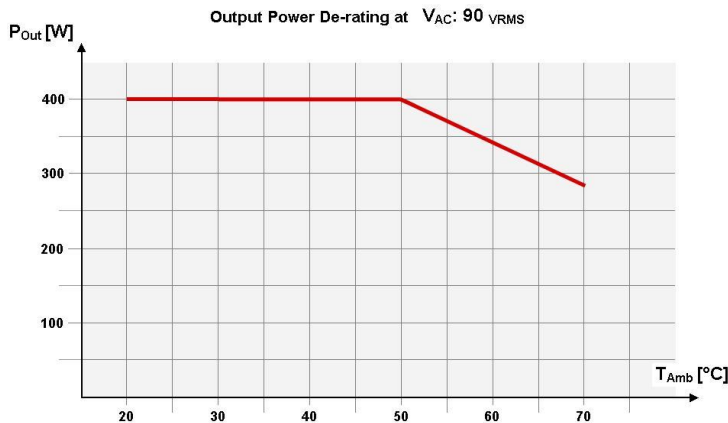
AC Input P1	
Pin	Function
1	Line 1
2	Not Present
3	Line 2

Protection Earth P5	
Pin	Function
GND	AC Ground



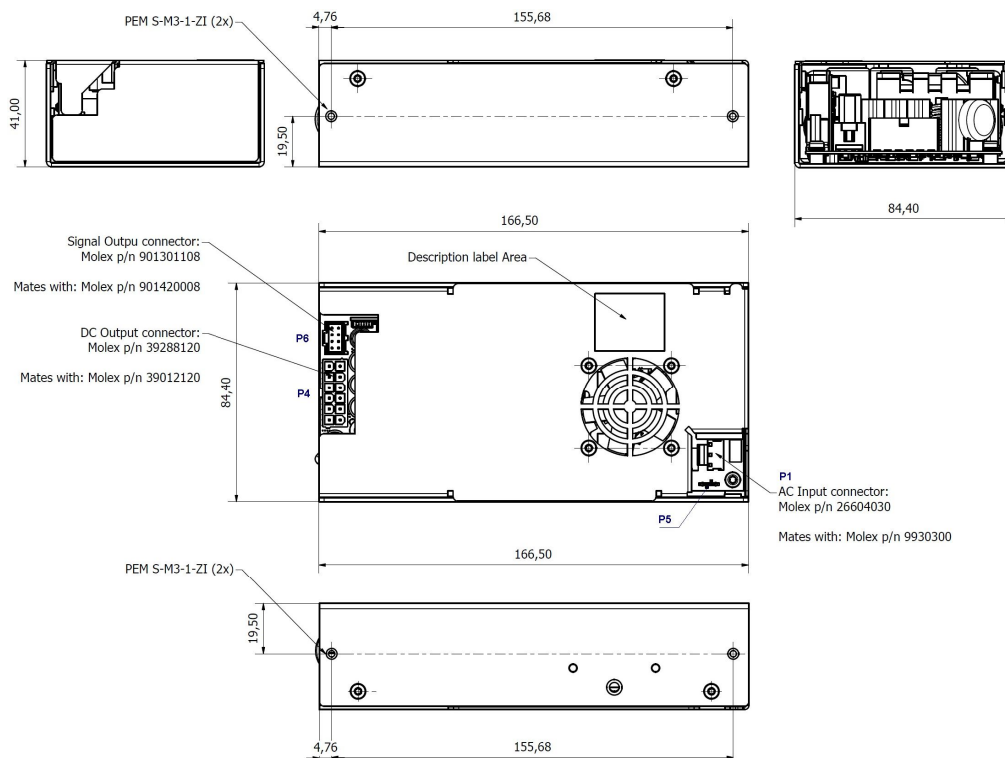
Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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



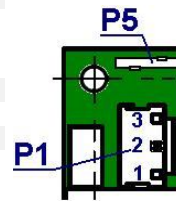
Overall dimensions: 84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)

Weight: 670 g (1.48 lb)



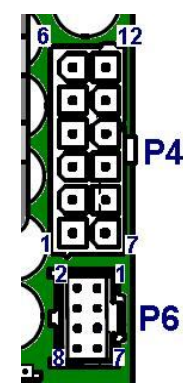
OUTLINE DRAWING AND CONNECTIONS – FRONT FAN (FF)

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)



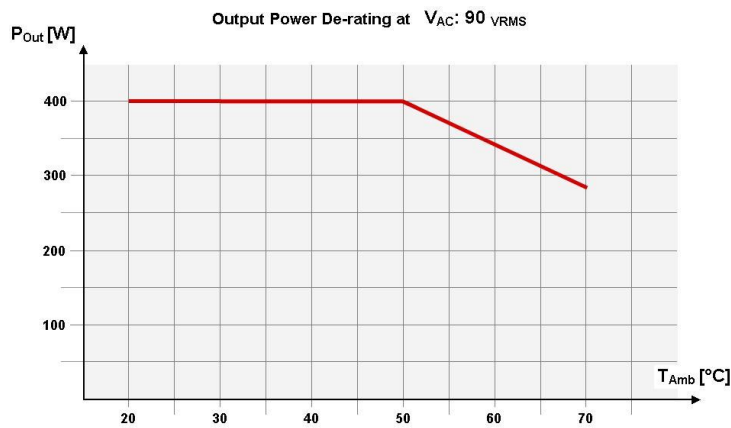
AC Input P1	
Pin	Function
1	Line 1
2	Not Present
3	Line 2

Protection Earth P5	
Pin	Function
GND	AC Ground



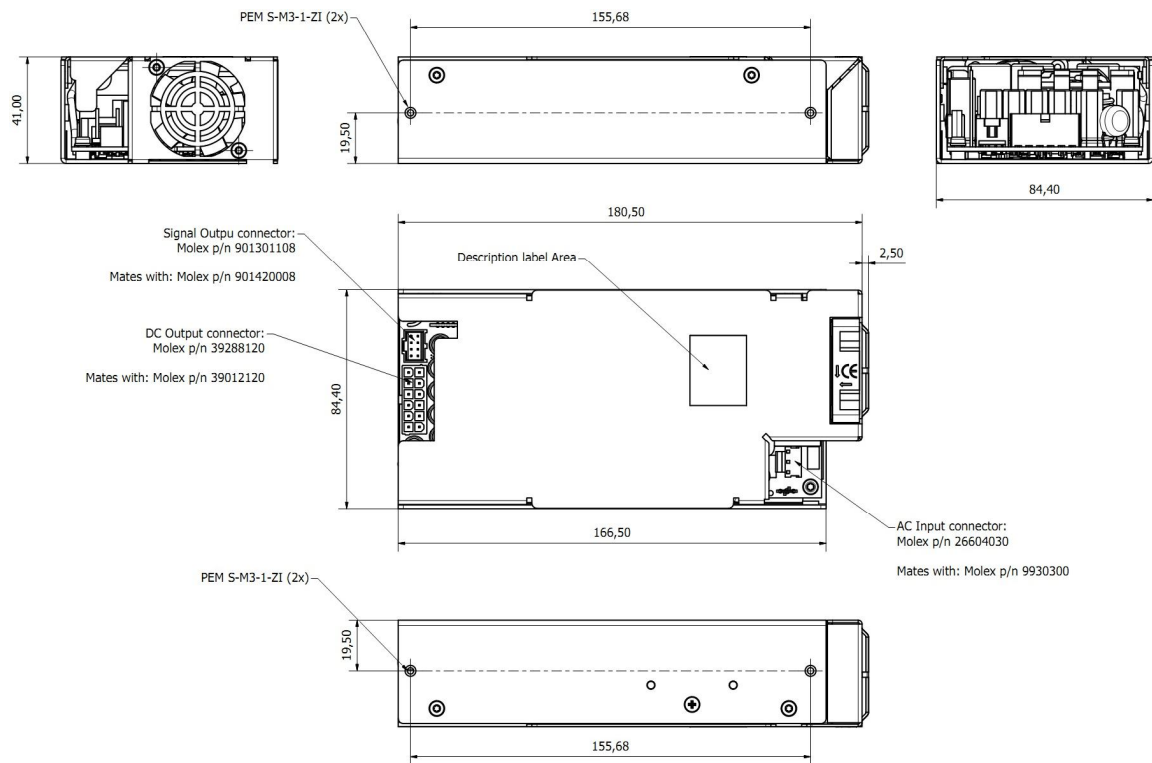
Output Connector P4	
Pin	Function
1-6	V1
7-12	DC Return

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 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)	EN61000-4-11		A
	Dip to 70% for 25 cycles (500 ms)	EN61000-4-11		B
	Interrupts > 95% for 5 s	EN61000-4-11		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)	Audio Video and Information Technology Equipment
	Directive 2014/30/EU: Electromagnetic Compatibility (EMC)	
	Directive EU 2015/863: RoHS 3	

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