MBC401 Series

400 W AC-DC Power Supplies

The MBC401 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 MBC401 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 MBC401 Series complies with the latest international safety standards for medical equipment, offers 2xMoPP means of patient protection, is suitable for BF rated applied parts 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 compliant
- 400 W rated 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 leakage current
- Fan speed control function (Off at <50 W)
- Over temperature protection
- Over current and short circuit protection
- Remote On/Off and power good signal
- 5 available packages all fit 1U installation
- IEC/EN 60601-1 3rd ed. compliant
- ANSI/AAMI ES60601-1 3rd ed. compliant
- 4000 m operation without de-rating

RoHS Compliant

Applications

- Diagnostic equipment
- Imaging equipment
- Respiratory devices
- Therapy appliances
- Dental equipment
- Dermatology aesthetic medicine

bel POWER SOLUTIONS & PROTECTION
a bel group

belfuse.com/power-solutions

1. MODEL SELECTION

MODEL NUMBER	PACKAGE & COOLING	INPUT VOLTAGE RANGE [VAC]	NOM. OUTPUT VOLTAGE [VDC]	MAX. OUTPUT POWER [W]	MAX. OUTPUT CURRENT [A]	DIMENSIONS
MBC401-1012	Open Frame Convection / Forced Air	90 - 264	12	400	33.3	76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)
MBC401-1012-UC	U-Chassis Convection / Forced Air	90 - 264	12	400	33.3	84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)
MBC401-1012-PC	Perforated Cover Convection / Forced Air	90 - 264	12	400	33.3	84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)
MBC401-1012-T	Vented Cover Top Fan	90 - 264	12	400	33.3	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1012-S	Enclosed Front Mounted Fan	90 - 264	12	400	33.3	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1024	Open Frame Convection / Forced Air	90 - 264	24	400	16.7	76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)
MBC401-1024-UC	U-Chassis Convection / Forced Air	90 - 264	24	400	16.7	84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)
MBC401-1024-PC	Perforated Cover Convection / Forced Air	90 - 264	24	400	16.7	84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)
MBC401-1024-T	Vented Cover Top Fan	90 - 264	24	400	16.7	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1024-S	Enclosed Front Mounted Fan	90 - 264	24	400	16.7	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1028-UC	U-Chassis Convection / Forced Air	90 - 264	28	400	14.3	84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)
MBC401-1036	Open Frame Convection / Forced Air	90 - 264	36	400	11.1	76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)
MBC401-1036-UC	U-Chassis Convection / Forced Air	90 - 264	36	400	11.1	84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)
MBC401-1036-PC	Perforated Cover Convection / Forced Air	90 - 264	36	400	11.1	84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)
MBC401-1036-T	Vented Cover Top Fan	90 - 264	36	400	11.1	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1036-S	Enclosed Front Mounted Fan	90 - 264	36	400	11.1	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1048	Open Frame Convection / Forced Air	90 - 264	48	400	8.3	76.0 x 164.2 x 37.7 mm (2.99 x 6.46 x 1.48 in)
MBC401-1048-UC	U-Chassis Convection / Forced Air	90 - 264	48	400	8.3	84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in)
MBC401-1048-PC	Perforated Cover Convection / Forced Air	90 - 264	48	400	8.3	84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in)
MBC401-1048-T	Vented Cover Top Fan	90 - 264	48	400	8.3	84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in)
MBC401-1048-S	Enclosed Front Mounted Fan	90 - 264	48	400	8.3	84.4 x 183.0 x 41.0 mm (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_{AC} at all load conditions		90	100-240	264	V_{RMS}
DC Input Voltage			170	-	270	V_{DC}
Input Frequency			47	50/60	440	Hz
Input Current	RMS at 180 V_{AC}, maximum load, 50 / 60 Hz RMS at 90 V_{AC}, maximum load, 50 / 60 Hz		-	-	2.5 5.0	A
Inrush Current	265 V_{AC}, 25 °C ambient, cold start. 24, 28, 36, 48 V, no damage 12 V		- -	- -	- 20	A
Fusing	2x Time Lag 6.3 A, 250 V on both L and N		-	-	6.3	A
Efficiency	At 115 V_{AC}	20% rated load	90	-	-	%
		50 – 100 % rated load	92	-	-	
	At 230 V_{AC}	20% rated load	90	-	-	
		50 – 100 % rated load	94	-	-	
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 VAC, 60 Hz and 230 VAC, 50 Hz input voltages		0.95	-	-	-
Harmonic Current Fluctuations and Flicker	Complies with EN-61000-3-2 Class C at 230 V_{AC} 50 Hz, load >50 W. Complies with EN-61000-3-3 at nominal voltages and full load.					
Leakage Current	Normal conditions, 240 V_{RMS}, 60 Hz.				300	µA

3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION		MIN	NOM	MAX	UNIT
V1 Output Voltage	0.5% set point accuracy for all voltage variants		- - - - -	12 24 28 36 48	- - - - -	V
V1 Output Power Rating	All voltages, convection cooled models only All voltages, fan cooled + forced air cooled (> 400 LFM) models All models, peak power (≤ 10 s)				250 400 440	W
V1 Output Current	* Fan cooled + forced air cooled (> 400 LFM) (All models)	V1: 12 V_{DC} V1: 24 V_{DC} V1: 28 V_{DC} V1: 36 V_{DC} V1: 48 V_{DC}			33.3 16.7 14.3 11.1 8.3	A
	** Convection cooled: ((-), -UC, -PC models)	V1: 12 V_{DC} V1: 24 V_{DC} V1: 28 V_{DC} V1: 36 V_{DC} V1: 48 V_{DC}			20.8 10.4 8.9 6.9 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) 0 – 16.7 A (24 V) 0 – 14.3 A (28 V) 0 – 13.9 A (36 V) 0 – 8.3 A (48 V) V2 Load: 0 – 1 A $5V_{SB}$ Load: 0 – 2 A	-	-	±2	%V1
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 12V at 2200 µF Load / I_{OUT}> 0.5 A 24 V at 1000 µF Load / I_{OUT}> 0.5 A 28 V at 1000 µF Load / I_{OUT}> 0.5 A 36 V at 820 µF Load / I_{OUT}> 0.5 A 48V at 560 µF Load / I_{OUT}> 0.5 A $5V_{SB}$ 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 5 V_{SB}		0	-	-	A
Maximum Load Capacitance	At nominal V_{IN}, 25 °C ambient	12 V 24 V 28 V 36 V 48 V	- - - - -	- - - - -	33000 16000 14300 10000 7000	µF
Temperature Drift			-1.2	-	+1.2	mV/°C
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
V2 Ripple	Peak-to-Peak measured at 20 MHz Bandwidth.		-	-	240	mV

$5V_{SB}$ Output Voltage	3% set point accuracy		-	5	-	V
$5V_{SB}$ Output Current ($I5V_{SB}$)	Convection cooled models Fan cooled + forced air cooled (> 400 LFM) models		- -	- -	1.5 2	A
$5V_{SB}$ Load-Line-Cross regulation	V_{AC}: 90 – 264 V_{RMS}	V1 Load: 0 – 33.3 A (12 V) 0 – 16.7 A (24 V) 0 – 14.3 A (28 V) 0 – 13.9 A (36 V) 0 – 8.3 A (48 V) V2 Load: 0 – 1 A $5V_{SB}$ Load: 0 – 2 A	-	-	±5	$\%5V_{SB}$
$5V_{SB}$ Ripple	Peak-to-Peak measured at 20 MHz Bandwidth.		-	-	50	mV

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

** The combined output power of V1, V2 and $5V_{SB}$ for (-), -UC, -PC models, 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.

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

3.1 OUTPUT POWER DE-RATING CURVES

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

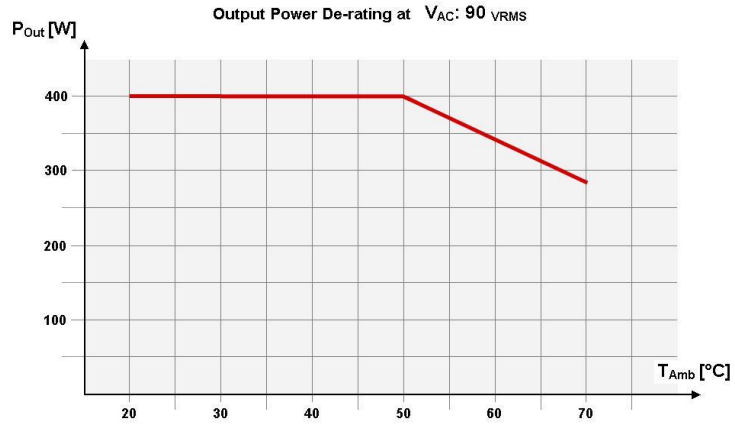
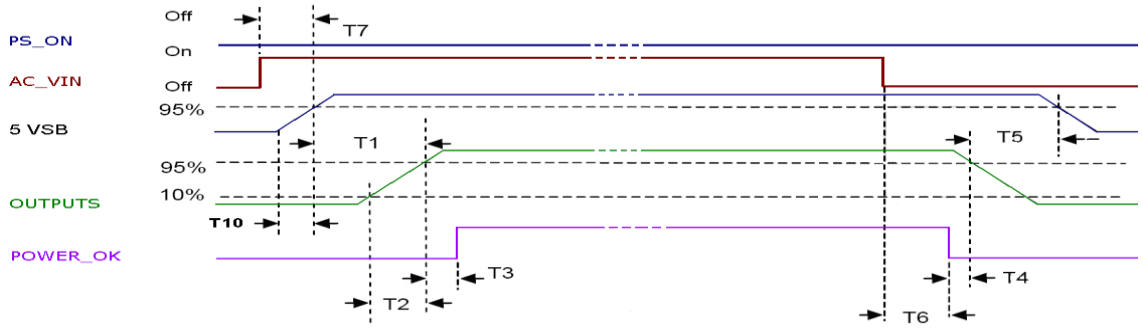


Figure 2. Power Derating Curves for Top Fan and Front Mounted Fan Models

4. SIGNALS, CONTROLS & TIMING SPECIFICATIONS

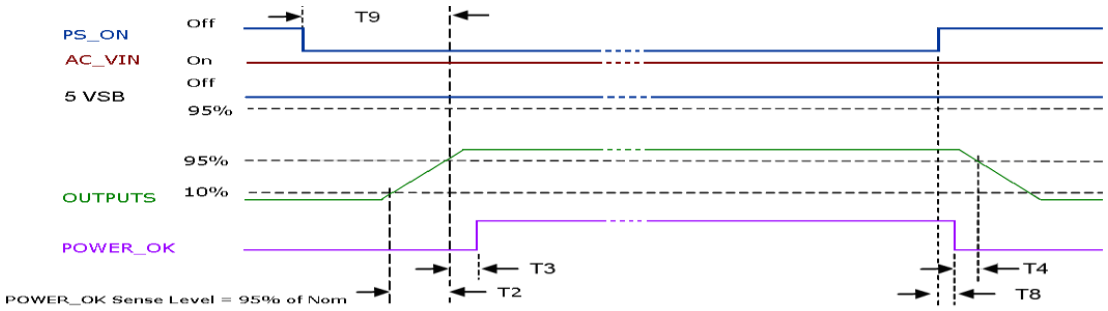
Base signals and controls are accessible from signal connector P204.

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 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 (100µA 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				



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 VAC)
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 warning [1]	1 ms ≤ T4 ≤ 5 ms
PS_ON - Main Output (off) Timing	T8 ≤ 1 ms
PS_ON - Main Output (on) Timin	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.

5. PROTECTION SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
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 24 V 28 V 36 V 48 V 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 (2x MoPP)	4000	-	-	V_{AC}
Isolation Input-to-PE	Basic (1x MoPP)	1500			V_{AC}
Isolation V1-to-V2		100	-	-	V_{DC}
Isolation Output-to-PE	Basic (1x MoPP)	1500	-	-	V_{AC}
Touch Current	Normal Condition (NC) Single Fault Condition (SFC)	- -	- -	100 500	µA

6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
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 250 W 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	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_{RMS}, 230 V_{RMS}. Maximum load 4 dB minimum margin	EN 60601-1-2 (Medical)	B
Radiated	At 10 m distance (-T, -S models)	EN 60601-1-2 (Medical)	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

8. ELECTROMAGNETIC COMPATIBILITY (EMC) – IMMUNITY

PARAMETER	DESCRIPTION / CONDITION	STANDARD	TEST LEVEL	CRITERIA
	Reference standard for the medical version	EN 60601-1-2,4th edition		
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 / 2 Hz 80% AM. Dwell time is 3 sec for 2 Hz modulation Dwell time is 1 sec for 1 kHz 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	4	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	Dip to 30% for 0.5 cycle (10 ms) Dip to 40% for 5 cycles (100 ms) Dip to 70% for 25 cycles (500 ms) Drop-out to 5% for 10 ms Interrupts > 95% for 5 s	EN61000-4-11 EN61000-4-11 EN61000-4-11 EN61000-4-11 EN61000-4-11		A B B B B

9. SAFETY AGENCIES APPROVALS

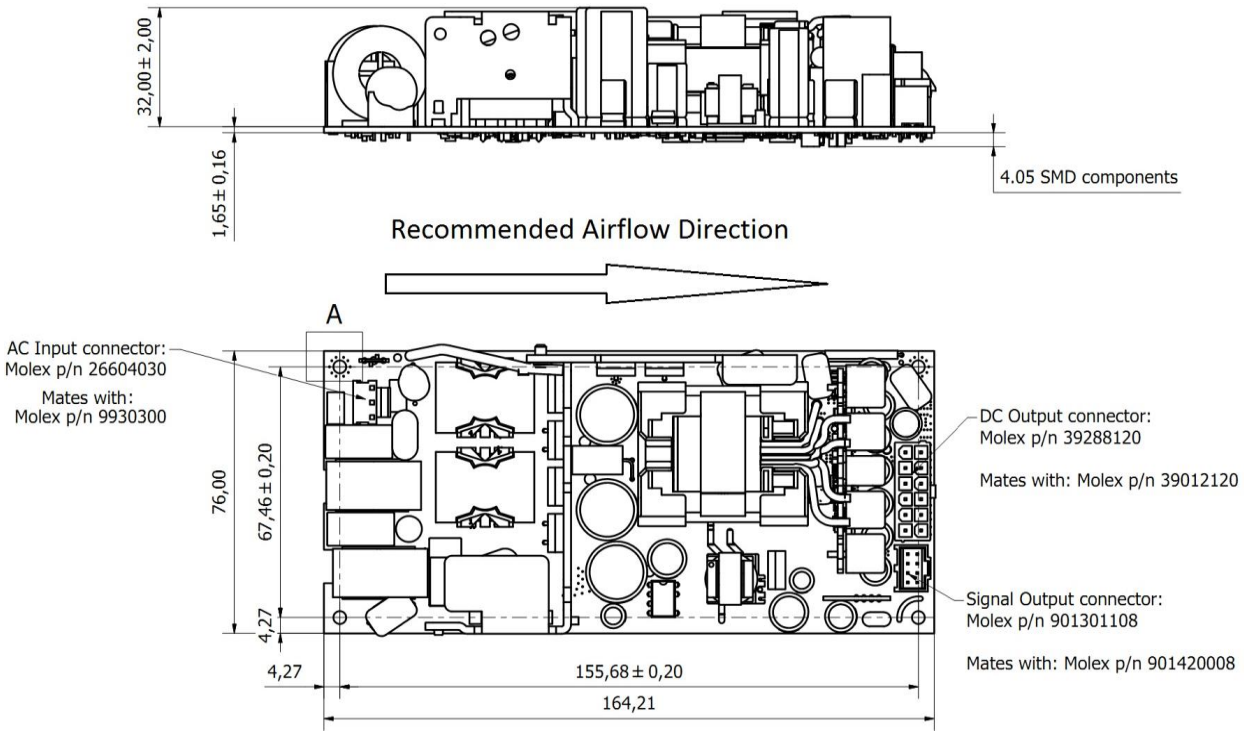
CERTIFICATION BODY	SAFETY STANDARDS	CATEGORY
CSA/UL	CSA C22.2 No.60601-1, ANSI/AAMI ES60601-1 3rd Edition + A1	Medical
IEC IECEE CB Certification	IEC/EN 60601-1 3rd edition+A1	Medical
CE	Directive 93/42/CEE: Safety Requirement of the Medical Device Directive 2014/30/EU: Electromagnetic Compatibility (EMC) Directive EU 2015/863: RoHS 3	Medical
	Designed to meet IEC/EN/UL/CSA 61010-1 2nd edition	

10. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION
Weight	410 g (0.90 lb) 525 g (1.16 lb) – UC model 575 g (1.43 lb) – PC model 670 g (1.48 lb) – T model 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) 84.4 x 166.5 x 40.0 mm (3.32 x 6.55 x 1.57 in) – UC model 84.4 x 170.5 x 41.0 mm (3.32 x 6.71 x 1.61 in) – PC model 84.4 x 166.5 x 41.0 mm (3.32 x 6.55 x 1.61 in) – T model 84.4 x 183.0 x 41.0 mm (3.32 x 7.20 x 1.61 in) – S model

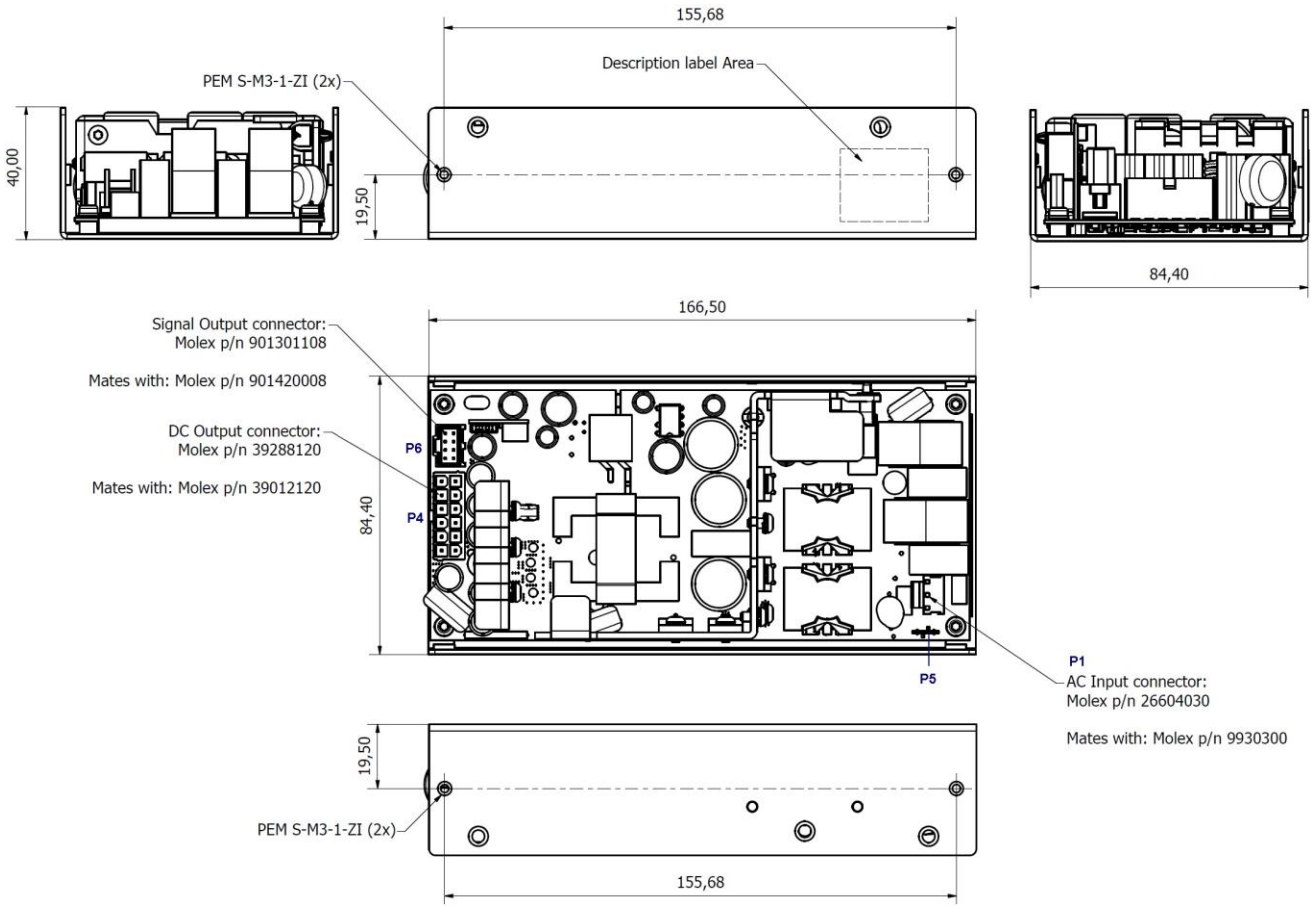
10.1 OUTLINE DRAWING & CONNECTIONS – OPEN FRAME MODEL

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)



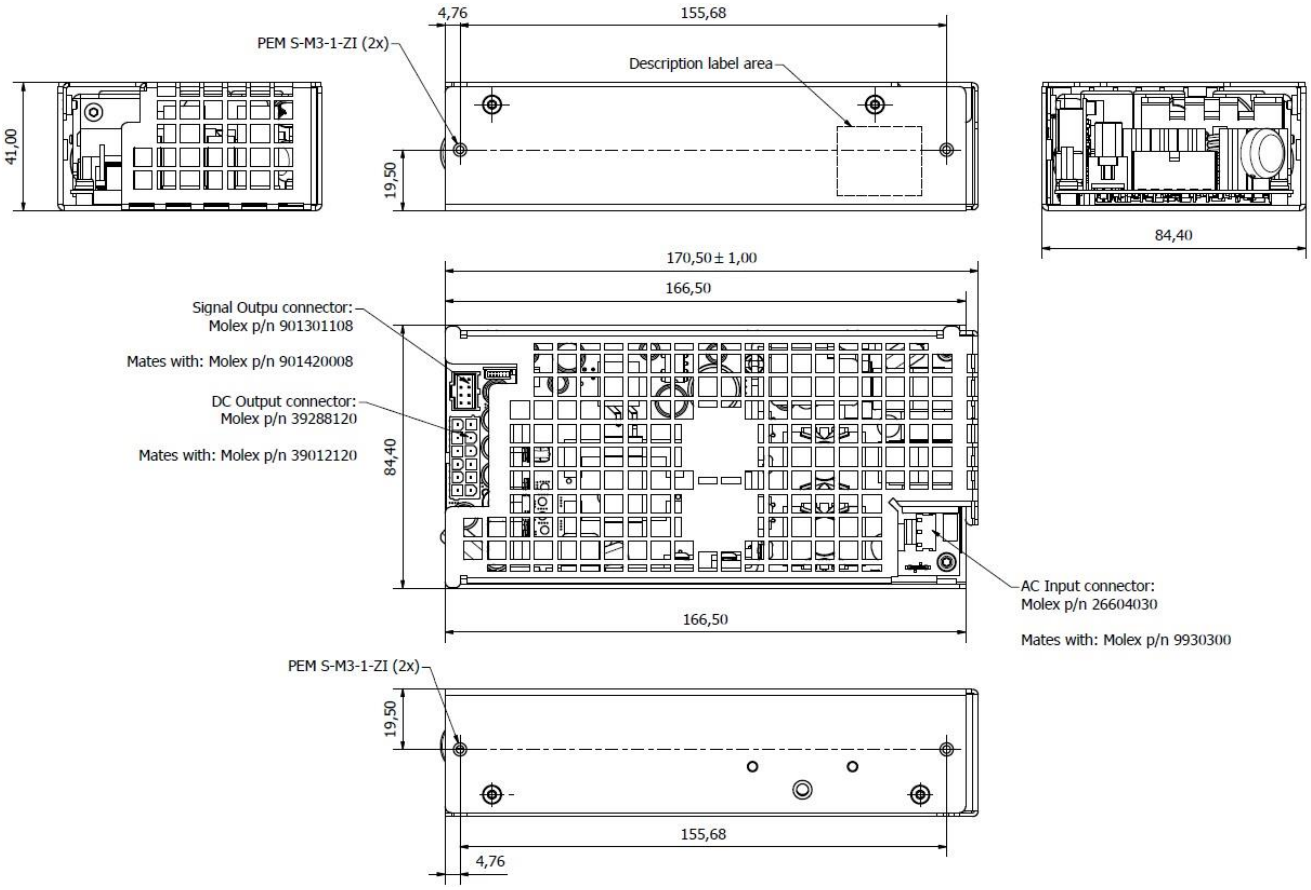
10.2 OUTLINE DRAWING & CONNECTIONS – U-CHASSIS MODEL (-UC)

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)



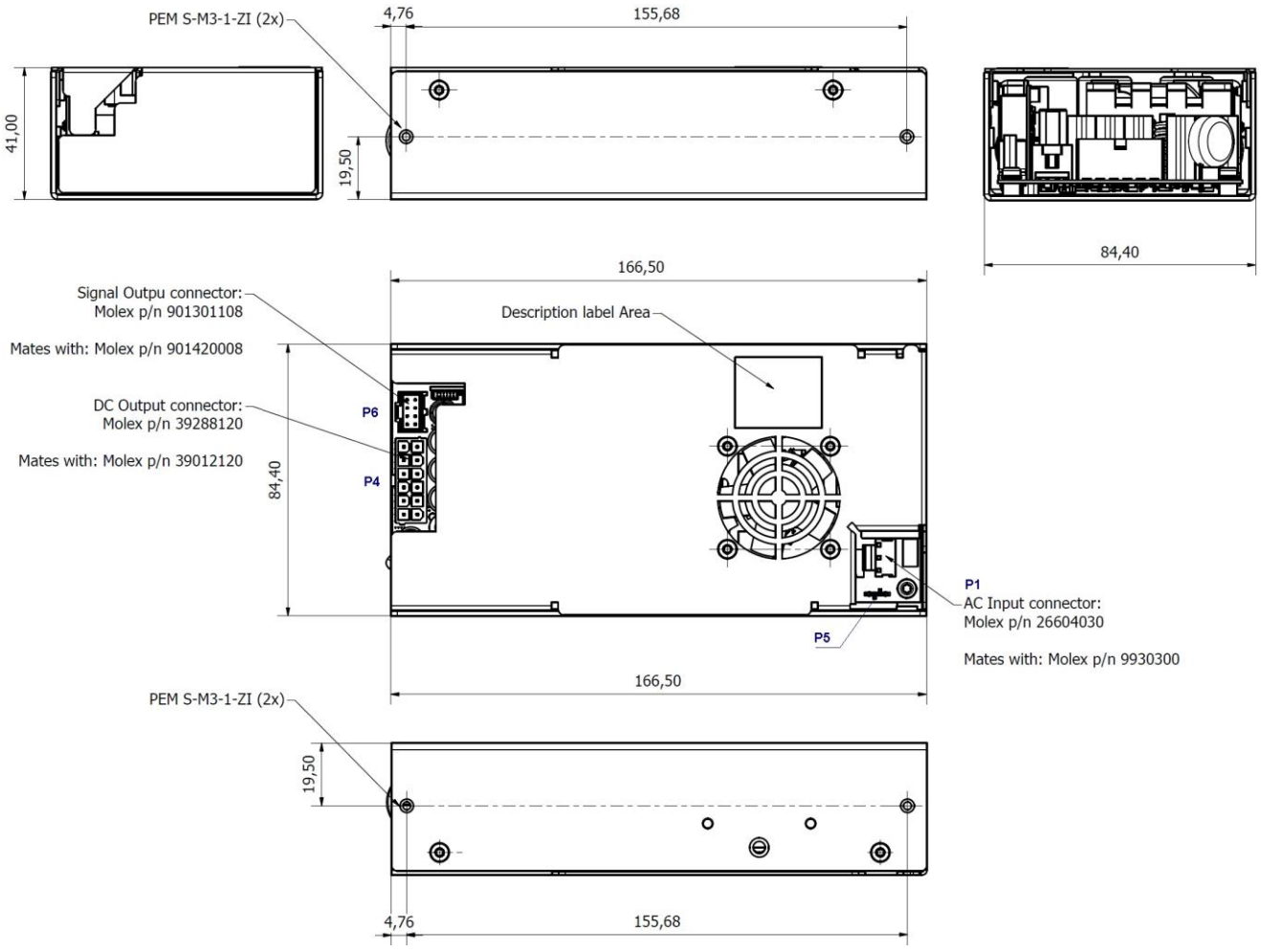
10.3 OUTLINE DRAWING & CONNECTIONS – PERFORATED MODEL (-PC)

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)



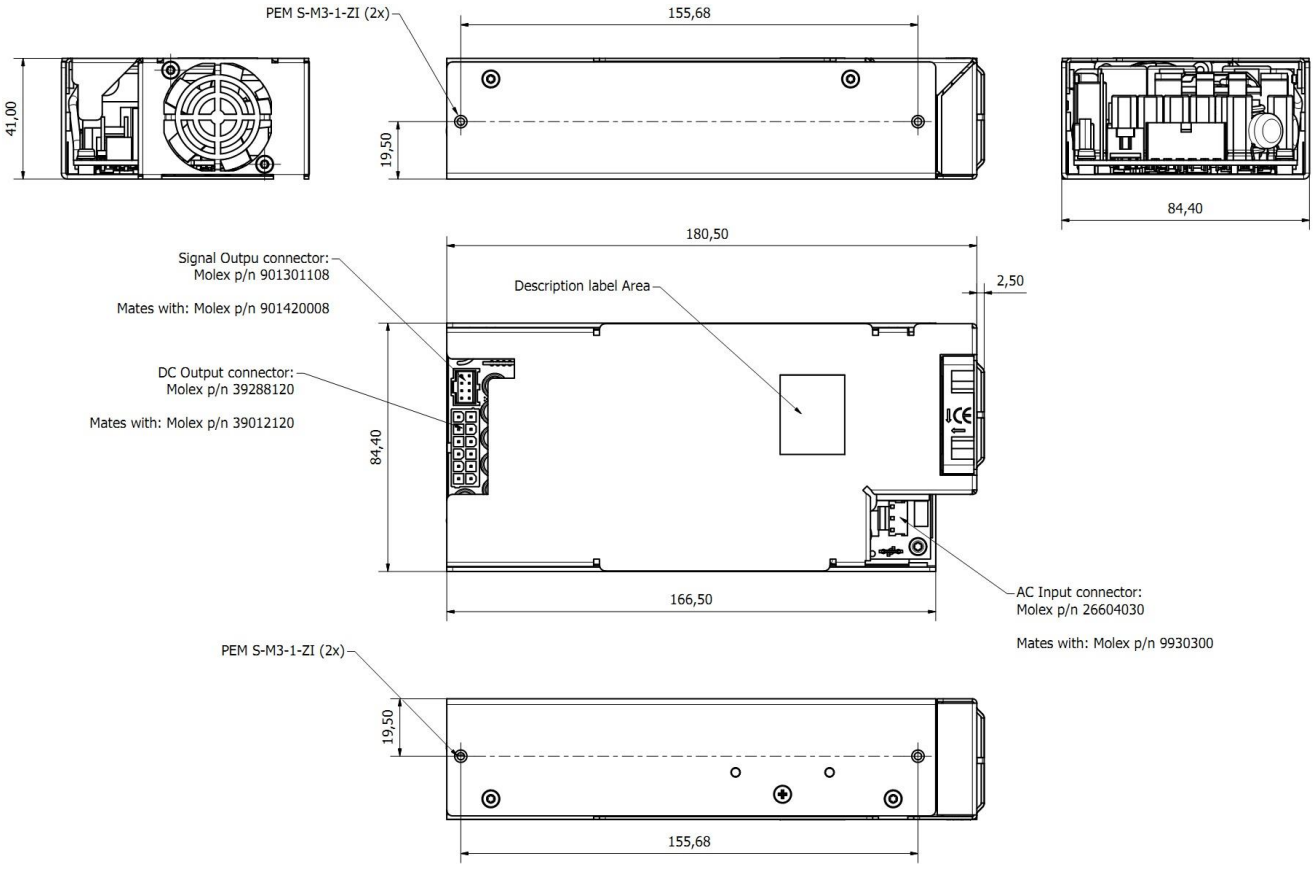
10.4 OUTLINE DRAWING & CONNECTIONS– VENTED COVER MODEL (-T)

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)



10.5 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)

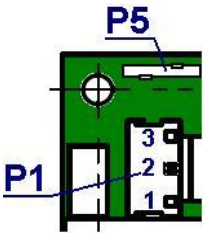


11. CONNECTIONS AND PIN DESCRIPTION

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)



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

PIN REF.	FUNCTION
GDN	AC Ground

PROTECTION EARTH CONNECTOR - P5

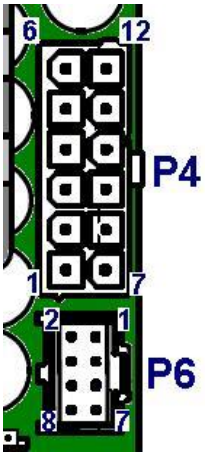
Tyco 63849-1 equivalent

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)



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

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	$+5V_{SB}$
2	P_OK
3	-V2
4	PS_ON
5	RS+
6	RTN
7	+V2
8	RTN