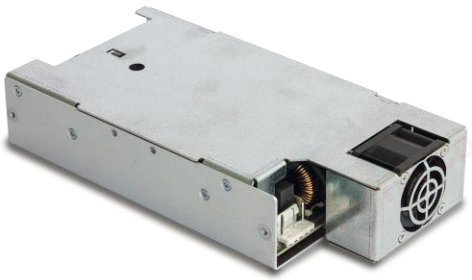
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ABC601 Series

600 W AC-DC Power Supplies





The ABC601 Series of industrial and medical AC-DC power supplies provides up to 600 W of regulated output power through wide input voltage range 85 – 305 VAC in single outputs of 24, 28, 36 or 48 VDC.

The ABC601 Series comes in two packages, U-frame chassis or enclosed with a front mounted fan, offering 12 and 5 VSB standby outputs and a full set of protection features.

The ABC601 Series features a built-in I-share circuit for parallel operation between power units to enhance total power. An optional OR-ing external circuit can be provided for N+1 redundant operation.

The ABC601 Series complies with the latest international safety standards for IT and medical equipment and displays the CE-Mark for the European Low Voltage Directive (LVD).

Key Features & Benefits

- Universal input voltage range (85 – 305 VAC)
- Input surge current limiting
- 800 W peak power (up to 10 s)
- High efficiency up to 94%
- 24, 28, 36 and 48 VDC standard output voltages
- Low stand-by consumption (<0.35 W)
- Active PFC, EN 61000-3-2 compliant (Class C, >25% load)
- Low earth / touch leakage current
- Fan speed control circuit
- Over temperature, OV, OC and SC protections.
- Stand by +5 V, 1.5 A and auxiliary / fan 12 VDC, 1 A outputs
- Built-in current share signal for parallel operation
- Remote On / Off signal
- Power good and remote sense signals
- Medical safety approval to IEC 60601-1, 2x MoPP protection grade BF appliances compatible
- IEC 60601-1-2 4th edition EMC compliant
- IEC 62368-1 standards for Audio Video & IT equipment
- LED lighting approval to UL 8750
- RoHS 3 compliant (Directive EU 2015/863)

RoHS Compliant

c UL us CE

Applications

- Video Wall Display and SSL Lighting
- Industrial Process Control and Automation
- Telecommunications
- Laboratory / Analysis Equipment
- Test and Measurement Equipment
- Medical Applications

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Please read our datasheet & drawing disclaimer here.

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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
ABC601-1T24-S	Enclosed Front Mounted Fan	85 - 305	24	600	25	107.0 x 206.0 x 41.0 mm 4.21 x 8.11 x 1.6 in
ABC601-1T24	U-Chassis Convection / Forced Air	85 - 305	24	600	25	107.0 x 178.5 x 41.0 mm 4.21 x 7.03 x 1.61 in
ABC601-1T28-S	Enclosed Front Mounted Fan	85 - 305	28	600	21.4	107.0 x 206.0 x 41.0 mm 4.21 x 8.11 x 1.6 in
ABC601-1T28	U-Chassis Convection / Forced Air	85 - 305	28	600	21.4	107.0 x 178.5 x 41.0 mm 4.21 x 7.03 x 1.61 in
ABC601-1T36-S	Enclosed Front Mounted Fan	85 - 305	36	600	16.7	107.0 x 206.0 x 41.0 mm 4.21 x 8.11 x 1.6 in
ABC601-1T36	U-Chassis Convection / Forced Air	85 - 305	36	600	16.7	107.0 x 178.5 x 41.0 mm 4.21 x 7.03 x 1.61 in
ABC601-1T48-S	Enclosed Front Mounted Fan	85 - 305	48	600	12.5	107.0 x 206.0 x 41.0 mm 4.21 x 8.11 x 1.6 in
ABC601-1T48	U-Chassis Convection / Forced Air	85 - 305	48	600	12.5	107.0 x 178.5 x 41.0 mm 4.21 x 7.03 x 1.61 in

2. INPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION		MIN	NOM	MAX	UNIT
AC Input Voltage	PS starts and operates at 85 V_{AC} at all load conditions		85	100-277	305	V_{RMS}
DC Input Voltage			170	-	300	V_{DC}
Input Frequency	440 Hz with reduced PFC and output power rating. Consult factory for details.		47	50/60	440	Hz
Input Current	RMS at 180 V_{AC}, maximum load, 50 / 60 Hz RMS at 85 V_{AC}, maximum load, 50 / 60 Hz		-	-	4.0 8.5	A
Inrush Current	Cold start, 25 °C ambient, full load	115 V_{AC} 230 V_{AC}	- -	- -	20 30	A
Fusing	High breaking, 10 A, 250 V on each AC lines.		-	-	10	A
Efficiency	At 115 V_{AC}	20% rated load 50% rated load 100% rated load	89 93 92	- - -	- - -	%
	At 230 / 277 V_{AC}	20% rated load 50% rated load 100% rated load	90 94 94	- - -	- - -	
Input Power Consumption	Power on, 115 V_{AC}, no load Power on, 230 V_{AC}, no load Stand by, 115, 230 V_{AC}, no load		- - -	- - -	5 4 0.35	W
Power Factor	From 50 to 100% of rated load, 230, 115 V_{AC}, 50 / 60 Hz input voltages.		0.90	-	-	-
THDi	From 50 to 100% rated load, 115, 230, 277 V_{AC} 50 / 60 Hz.		-	-	20	%
Harmonic Current Fluctuations and Flicker	Complies with EN 61000-3-2 at 230 V_{AC}, 50/60 Hz, Class A, D. Complies with EN 61000-3-2 Class C at 230 V_{AC}, 50/60 Hz, >150 W load. Complies with EN 61000-3-3 at nominal voltages and full load.					
Earth Leakage Current	Normal conditions 115 V_{RMS}, 60 Hz 230 V_{RMS}, 50 Hz 264 V_{RMS}, 60 Hz (worst case) 277 V_{RMS}, 60 Hz		 - - - -	 130 240 - -	 - - 400 -	µA
Touch Leakage Current	264 V_{RMS}, 60 Hz Normal Condition (NC) Single Fault Condition (SFC)		 - -	 - -	 100 500	µA
Patient Leakage Current	264 V_{RMS}, 60 Hz Normal Condition (NC) Single Fault Condition (SFC)		 - -	 - -	 100 500	µA

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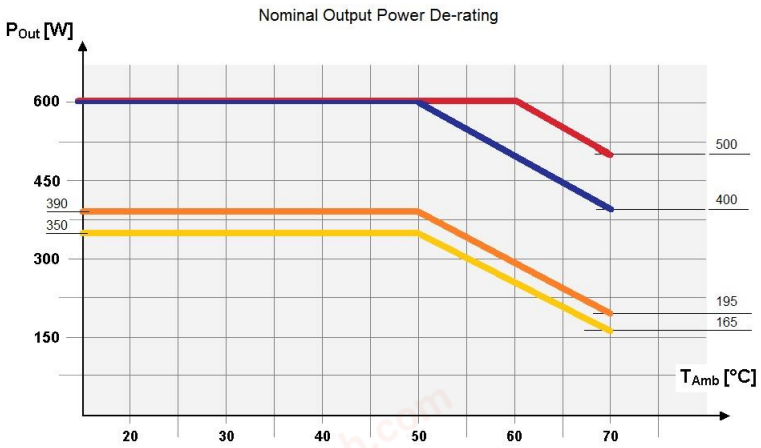
3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
V1 Output Voltages	±0.5% set point accuracy RS+ closed on +V1, RS- closed on V1 RTN, at 20% load.	-	24 28 36 48	-	V
V1 Output Power Rating	Convection cooling (Refer to the de-rating curves below) Forced air cooling Refer to the de-rating curves below) Peak (less than 10 s, after P_OK high)			400 600 800	W
V1 Output Current	V1: 24 V_{DC} V1: 28 V_{DC} V1: 36 V_{DC} V1: 48 V_{DC}			25.0 21.4 16.7 12.5	A
V1 Voltage Adjustment Range	Manually by potentiometer	-	-	±5	%V1
V1 Line Regulation	V_{AC}: 85 – 305 V_{RMS}	-	-	±0.1	%V1
V1 Load-Line-Cross Regulation	V_{AC}: 85 – 305 V_{RMS}; I1: 0 – 100%	-	-	±2	%V1
V1 Ripple and Noise	Rated load, Peak-to-peak, 20 MHz BW. (100 nF ceramic, 10 µF tantalum at load) *	-	-	1	%V1
Transient Response: V1, 5V_{SB} Voltage Deviation	25% load changes at 1 A/µs 24 V at 1000 µF load / I_{OUT}> 2.5 A 28 V at 1000 µF load / I_{OUT}> 2.5 A 36 V at 680 µF load / I_{OUT}> 1.9 A 48 V at 560 µF load / I_{OUT}> 1.25 A 5 V_{SB} at 560 µF load / I_{OUT}> 0.1 A	-	-	±5	%V1 %V_{SB}
V1 Start-up Rise Time	85<V_{IN}<305, any load conditions.	10	-	100	ms
V1 Hold-up Time	At nominal V_{IN}, full load **	16	-	-	ms
V1 Current Sharing Accuracy	Two units in parallel at I1 rated load. VS-Logic and I-Share signals connected together. RS^+, RS^- signals connected together and to the load	45.5	-	54.5	%I1
Start-up Delay	V1 in regulation after de-asserting PS_Inhibit V1 in regulation after AC is applied (worst case: 85 V_{AC}) 5 V_{SB} in regulation after AC is applied (worst case: 85 V_{AC})	- - -	- - -	450 2050 1500	ms
Turn-on Overshoot		- -	- -	10 10	%V1 %V_{SB}
Minimum Load	V1, V2, 5V_{SB}	0	-	-	A
Maximum Load Capacitance	V1: 24 V_{DC} V1: 28 V_{DC} V1: 36 V_{DC} V1: 48 V_{DC}	- - - -	- - - -	16000 15000 12000 8000	µF
V2 Output Voltage	V1 at nominal voltage	10.5	12.25	14.00	V
V2 Output Current	Convection / forced air cooling	-	-	1	A
5 V_{SB} Output Voltage	±3% set point accuracy, 20% load.	-	5	-	V
5 V_{SB} Output Current	Front Mounted Fan models (-S) U-Chassis models	- -	- -	1.5 1.2	A
5 V_{SB} Load, line cross Regulation	V_{AC}: 85 – 305 V_{RMS}; I_{SB}: 0 – 100%	-	-	±5	%V_{SB}

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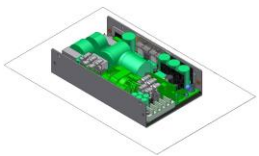
3.1 OUTPUT POWER DE-RATING CURVES



Natural Convection
U-Chassis Models
Vertical Mounting
180 – 305 V_{AC}



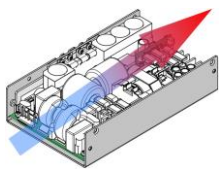
Natural Convection
U-Chassis Models
Horizontal Mounting
180 – 305 V_{AC}

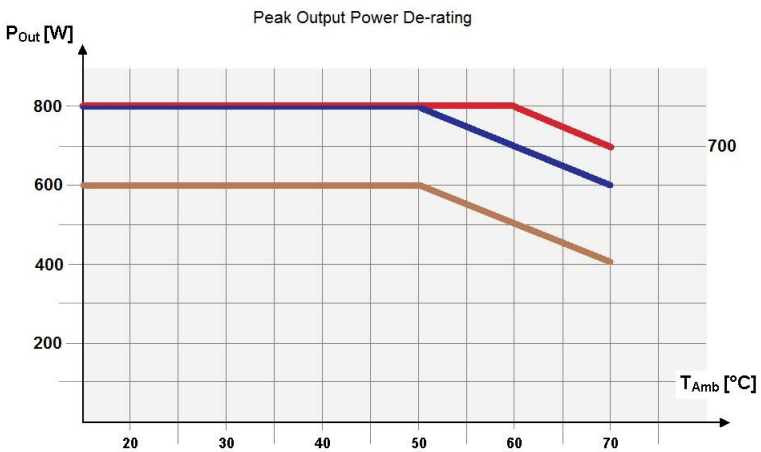


Forced Air Cooling
U-Chassis Models

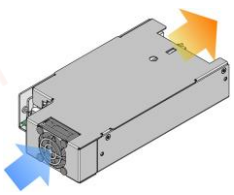
>500 LFM
At 180 – 305 V_{AC}

>600 LFM
At 85 – 180 V_{AC}

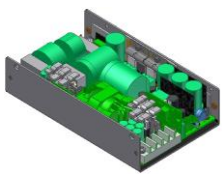




Enclosed Front Mounted
Fan Models
85 – 305 V_{AC}



Natural Convection
Any Orientation
85 – 305 V_{AC}



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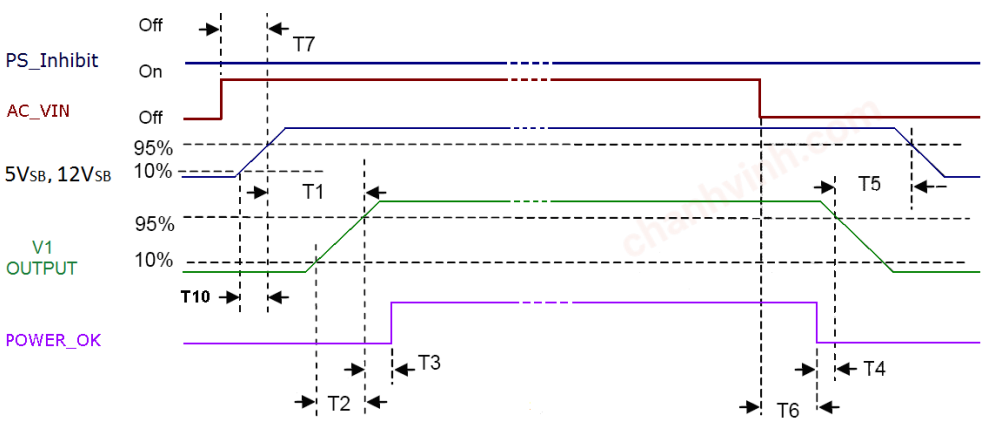
4. SIGNALS, CONTROLS & TIMING SPECIFICATIONS

Base signals and controls are accessible from signal connector P204.

SIGNAL	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
+PS_Inhibit	Active high. Input low voltage	0	-	1.5	V
	Input high voltage (I_{IN} = 300 µA)	3.5	-	5.5	V
	V1 and V2 disabled when PS_Inhibit is pulled high				
	$5V_{SB}$ not affected by PS_Inhibit				
	V1 and V2 enabled when PS_Inhibit is open or low				
-PS_Inhibit	Active low (reverse control, same voltage levels)				
P_OK *	Logic level low (<10 mA sinking)	-	-	0.7	V
	Logic level high (100 µA sourcing)	2.4	-	5.5	V
	Low to high time after V1 in regulation	40	-	350	ms
	Power down warning time	1	-	-	ms
$5V_{SB}$ Output	Active and in regulation after a 85 < V_{AC} < 305 is applied	-	-	1500	ms
	$5V_{SB}$ not affected by PS_Inhibit				

* When V1 is On, a P_OK low may indicates V1 under voltage condition. When two ABC601 operate in parallel, P_OK low in one unit indicates that it is not sharing the expected amount of current (current sharing fault). A 10 kΩ internal pull up to $5V_{SB}$ is used; do not add any other external pull up.

AC/DC INPUT OFF-TO-ON AND ON-TO-OFF TIMINGS

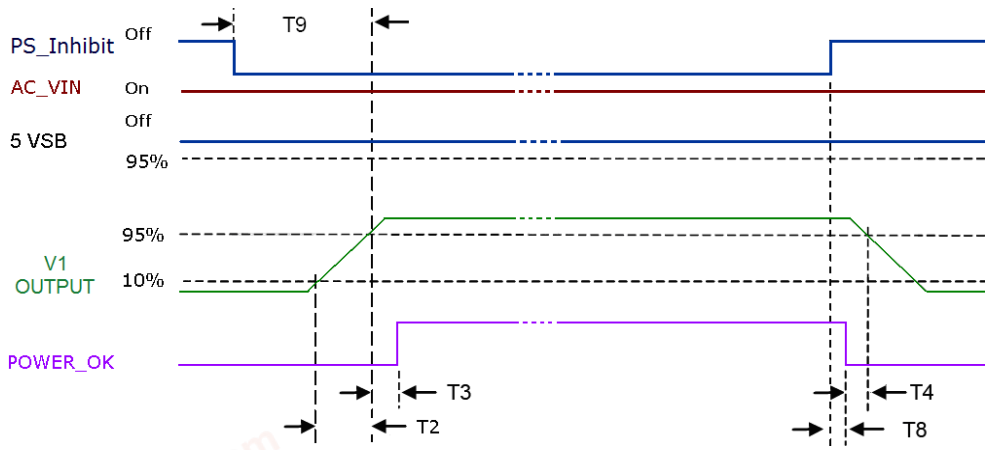


$5V_{SB}$ On – V1 On	250 ms ≤ T1 ≤ 550 ms
V1 rise time	10 ms ≤ T2 ≤ 100 ms
$5V_{SB}$ rise time	3 ms ≤ T10 ≤ 40 ms
V1 On – POWER_OK delay	200 ms ≤ T3 ≤ 350 ms
Power down warning	T4 ≥ 1 ms
V1 Off – $5V_{SB}$ Off	T5 ≥ 0.5 s (V1 load > 25 W)
AC Off – POWER_OK low	T6 ≥ 15 ms
AC_On – $5V_{SB}$ turn on time	T7 ≤ 1.5 s

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PS_INHIBIT OFF-TO-ON AND ON-TO-OFF TIMINGS



V1 rise time	10 ms ≤ T2 ≤ 100 ms
V1 On – POWER_OK delay	200 ms ≤ T3 ≤ 350 ms
Power down warning	T4 ≥ 1 ms
PS_Inhibit – POWER_OK low timing	T8 ≤ 2 ms
PS_Inhibit – V1 On delay	T9 ≤ 450 ms

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5. PROTECTION SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Input Under Voltage	Auto-recovering, hiccup mode.	58	65	75	V_{AC}
Input Fuse	High breaking, 10 A, 250 V on L and L1.	-	-	10	A
Over Current	At nominal input voltages V1: Hiccup mode, auto-recovering (>10 s) V1: Hiccup mode, auto-recovering (<10 s) V2: PTC limiting, auto-recovering. $5V_{SB}$: Hiccup mode, auto-recovering: U-Chassis models Front Mounted Fan models (-S)	 108 135 - 1.3 1.6	 - - - - -	 132 163 - 3.6 3.6	 $\%I1_{Rated}$ $\%I1_{Rated}$ A A
Short Circuit	At nominal input voltages V1: Hiccup mode, auto-recovering. V2: PTC limiting, auto-recovering. $5V_{SB}$: Hiccup mode, auto-recovering.	-	-	-	
Over Voltage	V1, Power shut down, latch off. $5V_{SB}$, Hiccup mode, auto-recovering.	120 -	- -	145 150	$\%V_{NOM}$
Over Temperature (on primary stage)	Shut down, latch off.	-	-	-	°C
Over Temperature (on secondary side)	Hiccup mode, auto-recovering.	-	-	-	°C
Isolation: Input-to-Output	Reinforced (2x MoPP). Production tested at 4242 V_{DC}	5660 4000	- -	- -	V_{DC} V_{AC}
Isolation: Input-to-Earth	Basic (1x MoPP) Production tested at 2121 V_{DC}	2121 1500	- -	- -	V_{DC} V_{AC}
Isolation: V1/$5V_{SB}$ to V2	Basic	100	-	-	V_{AC}
Isolation: Output-to-Earth	Basic (1x MoPP)	1500	-	-	V_{AC}
Means of Protection: Primary to secondary	2x MoPP (IEC 60601-1 3rd edition) at 100 – 250 V_{AC}, 50/60 Hz up to 4000 m 2x MoPP (IEC 60601-1 3rd edition) at 100 – 277 V_{AC}, 50/60 Hz up to 3000 m 2x MoOP (IEC 60601-1 3rd edition) at 100 – 277 V_{AC}, 440 Hz (50/60 Hz)				
Means of Protection: Primary to Protection Earth	1x MoPP (IEC 60601-1 3rd edition) at 100 – 250 V_{AC}, 50/60 Hz up to 4000 m 1x MoPP (IEC 60601-1 3rd edition) at 100 – 277 V_{AC}, 50/60 Hz up to 3000 m 1x MoOP (IEC 60601-1 3rd edition) at 100 – 277 V_{AC}, 440 Hz (50/60 Hz)				
Means of Protection: Secondary to Protection Earth	1x MoPP (IEC 60601-1 3rd edition) at 100 – 250 V_{AC}, 50/60 Hz up to 4000 m 1x MoPP (IEC 60601-1 3rd edition) at 100 – 277 V_{AC}, 50/60 Hz up to 3000 m (U-chassis variant only) 1x MoOP (IEC 60601-1 3rd edition) at 100 – 277 V_{AC}, 440 Hz (U-chassis variant only)				
Equipment Protection Class	Class I, compatible with BF (Body Floating) ME				

6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Operating Temperature Range	No de-rating up to 50°C	-20	-	50	°C
Operating Temperature Range with Derating	See derating curves & conditions in the Output Specifications section	-	-	70	°C
Storage Temperature Transportation Temperature	As per IEC/EN 60721-3-1 Class 1K4 As per IEC/EN 60721-3-2 Class 2K4	-40	-	85	°C
Humidity	RH, Non-condensing Operating. Non-operating	-	-	90 95	% %
Operating Altitude	MoPP (100 – 250 V_{AC}, 50/60 Hz) MoPP (100 – 277 V_{AC}, 50/60 Hz) MoOP, ITE grade Power de-rating above 1800 m	- - -	- - -	4000 3000 5000	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, 40 °C ambient 80% Duty cycle, Telcordia SR-332 Issue 2	300000	-	-	Hours
Useful Life	Nominal V_{IN}, 80% load, 40 °C ambient (IPC9592)	-	4	-	Years

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7. ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

PARAMETER	DESCRIPTION / CONDITION	STANDARD	PERFORMANCE CLASS
Conducted	115, 230, 277 V_{RMS}, Maximum load	EN 55032 (ITE) EN 55011 (ISM) EN 60601-1-2 (Medical) FCC Part 15	B
Radiated	At 10 m distance	EN 55032 (ITE) EN 55011 (ISM) EN 60601-1-2 (Medical) FCC Part 15	B *
Line Voltage Fluctuation & Flicker	At 20%, 50% and 100% maximum load. Nominal input voltages	EN 61000-3-3	
Harmonic Current Emission	230 V_{AC} input voltage, 50 / 60 Hz 230 V_{AC} 50 / 60 Hz, >150 W load	EN 61000-3-2 EN 61000-3-2	A, D C

* Performance referred to the enclosed package. Radiated emission relevant to the U-Chassis package, should be assessed at system level.

8. ELECTROMAGNETIC COMPATIBILITY (EMC) – IMMUNITY

PARAMETER	DESCRIPTION / CONDITION		STANDARD	TEST LEVEL	CRITERIA
	Reference standard for the medical version Reference standards for ITE Reference standard for Industrial/IMS equipment		EN 60601-1-2, 4th edition EN 55024 EN 61000-6-2		
ESD	15 kV air discharge, 8 kV contact, at any point of the system.		EN 61000-4-2	4	A
Radiated Field	10 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 kKHz modulation		EN 61000-4-3	3	A
Electric Fast Transient	±2 kV on AC power port for 1 minute		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	10 V_{RMS}, 0.15-80 MHz, 1 kHz, 80% AM		EN 61000-4-6	3	A
Dips and Interruptions	200 – 277 V_{AC}:	Drop-out to 0% for 10 ms	EN61000-4-11		A
		Dip to 40% for 5 cycles (100 ms)	EN61000-4-11		A
		Dip to 70% for 25 cycles (500 ms)	EN61000-4-11		A
		Drop-out to 0% for 5 s	EN61000-4-11		B
	100 – 127 V_{AC}:	Drop-out to 0% for 10 ms	EN 61000-4-11		A
		Dip to 40% for 5 cycles (100 ms)	EN 61000-4-11		A (derate to 150 W)
		Dip to 70% for 25 cycles (500 ms)	EN 61000-4-11		A (derate to 400 W)
		Drop-out to 0% for 5 s	EN 61000-4-11		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 Information Technology Equipment
	CSA C22.2 No.60601-1, ANSI/AAMI ES60601-1 3rd edition + A1 Including Risk Management Assessment	Medical
	UL8750, CSA C22.2 No 250.13	Lighting
IEC IECEE CB Certification	IEC/EN 62368-1	Audio Video and Information Technology Equipment.
	IEC/EN 60601-1 3rd edition+A1 Including Risk Management Assessment	Medical
CE	Directive 2014/35/EU: Electrical Safety: Low Voltage electrical equipment (LVD)	Audio Video and Information Technology Equipment
	Directive 93/42/CEE: Safety Requirement of the Medical Device	Medical
	Directive 2014/30/EU: Electromagnetic Compatibility (EMC)	
	Directive EU 2015/863: RoHS 3	
	Designed to meet IEC/EN/UL/CSA 61010-1 2nd edition	

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10. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION
Weight	820 g (1.8 lb) 1055 g (2.32 lb)
Overall Dimensions	107.0 x 178.5 x 41.0 mm (4.21 x 7.03 x 1.61 in) 107.0 x 206.0 x 41.0 mm (4.21 x 8.11 x 1.61 in)

10.1 OUTLINE DRAWING & CONNECTIONS – U-CHASSIS MODELS

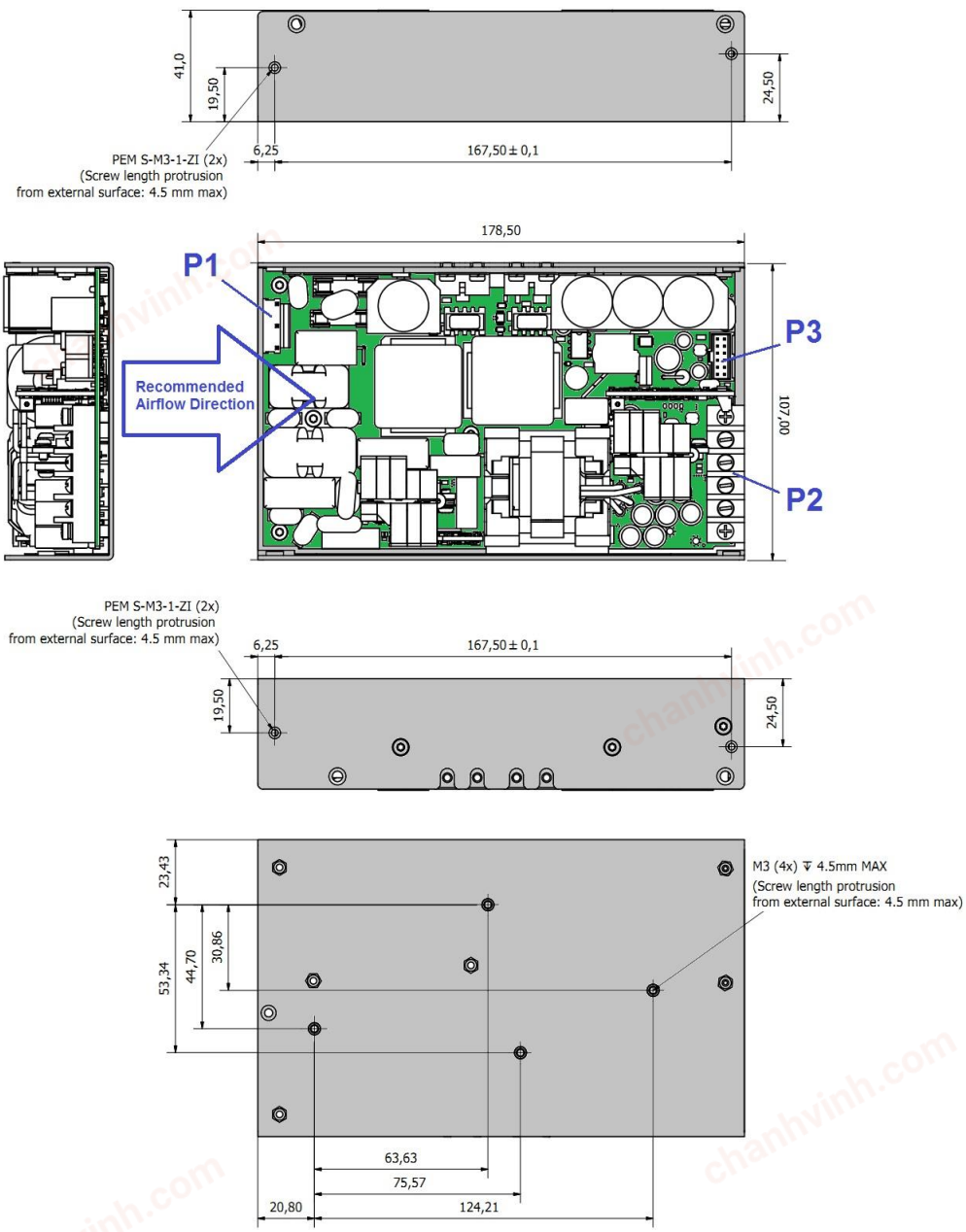


Figure 1. Mechanical drawing - U-Chassis Model

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10.2 OUTLINE DRAWING & CONNECTIONS – FRONT MOUNTED FAN MODELS (-S)

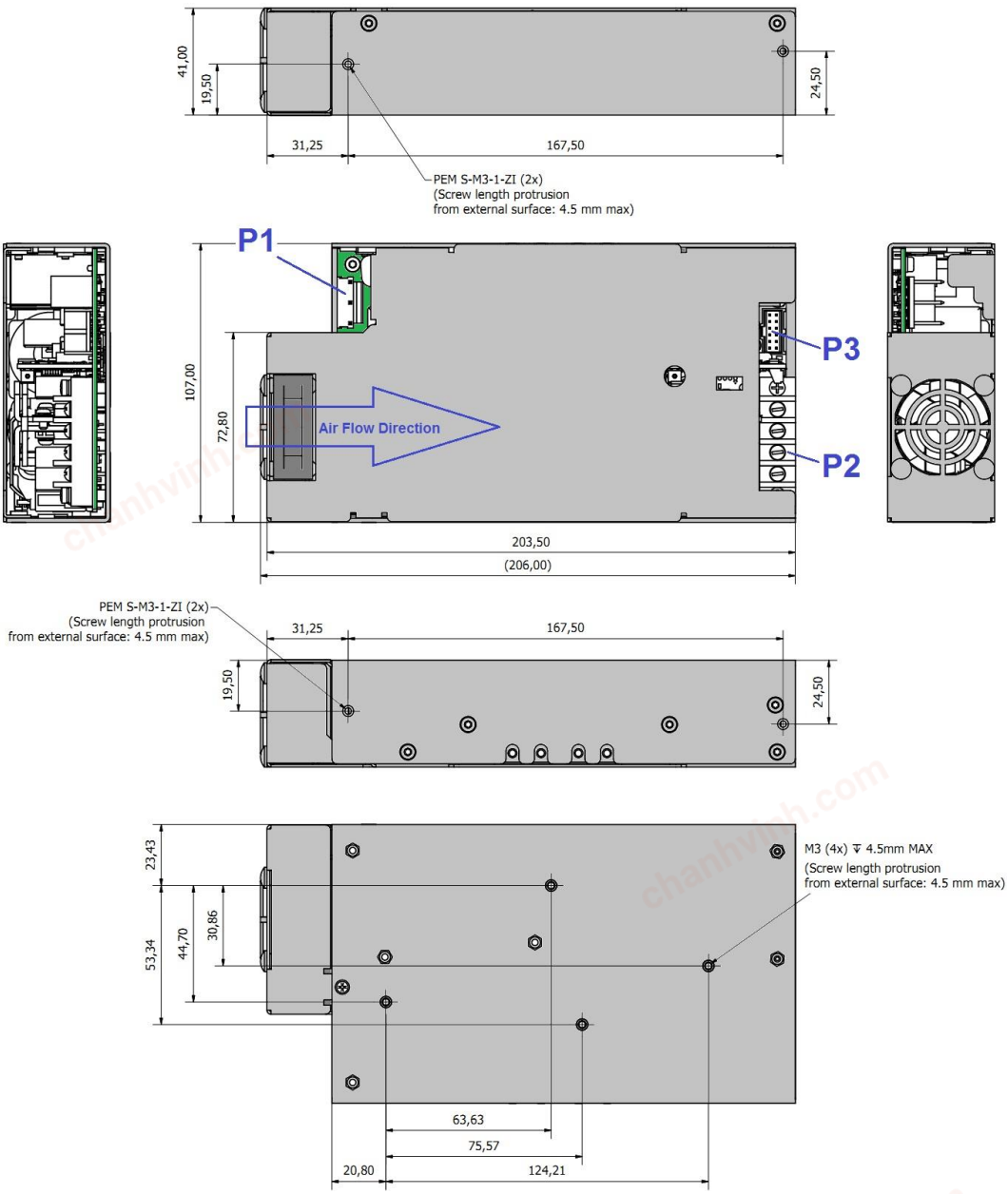


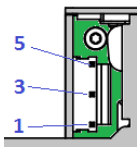
Figure 2. Mechanical drawing – Front Mounted Fan Models (-S)

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11. CONNECTIONS AND PIN DESCRIPTION

AC INPUT CONNECTOR – P1

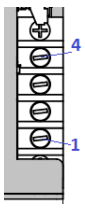
Molex 26-62-4051
Mates with
Molex 09-93-0500 (housing)
Molex 08-52-0071 (terminal phosphor bronze, tin finishing)
Use 18 AWG minimum wires



PIN REF.	FUNCTION
1	L1
3	L
5	PE

DC OUTPUT CONNECTOR – P2

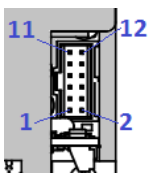
KARSON 520-041-2-1-00
Or equivalent



PIN REF.	FUNCTION
1 – 2	+V1
3 – 4	V1 RTN

SIGNAL CONNECTOR – P3

Molex 90130-1112
Mates with
Molex 90142-0012 (housing)
Molex 90119-0109 (terminal)
Use 22-24 AWG wires



PIN REF.	FUNCTION
1	RTN
2	-V2
3	$+5V_{SB}$
4	+V2
5	RS^-
6	RS^+
7	+PS_Inhibit
8	I-Share
9	P_OK
10	VS_Logic
11	-PS_Inhibit
12	RTN

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.
TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

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