



PHI-CON

120 W AC-DC Power Supply PACO120A-Series

- 85 ... 264 V_{AC} / 120 ... 370 V_{DC} universal input
- Continuous short circuit-, over current-, over voltage- & over temperature protection
- 4 kV_{AC} input/output isolation
- EN 60601-1, ES 60601-1, Safety class II
- MTBF > 300000 h
- Active PFC
- Small outlines 2" x 3" x 1"
- Base PCB with conformal coating



Model guide

Type	Output voltage		Output Current [A]	Output power		Efficiency@ full load & Vin 230 V _{AC} [%] typ.	Capacitive load [μF] max.
	[V _{DC}] nom.	Adjust-range [V _{DC}]		Nominal [W]	Peak ≤10 s [W] see note 3		
PACO120A12S	12	11.4...12.6	9.5	114	141.6	94	6000
PACO120A15S	15	14.3...15.8	7.6	114	142.5	94	5000
PACO120A24S	24	22.8...25.2	5	120	150.0	95	3200
PACO120A27S	27	25.6...28.4	4.44	119.9	149.8	95	2400
PACO120A36S	36	35.3...37.8	3.33	120	149.8	94	2000
PACO120A48S	48	45.6...50.4	2.5	120	150.0	94.5	1600
PACO120A54S	54	51.3...55.5	2.22	120	149.6	94	1000

Specifications

Input		
Voltage range		85 .. 264 V _{AC} or 120 .. 370 V _{DC} Power derating see diagram
Frequency		47 .. 63 Hz
Full load input current		≤ 2 A @ 115 V _{AC} ≤ 1 A @ 230 V _{AC}
Inrush current		40 A typ. @ 115 V _{AC} 75 A typ. @ 230 V _{AC}
Standby power @ 230 V _{AC}		≤ 0.5 W
Power factor correction	115 V _{AC}	0.98 @ full load
	230 V _{AC}	0.94 @ full load
Hot plug		Not possible
Isolation		
Isolation voltage	Input to output	4000 V _{AC} (1 Minute, < 10 mA)
	Input to PE	1500 V _{AC} (1 Minute, < 10 mA)
	Output to PE	
Isolation resistance	Input to output	100 MΩ
	Input to PE	@ 500 V _{DC} , Ta 25±5 °C, RH 95 %, not condensation
	Output to PE	
Leakage current		≤ 0.1 mA @ 240 V _{AC} , 60 Hz, ≤ 0.5 mA at failure mode
Isolation level	Input to output	2xMOPP
	Input to PE	1xMOPP
	Output to PE	1xMOPP
Output		
Voltage tolerance	PACO120A12S,-15S	± 2 %, typ.
	All others	± 1 %, typ.
Line regulation		± 0.5 %, typ.
Load regulation @ 0 to 100 % load change		± 1 %, typ.
Minimum load		Not required
Ripple & noise (BW 20 MHz) @ Load 15..100 %, (see Figure 1) (Double level at load ≤ 15 %)	Vout: 12V, 15V	≤ 120 mVp-p
	Vout: 24V, 27V	≤ 150 mVp-p
	All others	≤ 200 mVp-p
Hold up time @ Vin 230 V _{AC}		15 ms, typ.
Start up delay time @ Vin 230 V _{AC} and full load		50 ms, typ.
Temperature coefficient		0.03 % / °C
Protection		
Short circuit, continuous		Auto recovery time <3s after the short circuit disappear
Over current, hiccup, auto restart		≥ 130 % of rated current
Over-temperature		Output voltage turn off, re-power on to recovery after abnormal removed

Over voltage protection (Output voltage turn off, re-power on for recover)	Vout: 12V	≤ 16 V	
	Vout: 15V	≤ 25 V	
	Vout: 24V	≤ 32 V	
	Vout: 27V	≤ 35 V	
	Vout: 36V	≤ 50 V	
	Vout: 48V	≤ 60 V	
Safety standards	EN-, IEC-, UL 62368-1, EN 60335-1, EN 61558-1 EN-, ES 60601-1		
Safety Class I	PE Must be connected		
Safety Class II	PE Must be not connected		
EMC			
CE	EN 55032, CISPR 32	Class B (category I, with PE)	
RE	EN 55032, CISPR 32	Class A (category II, without PE)	
RE	EN 55032, CISPR 32	Class B	
Harmonic current	EN-, IEC 61000-3-2	Class A & Class D	
Voltage flicker	EN-, IEC 61000-3-3		
ESD	EN-, IEC 61000-4-2	Contact ±8 kV Air ±15 kV	Perf. Crit. A Perf. Crit. A
RS	EN-, IEC 61000-4-3	10 V/m	Perf. Crit. A
EFT	EN-, IEC 61000-4-4	±2 kV	Perf. Crit. A
Surge	EN-, IEC 61000-4-5	±2 kV, ±4kV	Perf. Crit. A
CS	EN-, IEC 61000-4-6	10 Vrms	Perf. Crit. A
Voltage dips, short interruptions and voltage variations immunity		EN-, IEC 61000-4-11	0 %...70 % Perf. Crit. B
General			
Reliability MTBF MIL-HDBK-217 @ 25 °C		> 300000 h	
Environmental			
Operating ambient temperature		-40 ... 85 °C	
Storage temperature		-40 ... 85 °C	
Power derating		see diagram	
Storage humidity		10..95 %	
Operating humidity		20..90 %	
Altitude operating & storage		5000 m	
Cooling (see derating diagram)		Free air convection, Forced cooling 10 CFM	
Physical			
Dimensions		50.8 x 76.2 x 31mm	
Weight		125 g	
Case material		Non (Open frame)	
Soldering temperature & Time		Wave: ≤ 265 °C duration, ≤ 10 s Manual: ≤ 370 °C duration, ≤ 5 s	

Note:

1. All specifications were measured at Ta 25 °C, humidity < 75 %, nominal input voltage (230 V_{AC}) and rated output load unless otherwise specified.
2. All EMC parameters were tested on a metal plate with a thickness of 1 mm and a length of 360 mm × 360 mm. The power supply must be combined with the connection devices to confirm electromagnetic compatibility.
3. The peak output power interval time must be greater than 30 minutes
4. See also notes on page 4.

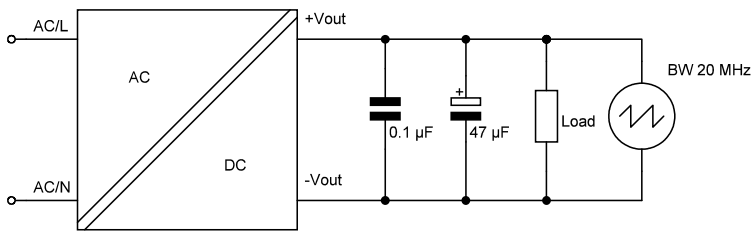


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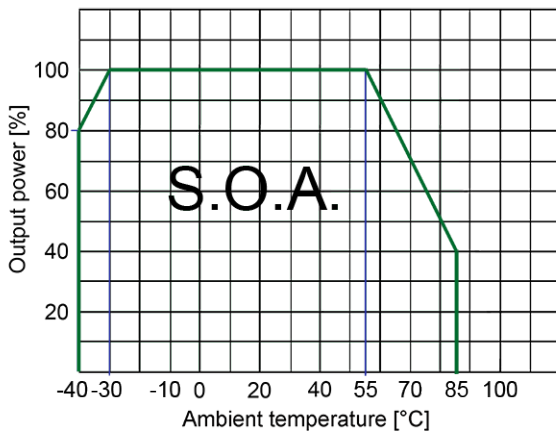
120 W AC-DC Power Supply PACO120A-Series

Part number information									
PHI-CON	AC/DC-Converter open Frame	Output Power		Series	Output voltage		Rev.	Output	
P	ACO	120	120 W	A	12	12 V	-	S	single
					15	15 V			
					24	24 V			
					27	27 V			
					36	36 V			
					48	48 V			
					54	54 V			
Example:	PACO120A12S	PHI-CON AC/DC Converter, open frame, Pout: 120 W, Vout: 12 V, single output							

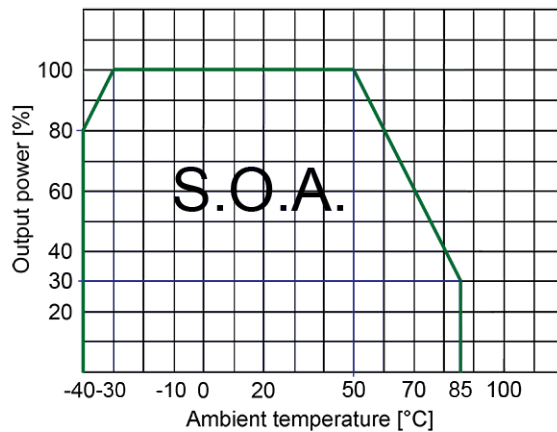
Figure 1 Output ripple and noise measure circuit



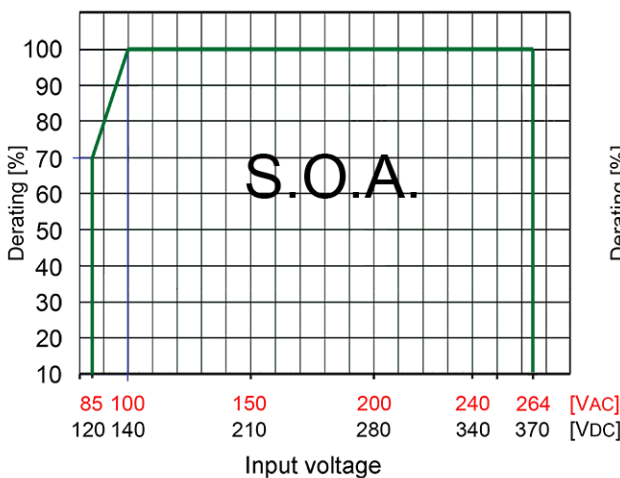
Temperature vs output current derating diagram
all PACO120AxxS at airflow 10 CFM



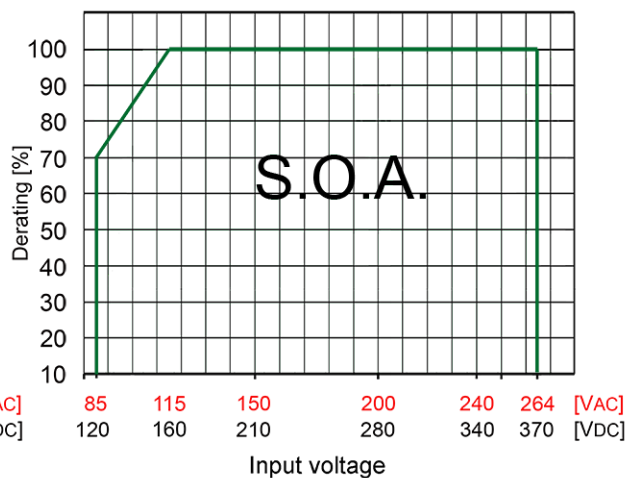
PACO120A Temperature vs output current
derating diagram at free air convection



Derating vs input voltage at 10 CFM



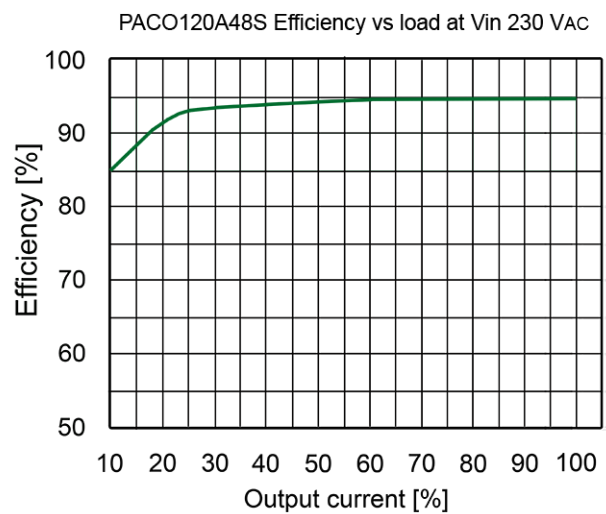
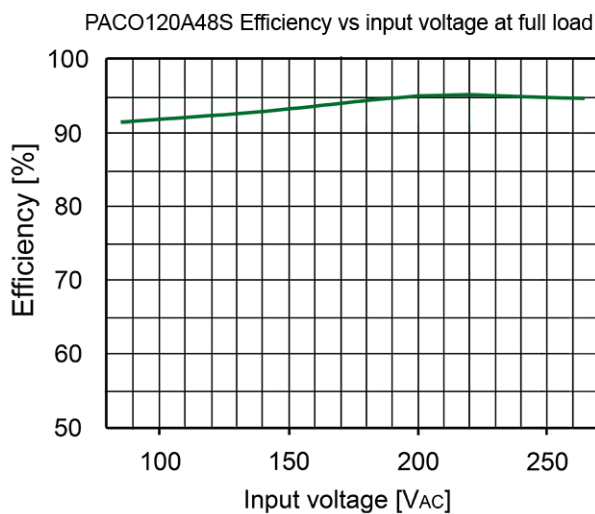
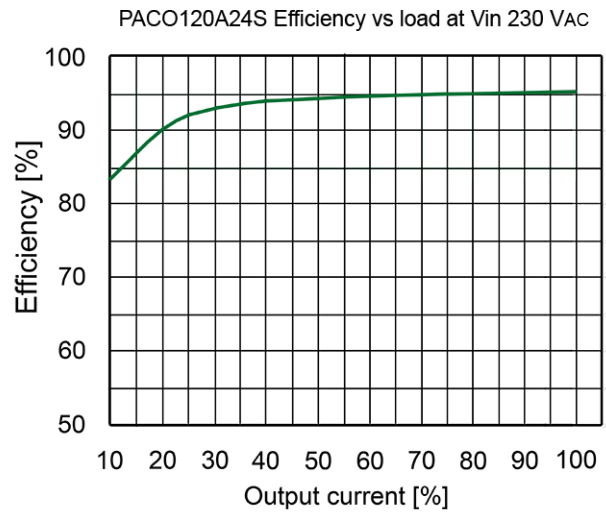
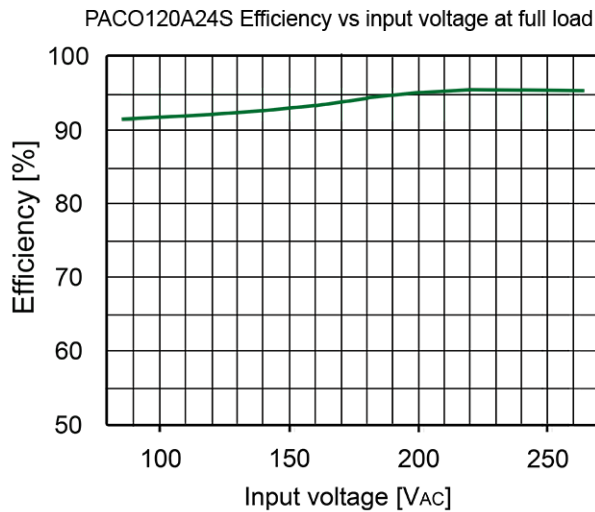
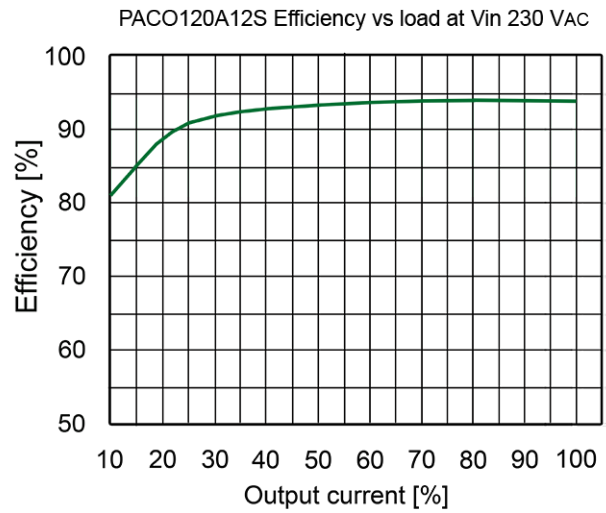
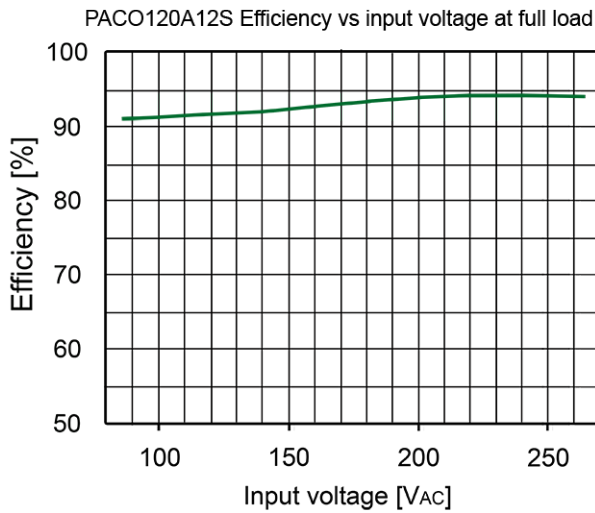
Derating vs input voltage at free air convection





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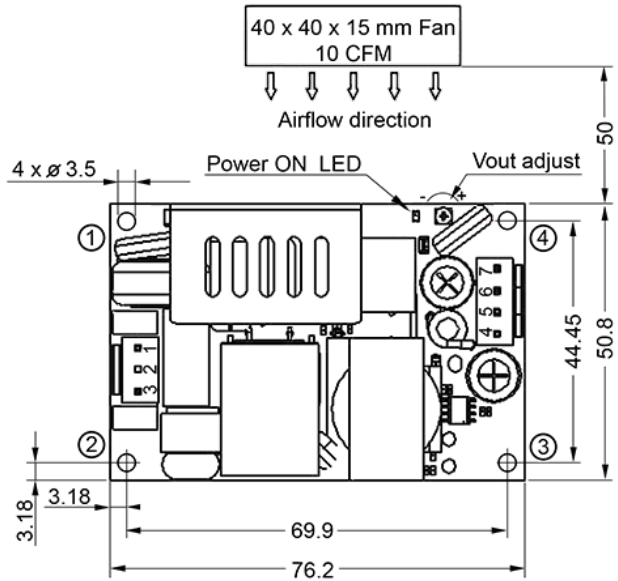




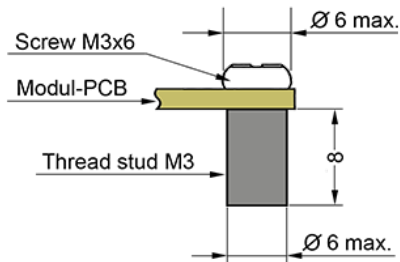
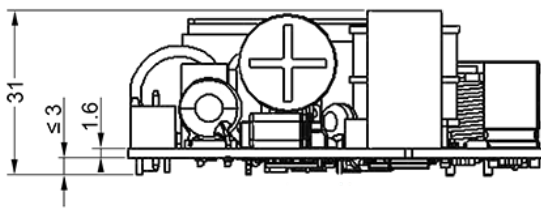
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Mechanical dimensions



Unit in mm
General tolerances ± 1 mm



Connector pin assignment			
Pin	Function	Modul connector	User connector
1	AC In/N (-Vin)	B3P-VH	Housing: VHR-3M Terminals: SVH-21T-P1.1
2	Not connected		
3	AC In/L (+Vin)		
4, 5	- Vout	B4P-VH	Housing: VHR-4N or VHR-4M Terminals: SVH-21T-P1.1
6, 7	+ Vout		
All connectors JST (Japan Solderless Terminals) or equivalent			

Note:

1. The layout of the device is for reference only, please refer to the actual product.
2. The recommended safety distance between the edge of the PCB and the user components should be ≥ 10 mm.
3. For safety class I systems, the metal bolts at hole positions 1 and 4 must be connected to PE (protective earth).
4. For safety class II systems, the conductor surfaces at hole positions 1 and 4 must be connected together.

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