



PHI-CON

350 W AC-DC Power Supply PACO350A-Series

- 90 ... 264 V_{AC} / 127 ... 370 V_{DC} universal input
- Continuously short circuit-, over current-, over voltage- & over temperature protection
- 4 kV_{AC} Input / output isolation
- EN 62638-1, EN 60335-1, EN 61558-1 Safety class I & II
- MTBF > 300000 h
- Active PFC
- Small outlines 5" x 3" x 1"
- Basic PCB with conformal coating



Model guide

Type	Output voltage		Output Current		Efficiency@ full load & Vin 230 V _{AC} [%] typ.	Capacitive load [µF] max.
	[V _{DC}] nom.	Adjust-range [V _{DC}]	Free air convection cooling [A]	Forced cooling [A] @ 20.5 CFM		
PACO350A12S	12	11.4..12.6	15	25	92	6000
PACO350A15S	15	14.25..15.75	12	21.67	92	5000
PACO350A24S	24	22.8..25.2	8.33	14.6	93	3200
PACO350A27S	27	25.65..28.35	7.4	13	93	2600
PACO350A48S	48	45.6..50.4	4.17	7.3	94	2000

Specifications

Input		Output	
Voltage range		90 .. 264 V _{AC} or 127 .. 370 V _{DC} Power derating see diagram	
Frequency		47 .. 63 Hz	
Full load input current		≤ 4 A @ 115 V _{AC} ≤ 2 A @ 230 V _{AC}	
Inrush current @ cold start		50 A typ. @ 115 V _{AC} 75 A typ. @ 230 V _{AC}	
Standby power @ 230 V _{AC}		≤ 1 W	
Power factor correction	115 V _{AC}	0.98 @ full load	
	230 V _{AC}	0.95 @ full load	
Hot plug		Not possible	
Isolation			
Isolation voltage	Input to output	4000 V _{AC} (1 Minute, < 10 mA)	
	Input to PE	2000 V _{AC} (1 Minute, < 10 mA)	
	Output to PE	1500 V _{AC} (1 Minute, < 10 mA)	
Isolation resistance	Input to output	100 MΩ	
	Input to PE	@ 500 V _{DC} , Ta 25 ± 5 °C, RH 95 %, non-condensing	
	Output to PE		
Leakage current		≤ 0.1 mA @ 240 V _{AC} , 60 Hz, ≤ 0.5 mA single fault	
Isolation level	Input to output	2xMOPP	
	Input to PE	1xMOPP	
	Output to PE	1xMOPP	
Output			
Voltage tolerance	Vo: 12 V & 15 V	± 2 %, typ.	
	Vo: 24 V, 27 V & 48 V	± 3 %, typ.	
Minimum load		Not required	
Line regulation		± 0.5 %, typ.	
Load regulation @ 0 to 100 % load change		± 1 %, typ.	
Ripple & noise (BW 20 MHz) @ Load 15..100 %	Vo: 12 V, 15 V	≤ 120 mVp-p	
	Vo: 24 V	≤ 150 mVp-p	
	Vo: 27 V	≤ 200 mVp-p	
	Vo: 48 V	≤ 250 mVp-p	
Hold up time @ Vin 230 V _{AC} , 25 °C	Without fan	12 ms, typ.	
	With fan	6 ms, typ.	
Temperature coefficient		0.03 % / °C	
Fan supply voltage output	PACO350A27S	12 V, - 25 % .. +15 %, 0.5 A	
	All others	12 V, ± 15%, 0.5 A	
Protection			
Short circuit		Continuous, auto recovery time < 5s after the short circuit disappear	
Over current		110 % of rated current	

Over voltage protection (Output voltage turn off, re-power on for recover)	Vout: 12V	≤ 15 V
	Vout: 15V	≤ 18.5 V
	Vout: 24V	≤ 30 V
	Vout: 27V	≤ 33.55 V
Vout: 48V	≤ 59.5 V	
Over temperature protection	Output shutdown, repower on for recover after the temperature drops	
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
Flickers	EN-, IEC 61000-3-3	
ESD	EN-, IEC 61000-4-2	Contact ±8 kV Perf. Crit. A Air ±15 kV Perf. Crit. A
RS	EN-, IEC 61000-4-3	10 V/m Perf. Crit. A
EFT	EN-, IEC 61000-4-4	±4 kV Perf. Crit. A
Surge	EN-, IEC 61000-4-5	Line to line ±2 kV, Perf. Crit. A
		Line to GND ±4 kV 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 ... 70 °C	
Storage temperature	-40 ... 85 °C	
Power derating	see diagrams	
Storage humidity	10..95 %	
Operating humidity	20..90 %	
Altitude operating & storage	5000 m	
Cooling (see derating diagram)	Free air convection, Forced cooling 20.5 CFM	
Physical		
Dimensions	127 x 76.2 x 25.4 mm	
Weight	295 g	
Case material	Non (Open frame)	

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 x 360 mm. The power supply must be combined with the connection devices to confirm electromagnetic compatibility.
3. See also notes on page 4.

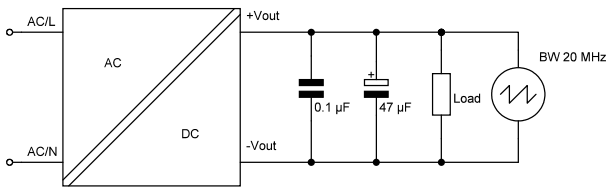


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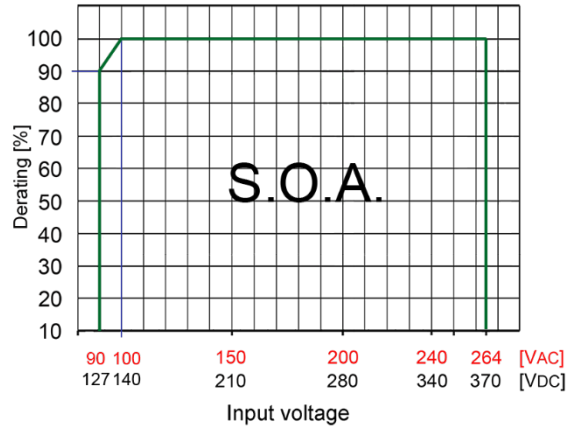
350 W AC-DC Power Supply PACO350A-Series

Part number information										
PHI-CON	AC/DC-Converter open Frame	Output Power		Series	Output voltage		Rev.	Output		Option
P	ACO	350	350 W	A	12	12 V	-	S	single	blanc
					15	15 V				C
					24	24 V				
					27	27 V				
					48	48 V				
Example:		PACO350A12S PHI-CON AC/DC Converter, open frame, Pout: 350 W, Vout: 12 V, single output,								

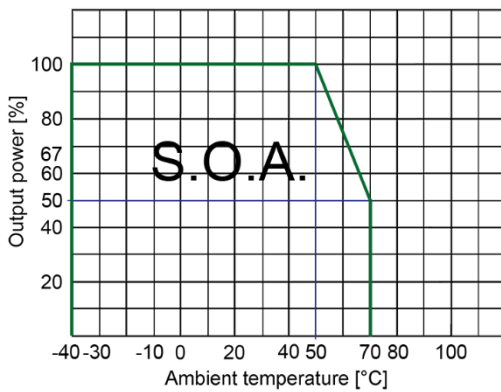
Figure 1 Output ripple and noise measure circuit



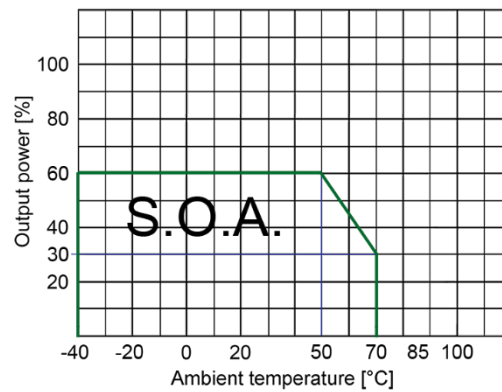
Derating vs input voltage



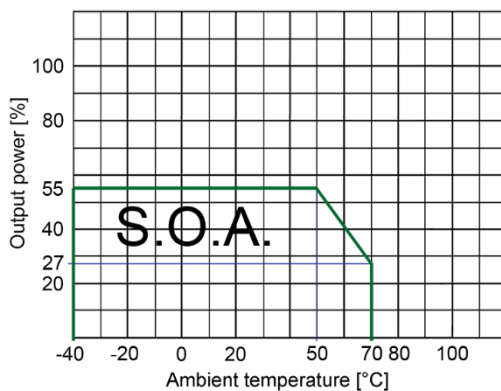
Temperature vs output current derating diagram all PACO350AxxS at airflow 20.5 CFM



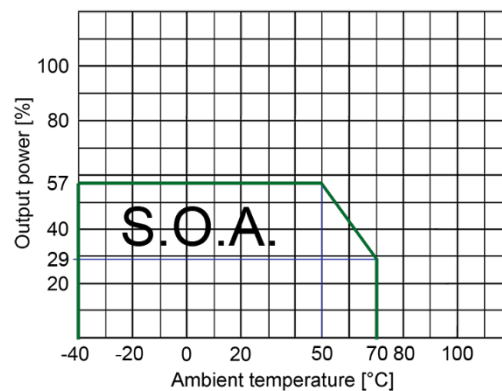
PACO350A12S Temperature vs output current derating diagram at free air convection



PACO350A15S temperature vs output current derating diagram at free air convection



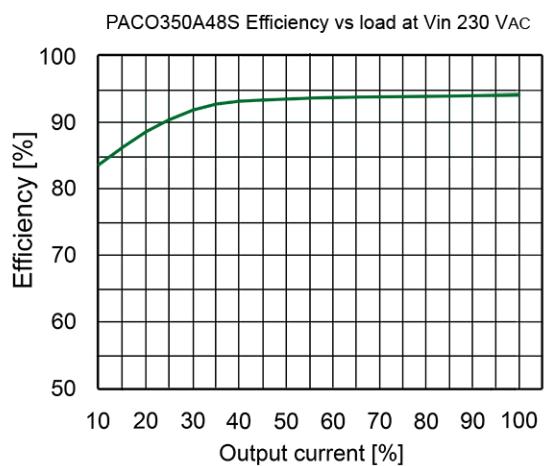
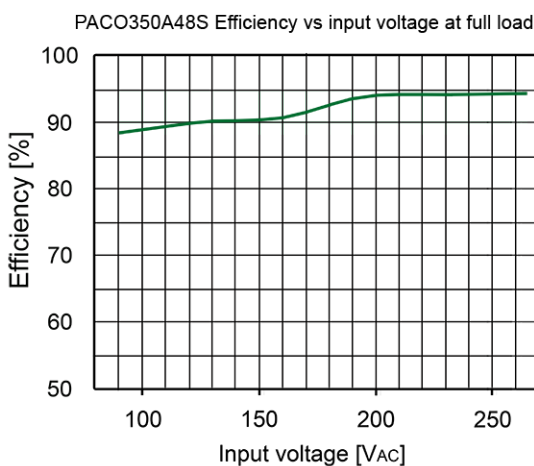
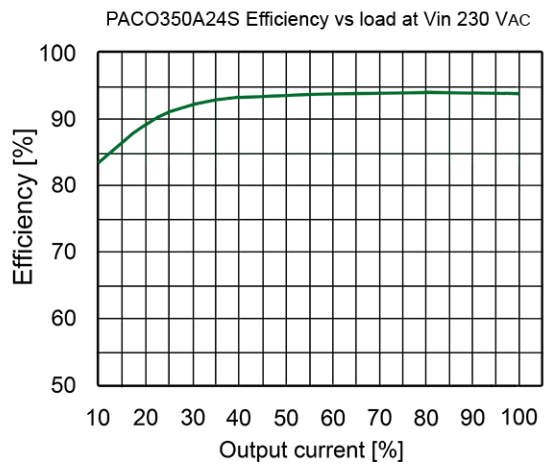
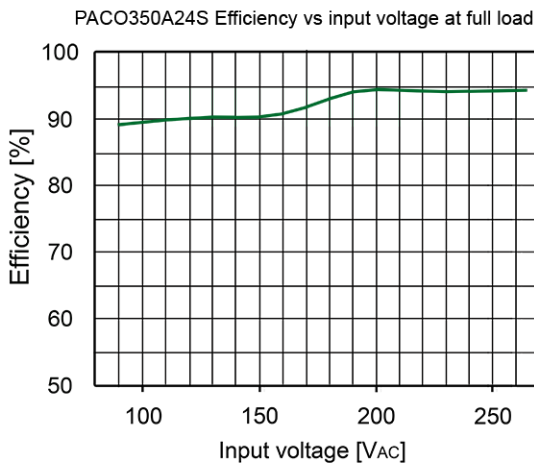
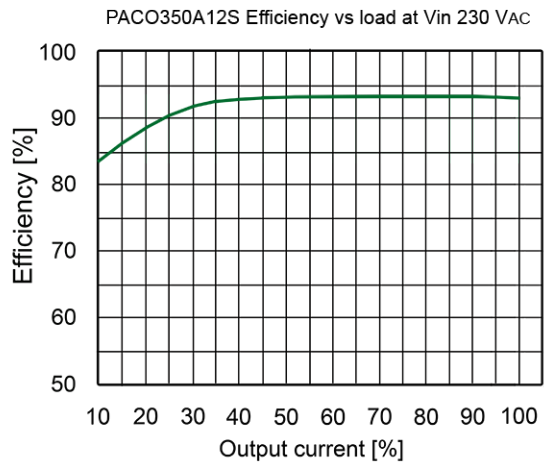
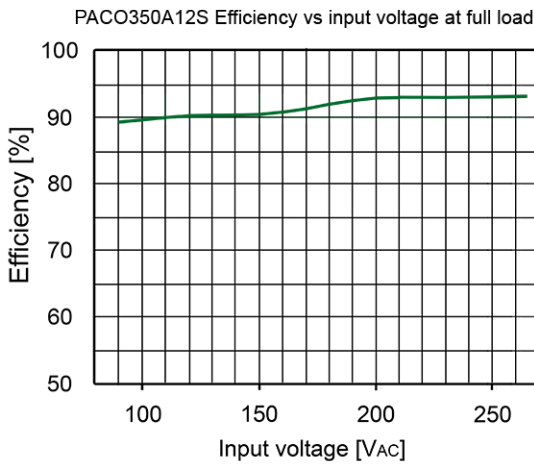
PACO350A24S, PACO350A27S, PACO350A48S temperature vs output current derating diagram at free air convection





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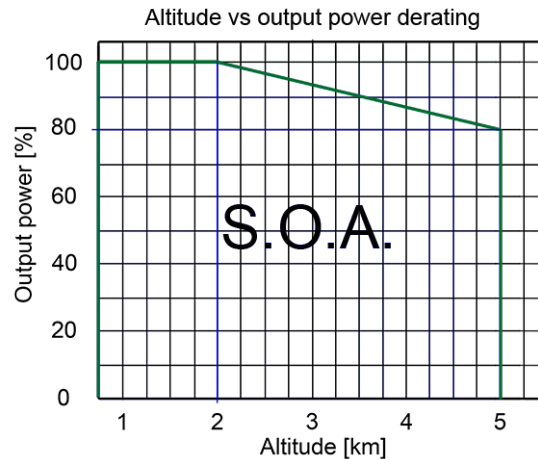
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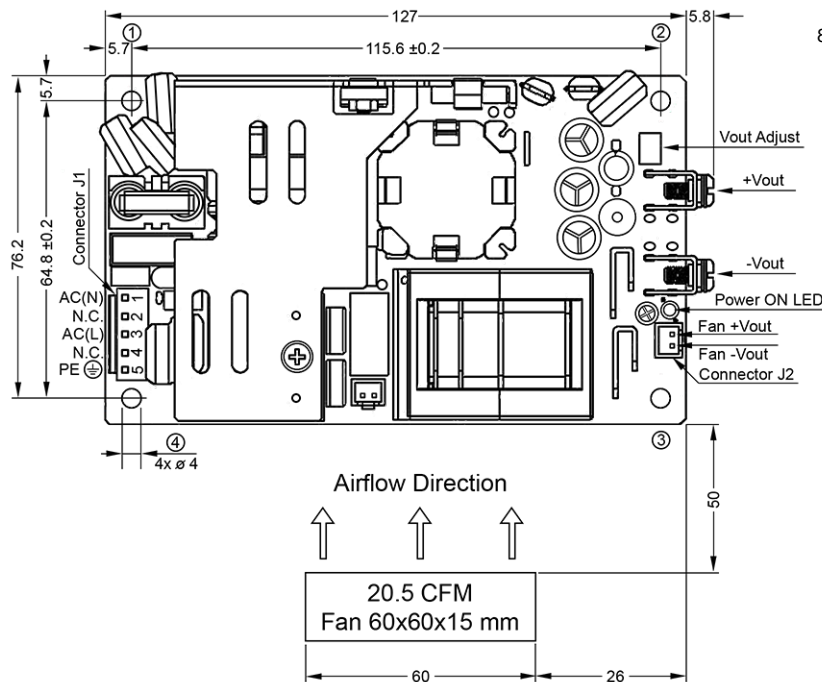
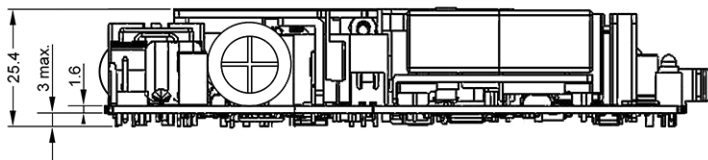


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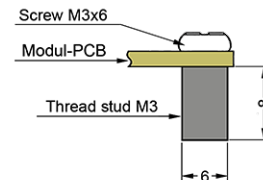
Mechanical dimensions



Note:

- Unit: mm
- General tolerances: ± 1 mm
- Terminal tightening torque M3.5: 0.8 Nm (Vout)
- Wire range: 24-18 AWG
- The layout of the device is reference only, please refer to the actual product.
- Reserved safety distance between PCB edge and user circuit should be more than 10 mm
- Safety Class I system: Positions ①②④ must be connected to the protective earth \oplus .
- Safety Class II system: Positions ①②④ must be connected together.

Con.	Module side	User side
J1	B5P-VH	Body: VHR Contacts: SVH-21T-P1.1
		JST or equivalent
J2	2.5XHS-2A	Body: 2.5XHS-2Y Contacts: 2.5XHS-2T
		KANGDAO or equivalent



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