



PHI-CON

10 W AC-DC Power Supply PAC10DxxS6-Series

- Enclosed plastic case
- 90 ... 528 V_{AC} or 100 ... 745 V_{DC} wide input range
- Isolation voltage 4000 V_{AC}
- Over voltage protected
- Over current & continuously short circuit protected
- Isolation class II
- MTBF > 300000 h
- 3 years product warranty



Model guide

Type	Output voltage [V _{DC}]	Output voltage tolerance [%] typ.	Output current [mA] max.	Output power [W] max.	Efficiency @ full load [%] typ.	Capacitive load [μF] max.
PAC10D03S6	3.3	±3	2000	6.6	72	15000
PAC10D05S6	5.0	±2	2000	10	76	15000
PAC10D09S6	9.0	±2	1100	10	78	6000
PAC10D12S6	12	±2	900	10	80	5000
PAC10D15S6	15	±2	700	10	80	3000
PAC10D24S6	24	±2	450	10	82	1000

Specifications

Input	
Voltage range	90..528 V _{AC} or 100..745 V _{DC} Power derating see diagram
Line frequency range	47...63 Hz
Full load input current	≤ 0.4 A @ 115 V _{AC} ≤ 0.23 A @ 230 V _{AC}
Inrush current	25 A typ. @ 115 V _{AC} 40 A typ. @ 230 V _{AC}
No load power consumption	≤ 0.75 W
Recommended fuse	3.15 A / 500 V _{AC} , time delayed type
Hot plug	Unavailable
Isolation	
Isolation voltage (input to output)	≥ 4000 V _{AC} for 1 Minute.
Leakage current	0.25 mA rms typ. @ Vin 230 V _{AC} / 50 Hz
Output	
Line regulation	± 0.5 %
Temperature coefficient	± 0.02 % / °C
Ripple & noise up to 20 MHz	≤ 150 mVp-p (see Figure 1)
Load regulation @ load change 0 % to 100 %	1 %
Minimum load	not required
Protection	
Short circuit	Continuous, hiccup, auto recovery
Over current	130 ... 400 %, of full load
Output over voltage protection (external TVS see Figure 2, 3 & 4)	PAC10D03S6: < 7.5 VDC
	PAC10D05S6: < 7.5 VDC
	PAC10D09S6: < 15 VDC
	PAC10D12S6: < 20 VDC
	PAC10D15S6: < 20 VDC
PAC10D24S6: < 30 VDC	
General	
Power derating at Ta 55...70 °C	3 % / °C
Power derating at Ta -40...-10 °C	1 % / °C
Power derating at Vin 90...110 V _{AC}	2 % / V _{AC}
Power derating at Vin 480...528 V _{AC}	0.42 % / V _{AC}

Safety standard	EN 62368-1	
Safety	Class II	
Switching frequency	65 kHz, typ.	
Hold up time @ full load	35 ms @ 230 V _{AC} typ.	
	100 ms @ 400 V _{AC} typ.	
Reliability MTBF MIL-HDBK-217 @ 25° C	≥ 300000 h	
EMC specification		
CE	EN 55032, CISPR32	Class B
RE	EN 55032, CISPR32	Class B
ESD	EN-, IEC 61000-4-2	Contact ± 6 kV, Perf. Criteria B
		Air ± 8 kV, Perf. Criteria B
RS	EN-, IEC 61000-4-3	10 V / m, Perf. Criteria A
EFT	EN-, IEC 61000-4-4	± 4 kV, Perf. Criteria B (see Figure 2)
		Line to line ± 2 kV, Perf. Criteria B
Surge	EN-, IEC 61000-4-5	Line to line ± 4 kV, Perf. Criteria B (see Figure 3 or 4)
		10 Vrms, Perf. Criteria A
CS	EN-, IEC 61000-4-6	0 %...70 %, Perf. Criteria B
Voltage dips, short interruptions and voltage variations immunity IEC-, EN 61000-4-11		
Environmental		
Operating ambient temperature range	-40 ...70 °C, see derating diagram	
Storage temperature	-40 ...85 °C	
Storage humidity	95 %, max., non condensing	
Cooling	Free air convection ≥ 35 LFM	
Physical		
	Dimensions	Weight
PAC10DxxS6	62 x 45 x 30 mm	120 g
PAC10DxxS6A2	96.1 x 54 x 38.5 mm	170 g
PAC10DxxS6A4	96.1 x 54 x 43.1 mm	210 g
Case material	Black plastic, UL94 V-0 rated	
Wave soldering temperature	≤265 °C, ≤10 s, ≥1.5 mm from case	
Manual soldering temperature	≤370 °C, ≤5 s, ≥1.5 mm from case	

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta 25 °C, humidity <75 % with nominal input voltage and rated output load.

Part number structure														
Brand		Type		Output power		Series	Output voltage		Outputs		Vin Range		Mounting	
P	PHI-CON	AC	AC/DC-Converter	10	10 W	D	03	3.3 V	S	single	6	90...528 V~	Blank	PCB
							05	5 V					A2	Chassis
							09	9 V					A4	DIN-Rail
							12	12 V						
							15	15 V						
							24	24 V						
Example:		PAC10D24S6 PHI-CON AC/DC-Converter, Pout 10 W, E-Serie, Vout 24 V, Single Output, Vin 90..528 VAC, PCB mountable												

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Figure 1 Output ripple & noise measure method

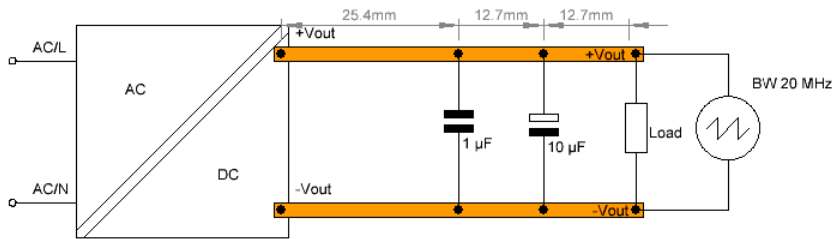


Figure 2 Typical application circuit

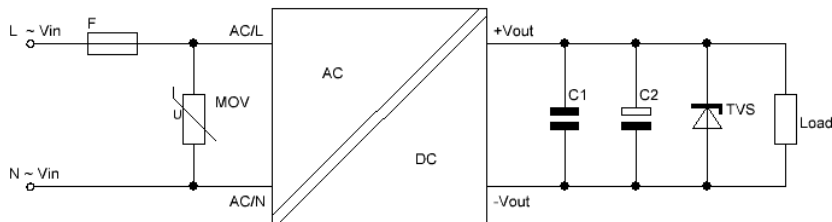


Table for typical circuit to Figure 2					
Type	Fuse time delayed	MOV	C1	C2	TVS
PAC10D03S6	3.15 AT / 500 V~	S20K625	1 µF, MLCC	330 µF	SMBJ7.0A
PAC10D05S6	3.15 AT / 500 V~	S20K625	1 µF, MLCC	330 µF	SMBJ7.0A
PAC10D09S6	3.15 AT / 500 V~	S20K625	1 µF, MLCC	220 µF	SMBJ12A
PAC10D12S6	3.15 AT / 500 V~	S20K625	1 µF, MLCC	220 µF	SMBJ20A
PAC10D15S6	3.15 AT / 500 V~	S20K625	1 µF, MLCC	220 µF	SMBJ20A
PAC10D24S6	3.15 AT / 500 V~	S20K625	1 µF, MLCC	220 µF	SMBJ30A

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Figure 3 Recommended circuit for applications which require 4 kV differential-mode inrush standard (half wave rectification)

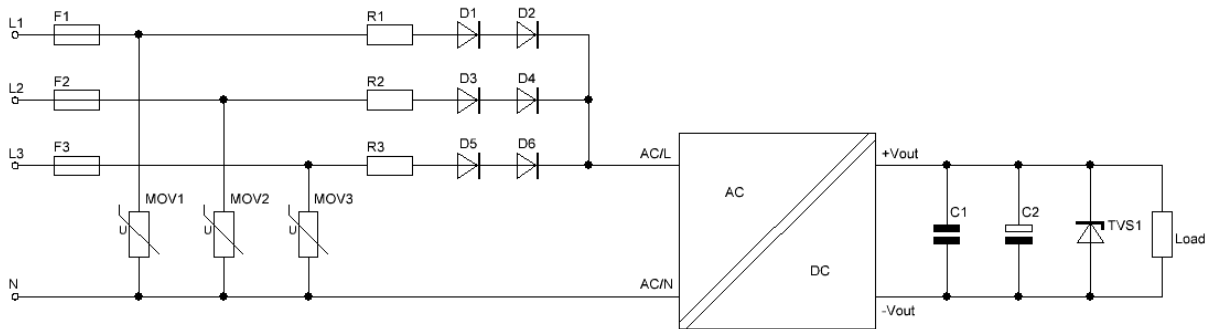


Table for Figure 3							
Type	Fuse F1 ... F3	MOV1 ... MOV3	D1 ... D6	R1...R3	C1	C2	TVS1
PAC10D3R3S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	330 μF	SMBJ7.0A
PAC10D05S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	330 μF	SMBJ7.0A
PAC10D09S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ12A
PAC10D12S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ20A
PAC10D15S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ20A
PAC10D24S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ30A
E.g.: RL207-G							

Figure 4 Recommended circuit for applications which require 4 kV differential-mode inrush standard (full wave rectification)

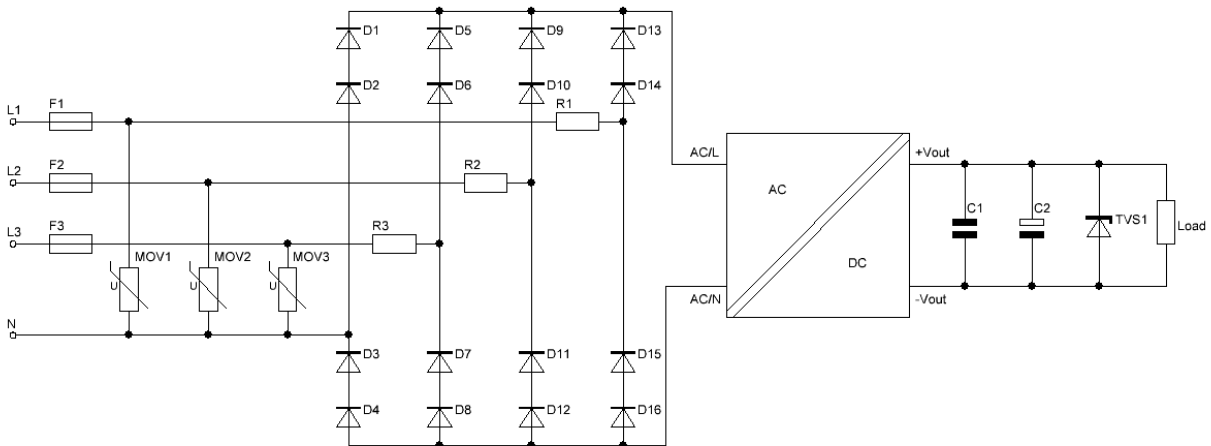
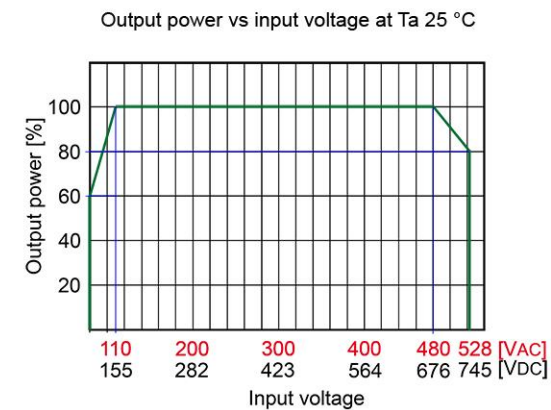
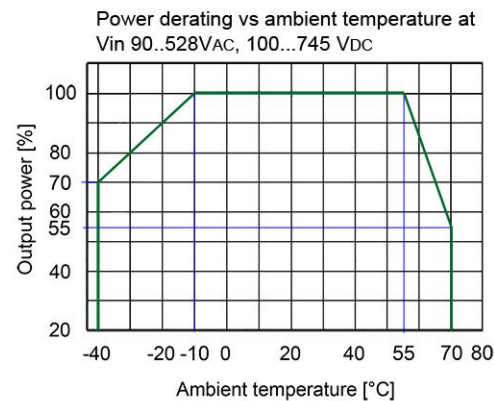
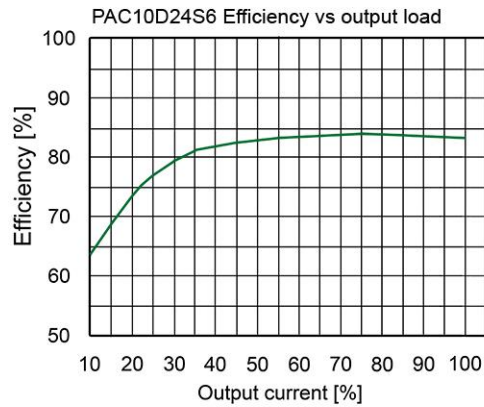
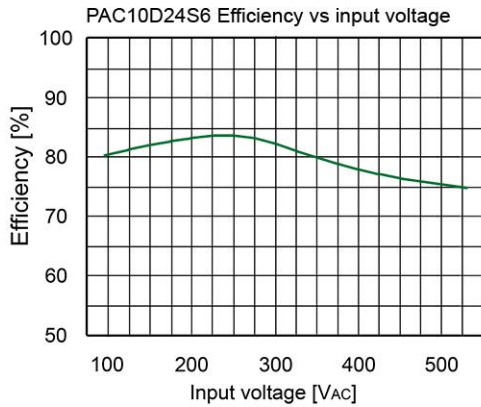
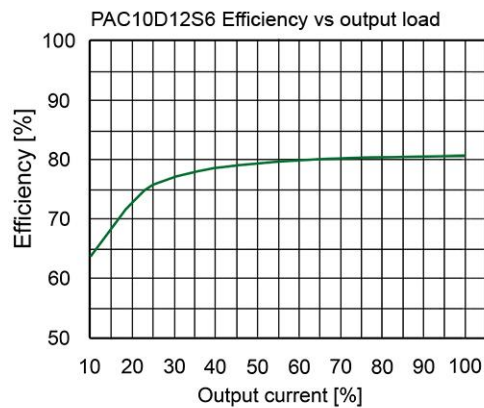
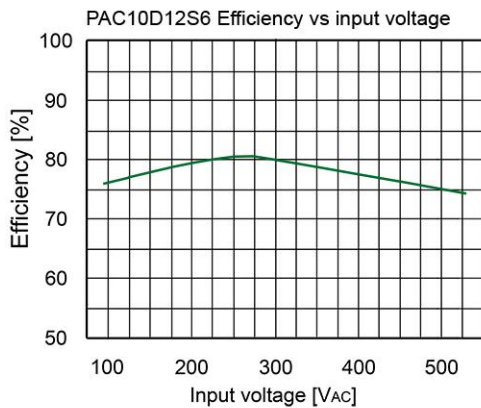
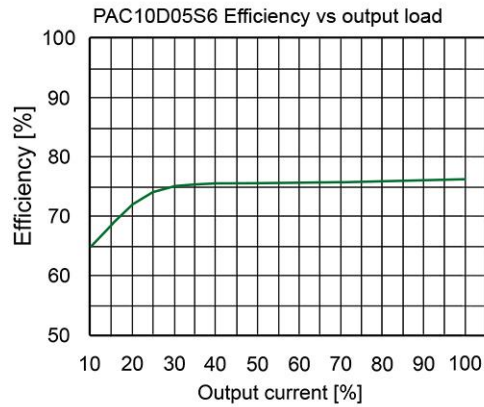
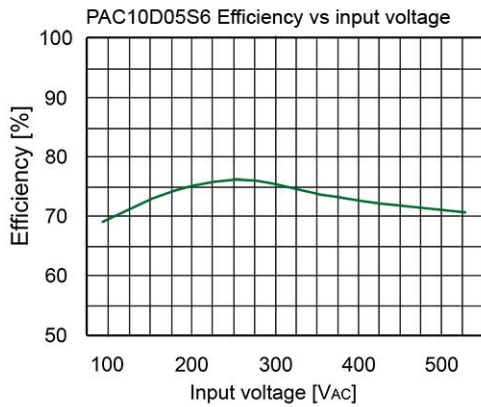


Table for Figure 4							
Type	Fuse F1 ... F3	MOV1 ... MOV3	D1 ... D16	R1...R3	C1	C2	TVS1
PAC10D3R3S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	330 μF	SMBJ7.0A
PAC10D05S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	330 μF	SMBJ7.0A
PAC10D09S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ12A
PAC10D12S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ20A
PAC10D15S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ20A
PAC10D24S6	3.15 A time delayed	S20K510	2 A, 2000 V, I _{FSM} >50A	10 Ω, 5 W	1 μF, MLCC	220 μF	SMBJ30A
E.g.: RL207-G							



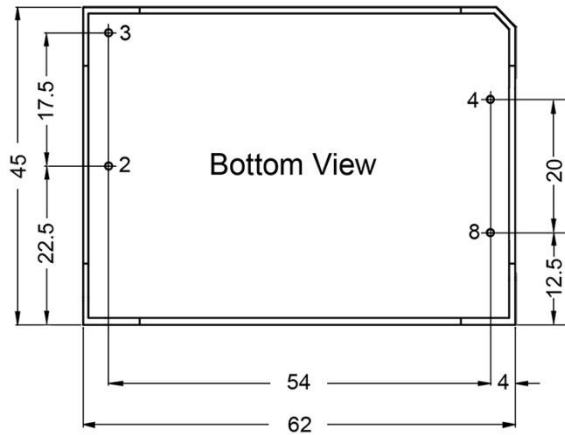
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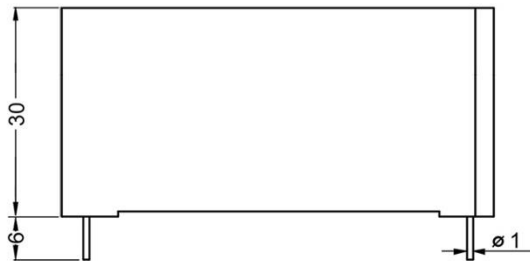


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Mechanical dimensions

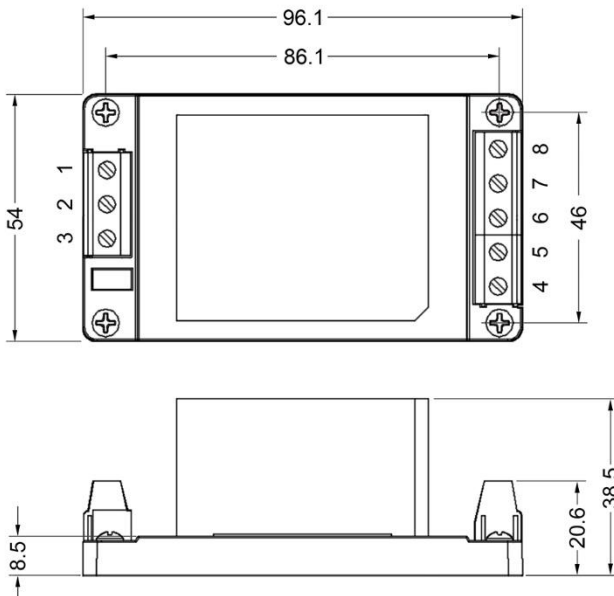


Pin assignment	
1	No pin
2	AC in, N
3	AC in, L
4	+ V out
5	No pin
6	No pin
7	No pin
8	- V out



Note:
 Unit: mm
 Pin diameter tolerance: ± 0.1 mm
 General tolerances: ± 0.5 mm
 Recommended drill hole diameter 1.5 mm

Mechanical dimensions chassis version PAC10DxxS6A2

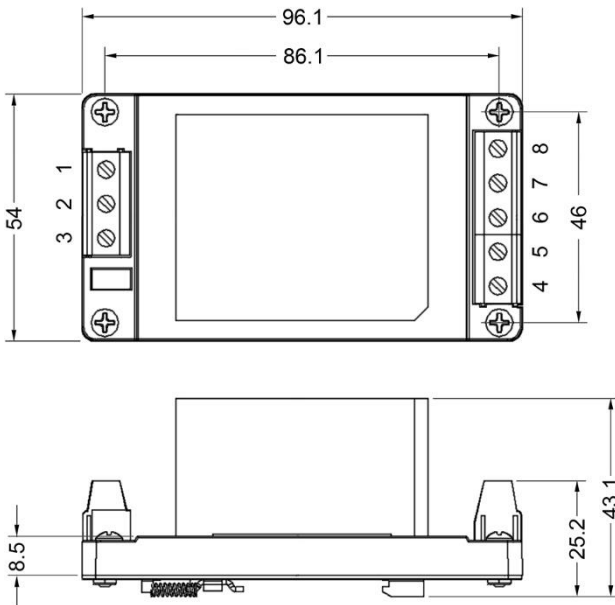


Terminal assignment	
1	Not connected
2	AC in, N
3	AC in, L
4	+ V out
5	Not connected
6	Not connected
7	Not connected
8	- V out

Note:
 Unit: mm
 General tolerances: ± 0.5 mm
 Wire range: 24...12 AWG
 Tightening torque: ≤ 0.4 Nm

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Mechanical dimensions DIN rail version PAC10DxxS6A4



Terminal assignment	
1	Not connected
2	AC in, N
3	AC in, L
4	+ V out
5	Not connected
6	Not connected
7	Not connected
8	- V out

Units in mm
 General tolerances: ± 1 mm
 Wire range: 24...12 AWG
 Tightening torque: 0.4 Nm, max.
 The DIN rail must be connected to protection ground

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