



PHI-CON

# 10 W AC-DC Converter PAC10DxxBS3-Series

- Enclosed plastic case
- 85 ... 305 V<sub>AC</sub>, 100 ... 430 V<sub>DC</sub> universal input range
- Continuous short circuit protected
- Over voltage protected
- Safety EN 62368-1, class II



## Model guide

Type	Output voltage [V <sub>DC</sub> ]	Output current [mA] max.	Output power [W] max.	Efficiency typ. @ full load [%]	Capacitive load [μF] max.
PAC10D3R3BS3	3.3	2600	8.6	74	6600
PAC10D05BS3	5.0	2000	10	79	5000
PAC10D09BS3	9.0	1100	10	81	3600
PAC10D12BS3	12	900	10	84	2000
PAC10D15BS3	15	660	10	84	820
PAC10D24BS3	24	410	10	85	470

## Specifications

<b>Input</b>	
Voltage range	85...305 V <sub>AC</sub> or 100...430 V <sub>DC</sub>
Line frequency range	47...63 Hz
Full load input current	0.23 A, max. @ 115 V <sub>AC</sub> 0.15 A, max. @ 230 V <sub>AC</sub>
No load input power consumption	0.12 W, typ. @ 230 V <sub>AC</sub>
Inrush current	25 A, typ. @ 115 V <sub>AC</sub> 40 A, typ. @ 230 V <sub>AC</sub>
Recommended fuse	2 A / 300 V~, time delayed type
Hold up time @ full load	8 ms, typ. @ 115 V <sub>AC</sub> 40 ms, typ. @ 230 V <sub>AC</sub>
<b>Isolation</b>	
Isolation voltage, input to output	4000 V <sub>AC</sub> for 1 min.
Isolation resistance	10 <sup>9</sup> Ω
Leakage current	≤ 0.1 mA @ V <sub>in</sub> 230 V <sub>AC</sub> , 50 Hz
<b>Output</b>	
Output voltage tolerance	±2 %
Line regulation at full load	± 0.5 %, typ.
Load regulation	± 1 %, typ. @ 0..100 % load
Temperature coefficient	± 0.02 % / °C
Ripple & noise @ BW 20 MHz	100 mVp-p, max. (see Figure 1)
Minimum load	Not required
<b>Protection</b>	
Output over voltage protection	PAC10D03BS3 ≤ 7.5 V <sub>DC</sub>
Hiccup or TVS diode clamping	PAC10D05BS3 ≤ 15 V <sub>DC</sub>
	PAC10D09BS3 ≤ 20 V <sub>DC</sub>
	PAC10D12BS3 ≤ 30 V <sub>DC</sub>
	PAC10D15BS3 ≤ 30 V <sub>DC</sub>
	PAC10D24BS3 ≤ 30 V <sub>DC</sub>
Short circuit	Continuous, hiccup, auto restart
Over current	≥ 110 % of rated current
<b>General</b>	
Safety standards	EN 62368-1, IEC 62368-1, UL 62368-1, EN 61558-1, EN 60335-1
Safety class	Class II
Switching frequency	65 kHz, typ.
Reliability MTBF	> 3200 000 h
MIL-HDBK-217F@25°C	

<b>EMC</b>			
CE	EN 55032, CISPR 32 EN 55014-1	Class B (See Figure 2 & 3)	
RE	EN 55032, CISPR 32 EN 55014-1	Class B (See Figure 2 & 3)	
ESD	EN-, IEC 61000-4-2 EN 55014-2	Air ±15 kV, Contact ±8 kV, performance Criteria B	
RS	EN-, IEC 61000-4-3 EN 55014-2	10 V/m perf. Crit. A 10 V/m perf. Crit. A	
	EFT	EN-, IEC 61000-4-4 EN 55014-2	± 2kV, perf. Crit. B ± 4kV, perf. Crit. B (see Figure 2) ± 4kV, perf. Crit. A (see Figure 3) ± 2kV, perf. Crit. B
Surge	EN-, IEC 61000-4-5	Line to line ± 1 kV perf. Crit. B Line to line ± 2 kV, perf. Crit. B (see Figure 2) Line to line ± 2 kV, perf. Crit. A, line to ground ± 4 kV, perf. Crit. A (see Figure 3)	
	EN 55014-2	perf. Crit. B	
	CS	EN-, IEC 61000-4-6 EN 55014-2	10 Vrms perf. Crit. A perf. Crit. A
Voltage dips, short interruptions and voltage variations	EN 61000-4-11 IEC 61000-4-11	0 %, 70 %	perf. Crit. B
	EN 55014-2		perf. Crit. B
<b>Environmental</b>			
Operating ambient temperature		-40 ... 85 °C with derating	
Storage temperature		-40 ... 85 °C	
Power derating		See diagramms	
Storage humidity		95 %, non condensing	
Cooling		Free air convection, ≥ 35 LFM	
<b>Physical</b>		Dimensions	Weight
PCB -Version PAC10DxxBS3		25.4 x 40 x 21 mm	34 g
Chassis Vers. PAC10DxxBS3A2		31.5 x 76 x 29.8 mm	54 g
DIN-Rail Vers. PAC10DxxBS3A4		31.5 x 76 x 34.4 mm	74 g
Case material		Black plastic, UL94V-0 rated	
Wave soldering temperature		≤ 265 °C, duration ≤ 10s, ≥ 1.5 mm distance from case	
Manual soldering temperature		≤ 370 °C, duration ≤ 5 s, ≥ 1.5 mm distance from case	

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	BS	single	3	85...305 V~	Blank	PCB
							05	5 V					A2	Chassis
							09	9 V					A4	DIN-Rail
							12	12 V						
							15	15 V						
							24	24 V						
Example:		PAC10D24BS3	PHI-CON AC/DC-Converter, Pout 10 W, D-Serie, Vout 24 V, Single Output, Vin 85...305 V <sub>AC</sub> , PCB mountable											

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Figure 1 Output ripple & noise measure method BW 20 MHz

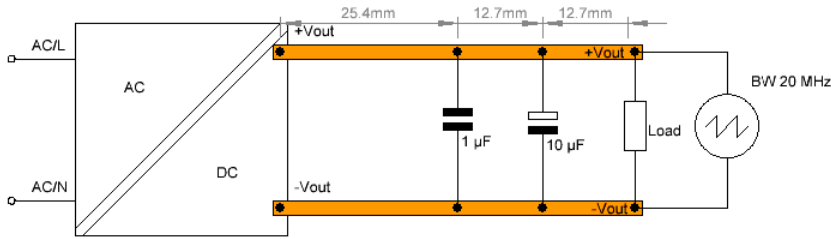


Figure 2 Typical application circuit

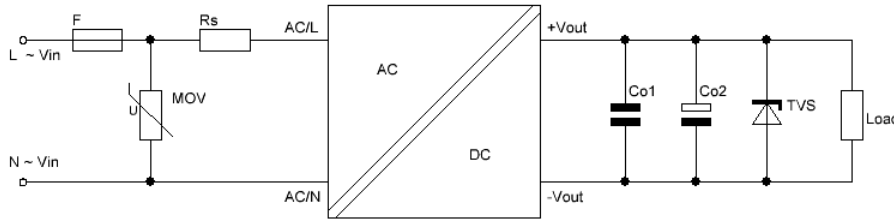


Table A for typical circuit Figure 2

Type	F Time delayed type	MOV	Rs Wire wound type	Co1	Co2	TVS
PAC10D03BS3	2 AT / >300 V~	S14K350	6.8 Ω, 3 W	1 µF, MLCC	220 µF, ≥ 10 V	SMBJ7.0A
PAC10D05BS3	2 AT / >300 V~	S14K350	6.8 Ω, 3 W	1 µF, MLCC	220 µF, ≥ 10 V	SMBJ7.0A
PAC10D09BS3	2 AT / >300 V~	S14K350	6.8 Ω, 3 W	1 µF, MLCC	100 µF, ≥ 25 V	SMBJ12A
PAC10D12BS3	2 AT / >300 V~	S14K350	6.8 Ω, 3 W	1 µF, MLCC	100 µF, ≥ 25 V	SMBJ20A
PAC10D15BS3	2 AT / >300 V~	S14K350	6.8 Ω, 3 W	1 µF, MLCC	100 µF, ≥ 25 V	SMBJ20A
PAC10D24BS3	2 AT / >300 V~	S14K350	6.8 Ω, 3 W	1 µF, MLCC	100 µF, ≥ 35 V	SMBJ30A

Figure 3 Application circuit for higher EMC performance

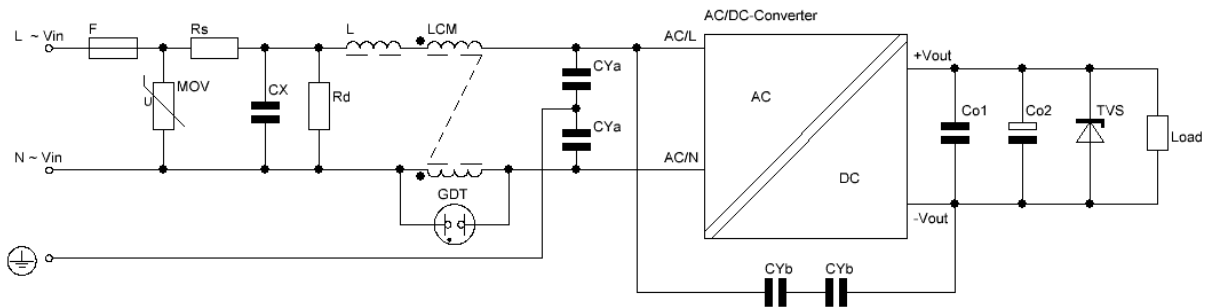


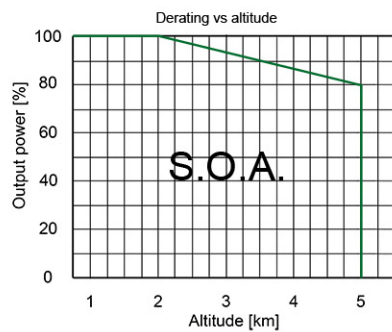
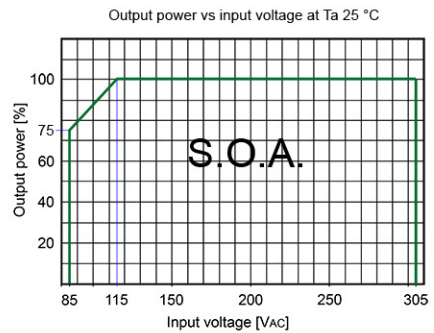
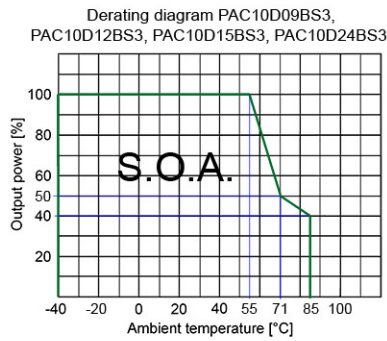
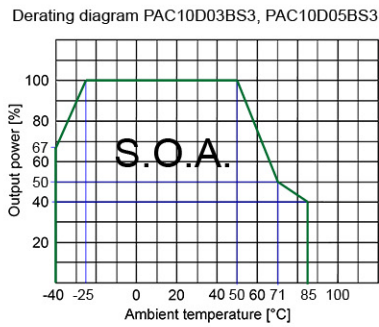
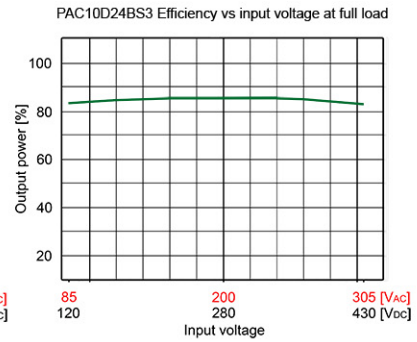
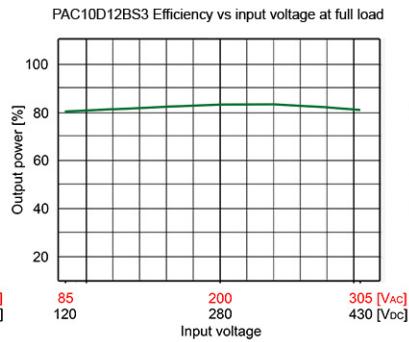
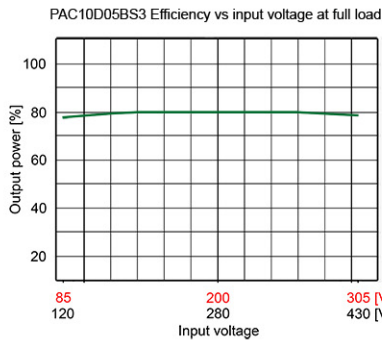
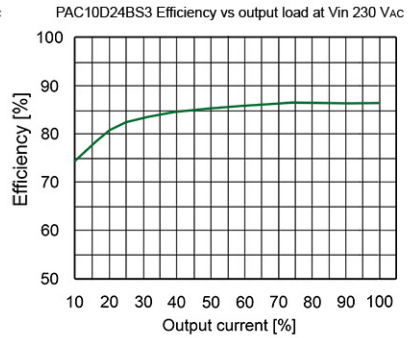
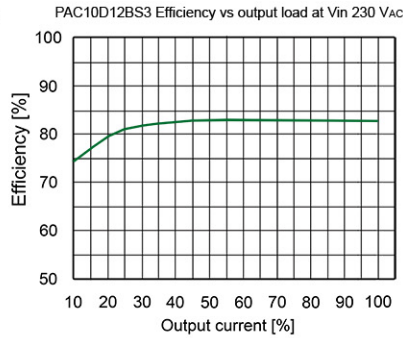
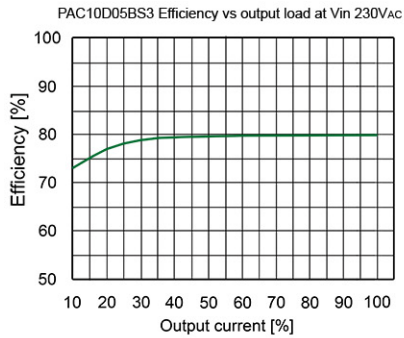
Table B for Figure 3

F	2 AT, >300 V~ Time delayed type
MOV	S14K350
Rs	12 Ω, 5 W, wire wounded type
CX	330 nF, 400 V <sub>AC</sub>
Rd	2.2 MΩ, operating voltage 400 V <sub>AC</sub>
L	12 mH, 0.5 A
LCM	20 mH
GDT	Gas discharge tube 300 V, 1 kA
CYa	2.2 nF, 400 V <sub>AC</sub>
CYb	1 nF, 400 V <sub>AC</sub>
Co1, Co2, D-TV S	See table A Figure 2



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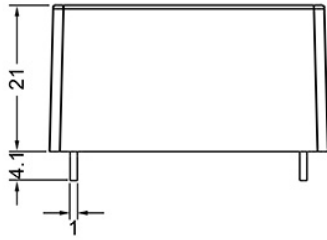




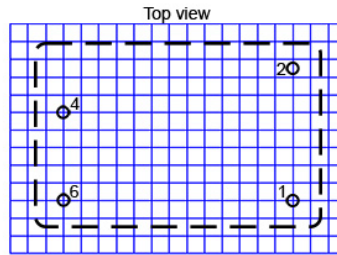
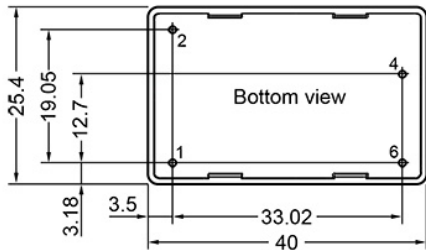
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# 10 W AC-DC Converter PAC10DxxBS3-Series

## Mechanical dimensions PCB Version



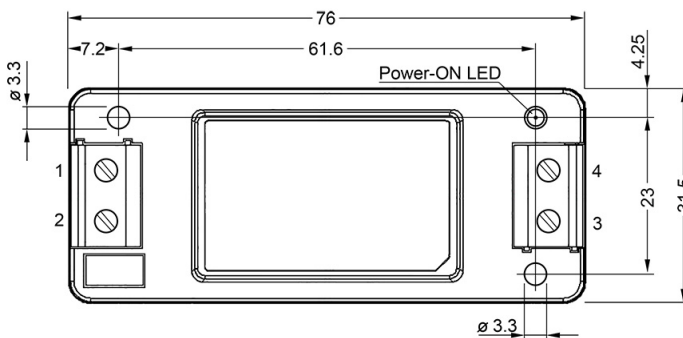
Note  
Unit: mm  
Pin diameter:  $1 \pm 0.1$  mm  
General tolerances:  $\pm 0.5$  mm



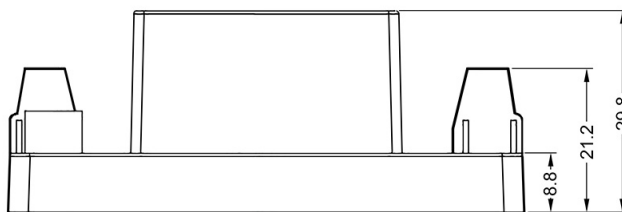
Pitch grit 2.54,  
Recommended drill hole diameter 1.5 mm

Pin assignment	
1	AC In (L)
2	AC In (N)
3	No Pin
4	+ DC Out
5	No Pin
6	- DC Out

## Mechanical dimensions chassis mountable version (Suffix A2)



Terminal assignment	
1	AC In (N)
2	AC In (L)
3	- DC Out
4	+ DC Out



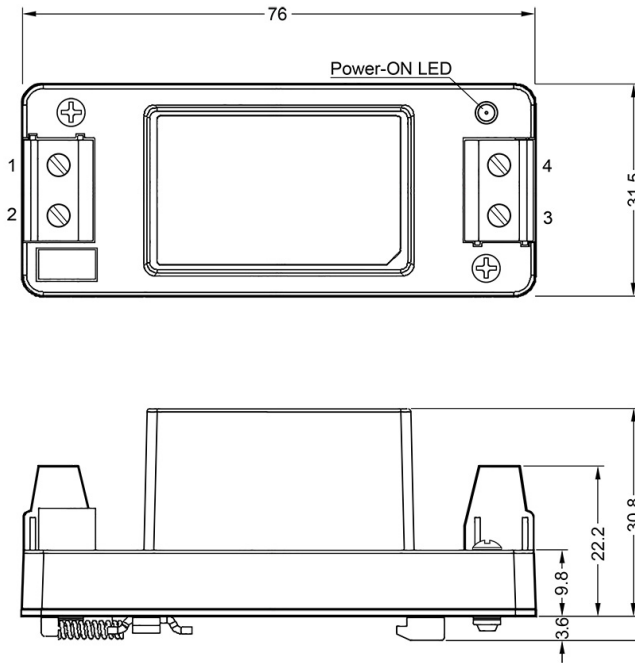
Note  
Unit: mm  
General tolerances:  $\pm 1$  mm  
Wire range: 24~12 AWG  
Tightening torque:  $\leq 0.4$  Nm



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# 10 W AC-DC Converter PAC10DxxBS3-Series

## Mechanical dimensions DIN-Rail mountable version (Suffix A4)



Terminal assignment	
1	AC In (N)
2	AC In (L)
3	- DC Out
4	+ DC Out



Note  
 Unit: mm  
 General tolerances:  $\pm 1$  mm  
 Wire range: 24~12 AWG  
 Tightening torque:  $\leq 0.4$  Nm  
 Mountable on DIN-Rail TS 35  
 DIN-Rail must be connected with protection earth

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