



PHI-CON

# 15 W AC-DC Power Supply PAC15E\_BS3-Series

- PCB-mountable plastic case
- 85 ... 305 V<sub>AC</sub> or 100 ... 430 V<sub>DC</sub> universal input range
- Continuously short circuit protected
- Over voltage protected
- Input/Output isolation 4200 V<sub>AC</sub>
- Isolation class II
- MTBF > 500 000 h



## Model guide

Type	Output voltage [V <sub>DC</sub> ]	Output current [mA] max.	Output power [W] max.	Efficiency @ full load & 230 V <sub>AC</sub> [%] typ.	Capacitive load [µF] max.
PAC15E03BS3	3.3	3000	9.9	77	30000
PAC15E05BS3	5.0	2800	14	79	16000
PAC15E12BS3	12	1250	15	82	4500
PAC15E15BS3	15	1000	15	82	4000
PAC15E24BS3	24	625	15	83	800
PAC15E48BS3	48	320	15	85	400

## Specification

<b>Input</b>	
Voltage range	85...305 V <sub>AC</sub> or 100...430 V <sub>DC</sub> Power derating see diagram
Line frequency range	47...63 Hz
Full load input current	0.37 A @ 115 V <sub>AC</sub> , typ. 0.22 A @ 230 V <sub>AC</sub> , typ.
Power consumption at 230 V <sub>AC</sub>	PAC15E48BS3 ≤ 0.5 W
	All others ≤ 0.3 W
Inrush current	16 A typ. @ 115 V <sub>AC</sub> 30 A typ. @ 230 V <sub>AC</sub>
Recommended fuse	2 A / 300 V <sub>AC</sub> , Time delayed type
<b>Isolation</b>	
Input to output isolation voltage Test 1 Minute, < 5 mA leakage	4200 V <sub>AC</sub>
Isolation resistance at 500 V <sub>DC</sub>	10 <sup>8</sup> Ω
Leakage current at V <sub>IO</sub> 277 V <sub>AC</sub> , 50 Hz	0.25 mA <sub>rms</sub>
<b>Output</b>	
Voltage tolerance	PAC15E03BS3 ± 3 % All others ± 2 %
Line regulation	± 0.5 %
Output load regulation	± 1 % @ load range 0..100 %
Temperature coefficient	± 0.02 % / °C, typ.
Ripple & noise (BW20 MHz)	100 mVp-p, max. (see Figure 1)
Minimum load	not required
Hold-up time	5 ms, typ. @ 115 V <sub>AC</sub> 40 ms, typ. @ 230 V <sub>AC</sub>
<b>Protection</b>	
Short circuit	Continuous, hiccup, auto recovery
Over current	≥ 150 % of rated load
<b>Output over voltage protection, hiccup &amp; clamping</b>	
PAC15E03BS3, PAC15E05BS3	≤ 7.5 V <sub>DC</sub>
PAC15E12BS3, PAC15E15BS3	≤ 20 V <sub>DC</sub>
PAC15E24BS3	≤ 30 V <sub>DC</sub>
PAC15E48BS3	≤ 60 V <sub>DC</sub>
<b>General</b>	
Reliability calculated MTBF MIL-HDBK-217F@25°C	> 500 000 h

Safety Standard		EN 62368-1
Safety class		Class II
Switching frequency		65 kHz, typ.
<b>EMC compliance</b>		
CE	EN 55032, CISPR32	Class B
RE	EN 55032, CISPR32	Class B
ESD	EN-, IEC 61000-4-2	Contact ± 8 kV, Air ± 15 kV perf. Criteria A
RS	EN-, IEC 61000-4-3	10 V / m perf. Criteria A
EFT	EN-, IEC 61000-4-4	± 4 kV, perf. Criteria A
Surge	EN-, IEC 61000-4-5	Line to line: ±2 kV, perf. Criteria A
		Line to line: ±4 kV, Line to PE: ±6 kV, perf. Criteria A (see Figure 3)
PFM	EN-, IEC 61000-4-8	10 A/m perf. Criteria A
CS	EN-, IEC 61000-4-6	10 Vrms perf. Criteria A
EN-, IEC 61000-4-11 Voltage dips, short interruptions and voltage variations immunity		0 %, 70 % perf. Criteria B
<b>Environmental</b>		
Operating ambient temperature		-40 ... 85 °C, with derating
Storage temperature		-40 ... 105 °C
Power derating		see diagram
Storage humidity		95 %, non condensing
Cooling		Free air convection, >35 LFM
<b>Physical</b>		
Mounting Version	Dimensions [mm]	Weight [g]
PCB	PAC15ExxBS3	62 x 45 x 22.5
Chassis	PAC15ExxBS3A2	96.1 x 54 x 31
DIN-Rail	PAC15ExxBS3A4	96.1 x 54 x 35.6
Case material	Black plastic, UL94V-0 rated	
Wave soldering temperature	≤ 265 °C, duration ≤ 10 s, ≥ 1.5 mm distance min. from case	
Manual soldering temperature	≤ 370 °C, duration ≤ 5 s, ≥ 1.5 mm distance min. from case	

Note:

All values are specified at Ta 25 °C, humidity <75 %, with nominal input voltage and rated output load current.

Brand		Part number structure		Output power		Series	Output voltage		Rev.	Outputs		Mounting	
P	PHI-CON	AC	AC/DC-Converter	15	15 W	E	03	3.3 V	B	S3	single	Blank	PCB
							05	5 V				A2	Chassis
							12	12 V				A4	DIN-Rail
							15	15 V					
							24	24 V					
							48	48 V					
Example: PAC15E24BS3		PHI-CON AC/DC-Converter, Pout 15 W, E-Series, Vout 24 V, Single Output, for PCB mounting											

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Figure 1 Output ripple & noise measure circuit (BW 20 MHz)

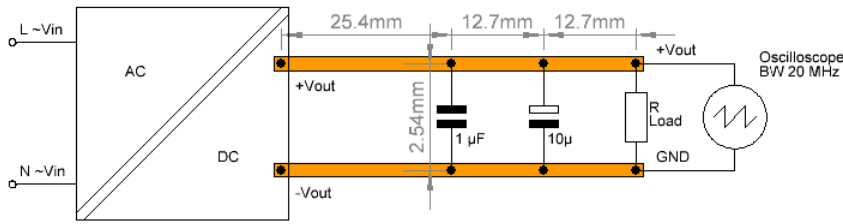
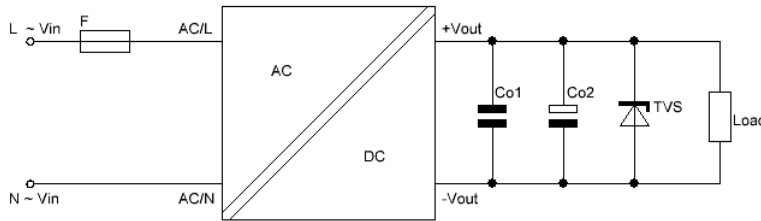
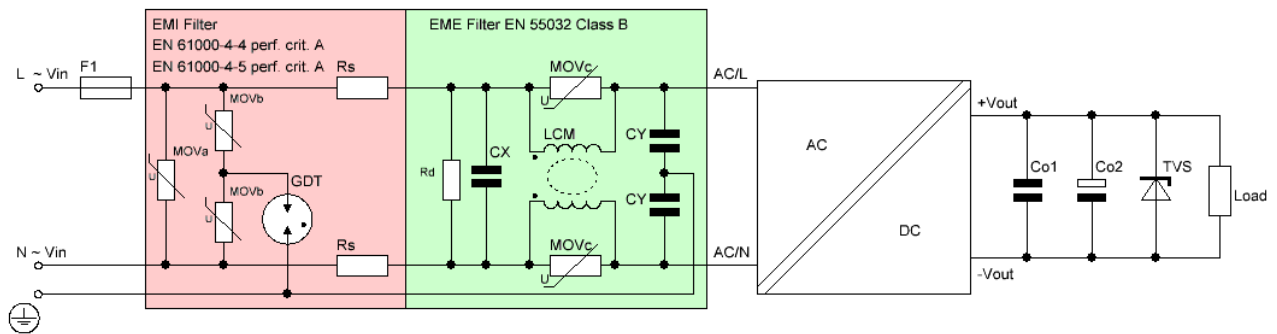


Figure 2 Typical application circuit



Model	Fuse (time delayed type)		Co1	Co2	TVS
	[A]	[V <sub>AC</sub> ]	Cer. cap. [µF]	El. cap [µF]	
PAC15E03BS3	2	300	1	680	SMBJ7.0A
PAC15E05BS3	2	300	1	680	SMBJ7.0A
PAC15E12BS3	2	300	1	220	SMBJ20A
PAC15E15BS3	2	300	1	220	SMBJ20A
PAC15E24BS3	2	300	1	68	SMBJ30A
PAC15E48BS3	2	300	1	33	SMBJ64A

Figure 3 Application circuit and example for ripple and noise reduction



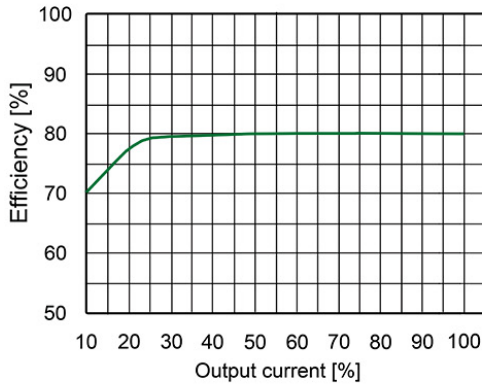
Model	Fuse (time delayed type)		MOV <sub>a</sub>	MOV <sub>b</sub>	GDT (Gas Discharge Tube)	R <sub>s</sub> Wire-type	C <sub>x</sub>	LCM Common mode	MOV <sub>c</sub>	CY		Co1	Co2	TVS
	[A]	[V <sub>AC</sub> ]	Type	Type	Type		[µF]	[mH]		[nF]	[V <sub>AC</sub> ]			See Table A
PAC15E03BS3	2	300	S20K350	S14K350	B5G3600	2 Ω, 3 W	0.15	10	S07K350	2.2	400			
PAC15E05BS3	2	300	S20K350	S14K350	B5G3600	2 Ω, 3 W	0.15	10	S07K350	2.2	400			
PAC15E12BS3	2	300	S20K350	S14K350	B5G3600	2 Ω, 3 W	0.15	10	S07K350	2.2	400			
PAC15E15BS3	2	300	S20K350	S14K350	B5G3600	2 Ω, 3 W	0.15	10	S07K350	2.2	400			
PAC15E24BS3	2	300	S20K350	S14K350	B5G3600	2 Ω, 3 W	0.15	10	S07K350	2.2	400			
PAC15E48BS3	2	300	S20K350	S14K350	B5G3600	2 Ω, 3 W	0.15	10	S07K350	2.2	400			



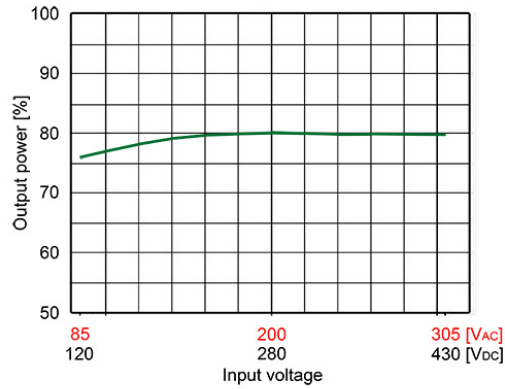
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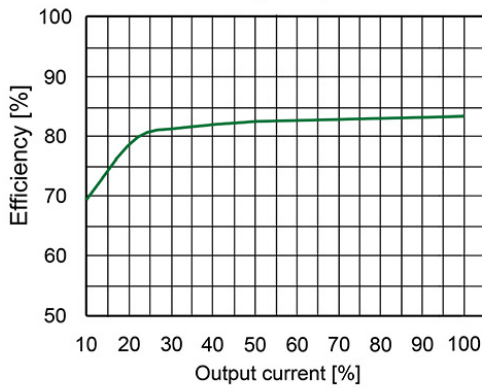
PAC15E05BS3 Efficiency vs output load at Vin 230 VAC



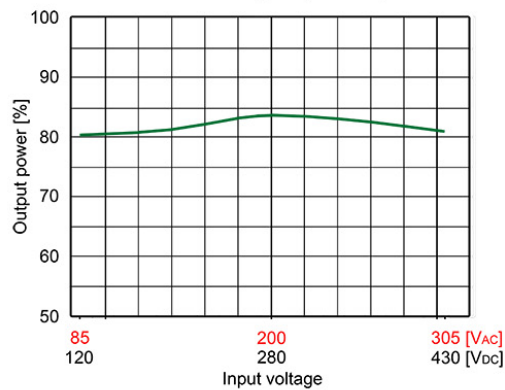
PAC15E05BS3 Efficiency vs input Voltage at full load



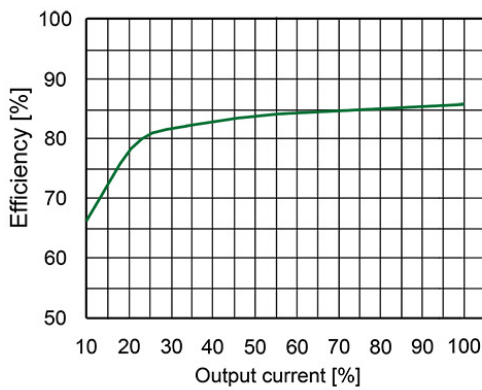
PAC15E12BS3 Efficiency vs output load at Vin 230 VAC



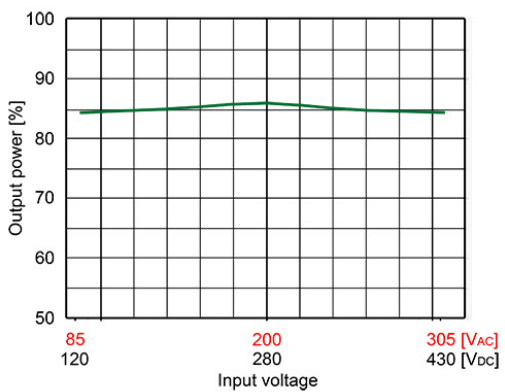
PAC15E12BS3 Efficiency vs input Voltage at full load



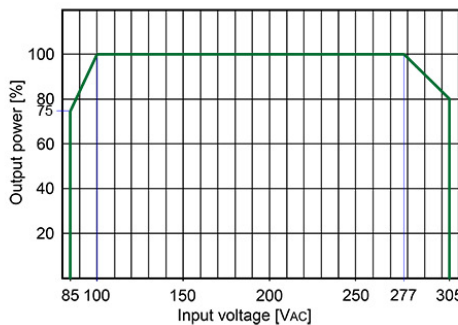
PAC15E24BS3 Efficiency vs output load at Vin 230 VAC



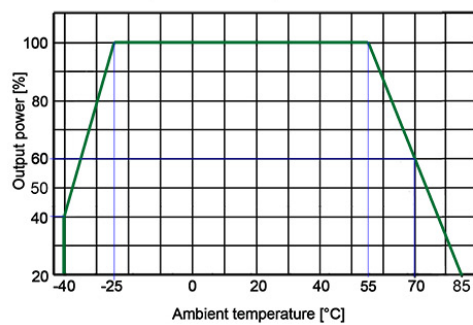
PAC15E24BS3 Efficiency vs input Voltage at full load



Power derating vs input voltage at Ta 25 °C



Power derating vs ambient temperature at Vin 100-305 VAC

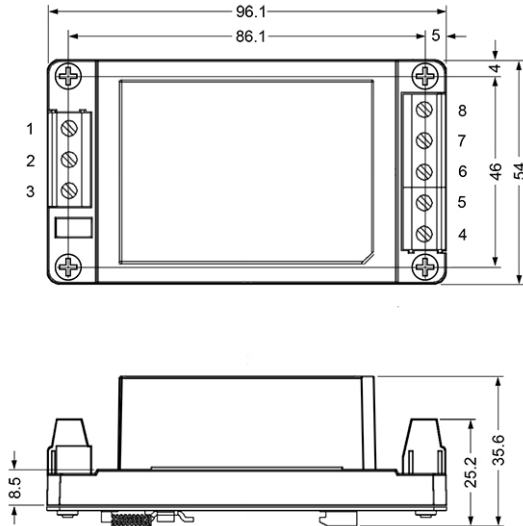




# 15 W AC-DC Power Supply PAC15E\_BS3-Series



## Mechanical dimensions Din-Rail mountable version PAC15ExxBS3A4



Terminal Assignment	
1	Not Connected
2	AC Input (N)
3	AC Input (L)
4	+V output
5	Not Connected
6	Not Connected
7	Not Connected
8	-V output

Note  
 Unit: mm  
 General tolerances:  $\pm 1$  mm  
 Wire range: 12...24 AWG  
 Tightening torque:  $< 0.4$  Nm  
 Mountable on DIN Rail TS35  
 The DIN-Rail must be connected  
 with protection earth!

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