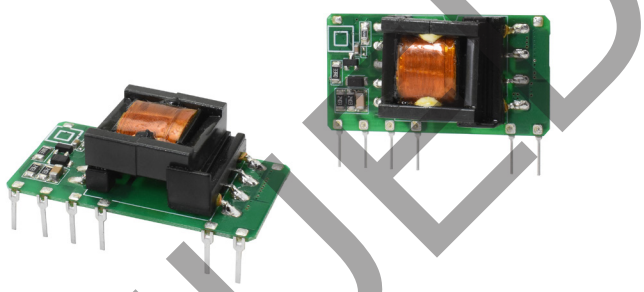
SERIES: PBO-10 | **DESCRIPTION:** AC-DC POWER SUPPLY

FEATURES

- wide input range (85 ~ 305 VAC)
- wide operating temperature range (-40 to +85 C)
- IEC/EN/UL 62368 certified
- designed to meet 60335 household safety certifications
- over voltage, over current, short circuit protections
- flexible implementations to power a wide array of applications



DISCONTINUED

MODEL

MODEL	output voltage (Vdc)	output current typ (A)	output power max (W)	ripple and noise[1] max (mVp-p)	efficiency[2] typ (%)
PBO-10-3[4,5]	3.3	2.0	6.6	150	70
PBO-10-5[4,5]	5	2.0	10.0	150	76
PBO-10-9[4,5]	9	1.1	10.0	150	78
PBO-10-12[4,5]	12	0.83	10.0	150	80
PBO-10-15[4,5]	15	0.67	10.0	150	81
PBO-10-24[5]	24	0.42	10.0	150	82

Notes:
1. At full load, nominal input, 20 MHz bandwidth oscilloscope, with a 1 µF ceramic and 10 µF electrolytyic capacitor on the output.
2. At 230 Vac input.
3. All specifications are measured at Ta=25°C, humidity <75%, 115 or 230 Vac input voltage, and rated output load unless otherwise specified.
4. Discontinued model - vertical
5. Discontinued model - right angle

PART NUMBER KEY

PBO-10 - XX - X

- PBO-10 — Base Number
- XX — Output Voltage
- X — Orientation: "blank" = vertical, B = right-angle

Please read our datasheet & drawing disclaimer here.

INPUT

parameter	conditions/description	min	typ	max	units
voltage		85 100		305 430	Vac Vdc
frequency		47		63	Hz
current	at 115 Vac at 230 Vac			0.3 0.15	A A
inrush current	at 115 Vac at 230 Vac		15 30		A A

OUTPUT

parameter	conditions/description	min	typ	max	units
capacitive load	3.3 Vdc output models 5 Vdc output models 9 Vdc output models 12 Vdc output models 15 Vdc output models 24 Vdc output models			1,500 1,500 1,000 680 470 330	µF µF µF µF µF µF
initial set point accuracy	from 0~100% load 3.3 Vdc output models all other models			 ±3 ±2	 % %
line regulation	at rated load		±0.5	±1	%
load regulation	from 0~100% load		±1	±1.5	%
temperature coefficient			±0.02		%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection	output voltage clamp or hiccup 3.3 & 5 Vdc output models 9 Vdc output models 12 & 15 Vdc output models 24 Vdc output models			 9 15 25 35	 Vdc Vdc Vdc Vdc
over current protection	auto recovery	110			%
short circuit protection	continuous, auto recovery, hiccup				

SAFETY & COMPLIANCE

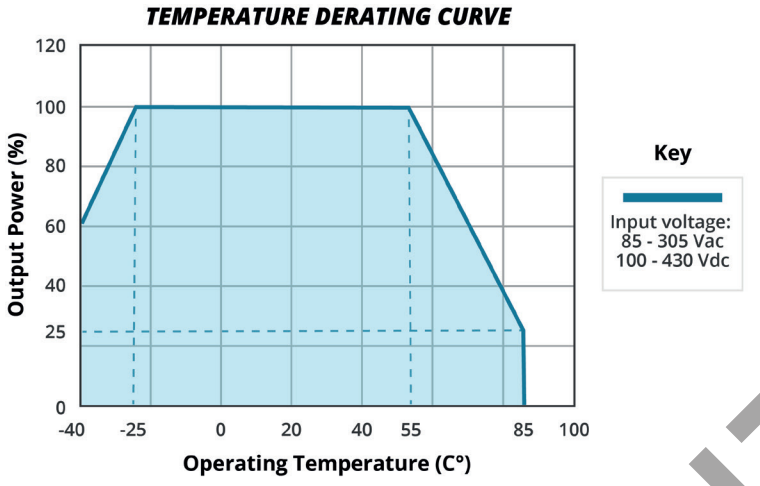
parameter	conditions/description	min	typ	max	units
isolation voltage	input to output, 1 min, <5mA	3,000			Vac
safety approvals	certified to 62368: IEC, EN, UL designed to meet 60335: IEC, EN				
safety class	class II				
conducted emissions	CISPR32/EN55032 Class A (recommended circuit 1,4) CISPR32/EN55032 Class B (recommended circuit 2,3)				
radiated emissions	CISPR32/EN55032 Class A (recommended circuit 1,4) CISPR32/EN55032 Class B (recommended circuit 2,3)				
ESD	IEC/EN61000-4-2, ±6 kV, perf. Criteria B				
radiated immunity	IEC/EN61000-4-3, 10V/m, perf. Criteria A				
EFT/burst	IEC/EN61000-4-4, ±2 kV (recommended circuit 1,2), perf. Criteria B IEC/EN61000-4-4, ±4 kV (recommended circuit 3,4), perf. Criteria B				
surge	IEC/EN61000-4-5, line to line ±1kV (recommended circuit 1,2), perf. Criteria B IEC/EN61000-4-5, line to line ±2kV (recommended circuit 3,4), perf. Criteria B IEC/EN61000-4-5, line to line ±4kV (recommended circuit 4), perf. Criteria B				
conducted immunity	IEC/EN61000-4-6, 10 Vr.m.s, perf. Criteria A				
voltage dips & interruptions	IEC/EN61000-4-11 0%, 70%, perf. Criteria B				
MTBF	as per MIL-HDBK-217 at °C	300,000			hours
RoHS	yes				

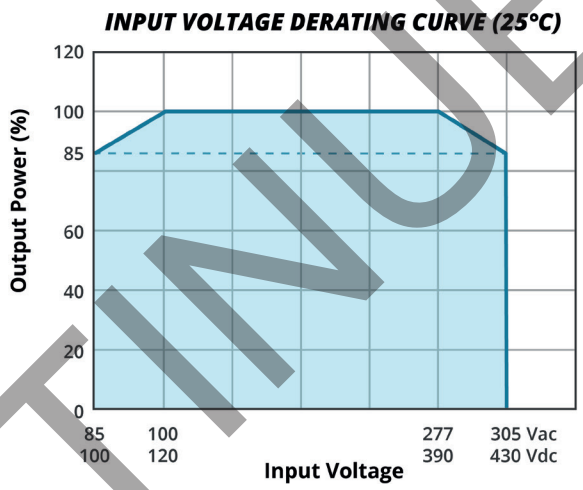
DISCONTINUED

ENVIRONMENTAL

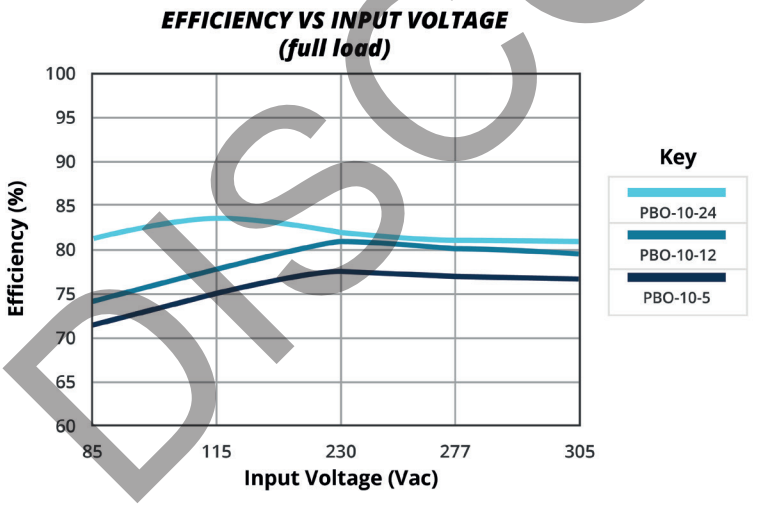
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-40		85	°C
storage temperature		-40		105	°C
storage humidity	non-condensing			95	%

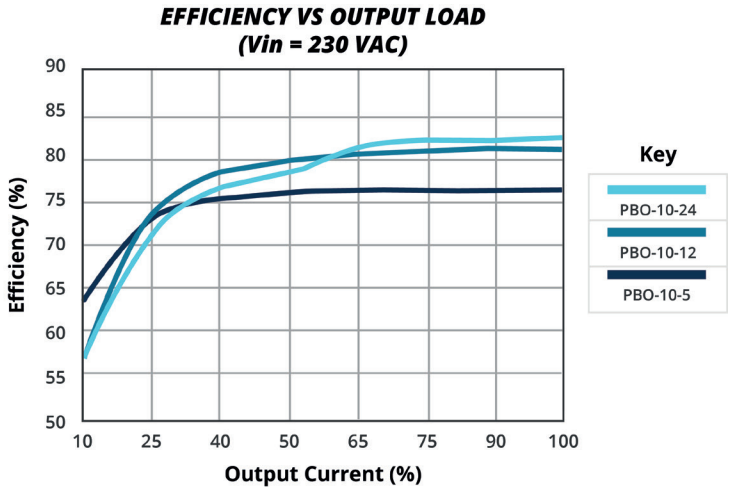
DERATING CURVES





EFFICIENCY CURVES





DISCONTINUED

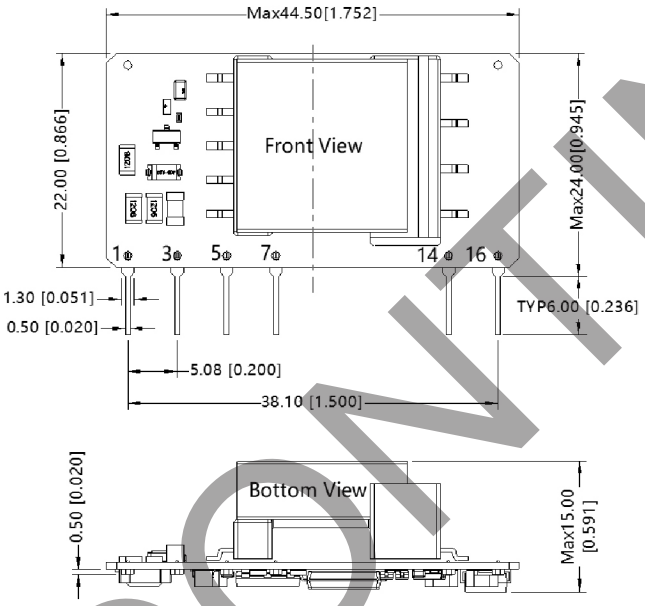
MECHANICAL

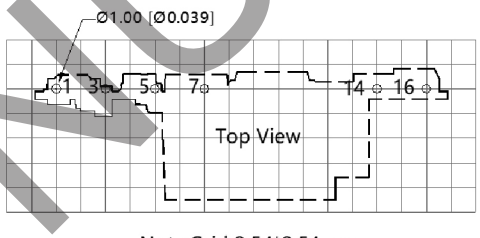
parameter	conditions/description	min	typ	max	units
dimensions	44.50 x 24.00 x 15.00 (1.751 x 0.944 x 0.590 inches)				mm
weight			11		g

MECHANICAL DRAWING

Vertical Orientation
units: mm[inch]
pin section tolerance: ±0.10[±0.004]
tolerance: ±0.50[±0.020]

PIN CONNECTIONS	
PIN	Function
1	AC (N)
3	AC (L)
5	+V(CAP)
7	-V(CAP)
14	-Vo
16	+Vo





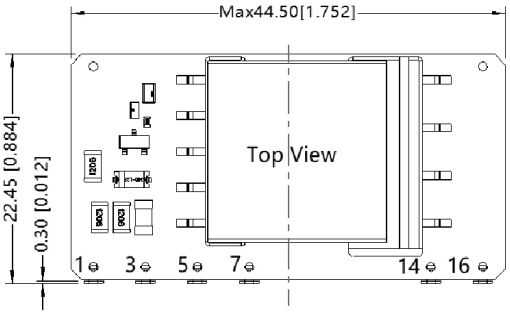
Note:Grid 2.54*2.54mm

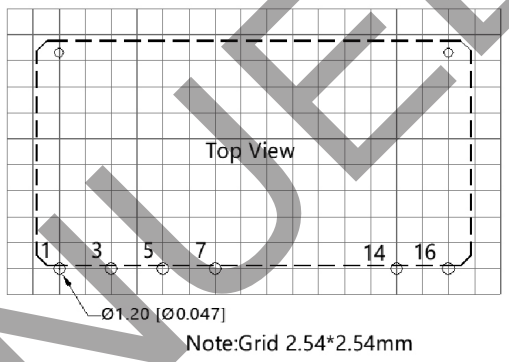
DISCONTINUED

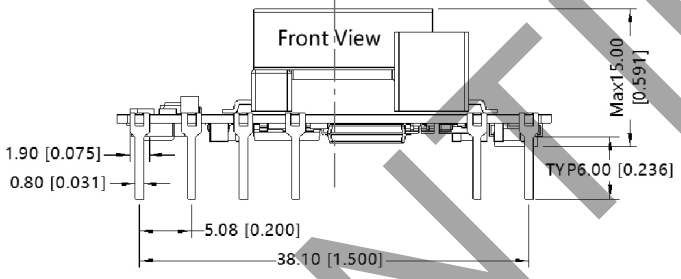
MECHANICAL DRAWING (CONTINUED)

Right-angle Orientation
units: mm[inch]
tolerance: ±0.50[±0.020]
pin section tolerance: ±0.10[±0.004]

PIN CONNECTIONS	
PIN	Function
1	AC (N)
3	AC (L)
5	+V(CAP)
7	-V(CAP)
14	-Vo
16	+Vo

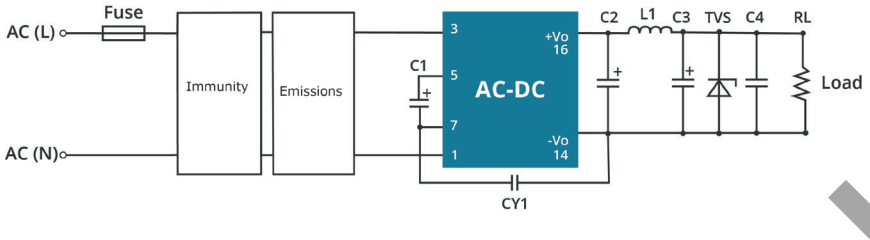


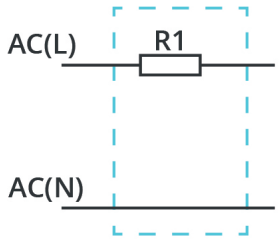
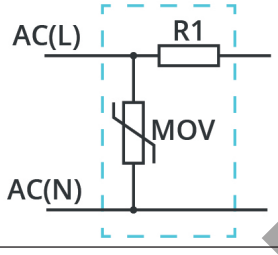
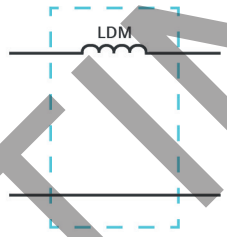
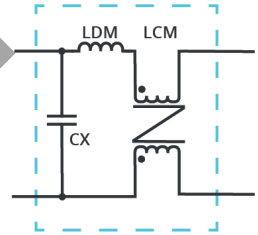




DISCONTINUED

APPLICATION DESIGN REFERENCE



PBO-10 series additional circuits design reference			
Immunity design circuits for reference		Emissions design circuits for reference	
Class III	Class IV	Class A	Class B
			

PBO-10 Series additional component selection guide								
Part no.	FUSE (required)	C1 (required)	C2 (required)	L1 (required)	C3[1] (required)	C4	CY1 (required)	TVS[2]
PBO-10-3	1A/300V	22μF/450V	470μF/16V (solid-state capacitor)	4.7μF (max 60mΩ)	150μF/35V	0.1μF/50V	1.0nF/400Vac	SMBJ7.0A
PBO-10-5								SMBJ7.0A
PBO-10-9			270μF/16V (solid-state capacitor)		100μF/35V			SMBJ12A
PBO-10-12								SMBJ20A
PBO-10-15			470μF/35V		47μF/35V			SMBJ20A
PBO-10-24			220μF/35V					SMBJ30A

Note: 1. Recommended to use a high frequency, low ESR, electrolytic capacitor with at least 20% margin on voltage rating.
2. A suppressor diode (TVS) is recommended to protect the downstream application in case of converter failure and should be rated for a minimum of 1.2 times the converter's output voltage.

PBO-10 Series Environmental and EMC selection guide						
Recommended circuit	Application environment	Typical industry	Input voltage range	Environment temperature	Emissions	Immunity
1	Basic application	None	85 ~ 305 Vac	-40° ~ 85°C	Class A	Class III
2	Indoor civil	Smart home / Home appliances (2 Y-caps)		-25° ~ 55°C	Class B	Class III
	Indoor general	Intelligent building / Intelligent agriculture				
3	Indoor industrial	Manufacturing workshop		-25° ~ 55°C	Class B	Class IV
4	Oudoor general	ITS / Video monitoring / Charging point / Communication / Securitiy and protection		-40° ~ 85°C	Class A	Class IV
	Outdoor harsh	On-line power meter Communication base station		-40° ~ 85°C	Class A	Class IV Surge: line to gnd ±4KV EFT: Class IV

DISCONTINUED

EMC RECOMMENDED CIRCUIT

Circuit 1

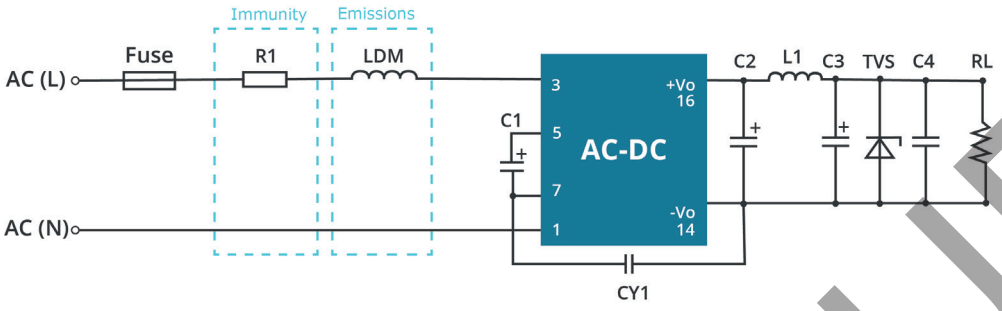


Table 1

Application environment	Ambient temperature range	Immunity Class	Emissions Class
Basic application	-40°C ~ 85°C	Class III	Class A

Component	Recommended value
R1	12Ω/3W
LDM	4.7mH

Note: R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

Circuit 2

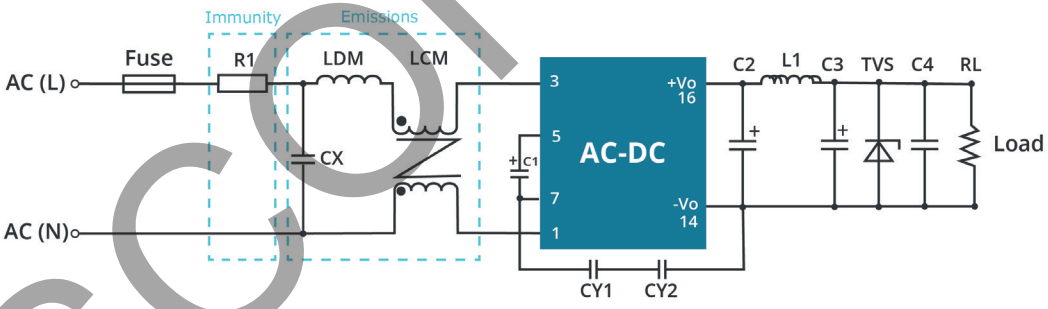


Table 2

Application environment	Ambient temperature range	Immunity Class	Emissions Class
Indoor civil / general	-25°C ~ 55°C	Class III	Class B

Component	Recommended value
R1	12Ω/3W
CY1 (CY2)	1.0nF/400Vac
LCM	3.5 mH
LDM	0.33 mH
CX	0.1μF/310Vac
FUSE (required)	1A/300V, slow-blow

Note: 1. For Smart Home and Home Appliance applications two Y-capacitors are required in series (2.2 nF/400 Vac each) to meet 60335 household safety rquirements.
2. R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

DISCONTINUED

EMC RECOMMENDED CIRCUIT (CONTINUED)

Circuit 3

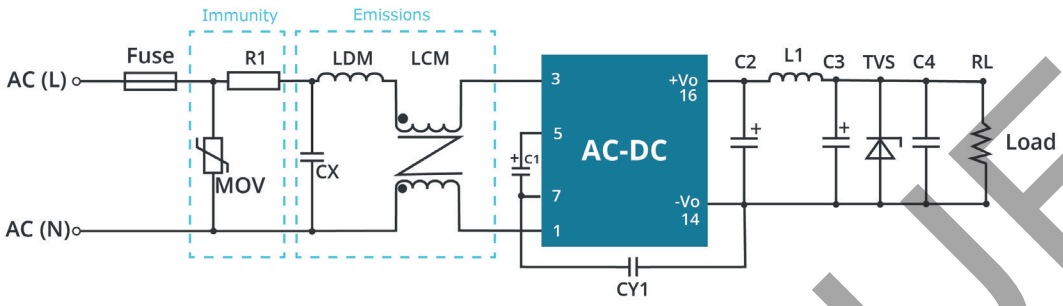


Table 3

Application environment	Ambient temperature range	Immunity Class	Emissions Class
Indoor industrial	-25°C ~ 55°C	Class IV	Class B

Component	Recommended value
MOV	S14K350
C1	22uF/450V
CY1	2.2nF/400Vac
CX	0.1μF/310Vac
LCM	3.5mH
LDM	0.33mH
R1	12Ω/3W
FUSE (required)	2A/300V, slow-blow

Note: R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

DISCONTINUED

EMC RECOMMENDED CIRCUIT (CONTINUED)

Circuit 4

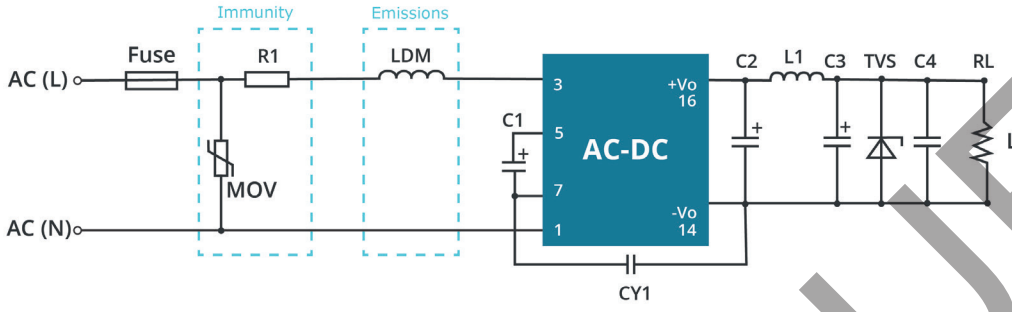


Table 4

Application environment	Ambient temperature range	Immunity Class	Emissions Class
Outdoor general	-40°C ~ 85°C	Class IV	Class A

Component	Recommended value
MOV	S14K350
C1	22uF/450V
LDM	4.7mH
R1	12Ω/3W
FUSE (required)	2A/300V, slow-blow

Note: R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

Table 5

Application environment	Ambient temperature range	Immunity Class	Emissions Class
Outdoor harsh	-40°C ~ 85°C	Class IV surge: line to ground ± 4kV EFT: Class IV	Class A

Component	Recommended value
MOV	S20K350
C1	33uF/450V (surge protection priority)
LDM	4.7mH
R1	33Ω/5W
FUSE (required)	6.3A/300V, slow-blow

Note: R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

DISCONTINUED

REVISION HISTORY

rev.	description	date
1.0	initial release	12/10/2020
1.01	derating and efficiency curves updated	01/21/2022
1.02	UKCA added to spec	05/25/2022
1.03	discontinued models PBO-10-3 PBO-10-5, PBO-10-9, PBO-10-12, PBO-10-15, PBO-10-3-B, PBO-10-5-B, PBO-10-9-B, PBO-10-12-B, PBO-10-15-B, PBO-10-24-B	04/09/2023

The revision history provided is for informational purposes only and is believed to be accurate.

DISCONTINUED

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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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