ZAO-15-BxxE Series

15W，AC/DC Converter

DESCRIPTIONS

ZAO-15-BxxE series is a special power supply design for the smart grid industry that meets the power industry standards. It features AC input and at the same time accepts DC input voltage, with ultra-wide input voltage range, wide operating temperature range, high EMS level, high reliability, and high isolation. It is suitable for smart grid occasions with poor power quality and high reliability requirements, such as smart power transmission and substations. It also can be used in microcomputer protection equipment, bus voltage protection equipment or equipment with high reliability requirements that require 110VDC input voltage.

RoHS

CE Report

EN62368-1

FEATURES

- Specific power supply designing for smart grid
- Ultra-thin, product height less than 22mm
- Ultra-wide 85 - 305VAC and 88 - 430VDC input voltage range
- Ultra-wide operating ambient temperature range: -40℃ to +85℃
- High reliability, low output ripple & noise
- EMI performance meets CISPR32/EN55032 CLASS B
- Immunity meets electricity standard Level 4
- Meets impulse voltage requirements of 1.2/50us 5KV
- Safety according to UL/IEC62368

APPLICATIONS

- Microcomputer protection
- Bus voltage protection
- smart power transmission

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current	Output Voltage Adjustable Range ADJ (V)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
EN	ZAO-15-B03E	9.9W	3.3V/3000mA	2.97-3.63	71	12000
	ZAO-15-B05E	15W	5V/3000mA	4.5-5.5	78	12000
	ZAO-15-B12E	15.6W	12V/1300mA	10.8-13.2	83	5000
	ZAO-15-B15E	15W	15V/1000mA	13.5-16.5	84	4000
	ZAO-15-B24E	16.8W	24V/700mA	21.6-26.4	85	1000

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Specifications

Product Specifications	Item		Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Voltage Range		AC input		85	--	305	VAC
			DC input		88	--	430	VDC
	Input Frequency				47	--	440	Hz
	Input Current		115VAC		--	--	370	mA
			230VAC		--	--	220	
	Inrush Current		115VAC		--	15	--	A
			230VAC		--	30	--	
	Leakage Current		277VAC		0.5mA RMS max.			
	Hot Plug				Unavailable			
Output Specifications	Output Voltage Accuracy		0% - 100% load	3.3V, 5V output	--	±2	--	%
				Other output	--	±1	--	
	Line Regulation		Rated load	3.3V, 5V output	--	±0.8	--	
				Other output	--	±0.4	--	
	Load Regulation		0% - 100% load		--	±1	--	
	Ripple & Noise*		100MHz bandwidth (peak-to-peak value)		--	70	120	mV
	Stand-by Power Consumption				--	--	0.5	W
	Temperature Coefficient				--	±0.02	--	%/° C
	Short Circuit Protection				Hiccup, continuous, self-recovery			
	Over-voltage Protection		3.3VDC output		≤5.25V	Output voltage clamp or hiccup		
			5VDC output		≤7V			
			12VDC output		≤16V			
			15VDC output		≤20.3V			
			24VDC output		≤32.4V			
	Over-current Protection				≥120%Io, self-recovery			
	Minimum Load				0	--	--	%
	Start-up Delay Time				--	500	1000	ms
	Hold-up Time		115VAC input, Io=100%		--	20	--	ms
			230VAC input, Io=100%		--	130	--	
General Specifications	Isolation	Input - output	Electric Strength Test for 1min., leakage current <10mA		4000	--	--	VAC
		Input - PE	Electric Strength Test for 1min., leakage current <5mA		2000	--	--	
		Output - PE	Electric Strength Test for 1min., leakage current <20mA		500	--	--	

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General Specifications	Insulation Resistance	Input - output	500VDC	100	--	--	MΩ
		Input - PE					
		Output - PE					
	Impulse Withstand Voltage	Input - output	5KV, 1.2/50 us Impulse voltage				
		Input - PE					
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-40	--	+85	
	Storage Humidity			--	--	90	%RH
	Altitude			--	--	5000	m
	Power Derating		-40℃ to -25℃	2	--	--	%/℃
		Natural air cooling	+50℃ to +70℃	2.5	--	--	
			+70℃ to +85℃	1.2	--	--	
		Forced cooling wind speed≥ 0.7m/s	+60℃ to +70℃	3	--	--	
			+70℃ to +85℃	2	--	--	
			85VAC - 100VAC	1.33	--	--	%/VAC
			277VAC - 305VAC	0.72	--	--	
			2000m-5000m	5	--	--	%/Km
	Safety Class			CLASS II			
	MTBF			MIL-HDBK-217F@25℃ >300,000 h			
Mechanical Specifications	Dimension		87.50 x 50.00 x 22.00 mm				
	Weight		3.3V/5V/12V	53g (Typ.)			
			15V/24V	58g (Typ.)			
	Cooling method		Free air convection				

Note: *The "Tip and barrel method" is used for ripple and noise test, with a 0.1uf ceramic capacitor & 100uf parallel capacitor.

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions	CE	CISPR32/EN55032	CLASS B	
		RE	CISPR32/EN55032	CLASS B	
	Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/ Air ±15KV	Perf. Criteria B
		RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
		EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria B
		Surge	IEC/EN61000-4-5	Line to line ±2KV/ line to ground ±4KV	Perf. Criteria B
		CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
		Voltage dips, short interruption and voltage variations	IEC/EN61000-4-11	100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods	Perf. Criteria B

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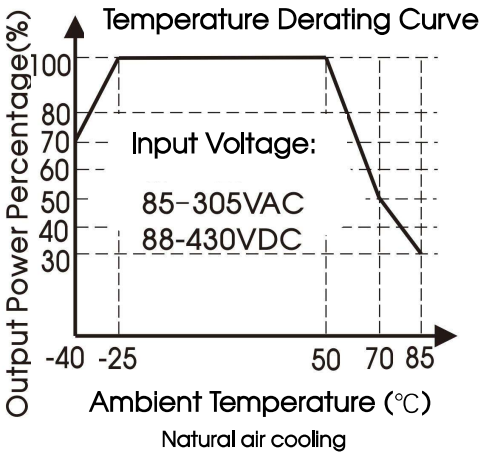
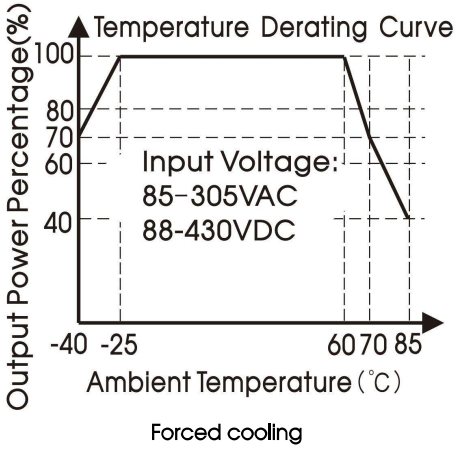
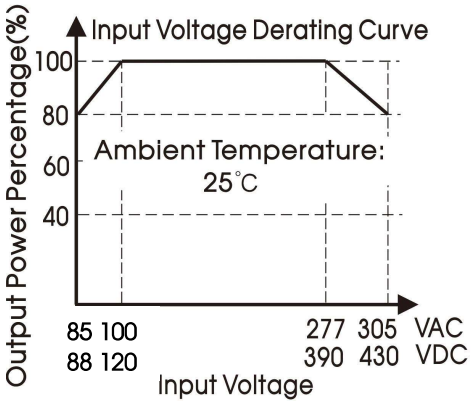
Product Characteristic Curve

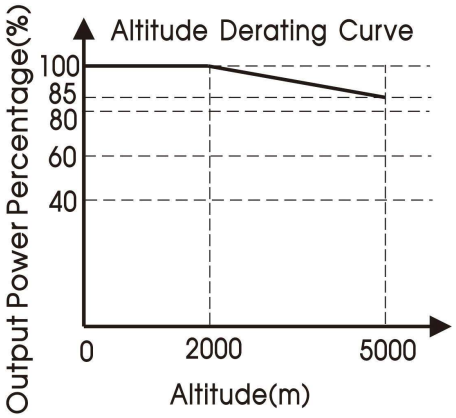


Natural air cooling



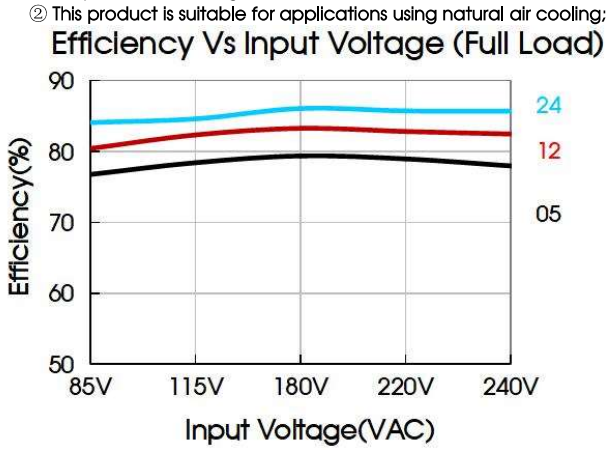
Forced cooling

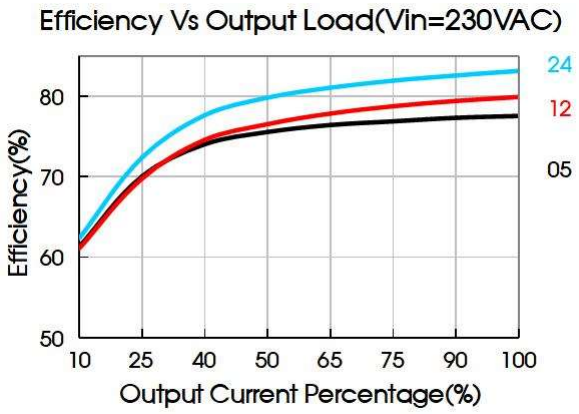




Note: ① With an AC input between 85-100VAC/277-305VAC and a DC input between 88-120VDC/390-430VDC, the output power must be derated as per temperature derating curves;

② This product is suitable for applications using natural air cooling;





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Design Reference

1. Typical application

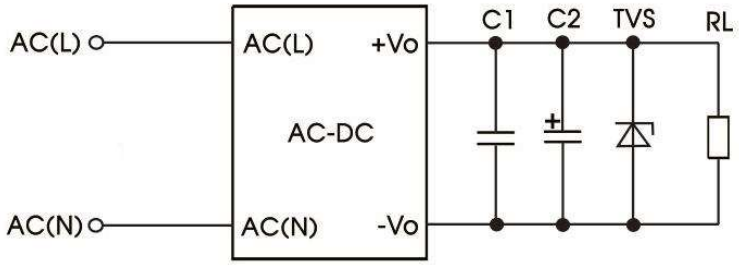

Fig. 1: Typical circuit diagram

Part no.	C1	C2	TVS
ZAO-15-B03E	0.1μF/50V	100μF/50V	SMBJ7.0A
ZAO-15-B05E			SMBJ7.0A
ZAO-15-B12E			SMBJ20A
ZAO-15-B15E			SMBJ20A
ZAO-15-B24E			SMBJ30A

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

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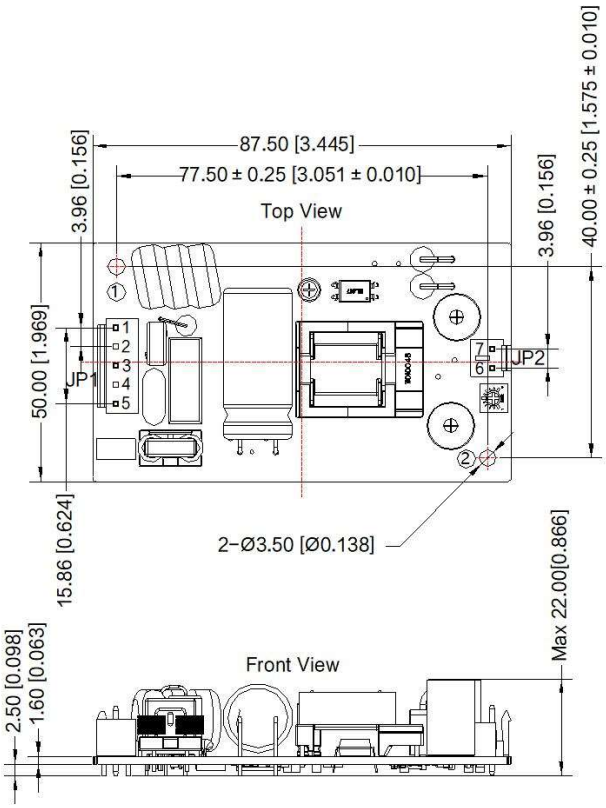
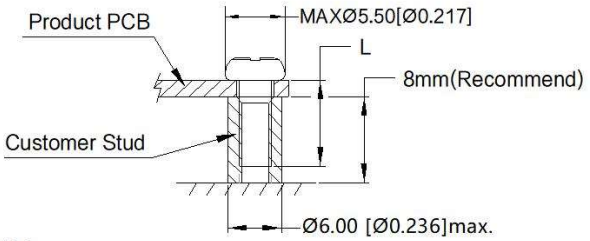
Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Pin-Out			
Connectors	Pin	Mark	Client Connectors
JP1	1	PE	Housing: JST VHR Contact: JSTSVH-21T-P1.1 or equivalent
	2	No Pin	
	3	AC(N)	
	4	No Pin	
	5	AC(L)	
JP2	6	+Vo	Housing: JST VHR Contact: JSTSVH-21T-P1.1 or equivalent
	7	-Vo	

Position	Screw Spec.	L(Recommend)	Torque(max)
① - ②	M3	6mm	0.4N · m



Note:
Unit: mm[inch]
General tolerances: ± 0.50[± 0.020]
The layout of the device is for reference only, please refer to the actual product

Note:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on our company corporate standards;
3. We can provide product customization service, please contact our technicians directly for specific information;
4. Products are related to laws and regulations: see "Features" and "EMC";

Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.