DESCRIPTIONS

20W，AC-DC Converter





RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

FEATURES

- Universal 85-305VAC or 100-430VDC input voltage
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4200VAC
- Up to 87% efficiency
- Output short circuit, over-current, over-voltage protection
- 5000m altitude application
- Plastic case meets UL94V-0 flammability
- Meets Emissions CLASS B and surge LEVEL 4 without
- additional circuits
- OVC III (meet IEC62477-1, 2000m altitude)

APPLICATIONS

- Industrial
- Electric power
- Civil applications

Selection Guide

Certification	Part No.	Output Power (W)	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN/BS EN	APH20-03	11.55	3.3V/3500mA	80	36000
	APH20-05	15.5	5V/3100mA	82	12240
	APH20-09	18.9	9V/2100mA	85	5600
	APH20-12	19.2	12V/1600mA	86	5000
	APH20-15	19.5	15V/1300mA	87	3000
	APH20-24	20.4	24V/850mA	85	1200
	APH20-48	19.68	48V/410mA	87	500

Note: 1.*Use suffix ” E2” for chassis and suffix ” D4” for DIN-Rail mounting.
2.The product picture is for reference only. For details, please refer to the actual product.

Specifications

Product Specifications	Item		Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Voltage Range		AC input		85	--	305	VAC
			DC input		100	--	430	VDC
	Input Frequency				47	--	63	Hz
	Input Current		115VAC		--	--	0.6	A
			230VAC		--	--	0.34	
	Inrush Current		115VAC		--	35	--	
			230VAC		--	70	--	
	Leakage Current		277VAC/50Hz		0.25mA RMS Max.			
	Recommended External Input Fuse				3.15A/300V, slow-blow, required			
	Hot Plug				Unavailable			
Output Specifications	Output Voltage Accuracy		All load range	3.3V output	--	±3	--	%
				others	--	±2	--	
	Linear Regulation		Full load		--	±0.5	--	
	Load Regulation		0% - 100% load		--	±1	--	
	Ripple & Noise*		20MHz bandwidth (peak-to-peak value)		--	--	100	mV
	Temperature Coefficient				--	±0.02	--	%/℃
	Stand-by Power Consumption		230VAC	3.3V/5V/9V/12V/15V/24V	--	0.15	0.3	W
				48V	--	0.3	0.5	
	Short Circuit Protection				Hiccup, continuous, self-recovery			
	Over-current Protection				≥130% Io, self-recovery			
	Over-voltage Protection		3.3/5V		≤7.5VDC (Output voltage Hiccup)			
			9V		≤15VDC (Output voltage Hiccup)			
			12/15V		≤20VDC (Output voltage Hiccup)			
			24V		≤30VDC (Output voltage Hiccup)			
			48V		≤60VDC (Output voltage Hiccup)			
	Minimum Load				0	--	--	%
	Hold-up Time		115VAC		--	15	--	ms
			230VAC		--	80	--	
General Specifications	Isolation	Input - output	Electric Strength Test for 1min., leakage current <5mA		4200	--	--	VAC
		Input - ⏚			2500	--	--	
		Output - ⏚			1250	--	--	
	Impulse Withstand Voltage	Input - output	1.2/50us impulse waveform, three positive/ negative pulses, interval ≥ 5s. There is no breakdown discharge during the test.		6000	--	--	VDC
		Input - ⏚			6000	--	--	
		Output - ⏚			6000	--	--	

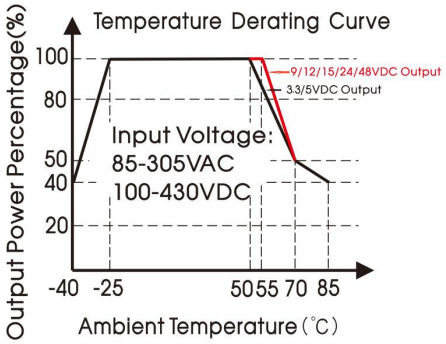
General Specifications	Insulation Resistance	Input - output	At 500VDC	100	--	--	MΩ
		Input - ⏚		100	--	--	
		Output - ⏚		100	--	--	
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-40	--	+105	
	Storage Humidity			--	--	95	%RH
	Soldering Temperature		Wave-soldering	260 ± 5℃; time: 5-10s			
			Manual-welding	360 ± 10℃; time: 3-5s			
	Switching Frequency			--	65	--	KHz
	Power Derating		-40℃ to -25℃	4.00	--	--	%/℃
			+50℃ to +70℃ (3.3V/5V)	2.50			
			+55℃ to +70 (9V/12V/15V/24V/48V)	3.33	--	--	
			+70℃ to +85℃	0.67	--	--	
			85VAC - 100VAC	1.67	--	--	%/VAC
			277VAC - 305VAC	0.72	--	--	
			2000m - 5000m	6.67	--	--	%/Km
	Safety Class			CLASS I			
	MTBF		MIL-HDBK-217F@25℃	≥300,000 h			
Mechanical Specifications	Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)				
	Dimension		Horizontal package	62.00 x 45.00 x 22.50 mm			
			E2 chassis mounting	96.10 x 54.00 x 31.00mm			
			D4 Din-Rail mounting	96.10 x 54.00 x 35.60mm			
	Weight		Horizontal package/E2 chassis mounting/D4 Din-Rail mounting	85g (Typ.)/130g (Typ.)/170g (Typ.)			
	Cooling Method		Free air convection				

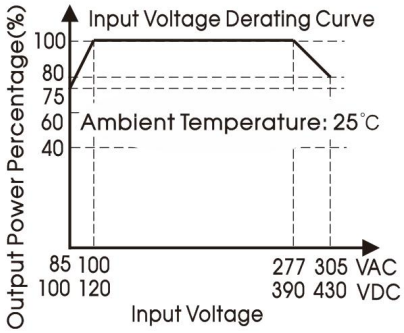
Note: * The "parallel cable" method is used for ripple and noise test.

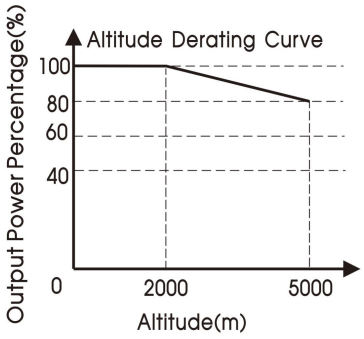
Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	CISPR32/EN55032 CLASS B	
		RE	CISPR32/EN55032 CLASS B	
	Immunity (EMS)	ESD	IEC/EN61000-4-2 Contact ±8KV/Air ±15KV	perf. Criteria A
		RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
		EFT	IEC/EN61000-4-4 ±4KV	perf. Criteria A
		Surge	IEC/EN61000-4-5 line to line ±2KV/line to PE ±4KV	perf. Criteria A
			IEC/EN61000-4-5 line to line ±4KV/ line to PE ±6KV (See Fig. 2 for recommended circuit)	perf. Criteria A
		CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A
		PFM	IEC/EN61000-4-8 30A/m	perf. Criteria A
		Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B

Characteristic Curve

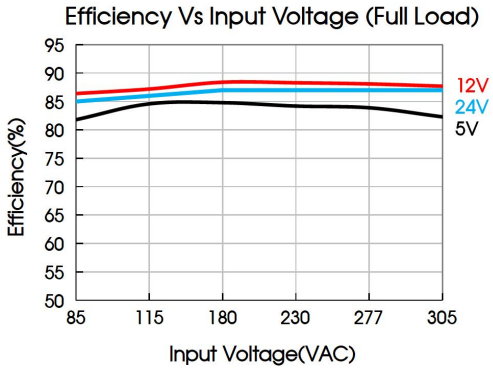


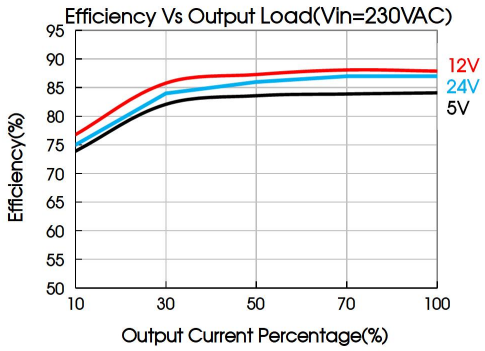




Note: ① With an AC input between 85-100VAC/277-305VAC and a DC input between 100-120VDC/390-430VDC, the output power must be derated as per temperature derating curves;

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





Design Reference

1. Typical application

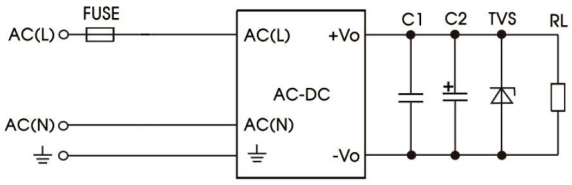


Fig. 1: Typical circuit diagram

Part No.	FUSE	C1	C2	TVS
APH20-03	3.15A/300V, slow-blow, required	1uF	680uF/25V	SMBJ7.0A
APH20-05			680uF/25V	SMBJ7.0A
APH20-09			470uF/25V	SMBJ12A
APH20-12			220uF/25V	SMBJ20A
APH20-15			220uF/25V	SMBJ20A
APH20-24			68uF/35V	SMBJ30A
APH20-48			33uF/63V	SMBJ64A

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.

2. EMC compliance recommended circuit

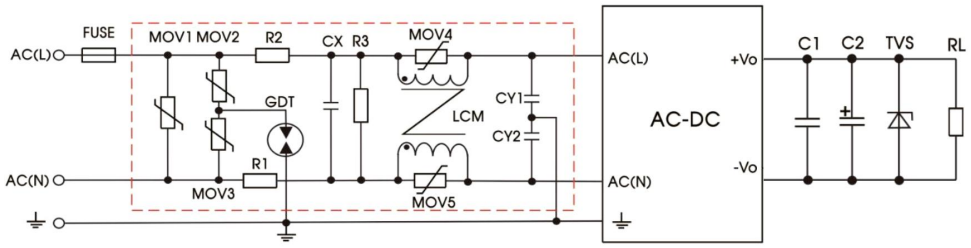
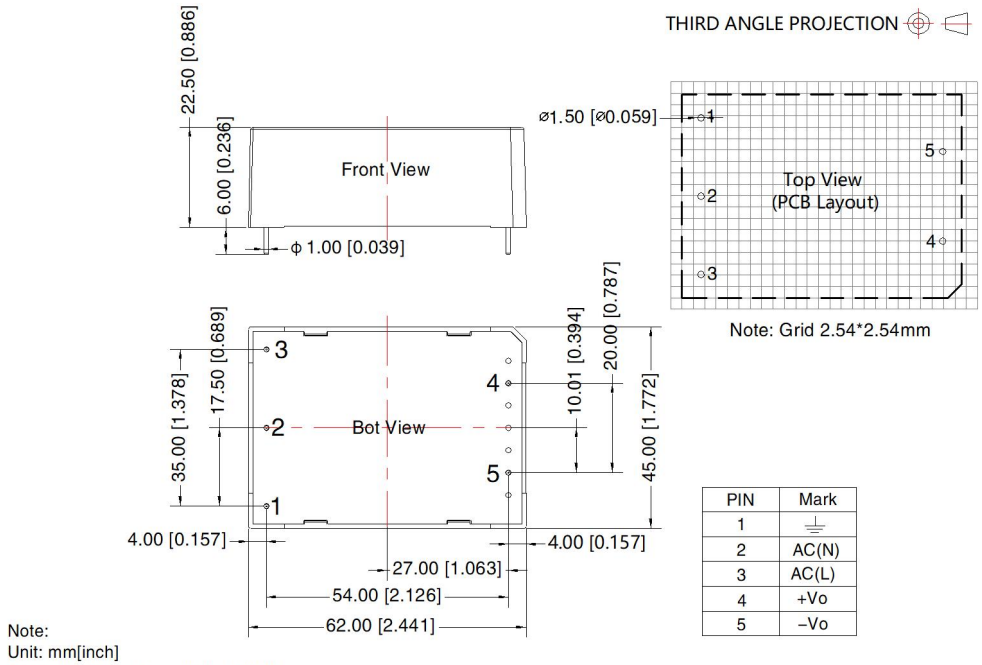


Fig. 2: EMC application circuit with higher requirements

(Output external circuit refer to the typical application)

Component	Recommended value	Component	Recommended value
MOV1	S20K350	CY1/CY2	2200PF/400VAC
MOV2/MOV3	S14K350	GDT	B 5G3600
MOV4/MOV5	S07K350	R3	1MΩ/2W (wire-wound resistor)
CX	0.15uF/310VAC	FUSE	3.15A/300V, slow-blow, required
R1/R2	2Ω/3W (wire-wound resistor)		
LCM	4.7mH		
Note: R3 can also be replaced by 4 pieces of 1.5MΩ/1206 SMD resistors in series and parallel.			

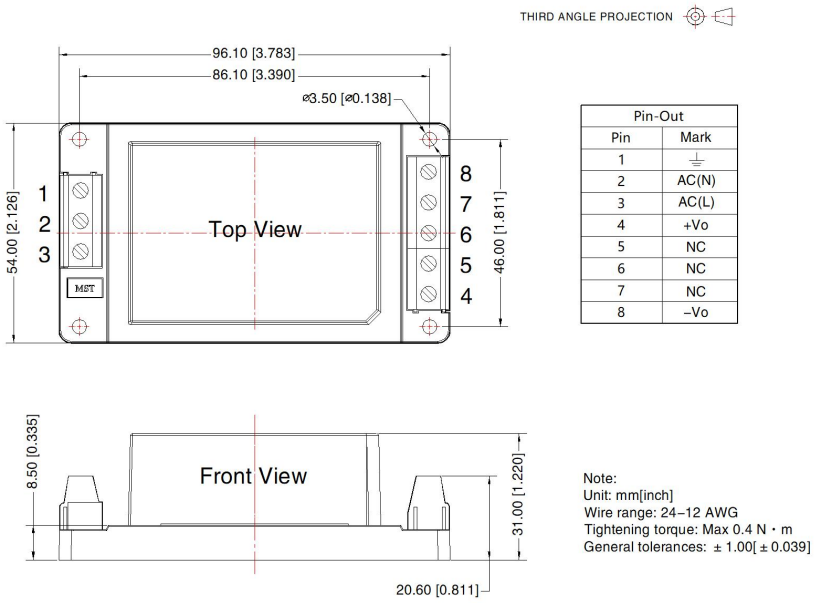
Dimensions and Recommended



PIN	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	–Vo

Note:
Unit: mm[inch]
General tolerances: ± 0.5[± 0.020]
Terminal section: ± 0.1[± 0.004]
The layout of the device is for reference only,
please refer to the actual product

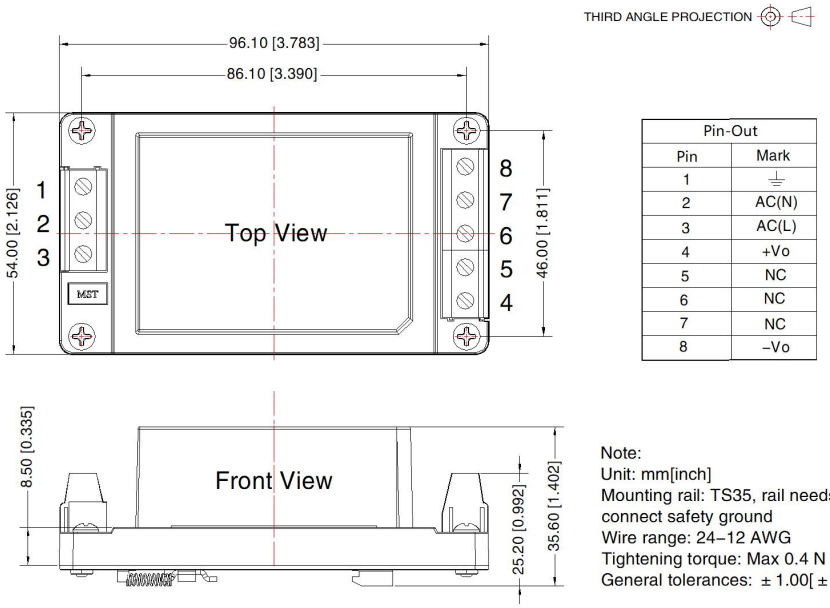
E2 Dimensions



Pin-Out	
Pin	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	–Vo

Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N・m
General tolerances: ± 1.00[± 0.039]

D4 Dimensions



Pin-Out	
Pin	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	–Vo

Note:
Unit: mm[inch]
Mounting rail: TS35, rail needs to connect safety ground
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N・m
General tolerances: ± 1.00[± 0.039]

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. 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;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.