

20W, AC-DC converter



UL US CE CB RoHS

FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40°C to +85°C
- High isolation voltage up to 4K VAC
- Regulated output, Low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case, meets UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B
- IEC62368, UL62368, EN62368 approval

LHE20-20Bxx series — a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, which meet IEC62368, CISPR32/EN55032, UL62368 and EN62368 standards, and it's widely used in industrial, office and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (μF)
UL/CE/CB	LHE20-20B03	11.55W	3.3V/3500mA	73	36000
	LHE20-20B05	15.5W	5V/3100mA	77	12240
	LHE20-20B09	20W	9V/2100mA	79	5600
	LHE20-20B12		12V/1600mA	81	5000
	LHE20-20B15		15V/1300mA	82	3000
	LHE20-20B24		24V/850mA	84	900

Note:*Part No. with suffix of "A2" means chassis mounting and suffix of "A4" means DIN-Rail mounting (e.g. LHE20-20B03A2 means chassis mounting; LHE20-20B03A4 means DIN-Rail mounting)

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	63	Hz
Input current	115VAC	--	--	0.60	A
	230VAC	--	--	0.34	
Inrush current	115VAC	--	20	--	
	230VAC	--	30	--	
Recommended External Input Fuse		2A/250V, slow fusing, necessary			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	3.3V output	--	±3	--	%
	Other output	--	±2	--	
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	100	mV
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccups, Continuous, self-recovery			
Over-current Protection		≥110%Io, self-recovery			

Over-voltage Protection	3.3V/5VDC output	≤7.5VDC (Output voltage clamp or hiccup)			
	9 VDC output	≤15VDC (Output voltage clamp or hiccup)			
	12V/15VDC output	≤20VDC (Output voltage clamp or hiccup)			
	24VDC output	≤30VDC (Output voltage clamp or hiccup)			
Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	15	--	ms
	230VAC input	--	80	--	
Note: * Ripple and noise tested with "parallel cable" method, Testing at rated load. please see <i>AC-DC Converter Application Notes</i> for specific operation methods.					

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	4000	--	--	VAC
Operating Temperature		-40	--	+85	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	95	%RH
Welding Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-welding	360 ± 10°C; time: 3 - 5s			
Power Derating	-40°C to -10°C	2.0	--	--	% / °C
	+50°C to +70°C	3.0	--	--	
	+70°C to +85°C	2.0	--	--	
	85 - 100VAC	1.67	--	--	% / VAC
	240 - 264VAC	0.83	--	--	
Safety Standard		IEC62368/EN62368/UL62368			
Safety-regulated Certification		IEC62368/EN62368/UL62368			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

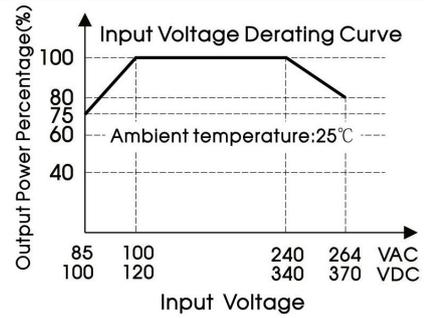
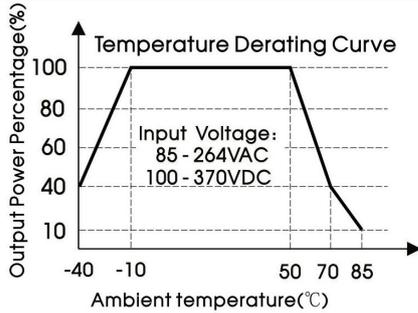
Physical Specifications

Casing Material		Black flame-retardant and heat-resistant plastic (UL94 V-0)
Package Dimensions	Horizontal package	62.00*45.00*22.50 mm
	A2 chassis mounting	96.10*54.00*31.00 mm
	A4 Din-Rail mounting	96.10*54.00*35.60 mm
Weight	Horizontal package	95g (Typ.)
	A2 chassis mounting	145g(Typ.)
	A4 Din-Rail mounting	185g(Typ.)
Cooling method		Free air convection

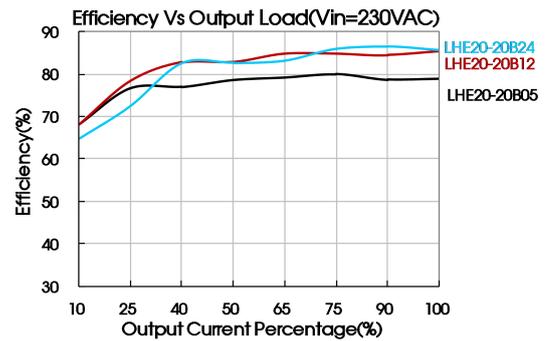
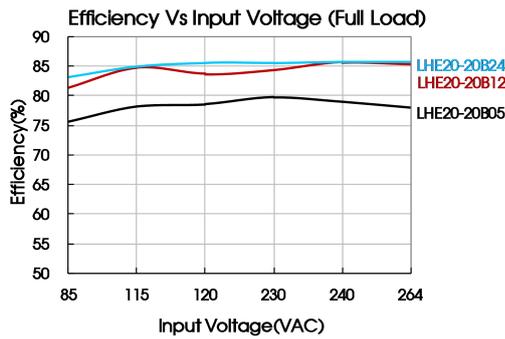
EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV	perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV /line to ground ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations	IEC/EN61000-4-11	0%,70%	perf. Criteria B

Product Characteristic Curve



Note: ① When input 85-100VAC/240-264VAC/100-120VDC/340-370VDC, it need to be voltage derated on basis of temperature derating;
② This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



Design Reference

1. Typical application circuit

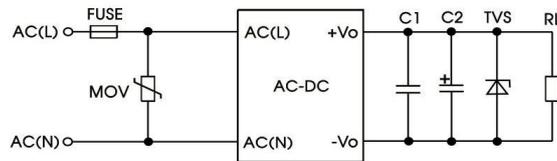


Fig. 1

Model	C2(μF)	FUSE	MOV	TVS
LHE20-20B03	680	2A/250V slow fusing, necessary	S14K300	SMBJ7.0A
LHE20-20B05	680			SMBJ7.0A
LHE20-20B09	470			SMBJ12A
LHE20-20B12	220			SMBJ20A
LHE20-20B15	220			SMBJ20A
LHE20-20B24	68			SMBJ30A

Note:
Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

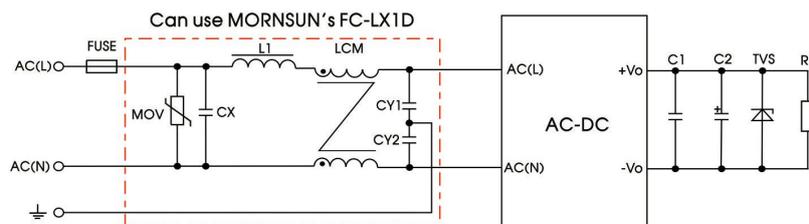
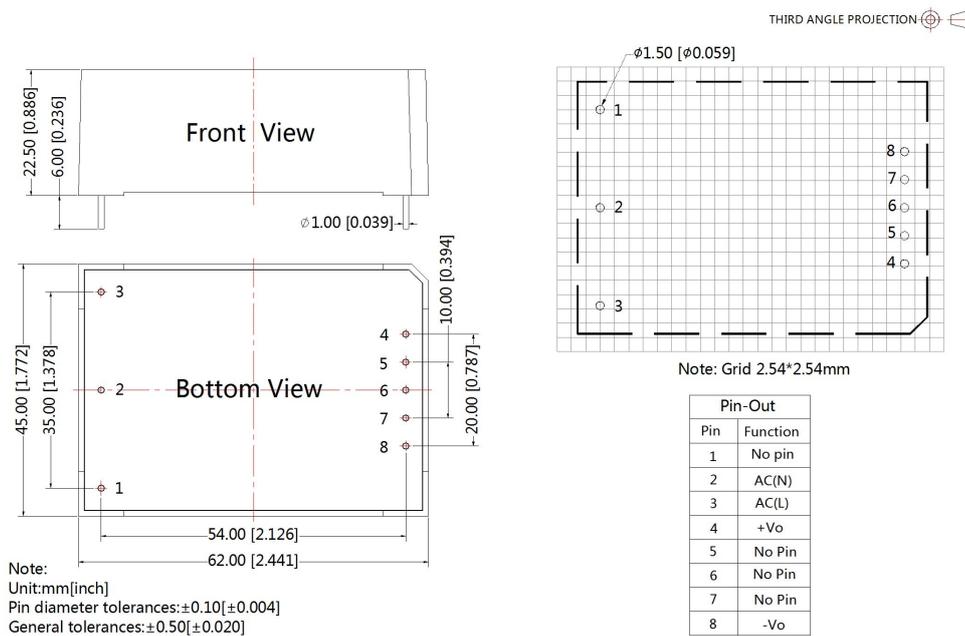


Fig 2

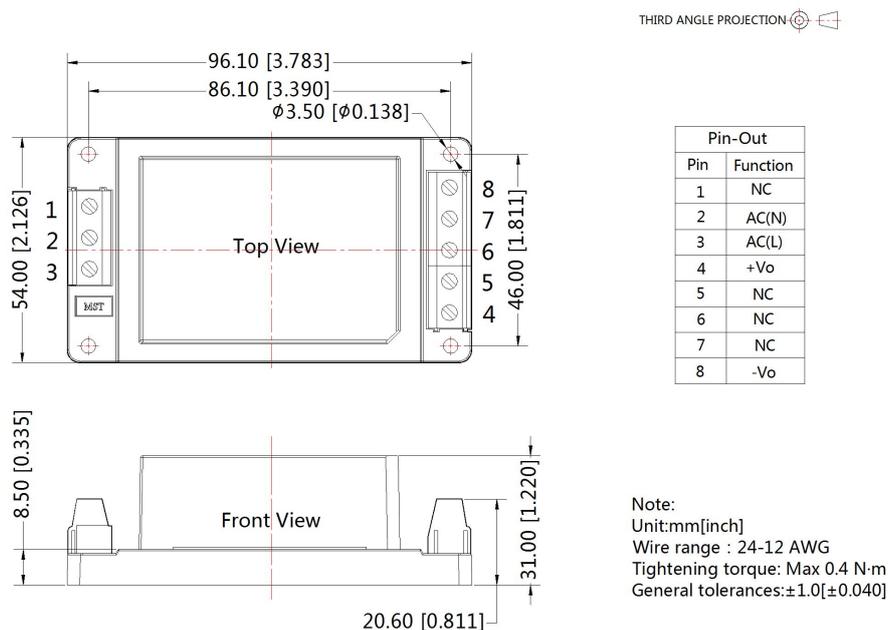
Element model	Recommended value
MOV	S14K300
CY1、CY2	1000pF/400VAC
CX	0.1μF/275VAC
LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
L1	4.7μH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	3.15A/250V slow fusing, necessary

3. For more information Please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout

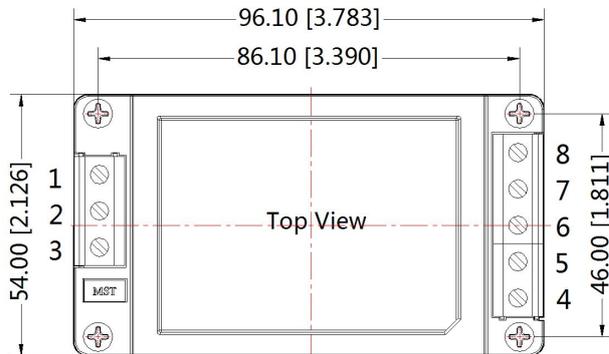


A2 Dimensions

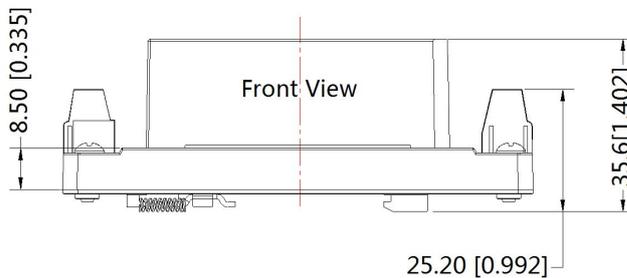


A4 Dimensions

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	NC
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
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: $\pm 1.0[\pm 0.040]$

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220006(Horizontal package); 58220010 (A2/A4 package);
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's 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.

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