10W, AC-DC converter

FEATURES

- 85 - 264V Universal AC or wide 100 - 370VDC Input
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4000VAC
- Regulated output, low ripple & noise
- Output short circuit, over-current and over-voltage protection
- High efficiency, high reliability
- Plastic case meets flammability per UL94V-0
- EMC compliant to CISPR32 / EN55032 CLASS B
- IEC/UL/EN62368 approval

LHE10-20Bxx series is one of Mornsun's compact size power converter. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and the safety certifications to UL62368, IEC62368 and EN62368 standards are pending. The converters are widely used in industrial and office applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
UL/CE/CB	LHE10-20B03	6.6 W	3.3V/2000mA	70	27000
	LHE10-20B05	10W	5V/2000mA	76	9500
	LHE10-20B09		9V/1100mA	78	3600
	LHE10-20B12		12V/900mA	80	2400
	LHE10-20B15		15V/700mA	81	1200
	LHE10-20B24		24V/450mA	82	470

Note:*Part No. with suffix of "A2" means chassis mounting and suffix of "A4" 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	--	--	0.26	A
	230VAC	--	--	0.16	
Inrush Current	115VAC	--	13	--	
	230VAC	--	23	--	
Leakage Current	230VAC/50Hz	0.3mA RMS typ.			
Recommended External Input Fuse		2A/250V, slow-blow, required			
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-to-peak value)	--	50	100	mV
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Continuous, self-recovery			

Over-current Protection		⩾110% Io, self-recovery			
Over-voltage Protection	3.3 / 5VDC Output	⩽7.5VDC			
	9VDC Output	⩽15VDC			
	12 /15VDC Output	⩽20VDC			
	24VDC Output	⩽30VDC			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	15	--	ms
	230VAC input	--	80	--	

Note: * The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Test	Input-output	Electric Strength Test for 1min., leakage current <5mA	4000	--	--	VAC
	Input-PE		2500	--	--	
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			--	100	--	kHz
Power Derating		-40℃ to -25℃	4.0	--	--	%/℃
		+55℃ to +70℃	3.3	--	--	
		+70℃ to +85℃	2.7	--	--	
		85 - 100VAC	1.67	--	--	%/VAC
		240 - 264VAC	0.83	--	--	
Safety Standard			IEC62368/EN62368/UL62368			
Safety Certification			IEC62368/EN62368/UL62368			
Safety Class			CLASS I			
MTBF			MIL-HDBK-217F@25°C > 300,000 h			

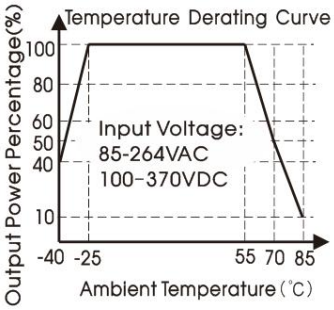
Mechanical Specifications

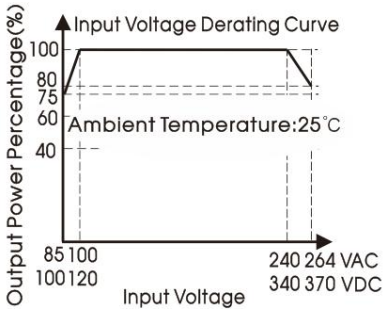
Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	Horizontal package	55.0 x 45.0 x 21.0 mm
	A2 chassis mounting	96.1 x 54.0 x 29.5 mm
	A4 Din-Rail mounting	96.1 x 54.0 x 34.1 mm
Weight	Horizontal package	75g (Typ.)
	A2 chassis mounting	125g (Typ.)
	A4 Din-Rail mounting	165g (Typ.)
Cooling method		Free air convection

Electromagnetic Compatibility (EMC)

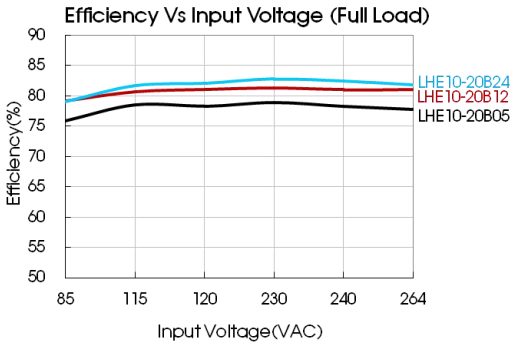
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN 61000-4-2	Contact ±6KV / Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 5 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV/line to ground ±4KV (See Fig. 5 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

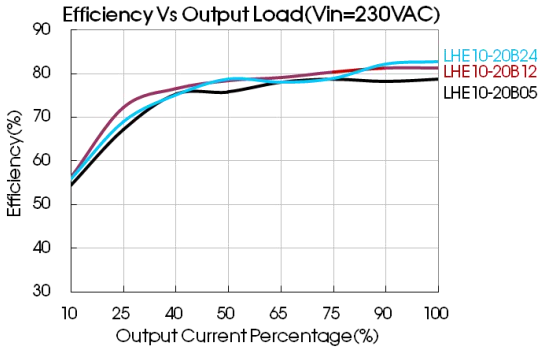
Product Characteristic Curve





Note: ① With an AC input between 85-100V/240-264VAC and a DC input between 100-120V/340-370VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Typical application

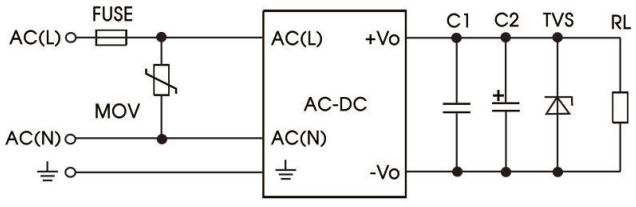


Fig. 1: Typical circuit diagram

Model	C2(μF)	FUSE	MOV	TVS
LHE10-20B03	470	2A/250V slow-blow required	S14K300	SMBJ7.0A
LHE10-20B05	330			SMBJ7.0A
LHE10-20B09	120			SMBJ12A
LHE10-20B12	120			SMBJ20A
LHE10-20B15	120			SMBJ20A
LHE10-20B24	68			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.

2. EMC compliance recommended circuit

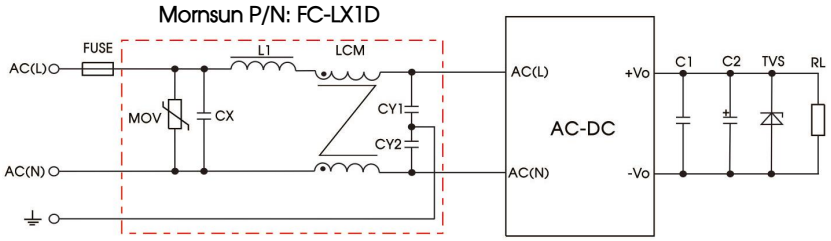
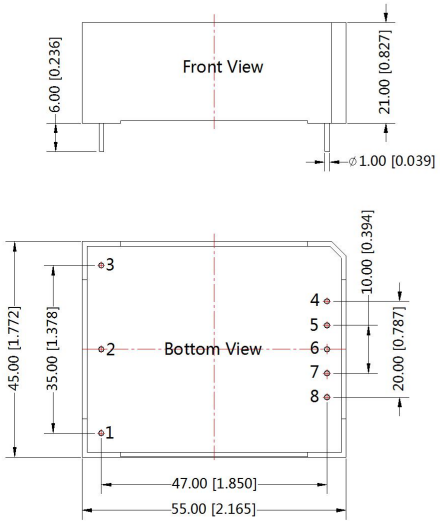


Fig 2: EMC circuit for harsh requirements; recommended filter part FC-LX1D (Mornsun)

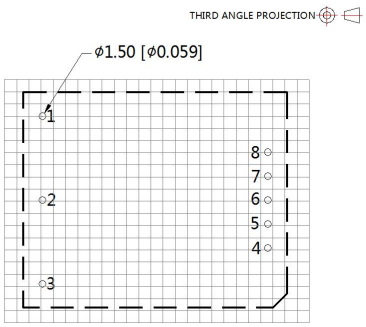
Component	Recommended value
MOV	S14K300
CY1, CY2	1000pF/400VAC
CX	0.1μF/275VAC
LCM	10mH, we recommend using part no. FL2D-Z5-103 (MORNSUN)
L1	4.7μH/2A
FC-LX1D	2kV/4kV EMC filter
FUSE	2A/250V slow-blow required

3. For additional information please refer to application notes on www.mornsun-power.com.

Dimensions and Recommended Layout



Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]

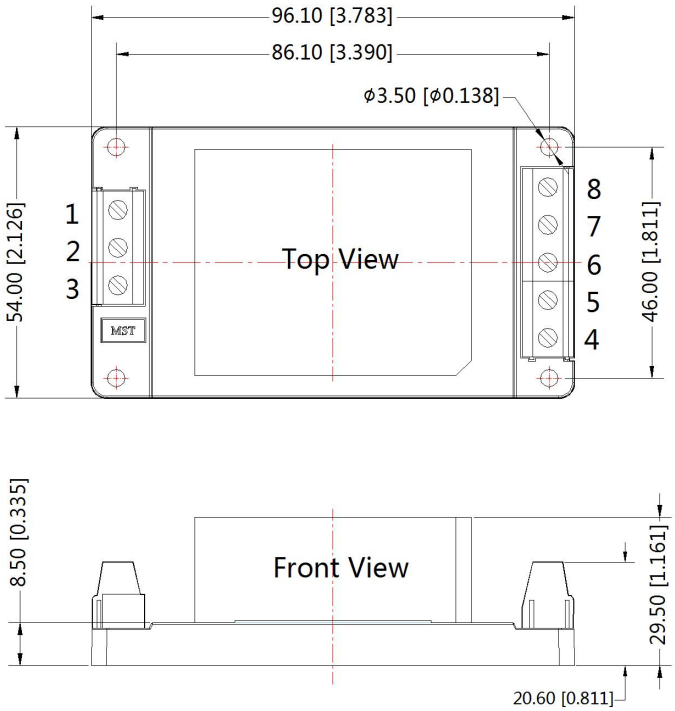


Note: grid 2.54*2.54mm

Pin-Out	
PIN	LHE10-20B
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	No Pin
7	No Pin
8	-Vo

A2 Dimensions

THIRD ANGLE PROJECTION

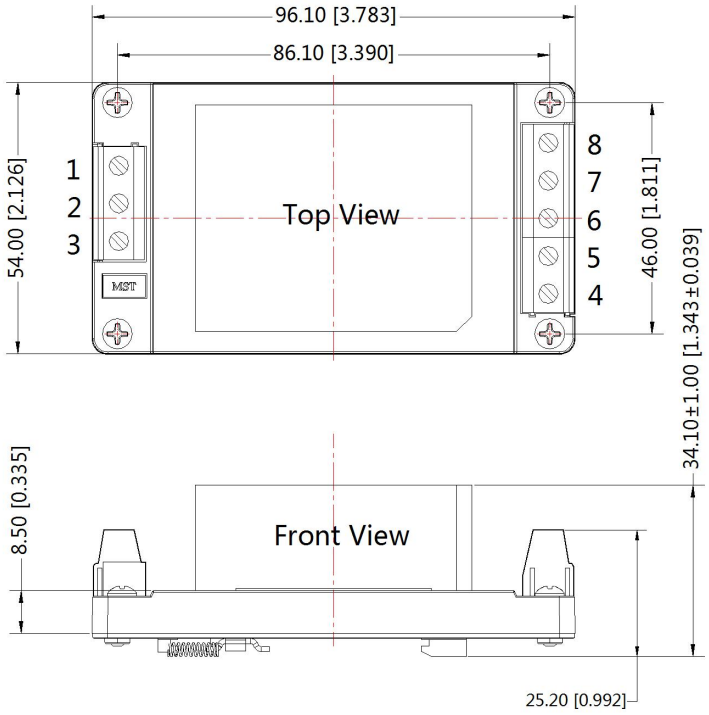


Pin-Out	
Pin	Function
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	-Vo

Note:
Unit:mm[inch]
Wire range : 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances:±1.0[±0.040]

A4 Dimensions

THIRD ANGLE PROJECTION



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

Note:
Unit:mm[inch]
Installed on DIN rail TS35,rail needs to connect safety ground
Wire range : 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances:±1.0[±0.040]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220006(Horizontal package); 58220010 (A2/A4 package);
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.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com