

15W, AC-DC converter



RoHS

## FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40°C to +70°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

*LHE15-20A/C/Dxx series —a compact size multipath output 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, 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

Part No.*	Output Power	Nominal Output Voltage and Current		Efficiency (230VAC, %/Typ.)	Max. Capacitive Load(μF)	
		(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
LHE15-20A05**	15W	+5V/1500mA	-5V/1500mA	76	12800	12800
LHE15-20A12**		+12V/650mA	-12V/650mA	80	2600	2600
LHE15-20A15**		+15V/500mA	-15V/500mA	81	2400	2400
LHE15-20C0505-05		5V/2000mA	±5V/500mA	75	11000	2200
LHE15-20C0512-02		5V/2000mA	±12V/200mA	77	11000	800
LHE15-20C0515-02		5V/1800mA	±15V/200mA	78	6000	370
LHE15-20D0505-08		5V/2000mA	5V/800mA	76	15000	3000
LHE15-20D0512-04		5V/2000mA	12V/400mA	78	12000	1800
LHE15-20D0524-02		5V/2000mA	24V/200mA	78	13000	800
LHE15-20D0524-04		5V/1000mA	24V/400mA	80	3000	1600

Note:\*Part No. with suffix of "A2" means chassis mounting and suffix of "A4" means DIN-Rail mounting (e.g. LHE15-20D0505-08A2 means chassis mounting; LHE15-20D0505-08A4 means DIN-Rail mounting)

\*\* About LHE15-20Axx, use both positive and negative output as sampling feedback; others use Vo1 as sampling feedback and defined as the primary output.

## 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	--	--	0.37	A
	230VAC	--	--	0.22	
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	Primary output			--	±2	--	%
	Secondary output	LHE15-20Axx		--	±2	--	
		LHE15-20C/Dxx		--	±10	--	
Line Regulation	Full load	Primary output		--	±0.5	--	
		Secondary output	LHE15-20Axx	--	±0.5	--	
			LHE15-20C/Dxx	--	±1.5	--	
Load Regulation	10%-100% load (balanced load)	Primary output		--	±2	--	
		Secondary output	LHE15-20Axx	--	±2	--	
			LHE15-20C/Dxx	--	±5	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	Primary output		--	50	100	mV
		Secondary output	LHE15-20Axx	--	--	100	
			LHE15-20C/Dxx	--	--	200	
Temperature Coefficient	Primary output			--	±0.02	--	%/°C
Short Circuit Protection				Continuous, self-recovery			
Over-current Protection				150% - 300% Io self-recovery			
Over-voltage Protection	Primary output	5VDC Output		≤7.5VDC			
		12VDC Output		≤20VDC			
		15VDC Output		≤22VDC			
Min. Load				10	--	--	%
Hold-up Time	115VAC input			--	8	--	ms
	230VAC input			--	50	--	
Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.							

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## General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	LHE15-20A/C/Dxx		4000	--	--	VAC
	Input- 	LHE15-20Dxx		2500	--	--	
		LHE15-20A/Cxx		2000	--	--	
	Vo1-Vo2	LHE15-20C/Dxx		500	--	--	VDC
Operating Temperature				-40	--	+70	°C
Storage Temperature				-40	--	+85	
Storage Humidity				--	--	95	%RH
Welding Temperature		Wave-soldering		260 ± 5℃; time: 5 - 10s			
		Manual-welding		360 ± 10℃; time: 3 - 5s			
Switching Frequency				--	65	--	kHz
Power Derating		-40℃ to -25℃		2.67	--	--	% / °C
		+50℃ to +70℃	LHE15-20C/Dxx	2.5	--	--	
		+55℃ to +70℃	LHE15-20Axx	3.33	--	--	
		85VAC-100VAC	LHE15-20A/C/Dxx	1.0	--	--	% / VAC
		240VAC-264VAC	LHE15-20A/Cxx	0.83	--	--	
Safety Standard				IEC62368/EN62368/UL62368			
Safety Class				CLASS I			
MTBF				MIL-HDBK-217F@25℃ > 300,000 h			

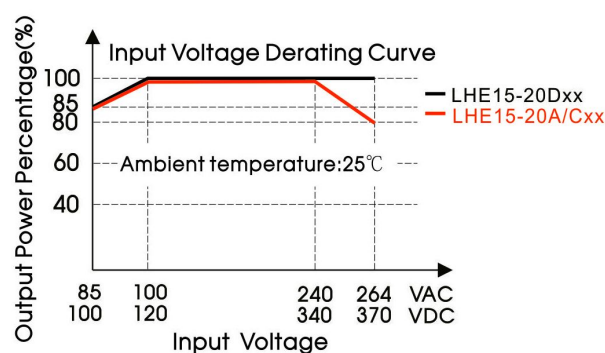
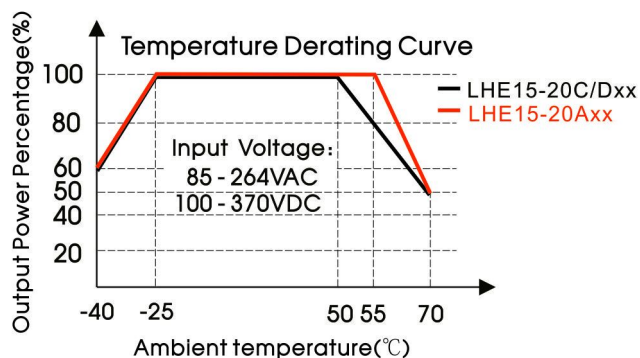
### Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94V-0)	
Dimension	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	90g(Typ.)
	A2 chassis mounting	140g(Typ.)
	A4 Din-Rail mounting	180g(Typ.)
Cooling method	Free air convection	

### EMC Specifications

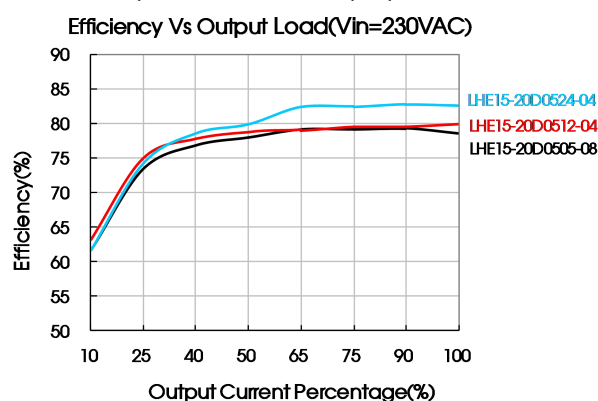
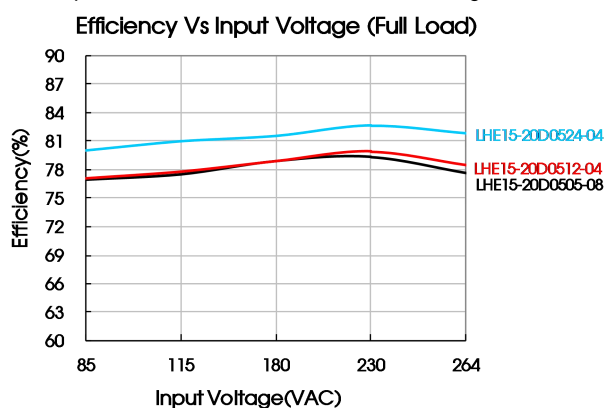
EMI	CE	CISPR32/EN55032	CLASS B		
	RE	CISPR32/EN55032	CLASS B		
EMS	ESD	IEC/EN 61000-4-2	Contact ±6KV / Air ±8KV	Perf. Criteria B	
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A	
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B	
		IEC/EN61000-4-4	±4KV (See Fig. 4 for recommended circuit)		perf. Criteria B
	Surge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

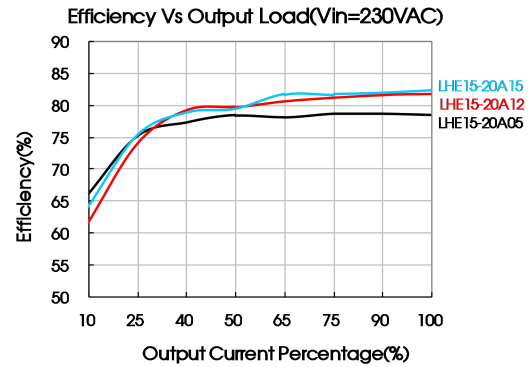
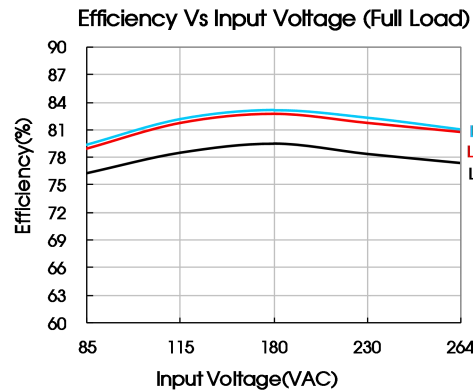
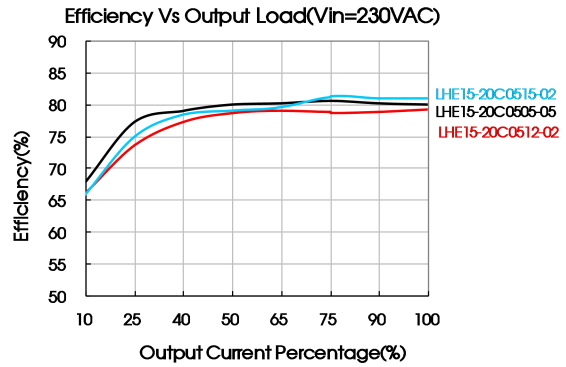
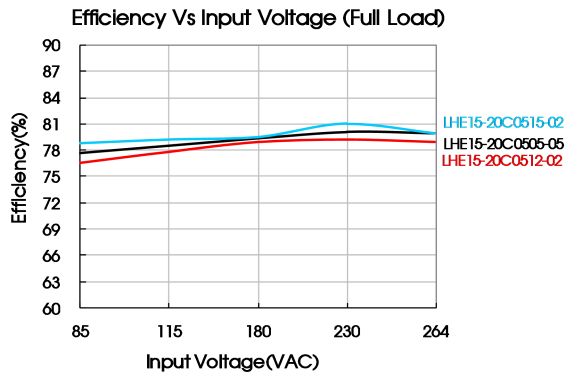
### Product Characteristic Curve



Note: ①When input 85-100VAC/240-264VAC/100-120VDC/340-370VDC, it need to be voltage derated on basis of temperature derating;

②This 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

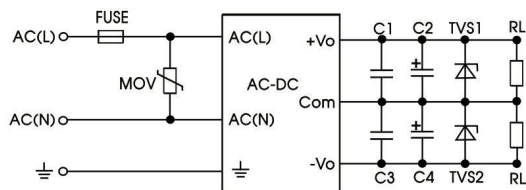


Fig. 1 LHE15-20Axx series

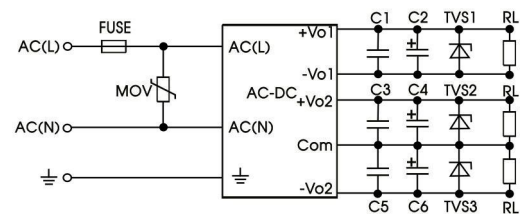


Fig. 2 LHE15-20Cxx series

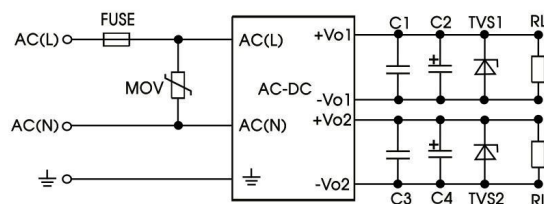


Fig. 3 LHE15-20Dxx series

Model	FUSE	MOV	C1/C3/C5	C2(μF)	C4(μF)	C6(μF)	TVS1	TVS2	TVS3
LHE15-20A05	2A/250V slow fusing, necessary	14D471K	1μF/50V	470	470	--	SMBJ7.0A	SMBJ7.0A	--
LHE15-20A12				220	220	--	SMBJ20A	SMBJ20A	--
LHE15-20A15				120	120	--	SMBJ20A	SMBJ20A	--
LHE15-20C0505-05				470	220	220	SMBJ7.0A	SMBJ7.0A	SMBJ7.0A
LHE15-20C0512-02				470	120	120	SMBJ7.0A	SMBJ20A	SMBJ20A
LHE15-20C0515-02				470	120	120	SMBJ7.0A	SMBJ20A	SMBJ20A
LHE15-20D0505-08				470	470	--	SMBJ7.0A	SMBJ20A	--
LHE15-20D0512-04					220	--	SMBJ7.0A	SMBJ7.0A	--
LHE15-20D0524-02					120	--	SMBJ7.0A	SMBJ20A	--
LHE15-20D0524-04					47	--	SMBJ7.0A	SMBJ30A	--

Note:  
Output filtering capacitors C2, C4 are electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1, C3 are ceramic capacitors, 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

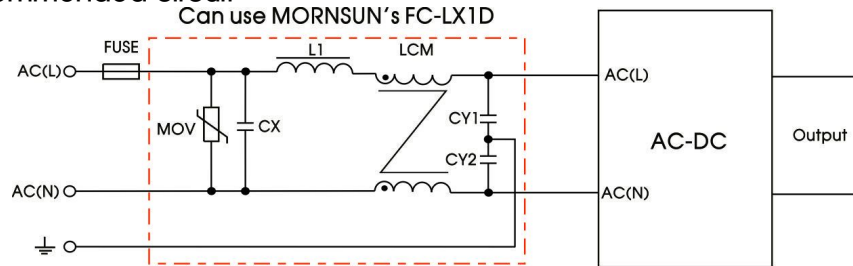
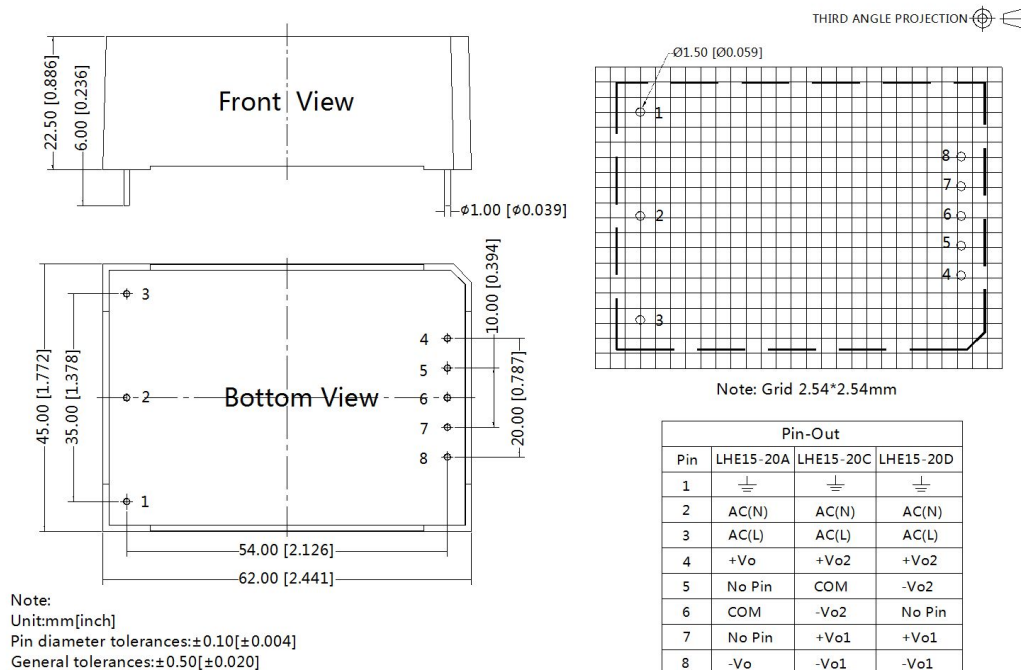


Fig 2: EMC Recommended circuit with higher requirements

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	2A/250V slow fusing, necessary

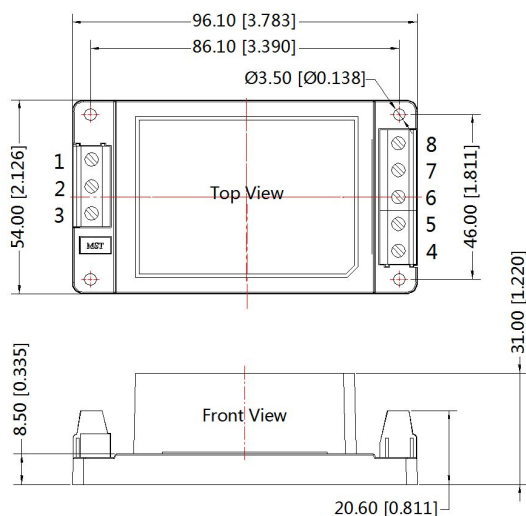
3. For more information Please find the application note on [www.mornsun-power.com](http://www.mornsun-power.com)

### Dimensions and Recommended Layout





## A2 Dimensions

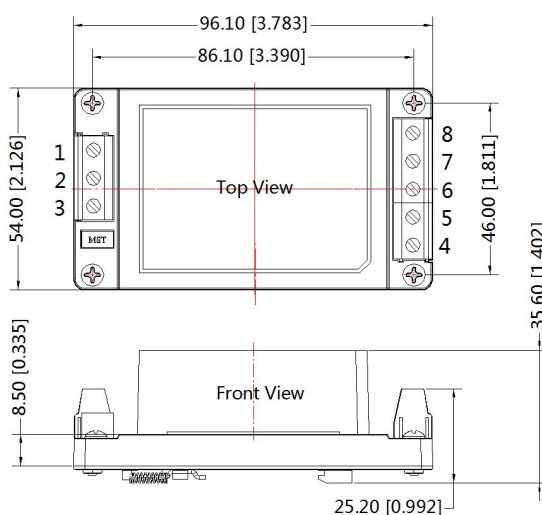


THIRD ANGLE PROJECTION

Pin-Out			
Pin	LHE15-20A	LHE15-20C	LHE15-20D
1	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	+Vo	+Vo2	+Vo2
5	NC	COM	-Vo2
6	COM	-Vo2	NC
7	NC	+Vo1	+Vo1
8	-Vo	-Vo1	-Vo1

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

## A4 Dimensions



THIRD ANGLE PROJECTION

Pin-Out			
Pin	LHE15-20A	LHE15-20C	LHE15-20D
1	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	+Vo	+Vo2	+Vo2
5	NC	COM	-Vo2
6	COM	-Vo2	NC
7	NC	+Vo1	+Vo1
8	-Vo	-Vo1	-Vo1

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. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing bag number: 58220006(Horizontal package); 58220010 (A2/A4 package);
2. 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;
3. 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;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. 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, Luogang District, Guangzhou, P. R. China  
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: [sales@mornsun.cn](mailto:sales@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)