

15W, AC-DC converter



FEATURES

- Universal Input: 85 - 264VAC, 100 - 370VDC, 50/60Hz
- Regulated output, Low ripple & noise
- Low no-load power consumption < 0.1W
- High efficiency up to 86%
- Output short circuit, over-current, over-voltage protection
- IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 approval (2xMOPP)
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting available
- Meets 5000m altitude requirements

LH15-20BxxMU series — is 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. Meets IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 standards (2xMOPP), and widely used in medical, industrial, instruments, telecommunication and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load(μF)
CSA/CE/CB	LH15-20B05MU	14W	5V/2800mA	78	8000
	LH15-20B12MU	15W	12V/1250mA	83	4000
	LH15-20B15MU		15V/1000mA	83	3000
	LH15-20B18MU		18V/833mA	84	2000
	LH15-20B24MU		24V/625mA	86	800

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	--	440	Hz
Input current	115VAC	--	--	0.37	A
	230VAC	--	--	0.22	
Inrush current	115VAC	--	10	--	A
	230VAC	--	20	--	
Leakage current		0.1mA RMS typ./264VAC/60Hz			
Recommended External Input Fuse (Chassis mounting, DIN-Rail mounting package series include fuse)		2A/250V, slow fusing			
Hot Plug		Unavailable			

*Medical Certification Input frequency range: 47-63 Hz

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation		--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-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	5VDC Output	≤7.5VDC			
	12 /15VDC Output	≤20VDC			
	18VDC Output	≤25VDC			
	24VDC Output	≤30VDC			
Stand-by Power Consumption		--	--	0.1	W
Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	15	--	ms
	230VAC input	--	80	--	

Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output Test time: 1min Leakage current ≅5mA	4000	--	--	VAC
Operating Temperature		-40	--	+70	°C
Storage Temperature		-40	--	+85	
Storage Humidity		--	--	95	%RH
Welding Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-welding	360 ± 10°C; time: 3 - 5s			
Switching Frequency		--	65	--	kHz
Power Derating	-40°C to -25°C	3.3	--	--	% / °C
	+55°C to +70°C	3.3	--	--	
Safety Standard		IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1			
Safety Certification		IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1			
Safety Class		CLASS II			
Insulation Level	Primary to secondary	2xMOPP			
MTBF		MIL-HDBK-217F@25°C ≥ 300,000 h			

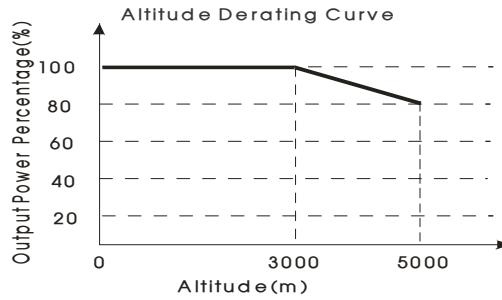
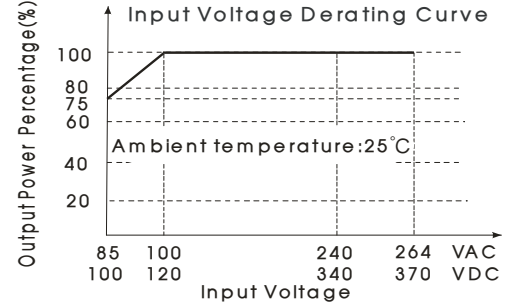
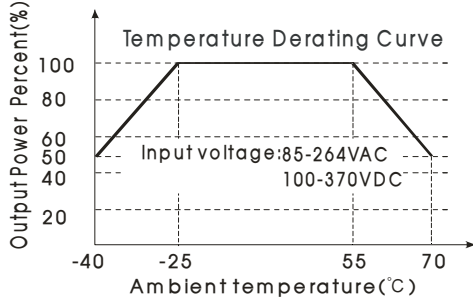
Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)				
Dimension	Horizontal package	62.00*45.00* 22.50mm			
	A2 chassis mounting	96.10*54.00*31.00mm			
	A4 Din-Rail mounting	96.10*54.00*35.60 mm			
Weight	Horizontal package	85g (Typ.)			
	A2 chassis mounting	135g (Typ.)			
	A4 Din-Rail mounting	175g (Typ.)			
Cooling method	Free air convection				

EMC Specifications

EMI	CE	EN55011(CISPR11) / EN55032(CISPR32) CLASS B			
	RE	EN55011(CISPR11) / EN55032(CISPR32) 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 (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 immunity	IEC/EN61000-4-11	0%,70%	perf. Criteria B	

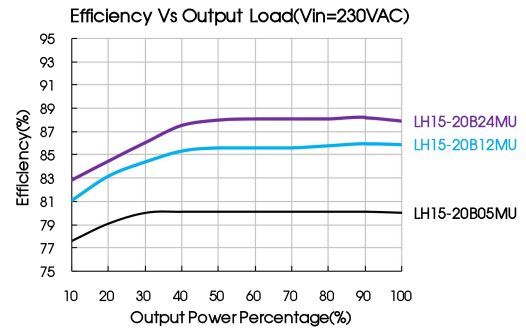
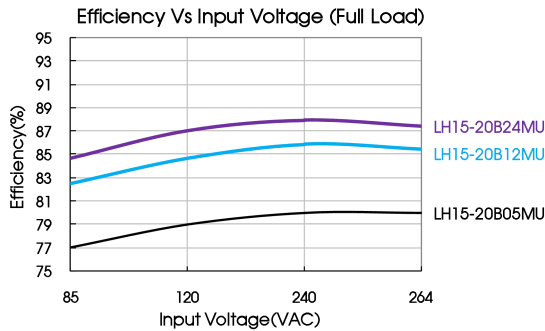
Product Characteristic Curve



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

② Altitude should be derated based on temperature derating when it is 3000 - 5000m;

③ 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

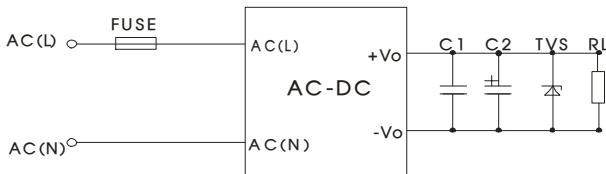


Fig. 1: Typical application circuit

Element model	C2(μF)	TVS1
LH15-20B05MU	680	SMBJ7.0A
LH15-20B12MU	470	SMBJ20A
LH15-20B15MU	220	SMBJ20A
LH15-20B18MU	220	SMBJ30A
LH15-20B24MU	68	SMBJ30A

Note:

Note: Output filtering capacitors C2 is electrolytic capacitor, 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 is ceramic capacitor, which is used to filter high-frequency noise, advice use 1μF. TVS is a recommended component to protect post-circuits if converter fails. External input FUSE model is recommended to use 2A/250V slow fusing.

2. EMC solution-recommended circuit

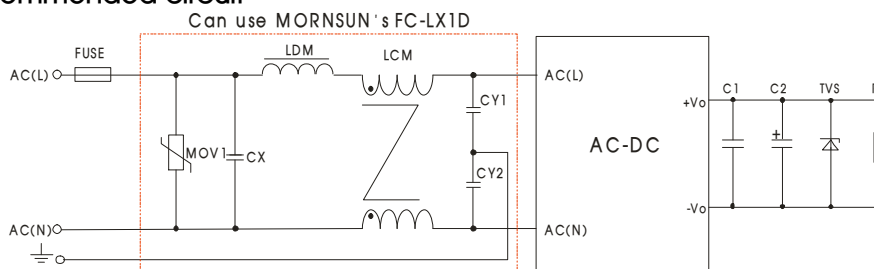
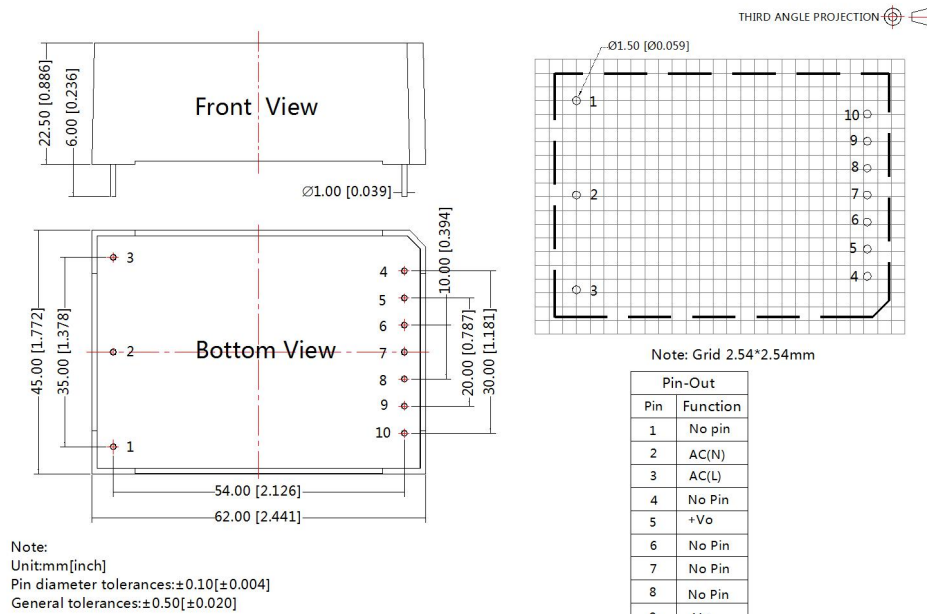


Fig 2: EMC Recommended circuit with higher requirements

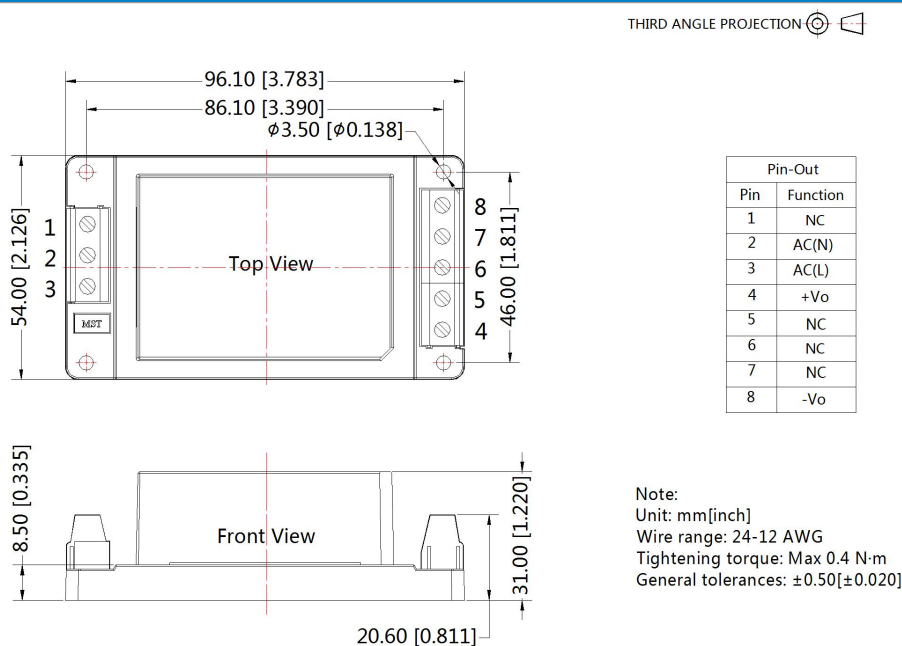
Element model	Recommended value
MOV1	S14K300
CY1, CY2	1nF/400VAC
CX	0.1μF/275VAC
LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
LDM	4.7μH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	2A/250V slow fusing, necessary

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

Dimensions and Recommended Layout

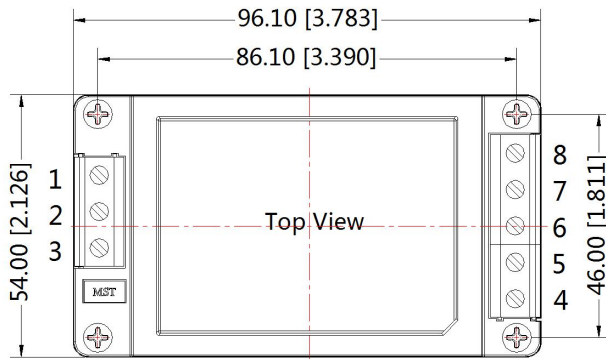


A2 Dimensions

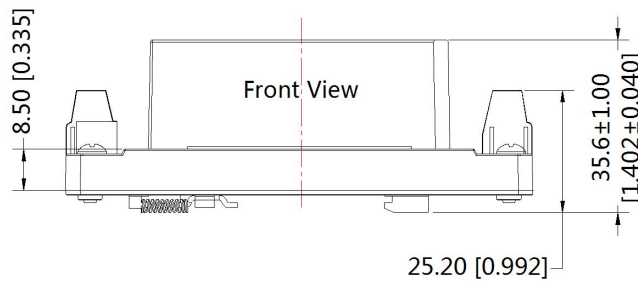


A4 Dimensions

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: ±1.00[±0.039]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number of Horizontal package : 58220006, the Packing bag number of A2/A4 package:58220010;
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 $T_a=25\text{ }^\circ\text{C}$, 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.

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