AC/DC 120W Din-Rail Power Supply

LIMF120-23Bxx Series

MORNSUN®

RoHS

FEATURES

- Universal 85 - 277VAC or 120 - 390VDC Input voltage
- Efficiency up to 94.5%
- Operating ambient temperature range: -40℃ to +85℃, full load at 60℃
- 150% peak load
- Active PFC, PF≥0.98
- DC OK function
- Double-sided conformal coating, salt-spray proof, explosion-proof
- Operating altitude up to 5000m
- 5 years warranty
- Output short circuit, over-current, over-voltage, over-temperature protection
- Safety according to ATEX, IECEx increased safety type explosion-proof certification
- Safety according to ANSI/ISA 71.04-2013 G3 anticorrosion test
- Safety according to IEC/EN/UL/BS EN62368, UL61010, EN60335, EN62477, UL508

LIMF120-23Bxx is Mornsun explosion-proof Din-rail power supply featuring with energy saving, high performance, high reliability, high efficiency. With 150% peak load capacitity is enough to support heavy loads such as DC motors or capacitive loads, up to 94.5% efficiency can greatly improve power supply reliability and service life. With good EMC performance and compliant with international standards of IEC/EN/UL/BS EN62368, UL61010, EN60335, EN62477, UL508 for EMC and safety. The power supply meets the "ec" increased safety and "nC" isolation short-circuit n-type explosion-proof certification and is suitable for explosive environment where the equipment protection level is Gc in zone 2. They are widely used in wind power industry, DCS, industrial control equipment, machine control, LED, street light control, electric power, security, 5G communication and other fields.

Selection Guide

Part No.*	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (μF)
LIMF120-23B12	120	12V/10A	12-14	93	80000
LIMF120-23B24		24V/5A	24-28	94	50000
LIMF120-23B48		48V/2.5A	48-56	94.5	25000

Note: *When the output voltage rises, the total power of the product should not exceed the rated power.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		100	--	240	VAC
	AC input		85	--	277	
	DC input		120	--	390	VDC
Maximum Input Voltage	Lasts for 2h without damage		--	--	305	VAC
Input Voltage Frequency			47	--	63	Hz
Input Current	115VAC		--	--	1.5	A
	230VAC		--	--	0.75	
Inrush Current	115VAC	Cold start	--	15	--	
	230VAC		--	30	--	
Power Factor	115VAC	Room temperature,	0.98	--	--	--

ES France - Département Composants & Modules
127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 89
Fax. 01 47 01 16 22
e-mail : comp@es-france.com
Site Web : www.es-france.com

	230VAC	full load	0.95	--	--	
Start-up Delay Time	115VAC/230VAC, rated load		--	--	3000	ms
Input Fuse	Built-in fuse		--	8	--	A
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range		--	±1.0	--	%
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	0% - 100% load		--	±1.0	--	
Minimum Load			0	--	--	
Stand-by Power Consumption			--	--	5	W
Power Consumption*	230VAC, rated load		--	8	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	--	100	mV
Hold-up Time			--	35	--	ms
DC OK Signal	Resistive load		30VDC/1A Max.			
Over-current Protection*	115VAC/230VAC	Room temperature	110	150	--	%
		High temperature, low temperature	105	--	--	
Short Circuit Protection*			Hiccup mode, constant current works 1s (Typ.), turn off 10s, continuous, self-recover			
Over-voltage Protection	12V		≤18VDC (Hiccup, self-recover)			
	24V		≤35VDC (Hiccup, self-recover)			
	48V		≤60VDC (Hiccup, self-recover)			
Over-temperature Protection*	230VAC, rated load	Over-temperature protection start	--	--	90	℃
		Over-temperature protection release	60	--	--	

Note: 1. *The "Tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to Enclosed Switching Power Supply Application Notes for specific information;
2. *Over-temperature protection: Put the product into a high temperature box. After the ambient temperature stabilizes, increase the temperature slightly (3℃ to 5℃), and the load remains unchanged. After the product reaches thermal equilibrium, increase the temperature until the product triggers over-temperature protection;
3. *Power consumption curve, over-current protection mode and short circuit protection mode see product characteristic curve.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Test*	Input - ⏚	Electric strength test for 1min., leakage current <10mA (Isolation Test for ⏚ need to remove the screw at the mark shall ⏚ *)		2500	--	--	VAC
	Input - output			4000	--	--	
	Output - ⏚			500	--	--	
	DC OK - output			500	--	--	
Insulation Resistance	Input - ⏚	Ambient temperature: 25 ± 5℃		500	--	--	MΩ
	Input - output	Relative humidity: < 95%RH, no condensation		500	--	--	
	Output - ⏚	Test voltage: 500VDC		500	--	--	
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Operating Humidity		Non-condensing		10	--	95	%RH
Storage Humidity				20	--	90	
Switching Frequency*		PFC		40	--	130	kHz
		DC-DC		50	--	130	
		Auxiliary source		--	65	--	
Power Derating		Operating temperature derating	-40℃ to -25℃	3.34	--	--	%/℃

		+60℃ to +70℃	3	--	--	
		+70℃ to +85℃	3.34	--	--	
	Input voltage derating	85VAC - 100VAC	1	--	--	%/VAC
Leakage Current	240VAC	Touch current	<0.88mA			
Safety Standard			Design refer to IEC/EN/UL/BS EN62368-1, UL61010-1, UL508, IEC60079-0, IEC60079-7, IEC60079-15, EN60335-1, EN62477-1, ANSI/ISA 71.04-2013			
Safety Class			CLASS I			
MTBF	MIL-HDBK-217F@25℃		>702,000h			
	MIL-HDBK-217F@40℃		>524,000h			
Warranty	Ambient temperature: <40℃		5 years			
High and Low Voltage Crossing	Need to cooperate with our UPS testing		NB/T 31111-2017			

Note: 1. *The gas discharge tube built into the device effectively protects the power supply against damage by asymmetric disturbance variables (eg EN 61000-4-5). Each power supply continuous withstand voltage test will cause extremely high load to the power supply. Therefore, unnecessary loading or damage to the power supply due to excessive test voltage should be avoided. If necessary, disconnect the gas discharge tube built into the device to use a higher test voltage. After successful completion of the test, reconnect the gas discharge tube. Please refer to the "LIMF120-23Bxx Installation and Application Manual" for specific operation methods;

2. *The power supply has three converters with three different switching frequencies. Auxiliary source frequency is nearly constant, other switching frequencies depend on input voltage and load.

Environmental Characteristics

Item	Operating Conditions	Standard
High and Low Temperature Working	+85℃, -40℃	GB2423.1, IEC60068-2-1
Sinusoidal Vibration	10 - 500Hz, 2g, three directions of X, Y, Z axis	GB2423.10, IEC60068-2-6
Salt Mist	+35℃, 5%NACL, 48h	GB2423.17, IEC60068-2-11
Alternating Hot and Humid	+25℃, 95%RH - +60℃, 95%RH	GB2423.4, IEC60068-2-30
Low Temperature Storage	-40℃	GB2423.1, IEC60068-2-1
High Temperature Storage	+85℃	GB2423.2, IEC60068-2-2
High Temperature Aging	+60℃	GB2423.2, IEC60068-2-2
Normal Temperature Aging	+25℃	GB2423.1, IEC60068-2-1
Temperature Shock	-40℃ to +85℃	GB2423.22, IEC60068-2-14
Temperature Cycle	-25℃ to +60℃	GB2423.22, IEC60068-2-14
Hot and Humid	+85℃, 85%RH	GB2423.50, IEC60068-2-67
High Temperature Elevation	+60℃, 54KPa	GB2423.26, IEC60068-2-41
Low Temperature Elevation	-25℃, 54KPa	GB2423.25, IEC60068-2-40
Constant Humid and Hot	+40℃, 95%RH	GB2423.3, IEC60068-2-78
Random Vibration	5 - 10Hz, ASD 0.3 - 10g²/Hz, three directions of X, Y, Z axis	GB/T 4798.2-2008, IEC60721-3-2
Sinusoidal Vibration Response	10 - 150Hz, 1g, three directions of X, Y, Z axis	GB/T 11287-2000, IEC60255-21-1
Sinusoidal Vibration Endurance Test		
Sinusoidal Impulse Response	15g, pulse duration 11ms, three times in each direction of X, Y, Z axis	GB/T 114537-1993, IEC60255-21-2
Sinusoidal Impact Endurance Test		
Packaging Drop	1m, one corner, three edges and six sides	GB2423.8, IEC68-2-32

Mechanical Specifications

Case Material	Metal (AL5052, SUS304)
Dimensions	124.00mm x 121.00mm x 34.00mm
Weight	540g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE (Input port)	CISPR32 EN55032	150K - 30MHz	CLASS B
	CE (Output port)	CISPR32 EN55032	150K - 30MHz	CLASS A +20dB
	RE	CISPR32 EN55032	30MHz - 2GHz	CLASS B
	Harmonic current	IEC/EN61000-3-2		CLASS A and CLASS D
	Voltage flicker	EN61000-3-3		
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/Air ±15KV	perf. Criteria A
	RS	IEC/EN61000-4-3	20V/m	
	EFT (Input port)	IEC/EN61000-4-4	±4KV	
	EFT (Output port)	IEC/EN61000-4-4	±2KV	
	Surge (Input port)	IEC/EN61000-4-5	line to line ±3KV/line to ground ±6KV	
	Surge (Output port)	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	
	MS	IEC/EN61000-4-8	30A/m	
	AC power port harmonics	IEC61000-4-13	CLASS 3	
	Harmonic and network signal			
	Low frequency immunity			
	CS	IEC/EN61000-4-6	0.15 - 80MHz 20Vr.m.s	
	Voltage dips	IEC/EN61000-4-11	0% of 100Vac, 0Vac, 20ms	perf. Criteria A
			40% of 100Vac, 40Vac, 200ms	perf. Criteria C
			70% of 100Vac, 70Vac, 500ms	perf. Criteria A
			0% of 200Vac, 0Vac, 20ms	perf. Criteria A
			40% of 200Vac, 80Vac, 200ms	perf. Criteria A
			70% of 200Vac, 140Vac, 500ms	perf. Criteria A
	Voltage interruption	IEC/EN61000-4-11	0% of 200Vac, 0Vac, 5000ms	perf. Criteria C

Note: *perf. Criteria:
A: The equipment shall continue to operate as intended without operator intervention;
B: After the test, the equipment shall continue to operate as intended without operator intervention;
C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

Product Characteristic Curve

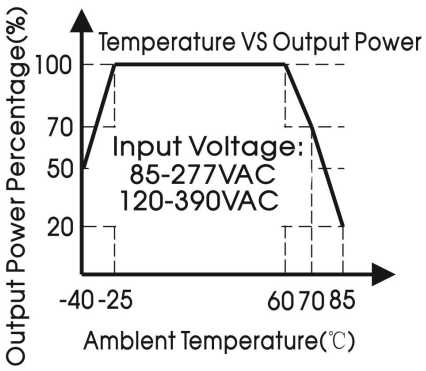


Figure 1

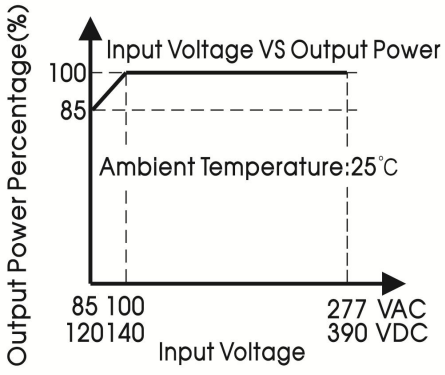


Figure 2

Output voltage VS Output current curve (Typ.)

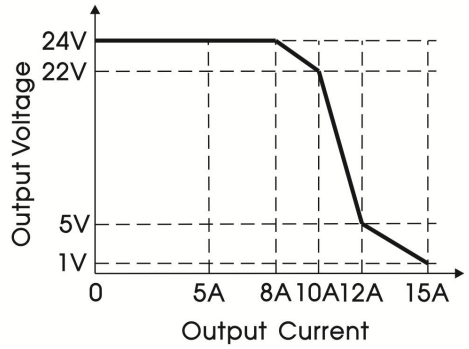


Figure 3

DC OK behavior curve (Typ.)

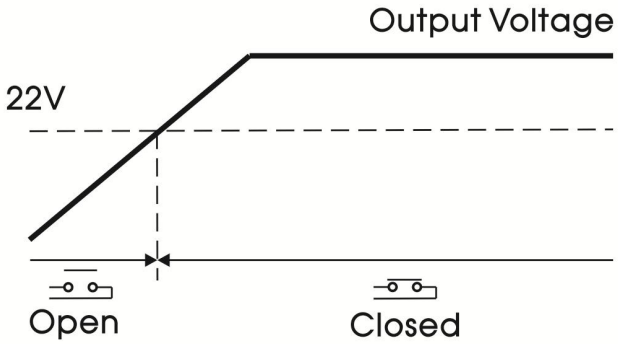


Figure 4

Over-current protection curve (Typ.)

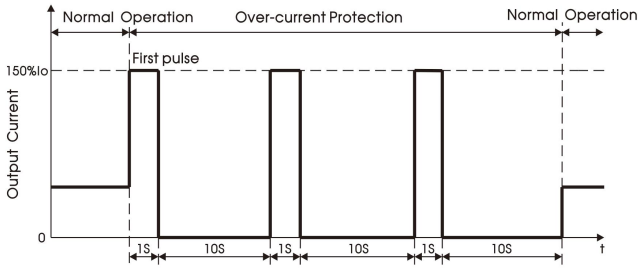


Figure 5

Short circuit protection curve (Typ.)

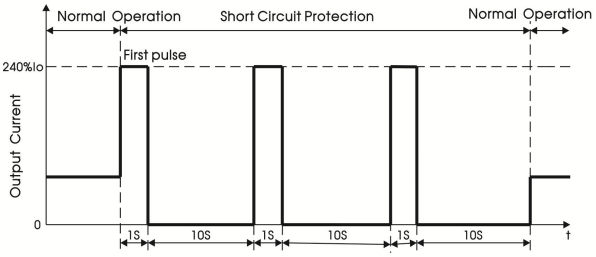


Figure 6

PF Vs Input Voltage (Full Load)

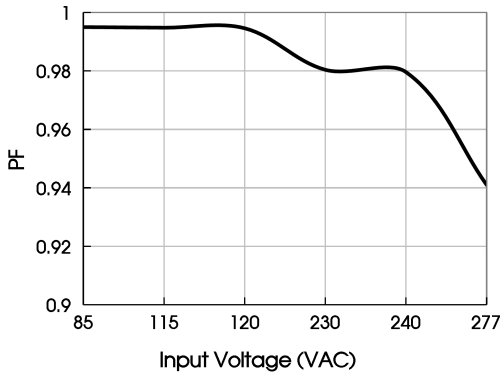


Figure 7

PF Vs Output Load (Vin=230VAC)

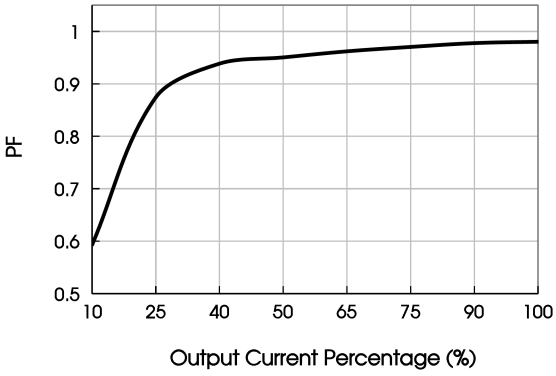


Figure 8

Loss Vs Input Voltage (Full Load)

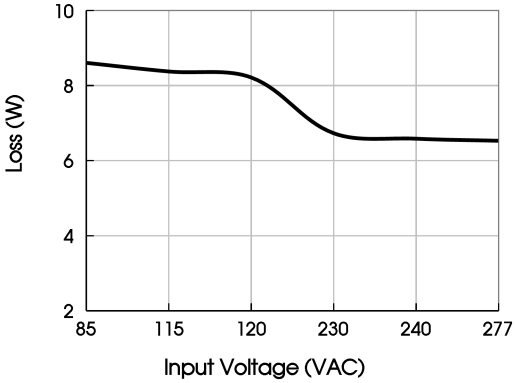


Figure 9

Loss Vs Output Load (Vin=230VAC)

Figure 10

Note: 1.All curves are for 24V output, measured at input 230VAC, 50Hz, output Io, ambient temperature 25℃, unless otherwise stated;
2.Figure 3 shows that the product will enter the overload state when the rated output current increases to 100%-150%Io (TYP.), and enter the overcurrent protection when the current > 150%Io (TYP.), and the output voltage will decrease with the increase of the output current. When the output current increases to a certain value, the product will enter the constant current mode;
3.With an AC input voltage between 85-100VAC and a DC input between120-140VDC the output power must be derated as per the temperature derating curves;
4.This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.

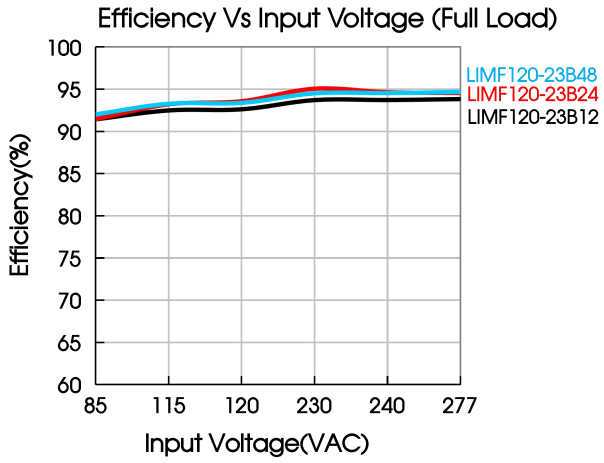


Figure 11

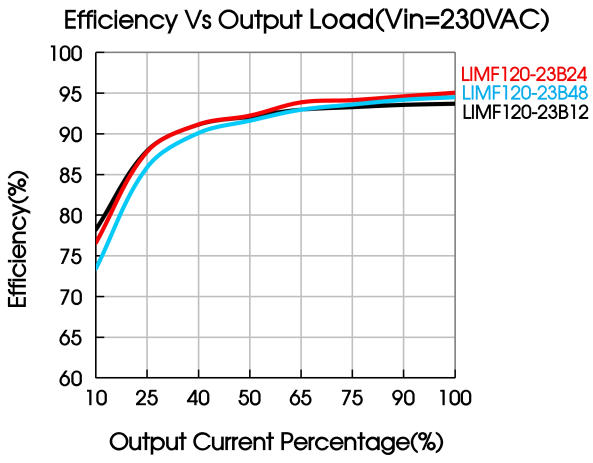
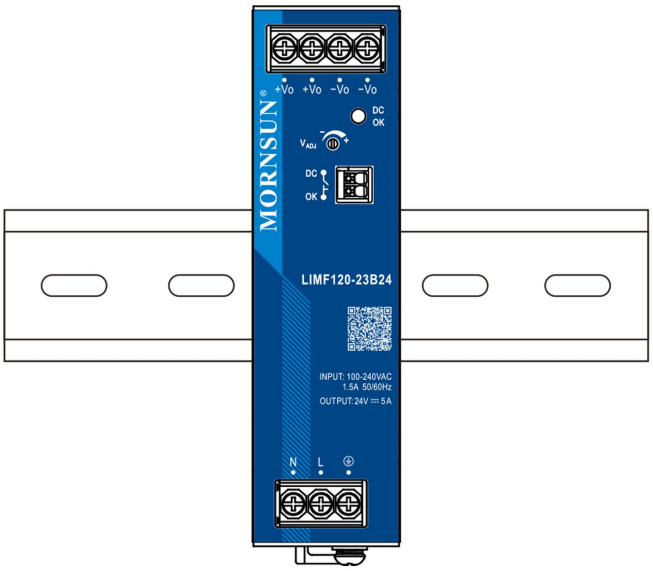
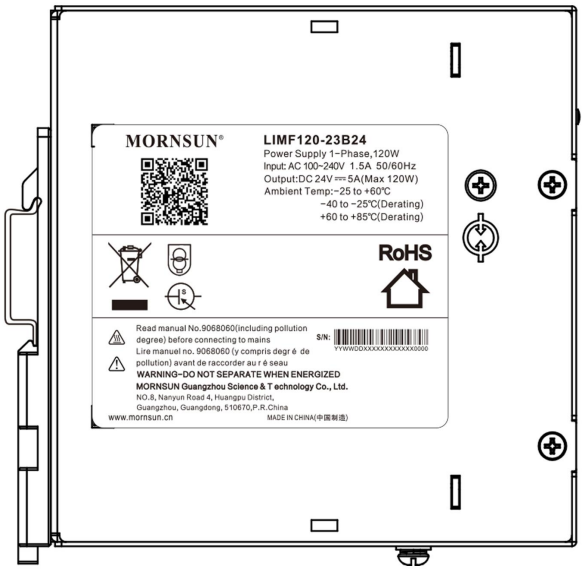


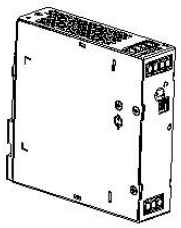
Figure 12

Installation Diagram

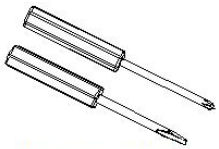




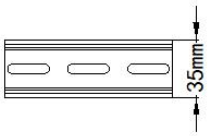
Bill Of Material		
1	Product	1 PCS
2	Phillips screwdriver Slotted screwdriver	1 PCS
3	TS35/7.5 or TS35/15	1 PCS
4	24–10AWG wires	/ PCS
	All above is only for reference, the actual wiring diameter and locking torque refer to the appearance size diagram	



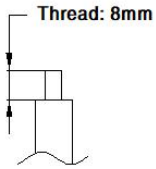
Product



Phillips screwdriver
Slotted screwdriver
Diameter of the cutting tools: 3mm

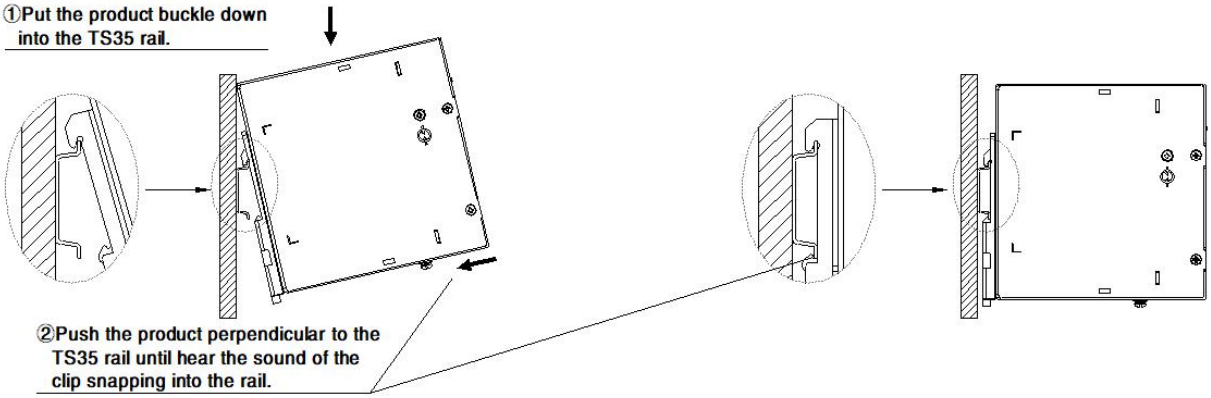


TS35/7.5 or TS35/15

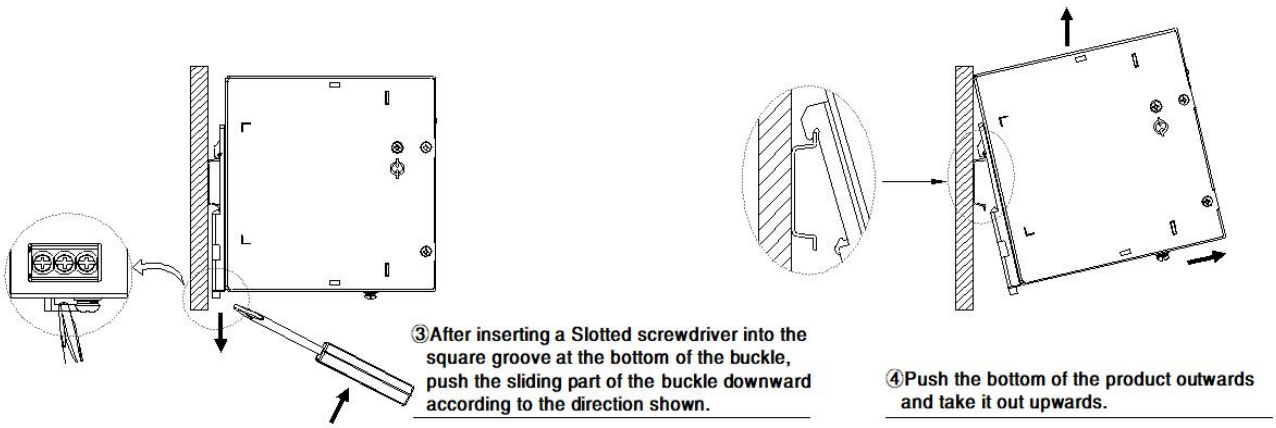


24–10AWG wires

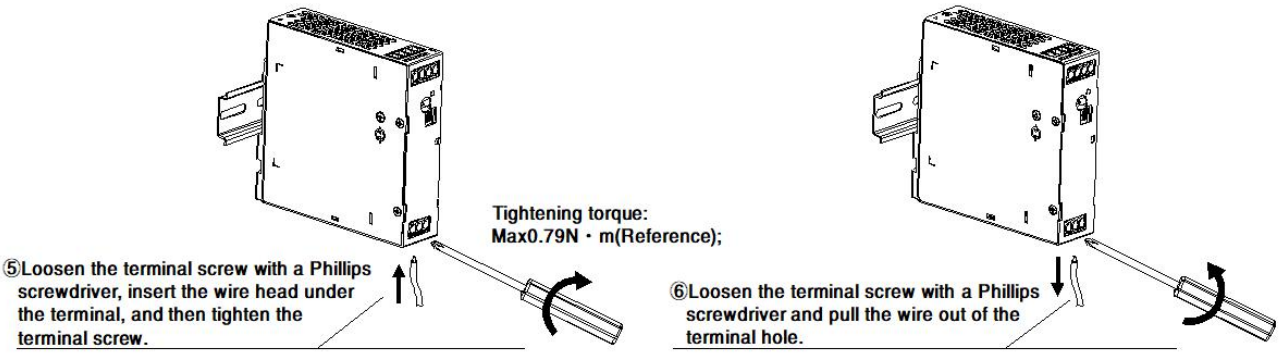
Installation steps ①–②



Disassembly steps ③–④



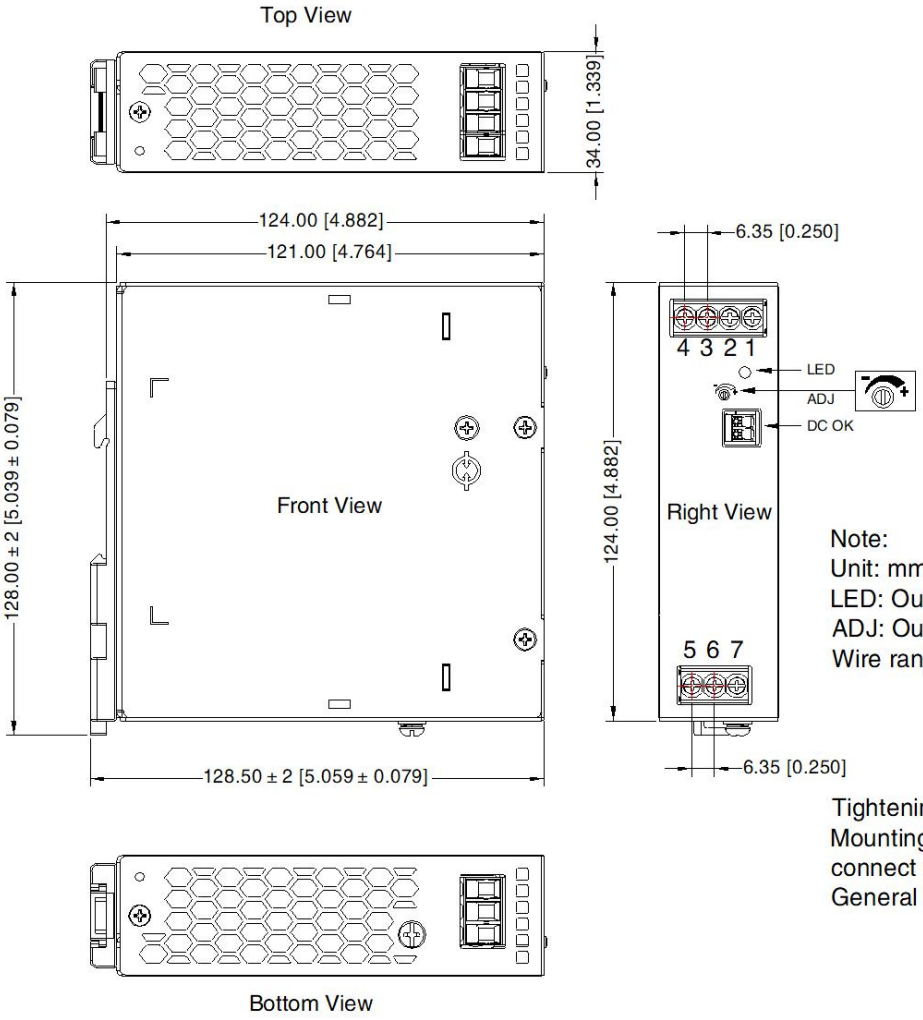
Connecting/Disconnecting Steps ⑤–⑥



Note: Keep the following installation clearances: 20mm on top, 20mm on the bottom, 5mm on the left and right sides are recommended when the device is loaded permanently with more than 50% of the rated power. Increase this clearance to 15mm in case the adjacent device is a heat source (e.g. another power supply).

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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

Note:
Unit: mm[inch]
LED: Output status indicator LED
ADJ: Output adjustable resistor
Wire range: Input: 24-10 AWG
(16-10AWG for pin7)
Output: 12V: 16-10AWG
24V/48V: 22-10AWG
DC OK: 24-14AWG
Tightening torque: Max 0.79 N·m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ± 1.00[± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220319;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity <75% RH with nominal input voltage and rated output load;
3. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
9. The output voltage can be adjusted by the ADJ, clockwise to increase;
10. 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