



RoHS



FEATURES

- Universal 85 - 277VAC or 120 - 390VDC Input voltage
- Efficiency up to 94.5%
- Operating ambient temperature range: -40°C to +85°C, full load at 60°C
- 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 capacity 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 | | -- | 15 | -- | |
| | 230VAC | | -- | 30 | -- | |
| Power Factor | 115VAC | Room temperature, | 0.98 | -- | -- | -- |

| | | | | | | |
|---------------------|---------------------------|-----------|-------------|----|------|----|
| | 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 | °C |
| | | 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°C to 5°C), 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°C | 500 | -- | -- | MΩ |
| | Input - output | Relative humidity: < 95%RH, no condensation | 500 | -- | -- | |
| | Output - ⊕ | Test voltage: 500VDC | 500 | -- | -- | |
| Operating Temperature | | | -40 | -- | +85 | °C |
| 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°C to -25°C | 3.34 | -- | -- | %/°C |

| | | | | | | |
|-------------------------------|--|----------------|--|----|----|-------|
| | | +60°C to +70°C | 3 | -- | -- | |
| | | +70°C to +85°C | 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°C | | > 702,000h | | | |
| | MIL-HDBK-217F@40°C | | > 524,000h | | | |
| Warranty | Ambient temperature: <40°C | | 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°C, -40°C | 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°C, 5%NaCl, 48h | GB2423.17, IEC60068-2-11 |
| Alternating Hot and Humid | +25°C, 95%RH - +60°C, 95%RH | GB2423.4, IEC60068-2-30 |
| Low Temperature Storage | -40°C | GB2423.1, IEC60068-2-1 |
| High Temperature Storage | +85°C | GB2423.2, IEC60068-2-2 |
| High Temperature Aging | +60°C | GB2423.2, IEC60068-2-2 |
| Normal Temperature Aging | +25°C | GB2423.1, IEC60068-2-1 |
| Temperature Shock | -40°C to +85°C | GB2423.22, IEC60068-2-14 |
| Temperature Cycle | -25°C to +60°C | GB2423.22, IEC60068-2-14 |
| Hot and Humid | +85°C, 85%RH | GB2423.50, IEC60068-2-67 |
| High Temperature Elevation | +60°C, 54KPa | GB2423.26, IEC60068-2-41 |
| Low Temperature Elevation | -25°C, 54KPa | GB2423.25, IEC60068-2-40 |
| Constant Humid and Hot | +40°C, 95%RH | GB2423.3, IEC60068-2-78 |
| Random Vibration | 5 - 10Hz, ASD 0.3 - 10g ² /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 | | | | |
| | Harmonic and network signal | IEC61000-4-13 | CLASS 3 | | |
| | 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

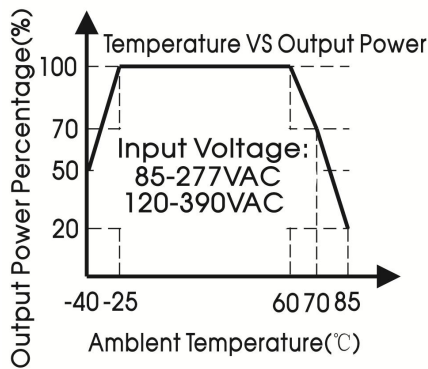


Figure 1

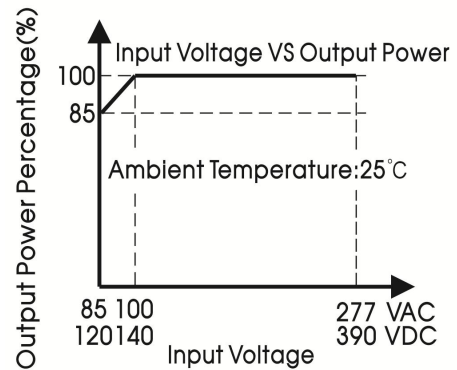


Figure 2

Output voltage VS Output current curve (Typ.)

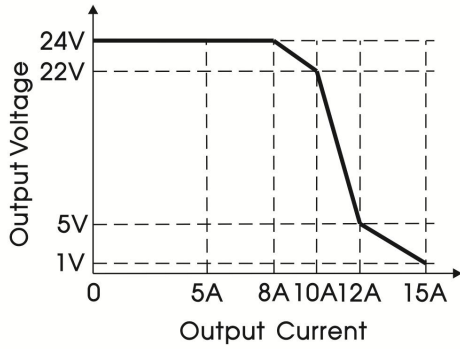


Figure 3

DC OK behavior curve (Typ.)

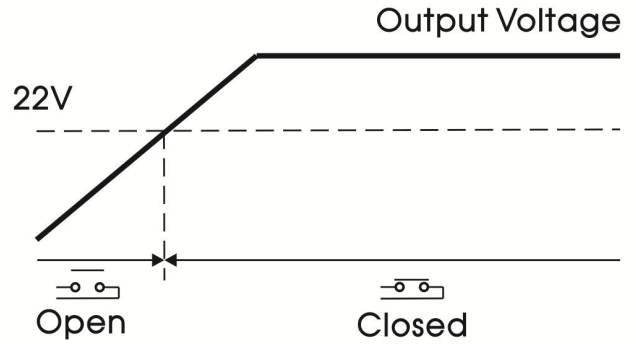


Figure 4

Over-current protection curve (Typ.)

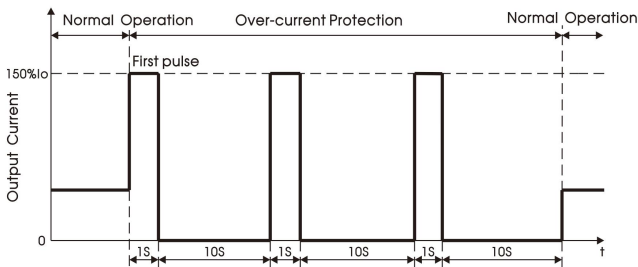


Figure 5

Short circuit protection curve (Typ.)

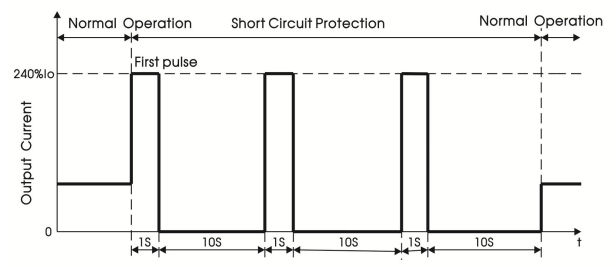


Figure 6

PF Vs Input Voltage (Full Load)

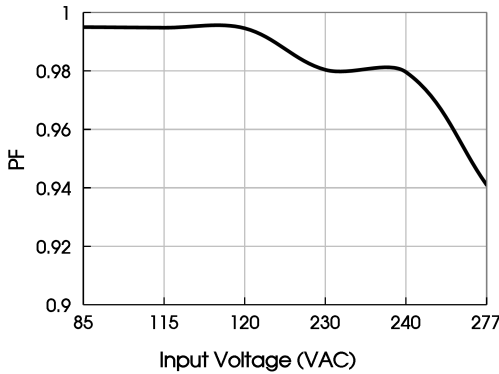


Figure 7

PF Vs Output Load (Vin=230VAC)

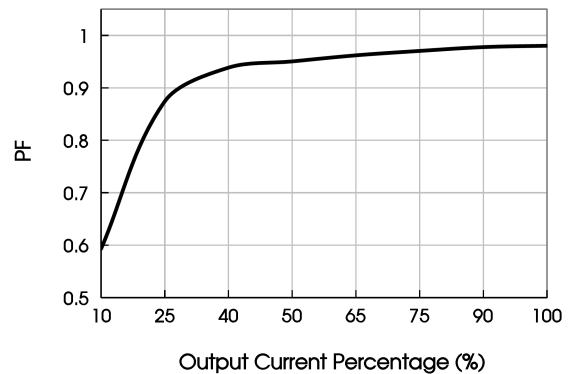


Figure 8

Loss Vs Input Voltage (Full Load)

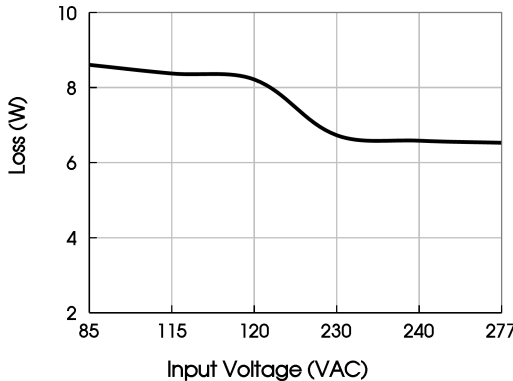


Figure 9

Loss Vs Output Load (Vin=230VAC)

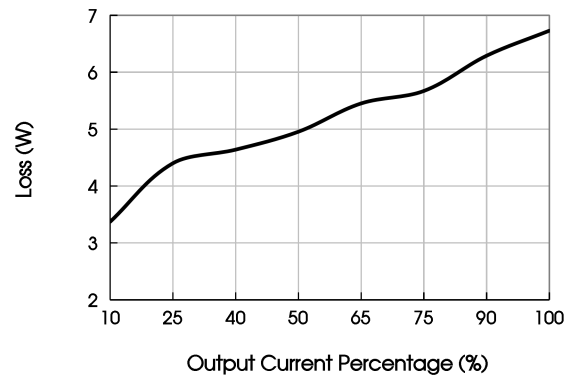


Figure 10

- Note: 1.All curves are for 24V output, measured at input 230VAC, 50Hz, output I_o , ambient temperature 25°C, unless otherwise stated;
 2. Figure 3 shows that the product will enter the overload state when the rated output current increases to 100%-150% I_o (TYP.), and enter the overcurrent protection when the current > 150% I_o (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 between 120-140VDC 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.

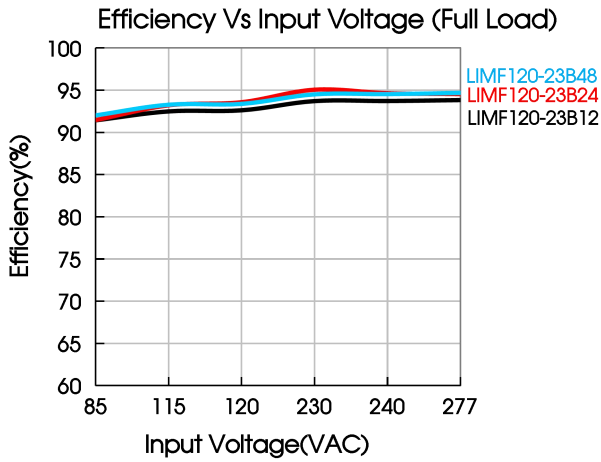


Figure 11

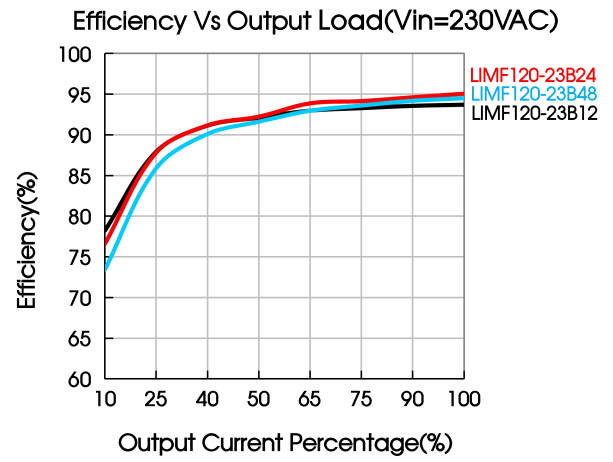
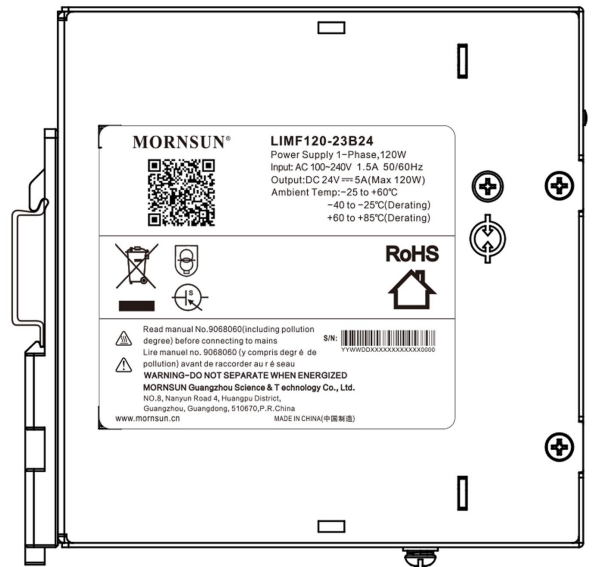
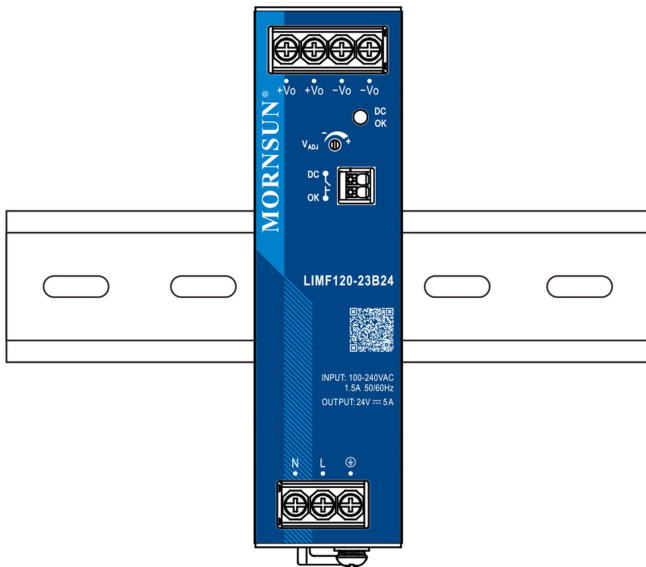
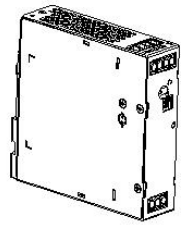


Figure 12

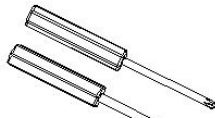
Installation Diagram



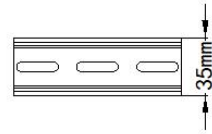
| Bill Of Material | | |
|------------------|---|-------|
| 1 | Product | 1 PCS |
| 2 | Phillips screwdriver Slotted screwdriver | 1 PCS |
| 3 | TS35/7.5 or TS35/15 | 1 PCS |
| 4 | 24-10AWG wires | /PCS |
| | All above is only for reference, the actual wiring diameter and locking torque refer to the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



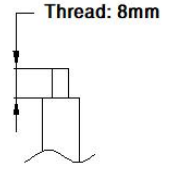
Product



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



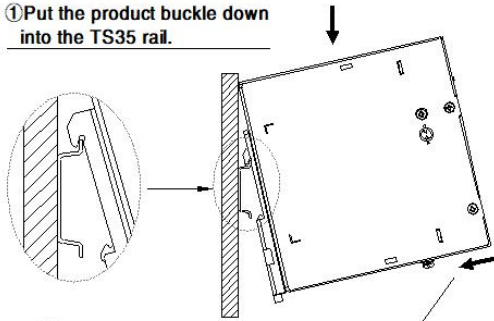
TS35/7.5 or TS35/15



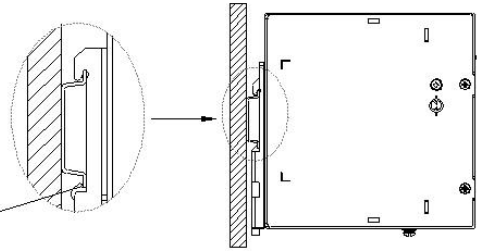
24-10AWG wires

Installation steps ①-②

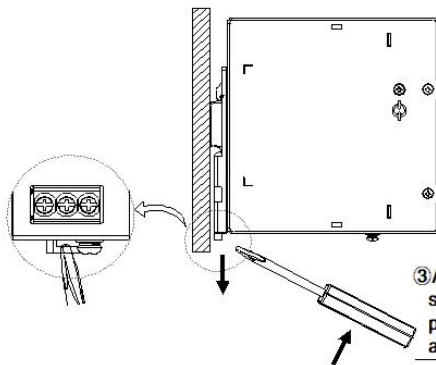
① Put the product buckle down into the TS35 rail.



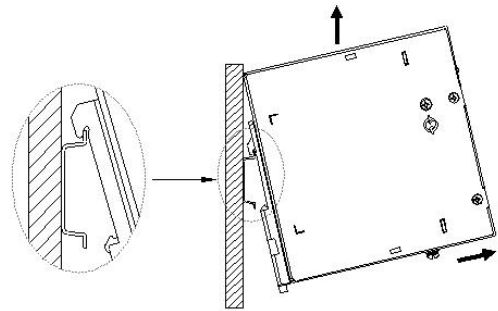
② Push the product perpendicular to the TS35 rail until hear the sound of the clip snapping into the rail.



Disassembly steps ③-④

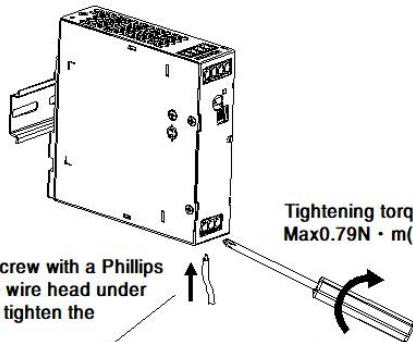


③ After inserting a Slotted screwdriver into the square groove at the bottom of the buckle, push the sliding part of the buckle downward according to the direction shown.



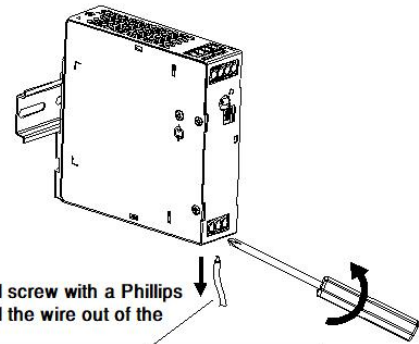
④ Push the bottom of the product outwards and take it out upwards.

Connecting/Disconnecting Steps ⑤-⑥



⑤ Loosen the terminal screw with a Phillips screwdriver, insert the wire head under the terminal, and then tighten the terminal screw.

Tightening torque:
Max0.79N·m(Reference);

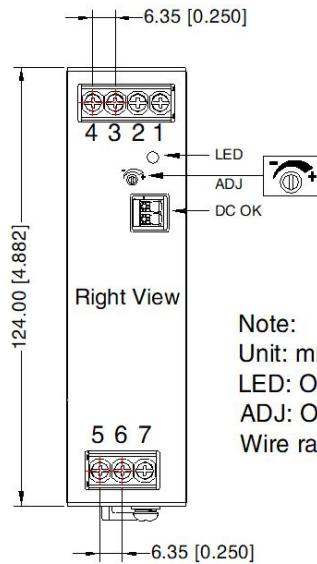
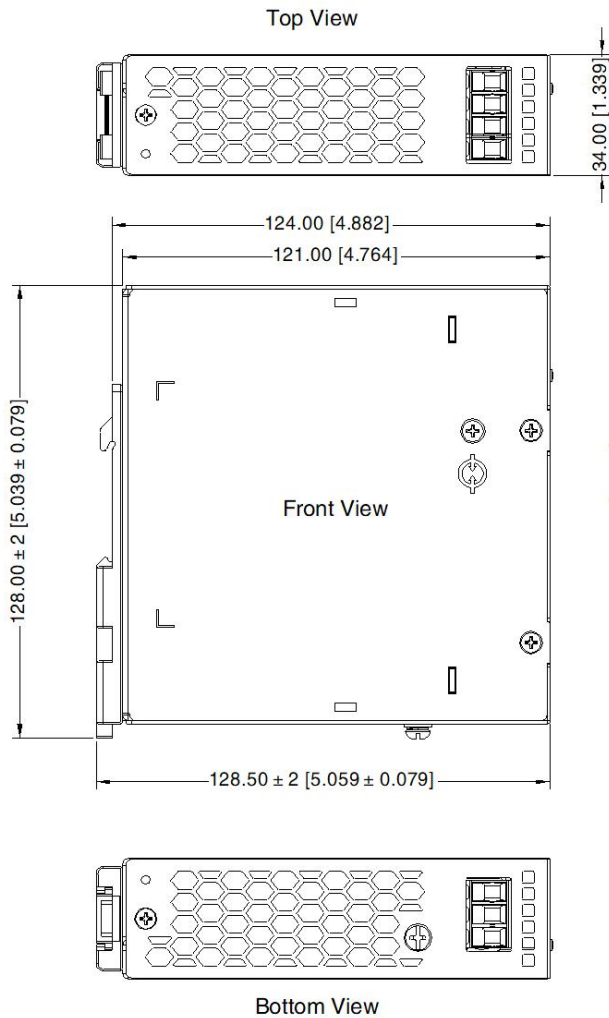



⑥ Loosen the terminal screw with a Phillips screwdriver and pull the wire out of the terminal hole.

Note: Keep the following installation clearances: 20mm on the 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:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220319;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity <75% RH with nominal input voltage and rated output load;
- The room temperature derating of 5°C/1000m is needed for operating altitude greater than 2000m;
- All index testing methods in this datasheet are based on our company corporate standards;
- 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;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- The out case needs to be connected to PE () of system when the terminal equipment in operating;
- The output voltage can be adjusted by the ADJ, clockwise to increase;
- 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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