



## FEATURES

- Input voltage range: 9-60VDC
- Operating ambient temperature range: -40℃ to +85℃
- High efficiency up to 98%
- 1500VAC insulation voltage
- The DC OK function is displayed, relay contact signal output
- Double side three anti-paint
- Operating altitude up to 5000m
- 3 years warranty
- Supporting for N+1 parallel redundancy
- Safety according to UL/IEC/EN62368、UL61010/508、ATEX、EN61558、EN60335、IECEX、EN62477、GB4943

LIR20-20 is one of Mornsun Din-rail parallel redundancy module. It is used with our high-end guide rail series 240W/480W/960W and other series, it features wide input voltage range, wide operating temperature, cost-effective, high efficiency and high reliability. It offers excellent EMC performance and meet UL/IEC/EN62368、UL61010/508、ATEX、EN61558、EN60335、IECEX、EN62477、GB4943 standards and it is widely used in areas of industrial, electricity, security, telecommunications etc.

## Selection Guide

| Certification | Part No. | Voltage Drop Vin-Vo (V/Typ.) | Nominal Output Current (A) Max. | Efficiency (24/48VDC, %/Typ.) |
|---------------|----------|------------------------------|---------------------------------|-------------------------------|
| --            | LIR20-20 | 0-0.2                        | 20                              | 98                            |

Note: \*The rated voltage difference of the product is related to the input voltage and the load condition, the greater the load, the greater the pressure difference.

## Input Specifications

| Item                      | Operating Conditions                                                                                                                   | Min. | Typ.     | Max. | Unit |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------|----------|------|------|
| Input Voltage Range       | DC input                                                                                                                               | 9    | 12/24/48 | 60   | VDC  |
| Input Current Range       | Each input 0-20A, continuous                                                                                                           | --   | --       | 20   | A    |
| Input Peak Current        | Each input 0-30A for 5s without damage                                                                                                 | --   | --       | 30   | A    |
| Input Under-voltage Alarm | Input 12V on one route and test the input voltage that triggers the under-voltage(One LED goes out. The relay changed from on to off ) | --   | 8        | --   | VDC  |
|                           | Input 24V on one route and test the input voltage that triggers the under-voltage(One LED goes out. The relay changed from on to off ) | --   | 18       | --   |      |
|                           | Input 48V on one route and test the input voltage that triggers the under-voltage(One LED goes out. The relay changed from on to off ) | --   | 36       | --   |      |
| Input Over-voltage Alarm  | Input 12V on one route and test the input voltage that triggers the over-voltage(One LED goes out. The relay changed from on to off )  | --   | 16       | --   |      |
|                           | Input 24V on one route and test the input voltage that triggers the over-voltage(One LED goes out. The relay changed from on to off )  | --   | 32       | --   |      |
|                           | Input 48V on one route and test the input voltage that triggers the over-voltage(One LED goes out. The relay changed from on to off )  | --   | 64       | --   |      |

|                                                                                                                                                                              |                          |             |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------|--|--|--|
|                                                                                                                                                                              | changed from on to off ) |             |  |  |  |
| Hot Plug                                                                                                                                                                     | --                       | Unavailable |  |  |  |
| Note: *LED state: Vin1 triggers the under-voltage alarm, Vin1 LED turns off, Vin2 LED turns on; Vin1 triggers the over-voltage alarm, Vin1 LED turns on, Vin2 LED turns off. |                          |             |  |  |  |

## Output Specifications

| Item                                                                                                                                                                                                                       | Operating Conditions                 | Min.                                                                  | Typ. | Max. | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------|------|------|------|
| Ripple & Noise*                                                                                                                                                                                                            | 20MHz bandwidth (peak-to-peak value) | --                                                                    | 200  | --   | mV   |
| Output Power                                                                                                                                                                                                               | 48V/20A                              | --                                                                    | 960  | --   | W    |
| DC OK Function                                                                                                                                                                                                             | The two input voltages are normal    | DC OK function is normal (relay on), two input LED indicator light on |      |      |      |
| LED1 (Vin1 OK)                                                                                                                                                                                                             | Vin1 input OK                        | ON                                                                    |      |      |      |
| LED2 (Vin2 OK)                                                                                                                                                                                                             | Vin2 input OK                        | ON                                                                    |      |      |      |
| Note: *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 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 < 2mA |              | 1500                                                  | --   | --   | VAC  |
| Insulation Resistance | Input output - ⊕ | At 500VDC                                               |              | 100                                                   | --   | --   | MΩ   |
| Operating Temperature |                  |                                                         |              | -40                                                   | --   | +85  | ℃    |
| Storage Temperature   |                  |                                                         |              | -40                                                   | --   | +85  |      |
| Storage Humidity      |                  | Non-condensing                                          |              | --                                                    | --   | 95   | %RH  |
| Power Derating        |                  | Operating temperature derating                          | +60℃ to +85℃ | 2.25                                                  | --   | --   | %/℃  |
| Safety Standard       |                  |                                                         |              | Design refer to IEC/EN/UL62368-1, UL61010-1, GB4943.1 |      |      |      |
| Safety Class          |                  |                                                         |              | CLASS III                                             |      |      |      |
| MTBF                  |                  | MIL-HDBK-217F@25℃                                       |              | >1000,000 h                                           |      |      |      |
| Warranty              |                  | Ambient temperature: <60℃                               |              | 3years                                                |      |      |      |

## Environmental Characteristics

| Item                             | Operating Conditions                             | Standard                 |
|----------------------------------|--------------------------------------------------|--------------------------|
| High and Low Temperature Working | +85℃, -40℃                                       | GB2423.1, IEC60068-2-1   |
| Sinusoidal Vibration             | 10 - 500Hz, 5g, three directions of X, Y, Z axis | GB2423.10, IEC60068-2-6  |
| 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   |
| 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 |
| Constant Humid and Hot           | +40℃, 95%RH                                      | GB2423.3, IEC60068-2-78  |
| Packaging Drop                   | 1m, one corner, three edges and six sides        | GB2423.8, IEC68-2-32     |

## Mechanical Specifications

|                |                              |
|----------------|------------------------------|
| Case Material  | Metal (AL1100, SGCC)         |
| Dimensions     | 110.00mm x 87.50mm x 32.00mm |
| Weight         | 255g (Typ.)                  |
| Cooling Method | Natural air cooling          |

### Electromagnetic Compatibility (EMC)

|           |       |                                                                                 |                  |
|-----------|-------|---------------------------------------------------------------------------------|------------------|
| Emissions | CE    | CISPR32/EN55032                                                                 | CLASS B          |
|           | RE    | CISPR32/EN55032                                                                 | CLASS B          |
| Immunity* | ESD   | IEC/EN 61000-4-2 Contact $\pm 8\text{KV}$ /Air $\pm 15\text{KV}$                | Perf. Criteria A |
|           | RS    | IEC/EN 61000-4-3 10V/m                                                          |                  |
|           | EFT   | IEC/EN 61000-4-4 $\pm 2\text{KV}$                                               |                  |
|           | Surge | IEC/EN 61000-4-5 line to line $\pm 1\text{KV}$ /line to ground $\pm 2\text{KV}$ |                  |
|           | MS    | IEC/EN 61000-4-8 30A/m                                                          |                  |
|           | CS    | IEC/EN 61000-4-6 0.15 - 80MHz 10 Vr.m.s                                         |                  |

Note: \*perf. Criteria:

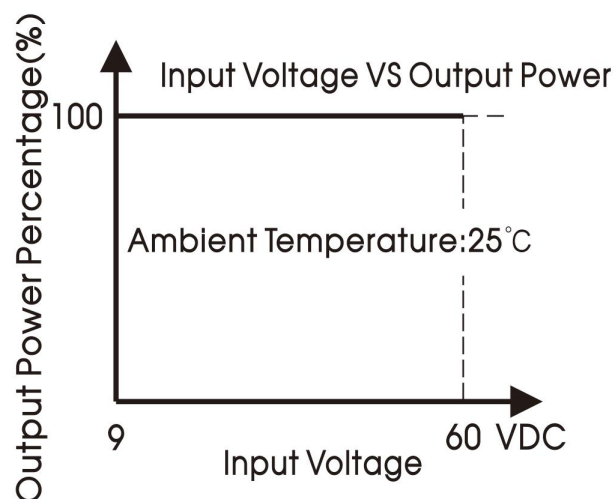
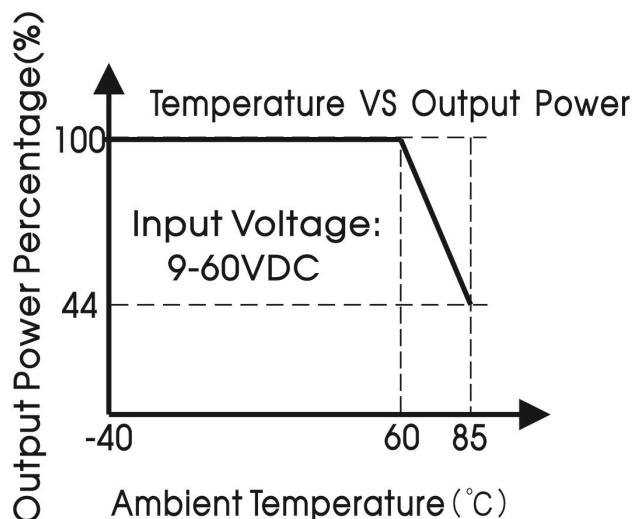
A: The product worked normally before, after and during the test.

B: Temporary reduction or loss of function or performance, but self-recovery.

C: Temporary reduction or loss of function or performance requiring operator intervention or system returning.

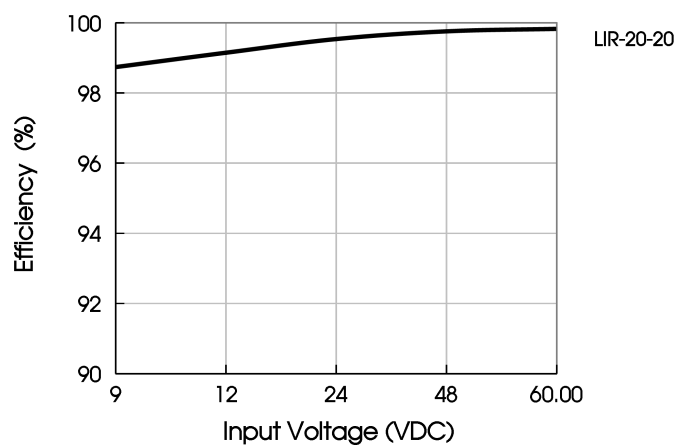
Note: Electromagnetic Compatibility (EMC): The AC-DC module is added to the front (Use with LI, LIF, LIMF, LIHF120/240/480 series product).

### Product Characteristic Curve

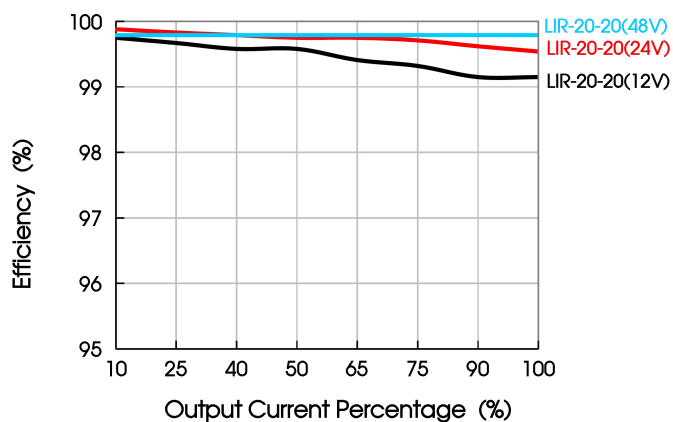


Note: This product is suitable for applications using natural air cooling, for applications in closed environment please consult Mornsun FAE.

#### Efficiency Vs Input Voltage (Full Load)

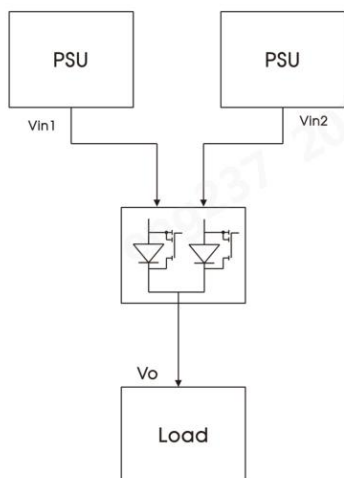


#### Efficiency Vs Output Load

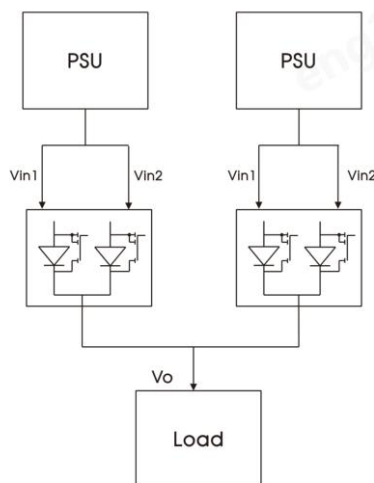


### Typical Application

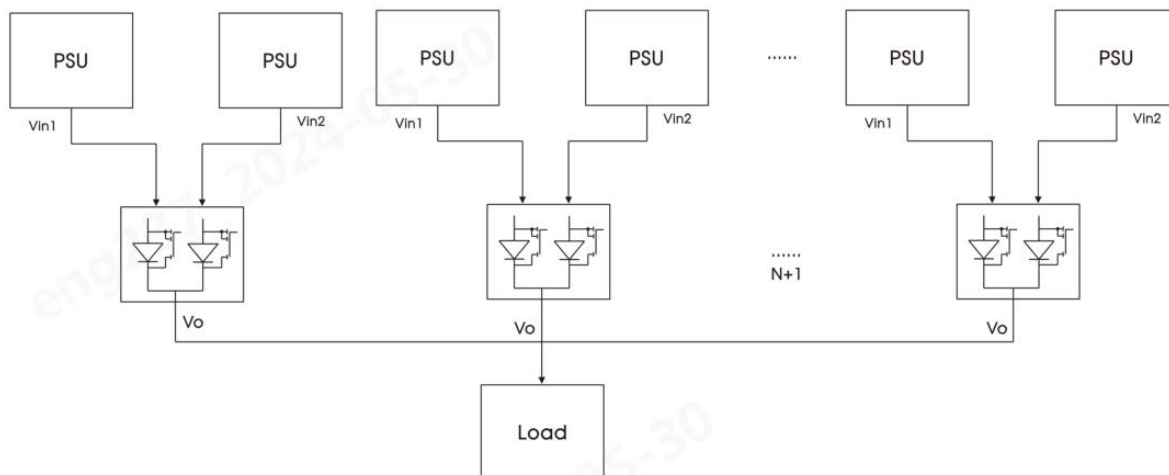
1. 1+1 Redundancy: Using 1 more PSU as the redundant unit.



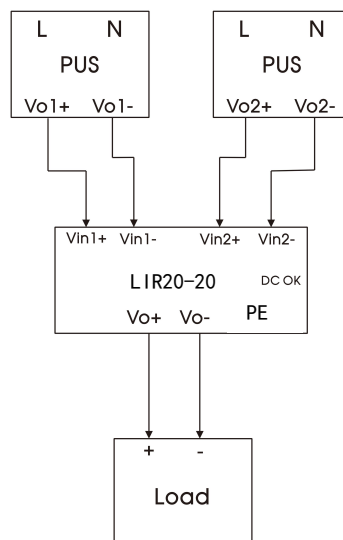
2. Single Use: Connecting only one PSU to one LIR20-20 module to Reduce the stress of the MOS and hence increase the reliability.



3.N+1 Redundancy: Using more PSUs as the redundant units to increase the reliability.



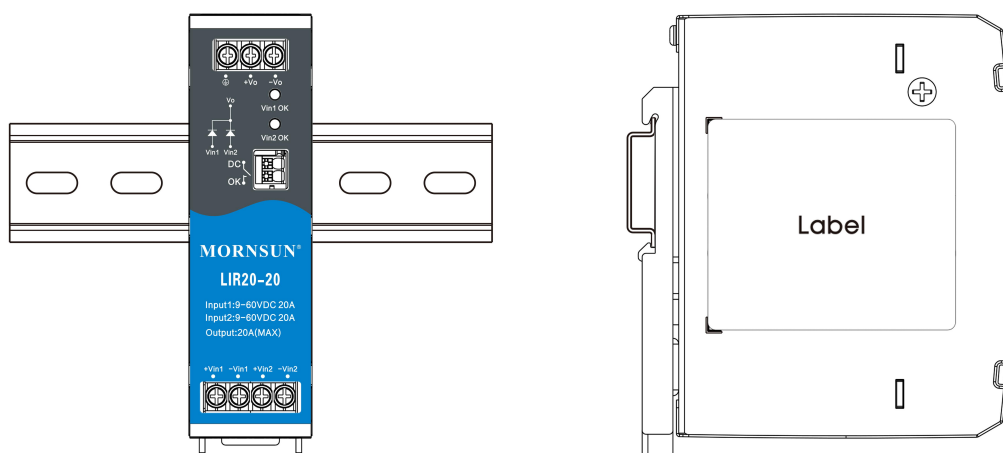
## 4. Cable connection reference

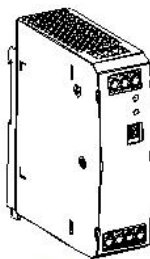
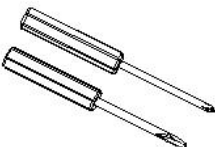
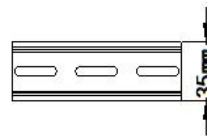
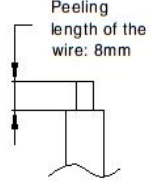
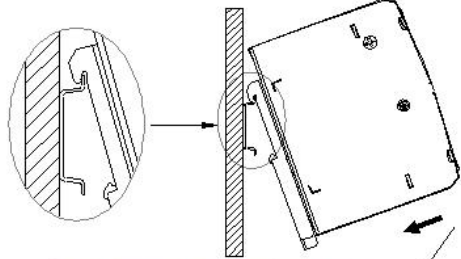
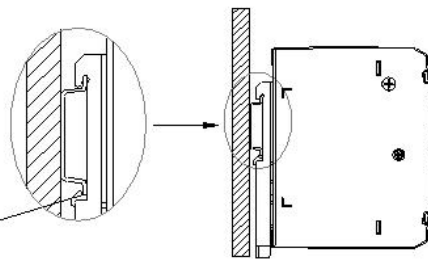
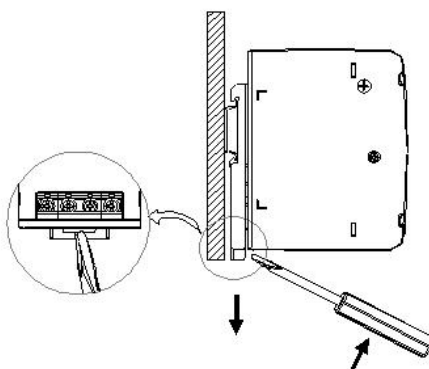
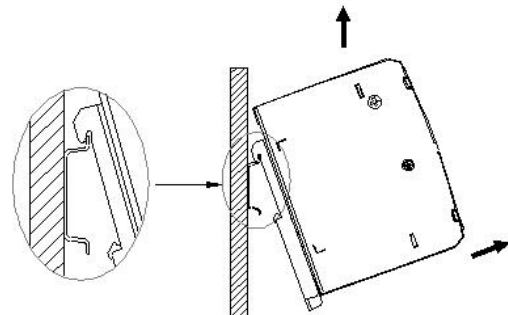
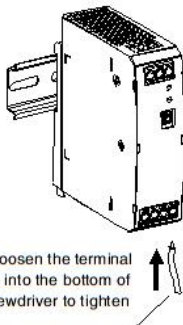
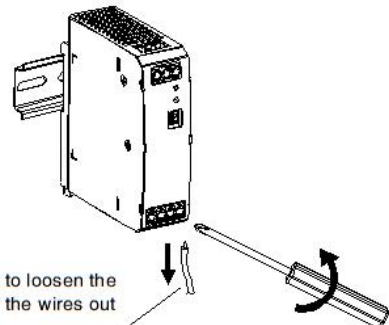


### Note:

1. Please add AC-DC module at front of LIR20-20 (Mornsun LI, LIF, LIMF, LIHF120/240/480 series products are recommended);
2. When the output is short circuited, the pre-stage AC-DC module short circuit protection will be triggered;

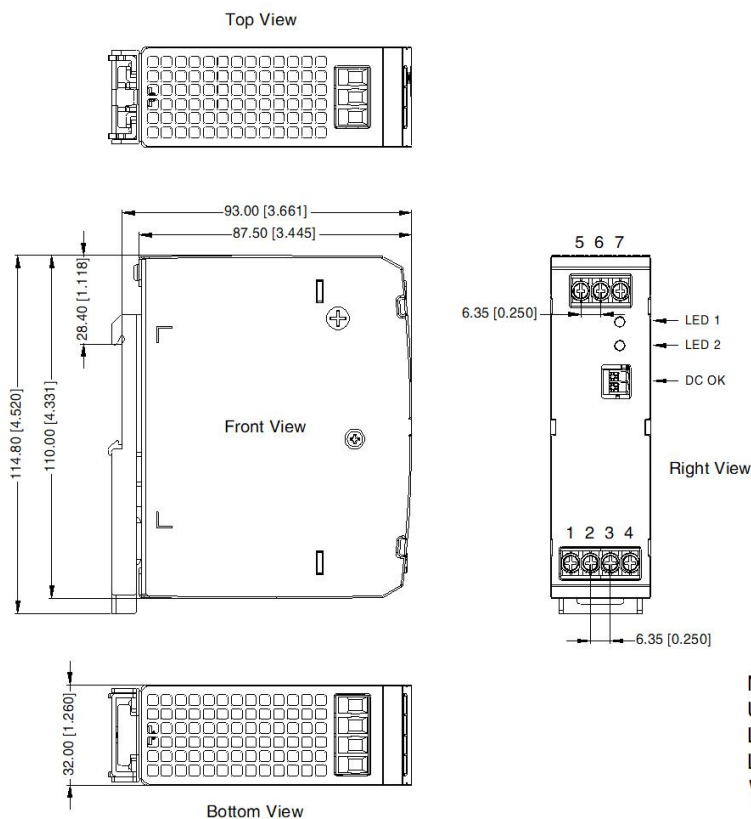
## Installation Diagram



| Materials required in the installation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Product                                     | 1 PC  |  |  |  |  |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Phillips screwdriver<br>Slotted screwdriver | 1 PC  |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TS35/7.5 or TS35/15                         | 1 PC  |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14-10AWG Wire                               | / PCS |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| The content is for reference only.<br>Regarding the actual wire diameter<br>and tightening torque, refer to the<br>dimensional drawing.                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Installation Steps ①-②                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| <p>① Clamp the buckle of the product into the TS35 DIN rail;</p>  <p>② Push the product vertically towards the TS35 DIN rail until hearing the sound of the buckle snapping into it.</p>                                                                                                                                                                                      |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Disassembly Steps ③-④                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|  <p>③ After inserting the Slotted screwdriver into the square groove at the bottom of the buckle, push the slider of the buckle downward in the direction shown in the figure.</p>  <p>④ Hold the bottom of the product and push it outwards, then lift the product up to take the product out of the DIN rail.</p>                                                       |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Wiring / Unwiring Steps ⑤-⑥                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|  <p>⑤ Use the Phillips screwdriver to loosen the terminal screws, insert the head of the wire into the bottom of the terminal, and then turn the screwdriver to tighten the terminal screws.</p> <p>Tightening torque:<br/>Max0.5N · m(For reference);</p>  <p>⑥ The Phillips screwdriver to loosen the terminal screws and pull the wires out of the terminal holes</p> |                                             |       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |

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   | +Vin1 |
| 2   | -Vin1 |
| 3   | +Vin2 |
| 4   | -Vin2 |
| 5   |       |
| 6   | +Vo   |
| 7   | -Vo   |

### Note:

Unit: mm[inch]

LED1: Input status indicator LED

LED2: Input status indicator LED

Wire range: Input: 20A 12-10 AWG

Output: 20A 12-10 AWG

DC OK: 24-16AWG

Input/Output Tightening torque: Max 0.5 N · m

Mounting rail: TS35

General tolerances:  $\pm 1.00[\pm 0.039]$

### Note:

- 1.For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220280;
- 2.Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75% RH with nominal input voltage and rated output load;
- 3.The ambient temperature derating of  $5^{\circ}\text{C}/1000\text{m}$  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.When the product is used at the terminal, the shell() must be connected to the system;
- 9.Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
- 10.The power supply should be considered as part of the components in the system, and all EMC tests should be validated in conjunction with the terminal equipment. For EMC test operation guidance, please consult our FAE.

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