

### Programmable thermocouple isolators



### FEATURES

- Isolation test voltage of 2000VAC for signal input to output and to power ports
- Ultra-slim 12.5mm case
- High accuracy (0.1% Full Scale)
- High linearity (0.1% Full Scale)
- Extremely low temperature coefficient (50PPM/°C)
- Excellent EMC performance
- Mini USB port communication
- Programmable input / output range
- Proven reliability with MTBF >500,000 hours

TCxxxPW series of programmable thermocouple isolators are mainly used in systems for industrial automation. They provide an isolated conversion of thermocouple input signals from common industrial instruments into matching analog output signals for DCS/PLC, by realizing acquisition and transmission of field signals. An independent DC power source is required to supply the module that isolates the power ports from the signal input and output ports. This series of products contains a combination of 1 input with 1 output, 1 input with 2 outputs or 2 inputs with 2 outputs. The extremely compact design having a thickness of only 12.5mm, meets the demand for high density installations.

### Selection Guide

| Output Type    | 1 input 1 output | 2 input 2 output                           | 1 input 2 output     |
|----------------|------------------|--|----------------------|
| Current Output | TC100PW          | TC200PW                                    | TC600PW              |
| Voltage Output | TC140PW          | TC240PW                                    | TC640PW              |
| Input Signal   | Signal type      | Measuring range                            | Min. measuring range |
|                | R                | -40℃ to +1700℃                             | 600℃                 |
|                | S                | -40℃ to +1700℃                             | 600℃                 |
|                | K                | -150℃ to +1370℃                            | 120℃                 |
|                | J                | -80℃ to +900℃                              | 100℃                 |
|                | T                | -160℃ to +390℃                             | 100℃                 |
|                | B                | +320℃ to +1820℃                            | 780℃                 |
|                | E                | -80℃ to +700℃                              | 500℃                 |
| Output Signal  | mV               | -60mV to +60mV                             | 10mV                 |
|                | Current          | 4-20mA / 0-20mA (programmable)             |                      |
|                | Voltage          | 0-5V / 0-10V / 1-5V / 2-10V (programmable) |                      |

#### Notes:

1. The customer must define type of input signal, measuring range and form of output signal when placing the order; customizations are available on request;
2. The auxiliary USB adapter model is T-01; please contact our technical staff for specific information.

### Input Specifications

| Item           | Operating Conditions   | Value  |
|----------------|--|--|
| Power Input    | Input Power  | 18-30VDC (Typical value 24VDC)   |
|                | Power Dissipation (isolators)                                  | 1 input 1 output ≤1.2W;<br>1 input 2 output and 2 input 2 output ≤1.8W |
|                | Power Supply Protection (isolators with isolated power output) | Reverse polarity protection, over-voltage protection                   |
| Hazardous Area | Input Signal   | See List of Product Models   |
|                | Cold junction Compensation                                     | Compensation range: -25℃ to +75℃<br>1℃ error for every 20℃             |
|                |  | Method of compensation: Internal compensation                          |

## Output Specifications

| Item      | Operating Conditions    | Value  |
|-----------|-------------------------|--|
| Safe Port | Fault Output            |  |
|           | Output Type             | 4-20mA    0-20mA    1-5V    0-5V    0-10V    2-10V |
|           | Input disconnection     | 2.5mA    23mA    0.625V    5.75V    11.5V    1.25V |
|           | Load Capacity           | Output current maximum $\leq 500\Omega$            |
|           |                         | Output voltage maximum $\geq 1M\Omega$             |
|           | Communication interface | Mini USB port                                      |
|           | Communication Protocol  | See "MORNSUN Modbus Protocol Rules"                |

## Transmission Specifications

| Item                       | Operating Conditions                       | Value  |
|----------------------------|--|--|
| Signal Precision           | Ta=25℃, full-scale range, 100% load        | 0.1% Full Scale  |
| Zero Offset                | Ta=25℃, Sin = 0, 100% load                 | 0.1% Full Scale  |
| Temperature Coefficient    | Operating temperature range of -25℃ ~ +71℃ | 50PPM/℃  |
| Lower Limit Alarm, approx. |  | About 3mA    About 21mA    About 0.75V    About 5.25V    About 10.5V    About 1.5V |
| Upper Limit Alarm, approx. |  | About 22mA    About 22mA    About 5.5V    About 5.5V    About 11V    About 11V     |
| Normal Operation           |  | Corresponding channel's Red LED warning light is off                               |
| Limit Alarm                | Exceeding upper or lower limit             | Corresponding channel's red LED blinks   |
| Disconnection Alarm        |  | Corresponding channel's red LED on   |
| Response Time              |  | < 0.5s   |

## General Specifications

| Item                                   | Operating Conditions   | Value   |
|--|--|---|
| Electric Isolation                     | Electric strength test for 1 minute with a leakage current of $\leq 5mA$ | Site zone and control zone 2kVAC/3kVAC<br>Output and power supply 2kVAC/3kVAC |
| Isolation Resistance                   | Signal input port, signal output port                                    | 100M $\Omega$ , 500VDC  |
| Operating Temperature                  |  | -25℃ to +71℃  |
| Transportation and Storage Temperature |  | -40℃ to +85℃  |

## Mechanical Specifications

|                    |  |
|--------------------|--|
| Case Material      | Flame retardant material UL94 V-0                                    |
| Safety Class       | IP20 (IEC60529 / EN60529)  |
| Package Dimensions | 35mm DIN rail package, direct plug-in type terminal, 22.5 mm wide    |
| Weight             | 100g / 135g (1 input 1 output / 2 input 2 output & 1 input 2 output) |

## Electromagnetic Compatibility (EMC)

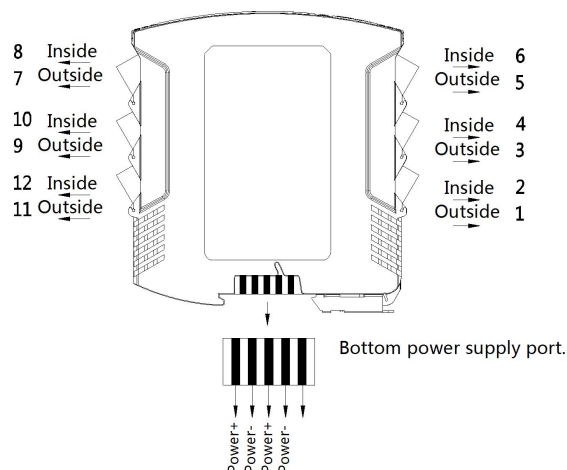
|           |       |                 |  |                  |
|-----------|-------|-----------------|--|------------------|
| Emissions | CE    | CISPR32/EN55032 | CLASS A                                |                  |
|           | RE    | CISPR32/EN55032 | CLASS A                                |                  |
| Immunity  | ESD   | IEC/EN61000-4-2 | Contact $\pm 4kV$ /Air $\pm 8kV$       | perf. Criteria B |
|           | RS    | IEC/EN61000-4-3 | 10V/m                                  | perf. Criteria A |
|           | EFT   | IEC/EN61000-4-4 | power supply port $\pm 2kV$            | perf. Criteria A |
|           |       | IEC/EN61000-4-4 | signal port $\pm 1kV$                  | perf. Criteria A |
|           | Surge | IEC/EN61000-4-5 | power supply port $\pm 1kV/2kV$        | perf. Criteria B |
|           |       | IEC/EN61000-4-5 | signal port $\pm 1kV$ (line-to-ground) | perf. Criteria B |
|           | CS    | IEC/EN61000-4-6 | 3 Vr.m.s                               | perf. Criteria A |

### Application Precautions

1. Carefully read and follow the instructions before use; contact our technical support if you have any question;
2. Do not use the product in hazardous areas;
3. Use only DC power supply source for this product and 220V AC power supply is prohibited;
4. It is strictly forbidden to disassemble the product privately in order to avoid product failure or malfunction.

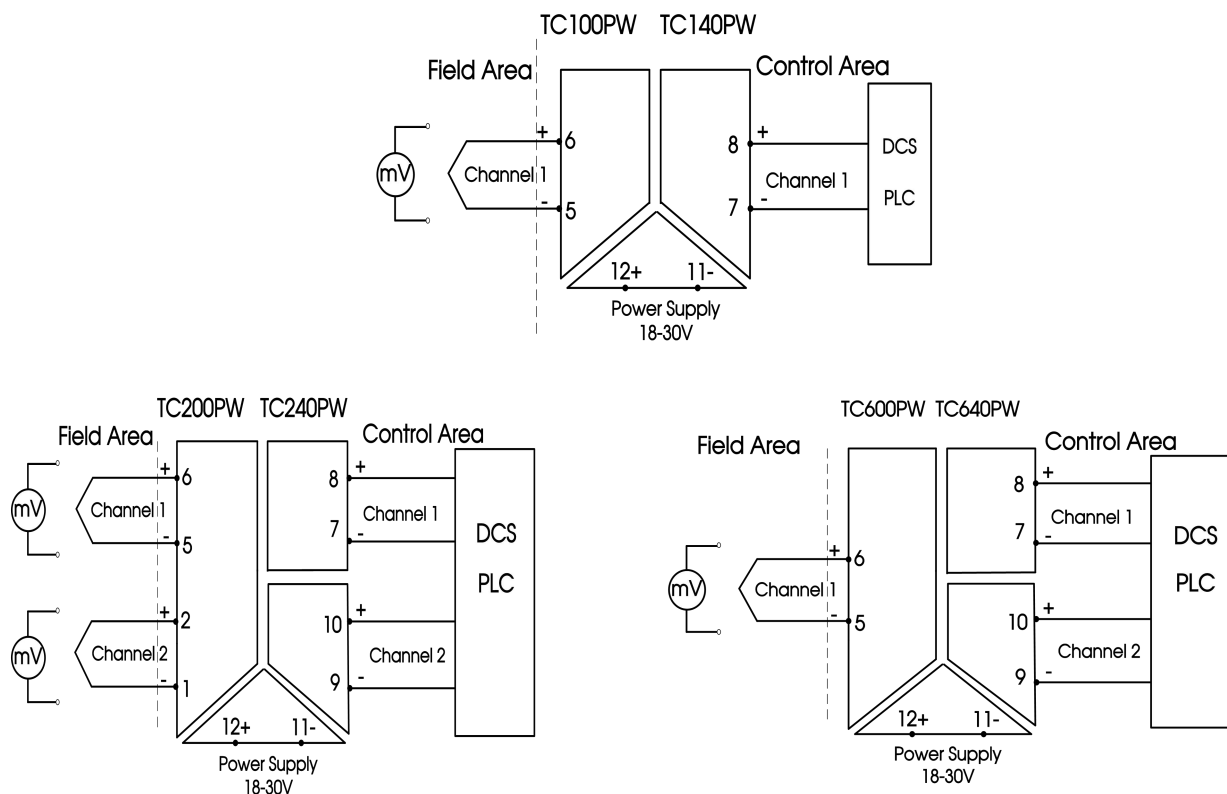
### Design Reference

#### 1. Wiring diagram for product application



| PIN | Description (2 input 2 output) |
|-----|--------------------------------|
| 1   | Signal 2 input-                |
| 2   | Signal 2 input+                |
| 5   | Signal 1 input-                |
| 6   | Signal 1 input+                |
| 7   | Signal 1 output-               |
| 8   | Signal 1 output+               |
| 9   | Signal 2 output-               |
| 10  | Signal 2 output+               |
| 11  | power input-                   |
| 12  | power input+                   |

Note: When use bottom power supply, anyone group or both is OK.



- ① Use dismountable terminals for instrument wiring, easy to operate;
- ② The sectional area of conductor is 0.5mm<sup>2</sup>- 2.5mm<sup>2</sup>;
- ③ The length of conductor exposed is 8mm and is fastened by M3 bolts.

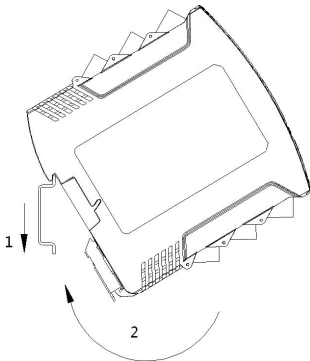
#### 2. For additional information please refer to application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

## Installation & Removal

### Installation

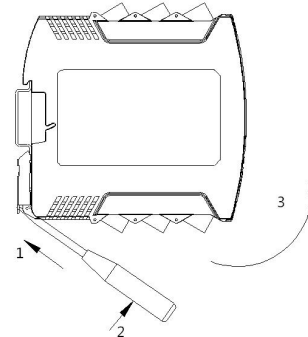
Standard 35mm DIN rail installation:

1. Insert top of Module into DIN rail;
2. Push bottom of Module into rail until it snaps in.

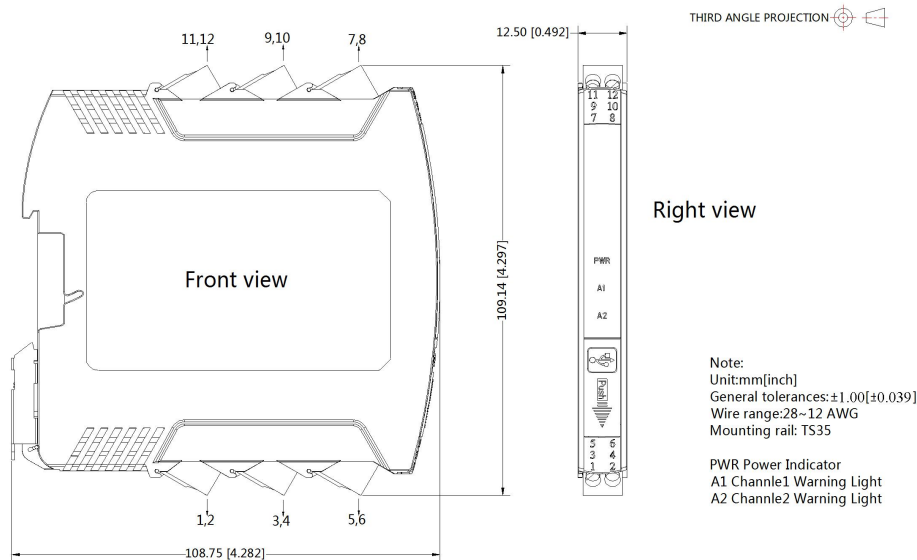


### Removal

1. Insert screw driver on the lower end of Module to release clamp (tool edge width  $\leq 6\text{mm}$ );
2. Push screw driver up towards Module to slide clamp out;
3. Pull Module up out of the guide rail.



## Dimensions



### Notes:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). The Packaging bag number: 58040010;
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. All index testing methods in this datasheet are based on company corporate standards;
4. The above are the performance indicators of the product models listed in this datasheet. Some indicators of non-standard models will exceed the above requirements. For details, please contact our technical staff;
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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