

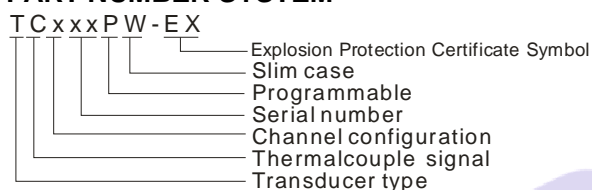
MORNSUN®

PROGRAMMABLE THERMOCOUPLES ISOLATION SAFETY BARRIER

— TCxxxPW-EX Series



PART NUMBER SYSTEM



FEATURES

- Isolation (input, output and power supply)
- 12.5mm slim case
- High accuracy (0.1% F.S.)
- High linearity (0.1% F.S.)
- Low temperature drift(50PPM/°C)
- Low-power dissipation
- Excellent EMC performance
- miniUSB port communication
- Input / Output range programmable
- High reliability(MTBF>500,000 hours)

GENERAL DESCRIPTION

TCxxxPW-EX thermocouples Isolation Safety Barrier series received from the hazardous area of thermocouple signals or mV level, and converted to the standard analog current or voltage signal which is isolated with application field, and transmitted to the control cabinet. While limiting the energy of intrinsically safe end string into hazardous area, to ensure that the system is intrinsically safe explosion-proof performance. The product has a Mini USB interface, It can be used for programming to configure the type and range of input and output signals. The product has the internal cold junction compensation function. An independent power supply is needed for the product later with isolation power output you need. and the port of power supply, input and output are isolated from each other. The thickness is 12.5mm.

Connection of field devices and the regions: thermocouples; zone 0, zone 1, zone 2; IIA, IIB, IIC, T4-T6 hazardous area. Product application: widely used in chemical, petroleum, pharmaceutical, metallurgy, coal mine, natural gas, electricity, etc Safety explosion protection system.

SELECTION GUIDE

Output type	1 input 1 output	1 input 2 output
Current output	TC100PW-EX	TC600PW-EX
Voltage type	TC140PW-EX	TC640PW-EX
Loop output	TC102PW-EX	TC602PW-EX
Input signal:		
Input signal	Range	The minimum range
R	-40~+1700°C	600°C
S	-40~+1700°C	600°C
K	-150~+1370°C	120°C
J	-80~+900°C	100°C
T	-160~+390°C	100°C
B	320~+1820°C	780°C
E	-80~+700°C	500°C
mV	-60~+60mV	10mV
Output signal:		
Output type	Output signal	
Current output	4~20mA / 0~20mA (programmable)	
Voltage output	0~5V / 0~10V / 1~5V / 2~10V (programmable)	

Note:

1. Customers need to choose the type of the input signal, output signal and range. We could also offer customer design for special input and output.
2. You can get the USB adapter T-01 for the isolator from Mornsun free of charge if you need.
3. Factory default: the input signal types are the mV signal, the output signal is 4~20mA and range is -60~+60mV.

ELECTRICAL CHARACTERISTICS							
Power input parameters	Input voltage	18~30VDC (Typical values 24VDC)					
	Power dissipation	≤1.8W					
	Power protection	Reverse polarity protection					
Safe Area	Input signal	See selection guide					
	Cold junction compensation	Compensation range:-25~+75°C(Error is less than 1 ° C per 20 ° C) Method of compensation: Internal compensation					
Hazardous Area	Fault output						
	Output type	4~20mA	0~20mA	1~5V	0~5V	0~10V	2~10V
	Input disconnection	23mA	23mA	5.75V	5.75V	11.5V	11.5V
	Lower limit alarm	About 3mA	About 21mA	About 0.75V	About 5.25V	About 10.5V	About 1.5V
	Upper limit alarm	About 22mA	About 22mA	About 5.5V	About 5.5V	About 11V	About 11V
	Normal operation	A1,A2 light off					
	Upper limit alarm	Above the upper limit of range + 5 ° C (temperature signal) or +2 mV (mV signal),output signal is about 110% of the maximum,A1 has been bright.					
	Lower limit alarm	Below the lower limit of range -5°C (temperature signal) or -2mV (mV signal),output signal is about 15% of the maximum, (Output types are 4~20mA, 2~10V,1~5V)or105% of the maximum (Output types are 0~20Ma,0~5V,0~10V), A2 has been bright.					
	Break alarm	Broken accidentally or input signal ≥70mV,output signal is 115% of the maximum,A1and A2 bright at the same time					
	Load capacity Communication port	≤500Ω(Output current maximum)					
		≥1MΩ(Output voltage maximum)					
		≤(Ue-4)/0.02 (loop power supply output) 20V≤Ue≤30V					
	Communication interface	MiniUSB port					
Communication protocol	See "MORNSUN Modbus Protocol Rules"						

TRANSMISSION CHARACTERISTICS	
Zero Offset	0.1%F.S. (Sin = 0,100% load,@25°C)
Accuracy	0.1%F.S. (Full-scale range,100% load,@25°C)
Temperature drift	0.0050%F.S./°C (-25°C~+71°COperating temperature range)
Response time	< 0.5s

ISOLATION CHARACTERISTICS	
Electrical Isolation	Safe Area and hazardous Area 2.5KVAC 1min,leakage current ≤5mA
	Output and power supply 2.5KVDC 1min,leakage current ≤5mA
Insulation resistance	100MΩ,500VDC (Signal input port, signal output port)

EMC CHARACTERISTICS			
EMI	CE	CISPR22/EN55022 CLASS A	
	RE	CISPR22/EN55022 CLASS A	
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 power port ±2KV	perf. Criteria B
		IEC/EN61000-4-4 signal port ±1KV	perf. Criteria B
	Surge	IEC/EN61000-4-5 power port ±1KV/2KV	perf. Criteria B
		IEC/EN61000-4-5 signal port ±1KV (Line to GND)	perf. Criteria B
CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A	

STANDARDS & CERTIFICATES	
Explosion protection certificate mark certificate mark	[Exia Ga]IIC
Explosion protection certificate parameters	Um=250Vrms,Uo=10.5V,Io=21mA,Po=56mW,Co=1.7uF,Lo=10mH
Explosion protection certificate agency	CHINA NATIONAL QUALITY SUPERVISION AND TEST CENTRE FOR EXPLOSION PROTECTED ELECTRICAL PRODUCTS
Explosion qualified No.	CNEx13.3054

OTHER CHARACTERISTICS

Temperature	Operating temperature:-25~+71 °C
	Transport and storage temperature:-40~+85 °C
Package	35mm DIN-rail package: T-rail card package (DIN50022), pluggable connection pin, thickness 12.5mm
Safety Class	IP20(IEC60529 / EN60529)
Weight	1 input 1 output: about 100g; 1 input 2 output: about 135g

CONNECTION

1. Connection used dismantlable terminals;
2. Cross section area of wiring: 0.5mm²~2.5 mm²;
3. The length of bare wire is about 8mm, locked up by the M3 bolt.

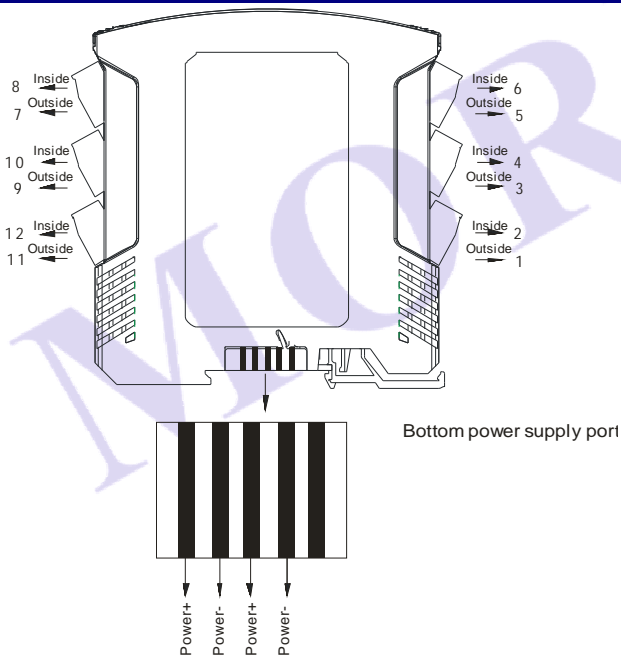
Selection guidelines for intrinsically safety explosion protection system

1. The explosion protection grade of the barrier must be not less than that of intrinsically safety explosion protection device in spot.
2. Take inconsideration of hazardous end output resistance and loop resistance make sure the barrier output voltage meets the minimum operation voltage requirement of intrinsically safety device in spot.
3. The safety parameters about intrinsically safety end meets:
 $U_o \leq U_i$, $I_o \leq I_{in}$, $P_o \leq P_{in}$
 $C_o \geq C_{in}$, $L_o \geq L_{in}$
4. Select suitable safety barrier which matches the intrinsically safety device in spot according to the power polarity, signal type and transmission mode about the device.
5. Much more protection is required, which can avoid the influence of the leakage current generated by safety barrier on intrinsically safety device in spot.

Operation notes

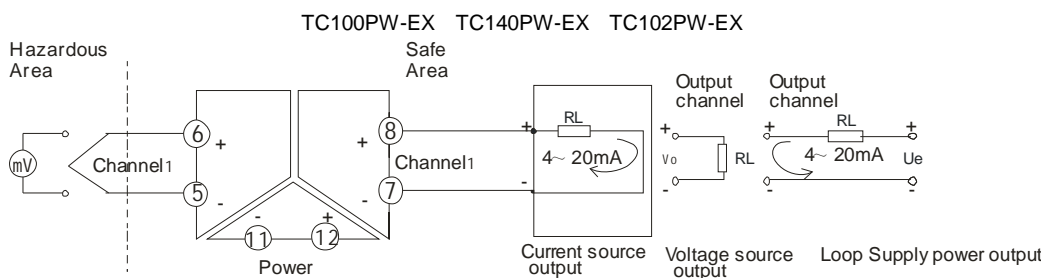
1. Please read the user manual carefully before using. If any question please contact our technical support department.
2. Please do not use this product in hazardous area.
3. The power supply of this product should be DC power source. It is forbidden to use 220VAC power supply.
4. To avoid invalid explosion protection function, or any failure, users disassemble this product is forbidden.

APPLICATION CIRCUIT DIAGRAM & PIN DESCRIPTION

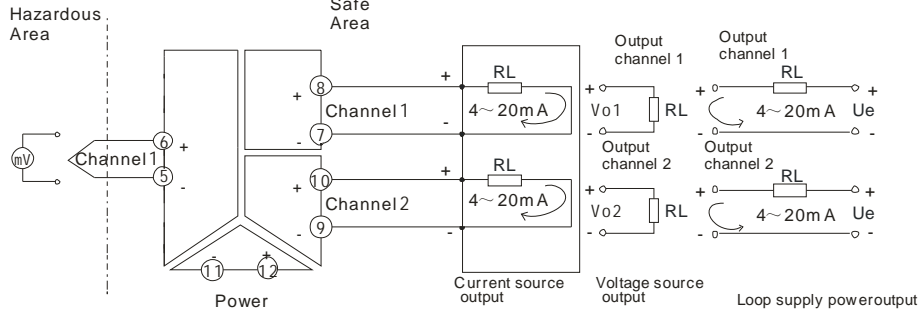


PIN	Description (1 input 2 output)
1	NC
2	NC
3	NC
4	NC
5	Signal 1 input-
6	Signal 1 output+
7	Signal 1 output-
8	Signal 2 output+
9	Signal 2 output-
10	power input+
11	power input-
12	Signal 1 input+

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



TC600PW-EX TC640PW-EX TC602PW-EX

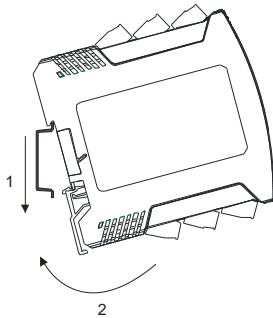


INSTALLATION & DISASSEMBLY

Installation

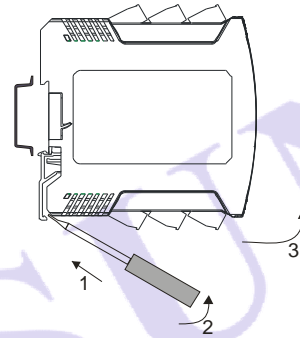
DIN35mm standard rail installation:

1. Insert the top of the instrument card in the rail;
2. Push the bottom of the instrument into the rail.

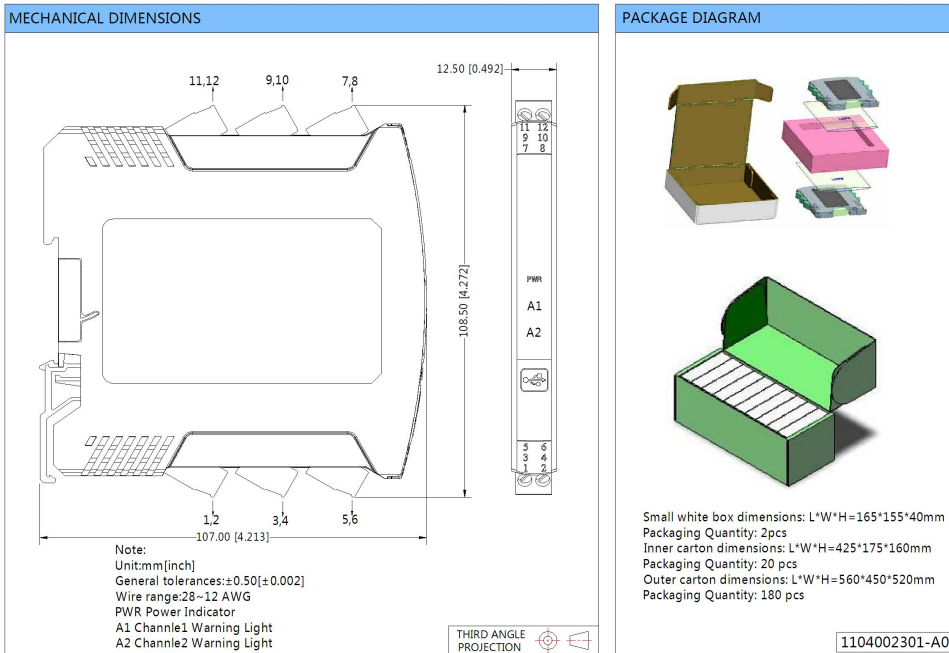


Disassembly

1. Insert a screwdriver between the bottom of the card lock and the rail;
2. Pull up the screwdriver and press the card lock downwards;
3. Pull the instrument out of the rail.



PACKAGING DIMENSION & PACKAGING DIAGRAM



Note:

1. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. In this datasheet, all the test setup and methods are based on our corporate standards.
3. All characteristics are meant for listed model, non-standard models may perform differently, you can contact MORN SUN FAE for more details.
4. Contact us for your specific requirement.
5. Specifications are subject to change without prior notice.

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