**RC Series** 

# **Temperature acquisition module**

**User Manual** 

# Table of contents

1	Produ	ct Overview	1
	1.1	Product Introduction	1
	1.2	Product Features	1
2	Produ	ct Parameters	2
	2.1	General parameters	2
3	panel		4
	3.1	Module Structure	4
	3.2	Indicator light function	4
4	wiring		5
	4.1	Terminal Blocks	5
	4.2	Wiring instructions and requirements	5
	4.3	Wiring Diagram	7
	4.3.1	Electrical Block Diagram	7
	4.3.2	RIO80TM	Э
	4.3.3	RIO40TM	)
5	use	1'	1
	5.1	Parameter settings and functions1	1
	5.1.1	Sensor Type Selection1	1
	5.1.2	Filter function1	1
	5.1.3	Channel enable function1	1
	5.2	Uplink and downlink process data and functions12	2
	5.2.1	Temperature/resistance data acquisition12	2
	5.2.2	Disconnection Detection	2
	5.2.3	Data compensation function12	2
	5.3	Use and parameter configuration in TwinCAT3 software environment	3
	5.4	Usage and parameter configuration in TIA Portal V14 software environment22	2

# 1 Product Overview

# 1.1 Product Introduction

RC series temperature acquisition modules support thermal resistors, thermocouples and other types of sensors. There are two types of modules: 4-channel and 8-channel. They use X-Bus bottom bus and are compatible with our RC series coupler modules.

# 1.2 Product Features

- Measurement types support RTD, thermocouple and resistor
- Sensitivity: 0.1°C
- Support single channel filter setting
- Support single channel enable setting
- Disconnect detection is supported for RTD, resistor, and thermocouple type sensors
- Support 50Hz suppression

# 2 Product Parameters

# 2.1 General parameters

Interface parameters	
Product Model	RIO80TM/RIO40TM
Product Name	RC series temperature acquisition module
Bus protocol	X-bus
Transfer rate	6 Mbps
Station Type	Slave
power supply	5 VDC, powered by X-bus
Rated current	80 mA
consumption	
<b>Technical Parameters</b>	
Specifications and	106×73×25.7 mm
dimensions	
weight	120 g
Operating temperature	-10~+60°C
Storage temperature	-20~+75°C
Relative humidity	95%, non-condensing
Protection level	IP20
EMI Characteristics	Compliant with EN IEC61000-6-4-2019
EMS Features	Compliant with EN IEC61000-6-2-2019
Vibration resistance	Complies with EN 60068-2-6
Impact resistance	Complies with EN 60068-2-27/29

Technical Parameters					
Number of channels	4, 8				
Sensor Type	Thermocouple	Thermal resistor	resistance		
Connection	2-wire	2-wire, 3-wire	2-wire		
	K:-200~1370°C	Pt100:-200~850°C	15Ω~3kΩ		
	J:-200~1200°C	Pt200:-200~600°C			
	E: -200~1000°C	Pt500:-200~600°C			
	S: -50~1690°C	Pt1000:-200~600°C			
	B: 50∼1800°C				
Accuracy	±0.3%	±1℃	±0.1%		
Sensitivity	0.1℃		±0.1Ω		
Resolution	16bit (int type)				
Conversion time (all channels filter	110ms	125 ms			
level is1 o'clock)					
Filtering	Single channel filte	ering, configurable (level	1 to 10)		
Disconnection detection	Both support				
Disconnection detection time	2ms				
Maximum input voltage allowed by	30VDC				
the channel					
Electrical isolation	500VAC, no isolati	on between channels			
Channel indicator light	greenLED Light				
Overflow and underflow functions	support				

# 3 panel

# 3.1 Module Structure

**Product Parts Name** 



# 3.2 Indicator light function

Logo	color	state	describe
Р	green	Always on	Power supply is normal

		Off	The product is not powered on or the power supply is
			abnormal
R	green	Always on	The system is running normally
		Flashing 1	I/O modules are connected and the X-bus system is ready
		Hz	to interact
		Off	The device is not powered on, the X-bus does not exchange
			data, or an exception occurs.
Channel	green	Always on	The channel is enabled and the sensor is connected
indication			normally
		Off	The channel is prohibited or the sensor is not connected
			normally

# 4 wiring

# 4.1 Terminal Blocks

Terminal Blocks		
Signal line terminal	Number of poles	16 P
	Number of poles	20 P
	Wire diameter	28~16 AWG 0.2~1.5 mm <sup>2</sup>

# 4.2 Wiring instructions and requirements

### Wiring tool requirements

The terminal adopts a screw-free design, and the installation and removal of the cable can be operated with a flat-blade screwdriver (specification:  $\leq 3$  mm) operation.



#### **Stripping length requirements**



Recommended stripping length 10 mm.

#### Wiring method

After stripping the corresponding length of the single-strand hard wire, press the button and Single strand guide Wireinsert.



For multi-strand flexible wires, after stripping the wires to the

corresponding length, you can directly connect them or use cold-pressed terminals of corresponding standard specifications (tubular insulated terminals, as shown in the following table) to insert the wires while pressing the button.



Specifications of tubular insulation terminals					
Specifications	model	Conductor			
		cross-sectional area			
		mm²			
	E0510	0.5			
	E7510	0.75			
	E7512	0.75			
	E1010	10			
	E1012	1.0			
The length of the tubular insulated terminal L is	E1510	1 6			
≥10 mm	E1518	1.5			

# 4.3 Wiring Diagram

# 4.3.1 Electrical Block Diagram

### **Electrical Block Diagram**



## 4.3.2 RIO80TM



\*PE内部导通 \*2线制热电阻需外部将"-"与"C"短接 \*4线制传感器需改成2线或3线接入

### 4.3.3 RIO40TM



\*PE内部导通 \*2线制热电阻需外部将"-"与"C"短接 \*4线制传感器需改成2线或3线接入

# 5 use

# 5.1 Parameter settings and functions

## 5.1.1 Sensor Type Selection

The module supports sensor type configuration function (for sensor types, see<u>2 Product parameters</u>). The same module only supports the same type of sensor, and a single channel cannot be configured. **Note: The default sensor type is PT100.** 

# 5.1.2 Filter function

A single channel of the module can filter each measured value through the filtering function, and perform sliding average processing on the previous N acquisition data to reduce the jitter range of the measured value, thereby improving stability and accuracy. Filter time = module cycle number (N) × module cycle time Module cycle time = conversion time + disconnection detection time Note: ① N configuration range 1~10. ② Filter parameter default setting: 1/time.

# 5.1.3 Channel enable function

The module can determine whether a channel is used by setting the "Enable/Disable" parameter. If a channel is set to be disabled, the channel is disabled regardless of whether the sensor is connected.show-9999.

Note: All channels are set to Disable by default when leaving the factory.

# 5.2 Uplink and downlink process data and functions

### 5.2.1 Temperature/resistance data acquisition

The upstream data (input) of the temperature module is the temperature or resistance data collected by each channel. The data of each channel is a 2-byte signed integer, and the collected data is 10 times the actual data. Divide the read data by 10 to get the actual temperature or resistance value in  $^{\circ}$ C or  $\Omega$ .

### 5.2.2 Disconnection Detection

Each channel of the temperature acquisition module supports disconnection detection. When any channel is not connected to a sensor or the sensor is connected incorrectly, the upstream data (Input) displays -9999. Thermocouples (TC), thermal resistors (RTDs), and resistance sensors all support disconnection detection, and display -9999 when disconnected.

### 5.2.3 Data compensation function

The module's downstream data (Output) is a manual compensation function for each channel data. The data compensation value can be entered according to actual needs. After setting the compensation value, the compensated temperature or resistance value will be automatically calculated in the upstream data (Input), that is, the upstream data is the final compensated temperature or resistance data. Divide the read data by 10 to get the compensated temperature or resistance value in  $^{\circ}$ C or  $\Omega$ .

# 5.3 Use and parameter configuration in TwinCAT3 software

# environment

The module needs to be used with the "RC-EC2200" coupler.

For details on adding and configuring module configuration files, see the usage section of the "RC-EC2200 Coupler Plug-in IO User Manual".

#### 1. Sensor Type Selection

a. Double-click Box1 (RC-EC2200) and switch to the "Startup" tab, as shown in the figure



Right click and s	elect "Inse	rt" to enter the	"Edit CANc	open Startup Entry"	interface, as	shov
	Edit CANope	en Startup Entry				>
	Transition ☐ I -> P ☑ P -> S ☐ S -> O	□S->P □O->S	Index (hex): Sub-Index (dec):	2000 0 Complete Access	Car	K
	Data (hexbin):	11			Hex E	Edit
	Validate Mask Comment:	SubIndex 000			Edit E	Entry
	Index	Name		Flags	Value	^
	- 2000.0 - 2000.0 - 2000.0 - 2000.0 - 2000.0 - 2000.0 - 2000.0 - 2000.0	Sensor Type       Channel1 Filte       Channel2 Filte       Channel2 Filte       Channel3 Filte       Channel4 Filte       Channel5 Filte       Channel6 Filte       Channel7 Filte       Channel7 Filte       Channel8 Filte       Channel8 Filte       Channel8 Filte	er Time er Time er Time er Time er Time er Time er Time er Time er Time	RW RW RW RW RW RW RW RW RW	PT100 (0) 0x00000001 (1) 0x00000001 (1) 0x00000001 (1) 0x00000001 (1) 0x00000001 (1) 0x00000001 (1) 0x00000001 (1)	
		0A Channel1 Ena 0B Channel2 Ena 0C Channel3 Ena	able able	RW RW RW	Disable (0) Disable (0) Disable (0)	

# 5 use

c. Select an existing module, such as "RIO80TM", click "Sensor Type", and select the sensor to be used in the "Set Value Dialog" interface, as shown in the figure

	Inc	lov (bov):	2000		OK
		ien (Hen).	2000		Cano
✓ P-> S	S-> P Su	b-Index (dec):	1		
□S->0 [	]0->S	Validate	Complete Access		
Data (hexbin):	00 00 00 00				Hex Ec
Validate Mask:					
Comment:	Sensor Type				Edit En
Index	Name		Flags	Value	
= 2000:0	RIO80TM Co	nfia	RW	> 17 <	
2000-01	Concertine				
2000.01	Sensor Type	Set Value	Dialog		
2000.01	Channel1 Filt	Set Value	Dialog		
2000.01	Channel1 Filt Channel2 Filt	Set Value	Dialog		0
2000.01 2000.02 2000.03 2000.04	Channel1 Filt Channel2 Filt Channel3 Filt	Set Value	Dialog		0
2000.01 2000:02 2000:03 2000:04 2000:05	Channel1 Filt Channel2 Filt Channel2 Filt Channel3 Filt Channel4 Filt	bec: te te te te Hex:	Dialog 0 0x0000000		OI
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06	Channel1 Filt Channel2 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt	Set Value	Dialog 0 0 0×0000000 PT100		
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07	Channel1 Filt Channel2 Filt Channel3 Filt Channel3 Filt Channel5 Filt Channel5 Filt	Set Value te Dec: te Hex: te Enum:	Dialog 0 0 0×00000000 PT100 PT100		Can
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07 2000.08	Channel1 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt Channel6 Filt Channel6 Filt	Set Value Dec: He Hex: te Enum:	Dialog 0 0 0×0000000 PT100 PT100 PT200		Can
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07 2000.08 2000.09	Channel1 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt Channel6 Filt Channel7 Filt Channel8 Filt	Set Value Dec: He Hex: Enum: He Back	Dialog 0 0 0×0000000 PT100 PT200 PT500		Can
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07 2000.08 2000.09 2000.04	Channel1 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt Channel6 Filt Channel7 Filt Channel8 Filt Channel8 Filt	Set Value Dec: Hex: Hex: Enum: Bool:	Dialog 0 0 0×0000000 PT100 PT200 PT500 PT1000 Desistance Ture		Can
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07 2000.08 2000.09 2000.0A 2000.0B	Channel1 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt Channel6 Filt Channel7 Filt Channel8 Filt Channel1 En Channel2 En	Set Value Dec: Hex: Hex: Hex: Hex: Bool: Binary:	Dialog 0 0 0×00000000 PT100 PT200 PT500 PT1000 Resistance Type K		Can
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07 2000.08 2000.09 2000.04 2000.09 2000.0B	Channel1 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt Channel6 Filt Channel7 Filt Channel8 Filt Channel1 En Channel2 En Channel3 En	Set Value	Dialog 0 0 0×0000000 PT100 PT200 PT500 PT1000 Resistance Type K J		Can
2000.01 2000.02 2000.03 2000.04 2000.05 2000.06 2000.07 2000.08 2000.09 2000.04 2000.0B 2000.0C 2000.0C	Channel1 Filt Channel2 Filt Channel3 Filt Channel4 Filt Channel5 Filt Channel6 Filt Channel7 Filt Channel8 Filt Channel1 En Channel2 En Channel3 En Channel4 En	Set Value  E E E E E E E E E E E E E E E E E E	Dialog 0 0 0x00000000 PT100 PT200 PT500 PT1000 Resistance Type K J E		Can Can

After the configuration is completed, the software needs to be reloaded and the module needs to be powered on again.

#### 2. Filter configuration

- a. Enter the "Edit CANopen Startup Entry" interface.
- b. Select the channel of the module to be modified and modify the filter value as

Transition	I	ndex (hex):	2000		Oł Can
✓ P-> S	_S->P 🔅	Sub-Index (dec):	2	1	
s→o [	]0->S	Validate	Complete Access		
Data (hexbin):	01 00 00 00				Hex E
Validate Mask:					
Comment:	Channel1 Filter Tim	ie			Edit E
l'anno conner			and and and and		
Index	Name		Flags	Value	
2000:0	RIU801M	Config	RW	>   / <	
2000:01	Sensor Ty		RW	PT100 (0)	• )
2000.02	Channell		RW	00000001(	IJ
2000.03	Channel2	Set Value D	lialog		
2000.04	Channels	r n Fil	13-		
2000.00	Channels	Fil Dec:	1		Ok
2000:07	Channel6	Fill 11-11-	0x0000001		0
2000.08	Channel7	Fil	0x0000001		Cano
2000:09	Channel8	Fil Float:	1.4012985e-45		
2000.0A	Channel1	Er			
	Channel2	En			
2000:0B		Er Bool	<u>0</u> <u>1</u>		Hex E
2000:0B	Channel3	EI] D001.			
2000:0B	Channel3 Channel4	Er Book. Er			
2000:0B 2000:0C 2000:0D 2000:0E	Channel3 Channel4 Channel5	Er Er Er Binary:	01 00 00 00		

After the configuration is completed, the software needs to be reloaded and the module needs to be powered on again.

#### 3. Channel Enable

- a. Enter the "Edit CANopen Startup Entry" interface.
- b. Select the channel of the module to be modified and modify the enable

Edit CANopen S	Startup Entry			>
Transition		Index (hex):	2000	OK
✓ P -> S	S -> P	Sub-Index (de	c): 10	
S->0	0->S	Set Value D	ialog	×
Data (hexbin):	00 00 00 00	Dec:	0	ОК
Validate Mask:		Hex:	0x0000000	Cancel
Comment:	Channel1 Enabl	Enum:	Disable Disable	
Index	Name		Enable	
2000:03	Channe	Bool:	Q 1	Hex Edit
2000:04	Channe			
2000:05	Channe	Binary:	00 00 00 00	4
2000:06	Channe	Bit Size:	$\bigcirc 1 \bigcirc 8 \bigcirc 16$	
2000:07	Channe		0.000	
2000:08	Channe	7 Filter Time	RW	0x0000001 (1)
2000:09	Channe	18 Filter Time	RW	0x0000001 (1)
2000:0A	Channe	11 Enable	RW	Disable (0)
2000:0B	Channe	l2 Enable	RW	Disable (0)
2000:0C	Channe	13 Enable	RW	Disable (0)
2000:0D	Channe	l4 Enable	RW	Disable (0)
2000:0E	Channe	l5 Enable	RW	Disable (0)
2000:0F	Channe	l6 Enable	RW	Disable (0)
2000:10	Channe	17 Enable	RW	Disable (0)
2000:11	Channe	18 Enable	RW	Disable (0)
E020-0	Configu	rod Modulo Idon	tlict D\W	

parameters.

After the modification is completed, you need to perform the Reload operation and power on the module again.

#### 4. Data Interaction

a. Take the RIO80TM module as an example: if the module has signal input, it can be monitored in the

"Inputs" of the module, as shown in the figure below.

© © ☆ 'o - ₫ 👂 <u>-</u>	Name	Online	Type	Size	>Add	In/Out	User
Search Solution Explorer (Ctrl+;)	🔎 🚽 🔁 Channel 1	1092	INT	2.0	41.0	Input	0
Colution 'TwinCAT Project50' (1 project)	🕫 Channel 2	996	INT	2.0	43.0	Input	0
TwinCAT Projectos (1 project)	🔁 Channel 3	19958	INT	2.0	45.0	Input	0
SYSTEM	🐔 Channel 4	1088	INT	2.0	47.0	Input	0
MOTION	🔁 Channel 5	0	INT	2.0	49.0	Input	0
PLC	🐔 Channel 6	0	INT	2.0	51.0	Input	0
SAFETY	🔁 Channel 7	0	INT	2.0	53.0	Input	0
96- C++	🔁 Channel 8	0	INT	2.0	55.0	Input	0
🔺 🔄 I/O							
<ul> <li>Devices</li> </ul>							
<ul> <li>Device 2 (EtherCAT)</li> </ul>							
🚺 Image							
🚔 Image-Info							
SyncUnits							
Inputs							
Outputs							
🕨 🛄 InfoData							
Box 1 (RC-EC2200)							
Inputs							
Outputs							
<ul> <li>Module 1 (RIO80TM)</li> </ul>							
Inputs							
Outputs							
WcState							
🕨 🛄 InfoData							
A Mariana							

Input register information table (read-only attribute) The temperature is a 2-byte signed integer, which is 10 times the actual temperature. The read data divided by 10 is the actual temperature or resistance value in  $^{\circ}$ C or  $\Omega$ .

#### 5. Temperature compensation

 a. The temperature compensation function only supports thermocouple type sensors. Take the RIO80TM module as an example. Channel 1 is connected to a thermocouple sensor, and the sensor type is selected as K-type thermocouple, as shown in the figure below.

Edit CANopen St	artup Entry							×
Transition ☐ I -> P ✓ P -> S ☐ S -> 0	]S-> P ]O-> S	Index (hex): Sub-Index (c	dec):	2000 1 Complete #	Access			OK Cancel
Data (hexbin):	Set Value Dia	alog				X		Hex Edit
Validate Mask: Comment:	Dec: Hex:	6 0x00000006			Ca	DK		Edit Entry
Index - 2000:0 - 2000:01 - 2000:02	Enum:	K	1			Fdit	1 (1)	
	Binary: Bit Size:	06 00 00 00	016	● 32 ○ 6	64 ()?	4	1 (1) 1 (1) 1 (1) 1 (1) 1 (1)	
2000:07	Channel7 Filte	r Time	RV	v V		0x00000000	1 (1)	
2000:09	Channel8 Filte	r Time	RV	V		0x0000000	1 (1)	
2000:0A	Channel1 Ena	ble	RV	V		Disable (0)		
2000:0B	Channel2 Ena	ble	RV	V ,		Disable (0)		
2000:0C	Channel3 Ena	ble blo	RV	Y J		Disable (0)		
2000.0D	Channel5 Ena	ble	BV	γ V		Disable (0)		
2000.0E	Channol6 Eng	blo	D\i			Dicable (0)		~

After the modification is completed, you need to perform the Reload operation and power on the module again.

b. After channel 1 is enabled, the measured temperature is 24°C, as shown in the figure below.

Solution Explorer	<b>-</b> ₽ ×	TwinCAT Project4 +	×						
○ ○ 습 io - i / ≠		Name	Online	Type	Size	>A	In/Out	User ID	Linked to
Search Solution Explorer (Ctrl+:)	0.	Channel 1	240	INT	2.0	41.0	Input	0	
		Channel 2	-9999	INT	2.0	43.0	Input	0	
Solution 'TwinCAT Project4' (1 project)		Channel 3	-9999	INT	2.0	45.0	Input	0	
<ul> <li>TwinCAT Project4</li> </ul>		Channel 4	-9999	INT	2.0	47.0	Input	0	
P SYSTEM		🕫 Channel 5	-9999	INT	2.0	49.0	Input	0	
MOTION		🕶 Channel 6	-9999	INT	2.0	51.0	Input	0	
		Channel 7	-9999	INT	2.0	53.0	Input	0	
SALETT		Channel 8	-9999	INT	2.0	55.0	Input	0	
Devices									
▲ ➡ Device 2 (EtherCAT)									
🛟 Image									
📑 Image-Info									
SyncUnits									
👂 🛄 Inputs									
Outputs									
👂 🛄 InfoData									
<ul> <li>Box 1 (RC-EC2200)</li> </ul>									
Inputs									
Outputs									
Module 1 (RIO80TM)									
Inputs									
P di Outputs									
V wcstate									
inappings									

c. In the "Outputs" of the module, you can set the temperature compensation value to 50, i.e. 5°C, as shown in the figure below.

Solution Explorer 🛛 👻 🕂 🗙	TwinCAT Project4 +	×						
G G 🟠 To - 🗗 🕨 🗕	Name	Online	Туре	Size	>A	In/Out	User ID	Linked to
Search Solution Explorer (Ctrl+:)	Channel 1 Offset	50	SINT	1.0	41.0	Output	0	
	Channel 2 Offset	0	SINT	1.0	42.0	Output	0	
Solution 'TwinCAT Project4' (1 project)	Channel 3 Offset	0	SINT	1.0	43.0	Output	0	
IwinCAI Project4	Channel 4 Offset	0	SINT	1.0	44.0	Output	0	
P SYSTEM	Channel 5 Offset	0	SINT	1.0	45.0	Output	0	
MOTION	Channel 6 Offset	0	SINT	1.0	46.0	Output	0	
	Channel 7 Offset	0	SINT	1.0	47.0	Output	0	
SAFETY	Channel 8 Offset	0	SINT	1.0	48.0	Output	0	
<ul> <li>I/O</li> <li>Devices</li> <li>Device 2 (EtherCAT)</li> <li>Image</li> <li>Image-Info</li> <li>SyncUnits</li> <li>Imputs</li> <li>Outputs</li> <li>InfoData</li> <li>Module 1 (RIO80TM)</li> <li>Outputs</li> <li>InfoData</li> <li>Module 1 (RIO80TM)</li> <li>InfoData</li> <li>Module 1 (RIO80TM)</li> <li>InfoData</li> <li>InfoData</li> <li>InfoData</li> <li>InfoData</li> </ul>								

d. After setting the compensation value, the temperature of channel 1 is 29°C, as shown in the figure below.

Solution Explorer 👻 👎 🗙	TwinCAT Project4	₽ X						
0 0 û 0 · 0 / 1 - 0	Name	Online	Type	Size	>A	In/Out	User ID	Linked to
Search Solution Explorer (Ctrl+1)	Channel 1	291	INT	2.0	41.0	Input	0	
	Channel 2	-9999	INT	2.0	43.0	Input	0	
Solution 'TwinCAT Project4' (1 project)	Channel 3	-9999	INT	2.0	45.0	Input	0	
TwinCAT Project4	Channel 4	-9999	INT	2.0	47.0	Input	0	
▷ SYSTEM	Channel 5	-9999	INT	2.0	49.0	Input	0	
MOTION	Channel 6	-9999	INT	2.0	51.0	Input	0	
	Channel 7	-9999	INT	2.0	53.0	Input	0	
SAFELY	Channel 8	-9999	INT	2.0	55.0	Input	0	
Devices								
Device 2 (EtherCAT)								
🛟 Image								
🛟 Image-Info								
SyncUnits								
Inputs								
Outputs								
InfoData								
<ul> <li>Box 1 (RC-EC2200)</li> </ul>								
Inputs								
Outputs								
Module 1 (RIO80TM)								
Inputs								
P Uutputs								
V w wcstate								
iviappings								

# 5.4 Usage and parameter configuration in TIA Portal V14 software environment

The module needs to be used with the "RC-PN2200" coupler.

For details on adding and configuring module configuration files, see the usage section of the "RC-PN2200 Coupler Plug-in IO User Manual".

- 1. Sensor Selection
- a. Open the Device View, as shown below.

Project Edit View Insert Online Optio	ns Tools Window Help	🍠 Go onli	ne 🖉 G	o offline 🖁 🛔	2 🖪 🖪	× = I	j •	Totall	y Integrate	d Automatin POI	on RTAL
Project tree	RC-PN2200 V Ungrouped d	evices ▶ R	C-PN220	00 [RC-PN2	200]					- 🖷	∎×
Devices						🛃 Top	pology view	Network	view	Device vie	w
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Device overview										
	Module	Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	Access	
▼ RC-PN2200	▼ RC-PN2200	0	0			RC-PN2200	1234567	V10.00.00		PLC_1	^
Add new device	► PN-IO	0	0 X1			PNIO				PLC_1	
Devices & networks	RIO80TM_1	0	1	6883	6471	RIOSOTM		1.0		PLC_1	
PLC_1 [CPU 1211C AC/DC/Rly]		0	2								
Device configuration		0	3								
😧 Online & diagnostics		0	4								
Program blocks		0	5								
Technology objects		0	6								=
External source files		0	7								
PLC tags		0	9								
Cell PLC data types		0	0								
Watch and force tables		0	9								
Online backups	8	0	10								
Traces		0	11								
OPC LIA communication	÷	0	12								
	e a	0	13								

b. In offline state, select an existing module, in this case "RIO80TM", select the corresponding channel, and set the sensor parameters, as shown in the figure below.

	RC-PN2200	Ungroupe	d devices 🕨	RC-PN220	0 [RC-PN	2200]								_ • •
Devices								🛃 Top	ology view	🔥 Ne	twork	view	Devic	e view
11 III III III III III III III III III	dt ' 🖬 🗍	Device over	erview											
G.CPN2200     Add new device     Devices & networks     Devices & networks     Devices & networks		₩ Module	e PN2200 PN-IO I80TM_1	Rack 0 0 0	Slot 0 0 X1 1	1 address 6883	Q address 6471	Type RC-PN2200 PNIO RIO80TM	Article num 1234567	ber Firm V10 1.0	ware .00.00	Comment	Access PLC_1 PLC_1 PLC_1	
Device configuration	RIOSOTM 1	RIO80TM1							Proportion	ti lofe	0	Diagnost	tice	
<ul> <li>Program blocks</li> <li>Program blocks</li> <li>Prochaldy objects</li> <li>Prochald Statemal source files</li> <li>Prochald State hard force tables</li> <li>Prochald State hard force hard force hard tables</li> <li>Proceedings and tables</li> <li>Proceedings and tables</li> <li>Proceedings and tables</li> <li>Proceedings and tables</li> </ul>	General Catalog ir Inputs Module para I/O addresse	IO tags nformation meters s	System c	onstants ule parame 080TM Paratu Chen Chen Chan Chan Chan Chan Chan Chan	Texts ters ameter re Sensor re	Select: 11 (1-10): P (1-10): R (1-10): R (1-10): T (1-10): T (1-10): T (1-10): T	HERMOCOUF F100 f200 f500 f1000 ESISTANCE HERMOCOUF HERMOCOUF HERMOCOUF HERMOCOUF	LE_K MEASUREMEN LE_K LE_J LE_E LE_S LE_S LE_B	T					<b>•</b>
Cross-device functions				Chan	nel7 Filter	(1-10): 1								
Gommon data     Documentation settings				ci	hannel O E hannel 1 E	inable: D	isable isable							•
Canguages & resources     Canguages & resources				C	hannel 2 B	nable: D	isable							•
Online access				C	hannel 3 E	nable: D	isable							-
<ul> <li>Card Reader/USB memory</li> </ul>				ci	hannel 4 E hannel 5 E	inable: D	isable isable				_			•
	-			C	hannel 6 B	nable: D	isable							-

\*After the modification is completed, download the program and power on the module again.

#### 2. Filter parameter settings

In the "Device View" menu page, select a module of an existing model, in this case "RIO80TM", select the corresponding channel, and set the filter parameters, as shown in the figure below.

Project tree	RC-PN2200	Ungroupe	ed device	es ▶ R	C-PN220	0 [RC-PN	2200]		_		_		_	∎ ∎ ×
Devices									📑 To	pology view	h Network	view [	Device	view
11 III III III III III III III III III	dt ' 🖬 🗍	Device ov	erview											
	^	- Module	e	_	Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	Access	
<ul> <li>RC-PN2200</li> </ul>	=	▼ RC-	PN2200		0	0			RC-PN2200	1234567	V10.00.00		PLC 1	~
🚔 Add new device	1		PN-IO		0	0 X1			PNIO				PLC 1	
📩 Devices & networks		RIC	80TM 1		0	1	68 83	6471	RIOSOTM		1.0		PLC 1	
PLC_1 [CPU 1211C AC/DC/Rly]		1												
Device configuration	Y 🔁		_	_	_	_	_	_					_	/
Q Online & diagnostics	RIO80TM_1	[RIO80TM]							Q	Properties 1	Info	Diagnost	tics	
Program blocks	General	IO tags	Syste	em con	stants	Text	s							
Technology objects	General		-											-
External source files	Catalog	aformation		Module	parame	ters								
PLC tags	Inputs	inormation.		BIOR	0.T. 4.D									_
PLC data types	tinputs	motor	_	RIUS	Unwiran	ameter								
Watch and force tables	1/O address	ameters	_	-			Colorty 7							
Online backups	no address	es.			emperatu	re sensor	select:	некиюсоон	LC_K					
🕨 📴 Traces			_		Char	nnelO Filte	r(1-10): 1							
DPC UA communication			_		Char	nnel1 Filte	r(1-10): 🚺	Value rang	ge: [110].	×				
Device proxy data			_		Char	nel? Filte	r(1-10): 1			_				
Program info			_		citor					_				
E PLC alarm text lists			_		Char	nnel3 Filte	r(1-10): 1							
Local modules					Char	nnel4 Filte	r(1-10): 1							
Distributed I/O			1		Char	nel5 Filte	r(1-10): 1							
Ungrouped devices					Char	and Ciles	-(1.10).							
Security settings			2		Char	meio riite	1(1-10):							
Cross-device functions					Char	nnel7 Filte	r(1-10): 1							
Common data					c	hannel 0	Enable: D	isable						-
Documentation settings					0	hannel 1	Enable: D	isable						-
Languages & resources														
Version control interface					c	hannel 2	Enable: D	isable						
Online access					c	hannel 3	Enable: D	isable						-
Card Reader/USB memory					c	hannel 4	Enable: D	isable						-
					0	hannel 5	Enable: D	icable						
						in annier 5								8-
	-				0	hannel 6	Enable: D	Isable						<b>v</b> V

\*After the modification is completed, download the program and power on the module again.

#### 3. Channel enable function

In the "Device View" menu page, select a module of an existing model, in this case "RIO80TM", select the corresponding channel, and set the enable parameters, as shown in the figure below.

	RC-PN2200	<ul> <li>Ungroupe</li> </ul>	d devi	ces 🕨	RC-PN	12200	[RC-PI	2200]						-		×
Devices										🛃 To	pology view	Network	view 🚺	Device	view	
11 II I	dt 🗖 🗐	Device over	erview													
	▲ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ </td <td>Module RC-1 RIO RIO RIO80TM]</td> <td>PN2200 PN-IO 80TM_1</td> <td></td> <td> Ri 0 0</td> <td>ack</td> <td>Slot 0 0 X1 1</td> <td>1 address 6883</td> <td>Q address 6471</td> <td>Type RC-PN2200 PNIO RIO80TM III</td> <td>Article number 1234567 Properties</td> <td>Firmware V10.00.00 1.0</td> <td>Comment</td> <td>Access PLC_1 PLC_1 PLC_1 PLC_1</td> <td>&gt;</td> <td>&lt; &gt;</td>	Module RC-1 RIO RIO RIO80TM]	PN2200 PN-IO 80TM_1		Ri 0 0	ack	Slot 0 0 X1 1	1 address 6883	Q address 6471	Type RC-PN2200 PNIO RIO80TM III	Article number 1234567 Properties	Firmware V10.00.00 1.0	Comment	Access PLC_1 PLC_1 PLC_1 PLC_1	>	< >
Program blocks	General	IO tags	Svs	tem co	onstan	ts	Text	s			-					
Technology objects	▼ General			Modu	le par	amet	ers _									^
External source files	Catalog i	nformation		RIO	ROTM	Para	meter									
PLC data types	Inputs		_	nu o		- uiu	meter									=
Watch and force tables	Module para	ameters	-		Tempe	eratur	e Sensor	Select: T	HERMOCOU	PLE_K					-	
Online backups	ilo addresse	5	-			Chann	nelO Filte	r(1-10): 1								
Traces						Chanr	nel1 Filte	r(1-10): 1			_					
OPC UA communication						Chan	nel2 Filte	r(1-10): 1								
Device proxy data						Chang	all Filte	r(1-10): 1								
PI C alarm text lists						chan	and a siles	-(1.10).			_					
Local modules						Chanr	hel4 Filte	r(1-10): 1								
Distributed I/O			•			Chan	nel5 Filte	r(1-10): 1								
Ungrouped devices						Chan	nel6 Filte	r(1-10): 1								
Security settings			-			Chan	nel7 Filte	r(1-10): 1								
Cross-device functions						Ch	annel 0	Enable: E	nable						-	
Common data						Ch	annel 1	Enable:	isable							
Documentation settings						ch		Enchles 1	nable						-	
Languages & resources						ch	anner 2		isable							
Caline access						Ch	annel 3	Enable:	Disable						-	
Card Reader/USB memory						Ch	annel 4	Enable: D	oisable						-	
Continue de la contra de la con						Ch	annel 5	Enable: D	oisable						-	
						Ch	annel 6	Enable: D	isable						-	

\*After the modification is completed, download the program and power on the module again.

#### 4. Data Display

#### • IO mapping address

Click "Device View". Under the "Device Overview" menu folder, you can find the address assigned by the system software to the I/O module, and you can also modify the address as needed, as shown in the figure below.

Module	 Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	
<ul> <li>RC-PN2200</li> </ul>	0	0			RC-PN2200	1234567	V10.00.00		1
PN-IO	0	0 X1			PNIO				Γ
RIO80TM_1	0	1	6883	6471	RIOSOTM		1.0		
	0	2							
	0	3							
	0	4							
	0	5							
	0	6							-
	0	7							
	0	8							
	0	9							
	0	10							
	0	11							
	0	12							
	0	13							
	0	14							

#### • Data Validation

Double-click "Add New Monitoring Table", enter the module channel address, and click button to monitor the input data, as shown in the figure below.

Devices		12					
<u>1</u>			11 II Io 91 9	A 🔭 🔐	,		
		i	Name	Address	Display format	Monitor value	Modif
<ul> <li>RC-PN2200</li> </ul>		1		%IW68	DEC+/-	-9999	
💕 Add new device		2		%IW70	DEC+/-	-9999	
📩 Devices & networks		3		%IW72	DEC+/-	-9999	
▼ 📑 PLC_1 [CPU 1211C AC/D	- M •	4		%IW74	DEC+/-	-9999	
Device configuration		5		%IW76	DEC+/-	175	
🖳 Online & diagnostics		6		%IW78	DEC+/-	-9999	
🕨 🔂 Program blocks	•	7		%IW80	DEC+/-	-9999	
Technology objects		8		%IW82	DEC+/-	-9999	
🕨 词 External source files		9		<添加>			
🕨 🞑 PLC tags	•						
PLC data types							
Watch and force tables	5						

Input register information table (read-only attribute) The temperature is a 2-byte signed integer, which is 10 times the actual temperature. The read data divided by 10 is the actual temperature or resistance value in  $^{\circ}$ C or  $\Omega$ .

a. The temperature compensation function only supports thermocouple type sensors. Take the RIO80TM module as an example. Channel 1 is connected to a thermocouple sensor, the sensor type is K-type thermocouple, and channel 1 is enabled, as shown in the following figure.

rio80TM_1 [	RIO80TM]			<b>Properties</b>	🛄 Info	<b>Diagnostics</b>	
General	IO tags	System constants Texts					
General Catalog ir	formation	Module parameters					
Inputs		RIO80TM Parameter					
Module para	meters						
I/O addresse	s	Temperature Sensor Select:	THERMOCOUPLE_K				-
		Channel0 Filter(1-10):	1				
		Channel1 Filter(1-10):	1				
		Channel2 Filter(1-10):	1				
		Channel3 Filter(1-10):	1				
		Channel4 Filter(1-10):	1				
		Channel5 Filter(1-10):	1				
	_	Channel6 Filter(1-10):	1				
	•	Channel7 Filter(1-10):	1				
		Channel O Enable:	Enable				
	-	Channel 1 Enable:	Disable				-
		Channel 2 Enable:	Disable				-
		Channel 3 Enable:	Disable				-
		Channel 4 Enable:	Disable				-
		Channel 5 Enable:	Disable				-
		Channel 6 Enable:	Disable				-
		Channel 7 Enable:	Disable				

\*After the modification is completed, download the program and power on the module again.

b. Check channel 1 in the monitoring table and the measured temperature is 24.4°C, as shown in the figure below.

学 👻	1. 1. 1.	R 🕾 🕿	1					
i	Name	Address	Display format	Monitor value	Modify value	9	Comment	Tag comment
1		%IW68	DEC+/-	244				
2		%IW70	DEC+/-	-9999				
3		%IW72	DEC+/-	-9999				
4		%IW74	DEC+/-	-9999				
5		1 %IW76	DEC+/-	-9999				
6		%IW78	DEC+/-	-9999				
7		%IW80	DEC+/-	-9999				
8		%IW82	DEC+/-	-9999				
9		%QB64	DEC+/-	0				
10		%QB65	DEC+/-	0				
11		%QB66	DEC+/-	0				
12		%QB67	DEC+/-	0				
13		%QB68	DEC+/-	0				
14		%QB69	DEC+/-	0				
15		%QB70	DEC+/-	0				
16		%QB71	DEC+/-	0				

c. In the monitoring table output control QB64~QB71, set the temperature compensation value to 50, that is, 5°C. After setting the compensation value, the temperature of channel 1 is 29.4°C, as shown in the figure below.

<i>∰ ∰ № 9</i> , <i>5</i> , <i>7</i>											
i	Name	Address	Display format		Monitor value	Modify value	9		Comment		Tag comment
1		%IW68	DEC+/-		294						
2		%IW70	DEC+/-		-9999						
3		%IW72	DEC+/-		-9999						
4		%IW74	DEC+/-		-9999						
5		%IW76	DEC+/-		-9999						
6		%IW78	DEC+/-		-9999						
7		%IW80	DEC+/-		-9999						
8		%IW82	DEC+/-		-9999						
9		%QB64	DEC+/-	•	50	50		4			
10		%QB65	DEC+/-		0						
11		%QB66	DEC+/-		0						
12		%QB67	DEC+/-		0						
13		%QB68	DEC+/-		0						
14		%QB69	DEC+/-		0						
15		%QB70	DEC+/-		0						
16		%QB71	DEC+/-		0						