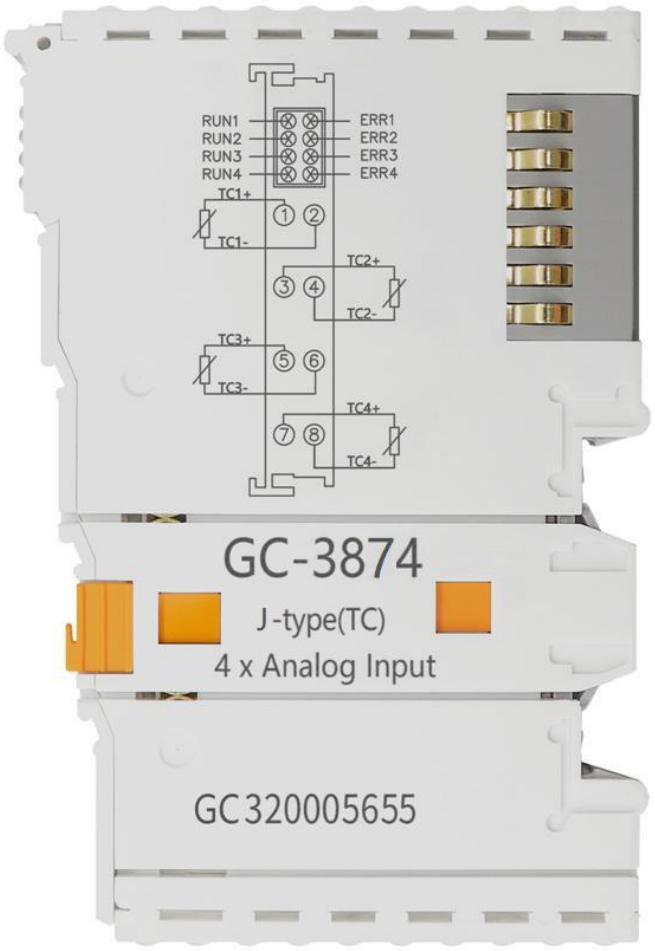
GC-3874

4-channel J-type thermocouple input module (TC)

User manual



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1. Function Introduction

1.1 Function Overview

The GC-3874 module is an I/O module that integrates 4 input channels of temperature sensors (J-type thermocouples). This module can be used to collect temperature information in real time and send the collected values to GCAN-PLC-400/510/511 or GCAN-8000/8100/8200/8300 series couplers through the internal bus. This module can be used with any other GC series IO module to realize the acquisition and processing of analog data in industrial automation or distributed control systems.

1.2 Performance characteristics

- The number of input points is 4;
- The wiring form adopts 2-wire system;
- The sensor type is J-type thermocouples;
- The measuring temperature range is -150~+1100℃;
- The measurement resolution is 0.1℃/digit;
- Conversion time is about 250ms;
- Measuring current flow is less than 0.5 mA (depending on load);
- The electrical isolation is 500Vrms;
- Power supply via GCAN-PLC-400/510/511 or GCAN-8000/8100/8200/8300;
- Current consumption is 200mA;
- The bit width input in the process image is 4 x 2bytes;
- Configuration without address setting, through bus coupler or controller configuration;
- Working temperature range:-40℃~+85℃;
- Dimensions: length 100mm * width 69mm * height 12mm.

1.3 Typical applications

- Connect J-type thermocouples to bus coupler or control

2. Equipment installation and use

This chapter will explain in detail the installation method, wiring method, the meaning of the indicator light and the meaning of the interface of the GC-3874 module.

2.1 Module fixing

The installation method of GC-3874 module is shown in Figure 2.1, you need to use a flat screwdriver for auxiliary installation.

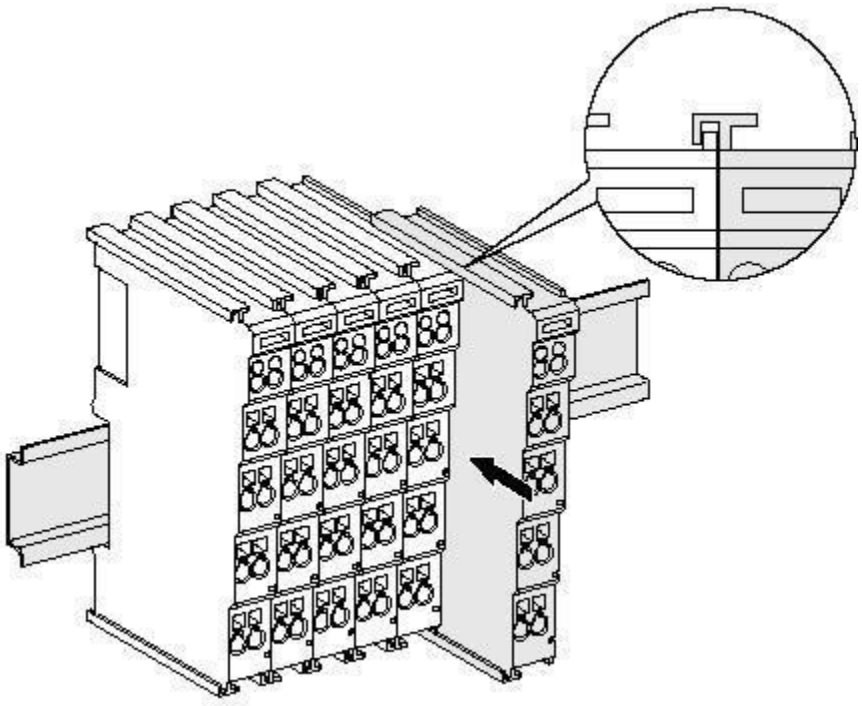

Figure 2.1 GC-3874 module installation

First, you need to install the fieldbus coupler on the rail, and then attach the GC-3874 module to the right of the fieldbus coupler or other modules to add this component. As shown in Figure 2.1, insert the GC-3874 module inward along the slot until the latch snaps and makes a “click” sound.

The GC-3874 module needs to be used with a GCAN-PLC-400/510/511 or GCAN- 8000/8100/8200/8300 series coupler, and can be directly powered by the coupler, so there is no need to separately provide additional power to it.

2.2 Wiring method

As shown in Figure 2.2, first use a flat-blade screwdriver to insert into the square hole and hold the screw in the square hole. Then insert the cable into the circular hole. After plugging in, pull out the screwdriver, and the cable can be firmly locked in the circular hole.

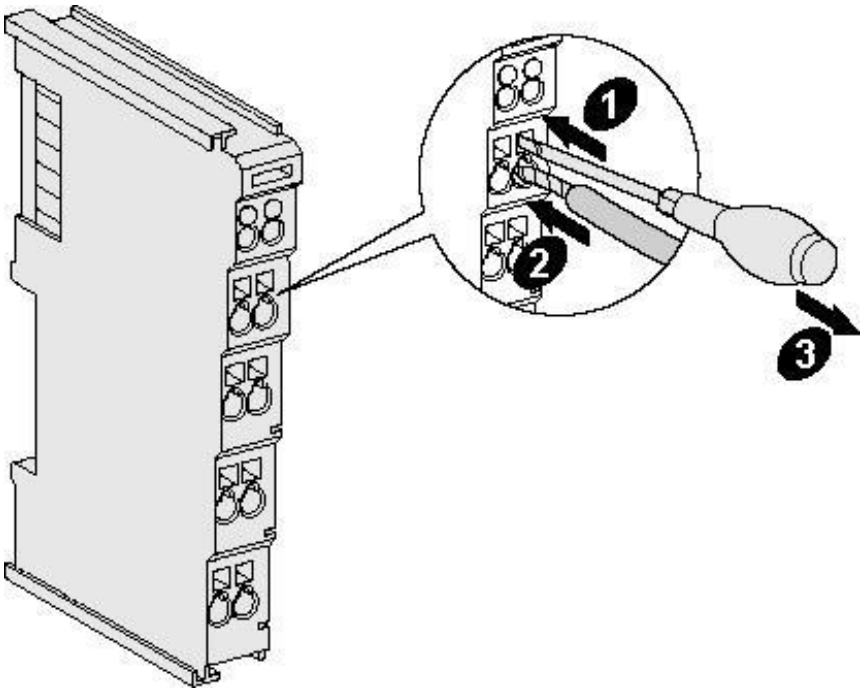

Figure 2.2 GC-3874 module installation

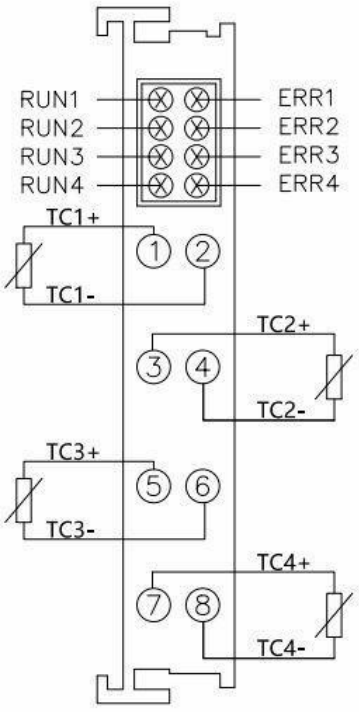

Figure 2.3 GC-3874 module terminal block

The terminal block of GC-3874 module is shown in Figure 2.3. GC-3874 contains 4 sets of input points, and can connect up to 4 J-type thermocouples sensors. The serial numbers corresponding to the terminals and their meanings are shown in Table 2.1.

Terminal	Serial number	Meaning
+TC1	1	+TC1 input
-TC1	2	-TC1 input
+TC2	3	+TC2 input
-TC2	4	-TC2 input
+TC3	5	+TC3 input
-TC3	6	-TC3 input
+TC4	7	+TC4 input
-TC4	8	-TC4 input

Table 2.1 GC-3874 module indicator

2.3 System status indicator

The GC-3874 module has 4 error indicators and 4 operation indicators to indicate the operating status of the device. The specific indication function of the indicator light is shown in Table 2.2. When the indicator is on, the GC-3874 module status is shown in Table 2.3.

Indicator light	Colour	Indication status
ERR	Red	Error indication
RUN	green	Operating instructions

Table 2.2 GC-3874 module indicator

After the GC-3874 module is connected to the J-type thermocouples normally, the operation indicator will light up.

Indicator light	Status	Indication status
ERR	Always on	Short circuit
	not bright	No error
RUN	Always on	Connect correctly
	not bright	Open circuit

Table 2.3 GC-3874 module indicator status

2.4 Use in combination with GCAN-PLC-400/510/511 series

GCAN-PLC-400/510/511 supports programming in five languages. The following uses ST language as an example to introduce how to use GCAN-PLC-400 to program to read the status of the analog input of the GC-3874 module.

When defining the GC-3874 module in ST programming, it is necessary to define the variable type, input signal position, start character, separator, etc. For example: "AI0 AT%I0.0:INT;", where "0.0" represents the input point position, "0.0"~"1.7" respectively define the first channel in the first GC-3874 module.

When the user uses the second channel of GC-3874, it is necessary to define from "2.0" to "3.7", and so on. The actual value of the temperature is the read value divided by 10. "%" (percent sign) is the direct variable start character, and ";" (semicolon) is the variable or type separator. Use the symbolic variable AI0 to read the signed integer variable from the %I0.0 address. AT represents the address of the variable access, and the additional attributes of the variable.

2.5 Combination with GCAN-IO-8000 series equipment

The status of the temperature input is represented by 2 bytes, channel 4 is in the high position and channel 1 is in the low position.

For example: the node number of the GCAN-IO-8000 module is 1, and the input state of channel 1 of the first GC-3874 module is 250℃, then the actual displayed value is 2500, which is converted to hexadecimal as 9C4, with the low bit first and the high bit last. The CAN data frame ID sent by the GCAN-IO-8000 module is 0x181, the data length(DLC) is 8, and the frame data is 0xC4, 0x09, 0xFF, 0x7F, 0xFF, 0x7F, 0xFF, 0x7F. The following table lists a common AI state and its corresponding state data.

AI status								
Number of channels	1		2		3		4	
state	250℃		No sensor connected		No sensor connected		No sensor connected	
CAN bus data	C4	09	FF	7F	FF	7F	FF	7F
	BYTE1	**BYTE2**	**BYTE3**	**BYTE4**	**BYTE5**	**BYTE6**	**BYTE7**	**BYTE8**

3. Technical specifications

Connection method	
Wiring form	2-wire system
Interface characteristics	
Input points	4
sensor type	J-type thermocouples
temperature range	-150~+1100℃
Resolution	0.1℃/digital
Conversion time	＜250 ms
Measuring current	0.5 mA
Measurement error	1%
Electrical isolation	500 Vrms (GC-bus/signal voltage)
Power supply	Powered by GCAN-PLC-400 /510/511 or GCAN-8000/8100 /8200/8300 coupler, the current consumption is more than 200mA
Bit width in process image	Input: 4 x2 bytes
Configuration method	Automatic configuration in order
Environmental test	
Operating temperature	-40℃~+85℃
Working humidity	95%RH, no condensation
EMC test	EN 55024:2011-09 EN 55022:2011-12
Anti-vibration/impact resistance	EN 60068-2-6/EN 60068-2-27/29
Anti-electromagnetic interference/anti-electromagnetic radiation performance	EN 61000-6-2 /EN 61000-6-4
Protection level	IP 20
Basic Information	
Dimensions	100mm *69mm *12mm
weight	50g

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5. Module selection table

GCAN-PLC-400 series products consist of a programmable main control module, several GC series IO modules and a terminal resistance module.

GC series IO modules currently include five categories: digital input, digital output, analog input, analog output, and communication extension. The specific selection table is shown in Table 6.1.

I/O	Type	Characteristic	Signal	Channel
PLC Control module	GCAN-PLC-400	CPU:168M	-	-
	GCAN-PLC-510	CPU:400M	-	-
	GCAN-PLC-511	CPU:400M (2CAN)	-	-
Digital input	GC-1008	Digital input (PNP)	24V DC	8-channel
	GC-1018	Digital input (NPN)	24V DC	8-channel
	GC-1502	Counter（200kHz max）	-	2-channel
Digital output	GC-2008	Digital output (PNP)	24V DC	8-channel
	GC-2018	Digital output (NPN)	24V DC	8-channel
	GC-2204	relay output	-	4-channel
	GC-2302	PWM （20Hz~200kHz）	-	2-channel
Analog input	GC-3604	Voltage input, 16 bits	-5~+5V	4-channel
	GC-3624	Voltage input, 16 bits	10V~+10V	4-channel
	GC-3644	Current input, 16 bits	0-20mA	4-channel
	GC-3654	Current input, 16 bits	4-20mA	4-channel
	GC-3664	Voltage input, 16 bits	0~+5V	4-channel
	GC-3674	Voltage input, 16 bits	0~+10V	4-channel
	GC-3804	2-wire PT100, 16 bits	Thermal resistance	4-channel
	GC-3822	3-wire PT100, 16 bits	Thermal resistance	2-channel

	GC-3874/3854/3864	K type / S type / T type thermocouple	Thermocouple	4-channel
Analog output	GC-4602	Voltage output, 16 bits	-5V~+5V	2-channel
	GC-4622	Voltage output, 16 bits	-10V~+10V	2-channel
	GC-4642	Current output, 16 bits	0-20mA	2-channel
	GC-4652	Current output, 16 bits	4-20mA	2-channel
	GC-4662	Voltage output, 16 bits	0~5V	2-channel
	GC-4672	Voltage output, 16 bits	0~10V	2-channel
	GC-4674	Voltage output, 12 bits	0~10V	4-channel
Special module	GC-6101	RS232/RS485 extension	-	-
	GC-6201	GPRS extension	-	-
	GC-6221	4G extension	-	-
	GC-6501	WiFi extension	-	-

Table 5.1 Selection table

Sales and service

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