GCAN-8100

Modbus I/O coupler

User Manual

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V1.00	2013/06/16	Create document
V2.01	2013/12/20	Fixed working parameters
V3.01	2015/04/22	Add some parameters

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1 Introduction

1.1 Overview

GCAN-8100 Modbus I/O Coupler can be used to connect Modbus system and distributed bus terminal module, and these terminal modules can be expanded in a modular way. A complete node consists of a bus coupler, 1-32 arbitrary number of terminal modules and a terminalmodule

GCAN-8100 ModbusBus Coupler uses standard Modbus protocol, a standard slave station. The GCAN-8100 Bus Coupler has two kinds of style, GCAN-8100-TCP supports Modbus TCP communication, GCAN-8100-RTU supports Modbus RTU communication. Besides, the firmware can be upgraded by configuring the interface.

GCAN-8100 Bus Coupler supports automatic configuration, and you do not need to set parameters on the PC. When GCAN-8100 bus coupler uses Modbus RTU communication, communication parameters can be configured by RS485 interface; When uses Modbus TCP communication, communication parameters can be configured by Ethernet interface

1.2 Performance

- Support standard Modbus protocol, a standard Modus slave station
- Support Modbus TCP, Modbus RTU communication (corresponding to two kinds of style)
- RS485 interface adopts standard two-wires system
- Serial interface baud rate supports 600bps~115200bps, configured by serial interface
- The maximum number of bus terminals module is 64
- Configuration mode is automatic configuration, expandedfreely
- Ethernet interface supports static or dynamic IP acquisition
- Ethernet interface supports heartbeat and timeout disconnection
- Ethernetwork interface is fixed, target IP and target interface can be set
- Automatic restoration of connection resources after the Ethernet interface is

disconnected, and reliable establishment of TCP connections

- Ethernet interface is compatible with the SOCKET working mode (TCP Server, TCP Client, UDP, etc.). The upper computer communication software complies with the standard SOCKET rules.
- Supply power: 24V DC (-15%/+20%)
- Input current, 70mA+ (total GC-bus current), maximum 4500mA
- Starting current: about 2.5 times continuous current
- Power contacts: maximum 24V DC/maximum 10A
- Electrical isolation: 1000 Vrms (power contact/bus coupled powervoltage)
- Working temperature: -40.00℃~ 85.00℃
- Standard DIN rail,designed for industrial design
- Dimensions： 100mm(L) * 69mm(W) * 48mm(H)

2 Installation and usage

This chapter introduces the method installation and wiring,the meaning of the indicator and the interface.

2.1 Fixed module

The installation method of GCAN-8100 ModbusBus Coupler is shown in Figure 2.1

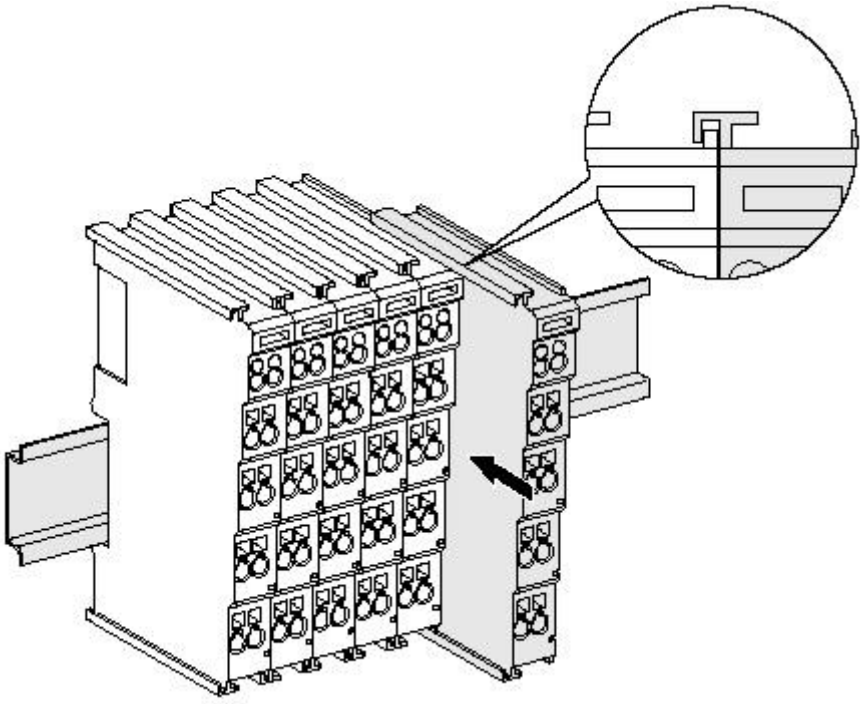

Figure 2.1 GCAN-8100 module installation

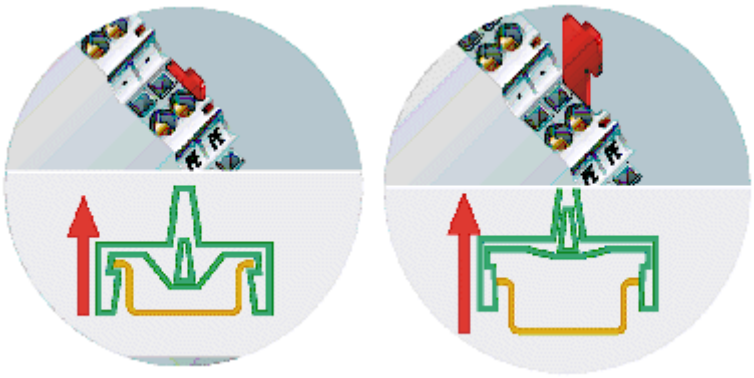

Figure 2.2 GCAN-8100 module self-locking mechanism

As shown figure 2.1, install the GCAN-8100 Modbus Bus Coupler on the guide rail

until the lock is stuck. The GCAN-8100 Modbus Bus Coupler has a self-locking mechanism that can effectively prevent equipment from falling. As shown figure 2.2, you can release the self-locking mechanism by pulling out the orange label

The GCAN-8100 Modbus Bus Coupler can connect up to 32 distributed bus terminal modules. When inserting bus terminal module, be sure to insert it along the groove on the right side of the existingmodulesequentially until the lock is stuck. **At theright end of the entire node, you need to installterminal module**. The terminal will guarantee the data transmission and power supply of the GC-Bus.

When youassemble the nodes correctly, there is no obvious gap between the terminal modules. If the modules are not assembled correctly, the entire node will not operate normally.

2.2 Wiring method

The powerwiring as shown in figure 2.3. First, use a flat-blade screwdriver to insert into the square hole, hold the top edge of the metal sheet in the square hole, and press toward the hole. Then, insert the wire into the hole. After plugging in, pull out the screwdriver and the wire can be firmly locked in the hole.

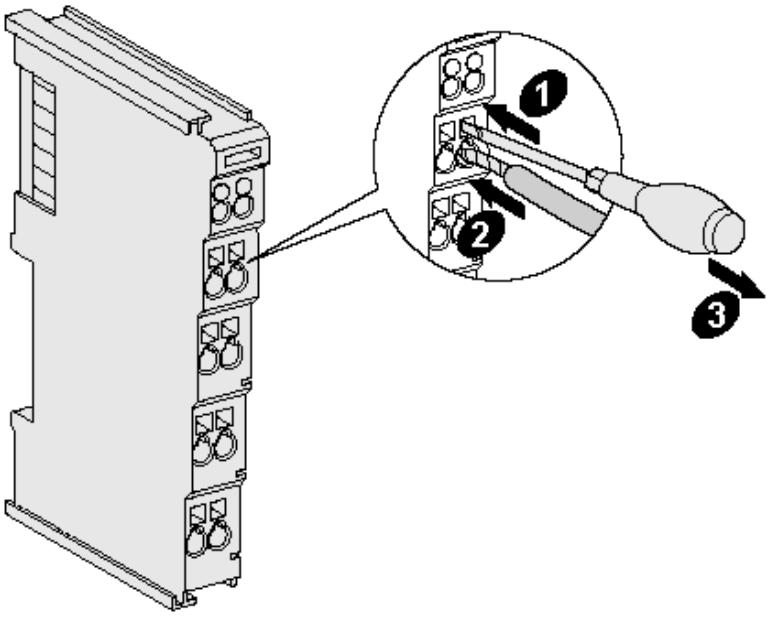

Figure 2.3 GCAN-8100 module installation

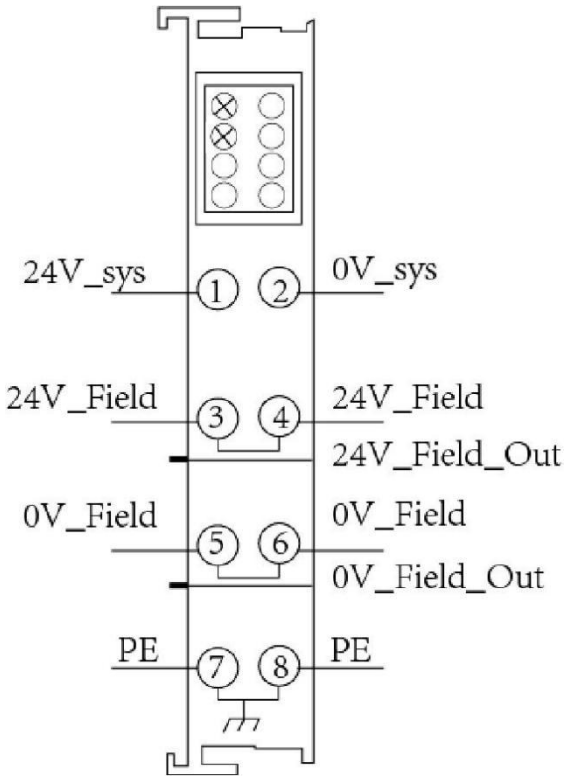

Figure 2.4 GCAN-8100 module, wiring terminal block

The wiring terminal block of the GCAN-8100 Modbus Bus Coupler is shown in Figure 2.4, including 8 terminals. Thenumber corresponding to each terminal and its meaning are shown in Table 2.1.

Note: connecting between terminal 3 and terminal 4, terminal 5 and terminal 6, terminal7 and terminal 8 inside the module.

Terminal	Number	Definition
24V	1	Input 24V power
0V	2	GND power
+	3	IO positive power
+	4	IO positive power
-	5	IO negative power
-	6	IO negative power
PE	7	shield
PE	8	shield

Table 2.1 GCAN-8100 module, wiring terminal definition

2.3 System status indicator

GCAN-8100 Modbus Bus Coupler has two sets of status indicators, contains 6

circular status indicators in the left area and 2 power indicators in the right area.

The specific indicating function of the indicatoris shown in table 2.2.

Indicator	Color	Status
PWR	green	Power
SYS	green	System
RUN	green	Run
ERR	green	Error
IO RUN	green	GC-Bus run
IO ERR	green	GC-Bus error
NO.1 on the right	green	Power
NO.3 on the right	green	GC-Bus power

Table 2.2 GCAN-8100 module, indicators

Indicator	Status	Meaning
PWR	bright	Power supply normally
	not bright	Power supply abnormally
SYS	Blinking	Working status
	not bright	Initialization error
RUN	Blinking	Run normal
	not bright	stop
ERR	bright	System error
	not bright	System normal
IO RUN	Blinking	GC-Bus run normally
	not bright	GC-Bus stop
IO ERR	bright	GC-Bus error
	not bright	GC-Bus normal
Terminal module		
NO.1 on the right	bright	Power supply normally
	not bright	Power supply abnormally
NO.3 on the right	bright	Internal power supply normally
	not bright	Internal Power supply abnormally

Table 2.3 GCAN-8100 module, indicators status

3 Communication connection

3.1 Serial connection

GCAN-8100-RTU module uses standard serial port level（RS485), so the module can directly connect to the device with RS485 interface.

3.2 Ethernet connection

Users canconnect directly to the LAN interface of the GCAN-8100-TCP module by more than 5 kinds of cable and establish communication.

4 Communication example

GCAN-8100 Modbus Bus Coupler execute Modbus communication protocol for Modbus slave devices.

When equipped with the GC-1008 module (8-channels digital input), the GCAN-8100 will store the DI data in the **Modbus digital input register**. You can read it using the 02 function code.

When equipped with GC-2008 module (8-channels digital output), GCAN-8100 will store DO data in the **Modbus digital output register**, you can write it down through 05, 15 function code, read it through the 01 function code.

When equipped with GC-3804 module (4-channels PT100 analog input), GCAN-8100 will store AI data in **Modbus analog input register**, you can read it through 04 function code

This chapter will use Modbus TCP as an example. Use the Network Debugging Assistant to receive and transmit Modbus protocol data.The Modbus Poll softwarehas a Modbus master function that allows you to debug the GCAN-8100 Modbus slave, which is very convenient and practical.

You can send control instructions to the GCAN-8100 Modbus Bus Coupler via the Network Debugging Assistant or Modbus Poll software.

If we use a GCAN-8100 Modbus slave equipped with two GC-1008 modules (8-channels digital inputs) and two GC-2008 modules (8-channels digital outputs), so the closest GC-1008 module to the GCAN-8100 module is 1008-1, and the farther GC-1008 is 1008-2.

Control instruction	Control and return instruction	Function code and its meaning
Enable the first channel of 2008-1	Transmit：00 00 00 00 00 06 01 **05** 00 00 FF 00 Return：00 00 00 00 00 06 01 **05** 00 00 FF 00	05 Force single coil
Enable the second channel of 2008-1	Transmit：00 00 00 00 00 06 01 **05** 00 01 FF 00 Return：00 00 00 00 00 06 01 **05** 00 01 FF 00	05 Force single coil
Unable the first channel of 2008-1	Transmit：00 00 00 00 00 06 01 **05** 00 00 00 00 Return：00 00 00 00 00 06 01 **05** 00 00 00 00	05 Force single coil
Read all channels of 1008-1	Transmit：00 00 00 00 00 06 01 **02** 00 00 00 08 Return：00 00 00 00 00 04 01 **02** 01 0C	02 Read input state
Enable all 2008-2	Transmit：00 00 00 00 00 08 01 **0F** 00 08 00 08 01 **FF** Return：00 00 00 00 00 08 01 **0F** 00 08 00 08	04Read analog input register

Figure 4.1 Modbus TCP testing instruction

4.1 Equipped with GC-1008 module

The state of the digital input is represented by one byte, channel 8 is high and channel 1 is low.

Eg: GCAN-8100 module node number is set to 1. The channel 8 and channel 4 status are 1 and the other status are 0, and the DI status data displayed on one end of the Modbus is 88.The following table lists two common DI states and their corresponding state data.

DI State								
Channel Number	8	7	6	5	4	3	2	1
State	1	0	0	0	1	0	0	0
Modbus data	88							

DI State								
Channel Number	8	7	6	5	4	3	2	1
State	0	1	0	1	1	0	1	0
Modbus data	5A							

4.2 Equipped with GC-2008 module

The state of the digital output is represented by one byte, channel 8 is high and channel 1 is low.

Eg: GCAN-8100 module node number is set to 1. Set the status of channel 8 and channel 4 to 1, and set the other status to 0. The data of the Modbus DO status to be sent is 88 (15 function code).

DO State								
Channel Number	8	7	6	5	4	3	2	1
State	1	0	0	0	1	0	0	0

Modbus data	88

DO State								
Channel Number	8	7	6	5	4	3	2	1
State	0	1	0	1	1	0	1	0
Modbus data	5A							

4.3 Equipped with GC-3804 module

The temperature status of each channel is represented by two bytes, eight bytes for four channels.

Among them, the two bytes representing the temperature state, the first byte is low, and thedataofbyte to be converted to decimal and multiplied by 0.1. The second byte is high, the data of byte need to be converted to decimal and multiplied by 25.6. Finally add the two values, which is the final temperature value, and the unit is degrees Celsius.

Eg: The temperature of the four channels is 25.6 degrees, 25.5 degrees, 20 degrees, and 30 degrees respectively. The analog input data is 0x00, 0x01, 0xFF, 0x00, 0xC8, 0x00, 0x2C, 0x01.

GC-3804 temperature and CAN data		
Modbus data	Low byte C8	High byte 00
coefficient	200（0xC8）x0.1	0（0x00）x25.6
temperature	20℃	

GC-3804 temperature and CAN data		
Modbus data	Low byte 2C	High byte 01
coefficient	44（0x2C）x0.1	1（0x01）x25.6
temperature	30℃	

4.4 Equipped with multiple modules

If GCAN-8100 is equipped with multiple sets of GC-1008 modules at the same time, then we number them from near to far, the nearest one is number 1. The GCAN-8100 coupler will confirm the first address of the digital input register according to the following table. For example, when GCAN-8100 is equipped with 9 GC-1008 modules, the digital input register addresses are 01-09.

If GCAN-8100 is equipped with multiple sets of GC-2008 modules at the same time, then we number them from near to far, the nearest one is number 1. The GCAN-8100 coupler will confirm the first address of the digital output register according to the following table. For example, when GCAN-8100 is equipped with 9 GC-1008 modules, the digital output register addresses are 01-09.

If GCAN-8100 is equipped with multiple sets of GC-3804 modules at the same time, then we number them from near to far, the nearest one is number1. The GCAN-8100 coupler will confirm the first address of the analoginput register according to the following table. For example, when GCAN-8100 is equipped with 3 GC-3804 modules, the analog input register addresses are 01-04、05-08、09-12..

5 Module selection table

I/O	Type	Characteristic	Signal	Channel
Digital iutput	GC-1008	PNP，filtering 3.0ms	24V DC	8-channel
	GC-1502	Add/Subtract 24V DC，100kHz	Counter	2-channel
Digital output	GC-2008	PNP，Imax=0.5A	24V DC	8-channel
	GC-2204	4-Relay output	230V AC 30V DC	2-channel
	GC-2302	24V DC，0.1A	PWM	2-channel
Analog input	GC-3604 / 3624	-5~+5V / -10~+10V, 16-bit	-5~+5V -10~+10V	4-channel
	GC-3644 / 3654	0-20mA / 4~20mA, 16-bit	0-20mA 4~20mA	4-channel
	GC-3664 / 3674	0~5V / 0~+10V AI, 16-bit	0~5V 0~+10V	4-channel 2-channel
	GC-3804	PT100, 16-bit, 2-wire	PT100	4-channel
	GC-3822	PT100, 16-bit, 3-wire	PT100	2-channel
	GC-3844 / 3854 / 3864	K / S /T	Thermocouple	4-channel
Analog output	GC-4602 / 4622	-5~+5V / -10~+10V, 16-bit	-5~+5V -10~+10V	2-channel
	GC-4642 / 4652	0-20mA / 4~20mA, 16-bit	0-20mA 4~20mA	2-channel
	GC-4662 / 4672	0~5V / 0~+10V, 16-bit	0~5V 0~+10V	2-channel

6 Technical specifications

PLC Parameters	
Modbus protocol	Modbus TCP,Modbus RTU
Bus terminal module quantity	Up to 32 modules
The biggest byte number of profibus	32 bytes input and 32 bytes output
Digital I/O signal	256 input/output

Analog I/O signal	60 input/output
Configuration mode	automatic configuration
Bus interface	RJ45
Power	24V DC（-15%/+20%）
Input current	70mA+（total GC-bus current）/maximum2.5A
Starting current	About 2.5 times continuous current
GC-bus current supply	500mA
Fuse capacity	≤10A
Power supply	Maximum 24V DC/maximum 10A
Electrical isolation	1000 Vrms (power contact/bus coupled powervoltage)
Environmental testing	
Working temperature	-40℃~+85℃
Working humidness	95%RH, without condensation
EMC test	EN 55024:2011-09 EN 55022:2011-12
Anti-vibration / impact resistance performance	EN 60068-2-6/EN 60068-2-27/29
Anti-electromagnetic interference/radiation performance	EN 61000-6-2 /EN 61000-6-4
IP grade	IP 20
Basic information	
Dimension	100mm *69mm *44mm
Weight	100g

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