

Module Type Four-Channels Temperature Controller

GTA2-B Version



Note:
 There is no isolation between the input channels. If the temperature sensor housings are installed in common ground, a temperature sensor that is isolated between the housing and the signal must be used; otherwise, the temperature controller will be inaccurate.

Features

- Four-loop thermocouple input and SSR control output.
- Communication and interconnection with host computer or touch screen via RS485.
- Fuzzy adaptive PID algorithm and standard algorithm are optional.
- This product is used in industrial machinery, machine tools, general measuring instruments and equipment.
- Economic and practical, easy to operate.

National High-tech Enterprise / National Standard Drafting Unit



Service Line : 400-0760-168

Version code: KKGTA2-B01E-A/1-20220615

This manual describes the settings, wiring, and names of various parts of the thermostat. Please read this manual carefully before using this product, and use it correctly after understanding the content. And please keep it in a safe place for future reference.

I. Precautions for safety use

⚠ Warning

- 1) When a malfunction or abnormality of this product may cause a serious accident in the system, please install an appropriate protection circuit externally.
- 2) Do not turn on the power until all wiring is completed. Failure to do so may cause electric shock, fire, or malfunction.
- 3) Do not use outside the scope of the product specifications. Doing so may cause fire or failure.
- 4) Do not use in places with flammable or explosive gas.
- 5) Do not touch high-voltage parts such as power terminals after power-on. Otherwise there is a danger of electric shock.
- 6) Do not disassemble, repair and modify this product. Failure to do so may cause electric shock, fire, or malfunction.

⚠ Attention

- 1) This product must not be used in atomic energy equipment and medical equipment related to human life.
- 2) When this product is used in a domestic environment, radio wave interference may occur. Adequate countermeasures should be taken at this time.
- 3) This product is protected against electric shock through reinforced insulation. When embedding this product in a device and wiring, follow the specifications that the embedded device meets.
- 4) In order to prevent the occurrence of surge when all indoor wiring is longer than 30m when this product is used and in case the wiring is outdoor, an appropriate surge suppression circuit must be installed.
- 5) This product is manufactured on the premise that it is installed in a cabinet. In order to prevent users from approaching high-voltage parts such as power terminals, please take necessary measures on the final product.
- 6) Be sure to follow the precautions in this manual, otherwise there is a danger of causing serious injury or accident.
- 7) Please observe local regulations when wiring.
- 8) In order to prevent damage to the machine and prevent machine failure, please install an appropriate capacity fuse on the power cord or larger capacity input and output lines connected to this product to protect the circuit.
- 9) Please do not mix metal pieces and wire debris into this product, otherwise it may cause electric shock, fire and failure.
- 10) Tighten the screws with the specified torque. Failure to fully tighten the screws may result in electric shock or fire.
- 11) In order not to hinder the heat dissipation of this product, please do not block the heat dissipation window holes and equipment vents around the cabinet.
- 12) Do not connect any wires to the unused terminals of this product.

- 13) Be sure to clean it after the power is off. Wipe the dirt on the product with a dry soft cloth, and do not use hygroscopic agents, otherwise it may cause deformation and discoloration.
- 14) Please do not hit or wipe the display panel with hard objects.
- 15) This manual assumes that the reader has basic knowledge in electrical, control, computer, and communications.
- 16) The illustrations, data examples, and screen examples used in this manual are entered for easy understanding of the manual and are not guaranteed to be the result of their operation.
- 17) In order to use this product safely for a long time, regular maintenance is necessary. Some parts of this product are limited by lifespan, and some may change due to long-term use.
- 18) Without prior notice, the contents of the manual may be changed. The content of the manual is expected to be free of any loopholes. If you have any questions or objections, please contact us.

⚠ Installation and wiring precautions

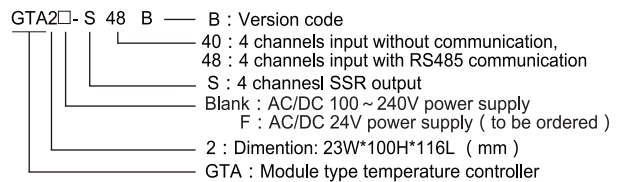
1. Precautions for installation:

- 1) This product is used in the following environmental standards. (IEC61010-1) [Overvoltage Category II, Pollution Degree 2]
- 2) Please use within the surrounding environment, temperature, humidity and environmental conditions of the following : Temperature: 0 to 50 ° C; Humidity: 45 to 85% RH; Environmental conditions: indoor use, altitude less than 2000m.
- 3) Avoid using in the following places: places where condensation may occur due to drastic temperature changes; places where corrosive gas or flammable gas is generated; places where direct vibration or may impact the product; water, oil, chemical Products, smoke, Places with steam, places with a lot of dust, salt, and metal powder, places with large clutter interference, and prone to static electricity, magnetic fields, and noise; places where the airflow of air conditioning or heating directly blows; places with direct sunlight; Places where heat can build up.
- 4) For installation, please consider the following points before installation: In order not to saturate the heat, allow sufficient ventilation space. Please consider the wiring and maintenance environment, etc. Please make sure that there is more than 50mm space above and below this product. Please do not install it directly above the heat-generating machine (such as heater, transformer, semiconductor manipulator, high-capacity resistor). If the ambient temperature is above 50 ° C, use a forced fan or cooler to cool it. However, do not allow the cooled air to blow directly into the product. In order to improve anti-interference performance and safety, please install as far away as possible from high-voltage equipment and power equipment. Do not install high-voltage machines in the same cabinet as this product. The distance between this product and the power line should be more than 200mm. Install the power machine as far away as possible.

2. Wiring precautions:

- 1) In the case of thermocouple input, please use the specified compensation wire; if the device to be measured is a metal heating object, please use insulated thermocouple; the thermocouples must be isolated from each other.
- 2) In the case of thermal resistance input, please use a wire with a small resistance and a (3-wire) non-resistance difference, but the total length should be within 5m; this product does not have this function for the time being.
- 3) In order to avoid the influence of noise interference, please keep the input wire away from the instrument power line, power supply line and load line.
- 4) In order to reduce the influence of power and heavy load power lines on this product, it is recommended to use a noise filter where it is easily affected. If using a noise filter, be sure to install it on a grounded panel and minimize the wiring between the output side of the noise filter and the power terminals; do not install fuses, switches, etc. on the wiring of the output side of the noise filter. Otherwise, the effect of the filter will be reduced.
- 5) The output time of this product when it is powered on is about 5 seconds. If signals such as interlocked circuits are used, please use a delay relay.
- 6) Please use shielded twisted pair as far as possible for the transmission output line. If necessary, you can also connect a common mode coil at the front of the signal receiving equipment to suppress the interference of the line and

II. Model Illustration



III. General model description

Model	Input/Output Function	RS485
GTA2□-S40	Four channels thermocouple inputs Four channels SSR outputs	No
GTA2□-S48	Four channels thermocouple inputs Four channels SSR outputs	Yes

Note: All models have no alarm output function, but the alarm status can be read through communication..

IV. Main Technical Parameters

1. Electrical parameter table

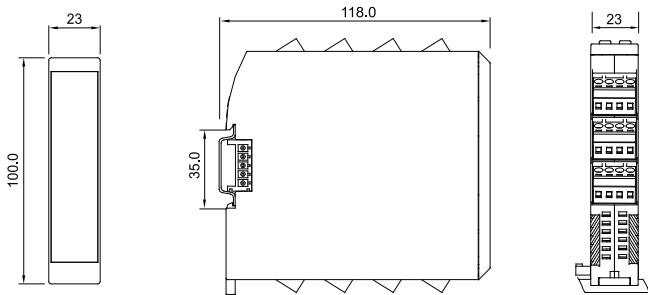
Input type	TC(K, J, E, T, N, B, R, S)4 inputs are not isolated, the thermocouples must be isolated from each other
Accuracy	Standard accuracy ±0.5%F.S ±3digits @ (20±5) °C
Resolution	K type is 1 degree for reference, 12-bit AD conversion accuracy, minimum bit error rate is 1.5 LSB
Power supply	100 ~ 240V AC/DC (85-265V)

Power consumption	<5VA
working Environment	Temperature : 0 ~ 50°C no condensation , Humidity : < 85%RH
Storage Environment	-10 ~ 60°C, no condensation
SSR output	MAX 24V DC Pulse level, 20mA per loop, four outputs are not isolated
Communication Port	RS485 Modbus-RTU Communication protocol Common ground for interface and output
Insulation resistance	Input, output, power to chassis > 20MΩ
Electrostatic discharge	IEC/EN61000-4-2 Contact ±4KV /Air ±8KV perf.Criteria B
Burst immunity	IEC/EN61000-4-4 ±2KV perf.Criteria B
Surge immunity	IEC/EN61000-4-5 ±2KV perf.Criteria B
Voltage sag and short-term Interruption immunity	IEC/EN61000-4-29 0% ~ 70% nbnperf.Criteria B
Isolation withstand voltage	Signal input and output and power supply 1500VAC 1min, DC500V for low voltage circuit below 60V, 1min
Total Weight	about 300g
Casing Material	PA66-FR(Flame resistance UL94V-0)
Panel Material	PVC film and PEM silicone button
Power failure data protection	10 years , Writable data 1 million times
Safety Standard	IEC61010-1 Over-voltage classification II , pollution level 2, level II (reinforced insulation)

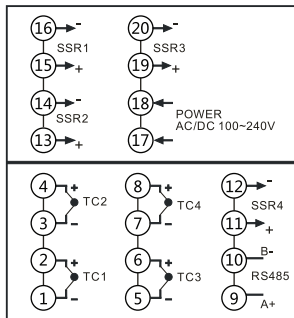
2. Measurement signal parameter table

Input type	Symbol	Measurement Range	Resolution	Accuracy	Input resistance	Comminication Code
K	ℰ	-50~1200	1°C	0.5%FS±3digits	>500kΩ	0
J	ℰ	0~1200	1°C	0.5%FS±3digits	>500kΩ	1
E	ℰ	0~850	1°C	0.5%FS±3digits	>500kΩ	2
T	ℰ	-50~400	1°C	0.5%FS±2°C	>500kΩ	3
B	ℰ	250~1800	1°C	1%FS±2°C	>500kΩ	4
R	ℰ	-10~1700	1°C	1%FS±2°C	>500kΩ	5
S	ℰ	-10~1600	1°C	1%FS±2°C	>500kΩ	6
N	ℰ	-50~1200	1°C	0.5%FS±3digits	>500kΩ	7

V. Dimentions

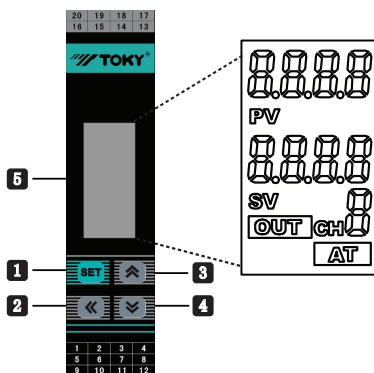


VI. Connections



If the wiring is changed, please refer to the wiring diagram on the actual case.

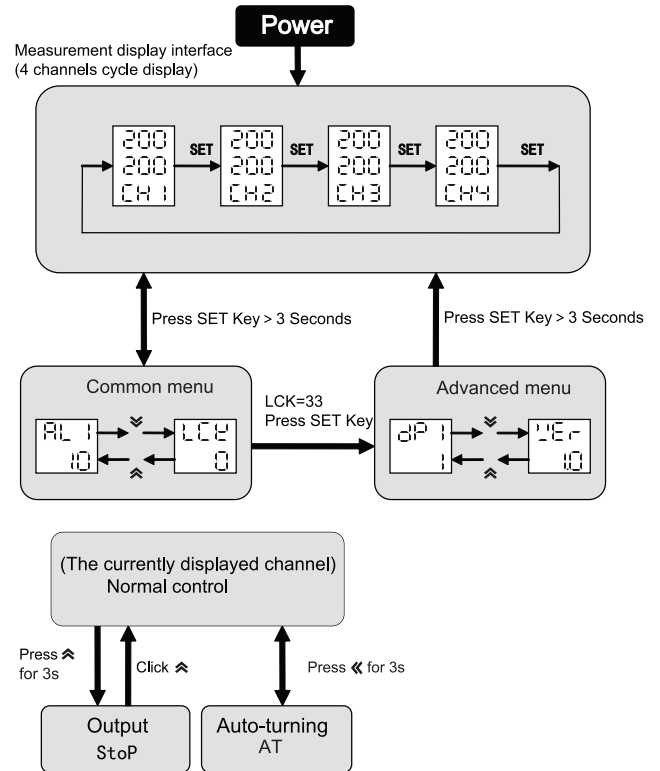
VII. Universal Panel name



No.	Symbol	Name	Function Description
1	SET	SET Function key	Menu key / Confirm key for entering or exiting parameter modification
2	◀	Shift /AT Key	Activation key / Shift key / AT auto-tuning key, long press in measurement control mode to enter or exit auto-tuning key, RUN / STOP Mode switch
3	⬆	Add key /R/S	Add key / menu up key, in measurement control mode, long press can realize RUN / STOP Mode switch
4	⬇	Decrease	Decrease key / Menu down key
5	PV	PV	Measured value, display the measured value corresponding to the current channel or display the menu symbol
	SV	SV	Set value, display the set value or STOP status corresponding to the current channel, or display the set value of the menu.
	CH	CH	Channel indication window, showing the current channel number
	OUT	OUT	OUT indication, when there is display, it indicates the current channel control output, when there is no display, it indicates that the current channel control is off
	AT	AT	AT instruction. When there is a display, it indicates that the current channel is performing auto-tuning. When there is no display, it indicates that there is no auto-tuning or auto-tuning is complete.

VIII. Operation process and menu description

1) Operation flowchart



Operation method:

- In normal measurement control mode after power on, short press "SET" key to switch the display channel, the channel number is displayed in the CH indication window; In any channel interface, press and hold the "SET" key for more than 3 seconds to enter the menu parameter viewing mode.
- In the menu view mode, every short press of the "SET" key can cycle through the commonly used menu parameters.
- In the menu view mode, short press the "◀" key to flash the viewed menu parameter value to enter the parameter modification mode, and each short press can move one bit to the left; this cycle.
- In the parameter modification mode, press the "⬆" or "⬇" key once to increase or decrease the flashing data bit by one.
- In the parameter modification mode, shortly press the "SET" key after the parameter is modified to save the modified parameter and exit to the menu view mode.
- In normal measurement control mode, press and hold the "◀" key for more than 3 seconds to enter the PID auto-tuning state corresponding to the channel.
- In the normal measurement control mode, press and hold the "⬆" key for more than 3 seconds to enter or exit the running or stop mode corresponding to the channel; the stop mode SV window displays "STOP".

2) Description of common menus (the menus in gray are only available for models with communication)

No	Symbol	Name	Description	Setting Range	Factory settings
1	ℰ	ADD	Communication address	1~247	1
2	ℰ	BAD	Communication baud rate 0 : 4.8K, 1 : 9.6K, 2 : 19.2K	0~2	9.6K
3	ℰ	PRTY	Communication check bit setting, 0: NO without check, 1: ODD odd check 2: EVEN even check	0~2	N0
4	ℰ	DTC	Communication data transmission order is set to 000; the first and third bits are reserved, and the second Byte transfer order	ref to communication protocol③	0

No	Symbol	Name	Description	Setting Range	Factory settings
5	⚡	OT1~OT4	Control method of each channel 0 : ON/OFF Bit heating ; 1 : PID heating ; 2 : ON/OFF Bit cooling ; 3 : reserve ; 4 : reserve ; 5 : PID cooling ;	0~5	1
6	P	P1~P4	Proportional band of each channel, PID control is invalid when P = 0 Unit: Degree	0~9999	30
7	I	I1~I4	Integration time of each channel, no integration effect when I = 0 Unit: second	0~9999	120
8	D	D1~D4	Differential time of each channel, no derivative action when D = 0 Unit: second	0~9999	30
9	CP	CP1~CP4	Control cycle of each channel, SSR control output should be set to 1 unit: second	1~200	1
10	DB	DB1~DB4	Bit control hysteresis of each channel	0~1000	1
11	DN	DN	Display the number of channels, indicating the number of measurement channels actually used by the meter	1~4	4
12	DNS	DNS	Display the start channel number. It is used to indicate the display number of channel 1 when multi-machine is used. For example: When DNS = 5, CH5 ~ CH8 indicate channels 1 ~ 4 respectively.	1~E	1
13	DNT	DNT	Channel cycle display time, 0 means cancel automatic cycle display Unit: second	0~99	4
14	INP	INP1~INP4	Input signal type of each channel	See measurement signal parameter table	K
15	PS	PS1~PS4	Input shift correction for each channel, display value = measured value + shift correction value	-1999~9999	0
16	LCK	LCK	Password lock function; 001: SV value cannot be modified; 010: Menu setting value can only be viewed and cannot be modified; 033: Can enter advanced menu; 123: Menu restore factory settings	0~9999	0

3)Advanced menu description

No	Symbol	Name	Description	Setting Range	Factory settings
17	DP	DP1~DP4	Decimal point of PV value of each channel, at most one decimal place for thermocouple	0~1	0
18	DTR	DTR	PV fuzzy tracking value. In some occasions, this value can be set appropriately to obtain a more stable control display, which has nothing to do with the actual measured value. Set to 0 to disable this feature.	0.0~2.0	1.0
19	FT	FT1~FT4	Filter coefficient of each channel, the larger the value, the stronger the filtering effect.	0~255	10
20	FL	FL1~FL4	Lower limit of each channel range, this setting must be less than the upper limit of the range.	See measurement signal parameter table	-50
21	FH	FH1~FH4	Upper limit of each channel range, this set value must be bigger than the lower limit of range.	See measurement signal parameter table	1200
22	PR	PRS1~PRS4	Setting parameter storage location: 0 (EEP): EEPROM has power failure protection; 1 (RAM): RAM has no power failure protection.	EEP/RAM	EEP
23	RSS	RSS1~RSS4	RUN / STOP storage location: 0 (EEP): EEPROM has power failure protection; 1 (RAM): RAM has no power failure protection	EEP/RAM	EEP
24	BLT	BLT	Backlight delay setting. When set to 0, the backlight is always on. Otherwise, the backlight is off after a delay. Unit: minute	0 ~ 10	5
25	PDC	PDC	PID algorithm selection, 0 (FUZ): fuzzy adaptive PID algorithm; 1 (STD): ordinary PID algorithm	FUZ, STD	FUZ
26	VER	VER	Software version	---	---

IX. Key function operations

- PID parameter self-tuning steps (take loop 1 as an example)
 - Disconnect the load power or disconnect the control output from the load first.
 - Try to keep the PV value around room temperature.
 - Set the SV value in the measurement display interface.
 - Press and hold the "⏪" key for 3 seconds to display the "AT" symbol, indicating that the auto tuning mode has been entered.
 - Connect the load power or connect the control output to the load.
 - Please do not modify the parameters or power off during the auto-tuning process to avoid affecting the tuning result.
 - When the "AT" symbol disappears automatically, it indicates the end of auto-tuning, and loop 1 will automatically enter the running mode.
 - Experienced users can set reasonable PID parameters by themselves.
- Stop mode (take circuit 1 as an example)
 - In the measurement control mode, press and hold the "⏸" key for 3 seconds to display the "STOP" character, which means entering the stop mode, otherwise exiting the stop mode
 - In STOP mode, at this time, the circuit 1 output is turned off.

X. Simple troubleshooting

Display info	Method
LLLL/HHHH	Check whether the input is disconnected; check the FH value and FL value; determine whether the working environment temperature is normal; check whether the input signal selection is correct.

XI. Communication protocol

The device uses Modbus RTU communication protocol for RS485 half-duplex communication, read function number 0x03, write function number 0x10 or 0x06, adopt 16-bit CRC check, the device does not return check error.

Data frame format:

Start bit	Data bit	Stop bit	Check bit
1	8	1	Settings in the PRTY menu

Communication abnormal Handling:

For abnormal response, set the highest bit of the function number to 1. For example: if the function number requested by the master is 0x03, the corresponding item of the function number returned by the slave is 0x83. Error type code:
0x01 --- Illegal function: The function number sent by the host is not supported by the device.
0x02 --- Illegal address: The register address specified by the host is outside the allowable range of the device parameter address.
0x03 --- Illegal value: The value of the write data sent by the host exceeds the allowable range of the device.

Communication cycle:

The communication cycle refers to the time from the completion of the master data request to the completion of the slave return data. That is: communication cycle = request data sending time + slave device reply time + response delay time + response return time. Take the 9600 baud rate as an example: the single measurement data communication period is not less than 250ms.

1. Read the register

Example: The host reads the integer SV1 (the given value is 200)

The address code of SV1 is 0x200C, because SV1 is an integer (2 bytes) and occupies 1 data register.

The memory code for decimal integer 200 is 0x00C8

Note: When reading the measured value, first read the DP value or confirm the DP menu value to determine the position of the decimal point, and convert the read data to get the actual value.

Host request (read multiple registers)							
1	2	3	4	5	6	7	8
Device Address	Function code	High start address	Low start address	High Data of sub-length	Low Data of sub-length	※Low bits of CRC code	※High bits of CRC code
0x01	0x03	0x20	0x0C	0x00	0x01	0x4F	0xC9
Slave normal response (read multiple registers)							
1	2	3	4	5	6	7	
Device Address	Function code	Qty of data bytes	High data	Low data	※Low bits of CRC code	※High bits of CRC code	
0x01	0x03	0x02	0x00	0xC8	0xB9	0xD2	

Function number abnormal response: (for example, the host request address is 0x2020)

Slave abnormal response (read multiple registers)				
1	2	3	4	5
Device Address	Function Number	Error code	※Low bits of CRC code	※High bits of CRC code
0x01	0x83	0x02	0xC0	0xF1

2. Write to register

Example: The host writes SV1 with 0x10 function (the given value is 150)

The address code of SV1 is 0x200C, because SV1 is an integer (2 bytes) and occupies 1 data register. The hexadecimal memory code for the decimal integer 150 is 0x0096

Host request (write multiple registers)										
1	2	3	4	5	6	7	8	9	10	11
Device Add	Function code	High start address	Low start address	High data word length	Low data word length	Data byte length	High data	Low data	※ Low bits of CRC code	※ High bits of CRC code
0x01	0x10	0x20	0x0C	0x00	0x01	0x02	0x00	0x96	0x07	0x30
Slave normal response (write to multiple registers)										
1	2	3	4	5	6	7	8			
Device Add	Function code	High start address	Low start address	High data word length	Low data word length	※ Low bits of CRC code	※ High bits of CRC code			
0x01	0x10	0x20	0x0C	0x00	0x01	0xCA	0x0A			

Data location error response (for example: host request write address index is 0x2020)

Slave abnormal response (read multiple registers)				
1	2	3	4	5
Device Add	Function code	Error code	※ Low bits of CRC code	※ High bits of CRC code
0x01	0x90	0x02	0xCD	0xC1

Host writes SV1 with 0x06 function (set value 150)

Host request (write single register)							
1	2	3	4	5	6	7	8
Device Add	Function code	High address	Low address	High data	Low data	※ Low bits of CRC code	※ High bits of CRC code
0x01	0x06	0x20	0x0C	0x00	0x96	0xC2	0x67
Slave normal response (write single register)							
1	2	3	4	5	6	7	8
Device Add	Function code	High address	Low address	High data	Low data	※ Low bits of CRC code	※ High bits of CRC code
0x01	0x06	0x20	0x0C	0x00	0x96	0x02	0x67

Data location error response (for example: host request write address index is 0x2020)

Slave abnormal response (write single register)				
1	2	3	4	5
Device Add	Function code	Error Code	※ Low bits of CRC code	※ High bits of CRC code
0x01	0x86	0x02	0xC3	0xA1

Parameter address mapping table

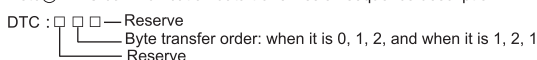
No	Address (register number ①)	Parameter name	Parameter name	Register qty	Read/Write	Remark
1	0x2000~0x2003(48193~48196)	PV1~PV4	Measured value of each channel	1	R	Combined decimal position reading
2	0x2004~0x2007(48197~48200)	STA1~STA4	Status value of each channel	1	R	See communication protocol note ②
3	0x2008~0x200B(48201~48204)	MV1~MV4	Output value of each channel	1	R	0~1000
4	0x200C~0x200F(48205~48208)	SV1~SV4	Setting value of each channel	1	R/W	
5	0x2010~0x2013(48209~48212)	RSA1~RSA4	Working switch of each channel	1	R/W	0: Run 1; Stop 2: self-tuning
Reserve						
6	0x2100~0x2103(48449~48452)	INP1~INP4	Input type of each channel	1	R/W	See measurement signal parameter table
7	0x2104~0x2107(48453~48456)	FL1~FL4	Lower limit of each channel range	1	R/W	
8	0x2108~0x210B(48457~48460)	FH1~FH4	Higher limit of each channel range	1	R/W	
9	0x210C~0x210F(48461~48464)	DP1~DP4	Decimal point position of each channel	1	R/W	
10	0x2110~0x2113(48465~48468)	PS1~PS4	Display correction for each channel	1	R/W	
11	0x2114~0x2117(48469~48472)	FT1~FT4	Display filter coefficients for each channel	1	R/W	
12	0x2118(48473)	DTR	Tracking value displayed for each channel	1	R/W	If the communication reads 10, it is actually 1.0.
13	0x2119(48474)	DN	Display channel qty	1	R/W	
14	0x211A(48475)	DNS	Display the starting channel number	1	R/W	
15	0x211B(48476)	DNT	Channel cycle display time	1	R/W	
16	0x211C~0x211F(48477~48480)	PRS1~PRS4	Set the parameter save location	1		
17	0x2120~0x2123(48481~48484)	RRS1~RRS4	RUN/STOP save location	1	R/W	
18	0x2124(48485)	BLT	Backlight delay setting	1	R/W	
Reserve						
19	0x2200~0x2203(48705~48708)	AL1~AL4	Alarm value of each channel	1	R/W	Factory default: 10
20	0x2204~0x2207(48709~48712)	AD1~AD4	The alarm mode of each channel is shown in the alarm logic diagram.	1	R/W	Factory default: 3 1: Upper limit absolute value alarm 2: Lower limit absolute value alarm 3: Upper limit deviation alarm 4: Lower limit deviation alarm 5: Alarm outside deviation 6: Alarm within up and down deviation
21	0x2208~0x220B(48713~48716)	HY1~HY4	Alarm difference of each channel	1	R/W	Factory default: 1
Reserve						
22	0x2300~0x2303(48961~48964)	OT1~OT4	Control method of each channel	1	R/W	
23	0x2304~0x2307(48965~48968)	P1~P4	Proportional band of each channel	1	R/W	
24	0x2308~0x230B(48969~48972)	I1~I4	Integration time of each channel	1	R/W	
25	0x230C~0x230F(48973~48976)	D1~D4	Differential time of each channel	1	R/W	
26	0x2310~0x2313(48977~48980)	CP1~CP4	Control period of each channel	1	R/W	
27	0x2314~0x2317(48981~48984)	DB1~DB4	Bit control hysteresis of each channel	1	R/W	
28	0x2318(48985)	PDC	PID algorithm selection	1	R/W	0(FUZ), 1(STD)
Reserve						
29	0x2500(49473)	ADD	Communication Add	1	R/W	
30	0x2501(49474)	BAD	Communication baud rate	1	R	
31	0x2502(49475)	PRTY	Communication check bit setting	1	R	
32	0x2503(49476)	DTC	Communication data transmission sequence	1	R	See Communication Protocol Note 3③
33	0x2504(49477)	LCK	Password	1	R	
34	0x2505(49478)	VER	Software version no.	1	R	If read out as 10 it's V1.0

Note①: The register number is the address converted to decimal plus 1 and then the register identification code 4 is added in front; for example: the register number of the data address 0x2000 is 8192 + 1 = 8193 and then 4 is added in front, that is, the register number 48193; Related applications can be seen, such as Siemens S7-200 PLC.

Note ②: Channel status indication. When the data bit is 1, it means execution, and when it is 0, it means not executed.

D7	D6	D5	D4	D3	D2	D1	D0
---	HHHH	LLLL	---	---	---	AL	OUT

Note③: DTC communication data transmission sequence description



※16-bit CRC check code to get C program

unsigned int Get_CRC(uchar *pBuf, uchar num)

```

{
    unsigned int i,j;
    unsigned int wCrc = 0xFFFF;
    for(i=0; i<num; i++)
    {
        wCrc ^= (unsigned int)(pBuf[i]);
        for(j=0; j<8; j++)
        {
            if(wCrc & 1){wCrc >>= 1; wCrc ^= 0xA001;}
            else
                wCrc >>= 1;
        }
    }
    return wCrc;
}

```

Alarm logic diagram (read alarm output status by communication):

Explanation of symbols: "☆" means HY part, "▲" means alarm value, and "△" means SV value

Alarm code	Alarm form	Alarm output Figure: The shaded area indicates the alarm action
1	Upper limit absolute value alarm	
2	Lower limit absolute value alarm	
3	※ Upper limit deviation alarm	
4	※ Lower limit deviation alarm	
5	※ Alarm outside upper / lower limit deviation	
6	※ Alarm within upper / lower limit deviation	

※ When the alarm value with deviation alarm is set to a negative number, it is treated as an absolute value.