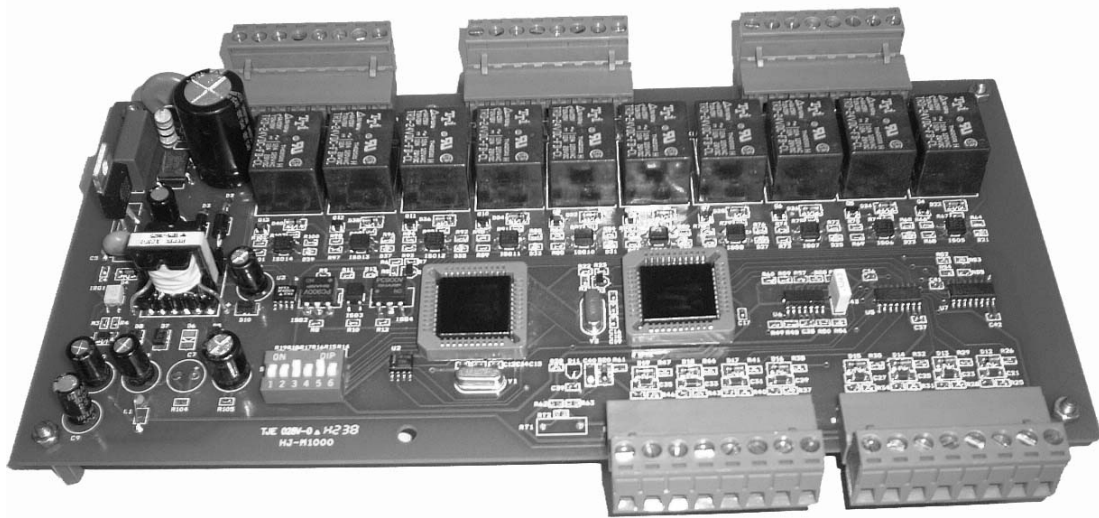


MULTI POINT TEMPERATURE CONTROL MODULE

M-1000 SERIES

Instruction manual



**8 Channels Independent
PID Auto Tuning**

TEL : 886 - 2 - 29912150 FAX : 886 - 2 - 89922663

5F, NO. 29, LANE 113, HWA CHENG ROAD, HSIN CHUANG CITY, TAIPEI HSIEN, TAIWAN, R.O.C.

HUNJOEN

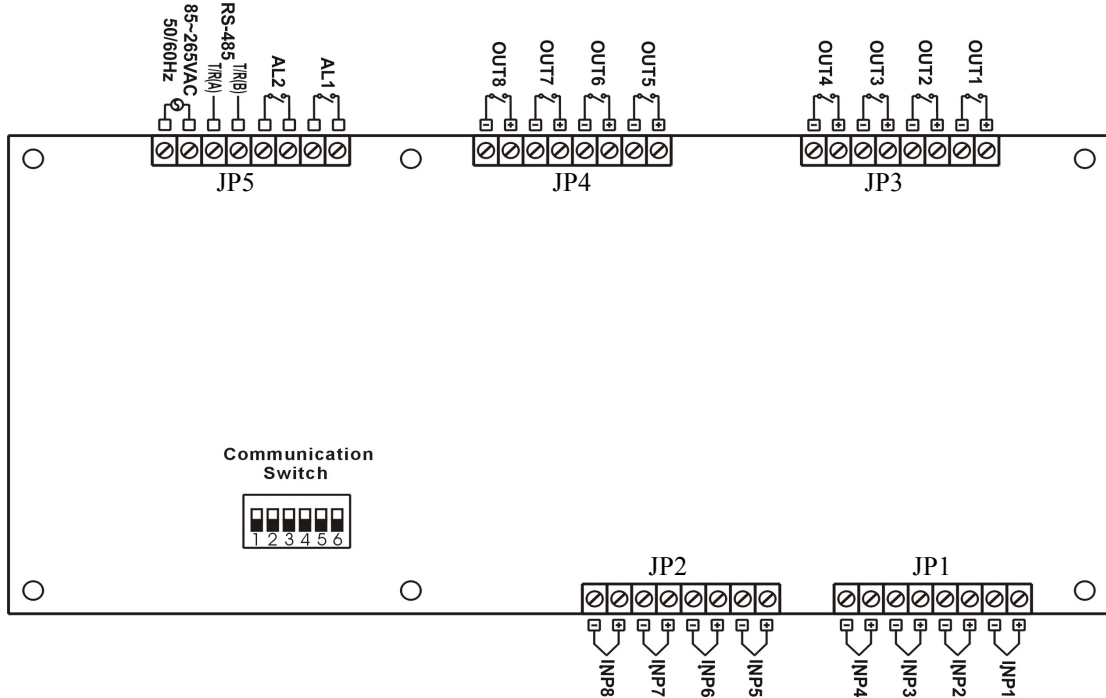
E-mail: hun88920@ms38.hinet.net

SPECIFICATION

Supply Voltage	AC85~265V 50/60Hz
Power Consumption	Less than 7VA
Sensor Inputs	Thermocouple : K 、 J 、 R 、 T 、 E 、 B 、 S 、 N
Measuring Accuracy	$\pm(0.3\%$ of reading + 1 digit) or $\pm 2^{\circ}\text{C}$ whichever is larger
Sampling Time	0.5 sec per 8 Channels
Input Filter	Time constant 0 to 100 sec. (off when 0 is set)
Control Outputs	Relay (250V/5A) DC24V (for SSR driven) 4~20mA
Control Method	ON/OFF 、 P 、 PI 、 PID
Number of Input Control Points	8 inputs and 8 control points
Proportional Band	0 ~ full scale
Integral Time	0 ~ 3600 sec
Derivative Time	0 ~ 3600 sec
Cycle Time	0 ~ 100 sec
Alarm Outputs	Sensor break at any inputs System ready or communication error
Setting Method	RS-485 communication interface Baud rate and address are set by switch
Protocol	Method: MODBUS 、 Hunjoen standard Start bit: 1 、 Data bit: 8 、 Parity: None 、 Stop bit: 1 Baud rate: 9600 、 19200 bps
Cable Length	Maximum cable length is 500 M
Connection units	Maximum is 31 units
Memory Backup	Non-volatile memory
Dimension	225mm*105mm without casing
Ambient Operating Temperature	-10~55 $^{\circ}\text{C}$
Storage Temperature	-25~65 $^{\circ}\text{C}$
Ambient Operating Humidity	35~85% RH (with no icing or condensation)
Storage Humidity	35~95% RH (with no condensation)

WIRING & HARDWARE SETTING

WIRING TERMINAL



COMMUNICATION SETTING

STATION NUMBER SETTING

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31

BAUD RATE SETTING

9600	19200

COMMUNICATION PROTOCOL

📖 INTERFACE

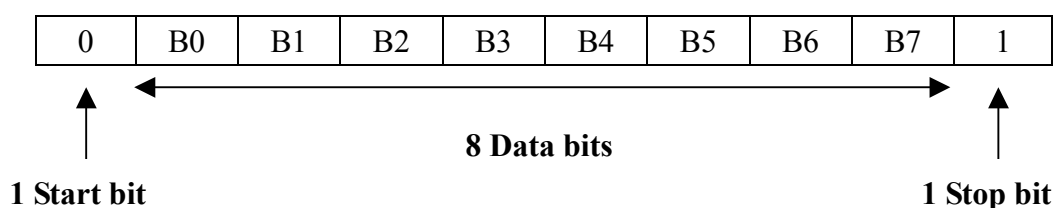
RS-485

📖 BAUD RATE

9600 , 19200 bps

📖 DATA FRAME

Data Bits = 8 , Parity = None , Start bit = 1 , Stop bit = 1



📖 DATA FORMAT

ModBus Protocol RTU Mode

RTU Request : Read command

0	1	2	3	4	5	6	7
	0x03						
Station Number	Func-tion	Address (MSB LSB)		Count (MSB LSB)		CRC16 (LSB MSB)	

Station Number: 00H~1FH

Address: 0000H~00FFH

Count: Number of Data

CRC16: Cyclical Redundancy Check

RTU Response : Read command

0	1	2	3	4	5	6	7	8
	0x03							
Station Number	Func-tion	Byte Count	Data1 (MSB LSB)		Data2.. (MSB LSB)		CRC16 (LSB MSB)	

Station Number: 00H~1FH

Address: 0000H~00FFH

Byte Count: Number of Data Bytes

CRC16: Cyclical Redundancy Check

RTU Request : Write command

0	1	2	3	4	5	6	7
	0x06						
Station Number	Function	Address (MSB LSB)		Data (MSB LSB)		CRC16 (LSB MSB)	

Station Number: 00H~1FH

Address: 0000H~00FFH

CRC16: Cyclical Redundancy Check


RTU Response : Write command

0	1	2	3	4	5	6	7
	0x06						
Station Number	Function	Address (MSB LSB)		Data (MSB LSB)		CRC16 (LSB MSB)	

Station Number: 00H~1FH

Address: 0000H~00FFH

CRC16: Cyclical Redundancy Check

 **COMMUNICATION EXAMPLES****RTU Request : Read command** Read P6 from station 1

☞ Station number: 01H

☞ Function: 03H

☞ Address MSB: 00H

☞ Address LSB: 1EH

☞ Count MSB: 00H

☞ Count LSB: 01H

☞ CRC16 LSB: E4H

☞ CRC16 MSB: 0CH

0	1	2	3	4	5	6	7
0x01	0x03	0x00	0x1E	0x00	0x01	0xE4	0x0C
Station Number	Function	Address (MSB LSB)		Count (MSB LSB)		CRC16 (LSB MSB)	

RTU Response : Read command

📁 Response P6 0.8°C from M-1000 station 1

☞ Station number: 01H

☞ Function: 03H

☞ Byte count: 02H

☞ Data MSB: 00H

☞ Data LSB: 08H

☞ CRC16 LSB: E4H

☞ CRC16 MSB: 0CH

0	1	2	3	4	5	6
0x01	0x03	0x02	0x00	0x08	0xB9	0x82
Station Number	Func-tion	Byte Count	Data1 (MSB LSB)		CRC16 (LSB MSB)	

RTU Request: Write command

📁 Write SV0 100.0°C to M-1000 station 1

☞ Station number: 01H

☞ Function: 06H

☞ Address MSB: 00H

☞ Address LSB: 10H

☞ Data MSB: 03H

☞ Data LSB: E8H

☞ CRC16 LSB: 88H

☞ CRC16 MSB: B1H

0	1	2	3	4	5	6	7
0x01	0x06	0x00	0x10	0x03	0xE8	0x88	0xB1
Station Number	Func-tion	Address (MSB LSB)		Data (MSB LSB)		CRC16 (LSB MSB)	

RTU Response: Write command

📁 Response request command from M-1000 station 1

☞ Station number: 01H

☞ Function: 06H

☞ Address MSB: 00H

☞ Address LSB: 10H

☞ Data MSB: 03H

☞ Data LSB: E8H

☞ CRC16 LSB: 88H

☞ CRC16 MSB: B1H

0	1	2	3	4	5	6	7
0x01	0x06	0x00	0x10	0x03	0xE8	0x88	0xB1
Station Number	Func- tion	Address (MSB LSB)		Data (MSB LSB)		CRC16 (LSB MSB)	

SETTING

📖 ADDRESS INDEX

PARA	ADDR	PARA	ADDR	PARA	ADDR	PARA	ADDR	PARA	ADDR
SV0	10H	CT0	30H	SOF0	50H	AT0B	70H		
SV1	11H	CT1	31H	SOF1	51H	AT1B	71H		
SV2	12H	CT2	32H	SOF2	52H	AT2B	72H		
SV3	13H	CT3	33H	SOF3	53H	AT3B	73H		
SV4	14H	CT4	34H	SOF4	54H	AT4B	74H		
SV5	15H	CT5	35H	SOF5	55H	AT5B	75H		
SV6	16H	CT6	36H	SOF6	56H	AT6B	76H		
SV7	17H	CT7	37H	SOF7	57H	AT7B	77H		
P0	18H	HST0	38H	ACT0	58H	CH0	78H		
P1	19H	HST1	39H	ACT1	59H	CH1	79H		
P2	1AH	HST2	3AH	ACT2	5AH	CH2	7AH		
P3	1BH	HST3	3BH	ACT3	5BH	CH3	7BH		
P4	1CH	HST4	3CH	ACT4	5CH	CH4	7CH		
P5	1DH	HST5	3DH	ACT5	5DH	CH5	7DH		
P6	1EH	HST6	3EH	ACT6	5EH	CH6	7EH		
P7	1FH	HST7	3FH	ACT7	5FH	CH7	7FH		
I0	20H	AT0	40H	OUTL0	60H	OUT0	80H	TYPE	F0H
I1	21H	AT1	41H	OUTL1	61H	OUT 1	81H	AF1	F1H
I2	22H	AT2	42H	OUTL2	62H	OUT 2	82H	AF2	F2H
I3	23H	AT3	43H	OUTL3	63H	OUT 3	83H	SOFT	F3H
I4	24H	AT4	44H	OUTL4	64H	OUT 4	84H		
I5	25H	AT5	45H	OUTL5	65H	OUT 5	85H		
I6	26H	AT6	46H	OUTL6	66H	OUT 6	86H		
I7	27H	AT7	47H	OUTL7	67H	OUT 7	87H		
D0	28H	POF0	48H	OUTH0	68H			PV0	F8H
D1	29H	POF1	49H	OUTH1	69H			PV1	F9H
D2	2AH	POF2	4AH	OUTH2	6AH			PV2	FAH
D3	2BH	POF3	4BH	OUTH3	6BH			PV3	FBH
D4	2CH	POF4	4CH	OUTH4	6CH			PV4	FCH
D5	2DH	POF5	4DH	OUTH5	6DH			PV5	FDH
D6	2EH	POF6	4EH	OUTH6	6EH			PV6	FEH
D7	2FH	POF7	4FH	OUTH7	6FH			PV7	FFH

 **DESCRIPTION OF EACH PARAMETER**

PARA	DESCRIPTION	RANGE	DEFAULT
SV0~SV7	Set value setting	Within input range	100.0
P0~P7	Proportional band	0.0~full scale	50.0
I0~I7	Integral time	0~3600 sec	120
D0~D7	Derivative time	0~3600 sec	30
CT0~CT7	Proportioning cycle time	0~100 sec	1
HST0~HST7	Hysteresis of on/off control	0.0~200.0	0.0
AT0~AT7	Execution of auto tuning	0 : AT end or cancel 1 : AT start or execution	0
POF0~POF7	Process value offset	-100.0~100.0	0.0
SOF0~SOF7	Setting value offset	-100.0~100.0	0.0
ACT0~ACT7	Control action mode	0 : cooling 1 : heating	1
OUTL0~OUTL7	Low limit of control output	0.0~100.0%	0.0
OUTH0~OUTH7	High limit of control output	0.0~100.0%	100.0
AT0B~AT7B	Auto tuning offset	-100.0~100.0	0.0
CH0~CH7	Used or unused of channels	0 : channel unused 1 : channel stopped 2 : channel run	2
TYPE	Sensor input type	0~7	0
AF1	Alarm 1	0~1	0
AF2	Alarm 2	0~1	0
SOFT	Digital filter	0~100 sec	0

 **INPUT RANGE TABLE**

TYPE UNIT (°C)	0	K Type	-50~1372
	1	J Type	0~1200
	2	R Type	0~1760
	3	T Type	-200~400
	4	E Type	0~1000
	5	B Type	0~1820
	6	S Type	0~1760
	7	N Type	0~1300

TROUBLESHOOTING

⚠ **WARNING**

- To prevent electric shock or instrument failure, always turn off the system power before replacing the instrument.
- To prevent electric shock or instrument failure, always turn off the power before mounting or removing the instrument.
- To prevent electric shock or instrument failure, do not turn on the power until all the wiring is completed.
- To prevent electric shock or instrument failure, do not touch the inside of the instrument.
- All wiring must be performed by authorized personnel with electrical experience in this type of work.

CAUTION

All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action.

The power must be turned off before repairing work for input break and output failure including replacement of sensor, contactor or SSR, and all wiring must be completed before power is turned on again.

MODBUS COMMUNICATION ERROR

PROBLEM	PROBABLE CAUSE	SOLUTION
No response	Wrong connection, no connection, or disconnection with the communication cable	Confirm the connection method or condition, then connect it correctly
	Wrong wiring, faulty contact, or malfunction of the communication cable	Confirm the wiring or connector and replace or repair the wrong one
	Mismatch of the setting data of communication speed or data bit configuration with those of the host	Confirm the setting and correct them
	Wrong communication address setting	
	Transmission error such as overrun, framing, parity, or CRC-16 error was occurred	Retransmit message again or verify communication problem