WINPARK 汇邦

Changzhou Winpark Electronics Co., Ltd
Address: 6th Floor of Tianan Industrial Village
A plus, Xinbei, Changzhou 213022, China
Tel: 0086-519-85132277 Email: winpark@cnwinpark.com
Fax: 0086-519-85108252 Web: www.cnwinpark.com

8-Channel Temperature Control Module Operation Manual

MC（苏）制 04000201

Version No.:V2.05

Thank you for using Winpark products. Please read this manual carefully before operating the controller and always keep it around you to make it available easily anytime.

WARNING

Wire connection

If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.
Choose fuse protection power supply wire and output wire to avoid strong current strike which may cause failure or damage to the controller.

Power supply

Please use the controller under rated power supply to avoid causing failure or damage to the controller.
Don't turn on thee power supply until all of the wiring is completed and checked again

Using sites limitation

Don't use this controller in the places subject to flammable or explosive gas to avoid cause fire.
Don't use this controller in dusty, corrosive and steam exhaust environment
Don't use this controller where there are strong shock and strike.

General Electrical Data

Rated voltage	85V AC~265V AC
Power consumption	≤5VA
Insulation Strength	Power supply- input：1500V AC 1min Input-relay output：1500V AC 1min Power supply-relay output：1500V AC 1min
Insulation Resistance	Input-relay output：>20MΩ Input-power supply：>20MΩ Power supply-relay output：>20MΩ
Working Environment	Ambient temperature：0°C ~50°C Relative humidity：35%~85%（no condensation）

Measuring Data

Permissible input resistance	thermocouple：≤100Ω
Measuring range	0 ~600°C or 0 ~1000°C
Display accuracy	0.1°C
tolerance	±0.5%FS

Output data

Capacity of relay output contacts	3A 220V； Resistive load or designated
SCR Zero cross trigger signal	100mA
SSR Trigger signal	Output voltage: 12V±3V Output current：35mA

Product model

TPC-8C2—□ □ □ □ □ –SP□ □-V□ □
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

SN	Name	Explanation
(1)	Design code	8C2: 8C2series products
(2)	Input method	0: thermocouple input
(3)	output method	0: break output
(4)	Alarm method	0: upper limit upward alarm
(5)	Input type	0: K 1:E 4:Pt100 5:J
(6)	Output type	0: relay contacts output 1: nonisolated logic level output (to control SSR) 2: Isolated logic level output (to control SSR)
(7) (8)	Special model code.	**: Ordinary 2：K (0 ~1000°C)
(9) (10)	Software Version	01: Ordinary

MTC-8C-EX1-□
（1） (2) (3)

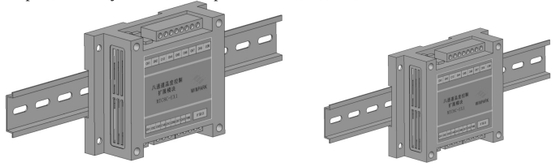
No.	Name	Explanation
(1)	Design code	8C: 8C series product
(2)	Mark	EX1：expansion module
(3)	Output type	0：relay contact switch output 1：logic electrical level output (control SSR)

Installation instruction

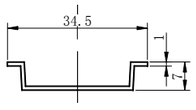
TPC-8C2 Actual size：145*90*72

MTC8C-EX1 Actual size：96*90*38

（picture is only for reference, please refer to actual size）（Unit：㎜）

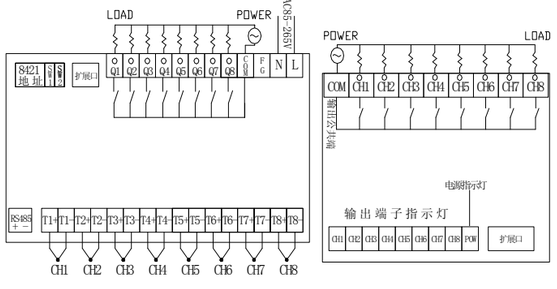


Installation slot



Wire Connection

TPC-8C2 **MTC8C-EX1**
（cooling output module）



Remark：

1）nonisolated logic level output: the COM terminal of main module is 12V and connect to the anode of SSR; Q1~Q8 connect to the cathode of SSR;
2）isolated logic level output: the COM terminal of main module connect 24V input(Anode), Q1~Q8 connect to the anode of SSR; the cathode of SSR connect to earth terminal of 24V power supply.
3）The above mentioned two ways can't be mixed, otherwise there might be damage to module.

Address Coding rule

The address select switch use 8421 coding. 1 corresponds to 8; 2 corresponds to 4; 3 corresponds to 2; 4 corresponds to 1; When it is switched to ON, it means valid. The communication address is the sum of the valid numbers added a extra 20. For example: （1：ON,2：OFF,3：ON,4：OFF），(8+0+2+0) +20=30; Which means the module address is 30. If there are several modules connected in the same BUS, the address of modules should be different from each other.

Baud rate：

SW1,SW2 switch status	OFF,OFF	OFF,ON	ON,OFF	ON,ON
Baud rate (BPS)	9600	19200	38400	57600

Parameter explanation

P	Proportional Band: Proportional band of heat end (when P=0, it is stepping control)
I	Integral Time: Integral Time of heating end (Re-adjust time)
D	Differential Time: Differential time of heating end (advance adjust time). ("D" is return difference in stepping control)
IT	Overshoot suppression: The smaller is this parameter, the smaller is the first overshoot, but it will take longer to reach the set temperature.
SP	proportional band separation: To prevent overshoot caused by proportional function.
T	Heat cycle time: Output one action in this cycle under break control
PC	Refrigerating Proportional band: Proportional band of time proportional control in refrigerating end
PO	Refrigerating Proportion band offset: Proportional band offset of time proportional control in refrigerating end
CT	Refrigerating cycle time: Output one action in this cycle under break control
TR	Temperature modification: Modify temperature when the position of sensor or other factors affect measuring.
DB	Dead band control Insensitive area of alarm. It can reduce the action times of alarm relay. Range ; -10.0%~10.0%（Default 0.0%）
FIL	Input filter factor used for input signal filter factor. The bigger is this factor the smoother is the input. But it cause delay to the input. Press SET to enter next page.

Refrigerating Parameter Description

PC: Refrigerating Proportional band; PO: Refrigerating offset (Unit: °C); CT: Refrigerating cycle time (Unit: Second)

Two types of refrigerating:

1. Step refrigerating

PC=0，PO：Refrigerating offset， CT：Non-defined

For example: set SV=100, PO=10, when PV=110.5°C alarm outputs, when PV=109.5°C alarm stops. When PV=109.6°C ~110.4°C, it remains the original status: which means Return Difference Value=1°C

2. Proportional refrigerating

PC= Proportional Band （%）， PO: Refrigerating offset (Unit: °C), CT: Refrigerating cycle time (Unit: Second)

Refrigerating output =（actual temperature –set temperature- Refrigerating offset）/（(Proportion band %）*500）

For example: PC=5，PO=5，CT=30，SV=100，Actual temperature =108

Refrigerating output =（108-100-5）/（5%*500）=0.12

Because Refrigerating cycle time CT=30 seconds，in refrigerating cycle the valid output time=30*0.12=3.6seconds

Basic communication protocol：

Modicon Modbus Protocol，RTU Slave Mode

(Note: If the touch screen has the function of fragment communication optimization, please close this optimization function)

Communication connection	RS485	Data bit	8
Parity bit	even	Stop bit	1

Baud rate	9600BPS-57600BPS
Equipment address	20+ the value of address coding switch
Parameter, variable	Exist in form of holding register（HR）, show in 2 bytes 16 hexadecimal complement, address shows as Wxxxx
Control switch, bit status	Exist in form of coil, show in 1 bit, value 1 means valid., address shows as Bxxxx

Supported command	01（Read Coil Status） 03（Read Holding Registers） 05（Force Single Coil） 06（Preset Single Register） 16（Preset Multiple Regs）
Alternating control area with touch screen	Address：80，words: 2-8
Alternating status area with touch screen	Address：88
Because the communication buffer area is relatively small in the module, please close communication optimization function when programming touch screen configuration.	

Basic data description

Version No. address of module software：W8600

Parameter	Explanation	Read/write	Address	Unit
PV1	Channel 1 PV value	R	W48	0.1℃
PV2	Channel 2 PV value	R	W49	0.1℃
PV3	Channel 3 PV value	R	W50	0.1℃
PV4	Channel 4 PV value	R	W51	0.1℃
PV5	Channel 5 PV value	R	W52	0.1℃
PV6	Channel 6 PV value	R	W53	0.1℃
PV7	Channel 7 PV value	R	W54	0.1℃
PV8	Channel 8 PV value	R	W55	0.1℃
SV1	Channel 1 SV value	R/W	W40	1℃
SV2	Channel 2 SV value	R/W	W41	1℃
SV3	Channel 3 SV value	R/W	W42	1℃
SV4	Channel 4 SV value	R/W	W43	1℃
SV5	Channel 5 SV value	R/W	W44	1℃
SV6	Channel 6 SV value	R/W	W45	1℃
SV7	Channel 7 SV value	R/W	W46	1℃
SV8	Channel 8 SV value	R/W	W47	1℃

Remark 1：STATUS（output status word）bit explanation
Channel output status corresponding to bit

Bit	7	6	5	4	3	2	1	0
High 8 bit	CH8 heat	CH7 heat	CH6 heat	CH5 heat	CH4 heat	CH3 heat	CH2 heat	CH1 heat
Coil address	B247	B246	B245	B244	B243	B242	B241	B240
Low 8 bit	CH8 cool	CH7 cool	CH6 cool	CH5 cool	CH4 cool	CH3 cool	CH2 cool	CH1 cool
Coil address	B255	B254	B253	B252	B251	B250	B249	B248

Remark 2：SWITCH（work switch）bit explanation
Whether the channel corresponding to bit is controlling temperature

Bit	7	6	5	4	3	2	1	0
16 High 8 bit	CH8 switch	CH7 switch	CH6 switch	CH5 switch	CH4 switch	CH3 switch	CH2 switch	CH1 switch
Coil address	B263	B262	B261	B260	B259	B258	B257	B256
Low 8 bit								

Address Assignment of system parameter

Name		Address	Explanation
IN_TYPE	Input type	W164	0：K，1：E，5：J
OUT_TYPE	Output type	W165	See appended Instructions
PRECISION	Display accuracy	B296	See appended Instructions

Address Assignment of control parameter per channel

	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
P	W100	W200	W300	W400	W500	W600	W700	W800
I	W101	W201	W301	W401	W501	W601	W701	W801
D	W102	W202	W302	W402	W502	W602	W702	W802
IT	W103	W203	W303	W403	W503	W603	W703	W803
SP	W104	W204	W304	W404	W504	W604	W704	W804
T	W105	W205	W305	W405	W505	W605	W705	W805
PC	W106	W206	W306	W406	W506	W606	W706	W806
PO	W107	W207	W307	W407	W507	W607	W707	W807
CT	W108	W208	W308	W408	W508	W608	W708	W808
TR	W132	W232	W332	W432	W532	W632	W732	W832
DB	W133	W233	W333	W433	W533	W633	W733	W833
FIL	W134	W234	W334	W434	W534	W634	W734	W834

Appended Instructions：

1 High/low temperature alarm

1.1 Bit parameter

Enable high/low temperature alarm	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W017	Correspond bit address（B）							
（highbyte）Enable high temperature alarm: Enable high temperature alarm of the corresponding channel, when the value is set to 1, it means the function is enabled.	279	278	277	276	275	274	273	272
（lowbyte）Enable low temperature alarm: Enable low temperature alarm of the corresponding channel, when the value is set to 1, it means the function is enabled.	287	286	285	284	283	282	281	280

high/low temperature alarm output	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W014	Correspond bit address（B）							
（highbyte）high temperature alarm output: When the value is 1, it means the corresponding channel is in high temperature alarm state.	231	230	229	228	227	226	225	224
（lowbyte）low temperature alarm output: When the value is 1, it means the corresponding channel is in low temperature alarm state.	239	238	237	236	235	234	233	232

Machine high temperature alarm bit	B176	when there are 2 or more channels of high temperature alarm, the bit=1
Machine low temperature alarm bit	B177	when there are 2 or more channels of low temperature alarm, the bit=1
Machine high temperature alarm expansion module output enable	B288	when this bit=1, the eighth channel of expansion module is forced to be used as Machine high temperature alarm
Machine low temperature alarm expansion module output enable	B289	when this bit=1, the seventh channel of expansion module is forced to be used as Machine low temperature alarm

1.2 Word parameter

Function	Address	
high temperature alarm deviation	W026	Unit: ℃，if high temperature alarm of this channel is enabled, when(PV-SV) ≥Value of high temperature alarm deviation, the high temperature alarm of this channel output=1. if high temperature alarm deviation=0, it means high temperature alarm is invalid.
low temperature alarm deviation	W027	Unit: ℃，if low temperature alarm of this channel is enabled, when(PV-SV) ≥Value of low temperature alarm deviation, the low temperature alarm of this channel output=1. if low temperature alarm deviation=0, it means low temperature alarm is invalid.

2 Measuring radix point control

Function	Address	
Measuring value radix point control	B296	When the bit=0，the unit of PV output value is 1℃ When the bit=1，the unit of PV output value is0. 1℃

3 Output mode

3.1 Address（W165）

Bit	7	6	5	4	3	2	1	0
	expansion module output				main module output			
Output mode	0000：refrigerating output 0001：User-defined output, the low 8 byte content of address (W096) register content is the output of expansion relay. “1” means relay pickup				0000：relay or SSR output 0001：SCR controlled AC cycle proportional output			

4 bit address of direct logic point output

4.1 bit parameter

	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W096（lowbyte）	Corresponding bit address（B）							
“1” means relay pickup	1551	1550	1549	1548	1547	1546	1545	1544

5 Sensor abnormal protection

5.1 Judging by heating power and temperature rising time

5.1.1 temperature rise threshold value 3.0 degree (fixed)

5.1.2 setting parameter

5.1.3 bit parameter

W010	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
	Corresponding bit address（B）							
Alarm status	167	166	165	164	163	162	161	160
Alarm clear: set to 1 to clear corresponding alarm output, control bit resets to zero automatically.	175	174	173	172	171	170	169	168

5.1.4 Word parameter

Function	Address	
Heating power valve value	W020	0~1000 correspond with 0~100.0%
Temperature rise valve value	W021	0~3600 correspond with 0~3600 seconds, if set to 0, the alarm function is invalid.

5.2 Working theory

5.2.1 When the heating power is continuously bigger than threshold value and temperature rise doesn’t reach 3.0 degree in temperature rise threshold value time, alarm is output.

6 Manual / Auto switch

6.1 Bit parameter

W012	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
	Corresponding bit address（B）							
Automatic reset control: set to 1, in the next action cycle, the program will automatically clear enabled bits of itself and manual. The channel would enter to auto control status steadily then.	199	198	197	196	195	194	193	192
Manual enable control: set to 1, the corresponding channel enter to manual status; set to 0 to enter to auto status. All channels are in auto status when power on.	207	206	205	204	203	202	201	200

6.2 Word parameter

Function	Address	
Channel 1 manual output control value	W056	0~100.0
Channel 2 manual output control value	W057	0~100.0

Channel 3 manual output control value	W058	0~100.0
Channel 4 manual output control value	W059	0~100.0
Channel5 manual output control value	W060	0~100.0
Channel 6 manual output control value	W061	0~100.0
Channel 7 manual output control value	W062	0~100.0
Channel 8 manual output control value	W063	0~100.0

6.3 Remark：Channel manual output control value: user defines output value under manual status（0~100.0）; display output value calculated by PID under automatic mode（0~100.0）

6.4 When break coupling mark is showed, manual output is forbidden and no heating output.

7 Auto-tuning mark

7.1 Bit parameter

	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W013（highbyte）	Corresponding bit address（B）							
Auto-tuning mark (1 means corresponding channel is under auto-tuning status, could be set.)	215	214	213	212	211	210	209	208

8 Break coupling mark

8.1 Bit parameter

	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W013（lowbyte）	Corresponding bit address（B）							
Break coupling mark （1 means corresponding channel is under Break coupling status）	223	222	221	220	219	218	217	216

9 2-way PID Paramete

9.1 Bit parameter

	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W024（lowbyte）	Corresponding bit address（B）							
2-way PID control （1 means 2-way PID is enabled in corresponding channel）	399	398	397	396	395	394	393	392

9.2 Word parameter

Function	Address	
2-way PID refrigerating power output factor	W025	Range 0~100 correspond to 0.1~10.0, when the set data <1.0, it means lower refrigerating output power; when the set data>1.0, it means higher refrigerating output power

10 Power restriction

10.1 Bit parameter

	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1
W024（highbyte）	Corresponding bit address（B）							
Power restriction control (1 means Power restriction is enabled in corresponding channel）	391	390	389	388	387	386	385	384

10.2 Word parameter

Function	Address	
Power restriction value	W022	Range 0~100 correspond to 0%~100% power, when power restriction is enabled and the actual temperature is below the power restriction temperature, to restrict the max output power lower than this power.
Power restriction temperature	W023	0~400 correspond to 0~400℃，when temperature exceeds this number, power restriction function is canceled.

11 Full switch on/off function

11.1 Bit paramete

Function	Address	
All temperature control on	B184	This bit=1, all temperature control channels are on, this bit reset automatically.
All temperature control off	B185	This bit=1, all temperature control channels are off, this bit reset automatically.

12 Dead band control，-10.0~10.0 correspond to -10.0%~10.0%（default 0.0%）

12.1 Word parameter

Function	Address	
CH1 dead band control	W133	When this value is positive, there is dead band in 2-way output, which means the actual output=0, when the absolute value of calculated output value is smaller than this value; when this value is negative, there is overlapping with 2-way output, the actual output value equals to sum of this value and the absolute value of calculated output value
CH2 dead band control	W233	
CH3 dead band control	W333	
CH4 dead band control	W433	
CH5 dead band control	W533	
CH6 dead band control	W633	
CH7 dead band control	W733	
CH8 dead band control	W833	

External wiring instructions

1. communication cable wiring instructions:
   a) Communication cable should be shielded or twisted-pair cable. Loose wires are forbidden
   b) Communication cable and power cable should be laid separately.

2. thermocouple wiring instructions
   a) Compensation wire should be used to connect thermocouple and module input port. Or use shielded or twisted-pair wire at least, but this would cause temperature difference in measuring.
   b) The connection wire for 8 channels of thermocouple should be laid concentratedly to enhance the stability of temperature measuring.
   c) Thermocouple wiring should be laid separately from the power line

3. Solid state output wiring instructions
   a) The common port of solid state output can’t be connected to the common port of other modules or circuits.
   b) The control line of solid state output could only be connected with corresponding SSR.
   c) Solid state output line should be laid concentratedly and separated from the power line.