TOHO

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QS Accreditation
認定番号R001

PROCESS CONTROLLER

TTM-100 SERIES

TOHO TOHO ELECTRONICS INC.

TTM-100

TTM-100 Series EXCELLENT PID FUNCTION PROCESS CONTROLLER

- Available for both Process controllers
  (all 100 series controllers from 104 to 109) and signal conditioner(all 104 to 109 models)
- 4 digits display
  PV is green LED, SV is Red LED, each 4 digits are independent displays.
- Free voltage AC85 TO 264V
- Competitive price with lots of functions.
- Compact size
  Depth is only 80 mm but 48x48mm(104 model) is 100mm.
- Easy operation
  Up/down key for each digit
- Various abnormal alarm functions(option)
  Alarms for temperature abnormal, heater break, input break, output trouble and others.

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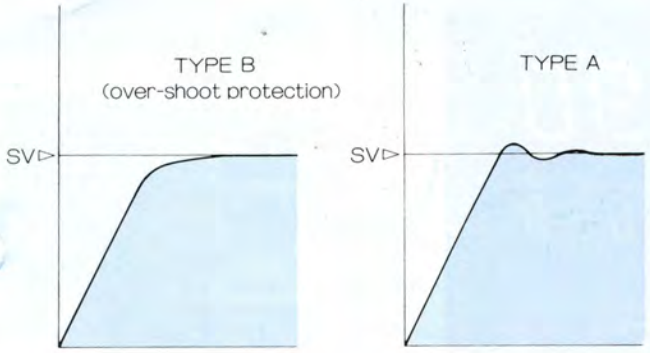
■Control Features

●Auto tuning

When SV (setting value) is set in PID mode, values at each P. I. D are automatically calculated.

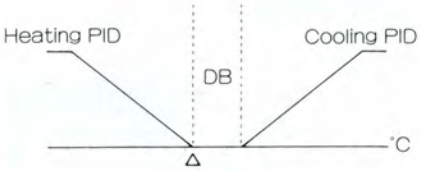
●Excellent P.I.D. (Toho Electronics' own control)
Toho's PID control technology is high technology of advanced PID control and actually mounted on from ordinary controllers to high grade TM55 process controllers. For TTM-100 series, this technology is extended and mounted. We provide two kinds control selectable;
PID-A (usual type PID)
PID-B (over-shoot protection type)



■Function Features

❶ Volume monitor operation (MV1, MV2)
Output volume for main control and sub-control, at the control time, will be indicated as numbers.

❷ Heat/cool PID
low cost type



❸ Manipulated variable limit (new function for 48×48mm model)
Limit for output signal is −10% to +100% for load. On relay or SSR, it is 0% to 100.0%.

❹ Abnormal alarm (new function!)
Controller itself can detect own troubles such as input broken. short-circuit output broken/melted.

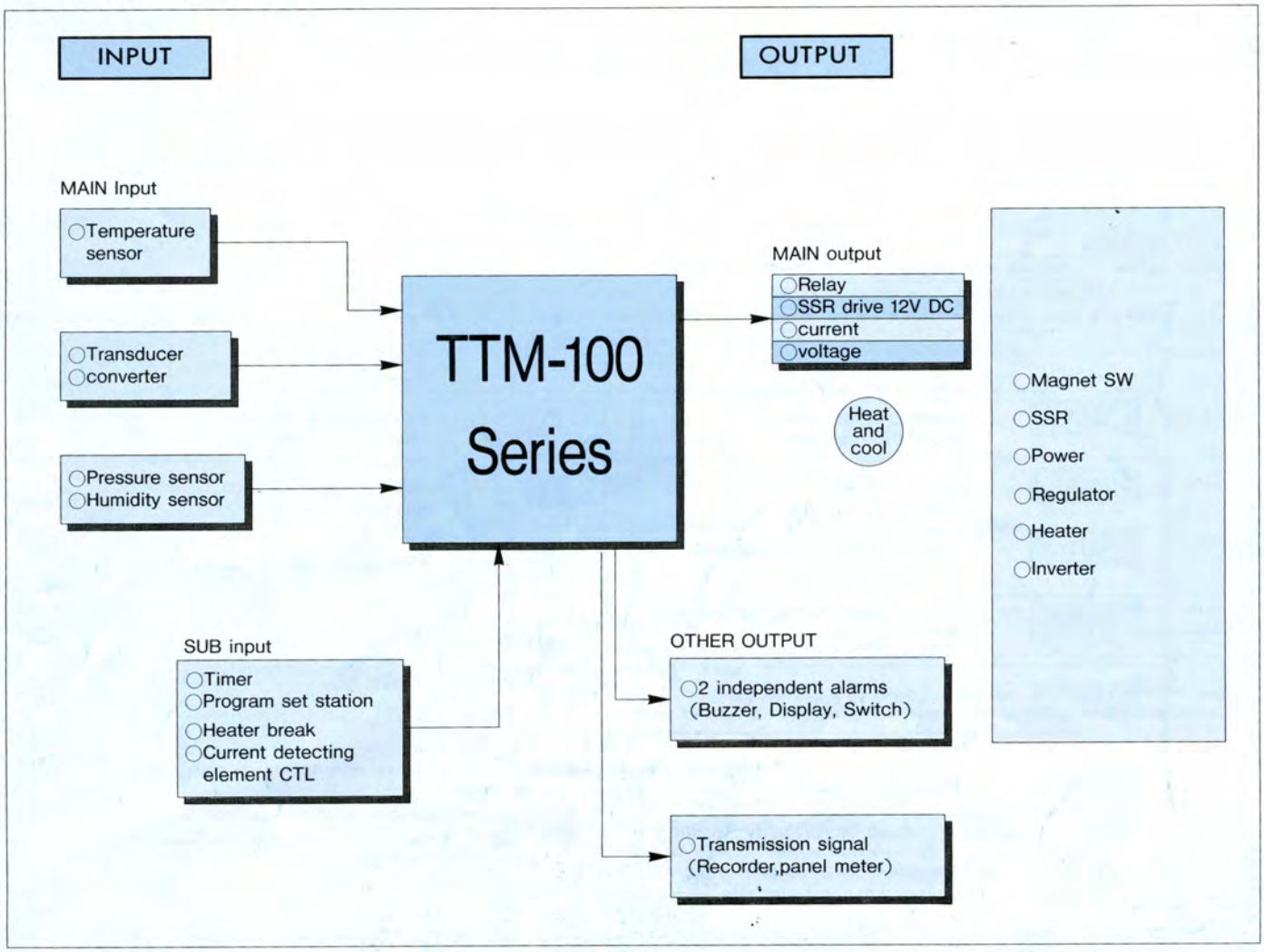
❺ Manual reset
In order to protect OFFSET at proportional control, manual reset for proportional band is provided.
Because offset' is taken place sometimes at proportional control.

❻ Scaling function
You can change setting range freely.
Ex. −199.0℃~100.0℃ _SLL"−199.9"
_SLH"100.0"

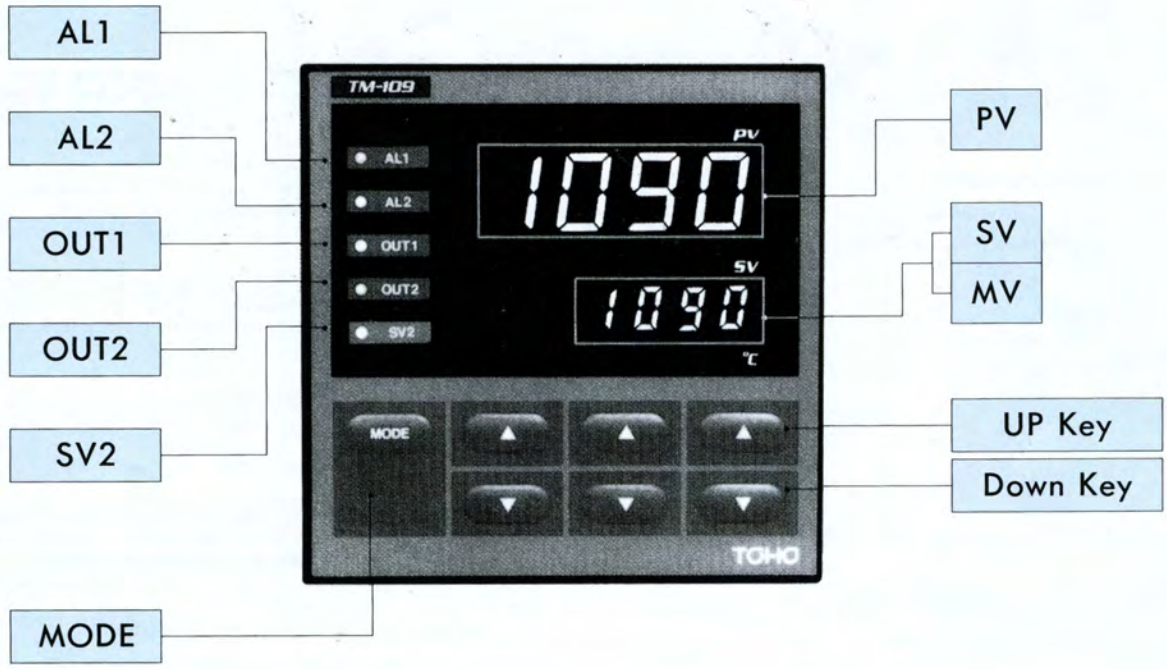
❼ Analog output
PV value, MV value, SV value are brought to an "output" as analog current/voltage signals, therefore, you can connect with a recorder (chart), and other various measuring instruments.

■SYSTEM CONSTITUTION

●Process control for various specific needs



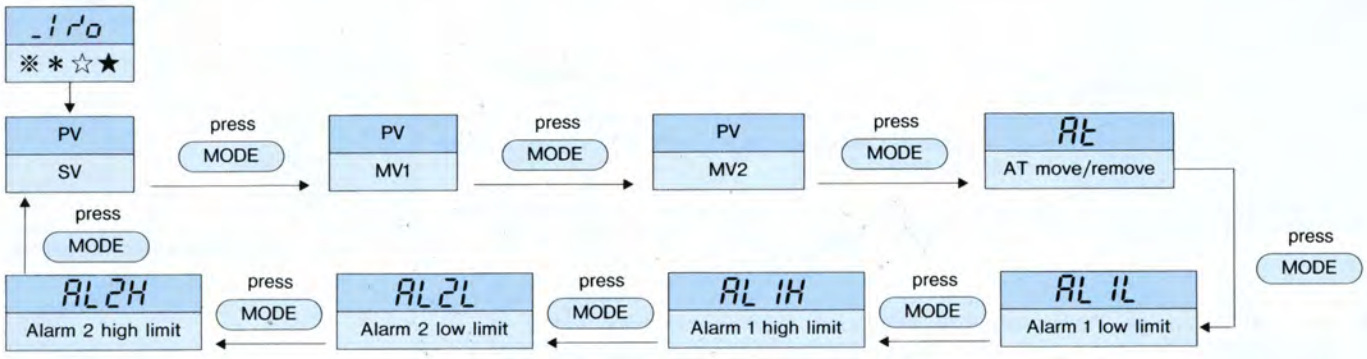
■LOCATION of FRONT PANEL



AL1 ------- Alarm 1 for low limit Alarm 1 for high limit	PV ------- Process value indication, character indication.
AL2 ------- Alarm 2 for low limit Alarm 2 for high limit	SV ------- Setting value indication. Change of character function.
OUT1 ------- Moniter (relay, SSR drive output only)	MV ------- Monitor of manipulation variable.
OUT2 ------- Cooling output monitor at heat/cool operating time. (relay, SSR drive outputs only)	△ ------- UP key ▽ ------- DOWN key
SV2 ------- Showing SV2 operating time	●Setting SV value and release a start of AT setting/change of alarm value ●A change of selection of other functions ●Key is in accordance with each digit and feeding of each digit is automatic.
MODE ------- MODE Key Call mode-key charactor. ●When mode-key is pressed, display at mode-side will be given. ●When you press mode-key for more than 2 seconds, you can get display at parameter side.	

■HOW TO SET

When Power is "ON", it displays for 6 seconds.
When Power is "ON" and Mode-key is pushed, you can get following characters. Please set in compliance with each character.
(when option is not included in, its display will not shown.)



PV	Process value
SV	Setting value
MV1	Monitor of manipulation Variable at Main control
MV2	Monitor of manipulation variable at sub control

AT	Auto tuning
AL 1L	Alarm1 lowlimit
AL 1H	Alarm1 high limit
AL 2L	Alarm2 high limit
AL 2H	Alarm2 high limit

■STANDARD SPECIFICATIONS

		TTM-104、TTM-105、TTM-107、TTM-109		
■Input	Thermocouple	K、J、E、T、R、S、N、Wre5-26 (untill 100Ω load resistance)		
	R.T.D.	Pt100ΩDIN、JPt100Ω (untill 5Ω load resistance)		
	Voltage	0~5V、1~5VDC、(If 250 ohm resistor is attached additionally,0 to 20 mA 4 to 20 mA will be provided.) 0~10V、0~1V、0~10mVDC.		
	current	4~20mA DC		
■Indication	PV	4 digit 7 segment LED green, Letter 10mm height. Letter 15mm heigt : TTM-109		
	SV	4digit 7 segment LED red, Letter 8mm height.		
		LED red : AL1、AL2、OUT1、OUT2、 LED green : SV2		
■Control output	P I D (AUTO tuning)	Proportional band (PH) cooling proportional band (PC)	PH is 0.1 to 200.0% of setting limiter range. It is operated ON/OFF at 0.	without TTM-104
			PC=0.1~10.0%×PH	
		Reset time (integral)	1~3,600sec (off at 0)	
		Rate time (derivative)	1~3,600sec (off at 0)	
		Cyclc time (th, tc)	1~120sec (heat,cool)	without tc of TTM-104
		Dead band (D, B)	-10.0, +10.0% of setting limiter span only heat/cool	withuot TTM-104
	ON/OFF	Control sensitivity (C)	Maximum 10% of setting limitter span. but setting is at mm. ON/OFF of heat/cool.	
	Relay	250V, 3A (load resistance) . 1c contact (in case of heat/cool, cooling output is 1a contact)		
	SSR	0—12V DC Minimum 600Ω load resistance.		
	Current	4~20mA DC MAX 600Ω (load resistance.)		
	Voltage	0~10V, 1~5V Minimum 1KΩ load resistance.		
■Sampling time		0.5sec.		
■Setting and indicating accuracy		R.T.D ±(0.3%+1digit) at setpoint value, or ±0.9℃ (1.8°F) TC ±(0.3%+1digit) at setpoint value, or ±3℃ (6°F) Current/Voltage ±(0.3%+1digit) in setting limiter span.		
■Memory element		EEPROM		
■Source Voltage		Free Power source(85~264VAC). 24VAC/DC:special factory option.		
■Standard function	Setting limiter	Minimum 50 digit within input span		
	Manipulated variable limiter	-10.0~-110.0% (0.0~100.0% at relay or SSR output)		
	PV correction	±10% of full scale.		
	℃/°F switchable	Only Thermocouple and RTD input.		
	Sensor correction	Only Thermocouple, RTD input.		
	Normal/direct switchable	In case of heat/cool, it is fixed.		
	Alarm mode	Two alarm mode of independent switchable (deviation-high low limit. upper limit. lower limit range. absolute value upper low limit. upper limit lower limit range) Input abnormal alarm. Heater abnormal alarm. All round alarm.		
	Alarm sensitivity	Maximum 10% within setting limiter span.		
	Manipulated variable indication	-10.0~110.0% (0.0~100.0% at relay or SSR output)		
	Key lock	3 mode (no key lock. All key lock. without SV. AT. Alarm key lock.)		
	Movement of decimal position	Under 2 digits only when input is voltage. electric current. But input of R.T.D. is only PV display. 1↔0.1 (℃/°F) switchable.		
	Operation condition	0~55℃、35~85%PH		
	Storage condition	-20~65℃、35~85%PH		
	Watch dog function	Data check by EEPROM : Erro, A/D converter check : Erro		

■Optional function

	Item	Contents	TTM-104	TTM-105、107、109
■Optional function	Buzzer	ON/OFF Buzzer sound	○	○
	Alarm 1	250V AC/0.5A、120V AC/1A (1a contact)	○	○
	Alarm 2	250V AC/0.5A、120V AC/1A (1a contact)	○	○
	Second SV	Setting rauge of SV is same	△	○
	Heater abnormal alarm	It can detect in current from 1A~30A/AC. (ON time is upper 300msec, errer is ± 50%)	△	○
	Transmission output	1~5V、4~20mA, 0~10mV output (choice from PV, SV, MV1,) with a function that output is reversible.	—	△
	Heat/cool	Relay, SSR drive, current, voltage output are available for both MV1 and MV2.	—	△

△mark means that it is selectable only one

■Input and its range Thermocouples, RTDs, electric current, for various ranges freely. (scaling)

Thermocouple		Setting range	Display range
K (JIS/IEC)	℃	0~1200	−40~1326
	℉	0~2200	−40~2420
J (JIS/IEC)	℃	0~800	−31~ 850
	℉	0~1450	−24~1563
E (JIS/IEC)	℃	0~ 800	−27~ 833
	℉	0~1450	−16~1531
T (JIS/IEC)	℃	−200~400	−231~407
	℉	−330~750	−385~765

Thermocouple		Setting range	Display range
N (NBC)	℃	0~1300	0~1335
	℉	32~2350	32~2435
W5Re/W26Re (ASTM)	℃	0~2300	0~2336
	℉	32~4200	32~4236
R (JIS/IEC)	℃	0~1700	0~1755
	℉	32~3100	32~3192
S (JIS/IEC)	℃	0~1700	0~1730
	℉	32~3100	32~3146

R.T.D		Setting range	Display range
Pt100 (JIS/IEC)	℃	−199.9~500.0	−199.9~539.1
	℉	−199.9~950.0	−199.9~999.9
JPt100 (JIS)	℃	−199.9~500.0	−199.9~529.0
	℉	−199.9~950.0	−199.9~984.4

Current, voltage	Setting range	Display range
4~20mA、1~5V	−1999~9999	SLL is 12%, SLH is +12% in setting range
0~10V、0~1V 0~10mV、0~5V	or −199.9~999.9	SLL is 2%, SLH is +10% in setting range

SLL means low limit value of SV limitter
SLH means high limit value of SV limitter

■Alarm mode

Unusual alarm

0	Non
1	PV unusual alarm. (refer PV alarm)
2	Heater abnomal alarm
3	PV unusual alarm and heater abnomal alarm

PV alarm

0	Non
1	Deviation high and low limit alarm
2	Deviation high limit alarm
3	Deviation low limit alarm
4	Deviation high and low range alarm
5	Absolute value high and low limit alarm
6	Absolute value high limit alarm
7	Absolute value low limit alarm
8	Absolute value high and low rang alarm

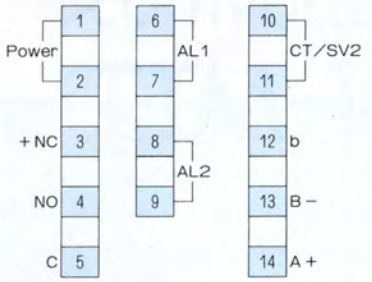
Additional function of alarm

0	Non
1	Alarm holding
2	Buzzer
3	Awaiting-sequence
4	Alarm holding and Buzzer
5	Alarm holding and Awaiting-sequence
6	Buzzer and Awaiting-sequence
7	Alarm holding and Buzzer, Awaiting-Sequence

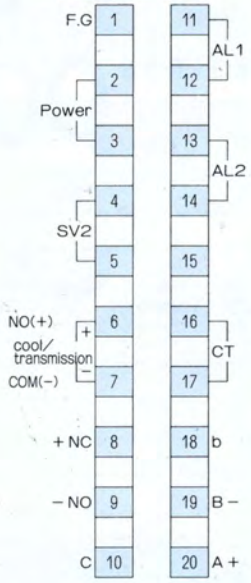
When kind of PV ararm is 0, only selectable 0,1,2, and 4.

■Terminal connections on back side

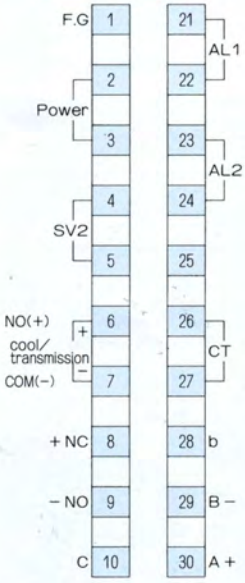
1. TTM-104



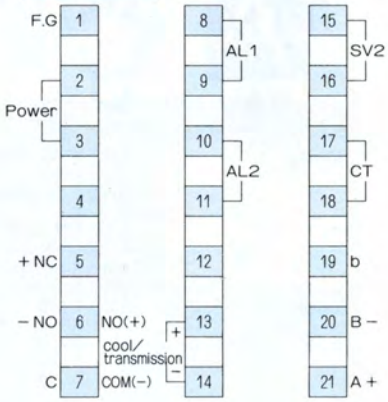
2. TTM-105



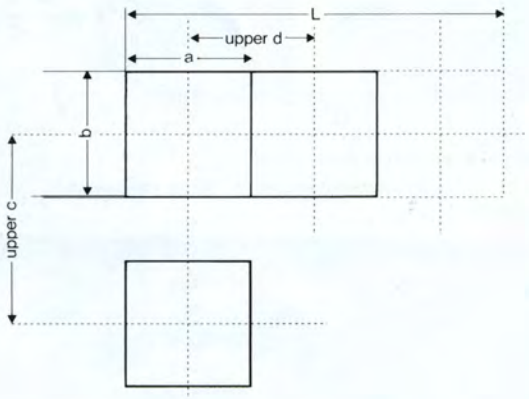
3. TTM-109



4. TTM-107



■Panel cut out dimensions



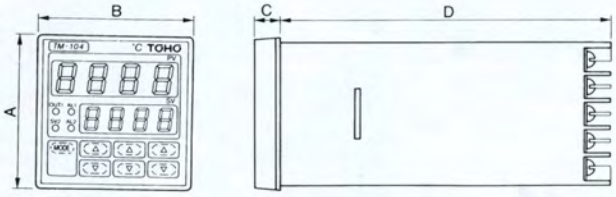
Panel cut out dimensions

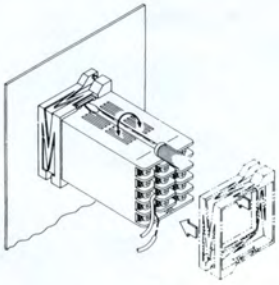
Model	a	b	c	d	A	B	C	D
TTM-104	$45^{+0.6}_{-0}$	$45^{+0.6}_{-0}$	60	48	48	48	8	100
TTM-105	$45^{+0.6}_{-0}$	$92^{+0.8}_{-0}$	120	48	96	48	11	80
TTM-107	$68^{+0.6}_{-0}$	$68^{+0.6}_{-0}$	90	72	72	72	11	80
TTM-109	$92^{+0.8}_{-0}$	$92^{+0.8}_{-0}$	120	96	96	96	11	80

※L=(d×N−3)$^{+1}_{-0}$for multiple units installation case.

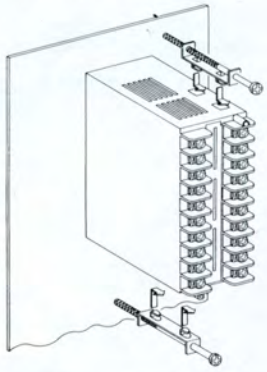
■Attachment for panel in stalling

(only TTM-104)



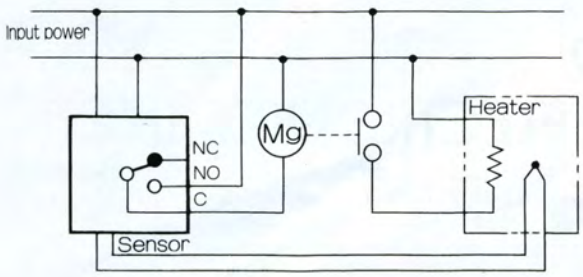


(TTM-105、107、109)

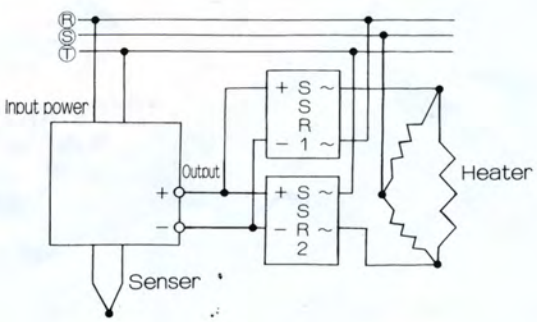


■Wiring diagram

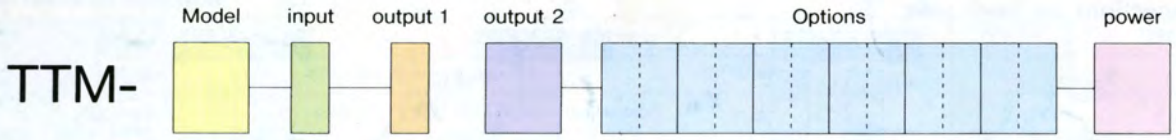
Example 1 : (Relay contact. Heating)



Example 2 : (SSR drive, Heating)



■Ordering Information



Contents			
Model	104	48×48mm	
	105	96×48mm	
	107	72×72mm	
	109	96×96mm	
Input	0	Thermocouple (K、J、E、T、R、S、N、W5Re/W26Re)	multiple input
	1	R. T. D. Pt100 DIN. JPt100	switchable
	2	Voltage 1~5V	
	3	Current 4~20mA	
	4	Voltage 0~1V	
	5	Voltage 0~10V	
	6	Voltage 0~10mV	
	7	Voltage 0~5V	
Output1	N	Nothing. Output 1 is output only for either heat/cool control or cooling control. In the time of heat/cool control, it is for heat output.	
	R	Relay contact	
	P	SSR drive 12VDC	
	F	Voltage 1~5V	
	G	Voltage 0~10V	
	I	Current 4~20mA	
Output2 (options) Limited cooling at heat/cool operation time. TTM-104 does not provide Output-2.	N	Nothing Output 2 is output at cooling side at cooling control time. When output 1 is N (nothing) , you cannot select except N. When you select transfer output, output 2 must be N (nothing).	
	R	Relay contact	
	P	SSR drive 12V	
	F	Voltage 1~5V	
	G	Voltage 0~10V	
	I	Current 4~20mA	
Options A selection of option is maximum 6 digits. (TTM-104 is maximum 4 digits.)	A	AL1 Alarm relay	
	B	AL2 Alarm relay	
	C	Buzzer	
	D	CT input When AL1 or AL2 are not selected, you cannot select CT input. When SV2 is selected On TTM-104 model, you cannot select CT input.	
	E	SV2 When CT input is selected on TTM-104, you cannot select SV2. When Output 1 is N, SV2 cannot be selected.	
	F	Transmission output : 1~5V. TTM-104 does not provide.	
	I	Transmission output : 4~20mA	
	H	Transmission output : 0~10mV	(G : 0~10V)
Power	24	24VAC/DC (Special factory option)	