

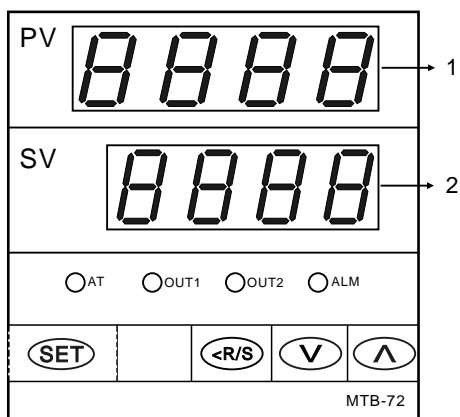
Digital Temperature Controller

MTB Serials

User Manual

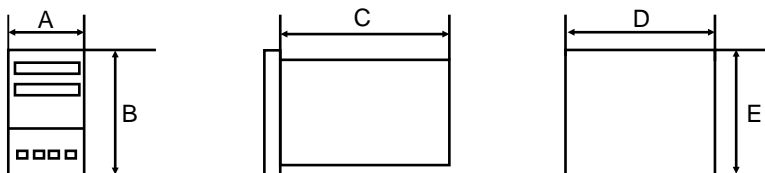
Thank you for purchasing our products, please read this manual before using and keep this manual for future reference

1:Panel description



Number	Symbol	Description
1	PV	Process Value
2	SV	Setting Value
Refer to left figure	SET	Function Key Shift between parameters
Refer to left figure	<R/S>	Shift Key
Refer to left figure	V	Decrease Key
Refer to left figure	^	Increase Key
Refer to left figure	AT	Indicator for Auto-Tuning
Refer to left figure	OUT1	output 1 indicator
Refer to left figure	OUT2	output 2 indicator
Refer to left figure	ALM	Alarm indicator

2:Mounting and Size

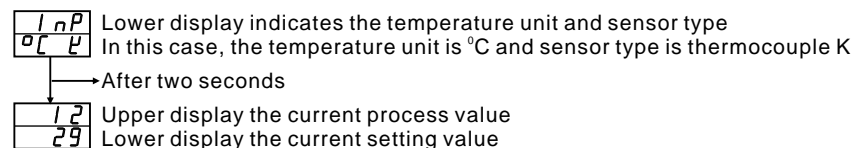


ITEM NO	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
MTB-96	96	96	70	91.5	91.5
MTB-72	72	72	92	67.5	67.5
MTB-49	48	96	70	45	91.5
MTB-48	48	48	78	45	45
MTB-94	96	48	70	91.5	45

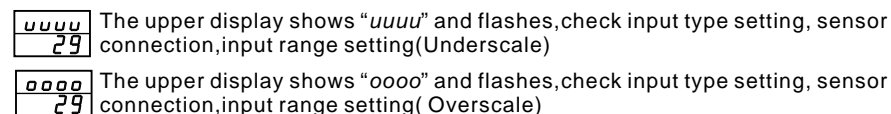
3:Power on self-check

3.1:Sensor type and temperature unit display

This unit will perform self-check after power on, and it will display some symbols as following charts

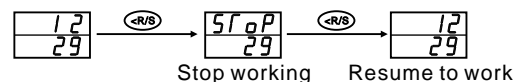


3.2:Error Display



4:Run or stop the program

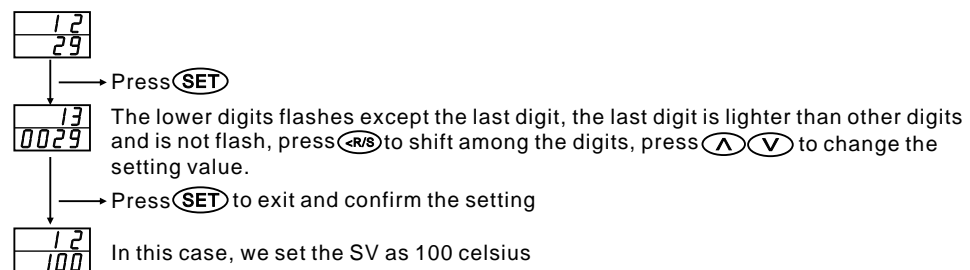
It is possible to Run/Stop the controller during the operation, when the upper display shows PV and Lower display shows SV, press **<R/S>** for more than three seconds can stop the program press **<R/S>** again for more than three seconds can run the program.



5:Setting and configuration

5.1:Setting Value(SV) configuration

Setting value can only be configured when temperature shows PV in the upper display and SV in the lower display, follow below steps to set the setting value

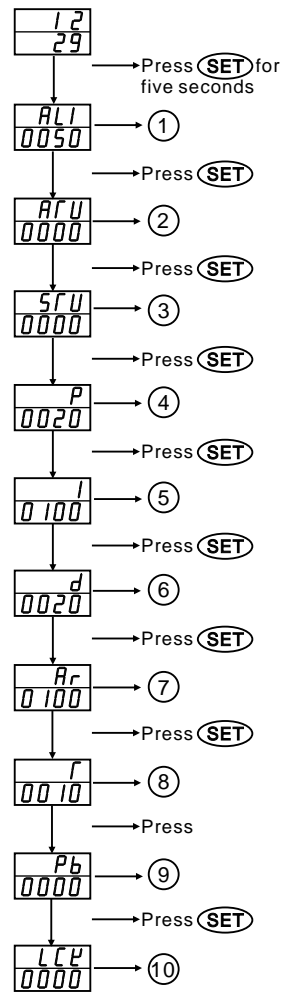


5.2:Field parameters table and settings can be done within this level

There are three level of parameters table within the software menu of this controller, each level of parameters table contains various parameters, user have to access to different level to configure the parameters. below charts shows the sequence of different parameters that are displayed within field parameters table, go through the charts will help you pinpoint the exact parameters to be modified to execute different functions.

At PV/SV status, press **SET** for at least three seconds to access field parameters level. details refer to below charts.

Field parameters level



Parameters are numbered from 1 to 10, and each of them define some function or settings, see below details setting guide for parameters ① to ⑩.

- ① **ALI**—this parameter defines the value for alarm, for example if the alarm mode is deviation high alarm, setting value is 100C, alarm value is 20C, means the alarm will be triggered when temperature reach to 120C. press **<R/S>** **<V>** **<^>** can modify the value.
- ② **ARU**—This is a auto-tuning switch parameter, modify the value to “1” will perform the auto-tuning and “0” will terminate the auto-tuning
- ③ **SFU**—Function disabled
- ④ **P** —This is proportional band value for PID action, normally the value will be set automatically via auto-tuning function, but also can be set manually to have better control result
- ⑤ **I** —This is integral time value for PID action, normally the value will be set automatically via auto-tuning function, but also can be set manually to have better control result.
- ⑥ **d** —This parameter defines the deviation time value for PID action, can be set automatically via auto-tuning process or manually.
- ⑦ **Ar** —This is a anti-reset windup parameters, overshoot or under-shoot are restricted by the integral effect.
- ⑧ **r** —Cycle time for control
- ⑨ **Pb** —PV bias value, this parameter can compensate display deviation, the display(PV)= Measuring value+/- PV Bias can be positive or negative number, for example can be 10C or -10C.
- ⑩ **LCP**—This a data lock value parameters, there are some parameter within the controller is very sensitive to the integral and accuracy of the system, therefore, those parameters should not be modified by mistake or by unauthorized personal. the data lock can prevent unauthorized personal access to certain parameter and therefore will prevent parameters be modified by mistake.

Press **<SET>** at any time of during the setting can save the modification and exit to PV/SV status

See below table 1 for the range and default value of field parameters. (Table 1)

Symbol	Name	Range	Factory default
ALI	Alarm value	-1999 to 9999	50/50.0
ARU	auto-tuning switch	0 or 1	0
SFU	not applicable	not applicable	not applicable
P	Proportional band	0-9999 or 0.1~999.9	15/15.0
I	Integral time	1-3600 S	40
d	deviation time	1-3600 S	20
Ar	anti-reset windup	0~100%	25
r	cycle time	1-100S	20/2
Pb	PV Bias	-1999 to 1999/-199.9 to 999.9	0
LCP	Data Lock	See table 2	0000

Data Lock Details(Table 2)

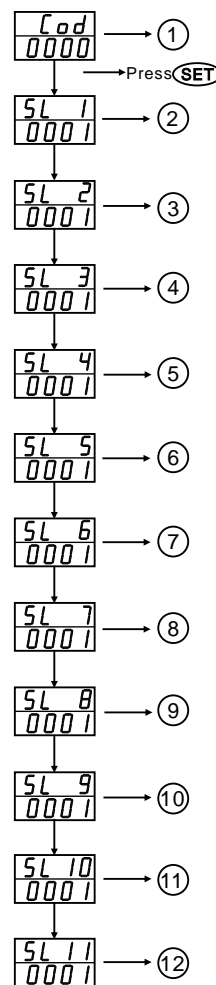
Lock value	Protection	Lock value	Protection
0000	SV and all parameters can be modified	0011	Only SV can be modified
0001	Only SV and alarm value can be modified	0101	Only alarm value can be modified
0010	All parameters expect alarm can be modified	0110	All parameters can be modified except SV and alarm
0100	All parameters expect SV can be modified	0111	All parameters are locked

5.3: System parameters level 1

Go to field parameters level and shift to parameter “LOCK”, change the lock value to “1000” and press **<SET>** to save and exit the field parameters table. Press **<SET>** **<R/S>** at the same time can access to system parameters level 1, please note whenever press **<SET>** **<R/S>** at the same time means press **<SET>** first, and followed with **<R/S>**, because these two keys are not possible to be pressed at exactly the same time and have to follow the sequence that press **<SET>** first and **<R/S>** followed to make sure this two keys are pressed for more than 3 seconds. following charts for details of system parameters level 1

Change the lock value to “1000”

Press the **<SET>** **<R/S>** at the same time. Press **<SET>** to shift between parameters



- ① **Cod**—system parameter level code, “0000” means system parameters level 1
- ② **SL 1**—This parameter defines the type of input signals, if the sensor for the system has changed, for example from thermocouple type K to J, the value of this parameter has to be modified accordingly, please refer to below table 3 for details

Sensor type table (table 3)

Value				Input Type	Range
0	0	0	0	K	(0 to 1372 °C)
0	0	0	1	J	(0 to 1200 °C)
0	0	1	0	L	(0 to 900 °C)
0	0	1	1	E	(0 to 1000 °C)
0	1	0	0	N	(0 to 1300 °C)
0	1	1	1	R	(0 to 1769 °C)
1	0	0	0	S	(0 to 1769 °C)
1	0	0	1	B	(0 to 1820 °C)
1	0	1	0	W5Re/W26Re	(0 to 2320 °C)
1	0	1	1	PL II	(0 to 1390 °C)
0	1	0	1	T	(-199.9 to 400 °C)
0	1	1	0	U	(-199.9 to 600 °C)
1	1	0	0	Pt100(JIS/IEC)	(-199.9 to 649 °C)
1	1	0	1	JPt100(JIS)	(-199.9 to 649 °C)
1	1	1	0	0 to 5V DC	-1999 to 9999
1	1	1	1	1 to 5V DC	(configurable)
1	1	1	0	0 to 20mA DC	-1999 to 9999
1	1	1	1	4-20mA DC	(configurable)

- ③ **SL 2**— function disabled
- ④ **SL 3**— function disabled

⑤5L 4- This parameter is to select the alarm mode for alarm. refer to below table four for details change to different value can have different alarm mode

*Alarm mode table (Table 4)

Value				Alarm Type
0	0	0	0	Alarm disabled
0	0	0	1	Deviation high-limit alarm
0	0	1	0	Deviation high/low-limit alarm
0	0	1	1	Absolute value high-limit alarm
0	1	0	1	Deviation low-limit alarm
0	1	1	0	Deviation high-low limit reverse alarm
0	1	1	1	Absolute value low-limit alarm

⑥5L 5- Function disabled

⑦5L 6- Output type selection, the output code was configured at the factory floor when item was made do not change the value at anytime during the operation, otherwise the controller will not be able to work properly. see below table 5 for output details

*Output table (Table 5)

Value				Control Action
			0	Direct Action
			1	Reverse Action
		0		PID action
		1		Heat/Cool PID action
	0			Relay/SSR drive output
	1			4-20mA output

⑧5L 7- Function disabled

⑨5L 8- Function disabled

⑩5L 9- Function disabled

⑪5L 10- To configure RUN/STOP function, "1001" enable the RUN/STOP function via <R/S> key on front panel. "1000" to disable the RUN/STOP function on front panel.

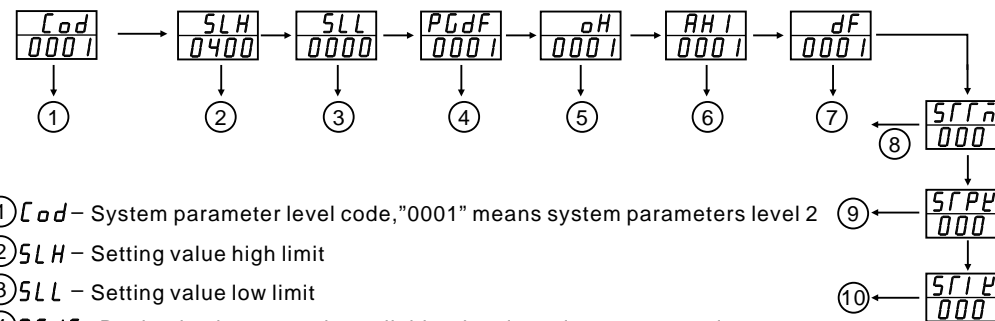
⑫5L 11- Function disabled

Note: Be sure to press <SET> and do not release, then press <R/S> at the same time These two keys are pressed at the same time for more than three seconds will save the modification and exit to PV/SV status

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5.4: System parameters level 2

Change the Cod value to "0001" at system parameter level 1 and press <SET> to go to system parameter level 2.



① Cod - System parameter level code, "0001" means system parameters level 2

② SLH - Setting value high limit

③ SLL - Setting value low limit

④ PGdF - Decimal points set, only available when input is current or voltage can set up to three decimal points tops

⑤ oH - Action dead band for on/off control action
 0 to 100 or 0.0 to 100.0
 0.0% to 10.0% of full scale for voltage current input (Factory default is 2.0)

⑥ AHl - Action dead band for alarm action
 0 to 100 or 0.0 to 100.0
 0.0% to 10.0% of full scale for voltage current input (Factory default is 2.0)

Parameter ⑦ ⑧ ⑨ ⑩ are disabled.

6: Terminal Arrangement

