

EN

TTM-000W Series

Temperature Controller

TTM-004W | TTM-005W | TTM-009W



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1 Intended use (areas of application)



Refer to the chapter 'Product description' for detailed specifications for the area of application. The operational safety of the device is only assured when used as intended in accordance with the specifications in the operating manual. Intervention beyond the actions described in the operating manual may only be carried out by personnel authorized by the manufacturer for safety and warranty reasons. Conversions or modifications made on one's own authority are expressly prohibited.



Application-specific dangers can emanate from this device when used improperly or not as intended. The device is **not** intended for use in explosion-prone areas and safety-related system parts in accordance with SIL

General safety instructions, use

This operating manual must be kept in a location such that qualified personnel can refer to it at all times. Any processes described in this operating manual may only be carried out by trained, qualified personnel who are authorized by the owner and wearing protective clothing. All rights reserved.

1.1 Safety signs and symbols

Warning notices are identified in this document as described under Table 1:



Danger

Warning! This symbol warns of imminent danger, which can result in death, severe bodily injury, or severe property damage in case of non-observance.



Ach Attention! This symbol warns of potential dangers or harmful situations, which can cause damage to the device or to the environment in case of non-observance.



Note! This symbol indicates processes, which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.



Warning! of an area in which explosive atmospheres can form. This only applies to devices with ATEX approval.

Tab.1: Safety signs and symbols

1.2 Safety instructions

Read the product description before commissioning the device. Ensure that there are no limitations for use of the product for the relevant applications.



The owner is responsible for ensuring the fault-free operation of the device. The owner is obligated to ensure compliance and to observe the required work and safety measures of the current applicable regulations for the entire duration of use.

1.3 Product liability and warranty

Exclusion of liability:

The contents of the operating manual have been checked to ensure conformity with the described device. However, deviations cannot be entirely ruled out. Therefore, we cannot assume any guarantee for complete conformity. The specifications in this document are checked regularly and any necessary corrections are incorporated into subsequent versions. This document is subject to technical changes. In addition, all claims are based on the valid 'Standard Terms for the Supply of Products and Services of the Electrical Industry'



SENSECA cannot inspect or repair any devices without the required form having been filled in completely.

2 Product description

The controllers of the TTM-00W series are available in three different designs (DIN-format), as well as in both input variants for temperature or normal singles.

They are used to control temperatures and other process values.

Up to 3 process outputs can be configured on the ordering code..

Depending on the design, the devices can be used for 2-point (on/off- or PID-control), 3-point control or continuous control. Depending on the configuration, up to 2 alarm outputs are available.

As an option, the device can be equipped with a digital input to activate a second set point (ramp), to control the timer function, Auto/Manual switching, or to start self-optimization. An RS485 interface (MODBUS) can also be selected to integrate the device into the field bus level.

Configuration and operation is done via a two-line LED 7-segment display in green and white, as well as 4 buttons.

2.1 Scope of delivery

- TTM-00xW, according to ordering code.
- Mounting accessories (depending on model mounting frame or brackets)
- This manual.

2.2 Type plate



Fig. 1: Type plate

3 Assembly and installation

3.1 Mechanical assembly

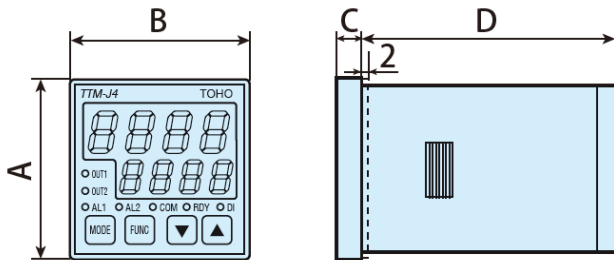


Fig. 2: TTM000W dimensions

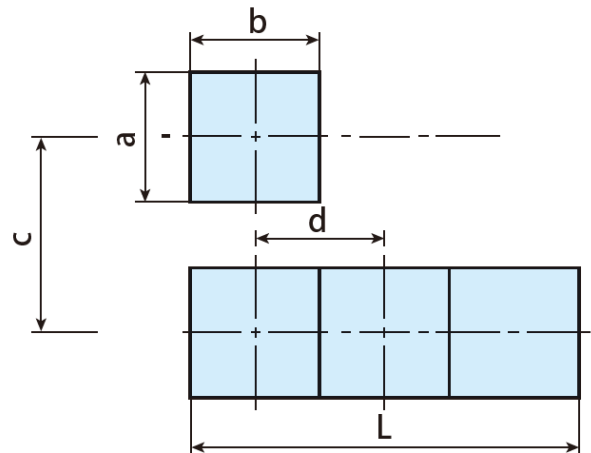


Fig. 3: TTM000W cut-out, single and side-by-side installation

Typ	A	B	C	D	a	b	c	d	L
TTM004W	48	48	6	77	45 +0.6 -0	45 +0.6 -0	60	48	(B × N-3) +0.6 -0
TTM005W	96	48	6,5	76,5	92 +0.6 -0	45 +0.6 -0	120	48	(B × N-3) +1 -0
TTM009W	96	96	9	77	92 +0.6 -0	92 +0.6 -0	120	96	(B × N-3) +1 -0

Table 2: Device dimensions and panel cut-out

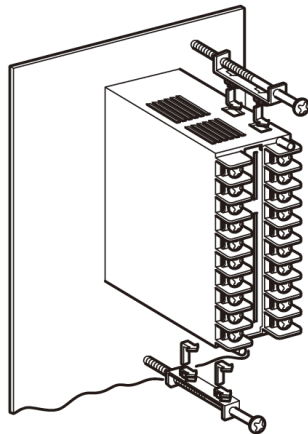


Fig. 4: Fixing of
TTM005W / TTM009W

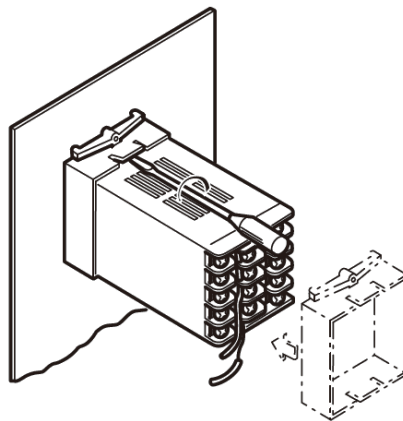


Fig. 5: Fixing of
TTM004W

3.2 Electrical installation



An electrician may install the device, only. The national and international regulations for connection of electrical systems in the respective user country apply

TTM-004W (TTM-005W / TTM-009W)

The auxiliary voltage is connected to the connections 4 and 5 (9 and 10) of the clamp bar.

The clamps 13,14,15 (1, 2, 3) are used for the sensors connection.

Clamps 2 and 3 (7 and 8) serve the control output OUT1 and are equipped as a relay, bistable or continuous output.

Clamps 1 and 6 (6 and 17) serve the control output OUT2 or the alarm function AL2

Clamps 11 and 12 (4 and 5) are assigned to the alarm function AL1.

Clamps 7 and 8 (13 and 14) are only available for devices with the ordering option ME and are used for connection via RS485.

Clamps 9 and 10 (11 and 12) are only available for devices with the ordering option ME and serve as a digital input DI.

3.3 Connection Diagram

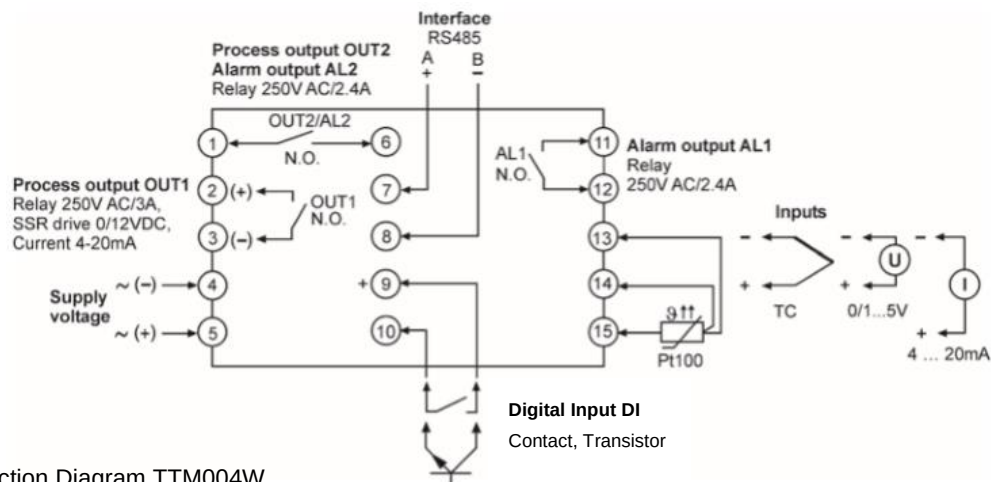


Fig.6: Connection Diagram TTM004W

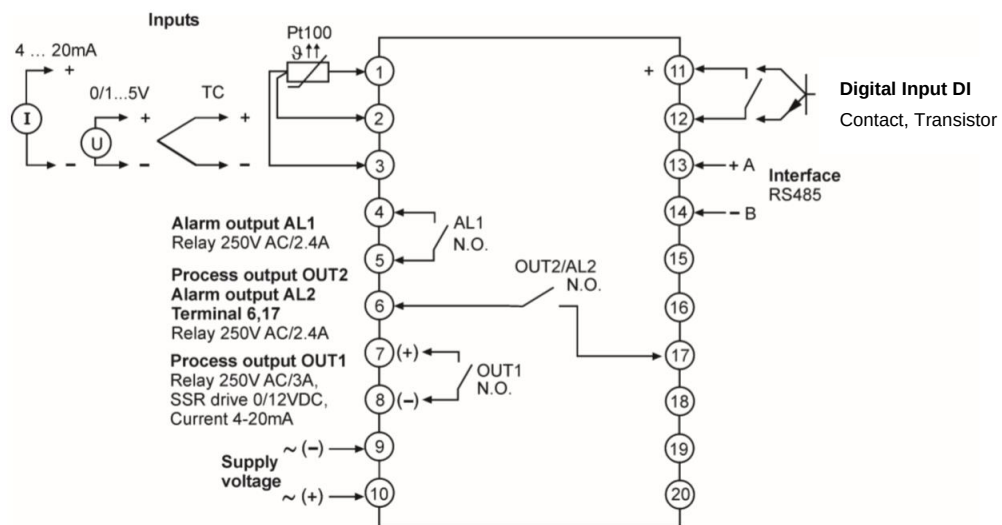
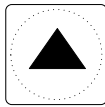
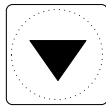
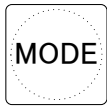


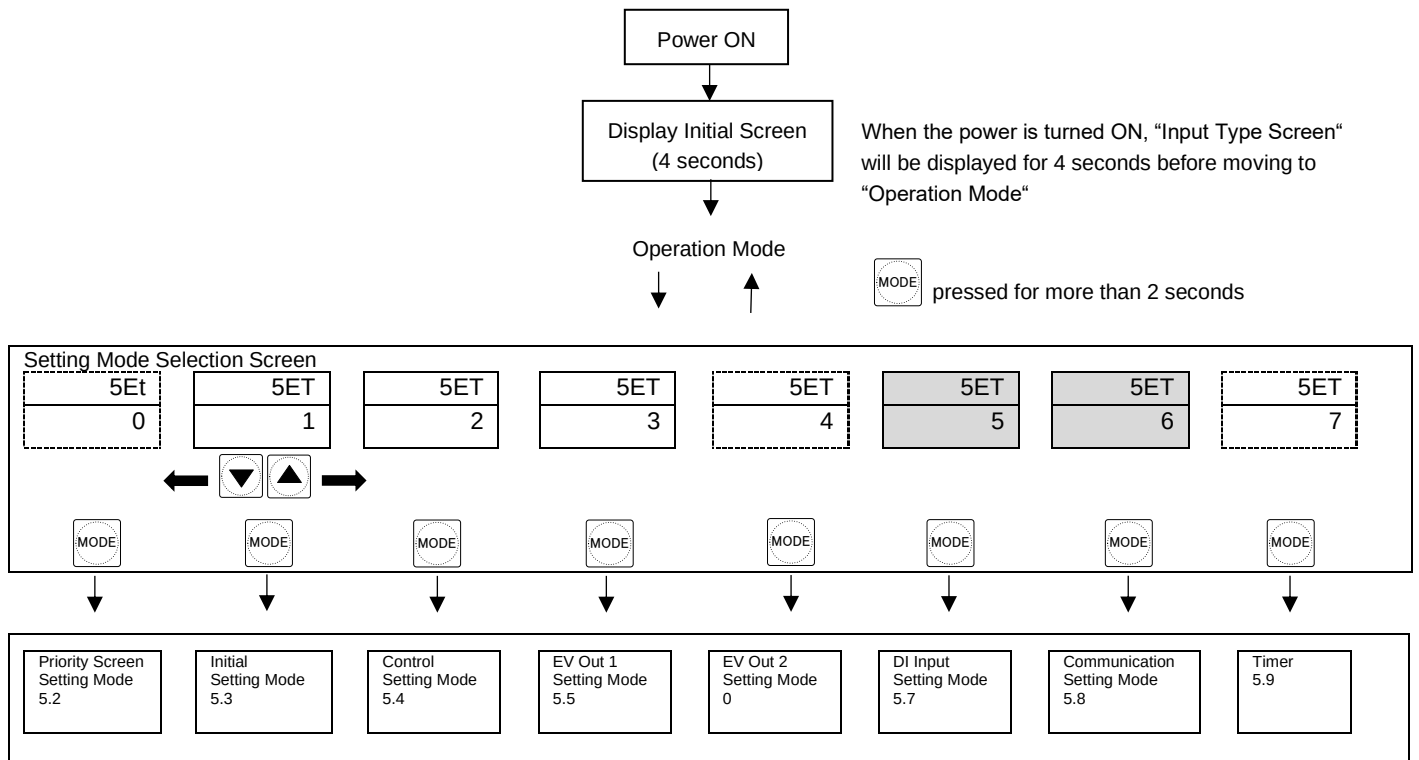
Fig.7: Connection Diagram TTM005W and TTM009W

4 Key Operations



Operation Keys	Description
Mode Key 	Switches screens. (It memorizes configured parameters.)
Function Key 	- Executes functions that are being set. 1) Digit Navigation Key (selected digit blinks): Enabled in all modes. 2) AT Key: Enabled only at operation mode. Press once to activate. 3) RUN/READY Key: Enabled only at operation mode. Press once to activate. 4) Timer Start/Reset: Enabled only at operation mode. Press once to activate.
DOWN Key 	Decreases the setting value. (Press continuously bet. 1s - 10s: 1 digit/100ms) (Press continuously bet. 10s - 20s: 10 digits/100ms) (Pressed consecutively for more than 20s: 100 digits/100ms)
UP Key 	Increases the setting value. (Press continuously bet. 1s - 10s: 1 digit/100ms) (Press continuously bet. 10s - 20s: 10 digits/100ms) (Pressed consecutively for more than 20s: 100 digits/100ms)

5 Operation Flow



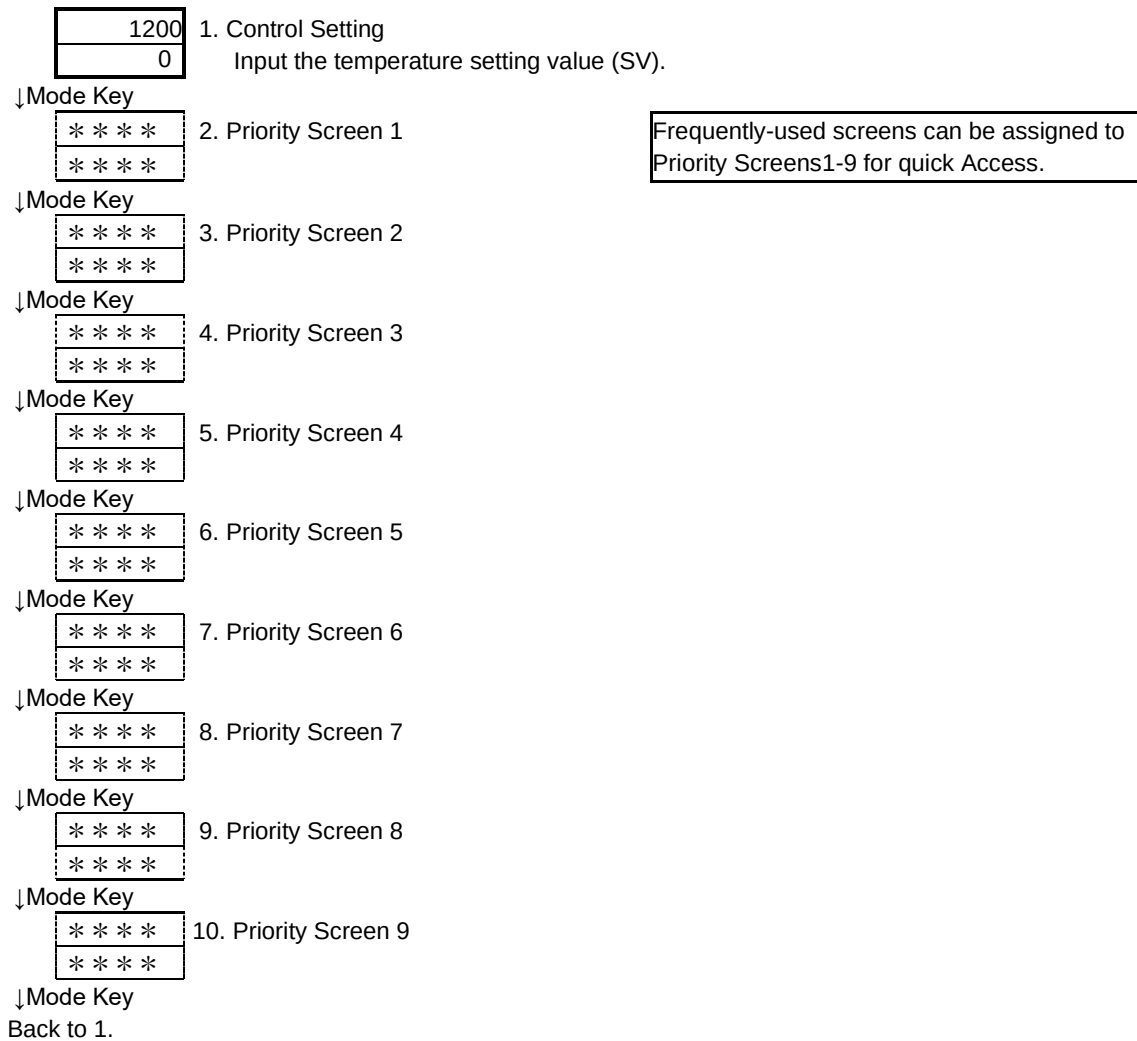
To go Back to –Operation Mode- from each setting mode, press the mode key for more than 2 seconds.
 Leave –Setting Mode Selection Screen- or each setting mode unoperated for 2 minutes will move the mode back to operation mode.

 Grey marked parameters SET5 / 6 are only available in order option ME.

 Parameter sets SET0 / SET7 are hidden in the delivery state by means of [Blind Setting Mode](#)
 SET4 is only visible, if OUT2 to is assigned to event function.

5.1 Operation Mode (Parameters 6.1 Operation Mode)

Display of process value and set point as well as user parameters 1 to 9 according to assignment SET0



5.2 SET0 Priority Screen (Parameters 6.2 Priority Screen)

Not visible with factory settings, see [Blind Setting Mode](#) for release. Up to 9 parameters can be assigned to operating screen.

5ET 0	1. Setting Mode Selection Screen	
↓Mode Key		
Pr11 oFF	2. Setting of Priority Screen 1	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr12 oFF	3. Setting of Priority Screen 2	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr13 oFF	4. Setting of Priority Screen 3	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr14 oFF	5. Setting of Priority Screen 4	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr15 oFF	6. Setting of Priority Screen 5	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr16 oFF	7. Setting of Priority Screen 6	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr17 oFF	8. Setting of Priority Screen 7	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr18 oFF	9. Setting of Priority Screen 8	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Pr19 oFF	10. Setting of Priority Screen 9	Select the parameter with ▲▼keys. If unnecessary select OFF.
↓Mode Key		
Back to 1.		

5.3 SET1 Initial Setting (Parameters 6.3 Initial Setting)

5ET 1. Setting Mode Selection Screen
1

↓Mode Key
_1nP 2. Setting of Input Type
00

↓Mode Key
_PuG 3. Setting of Gain of PV Correction
1.00

↓Mode Key
_Pu5 4. Setting of Zero Point of PV Correction
0

↓Mode Key
_PdF 5. Setting of Input Filter
0.0

↓Mode Key
_dP 6. Setting of Decimal Point
0

↓Mode Key
_Fv 7. Setting of Function Key Function
0

↓Mode Key
_LoC 8. Setting of Key Lock
0

↓Mode Key
Back to 1.

Symbol*	W/O Dec. Point	W/ Decimal Point
00 Thermo-couple K	-200 ~ 1372	-199.9 ~ 990.0
01 Thermo-couple J	-200 ~ 850	-199.9 ~ 850.0
02 Thermo-couple R	0 ~ 1700	-----
03 Thermo-couple T	-200 ~ 400	-199.9 ~ 400.0
04 Thermo-couple N	-200 ~ 1300	-199.9 ~ 990.0
05 Thermo-couple S	0 ~ 1700	-----
06 Thermo-couple B	0 ~ 1800	-----
10 Pt100	-199 ~ 500	-199.9 ~ 500.0
11 JPt100	-199 ~ 500	-199.9 ~ 500.0
20 DC0-5V	SLL~SLH	
21 DC1-5V		
22 DC4-20mA		

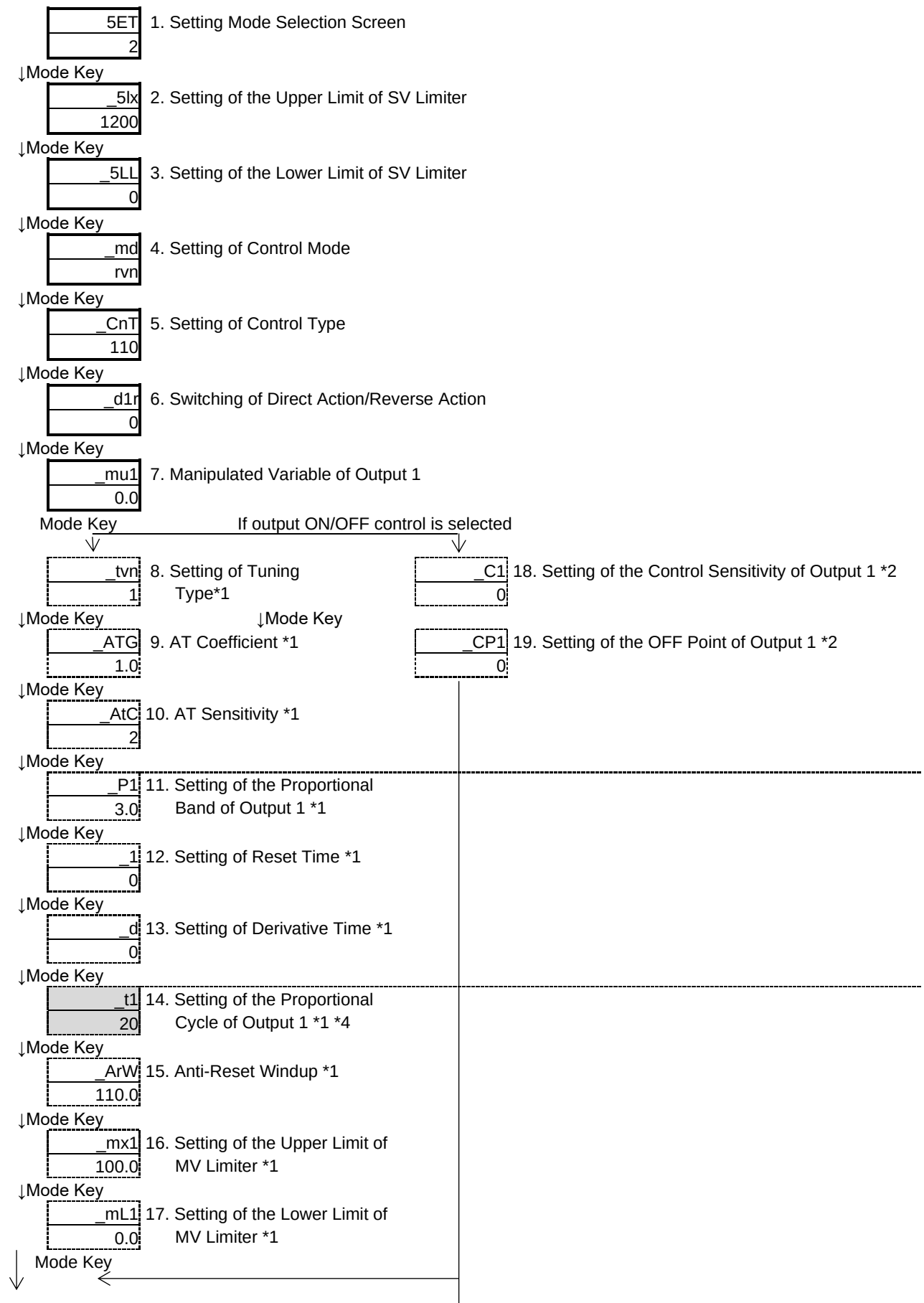
0	OFF
1	Digit Shifting Key
2	RUN/READY Key
3	AT Key
4	Timer Start/Reset

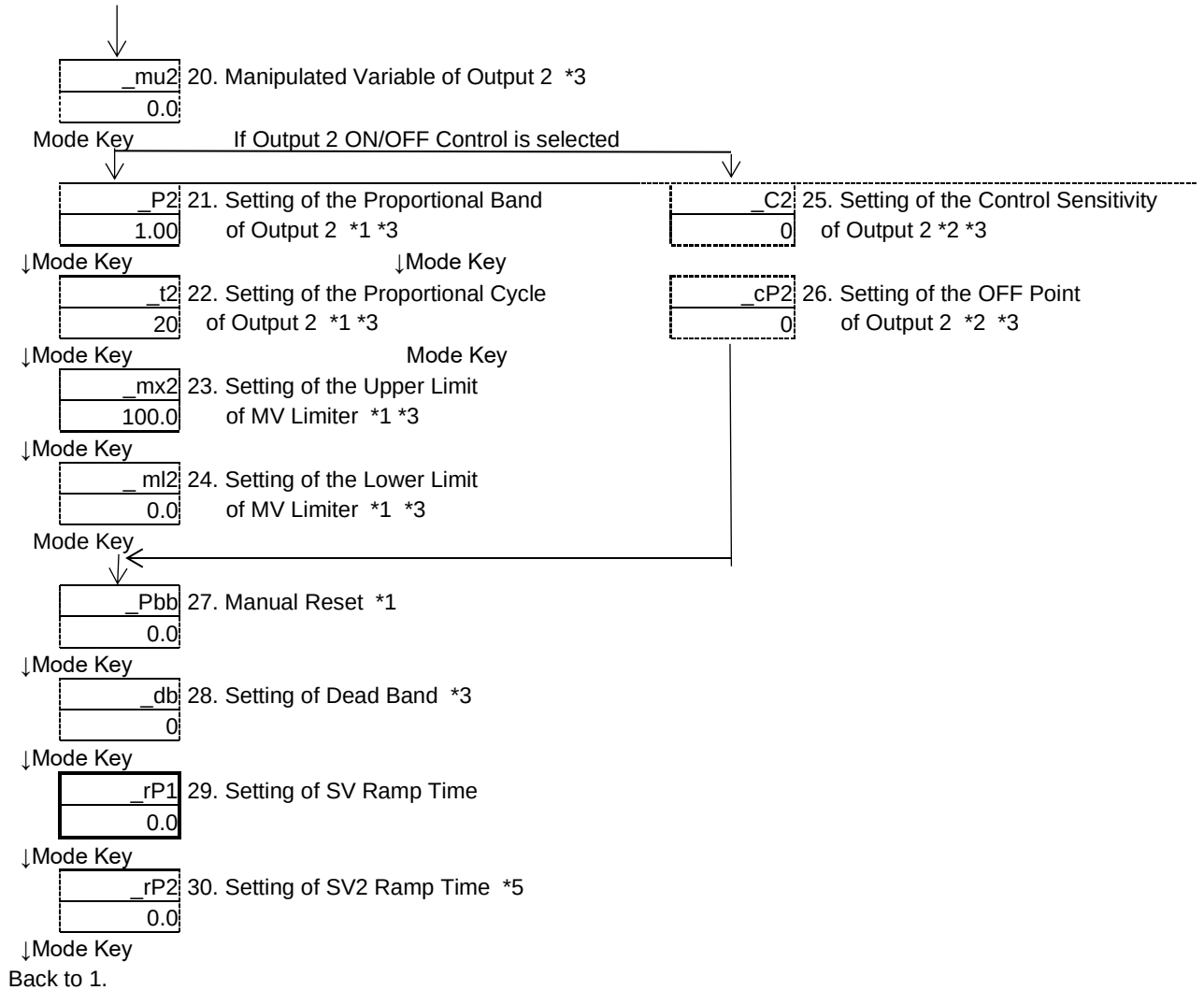
0	OFF
1	Lock ALL
2	Lock Operation Mode
3	Lock All Modes Except Operation Mode

Parameters _PuG and _Fv are hidden in the delivery state by means of [Blind Setting Mode](#)

- * Value 00 ... 11 of parameter _1nP are available with type TTM00xW-0-x-AB-x-x, only
Value 20 ... 22 of parameter _1nP are available with type TTM00xW-2-x-AB-x-x, only

5.4 SET2 Control (Parameters 6.4 Control)

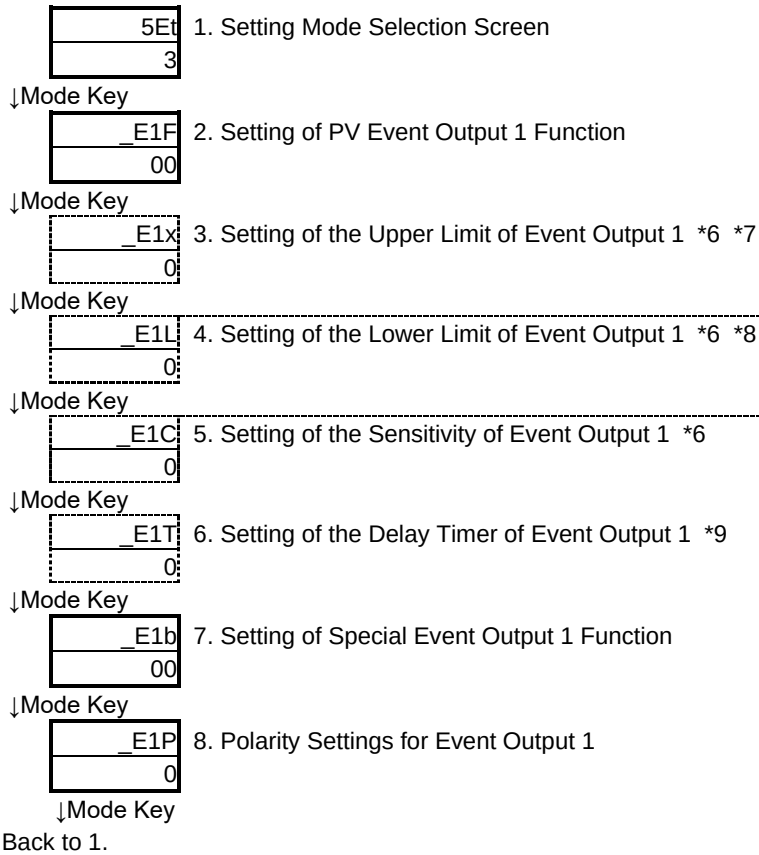




Parameters are hidden in the delivery state by means of [Blind Setting Mode](#)

- *1 This will not be displayed at ON/OFF Control
- *2 This will not be displayed at PID Control.
- *3 This will be only displayed in 3-point controller configuration ($_CnT= 011 / 111$)
- *4 This will not be displayed if device Output 1 is analogue (TTM00xW-x-I-AB-x-x).
- *5 This will not be displayed when DI Input is not included in the designation of the model or when the setting of the allocation of the DI function is other than SV2 (Set Point 2).

5.5 SET3 Event Output 1 (Parameters 6.5 Event Output 1/2)



- *6 This will not be displayed if the Measurement Value (PV) Event Output function will not be used.
- *7 This will not be displayed if the Measurement Value (PV) Event Output function will not be used at the upper limit alarm.
- *8 This will not be displayed if the Measurement Value (PV) Event Output function will not be used at the lower limit alarm.
- *9 This will not be displayed if the Measurement Value (PV) Event Output function/Special Event Output will not be used.

5.6 SET4 Event Output 2 (Parameters 6.5 Event Output 1/2)

Only visible if OUT 2 has been configured as alarm output (5ET2; _Cnt = __3)

- 5Et
4

1. Setting Mode Selection Screen
- ↓Mode Key

E2F
00

2. Setting of PV Event Output 2 Function
- ↓Mode Key

E2x
0

3. Setting of the Upper Limit of Event Output 2 *11 *12
- ↓Mode Key

E2L
0

4. Setting of the Lower Limit of Event Output 2 *11 *13
- ↓Mode Key

E2C
0

5. Setting of the Sensitivity of Event Output 2 *11
- ↓Mode Key

E2t
0

6. Setting of the Delay Timer of Event Output 2 *14
- ↓Mode Key

E2b
00

7. Setting of Special Event Output 2 Function
- ↓Mode Key

E2P
0

8. Polarity Settings for Event Output 2
- ↓Mode Key

Back to 1.

*11 This will not be displayed when Event Output 2 function will not be used.

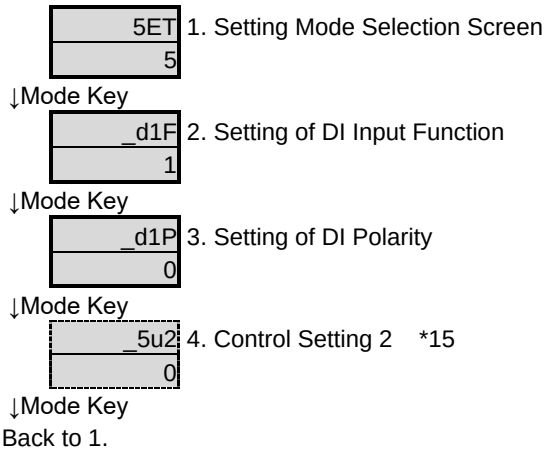
*12 This will not be displayed when Event Output 2 function will not be used at the upper limit alarm.

*13 This will not be displayed when Event Output 2 function will not be used at the lower limit alarm.

*14 This will not be displayed when Event Output 2 function/Special Event Output will not be used.

5.7 SET5 DI Input (Parameters 6.6 DI Input)

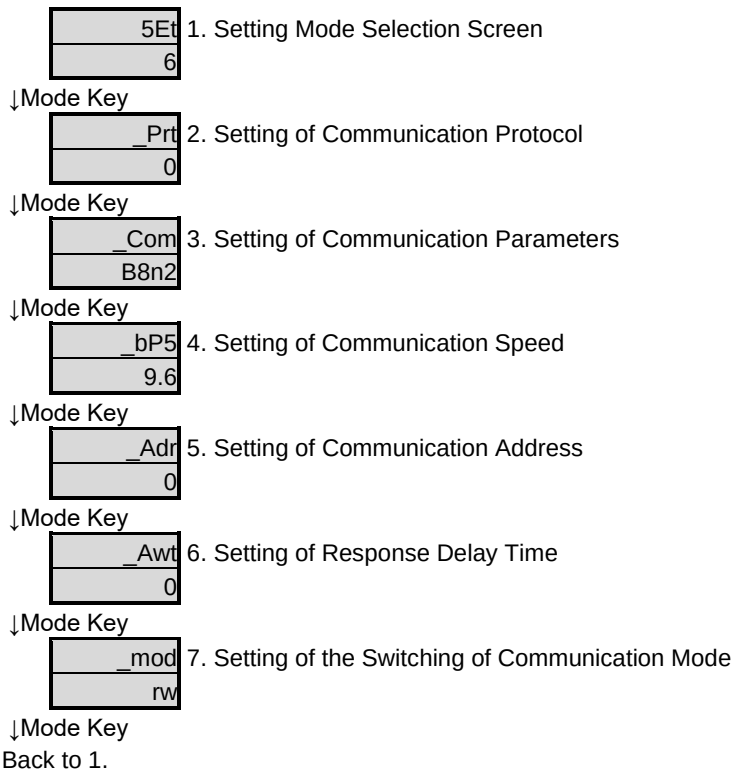
Only available in order option ME



*15 This will not be displayed when the SV Switching function is not used.

5.8 SET6 Communication (Parameters 6.7 Communication)

Only available in order option ME



5.9 SET7 Timer (Parameters 6.8 Timer)

Factory-hidden, see [Blind Setting Mode](#) for release.

- 5Et
7

1. Setting Mode Selection Screen

↓Mode Key
 - _tmo
0

2. Setting of Timer Output Destination

↓Mode Key
 - _tmF
1

3. Setting of Timer Function *16

↓Mode Key
 - _x¹m
1

4. Switching of Timer Unit *16

↓Mode Key
 - _t5u
0

5. Setting of Timer SV Start Permission Range *16 *17

↓Mode Key
 - _t1m
0.00

6. Setting of Timer *16

↓Mode Key
 - _t1A

7. Setting of Timer Remaining Time Monitor *16

↓Mode Key
- Back to 1.

*16 This will not be displayed when "Timer OFF" is selected ($_tmo = 0$).

*17 This will not be displayed when "SV Start" is not selected ($_tmF=7$).

6 Parameters

6.1 Operation Mode

No.	Character	Name	Description	Initial Value
		Operation Mode	Mode typically used by PV/SV	
1		Control Setting	Setting Range: 5LL ~ 5Lx Setting Unit: °C (Thermocouple / Resistance Temperature Detector Input Model) digit (Current & Voltage Input Model)	0
2		Priority Screen 1	Displays the screen that is set at Priority Screen.	
3		Priority Screen 2		
4		Priority Screen 3		
5		Priority Screen 4		
6		Priority Screen 5		
7		Priority Screen 6		
8		Priority Screen 7		
9		Priority Screen 8		
10		Priority Screen 9		

6.2 Priority Screen

No.	Character	Name	Description	Initial Value
1	5Et 0	Setting Mode Selection Screen Priority Screen Setting	Settings of the Priority Screen.	
2	Pr11	Setting of Priority Screen 1	Sets the parameter to be displayed on a priority screen	oFF
3	Pr12	Setting of Priority Screen 2		
4	Pr13	Setting of Priority Screen 3		
5	Pr14	Setting of Priority Screen 4		
6	Pr15	Setting of Priority Screen 5		
7	Pr16	Setting of Priority Screen 6		
8	Pr17	Setting of Priority Screen 7		
9	Pr18	Setting of Priority Screen 8		
10	Pr19	Setting of Priority Screen 9		

6.3 Initial Setting

[illegible]

No.	Character	Name	Description	Initial Value	
7	_FV	Function Key Function Settings	0	No function	0
			1	Digit Shifting Key	
			2	RUN/READY Key	
			3	AT Key	
			4	Start/Reset Timer	
8	_LOC	Key Lock Settings	0	OFF	0
			1	Lock All	
			2	Lock Operation Mode	
			3	Lock All Modes Except for Operation Mode	

6.4 Control

No.	Character	Name	Description	Initial Value																										
1	5Et 2	Setting Mode Selection Screen Control Setting Mode	Settings of the Control Constant.																											
2	_5LX	Setting of the Maximum Limit of SV Limiter	Thermocouple/Resistance Temperature Detector model Setting Range: Lower limit setting range-Upper limit setting range. Provided that its difference from the lower limit of the SV limiter is 50 digits or greater. Setting Unit: °C	1200																										
			Current and Voltage model Setting Range: -1999-9999 (Decimal point is at the designated position). Provided that its difference from the lower limit of the SV limiter is 50 digits or greater. Setting Unit: digit	9000																										
3	_5LL	Setting of the Minimum Limit of SV Limiter	Setting Range: Lower limit setting range-Upper limit setting range Provided that its difference from the maximum limit of the SV limiter is 50 digits or greater. Setting Unit: °C	0																										
			Current and Voltage model Setting Range: -1999-9999 (Decimal point is at the designated position). Provided that its difference from the upper limit of the SV limiter is 50 digits or greater. Setting Unit: digit	-1000																										
4	_md	Control Mode	To be used for the setting of control mode. rvn: Execute the Control rdy: Stop the Control (Lower limit Output of the MV Limiter) mAn: Manual Control	rvn																										
5	_Cnt	Setting of Control Type	<table border="1"><tr><td colspan="2">Cnt</td></tr><tr><td colspan="2">※ ☆ *</td></tr></table> Function <table border="1"><tr><td>※ □ □</td><td>Type</td></tr><tr><td>0 □ □</td><td>TYPE A</td></tr><tr><td>1 □ □</td><td>TYPE B (Overshoot Control Function)</td></tr></table> Control Type of Output 1 <table border="1"><tr><td>□ ☆ □</td><td>Type</td></tr><tr><td>□ 1 □</td><td>PID Control</td></tr><tr><td>□ 2 □</td><td>ON/OFF Control</td></tr></table> Control Type of Output 2 <table border="1"><tr><td>□ □ *</td><td>Type</td></tr><tr><td>□ □ 0</td><td>OFF</td></tr><tr><td>□ □ 1</td><td>PID Control</td></tr><tr><td>□ □ 2</td><td>ON/OFF Control</td></tr><tr><td>□ □ 3</td><td>Event Output</td></tr></table>	Cnt		※ ☆ *		※ □ □	Type	0 □ □	TYPE A	1 □ □	TYPE B (Overshoot Control Function)	□ ☆ □	Type	□ 1 □	PID Control	□ 2 □	ON/OFF Control	□ □ *	Type	□ □ 0	OFF	□ □ 1	PID Control	□ □ 2	ON/OFF Control	□ □ 3	Event Output	113
Cnt																														
※ ☆ *																														
※ □ □	Type																													
0 □ □	TYPE A																													
1 □ □	TYPE B (Overshoot Control Function)																													
□ ☆ □	Type																													
□ 1 □	PID Control																													
□ 2 □	ON/OFF Control																													
□ □ *	Type																													
□ □ 0	OFF																													
□ □ 1	PID Control																													
□ □ 2	ON/OFF Control																													
□ □ 3	Event Output																													

No.	Character	Name	Description	Initial Value										
6	_d1r	Switching of Direct Action / Reverse Action	<table><tr><td>0</td><td>Reverse Action (heating)</td></tr><tr><td>1</td><td>Direct Action (cooling)</td></tr></table>	0	Reverse Action (heating)	1	Direct Action (cooling)	0						
0	Reverse Action (heating)													
1	Direct Action (cooling)													
7	_mu1	Manipulated Variable of Output 1	It shall be used to monitor the manipulated variable of Output 1 and to set the manipulated variable during manual control. Display Range: 0.0-100.0% (-10.0-110.0%) Setting Range: Lower Limit-Upper Limit of the MV Limiter () is for the current output model	0.0										
8	_tvn	Setting of Tuning Type	<table><tr><td>1</td><td>Auto Tuning: Output 1</td></tr><tr><td>2</td><td>Self Tuning: Output 1</td></tr><tr><td>3</td><td>Auto Tuning: Output 2</td></tr><tr><td>4</td><td>Self Tuning: Output 2</td></tr><tr><td>5</td><td>Auto Tuning: Output 1/Output 2</td></tr></table> Auto tuning will be activated by selecting 1/ 3 / 5 and pressing the FUNC key once. To deactivate, press the FUNC key once while auto tuning is active.	1	Auto Tuning: Output 1	2	Self Tuning: Output 1	3	Auto Tuning: Output 2	4	Self Tuning: Output 2	5	Auto Tuning: Output 1/Output 2	1
1	Auto Tuning: Output 1													
2	Self Tuning: Output 1													
3	Auto Tuning: Output 2													
4	Self Tuning: Output 2													
5	Auto Tuning: Output 1/Output 2													
9	_AtG	AT Coefficient	Setting Range: 0.1-10.0 Setting Unit: Times	1.0										
10	_ATC	AT Sensitivity Is set up during ON/OFF control at auto-tuning, particularly when PV is fairly unstable	Thermocouple / Resistance Temperature Detector Input Model Setting Range: 0-999 or 0.0-999.9 Setting Unit: °C	2										
			Current and Voltage Input Model Setting Range: 0-9999 (Decimal point is at the designated position) Setting Unit: digit	20										
11	_P1	Setting of the Proportional Band of Output 1	Setting Range: 0.1-200.0% Setting Unit: % against configured measuring range	3.0										
12	_1	Setting of Reset Time	Setting Range: 0-3600 seconds	0										
13	_d	Setting of Derivative Time	Setting Range: 0-3600 seconds	0										
14	_t1	Setting of the Proportional Cycle of Output 1	Setting Range: 1-120 seconds	20										
15	_Arw	15. Anti-Reset Windup Takes effect of overshooting by over-integral of PID control action.	Setting Range: 0.0-110.0 Setting Unit: %	110.0										

No.	Character	Name	Description	Initial Value
16	_mx1	Setting of the Maximum Limit of MV Limiter	Setting Range: Minimum Limit of the MV Limiter-100.0% (110.0%) () is for current output model	100.0
17	_mL1	Setting of the Minimum Limit of MV Limiter	Setting Range: 0.0%(-10.0%)-Maximum Limit of MV Limiter () is for current output model	0.0
18	_C1	Setting of the Control Sensitivity of Output 1	Thermocouple / Resistance Temperature Detector Input Model Setting Range: 0-999 or 0.0-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: 0-9999 (Decimal point is at the designated position) Setting Unit: digit	0
19	_C P1	Setting of the OFF Point of Output 1	Thermocouple / Resistance Temperature Detector Input Model Setting Range: -199-999 or -199.9-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: -1999-9999 (Decimal point is at the designated position) Setting Unit: digit	0
20	_mu2	Manipulated Variable of Output 2	It shall be used to monitor the manipulated variable of Output 2 and to set the manipulated variable during manual control. Display Range: 0.0-100.0% Setting Range: Lower Limit-Higher Limit of the MV Limiter	0.0
21	_P2	Setting of the Proportional Band of Output 2	Setting Range: 0.10-10.00 times Setting Unit: Magnification for Output 1 proportional band	1.00
22	_t2	Setting of the Proportional Cycle of Output 2	Setting Range: 1-120 seconds	20
23	_mx2	Setting of the Maximum Limit of MV Limiter (Output 2)	Setting Range: Lower Limit of the MV Limiter-100.0%	100.0
24	_mL2	Setting of the Minimum Limit of MV Limiter (Output 2)	Setting Range: 0.0%-Upper Limit of the MV Limiter	0.0
25	_C 2	Setting of the Control Sensitivity of Output 2	Thermocouple / Resistance Temperature Detector Input Model Setting Range: 0-999 or 0.0-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: 0-9999 (Decimal point is at the designated position) Setting Unit: digit	0

No.	Character	Name	Description	Initial Value
26	_CP2	Setting of the OFF Point of Output 2	Thermocouple / Resistance Temperature Detector Input Model Setting Range: -199-999 or -199.9-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: -1999-9999 (Decimal point is at the designated position) Setting Unit: digit	0
27	_Pbb	Manual Reset	Setting Range: 0.0-100.0 -100.0-100.0 (heat/cool) Setting Unit: %	0.0
28	_db	Setting of Dead Band	Thermocouple/Resistance Temperature Detector Input Model Setting Range: -100-100 or -100.0-100.0 Setting Unit: °C Current and Voltage Input Model Setting Range: -1000-1000 (Decimal point is at the designated position) Setting Unit: digit	0
29	_rP1	Setting of the SV Ramp Time	Setting Range: 0.0-999.9 Setting Unit: 0.1°C/minute (Thermocouple/Resistance Temperature Detector Input Model) 0.1 digit/minute (Analog input model) Ramp function will be turned OFF if _rP1 = 0.0	0.0
30	_rP2	Setting of the SV2 Ramp Time	Setting Range: 0.0-999.9 Setting Unit: 0.1°C/minute (Thermocouple/Resistance Temperature Detector Input Model) 0.1 digit/minute (Analog input model) Ramp function will be turned OFF if _rP2 = 0.0 ※ This will be displayed if DI is available.	0.0

6.5 Event Output 1/2

No.	Character	Name	Description	Initial Value																														
1	5Et 3 4	Setting Mode Selection Screen EV Output 1 Setting Mode EV Output 2 Setting Mode	Settings of the Event Output 1 Function. Settings of the Event Output 2 Function.																															
2	_E□F	Setting of Event Output □ Function (PV Event)	E□F ①② PV Event Function <table><tr><td>②</td><td>Type</td></tr><tr><td>0</td><td>OFF</td></tr><tr><td>1</td><td>Upper & Lower Limit Deviation, 1 – 0 – 1</td></tr><tr><td>2</td><td>Upper Limit Deviation, 0 – 1</td></tr><tr><td>3</td><td>Lower Limit Deviation, 1 – 0</td></tr><tr><td>4</td><td>Deviation Range, 0 – 1 – 0</td></tr><tr><td>5</td><td>Upper & Lower Limits, 1 – 0 – 1, absolute</td></tr><tr><td>6</td><td>Upper Limit, 0 – 1, absolute</td></tr><tr><td>7</td><td>Lower Limit, 1 – 0, absolute</td></tr><tr><td>8</td><td>Range, 0 – 1 – 0, absolute</td></tr></table> Additional Function <table><tr><td>①</td><td>Type</td></tr><tr><td>0</td><td>OFF</td></tr><tr><td>1</td><td>Keep</td></tr><tr><td>2</td><td>Standby Sequence</td></tr><tr><td>3</td><td>Keep + Standby Sequence</td></tr></table>	②	Type	0	OFF	1	Upper & Lower Limit Deviation, 1 – 0 – 1	2	Upper Limit Deviation, 0 – 1	3	Lower Limit Deviation, 1 – 0	4	Deviation Range, 0 – 1 – 0	5	Upper & Lower Limits, 1 – 0 – 1, absolute	6	Upper Limit, 0 – 1, absolute	7	Lower Limit, 1 – 0, absolute	8	Range, 0 – 1 – 0, absolute	①	Type	0	OFF	1	Keep	2	Standby Sequence	3	Keep + Standby Sequence	00
②	Type																																	
0	OFF																																	
1	Upper & Lower Limit Deviation, 1 – 0 – 1																																	
2	Upper Limit Deviation, 0 – 1																																	
3	Lower Limit Deviation, 1 – 0																																	
4	Deviation Range, 0 – 1 – 0																																	
5	Upper & Lower Limits, 1 – 0 – 1, absolute																																	
6	Upper Limit, 0 – 1, absolute																																	
7	Lower Limit, 1 – 0, absolute																																	
8	Range, 0 – 1 – 0, absolute																																	
①	Type																																	
0	OFF																																	
1	Keep																																	
2	Standby Sequence																																	
3	Keep + Standby Sequence																																	
3 4	_E□x _E□L	Event Output □ Upper Limit Setting Event Output □ Lower Limit Setting	Thermocouple/Resistance Temperature Detector Input Model Setting Range: -1999-3276 or -199.9-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: -1999-9999 (Decimal point is at the designated position) Setting Unit: digit	0																														
5	_E□C	Setting of Event Output □ Sensitivity	Input Type of Thermocouple/Resistance Temperature Detector Setting Range: 0-999 or 0.0-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: 0-9999 (Decimal point is at the designated position) Setting Unit: digit	0																														
6	_E□t	Event Output □ Delay Timer Setting	Setting Range: 0-9999 seconds	0																														

No.	Character	Name	Description	Initial Value
7	_E□b	Event Output □ Function (Special)	_E□b ①② ② Type 0 OFF 1 PV Abnormality (break of sensor) Additional Function ① Type 0 OFF 1 Keep (Power reset)	00
8	_E□P	Event Output □ Polarity Setting	_E□P ① ① Type 0 Normal Open 1 Normal Close	0

6.6 DI Input

No.	Character	Name	Description	Initial Value																															
1	5Et 5	Setting Mode Selection Screen DI Input Setting Mode	Setting of the DI Function.																																
2	_d1F	DI Function Allocation	<table><tr><td colspan="3"><table><tr><td></td><td>d1F</td></tr><tr><td></td><td>①</td></tr></table></td></tr><tr><td>①</td><td>Not Active</td><td>Active</td></tr><tr><td>1</td><td>SV</td><td>SV2</td></tr><tr><td>2</td><td>RUN</td><td>READY</td></tr><tr><td>3</td><td>Auto</td><td>Manual</td></tr><tr><td>4</td><td>Reverse Action</td><td>Direct Action</td></tr><tr><td>5</td><td></td><td>Start Auto Tuning</td></tr><tr><td>6</td><td>Reverse Action SV</td><td>Direct Action SV2</td></tr><tr><td>7</td><td></td><td>Timer Start/Reset</td></tr></table>	<table><tr><td></td><td>d1F</td></tr><tr><td></td><td>①</td></tr></table>				d1F		①	①	Not Active	Active	1	SV	SV2	2	RUN	READY	3	Auto	Manual	4	Reverse Action	Direct Action	5		Start Auto Tuning	6	Reverse Action SV	Direct Action SV2	7		Timer Start/Reset	1
<table><tr><td></td><td>d1F</td></tr><tr><td></td><td>①</td></tr></table>				d1F		①																													
	d1F																																		
	①																																		
①	Not Active	Active																																	
1	SV	SV2																																	
2	RUN	READY																																	
3	Auto	Manual																																	
4	Reverse Action	Direct Action																																	
5		Start Auto Tuning																																	
6	Reverse Action SV	Direct Action SV2																																	
7		Timer Start/Reset																																	
3	_d1P	DI Polarity	<table><tr><td colspan="2"><table><tr><td></td><td>d1P</td></tr><tr><td></td><td>①</td></tr></table></td></tr><tr><td>①</td><td>Polarity</td></tr><tr><td>0</td><td>Close Active</td></tr><tr><td>1</td><td>Open Active</td></tr></table>	<table><tr><td></td><td>d1P</td></tr><tr><td></td><td>①</td></tr></table>			d1P		①	①	Polarity	0	Close Active	1	Open Active	0																			
<table><tr><td></td><td>d1P</td></tr><tr><td></td><td>①</td></tr></table>			d1P		①																														
	d1P																																		
	①																																		
①	Polarity																																		
0	Close Active																																		
1	Open Active																																		
4	_5u2	Control Setting 2	Input Type of Thermocouple/Resistance Temperature Detector Setting Range: 5LL ~ 5Lx Setting Unit: °C Current and Voltage Input Model Setting Range: 5LL ~ 5Lx Setting Unit: digit	0																															

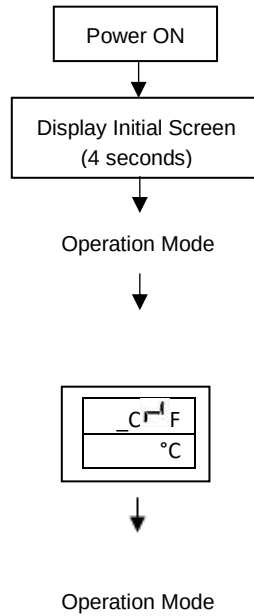
6.7 Communication

No.	Character	Name	Description	Initial Value																														
1	5Et 6	Setting Mode Selection Screen	Setting of the communication parameter.																															
2	_Prt	Setting of Communication Protocol	<table><tr><td>0</td><td>Dedicated Protocol</td></tr><tr><td>1</td><td>MODBUS (RTU)</td></tr><tr><td>2</td><td>MODBUS (ASCII)</td></tr></table>	0	Dedicated Protocol	1	MODBUS (RTU)	2	MODBUS (ASCII)	0																								
0	Dedicated Protocol																																	
1	MODBUS (RTU)																																	
2	MODBUS (ASCII)																																	
3	_Com	Setting of Communication Parameters	<table><tr><td>Com</td><td></td></tr><tr><td>※※☆☆</td><td></td></tr></table> BCC Checking Function <table><tr><td>※□□□</td><td>Type</td></tr><tr><td>n□□□</td><td>OFF</td></tr><tr><td>b□□□</td><td>ON</td></tr></table> Selection of Data Length <table><tr><td>□*□□</td><td>Type</td></tr><tr><td>□7□□</td><td>7 bit</td></tr><tr><td>□8□□</td><td>8 bit</td></tr></table> Parity Check Function <table><tr><td>□□☆☆</td><td>Type</td></tr><tr><td>□□n□</td><td>OFF</td></tr><tr><td>□□o□</td><td>Odd</td></tr><tr><td>□□E□</td><td>Even</td></tr></table> Stopbit Length Function <table><tr><td>□□□★</td><td>Type</td></tr><tr><td>□□□1</td><td>1 bit</td></tr><tr><td>□□□2</td><td>2 bits</td></tr></table> • If MODBUS (RTU) is selected: Only 8n2, 8o1 and 8e1 can be selected. • If MODBUS (ASCII) is selected: Only 7n2, 7o1 and 7e1 can be selected. BCC checking will be disabled.	Com		※※☆☆		※□□□	Type	n□□□	OFF	b□□□	ON	□*□□	Type	□7□□	7 bit	□8□□	8 bit	□□☆☆	Type	□□n□	OFF	□□o□	Odd	□□E□	Even	□□□★	Type	□□□1	1 bit	□□□2	2 bits	B8n2
Com																																		
※※☆☆																																		
※□□□	Type																																	
n□□□	OFF																																	
b□□□	ON																																	
□*□□	Type																																	
□7□□	7 bit																																	
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□□n□	OFF																																	
□□o□	Odd																																	
□□E□	Even																																	
□□□★	Type																																	
□□□1	1 bit																																	
□□□2	2 bits																																	
4	_bP5	Setting of Communication Speed	<table><tr><td>1.2</td><td>1200bps</td></tr><tr><td>2.4</td><td>2400bps</td></tr><tr><td>4.8</td><td>4800bps</td></tr><tr><td>9.6</td><td>9600bps</td></tr><tr><td>19.2</td><td>19200bps</td></tr></table>	1.2	1200bps	2.4	2400bps	4.8	4800bps	9.6	9600bps	19.2	19200bps	9.6																				
1.2	1200bps																																	
2.4	2400bps																																	
4.8	4800bps																																	
9.6	9600bps																																	
19.2	19200bps																																	
5	_Adr	Communication Address Setting	Setting Range: Dedicated Protocol・・・1-99 stations MODBUS・・・1-247 stations	1																														
6	_Awt	Setting of Response Delay Time	Setting Range: 0-250ms	0																														
7	_mod	Setting of the Switching of Communication Mode	<table><tr><td>R0</td><td>Communication R is available.</td></tr><tr><td>rw</td><td>Communication RW is available.</td></tr></table> Switching is disabled in MODBUS mode.	R0	Communication R is available.	rw	Communication RW is available.	rw																										
R0	Communication R is available.																																	
rw	Communication RW is available.																																	

6.8 Timer

No.	Character	Name	Description	Initial Value																
1	Set 7	Setting Mode Selection Screen Timer Setting Mode	Setting of the timer parameter.																	
2	_tmo	Setting of Timer Output Destination	<table><tr><td></td><td>Type of Output Destination</td></tr><tr><td>0</td><td>Timer OFF</td></tr><tr><td>1</td><td>Control</td></tr><tr><td>2</td><td>Event 1 Output</td></tr></table>		Type of Output Destination	0	Timer OFF	1	Control	2	Event 1 Output	0								
	Type of Output Destination																			
0	Timer OFF																			
1	Control																			
2	Event 1 Output																			
3	_tmF	Setting of Timer Function	<table><tr><td></td><td>Type</td></tr><tr><td>1</td><td>Auto Start (ON Delay)</td></tr><tr><td>2</td><td>Manual Start (ON Delay)</td></tr><tr><td>3</td><td>Event Start (ON Delay)</td></tr><tr><td>4</td><td>Auto Start (OFF Delay)</td></tr><tr><td>5</td><td>Manual Start (OFF Delay)</td></tr><tr><td>6</td><td>Event Start (OFF Delay)</td></tr><tr><td>7</td><td>SV Start (OFF Delay)</td></tr></table>		Type	1	Auto Start (ON Delay)	2	Manual Start (ON Delay)	3	Event Start (ON Delay)	4	Auto Start (OFF Delay)	5	Manual Start (OFF Delay)	6	Event Start (OFF Delay)	7	SV Start (OFF Delay)	1
	Type																			
1	Auto Start (ON Delay)																			
2	Manual Start (ON Delay)																			
3	Event Start (ON Delay)																			
4	Auto Start (OFF Delay)																			
5	Manual Start (OFF Delay)																			
6	Event Start (OFF Delay)																			
7	SV Start (OFF Delay)																			
4	_x ¹ m	Switching of Timer Unit	<table><tr><td>1</td><td>Hr. & Min.</td></tr><tr><td>2</td><td>Min. & Sec.</td></tr></table>	1	Hr. & Min.	2	Min. & Sec.	1												
1	Hr. & Min.																			
2	Min. & Sec.																			
5	_t5u	Timer SV Start Permission Range Setting	Input Type of Thermocouple/Resistance Temperature Detector Setting Range: 0-999 or 0.0-999.9 Setting Unit: °C Current and Voltage Input Model Setting Range: 0-9999 (Decimal point is at the designated position) Setting Unit: digit	0																
6	_t1M	Timer Time Setting	Setting Range: 00:00-99:59 (Hr. and Min.) 00:00-99:59 (Min. and Sec.)	00.00																
7	_t1A	Timer Remaining Time Monitor	Monitoring of remaining time Pressing the FUNC key once at this screen will start the timer.																	

7 Change of temperature unit °C / °F



When the power is turned ON, "Input Type screen" will be displayed for 4 seconds before moving to "Operation Mode"

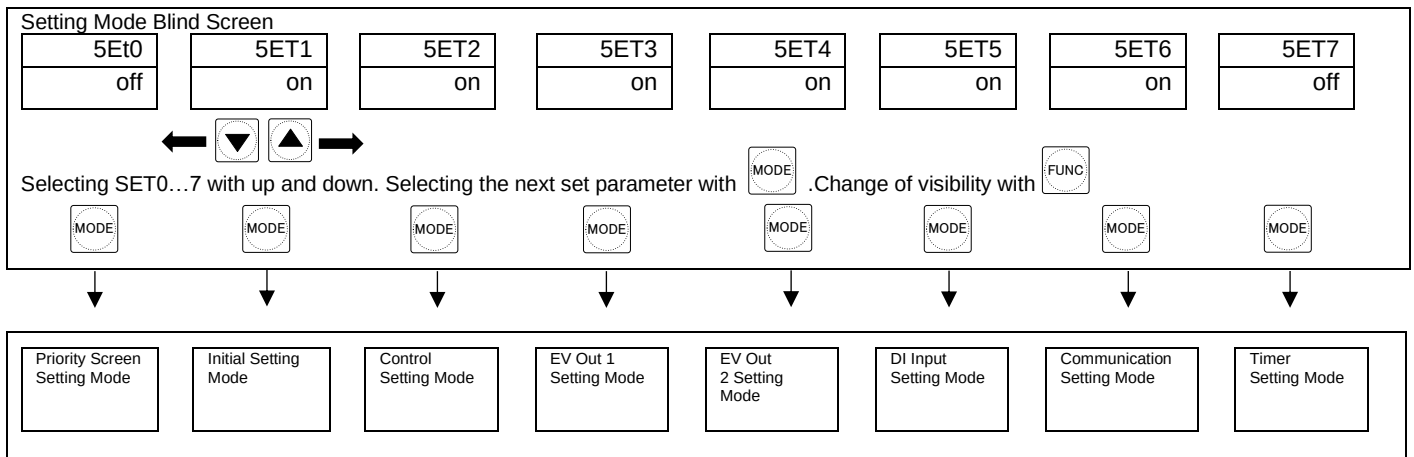
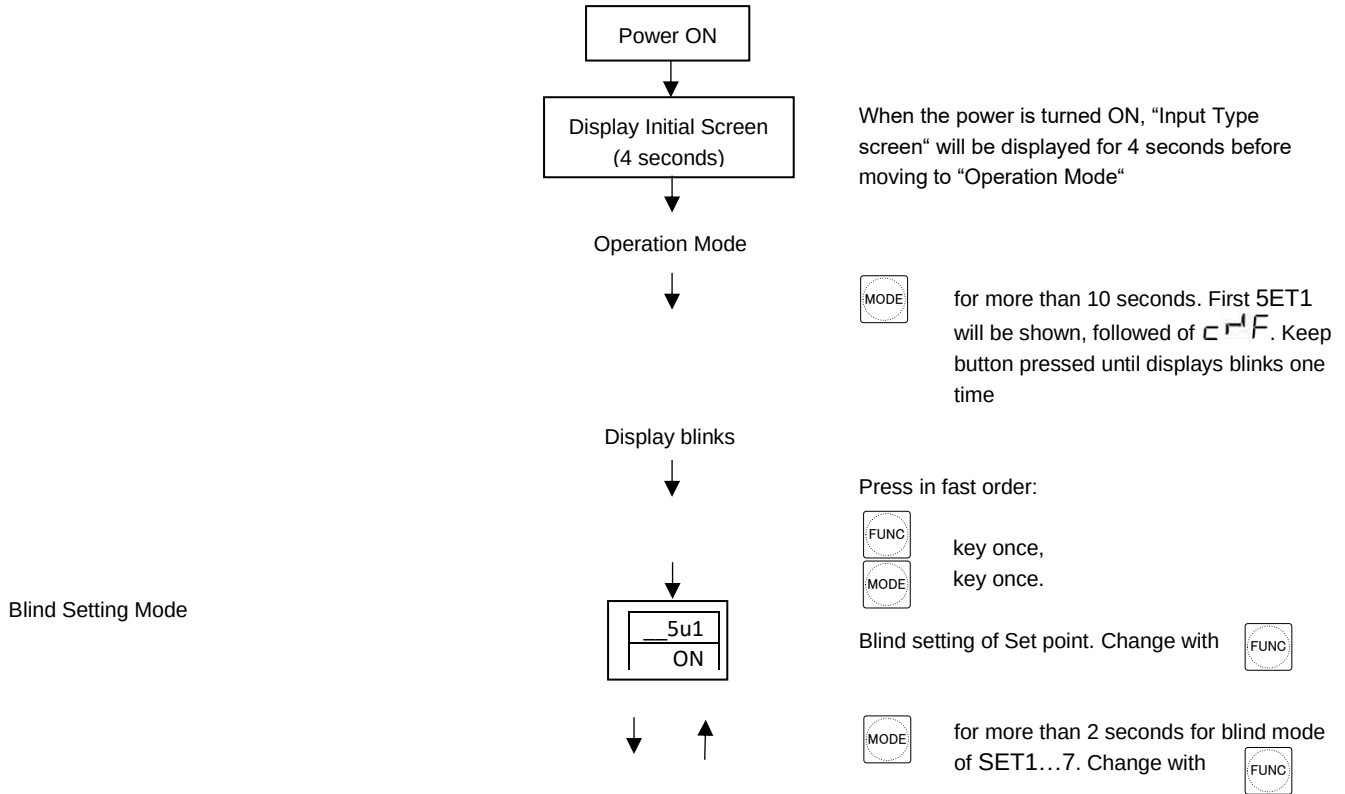
 for more than 5 seconds. First 5ET1 will be shown. Keep button pressed until parameter for changing temperature unit appears.

Change with 

 for more than 3 seconds to return to operations mode

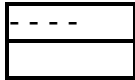
8 Blind Setting Mode

With blind-mode-function, parameter sets (5ET0...7) or individual parameters from the configuration level can be hide to the user.



- In blind setting mode. "ON" and "OFF" will be displayed under each character (Set Point display area).
- "ON" to display and "OFF" to hide (blind).
- The FUNC key can switch "ON" and "OFF". Press mode key to change these setting item under the blind mode (the same procedure as that in the ordinary mode).
- To end the blind mode turn the power OFF.

9 Other Displays



This will be displayed when the input exceeds the upper limit of the display range.

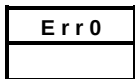
This will be displayed when the thermocouple is disconnected.

This will be displayed when any of ABb terminals of resistance temperature detector is disconnected.



This will be displayed when the input drops below the lower limit of the display range.

This will be displayed when DC1-5V 4-20mA input is disconnected.



This will be displayed when memory error occurs.

Repair is required if the error appears again when the power is turned ON.

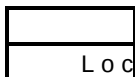


This will be displayed when the resistance temperature detector is connected while the thermocouple is being set and when A/D error occurs.

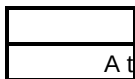
Repair is required if the error appears again when the setting is changed or power is turned ON.



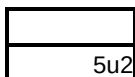
This will be displayed when auto tuning error occurs.



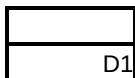
This will be displayed when the user tries to change the parameter while the key is locked.



This will be displayed alternately with the normal screen while the auto tuning process is in progress.



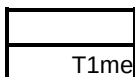
This will be displayed when the user tries to change the set value while the control mode is SV2.



This will be displayed when the user tries to change the set value that is allocated to DI input.



This will be displayed when the user tries to change the setting value at the control mode screen while the function key is being assigned to RUN/READY.



This will be displayed when the user tries to change the control mode while the timer is being used.

10 Technical Data

Power supply	
Supply Voltage	100..240 V AC, -15%, +10% or 24 V AC/DC, ± 10 ; 50/60 Hz
Power consumption	< 10 VA @ 240 V AC
Conformity	CE
Certification	UL3121-1 (UL/CUL)
Measuring input	
Pt100	Pt100/JPt100 range -199,(9)..500,(0) °C 2- or 3-wire connection
Thermocouple	
Typ J	Fe-CuNi -200..+850/-199,9..+850,0 °C
Typ K	NiCr-Ni -200..+1372/-199,9..+990,0 °C
Typ N	NiCrSi-NiSi -200..+1300/-199,9..+990,0 °C
Typ R	PtRh-Pt87/13 0..1700°C
Typ S	PtRh-Pt90/10 0..1700°C
Typ T	Cu-CuNi -200..+400/-199,9..+400,0 °C
Typ B	Pt30Rh/Pt6Rh 0..1800 °C
Voltage	0/1..5 V DC -1999..+9999 Digit
Current	4..20 mA -1999..+9999 Digit
Sensor correction	programmable
Accuracy	$\pm 0,3 \%$ +1 Digit of the measuring range
Sampling rate	0,25 s
Output	
Electronic	0/12 V DC bistabil, max. 20 mA, > 600 Ω
Relay	Process output <250 V AC <250 VA <3 A Alarm output <250 V AC <250 VA <2,4 A
Continuous	4..20 mA, burden max. 600 Ω
Interface	
Physically	RS485
Protocol	Toho / MODBUS (RTU, ASCII)
Baud rates	1200, 2400, 4800, 9600, 19200 bps
Display	
Process value	LED 4-digit white 10 or 14 mm
Set value	LED 4-digit green 8 mm
Decimal point	programmable
Status indicator	LED red or green
Case	
Dimensions	H x B x T
TTM-004W	48x48x77 mm DIN48x48
TTM-005W	48x96x76,5 mm DIN48x96
TTM-009W	96x96x77 mm DIN96x96
Protection class	Front IP65
Terminals	Screw terminals max 2,5 mm ²

11 Ordering Code

TTM - ^{1.} - ^{2.} - ^{3.} - ^{4.} - ^{5.}

1.	Model	
	004W	DIN 48x48
	005W	DIN 48x96
	009W	DIN 96x96
2.	Input	
	0	Thermocouple; Pt100, JPt100
	2	Current, voltage
3.	Process output, OUT1	
	R	Relay, SPST
	P	Electronic bistable 0/12 V DC for SSR relay
	I	Continuous, current 4..20 mA
4.	Options	
	AB	AL1 relay SPST (standard) OUT2 / AL2 relay SPST (3-point-controller)
5.	Interface	
	0	Without interface
	ME	Serial interface RS485, 2. set value SV2, digital Input
	Supply Voltage	
	0	100...240 V AC
	5	24 V AC/DC

12 Disposal



Separation by material and recycling of device components and packaging must take place when the device is disposed of. The valid legal regulations and directives applicable at the time must be observed.

The device may not be disposed of with household waste. If the device should be disposed of, return it to us with the return shipment form filled in under the chapter "Info desk". We will then arrange for the proper disposal.

13 Service

If you have any questions, please do not hesitate to contact us:

Senseca Germany GmbH
Tenter Weg 2-8
42897 Remscheid
GERMANY
Mail: info@senseca.com
WEEE-reg. no. DE 93889386