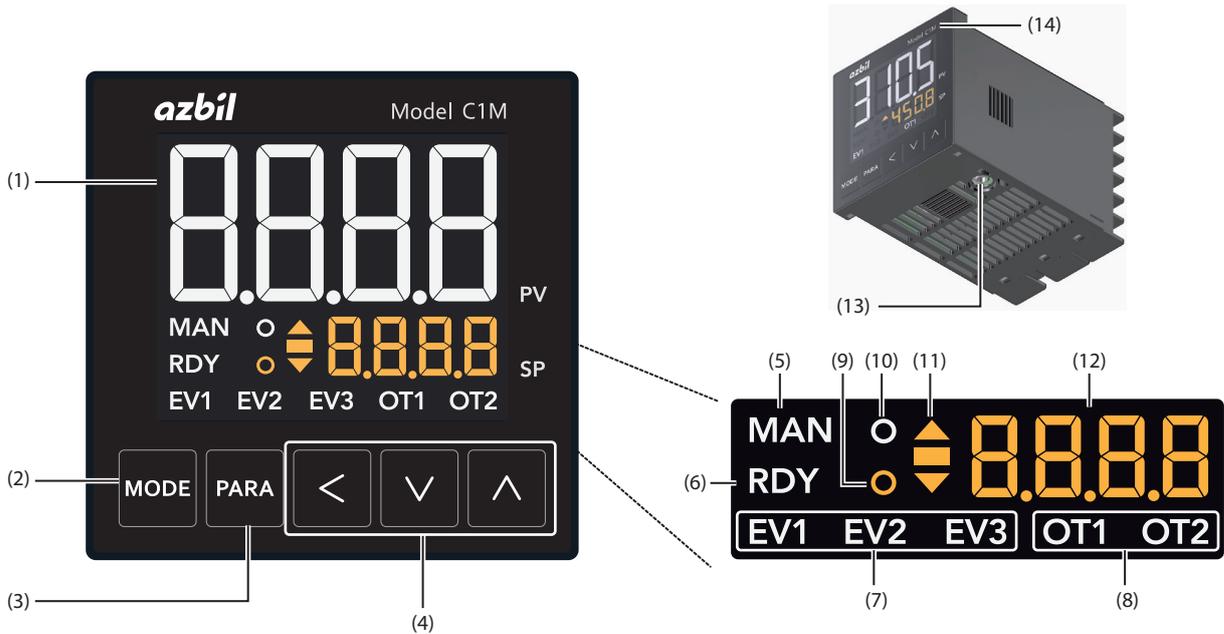


Quick Reference Guide for Model C1M

This guide offers a summary of key operations, parameter flowcharts, and settings, for convenient reference at the operation site. This guide is made for repeated use. Dirt wipes off easily and even notes written with an oil-based felt-tip pen can be removed with an eraser.

If more detailed information on model C1M is needed, refer to the user's manual for installation and configuration (CP-SP-1448E). The most convenient way to configure the C1M is with the Smart Loader Package (model No. SLP-C1FJA_). Please contact the azbil Group or a distributor for more information.



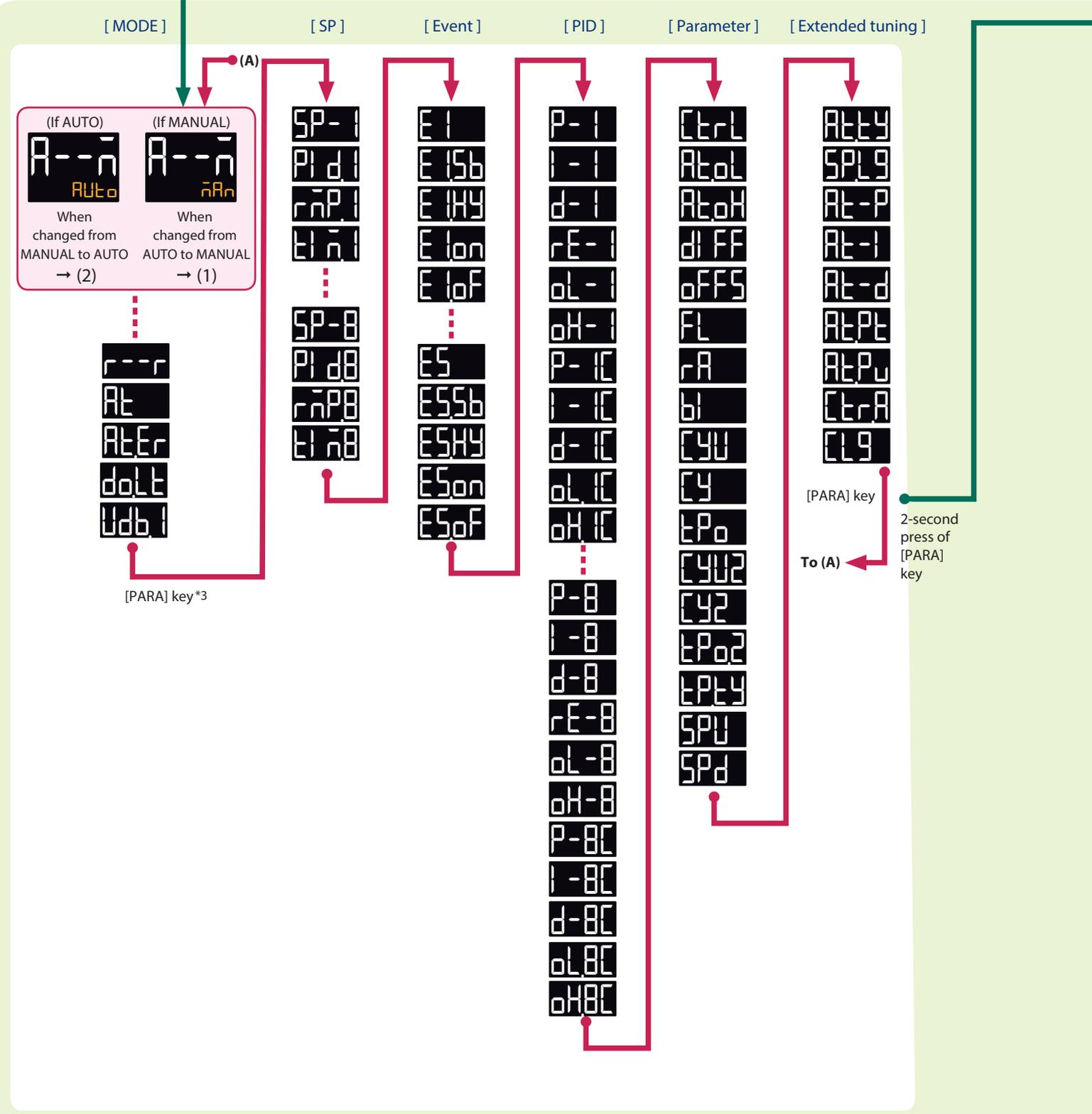
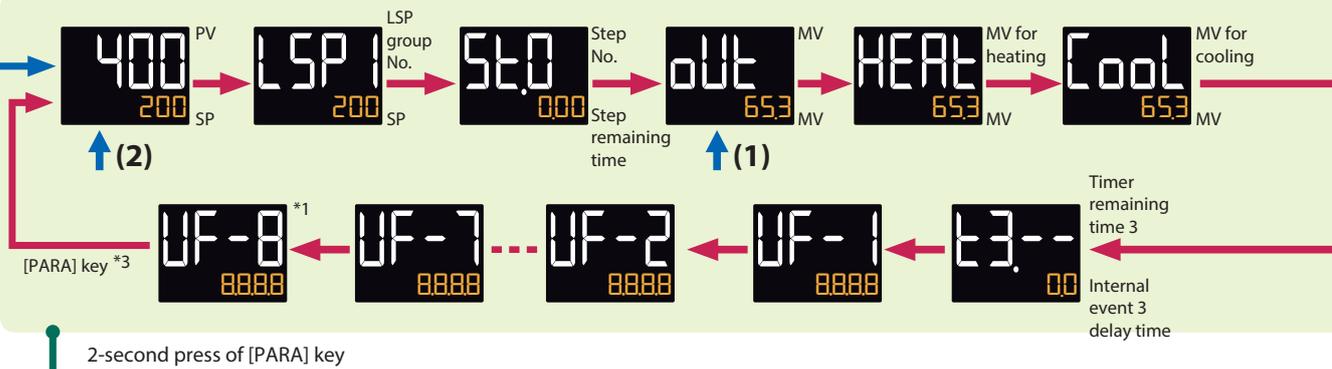
(1)	Upper display	Shows PV (present temperature, etc.) or items that can be set.
(2)	[MODE] key	Pressing this button shows the operation display. If it is held down for 1 second or longer, the preset operation (initial setting: AUTO/MANUAL selection) can be executed.
(3)	[PARA] key	Switches the display.
(4)	[<], [V], and [^] keys	Used for incrementing/decrementing numeric values and performing arithmetic shift operations.
(5)	MAN mode indicator	Lights up in MANUAL mode.
(6)	RDY mode indicator	Lights up in READY (control stop) mode.
(7)	Event indicator	Lights up when the corresponding event output is ON.
(8)	Control output indicator	Lights up when the corresponding control output is ON.
(9)	Status indicator	Lights up according to the setting of the status indicator. (Default: Not used)
(10)	AT indicator	Flashes during AT execution.
(11)	Slope display unit	Shows the operation status during a step operation.
(12)	Lower display	Shows SP (set temperature, etc.) and other settings.
(13)	Loader connector	Connected to the PC using the USB loader cable included with the Smart Loader Package.
(14)	Protective film	Protects the surface. Please remove the protective film before use.

Flowchart of Key Operations and Displays

When the power is turned ON

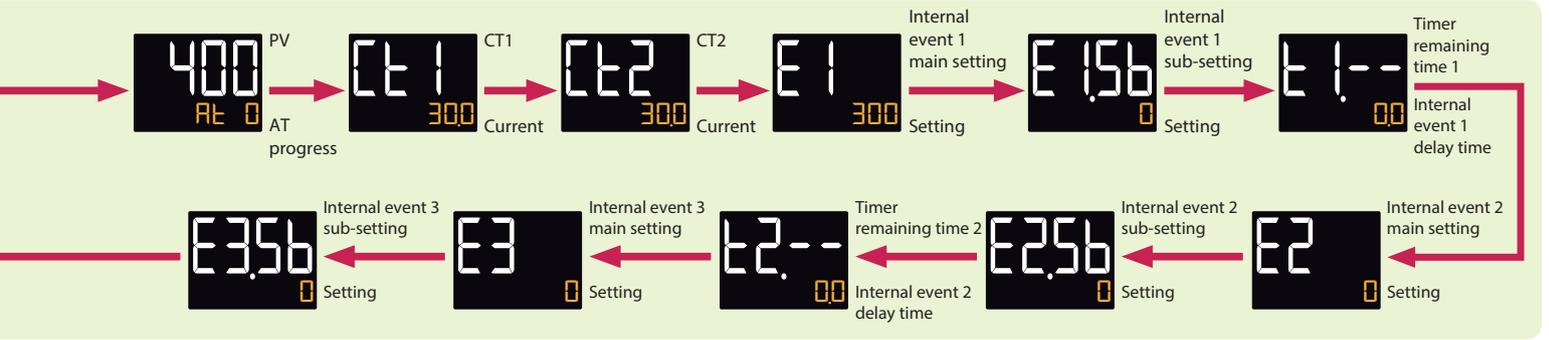


Power-on → all on → all off → sequential on and off → operation display (sequence takes about 9 s)

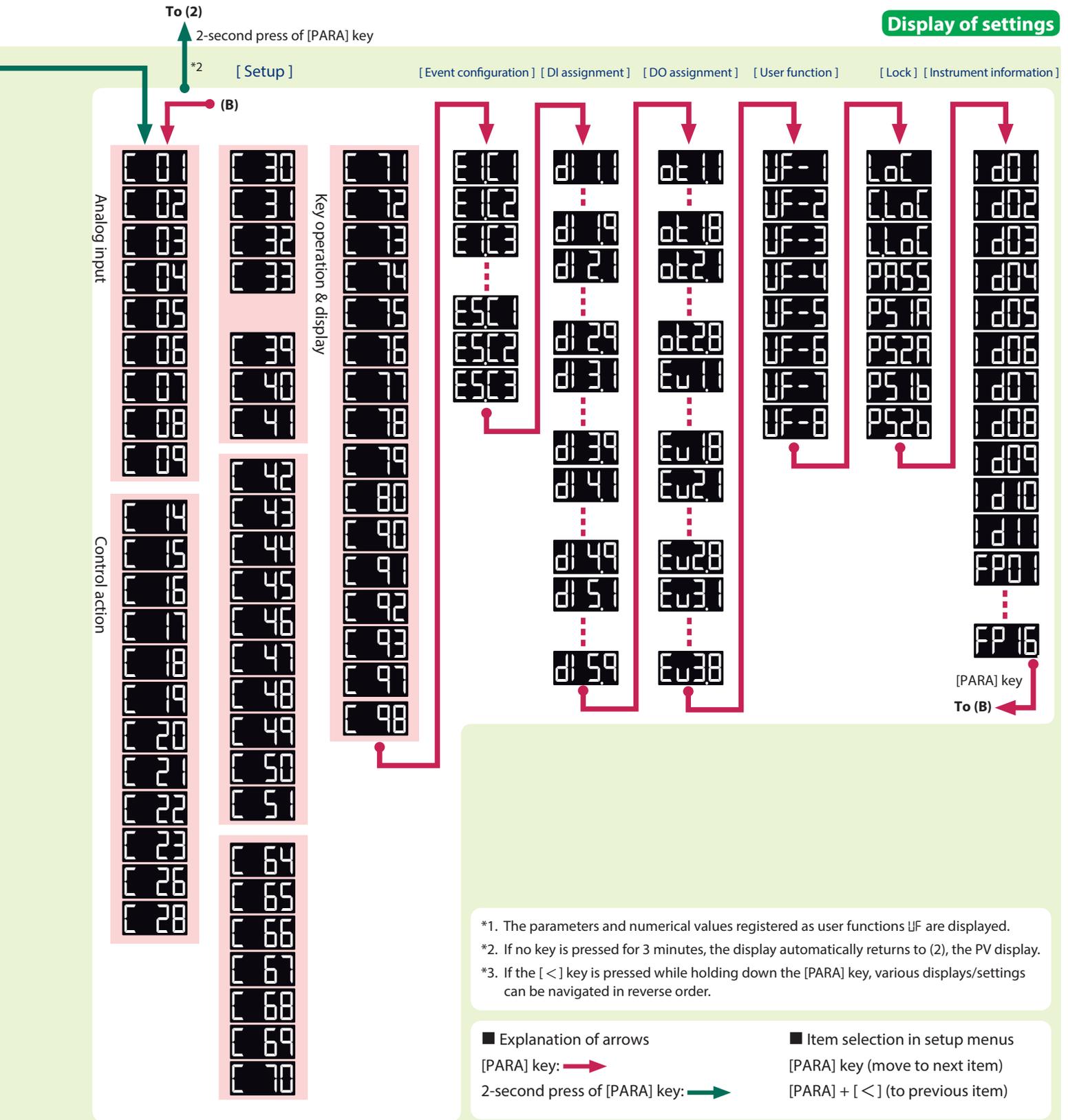


- Some items are not displayed depending on the availability of optional functions, model number, display setup (E 73 to E 78) and user level (E 79).
- Pressing the [PARA] key while changing the setting of an item will cancel the change, and the next item will be displayed.

Operation display



Display of settings



Operation Examples

Setup of PV input range type

<p>1</p>  <p>Press [MODE] once to show the operation display.</p> <p>If the sensor has not been wired or is disconnected, an alarm for abnormal PV input (any one from $RL\ \square$ to $RL\ \uparrow$) may appear on the upper display.</p>	<p>2</p>  <p>Hold down [PARA] for 2 s or longer. The screen for specifying parameters is shown with $A--n$ on the upper display.</p> <p>In ON/OFF control, $---$ is on the upper display.</p>
<p>3</p>  <p>Hold down [PARA] for 2 s or longer again.</p> <p>The setup screen showing the setting for \square (PV input range type) is displayed.</p>	<p>4</p>  <p>Press [\leftarrow], [\vee], or [\wedge]. The rightmost digit on the lower display flashes and its value can be changed.</p> <p>Select the range of the sensor (see the PV input range table) by pressing [\leftarrow], [\vee], or [\wedge].</p> <p>Do not press any key for 2 s. The new value stops flashing and is now set.</p>

Setup of event operation type

In this example, the operation type of event 1 is set to "deviation high limit."

<p>1</p>  <p>Press [MODE] once to show the operation display.</p>	<p>2</p>  <p>Hold down [PARA] for 2 s or longer. The screen for specifying parameters is shown with $A--n$ on the upper display.</p>
<p>3</p>  <p>Hold down [PARA] for 2 s or longer again.</p> <p>The setup screen showing the setting for \square (PV input range type) is displayed.</p>	<p>4</p>  <p>Press [PARA] several times. $E\ \square$ is shown on the upper display and \square on the lower display.</p> <p>\square on the lower display means that no event is set.</p>
<p>5</p>  <p>Press [\vee] or [\wedge]. The rightmost digit on the lower display flashes.</p> <p>Press [\vee] or [\wedge] until 4 is displayed. Do not press any key for 2 s. The new value stops flashing and is now set.</p> <p>4 on the lower display means that the event operation type is "deviation high limit."</p>	

Use $E\ \square$ to set the operation type for event 2, and $E\ \square$ for event 3.

Red letters : Initial setup procedure

Blue letters : Procedure during operation

Execution of auto tuning (AT)

AT forces ON/OFF of the MV a number of times (a limit cycle) to calculate PID values. Check that this operation does not create any problems for the associated equipment before executing AT.

<p>1</p>  <p>Press [MODE] once to show the operation display.</p>	<p>2</p>  <p>Hold down [PARA] for 2 s or longer. The screen for specifying parameters is shown with $A--n$ on the upper display.</p>
<p>3</p>  <p>Press [PARA] twice. At is shown on the upper display and $At\ oF$ on the lower display.</p> <p>If the control method is ON/OFF control and if bit 3 (AT stop/start display) of \square (mode display setup) is "0" (disabled), the parameter and setting are not displayed.</p>	<p>4</p>  <p>Press [\vee] or [\wedge]. $At\ oF$ flashes.</p> <p>The display flashes only in RUN and AUTO modes, and only if there is no PV input error.</p> <p>Also, if "AT stop/start" is set as the DI assignment, the display does not flash and the setting cannot be changed using the keys.</p>
<p>5</p>  <p>Press [\wedge] once. $At\ on$ flashes on the lower display.</p>	<p>6</p>  <p>Do not press any key for 2 s. $At\ on$ stops flashing and AT begins.</p> <p>During AT, the AT indicator flashes and repeatedly.</p> <p>When AT and the calculation of PID constants are done, the indicator turns off.</p>

During the AT process, if the mode is changed to READY or MANUAL, if PV input is faulty, or if a power failure occurs, AT stops automatically without changing the PID constants. AT can also be stopped by changing the setting from $At\ on$ to $At\ oF$ (return to step 3 above).

Setup of the SP

<p>1</p>  <p>Press [MODE] once to show the operation display.</p>	<p>2</p>  <p>Check that the operation display shows the SP.</p> <p>(If not, press [PARA] several times until it is displayed).</p>
<p>3</p>  <p>Press [\leftarrow], [\vee], or [\wedge]. The rightmost digit on the lower display flashes and its value can be changed. Change to the desired SP by pressing [\leftarrow], [\vee], or [\wedge].</p> <p>Flashing means the setting has not been finalized.</p> <p>If the SP limit function is enabled, a value exceeding the limit cannot be set. If you need to change the value, change the SP limit first.</p>	<p>4</p>  <p>Do not press any key for 2 s. The new value stops flashing and is now set.</p> <p>If [MODE] is pressed while the setting is flashing, the status returns to that of step 1.</p>

For highlighted steps (e.g., **4**), the following precaution applies:

- If keys are locked, the setting does not flash and cannot be changed. To change the setting, cancel the key lock first.

RUN/READY mode selection

<p>1</p> <p>Press [MODE] once to show the operation display.</p> 	<p>2</p> <p>Hold down [PARA] for 2 s or longer. The screen for specifying parameters is shown with R--n̄ on the upper display.</p>  <p>In ON/OFF control, r--r is on the upper display.</p>
<p>3</p> <p>Press [PARA] once. r--r is shown on the upper display and rdy or rLn is shown on the lower display.</p>  <p>The current mode is indicated by rLn (RUN) or rdy (READY).</p>	<p>4</p> <p>Press [V] or [^]. The lower display flashes.</p>  <p>If "RUN/READY selection" is set as the DI assignment, the display does not flash and the mode cannot be changed using the keys.</p>
<p>5</p> <p>Press [V] or [^] to select rLn or rdy.</p> 	<p>6</p> <p>Do not press any key for 2 s. The new value stops flashing and the mode is now set.</p> 

Setup of PID values

<p>1</p> <p>Press [MODE] once to show the operation display.</p> 	<p>2</p> <p>Hold down [PARA] for 2 s or longer. The screen for specifying parameters is shown with R--n̄ on the upper display.</p> 
<p>3</p> <p>Press [PARA] several times. P- I (proportional band) is shown on the upper display and the present setting is shown on the lower display.</p>  <p>If the control method is ON/OFF control, the parameter and setting are not displayed.</p>	<p>4</p> <p>Press [<], [V], or [^]. The rightmost digit on the lower display flashes and its value can be changed.</p>  <p>Change to the desired P value by pressing [<], [V], or [^].</p> <p>Flashing means the setting has not been finalized.</p> <p>The setting range of the proportional band is from 0.1 to 999.9%.</p>
<p>5</p> <p>Do not press any key for 2 s. The new value stops flashing and is now set.</p>  <p>If [MODE] is pressed while the setting is flashing, the status returns to that of step 1.</p>	

Use I - I for specifying the integral time (0–9999 s) and d- I for the derivative time (0–9999 s).

Setup of event value

<p>1</p> <p>Press [MODE] once to show the operation display.</p> 	<p>2</p> <p>Hold down [PARA] for 2 s or longer. The screen for specifying parameters is shown with R--n̄ on the upper display.</p> 
<p>3</p> <p>Press [PARA] several times. E I is shown on the upper display and 0 on the lower display.</p>  <p>0 on the lower display means that the event main setting is "0."</p>	<p>4</p> <p>Press [<], [V], or [^]. The rightmost digit on the lower display flashes and its value can be changed.</p>  <p>Change to the desired event setting by pressing [<], [V], or [^].</p> <p>Flashing means the setting has not been finalized.</p>
<p>5</p> <p>Do not press any key for 2 s. The new value stops flashing and is now set.</p>  <p>If [MODE] is pressed while the setting is flashing, the status returns to that of step 1.</p>	

Use E2 to specify the setting for event 2, and E3 for event 3.

<p>6</p> <p>To proceed to hysteresis setup, press [V] twice or press [^] several times. E H4 is shown on the upper display and 5 on the lower display.</p>  <p>5 on the lower display means that the hysteresis setting is "5."</p>	<p>7</p> <p>Press [<], [V], or [^]. The rightmost digit on the lower display flashes and its value can be changed.</p>  <p>Change to the desired hysteresis setting by pressing [<], [V], or [^].</p> <p>Do not press any key for 2 s. The new value stops flashing and is now set.</p>
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Use E2H4 to specify the hysteresis setting for event 2, and E3H4 for event 3.

Memo

Parameters

Operation settings

Display	Item	Contents	Initial value	Setting
Left: upper display Right: lower display				
Value (PV) Value (SP)	SP (target value)	SP low limit to SP high limit	0	
LSP 1~*1	LSP (the last digit)	1 to LSP system group (max. 8)	1	
St. 1~*1	Step remaining time	Not applicable Step No. indicates whether the process is ramp-up, ramp-down, or soak.	-	
αUb	Value	MV (Manipulated Variable)	-10.0 to +110.0 % Setting is enabled in MANUAL mode (value flashing)	-
HERb	Value	Heat MV (Manipulated Variable)	Not applicable.	-
Cool.	Value	Cool MV (Manipulated Variable)	-10.0 to +110.0 %	-
Value (PV)	Re: *1	AT progress display (the last digit)	Not applicable.	-
CT 1	Value	CT current value 1	Not applicable.	-
CT 2	Value	CT current value 2	Not applicable.	-
E1	Value	Internal Event 1 main setting	-1999 to +9999 U or 0 to 9999 U	0
E5a	Value	Internal Event 1 sub-setting	-	0
t 1~*1	Value	Timer remaining time 1	Not applicable. Upper display: ON delay / OFF delay distinction is displayed.	-
E2	Value	Internal Event 2 main setting	Same as Internal Event 1 main setting	0
E25a	Value	Internal Event 2 sub-setting	Same as Internal Event 1 sub-setting	0
t 2~*1	Value	Timer remaining time 2	Same as Timer remaining time 1	-
E3	Value	Internal Event 3 main setting	Same as Internal Event 1 main setting	0
E35a	Value	Internal Event 3 sub-setting	Same as Internal Event 1 sub-setting	0
t 3~*1	Value	Timer remaining time 3	Same as Timer remaining time 1	-

*1. Display example

Parameter settings

Mode bank

Display	Item	Contents	Initial value	Setting
R~*1	AUTO/MANUAL	Rb: AUTO mode rR: MANUAL mode	AUTO	
r~*1	RUN/READY	rL: RUN mode rR: READY mode	RUN	
Re	AT execution/stop instructions	Rb: AT stop rR: AT execution	AT stop	
REr	Auto tuning error	Er: Normal Er: Abnormal	Normal	
doL	Release all DO latches	Lt: Latch continue Lt: Latch release	Latch continue	
uob	User-defined bit	db: OFF db: ON	OFF	

SP bank

Display	Item	Contents	Initial value	Setting
SP 1~ SP 8	SP (for LSP 1 to 8)	SP low limit to SP high limit	0	
PI d 1~ PI d 8	PID group number (for LSP 1 to 8)	1 to 8	1	
rSP 1~ rSP 8	Ramp (for LSP 1 to 8)	0 to 9999	0	
Soak 1~ Soak 8	Soak time (for LSP 1 to 8)	0.0 to 999.9 s 0 to 9999	0	

Event bank

Display	Item	Contents	Initial value	Setting
E 1~ E5	Internal Event 1 to 5 main setting	-1999 to +9999 U or 0 to 9999 U*	0	
E5a~ E55a	Internal Event 1 to 5 sub-setting	0 to 9999*	0	
E H1~ E5H1	Internal Event 1 to 5 hysteresis	0 to 29999*	5	
E on 1~ E5on 1	Internal Event 1 to 5 ON delay time	0.0 to 999.9 s 0 to 9999	0	
E off 1~ E5off 1	Internal Event 1 to 5 OFF delay time	0 to 9999*	0	

* The number of decimal places changes according to the operation type of the internal event.

PID bank

Display	Item	Contents	Initial value	Setting
P 1~ P 8	Proportional band (1 to 8)	0.1 to 999.9 %	5.0	
I 1~ I 8	Integration time (1 to 8)	0 to 9999 s (No integral control action when set at "0")	120	
D 1~ D 8	Derivative time (1 to 8)	0 to 9999 s (No derivative control action when set at "0")	30	
rE 1~ rE 8	Manual reset (1 to 8)	-10.0 to +110.0 %	50.0	
αL 1~ αL 8	MV low limit (1 to 8)	-10.0 to +110.0 %	0.0	
αH 1~ αH 8	MV high limit (1 to 8)	-10.0 to +110.0 %	100.0	
P 1~ P 8-BC	Cool-side proportional band (1 to 8)	0.1 to 999.9 %	5.0	
I 1~ I 8-BC	Cool-side integration time (1 to 8)	0 to 9999 s (No integral control action when set at "0")	120	
D 1~ D 8-BC	Cool-side derivative time (1 to 8)	0 to 9999 s (No derivative control action when set at "0")	30	
αL 1~ αL 8-BC	Cool-side MV low limit (1 to 8)	-10.0 to +110.0 %	0.0	
αH 1~ αH 8-BC	Cool-side MV high limit (1 to 8)	-10.0 to +110.0 %	100.0	

* The number of decimal places changes according to the setting for I (integral time and derivative time decimal point position).

Parameter bank

Display	Item	Contents	Initial value	Setting
Control				
Ctrl	Control method	0: ON/OFF control 1: Fixed PID	0 or 1	
RbαL	MV low limit at AT	-10.0 to +110.0 %	0.0	
RbαH	MV high limit at AT	-10.0 to +110.0 %	100.0	
dI FF	ON/OFF control differential	0 to 9999 U	0	
αFF5	ON/OFF control operating point offset	-1999 to +9999 U	0	
PV				
FL	PV filter	0.0 to 120.0 s	0.0	
rR	PV ratio	0.001 to 9.999	1.000	
bl	PV bias	-1999 to +9999 U	0	
Time proportional output				
C1U	Time proportional cycle unit 1	0: Unit of 1 s 1: Fixed at 0.5 s 2: Fixed at 0.25 s 3: Fixed at 0.1 s 5 to 120 s or 1 to 120 s (5 to 120 s when output includes relay output)	10 or 2	
C1	Time proportional cycle 1	Set value: 0 If either one of the conditions below is true, 250 ms applies. Otherwise, 1 ms applies. - MV1 is set for relay output or event output in DO assignment. - Time proportional cycle is 10 s or longer. Set value: 1~250 If MV1 is set for relay output or event output in DO assignment, 1~49: 50 ms applies. 50~250: The set value applies.	0	
LPa	Time proportional minimum ON/OFF time 1	Set value: 0 If either one of the conditions below is true, 250 ms applies. Otherwise, 1 ms applies. - MV2 is set for relay output or event output in DO assignment. - Time proportional cycle is 10 s or longer. Set value: 1~250 If MV2 is set for relay output or event output in DO assignment, 1~49: 50 ms applies. 50~250: The set value applies.	0	
C1U2	Time proportional cycle unit 2	0: Unit of 1 s 1: Fixed at 0.5 s 2: Fixed at 0.25 s 3: Fixed at 0.1 s	10 or 2	
C2	Time proportional cycle 2	Set value: 0 If either one of the conditions below is true, 250 ms applies. Otherwise, 1 ms applies. - MV2 is set for relay output or event output in DO assignment. - Time proportional cycle is 10 s or longer. Set value: 1~250 If MV2 is set for relay output or event output in DO assignment, 1~49: 50 ms applies. 50~250: The set value applies.	0	
LPa2	Time proportional minimum ON/OFF time 2	Set value: 0 If either one of the conditions below is true, 250 ms applies. Otherwise, 1 ms applies. - MV2 is set for relay output or event output in DO assignment. - Time proportional cycle is 10 s or longer. Set value: 1~250 If MV2 is set for relay output or event output in DO assignment, 1~49: 50 ms applies. 50~250: The set value applies.	0	
SP				
SPU	SP up ramp (U/min)	0.0 to 999.9 U (No ramp when set at 0.0 U)	0.0	
SPd	SP down ramp (U/min)	0.0 to 999.9 U (No ramp when set at 0.0 U)	0.0	

U (unit): The smallest unit of an industrial quantity (°C, Pa, L/min, etc.) of a PV range

Extended tuning bank

Display	Item	Contents	Initial value	Setting
Rb: 3	AT type	0: Normal 1: Immediate response 2: Stable*	1	
SP 3	SP lag constant	0.0 to 999.9	0.0	
Rb: P	Proportional Band adjust	0.00 to 99.99	1.00	
Rb: I	AT integral time adjust	0.00 to 99.99	1.00	
Rb: d	AT derivative time adjust	0.00 to 99.99	1.00	
Rb: P	Type of MV switching point at AT	0: Default (2/3 of initial PV and SP) 1: SP 2: PV	0	
Rb: P	MV switching point PV in AT	-1999 to +9999 U	0	
CL: R	Control algorithm	0: PID (Conventional PID) 1: Ra-PID (High-performance PID)	0	
CL: G	Cooling Gain	-10.0 to +110.0 %	30.0	

* Normal = standard control characteristics, immediate response = control with quick response to external disturbance, stable = control with less PV fluctuation

Essential parameters for PV measurement and control

Basic parameters

Required when using optional functions

Setup bank, etc., settings

Setup bank

Display	Item	Contents	Initial value	Setting
0 1	PV input range type	For details, refer to the PV Input Range Table	Depends on the model	
0 2	Temperature unit	0: Celsius (°C) 1: Fahrenheit (°F)	0	
0 3	Reference junction compensation (Cold junction compensation)	0: Performed (internal) 1: Not performed (external)	0	
0 4	Decimal point position	0: No decimal point 1 to 3: 1 to 3 digits below decimal point	0	
0 5	PV range low limit	When the PV input type is DC voltage/DC current, -1999 to +9999 U	0	
0 6	SP low limit	PV input range low limit to PV input range high limit	1000	
0 7	SP high limit	-	-	
0 8	SP square root extraction dropout	0.0 to 100.0 % (PV square root extraction is not performed when set at 0.0)	0.0	
0 9	Control action (Direct/Reverse)	0: Heat control (Reverse action) 1: Cool control (Direct action)	0	
1 4	Output operation at PV alarm	0: Control calculation is continued. 1: Output at PV alarm is output.	0	
1 5	Output at PV alarm	-10.0 to +110.0 %	0.0	
1 7	Output at READY (Heat)	-10.0 to +110.0 %	0.0	
1 8	Output at READY (Cool)	-10.0 to +110.0 %	0.0	
1 9	Output operation at changing AUTO/MANUAL	0: Bumpless transfer 1: Preset	0	
2 0	Preset MANUAL value	-10.0 to +110.0 %	0.0 or 50.0	
2 1	Initial output type (mode) of PID control	0: Auto 1: Not initialized 2: Initialized	0	
2 2	Initial output of PID control	-10.0 to +110.0 %	0.0 or 50.0	
2 3	Integral time and derivative time decimal point position	0: XXXX (No decimal point) 1: XXXX 2: XXXX 3: XXXX	0	
2 6	Heat/Cool control	0: Not used 1: Individual PID 2: Common PID	0	
2 8	Heat/Cool control dead zone	-10.0 to +110.0 %	0.0	
3 0	LSP system group	1 to 4	1	
3 1	SP ramp type	0: Standard 1: Multi-ramp 2: Step operation: When the power is turned ON again, the step operation is stopped (READY) 3: Step operation: When the power is turned ON again, the step operation is reset	0	
3 2	SP ramp unit	0: 0.1 U/s 1: 0.1 U/min 2: 0.1 U/h	1	
3 3	STEP time unit	0: 0.1 s 1: 1 s 2: 1 min	2	
3 4	STEP PV start	0: None 1: Up start 2: Down start	0	
3 5	STEP loop	0: Stop 1: Loop 2: Final step continued	0	
3 6	CT1 operation type	0: Heater burnout detection 1: Current value measurement	0	
3 7	CT1 output	0 to 1: Control output 1 to 2 2 to 4: Event output 1 to 3	0	
3 8	CT1 measurement wait time	30 to 300 ms	30	
3 9	CT2 operation type	Same as CT1	0	
4 0	CT2 output	Same as CT1	0	
4 1	CT2 measurement wait time	Same as CT1	30	
4 2	Control output 1 range	1: 4 to 20 mA 2: 0 to 20 mA	1	
4 3	Control output 1 type	0: MV 1: Heat MV 2: Cool MV 3: PV 4: PV before ratio, bias, and filter 5: SP 6: Deviation 7: CT1 current value 8: CT2 current value 9: Invald 10: SP+MV 11: PV+MV	0	
4 4	Control output 1 scaling low limit	-1999 to +9999 U	0.0	
4 5	Control output 1 scaling high limit	0 to 9999 (Valid when control output 1 type is 10 or 11)	100.0	
4 6	Control output 1 MV scaling bandwidth	0 to 9999 (Valid when control output 1 type is 10 or 11)	200	
4 7	Control output 2 range	Same as control output 1	1	
4 8	Control output 2 type	Same as control output 1	3	
4 9	Control output 2 scaling low limit	Same as control output 1	0	
5 0	Control output 2 scaling high limit	Same as control output 1	1000	
5 1	Control output 2 MV scaling bandwidth	Same as control output 1	200	
6 4	Communication type	0: CPL 1: Modbus/ASCII 2: Modbus/RTU 3: PLC-Link communication 4: 1 to 127 (Communication is disabled when set at "0")	0	
6 5	Station address	0 to 127 (Communication is disabled when set at "0")	2	
6 6	Transmission speed (bps)	0: 4800 1: 9600 2: 19200 3: 38400	0	
6 7	Data format (Data length)	0: 7 bits 1: 8 bits	1	
6 8	Data format (Parity)	0: Even parity 1: Odd parity 2: None parity	0	
6 9	Data format (Stop bit)	0: 1 bit 1: 2 bits	3	
7 0	Communication minimum response time	1 to 250 ms	3	
7 1	Key operation type	0: Standard type 1: Special type	1	
7 2	[MODE] key function	0: Invalid 1: AUTO/MANUAL selection 2: RUN/READY selection 3: AT execution/stop instructions 4: LSP group selection 5: Release all DO latches 6: Invalid 7: User-defined bit 1 selection 8: Invalid	1	
7 3	MODE display setup (Sum of the weighting)	0: AUTO/MANUAL display (Enabled: +1) Bit 1: RUN/READY display (Enabled: +2) Bit 2: Invald Bit 3: AT Stop/Start display (Enabled: +8) Bit 4: Release all DO latches display (Enabled: +16) Bit 5: User-defined bit 1 ON/OFF display (Enabled: +32) Bit 6 to 7: Invald	255	
7 4	PV/SP display setup (Sum of the weighting)	0: PV display (Enabled: +1) Bit 1: SP display (Enabled: +2) Bit 2: LSP group number display (Enabled: +4) Bit 3 to 7: Invald	15	
7 5	MV display setup (Sum of the weighting)	0: MV display (Enabled: +1) Bit 1: Heat MV/cool MV display (Enabled: +2) Bit 2: Invald Bit 3: AT progress display (Enabled: +8) Bit 4 to 7: Invald	15	
7 6	EV display setup (Operation display)	0: Not displayed 1: Set value of internal event 1 is displayed 2: Set values of internal event 1 to 2 are displayed 3: Set values of internal event 1 to 3 are displayed	0	
7 7	Event remaining time display setup (Operation display)	0: Not displayed 1: Internal event 1 is displayed 2: Internal event 1 to 2 is displayed 3: Internal event 1 to 3 is displayed	0	
7 8	CT input current value display setup (Operation display)	0: Not displayed 1: CT1 current value is displayed 2: CT1 to 2 current values are displayed	1	
7 9	User level	0: Simple configuration 1: Standard configuration 2: Advanced configuration	0	
8 0	Status indicator	0: Not used 1: Flashing while data is sending through RS-485 communication. 2: Flashing while data is receiving through RS-485 communication. 3: Logical OR of all DI statuses 4: Invald (OFF)	0	
8 1	Number of CT1 turns	0: 800 turns 1 to 40: CT turns divided by 100	8	
8 2	Number of CT1 power wire loops	0: 1 time 1 to 6: Number of times	1	
8 3	Number of CT2 turns	0: 800 turns 1 to 40: CT turns divided by 100	8	
8 4	Number of CT2 power wire loops	0: 1 time 1 to 6: Number of times	1	
8 5	PV input failure (under range) type	0: -10 %FS 1: -5 mV (This setting is applicable if C01 (PV input range type) is set for sensor type B (No.17) or PR40-20 (No.23))	0	
8 6	Sampling period	1: 50 ms 2: 100 ms 3: 300 ms 4: 500 ms	1	

Items marked with ● in the tables are displayed if standard configuration or advanced configuration is selected for the user level. To change the user level, see **Changing the user level** at the bottom right of this page.

EuCF [Event configuration bank]

Display	Item	Contents	Initial value	Setting
E IC 1 ~ ESC 1	Internal event 1 to 5 Configuration 1	See "Event types."	0	
E IC 2 ~ ESC 2	Internal event 1 to 5 Configuration 2	"1st digit" (2nd, etc.) means the first digit (etc.) <u>from the right</u> .		
	1st digit: Direct/Reverse	0: Direct 1: Reverse	0	
	2nd digit: Standby	0: None 1: Standby 2: Standby + Standby at SP change	0	
	3rd digit: EVENT state at READY	0: Continue 1: Forced OFF	0	
E IC 3 ~ ESC 3	Internal event 1 to 5 Configuration 3	"1st digit" (2nd, etc.) means the first digit (etc.) <u>from the right</u> .		
	1st digit: Alarm OR	0: None 1: Alarm direct + OR operation 2: Alarm direct + AND operation 3: Alarm reverse + OR operation 4: Alarm reverse + AND operation	0	
	2nd digit: Special OFF	0: As usual 1: When the event set value (main setting) is 0, the event is "OFF".	0	
	3rd digit: Delay time unit	0: 0.1 s 1: 1 s 2: 1 min	0	
	4th digit: Undefined	0	0	

dl [DI assignment bank]

Display	Item	Contents	Initial value	Setting
dl 11 ~ dl 51	Internal contact 1 to 5 Operation type	0: No function 1: LSP group selection (0/+1) 2: LSP group selection (0/+2) 3: LSP group selection (0/+4) 4: PID group selection (0/+1) 5: PID group selection (0/+2) 6: PID group selection (0/+4) 7: RUN/READY selection 8: AUTO/MANUAL selection 9: Invalid 10: AT execution/stop instructions 11: Invalid 12: Control action direct/reverse 13: SP Ramp enabled/disabled 14: PV Hold 15: PV Maximum value hold 16: PV Minimum value hold 17: Timer Stop/Start 18: Release/continue all DO latches 19: Advance 20: SP Step Hold	0	
dl 12 ~ dl 52	Internal contact 1 to 5 Input bit operation	0: Not used (Default input) 1: Function 1 (A and B) or (C and D) 2: Function 2 (A or B) and (C or D) 3: Function 3 (A or B or C or D) 4: Function 4 (A and B and C and D)	0	
dl 13 ~ dl 53	Internal contact 1 to 5 Input assignment A	0: Normally open (normally off = 0) 1: Normally closed (normally on = 1) 2: DI 1 3: DI 2 4 to 9: Invalid 10 to 14: Internal event 1 to 5 15 to 17: Invalid 18 to 21: User-defined bit 1 to 4 22: MANUAL 23: READY 24: Invalid 25: AT (Auto-Tuning) 26: During SP ramp 27: Invalid 28: All alarm 29: PV alarm 30: Invalid 31: [MODE] key status 32: Event output 1 terminal status 33: Control output 1 terminal status	0, 2-5	
dl 14 ~ dl 54	Internal contact 1 to 5 Input assignment B		0	
dl 15 ~ dl 55	Internal contact 1 to 5 Input assignment C		0	
dl 16 ~ dl 56	Internal contact 1 to 5 Input assignment D		0	
dl 17 ~ dl 57	Internal contact 1 to 5 Polarity A to D	"1st digit" (2nd, etc.) means the first digit (etc.) <u>from the right</u> .		
	1st digit: Polarity A	0: Direct 1: Reverse	0	
	2nd digit: Polarity B		0	
	3rd digit: Polarity C		0	
dl 18 ~ dl 58	Internal contact 1 to 5 Polarity	0: Direct 1: Reverse	0	
dl 19 ~ dl 59	Internal contact 1 to 5 Internal event No. assignment	0: All internal events 1 to 5: Internal event No.	0	

do [DO assignment bank]

Display	Item	Contents	Initial value	Setting
do 11 ~ do 21 Eu 11 ~ Eu 31	Control output 1 to 2, event output 1 to 3 Operation type	0: Default output 1: MV ON/OFF status 1 2: MV ON/OFF status 2 3 to 6: Function 1 to 4	0	
do 12 ~ do 22 Eu 12 ~ Eu 32	Control output 1 to 2, event output 1 to 3 Output assignment A	0: Normally open (normally off = 0) 1: Normally closed (normally on = 1) 2 to 6: Internal Event 1 to 5 7 to 13: Invalid 14: MV ON/OFF status 1 15: MV ON/OFF status 2 16,17: Invalid 18: DI 1 19: DI 2 20 to 25: Invalid 26 to 30: Internal contact 1 to 5 31 to 33: Invalid 34 to 37: User-defined bit 1 to 4 38: MANUAL 39: READY 40: Invalid 41: AT (Auto-Tuning) 42: During SP ramp 43: Invalid 44: Alarm 45: PV alarm 46: Invalid 47: [MODE] key status 48: Event output 1 terminal status 49: Control output 1 terminal status	2-4, 14, 15	
do 13 ~ do 23 Eu 13 ~ Eu 33	Control output 1 to 2, event output 1 to 3 Output assignment B		0	
do 14 ~ do 24 Eu 14 ~ Eu 34	Control output 1 to 2, event output 1 to 3 Output assignment C		0	
do 15 ~ do 25 Eu 15 ~ Eu 35	Control output 1 to 2, event output 1 to 3 Output assignment D		0	
do 16 ~ do 26 Eu 16 ~ Eu 36	Control output 1 to 2, event output 1 to 3 Polarity A to D	"1st digit" (2nd, etc.) means the first digit (etc.) <u>from the right</u> .		
	1st digit: Polarity A	0: Direct 1: Reverse	0	
	2nd digit: Polarity B		0	
	3rd digit: Polarity C		0	
	4th digit: Polarity D		0	
do 17 ~ do 27 Eu 17 ~ Eu 37	Control output 1 to 2, event output 1 to 3 Polarity	0: Direct 1: Reverse	0	
do 18 ~ do 28 Eu 18 ~ Eu 38	Control output 1 to 2, event output 1 to 3 Latch	0: None 1: Latch (Latch at ON) 2: Latch Latch at OFF except for initialization at power ON	0	

UF [User function bank]

Display	Item	Contents	Initial value	Setting
UF 1 ~ UF 8	User function 1 to 8	-	-	

LoC [Lock bank]

Display	Item	Contents	Initial value	Setting
LoC	Key lock	0: All settings can be specified. 1: Mode, event, operation display, SP, UF, lock, manual MV, and [MODE] key operation can be specified. 2: Operation display, SP, UF, lock, manual MV, and [MODE] key operation can be specified. 3: UF, lock, manual MV, and [MODE] key operation can be specified.	0	
CLoC	Communication lock	0: Unlocked 1: Locked	0	
LLoC	Loader lock	0: Unlocked 1: Locked	0	
PR55	Password display	0 to 15 (5: Password 1A to 2B display)	0	
P5 1R	Password 1A	0000 to FFFF (hex)	0000	
P5 2R	Password 2A	0000 to FFFF (hex)	0000	
P5 1b	Password 1B	0000 to FFFF (hex)	0000	
P5 2b	Password 2B	0000 to FFFF (hex)	0000	

Id [Instrument information bank]

Display	Item	Contents	Initial value	Setting
Id 1	ROM ID	16: Fixed	Not Applicable	
Id 2	ROM Version 1		Not Applicable	
Id 3	ROM Version 2		Not Applicable	
Id 4	Loader information		Not Applicable	
Id 5	EST information		Not Applicable	
Id 6	Manufacturing date code (year)	Subtract 2000 from the year. Example: "21" means the year 2021.	Not Applicable	
Id 7	Manufacturing date code (month, day)	Month + day divided by 100. Example: "12.01" means the 1st day of December.	Not Applicable	
Id 8	Serial No.		Not Applicable	
Id 9	Model No.		Not Applicable	
Id 10	Model Information		Not Applicable	
Id 11	Production site code		Not Applicable	
FPD 1 FP 16	Advanced function password 1 to 16	0000 to FFFF (hex)	0000	

! Precautions for setup

- The type of automatic tuning can be changed by **AT type** in the extended tuning bank. Specify the setting in accordance with the control characteristics.

Memo

Changing the user level

The user level can be selected from three options with **[79]**. The number of available displays and settings decreases in the order: advanced → standard → simple. All items are displayed when advanced configuration is selected.

1



Press [MODE] once to show the operation display, and then hold down [PARA] for 2 s or longer.

The screen for specifying parameters is shown with **A--n** or **r--r** on the upper display.

2



Hold down [PARA] for 2 s or longer again. **[01]** is shown on the upper display.

3



Press [PARA] several times to change to **[79]** (user level).

4



Press [**<**], [**V**], or [**^**]. The lower display flashes. Change to the desired setting by pressing [**V**] or [**^**]. Do not press any key for 2 s. The new value stops flashing and is now set.

0: Simple (initial value)
1: Standard
2: Advanced

PV input range table

[Thermocouple]

Setting	Sensor type	Range (Celsius)	Range (Fahrenheit)
1	K	-200 to +1200 °C	-300 to +2200 °F
2	K	0 to 1200 °C	0 to 2200 °F
3	K	0.0 to 800.0 °C	0 to 1500 °F
4	K	0.0 to 600.0 °C	0 to 1100 °F
5	K	0.0 to 400.0 °C	0.0 to 700.0 °F
6	K	-200.0 to +400.0 °C	-300 to +700 °F
9	J	0.0 to 800.0 °C	0 to 1500 °F
10	J	0.0 to 600.0 °C	0 to 1100 °F
11	J	-200.0 to +400.0 °C	-300 to +700 °F
13	E	0.0 to 600.0 °C	0 to 1100 °F
14	T	-200.0 to +400.0 °C	-300 to +700 °F
15	R	0 to 1600 °C	0 to 3000 °F
16	S	0 to 1600 °C	0 to 3000 °F
17	B	0 to 1800 °C	0 to 3300 °F
18	N	0 to 1300 °C	0 to 2300 °F
19	PL II	0 to 1300 °C	0 to 2300 °F
20	WR5-26	0 to 1400 °C	0 to 2400 °F
21	WR5-26	0 to 2300 °C	0 to 4200 °F
23	PR40-20	0 to 1900 °C	0 to 3400 °F
24	DIN U	-200.0 to +400.0 °C	-300 to +700 °F
25	DIN L	-100.0 to +800.0 °C	-150 to +1500 °F

[RTD]

Setting	Sensor type	Range (Celsius)	Range (Fahrenheit)
41	Pt100	-200 to +500 °C	-300 to +900 °F
42	JPt100	-200 to +500 °C	-300 to +900 °F
43	Pt100	-200 to +200 °C	-300 to +400 °F
44	JPt100	-200 to +200 °C	-300 to +400 °F
45	Pt100	-100.0 to +300.0 °C	-150 to +500 °F
46	JPt100	-100.0 to +300.0 °C	-150 to +500 °F
51	Pt100	-50.0 to +200.0 °C	-50.0 to +400.0 °F
52	JPt100	-50.0 to +200.0 °C	-50.0 to +400.0 °F
53	Pt100	-50.0 to +100.0 °C	-50.0 to +200.0 °F
54	JPt100	-50.0 to +100.0 °C	-50.0 to +200.0 °F
63	Pt100	0.0 to 200.0 °C	0.0 to 400.0 °F
64	JPt100	0.0 to 200.0 °C	0.0 to 400.0 °F
67	Pt100	0.0 to 500.0 °C	0.0 to 900.0 °F
68	JPt100	0.0 to 500.0 °C	0.0 to 900.0 °F

[DC voltage / DC current]

Setting	Sensor type	Range
84	0 to 1 V	The scaling range is -1999 to +9999. The number of decimal places is changeable.
86	1 to 5 V	
87	0 to 5 V	
88	0 to 10 V	
89	0 to 20 mA	
90	4 to 20 mA	

: Initial value

Alarm codes

Alarm code ^{*1}	Description	Cause	Corrective action	
Input errors	RL01	PV input error (over range)	Sensor burnout, incorrect wiring Incorrect settings for PV range type, etc.	Check the wiring. Check the PV range type (C01) and other settings.
	RL02	PV input error (under range)	Sensor burnout, incorrect wiring Incorrect settings for PV range type, etc.	Check the wiring. Check the PV range type (C01) and other settings.
	RL03	Reference junction compensation (cold junction compensation) error	Measurement range error in terminal temperature at reference junction compensation	Make sure that the ambient temperature is within the specifications of this product.
	RL11	Current transformer (CT) input error (over range) ^{*2}	Current input exceeding the high limit of the display range	• Use a current transformer with a number of turns that matches the display range. • Check the number of CT turns and the setting. • Check the setting and the number of times the power wire passes through the CT.
		RTD input error	Sensor burnout, incorrect wiring	Check the wiring.
Instrument errors	RL70	A/D conversion error	A/D conversion unit failure	Turn the power off and then on again.
	RL74	Nonvolatile memory error	Temporary communication error, corruption of data written, or failure of this device	If the alarm is triggered when the power is turned on again, replace the device.
	RL80	Nonvolatile memory not initialized		
	RLB1	Setting value area error ^{*3}		
	RLB2	Adjustment value area error ^{*3}		
	RLB3	Internal system error		
	RLB4	Setting value initialization error		Turn the power off and then on again. If the alarm is triggered after turning the power on again, the problem can be corrected with the following procedure: • Initialize the set point • Write the setting again If this procedure does not correct the problem, replace the device.
RL95	Setting value error		Turn the power off and then on again. If the alarm is triggered after turning the power on again, the problem can be corrected with the following procedure: • Restore the adjusted value ^{*4} If this procedure does not correct the problem, replace the device.	
RL96	Adjustment value error		Turn the power off and then on again. If the alarm is triggered after turning the power on again, the problem can be corrected with the following procedure: • Restore the adjusted value ^{*4} If this procedure does not correct the problem, replace the device.	

*1. Multiple alarms may occur at the same time. If the corrective action for one of the alarms says that the device should be replaced, it should be replaced.

*2. The error occurred because of CT input 1, 2, or both.

*3. This error may occur when updating the firmware.

*4. If the area in memory for restoring the adjustment value has been corrupted, the value cannot be restored.

Event types

Operation type	Setting	Direct action ●: ON/OFF changes at the value ○: ON/OFF changes when the value is exceeded	Reverse action ●: ON/OFF changes at the value ○: ON/OFF changes when the value is exceeded
No event	0	Always OFF	Always OFF
PV high limit	1		
PV low limit	2		
PV high/low limit	3		
Deviation high limit	4		
Deviation low limit	5		
Deviation high/low limit	6		
Deviation high limit (Final SP reference)	7		
Deviation low limit (Final SP reference)	8		
Deviation high/low limit (Final SP reference)	9		
Heater 1 burnout/Overcurrent	16		
Heater 1 shortcircuit	17		
Heater 2 burnout/Overcurrent	18		
Heater 2 shortcircuit	19		
Alarm (status)	23	ON if there is an alarm, otherwise OFF	OFF if there is an alarm, otherwise ON

: Initial value

* If the main setting is greater than the sub-setting, operations are performed with the settings automatically swapped.

Event types other than the above

Operation		Operation		Operation	
Type	Setting	Type	Setting	Type	Setting
SP high limit	10	MV high/low limit	15	MANUAL (status)	25
SP low limit	11	Loop diagnosis 1	20	AT in execution (status)	27
SP high/low limit	12	Loop diagnosis 2	21	During SP ramp	28
MV high limit	13	Loop diagnosis 3	22	Control action (status)	29
MV low limit	14	READY (status)	24	Timer (status)	32

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Specifications are subject to change without notice. (11)

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