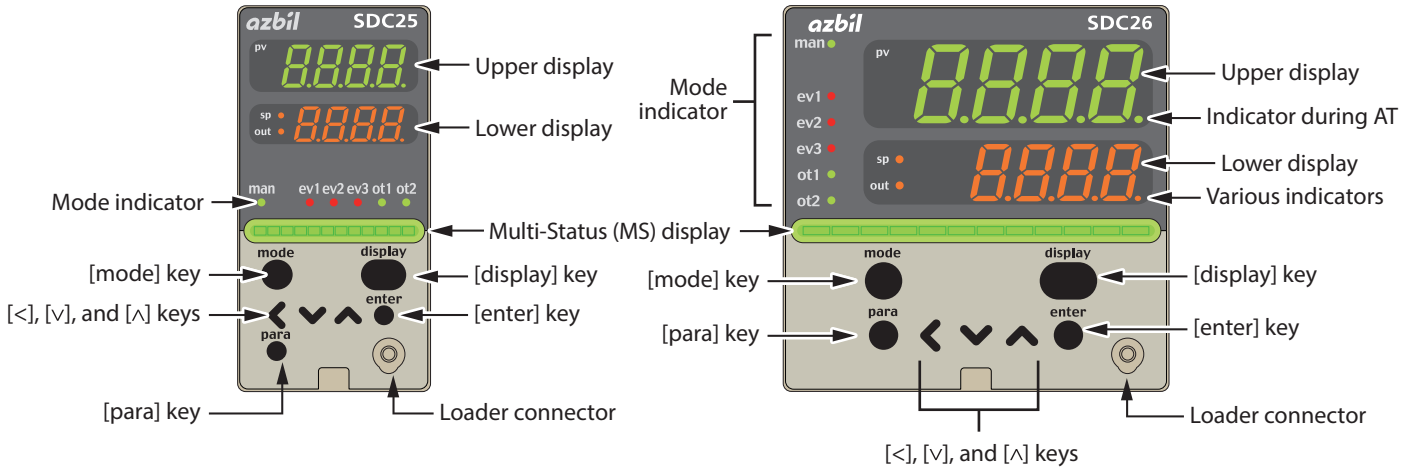
Quick Reference Guide for Model C25/26

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 C25/26 is needed, refer to the user's manuals: CP-SP-1149E for installation and configuration.

The most convenient way to configure the C25/26 is with the Smart Loader Package (model No. SLP-C35J50). Please contact the azbil Group or a distributor for more information.

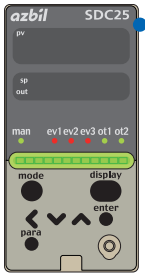


Upper display	This display shows either the PV value or the display value and set value for each displayed item. If an alarm is triggered, the normal display and alarm code are displayed alternately. During auto tuning (AT), the rightmost decimal point flashes twice repeatedly.
Lower display	This display shows either the SP/MV/CT or the display value and set value for each displayed item. The rightmost decimal point lights up or flashes to show RUN/READY mode or communications status, depending on the setting.
Multi-Status (MS) display	Turns ON in READY mode or when an alarm occurs, depending on the ON conditions and the current status. When lit, in addition to flashing and reciprocating between left and right, it performs MV graph, DI monitor, internal event monitor, and other display functions.
Mode indicators	man: Lights when MANUAL (AUTO mode if not lit) ev1, ev2, ev3: Lights when event relays are ON ot1, ot2: Lights when the control output is ON (always lit when the current output is used)
[mode] key	• When this key is pressed and held for more than 1 second in the operation display mode, any of the following operations from 0 to 7 which have been set previously can be executed: 0 : Mode key does not operate 1 : AUTO/MANUAL mode selection (Initial value) 2 : RUN/READY mode selection 3 : AT (Auto Tuning) start/stop selection 4 : LSP (Local SP) group selection 5 : Release all DO (Digital Output) latches 6 : Mode key does not operate 7 : ON/OFF selection of communication DI1
[display] key	This key is used to change the display item in the operation display mode. When pressing this key in the bank selection, bank setup, or user function setup display mode, the display is changed ot the operation display.
[para] key	When this key is kept pressed for 2 s. or longer in the operation display mode, the display is then changed to the setup display.
[<], [∨] , [∧] keys	Theses keys are used to increase or decrease the numeric value, or to shift the digit. The [∨] and [∧] keys are used to change the bank or display item.
[enter] key	This key is used to begin changing settings (display goes from lit to flashing) and to finalize new settings (display goes from flashing to steadily lit).
Loader connector	This connector is used for connecting to a PC using the dedicated cable supplied with the Smart Loader Package.

: Initial value

Flowchart of key operations and displays

When the power is turned ON



[display] key

Upper and lower displays remain off for 5s after power ON. Each mode indicator lights sequentially, and then the operation display appears.

[display] key

[para] key

PV value → SP value → (2)

LSP group number → SP value

PV value → MV value → (1)

Heat manipulated variable → MV value

Timer remaining time 3 → Internal event 3 delay time

Internal event 3 sub setting → Setting value

Internal event 3 main setting → Setting value

[display] key *3

[display] key *2

2-second press + hold of [para] key

User function

*1

UF-1 → UF-2 → ... → UF-7 → UF-8 → [para] key

[Mode] → [para] key or [V] key → **[SP]** → **[Event]** → **[PID]** → **[Parameter]** → **[Extended tuning]**

[Λ] key

[enter] key

2-second press + hold of [para] key

[enter] key

2-second press + hold of [para] key

(AUTO) For change from MANUAL to AUTO to **(2)**

(MANUAL) For change from AUTO to MANUAL to **(1)**

SP-1, PId.1, ..., SP-4, PId4

E1, E.1Sb, E.1HY, ..., ES, ES.Sb, ES.HY, E.Ion, E.IoF, ..., ES.on, ES.oF

P-1, I-1, d-1, rE-1, oL-1, oH-1, P-1C, I-1C, d-1C, oL.1C, oH.1C, ..., P-4, I-4, d-4, rE-4, oL-4, oH-4, P-4C, I-4C, d-4C, oL.4C, oH.4C

CtrL, At.oL, At.oH, diFF, oFFS, FL, rA, bI, CYU, CY, CYU2, CY2, tPt.Y, SPU, SPd

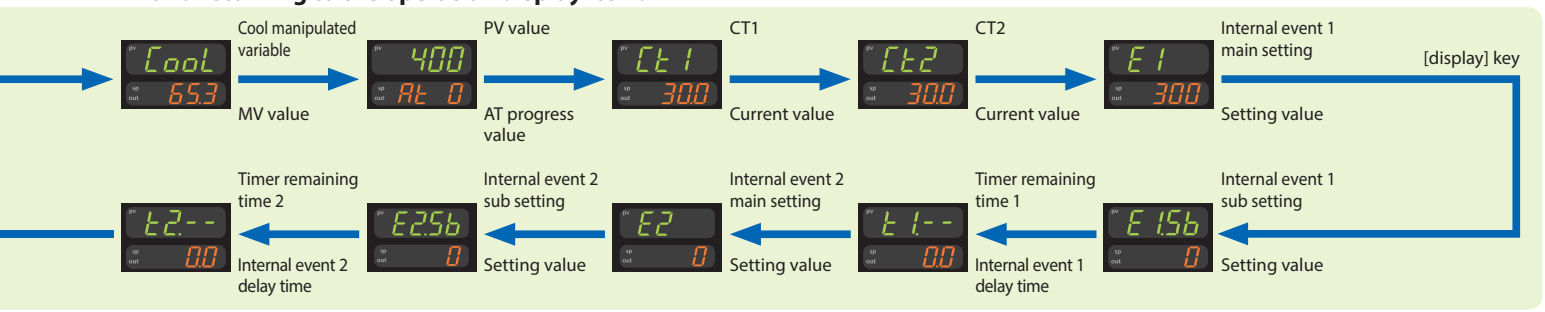
At.tY, JF.bd, SPL.9, At-P, At-I, At-d, CtrA, JF.ou

r---r, At, do.Lt, Cdl 1

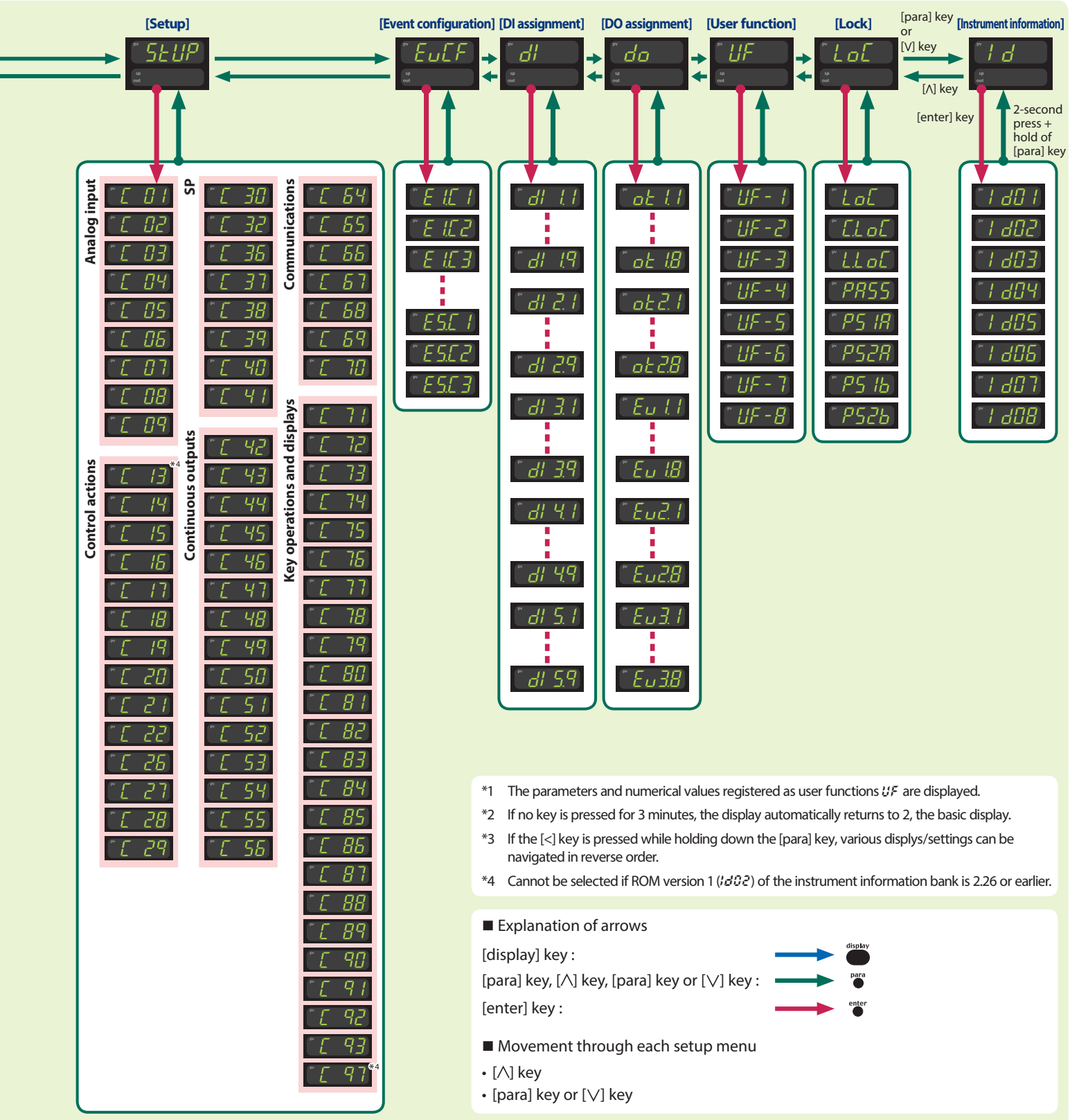
○ **Some items are not displayed depending on the availability of optional functions, model number, display setup (C73 to C78) and User level (C79).**

○ **Pressing [display] key while bank item or user function item is displayed has the effect of canceling and returning to the operation display item.**

Operation displays



Bank selection



*1 The parameters and numerical values registered as user functions UF are displayed.

*2 If no key is pressed for 3 minutes, the display automatically returns to 2, the basic display.

*3 If the [<] key is pressed while holding down the [para] key, various displys/settings can be navigated in reverse order.

*4 Cannot be selected if ROM version 1 (id02) of the instrument information bank is 2.26 or earlier.

■ Explanation of arrows

[display] key :

[para] key, [Λ] key, [para] key or [V] key :

[enter] key :

■ Movement through each setup menu

- [Λ] key
- [para] key or [V] key

Operation examples

Red letters : Items before operation

Blue letters : Items during operation

Setup of PV input range type

1

Press [display] once to get the operation display.

If the sensor has not been wired or is disconnected, an alarm for abnormal PV input (any one from AL01 to AL11) may appear on the upper display.

2

Press and hold [para] for more than 2s to get the parameter setup display.
nodE flashes on the upper display.

3

Press [∨] or [∧] repeatedly, and SEUP flashes on the upper display.

4

Press [enter].
The current set value for C01 (PV input range type) is displayed.

5

Press [enter].
The rightmost digit on the lower display flashes and its value can be changed.
Press [<], [∨] or [∧] to change to the desired sensor type in the PV input range list.
Then press [enter] to finalize your selection.
If the number is flashing, the [enter] key has not yet been pressed, and the setting has not yet been saved.

Setup of event operation type

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

1

Press [display] once to get the operation display.

2

Press and hold [para] for more than 2s to get the parameter setup display.
nodE flashes on the upper display.

3

Press [∨] or [∧] repeatedly to get EuCF flashing on the upper display.

4

Press [enter] to get E1.C1 on the upper display and 0 is displayed on the lower display.

0 on the lower display indicates that the event operation type is set to "none."

5

When [enter] is pressed, the rightmost digit on the lower display flashes.
Press [∨] or [∧] to get 4 flashing on the display.

4 on the lower display indicates that the event operation type is set for deviation high limit.

6

Press [enter], and the displayed value 4 on the lower display changes from flashing to continuously lit and the displayed value is set.

Similarly, use E2.C1 to set the event 2 operation type, and use E3.C1 for event 3.

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.

1

Press [display] once to get the operation display.

2

Press and hold [para] for more than 2s to get the parameter setup display.
nodE flashes on the upper display.

3

Press [enter] or [<] to get A--M on the upper display and AUto on the lower display.

If the control method is ON/OFF control and if Bit 3 (AT stop/start display) of the mode display setting (C73) is set to "disabled: 0," nothing is displayed.

4

Press [∨] as needed until At and At.oF appear on the upper and lower displays respectively.

5

When [enter] is pressed, At.oF flashes on the lower display.

The display flashes only in RUN and AUTO modes, and only if there is no PV problem.
Also, if DI is set to "AT stop/start", the display does not flash and the setting cannot be changed.

6

Press [∨] or [∧] once, and At.oF flashes on the lower display.

7

If [enter] is pressed, At.on remains steadily lit and AT begins.
During AT, the rightmost decimal point flashes twice repeatedly.
When AT is done, the light goes off and the new PID values go into effect.

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 values.
AT can also be stopped by changing the setting from At.on to At.oF (return to step 4 above).

Setup of SP value

1

Press [display] repeatedly so that the orange SP indicator lights up on the lower display.
The operation display now shows the SP.

2

If [enter] is pressed, the rightmost digit on the lower display flashes and numerical value can be changed.

3

Press [<], [∨] or [∧] to change to the desired SP value.
The flashing of the number indicates that the setting has not yet been finalized.

If an SP limit is in effect, the numerical value cannot be changed to a value above the limit. The SP limit must be changed first.

4

If [enter] is pressed, the displayed value is set and the display changes from flashing to continuously lit.

If the [display] key is pressed without pressing [enter] key, the status returns to that of step 1.

For step numbers indicated in red like **5**, the following precaution applies:

- If the key lock is set, the numerical value does not flash, and the value cannot be changed. To change a numerical value, cancel the key lock first.

AUTO/MANUAL mode selection

1 Press [display] once to get the operation display.

The [mode] key can be used for 1 of 7 different operations. The initial (factory) setting is "AUTO/MANUAL selection".

2 Press and hold [mode] for more than 2s, "mAn" flashes on the lower display.

If the control method is set to "ON/OFF control" and if the DI assignment is "AUTO/MANUAL," the display does not blink and the setting cannot be changed.

3 When "mAn" appears, stop pressing [mode]. The MV is shown on the lower display. The rightmost digit of the MV on the lower display flashes and its value can be changed.

4 Press [<], [v] or [^] to change to the desired MV value. Even while the number is flashing, the MV is changed at the same time that the number is changed.

For the flashing MV in step 3, either bumpless transition (the same value as before the change) or preset MANUAL value (the value set in setup C20) can be selected (in setup C19, Output operation at changing Auto/Manual).

Setup of PID value

1 Press [display] once to get the operation display.

2 Press and hold [para] for more than 2s to get the parameter setup display. "modE" flashes on the upper display.

3 Press [v] or [^] repeatedly until "PId" is flashing on the upper display.

4 When [enter] is pressed, "P-1" (for proportional band of PID group No. 1) is shown on the upper display, and the preset value is shown on the lower display.

If the control method is "ON/OFF control," nothing is displayed.

5 Press [enter]. The rightmost digit on the lower display flashes and its numerical value can be changed. Press [<], [v] or [^] to change to the desired proportional band setting. The flashing of the number indicates that the setting change has not yet been finalized.

6 If [enter] is pressed, the changed numerical value is set and changes from flashing to continuously lit.

The proportional band can be set in a range from 0.1 to 999.9%.

Similarly, use I-1 to set the integral time (0 to 9999s), and d-1 to set the derivative time (0 to 9999s).

Setup of event value

In this example, the event set value and hysteresis for the event 1 operation type is set to deviation high limit.

1 Press [display] once to get the operation display.

2 Press and hold [para] for more than 2s to get the parameter setup display. "modE" flashes on the upper display.

3 Press [v] twice or [^] repeatedly, and "Eu" flashes on the upper display.

4 Press [enter] to get E1 on the upper display and 0 is displayed on the lower display.

0 on the lower display indicates that the event main setting is "0".

5 If [enter] is pressed, the rightmost digit on the lower display flashes, and can be changed. Press [<], [v] or [^], and change to the desired value for event set value. In this case, the flashing of the numerical value implies that it is not yet set.

6 If [enter] is pressed, the changed numerical value is set and changes from flashing to continuously lit.

Similarly, use E2 to set a value for event 2, and E3 to set a value for event 3.

7 To continue from this point and set hysteresis as well, press [v] twice or [^] repeatedly to get E1.HY on the upper display. The lower display says 5.

5 on the lower display indicates that the event hysteresis is "5".

8 In the same way that event settings were changed, press [enter] to make the number flash, and then press [<], [v] or [^] to change to the desired setting for hysteresis. After that, press [enter] to finalize the setting.

Similarly, use E2.HY to set a value for event 2, and E3.HY to set a value for event 3.

Memo

List of parameters

: Essential parameters for PV measurement and control
: Basic parameters
: Required parameters when using optional functions

List of operation displays

Display Upper display: PV Lower display: SP	Item	Contents	Initial value	Setting value
PV SP	SP (Target value)	SP low limit to SP high limit	0	
LSP 1 (Display example) LSP	LSP No. (1st digit: Value at the right end digit)	1 to LSP system group (Max. 8)	1	
PV MV	MV (Manipulated Variable)	-10.0 to +110.0% Setting is enabled in MANUAL mode (Numeric value flashed)	–	
HERt Numeric value	Heat MV (Manipulated Variable)	Setting is disabled. -10.0 to +110.0%	–	
Cool Numeric value	Cool MV (Manipulated Variable)		–	
PV Rt 1 (Display example)	AT progress display (1st digit= Numeric value at right end digit)	Setting is disabled.	–	
Ct1 Numeric value	CT current value 1	Setting is disabled.	–	
Ct2 Numeric value	CT current value 2	Setting is disabled.	–	
E1 Numeric value	Internal Event 1 main setting	-1999 to +9999U or 0 to 9999U	0	
E1.Sb Numeric value	Internal Event 1 sub setting		0	
t1. - - (Display example) Numeric value	Timer remaining time 1	Setting is disabled. Upper display: The distinction by ON delay or OFF delay is displayed at the side location of "t1.".	–	
E2 Numeric value	Internal Event 2 main setting	Same as Internal Event 1 main setting	0	
E2.Sb Numeric value	Internal Event 2 sub setting	Same as Internal Event 1 sub setting	0	
t2. - - (Display example) Numeric value	Timer remaining time 2	Same as Timer remaining time 1	–	
E3 Numeric value	Internal Event 3 main setting	Same as Internal Event 1 main setting	0	
E3.Sb Numeric value	Internal Event 3 sub setting	Same as Internal Event 1 sub setting	0	
t3. - - (Display example) Numeric value	Timer remaining time 3	Same as Timer remaining time 1	–	

List of parameter setting displays

[Mode bank]

Display	Item	Contents	Initial value	Setting value
A - M	AUTO/MANUAL	AUto: AUTO mode MAn: MANUAL mode	AUTO	
r - r	RUN/READY	rUn: RUN mode rdY: READY mode	RUN	
At	AT stop/start	At.oF: AT stop At.on: AT start	AT stop	
do.Lt	Release all DO latches	Lt.on: Latch continue Lt.oF: Latch release	Latch continue	
C.di1	Communication DI1	di.oF: OFF di.on: ON	OFF	

[SP bank]

Display		Item	Contents	Initial value	Setting value
SP - 1 to SP - 4		SP (for LSP 1 to 4)	SP low limit to SP high limit	0	
Pid. 1 to Pid.4	●	PID group No. (LSP 1 to 4)	1 to 4	1	

[Event bank]

Display		Item	Contents	Initial value	Setting value
E1 to E5		Internal Event 1 to 5 main setting	-1999 to +9999 or 0 to 9999 *	0	
E1.Sb to E5.Sb		Internal Event 1 to 5 sub setting		0	
E1.HY to E5.HY		Internal Event 1 to 5 hysteresis	0 to 9999 *	5	
E1.on to E5.on	●	Internal Event 1 to 5 ON delay time	0.0 to 999.9 or 0 to 9999	0	
E1.oF to E5.oF	●	Internal Event 1 to 5 OFF delay time		0	

* The decimal point position varies by meeting the internal event operation type.

[PID bank]

Display	Item	Contents	Initial value	Setting value
P - 1 to P - 4	Proportional band (PID1 to 4 group)	0.1 to 999.9%	5.0	
I - 1 to I - 4	Integration time (PID1 to 4 group)	0 to 9999s or 0.0 to 999.9s (No integration control action when set at "0")	120	
d - 1 to d - 4	Derivative time (PID1 to 4 group)	0 to 9999s or 0.0 to 999.9s (No derivative control action when set at "0")	30	
rE - 1 to rE - 4	Manual reset (PID1 to 4 group)	-10.0 to +110.0%	50.0	
oL - 1 to oL - 4	MV low limit (PID1 to 4 group)	-10.0 to +110.0%	0.0	
oH - 1 to oH - 4	MV high limit (PID1 to 4 group)	-10.0 to +110.0%	100.0	
P - 1C to P - 4C	Cool-side proportional band (PID1 to 4 group)	0.1 to 999.9%	5.0	
I - 1C to I - 4C	Cool-side Integration time (PID1 to 4 group)	0 to 9999s or 0.0 to 999.9s (No integration control action when set at "0")	120	
d - 1C to d - 4C	Cool-side derivative time (PID1 to 4 group)	0 to 9999s or 0.0 to 999.9s (No derivative control action when set at "0")	30	
oL.1C to oL.4C	Cool-side MV low limit (PID1 to 4 group)	-10.0 to +110.0%	0.0	
oH.1C to oH.4C	Cool-side MV high limit (PID1 to 4 group)	-10.0 to +110.0%	100.0	

[Parameter bank]

	Display		Item	Contents	Initial value	Setting value
Control	Ctrl		Control method	0: ON/OFF control 1: Fixed PID	0 or 1	
	At. oL		MV low limit at AT	-10.0 to +110.0%	0.0	
	At. oH		MV high limit at AT	-10.0 to +110.0%	100.0	
	diFF		ON/OFF control differential	0 to 9999U	5	
	oFFS	●	ON/OFF control operating point offset	-1999 to +9999U	0	
PV	FL		PV filter	0.0 to 120.0s	0.0	
	rR	●	PV ratio	0.001 to 9.999	1.000	
	bi		PV bias	-1999 to +9999U	0	
Time proportional output	CYU	●	Time proportional cycle unit 1	0 to 3 *1	0	
	CY		Time proportional cycle 1	5 to 120s or 1 to 120s *2	10 or 2	
	CYU2	●	Time proportional cycle unit 2	0 to 3 *1	0	
	CY2		Time proportional cycle 2	5 to 120s or 1 to 120s *2	10 or 2	
	tP. tY	●	Time proportional cycle mode	0: Controllability aiming type 1: Operation end service life aiming type (Only ON/OFF operation within Time proportional cycle)	0 or 1	
SP	SPU	●	SP up ramp (U/min)	0.0 to 999.9U(No ramp when set at "0.0U")	0.0	
	SPd	●	SP down ramp (U/min)		0.0	

*1 0: Unit of "1s" 1: Fixed at 0.5s 2: Fixed at 0.2s 3: Fixed at 0.1s
*2 5 to 120s when output includes the relay output
U: Unit Maximum unit of Industrial volume in PV range (°C, Pa,L/min, etc.)

[Extended tuning bank]

Display		Item	Contents	Initial value	Setting value
At.tY		AT type	0: Normal 1: Immediate response 2: Stable *1	0	
uF.bd	●	Just-FITTER setting band	0.00 to 10.00	0.30	
SP.LG	●	SP lag constant	0.0 to 999.9	0.0	
At-P	●	AT Proportional Band adjust	0.00 to 99.99	1.00	
At-I	●	AT Integral time adjust	0.00 to 99.99	1.00	
At-d	●	AT Derivative time adjust	0.00 to 99.99	1.00	
Ctr.A	●	Control algorithm	0: PID(Conventional PID) 1: Ra-PID(High-performance PID)	0	
uF.ou	●	Just-FITTER assistance coefficient	0 to 100	0	

*1 Normal = Standard control characteristics, Immediate response = Control characteristics that respond immediately to external disturbance, Stable = Control characteristics having less up/down fluctuation of PV

List of setup setting displays

[Setup bank]

	Display		Item	Contents	Initial value	Setting value
Analog input	C01		PV input range type	For details, refer to the PV Input Range Table	88	
	C02		Temperature unit	0: Celsius (°C) 1: Fahrenheit (°F)	0	
	C03	●	Cold junction compensation	0: Performed (internal) 1: Not performed (external)	0	
	C04		Decimal point position	0: No decimal point 1 to 3: 1 to 3 digits below decimal point	0	
	C05		PV range low limit	When the PV input type is DC voltage/DC current, -1999 to +9999U	0	
	C06		PV range high limit		1000	
	C07	●	SP low limit	PV input range low limit to PV input range high limit	0	
	C08	●	SP high limit		1000	
	C09	●	PV square root extraction dropout	0.0 to 100.0% (PV square root extraction is not performed when set at "0.0".)	0.0	
Control action	C13	●	PID calculation adjustment function *1	0: Enabled 1: Disabled	0	
	C14		Control action (Direct/Reverse)	0: Heat control (Reverse action) 1: Cool control (Direct action)	0	
	C15	●	Output operation at PV alarm	0: Control calculation is continued. 1: Output at PV alarm is output.	0	
	C16	●	Output at PV alarm	-10.0 to +110.0%	0.0	
	C17	●	Output at READY (Heat)	-10.0 to +110.0%	0.0	
	C18	●	Output at READY (Cool)	-10.0 to +110.0%	0.0	
	C19	●	Output operation at changing AUTO/MANUAL	0: Bumpless transfer 1: Preset	0	
	C20	●	Preset MANUAL value	-10.0 to +110.0%	0.0 or 50.0	
	C21	●	Initial output type (mode) of PID control	0: Auto 1: Not initialized 2: Initialized	0	
	C22	●	Initial output of PID control	-10.0 to +110.0%	0.0 or 50.0	
	C26		Heat/Cool control	0: Not used 1: Used	0	
	C27	●	Heat/Cool	0: Normal 1: Energy saving	0	
	C28		Heat/Cool control dead zone	-100.0 to +100.0%	0.0	
	C29	●	Heat/Cool change point	-10.0 to +110.0%	50.0	
SP	C30		LSP system group	1 to 4	1	
	C31	●	SP ramp type	0: Standard 1: Multi-ram 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	
	C32	●	SP ramp unit	0: 0.1U/s 1: 0.1U/min 2: 0.1U/h	1	
	C36		CT1 operation type	0: Heater burnout detection 1: Current value measurement	0	
	C37		CT1 output	0 to 1: Control output 1 to 2, 2 to 4: Event output 1 to 3	0	
	C38		CT1 measurement wait time	30 to 300ms	30	
	C39		CT2 operation type	Same as CT1	0	
	C40		CT2 output	Same as CT1	0	
	C41		CT2 measurement wait time	Same as CT1	30	
Continuous output	C42		Control output 1 range	1: 4 to 20mA 2: 0 to 20mA	1	
	C43		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: Invalid 10: SP+MV 11: PV+MV	0	
	C44		Control output 1 scaling low limit	-1999 to +9999U	0.0	
	C45		Control output 1 scaling high limit		100.0	
	C46		Control output 1 MV scalable bandwidth	0 to 9999 (Valid when control output 1 type is 10 or 11)	200	
	C47		Control output 2 range	Same as control output 1	1	
	C48		Control output 2 type	Same as control output 1	3	
	C49		Control output 2 scaling low limit	Same as control output 1	0	
	C50		Control output 2 scaling high limit	Same as control output 1	1000	
	C51		Control output 2 MV scalable bandwidth	Same as control output 1	200	
	C52		Auxiliary output range	Same as control output 1	1	
	C53		Auxiliary output type	Same as control output 1	3	
	C54		Auxiliary output scaling low limit	Same as control output 1	0	
	C55		Auxiliary output scaling high limit	Same as control output 1	1000	
	C56		Auxiliary output MV scalable bandwidth	Same as control output 1	200	
Communication	C64		Communication type	0: CPL 1: Modbus (ASCII format) 2: Modbus (RTU format)	0	
	C65		Station address	0 to 127 (Communication is disabled when set at "0".)	0	
	C66		Transmission speed (bps)	0: 4800 1: 9600 2: 19200 3: 38400	2	
	C67		Data format (Data length)	0: 7 bits 1: 8 bits	1	
	C68		Data format (Parity)	0: Even parity 1: Odd parity 2: No parity	0	
	C69		Data format (Stop bit)	0: 1 bit 1: 2 bits	0	
	C70	●	Communication minimum response time	1 to 250ms	3	
	C71	●	Key operation type	0: Standard type 1: Special type	0	
	C72		[mode] key function	0: Invalid 1: AUTO/MANUAL selection 2: RUN/READY selection 3: AT Stop/Start 4: LSP group selection 5: Release all DO latches 6: Invalid 7: Communication DI1 selection 8: Invalid	1	
	C73	●	MODE display setup (Sum of the weighting)	Bit 0: AUTO/MANUAL display (Enabled: +1) Bit 1: RUN/READY display (Enabled: +2) Bit 2: Invalid Bit 3: AT Stop/Start display (Enabled: +8) Bit 4: Release all DO latches display (Enabled: +16) Bit 5: Communication DI1 ON/OFF display (Enabled: +32) Other invalid setting, 0, +4, +64, +128	255	
	C74	●	PV/SP display setup (Sum of the weighting)	Bit 0: PV display (Enabled: +1) Bit 1: SP display (Enabled: +2) Bit 2: LSP group number display (Enabled: +4) Other invalid setting, 0, +8	15	
	C75	●	MV display setup (Sum of the weighting)	Bit 0: MV display (Enabled: +1) Bit 1: Heat MV/cool MV display (Enabled: +2) Bit 2: Invalid Bit 3: AT progress display (Enabled: +8) Other invalid setting, 0, +4	15	
	C76	●	Event setting value 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	
	C77	●	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	
	C78	●	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	0	
	C79		User level	0: Simple configuration 1: Standard configuration 2: High function configuration	1	

• Items marked ● in the tables are displayed in standard and/or high function configuration.
• To change a user level, refer to **Changing the user level** in the lower right part of this page.

Key operation • display

Display		Item	Contents	Initial value	Setting value
C80	●	LED monitor	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: Flashing in READY mode	0	
C81	●	MS indicating lamp ON condition (1st priority)	0: Normally OFF 1: Normally ON 2 to 6: Internal event 1 to 5 7 to 9: Invalid 10 to 13: Undefined 14: MV1 15: MV2 16 to 17: Undefined 18 to 21: DI1 to 4 22 to 25: Undefined 26 to 30: Internal contact 1 to 5 31 to 33: Undefined 34 to 37: Communication DI 1 to 4 38: MANUAL 39: READY 40: Invalid 41: AT 42: During ramp 43: Undefined 44: Alarm 45: PV alarm 46: Undefined 47: [mode] key pressing status 48: Event output 1 terminal status 49: Control output 1 terminal status	39	
C82	●	MS indicating lamp ON status (1st priority)	0: lit 1: Slow flashing 2: Flashing twice 3: Fast flashing 4: Left to right 5: Right to left 6: Reciprocating between left and right 7: Deviation OK 8: Deviation graph 9: MV graph 10: Heat-side MV graph 11: Cool-side MV graph 12: Invalid 13: DI monitor 14: Internal contact monitor 15: Internal event monitor	1	
C83	●	MS indicating lamp ON condition (2nd priority)	Same as MS display, Condition (1st priority)	44	
C84	●	MS indicating lamp ON status (2nd priority)	Same as MS display, Status (1st priority)	6	
C85	●	MS indicating lamp ON condition (3rd priority)	Same as MS display, Condition (1st priority)	1	
C86	●	MS indicating lamp ON status (3rd priority)	Same as MS display, Status (1st priority)	9	
C87	●	MS indicating lamp deviation range	0 to 9999U	5	
C88	●	Special function	0 to 15 (This value becomes "0" when the power is turned ON.)	0	
C89	●	Zener barrier adjustment	The value can be changed with the adjustment. The numeric value cannot be directly input with the manual operation.	0.00	
C90	●	Number of CT1 turns	0: 800 turns 1 to 40: CT turns divided by 100	8	
C91	●	Number of CT1 power wire loops	0: 1 time 1 to 6: Number of times	1	
C92	●	Number of CT2 turns	0: 800 turns 1 to 40: CT turns divided by 100	8	
C93	●	Number of CT2 power wire loops	0: 1 time 1 to 6: Number of times	1	
C97		PV input failure (under range) type *1	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	

*1 Cannot be selected if ROM version 1 (id02) of the instrument information bank is 2.26 or earlier.

EvCF [Event configuration bank]

Display		Item	Contents	Initial value	Setting value
E1.C1 to E5.C1		Internal event 1 to 5 Configuration 1 Operation type	Refer to event type (see page 8)	0	
E1.C2 to E5.C2		Internal event 1 to 5 Configuration 2	The digits are determined to 1st, 2nd, 3rd, and 4th digit from the right end.		
		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	
		4th digit: Undefined	0	0	
E1.C3 to E5.C3	●	Internal event 1 to 5 Configuration 3	The digits are determined to 1st, 2nd, 3rd, and 4th digit from the right end.		
		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: 0.1s 1: 1s 2: 1min	0	
		4th digit: Undefined	0	0	

di [DI assignment bank]

Display		Item	Contents	Initial value	Setting value
di1.1 to di5.1		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 Stop/Start 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 all DO latches (Continue/Release) 19: Invalid 20: Invalid	0	
di1.2 to di5.2	●	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	
di1.3 to di5.3	●	Internal contact 1 to 5 Input assignment A	0: Normally opened 1: Normally closed 2: DI1 3: DI2 4: DI3 5: DI4 6 to 9: Undefined 10 to 14: Internal event 1to 5 15 to 17: Undefined 18 to 21: Communication DI1 to 4 22: MANUAL 23: READY 24: Undefined 25: AT running 26: During SP ramp 27: Undefined 28: Alarm occurs 29: PV alarm occurs 30: Undefined 31: mode key pressing status 32: Event output 1 status 33: Control output 1 status	2 to 5 or 0	
di1.4 to di5.4	●	Internal contact 1 to 5 Input assignment B		0	
di1.5 to di5.5	●	Internal contact 1 to 5 Input assignment C		0	
di1.6 to di5.6	●	Internal contact 1 to 5 Input assignment D		0	
di1.7 to di5.7	●	Internal contact 1 to 5 Polarity A to D	The digits are determined to 1st, 2nd, 3rd and 4th digit from the right end.		
		1st digit: Polarity A	0: Direct 1: Reverse	0	
		2nd digit: Polarity B		0	
		3rd digit: Polarity C		0	
		4th digit: Polarity D		0	
di1.8 to di5.8	●	Internal contact 1 to 5 Polarity	0: Direct 1: Reverse	0	
di1.9 to di5.9	●	Internal contact 1 to 5 Internal event No. assignment	0: Every Internal Event 1 to 8: Internal Event No.	0	

do [DO assignment bank]

Display		Item	Contents	Initial value	Setting value
ot1.1 to ot2.1 Ev1.1 to Ev3.1	●	Control output 1 to 2, event output 1 to 3 Operation type	0: Default output 1 to 2: MV1 to 2 3 to 6: Function 1 to 4	0	
ot1.2 to ot2.2 Ev1.2 to Ev3.2	●	Control output 1 to 2, event output 1 to 3 Output assignment A	0: Normally opened 1: Normally closed 2 to 6: Internal Event 1 to 5 7 to 9: Invalid 10 to 13: Undefined 14 to 15: MV1 to 2 16 to 17: Undefined 18 to 21: DI1 to 4 22 to 25: Undefined 26 to 30: Internal Contact 1 to 5 31 to 33: Undefined 34 to 37: DI1 to 4 38: MANUAL 39: READY 40: Undefined 41: AT running 42: During SP ramp 43: Undefined 44: Alarm occurs 45: PV alarm occurs 46: Undefined 47: Mode key pressing status 48: Event output 1 status 49: Control output 1 status	14: Output 1 15: Output 2 2: Event 1 3: Event 2 4: Event 3	
ot1.3 to ot2.3 Ev1.3 to Ev3.3	●	Control output 1 to 2, event output 1 to 3 Output assignment B		0	
ot1.4 to ot2.4 Ev1.4 to Ev3.4	●	Control output 1 to 2, event output 1 to 3 Output assignment C		0	
ot1.5 to ot2.5 Ev1.5 to Ev3.5	●	Control output 1 to 2, event output 1 to 3 Output assignment D		0	
ot1.6 to ot2.6 Ev1.6 to Ev3.6	●	Control output 1 to 2, event output 1 to 3 Polarity A to D	The digits are determined to 1st, 2nd, 3rd, and 4 th digit from the right end.		
		1st digit: Polarity A	0: Direct 1: Reverse	0	
		2nd digit: Polarity B		0	
		3rd digit: Polarity C		0	
		4the digit: Polarity D		0	
ot1.7 to ot2.7 Ev1.7 to Ev3.7	●	Control output 1 to 2, event output 1 to 3 Polarity	0: Direct 1: Reverse	0	
ot1.8 to ot2.8 Ev1.8 to Ev3.8	●	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 value
UF-1 to UF-8	●	User function 1 to 8	–	–	

LoC [Lock bank]

Display		Item	Contents	Initial value	Setting value
LoC		Key lock	0: All settings are possible 1: Mode, event, operation display, SP, UF, lock, manual MV can be set 2: Operation display, SP, UF, lock, manual MV can be set 3: UF, lock, manual MV can be set	0	
C.LoC	●	Communication lock	0: read/write enabled 1: read/write disabled	0	
L.LoC	●	Loader lock	0: read/write enabled 1: read/write disabled	0	
PASS		Password display	0 to 15 (5: Password 1A to 2B display)	0	
PS1A		Password 1A	0000 to FFFF (Hexadecimal value)	0000	
PS2A		Password 2A	0000 to FFFF (Hexadecimal value)	0000	
PS1b		Password 1B	0000 to FFFF (Hexadecimal value)	0000	
PS2b		Password 2B	0000 to FFFF (Hexadecimal value)	0000	

id [Instrument information bank]

Display		Item	Contents	Initial value	Setting value
id01	●	ROM ID	1: Fixed	0	
id02	●	ROM Version 1	XX. XX (2 digits after decimal point)	–	
id03	●	ROM Version 2	XX. XX (2 digits after decimal point)	–	
id04	●	Loader information		–	
id05	●	EST information		–	
id06	●	Manufacturing date code (year)	Subtract 2000 from the year. Example: "3" means the year 2003.	–	
id07	●	Manufacturing date code (month, day)	Month + day divided by 100. Example: "12.01" means the 1st day of December.	–	
id08	●	Serial No.		–	

Precaution for setup

- The type of auto tuning can be changed by changing the value of AT.tY (AT type) in the extended tuning bank. Set it to match the control characteristics.

Memo

Changing the user level

This controller's user level can be set to 1 of 3 types in setup C79. The number of possible displays and settings decreases according to the user level: high function > standard > simple. All items are displayed when high function is selected.

1 Press [display] once to get the operation display.
Next, press and hold [para] for more than 2s to get the parameter setup display. mode flashes on the upper display.

2 Press [v] or [^] repeatedly as needed to get SEUP flashing on the upper display.

3 Press [enter].
C01 is shown on the upper display.
Press [<], [v] or [^] to change to C79 (user level).

4 When [enter] is pressed, the lower display flashes.
Press [v] or [^] to change to the desired setting, and press [enter] to finalize your selection.

0: Simple configuration
1: Standard configuration (initial value)
2: High function configuration

PV input range table

[Thermocouple]

C01 set value	Sensor type	Range (°C)	Range (°F)
1	K	-200 to +1200	-300 to +2200
2	K	0 to 1200	0 to 2200
3	K	0.0 to 800.0	0 to 1500
4	K	0.0 to 600.0	0 to 1100
5	K	0.0 to 400.0	0 to 700
6	K	-200.0 to +400.0	-300 to +700
7	K	-200.0 to +200.0	-300 to +400
8	J	0 to 1200	0 to 2200
9	J	0.0 to 800.0	0 to 1500
10	J	0.0 to 600.0	0 to 1100
11	J	-200.0 to +400.0	-300 to +700
12	E	0.0 to 800.0	0 to 1500
13	E	0.0 to 600.0	0 to 1100
14	T	-200.0 to +400.0	-300 to +700
15	R	0 to 1600	0 to 3000
16	S	0 to 1600	0 to 3000
17	B	0 to 1800	0 to 3300
18	N	0 to 1300	0 to 2300
19	PL II	0 to 1300	0 to 2300
20	WRe5-26	0 to 1400	0 to 2400
21	WRe5-26	0 to 2300	0 to 4200
22	Ni-Ni-Mo	0 to 1300	0 to 2300
23	PR40-20	0 to 1900	0 to 3400
24	DIN U	-200.0 to +400.0	-300 to +700
25	DIN L	-100.0 to +800.0	-150 to +1500
26	Gold iron chromel	0.0K to 360.0 K	0 to 360 K

[RTD]

C01 set value	Sensor type	Range (°C)	Range (°F)
41	Pt100	-200 to +500	-300 to +900
42	JPt100	-200 to +500	-300 to +900
43	Pt100	-200 to +200	-300 to +400
44	JPt100	-200 to +200	-300 to +400
45	Pt100	-100 to +300	-150 to +500
46	JPt100	-100 to +300	-150 to +500
47	Pt100	-100 to +200	-150 to +400
48	JPt100	-100 to +200	-150 to +400
49	Pt100	-100 to +150	-150 to +300
50	JPt100	-100 to +150	-150 to +300
51	Pt100	-50.0 to +200.0	-50 to +400
52	JPt100	-50.0 to +200.0	-50 to +400
53	Pt100	-50.0 to +100.0	-50 to +200
54	JPt100	-50.0 to +100.0	-50 to +200
55	Pt100	-50.0 to +100.0	-50 to +200
56	JPt100	-60.0 to +40.0	-60 to +100
57	Pt100	-60.0 to +40.0	-60 to +100
58	JPt100	-40.0 to +60.0	-40 to +140
59	Pt100	-40.0 to +60.0	-40 to +140
60	JPt100	-10.00 to +60.00	-10 to +140
61	Pt100	-10.00 to +60.00	-10 to +140
62	JPt100	0.0 to 100.0	0 to 200
63	Pt100	0.0 to 100.0	0 to 200
64	JPt100	0.0 to 200.0	0 to 400
65	Pt100	0.0 to 300.0	0 to 500
66	JPt100	0.0 to 300.0	0 to 500
67	Pt100	0 to 500	0 to 900
68	JPt100	0 to 500	0 to 900

[DC voltage/DC current]

C01 set value	Input type	Range
81	0 to 10 mV	The scaling and decimal point position can be changed variably in a range of –1999 to +9999
82	-10 to +10 mV	
83	0 to 100 mV	
84	0 to 1 V	
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

*1 • The accuracy of the B thermocouple is ±4.0 %FS for a range of 260 °C or less, ±0.4 %FS for 260 to 800 °C. The PV values under 20 °C are not shown.
• The accuracy of the No.23 (sensor type PR40-20) is ±2.5 %FS for 0 to 300 °C, and ±1.5 %FS for 300 to 800 °C, ±0.5 %FS for 800 to 1900 °C.
• The accuracy of the No.26 (sensor type gold iron chromel) is ±2.0 K.

*2 The indicated low limit for a B thermocouple is 20°C. However, if ROM version 1 of the instrument information bank (J802) is prior to 2.04, the value is -180°C.

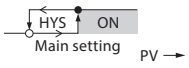
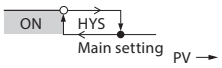
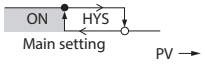
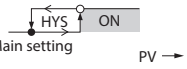
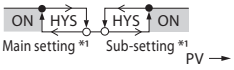
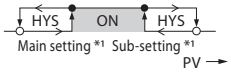
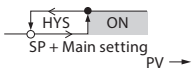
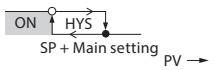
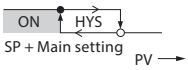
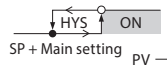
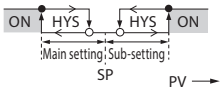
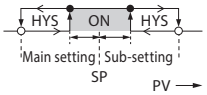
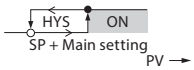
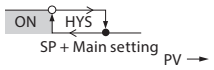
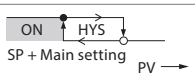
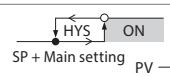
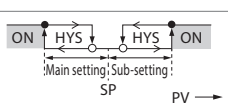
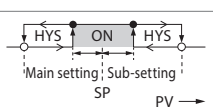
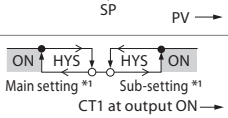
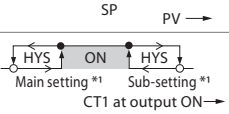
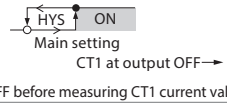
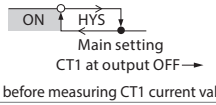
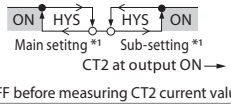
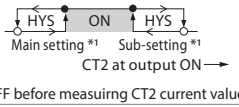
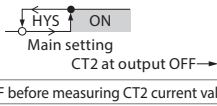
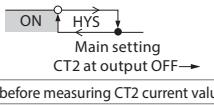
List of alarm codes

	Alarm code	Failure name	Cause	Corrective action
Input failure	AL01	PV input failure (Over-range)	Sensor burnout, incorrect wiring, incorrect PV input type setting	Check the wiring. Set the PV input type again.
	AL02	PV input failure (Under-range)	Sensor burnout, incorrect wiring, incorrect PV input type setting	
	AL03	CJ failure	Terminal temperature is faulty (thermocouple).	Check the ambient temperature.
		PV input failure (RTD)	Sensor burnout, incorrect wiring	Check the wiring.
	AL11	CT input failure (Over-range) (CT input 1 or 2, or both)	A current exceeding the upper limit of the display range was measured. The number of CT turns or the number of CT power wire loops is incorrectly set, or wiring is incorrect.	• Use a CT with the correct number of turns for the display range. • Reset the number of CT turns. • Reset the number of CT power wire loops. • Check the wiring.
Unit failure	AL70	A/D conversion failure	A/D converter is faulty.	Replace the unit.
	AL95	Parameter failure	Power is shut-down while the data is being set, or data is corrupted by noise.	• Restart the unit. • Set the data again (set data for AL95/97 and adjustment data for AL96/98. • Replace the unit.
	AL96	Adjustment data failure	Power is shut-down while the data is being set, or data is corrupted by noise.	
	AL97	Parameter failure (RAM area)	Data is corrupted by noise.	
	AL98	Adjustment data failure (RAM area)	Data is corrupted by noise.	
	AL99	ROM failure	ROM (memory) is faulty.	• Reset the unit. • Replace the unit.

Handling Precautions

- If ROM version 1 (J802) of the instrument information bank is 2.04 or earlier, CT input failure (AL11) is not displayed.

Event type

Operation type	Set value	Direct action ●: shows that the ON/OFF is changed at this value. ○: shows that the ON/OFF is changed at a point that "1U" is added to this value.	Reverse action ●: shows that the ON/OFF is changed at this value. ○: shows that the ON/OFF is changed at a point that "1U" is added to this value.
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/ Over-current	16	 OFF before measuring the CT1 current value	 OFF before measuring CT1 current value
Heater 1 short-circuit	17	 OFF before measuring CT1 current value	 OFF before measuring CT1 current value
Heater 2 burnout/ Over-current	18	 OFF before measuring CT2 current value	 OFF before measuirng CT2 current value
Heater 2 short-circuit	19	 OFF before measuring CT2 current value	 OFF before measuring CT2 current value
Alarm (status)	23	ON if alarm occurs (alarm code AL01 to 99). OFF in other cases.	OFF if alarm occurs (alarm code AL01 to 99). ON in other cases.

: initial value

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

Event types other than the above:

Operation type	Set value
SP high limit	10
SP low limit	11
SP high/low limit	12
MV high limit	13
MV low limit	14
MV high/low limit	15

Operation type	Set value
Loop diagnosis 1	20
Loop diagnosis 2	21
Loop diagnosis 3	22
READY (status)	24
MANUAL (status)	25
RSP (status) *1	26

Operation type	Set value
During AT (status)	27
During SP ramp	28
Control action (status)	29
ST settling standby (status) *1	30
Estimated position contorol (status) *1	31
Timer (status)	32

*1 Invalid in this unit

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Specifications are subject to change without notice. (11)

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