SDC25/26 Quick Reference Guide
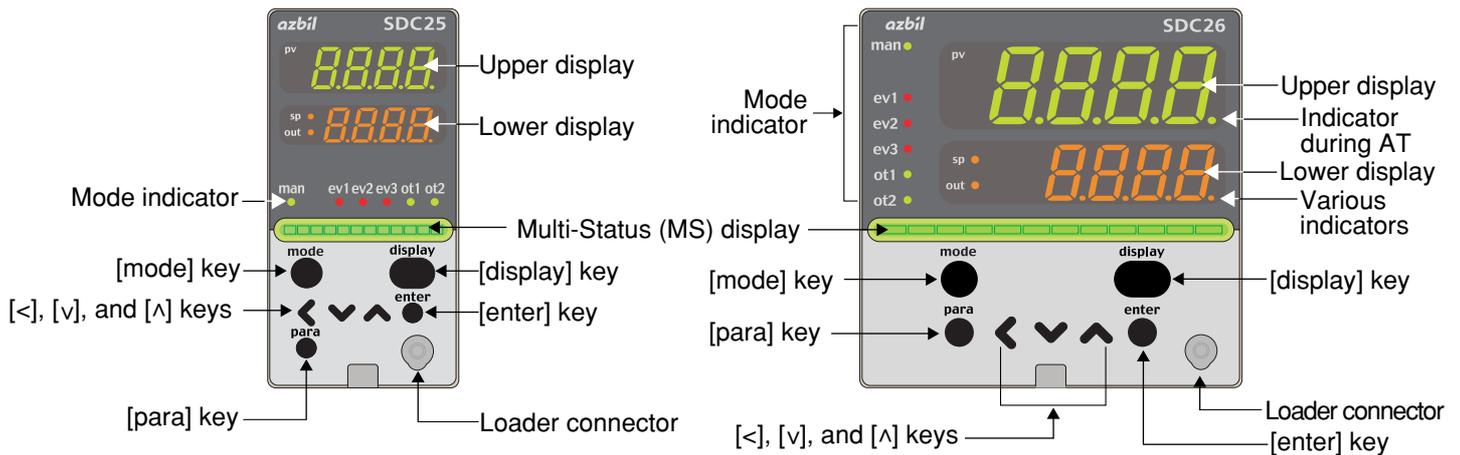
This guide offers a summary of key operations, parameter flowcharts, and settings, for convenient reference at the operation site. This guide is made for repeated use. Dirt wipes off easily and even notes written with an oil-based felt-tip pen can be removed with an eraser. If more detailed information on the SDC25/26 is needed, refer to the user's manual: CP-SP-1149E for installation and configuration.

The most convenient way to configure the SDC25/26 is with the Smart Loader Package (model No. SLP-C35J50). Please contact the azbil Group or a distributor for more information.
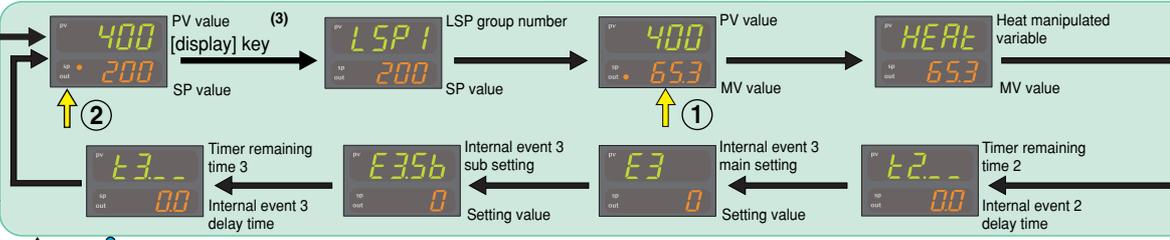
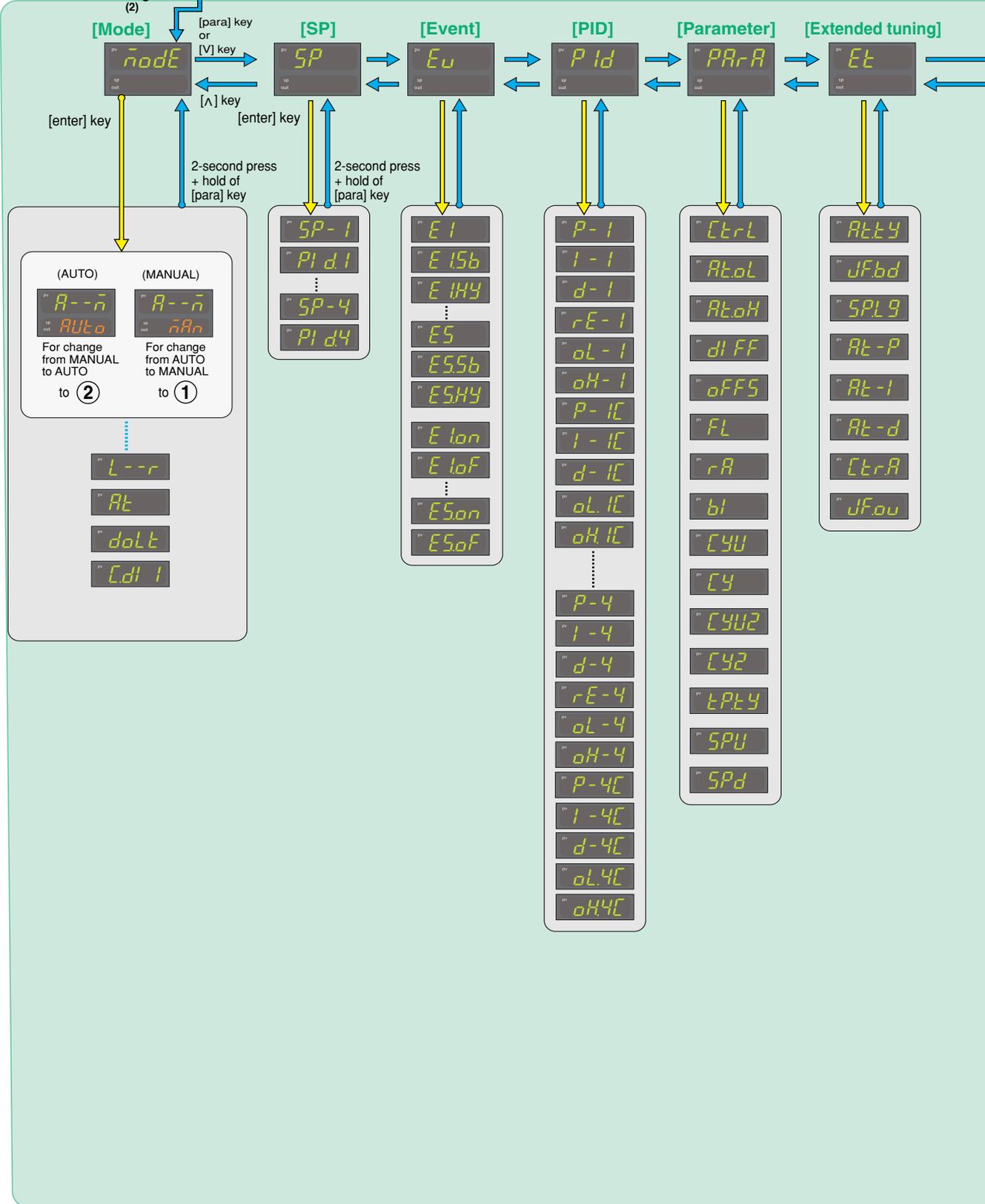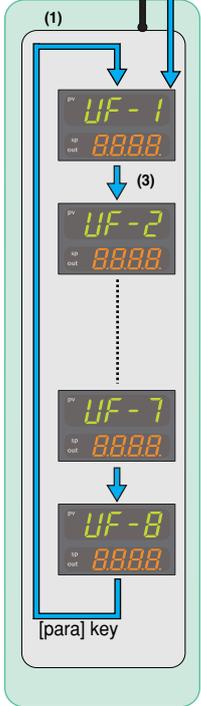|	
Upper display	This display shows either the PV value or the display value and set value for each displayed item. If an alarm is triggered, the normal display and alarm code are displayed alternately. During auto tuning (AT), the rightmost decimal point flashes twice repeatedly.
Lower display	This display shows either the SP/MV/CT or the display value and set value for each displayed item. Depending on the settings, the rightmost decimal point lights up, flashes, etc. to show RUN/READY mode or communications status.
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 (Initial value) 1 : AUTO/MANUAL mode selection 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 DI • When pressing the [mode] key in the setup display mode, the display is changed to the operation display
[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 sec. or longer in the operation display mode, the display is then changed to the setup display.
[<], [∨], [∧] keys	These 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 personal computer using the dedicated cable supplied with the Smart Loader Package.

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.
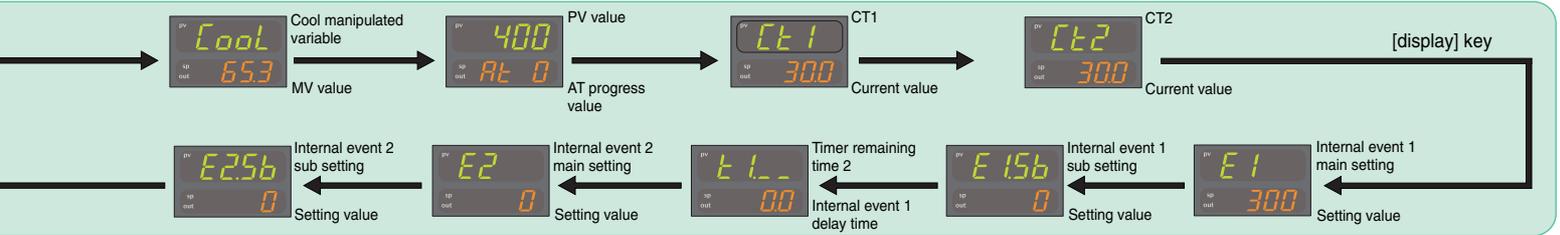
azbil SDC25

pv
sp
out

man ev1 ev2 ev3 ot1 ot2

mode display
enter
para

[para] key

[display] key

[display] key

User function

PV value (3) — **400 / 200** — SP value
[display] key

LSP group number — **L5P1 / 200** — SP value

PV value — **400 / 65.3** — MV value ①

Heat manipulated variable — **HEAt / 65.3** — MV value

Timer remaining time 3 — **t3_ _ / 0.0** — Internal event 3 delay time

Internal event 3 sub setting — **E3.5b / 0** — Setting value

Internal event 3 main setting — **E3 / 0** — Setting value

Timer remaining time 2 — **t2._ _ / 0.0** — Internal event 2 delay time

②

[para] key

2-second press + hold of [para] key

[Mode] — **n̄odE**
[para] key or [V] key

[SP] — **5P**

[Event] — **Eu**

[PID] — **PId**

[Parameter] — **PAr-A**

[Extended tuning] — **Et**

[enter] key

[∧] key

[enter] key

2-second press + hold of [para] key

2-second press + hold of [para] key

(1)

UF-1 / 8.8.8.8.

(3)

UF-2 / 8.8.8.8.

UF-7 / 8.8.8.8.

UF-8 / 8.8.8.8.

[para] key

(2)

(AUTO) — **A--n̄ / AUto**
For change from MANUAL to AUTO — to ②

(MANUAL) — **A--n̄ / n̄An**
For change from AUTO to MANUAL — to ①

L--r
At
doLt
C.dI 1

SP-1
PId.1
...
SP-4
PId.4

E1
E1.5b
E1.HY
E5
E5.5b
E5.HY
E1.on
E1.oF
...
E5.on
E5.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
oFF5
FL
rA
bI
CYU
CY
CYU2
CY2
tP.tY
SPU
SPd

AttY
JF.bd
SPLY
At-P
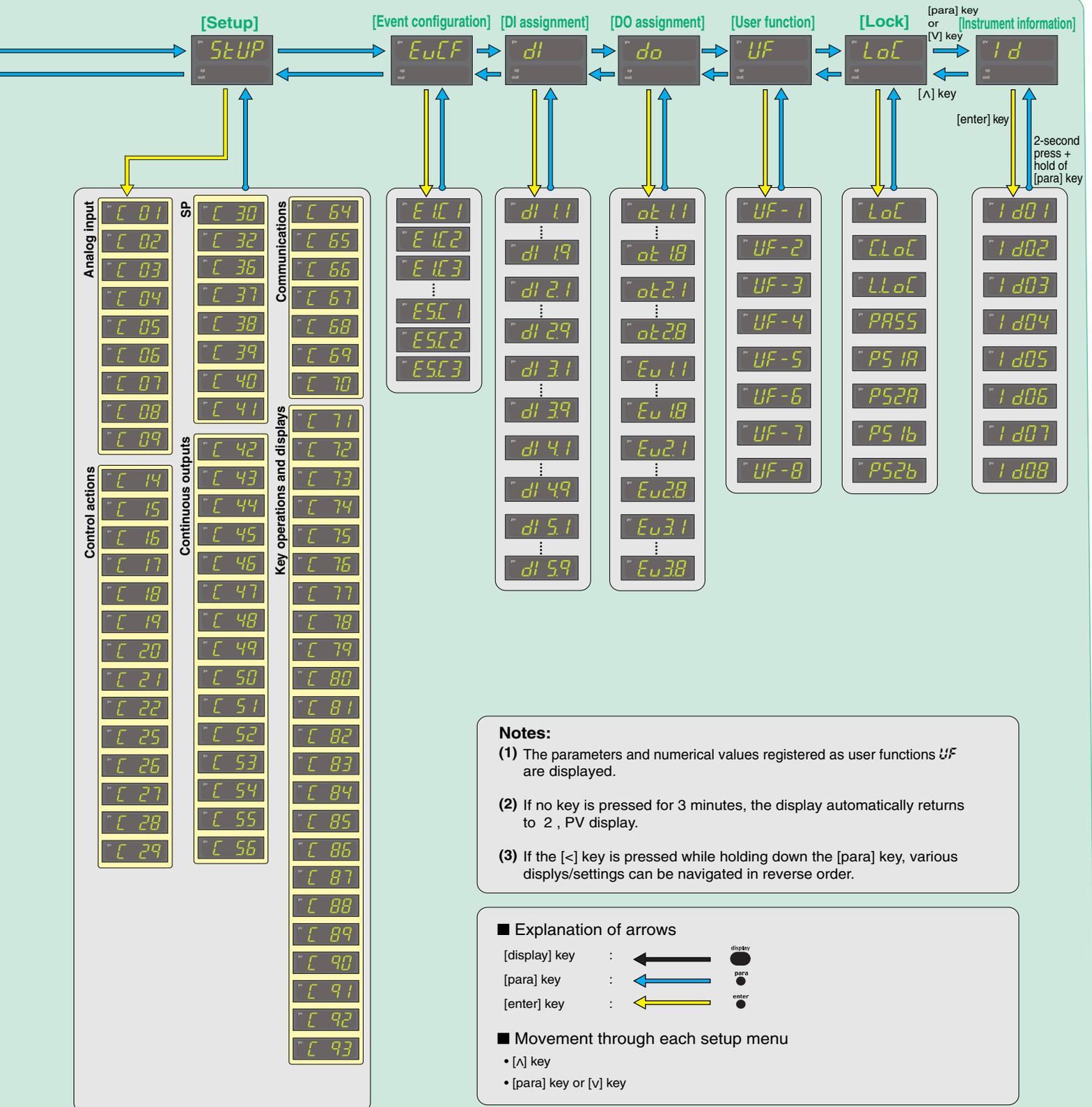**At-I**
At-d
Ctr.A
JF.ou

○ Some items are not displayed depending on the availability of optional functions, model number, display setup (*C73* to *C78*) and display level (*C79*).
○ Pressing [display] while bank item or user function item is displayed has the effect of canceling and returning to the operation display item.

Operation displays

CooL 65.3 — Cool manipulated variable / MV value	*400* *At 0* — PV value / AT progress value	*Ct1* 30.0 — CT1 / Current value
Ct2 30.0 — CT2 / Current value	[display] key	

E2.5b 0 — Internal event 2 sub setting / Setting value
E2 0 — Internal event 2 main setting / Setting value
t1__ 0.0 — Timer remaining time 2 / Internal event 1 delay time
E1.5b 0 — Internal event 1 sub setting / Setting value
E1 300 — Internal event 1 main setting / Setting value

Bank selection

[Setup] *StUP*
[Event configuration] *EuCF*
[DI assignment] *dI*
[DO assignment] *do*
[User function] *UF*
[Lock] *LoC*
[para] key or [∨] key
[Instrument information] *Id*
[∧] key
[enter] key
2-second press + hold of [para] key

Analog input
C 01, *C 02*, *C 03*, *C 04*, *C 05*, *C 06*, *C 07*, *C 08*, *C 09*

Control actions
C 14, *C 15*, *C 16*, *C 17*, *C 18*, *C 19*, *C 20*, *C 21*, *C 22*, *C 25*, *C 26*, *C 27*, *C 28*, *C 29*

SP
C 30, *C 32*, *C 36*, *C 37*, *C 38*, *C 39*, *C 40*, *C 41*

Continuous outputs
C 42, *C 43*, *C 44*, *C 45*, *C 46*, *C 47*, *C 48*, *C 49*, *C 50*, *C 51*, *C 52*, *C 53*, *C 54*, *C 55*, *C 56*

Communications
C 64, *C 65*, *C 66*, *C 67*, *C 68*, *C 69*, *C 70*

Key operations and displays
C 71, *C 72*, *C 73*, *C 74*, *C 75*, *C 76*, *C 77*, *C 78*, *C 79*, *C 80*, *C 81*, *C 82*, *C 83*, *C 84*, *C 85*, *C 86*, *C 87*, *C 88*, *C 89*, *C 90*, *C 91*, *C 92*, *C 93*

[Event configuration]
E1.C1, *E1.C2*, *E1.C3* … *E5.C1*, *E5.C2*, *E5.C3*

[DI assignment]
dI 1.1 … *dI 1.9*, *dI 2.1* … *dI 2.9*, *dI 3.1* … *dI 3.9*, *dI 4.1* … *dI 4.9*, *dI 5.1* … *dI 5.9*

[DO assignment]
ot 1.1 … *ot 1.8*, *ot2.1* … *ot2.8*, *Eu 1.1* … *Eu 1.8*, *Eu2.1* … *Eu2.8*, *Eu3.1* … *Eu3.8*

[User function]
UF-1, *UF-2*, *UF-3*, *UF-4*, *UF-5*, *UF-6*, *UF-7*, *UF-8*

[Lock]
LoC, *C.LoC*, *L.LoC*, *PASS*, *PS1A*, *PS2A*, *PS1b*, *PS2b*

[Instrument information]
Id01, *Id02*, *Id03*, *Id04*, *Id05*, *Id06*, *Id07*, *Id08*

Notes:

(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 , PV display.

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

■ Explanation of arrows

[display] key : ← (display)
[para] key : ← (para)
[enter] key : ← (enter)

■ Movement through each setup menu
• [∧] key
• [para] key or [∨] key

Operation examples

Setup of PV input range type

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

If no sensor is connected, 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. `modE` flashes on the upper display.

3 Press [v] or [∧] repeatedly, and `StUP` 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 [<], [v] 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. `modE` flashes on the upper display.

3 Press [v] or [∧] repeatedly to get `EvCF` 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 [v] 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. `modE` 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 (`C13`) is set to "disabled: 0," nothing is displayed.

4 Press [v] 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 [v] 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 [<], [v] 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 **2**, 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, *nАn* 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 *nАn* 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 [<], [∨] 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 after AUTO-MANUAL change).

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. *nodE* flashes on the upper display.

3 Press [∨] 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 [<], [∨] 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. *nodE* flashes on the upper display.

3 Press [∨] twice or [∧] repeatedly, and *Ev* 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 [<], [∨], 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 [∨] 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 [<], [∨] 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.

List of parameter

- 🟥 : 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	
LSP1 (Display example) LSP	LSP group number (1st digit=the right end digit)	1 to LSP system group (Max. 4)	1	
PV MV	MV (Manipulated Variable)	-10.0 to +110.0% Setting is enabled in MANUAL mode (Numeric value flashed)	–	
HERE Numeric value	Heat MV (Manipulated Variable)	Setting is disabled. -10.0 to +110.0%	–	
Cool Numeric value	Cool MV (Manipulated Variable)		–	
PV At1 (Display example)	AT progress display (1st digit=the 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	
E1.--(Display example) Numeric value	Internal Event 1 remaining time	Setting is disabled. " г ", is displayed at the right end digit when using the ON delay time, and "L", the OFF delay time.	–	
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	
E2.--(Display example) Numeric value	Internal Event 2 remaining time	Same as Internal Event 1 remaining time	–	
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	
E3.--(Display example) Numeric value	Internal Event 3 remaining time	Same as Internal Event 1 remaining time	–	

List of parameter setting displays

🟫 modE [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 [SP bank]

Display	Item	Contents	Initial value	Setting value
SP-1 to SP-4	SP of LSP 1 group to 4 group	SP low limit to SP high limit	0	
Pid.1 to Pid.4	PID group number (LSP 1 to 4)	1 to 4	1	

🟫 Eu [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	(The decimal point position may vary so that it meets the operation type of the internal event)	0	
E1.HY to E5.HY	Internal Event 1 to 5 hysteresis	0 to 9999 (The decimal point position may vary so that it meets the operation type of the internal event)	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			

🟫 PId [PID bank]

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

🟫 PArA [Parameter bank]

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

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

Et [Extended tuning bank]

Display	Item	Contents	Initial value	Setting value
At.tY	AT type	0: Normal 1: Immediate response 2: Stable *1	1	
⬤ JF.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	Proportional band tuning factor at AT	0.00 to 99.99	1.00	
⬤ At-i	Integral time adjust at AT	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	
JF.ou	Just-FiTTER oversheet suppression factor	0 to 100	0	

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

List of setup setting displays

SEtUP [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	
Analog input	C02	Temperature unit	0: Celsius (°C) 1: Fahrenheit (°F)	0	
Analog input	⬤ C03	Cold junction compensation	0: Performed (internal) 1: Not performed (external)	0	
Analog input	C04	Decimal point position	0: No decimal point 1 to 3: 1 to 3 digits below decimal point	0	
Analog input	C05	PV input range low limit	When the PV input type is DC voltage/DC current,	0	
Analog input	C06	PV input range high limit	-1999 to +9999U	1000	
Analog input	C07	SP low limit	PV input range low limit to PV input range	0	
Analog input	C08	SP high limit	high limit	1000	
Analog input	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	C14	Control action (Direct/Reverse)	0: Heat control (Reverse action) 1: Cool control (Direct action)	0	
Control action	⬤ C15	Output operation at PV alarm	0: Control calculation is continued. 1: Output at PV alarm is output.	0	
Control action	⬤ C16	Output at PV alarm	-10.0 to +110.0%	0.0	
Control action	C17	Output at READY (Heat)	-10.0 to +110.0%	0.0	
Control action	C18	Output at READY (Cool)	-10.0 to +110.0%	0.0	
Control action	C19	Output operation at changing AUTO/MANUAL	0: Bumpless transfer 1: Preset	0	
Control action	C20	Preset MANUAL value	-10.0 to +110.0%	0.0 or 50.0	
Control action	⬤ C21	Initial output type of PID control	0: Auto 1: Not initialized 2: Initialized	0	
Control action	C22	Initial output of PID control	-10.0 to +110.0%	0.0 or 50.0	
Control action	C26	Heat/Cool control	0: Not used 1: Used	0	
Control action	C27	Heat/Cool selection	0: Normal 1: Energy saving	0	
Control action	C28	Heat/Cool control dead zone	-100.0 to +100.0%	0.0	
Control action	⬤ C29	Heat/Cool control change point	-10.0 to +110.0%	50.0	
SP	🟪 C30	LSP system group	1 to 4	1	
SP	⬤ C32	SP ramp unit	0: 0.1U/s 1: 0.1U/min 2: 0.1U/h	1	
SP	C36	CT1 operation type	0: Heater burnout detection 1: Current value measurement	0	
SP	C37	CT1 output	0: Control output 1 to 2, 2 to 4: Event output 1 to 3	0	
SP	C38	CT1 measurement wait time	30 to 300ms	30	
SP	C39	CT2 operation type	Same as CT1	0	
SP	C40	CT2 output	Same as CT1	0	
SP	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	
Continuous output	C43	Control output 1 type	0: MV 1: Heat MV 2: Cool MV 3: PV 4: Ratio, bias, and PV before filter 5: SP 6: Deviation 7: CT1 current value 8: CT2 current value 9: Invalid 10: SP+MV 11: PV+MV	0	
Continuous output	C44	Control output 1 scaling low limit	-1999 to +9999U	0.0	
Continuous output	C45	Control output 1 scaling high limit		100.0	
Continuous output	C46	Control output 1 MV scaling	0 to 9999 (Valid when control output 1 type is 10 or 11)	200	
Continuous output	C47	Control output 2 range	Same as control output 1	1	
Continuous output	C48	Control output 2 type	Same as control output 1	3	
Continuous output	C49	Control output 2 scaling low limit	Same as control output 1	0	
Continuous output	C50	Control output 2 scaling high limit	Same as control output 1	1000	
Continuous output	C51	Control output 2 MV scaling	Same as control output 1	200	
Continuous output	C52	Auxiliary output range	Same as control output 1	1	
Continuous output	C53	Auxiliary type	Same as control output 1	3	
Continuous output	C54	Auxiliary output scaling low limit	Same as control output 1	0	
Continuous output	C55	Auxiliary output scaling high limit	Same as control output 1	1000	
Continuous output	C56	Auxiliary output MV scaling	Same as control output 1	200	
Communication	C64	CPL/MODBUS	0: CPL 1: MODBUS (ASCII format) 2: MODBUS (RTU format)	0	
Communication	C65	Station address	0 to 127 (Communication is disabled when set at "0".)	0	
Communication	C66	Transmission speed (bps)	0: 4800 1: 9600 2: 19200 3: 38400	2	
Communication	C67	Data format (Data length)	0: 7 bits 1: 8 bits	1	
Communication	C68	Data format (Parity)	0: Even parity 1: Odd parity 2: No parity	0	
Communication	C69	Data format (Stop bit)	0: 1 bit 1: 2 bits	0	
Communication	⬤ C70	Response time-out	1 to 250ms	3	
Key operation・display	C71	Key operation type	0: Standard type 1: Special type	0	
Key operation・display	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	0	
Key operation・display	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	
Key operation・display	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	
Key operation・display	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	
Key operation・display	C76	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	
Key operation・display	C77	Timer remain 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	
Key operation・display	C78	CT display setup (Operation display)	0: Not displayed 1: CT1 current value is displayed 2: CT1 to 2 current values are displayed	0	
Key operation・display	🟪 C79	User level	0: Simple configuration 1: Standard configuration 2: High function configuration	1	
Key operation・display	⬤ C80	Communication monitor display	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	

- 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.

Display		Item	Contents	Initial value	Setting value
Key operation • display	C81 ●	MS display, Condition (top 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 display, Status (top 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 display, Condition (secondary priority)	Same as MS display, Condition (top priority)	44	
	C84 ●	MS display, Status (secondary priority)	Same as MS display, Status (top priority)	6	
	C85 ●	MS display, Condition (third priority)	Same as MS display, Condition (top priority)	1	
	C86 ●	MS display, Status (third priority)	Same as MS display, Status (top priority)	9	
	C87 ●	MS display, Condition (secondary priority)	Same as MS display, Condition (top priority)	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	

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 Operation type	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: Controller 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 setup	0: As usual 1: When the event set value (main setting) is 0, the event is "OFF".	0	
	3rd digit: Delay 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 function	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 assign A	0: Normally opened 1: Normally closed 2 to 6: DI1 to 4 6 to 9: Undefined 10 to 14: Internal Event 1 to 5 15 to 17: Undefined	2: Contact 1 3: Contact 2 4: Contact 3 5: Contact 4	
di1.4 to di5.4 ●	Internal contact 1 to 5 Input assign B	18 to 21: Communication DI1 to 4 22: MANUAL 23: READY 24: Invalid	0	
di1.5 to di5.5 ●	Internal contact 1 to 5 Input assign C	25: AT running 26: During SP ramp 27: Undefined 28: Alarm occurs 29: PV alarm occurs	0	
di1.6 to di5.6 ●	Internal contact 1 to 5 Input assign D	30: Undefined 31: mode key pressing status 32: Event output 1 status 33: Control output 1 status	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 Event channel def.	0: Every Internal Event 1 to 8: Internal Event No.	0	

> ⚠ **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.

do [DO assignment bank]

Display		Item	Contents	Initial value	Setting value
ot1.1 to ot2.1 Ev1.1 to Ev3.1	●	Operation type (Control output 1 to 2, Event output 1 to 3)	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	●	Output assign A (Control output 1 to 2, Event output 1 to 3)	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	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	●	Output assign B (Control output 1 to 2, Event output 1 to 3)	26 to 30: Internal Contact 1 to 5 31 to 33: Undefined 34 to 37: DI1 to 4 38: MANUAL 39: READY 40: Invalid	0	
ot1.4 to ot2.4 Ev1.4 to Ev3.4	●	Output assign C (Control output 1 to 2, Event output 1 to 3)	41: AT running 42: During SP ramp 43: Undefined 44: Alarm occurs 45: PV alarm occurs 46: Undefined 47: Mode key pressing status	0	
ot1.5 to ot2.5 Ev1.5 to Ev3.5	●	Output assign D (Control output 1 to 2, Event output 1 to 3)	48: Event output 1 status 49: Control output 1 status	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	
		4th digit: Polarity D		0	
ot1.7 to ot2.7 Ev1.7 to Ev3.7	●	Polarity (Control output 1 to 2, Event output 1 to 3)	0: Direct 1: Reverse	0	
ot1.8 to ot2.8 Ev1.8 to Ev3.8	●	Latch (Control output 1 to 2, Event output 1 to 3)	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, [mode] key can be set 2: Operation display, SP, UF, lock, manual MV, [mode] key can be set 3: UF, lock, manual MV, [mode] key 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	Disabled	
Id02	●	ROM Version 1	XX. XX (2 digits after decimal point)	Disabled	
Id03	●	ROM Version 2	XX. XX (2 digits after decimal point)	Disabled	
Id04	●	Loader information		Disabled	
Id05	●	EST information		Disabled	
Id06	●	Manufacturing date code (year)	Subtract 2000 from the year. Example: "3" means the year 2003.	Disabled	
Id07	●	Manufacturing date code (month, day)	Month + day divided by 100. Example: "12.01" means the 1st day of December.	Disabled	
Id08	●	Serial No.		Disabled	

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 If necessary, press [mode] once to change to the operation display. Next, press and hold [para] for more than 2 seconds to get the parameter setup display. ñodE flashes on the upper display.

2 Press [∨] or [∧] repeatedly as needed to get SEtUP flashing on the upper display.

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

4 When [enter] is pressed, the lower display flashes. Press [∨] 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
1	K	-200 to +1200°C
2	K	0 to 1200°C
3	K	0.0 to 800.0°C
4	K	0.0 to 600.0°C
5	K	0.0 to 400.0°C
6	K	-200.0 to +400.0°C
7	K	-200.0 to +200.0°C
8	J	0 to 1200°C
9	J	0.0 to 800.0°C
10	J	0.0 to 600.0°C
11	J	-200.0 to +400.0°C
12	E	0.0 to 800.0°C
13	E	0.0 to 600.0°C
14	T	-200.0 to +400.0°C
15	R	0 to 1600°C
16	S	0 to 1600°C
17	B	0 to 1800°C
18	N	0 to 1300°C
19	PL II	0 to 1300°C
20	WRe5-26	0 to 1400°C
21	WRe5-26	0 to 2300°C
22	Ni-NiMo	0 to 1300°C
23	PR40-20	0 to 1900°C
24	DIN U	-200.0 to +400.0°C
25	DIN L	-100.0 to +800.0°C
26	Gold iron chromel	0.0K to 360.0K

[RTD]

C01 Set value	Sensor type	Range
41	Pt100	-200.0 to +500.0°C
42	JPt100	-200.0 to +500.0°C
43	Pt100	-200.0 to +200.0°C
44	JPt100	-200.0 to +200.0°C
45	Pt100	-100.0 to +300.0°C
46	JPt100	-100.0 to +300.0°C
47	Pt100	-100.0 to +200.0°C
48	JPt100	-100.0 to +200.0°C
49	Pt100	-100.0 to +150.0°C
50	JPt100	-100.0 to +150.0°C
51	Pt100	-50.0 to +200.0°C
52	JPt100	-50.0 to +200.0°C
53	Pt100	-50.0 to +100.0°C
54	JPt100	-50.0 to +100.0°C
55	Pt100	-60.0 to +40.0°C
56	JPt100	-60.0 to +40.0°C
57	Pt100	-40.0 to +60.0°C
58	JPt100	-40.0 to +60.0°C
59	Pt100	-10.00 to +60.00°C
60	JPt100	-10.00 to +60.00°C
61	Pt100	0.0 to 100.0°C
62	JPt100	0.0 to 100.0°C
63	Pt100	0.0 to 200.0°C
64	JPt100	0.0 to 200.0°C
65	Pt100	0.0 to 300.0°C
66	JPt100	0.0 to 300.0°C
67	Pt100	0.0 to 500.0°C
68	JPt100	0.0 to 500.0°C

[DC voltage/DC current]

C01 Set value	Sensor type	Range
81	0 to 10mV	Scaling range is -1999 to +9999.
82	-10 to +10mV	
83	0 to 100mV	
84	0 to 1V	
86	1 to 5V	
87	0 to 5V	
88	0 to 10V	
89	0 to 20mA	
90	4 to 20mA	

▮ : Initial value

*1: If the ROM version 1 of the instrument information bank (*I d02*) is prior to 2.04, a setting of "3" for the PV input range type (*C01*) will result in display of the K thermocouple 0 to 800°C range with no decimal point.

*2: The indicated low limit for a B thermocouple is 20°C. However, if ROM version 1 of the instrument information bank (*I d02*) is prior to 2.04, the value is -180°C.

List of alarm code

	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.
Instrument 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 of the instrument information bank (*I d02*) is prior to 2.04, CT input failure (*AL11*) is not displayed.

Event type

Operation type	Set value	Direct action	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.	● 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	CT1 at output ON → OFF before measuring the CT1 current value	CT1 at output ON → OFF before measuring CT1 current value
Heater 1 short-circuit	17	CT1 at output OFF → OFF before measuring CT1 current value	CT1 at output OFF → OFF before measuring CT1 current value
Heater 2 burnout/Over-current	18	CT2 at output ON → OFF before measuring CT2 current value	CT2 at output ON → OFF before measuring CT2 current value
Heater 2 short-circuit	19	CT2 at output OFF → OFF before measuring CT2 current value	CT2 at output OFF → 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

*: 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)	26

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