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 to 800°C
4	K	0 to 600°C
5	K	0 to 400°C
6	K	-200 to +400°C
9	J	0 to 800°C
10	J	0 to 600°C
11	J	-200 to +400°C
13	E	0 to 600°C
14	T	-200 to +400°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
24	DIN U	-200 to +400°C
25	DIN L	-100 to +800°C

[RTD]

C01 Set value	Sensor type	Range
41	Pt100	-200 to +500°C
42	JPt100	-200 to +500°C
43	Pt100	-200 to +200°C
44	JPt100	-200 to +200°C
45	Pt100	-100 to +300°C
46	JPt100	-100 to +300°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
63	Pt100	0 to 200.0°C
64	JPt100	0 to 200.0°C
67	Pt100	0 to 500°C
68	JPt100	0 to 500°C

[DC voltage/DC current]

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

▢ : Initial value

*1: PL II thermocouple is a range, which has been added to the units manufactured form July, 2003.

*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.

*3: Thermocouple, RTD, and DC voltage/DC current are according to PV No. type.

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

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Event type

Operation type	Set value	Direct action	Reverse action
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		
Heater 1 short-circuit	17		
Heater 2 burnout/ Over-current	18		
Heater 2 short-circuit	19		
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.

● 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.

▢ : 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	Operation type	Set value	Operation type	Set value
SP high limit	10	Loop diagnosis 1	20	During AT (status)	27
SP low limit	11	Loop diagnosis 2	21	During SP ramp	28
SP high/low limit	12	Loop diagnosis 3	22	Control action (status)	29
MV high limit	13	READY (status)	24	ST setting standby (status)	30
MV low limit	14	MANUAL (status)	25	Timer (status)	32
MV high/low limit	15				

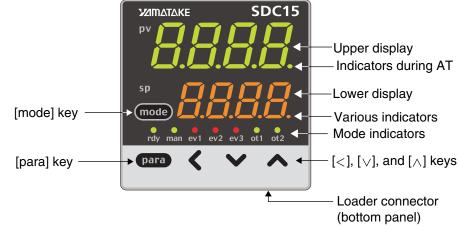Specifications are subject to change without notice. (09)

azbil

1st edition: Mar. 2007 (W)
2nd edition: Apr. 2012 (M)

SDC15 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 SDC15 is needed, refer to the user's manuals: CP-SP-1147E for basic operation and CP-SP-1148E for installation and configuration.

The most convenient way to configure the SDC15 is with the Smart Loader Package (model No. SLP-C35J50). Please contact the azbil Group or a distributor for more information.
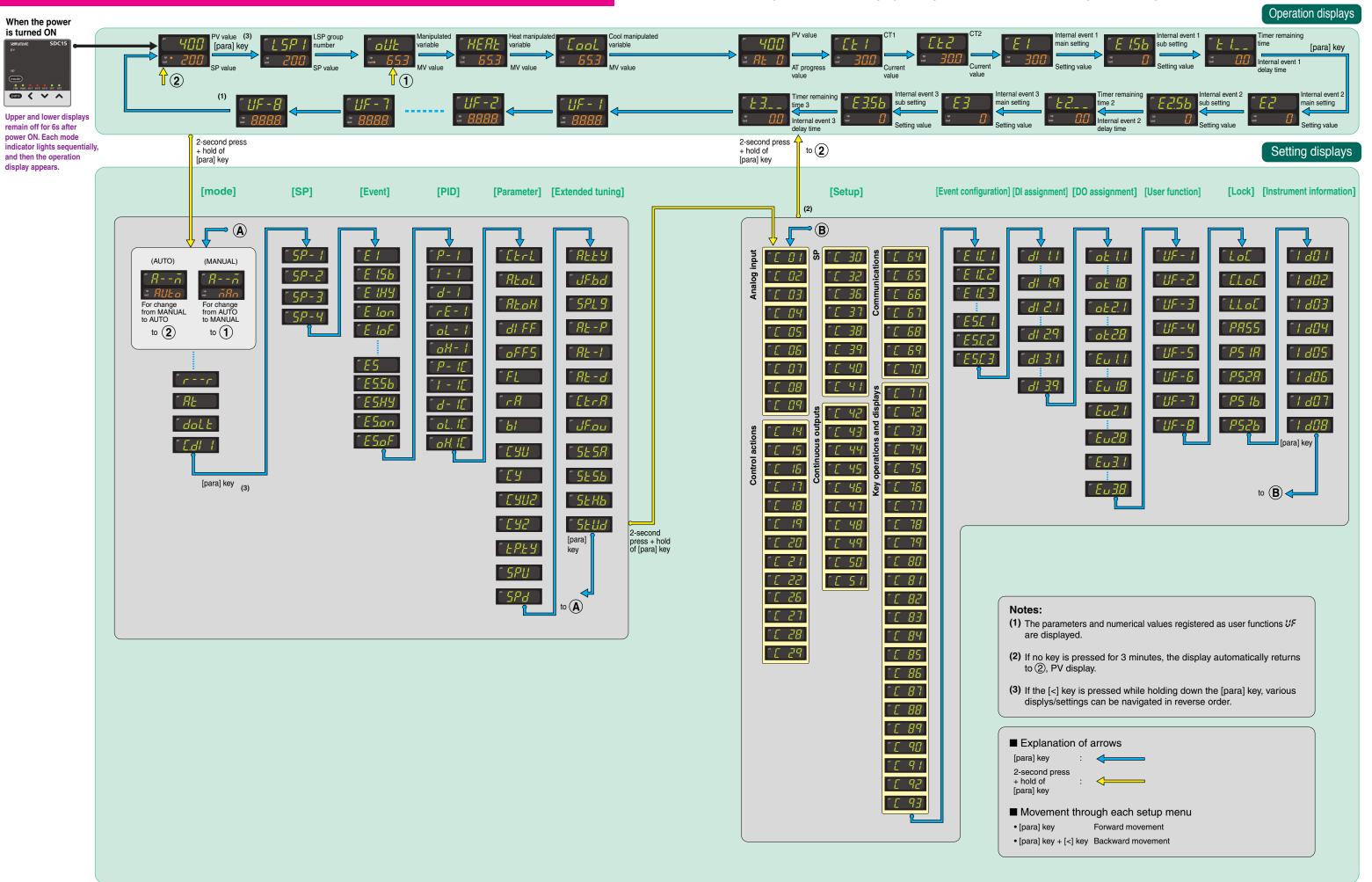
YAMATAKE SDC15

- pv — Upper display
- — Indicators during AT
- sp — Lower display
- (mode) [mode] key — Various indicators
- — Mode indicators
- rdy man ev1 ev2 ev3 ot1 ot2
- (para) [para] key — [<], [∨], and [∧] keys
- — Loader connector (bottom panel)

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.
Mode indicators	rdy: Lights when READY (RUN mode if not lit) 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

[para] key	• This key is used to change the display item. • 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	Theses keys are used to increase or decrease the numeric value, or to shift the digit.
Loader connector	The Smart Loader connector is on the bottom of the SDC15.

Flowchart of key operations and displays

○ Some items are not displayed depending on the availability of optional functions, model number, display setup (*C73* to *C78*) and display level (*C79*).
○ Pressing [para] while changing settings has the effect of canceling and moving to the next item.
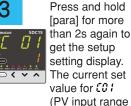

When the power is turned ON

SDC15

Upper and lower displays remain off for 6s after power ON. Each mode indicator lights sequentially, and then the operation display appears.

Operation displays

Display	Label
400 / 200	PV value (3) [para] key / SP value
LSP1 / 200	LSP group number / SP value
oUt / 65.3	Manipulated variable / MV value
HEAt / 65.3	Heat manipulated variable / MV value
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
E1 / 30.0	Internal event 1 main setting / Setting value
E15b / 0	Internal event 1 sub setting / Setting value
t1__ / 0.0	Timer remaining time [para] key / Internal event 1 delay time

(1)

| UF-8 / 8888 | | UF-7 / 8888 | ----- | UF-2 / 8888 | UF-1 / 8888 | t3__ / 0.0 (Timer remaining time 3 / Internal event 3 delay time) | E35b / 0 (Internal event 3 sub setting / Setting value) | E3 / 0 (Internal event 3 main setting / Setting value) | t2__ / 0.0 (Timer remaining time 2 / Internal event 2 delay time) | E25b / 0 (Internal event 2 sub setting / Setting value) | E2 / 0 (Internal event 2 main setting / Setting value) |

2-second press + hold of [para] key
2-second press + hold of [para] key → to ②
to ②

Setting displays

[mode]   [SP]   [Event]   [PID]   [Parameter]   [Extended tuning]   [Setup]   [Event configuration] [DI assignment] [DO assignment] [User function]   [Lock] [Instrument information]

(2)

[mode]

(AUTO)
A--n / AUto
For change from MANUAL to AUTO
to ②

(MANUAL)
A--n / nAn
For change from AUTO to MANUAL
to ①

r--r
At
doLt
Cdl1

[para] key (3)

[SP]
SP-1
SP-2
SP-3
SP-4

[Event]
E1
E15b
E1HY
E1on
E1oF
E5
E55b
E5HY
E5on
E5oF

[PID]
P-1
1-1
d-1
rE-1
oL-1
oH-1
P-1C
1-1C
d-1C
oL.1C
oH.1C

[Parameter]
CtrL
AtoL
AtoH
diFF
oFFS
FL
rA
bI
CYU
CY
CYU2
CY2
tPtY
SPU
SPd

to Ⓐ

[Extended tuning]
AttY
JFbd
SPLY
At-P
At-1
At-d
Ctr.A
JFou
St5.A
St5b
StHb
StUd

[para] key
2-second press + hold of [para] key

[Setup]

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 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

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]
E1C1
E1C2
E1C3
E5C1
E5C2
E5C3

[DI assignment]
di 1.1
di 1.9
di 2.1
di 2.9
di 3.1
di 3.9

[DO assignment]
ot 1.1
ot 1.8
ot 2.1
ot 2.8
Eu 1.1
Eu 1.8
Eu 2.1
Eu 2.8
Eu 3.1
Eu 3.8

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

[Lock]
LoC
CLoC
LLoC
PASS
PS1A
PS2A
PS1b
PS2b

[Instrument information]
1d01
1d02
1d03
1d04
1d05
1d06
1d07
1d08

[para] key

to Ⓑ

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**
[para] key   : ←
2-second press + hold of [para] key : ←

■ **Movement through each setup menu**
• [para] key   Forward movement
• [para] key + [<] key   Backward movement

Operation examples

Green letters : Items before operation

Blue letters : Items during operation

• For step numbers indicated in red like 4 , 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.

Setup of PV input range type

1 Start from the operation display (if necessary press [mode] once to get the opera-tion display).

2 Press and hold [para] for more than 2s to get the parameter setup display. *A--n* is shown on the upper display.

> If no sensor is connected, an alarm for abnormal PV input (any one from *AL01* to *AL11*) may appear on the upper display.

> In case of ON/OFF control, *r--r* appears on the upper display.

3 Press and hold [para] for more than 2s again to get the setup setting display. The current set value for *C01* (PV input range type) is displayed.

4 When the [<], [∨] or [∧] key is pressed, the right-most digit on the lower display flashes. If no key is pressed for more than 2s after changing to the desired value in the PV input range list, the display changes from flashing to conti-nuously lit, and the displayed value is now set.

Setup of event operation type

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

1 Start from the operation display (if necessary press [mode] once to get the operation display).

2 Press and hold [para] for more than 2s to get the parameter setup display. *A--n* is shown on the upper display.

3 Press and hold [para] for more than 2s again to get the setup setting display. The current set value for *C01* (PV input range type) is displayed.

4 Press [para] repeatedly to get *E1C1* on the upper display. *0* is displayed on the lower display.

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

5 When the [∨] or [∧] key is pressed, the rightmost digit on the lower display flashes. Change the flashing digit to *4* by pressing [∨] or [∧]. If no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

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

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.
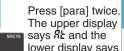Check that this operation does not create any problems for the associated equipment before executing AT.

1 Start from the operation display (if necessary press [mode] once to get the operation display).

2 Press and hold [para] for more than 2s to get the parameter setup display. *A--n* is shown on the upper display.

3 Press [para] twice. The upper display says *At* and the lower display says *At.oF*.

> 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 When [∨] or [∧] is pressed, *At.oF* flashes.

> Flashing occurs only in RUN and AUTO modes, if there is no PV input abnormality.
> Also, if "AT stop/start" is selected for DI assign-ment, the display does not blink and no change can be made.

5 [Press [∧] once. The lower display starts to flash *At.on*.

6 If no key is pressed for more than 2s, *At.on* remains steadi-ly lit and AT begins. During AT, the right-most decimal point flashes twice re-peatedly. (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 3 above).
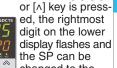
Setup of SP value

1 Start from the operation display (if necessary press [mode] once to get the opera-tion display).

2 Check that the operation display is displaying the SP.
(If not, press [para] repeatedly until the SP is displayed.)

3 When the [<], [∨] or [∧] key is press-ed, the rightmost digit on the lower display flashes and the SP can be changed to the desired value. In this case, the flashing of the numerical value implies that it is not yet set. A numerical setting that is being changed flashes the same way.

4 If no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

> If the [mode] key is pressed when the display is flashing, the status returns to that of step 1.

> 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.

RUN/READY mode selection

1 Start from the operation display (if necessary press [mode] once to get the operation display).

2 Press and hold [para] for more than 2s to get the parameter setup display. *A--n* is shown on the upper display.

> In case of ON/OFF control, *r--r* appears on the upper display.

3 Press the [para] key once. The upper display says *r--r* and the lower display says *rdy* (or *rUn*).

> The current mode is indicated by *rUn* for RUN mode or *rdy* for READY mode.

4 When [∨] or [∧] is pressed, the lower display flashes.

> If the DI assignment is set to "RUN/READY selection," the display does not flash and no change can be made.

5 When [∨] or [∧] is pressed, *rUn* (or *rdy*) on the lower display flashes.

6 If no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

Setup of PID value

1 Start from the operation display (if necessary press [mode] once to get the operation display).

2 Press and hold [para] for more than 2s to get the parameter setup display. *A--n* is shown on the upper display.

3 Press [para] repeatedly to get *P-1* (for propor-tional band) on the upper display. The value set for *P-1* is displayed on the lower display.

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

4 When [<], [∨] or [∧] is pressed, the rightmost digit on the lower display flashes, and can be changed to the desired value for the proportional band. In this case, the flashing of the numerical value implies that it is not yet set. A numerical setting that is being changed flashes the same way.

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

5 If no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

> If the [mode] key is pressed when the display is flashing, the status returns to that of step 1.

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

1 Start from the operation display (if necessary press [mode] once to get the operation display).

2 Press and hold [para] for more than 2s to get the parameter setup display. *A--n* is shown on the upper display.

3 Press [para] repeatedly to get *E1* on the upper display. The lower display says *0*.

4 When [<], [∨] or [∧] is pressed, the rightmost digit on the lower display flashes, and can be changed to the desired value for the event. In this case, the flashing of the numerical value implies that it is not yet set. A numerical set-ting that is being changed flashes the same way.

> *0* on the lower display indicates that the event main set value is "zero."

5 If no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

> If the [mode] key is pressed when the display is flashing, the status returns to that of step 1.

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

6 To set hysteresis as well, press [para] once (or twice, depending on the settings) to display *E1.HY* on the upper display. The lower display says *5*.

7 When [<], [∨] or [∧] is pressed, the rightmost digit on the lower display flashes, and can be changed to the desired value for hysteresis. If no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

> *5* on the lower display indicates that the current set value for event hysteresis is 5.

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

Memo

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

- 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.

List of operation displays

Display	Item	Contents	Initial value	Setting value
Upper display: PV / Lower display: SP				
PV / SP	SP(Target value)	SP low limit to SP high limit	0	
LSP1 (Display example) / LSP	SP 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)	Setting is disabled.	–	
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		–	
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 bank] (modE)

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 start/stop	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] (SP)

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	

[Event bank] (Eu)

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)		
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 bank] (Pid)

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

[Parameter bank] (PArA)

Display	Item	Contents	Initial value	Setting value
Ctrl	Control method	0: ON/OFF control 1: Fixed PID 2: ST(Self-tuning)	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	Differential (for ON/OFF control)	0 to 9999U	5	
oFFS	ON/OFF control action point offset	-1999 to +9999U	0	
FL	PV filter	0.0 to 120.0s	0.0	
rA	PV ratio	0.001 to 9.999	1.000	
bI	PV bias	-1999 to +9999U	0	
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	
EP.tY	Time proportional cycle mode	0: Controllability aiming type 1: Operation and service life aiming type(Only ON/OFF operation within Time proportional cycle)	0 or 1	
SPU	SP up ramp	0.0 to 999.9U(No ramp when set at "0.0U")	0.0	
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 volume in PV range (°C, Pa,L/min, etc.)
*2 5 to 120s when output includes the relay output

[Extended tuning bank] (Et)

Display	Item	Contents	Initial value	Setting value
At.tY	AT type	0: Normal 1: Immediate response 2: Stable *1	1	
uF.bd	Just-FiTTER setting band	0.00 to 10.00	0.30	
SP.L9	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	
uF.ou	Just-FiTTER overshoot suppression factor	0 to 100	0	
SE.SE	ST step execution band	0.0 to 99.99	10.0	
SE.Sb	ST step setting band	0.0 to 10.00	0.50	
SE.Nb	ST hunting setting band	0.0 to 10.00	1.00	
SE.Ud	ST step ramp change	0: ST is executed when the PV moves up or down. 1: ST is executed only when the PV moves up.	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] (SEtUP)

Display	Item	Contents	Initial value	Setting value
C01	PV input range type	For details, refer to the PV Input Range Table	Depending on Model No.	
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 input range low limit	When the PV input type is DC voltage/DC current,	0	
C06	PV input range high limit	-1999 to +9999U	1000	
C07	SP low limit	PV input range low limit to PV input range high limit	–	
C08	SP high limit		–	
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	
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 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 selection	0: Normal 1: Energy saving	0	
C28	Heat/Cool control dead zone	-100.0 to +100.0%	0.0	
C29	Heat/Cool control change point	-10.0 to +110.0%	50.0	
C30	LSP system group	1 to 4	1	
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	
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 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 scaling	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 scaling	Same as control output 1	200	
C64	CPL/MODBUS	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	Response time-out	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	0	
C73	MODE display setup (Sum of the weighting)	Bit 0: AUTO/MANUAL display (Enabled: +1) Bit 1: RUN/READY display (Enabled: +2) 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 3: AT progress display (Enabled: +8) Other invalid setting: 0, +4	15	
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	
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	
C78	CT display setup (Operation display)	0: Not displayed 1: CT1 current value is displayed 2: CT1 to 2 current values are displayed	1	
C79	User level	0: Simple configuration 1: Standard configuration 2: High function configuration	0	
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	
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	

[Event configuration bank] (EuCF)

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.	0	
	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 assignment bank] (di)

Display	Item	Contents	Initial value	Setting value
di1.1 to di3.1	Internal contact 1 to 3 Operation type	0: No function 1: LSP group selection (0/+1) 2: LSP group selection (0/+2) 3: LSP group selection (0/+4) 4: Invalid 5: Invalid 6: Invalid 7: RUN/READY selection 8: AUTO/MANUAL selection 9: LSP/RSP selection 10: AT Stop/Start 11: ST disabled/enabled 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 di3.2	Internal contact 1 to 3 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 di3.3	Internal contact 1 to 3 Input assign A	0: Normally opened 1: Normally closed 2: DI1 3: DI2 4 to 9: Undefined 10 to 14: Internal Event 1to 5	2: Contact 1 3: Contact 2 4: Contact 3	
di1.4 to di3.4	Internal contact 1 to 3 Input assign B	15 to 17: Undefined 18 to 21: Communication DI1 to 4	0	
di1.5 to di3.5	Internal contact 1 to 3 Input assign C	22: MANUAL 23: READY 24: Undefined 25: AT running 26: During SP ramp 27: Undefined	0	
di1.6 to di3.6	Internal contact 1 to 3 Input assign D	28: Alarm occurs 29: PV alarm occurs 30: Undefined 31: mode key pressing status 32: Event output 1 status 33: Control output 1 status	0	
di1.7 to di3.7	Internal contact 1 to 3 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	
di1.5 to di3.5	Internal contact 1 to 3 Polarity	0: Direct 1: Reverse	0	
di1.9 to di3.9	Internal contact 1 to 3 Event channel def.	0: Every Internal Event 1 to 5: Internal Event No.	0	

[DO assignment bank] (do)

Display	Item	Contents	Initial value	Setting value
ot1.1 to ot2.1 / Eu1.1 to Eu3.1	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 / Eu1.2 to Eu3.2	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 13: Undefined 14 to 15: MV1 to 2 16 to 17: Undefined 18 to 19: DI1 to 2 20 to 25: Undefined	14: Output 1 15: Output 2 2: Event 1 3: Event 2 4: Event 3	
ot1.3 to ot2.3 / Eu1.3 to Eu3.3	Output assign B (Control output 1 to 2, Event output 1 to 3)	26 to 28: Internal Contact 1 to 3 29 to 33: Undefined 34 to 37: DI1 to 4 38: MANUAL 39: READY 40: Undefined	0	
ot1.4 to ot2.4 / Eu1.4 to Eu3.4	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 / Eu1.5 to Eu3.5	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 / Eu1.6 to Eu3.6	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 / Eu1.7 to Eu3.7	Polarity (Control output 1 to 2, Event output 1 to 3)	0: Direct 1: Reverse	0	
ot1.8 to ot2.8 / Eu1.8 to Eu3.8	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	

[User function bank] (UF)

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

[Lock bank] (LoC)

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	

[Instrument information bank] (id)

Display	Item	Contents	Initial value	Setting value
id01	ROM ID	0: SDC15	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. If necessary press [mode] once to change to the operation display. Next, press and hold [para] for more than 2s to get the parameter setup display. A--m or r--r appears on the upper display.

2. Press and hold [para] for more than 2s again to display C01 on the upper display.

3. Press [para] repeatedly to change the upper display to C79 (user level).

4. When [<], [v] or [^] is pressed, the lower display flashes and can be changed to the desired numerical value. Then, if no key is pressed for more than 2s, the displayed value is set and the display changes from flashing to continuously lit.

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