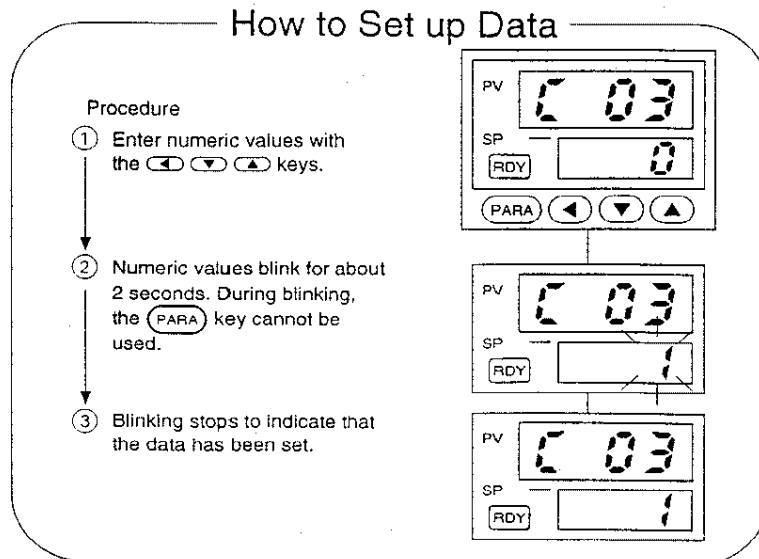
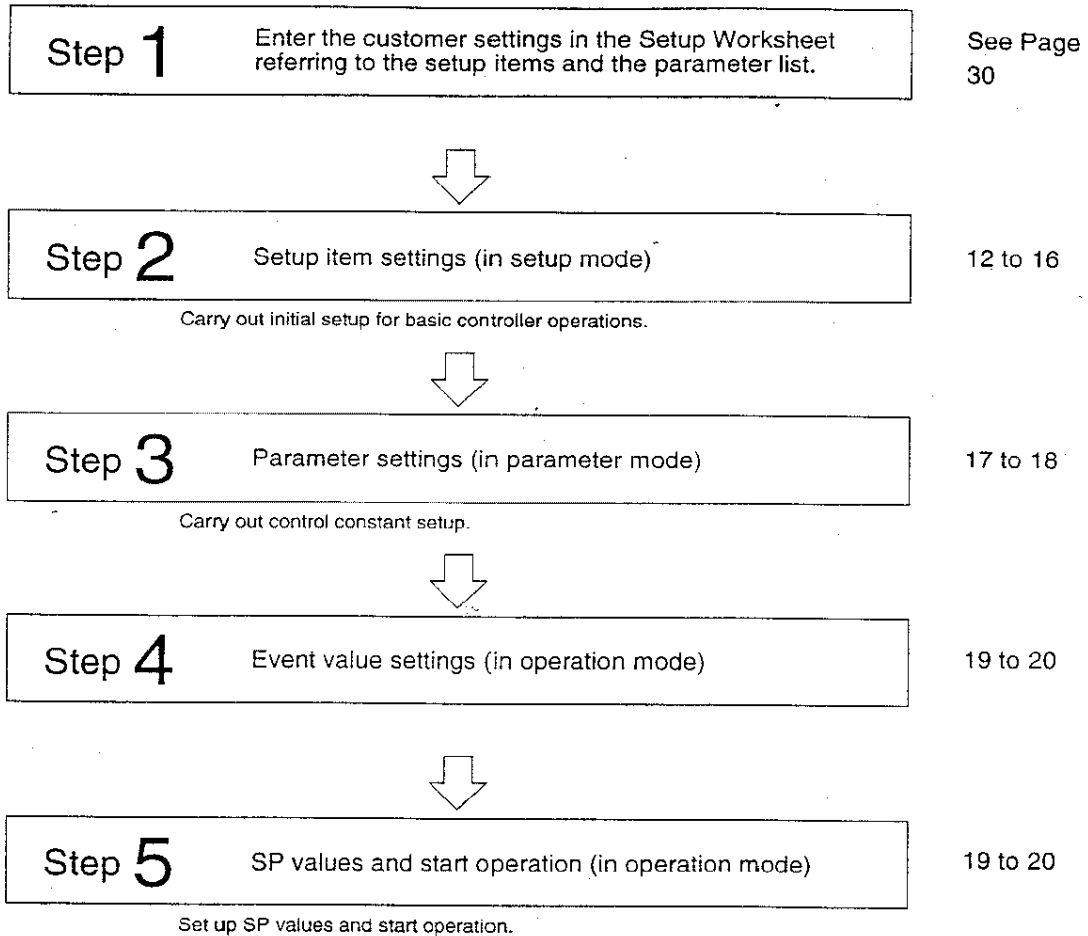


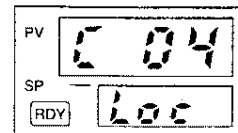
Chapter 5 INITIAL SETTINGS

Setup the UDC900 according to the following procedure.

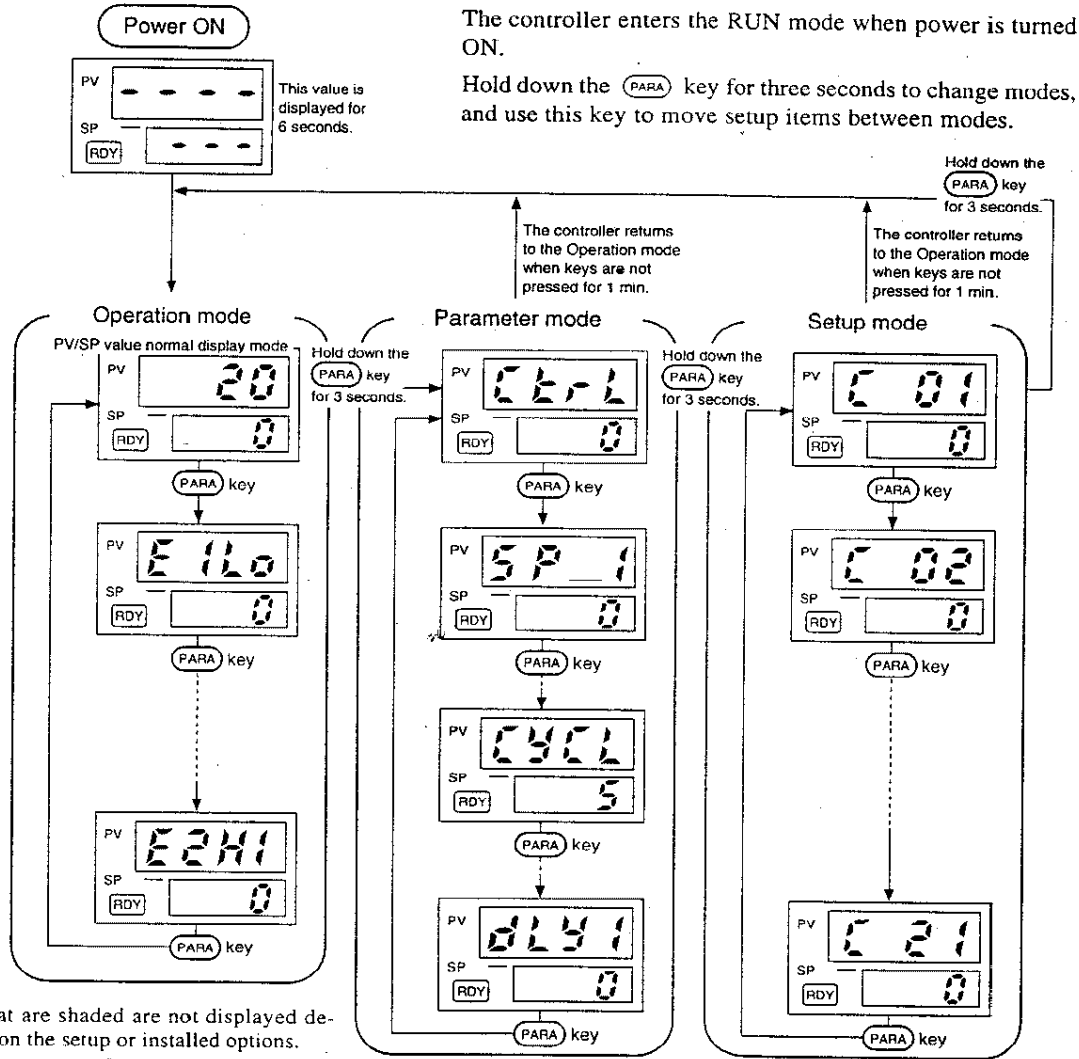


(Note)

"Loc" is displayed in the lower display for about 2 seconds to indicate that an incorrect key or data entry was made. Such entries are ignored.



5-1 Overall Operation Flow



Items that are shaded are not displayed depending on the setup or installed options.

Operation Mode Display Order

- **o v t** : Basic display state
- **o v t** : Control output value
- **C t** : Current value (CT)
- **t 1** : Remaining timer 1 time
- **t 2** : Remaining timer 2 time
- **E 1 L o** : Event 1
(E L) Low limit
- **E 1 H i** : Event 1
High limit
- **E 2 L o** : Event 2
(E 2) Low limit
- **E 2 H i** : Event 2
High limit

Parameter Mode Settings and Display Order

- **C t L** : Control method
- **R t** : Auto-tuning
- **S P - 0** : SP value No. 0
- **S P - 1** : SP value No. 1
- **P** : Proportional band
- **i** : Reset time
- **d** : Rate time
- **r E** : Manual reset value
- **d i F F** : Differential
- **C Y C L** : Time proportional cycle
- **P b i a s** : PV bias value
- **H Y S 1** : Event 1 hysteresis
- **d L Y 1** : Event 1 ON delay time
- **H Y S 2** : Event 2 hysteresis
- **d L Y 2** : Event 2 ON delay time
- **F i l t e r** : PV filter

Setup Mode Settings and Display

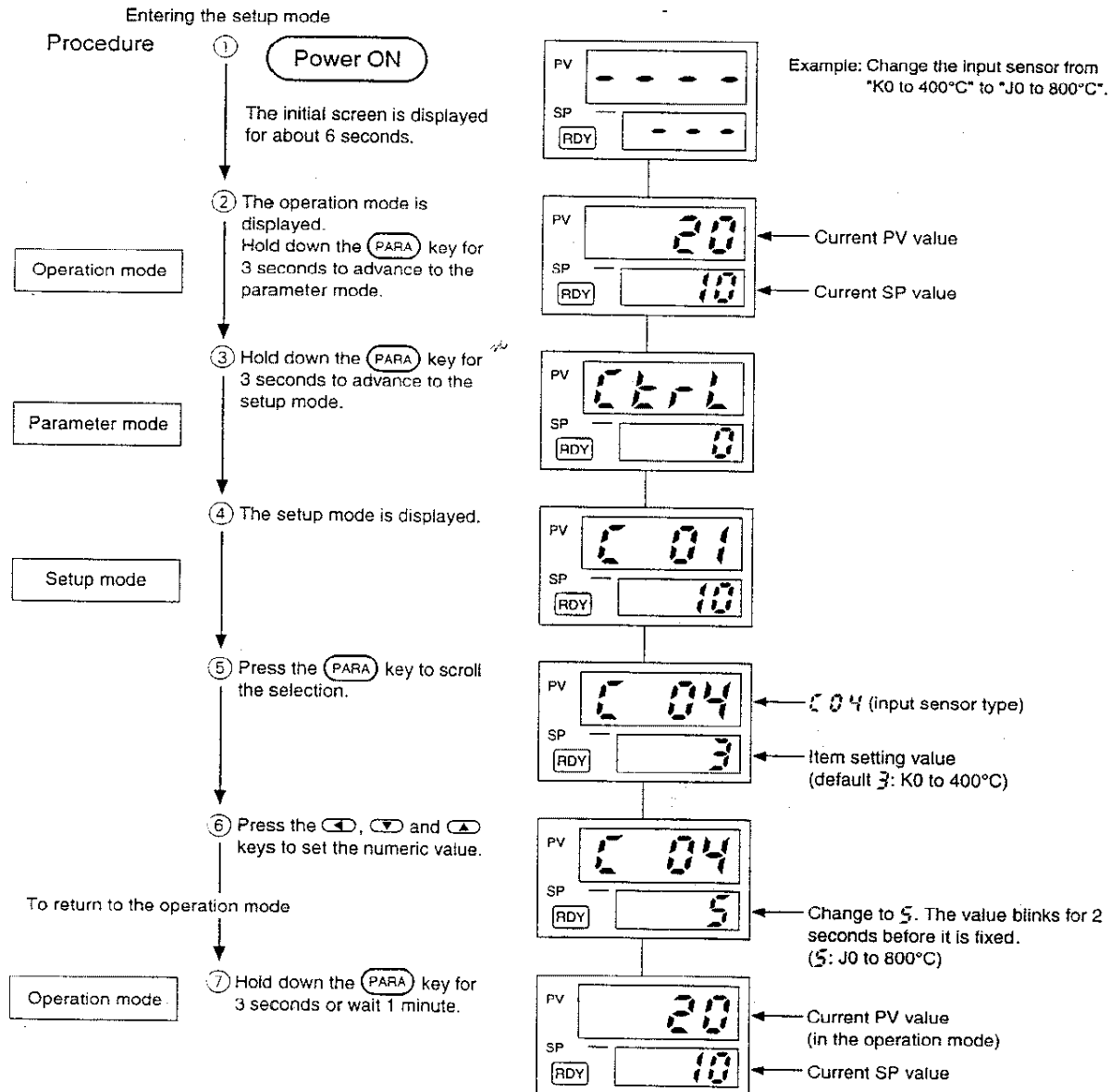
- **C 0 1** : Key lock
- **C 0 2** : Temperature unit
- **C 0 3** : Direct/reverse operation
- **C 0 4** : Input sensor type
- **C 0 9** : Lower SP limit
- **C 1 0** : Upper SP limit
- **C 1 2** : Operation mode display
- **C 1 4** : Event 1 type
- **C 1 5** : Event 2 type
- **C 1 6** : Event operation when READY
- **C 1 7** : External contact input 1 type
- **C 1 8** : External contact input 2 type
- **C 2 1** : READY key settings

5-2 Setup Items

This section describes how to set the controller to the operation mode after it is first mounted in equipment. Before this controller is first used, the sensor type, control output direction and other operating conditions matched to the desired equipment application must be set. This is referred to as "setup."

If this controller is already mounted in equipment and the setup is already completed, proceed to the next chapter.

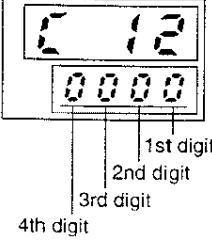
The following shows the initial settings in basic controller operation.





! HANDLING PRECAUTIONS

The alarm code is not displayed while moving to the setup mode.

● List of setup items

Function Prompt	Function	Selections and Setting Range	Factory Setting	Remarks
C01	Key lock	0: Key lock not engaged 1: Key lock engaged for items other than SP value, event value and RDY key 2: Key lock engaged for items other than SP value and RDY key 3: Key lock engaged for all items	0	Key lock can be canceled anytime
C02	Temperature unit	0: °C 1: °F	0	
C03	Control output direction	0: Reverse operation (heat control) 1: Direct operation (cooling control)	0	
C04	Input type and range	Thermocouple input range 1: K 0 to 1200°C 0 to 2200°F 2: K 0 to 600°C 0 to 1100°F 3: K 0 to 400°C 0 to 700°F 4: K -200 to 400°C -300 to 700°F 5: J 0 to 800°C 0 to 1500°F 6: J -200 to 400°C -300 to 700°F 7: E 0 to 600°C 0 to 1100°F 8: T -200 to 400°C -300 to 700°F 9: DIN U -200 to 400°C -300 to 700°F 10: DIN L 0 to 800°C 0 to 1500°F	3	
		RTD range 21: Pt100 -200 to 500°C -300 to 700°F 22: Pt100 0 to 200°C 0 to 300°F 23: Pt100 0.0 to 200.0°C 0.0 to 300.0°F 24: JPt100 -200 to 500°C -300 to 700°F 25: JPt100 0 to 200°C 0 to 300°F 26: JPt100 0.0 to 200.0°C 0.0 to 300.0°F	22	
C09	SP low limit	Setting range : Range Min. to SP high limit	Range Min.	
C10	SP high limit	Setting range : SP low limit to range Max.	Range Max.	
C12	Operation mode 	1st digit 0: Displays both SP and PV values 1: Displays SP value only 2: Displays PV value only 2nd digit 0: Does not display output value 1: Displays output value 3rd digit 0: Displays event settings or heater current value 1: Does not display event settings or heater current value 2: Does not display heater current 4th digit 0: Displays remaining timer event time 1: Does not display remaining timer event time	0000	
C14	Event 1 operation type	See next page	0000	Displayed on event output model
C15	Event 2 operation type	See next page	0000	Displayed on event output model
C16	Event operation in READY mode	0: Operation continued in READY mode 1: Event output OFF in READY mode	0	Displayed on event output model

Function Prompt	Function	Selections and Setting Range			Factory Setting	Remarks
C17	External contact input 1 operation type	Description	Operation when OFF	Operation when ON	0	Displayed on external contact input model. All operation types are alternated.
		0: No operation				
C18	External contact input 2 operation type	1: Switches between No.0 SP and No.1 SP	No.0 SP	No.1 SP	0	Do not set the same operation type No. in external inputs 1 and 2.
		2: Switches between RUN and READY	RUN	READY		
		3: Event 1 timer operation	Timer reset	Timer activated		
		4: Event 2 timer operation	Timer reset	Timer activated		
		5: Event 1 latch canceled	Latch enabled	Latch canceled		
		6: Event 2 latch canceled	Latch enabled	Latch canceled		
		7: Auto-tuning starts/ stops	Stopped	Started		
C21	 key setting	0: Disabled 1: Switches between RUN and READY 2: Event latch canceled			0	 key cannot be operated when same functions as external contact input have been set.

C14 and C15 settings



- 1st digit: Event operation type setting
- 2nd digit: Direct/reverse operation
- 3rd digit: Operation additional function setting
- 4th digit: Controller fault alarm setting

Digit settings: Enable/Disable

C14 and C15 Settings				Event Settings		Enable/Disable Related Settings	
4th digit	3rd digit	2nd digit	1st digit	E1 or E1 Low (E2) (E2 Low)	E1 High (E2 High)	Hyster-esis	ON delay
Controller fault alarm 0: No 1: Yes	0: No 1: Standby 2: Latch 3: Standby and latch	0: Direct 1: Reverse	0: No	—	—	—	—
			1: PV high alarm	-1999 to 9999	—	<input type="radio"/>	<input type="radio"/>
			2: PV low alarm	-1999 to 9999	—	<input type="radio"/>	<input type="radio"/>
			3: PV high and low alarms	-1999 to E1 High (E2 High)	E1 Low to 9999 (E2 Low)	<input type="radio"/>	<input type="radio"/>
			4: Deviation high alarm	-1999 to 9999	—	<input type="radio"/>	<input type="radio"/>
			5: Deviation low alarm	-1999 to 999	—	<input type="radio"/>	<input type="radio"/>
			6: Deviation high and low alarms	0 to 9999	0 to 9999	<input type="radio"/>	<input type="radio"/>
			7: Heater line break/current high alarm	-1999 to E1 High (A) (E2 High)	E1 Low to 9999 (A) (E2 Low)	<input type="radio"/>	<input type="radio"/>
			8: Control device short-circuit alarm	-1999 to 9999 (A)	—	<input type="radio"/>	<input type="radio"/>
(See note)			9: Timer	1 to 9999 (sec.)	—	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

(Note)

- When the event operation type is set to timer, set digits 2, 3 and 4 to 0.
- When the controller fault alarm (4th digit) is set, the controller fault alarm operates directly at all times.

① Event operation type setting, direct/reverse operation

2nd Digit	1st Digit	Event	Description	Remarks
0	0	No		
0	1	PV high alarm		
0	2	PV low alarm		
0	3	PV high and low alarms		
0	4	Deviation high alarm		
0	5	Deviation low alarm		See note 1
0	6	Deviation high and low alarms		
0	7	Heater line break/ current high alarm		See note 2
0	8	Control device short-circuit alarm		See note 2
0	9	Timer		

Note 1 Set a negative value as the lower deviation limit (E1). If a positive value is set, a temperature higher than the SP value will be used as the operating point.

Example: Enter -10 to set an operating point of SP-10°C

Note 2 Heater line break/current high and control device short-circuit alarm.

Models with a current transformer input detect heater line breaks, overcurrent conditions and control device short-circuit alarms.

- Heater line break/overcurrent alarm (operation type: 7)
Heater line break: This alarm is activated when the current at control output ON is lower than the event setting (Ex Low). Set Ex High to "9999" to disable the overcurrent alarm.

- Current high: This alarm is activated when the current is higher than the event setting (Ex High) when the control output is ON. Set Ex Low to "1999" to disable the heater line break alarm.

- Control device short-circuit alarm (operation type: 8)
This alarm is activated when the current is higher than the event setting (Ex) when control output is OFF.

NOTE

- The current display (\bar{I}) in the operation mode indicates the current value when the control output is ON. This displayed current value is not updated when control output is OFF and for 300 ms after control output changes to ON.

Detection of the current value is not updated for 300 ms after the current output state changes.

- The following shows an example of how to set the event setting during detection of a line break.

Calculate the event setting using the heater current value at control output ON (monitor the displayed CT value) and heater current value at control output OFF (cannot be measured on the product) according to the following equation:

$$\text{Event setting} = \{(\text{heater current value at control output ON}) + (\text{heater current value at control output OFF})\} / 2$$

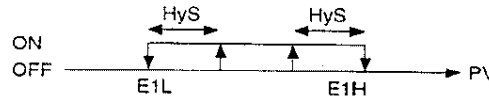
② Direct/reverse setting (C14 and C15 2nd digit setting)

The direct/reverse setting is used to reverse (invert an ON/OFF relationship) the operation of the event set on the 1st digit. (0: Direct, 1: Reverse)

! HANDLING PRECAUTIONS

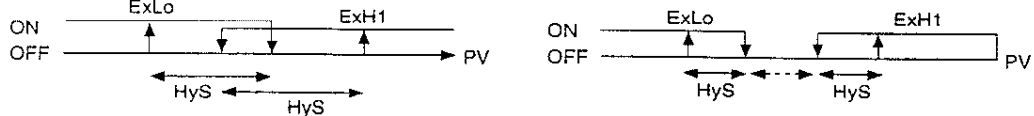
- Direct operation of the PV high alarm and deviation high alarm is the same as the reverse limit of PV low alarm and deviation low alarm operation.

Example: Event operation type setting (1st digit): 3 (PV high and low limits)
Direct/reverse operation setting (2nd digit): 1 (reverse)



- When using the PV, deviation high/low limit and heater line break/current high and control device short-circuit alarm, set HYS so that the OFF point is not lost.

(bad example)



- When using the heater line break/current high and control short-circuit alarm, set the \longleftrightarrow area to 3 A or more.

③ Additional function settings (C14 and C15 3rd digit setting)

Standby and latch operations can be added as additional functions to an event operation type set on the 1st digit.

- Settings
- 0: No
 - 1: Standby
 - 2: Latch
 - 3: Standby and Latch

NOTE

- Standby

The standby function prevents an event from going ON, even when the ON condition of that event is satisfied at controller power ON or when the READY mode changes to the RUN mode.

Event output is activated when an ON condition is satisfied after an OFF condition has been satisfied. The standby state occurs at power ON when the PV value is the shaded area.

• Latch

Once event output is ON, the latch function holds an event in the ON state even when an OFF condition is satisfied. Follow the procedure below to reset the latch state.

1. Set "Latch Cancel" to the external contact input to turn the external contact ON.
2. Reset the additional event setting function (by setting the 3rd digit on C14 and C15 to 0).
3. Turn the power OFF and back ON again.
4. Set "Latch Cancel" to the **[RDY]** key, and hold down the **[RDY]** key for at least one second.

[!] HANDLING PRECAUTIONS

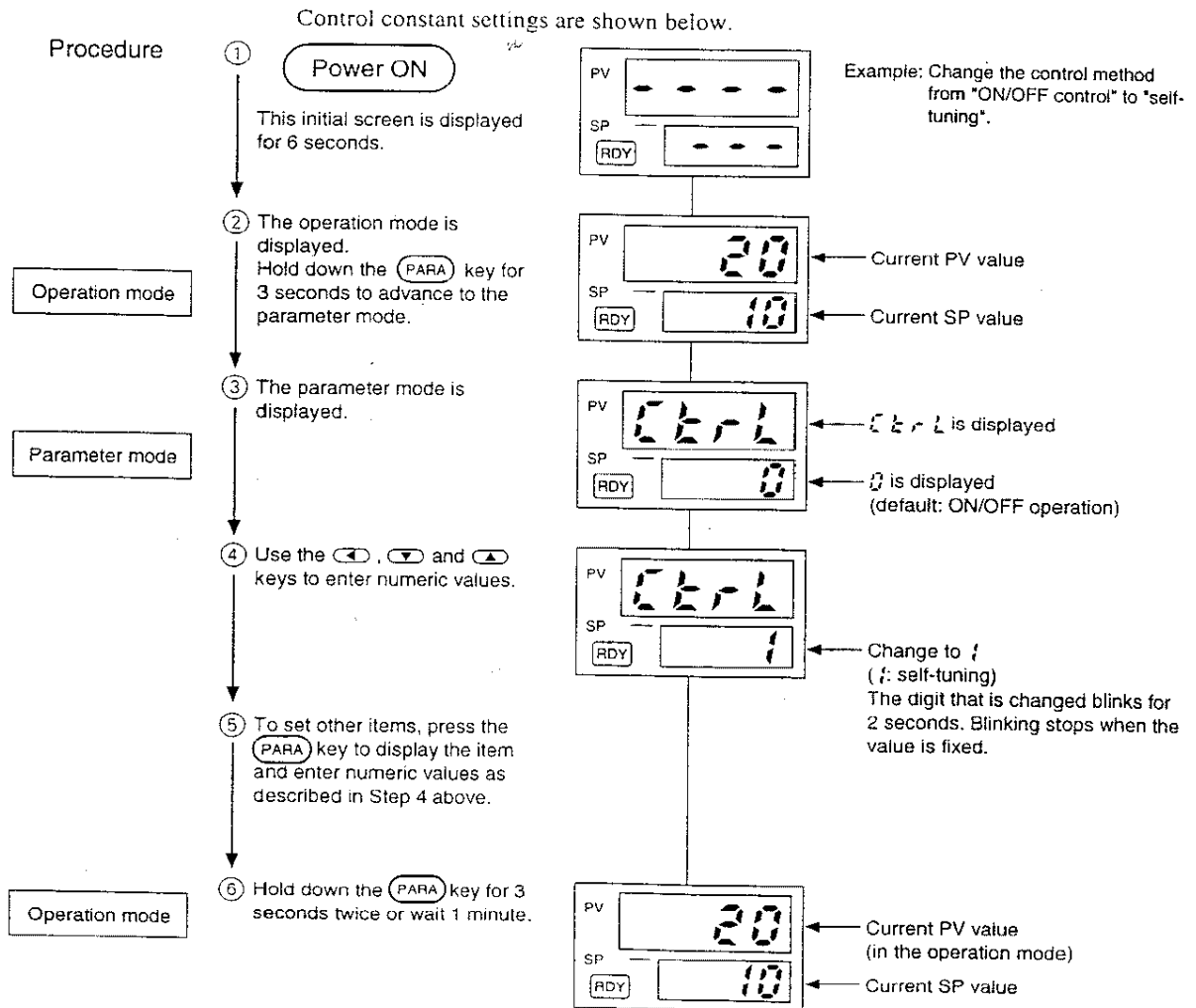
Latch Cancel by the **[RDY]** key is enabled for both events 1 and 2. External contact input is valid individually for events 1 and 2.

④ Controller alarm setting (C14 and C15 4th digit setting)

This function turns ON an event when a controller alarm code (AL01, AL02, AL03, AL70, AL97 and AL98) is generated regardless of the direct/reverse setting of the operation mode (see Chapter 8). OR logic can be set on the 1st digit of the event operation type.

- Setting: 0: Disable
1: Enable

5-3 Parameter Settings



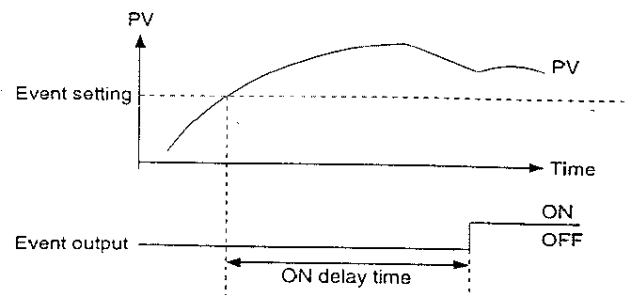
● List of parameters

Function Prompt	Function	Selections and Setting Range	Factory Setting	Remarks
<i>C t r l</i>	Control method	0: ON/OFF control 1: Self-tuning 2: PID constant control	0	
<i>R t</i>	Auto-tuning	0: Stop 1: Start	0	Displayed when <i>C t r l</i> (control method) is set to 1 or 2. Normally, setting is not required when <i>C t r l</i> (control method) is set to 1 (self-tuning).
<i>S P _ 0</i>	No.0 SP value	Same as normal SP value or SP limit value range	0 (0.0)	External contact input model only: <i>C 1 7</i> or <i>C 1 8 = 1</i>
<i>S P _ 1</i>	No.1 SP value		0 (0.0)	
<i>P</i>	Proportional band	0.1 to 999.9%	5.0	
<i>I</i>	Reset time	0 to 3600 sec	120	
<i>d</i>	Rate time	0 to 1200 sec	30	
<i>r E</i>	Manual reset value	0 to 100%	50	
<i>d i f f</i>	Control output differential	1 to 9999 (or 0.1 to 999.9)	5 (0.5)	<i>C t r l = 0</i>
<i>C Y C L</i>	Time proportional cycle	5 to 120 sec (relay output) 1 to 120 sec (voltage output)	10	Displayed when <i>C t r l = 1</i> or <i>2</i>
<i>P b i a s</i>	PV bias value	-1999 to 9999 (or -199.9 to 999.9)	0 (0.0)	
<i>H Y S 1</i>	Event 1 output hysteresis	0 to 9999 (or 0.0 to 999.9)	5 (0.5)	Displayed on event output model and when value of 1st digit of event type setting (<i>C 1 4</i> or <i>C 1 5</i>) is 1 to 8
<i>d L Y 1</i>	Event 1 ON delay time	0 to 9999 sec	0	
<i>H Y S 2</i>	Event 2 output hysteresis	0 to 9999 (or 0.0 to 999.9)	5 (0.5)	
<i>d L Y 2</i>	Event 2 ON delay time	0 to 9999 sec	0	
<i>F I L T</i>	PV filter	0.0 to 20.0 sec	0.0	

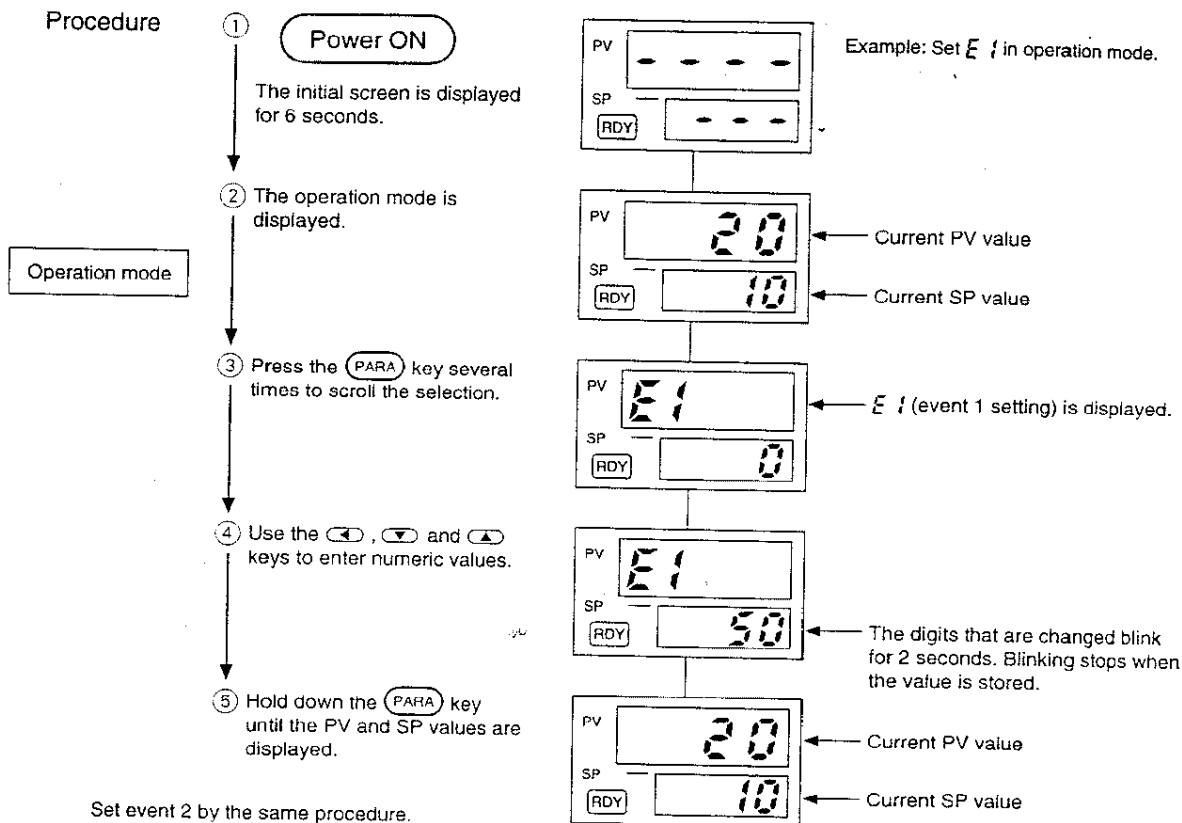
 NOTE

Event ON delay

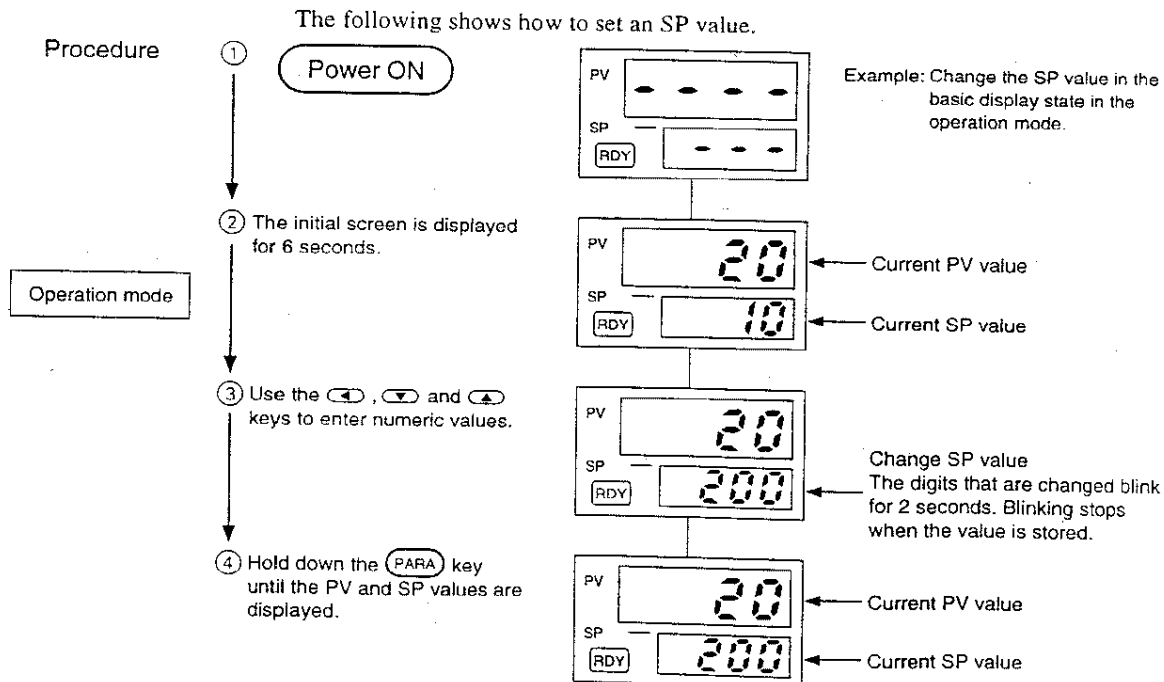
An event operation whose condition (exceeding an upper temperature limit, for example) has been satisfied is not activated until a set time has elapsed.



5-4 Event Settings (only with option installed)



5-5 SP Setting



■ List of Operation modes

Function Prompt	Function	Selections and Setting Range	Factory Setting	Remarks
Upper display: PV Lower display: SP	Normal display mode	SP: high and low SP limit Settings can be made in the $\text{C}09$ to $\text{C}10$ range	0	Upper display (PV): Displays $\text{C}12 = \text{XXX}0, \text{XXX}2$ Lower display (SP): Displays $\text{C}12 = \text{XXX}0, \text{XXX}1$ (See note 1)
$\text{O} \cdot \text{V} \cdot \text{E}$	Output value displayed	Not settable	—	Displays $\text{C}12 = \text{XX} \cdot \text{IX}$ ON/OFF control: "0.0" is displayed at OFF "100.0" is displayed at ON PID control: Values in 0.0 to 100.0 (%) range displayed
$\text{C} \cdot \text{E}$	Current (CT) displayed	Not settable	—	$\text{C}12 = \text{X}0\text{XX}$ is displayed on CT model Measurement range: 0 to 55 A Event operable range: 3 to 50 A Lights when control output is 300 ms or more (See note 2).
$\text{E} \cdot 1$	Timer event 1 remaining time displayed	Not settable	—	Displays $\text{C}12 = 0\text{XXX}$ (See note 3)
$\text{E} \cdot 2$	Timer event 2 remaining time displayed	Not settable	—	Displays $\text{C}12 = 0\text{XXX}$
$\text{E} \cdot 1$ ($\text{E} \cdot 1 \cdot \text{L} \cdot 0$)	Event 1 (low limit) setting	Depends on event 1 operation type See pages 10 to 12 for details	0	Displays $\text{C}12 = \text{X}0\text{XX}$ Displays settings $\text{C}14 = 1$ to 9
$\text{E} \cdot 1 \cdot \text{H} \cdot 1$	Event 1 (high limit) setting	See pages 10 to 12 for details	0	$\text{E} \cdot 1$: Sets either high or low limit. Displayed at event
$\text{E} \cdot 2$ ($\text{E} \cdot 2 \cdot \text{L} \cdot 0$)	Event 2 (low limit) setting	Depends on event 2 operation type See pages 10 to 12 for details	0	$\text{E} \cdot 1 \cdot \text{L} \cdot 0, \text{E} \cdot 1 \cdot \text{H} \cdot 1$
$\text{E} \cdot 2 \cdot \text{H} \cdot 1$	Event 2 (high limit) setting	See pages 10 to 12 for details	0	Displayed at events requiring high/low limit setting

(Note 1) This value cannot be changed when No.1 SP is selected with the external contact input.

(Note 2) This value blinks when control output is OFF or ON at 300 ms or less. During blinking, the displayed CT value cannot be changed.

(Note 3) Displayed by timer events set in the event and by the operation type of the external contact input set to the timer start setting. As long as timer operation continues, the time elapsed after the occurrence of the event is displayed within the range 0 to 1999 seconds.