



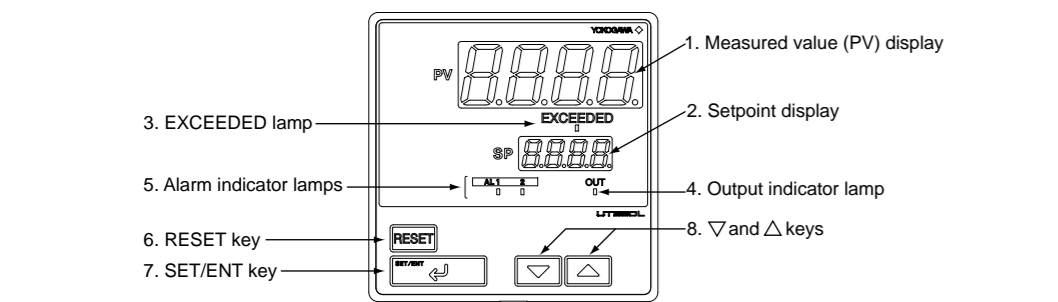


This manual describes examples of setting PV input types, limit control types, and alarm types. Carrying out settings described herein allows you to perform basic control. Refer to examples of various settings to understand how to set parameters required. Refer to "1. Basic Key Operation Sequence and Parameter Map" in **Parameters and Functions User's Manual** for an easy to understand explanation of setting various parameters. If you cannot remember how to carry out an operation during setting, press the key for more than 3 seconds. This brings you to the display (operating display) that appears at power-on.

**Contents**

- Names and Functions of Front Panel Parts
- Setting PV Input Type
- Changing Limit Control Type
- Changing Alarm Type

**1. Names and Functions of Front Panel Parts**



Name of Part	Function
1. Measured value (PV) display	Displays PV. Displays a parameter symbol when you set a parameter. Displays an error code (in red) if an error occurs.
2. Setpoint display	Displays the setpoint (SP) during operation. Displays the set value of parameters on the parameter setting display.
3. EXCEEDED lamp	Light (green) to indicate the exceeded status of PV. Lights while PV exceeds SP.
4. Output indicator lamp	Light (green) to indicate the output status. Lights while the relay output is OFF.
5. Alarm indicator lamps	If any of alarms 1 and 2 occurs, the respective alarm indicator lamp (AL1 and AL2) is lit (in orange).
6. RESET key	Used to confirm and reset the limit output and related parameters.
7. SET/ENT key	Used to switch or register a parameter. Pressing the key for more than 3 seconds allows you to switch between the operating display and the menu for operating parameter setting display alternately.
8. V and Δ keys	Used to change numerical values. On setting displays for various parameters, you can change target setpoints and parameters. Pressing the V key decreases a numerical value, while pressing the Δ key causes it to increase. You can hold down a key to gradually increase the speed of change.

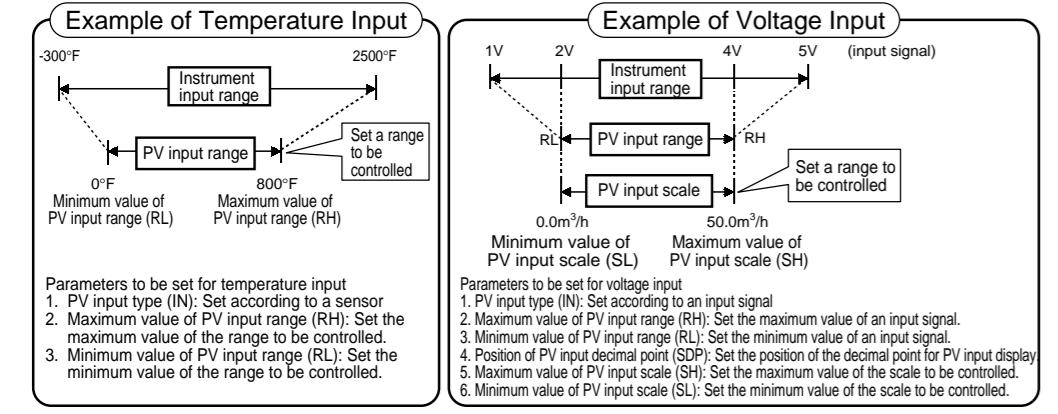
**IMPORTANT**  
The controller automatically returns to the display at the time of power-on (i.e., operating display) if no key is operated for at least one minute.

**Setting of Main Parameters at the Factory before Shipment**

Item	Factory-set defaults
PV input type	Thermocouple type K (-300 to 2500°F) (1)
Limit control type	High limit (HI)
Time unit for duration time	Hour and minute (0)
Alarm output	Alarm-1: PV high limit (1), Alarm-2: PV low limit (2)
Retransmission output	PV retransmission (1)

**2. Setting PV Input Type**

**NOTE**  
The controller is configured to the initial value of each parameter at the factory before shipment. First check the initial values shown in "2. Lists of Parameters," in **Parameters and Functions User's Manual** and change parameter values as necessary.



- Parameters to be set for temperature input
- PV input type (IN): Set according to a sensor
  - Maximum value of PV input range (RH): Set the maximum value of the range to be controlled.
  - Minimum value of PV input range (RL): Set the minimum value of the range to be controlled.
- Parameters to be set for voltage input
- PV input type (IN): Set according to an input signal
  - Maximum value of PV input range (RH): Set the maximum value of an input signal.
  - Minimum value of PV input range (RL): Set the minimum value of an input signal.
  - Position of PV input decimal point (SDP): Set the position of the decimal point for PV input display
  - Maximum value of PV input scale (SH): Set the maximum value of the scale to be controlled.
  - Minimum value of PV input scale (SL): Set the minimum value of the scale to be controlled.

The following operating procedure describes an example of setting the controller to a K-type thermocouple (-199.9°F to 999.9°F) and the measurement range of 0.0°F to 200.0°F.

- Bring the operating display into view (display appears at power on).
- Press the key for more than 3 seconds to call up the menu "OP.PA".
- Press the key once to display the menu "STUP".
- Press the key once to display the parameter "PVD".
- Press the key once to display the menu "FUNC".
- Press the key once to display the menu "I/O".
- Press the key once to display the parameter "IN" (PV input type).
- Press the key or key to display the required setpoint. The figure below is an example of the controller set to a Pt100 resistance temperature detector (-199.9°F to 999.9°F).
- Press the key once to register the setpoint.
- Press the key once to display the parameter "RH" (maximum value of PV input range).
- Press the key or key to display the required setpoint. The figure below shows an example of setting the maximum value of PV input range to 200.0°F.
- Press the key once to register the setpoint.
- Press the key once to display the menu "I/O".
- Press the key or key to display the required setpoint. The figure below shows an example of setting the minimum value of PV input range to 0.0°F.
- Press the key or key to register the setpoint.
- Press the key once to display the parameter "RL" (minimum value of PV input range).
- Press the key or key to display the required setpoint. The figure below shows an example of setting the minimum value of PV input range to 0.0°F.
- Press the key or key to register the setpoint.
- Press the key once to display the menu "I/O".
- Press the key or key to display the required setpoint. The figure below shows an example of setting the minimum value of PV input range to 0.0°F.
- Press the key or key to register the setpoint.

**NOTE**  
The controller may automatically initialize the registered operating parameter setpoints if any change is made to the data item PV Input Type (IN), Maximum Value of PV Input Range (RH), Minimum Value of PV Input Range (RL), PV Input Decimal Point Position (SDP), Maximum Value of PV Input Scale (SH) or Minimum Value of PV Input Scale (SL). After a change has been made to any of these data items, be sure to verify the registered operating parameter setpoints to ensure that they are correct. If any data item has been changed to its default, set it to a required value.

**Instrument Input Range Codes**

Input	Type	Instrument Input Range Code	Instrument Input Range	Measurement Accuracy
K	Thermocouple	1	-200 to 1370°C -300 to 2500°F	±0.1% of instrument range ±1 digit for temperatures equal to or higher than 0°C ±0.2% of instrument range ±1 digit for temperatures below 0°C
		2	-199.9 to 999.9°C 0 to 2300°F	
		3	-199.9 to 500.0°C -199.9 to 999.9°F	
		4	-199.9 to 500.0°C -300 to 2300°F	
		5	-199.9 to 400.0°C -300 to 750°F	
		6	0.0 to 400.0°C -199.9 to 750.0°F	
B	Thermocouple	7	0 to 1800°C 32 to 3300°F	±0.15% of instrument range ±1 digit for temperatures equal to or higher than 400°C ±5% of instrument range ±1 digit for temperatures below 400°C
		8	0 to 1700°C 32 to 3100°F	
		9	0 to 1700°C 32 to 3100°F	
		10	-200 to 1300°C -300 to 2400°F	
		11	-199.9 to 999.9°C -300 to 1800°F	
		12	-199.9 to 900.0°C -300 to 1300°F	
		13	-199.9 to 400.0°C -300 to 750°F	
		14	0.0 to 400.0°C -199.9 to 750.0°F	
		15	0 to 2300°C 32 to 4200°F	
		16	0 to 1300°C 32 to 2500°F	
RTD	Thermocouple	30	-199.9 to 500.0°C -199.9 to 999.9°F	±0.1% of instrument range ±1 digit (Note1) (Note2) ±0.2% of instrument range ±1 digit (Note1) (Note2) No guarantee of accuracy for temperatures below 800°C
		31	-150.0 to 150.0°C -199.9 to 300.0°F	
		35	-199.9 to 850.0°C -300 to 1180°F	
		36	-199.9 to 500.0°C -199.9 to 999.9°F	
		37	-150.0 to 150.0°C -199.9 to 300.0°F	
Standard signal	DC voltage	40	0.40 to 2.000 V	±0.1% of instrument range ±1 digit The read-out range can be scaled between -1999 and 9999.
		41	1.000 to 5.000 V	
		50	0.0 to 2.0 V	
		51	0.00 to 10.00 V	
		55	-10.00 to 20.00 mV	
56	0.0 to 100.0 mV			

\* Performance in the standard operating condition (at 23±2°C, 55±10%RH, and 50/60Hz power frequency)  
Note1: The accuracy is ±0.3°C of instrument range ±1 digit for a temperature range from 0°C to 100°C.  
Note2: The accuracy is ±0.5°C of instrument range ±1 digit for a temperature range from -100°C to 200°C.  
\* To receive a 4-20 mA DC signal, select a standard signal of 1 to 5 V DC and connect it to a 250Ω resistor. This resistor is optional. Model: X010-250-2 (resistor with M3.5 crimp-on terminal lugs)

**3. Changing Limit Control Type**

The following operating procedure describes an example of changing limit control type (factory-set default: high limit type) to low limit type.

- Bring the operating display into view (display appears at power on).
- Press the key for more than 3 seconds to call up the menu "OP.PA".
- Press the key once to display the menu "STUP".
- Press the key once to display the parameter "PVD".
- Press the key once to display the menu "FUNC".
- Press the key several times to display the parameter "HI.LO" (limit control type selection).
- Press the key or key to display the required setpoint. The figure below is an example of the controller set to a low limit type.
- Press the key once to register the setpoint.
- Press the key for more than 3 seconds. This returns you to the display shown at power on (figure below).

**4. Changing Alarm Type**

The following operating procedure describes an example of changing alarm-1 (factory-set default: PV high limit alarm) to PV low limit alarm. When you have changed alarm type, the alarm setpoint will be initialized; set the alarm setpoint again.

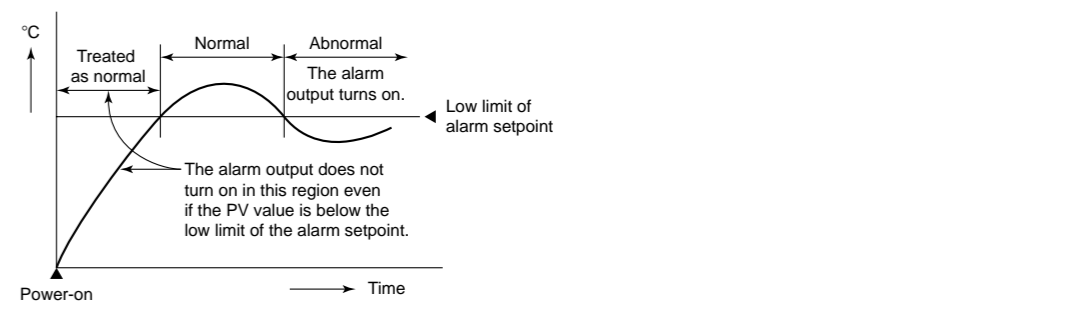
- Bring the operating display into view (appears at power-on).
- Press the key for more than 3 seconds to call up the menu "OP.PA".
- Press the key once to display the menu "STUP".
- Press the key once to display the parameter "PWD".
- Press the key once to display the menu "FUNC".
- Press the key once to display the parameter "AL1" type.
- Press the key or key to display the required setpoint. The figure below shows an example of setting PV low limit alarm.
- Press the key once to register the setpoint.
- Press the key for more than 3 seconds. This returns you to the display shown at power-on (figure below).
- When setting an alarm setpoint, see "3. Setting Alarm Setpoints" in **Operations User's Manual**.

**List of Alarm Types**

The table below shows the alarm types and alarm actions. In the table, codes 1 to 10 are not provided with stand-by actions, while codes 11 to 20 are provided with stand-by actions.

Alarm type	Alarm action	Alarm type code	Alarm type	Alarm action	Alarm type code
No alarm	"Open/closed" shows status of relay contact, and "if" and "until" shows status of lamp	OFF	Hysteresis	"Open/closed" shows status of relay contact, and "if" and "until" shows status of lamp	
PV high limit	Open (lit) / Closed (lit) / PV Alarm setpoint	1 / 11	De-energized on deviation low limit alarm	Open (lit) / Closed (until) / Deviation setpoint / Target SP	6 / 16
PV low limit	Closed (lit) / Open (until) / Alarm setpoint / PV	2 / 12	Deviation high and low limits	Closed (lit) / Open (until) / Closed (lit) / Deviation setpoint / Target SP	7 / 17
Deviation high limit	Open (until) / Closed (lit) / Deviation setpoint / Target SP	3 / 13	Deviation within high and low limits	Open (until) / Closed (lit) / Open (until) / Deviation setpoint / Target SP	8 / 18
Deviation low limit	Closed (lit) / Open (until) / Deviation setpoint / Target SP	4 / 14	De-energized on PV high limit	Closed (until) / Open (lit) / PV Alarm setpoint	9 / 19
De-energized on deviation high limit alarm	Closed (until) / Open (lit) / Deviation setpoint / Target SP	5 / 15	De-energized on PV low limit	Open (lit) / Closed (until) / Alarm setpoint / PV	10 / 20
Fault diagnosis output (Note 1)	Fault diagnosis output	21	FAIL output (Note 2)	The controller stops when in a FAIL state. The control output is set to "OFF", alarm output is set to "OFF" and retransmission output is set to 0%.	22

**Stand-by Action**



Note 1: The fault diagnosis output turns on in case of input burnout, A/D converter failure, or reference junction compensation (RJC) failure. In case of RJC failure, the controller continues control under the condition of "RJC-OFF".  
Note 2: The FAIL output is on during normal operation and turn off in case of ROM failure, RAM failure, power failure.

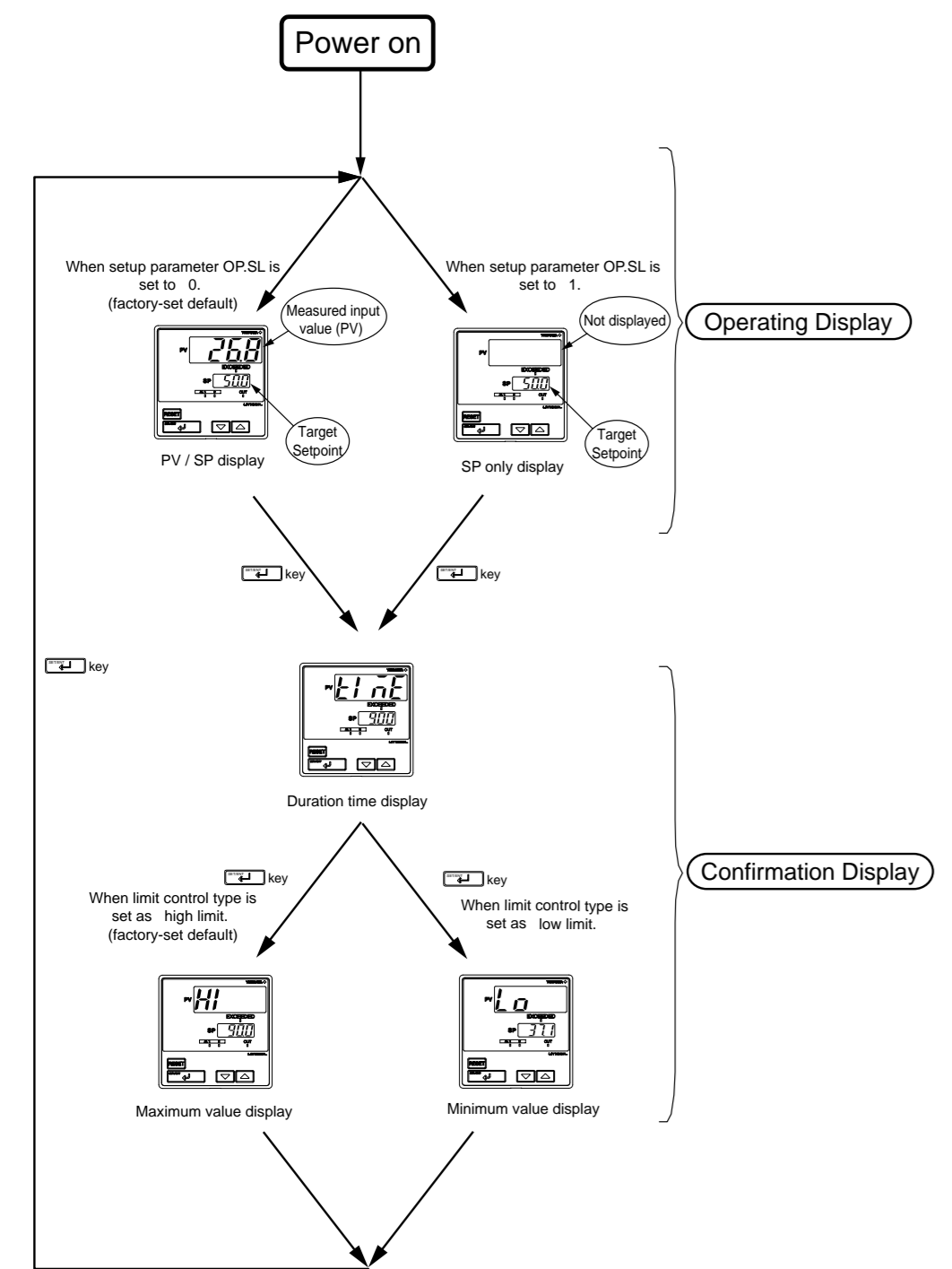
This manual describes key entries for operating the controller. For operations using external contact inputs. See "6. Terminal Wiring Diagrams" in **Installation User's Manual**. If you cannot remember how to carry out an operation during setting, press the **←** key for more 3 seconds. This brings you to the display (operating display) that appears at power-on.

**Contents**

1. Monitoring-purpose Operating and Confirmation Displays Available during Operation
2. Setting Target Setpoint (SP)
3. Setting Alarm Setpoints
4. Confirmation of the Limit Output
5. Operation in Confirmation Display
6. Troubleshooting
7. Cleaning and Maintenance

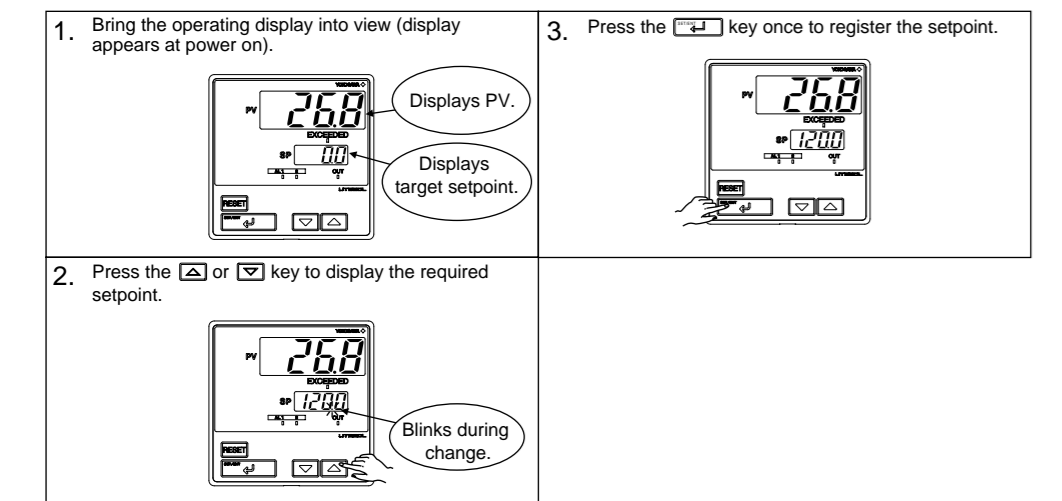
**NOTE**  
 Do not use the instrument generating strong magnetic field such as radio equipment and the like near the controller. This may cause the fluctuation of the PV value.

**1. Monitoring-purpose Operating Confirmation Displays Available during Operation**



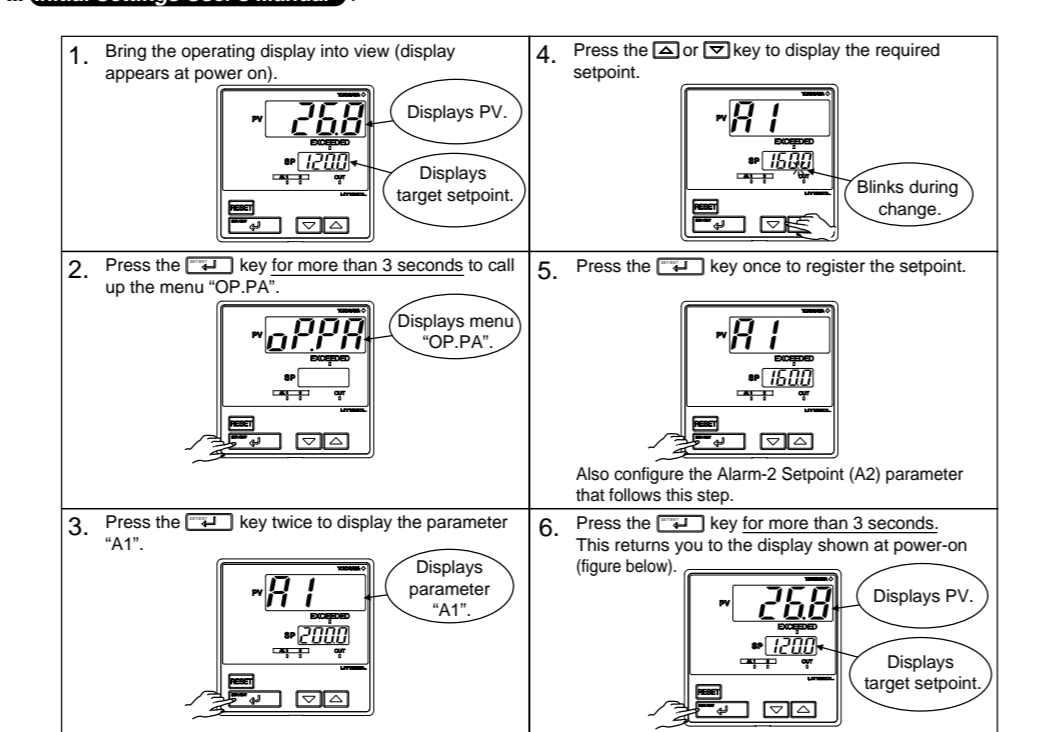
**2. Setting Target Setpoint (SP)**

The following operating procedure describes an example of setting 120.0 to a target setpoint.



**3. Setting Alarm Setpoints**

The following operating procedure describes an example of setting 160.0 to alarm-1 setpoint. Check alarm type before setting the alarm setpoint. To change the type of alarm, see "4. Changing Alarm Type" in **Initial Settings User's Manual**.

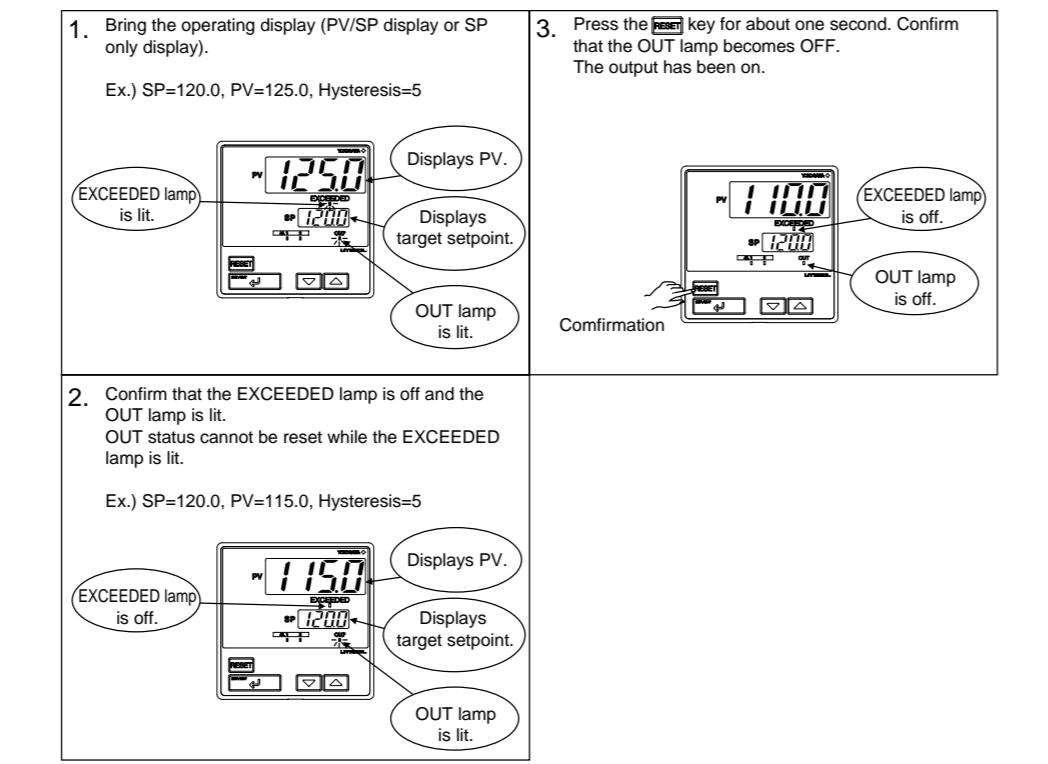


**4. Confirmation of the Limit Output**

When the measured value (PV) exceeds the setpoint for limit control (SP).

Procedure 1) The exceeded lamp lights, and also the output lamp lights.  
 Procedure 2) Exceeded lamp is off when the PV recovers to the normal status where PV doesn't exceed SP, while OUTPUT lamp keeps lit until the confirmation is done.  
 Procedure 3) Confirmation of the limit output can be done either by a front panel or external contact input.

See "3. Description of Limit Control Functions" in **Parameters and Functions User's Manual**. Here explains the way to reset key operation.



**Confirmation of Limit Status**

Limit control output and related parameter such as duration time and maximum / minimum PV value can be confirmed by a front key operation. It is possible to confirm limit control output by using external contact input. The way of confirmation is set by setup parameter DIS.

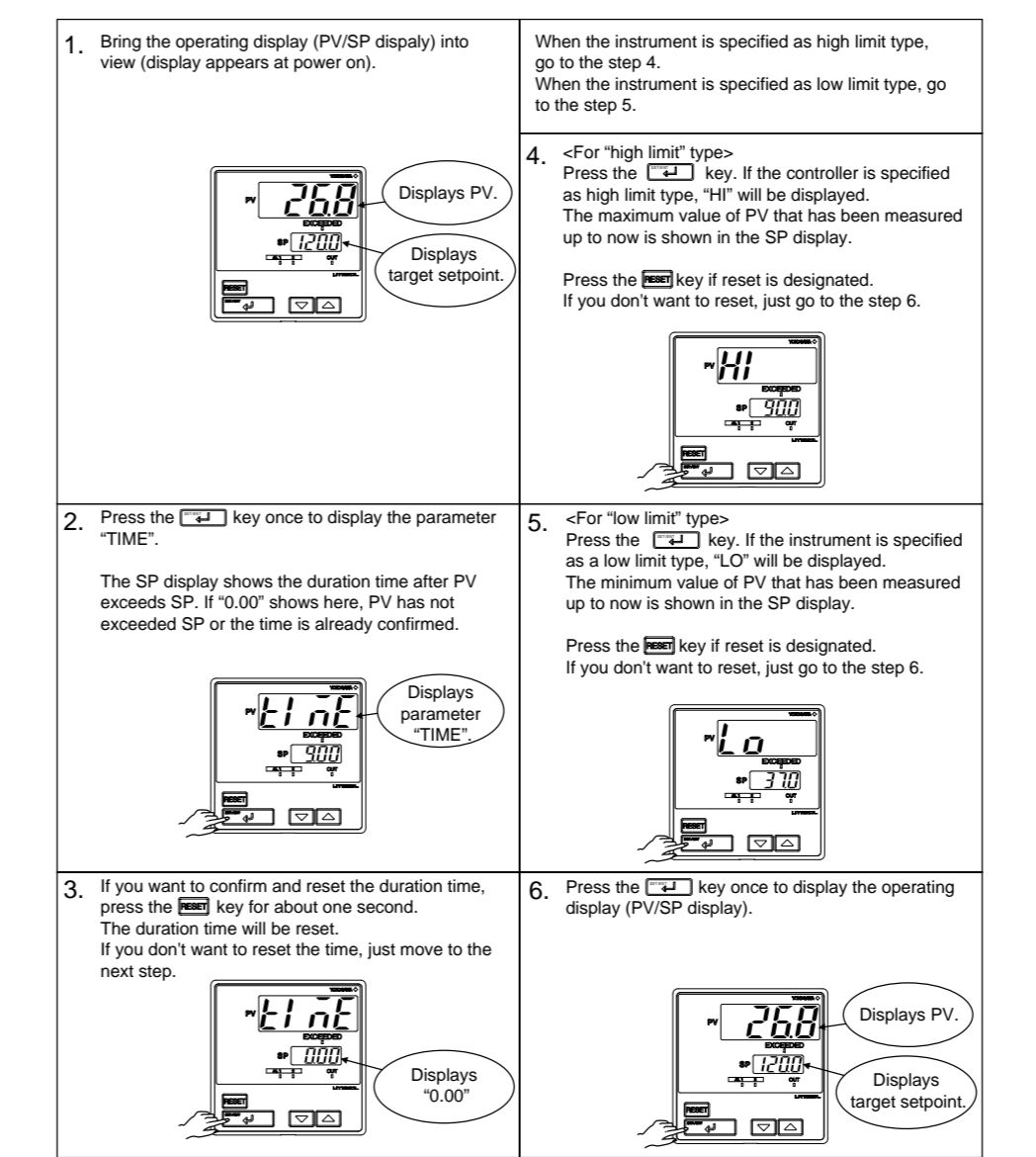
Table below shows the item which can be confirmed by front key or external contact input according to the setting of DIS.

Item to be confirmed	DIS parameter = KEY		DIS parameter = DI	
	KEY	DI	KEY	DI
Output relay	Able	Disable	Disable	Able
Duration time	Able	Disable	Able	Disable
Maximum / Minimum value	Able	Disable	Able	Disable

**5. Operation in Confirmation Display**

Following parameters can be seen in the confirmation display. These parameters can be confirmed and reset by pressing the **←** key at each parameter display.

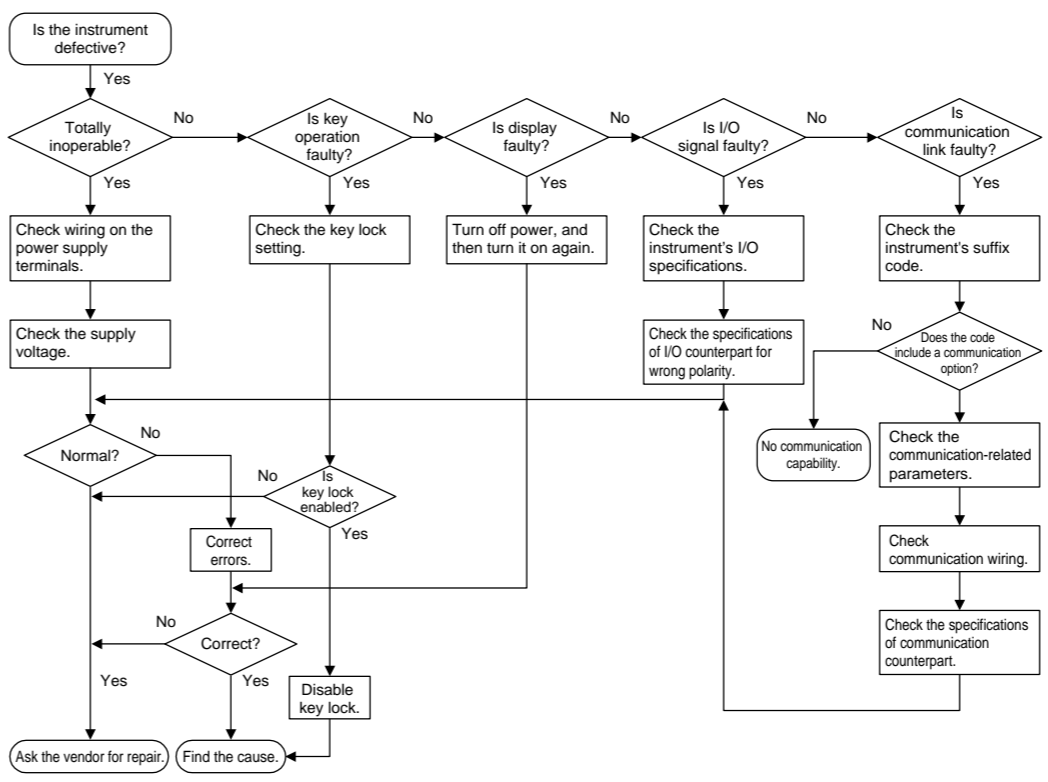
- Duration time (TIME)
- Maximum value of PV (HI) or Minimum value of PV (LO)



**6. Troubleshooting**

**Troubleshooting Flow**

If the operating display does not appear after turning on the controller's power, follow the measures in the procedure below. If a problem appears complicated, contact our sales representative.



**IMPORTANT**  
 Take note of the parameter settings when asking the vendor for repair.

**Errors at Power On**

The following table shows errors that may be detected by the fault diagnosis function when the power is turned on.

Error indication (on PV display unit)	Description of error	PV	Control output	Alarm output	Retransmission output	Communication	Remedy
E000 (E000)	Faulty RAM	None	0% or less or OFF	OFF	0% or less	Stopped	Faulty Contact us for repair.
E001 (E001)	Faulty ROM	0%					
E002 (E002)	System data error	0%					
PV decimal point blinks.	Faulty calibration value	Normal action (out of accuracy)	Normal action (out of accuracy)	Normal action (out of accuracy)	Normal action (out of accuracy)	Normal action	Check and set the parameters, as they have been set to the limited values.
E400 (E400)	Parameter error	0%	OFF	OFF	0%		

**Possible Errors during Operation**

The following shows possible errors occurring during operations.

Error indication (on PV display unit)	Description of error	PV	Control output	Alarm output	Retransmission output	Communication	Remedy
Displays "RJC" and PV alternately	RJC error	Measured with RJC=0	Normal action	Normal action	Normal action	Normal action	Faulty Contact us for repair.
PV value blinks.	EEPROM error	Normal action	Normal action	Normal action	Normal action		
E300 (E300)	A/D error	105%	Normal action	Normal action	Normal action	Normal action	
bOUT (B.OUT)	PV burnout error	Dependent on the BSL parameter Up-scale: 105% Down-scale: -5%	Normal action	Normal action	Normal action	Normal action	Check wires and sensor.
oBr (OVER) or -oBr (-OVER)	Excessive PV Out of -5 to 105%	-5% or 105%	Normal action	Normal action	Normal action	Normal action	Check process.
SP decimal point blinks. (on setpoint display unit)	Faulty communication line	Normal action	Normal action	Normal action	Normal action	Normal action	Check wires and communication parameters, and make resetting. Recovery at normal receipt
All indications off	Runaway (due to defective power or noise)	None	0% or less or OFF	OFF	0% or less	Stopped	Faulty if power off/on does not reset start the unit. Contact us for repair.
All indications off	Power off	None	0%	OFF	0%	Stopped	Check for abnormal power.

**If a Power Failure Occurs during Operation**

- Momentary power failures shorter than 20 ms  
 The controller is not affected at all and continues normal operation.
- Power failures of 20 ms or longer  
 The alarm function of the controller continues to work normally. (Alarms with the stand-by feature temporarily return to their stand-by state, however.)  
 Setting parameters that have already been configured retain their settings.  
 After recovery from a power failure, limit control status is reset.

**Troubleshooting When the Controller Fails to Operate Correctly**

If your control tasks are not successful, check the preset parameters and controller wiring before concluding the controller to be defective. The following show examples of troubleshooting you should refer to in order to avoid the possibility of other problems.

- The controller does not show the correct measured value (PV).  
 The UT350L controllers have a universal input. The type of PV input can be set/changed using the parameter "IN". At this point, the controller must be wired correctly according to the selected type of PV input. Check the wiring first if the controller fails to show the correct PV. To do this, refer to **Initial Settings User's Manual**. With the parameters "RH", "RL", "SDP", "SH" and "SL", it is possible to scale the input signal and change its number of decimal places. Also check that these parameters are configured correctly.

**7. Cleaning and Maintenance**

**Cleaning**

Use a dry cloth and wipe gently to clean the product's front panel, keys, and other areas.

**NOTE**  
 Do not use solvents such as alcohol or benzene.

**Replacing the Mounting Bracket**

If the mounting bracket is damaged or lost, order a replacement using the following serial number and sales unit.

Part No.	Sales Unit
T9115NL	One pair (upper and lower bracket)

**Limited Life Components and Maintenance**

The parts used in this product that have an especially limited life are shown below.

Part No.	Service Life
Aluminum electrolytic capacitor	About 10 years (Estimated)
Non-volatile memory	Can be written to up to 100,000 times
Alarm output relay	100,000 times
Limit control output relay (Note)	100,000 times

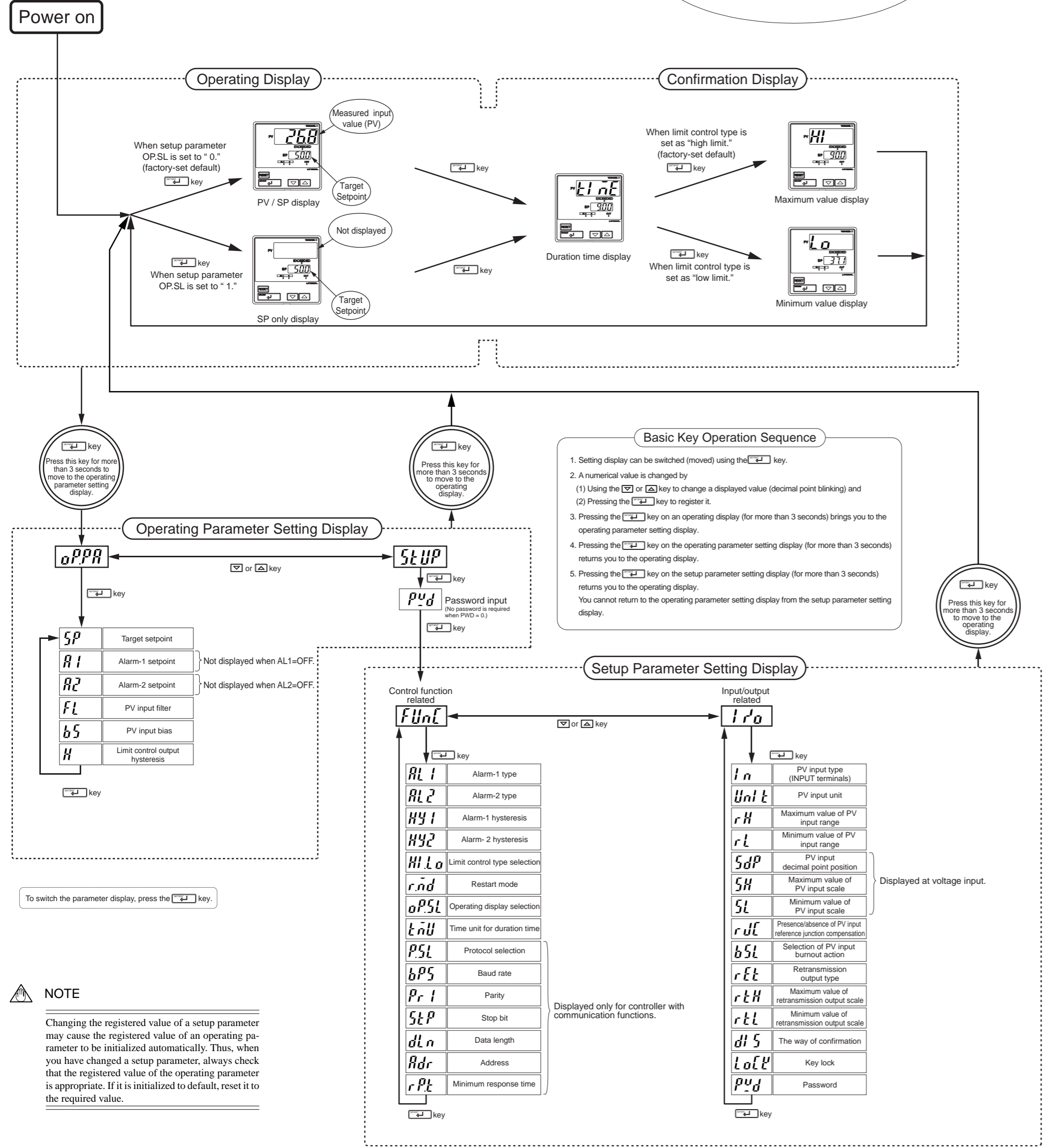
Note) Limit control output relay can be replaced by users.

This manual contains a parameter map as a guideline for setting parameters, and lists of parameters for recording user settings.

**Contents**

1. Basic Key Operation Sequence and Parameter Map
2. Lists of Parameters
3. Description of Limit Control Functions
4. Parameters in the Confirmation Displays
5. Function Block Diagram

**1. Basic Key Operation Sequence and Parameter Map**



**2. Lists of Parameters**

**Operating Parameters**

Parameter Symbol	Name of Parameter	Setting Range and Description	Initial Value	User Setting
SP (SP)	Target setpoint	0.0 to 100.0% of PV input range	0.0% of PV input range	
R1 (A1)	Alarm-1 setpoint	PV alarm: -100.0 to 100.0% of PV input range Deviation alarm: -100.0 to 100.0% of PV input range span	PV high limit alarm: 100.0% of PV input range Deviation alarm: 0.0% of PV input range span Other PV low limit alarm: 0.0% of PV input range	
R2 (A2)	Alarm-2 setpoint			
FL (FL)	PV input filter	OFF, 1 to 120 seconds. Used when the PV input fluctuates.	OFF	
bS (BS)	PV input bias	-100.0% to 100.0% of PV input range span Used to correct the PV input range.	0.0% of PV input range span	
H (H)	Limit control output hysteresis	0.0 to 100.0% of PV input range span  In case of HIGH LIMIT  In case of LOW LIMIT 	0.5% of PV input range span	

**Setup Parameters**

**Control Function-related Parameters**

Parameter Symbol	Name of Parameter	Setting Range and Description	Initial Value	User Setting
RL1 (AL1)	Alarm-1 type	OFF, 1 to 22 1: PV high limit (energized, no stand-by action) 2: PV low limit (energized, no stand-by action) 3: Deviation high limit (energized, no stand-by action) 4: Deviation low limit (energized, no stand-by action) 5: Deviation high limit (de-energized, no stand-by action) 6: Deviation low limit (de-energized, no stand-by action) See "List of Alarm Types" in <b>Initial Settings User's Manual</b> .	1	
RL2 (AL2)	Alarm-2 type		2	
HY1 (HY1)	Alarm-1 hysteresis	0.0 to 100.0% of PV input range span  Hysteresis for PV high limit alarm 	0.5% of PV input range span	
HY2 (HY2)	Alarm-2 hysteresis			
HILo (HI,LO)	Limit control type selection	HI: High limit, LO: Low limit	HI	
rMd (R.MD)	Restart mode	0: Limit output is ON at power on in any cases. 1: Limit output is OFF at power on when PV doesn't exceed SP	0	
oP.SL (OP.SL)	Operating display selection	0: PV/SP display first, 1: SP only display first	0	
tMu (TMU)	Time unit for duration time	0: hour and minute 1: minute and second	0	
P.SL (P.SL)	Protocol selection	0: PC link communication (with sum check) 1: PC link communication (with sum check) 2: Ladder communication	0	
bP.S (BPS)	Baud rate	0: 600, 1: 1200, 2: 2400, 3: 4800, 4: 9600 (bps)	4	
Pr1 (PRI)	Parity	0: None 1: Even 2: Odd	1	
StP (STP)	Stop bit	1, 2	1	
dLn (DLN)	Data length	7, 8 Fixed at 8, when the P.SL parameter is set to Ladder Communication.	8	
Rdr (ADR)	Address	1 to 99 However, the maximum number of stations connectable is 31.	1	
rPt (RP.T)	Minimum response time	0 to 10 (<math>\times 10</math> ms)	0	

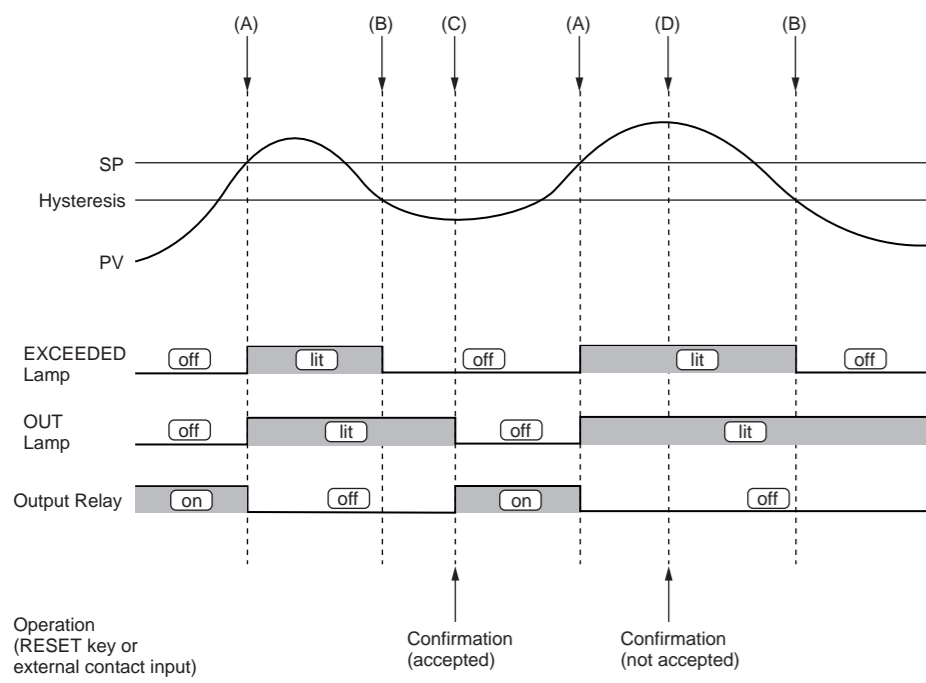
**Input/Output-related Parameters**

Parameter Symbol	Name of Parameter	Setting Range and Description	Initial Value	User Setting
In (IN)	PV input type (INPUT terminals)	OFF, 1 to 18, 30, 31, 35 to 37, 40, 41, 50, 51, 55, 56 See Instrument Input Range Codes in <b>Initial Settings User's Manual</b> .	1	
Unit (UNIT)	PV input unit	"C": degree Celsius "F": Fahrenheit (This parameter is not shown for voltage input.)	"F"	
rH (RH)	Max. value of PV input range	Set the PV input range, however RL < RH. - Temperature input Set the range of temperature that is actually controlled.	Max. value of instrument input range	
rL (RL)	Min. value of PV input range	Set the range of a voltage signal that is applied. The scale across which the voltage signal is actually controlled should be set using the parameters Maximum Value of PV Input Scale (SH) and Minimum Value of PV Input Scale (SL).	Min. value of instrument input range	
SdP (SDP)	PV input decimal point position (displayed at voltage input)	0 to 3 Set the position of the decimal point of voltage-mode PV input. 0: No decimal place 1: One decimal place 2, 3: Two, three decimal places	1	
SH (SH)	Max. value of PV input scale (displayed at voltage input)	-1999 to 9999, however SL < SH Set the read-out scale of voltage-mode PV input.	100.0	
SL (SL)	Min. value of PV input scale (displayed at voltage input)		0.0	
rJc (RJC)	Presence/absence of PV input reference junction compensation	OFF, ON	ON	
bSL (BSL)	Selection of PV input burnout action	OFF 1: Up scale 2: Down scale	1	
rEt (RET)	Retransmission output type	1: PV, 2: SP	1	
rTH (RTH)	Max. value of retransmission output scale	RTL + 1 digit to 100.0% of PV input range	100.0% of PV input range	
rTL (RTL)	Min. value of retransmission output scale	0.0% of PV input range to RTH - 1 digit	0.0% of PV input range	
dIS (DIS)	The way of confirmation	KEY: By key operation. DI: By contact output, only the limit output can be confirmed.	KEY	
LoLK (LOCK)	Key lock	OFF: No key lock ON: Change to any parameter prohibited Prohibits any operating parameter or setup parameter from being changed. The setpoint of the LOCK parameter itself can be changed, however.	OFF	
PwD (PWD)	Password setting	0: Password not set 1 to 9999	0	

### 3. Description of Limit Control Functions

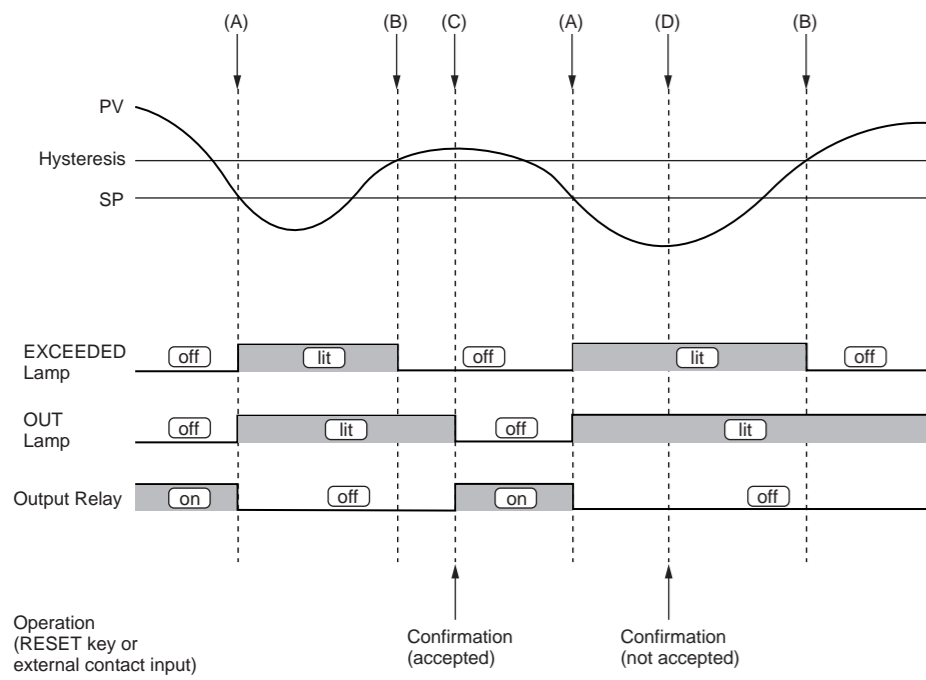
#### ■ In Case of High Limit Control

When a measured value (PV) exceeds a setpoint (SP), "EXCEEDED" lamp lights, and "OUT" lamp turns ON (point A). The limit control output relay is de-energized then. "EXCEEDED" lamp turns off when PV goes into normal condition, while "OUT" lamp stays on as it is (point B). "OUT" lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the "RESET" key (or by an external contact, according to the setting of setup parameter DIS). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is de-energized whenever "OUT" lamp is on. (NC terminal : CLOSE, NO terminal : OPEN)



#### ■ In Case of Low Limit Control

When a measured value (PV) exceeds a setpoint (SP), "EXCEEDED" lamp lights, and "OUT" lamp turns ON (point A). The limit control output relay is de-energized then. "EXCEEDED" lamp turns off when PV goes into normal condition, while "OUT" lamp stays on as it is (point B). "OUT" lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the "RESET" key (or by an external contact, according to the setting of setup parameter DIS). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is de-energized whenever "OUT" lamp is on. (NC terminal : CLOSE, NO terminal : OPEN)



#### ■ Power on Status

The state of output relay at power-on can be set by a setup parameter restart mode R.MD.

##### Setup Parameters

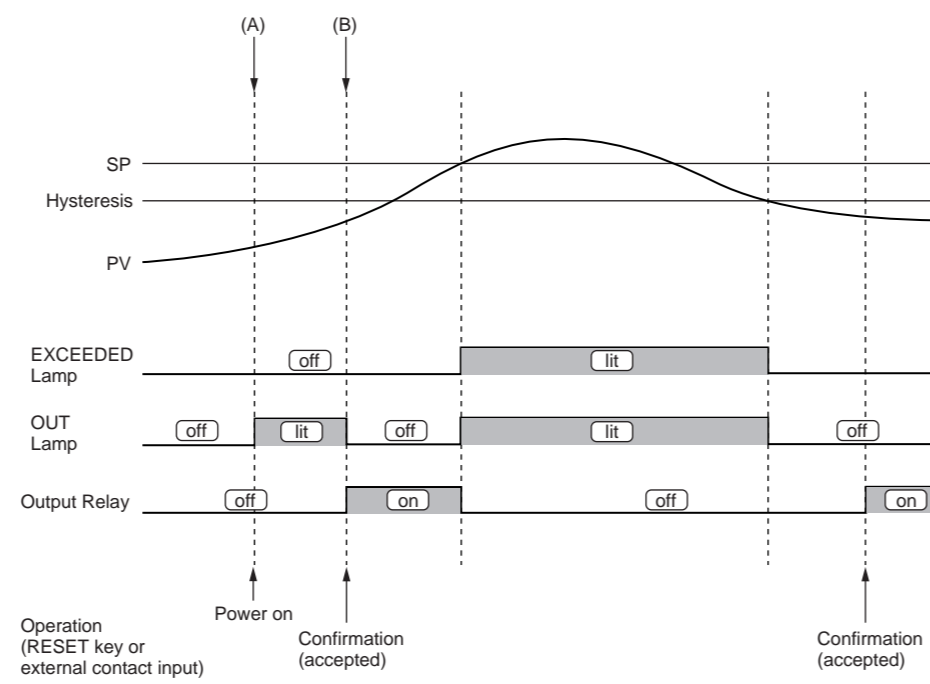
Restart mode R.MD :

- 0 : Limit output relay is de-energized at power on.
- 1 : Limit output relay is energized at power on.

#### ● When parameter R.MD is set to 0.

The limit output relay is always de-energized at power on, even if PV doesn't exceed SP (point A). (NC terminal : CLOSE, NO terminal : OPEN). "OUT" lamp is lit. After the confirmation, state of output relay is energized (NC terminal : OPEN, NO terminal : CLOSE) and "OUT" lamp turns off, if the PV doesn't exceed SP (point B).

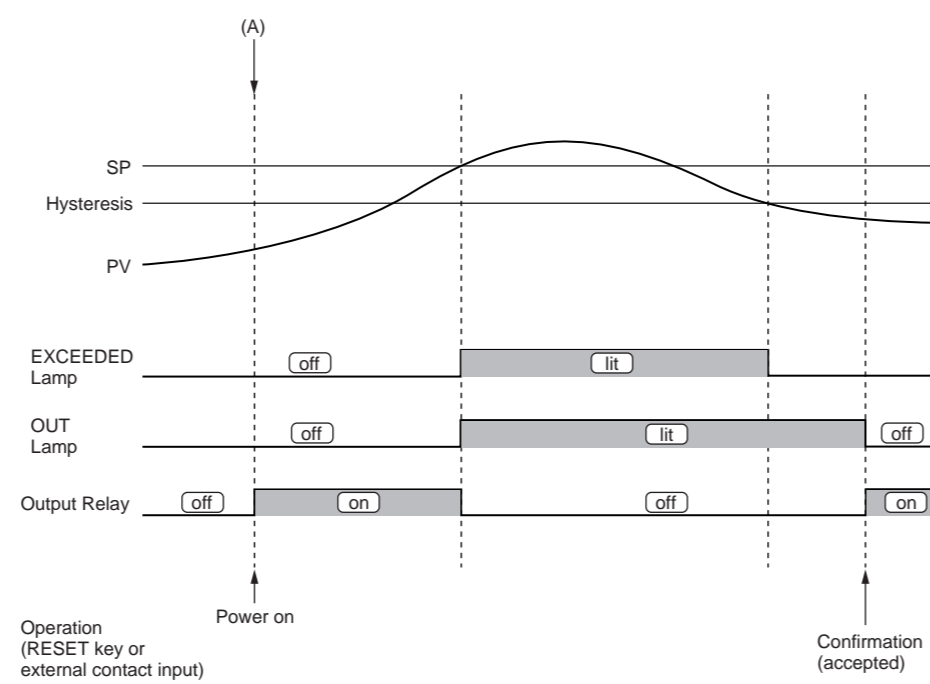
#### In Case of High Limit Control



#### ● When parameter R.MD is set to 1.

The limit output relay is always energized at power on (point A) (NC terminal : OPEN, NO terminal : CLOSE) and "OUT" lamp is off, except when PV exceeds SP at power on.

#### In Case of High Limit Control



### 4. Parameters in the Confirmation Displays

#### ■ Duration Time

The time while PV exceeds SP is counted and stored in the memory. It is displayed in the "TIME" display in the confirmation display.

Display time range : 0.00 to 99.59

Unit of time is either "hour.minute" or "minute.second", and can be set by setup parameter TMU.

#### - To RESET

- Push "RESET" key for about one second to reset the duration time in the confirmation display where "TIME" is displayed.
- When the count are reset, "0.00" is displayed until PV exceeds SP again.
- The time count are reset when power is turned on.
- If PV exceeds SP during the old time count data is retained in the memory, the old data should be automatically reset, and the new time counting starts from "0.00".
- It is impossible to reset the time count while PV exceeds SP by any operation.
- Duration time cannot be reset by an external contact input.

#### ■ Maximum / Minimum Value

The maximum value or minimum value of PV is stored in the memory and display in the "HI" or "LO" display in the confirmation display. When the control type is specified as high limit control, the maximum value is displayed in the "HI" display, and control type is specified as low limit control, the maximum value is displayed in the "LO" display.

When the PV exceeds SP and then returns to the normal status, Maximum / Minimum Value is retained as it is, but when PV exceeds SP again, it is automatically reset and starts taking new value for its minimum / maximum value.

#### - To RESET

- Push the "RESET" key for about one second to reset the maximum / minimum value in the confirmation display where "HI" or "LO" is displayed. The value is reset, and the value immediately after the confirmation should be recognized as a maximum or minimum value.
- When the power is turned on, the memory should be reset and the first PV should be recognized as a maximum or minimum value.
- Maximum / Minimum value cannot be reset by an external contact input.
- It is impossible to reset the maximum / minimum value while PV exceeds SP by any operation.

### 5. Function Block Diagram

