

This manual describes installation, wiring, and other tasks required to make the controller ready for operation.

**Contents**

- Safety Precautions
- Model and Suffix Codes
- How to Install
- How to Connect Wires
- Hardware Specifications
- Terminal Wiring Diagrams

**Introduction**  
 Thank you for purchasing the UT350L limit controller.  
 The controller is shipped from the factory with 3 hardcopy user's manuals (A2 size). The 3 user's manuals in hardcopy format describe the operating procedures required for basic use. It is recommended that you refer to these user's manuals to understand [1] installation, [2] initial settings, [3] operating procedures, and [4] limit control function of the controller.

**How to Use the Manuals**

Purpose	Manual Title	Description	Media
Setup	<b>Installation</b>	Describes the tasks (installation, wiring, and others) required to make the controller ready for operations.	A2-size paper, front
Basic operation	<b>Initial Settings</b>	Describes examples of setting PV input types, limit control type selection, and alarm types. Making settings described herein allows you to carry out basic control.	A2-size paper, front
Operating procedures, troubleshooting, and maintenance	<b>Operations</b>	Describes key operation sequences. For operation control through external contact inputs, see <b>Installation</b> User's Manual.	A2-size paper, back
Brief operation, setpoint recording, and description of limit control function	<b>Parameters and Functions</b>	Contains the parameter map used as a guideline for setting parameters and lists of parameters for recording user settings. Describes the limit control functions.	A2-size paper, back and front

**1. Safety Precautions**

The following symbol is indicated on the controller to ensure safe use.

**CAUTION**

This symbol on the controller indicates that the operator must refer to an explanation in the user's manual in order to avoid the risk of injury or death of personnel or damage to the instrument. The manual describes how the operator should exercise special care to avoid electric shock or other dangers that may result in injury or loss of life.

The following symbols are used in the hardcopy user's manuals.

**NOTE**

Indicates that operating the hardware or software in a particular manner may damage it or result in a system failure.

**IMPORTANT**

Draws attention to information that is essential for understanding the operation and/or features of the controller.

**2. Model and Suffix Codes**

Before using the controller, check that the model and suffix codes match your order.

Model	Suffix Code	Description
UT350L		Limit controller
Type	-0	Standard type
Optional functions	0 1	None With communication

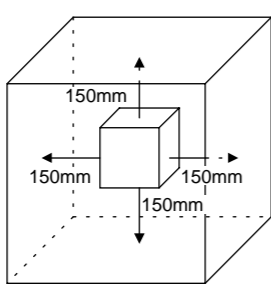
- Check that the following items are provided:
- Limit controller (of ordered model): 1
  - Brackets (mounting hardware): 1 pair
  - Unit label: 1
  - User's Manuals: 3 (A2 size)
  - User's Manual (Model UT350L Communication Functions): 1 (A5 size)
- Supplied only for UT350L model with communication functions.

**3. How to Install**

**NOTE**

To install the controller, select a location where:

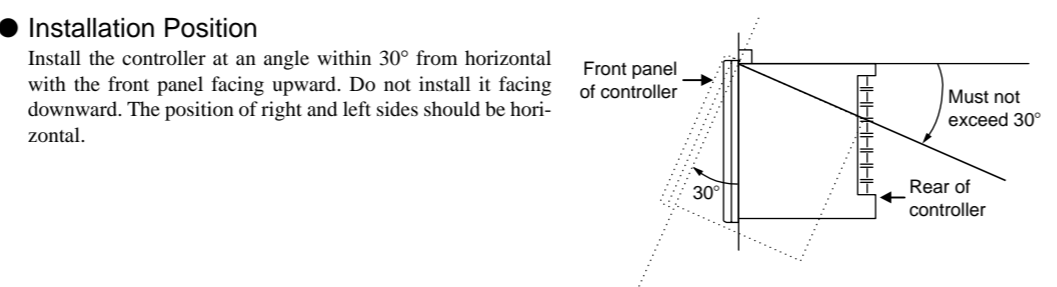
- no one may accidentally touch the terminals,
- mechanical vibrations are minimal,
- corrosive gas is minimal,
- temperature can be maintained at about 23°C and the fluctuation is minimal,
- no direct radiant heat is present,
- no magnetic disturbances are caused,
- no wind blows against the terminal board (reference junction compensation element),
- no water is splashed,
- no flammable materials are around,



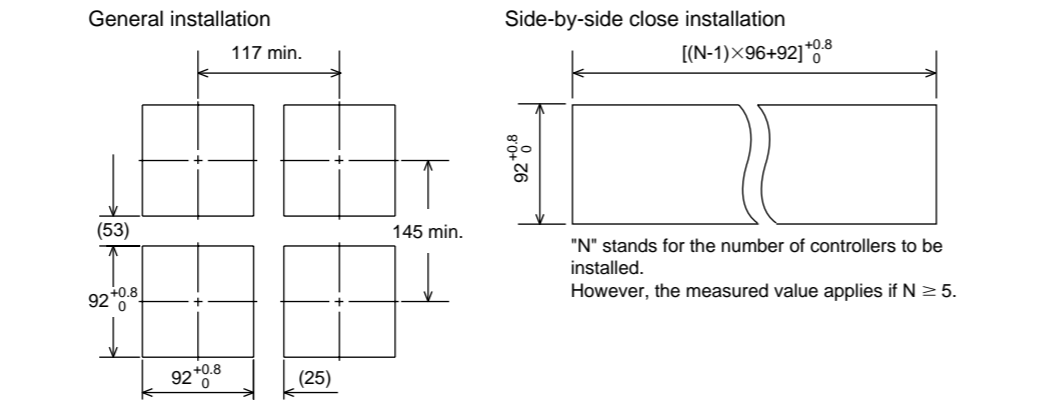
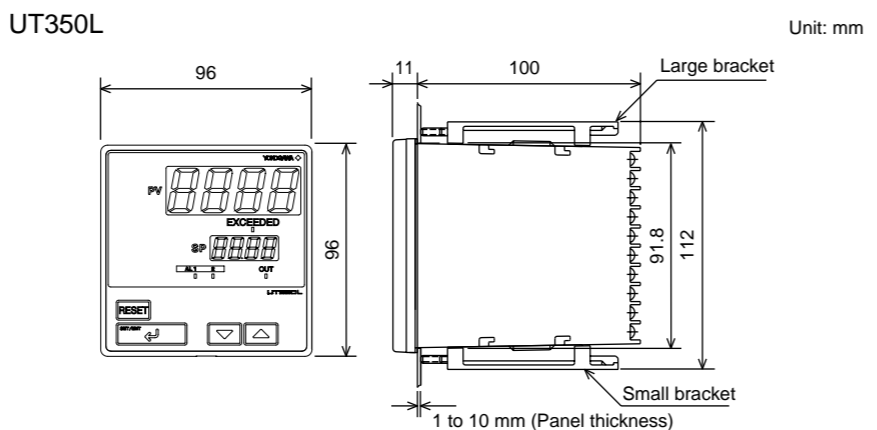
Never place the controller directly on flammable items or equipment.  
 If the controller has to be installed close to flammable items or equipment, be sure to provide shielding panels all around the controller, at least 150mm away from every side; the panels should be made of either 1.43mm-thick metal-plated steel plates or 1.6mm-thick uncoated steel plates.

**NOTE**

Never touch the opening at the bottom of the case. It is to be used in the factory at shipping.



**External Dimensions and Panel Cutout Dimensions**



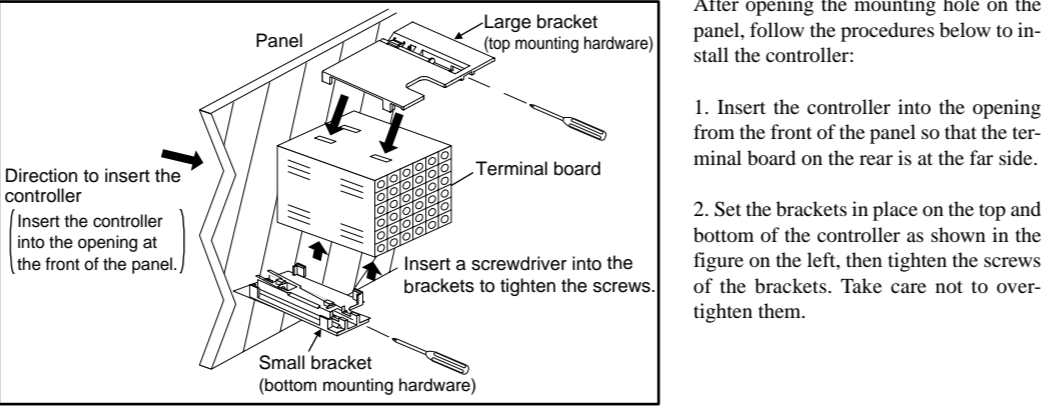
**4. How to Connect Wires**

**CAUTION**

1) Before carrying out wiring, turn off the power to the controller and check that the cables to be connected are not alive with a tester or the like because there is a possibility of electric shock.

2) For safety, be sure to install a circuit breaker switch (of 5A and 100V AC or 220V AC, and that conforms to IEC60947) near the controller so as to be operated easily, and clearly indicate that the device is used to de-energize the controller.

3) Wiring must be carried out by personnel who have basic electrical knowledge and practical experience.



**5. Hardware Specifications**

**PV Input Signals**

- Number of inputs: 1 (terminals ①-③)
- Input type: Universal input system. The input type can be selected with the software.
- Sampling period: 250 ms
- Burnout detection: Functions at TC, RTD, standard signal (0.4 to 2 V or 1 to 5 V). Upscale, downscale, and off can be specified. For standard signal, burnout is determined to have occurred if it is 0.1 V or less.
- Input bias current: 0.05 μA (for TC or RTD b-terminal)
- Measurement current (RTD): About 0.13 mA
- Input resistance: 1 MΩ or more for thermocouple or mV input About 1 MΩ for DC voltage input
- Allowable signal source resistance: 250 Ω or less for thermocouple or mV input Effects of signal source resistance: 0.1 μV/Ω or less 2 kΩ or less for DC voltage input Effects of signal source resistance: About 0.01%/100 Ω
- Allowable wiring resistance: for RTD input Maximum 150 Ω/wire; Conductor resistance between three wires should be equal However, 10 Ω/wire for a maximum range of -150.0 to 150.0°C. Wire resistance effect: ±0.1°C /10 Ω
- Allowable input voltage: ±10 V DC for thermocouple, mV, or RTD input ±20 V DC for DC voltage input
- Noise rejection ratio: 40 dB (50/60 Hz) or more in normal mode 120 dB (50/60 Hz) or more in common mode
- Reference junction compensation error: ±1.0°C (15 to 35°C) ±1.5°C (0 to 15°C, 35 to 50°C)
- Applicable standards: JIS, IEC, DIN (ITS-90) for thermocouples and RTD

**Retransmission Output**

Either PV, or target setpoint is output.

- Number of outputs: 1 (terminals ④-⑤)
- Output signal: 4-20 mA DC
- Load resistance: 600 Ω or less
- Output accuracy: ±0.3% of span under standard operating conditions (23 ±2°C, 55 ±10% RH, power frequency of 50/60 Hz)

**Limit Control Output**

- Relay contact output (Standard type: terminals ①-②-③)

Number of outputs	1
Output signal	Three terminals (NC, NO, and common)
Contact rating	250V AC or 30V DC, 3A (resistance load)
Resolution	10 ms

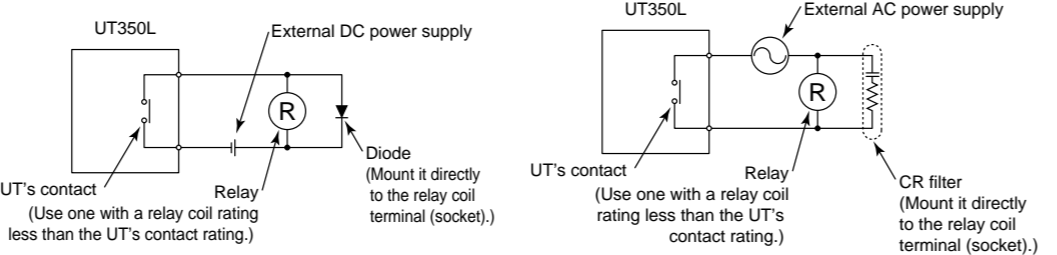
**Contact Inputs**

- Purpose: Confirmation of limit output.
- Number of input: 1
- Input type: Non-voltage contact or transistor open collector input
- Input contact rating: 12 V DC, 10 mA or more
- On/off determination: For non-voltage contact input, contact resistance of 1 kΩ or less is determined as "on" and contact resistance of 20 kΩ or more as "off." For transistor open collector input, input voltage of 2 V or less is determined as "on" and leakage current must not exceed 100 μA when "off."
- Minimum status detection hold time: About 1 second.
- Devices connected to the UT350L must comply with IEC61010 and 60950.

**Contact Outputs**

- Purpose: Alarm output, FAIL output
- Number of outputs: 2
- Relay contact rating: 240 V AC/1 A or 30 V DC/1 A (COM terminal is common) ; 1a, FAIL output ; 1b
- Devices connected to the UT350L must comply with IEC61010 and 60950.

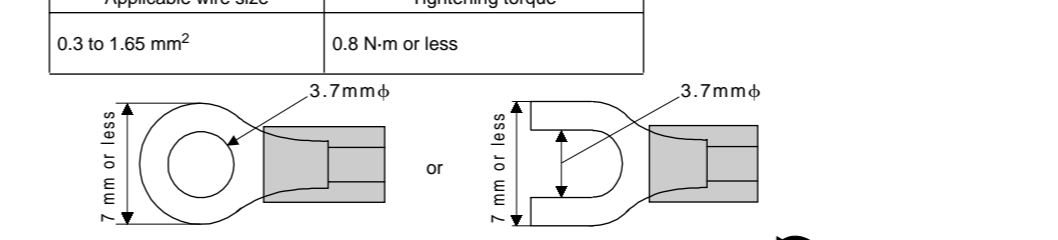
**For DC Relay Wiring** **For AC Relay Wiring**



**Cable Specifications and Recommended Cables**

Purpose	Name and Manufacturer
Power supply, grounding, relay contact outputs	600 V PVC insulated wires, JIS C 3307, 0.9 to 2.0 mm <sup>2</sup>
Thermocouple	Shielded compensating lead wires, JIS C 1610, □□-□□-□□ (See Yokogawa Electric's GS 6B1U1-E.)
RTD	Shielded wires (three conductors), UL2482 (Hitachi Cable)
Other signals	Shielded wires

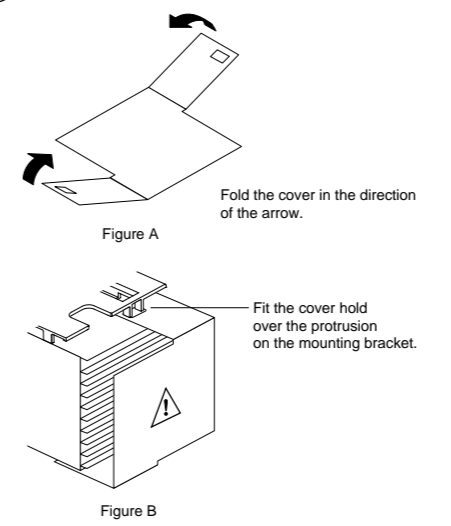
**Recommended Terminal Lugs**



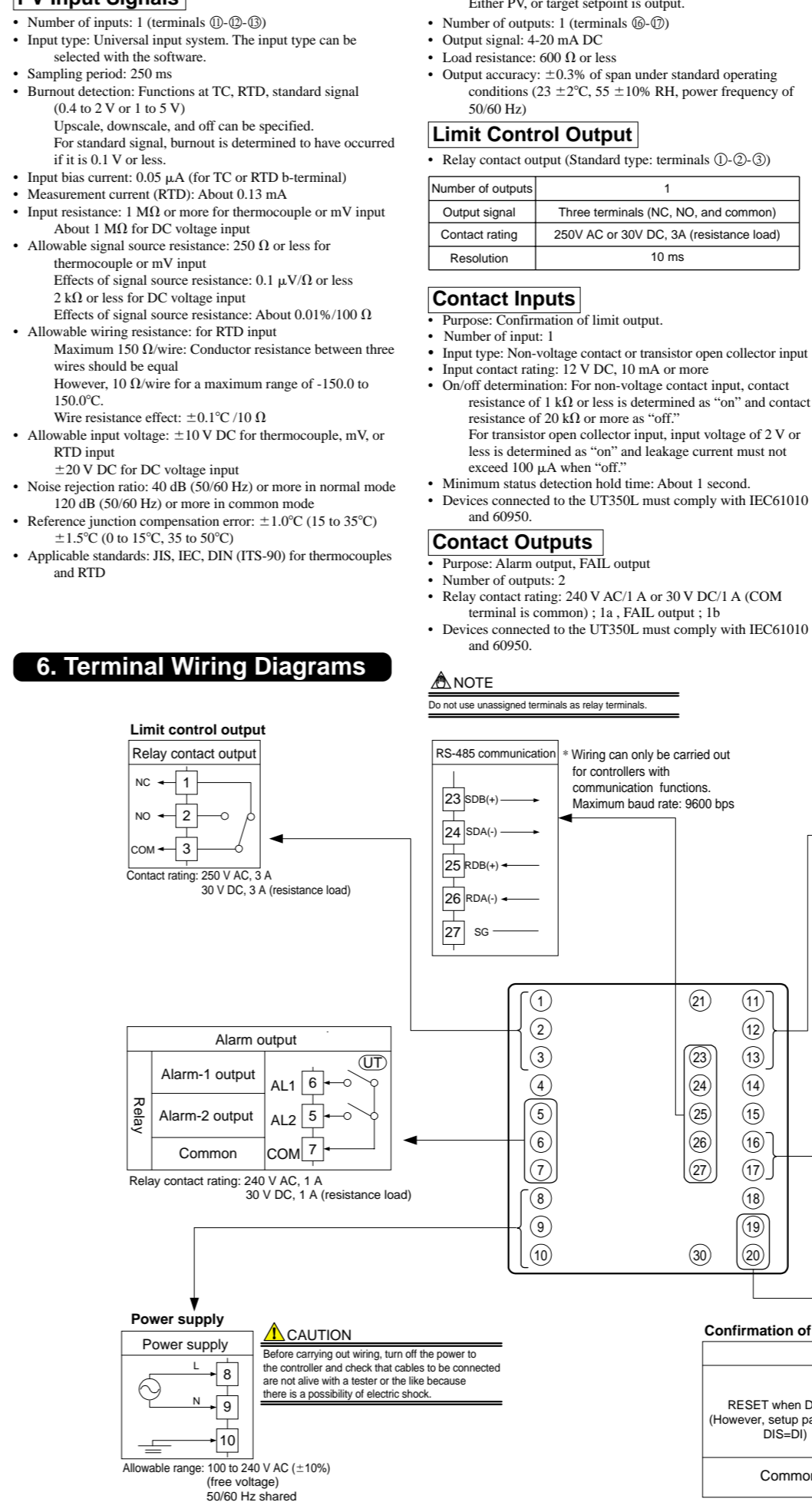
**Terminal Covers (Optional parts)**

Target Model	Part Number	Sales Unit
For UT350L	T9115YD	1

- Before attaching the terminal cover, bend the side with the groove inward as shown in Fig. A. Be careful not to bend it backwards. This not only marks it harder to attach the cover but will also weaken its hold.
- Fit the holes on the top and bottom (UT350L) of the terminal cover the projections on the brackets (Fig. B) and lock in place. The figure right shows the attachment of a terminal cover to UT350L.



**6. Terminal Wiring Diagrams**



**Communication Function**

- Communication protocol
  - Personal computer link: Used for communication with a personal computer, or UT link module of the FA-M3 controller (from Yokogawa Electric Corporation).
  - Ladder communication: Used for communication with a ladder communication module of the FA-M3, or a programmable controller of other manufactures.
- Communication Interface
  - Applicable standards: Complies with EIA RS-485
  - Number of controllers that can be connected: Up to 31
  - Maximum communication distance: 1,200m
  - Communication method: Two-wire half-duplex, start-stop synchronization, non-procedural
  - Baud rate: 600, 1200, 2400, 4800, or 9600 bps

**Display Specifications**

- PV display: 4-digit, 7-segment red LED display, character height of 20 mm
- Setpoint display: 4-digit, 7-segment red LED display, character height of 9.3 mm
- Status indicating lamps: LEDs

**Safety and EMC Standards**

- Safety: Complies with IEC/EN61010-1 (CE), approved by C22.2 No.61010-1, approved by UL508. Certified for FM-3810 and FM-3545. Installation category: CAT II Pollution degree: 2 (IEC/EN61010-1, C22.2 No.61010-1) Measurement category: I (CAT. I: IEC/EN61010-1) Rated measurement input voltage: 10V DC max.(across terminals), 300V AC max.(across ground) Rated transient overvoltage: 1500V (Note) Note: It is a value on the safety standard which is assumed by IEC/EN61010-1 in Measurement category I, and is not the value which guarantees an apparatus performance.

**CAUTION**

This equipment has Measurement category I, therefore do not use the equipment for measurements within Measurement categories II, III and IV.

Measurement category	Description	Remarks
I	CAT. I For measurements performed on circuits not directly connected to MAINS.	
II	CAT. II For measurements performed on circuits directly connected to the low voltage installation.	Appliances, portable equipments, etc.
III	CAT. III For measurements performed in the building installation.	Distribution board, circuit breaker, etc.
IV	CAT. IV For measurements performed at the source of the low-voltage installation.	Overhead wire, cable systems, etc.

**Environmental Conditions**

- Normal operating conditions: Ambient temperature: 0 to 50°C (40°C or less for side-by-side close installation) The operating ambient temperature range is between 0°C. Temperature change rate: 10°C/h or less Ambient humidity: 20 to 90% RH (no condensation allowed) Magnetic field: 400 A/m or less Continuous vibration at 5 to 14 Hz: Full amplitude of 1.2 mm or less
- Continuous vibration at 14 to 150 Hz: 4.9 m/s<sup>2</sup> or less Short-period vibration: 14.7 m/s<sup>2</sup>, 15 seconds or less Shock: 147 m/s<sup>2</sup> or less, 11 ms Installation height: Height above sea level of 2000 m or less Warm-up time: 30 minutes or more after power on Installation category based on IEC61010-1: I (See Note) Pollution degree based on IEC61010-1: 2 (See Note)

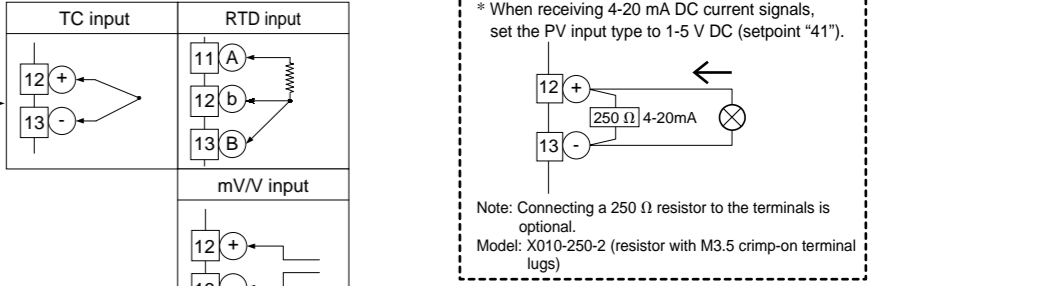
**Construction, Installation, and Wiring**

- Construction: Only the front panel is dust-proof and drip-proof (protection class IP55) For side-by-side close installation the controller loses its dust-proof and drip-proof protection.
- Material: ABS resin and polycarbonate
- Case color: Black
- Weight: About 1 kg or less
- Dimensions: 96 (W) × 96 (H) × 100 (depth from panel face) mm
- Installation: Panel-mounting type. With top and bottom mounting hardware (1 each)
- Panel cutout dimensions: 92<sup>+0.4</sup> (W) × 92<sup>+0.4</sup> (H) mm
- Installation position: Up to 30° upward facing (not designed for facing downward)
- Wiring: M3.5 screw terminals (for signal wiring and power/ground wiring as well)

**NOTE**

- The "Installation category" implies the regulation for impulse withstand voltage. It is also called the "Overvoltage category." "II" applies to electrical equipment.
- "Pollution level" describes the degree to which a solid, liquid or gas which deteriorates dielectric strength is adhering. "2" applies to a normal indoor atmosphere.
- Transportation and storage conditions: Temperature: -25 to 70°C Temperature change rate: 20°C/h or less Humidity: 5 to 95% RH (no condensation allowed)
- Effects of changes in operating conditions: Effects from changes in ambient temperature: - On voltage or thermocouple input, ±1 μV/°C or ±0.01% of F.S./°C, whichever is larger - On RTD input, ±0.05°C/°C (ambient temperature) or less - On analog output, ±0.05% of F.S./°C or less
- Effects from power supply fluctuation (within rated voltage range): - On analog input, ±1 μV/10 V or ±0.01% of F.S./10 V, equal to or less than whichever is larger - On analog output, ±0.05% of F.S./ 10 V or less

**Receiving 4-20 mA DC Current Signals with the Controller**







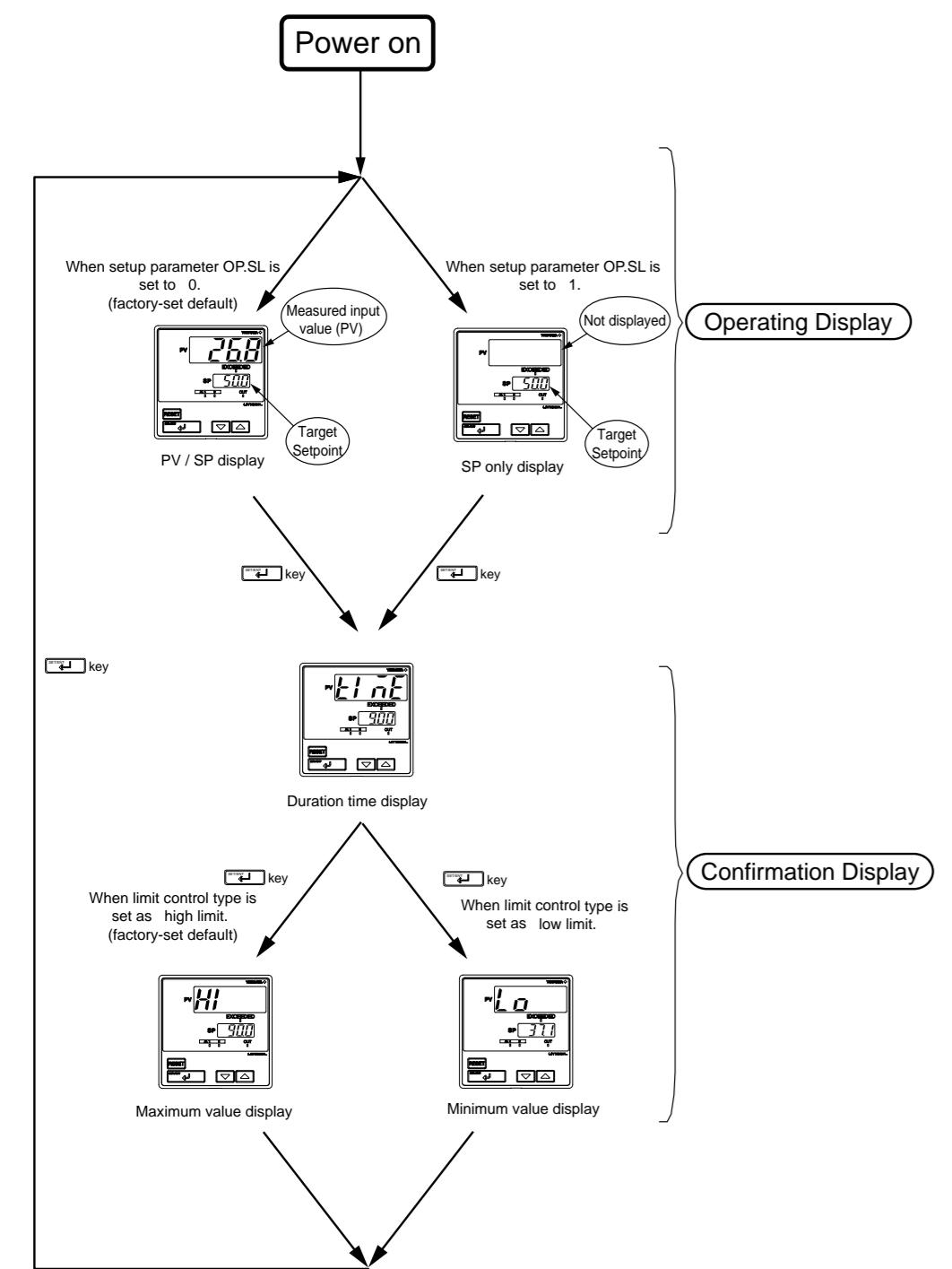
This manual describes key entries for operating the controller. For operations using external contact inputs. See "6. Terminal Wiring Diagrams" in **Installation User's Manual**. If you cannot remember how to carry out an operation during setting, press the **←** key for more 3 seconds. This brings you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

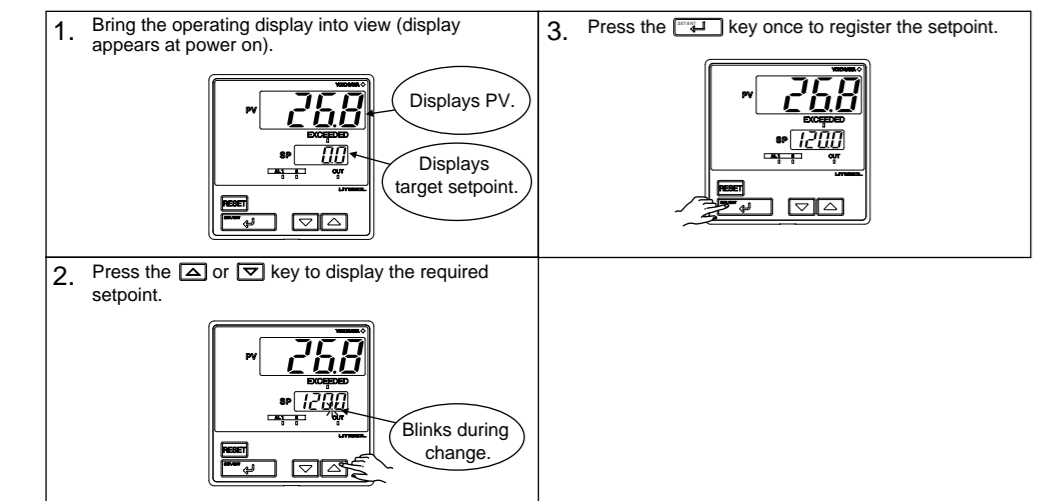
**NOTE**  
 Do not use the instrument generating strong magnetic field such as radio equipment and the like near the controller. This may cause the fluctuation of the PV value.

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



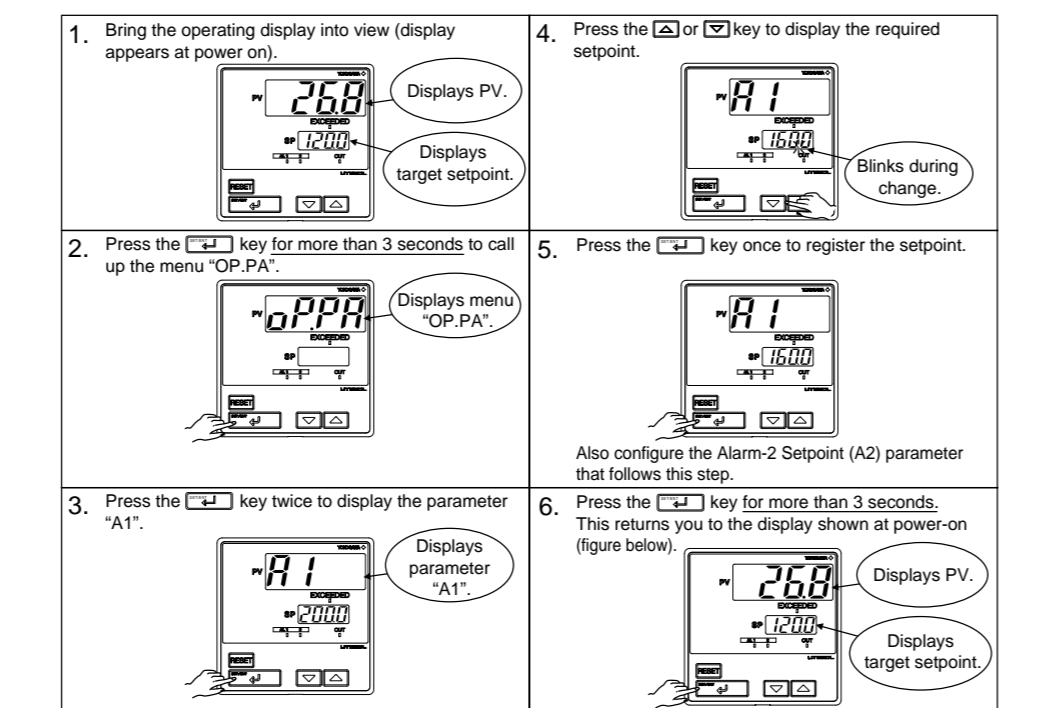
**2. Setting Target Setpoint (SP)**

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**.

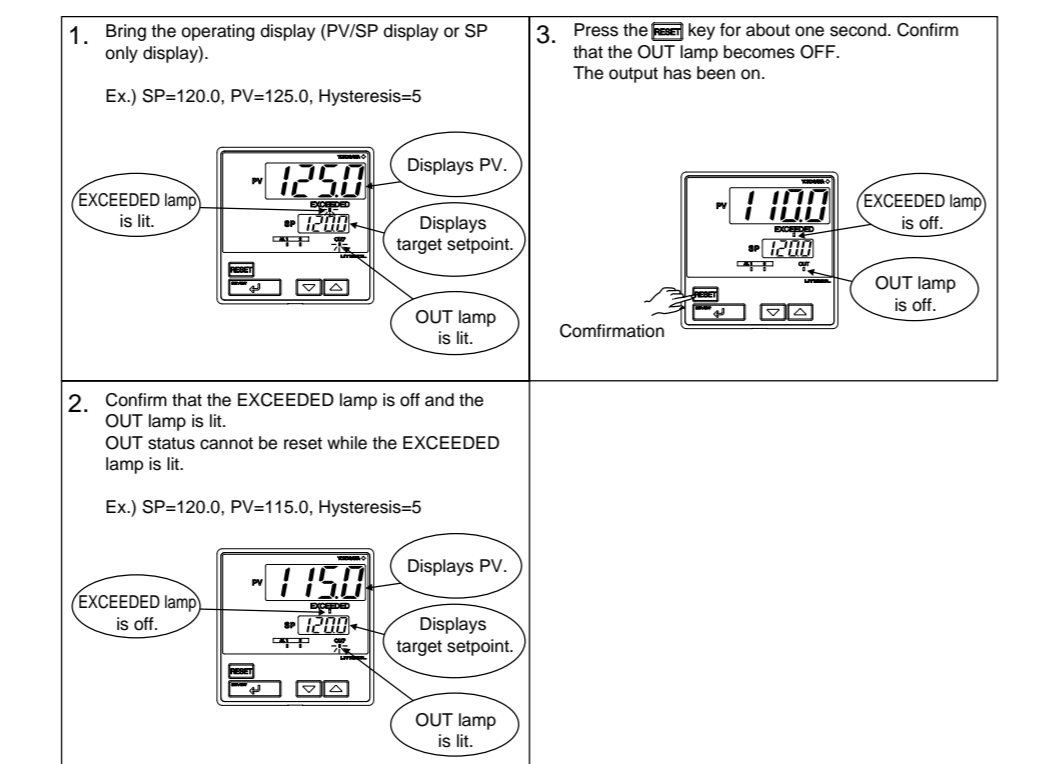


**4. Confirmation of the Limit Output**

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.

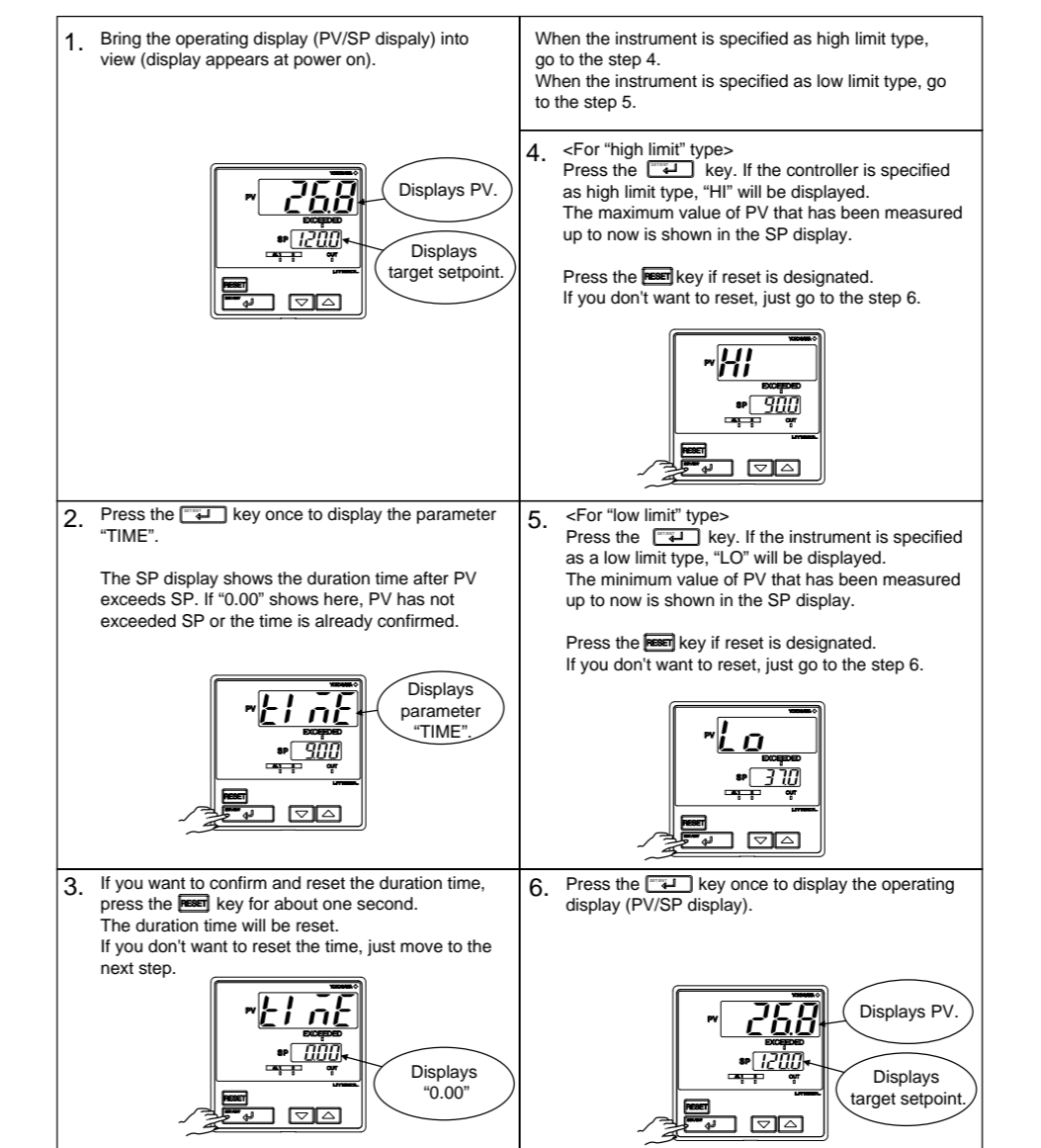
Table below shows the item which can be confirmed by front key or external contact input according to the setting of DIS.

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.

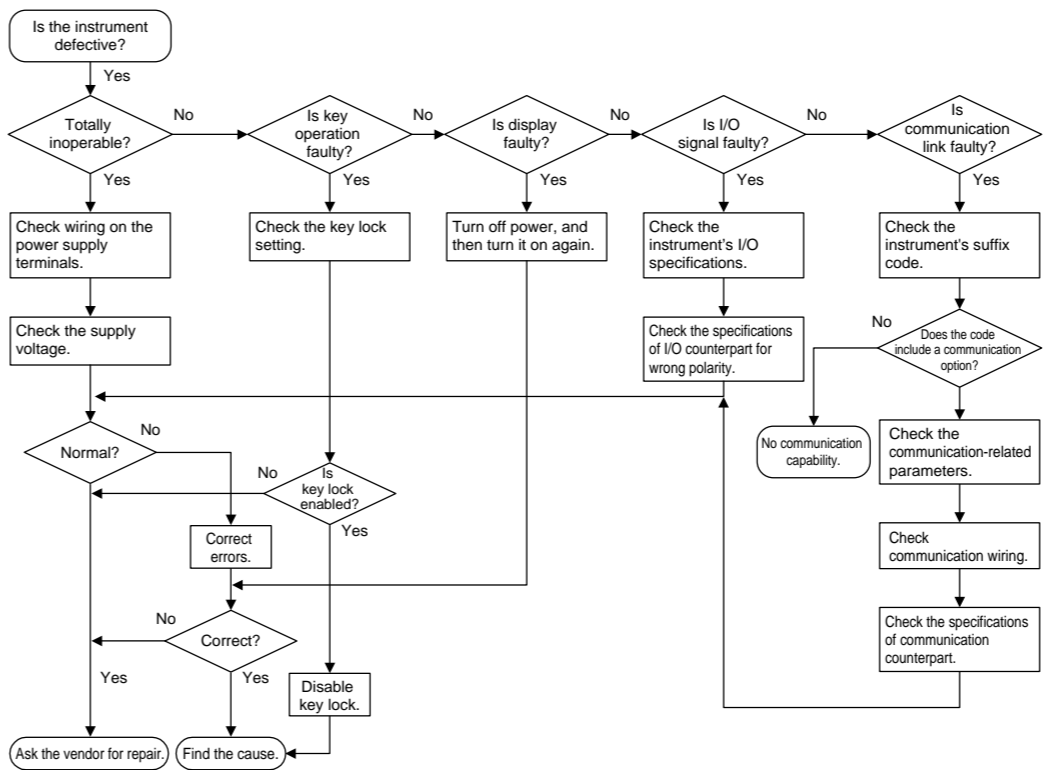
- Duration time (TIME)
- Maximum value of PV (HI) or Minimum value of PV (LO)



**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%			0%		
E002 (E002)	System data error	0%			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

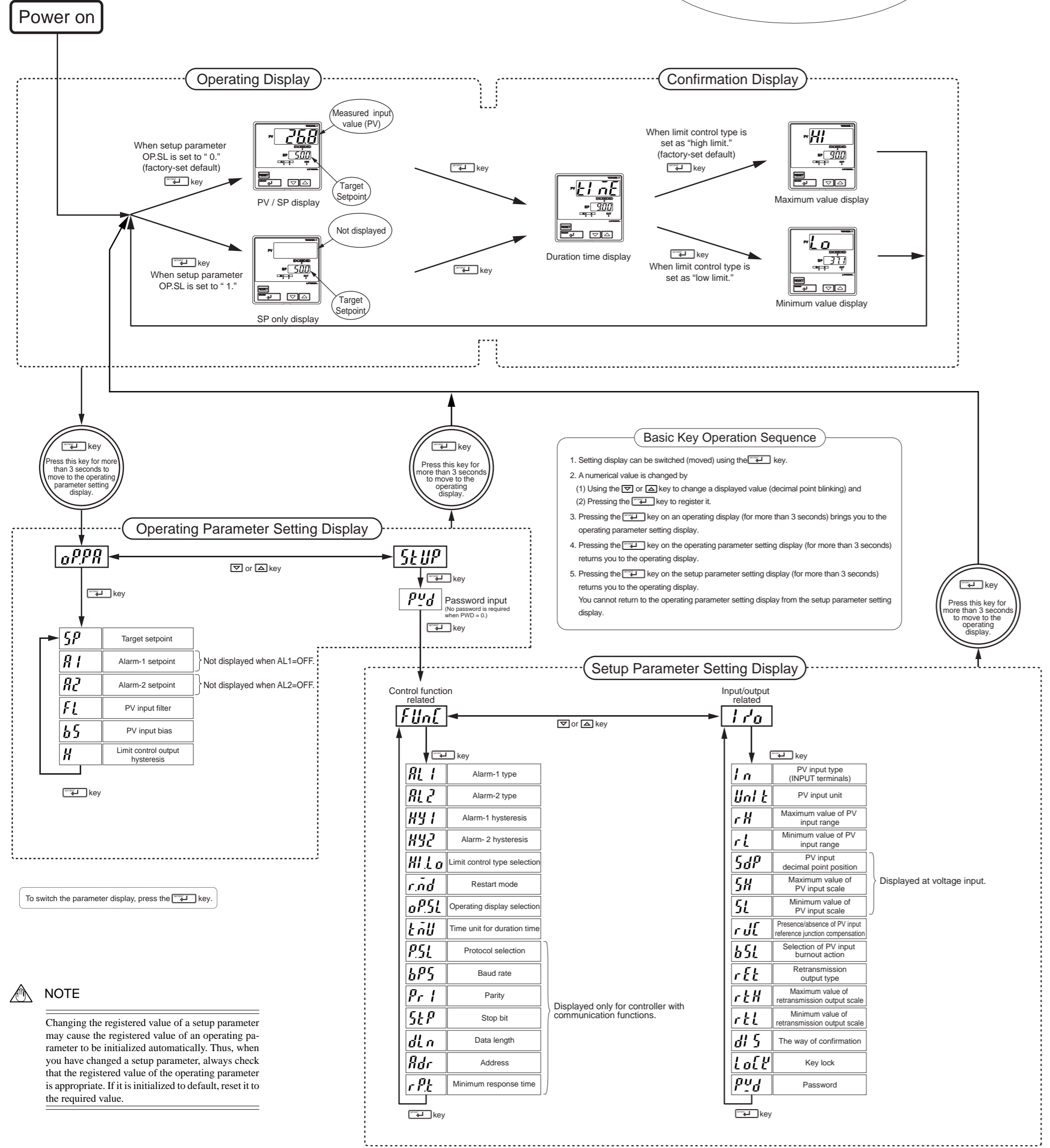
Note) Limit control output relay can be replaced by users.

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

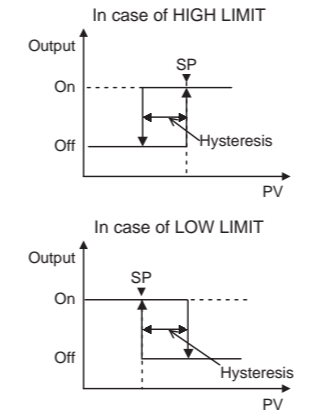
**1. Basic Key Operation Sequence and Parameter Map**



**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	
RL1 (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	
RL2 (A2)	Alarm-2 setpoint		Other PV low limit alarm: 0.0% of PV input range	
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	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 <i>Initial Settings User's Manual</i> .	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	
r.nd (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	
t.nU (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	
b.PS (BPS)	Baud rate	0: 600, 1: 1200, 2: 2400, 3: 4800, 4: 9600 (bps)	4	
Pr.1 (PRI)	Parity	0: None 1: Even 2: Odd	1	
SLP (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	
r.Pt (RP.T)	Minimum response time	0 to 10 ( $\times$ 10 ms)	0	

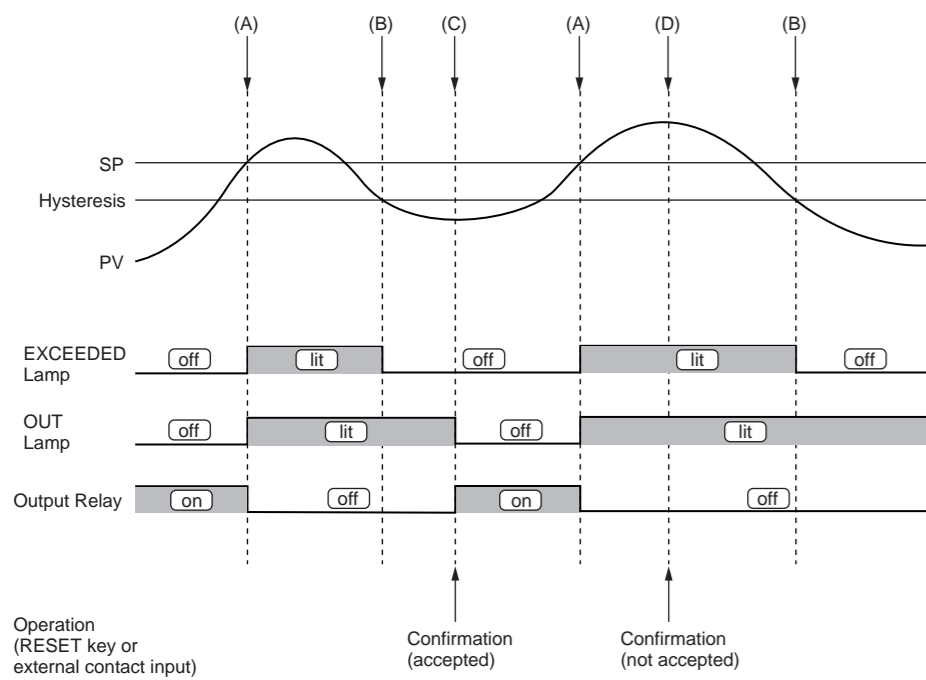
**Input/Output-related Parameters**

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 <i>Initial Settings User's Manual</i> .	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	
r.dC (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	
r.tH (RTH)	Max. value of retransmission output scale	RTL + 1 digit to 100.0% of PV input range	100.0% of PV input range	
r.tL (RTL)	Min. value of retransmission output scale	0.0% of PV input range to RTH - 1 digit	0.0% of PV input range	
dI.S (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

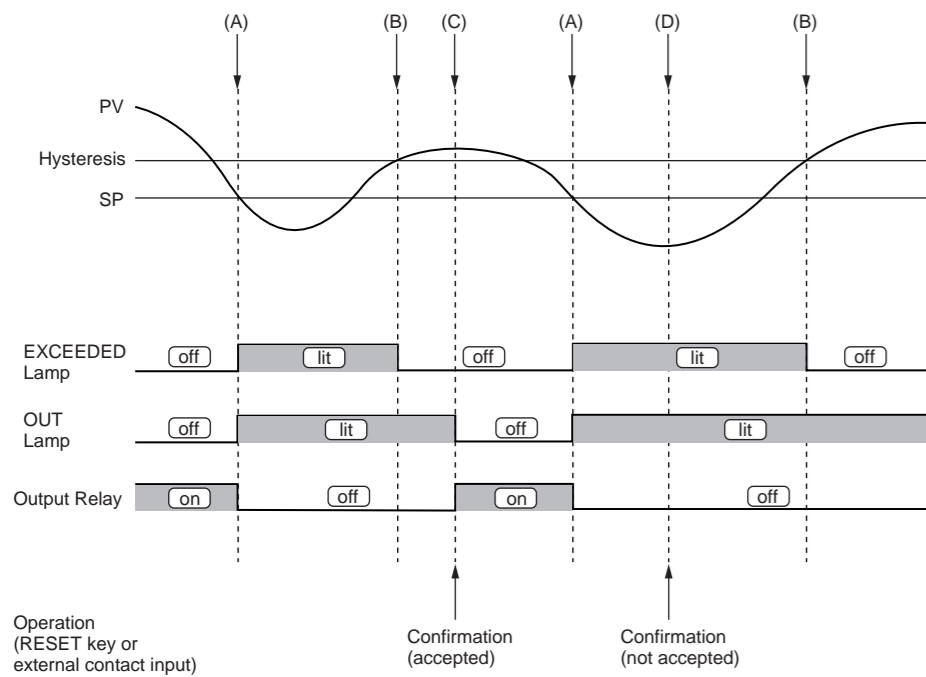
#### In Case of High Limit Control

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

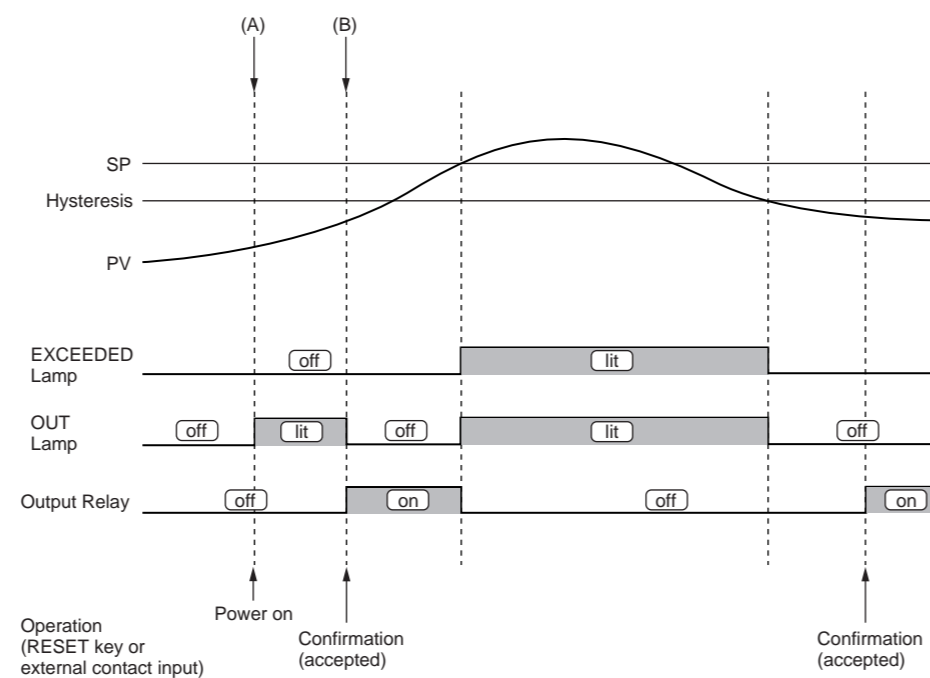
Restart mode R.MD :

- 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).

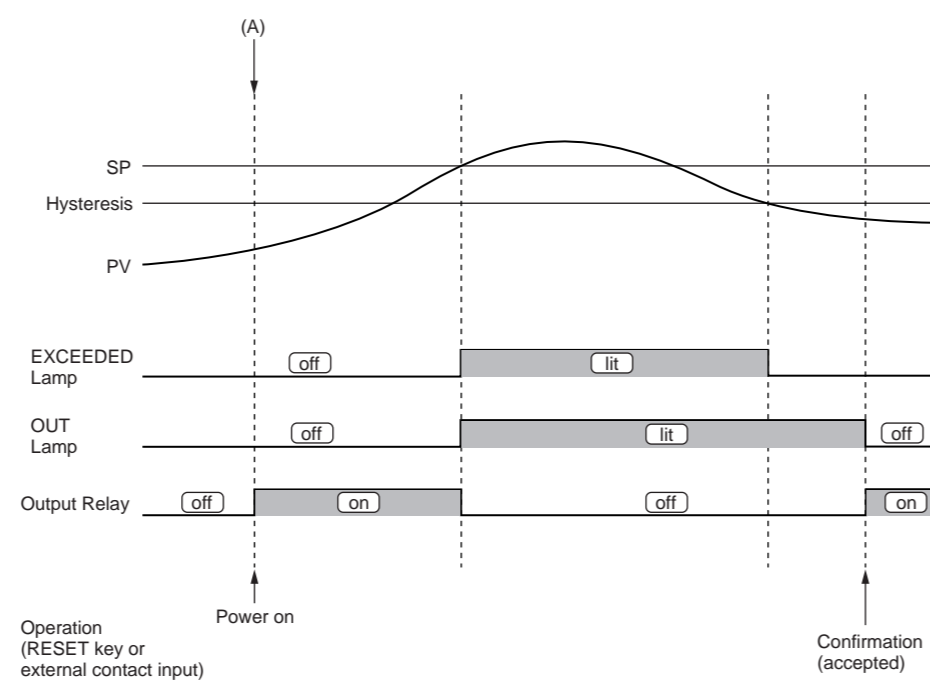
#### In Case of High Limit Control



#### 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

