

Please read through this user's manual to ensure correct usage of the controller and keep it handy for quick reference.

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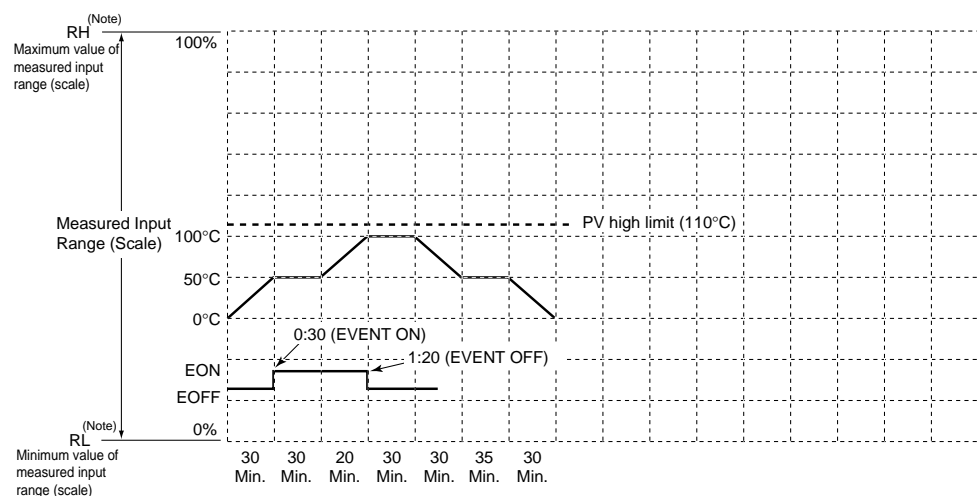
Revision Record

IM 05C01F12-02E 1st Edition: Feb. '01

1. Overview of Program Setting

To operate the controller using a program, first create the program. The UP150 have one program pattern.

Program operation is based on a program pattern consisting of up to 16 segments as shown in the figure below. To create a program pattern, set the target setpoint to be reached and segment time for each segment. Two PV events and/or two time events can be set for a program.



(Note) Displayed only for DC voltage input.

Starting target setpoint value (SSP)	0 °C
Start code (STC)	0 (program operation begins with the starting target setpoint)
Junction code (JC)	0 (reset)

Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Target setpoint (SP)	50°C	50°C	100°C	100°C	50°C	50°C	0°C									
Segment time (TM) (hour:minute or minute:second) Use the TMU setup parameter to set the time unit.	0:30	0:30	0:20	0:30	0:30	0:35	0:30									
Time event 1 (EV1=1)	EON1 EOF1	0:30 1:20														
PV event 1 (EV1=0)	AL1 A1 HY1	Can not be used in this example because Event 1 is used as time event.														
Time event 2 (EV2=1)	EON2 EOF2	Can not be used in this example because Event 2 is used as PV event.														
PV event 2 (EV2=0)	AL2 A2 HY2	1(PV high limit) 110°C 10°C														

Example of Program Pattern Settings

Program Pattern Setting Table

Use a copy of the program pattern setting table to develop the program. This will allow you to visualize the program. (Please copy the table and use it to develop your own programs.)

Device name	
Program name	
Model name	
Serial No.	



(Note) Displayed only for DC voltage input.

Starting target setpoint value (SSP)	
Start code (STC)	
Junction code (JC)	

Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Target setpoint (SP)																
Segment time (TM) (hour:minute or minute:second) Use the TMU setup parameter to set the time unit.																
Time event 1 (EV1=1)	EON1 EOF1															
PV event 1 (EV1=0)	AL1 A1 HY1															
Time event 2 (EV2=1)	EON2 EOF2															
PV event 2 (EV2=0)	AL2 A2 HY2															

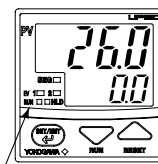
2. Creating the Program

NOTE

Before creating the program, reverify the Measured Input Type (IN), Maximum Value of Measured Input Scale (RH), Minimum Value of Measured Input Scale (RL), and Control Mode (CTL) parameters.

Step 1:

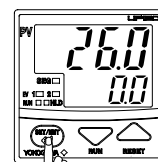
Press the key for at least 1 second to reset the program operation, and confirm that the UP150 shows the operating display ①, ② or ③.



Confirm that "RUN" lamp is not lit.

Step 2:

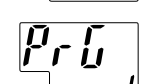
To enter the program parameter setting display, do key operation as follows.



[1] Press the key for at least 3 seconds to display "PRG".



[2] Press the key once to display "1". The period flashes while the value is being changed.



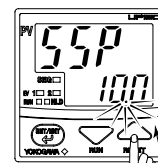
[3] Press the key once to display "SSP" in the program parameter setting display.



Step 3:

Set the parameters from "SSP" to "WTZ" by using the , and keys.

- Use the or key to change the value of parameters.
- Use key to register the setpoint.
- When "creating program" is finished, press the key for at least 3 seconds to return to the operating display ①.



The period flashes during change.

The period is lit or goes out after registration.

3. Deleting the Program Segment


To delete a part of the program pattern, set the segment time of the segment to be deleted ("TMn" n=1 to 16) to OFF, referring to "2. Creating the program."


Note : If the segment time of the halfway segment is set to OFF, all of the following segment will not be displayed. Be careful!


4. Start Program Operation

“Creating the program” must be finished before starting program operation.

Step 1:
Confirm that the controller shows the operating display ①, ② or ③.




Step 2:
Press the  key for at least 1 second.
“RUN” lamp is lit, and starts the program operation.




“RUN” lamp is lit.

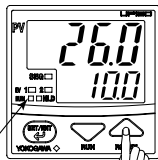
5. Reset (Stop) Program Operation

Step 1:
Confirm that the controller is in program operation.



“RUN” lamp is lit.

Step 2:
Press the  key for at least 1 second.
“RUN” lamp goes out, and resets(stops) the program operation.



“RUN” lamp goes out.

Note:

- ① “Program operation” mode can be changed (run/reset) by key operation, communication or external contact input signal.
- ② When the program operation is reset (stopped), control action is also stopped, and the control output is to be 0% or OFF.

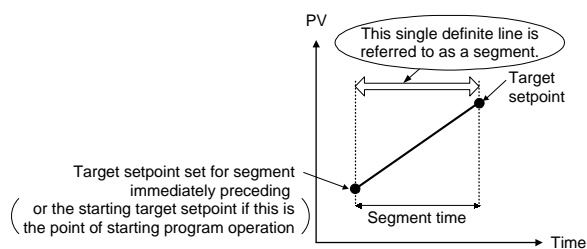
6. Description of Program Functions

Programming

Before you begin programming, determine whether your programs are created using the time unit of “hour and minute” or “minute and second.” The controller is factory-set to the “hour and minute” time unit. To create programs using the “minute and second” time unit, change the setpoint of the TMU (Time Unit of Program) setup parameter to “1”.

Creating programs by setting target setpoint and segment time

As shown in the figure below, this method creates programs by setting a segment time and a target setpoint on a segment-by-segment basis.



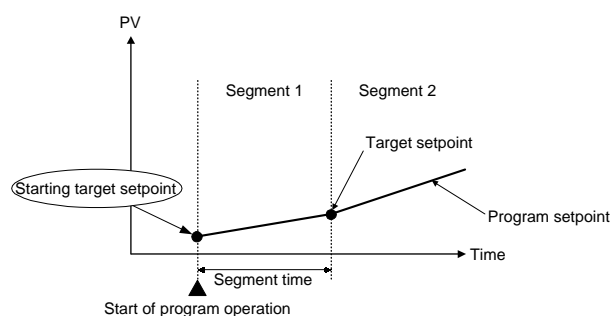
Conditions for Starting Program

1. Letting the controller run from a starting target setpoint

A starting target setpoint refers to a setpoint from which program operation begins. The controller operates in such a manner that the setpoint changes to the target setpoint over the segment time set for segment 1, irrespective of what the PV value is.

Controller Settings

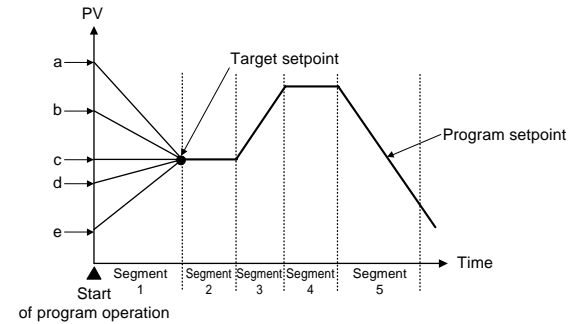
Set the STC (Start Code) program parameter to “0”.



2. Letting the controller start from the current PV and run according to time settings defined for segment 1

Controller Settings

Set the STC (Start Code) program parameter to “2”.



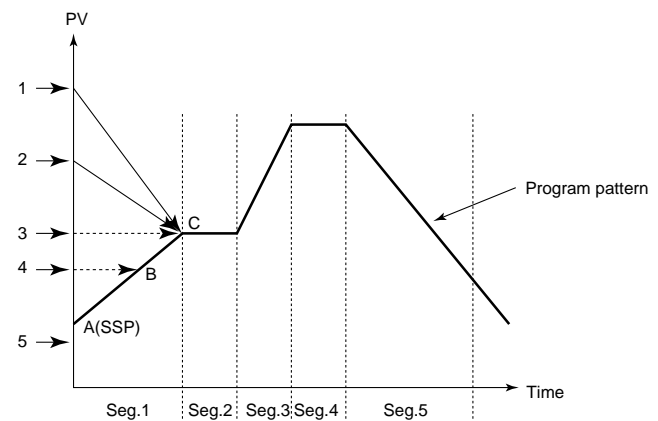
Starting Point of Operation	Controller Behavior
a	Begins to run from point a according to the time setting defined for segment 1.
b	Begins to run from point b according to the time setting defined for segment 1.
c	Begins to run from point c according to the time setting defined for segment 1.
d	Begins to run from point d according to the time setting defined for segment 1.
e	Begins to run from point e according to the time setting defined for segment 1.

3. Letting the controller start from the current PV and run according to ramp settings defined for segment 1

Controller Settings

Set the STC (Start Code) program parameter to “1”.

- (1) If segment 2 is a soak segment
Program operation starts from any of the points A (SSP) to C. For other information, see the following table.

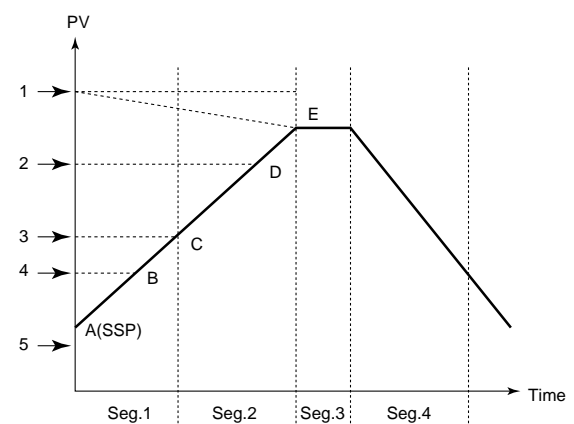


Example Where Segment 2 is a Soak Segment

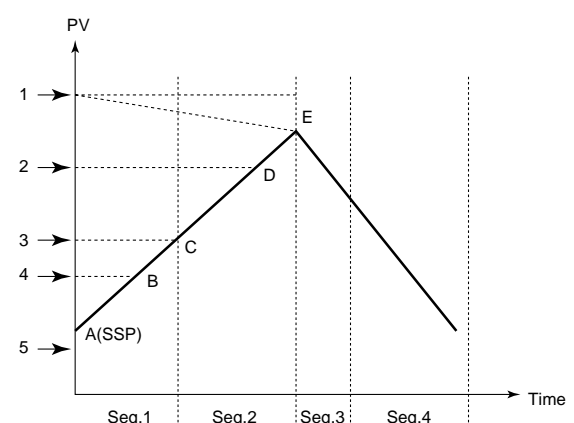
The starting point of program operation is determined by where the measured input value (PV) is located at the time the operation starts.

Measured input value (PV) at startup of program operation	Starting point of program operation
1	C
2	C
3	C
4	B
5	A (SSP)

- (2) If segment 3 is a soak segment:
The starting point of program operation is any of points A (SSP) to E.



Example Where Segment 3 is a Soak Segment

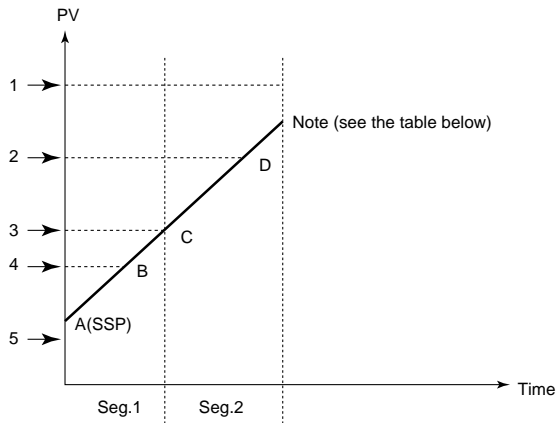


Example With No Soak Segment

The starting point of program operation is determined by where the measured input value (PV) is located at the time the operation starts.

Measured input value (PV) at startup of program operation	Starting point of program operation
1	E
2	D
3	C
4	B
5	A (SSP)

- (3) If the segment consists of an ascending gradient (ramp) only:
The starting point of program operation is any of points A (SSP) to D.

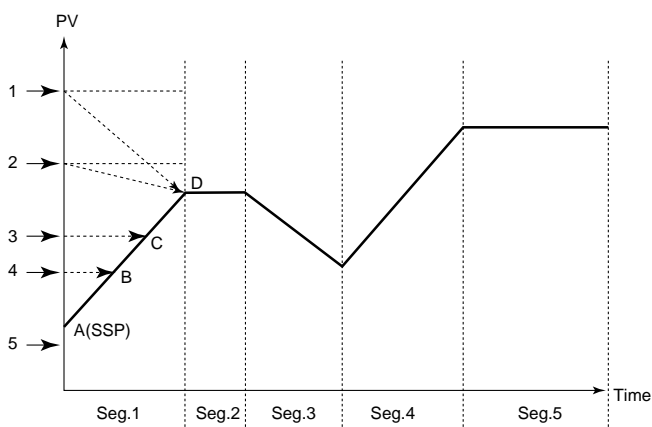
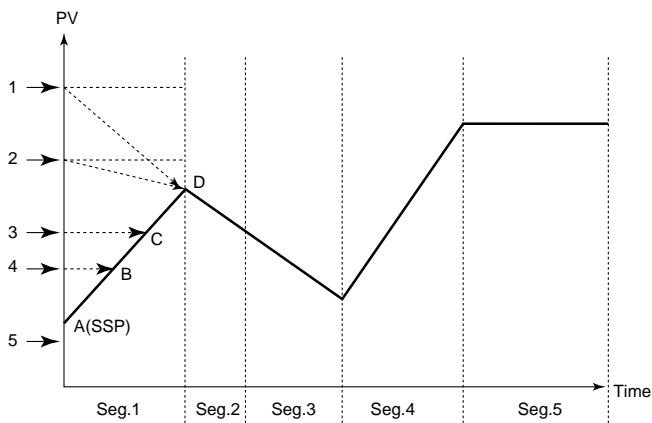


Example Where the Segment Consists of an Ascending Gradient (Ramp) Only

The starting point of program operation is determined by where the measured input value (PV) is located at the time the operation starts.

Measured input value (PV) at startup of program operation	Starting point of program operation
1	Program operation does not start up.
2	D
3	C
4	B
5	A (SSP)

- (4) In the case of other program pattern is set.
The starting point of program operation is any of points A (SSP) to D.



The starting point of program operation is determined by where the measured input value (PV) is located at the time the operation starts.

Measured input value (PV) at startup of program operation	Starting point of program operation
1	D
2	D
3	C
4	B
5	A (SSP)

PV Event Function List

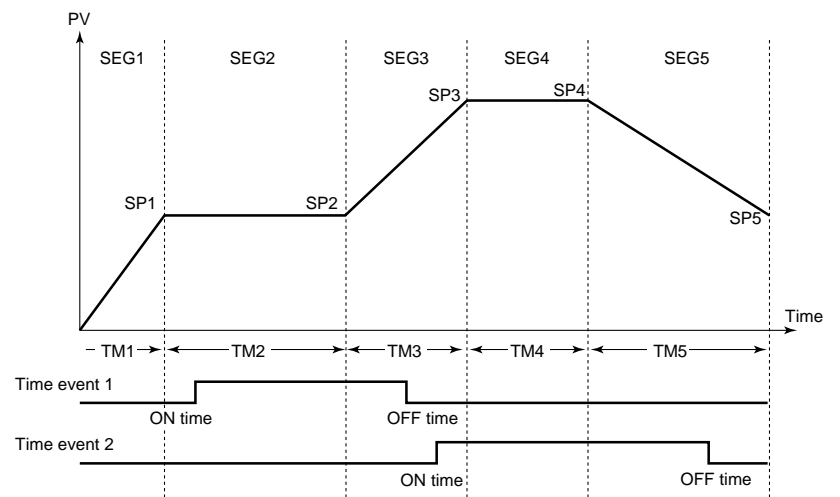
PV event is the function to output the PV or deviation alarm related to the created program.

PV event (alarm) type	Action ("Opn" and "Cls" indicate that the relay contact is opened and closed; "on" and "off" indicate that the lamp is on and off; and white triangles indicate temperature control setpoints.)	PV event type code		PV event (alarm) type	Action ("Opn" and "Cls" indicate that the relay contact is opened and closed; "on" and "off" indicate that the lamp is on and off; and white triangles indicate temperature control setpoints.)	PV event type code	
		Closed contact during PV event (alarm)	Open contact during PV event (alarm)			Closed contact during PV event (alarm)	Open contact during PV event (alarm)
No alarm		OFF					
PV high limit		1		De-energized on deviation low limit			6
PV low limit		2		Deviation high and low limits			7
Deviation high limit		3		Deviation within high and low limits			8
Deviation low limit		4		De-energized on PV high limit			9
De-energized on deviation high limit		5		De-energized on PV low limit			10

Time Event

The time event feature begins countdown when a program starts running, and after the elapse of a preset time, output an on-time event (contact output ON) or off-time event (contact output OFF).

The time of time event is not elapsed during "Hold" or "Wait" status. When the "Advance" is executed, remaining time in the segment is canceled.



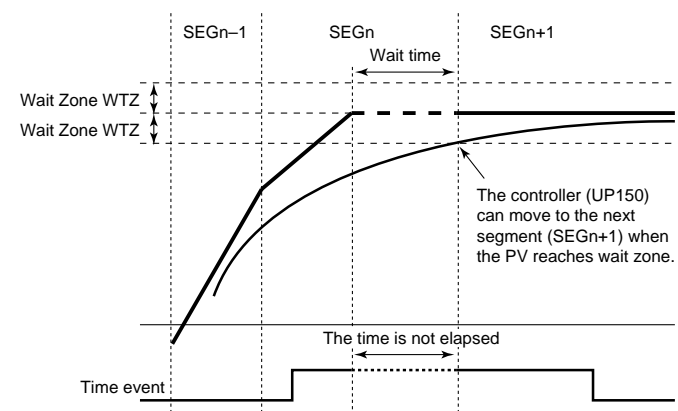
NOTE

- When you don't want "event-OFF" at the end of program operation, set "OFF" to time event 1 or 2 off time (EOF1 or EOF2) of segment.
- When you want "event-ON" at the start of program operation, set "0.00" to time event 1 or 2 on time (EON1 or EON2) of final segment 1.
- When the time of events on/off time exceeds the setting time of program, these events do not work.
- Digital (Contact) output is OFF, when controller is in RESET mode.
- The previous event status are kept when controller is in Hold mode.

Wait Operation

During a segment transition, wait operation brings the transition to be next segment into a wait (standby) state, using the wait zone, until the deviation is canceled. The wait zone is a span of deviation that determines to what degree a PV input is tracked.

Wait operation is available only at a segment junction that transfers from ramp to soak.



During the "wait", the timer for the program pattern progress stops, so that time event (EVn) is held. (RUN lamp flashes.)

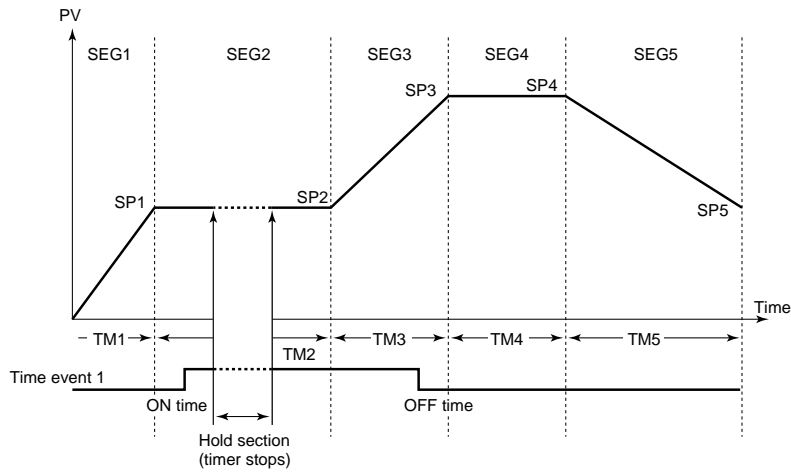
The PV event does not stop even if the controller is in the "wait".

■ HOLD Function

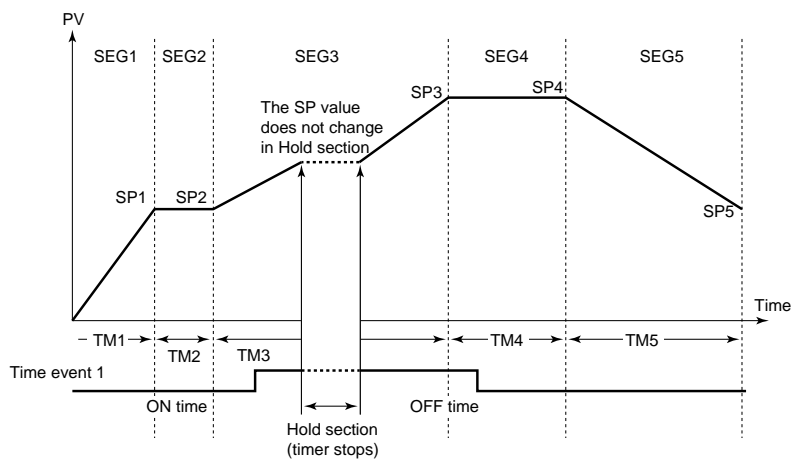
During program operation, the time of “segment time” can be stopped by “HOLD function”.

When the controller is in “Hold”, the time of time events are also stopped. (PV events do not stop at this time.) When program operation is held, time event and segment time are extended only by amount of the hold.

(1) “Hold” in soak segment

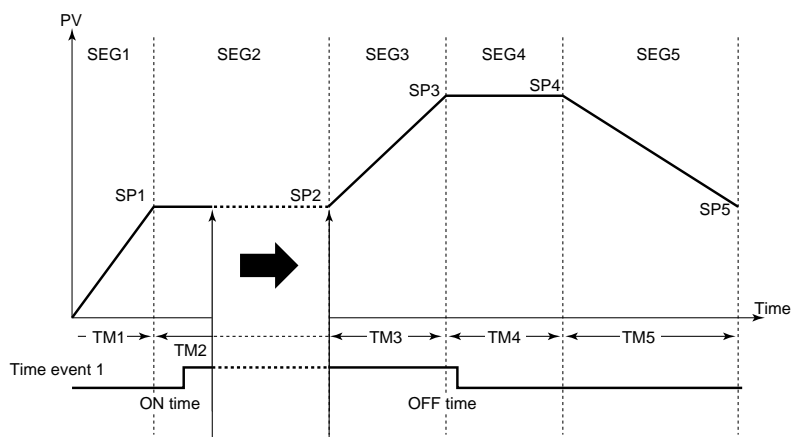


(2) “Hold” in ramp segment



■ Advance Function

Advance (moving program pattern forward 1 segment) can be executed by key operation or via communication. If advance is executed at the final segment, the system operates according to the set junction code. If advance is executed during hold, hold is released. When advance is executed, time and event move forward.

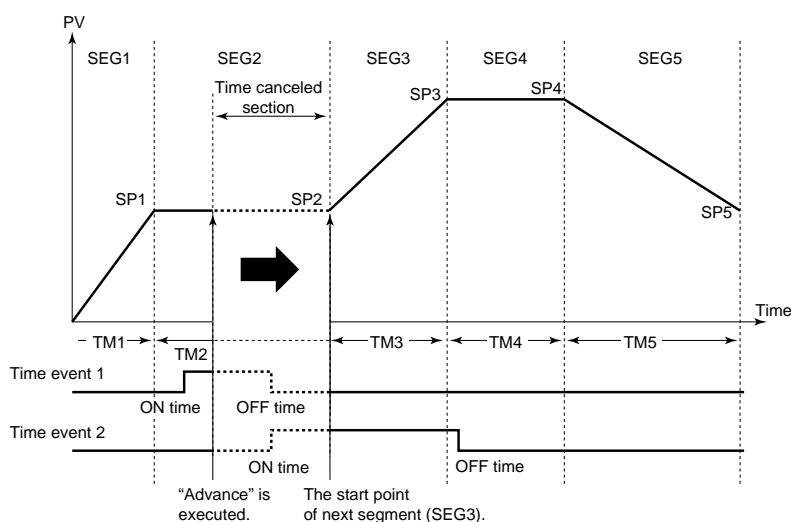


The time when “Advance” is executed, the remaining time of this segment (SEG2) is canceled.

The program moves to the start point of next segment.

● Effect on time events

When the ON/OFF action of time events is set in “time canceled section”, the status of time events are changed, and these are kept in the next segment.



“Advance” is executed. The start point of next segment (SEG3).

■ Junction Code

The operation at the end of program pattern can be specified by junction code (JC).

(1) Reset termination (JC = 0)

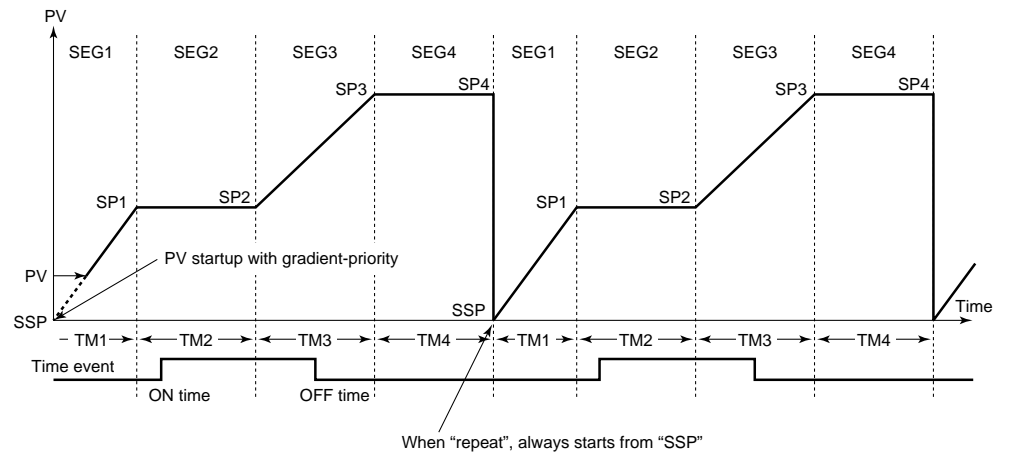
At program termination, the controller enters reset status. At this time, control output becomes 0% or OFF, and event status is OFF.

(2) Hold termination (JC = 1)

At program termination, the system enters hold status. At this time, control output and time event status are held (PV events do not stop at this time). The hold status continues until canceled by key operation or external contact input (digital input). When hold status is canceled, control output becomes 0% or OFF, and event status is OFF.

(3) Repeat (JC = 2)

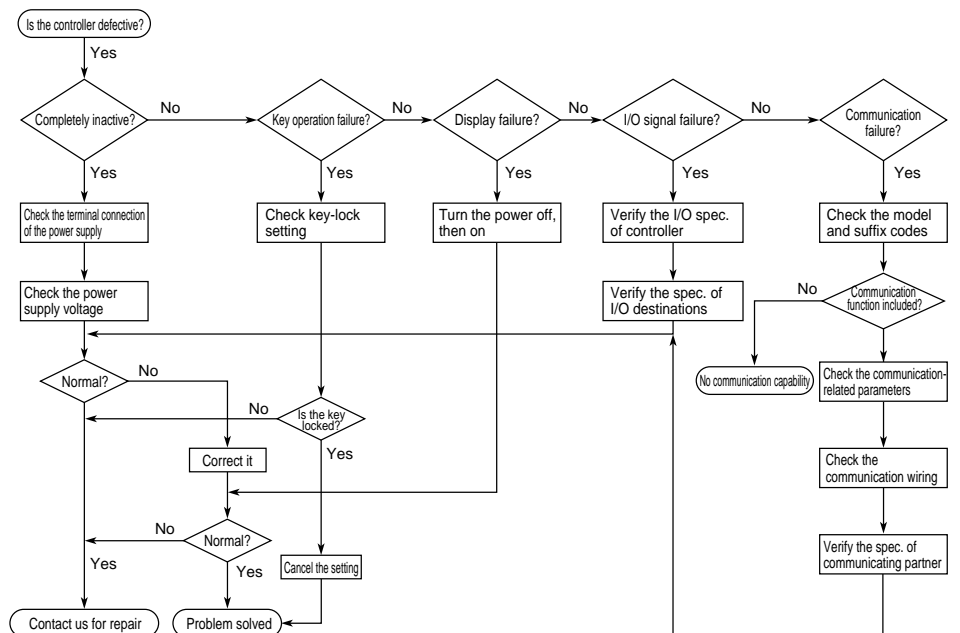
At the program termination, the controller repeats execution of same program pattern. At the start of program operation, PV starts up with gradient-priority. At the start of second time or later where the repeat action is activated, the program operation always starts from “SSP” regardless of PV.



When “repeat”, always starts from “SSP”

7. Troubleshooting

In the event of an abnormality, perform the following checks as outlined by the flow-chart.



■ Error Display During Operation

(1) If the controller displays one of the following, carry out the appropriate remedy for the particular error.

Display	Error content	Remedy
P.Er P.Er	The parameter is abnormal	Check the settings of all the parameters and set them at their proper values.
b.o B.o	Input burnout	Check the sensor wiring and correct it.
ooo OOO	PV over-scale (PV exceeds its effective range.)	Check the input type and scale settings and correct them.
uuu UUU	PV under-scale (PV falls below its effective range.)	
Flashing period	Communication failure (for /RS option only)	Press any key to stop the flashing.

(2) The controller needs to be repaired if any of the indications in the table below appear.

In these cases, do not try to repair the controller yourself. Order a new controller or contact us for repair.

Display	Error content
Unknown (at power-on)	CPU failure
All extinguished (at power-on)	Power source failure
“Err” (at power-on)	Calibration abnormal
Flashing “Err” (at power-on)	RAM or ROM failure
Flashing “Err” (during operation)	A/D converter failure, RJC failure, or EEPROM failure

■ When Power Failure Occurred During Operation

- Momentary power failures shorter than 20ms (or shorter than 1ms for “/V24”) have no effect on the controller operation (i.e., normal operation continues).
- For power failures of 20ms or longer (or of 1ms or longer for “/V24”), however the status will be as follows.
(The controller action at power recovery is the same as at power-on.)
 - Alarm (PV event) action: Continues
 - Setting parameters: Maintained
 - Auto-tuning: Canceled