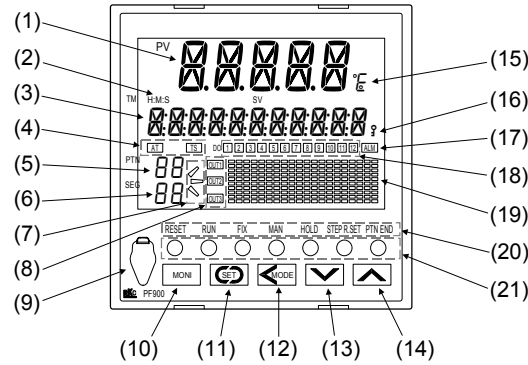


This manual describes the basic key operation and mode selection of the PF900/PF901. For detailed handling procedures and various function settings, please refer to the following separate manuals:

- PF900/PF901 Instruction Manual (IMR02L03-E0)

The above manuals can be downloaded from our website:
URL: http://www.rkcinst.com/english/manual_load.htm

1. PARTS DESCRIPTION



(1) Measured value (PV) display [Green *]	Displays measured value (PV) or various parameter symbols.
(2) TIME display [Orange *]	Displays selected time unit: Hour and Minute (H: M) or Minute and Second (M: S).
(3) SV/Timer display [Orange *]	Displays Set value (SV), Timer setting time or various characters.
(4) AT/TS lamp [Green *]	AT: Flashes when autotuning is activated. (After autotuning is completed: AT lamp will go out) TS: Lights when time signal is turned on.
(5) PTN display [Green *]	Displays the pattern number in the execution: 1 to 99.
(6) SEG display [Green *]	Displays the segment number in the execution: 1 to 99.
(7) Gradient state lamp [Green *]	Displays the state of program in process: rise, soak and fall. The display flashes when the process is in the wait mode.
(8) Output lamp [Green *]	Lights when the output (OUT1 to OUT3) corresponding to each lamp is ON. Lamp indication becomes as follows for current output and voltage current. For an output of less than 0 %: Extinguished For an output of more than 0 %: Lit
(9) Loader communication connector	Setting and monitoring on a personal computer (PC) is possible if the controller is connected with our cable to a PC via our USB communication converter COM-K-3 (sold separately) ¹ . Our communication software ² must be installed on the PC.
(10) MONI Monitor key	Use to switch the monitor screen. Pressing this key while any screen other than the SV setting & Monitor mode screen is being displayed returns to the Measured value (PV)/Set value (SV) monitor screen.
(11) SET key	Used for parameter calling up and set value registration.
(12) MODE Shift key	Shift digits when settings are changed. Used to selection operation between modes.
(13) DOWN key	Decrease numerals. To scroll through numbers faster, press and hold the DOWN key in the manual mode. To turn back to the previous time of the program, press and hold the DOWN key in the operation mode.
(14) UP key	Increase numerals. To scroll through numbers faster, press and hold the UP key in the manual mode. To forward the time of the program, press and hold the UP key in the operation mode.
(15) Unit display [Green*]	Displays unit: °C (°F) or % Lights % for parameters in unit of %.
(16) Set lock display [Orange*]	Lights when the settings are locked.
(17) ALM lamp [Red]	Lights when alarm (Event or heater break alarm [HBA]) is turned ON. Confirm the alarm type at the Event monitor display.
(18) Digital output lamp [Green*]	Lights when the digital output (DO1 to DO12) corresponding to each lamp is ON.
(19) Program pattern/Bar graph display [White]	Displays program patterns or bar graph for manipulated value (MV). Red display is selectable at event or self-diagnostic error.

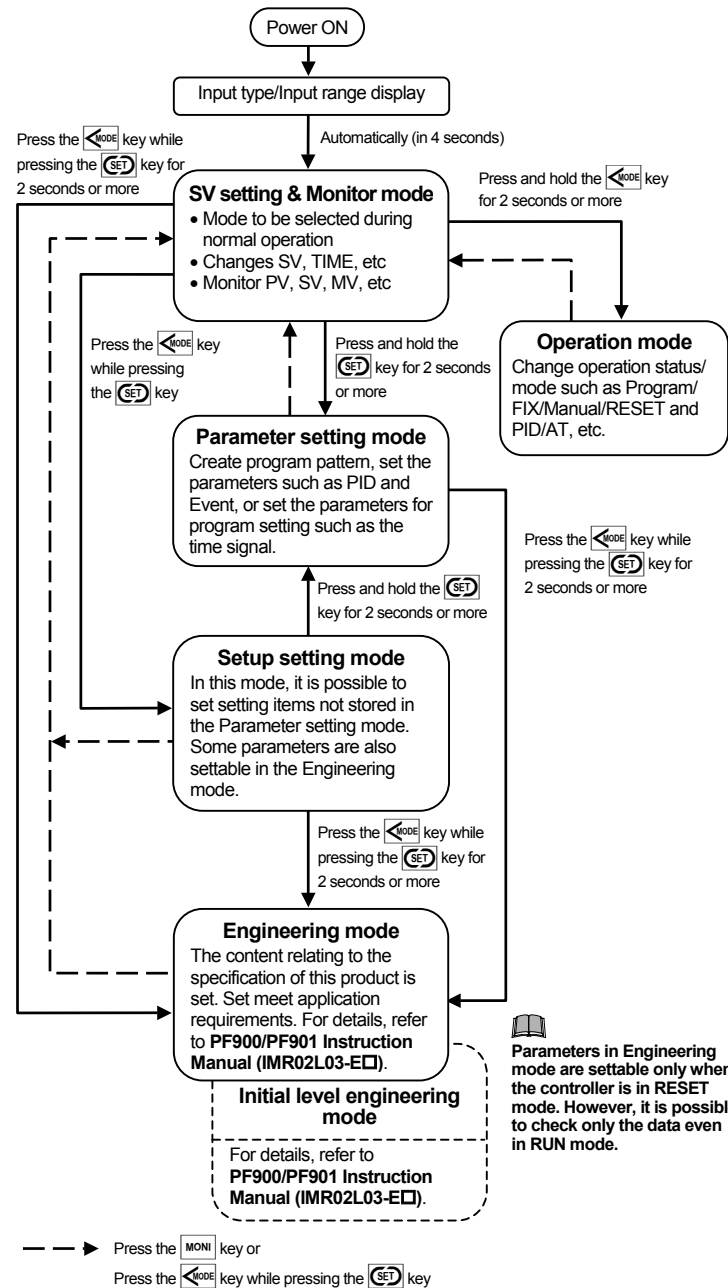
* PF901: White
¹ For the COM-K, refer to COM-K Instruction Manual (IMR01Z01-E0).
² Software name: WinUCI-PF900 (Only available as a download from our website.)

(20) State display lamp [Green or Orange]	RESET: Lights in RESET mode [Orange] ** RUN: Lights in RUN mode [Orange] ** FIX: Lights in FIX mode [Orange] ** MAN: Lights in MAN mode [Orange] ** ** Other lamps light in green. HOLD: Lights when the HOLD key is valid. [Green] STEP: Lights when the STEP/R.SET key is set to STEP [Green] R.SET: Lights when the STEP/R.SET key is set to R.SET [Green] PTN: Lights when the PTN/END key is set to PTN [Green] END: Lights when the PTN/END key is set to END [Green]
(21) Direct key	RESET: Use to switch to RESET (Control stop) mode. RUN: Use to switch to RUN (Program control start) mode. FIX: Use to switch to FIX (Fixed set point control) mode. MAN: Use to switch to MAN (Manual control) mode. HOLD: Use to stop the process of the program or release the hold function. STEP/R.SET: Use to forward a segment of the program. R.SET: Use to turn back to the previous parameter setting. PTN/END: Use to display the execution pattern setting display. PTN: Use to display the execution pattern setting display. END: Use to set or release the Program end when setting program.

2. PARAMETER SETTING MODE

2.1 Transfer to Each Mode

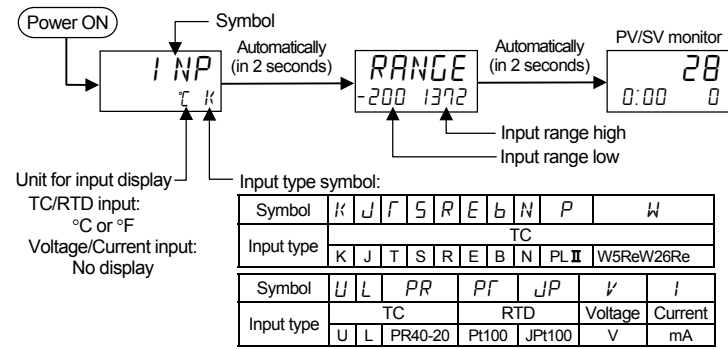
The controller has five different setting modes, and all settable parameters belongs to one of them. The following chart show how to access different setting mode.



Parameters in Engineering mode are settable only when the controller is in RESET mode. However, it is possible to check only the data even in RUN mode.

Input type and range display

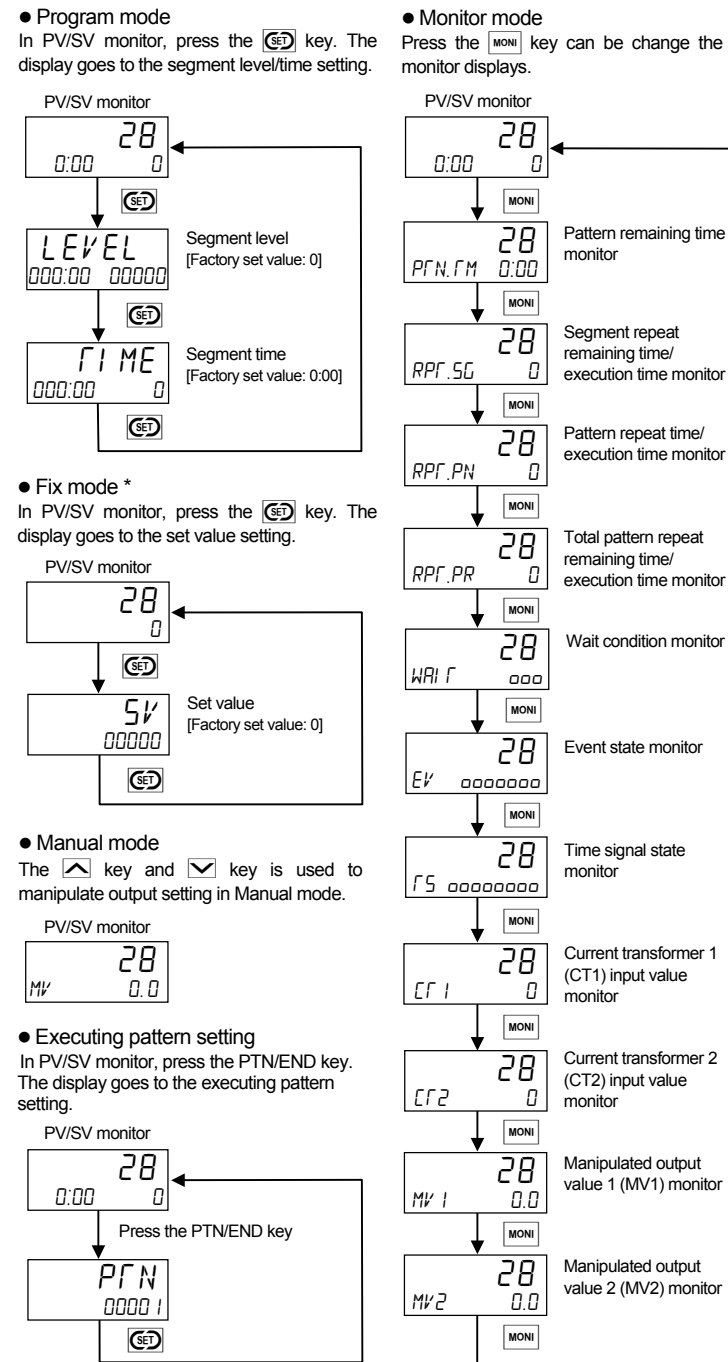
This instrument immediately displays input type symbol and input range following power ON. Example: When sensor type is K thermocouple (-200 to +1372 °C)



2.2 Parameter Selection within Mode

SV setting & Monitor mode

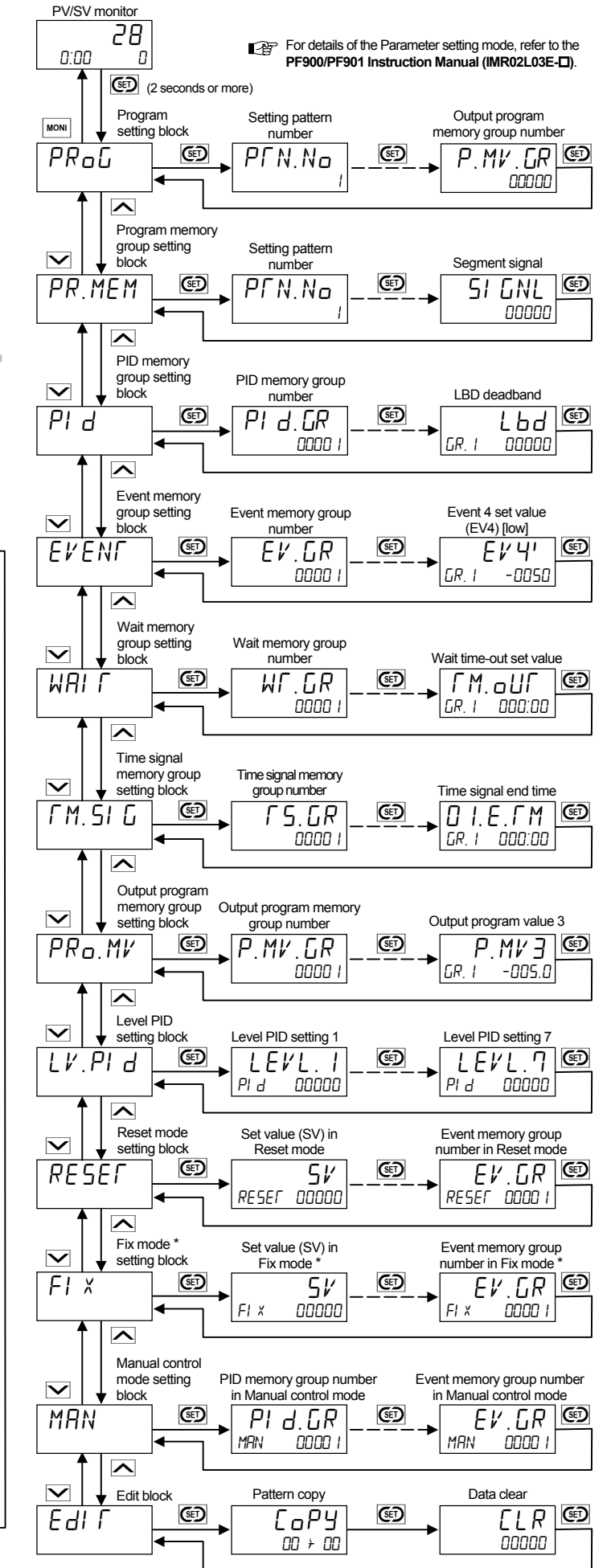
It is possible to set SV which is a control target and also to monitor PV, SV, MV, etc.



* Fix mode: Fixed set point control mode
For details of the SV setting & Monitor mode, refer to the PF900/PF901 Instruction Manual (IMR02L03E-E).

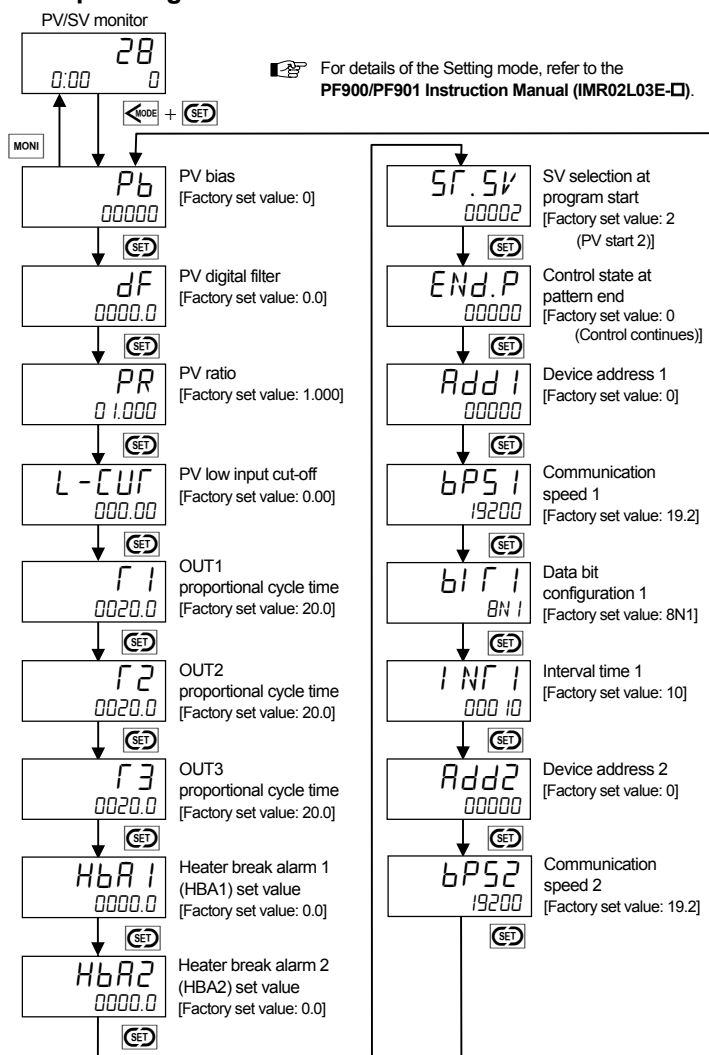
Parameter setting mode

It is possible to set any parameter relating to control.

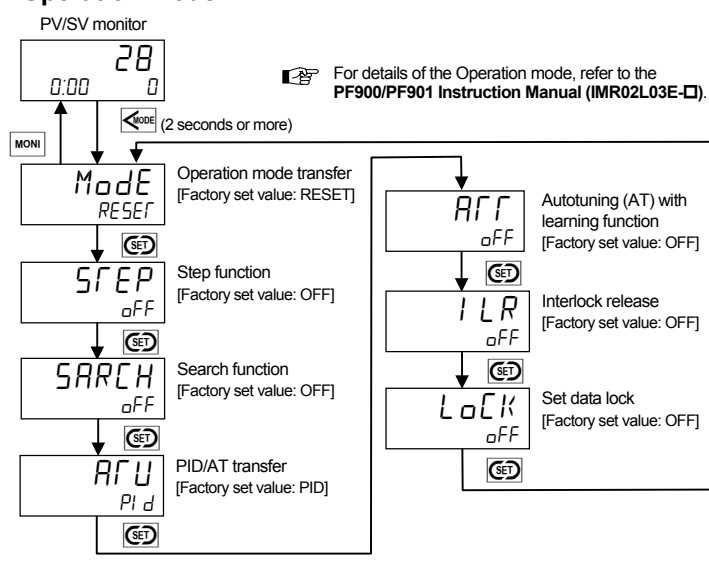


* Fix mode: Fixed set point control mode

Setup setting mode



Operation mode



3. OPERATION

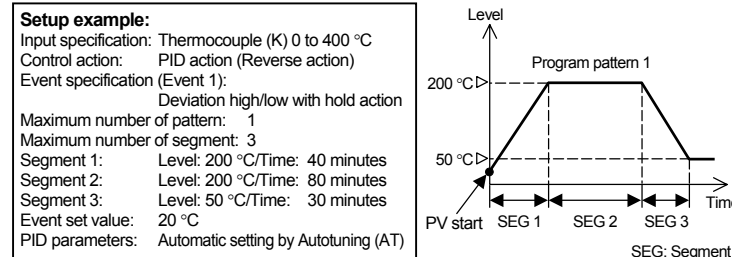
CAUTIONS

- All mounting and wiring must be completed before the power is turned on. If the input signal wiring is disconnected or short-circuited (RTD input only), the instrument determines that input error (burnout, etc.) has occurred.
- Displays
 - Upscale: Thermocouple input *, RTD input (when input break), Voltage (low) input *
 - Downscale: Thermocouple input *, RTD input (when short-circuited), Voltage (low) input *, Voltage (high) input or Current input
 - For the voltage (high) or current input, the display becomes indefinite (display of about zero value).
 - * For thermocouple input and Voltage (low) input, it is possible to select upscale or downscale when burnout occurs. (Factory set value: Upscale)

- Outputs
 - Control output: Conforms to the setting of Action (high) at input error or Action (low) at input error in the Engineering mode F50. (Factory set value: Normal control)
 - Event output: Conforms to the setting of Event output action at input error in the Engineering mode F41 to F44. (Factory set value: Conform to Event action)
 - A power failure of 20 ms or less will not affect the control action. When a power failure of more than 20 ms occurs, the instrument assumes that the power has been turned off. When power returns, the controller will retain the conditions (Factory set value: Hot start 1) that existed prior to shut down.
 - Control target value and parameters should be appropriate for the application when setting Segment level, Set value (SV) or parameters. There are parameters in Engineering mode which can not be changed when the controller is in RUN mode. Change the Operation mode from RUN to RESET when a change for the parameters in Engineering mode is necessary.
 - Event hold action becomes active when turning on the instrument or starting Event (only for event with hold action).

3.1 Setting Example Before Operation

Setup the controller prior to operating the instrument. Refer to the following setup example.

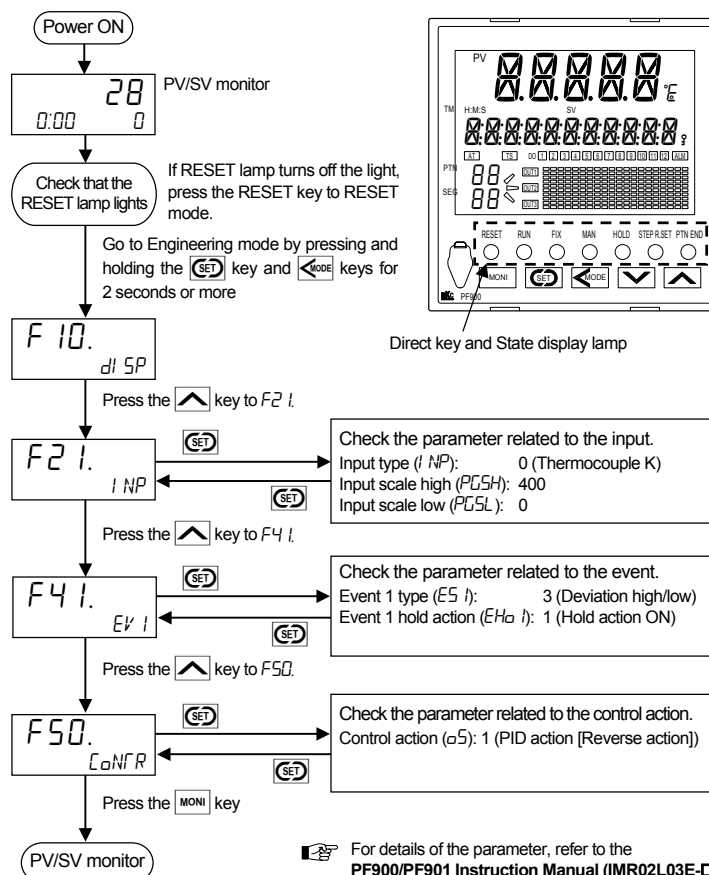


Initial setting

WARNING
 Parameters in the Engineering mode should be set according to the application before setting any parameter related to operation. Once the parameters in the Engineering mode are set correctly, no further changes need to be made to parameters for the same application under normal conditions. If they are changed unnecessarily, it may result in malfunction or failure of the instrument. RKC will not bear any responsibility for malfunction or failure as a result of improper changes in the Engineering mode.

Set value change and registration:

- The blinking digit indicates which digit can be set. The blinking digit can be moved by pressing the \leftarrow key.
- However, the changed data is not stored by the operation of the \uparrow and \downarrow keys alone. In order for the new parameter value to be stored, the SET key must be pressed within 1 minute after the new value is displayed. The new value will then be saved and the display will move to the next parameter.

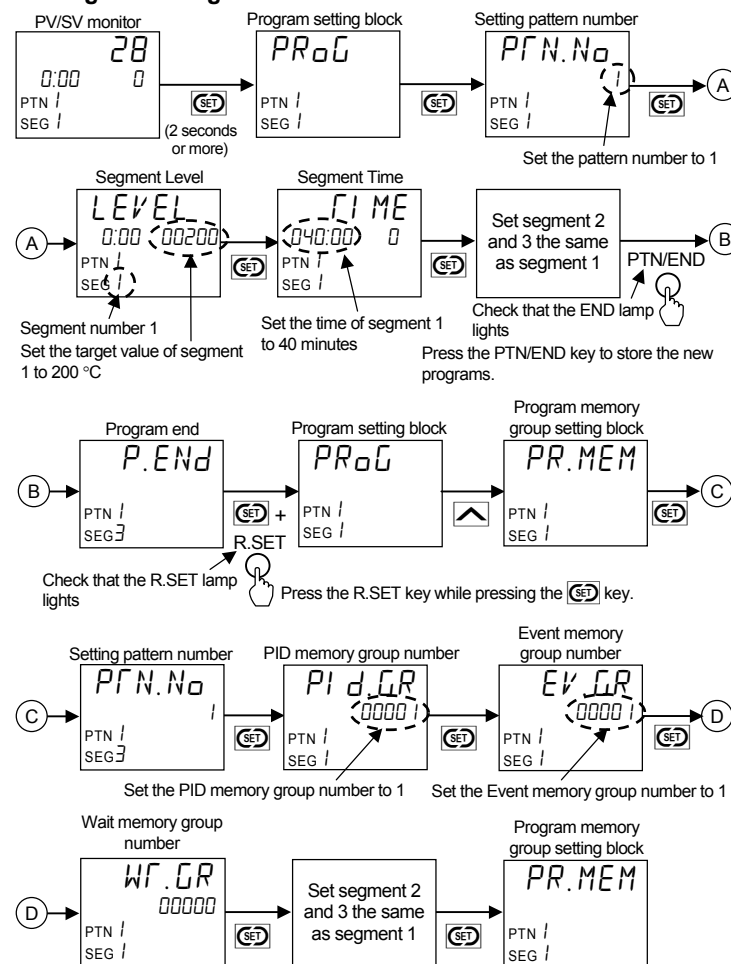


For details of the parameter, refer to the PF900/PF901 Instruction Manual (IMR02L03E-C).

Operation setting

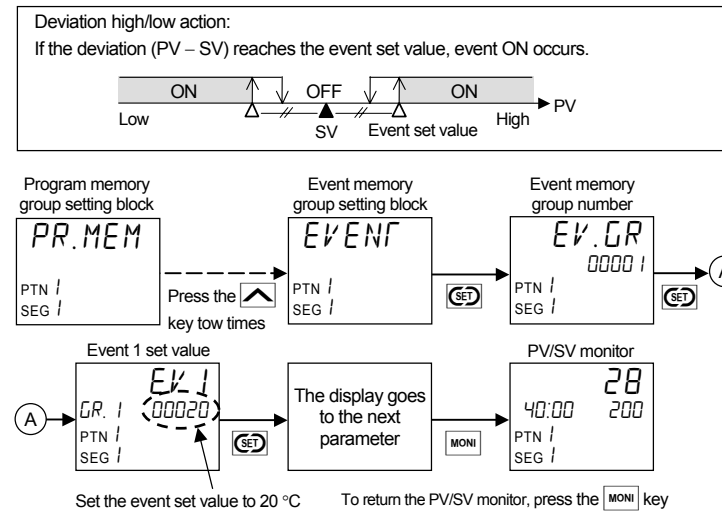
After finishing the initial settings, set the program set value, event set value.

Program setting



Event setting

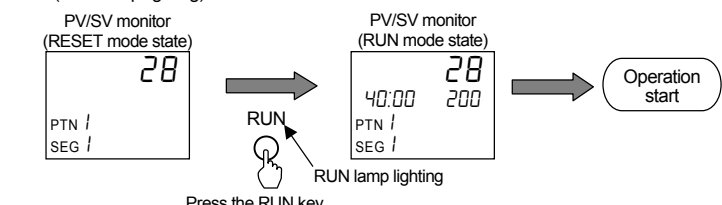
After finishing the program settings, set the event set value.



3.2 Operation Start/Stop

Operation start

Press the RUN key in the RESET mode to change to the RUN mode, and Program control start (RUN lamp lighting).



It is possible to change the pattern level in the execution or the set value of the time at the RUN mode.

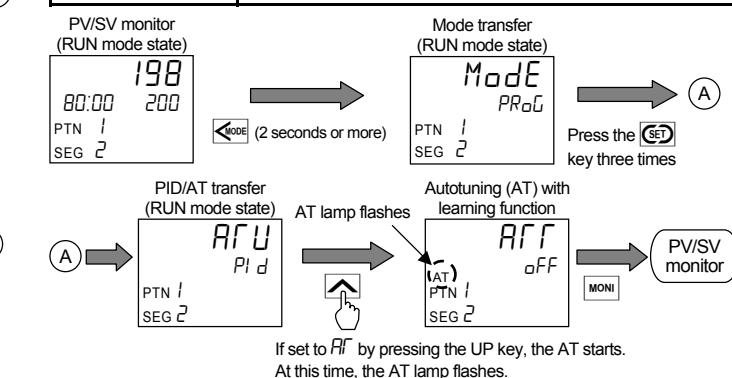
Autotuning (AT) Start/Stop

The AT function automatically measures, computes and sets the optimum PID values.

- When a temperature change (UP and/or Down) is 1 °C or less per minute during AT, AT may not be finished normally. In that case, adjust the PID values manually. Manual setting of PID values may also be necessary if the set value is around the ambient temperature or is close to the maximum temperature achieved by the load.
- If the manipulated output may be limited by the output limiter setting, the optimum PID values may not be calculated by AT.
- Requirements for AT start

Start the AT when all following conditions are satisfied:

Operation mode state	PID control
RUN mode, FIX mode	
Input value state	The measured value (PV) is not underscale or over-scale.
Output limiter setting	The output limiter high limit is be 0.1 % or higher and the output limiter low limit is 99.9 % or less.

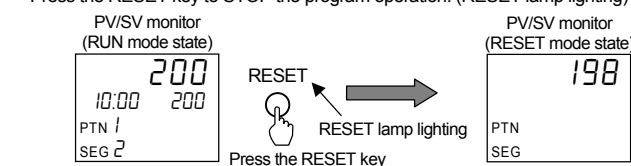


- When the AT is finished, the control will automatically returns to PID control. At this time, the AT lamp turns off.

When canceling the AT, press the \checkmark key to be set to $Pi d$.

Operation stop

Press the RESET key to STOP the program operation. (RESET lamp lighting)



4. ERROR DISPLAYS

Display when input error occurs

Prior to replacing the sensor, always turn the power OFF or change to RESET mode.

Display	Description	Action (Output)	Solution
PV [Flashing]	PV exceeds the Input scale high/low.	Action at input error: Output depending on the action at Input error (high/low limit)	Check Input type, Input range and connecting state of sensor.
0000 [Flashing]	Over-scale PV is above the display range limit high.	Output depending on the conform the Event action	Confirm that the sensor or wire is not broken.
UUUUU [Flashing]	Underscale PV is below the display range limit low.		

Self-diagnostic error

In an error is detected by the self-diagnostic function, the PV display shows "Err," and the SV/Timer display shows the error code. If two or more errors occur simultaneously, the total summation of these error codes is displayed.

Solution: Turn off the power at once. If an error occurs after the power is turned on again, please contact RKC sales office or the agent.

PV display	SV/Timer display	Description	Control output	Digital output	Transmission output
Err	1	Adjusted data error	OFF	OFF	OFF
	2	Data back-up error			
	4	A/D conversion error or Temperature compensation error			
	8	Segment level error	ON	ON	ON
	16	Intercontroller communication error	ON	ON	ON
The error number is not displayed		Watchdog timer error	OFF	OFF	OFF
		Power supply voltage is abnormal	OFF	OFF	OFF

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