

Digital Program Controller

REX-P200 SERIES

INSTRUCTION MANUAL

IM200P11-E1

Notes:

Make sure that this Instruction Manual is always readily available to personnel who use the REX-P200 series.

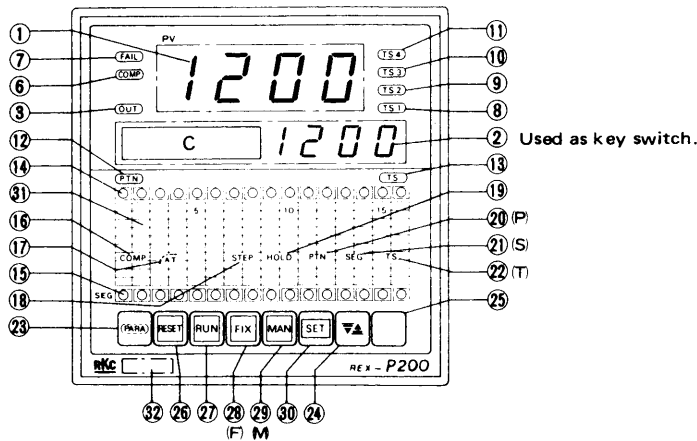
The contents of the Instruction Manual are subject to change without notice. If you have any questions regarding the manual, contact one of our sales people, our nearest sales office, or the place where you have purchased this controller.

* See the "Instruction Manual for Communication" for detail of the communication.

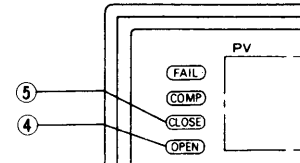
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1. FUNCTIONAL DESCRIPTION



*Only applicable with position proportioning type



Display unit

- ① **Measured-value (PV) display unit**
Displays measured-value (PV).
- ② **Set-value (SV)/character display unit**
Displays set-value and its character. It can also be used as a setting display or setting digit shift key.

Indication lamps

- ③ **Control output indication lamp (OUT)**
Lights up when control output is activated.
- ④ **Open side output indication lamp (OPEN)**
Lights up when the open side control output is activated (only position proportioning type).
- ⑤ **Closed side output indication lamp (CLOSE)**
Lights up when the closed side control output is activated(only position proportioning type).
- ⑥ **Computer mode indication lamp (COMP)**
Lights up when in the computer mode (in communication with the host computer).
- ⑦ **Fail indication lamp (FAIL)**
Lights up if an error occurs in this unit.
- ⑧ **Time signal number 1 output indication lamp (TS1)**
Lights up when time signal No. 1 output is activated, or flashes at setting and check.
- ⑨ **Time signal number 2 output indication lamp (TS2)**
Same function as TS1
- ⑩ **Time signal number 3 output indication lamp (TS3)**
Same function as TS1
- ⑪ **Time signal number 4 output indication lamp (TS4)**
Same function as TS1
- ⑫ **Pattern mode indication lamp (PTN)**
Lights up together with one of the 16 lamps to indicate the Pattern No.
- ⑬ **Time signal mode indication lamp (TS)**
Lights up together with one of the 16 lamps to indicate the Time signal No.
- ⑭ **i) Pattern No. indication lamps (16)**
When the " ⑫ Pattern mode indication lamp (PTN)" is lit, the activated pattern No. or setting is indicated.
- ii) Time signal No. indication lamp (16)**
When the " ⑬ Time signal mode indication lamp (TS)" is lit, the activated time signal in a certain segment is indicated.
- ⑮ **Segment display lamps (SEG)**
The segment No. of the program in progress lights up or lights up during setting procedure.

Operation keys

- ⑩⑥ **Computer mode key (COMP)**
Key to open communication line for use with Host Computer, the COMP key together with the Hidden key have to be pressed at the same time.
- ⑩⑦ **Auto-tuning key (AT)**
Key to activate auto-tuning, the Hidden key and AT key have to be pressed at the same time.
- ⑩⑧ **Step key (STEP)**
Next segment step in running program
- ⑩⑨ **Hold key (HOLD)**
Program progress stop key
- ⑩⑩ **Pattern key (PTN)**
Pattern number setting key
- ⑩⑪ **Segment key (SEG)**
Segment number setting key (level setting)
- ⑩⑫ **Time signal key (TS)**
Time signal setting key
- ⑩⑬ **Parameter select key (PARA)**
Programming parameter selection key, Functional character display key
- ⑩⑭ **Set value increment/decrement key (Up-Down)**
By pressing this key only the set-value can be increased. If this key is pressed together with the hidden key, set-value can be decreased.
- ⑩⑮ **Hidden key (Blank)**
This key must be pressed together with all available key functions at the same time.

Operation mode + Indication lamps

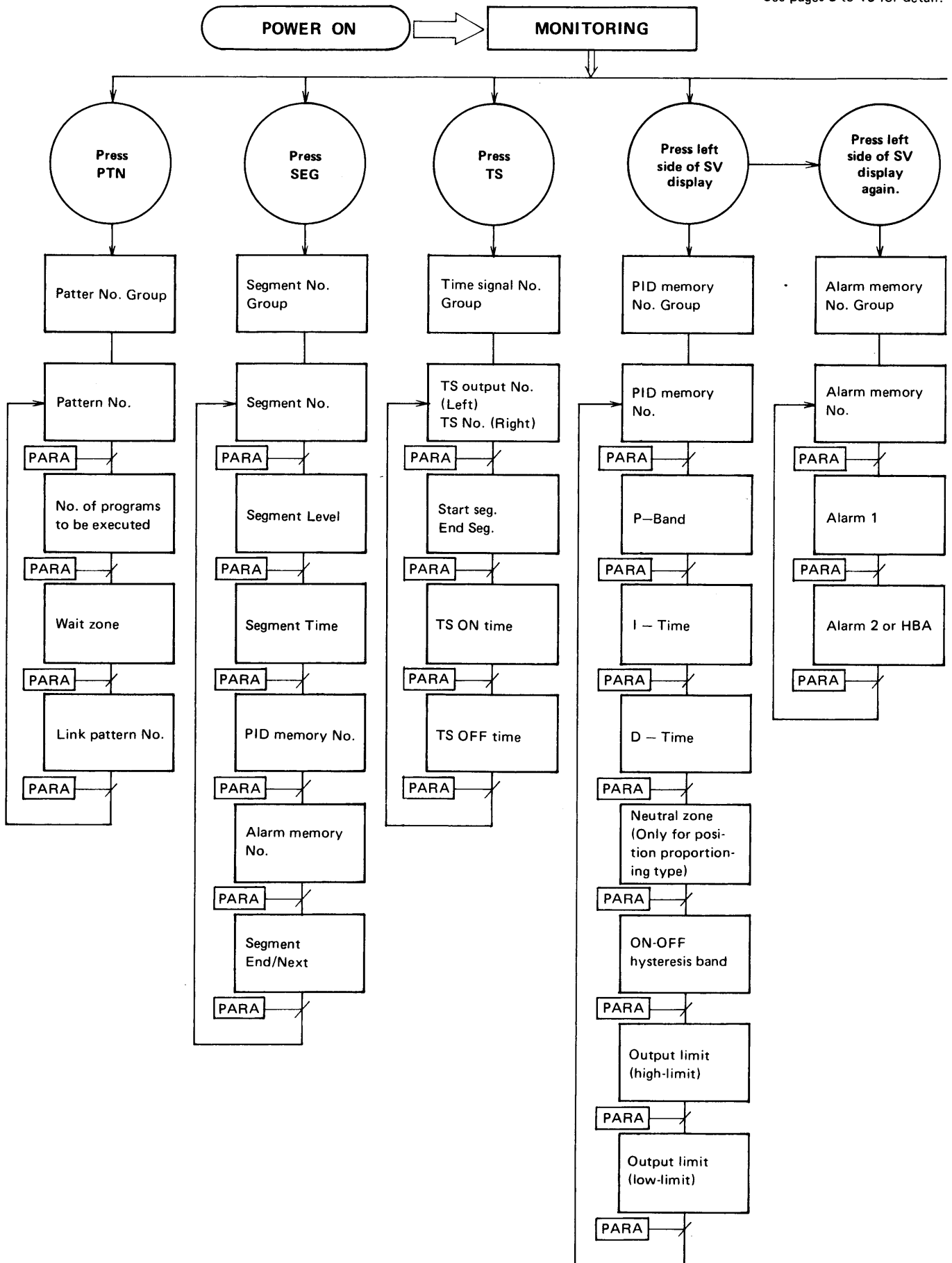
- ⑩⑯ **Reset key and lamp (RESET)**
Pressing this key together with the hidden key the unit turns to Reset mode and the lamp lights up.
- ⑩⑰ **Run key and lamp (RUN)**
Pressing this key together with the hidden key starts the program control and the lamp lights up.
- ⑩⑱ **Fix key and lamp (FIX)**
By pressing this key only, the unit displays the fixed set-point control setting parameters. If this key is pressed together with the hidden key, the unit can be used as a fixed set-point controller and the lamp lights up for both operations.
- ⑩⑲ **Manual key and lamp (MAN)**
By pressing this key only, the unit displays the manual operation setting data. If this key is pressed together with the hidden key, the unit is set to manual control mode and the lamp lights up for both operations.
- ⑩⑳ **Set key and lamp (SET)**
Pressing this key together with the hidden key, the unit is ready for parameter setting and the lamp lights up.

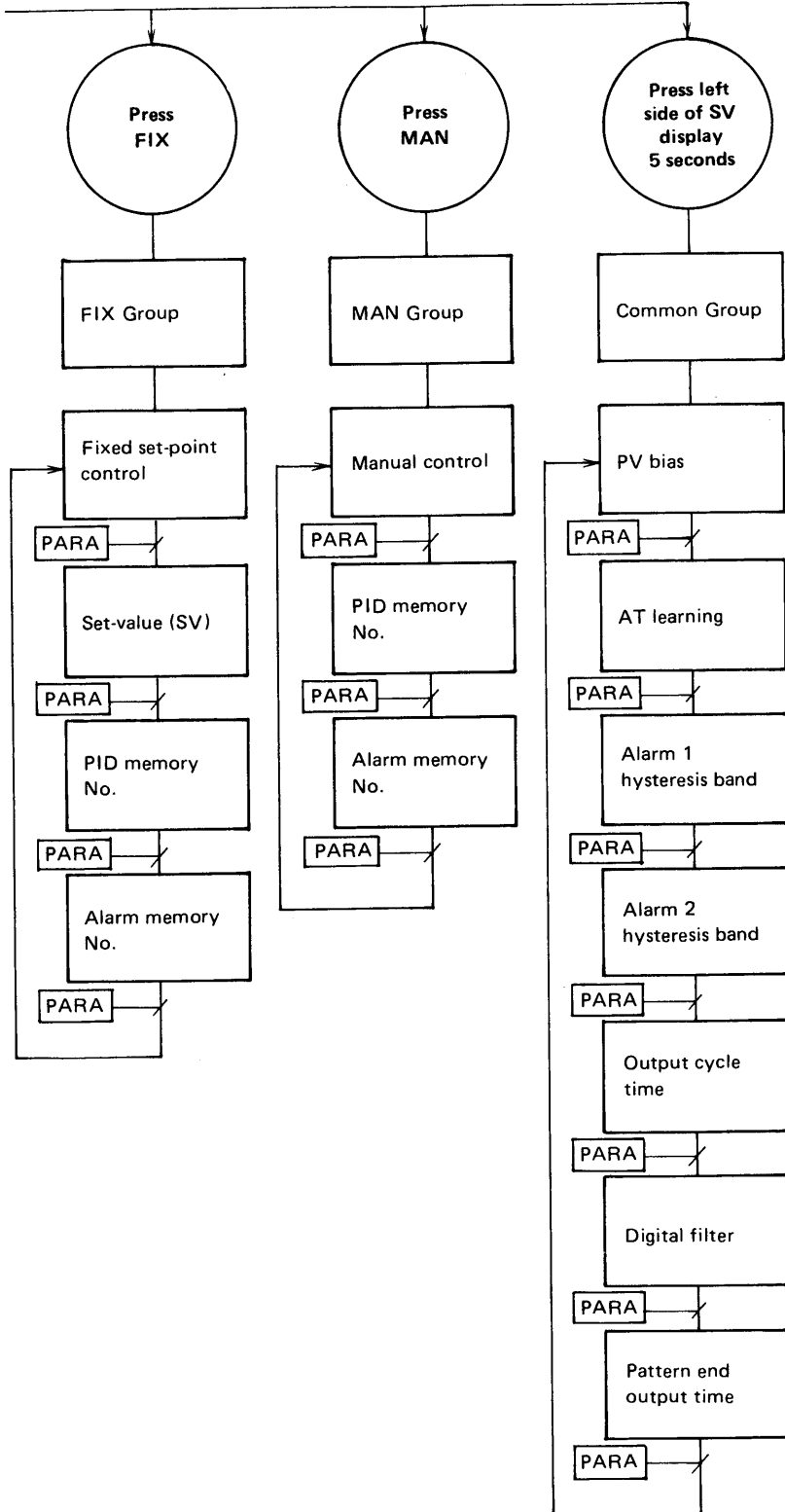
Others

- ⑩㉑ **Pattern card**
Card for recording your program. The record cards can be filed on the front of panel for easy reference.
- ⑩㉒ **Input type and range tagplate.**

2. QUICK REFERENCE PROGRAMMING FLOW CHART

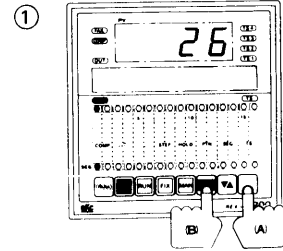
See pages 8 to 13 for detail.



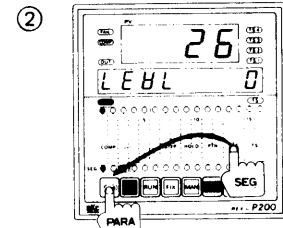


● Setting method

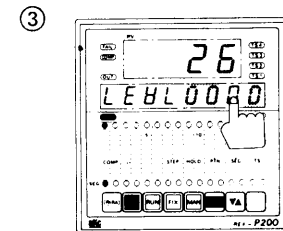
Press the set key (B) while pressing the hidden key (A).
"SET" lights up (Ready to program)



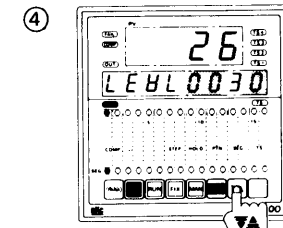
Press the each group key.
Then, pressing the (PARA) key changes the parameter display.



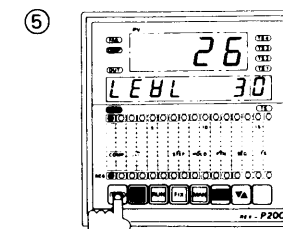
By pressing any digit section desired to be changed, it lights up brightly and other digits section lights up dimly.



Pressing only the ∇/Δ key increments figures, but pressing the ∇/Δ key while pressing the hidden key decrements figures.

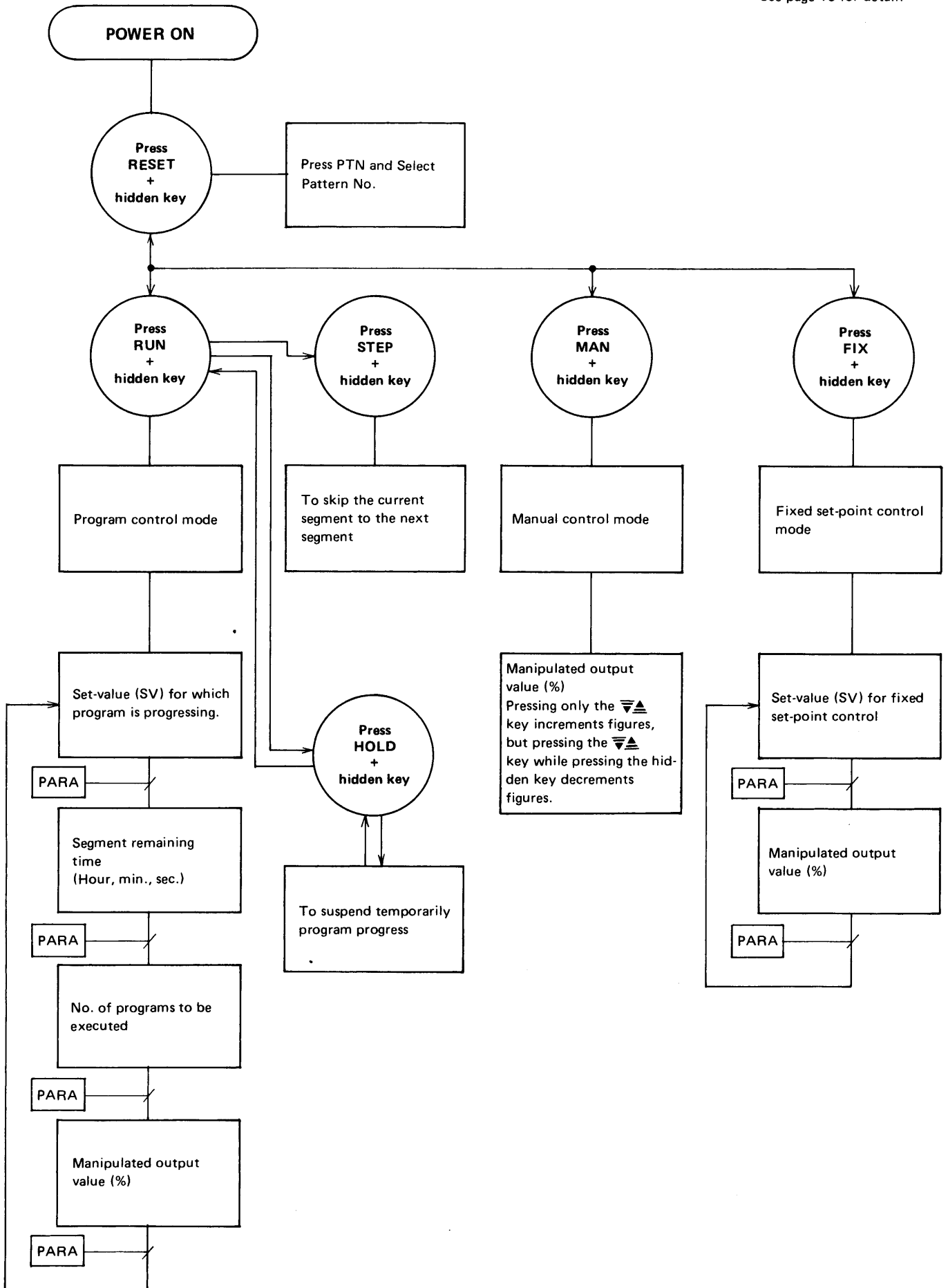


After finishing the setting.
Press the (PARA) key.



3. QUICK REFERENCE FOR NORMAL OPERATION (AFTER PROGRAMMING)

See page 16 for detail.



4. QUICK REFERENCE ADDITIONAL FUNCTIONS

4.1 Set data locking function

Locks all previous programmed setting parameters.
No parameters can be changed by unskilled operators.

Press character display at the left side of SV together with the hidden key.
"LoCK SET" flashes during 2 to 3 sec.
Lock is set.

To release Lock function, press character display at the left side of SV together with the hidden key.
"LoCK CLr" flashes during 2 to 3 sec.
Lock is released.

See page 23
Item 7.16

4.2 User initial setting function

- ① Communication setting
- ② Start mode selection (hot/cold start)
- ③ SV level selection at start
- ④ Data all clear setting

See page 17 (1) a), b)

4.3 User adjustment feedback resistance

(For the position proportioning type)

Automatic adjustment of feedback resistance for the position proportioning type

See page 18 (2) a), b)

4.4 Communication function

Only applicable when communication function is supplied

See page 23 Item 7.17

4.5 Auto-tuning function

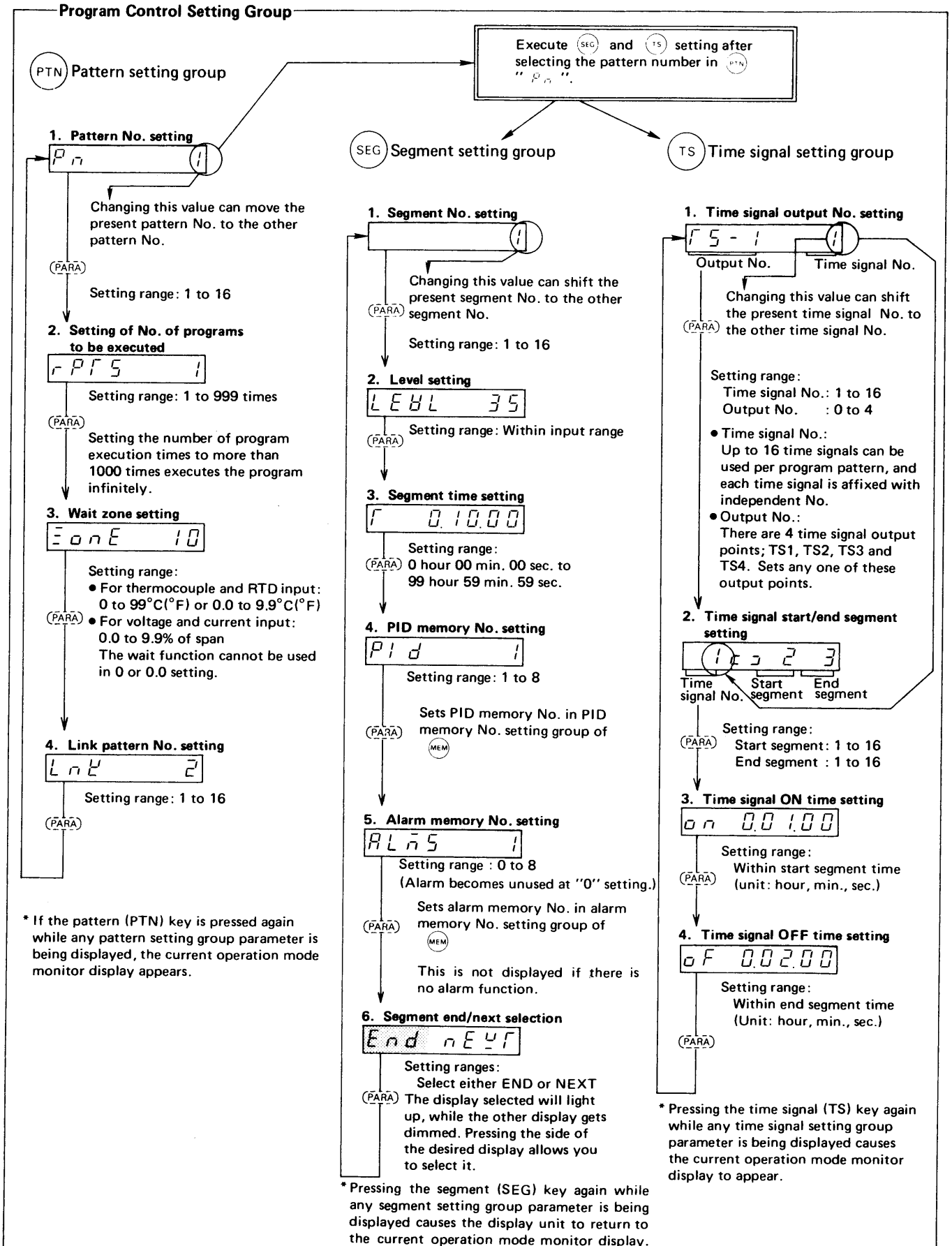
The auto-tuning function measures, calculates and sets the optimum PID constants automatically. It is used in the program control or fixed set-point control mode.

See page 21 Item 7.4 and 7.5

5. SETTING

5.1 Description of setting groups

For actual data setting, see "5.2 Fundamentals of data setting" (page 12).



MEM Memory setting group

• PID memory No. setting group

1. PID memory No. setting

Pidno 1

Changing this value can shift the present PID memory No. to the other PID memory No.

(PARA) Setting range: 1 to 8

2. Proportional band (P) setting

P 2.0

Setting range:
 • 0.0 to 999.9% of span in the standard type (Setting 0.0 actuates ON-OFF action)
 • 0.1 to 999.9% of span in the position proportioning type ("0.0" cannot be set.)

(PARA)

3. Integral time (I) setting

I 200

Setting range: 0 to 3600 seconds (Setting "0" turns integral control action OFF.)

(PARA)

4. Derivative time (D) setting

d 50

Setting range: 0 to 3600 seconds (Setting "0" turns derivative control action OFF.)

(PARA)

5. Neutral zone setting

db 0.1

Setting range: 0.1 to 20.0% of output span ("0.0" cannot be set.)
 This is displayed only in the position proportioning type.

(PARA)

6. ON-OFF action hysteresis band setting

OH 2

Setting range:
 • 0 to 100°C(°F) or 0.0 to 100.0°C(°F) for standard thermocouple/RTD input
 • 0.0 to 100.0% of span for standard voltage/current input
 • 0.1 to 20.0% of output span in the position proportioning type. ("0.0" cannot be set.)

(PARA)

Open/close output hysteresis band setting is activated for the position proportioning type. (The character does not change.)

7. Output limit (high-limit) value setting

hBLH 100.0

Setting range: -5.0 to +105.0%
 [Provided that output limit (high-limit) ≥ Output limit (low-limit)]

(PARA)

8. Output limit (low-limit) value setting

hBLL 0.0

Setting range: -5.0 to +105.0%
 [Provided that output limit (high-limit) ≥ Output limit (low-limit)]

(PARA)

Pressing any one of the upper 4 digits on the set-value (SV)/character display unit again when any parameter of the PID memory No. setting group is displayed causes the display unit to display the first parameter of the alarm memory No. setting group.

ALno 1

• Alarm memory No. setting group

(This is not displayed if there is no alarm function.)

1. Alarm memory No. setting

ALno 1

Changing this value can shift the present alarm memory No. to the other alarm memory No.

(PARA)

Setting range: 1 to 8

2. Alarm 1 setting

AL1 20

Setting range:

- Deviation alarm
 - Span to + span °C(°F) for thermocouple/RTD input
 - Span to + span for voltage/current input (Provided that it is in the -1999 to +9999 range.)
- Process alarm
 - (Low-limit set-value -Span) to (High-limit set-value + Span) °C (°F) for thermocouple/RTD input (Provided that it is in the -1999 to +9999 °C (°F) or -199.9 to +999.9°C(°F) range.)
 - (Low-limit set-value -Span) to (High-limit set-value + Span) (Provided that it is in the -1999 to +9999 range.)

(PARA)

* The position of the decimal point is the same as for the input range.

3. Alarm 2 setting

AL2 10

Setting range: The same as for the alarm 1 setting range

(PARA)

This is not displayed in the case of one alarm output or if a heater break alarm is provided.

4. Heater break alarm setting

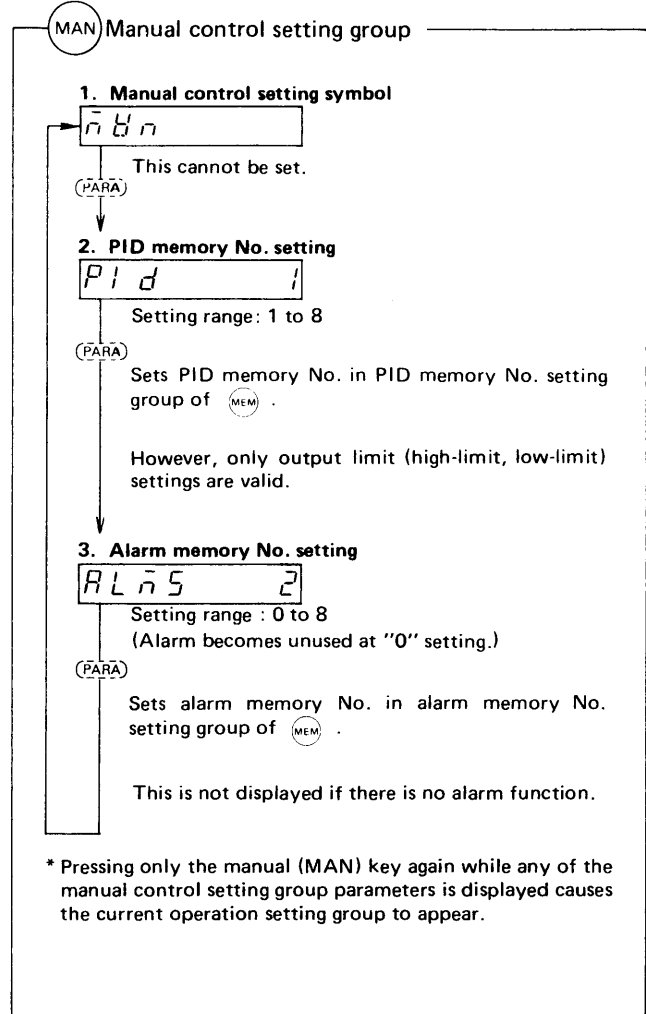
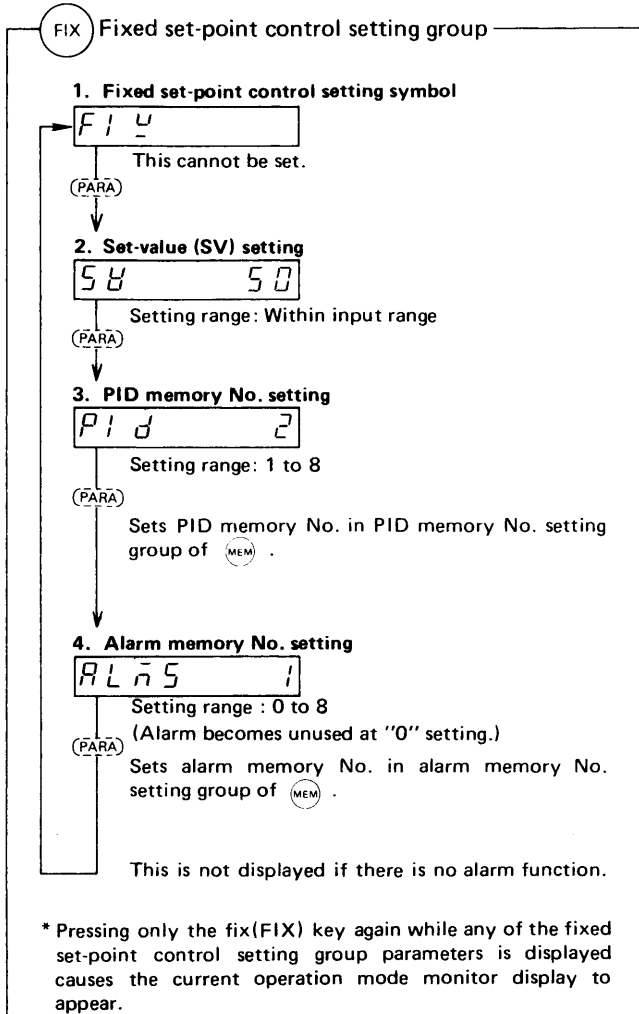
HbA 0.0

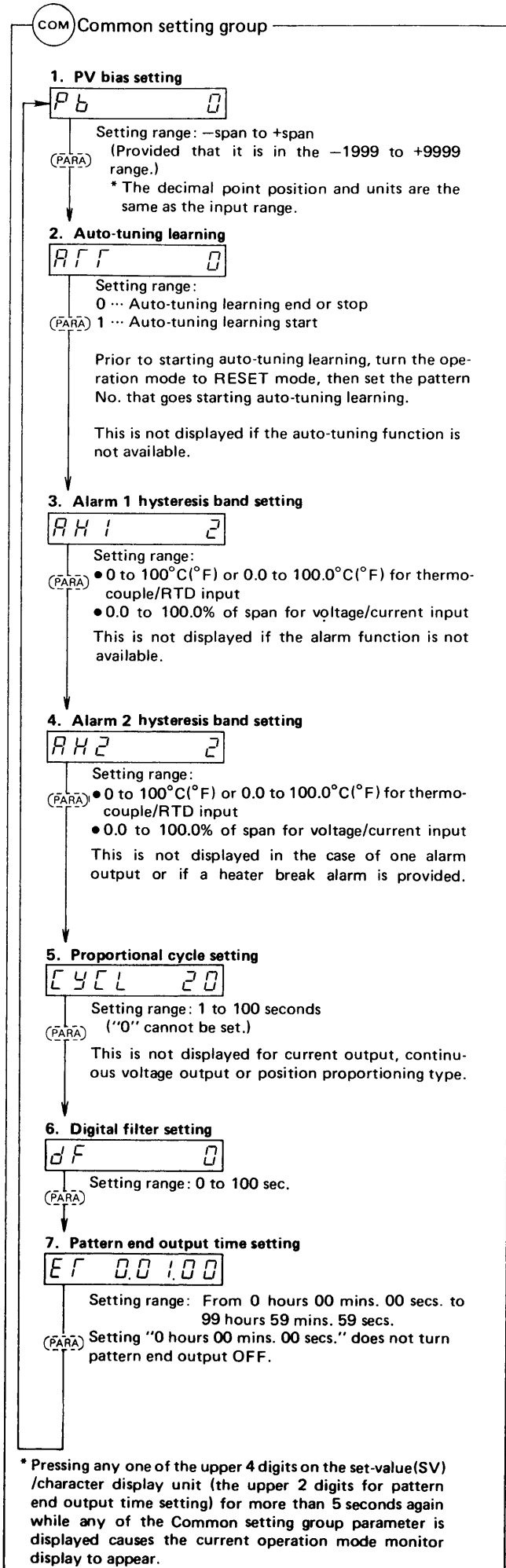
Setting range: 0.0 to 100.0 (A)

(PARA)

This is not displayed in the case of two alarm outputs.

* Pressing any one of the upper 4 digits on the set-value (SV)/character display unit once again while any of the alarm memory No. setting group parameter is being displayed causes the current operation mode monitor display to appear.





Cautions

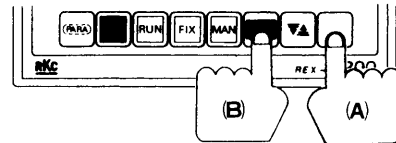
- Pressing the ($\overline{\text{PARA}}$) key changes the parameter display as shown by the arrow. Also, pressing the ($\overline{\text{PARA}}$) key while the hidden key is pressed changes the parameter display in the direction opposite to the arrow.
- Each parameter value is one example.
- If key operation is not performed for more than 30sec., the present display returns to the monitoring display.
- If any digit in the upper 4 digits on the set-value (SV)/character display unit is pressed by mistake during setting, the display jumps suddenly to "Memory setting group". In this case, call up the setting group already set, again and continue the setting. (See status transition diagram.)
- Always operate keys with fingers.
 - * For 3 and 4, the case where any parameter in "Common setting group" is displayed is excluded.

5.2 Fundamentals of data setting

The following shows examples of basic data setting. Because parameter data is set and changed in accordance with this procedure, first carry out operations as shown in the examples to master data-setting. Also, the measured-value (PV) display unit always displays a measured-value regardless of the setting. As an example, change the level set-value in the segment setting group from 0°C to 35°C.

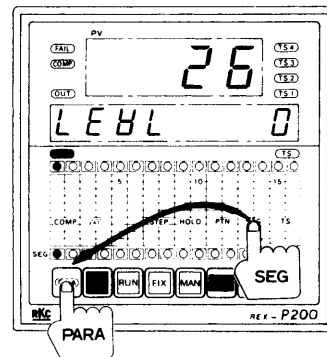
①

In order to set the instrument to the setting enable state first, press the set key (B) while pressing the hidden key (A) to set the instrument to the setting mode. At this time, the lamp in the set key lights up to indicate the setting enable state.



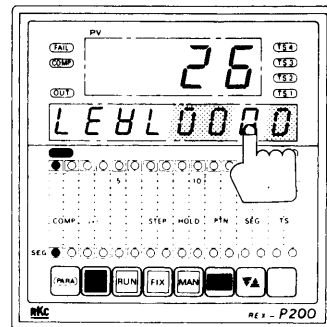
②

Next, in order to display the level set-value parameter, press the segment (SEG) key to call up the segment setting group. Then, press the (PARA) key to display the level set-value which is the 2nd parameter in the segment setting group. The level set-value in this case is set to 0°C. (Figure at right)



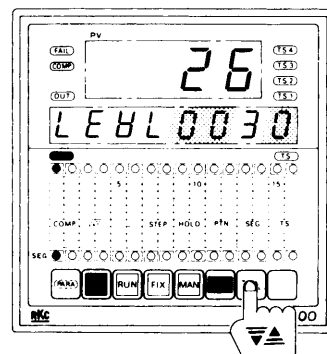
③

Next, change the level set-value. The lower 4 digits on the set-value (SV)/character display unit are also used as key switches. By pressing any digit section desired to be changed, it lights up brightly and other digit sections light up dimly. The digit lit brightly can be changed. When changing 0°C to 35°C, first press the tens digit to set the instrument to the setting change enable state.



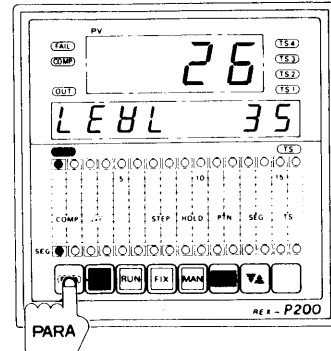
④

Set a value to the digit section lit brightly using the ∇/\blacktriangle key. Pressing only the ∇/\blacktriangle key increments figures, but pressing the ∇/\blacktriangle key while pressing the hidden key decrements figures. In this example, set "3" by pressing the ∇/\blacktriangle key. Next, press the units digit section, then set "5" by pressing the ∇/\blacktriangle key.



⑤

After finishing the setting, press the (PARA) key.
All of the set-value digits light brightly to indicate that the setting has ended.



⑥

Thus, the setting has been finished. If key operation is not performed for more than 30 sec., the present display returns to the monitoring display. In this case repeat the setting procedure from ②. If no more set-value change is required, press the set key while pressing the hidden key as shown in ①. The setting lamp lights out to exit from the setting mode.

Notes**Take care of the following when setting data.**

- When the instrument is not set to the setting mode (the setting lamp does not light up even if the set key is pressed while the hidden key is pressed), the setting data may be locked.
(For set data locking function, see "7. MAIN FUNCTIONS" on page 23.)
- This controller uses each parameter in any digit at the time it was changed.
- This controller can shift the digit up and down when each parameter is changed.
For example, if "199°C" is necessary to be changed to "200°C", first shift the digit which lights brightly to the least significant digit, then press the $\nabla\Delta$ key to change "9" to "0", thereby obtaining 200°C.
This procedure also applies to shift the digit down.
- To set a minus (-):
(Example)
To change 200 to -100, shift the digit lit brightly to the hundreds digit then press the $\nabla\Delta$ key while also pressing the hidden key to decrement the figures in order of 1 → 0 → -1.
- The number of digit to be lit brightly or dimly varies with the parameter type. This means the effective setting digit of that parameter lights up brightly or dimly. However, when the effective setting digit corresponds to the units digit, the tens digit lights up dimly for convenience.

(Example 1) For setting PID memory No.

Since the effective setting digit corresponds to the units digit, the tens digit lights up dimly for convenience, but the digit lit brightly cannot be shifted.

(Example 2) For setting time signal output No.

Since the low 3rd and 4th digits are not the effective setting digits, they cannot be lit brightly.

(Example 3) For setting segment time

For time setting, digits down to the 6th digit are effective.

- When the set-value (SV) character display unit displays other than the current operation mode monitoring display, the present display returns to the monitoring display if key operation is not performed for more than 30 sec..
However, this does not apply when the display unit displays common setting group parameters.
(For each operation mode monitor display, refer to Page 16.)
- Always operate keys with fingers.

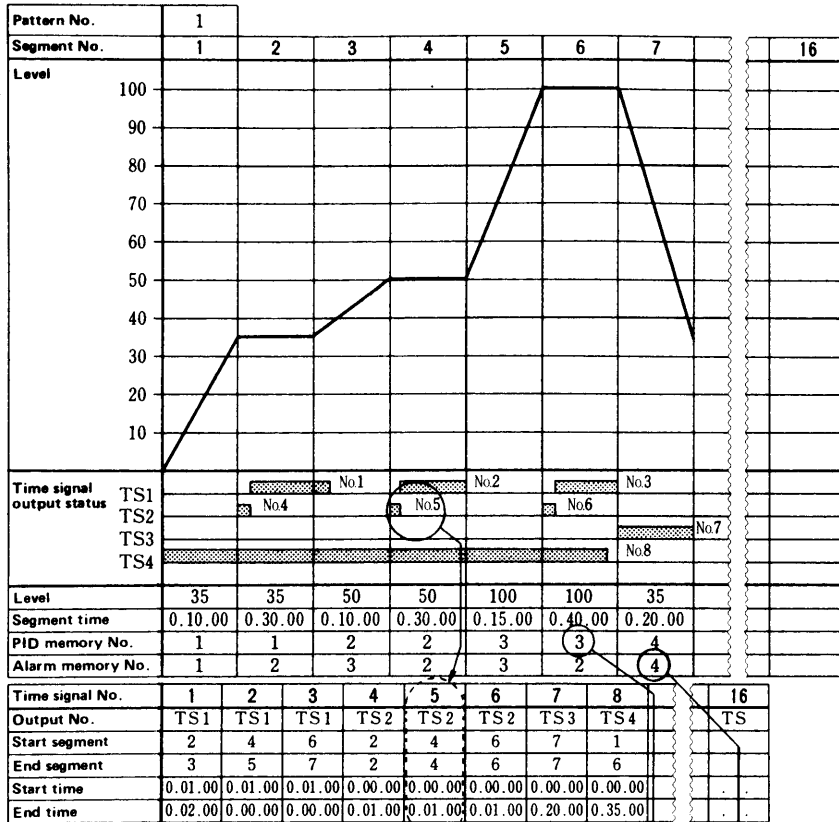
* The section shown by  on the set-value (SV)/character display unit in the Figure indicate that it lights up dimly.

5.3 Program set-up diagram example

Prepare a figure and table like those shown below beforehand to set each data. Regard the instrument to be set in the following data examples as REX-P200FDC-M*A-NN-N (See "11. MODEL No." on page 29.). The forms of data entry to these graph and tables are attached at the end of this manual for your use.

(1) Program control setting group

Always fill in the figure and table as shown below to execute program control. In program control, set the number of patterns (16 patterns or less) to be used.



Program execution time	Once
Wait zone	10
Link pattern No.	—

- ① Although the example at the left shows setting up to segment No. 7, it can actually be set up to No. 16. Further, it also shows time signal setting up to No. 8, whereas it can actually be set up to No. 16.
- ② Time signal numbers can be assigned arbitrarily. For example, reversing time signal No. 1 to 8 in the example at the left causes no problems.
- ③ The link pattern No. is blank in this example as pattern connection is not executed.
- ④ Time setting is in the order of hours, minutes and seconds. (e.g., "0.10.30" for 10 minutes 30 seconds)

Hereafter, conduct the setting from (2) to (5) only once.

(2) Memory setting group

(a) PID memory No. setting group

This setting is common to each operation mode.

Memory No.	1	2	3	4	5	6	7	8
Proportional band P (%)	2.0	3.3	4.0	3.0	—	—	—	—
Integral time I (Sec)	200	240	500	240	—	—	—	—
Derivative time D (Sec)	50	60	120	60	—	—	—	—
Neutral zone d_b (%)	—	—	—	—	—	—	—	—
ON-OFF action hysteresis band σ_H	—	—	—	—	—	—	—	—
Output limit (high-limit) σ_{BLLH} (%)	100.0	100.0	100.0	50.0	—	—	—	—
Output limit (low-limit) σ_{BLLL} (%)	0.0	0.0	0.0	0.0	—	—	—	—

(b) Alarm memory No. setting group

Alarm setting is common to each operation mode.

(Alarm 1: High limit deviation alarm,
Alarm 2: Low limit deviation alarm)

Memory No.	1	2	3	4	5	6	7	8
Alarm 1 $RL1$	20	10	20	50	—	—	—	—
Alarm 2 $RL2$	10	10	30	25	—	—	—	—
Heater break alarm HBR	—	—	—	—	—	—	—	—

- ① The neutral zone is set only for the position proportioning type. It is not filled in this example.
- ② As the ON-OFF action activates when the proportional band is 0.0, it is not necessary to set ON-OFF action hysteresis band in this case.
- ③ Although this example shows PID memory setting up to No. 4, it can actually be set up to No. 8.

- ① Since this example shows only two alarm points, a heater break alarm cannot be added.
- ② Although this example shows alarm memory setting up to No. 4, it can actually be set up to No. 8.

(3) Common setting group

PV bias	<i>Pb</i>	0
Alarm 1 hysteresis band	<i>AH1</i>	2
Alarm 2 hysteresis band	<i>AH2</i>	2
Proportional cycle	<i>CYCL</i> (Sec.)	20
Digital filter	<i>DF</i> (Sec.)	0
Pattern end output time	<i>ET</i>	0.01.00 (Hour, minute, sec.)

(4) Fixed set-point control setting group

To be filled in when fixed set-point control is executed.

Set-value (SV)	<i>SV</i>	50
PID memory No.	<i>PI d</i>	2
Alarm memory No.	<i>AL n S</i>	1

(5) Manual control setting group

To be filled in when manual control is executed.

PID memory No.	<i>PI d</i>	1
Alarm memory No.	<i>AL n S</i>	2

Note

PID memory No. setting group constants used in each operation mode are as follows.

Control mode PID memory No. setting group	Program control mode (RUN)	Fixed set-point control mode (FIX)	Manual control mode (MAN)
Proportional band <i>P</i> (%)	○	○	×
Integral time <i>I</i> (Sec.)	○	○	×
Derivative time <i>d</i> (Sec.)	○	○	×
Neutral zone <i>db</i> (%)	△	△	×
ON-OFF action hysteresis band <i>oH</i>	△	△	×
Output limit (high-limit) <i>nHLH</i> (%)	○	○	○
Output limit (low-limit) <i>nHLL</i> (%)	○	○	○

○ : Used

× : Unused

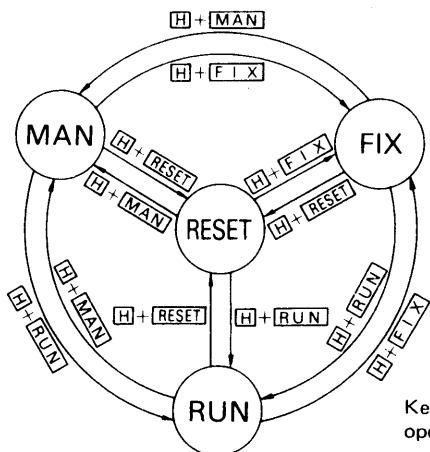
△ : Used depending on control operation type

6. OPERATION

6.1 Operation mode status transition and monitoring display

• **Operation mode status transition diagram**

If only the (PARA) key is pressed in each operation mode, parameters in the monitoring display diagram shown in the following can be checked. This instrument enables parameter check and setting in each setting group even if it is in any operation mode. (For setting group, see pages 8 to 11.)



- RESET Reset mode (RESET lamp lights up.)
- RUN Program control mode (RUN lamp lights up.)
- FIX Fixed set-point control mode (FIX lamp lights up.)
- MAN Manual control mode (MAN lamp lights up.)

- Key operation
- H + RESET Press the RESET key with the hidden key pressed.
 - H + RUN Press the RUN key with the hidden key pressed.
 - H + MAN Press the MAN key with the hidden key pressed.
 - H + FIX Press the FIX key with the hidden key pressed.

* Always operate keys with fingers.

• **Monitoring display**

Monitoring display is for checking each status in each operation mode. Therefore, each monitoring display parameter cannot be set. (Excluding manipulated output in the manual control mode.) Also in the normal status (Where neither check nor setting is made through key operation), the monitoring display "1" in each operation mode is shown. (See the following.)

Program control mode

- Set-value (SV) for which program is progressing.
35
- Segment remaining time
r r 002.36
(Hour, min., sec.)
- No. of programs to be executed
r P r r 1
No. of times
- Opening feedback input value
P o 5 30.0
(0.0 to 100.0%)
* This is displayed only for position proportioning type.
- Current transformer input value
C r 8.0
(0.0 to 100.0A)
* This is displayed only if heater break alarm function is provided.
- Manipulated output value
n y 27.0
(%)

Fixed set-point control mode

- Set-value (SV) for fixed set-point control
50
- Opening feedback input value
P o 5 30.0
(0.0 to 100.0%)
* This is displayed only for position proportioning type.
- Current transformer input value
C r 8.0
(0.0 to 100.0A)
* This is displayed only if heater break alarm function is provided.
- Manipulated output value
n y 80.0
(%)

Manual control mode

- Manipulated output value
n y 50.0
Pressing only the $\nabla \blacktriangle$ key increments figures, but pressing the $\nabla \blacktriangle$ key while pressing the hidden key decrements figures.
Setting range: (%)
Output limit (high-limit) to output limit (low-limit)
- Opening feedback input value
P o 5 30.0
(0.0 to 100.0%)
* This is displayed only for position proportioning type.
- Current transformer input value
C r 8.0
(0.0 to 100.0A)
* This is displayed only if heater break alarm function is provided.

Reset mode

(Nothing is displayed.)

Caution

- Pressing the (PARA) key changes the parameter display as shown by the arrow. Also, pressing the (PARA) key while the hidden key is pressed changes the parameter display in the direction opposite to the arrow.
- Each parameter value is one example.
- The operation mode cannot be changed when common setting group parameter is displayed.

6.2 Prior to operation

(1) Setting in the user initial setting mode

Prior to starting operations, carry out setting in the user's initial setting mode.

(a) Preparation

As shown in Fig. 1, pull out the internal chassis from the housing while pushing up the stopper at the bottom of the instrument with fingers. Thus, it can be withdrawn from the housing. Next, as shown in Fig. 2, turn ON the internal switch A at the top of the instrument, then push the internal chassis into the housing. Thus the instrument is set to the user initial setting mode.

In order to exit from the user initial setting mode, turn OFF the internal switch shown in Fig. 2.

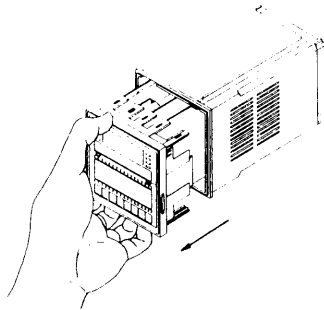


Fig. 1

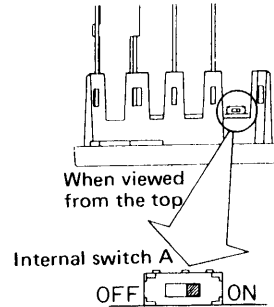


Fig. 2

(b) Parameter descriptions

Entering the user initial setting mode causes the measured-value (PV) display unit and the set-value (SV)/character display unit to display " b P S " (bPS). Then, pressing the (PARA) key changes the setting item as follows. (When one cycle is complete, it returns to the first item, " b P S " (bPS).)

Note

If instrument is not supplied communication function, starts with display " P d " (Pd).

Measured-value (PV) display unit	Symbol	Name	Description	Initial value at shipment								
b P S	bPS	Communication rate setting	No display is made if this controller is not provided with the communication function. For these setting, see "REX-P200 SERIES INSTRUCTION MANUAL FOR COMMUNICATION" separately prepared.	4800								
b I T	bIT	Data forms setting		072								
A d d	Add	Device address setting		0								
I n T	InT	Interval time setting		120								
* P d	Pd	Start mode selection	This parameter sets the initial instrument status at recovery from power failure or power ON. <table border="1"> <thead> <tr> <th>Set-value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Cold start in the reset mode (All outputs are OFF.)</td> </tr> <tr> <td>1</td> <td>Cold start in the manual mode (Outputs is the output limit (low-limit) value.)</td> </tr> <tr> <td>2</td> <td>Hot start (Status before power is turned OFF.)</td> </tr> </tbody> </table> For an instantaneous power failure of less than 4 seconds, the instrument performs a hot start regardless of the setting.	Set-value	Description	0	Cold start in the reset mode (All outputs are OFF.)	1	Cold start in the manual mode (Outputs is the output limit (low-limit) value.)	2	Hot start (Status before power is turned OFF.)	0
Set-value	Description											
0	Cold start in the reset mode (All outputs are OFF.)											
1	Cold start in the manual mode (Outputs is the output limit (low-limit) value.)											
2	Hot start (Status before power is turned OFF.)											
* S V S T	SVST	Set-value (SV) selection at start	This sets the level at which the set-value (SV) starts when program control is executed. <table border="1"> <thead> <tr> <th>Set-value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Starts set-value (SV) from level 0.</td> </tr> <tr> <td>1</td> <td>Starts set-value (SV) from measured-value (PV).</td> </tr> </tbody> </table>	Set-value	Description	0	Starts set-value (SV) from level 0.	1	Starts set-value (SV) from measured-value (PV).	0		
Set-value	Description											
0	Starts set-value (SV) from level 0.											
1	Starts set-value (SV) from measured-value (PV).											
E L r	CLr	Data all clear setting	Setting "9999" cancels all data excluding the user initial setting and causes the initial value to appear. This parameter can be set by performing steps ③ to ⑤ in Item "5.2 Fundamentals of data setting" (page 12, 13). Settings other than "0" or "9999" cannot be achieved.	0								

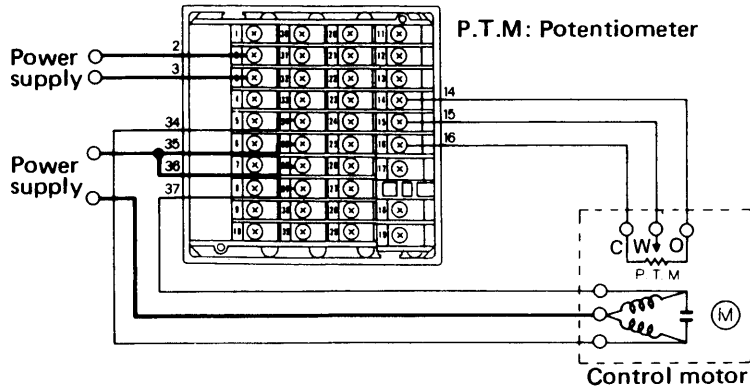
* Setting can be done only with the key.

(2) Opening adjustment

(For the position proportioning type)

This instrument has already been adjusted at shipment to the resistance value corresponding to opening feedback input. However, if fine adjustment needs to be made, do it in the following way. In this case, check connections and make sure that loads such as the control motor operate.

(a) Wiring procedure



(b) Adjustment procedure

Caution

Pay much attention that load such as control motor operates during adjustment.

Pull the internal chassis from the housing as shown in Fig. 1. Turn the internal switch B on the top of the instrument to ON as shown in Fig. 3, then return the internal chassis to the housing. Turning the power supply ON causes the display units to display parameter as shown in ①. Pressing the (PARA) key starts adjustment, and the display automatically changes in the order of ① → ② → ③ → ④ shown. Adjustment is complete when display ④ appears. Then, turn the internal switch B shown in Fig. 3 to OFF to return to the normal status.

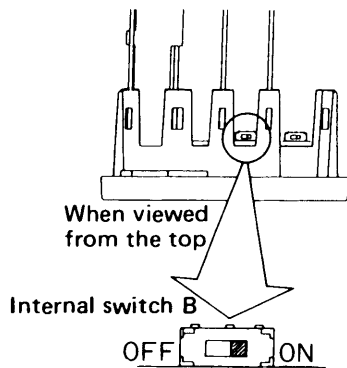
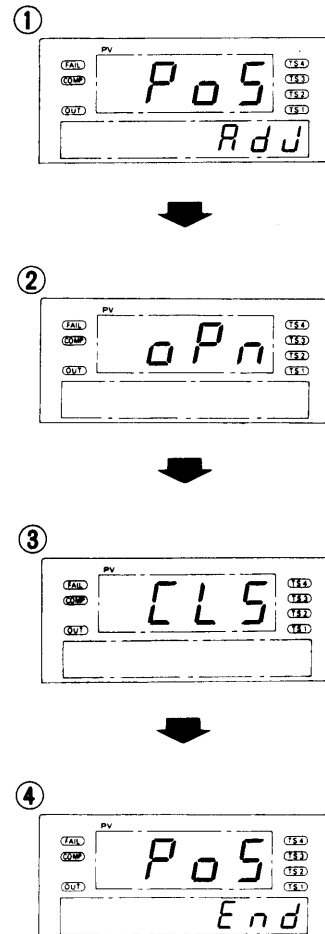


Fig. 3



(3) How to use pattern cards

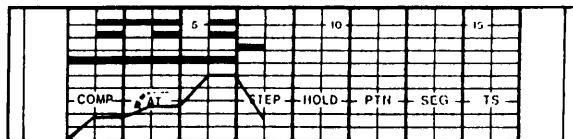
This instrument is capable of programming 16 control patterns in program control. Therefore, the control processes are on pattern cards which are mounted on the instrument's front panel to allow you to check the control pattern at a glance. (The pattern cards (for 20 patterns) are attached.)

(a) Pattern card data entry

Take a level on the vertical line of the pattern card and regard one scale division of the horizontal line as one segment as in the pattern graph shown in Item "5.3 Program set-up diagram example". Using a time signal is also a help.

(Example)

Example of entering data using data from Item "5.3 Program set-up diagram example".



- ① The vertical line shows levels in which one scale division is 20°C, while the horizontal line shows segments in which each scale division represents one segment.
- ② The lines at the upper section of the graph show segments where the time signal is turned ON. As there are 4 time signal outputs, each scale division from the top is regarded as TS1, TS2, TS3, and TS4 respectively.

(b) Pattern card insertion and removal

① Insertion

Insert a pattern card through the insertion slot on the sides of the instrument's front panel (on either the right or left side) and locate it so that the horizontal line scale divisions match the 16 segment (SEG) indication lamps.

The pattern card is inserted into the instrument front after folded into two. However, if it is difficult to insert the card, re-fold it in the same crease.

② Removal

The pattern card can be easily removed from the front panel by first pushing one end of the card to side it to the other side and then pulling it forward.

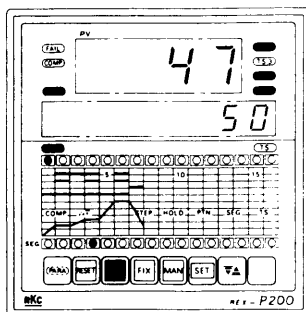
* If another instrument is installed right beside this instrument, it may be difficult to insert a pattern card in the above way. In this case, pull the internal chassis slightly forward as shown in Fig. 1 to arrows you to insert the card.

(c) How to utilize a pattern card

- ① Prior to starting program control, insert a pattern card showing the pattern which is going to be started, into the slit at the side of the front panel.

It is convenient to write the pattern number on the empty space on the card.

- ② Entering data in the pattern card with one scale division of horizontal line as one segment in accordance with "(a) Pattern card data entry", causes the segment (SEG) indication lamps below the pattern card to match the horizontal line (1 segment). The segment (SEG) indication lamps light up in series as the program progresses. Thus, you can know at a glance which part of the pattern is being controlled by seeing which lamp is lit. (The figure at the left side shows that segment No. 4 of pattern No. 1 is being controlled.)



- ③ The back of the pattern cards lists abbreviations of the meanings of all the characters displayed on this instrument to assist you in setting and checking each parameter. (If a character is duplicated, only one of them is indicated.)

7. MAIN FUNCTIONS

7.1 Self-diagnostic function

Check item	Display during trouble occurrence
Set data check	
Input data check (Measured-value input/ current transformer input)	Displays "Err" or error code No. on the measured value (PV) display unit.
RAM check	
CPU power monitoring	FAIL indicating lamp lights up.
Watch dog timer	All other displays lights out.

(a) Error codes

- ① Error 1 (Err 1) CPU error
 [Cause] : Influence by noise, etc.
 [Remedy] : Turn the power OFF once, then turn ON again. However, if the error still occurs contact our agency.
- ② Error 2 (Err 2) RAM error
 [Cause] : Backup battery is dead and/or RAM is faulty.
 [Remedy] : Contact our agency.
- ③ Error 3 (Err 3) Data error
 [Cause] : Electrical noise, incorrect setting, etc.
 [Remedy] : Check each setting item, again (Especially, time signal and linked pattern No. settings). However, if the error still occurs, contact our agency.
- ④ Error 4 (Err 4) A/D conversion error
 [Cause] : A/D converter trouble, etc.
 [Remedy] : Contact our agency.

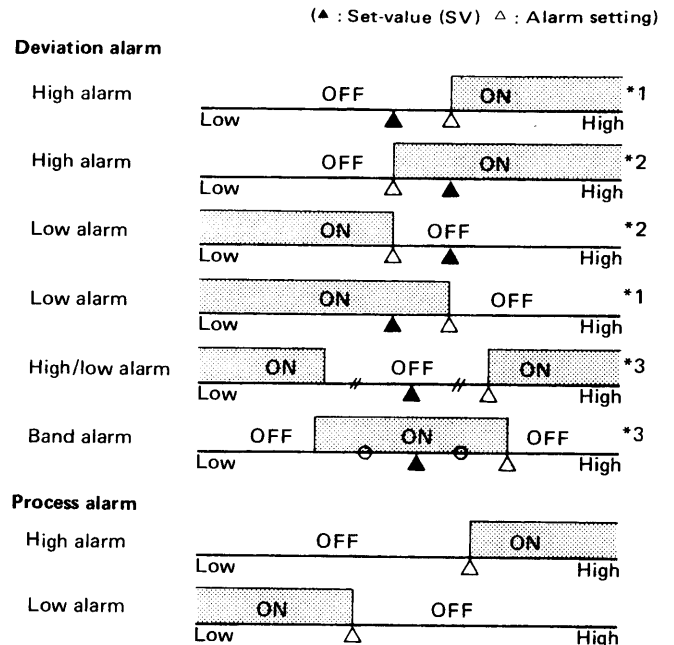
(b) Output status during trouble occurrence

- Control output (relay contact, voltage pulse, Triac drive tigger) and alarm output OFF
- Control output (current, continuous voltage) and analog output -5.0% or less
- FAIL output (Contacts keep being closed during error code display.) Contact open

7.2 Alarm (ALM) function

Up to 2 alarm output points are available. When alarm 1 is activated, the set-value (SV)/character display unit flashed "ALM1" (ALM1). [For alarm 2, "ALM2" (ALM2)] When both the alarms are activated, the display unit flashes "ALM1" (ALM1) and "ALM2" (ALM2) alternately.

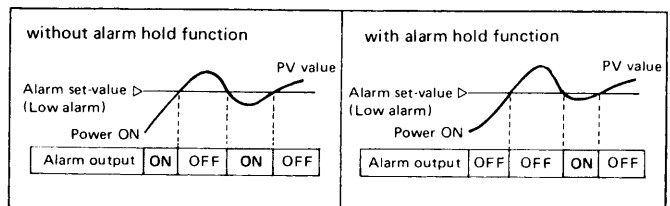
(1) The action of each alarm is as shown in the following.



- *1 Alarm status where the alarm set-value is set to plus (+).
- *2 Alarm status where the alarm set-value is set to minus (-).
- *3 Status where alarm is activated at 2 equal deviation points from the set-value (SV) with alarm set-value (absolute deviation) is set.

(2) Alarm hold function

With alarm hold function, the instrument ignores alarm conditions after power-ON, generating no alarm output when the input is in the alarm zone until the input has exited once from the alarm zone.



The alarm hold action is activated when not only the power is turned ON, but also in the following circumstances.

- ① When the PV bias is changed.
- ② When the set-value (SV) is changed in fixed set-point control mode.

7.3 Heater break alarm (HbA) function

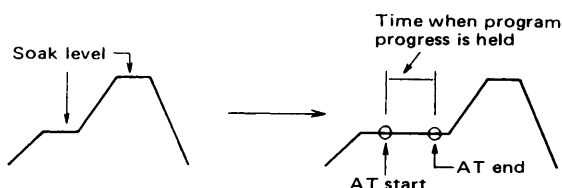
- ① When the heater break alarm is activated, the set-value (SV)/character display unit flashes " H b A " (HbA).
- ② It is desirable that basically the heater break alarm be set to about 85% of a current transformer input value, " [F " (CT). However, when power supply variations are large, set the alarm to a slightly smaller value. In addition, when two or more heaters are connected in parallel, set the alarm to a slightly larger value so that it is activated even with only one heater is broken. (However, within the value of " [F " (CT).)
 - The heater break alarm is set in accordance with "Alarm memory No. setting group." (See page 9.)

The current transformer input value can be checked by Monitoring display. (See page 16.)

7.4 Auto-tuning (AT) function

The auto-tuning function measures, calculates and sets the optimum PID constants automatically. It is used in the program control or fixed set-point control mode.

- ① Pressing the $\overset{AT}{\text{AT}}$ key while pressing the hidden key starts auto-tuning. The set-value (SV)/character display unit flashes " R F U " (ATU) while the auto-tuning function is activated.
- ② When the function ends its activation, " R F U " (ATU) stops flashing. The PID constants thus computed are automatically written into the PID memory No. already selected at the time of auto-tuning start, and as a result the PID constants stored before this time are erased.
- ③ If it needs to confirm the auto-tuned constants, call up the PID memory No. setting group in accordance with "5.1 Description of setting groups" (page 8). Also, change the auto-tuned constants in accordance with "5.2 Fundamentals of data setting" (page 12).
- ④ When suspending the auto-tuning function halfway, press the $\overset{AT}{\text{AT}}$ key while pressing the hidden key, again. In this case, PID constants are not changed. (The values before auto-tuning start are retained.)
- ⑤ Auto-tuning execution in a soak level (fixed set-point control sections in program control) during program control can obtain a good controlled result. Also, program progress is automatically held during auto-tuning execution and the program automatically restarts after the auto-tuning function is finished.



- ⑥ Auto-tuning function progress is suspended when:
 - the operation mode is changed.
 - the PV bias value is changed.
 - the set-value (SV) is changed during fixed set-point control.

- an error occurs.
 - an input wire is disconnected.
 - the auto-tuning function does not end after the lapse of about 9 hours from its start.
- * However, when power failure occurs (including instantaneous power failure within about 4 sec.) and then recovers during auto-tuning execution, the auto-tuning function is not cancelled but is started from the beginning.
- [Only when hot start is selected in the user initial set mode]

7.5 Auto-tuning learning function

The PID constants vary with the level to be set even at the same load. For this reason, the auto-tuning function must be executed for each segment in program control. However, if the auto-tuning function is learned, each program soak level (fixed set-point control section in program control) is automatically detected for executing the auto-tuning function, and up to 8 PID constants are stored in a PID memory No. setting group from PID memory No. 1 in executing order.

After confirming whether or not the values thus stored are appropriate, set up a program to be executed. The auto-tuning learning function can be used only in the reset mode. This setting is made in accordance with "Common setting group". (See page 11.)

7.6 External contact input

Pattern No., reset mode and program control mode settings, and step and hold functions can be performed by not only front keys but also contact input from the rear terminals.

① Pattern No. setting

A pattern No. is selected according to the open/close status of rear terminal Nos. from 20 to 24. If rear terminals, Nos. 20 and 25 (P. SET) are closed, the selected data is captured. This is effective only in the reset mode.

Pattern No. selection according to terminal status

Terminal No. Pattern No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
No. 20 - 21	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X
No. 20 - 22	-	-	X	X	-	-	X	X	-	-	X	X	-	-	X	X
No. 20 - 23	-	-	-	-	X	X	X	X	-	-	-	-	X	X	X	X
No. 20 - 24	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X

- : Open X : Close (No. 20 : Common)

- ② Reset mode setting
If rear terminals, Nos. 20 and 26 (RESET) are closed, the operation mode is set to the reset mode.
- ③ Program control mode setting
If rear terminals, Nos. 20 and 27 (RUN) are closed, the operation mode is set to the program control mode.
- ④ Step function
If rear terminals, Nos. 20 and 28 (STEP) are closed, the step function is activated. However, this is effective only in the program control mode.

⑤ Hold function

If rear terminals, Nos. 20 and 29 (HOLD) are closed, the hold function is activated. However, this is effective only in the program control mode.

Notes

1. Reset mode and program control mode setting keep their statuses even if the relevant terminals are opened after being closed once.
2. When the relevant terminals are closed by external contact input in order to set the controller to the reset or program control mode, no operation mode change by the front key can be made.
3. The hold function is activated only when the relevant terminals are closed.
4. Priority is given in the order of ②, ③, ⑤, ④ and ① described above.
If the terminals in higher priority are closed, those in lower priority become invalid.

7.7 Overscale/underscale

- ① If a measured-value goes increasing and exceeds the high limit of the setting range due to input disconnection (or shorting), the measured-value display starts flashing. Further if it exceeds the input display range, the measured-value (PV) display unit flashes "oooo" (overscale display).
 - ② If a measured-value goes decreasing and falls below the low limit of the setting range due to input disconnection (or shorting), the measured-value display starts flashing. Further, if it falls below the input display range, the measured-value (PV) display unit flashes "uuuu" (underscale display).
- * For overscale and underscale display ranges, see "9. SPECIFICATION" (page 27).

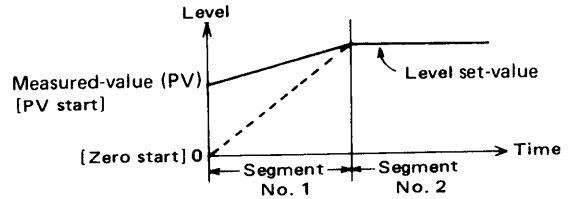
When an opening feedback input wire is disconnected for the position proportioning type.

Disconnected position	Display	Control output	Alarm output
C	□ □ □ □ (Overscale)	Open side (OUT(1))	Alarm 1 (AL1)
W	uuuu (Underscale)		
O	uuuu (Underscale)	Close side (OUT(2))	Alarm 2 (AL2)
Others (2 wires or more)	uuuu (Underscale)	Both are OFF.	Both are ON.

- For disconnected positions, see Item 8.1 (page 24).
- Overscale or underscale is displayed on the set-value (SV)/character display unit only when an opening feedback input value (POS) is being displayed as described in Item 6.1 Monitoring Display (page 16).

7.8 PV start

When a measured-value (PV) already reaches to a certain level just at program control start, control is performed just after the start by setting the program start level to the current measured-value (PV). The PV start setting is made in the user initial setting mode (page 17). (Zero start selection is also possible.)



7.9 Step function

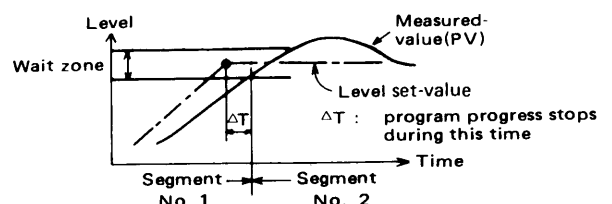
If it is necessary to perform program control by skipping the current segment to the next segment, press the STEP key while pressing the hidden key. The segment now in program control is skipped to perform the control from the next segment.

7.10 Hold function

If it is necessary to suspend temporarily program progress in program control, press the HOLD key while pressing the hidden key. The set-value(SV)/character display unit flashes "Hold" (HoLd), and as a result the control stops at the level set to the HOLD status. This status is not released even if the controller is set to any other operation mode (fixed set-point control or manual control mode). For releasing the hold status, press the HOLD key while pressing the hidden key again.

7.11 Wait function

If a measured-value (PV) cannot follow program progress in program control, this function stops program movement to the next segment. When the measured-value (PV) enters within the specified value by setting a wait zone (setting of absolute deviation value with respect to level) the program moves to the next segment. The wait zone is set in accordance with "Pattern setting group". (See page 8.)



7.12 Pattern link (connection) function

One pattern of this controller consists of up to 16 segments and up to 16 patterns (256 segments) can be stored.

However, when one pattern consisting of 16 segments is not sufficient, a successive program with more than 16 segments can be set up by connecting more than one pattern. Pattern link setting is in accordance with "Pattern setting group". (See page 8.)

However, when "Segment end" (segment setting group) is set in the pattern segment to be connected or setting corresponding to 16 segments is not made to the pattern to be connected, no pattern link is performed. In addition, pattern connection order can be freely set, but the same pattern cannot be connected two or more times.

7.13 PV bias

If a PV bias is set for the following cases, a value obtained by adding the PV bias to a measured-value (PV) becomes an indicated value, and computation is performed using that value. A PV bias is set in accordance with "Common setting group". (See page 11.)

- For thermocouple or RTD input
When an indicated value needs to be corrected because of the difference between the above indicated value and measured-value (PV) of other instruments being used simultaneously resulting from the characteristic dispersion and location of each sensor.
- For voltage or current input
When input value needs to be corrected.

7.14 Digital filter

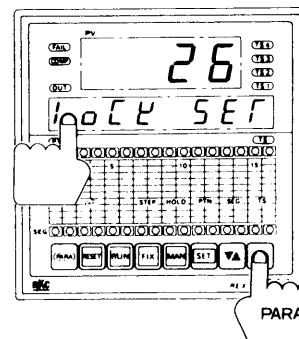
In order to reduce noise contained in a measured-value (PV), a low pass filter can be inserted. Thus, control without input noise influence becomes possible by setting appropriately this filter time constant according to measured-object characteristics and noise level. This digital filter is set in accordance with "Common setting group". (See page 11.)

7.15 Pattern end output function

If one program ends, the set-value (SV)/character display unit flashes " *E n d* " (End). At this time, a pattern end signal is also output. Pattern end output time is set in accordance with "Common setting group". (See page 11.) Also, even if the pattern end output ends, " *E n d* " (End) goes flashing. " *E n d* " (End) disappears when the controller is set to the reset mode by pressing the RESET key while the hidden key is pressed.

The pattern end output enables the execution of the next process at the program end during the preset time or external counting of the number of program execution times. (The pattern end signal is output for 0.5 sec. when the program is repeated.)

7.16 Set data locking function



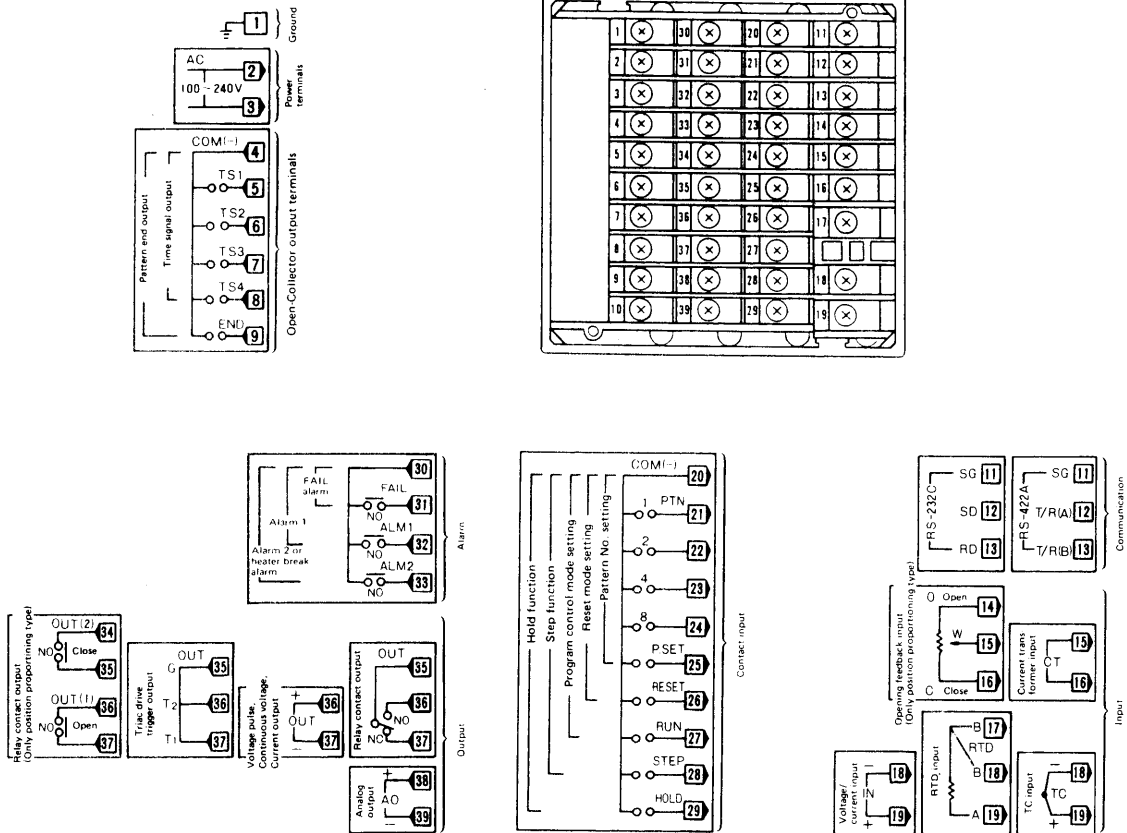
The set data locking function makes each set data change impossible. Therefore, the controller cannot be set to the setting mode even if the SET key is pressed while the hidden key is pressed. (The set lamp keeps going off.) In order to set the controller to the set data locking state, press the character display section (any one digit in the upper 4 digits) on the set-value (SV)/character display unit while pressing the hidden key. Thus, the set-value (SV)/character display unit flashes " *LoCK SET* " (LoCK SET) for about 2 to 3 sec. to inform the operator of the locked state. In order to release data locking, press the character display section (any one digit in the upper 4 digit in the upper 4 digits) on the set-value (SV)/character display unit while pressing the hidden key, again. Thus, the set-value (SV)/character display unit flashes " *LoCK CLr* " (LoCK CLr) for about 2 to 3 sec. to inform the operator of lock release.

7.17 Communication function

The built-in RS-422A or RS-232C interface enables data communication with a host computer. For details, see "REX-P200 SERIES INSTRUCTION MANUAL FOR COMMUNICATION".

8. WIRING

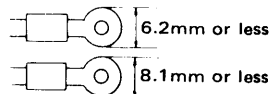
8.1 Rear terminals



NO : Normally Open NC : Normally Closed COM : Common

Notes

1. All of unused terminals are covered by blind patches.
2. For input terminals with terminals Nos. 17, 18, and 19, use solderless terminals of 8.1mm or less wide and for the terminals with terminal Nos. other than the above, use solderless terminals 6.2mm or less wide.

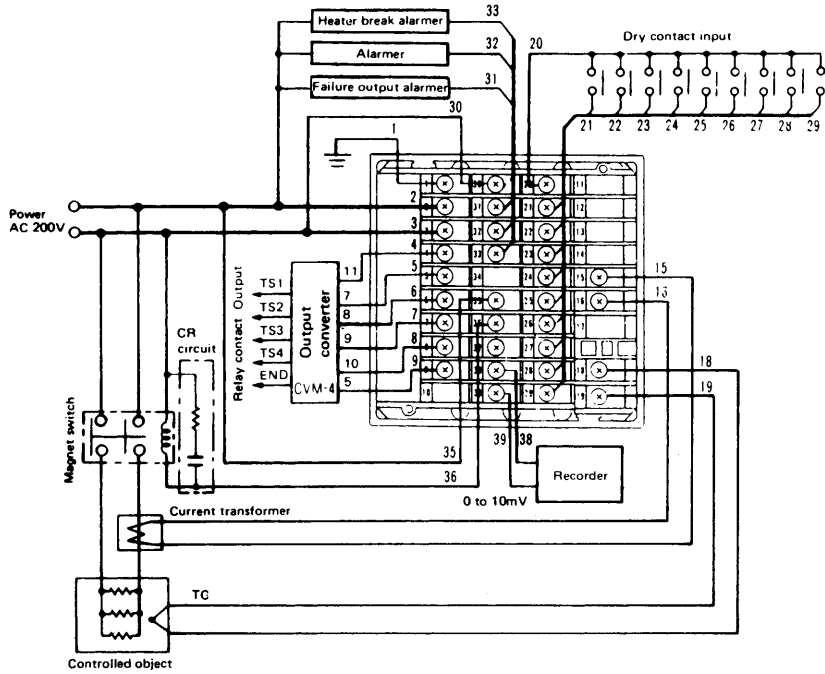


3. For thermocouple input, the temperature compensation element in the internal assembly is projected through a gap between terminal Nos. 17 and 18. Do not damage the above temperature compensation element when the internal assembly is removed from the case.

8.2 Wiring example

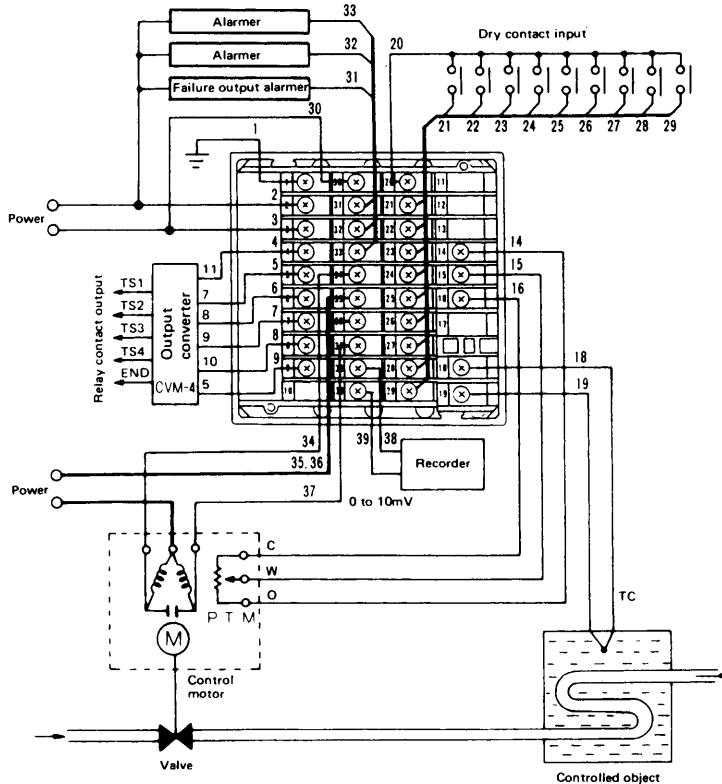
- Standard type

(REX-P200^H_F SC-M* □ -21-N)



- Position proportioning type

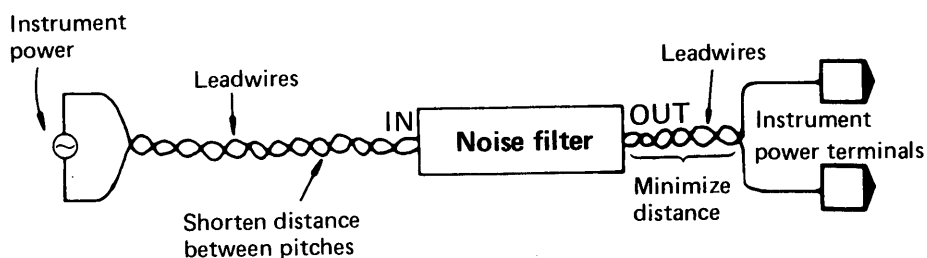
(REX-P200YDC-M* □ -N1-N)



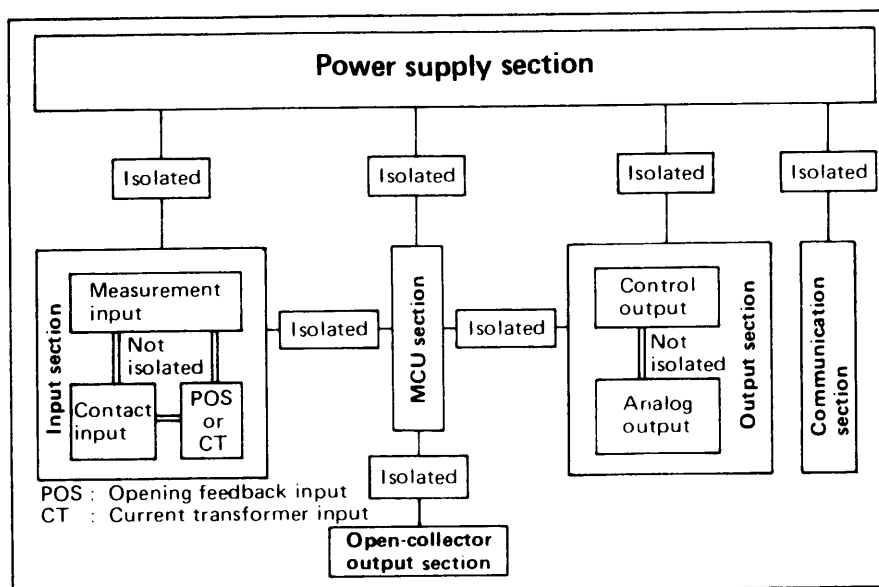
* For Models, see page 29.

8.3 Cautions for wiring

- (1) Conduct input signal wiring away from instrument, electric equipment power and load lines as such as possible to avoid noise induction.
- (2) Conduct instrument power wiring so as not to be influenced by noise from the electric equipment power.
If it is assumed that a noise generation source is located near the controller and the controller is influenced by noise, use a noise filter (select the filter by checking instrument power supply voltage.)
* Sufficient effect may not be obtained depending on the filter. Therefore, select the filter by referring to its frequency characteristic, etc.
 - ① For instrument power wiring, if it is assumed that noise exerts a bad influence upon the controller, shorten the distance between twisted power supply wire pitches.
(The shorter the distance between the pitches, the more effective for noise reduction.)
 - ② Install the noise filter on the panel which is always grounded and minimize the wiring distance between the noise filter output side and the controller power terminals.
Otherwise, the longer the distance between output side and instrument power terminals, the less effective for noise.
 - ③ Do not install fuses and/or switches on the filter output signal since this may lessen filter effect.



- (3) For wiring, use wires conforming to the domestic standard of each country.
(For instrument grounding, use wires with nominal sectional area of 1.25 to 2.0 mm², and securely ground the instrument at the minimum distance.)
- (4) About 1 to 2 sec. are required as the preparation time of contact output during power-ON. Use a delay relay when the output line, is used for an external interlock circuit.
- (5) The following diagram shows the REX-P200 circuit configuration. Input, MCU, output and communication circuits are mutually isolated, but the inside of the input and output circuits is not isolated. Therefore, pay attention to wiring.



REX-P200 circuit configuration

9. SPECIFICATION

(1) Input

Input impedance	Thermocouple input	Approx. 1MΩ
	Voltage input	250KΩ or more
	Current input	250Ω
Influence of external resistance	Approx. 0.35μV/Ω (For thermocouple input)	
Influence of input lead	Approx. 0.0075%/Ω of reading (For RTD input)	
Contact input	Input type	Dry contact input 500KΩ or more Open 10Ω or less Closed
	Contact current	4mA or less (Current flowing when each external contact terminal is shorted.)
	Contact open voltage	9VDC or less (Built-in power)
	Wiring distance	10m or less (Varies with installation environment (noise, etc.))
Opening feedback input	[Only for the position proportioning type] • Variable resistor (3 terminal): 135Ω ± 10% (For standard controller) * Other resistance values can be specified (100 to 2000Ω). • Action during input disconnection: Control output OFF for both control output open and close side • Range: Fully closed → Fully open (0.0 to 100.0%)	
Sampling cycle	0.5 sec.	

- *1 Accuracy in the range of 0 to 399°C (0 to 750°F):
Within ±6°C (12°F)
- *2 Accuracy in the range of 0 to 399°C (0 to 750°F):
Not guaranteed.
- *3 Conforming to JIS/IEC
- *4 Conforming to JIS

IEC(International Electrotechnical Commission) is equivalent to JIS, DIN and ANSI.

(2) Setting

No. of Program storage patterns	Up to 16 patterns (Up to 16 segments/Pattern)	
No. of Segments	Up to 256 segments (16 patterns X 16 segments)	
No. of connectable patterns	Up to 16 patterns	
Time signal	No. of program storage patterns	16 patterns
	No. of storage times	16 per pattern
No. of storage PID constants	8 memory (Selected for each segment)	
No. of storage alarm settings		

(3) Output

Control output	Relay contact output	250V, 3A (Resistive load) 1" c" contact Electrical life: 0.3 million times or more, (Rated load) * For the position proportioning type No. of output points: 2 250V, 3A (Resistive load) 1" a" contact Electrical life: 0.3 million times or more, (Rated load)
	Voltage pulse output	0/12V DC (Load resistance: 800Ω or more)
	Current output	0 to 20mA DC, 4 to 20mA DC (Load resistance: 600Ω or less)
	Continuous voltage output	0 to 5V DC, 0 to 10V DC, 1 to 5V DC (Load resistance: 1KΩ or more)
	Trigger output for triac driving	Zero-cross method For medium capacity Triac (100A or less) drive ① Load voltage used: 100V AC line 200V AC line ② Load used: Resistive load
	Pattern end output	Open collector output 24V DC, 50mA max. No. of output points: 1
Time signal output	Open collector output 24V DC, 50mA max. No. of output points: 4	
Alarm output	Relay contact output 250V AC, 1A (Resistive load) 1" a" contact Electrical life: 50,000 times or more (Rated load)	
Fail output	Relay contact output (Open when trouble occurs.) Load 250V AC, 0.1A or less (Resistive load) 1" a" contact	

Input scale range

	Type	Range	Resolution	Underscale	Overscale
Thermocouple	K	0 to 1372°C 0 to 2502°F	1°C 1°F	Less than -30°C Less than -30°F	1373°C or more 2503°F or more
		-100.0 to +400.0°C -148.0 to +752.0°F	0.1°C 0.1°F	Less than -100.0°C Less than -148.0°F	400.1°C or more 752.1°F or more
	J	0 to 1200°C 0 to 2192°F	1°C 1°F	Less than -30°C Less than -30°F	1201°C or more 2193°F or more
		-100.0 to +400.0°C -148.0 to +752.0°F	0.1°C 0.1°F	Less than -100.0°C Less than -148.0°F	400.1°C or more 752.1°F or more
	R *1	0 to 1769°C 0 to 3216°F	1°C 1°F	Less than -30°C Less than -30°F	1770°C or more 3217°C or more
	S *1	0 to 1769°C 0 to 3216°F	1°C 1°F	Less than -30°C Less than -30°F	1770°C or more 3217°F or more
	B *2	0 to 1820°C 0 to 3308°F	1°C 1°F	Less than -30°C Less than -30°F	1821°C or more 3309°F or more
	E	0 to 1000°C 0 to 1832°F	1°C 1°F	Less than -30°C Less than -30°F	1001°C or more 1833°F or more
		-100.0 to +300.0°C -148.0 to +572.0°F	0.1°C 0.1°F	Less than -100.0°C Less than -148.0°F	300.1°C or more 572.1°F or more
	T	0 to 400°C 0 to 752°F	1°C 1°F	Less than -30°C Less than -30°F	401°C or more 753°F or more
		-199.9 to +400.0°C -199.9 to +752.0°F	0.1°C 0.1°F	Less than -199.9°C Less than -199.9°F	400.1°C or more 752.1°F or more
	N(NBS)	0 to 1330°C 0 to 2372°F	1°C 1°F	Less than -30°C Less than -30°F	1301°C or more 2373°F or more
		0 to 1300°C 0 to 2372°F	1°C 1°F	Less than -30°C Less than -30°F	1301°C or more 2373°F or more
	L(DIN)	0 to 900°C 0 to 1652°F	1°C 1°F	Less than -30°C Less than -30°F	901°C or more 1653°F or more
W5Re/W26Re (ASTM) 0 to 2320°C 0 to 4200°F		1°C 1°F	Less than -30°C Less than -30°F	2321°C or more 4201°F or more	
RTD	Pt100(JIS/IEC) JPt100(JIS)	-199.9 to +649.0°C -199.9 to +999.9°F	0.1°C 0.1°F	Less than -199.9°C Less than -199.9°F	649.1°C or more 1000.0°F or more
	Pt100 *3 JPt100 *4	-199.9 to +999.9°F	0.1°F	Less than -199.9°F	1000.0°F or more
Voltage/current	DC 0 to 10mV DC 0 to 100mV	Can be programmed in the range of -1999 to +9999	1	When input becomes below (Low limit of level setting range) (3% of span)	When input exceeds (High limit of level setting range) + (3% of span)
	DC 0 to 1V DC 0 to 5V				
	DC 0 to 10V DC 1 to 5V				
	DC 0 to 20mA DC 4 to 20mA				

(4) Performance

Setting accuracy	Level	<p>① Thermocouple input $\pm(0.3\%$ of set-value + 1 digit) or $\pm 2^{\circ}\text{C}(\pm 4^{\circ}\text{F})$ (Within value whichever the greater) * For thermocouple input of R, S, and B • R,S In the range of 0 to 399°C (0 to 750°F): Within $\pm 6^{\circ}\text{C}(\pm 12^{\circ}\text{F})$ • B In the range of 0 to 399°C (0 to 750°F): Not guaranteed</p> <p>② RTD input $\pm(0.3\%$ of set-value + 1 digit) or $\pm 0.8^{\circ}\text{C}[\pm 1.6^{\circ}\text{F}]$ (Within value whichever the greater)</p> <p>③ Voltage/current input Within $\pm(0.2\%$ of setting limiter span + 1 digit) * Same for set-value (SV) in fixed set-point control and wait zone</p>
	Segment time	<p>$\pm(0.01\%$ of set-value) or 50m sec. (Within value whichever the greater) (Excluding time required for processing during segment change) * Same for time signal and pattern end output times</p>
	proportional band	<p>① Thermocouple/RTD input $\pm 0.5\%$ of setting limit span or $\pm 0.5^{\circ}\text{C}[\pm 1^{\circ}\text{F}]$ (Within value whichever the greater.) ② Voltage/current input Within $\pm 0.5\%$ of setting limiter span * Same for hysteresis band of ON-OFF action, neutral zone, and hysteresis band of open/close output</p>
	other settings	Within $\pm 0.5\%$ of setting range
Input display accuracy	Thermocouple	<p>$\pm(0.3\%$ of displayed value + 1 digit) or $\pm 2^{\circ}\text{C}[\pm 4^{\circ}\text{F}]$ (Within value whichever the greater) * For thermocouple input of R, S, B • R,S In the range of 0 to 399°C (0 to 750°F): Within $\pm 6^{\circ}\text{C}(\pm 12^{\circ}\text{F})$ • B In the range of 0 to 399°C (0 to 750°F): Not guaranteed</p>
	RTD	<p>$\pm(0.3\%$ of displayed value + 1 digit) or $\pm 0.8^{\circ}\text{C}[\pm 1.6^{\circ}\text{F}]$ (Within value whichever the greater)</p>
	Voltage/current	Within $\pm(0.2\%$ of setting limit span + 1 digit)
Insulation resistance	<p>Between measuring and grounding terminals; 20MΩ or more at 500V DC Between power and grounding terminals; 20MΩ or more at 500V DC</p>	
Dielectric strength	<p>Between measuring and grounding terminals; For 1 min. at 1000V AC Between power and grounding terminals; For 1 min. at 1500V ac</p>	

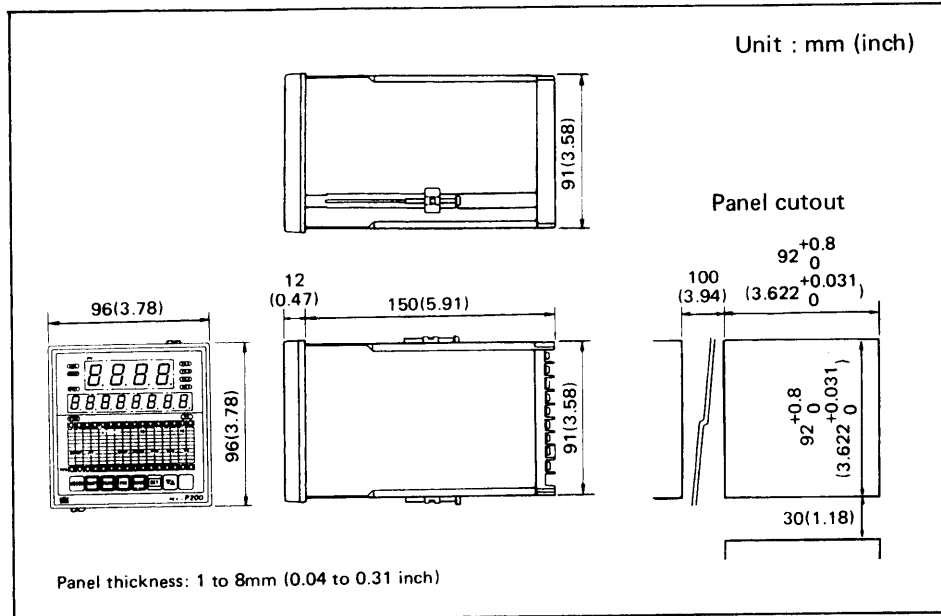
(5) Option

Heater break alarm	Input	Current transformer input		
	Setting accuracy	Within $\pm 5\%$ of set-value or $\pm 2\text{A}$ (Whichever the greater)		
Analog output	Output	Relay contact output: 250V AC, 1A (Resistive load) 1 "a" contact Electrical life: 50,000 or more times (Rated load)		
	No. of output points	1 max.		
Analog output	Output type	Continuous voltage/current output		
	Resolution	12 bits or more		
	Output signal	0 to 10mV 0 to 100mV	0 to 1V 0 to 5V 0 to 10V 1 to 5V	0 to 20mA 4 to 20mA
	Output impedance	Approx. 10Ω	0.1Ω or less	5MΩ or more
	Allowable load resistance	20KΩ or more	1KΩ or more	600Ω or less

(6) Other specifications

Power supply voltage	90 to 264V AC (50/60Hz common use) (Including power supply voltage variation) (Rating: 100 to 240V AC)
Power consumption	15VA or less (However, 9VA or less at 100V)
Setting condition	Do not install the controller at a location where the operator needs a safeguard and/or corrosive gases exist.
Allowable ambient temperature	0 to 50°C [32 to 122°F]
Allowable humidity	45 to 85% RH
Weight	750g (1.65lb)

10. DIMENSIONS



* Dimensions in inches are shown for reference.

11. MODEL No.

The REX-P200 Model No. is shown inside the controller

Model	Description	Spec. code			
REX-P200		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type of control operation	PID action PID action with auto-tuning Position proportioning PID action	H F Y			
Type of alarm operation	Not supplied With 1 alarm With 2 alarms	N S D			
Type of input	Thermocouple input RTD input Voltage/current input *1 *1 For the contents in <input type="checkbox"/> , see the signal code table.		C R <input type="checkbox"/>		
Type of control output	Relay contact output Voltage pulse output Current output Continuous voltage output Trigger output for triac driving			M V R E G	
Case color	Ivory Black			A B	
Analog input	Not supplied Heater break alarm function			N 2	
Analog output	Not supplied Signal level selection (See the signal code table)				N <input type="checkbox"/>
Communication function	Not supplied RS-232C RS-422A				N 1 2

<Signal code table>

1 : 0 to 10mV	6 : 1 to 5V
2 : 0 to 100mV	7 : 0 to 20mA
3 : 0 to 1V	8 : 4 to 20mA
4 : 0 to 5V	9 : Others
5 : 0 to 10V	

12. DATA ENTRY FORM

- Form 1 [prepare the forms corresponding to the number of patterns (16 patterns or less)] Copy this form for its use.

Pattern No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Segment No.																
Level																
Time signal	TS1															
	TS2															
	TS3															
	TS4															
Level																
Segment time																
PID memory No.																
Alarm memory No.																

Time signal No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Output No.	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Start segment																
End segment																
Start time																
End time																

Program execution time	
Wait zone	
Link pattern No.	

- Form 2 [prepare only one of this form]

PID memory No. setting group

Memory No.	1	2	3	4	5	6	7	8
Proportional band <i>P (%)</i>								
Integral time <i>I (Sec.)</i>								
Derivative time <i>d (Sec.)</i>								
Neutral zone <i>db (%)</i>								
* ON-OFF action hysteresis band <i>oH</i>								
Output limit (high-limit) <i>nY L H (%)</i>								
Output limit (low-limit) <i>nY L L (%)</i>								

* "Open/close output hysteresis band *oH*" is shown for the position proportioning type.

Alarm memory No. setting group

(Alarm 1: Alarm 2:)

Memory No.	1	2	3	4	5	6	7	8
Alarm 1 <i>RL 1</i>								
Alarm 2 <i>RL 2</i>								
Heater break alarm <i>HbA</i>								

Common setting group

PV bias <i>Pb</i>	
Alarm 1 hysteresis band <i>RH 1</i>	
Alarm 2 hysteresis band <i>RH 2</i>	
Proportional cycle <i>EYCL (Sec.)</i>	
Digital filter <i>dF (Sec.)</i>	
Pattern end output time <i>ET</i>	

Fixed set-point control setting group

Set-value (SV) <i>SV</i>	
PID memory No. <i>PI d</i>	
Alarm memory No. <i>RL n 5</i>	

Manual control setting group

PID memory No. <i>PI d</i>	
Alarm memory No. <i>RL n 5</i>	

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