Digital Program Controller (For 8 points time signal)

REX-P210 SERIES INSTRUCTION MANUAL

IM200P08-E2

Notes:

Make sure that this Instruction Manual is always readily available to personnel who use the REX-P210 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.

Contents

1. Model No.

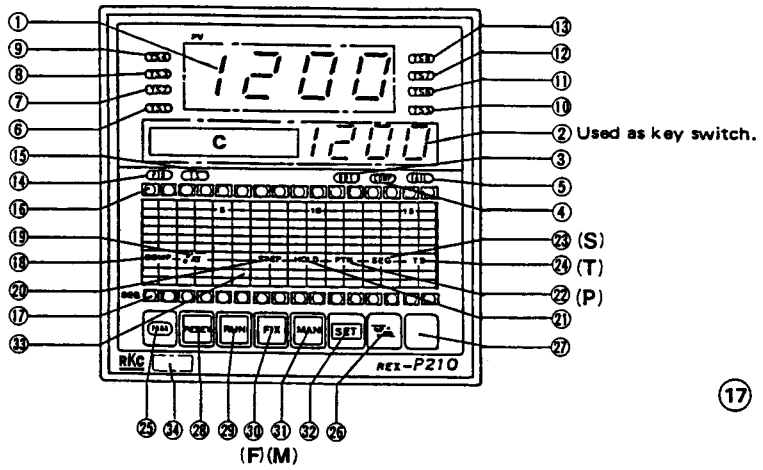
The REX-P210 model No. is shown inside the controller.

Model	Description	Spec. code
REX-P210		□ □ □-□*□-□ □-□
Type of control operation	PID operation PID operation with auto-tuning	H F
Type of alarm operation	With no alarm 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 □, refer to the signal code table.	C R □
Type of control output	Relay contact output Voltage pulse output Current output Continuous voltage output	M V R E
Case color	Black	B
Analog input	Non Heater break alarm function	N 2
Analog output	Non Signal level selection (Refer to the signal code table)	N □
Communication function	Non 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	

2. Functional Description



(For P, S, T, F, M and C in the above Fig., refer to the status transition diagram on the next page.)

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 (OUT) indication lamp**
Lights up when control output is ON.

④ **Computer mode (COMP) indication lamp**
Lights up when in the computer mode (in communication with the host computer).

⑤ **Fail (FAIL) indication lamp**
Lights up if an error occurs in this unit.

⑥ **Time signal 1 (TS1) output indication lamp**
Lights up when time signal No. 1 output is ON. It flashes when time signal No. 1 setting is being checked.

⑦ **Time signal 2 (TS2) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑧ **Time signal 3 (TS3) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑨ **Time signal 4 (TS4) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑩ **Time signal 5 (TS5) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑪ **Time signal 6 (TS6) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑫ **Time signal 7 (TS7) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑬ **Time signal 8 (TS8) output indication lamp**
Functions in the same way as the time signal 1 (TS1) output indication lamp.

⑭ **Pattern (PTN) mode indication lamp**
When this lamp is lit, the 16 lamps of ⑯ act as pattern No. indication lamps.

⑮ **Time signal (TS) mode indication lamp**
When this lamp is lit, the 16 lamps of ⑯ act as time signal No. indication lamps.

⑯ i) **Pattern No. indication lamps (16)**
When the pattern (PTN) mode indication lamp is lit, the lamp of the pattern number being control or setting lights up.

ii) **Time signal No. indication lamp (16)**
When the time signal (TS) mode indication lamp is lit, the lamp of a segment number whose time signal output is ON, lights up.

⑰ **Segment (SEG) display lamps**
The segment No. in program progress or that during setting lights up.

Operation keys

⑱ **Computer mode (COMP) key**
When this key is pressed together with a hidden key, communication with the host computer is available.

⑲ **Auto-tuning (AT) key**
Pressing this key together with the hidden key allows the unit to use auto tuning.

⑳ **Step (STEP) key**
This key is used to move the program forward by one segment.

㉑ **Hold (HOLD) key**
This key is used to stop the program from progressing.

㉒ **Pattern (PTN) key**
Displays a pattern setting group.

㉓ **Segment (SEG) key**
Displays a segment setting group.

㉔ **Time signal (TS) key**
Displays a time signal setting group.

㉕ **Parameter select key**
Displays parameters such as setting group, etc.

㉖ **Set value increment/decrement key**
This key is used to change set-value. Pressing only this key increments set-value, while pressing it together with the hidden key decrements set-value.

㉗ **Hidden key**
Pressing this key together with another key makes that key's function available.

Operation keep + Indication lamps

㉘ **Reset (RESET) key and lamp**
Pressing this key together with the hidden key selects the reset mode and lights up its lamp.

㉙ **Run (RUN) key and lamp**
Pressing this key together with the hidden key selects the program control mode and lights up its lamp.

㉚ **Fix (FIX) key and lamp**
Pressing only this key displays fixed set-point control setting group data, while pressing it together with the hidden key enables the unit to function in the fixed set-point control mode. At the same time, its lamp lights up.

㉛ **Manual (MAN) key and lamp**
Pressing only this key displays manual control setting group data, while pressing it together with the hidden key enables the unit to select the manual control mode. At the same time, its lamp lights up.

㉜ **Set (SET) key and lamp**
Pressing this key together with the hidden key selects the setting mode and lights up its lamp.

Others

㉝ **Pattern card**
Enter the pattern stored in the unit (for 1 pattern) into this card.

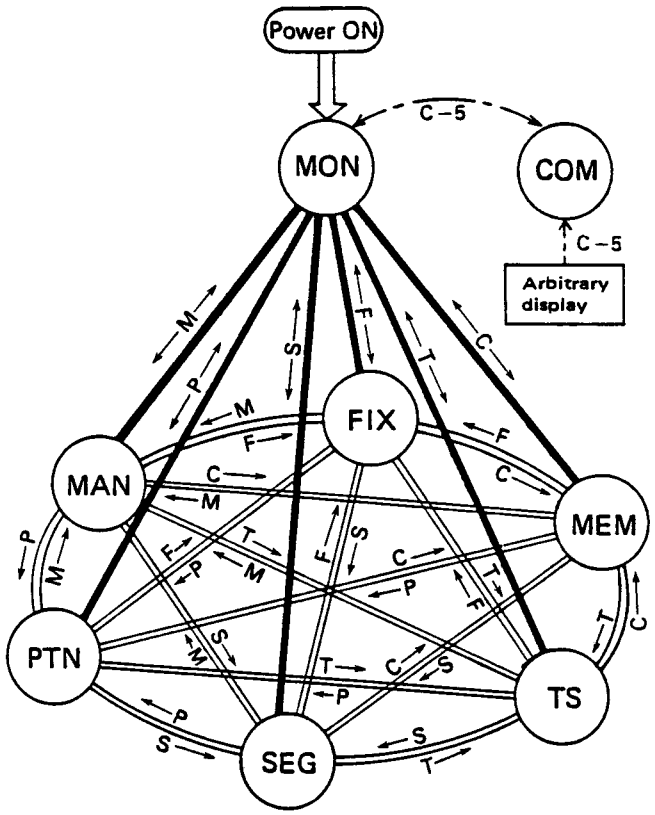
㉞ **Input range display**
Input type or range is indicated.

3. Setting

3.1 Fundamental knowledge required for setting

This instrument is designed so that setting items are grouped for their settings, which is called "Setting groups". Each setting group can be easily shifted only by pressing the corresponding dedicated key.
The status transition diagram indicating the relationship between each setting group is shown in the following.

Setting group status transition diagram



For details of each setting group, refer to pages 4 to 7

(MON) Monitoring display of each operation mode (reset, program control, fixed set-point control or manual control)
(For monitoring display, refer to page 10.)

(PTN) Pattern setting group
(SEG) Segment setting group
(TS) Time signal setting group
→ Program control setting group

(FIX) Fixed set-point control setting group

(MAN) Manual control setting group.

(MEM) • PID memory No. setting group
• Alarm memory No. setting group
→ Memory setting group

(COM) Common setting group

Key operation

- P ..... Press the pattern (PTN) key.
- S ..... Press the segment (SEG) key.
- T ..... Press the time signal (TS) key.
- F ..... Press the fix (FIX) key.
- M ..... Press the manual (MAN) key.
- C ..... Press the character display section (any one digit in the upper 4 digits) on the set-value (SV)/character display unit.
- C-5 ..... The same operation as C is repeated for more than 5sec. [Press the character display section (any one digit in the upper 4 digits) on the set-value(SV)/character display unit].

* Always operate keys with fingers.

• (MON) : **Monitoring display**

Monitoring display varies with each operation mode of reset, program control, fixed set-point control and manual control.

• (PTN) (SEG) (TS) : **Program control setting group**

This program control setting group is for setting each set-value necessary for program control.
This group consists of the following 3 subgroups.

- (PTN) **Pattern setting group** : Sets pattern No.
- (SEG) **Segment setting group** : Forms pattern.
- (TS) **Time signal setting group** : Sets time signal

• (FIX) : **Fixed set-point control setting group**

The fixed set-point control setting group is for setting each set-value necessary for fixed set-point control.

• (MAN) : **Manual control setting group**

The manual control setting group is for setting each set-value necessary for manual control.

• (MEM) : **Memory setting group**

The memory setting group is for collectively storing data items such as PID constants, alarms, etc. and consists of the following 2 subgroups.

- ① **PID memory No. setting group** : Stores 8 types of data such as PID constants, etc.
- ② **Alarm memory No. setting group** : Stores 8 types of data such as alarm constants, etc.

In each setting group of segment, fixed set-point control and manual control, no setting of PID constants and alarm data is required. Each memory No. of ① and ② above is set.

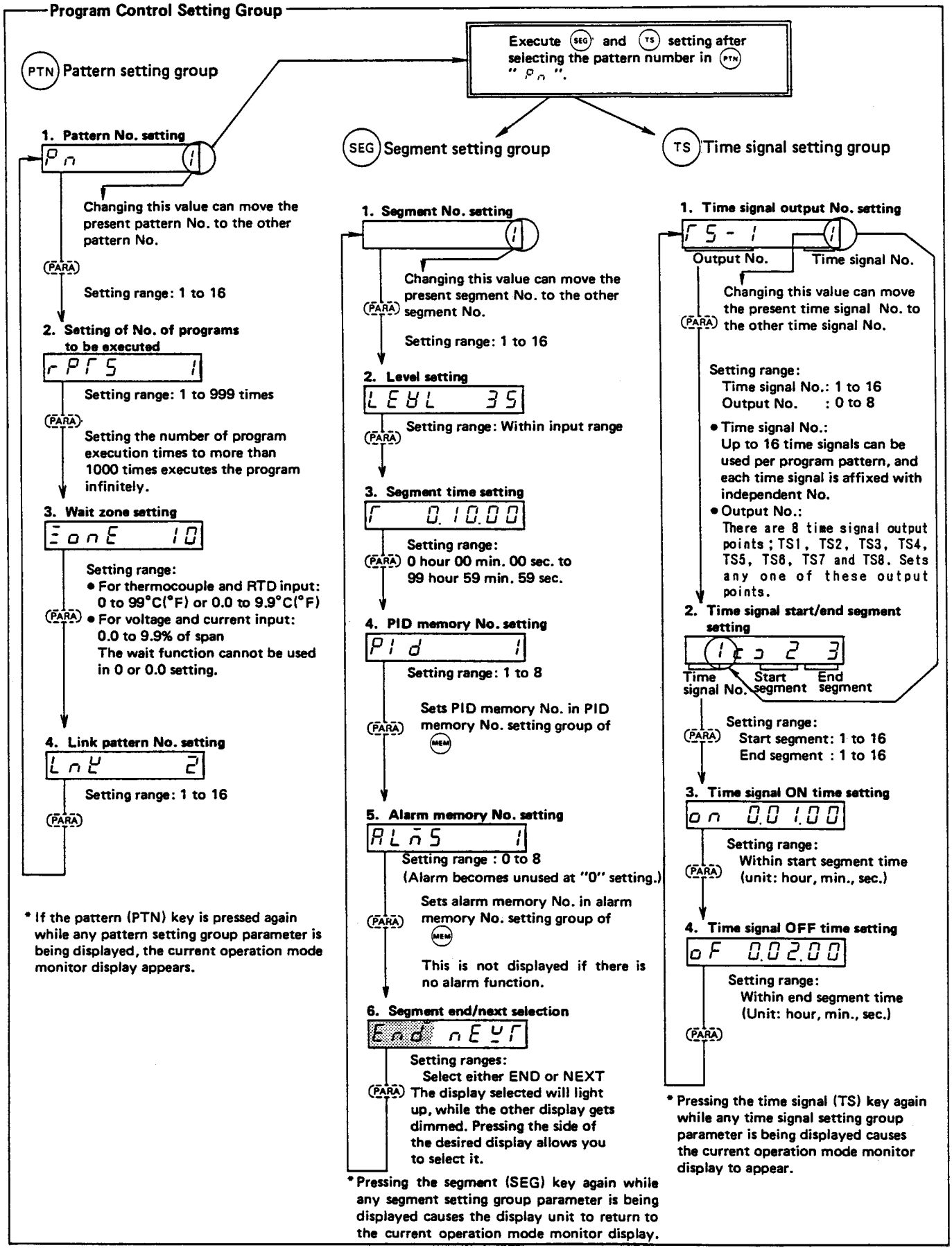
• (COM) : **Common setting group**

The common setting group is for collectively setting and storing data relating to the entire instrument.

For details of each setting group, refer to pages 4 to 7.

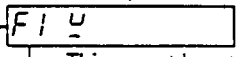
3.2 Description of setting group

For actual data setting, refer to "3.3 Fundamentals of data setting" (page 8).



(FIX) Fixed set-point control setting group

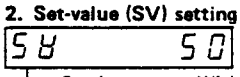
1. Fixed set-point control setting symbol



This cannot be set.

(PARA)

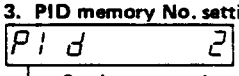
2. Set-value (SV) setting



Setting range: Within input range

(PARA)

3. PID memory No. setting

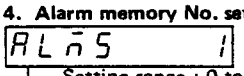


Setting range: 1 to 8

(PARA)

Sets PID memory No. in PID memory No. setting group of (MEM).

4. Alarm memory No. setting



Setting range : 0 to 8
(Alarm becomes unused at "0" setting.)

(PARA)

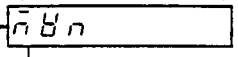
Sets alarm memory No. in alarm memory No. setting group of (MEM).

This is not displayed if there is no alarm function.

* Pressing only the fix(FIX) key again while any of the fixed set-point control setting group parameters is displayed causes the current operation mode monitor display to appear.

(MAN) Manual control setting group

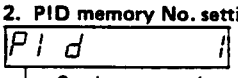
1. Manual control setting symbol



This cannot be set.

(PARA)

2. PID memory No. setting



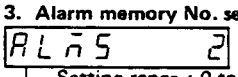
Setting range: 1 to 8

(PARA)

Sets PID memory No. in PID memory No. setting group of (MEM).

However, only upper and lower output limiter settings are valid.

3. Alarm memory No. setting



Setting range : 0 to 8
(Alarm becomes unused at "0" setting.)

(PARA)

Sets alarm memory No. in alarm memory No. setting group of (MEM).

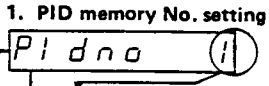
This is not displayed if there is no alarm function.

* Pressing only the manual (MAN) key again while any of the manual control setting group parameters is displayed causes the current operation mode monitor display to appear.

MEM Memory setting group

• PID memory No. setting group

1. PID memory No. setting

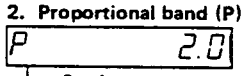


Changing this value can move the present PID memory No. to the other PID memory No.

PARA

Setting range: 1 to 8

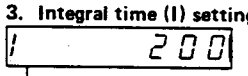
2. Proportional band (P) setting



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

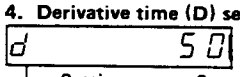
3. Integral time (I) setting



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

PARA

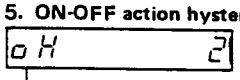
4. Derivative time (D) setting



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

PARA

5. ON-OFF action hysteresis band setting

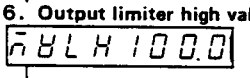


Setting range:
- 0 to 100°C(°F) or 0.0 to 100.0°C(°F) for standard thermocouple/RTD input
- 0.0 to 100.0% of span for standard voltage/current input

PARA

This setting becomes invalid if ON-OFF action control (proportional band is other than "0.0") is not performed.

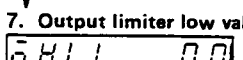
6. Output limiter high value setting



Setting range: −5.0 to +105.0%
(Provided that output limiter high limit ≧ Output limiter low limit)

PARA

7. Output limiter low value setting



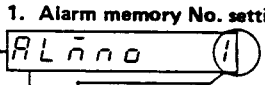
Setting range: −5.0 to +105.0%
(Provided that output limiter high limit ≧ Output limiter low limit)

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 show the first parameter of the alarm memory No. setting group.

• Alarm memory No. setting group
(This is not displayed if there is no alarm function.)

1. Alarm memory No. setting

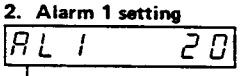


Changing this value can move the present alarm memory No. to the other alarm memory No.

PARA

Setting range: 1 to 8

2. Alarm 1 setting

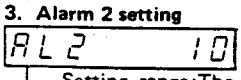


Setting range:
1. Deviation alarm
   - − Span to + span °C(°F) for thermocouple/RTD input
   - − Span to + span for voltage/current input (Provided that it is in the −1999 to +9999 range.)
2. Process alarm
   - (Low limit set-value −Span) to (High limit set-value + Span) °C (°F) for thermocouple/RTD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

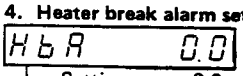


Setting range: The same as for the alarm 1 setting range

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



Setting range: 0.0 to 100.0 (A)

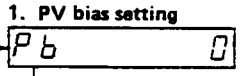
This is not displayed in the case of two alarm outputs.

PARA

* 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.

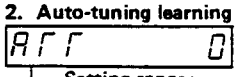
(COM) Common setting group

1. PV bias setting



Setting range: −span to +span
(PARA) (Provided that it is in the −1999 to +9999 range.)
* The decimal point position and units are the same as the input range.

2. Auto-tuning learning

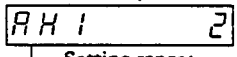


Setting range:
0 ··· Auto-tuning learning end or stop
(PARA) 1 ··· Auto-tuning learning start

Prior to starting auto-tuning learning, turn the operation mode to RESET mode, then set the pattern No. that goes starting auto-tuning learning.

This is not displayed if the auto-tuning function is not available.

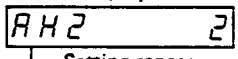
3. Alarm 1 hysteresis band setting



Setting range:
(PARA)
- 0 to 100°C(°F) or 0.0 to 100.0°C(°F) for thermocouple/RTD input
- 0.0 to 100.0% of span for voltage/current input

This is not displayed if the alarm function is not available.

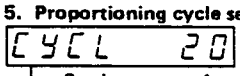
4. Alarm 2 hysteresis band setting



Setting range:
(PARA)
- 0 to 100°C(°F) or 0.0 to 100.0°C(°F) for thermocouple/RTD input
- 0.0 to 100.0% of span for voltage/current input

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

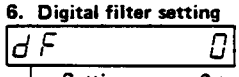
5. Proportioning cycle setting



Setting range: 1 to 100 seconds
(PARA) ("0" cannot be set.)

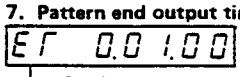
This is not displayed for current output or continuous voltage output.

6. Digital filter setting



Setting range: 0 to 100 sec.
(PARA)

7. Pattern end output time setting



Setting range: From 0 hours 00 mins. 00 secs. to 99 hours 59 mins. 59 secs.
(PARA) Setting "0 hours 00 mins. 00 secs." does not turn pattern end output OFF.

* Pressing any one of the upper 4 digits on the set-value(SV) /character display unit (the upper 2 digits for pattern end output time setting) for more than 5 seconds again while any of the Common setting group parameter is displayed causes the current operation mode monitor display to appear.

Cautions

1. 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.
2. Each parameter value is one example.
3. If key operation is not performed for more than 30sec., the present display returns to the monitoring display.
4. 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. (Refer to status transition diagram.)
5. Always operate keys with fingers.

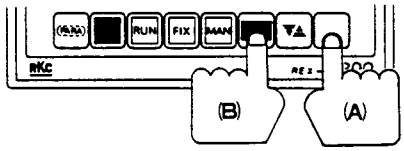
* For 3 and 4, the case where any parameter in "common setting group" is displayed is excluded.

3.3 Fundamentals of data setting

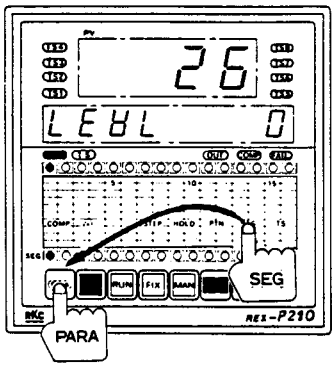
The following shows examples of basic data setting. Because parameter data is set and changed in accordance with this procedure, first carry out operations as shown in the examples to master data-setting.

Also, the measured-value (PV) display unit always displays a measured-value regardless of the setting.

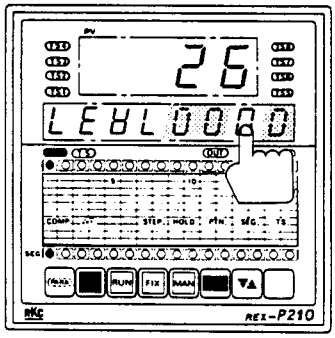
As an example, change the level set-value in the segment setting group from 0°C to 35°C.

① 

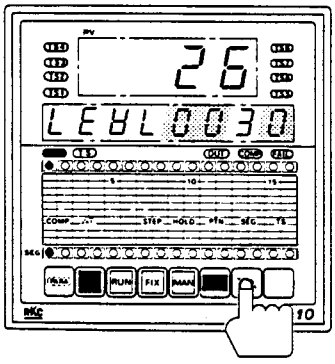
In order to set the instrument to the setting enable state first, press the set key (B) while pressing the hidden key (A) to set the instrument to the setting mode. At this time, the lamp in the set key lights up to indicate the setting enable state.

② 

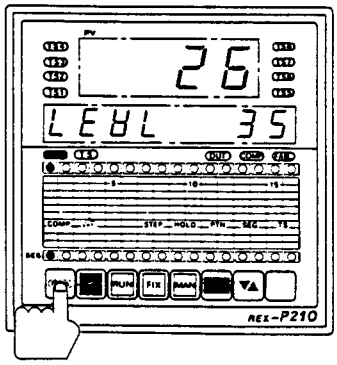
Next, in order to display the level set-value parameter, press the segment (SEG) key to call up the segment setting group. Then, press the (PARA) key to display the lavel set-value which is the 2nd parameter in the segment setting group. The level set-value in this case is set to 0°C. (Figure at left)

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. Therefore, pressing any digit section desired to be changed lights up brightly that digits and other digit section 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 ▼▲ key. Pressing only the ▼▲ key increments figures, but pressing the ▼▲ key while pressing the hidden key decrements figures.
In this example, set "3" by pressing the ▼▲ key. Next, press the units digit section, then set "5" by pressing the ▼▲ key.

⑤ 

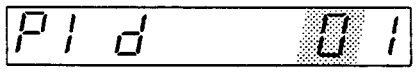
After finishing the setting. Press the (PARA) key. All of the set-value digits light brightly to indicate that the setting has ended.

⑥ Thus, the setting has been finished. If key operation is not performed for more than 30sec., 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 goes off to enable exit from the setting mode.

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

1. 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 setting data lock, refer to "5 Main functions" on page 12.)
2. This controller uses each parameter in any digit at the time it was changed.
3. 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 ▼▲ key to change "9" to "0 ', thereby obtaining 200°C.
   This procedure also applies to shift the digit down.
4. To set a minus (−):
   (Example)
   To change 200 to −100, shift the digit lit brightly to the hundreds digit then press the ▼▲ key while also pressing the hidden key to decrement the figures in due order of 1 → 0 → −1.
5. 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 moved.

   (Example 2) For setting time signal output No.

   Since the lower 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.

6. When the set-value(SV)/character display unit shows other than the current operation mode monitor display, if key operation is not performed for more than 30 sec., the present display returns to the monitoring display.
   However, this does not apply when the display unit displays common setting group parameters.
   (For each operation mode monitor display, refer to Page 10.)
7. Always operate keys with fingers.

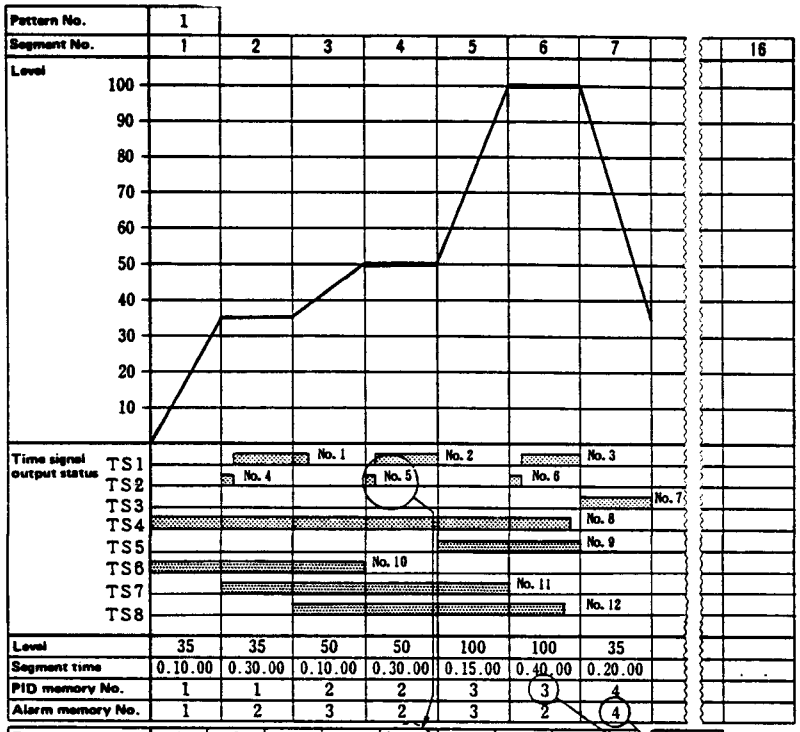
* The section shown by ▒▒ on the set-value(SV)/character display unit in the Figure indicate that it lights up dimly.

3.4 Setting data 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-P210FDC-M*B-NN-N (See item 1 Model No.). The formats 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.



Time signal No.	1	2	3	4	5	6	7	8		16
Output No.	TS1	TS1	TS1	TS2	TS2	TS2	TS3	TS4		TS
Start segment	2	4	6	2	4	6	7	1		
End segment	3	5	7	2	4	6	7	6		
Start time	0.01.00	0.01.00	0.01.00	0.00.00	0.00.00	0.00.00	0.00.00	0.00.00		
End time	0.02.00	0.00.00	0.00.00	0.01.00	0.01.00	0.01.00	0.20.00	0.35.00		

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 12 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	——	——	——	——
ON-OFF action hysteresis band	oH	——	——	——	——	——	——	——	——
Output limiter high limit	oLH (%)	100.0	100.0	100.0	50.0	——	——	——	——
Output limiter low limit	oLL (%)	0.0	0.0	0.0	0.0	——	——	——	——

① 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.
② Although this example shows PID memory setting up to No. 4, it can actually be set up to No. 8.

(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	AL1	20	10	20	50	——	——	——	——
Alarm 2	AL2	10	10	30	25	——	——	——	——
Heater break alarm	HbA								

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	Pb	0
Alarm 1 hysteresis band	AH1	2
Alarm 2 hysteresis band	AH2	2
Proportioning cycle	CYCL (Sec.)	20
Digital filter	dF (Sec.)	0
Pattern end output time	ET	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)	SV	50
PID memory No.	PId	2
Alarm memory No.	ALNS	1

(5) Manual control setting group

To be filled in when manual control is executed.

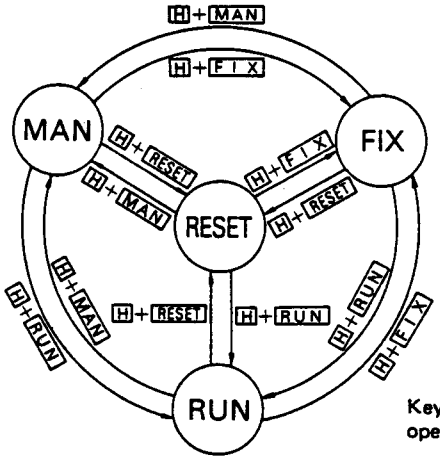
PID memory No.	PId	1
Alarm memory No.	ALNS	2

Even though the PID memory No. is set, the constants actually used are the output limiter's high and low limits.

4. Operation

4.1 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, refer to pages 3 to 7.)



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. (Refer to the following.)

RUN Program control mode

1. Set-value (SV) for which program is progressing.
   35
   (PARA)
2. Segment remaining time
   0.02.36
   (Hour, min., sec.)
   (PARA)
3. No. of programs to be executed
   1
   No. of times
   (PARA)
4. Current transformer input value
   8.0
   (0.0 to 100.0A)
   (PARA) * This is displayed only if heater break alarm function is provided.
5. Manipulated output value
   27.0
   (PARA) (%)

FIX Fixed set-point control mode

1. Set-value (SV) for fixed set-point control
   50
   (PARA)
2. Current transformer input value
   8.0
   (0.0 to 100.0A)
   (PARA) * This is displayed only if heater break alarm function is provided.
3. Manipulated output value
   80.0
   (%)
   (PARA)

RESET Reset mode

(Nothing is displayed.)

MAN Manual control mode

1. Manipulated output value
   50.0
   Pressing only the ▼▲ key increments figures, but pressing the ▼▲ key while pressing the hidden key decrements figures.
   (Setting range: (%)
   Output limiter high limit to output limiter low limit)
   (PARA)
2. Current transformer input value
   8.0
   (0.0 to 100.0A)
   (PARA) * This is displayed only if heater break alarm function is provided.

Caution

1. 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.
2. Each parameter value is one example.
3. The operation mode cannot be changed when common setting group parameter is displayed.

4.2 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.

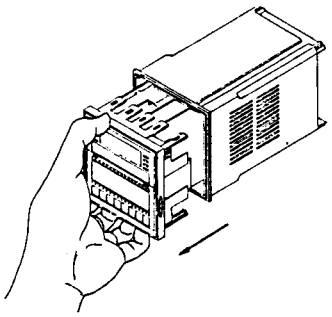


Fig. 1

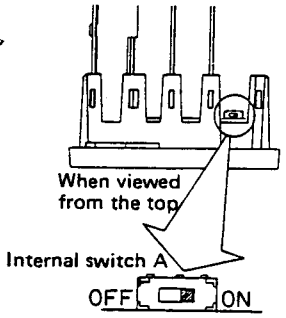


Fig. 2

(b) Parameter descriptions

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

Measured-value (PV) display unit	Name	Description	Initial value at shipment
bPS	Communication rate setting	No display is made since this controller is not provided with the communication function. For these settings, refer to "Communication Instruction Manual" separately prepared.	4800
bIT	Data forms setting		o72
Add	Device address setting		0
InT	Interval time setting		120
* Pd	Start mode selection	This parameter sets the initial instrument status at recovery from power failure or power ON. Set-value 0: Cold start in the reset mode (All outputs are OFF.) Set-value 1: Cold start in the manual mode (Output is the output limiter low limit value.) Set-value 2: Hot start (Status before power is turned OFF.) For an instantaneous power failure of less than 4 seconds, the instrument performs a hot start regardless of the setting.	0
* SuST	Set-value (SV) selection at start	This sets the level at which the set-value (SV) starts when program control is executed. Set-value 0: Starts set-value (SV) from level 0. Set-value 1: Starts set-value (SV) from measured-value (PV).	0
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 "3.3 Fundamentals of data setting" (page 8). Settings other than "0" or "9999" cannot be achieved.	0

* Setting can be done only with the ▽△ key.

(3) How to use pattern cards

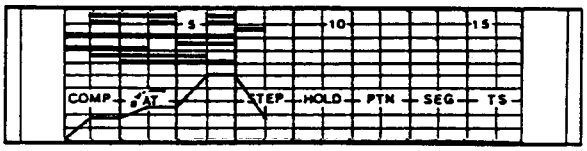
This instrument is capable of programming 16 control patterns in program control. Therefore, the control processes are on pattern cards which are mounted on the instrument's front panel to allow you to check the control pattern at a glance. (Ten pattern cards (for 20 patterns) are attached.)

(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 "3.4 Setting data example". Using a time signal is also a help.

(Example)

Example of entering data using data from Item "3.4 Setting data 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 8 time signal outputs, from the top is regarded as TS1, TS2, TS3, TS4, TS5, TS6, TS7 and TS8 respectively.

(b) Pattern card insertion and removal

① Insertion

Inset 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 slide it to the other side and then pulling it forward.

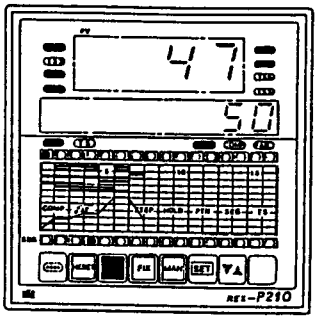
* If another instrument is installed right beside this instrument, it may be difficult to insert a pattern card in the above way. In this case, pull the internal chassis slightly forward as shown in Fig. 1 to arrows you to insert the card.

(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.)

5. Main functions

(1) Self-diagnostic function

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

(a) Error codes

① Error 1 (Err 1) ··· CPU error
[Cause] : Influence by noise, etc.
[Remedy] : Turn the power OFF once, then turn it ON again. However, if the error still occurs contact our service department.

② Error 2 (Err 2) ··· RAM error
[Cause] : Backup battery is dead and/or RAM is faulty.
[Remedy] : Contact our service department.

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 service department.

④ Error 4 (Err 4) ··· A/D conversion error
[Cause] : A/D converter trouble, etc.
[Remedy] : Contact our service department.

(b) Output status during trouble occurrence

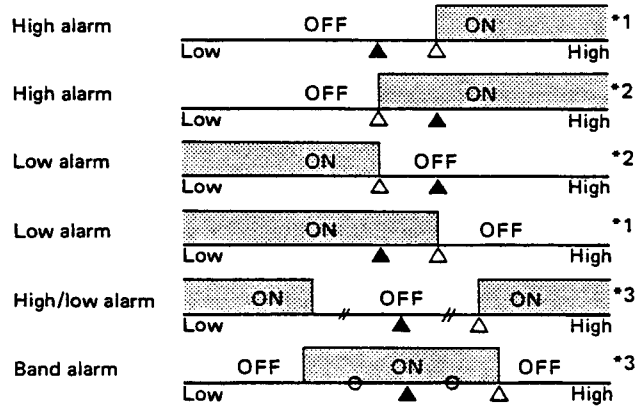
- Control output (relay contact, voltage pulse) and alarm output . . . . . .OFF
- Control output (current, continuous voltage) and analog output . . . . . .–5.0% or less
- FAIL output (Contacts keep being closed during error code display.) . . . . . .Contact open

(2) Alarm (ALM) function

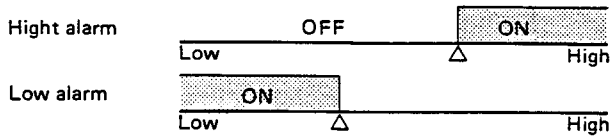
Up to 2 alarm output points are available. When alarm 1 is activated, the set-value(SV)/character display unit flashed " AL1 ". (For alarm 2, " AL2 ") When both the alarms are activated, the display unit flashes " AL1 " and " AL2 " alternately.
The action of each alarm is as shown in the following.

(▲ : Set-value (SV) △ : Alarm setting)

Deviation alarm



Process alarm



*1 · · · Alarm set-value : Plus (+) setting
*2 · · · Alarm set-value : Minus (—) setting
*3 · · · Alarm set-value : Alsolute deviation value setting

(3) Heater break alarm (HBA) function

① When the heater break alarm is activated, the set-value (SV)/character display unit flashes " HbA ".

② It is desirable that basically the heater break alarm be set to about 85% of a current transformer input value, " 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 " CT ".)

- The heater break alarm is set in accordance with "Alarm memory No. setting group." (Refer to page 6.)
The current transformer input value can be checked by Monitoring display. (Refer to page 10.)

(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.

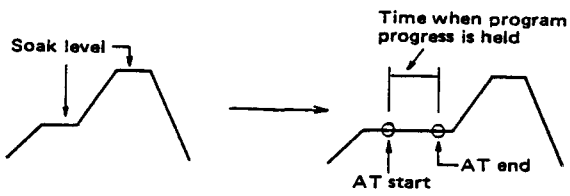
① Pressing the AT key while pressing the hidden key starts auto-tuning. The set-value (SV)/character display unit flashes " ATU " while the auto-tuning function is activated.

② When the function ends its activation, " 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 "3.1 Fundamental knowledge required for setting" (page 3) and "3.2 Description of setting groups" (page 4). Also, change the auto-tuned constants in accordance with "3.3 Fundamentals of data setting" (page 8).

④ When suspending the auto-tuning function halfway, press the AT key while pressing the hidden key, again. In this case, no PID constants are changed. (The values before auto-tuning start)

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]

(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 stocked 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". (Refer to page 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	×	○	×	○	×	○	×	○	×	○	×	○	×	○	×	○
No. 20 – 22	×	×	○	○	×	×	○	○	×	×	○	○	×	×	○	○
No. 20 – 23	×	×	×	×	○	○	○	○	×	×	×	×	○	○	○	○
No. 20 – 24	×	×	×	×	×	×	×	×	○	○	○	○	○	○	○	○

X : Open O : 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.

Cautions

1. Reset mode and program control mode settings 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) Overscale/underscale

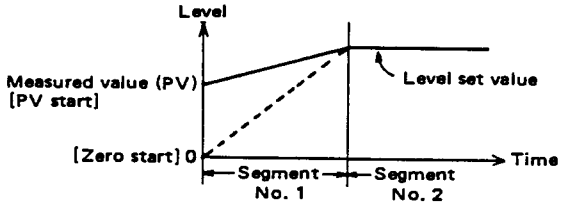
① If a measured-value goes increasing and exceeds the high limit of the setting range due to input disconnection (or shorting), the measured-value display starts flashing. Further if it exceeds the input display range, the measured-value (PV) display unit flashes "▫▫▫▫" (overscale display).

② If a measured-value goes decreasing and becomes below the low limit of the setting range due to input disconnection (or shorting), the measured-value display start flashing. Further, if it becomes below the input display range, the measured-value (PV) display unit flashes "▫▫▫▫" (underscale display).

* For overscale and underscale display ranges, refer to "7. Specifications" (page 16).

(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 set mode (page 11). (Zero start selection is also possible.)



(9) Step function

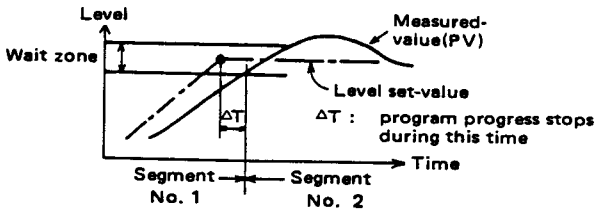
If it needs to perform program control by skipping the current segment to the next segment, press the STEP key while pressing the hidden key. Thus, the segment now in program control is skipped to perform the control from the next segment.

(10) Hold function

If it needs to suspend temporarily program progress in program control, press the HOLD key while pressing the hidden key. Thus, the set-value (SV)/character display unit flashes "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.

(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". (Refer to page 4).



(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". (Refer to page 4.)
However, when "Segment end" (segment setting group) is set in the pattren segment to be connected is set 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.

(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". (Refer to page 7.)

- 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.

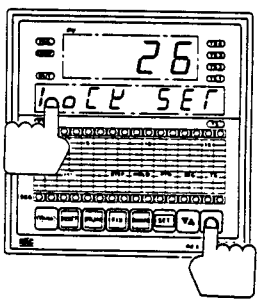
(14) Digital filter

In order to reduce noise contained in a measured-value (PV), a low pass filter can be inserted. Thus, control eliminating 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". (Refer to page 7.)

(15) Pattern end output function

If one program ends, the set-value(SV)/character display unit flashes " End ". At this time, a pattern end signal is also output. Pattern end output time is set in accordance with "Common setting group". (Refer to page 7.)
Also, even if the pattern end output ends, " End " goes flashing. " 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.)

(16) Set data lock function



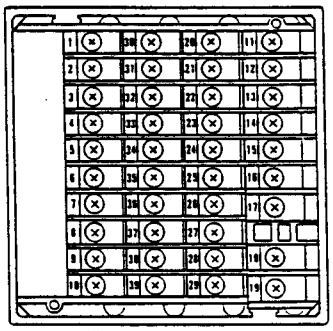
The set data lock function makes each set data change impossible. Therefore, the controller cannot be set to the setting mode even if the SET key is pressed while the hidden key is pressed. (The set lamp keeps going off.) In order to set the controller to the set data lock state, press the character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

(17) Communication function

The built-in RS-422A or RS-232C interface enables data communication with a host computer. For details, refer to Instruction Manual "REX-P210 Communication".

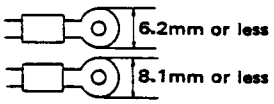
6. Wiring

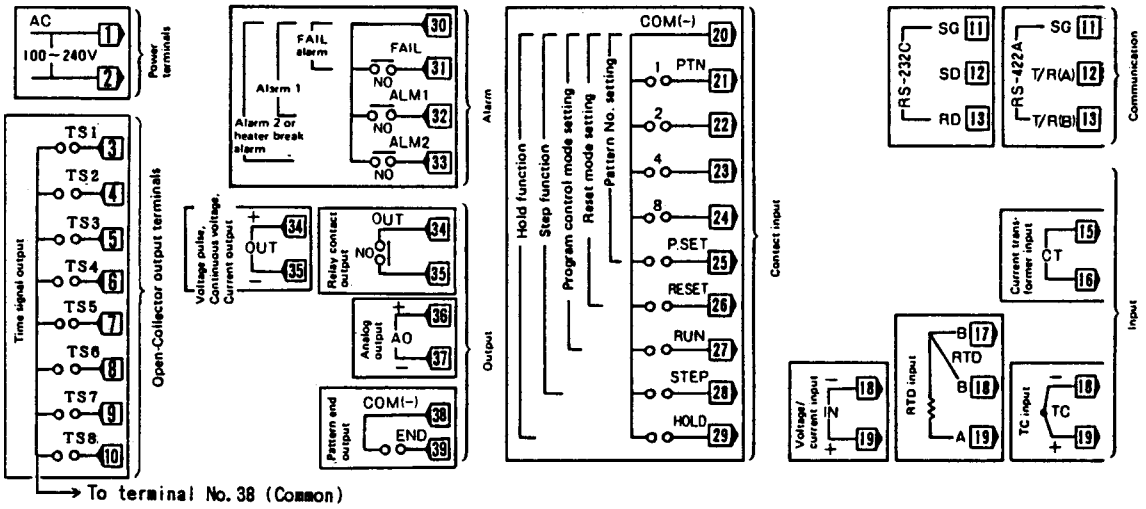
6.1 Rear terminals



Cautions

1. Each unused terminal (which varies with instrument Model) is fitted with a blind patch.
2. For input terminals with terminal 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.



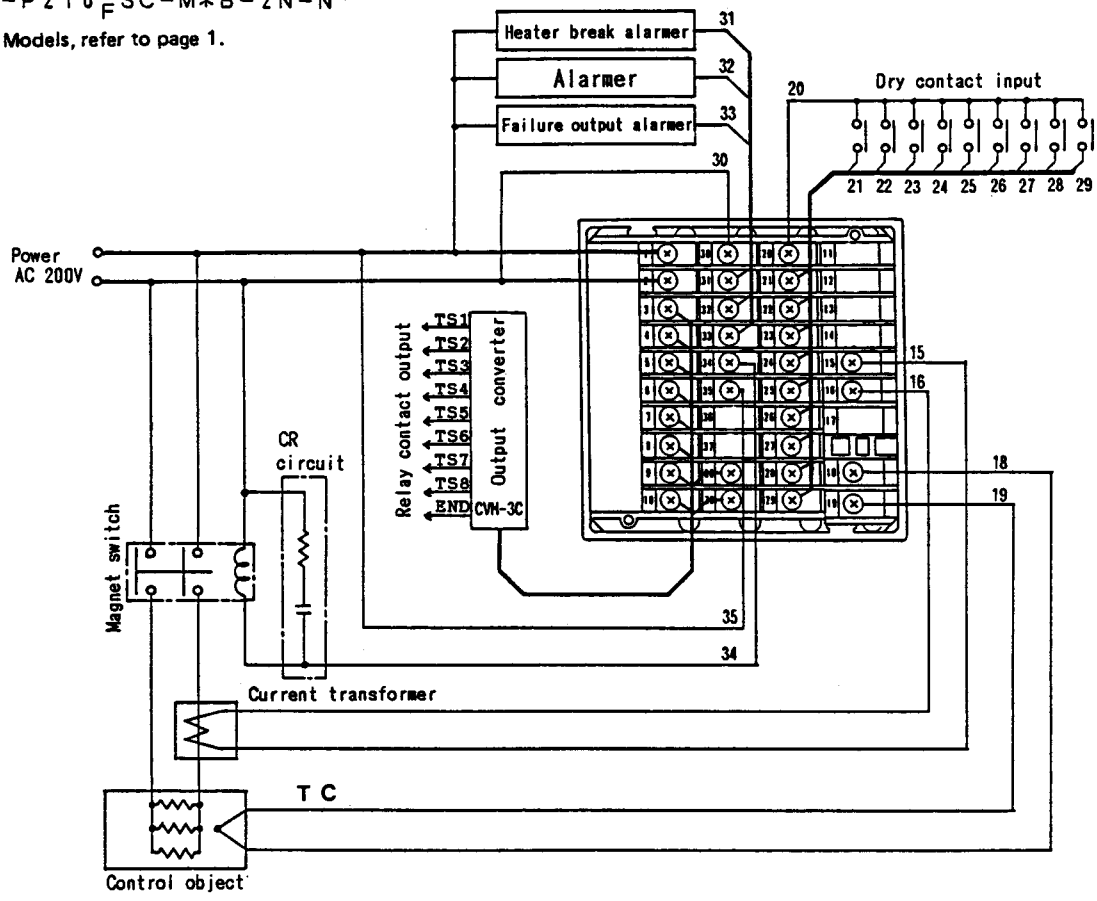


NO : Normally Open COM : Common

6.2 Wiring example

REX-P210$^{H}_{F}$SC-M*B-2N-N

* For Models, refer to page 1.



6.3 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.

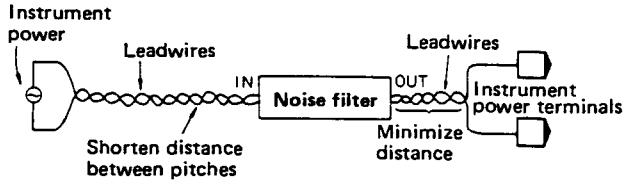
(2) Conduct instrument power wiring so as not to be influenced by noise from the electric equipment power.
If it is assumed that a noise generation source is located near the controller and the controller is influenced by noise, use a noise filter (select the filter by checking instrument power supply voltage.)

- Sufficient effect may not be expected depending on the filter. Therefore, select the filter by referring to its frequency characteristic, etc.

(a) 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.)

(b) 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.

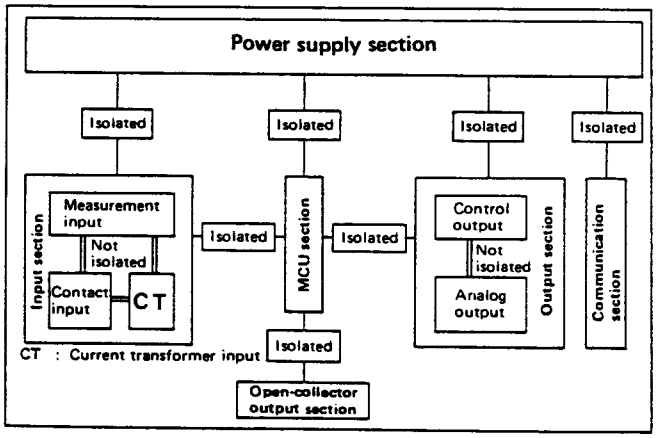
(c) Do not install fuses and/or switches on the filter output signal since this may lessen filter effect.



(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 mm^2, 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-P210 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-P210 circuit configuration

7. Specifications

(1) Input

Input impedance	Thermo-couple input	Approx. 1MΩ
	Voltage input	250KΩ or more
	Current input	250Ω
External resistance effect	Approx. 0.35μV/Ω (For thermocuple input)	
Input lead resistance effect	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 control terminal and COMMON are shorted.)
	Contact open voltage	9VDC or less (Built-in power)
	Wiring distance	10m or less (Varies with installation environment (noise, etc.))
Sampling cycle	0.5 sec.	

Input scale range

	Type	Range	Resolution	Underscale	Overscale
Thermocouple	K	0 to 1372°C	1°C	Less than −30°C	1373°C or more
		0 to 2502°F	1°F	Less than −30°F	2503°F or more
		−100.0 to +400.0°C	0.1°C	Less than −100.0°C	400.1°C or more
		−148.0 to +752.0°F	0.1°F	Less than −148.0°F	752.1°F or more
	J	0 to 1200°C	1°C	Less than −30°C	1201°C or more
		0 to 2192°F	1°F	Less than −30°F	2193°F or more
		−100.0 to +400.0°C	0.1°C	Less than −100.0°C	400.1°C or more
		−148.0 to +752.0°F	0.1°F	Less than −148.0°F	752.1°F or more
	R *1	0 to 1769°C	1°C	Less than −30°C	1770°C or more
		0 to 3216°F	1°F	Less than −30°F	3217°C or more
	S *1	0 to 1769°C	1°C	Less than −30°C	1770°C or more
		0 to 3216°F	1°C	Less than −30°F	3217°F or more
	B *2	0 to 1820°C	1°C	Less than −30°C	1821°C or more
		0 to 3308°F	1°F	Less than −30°F	3309°F or more
	E	0 to 1000°C	1°C	Less than −30°C	1001°C or more
		0 to 1832°F	1°F	Less than −30°F	1833°F or more
		−100.0 to +300.0°C	0.1°C	Less than −100.0°C	300.1°C or more
		−148.0 to +572.0°F	0.1°F	Less than −148.0°F	572.1°F or more
	T	0 to 400°C	1°C	Less than −30°C	401°C or more
		0 to 752°F	1°F	Less than −30°F	753°F or more
		−199.9 to +400.0°C	0.1°C	Less than −199.9°C	400.1°C or more
		−199.9 to +752.0°F	0.1°F	Less than −199.9°F	752.1°F or more
	N(NBS)	0 to 1330°C	1°C	Less than −30°C	1301°C or more
		0 to 2372°F	1°F	Less than −30°F	2373°F or more
	PL II (NBS)	0 to 1300°C	1°C	Less than −30°C	1301°C or more
		0 to 2372°F	1°F	Less than −30°F	2373°F or more
	L(DIN)	0 to 900°C	1°C	Less than −30°C	901°Cor more
		0 to 1652°F	1°F	Less than −30°F	1653°F or more
	W5Re/W26Re (Hoskins)	0 to 2320°C	1°C	Less than −30°C	2321°C or more
		0 to 4200°F	1°F	Less than −30°F	4201°F or more
RTD	Pt100(JIS/IEC) JPt100(JIS)	−199.9 to +649.0°C	0.1°C	Less than −199.9°C	649.1°C 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 DC 0 to 1V DC 0 to 5V DC 0 to 10V DC 1 to 5V DC 0 to 20mA DC 4 to 20mA	Can be programmed in the range of −1999 to +9999.	1. 0.1 0.01 0.001	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).

*1 Accuracy in the range of 0 to 399°C (0 to 750°F): With in ± 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 connect-able patterns	Up to 16 patterns	
Time signal	No. of program storage patterns	16 patterns
	No. of storage times	16/pattern
No. of storage PID constants	8 memories (Selected for each segment)	
No. of storage alarm settings		

(3) Output

Control output	Relay contact output	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)
	Contin-uous voltage output	0 to 5V DC, 0 to 10V DC, 1 to 5V DC (Load resistance: 1KΩ or more)
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: 8	
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	

(4) Performance

Setting accuracy	Level	① Thermocouple input ±(0.3% of set-value + 1 digit) or ±2°C(±4°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 ±6°C(±12°F) • B . . . . . In the range of 0 to 399°C(0 to 750°F): Not guaranteed ② RTD input ±(0.3% of set-value + 1 digit) or ±0.8°C[±1.6°F] (Within value whichever the greater) ③ Voltage/current input Within ±(0.2% of setting limiter span + 1 digit) * Same for set-value (SV) in fixed set-point control and wait zone
	Segment time	±(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
	propor-tional band	① Thermocouple/RTD input ±0.5% of setting limiter span or ±0.5°C[°F] (Within value whichever the greater.) ② Voltage/current input Within ±0.5% of setting limiter span * Same for hysteresis band of ON-OFF action.
	other settings	Within ±0.5% of setting range
Input display accuracy	Thermo-couple	±(0.3% of displayed value + 1 digit) or ±2°C[±4°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 ±6°C(±12°F) • B . . . . . In the range of 0 to 399°C(0 to 750°F): Not guaranteed
	RTD	±(0.3% of displayed value + 1 digit) or ±0.8°C[±1.6°F] (Within value whichever the grater)
	Voltage/ current	Within ±(0.2% of setting limiter span + 1 digit)
Insulation resistance	Between measuring and grounding terminals; 20MΩ or more at 500V DC Between power and grounding terminals; 20MΩ or more at 500V DC	
Dielectric strength	Between measuring and grounding terminals; For 1 min. at 1000V AC Between power and grounding terminals; For 1 min. at 1500V ac	

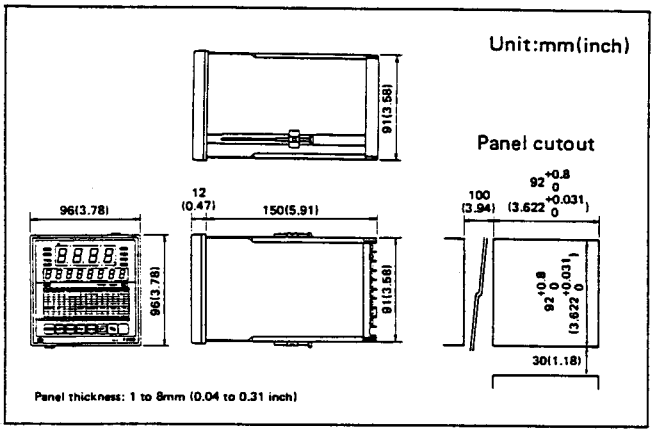
(5) Option

Heater break alarm	Input	Current detector output		
	Setting accuracy	Within ±5% of set-value or ±2A (Whichever the greater)		
	Output	Relay contact output: 250V AC, 1A (Resistive load) 1 "a" contact Electrical life: 50,000 or more times (Rated load)		
Analog output	No. of output points	1 max.		
	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, 10 VA 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)

8. Dimensions



* Dimensions in inches are shown for reference.

9. Data entry format

O Format 1 [Prepare the formats corresponding to the number of patterns (16 patterns or less)] Copy this format for its use.

Pattern No.																
Segment No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Level																
Time signal TS1																
TS2																
TS3																
TS4																
TS5																
TS6																
TS7																
TS8																
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.	

O Format 2 [prepare only one of this format.]

PID memory No. setting group

Memory No.	1	2	3	4	5	6	7	8
Proportional band P (%)								
Integral time I (Sec.)								
Derivative time d (Sec.)								
ON-OFF action hysteresis band oH								
Output limiter high limit oHLH (%)								
Output limiter low limit oHLL (%)								

Common setting group

PV bias	Pb	
Alarm 1 hysteresis band	AH1	
Alarm 2 hysteresis band	AH2	
Proportioning cycle	CYCL (Sec.)	
Digital filter	dF (Sec.)	
Pattern end output time	Er	. .

Fixed set-point control setting group

Set-value (SV)	SV	
PID memory No.	PId	
Alarm memory No.	ALNS	

Alarm memory No. setting group

(Alarm 1: Alarm 2:)

Memory No.	1	2	3	4	5	6	7	8
Alarm 1 AL1								
Alarm 2 AL2								
Heater break alarm HbA								

Manual control setting group

PID memory No.	PId	
Alarm memory No.	ALNS	

RKC. RKC INSTRUMENT INC.

IM200P08-E2

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