

**SINGLE LOOP MCU BASED
DIRECT DIGITAL CONTROLLERS**

REX-F7 SERIES

H,F STANDARD TYPE
INSTRUCTION MANUAL

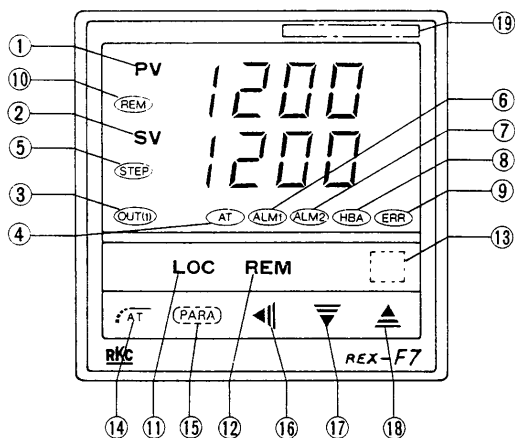
IMF701-E2

Note:

Arrange that this manual will be handed to person in charge of the Controller.

Specification subject to change without notice.

1. Functional Description



- ① Measured-value (PV) display unit (Green)
- ② Set-value (SV) display unit (Orange)
- ③ Control output (OUT (1)) lamp (Green)
- ④ Auto-tuning (AT) lamp (Green) (Optional)
- ⑤ Step lamp (Green) (Optional)
- ⑥ Alarm 1 (ALM1) lamp (Red)
- ⑦ Alarm 2 (ALM2) lamp (Red)
- ⑧ Heater break alarm (HBA) lamp (Red) (Optional)
- ⑨ Error (ERR) lamp (Red)
- ⑩ Remote mode (REM) lamp (Green) (Optional)
- ⑪ Local mode (LOC) key
- ⑫ Remote mode (REM) key (Optional)
- ⑬ Hidden key
- ⑭ Auto-tuning (AT) key (Optional)
- ⑮ Parameter select key
- ⑯ Setting digit shift key
- ⑰ Set-value decrement key
- ⑱ Set-value increment key
- ⑲ Input range display

2. Operation

2.1 Description of each parameter

The measured-value (PV) display unit displays a measured-value with the power turned ON, and the set-value (SV) display unit displays the set-value (SV).

Every time the (PARA) key is pressed, parameters change as shown in the following table. (When the last parameter is displayed, it returns to the first parameter.) At this time, the measured-value (PV) display unit shows each parameter symbol and the set-value (SV) display unit shows the relevant parameter set-value.

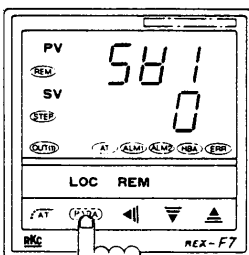
Measured-value (PV) display unit	Name	Description	Initial value prior to shipment
Measured-value		Displays measured-value. No setting is made.	
*1 SV1	Set-value (SV1)	Desired value for control. Any value is settable within input range.	0 or 0.0
*2 SV2	Step set-value (SV2)	One more desired value for control. Set-value (SV1) changes according to contact input.	0 or 0.0
*3 SV(R)	Remote set input (SV (R))	Displays set-value (SV(R)) from external setting unit. No setting is made.	
*4 CT	Current transformer input	Displays input value from the current transformer. No setting is made.	
*5 AL1	Alarm 1	Displays alarm set-value of Alarm 1.	50 or 50.0 (Voltage/ current input: 5.0)
*6 AL2	Alarm 2	Displays alarm set-value of Alarm 2.	50 or 50.0 (Voltage/ current input: 5.0)
*7 HBA	Heater break alarm (HBA)	Alarm value is set by referring to input value from the current transformer	0.0
P	Proportional band (P)	Set when proportional control is performed. Control becomes ON/OFF action with P set to "0" or "0.0".	30 or 30.0 (Voltage/ current input: 3.0)
I	Integral time (I)	Eliminates offset occurring in proportional control. Integral action turns OFF with this action set to "0".	240
D	Derivative time (D)	Prevents ripples by predicting output change, thereby improving control stability. Derivative action turns OFF with this action set to "0".	60
AR	Anti-reset windup (ARW)	Prevents overshoot and/ or undershoot caused by integral action effect. Integral action is turned OFF with ARW set to "0".	100
*8 Pb	Proportioning cycle	Displays manipulated output cycle (sec.)	Relay contact output: 20 Voltage pulse output: 2 Triac drive trigger output: 2 Triac output: 2
Pb	PV bias	Sensor is corrected by adding a bias value to measured-value (PV).	0 or 0.0
OH	ON/OFF action hysteresis band	Displays hysteresis band in ON/OFF action control	2 or 2.0 (Voltage/ current input: 0.2)

- *1 : [When no step function is attached.]
Does not display when the balanceless/bumpless function (during remote/local transfer) is provided and during remote setting operation.
- *1, *2 : [When the step function is provided.]
Does not display the set-value selected by the step function when the balanceless/bumpless function (during remote/local transfer) is provided and during remote setting operation.
- *2 : Does not display when no step function is provided, remote mode-local mode transfer by contact input is provided.
- *3 : Does not display when no external setting function is provided, and the heater break alarm is provided.
- *4, *7 : Does not display when no heater break alarm is provided, the external setting function is provided and 2 alarm outputs are provided.
- *5 : Does not display when no alarm is provided.
- *6 : Does not display when no alarm is provided, one alarm output is provided and heater break alarm is provided.
- *8 : Does not display when current output or continuous voltage output is provided.

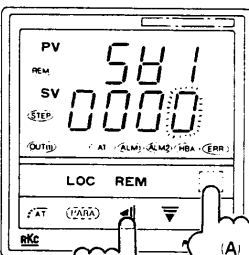
2.2 Each parameter setting

Following is an example of setting the set-value (SV1) to 200°C.

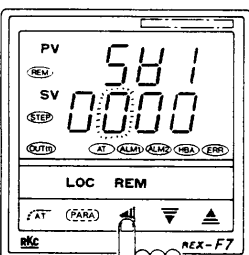
① Press the (PARA) key to display the set-value (SV1) parameter symbol (SV1) on the measured-value (PV) display unit.

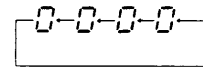


② Press the \lll key (B) while pressing the hidden key (A) to enter the setting mode. The least significant digit on the set-value (SV) display unit lights brightly, and other digits light dimly. The digit which lights brightly is settable.



③ Press the \lll key to shift the digit which lights brightly up to the hundreds digit. The digit which lights brightly shifts as follows every time the \lll key is pressed.

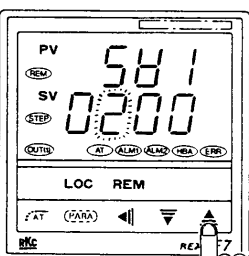




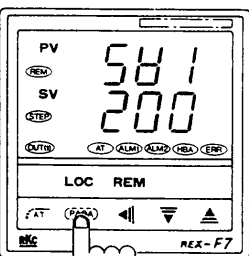
④ Press the \blacktriangle key to set "2". Pressing the \blacktriangle key increments numerals, and pressing the \blacktriangledown key decrements numerals.

● Setting range: Within input range

(When minus (-) sign is set.
Example:
When 200 is changed to -100, shift the digit lit brightly to the hundreds digit, then press the \blacktriangledown key to decrement figures in due order of 1 → 0 → -1.)



⑤ After finishing the setting, press the (PARA) key. All of the set-value digits light brightly to indicate that the setting has ended. Pressing the (PARA) key again shifts to the next parameter. Repeat the procedures from ② to ⑤ to set each parameter in order.



Each parameter symbol and setting range are shown in the following.

	Parameter Symbol	Setting Range	
	Step set-value	58.2	Within input range
*1	Remote set input value	58.1	No setting is done.
*2	Current transformer input	CT	No setting is done. Set heater break alarm value by referring to this value.
	Alarm 1	AL1	-1999 to +9999 (Decimal point position is the same as that of input range.)
*3	Alarm 2	AL2	-1999 to +9999 (Decimal point position is the same as that of input range.)
*4	Heater break alarm	HbA	0.0 to 100.0A
	Proportional band	P	1 to span or 0.1 to span (TC or RTD input) 0.1 to 100.0% for input range (voltage/current input) (ON/OFF action with P set to "0" or "0.0".)
	Integral time	I	1 to 3600 sec. (I action turns OFF with I set to "0".)
	Derivative time	D	1 to 3600 sec. (D action turns OFF with D set to "0".)
	Anti-reset windup	Ar	1 to 100% of P band I action turns OFF with this action set to "0".
	Proportioning cycle	f	1 to 100 sec.
	PV bias	Pb	-1999 to +9999 (Decimal point position is the same as that of input range.)
*5	ON/OFF action hysteresis band	OH	For TC or RTD input 0 to 100°C [°F] or 0.0 to 100.0°C [°F] (0 to ±50.0°C [°F] or 0.0 to ±50.0°C [°F] for set-value (SV1) or step set-value (SV2).) For voltage/current input 0.0 to 100.0% of span (0.0 to ±50.0% of span from set-value (SV1) or step set-value (SV2).)

*1, *2: Neither of them is displayed simultaneously.

*3, *4: Neither of them is displayed simultaneously.

*4: Heater break alarm is not available on a current output or a continuous voltage output type.

*5: Setting becomes invalid when no ON/OFF action control is performed (P value is other than "0" or "0.0".)

○ Heater break alarm (HbA) setting

① Press the (PARA) key to set the parameter to "CT" (current transformer input). The measured heater current is displayed in A (amperes).

② Next, press the (PARA) key to display "HbA" (heater break alarm). Basically, it is desirable that the heater break alarm set-value be set to about 0.85 times the current transformer input (CT). However, set a value slightly smaller than the above value if power supply variation is large. In addition, when two or more heaters are connected in parallel, set a value slightly higher than the above value (but within the CT value) so that the heater break alarm is turned ON even with one heater broken. When the heater break alarm set-value is set to "0.0" or the current transformer is not connected, the heater break alarm is turned ON.

For example, when current transformer input is 20A:



HbA becomes $20(A) \times 0.85 = 17(A)$.

Therefore, the heater break alarm set-value can be set to about 17A.

③ After the above setting is finished, press the (PARA) key. All the set-value digits then light up brightly to indicate that the setting is finished.

When setting parameters other than the set-value (SV1), follow the above procedures.

Cautions

1. If the controller does not enter the setting mode (even if the  key is pressed while pressing the hidden key), the set data may be locked.
Therefore in the case, check that internal switch No. 2 inside the controller is turned OFF. (For set data lock, see "3. Main Functions".)
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. If key operation is not performed for more than 10 sec. with any parameter displayed by the (PARA) key (including display other than measured-value and that in the set mode), when the operation mode is changed, and the step function is actuated, the measured-value (PV) display unit displays a measured-value, and the set-value (SV) display unit displays any of set-value (SV1), step set-value (SV2), and remote set-value (SV (R)).

2.3 Operation mode transfer

Operation mode transfer is performed by the instrument front key or contact input.



When the mode is transferred by the front key, press the key corresponding to the mode desired to be changed while pressing the hidden key. At this time, the lamp corresponding to the mode changed lights up.

However, for the instrument whose mode can be changed by contact input, the lamp may sometimes flash. (For operation mode transfer by contact input, and the priority of transfer by the front key and the contact input, refer to "3 · Main functions".)

2.4 Auto-tuning (AT) procedure

The Auto-tuning function automatically measures, computes and sets the optimum PID constants.

This function is activated after POWER-ON, during temperature rise and/or when control is stabilized from any process state.

- (1) Conduct auto-tuning after set-value (SV1), step set-value (SV2), alarm, ARW, proportioning cycle and PV bias settings have ended.
- (2) Pressing the  key while pressing the hidden key, the AT lamp flashes to start the auto-tuning function.
- (3) If the auto tuning has ended, AT lamp flashing stops. When the values auto-tuned are necessary to be checked, press the (PARA) key to show each value on the set-value (SV) display unit.
- (4) When changing the constants automatically set by the auto-tuning, change each constant in accordance with each parameter setting (See Item 2.2).
- (5) When suspending the auto-tuning function, press the  key while pressing the hidden key to stop AT lamp flashing, thereby releasing the auto-tuning. No PID constants at this time can be changed.
(The values before the auto tuning function is activated.)
- (6) When changing the set-value (SV1) or step set-value (SV2) during progress in the auto-tuning function, or changing the PV bias value, suspend the auto-tuning to perform PID control using the values before auto-tuning start.

2.5 Cautions for operation

- (1) Do not use the auto-tuning function in a control system where hunting causes trouble.
In this case, set each PID constant appropriate to the controlled object.

- (2) Connect the measuring circuit, and then turn ON the power. If the circuit opens, the controller judges that input is disconnected to cause the upscale of measured-value display (for thermocouple input, downscale is also available only as option.)
 - Upscale For TC or RTD input
 - Downscale For TC (To be specified when ordering) or voltage/current input
- (3) No influence is exerted upon the controller for power failure of less than 30msec. For power failure of more than 30msec., the controller performs the same operation as that at the time of power-ON after power recovery.
(This applies only when alarm action is turned OFF.)
- (4) The alarm hold action is activated when not only the power is turned ON, but also for the following cases.
 - 1) When the set-value (SV1) (or step set-value (SV2)) is changed.
 - 2) The set-value is changed by the step function.
 - 3) When the PV bias value is changed.

3. Main Functions

- (1) Self-diagnostic function

Self-diagnostic function	During abnormality	
	*Display	Output
Non-volatile RAM check	"ERR" flashes on the measured-value (PV) display unit.	<ul style="list-style-type: none"> • Error output ... Contact open
A/D converter check		
CPU power monitoring	The error (ERR) lamp Red lights.	<ul style="list-style-type: none"> • Control output (Relay contact, voltage pulse, triac drive trigger, triac) } OFF • Alarm output • Control output (Current, continuous voltage) } Output low-limit • Analog output

* Turn off the power to release the ERROR display.
If the ERROR display still appears after power is re-applied, contact our distributor or RKC.

- (2) Overscale and underscale

- ① If a measured value exceeds the high setting range limit due to upscale, etc., measured-value display starts flashing. Further, if it exceeds the high input display range limit, the measured-value (PV) display unit flashes overscale display "9999".
- ② If a measured value becomes below the low setting range limit due to downscale, etc., measured-value display starts flashing. Further, if it becomes below the low input display range limit, the measured-value (PV) display unit flashes underscale display "0000".

Input	Type	Input display Range	
		°C	°F
TC	K	-30 to +1372	-30 to +2502
	J	-30 to +1200	-30 to +2192
	R	-30 to +1769	-30 to +3216
	S		
	B		
	E	-30 to +1820	-30 to +3308
	N	-30 to +1000	-30 to +1832
	T	-30 to +1300	-30 to +2372
	L	-30 to +400	-30 to +752
-199.9 to +400.0		-100.0 to +752.0	
RTD	Pt100Ω	-30 to +900	-30 to +1652
Voltage/Current		-199.9 to +649.0°C, -199.9 to +999.9°F	

(Low limit of setting range) - (3% of span) to (High limit of setting range) + (3% of span)

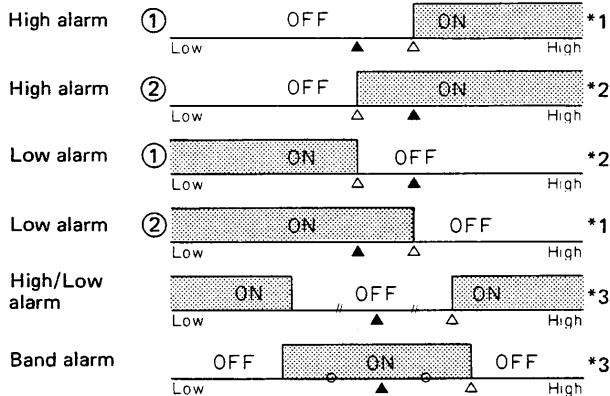
(3) Step function (optional)

The controller has 2 set-values (SV).
 This step function selects one of these 2 set value (SV) by contact input (Rear terminal Nos. 14 and 15).
 Contact open Set value (SV1)
 Contact closed Step set value (SV2)

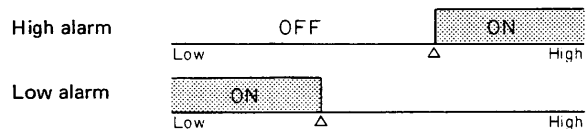
(4) Alarm (ALM) function

The action for each alarm becomes as follows.
 (▲ : Set-value (SV) △ : Alarm set-value)

○ Deviation alarm



○ Process alarm



- *1 Alarm set-value becomes a pluse (+) setting.
- *2 Alarm set-value becomes a minus (-) setting.
- *3 Alarm set-value becomes the absolute deviation-value setting.

(5) Heater break alarm function (Optional)

The following two alarms are available.

- ① Alarm for heater break when control output is ON and when the input-value from the current transformer is smaller than the set-value. (Alarm will not function when the control output ON time is shorter than 0.5 sec.)
- ② Alarm for melt of the relay contacts when control output is OFF and the input-value from the current transformer is larger than the set-value. (Alarm will not function when the control output OFF time is shorter than 0.5 sec.)

(6) Function of operation mode transfer by contact input (Optional)

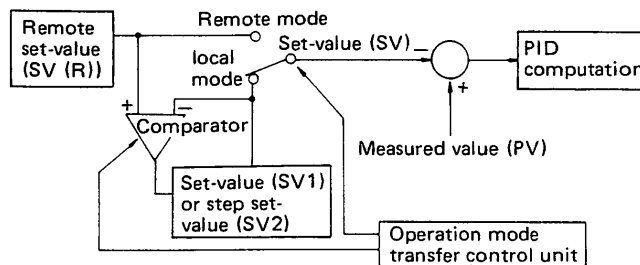
Mode selected by front key	Contact status	Set-value used for computation (SV)	Computation	Lamp status
				REM
Remote mode (REM)	Open	Set-value (SV1)	PID	△
	Closed	Remote set-value (SV (R))		○
Local mode (LOC)	No relation*	Set-value (SV1)		X

○ : Lit △ : Flashing X : Extinguished

* When transfer by front key has priority over that by contact input.

(7) Balanceless/bumpless transfer

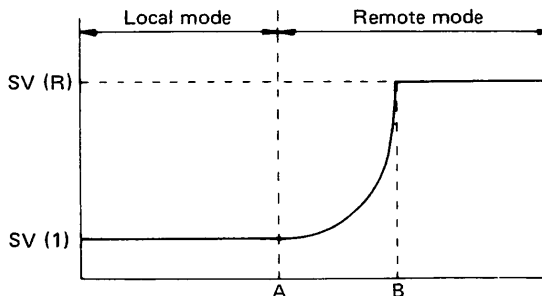
In a controlled object which does not desire rapid output change with changes in set-value (SV), this function restricts rapid change in set-value (SV) during transfer from the remote mode to the local mode and vice versa.



Conceptual diagram of balanceless/bumpless remote/local transfer

- ① Operation during transfer from the remote mode to the local mode.
 The set-value (SV1) (or step set-value (SV2)) matches to the remote set-value (SV (R)) by the comparator.
- ② Operation during transfer from the local mode to the remote mode.
 When the local mode is transferred to the remote mode, the display shows a value in the remote mode.
 However, the set-value (SV) does not immediately change to the remote set-value (SV (R)), but the comparator gradually changes the set-value (SV1) (or step set-value (SV2)) to match it to the remote set-value (SV (R)).

— Example —



When the local mode is transferred to the remote mode at time A, the set-value changes exponentially from SV1 to SV (R) and reaches SV (R) at time B. For control from time A to time B, the set-value now changing is used.

(8) Analog output (optional)

One analog output can be selected from among manipulated output (MV), measured-value (PV), set-value (SV1) (or step set-value (SV2)) and remote set-value (SV (R)).
 When control output is current and continuous voltage output, the analog terminals cannot be used.

(9) Set data locking function

Set-value change and the auto tuning function become invalid with internal switch No. 2 inside the controller turned ON.
 However, each set-value can be checked by the (PARR) key.
 Use this function for misoperation prevention after finishing the setting.

*** Set data locking procedure**

As shown in the following Fig., the controller can be with drawn from its housing if it is pulled out forward while the stopper at the bottom is pushed up with fingers.

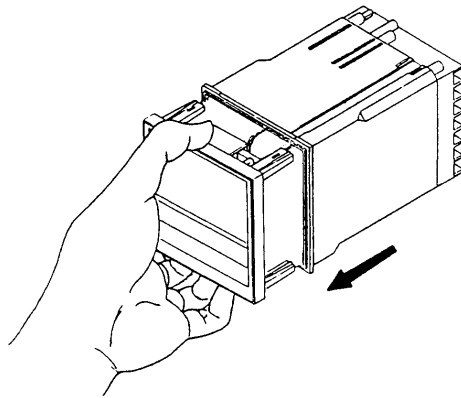


Fig. 1

Next, turn ON internal switch No. 2 at the lower part of the controller. (Do not touch other switches.) (Fig. 2)

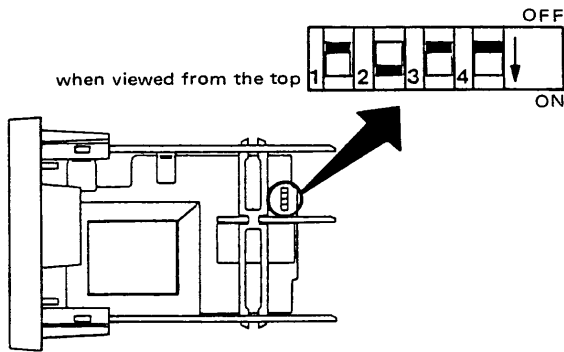
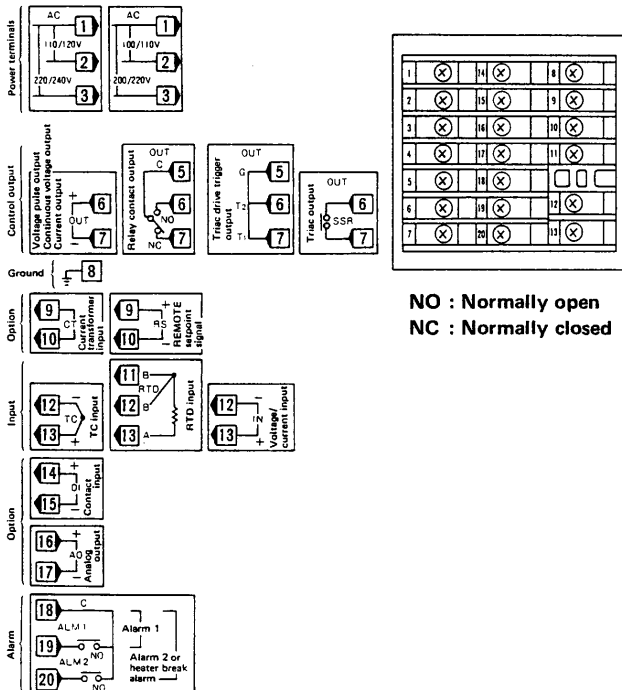


Fig. 2

Thus, the set data has been locked.
For set data locking release, turn OFF internal switch No. 2.

4. Wiring

4.1 Rear terminal connection



Cautions

1. All of unused terminals are covered by blind patches.
2. When the heater break alarm is used, connect the current transformer to terminals 9 and 10, then pass a cable for the heater current to be measured through the current transformer.

○ Solderless terminal

Therefore, use the lug suitable for a screw of M3.

- (1) Terminals Nos. 1 to 10, 16 and 17



- (2) Terminals Nos. 11 to 13



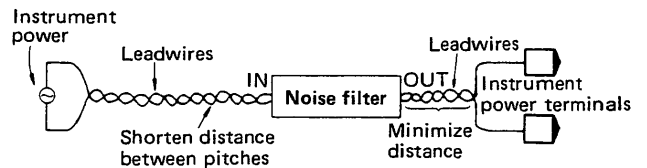
[Unit: mm (inch)]

4.2 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 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 voltage etc.)

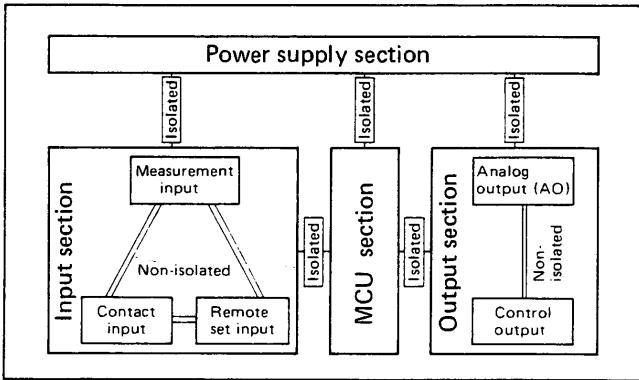
• Sufficient effect may not be expected depending on the filter. Therefore, select the filter by referring to its frequency characteristic, etc.

- 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.)
- 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 filter may lessen its effect.
- 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 internal interlock circuit.

(5) As shown in the following circuit configuration diagram, the power, input, MCU and output circuits are mutually isolated. However, since the input and output circuits are not isolated, be careful when wiring.

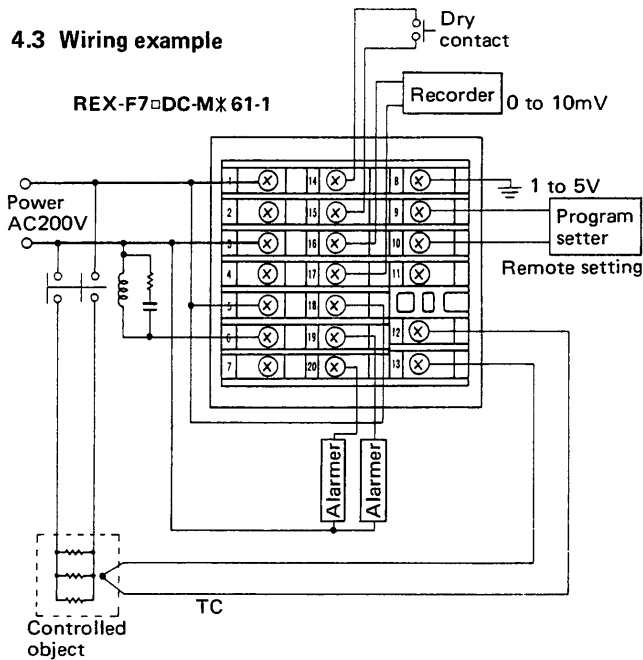


REX-F7 circuit configuration

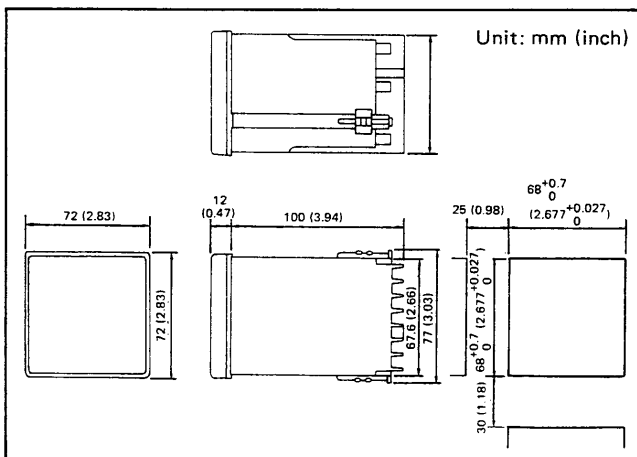
Example

- Use the signal isolated for each channel (or each instrument) as a remote setting signal.
- Use the dry contact isolated for each channel (or each instrument) as an SV1/SV2 selection contact.
- Connect equipment connected to the analog output so it is electrically isolated.

4.3 Wiring example



5. Dimensions



6. Specification

(1) Input

Influence of external resistance	Approx. 0.35 μ V/ Ω (For TC input)	
Influence of input lead	Approx. 0.0075%/ Ω of reading (For RTD input)	
Display accuracy	<ul style="list-style-type: none"> • $\pm(0.3\%$ of displayed value + 1 digit) or $\pm 2^\circ\text{C}$ [$\pm 4^\circ\text{F}$] (For TC input) • $\pm 0.8^\circ\text{C}$ [$\pm 1.6^\circ\text{F}$] (For RTD input) * Whichever is greater. • Within $\pm(0.2\%$ of span + 1 digit) (For voltage/current input) 	
External setting input signal	Input impedance	<ul style="list-style-type: none"> • Voltage input: More than 250kΩ • Current input: Approx. 250Ω
	Operation during input disconnection	Downscale

(2) Setting

	Range	Resolution	Accuracy \star
Set-value (SV1) (Step set-value(SV2))	Same as input range	<ul style="list-style-type: none"> • 1°C [$^\circ\text{F}$] or 0.1°C [$^\circ\text{F}$] (For TC or RTD input) • 0.001 to 1 Depending on decimal point position (For voltage/current input) 	<ul style="list-style-type: none"> • $\pm(0.3\%$ of set-value (SV)+1 digit) or $\pm 2^\circ\text{C}$ [$\pm 4^\circ\text{F}$] (For TC input) • $\pm 0.8^\circ\text{C}$ [$\pm 1.6^\circ\text{F}$] (For RTD input) * Whichever is greater. • Within $\pm(0.2\%$ of span +1 digit) (For voltage/current input)
Proportional (P) band	<ul style="list-style-type: none"> • 1 to span or 0.1 to span (For TC or RTD input) • For input range 0.1 to 100.0% (For voltage/current input) 	<ul style="list-style-type: none"> • 1°C [$^\circ\text{F}$] or 0.1°C [$^\circ\text{F}$] (For TC or RTD input) • 0.1% (For voltage/current input) 	$\pm 0.5\%$ of setting range
Integral time (I)	1 to 3600sec.	1 sec.	
Derivative time (D)			
Anti-reset windup	1 to 100% of P	1%	
Proportioning cycle	1 to 100sec.	1 sec.	

(3) Output

Control output	Relay contact output	250V AC 3A (resistive load) 1" contact Life; More than 300,000 times (rated load)
	Voltage pulse output	0/12V DC (Load resistance more than 800 Ω)
	Current output	4 to 20mA DC, 0 to 20mA DC (Load resistance less than 600 Ω)
	Continuous output	0 to 5V DC, 0 to 10V DC, 1 to 5V DC (Load resistance more than 1k Ω)
	Triac drive trigger output	Zero-cross method For medium capacity triac (less than 100A) drive. i) Load voltage: 100V AC system 200V AC system ii) Load : Resistive load
	Triac output	Zero-cross method Capacity: 0.5A (at ambient temperature of 40°C [104°F])

(4) Alarm

Type	Process alarm, Deviation alarm	
Action	High alarm, Low alarm, High/Low alarm, Band alarm (High/Low, Band; for Deviation alarm only)	
Setting range	-1999 to +9999	
Setting resolution	Same as set-value (SV1)	
Setting accuracy		
Hysteresis	2°C [°F] (For TC or RTD input) 0.2% of span (For voltage/current input)	
Output	No. of points	Emergency alarm: 2 points, max.
	Rating	Relay contact: 250V AC 1A (resistive load) 1 "a" contact Life : More than 50,000 times. (rated load)
Additional function	Hold action	

(5) Options

Heater break alarm	Input	Current transformer output		
	Setting accuracy	Within ±5% of set value or ±2A (Whichever is greater)		
Contact input	Output	Relay contact: 250V AC 1A (resistive load) 1 "a" contact Electrical life : More than 50,000 times. (rated load)		
	Input type	Dry contact input More than 500kΩ Open Less than 10Ω Closed		
Analog output	Contact current	Less than 4mA (Current flowing when each external control terminal and COMMON are shorted.)		
	Voltage when opened	Less than 17V DC (With built-in battery)		
	Wiring distance	Less than 10m (Differs with installation environment (noise, etc.))		
	No. of output points	1 point, max.		
DC Current and Voltage	Output type	Voltage/current continuous		
	Resolution	More than 10 bits		
	Output signal	0 to 10mV	0 to 1V	0 to 20mA
		0 to 100mV	0 to 5V	4 to 20mA
	Output impedance	Approx. 10Ω	Less than 0.1Ω	More than 5MΩ
		Allowable load resistance	More than 20kΩ	More than 1kΩ

(6) Other specifications

Power supply voltage	(a) AC 100/110V and AC 200/220V (50/60Hz common use) (b) AC 110/120V and AC 220/240V (50/60Hz common use) * Specify either (a) or (b)
Allowable voltage variation	±10% of rating
Power consumption	Less than 5VA
Allowable ambient temperature	0 to 50°C (32 to 122°F)
Allowable relative humidity	45 to 85% RH
Insulation strength	Between measuring and grounding terminals: More than 20MΩ at 500V DC Between power and grounding terminals: More than 20MΩ 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
Weight	Approx. 500g (1.1 lb)

○ Scale ranges

Input type		Scale range			
TC	K	0 to 1372°C,	0 to 2502°F		
	J	0 to 1200°C,	0 to 2192°F		
	E	0 to 1000°C,	0 to 1832°F		
	N	0 to 1300°C,	0 to 2372°F		
	R	0 to 1769°C,	0 to 3216°F		
	S	0 to 1769°C,	0 to 3216°F		
	T	0 to 400°C, -199.9 to +400.0°C,	0 to 752°F -199.9 to +752.0°F		
	B	0 to 1820°C,	0 to 3308°F		
RTD Pt100	L	0 to 900°C,	0 to 1652°F		
	JIS	-199.9 to +649.0°C,	-199.9 to +999.9°F		
DC Current and Voltage	DIN	-199.9 to +649.0°C,	-199.9 to +999.9°F		
	DC Current and Voltage	DC 0 to 1V	Programmable within the range shown as follows		
		DC 0 to 5V			
		DC 0 to 10V			
		DC 1 to 5V			-1999 to +9999
		DC 0 to 10mV			-199.9 to +999.9
		DC 0 to 100mV			-19.99 to +99.99
		DC 0 to 20mA			-1.999 to +9.999
DC 4 to 20mA					

☆ For thermocouple inputs R, S and B, display accuracy and setting accuracy differ from those of other thermocouple inputs.

- R, S Within ±4°C [8°F] for the range of 0 to 199°C [0 to 399°F].
- B Out of the guaranteed range for the range of 0 to 399°C [0 to 799°F].

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IMF701-E2

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