Honeywell

SA-90 Series
Digital Temperature Controller

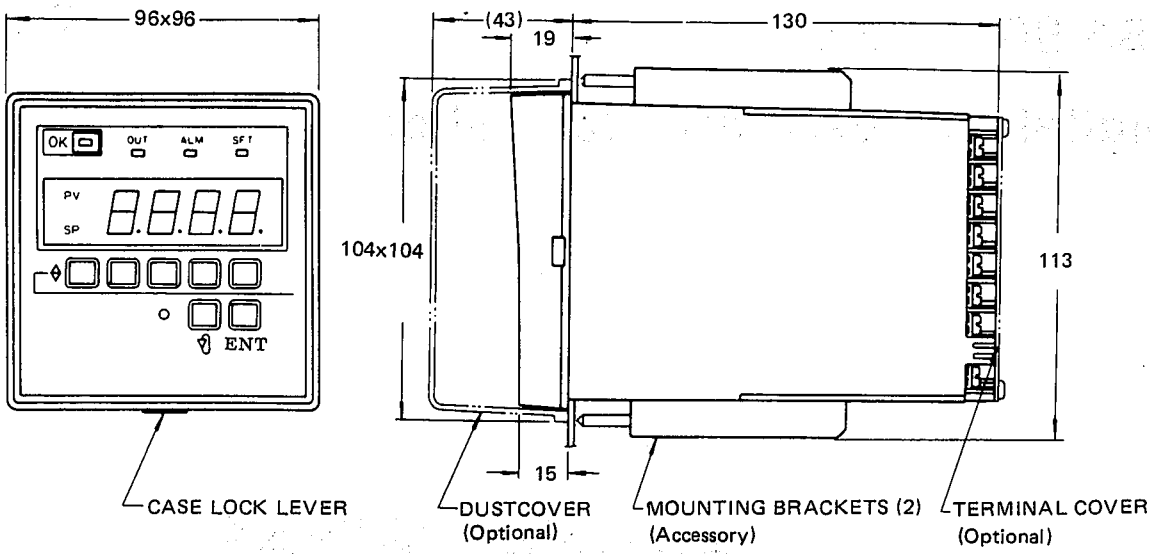
Product Manual

CONTENTS

No. CP-UM-1002-2E
March, 1988

DIMENSIONS AND PANEL CUTOUT DIMENSIONS

EXTERNAL DIMENSIONS (mm)



PANEL CUTOUT DIMENSIONS

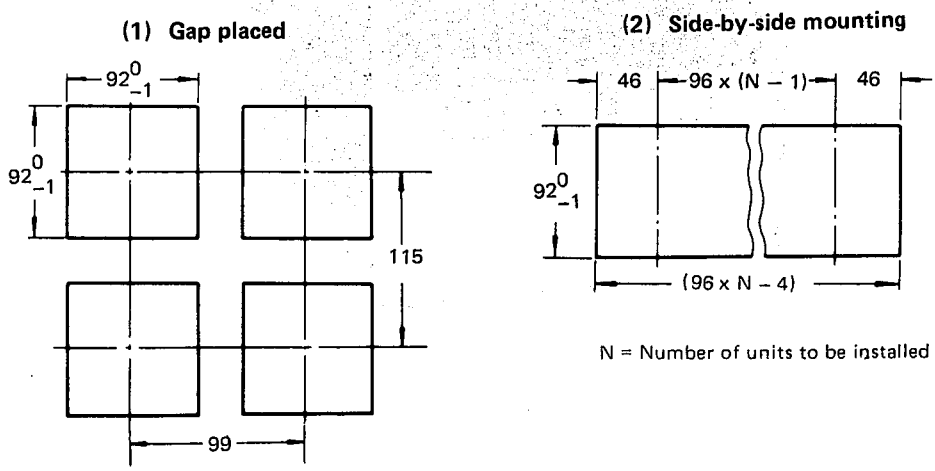


Fig. 1

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2. INSTALLATION

1. INSTALLATION LOCATION LIMITATIONS

When installing, observe the following conditions:

(1) Physical Conditions
Ambient Temperature: 0 – 50°C
Humidity Range: 90% RH max. at 40°C
Vibration Resistance: Less than 0.5 G (10 to 60Hz)
Shock Resistance: Less than 50 G

(2) Environmental Conditions

1 Avoid installation in places where corrosion or an explosion might occur.

2 When using the controller in an place where there are dust or grease particles, use it with the dust-cover. (Part No. 81401330A)

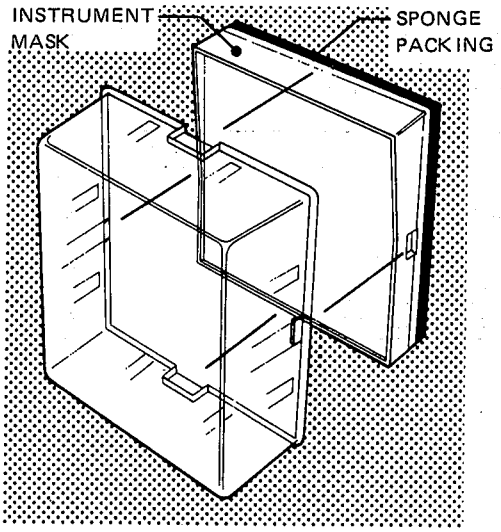
NOTE: When installing side-by-side, it is not possible to use the dustcover.

(3) Electrical Noise
As far as possible, keep the controller away from: high capacity electromagnetic switches, electrical devices generating strong high frequency waves, and SCR units.

2. INSTALLATION METHOD (Fig. 3)

Installing the case into the panel opening, tighten all screws with the accessory mounting brackets (2), until the tip of the screws are secured. As the mounting brackets are rachet-type, threr is no need to worry about over-tightening.

DUST COVER ATTACHMENT



After securing the sponge packing around the surrounding panel surface, attach the dustcover.

Fig. 2

PANEL INSTALLATION

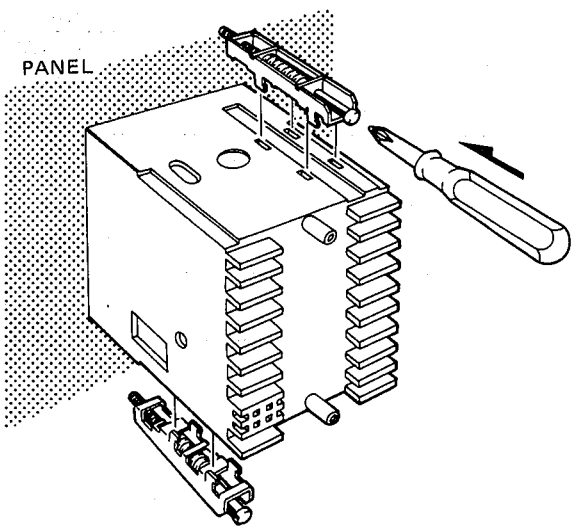


Fig. 3

3. WIRING

PRECAUTIONS

1. Input Signal Wire and Power Wire

(1) Keep the two wires spaced more than 50cm apart.
(2) Do not tie the wires together into a bundle.
(3) Do not insert both wires into the same conduit.
(4) Even inside the panel, follow the above precautions (1) to (3).

2. Output Signal Wire

When the output signal type is voltage or current, keep the output signal wire as far away as possible from power or load lines.

3. Types of Electric Wire to be Used

(1) In the Case of Thermocouple Input
For the thermocouple leadwire, it is necessary to use special thermocouple temperature compensation wire (see Table 1, below).

(2) In the case of Platinum Pt Resistance Bulb (RTD) Input
The three leadwires must be of uniform thickness.

(3) Type of Electric Wire to be Used (including RTD)
Use either type listed below, or an equivalent type.
JIS C3307 600V Plastic insulated wire.
Conductor diameter: 0.5 to 1.25 mm.
Finished outside diameter: 2.0 to 3.2 mm.

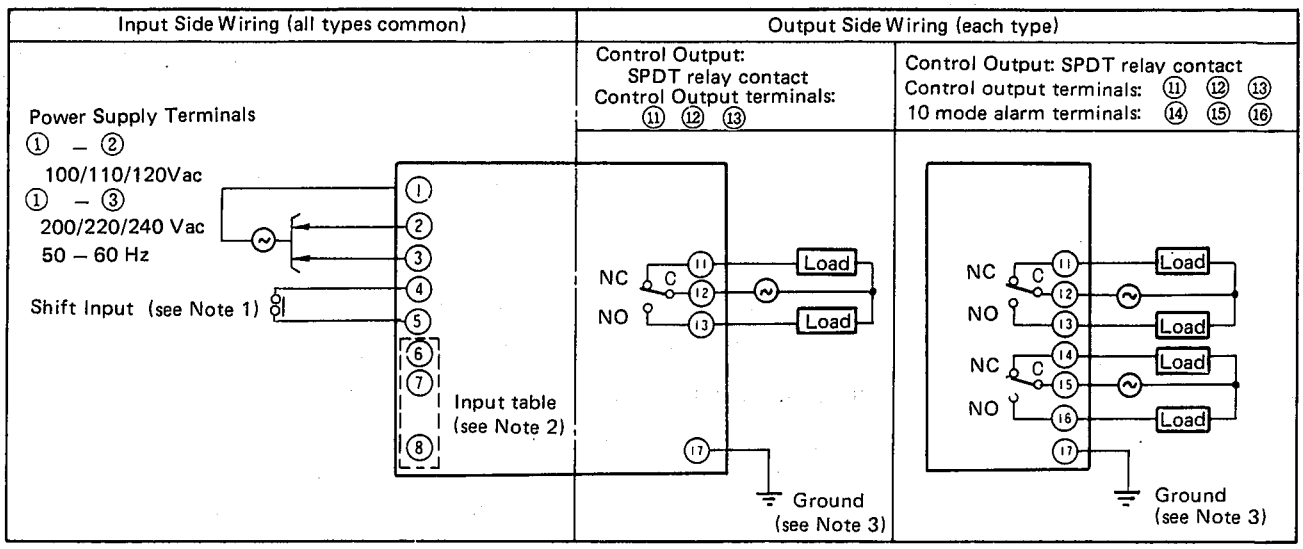
4. Wiring

(1) For solderless terminals, use a compatible M3.5 (metric) screw.
(2) Use the wiring diagram which corresponds to the controller model number. After completion of wiring, be sure to check for possible errors.
(3) No power supply switch is provided in this unit. If required, one should be provided externally.

TABLE 1: TYPES OF COMPENSATING CONDUCTOR

TYPE OF THERMOCOUPLE	TYPE OF COMPENSATING CONDUCTOR	SYMBOL	USAGE	TEMPERATURE OF ATMOSPHERE (DEGREES C)
R	For R	RX-G	General application	0 – 90
		RX-H	Heat-proof application	0 – 150
K	For K	KX-G	General application	–20 to 90
		KX-GS		
		KX-H	Heat-proof application	0 – 150
		KX-HS		
E	For E	EX-G	General application	–20 to 90
		EX-H	Heat-proof application	0 – 150
J	For J	JX-G	General application	–20 to 90
		JX-H	Heat-proof application	0 – 150
T	For T	TX-G	General application	–20 to 90
		TX-H	Heat-proof application	0 – 150

WIRING DIAGRAM



Input table (See Note 2)

Voltage (1–5Vdc)	Thermocouple (J, K, R)	RTD (JIS Pt 100Ω)
+ ⑥ / – ⑦	+ ⑥ / – ⑦	A ⑥ / B ⑦ / C ⑧

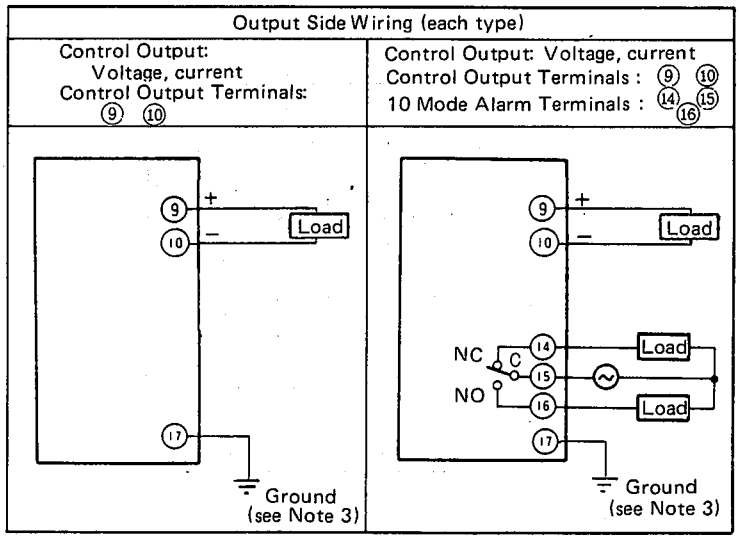


Fig. 4

NOTE 1: For external shift input, use the following:
External Shift Input: Dry Contact
Contact Material: Gold Contact
Current: 0.5 mA
Maximum Resistance at ON: 100 Ω

NOTE 2: When input is thermocouple, do not short-circuit the terminals ⑦ & ⑧ . If shorted will cause error indication.

NOTE 3: Grounding terminal ⑰ will be used only for sealed wire.

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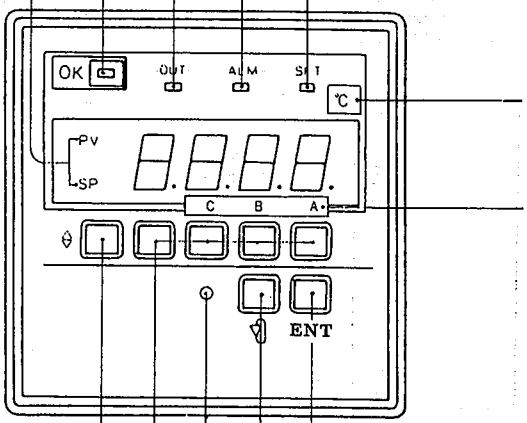
4. FRONT PANEL LAYOUT



PV/SP Indicator: PV: Lights when indicating PV value.
SP: Lights when indicating SP value.

OK Lamp: Lights to indicate |SP–PV| ≦ Ob set point.

Output Operation LED: Lights to indicate output
(Do not indicate for current output type)

Alarm Indicator LED: Lights to indicate alarm action.

Shift Operation LED:
Lights to indicate external shift input closed.

Industrial Unit Label: (see NOTE).

One Touch Shift Label: (see NOTE).

ENT-Key: Stores set point into memory.

Setting Item Selection Key: Indicates change of setting item.

Set UP Use Pinhole Key: For change of initial parameter value.

Numerical Value Change Key: For changing numerical value of each digit.

Increment/Decrement Key: For raising or lowering numerical values.

NOTE: Apply a proper label from accessory attached.

Fig. 5

5. MAIN SETTINGS AND PARAMETER SETTINGS

1. Precautions

Apply voltage after checking the controller's power supply voltage.

2. Setting of Main Set Point

(1) PV (input value), SP (main set point), PV/SP (output value) will be indicated.

Each time the ▢ key is pressed, the indicator display will change, according to the order given in TABLE 2.

(2) By pushing the ▢ key, it will cause SP to be in dicated.

(3) When the ▲▼▢ key is pushed, value increment/decrement will be given to the ▢▢▢▢ upper numerical value change keys.
The initial condition's increment. The condition is alternatively changed at every key push.

(4) When the ▢▢▢▢ numerical value change keys are pushed, all set point digits will be displayed. When the ▢ ENT key is pressed, main set points will be stored into memory.

3. Setting of Control Parameters

(1) When the ▢ key is pressed, PV/SP (output value) will be indicated.

(2) When the ▢ ENT key is pushed for about 3 seconds, (buzzer will sound 5 times), the name of initial control parameter indicated in TABLE 3 is indicated for two seconds and disappears. Then, the initial set point value will be displayed, signifying switchover to the control parameter mode.

(3) After changing the initial control parameter value to the desired set point by pushing the ▲▼▢ key and ▢▢▢▢ numerical value change keys, push to ▢ ENT key to store into memory.

(4) When the ▢ key is pushed, the next control parameter will be recalled. Follow the same setting order given in (3).

(5) After completing setting of all of the required control parameters, the controller will return to the operation mode.

TABLE 2: OPERATION MODE

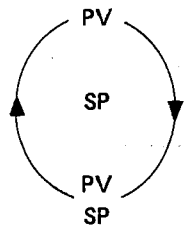
INDICATION AND THE ORDER	ITEM INDICATED	SETTING RANGE	INITIAL SET POINT (Factory setting)	UNIT	REMARKS
	Input Value (process value)	0 – 100% FS	50% FS	U	U: Industrial Unit
	Main Set Point			U	
	Output Value			%	

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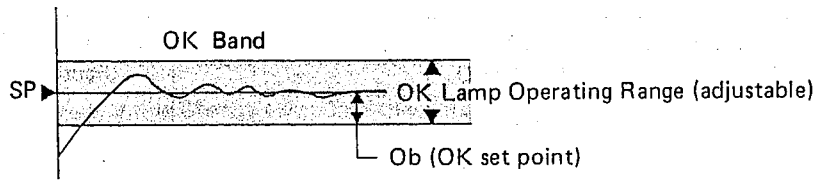
TABLE 3: CONTROL PARAMETER MODE

INDICATION AND THE ORDER	ITEM INDICATED	SETTING RANGE	INITIAL SET POINT (Factory setting)	UNIT	REMARKS
SA	SA Set Point	0 – 100% FS	50% FS	U	One-touch shift.
Sb	SB Set Point	0 – 100% FS	0% FS	U	One-touch shift or upper limit setting limit. (see NOTE 2)
SC	SC Set Point	0 – 100% FS	100% FS	U	One-touch shift or upper limit setting limit (see NOTE 2)
P	Proportional Band	0 – 39 1 – 39	39 39	%FS %FS	At p=0 ON-OFF control, current output.
I	Integral Time	0 – 300	0	Sec.	At I=0, integral action, off
d	Derivative Time	0 – 300	0	Sec.	At D=0, derivative action, off
Ad	Main Set Point Manual adjustment off-set elimination	−1/10 span to +1/10 span −1/2 to +1/2 proportional band	0 0	U	For ON-OFF control: For time proportioning control.
dF	Differential	1 – 100	10	U	For ON-OFF control
AL	Alarm Set Point	0 – 1/2 span 0 – 100% FS	0 0	U	Alarm mode # 0 to 7 Alarm mode # 8 to 9
ob	OK Lamp	1 – 100	10	U	See NOTE 3.
PV → SP → PV SP	Operation Mode				

NOTE 1: Kind and number of parameters are different in accordance with the type of controller.

NOTE 2: When setting upper and lower setting limits, SB <SC.

NOTE 3: Control condition can be confirmed with the OK lamp.



6. SET UP

1. When initial standard specifications are to be altered, or when optional setting is selected, set up will be necessary. Set up involves the following items:

(1) Change of input type and range.
(2) Change of normal/reverse output action.
(3) Change of alarm mode.
(4) Setting of programmable range decimal point position.
(5) Change of programmable range upper and lower limits.

2. Precautions for Set Up

(1) When the chassis is to be removed from its case, be sure to disconnect the controller's power source.
(2) Do not get the instrument's terminal plate dirty.
(3) Keep in mind that when set up is performed while the instrument is in operation, output will instantly drop to zero upon completion.

3. Order for Shifting Over to Set Up Mode

(1) Set up can be performed when any of the PV, SP, SV/SP operation modes are indicated.

(2) Lightly push the ○ pinhole key with a pencil, etc., for 3 seconds (buzzer will sound 5 times).

C1 indicates for 2 seconds and disappears. The initial set mode number will be indicated and set up mode will be achieved.

(3) Each time the □ key is pushed, all modes in the order given in TABLE 4 will be displayed.

(4) When performing set up, the ▲▼□ key will not function. Perform each digit change from 1 to 9 using the □□□□ keys only.

(5) When set up is completed, the mode return to the operation mode.

TABLE 4: SET UP MODE

INDICATION, INDICATION ORDER (NOTE)	ITEM INDICATED	SETTING RANGE	INITIAL SET POINT (Factory set)	UNIT	REMARKS
C1	Input Type/range	TABLE 5	As Specified	U	
	Output Normal/reverse action	TABLE 6	0		
	Setting Method	TABLE 7	0		
C2	Alarm Mode	TABLE 8	1	U	With programmable range.
	Decimal Point Position	TABLE 9	0		
C3	Programmable Range Lower Limit	TABLE 10	0	U	With programmable range.
C4	Programmable Range Upper Limit	TABLE 11	1000	U	With programmable range.
PV → SP → PV SP	Operation Mode	NOTE: Indicator types and number vary according to the type of controller.			

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3-1 CHANGES OF INPUT TYPE/RANGE, OUTPUT DIRECT/REVERSE ACTION, AND SETTING METHOD

(1) Changing Input/Type and Range (see PHOTO 1, TABLE 5)

1 After disconnecting the controller's power source, select the type of input by configurating the DIP switch. Replace in the case, and apply power.

2 Push the set up ○ pinhole key. C 1 is displayed for two seconds, followed by the initial range mode number. After this, set the desired range mode number in the first digit by pressing the □ numerical value change key. Push the □ ENT key to store into memory. (The microcomputer will automatically perform zero span adjustment.)

(2) Output Normal/Reverse Action Change (see Table 6)

Push the set up ○ pinhole key. C 1 is displayed for two seconds, followed by indication of the intial action output mode No. After this, set the desired output action mode number in the second digit by pressing the □ numerical value change key. Push the □ ENT key to store into memory.

(3) Changing the Setting Method (see TABLE 7)

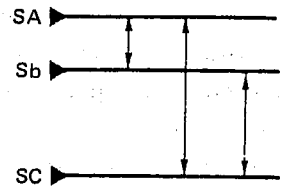
Push the set up ○ pinhole key. C 1 is displayed for two seconds, followed by indication of the initial setting method mode No. After this, set the desired setting method mode number in the third digit by pressing the □ numerical value setting key. Push the □ ENT key to store into memory.

(4) When two or all of the above items (1) – (3) are to be performed at the same time, set all of the digits, one-by-one, after C 1 indication. By pushing the □ ENT key once, they can be stored into memory.

Also, it is possible to begin setting with any of the digits first.

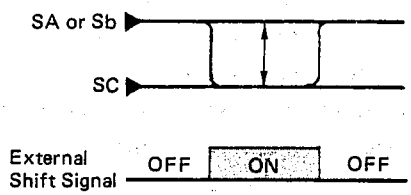
NOTE 1: ONE-TOUCH SHIFT:

(1) Local One-Touch Shift



Set the 3 set points SA, Sb and SC in advance.
By pushing the C B A □□□ keys, one desired set point can be designated.

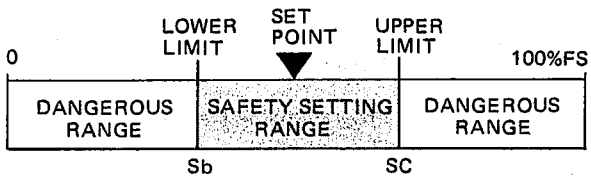
(2) Remote One-Touch Shift



Set the 3 set points SA, Sb and SC, in advance.
Two setting changes can be accomplished.
If external terminals ④ — ⑤ are open, then SA or Sb ← SC.
If external terminals ④ — ⑤ are closed, then SA or Sb → SC.
In this case, the set point will not be changed even by pushing C B A □□□ keys.

NOTE 2: SETTING LIMITS:

To prevent missetting into dangerous ranges, upper and lower limits for safe setting range can be set.
In this case, Sb will serve as the lower limit point, and SC as the upper limit point.



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INDICATOR

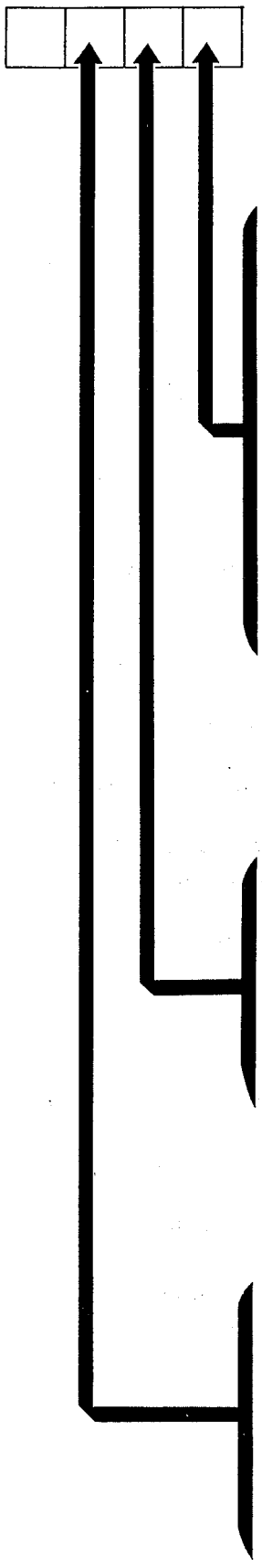

TABLE 5: RANGE MODE NUMBER AND DIP SWITCH POSITION

① RANGE MODE No.	INPUT TYPE/RANGE		RANGE CODE No.	② DIP SWITCH POSITION 1 2 3 4 5 6 7 8 9 10
0	0 – 400°C	J	J04	1 0 0 0 0 1 1 0 0 1
1	0 – 400°C	K	K04	
2	0 – 1600°C	R	R16	
3	0 – 1200°C	K	K09	1 0 0 0 0 1 1 0 0 0
4	0 – 100°C	JIS Pt 100Ω	P01	1 0 1 1 0 0 0 1 1 0
5	0.0 – 100.0°C	JIS Pt 100Ω		
6	-50 to 200°C	JIS Pt 100Ω	~~P36~~	0 0 1 1 0 0 0 1 1 0
7	-50.0 to 200.0°C	JIS Pt 100Ω		
8	0 – 400°C	JIS Pt 100Ω	P04	
9	1 – 5Vdc	programmable range	V01	1 0 1 1 0 1 1 0 0 0
Remarks:	① Specified range no. is set at factory		② 1 : ON side 0 : OFF side	

TABLE 6: OUTPUT ACTION

OUTPUT ACTION MODE No.	OUTPUT TYPE		
	VOLTAGE · CURRENT	RELAY CONTACT	CYCLE TIME
0	Reverse Action	Reverse Action	40 sec.
1	Direct Action	Direct Action	40 sec.
2	–	Reverse Action	20 sec.
3	–	Direct Action	20 sec.
Remarks	No. 0 is set at factory.		

TABLE 7: SETTING METHOD

SETTING METHOD MODE No.	SETTING METHOD TYPE	
0	Does not lock set point	
1	Locks set point	
2	Setting limit	Available for one-touch shift option
3	One-touch shift	
Remarks	No. 2 & 3 can not be used at the same time. No. 0 is set at factory.	

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INPUT TYPE CHANGE DIP SWITCH

Facing the controller chassis at it is removed from its case, this DIP switch will be found on the right hand side.

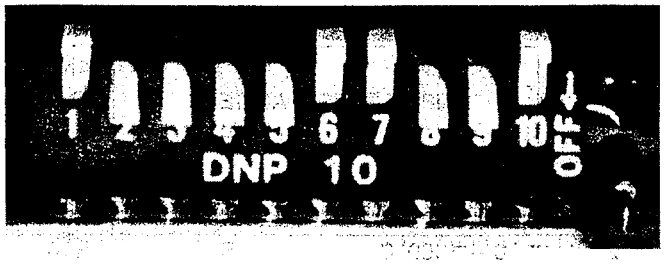

PHOTO 1

3-2 CHANGE OF ALARM MODE AND PROGRAMMABLE RANGE DECIMAL POINT POSITION

CAUTION:

When changing the alarm mode and setting the alarm point; since entering erroneous information may easily cause an accident, all input and output terminals other than the controller's power supply terminals ① - ② or ① - ③ should be disconnected. Once the setting and change are completed, return to the original wiring in accordance with the wiring diagram.

(1) Change of Alarm Mode (TABLE 8)

Push the ▢ key. C2 is displayed, followed by indication of the initial alarm mode No. After this, push the ▢ numerical value change key to set the desired alarm mode number in the first key. Push the ▢ ENT key to store into memory.

(2) Change of Programmable Range Decimal Point Position (TABLE 9).

Push the ▢ key. C2 is displayed, followed by indication of the initial decimal point position mode No. After this, push the ▢ numerical value setting key to set the desired decimal point position mode no. in the second digit. Push the ▢ ENT key to store into memory.

NOTE:

When changing (1) and (2) at the sam time; after C2 is indicated, set each of the digits of (1) and (2), and push the ▢ ENT key once to store into memory.

Also, starting with any digit is possible.

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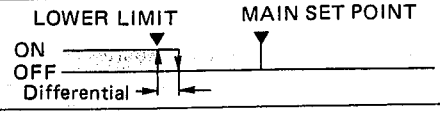
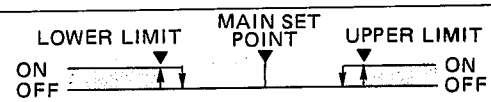
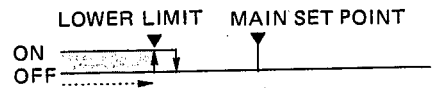
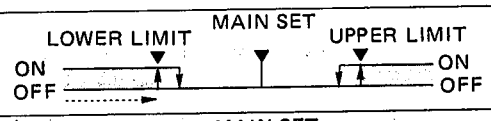
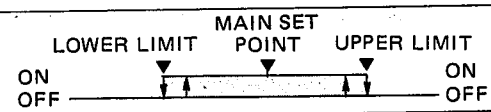
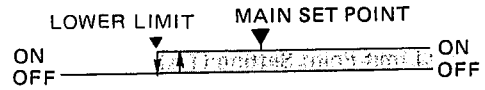
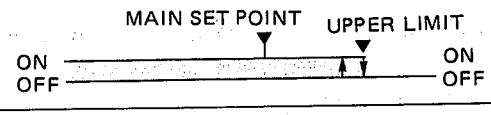
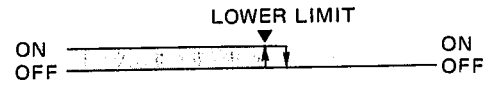
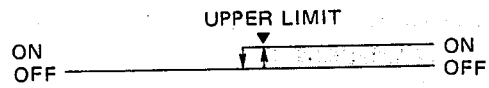
INDICATOR

TABLE 8: ALARM MODE SELECTION GUIDE

MODE No.	ALARM MODE	ACTION When relays of each mode are ON : terminals (14) - (15) open : terminals (14) - (16) closed
0	Lower Limit Alarm	
1	Upper Limit Alarm	
2	Upper & Lower Limit Alarm	
3	Lower Limit Alarm with Stand-by Sequence*	
4	Upper & Lower Limit Alarm with Stand-by Sequence*	
5	Upper & Lower Limit Alarm, NC Contact Output	
6	Lower Limit Alarm, NC Contact Output	
7	Upper Limit Alarm NC Contact Output	
8	PV Lower Limit Alarm	
9	PV Upper Limit Alarm	
Remarks	Factory set at No. 1.	

*With stand-by sequence.

- When initially operating, if actual temperature is lower than lower limit, the alarm will not operate.
- When the temperature rises above the lower limit, and then the temperature falls back once below the lower limit, the alarm will operate.

TABLE 9: PROGRAMMABLE RANGE DECIMAL POINT POSITION

DECIMAL POINT POSITION MODE No.	DECIMAL POINT POSITION	
0	No Decimal Point	X X X X
1	Decimal Point Not More Than 1 Digit	X X X. X
2	Decimal Point Not More Than 2 Digits	X X. X X
Remarks	Factory setting : No.0	

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3-3 PROGRAMMABLE RANGE UPPER AND LOWER LIMIT SETTING

Only possible with 1 - 5 Vdc Linear Input.

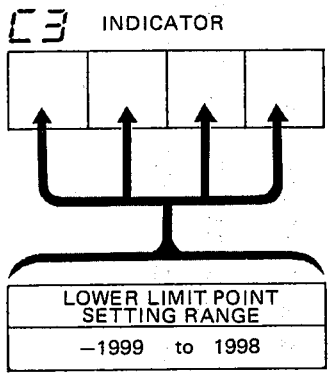
Applicable also to any process variable and range other than temperature by an input converted to 1 - 5 Vdc signal.

(1) Lower Limit Point Setting (TABLE 10)

Push the ▢ key. C3 is displayed, followed by the initial lower limit value.

After this, push the ▢▢▢▢ numerical value change keys to set the desired lower limit point. Push the ▢ ENT key to store into memory.

TABLE 10

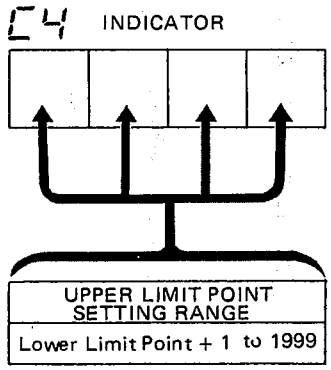


(2) Upper Limit Point Setting (TABLE 11)

Push the ▢ key. C4 is displayed, followed by the initial upper limit value.

After this, push the ▢▢▢▢ numerical value change keys to set the disired upper limit point. Push the ▢ ENT key to store into memory.

TABLE 11



(3) Decimal Point Position Setting

Refer to Item 3-2 and TABLE 9, concerning change of decimal point positions.

(4) Industrial Unit Indication

When setting the programmable range, select the corresponding industrial unit seal, and place it in the indicator provided.

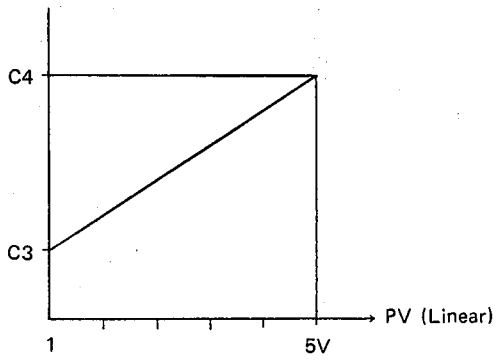


Fig. 6

7. TROUBLESHOOTING

1. DETECTION OF INPUT ABNORMALITY

When input becomes abnormal, Er-0 will be indicated.

(1) When the input value is less than -15% FS or over 115% FS, Er-0 will be indicated. However, control action will continue to operate.

(2) When the thermocouple is broken, Er-0 will be indicated. (Upscale burnout)

2. SELFDIAGNOSTIC FUNCTION

When an error is generated, Er-1 will be indicated. The selfdiagnostic function will perform a data check of control parameters, etc.

When Er-1 is indicated;

(1) Confirm data in the order of the set up → control parameter → setting.

(2) If the indication is different from the initial data, enter the correct data.

(3) Finally, disconnect the controller's power source, or go to the set up mode, and cause it to advance C1 → C2 → C3 → C4 and return to initial condition. At this point, if Er-1 disappears, the controller is operating normally. If Er-1 continues to be indicated, contact Honeywell, or the distributor from which the controller was purchased.

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8. SPECIFICATIONS AND MODEL SELECTION GUIDE

SPECS.	SA90 SERIES DIGITAL TEMPERATURE INDICATING CONTROLLER	
Indication Method	Digital 4 digit 7 segment LED	
Setting Method	Digital (with set lock, sound key) Standard setting method SP ▼ → TEMP	
Alarm	No alarm	
Alarm Setting Range	—	
Alarm Output	—	
Mask Color	Blue (Muncell 2.5 PB 6/9)	
Control Mode	Time proportional (ON/OFF at P = 0)	Time proportional (ON/OFF at P = 0)
Output	SPDT relay contact	Voltage
Output Rating	5A, 240Vac Resistance load	ON voltage: 23 — 43Vdc Internal resistance 1.5KΩ with short circuit-proof
Proportional Band (P)	0 — 39% FS	0 — 39% FS
Cycle Time	20/40 sec. selectable	2 sec. fixed
Setpoint Manual Calibration (Offset Removed)	ON/OFF mode (P = 0): −1/10 to +1/10 span Time proportional mode (P ≠ 0): −1/2 to +1/2 proportional band	
Integral Time (I)	—	—
Derivative Time (D)	—	—
Differential	1 — 100 U adjustable	1 — 100 U adjustable
Normal/Reverse Action	Selectable	Selectable
Setting Range for OK Lamp ON		
Input Type and Range	Thermocouples, RTD, 1 — 5Vdc.	
Options	One-touch shift or set limit	Setting range:
	Programmable range	Setting range: (DC1 — 5V)

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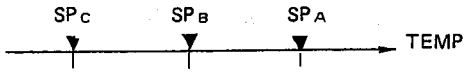
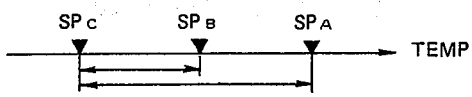
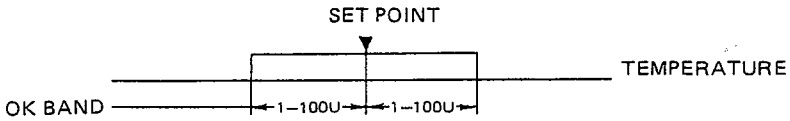
Indication range	0 – 100% FS	Indicating accuracy	±0.8% FS ±1 digit
Setting range	0 – 100% FS	Setting accuracy	Error-free
One-touch shift method (Option)		External shift method (Option)	
 Using one-touch key, changing of 3 set points is possible.		 Possible to change 3 set points with external shift signal If "ON" signal, then $SP_A \rightarrow SP_C$ or $SP_B \rightarrow SP_C$ If "OFF" signal, then $SP_A \leftarrow SP_C$ or $SP_B \leftarrow SP_C$	

With 10 mode alarm: 1 out of 10 modes can be selected (Modes 0 – 9)

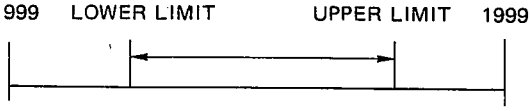
Alarm mode 0–7: 0–1/2 span, mode 8–9: 0–100% FS

SPDT relay contact (Contact rating 240Vac, 5A resistive load),
Differential 2U fixed (U: Industrial unit including decimal point)

Black (Equivalent to muncell N2)		Metalic gold
Time proportional PID	Time proportional PID	Continuous proportional PID
SPDT relay contact	Voltage	Current
5A, 240Vac	On voltage: 23–43Vdc	4 – 20mA dc, output load resistance less than 500Ω
Resistance load	Internal resistance 1.5KΩ with short circuit-proof	Output sampling rate 1 sec. output resolution within 1%
0 – 39% FS	0 – 39% FS	1 – 39% FS
20/40 sec. selectable	2 sec. fixed	–
		–
0 – 300 sec.	0 – 300 sec.	0 – 300 sec.
0 – 300 sec.	0 – 300 sec.	0 – 300 sec.
1 – 100 U adjustable	1 – 100 U adjustable	–
Selectable	Selectable	Selectable



Input type and range can be selected using the DIP switch and set up key
(See model selection guide, No. V)

Upper limit 0 – 100% FS Lower limit 0 – 100% FS	Setting limit, one-touch shift, remote shift set possible.
Lower limit: –1999 to 1998 Upper limit: Lower limit +1 – 1999 Decimal point: Possible to designate one or two digits.	

Alarm Indication:
At sensor burnout, or EEROM check sum abnormal.
Input Sampling Rate: 1 sec.
Allowable Wiring Resistance:
Thermocouple: less than 160Ω in return
RTD; less than 4Ω
Input Bias Current:
Thermocouple/Voltage Signal: Within ± 0.8μA
RTD: 0.5mA
Burnout:
Upscale (thermocouple only)
Rated Power Supply Voltage:
100/110V, 120V, 200/220V, 240Vac, 50 - 60Hz

Allowable Power Supply Voltage:
90 - 121V at 100/110V rating,
180 - 242V at 200/220V rating.
102 - 132V at 120V rating
204 - 264V at 240V rating
Power Consumption: Less than 6W
Case Material: Heat resistant resin
Weight: Approx. 500g
Installation: Panel Mounting
Accessory: Mounting Brackets (1 set) Part No. N-3174
Auxiliary Parts (option):
Dustcover Part No. N-81401330A
Terminal Cover Part No. N-3170

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COSMOPAK MODEL SELECTION GUIDE

Example:

I	II	III	IV	V	VI	VII
SA 9	3	A	G	K04	00	Q

☆ SA9/SE9: Honeywell version available

No.	Code	Availability									Model - Temperature Controller			
											Version	Setting	Indication	Mask Size
I	SA9	↓									YH	Digital (Key)	Digital	96x96 mm
	☆SA9		↓								Honeywell	Digital (Key)	Digital	96x96
	SE9			↓							YH	Digital (Key)	Digital	48x96
	☆SE9				↓						Honeywell	Digital (Key)	Digital	48x96
	SA6					↓					YH	Digital (Thumwheel)	—	96x96
	SA8						↓				YH	Digital (Thumwheel)	Analog	96x96
	SE6							↓			YH	Digital (Thumwheel)	—	48x96
	SE7								↓		YH	Digital (Thumwheel)	Analog	48x96
	SA1									↓	YH	Analog (Dial)	—	96x96
	SA3									↓	YH	Analog (Dial)	Analog	96x96
II											Alarm			
	0	○	●	○	●	○	○	○	○	○	○	None		
	1					○	○	○	○	○	○	Upper or lower limit alarm		
	2					○	○			○	○	8 mode alarm		
	3	○	●	○	●							10 mode alarm		
III											Mask color			
	A	○		○		○	○	○	○	○	○	Blue		
	B	○		○		○	○	○	○	○	○	Black		
	C	○		○		○	○	○	○	○	○	Metalic gold		
	D		●		●							Honeywell blue		
IV											Control mode - output			
	A					○	○	○	○	○	○	ON/OFF relay contact (SPDT)		
	C	○	●	○	●	○	○	○	○	○	○	Time prop. relay contact (SPDT)	ON/OFF at P=0 for	
	D	○	●	○	●	○	○	○	○	○	○	Time prop. voltage (23 to 43 Vdc)	SA9/SE9	
	E	○	●	○	●							Time prop. relay contact (SPDT)	PID	
	F	○	●	○	●							Time prop. voltage (23 to 43 Vdc)	PID	
	G	○	●	○	●							Current prop. (4-20 mAdc)	PID	
V											Input Type and Range (°C) - Field selectable for SA9/SE9			
	J02								○	○	T/C J	0 to 200C		
	J04	○	●	○	●	○	○	○	○	○	○	T/C J	0 to 400C (399C for SA6/8 SE6/7)	
	K03								○	○	T/C K	0 to 300C		
	K04	○	●	○	●	○	○	○	○	○	○	T/C K	0 to 400C (399C for SA6/8 SE6/7)	
	K06								○	○	T/C K	0 to 600C		
	K15			○	●	○	○	○	○	○	○	T/C K	0 to 1000C (999C for SA6/8 SE6/7/9)	
	K09	○	●						○	○	T/C K	0 to 1200C		
	R16	○	●						○	○	T/C R	0 to 1600C		
	P10								○	○	Pt100-ohm (JIS)	0 to 50C		
	P01	○		○		○	○	○	○	○	○	Pt100-ohm (JIS)	0 to 100C (99.9C for SA6/8 SE6/7)	
	P12								○	○	Pt100-ohm (JIS)	0 to 150C		
	P35								○	○	Pt100-ohm (JIS)	-50 to 150C		
	P02					○	○	○	○	○	○	Pt100-ohm (JIS)	0 to 200C (199C for SA6/8 SE6/7)	
	P36	○		○								Pt100-ohm (JIS)	-50 to 200C	
	P03								○	○	Pt100-ohm (JIS)	0 to 300C		
	P04	○		○		○	○	○	○			Pt100-ohm (JIS)	0 to 400C (399C for SA6/8 SE6/7)	
	H05		●		●							Pt100-ohm (IEC DIN)	0 to 100C	
	H06		●		●							Pt100-ohm (IEC ")	0 to 400C	
	H04		●		●							Pt100-ohm (IEC ")	-50 to 200C	
	C01								○	○	4-20 mAdc	0 to 100%		
	C02								○	○	4-20 mAdc	0 to 50%		
	V01	○	●	○	●						1-5Vdc	0 to 100%		
		○	●								1-5Vdc	Programmable range		
VI											☆☆ One touch shift or setting limit		Programable range	
	00	○	●	○	●	○	○	○	○	○	○	—		—
	01	○	●									—		○
	02	○	●	○	●							○		—
	03	○	●									○		○
	01								○	○	With set point position stopper			
VII											Power			
	—	○		○		○	○	○	○	○	○	100/110V or 200/220V 50/60Hz		
	Q	○		○		○	○	○	○	○	○	120/240V 50/60Hz		
	R		●		●							115/230V (120/240V) 50/60Hz (European region)		
	U		●		●							115/230V (120/240V) 50/60Hz (Other Regions)		

☆☆ Select one function (one touch shift and setting limit cannot be used at the same time.)

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ORDERING INFORMATION

Specify—

1. Model Number
2. Specifications
3. Accessories

Order Form—

1. Your usual source, or
2. Yamatake-Honeywell Co., Ltd.
   Nagai International Building,
   2-12-19, Shibuya, Shibuya-ku,
   Tokyo, 150 Japan