azbil

No. CP-UM-1332E

IP50TC, IP50RD, IP50PM
INTELLPAK
mV-I Converter

User's Manual

Yamatake Corporation

RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.
Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

REQUEST

Ensure that this User's Manual is handed over to the user before the product is used.

Copying or duplicating this User's Manual in part or in whole is forbidden. The information and specifications in this User's Manual are subject to change without notice.

Considerable effort has been made to ensure that this User's Manual is free from inaccuracies and omissions.
If you should find any inaccuracies or omissions, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

SAFETY PRECAUTIONS

⚠WARNING Warnings are indicated when mishandling this product might result in death or serious injury.

⚠CAUTION Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.

⚠WARNING

- Before wiring, or removing/mounting the IP50, be sure to turn the power OFF. Failure to do so might cause electric shock.

⚠CAUTION

- Before removing or mounting the IP50, be sure to turn the power OFF. Failure to do so might cause electric shock.
- Use the IP50 within the operating ranges recommended in the specifications (temperature, humidity, voltage, vibration, shock, mounting direction, atmosphere, etc.).
- Do not block ventilation holes. Doing so might cause fire or faulty operation.
- Do not disassemble the IP50. Doing so might cause electric shock or faulty
- Before wiring the IP50, be sure to turn the power OFF. Failure to do so might cause electric shock.
- Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.
- Do not allow lead clippings, chips or water to enter the controller case. Doing so might cause fire or faulty operation.
- Firmly tighten the terminal screws at the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
- Do not use unused terminals on the IP50 as relay terminals. Doing so might cause electric shock, fire, or faulty operation.

CONTENTS

1. Introduction and Specifications

1. INTRODUCTION

The IntellpaK IP50TC, RD, and PM are thin plug-in system mV-I converters, which convert the input signal from a thermocouple, resistance thermometer bulb or potentiometer, etc. into a DC voltage or current output.

2. SPECIFICATIONS

Input part	Model	Thermocouple converter	Resistance thermometer bulb converter	Potentiometer converter
	Basic type No.	IP50TC	IP50RD	IP50PM
	Input type	Thermocouple. Refer to Table 1.	Resistance thermometer bulb. Refer to Table 2.	Potentiometer. Refer to Table 3.
	Input bias current	± 0.1μA or less	Approx. 2mA	± 0.02μA or less
	Input impedance	1 MΩ or more	—	—
	Wiring resistance	1 kΩ or less	200Ω or less in each wire	0.1% or less of potentiometer rating in each wire
	Cold junction compensation accuracy	J·E·T·K: ±0.5°C R·W: ±1.0°C (within −5 to +55°C)	—	—
	Linearize	Provided	Provided	—
	Burnout	Up scale at input disconnection	Up scale at input disconnection	—
	Zero span adjustment	± 10% (3-revolutions trimmer)	± 10% (3-revolutions trimmer)	Zero span: 0 to 50% FS +50 to 100% FS Refer to Table 3.
Output part	Output type	DC voltage, DC current, Refer to Table 5.	DC voltage, DC current, Refer to Table 5.	DC voltage, DC current, Refer to Table 5.
	Allowable load resistance	Refer to Table 5.	Refer to Table 5.	Refer to Table 5.
General specifi-cations	Accuracy	± 0.4% FS	± 0.2% FS	± 0.1% FS
	Response time	25ms (at 90% response)	25ms (at 90% response)	25ms (at 90% response)
	Power supply type	AC		DC
	Rated power voltage	100 to 120V AC 50/60Hz common		24V DC
	Operating power voltage	80 to 132V AC 50/60Hz		24V DC ± 10%
	Power consumption	Approx. 5.5VA		Approx. 2.7VA
	Starting current	—		0.11A or less
	Peak value and width of power switching current	10A or less, 1ms		5A or less, 1ms
	Insulation resistance	100MΩ or more between I/O terminal and power terminal, or between I and O terminals (isolated) when measured by 500V DC megger.		
	Dielectric strength	2000V AC, 1 min between I/O terminal and power terminal, or I and O terminals (isolated type)		
	Power supply characteristic	± 0.1% FS/90 to 132V AC		± 0.1% FS/24V DC ± 10%
	Temperature characteristic	± 0.15% FS/10°C		

General specifi-cations	Operating ambient temperature	– 5 to +55°C, without freezing
	Storage ambient temperature	– 20 to +70°C, without freezing
	Operating ambient humidity	90% RH or less, without condensation
	Storage ambient humidity	90% RH or less, without condensation
	Vibration resistance *	4.9m/s^2 or less, 10 to 60Hz, for 2 hr in each direction of X, Y and Z (with vibration-absorbing bracket)
	Shock resistance *	490m/s^2 or less. 3 times each, up or down
	Case material	Heat-resisting ABS resin
	Case color	Gray, Munsell 2.5PB3.5/1
	Wiring terminal screw	M3.5
	Installation	Installed on wall or DIN rail
	Mass	Approx. 220g (including the base socket)

* Not applicable when this unit is mounted on DIN rail.

Standard accessories	Base socket, Part No. QN719A
Auxiliary parts (option)	Vibration-absorbing bracket, Part No. QN718A

2. Type Number

Configuration of Type Number

I	II	III	IV	V	0	VI

Example 1: IP50TCAKEAA00 2. IP50TCAIKAA0001C1

I	II	III	IV	V	VI	Contents	
Basic type No.	Tempera-ture range	Output types	Power voltage	Additional processing	Temperature range specification		
IP50TCA						Non-isolated type: thermocouple converter	Table 1. Only the thermocouple input is applicable.
IP50TCC						Isolated thermocouple converter	
IP50RDA						Non-isolated resistance thermometer bulb converter	Table 2. Only the resistance thermometer bulb input is applicable.
IP50RDC						Isolated resistance thermometer bulb converter	
IP50PMA						Non-isolated potentiometer converter	Table 3. Only the potentiometer input is applicable.
IP50PMC						Isolated potentiometer converter	
Selected from Tables 1 to 3.						—	
	Selected from Table 5.					—	
			A			100 to 120V AC 50/60Hz common	
			D			24V DC	
				0		None	
				T		With tropical zone processing	
				D		Inspection Certificate provided	
				B		With tropical zone processing, and test data	
				Y		Complying with the traceability certification	
				Selected from Table 4.		Refer to Note 1.	

Note 1: In case of the standard range, the relevant Type No. shall be entered in [II], but nothing need be entered in [VI].

For the semi-standard range, the relevant Type No. including the temperature range shall be entered in [II], and further the Type No. for specifying the temperature range, which is configured from Table 4, shall be entered in [VI].

Table 1. Thermocouple Input: Applied to IP50TCA and IP50TCC

Input type	Range type	Type No.	Input type and range	Type No.	Input type and range	Type No.	Input type and range
Standard range	General type	KE	K 0 to 250°C	ED	E 0 to 200°C	WK	WRe5-26 0 to 600°C
		KF	K 0 to 300°C	EE	E 0 to 250°C	WL	WRe5-26 0 to 800°C
		KH	K 0 to 400°C	EF	E 0 to 300°C	WM	WRe5-26 0 to 1000°C
		KJ	K 0 to 500°C	EH	E 0 to 400°C	WN	WRe5-26 0 to 1200°C
		KK	K 0 to 600°C	EJ	E 0 to 500°C	WP	WRe5-26 0 to 1300°C
		KL	K 0 to 800°C	EK	E 0 to 600°C	WQ	WRe5-26 0 to 1400°C
		KM	K 0 to 1000°C	TE	T 0 to 250°C	WR	WRe5-26 0 to 1600°C
		KN	K 0 to 1200°C	TF	T 0 to 300°C	WS	WRe5-26 0 to 1800°C
		JD	J 0 to 200°C	RM	R 0 to 1000°C	WT	WRe5-26 0 to 2000°C
		JE	J 0 to 250°C	RN	R 0 to 1200°C	WU	WRe5-26 0 to 2300°C
		JF	J 0 to 300°C	RP	R 0 to 1300°C	—	—
		JH	J 0 to 400°C	RQ	R 0 to 1400°C	—	—
		JJ	J 0 to 500°C	RR	R 0 to 1600°C	—	—
		JK	J 0 to 600°C	—	—	—	—
	Narrow span type	K1	K 0 to 100°C	E1	E 0 to 100°C	R4	R 0 to 400°C
		K2	K 0 to 150°C	E2	E 0 to 150°C	R5	R 0 to 500°C
		K3	K 0 to 200°C	T1	T 0 to 100°C	R6	R 0 to 600°C
		J1	J 0 to 100°C	T2	T 0 to 150°C	R7	R 0 to 800°C
		J2	J 0 to 150°C	T3	T 0 to 200°C	—	—
Semi-standard range (span specification)	General type	0K	Temperature range span: 100°C or more within K 0 to 1200°C			• Configure the type No. of the temperature range specification according to Table 4, and enter the result in VI. • The lower limit of the range should be 0°C.	
		0J	Temperature range span: 100°C or more within J 0 to 600°C				
		0E	Temperature range span: 100°C or more within E 0 to 600°C				
		0T	Temperature range span: 100°C or more within T 0 to 300°C				
		0R	Temperature range span: 400°C or more within R 0 to 1600°C				
		0W	Temperature range span: 600°C or more within WRe5-26 0 to 2300°C				

Note: Linearization processing range for R and WRe5-26 thermocouples is 30% FS to 100% FS.

Table 2. Resistance Thermometer Bulb Input: Applied to IP50RDA and IP50RDC

Category	Range type	Type No.	Input type and range	Type No.	Input type and range	Type No.	Input type and range
Standard range	General type	FA	JIS Pt100Ω (IEC・DIN) 0 to 50°C	PA	Old JPT100Ω 0 to 50°C	NA	Ni508Ω 0 to 50°C
		FB	JIS Pt100Ω (IEC・DIN) 0 to 100°C	PB	Old JPT100Ω 0 to 100°C	NB	Ni508Ω 0 to 100°C
		FC	JIS Pt100Ω (IEC・DIN) 0 to 150°C	PC	Old JPT100Ω 0 to 150°C	NC	Ni508Ω 0 to 150°C
		FD	JIS Pt100Ω (IEC・DIN) 0 to 200°C	PD	Old JPT100Ω 0 to 200°C	ND	Ni508Ω 0 to 200°C
		FE	JIS Pt100Ω (IEC・DIN) 0 to 250°C	PE	Old JPT100Ω 0 to 250°C	NN	Ni508Ω – 20 to 80°C
		FF	JIS Pt100Ω (IEC・DIN) 0 to 300°C	PF	Old JPT100Ω 0 to 300°C	NP	Ni508Ω – 20 to 100°C
		FG	JIS Pt100Ω (IEC・DIN) 0 to 350°C	PG	Old JPT100Ω 0 to 350°C	NQ	Ni508Ω – 20 to 50°C
		FH	JIS Pt100Ω (IEC・DIN) 0 to 400°C	PH	Old JPT100Ω 0 to 400°C	—	—
		FJ	JIS Pt100Ω (IEC・DIN) 0 to 500°C	PJ	Old JPT100Ω 0 to 500°C	—	—
		FK	JIS Pt100Ω (IEC・DIN) 0 to 600°C	PK	Old JPT100Ω 0 to 600°C	—	—
		FN	JIS Pt100Ω (IEC・DIN) – 20 to 80°C	PN	Old JPT100Ω – 20 to 80°C	—	—
		FP	JIS Pt100Ω (IEC・DIN) – 20 to 100°C	PP	Old JPT100Ω – 20 to 100°C	—	—
		FQ	JIS Pt100Ω (IEC・DIN) – 50 to 50°C	PQ	Old JPT100Ω – 50 to 50°C	—	—
		FR	JIS Pt100Ω (IEC・DIN) – 50 to 100°C	PR	Old JPT100Ω – 50 to 100°C	—	—
		FS	JIS Pt100Ω (IEC・DIN) – 100 to 100°C	PS	Old JPT100Ω – 100 to 100°C	—	—
		FT	JIS Pt100Ω (IEC・DIN) – 200 to 200°C	PT	Old JPT100Ω – 200 to 200°C	—	—
Semi-standard range	Span specification type	0F	Temperature range with a span of 50°C or more within JIS Pt100Ω (IEC・DIN) – 200 to 600°C.				
		0P	Temperature range with a span of 50°C or more within the old JIS Pt100Ω (IEC・DIN) – 200 to 600°C.				
		0N	Temperature range with a span of 50°C or more within Ni508 – 50 to 250°C.				

- Configure the type No. of the input range specification according to Table 4, and enter the result in VI .

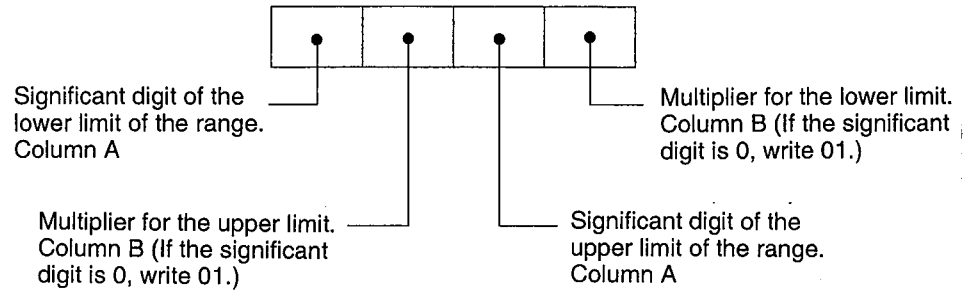
Cautions:

- When the lower limit value of the range is 0°C or more, that value shall be the span value × 2 or less.
- When the upper limit value of the range is less than 0°C, that value shall be the span value × (– 2) or more.

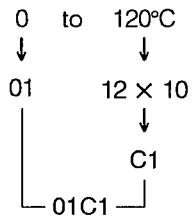
Table 3. Potentiometer Input: Applicable to IP50PMA and IP50PMC

Category	Range type	Type No.	Rated resistance value	Zero variable range	Span variable range
Standard range	General type	9A	50 to 500Ω	0 to 50% FS	50 to 100% FS
		9B	501 to 10kΩ		

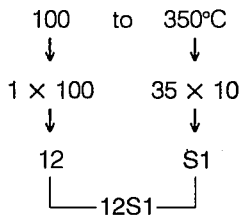
Table 4. Temperature Range Specification (semi-standard range): Applicable to IP50TCA, IP50TCC, IP50RDA and IP50RDC



Example (1)



Example (2)



A						B	
Type No.	Significant Digit	Type No.	Significant Digit	Type No.	Significant Digit	Type No.	Multiplier
0	0	B	11	P	23	1	× 10
1	1	C	12	Q	24	2	× 100
2	2	D	13	R	25	3	× 1000
3	3	E	14	S	35	8	× 1
4	4	F	15	T	45	A	× (–10)
5	5	G	16	U	55	B	× (–100)
6	6	J	17	V	65	Y	× (–1)
7	7	K	18	W	75	—	—
8	8	L	19	X	85	—	—
9	9	M	21	Y	95	—	—
—	—	N	22	—	—	—	—

Note: For the multiplier for the lower limit of the range (column B), only the type numbers A, B and Y can be specified.

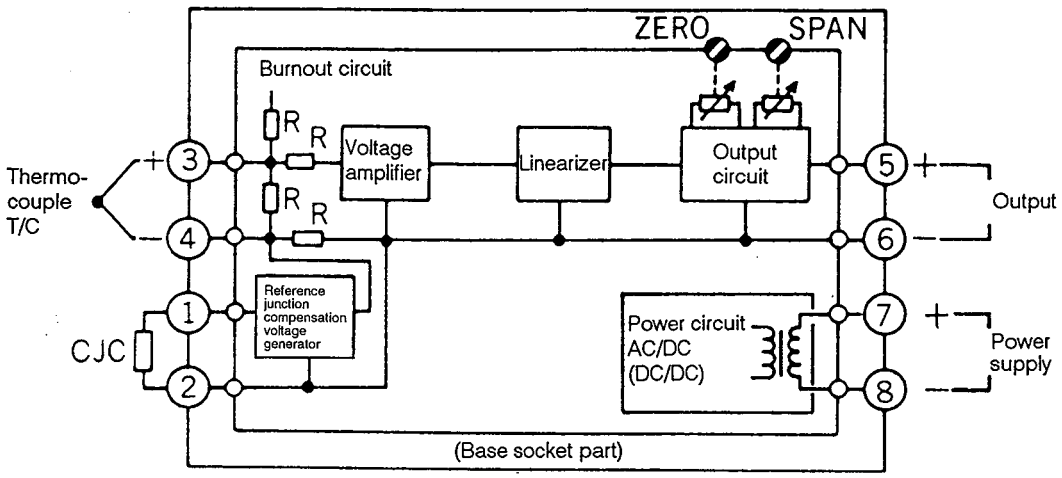
Table 5. Output Range

Type No.	Output range	Allowable load resistance
A	4 to 20mA	750Ω or less
B	1 to 5mA	3kΩ or less
C	2 to 10mA	1.5kΩ or less
D	0 to 1mA	15kΩ or less
E	0 to 10mA	1.5kΩ or less
F	0 to 16mA	937Ω or less
G	0 to 20mA	750Ω or less
H	1 to 5V	2.5kΩ or more
J	0 to 10mV	10kΩ or more
K	0 to 100mV	100kΩ or more
L	0 to 1V	500Ω or more
N	0 to 5V	2.5kΩ or more
P	0 to 10V	5kΩ or more
R	± 10V	5kΩ or more

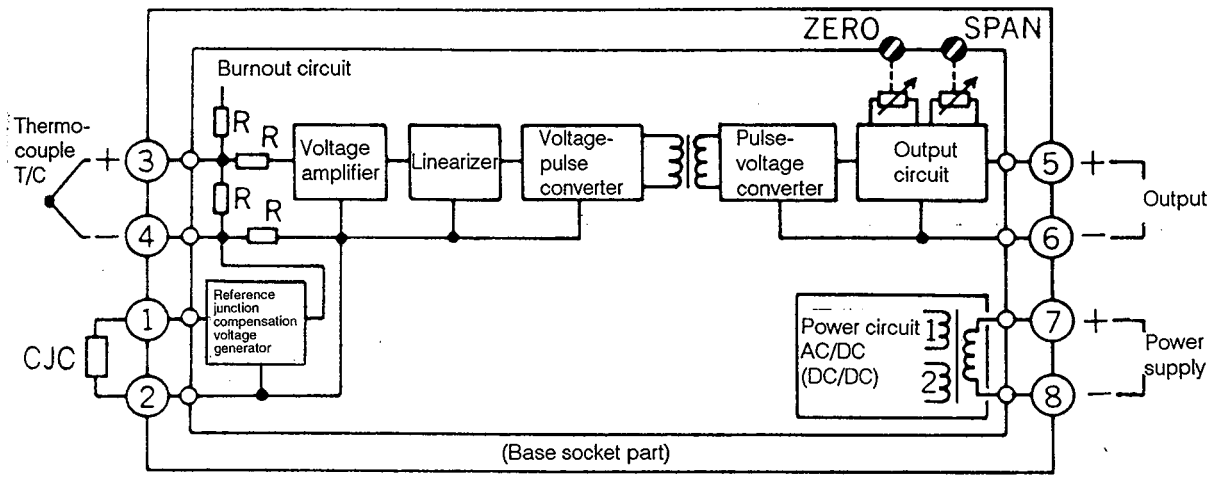
3. Circuit Block Diagrams

Thermocouple Input Type

(Non-isolated)

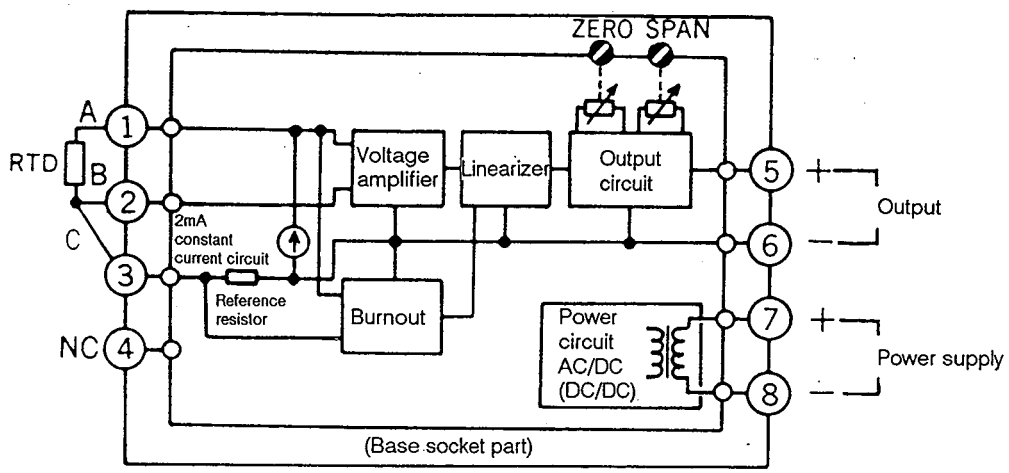


(Isolated)

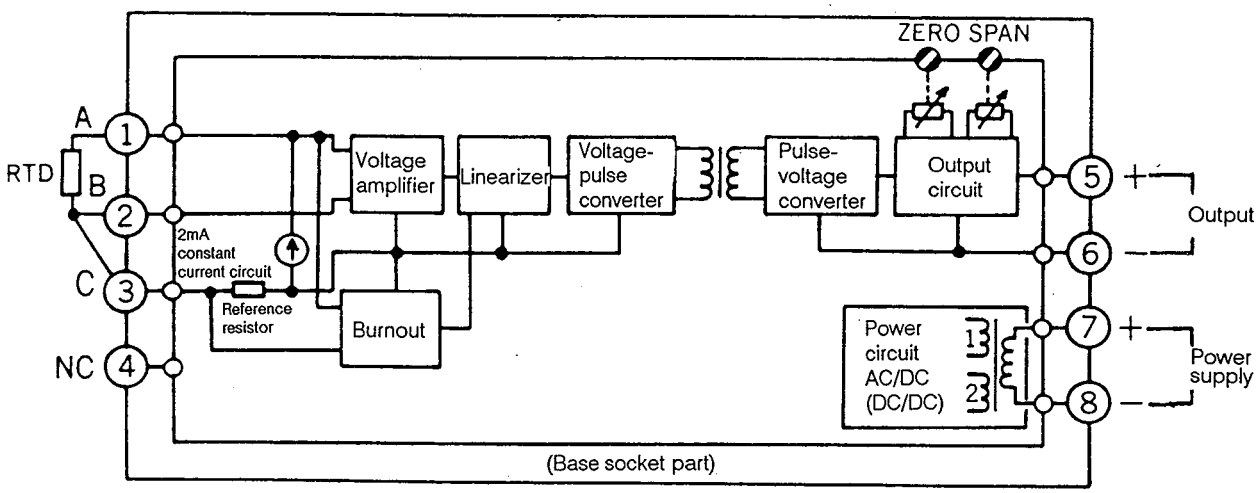


Resistance Thermometer Bulb Input Type

(Non-isolated)

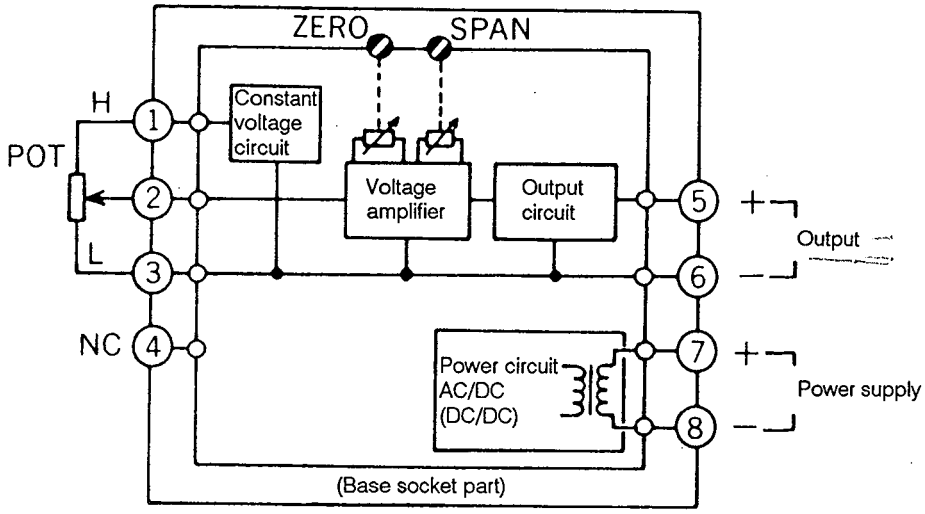


(Isolated)

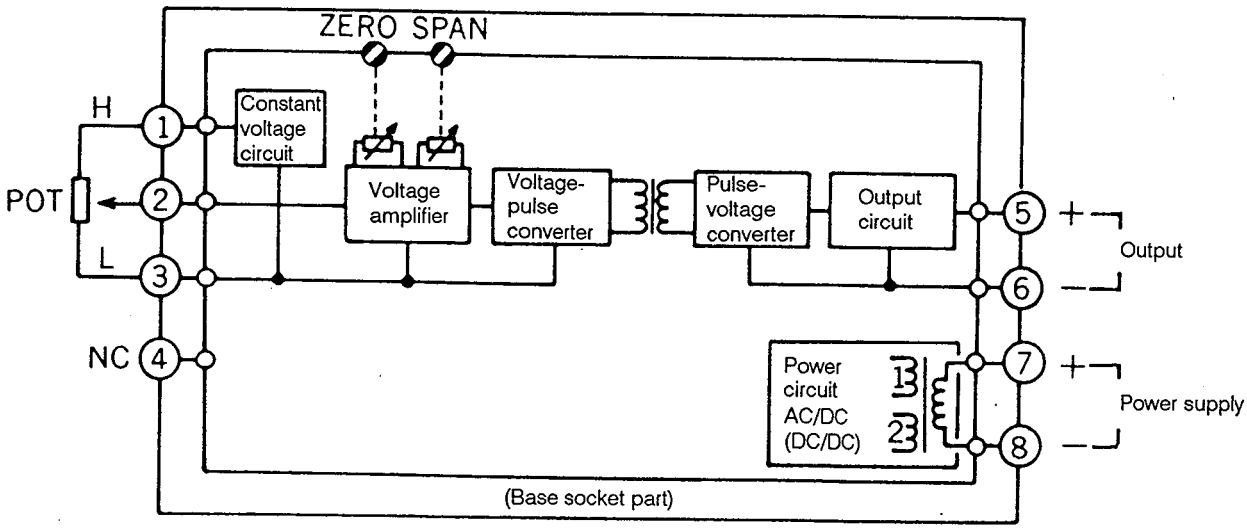


Potentiometer Input Type

(Non-isolated)



(Isolated)

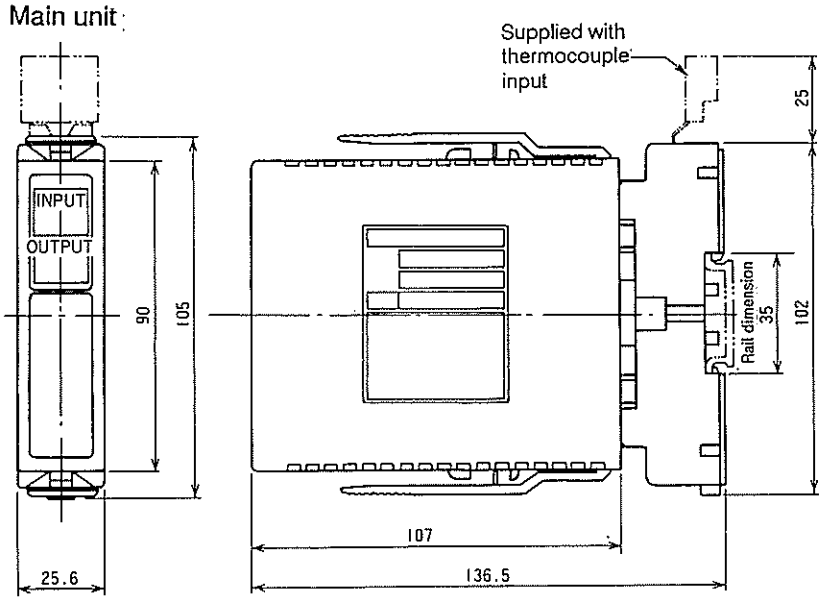


4. External Dimension Drawing

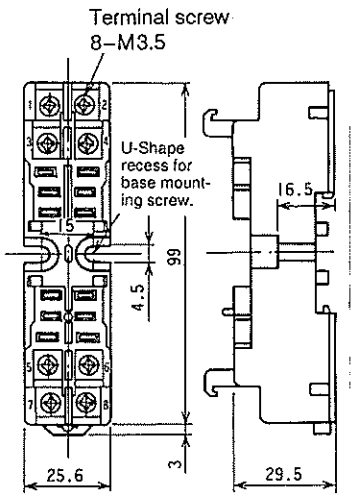
External Dimension Drawing

Unit: mm

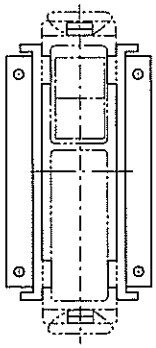
Main unit



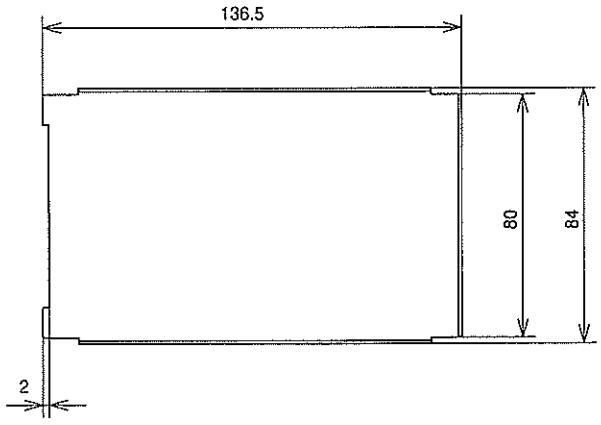
Base socket Part No. QN719A

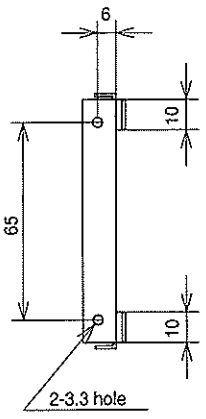


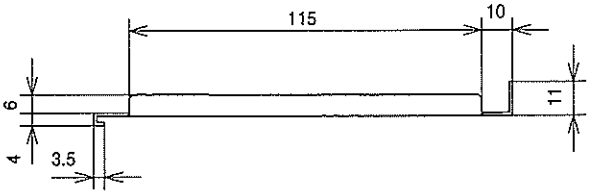
Damping bracket part number QN718A



Attached view







Material:
Cold rolled steel plate SPCC t1
Galvanizing and chromate treatment

5. Installation

1. CAUTIONS IN INSTALLATION

(1) Handling

When removing or mounting the main unit from/to the socket, be sure to turn OFF the power supply and the input signal in advance to prevent trouble from occurring.

(2) Installation

(a) When the equipment is installed in a location subject to dust or chips, house it in a dust-proof cabinet with a heat radiation function.

(b) Avoid exposing the equipment to vibration and shocks as much as possible, since they may cause malfunctions.

(3) Wiring

(a) Don't lay the power line, input signal line, and output signal line near a noise generator, or relay drive line.

(b) Avoid clamping these lines together with a noise superimposed line or putting them together in the same duct.

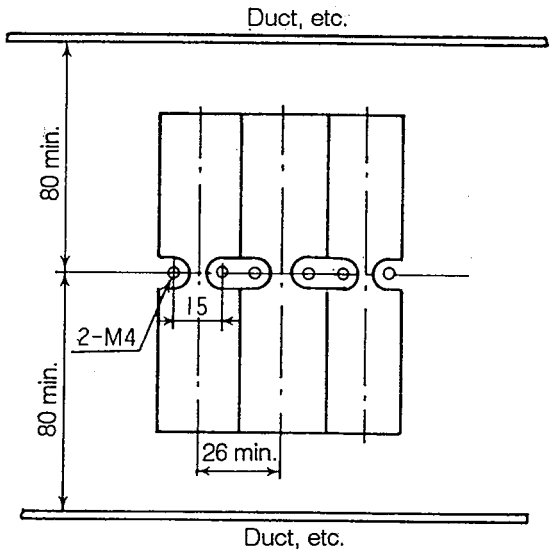
(c) This equipment can be operated as soon as the power supply is turned ON. However, for optimum performance, allow 30 minutes of energizing time before operating.

(4) Short circuit of output terminals

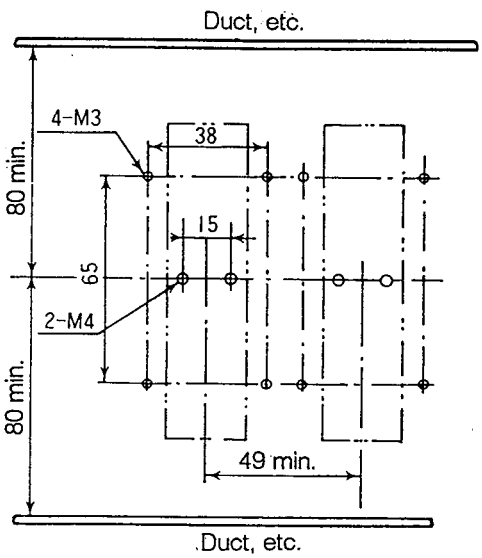
In the case of the voltage output, avoid shorting the output terminals for a long time.

2. INSTALLATION METHOD

Lateral installation and vertical space



Installation on vibration-absorbing bracket and vertical space



Cautions:

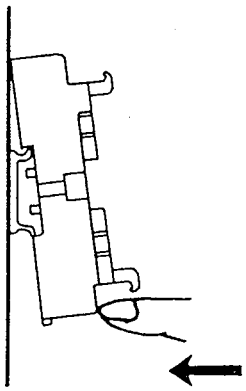
① When installing the equipment on a wall subject to vibration, use the vibration-absorbing bracket (option, QN718A). Where there is vibration, the equipment cannot be installed on the DIN rail.

② When the output of the main unit is to be A/D converted, use the integral A/D converter. When the high speed A/D converter for sequential comparison, etc. is to be used, check the operation by the combination test in advance.

3. MOUNTING AND REMOVING TO/FROM THE DIN RAIL

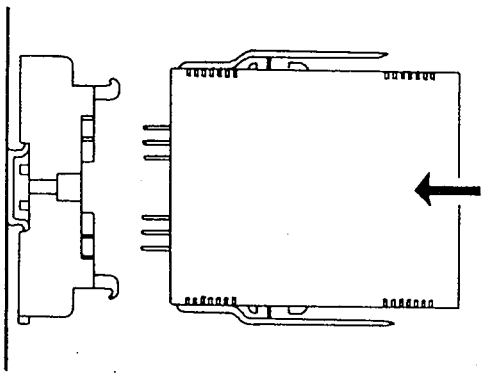
(1) How to fix the socket

Hook the click to the rail with the slider on the socket bottom-down, and push in the lower part of the socket in the direction of the arrow, as shown in the figure, until it is fixed.



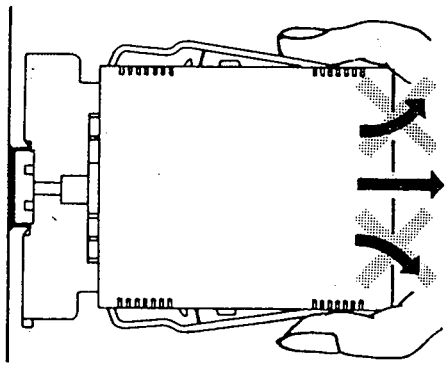
(2) How to fix the main unit to the socket

Set the main unit so that the label can be properly read, and insert it straight and level. At this time, insert it until the hooks are parallel with the main unit case, and they are completely engaged with the projection of the socket.



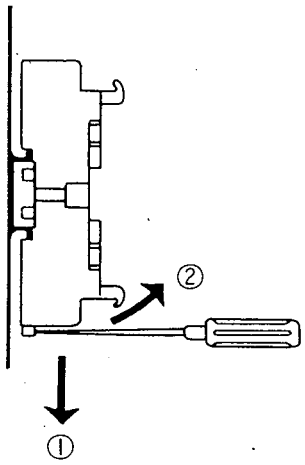
(3) How to remove the main unit from the socket

Push in the main unit sufficiently, and spread the upper and lower hooks simultaneously, and then extract the main unit forward straight. Note that the socket may be damaged if the unit is extracted without spreading both hooks sufficiently.



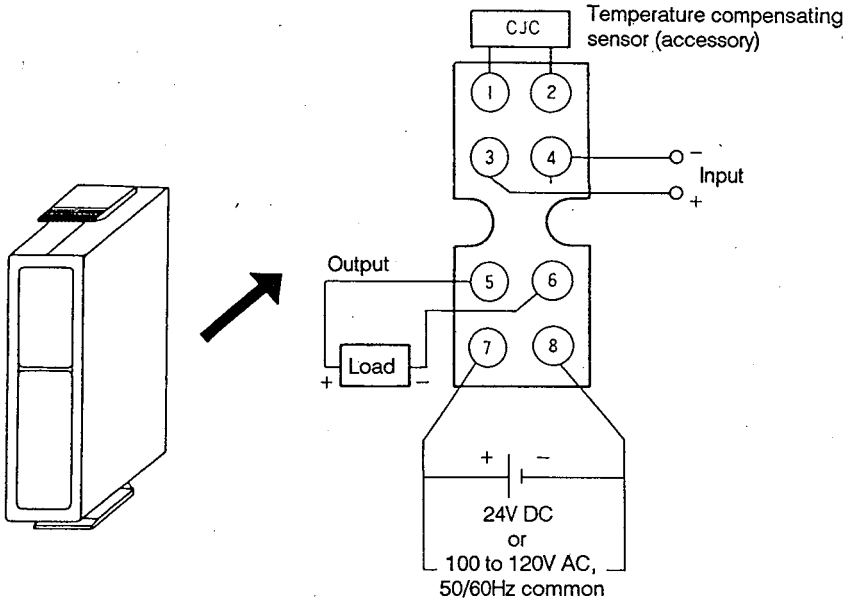
(4) How to remove the socket

Insert a screwdriver in the slider groove of the socket. While pulling the screwdriver in the arrow direction as shown in the figure, draw the lower part of the socket forward until it is removed.



6. Wiring

1. THERMOCOUPLE INPUT

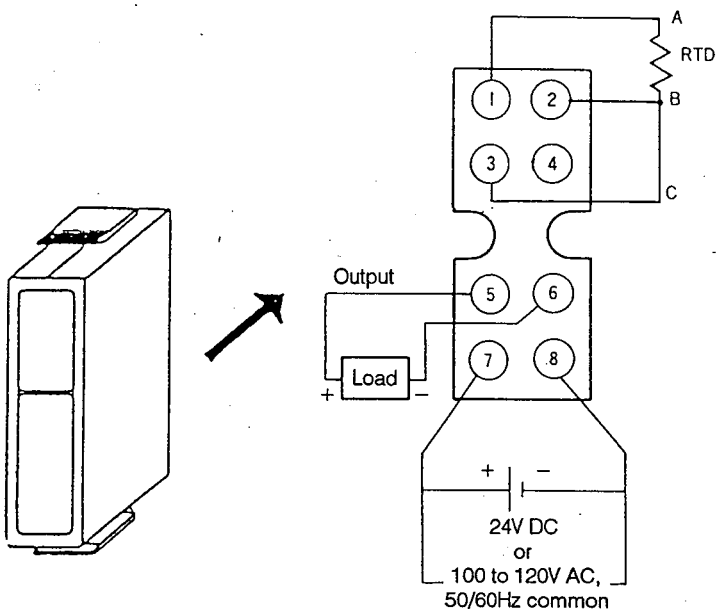


Terminal No.	Symbol		Contents
1	CJC	+	Mount the cold junction compensating sensor. (CJC)
2		−	
3	Input	+	Connect the specified input signal.
4		−	
5	Output	+	The signal based on the I/O specification is output.
6		−	
7	Power supply	+	Connect the power supply of the rated voltage.
8		−	

1) This equipment incorporates a burnout detector circuit which overshoots the output signal beyond the upper limit of the output range if the thermocouple is disconnected. Therefore, even when the power supply is turned ON without connecting the thermocouple, the output signal is increased up to approx. 120% of the full span. Therefore, when the thermocouple is not connected, turn OFF the power supply or short the input terminals.

2) This equipment incorporates a cold junction compensating circuit. Mount the temperature compensating sensor, which is supplied at shipping, on the socket. Combine the main unit and the temperature compensating sensor having the same No.

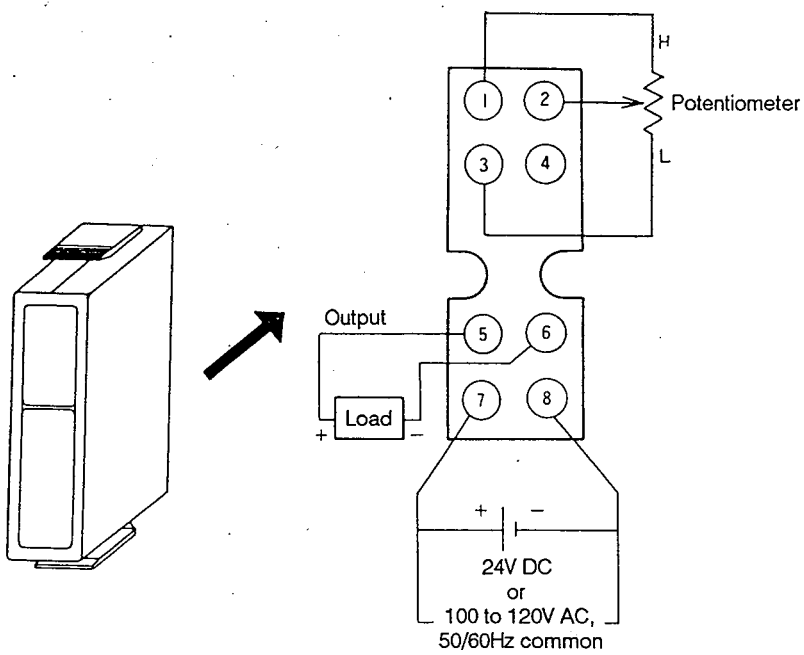
2. RESISTANCE THERMOMETER BULB INPUT



Terminal No.	Symbol		Contents
1	Input	A	Connect the specified resistance thermometer bulb.
2		B	
3		C	
4			Blank terminal
5	Output	+	The signal based on the I/O specification is output.
6		–	
7	Power supply	+	Connect the power supply of the rated voltage.
8		–	

This equipment incorporates a burnout detector circuit, which overshoots the output signal beyond the upper limit of the output range if the resistance thermometer bulb is disconnected. Therefore, even when the power supply is turned ON without connecting the resistance thermometer bulb, the output signal is increased up to approx. 120% of the full span. Therefore, when the resistance thermometer bulb is not connected, turn OFF the power supply.

3. POTENTIOMETER INPUT



Terminal No.	Symbol		Contents
1	Input	H	Connect the HIGH (100%) side terminal.
2		S	Connect the slide wire terminal.
3		L	Connect with the LOW (0%) side
4			Blank terminal
5	Output	+	The signal based on the I/O specification is output.
6		–	
7	Power supply	+	Connect the power supply of the rated voltage.
8		–	

7. Adjustment

1. THERMOCOUPLE INPUT TYPE

Zero and Span Adjusting Method

Since this equipment has been properly calibrated at shipping, each trimmer of ZERO and SPAN need not be adjusted so far as the equipment is operated according to the manufacturing specifications. If matching with the connected equipment or routine calibration is required, observe the following procedures. This calibration shall be made 30 min. after the power supply is turned ON, using a signal source (such as standard voltage, current generator), and measuring instruments (voltmeter, ammeter, zero controller, and compensation lead), whose accuracies are 10 times or more as high as the tolerance of this equipment.

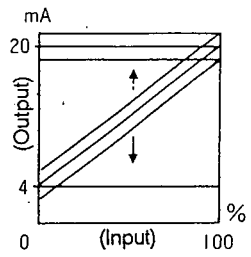
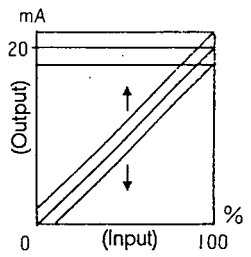
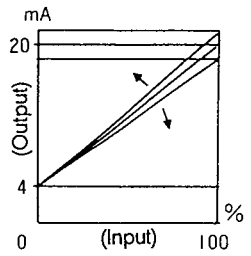
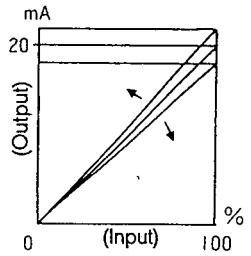
The adjustable ranges of zero and span and approx. +10% FS each. Multi-revolution trimmers are used for these adjustments. Note that these multi-revolution trimmers are not provided with stoppers.

1) Zero adjustment

   Apply a minimum value within the input range to the input terminals, and turn the zero trimmer until the output signal reaches the minimum value within the output range.

2) Span adjustment

   Apply a maximum value within the input range to the input terminals, and turn the span trimmer until the output signal reaches the maximum value within the output range.

		With the output of 4 to 20mA	With the output of 0 to 20mA
Zero adjustment	The zero point is shifted upward. ⟨⊕ZERO The zero point is shifted downward.		
Span adjustment	The span is widened. ⟨⊕SPAN The span is narrowed.		

2. RESISTANCE THERMOMETER BULB INPUT TYPE

Zero and Span Adjusting Methods

Since this equipment has been properly calibrated at the time of shipping, each SPAN and ZERO trimmer need not be adjusted so far as the equipment is operated according to the manufacturing specifications. If matching with the connected equipment or the routine calibration is required, observe the following procedures. This calibration shall be made 30 min. after the power supply is turned ON, using a signal source (such as precision resistor) and measuring instruments (voltmeter and ammeter), whose accuracies are 10 times or more each as high as the tolerance of this equipment.

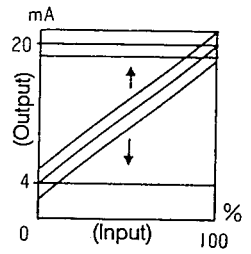
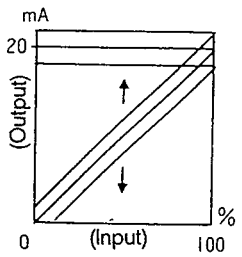
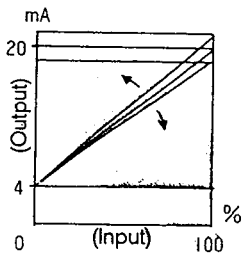
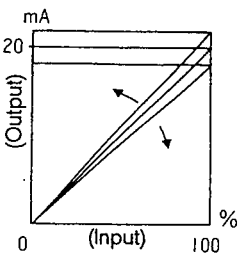
The adjustable ranges of zero and span are approx. +10% each. Multi-revolution trimmers are used for these adjustments. Note that these multi-revolution trimmers are not provided with stoppers.

1) Zero adjustment

   Apply a minimum value within the input range to the input terminals, and turn the zero trimmer until the output signal reaches the minimum value with the output range.

2) Span adjustment

   Apply a maximum value within the input range to the input terminals, and turn the span trimmer until the output signal reaches the maximum value within the output range.

		With the output of 4 to 20mA	With the output of 0 to 20mA
Zero adjustment	The zero point is shifted upward. ↑ⓉZERO The zero point is shifted downward.		
Span adjustment	The span is widened. ↑ⓉSPAN The span is narrowed.		

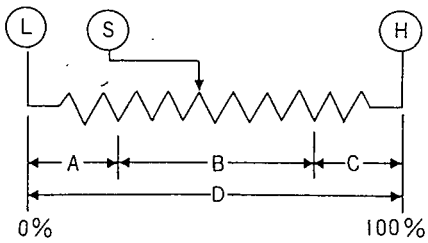
3. POTENTIOMETER INPUT TYPE

Zero and Span Setting Range

The adjustable ranges by the zero trimmer and span trimmer, which are mounted on the front of this equipment, as shown in the following figure. The adjustable range by the zero trimmer is within 0 to 50% of the rating, while that by the span trimmer is within 100 to 50% of the rating. Fine adjustment is facilitated as each trimmer has multirevolution capabilities.

The potentiometer shall be used within the range where the total value of "residual resistances" satisfies the following expression in Fig. 1.

$$A + C \leqq \frac{\text{Rating of potentiometer (D)}}{2}$$



where, A: Lower side residual resistance
B: Measuring range
C: Upper side residual resistance
D: Rating of potentiometer

Fig. 1

As for the adjustment sequence, first make the zero adjustment, then the span adjustment.

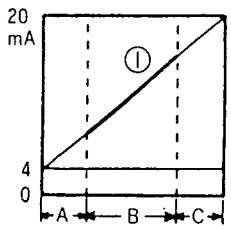
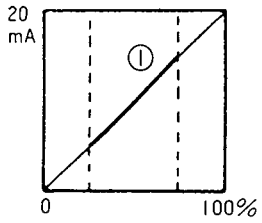
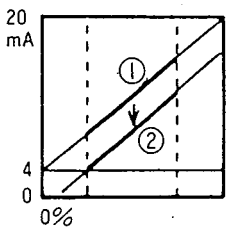
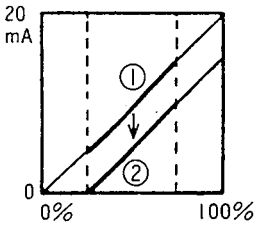
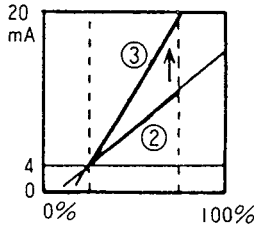
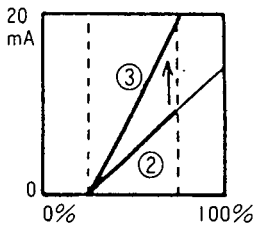
	With the output of 4 to 20mA	With the output of 0 to 20mA
① Prior to adjustment		
② Zero adjustment The span is widened. ⇕① The span is narrowed.		
③ Span adjustment The span is widened. ⇕① The span is narrowed.		

Fig. 2

Operations Against Conditions Out of Range

1) Excessively large input

When a signal exceeding the upper limit of the input range is input, the output signal is increased in proportion to the input up to approx. 120% FS. Even when a greater input signal is input, the output signal won't be increased beyond approx. 120% FS due to operation of the built-in limiter circuit.

2) Excessively small input

If a signal lower than the lower limit of the input range is input, the output operation is as follows:

(a) With the current output, the output signal is reduced nearly proportional to the input down to approx. –20% FS, but no negative current is output.

(b) With the voltage output, the output signal is reduced nearly proportional to the input down to –120% FS. Even when a smaller signal is input, the output signal won't be reduced below approx. –120% FS by the operation of the built-in limiter circuit.

3) Excessive output

(a) In case of current output

When the output exceeds the "allowable load resistance range", the output is nearly proportional to the input until the voltage between the output terminals becomes approx. 16V. If this range is exceeded, the output will be saturated, resulting in a more serious malfunction.

(b) In case of voltage output

When the output is reduced below the "allowable load resistance range", the output will be saturated, resulting in a more serious error.

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Specifications are subject to change without notice.

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