Thin Type Isolated Temperature Transducer

MODEL TH-1C

INSTRUCTION MANUAL

Warning

This marking indicates that the erroneous operation of this transducer may result in death or serious injury.

Precautions

- (1) If voltage or current exceeding the input allowable voltage or current is applied to the input terminals, the distributor may be damaged.
- (2)Apply power within the applicable range of the transducer. Othewise fire, electric shock or transducer damage may result.
- (3)The contents of this instruction manual are subject to change without prior notice.
- This instruction manual is carefully prepared. However, if any mistake or omission is (4)found, contact your nearest Watanabe Electric industry sales agent or Watanabe Electric Industry directly.
- (5)Make this manual available easily anytime

Outline

The Model TH-1C thin type isolated temperature transducer inputs any one of the R, K, E, J, T, S and B type thermocouples or a RTD (Pt 100) and outputs the corresponding isolated DC voltage or current.

Burnout and cold junction compensation circuits are built in this transducer. In addition, the three ports of input, output and power are mutually isolated. The case can be engaged with its mounting DIN rail in one touch. For input and output, a detachable connector is used.

Model No. Configuration

Each code and the standard specifications of this transducer are as follows. First check whether or not your desired specifications are correct by comparing them to the following specifications.

Example:TH-1C-KO-1 0 to 1000°C



As input specifications, separately specify the zero and span temperatures (in steps of 1°C).

Otherwise, any one of the above temperatures is selected.

When purchasing only the setting soft cable, specify "TH-1C-XX-1."

Input Specification

Sensor	Code	Input temperature	Minimum Span
R	R	0 to 1700°C	400°C
К	к	-50 to 1200°C	100°C
E	E	-50 to 900°C	100°C
J	J	-50 to 1000°C	100°C
Т	Т	-50 to 350°C	100°C
S	S	0 to 1700°C	500°C
В	В	200 to 1700°C	1000°C
Pt 100Ω	Р	-150 to 800°C	100°C
hormoco		nout Specification	

mocouple Input Specification

Accuracy of Cold Junction Compensation ±1°C (10 to 30°C) (For thermocouples other than B type thermocouple)

Burnout detection current:300nA(TYP)

RTD Input Specification

Allowable lead wire resistance: Less than 10Ω

Current following through RTD: 1 mA

Output Specification

Code	Output signal	Output Load resistance	Output at burnout
0	DC 0 to 5 V	More then 21: 0	Approx. 120%F.S
1	DC 1 to 5 V	WOIC than 2K \$2	
2	DC 0 to 10 V	More than $4k \Omega$	
Α	DC 4 to 20 mA	Less than 550Ω	

General Specifications

Accuracy : ±0.25%F.S(At 25±2°C)

Temperature characteristic : ±0.02%F.S/°C

Power supply voltage variation : $\pm 0.1\%$ F.S

Response time : Less than 2sec $(0 \rightarrow 90\%)$

Insulation resistance : Between input and output/power supply;

More than 100MΩ at 500V DC

Dielectric strength : Between input and output/power supply; For 1 min. at 1500V AC

Power supply voltage : 24V DC±10%

Consuming current : Less than 60mA (At 24V DC)

Operating ambient temperature : -5 to +50°C

Operating ambient humidity : Less than 90 %RH (No-condensing)

Storage temperature : -10 to +70°C

Storage humidity: Less than 60%RH (No-condensing)

Case material : Black PC 94V-2

Weight : Approx. 80g

Output calibration

The output calibration of this transducer (zero and span adjustments) cannot be made alone, but can be made by using the setting software (Windows98, 2000, XP,7 compatible) and dedicated RS-232C communication cable which are optional. In addition, the input range (from Pt to thermocouple input range or from thermocouple to Pt input range) or the input temperature range can also be changed by using the setting software and dedicated communication cable.

For details of these settings, see the instruction manual for the "Setting software."

Input/Output connection diagram

Note : In order to enable the specified performance to be displayed, always connect the temperature sensor firmly to terminal Nos. 3 and 4. In addition, as the product has already been adjusted together with the temperature sensor combined,

do not use any temperature sensors combined with other products



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Recommended treatment of wires connected to connector typ terminal board



Recommended solid wire connection terminals cannot be used for thermocouple input connection.

After-sale service

This transducer is delivered after being manufactured, tested and inspected, under strict quality control. However, if any problem does occur, contact your nearest Watanabe Electric Industry sales agent or Watanabe Electric Industry directly giving as much information on problem as possible.

Mounting/dismounting

Mounting

Engage the upper side of the transducer with the rail.
 Push the lower side of the transducer into the rail.



Dismounting

1)Push down the slider with a screwdriver.

Pull the transducer toward you, then disengage the lower side of the transducer from the rail.

2)Disengage the upper side of the transducer from the rail.



* As the temperature sensor may be damaged, always connect or remove Nos. 3 and 4 connectors after disconnecting the temperature sensor from them.

*If the transducer is likely to be dislocated that a clamp be used. (For

example E/N35N made by PHOENIX CONTACT)

Caution

- a) Store the distributor at a storage temperature of -10 to $+70^\circ\!{\rm C}$ and a humidity of less than 60%RH.
- b) Use the distributor at a location where are no chemicals or gases harmful to electrical parts or there is no dust.
- c) Do not apply any vibration or impact to the transducer.
- d) In order to lessen the effect of noise, etc., do not bundle the input/output wires with the power supply wires, nor put these wires in the same duct.

Warranty

This transducer is warranted for a period of one year from date of delivery. Any defect which occurs in this period and is undoubtedly caused by Watanabe Electric Industry faults will be remedied free of charge. This warranty does not apply to the transducer showing abuse or damage which has been altered or repaired by others except as authorized by Watanabe Electric Industry.

Accessory

Power cable connection clamps: 2pcs. Use them when two or more meters are connected.



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SETUP UTILITY for MODEL TH-1C

THIN TYPE ISOLATED TEMPERATURE TRANSDUCER INSTRUCTION MANUAL



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■Outline

This utility enables the user to change the TH–1C setting.

It can set the temperature and also adjust the zero and span values.

Operating environment

OS: Windows98, 2000,XP,7

PC/AT compatible

Any one of RS-232C communication ports 1 to 4 (serial ports/COM ports) is used. Prepare a personal computer with COM ports (DSUB 9-pin).

In addition to the above, use this utility in an environment where the OS can operate satisfactorily.

Caution:

The TH-1C uses an EEPROM.

(Set data can be held for about 10 years and the number of 100,000 write times can be assured.)

Preparation

O Connection

Connect the dedicated RS-232C communication cable to the COM ports of the personal computer. $\boxed{12}$

Next, tear off the seal stuck on the TH-1C. Thus, the connector shown in the figure at right appears. Insert the connector so that the direction of its projection matches that of the connector pushbutton until a click sound is made. Do not forcibly insert the connector.

O Startup

Start the "TH1CSet. exe" file in the compact disc. "TH1Cset" may appear depending on the setting of the personal computer.

Operation

Startup screen

Starting the TH-1C setup utility (hereafter called the "utility") displays the screen shown in the figure at right. Set the COM port number to the COM port of your personal computer.



Clicking the ▼ mark displays the list shown at right. Therefore select the desired port. After turning on the TH-1C, press the [PortOpen]

button. Thus, the TH-1C starts being read. The progress of reading is displayed at the bottom of the window as shown in the figure at right. The reading ends if reached at the right end.



com2

com3

Caution:

The output may change while reading the EEPROM.

After the reading ends, the following screen appears. However, the screen may differ depending on the thermocouple or RTD model of the TH-1C purchased. See the relevant item in the following.

O Thermocouple model

O Temperature setting

For the thermocouple model, the screen shown in the figure at right is displayed. First, set the thermocouple type used.



Clicking the \checkmark mark displays the list shown at right. Therefore, click the thermocouple type used. Then, set the zero and span temperatures. Directly

enter the values, or for their settings click the \blacktriangle and \blacktriangledown marks, respectively. Make these settings by paying attention to the input temperature range and



minimum span temperature of the selected thermocouple type. (See Supplement: "Input specifications.")

Pressing the $^{\rm o}{\rm C}/^{\rm o}{\rm F}$ button can select the Celsius or Fahrenheit temperature display.

Caution:

Processing at the Celsius temperature is made inside the TH-1C. Therefore, if the Fahrenheit temperature setting is made, an error caused by rounding off may occur.

O Zero and span adjustments

On this screen, the zero and span outputs can be finely

adjusted (±5%, each). First, select whether cold junction compensation is made valid or invalid. This is valid only when the utility is started.

TH-10 Setup	2
* TC input Zero/Span	
	20m2 =
	CONT
Cool Junction Compensation enable disable	
minut and the input companyation to	Portupen
a temperature of zero to the input	1
terminals(No.3 and 4).	1
-58 08 58	1 Write
First, apply the input corresponding to	1
a temperature of span to the input Default	PortClose
terminals(No.3 and 4).	
🍽 ' ?	
958 1008 1058	👖 Close
	Ver. 1.0.0.2

INSTRUCTION MANUAL MODEL TH-1C (UT-46829j)

Apply the input corresponding to the zero temperature to Terminal Nos. 3 and 4, and then press the ARROW button to adjust the output. It is also possible to directly adjust the slide bar. Pressing the DEFAULT button sets the output to 0%. Similarly, apply the input corresponding to the span temperature to Terminal Nos. 3 and 4, and then press the ARROW button to adjust the output. It is also possible to directly adjust the slide bar.

Pressing the DEFAULT button sets the output to 100%.

Caution:

Any value out of -5% to 105% can be set by combining the zero and span adjustments. However, a value only from -5% to 105% is actually output.

RTD model

O Temperature setting

temperatures. Directly

enter the values, or for

their settings click the

For the RTD model, the following screen is displayed. Set the zero and span

RTD Pt Zero Temperature Span Temperature D C 100 C C Celsius Fahrenheit

 \blacktriangle or \blacktriangledown marks, respectively.

Make these settings by paying attention to the input temperature range (-150 to 800°C) and minimum span temperature (100°C). (See Supplement: "Input specifications.") Pressing the °C/°F button can select the Celsius or Fahrenheit temperature display.

Caution:

Processing at the Celsius temperature is made inside the TH-1C. Therefore, if the Fahrenheit temperature setting is made, an error caused by rounding off may occur.

O Zero and span adjustments

On this screen, the zero and span outputs can be finely adjusted (\pm 5%, each).

Apply the input corresponding to the zero temperature to Terminal Nos. 2, 3 and 4, and then press the ARROW button to adjust the output. It is also possible to directly adjust the slide bar.

TH-10 Setup			
* Pt input Zer	o/Span		
			COMZ
			PortOpen
First, apply	the input corresponding to		
a temperature	of zero to the input	Default	
terminals(No.	3 and 4).		
<u> </u>		🔎	
-58	0.8	58	😏 Write
			_
First, apply	the input corresponding to		
a temperature	of span to the input	Default	
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< /		-	
	1008	1058	A
23.8	1004	T0.2.#	Close
			Ver. 1.0.0.2

Pressing the DEFAULT button sets the output to 0%.

Similarly, apply the input corresponding to the span temperature to Terminal Nos. 2, 3 and 4, and then press the ARROW button to adjust the output. It is also possible to adjust the slide bar. Pressing the DEFAULT button sets the output to 100%.

Data write

The content thus set is stored into the TH-1C.

Caution:

Be careful that pressing the [COM.END] or [END] button deletes but not store the content thus set. The TH-1C setting may differ from the content stored. Therefore in this case, turn on the TH-1C again.

Caution:

During data write, never turn off the TH-1C and personal computer.

Pressing the [WRITE] button starts writing. As the dialog box shown in the figure at right is displayed, press the

[OK] button. During data write, the window shown in the figure at right is displayed. Therefore, wait for a while.

After data write is complete, as the

is shown, press the [OK] button.

dialog box shown in the figure at right



Communication end

Pressing the [PortClose] button ends communication.

Caution:

If communication ends without data write, the setting of the TH-1C may differ from the content stored. In this case, turn on the TH-1C again.

End

Pressing the [Close] button ends the utility.

SupplementInput specifications

Sensor	Input temp. range (°C)	Min. span (°C)
R	0~1700	400
Κ	$-50 \sim 1200$	100
Е	$-50 \sim 900$	100
J	$-50 \sim 1000$	100
Т	$-50 \sim 350$	100
S	0~1700	500
В	200~1700	1000
$Pt100\Omega$	-150~800	100



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