

SystempaK (Digital/Single Case)
Thermocouple Conversion Module
Model J-STP90/95
Operator's Manual



Yamatake Corporation



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SAFETY PRECAUTIONS

■ About Icons

The safety precautions described in this manual are indicated by various icons. Please be sure you read and understand the icons and their meanings described below before reading the rest of the manual. Safety precautions are intended to ensure the safe and correct use of this product, to prevent injury to the operator and others, and to prevent damage to property. Be sure to observe these 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.

■ Examples



Triangles warn the user of a possible danger that may be caused by wrongful operation or misuse of this product. These icons graphically represent the actual danger. (The example on the left warns the user of the danger of electric shock.)



White circles with a diagonal bar notify the user that specific actions are prohibited to prevent possible danger. These icons graphically represent the actual prohibited action. (The example on the left notifies the user that disassembly is prohibited.)



Filled-in black circles instruct the user to carry out a specific obligatory action to prevent possible danger. These icons graphically represent the actual action to be carried out. (The example on the left instructs the user to remove the plug from the outlet.)

RESTRICTIONS ON USE

When using this product in applications requiring particular safety, or involving particularly important equipment, special care should be taken to implement a fail-safe and/or redundant design and periodic maintenance program encompassing all of the devices in the system.

Take malfunction, breakage and response lag into consideration when using this product.

Use this product within the established ranges and limits stated in the specifications.

There is no guarantee of product performance for use outside of the specifications.



WARNING



Before mounting, removing or wiring this device, be sure to turn the power off. Failure to do so could result in electric shock.



To avoid electric shock, be sure to ground the GND terminal to an earth ground of less than 100 Ω .



Be sure to attach the terminal cover to this device after wiring is complete. Otherwise, touching a charged terminal accidentally could result in electric shock.



To avoid electric shock, be sure not to touch charged terminals during maintenance and inspection.



CAUTION



If a hazardous condition develops in which equipment overheats or begins to emit smoke, turn off the power switch of this device and connected equipment at once.



Make sure that wire scraps do not fall into this device. They might cause a short circuit, device failure, or fire.



Before setting the function switching jumper, be sure to turn the equipment power off.



When removing the chassis from the case while the monitor switches are wired, after checking the monitor condition and alarm circuit operation (for example, by turning the alarm circuit function off), turn the power off.



Do not touch IC leads with bare hands. Internal electrical parts of the IC can be damaged by static electricity. If available, the use of a dedicated antistatic workbench is recommended.

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MEMO

1. General

The Thermocouple Conversion (J-STP) Module is a signal conversion module housed in a single case and accepts an electromotive force of thermocouple input, and converts it into a 1 to 5 V DC or 4 to 20 mA DC signal.

The Thermocouple Conversion Module provides a linearization function as a standard function to obtain a linear output proportional to the measured temperature, as well as a filter function to convert input and output signals in response to the application.

The J-STP is available for one-output (J-STP90) or two-output (J-STP95) model. Kind of thermocouple, range, filter function changes, and such other setting changes are easily done with the dedicated Loader Software, which operates on a general-purpose PC.

Complete isolation is employed between the power, input, and output circuits. In the two-output model, isolation is employed also between the two output circuits.

- Note** This document generally describes the method of setting the function.
 Refer to the following document how to operate SystempaK Configuration Tool for details.
- SystempaK Configuration Tool Operation Guide: OM2-2320-1920

The following figure is the function block of Thermocouple Conversion Module.

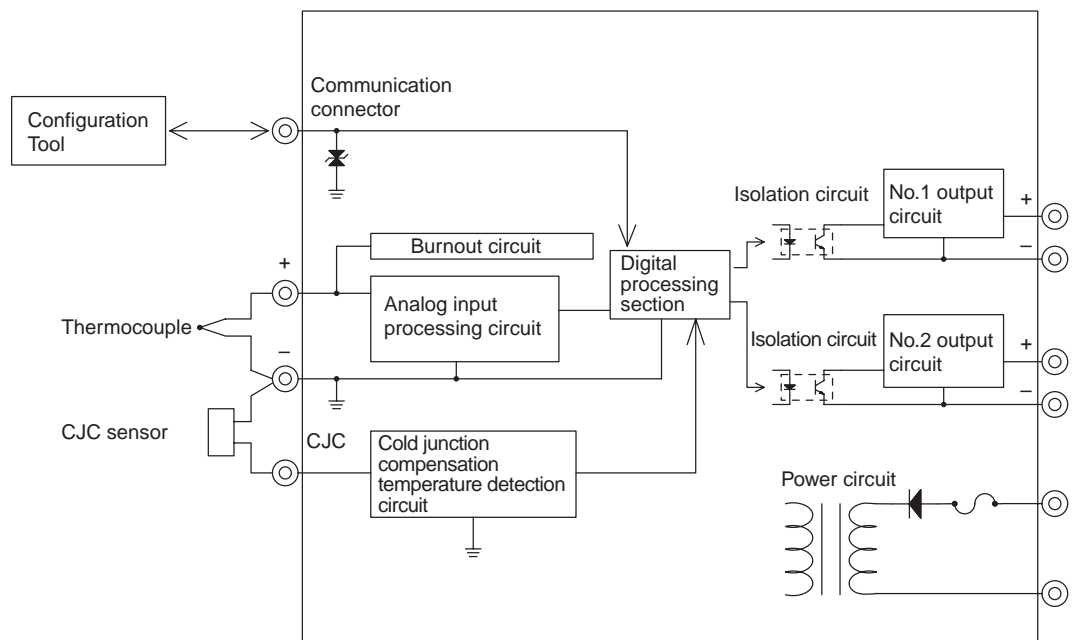


Fig.1-1. Functional block diagram of Thermocouple conversion module

2. **Standard Specifications**

Standard specifications are described as follows.

Input signal:

Thermocouples Types R, S, B, K, E, J, T, N (IEC 584-1 1995 / JIS C 1602-1995)

Measuring range:

T/C type	Measuring range
R	0 to 1760 °C
S	0 to 1760 °C
B	400 to 1820 °C
K	-200 to 1370 °C
E	-200 to 1000 °C
J	-200 to 1200 °C
T	-200 to 400 °C
N	-200 to 1300 °C

Span:

Specifiable to a desired span within the measuring range.

Contact us for ranges less than -200 °C.

(Because thermocouple electromotive changes are extremely small.)

Burnout protection:

Upscale/Downscale (Specify when ordering.)

Burnout response:

30 s or less (Moving average available, first-order lag filtering: 0.1 s)

Output signal:

No. 1 output; 1 to 5 V DC or 4 to 20 mA DC

No. 2 output; 1 to 5 V DC (Between No. 1 and No. 2 outputs is isolated.)

Edge connector output; 1 to 5 V DC (No. 1 output must be 1 to 5 V DC when connecting the signal with the A-MC I/O cable.)

Output impedance:

Voltage output; 250 Ω or less, Current output; 250 kΩ or more

Output range:

-20 to +120 % F.S.

Allowable load resistance:

0 to 600 Ω (Current output: Up to +110 %)

Output update interval:

5 ms (Output hardware filter: 0 to 90 % response, 50 ms)

Input/output response:

180 ms (Typ), 0 to 90 % response

(Moving average and first-order lag filtering are not provided.)

Accuracy:

Input Accuracy + CJC Accuracy (refer to the table below)

Input Accuracy

Thermocouple	Upper range setting (100 % input temperature)	Input accuracy (% F.S.) *1
K	250 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1 *2
	Less than 250 °C	$\pm 0.15 \% \times 250 \text{ °C} /$ Span of input temperature range settings [°C] *1 *2
J	200 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1 *2
	Less than 200 °C	$\pm 0.15 \% \times 200 \text{ °C} /$ Span of input temperature range settings [°C] *1 *2
T	250 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1 *2
	Less than 250 °C	$\pm 0.15 \% \times 250 \text{ °C} /$ Span of input temperature range settings [°C] *1 *2
E	200 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1 *2
	Less than 200 °C	$\pm 0.15 \% \times 200 \text{ °C} /$ Span of input temperature range settings [°C] *1 *2
R	1000 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1
	Less than 1000 °C	$\pm 0.15 \% \times 1000 \text{ °C} /$ Span of input temperature range settings [°C] *1
S	1050 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1
	Less than 1050 °C	$\pm 0.15 \% \times 1050 \text{ °C} /$ Span of input temperature range settings [°C] *1
N	350 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1 *3
	Less than 350 °C	$\pm 0.15 \% \times 350 \text{ °C} /$ Span of input temperature range settings [°C] *1 *3
B	1500 °C or more	$\pm 0.15 \% \times$ Upper range setting (100 % input temperature) [°C] / Span of input temperature range settings [°C] *1
	Less than 1500 °C	$\pm 0.15 \% \times 1500 \text{ °C} /$ Span of input temperature range settings [°C] *1

*1. $\pm 0.15 \%$ to be applied, when a calculation result is less than $\pm 0.15 \%$.

*2. "2 x Input accuracy" to be applied, when the measuring temperature is from -150 to -100 °C.

"4 x Input accuracy" to be applied, when the measuring temperature is from -200 to -150 °C.

*3. "2 x Input accuracy" to be applied, when the measuring temperature is from -100 to 0 °C.

"4 x Input accuracy" to be applied, when the measuring temperature is from -200 to -100 °C.

Cold Junction Compensation (CJC) Accuracy

	CJC base accuracy	Additional accuracy
Other than R	$\pm 0.5 \text{ °C}$ (at 23 °C)	CJC temperature effect $\pm 0.5 \text{ °C} / 10 \text{ °C}$, 5 to 45 °C
R	$\pm 1.0 \text{ °C}$ (at 23 °C)	CJC temperature effect $\pm 0.5 \text{ °C} / 10 \text{ °C}$, 5 to 45 °C

2. Standard Specifications

Insulation resistance:

500 V DC, 100 M Ω min

(Mutual between input - output - GND - power terminal)

Withstand voltage:

1000 V AC, 1 min

(Mutual between input - output - GND - power terminal)

Power supply:

24 V DC $^{+10}_{-15}$ %

Current consumption:

130 mA or less (at 24 V DC)

Ambient temperature:

Normal operating condition; 5 to 45

Operation limit; 0 to 50

Ambient humidity:

0 to 90 % RH (No condensation allowed)

Mounting:

Panel, Wall, DIN rail mounting

Front mask color:

Black

Weight:

400 g

Operating influence:

Cold junction compensation accuracy; ± 0.5 °C / 10 °C , 5 to 45

Supply voltage effect; ± 0.1 % F.S. / 24 V DC $^{+10}_{-15}$ %

Settings of Configuration Tool:

Module ID; 16 one-byte characters, 8 two-byte kanji characters

Input type; Specify thermocouple type.

Unit of temperature; °C, F

Input range; Lo and Hi setting values

Input filtering; Disabled / Enabled (moving average)

Zero-span adjustment; Adjustable between -20 and +120 % F.S.

First-lag filtering; Without / With (0 to 999.9 s, 63 % response time)

Note Burnout protection (Upscale / Downscale) is specified by hardware.
Please specify it when ordering.
Default setting is "Upscale" unless specified otherwise.

3. Model Number Table

A Model Number Table is described in the following.

One-output model:

Basic model number		Selections		Additions	Description
		I	II	I	
J-STP90					Thermocouple Conversion Module (1-output)
	X				No varnish coated
	C				Varnish coated
		-T			Input signal: Thermocouple (Type T)
		-J			Input signal: Thermocouple (Type J)
		-K			Input signal: Thermocouple (Type K)
		-E			Input signal: Thermocouple (Type E)
		-R			Input signal: Thermocouple (Type R)
		-S			Input signal: Thermocouple (Type S)
		-B			Input signal: Thermocouple (Type B)
		-N			Input signal: Thermocouple (Type N)
			1		Output signal: 1 to 5 V DC
			2		Output signal: 4 to 20 mA DC
				-0	Without test report
				-1	With test report

Two-output model:

Basic model number		Selections		Additions	Description
		I	II	I	
J-STP95					Thermocouple Conversion Module (2-output)
	X				No varnish coated
	C				Varnish coated
		-T			Input signal: Thermocouple (Type T)
		-J			Input signal: Thermocouple (Type J)
		-K			Input signal: Thermocouple (Type K)
		-E			Input signal: Thermocouple (Type E)
		-R			Input signal: Thermocouple (Type R)
		-S			Input signal: Thermocouple (Type S)
		-B			Input signal: Thermocouple (Type B)
		-N			Input signal: Thermocouple (Type N)
			1		No. 1 output signal: 1 to 5 V DC, No. 2 output signal: 1 to 5 V DC
			2		No. 1 output signal: 4 to 20 mA DC, No. 2 output signal: 1 to 5 V DC
				-0	Without test report
				-1	With test report

4. Mounting



Before mounting, removing or wiring this device, be sure to turn the power off. Failure to do so could result in electric shock.



To avoid electric shock, be sure to ground the GND terminal to an earth ground of less than 100 Ω .



Be sure to attach the terminal cover to this device after wiring is complete. Otherwise, touching a charged terminal accidentally could result in electric shock.

4.1 Mounting Locations

For the place of installation of the module, select a place which meets the following requirements:

- (1) Ambient temperature is normal and does not change sharply.
- (2) Ambient humidity is normal and does not become abnormally high.
- (3) Atmosphere does not contain corrosive gas.
- (4) Atmosphere does not contain dust, oil fumes, or other undesirable substances.
- (5) The place is less affected by electrical noise.

4.2 Mounting Method

The module can be installed in one of the following three methods:

- (1) Panel mount (flush mount)
- (2) Wall mount (protruding mount)
- (3) DIN rail mount

4.2.1 Panel Mount and Wall Mount

Fix the L-shape mounting brackets on top and bottom of the casing by means of the fixing grooves as shown in Figs.4-1 and 4-2. For panel mount, fix the brackets at the front end positions; for wall mount, fix them at rear end positions. Fix the casing on a panel or a wall by fixing the brackets to the panel or the wall.

For the panel cutout dimensions and the locating pitch, see Fig.4-3.

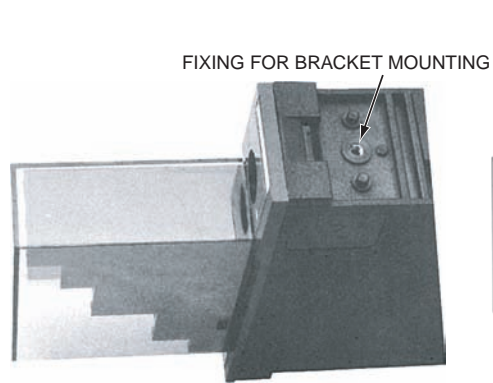


Fig.4-1.

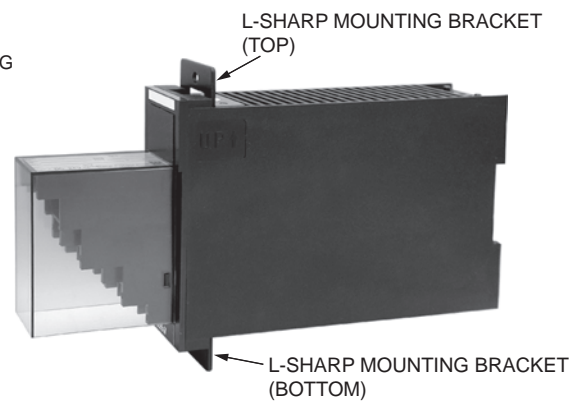
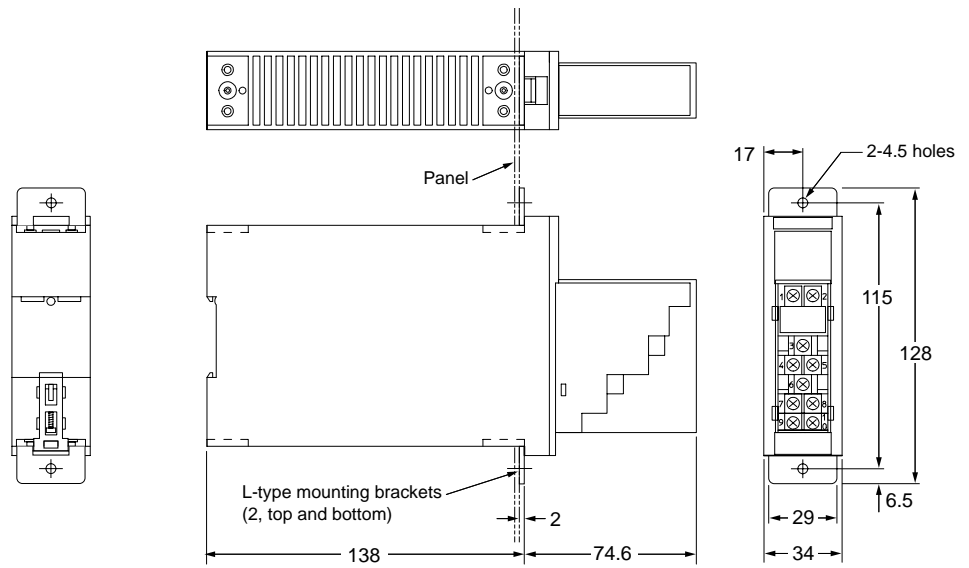


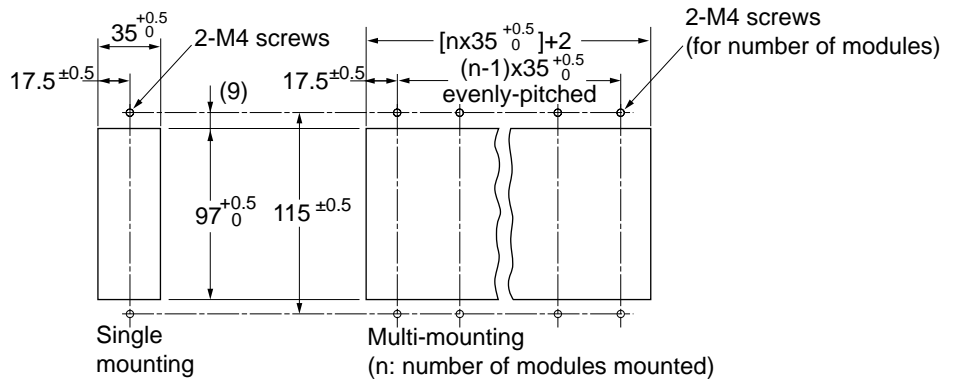
Fig.4-2 .

4.2.2 Panel - Mounting

Panel-mounting



Panel-cutout



Wall-mounting

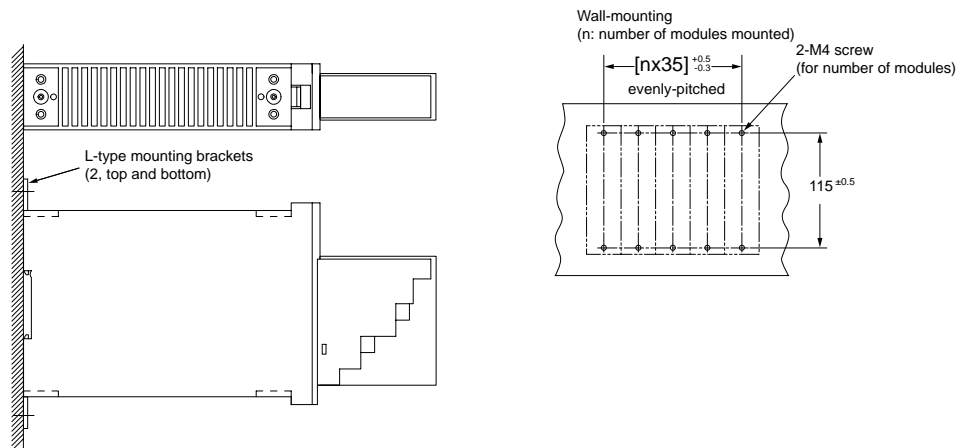


Fig.4-3. Dimensions for Panel Mount and Wall Mount

4.2.3 Mounting/Dismounting with DIN Rail

Notes 1 The following models of DIN rails and side clamps are recommended.

Rails: Model DAS-4 (Toyo Giken Co., Ltd.)*

Side clamps: ATO-19 (Toyo Giken Co., Ltd.)*

* Or equivalent

Notes 2 Fix the rail with M4 screws at 200-mm intervals. Put the side clamps on both ends of the rail before fixing the rail.

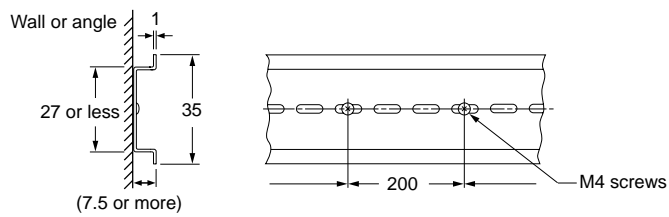


Fig.4-4.

(1) Install the module by engaging the top of the DIN rail mount indent of the rear panel of the module with the DIN rail as shown in Fig.4-5.

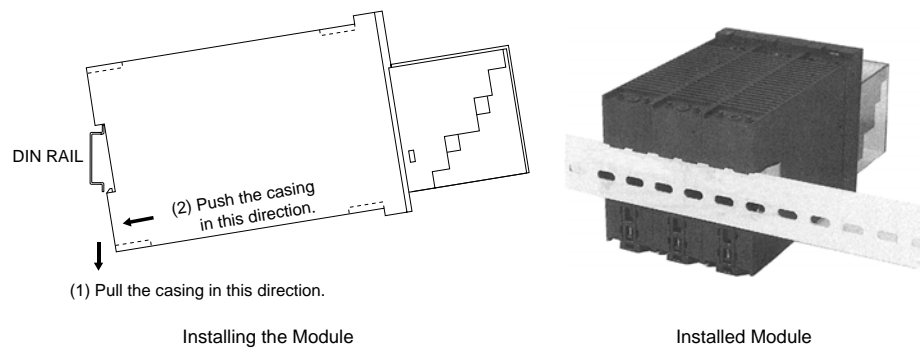


Fig4-5.

Note When installing two or more modules, install them being closely contacted side by said.

- (2) After installing the modules, fix the side clamps supporting the right or left ends of the outermost modules as shown in Fig.4-6.

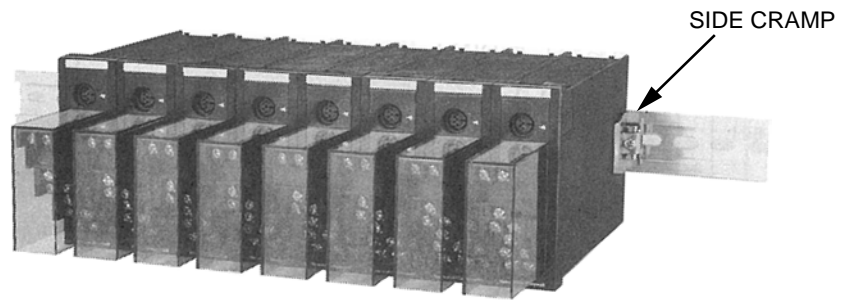


Fig.4-6.

- (3) To remove the module, observe the instructions given in Fig.4-7.

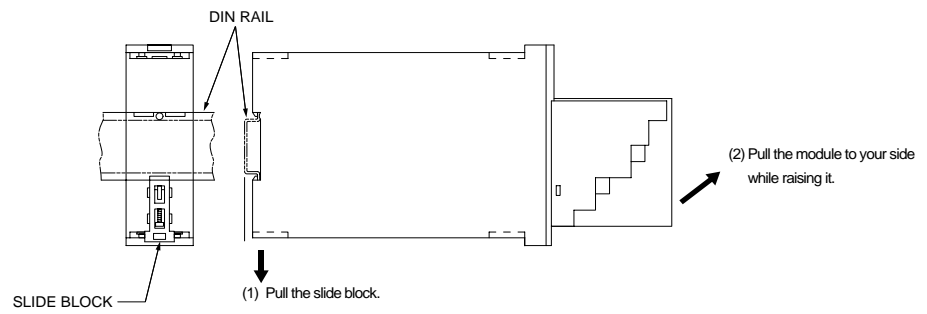


Fig.4-7.

5. Outline of the SystempaK Configuration Tool

This chapter generally describes “SPAK Configuration Tool”.

Refer to “SPAK Configuration Tool Operation Guide(OM2-2320-1920)”, when setting parameters in the module.

To set various parameters for SystempaK (here after called SPAK), use “SPAK Configuration Tool” (J-SLD90 model) that operates on a Windows PC. A special cable must be used to connect the SPAK to a PC.

5.1 Preparations

5.1.1 Required Equipment

- Windows PC
Windows 2000 or Windows XP PC with USB ports (for information on other operating conditions, refer to “SPAK Configuration Tool Operation Guide”).
- Installation CD
The installation CD is enclosed in the SPAK Configuration Tool package J-SLD90.
- Connecting cable
If the connecting cable is not enclosed in the SPAK Configuration Tool package, it must be acquired separately (J-SLDC00).

5.1.2 Installation

Install “SPAK Configuration Tool” application and USB cable driver software on a PC.

For information on installation procedures, refer to each instruction manual.

5.1.3 How to Connect the Cable

Connect the SPAK (module whose parameters are to be set) to a PC via the connecting cable. Connect the cable to a connecting jack on the front face of the SPAK module and to the USB connector on the PC.

Note Insert the stereo plug of the cable fully and firmly into the root of the SPAK connecting jack. If it is not inserted fully, communication problems or software malfunction may occur.

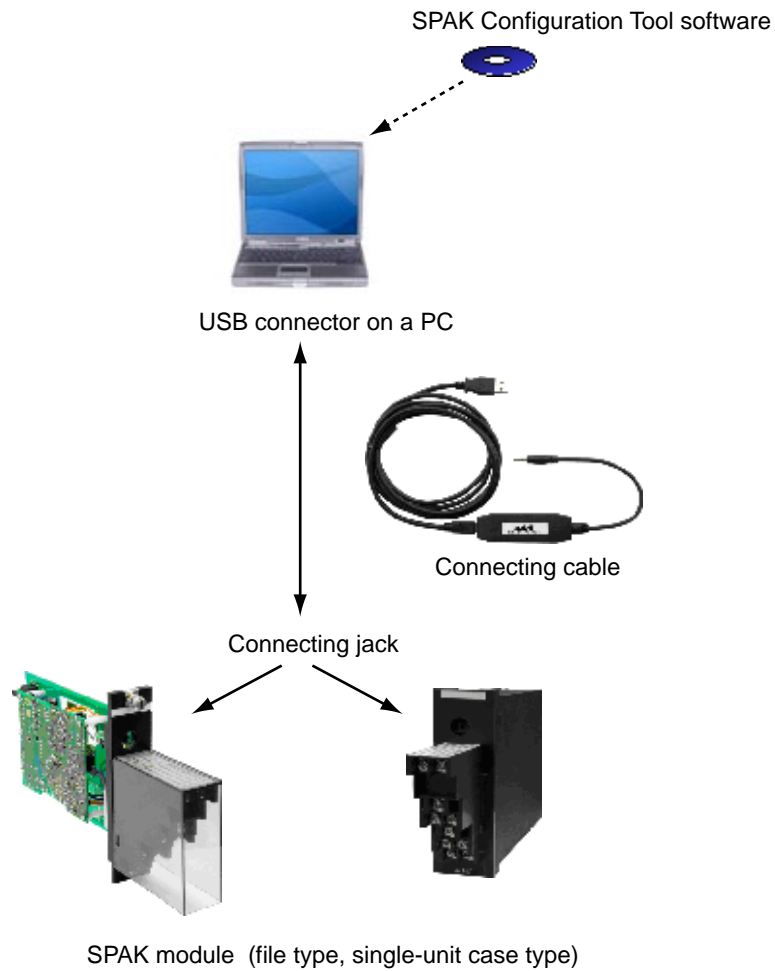


Fig. 5-1. Connection diagram

5.2 Parameter Setting Procedure

Set parameters by performing the procedure described below. For information on “Detailed setting methods” and “Types and contents of parameters,” refer to “SPAK Configuration Tool Operation Guide(OM2-2320-1920)”, when setting parameters in the module.

Note Do not set parameters when the SPAK is operating.

(1) Start “SPAK Configuration Tool” on a PC. (It is assumed that the communication setting is already completed. For information on how to make a communication setting, refer to “SPAK Configuration Tool Operation Guide.”)

(2) Connect the SPAK (module whose parameters are to be set) to the PC via the cable. (See the section where the cable connecting method is described.)

Note Insert the cable securely into the roots of jacks on both the PC and SPAK. If it is not inserted securely, communication problems or software malfunction may occur.

(3) Click on [File] → [Read All Data] from the menu bar. (This allows you to start communication with and connect to the module.)

Note First establish communication by performing this step. As communication is established, the model with which communication has been established is identified, and the setup screen appropriate for that identified model is shown. Parameters cannot be set until communication is established between the SPAK and PC.

Note The setup screen can also be brought up by reading the setting file created and saved in the PC instead of connecting to the module. For information on how to read a setting file, see “SPAK Configuration Tool Operation Guide”.

(4) Select each tab shown on the screen (Fig. 5-2 to 5-7).

Enter values in the spaces next to the parameter names shown in each tab, as necessary.

(5) Download the set values to the module. Click the <Data Write to Module> button.

Note To download the set values shown only in a single tab, use <Data Write to Module> button. To download the set values shown in all tables, click on [File] → [Write All Data] from the menu bar.

If you want to read the set values in one tab, which are presently shown on the screen,

from the module, click the <Data Read from Module> button. To read all set values in all tabs, Click on [File] → [Read All Data] from the menu bar.

Note After a set value has been changed, make sure that you download data to reflect the change in the module. It is recommended that after all settings are completed, Click on [File] → [Write All Data] from the menu bar to ensure downloading of all changed data without omission.

(6) Check that the values set on a PC are reflected in the module.

Click on [File] → [Read All Data] from the menu bar. Select each tab and check that all parameters are set correctly.

Note Make sure that you perform this step to prevent errors in the parameter setting from occurring.

Typical tab screens are shown below.

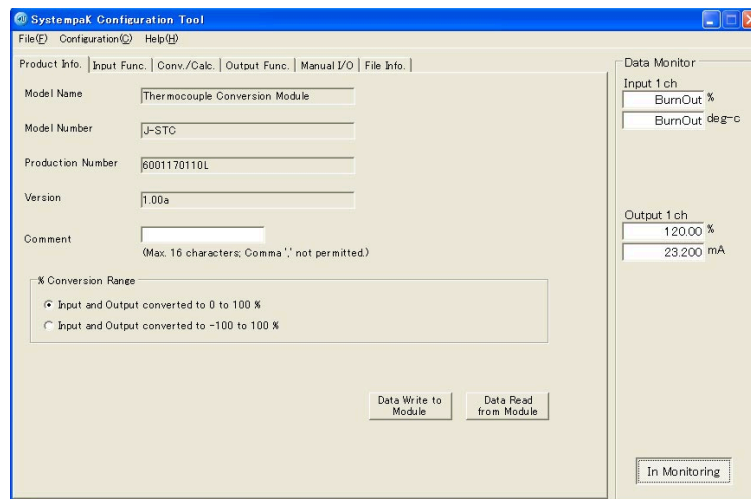


Fig. 5-2. Product information tab screen

5. Outline of the SystempaK Configuration Tool

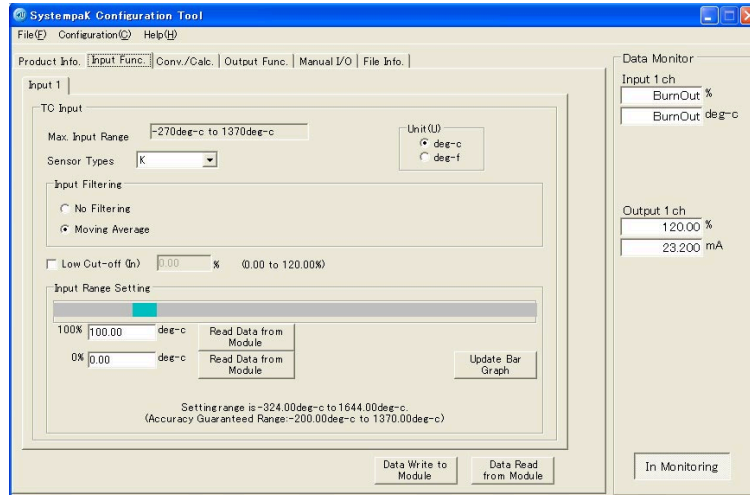


Fig. 5-3. Input function tab screen

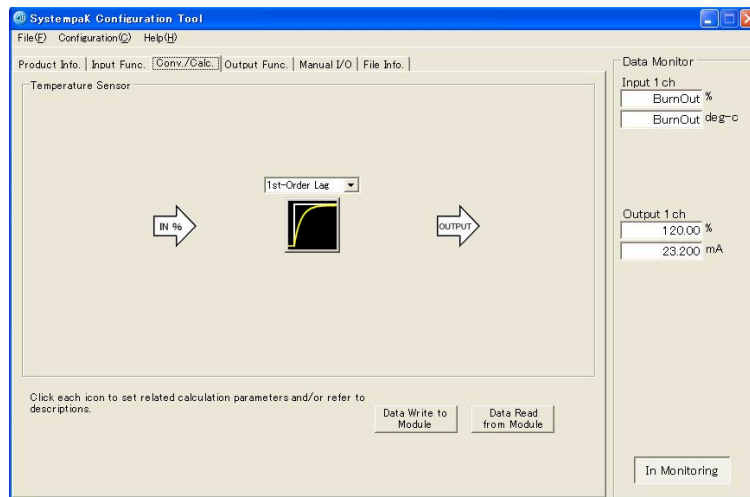


Fig. 5-4. Conversion & calculation tab screen

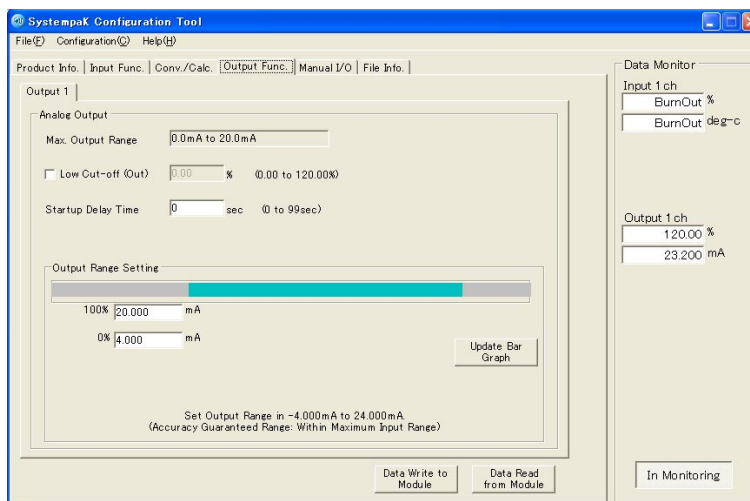


Fig. 5-5. Output function tab screen

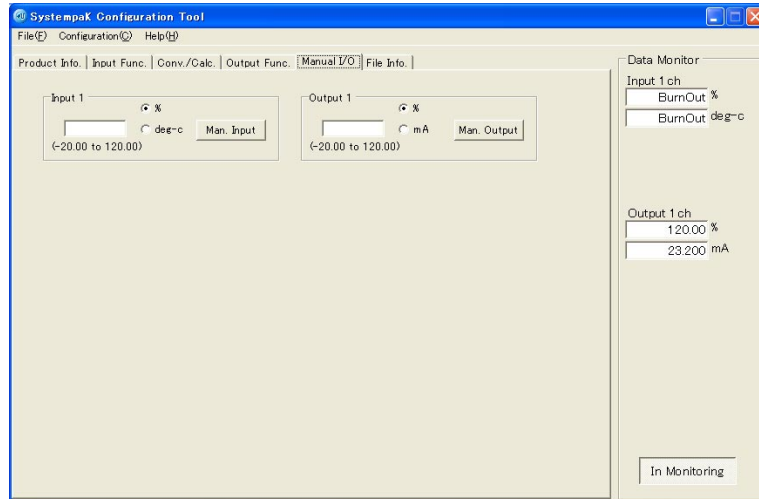


Fig. 5-6. Manual input-output tab screen

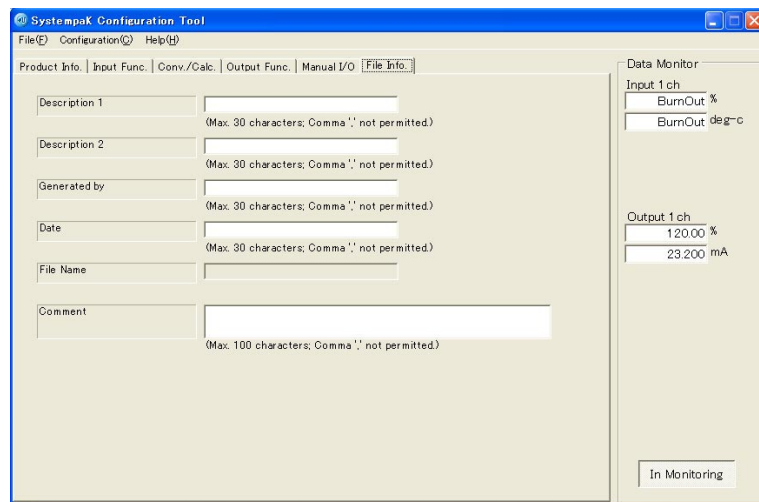


Fig. 5-7. File information tab screen

5.3 Other Functions

Other typical functions of “SPAK Configuration Tool” are shown below. For further information on these functions, refer to “SPAK Configuration Tool Operation Guide.”

- Data monitor (input and output values are shown on the screen)
- Manual input and output (this is the function for specifying input and output values by operating the screen)
- Saving settings in a file, and reading them from a file
- Initialization of settings (this is the function for resetting data to a factory setting)
- Input and Output adjustment.

5.4 List of Parameters

The list of parameters is shown below.

Table 5-1. Parameters (thermocouple)

Parameter	Tab	Description
Comment	Product information	Input the module identification number, etc. Informations are reflected in the module.
% conversion range	Product information	Specify "0 to 100 %" as a fixed range.
Sensor type	Input function	Sensor type
Unit	Input function	Centigrade or Fahrenheit
Input filtering	Input function	Normally use this filter in the moving average process. (Option: No filtering)
Low cut-off	Input function	Normally leave this parameter unchecked.
Input % range setting - 100 %	Input function	Upper-limit input range value
Input % range setting - 0 %	Input function	Lower-limit input range value
Calculation settings	Conversion and calculation	Normally "select first-order lag response" (set to 0.1 s). (Option: Deselecting "Select calculation")
Low cut-off - output 1 (output 2)	Output function	Normally leave this parameter unchecked.
Start up delay time - output 1 (output 2)	Output function	Set time. 0 % output during start up delay time
Output % range setting - 100 % - output 1 (output 2)	Output function	Upper-limit output range value
Output % range setting - 0 % - output 1 (output 2)	Output function	Lower-limit output range value
Input 1ch	Manual input-output	Activate by specifying an input value on the screen.
Output 1ch (Output 2ch)	Manual input-output	Activate by specifying an output value on the screen. For the 2-output type, specify two output values.
Title 1/title 2/ originator/ date/ comment	File information	Parameters are reflected in a setting file. These are not reflected in the module.



Note

- Use the SPAK within the limits of its specifications. If it is used outside the limits of its specifications, the warranty will become invalid.
- The % conversion range must be fixed from 0 to 100 %. Do not set it in the range from -100 % to 100 %.
- Use the input and output range settings (4 to 20 mA and 1 to 5 V) as is without changing them. Follow other instructions given in the operation manual.
- If ongoing calculations generate the values with a deviation of more than $\pm 2,000,000$ %, such values cannot be handled. Use caution to keep the values within the limits in which an overflow does not occur.
- Calculations are performed to three decimal places. If 0.001 is used as a ratio, calculations are performed to four or more decimal places, and information on values at four or more decimal places will be lost. Take note of the accuracy in calculation.

6. Input and Output Adjustment

The SystempaK Input/Output adjustment function is enabled by putting the SystempaK Configuration Tool in adjustment mode.

For details, refer to “SystempaK Configuration Tool Operation Guide (OM2-2320-1920)”.

Note Complete Input/Output Adjustment certainly till the last, or the adjusting data may corrupt and previous adjusted data will be lost.

Note Adjust data within the same accuracy as the input accuracy of the module. (ex. $0\% \pm 0.15\%$)
CJC accuracy is considered to be added to the input accuracy.

Note that input accuracy varies depending on the input range.

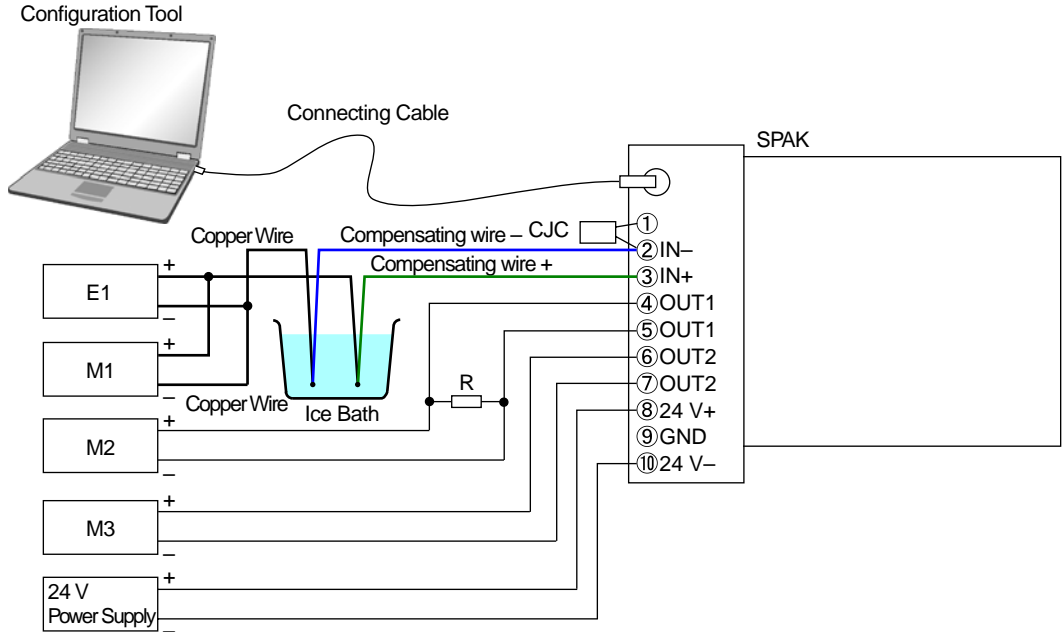
Note At the last of the adjustment, it is need to click the <Data Write to Module> button or click on [File] → [Comm. Start - Write All Data] from the menu bar. (Without this operation, the adjusted data will be lost when the power of the module will be turned off.)

Note When the input/output range is changed, re-adjustment should be performed by starting adjustment mode. If adjustment is not necessarily required, check that the adjusted values are '0' in adjustment mode. Without re-adjustment for updating the adjustment values, the module accuracy may deviate.

In case of downloading parameters after reading from DAT file, the input/output range in the module may change, so re-adjustment is required.

6.1 Preparation

Procedure and preparing for input and output adjustment are described as follows.



- E1: Voltage Generator
- M, M2, M3: Multi-meter (measuring voltage, current)
The multi-meters are required for assuring less than 1/10 accuracy of the module for adjustment.
- R: 250 Ω Resistor ($\pm 0.02\%$ accuracy) used with the current-output type module
- CJC: Cold Junction Compensation sensor (attached)
- Note.** Connect the input of the module with specified compensation wires and the Ice Bath, according to the figure above.

Fig.6-1. Connection for Thermocouple Conversion Module

Table 6-1. Div.1 Color Codes of Compensating Wires (JIS C1610-1995)

T/C	Sheath	+	-
J	Black	Red	White
K	Green	Red	White
T	Brown	Red	White
B	Gray	Red	White
R, S	Oreng	Red	White
E	Purple	Red	White
N	-	Red	White

- (1) Connect measuring instruments with the module as indicated by figure 6-1.
- (2) To stabilize the module, perform a warm-up for 15 minutes or longer.

6.2 Starting adjustment mode

Procedure of starting adjustment mode is described as follows.

- (1) Start the SystempaK Configuration Tool in adjustment mode with the Shift key held down at program startup.
- (2) Connect a communication cable with your PC and the module, and click on [File] → [Comm. Start - Read All Data] from the menu bar.

6.3 Input adjustment

Procedure of Input Adjustment is described as follows.

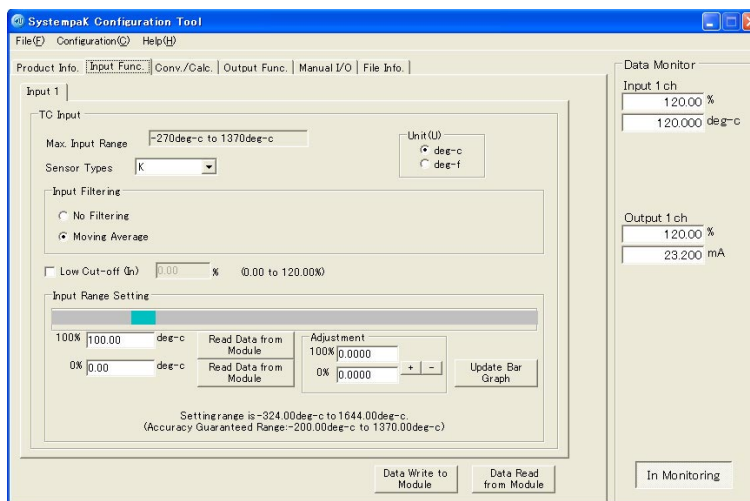


Fig.6-2. Input Function Screen

- (1) Click the Input Function tab of the SystempaK Configuration Tool to display the input setting window.
- (2) Click the <Start Monitor> button to display <In Monitoring>.
- (3) The low cut-off function must be canceled, during input adjustment.
To cancel the function, uncheck the box of [Low Cut-off] and then click the <Data Write to Module> button or click on [File] → [Comm. Start - Write All Data] from the menu bar.
- (4) Make the input signal 0 % electromotive force value using a voltage generator E1.
- (5) Check that the display (upper) of [Input 1ch] in the Data Monitor area is 0.00 % ± 0.15 %.

6. Input and Output Adjustment

- (6) If the display value deviates, adjust the display (upper) of [Input 1ch] to be within $0.00\% \pm 0.15\%$ by clicking the <+> or <-> button.
- (7) Make the input signal 100 % electromotive force value using a voltage generator E1.
- (8) Check that the display (upper) of [Input 1ch] in the Data Monitor area is $100.00\% \pm 0.15\%$.
- (9) If [Low Cut-off] is to be set, check the box of [Low Cut-off].
- (10) To finalize the adjusted data, click the <Data Write to Module> button or click on [File] → [Comm. Start - Write All Data] from the menu bar. (Without this operation, the adjusted data will be lost when the power of the module will be turned off.)
- (11) Click the <In Monitoring> button to display <Start Monitor>.
(This operation is not necessary if you continue to perform output adjustment.)

6.4 Output adjustment

Procedure of Output Adjustment is described as follows.

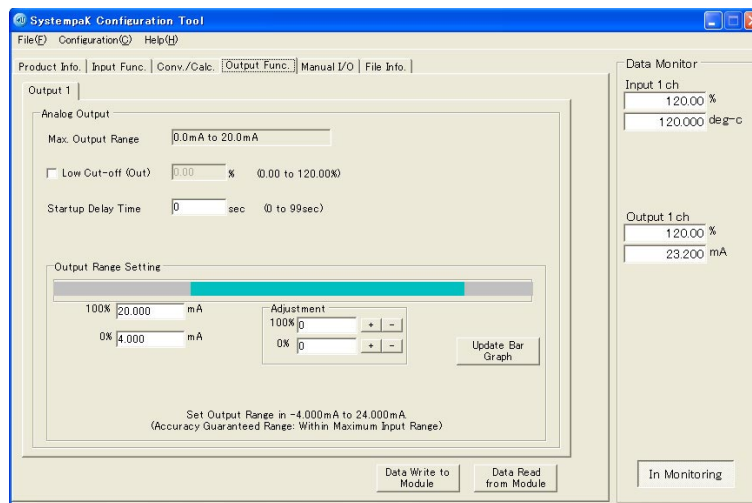


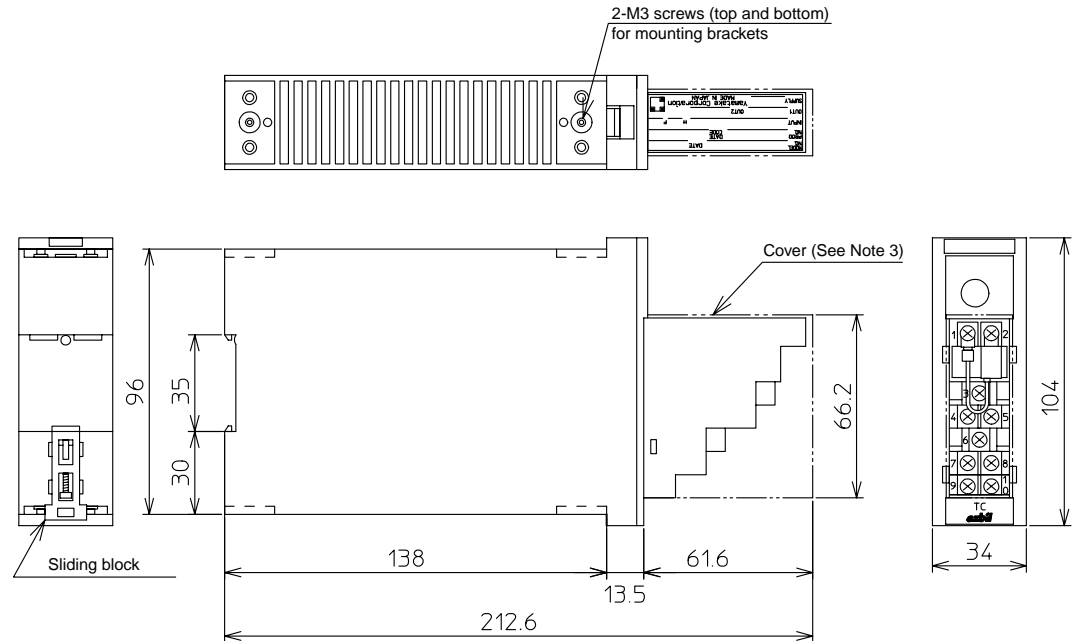
Fig.6-3. Output Function Screen

- (1) Click the <Start Monitor> button to display <In Monitoring>.
(This operation is not necessary if you perform output adjustment following input adjustment.)
- (2) Click the Output Function tab of the SystempaK Configuration Tool to display the output 1ch setting window (or select the Output 2ch tab).

- (3) The low cut-off function must be canceled, during output adjustment.
To cancel the function, uncheck the box of [Low Cut-off] and then click the <Data Write to Module> button or click on [File] → [Comm. Start - Write All Data] from the menu bar.
- (4) Make the input signal 0% electromotive force value using a voltage generator E1.
- (5) Check that the value of output 1ch is $0.00\% \pm 0.15\%$ monitoring the voltage indicated on M2.
- (6) If the output value deviates, adjust the value of output 1ch to be within $0.00\% \pm 0.15\%$ by clicking the <+> or <-> button.
- (7) Make the input signal 100 % electromotive force value using a voltage generator E1.
- (8) Check that the value of output 1ch is $100.00\% \pm 0.15\%$ monitoring the voltage indicated on M2.
- (9) If the output value deviates, adjust the value of output 1ch to be within $100.00\% \pm 0.15\%$ by clicking the <+> or <-> button.
- (10) If [Low Cut-off] is to be set, check the box of [Low Cut-off].
- (11) To finalize the adjusted data, click the <Data Write to Module> button or click on [File] → [Comm. Start - Write All Data] from the menu bar. (Without this operation, the adjusted data will be lost when the power of the module will be turned off.)
- (12) When a 2-output module is used, perform the adjustment indicated by (2) to (11) for output 2ch.
- (13) Click the <In Monitoring> button to display <Start Monitor>.

7. External Dimension Drawing and Terminal Connection Diagram

External dimension drawing and terminal connection diagram is described as follows.



No.	Description
1 ^(Note 2)	_____
2 ^(Note 2)	T/C input(-)
3	T/C input(+)
4	No.1 output(+)
5	No.1 output(-)
6	No.2 output(+) ^(Note 1)
7	No.2 output(-) ^(Note 1)
8	24 V (PS+)
9	GND
10	0 V (PS-)

- Note: 1) For tow-output model.
 2) Used for cold junction compensation sensor.
 3) Do not remove the cold junction compensation sensor. If it is removed, indication will be at the lower limit continuously. (When checking burnout, leave terminal 3 open.)
 4) The cold junction compensation sensor cannot be installed away from the module.
 5) Operate the Module with a cover.
 6) Terminal screws: M3.5
 7) Use the crimping terminals with insulation sheath.

Fig.7-1. Dimensions and wiring diagram

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