



Product Specification Sheet

Model: MS3971

MS3900

Chassis-Mount Programmable Thermocouple Temperature Transmitter with Isolated Dual Output

DESCRIPTION

The MS3971 is a chassis-mount programmable thermocouple temperature transmitter that converts mV input signals from a thermocouple into mutually isolated dual channel DC output signals. The input and/or output settings of the unit can be easily configured using configuration software running on a personal computer.

- ▽ Features cold junction compensation, linearization, and burnout protection.
- ▽ A multi-slot chassis provides ease of maintenance and high-density mounting.
- ▽ Input, output 1, output 2, and power circuits are all isolated from each other.
- ▽ Equipped with a fuse on the DC power line as standard.

ORDERING INFORMATION

Ordering Code

MS3971-□(□-□)-8□□-B□_
[1] [2] [3] [4][5]

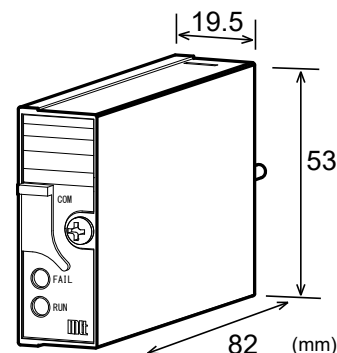
SPECIFICATIONS

POWER SECTION

Power Requirement	24V DC±10%
Power Sensitivity	Better than ±0.1% of span per 10% change in supply voltage
Power Line Fuse	300mA fuse
Current Consumption	55mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	Input (Measuring temp. range) Code ■ TC type K (-200 to 1200°C) K ■ TC type E (-200 to 800°C) E ■ TC type J (0 to 750°C) J ■ TC type T (-200 to 350°C) T ■ TC type B (600 to 1700°C) B ■ TC type R (0 to 1600°C) R ■ TC type S (0 to 1600°C) S ■ TC type N (-200 to 1200°C) N ■ W97Re3-W75Re25 (ASTM E988) (0 to 2000°C) W97 ■ W95Re5-W74Re26 (ASTM E988) (0 to 2000°C) W95 Note: For any other specifications, consult MTT.
Measuring Temp Range (Specify a range in the field [2].)	Specify a measuring temperature range in °C within the above temperature range.



Input Resistance	1MΩ min. (without power: 1MΩ min. at rated input)
Allowable Input Voltage	25V DC max., continuous.
Cold Junction Compensation	Cold junction compensation sensor, stuck to the input terminal of an optional chassis (RC3900A-□□AI or RS3900-01TB).
Cold Junction Compensation Error	±0.5°C max. (at 25°C±15°C)
Linearizer	Built-in linearizer (program)
Factory Default Settings	Unless otherwise requested, the following factory default settings are used: Input code: K Measuring temperature range: 0 to 1200°C

OUTPUT SECTION

Output (Specify a code in the field [3].)	Output 1 / Output 2 Code ■ 1-5V DC / 1-5V DC *1 V1 ■ 0-5V DC / 0-5V DC *1 V5 ■ 0-10V DC / 0-10V DC *1 V6 ■ 1-5V DC / 4-20mA DC *2 C1 *1: The output range can be changed. *2: Fixed outputs. The output range cannot be changed.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Burnout Protection (Specify a code in the field [4].)	Detection current: Approx. 25nA ■ Upscale U ■ Downscale D
Burnout Drive Time	20s max.
Factory Default Settings	Unless otherwise requested, the following factory default settings are used for voltage output models: Output code: V1 (1-5V DC / 1-5V DC) Burnout protection: Upscale

SOFTWARE CONFIGURATION PARAMETERS

Configurable Parameters	<ul style="list-style-type: none"> - Thermocouple type - ADC range (Input range) - Measuring temperature range - Burnout protection - Output range - Zero/Span adjustment (Approx. $\pm 4\%$ of span) - PAUSE status <p>(All of the above are configurable by PC via RS-232C.)</p>
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ADDITIONAL

Option [5]	■ Polyurethane conformal coating ··· /H
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PERFORMANCE

Accuracy Rating	Input accuracy + Output accuracy Refer to the table on page 3.
Temperature Effect	100ppm/°C
Response Time	260ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Effect of Wiring Resistance	$\pm 5\mu\text{V}$ max. per 100 Ω
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100M Ω min. (@ 500V DC) between input, output 1, output 2, and power.
Dielectric Strength	[Input, RS-232C Port] / [Output 1, Output 2, Power]: 1500V AC for 1 minute (Cutoff current: 0.5mA) Output 1 / Output 2 / Power: 500V AC for 1 minute (Cutoff current: 0.5mA) Input / RS-232C Port: 50V DC for 1 minute (Cutoff current: 1.0mA)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: -5 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	-10 to 60°C

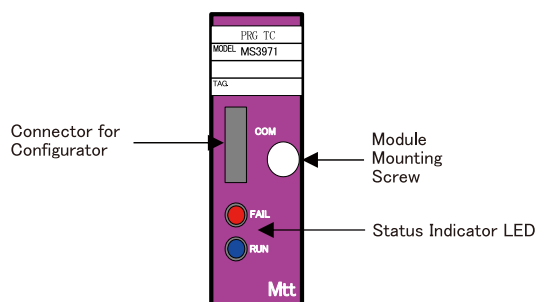
PHYSICAL

Installation	Mounted in an optional chassis (RC3900A-□□AI or RS3900-01TB).
Wiring	Wired to an optional chassis (RC3900A-□□AI or RS3900-01TB).
External Dimensions	W19.5 × H53 × D82 mm
Weight	70g

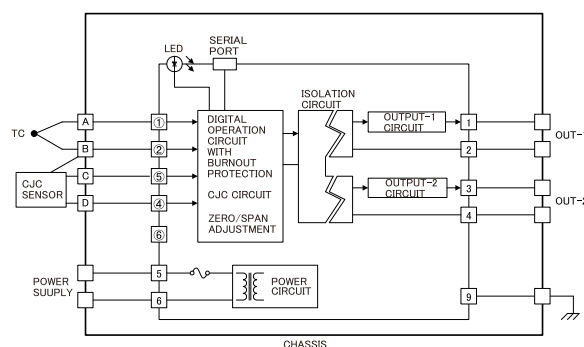
MATERIAL

Housing	ABS Resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

FRONT VIEW



BLOCK DIAGRAM



CONNECTOR

COM (CONNECTOR FOR CONFIGURATOR)

The COM port is used to connect the transmitter to a personal computer through serial communication (RS-232C). An optional communication cable, MTT's MS-CBL01 (with a 9-pin D-subminiature female connector for PC connection) is required for the connection. If the USB port is used, it is recommended that a USB conversion adapter, REX-USB60F (made by RATOC Systems) be used with the MS-CBL01.

Connector Pin Assignments

Pin No.	Signal Name	Pin No.	Signal Name
1	DVdd	5	TX
2	SHDN	6	RX
3	N.C.	7	ISOCOM
4	N.C.	8	ISOCOM

ACCURACY RATING

Thermocouple	Input Accuracy	Output Accuracy
K	1400°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.02\%$	Better than $\pm 0.04\%$
E	1000°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.02\%$	Better than $\pm 0.04\%$
J	750°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.02\%$	Better than $\pm 0.04\%$
T	550°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.03\%$	Better than $\pm 0.04\%$
R	1600°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.04\%$	Better than $\pm 0.04\%$
S	1600°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.04\%$	Better than $\pm 0.04\%$
B	1100°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.06\%$	Better than $\pm 0.04\%$
N	1400°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.02\%$	Better than $\pm 0.04\%$
WRe3-25	2000°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.03\%$	Better than $\pm 0.04\%$
WRe5-26	2000°C (Fixed) / Input span (Measuring temperature range) $\times \pm 0.03\%$	Better than $\pm 0.04\%$

Note: Input accuracy is inversely proportional to input span.

The measuring temperature range must be equivalent to an input span of 3mV or greater.

LED STATUS INDICATORS

INDICATOR LIGHT PATTERNS

Module Status	Description	LED		Remarks
		Blue (RUN)	Red (FAIL)	
INIT		●	●	
RUN		●	-	
PAUSE	Common to all commands.	◎	-	Blink pattern: ●●●●○○○○
ERROR	ADC error	-	◎	Blink pattern: ●●●●○○○○●○
	DA output error	-	◎	Blink pattern: ●●●●○○○○●●●○
	Burnout	-	◎	Blink pattern: ●●●●○○○○●○●●●○
	Power error	-	◎	Blink pattern: ●●●●○○○○
HALT	WDT	-	●	May fail to turn ON.
	Memory	-	●	May fail to turn ON.
	Power error	-	●	May fail to turn ON.

Notes:

1. OFF: - or ○, ON: ●, Blinking: ◎

2. Each of the circle symbols (○, ●) shown in the Remarks column indicates a duration of 0.25 s.