



**DESCRIPTION**

The MS5001 is an ultra-slim thermocouple temperature transmitter that converts input signals from a thermocouple into commonly used DC signals and provides an isolated single output.

**ORDERING CODE**

**Model** MS5001 -   /

**Input**

<b>K:</b> Type K thermocouple	<b>B:</b> Type B thermocouple
<b>E:</b> Type E thermocouple	<b>R:</b> Type R thermocouple
<b>J:</b> Type J thermocouple	<b>S:</b> Type S thermocouple
<b>T:</b> Type T thermocouple	<b>N:</b> Type N thermocouple
	<b>0:</b> Other than those above.

**Output**

<b>A:</b> 4 to 20mA DC	<b>1:</b> 0 to 10mV DC
<b>D:</b> 0 to 20mA DC	<b>2:</b> 0 to 100mV DC
<b>Z:</b> Other DC current signals	<b>3:</b> 0 to 1V DC
	<b>4:</b> 0 to 10V DC
	<b>5:</b> 0 to 5V DC
	<b>6:</b> 1 to 5V DC
	<b>3W:</b> ±1V DC
	<b>4W:</b> ±10V DC
	<b>5W:</b> ±5V DC
	<b>0:</b> Other DC voltage signals

**Connection Type**

**No code:** Screw connection  
**S:** Spring-cage connection

**Options**

**No code:** None  
**/D:** Downscale burnout protection  
**/X:** Others (Special order)  
 \* For non-standard options, ask MTT for availability.

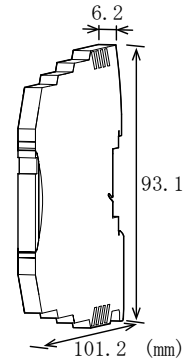
**ORDERING INFORMATION**

To place an order, please use the ordering code format as shown above. Also specify a desired temperature range.

- (e.g.) MS5001-KA (0 to 500°C)
- MS5001-KA/S (0 to 500°C)
- MS5001-KA/D (0 to 500°C)
- MS5001-KA/SDX (0 to 500°C / Frequency characteristics 1Hz-3dB)

\* Note that the temperature range should be specified in steps of at least 10 degrees Celsius.

Other Ordering Examples:  
 For an input code of "0": MS5001-06 (WRc5-26, 0 to 2000°C)  
 For an output code of "0": MS5001-K0 (0 to 500°C / Output: 2 to 5V)



**SPECIFICATIONS**

**POWER SECTION**

Power Requirement	24V DC±10%
Power Sensitivity	Better than ±0.1% of span.
Power Line Fuse	125mA fuse is installed (standard).
Current Consumption	
Voltage Output	13mA max. (at 24V DC) (Approx.11mA for 100% input)
Current Output	29mA max. (at 24V DC) (Approx.27mA for 100% input)

**INPUT SECTION**

Input Resistance	With or without power: 1MΩ min.
Signal Source Resistance	1kΩ max.
Input Voltage	30V DC max., continuous.
Cold Junction Compensation	A built-in cold junction compensation sensor is used.
Linearizer	Built-in digital linearizer

**Ranges Available**

<Standard specifications> (Temp at 0% input = 0°C)

K	Specify between 0-100°C and 0-1350°C in steps of 50°C (e.g. K 0 to 350°C).
E	Specify between 0-100°C and 0-1000°C in steps of 50°C (e.g. E 0 to 150°C).
J	Specify between 0-100°C and 0-800°C in steps of 50°C (e.g. J 0 to 550°C).
T	Specify between 0-100°C and 0-400°C in steps of 50°C (e.g. T 0 to 250°C).
B	Specify between 0-1200°C and 0-1800°C in steps of 100°C (e.g. B 0 to 1700°C).
R	Specify between 0-400°C and 0-1700°C in steps of 100°C (e.g. R 0 to 1400°C).

<Quasi-standard specifications>

Type	Temperature Range (°C)	(+) Bias	(-) Bias
K	-200 to +1370	Up to 5x input span.	Up to 1x input span.
E	-200 to +1000	Up to 3x input span.	Up to 0.5x input span.
J	-200 to +1200	Up to 5x input span.	Up to 0.5x input span.
T	-200 to +400	Up to 2x input span.	Up to 0.5x input span.
B	0 to +1820	Up to 5x input span.	N/A
R	-50 to +1760	Up to 10x input span.	No limitation.
S	-50 to +1760	Up to 10x input span.	No limitation.
N	-200 to +1300	Up to 5x input span.	Up to 0.5x input span.

Input Spec Ex. 1: For K -100 to 400°C, the input span is 500°C and the bias -0.2x the input span.

Input Spec Ex. 2: For J 300 to 400°C, the input span is 100°C and the bias 3x the input span.

Note 1: Input span: 3mV min.

Note 2: For input temperature ranges starting from any specified temperature below 0°C, the accuracy may partly be out of specification.

Note 3: For the type B thermocouple, the accuracy in the temperature range below 600°C is not guaranteed.

Note 4: Any specification out of the temperature range or bias requirement listed above is handled as a special order.

● OUTPUT SECTION

Allowable Output Load

Voltage Output (DC)	10V	5kΩ min.
	5V	2.5kΩ min.
	1V	500Ω min.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4 to 20mA output	550Ω max.

Zero Adjustment Approx. ±10% of span. (Adjustable by the front-accessible trimmer.)

Span Adjustment Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)

Burnout Protection Standard: Upscale (Downscale is optional.)

Ranges Available

	Current Signal	Voltage Signal
Output Range (DC)	0 to 20mA	-10 to 10V
Output Span (DC)	4 to 20mA	10mV to 20V
Output Bias	0 to 100%	-100 to 100%

\* For current output signals, the accuracy of any current output smaller than 0.1mA is not guaranteed.

Output Spec Ex. 1: For 4 to 20mA output, the output span is 16mA and the bias +25%.

Output Spec Ex. 2: For -1 to 4V output, the output span is 5V and the bias -20%.

● PERFORMANCE

Accuracy Rating

Better than ± [0.1% of span + 3°C {Cold junction compensation error} + Linearity error] (at 25°C±5°C)

\* Linearity errors vary with input spans.

Input Span	Linearity Error (%)	Input Span	Linearity Error (%)
JIS K 0-300°C	0.1	JIS K 0-600°C	0.15
JIS J 0-200°C	0.15	JIS E 0-200°C	0.15
JIS E 0-600°C	0.25	JIS R 0-1600°C	0.3
JIS S 0-1000°C	0.25	JIS T 0-100°C	0.12

Temperature Effect Better than ±0.2% of span per 10°C change in ambient.

Response Time 160ms max. (0 to 90%) with a step input at 100%.

CMRR 100dB min. (500V AC, 50/60Hz)

Isolation 3-way isolation between input, output, and power.

Insulation Resistance 100MΩ min. (@ 500V DC) between input, output, and power.

Dielectric Strength 1500V AC for 1 minute between input, output, and power. (Cutoff current: 0.5mA)

Operating Environment Ambient temperature: -20 to 65°C  
Humidity: 5 to 90% RH (non-condensing)

Storage Temperature -25 to 70°C

● PHYSICAL

Installation DIN rail mounting

Wiring Screw connection or spring-cage connection  
Recommended tightening torque for screw connection: 0.5 to 0.6 Nm

Wire Size 0.2 to 2.5 mm<sup>2</sup>

External Dimensions W93.1 × H101.2 × D6.2 mm

Weight 60g max.

● MATERIAL

Housing PBT resin (UL 94V-0)

Screw Terminal Tin-plated copper alloy

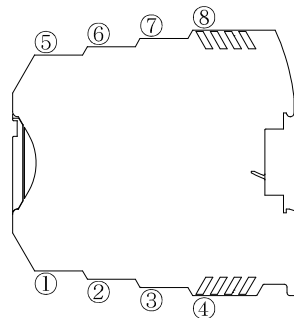
Printed Circuit Board Glass fabric, epoxy resin (FR-4: UL 94V-0)

Conformal Coating HumiSeal® 1A27NSLU

(Polyurethane)

\* HumiSeal® is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENTS



①	TC +
②	TC -
③	N.C.
④	N.C.
⑤	OUTPUT +
⑥	OUTPUT -
⑦	POWER +
⑧	POWER -

BLOCK DIAGRAM

