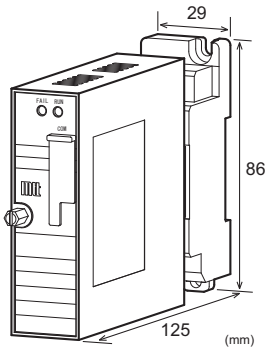
Product Specification Sheet Model: MS3771

Slim Plug-In Programmable Thermocouple Temperature Transmitter with Isolated Single/Dual Output

DESCRIPTION

The MS3771 is a slim, plug-in programmable thermocouple temperature transmitter that converts input signals from a thermocouple into commonly used DC signals and provides isolated single or dual output. The input and/or output settings of the unit can be easily configured using configuration software running on a personal computer.



ORDERING CODE

MS3771 - □ - □□

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 100 to 240V DC

Input (Measuring Temperature Range)

K: Type K thermocouple (-200 to 1200°C)
E: Type E thermocouple (-200 to 800°C)
J: Type J thermocouple (0 to 750°C)
T: Type T thermocouple (-200 to 350°C)
B: Type B thermocouple (600 to 1700°C)
R: Type R thermocouple (0 to 1600°C)
S: Type S thermocouple (0 to 1600°C)
N: Type N thermocouple (-200 to 1200°C)
W97: W97Re3-W75Re25 (ASTM E988) (0 to 2000°C)
W95: W95Re5-W74Re26 (ASTM E988) (0 to 2000°C)
* For any other special specifications, consult MTT.

Output

Single Output Model

A: 4 to 20mA DC *1
4: 0 to 10V DC *2
5: 0 to 5V DC *2
6: 1 to 5V DC *2

Dual Output Model

A1: 4 to 20mA DC / 1 to 5V DC *1
A2: 4 to 20mA DC / 4 to 20mA DC *1
4W: 0 to 10V DC / 0 to 10V DC *2
5W: 0 to 5V DC / 0 to 5V DC *2
6W: 1 to 5V DC / 1 to 5V DC *2

*1: Fixed output(s). The output range cannot be changed.
*2: The output range can be changed.

Options

No code: None (Upscale burnout protection will apply if no option is specified.)
/U: Upscale burnout protection
/D: Downscale burnout protection
/L: Dual current output with high output load (OUT-1: 750Ω / OUT-2: 550Ω)
/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 on the left. Also specify a measuring temperature range.
(e.g.) MS3771-A-K4W (0 to 500°C)

* Note that the temperature range should be specified in °C within the range listed below.

Input Code	Measuring Temperature Range	Code shown on Configuration Window
K	-200 to 1200°C	K
E	-200 to 800°C	E
J	0 to 750°C	J
T	-200 to 350°C	T
B	600 to 1700°C	B
R	0 to 1600°C	R
S	0 to 1600°C	S
N	-200 to 1200°C	N
W97	0 to 2000°C	W3Re/W25Re
W95	0 to 2000°C	W5Re/W26Re

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

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 100 to 240V DC: 85 to 264V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse is installed (standard).

Power Consumption

Power	100-240V AC	24V DC	100-240V DC
Single Output	5.0VA max	1.1W max	4.8W max
Dual Output	5.0VA max	1.5W max	6.0W max

●INPUT SECTION

Input Resistance	1MΩ min. (Without power: 1MΩ min. at rated input.)
Burnout Protection	Selectable from upscale, downscale and no burnout protection. (Detection current: Approx. 25nA)

Burnout Drive Time	20s max.
Allowable Input Voltage	25V DC, continuous.
Cold Junction Compensation	Cold junction compensation sensor, stuck to the input terminal of the supplied socket.
Cold Junction Compensation Error	±0.5°C max. (25°C±15°C)
Factory Default Settings	The factory default settings are as follows: Input code: K Measuring temperature range: 0 to 1200°C Burnout protection: Upscale

●OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	2mA max.	
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.
Zero Adjustment	Approx. ±4% of span. (Adjustable by PC via RS-232C.)	
Span Adjustment	Approx. ±4% of span. (Adjustable by PC via RS-232C.)	
Factory Default Settings	The factory default settings for voltage output models are as follows: Single output model: Output code: 6 (1 to 5V DC) Dual output model: Output code: 6W (1 to 5V DC / 1 to 5V DC)	

●SOFTWARE CONFIGURATION PARAMETERS

Configurable Parameters	- Thermocouple type - ADC range (Input range) - Measuring temperature range - Burnout protection - Output range - Zero/Span adjustment (Approx. ±4% of span) - PAUSE status (All of the above are configurable by PC via RS-232C.)

Note: Any ADC range setting should satisfy:
Electromotive force value* × 1.1 < ADC range
(Example)
If the thermocouple is type K and the temperature range is from 0 to100°C:
41276μV × 1.1 = 45403μV (= Approx. 46mV)
Therefore, the ADC range selection should be set to "80mV".

* For the electromotive force of thermocouples (type K - type N), refer to the EMF Table of JIS C 1602.

●PERFORMANCE

Accuracy Rating (Input accuracy + Output accuracy)
* Refer to the table on page 3.

Temperature Effect	100ppm/°C max.
Response Time	260ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output [Output 1/Output 2], power, and ground.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output [Output 1/Output 2], power, and ground.
Dielectric Strength	[Input, RS-232C Port] / Output [Output 1/Output 2] / [Power, Ground]: 2000V AC for 1 minute (Cutoff current: 0.5mA) Power / Ground: 2000V AC for 1 minute (Cutoff current: 5mA) Output 1 / Output 2: 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

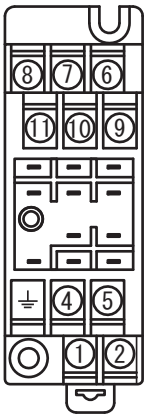
Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-out prevention screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 × H86 × D125mm (including the mounting screw and socket)
Weight	Main unit: 120g max. Socket: 80g max.

●MATERIALS

Housing	ABS resin (UL 94V-0)
Terminal Block	PBT resin (UL 94V-0)
Terminal Block Cover	PC resin (UL 94V-2)
DIN Rail Stopper	PP resin (UL 94HB)
Screw Terminal	Nickel-plated steel
Contacts Material and Finish	Brass with 0.2μm gold plating
Printed Circuit Board	Glass fabric epoxy resin (FR-4: UL 94V-0)
Anti-Humidity Coating	HumiSeal® 1A27NS (Polyurethane)

* HumiSeal® is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENT



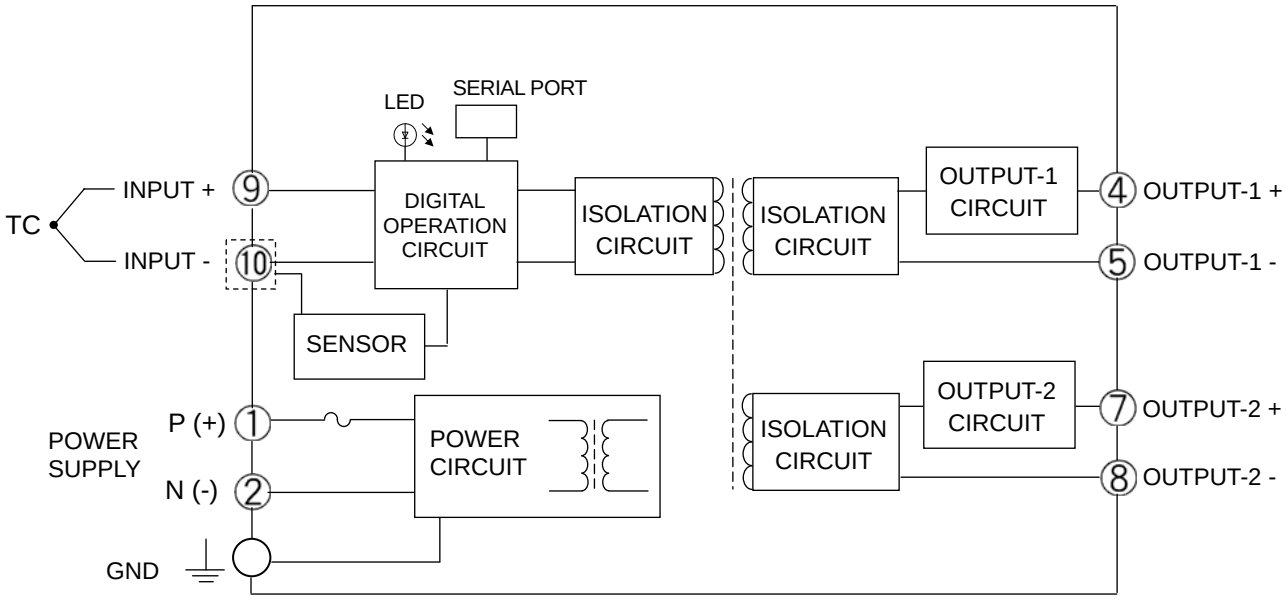
①	P (+)	POWER
②	N (-)	
⏚	GND	
④	+ OUTPUT 1	
⑤	- OUTPUT 1	
⑥	N.C.	
⑦	+ OUTPUT 2	
⑧	- OUTPUT 2	
⑨	TC +	
⑩	TC -	
⑪	N.C.	

ACCURACY RATING

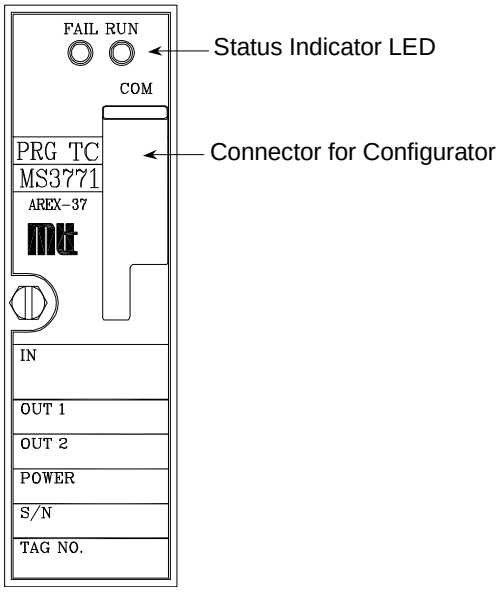
Thermocouple	Input Accuracy	Output Accuracy
K	1400°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	±0.04% max.
E	1000°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	±0.04% max.
J	750°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	±0.04% max.
T	550°C (Fixed) / Input span (Measuring temperature range) × ±0.03%	±0.04% max.
R	1600°C (Fixed) / Input span (Measuring temperature range) × ±0.04%	±0.04% max.
S	1600°C (Fixed) / Input span (Measuring temperature range) × ±0.04%	±0.04% max.
B	1100°C (Fixed) / Input span (Measuring temperature range) × ±0.06%	±0.04% max.
N	1400°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	±0.04% max.
W97Re3-W75Re25	2000°C (Fixed) / Input span (Measuring temperature range) × ±0.03%	±0.04% max.
W95Re5-W74Re26	2000°C (Fixed) / Input span (Measuring temperature range) × ±0.03%	±0.04% max.

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

BLOCK DIAGRAM



FRONT VIEW



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 Assignment

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

LED STATUS INDICATOR

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