Product Specification Sheet Model: MS3101

Terminal Block Type Thermocouple Temperature Transmitter with Isolated Dual Output

DESCRIPTION

The MS3101 is a terminal block type thermocouple temperature transmitter that converts input signals from a thermocouple into commonly used DC signals and provides an isolated dual output.

ORDERING CODE

MS3101 - □ - □ □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 110V DC

Input

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

Output 1

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

Output 2

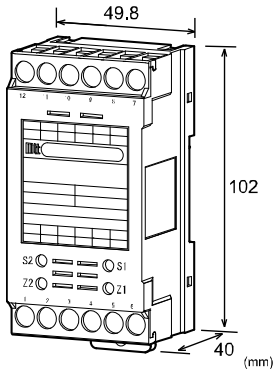
The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.
Note 3: Upscale burnout protection is standard.

Options

No code: None
/D: Downscale burnout protection
/K: Fast response (0 to 90% response time: 10ms max.)
/H: Polyurethane conformal coating
/X: Others (Special order)
* For non-standard options, ask MTT for availability.

CE



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.) MS3101-A-KA6 (0 to 500°C)

* 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": MS3101-A-0AA (WRe5-26 0 to 2000°C)
For an output code of "0": MS3101-A-K60 (0 to 500°C / Output: 2 to 5V)
For an option code of "X": MS3101-A-K66/X (0 to 500°C / Burnout drive time: 500ms max.)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC		
Power Sensitivity	Better than ±0.1% of span for each power supply range.		
Power Line Fuse	160mA fuse		
Maximum Power Consumption			
Power	100-240V AC Approx. 7.0VA	24V DC Approx. 1.8W	110V DC Approx. 2.5W

●INPUT SECTION

Input Resistance	With or without power: 1MΩ min.
Allowable Signal Source Resistance	1kΩ max.
Allowable Input Voltage	30V DC max., continuous.
Cold Junction Compensation	A built-in cold junction compensation sensor is used.
Cold Junction Compensation Error	±0.5°C max. (25°C±15°C)
Linearizer	Built-in analog linearizer (6 segments maximum)

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 be partly 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)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.

Zero Adjustment	Approx. ±5% 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 + 0.5°C {Cold junction compensation error} + Linearity error] (at 25°C±5°C)
Note: Linearity errors vary with input spans. (0.1% of span typ.)

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	0.5
JIS S 0-1000°C	0.25	JIS T 0-300°C	0.25

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	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

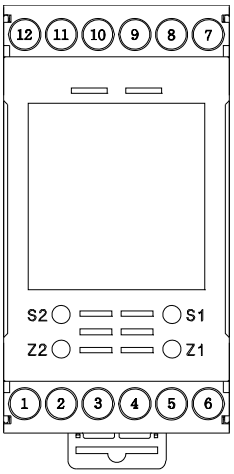
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

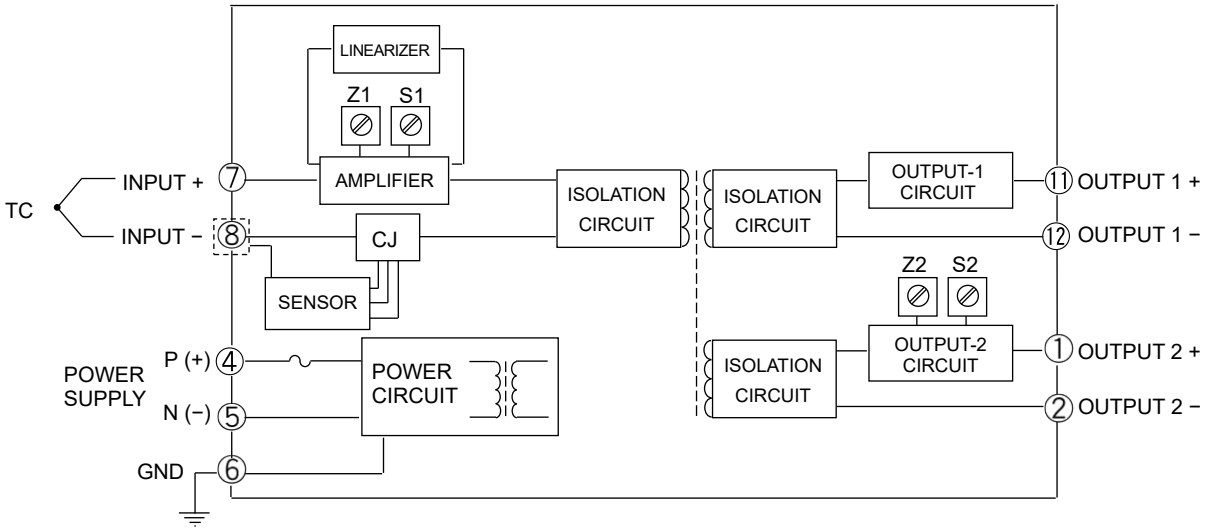
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	T.C. +	
⑧	T.C. −	
⑨	N.C.	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM



Product Specification Sheet Model: MS3102

Terminal Block Type RTD Temperature Transmitter with Isolated Dual Output

DESCRIPTION

The MS3102 is a terminal block type RTD temperature transmitter that converts input signals from an RTD into commonly used DC signals and provides an isolated dual output.

ORDERING CODE

MS3102 - □ - □ □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 110V DC

Input

P1: Pt 100Ω
P5: Pt 50Ω
J: JPt 100Ω
N: Ni 508.4Ω
Y: Other than those above.

Output 1

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

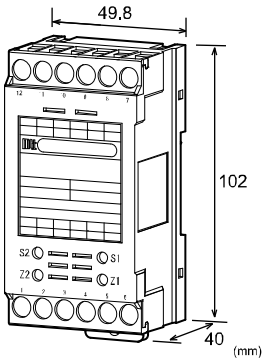
Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.
Note 3: Upscale burnout protection is standard.

Options

No code: None
/K: Fast response (0 to 90% response time: 10ms max.)
/H: Polyurethane conformal coating
/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.) MS3102-A-P1A6 (0 to 150°C)

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

Other Ordering Examples:
For an input code of "Y": MS3102-A-YAA (Input: Cu 10Ω at 0°C / 0 to 100°C)
For an output code of "0": MS3102-A-P106 (0 to 150°C / Output: 2 to 5V)
For an option code of "X": MS3102-A-P1AA/X (0 to 150°C / Response frequency 50Hz)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse

Maximum Power Consumption

Power	100-240V AC	24V DC	110V DC
	Approx. 7.0VA	Approx. 1.8W	Approx. 2.5W

●INPUT SECTION

Excitation Current	Approx. 1mA with Pt for 0 to 100°C
Lead Wire Resistance	200Ω max. per wire

Ranges Available

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

Pt 100Ω	Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100Ω, 0 to 150°C).
JPt 100Ω	Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100Ω, 0 to 250°C).
Pt 50Ω	0 to 100°C

<Quasi-standard specifications>

RTD	Temperature Range (°C)	Input Span	Input Bias
Pt 100Ω	-200 to +850	50°C min.	Up to 4x the input span.
JPt 100Ω	-200 to +500	50°C min.	
Pt 50Ω	-200 to +600	100°C min.	
Ni 508.4Ω	-50 to +250	30°C min.	

Input Spec Ex.: For Pt 100Ω (150 to 200°C), the input span is 50°C and the bias 150°C (3x the span).
Note: 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)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.

Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)
Burnout Protection	Upscale (even if any of the three wires, A, B, and B' is opened)

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 ± [0.15% of span + 0.1°C] (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	170ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

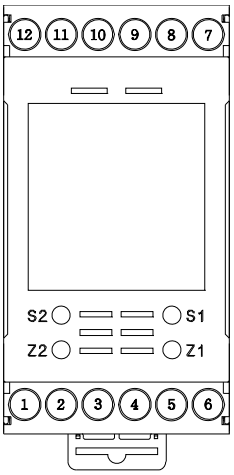
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

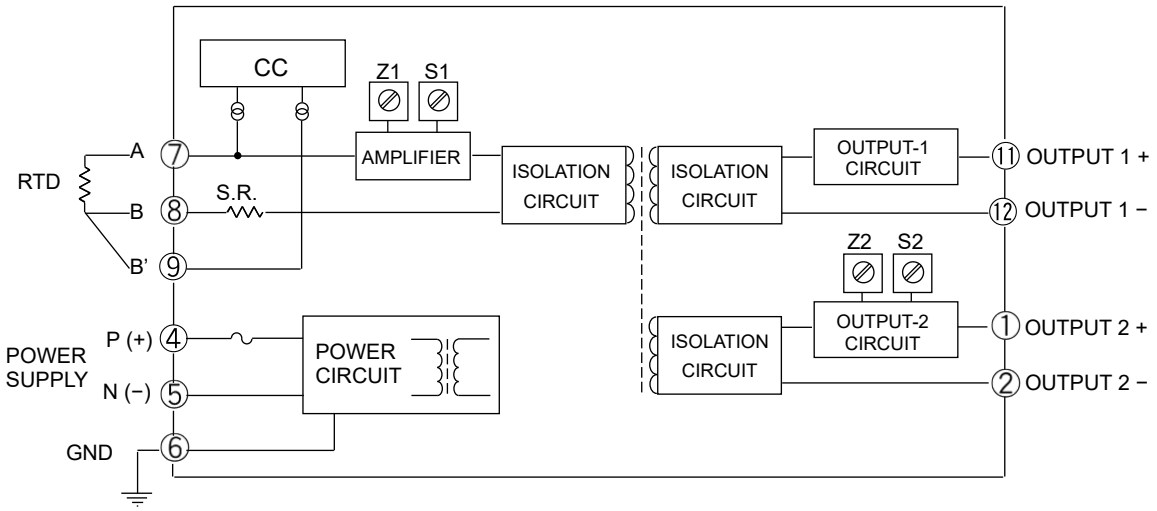
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	RTD A	
⑧	RTD B	
⑨	RTD B'	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM



Product Specification Sheet Model: MS3103

Terminal Block Type Millivolt Isolator with Isolated Dual Output

DESCRIPTION

The MS3103 is a terminal block type millivolt (mV) isolator that converts mV input signals from sensors or other devices into commonly used DC signals and provides an isolated dual output.

ORDERING CODE

MS3103 - □ - □ □ □

Model

Power Supply
- **A**: 100 to 240V AC (50 to 60Hz)
- **D**: 24V DC
- **P**: 110V DC

Input
- **1**: 0 to 10mV DC
- **2**: 0 to 100mV DC
- **1W**: ±10mV DC
- **2W**: ±100mV DC
- **0**: Other DC voltage signals

Output 1
- **A**: 4 to 20mA DC
- **D**: 0 to 20mA DC
- **Z**: Other DC current signals
- **1**: 0 to 10mV DC
- **2**: 0 to 100mV DC
- **3**: 0 to 1V DC
- **4**: 0 to 10V DC
- **5**: 0 to 5V DC
- **6**: 1 to 5V DC
- **3W**: ±1V DC
- **4W**: ±10V DC
- **5W**: ±5V DC
- **0**: Other DC voltage signals

Output 2

The codes are the same as for Output 1.

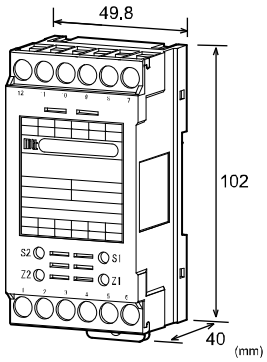
Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.

Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

Options
- **No code**: None
- **/K**: Fast response (0 to 90% response time: 10ms max.)
- **/H**: Polyurethane conformal coating
- **/X**: Others (Special order)

* For non-standard options, ask MTT for availability.

CE



ORDERING INFORMATION

To place an order, please use the ordering code format as shown on the left.
(e.g.) MS3103-A-2A6

Other Ordering Examples:
For an input code of "0": MS3103-A-0AA (Input: 0 to 75mV)
For an output code of "Z": MS3103-A-2Z6 (Output: 8 to 20mA)
For an option code of "X": MS3103-A-2A6/X (Response frequency: 50Hz)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse

Maximum Power Consumption

Power	100-240V AC	24V DC	110V DC
	Approx. 6.5VA	Approx. 1.6W	Approx. 2.5W

●INPUT SECTION

Input Resistance	With or without power: 1MΩ min.
Allowable Input Voltage	30V DC max., continuous.

Range Available

Input Range (DC)	-200mV to 200mV
Input Span (DC)	5mV* to 400mV
Input Bias	-100 to 100%

Note: For any input range including negative input signals, the input span ranges from *10mV to 400mV.

Input Spec Ex. 1: For 50 to 150mV input, the input span is 100mV and the bias +50%.

Input Spec Ex. 2: For -10 to 30mV input, the input span is 40mV and the bias -25%.

●OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.
Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	

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 (at 25°C±5°C).
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	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

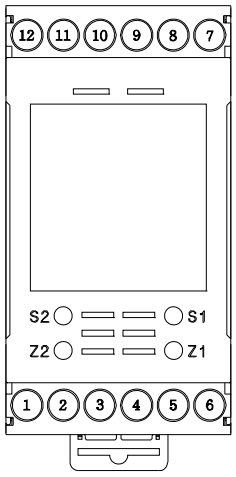
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

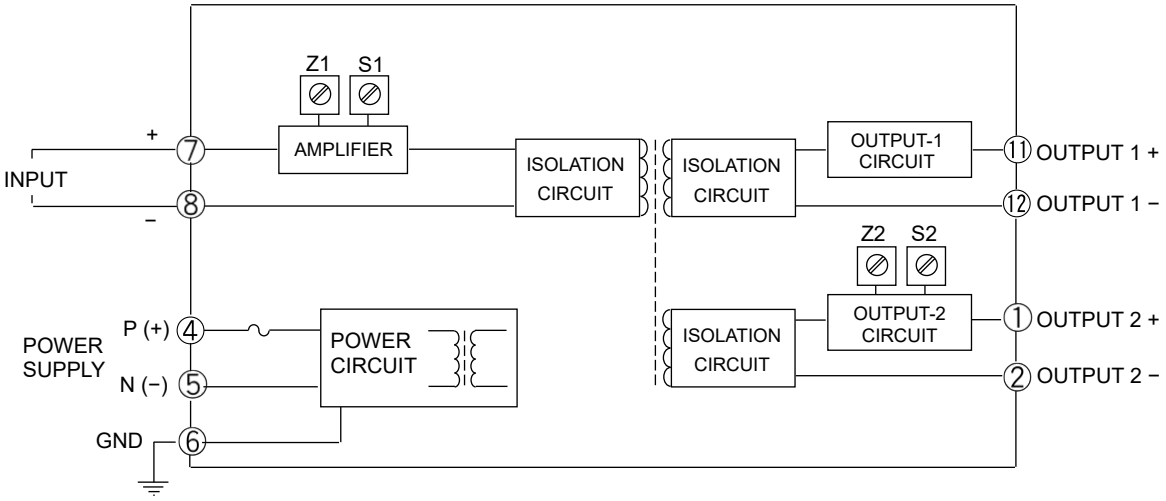
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	+ INPUT	
⑧	− INPUT	
⑨	N.C.	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM



Product Specification Sheet Model: MS3104

Terminal Block Type High-Level Signal Conditioner (Isolator) with Isolated Dual Output

DESCRIPTION

The MS3104 is a terminal block type high-level signal conditioner (isolator) that converts DC current or voltage signals into commonly used DC signals and provides an isolated dual output.

ORDERING CODE

MS3104 - □ - □ □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 110V DC
Q: 12V DC

Input

A: 4 to 20mA DC
B: 2 to 10mA DC
C: 1 to 5mA DC
D: 0 to 20mA DC
E: 4 to 20mA DC *1
H: 10 to 50mA DC
Z: Other DC current signals
3: 0 to 1V DC
4: 0 to 10V DC
5: 0 to 5V DC
6: 1 to 5V DC
4W: ±10V DC
5W: ±5V DC
0: Other DC voltage signals

*1: Shunt resistor 50Ω

Output 1

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

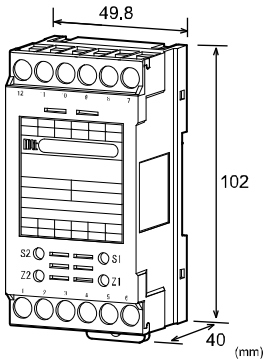
Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

Options

No code: None
/K: Fast response (0 to 90% response time: 10ms max.)
/H: Polyurethane conformal coating
/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.
(e.g.) MS3104-A-AA6

Other Ordering Examples:
For an input code of "Z": MS3104-A-ZAA (Input: 8 to 20mA)
For an output code of "0": MS3104-A-A60 (Output: 2 to 5V)
For an option code of "X": MS3104-A-66/X (0-90% response time: 5ms max.)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC 12V DC: 12V DC±20%	
Power Sensitivity	Better than ±0.1% of span for each power supply range.	
Power Line Fuse	160mA fuse 315mA fuse (for 12V DC power)	
Maximum Power Consumption	100-240V AC 24V DC 110V DC 12V DC	Approx. 6.5VA Approx. 1.6W Approx. 2.5W Approx. 1.3W

●INPUT SECTION

Input Resistance		
Voltage Input (DC)	With or without power: 1MΩ min.	
Current Input (DC)	4 to 20mA (std.)	250Ω
	2 to 10mA	250Ω
	1 to 5 mA	100Ω
	0 to 20mA	250Ω
	10 to 50mA	10Ω
Allowable Input Voltage		
Voltage Input Model	30V DC max., continuous. (Standard for a span up to 10V)	
Current Input Model	40mA DC max., continuous. (Standard for 4 to 20mA)	

Ranges Available	Current Signal	Voltage Signal
Input Range (DC)	-100 to 100mA	-300 to 300V
Input Span (DC)	100μA[*1] to 200mA	200mV[*2] to 600V
Input Bias	-100 to 100%	-100 to 100%

Note: For any input range including negative input signals, the input spans for current and voltage signals range from [*1]200μA to 200mA and [*2]400mV to 600V, respectively.

Input Spec. Ex.1: For 3 to 8V input, the input span is 5V and the bias +60%.

Input Spec. Ex. 2: For -5 to 0V input, the input span is 5V and the bias -100%.

●OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.

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

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 (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	85ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

●MATERIAL

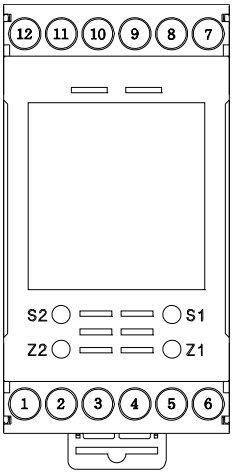
Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

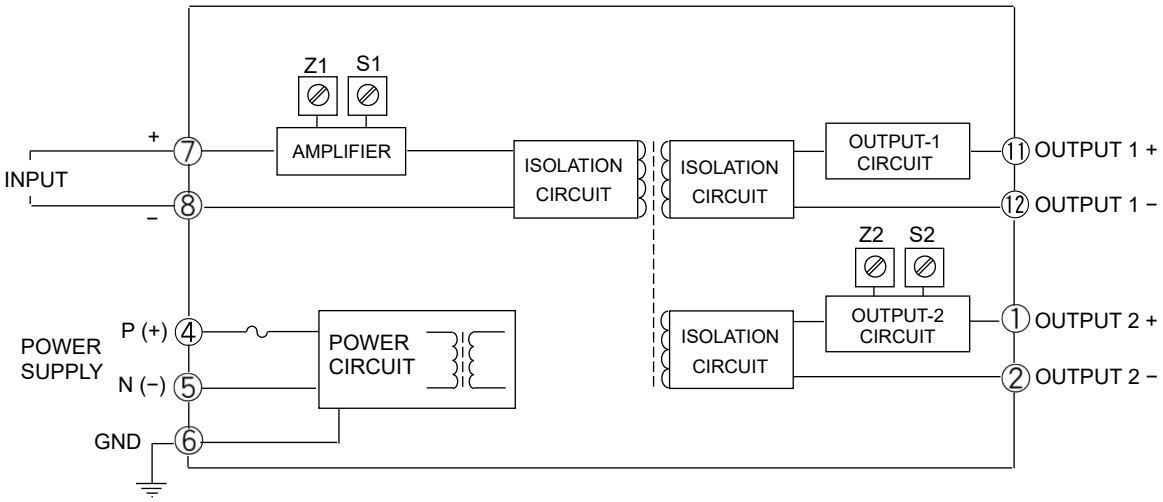
Note: The 12V DC version is not subject to CE approval.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	+ INPUT	
⑧	− INPUT	
⑨	N.C.	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM



Product Specification Sheet Model: MS3107

Terminal Block Type Distributor with Isolated Dual Output

DESCRIPTION

The MS3107 is a terminal block type distributor that powers a two-wire transmitter, converts its 4 to 20mA signals into commonly used DC signals, and provides an isolated dual output. This model can also be used as an isolator.

ORDERING CODE

MS3107 - □ - □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC
P: 110V DC
Q: 12V DC

Input

4 to 20mA DC from 2-wire transmitters

Output 1

A: 4 to 20mA DC
D: 0 to 20mA DC
Z: Other DC current signals
1: 0 to 10mV DC
2: 0 to 100mV DC
3: 0 to 1V DC
4: 0 to 10V DC
5: 0 to 5V DC
6: 1 to 5V DC
0: Other DC voltage signals

Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

Options

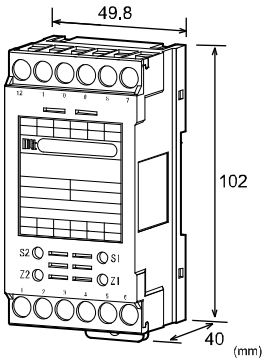
No code: None
/K: Fast response (0 to 90% response time: 10ms max.)
/H: Polyurethane conformal coating
/X: Others (Special order)

* For non-standard options, ask MTT for availability.

ORDERING INFORMATION

To place an order, please use the ordering code format as shown above.
(e.g.) MS3107-A-A6

Other Ordering Examples:
For an output code of "0": MS3107-A-60 (Output: 2 to 5V)
For an option code of "X": MS3107-A-AA/X (Response frequency: 50Hz)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).



SPECIFICATIONS

POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC 12V DC: 12V DC±20%	
Power Sensitivity	Better than ±0.1% of span for each power supply range.	
Power Line Fuse	160mA fuse 315mA fuse (for 12V DC power)	
Maximum Power Consumption	100-240V AC 24V DC 110V DC 12V DC	Approx. 9.0VA Approx. 2.4W Approx. 3.5W Approx. 2.4W

INPUT SECTION

Input Signal	4 to 20mA DC from 2-wire transmitters
Input Resistance	250Ω
Transmitter Power Supply	Output voltage: 25V, typical. (0% input) 18V, typical. (100% input) Maximum current: 25mA, typical.
Limit Current for Short-Circuit Protection	26mA (typ.) * The unit has a built-in short-circuit detection circuit.
Permissible Short-Circuit Duration	Continuous.

OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.

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

Ranges Available

	Current Signal	Voltage Signal
Output Range (DC)	0 to 20mA	0 to 10V
Output Span (DC)	4 to 20mA	10mV to 10V
Output Bias	0 to 100%	0 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 4 to 8V output, the output span is 4V and the bias +100%.

●PERFORMANCE

Accuracy Rating	Better than ±0.1% of span (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	85ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

●MATERIAL

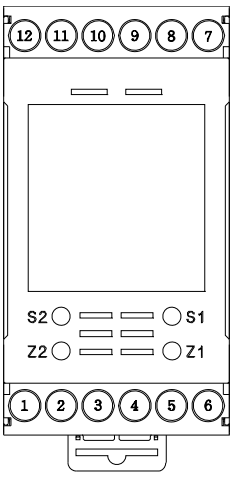
Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

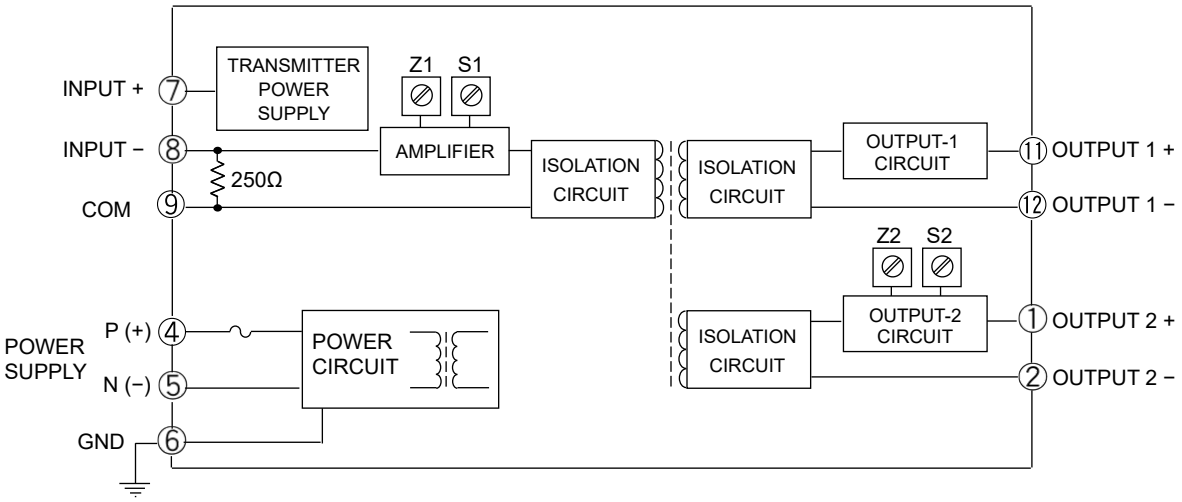
Note: The 12V DC version is not subject to CE approval.

TERMINAL ASSIGNMENTS

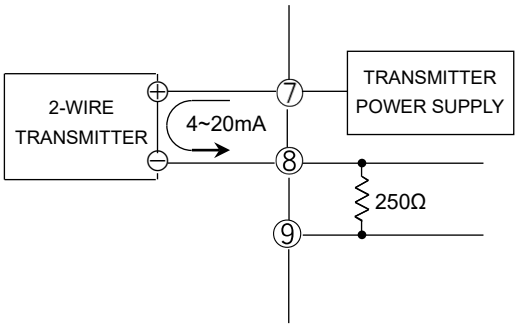


①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	+ INPUT	
⑧	− INPUT	
⑨	COM	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

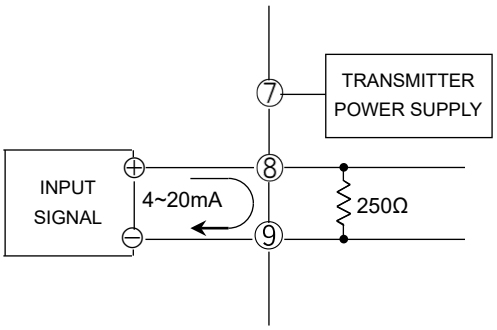
BLOCK DIAGRAM



When used as a distributor:



When used as an isolator:



Product Specification Sheet Model: MS3108

Terminal Block Type Frequency/Analog Converter with Isolated Dual Output

DESCRIPTION

The MS3108 is a terminal block type frequency to analog converter that converts pulse train signals from flow sensors and the like into commonly used DC signals and provides an isolated dual output.

ORDERING CODE

MS3108 - □ - □ □ □

Model

Power Supply
- **A**: 100 to 240V AC (50 to 60Hz)
- **D**: 24V DC
- **P**: 110V DC

Input
- **O**: Dry contact or open collector (Pull-up: Approx. 13V, 3.3kΩ)
- **A**: AC voltage pulse (Threshold voltage: Approx. 0.06Vp-p)
- **D**: DC voltage pulse (Threshold voltage: Approx. 2V)
- **I**: 4 to 20mA DC pulse (Threshold current: Approx. 8mA)
- **Y**: Other input signals and/or threshold voltage

Output 1
- **A**: 4 to 20mA DC
- **D**: 0 to 20mA DC
- **Z**: Other DC current signals
- **1**: 0 to 10mV DC
- **2**: 0 to 100mV DC
- **3**: 0 to 1V DC
- **4**: 0 to 10V DC
- **5**: 0 to 5V DC
- **6**: 1 to 5V DC
- **3W**: ±1V DC
- **4W**: ±10V DC
- **5W**: ±5V DC
- **0**: Other DC voltage signals

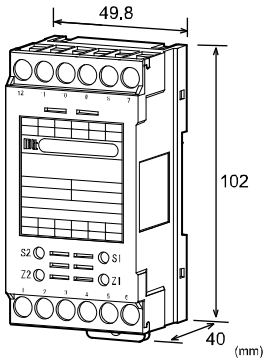
Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

Options
- **No code**: None
- **/H**: Polyurethane conformal coating
- **/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 frequency range.
(e.g.) MS3108-A-DA6 (0 to 850Hz)

Other Ordering Examples:
For an input code of "Y": MS3108-A-YAA (0 to 500Hz / Input DC voltage pulse: 0 to 12V / SH = 8.5V, SL = 2.5V)
For an input code of "Y": MS3108-A-YAA (0 to 500Hz / Input AC voltage pulse: 200Vp-p / S = 2Vp-p)
* SH = Threshold level HI, SL = Threshold level LO, S = Threshold level
Note: For DC current pulse input, the range should be specified between 0-100μA and 0-100mA.

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse

Maximum Power Consumption

Power	100-240V AC	24V DC	110V DC
	Approx. 7.0VA	Approx. 1.7W	Approx. 2.5W

●INPUT SECTION

Input Resistance		
Voltage Input Model (DC)	With power:	1MΩ min. (Standard, 5V input)
	Without power:	30kΩ min.
Current Input Model (DC)	250Ω (Standard for 4 to 20mA)	
Allowable Input Voltage		
DC Voltage Input Model	30V DC max., continuous.	
DC Current Input Model	40mA DC max., continuous.	
AC Voltage Input Model	200Vp-p AC max., continuous (up to ±100V with reference to 0V).	
Input Pulse Width	20μs min.	
Duty Ratio	40 to 60%	

Ranges Available		
	AC Voltage Pulse	DC Voltage Pulse
Input Range	-300 to 300V	0 to 300V
Input Voltage Span	0.1 to 600Vp-p	1 to 300V
Input Bias	N/A	0 to +300%
Threshold Voltage	50mVp-p min.	Hi-Lo voltage: 0.2V min.
Input Frequency	Within the range between 0-20Hz and 0-20kHz.	

Input Spec. Ex.: For 10 to 15V DC voltage pulse input, the input voltage span is 5V and the bias +200%.

●OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.
Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	

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 ±0.3% of span. Ripple: 0.2%p-p or less of span (for at least 10% input) (at 25°C±5°C)
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	
Input Frequency	0 to 90% with a step input at 100%
20Hz	8s max.
200Hz	1s max.
2kHz	500ms max.
20kHz	500ms max.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

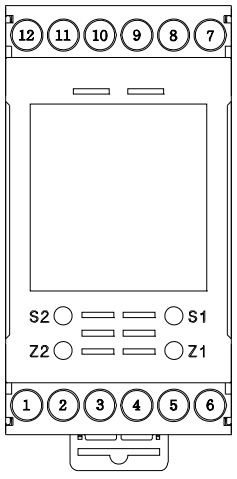
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

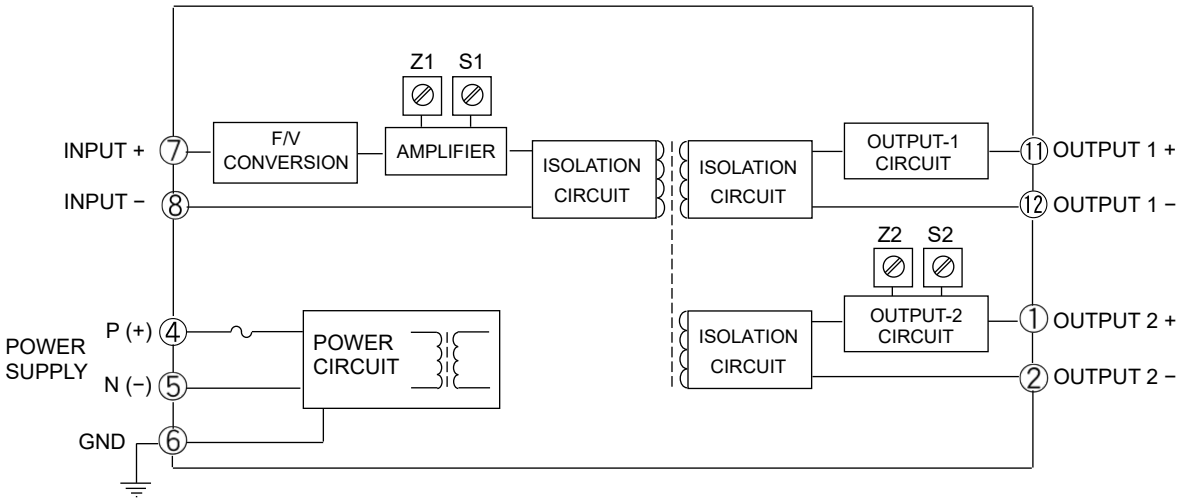
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS

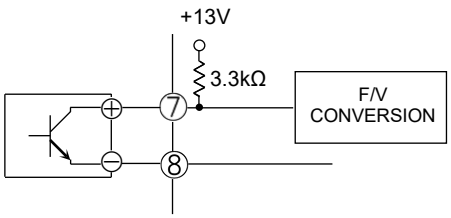


①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	+ INPUT	
⑧	− INPUT	
⑨	N.C.	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

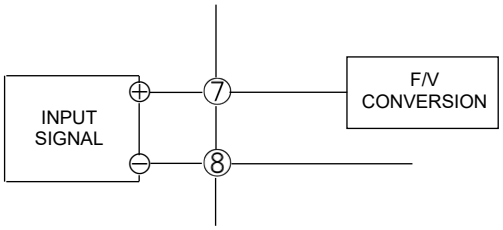
BLOCK DIAGRAM



For dry contact or open collector input:



For voltage pulse input:

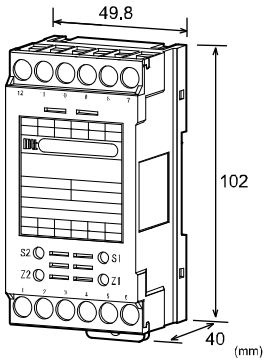


Product Specification Sheet Model: MS3110

Terminal Block Type Potentiometer Transmitter with Isolated Dual Output

DESCRIPTION

The MS3110 is a terminal block type potentiometer transmitter that detects changes in the resistance of potentiometric sensors, converts them into commonly used DC signals and provides an isolated dual output.



ORDERING CODE

MS3110 - □ - □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 110V DC

Input

Range between 0-100Ω and 0-10kΩ

Output 1

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

Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

Options

No code: None
/K: Fast response (0 to 90% response time: 10ms max.)
/H: Polyurethane conformal coating
/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.
(e.g.) MS3110-A-A6
* Factory default: Factory testing is carried out with an input range of 0 to 5kΩ.

Other Ordering Examples:
For an output code of "0": MS3110-A-00 (Output: 2 to 5V)
For a specific resistance range: MS3110-A-AA (0 to 500Ω) (When you specify a resistance range, our factory performs the test accordingly, the fact of which will be indicated in the label attached.)
For an option code of "X": MS3110-A-AA/X (Response frequency: 50Hz)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse

Maximum Power Consumption

Power	100-240V AC	24V DC	110V DC
	Approx. 7.0VA	Approx. 1.5W	Approx. 2.5W

●INPUT SECTION

Input Signal	Range between 0-100Ω and 0-10kΩ.
Measuring Voltage	Approx. 0.5V
Allowable Lead Wire Resistance	10% or less of total resistance per wire. (The resistance of all three wires must be equal.)

●OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.
Zero Adjustment	Output 1: Approx. 0 to 30% of total resistance. Output 2: Approx. ±5% of span. (Adjustable by the front-accessible trimmers.)	
Span Adjustment	Output 1: Approx. 70 to 100% of total resistance. Output 2: Approx. ±5% of span. (Adjustable by the front-accessible trimmers.)	

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 ±0.2% of span (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	170ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

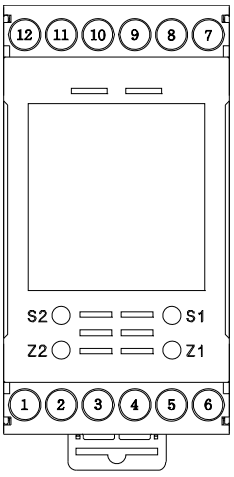
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

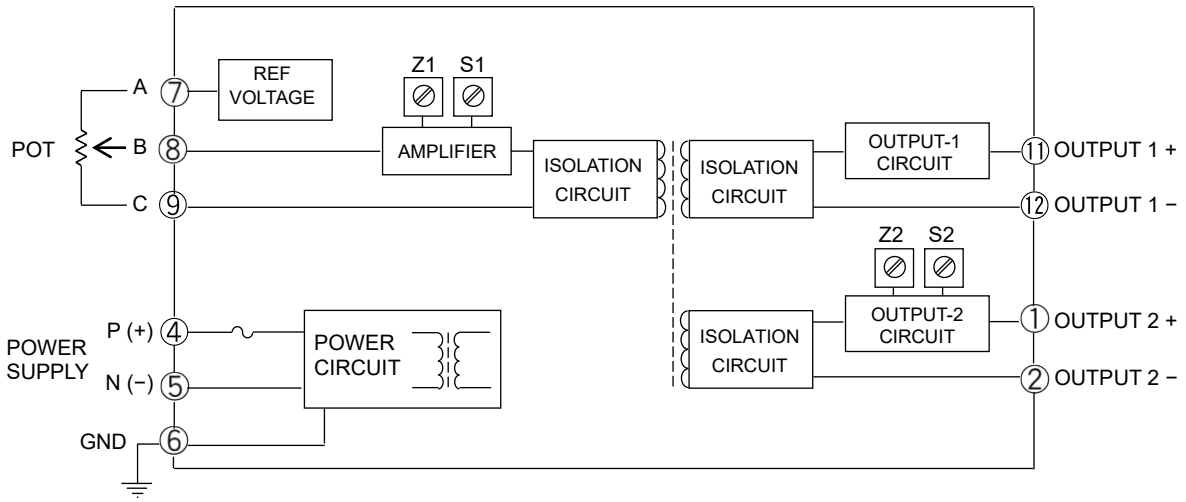
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	A	
⑧	B	
⑨	C	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM



Product Specification Sheet Model: MS3120

Terminal Block Type CT Transmitter with Isolated Dual Output

DESCRIPTION

The MS3120 is a terminal block type CT transmitter that calculates the rms values of AC current signals from a CT, converts them into commonly used DC signals, and provides an isolated dual output.

ORDERING CODE

MS3120 - □ - □ □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 110V DC

Input (AC Current Signal)

1: 0 to 1A AC, 50/60Hz
5: 0 to 5A AC, 50/60Hz

Output 1

A: 4 to 20mA DC
D: 0 to 20mA DC
Z: Other DC current signals

1: 0 to 10mV DC
2: 0 to 100mV DC
3: 0 to 1V DC
4: 0 to 10V DC
5: 0 to 5V DC
6: 1 to 5V DC
3W: ±1V DC
4W: ±10V DC
5W: ±5V DC
0: Other DC voltage signals

Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

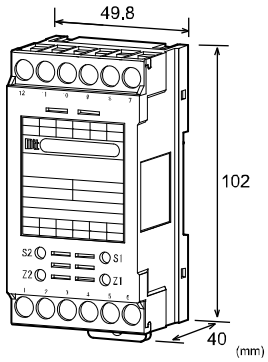
Options

No code: None
/H: Polyurethane conformal coating
/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.
(e.g.) MS3120-A-5A6

Other Ordering Examples:
For an output code of "0": MS3120-A-160 (Output: 2 to 5V)
For an option code of "X": MS3120-A-1AA/X (0-90% response time: 100ms max.)



SPECIFICATIONS

POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC		
Power Sensitivity	Better than ±0.1% of span for each power supply range.		
Power Line Fuse	160mA fuse		
Maximum Power Consumption			
Power	100-240V AC Approx. 6.5VA	24V DC Approx. 1.6W	110V DC Approx. 2.5W

INPUT SECTION

Input Resistance	5A AC input: 2mΩ (Shunt resistor) 1A AC input: 10mΩ (Shunt resistor)
Allowable Input Current	Continuous: 120% of the rated input value Instantaneous: 10 times the rated input value (within 3 seconds)
Crest Factor	3 max.

OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up 10mV 100mV	2mA max. 10kΩ min. 100kΩ min.
Current Output (DC)	4-20mA single output 4-20mA dual output	750Ω max. Output 1: 550Ω max. Output 2: 350Ω max.
Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	

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 ±0.25% of span with at least 10% input (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	400ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws) The supplied shunt resistor should be connected to the terminal block. (The two brackets of the resistor should be fixed to the terminals ⑦ and ⑧.)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail, but not including the shunt resistor)
Weight	Main unit: 140g max. Shunt resistor: 5g max.

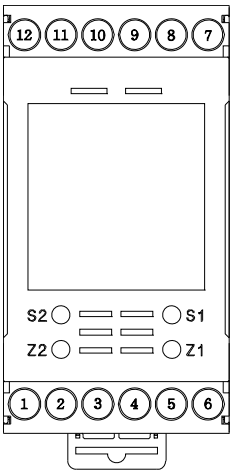
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

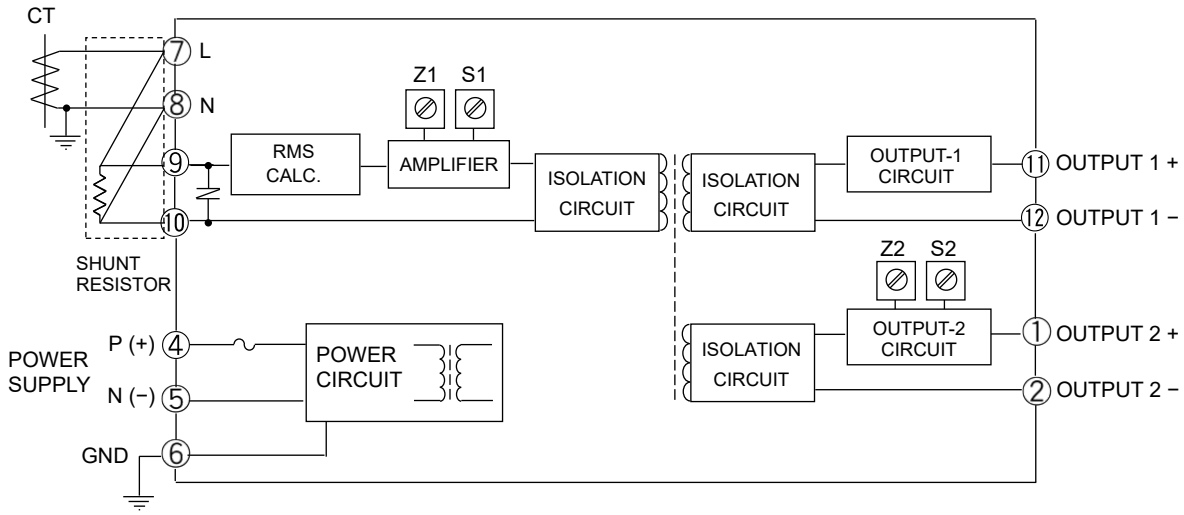
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	L INPUT	
⑧	N INPUT	
⑨	(L) INPUT	
⑩	(N) INPUT	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM



Product Specification Sheet Model: MS3121

Terminal Block Type PT Transmitter with Isolated Dual Output

DESCRIPTION

The MS3121 is a terminal block type PT transmitter that calculates the rms values of AC voltage signals from a PT, converts them into commonly used DC signals, and provides an isolated dual output.

ORDERING CODE

MS3121 - □ - □ □ □

Model

Power Supply

A: 100 to 240V AC (50 to 60Hz)
D: 24V DC **P**: 110V DC

Input (AC Voltage Signal)

1: 0 to 110V AC, 50/60Hz
2: 0 to 150V AC, 50/60Hz
3: 0 to 300V AC, 50/60Hz
0: Other AC voltage signals, 50/60Hz

Output 1

A: 4 to 20mA DC
D: 0 to 20mA DC
Z: Other DC current signal

1: 0 to 10mV DC
2: 0 to 100mV DC
3: 0 to 1V DC
4: 0 to 10V DC
5: 0 to 5V DC
6: 1 to 5V DC
3W: ±1V DC
4W: ±10V DC
5W: ±5V DC
0: Other DC voltage signals

Output 2

The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

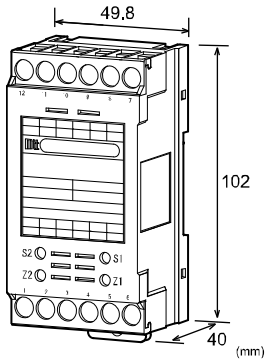
Options

No code: None
/H: Polyurethane conformal coating
/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.
(e.g.) MS3121-A-2A6

Other Ordering Examples:
For an input code of "0": MS3121-A-0AA (Input: 0 to 200V AC)
For an output code of "0": MS3121-A-160 (Output: 2 to 5V)
For an option code of "X": MS3121-A-1AA/X (0-90% response time: 100ms max.)



SPECIFICATIONS

POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 110V DC: 90 to 121V DC		
Power Sensitivity	Better than ±0.1% of span for each power supply range.		
Power Line Fuse	160mA fuse		
Maximum Power Consumption			
Power	100-240V AC Approx. 6.5VA	24V DC Approx. 1.6W	110V DC Approx. 2.5W

INPUT SECTION

Input Resistance	1MΩ min. with or without power.
Allowable Input Voltage	Continuous: 120% of the rated input value Instantaneous: 1.5 times the rated input value (within 5 seconds)
Crest Factor	3 max.
Ranges Available	Between 0-10mV AC and 0-300V AC.

OUTPUT SECTION

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.
Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)	

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 ±0.25% of span with at least 10% input (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	400ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, power, and ground.
Dielectric Strength	Input / [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)
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	DIN rail mounting
Wiring	M3.5 screw terminal connection (with drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W49.8 × H102.0 × D40.0 mm (including DIN rail)
Weight	140g max.

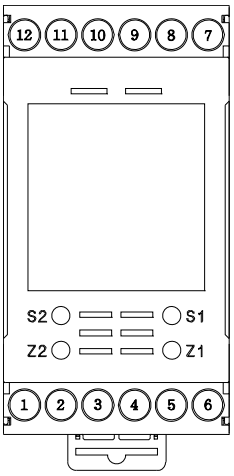
●MATERIAL

Housing	ABS resin (UL 94V-0)
Screw Terminal	Nickel-plated steel
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

●STANDARDS CONFORMITY

EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013 Low Voltage Directive (2014/35/EU) IEC61010-1 EN61010-1:2010/A1:2019 Installation Category II Pollution Degree 2 Maximum operating voltage 300V Reinforced insulation between [input/output/GND] and power.

TERMINAL ASSIGNMENTS



①	+ OUTPUT 2	
②	− OUTPUT 2	
③	N.C.	
④	P (+)	POWER
⑤	N (−)	
⑥	GND	
⑦	L INPUT	
⑧	N INPUT	
⑨	N.C.	
⑩	N.C.	
⑪	+ OUTPUT 1	
⑫	− OUTPUT 1	

BLOCK DIAGRAM