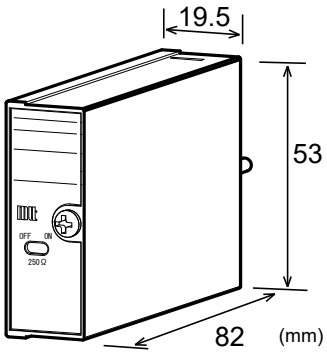
Product Specification Sheet — Model: MS3900-TH

Non-Conditioning I/O Adapter

DESCRIPTION

The MS3900-TH is an I/O adapter that does not provide any signal conditioning. The module includes a front-accessible switch, which allows the user to utilize the internal shunt resistor (250Ω) to convert current signal into voltage signal.



ORDERING INFORMATION

Ordering Code
MS3900-TH_ [1]

SPECIFICATIONS

INPUT & OUTPUT SECTION	
Input	1 to 5V DC voltage signals or 4 to 20mA DC current signals Note: When the front-accessible switch is turned on for current signal input, the internal 250Ω shunt resistor is connected across the input to output voltage signals. The switch must be turned off for voltage signal input.
Shunt Resistor	250Ω (Accuracy: ±0.1%)

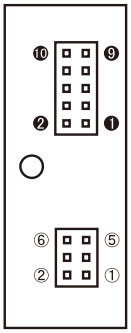
ADDITIONAL	
Option [1]	■ Polyurethane conformal coating ····· /H

PERFORMANCE	
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	Approx. 35g

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

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	N. C.
⑥	N. C.	❻	N. C.
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM

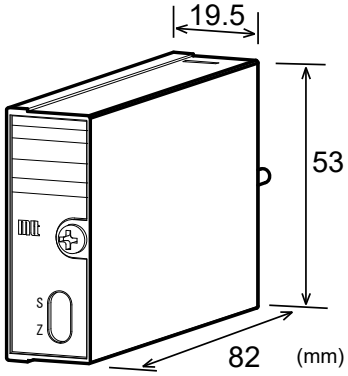
Product Specification Sheet **Model: MS3901** **MS3900**

Chassis-Mount Thermocouple Temperature Transmitter with Isolated Dual Output

DESCRIPTION

The MS3901 is a chassis-mount thermocouple temperature transmitter that converts millivolt input signals from a thermocouple into mutually isolated dual channel DC output signals.

- ▽ 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
MS3901-☐(☐–☐)-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	Output Code	Fuse
	V1, V5, V6, V7, W5, W6, C1	160mA fuse
	C2	300mA fuse
Current Consumption	50mA max. at 24V DC	

INPUT SECTION

Input (Specify a code in the field [1].)	JIS or other standard thermocouples (Span: 3mV min.) Code ■ Type K thermocouple ····· K ■ Type E thermocouple ····· E ■ Type J thermocouple ····· J ■ Type T thermocouple ····· T ■ Type B thermocouple ····· B ■ Type R thermocouple ····· R ■ Type S thermocouple ····· S ■ Type N thermocouple ····· N ■ Other than those above ····· X Specify a thermocouple standard (A) and symbol (B) as indicated below: X = A / B Notes: 1. When the type of a thermocouple is specified with a JIS symbol, the latest edition of the relevant JIS will be used, unless otherwise requested. 2. For non-JIS standard thermocouples, submission of a relevant EMF table may be required.
Input Range (Specify a range in the field [2].)	Specify a measuring temperature range in °C within the range given in the EMF table. The input span must be 3mV or greater. Notes: 1. For input temperature ranges starting from any specified temperature below 0°C, the accuracy may be partly out of specification. 2. For the type B thermocouple, the accuracy in the temperature range below 600°C is not guaranteed.
Input Resistance	1MΩ min. with or without power.
Allowable Lead Wire Resistance	1kΩ max.
Allowable Input Voltage	30V DC max., continuous.
Cold Junction Compensation	A cold-junction compensation sensor attached to an optional chassis (RC3900A-☐☐AI or RS3900-01TB).
Cold Junction Compensation Error	±0.3°C max.
Linearizer	Built-in (6 segments max.)

OUTPUT SECTION

Output (Specify a code in the field [3].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ −5–10V DC / −5–10V DC ····· V7 ■ ±5V DC / ±5V DC ····· W5 ■ ±10V DC / ±10V DC ····· W6 ■ 1–5V DC / 4–20mA DC ····· C1 ■ 4–20mA DC / 4–20mA DC ····· C2 Note: Combinations of two outputs are only available as shown above.

Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max. (350Ω max. for dual current output)
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Burnout Protection (Specify a code in the field [4].)	■ Upscale (standard)····· U ■ Downscale ····· D Note: Upscale burnout protection will apply if nothing is specified.

ADDITIONAL

Options [5]	■ CE compliant····· /C Notes: 1. This applies to orders having an output code other than "-8C1" and "-8C2". 2. CE-compliant chassis must be used to meet the CE marking requirements. ■ Polyurethane conformal coating····· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency ··· Fc = □□□Hz ■ Response time constant · Tc = □□□s ■ Burnout Drive Time ·····Bt = □□□s

PERFORMANCE

Accuracy Rating	Better than ±(0.1% of span + 0.3°C[*1] + Linearity error[*2]) (at 25°C±5°C) *1: Accuracy of the cold-junction compensation sensor *2: Linearity errors vary with input spans. (0.1% of span, typical)
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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 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 [*1]	Wired to an optional chassis (RC3900A-☐☐AI or RS3900-01TB).
External Dimensions	W19.5 × H53 × D82 mm
Weight	70g max.

*1: For a dual current output version, external connection to the Output-1 shall only be made with either the terminal block or D-subminiature connector.

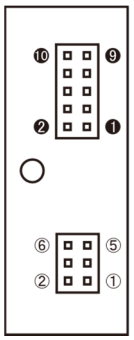
MATERIAL

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

STANDARDS CONFORMITY

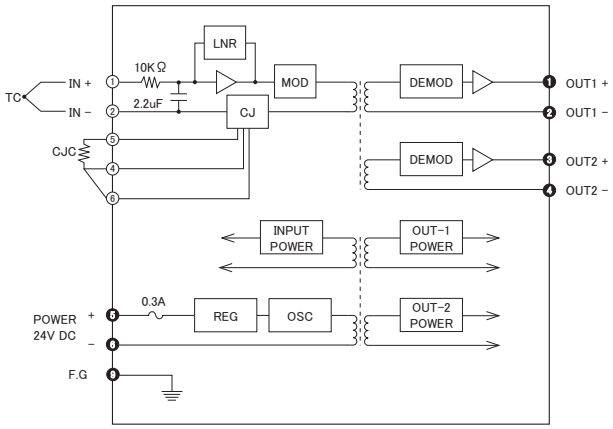
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	T. C. +	❶	+ OUTPUT 1
②	T. C. −	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④		❹	− OUTPUT 2
⑤	C. J	❺	+ POWER DC24V
⑥		❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



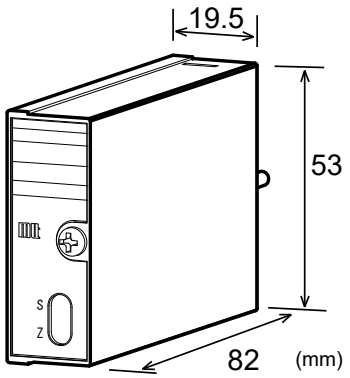
Product Specification Sheet Model: MS3902 MS3900

Chassis-Mount RTD Temperature Transmitter with Isolated Dual Output

DESCRIPTION

The MS3902 is a chassis-mount RTD temperature transmitter that supplies constant current to a three-wire RTD and converts its mV input signals into mutually isolated dual channel DC output signals.

- ▽ Features 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
MS3902-□(□–□)-8□□_ [1] └[2]┘ [3] [4]

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	Output codes other than C2: 160mA fuse Output code C2: 125mA fuse
Current Consumption	60mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	JIS or other standard RTDs Code ■ Pt 100Ω ····· Pt100 ■ JPt 100Ω ····· JPt100 ■ Pt 50Ω ····· Pt50 ■ Cu 25Ω ····· Cu25 ■ Cu 100Ω ····· Cu100 ■ Ni 508.4Ω ····· Ni508 ■ Other than the above ····· X Specify an RTD standard (A) and symbol (B) as indicated below: X = A / B Notes: 1. When Pt100 is specified, the resistance table of the latest edition of the relevant JIS will be used, unless otherwise specified. 2. For other RTD types, submission of a resistance table may be required.
Input Range (Specify a range in the field [2].)	Specify an input range in °C within the range given in the resistance table.
Excitation Current	Approx. 1mA
Input Resistance	1MΩ min. (1kΩ min. without power)
Allowable Lead Wire Resistance	200Ω max. per wire

OUTPUT SECTION

Output (Specify a code in the field [3].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ ±5V DC / ±5V DC ····· W5 ■ ±10V DC / ±10V DC ····· W6 ■ 1–5V DC / 4–20mA DC ····· C1 ■ 4–20mA DC / 4–20mA DC ····· C2 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max. (350Ω max. for dual current output)
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Burnout Protection	Upscale (even if any of the three wires, A, B, and B' is opened)

ADDITIONAL

Options [4]	■ CE compliant ····· /C Note: CE-compliant chassis must be used to meet the CE marking requirements. ■ Polyurethane conformal coating ···· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency Fc = □□□Hz ■ Response time constant Tc = □□□s

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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 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 *1	Wired to an optional chassis (RC3900A-☐☐AI or RS3900-01TB)
External Dimensions	W19.5 × H53 × D82 mm
Weight	70g max.

*1: For a dual current output version, external connection to the Output-1 shall only be made with either the terminal block or D-subminiature connector.

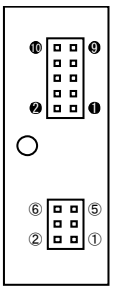
MATERIAL

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

STANDARDS CONFORMITY

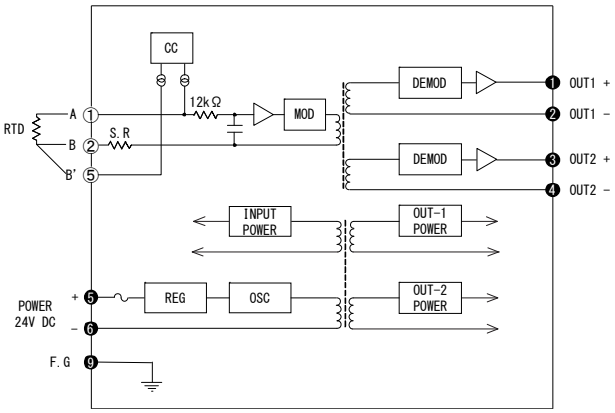
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	A RTD	❶	+ OUTPUT 1
②	B RTD	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	B' RTD	❺	+ POWER DC24V
⑥	N. C.	❻	− POWER DC24V
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



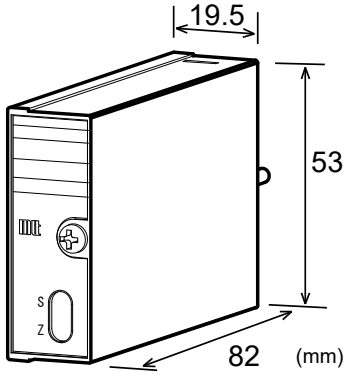
Product Specification Sheet Model: MS3903

Chassis-Mount Millivolt Isolator with Isolated Dual Output

DESCRIPTION

The MS3903 is a chassis-mount millivolt isolator that amplifies millivolt input signals from sensors and converts them into mutually isolated dual channel DC output signals.

- ▽ 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
MS3903-1□□-8□□_ [1] [2] [3]

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	160mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 0–10mV DC ·····V2 ■ 0–100mV DC ·····V3 ■ ±10mV DC ·····W2 ■ ±100mV DC·····W3 ■ Other DC voltage signal ·····X1 (□–□) Specify an input range in parentheses. The span must be between 5mV and 200mV.
Input Resistance	1MΩ min. with or without power.
Allowable Input Voltage	30V DC max., continuous.

OUTPUT SECTION

Output (Specify a code in the field [2].)	Output 1 / Output 2 ·····Code ■ 1–5V DC / 1–5V DC·····V1 ■ 0–5V DC / 0–5V DC·····V5 ■ 0–10V DC / 0–10V DC·····V6 ■ ±5V DC / ±5V DC·····W5 ■ ±10V DC / ±10V DC·····W6 ■ 1–5V DC / 4–20mA DC ·····C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [3]	■ Polyurethane conformal coating···· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency ·· Fc = □□□Hz (Up to 200Hz) ■ Response time constant · Tc = □□□s (Up to 2ms @ 90%)

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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

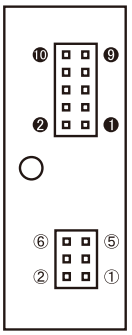
PHYSICAL

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 max.

MATERIAL

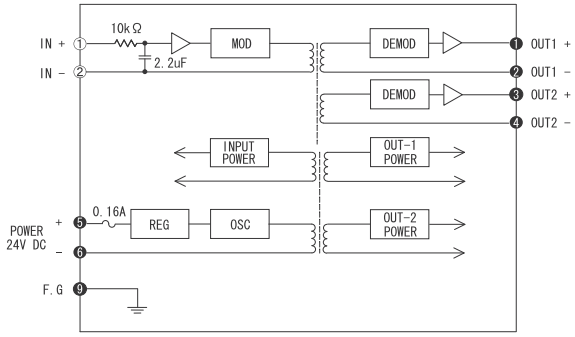
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



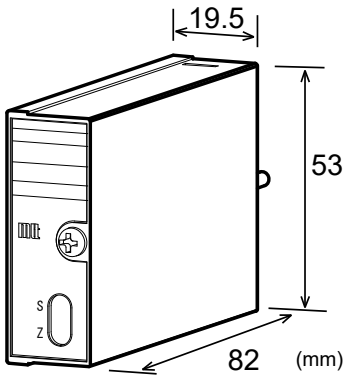
Product Specification Sheet Model: MS3904

Chassis-Mount High-Level Signal Conditioner (Isolator) with Isolated Dual Output

DESCRIPTION

The MS3904 is a chassis-mount high-level signal conditioner (isolator) that converts DC input signals into mutually isolated dual channel DC output signals.

- ▽ 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
MS3904-1□□-8□□_ [1] [2] [3]

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	Output codes other than C2: 160mA fuse Output code C2: 125mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 1–5V DC ····· V1 ■ 0–1V DC ····· V4 ■ 0–5V DC ····· V5 ■ 0–10V DC ····· V6 ■ ±5V DC ····· W5 ■ ±10V DC ····· W6 ■ Other DC voltage signals ····· X2 (□–□) Specify a DC voltage range in parentheses. The ranges available are from 0–200mV to 0–50V and from ±200mV to ±50V. ■ 4–20mA DC (input resistance 250Ω) ····· C1 ■ Other DC current signals ····· CY (□–□) Specify a DC current range in parentheses. The ranges available are from 0–100μA to 0–100mA and from ±100μA to ±100mA.
Input Resistance	Voltage input: 1MΩ min. with or without power Current input: 250Ω (standard for 4–20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. Current input: 40mA DC max., continuous.

OUTPUT SECTION

Output (Specify a code in the field [2].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–1V DC / 0–1V DC ····· V4 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ ±5V DC / ±5V DC ····· W5 ■ ±10V DC / ±10V DC ····· W6 ■ 1–5V DC / 4–20mA DC ····· C1 ■ 4–20mA DC / 4–20mA DC ····· C2 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max. (350Ω max. for dual current output)
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Options [3]	■ CE compliant ····· /C Note: CE-compliant chassis must be used to meet the CE marking requirements. ■ Polyurethane conformal coating ····· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency Fc = □□□Hz (Up to 200Hz) ■ Response time constant Tc = □□□s (Up to 2ms @ 90%)

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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 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 *1	Wired to an optional chassis (RC3900A-☐☐AI or RS3900-01TB).
External Dimensions	W19.5 × H53 × D82 mm
Weight	70g max.

*1: For a dual current output version, external connection to the Output-1 shall only be made with either the terminal block or D-subminiature connector.

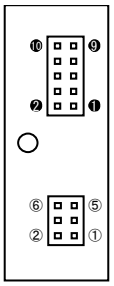
MATERIAL

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

STANDARDS CONFORMITY

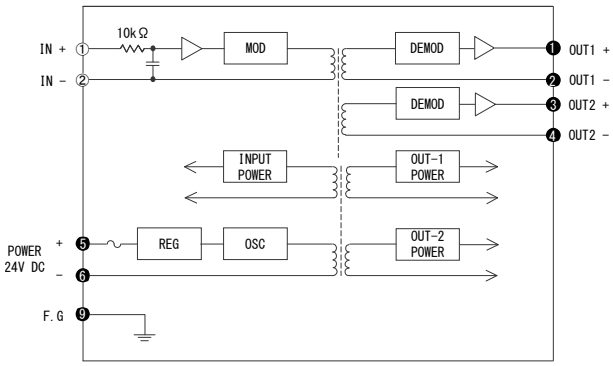
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



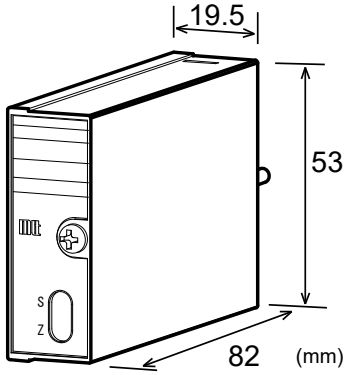
Product Specification Sheet **Model: MS3904F** **MS3900**

Chassis-Mount Fast-Response High-Level Signal Conditioner (Isolator) with Isolated Dual Output

DESCRIPTION

The MS3904F is a chassis-mount fast-response high-level signal conditioner (isolator) that converts DC input signals into mutually isolated dual channel DC output signals.

- ▽ 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
MS3904F-1☐☐-8☐☐_ [1] [2] [3]

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	160mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 1–5V DC ····· V1 ■ 0–1V DC ····· V4 ■ 0–5V DC ····· V5 ■ 0–10V DC ····· V6 ■ ±5V DC ····· W5 ■ ±10V DC ····· W6 ■ 4–20mA DC (input resistance 250Ω) ····· C1 ■ Other DC voltage signals ····· X2 (☐–☐) Specify a voltage range in parentheses. The span must be between 1V and 50V.
Input Resistance	Voltage input: 1MΩ min. with or without power Current input: 250Ω (standard for 4–20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. Current input: 40mA DC max., continuous.

OUTPUT SECTION

Output (Specify a code in the field [2].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ ±5V DC / ±5V DC ····· W5 ■ ±10V DC / ±10V DC ····· W6 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max.
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [3]	■ Polyurethane conformal coating ····· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency Fc = ☐☐☐Hz (200Hz to 1kHz) ■ Response time constant Tc = ☐☐☐s (600µs to 2ms @ 90%)

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	600µs max. (0 to 90%) with a step input at 100% (Frequency characteristics: Approx. 1kHz-3dB).
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, and power.

Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

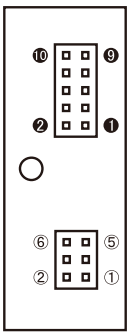
PHYSICAL

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 max.

MATERIAL

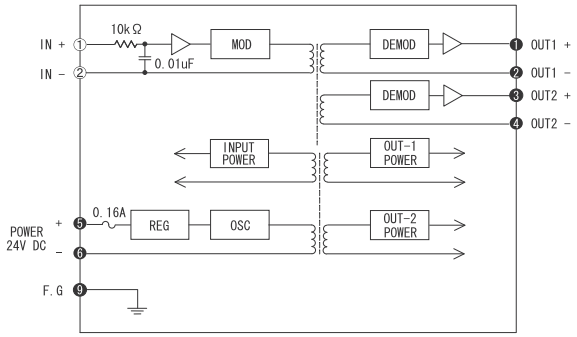
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



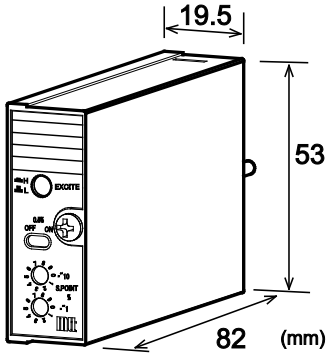
Product Specification Sheet Model: MS3905

Chassis-Mount Alarm Setter

DESCRIPTION

The MS3905 is a chassis-mount alarm setter that compares the level of a DC current or voltage signal with a set-point and outputs an isolated relay contact closure signal.

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



ORDERING INFORMATION

Ordering Code
MS3905-1☐☐-RY(☐☐/☐☐.☐)_
[1] [2] [3] [4]

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	160mA fuse
Current Consumption	40mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 1–5V DC ····· V1 ■ 0–5V DC ····· V5 ■ 0–10V DC ····· V6 ■ ±5V DC ····· W5 ■ ±10V DC ····· W6 ■ Other DC voltage signals ····· X2 (☐–☐) Specify a DC voltage range in parentheses. The ranges available are from 0–10mV to 0–100V and from ±10mV to ±100V. ■ 4–20mA DC (input resistance 250Ω) ····· C1 ■ 1–5mA DC (input resistance 250Ω) ····· C4 ■ 10–50mA DC (input resistance 250Ω) ····· C5 ■ Other DC current signals ····· CY (☐–☐) Specify a DC current range in parentheses. The ranges available are from 0–100μA to 0–100mA and from ±100μA to ±100mA.
Input Resistance	Voltage input: 1MΩ min. (10kΩ min. without power) Current input: 250Ω (Standard for 4 to 20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. (Standard for a span up to 10V) Current input: 40mA DC max., continuous. (Standard for 4 to 20mA)

OUTPUT SECTION

Relay Activation Modes (Specify a code in the field [2].)	Mode of operation can be selected from the table below.

Input value > Set value	Input value < Set value	Without Power	Front Push Switch	Code
ON	OFF	OFF		OH
OFF	ON	OFF		OL
OFF	ON	ON		CH
ON	OFF	ON		CL

Trip Point (Specify a value in the field [3].)	Specify a trip point within the range of 0 to 99.5% of input span; otherwise, the trip point will be adjusted to 50% of input span.
Output	SPST relay contact closure signal
Setting	Through the front-accessible rotary switches.
Range	0 to 99% in 1% steps (+0.5% with the toggle switch on)
Accuracy	±0.5% of span
Hysteresis	0.1% of span

ADDITIONAL

Option [4]	■ Polyurethane conformal coating ···· /H

PERFORMANCE

Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	150ms max. (0 to 90%) with a step input at 100%.
Relay Response Time	Approx. 3ms
Isolation	Isolation between input, output, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output, and power.
Dielectric Strength	Input / [Output, Power]: 1500V AC for 1 minute (Cutoff current: 0.5mA) Output / Power: 500V AC for 1 minute (Cutoff current: 0.5mA)
Contact Dielectric Strength	Contact / contact: 500V AC for 1 minute (Cutoff current: 10mA) Contact / Coil: 500V AC for 1 minute (Cutoff current: 10mA)
Contact Capacity	Rated capacity (resistive load): 1A 30V DC / 0.5A 125V AC Maximum allowable power (resistive load): 30W DC / 62.5VA AC Maximum allowable voltage: 110V DC / 125V AC Maximum allowable current: 1A
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

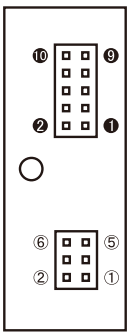
PHYSICAL

Installation	Mounted in an optional chassis (RC3900A-☐☐AI).
Wiring	Wired to an optional chassis (RC3900A-☐☐AI).
External Dimensions	W19.5 × H53 × D82 mm
Weight	60g max.

MATERIAL

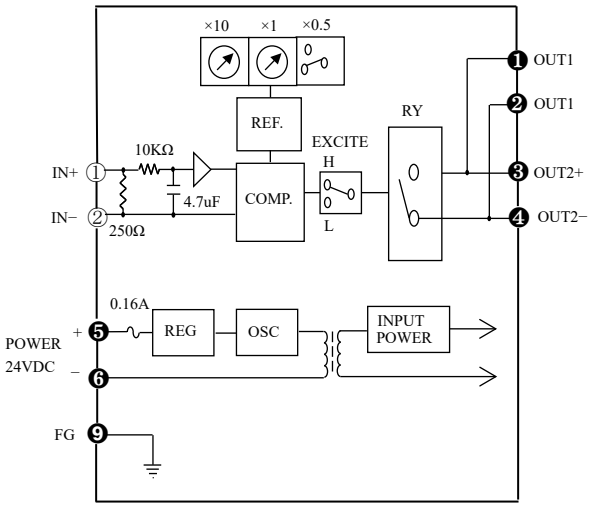
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



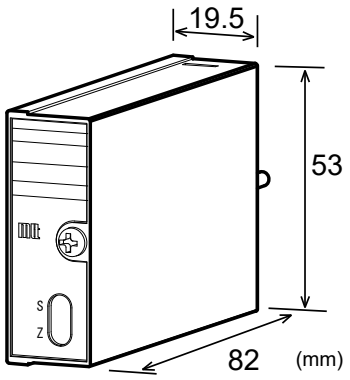
Product Specification Sheet Model: MS3906 MS3900

Chassis-Mount Strain Gauge Transmitter with Isolated Dual Output

DESCRIPTION

The MS3906 is a chassis-mount strain gauge transmitter that supplies excitation voltage to strain-gauge type pressure sensors, load cells, and the like and converts their output signals into mutually isolated dual channel DC output signals.

- ▽ 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
MS3906-□□-□□-1□□-8□□_ [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	160mA fuse
Current Consumption	70mA max. at 24V DC

INPUT SECTION

Excitation Voltage (Specify a code in the field [1].)	■ 5V DC ····· E2 ■ 10V DC ····· E3 ■ Other DC voltages ····· EY(□□□) Specify a voltage between 5V and 10V in parentheses.
	5V DC at 120Ω bridge resistance 10V DC at 350Ω bridge resistance
Bridge Resistance (Specify resistance in the field [2].)	Specify a resistance value.
Input (Specify a code in the field [3].)	■ 0–10mV DC ····· V2 ■ 0–100mV DC ····· V3 ■ ±10mV DC ····· W2 ■ ±100mV DC ····· W3 ■ Other DC voltage signals ·· X1(□–□) Specify a voltage range in parentheses. The span must be 5mV or greater.
Input Resistance	1MΩ min. (10kΩ min. without power)
Allowable Input Voltage	30V DC max., continuous.

OUTPUT SECTION

Output (Specify a code in the field [4].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ ±5V DC / ±5V DC ····· W5 ■ ±10V DC / ±10V DC ····· W6 ■ 1–5V DC / 4–20mA DC ····· C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. ±5% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±5% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [5]	■ Polyurethane conformal coating ···· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency Fc = □□□Hz ■ Response time constant Tc = □□□s

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	180ms 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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

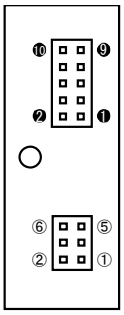
PHYSICAL

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	80g max.

MATERIAL

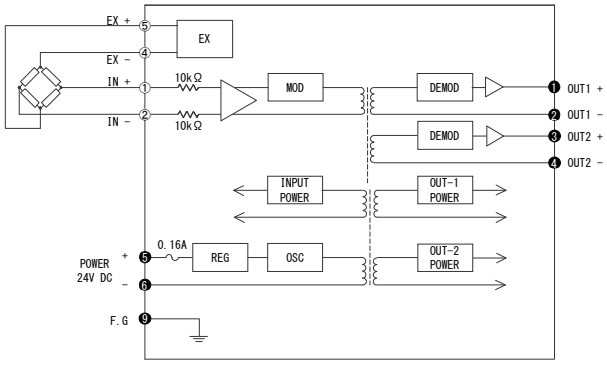
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	− EX	❹	− OUTPUT 2
⑤	+ EX	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



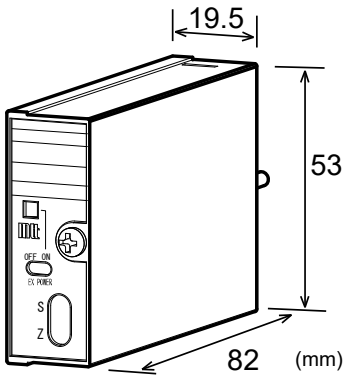
Product Specification Sheet Model: MS3907

Chassis-Mount Distributor with Isolated Dual Output

DESCRIPTION

The MS3907 is a chassis-mount distributor that powers a two-wire transmitter and converts its 4 to 20mA signals into mutually isolated dual channel DC output signals.

- ▽ 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
MS3907-8□□_ [1] [2]

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	Output codes other than C2: 160mA fuse Output code C2: 125mA fuse
Current Consumption	80mA max. at 24V DC

INPUT SECTION

Input	4 to 20mA DC from 2-wire transmitters
Input Resistance	250Ω
Transmitter Power Supply	Output voltage: Approx. 25V (at no load) Approx. 18V (with 20.48mA input) Maximum current: 25mA, typical.
Transmitter Load Resistance	550Ω max.
Limit Current for Short-Circuit Protection	26mA, typical.
Permissible Short-Circuit Duration	Continuous.
Transmitter Power Switch	ON/OFF selectable by front-accessible toggle switch. (Green LED lights when the power switch is ON.)

OUTPUT SECTION

Output (Specify a code in the field [1].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ 1–5V DC / 4–20mA DC ····· C1 ■ 4–20mA DC / 4–20mA DC ····· C2 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max. (350Ω max. for dual current output)
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Options [2]	■ CE compliant ····· /C Note: CE-compliant chassis must be used to meet the CE marking requirements. ■ Polyurethane conformal coating ····· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency ·· Fc = □□□Hz ■ Response time constant · Tc = □□□s

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, and power.

Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 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 *1	Wired to an optional chassis (RC3900A-☐☐AI or RS3900-01TB).
External Dimensions	W19.5 × H53 × D82 mm
Weight	80g max.

*1: For a dual current output version, external connection to the Output-1 shall only be made with either the terminal block or D-subminiature connector.

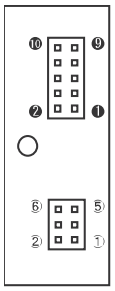
MATERIAL

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

STANDARDS CONFORMITY

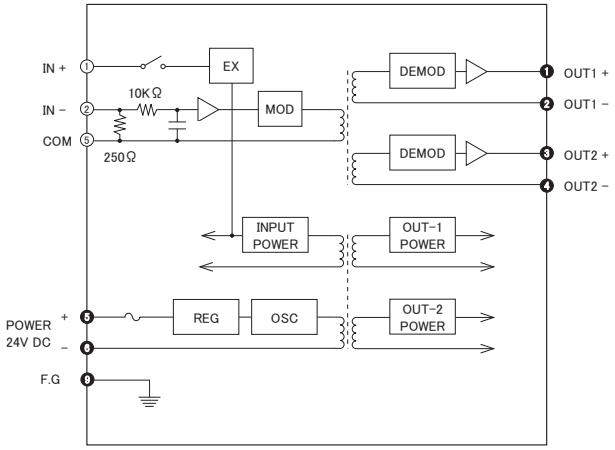
EC Directive Conformity	EMC Directive (2014/30/EU) EN61326-1:2013

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	COM.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



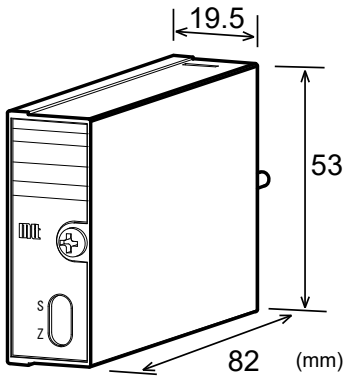
Product Specification Sheet Model: MS3908 MS3900

Chassis-Mount Frequency/Analog Converter with Isolated Dual Output

DESCRIPTION

The MS3908 is a chassis-mount frequency to analog converter that converts pulse train signals from flow sensors and the like into mutually isolated dual channel DC analog output signals.

- ▽ 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
MS3908-1☐☐(☐–☐)-8☐☐_ [1] └[2]┘ [3] [4]

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].)	■ Dry contact or open collector ····· OP (Pull-up: Approx. 12V, 3.3kΩ) ■ AC voltage pulse (0.1 to 100Vp-p) ····· AP (☐☐☐) (Threshold voltage: Approx. 0.06Vp-p) Specify the peak-to-peak value of input voltage in parentheses. ■ DC voltage pulse ····· ·····DP (☐–☐ / SH☐ SL☐) (Standard threshold voltage: Approx. 2V) Specify a voltage range in parentheses. If you need non-standard threshold voltage, also specify high threshold SH and low threshold SL in parentheses. ■ 4–20mA DC pulse ·····IP (Threshold current: Approx. 8mA) ■ Other current pulses ····· ····· IP (☐–☐ / SH ☐ SL ☐) Specify a current range between 0–100μA and 0–100mA in parentheses. If you need non-standard threshold current, also specify high threshold SH and low threshold SL in parentheses.
Measuring Frequency Range (Specify a range in the field [2].)	Specify a measuring frequency range between 0–20Hz and 0–20kHz.
Input Resistance	Voltage input: 1MΩ min. with power (Standard, 5V input); 30kΩ min. without power. Current input: 250Ω (Standard for 4–20mA)
Allowable Input Voltage	DC voltage input: 30V DC max., continuous. DC current input: 40mA DC max., continuous. AC voltage input: 200Vp-p AC max., continuous (up to ±100V with reference to 0V)
Input Pulse Width	20μs min.
Duty Ratio	40 to 60%

OUTPUT SECTION

Output (Specify a code in the field [3].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC·····V1 ■ 0–5V DC / 0–5V DC·····V5 ■ 0–10V DC / 0–10V DC·····V6 ■ ±5V DC / ±5V DC····· W5 ■ ±10V DC / ±10V DC····· W6 ■ 1–5V DC / 4–20mA DC ·····C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [4]	■ Polyurethane conformal coating···· /H

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, and power.	
Dielectric Strength	Input / [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)	
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.	
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)	
Storage Temperature	−10 to 60°C	

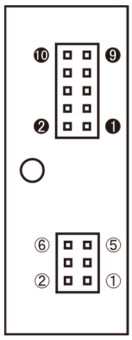
PHYSICAL

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 max.

MATERIAL

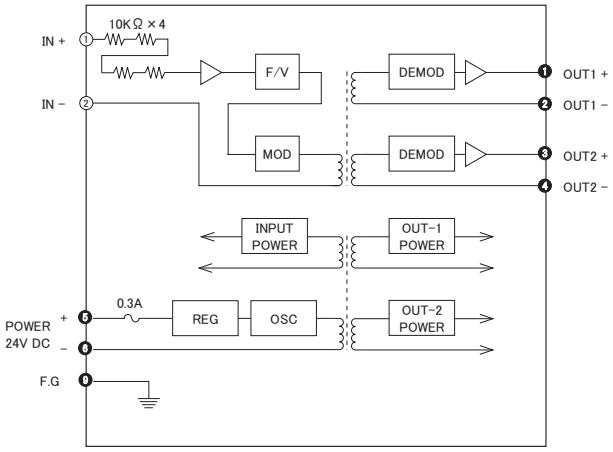
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



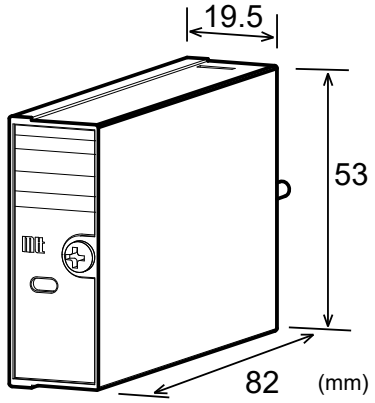
Product Specification Sheet Model: MS3909

Chassis-Mount Pulse Shaper (Pulse Isolator) with Isolated Dual Output

DESCRIPTION

The MS3909 is a chassis-mount pulse shaper (pulse isolator) that converts pulse train signals into mutually isolated dual channel pulse train signals.

- ▽ 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
MS3909-1□□-6□□-7□□-□□□-T□□_ [1] [2] [3] [4] [5] [6]

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	160mA fuse		
Current Consumption	w/o transmitter power supply		
	Open Collector (dual output)	TTL (dual output)	Voltage Pulse 12V (dual output)
	30mA max.	35mA max.	40mA max.
	w/ 24V transmitter power supply		
	Open Collector (dual output)	TTL (dual output)	Voltage Pulse 12V (dual output)
	80mA max.	85mA max.	90mA max.

INPUT SECTION

Input (Specify a code in the field [1].)	■ Dry contact or open collector ····· OP (Pull-up: Approx. 12V, 3.3kΩ) ■ AC voltage pulse (0.1 to 100Vp-p) ····· AP (□□□) (Threshold voltage: Approx. 0.06Vp-p) Specify the peak-to-peak value of input voltage in parentheses. ■ DC voltage pulse ····· DP (□–□ / SH □ SL □) (Standard threshold voltage: Approx. 2V) Specify a voltage range in parentheses. If you need non-standard threshold voltage, also specify high threshold SH and low threshold SL in parentheses. ■ 4–20mA DC pulse ····· IP (Threshold current: Approx. 8mA)
Input…*continued*	■ Other current pulses ····· IP (□–□ / SH □ SL □) Specify a current range between 0–100μA and 0–100mA in parentheses. If you need non-standard threshold current, also specify high threshold SH and low threshold SL in parentheses.
Input Resistance	Voltage input: 1MΩ min. with power (Standard, 5V input) 10kΩ min. without power Current input: 250Ω (Standard for 4–20mA)
Allowable Input Voltage	DC voltage input: 30V DC max., continuous. DC current input: 40mA DC max., continuous. AC voltage input: 200Vp-p AC max., continuous (up to ±100V with reference to 0V)
Input Pulse Width	10μs min. (for both ON and OFF)
Transmitter Power Supply (Optional) (Specify a code in the field [4].)	Maximum current: 30mA (2-wire or 3-wire type) ■ 24V DC (±10%), 2-wire type (specify shunt resistor value) ····· 2E1 ■ 12V DC (±10%), 2-wire type (specify shunt resistor value) ····· 2E4 ■ 24V DC (±10%), 3-wire type ····· 3E1 ■ 12V DC (±10%), 3-wire type ····· 3E4

OUTPUT SECTION

Output (Specify a code in each of the fields [2] & [3].)	■ TTL level ····· TT ■ Open collector ····· OP ■ Voltage pulse (10V±10%) ····· V6 ■ Voltage pulse (12V±10%) ····· V7 Note: When a combination of TTL levels or voltage pulses is selected for Output 1 and Output 2, the voltage levels for both outputs should be the same.

Allowable Output Load	TTL level (Maximum output 10mA @ 3.5V) Voltage pulse 10V (Maximum output 7mA @ ±10%) Voltage pulse 12V (Maximum output 7mA @ ±10%)
Maximum Rating	Open collector (Maximum rating: 30V, 100mA)
Duty Ratio	50% typical (Input pulse duty ratio 50%, standard threshold voltage) DC voltage pulse: 0–5V/1kHz input AC voltage pulse: 5Vp-p/1kHz input Open collector: 1kHz input
Maximum Output Frequency without Pulse Hold Function	Voltage pulse output: 50kHz Open collector output: 20kHz (For both of the above, the conditions are as follows: input pulse duty ratio 50% and standard threshold voltage.)
Pulse Hold Time (Optional) (Specify a value in the field [5].)	Specify a pulse width between 200µs and 200ms. When a pulse hold time is specified, the maximum possible output frequency is determined by: Hz = 1 / (T × 1.2 + 10µs*) * 10µs: Output pulse Lo level for TTL and voltage pulse outputs or output pulse ON for open collector output.
Polarity Reversing Function	See the Output Logic Table on the right.

ADDITIONAL

Option [6]	■ Polyurethane conformal coating ····· /H

PERFORMANCE

Pulse Hold Time Accuracy	Better than ±20% of a customer-specified value.
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 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	80g max.

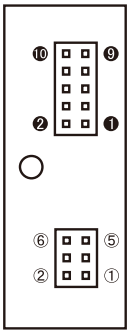
MATERIAL

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

OUTPUT LOGIC

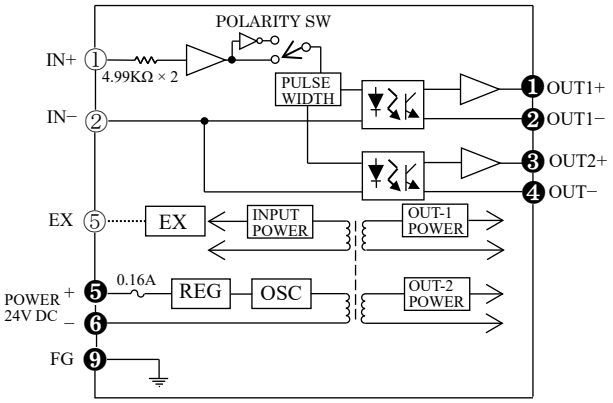
Input Signal	Input Waveform	Polarity Reversing Switch	Voltage Pulse Output	Open Collector Output
Voltage Pulse	H / L	NORMAL	H / L	OFF / ON
		REVERSE	H / L	OFF / ON
Open Collector	OFF / ON	NORMAL	H / L	OFF / ON
		REVERSE	H / L	OFF / ON

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N.C.	❸	+ OUTPUT 2
④	N.C.	❹	− OUTPUT 2
⑤	EX	❺	+ POWER DC24V
⑥	N.C.	❻	−
		❼	N.C.
		❽	N.C.
		❾	F.G.
		❿	N.C.

BLOCK DIAGRAM



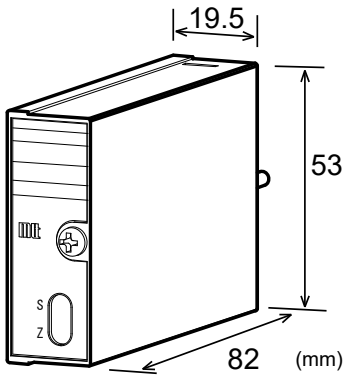
Product Specification Sheet Model: MS3910

Chassis-Mount Potentiometer Transmitter with Isolated Dual Output

DESCRIPTION

The MS3910 is a chassis-mount potentiometer transmitter that detects changes in the resistance of potentiometric sensors and converts them into mutually isolated dual channel DC output signals.

- ▽ 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
MS3910-(☐–☐)-8☐☐_ └[1]┘ [2] [3]

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	160mA fuse
Current Consumption	55mA max. at 24V DC

INPUT SECTION

Input Range (Specify a range in the field [1].)	Specify an input 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

Output (Specify a code in the field [2].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ 1–5V DC / 4–20mA DC ····· C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. 0 to 30% of span. (Adjustable by front-accessible trimmer)
Span Adjustment	Approx.70 to 100% of span. (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [3]	■ Polyurethane conformal coating ···· /H
Optional Parameter Changes	You can optionally specify the following parameters when ordering. Please ask our Sales representatives for availability in advance. <Parameter> ····· <How to specify> ■ Response frequency Fc = ☐☐☐Hz ■ Response time constant Tc = ☐☐☐s

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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

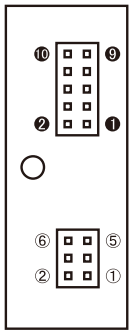
PHYSICAL

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 max.

MATERIAL

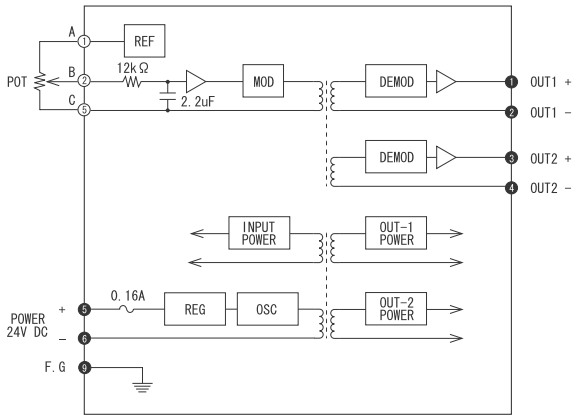
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	A POT	❶	+ OUTPUT 1
②	B POT	❷	− OUTPUT 1
③	N.C.	❸	+ OUTPUT 2
④	N.C.	❹	− OUTPUT 2
⑤	C POT	❺	+ POWER DC24V
⑥	N.C.	❻	−
		❼	N.C.
		❽	N.C.
		❾	F.G.
		❿	N.C.

BLOCK DIAGRAM



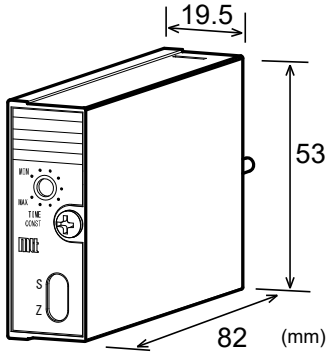
Product Specification Sheet **Model: MS3916** **MS3900**

Chassis-Mount First-Order Delay Signal Conditioner with Isolated Dual Output

DESCRIPTION

The MS3916 is a chassis-mount first-order delay signal conditioner that adds a first-order delay to DC input signals and converts them into mutually isolated dual channel DC output signals.

- ▽ 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
MS3916-1□□(□–□)-8□□_ [1] └[2]┘ [3] [4]

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	160mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 1–5V DC ····· V1 ■ 0–1V DC ····· V4 ■ 0–5V DC ····· V5 ■ 0–10V DC ····· V6 ■ ±5V DC ····· W5 ■ ±10V DC ····· W6 ■ Other DC voltage signals ····· X2(□–□) Specify a DC voltage range in parentheses. The ranges available are from 0–200mV to 0–100V and from ±200mV to ±100V. ■ 4–20mA DC ····· C1 ■ 1–5mA DC ····· C4 ■ 10–50mA DC ····· C5 ■ Other DC current signals ····· CY(□–□) Specify a DC current range in parentheses. The ranges available are from 0–100µA to 0–100mA and from ±100µA to ±100mA.
Input Resistance	Voltage input: 1MΩ min. with or without power Current input: 250Ω (Standard for 4 to 20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. (Standard for a span up to 10V) Current input: 40mA DC max., continuous. (Standard for 4–20mA)
Time Constant Setting Range (Specify a range in the field [2].)	A time constant setting range should be specified between 0.2 and 20 seconds.
Time Constant Setting Trimmer	Rotation of up to 270°
Time Constant Setting Accuracy	Minimum value: −30 to 0% of a customer specified value Maximum value: 0 to +30% of a customer specified value

OUTPUT SECTION

Output (Specify a code in the field [3].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ 1–5V DC / 4–20mA DC ····· C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [4]	■ Polyurethane conformal coating ···· /H

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.

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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

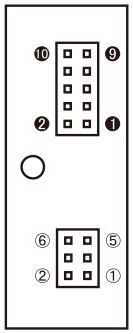
PHYSICAL

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	80g max.

MATERIAL

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

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N.C.	❸	+ OUTPUT 2
④	N.C.	❹	− OUTPUT 2
⑤	N.C.	❺	+ POWER DC24V
⑥	N.C.	❻	−
		❼	N.C.
		❽	N.C.
		❾	F.G.
		❿	N.C.

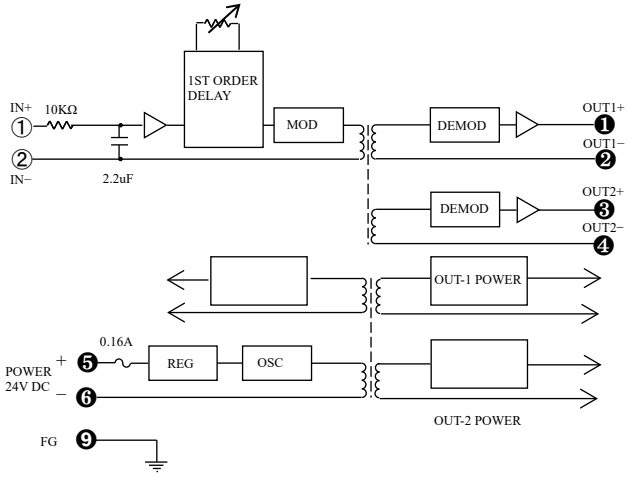
FACTORY DEFAULT SETTINGS

If you specify a time constant at the time you place your order, the product will be adjusted to your specified value prior to shipment as fa as it is within the given constant setting range. The following example shows how you specify your desired time constant.

(Example)
When you specify a time constant of 10 seconds:
Time constant: 10s (63%)

If not specified, the time constant will be set to the minimum value of your specified range.

BLOCK DIAGRAM



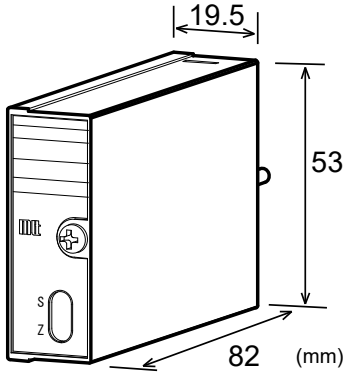
Product Specification Sheet **Model: MS3919** **MS3900**

Chassis-Mount Filter Unit with Single Output
(Non-Isolation between Input and Output)

DESCRIPTION

The MS3919 is a chassis-mount filter unit that filters voltage input signals with preset filter characteristics and provides a single output. The unit has no isolation between input and output.

- ▽ A multi-slot chassis provides ease of maintenance and high-density mounting.
- ▽ Input and output circuits are isolated from the power circuit.
- ▽ Equipped with a fuse on the DC power line as standard.



ORDERING INFORMATION

Ordering Code
MS3919-1□(□□□)_ [1] [2] [3]

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	160mA fuse
Current Consumption	25mA max. at 24V DC

INPUT SECTION

Input	±10V DC
Input Resistance	1MΩ min. with or without power
Allowable Input Voltage	30V DC max., continuous.

OUTPUT SECTION

Output	±10V DC
Allowable Output Load	2mA max.
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [3]	■ Polyurethane conformal coating ····· /H

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.
Filter Characteristics (Specify a code in the field [1].)	Low pass filter function (Butterworth) ■ 2nd-orer filter ·····2 ■ 4th-order filter·····4 ■ 8th-order filter·····8
Cutoff Frequency (Specify freq. in the field [2].)	Specify a cutoff frequency between 10 and 10kHz.
Cutoff Frequency Tolerance	±10% (at −3dB)
Passband Ripple	±0.5dB
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	Isolation between [input, output] and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between [input, output] and power.
Dielectric Strength	[Input, Output] / Power: 500V AC for 1 minute (Cutoff current: 0.5mA)
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

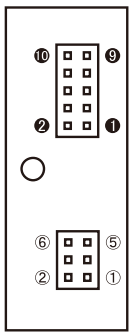
PHYSICAL

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	60g max.

MATERIAL

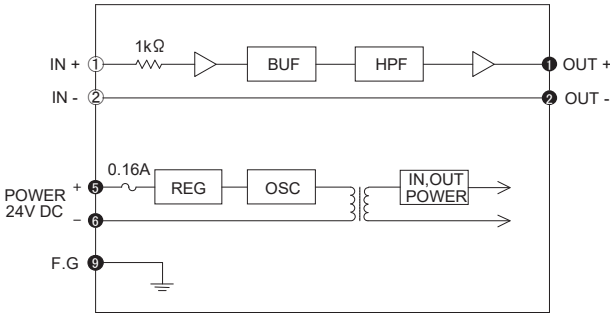
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N.C.	❸	N.C.
④	N.C.	❹	N.C.
⑤	N.C.	❺	+ POWER DC24V
⑥	N.C.	❻	−
		❼	N.C.
		❽	N.C.
		❾	F.G.
		❿	N.C.

BLOCK DIAGRAM



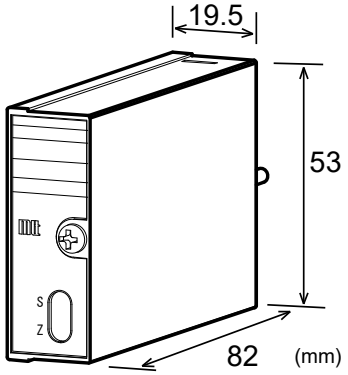
Product Specification Sheet Model: MS3920

Chassis-Mount CT Transmitter with Isolated Dual Output
(RMS Calculation Type)

DESCRIPTION

The MS3920 is a chassis-mount CT transmitter that measures a load current flowing through power equipment and converts it into mutually isolated dual channel DC output signals.

- ▽ 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
MS3920-1□□-8□□_ [1] [2] [3]

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].)	■ 0–1A AC, 50/60Hz ····· M1 ■ 0–5A AC, 50/60Hz ····· M2
Input Resistance	5A AC input: 5mΩ (shunt resistor) 1A AC input: 25mΩ (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

Output (Specify a code in the field [2].)	Output 1 / Output 2 ····· Code ■ 1–5V DC / 1–5V DC ····· V1 ■ 0–5V DC / 0–5V DC ····· V5 ■ 0–10V DC / 0–10V DC ····· V6 ■ ±5V DC / ±5V DC ····· W5 ■ ±10V DC / ±10V DC ····· W6 ■ 1–5V DC / 4–20mA DC ····· C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [3]	■ Polyurethane conformal coating ···· /H

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	0.4s 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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

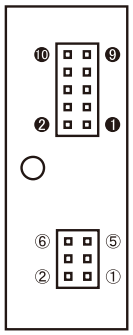
PHYSICAL

Installation	Mounted in an optional chassis (RC3900A-□□AI or RS3900-01TB).
Wiring	Wired to an optional chassis (RC3900A-□□AI or RS3900-01TB). The supplied shunt resistor should be connected to the terminal block. (The two brackets of the resistor should be fixed to the terminals A and B.)
External Dimensions	W19.5 × H53 × D82 mm
Weight	70g max.

MATERIAL

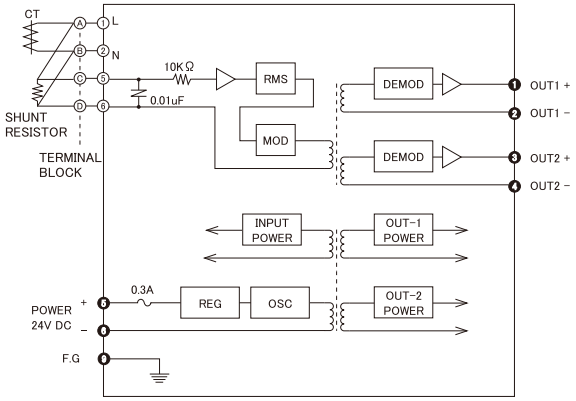
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	N.C.	❶	+ OUTPUT 1
②	N.C.	❷	− OUTPUT 1
③	N.C.	❸	+ OUTPUT 2
④	N.C.	❹	− OUTPUT 2
⑤	N INPUT	❺	+ POWER DC24V
⑥	L INPUT	❻	−
		❼	N.C.
		❽	N.C.
		❾	F.G.
		❿	N.C.

BLOCK DIAGRAM



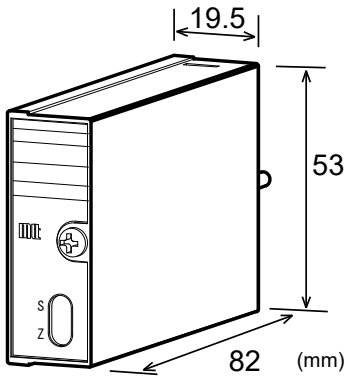
Product Specification Sheet Model: MS3921

Chassis-Mount PT Transmitter with Isolated Dual Output (RMS Calculation Type)

DESCRIPTION

The MS3921 is a chassis-mount PT transmitter that measures a supply voltage applied to power equipment and converts it into mutually isolated dual channel DC output signals.

- ▽ 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
MS3921-1□□-8□□_ [1] [2] [3]

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].)	■ 0–100V AC, 50/60Hz ·····N1 ■ 0–110V AC, 50/60Hz ·····N2 ■ 0–250V AC, 50/60Hz ·····N3
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.

OUTPUT SECTION

Output (Specify a code in the field [2].)	Output 1 / Output 2 ·····Code ■ 1–5V DC / 1–5V DC ·····V1 ■ 0–5V DC / 0–5V DC ·····V5 ■ 0–10V DC / 0–10V DC ·····V6 ■ ±5V DC / ±5V DC ·····W5 ■ ±10V DC / ±10V DC ·····W6 ■ 1–5V DC / 4–20mA DC ·····C1 Note: Combinations of two outputs are only available as shown above.
Allowable Output Load	Voltage output: 2mA max. Current output: 300Ω max.
Zero Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [3]	■ Polyurethane conformal coating ···· /H

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	0.4s 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, and power.
Dielectric Strength	Input / [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)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

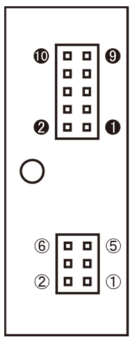
PHYSICAL

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 max.

MATERIAL

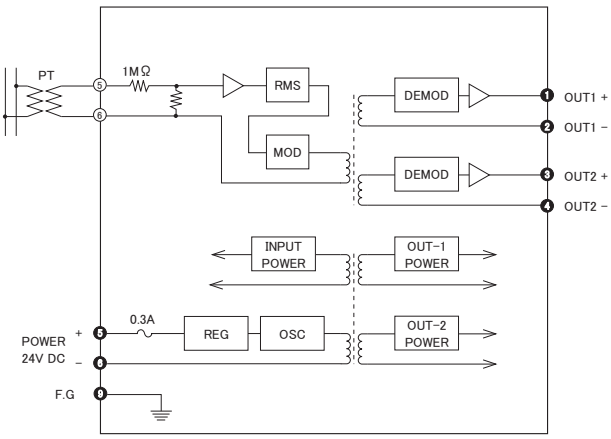
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	N. C.	❶	+ OUTPUT 1
②	N. C.	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N INPUT	❺	+ POWER DC24V
⑥	L INPUT	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



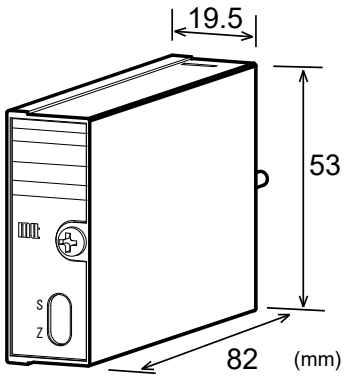
Product Specification Sheet **Model: MS3929** **MS3900**

Chassis-Mount Analog/Frequency Converter with Isolated Dual Output

DESCRIPTION

The MS3929 is a chassis-mount analog to frequency converter that converts DC input signals into mutually isolated dual channel pulse train signals.

- ▽ 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
MS3929-1□□-2(□–□)-6□□-7□□-T□□_ [1] └[2]┘ [3] [4] [5] [6]

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	160mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 4–20mA DC ····· C1 ■ 2–10mA DC ····· C3 ■ 1–5mA DC ····· C4 ■ 10–50mA DC ····· C5 ■ Other DC current signals ····· CY(□–□) Specify a DC current range in parentheses. The ranges available are from 0–100μA to 0–100mA and from ±100μA to ±100mA. ■ 1–5V DC ····· V1 ■ 0–1V DC ····· V4 ■ 0–5V DC ····· V5 ■ 0–10V DC ····· V6 ■ Other DC voltage signals ····· X2(□–□) Specify a DC voltage range in parentheses. The ranges available are from 0–200mV to 0–300V and from ±200mV to ±300V.
Input Resistance	Voltage input: 1MΩ min. with or without power Current input: 250Ω (Standard for 4–20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. (Standard for a span up to 10V) Current input: 40mA DC max., continuous (Standard for 4–20mA)

OUTPUT SECTION

Output Frequency Range (Specify a range in the field [2].)	Specify an output frequency range between 0–0.001Hz and 0–5kHz.
Output (Specify a code in each of the fields [3] & [4].)	■ TTL level ····· TT ■ Open collector ····· OP
Allowable Output Load	TTL level: Maximum output 10mA @ 3.5V
Maximum Rating	Open collector: Maximum rating 30V, 100mA (Resistive load)
Zero Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span. (Adjustable by front-accessible trimmer)
Output Duty Ratio w/o Pulse Hold Function	40 to 60%
Pulse Hold Time (Optional) (Specify a value in the field [5].)	Specify a pulse width between 200μs and 200ms. When a pulse hold time is specified, the maximum possible output frequency is determined by: Hz = 1 / (T × 1.2 + 10μs*) * 10μs: Output pulse Lo level for TTL and voltage pulse outputs or output pulse ON for open collector output.

ADDITIONAL

Option [6]	■ Polyurethane conformal coating ···· /H

PERFORMANCE

Accuracy Rating	Better than ±0.1% of span (at 25°C±5°C).	
Pulse Hold Time Accuracy	Better than ±20% of a customer specified value.	
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.	
Response Time	Output frequency	0–90% with a step input at 100%
	0.5Hz	3.1s max.
	5Hz	310ms max.
	50Hz	65ms max.
	Over 500Hz	35ms max.
Isolation	4-way isolation between input, output 1, output 2, and power.	
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output 1, output 2, and power.	
Dielectric Strength	Input / [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)	
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.	
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)	
Storage Temperature	−10 to 60°C	

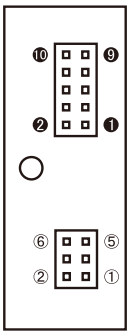
PHYSICAL

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	80g max.

MATERIAL

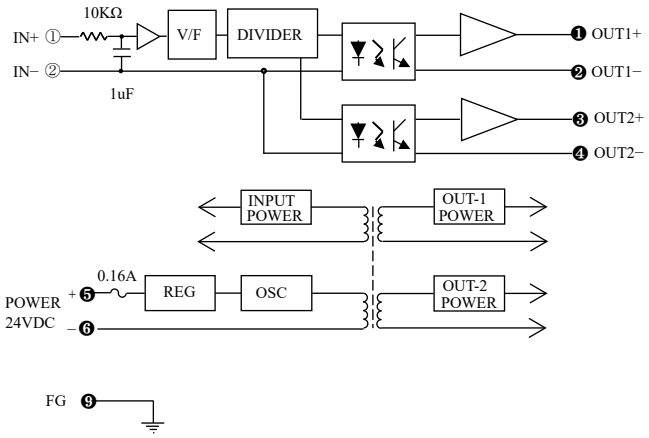
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	+ OUTPUT 2
④	N. C.	❹	− OUTPUT 2
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



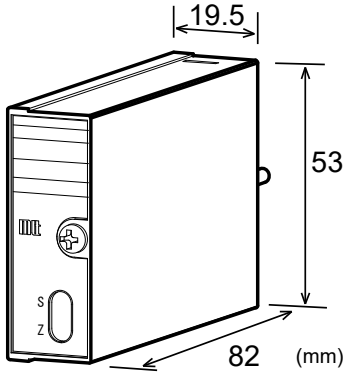
Product Specification Sheet **Model: MS3944** **MS3900**

Chassis-Mount High-Level Signal Conditioner (Fast Response Model)

DESCRIPTION

The MS3944 is a chassis-mount high-level signal conditioner that converts DC input signals into isolated DC output signals with fast response (10kHz, 20kHz, or 40kHz).

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



ORDERING INFORMATION

Ordering Code
MS3944-□□K-1□□-6□□_ [1] [2] [3] [4]

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	160mA fuse
Current Consumption	35mA max. at 24V DC

INPUT SECTION

Response Frequency (Specify a code in the field [1].)	■ Fc 10kHz–3dB ····· 10 ■ Fc 20kHz–3dB ····· 20 ■ Fc 40kHz–3dB ····· 40 ■ Others (Special order)····· 99 Specify a frequency in steps of at least 100Hz within the range of 200Hz–3dB to 10kHz–3dB. The response frequency of 40kHz-3dB is available only in the following input and output combinations: ・ MS3944-40K-1V1-6V1 (Input: 1–5V; Output: 1–5V) ・ MS3944-40K-1V5-6V5 (Input: 0–5V; Output: 0–5V) ・ MS3944-40K-1V6-6V6 (Input: 0–10V; Output: 0–10V) ・ MS3944-40K-1W5-6W5 (Input: ±5V; Output: ±5V) ・ MS3944-40K-1W6-6W6 (Input: ±10V; Output: ±10V) For special orders, ask our sales representatives for availability before ordering.
Input (Specify a code in the field [2].)	■ 1–5V DC·····V1 ■ 0–1V DC·····V4 ■ 0–5V DC·····V5 ■ 0–10V DC ·····V6 ■ ±5V DC ····· W5 ■ ±10V DC····· W6 ■ 4–20mA DC (input resistance 50Ω)C1 ■ Other DC voltage signals (special order)·····X2 For code "X2", specify a voltage range.
Input Resistance	Voltage input: 1MΩ min. with or without power Current input: 50Ω (Standard for 4–20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. Current input: 40mA DC max., continuous.

OUTPUT SECTION

Output (Specify a code in the field [3].)	■ 1–5V DC·····V1 ■ 0–5V DC·····V5 ■ 0–10V DC ·····V6 ■ ±5V DC ····· W5 ■ ±10V DC····· W6
Allowable Output Load	Voltage output: 2mA max.
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [4]	■ Polyurethane conformal coating···· /H

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.
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	Input / Output / Power: 1500V 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

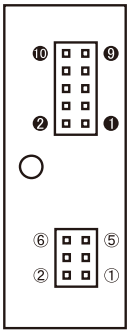
PHYSICAL

Installation	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	60g max.

MATERIAL

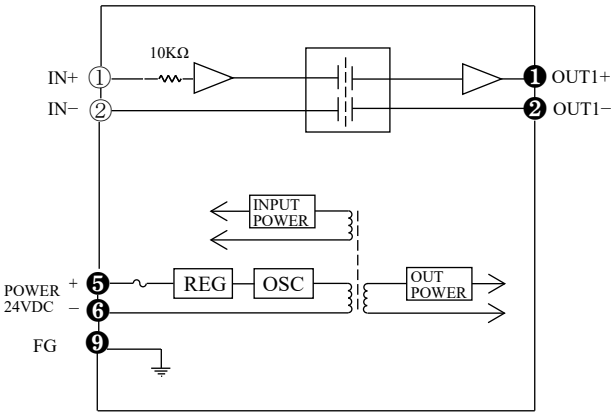
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ INPUT	❶	+ OUTPUT 1
②	− INPUT	❷	− OUTPUT 1
③	N. C.	❸	N. C.
④	N. C.	❹	N. C.
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



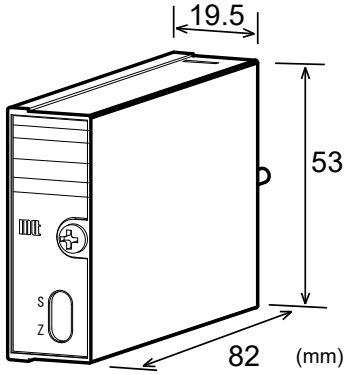
Product Specification Sheet Model: MS3954

Chassis-Mount High-Level Signal Conditioner with Isolated Single Output (Current Output Model, with Open Circuit Detection)

DESCRIPTION

The MS3954 is a chassis-mount high-level signal conditioner that converts DC input signals into isolated DC output signals.

- ▽ A multi-slot chassis provides ease of maintenance and high-density mounting.
- ▽ Input, output, and power circuits are all isolated from each other.
- ▽ Equipped with a fuse on the DC power line as standard.
- ▽ Features output open circuit detection.



ORDERING INFORMATION

Ordering Code
MS3954-1☐☐-8C1_ [1] [2]

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	160mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 4–20mA DC ····· C1 ■ 2–10mA DC ····· C3 ■ 1–5mA DC ····· C4 ■ 10–50mA DC ····· C5 ■ Other DC current signals ····· CY(☐–☐) Specify a DC current range in parentheses. The ranges available are from 0 to 100mA and from ±100μA to ±100mA. ■ 1–5V DC ····· V1 ■ 0–1V DC ····· V4 ■ 0–5V DC ····· V5 ■ 0–10V DC ····· V6 ■ 0.4–2V DC ····· V7 ■ ±5V DC ····· W5 ■ ±10V DC ····· W6 ■ Other DC voltage signals ····· X2(☐–☐) Specify a DC voltage range in parentheses. The ranges available are from 0–200mV to 0–50V and from ±200mV to ±50V.
Input Resistance	Voltage input: 1MΩ min. with power (10kΩ min. without power) Current input: 250Ω (Standard for 4–20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. Current input: 40mA DC max., continuous.

OUTPUT SECTION

Output	4–20mA DC
Allowable Output Load	550Ω max.
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [2]	■ Polyurethane conformal coating ····· /H

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	15ms max. (0 to 90%) with a step input at 100%.
Open Circuit Detection	Open collector output (Maximum rating: 35V, 4mA) If output falls below the detection level, the transistor will be turned on.
Detection Level	Approx. 10% of F.S.
Time Constant for Detection Circuit	Approx. 1s (0 to 63%)
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	Input / Power: 500V AC for 1 minute (Cutoff current: 0.5mA) Output / [Input, Power]: 1500V AC for 1 minute (Cutoff current: 0.5mA)

Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

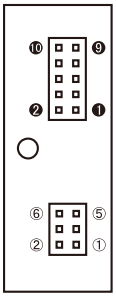
PHYSICAL

Installation	Mounted in an optional chassis (RC3900A-☐☐AO).
Wiring	Wired to an optional chassis (RC3900A-☐☐AO).
External Dimensions	W19.5 × H53 × D82 mm
Weight	55g max.

MATERIAL

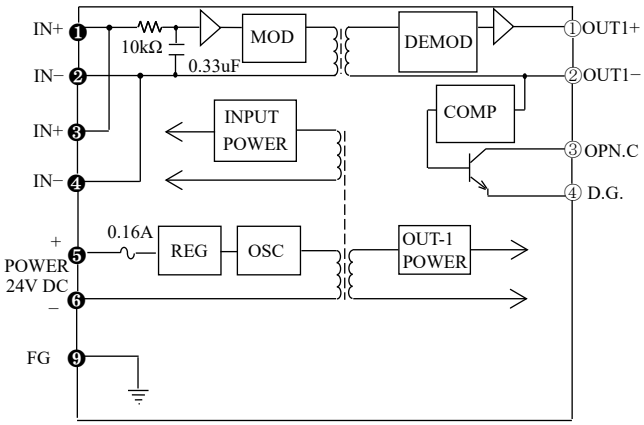
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ OUTPUT	❶	+ INPUT
②	− OUTPUT	❷	− INPUT
③	OPN. C	❸	+ INPUT
④	D. G.	❹	− INPUT
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



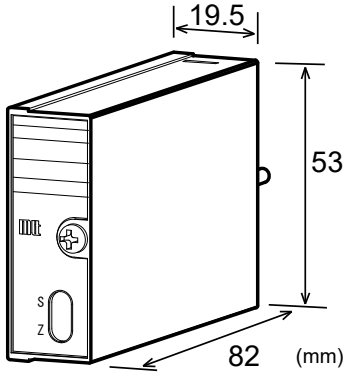
Product Specification Sheet **Model: MS3954HI** **MS3900**

Chassis-Mount High-Level Signal Conditioner with Isolated Single Output(High Current Load Model, with Open Circuit Detection)

DESCRIPTION

The MS3954HI is a chassis-mount high-level signal conditioner that converts DC input signals into isolated DC output signals.

- ▽ Allowable output load: 750Ω
- ▽ A multi-slot chassis provides ease of maintenance and high-density mounting.
- ▽ Input, output, and power circuits are all isolated from each other.
- ▽ Equipped with a fuse on the DC power line as standard.
- ▽ Features output open circuit detection.



ORDERING INFORMATION

Ordering Code
MS3954HI-1□□-8C1_ [1] [2]

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	160mA fuse
Current Consumption	45mA max. at 24V DC

INPUT SECTION

Input (Specify a code in the field [1].)	■ 4–20mA DC ·····C1 ■ 2–10mA DC ·····C3 ■ 1–5mA DC·····C4 ■ 1–5V DC ····· V1 ■ 0.4–2V DC····· V7
Input Resistance	Voltage input: 1MΩ min. with power (10kΩ min. without power) Current input: 250Ω (Standard for 4–20mA)
Allowable Input Voltage	Voltage input: 30V DC max., continuous. Current input: 40mA DC max., continuous.

OUTPUT SECTION

Output	4–20mA DC
Allowable Output Load	250 to 750Ω Note: If the output load is under 250Ω, the supplied 250Ω resistor must be added to the output load.
Zero Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)
Span Adjustment	Approx. ±2% of span (Adjustable by front-accessible trimmer)

ADDITIONAL

Option [2]	■ Polyurethane conformal coating···· /H

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	15ms max. (0 to 90%) with a step input at 100%.
Open Circuit Detection	Open collector output (Maximum rating: 35V, 4mA) If output falls below the detection level, the transistor will be turned on.
Detection Level	Approx. 10% of F.S.
Time Constant for Detection Circuit	Approx. 1s (0 to 63%)
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	Input / Power: 500V AC for 1 minute (Cutoff current: 0.5mA) Output / [Input, Power]: 1500V AC for 1 minute (Cutoff current: 0.5mA)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	−10 to 60°C

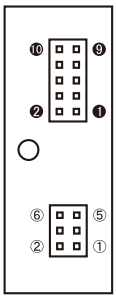
PHYSICAL

Installation	Mounted in an optional chassis (RC3900A-☐☐AO).
Wiring	Wired to an optional chassis (RC3900A-☐☐AO).
External Dimensions	W19.5 × H53 × D82 mm
Weight	55g max.

MATERIAL

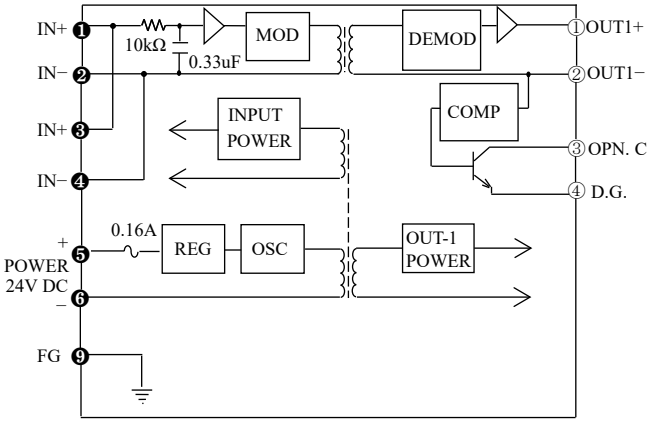
Housing	ABS resin
PC Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)

PIN ASSIGNMENTS



PIN	SIGNAL	PIN	SIGNAL
①	+ OUTPUT	❶	+ INPUT
②	− OUTPUT	❷	− INPUT
③	OPN. C	❸	+ INPUT
④	D. G.	❹	− INPUT
⑤	N. C.	❺	+ POWER DC24V
⑥	N. C.	❻	−
		❼	N. C.
		❽	N. C.
		❾	F. G.
		❿	N. C.

BLOCK DIAGRAM



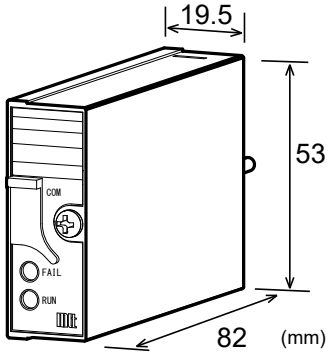
Product Specification Sheet **Model: MS3971** **MS3900**

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	- 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.)

ADDITIONAL

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

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	±5μV max. per 100Ω
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ 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

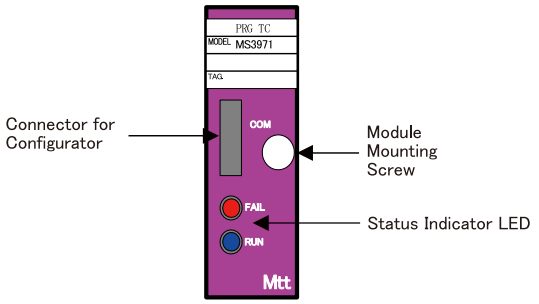
PHYSICAL

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

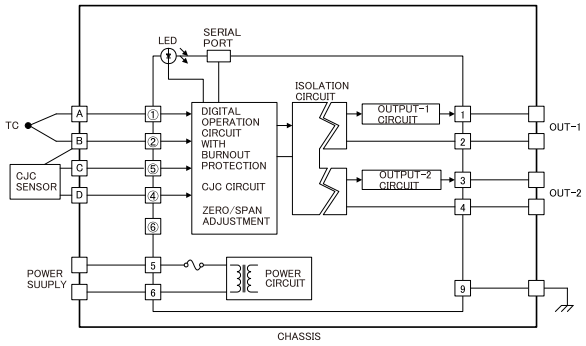
MATERIAL

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) × ±0.02%	Better than ±0.04%
E	1000°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	Better than ±0.04%
J	750°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	Better than ±0.04%
T	550°C (Fixed) / Input span (Measuring temperature range) × ±0.03%	Better than ±0.04%
R	1600°C (Fixed) / Input span (Measuring temperature range) × ±0.04%	Better than ±0.04%
S	1600°C (Fixed) / Input span (Measuring temperature range) × ±0.04%	Better than ±0.04%
B	1100°C (Fixed) / Input span (Measuring temperature range) × ±0.06%	Better than ±0.04%
N	1400°C (Fixed) / Input span (Measuring temperature range) × ±0.02%	Better than ±0.04%
WRe3-25	2000°C (Fixed) / Input span (Measuring temperature range) × ±0.03%	Better than ±0.04%
WRe5-26	2000°C (Fixed) / Input span (Measuring temperature range) × ±0.03%	Better than ±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.

Product Specification Sheet **Model: MS3972** **MS3900**

Chassis-Mount Programmable RTD Temperature Transmitter with Isolated Dual Output

DESCRIPTION

The MS3972 is a chassis-mount programmable RTD temperature transmitter that converts input signals from an RTD 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 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
MS3972-□(□–□)-8□□-B□_ [1] [2] [3] [4][5]

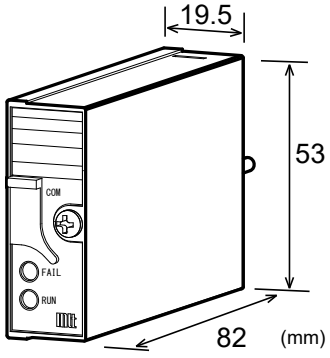
SPECIFICATIONS

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 ■ Pt 100Ω (ITS-90) (−200–660°C) ··· P1 ■ Pt 100Ω (IPTS-68) (−200–660°C) · P2 ■ JPt 100Ω (JIS'89) (−200–510°C) ···· J ■ Pt 50 Ω (JIS'81) (200–649°C) ····· P5 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.
Linearizer	Built-in linearizer (program)
Factory Default Settings	Unless otherwise requested, the following factory default settings are used: Input code: P1 (Pt 100Ω, ITS-90) Measuring temperature range: 0 to 100°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].)	Upscale or downscale (if any of the three wires A, B, and B' is opened) ■ Upscale····· U ■ Downscale ····· D
Burnout Drive Time	10s 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	- RTD 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.)

ADDITIONAL

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

PERFORMANCE

Accuracy Rating (Input accuracy + Output accuracy)

Input Accuracy (inversely proportional to input span)

Pt 100Ω (ITS-90)	Coefficient 0.01%
Pt 100Ω (IPTS-68)	Coefficient 0.01%
JPt 100Ω (JIS '89)	Coefficient 0.01%
Pt 50Ω (JIS '81)	Coefficient 0.02%

Input Accuracy List

RTD	Input Accuracy
Pt100 (JIS '97)	860°C / Input span (measuring temp) × ±0.01%
Pt100 (JIS '89)	860°C / Input span (measuring temp) × ±0.01%
JPt100 (JIS '89)	710°C / Input span (measuring temp) × ±0.01%
Pt50 (JIS '81)	849°C / Input span (measuring temp) × ±0.02%

* Minimum input span: 25°C

Output Accuracy	Better than ±0.04%
Temperature Effect	100ppm/°C
Response Time	Approx. 260ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Effect of Wiring Resistance	±5μV max. per 100Ω
Isolation	4-way isolation between input, output 1, output 2, and power.
Insulation Resistance	100MΩ 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

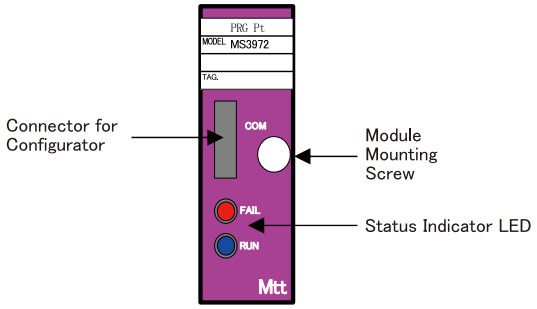
PHYSICAL

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

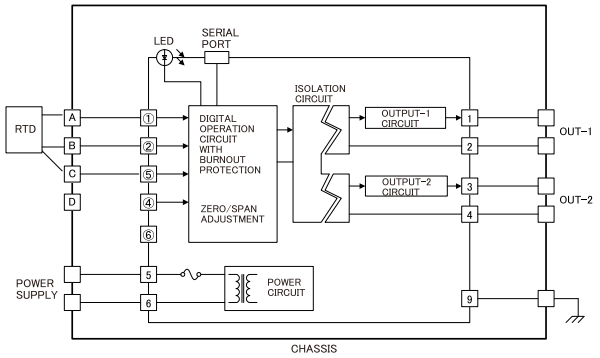
MATERIAL

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 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

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.

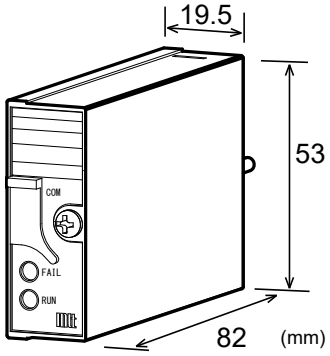
Product Specification Sheet **Model: MS3973** **MS3900**

Chassis-Mount Programmable Millivolt Isolator with Isolated Dual Output

DESCRIPTION

The MS3973 is a chassis-mount programmable millivolt isolator that amplifies millivolt input signals from sensors and converts them 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 burnout protection and coefficient setting (using 6th-order polynomials).
- ▽ 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
MS3973-□(□–□)-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 input range)····· Code ■ 20mV DC ····· 1 (±9mV, minimum span 5mV) ■ 40mV DC ····· 2 (±9mV, minimum span 19mV) ■ 80mV DC ····· 3 (±36mV, minimum span 37mV) ■ 160mV DC ····· 4 (±72mV, minimum span 73mV) ■ 320mV DC ····· 5 (±144mV, minimum span 145mV) ■ 640mV DC ····· 6 (±288mV, minimum span 289mV) ■ 1V DC ····· 7 (±499mV, minimum span 577mV) ■ 2V DC ····· 8 (±1V, minimum span 1V) * Custom linearization using 6th-order polynomials is available.
Measuring Input Range (Specify a range in the field [2].)	Specify a measuring input range within the range available.
Input Resistance	1MΩ min. (Without power: 1MΩ min. at rated input)
Allowable Input Voltage	25V DC max., continuous.
Linearizer	Built-in linearizer (program)
Factory Default Settings	Unless otherwise requested, the following factory default settings are used: Input code: 4 Measuring input range: 0 to 100mV

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. 55nA ■ Upscale ····· U ■ Downscale ····· D
Burnout Drive Time	80s max. 160s max. for 1V range 480s max. for 2V range
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: Downscale

SOFTWARE CONFIGURATION PARAMETERS

Configurable Parameters	- Coefficient setting function (6th-order polynomials) - ADC range (Input range) - Measuring input 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.)

ADDITIONAL

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

PERFORMANCE

Accuracy Rating	Input accuracy + Output accuracy
Input Accuracy	Range / Span × 0.02% (excluding custom linearization)
Output Accuracy	Better than ±0.04%
Temperature Effect	100ppm/°C
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 1, output 2, and power.
Insulation Resistance	100MΩ 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

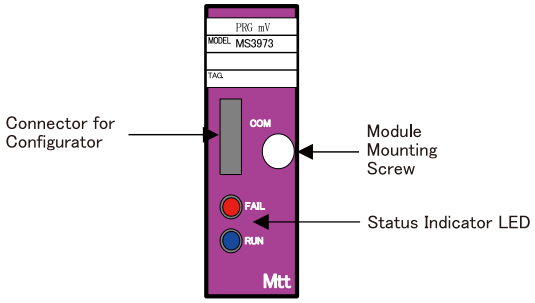
PHYSICAL

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

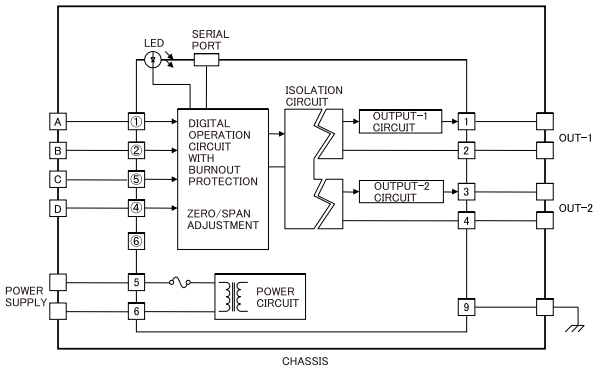
MATERIAL

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 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

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.

DESCRIPTION

The RC3900A is a chassis that accommodates MS3900 series isolated signal conditioners. All wiring connections are made to the terminal blocks on the chassis. Single power connection to the chassis permits power supply to all I/O modules mounted therein through its motherboard.

ORDERING INFORMATION

Ordering Code
For Input Modules: RC3900A-☐☐AI-☐☐-☐_ [1] [2][3]
For Output Modules: RC3900A-☐☐AO-☐☐-☐_ [1] [2][3]

SPECIFICATIONS

GENERAL

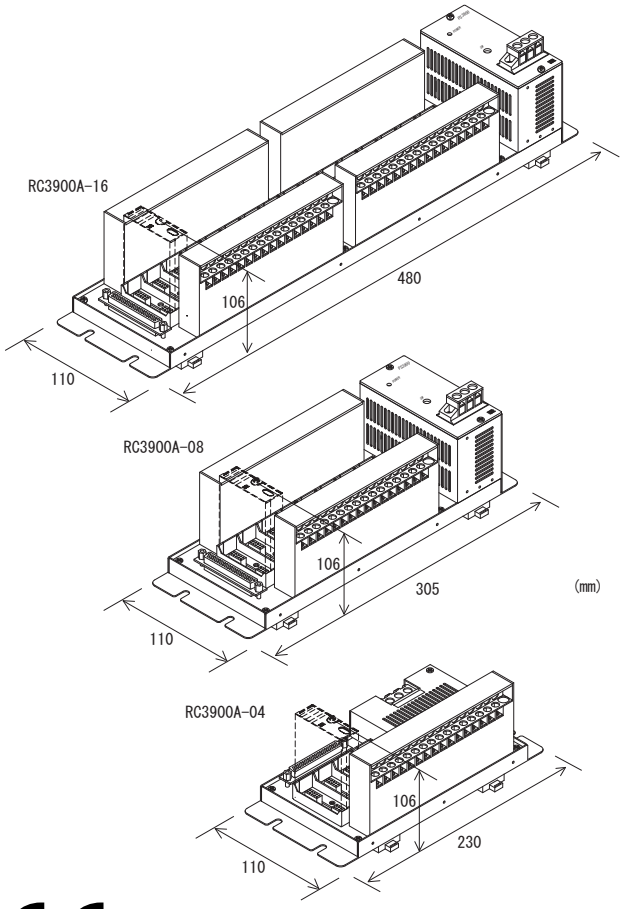
Power Requirements (Specify a code in the field [1].)	■ 85–264V AC (47–63Hz) rated for 100V–240V····· AU ■ 24V DC ····· D1
Installation (Specify a code in the field [2].)	■ DIN rail mounting (Optional)····· D ■ Wall mounting····· R

ADDITIONAL

Options [3]	■ CE compliant····· /C Notes: 1. This only applies to orders having a code of "-08AI" or "-16AI". 2. CE-compliant modules must be used to meet the CE marking requirements. ■ Polyurethane conformal coating···· /H

PHYSICAL

Wiring (Connector) (See the tables on page 2.)	AI: Input, Output 1, and Output 2 terminal blocks: M3.5 screw Output 1 connector: 37-pin D-subminiature (Hirose SDCB-37S) AO: Input and Output terminal blocks: M3.5 screw Input connector: 37-pin D-subminiature (Hirose SDCB-37P)



CE

External Dimensions (with modules mounted)	04AI/04AO: Wall mount: W230 × H110 × D99 mm DIN rail mount: W230 × H110 × D106 mm 08AI (exc. 08AI-AU-☐/C)/08AO: Wall mount: W305 × H110 × D99 mm DIN rail mount: W305 × H110 × D106 mm 08AI-AU-☐/C: Wall mount: W305 × H110 × D123 mm DIN rail mount: W305 × H110 × D130 mm 16AI (exc. 16AI-AU-☐/C)/16AO: Wall mount: W480 × H110 × D99 mm DIN rail mount: W480 × H110 × D106 mm 16AI-AU-☐/C: Wall mount: W480 × H110 × D123 mm DIN rail mount: W480 × H110 × D130 mm

WIRING CONNECTIONS

Chassis for Input Modules

Input Side	Output Side	
	Output 1	Output 2
M3.5 screw terminals	M3.5 screw terminals or 37-pin D-subminiature connector	M3.5 screw terminals

Chassis for Output Modules

Input Side	Output Side
M3.5 screw terminals or 37-pin D-subminiature connector	M3.5 screw terminals

PERFORMANCE

Number of MS3900 Modules Accommodated	Up to 16 modules Note: The RC3900A-☐☐AO only accommodates two models, MS3954 and MS3954HI (High Level Signal Conditioners).
Power Indicator LED	Green LED lights when the power is ON. (Only for 04AI/AO)
Insulation Resistance	100MΩ min. (@ 500V DC) between input, [output 1, output 2], power, and FG.
Dielectric Strength	AI: Input / (Output 1, Output 2, Power, FG): 1500V AC for 1 minute (Cutoff current: 0.5mA) Output 1 / Output 2 / (Power, FG): 500V AC for 1 minute (Cutoff current: 0.5mA) Power / FG: 500V AC for 1 minute (Cutoff current: 5mA) Output channel to output channel: 200V AC for 1 minute (Cutoff current: 0.5mA) AO: Output / (Input, Power, FG): 1500V AC for 1 minute (Cutoff current: 0.5mA) Input / (Power, FG): 500V AC for 1 minute (Cutoff current: 0.5mA) Power / FG: 500V AC for 1 minute (Cutoff current: 5mA) Input channel to input channel: 200V AC for 1 minute (Cutoff current: 0.5mA)
Operating Environment	Ambient temperature: 0 to 55°C Humidity: 5 to 90% RH (non-condensing)
Current Consumption	04AI: AC powered: ≤ 25VA (rated for 100VAC; fully loaded) ≤ 35VA (rated for 240VAC; fully loaded) DC powered: ≤ 350mA (rated for 24VDC; fully loaded)
Current Consumption (Continued)	04AO: AC powered: ≤ 15VA (rated for 100VAC; fully loaded) ≤ 25VA (rated for 240VAC; fully loaded) DC powered: ≤ 200mA (rated for 24VDC; fully loaded) 08AI: AC powered: ≤ 45VA (rated for 100VAC; fully loaded) ≤ 60VA (rated for 240VAC; fully loaded) DC powered: ≤ 600mA (rated for 24VDC; fully loaded) 08AO: AC powered: ≤ 25VA (rated for 100VAC; fully loaded) ≤ 35VA (rated for 240VAC; fully loaded) DC powered: ≤ 400mA (rated for 24VDC; fully loaded) 16AI: AC powered: ≤ 75VA (rated for 100VAC; fully loaded) ≤ 95VA (rated for 240VAC; fully loaded) DC powered: ≤ 1.2A (rated for 24VDC; fully loaded) 16AO: AC powered: ≤ 45VA (rated for 100VAC; fully loaded) ≤ 60VA (rated for 240VAC; fully loaded) DC powered: ≤ 750mA (rated for 24VDC; fully loaded)
Inrush Current	04AI/AO: AC powered: ≤ 30A (240VAC @ 25°C) DC powered: ≤ 5A (24VDC @ 25°C) 08AI/AO & 16AI/AO: AC powered: ≤ 35A (240VAC @ 25°C) DC powered: ≤ 30A (24VDC @ 25°C)
Storage Temperature	−10 to 60°C

MATERIAL

Case	SECC-JN
PC Board	Glass fabric, epoxy resin

WEIGHT

RC3900A-16AI/AO-AU-D	2,100g max.
RC3900A-16AI/AO-AU-R	2,100g max.
RC3900A-16AI/AO-D1-D	2,000g max.
RC3900A-16AI/AO-D1-R	2,000g max.
RC3900A-08AI/AO-AU-D	1,400g max.
RC3900A-08AI/AO-AU-R	1,400g max.
RC3900A-08AI/AO-D1-D	1,300g max.
RC3900A-08AI/AO-D1-R	1,300g max.
RC3900A-04AI/AO-AU-D	900g max.
RC3900A-04AI/AO-AU-R	850g max.
RC3900A-04AI/AO-D1-D	800g max.
RC3900A-04AI/AO-D1-R	760g max.

STANDARDS CONFORMITY

EC Directives 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