



## 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]

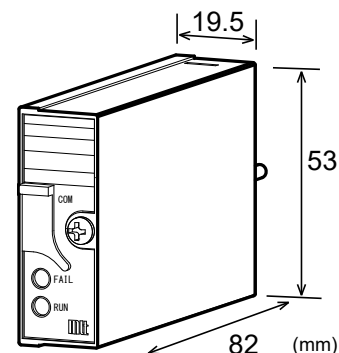
## SPECIFICATIONS

## 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.
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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	<ul style="list-style-type: none"> <li>- Coefficient setting function (6th-order polynomials)</li> <li>- ADC range (Input range)</li> <li>- Measuring input range</li> <li>- Burnout protection</li> <li>- Output range</li> <li>- Zero/Span adjustment (Approx. <math>\pm 4\%</math> of span)</li> <li>- PAUSE status</li> </ul> <p>(All of the above are configurable by PC via RS-232C.)</p>
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## ADDITIONAL

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

Accuracy Rating	Input accuracy + Output accuracy
Input Accuracy	Range / Span $\times 0.02\%$ (excluding custom linearization)
Output Accuracy	Better than $\pm 0.04\%$
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	100M $\Omega$ 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 $55^{\circ}\text{C}$ Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	$-10$ to $60^{\circ}\text{C}$

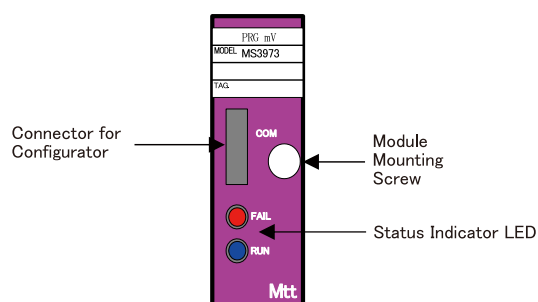
## PHYSICAL

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 $\times$ H53 $\times$ D82 mm
Weight	70g

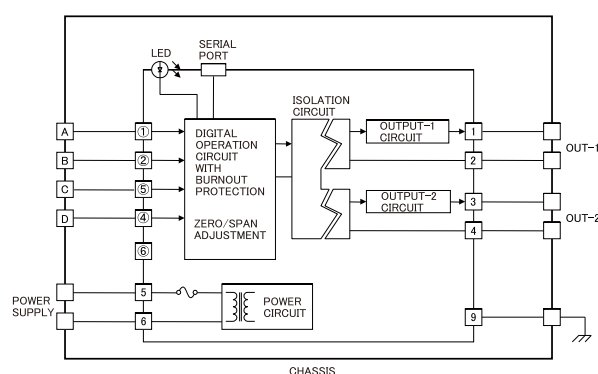
## MATERIAL

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.