



DESCRIPTION

The MS3786 is a slim, plug-in DC signal transmitter that converts DC current or voltage signals into high DC current signals and provides an isolated single output.

ORDERING CODE

MS3786 - D -

Model _____

Power Supply _____
D: 24V DC

Input _____

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

* 1: Shunt resistor 50Ω

Output _____
Z (Output Specification)

Options _____

No code: None

/K: Fast response (10 to 90% response time: 10ms max.)
(Applicable only for positive output ranges.)

/X: Special order

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

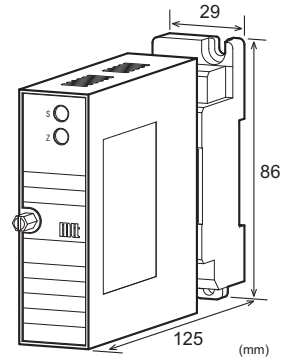
ORDERING INFORMATION

To place an order, please use the ordering code format as shown above. Also specify an output range. (e.g.) MS3786-D-AZ (20 to 160mA)

Other Ordering Examples:

For an input code of "Z": MS3786-D-ZZ (Input: 8 to 20mA / Output: 0 to 320mA)

For an option code of "X": MS3786-D-AZ/X (Output: 0 to 340mA)



SPECIFICATIONS

POWER SECTION

Power Requirement	24V DC: 24V DC±10%
Power Sensitivity	Better than ±0.1% of span.
Power Line Fuse	1.6A fuse is installed (standard).
Power Consumption	6.5W max.

INPUT SECTION

Input Resistance	With or without power: 1MΩ min.	
Voltage Input (DC)	4 to 20mA (std.)	250Ω
Current Input (DC)	2 to 10mA	250Ω
	1 to 5 mA	100Ω
	0 to 20mA	250Ω
	10 to 50mA	10Ω
	Without power:	1MΩ min.
Allowable Input Signal	30V DC max., continuous. (Standard for a span up to 10V)	
Voltage Input Model	40mA DC max., continuous. (Standard for 4 to 20mA)	
Current Input Model	Burnout Protection	
	Depends on input/output specifications. Refer to the "OPEN CIRCUIT BEHAVIOR" section on page 3.	
Open Circuit Detection (current input only)	If the output is opened, the input circuit will be opened. Additionally, if the voltage between output terminals exceeds 11V, the open circuit detection function will be activated and the input circuit will be opened.	
Self-Diagnosis (current input only)	If the supply voltage for the input/output circuit drops, the input circuit will be opened.	

Ranges Available		
	Current Signal	Voltage Signal
Input Range (DC)	-50 to 50mA	-10 to 10V
Input Span (DC)	100 μ A ⁽¹⁾ to 100mA	200mV ⁽²⁾ to 20V
Input Bias	-100 to 100%	-100 to 100%
Note: For any input range including negative input signals, the input spans for current and voltage signals range from ⁽¹⁾ 200 μ A to 100mA and ⁽²⁾ 400mV to 20V, respectively.		
Input Spec. Ex. 1: For 3 to 8V input, the input span is 5V and the bias +60%.		
Input Spec. Ex. 2: For -5 to 0V input, the input span is 5V and the bias -100%.		

● OUTPUT SECTION

Maximum Output Load	
Resistance value by which the voltage between the output terminals is 10V or smaller:	
$R_L [\Omega] = 10 [V] / \text{Maximum Output Current [A]}$	
200mA (100% output):	50 Ω max. 10V/200mA = 50 Ω
300mA (100% output):	33 Ω max. 10V/300mA = 33.333 Ω
320mA (100% output):	31 Ω max. 10V/320mA = 31.25 Ω
Zero Adjustment	Approx. \pm 5% of span. (Adjustable by the front-accessible trimmer.)
Span Adjustment	Approx. \pm 5% span. (Adjustable by the front-accessible trimmer.)

Ranges Available	
Output Range (DC)	-320 to 320mA
Note: Any output range including negative output signals must have input and output biases of -50%.	
(Ex. 1) Input: -20 to 20mA / Output: -160 to 160mA	
(Ex. 2) Input: -10 to 10V / Output: -320 to 320mA	
Output Span (DC)	20 to 640mA
Output Bias	-50 to 50%
Output Spec. Ex. 1: For 100 to 300mA output, the output span is 200mA and the bias +50%.	
Output Spec. Ex. 2: For -200 to 200mA output, the output span is 400mA and the bias -50%.	

● PERFORMANCE

Accuracy Rating	Better than \pm 0.2% of span (at 25°C \pm 5°C).
Temperature Effect	Better than \pm 0.2% of span per 10°C change in ambient.
Response Time	160ms max. (0 to 90%) with a step input at 100%.
Isolation	Isolation between [input, output, open circuit detection, self-diagnosis], power, and ground.
Insulation Resistance	100M Ω min. (@ 500V DC) between [input, output, open circuit detection, self-diagnosis], power, and ground.
Dielectric Strength	[Input, Output, Open Circuit Detection, Self-diagnosis] / [Power, Ground]: 500V AC for 1 minute (Cutoff current: 0.5mA) Power / Ground: 500V AC for 1 minute (Cutoff current: 5mA)
Operating Environment	Ambient temperature: -5 to 55°C Humidity: 5 to 90% RH (non-condensing)

Storage Temperature	-10 to 60°C
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● FUNCTIONS

Open Circuit Detection	Photo MOS relay output (Maximum rating: 35V/10mA) If the output is opened, the relay will be opened. The open circuit detection function is also activated if the voltage between the output terminals exceeds 11V. When the output current is 0mA \pm 0.01mA, the open circuit detection function is disabled.
Self-diagnosis	Photo MOS relay output (Maximum rating: 35V/10mA) If the supply voltage for the input/output circuit drops, the relay will be opened.

● PHYSICAL

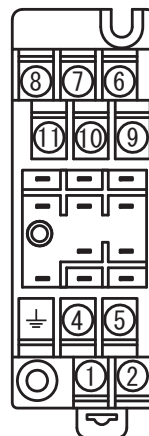
Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-out prevention screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 x H86 x D125mm (including the mounting screw and socket)
Weight	Main unit: 120g max. Socket: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

● MATERIALS

Housing	ABS resin (UL 94V-0)
Terminal Block	PBT resin (UL 94V-0)
Terminal Block Cover	PC resin (UL 94V-2)
DIN Rail Stopper	PP resin (UL 94HB)
Screw Terminal	Nickel-plated steel
Contacts Material and Finish	Brass with 0.2 μ m gold plating
Printed Circuit Board	Glass fabric epoxy resin (FR-4: UL 94V-0)
Anti-Humidity Coating	HumiSeal [®] 1A27NSLU (Polyurethane)

* HumiSeal[®] is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENT



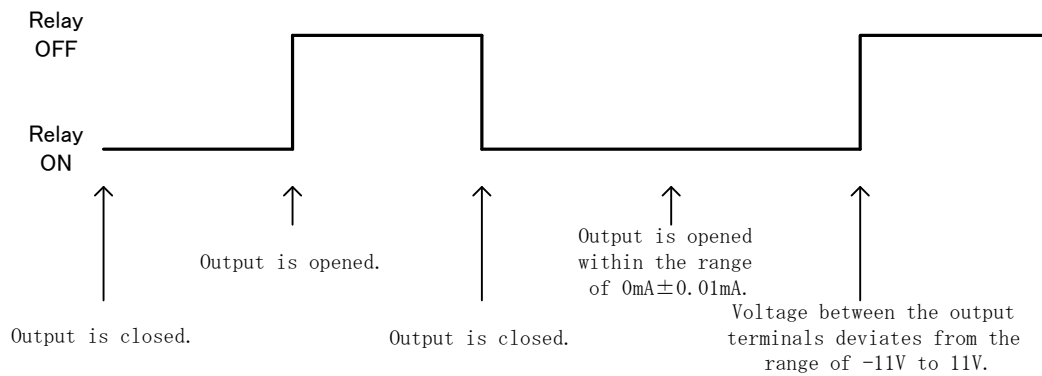
①	+	POWER
②	-	24V DC
⊥		GND
④	+	OUTPUT 1
⑤	-	OUTPUT 1
⑥		DET GND
⑦		CHECK OPN. C
⑧		CHECK GND
⑨	+	INPUT
⑩	-	INPUT
⑪		DET OPN. C

OPEN CIRCUIT BEHAVIOR

Input Specification	Output Specification	Output
2 to 10mA, 4 to 20mA, 1 to 5V	0 to 160mA, 0 to 320mA	Approx. -12%
	32 to 160mA, 64 to 320mA	Approx. -25%
0 to 20mA, 0 to 5V, 0 to 10V	0 to 160mA, 0 to 320mA	Approx. 0%
	32 to 160mA, 64 to 320mA	Approx. 0%
±20mA, ±5V, ±10V	0 to 160mA, 0 to 320mA	Approx. 50%
	32 to 160mA, 64 to 320mA	Approx. 50%
	±160mA, ±320mA	Approx. 0%

OPEN CIRCUIT DETECTION CHARACTERISTICS

Open Circuit Detection Terminal (when 35V/10mA is applied)



BLOCK DIAGRAM

