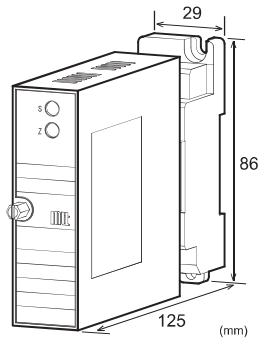
Product Specification Sheet Model: MS3786 MS3700

Slim Plug-In Direct Current Signal Conditioner (Isolator) with Isolated Single Output (High Current Output Model)

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 signals	**0**: Other DC voltage signals

* 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.)
/H: Polyurethane conformal coating
/X: Others (Special order)
* For non-standard options, ask MTT for availability.

ORDERING INFORMATION

To place an order, please use the ordering code format as shown above. 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		
Voltage Input (DC)	With or without power: 1MΩ min.	
Current Input (DC)	4 to 20mA (std.)	250Ω
	2 to 10mA	250Ω
	1 to 5 mA	100Ω
	0 to 20mA	250Ω
	10 to 50mA	10Ω
	Without power:	1MΩ min.
Allowable Input Signal		
Voltage Input Model	30V DC max., continuous. (Standard for a span up to 10V)	
Current Input Model	40mA DC max., continuous. (Standard for 4 to 20mA)	
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)	100μA[*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)200μA 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 [Ω] = 10 [V] / Maximum Output Current [A]

200mA (100% output): 50Ω max.
10V/200mA = 50Ω

300mA (100% output): 33Ω max.
10V/300mA = 33.333Ω

320mA (100% output): 31Ω max.
10V/320mA = 31.25Ω

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

Ranges Available	
Output Range (DC)	-320 to 320mA
Output Span (DC)	20 to 640mA
Output Bias	-50 to 50%

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 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 ±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	160ms max. (0 to 90%) with a step input at 100%.
Isolation	Isolation between [input, output, open circuit detection, self-diagnosis], and power.
Insulation Resistance	100MΩ 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

●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±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.

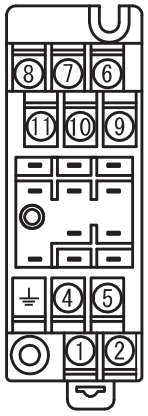
●PHYSICAL

Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-proof screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 × H86 × D125 mm (including the mounting screw and socket)
Weight	Main unit: 120g max. Socket: 80g max.

●MATERIAL

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

TERMINAL ASSIGNMENTS

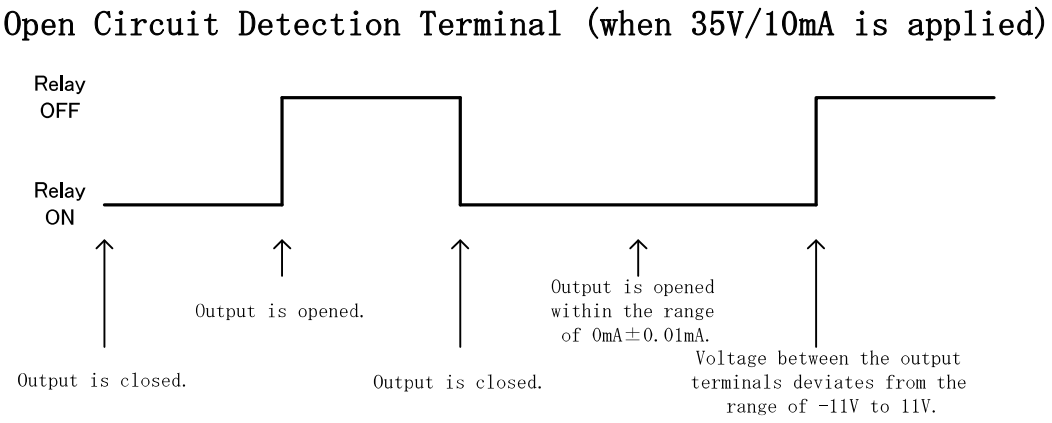


①	+ POWER
②	− 24V DC
⏚	GND
④	+ OUTPUT
⑤	− OUTPUT
⑥	DET GND
⑦	CHECK OPN. C
⑧	CHECK GND
⑨	+ INPUT
⑩	− INPUT
⑪	DET OPN. C

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



BLOCK DIAGRAM