Slim Plug-In Square-Root Extractor with Isolated Single/Dual Output

DESCRIPTION

The MS3713 is a slim, plug-in square-root extractor that extracts the square roots of DC current or voltage signals, converts them into commonly used DC signals and provides isolated single or dual output.

ORDERING CODE

MS3713 - □ - □ □ □

Model

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

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

*1: Shunt resistor 50Ω

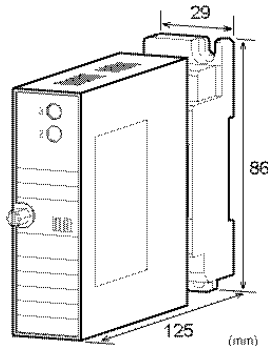
Output 1
- **A**: 4 to 20mA DC
- **D**: 0 to 20mA DC
- **Z**: Other DC current signal
- **1**: 0 to 10mV DC
- **2**: 0 to 100mV DC
- **3**: 0 to 1V DC
- **4**: 0 to 10V DC
- **5**: 0 to 5V DC
- **6**: 1 to 5V DC
- **3W**: ±1V DC
- **4W**: ±10V DC
- **5W**: ±5V DC
- **0**: Other DC voltage signal

Output 2
- **No code**: None
- **The codes are the same as for Output 1.**

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

Options
- **No code**: None
- **/L**: Dual current output with high output load (OUT-1: 750Ω / OUT-2: 550Ω)
- **/X**: Others (Special order)

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



ORDERING INFORMATION

To place an order, please use the ordering code format as shown on the left.
(e.g.) MS3713-A-A66

Other Ordering Examples:
For an input code of "Z": MS3713-A-ZAA (Input: 8 to 20mA)
For an output code of "0": MS3713-A-A60 (Output: 2 to 5V)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /LX).

SPECIFICATIONS

●POWER SECTION

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

Power Consumption

Power	100-240V AC	24V DC	100-240V DC
Single Output	5.5VA max	1.6W max	6.0W max
Dual Output	6.0VA max	2.0W max	7.2W 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

Allowable Input Voltage

Voltage Input Model	30V DC max., continuous. (Standard for a span up to 10V)
Current Input Model	40mA DC max., continuous. (Standard for 4 to 20mA)

Ranges Available	Current Signal	Voltage Signal
Input Range (DC)	0 to 100mA	0 to 300V
Input Span (DC)	100μA to 100mA	200mV to 300V
Input Bias	0 to 100%	0 to 100%

Input Spec. Ex.1: For 4 to 20mA input, the input span is 16mA and the bias +25%.
Input Spec. Ex. 2: For 2 to 6V input, the input span is 4V and the bias +50%.

●OUTPUT SECTION

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

Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)
Square-Root Extraction	$X = 10 \times \sqrt{Y}$ where X = Output signal (0 to 100%) Y = Input signal (0 to 100%) Note: The cutoff function works when the output is less than or equal to 8%±1%.

Ranges Available	Current Signal	Voltage Signal
Output Range (DC)	0 to 20mA	-10 to 10V
Output Span (DC)	4 to 20mA	10mV to 20V
Output Bias	0 to 100%	-100 to 100%

* For current output signals, the accuracy of any current output smaller than 0.1mA is not guaranteed.
Output Spec. Ex.1: For 4 to 20mA output, the output span is 16mA and the bias +25%.
Output Spec. Ex. 2: For -1 to 4V output, the output span is 5V and the bias -20%.

●PERFORMANCE

Accuracy Rating	Better than ±0.2% of span (with input of 1 to 100%, at 25°C±5°C).
Temperature Characteristics	Better than ±0.2% of span per 10°C change in ambient.
Response Time	120ms max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output [Output 1/Output 2], power, and ground.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output [Output 1/Output 2], power, and ground.
Dielectric Strength	Input / Output [Output 1/Output 2] / [Power, Ground]: 2000V AC for 1 minute (Cutoff current: 0.5mA) Power / Ground: 2000V AC for 1 minute (Cutoff current: 5mA) Output 1 / Output 2: 500V AC for 1 minute (Cutoff current: 0.5mA)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: -5 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	-10 to 60°C

●PHYSICAL

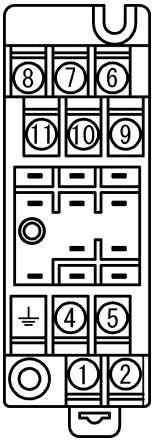
Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-out prevention screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 × H86 × D125mm (including the mounting screw and socket)
Weight	Main unit: 120g max. Socket: 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 0.2μm gold plating
Printed Circuit Board	Glass fabric epoxy resin (FR-4: UL 94V-0)
Anti-Humidity Coating	HumiSeal® 1A27NS (Polyurethane)

* HumiSeal® is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENT



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

BLOCK DIAGRAM