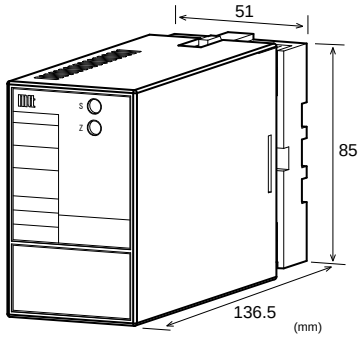
Product Specification Sheet Model: MS5513

Plug-In Square-Root Extractor with Isolated Single Output

DESCRIPTION

The MS5513 is a 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 an isolated single output.



ORDERING CODE

MS5513 - □ - □ □

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 signals
3: 0 to 1V DC
4: 0 to 10V DC
5: 0 to 5V DC
6: 1 to 5V DC
0: Other DC voltage signals

*1: Shunt resistor 50Ω

Output

A: 4 to 20mA DC
D: 0 to 20mA DC
Z: Other DC current signals
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 signals

Options

No code: None
/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.
(e.g.) MS5513-A-6A

Other Ordering Examples:
For an input code of "0": MS5513-D-04 (Input: 2 to 5V)
For an output code of "Z": MS5513-A-EZ (Output: 8 to 20mA)

SPECIFICATIONS

●POWER SECTION

Power Requirement	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

Maximum Power Consumption

Power	100-240V AC	24V DC	100-240V DC
	Approx. 5.5VA	Approx. 1.6W	Approx. 6.0W

●INPUT SECTION

Input Resistance

Voltage Input (DC)	1MΩ min. with or without power.	
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

Allowable Output Load		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4 to 20mA	750Ω 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 (1 to 100% input at 25°C±5°C)
Temperature Effect	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	3-way isolation between input, output, and power.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output, and power.
Dielectric Strength	Input / Output / Power: 2000V 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

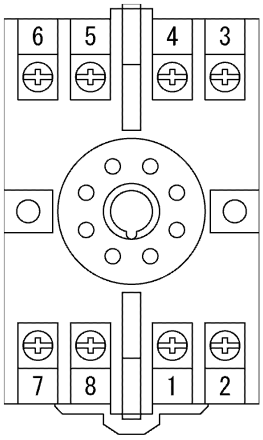
Installation	Wall/DIN rail mounting
Mounting Direction	Vertical
Screwing Torque	0.78 to 1.18 [Nm] * Recommended
Wiring	M3.5 screw terminal connection
External Dimensions	W51 × H85 × D136.5 mm (including the socket)
Weight	Main unit: 200g max. Socket: 60g max.

●MATERIAL

Housing	ABS resin (UL 94V-0)
Socket	ABS resin (UL 94V-0)
Screw Terminal	Galvanized steel with trivalent chromate finish
Printed Circuit Board	Glass fabric, epoxy resin (FR-4: UL 94V-0)
Conformal Coating	HumiSeal® 1A27NSLU (Polyurethane)

* HumiSeal® is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENTS



①	+ OUTPUT	
②	− OUTPUT	
③	+ INPUT	
④	− INPUT	
⑤	N.C.	
⑥	N.C.	
⑦	P (+)	POWER
⑧	N (−)	

BLOCK DIAGRAM