General Specifications

Model MH5
Isolator
(Free Range Type)

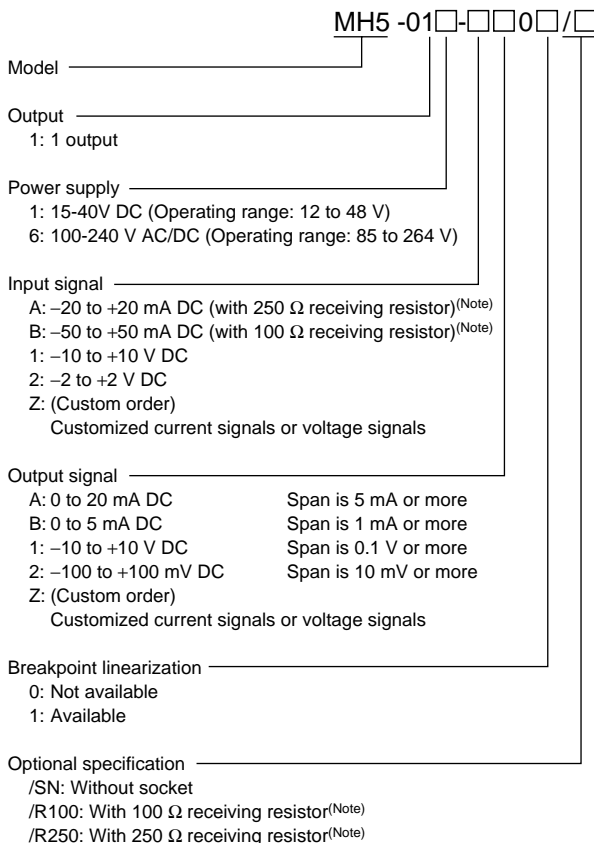**JUXTA**

GS 77J04H05-01E

■ General

The MH5 is a plug-in type isolator that converts DC current or DC voltage signals into isolated DC current or DC voltage signals.

- I/O range setting, selection of square root extractor and breakpoint linearization (breakpoint setting), I/O adjustment, I/O monitoring, and loop back test can be made using the optional Parameter Setting Tool (VJ77) or Handy Terminal (JHT200).
- The operation indicating lamp shows the operation status, abnormalities in a setting etc.
- I/O adjustment can be made using the switches on the front panel of the MH5 without a setting tool such as Handy Terminal.

■ Model and Suffix Codes

MH5 -01□-□□0□/□

Model

Output
1: 1 output

Power supply
1: 15-40V DC (Operating range: 12 to 48 V)
6: 100-240 V AC/DC (Operating range: 85 to 264 V)

Input signal
A: −20 to +20 mA DC (with 250 Ω receiving resistor)(Note)
B: −50 to +50 mA DC (with 100 Ω receiving resistor)(Note)
1: −10 to +10 V DC
2: −2 to +2 V DC
Z: (Custom order)
   Customized current signals or voltage signals

Output signal
A: 0 to 20 mA DC   Span is 5 mA or more
B: 0 to 5 mA DC   Span is 1 mA or more
1: −10 to +10 V DC   Span is 0.1 V or more
2: −100 to +100 mV DC Span is 10 mV or more
Z: (Custom order)
   Customized current signals or voltage signals

Breakpoint linearization
0: Not available
1: Available

Optional specification
/SN: Without socket
/R100: With 100 Ω receiving resistor(Note)
/R250: With 250 Ω receiving resistor(Note)

Note: Specify "/R100" or "/R250" when using different receiving resistor from the receiving resistor specified in the input signal suffix code "A" or "B".
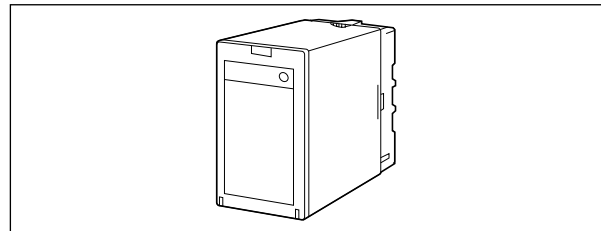
■ Ordering Information

Specify the following when ordering.
- Model and suffix codes: e.g. MH5-016-AA00
- Input range: e.g. 4 to 20 mA DC
- Output range: e.g. 4 to 20 mA DC

Specify a lowcut point when "with square root extractor" is required: e.g. Lowcut point 0.4%
The isolator will be shipped with a lowcut point of 0.6% if no specification of lowcut point.
Specify breakpoints in Work Sheet when linearization is required.
The isolator will be shipped with a specified resistor if the input signal is current input and a receiving resistor of the optional specification is specified.

■ Input/Output Specifications

Input signal: DC current or DC voltage signal
Input signal setting range:

Input signal suffix code	Setting range
A	±20 mA DC Span is 1 mA or more
B	±50 mA DC Span is 5 mA or more (±35 mA DC Span is 2 mA or more for the optional specification "/R250")
1	±10 V DC Span is 1 V or more
2	±2 V DC Span is 3 mV or more

Input resistance:
  Current input: 250 Ω for the suffix code "A"
               100 Ω for the suffix code "B"
  Note: A specified resistor is applied if a receiving resistor of the optional specification is specified.
  Voltage input: 1 MΩ for the suffix code "1"
              (800 kΩ during power off)
             1 MΩ for the suffix code "2"
              (10 kΩ during power off)
Maximum allowable input:
  Current input:
          40 mA DC or less for 250 Ω receiving resistor.
   70 mA DC or less for 100 Ω receiving resistor.
  Voltage input: ±15 V DC or less

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Square root extractor: Outputted against the result of extracting square root of input.

$$Y= \left(\sqrt{\dfrac{X- \text{(input 0 \% value)}}{\text{input span}}} \right) \times \text{(output span)} + \text{(output 0 \% value)}$$

Lowcut point setting range: 0.3 to 100% of input, setting available by 0.1% notch

Output characteristic: Output for lowcut point or less is cramped with straight line proportional to input.
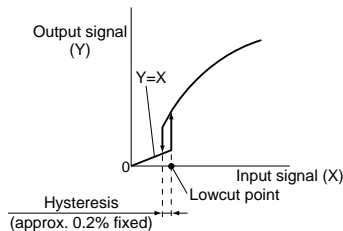
Output signal: 1 point of DC current or DC voltage signal

Output signal setting range:

Output signal suffix code	Setting range
A	0 to 20 mA DC Span is 5 mA or more
B	0 to 5 mA DC Span is 1 mA or more
1	±10 V DC Span is 0.1 V or more
2	±100 mV DC Span is 10 mV or more

Allowable load resistance:
 Voltage output: 2 kΩ or more for ±5 V DC
  10 kΩ or more for ±10 V DC
  250 kΩ or more for ±100 mV DC
 Current output: 15 (V)/max. output (A) (Ω) or less
Linearization:
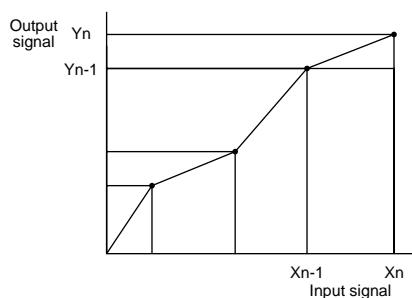 Breakpoint: Up to 32 points (Set a relationship between input and output with % value over the span.)
 Allowable setting range of breakpoint:
  −6 to +106% (both input and output)
 • With 4 significant digits; can be set to the second place of a decimal point.
 • Set breakpoints according to the following.
  For input: $-6.0\% \leqq X_0 < X_1 < X_2 \cdots X_{n-1} < X_n \leqq 106.0\%$
  For output: $-6.0\% \leqq Y_0$ to $Y_n < 106.0\%$

Adjustment range:
 Input adjustment: ±1% of span or more (Zero/Span)
 Output adjustment: ±5% of span or more (Zero/Span)

■ Standard Performance

Accuracy rating: ±0.1% of span
 However, the accuracy is not guaranteed for output levels less than 0.5% of the span of a 0 to X mA output range type.
 For square root extractor input, ±1% of span when the input is 2% or less.
The accuracy is limited according to the input/output range settings.
• Accuracy Calculation
 Accuracy = Input accuracy + Output accuracy (%)
 Accuracy is obtained by totalizing the expression (1) for input accuracy and the expression (2) for output accuracy. However, ±0.05% is applied if a value obtained from the expression (1) or (2) is less than ±0.05%.
 For current input, add the error of receiving resistor ±0.1% to the input accuracy.

Input accuracy = $\pm 0.05\% \times a/b$ ··· expression (1)

Input signal suffix code		Accuracy calculation condition	
	Input range (Range converted into voltage)	a	b
A* B* 1	±2.5 V DC	1(V)	Input span (Span converted into voltage)
	Outside of ±2.5 V DC and within ±10 V DC	4(V)	
2	±20 mV DC	10(mV)	
	Outside of ±20 mV DC and within ±100 mV DC	40(mV)	
	Outside of ±100 mV DC and within ±0.5 V DC	0.2(V)	
	Outside of ±0.5 V DC and within ±2 V DC	0.8(V)	

*: When input signal is current, the values converted into voltage by the receiving resistor are applied to the input range and input span.

Output accuracy = $\pm 0.05\% \times a/b$ ··· expression (2)

Output signal suffix code		Accuracy calculation condition	
	Output range	a	b
A	0 to 20 mA DC	10(mA)	Output span
B	0 to 5 mA DC	2.5(mA)	
1	±2.5 V DC	1(V)	
	Outside of ±2.5 V DC and within ±10 V DC	4(V)	
2	±25 mV DC	10(mV)	
	Outside of ±25 mV DC and within ±100 mV DC	40(mV)	

If 1 or more is set for the line segment gain of linearization, multiply the input/output accuracy by the value of line segment gain.
Line segment gain (slope) is the maximum value calculated from the following expression.

$$\text{Line segment gain} = \frac{Y_n - Y_{n-1}}{X_n - X_{n-1}}$$

Response speed: 150 ms, 63% response (10 to 90%)
Effect of power supply voltage fluctuations:
  ±0.1% of span or less for the fluctuation within the operating range of each power supply voltage specification.
Effect of ambient temperature change:
  ±0.15% of span or less for a temperature change of 10°C.

■ Power Supply and Isolation

Power supply rated voltage:
  15-40 V DC ⎓ or
  100-240 V AC/DC ∿ 50/60 Hz
Power supply input voltage:
  15-40 V DC ⎓ (±20%) or
  100-240 V AC/DC ∿ (−15, +20%) 50/60 Hz
Power consumption:
  24 V DC 1.7 W, 110 V DC 1.6 W
  100 V AC 3.5 VA, 200 V AC 4.9 VA
Insulation resistance:
  100 MΩ at 500 V DC between input,
  output, power supply, and grounding
  terminals mutually.
Withstand voltage:
  2000 V AC for 1 minute between input,
  output, power supply and grounding
  terminals mutually.

■ Environmental Conditions

Operating temperature range: 0 to 50°C
Operating humidity range: 5 to 90% RH (no conden-
  sation)
Operating conditions: Avoid installation in such
  environments as corrosive gas like sulfide
  hydrogen, dust, sea breeze and direct
  sunlight.
  Installation altitude: 2000 m or less above
  sea level.

■ Mounting and Dimensions

Construction: Plug-in type
Material: Main unit : ABS resin (black), UL94 V-0
  ABS resin + polycarbonate resin (black),
  UL94 V-0
  PBT resin, including glass fiber (black),
  UL94 V-0
  Socket: Modified polyphenylene oxide resin,
  including glass fiber (black), UL94 V-1
Mounting: Wall or DIN rail mounting
Connection: M3.5 screw terminals
External dimensions: 86.5 (H)×51 (W)×123 (D) mm
  (including a socket)
Weight: Main unit: approx. 200 g
  Socket: approx. 60 g

■ Accessories

Spacer: One (for DIN rail mounting)
Range label: One
Receiving resistor: One (for current input)

■ Front Panel

Input/output can be adjusted using the selection
switch and adjustment switch.

Connector for communication
Selection switch
Adjustment switch
Operation indicating lamp: Turns on at power on.
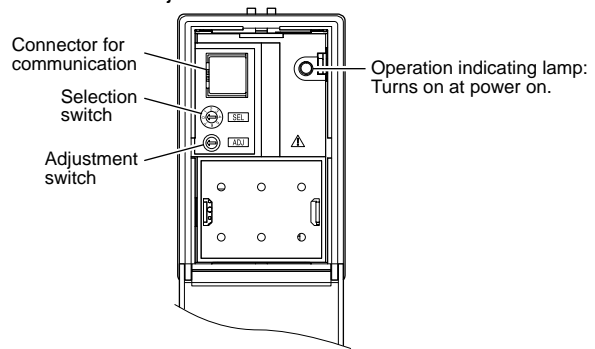
Position of selection switch	Item to be adjusted
0	No function
1	Output zero adjustment
2	Output span adjustment
5	Input zero adjustment
6	Input span adjustment

■ Terminal Assignments
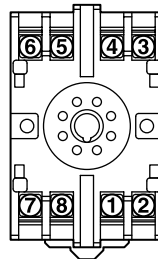
1	OUTPUT	(+)
2	OUTPUT	(−)
3	INPUT	(+)
4	INPUT	(−)
5	N.C.	
6	GND	(GND)
7	SUPPLY	(L+)
8	SUPPLY	(N−)

■ Block Diagrams
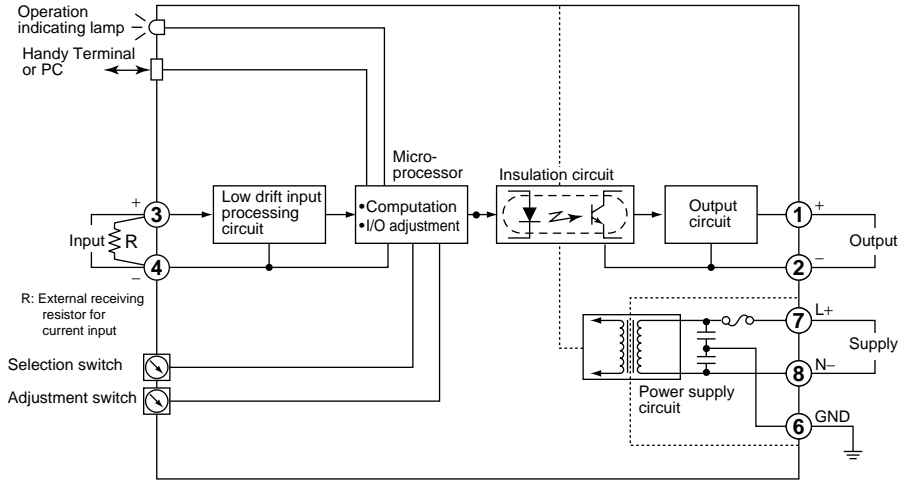
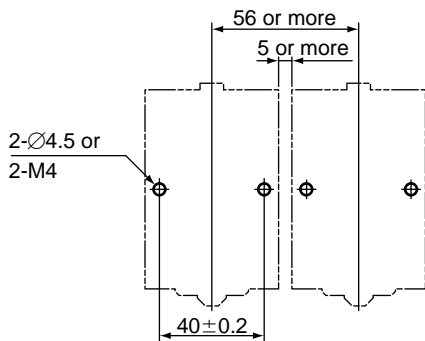

■ External Dimensions

Unit: mm
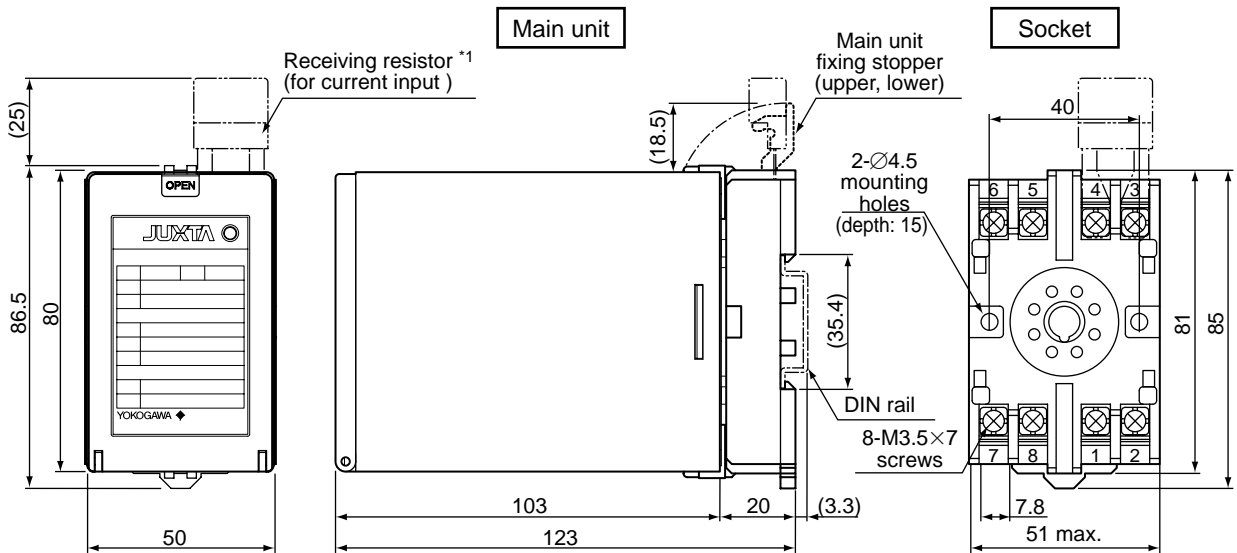
*1: "250 Ω" or "100 Ω" is attached for current input.

<Mounting Dimensions>

Note:
• When mounting the units close together, leave a space of at least 5 mm between them.
• Use the supplied spacer to keep a space of 5 mm for DIN rail mounting.

■ Work Sheet

Model and Suffix Codes [   ]

Number of breakpoints _____

Write at least 2 points for input and output breakpoints data.

Input (%)	Output (%)	Input (%)	Output (%)
X_0	Y_0	X_{16}	Y_{16}
X_1	Y_1	X_{17}	Y_{17}
X_2	Y_2	X_{18}	Y_{18}
X_3	Y_3	X_{19}	Y_{19}
X_4	Y_4	X_{20}	Y_{20}
X_5	Y_5	X_{21}	Y_{21}
X_6	Y_6	X_{22}	Y_{22}
X_7	Y_7	X_{23}	Y_{23}
X_8	Y_8	X_{24}	Y_{24}
X_9	Y_9	X_{25}	Y_{25}
X_{10}	Y_{10}	X_{26}	Y_{26}
X_{11}	Y_{11}	X_{27}	Y_{27}
X_{12}	Y_{12}	X_{28}	Y_{28}
X_{13}	Y_{13}	X_{29}	Y_{29}
X_{14}	Y_{14}	X_{30}	Y_{30}
X_{15}	Y_{15}	X_{31}	Y_{31}

(Specification conditions)
Input conditions: $-6.0\% \leqq X_0 < X_1 < X_2 < \cdots\cdots X_{n-1} < X_n \leqq 106.0\%$
Output conditions: $-6.0\% \leqq (Y_0 \text{ to } Y_n) \leqq 106.0\%$

• The information covered in this document is subject to change without notice for reasons of improvements in quality and/or performance.

GS 77J04H05-01E   1st Edition Jul.19, 2005-00