

General Specifications

GS 77J01H01-01E

Model VJH1
Isolator
(Isolated Single-output and Isolated Dual-output Types)

JUXTA

General

The VJH1 is a compact, plug-in type isolator that converts DC current or DC voltage signals into isolated DC current or DC voltage signals.

- With OOP: VJH1/C (Option code /C)
When the load circuit opens (OOP: output open), input resistance increases rapidly to 48kΩ or more so as to detect the open state through the input device.
- With OOP (HART communication): VJH1/HC (Option code /HC)
In addition to the load circuit open (OOP) detection function, HART communication signals are relayed bidirectionally with the field device and host device isolated.

Model and Suffix Codes

Model VJH1-0 - 0/

Output
1: 1 output
2: 2 outputs

Power supply
6: 100-240 V AC/DC (Operating range: 85 to 264 V)
7: 15-30 V DC (Operating range: 12 to 36 V)

Input signal
A: 4 to 20 mA DC 1: 0 to 10 mV DC
B: 2 to 10 mA DC 2: 0 to 100 mV DC
C: 1 to 5 mA DC 3: 0 to 1 V DC
D: 0 to 20 mA DC 4: 0 to 10 V DC
E: 0 to 16 mA DC 5: 0 to 5 V DC
F: 0 to 10 mA DC 6: 1 to 5 V DC
G: 0 to 1 mA DC 7: -10 to +10 V DC
H: 10 to 50 mA DC
Z: Custom order (DC current/voltage signal)
See Customized Signal Specifications.

Output-1 signal
A: 4 to 20 mA DC 1: 0 to 10 mV DC
B: 2 to 10 mA DC 2: 0 to 100 mV DC
C: 1 to 5 mA DC 3: 0 to 1 V DC
D: 0 to 20 mA DC 4: 0 to 10 V DC
E: 0 to 16 mA DC 5: 0 to 5 V DC
F: 0 to 10 mA DC 6: 1 to 5 V DC
G: 0 to 1 mA DC 7: -10 to +10 V DC
Z: Custom order (DC current/voltage signal)
See Customized Signal Specifications.

Output-2 signal
A: 4 to 20 mA DC 6: 1 to 5 V DC
N: No output-2
Z: Customized voltage/current signal
See Customized Signal Specifications.

Option
/SN: No socket (with socket if not specified)
/C0: Coating ^(*)
/FB: Fuse bypass ^(*)
/C: With OOP ^{(2)(*)}
/HC: With OOP (HART communication) ^{(2)(*)}



- *1: When option code /C0 or /FB is specified, the conformity to the safety and EMC standards is excluded. CE marking is not applicable.
- *2: When the option code /C or /HC is specified, only the input signal code "A" (4 to 20 mA DC) can be specified, and the output-1 signal code can be specified only "A" (4 to 20 mA DC).
- *3: Only output-1 is supported.

Note 1: "/C0" option: Polyurethane coating. The "/C0" option does not guaranteed the coating effect though it is expected that the corrosion resistance for electric circuit is reinforced. And it is not able to submit coating test data.

Note 2: "/FB" option: The primary power supply fuse is deleted, short circuit and ship it.

Ordering Information

- Model and Suffix Code: e.g. VJH1-026-1A60

Input/Output Specifications

Input signal: DC voltage or DC current signal

Input resistance: Attach an external resistor for current input ^{*}.

Input Range	Input Resistance	Input Range	Input Resistance
4 to 20 mA DC	250 Ω	0 to 10 mV DC	1 MΩ during power on
2 to 10 mA DC	500 Ω	0 to 100 mV DC	10 kΩ or more during power off
1 to 5 mA DC	1 kΩ	0 to 1 V DC	
0 to 20 mA DC	250 Ω	0 to 10 V DC	
0 to 16 mA DC	250 Ω	0 to 5 V DC	1 MΩ during power on
0 to 10 mA DC	500 Ω	1 to 5 V DC	800 kΩ or more during power off
0 to 1 mA DC	1 kΩ	-10 to +10 V DC	
10 to 50 mA DC	100 Ω		

^{*} Option code /C and /HC have a built-in receiving resistor.

For option code /C: 250 Ω

For option code /HC: 250Ω equivalent (20mA input: Voltage drop 5V or less)

Allowable input level:

Voltage input: Within ±30 V DC

Current input: Any level that satisfies the following condition,

(Input current)² × Input resistance ≤ 0.5 W

For option codes /C and /HC: 40mA DC or less

Output signal: DC voltage or DC current signal

Output variable range: -6 to 106 % (Both output 1 and output 2)

Allowable load resistance:

Output-1 Range	Allowable Load Resistance	Output-1 Range	Allowable Load Resistance
4 to 20 mA DC	750 Ω maximum	0 to 10 mV DC	250 kΩ minimum
2 to 10 mA DC	1500 Ω maximum	0 to 100 mV DC	250 kΩ minimum
1 to 5 mA DC	3000 Ω maximum	0 to 1 V DC	2 kΩ minimum
0 to 20 mA DC	750 Ω maximum	0 to 10 V DC	10 kΩ minimum
0 to 16 mA DC	900 Ω maximum	0 to 5 V DC	2 kΩ minimum
0 to 10 mA DC	1500 Ω maximum	1 to 5 V DC	2 kΩ minimum
0 to 1 mA DC	15 kΩ maximum	-10 to +10 V DC	10 kΩ minimum
Output-2 Range	Allowable Load Resistance	Output-2 Range	Allowable Load Resistance
4 to 20 mA DC	350 Ω maximum	1 to 5 V DC	2 kΩ minimum

Note: Use HART communication within the allowable load resistance range of the HART communication specifications.

Output resistance: Current output; 500 kΩ or more

Voltage output other than below: 1 Ω or less

0 to 10 mV DC, 0 to 100 mV DC: 100 Ω or less

Zero adjustment: -5 to +5%

Span adjustment: 95 to 105%

■ HART Communication Specifications

Frequency band: 500 Hz to 10 kHz (-6dB range)

500 Hz to 5 kHz (-3dB range)

Allowable load resistance: 230 to 600 Ω

Communication direction: Bi-directional (*)

* HART communication can only be used between the input and Output-1.

Maximum number of connectable HART communication devices: 1

Trademarks: HART is a registered trademark of the FieldComm Group.

■ Standard Performance

Accuracy rating: ±0.1% of span (aside from the ±0.1% accuracy of the external resistor for current input); accuracy is not guaranteed for output levels less than 0.5% of the span of a 0 to X mA output range type.

Response speed: 150 ms, 63% response (10 to 90%)
For option codes /C and /HC: 25 ms, 63% response (10 to 90%)

Effect of power supply voltage fluctuation: Accuracy range or less of span for power supply voltage fluctuation.

Effect of ambient temperature change: ±0.15 % or less of span for change of 10 °C

■ Safety and EMC Standards

CE:

EMC directive

EN 61326-1 Class A Table 2 *1 compliance

EN 61326-2-3 compliance

EN 61000-3-2 compliance

EN 61000-3-3 compliance

EN 55011 Class A Group 1 compliance

Low voltage directive:

EN 61010-1, EN 61010-2-030

Overvoltage category II *2, Pollution degree 2 *3,

Measurement category O (other)

CSA: CAN/CSA C22.2 No. 61010-1

CAN/CSA C22.2 No. 61010-2-030

Overvoltage category II *2, Pollution degree 2 *3,

Measurement category O (other)

UL: UL 61010-1 (CSA NRTL/C)
UL 61010-2-030 (CSA NRTL/C)
Overvoltage category II *2, Pollution degree 2 *3,
Measurement category O (other)

RCM: EN 55011 Class A Group 1 compliance

KC: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

- *1 The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
- *2 Overvoltage category II: Describes a number which defines a transient overvoltage condition. Implies the regulation for impulse withstand voltage. "II" applies to electrical equipment which is supplied from the fixed installation like a distribution board.
- *3 Pollution degree 2: Describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. "2" applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs.

However, if optional code /C0 or /FB is specified, the conformity to the safety and EMC standards is excluded.

■ Environment Standard

EU RoHS directive: EN IEC 63000

(However, when option code /C0 or /FB is specified, CE marking is not applicable because the product does not comply with the Safety and EMC standards.)

■ Power Supply and Isolation

Power supply rated voltage:

100-240 V AC/DC ≈ 50/60 Hz or

15-30 V DC ∴

Power supply input voltage:

100-240 V AC/DC ≈ (-15, +10%) 50/60 Hz or 15-30 V DC ∴ (±20%)

Power consumption:

2.2 W at 24 V DC; 2.1 W at 110 V DC;

4.2 VA at 100 V AC; 6.1 VA at 200 V AC

Insulation resistance: 100 MΩ minimum at 500 V DC between input, output-1, output-2, power supply and grounding terminals mutually

Withstanding voltage: 2000 V AC for one minute between input, (output-1 and output-2), power supply and grounding terminals mutually;

1000 V AC for one minute between output-1 and output-2 terminals

■ Environmental Conditions

Temperature: -10 to 55 °C (45 °C or less for side-by-side close installation*)

* If the previous model (style S3.xx earlier) is installed together, the ambient temperature is 0 to 40°C.

Humidity: 5 to 90 % RH (no condensation)

Ambient Condition: Avoid installation in such environments as corrosive gas like sulfide hydrogen, dust, sea breeze and direct sunlight.

Magnetic field: 400 A/m or less.

Continuous vibration (at 5 to 9 Hz) Half amplitude of 3 mm or less (at 9 to 150 Hz) 4.9 m/s² or less, 1 oct/min for 90 minutes each in the 3-axis directions.

Impact: 98 m/s² or less, 11 msec, 3-axis 3 times each in 6 directions.

Altitude: 2000 m or less.

Installation location: Indoors

Warm-up time: At least 30 minutes after power on.

■ Transport and Storage Conditions

Ambient temperature: -25 to 70 °C

Temperature change rate: 20 °C per hour or less

Ambient humidity: 5 to 95 %RH (no condensation)

■ Mounting and Appearance

Construction: Compact plug-in type

Material: Modified polyphenylene oxide (casing)

Mounting method: Wall, DIN rail or dedicated VJ mounting base (VJCE) mounting

Connection method: M3 screw terminals

External dimensions:

76 (H) × 29.5 (W) × 124.5 (D) mm
(including a socket)

Weight: Main unit: 100 g or less

Socket: 50 g or less

■ Accessories

Tag number label: 1 sheet

Shunt resistor: 1 piece (only when current input is specified*)

Resistance	Part No.	Resistance	Part No.
100 Ω	E9786WD	500 Ω	E9786WF
250 Ω	E9786WE	1 kΩ	E9786WG

* Excluding option codes /C and /HC.

■ Customized Signal Specifications

● Input custom specification

- Customized specifications complying with safety standards, EMC standards, and environmental standards

Input range (DC)	Standard span (DC)	Input resistance
-0.025 to 0.025 V	0.01 V	1 MΩ during power on 10 kΩ or more during power off
-0.125 to 0.125 V	0.04 V	
-1.25 to 1.25 V	0.4 V	
-2.5 to 2.5 V	1 V	1 MΩ during power on 800 kΩ or more during power off
-12.5 to 12.5 V	4 V	
-25 to 25 V	8 V	
-0.1 to 0.1 mA	0.04 mA	1 kΩ
-1 to 1 mA	0.4 mA	
-5 to 5 mA	4 mA	
-10 to 10 mA	8 mA	500 Ω
-20 to 20 mA ^{*1}	16 mA	250 Ω
-50 to 50 mA ^{*2}	40 mA	100 Ω

*1 The following can not be produced.

Input range (DC)	Input span (DC)
-20 to -16.8 mA	3.2 mA or less
16.8 to 20 mA	

*2 The following can not be produced.

Input range (DC)	Input span (DC)
-50 to -30 mA	20 mA or less
30 to 50 mA	

Accuracy rating: ±0.1% of span^{*5}

- Customized specifications that do not comply with safety standards, EMC standards, and environmental standards

Input range (DC)	Standard span (DC)	Input resistance
-100 to 100 V	40 V	1 MΩ during power on 800 kΩ or more during power off
-200 to 200 V	80 V	
-300 to 300 V	120 V	
-70 to 70 mA ^{*3}	80 mA	50 Ω
-150 to 150 mA ^{*4}	100 mA	10 Ω

*3 The following can not be produced.

Input range (DC)	Input span (DC)
-70 to -42 mA	28 mA or less
42 to 70 mA	

*4 The following can not be produced.

Input range (DC)	Input span (DC)
-150 to -90 mA	60 mA or less
90 to 150 mA	

Accuracy rating: ±0.1% of span^{*5}

*5 Accuracy restrictions

When the input span is less than the standard span, the accuracy calculated by the following formula is applied.

$$\text{Accuracy rating (\%)} = \pm 0.1\% \times \frac{\text{Standard span}}{\text{Input span}}$$

Other restrictions

- The input span is 1/10 or more of the standard span

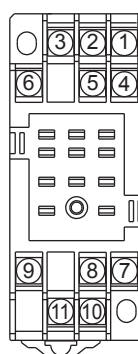
● Output custom specification

	Current Signal	Voltage Signal
Output range (DC)	0 to 24 mA	-10 to +10 V
Span (DC)	1 to 24 mA	10 mV to 20 V
Zero elevation	0 to 200%	-100 to +200%

Note: Customized specifications for the output-1 signal within 0 to 20 mA DC or within -10 to +10 V DC comply with safety standards, EMC standards, and environmental standards.

- The above note is limited to the standard specification of output-2.
- Other customized specifications do not conform to these standards.

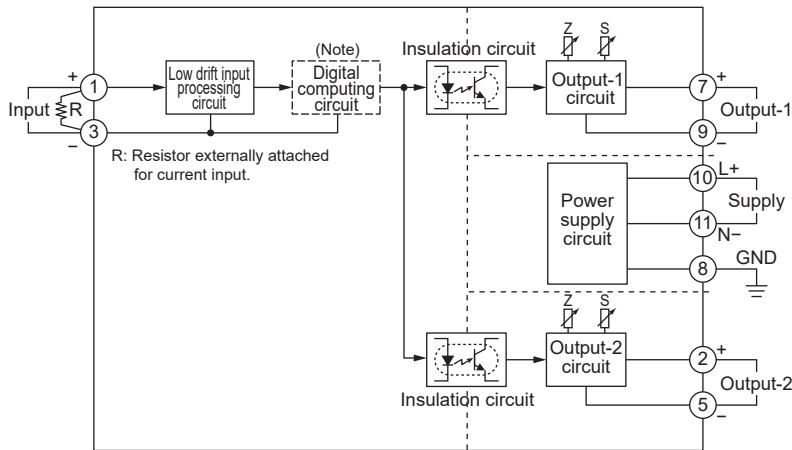
■ Terminal Assignments



1	Input	(+)
2	Output-2	(+)
3	Input	(-)
4	Do not use	
5	Output-2	(-)
6	Do not use	
7	Output-1	(+)
8	GND	
9	Output-1	(-)
10	Supply	(L+)
11	Supply	(N-)

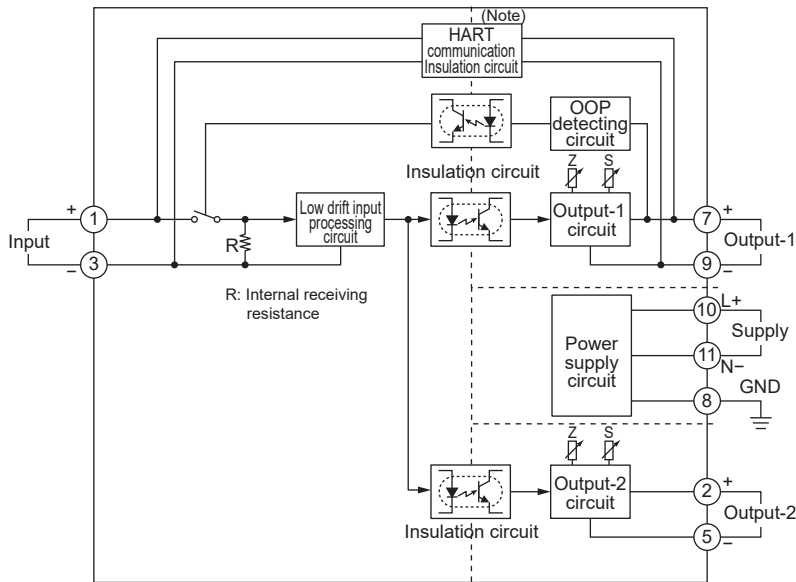
Do not use output-2 for the single-output type.

■ Block Diagram



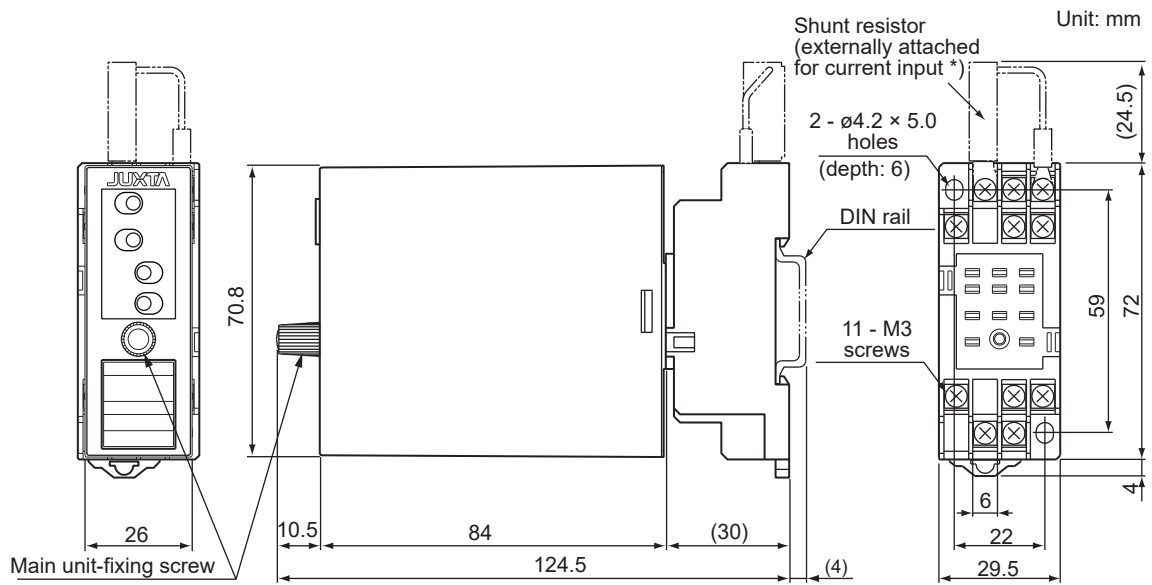
Note: Digital computing circuit is added for the input/output suffix codes other than "A" and "6".

For option codes /C and /HC



Note: The HART communication isolation circuit is added when the option code / HC is specified.

External Dimensions



* Excluding option codes /C and /HC.