General Specifications

Model VJH7
Isolator (Multi-function)
(Isolated Single-output and Isolated Dual-output Types)

■ Overview
This plug-in type isolator converts DC current or DC voltage signal into isolated DC current or DC voltage signal.
- DC voltage signal, communication output (RS485), or alarm output (2 relay contacts) is selectable as output-2.
- Incorporation of microcomputer allows I/O adjustment, I/O monitoring, and loopback test output through PC-based Parameters Setting Tool (VJ77 sold separately) or Handy Terminal (JHT200 sold separately).

■ Model and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Output</th>
<th>Power Supply</th>
<th>Input Signal</th>
<th>Output-1 Signal</th>
<th>Output-2 Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>VJH7-0</td>
<td>1 output</td>
<td>6: 100-240 V AC/DC (Operating range: 85 to 264 V)</td>
<td>A: 0 to 50 mA DC, span is 5 mA or more</td>
<td>A: 4 to 20 mA DC</td>
<td>A: 4 to 20 mA DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7: 15-30 V DC (Operating range: 12 to 36 V)</td>
<td>1: -10 to +10 V DC, span is 0.1 V or more</td>
<td>6: 1 to 5 V DC</td>
<td>6: 1 to 5 V DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Z: (Custom Order) DC current/voltage signal</td>
<td>P: Communication function (RS485)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T: Alarm output (2 relay contacts)</td>
<td>T: Alarm output (2 relay contacts)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N: No output-2</td>
<td>N: No output-2</td>
</tr>
<tr>
<td>Options</td>
<td>/SN: No socket (with socket if not specified)</td>
<td>/CO: HumiSeal coating*1</td>
<td>/CO: HumiSeal coating*1</td>
<td>/FB: Fuse bypass*1</td>
<td>/FB: Fuse bypass*1</td>
</tr>
</tbody>
</table>

*1. When option code /CO or /FB is specified, the conformity to the safety and EMC standards is excluded. CE marking is not applicable.

(Not 1) "/CO" option: Polyurethane coating. The "/CO" (HumiSeal coating) 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.

(Not 2) "/FB" option: The primary power supply fuse is deleted, short circuit and ship it.

■ Factory Default Settings
Factory settings are as follows:
To change the set value, a PC-based Parameter Setting Tool (VJ77) or Handy Terminal (JHT200) is required.
- Software filter: OFF
- Output operating direction: Direct

- When output-2 is specified as communication output
  - Address No.: 01
  - Communication rate: 9600 bps
  - Parity: Even
  - Data length: 8 bit
  - Stop bit: 1 bit
  - Protocol: PCLINK

- When output-2 is specified as alarm output
  - Alarm operating direction: High limit alarm (alarm-1), low limit alarm (alarm-2)
  - Relay operating direction: Energized under alarm condition (alarm-1 / 2)
  - Alarm setting: 100 % (alarm-1), 0 % (alarm-2)
  - Hysteresis: 3 % (alarm-1 / 2)
  - Alarm on-delay: 0 second (alarm-1 / 2)
  - Alarm off-delay: 0 second (alarm-1 / 2)

■ Input Specifications
Input Signal: DC current/voltage signal
Input Range:
- Code A : 0 to +50 mA DC, span is 5 mA or more
- Code 1 : -10 to +10 V DC, span is 0.1 V or more
Input Resistance:
- DC current signal: 100 Ω (External shunt resistor) (standard accessory)
- DC voltage signal: 1 MΩ (100 kΩ when power off)
Maximum allowable input:
- Voltage input: ± 30V DC or less
- Current input: Any level that satisfies the following condition.
  (Input current)^2 x Input resistance ≤ 0.5W
Input adjustment range: ±1% of span or more (Zero/Span)
Software filter: OFF, Low, Middle, High (default value: OFF)
When Low, Middle, or High is selected, a first-order filter equivalent to 100 ms, 300 ms, or 1 s is inserted in the input.

■ Ordering Information
Shipped after setting the input ranges as specified.
- Model and suffix code: e.g. VJH7-026-AAA0
- Input range (required item): e.g. 4 to 20 mA DC
## Output Specifications

### 1. Output-1

<table>
<thead>
<tr>
<th>Output Signal</th>
<th>Output Resistance</th>
<th>Permissible Load Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5 V DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>4 to 20 mA DC</td>
<td>500 kΩ or more</td>
<td>750 Ω or less</td>
</tr>
</tbody>
</table>

- **Custom Order Output Signal**
  2 to 10 mA DC, 1 to 5 mA DC, 0 to 20 mA DC,
  0 to 16 mA DC, 0 to 10 mA DC, 0 to 1 mA DC,
  0 to 10 mV DC, 0 to 100 mV DC, 0 to 1 V DC,
  0 to 10 V DC, 0 to 5 V DC, -10 to +10 V DC

### 2. Output -2

- **Analog Output**

<table>
<thead>
<tr>
<th>Output Signal</th>
<th>Output Resistance</th>
<th>Permissible Load Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5 V DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>4 to 20 mA DC</td>
<td>500 kΩ or more</td>
<td>350 Ω or less</td>
</tr>
</tbody>
</table>

Output variable range: -6 to 106 % (Output 1 and output 2)
Output adjustment: ±10 % (Zero/Span) (Output 1 and output 2)

### Communication Function

This isolator can be connected to a personal computer, graphic panel, YOKOGAWA programmable controller FA-M3, or programmable controllers of other manufacturers.

- Standards: EIA RS485
- Maximum number of connectable controllers: 31 controllers
- Maximum communication distance: 1200 m
- Communication method: 2-wire half duplex, start-stop synchronization, non-procedural
- Communication rate: 1200, 2400, 4800, 9600, 19200, or 38400 bps
- Data length: 8, 7 bit
- Stop bit: 1, 2 bit
- Parity: Even parity, odd parity, or none
- Communication protocol: PC-link, PC-link with SUM, MODBUS ASCII, MODBUS RTU, or LADDER
- PC-link communication: Communication protocol with a personal computer, graphic panel, UT link module of FA-M3
- MODBUS communication: Communication protocol with a personal computer (SCADA)
- Ladder communication: Communication protocol with ladder communication module of FA-M3 and programmable controller of other manufacturers

### Alarm Output

- **Signal type:** Relay contact
- **Output signal:** N. O. contact output (contact ON at excitation) 2 points, COM common
- **Contact capacity:** 30 V DC, 1 A
- **Alarm operating direction:** High limit alarm or low limit alarm
- **Relay operating direction setting:** Energized or de-energized under normal condition
- **Alarm setting range:** 0 to 100 % of input range
- **Setting resolution:** 0.1 %
- **Hysteresis:** Set the value added to alarm setting point at alarm release.
  - Setting range: 0 to 100 % of input range
  - Setting resolution: 0.1 %
- **Alarm on-delay setting:** Delay time from alarm condition completion to output
  (Ex. Outputted when alarm status continues for 1 second or more after input value is over alarm point in case of set value “1 second.”)
  - Setting range: 0 to 999 seconds
  - Setting resolution: 1 second (however, add about 0.2 seconds to setting time to prevent wrong operation)
- **Alarm off-delay setting:** Delay time from alarm normal condition completion to output
  (Ex. Released when normal status continues for 2 seconds or more after input value becomes normal status from alarm status in case of set value “2 seconds.”)
  - Setting range: 0 to 999 seconds
  - Setting resolution: 1 second (however, add about 0.2 seconds to setting time to prevent wrong operation)
- **Alarm operation display:** Front LED lights at excitation, 2 LEDs

### Items Available to Be Set

The following items can be set through PC-based Parameters Setting Tool (VJ77) or Handy Terminal (JHT200):

- **Input type**, **Input range**, **address number**, **communication rate**, **parity**, **data length**, **stop bit**, **protocol**, **alarm operating direction**, **relay operating direction**, **alarm setting**, **Hysteresis**, **alarm on-delay**, **alarm off-delay**, **I/O adjustment**, **output operating direction**, **software filter**

### 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.
- **Input range** is -10 to +10 V, span is under 4 V;
  - Accuracy (%) = ± 0.1 % x 4 V / input span [V]
- **Input range** is -2.5 to +2.5 V, span is under 1 V;
  - Accuracy (%) = ± 0.1 % x 1 V / input span [V]
When current input, apply [input range x input resistance] to the above, and add 0.1% of resistance error.

Response Speed: 150 ms, 63% response (10 to 90%)
- Alarm output: 350 ms (input change 10 to 90%, alarm setting point 50%, time till alarm output, when alarm delay setting and hysteresis are min.)
- If the software filter is on, add the following to the value above: Low: 100 ms, Middle: 300 ms, High: 1 s.

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

CSA: CSA 22.2 No. 61010-1, installation category II*, pollution degree 2**, and CSA C22.2 No. 61010-2-030
UL: UL61010-1, UL 61010-2-030 (CSA NRTL/C)
CE:
- EMC directive:
  - EN 61326-1 compliance, Class A Table 2***
  - EN 61326-2-3 compliance
  - EN 61000-3-2 compliance
  - EN 61000-3-3 compliance
  - EN 55011 Class A Group 1
- Low voltage directive:
  - EN 61010-1, EN 61010-2-030
  - Installation category II*
  - Pollution degree 2**
  - Measurement category O (other)
- EMC Regulatory Arrangement in Australia and New Zealand (RCM): EN 55011 Class A, Group 1
- KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

* Installation category (overvoltage category) II: Describes a number which defines a transient overvoltage condition. Applies the regulation for impulse withstand voltage.
  - “II” applies to electrical equipment which is supplied from the fixed installation like a distribution board.

** 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.

*** The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.

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

■ Environment Standard

RoHS Directive: EN 50581
(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 to 240 V AC/DC ≈ 50/60 Hz
- 15 to 30 V DC ≈

Power Supply Input Voltage:
- 100 to 240 V AC/DC (-15, +10%) 50/60 Hz
- 15 to 30 V DC (±20%)

Power Dissipation:
- 24 V DC 2.5 W
- 100 V AC 5 VA
- 200 V AC 6.7 VA

Insulation Resistance: 100 M/500 V DC between input, output-1, output-2, power supply and ground mutually

Withstand Voltage: 2000 V AC / minute between input, output-1, output-2, power supply, and ground mutually.

Ambient Condition: 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.

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.

Ambient: 2000 m or less.

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

■ Environmental Conditions

Temperature: -10 to 55 °C (40 °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.

Installation altitude 2000m or less above sea level.

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.

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 Dimensions

Construction: Compact plug-in type

Material: Modified Polyphenylene Oxide (Case body)

Mounting Method: Wall, DIN rail, or dedicated VJ mounting base mountings

Connection Method: M3 screw terminal

External Dimension: 29.5x76x124.5mm (WxHxD)

Weight:
- Main unit: 100 g or less
- Socket: 50 g or less
■ Standard Accessories
Tag Number Label: 1 sheet
Range Label: 1 sheet
Shunt Resistor: 1 (only when current input is specified)

■ Terminal Arrangement

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Signal</th>
<th>Output-2 Analog output</th>
<th>Output-2 Communication output</th>
<th>Output-2 Alarm output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input</td>
<td>(+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Output-2</td>
<td>(+)</td>
<td>B (+)</td>
<td>ALM1</td>
</tr>
<tr>
<td>3</td>
<td>Input</td>
<td>(-)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Input</td>
<td>N.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Output-2</td>
<td>(-)</td>
<td>A (-)</td>
<td>COM</td>
</tr>
<tr>
<td>6</td>
<td>Output-2</td>
<td>N.C.</td>
<td>COM</td>
<td>ALM2</td>
</tr>
<tr>
<td>7</td>
<td>Output-1</td>
<td>(+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Output-1</td>
<td>(-)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Supply</td>
<td>L+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Supply</td>
<td>N-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: In case of one output type, output-2 is N.C.

■ Block Diagram

- When output-2 is analog output

- When output-2 is communication output

- When output-2 is alarm output
### External Dimensions

- **Unit:** mm

- **Dimensions:**
  - Length: 124.5 mm
  - Width: 84 mm
  - Height: 70.8 mm

- **Features:**
  - Shunt resistor (at current input)
  - Connector for Handy Terminal
  - 2×ø4.5x5 Small oval hole
  - 11-M3 screw

Note 2: Only when output-2 is alarm output.