General Specifications

This plug-in type pulse to analog converter receives contact pulse, voltage pulse, or current pulse from the field and converts the signal into isolated DC current or voltage signals.

- Output-2 can be selected from DC voltage signal, DC current signal, communication function (RS-485), or alarm output (2 relay contacts).
- Various parameters such as input range can be set and modified using a PC (VJ77) or Handy Terminal (JHT200 and the like).
- A pulse integration function that converts integrated flow value (average pulse frequency) through specified sampling time into analog signals is provided.

Model and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Output-1</th>
<th>Output-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: 4 to 20 mA DC</td>
<td>1: 0 to 10 mA DC</td>
<td>2: 5 to 10 mA DC</td>
</tr>
<tr>
<td>B: 2 to 10 mA DC</td>
<td>2: 0 to 100 mA DC</td>
<td>6: 1 to 5 V DC</td>
</tr>
<tr>
<td>C: 1 to 5 mA DC</td>
<td>3: 0 to 1 V DC</td>
<td></td>
</tr>
<tr>
<td>D: 0 to 20 mA DC</td>
<td>4: 0 to 10 V DC</td>
<td></td>
</tr>
<tr>
<td>E: 0 to 16 mA DC</td>
<td>5: 0 to 5 V DC</td>
<td></td>
</tr>
<tr>
<td>F: 0 to 10 mA DC</td>
<td>6: 1 to 5 V DC</td>
<td></td>
</tr>
<tr>
<td>G: 0 to 1 mA DC</td>
<td>7: 0 to +10 V DC</td>
<td></td>
</tr>
<tr>
<td>Z (Custom Order): DC current/voltage signal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Non-voltage contact
  - ON input: Contact resistance of 200 Ω or less
  - OFF input: Contact resistance of 100 Ω or more

- Voltage pulse: Current pulse

- High level (OFF input): 2 to 50 V DC
  - (2V/RL) to (50V/RL) mA DC

- Low level (ON input): –1 to +8 V DC
  - (–1V/RL) to (8V/RL) mA DC

- Pulse width: 2 to 50 V DC
  - (2V/RL) to (50V/RL) mA DC

Maximum permissible input voltage: 58 V DC or less

Maximum permissible input current

<table>
<thead>
<tr>
<th>External shunt resistance [Ω]</th>
<th>Permissible input current [mA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>220</td>
<td>40</td>
</tr>
<tr>
<td>510</td>
<td>25</td>
</tr>
<tr>
<td>1000</td>
<td>20</td>
</tr>
<tr>
<td>2200</td>
<td>12</td>
</tr>
</tbody>
</table>

Note1: Transmitter power supply use. Permissible input current is 30mA maximum.

Lowcut point: 0.01 Hz to 100% of input frequency

Input resistance:
- Contact or voltage pulse: 15 kΩ or more
- Current pulse; external shunt resistor of selected options code

Minimum input pulse width:
- 30 µs for less than 10 kHz of input frequency
- 30% of pulse interval for 10 kHz or more of input frequency

Contact input signal rated supply: 15 V DC/15 mA or more
Input filter: Approx. 10ms of time constant
On setting: input frequency is 100Hz less
(input pulse width is 3ms or more.)
On/off can be set by communication
function
Transmitter power supply: 12 V DC±10% (4 to 30 mA output) or 24 V DC±10% (4 to 30 mA output)
(with current limit circuit at 50 mA )
Pulse count point: Turning point from Off input to On input
Input conversion mode: Can be selected from F/V conversion or pulse integration
F/V conversion: Converts 0 to 100% of frequency inputs into 0 to 100% analog outputs
Pulse integration: Calculates average frequency from integrated pulse counts for preset sampling time, then converts 0 to 100% of frequency inputs into 0 to 100% analog outputs
Sampling mode: Can be selected from AUTO or MANUAL
Sampling time: 0.1 to 100 sec in increments of 0.1 sec
However in AUTO mode, sampling time is not preset, but is forcibly determined as follows:
0.1 sec when \( F_{100} \) is 1 kHz or more; \( \frac{1}{F_{100}} \times 100 \) sec when \( F_{100} \) is more than 1 Hz and less than 1 kHz; and 100 sec when \( F_{100} \) is 1 Hz or less. Where \( F_{100} \) is 100% of input frequency.
Output response: Sampling time + 100 ms

### Output

1. **Output-1**

<table>
<thead>
<tr>
<th>Output Signal</th>
<th>Output Resistance</th>
<th>Permissible Load Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 20 mA DC</td>
<td>500 kΩ or more</td>
<td>750 Ω or less</td>
</tr>
<tr>
<td>2 to 10 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>1 to 5 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>0 to 20 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>0 to 10 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>0 to 5 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>0 to 10 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>0 to 10 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>0 to 5 mA DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
<tr>
<td>−10 to +10 V DC</td>
<td>1 Ω or less</td>
<td>2 kΩ or more</td>
</tr>
</tbody>
</table>

2. **Output -2**

<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>

- **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: Excitation or non-excitation at normal status
  - Alarm setting range: 0 to 100% of input range
  - Setting resolution: 0.1%, 4 significant digits
  - Hysteresis setting range: 0 to 100% of input range
  - Setting resolution: 0.1%, 4 significant digits
  - 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 second 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 comes back to 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 second to setting time to prevent wrong operation)
  - Alarm operation display: Front LED lights at alarm, 2 LEDs

- **Zero and Span adjustment:**
  - Output Zero adjustment: ±5%
  - Output Span adjustment: ±10% of Span
  - Output Span adjustment: ±5% of Span
    (Output-1 Signal; −10 to +10 V DC)

- **Communication Function**
  - This transmitter can be connected to a PC, graphic panel, YOKOGAWA programmable controller FA-M3, or programmable controllers of other manufacturers.
**Items Available to Be Set**

The following items can be set via a PC (VJ77 PC-based parameters setting tool) or Handy Terminal (JHT200 and the like):

- Conversion mode, range units, input frequency, lowcut points, input filter, sampling mode, sampling time, address number, baud rate, parity, data length, stop bit, protocol, alarm operating direction, relay operating direction, alarm setting, hysteresis, alarm on-delay and alarm off-delay

**Standard Performance**

- Accuracy rating: ±0.1% of span
- However, accuracy is not guaranteed for output level less than 0.5% of the span of a 0 to X mA output range type. Accuracy is limited when $F_0/F_{100}$ is 50% or more.

  \[
  \text{Accuracy (\%)} = \left(\frac{F_{100}}{F_0} - 1\right) \times 0.1
  \]

  - $F_0$: 0% input frequency
  - $F_{100}$: 100% input frequency

- Response speed: 2 intervals of input pulse + 100 ms (63% response (10% to 90%) when in F/V conversion mode)

- Effect of power supply voltage fluctuation: ±0.1% or less of span for power supply voltage fluctuation of 85 to 264 V AC (47 to 63 Hz)/DC and 12 to 36 V DC

- Effect of ambient temperature change: ±0.2% or less of span for change of 10 °C

**Safety and EMC Standards**

- CSA: CAN/CSA C22.2 No.61010-1
- UL: UL 61010-1
- RCM: EN 55011 Class A Group 1 compliance
- KC: Modified Polyphenylene Oxide (Case body)

- Construction: Compact plug-in type
- Material: Modified Polyphenylene Oxide (Case body)
- Mounting: Wall, DIN rail, or dedicated VJ mounting base mountings (only when output-2 is analog output.)
- Connection: M3 screw terminal
- External Dimension: 29.5X76X124.5mm (WxHxD)
- Weight: Approx. 170 g

**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:

<table>
<thead>
<tr>
<th>Type</th>
<th>Voltage</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>one-output type</td>
<td>24 V DC</td>
<td>3.3 W</td>
</tr>
<tr>
<td></td>
<td>110 V DC</td>
<td>3.3 W</td>
</tr>
<tr>
<td></td>
<td>100 V AC</td>
<td>6.2 VA</td>
</tr>
<tr>
<td></td>
<td>200 V AC</td>
<td>8.1 VA</td>
</tr>
<tr>
<td>two-output type</td>
<td>24 V DC</td>
<td>4.1 W</td>
</tr>
<tr>
<td></td>
<td>110 V DC</td>
<td>4.1 W</td>
</tr>
<tr>
<td></td>
<td>100 V AC</td>
<td>7.0 VA</td>
</tr>
<tr>
<td></td>
<td>200 V AC</td>
<td>9.0 VA</td>
</tr>
</tbody>
</table>

**Environmental Conditions**

- Temperature: 0 to 50 °C (0 to 40°C when 2 current-output is selected and side-by-side close installation.)
- Humidity: 5 to 90% RH (no condensation)
- Ambient Condition: Avoid installation in such environments as corrosive gas like hydrogen sulfide, dust, sea breeze and direct sunlight.
- Altitude: 2000 m or less.
- Installation location: Indoors

**Mounting and Appearance**

- Construction: Compact plug-in type
- Material: Modified Polyphenylene Oxide (Case body)
- Connection Method: M3 screw terminal
- External Dimension: 29.5x76x124.5mm (WxHxD)
- Weight: Approx. 170 g

**Standard Accessories**

- Tag number label: 1
- Range label: 1
- Shunt resistor: 1 (when optional code shunt resistor is specified)

**Items to Specify When Ordering**

The conversion mode, range units, input frequency, lowcut point, input filter on/off setting, sampling mode and sampling time are set as specified before shipment.

- Model and suffix codes: e.g. VJQ8-026-1AA0
- Conversion mode: e.g. F/V conversion
- Input frequency: e.g. 0 to 10 Hz
- Low cut point (Hz): e.g. 0.01
- Input filter: e.g. OFF
- When specifying F/V conversion, the specifications of sample mode, sample time are unnecessary.
Factory Setting

Factory settings are as follows:
- Conversion mode: F/V conversion
- Input frequency: 0 to 10 Hz
- Low cut point (Hz): 0.01
- Input filter: Off
- Sampling mode: AUTO
- Sample time: 10
- **When output-2 is specified as communication output**
  - Address No.: 01
  - Baud rate: 9600 bps
  - Parity: Even
  - Data length: 8 bits
  - Stop bit: 1 bits
  - 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: Excitation at alarm (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)

Timing Chart of Pulse Integration Operation

This timing chart shows an example of the integration operation where input frequency is 0 to 10 Hz and sampling time is 2 sec.

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>(PS+)</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>(‐)</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>Not connected</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>(‐)</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>Power supply</td>
<td>(+)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 2: With the one-output type, terminals for Output-2 are not connected.
**Block Diagram**

- When receiving current pulse by running a transmitter on an internal power supply
- When receiving voltage pulse by running a transmitter on an internal power supply
- When receiving non-voltage contact signal or voltage pulse (Where, terminal 3 is the positive input (+) and terminal 4 is the negative (–) for voltage pulse)
- When output-2 is communication output
- When output-2 is alarm output

**External Dimensions**

- 2-4 2 x 5 holes
- 11-M3 screw
- DIN rail

- Unit: mm

**Note 3:** Only when output-2 is alarm output.