Introduction
The Frequency Conversion Module (J-SFP90) is a signal conversion module housed in a single case and accepts a pulse signal from the pulse transmitters such as PD meter, turbine meter, or rotary encoder and converts it into 1 to 5V DC or 4 to 20 mA DC signal.
Function setting changes on the Frequency Conversion Module are easily done with the dedicated Loader Software, which operates on a general-purpose PC.

Specification
- Input signal: Input signal is set by open/short between terminal Nos. 1 and 3. Voltage pulse (A proximity or a photoelectric switch is used.)
  - Pulse frequency: Input range 0.01 HzFS to 100 kHzFS
  - Pulse voltage: High level [1]: 5 to 30V, Low level [0]: -30 to 1.5V
  - Input impedance: 20 kΩ or more
- Dry contact pulse (A dry contact or open collector is used.)
  - Pulse frequency: 0.01 HzFS to 100 kHzFS (Limited by frequencies used at the pulse generation source.)
  - Contact rating: 5V or more during OFF, 1 mA during ON
- Input frequency division setting:
  - 1/1 to 1/64 (When the rated frequency after input frequency division is 100 Hz or less)
- Input filtering: With/without
  - Provided by default when 100 Hz or less of pulse frequency for chattering prevention during a low frequency input is set. When with filtering Minimum pulse width: 3 msec or more
- Low-level cut: 0.1% to 100.0% or none
  - Setting of a frequency so that an input is considered as 0.
- Output signal: 1 to 5V DC or 4 to 20 mA DC
- Output impedance:
  - Voltage output; 250 Ω or less, Current output; 250 kΩ or more
  - Allowable load resistance: 0 to 600 Ω (current output)
- Linearizer function: 101 linearization points
- First-order lag filtering: 0.0 to 5.0 seconds (0 to 90%)
- Predictive arithmetic function:
  - When an input signal stops, outputs are reduced consecutively to prevent a sudden reduction.
- Response time:

<table>
<thead>
<tr>
<th>Measurement frequency</th>
<th>Response time (0 to 90%)</th>
<th>Low-level cut default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01 HzFS to 50 HzFS</td>
<td>input pulse interval + 100 ms</td>
<td>1% of rating</td>
</tr>
<tr>
<td>51 Hz to 100 HzFS</td>
<td>input pulse interval + 100 ms</td>
<td>2.5 Hz</td>
</tr>
<tr>
<td>101 HzFS to 200 HzFS</td>
<td>input pulse interval + 100 ms</td>
<td>5 Hz</td>
</tr>
<tr>
<td>201 Hz to 500 HzFS</td>
<td>100 ms</td>
<td>10 Hz</td>
</tr>
<tr>
<td>501 HzFS to 100 kHzFS</td>
<td>100 ms</td>
<td>25 Hz</td>
</tr>
</tbody>
</table>
- Output update interval: 5 msec
  - (Output hardware filtering, 0 to 90% response, 50 msec)
- Accuracy:
  - When a 0% input frequency is 0 Hz or the span width is 50% or more of the full scale

<table>
<thead>
<tr>
<th>Full-scale input frequency</th>
<th>Input accuracy % of input span</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01 HzFS to 100 kHzFS</td>
<td>±0.2%</td>
</tr>
</tbody>
</table>

When a 0% input frequency is greater than 0 Hz and the span width is 50% or less

- Insulation resistance: 500V DC, 100 MΩ min.
  - Mutual between input - output - GND - power terminal
- Withstand voltage: 1000V AC, 1 minute
  - Mutual between input - output - GND - power terminal
- Power supply: 24V DC ±10 %
- Current consumption: 200 mA or less (at 24V)
- Ambient temperature:
  - Normal operating condition: 5 to 45°C
  - Operation limit: 0 to 50°C
  - Ambient humidity: 0 to 90%RH (No condensation allowed)
  - Mounting: Panel, wall, DIN rail attachment
  - Color of front mask: Black
  - Weight: 400 g
- Operating influence:
  - Supply voltage effect: ±0.1%FS/24V DC ±15 %
  - Temperature effect: ±0.15%FS/10°C
- Loader settings:
  - Module ID: 16 one-byte characters, 8 two-byte kanji characters
  - Input scaling setting; Frequency zero span setting within the input range (Setting of an input such as 0, 100% at each input)
  - Set at 0 and a value within the range 0.01 Hz to 100 kHz.
  - Linearization table; 101 points
  - Input filtering: Unavailable/available (Moving averaging)
  - Output low level cut; Without/with (Low-level cut frequency is variable: 0.001 Hz to 100%)
  - Setting of input frequency division; Settable to 1/1 to 1/64 when the frequency after input frequency division is 100 Hz or less
  - Output zero span adjustment; Settable to any value within the output range (-20 to +120%FS) (The span width is inversely proportional to the accuracy.)
  - First-order lag filtering; Settable within the range 0.0 to 5.0 sec (63% response) or none (Set to "0.1 sec" by default)
Figure 1. Functional block diagram of frequency conversion module

Model Number Table

<table>
<thead>
<tr>
<th>Basic model number</th>
<th>Selections</th>
<th>Additions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-SFP90</td>
<td>I</td>
<td>II</td>
<td>I</td>
</tr>
<tr>
<td>X</td>
<td>No varnish coated</td>
<td></td>
<td>Frequency Conversion Module</td>
</tr>
<tr>
<td>C</td>
<td>Varnish coated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0</td>
<td></td>
<td>Input: Voltage pulse or dry contact pulse</td>
</tr>
<tr>
<td>1</td>
<td>Output: 1 to 5V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Output: 4 to 20 mA DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0</td>
<td></td>
<td>Without test report</td>
</tr>
<tr>
<td></td>
<td>-1</td>
<td></td>
<td>With test report</td>
</tr>
</tbody>
</table>

Example: J- SFP90X-02-0
An open between terminal Nos. 1 and 3 can set the voltage pulse, and a short can set the dry contact pulse input.

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Input range</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>0 to 10 Hz</td>
</tr>
<tr>
<td>02</td>
<td>0 to 20 Hz</td>
</tr>
<tr>
<td>03</td>
<td>0 to 50 Hz</td>
</tr>
<tr>
<td>04</td>
<td>0 to 100 Hz</td>
</tr>
<tr>
<td>05</td>
<td>0 to 200 Hz</td>
</tr>
<tr>
<td>06</td>
<td>0 to 500 Hz</td>
</tr>
<tr>
<td>07</td>
<td>0 to 1 kHz</td>
</tr>
<tr>
<td>08</td>
<td>0 to 5 kHz</td>
</tr>
<tr>
<td>09</td>
<td>0 to 10 kHz</td>
</tr>
</tbody>
</table>

Figure 2. Dimensions and wiring diagram
Panel-mounting

Panel-cutout

DIN rail mounting

Wall-mounting

Single mounting

Multi-mounting

(n: number of modules mounted)

2-M4 screws

(2-M4 screws (for number of modules))

L-type mounting brackets
(2, top and bottom) (standard accessory)

Figure 3. Mounting method

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