General Specifications

GS 77J01Q08-01E

Model VJQ8
Pulse to Analog Converter (Multi-function)
(Isolated Single-output and Isolated Dual-output Types)

JUXTA

■ General

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

VJQ8-0□□-□□□0/□

Model

Output
1: 1 output
2: 2 outputs

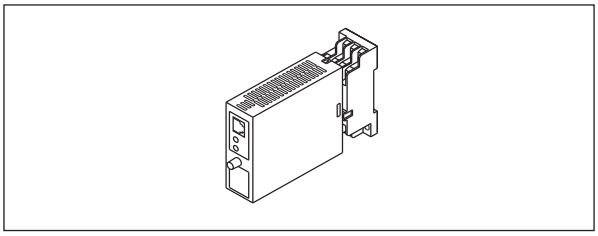
Power Supply
6: 100 to 240 V AC/DC ≃ (–15, +10%) 50/60 Hz
7: 15 to 30 V DC ⎓ (±20%)

Transmitter Power Supply
1: 12 V DC±10%
2: 24 V DC±10%

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

Output-2
A: 4 to 20 mA DC
6: 1 to 5 V DC
P: Communication function (RS-485)
T: High/low limit alarm output (2 relay contacts)
N: No Output-2

Options
/SN: Without socket
Blank: With socket
/R100: With 100 Ohm shunt resistor
/R220: With 220 Ohm shunt resistor
/R510: With 510 Ohm shunt resistor
/R1000: With 1000 Ohm shunt resistor
/R2200: With 2200 Ohm shunt resistor
(Specify when current pulse input)



■ Input

Input signal: 2-wire type ON/OFF contact, voltage pulse, current pulse (transmitter power supply available) or 3-wire type voltage pulse (transmitter power supply available).

Input frequency: 0.1 Hz≤ F_{100}≤ 100 kHz and
0 Hz ≤ F_0 ≤ F_{100}
Where F_0 is 0% of and F_{100} is 100% of input frequency.
F can be set in increments of 0.00001 (Hz or kHz) within 4 significant digits.

Input range unit: Selectable from Hz and kHz

Input signal type:

	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

External shunt resistance [Ω]	Permissible input current [mA]
100	50
220	40
510	25
1000	20
2200	12

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

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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 when 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;
$(1/F_{100})$ x 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

Output Signal	Output Resistance	Permissible Load Resistance
4 to 20 mA DC	500 kΩ or more	750 Ω or less
2 to 10 mA DC		1500 Ω or less
1 to 5 mA DC		3000 Ω or less
0 to 20 mA DC		750 Ω or less
0 to 16 mA DC		900 Ω or less
0 to 10 mA DC		1500 Ω or less
0 to 1 mA DC		15 kΩ or less
0 to 10 mV DC	100 Ω or less	250 kΩ or more
0 to 100 mV DC		
0 to 1 V DC	1 Ω or less	2 kΩ or more
0 to 10 V DC		10 kΩ or more
0 to 5 V DC		2 kΩ or more
1 to 5 V DC		2 kΩ or more
–10 to +10 V DC		10 kΩ or more

2. Output -2

- **Analog Output**

Output Signal	Output Resistance	Permissible Load Resistance
1 to 5 V DC	1 Ω or less	2 kΩ or more
4 to 20 mA DC	500 kΩ or more	350 Ω or less

- **Communication Function**

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

Standards: EIA RS-485
Maximum number of connectable units: 31 units
Maximum communication distance: 1200 m
Communication method: 2-wire half duplex, start-stop synchronization, non-procedural
Communication rate: 1200, 2400, 4800, 9600 bps
Data length: 8, 7 bits
Stop bit: 1, 2 bits
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 PC, graphic panel, UT link module of FA-M3
MODBUS communication: Communication protocol with a PC (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: 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 Siganal; –10 to +10 V DC)

■ 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.

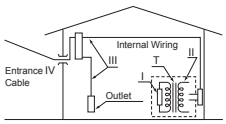
$$\text{Accuracy (\%)} = \frac{F_{100}/2}{F_{100} - F_0} \times 0.1$$

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

Safety: Approved by CAN/CSA C22.2 No.61010-1(CSA), approved by UL61010-1.
Installation category: CAT. II
Pollution degree: 2
As for the apparatus authorized, power supply voltage is limited to 15 V to 30 V DC, and the circuit to connect is limited to a class 2.

Category	Description	Remarks
CAT.I	For measurements performed on circuits not directly connected to MAINS.	
CAT.II	For measurements performed on circuits directly connected to the low voltage installation.	Appliances, portable equipments, etc.
CAT.III	For measurements performed in the building installation.	Distribution board, circuit breaker, etc.
CAT.IV	For measurements performed at the source of the low-voltage installation.	Overhead wire, cable systems, etc.



EMC Standards:
Compliant with CE marking EN 61326-1.
KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance.
The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
The above conformed instrument is only for voltage of 15 to 30 V DC ⎓ (±20%).

■ 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:

one-output type	24 V DC	3.3 W
	110 V DC	3.3 W
	100 V AC	6.2 VA
	200 V AC	8.1 VA
two-output type	24 V DC	4.1 W
	110 V DC	4.1 W
	100 V AC	7.0 VA
	200 V AC	9.0 VA

Insulation Resistance: 100 MΩ/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
1000 V AC / minute between input and output-2 when alarm output
1000 V AC / minute between output-1 and output-2

■ 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.
Installation altitude 2000 m or less above sea level.

■ Mounting and Appearance

Construction: Compact plug-in type
Material: Modified Polyphenylene Oxide (Case body)
Mounting Method: Wall, DIN rail, or dedicated VJ mounting base mountings (only when output-2 is analog output.)
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

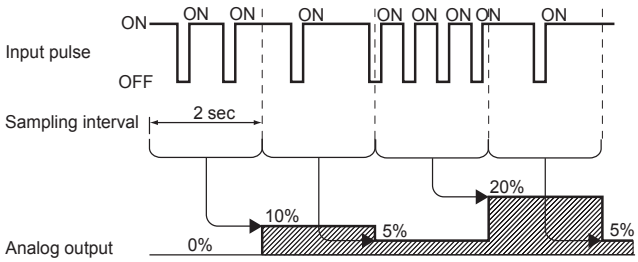
- Address No.: 01
- Baud rate: 9600 bps
- Parity: Even
- Data length: 8 bits
- Stop bit: 1 bits
- Protocol: PCLINK

● When output-2 is specified as alarm output

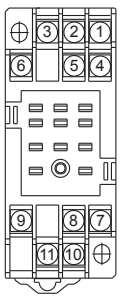
- Alarm operating direction: High limit alarm (alarm-1), low limit alarm (alarm-2)
- Relay operating direction: Excitation at alarm (alarm-1 / 2)
- Alarm setting: 100% (alarm-1), 0% (alarm-2)
- Hysteresis: 3% (alarm-1 / 2)
- Alarm on-delay: 0 second (alarm-1 / 2)
- Alarm off- delay: 0 second (alarm-1 / 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.



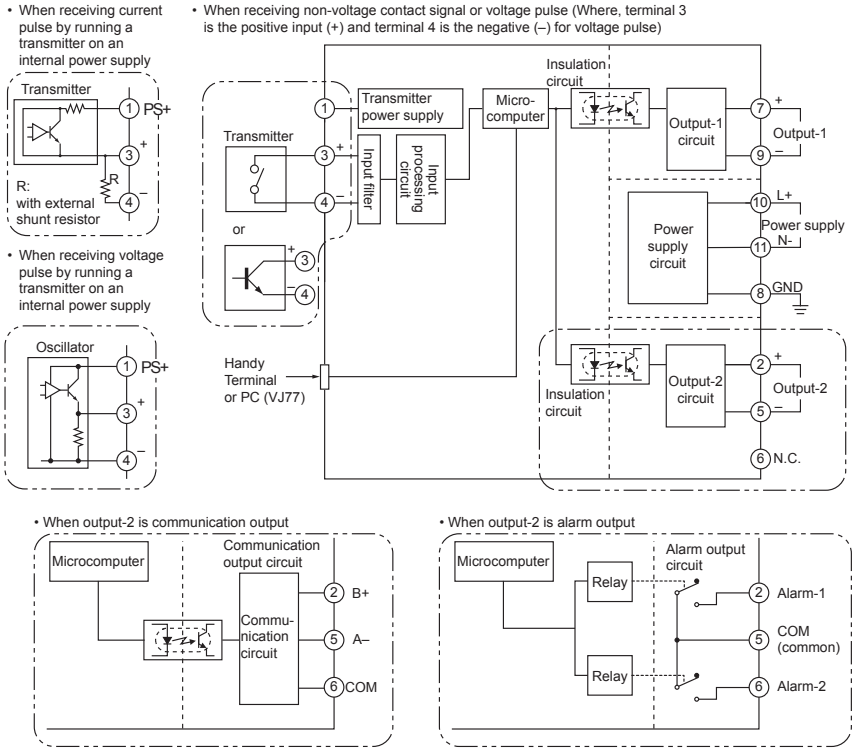
■ Terminal Arrangement



Terminal No.	Signal	Output-2 analog output	Output-2 communication output	Output-2 alarm output
1	Input	(PS+)		
2	Output-2	(+)	B (+)	ALM1
3	Input	(+)		
4	Input	(–)		
5	Output-2	(–)	A (–)	COM
6	Output-2	Not connected	COM	ALM2
7	Output-1	(+)		
8	GND	GND		
9	Output-1	(–)		
10	Power supply	(L+)		
11	Power supply	(N–)		

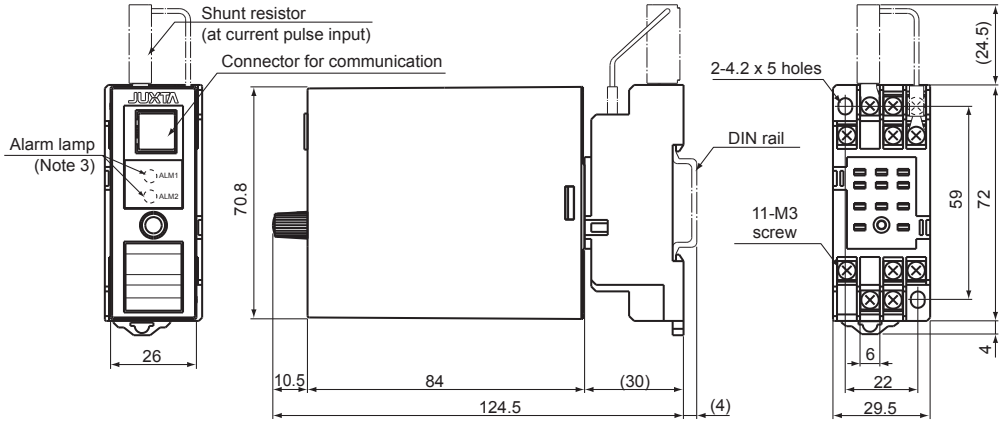
Note 2: With the one-output type, terminals for Output-2 are not connected.

■ Block Diagram



■ External Dimensions

Unit: mm



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