General Specifications

GS 77J01Q17-01E

Model VJQ7
Analog to Pulse Converter
(Isolated Single-output and
Isolated Dual-output Types)

JUXTA

■ General

The VJQ7 is a plug-in type analog to pulse converter that converts DC current or DC voltage signal into isolated transistor-contact pulse or contactless AC switch pulse.

The VJQ7 converter features:

- Either pulse output, communication function (RS-485), or alarm output (2 relay contacts) is selectable as Output-2.
- Various parameters such as input ranges can be set and modified through a PC (VJ77) or Handy Terminal (JHT200 and the like).

■ Model and Suffix Codes

VJQ7-0□□-□□□0

Model

Output
1 : 1 output
2 : 2 outputs

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

Input
A : 0 to 50mA DC, span is 5mA or more
1 : –10 to +10V DC, span is 0.1V or more

Output-1
1 : Open collector
3 : Contactless AC switch

Output-2
1 : Open collector
3 : Contactless AC switch
P : Communication function (RS-485)
T : Alarm output (2 relay contacts)
N : No Output-2

■ Input

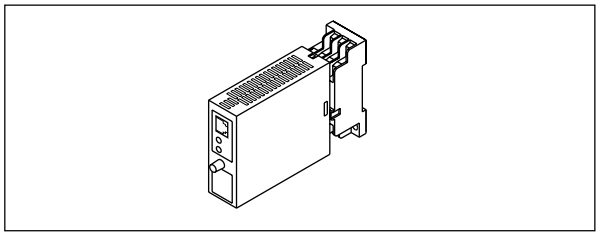
Input Signal: DC voltage or DC current signal
Input Range:
Code A: 0 to 50mA DC, span is 5mA or more
Code 1: –10 to +10V DC, span is 0.1V or more
Input Resistance:
DC current signal: 100Ω (External shunt resistor)
DC voltage signal: 1MΩ (100kΩ when power off)

■ Output

1. Output-1

The operation of Output-1 is same as that of Output-2.

Output signal: Open collector or contactless AC switch



Output frequency: 0.001Hz≦F_{100}≦2kHz
However, 1kHz or less for contactless AC switch
0Hz≦F_0< F_{100}
F_0 is 0% of output frequency.
F_{100} is 100% of output frequency.
Frequency can be set in increments of 0.00001 (Hz or kHz) within 4 significant digits.
Output range unit: Either Hz or kHz is selectable.
Low–level output cutoff point: 0.0001Hz to 100% of output frequency
Maximum permissible load:
Open collector: 30V DC/200mA
Contactless AC switch: 100V AC/200mA
Pulse width type: Either 50% duty, fixed on-state pulse width, or fixed off-state pulse width is selectable.
Pulse width time: 0.1 to 500ms, settable by 0.1ms
Output frequency available for fixed pulse width:

$$\frac{1}{\text{Set value of pulse width (ms)} \times 2} \times 1000\text{[Hz]}$$

The frequency over the above is limited.

2. Output-2

● **Pulse Output**

Same as Output-1 specifications

When either Output-1 or Output-2 is contactless AC switch, output frequency is 1 kHz or less.

● **Communication Function**

This converter 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
Baud rate: 1200, 2400, 4800, 9600 bps
Data length: 8, 7 bit
Stop bit: 1, 2 bit
Parity: Even parity, odd parity, or none

GS 77J01Q17-01E

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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 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 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 seconds to setting time to prevent wrong operation)
Alarm operation display: Front LED lights at alarm, 2 LEDs

■ Items Available to Be Set

The following items can be set through a PC (VJ77 PC-based parameters setting tool) or Handy Terminal:

Input range, output range unit, output range, low-level output cutoff point, output pulse width type, output pulse width 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 limited in the following case according to the input and output ranges:
Accuracy limitation by input range
Input range is –10 to +10 V (H range), span is under 5 V; accuracy (%)=±0.1%×5 V / input span [V]
Input range is -5 to +5 V (M range), span is under 2.5 V; accuracy (%)=±0.1%×2.5 V / input span [V]
Input range is -1 to +1 V (L range), span is under 0.5 V; accuracy (%)=±0.1%×0.5 V / input span [V]
When current input, apply [input range×input resistance] to the above, and add 0.1% of resistance error.
Accuracy limitation by output range
When $F_{100} \leqq 1$kHz, zero elevation is 50% or more;

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

When $F_{100} > 1$kHz, zero elevation;

$$\text{Accuracy (\%)} = \frac{F_{100}/2}{F_{100}-F_0} \times 0.2$$

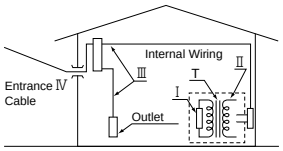
F_0 is 0% of output frequency, F_{100} is 100% output frequency.
When both input and output have accuracy limitation, total accuracy is their sum.
Response speed: One cycle of output pulse + 150ms (for 50% duty), 63% response (10 to 90%)
Alarm output: 350ms (input change 10 to 90%, alarm setting point 50%, time till alarm output, when alarm delay setting and hysteresis are min.)
Effect of Power Supply Voltage Fluctuation: ±0.1% or less of span for power supply voltage fluctuation of 85 to 264V AC (47 to 63 Hz),/DC, 12 to 36V DC.
Effect of Ambient Temperature Change: ±0.2% or less of span for change of 10°C

■ Safety and EMC Standards

Safety: Approved by CSA1010, approved by UL3121-1.

Installation category: CAT. II (CSA1010)
Pollution degree: 2 (CSA1010)
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. (UL3121-1)

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: Complies with EN61326.

The above conformed instrument is only for voltage of 15 to 30 V DC ⎓ (±20%); models that have contactless AC switch output are not CE certified.

■ 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 2.4 W, 110 V DC 2.4 W
100 V AC 4.5 VA, 200 V AC 6.3 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 at alarm output
1000 V AC / minute between output-1 and output-2

■ Environmental Conditions

Temperature: 0 to 50 °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.

■ Mounting and Appearance

Construction: Compact plug-in type
Material: Modified Polyphenylene Oxide (Case body)
Mounting Method: Wall, DIN rail, or dedicated VJ mounting base (only when Output-2 is analog output) mountings
Connection Method: M3 screw terminal
External Dimension: 29.5×76×124.5mm (W×H×D)
Weight: Approx. 170 g

■ Accessories

Tag Number Label: 1 sheet
Range Label: 1 sheet
Shunt Resistor: 1 (when current input is specified)

■ Items to Specify When Ordering

Shipped after setting the input range, output frequency, output range unit, low-level output cutoff point, pulse width type, pulse width time as specified.

- Model and Suffix Code: e.g. VJQ7-026-A110
- Input range: e.g. 4 to20 mA DC
- Output frequency: e.g. 0 to 10 Hz
- Low cut point (Hz): e.g. 0.0001
- Pulse width type: e.g. Duty of 50%

* When specifying “Duty of 50%” for pulse width type, the specification of pulse width (ms) is unnecessary.

■ Factory Setting

Factory settings are as follows:

- Input range: 4 to 20mA DC (for current input), or 1 to 5V DC (for voltage output)
- Output frequency: 0 to 10Hz
- Low cut point (Hz): 0.0001
- Pulse width type: fixed on-state pulse width
- Pulse width (ms): 30

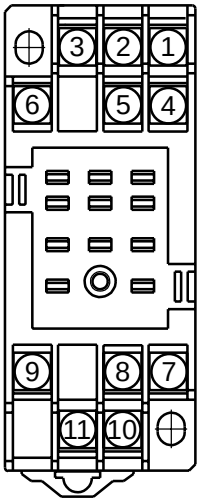
● **When output-2 is specified as communication output**

- Address No.: 01
- Baud 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: 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)

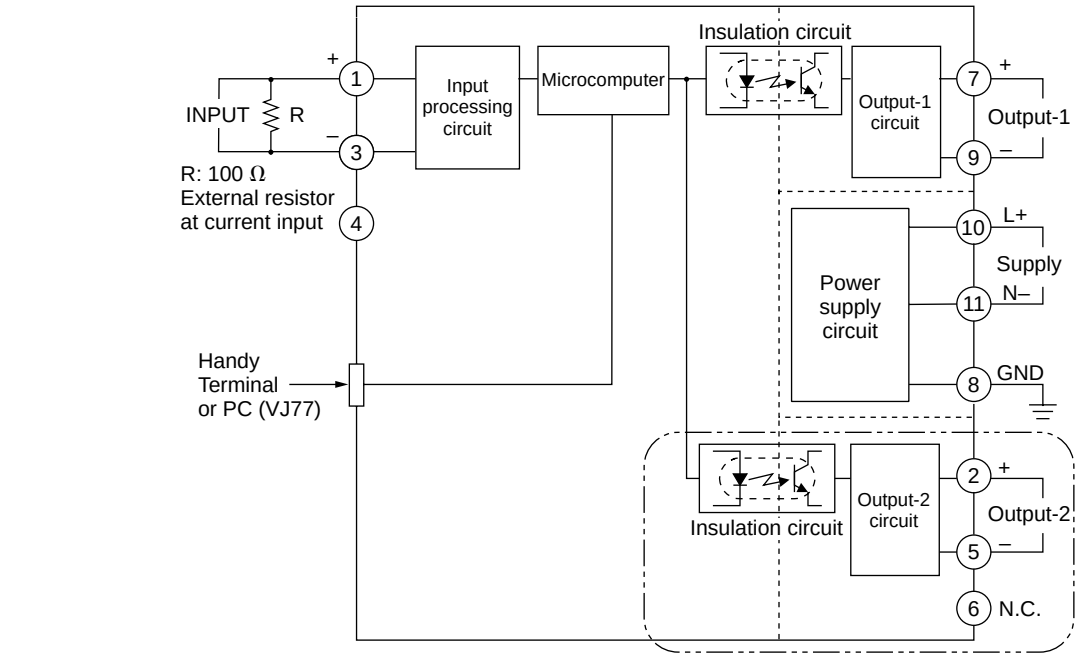
■ Terminal Arrangement



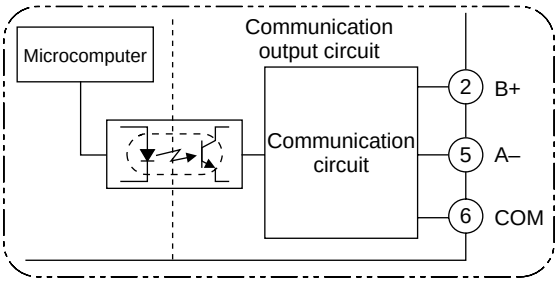
Terminal No.	Signal	Output-2 Analog output	Output-2 Communication output	Output-2 Alarm output
1	Input	(+)		
2	Output-2	(+)	B (+)	ALM1
3	Input	(–)		
4	N.C.			
5	Output-2 (Note 1)	(–)	A (–)	COM
6	Output-2 (Note 1)	N.C.	COM	ALM2
7	Output-1	(+)		
8	GND	GND		
9	Output-1	(–)		
10	Supply	(L+)		
11	Supply	(N–)		

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

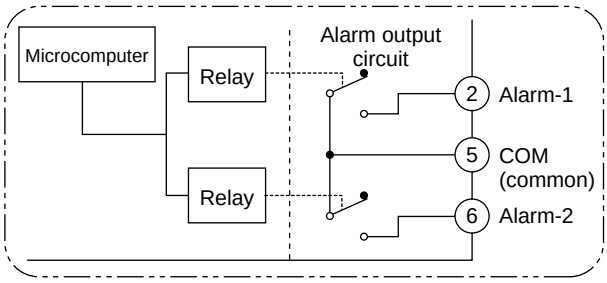
■ Block Diagram



● When output-2 is communication output

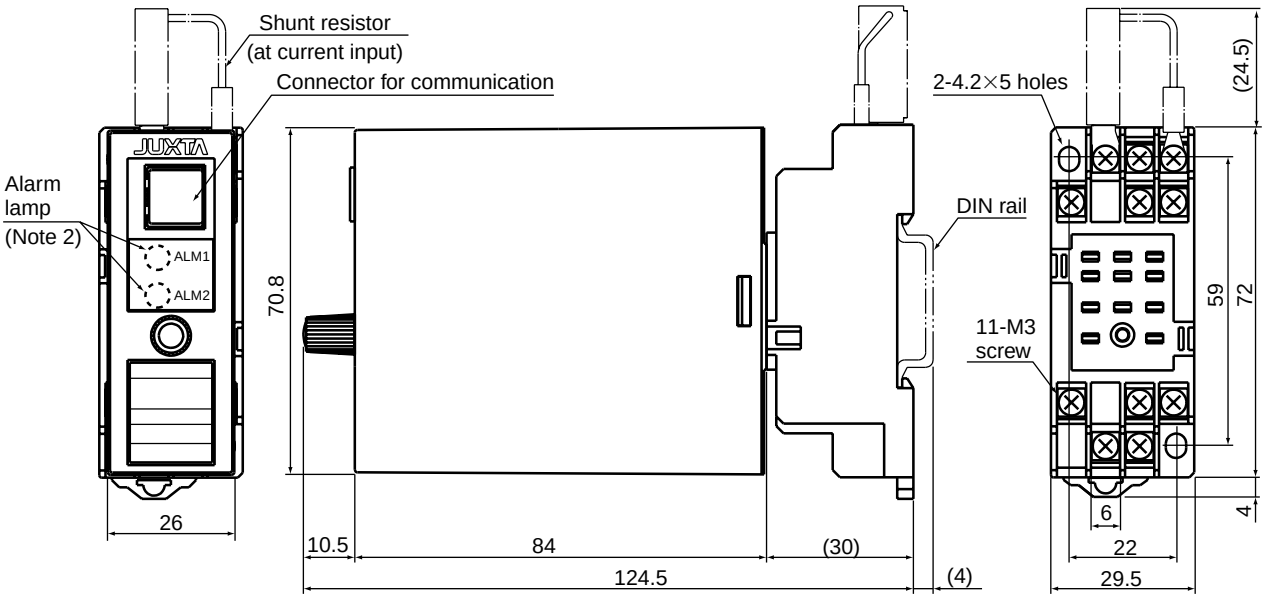


● When output-2 is alarm output



■ External Dimensions

Unit : mm



Note 2: Only when output-2 is alarm output