

General Specifications

GS 77J01S07-01E

Model VJS7
Potentiometer Converter (Multi-function)
(Isolated Single-output and Isolated Dual-output Types)

JUXTA

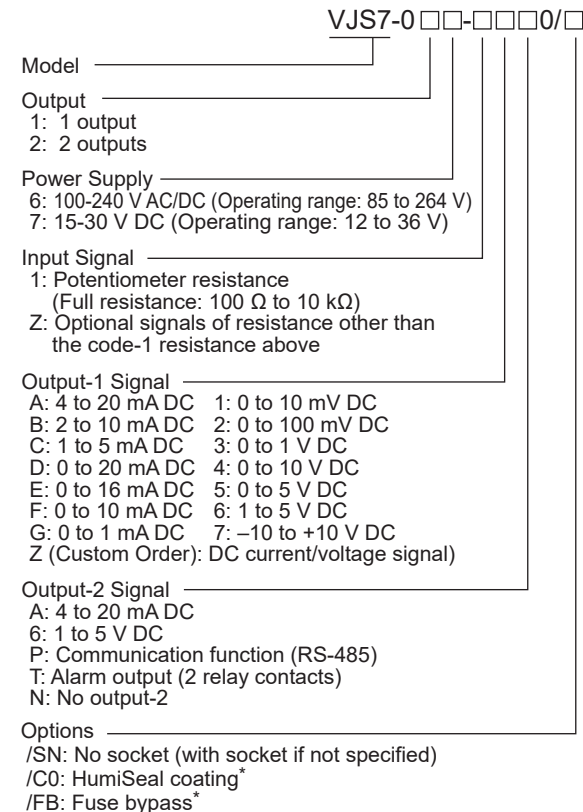
General

The VJS7 is a compact, plug-in potentiometer converter that is used in combination with an instrument to transmit information for displacement of valve, etc. by resistance change of potentiometer. It converts the resistance changes into isolated DC current or DC voltage signals.

- Output-2 can be selected from DC voltage signal, DC current signal, communication output (RS-485), or alarm output (2 relay contacts).
- Various parameters such as input range can be set and modified using a PC (VJ77).



Model and Suffix Codes



* When option code /C0 or /FB is specified, the conformity to the safety and EMC standards is excluded. CE marking is not applicable.

Note 1: "/C0" option: Polyurethane coating. The "/C0" 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.

Note 2: "/FB" option: The primary power supply fuse is deleted, short circuit and ship it.

Ordering Information

- Model and suffix codes
The input ranges and burnout are set as specified before shipment.
- Model and suffix code: e.g. VJS7-026-1AA0
- Full resistance (required item) : 1 kΩ
- Input range (required item) : 0 to 1 kΩ
- Burnout (required item) : UP

Factory Default Settings

Factory settings are as follows:

To change the set value, a PC-based Parameter Setting Tool (VJ77) is required.

- Software filter: OFF
- Output operating direction: Direct
- **When output-2 is specified as communication output**
 - Address No.: 01
 - Baud rate: 9600 bps
 - Parity: Even
 - Data length: 8 bits
 - 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: Potentiometer resistance change (3-wire type)

Measuring range:

Full resistance: 100 Ω to 10 kΩ

Measurement span: 50 Ω to 10 kΩ

Zero elevation: 50% of full resistance or less

Measuring voltage: Approx. 0.5 V DC

Permissible input conductor resistance: 150 Ω per leadwire or less (Resistance of 3 lines must be the same.)
 Input adjustment range: $\pm 1\%$ 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.

■ Output Specifications

1. Output-1

Output Signal	Output Resistance	Permissible Load Resistance
4 to 20 mA DC	500 k Ω 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		
0 to 16 mA DC		
0 to 10 mA DC		
0 to 1 mA DC		
0 to 10 mV DC	100 Ω or less	250 k Ω or more
0 to 100 mV DC		
0 to 1 V DC	1 Ω or less	2 k Ω or more
0 to 10 V DC		10 k Ω or more
0 to 5 V DC		2 k Ω or more
1 to 5 V DC		2 k Ω or more
-10 to +10 V DC		10 k Ω or more

Note: Customized specifications for the output-1 signal within 0 to 20 mA DC or within -10 to +10 V DC comply with safety standards, EMC standards, and environmental standards.

- The above note is limited to the standard specification of output-2.
- Other customized specifications do not conform to these standards.

2. Output -2

● Analog Output

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

Output variable range: -6 to 106 % (Both output 1 and output 2)

Output adjustment (Output 1 and output 2):
 $\pm 5\%$ (Zero adjustment)
 $\pm 10\%$ of span (Span adjustment)
 $\pm 5\%$ of span (when the output-1 signal = 7)

● Communication Function

This isolator 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 controllers:
31 controllers

Maximum communication distance: 1200 m

Communication method: 2-wire half duplex, start-stop synchronization, non-procedural

Baud rate: 1200, 2400, 4800, 9600, 19200, or 38400 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: Energized or de-energized under normal condition

Alarm setting range: 0 to 100% of input range

Setting resolution: 0.1%

Hysteresis 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 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

■ Items Available to Be Set

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

Input range, burnout, 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, output operating direction, software filter

■ Standard Performance

Accuracy rating: $\pm 0.1\%$ 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. However, accuracy is limited in the following case. Accuracy is a large-value, either of case 1) or case 2).

case 1) : Measurement span is under 50% of Full resistance

$$\text{Accuracy (\%)} = \frac{0.1\% \times \text{Full resistance } (\Omega)}{2 \times \text{Measurement span } (\Omega)}$$

case 2) : Measurement span is under 80 Ω

$$\text{Accuracy (\%)} = \frac{0.1\% \times 80 (\Omega)}{\text{Measurement span } (\Omega)}$$

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.

Burnout: UP, DOWN or OFF

Burnout time: Within 60 seconds

Effect of power supply voltage fluctuation: Within the accuracy range of span for power supply voltage fluctuation.

Effect of Ambient Temperature Change: $\pm 0.15\%$ of span for change of 10 °C.

Effect of leadwire resistance change: $\pm 0.1\%$ for a resistance change of 100 Ω / leadwire.

■ Safety and EMC Standards

CE:

EMC directive

- EN 61326-1 Class A Table 2 ^{*1} compliance
- EN 61326-2-3 compliance
- EN 61000-3-2 compliance
- EN 61000-3-3 compliance
- EN 55011 Class A Group 1 compliance

Low voltage directive:

- EN 61010-1, EN 61010-2-030
- Overvoltage category II ^{*2}, Pollution degree 2 ^{*3}, Measurement category O (other)

CSA: CAN/CSA C22.2 No. 61010-1

- CAN/CSA C22.2 No. 61010-2-030
- Overvoltage category II ^{*2}, Pollution degree 2 ^{*3}, Measurement category O (other)

UL: UL 61010-1 (CSA NRTL/C)

- UL 61010-2-030 (CSA NRTL/C)
- Overvoltage category II ^{*2}, Pollution degree 2 ^{*3}, Measurement category O (other)

RCM: EN 55011 Class A Group 1 compliance

KC: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

- *1 The instrument continues to operate at a measurement accuracy of within $\pm 20\%$ of the range during testing.
- *2 Overvoltage category II: Describes a number which defines a transient overvoltage condition. Implies the regulation for impulse withstand voltage. "II" applies to electrical equipment which is supplied from the fixed installation like a distribution board.

- *3 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.

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

■ Environment Standard

EU RoHS directive: EN IEC 63000

(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 \approx 50/60 Hz
15 to 30 V DC \approx

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

Power Dissipation: 24 V DC 2.5 W, 110 V DC 2.6 W
100 V AC 5 VA, 200 V AC 6.7 VA

Insulation Resistance: 100 M Ω /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 output-1 and output-2.

■ 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 hydrogen sulfide, dust, sea breeze and direct sunlight.

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.

Installation location: Indoors

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 Demensions

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: Main unit: 100 g or less,

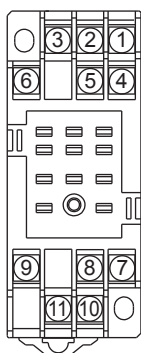
Socket: 50 g or less

■ Standard Accessories

Tag number label: 1 sheet

Range label: 1 sheet

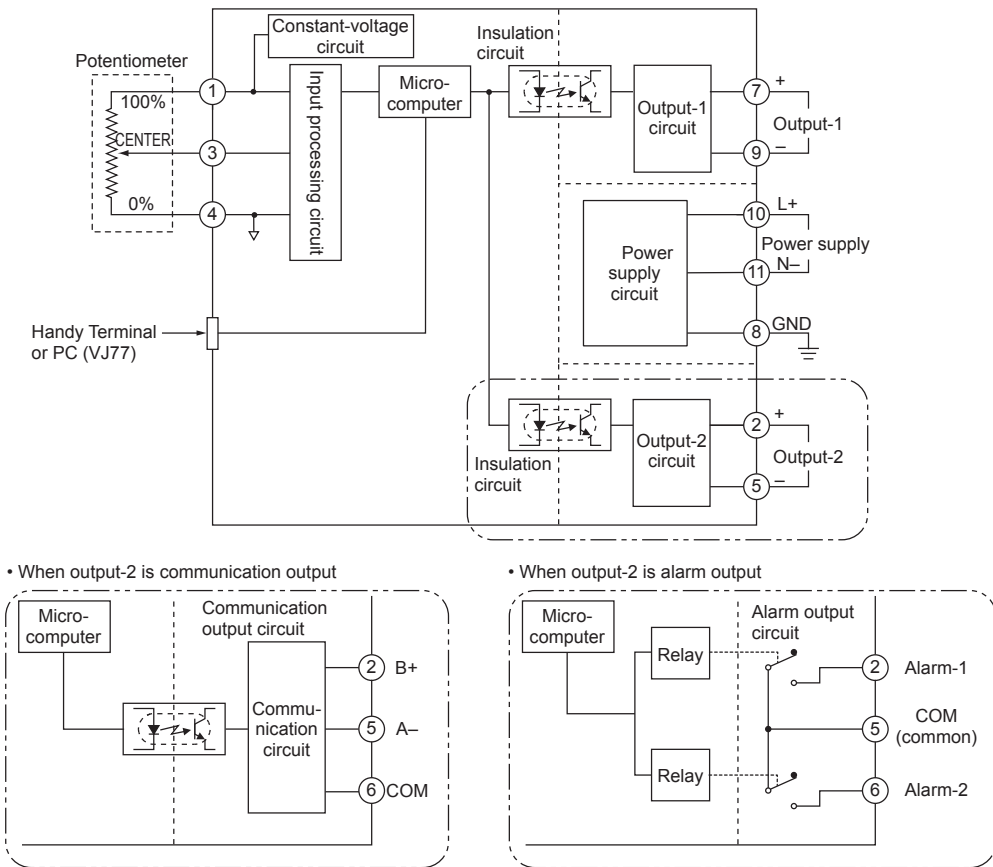
■ Terminal Arrangement



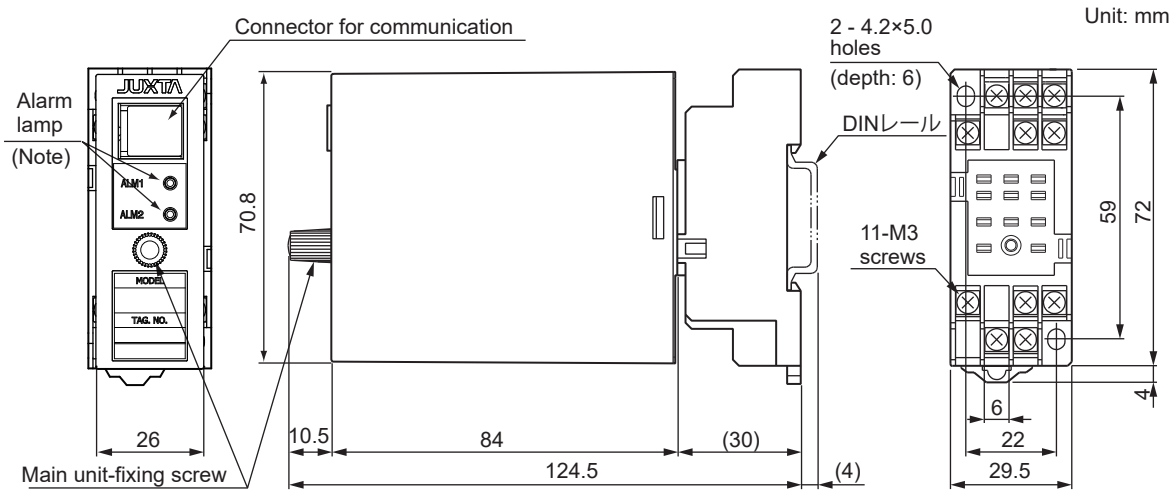
Terminal No.	Signal	Output-2		
		Analog output	Communication output	Alarm output
1	Input	100%		
2	Output-2	+	B (+)	ALM1
3	Input	CENTER		
4	Input	0%		
5	Output-2	-	A (-)	COM
6	Output-2	Do not use	COM	ALM2
7	Output-1	+		
8	GND	GND		
9	Output-1	-		
10	Supply	L+		
11	Supply	N-		

Note: Do not use output-2 for the single-output type.

■ Block Diagram



■ External Dimensions



Note: Only when output-2 is alarm output