

General Specifications

GS 77J01U07-01E

Model VJU7
 Universal Temperature Converter
 (Isolated Single-output and Isolated Dual-output Types)

JUXTA

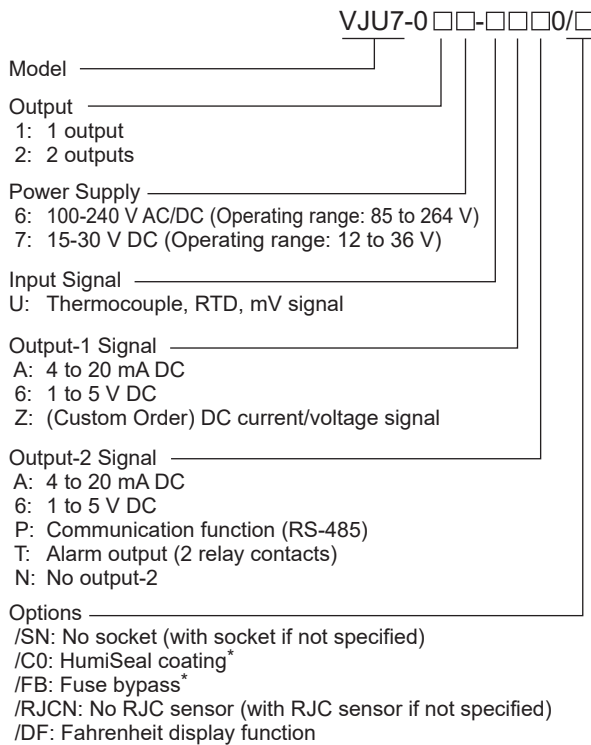
General

This plug-in type universal temperature converter converts input signal (thermocouple, RTD or mV signal) into isolated DC voltage signal or DC current signal.

- Universal input enables selection of input type (thermocouple, RTD, mV signal) and of measuring ranges within specifications.
- DC voltage signal, DC current signal, communication output (RS485), or alarm output (2 relay contacts) is selectable as output-2.
- Change of input types / input ranges/burnout action, and I/O monitoring etc. can be made using the optional Parameter Setting Tool (VJ77).
- For the Fahrenheit display, specify the option "/DF".



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 code
 Shipped after setting the input type (selected from Table 1), input range (within available measuring range in Table 1), and burnout action as specified.
- Model and suffix code: e.g. VJU7-026-UAA0
- Input type : Pt100 (ITS-90)
- Input range : 0 to 100 °C
- 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.

- Input type: RTD input Pt100 (ITS-90)
- Input range: 0 to 100 °C
- Software filter: OFF
- Output operating direction: Direct
- **When output-2 is specified as communication output**
 - Address No.: 01
 - Communication 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: Energized under alarm condition (alarm-1 / 2)
 - Alarm setting: The value equivalent to 100 % (alarm-1), The value equivalent to 0 % (alarm-2)
 - Hysteresis: The value equivalent to 3 % (alarm-1/2)
 - Alarm on-delay: 0 second (alarm-1/2)
 - Alarm off-delay: 0 second (alarm-1/2)

Input Specifications

Input Signal Type:

Thermocouple JIS C 1602, IEC 60584-1 (ITS-90):
Type K, T, E, J, R, S, B, N, W3 (see
Note 1), W5 (see Note 2)

Note 1: W3 is the abbreviation of W97Re3-W75Re25
(tungsten97 % rhenium 3 % - tungsten75 %
rhenium25 %) ASTM E988 Standard

Note 2: W5 is the abbreviation of W95Re5-W74Re26
(tungsten95 % rhenium 5 % - tungsten74 %
rhenium 26 %) ASTM E988 Standard

RTD : JIS C 1604, IEC 60751 (ITS-90) Pt100
JIS C 1604: 1989, DIN (IPTS-68) Pt100
JIS C 1604: 1989, JPt100
JIS C 1604: 1981, Pt50 JIS C 1604

mV signal : Can be set within -10 to 100 mV

Measuring unit: °C, K, °F^(*), mV

*1: When specify the option code "/DF".

Table 1 Input Type and Range

Input Type (Thermocouple)	Measuring range(°C)
JIS C 1602, IEC 60584-1 (ITS-90) TYPE K	-270 to 1372
JIS C 1602, IEC 60584-1 (ITS-90) TYPE T	-270 to 400
JIS C 1602, IEC 60584-1 (ITS-90) TYPE E	-270 to 1000
JIS C 1602, IEC 60584-1 (ITS-90) TYPE J	-210 to 1200
JIS C 1602, IEC 60584-1 (ITS-90) TYPE R	-50 to 1768
JIS C 1602, IEC 60584-1 (ITS-90) TYPE S	-50 to 1768
JIS C 1602, IEC 60584-1 (ITS-90) TYPE B	0 to 1820
JIS C 1602, IEC 60584-1 (ITS-90) TYPE N	-270 to 1300
Type W3	0 to 2300
Type W5	0 to 2300
Input Type (RTD)	Measuring range(°C)
JIS C 1604, IEC 60751(ITS-90)PT100	-200 to 850
JIS C 1604:1989, DIN(IPTS-68) Pt100	-200 to 660
JIS C 1604:1989, JPt100	-200 to 510
JIS C 1604:1981, Pt50	-200 to 649
Input Type (mV signal)	Measuring range(mV DC)
mV	-10 to 100

Measuring Span: 3 mV or more (thermocouple, mV signal)
10 °C or more (RTD)

Input Resistance: 1 MΩ (when power on), 4 kΩ (when power off) when thermocouple, mV input

Burnout detective current: 0.1 μA (Thermocouple, mV input)

Input External Resistance:

Thermocouple, mV signal: 500 Ω or less
However, when combination with BARD-600, it is the value connectable as external resistance besides internal resistance.

RTD: Input span (°C) x 0.4 Ω or less / wire or 10 Ω or less, whichever smaller
However, when combination with BARD-700, it is the value connectable as external resistance besides internal resistance.

RTD Detective Current: About 0.2 mA

Permissible Applicable Voltage: ±4 V DC or less

Input adjustment range: ±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
1 to 5 V DC	1 Ω or less	2 kΩ or more
4 to 20 mA DC	500 kΩ or more	750 Ω or less

• Custom Order Output Signal

2 to 10 mA DC, 1 to 5 mA DC, 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, 0 to 100 mV DC, 0 to 1 V DC, 0 to 10 V DC, 0 to 5 V DC, -10 to +10 V DC

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 kΩ or more
4 to 20 mA DC	500 kΩ or more	350 Ω or less

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

Output adjustment: ±10 % (Zero/Span) (Output 1 and output 2)

• Communication Function

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

Standards: EIA RS485

Maximum number of connectable controllers:
31 controllers

Maximum communication distance: 1200 m

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

Communication rate: 1200, 2400, 4800, 9600, 19200, or 38400 bps

Data length: 8, 7 bit

Stop bit: 1, 2 bit

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 personal computer, graphic panel, UT link module of FA-M3

MODBUS communication: Communication protocol with a personal computer (SCADA).

Ladder communication: Communication protocol with ladder communication module of FA-M3 and programmable controller of other manufacturers

■ Alarm Output Specifications

- 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 Ranges: 0 to 100 % of input range
 Temperature input [°C], mV input [%]
 Setting resolution: 0.1 °C for mV input, 4 significant digits for Temperature input
 Hysteresis: Set the value added to alarm setting point at alarm release
 Setting range: 0 to 100 % of input range
 Temperature input [°C], mV input [%]
 Setting resolution: 0.1 °C for mV input, 4 significant digits for Temperature input
 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 becomes 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 excitation, 2 LEDs

■ Items Available to Be Set

The following items can be set through PC-based Parameters Setting Tool (VJ77 sold separately):

Input sensor type, Input type, input unit, 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, alarm off-delay, I/O adjustment, software filter

■ Standard Performance

Accuracy rating: ± 0.1 % of span.
 However, the accuracy is not guaranteed for 0 to 400 °C of TC input (Type B) and output levels less than 0.5% of the span of a 0 to X mA (e.g. 0 to 20 mA) output range type. However, accuracy is limited in the following cases.

Thermocouple input:

When an input range is ± 25 mV or less in thermoelectromotive force conversion, ± 0.1 % of span or 10 μ V, whichever is greater.

When an input range is more than ± 25 mV and ± 100 mV or less in thermoelectromotive force conversion, ± 0.1 % of span or 40 μ V, whichever is greater.

mV input:

When the input range is ± 25 mV or less, ± 0.1 % of span or 10 μ V, whichever is greater

When an input range is more than ± 25 mV and ± 100 mV or less, ± 0.1 % of span or 40 μ V, whichever is greater.

RTD input:

± 0.1 % of span or ± 0.1 °C of span, whichever is greater (for Pt50, ± 0.1 % or ± 0.2 °C, whichever is greater.)

Reference Junction Compensation Accuracy:

Except for Type R, S;

± 1 °C (25 °C ± 15 °C)

± 2 °C (except for terminal temperature 25 °C ± 15 °C)

Type R, S;

± 2 °C (25 °C ± 15 °C)

± 4 °C (except for terminal temperature 25 °C ± 15 °C)

Reference junction compensation of Type B is not carried out.

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: ± 0.15 % of span for change of 10 °C

Effect of Wiring Resistance Change:

Thermocouple: ± 15 μ V of span for change of 100 Ω

RTD: ± 0.2 °C of span for change of 10 Ω /wire.

■ 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 at alarm output

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)

■ 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 sulfide hydrogen, dust, sea breeze and direct sunlight

Installation altitude 2000m or less above sea level.

■ Mounting and Dimensions

Construction: Compact plug-in type

Material: Modified Polyphenylene Oxide (Case body)

Mounting Method: Wall, DIN rail, or dedicated base

(VJ mounting base: VJCE) mountings

Connection Method: M3 screw terminal

External Dimension: 29.5x76x124.5 mm (WxHxD)

Weight: Main unit: 100 g or less,

Socket: 50 g or less

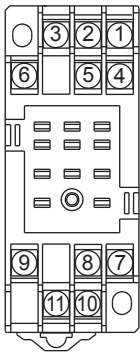
■ Standard Accessories

Tag No. Label: 1 sheet

Range Label: 1 sheet

RJC Sensor (A1167HT): 1 piece (when /RJCN option is not specified.)

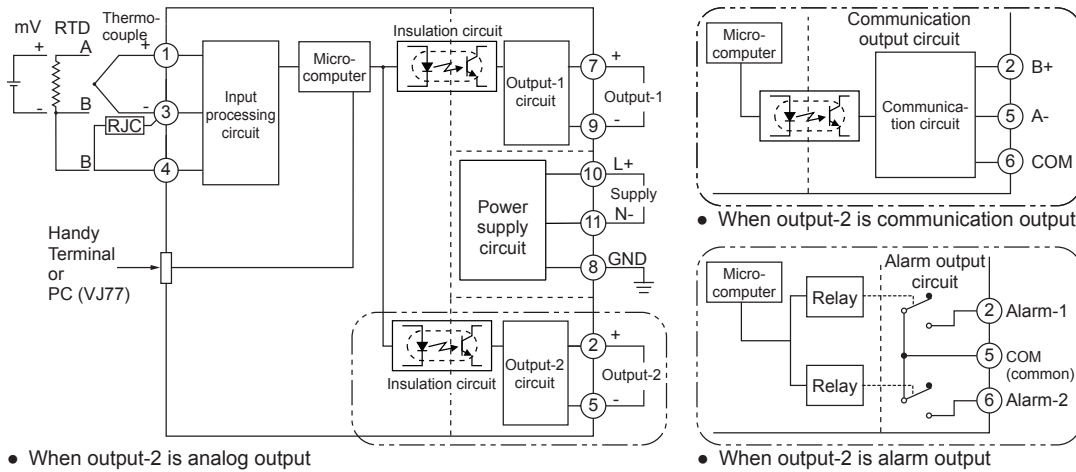
Terminal Arrangement



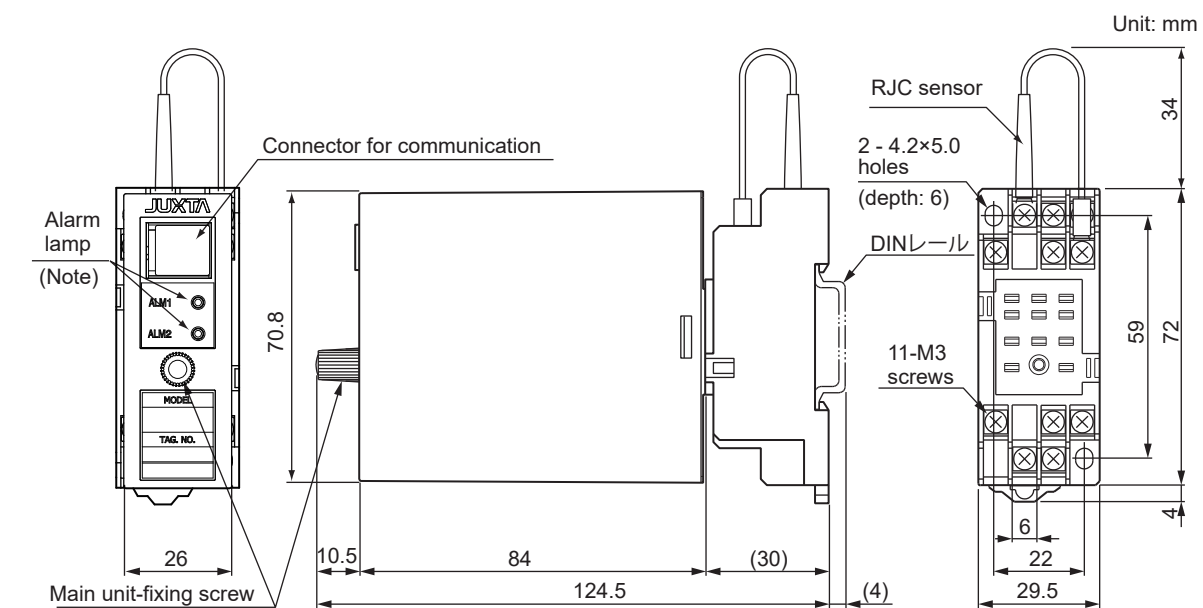
Terminal No.	Signal	Thermocouple	RTD	mV input	Output-2		
					Analog output	Communication output	Alarm output
1	Input	+	A	+	←		
2	Output-2		→		+	B (+)	ALM1
3	Input	- [RJC]	B	-	←		
4	Input	(RJC reverse side)	B	Do not use	←		
5	Output-2		→		-	A (-)	COM
6	Output-2		→		Do not use	COM	ALM2
7	Output-1				+		
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