

# User's Manual

Model VJB1  
CT Converter (RMS)

JUXTA

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You can download the latest manuals from the following website:

 <http://www.yokogawa.com/ns/juxta/im/>

Thank you for purchasing the JUXTA Signal Conditioner.  
Please read through this manual before use for correct handling.

**YOKOGAWA**   
Yokogawa Electric Corporation

IM 77J01B01-01E  
1st Edition Aug. 2021 (YK)

## CAUTIONARY NOTES FOR SAFE USE OF THE PRODUCT

This User's Manual should be carefully read before installing and operating the product. Please keep this User's Manual for future reference.

For more information of the safety precautions, please refer to the "Precautions on the Use of the JUXTA Series (IM 77J01A00-91Z1)".

The related manuals and general specifications are shown in the table below.

Doc. Name	Doc. Number
Precautions on the Use of the JUXTA Series (User's Manual)	IM 77J01A00-91Z1
Model VJB1 CT Converter (User's Manual)	IM 77J01B01-01E (This manual)
Model VJB1 CT Converter (General Specifications)	GS 77J01B01-01E

User's manuals in the above table are essential parts of the product; keep it in a safe place for future reference.

This manual is intended for the following personnel;

- Engineers responsible for installation, wiring, and maintenance of the equipment.
- Personnel responsible for normal daily operation of the equipment.

The following symbol is used on the product and in this manual to ensure safe usage.



### WARNING

**Calls attention to actions or conditions that could cause serious or fatal injury to the user, and indicates precautions that should be taken to prevent such occurrences.**



### CAUTION

**Calls attention to actions or conditions that could cause injury to the user or damage to the instrument or property and indicates precautions that should be taken to prevent such occurrences.**

### QR Code

The product has a QR Code pasted for efficient plant maintenance work and asset information management. It enables confirming the specifications of purchased products and user's manuals.

For more details, please refer to the following URL.

<https://www.yokogawa.com/qrcode>

\* QR Code is a registered trademark of DENSO WAVE INCORPORATED.

## CHECKING PRODUCT SPECIFICATIONS AND PACKAGE

### (1) Checking the Model and Product Specifications

Check that the model and specifications indicated on the nameplate attached to the main unit are as ordered.

### (2) Packaged Items

Check that the package contains the following items:

- VJB1: 1 unit

### Standard Accessories:

- Tag number label: 1 sheet
- Socket (T9093FL): 1 piece  
(when /SN option is not specified.)
- CT protector (CTG-5): 1 piece  
(when "1" is specified for the CT protector code.)
- User's manual (IM 77J01B01-01E, this manual): 1 copy
- User's manual (IM 77J01A00-91Z1): 1 copy

## GENERAL

The VJB1 is a compact, plug-in CT converter that converts sinusoidal AC current signal from a current transformer (CT output, etc.) into isolated DC voltage or DC current signals.

## MODEL AND SUFFIX CODES

Model	Suffix codes								Description
VJB1	-0	1	x	-x	x	N	x	/x	CT Converter (RMS)
Fixed code	-0								Always -0
Output		1							1 output
Power supply		6							100-240 V AC/DC *1
		7							15-30 V DC *2
Input signal			-A						0 to 1 AAC
			-B						0 to 5 AAC
			-Z						Custom order (AC current signal)
Output signal				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 *3
Fixed code					N				Always N
CT protector						0			Not provided *5
						1			1 piece provided
Option							/SN		No socket (with socket if not specified)
							/C0		Coating *4
							/FB		Fuse bypass *4

\*1 Operating range: 85 to 264 V AC/DC

\*2 Operating range: 12 to 36 V DC

\*3 DC voltage signal or DC current signal

\*4 When option code /C0 or /FB is specified, the conformity to the safety and EMC standards is excluded. CE marking is not applicable.

\*5 When "0" is specified in the CT protector code, the CT protector (CTG-5) must be ordered separately.

Note: An exclusive User's Manual might be attached to the products whose suffix codes or option codes contain the code "Z" (made to customers' specifications). Please read it along with this manual.

## 1. MOUNTING METHOD

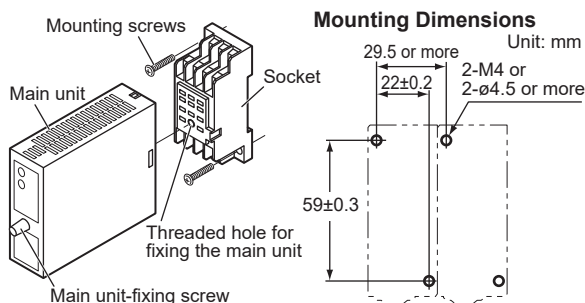


### CAUTION

- Plug/disconnect the main unit into/from the socket vertically to the socket face. Otherwise the terminals may bend and it may cause bad contact.
- The converter shall not tilt 5 degrees or more in either direction when installed.
- When the converter is not connected to the socket, it is necessary to protect the socket against ingress of dust to the connector part.
- Keep this product in a conductive bag when plugged out, during transport or storage.

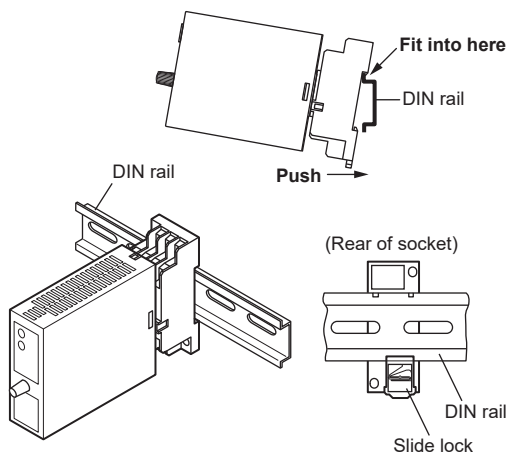
### 1.1 Wall Mounting

Loosen the main unit-fixing screw of the product and pull out the main unit from the socket. Fix the socket on the wall with screws. Next, insert the main unit into the socket and fasten the main unit with the main unit-fixing screw.



### 1.2 DIN Rail Mounting

Insert a DIN rail into the upper part of the DIN rail groove on the rear of the socket, and then slide the slide lock at the lower part of the socket upwards until the socket is fixed into position as shown below.



### 1.3 Mounting Using a Multi-mounting Base

When using a multi-mounting base, see the User's Manual for VJCE-01A (VJ Mounting Base for communication) (IM 77J01C51-11E).

### 1.4 Using a Duct

When using a wiring duct, install the duct at least 30 mm away from the top and bottom faces of the main unit.

## 2. INSTALLATION AND ENVIRONMENTAL CONDITIONS

- Avoid the following environments for installation locations: Areas with vibrations, corrosive gases, dust, water, oil, solvents, direct sunlight, radiation, a strong electric field, and/or a strong magnetic field, direct radiant heat, wind, temperature fluctuation.
- If there is any risk of a surge being induced into the power line and/or signal lines due to lightning or other factors, a dedicated lightning arrester should be used as protection for both the product and a field-installed device.
- Use indoors at an altitude of 2000 m or less.
- Operating temperature/humidity range: -10 to 55°C (-10 to 45°C for side-by-side mounting\*)/5 to 90%RH (no condensation)
  - \* If the previous model (style S3.xx earlier) is installed together, the ambient temperature is 0 to 40°C.
- Continuous vibration: (at 5 to 9 Hz) Half amplitude of 3 mm or less (at 9 to 150 Hz) 9.8m/s<sup>2</sup> or less, 1 oct/min for 90 minutes each in the three axis directions
- Impact: 98 m/s<sup>2</sup> or less, 11 ms, 3 axes, 6 directions, 3 times each

## 3. EXTERNAL WIRING



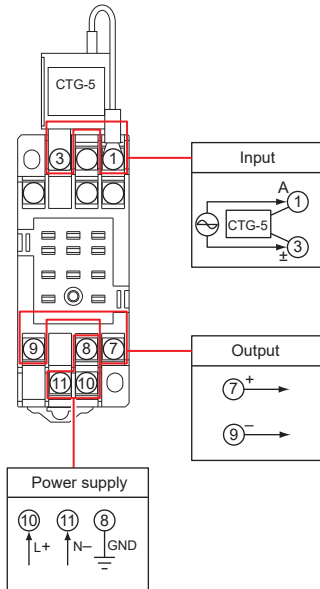
### WARNING

- To avoid the risk of an electric shock, turn off the power supply and use a tester or similar device to ensure that no power is supplied to a cable to be connected, before carrying out wiring work.
- Do not operate the product in the presence of flammable or explosive gases or vapors. To do so is highly dangerous.
- Use of the product ignoring the specifications may cause overheating or damage. Before turning on the power, ensure the following:
  - Power supply voltage and input signal value applied to the product should meet the required specifications.
  - The external wiring to the terminals and wiring to ground are as specifications.
- When disconnecting the main unit from the socket with a live wire, it is necessary to install a CT protector (CTG-5: sold separately) on the input terminal of VJB1. However, do not leave the main unit unattached from the socket for more than one minute even with the CTG-5 installed. If the main unit is removed from the socket without the CTG-5 installed, high voltage will be generated on the secondary side of the CT, which may cause burnout of the CT and is very dangerous.

Wiring should be connected to the terminals on the socket of the product. The terminals for external connections are of M3 screws. Use crimp-on terminal lugs for connections to the terminals.

- Recommended cables: A nominal cross-sectional area of 0.5 mm<sup>2</sup> or thicker for signal cables, and that of 1.25 mm<sup>2</sup> or thicker for power cables.

## Wiring Diagram



## CAUTION

- Unused terminals should not be connected.
- The power line and input/output signal lines should be installed away from noise-generating sources. Other wise accuracy cannot be guaranteed.
- Make sure to earth ground the ground terminal through minimum resistance. The length and thickness of the grounding cable should be as short and thick as possible. Directly connect the lead from the ground terminal (terminal no. 8) of the product to the ground. Do not carry out daisy-chained inter-ground terminal wiring.
- The product is sensitive to static electricity; exercise care in operating it. Before you operate the product, touch a nearby metal part to discharge static electricity.
- If the ambient temperature is 50 °C or more, please use the cable that the rated temperature is 70 °C or more.

## 4. MAINTENANCE

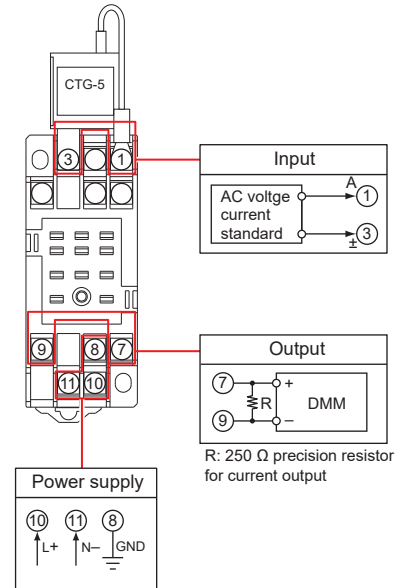
The product starts running immediately when the power is turned on; however, it needs 10 to 15 minutes of warm-up before it meets the specified performance.

### 4.1 Calibration Apparatus

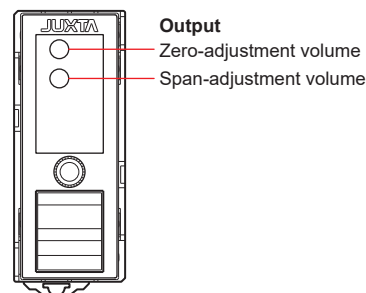
- A AC voltage current standard (YOKOGAWA 2558A or the equivalent)
- A digital multimeter (YOKOGAWA DM7560 or the equivalent)
- A precision resistor of 250  $\Omega \pm 0.01\%$ , 1 W

### 4.2 Calibration Procedure

1. Connect the instruments as shown below.



2. Use the AC voltage current standard and apply input signals equivalent to 0, 25, 50, 75, and 100% of the input span to the product.
3. Check to see the corresponding output voltages are 0, 25, 50, 75, and 100% respectively and within the specified accuracy rating. "R" is used for current output.
- If the output signals are out of the accuracy rating range, adjust the output signal level using the zero and span adjustment volumes on front face of the product.



## 5. SAFETY AND EMC STANDARDS

The following will be acquired.

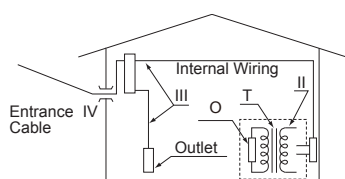
### Safety:

IEC/EN 61010-1 compliance (CE)  
 IEC/EN 61010-2-030 compliance (CE)  
 CAN/CSA-C22.2 No.61010-1 (CSA)  
 CAN/CSA-C22.2 No.61010-2-030 (CSA)  
 UL61010-1 (CSA NRTL/C)  
 UL61010-2-030 (CSA NRTL/C)  
 Overvoltage category: II  
 Pollution degree: 2  
 Measurement category: II  
 Rated power supply voltage: 15-30 V DC ( $\pm 10\%$ ) 1.6 W or  
 100-240V AC/DC ( $\pm 10\%$ )  
 50/60 Hz 1.6 W 4.6 VA  
 Rated voltage (Input signal) : 0.5 V rms  
 Rated voltage (Analog output signal): -10 to +10 V DC,  
 0 to 20 mA DC  
 Rated transient overvoltage: 1500 V



### CAUTION

**This instrument is for Measurement Category II.**  
**Do not use it for measurements in locations falling**  
**under Measurement Categories III, and IV.**



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



### CAUTION

**Precautions for using this product to comply with safety standards:**

**The insulation class between the input and output of this product is basic insulation (150V). When installing this product, make sure that the insulation class of this product satisfies the requirements for use. In addition, supplementary insulation is required between the output of this product and the connected equipment.**

### EMC standards:

- CE:
  - EN 61326-1 Class A, Table 2
  - EN 61326-2-3
  - \* The instrument continues to operate at a measurement accuracy of within  $\pm 20\%$  of the range during testing.
  - EN 55011 Class A, Group 1
  - EN 61000-3-2
  - EN 61000-3-3
- RCM:
  - EN 55011 Class A, Group 1
- KC:
  - Electromagnetic wave interference prevention standard, electromagnetic wave protection standard



### CAUTION

**Caution to comply with EMC standards: When operating this instrument by external power supply, use an independent power unit conforming to CE-marking. Be sure to use the lightning arrester to comply EMC standards.**

Note: When option code /C0 or /FB is specified, the conformity to the safety and EMC standards is excluded.

## 6. 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.)

## 7. TRANSPORT AND STORAGE CONDITIONS

- Temperature: -25 to 70°C
- Temperature change rate: 20°C per hour or less
- Humidity: 5 to 95%RH (no condensation)



### CAUTION

**Keep this product in a conductive bag when plugged out, during transport or storage.**