

Yokogawa Electric Corporation  
2-9-32, Naka-cho Musashino-shi, Tokyo 180-8750 Japan

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 77J01H21-01E  
1st Edition Feb. 2001 (MC)  
4th Edition Feb. 2017 (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 VJHK Limit Alarm for DC Voltage Input IM 77J01H21-01E (User's Manual)	(This manual)
Model VJHK Limit Alarm for DC Voltage Input GS 77J01H21-01E (General Specifications)	

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.**

### CHECKING THE PRODUCT SPECIFICATIONS AND THE CONTENTS OF PACKING

#### (1) Model and Specifications Check

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

#### (2) Contents of the Packing

Check that the package contains the following items:

- VJHK: 1
- Standard Accessories:
  - Tag number label: 1 sheet
  - Range label: 1 sheet
  - Shunt resistor (supplied when current input is specified): 1
  - User's manual (IM 77J01H21-01E, this manual): 1 copy
  - User's manual (IM 77J01A00-91Z1): 1 copy

### GENERAL

This plug-in type Limit Alarm for DC input receives DC current or DC voltage signal.

- Each parameter setting can be changed using a PC (VJ77 PC-based Parameters Setting Tool) or the Handy Terminal (JHT200).

### MODEL AND SUFFIX CODES

Model	Suffix codes							Description	
VJHK	-0	2	x	-x	T	0	0	/x	Limit Alarm for DC Voltage Input
Fixed code	-0								Always -0
Output configuration	2								2 outputs
Power supply	6								100-240 V AC/DC <sup>*1</sup>
	7								15-30 V DC <sup>*2</sup>
Input signal				-A					Within the range of 0 to 50 mA DC, span is 5 mA or more
				-1					Within the range of -10 to +10 V DC, span is 0.1 V or more
Output signal					T				Alarm output (2 relay contacts)
Fixed code						0			Always 0
Fixed code							0		Always 0
Option								/SN	No socket (with socket if not specified)
								/CO	HumiSeal coating
								/FB	Fuse bypass

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

\*2: Operating range: 12 to 36V DC

\*3: DC voltage signal or DC current signal

### 1. MOUNTING METHODS

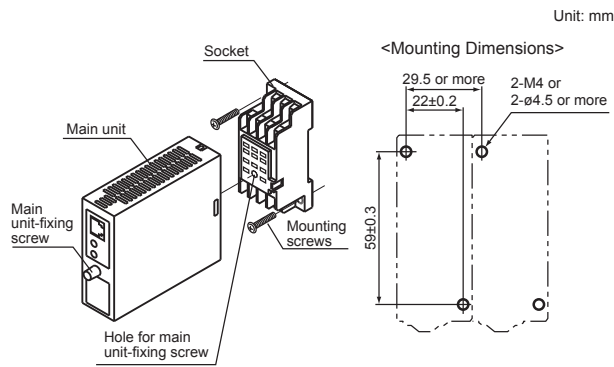


#### CAUTION

- 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.

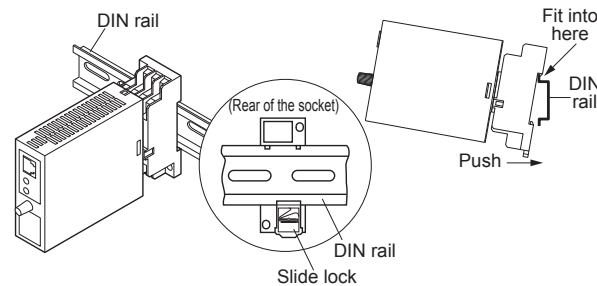
## 1.1 Wall Mounting

Loosen the main unit-fixing screw to disconnect the main unit from the socket. Next, anchor the socket onto the wall with screws. Then, plug the main unit into the socket and secure the main unit with the main unit-fixing screw.



## 1.2 DIN Rail Mounting

Locate the VJHK so that the DIN rail fits into the upper part of the DIN-rail groove at the rear of the socket, and fasten the socket using the slide lock at the lower part of the socket.



## 1.3 Mounting Using a Multi-mounting Base

For mounting using a multi-mounting base, see the Instruction Manual for VJCE (VJ Mounting Base).

## 1.4 Using a Duct

Wiring duct should be installed at least 30 mm away from the top and bottom faces of the main unit.

## 2. INSTALLATION LOCATIONS

- 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, 2,000 m or more above sea level.
- 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.
- 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



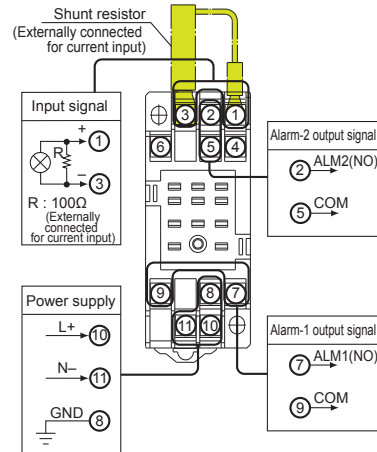
### WARNING

- 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.

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

- It is recommended that signal wires have a nominal cross-sectional area of 0.5 mm<sup>2</sup> or thicker, while the power cable has a nominal cross-sectional area of 1.25 mm<sup>2</sup> or thicker.



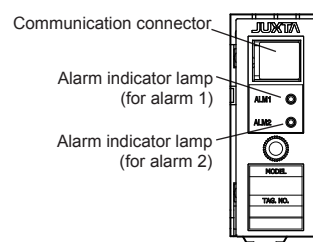
### CAUTION

- 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 an inductance (L) load such as auxiliary relays or solenoid valves is used, always insert a spark killer for diminishing sparks, such as a CR filter or a diode in parallel with the inductance load. Otherwise a malfunction or relay failure may occur. Refer to the following guidelines for a capacitor and resistor:
  - Capacitor : 0.5 to 1 μF with respect to a contact current of 1 A
  - Resistor: 0.5 to 1 Ω with respect to a contact voltage of 1 V
- The power line and input/output signal lines should be installed away from noise-generating sources. Otherwise 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.
- If the ambient temperature is 50 °C or more, please use the cable that the rated temperature is 70 °C or more.

## 4. DESCRIPTION OF FRONT PANEL AND CONNECTION OF SETTING TOOLS

### 4.1 Front Panel

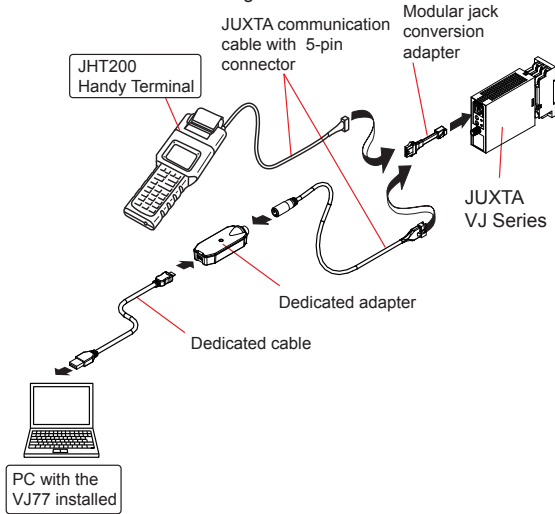
The communications connector on the front panel is used for setting up parameters using a PC (VJ77 PC-based Parameters Setting Tool) or the Handy Terminal (JHT200). The alarm indicator lamps for alarm 1 and alarm 2 light up if an alarm occurs.



## 4.2 Connecting the Setting Tools

Connect the modular jack conversion adapter to the JUXTA communication cable with 5-pin connector and then connect this adapter to the communication connector of JUXTA.

<How to connect with the setting tool>



- Use the VJ77 of version R2.02.01 or later.
- The modular jack conversion adapter does not come with the JHT200 Handy Terminal. It is sold separately.

## 5. SETTING PARAMETERS

Set the parameters using a PC (VJ77 PC-based Parameters Setting Tool) or the Handy Terminal (JHT200). Refer to the list of parameters in this manual and the user's manual for VJ77 PC-based Parameters Setting Tool (IM 77J01J77-01E) or JHT200 Handy Terminal (IM 77J50H01-01EN).

### 5.1 Settings Related to Input

#### 5.1.1 Input Type

Select the input type from among VOLTS (DC voltage) and CURRENT (DC current) in [D12: INP TYPE].

#### 5.1.2 Input Range

Set the 0% value of input range in [D25: INPUT1 L\_RNG] and the 100% value of input range in [D26: INPUT1 H\_RNG] numerically within the specified range.

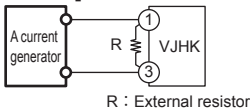
#### 5.1.3 Software Filter

Set the software filter in [D57: S/W 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.

#### 5.1.4 External Input Resistance Correction

For current input, set the external resistance to [D13: IN RESIST]. There is a difference between this value and the actual external resistance. If this difference causes an error, the input can be corrected. To perform correction, wire as shown in the figure below, apply a stable input equivalent to 100%, and set [P40: RESISTOR ADJ] to EXECUTE.

If you need perform correction again such as when the external resistance is changed, reset the correct value. To do so, set [P40: RESISTOR ADJ] to RESET.



### 5.2 Settings Related to Alarm Output

#### 5.2.1 Alarm Setpoint

Set the alarm setpoints of alarm 1 and alarm 2 in [E03: SET POINT1] and [E04: SET POINT2] numerically.

- Setting range: 0 to 100% of input range
- Setting resolution: 0.1%

#### 5.2.2 Direction of Alarm Action

Select the direction of alarm-1 action and that of alarm-2 action from among HIGH ALM (high-limit alarm) and LOW ALM (low-limit alarm) in [E05: ALM1 ACTION] and [E06: ALM2 ACTION].

- To activate alarm status when input signal  $\geq$  alarm setpoint, select HIGH ALM.
- To activate alarm status when input signal  $\leq$  alarm setpoint, select LOW ALM.

#### 5.2.3 Hysteresis

Set the alarm-1 and alarm-2 hysteresis in [E09: HYSTERESIS1] and [E10: HYSTERESIS2]. Hysteresis is a value added to the alarm setpoint in order for an alarm status to be released (to normal) after the alarm status has been activated. The alarm status will be released in the following conditions, depending on the direction of alarm action.

- \* When HIGH ALM (high-limit alarm) is set: Alarm is released when input signal  $<$  (alarm setpoint - hysteresis).
- \* When LOW ALM (low-limit alarm) is set: Alarm is released when input signal  $>$  (alarm setpoint + hysteresis).
- Setting range: 0 to 100% of input range
- Setting resolution: 0.1%

#### 5.2.4 Alarm ON Delay and Alarm OFF Delay

Set the alarm-1 and alarm-2 ON delays in [E11: ON DELAY1] and [E12: ON DELAY2] and then alarm-1 and alarm-2 OFF delays in [E13: OFF DELAY1] and [E14: OFF DELAY2].

An alarm ON delay is the condition monitoring time from the establishment of alarm conditions to its output; an alarm OFF delay is the condition monitoring time from the establishment of return-to-normal conditions to its output.

- Setting range: 0 to 999 seconds
- Setting resolution: 1 second (However, about 0.2 second is to be added to the set time to prevent wrong operation.)

For example, when an alarm ON delay is set to 1 second, alarm output is generated if alarm status continues for 1 second or more after the input value exceeds the alarm setpoint. Further, when an alarm OFF delay is set to 2 seconds, alarm output is released if normal condition continues for 2 seconds or more after the input value has returned to normal from the alarm status.

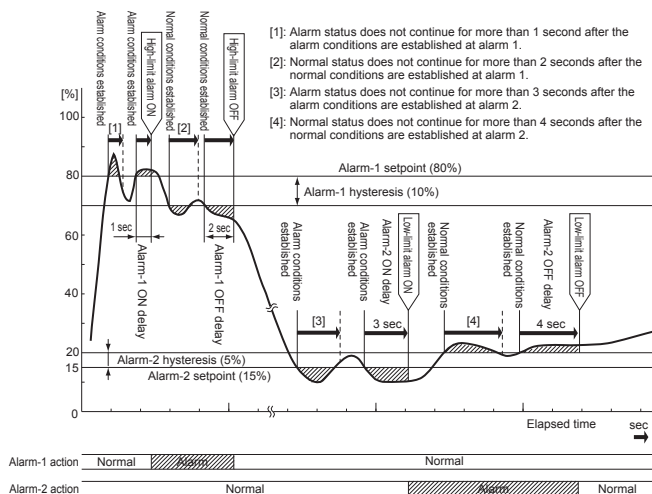
#### 5.2.5 Direction of Relay Action

Select the direction of relay energizing in alarm-1 normal condition and alarm-2 normal condition from among NRM DE-ENERGIZED (de-energized under normal condition) and NRM ENERGIZED (energized under normal condition) in [E15: RL1 ACTION] and [E16: RL2 ACTION].

## 6. DESCRIPTION OF ALARM ACTIONS

This chapter describes examples of alarm actions under the following conditions.

Item	Alarm 1		Alarm 2	
	Parameter	Setpoint	Parameter	Setpoint
Direction of alarm action	E05 : ALM1 ACTION	High-limit alarm	E06 : ALM2 ACTION	Low-limit alarm
Alarm setting	E03 : SET POINT1	80%	E04 : SET POINT2	15%
Hysteresis	E09 : HYSTERESIS1	10%	E10 : HYSTERESIS2	5%
Alarm ON delay	E11 : ON DELAY1	1 sec	E12 : ON DELAY2	3 sec
Alarm OFF delay	E13 : OFF DELAY1	2 sec	E14 : OFF DELAY2	4 sec
Description of alarm actions	The alarm is output if the condition where the input value is 80% or more of high-limit alarm continues for 1 second or more. After the alarm is output, when the condition where the input value is less than 70% of high-limit alarm continues for 2 seconds or more, the status returns to normal.		The alarm is output if the condition where the input value is 15% or less of low-limit alarm continues for 3 seconds or more. After the alarm is output, when the condition where the input value is more than 20% of low-limit alarm continues for 4 seconds or more, the status returns to normal.	



## 7. LIST OF PARAMETERS

	DISPLAY	ITEM
	MODEL	Model
	TAG NO	Tag No.
	SELF CHK	Self-check result
<b>A</b>	<b>DISPLAY1</b>	<b>Display 1</b>
A01	INPUT1	Input value 1
A09	OUTPUT1	Output value 1
A15	ALM1 STATUS	Alarm-1 status
A16	ALM2 STATUS	Alarm-2 status
A54	STATUS	Status *1
A56	REV NO	Rev No.
A58	MENU REV	Menu Rev
A60	SELF CHK	Self-check result
<b>B</b>	<b>DISPLAY2</b>	<b>Display 2</b>
B01	INPUT1	Input value 1
B09	OUTPUT1	Output value 1
B15	ALM1 STATUS	Alarm-1 status
B16	ALM2 STATUS	Alarm-2 status
B60	SELF CHK	Self-check result
<b>D</b>	<b>SET (I/O)</b>	<b>Setting (I/O)</b>
D01	TAG NO.1	Tag no.1
D02	TAG NO.2	Tag no.2
D03	COMMENT1	Comment 1
D04	COMMENT2	Comment 2
D12	INP TYPE	Input type
D13	IN RESIST	Input resistance
D24	INPUT1 L_RNG	Input low range
D25	INPUT1 H_RNG	Input high range
D57	S/W FILTER	Software filter
D59	NMRR	Frequency setting *2
D60	SELF CHK	Self-check result
<b>E</b>	<b>SET(ALM)</b>	<b>Setting (alarm output)</b>
E03	SET POINT1	Alarm-1 setting (%)
E04	SET POINT2	Alarm-2 setting (%)
E05	ALM1 ACTION	Direction of alarm-1 action
E06	ALM2 ACTION	Direction of alarm-2 action
E09	HYSTERESIS1	Alarm-1 hysteresis
E10	HYSTERESIS2	Alarm-2 hysteresis
E11	ON DELAY1	Alarm-1 ON delay setting
E12	ON DELAY2	Alarm-2 ON delay setting
E13	OFF DELAY1	Alarm-1 OFF delay setting
E14	OFF DELAY2	Alarm-2 OFF delay setting
E15	RL1 ACTION	Direction of alarm-1 relay action
E16	RL2 ACTION	Direction of alarm-2 relay action
E60	SELF CHK	Self-check result
<b>P</b>	<b>ADJUST</b>	<b>Adjustment</b>
P04	IN1 ZERO ADJ	Zero adjustment of input 1
P05	IN1 SPAN ADJ	Span adjustment of input 1
P40	RESISTOR ADJ	Adjustment of external input resistance
P60	SELF CHK	Self-check result
<b>Q</b>	<b>TEST</b>	<b>Test</b>
Q10	ALM1 TEST	Forced output (alarm 1)
Q11	ALM2 TEST	Forced output (alarm 2)
Q60	SELF CHK	Self-check result

\*1 The status is displayed for service personnel to see history records.

\*2 The parameters are the items to be set at the factory.

## 8. MAINTENANCE

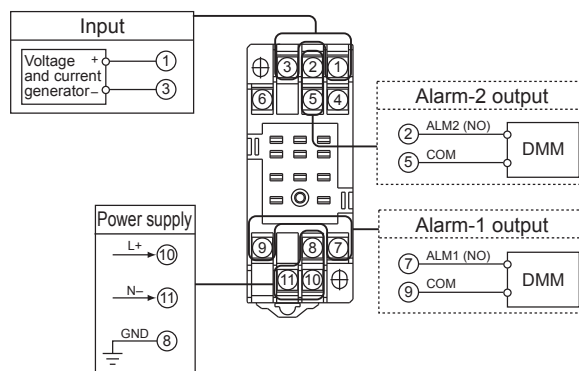
The product enters the operable status as soon as the power is turned on, but requires 10 to 15 minutes of warm-up to meet the performance requirements.

### 8.1 Calibration Apparatus

- A voltage and current generator (YOKOGAWA GS200 or the equivalent): 1
- Digital Multimeter (YOKOGAWA 7561 or equivalent): 1
- Setting tool for adjustment (Refer to "4.2 Connecting the Setting Tools" in this manual.)

### 8.2 Calibration Procedure

1. Connect the instruments as shown in figure below.



2. Produce the input signal equivalent to 0% of the input range from the voltage and current generator to the product.
3. Then, read the input value of Display items, "A01: INPUT1" using the VJ77 or JHT200 and check that the input value is within the rated accuracy range.
4. Take the same procedure for the input signal equivalent to 25, 50, 75 and 100% of the input range and check that the input values are within the rated accuracy range.

For alarm output, check the relay action by the alarm indicator lamp or resistance of output terminals.

- Use the setting tool (VJ77 Parameter Setting Tool or JHT200 Handy Terminal) to adjust the output signals.

User's Manual for VJ77 [Document No.: IM 77J01J77-01E]

User's Manual for JHT200 [Document No.: IM 77J50H01-01EN]

## 9. 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.