

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

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 VJA7 Distributor (User's Manual)	IM 77J01A07-01E (This manual)
Model VJA7 Distributor (General Specifications)	GS 77J01A07-01E

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.

CHECKING PRODUCT SPECIFICATIONS AND THE CONTENTS OF PACKING

(1) Model Number and Specification Check

Check that the model number and specifications shown on the nameplate attached on the side of the product are as ordered.

(2) Contents of the Packing

Check that the packing contains the following items:

- VJA7: 1 unit
- Standard Accessories:
 - Tag number label: 1 sheet
 - User's manual (IM 77J01A07-01E, this manual): 1 copy
 - User's manual (IM 77J01A00-91Z1): 1 copy

GENERAL

This distributor, which belongs to the JUXTA series of signal conditioners, receives 4 to 20 mA DC signals from two-wire transmitters while supplying power to transmitters and converting the received signal to pairs of isolated current and voltage signals.

- Output-2 signal is selectable from a DC voltage signal, DC current signal, communication function (RS-485), and alarm output (two relay contacts). (Isolated Dual-output Type)
- Various parameters such as input range can be set and modified using a PC (VJ77 (sold separately)) or Handy Terminal (JHT200 (sold separately) and the like).

MODEL AND SUFFIX CODES

Model	Suffix codes	Description
VJA7	-0 x x -A x x 0 /x	Distributor (Multi-function)
Fixed code	-0	Always -0
Output configuration	1 2	1 output 2 outputs
Power supply	6 7	100-240 V AC/DC ¹ 15-30 V DC ²
Input signal	-A	4 to 20 mA DC Transmitter power supply: 25.25 ± 0.25 V DC
Output-1 signal	A 6 Z	4 to 20 mA DC 1 to 5 V DC (Custom order) ³
Output-2 signal	A 6 P T N	4 to 20 mA DC 1 to 5 V DC Communication function (RS485) Alarm output (2 relay contacts) No output-2
Fixed code	0	Always 0
Option	/SN /C0 /FB	No socket (with socket if not specified) HumiSeal coating ⁴ Fuse bypass ⁴

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

*2: Operating range: 12 to 36V 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.

1. MOUNTING METHODS

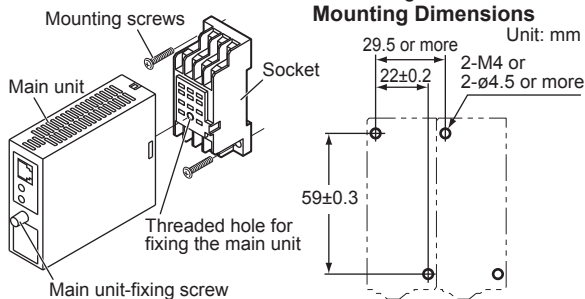


CAUTION

- 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.

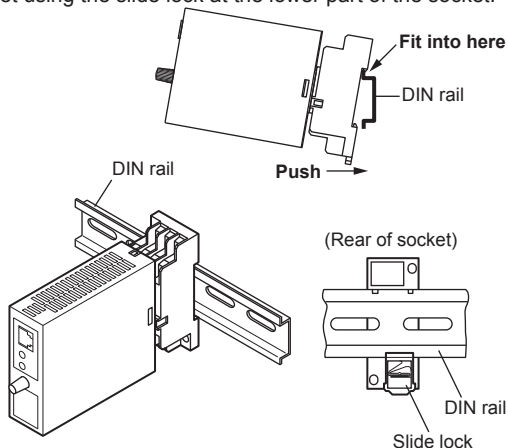
1.1 Wall Mounting

Loosen the main unit-fixing screw of the distributor 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 distributor 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 Ducts

Wiring ducts should be installed at least 30 mm away from the top or bottom of the main unit.

2. INSTALLATION LOCATION

- 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/s² or less, 1 oct/min for 90 minutes each in the three axis directions
- Impact: 98 m/s² or less, 11 ms, 3 axes, 6 directions, 3 times each

3. EXTERNAL WIRING



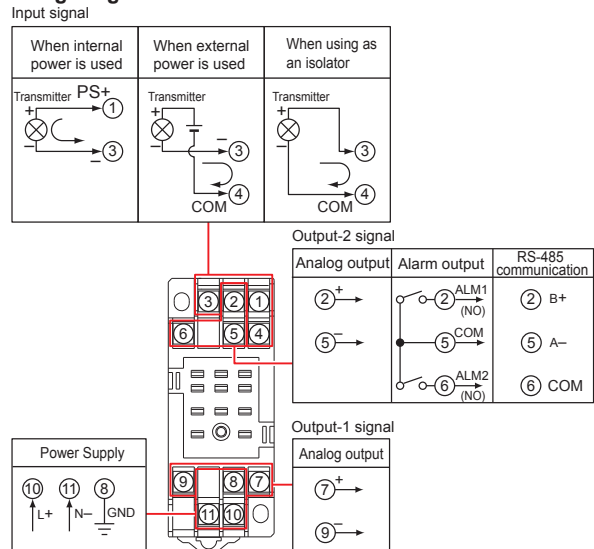
WARNING

- 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 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 mm² or thicker for signal cables, and that of 1.25 mm² or thicker for power cables.

Wiring Diagram



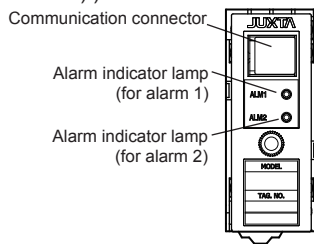
CAUTION

- Do not use output-2 for the isolated single-output type.
- 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.
- The use of inductance (L) loads such as auxiliary relays and solenoid valves causes malfunction or relay failure; always insert a CR filter or diode for spark-removal into the line in parallel with the load.
 - Recommended CR
 - C: 0.5 to 1μF against contact current 1A
 - R: 0.5 to 1Ω against contact voltage 1V
- 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 HANDY TERMINAL

4.1 Front Panel

The communications connector in the front panel is used for setting up parameters through the Handy Terminal. The alarm-1 and alarm-2 LEDs light up if an alarm occurs (those LEDs are provided only when the output-2 is specified for alarm output (the output-2 suffix code is T).)

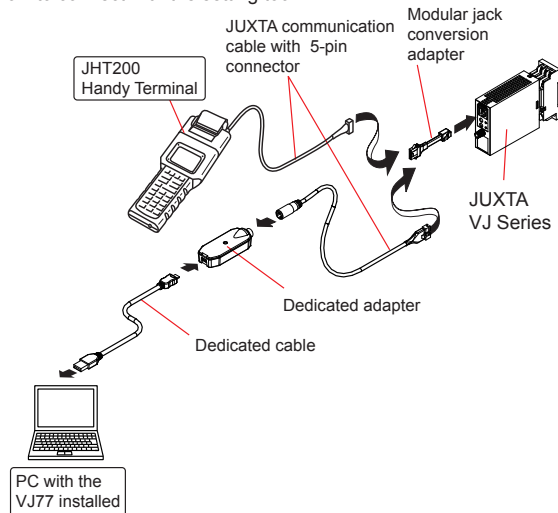


4.2 Connecting the Handy Terminal

Connect the modular jack-to-connector adapter to the connection cable (with 5-pin connector) of the Handy Terminal and then connect this adapter to the communications connector of the distributor.

< How to connect with the setting tool >

<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 Parameter Setting Tool) or the Handy Terminal. Refer to "7. LIST OF PARAMETERS" in this manual and the User's Manual for VJ77 PC-based Parameters Setting Tool (IM 77J01J77-01E) or the User's Manual for JHT200 Handy Terminal (IM 77J50H01-01EN).

5.1 Settings Related to Inputs and Outputs

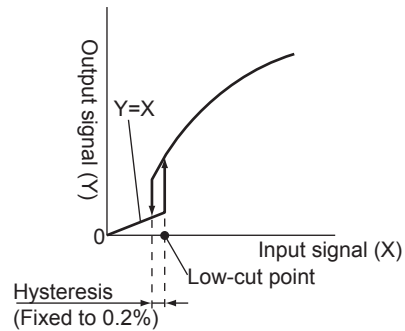
5.1.1 Square Root Extraction

Select SQR in [D41: LINEARIZE]. To linearize the signal, set [D41: LINEARIZE] to SQR. Not to linearize the signal, set [D41: LINEARIZE] to OFF.

5.1.2 Low-cut Function

Set this parameter when an input signal is square-root extracted for use. Set it in [D42: LOW CUT] numerically.

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



5.1.3 Linearization

Set the breakpoint linearization in [D41: LINEARIZE].

Select "ON" to use the breakpoint linearization.

Select "OFF" not to use the breakpoint linearization.

Set the breakpoints data.

Set the input breakpoints data in [M01: X TABLE] to [M32: X TABLE].

Set the number of breakpoints data in [M33: MAX POINT].

Set the output breakpoints data in [N01: Y TABLE] to [N32: Y TABLE].

- Setting condition of breakpoints data

Maximum number of breakpoints: 32

Setting range: -6 to 106% (both input and output)

- Set a relationship between the input and output at % value to the span.
- With 4 significant digits; can be set to the second place of a decimal point.
- For input: $-6.00\% \leq X_0 < X_1 < X_2 \dots X_{n-1} < X_n \leq 106.0\%$
- For output: $-6.00\% \leq Y_0 < Y_1 \leq 106.0\%$

5.1.4 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.

5.1.5 Direction of Output Action

Analog output signals can be reversed. To reverse the signal from output-1, set [D50: OUT1 DR] to REVERSE. For output-2, set [D51: OUT2 DR] to REVERSE. To return the output-1 signal to normal, set [D50: OUT1 DR] to DIRECT. For output-2, set [D51: OUT2 DR] to DIRECT.

5.2 Settings Related to Communication Function

Set the following parameters when output-2 is specified for communication function. For more information on the communication function, see the Instruction Manual for VJ Series Communication Function (IM 77J1J11-01E).

5.2.1 Communication Protocol

Set the communication protocol by selecting from among PC-LINK, PC-LINK WITH SUM, MODBUS ASCII, MODBUS RTU, and LADDER in [F01: PROTOCOL].

5.2.2 Communication Address

Set the address number of the distributor numerically in a range of 1 to 99 in [F02: ADDRESS].

5.2.3 Baud Rate

Set the baud rate by selecting from among 1200, 2400, 4800, 9600, 19200, and 38400 bps in [F03: BAUD RATE].

5.2.4 Parity

Select and set NONE, EVEN, or ODD in [F04: PARITY].

5.2.5 Data Length

Select and set 7 bits or 8 bits in [F05: DATA LEN].

5.2.6 Stop Bit

Select and set 1 bit or 2 bits in [F06: STOP BIT].

5.2.7 Input Decimal Point Position

Number of digits of decimal places (setting of D register [D0003]) can be set.

Select and set among 0 to 5 digits in [F07: INPUT DEC PT].

5.3 Settings Related to Alarm Output

Set the following parameters when output-2 is specified for alarm output.

5.3.1 Alarm Setpoints

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

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

5.3.2 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) and set each in [E05: ALM1 ACTION] (direction of alarm-1 action) or [E06: ALM2 ACTION] (direction of alarm-2 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.

5.3.3 Hysteresis

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

5.3.4 Alarm ON Delay and Alarm OFF Delay

Set 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 a delay time from the establishment of alarm condition to alarm output; an alarm OFF delay is a delay time from the establishment of return-to-normal condition to output.

- Setting range: 0 to 999 seconds
- Setting resolution: 1 second (Note that about 0.2 second will be added to set time to prevent erroneous operation.)

For example, when an alarm ON delay is set to 1 second, alarm output is generated if alarm status continues for more than 1 second 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 more than 2 seconds after the input value has returned to normal from the alarm status.

5.3.5 Direction of Relay Action

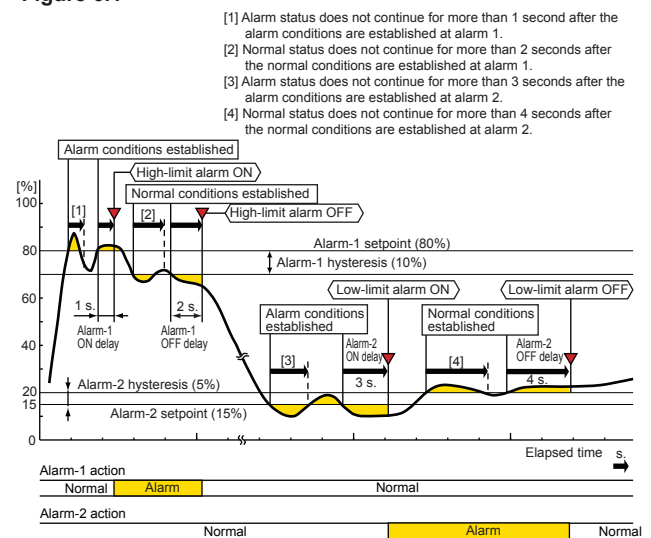
Set the direction of relay energizing in alarm-1 normal condition and alarm-2 normal condition by selecting from among NRM DE-ENERGIZED (de-energized under normal condition) and NRM ENERGIZED (energized under normal condition) in [E15: RL1 ACTION] and [E16: RL2 ACTION] and set them.

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.	

Figure 6.1



7. LIST OF PARAMETERS

Parameter Display	Item
MODEL	Model
TAG NO	Tag no.
SELF CHK	Self-check result
A DISPLAY1	Display 1 *2
A01 INPUT1	Input value 1
A09 OUTPUT1	Output value 1
A10 OUTPUT2	Output value 2
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 DISPLAY2	Display 2 *2
B01 INPUT1	Input value 1
B09 OUTPUT1	Output value 1
B10 OUTPUT2	Output value 2
B15 ALM1 STATUS	Alarm-1 status
B16 ALM2 STATUS	Alarm-2 status
B60 SELF CHK	Self-check result
D SET (I/O)	Setting (I/O) *2
D01 TAG NO.1	Tag no. 1
D02 TAG NO.2	Tag no. 2
D03 COMMENT1	Comment 1
D04 COMMENT2	Comment 2
D32 OUT1 L RNG	Output-1 low range *3
D33 OUT1 H RNG	Output-1 high range *3
D34 OUT2 L RNG	Output-2 low range *3
D35 OUT2 H RNG	Output-2 high range *3
D41 LINEARIZE	Linearize
D42 LOW CUT	Low cut
D50 OUT1 DR	Direction of output-1 action
D51 OUT2 DR	Direction of output-1 action
D57 S/W FILTER	Software filter
D59 NMRR	Frequency setting *3
D60 SELF CHK	Self-check result
E SET(ALM)	Setting (alarm output) *2
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-1 relay action
E60 SELF CHK	Self-check result
F SET(COM)	Setting (communication) *2
F01 PROTOCOL	Communication protocol
F02 ADDRESS	Address
F03 BAUD RATE	Baud rate
F04 PARITY	Parity
F05 DATA LEN	Data Length
F06 STOP BIT	Stop bit
F07 INPUT DEC PT	Decimal point position of input
F60 SELF CHK	Self-check result
M X TABLE	Input breakpoint table *2
M01 X TABLE	Input breakpoints data
M02 X TABLE	Input breakpoints data
⋮	⋮
M31 X TABLE	Input breakpoints data
M32 X TABLE	Input breakpoints data
M33 MAX POINT	Number of breakpoints
M60 SELF CHK	Self-check result
N Y TABLE	Output breakpoint table *2
N01 Y TABLE	Output breakpoints data
N02 Y TABLE	Output breakpoints data
⋮	⋮
N31 Y TABLE	Output breakpoints data
N32 Y TABLE	Output breakpoints data
N60 SELF CHK	Self-check result
P ADJUST	Adjustment *2
P04 IN1 ZERO ADJ	Zero adjustment of input-1
P05 IN1 SPAN ADJ	Span adjustment of input-1
P30 OUT1ZERO ADJ	Zero adjustment of output-1
P31 OUT1SPAN ADJ	Span adjustment of output-1
P32 OUT2ZERO ADJ	Zero adjustment of output-2
P33 OUT2SPAN ADJ	Span adjustment of output-2
P60 SELF CHK	Self-check result

Q	TEST	Test	*2
Q04	OUT1 TEST	Forced output (output 1)	
Q05	OUT2 TEST	Forced output (output 2)	
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 There are items not displayed depending on what output-2 is specified.
X TABLE/Y TABLE is displayed when D41:LINEARIZE=ON.

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

8. 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.

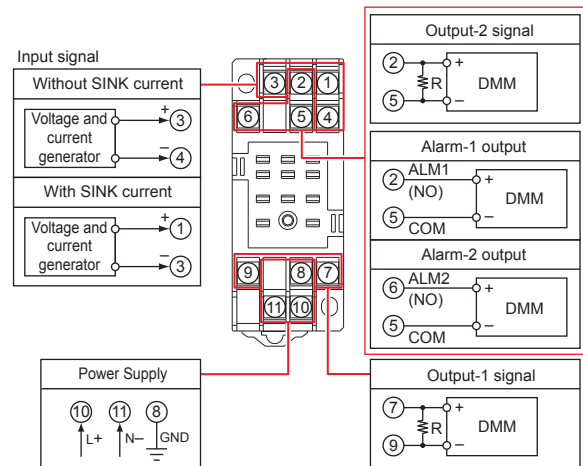
For cleaning the instrument, use a soft and dry cloth.

8.1 Calibration Apparatus

- A voltage and current generator (YOKOGAWA GS200 or the equivalent)
- A voltmeter (YOKOGAWA 7561 or the equivalent)
- A precision resistor of $250 \Omega \pm 0.01\%$, 1 W (for current output)
- 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. First adjust the output-1 signal and then the output-2 signal.



R: For current output using 250Ω precision resistor

2. Produce input signals equivalent to 0, 25, 50, 75, and 100% of the input span (or those equivalent to 0, 6.25, 25, 56.25, and 100% of the input span if square root extraction is set) from the voltage and current generator to the distributor.
3. Then, check that the distributor's output signal shows voltages corresponding to 0, 25, 50, 75, and 100% of the input span within the rated accuracy range.

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

- If the output signal is out of the rated accuracy range, adjust the output signal level using the Handy Terminal (JHT200). For adjustment using a setting tool, refer to the User's Manual for each setting tool and "List of Parameters" in this manual. User's Manual for VJ77 [Document No.: IM 77J01J77-01E] User's Manual for JHT200 [Document No.: IM 77J50H01-01EN]

9. 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 compliance (CSA)

UL61010-1 (CSA NRTL/C)

Installation category II

Pollution degree 2

Measurement category O (other)

Rated measurement input voltage: 10 V DC max.

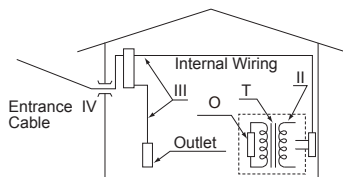
Rated transient overvoltage: 1500 V (*)

* This is a reference safety standard value for Measurement Category I of CSA/UL61010-1 and Measurement Category O of EN 61010-2-030. This value is not necessarily a guarantee of instrument performance.



CAUTION

This instrument is for Measurement Category O (other). Do not use it for measurements in locations falling under Measurement Categories II, 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.

EMC standards:

- CE marking:
 - 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 Class A
 - EN 61000-3-3
- EMC Regulatory Arrangement in Australia and New Zealand (RCM):
 - EN 55011 Class A, Group 1
- KC marking:
 - Electromagnetic wave interference prevention standard,
 - electromagnetic wave protection standard compliance



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.

10. ENVIRONMENT STANDARD

RoHS Directive: EN 50581

(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.)

11. 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.