

General Specifications

Model MVRK
Limit Alarm for RTD Input
(with Active Color PV Display)

JUXTA

GS 77J04R31-01E

General

This plug-in type Limit Alarm for RTD input receives RTD signal. It is equipped with Active color PV display (PV display color changing function).

- Either 2 points of alarms (relay transfer contact [1a1b], 2 points) or 4 points of alarms (relay NO contact, 4 points) can be selected.
- An alarm status in the event of an alarm can be recognized.
- Equipped with easy-to-see large LED display as standard.
- Using the economical mode enables the low power consumption operation (normal operation: approx. 0.5 W, 1 VA).
- Input range and each parameter setting can be changed by the operation keys on the front panel.
- Can be equipped with monitor output (1 to 5 V DC, 4 to 20 mA DC or RS-485 communication).

Model and Suffix Codes

Model	Type	Power Supply	Input Signal	Output Signal	Monitor Output	Burnout Function	Optional Specification
MVRK-□ 0 □ - □ □ □ □ / □ □	0: General use type	3: 24 V DC±10% 6: 100-240 V AC/DC (Operating range: 85 to 264 V)	U: RTD input Z: Custom order	1: Alarm output (transfer contact [1a1b]), 2 points 2: Alarm output (NO contact), 4 points	6: 1 to 5 V DC A: 4 to 20 mA DC P: Communication function (RS-485) N: No monitor output	U: UP D: DOWN N: OFF	/SN: No socket (with socket if not specified) /C0: Coating (Note 1) /FB: Fuse bypass (Note 2)

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

- Specify the following when ordering.
- Model and suffix codes: e.g. MVRK-006-U2PU
 - Range code No.: e.g. 61

Initial Values (Factory-set Values)

The following are the initial values for range code No. 61.

Item	Initial value	
	2 points of alarms	4 points of alarms
Range code No.	61	
	Input type: Pt100 (ITS-90) Instrument input range: -199.9 to 660.0°C	
Economical mode	10 minutes	
Active color PV display	1 (fixed in red)	
Direction of alarm action	Alarm 1	Low-limit alarm
	Alarm 2	High-limit alarm
	Alarm 3	—
	Alarm 4	—
Alarm setting	Alarm 1	20.0°C
	Alarm 2	80.0°C
	Alarm 3	—
	Alarm 4	—
Hysteresis (For all of alarms 1, 2, 3 and 4)	3.0°C	
Alarm ON delay	0 second	
Alarm OFF delay	0 second	
When the monitor output code "6" or "A" is specified		
Monitor output	A value that -199.9 to 660.0°C is equivalent to 0 to 100%.	
When the monitor output code "P" is specified		
Address	01	
Baud rate	9600	
Parity	Even	
Data length	8 bits	
Stop bit	1 bit	
Protocol	PC link	

Input and Display Specifications

Input

Number of inputs: 1 point

Signal type: IEC/JIS-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

Input range: Within the instrument input range

Range code No.	Input type	Instrument input range
61	Pt100 (ITS-90)	-199.9 to 660.0 °C
62		-199.9 to 200.0 °C
63	Pt100 (IPTS-68)	-199.9 to 660.0 °C
64		-199.9 to 200.0 °C
65	JPt100 (JIS'89)	-199.9 to 510.0 °C
66		-199.9 to 190.0 °C
67	Pt50 (JIS'81)	-199.9 to 649.0 °C

Pt100 (ITS-90): R0=100 Ω, R100/R0=1.3851
 JPt100 (JIS'89): R0=100 Ω, R100/R0=1.3916
 Pt100 (IPTS-68): R0=100 Ω, R100/R0=1.3850

* Range code No. (71 to 77) for Kelvin (K) is also available.

Burnout detective current: 0.1 μA

Allowable leadwire resistance: [Input span (°C) × 0.4 (Ω)] or 10 Ω per leadwire, equal or less than whichever is smaller. (Make the resistance of each wire the same.)
 However, when used with BARD-700, this value can be added to the BARD internal resistance.

Detective current: Approx. 0.2 mA

Maximum allowable input: ±4 V DC

Display

PV (measured value) display: 4-digit, 7-segment, red/green LED, character height of 13.5 mm

Data display: 4-digit, 7-segment, green LED, character height of 9 mm

Alarm indicator lamp: 2 orange LEDs for 2 points of alarms or 4 orange LEDs for 4 points of alarms. Lights up if an alarm occurs.

Economical mode: Turns off the indicating LED if no keystroke is made within the set time.

Setting range: 0 (does not go off) or 1 to 60 minutes

Active color PV display (PV display color changing function): This function changes the PV display color from green to red or from red to green according to the set PV display color mode shown below.

[PV display color mode to be set]

Link to alarm 1: Links to alarm 1.

Link to alarm 1 and alarm 2: Links to alarm 1 and alarm 2.

Link to alarm 1 to alarm 4 (only for 4 points of alarms): Links to alarm 1 to alarm 4.

SP deviation: Changes the PV display color according to whether measured value is within or out of the set SP deviation. The deviation range (high and low limits) can be changed using a parameter.

PV limit: Changes the PV display color according to whether measured value is within or out of the set measured range. The range (high and low limits) can be changed using a parameter.

Fixed color: Fixes PV display color in green or red.

Output Specifications

Signal type: Relay contact

Number of outputs: 2 points of contact outputs (transfer contact [1a1b]) or 4 points of contact outputs (NO contact)

Contact rating: 120 V AC/1 A, 220 V AC/0.5 A (resistance load)
 30 V DC/1 A, 120 V DC/0.1 A (resistance load)

Alarm action:

Alarm action	Relay action
PV high-limit alarm	Energized or de-energized under normal condition
PV low-limit alarm	Energized or de-energized under normal condition
Deviation high-limit alarm	Energized or de-energized under normal condition
Deviation low-limit alarm	Energized or de-energized under normal condition
Deviation high and low-limit alarm	De-energized under normal condition
Deviation within high and low-limit alarm	De-energized under normal condition

Stand-by action can be set to each alarm in the table above.

Stand-by action: Stand-by action turns off the PV (measured value) and deviation alarms during the start-up of control and does not allow them to resume until the operation stabilizes.

Alarm setting range: Within the input range

Setting resolution: 1 digit (0.1°C)

Setpoint setting: Virtual setpoint when the deviation alarm occurs

Setting range: Within the input range

Setting resolution: 1 digit (0.1°C)

Hysteresis setting range: The value resulting from adding a hysteresis value to an alarm setpoint should be within the input range.

Setting resolution: 1 digit (0.1°C)

Alarm ON delay setting: Condition monitoring time from the establishment of alarm 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.)

Alarm OFF delay setting: 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.)

■ Monitor Output

● Analog Output

Output signal: 1 to 5 V DC or 4 to 20 mA DC

Allowable load resistance:

2 k Ω or more for 1 to 5 V DC

350 Ω or less for 4 to 20 mA DC

Output variable range: -6 to +106%

Output scaling: Set any value within the measured input range ^(Note 3).

Note 3: Set the value so that the input range corresponding to the output scaling is 10°C or more.

Output accuracy: $\pm 0.1\%$ of output span

However, the accuracy is limited in the following cases according to the output scaling setting.

When the input range corresponding to the output scaling converted into resistance is less than 38.6 Ω in the instrument input range

$$\text{Accuracy} = \frac{\pm 0.1 (\%) \times 38.6 (\Omega)}{\text{Input range converted into resistance } (\Omega)} (\%)$$

● Communication Output (RS-485)

The MVRK can be connected to a personal computer, graphic panel, Yokogawa's programmable controller FA-M3 or programmable controllers of other manufacturers.

Standards: EIA RS-485

Maximum number of connectable units: 31 units

Maximum communication distance: 1200 m

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

Baud rate: 1200, 2400, 4800, 9600, 19200, 38400 bps

Data length: 8 or 7 bits

Stop bit: 1 or 2 bits

Parity: Even, odd 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 or 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.

■ Standard Performance

Input display accuracy: $\pm 0.1\% \pm 1$ digit of instrument input range span

Alarm action point setting accuracy: $\pm 0.1\% \pm 1$ digit of instrument input range span

Response speed: 500 ms (Time to alarm output when the input change is 10 to 90% and alarm setpoint is 50%. When the alarm delay setting and hysteresis are minimum.)

Burnout: UP, DOWN or OFF

Burnout time: 60 seconds or less

Action: High-limit alarm output for UP

Low-limit alarm output for DOWN

Effect of power supply fluctuation: $\pm 0.1\%$ of span or less for the fluctuations within the allowable range of each power supply specification

Effect of ambient temperature change: $\pm 0.2\%$ of span or less for a temperature change of 10°C

Effect of leadwire resistance change: $\pm 0.2^\circ\text{C}$ or less for a change of 10 Ω /leadwire

■ Power Supply and Isolation

Power supply voltage: 24 V DC $\pm 10\%$

100-240 V AC/DC (-15%, +10%) 50/60 Hz

Power consumption: 24V DC 2.7 W, 110V DC 2.5W

100 V AC 4.2 VA, 200 V AC 5.4 VA

Insulation resistance: 100 M Ω /500 V DC between inputs, alarm outputs, power supply and monitor output mutually.

Withstand voltage: 2000 V AC/minute between inputs, (alarm outputs 1, 2, 3, 4), monitor output and power supply mutually.

However, the following is excluded.

1000 V AC/minute between (alarm outputs 1, 4) and (alarm outputs 2, 3) and between inputs and monitor output.

Note 4: For 2 points of alarms, alarm outputs 3 and 4 are excluded.

■ Environmental Conditions

Temperature: 0 to 50 °C (0 to 40 °C for multiple mounting)

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.

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.

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 Appearance

Construction: Plug-in type

Material: Casing: ABS + polycarbonate resin resin (black)

Socket: Modified polyphenylene oxide resin, including glass fiber (black)

Mounting method: Wall or DIN rail mounting
For side-by-side mounting, provide spacing of 5 mm or more between the products.

Connection method: M3.5 screw terminal for input/output and power supply

3-pin 2-piece connector for monitor output

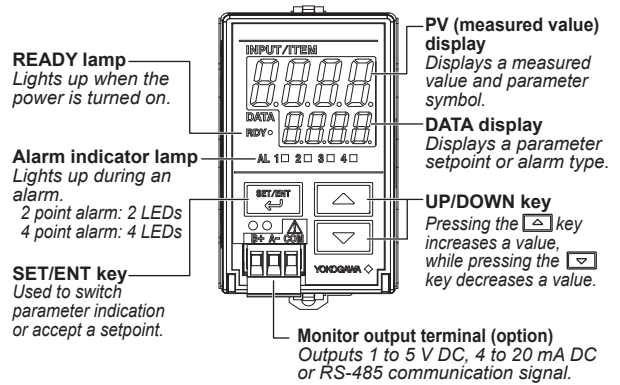
External dimensions: 86.5 (H) \times 51 (W) \times 132 (D) mm (including a socket)

Weight: Main unit: 200 g or less
 Socket: 80 g or less

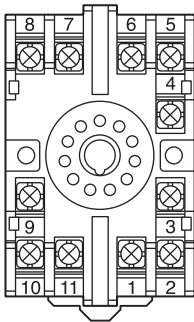
■ Accessories

- Tag number label: 1 sheet
- Range label: 1 sheet
- Spacer (used for DIN rail mounting): 1
- Monitor output terminal connector: 1 (supplied when monitor output code 6, A, P is specified)

■ Front Panel



■ Terminal Assignments



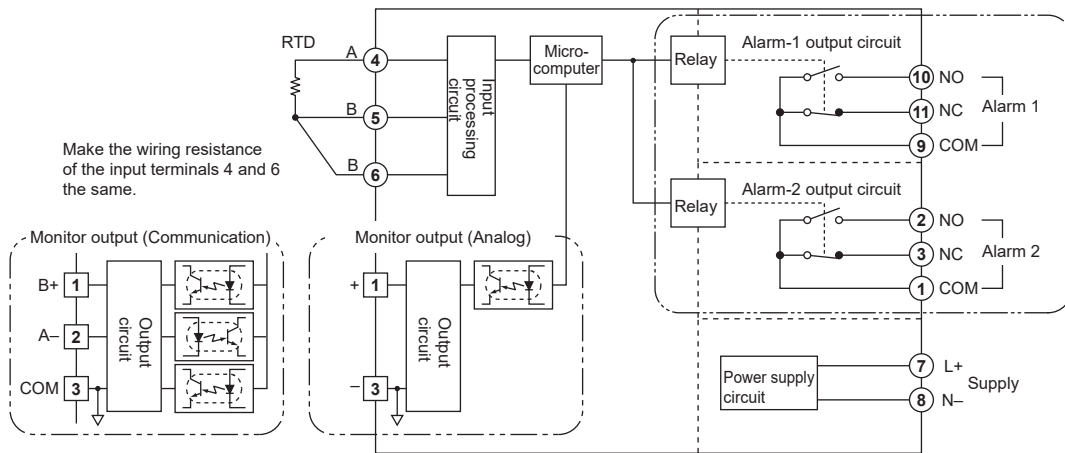
For MVRK-000-0100

Terminal No.	Signal	
1	Alarm 2	(COM)
2	Alarm 2	(NO)
3	Alarm 2	(NC)
4	Input	(A)
5	Input	(B)
6	Input	(B)
7	Supply	(L+)
8	Supply	(N-)
9	Alarm 1	(COM)
10	Alarm 1	(NO)
11	Alarm 1	(NC)

For MVRK-000-0200

Terminal No.	Signal	
1	Alarm 2, 3	(COM)
2	Alarm 2	(NO)
3	Alarm 3	(NO)
4	Input	(A)
5	Input	(B)
6	Input	(B)
7	Supply	(L+)
8	Supply	(N-)
9	Alarm 1, 4	(COM)
10	Alarm 1	(NO)
11	Alarm 4	(NO)

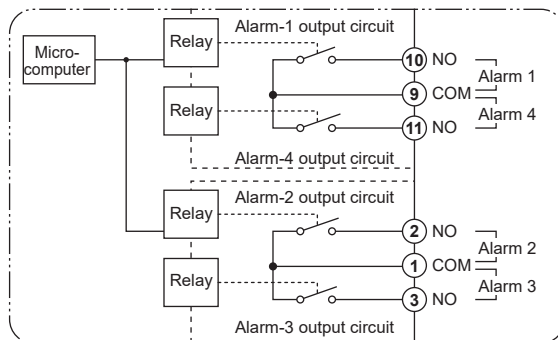
■ Block Diagrams



Note: The numbers in "○" indicate the terminal numbers of socket.
 The numbers in "□" indicate the monitor output terminals. The left most number is "1."

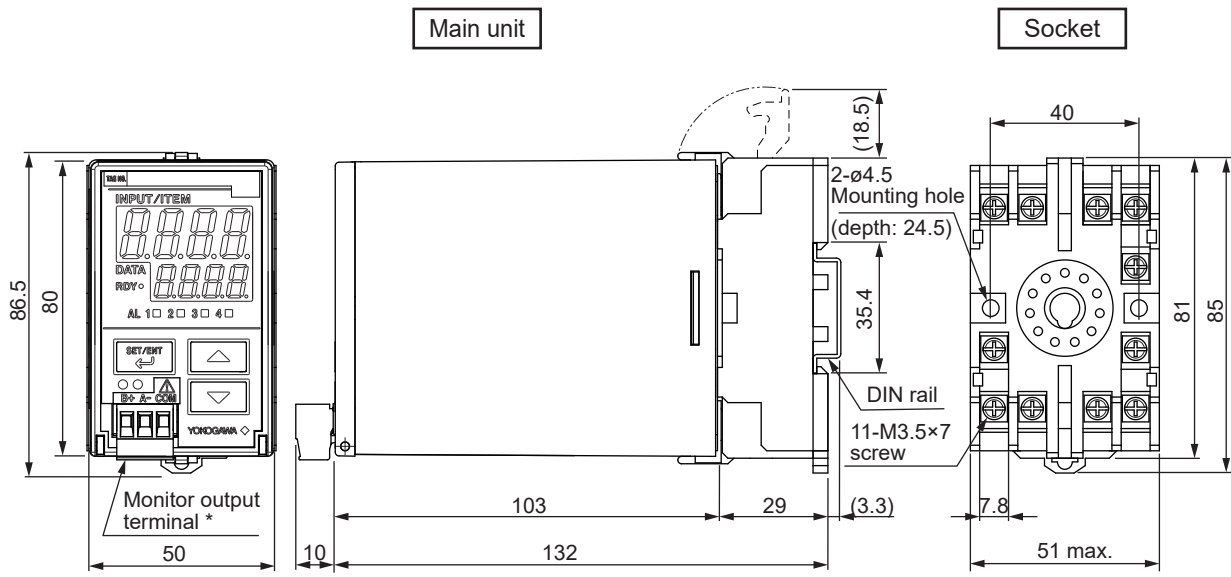
[Notes about the contact configuration for 2 points of alarms]
 Transfer contacts for 2 points of alarms consist of an NO contact and an NC contact. When using transfer contacts, consideration should be given to the risk of a short circuit due to contact MBB*1 resulting from non-concurrent action of the NO and NC contacts or to a short circuit caused by arcs produced when opening a contact at large current.
 *1: The condition where both NO and NC contacts close when the contact actuates

For 4 points of alarm outputs



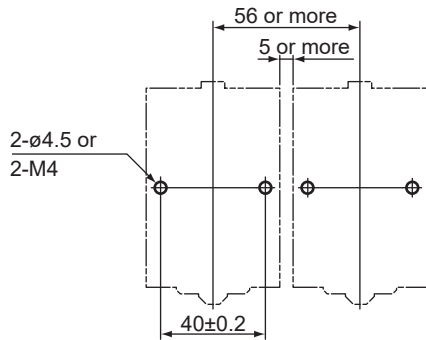
■ External Dimensions

Unit: mm



* To be added when the monitor output is specified.

Mounting Dimensions



Note:

- More than 5 mm interval is required for side-by-side close mounting.
- Use the supplied spacer for DIN rail mounting to keep 5 mm interval.

Normal Allowable Deviation= ± (Value of JIS B 0401-2016 tolerance grade IT18) / 2