General Specifications

Model MVHK
Digital Limit Alarm (DC Input Type)
with Active Color PV Display

JUXTA

GS 77J04H31-01E

■ General

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

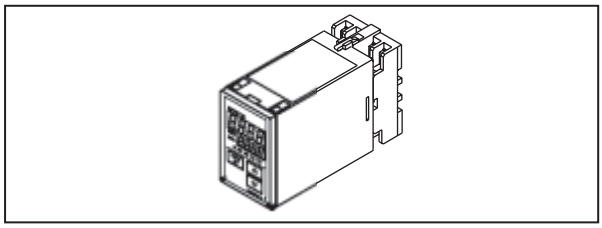
- Either 2 points of alarms (relay transfer contact [1a1b], 2 points) or 4 points of alarms (relay NO contact, 4 points) can be selected.
- An alarm status in the event of an alarm can be recognized.
- Equipped with easy-to-see large LED display as standard.
- Using the economical mode enables the low 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

MVHK-□ 0 □ - □ □ □ 0/□

Model
Type
0: General use type
1: JK12 type (The terminal assignment is same as that of Yokogawa's JK12 and MHKW.) (Note 1)
Power Supply
3: 24 V DC±10%
6: 100-240 V AC/DC (Operating range: 85 to 264 V)
Input Signal
6: 1 to 5 V DC (Note 2)
A: 4 to 20 mA DC (with 250 Ω receiving resistor)(Note 2)
U: DC voltage or DC current signal (shipped with factory-set value)(Note 3)
Z: Custom order
Output Signal
1: Alarm output (transfer contact [1a1b]), 2 points
2: Alarm output (NO contact), 4 points
Monitor Output
6: 1 to 5 V DC
A: 4 to 20 mA DC
P: Communication function (RS-485)
N: No monitor output
Optional Specification
/R100: With 100 Ω receiving resistor (Note 4)
/R250: With 250 Ω receiving resistor (Note 5)
/SN: Without socket

Note 1: For the type code "1" (JK12 type), output is 2 points of transfer contacts (1a1b) only.
Note 2: For the input signal code "6," factory-set values are as follows: range code No.: 92; measured input range: 1 to 5 V DC.
For the input signal code "A," factory-set values are as follows: range code No.: 97; measured input range: 4 to 20 mA DC.



Note 3: Refer to "Initial Values (Factory-set Values)."
Note 4: Specify "/R100" when using the range code No. 95 or 96.
Note 5: Specify "/R250" when using the range code No. 97 or 98.

■ Ordering Information

Specify the model and suffix codes at the time of order.
- Model and suffix codes: e.g. MVHK-006-U1N0/R250

■ Input and Display Specificaitons

Number of inputs: 1 point
Input signal: Set the measured input range within the instrument input range.

Range code No.	Instrument input range			
91	–10.00	to +10.00 V DC		(H range)
92	–5.00	to +5.00 V DC		(M range)
93	–1.000	to +1.000 V DC		(L range)
95	0.00	to 50.00 mA DC	*1	(M range)
96	0.00	to 10.00 mA DC	*1	(L range)
97	0.00	to 20.00 mA DC	*2	(M range)
98	0.000	to 4.000 mA DC	*2	(L range)

*1: 100 Ω receiving resistor; *2: 250 Ω receiving resistor

Input resistance:
For voltage input: 1 MΩ (100 kΩ during power off)
For current input: 100 Ω or 250 Ω (with external receiving resistor)
Input scaling (displayed value): –1999 to 9999 (Decimal point position can be set.)
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

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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 set input scaling value

Setting resolution: 1 digit (Note 6)

Setpoint setting: Virtual setpoint when the deviation alarm occurs

Setting range: Within the set input scaling value

Setting resolution: 1 digit (Note 6)

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

Setting resolution: 1 digit (Note 6)

Note 6: The content of 1 digit is variable according to the input scaling value.

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 kΩ 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 set input scaling value (displayed value).

Output accuracy: ±0.1% of output span
However, the accuracy is limited in the following cases according to the scaling setting.

When the input range corresponding to the output scaling is less than 5 V in the instrument input range H:

$$\text{Accuracy} = \frac{\pm 0.1\ (\%) \times 5\ (\text{V})}{\text{Corresponding input range (V)}}\ (\%)$$

When the input range corresponding to the output scaling is less than 2.5 V in the instrument input range M:

$$\text{Accuracy} = \frac{\pm 0.1\ (\%) \times 2.5\ (\text{V})}{\text{Corresponding input range (V)}}\ (\%)$$

When the input range corresponding to the output scaling is less than 0.5 V in the instrument input range L:

$$\text{Accuracy} = \frac{\pm 0.1\ (\%) \times 0.5\ (\text{V})}{\text{Corresponding input range (V)}}\ (\%)$$

For current input, apply the value [input range x input resistance] to the above, and add the resistor error 0.1%.

● Communication Output (RS-485)

The MVHK 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 or 9600 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: ±0.1%±1 digit of instrument input range span
Alarm action point setting accuracy: ±0.1%±1 digit of instrument input range span
For current input, add the resistor error 0.1%.
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.)
Insulation resistance: 100 MΩ/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 and 4), monitor output and power supply mutually.
However, the following is excluded.
1000 V AC/minute between (alarm outputs 1 and 4) and (alarm outputs 2 and 3) and between inputs and monitor output.
Note 7: For 2 points of alarms, alarm outputs 3 and 4 are excluded.
Power supply voltage: 24 V DC±10%
100-240 V AC/DC (-15%, +10%) 50/60 Hz
Power consumption: 24V DC 3.0 W, 110V DC 2.4W
100 V AC 3.9 VA, 200 V AC 5.3 VA
Effect of power supply fluctuation: ±0.1% of span or less for the fluctuations within the allowable range of each power supply specification
Effect of ambient temperature change: ±0.2% of span or less for a temperature change of 10 °C

■ Mounting, Appearance and Environmental Conditions

Construction: Plug-in type
Material: Casing: ABS resin (black), UL94 V-0
Socket: Modified polyphenylene oxide resin, including glass fiber (black), UL94 V-1
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: 51 (W) x 86.5 (H) x 133 (D) mm (including a socket)
Weight: Main unit: approx. 270 g
Socket: approx. 80 g
Operating temperature range: 0 to 50 °C
Operating humidity range: 5 to 90% RH (no condensation)
Operating conditions: Avoid installation in such environments as corrosive gas like sulfide hydrogen, dust, sea breeze and direct sunlight.

■ Accessories

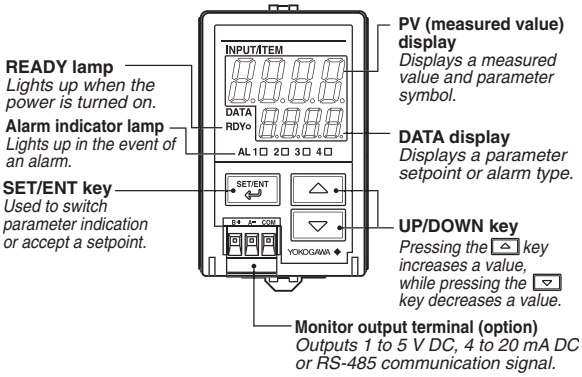
Tag number label: 1 sheet
Range label: 1 sheet
Receiving resistor (supplied when the optional specification code "/R100," "/R250" or the input signal code "A" is specified): 1
Spacer (used for DIN rail mounting): 1

■ Initial Values (Factory-set Values)

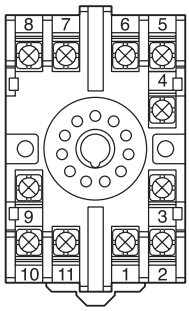
The table below shows the factory-set values when the input signal code "U" is specified.
For the input signal code "6," the range code No. is "92" and measured input range is "1.00 to 5.00 V DC."
For the input signal code "A," the range code No. is "97" and measured input range is "4.00 to 20.00 mA DC."
See the table below for other factory-set values.

Item		Initial value	
		2 points of alarms	4 points of alarms
Range code No.		92	
Measured input range		–5.00 to +5.00 V DC	
Decimal point position of scaling value		1 (first decimal place)	
Input scaling value		0.0 to 100.0	
Economical mode		10 minutes	
Active color PV display		1 (fixed in red)	
Direction of alarm action	Alarm 1	Low-limit alarm	Low-limit alarm
	Alarm 2	High-limit alarm	Low-limit alarm
	Alarm 3	———	High-limit alarm
	Alarm 4	———	High-limit alarm
Alarm setting	Alarm 1	20.0	20.0
	Alarm 2	80.0	30.0
	Alarm 3	———	70.0
	Alarm 4	———	80.0
Hysteresis (For all of alarms 1, 2, 3 and 4)		1.0	1.0
Alarm ON delay		0 second	0 second
Alarm OFF delay		0 second	0 second
When the monitor output code "6" or "A" is specified			
Monitor output		A value that scaling value is equivalent to 0 to 100%. (Input range is output in linear.)	
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	

■ Front Panel



■ Terminal Assignments



MVHK-0□□-□1□□

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

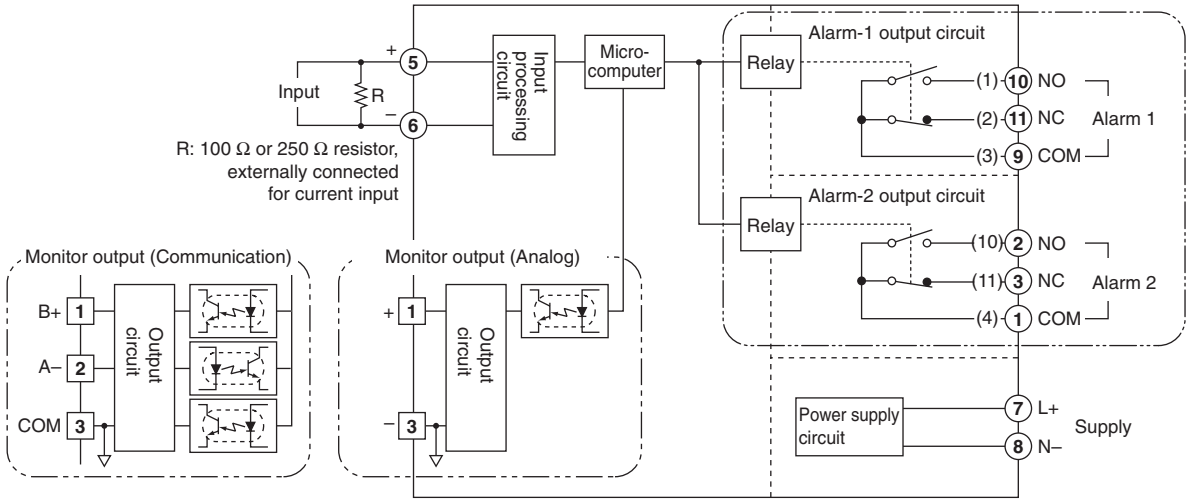
MVHK-0□□-□2□□

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

MVHK-1□□-□1□□

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

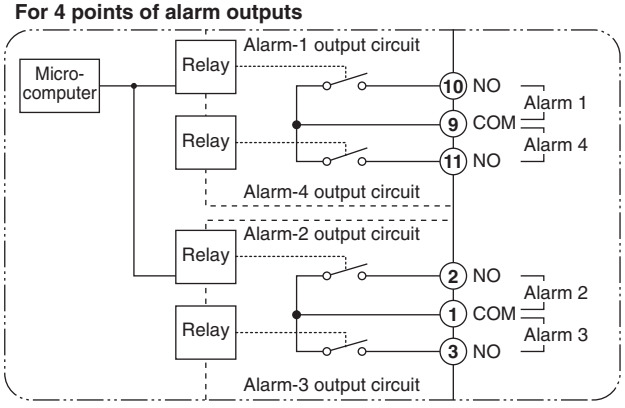
■ Block Diagrams



Note: The numbers in "◯" indicate the terminal numbers of socket.
The numbers in "□" indicate the monitor output terminals. The left most number is "1."
The numbers in "( )" indicate the terminal numbers when MVHK-1□□-□□□□ (JK12 or MHKW type) is specified.
JK12 or MHKW type can be specified only for 2 points of alarms.

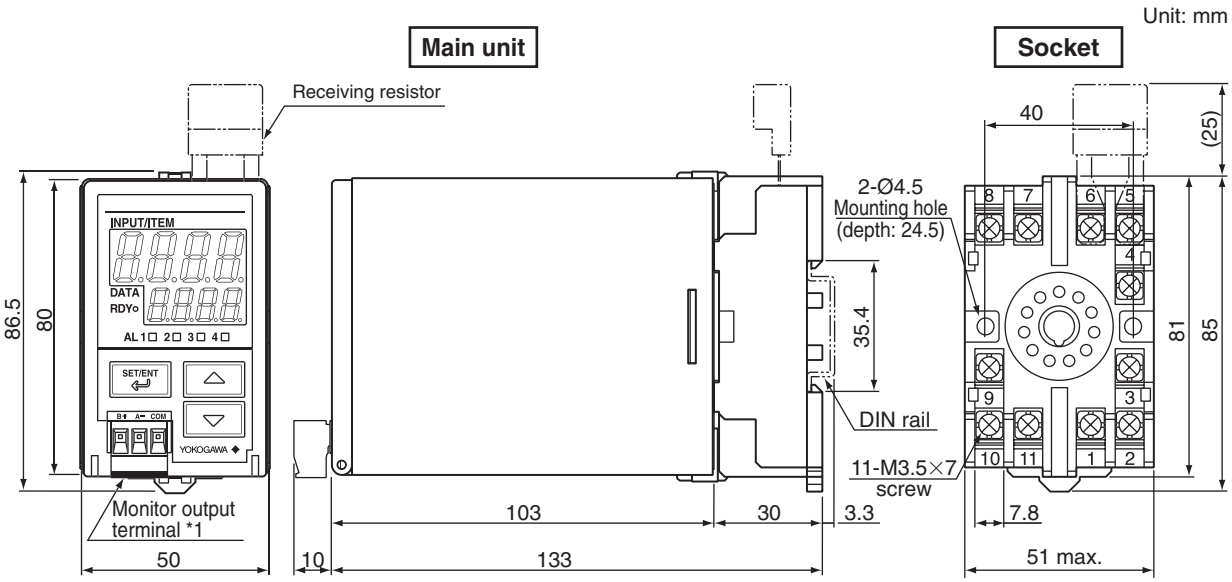
[Notes about the contact configuration for 2 points of alarms]
Transfer contacts for 2 points of alarms consist of an NO contact and an NC contact. When using transfer contacts, consideration should be given to the risk of a short circuit due to contact MBB*1 resulting from non-concurrent action of the NO and NC contacts or to a short ciucuit 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



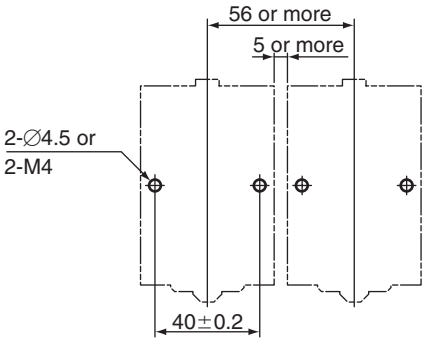
■ External Dimensions

Unit: mm



*1 To be added when the monitor output is specified.

<Mounting Dimensions>



Note:
- For side-by-side mounting, provide spacing of 5 mm or more between the products.
- For DIN rail mounting, use the supplied spacer to provide spacing of 5 mm between the products.