#### **JUXTA** User's Model MVHK Digital Limit Alarm (DC Input Type) Manual with Active Color PV Display

IM 77J04H31-01E

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#### Keep this manual in a safe place.

Yokogawa 🛚

Yokogawa Electric Corporation

IM 77J04H31-01E 1st Edition : Oct. 2002 (MC) 3rd Edition: Aug. 2006(YK)

## 1. NOTICE

This user's manual should be carefully read before installing and operating the product. The following symbol is used on the product and in this manual to ensure safe use.

This symbol is displayed on the product when it is necessary to refer to the user's manual for information on personnel and instrument safety. This symbol is displayed in the user's manual to indicate precautions for avoiding danger to the operator, such as an electric shock.

The following symbols are used only in this manual.



## IMPORTANT

Indicates that operating the hardware or software in a particular manner may cause damage or result in a system failure.

# NOTE

Draws attention to essential information for understanding the operations and/or functions of the product

## 2. MOUNTING METHODS

### 2.1 Wall Mounting

Unfasten the upper and lower stoppers to disconnect the main unit from the socket. Next, anchor the socket onto the wall with two M4 screws. Then plug the main unit into the socket and secure the main unit with the upper and lower stoppers.



### 2.2 DIN Rail Mounting

Locate the MVHK 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. For side-by-side mounting, attach the spacer supplied with the product to the DIN rail to provide spacing between the products.



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

### (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. (In checking the model and suffix codes, refer to the main specifications listed on the last page of this manual.)

#### (2) Contents of the Package

- Check that the package contains the following items.
- MVHK: 1
- User's manual (this manual: IM 77J04H31-01E): 1
- Accessories:
- Tag number label: 1 sheet
- Range label: 1 sheet
- Spacer: 1 (used for DIN rail mounting)
- Receiving resistor: 1 (supplied when the input signal code "A," optional specification code "/R100" or "/R250" is specified)

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## **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.

## CAUTION

- Use of the product ignoring the specifications may cause overheating or damage. Before turning on the power, ensure the following:
  - (a) Power supply voltage and input signal value applied to the product should meet the required specifications.
  - (b) The external wiring to the terminals and wiring to ground are as specifications.
- Do not operate the product in the presence of flammable or explosive gases or vapors. To do so is highly dangerous.
- 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  $\Omega$  with respect to a contact voltage of 1 V
- 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.

- The condition where both NO and NC contacts close when the contact actuates
- · The power line and input/output signal lines should be installed away from noisegenerating sources. Otherwise accuracy cannot be guaranteed.
- 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.

Wiring should be connected to the terminals on the socket of the MVHK. The terminals for external connections are of M3.5 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.





#### 2.3 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.

#### 2.4 Installation Locations

- Avoid the following environments for installation locations: Areas with vibration, corrosive gases, dust, water, oil, solvents, direct sunlight, radiation, a strong electric field and/or a strong magnetic field
- 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.

#### Wiring for Monitor Output

1

If the monitor output code (one of 6, A or P) is specified at the time of order, the following wiring is possible.



## 4. PART NAMES OF FRONT PANEL AND THEIR FUNCTIONS



Part Name	Function
PV (measured value) display	Displays a measured value during operation. Displays a parameter symbol when a parameter is set. Displays an error code in the event of an error.
2 DATA display	Displays the setpoint of a variety of parameters. Displays an alarm type in the event of an alarm. (Not displayed during normal operation. H: High-limit alarm $L$ : Low-limit alarm $R$ : Other alarms
3 Alarm indicator lamp	In the event of an alarm, AL1 to AL4 (alarm 1 to alarm 4) light up.
4 READY lamp	Lights up when the power is turned on.
5 SET/ENT key	Used to switch parameter indication or accept a setpoint. Pressing this key for more than 3 seconds allows you to select the Operation Parameter Screen and Setup Parameter Screen alternately.
6 UP/DOWN key	Used to change the setpoint of a parameter. Pressing the A key increases a numerical value. Pressing the V key decreases a numerical value. Holding down a key accelerates the speed of change.
(7) Monitor output terminal (Two-piece connector)	Outputs 1 to 5 V DC, 4 to 20 mA DC or RS-485 communication signal. (To be added only when the monitor output has been specified at the time of order.)

### 5. SWITCHING PARAMETERS

Forcing it open will result in breakage.



#### 6. PARAMETER SETTING ORDER AND PRECAUTIONS



Parameters to be initialized if the range code No. (IN) is changed Max. and min. measured input values (RH, RL), decimal point position of scaling value (SDP), max. and min. input scaling values (SH, SL) Alarm setpoints (A1 to A4), bysteresis (HX1 to HX4), setpoint (SP)
Max. and min. measured input values (RH, RL), decimal point position of scaling value (SDP), max. and min. input scaling values (SH, SL) Alarm setpoints (A1 to A4), bysteresis (HX1 to HX4), setpoint (SP)
min. input scaling values (SH, SL)
Alarm set points (A1 to A4) by steres (HV1 to HV4) set point (SP)
Alam servoints (AT to A4), hysteresis (TTT to TT4), servoint (OT)
Max. and min. monitor output values (RTH, RTL)
Input adjustment point LOW (BL) and HIGH (BH), input adjustment LOW (AL) and HIGH (AH)
High and low limits for PV display color change (PCH, PCL)
Parameters to be initialized if the maximum or minimum input scaling value (SH) or (SL) is changed
Alarm setpoints (A1 to A4), hysteresis (HY1 to HY4), setpoint (SP)
Max. and min. monitor output values (RTH, RTL)
Input adjustment point LOW (BL) and HIGH (BH), input adjustment LOW (AL) and HIGH (AH)
High and low limits for PV display color change (PCH, PCL)
Parameters to be initialized if the type of alarm action (AL1 to AL4) is changed
The alarm setpoint (A1 to A4) corresponding to each alarm action (AL1 to AL4)
(Example: If AL1 is changed, A1 will be initialized.)
Parameters to be initialized if the type of PV display color mode (PCM) is changed
High and low limits for PV display color change (PCH, PCL)

To change a parameter setpoint, begin with Step 1 above and continue in sequence.

### 7. SETTING INPUT-RELATED PARAMETERS

shown in the table below will be initialized.

#### 7.1 Input Scaling

The MVHK allows you to set any input scaling value (displayed value) with respect to the measured input range.

For example, if the MVHK measured input range is 4 to 20 mA DC, setting the input scaling range (displayed value) to -50 to 150 causes the MVHK to display "0" in the PV display at 8 mA input (equivalent to 25% of 4 to 20 mA input) as shown in the figure below.



## 7.2 Setting Ranges and Factory-Set Values of Input-Related Parameters

#### Setup Parameter Screen 2

Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
1.0	Range code No.	Range code No. Instrument input range	
, ,,	(IN)	<i>引                                    </i>	92 1
		引こ M range -5.00 to +5.00 V DC	
		33 Lrange -1.000 to +1.000 V DC	
		35 M range 0.00 to 50.00 mA DC	
		<u>95</u> L range 0.00 to 10.00 mA DC	
		97 M range 0.00 to 20.00 mA DC	
		38 L range 0.000 to 4.000 mA DC	
гH	Maximum measured input value (RH)	RL + 1 digit to the max. value of instrument input range	5.00 <sup>*1</sup>
rL	Minimum measured input value (RL)	RL to RH - 1 digit	-5.00 <sup>*1</sup>
SdP	Decimal point position of scaling value (SDP)	0 (no decimal place), 1 (one decimal place), 2 (two decimal places), 3 (three decimal places)	1
SH	Maximum input scaling value (SH)	SL + 1 digit to 9999 *The setting range depends on the setting of the decimal point position (SDP).	100.0
51	Minimum input scaling value (SL)	-1999 to SH - 1 digit *The setting range depends on the setting of the decimal point position (SDP).	0.0

#### 7.3 Setting Input-Related Parameters

This section describes an example of setting the range code No. (IN) to "97," measured input range (RL, RH) to "4 to 20 mA DC," the decimal point position of input scaling value (SDP) to "0" (with no decimal place) and input scaling values (SL, SH) to "-50 to 150."

## 🛝 ΝΟΤΕ

Note that setting the range code No. (IN) to a value other than those specified in Section 7.2 is invalid.

Power ON	When the power is turned on, the PV screen of the Operation	
Operation Parameter Screen		
AL 10 20 30 40	When you press the SET/ENT key for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears.	
Setup Parameter Screen 1		
Press to display "LOC."	Press the SET/ENT key to display parameter "LOC."	
DATA RDyo - Press v to display "-1."	Press the DOWN key to display "-1" on the DATA display.	
data change.	Proce the SET/ENT (ou to diaplay parameter "INI" in the Setup	
Press settent.	Parameter Screen 2.	
Setup Parameter Screen 2	Step 1	
Press or v	Press the UP or DOWN key to display "97" on the DATA display.	Se
AL 10 20 30 40 The decimal point blinks during data change.		tting tl
Press SET/ENT.	Press the SET/ENT key to accept range code No. "97."	ne ran
AL 10 20 30 40 This completes the process for setting the range code No.	Press the SET/ENT key again to display parameter "RH."	ge co
Press SET/ENT		de /
	Step 2	Ď
Press stream because the data remains the same.	Press the SET/ENT key to accept the data as is, because the initial value for the range code No. 97 is "20.00." (The next parameter "RL" appears because no data has been changed.)	Setti
This completes the process for setting the max. measured input value.		ng the ma
Press to display "4.0."	Press the UP key to display "4.00" on the DATA display.	x. and min. m
The decimal point blinks during data change.	Press the SET/ENT key to accept this data.	easured ir
ALIO 20 30 40		put value:
Press .	riess the SET/ENT key again to display parameter SDF.	ľ,
DATA BOYO	Press the DOWN key to display "0" on the DATA display.	Setting the o
Ine decimal point blinks during data change.		decim
Press SET/ENT .	Press the SET/ENT key to accept this data.	al poin
AL 10 20 30 40 This completes the process for setting the decimal point position.		t posit
Press SETTENT .	Press the SET/ENT key again to display parameter "SH."	
NPUTITEM	Press the UP key to display "150" on the DATA display.	
AL 10 20 30 40 1 An		Sett
	Press the SET/ENT key to accept this data.	ing the
ALID 20 30 40 This completes the process for setting the maximum input scaling value.		e max.
Press errent	Press the SET/ENT key again to display parameter "SL."	and mi
DATA DATA ADTO - 50	Press the DOWN key to display "-50" on the DATA display.	n. input scalir



\*1 The factory-set values for the input signal code "6" are as follows:

Range code No.: 92; maximum measured input value: 5.00; and minimum measured input value: 1.00 The factory-set values for the input signal code "A" are as follows:

Range code No.: 97; maximum measured input value: 20.00; and minimum measured input value: 4.00

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#### 8. SETTING ALARM-RELATED PARAMETERS

#### 8.1 Setting Ranges and Factory-Set Values of Alarm-Related Parameters

### **Operation Parameter Screen**

Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
<i>R</i> (	Alarm-1 setpoint (A1)	-1999 to 9999 (Within the range of set input scaling values)	20.0
82	Alarm-2 setpoint (A2)	*The setting range depends on the setting of the decimal point position (SDP).	2 points of alarms: 80.0 4 points of alarms: 30.0
83	Alarm-3 setpoint (A3)		70.0
ŖЧ	Alarm-4 setpoint (A4)		80.0

#### Setup Parameter Screen 1

Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
<i>RL 1</i>	Alarm-1 action (AL1)	See the Alarm Action Type Codes table.	2
865	Alarm-2 action (AL2)		2 points of alarms: 1 4 points of alarms: 2
<i>RL</i>	Alarm-3 action (AL3)		1
RL 4	Alarm-4 action (AL4)		1
HY (	Alarm-1 hysteresis (HY1)	0 to 9999 The value resulting from adding a hysteresis	1.0
$H_{2}$	Alarm-2 hysteresis (HY2)	value to an alarm setpoint should be within the range of set input scaling values.	1.0
XY]	Alarm-3 hysteresis (HY3)	decimal point position (SDP).	1.0
НЧЧ	Alarm-4 hysteresis (HY4)		1.0
ond	Alarm ON delay (OND)	Setting range: 0 to 999 sec. Setting resolution: 1 sec.	0
oFd	Alarm OFF delay (OFD)	Setting range: 0 to 999 sec. Setting resolution: 1 sec.	0
58	Setpoint (SP)	<ul> <li>-1999 to 9999</li> <li>Within the range of set input scaling values</li> <li>* The setting range depends on the setting of the decimal point position (SDP).</li> </ul>	0.0

<Alarm Action Type Codes>



#### 8.2 Setting Alarm Output-Related Parameters

This section describes an example of setting the alarm-1 action (AL1) to "12" (PV low-limit alarm, with stand-by action), alarm-1 setpoint (A1) to "0," alarm-1 hysteresis (HY1) to "5," alarm ON delay (OND) to "5" and alarm OFF delay (OFD) to "5" with the input scaling values (SL, SH) set to "-50 to 150." (Parameters relating to alarm 2 to alarm 4 can be set in the same way as the procedure below.)

The alarm setpoints, setpoint (set when setting a deviation alarm) and hysteresis are based on the set input scaling values.

For example, if the input scaling values are "-50 to 150," to set the low-limit alarm value to 25% of the measured input range, set the low-limit alarm value to "0."

When the power is turned on, the PV screen of the Operation Parameter Screen appears.	
When the SET/ENT key is pressed for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears with parameter "AL1" displayed.	
Step 3	
Press the UP or DOWN key to display "12" on the DATA display.	Setti
Press the SET/ENT key to accept alarm-1 action "12." Then to set the alarm setpoint, press the SET/ENT key for more than 3 sec. to display the Operation Parameter Screen. (To set the hysteresis parameter and successive settings, press the SET/ENT key to display the next parameter.)	ng the alarm action
	Υ
Press the SET/ENT key to display parameter "A1." Press the UP or DOWN key to display a low-limit alarm value "0" (value corresponding to 25% of the scaling value) that is set to the DATA display. Press the SET/ENT key to accept low-limit alarm "0."	Setting the alarm setpoint
	<ul> <li>When the power is turned on, the PV screen of the Operation Parameter Screen appears.</li> <li>When the SET/ENT key is pressed for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears with parameter "AL1" displayed.</li> <li>Step 3</li> <li>Press the UP or DOWN key to display "12" on the DATA display.</li> <li>Press the SET/ENT key to accept alarm-1 action "12."</li> <li>Then to set the alarm setpoint, press the SET/ENT key for more than 3 sec. to display the Operation Parameter Screen. (To set the hysteresis parameter and successive settings, press the SET/ENT key to display the next parameter.)</li> <li>Press the SET/ENT key to display parameter "A1."</li> <li>Press the SET/ENT key to display parameter "A1."</li> <li>Press the SET/ENT key to display a low-limit alarm value "0" (value corresponding to 25% of the scaling value) that is set to the DATA display.</li> <li>Press the SET/ENT key to accept low-limit alarm "0."</li> </ul>

Setup Parameter Screen 1		
Press or atta atta atta atta atta atta by by c to display "5."	Press the UP or DOWN key to display "5" on the DATA display.	Setting
A: 10 20 30 40       The decimal point blinks during data change.         WEVITIEN       Press	Press the SET/ENT key to accept alarm-1 hysteresis "5."	the hysteresis
Press to display "OND."	Press the SET/ENT key to display parameter "OND."	
DATA DATA ROVE AL 10 20 30 40 The decimal point blinks during	Press the UP or DOWN key to display "5" (sec.) on the DATA display.	Setting the
ALID 2D 3D 4D Press	Press the SET/ENT key to accept alarm ON delay "5" (sec). Press the SET/ENT key again to display parameter "OFD."	alarm ON delay
Press or to display "5." AL 10 20 30 40 The decimal point blinks during	Press the UP or DOWN key to display "5" (sec.) on the DATA display.	Setting th
Nevrifient     Press       Bara     5       AL 10 20 30 40     This completes the process for setting the alarm OFF delay.	Press the SET/ENT key to accept alarm OFF delay "5" (sec).	ie alarm OF
Press for more than 3 sec. (To the Operation Parameter Screen)	Press the SET/ENT key for more than 3 sec. This causes the Operation Parameter Screen to appear.	F delay

## 9. INPUT ADJUSTMENTS

#### 9.1 Setting Ranges and Factory-Set Values of Adjustment-Related Parameters

#### Setup Parameter Screen 2

Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
r St	Input adjustment reset (RST)	OFF (0) or ON (1) (This parameter is used (set to ON) to reset adjusted values.)	OFF
61	Input adjustment point LOW (BL)	$(SH - SL) - 10\% \le BL < BH \le (SH - SL) + 10\%$	SL
ΠL	Input adjustment LOW (AL)	$(SH - SL) - 10\% \le AL < AH \le (SH - SL) + 10\%$	SL
ЬН	Input adjustment point HIGH (BH)	$(SH - SL) - 10\% \le BL < BH \le (SH - SL) + 10\%$	SH
ŔН	Input adjustment HIGH (AH)	$(SH - SL) - 10\% \le AL < AH \le (SH - SL) + 10\%$	SH

#### 9.2 Instrument for Adjustments

• DC voltage/current standard (Yokogawa's 7651 or equivalent): 1



#### 9.3 Input Adjustment

#### 9.3.1 Connecting the Adjustment Instrument





#### 9.3.2 Adjusting Inputs

Carry out input adjustments between two points, or the low limit (BL: input adjustment point LOW) and high limit (BH: input adjustment point HIGH) that have been set within the adjustment range (see Section 9.1).

This subsection describes an example of making an input adjustment between two points, or input scaling values "0" and "100" applied at 8 mA input (25% of measured input range) and 16 mA input (75% of measured input range) with the MVHK range code No. set to "97," the measured input range set to "4 to 20 mA DC" and the input scaling value (displayed value) set to "-50 to 150."

The MVHK 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.

Power ON	When the power is turned on, the PV screen of the Operation Parameter Screen appears.
Operation Parameter Screen	
AL 10 20 10 40 Set up Parameter Screen 1	When you press the SET/ENT key for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears.
	Press the SET/ENT key to display parameter "LOC."
DATA DVA ALID 20 30 4D The decimal point blinks during	Press the DOWN key to display "-1" on the DATA display.
Press	Press the SET/ENT key to display the Setup Parameter Screen 2.
Setup Parameter Screen 2	
Data Rove         5 Ω           AL 10 20 30 40         Press	Press the SET/ENT key to display parameter "BL." In this case, the DATA display shows the set minimum input scaling value "-50."
Press to display "0."	Press the UP key to display "0" on the DATA display.
AL 10 20 30 40 The decimal point blinks during data change.	
Press ETENT	Press the SET/ENT key to accept this data.
Press	Press the SET/ENT key to display the next parameter.
	Using the voltage/current standard, apply 8 mA input to the MVHK
The measured value and parameter AL are displayed alternately. Press or v.	This causes parameter "AL" and the scaling value corresponding to the measured value (8 mA) to appear alternately. Press the UP or DOWN key.
AL 10 20 30 40 The decimal point blinks.	The decimal point blinks.
Press SETIENT .	Press the SET/ENT key.
"2" appears on the DATA display.	The value before adjustment "2" appears on the DATA display.
ALID 20 30 4D Press .	Press the SET/ENT key to display the next parameter "BH."
	In this case, the DATA display shows the set maximum input scaling value "150."
DATA DATA NOV ALTO 20 30 40 The decimal point blinks during data change.	Press the DOWN key to display "100" on the DATA display.
Press SETTENT .	Press the SET/ENT key to accept this data.
Press SET/ENT	Press the SET/ENT key to display the next parameter.
	Using the voltage/current standard, apply 16 mA input to the MVHK.
I he measured value and parameter AH are displayed alternately.	This causes parameter "AH" and the scaling value corresponding to the measured value (16 mA) to appear alternately.

#### 10. SETTING ACTIVE COLOR PV DISPLAY (PV DISPLAY COLOR CHANGING FUNCTION)

#### **10.1 Setting Ranges and Factory-Set Values**

Setup Parameter Screen 1

Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
Р[Н	High limit for PV display color change (PCH)	<ul> <li>When PV display color mode (PCM) is 6 or 7:</li> <li>PCL+1digit to 9999</li> <li>When PV display color mode (PCM) is 8 or 9:</li> <li>-100.0 to 100.0% of the measured input range</li> <li>* The setting range depends on the setting of the decimal point position (SDP).</li> </ul>	_
PEL	Low limit for PV display color change (PCL)	When PV display color mode (PCM) is 6 or 7: -1999 to PCH-1digit When PV display color mode (PCM) is 8 or 9: -100.0 to 100.0% of the measured input range * The setting range depends on the setting of the decimal point position (SDP).	_

#### Setup Parameter Screen 2

Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
PEñ	PV display color mode (PCM)	<ul> <li>0: Fixed in green</li> <li>1: Fixed in red</li> <li>2: Link to alarm 1 (under normal condition: green; at alarm status: red)</li> <li>3: Link to alarm 1 (under normal condition: red; at alarm status: green)</li> <li>4: Link to alarm 1 and alarm 2 (under normal condition: green; at alarm status: green)</li> <li>5: Link to alarm 1 and alarm 2 (under normal condition: red; at alarm status: green)</li> <li>6: PV limit* (when more than PCL, less than PCH: green; when PCL or less, PCH or more: red)</li> <li>7: PV limit* (when more than PCL, less than PCH:red; when PCL or less, PCH or more: green)</li> <li>8: SP deviation* (when more than SP-PCL, less than SP+PCH: green; when SP-PCL or less, SP+PCH or more: red)</li> <li>9: SP deviation* (when more than SP-PCL, less than SP+PCH: green; when SP-PCL or less, SP+PCH or more: green)</li> <li>10: Link to alarm 1 to alarm 4 (under normal condition: green; at alarm status: green)</li> </ul>	1

\*: PV display color is changed linking to the setting range of high limit (PCH) and low limit (PCL) for PV display color change.

#### 10.2 Setting Active Color PV Display

This section describes an example of setting the PV display color mode (PCM) to "6," high limit for PV display color change (PCH) to "70" and low limit (PCL) to "20." The procedure below begins with the condition in which the Setup Parameter Screen 2 is displayed.

——(Setup Parameter Screen 2)		_
	:	
Press settent "PCM."	Press the SET/ENT key to display parameter "PCM."	
Press or DATA Rove to display "6."	Press the UP or DOWN key to display "6" on the DATA display.	2 5 0
AL 10 20 30 40 The decimal point blinks during data change.	<ul> <li>dist</li> </ul>	1 dier
Press ETENT .	Press the SET/ENT key to accept PV display color	102 2
This completes the process for setting the PV display color mode.		22, 31
Press for more than 3 sec.	Press the SET/ENT key for more than 3 sec. This causes the Operation Parameter Screen to appear.	222
Operation Parameter Screen	$\sim$	L
AL 10 20 30 40	When you press the SET/ENT key for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears.	
Setup Parameter Screen 1		٦
Press to display "PCH."	Press the SET/ENT key to display parameter "PCH."	
Pressor <sup>DATA</sup> H Rove T∩∏ to display "70."	Press the UP or DOWN key to display "70" on the DATA display.	0
		-



## **11. OTHER PARAMETERS**

### **11.1 Setting Ranges and Factory-Set Values**

## Setup Parameter Screen 1

<u> </u>			
Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value
Loĺ	Key lock (LOC)	<ol> <li>0: Without lock. All parameters can be set.</li> <li>1: Parameters other than the operation parameters cannot be changed.</li> <li>2: All parameters cannot be changed.</li> <li>-1: This moves to the Setup Parameter Screen 2.</li> </ol>	0
Setup	Parameter Screen 2		
Parameter Parameter Name Symbol		Setting Range	Factory-Set Value
Measured input bias (BS)		-1999 to 9999	0
ELo	Economical mode time (ECO)	0 (Continuous: no display OFF function), 1 to 60 (minutes)	10

#### 11.2 Setting Key Lock

This section describes an example of locking keys so that parameter settings other than the operation parameters cannot be changed. The procedure below begins with the condition in which the Setup Parameter Screen 1 is displayed.

![](_page_5_Figure_6.jpeg)

#### 11.3 Setting Economical Mode Time

Setting economical mode time allows indications on the PV display to be extinguished if no keystroke is made within the set time.

The MVHK's power consumption in the OFF mode is approximately 0.5 W or 1 VA during normal operations (non-alarm status). This section describes an example of setting the economical mode time to "5 minutes" (factory-set value: 10 minutes ).

The procedure below begins with the condition in which the Setup Parameter Screen 2 is displayed.

![](_page_5_Figure_11.jpeg)

## NOTE

The economical mode is temporarily released at the time of PV display color change and the PV display lights up. After the set economical mode time elapsed from the time of returning to normal operation, the economical mode operation begins again.

#### 11.4 Setting Input Bias

This section describes an example of correcting an error by setting input bias if there is an error of "-1" in the MVHK scaling value (displayed value) with respect to the measured value. The procedure below begins with the condition in which the Setup Parameter Screen 2 is displayed.

![](_page_5_Figure_16.jpeg)

## **12. MONITOR OUTPUT**

### 12.1 Monitor Output (Analog)

Monitor output (analog) is added only when monitor output code "6" or "A" is specified at the time of order.

12.1.2 Setting Ranges and Factory-Set Values of Monitor Output (Analog)-Related **Parameters** 

Setup	Parameter Screen 2				
Parameter Symbol	Parameter Name	Setting Range	Factory-Set Value		
rŁH	Image: Maximum monitor output value (RTH)RTL + 1 digit to 9999 Within the instrument input range				
rtl	Minimum monitor output value (RTL)	-1999 to RTH - 1 digit Within the instrument input range	SL		
non	Visibility of monitor output adjustment screen (MON)	OFF (invisible) or ON (visible) Set this parameter to "ON" for adjustments of monitor output.	OFF (invisible)		
กกิก	Forced output of a monitor output value (MAN)	-25.0 to +125.0 (%) Note that the assured range is -6.0 to +106 (%).	0.0		
EEr	Monitor output zero adjustment (ZER)	-19.99 to 20.00 (%)	0.00		
Spn	Monitor output span adjustment (SPN)	-19.99 to 20.00 (%)	0.00		

#### 12.1.3 Setting Monitor Output

## NOTE

Accuracy (±0.1% of output span) is limited depending on the settings for input scaling and maximum and minimum monitor output values. For more information on accuracy limitations, refer to the main specifications on the last page of this manual.

This subsection describes an example of setting the maximum monitor output value (RTH) to "125" and minimum monitor output value (RTL) to "-25" when the MVHK input scaling values (displayed values) (SL, SH) are "-50 to 150."

Power ON	When the power is turned on, the PV screen of the Operation Parameter Screen appears.
—(Operation Parameter Screen)——	·
AL 10 20 30 40	When you press the SET/ENT key for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears.
—(Setup Parameter Screen 1)——	
Press strent to display LOC."	Press the SET/ENT key to display parameter "LOC."
LOL Press to display "-1."	Press the DOWN key to display "-1" on the DATA display.
Press Stream .	Press the SET/ENT key to display the Setup Parameter Screen 2.
Setup Parameter Screen 2	
Image: New Series     Series       AL 1D 20 30 40     Press	Press the SET/ENT key to display parameter "RTH." In this case, the DATA display shows the set maximum input scaling value "150."
Press to display "125."	Press the DOWN key to display "125" on the DATA display.
AL 10 20 30 40 AL 10 20 30 40 The decimal point blinks during data change.	
Press	Press the SET/ENT key to accept this data.
This completes the procedure for setting the maximum monitor output value.	
Press strent	Press the SET/ENT key to display the next parameter.
ALID 20 30 40	Press the SET/ENT key to display parameter "RTL." In this case, the DATA display shows the set minimum input scaling value "-50."
Press to display "-25."	Press the UP key to display "-25" on the DATA display.
The decimal point blinks during data change. Press Street . This completes the procedure	Press the SET/ENT key to accept this data.
for setting the minimum monitor	

#### 12.1.4 Adjusting Monitor Output

(1) Instruments for adjustment

output value

- Voltmeter (Yokogawa's 7562 or equivalent): 1
- Precision resistor of 250 Ω ±0.01%, 1 W: 1
- (2) Output adjustments

#### 12.1.1 Setting Monitor Output

In setting monitor output, the maximum monitor output value (RTH) and minimum monitor output value (RTL) can be freely set within the range of the maximum input scaling value (SH) and minimum input scaling value (SL) that have been set for the MVHK. For example, when the MVHK range code No. (IN) is "97," the measured input range (RL, RH) is "4 to 20 mA DC," the input scaling values (displayed values) (SL, SH) are "-50 to 150" and monitor output is "1 to 5 V DC," setting the maximum monitor output value (RTH) to "125" and the minimum monitor output value (RTL) to "-25" causes monitor output to be "1 V" when input to the MVHK is 6 mA (scaling value -25) as shown below.

![](_page_5_Figure_35.jpeg)

Connect each instrument as shown below

![](_page_5_Figure_37.jpeg)

#### (3) Adjusting monitor output

The following describes an example of adjusting an error when the minimum monitor output value (measured value) is 1.008 V (an error of 0.008 V) with the MVHK monitor output set to "1 to 5 V DC." The basic adjusting procedure for the maximum monitor output value is the same as that of the minimum monitor output value; perform it by referring to the procedure below.

The procedure below begins with the condition in which the Setup Parameter Screen 2 is displayed.

![](_page_6_Figure_0.jpeg)

#### 12.1.5 Using the Forced Output Function

The use of the forced output function allows you to conduct operation tests for a device connected to the monitor output terminals of the MVHK.

This subsection describes an example of forcing a value equivalent to 50% of the output range (3 V) to output when the monitor output of the MVHK is "1 to 5 V DC." The procedure below begins with the condition in which parameter "MAN" is displayed

with the MON parameter set to "ON" in the Setup Parameter Screen 2.

The minimum output value (1 V) is output forcibly. Pressing C causes	When this parameter (MAN) is displayed, the MVHK forces the monitor output value to be output, regardless of input. Press the UP key to display "50.0" on the DATA display.
The value equivalent to $10^{\text{DVLATEM}}$ The value equivalent to $50\%$ of the output range $(3 \text{ V})$ is output forcibly.	3 V is output forcibly. The MVHK continues to output while this parameter is displayed on the screen.
After completion of the forced output, adjustment screen invisible).	return the MON parameter setting to "OFF" (making the

## IMPORTANT

After performing monitor output adjustments or forced output, always set the MON parameter to "OFF" (making the adjustment screen invisible). If the Setup Parameter Screen 2 is switched while the MON parameter is set to "ON," displaying parameter "MAN," "ZER" or "SPN" causes a value corresponding to the set value to be output forcibly. Furthermore, if the power is turned off while parameter "MAN" is displayed, the set values will be initialized.

### **12.2 Monitor Output (Communication)**

Monitor output (communication) is added only when the monitor output code "P" is specified at the time of order.

#### 12.2.2 Setting the Communication-Related Parameters

Power ON	When the power is turned on, the PV screen of the Operation Parameter Screen appears.					
Operation Parameter Screen						
DATA AUTO 20 30 40 NOV AL 10 20 30 40 NOV AL 10 20 30 40 Press this key for more than 3 sec.	When you press the SET/ENT key for more than 3 sec. with the Operation Parameter Screen displayed, the Setup Parameter Screen 1 appears.					
Press strent to display	Press the SET/ENT key to display parameter "LOC."					
Press to display	Press the DOWN key to display "-1" on the DATA display					
ALID 2D 3D 4D The decimal point blinks during data change.						
Press 🔄 .	Press the SET/ENT key to display the Setup Parameter Screen 2					
Setup Parameter Screen 2						
Press to display "PSL." Press or viewer to display "PSL."	Press the SET/ENT key to display parameter "PSL" for setting the communication protocol. Press the UP or DOWN key to display the communication protocol number on the DATA display.					
Press .						
This completes the process for setting the communication protocol.						
Press SET/ENT	Press the SET/ENT key to display the next parameter.					
	etting the communication address					
ALID 20 30 40	tting the baud rate					
ARPUTITIEM Parameter "PRI" for se A 10 20 30 40	tting the parity					
Parameter "STP" for se	etting the stop bit					
AL 10 20 30 40						
See Also						

## **13. TROUBLESHOOTING**

separately.

#### Possible Errors Occurring at Power ON

The following describes possible errors occurring at power ON.

Error In	dication		Description Status				
PV Display	Alarm Indicator Lamps	READY Lamp	of Error	PV	Alarm Output	Monitor Output	Remedy
Undefined	Undefined	Undefined	CPU failure	Undefined	Undefined	Undefined	
OFF	OFF	OFF	Power failure	None (0%)	OFF	0% or less	Failure.
E	OFF	Blinking	RAM error	None (0%)	OFF	0% or less	for us to repair.
	AL2 blinking	Blinking	ROM error	None (0%)	OFF	0% or less	
P.E r	Normal	Normal	Parameter error	Normal	Normal	Normal	Check all
5.E r	Normal	Normal	EEP sum error	Normal	Normal	Normal	parameters.

- .
- 12.2.1 Setting Ranges and Factory-Set Values of Monitor Output (Communication)-Related Parameters

Setup Parameter Screen	2
------------------------	---

Parameter Symbol	Parameter Name	Setting F	Factory-Set Value	
PSL	Communication protocol (PSL)	0: PC link 1: PC link with SUM 2: Ladder communication	0 (PC link)	
Ädr	Communication address (ADR)	1 to 99	1	
622	Baud rate (BPS)	1.2 (0: 1200 bps) 2.4 (1: 2400 bps)	4.8 (2: 4800 bps) 9.6 (3: 9600 bps)	9.6 (9600 bps)
Pr l	Parity (PRI)	NON (0: None) EVN (1: Even)	EVN (Even)	
SEP	Stop bit (STP)	1 or 2 (bits)		1
dLn	Data length (DLN)	7 or 8 (bits)	8	

#### Possible Errors Occurring during Operations

The following describes errors that may occur during operations.

Error Indication			Description		Status		
PV Display	Alarm Indicator Lamps	READY Lamp	of Error	PV	Alarm Output	Monitor Output	Remedy
Err blinks	AL1 lights	Normal	EEPROM error	None (0%)	OFF	0% or less	Failure. Submit request for us to repair.
000	Normal	Normal	Input exceeding high limit	110% of the measured range	Normal	106% or more of the output range	Check input.
UUU	Normal	Normal	Input falling below low limit	-10% of the measured range	Normal	-6% or less of the output range	Check input.
Decimal point blinks	Normal	Normal	Communication error	Normal	Normal	Normal	Press any key, or if normal communication is made, a communication error will be cleared.

#### **14. MAIN SPECIFICATIONS**

#### Model and Suffix Codes

ſ	Model	Suffix Codes			es		Description	
ſ	MVHK				0	/ 🗆	Digital Limit Alarm (DC Input Type)	
Γ	Turne	-0						General use type
	туре	-1						JK12 type (The terminal assignment is same as that of Yokogawa's JK12 and MHKV
ſ		0						Always 0
ſ	Dower Curr	.h.c	3					24 V DC±10%
	Power Supp	лу	6					100-240 V AC/DC (Operating range: 85 to 264 V AC/DC)
ſ			$\neg$	-6				1 to 5 V DC
	Innut Cignal		— Г	-A				4 to 20 mA DC (with 250 $\Omega$ receiving resistor)
	input Signal			-U				DC voltage or DC current signal
L				-Z				Custom order
	Output Sign	al			1			Alarm output (transfer contact [1a1b] ), 2 points
L	Output Sign	ai		1	2			Alarm output (NO contact), 4 points
I					6			1 to 5 V DC
	Monitor Out	put			A	A		4 to 20 mA DC
					F	)		Communication function (RS-485)
					Ν	1		No monitor output
						0	_	Always 0
	Optional Specification /R100 /R250						/R100	With 100 Ω receiving resistor
							/R250	With 250 $\Omega$ receiving resistor
· · ·						/SVI	Without socket	

#### Input and Display

Number of inputs: 1 point

- Input signal: Set the measured input range within the instrument input range. (Refer to Section 7.2.)
- Input resistance:
- For voltage input: 1 M $\Omega$  (100 k $\Omega$  during power off)
- For current input: 100  $\Omega$  or 250  $\Omega$  (with external receiving resistor) (Specify at the time of order.)
- 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
- 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 less than SP deviation high limit or SP deviation high limit or more; whether measured value is more than SP deviation low limit or SP deviation low limit or less.
- PV limit: Changes the PV display color according to whether measured value is less than measured range high limit or measured range high limit or more; whether measured value is more than measured range low limit or measured range low limit or less.
- Fixed color: Fixes PV display color in green or red.

#### Output

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

Alarm setting range: Within the set input scaling value

Setting resolution: 1 digit (Note)

- Setpoint setting: Virtual setpoint when the deviation alarm occurs Setting range: Within the set input scaling value
- Setting resolution: 1 digit (Note)
- 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)

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

#### 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  $\Omega$  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:

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

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

$$\label{eq:Accuracy} \mbox{Accuracy} = \frac{\pm 0.1 \ (\%) \times 2.5 \ (V)}{\mbox{Corresponding input range (V)}} \ (\%$$

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

$$\label{eq:Accuracy} \mbox{Accuracy} = \frac{\pm 0.1 \ (\%) \times 0.5 \ (V)}{\mbox{Corresponding input range (V)}} \ \ (\%)$$

For current input, apply the value [input range  $\times$  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.
  - (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%) 50/60Hz
- Power consumption: 24 V DC 3.0 W, 110 V DC 2.4 W, 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

- Casing; ABS resin (black), UL94 V-0 Material:
  - Socket; Modified polyphenylene oxide resin, including glass fiber (black), UL94-V1
- Mounting method: Wall or DIN rail mounting
- Connection method: M3.5 screw terminal for input/output and power supply
- 3-pin 2-piece connector for monitor output
- External dimensions: 51(W)×86.5(H)×133(D) mm (including a socket)
- Weight: Main unit; approx. 270 g
  - Socket; approx. 80 g

#### 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-tonormal 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.)

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.

## External Dimensions

![](_page_7_Figure_97.jpeg)

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

![](_page_7_Picture_100.jpeg)