Process Meter

K3MA-J

CSM_K3MA-J_DS_E_13_5

Highly Visible LCD Display with 2-color (Red and Green) LEDs

- Multi-range DC voltage/current input.
- Front-panel key operation for easy setting.
- Average processing function suppresses flicker.
- Scaling, front-panel forced-zero, zero-limit functions.
- Easy confirmation of max/min display.
- Short 80-mm depth (measured from edge of face plate).
- Finger protective cover (standard equipment) guards against electric shock.
- Water- and dust-proof NEMA TYPE 4X (IP66 equivalent) front panel.
- Recognized to U.S. and Canadian requirements under the Component Recognition Program of UL.
- CE marking.

Refer to *Safety Precautions for All Digital Panel Meters*.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Model Number Structure

■Model Number Legend

K3MA-J-□ □
1 2 3

1. **Input Type**
   J: DC voltage/current
2. **Comparative Output Model**
   None: No output
   A2: 2 relay contact outputs (SPST-NO)
3. **Supply Voltage**
   100-240VAC: 100 to 240 VAC
   24VAC/VDC: 24 VAC/VDC

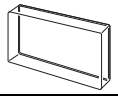
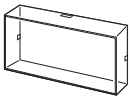
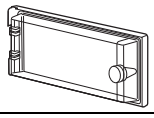
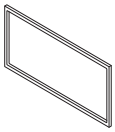
Ordering Information

■List of Models

Input type	Supply voltage	Comparative Output Model	Model
DC voltage/current	100 to 240 VAC	None ✻	K3MA-J 100-240VAC
		2 relay contact outputs (SPST-NO)	K3MA-J-A2 100-240VAC
	24 VAC/VDC	None ✻	K3MA-J 24VAC/VDC
		2 relay contact outputs (SPST-NO)	K3MA-J-A2 24VAC/VDC

✻ Changing the display color based on comparison with a reference value is not possible.

■Accessories (Order Separately)

Name	Shape	Model
Splash-proof Soft Cover		K32-49SC
Hard Cover		K32-49HC
Watertight Cover		Y92A-49N
Rubber Packing		K32-P1

Note: Rubber packing is provided with the Controller.

Specifications

■Ratings

Model	K3MA-J 100-240VAC, K3MA-J-A2 100-240VAC	K3MA-J 24VAC/VDC, K3MA-J-A2 24VAC/VDC
Supply voltage	100 to 240 VAC	24 VAC/VDC
Operating voltage range	85% to 110% of the rated supply voltage	
Power consumption (under maximum load)	6 VA max.	4.5 VA max. (24 VAC) 4.5 W max. (24 VDC)
Insulation resistance	20 MΩ min. (at 500 VDC) between external terminal and case. Insulation provided between inputs, outputs, and power supply.	
Dielectric strength	2,000 VAC for 1 min between external terminal and case. Insulation provided between inputs, outputs, and power supply.	
Noise immunity	±1,500 V on power supply terminals in normal or common mode. ±1 μs, or 100 ns for square-wave noise with 1 ns.	±480 V on power supply terminals in normal mode. ±1,500 V in common mode. ±1 μs, or 100 ns for square-wave noise with 1 ns.
Vibration resistance	Vibration: 10 to 55 Hz, 0.35-mm half amplitude 5 min each in X, Y, and Z directions for 10 sweeps.	
Shock resistance	150 m/s^2 (100 m/s^2 for relay contact outputs) 3 times each on 3 axes, 6 directions.	
Ambient temperature	Operating: −10°C to 55°C (with no condensation or icing) Storage: −25°C to 65°C (with no condensation or icing)	
Ambient humidity	Operating: 25% to 85% (with no condensation)	
Approved safety standards	UL61010-1, CSA C22.2 No.61010-1-04, conforms to EN61010-1 (Pollution degree 2/overvoltage category II) Conforms to VDE0106/P100 (finger protection)	
EMC	(EMI) Emission Enclosure: Emission AC Mains: (EMS) Immunity ESD: Immunity RF-interference: Electrical Fast Transient Noise: Immunity Burst Noise: Immunity Surge: Immunity Conducted Disturbance: Immunity Voltage Dip/Interrupting:	EN61326-1 Industrial electromagnetic environment CISPR 11 Group 1 class A: CISRP16-1/-2 CISPR 11 Group 1 class A: CISRP16-1/-2 EN61326-1 Industrial electromagnetic environment EN61000-4-2: 4 kV contact discharge 8 kV air discharge EN61000-4-3: 10 V/m (amplitude-modulated, 80 MHz to 1 GHz) EN61000-4-4: 2 kV (power line) 1 kV line to line (I/O signal line) EN61000-4-5: 1 kV (power line) 2 kV line to ground (power line) EN61000-4-6: 3 V (0.15 to 80 MHz) EN61000-4-11: 0.5 cycle, 0, 180°, 100% (rated voltage)
Weight	Approx. 200 g	

■Characteristics

Input signal	DC voltage/current (0 to 20 mA, 4 to 20 mA, 0 to 5 V, 1 to 5 V, ±5 V, ±10 V)
A/D conversion	Double integral method
Input impedance	Current input: Approx. 45 Ω, Voltage input: 1 MΩ min.
Sampling period	250 ms
Display refresh period	Sampling period (sampling times multiplied by number of measurements for averaging if average processing is selected.)
Max. displayed digits	5 digits (–19999 to 99999)
Display	7-segment digital display, Character height: 14.2 mm
Polarity display	"–" is displayed automatically with a negative input signal.
Zero display	Leading zeros are not displayed.
Scaling function	Programmable with front-panel key inputs (range of display: –19999 to 99999). The decimal point position can be set as desired.
Hold function	Max. hold (maximum value), Min. hold (minimum value)
Hysteresis setting	Programmable with front-panel key inputs (0001 to 9999).
Other functions	Forced-zero (with front-panel key) Zero-limit Scaling teach function Display color change (green (red), green, red (green), red) OUT type change (upper limit, lower limit, upper/lower limit) Average processing (simple average)
Output	Relays: 2 SPST-NO
Delay in comparative outputs	750 ms max.
Degree of protection	Front panel: NEMA TYPE 4X for indoor use (equivalent to IP66) Rear case: IEC standard IP20 Terminals: IEC standard IP00 + finger protection (VDE0106/100)
Memory protection	Non-volatile memory (EEPROM) (possible to rewrite 100,000 times) (with terminal cover attached)

■Measuring Ranges

Process Voltage/Current Inputs

Input	Measuring range	Measuring accuracy	Input impedance	Displayable range
DC voltage	1.000 to 5.000 V	±0.1% FS ±1 digit max. (at 23±3°C)	1 MΩ min.	–19999 to 99999 (with scaling function)
	0.000 to 5.000 V			
	–5.000 to 5.000 V	±0.1% FS ±1 digit max. (at 23±5°C)		
	–10.00 to 10.00 V			
DC current	4.00 to 20.00 mA/ 0.00 to 20.00 mA	±0.1% FS ±1 digit max. (at 23±3°C)	45 Ω	

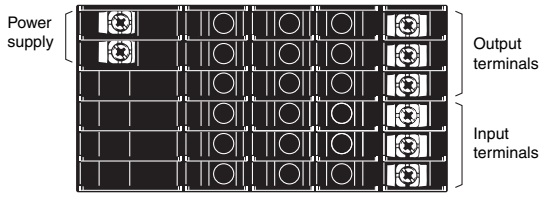
■Input/Output Ratings

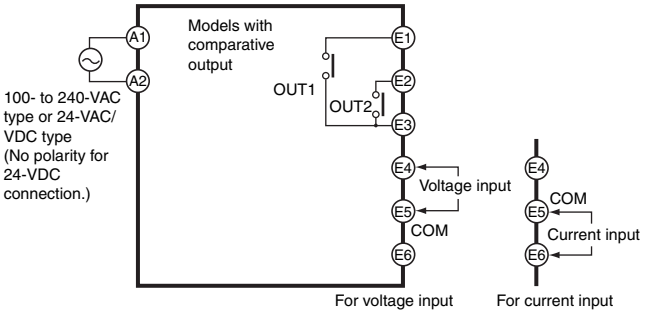
Relay Contact Output

Item	Resistive load (cosϕ = 1)	Inductive load (cosϕ = 0.4, L/R=7 ms)
Rated load (UL ratings)	5 A at 250 VAC, 5 A at 30 VDC	1.5 A at 250 VAC, 1.5 A at 30 VDC
Min. permissible load (P level, reference value)	10 mA at 5 VDC	
Mechanical life	5,000,000 times min.	
Electrical life	100,000 times min.	

Connections

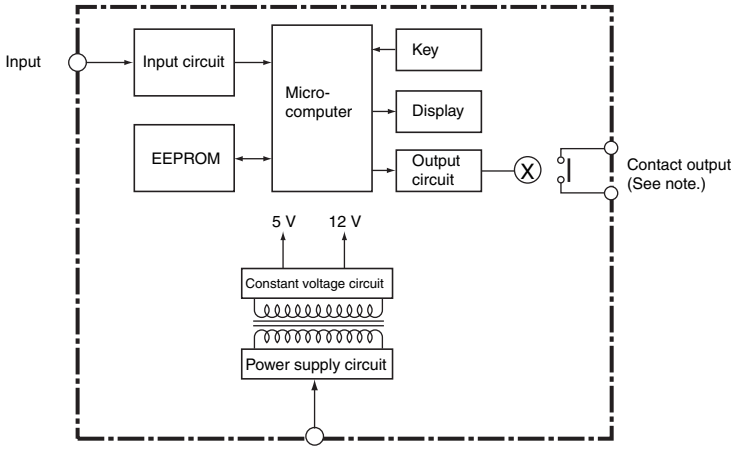
■Terminal Arrangement





Terminal No.	Name	Description
A1 - A2	Operation power	Connects the operation power supply.
E4 , E6 - E5	Analog input	Connects the voltage or current analog input.
E1 , E2 - E3	Outputs	Outputs the relay outputs.

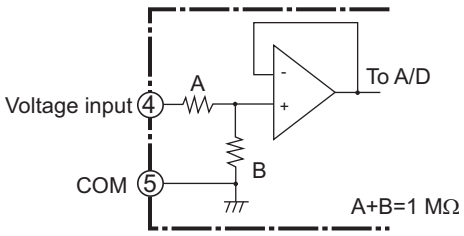
■Block Diagram

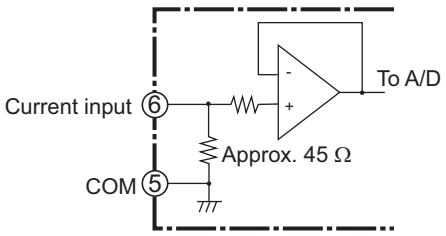


Note: Relay output models only.

■Input Circuits

Analog Input (DC Voltage/Current)





Operation

■Main Functions

Input Types and Ranges

Input type (setting parameter)	Function	Input range (setting parameters)		Setting range
Input range (in-t)	Selects DC voltage/current signal input	0 to 20 mA	(0-20)	Displayable from –19999 to 99999 with scaling function. The position of the decimal point can be set as desired.
		4 to 20 mA	(4-20)	
		0 to 5 V	(0-5)	
		1 to 5 V	(1-5)	
		±5 V	(5)	
		±10 V	(10)	

Note: The initial value for the input range is "4 to 20 mA (4-20)."

Scaling

• Analog (Process) Inputs

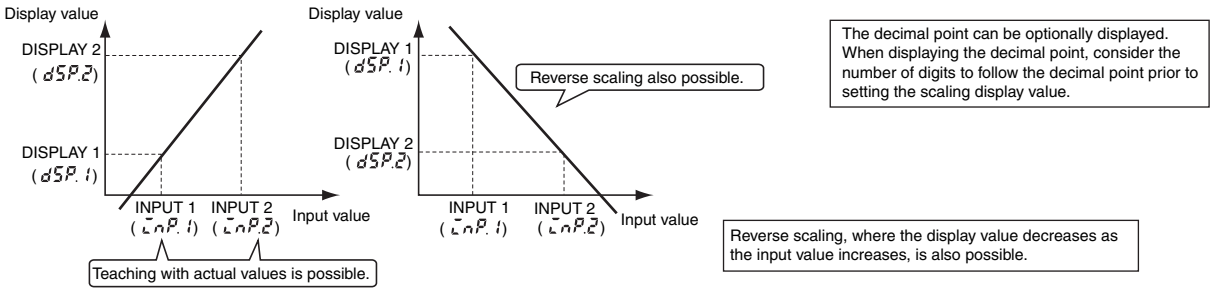
The K3MA-J converts input signals into desired physical values.

INPUT2: Any input value
DISPLAY2: Displayed value corresponding to INPUT2
INPUT1: Any input value
DISPLAY1: Displayed value corresponding to INPUT1

When DISPLAY1 is set for INPUT1, and DISPLAY2 is set for INPUT2, a line will be displayed joining the two points. (Raise shift, reverse scaling, plus/minus display, etc., can be adjusted as desired.)

Parameter	Setting value	Meaning
inP.1	-19999 to 99999	Input value for dSP.1
dSP.1	-19999 to 99999	Input value for inP.1
inP.2	-19999 to 99999	Input value for dSP.2
dSP.2	-19999 to 99999	Input value for inP.2

Parameter	Setting value	Meaning
dP	0.0000	Display four digits after decimal point
	00.000	Display three digits after decimal point
	000.00	Display two digits after decimal point
	0000.0	Display one digit after decimal point
	00000	No decimal point

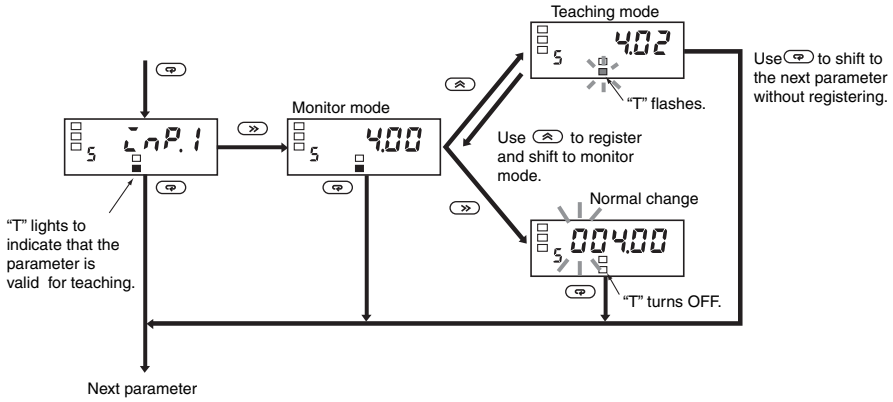


Instead of setting by inputting with the Up Key and Shift Key, current values can be input as scaling input values for teaching. This is useful for making settings while checking the operation status of the K3MA-J.

Convenient Functions

Scaling Teach

The parameters (InP.1, InP.2) for the K3MA-J's initial setting level can be set using actual input values with the teaching function. After displaying the parameters, the actual input settings can be made with the following operation.

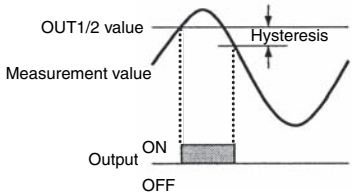


OUT Types (Comparative Output Models Only)

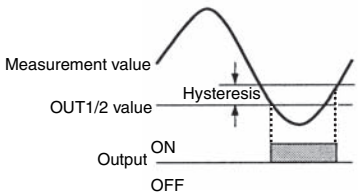
OUT 1 and OUT 2 can be set to operate in one of the three following modes in accordance with the compared values:

- Upper limit (High Acting):
  The output is turned ON when the measurement value is greater than its set value.
- Lower limit (Low Acting):
  The output is turned ON when the measurement value is less than its set value.
- Upper and lower limits (Outside Band Acting):
  An upper limit (H set value) and lower limit (L set value) can be set independently.
  The output is turned ON when the measurement value is greater than upper-limit set value or less than the lower-limit set value.

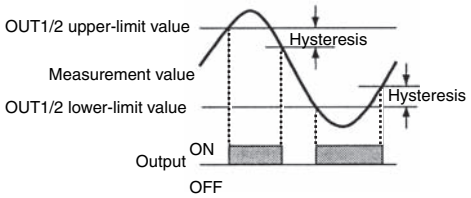
Upper Limit (High Acting)



Lower Limit (Low Acting)

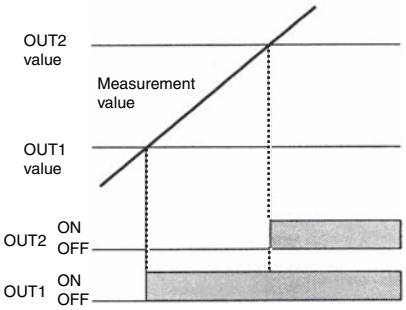


Upper and Lower Limits (Outside Band Acting)

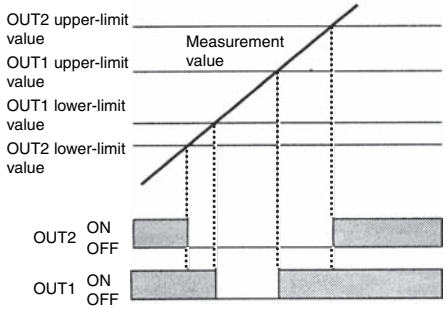


The three types of output operations shown above can be combined as desired. The following are examples of possible combinations.

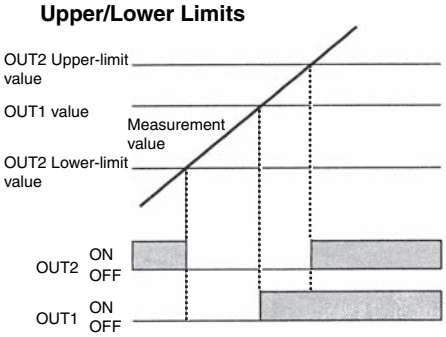
Upper Limit 2-stage Output



Threshold Output



Combination of Upper Limit and Upper/Lower Limits



Parameter Initialization

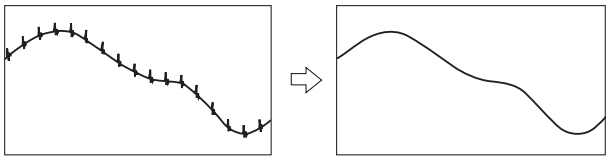
This function returns all of the parameters to their initial values.

Parameter	Setting value	Meaning
initt	oFF	---
	on	Initializes all parameters.

Use this to reset the K3MA-J after returning it to its factory-set condition.

Average Processing

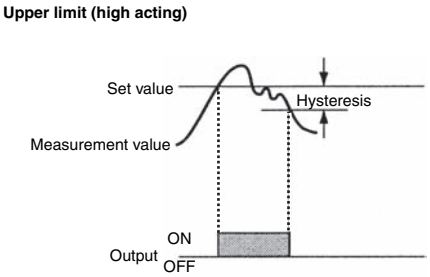
Average processing stabilizes displayed values to minimize flicker by averaging the fluctuating input signals. Average processing can be performed for the measurement values in either of four steps (OFF, 2 times, 4 times, or 8 times).



This is useful for ignoring rapid fluctuations, e.g., eliminating spike noise.

Hysteresis (Comparative Output Models Only)

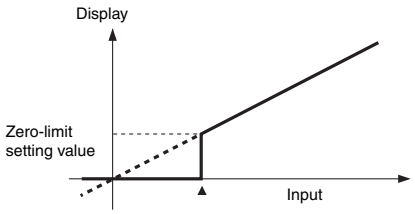
The hysteresis of comparative outputs can be set to prevent chattering in the output when the measurement value fluctuates finely near the OUT value.



Zero-limit Function

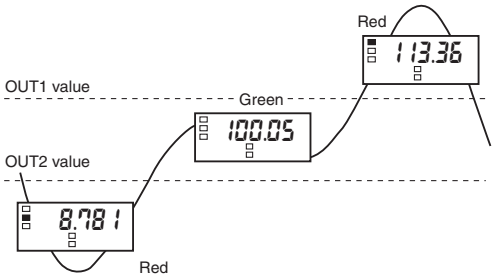
The zero-limit function changes any value below the set value to zero. This is useful when you want to change negative values to zero rather than display them, or when you want to make the display in the smallest part of the input range zero.

Parameter	Setting value	Meaning
Z-LIM	oFF	OFF: No zero-limit
	on	ON: Zero-limit
LIM-P	0 to 99	0 to 99: Zero-limit value



Changing the Display Color

The color of the value displayed can be set to either red or green. For comparative output models (K3MA-J-A2), the display color can be set to change from green to red, or from red to green, according to the status of the comparison criterion.



Display Auto-return Time

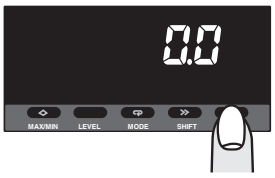
This function automatically returns the display to the operation level's current value if no keys are pressed for a preset time (called the display auto-return time).

Move-to-Protect-Level Time

The time required to shift to the protect level can be set as desired.

Forced-zero Function

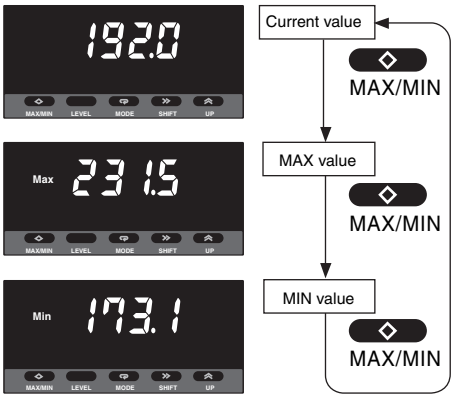
It is possible to shift from a value to the zero point with one touch of the Up Key on the front panel (for example, when adjusting reference values).



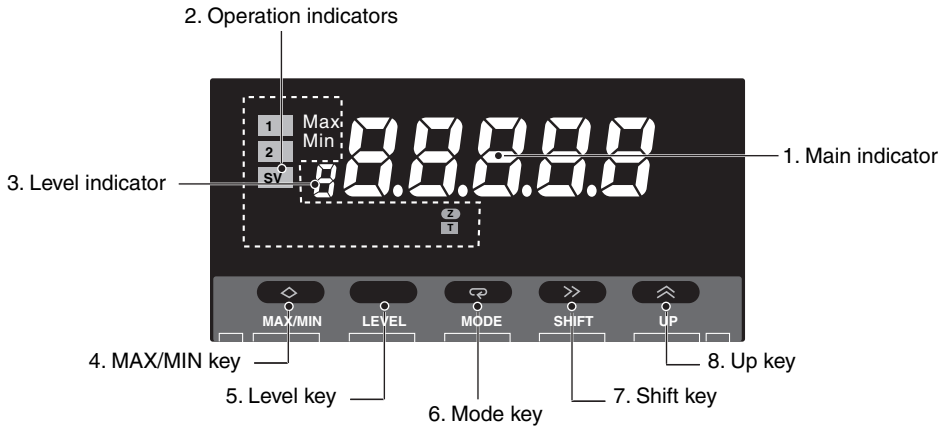
Note: Used only for releasing the forced-zero with the Protect menu.

MAX/MIN Display

The maximum and minimum measurement (display) values from the time the power is turned ON until the current time can be stored and displayed. This is useful, for example, when measuring the maximum value.



Nomenclature

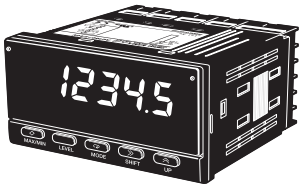


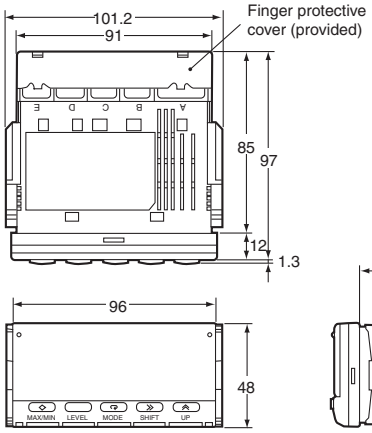
Name		Functions
1. Main indicator		Displays current values, parameters, and set values.
2. Operation indicators	1	Lit when output 1 is ON.
	2	Lit when output 2 is ON.
	SV	Lit when a set value is being displayed or changed.
	Max	Lit when the main indicator is showing the MAX value.
	Min	Lit when the main indicator is showing the MIN value.
	Z	Lit during the forced-zero operation.
	T	Lit when the teaching function is operable. Blinks while the teaching function is operating.
3. Level indicator		Displays the current level that the K3MA-J is in. (See below for details.)
4. MAX/MIN Key		Used to display the MAX and MIN values when a measurement value is being displayed.
5. Level Key		Used to change the level.
6. Mode Key		Used to allow the main indicator to indicate parameters sequentially.
7. Shift Key		Used to enable a set value to be changed. When changing a set value, this key is used to move along the digits.
8. Up Key		Used to change a set value. Used to set or clear a forced-zero function when a measurement value is being displayed.

Level indicator	Level
P	Protect
Not lit	Operation
S	Initial setting
F	Advanced-function setting

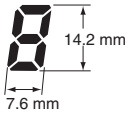
Dimensions

(Unit:mm)

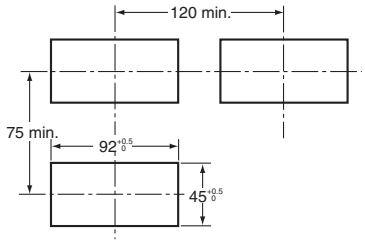




Main indicator character size



Panel cut-out

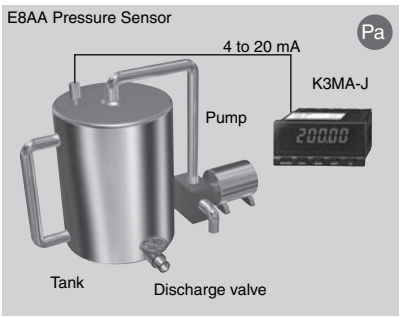


Mounting Recommended Panel Thickness
1 to 8 mm.
Mount the product horizontally.

The K3MA-J uses M3 terminals.

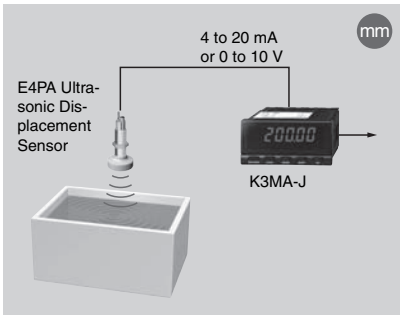
Application Examples

Monitoring interior tank pressure



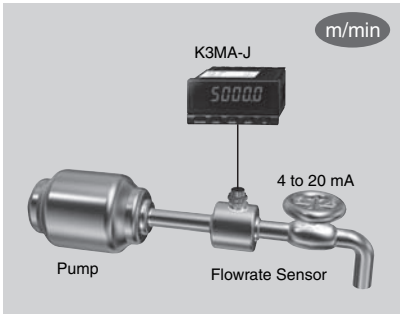
- Monitoring gas pressure
- Inspection instruments in food or pharmaceutical plants

Displaying/outputting liquid level



- Monitoring liquid level in cleaning tanks
- Water tanks, devices using chemicals, etc.

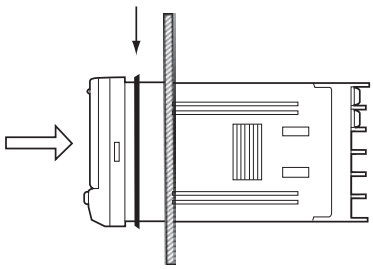
Flowrate sensor



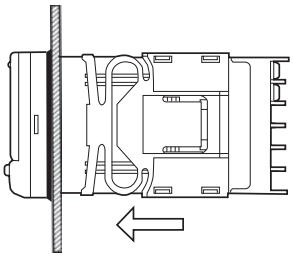
- Monitoring send-out flowrate
- Water processing devices, etc.

Installation

1. Insert the K3MA-J into the panel cut-out hole.
2. For a waterproof installation, insert the rubber gasket onto the body of the K3MA-J.

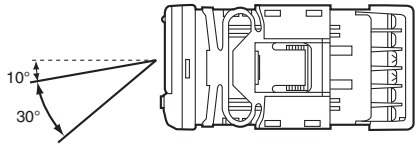


3. Fit the adaptor into the grooves on the left and right sides of the rear case, then push it until it contacts the panel to secure the K3MA-J.



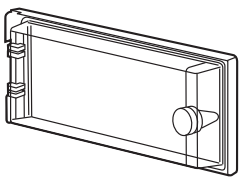
■Angle of View

The K3MA is designed to provide the best visibility at the angles shown in the following diagram.



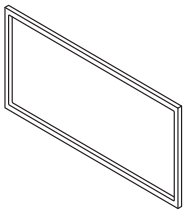
■Watertight Cover

Y92A-49N



■Rubber Packing

K32-P1



If the rubber packing is lost or damaged, it can be ordered using the following model number: K32-P1.
(Depending on the operating environment, deterioration, contraction, or hardening of the rubber packing may occur and so, in order to ensure the level of waterproofing specified in NEMA TYPE 4, periodic replacement is recommended.)

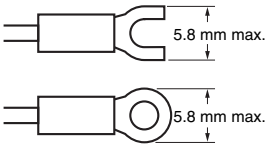
Note: Rubber packing is provided with the Controller.

■Wiring Precautions

- Use crimp terminals.
- Tighten the terminal screws to a torque of approximately 0.5 N·m.
- To avoid the influence of noise, route signal lines and power lines separately.

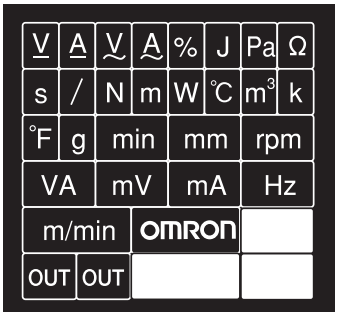
■Wiring

- Use the following M3 crimp terminals.



■Unit Labels (Provided)

- The unit labels are not attached to the K3MA-J. Select the desired labels from the provided sheet.



Note: For scales and gauges, use the unit labels that are specified by the relevant laws or regulations.

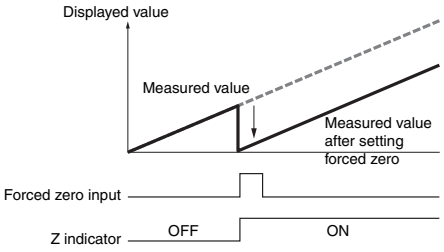
Operating Procedures

■Operations in Run Mode

Setting and Releasing a Forced Zero

Setting a Forced Zero

Any reference point can be easily set to zero.



- Press the Up Key while the measurement is being displayed. The displayed value will be shifted to 0 and measurement will be continued.

If forced-zero protection is turned ON in the protect level, the Up Key cannot be used to set a forced zero. Forced-zero protection is ON in the default settings.

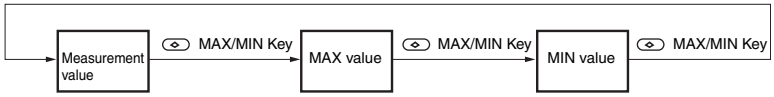
- The Z indicator will light when a forced zero has been set.
- The shifted measurement value after a forced zero has been set will be maintained even after power is turned OFF.

Releasing a Forced Zero

- Press the Up Key for 1 s min. to release the forced zero. The Z indicator will turn OFF.

Checking the Maximum and Minimum Values

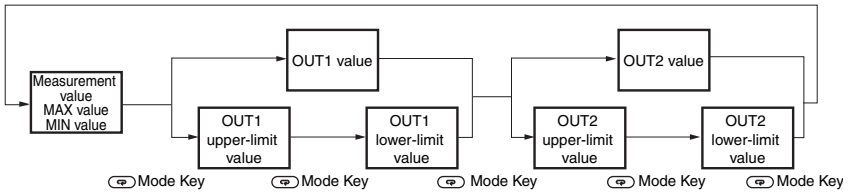
The maximum and minimum values can be displayed by pressing the MAX/MIN Key while the measurement is being displayed.



The maximum and minimum values can be reset by pressing the MIN/MAX Key for 1 s min. when the maximum or minimum value is displayed.

Checking and Setting Comparative Set Values (for Models with the Comparative Output Function)

Each time the Mode Key is pressed when the measurement value, maximum value, or minimum value is displayed, the comparative values will be displayed in the following order: OUT1 value (or OUT1 upper-limit value, OUT1 lower-limit 1), OUT 2 value (or OUT 2 upper-limit value, OUT2 lower-limit value 2).

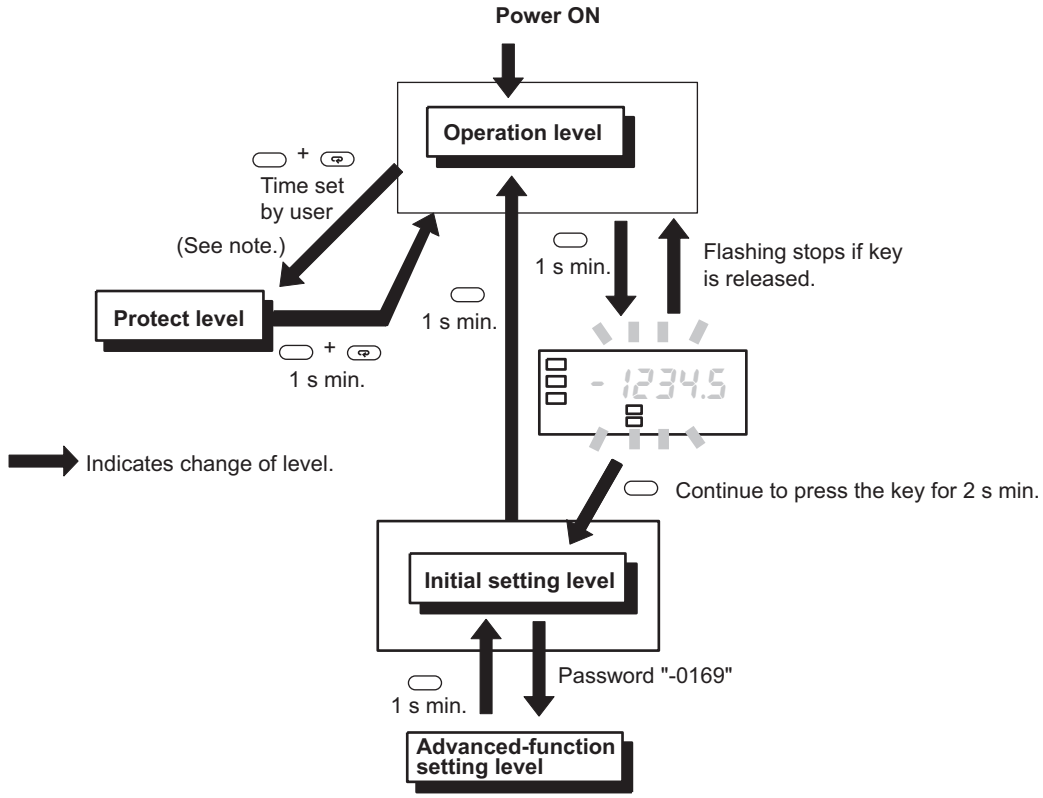


Note: When a comparative value is displayed, it can be changed by pressing the Shift Key and the Up Key (when key protection is OFF).

■Levels

"Level" refers to a grouping of parameters. The following table lists the operations that are possible in each of the levels, and the diagram tells how to move between levels. There are some parameters that are not displayed for certain models.

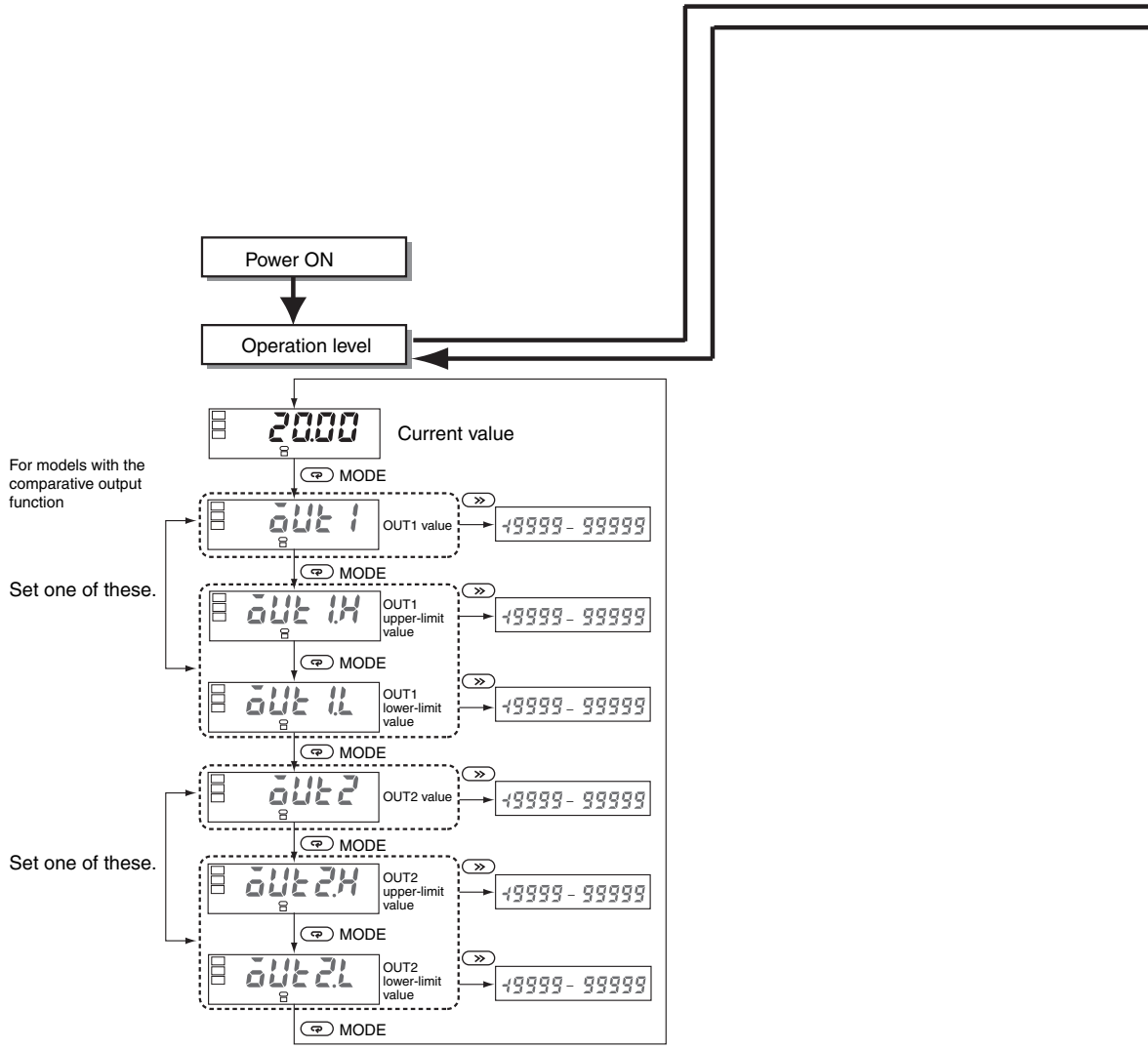
Level name	Function	Measurement
Protect	Setting lockouts.	Continue
Operation	Displaying current values, setting/clearing forced-zero function, and setting OUT 1/2 values.	Continue
Initial setting	Making initial settings of input type, scaling, output operating action, and other parameters.	Stopped
Advanced-function setting	Setting average processing, display color settings, and other advanced-function parameters.	Stopped

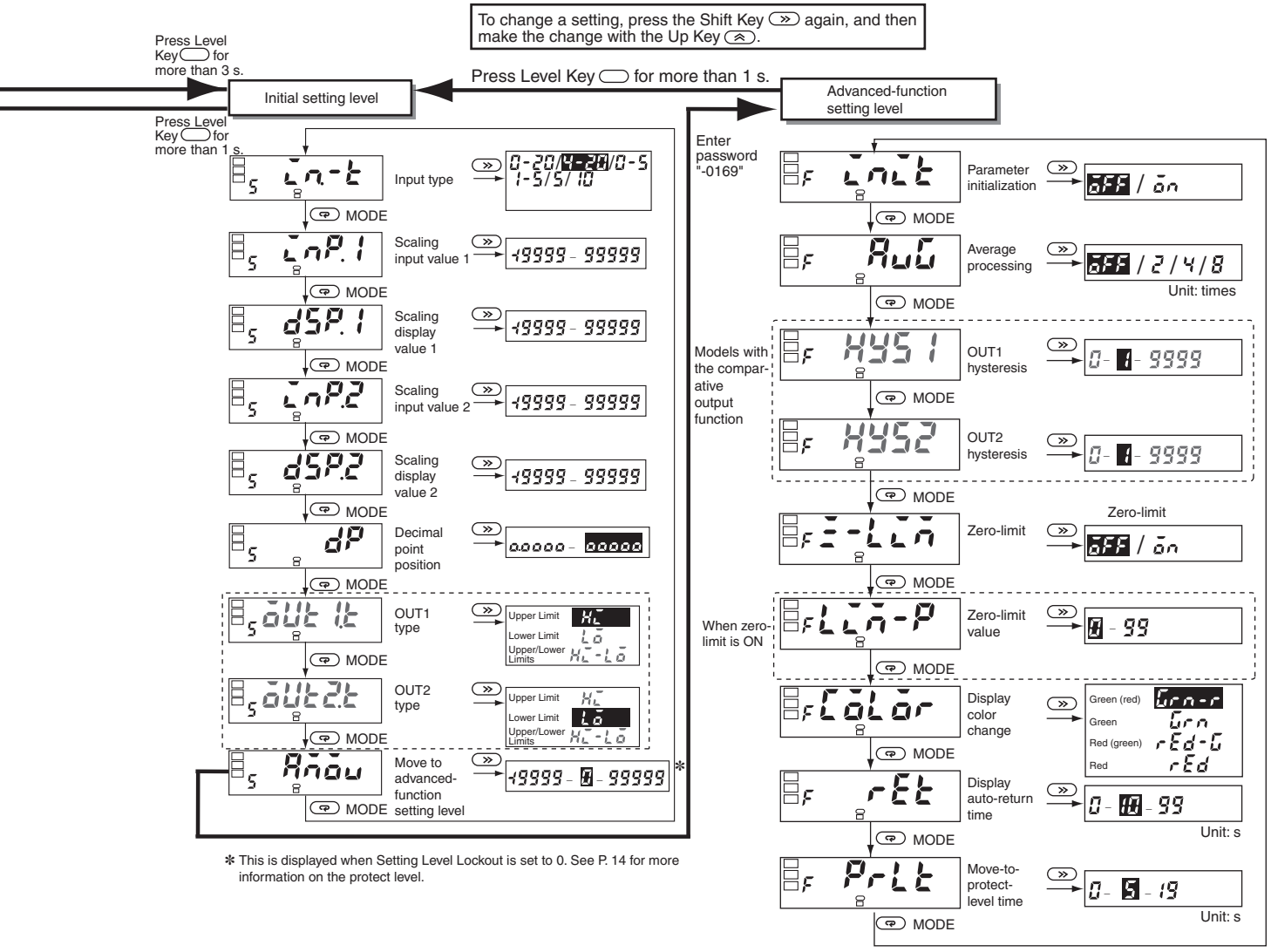


Note: The move-to-protect-level time can be set in the advanced-function setting level.

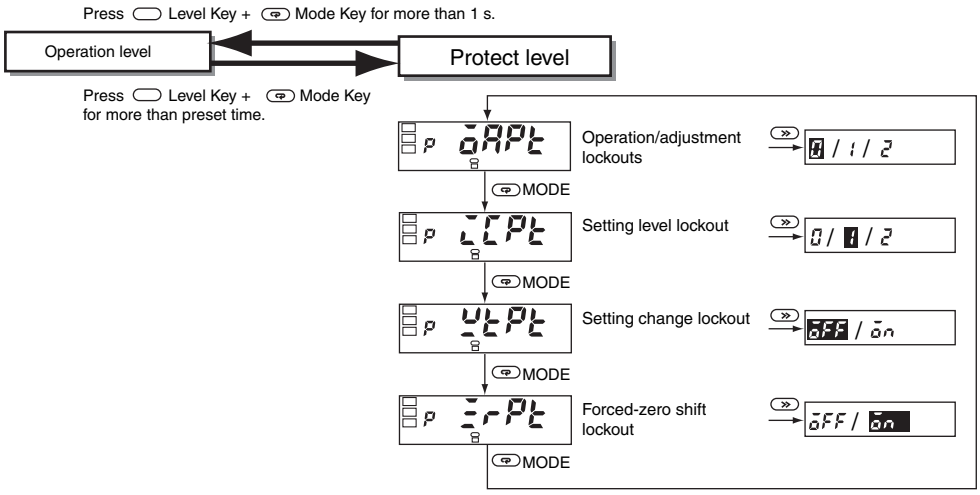
■Parameters

Note: 1. Some parameters are not displayed for certain models.
2. The K3MA-J will stop measurement if the level is changed to the initial setting level or the advanced-function setting level.
3. If the input range is changed, some parameters are set to default values. Therefore, set the input range first.
4. Settings displayed in reversed colors are defaults.





* This is displayed when Setting Level Lockout is set to 0. See P. 14 for more information on the protect level.



Operation/Adjustment Lockouts

Restricts key operations for operation level and adjustment level.

Parameter	Setting	Operation level	
		Current value display	Set value display
oAPt	0	Allowed	Allowed
	1	Allowed	Allowed
	2	Allowed	Prohibited

- Initial setting is 0.
- This cannot be displayed on models not equipped with the comparative output function.

Setting Level Lockout

Restricts shifting to initial setting level or advanced-function setting level.

Parameter	Setting	Shift to initial setting level	Shift to advanced-function setting level
LCPt	0	Allowed	Allowed
	1	Allowed	Prohibited
	2	Prohibited	Prohibited

Setting Change Lockout

Restricts setting changes by key operation. When this lockout is set, it is no longer possible to shift to a setting change mode.

Parameter	Setting	Setting change by key operation
VtPt	oFF	Allowed
	on	Prohibited

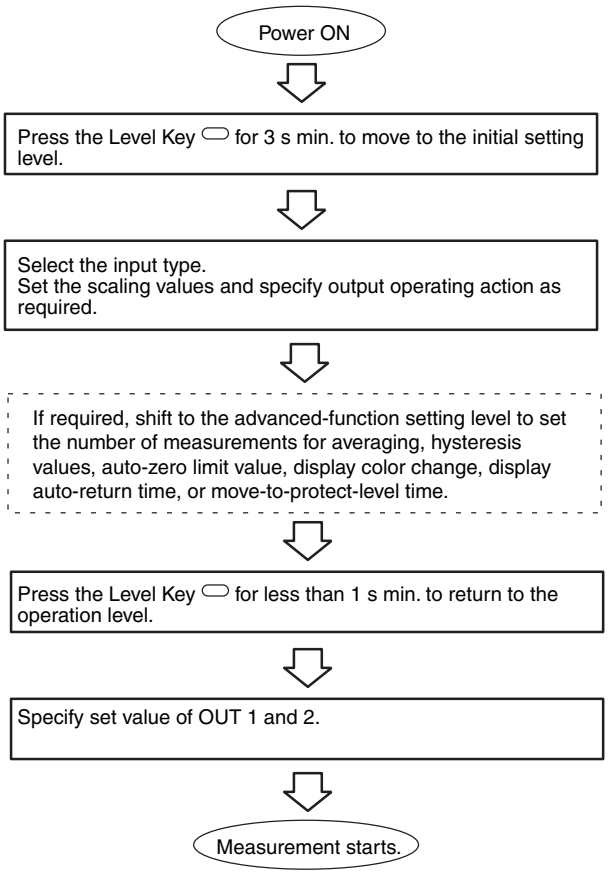
However, all protect level parameters can still be changed.

Forced-zero Lockout

Restricts the setting or release of a forced-zero by front-panel key operation.

Parameter	Setting	Setting/release of forced-zero by key operation
ZrPt	oFF	Allowed
	on	Prohibited

■Initial Settings

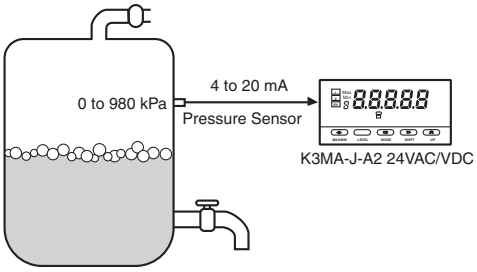


■Setting Example

Initial Settings

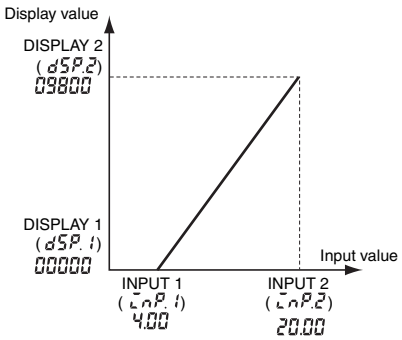
The settings for the following example are shown here.

Example: Tank pressure display



Here, the pressure inside the tank is to be displayed in units of 0.1 kPa.

- Pressure Sensor
  Measuring range: 0 to 980 kPa, output 4 to 20 mA



1. Set the K3MA-J input type to the 4 to 20 mA input range.
   Parameter: In-t (input type), Setting value: 4-20
2. Set the display values for the corresponding input values.
   Set the scaling as shown below for the following correspondence: input 4 mA-->display 0.0, input 20 mA-->display 980.0

Parameter	Setting value
InP.1 (scaling input value 1)	4.00
dSP.1 (scaling display value 1)	00000
InP.2 (scaling input value 2)	20.00
dSP.2 (scaling display value 2)	09800
dP (decimal point position)	oooo.o

Note: The decimal point position here refers to the position in the number after scaling. When setting the scaling display value, it is necessary to consider the number of digits to be displayed past the decimal point.

■Troubleshooting

When an error occurs, error details will be displayed on the main indicator. Confirm the error from the main indicator and take the appropriate countermeasures.

Level display	Main indicator	Error contents	Countermeasures
Not lit	E111	RAM memory error	Repair is necessary. Consult your OMRON sales representative.
S	E111	EEPROM memory error	When this error is displayed, press the Level Key for 3 seconds, and the settings will be restored to the factory settings. If the error cannot be recovered, repair is necessary. Consult your OMRON sales representative.
Not lit	Flashes S.Err	You will see this indication when turning ON the product the first time after purchase. This is because the input signal value is 0 mA at that time even though the range is factory set to 4 to 20 mA. For the K3MA-J-A2, the relay output will be OFF.	At the initial setting level, set the input type and other parameters according to your application.
		Input error	Promptly change the input voltage/current to a value that falls within the measurement range. If the error cannot be recovered, repair is necessary. Consult your OMRON sales representative.
Not lit	Flashes 99999	The scaling display value exceeds 99999.	Promptly change the input to a value that falls within the specified range.
			The scaling value may be inappropriate. Review the scaling value at the initial setting level.
Not lit	Flashes -19999	The scaling display value is lower than –19999.	Promptly change the input to a value that falls within the specified range.
			The scaling value may be inappropriate. Review the scaling value at the initial setting level.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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2023.12

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