

Scaling Meter

K3TJ

Highly Functional Scaling Meter with Versatile, Easy-to-read Red or Green Display

- Red or green display color available.
- Wide range of scaling settings, including negative scaling.
- Simple average and movement average processing methods allow 4 s max. to display the process value, thus reducing display blinking and making it easier to read the display.
- Step display setting adjusts the step of the displayed rightmost digit to 2, or 5. It is possible to fix the displayed rightmost digit to 0.
- Zero limit setting enables the K3TJ to display zero for any value less than the set value and is ideal for water depth display.
- Display brightness can be adjusted.
- Conforms to the EMC standard EN61010-1 (IEC1010-1).



Ordering Information

DC Voltage Input Model

Voltage measurement range	Display color	Supply voltage	
		100 to 240 VAC	24 VDC (internally insulated)
1 to 5 VDC, 0 to 5 VDC, and 0 to 10 VDC (multi-range)	Red	K3TJ-V111R	K3TJ-V116R
	Green	K3TJ-V111G	K3TJ-V116G

DC Current Input Model

Current measurement range	Display color	Supply voltage	
		100 to 240 VAC	24 VDC (internally insulated)
4- to 20-mA DC	Red	K3TJ-A111R	K3TJ-A116R
	Green	K3TJ-A111G	K3TJ-A116G

Model Number Legend

K3TJ-j j j j j
1 2 3 4 5

1, 2. Input Code

- V1: DC voltage input
1 to 5 VDC, 0 to 5 VDC, and 0 to 10 VDC (multi-range)
- A1: DC current input
4 to 20 mA

3. Series No.

- 1: Present series

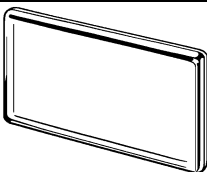

4. Supply Voltage

- 1: 100 to 240 VAC
- 6: 24 VDC (internally insulated)

5. Display Color

- R: Red LED
- G: Green LED (available upon request)

■ Accessories (Order Separately)

Name	Appearance	Model	Applicable Unit
Water-resistive Soft Front Cover		K32-L49SC	K3TE K3TF K3TL K3TJ
Terminal Cover		K32-L49TC	K3TF K3TL K3TJ

- Note:** 1. Use the Mounting Adapters provided with the K3TJ to mount the above accessories.
2. The Terminal Cover is used to protect against electric shock but is not waterproof.

Specifications

■ Ratings

Supply voltage	100 to 240 VAC (50/60 Hz); 24 VDC (internally insulated)		
Operating voltage range	-15% to 10% of supply voltage		
Power consumption	Approx. 7.7 VA (max. AC load); approx. 2.8 W (max. DC load)		
Insulation resistance	10 MΩ min. (at 500 VDC) between external terminals and case		
Dielectric strength	2,000 VAC for 1 minute between input terminals and power supply 2,000 VAC for 1 minute between external terminals and case		
Noise immunity	AC Model: ±1,500 V on power supply terminals in normal or common mode DC Model: ±480 V on power supply terminals in normal mode and ±1,500 V on power supply terminals in common mode		
Vibration resistance	Malfunction: 10 to 55 Hz, 0.5-mm single amplitude for 10 minutes each in X, Y, and Z directions Destruction: 10 to 55 Hz, 0.75-mm single amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Malfunction: 98 m/s ² (10G) for 3 times each in 6 directions. Destruction: 294 m/s ² (30G) for 3 times each in 6 directions		
Ambient temperature	Operating: -10°C to 55°C (with no icing) Storage: -20°C to 65°C (with no icing)		
Ambient humidity	Operating: 35% to 85% (with no condensation)		
Ambient atmosphere	Must be free of corrosive gas		
Weight	200 g		
Case material	Heat-resistive ABS/PC		
EMC	Emission Enclosure:	EN55011	Group 1 class A
	Emission AC Mains:	EN55011	Group 1 class A
		EN61000-4-2:	4 kV contact discharge (level 2) 8 kV air discharge (level 3)
	Immunity RF-interference:	ENV50140:	10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3) 10 V/m (pulse modulated, 900 MHz)
	Immunity Conducted Disturbance:	ENV50141:	10 V (0.15 to 80 MHz) (level 3)
	Immunity Burst:	EN61000-4-4:	2 kV power-line (level 3) 2 kV I/O signal-line (level4)
Approved standards	UL (File No. E4151), CSA (File No. LR67027) Conforms to EN50081-2 and EN50082-2		

- Note:** An initial current of approximately 0.25 A will flow for approximately 35 ms the moment the K3TJ is turned on.

■ Characteristics

Input signal	DC voltage/current (4 to 20 mA, 1 to 5 V, 0 to 5 V, and 0 to 10 V)
A/D conversion method	Double integral method
Sampling time	0.5 s
Display refresh period	0.5 s
Process value averaging method	Simple average/movement average
No. of process value averaging operation	1, 2, 4, or 8 times
Max. displayed digits	4 digits (-1,999 to +9,999)
Display	7-segment red or green LED with a character height of 14.2 mm
Decimal display	Selected by the Up and Down Keys and parameter selector
Scaling function	Shift/Scaling adjustment is possible with the Up and Down Keys and parameter selector
Scaling range	-1,999 to +9,999
Zero-limit range	0 to 99 digits
Overflow display	Flashes
Zero-suppress function	Available
External control	Process value hold (by short-circuiting the rear terminals)
Enclosure rating	Front panel: IP51 (see note) Case: IP20 Terminals: IP00 } Refer to IEC
Memory protection	Non-volatile memory (no backup battery is required)

Note: IP51 is ensured with the Water-resistive Soft Front Cover, which can be ordered separately. Without the Water-resistive Soft Front Cover, the front panel meets the requirements of IP50 instead.

■ Measuring Ranges

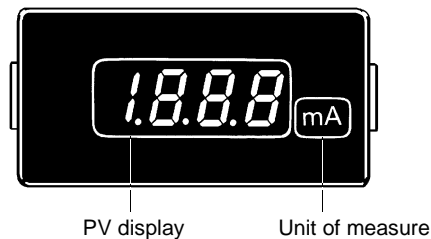
Measuring range		Input impedance	Reliability	Max. permissible continuous load
Voltage (DC)	1 to 5 VDC	1 M Ω	$\pm 0.1\%$ rdg ± 1 digit	± 250 V
	0 to 5 VDC	1 M Ω	$\pm 0.1\%$ rdg ± 1 digit	± 250 V
	0 to 10 VDC	1 M Ω	$\pm 0.1\%$ rdg ± 1 digit	± 250 V
Current (DC)	4 to 20 mA DC	100 Ω	$\pm 0.1\%$ rdg ± 1 digit	± 50 mA

Note: The measurement accuracy values stated in the above table are guaranteed at an ambient temperature of 25 ± 5 °C.

■ Parameter List

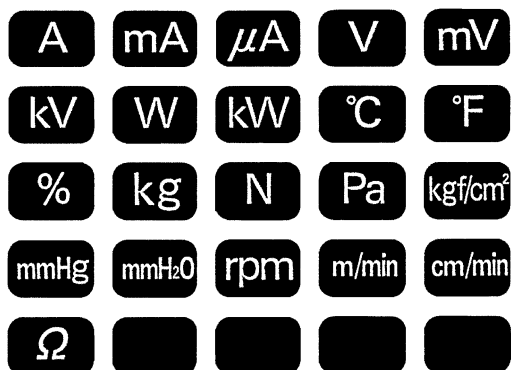
Parameter name	Operation	Setting method
Display shift	By setting a shift value, the displayed value will be shifted and displayed.	Set with the internal parameter selector and key input.
Scaling value	By setting a scaling value, the input signal will be converted and displayed. Negative value scaling is possible.	
Decimal point	The decimal point position can be selected.	
Average display	Displays the process value for 4 s maximum after a simple average or movement average process.	
Zero-limit range input	Zero will be displayed for any value below the zero-limit value.	
2-digit step display	Rounds the rightmost digit to 0, 2, 4, 6, or 8.	
5-digit step display	Rounds the rightmost digit to 0 or 5.	
Rightmost digit at 0	Rounds the rightmost digit to 0.	
Display brightness adjustment	Adjusts the brightness of the display to one of three levels.	

Nomenclature



Unit Label (Provided)

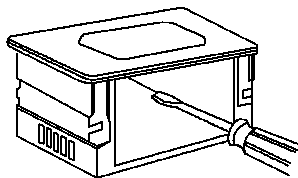
Select the applicable unit label from the unit label sheet provided with the K3TJ and attach it to the bottom-right side of the display.



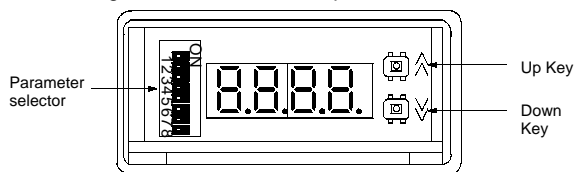
Operation

■ Removal of Front Panel

Insert a flat-blade screwdriver into the groove on the bottom of the front panel and pull the front panel off.



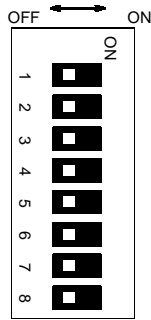
The following is seen after the front panel is removed.



No.	Name	Parameter
1	Parameter selector	When any one of parameter selector pins 1 to 8 is set to ON, the corresponding setting item can be changed.
2, 3	Up Key, Down Key	The Up and Down Keys are used to change the set value when the corresponding parameter selector pin is set to ON.

Parameter Selection

When a parameter selector pin is set to OFF, the corresponding set value that has been changed will be stored in the non-volatile memory. Any data that has been previously set will be kept in the non-volatile memory regardless of whether the K3TJ is turned on or off. The following table lists the parameters assigned to parameter selector pins 1 to 8.



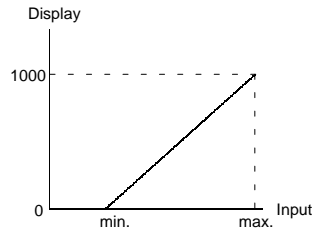
Pin no.	Setting
1	Input range
2	Display shift
3	Scaling
4	Decimal point
5	Averaging
6	Zero limit
7	Step display
8	Display brightness

Parameter Setting

The K3TJ is factory-set to display 0 when the minimum input range value is input and display 1,000 when the maximum input range value is input.

DC Voltage Input Model

Input range	Display
0- to 5-VDC input	0 to 1000
1- to 5-VDC input	
0- to 10-VDC input	



Adjust the display shift and scaling for the K3TJ while applying an actual input.

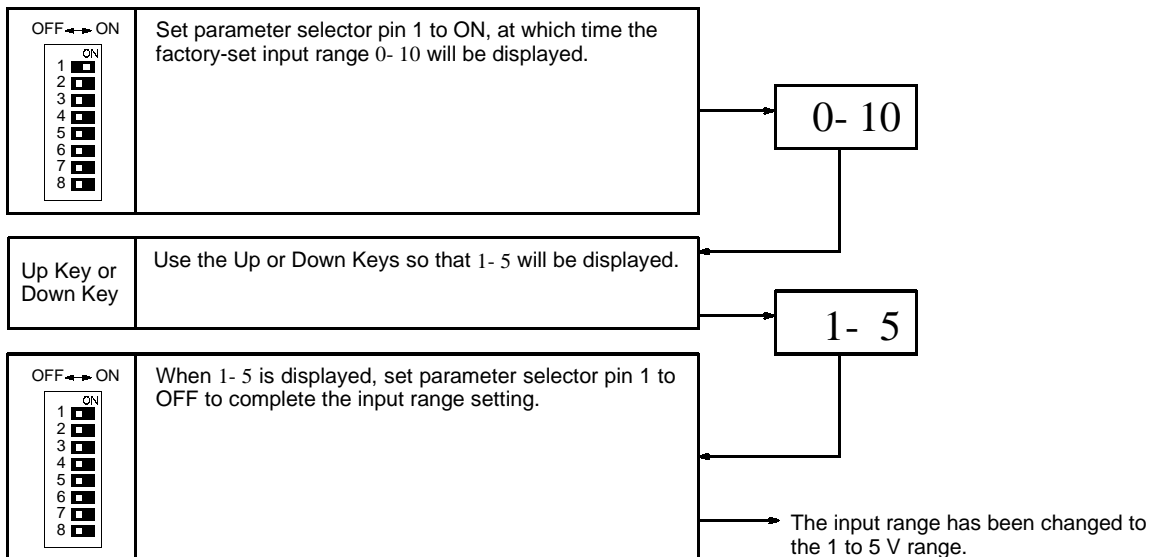
DC Current Input Model

Input range	Display
4 to 20 mA DC input	0 to 1000

1. Input Range Setting

Select the 0- to 5-V, 1- to 5-V, or 0- to 10-V input range on the DC Voltage Input Model and 4- to 20-mA input range on the DC Current Input Model.

Example: When selecting the 1- to 5-V input range on the DC Voltage Input Model



DC Voltage Input Model

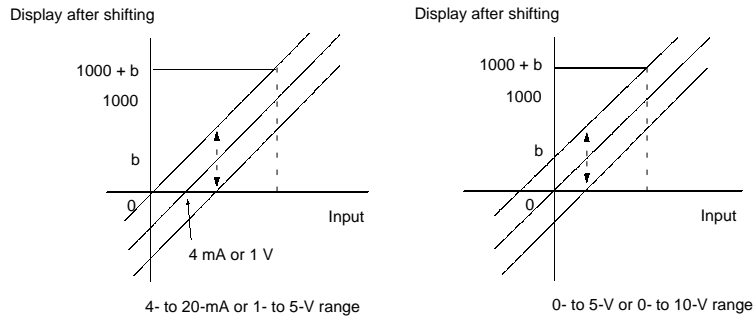
Display	Input range
0- 5	0 to 5 VDC
1- 5	1 to 5 VDC
0-10	0 to 10 VDC (factory-set)

DC Current Input Model

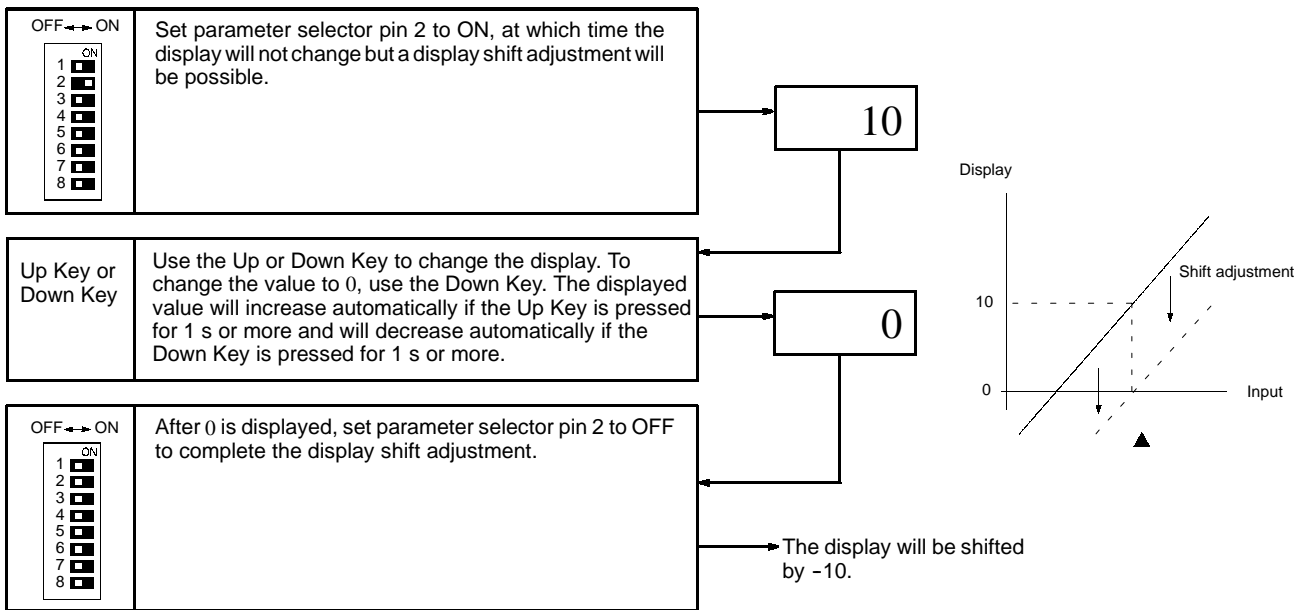
Display	Input range
4-20	4 to 20 mA DC

2. Display Shift Adjustment

The display can be shifted within a range of -1,999 to 9,999. Adjust the display shift while applying an actual input.

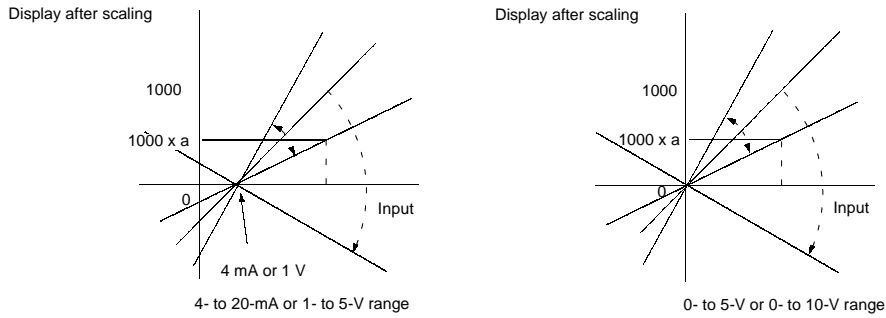


Example: When shifting from 10 to 0

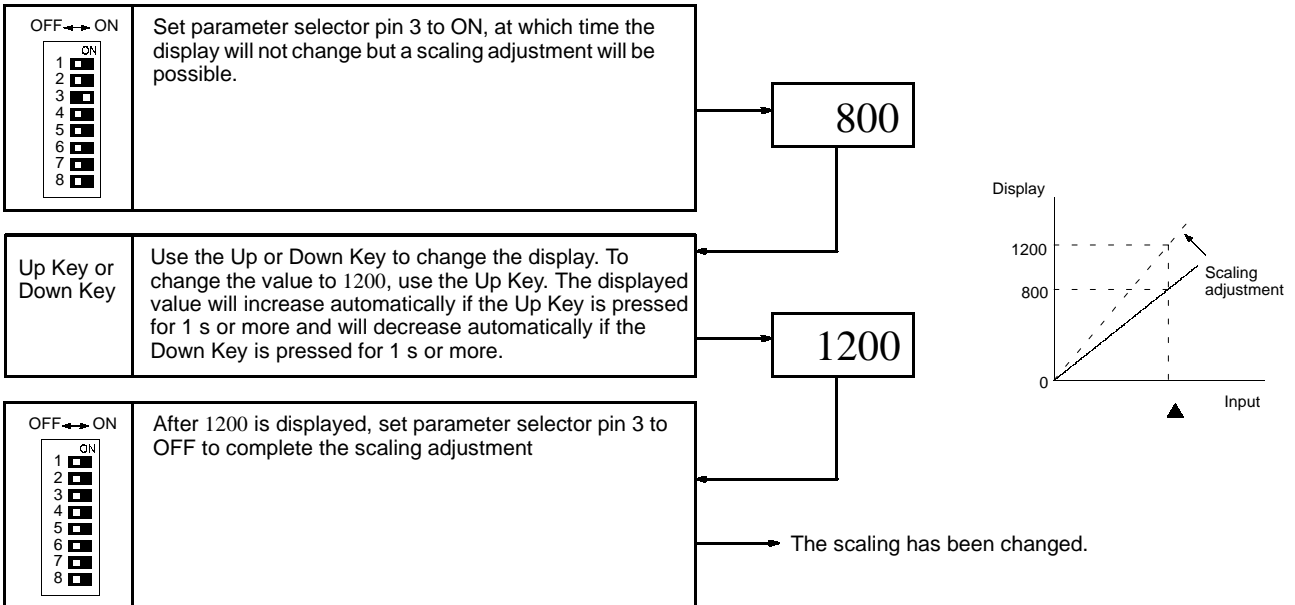


3. Scaling Adjustment

The K3TJ is factory-set to display 0 to 1,000 for the minimum and maximum input range value. By setting the scaling, the K3TJ can be scaled within a range of 0 to 9,999 or 0 to -1,999.

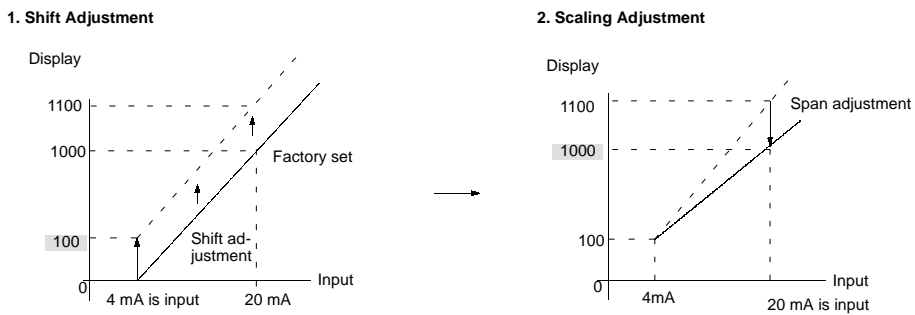


Example: When adjusting the factory set value 800 to a scaling value of 1200
Adjust the scaling while applying an actual input.



Display Shift Setting and Scaling Operation

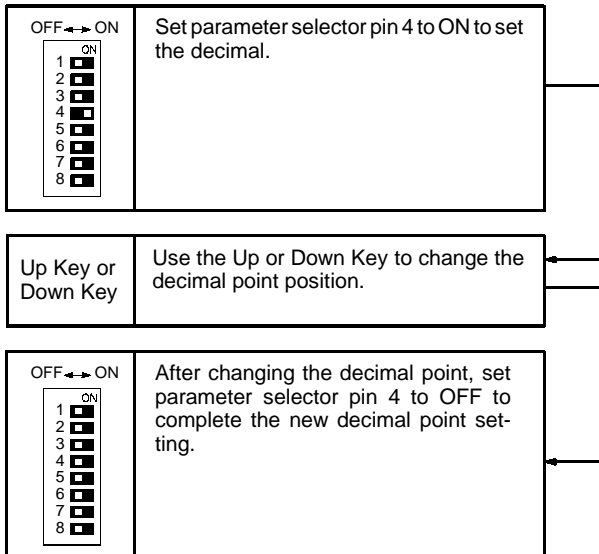
In the following example, 4 to 20 mA is scaled to be 100 to 1,000.



- Note:**
1. At the time of scaling adjustment, the starting point for changing the inclination of the straight line will be the minimum value of the input range. Therefore, when using only a part of the input range, repeat shifting and scaling adjustments several times.
 2. Turn the K3TJ off and on while pressing both the Up and Down Keys so that the K3TJ's shifting and scaling settings will return to the ones preset before shipping.

4. Decimal Point Setting

The decimal is set to the desired position.



Display	Decimal point
0000	No decimal point (factory-set)
000.0	Next to 10^1 digit on the left
00.00	Next to 10^2 digit on the left
0.000	Next to 10^3 digit on the left

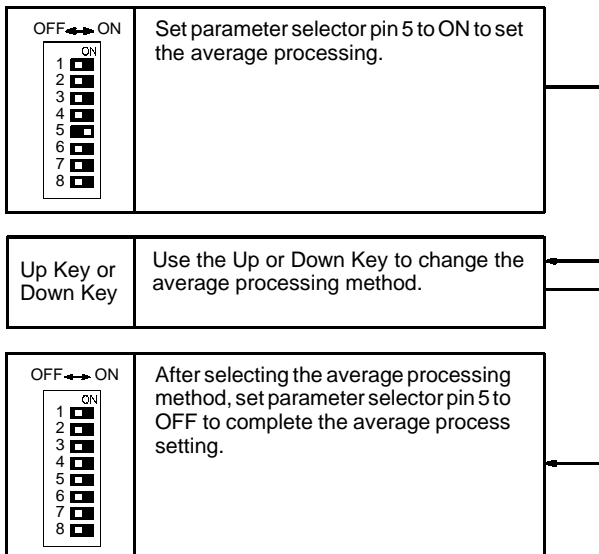
Note: In the case of a range of -0.001 to -0.999, -.001 to -.999 will be displayed.

5. Average Process Setting

There are two ways to input signals: the simple average processing method and the movement average processing method.

In the simple average processing method, the mean value is displayed after sampling n times. This method is effective when the user requires a long display refresh period.

In movement average processing method, the sampling data obtained from sampling n times including the present sampling operation is averaged and displayed. This method is effective for removing the periodical noise overlapped with the input signals.




Display	Average processing
1	No average processing is possible (factory set)
a- 2	Simple average processing by sampling twice
a- 4	Simple average processing by sampling four times
a- 8	Simple average processing by sampling eight times
b- 2	Movement average processing by sampling twice
b- 4	Movement average processing by sampling four times
b- 8	Movement average processing by sampling eight times

6. Zero Limit Setting

Zero limit setting enables the K3TJ to display zero for any value less than the set value. This is effective if the user needs to have the K3TJ display zero instead of a negative value or the user needs to have the K3TJ display zero for the minimum input range value. The setting range is from 00 to 99. When no zero limit is set, off will be displayed.

OFF ↔ ON




Set parameter selector pin 6 to ON to set the zero limit.

Up Key or Down Key

Use the Up or Down Key to input the zero limit value. The displayed value will increase automatically if the Up Key is pressed for 1 s or more and will decrease automatically if the Down Key is pressed for 1 s or more.

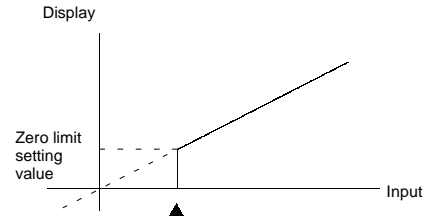
OFF ↔ ON



After setting the zero limit, set parameter selector pin 6 to OFF to complete the zero limit setting.

Display	Zero limit setting
99 to 00	Zero limit setting range
off	No zero limit (factory set)


Zero Limit Setting Range



7. Step Display Setting

Step display setting is used to change the step of the displayed rightmost digit changes. This setting is effective if the input signal repeatedly displays 999 and 1000 and is difficult to read. The following table shows the step display patterns.

OFF ↔ ON

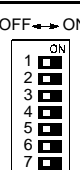


Set parameter selector pin 7 to ON to set the step display.

Up Key or Down Key

Use the Up or Down Key to select the display pattern.

OFF ↔ ON



After selecting the display pattern, set parameter selector pin 7 to OFF to complete the step display setting.

Display	Step display pattern
1	No step display (factory set)
2	With every two digits
5	With every five digits
10	With every ten digits (the rightmost digit is fixed to 0)

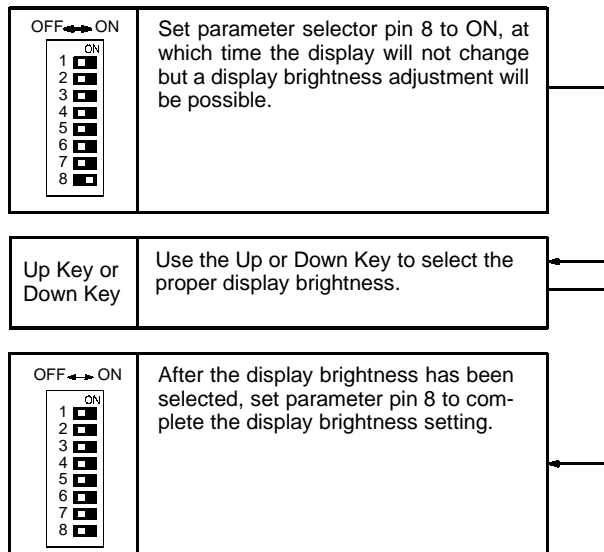
Step Display Parameter

The display step of the rightmost digit can be selected.

Input value		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Displayed value	2-digit step	0		2		4		6		8		10		12		14
	5-digit step	0		5			10			15						
	Fixed to be zero	0				10										

8. Display Brightness Adjustment

It is possible to change the display brightness in three steps.



■ Error Message

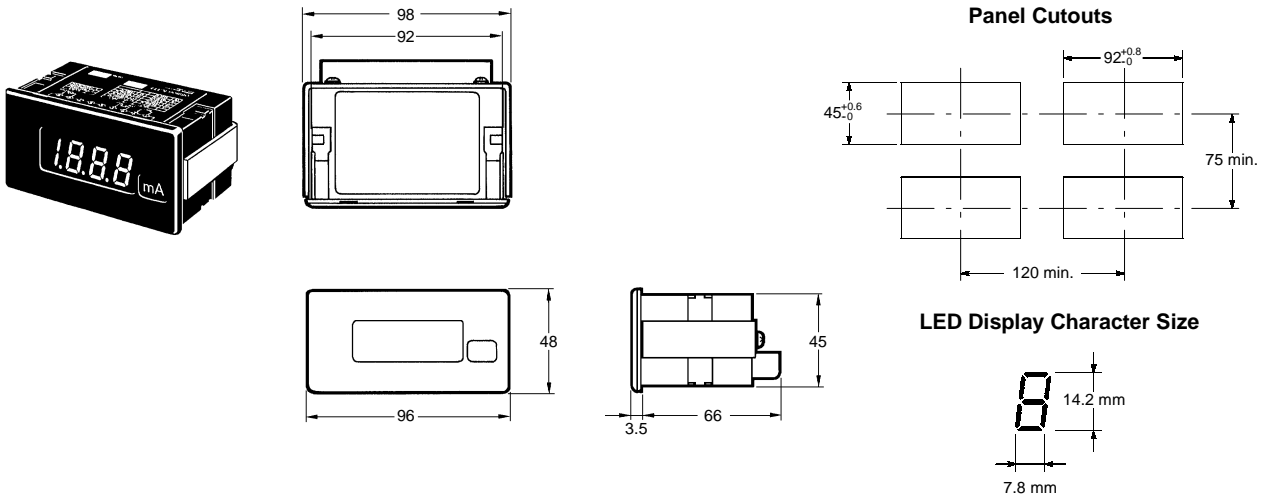
Refer to the following table in the case of an error.

Display	Cause	Remedy
e 01	The internal memory has malfunctioned.	Turn the K3TJ OFF and ON. If the error condition of the K3TJ does not change, consult your OMRON representative.
e 02	The non-volatile memory has malfunctioned.	
e 03	The calibration value stored in the non-volatile memory has been corrupted.	
e 10	The input range set value stored in the non-volatile memory has been corrupted.	Select the input range again according to the input range setting procedure.
e 11	The shift value stored in the non-volatile memory has been corrupted.	Execute display shift again according to the display shift adjustment procedure.
e 12	The scaling value stored in the non-volatile memory has been corrupted.	Execute scaling again according to the scaling adjustment procedure.
e 13	The decimal point set value stored in the non-volatile memory has been corrupted.	Set the decimal point again according to the decimal point setting procedure.
e 14	The average processing set value stored in the non-volatile memory has been corrupted.	Select average processing again according to the average processing setting procedure.
e 15	The zero limit value stored in the non-volatile memory has been corrupted.	Set the zero limit value again according to the zero limit value setting procedure.
e 16	The step value stored in the non-volatile memory has been corrupted.	Set the step display pattern again according to the step display setting procedure.
e 17	The brightness setting value in the non-volatile memory has been corrupted.	Set the display brightness again according to the display brightness adjustment procedure.

Note: Turn the K3TJ OFF and ON while pressing both the Up and Down Keys so that the K3TJ's shifting and scaling settings will return to the ones preset before shipping.

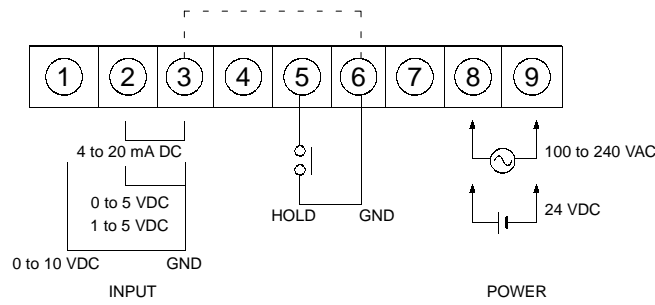
Dimensions

Note: All units are in millimeters unless otherwise indicated.



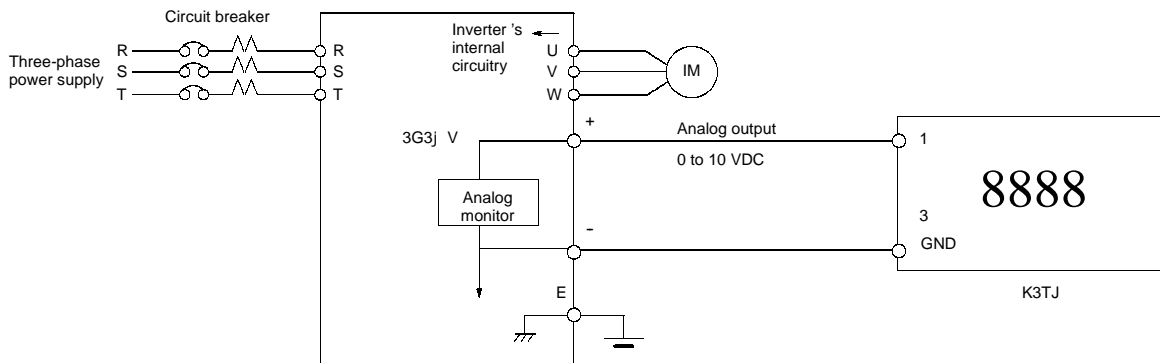
Installation

External Connections



Note: Terminals 3 and 6 are connected internally. The power supply terminals are insulated from other circuits.

Connection Example with Inverter



Precautions

Mounting

Recommended panel thickness is 1 to 3.2 mm.

Mount the K3TJ by attaching the mounting bracket supplied as an accessory from the rear of the K3TJ. Turn each mounting screw clockwise and tighten it to a torque of 5 kgf • cm (0.49N • m).

Mount the K3TJ as horizontally as possible.

Never use the K3TJ in locations where corrosive gas (particularly sulfuric or ammonia gas) exists.

Avoid use of the K3TJ in locations subject to severe shock or vibration, excessive dust, or excessive moisture.

Select mounting locations where the ambient operating temperature is -10°C to 55°C.

Others

When selecting parameters or making settings, the front panel cover should be removed. Do not touch parts other than the DIP switch and keys with your hand or a metal object, especially when the K3TJ is turned ON.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. N080-E1-1C In the interest of product improvement, specifications are subject to change without notice.

OMRON Corporation

Systems Components Division
28th Fl., Crystal Tower Bldg.
1-2-27, Shiromi, Chuo-ku,
Osaka 540 Japan
Phone: 06-949-6012 Fax: 06-949-6021

Printed in Japan
1096-0.5M (0694) a