

Low-cost, High-quality Digital Thermometer with Built-in Microcomputer

- Compact DIN-size (96 x 48 x 66 (W x H x D)) body.
- Mounting thickness of only 3.5 mm required.
- Highly visible display with 14.2-mm-high LEDs.
- Multi-temperature range incorporated.
- Upper or lower limit selectable (models with alarm output).
- Water-resistant (IP51) construction (optional).

Ordering Information

Temperature Range

Item		Thermocouple				Platinum resistance thermometer		
Input		K (CA)		J/L (IC)		Pt100/JPt100		
Temperature range		0% to 400% C	0% to 999% C	0% to 300% C	0% to 500% C	0% to 99.9% C	0% to 400% C	-50% to 50% C
		0% to 400% F	0% to 999% F	0% to 400% F	0% to 999% F	0% to 99.9% F	0% to 800% F	0% to 200% F
Range selection		4-range selectable				3-range selectable		
Model	Display only	K3TL-TA11				K3TL-TB11		
	With alarm output	K3TL-TA11-C				K3TL-TB11-C		

Note: The %C or %F display can be selected. For details, refer to "Measuring Ranges."

Model Number Legend

K3TL - -
 1 2 3 4 5

1, 2. Input Sensor Code

TA: Thermocouple (K, J)

TB: Platinum resistance thermometer (Pt)

3. Series No.

1: Current series

4. Supply Voltage

1: 100 to 240 VAC

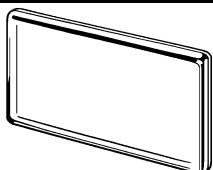

8: 24 VAC (24-VAC type is available by request.)

5. Output

None: Without relay output

C: With relay output

■ Accessories (Order Separately)

Name	Appearance	Model
Water-resistive Soft Front Cover		K32-L49SC
Terminal Cover		K32-L49TC

Specifications

■ Ratings

Supply voltage	100 to 240 VAC (50/60 Hz)
Operating voltage range	-15% to +10% of supply voltage
Power consumption	6.6 VA (at max. load) (see note)
Insulation resistance	10 MW min. (at 500 VDC) between external terminal and case
Dielectric withstand voltage	2,000 VAC min. for 1 min between input terminal and power supply 2,000 VAC min. for 1 min between external terminal and case
Noise immunity	+1,500 V on power supply terminals in normal or common mode
Vibration resistance	Malfunction: 10 to 55 Hz, 0.5-mm single amplitude for 10 min each in X, Y, and Z directions Destruction: 10 to 55 Hz, 0.75-mm single amplitude for 2 hrs each in X, Y, and Z directions
Shock resistance	Malfunction: 100 m/s ² (approx. 10G) for 3 times each in 6 directions Destruction: 300 m/s ² (approx. 30G) for 3 times each in 6 directions
Ambient temperature	Operating: -10% to 55°C (with no icing) Storage: -20% to 65°C (with no icing)
Ambient humidity	Operating: 35% to 85% (with no condensation)
Ambient atmosphere	Must be free of corrosive gas

Note: An inrush current of approximately 1.0 A will flow at the moment power is turned on and continue for approximately 5 ms.

Output Ratings

Item	Resistive load (cos ϕ = 1)	Inductive load (cos ϕ = 0.4, L/R = 7 ms)
Rated load	5 A at 250 VAC; 5 A at 30 VDC	1.5 A at 250 VAC; 1.5 A at 30 VDC
Rated carry current	5 A max. (at COM terminal)	
Max. contact voltage	380 VAC, 125 VDC	
Max. contact current	5 A max. (at COM terminal)	
Max. switching capacity	1,250 VA, 150W	375 VA, 80 W
Min. permissible load	10 mA at 5 VDC	

■ Characteristics

Measuring accuracy	+0.5% FS +1 digit (see note 1)
Input	Thermocouple: K (CA), J/L (IC) Platinum resistance thermometer: JPt100/Pt100
Sampling period	2 times/s
Display refresh period	2 s (average of 4 sampling data)
Display	7-segment LED
Display scale	%C or %F display selectable
Input shift	-99% to 99% C/%F or -9.9% to 9.9% C/%F (see note 2)
Alarm output function	Output configuration: Relay contact (SPDT) Upper or lower range selectable with DIP switch
Enclosure ratings	Front panel: IEC IP51 (see note3) Case: IEC IP20 Terminals: IEC IP00

Note:

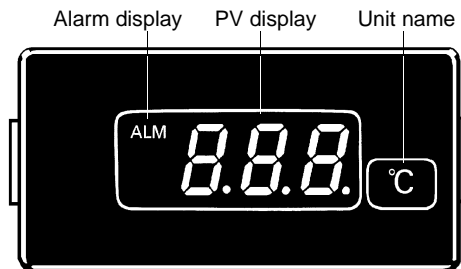
1. The measuring accuracy is at an ambient temperature of 25%+5°C.
2. This applies only to a platinum resistance thermometer with an input range of 0% to 99.9% C/%F.
3. IP51 is maintained when the water-resistive soft cover and bracket are used. IP50 will be, however, maintained without these water-resistive accessories.

■ Measuring Ranges

Input		Measuring ranges		Hysteresis (see note)
Thermocouple	K	0% to 400% C	0% to 400% F	1% C/% F
		0% to 999% C	0% to 999% F	1% C/% F
	J/L	0% to 300% C	0% to 400% F	1% C/% F
		0% to 500% C	0% to 999% F	1% C/% F
Platinum resistance thermometer		0.0% to 99.9% C	0.0% to 99.9% F	0.1% C/% F
		0% to 400% C	0% to 800% F	1% C/% F
		-50% to 50% C	0% to 200% F	1% C/% F

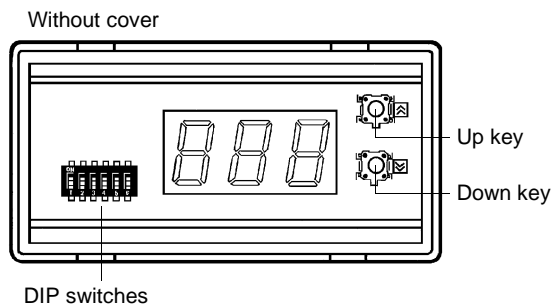
Note: Hysteresis of alarm output set value (fixed value for each range)

Nomenclature



Operation

The lower part of the front panel cover has two grooves. Hook the grooves with a flat-blade screwdriver or fingernails to remove the cover before operating the K3TL.



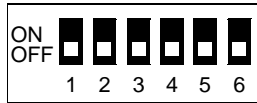
Name	Function
DIP switches	Used to select input range, display unit, alarm mode.
Up/Down Key	Used to select alarm set value and input compensation value.

■ DIP Switch

The DIP switch pins are all set to OFF before shipping. Refer to the following tables for setting the DIP switch.

Note: Be sure to turn off the power before changing the settings of the DIP switch other than pin 6.

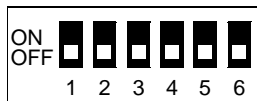
Thermocouple Models (K3TL-TA)



Function				Pin no.	Pin setting
Input range	K	0% to 400% C	0% to 400% F	1/2	OFF/OFF
		0% to 999% C	0% to 999% F		ON/OFF
	J/L	0% to 300% C	0% to 400% F		OFF/ON
		0% to 500% C	0% to 999% F		ON/ON
Specification (see note)	K, L (DIN)		3	ON	
	K, J (JIS)			OFF	
Scale	% F		4	ON	
	% C			OFF	
Alarm mode	Lower-limit (relay operates for values less than the set value)		5	ON	
	Upper-limit (relay operates for values more than the set value)			OFF	
Input compensation function	Input compensation value set mode		6	ON	
	Usually set to OFF			OFF	

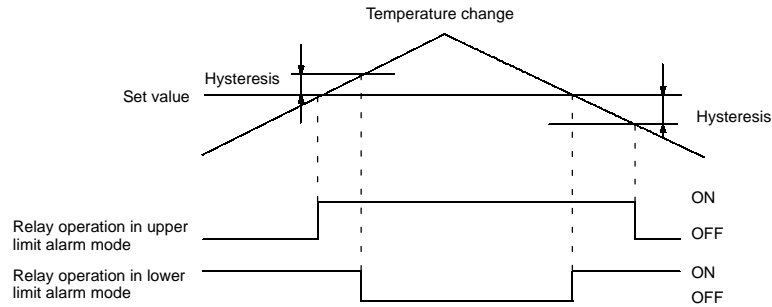
Note: If a K-type sensor is used, you can set pin 3 to either ON or OFF.

Platinum Resistance Thermometer Models (K3TL-TB)



Function				Pin no.	Pin setting
Input range	0% to 99.9% C	0% to 99.9% F	1/2	OFF/OFF	
	0% to 400% C	0% to 800% F		ON/OFF	
	-50% to 50% C	0% to 200% F		OFF/ON	
Specification	Pt100		3	ON	
	JPt100 (JIS 1981)			OFF	
Scale	% F		4	ON	
	% C			OFF	
Alarm mode	Lower-limit (relay operates for values less than the set value)		5	ON	
	Upper-limit (relay operates for values more than the set value)			OFF	
Input compensation function	Input compensation value set mode		6	ON	
	Usually set to OFF			OFF	

Operation Timing of Alarm Output

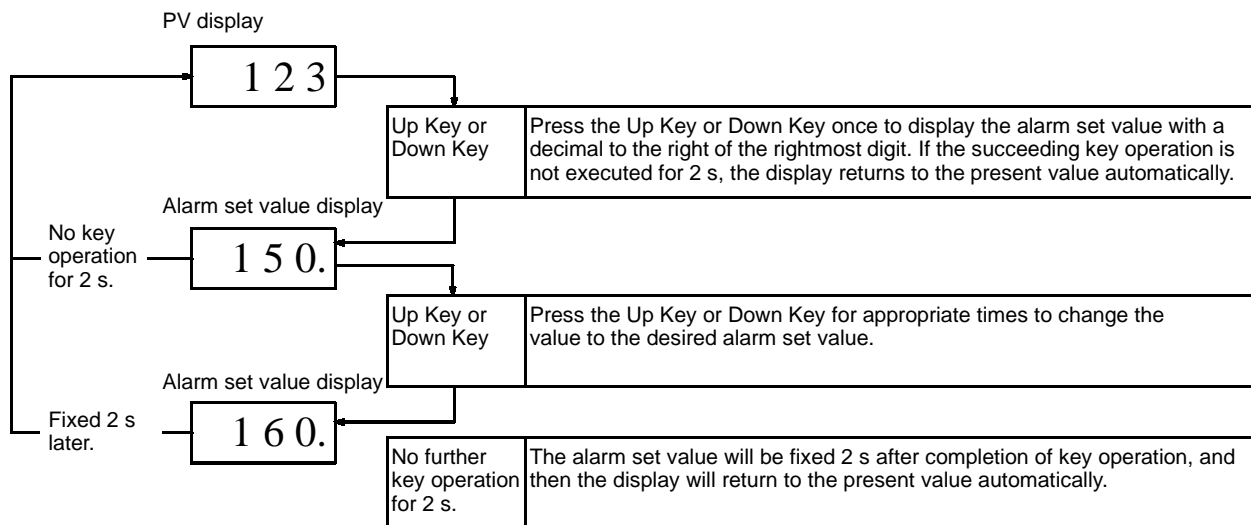


■ Operating Procedures

Alarm Value Setting

Setting Range

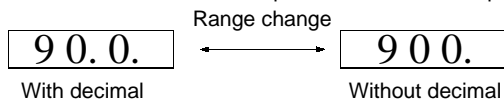
-99 to 999 or -9.9 to 99.9 (%C/%F) regardless of the temperature range that you have selected.



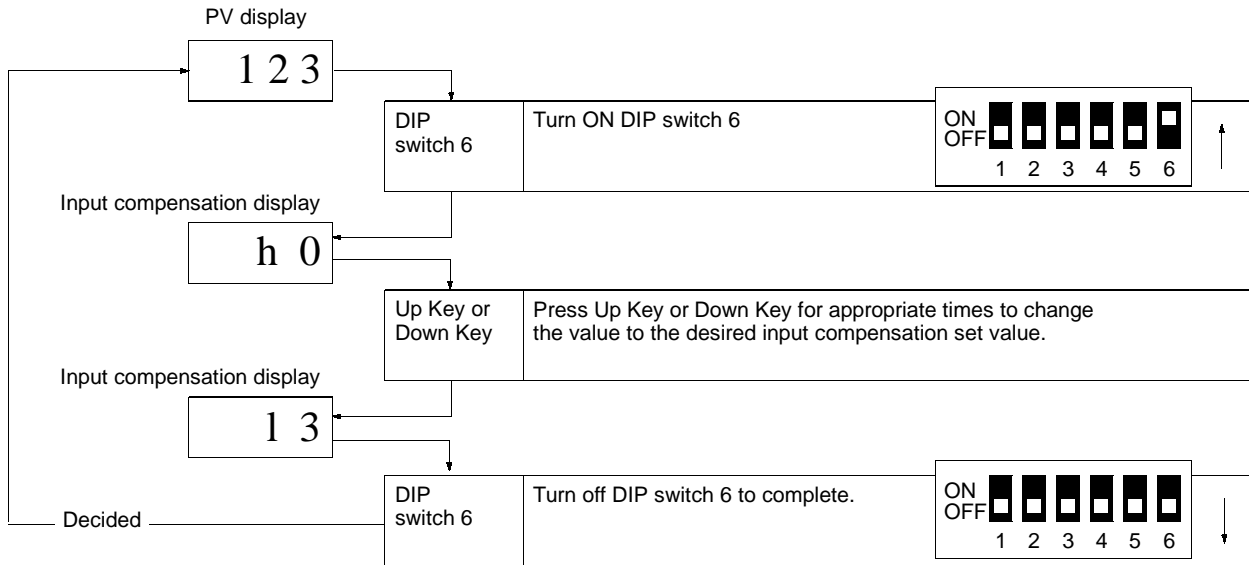
If you change the temperature range after you set the alarm set value, the new alarm set value will remain unchanged.

If you change the display unit, the alarm set value will not be converted from the %C to %F value or vice versa.

If you remove or add the decimal point from or to the display, the display value will change as follows:



Input Compensation (Shift) Setting



Possible Compensation Range for Each Temperature Range

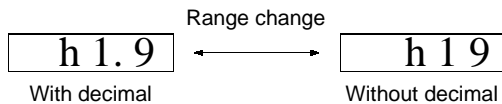
Temperature range	Platinum resistance thermometer 0.0 to 99.9 (%C/%F)	Other ranges
Possible compensation range	-9.9 to 9.9 (%C/%F)	-99 to 99 (%C/%F)
Input compensation display	19.9 to h9.9	199 to h99

Example of Compensation

Input compensation value display	Sensor measurement temperature	Displayed temperature
h 0 (With no compensation)	100% C	100% C
h 9 (9% C compensation)	100% C	109% C
1 9 (-9% C compensation)	100% C	91% C

If you change the temperature range after you set the input compensation, the new input compensation will remain unchanged.

If you remove or add the decimal point from or to the display, the display value will change as follows:

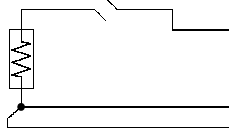
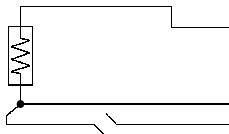
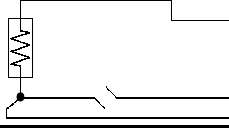
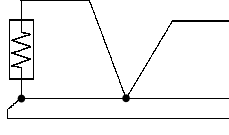
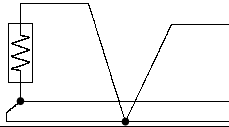


■ Display with Sensor Error Thermocouple

Condition	Message	Alarm output
Disconnected 	fff (flashes)	OFF

Note: The room temperature will be displayed if the input terminals are short-circuited.

Platinum Resistance Thermometers

	Condition	Message	Alarm output
Disconnected		fff (flashes)	OFF
			
		--- (flashes)	OFF
	Breaks in 2 or 3 wires.	fff (flashes)	OFF
Short-circuited		--- (flashes)	OFF
			

Note: The Pt has a resistance of 100 W at a temperature of 0°C and approximately 140 W at a temperature of 100°C.

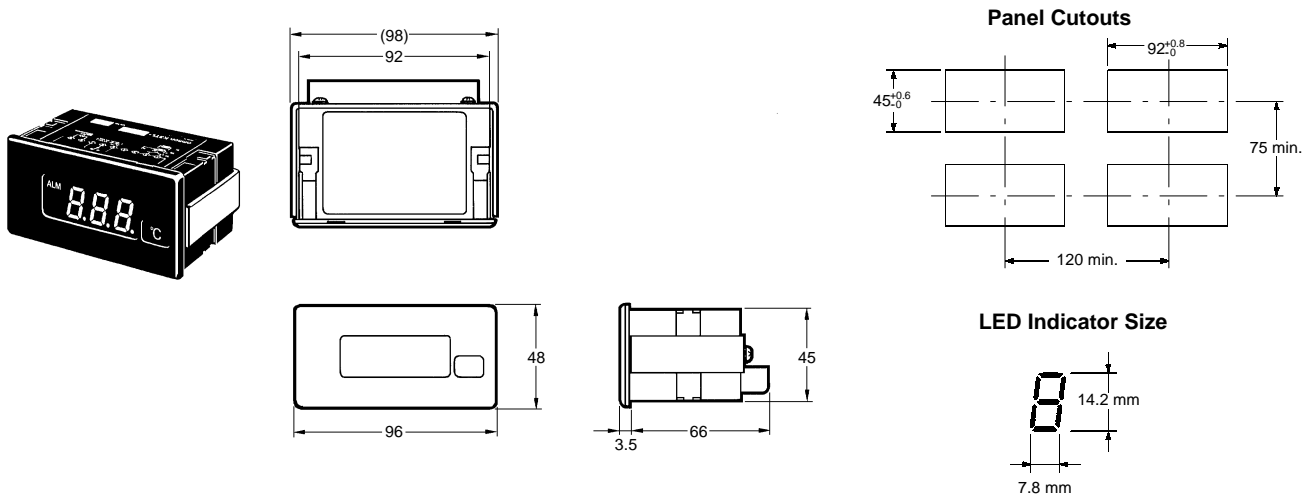
■ Error Messages

The following table lists the error messages and the meaning of the error messages.

Message	Cause	Alarm output	Remedy
fff	The input temperature value is higher than the permissible measuring range.	The present setting will be put on hold.	Limit the input temperature value within the permissible range.
---	The input temperature value is lower than the permissible measuring range.	The present setting will be put on hold.	Limit the input temperature value within the permissible range.
fff (flashes) --- (flashes)	A sensor error has occurred or the sensor temperature is far higher or lower than the permissible measuring range.	OFF	Remove the cause of the sensor error by referring to the error message.
e11 e33	A memory error (E11) or AD converter error (E33) has occurred.	OFF	Turn power on again. If the K3TL is still not reset, consult your OMRON representative.

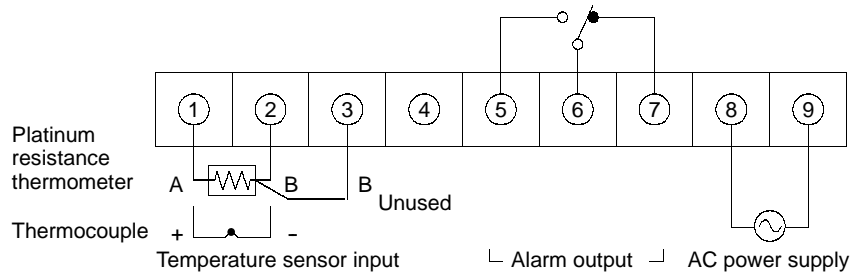
Dimensions

Note: All units are in millimeters unless otherwise indicated.



Installation

External Connection



Note: Terminals 5, 6, and 7 are not used by models with no alarm output. (These terminals are open only for models incorporating the display function.)

Precautions

Mounting

Recommended panel thickness is 1 to 3.2 mm.

Mount the Digital Panel Meter by attaching the mounting bracket supplied as an accessory from the rear of the Digital Panel Meter, hook the mounting bracket to the Digital Panel Meter securely, and tighten the mounting screws by turning them clockwise with a tightening torque of 5 kgf·cm (0.49 N·m). For dismounting, loosen the screws and widen the hooks.

Always attach the Mounting Bracket before wiring the terminals. Also, always remove the wiring before removing the Mounting Bracket.

Mount the Digital Panel Meter as horizontally as possible.

Never use the Digital Panel Meter in locations where corrosive gas (particularly sulfured or ammonia gas) is generated.

As much as possible avoid use of the Digital Panel Meter in a location subject to severe shock or vibration, excessive dust, or excessive moisture.

Select a mounting location where the Digital Panel Meter can be used at an ambient operating temperature -10% to 55°C.

No product is shipped with the unit label attached. Select a unit label from the sheet provided, and attach it to the Digital Panel Meter.



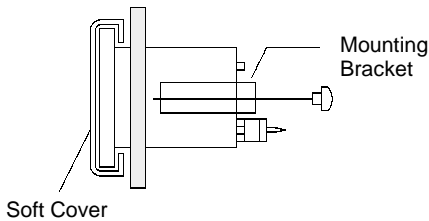
Others

After the front panel cover is removed to select the function or perform the necessary settings, do not touch components other than the dip switch or keys. Keep metal objects off the K3TL, especially when power is turned on.

Accessories (Order Separately)

Water-resistant Soft Front Cover

Before mounting the Digital Panel Meter to a panel, attach the water-resistant soft front cover and mounting bracket to the Digital Panel Meter properly so that the Digital Panel Meter will maintain IP51 water-resistant standards. Before you calibrate Digital Panel Meters, remove the water-resistant soft front cover.

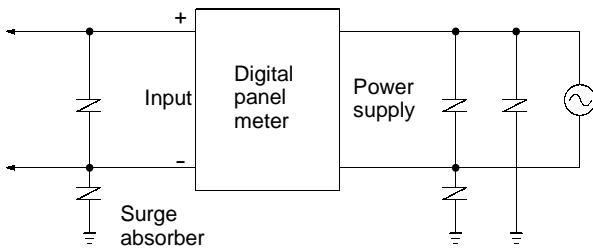
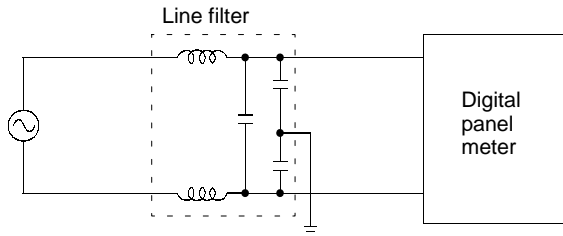


Note: Be sure to use the Water-resistant Soft Front Cover and mounting bracket together.

Counter-measures Against Noise

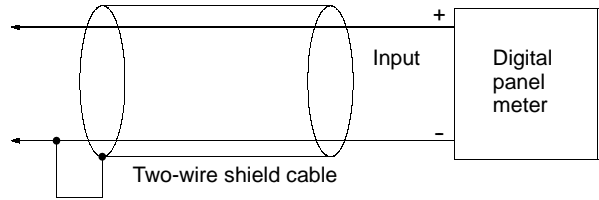
Power Supply

Although all possible counter-measures against noise have been taken on the digital panel meter, the Digital Panel Meter cannot resist excess noise. If a power relay, magnetic switch, or high-frequency device is connected to the power supply line or if there is a high-voltage spark or abnormal voltage generation due to lightning, connect a noise absorption circuit such as a line filter, noise-cut transformer, or varistor to the Digital Panel Meter.



Induced Noise

If induced noise is a problem, shield the Digital Panel Meter with a metal cover and ground the metal cover. To reduce induced noise on the input lines, use a two-wire shielded cable, and connect the shield wire to the negative terminal at a point on the signal source.



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. N075-E1-1 In the interest of product improvement, specifications are subject to change without notice.

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