

Digital Panel Meter

K3TL

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

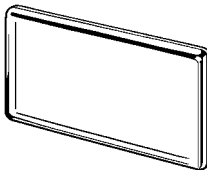

8: 24 VAC (24-VAC type is available by request.)

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 | Approx. 6.6 VA (at max. load) (See note.) Approx. 3.5 VA (at 100 VAC) |
| Insulation resistance | 10 M Ω 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 | \pm 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: 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 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: When power is supplied, an inrush current that exceeds the rated current will flow.

Output Ratings

| Item | Resistive load ($\cos\phi = 1$) | Inductive load ($\cos\phi = 0.4$, 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 (P level reference value) | 10 mA at 5 VDC | |

■ Characteristics

| | |
|------------------------|---|
| Measuring accuracy | \pm 0.5% FS \pm 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 Red LED |
| Display scale | $^{\circ}$ C or $^{\circ}$ F display selectable |
| Input shift | -99 to 99 $^{\circ}$ C/ $^{\circ}$ F or -9.9 to 9.9 $^{\circ}$ C/ $^{\circ}$ F |
| Alarm output function | Output configuration: Relay contact (SPDT) Upper or lower range selectable with DIP switch |
| Enclosure ratings | Front panel: IEC IP51 (See note 2.) Case: IEC IP20 Terminals: IEC IP00 |
| Memory protection | Non-volatile memory |

Note: 1. The measuring accuracy is at an ambient temperature of 23 \pm 5 $^{\circ}$ C.

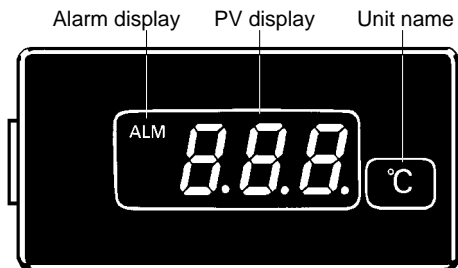
2. IP51 is maintained when the water-resistive soft cover and bracket are used. IP50 will be, however, maintained without these water-resistive accessories.

■ 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)

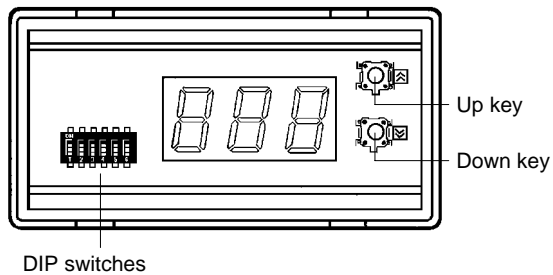
Nomenclature



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.

Without cover



| 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. |

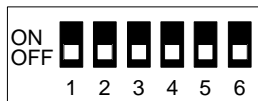
Note: Switching the alarm mode is possible only for models with alarms.

■ 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.

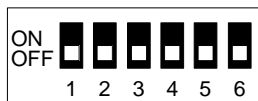
Thermocouple Models (K3TL-TA)



| Function | | | Pin no. | Pin setting |
|-----------------------------|---|------------|---------|-------------|
| Input range | K | 0 to 400°C | 1/2 | OFF/OFF |
| | | 0 to 999°C | | ON/OFF |
| | J/L | 0 to 300°C | | OFF/ON |
| | | 0 to 500°C | | 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 |

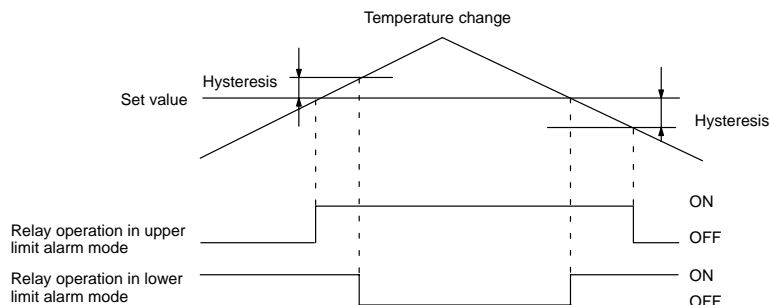
Note: If a K-type sensor is used, you can set pin 3 to either ON or OFF.

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

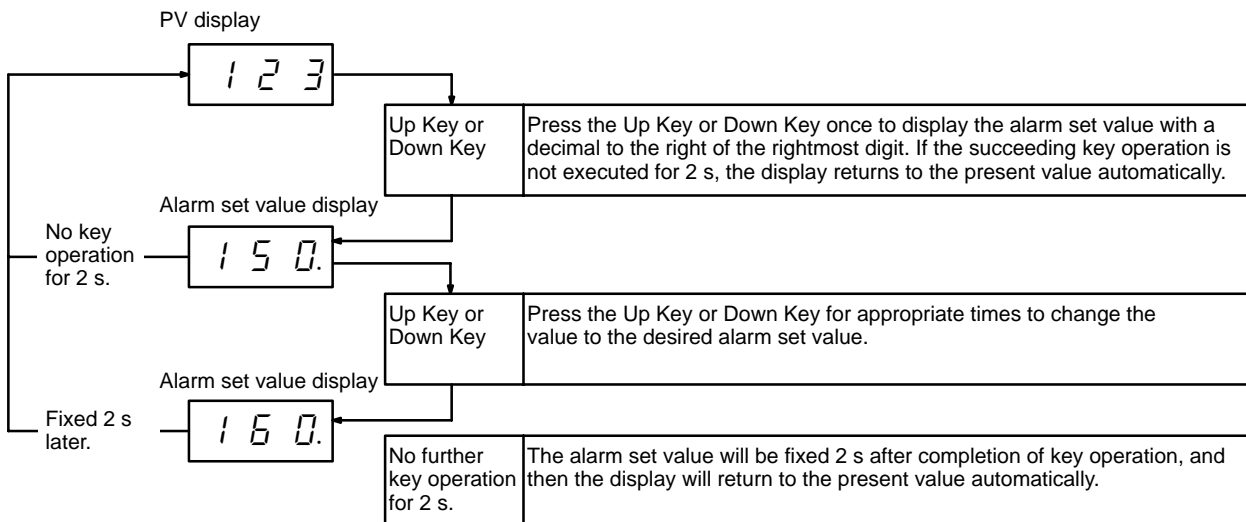


Operating Procedures

Alarm Value Setting

Setting Range

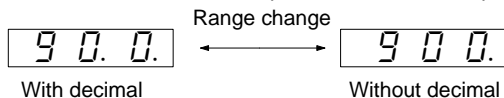
-99 to 999 or -9.9 to 99.9 (°C/°F) regardless of the temperature range that you have selected.



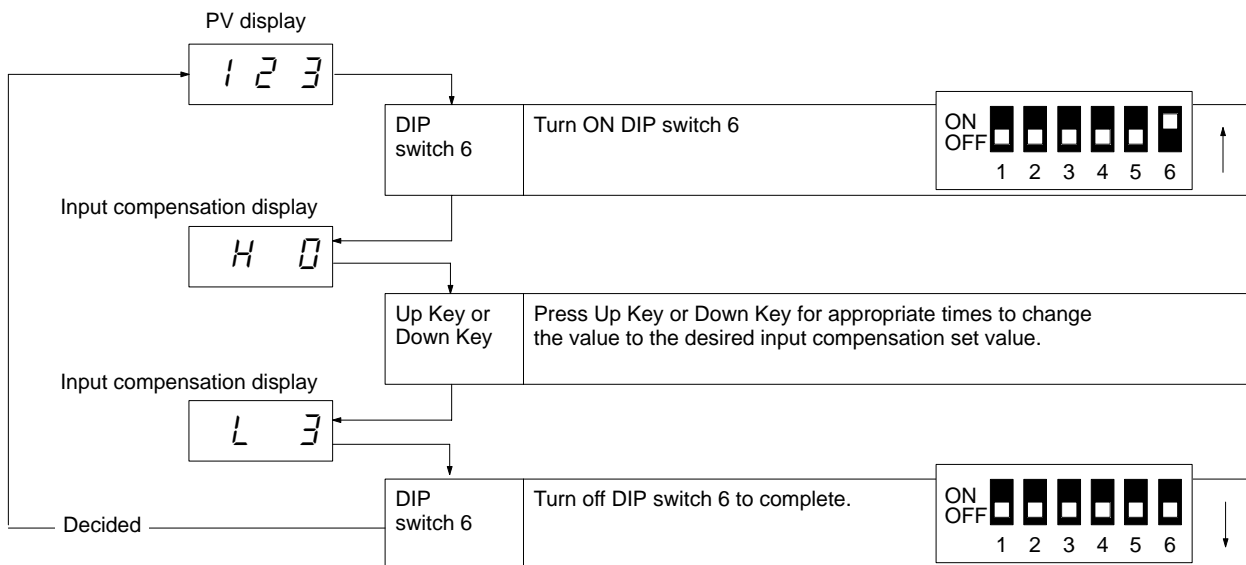
If you change the temperature range after you set the alarm set value, the new alarm set value will remain unchanged.

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

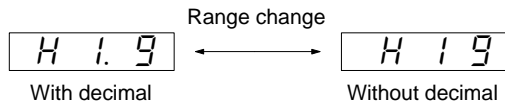
| Temperature range | Platinum resistance thermometer 0.0 to 99.9 (°C/°F) | Other ranges |
|-----------------------------|--|-------------------|
| Possible compensation range | -9.9 to 9.9 (°C/°F) | -99 to 99 (°C/°F) |
| Input compensation display | L9.9 to H9.9 | L99 to H99 |

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 |
| L 9 (-9°C compensation) | 100°C | 91°C |

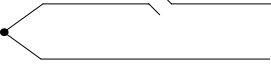
If you change the temperature range after you set the input compensation, the new input compensation will remain unchanged.

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



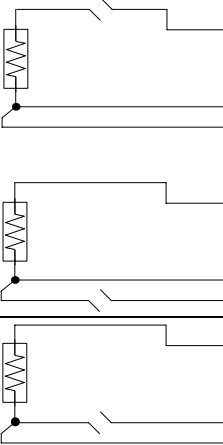
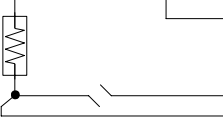
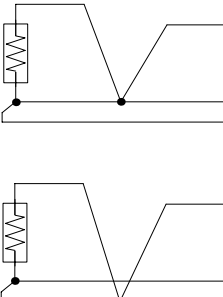
■ Display with Sensor Error

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 |
| Breaks in 2 or 3 wires.  | FFF (flashes) | OFF |
| Short-circuited  | FFF (flashes) | OFF |

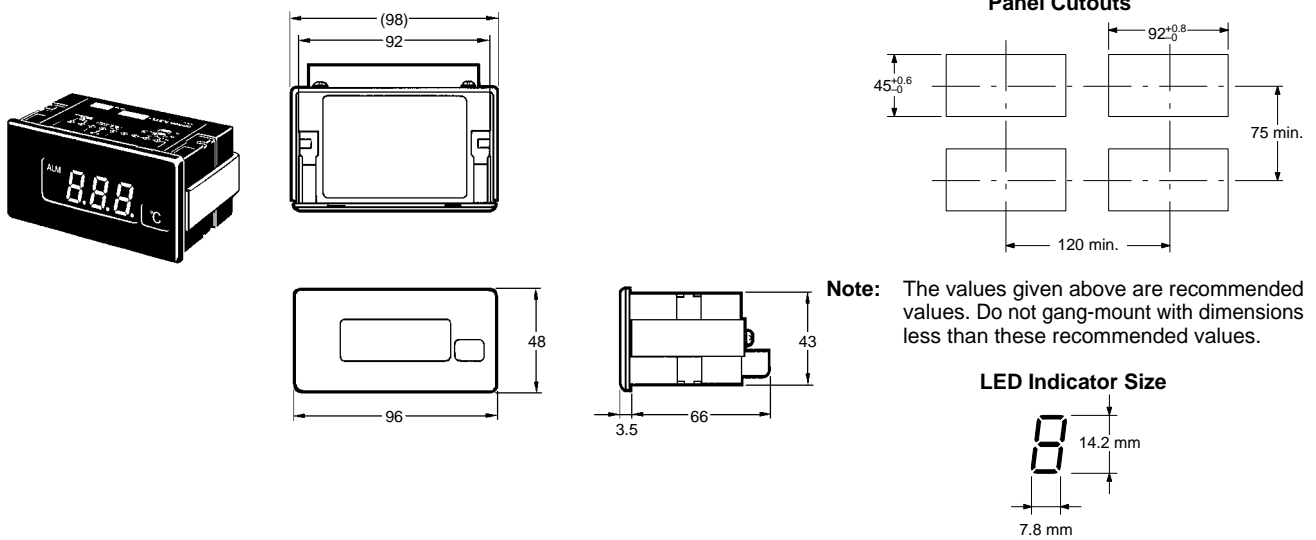
■ Error Messages

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. |
| 000 | 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) 000 (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 <i>Display with Sensor Error</i> . |
| 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. |

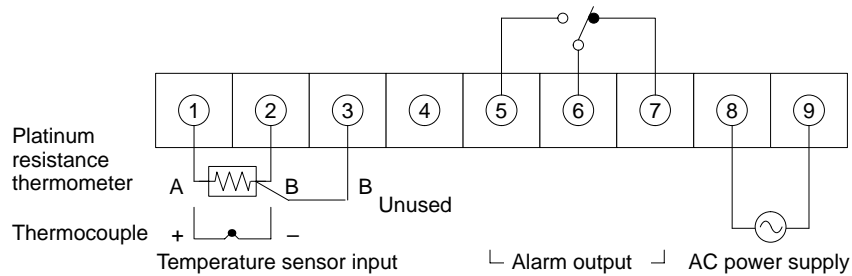
Dimensions

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 sulfide 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.

Connecting a Temperature Sensor

In order to avoid the influence of noise and induction, keep the lead wire used to connect the K3TL to a temperature sensor away from power lines or lines carrying loads.

Connect thermocouple input with the specified compensating conductor.

Connect platinum resistance thermometer input using a lead wire with a low resistance.



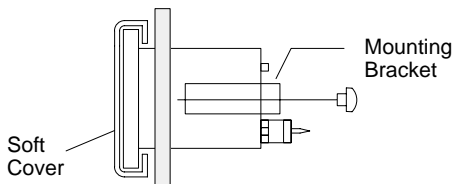
Others

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-resistive Soft Front Cover

Before mounting the Digital Panel Meter to a panel, attach the water-resistive soft front cover and mounting bracket to the Digital Panel Meter properly so that the Digital Panel Meter will maintain IP51 water-resistive standards. When performing settings, remove the water-resistive soft front cover.



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

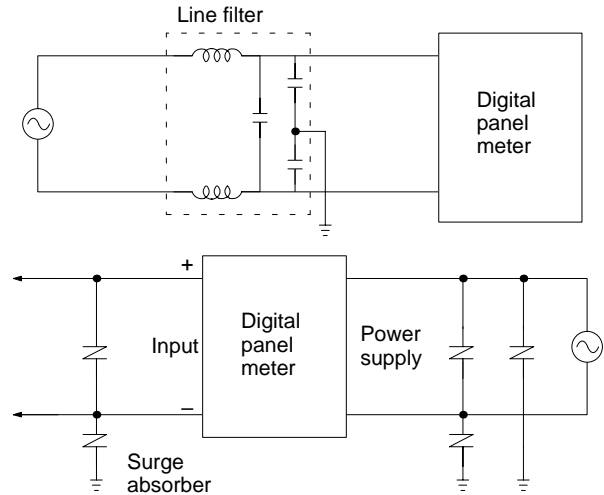
Terminal Cover

The Terminal Cover does not provide drip-proof specifications. Use the Terminal Cover for finger protection.

Counter-measures Against Noise

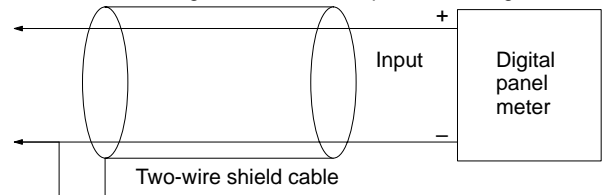
Power Supply

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

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