

Temperature Meter K3MA-L

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

- Wide input range - select from two types of platinum-resistance thermometers and ten types of thermocouples.
- Front-panel key operation for easy setting.
- Average processing function suppresses flicker.
- Temperature input shift and temperature unit selection functions.
- Easy confirmation of max/min display.
- Short 80-mm depth (measured from edge of face plate).
- Water- and dust-proof NEMA4X (IP66 equivalent) front panel.
- Finger protective cover (standard equipment) protects against electric shock.
- Recognized to U.S. and Canadian requirements under the Component Recognition Program of UL with CE marking.



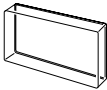
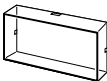
Ordering Information

Stock Note: Shaded models are normally stocked.

| Input type | Supply voltage | Output | Model |
|-------------------------------------------------|----------------|-------------------------------|----------------------------|
| Platinum-resistance thermometer or thermocouple | 100 to 240 VAC | None | K3MA-L 100-240VAC |
| | | 1 relay contact output (SPDT) | K3MA-L-C 100-240VAC |
| | 24 VAC/VDC | None | K3MA-L 24VAC/VDC |
| | | 1 relay contact output (SPDT) | K3MA-L-C 24VAC/VDC |

■ Accessories (Order Separately)

Stock Note: Shaded models are normally stocked.

| Name | Shape | Model |
|-------------------------|-------------------------------------------------------------------------------------|-----------------|
| Splash-proof soft cover |  | K32-49SC |
| Hard cover |  | K32-49HC |

Specifications

■ Ratings

| Item | Model | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------|----------|---------------------|------------------|-----------------------|--------------------|------------------|-----------------------|-------|------------|----------|---------------|--------------|----------------------------------------------|---------------------------|--------------|-----------------------------------------------|----------------------------------|--------------|-------------------|-----------------------|-------------------------------------|--|-----------------|--------------|-------------------------------------------------------|---------------------------------|--------------|----------------------|------------------------------------|---------------|------------------------------------------|
| | K3MA-L 100-240VAC, K3MA-L-C 100-240VAC | K3MA-L 24VAC/VDC, K3MA-L-C 24VAC/VDC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Supply voltage | 100 to 240 VAC, 50/60 Hz | 24 VAC (50/60 Hz), 24 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 M Ω min. (at 500 VDC) between external terminal and case. Insulation provided between inputs, outputs, and power supply. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dielectric withstand voltage | 2,000 VAC for 1 min between external terminal and case. Insulation provided between inputs, outputs, and power supply. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Noise immunity | \pm 1,500 V on power supply terminals in normal or common mode. \pm 1 μ s, or 100 ns for square-wave noise with 1 ns. | \pm 480 V on power supply terminals in normal mode. \pm 1,500 V in common mode. \pm 1 μ s, or 100 ns for square-wave noise with 1 ns. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vibration resistance | Vibration: 10 to 55 Hz, Acceleration: 50 m/s ² 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 (14°F to 131°F) with no condensation or icing Storage: -25°C to 65°C (-13°F to 149°F) with no condensation or icing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ambient humidity | Operating: 25% to 85% (with no condensation) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ambient atmosphere | Must be free of corrosive gas. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Approved safety standards | UL3121, conforms to EN61010-1 (Pollution degree 2/overvoltage category II) Conforms to VDE0106/P100 (finger protection) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EMC | <table border="0"> <tr> <td>(EMI)</td> <td>EN61326+A1</td> <td>Industry</td> </tr> <tr> <td>Emission Enclosure:</td> <td>CISPR 11 Group 1</td> <td>class A: CISRP16-1/-2</td> </tr> <tr> <td>Emission AC Mains:</td> <td>CISPR 11 Group 1</td> <td>class A: CISRP16-1/-2</td> </tr> <tr> <td>(EMS)</td> <td>EN61326+A1</td> <td>Industry</td> </tr> <tr> <td>Immunity ESD:</td> <td>EN61000-4-2:</td> <td>4-kV contact discharge 8-kV air discharge</td> </tr> <tr> <td>Immunity RF-interference:</td> <td>EN61000-4-3:</td> <td>10 V/m (amplitude-modulated, 80 MHz to 1 GHz)</td> </tr> <tr> <td>Electrical Fast Transient Noise:</td> <td>EN61000-4-4:</td> <td>2 kV (power line)</td> </tr> <tr> <td>Immunity Burst Noise:</td> <td>1 kV line to line (I/O signal line)</td> <td></td> </tr> <tr> <td>Immunity Surge:</td> <td>EN61000-4-5:</td> <td>1 kV (power line) 2-kV line to ground (power line)</td> </tr> <tr> <td>Immunity Conducted Disturbance:</td> <td>EN61000-4-6:</td> <td>3 V (0.15 to 80 MHz)</td> </tr> <tr> <td>Immunity Voltage Dip/Interrupting:</td> <td>EN61000-4-11:</td> <td>0.5 cycle, 0, 180°, 100% (rated voltage)</td> </tr> </table> | | (EMI) | EN61326+A1 | Industry | Emission Enclosure: | CISPR 11 Group 1 | class A: CISRP16-1/-2 | Emission AC Mains: | CISPR 11 Group 1 | class A: CISRP16-1/-2 | (EMS) | EN61326+A1 | Industry | Immunity ESD: | EN61000-4-2: | 4-kV contact discharge 8-kV air discharge | Immunity RF-interference: | EN61000-4-3: | 10 V/m (amplitude-modulated, 80 MHz to 1 GHz) | Electrical Fast Transient Noise: | EN61000-4-4: | 2 kV (power line) | Immunity Burst Noise: | 1 kV line to line (I/O signal line) | | Immunity Surge: | EN61000-4-5: | 1 kV (power line) 2-kV line to ground (power line) | Immunity Conducted Disturbance: | EN61000-4-6: | 3 V (0.15 to 80 MHz) | Immunity Voltage Dip/Interrupting: | EN61000-4-11: | 0.5 cycle, 0, 180°, 100% (rated voltage) |
| (EMI) | EN61326+A1 | Industry | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Emission AC Mains: | CISPR 11 Group 1 | class A: CISRP16-1/-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (EMS) | EN61326+A1 | Industry | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Immunity ESD: | EN61000-4-2: | 4-kV contact discharge 8-kV air discharge | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Immunity RF-interference: | EN61000-4-3: | 10 V/m (amplitude-modulated, 80 MHz to 1 GHz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electrical Fast Transient Noise: | EN61000-4-4: | 2 kV (power line) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Immunity Burst Noise: | 1 kV line to line (I/O signal line) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Immunity Surge: | EN61000-4-5: | 1 kV (power line) 2-kV line to ground (power line) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Immunity Conducted Disturbance: | EN61000-4-6: | 3 V (0.15 to 80 MHz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Immunity Voltage Dip/Interrupting: | EN61000-4-11: | 0.5 cycle, 0, 180°, 100% (rated voltage) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weight | Approx. 200 g | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Input/Output Ratings

Relay Contact Output

| 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 | 400 VAC, 150 VDC | |
| Max. contact current | 5 A (at COM terminal) | |
| Max. switching capacity | 2,000 VA, 192 W | 375 VA, 36 W |
| Min. permissible load (P level, reference value) | 10 mA at 5 VDC | |
| Mechanical life | 20,000,000 times min. (at a switching frequency of 1,200 time/min) | |
| Electrical life (at an ambient temperature of 20°C) | 100,000 times min. (at a rated load switching frequency of 10 time/min) | |

■ Measuring Ranges

Platinum-Resistance Thermometer

| Input | | Pt100 | | | JPt100 | |
|-----------|----|--------------|-----------------|--------------|-----------------|--------------|
| Range | °C | -200 to 850 | -199.9 to 500.0 | 0.0 to 100.0 | -199.9 to 500.0 | 0.0 to 100.0 |
| | °F | -300 to 1500 | -199.9 to 900.0 | 0.0 to 210.0 | -199.9 to 900.0 | 0.0 to 210.0 |
| Parameter | | 0 | 1 | 2 | 3 | 4 |

Thermocouple

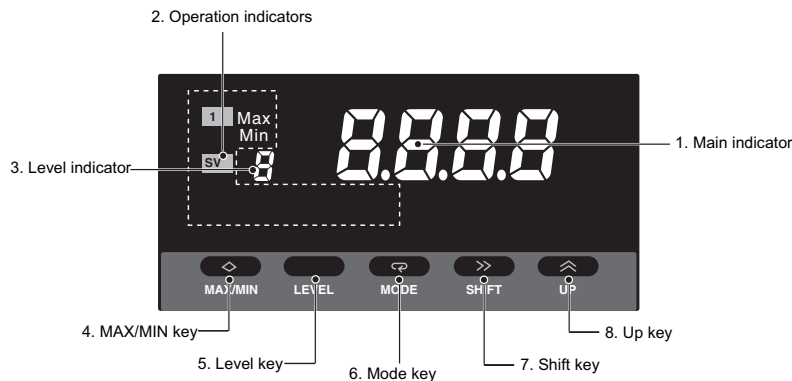
| Input | | K | | J | | T | | E | L | U | | N | R | S | B |
|-----------|----|--------------|----------------|--------------|----------------|-------------|-----------------|-----------|--------------|-------------|-----------------|--------------|-----------|-----------|-------------|
| Range | °C | -200 to 1300 | -20.0 to 500.0 | -100 to 850 | -20.0 to 400.0 | -200 to 400 | -199.9 to 400.0 | 0 to 600 | -100 to 850 | -200 to 400 | -199.9 to 400.0 | -200 to 1300 | 0 to 1700 | 0 to 1700 | 100 to 1800 |
| | °F | -300 to 2300 | 0.0 to 900.0 | -100 to 1500 | 0.0 to 750 | -300 to 700 | -199.9 to 700.0 | 0 to 1100 | -100 to 1500 | -300 to 700 | -199.9 to 700.0 | -300 to 2300 | 0 to 3000 | 0 to 3000 | 300 to 3200 |
| Parameter | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

■ Characteristics

| | |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indication accuracy (at 23±5°C) (See note.) | Thermocouple: (±0.5% of indication value or ±1°C, whichever greater) ±1 digit max. Platinum-resistance thermometer: (±0.5% of indication value or ±1°C, whichever greater) ±1 digit max. |
| Input | Thermocouple: K, J, T, E, L, U, N, R, S, B Platinum-resistance thermometer: JPt100, Pt100 |
| Measurement method | Double integral method |
| Sampling period | 500 ms |
| Display refresh period | Sampling period (sampling times multiplied by number of averaging times if average processing is selected.) |
| Max. displayed digits | 4 digits (-1999 to 9999) |
| 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. |
| Input shift | Input shift equivalent to the setting value supported for all points within the sensor measurement range. |
| Hold function | Max hold (maximum value), Min hold (minimum value) |
| Hysteresis setting | Programmable with front-panel key inputs (0001 to 9999). |
| Other functions | Display color change (green (red), green, red (green), red) Average processing (simple average OFF/2/4/8 operations) Setting change lockout Parameter initialization |
| Output | Relay contact (SPDT) |
| Delay in comparative outputs | 1 s max. |
| Enclosure ratings | Front panel: NEMA4X 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) |

Note: The indication accuracy of the K thermocouple at a temperature of -200 to 1300°C is ±2°C ±1 digit maximum.
The indication accuracy of the T and N thermocouples at a temperature of -100°C or less is ±2°C ±1 digit maximum.
The indication accuracy of the U and L thermocouples at any temperature is ±2°C ±1 digit maximum.
The indication accuracy of the B thermocouple at a temperature of 400°C or less is unrestricted.
The indication accuracy of the R and S thermocouples at a temperature of 200°C or less is ±3°C ±1 digit maximum.

Nomenclature

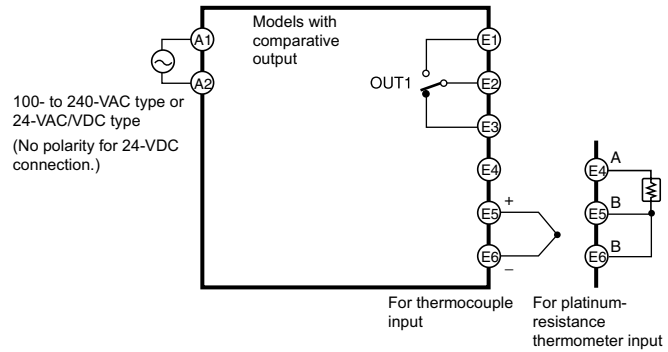
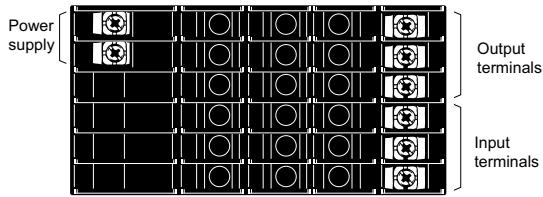


| Name | Functions | |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 1. Main indicator | Displays current values, parameters, and set values. | |
| 2. Operation indicators | 1 | Lit when output 1 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. |
| 3. Level indicator | Displays the current level that the K3MA-L 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 |
| R | Adjustment |
| S | Initial setting |
| F | Advanced-function setting |

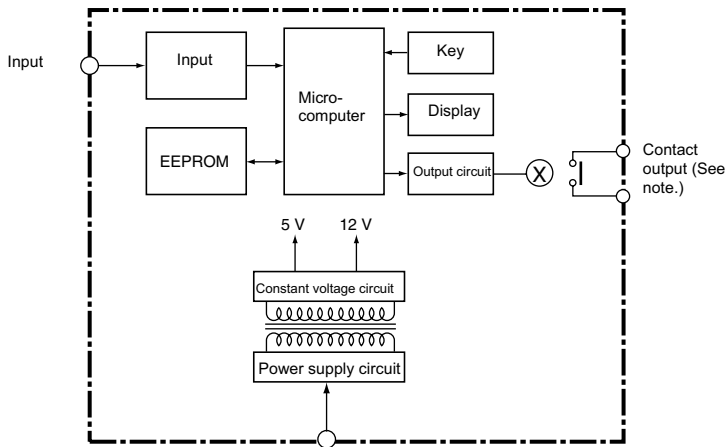
External Connections

Terminal Arrangement



| Terminal No. | Name | Description |
|--------------|-------------------------------------------------------|---------------------------------------------------------------------|
| A1 - A2 | Operation power | Connects the operation power supply. |
| E4 - E6 - E5 | Thermocouple or platinum-resistance thermometer input | Connects the thermocouple or platinum-resistance thermometer input. |
| E1, E2 - E3 | Outputs | Outputs the relay outputs. |

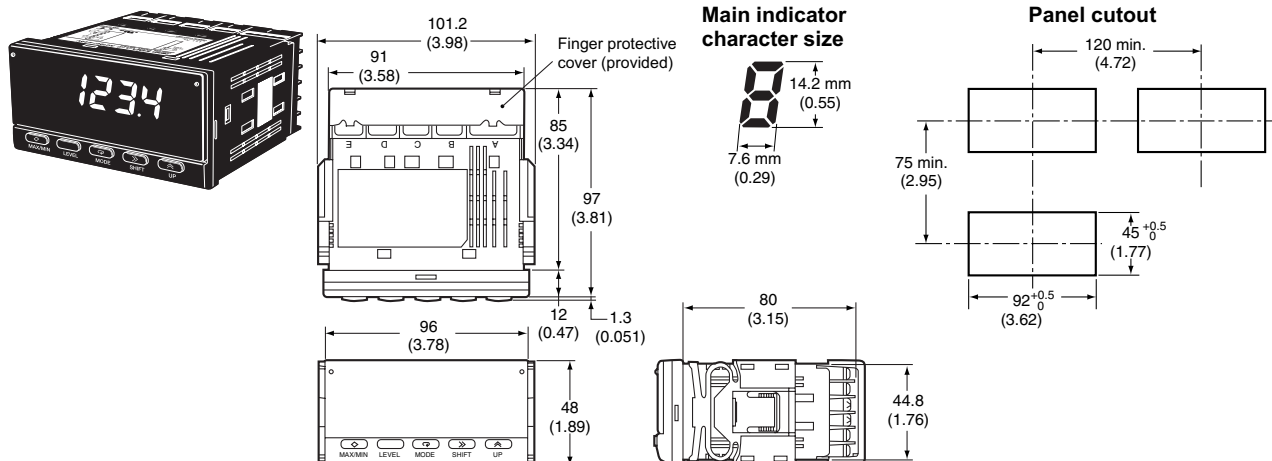
Block Diagram



Note: Relay output models only.

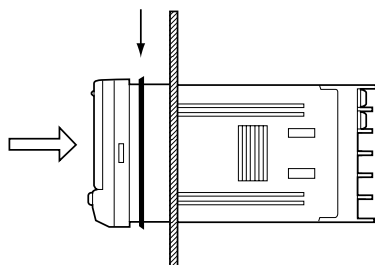
Dimensions

Unit: mm (inch)

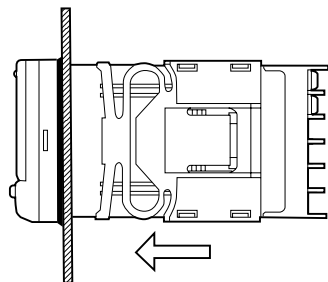


Installation

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

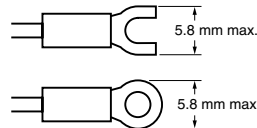


3. Fit the adaptor into the grooves on the left and right sides of the rear case, then push it until it contacts the panel to secure the K3MA-L.



Wiring

- Use the following M3 crimp terminals.



Unit Markings (Provided)

- The unit markings are not attached to the K3MA-L. Select the desired markings from the provided sheet.

| | | | | | | | |
|-------|-------|-----|----|-----|----|----------------|---|
| V | A | V | A | % | J | Pa | Ω |
| s | / | N | m | W | °C | m ³ | k |
| °F | g | min | mm | rpm | | | |
| VA | mV | mA | Hz | | | | |
| m/min | OMRON | | | | | | |
| OUT | OUT | | | | | | |

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

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.

Precautions

⚠ Caution
Do not touch the terminals while the power is being supplied. Doing so may result in electric shock.

⚠ Caution
Do not disassemble the product or touch the internal components of the product while the power is being supplied. Doing so may result in electric shock.

⚠ Caution
Do not allow pieces of metal or wire clippings to enter the product. Doing so may result in electric shock, fire, or malfunction.

⚠ Caution
Perform correct settings for the product according to the control application. Failure to do so may cause unexpected operation, resulting in damage to the product or injury.

⚠ Caution
Take safety measures, such as installing a separate monitoring system, to ensure safety even if the product fails. Product failure may prevent comparative outputs from being generated, resulting in serious accidents.

Observe the following precautions to ensure safety.

1. Maintain the power supply voltage within the range specified in the specifications.
2. Maintain the load within the ratings specified in the specifications.
3. Check each terminal for correct number and polarity before connecting it. Incorrect or reverse connections may damage or burn out internal components in the product.
4. Tighten the terminal screws securely. The recommended tightening torque is 0.43 to 0.58 N·m. Loose screws may cause fire or malfunction.
5. Do not connect anything to unused terminals.
6. Provide a switch or circuit breaker so that operators can easily turn OFF the power supply when necessary. Also provide appropriate indications of such devices.
7. Do not attempt to disassemble, repair, or modify the product.
8. Do not use the product where flammable or combustible gases are present.

Application

General Precautions

1. Do not use the product in the following locations:
 - Locations subject to direct radiant heat from heating equipment.
 - Locations subject to exposure to water, oil, or chemicals.
 - Locations subject to direct sunlight.
 - Locations subject to dust or corrosive gases (particularly, sulfuric gas or ammonia gas).
 - Locations subject to severe changes in temperature.
 - Locations subject to icing or condensation.
 - Locations subject to shock or vibration.
2. Do not block heat dissipation around the product, i.e., provide sufficient space for heat dissipation.
3. Ensure that the rated voltage is reached within two seconds after the power is turned ON.
4. Conduct aging for 15 minutes min. after power is turned ON for correct measurement.

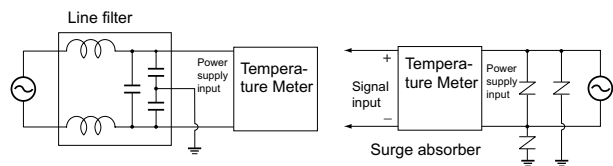
5. Do not touch the slit sections or terminals while the power is being supplied to prevent the product from being affected by static electricity.
6. Do not lay heavy objects on the product during use or storage. Doing so may deform or deteriorate the product.
7. Do not use paint thinner for cleaning. Use commercially available alcohol.

Mounting

- Mount the product to a panel that is 1 to 8 mm thick.
- Install the product in a horizontal position.
- Use crimp terminals that match screw sizes.

Noise Prevention

- Install the product as far as possible from devices that generate strong, high-frequency fields (such as high-frequency welders or sewing machines) or surges.
- Install surge absorbers or noise filters on nearby devices that generate noise (particularly motors, transformers, solenoids, magnet coils, and other devices that have a high inductance component). Do not connect a surge absorber to the temperature sensor input section of the K3MA-L.



- To prevent inductive noise, separate the terminal block wiring for the product from high-voltage or high-current power lines. Do not route the wiring for the product in parallel with or tie it in a bundle with power lines. Take the following countermeasures against inductive noise in input lines.

Temperature Inputs

Separate the lead wire that connects the product with a temperature sensor from the load line to prevent the product from being affected by inductive noise.

- When using a noise filter for the power supply, check for the voltage and current and install it as close as possible to the Temperature Meter.
- Do not install the product near radios, television sets, or wireless devices. Doing so may cause reception interference.

■ Increasing Service Life

- Do not use the product in locations where the temperature or humidity exceeds the ratings or where condensation may occur. When installing the product in a panel, be sure that the temperature around the product (not the temperature around the panel) does not exceed the ratings. The product service life depends on the ambient temperature. The higher the ambient temperature, the shorter the service life. To extend the product service life, lower the temperature inside the Temperature Meter.
- Use and store the product within the temperature and humidity ranges given in the specifications. When gang-mounting Temperature Meters or arranging them vertically, heat generated by the Temperature Meters will cause the internal temperature to rise, reducing the service life. In such cases, consider forced cooling methods, such as using a fan to circulate air around the Temperature Meters. Do not, however, allow only the terminals to be cooled. Doing so will increase measurement error.
- The life of the output relays are greatly affected by the switching capacity and switching conditions. Use these relays within their rated load and electrical life. The contacts may fuse or burn if they are used past their electrical life.