



**0.56" Digital Red LED Automobile
Thermometer Panel Meter
User's Guide**



0.56" DIGITAL RED LED AUTOMOBILE THERMOMETER PANEL METER USER'S GUIDE

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NOTES:

Product Version : Ver 1.0

Document Version : Ver 1.0

Chapter 1. Overview

1.1 Overview

Thanks for using the thermometer of ME-SP33X series by Sure Electronics. Please read this manual carefully prior to the installation of thermometer.

Thermometers of ME-SP33X series are the first LED-based self-made type. Aside from the features such as simplicity, self-adaptation to ambient brightness inherited from panel meter of ME-SP03X series, flexibility is the most impressive feature which provides 4 different versions that can suit the needs of global buyers.

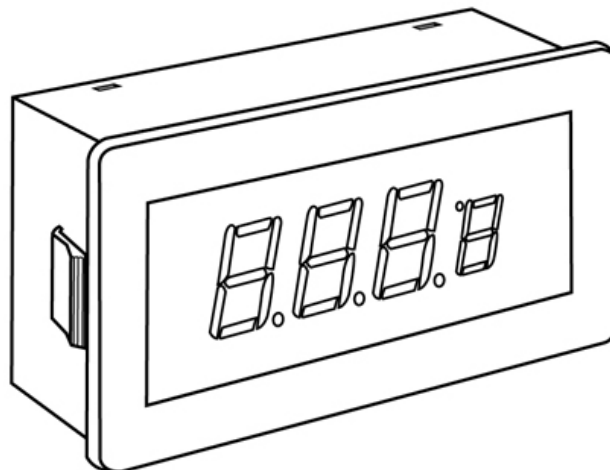
TABLE 1-1 MEMBERS OF ME-SP33X SERIES

| ME-SP33X SERIES | | |
|-----------------|----------------|-----------------|
| S/N | CH1 | CH2 |
| ME-SP330 | - | Built-in sensor |
| ME-SP331 | External Probe | - |
| ME-SP332 | External Probe | Built-in sensor |
| ME-SP333 | External Probe | External Probe |

Thermometers equipped with built-in sensor, such as ME-SP330 and ME-SP332, can be used to measure temperature in household families, offices, PC rooms and vehicles. While external probe can help you extend your application range to some harsh environment, such as to measure the water temperature of vehicles, air-conditioners, refrigerators, water-heaters or the temperature of computer cases since the external probe itself is water-proof.

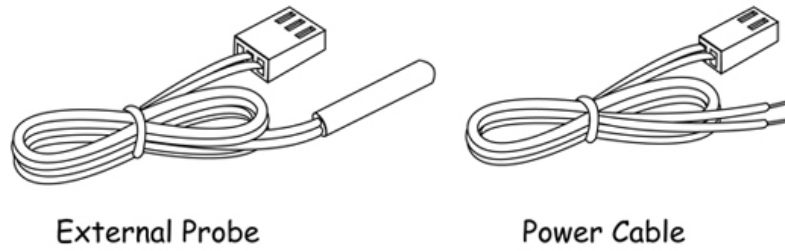
As listed in the above table, ME-SP330 and ME-SP331 are equipped with a single built-in sensor and an external probe respectively. While ME-SP332 and ME-SP333 can measure temperature of two different applications since both of them are equipped with dual sensors.

FIGURE 1-1 PRODUCT DIAGRAM



0.56" Digital Red LED Automobile Thermometer Panel Meter

FIGURE 1-2 ACCESSORIES



Note: All diagrams or schematics in this manual are for reference only.

1.2 Main Features

1. °C/°F selectable
2. Internal sensor or external thermo probe or a combination of both are provided
3. By the change of ambient brightness, thermometer will alternately display temp in °C and °F
4. Self adapted to ambient brightness, not dazzling in night time since the brightness can be adjusted automatically.
5. Large (0.56"/14.2mm) easy-to-read red LED display
6. Miniature housing
7. Ideal for automotive, industrial applications
8. -10 to +60 °C operating temperature range
9. Over 90% components are SMT based, which are reliable and environment-friendly
10. UL and CE-certified compound AWG22 cables are used, low voltage drop

Chapter 2. Specification Characteristics

2.1 Specification Characteristics

| Power Supply Requirements | Min. | Typ. | Max. | Units |
|---|---------------------------------|------|----------|---------|
| Supply Voltage | | | | |
| ME-SP33X | 8.5 | 12 | 26 | V |
| Supply Current (@ VCC = 12V) | | | | |
| Full Sunlight | - | 36 | - | mA |
| Total Darkness | - | 13 | - | mA |
| Performance | | | | |
| Temperature Range | | | | |
| Internal Sensor | 32(0) | - | 140(60) | °F (°C) |
| External Probe | -31(-24) | - | 257(125) | °F (°C) |
| Display Resolution | | | | |
| -9.9°F (°C) to 99.9°F (°C) | - | 0.1 | - | °F (°C) |
| Other range | - | 1 | - | °F (°C) |
| Accuracy 0°C to 60°C | | | | |
| External | 0 | ±1.0 | ±1.5 | °C |
| Internal | 0 | ±2.0 | ±4.0 | °C |
| Responding Rate: | - | 0.5 | - | S |
| Display | | | | |
| Display Type and Size | | | | |
| Digit Display | 3 digit, 0.56"/14.2 mm high LED | | | |
| °F & °C Display | 1 digit, 0.39"/9.9 mm high LED | | | |
| Over-range Indication or no signal input | | | | |
| ME-SP33X | "OL" | | | |
| Physical/Environmental | | | | |
| Operating Temperature | -10 | - | 60 | °C |
| Storage Temperature | -40 | - | 75 | °C |
| Humidity | 0 | - | 85 | %RH |

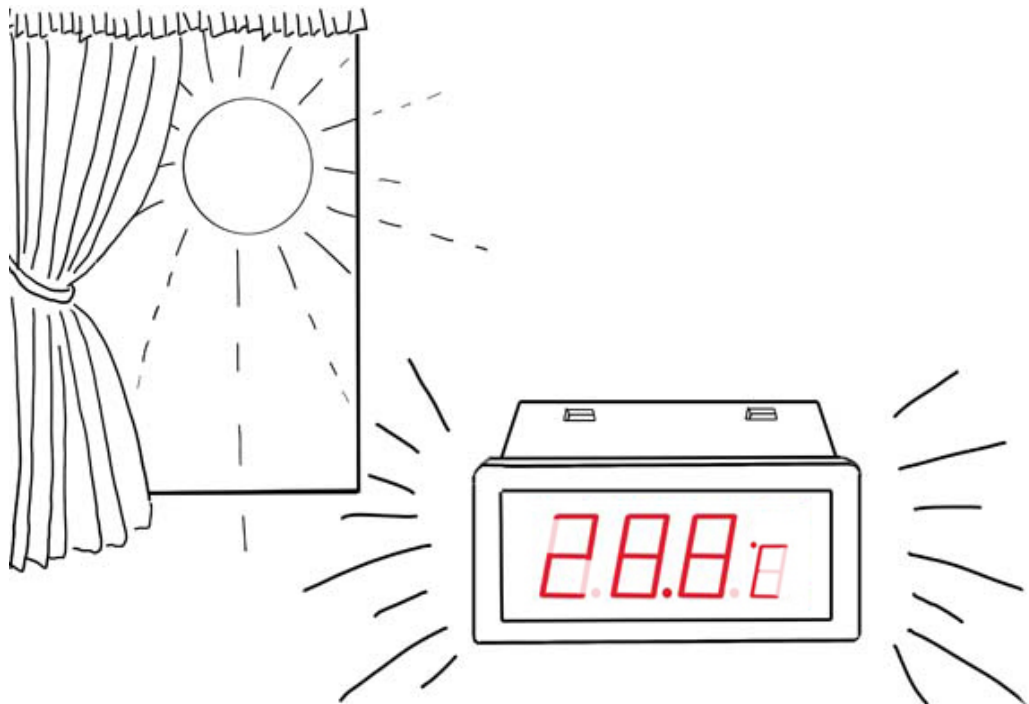
Note: The allowed input range of power supply is DC 8.5-26V, a higher voltage may burn out the thermometer.

Chapter 3. Features

The brightness of the diode varies with the change of ambient brightness and won't be too dazzling in night time.

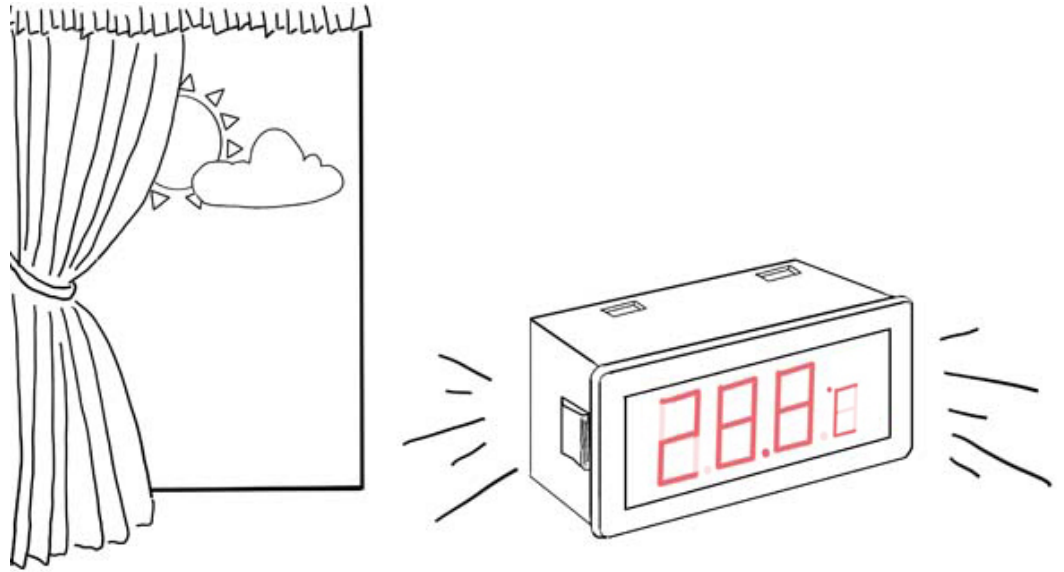
3.1 Adapted to the Ambient Brightness

1. The brightness of diode will reach its topmost when the panel meter is in a room under direct sunlight exposure.

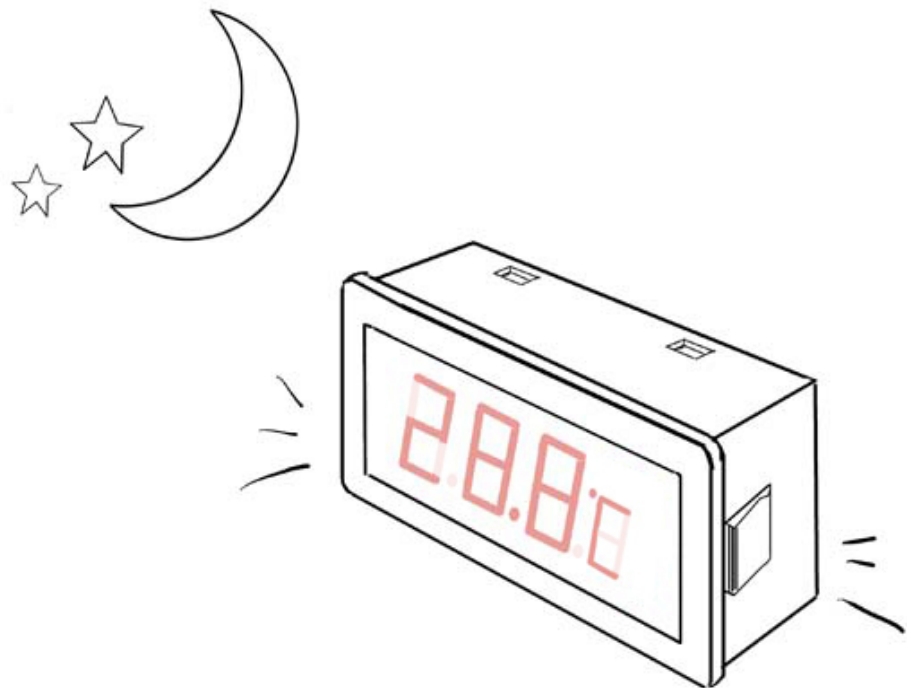


2. The brightness of the diode is comparatively high when the panel meter is placed in a room, around which the environment is similar to dawn, nightfall or cloudy weather.

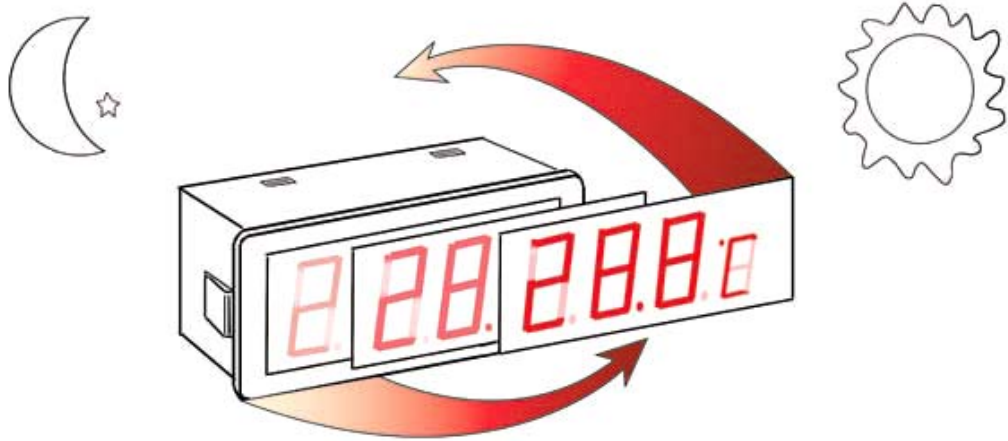
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3. The brightness of the diode is the darkest when the panel meter is placed in an environment of almost no light from outside.



3.2 Slowly Adjust the Brightness of Diode

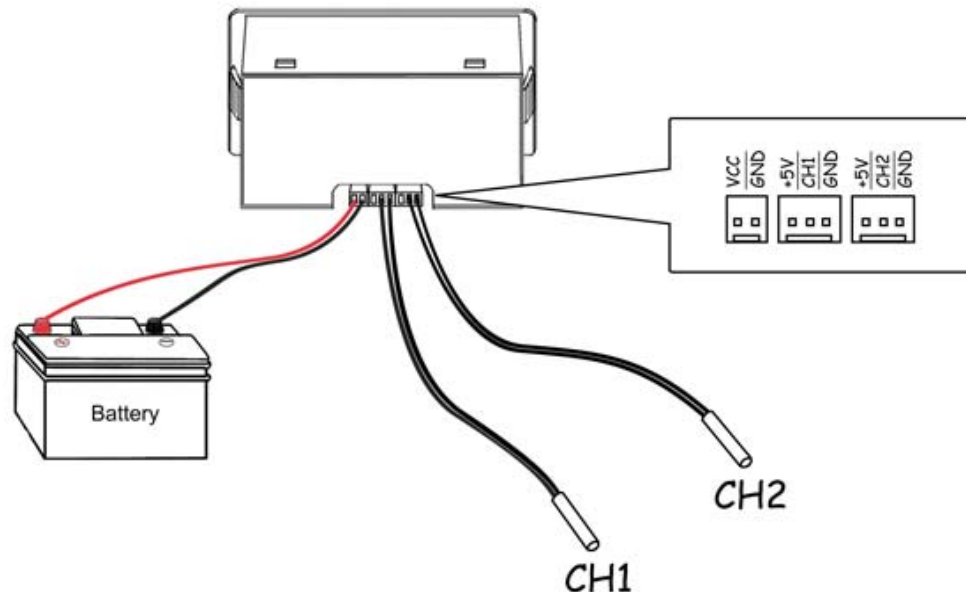


When the ambient environment of panel meter is shifted from light to dark or dark to light, the brightness of diode will be gradually changed and whole process will last for 1 seconds. The adjustment of brightness is smooth and it won't make people feel abrupt.

Chapter 4. How to Use a Thermometer

4.1 Connection with Power Supply and Thermo Probe

FIGURE 4-1 CONNECTION SCHEMATIC



Note:

1. "VCC (+)" and "GND (-)" shall be connected with the positive (+) and negative (-) of DC power supply ranging from 8.5-26V.
2. Pay more attention to polarity when hooking up, otherwise thermometer will be burnt out.
3. When an external probe (no matter a 2-pin or 3-pin version) is to be connected with the pin header of thermometer, always leave the pin "+5V" disconnected.

4.2 Display Mode Settings

4.2.1 Display in °F & °C

Thermometer can display temperature in °F or °C, which can be set by K1 and K2 of DIP switch.

| K1 | K2 | Func. |
|-----|-----|---|
| OFF | OFF | Display in °C |
| ON | OFF | Display in °F |
| OFF | ON | Alternate display with the change of ambient brightness (°F/°C) |
| ON | ON | No function |

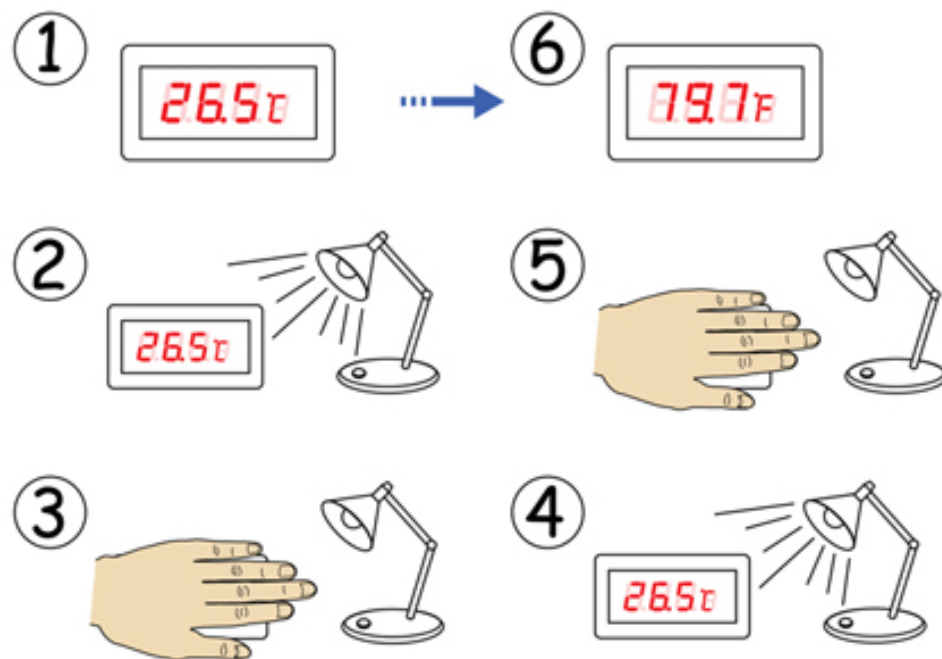
Notes:

1. By setting K1 and K2, thermometer can alternately display temperature in °F and °C.

How to Use a Thermometer

2. See following for steps of how to make the thermometer change its display from C(F)to F(C) with the change of ambient brightness C(F)to F(C):
 - ① Expose thermometer under intense light source (luminance intensity ≥ 1000 Lux).
 - ② Cover thermometer with something to avoid being exposed under intense light (luminance intensity ≤ 60 Lux).
 - ③ Thermometer will start to change the current display from $^{\circ}\text{C}$ ($^{\circ}\text{F}$) to $^{\circ}\text{F}$ ($^{\circ}\text{C}$) if you repeat the above steps twice.

Application example:



You will need a flashlight to toss light directly on thermometer when ambient luminance intensity is less than 60 Lux and normally you will need to repeat the on & off action twice. You can also use flashlight even when the ambient luminance intensity exceeds 60 Lux, when you switch off the flashlight, cover your thermometer with your hands so that the luminance intensity can fall short of 60 Lux.

4.2.2 Select Display Temperature from CH1 or CH2

Thermometer allows you to select displaying temperature reading from CH1 or CH2, which can be achieved by setting k3 and k4 of DIP switch.

| K3 | K4 | Func. |
|-----|-----|--|
| OFF | OFF | Display temp reading of CH2 |
| ON | OFF | Display temp reading of CH1 |
| OFF | ON | Alternate displaying automatically (CH1 / CH2) |
| ON | ON | Alternate display with the change of ambient brightness(CH1 / CH2) |

Notes:

1. Set K3 and K4 to OFF in terms of ME-SP330.

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2. Set K3 and K4 to ON and OFF respectively in terms of ME-SP331.
3. In terms of ME-SP332 and ME-SP333, thermometer can alternately display temperature of CH1 or CH2 by setting K3 and K4.
4. Thermometer will display temperature reading of CH2 if it were selected to do so.
5. Thermometer will display temperature reading of CH1 if it were selected to do so.
6. When you select to display temperature readings of both CH1 and CH2 automatically and alternately, thermometer will do so.

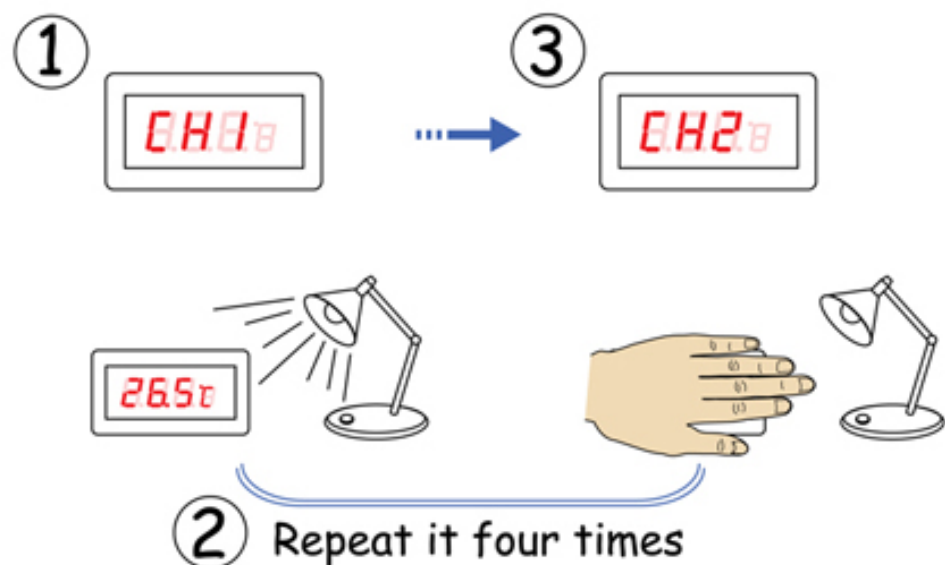
Details are as follows:

- ① Time interval for each change in between CH1 and CH2 is 4 seconds.
- ② The displaying of CH1 and CH2 denotes the temperature displaying thereafter. CH1 means temperature reading from CH1 will be displayed and CH2 means temperature reading from CH2 will be displayed.
7. When Alternate display with the change of ambient brightness is selected, you can have thermometer display temperature readings of CH1 and CH2 alternately by changing the ambient brightness.

Detailed steps are as follows:

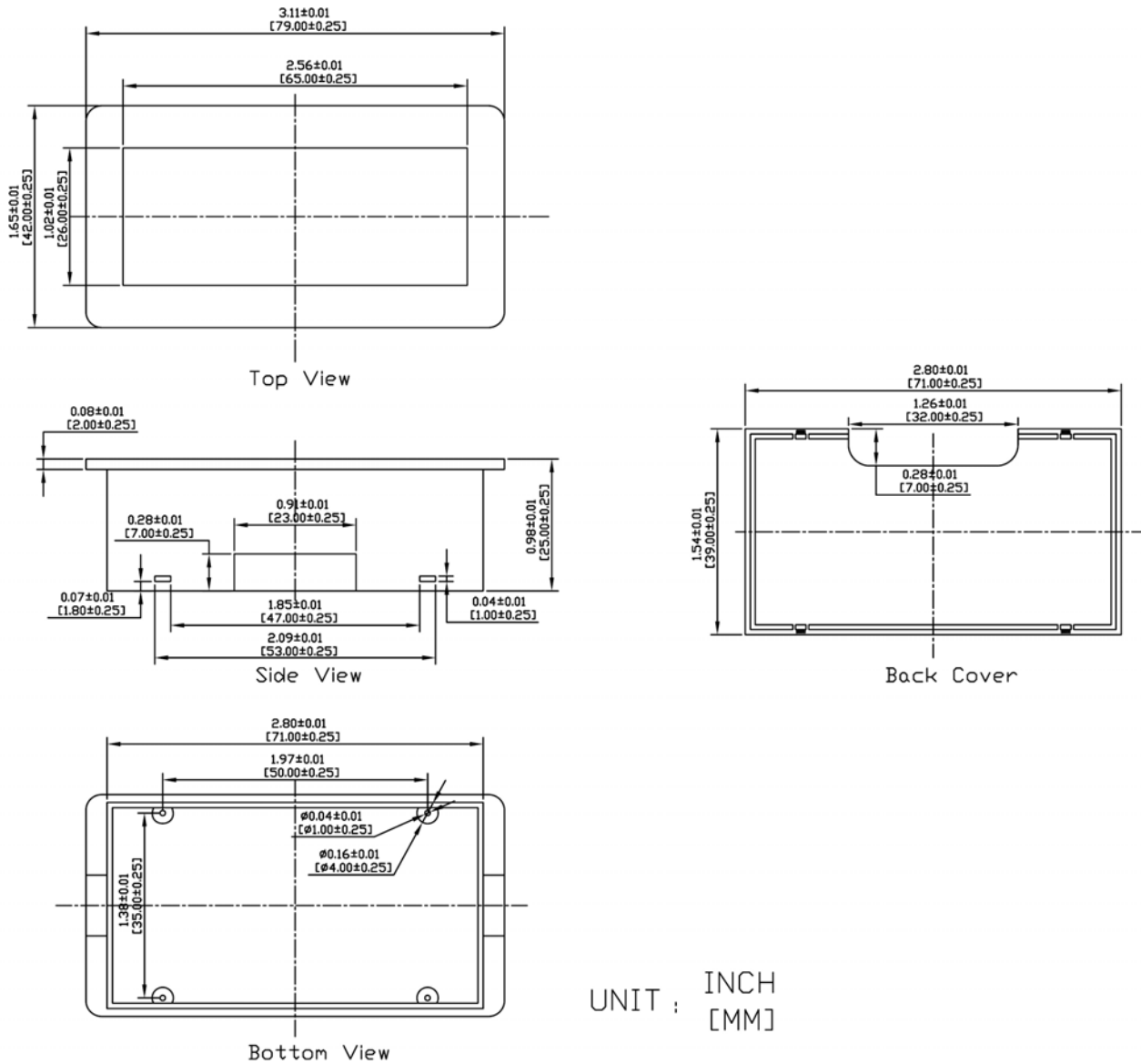
- ① Expose thermometer under intense light (make luminance intensity ≥ 1000 Lux).
- ② Cover thermometer with something to avoid intense light (make luminance intensity ≤ 60 Lux).
- ③ Repeat the above steps four times and thermometer will change the current display from CH1 (CH2) to CH2 (CH1).
- ④ It takes approximately 9 seconds before the next prompt(CH1/CH2) can be displayed when the thermometer is in use. The display of CH1(CH2) denotes the display of temperature readings from CH1(CH2).

Application example: refer to 4.2.1



Chapter 5. Mechanical Drawing

FIGURE 5-1 MECHANICAL DRAWING





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