

# **Temperature Recorder**

**Applicable to blood bank refrigerators, medical, low temperature,  
and ultra low temperature units.**

TMP Scientific

## Content

### Product introduction

|                          |   |
|--------------------------|---|
| Product features -----   | 3 |
| Name of components ----- | 4 |
| Installation -----       | 5 |

### Operating guides

|  |    |
|--|----|
| Selection of temperature ranges -----  | 7  |
| Paper loading/changing -----           | 8  |
| Calibration of temperature -----       | 8  |
| Power supply and standby battery ----- | 9  |
| Attention -----                        | 10 |

### Parameters and dimensions

|                          |    |
|--------------------------|----|
| Main parameters -----    | 11 |
| Outline dimensions ----- | 11 |

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### Product introduction

## Product features

- The product mainly applies to blood bank refrigerators, ultra low temperature freezers and other medical equipment that requires temperature recording over time.
- The record chart paper is circular. Reading of temperature is simple and reliable. The operation of the unit is rather straightforward.
- The unit is designed to operate with a precise microchip to ensure an accurate and reliable recording of time.
- The recorder is also designed with a special circuitry to protect the operation of the motor from external electronic disturbance.

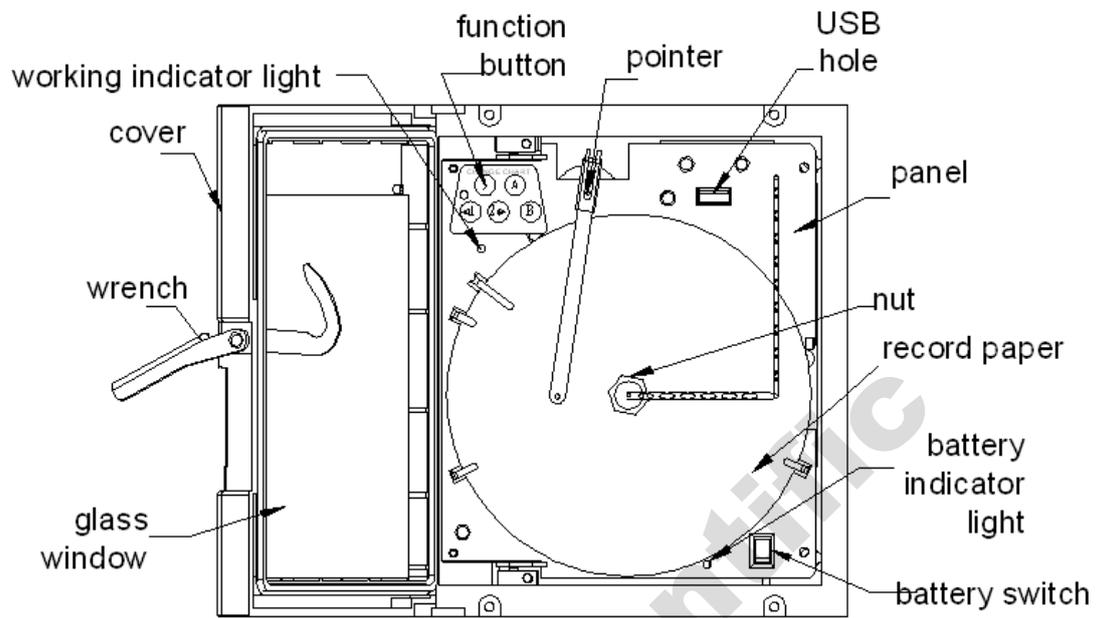
## Ambient conditions

Please perform operation under the following conditions in order to ensure accuracy.

- Indoor use;
- Elevation above sea level  $\leq$  2,000m;
- Ambient temperature within  $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$ ;
- Ambient humidity within 0% ~ 90% RH;
- The fluctuation of voltage of the main power supply without exceeding the rated voltage.

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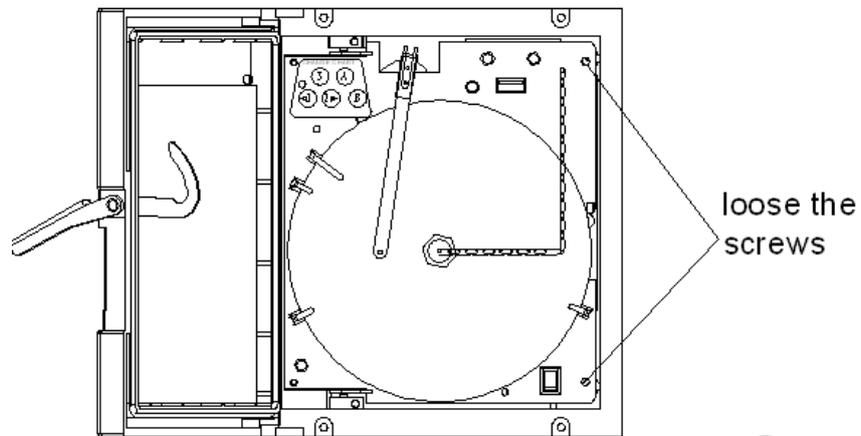
## Name of components



## Installation

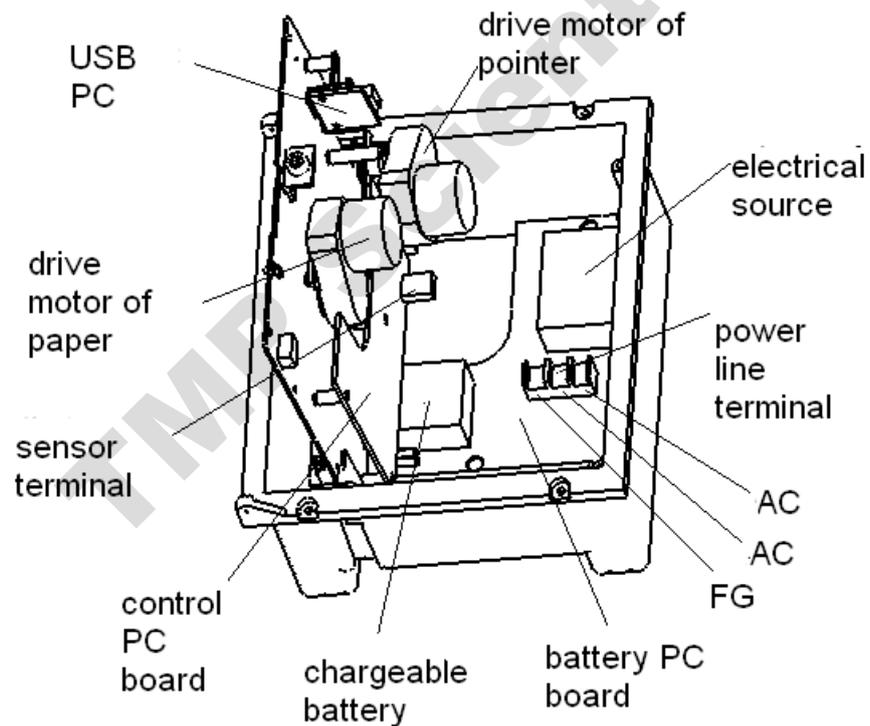
## Installations of power line and sensor line

Unscrew the two fixing screws outboard panel.



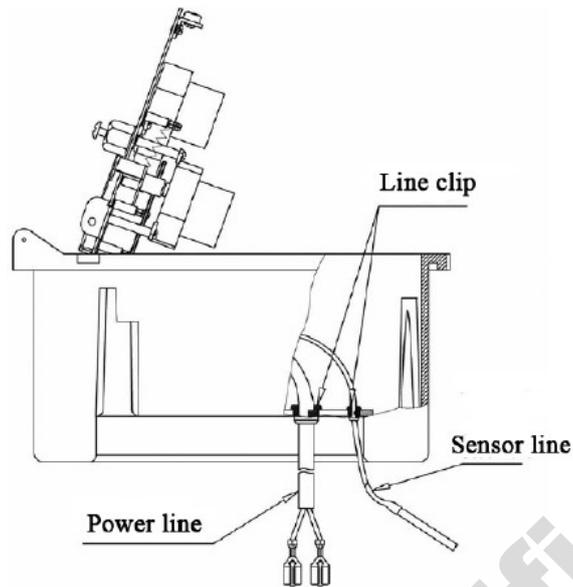
Connect power line and sensor line into power socket connector and sensor socket connector respectively. The power line connection is illustrated with the following diagram.

**Rear View of Recorder Panel**



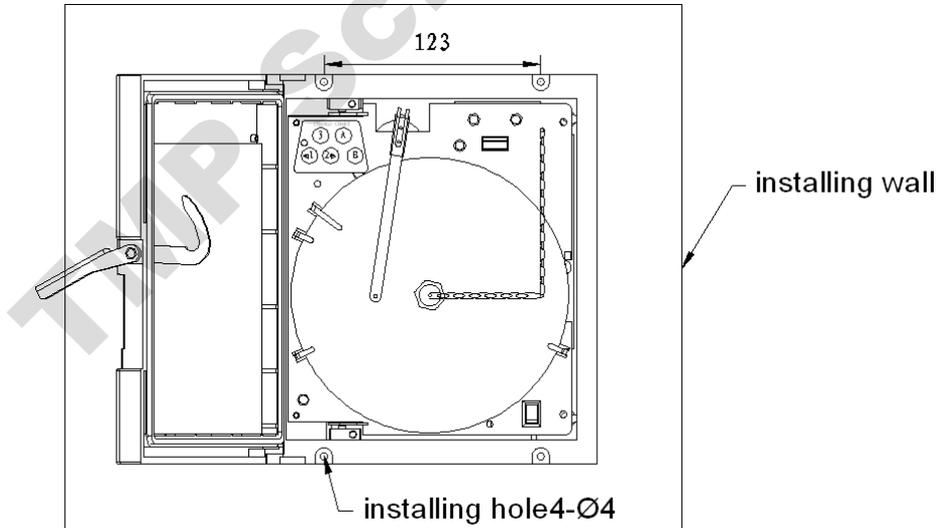
## Installation

After completing the connection, use line clips to secure the lead power line and sensor line through the bottom shell.



### Installation of instrument

This recorder is mounted through the opening window on your instrument via self-tapping screws on the recorder mounting plate.



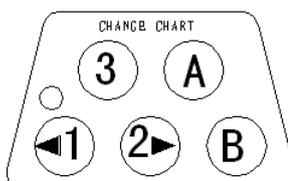
## Operating Guides

## Selection of Temperature Ranges

After temperature recorder is powered on, press Key #3 for 5 seconds until hearing “Ticking” by buzzer to let the recorder enter the option mode.

Press Key #1 to choose temperature range. Each pressing of this key will rotate the option to choose one of three temperature ranges. Each temperature range is identified with the color of the working indicator light.

- 40°C ~+30°C: Green;
- 115°C ~+50°C: Yellow;
- 200°C ~0°C: Red;



Press Key #2 to choose the recording time cycle. Each pressing of this key will alternate the option of choosing the two time recording periods distinguished with the counts of buzzer.

- 24 hour recording time cycle: Rapid and short buzz;
- 7 day recording time cycle: Constant and long buzz.

After completion of the above operation, press Key #3 to exit. Press Key #3 again to perform paper loading calibration.

Notice:

- a) After selecting a new temperature range or recording time cycle, a new calibration procedure for paper loading must be performed. Otherwise the above operation cannot be accepted and saved by the temperature recorder.
- b) If there is no new selection of temperature range and recording time cycle after it powers on for 5 seconds, the temperature recorder will automatically enter the mode of paper loading calibration. Temperature selection and recording time are based on the prior settings before the last power shut down.

## Operating guides

## Paper loading/changing

When the temperature recorder is in normal operation, press the #3 key. The embossing stylus moves 5 mm away from the outer edge of chart paper. The circular chart paper can then be replaced.

1) Unscrew the compression nut for the recording paper, place a new recorder paper with the tick mark of starting time positioned at the reference line on the panel. Tighten the nut to secure the paper.

2) Perform calibration: press the #3 key again. The embossing stylus returns to the scale point B1 (Table 1 for reference), and continues to move to scale points B2 and B3. The embossing stylus stops at B1, B2 and B3 for 3 seconds (the working indicator light is not on). At each tick mark, press the #1 or

#2 key to move the embossing stylus to match the temperature reading on the chart recorder paper. The recorder returns to the working condition of temperature recoding after calibration.

Table 1 Scale point of strike stoppage upon each gear for temperature test

| Level \ Scale point | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> |
|---------------------|----------------|----------------|----------------|
| -40°C~+30°C         | -40°C          | -20°C          | 0°C            |
| -115°C~+50°C        | -115°C         |                | 0°C            |
| -200°C~0°C          | -200°C         | -100°C         | 0°C            |

## Temperature calibration

Connect the temperature recorder to a power supply. Place the temperature probe in an environment of a stable temperature such as an ice water bath. After the unit enters the mode of temperature recording, press the #1 or #2 key for about 5 seconds. When there is a “ticking” sound, the temperature recorder enters temperature calibration. Use #1 key and #2 key to perform the left and right adjustment of the stylus to make sure the marking on the paper scale match the temperature of the known source. Stop the adjustment once the stylus position is correct. The temperature recorder automatically exits the temperature calibration and returns to temperature recording mode in 5 seconds.

## Operation of power supply and back-up battery

### A) Operation after a power interruption

When the recorder experiences a power outage and resumes operation, the embossing stylus automatically moves 5 mm away from chart paper. At B1, B2 and B3, it stops for 3 seconds on each point. During the period, it is allowed to perform left and right adjustment by using the #1 and the #2 keys to match the position of the stylus to the tick marks. The embossing stylus stops at the position that reflects the temperature of the probe. The working indicator light keeps flashing, indicating the condition of temperature recording.

## Operating guides

## B) Working indicator light

Flash—The temperature recorder is under working state;

Bright but don't flash—The motor of pointer is continuously operating (For example ,the process of pointer pass from B1 to B2 to B3);

Not bright—It means that the temperature recorder enters into setting and adjusting mode (For example, press button 1# or 2#) ;

**Note: 1) The variation of the working indicator light flashing frequency is the only illustration of the source of the power supply. The color of the light indicator is the same as the corresponding temperature range of the temperature selected.**

**2) Make sure the '—'side of the battery switch is pressed down, otherwise the back-up battery will not work.**



## C) Indication of battery indicator light

Continuously glow: rapid charge

Flash: trickle charge

Off: battery charge finished

## D) Recorder real time and ID (Identity of the temperature recorder) setting, data reading

Before changing the setting of recorder time, ID, and data reading, the saving card should be firstly set with the management software (see the recorder PC management software instruction).

### Real time and ID setting

Insert the card onto the recorder, the light indicator will begin to flash. Press 5# button, if the time and ID have already been set in the card, the recorder will renew the setting. The temperature data, the original time and ID setting will all together be deleted. After the operation the light indicator will begin glowing continuously, otherwise it will keep flashing.

### Data reading

Insert the card onto the recorder, the light indicator will begin to flash. Press 4# button. If there is space in the card for data reading, the data will be sent to the card. After the operation the light indicator will begin glowing continuously, otherwise data reading operation fails and the light will keep flashing.

**Note: 1) The recorder saves data hourly. It can record at most 2 weeks' data. When the storage space is full, the new data will cover the old data starting from the first hour's data.**

**2) After the data being sent to the card, the recorder still has the data .The data can be cleaned only by ID or real time resetting.**

## Attention

- The temperature recorder case is not waterproof. Keep the unit away from exposure to water.
  - During transportation, a temperature recorder must be carefully handled so it would not experience strong vibrations and hits.
  - When a temperature recorder fails due to damage in transportation, non-professionals must not open the panel and loosen internal components;
    - Do not put a temperature recorder (parts other than sensor) into environment of temperature lower than  $-10^{\circ}\text{C}$  or higher than  $+50^{\circ}\text{C}$ .
    - When standby battery is permanently connected with the instrument, this battery should be checked for proper voltage supply on a monthly basis so it can operate the recorder properly when there is a power outage to the main AC power. Replace the battery as soon as there is a sign of low battery voltage.
    - In case of battery leakage, immediately change it.
    - When there is a constant alarming of buzzer after it is powered on and working, check for any sign of the main power supply failure.

## Technical parameters

### Main parameters

- a) Range of test temperature:
  - $40^{\circ}\text{C}$  ~  $+30^{\circ}\text{C}$ , resolution:  $1^{\circ}\text{C}$ ;
  - $115^{\circ}\text{C}$  ~  $+50^{\circ}\text{C}$ , resolution:  $5^{\circ}\text{C}$ ;
  - $200^{\circ}\text{C}$  ~  $0^{\circ}\text{C}$ , resolution:  $5^{\circ}\text{C}$ ;
- b) Temperature and humidity of working environment:  $-10^{\circ}\text{C}$  ~  $50^{\circ}\text{C}$  and 0 ~ 90% RH;
- c) Recording time cycle: 7 days or 24 hours;
- d) Working power supply: AC 100V ~ 240V and 50 Hz or 60 Hz;
- e) Rated power:  $\leq 8\text{W}$ ;
- f) Installation method: Mosaic installation on the wall;
- g) Back-up battery: Lithium Battery (When the battery is fully charged, it can run the recorder for at least 24 hours.)

## Outline dimensions

The temperature recorder case is made of black plastic, and the outline dimensions and installation dimensions are as following:

