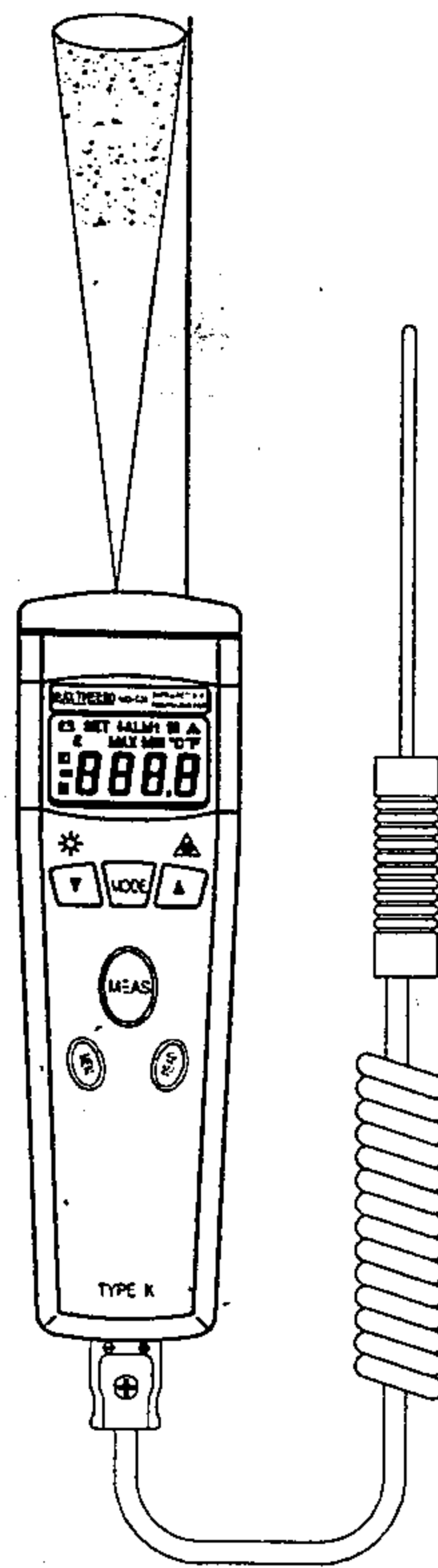


MD-526

INSTRUCTION MANUAL



- Storage temperature and humidity: -10°C to 60°C (14°F to 140°F), below 70%RH.
- Dimensions : 170(L)×52(W)×38mm(H)
6.7(L)×2.1(W)×1.5(H) inches..
- Weight : Approx. 180g with battery.
- Accessories : instruction manual, carrying case, battery.

3-2 Electrical Specifications

- Infrared
- Measuring range : -20°C to 500°C (-4°F to 932°F)
- Resolution : 0.1°C , 0.2°F
- Accuracy : ± 2% reading or ± 2°C or 4°F. Whichever is greater.
- Temperature coefficient : 0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).
- Responding time : Once per second.
- Spectral Response : 6 ~ 14um.
- Field of view : 8:1 ; optics ratio with a 1" min target.
- Emissivity : 0.17 ~ 1.00
- Sighting : Laser marker 1mw (class 2).
- Sensor : Thermopile.

INTRODUCTION

The Infrared Thermometer is digital and is used with a type-K thermocouple input, being a dual measurement product. Although its precise design, the hand-held Infrared Thermometer is easy to operate. Furthermore, the backlight illumination function is helpful to user who is accustomed to measure in dark places. The Infrared Thermometer will also indicate a Laser symbol on LCD as a reminder and its additional **auto hold reading & auto power off** functions are practical to users.

The Infrared Thermometer is a **non-contact** thermometer with laser pointer. It can be used to measure the temperature of objects' surface that is improper to be measured by traditional (contact) thermometer (such as moving object, surface with electricity current or objects that are difficult to reach).

I. SAFETY INFORMATION

1. Read the following safety information carefully before attempting to operate or service the meter.
2. Use the meter only as specified in this manual ; otherwise, the protection provided by the meter may be impaired.

Warning

If user presses **MEAS** button while the symbol is shown on LCD, the meter will radiate the laser. At this moment, you must avoid the laser radiating your eyes to prevent any injury.

- If the measured object has a smooth surface, the laser will reflect. Please prevent the reflected laser to radiate your eyes.
- Please, do not radiate the laser to inflammable gas to avoid dangers.

Type K

- Measuring range : -100°C to 1333°C (-148°F to 1999°F).
- Resolution : 0.1°C , 1°C , 0.1°F , 1°F.
- Responding time : Once per second.
- Basic accuracy : (@ 23±5°C calibration) accuracy are ± (...% of reading + degree) at 18°C to 28°C with relative humidity up 80%.

Function	Resolution	Range	Accuracy
°C	0.1°C	-100°C ~ 0°C	± (0.2%rdg + 1.0°C)
		0°C ~ 200°C	± (0.1%rdg + 1.0°C)
	1°C	200°C ~ 1333°C	± (0.2%rdg + 2°C)
°F	0.1°F	-148°F ~ 32°F	± (0.2%rdg + 2°F)
		32°F ~ 200°F	± (0.1%rdg + 2°F)
	1°F	200°F ~ 1999°F	± (0.2%rdg + 4°F)

Temperature Coefficient:
0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).

Note :
The basic accuracy specification does not include the error of the probe. Please refer to the probe accuracy specification for additional details.

3. Precautions:

- a). Do not operate the thermometer near large electrical or magnetic fields.
 - b). Keep the thermometer away from direct sunlight or strong source of light, hot objects (70°C/158°F), high temperatures, high humidity, or dust during use and storage.
 - c). If the thermometer is in an environment where the temperature changes drastically, please wait that the thermometer returns to a stable status before starting the measuring
 - d). Condensation may form on the focal lens if the thermometer is moved quickly from a cold to a hot environment. Before taking measurements, please wait for the condensation to dissipate.
 - e). Do not touch the focal lens.
4. Environmental conditions:
- a). Altitude up to 2000 meters.
 - b). Relative humidity 80% max.
 - c). Operating Ambient 0 ~ 50°C
5. Maintenance & Clearing:
- a). Repairs or servicing are not covered in this manual and should be performed by qualified personnel only.
 - b). Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on the instrument.
 - c). When servicing, use only specified replacement parts.
6. Safety symbols:
 Comply with EMC
7. U.S. Pat. No. Des. 448,314

II. FEATURES

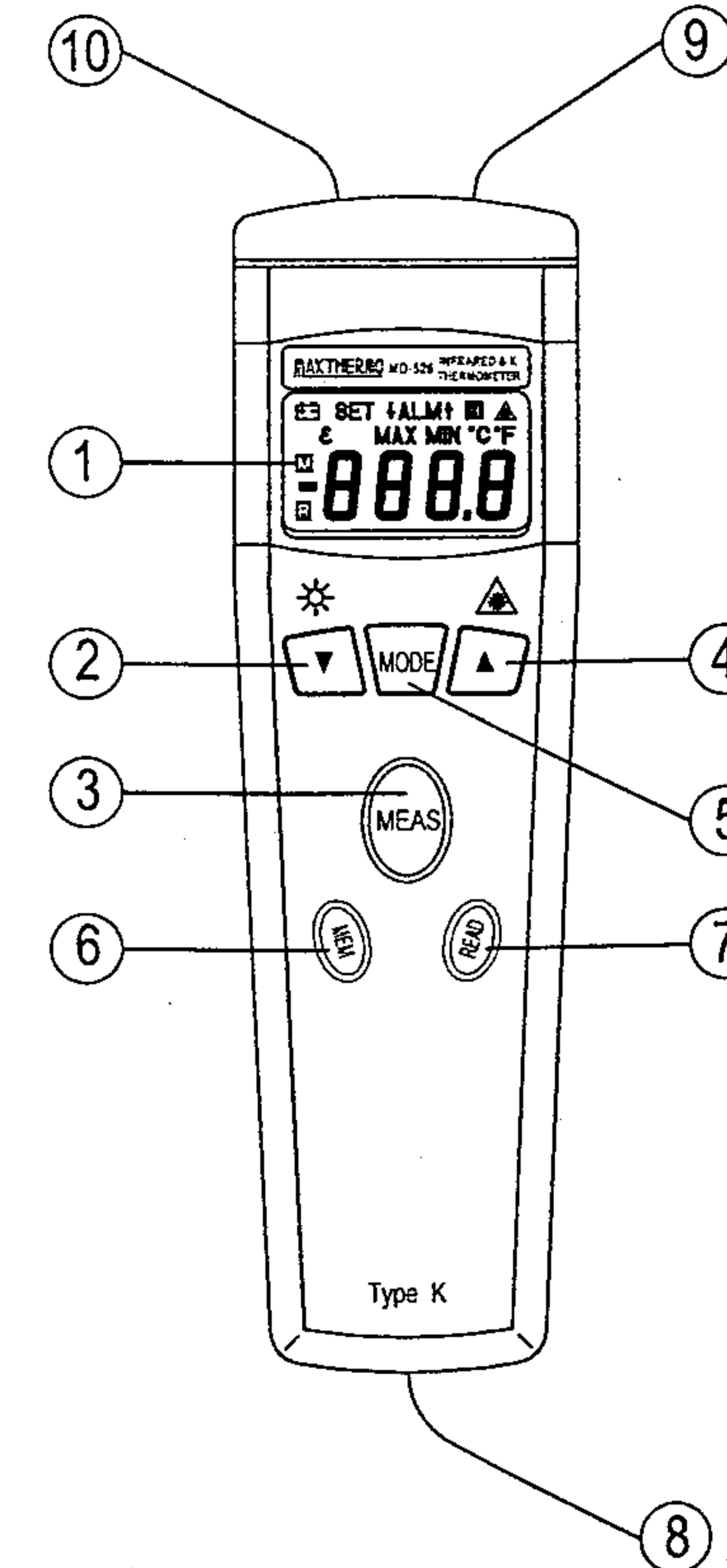
- °C / °F Selectable.
- Backlight LCD display.
- Laser targeting.
- Adjustable Emissivity .
- Audible and visible alarm.
- Data memory and read function.

III. SPECIFICATIONS

3-1 General Information

- Display : Backlight LCD Display.
- Auto power off : Approx. 10 sec. (Infrared), 30 minute (type-K).
- Data memory capacity : 50 set. (Direct reading from LCD display)
- Over range indication : "OL" or "-OL".
- Low battery indication : The symbol is displayed on LCD when the battery voltage drops below the operating voltage.
- Power supply : Single 9V battery 006P 9V or IEC6F22, or NEDA1604.
- Battery life : Approx. 150 hours (laser pointer and backlight turn off)
- Operating temperature and humidity : 0°C to 50°C (32°F to 122°F), below 80%RH.

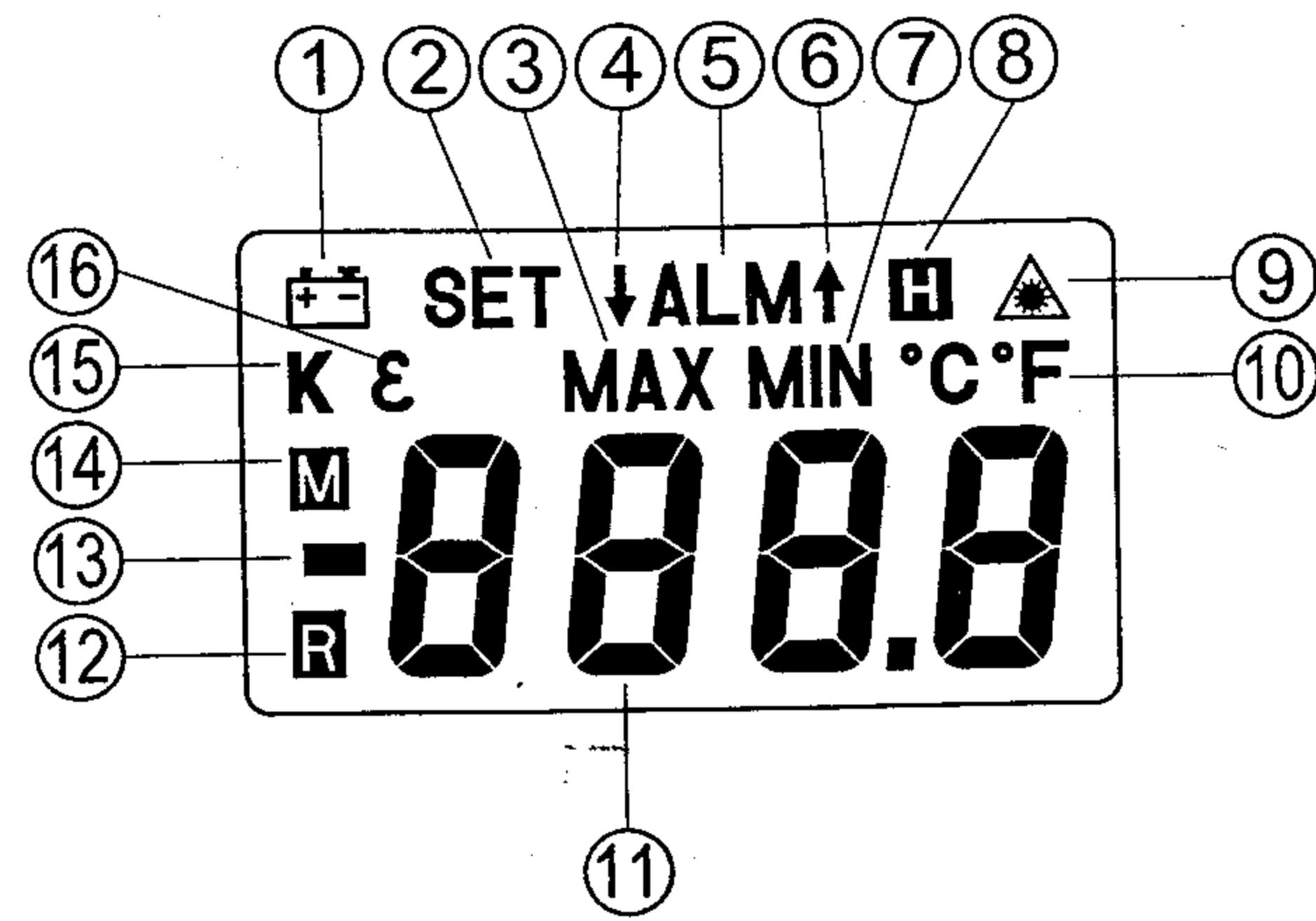
IV. FRONT PANEL DESCRIPTION



1. Display.
2. : Backlight key.

3. **MEAS** : key for powering on.
Press **MEAS** to turn on the thermometer.
4. : Laser pointer key.
5. **MODE** : Measuring mode and mode settings selection.
 - a). Press **MODE** for one second to toggle maximum (MAX), minimum (MIN) and current (MAX MIN) recorder reading mode, press **MODE** for 2 seconds to exit this mode.
 - b). Press **MODE** for 3 seconds to select measuring mode. [Infrared thermometer ↔ Type K thermometer (LCD shows K mark)]
 - c). Press **MODE** for 5 seconds entering into the mode settings.
6. **MEM** : Press **MEM** one time to store one set of data into the memory. (total 50 sets)
7. **READ** : Press **READ** to enter into read mode, then press read the memory data, press **MODE** exit read mode.
8. Type K input connector.
9. Laser aperture.
10. Focal lens.

V. LCD DISPLAY DESCRIPTION



1. Low battery mark	9. Laser indicator
2. SET symbols	10. Unit "°C", "°F"
3. Maximum reading	11. Measure value
4. Lo alarm	12. Read memory data
5. Alarm function	13. Negative polarity
6. Hi alarm	14. Store data to memory
7. Minimum reading	15. Type-K temperature measurement
8. Hold function	16. Emissivity value setting

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VI. Emissivity Adjustment

- Emissivity** : Emissivity is a value between 0.17 and 1 that indicates an object's ability to emit infrared energy. Emissivity is determined primarily by the object's composition and surface finish. The thermometer's sensitivity to emissivity "ε" was set at 0.95 before shipment because in 90% of the time, objects' emissivity is set at 0.95.
- Emissivity Adjustment**
 - Apply black tape, black mat paint or black magic marker to the object if it is safe.
 - "ε" is set at 0.95 to measure the dark surface.
 - To aim the laser at dark surface, press **MEAS** to get measurement as T1.
 - Remove the black tape or black mat paint and aim laser at the same area again then press **MEAS** to get the measurement as (T).
 - Change & reset a value for emissivity "ε" to get measurement (T) until T equal to T1.

Emissivity VALUES (cont.)

Typical Emissivity Values-Metals (cont.)	
SURFACE	EMISSIVITY
Zinc (oxidized)	0.1*
Galvanized iron	0.3
Tin-plated steel	0.1*
Gold (polished)	0.1*
Silver (polished)	0.1*
Chromium (polished)	0.1*
Emissivity Values-Non-Metals Refractory & Building Materials	
Red brick (rough)	0.75 to 0.9

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Fire clay	0.75
Asbestos	0.95
Concrete	0.7
Marble	0.9
Carborundum	0.85
Plaster	0.9
Alumina (fine grain)	0.25
Alumina (coarse grain)	0.45
Silica (fine grain)	0.4
Silica (coarse grain)	0.55
Zirconium silicate up to 500°C	0.85
Zirconium silicate at 850°C	0.6
Quartz (rough)	0.9
Carbon (graphite)	0.75
Carbon (soot)	0.95
Timber (various)	0.8 to 0.9
Miscellaneous	
Enamel (any color)	0.9
Oil paint (any color)	0.95
Lacquer	0.9
Matte black paint	0.95 to 0.98
Aluminum lacquer	0.5
Water	0.98
Rubber (smooth)	0.9
Rubber (rough)	0.98
Plastics (various, solid)	0.8 to 0.95
Plastic films (05 mm thick)	0.5 to 0.95
Polythene film (03 mm thick)	0.2 to 0.3
Paper and cardboard	0.9
Silicone polish (03 mm thick)	0.7
* Emissivity values with purity	

EMISSIVITY VALUES	
Typical Emissivity Values-Metals	
SURFACE	EMISSIVITY
Iron and Steel	
Cast iron (polished)	0.2

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Cast iron (turned at 100°C)	0.45
Cast iron (turned at 1000°C)	0.6 to 0.7
Steel (ground sheet)	0.6
Mild steel	0.3 to 0.5
Steel plate (oxidized)	0.9
Iron plate (rusted)	0.7 to 0.85
Cast iron (rough) rusted	0.95
Rough ingot iron	0.9
Molten cast iron	0.3
Molten mild steel	0.3 to 0.4
Stainless steel (polished)	0.1
Stainless steel (various)	0.2 to 0.6
Aluminum	
Polished aluminum	0.1*
Aluminum (heavily oxidized)	0.25
Aluminum oxide at 260°C	0.6
Aluminum oxide at 800°C	0.3
Aluminum Alloys various	0.1 to 0.25
Brass	
Brass (polished)	0.1*
Brass (roughened surface)	0.2
Brass (oxidized)	0.6
Copper	
Copper (polished)	0.05*
Copper plate (oxidized)	0.8
Molten copper	0.15
Lead	
Lead (pure)	0.1*
Lead (oxidized at 25°C)	0.3
Lead (oxidized, reated to 200°C)	0.6
Nickel and its alloys	
Nickel (pure)	0.1*
Nickel plate (oxidized)	0.4 to 0.5
Nichrome	0.7
Nichrome (oxidized)	0.95

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VII. TEMPERATURE MEASUREMENT

1. Infrared or type-K temperature measuring select :

- Press **MEAS** turn on the meter.
- Press **MODE** 3 seconds to select Infrared temperature or thermocouple type-K (LCD shown K mark) temperature measurement.

2. Infrared measuring :

- Infrared measuring : Press **MEAS** to power on the meter and start measuring. Release **MEAS** to stop measuring and auto hold the reading. The meter will turn itself off automatically after 10 seconds.
- Under the Infrared measuring mode, press & hold **MEAS** and press **MODE** 1 second to toggle select MAX, MIN and current reading. Press **MODE** two seconds to exit this mode.

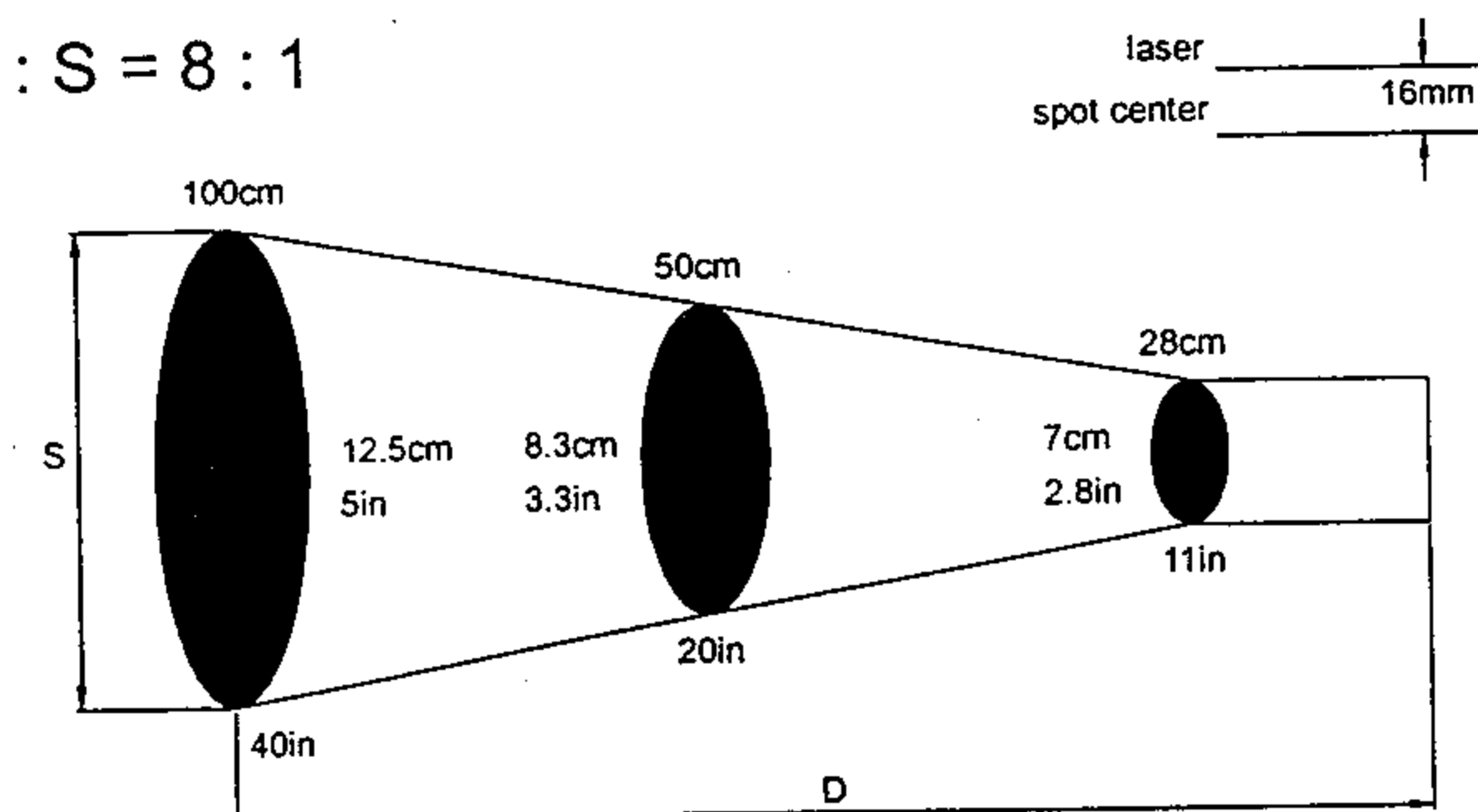
3. Continuous infrared measuring

Start with power off status. Press and hold down **MODE** then press **MEAS** to power on the meter. The Infrared Thermometer can start the continuous measurement. In the meanwhile, **H** symbol won't appear in LCD, the Hold function is unavailable.

- Under continuous measurement, press **MEAS** to turn off the meter.
- Under continuous measurement, press **MODE** 1 second to select MAX, MIN and current reading, press **MODE** 2 seconds to exit this mode.

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D : S = 8 : 1



Note:

- Laser offset: The laser beam is offset 16mm(0.63in) from the focal lens. Choose a sampling spot that is large enough to include the laser offset.
- Surface Temperatures: The thermometer will measure the first surface it detects, even a glass cover, dust or fog. Make sure the object is not obstructed.

3. Type - K measuring :

- Under the Infrared measuring mode, press **MODE** 3 seconds to entering into Type - K measuring.
- Under Type - K measuring mode, press **MEAS** to power off the meter.
- Under Type - K measuring mode, the auto power off is 30 minutes.

4. Selecting °C/°F unit

While powering on the meter, the temperature unit that appears in LCD would be the last unit you measured. If user wants to change the temperature unit, press **MEAS** turn on the meter, then press **MODE** 5 seconds enter to SET mode, press **▲** or **▼** to select desired °C/°F unit, press **MEAS** to store the unit.

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VIII. MODE SETTING

Press **MEAS** to power on the meter. Press & hold **MODE** for 5 seconds to enter in the option of the setting mode. While "SET" symbol appears on LCD.

- Parameter settings for Infrared measuring:
Under the infrared parameter setting mode, LCD will show **SET**. Press **MODE** to select setting of "°C/°F", "ALM ON/OFF", "↓ALM" "ALM↑" and emissivity "ε". Press **MEAS** to exit the setting mode and return to the general measurement.
- Parameter settings :
 - "°C/°F" : Temperature unit °C/°F, press **▲** or **▼** to select units °C or °F.
 - ALM : Alarm function ON/OFF ; press **▲** or **▼** to select alarm function on or off.
 - ↓ALM: Lo Alarm Function. Press **▲** or **▼** to set up a value as an alarm value. When this Lo alarm value is exceeded, the beeper will beep and "↓ALM" symbol will appear on LCD.
 - ALM↑: Hi Alarm Function. Press **▲** or **▼** to set up a value as an alarm value. When this Hi alarm value is exceeded, the beeper will beep and "ALM↑" symbol will appear on LCD.
 - ε : Emissivity, user can press **▲** or **▼** to adjust parameter.
 - ▲** : key for increasing the value of Parameters, hold down will increasing the parameter rapidly.
 - ▼** : key for decreasing the value of Parameters, hold down will decrease the parameter rapidly.

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Note:

- After setting procedure is terminated, the parameter will be memorized until next setting.
- Under mode settings, Backlight and Laser light functions will be disabled.
- Press **MEAS** to exit setting mode.

IX. BATTERY REPLACEMENT

- As battery power is not sufficient, LCD will display the symbol **+**. Replace old battery with one new battery type 9V.
- Open battery cover then take out the battery from instrument and replace with a new 9-Volt battery. Put back the battery cover.