



Thermocouple and Infrared Thermometer

code: W081



INFRARED/K-TYPE THERMOMETER

MODEL TES-1322

0.1°C/0.2°F Resolution
Infrared: -20°C~500°C
Thermomouple input "K": -50°C ~ 1370°C
Built-in Laser sighting / Backlight LCD display
Data Memory and Read Capacity 20 sets. (TES-1322A)
Adjustable & Visible Alarm
MAX/MIN Reading



TES-1322

Specifications for TES-1322

Model	TES-1322A	
Function		
Measurement Range	-20°C ~ 500°C (-4°F ~ 932°F)	
Resolution	0.1°C / 0.2°F	
Accuracy	± 2% reading or ± 2°C	
Spectral Response	6 ~ 14μm	
Field of View	8:1 optics ratio with a 1" min target	
Auto power off	approx. 15 sec	
Sighting	Laser marker < 1mW	
Emissivity	Pre-set 0.95	0.10 ~ 1.00
Measurement Rate	2.5 times per second	
Battery life	100 hours	

K-TYPE THERMOMETER SPECIFICATIONS (TES-1322):

□ Measurement Range: -50°C ~ 1370°C (-58°F ~ 2498°F)
□ Resolution: 0.1°C / 1°C, 0.1°F / 1°F

Function		Range	Accuracy
°C		-50°C ~ 0°C	± (0.2%rdg + 1.0°C)
		0°C ~ 200°C	± (0.1%rdg + 0.8°C)
		200°C ~ 1370°C	± (0.2%rdg + 2°C)
°F		-58°F ~ 32°F	± (0.2%rdg + 2°F)
		32°F ~ 392°F	± (0.1%rdg + 1.6°F)
		392°F ~ 2498°F	± (0.2%rdg + 4°F)

□ Power Source: One 9V battery (ANSI/NEDA-1604A, IEC-6LR61)

□ Operating / Storage Condition:

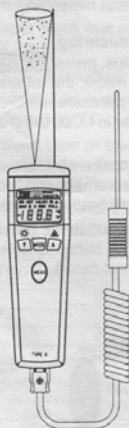
0°C ~ 50°C (32°F ~ 122°F) below 80%RH
-10°C ~ 60°C (14°F ~ 140°F) below 70%RH

□ Dimensions / Weight: 170 x 52 x 38mm / 180g

□ Accessories: Instruction manual, Battery & Carry case.

TES-1322

INSTRUCTION MANUAL



TES ELECTRICAL ELECTRONIC CORP.

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, carry case,
battery.

3-2 Electrical Specifications

□ Infrared

Measuring range : -20°C to 500°C (-4°F to 932°F)

Resolution : 1°C , 1°F

Accuracy : ± 3% reading or ± 3°C or 6°F.

Temperature coefficient : 0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 40°C (32°F to 64°F and 82°F to 104°F).

Responding time : once per second.

Spectral Response : 6 ~ 14um.

Field of view : 8:1 ; optics ratio with a 1" min target.

Emissivity : 0.1 ~ 1.0

Sighting : Laser marker 1mw (class 2).

Sensor : Thermopile.

INTRODUCTION

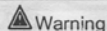
The Infrared Thermometer is digital and with type-K thermocouple input being a dual measurement product.

Although the precised design in it, the hand-held Infrared Thermometer is easy for user to operate, in addition, the backlight illuminative function is helpful to user who is used to measure at the dark place. Moreover, the Infrared Thermometer will show a Laser symbol in LCD as a reminder and its additional auto hold the 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, the surface with electricity current or the objects which are uneasy to be touched.)

1. 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.



If user presses **MEAS** button while the symbol is showing in LCD, then the meter will radiate the laser. At this moment, user has to avoid the laser radiating to your eyes to prevent any hurts.

- If the measured object with smooth surface and will reflect the laser, pls. prevent the reflected laser to radiate your eyes.
- Pls. don't radiate the laser to inflammable gas to avoid dangers.

□ Type K

Measuring range : -50°C to 1333°C (-58°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	-50°C ~ 0°C	± (0.2%rdg + 1.0°C)
	1°C	0°C ~ 200°C	± (0.1%rdg + 0.8°C)
°F	0.1°F	200°C ~ 1333°C	± (0.2%rdg + 2°C)
	0.1°F	-58°F ~ 32°F	± (0.2%rdg + 2°F)
	1°F	32°F ~ 200°F	± (0.1%rdg + 1.6°F)
	1°F	200°F ~ 1999°F	± (0.2%rdg + 3°F)

Temperature Coefficient:

0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 40°C (32°F to 64°F and 82°F to 104°F).

Note :

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

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

- ▲ : Button for increasing the value of Parameters, increasing the parameter rapidly.
- ▼ : Button for decreasing the value of Parameters, decrease the parameter rapidly.

Note:

- After finishing the setting procedure, the parameter will be memorized until next setting.
- Under mode settings, Backlight and Laser light function will be disabled.

IX. BATTERY REPLACEMENT

1. As battery power is not sufficient, LCD will display **BT** replacement with one new battery type 9V is required.
2. Open battery cover, then take out the battery from instrument and replace with a new 9-Volt battery and place the battery cover back.

VII. TEMPERATURE MEASUREMENT

1. Infrared measuring :

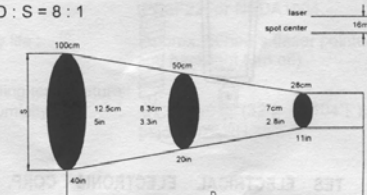
- a). Infrared measuring : Press **MEAS** button to power on the meter and start measuring. Release **MEAS** button to stop measuring and auto hold the reading, the meter will be off automatically after 15 secs.
- b). Under the Infrared measuring mode, press & hold **MEAS** button and press **MODE** button to select MAX measurement & General measuring mode.

2. Continuous infrared measuring

Start with power-off status, press **MODE** and **MEAS** buttons 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.

- a). Under continuous measurement, press **MEAS** button to stop continuous measurement and lock the reading, the meter will be off automatically after 15 secs.
- b). Under continuous measurement, press & hold **MEAS** button and press **MODE** button to select MAX measurement & General measurement.

D : S = 8 : 1



VI. Emissivity Adjustment

1. **Emissivity** : Emissivity is a value between 0 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 a 0.95 before shipment because the objects of 90% that emissivity are around 0.95.

2. 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** button to get measurement as T1.
- Remove the black tape or black mat paint and aim laser at the same area again then press **MEAS** button 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	EMISSION
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

EMISSION VALUES

Typical Emission Values-Metals	
SURFACE	EMISSION
Iron and Steel	
Cast iron (polished)	0.2

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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** button entering into Type - K measuring.
- Under Type - K measuring mode, press **MEAS** button for 3 secs to power off the meter.

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, first of all, user has to power-off the meter, then press & hold **▲** (°C) or **▼** (°F) and press **MEAS** button to power on the meter and get the proper unit.

VIII. MODE SETTING

Press **MEAS** button to power on the meter, then press & hold **MODE** button for 3 seconds entering into the setting mode for option. While flashed "SET" symbol appears in LCD, user should press **▲** **▼** to choose the setting mode for Infrared or Type K measurement.

It is under the parameter settings of infrared measurement if "K" doesn't appear in LCD.

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1. Parameter settings for Infrared measuring:

Under the infrared parameter setting mode, LCD will show **SET** press **MODE** button to select in turn for setting "ε", "ALM↑", "↓ALM", press **MODE** button again to escape the setting mode and return to the general measurement.

Note: In the setting mode, if users don't push any button in 15 seconds, then it will escape from setting mode and enter into Infrared temperature measuring mode.

2. Parameter settings for Type-K measuring:

Under the Type-K parameter setting mode, LCD will show **SET** press **MODE** button to select in turn for setting "ALM↑", "↓ALM", press **MODE** button again to escape the setting mode and return to the general measurement.

Note: In the set mode, if users don't push any button in 15 seconds, then it will escape from setting mode and enter into Type K temperature measuring mode.

ε : Emissivity, users can press **▲** or **▼** button to adjust parameter.

ALM↑: Hi Alarm Function. Press **▲** or **▼** to set up a value as an alarm value, while the measurement exceed it, the beeper will beep and "ALM↑" symbol will appear in LCD.

↓ALM: Lo Alarm Function. Press **▲** or **▼** to set up a value as an alarm value, while the measurement low it, the beeper will beep and "↓ALM" symbol will appear in LCD.

MAX: Display the Maximum reading.

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3. Precautions:

- Do not operate the thermometer near the large electrical or magnetic fields.
- 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 using and storing.
- If the thermometer was at the environment where's temperature changes drastically, it would be fine to start measuring until the thermometer return to the stable status.
- Condensation may form on the focal lens if the thermometer was moved quickly from a cold to a hot environment. Before taking measurements, pls. wait for the condensation to dissipate.
- Do not touch the focal lens.

4. Environment conditions:

- Altitude up to 2000 meters.
- Relatively humidity 80% max.
- Operating Ambient 0 ~ 40°C

5. Maintenance & Clearing:

- Repairs or serving aren't covered in this manual should only be performed by qualified personnel.
- Periodically wipe the case with a dry cloth. Don't use abrasives or solvents on this instrument.
- When serving, use only specified replacement parts.

6. Safety symbols:



Comply with EMC

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II. FEATURES

- °C / °F Selectable
- Back-light LCD display
- Laser targeting
- Emissivity adjustable
- Audible and visible alarm

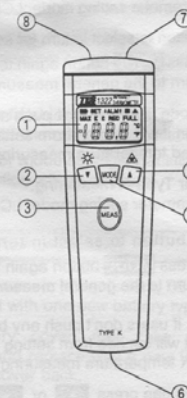
III. SPECIFICATIONS

3-1 General Information

Display :	Backlight LCD Display.
Auto power off :	Approx. 15sec. (Infrared)
Over range indication :	"OL" or "-OL".
Low battery indication :	The BT will be displayed in LCD when the battery voltage drops below the operating voltage.
Power supply :	Single 9V battery 006P 9V or IEC6F22, or NEDA1604.
Battery life :	Approx. 50hours (laser pointer and backlight turn off)
Operating temperature : and humidity	0°C to 40°C (32°F to 104°F), below 80%RH.

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IV. FRONT PANEL DESCRIPTION



1. Display.

2. **MAX** : Backlight button.

3. **MEAS** : Button for powering on.

Press **MEAS** button to turn on the thermometer, the Infrared Thermometer is selected.

4. **▲** **▼** : Laser pointer button.

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5. **MODE** : Measuring mode and mode settings selection.

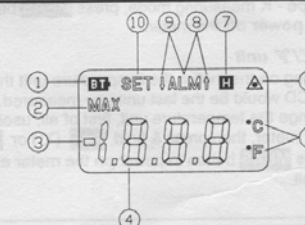
- Press **MODE** button to select measuring mode.(Infrared thermometer ↔ Type K thermometer)
- Press **MODE** button for 3 seconds entering into the mode settings.

6. Type K input connector

7. Laser aperture

8. Focal lens

V. LCD DISPLAY DESCRIPTION



1. Low battery mark.	6. Laser indicator
2. Maximum	7. Hold function
3. Negative polarity	8. Hi Alarm
4. Measure value	9. Lo Alarm
5. Unit °C, °F	10. SET symbols

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