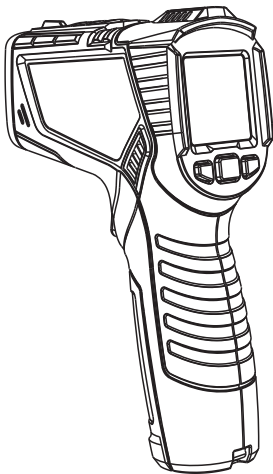


USERS MANUAL

INFRARED THERMOMETERS



Before using the instrument, please read this manual carefully, and save it well for future using.

Statement

In accordance with the international copyright law, without permission and written consent, do not copy the contents of this manual in any form (including storage and retrieval or translation into languages of other countries or regions). The manual is subject to change in future edition without prior notice.

Safety Statement



“Caution” mark refers to the condition and operation which may cause damage to the instrument or equipment.

It requires that you must be careful during the execution of the operation. If incorrectly perform the operation or do not follow the procedure, it may damage the instrument or equipment. In the circumstances that such conditions are not met or not fully understood, please do not continue to perform any operation indicated by the caution mark.



“Warning” mark indicates the condition and operation which may cause danger to users.

It requires that you must pay attention during the execution of this operation. If incorrectly perform the operation or do not follow the procedure, it may result in personal injury or casualties. In the circumstances that such conditions are not met or not fully understood, please do not continue to perform any operation indicated by the warning mark.

Introduction

The infrared thermometer is suitable for non-contact temperature measurement. The thermometer determines the surface temperature of the object by measuring the infrared energy of the radiation from the surface of the object.

Safety Operation Specifications

WARNING

To prevent eye injury or personal injury :

- Please read the manual carefully before using the product.
- Please do not look at the laser directly. Do not direct laser direct to humans or animals or indirectly from the reflecting surface.
- If the instrument works abnormally, do not use.
- Do not use optical tools (such as binocular, telescope, microscope, etc.) to look directly at the laser. Optical tools may focus on lasers, thereby damaging the eyes.
- Replace battery when indication of battery power is insufficient, so as to prevent measurement error.
- Do not use products in the environment of explosive gas, water vapor or dust.
- For actual temperature, please refer to the emissivity information. Reflective objects will cause the measured

temperature to be lower than the actual temperature. These objects are dangerous to burn.

- Do not put the thermometer near or put it on a high temperature object
- Please be sure to use the meter according to the regulations, otherwise the protection function provided by the product may be weakened.
- Do not use a solvent cleaning thermometer

Caution

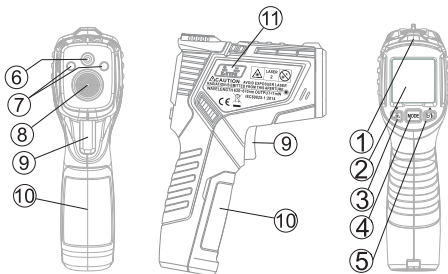
To avoid damaging the thermometer or the tested equipment, please protect it from the following effects :

- Electromagnetic field and static electricity of arc welding machine, induction heater and other equipment.
- Thermal shock (when a sudden change in ambient temperature occurs, the thermometer must be placed in the environment for 30 minutes to stabilize the thermometer).
- Do not put the thermometer near or put it on a high temperature object.
- Keep the thermometer clean and avoid dust entering the barrel.

Symbolic description

	Laser, warning
	Warning, important safety mark
°C	Centigrade
°F	Fahrenheit degree
	Ambient temperature
	Humidity
	Dew point temperature
	Non-contact temperature
	Low battery
CE	Product complies with all relevant European laws
	The additional product label shows that do not discard this electrical/electronic product into household garbage.

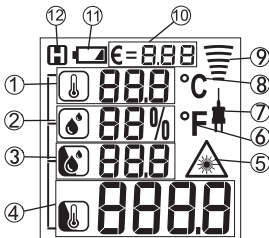
Component description



- ① Alarm indicator
- ② LCD display
- ③ Laser key / digital adjusting control key decreases ▼
- ④ Mode key
- ⑤ °C/°F (UV light control) / digital regulation increase key ▲
- ⑥ Laser
- ⑦ UV lights
- ⑧ Infrared sensor induction zone
- ⑨ Measure Trigger Switch

- ⑩ Battery cover
- ⑪ Thermocouple socket

LCD description



- ① Ambient temperature
- ② Relative humidity
- ③ Dew point temperature
- ④ Non-contact temperature
- ⑤ Laser on indicator
- ⑥ Fahrenheit unit
- ⑦ Thermocouple
- ⑧ Celsius unit
- ⑨ Measuring indicator

- ⑩ Emittance display
- ⑪ Low battery indicator
- ⑫ Data hold indicator

Setting

Emittance **setting**:

- ① Press the  key and hold it for more than 2 seconds. The instrument goes into the setting state, as shown in the right figure.



- ② At this time, the instrument emittance display area flickers
- ③ Press the ▲/▼ key to increase or decrease the setting value, and long press to quickly increase or decrease the setting value.
- ④ After setting, press the  key and hold it for more than 2 seconds or press the trigger switch to exit the setting state, or press the  key (< 1 second) to the next setting.

Alarm upper limit **setting**:

- ① Press the  key and hold it for more than 2 seconds. The instrument goes into the setting state

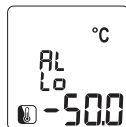
- ② Press the  key (< 1 second) to switch to the alarm upper limit setting state and the instrument displays the "HI" character. And display the current alarm upper limit value, such as the right figure



- ③ Press the  key to increase or decrease the setting value, and long press to quickly increase or decrease the setting value.
- ④ After setting, press the  key and hold it for more than 2 seconds or press the trigger switch to exit the setting state, or press the  key (< 1 second) to the next setting.

Alarm Lower Limit Setting:

- ① Press the  key and hold it for more than 2 seconds. The instrument goes into the setting state
- ② Press the  key (< 1 second) to switch to the alarm lower limit setting state and the instrument displays the "Lo" character. And display the current alarm lower limit value, such as the

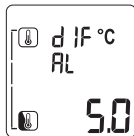


right figure.

- ③ Press the ▲/▼ key to increase or decrease the setting value, and long press to quickly increase or decrease the setting value.
- ④ After setting, press the  key and hold it for more than 2 seconds or press the trigger switch to exit the setting state, or press the  key (< 1 second) to the next setting.

Temperature difference alarm value setting between infrared temperature and ambient temperature:

- ① Press the  key and hold it for more than 2 seconds. The instrument goes into the setting state
- ② Press  key (< 1 second) to switch to the temperature difference alarm value setting state of infrared temperature and ambient temperature, the



instrument displays "  " logo and

displays the temperature difference alarm value, as shown in the figure on the right

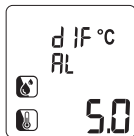
- ③ Press the ▲/▼ key to increase or decrease the setting value,

and long press to quickly increase or decrease the setting value.

- ④ After setting, press the  key and hold it for more than 2 seconds or press the trigger switch to exit the setting state, or press the  key (< 1 second) to the next setting.

Temperature difference alarm value setting between infrared temperature and dew point temperature:

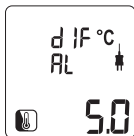
- ① Press the  key and hold it for more than 2 seconds. The instrument goes into the setting state
- ② Press  key (< 1 second) to switch to the temperature difference alarm value setting state of infrared temperature and dew point temperature, the instrument displays "  " logo and displays the temperature difference alarm value, as shown in the figure on the right
- ③ Press the ▲/▼key to increase or decrease the setting value, and long press to quickly increase or decrease the setting value.



- ④ After setting, press the  key and hold it for more than 2 seconds or press the trigger switch to exit the setting state, or press the  key (< 1 second) to the next setting.

Temperature difference alarm value setting between infrared temperature and thermocouple temperature:

- ① Press the  key and hold it for more than 2 seconds. The instrument goes into the setting state
- ② Press  key (< 1 second) to switch to the temperature difference alarm value setting state of infrared temperature and thermocouple temperature, the



instrument displays "  " logo and displays the temperature difference alarm value, as shown in the figure on the right

- ③ Press the ▲/▼ key to increase or decrease the setting value, and long press to quickly increase or decrease the setting value.
- ④ After setting, press the  key and hold it for more than 2 seconds or press the trigger switch to exit the setting state, or

press the  key (< 1 second) to the next setting.

Measurement operation

Turn on or off lasers

Press the  key (< 1 second) to turn on or off the laser.

When the laser is turned on, the display screen will show "▲".

Turn on or off UV lights:

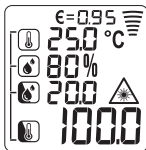
Press the C/F key (>2 seconds) to turn on or off the ultraviolet lamp for fluorescence leak detection.

Temperature unit shift:

Press the C/F key (< 1 second) to switch temperature units.

The 1st measurement function (without thermocouple):

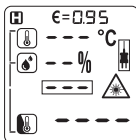
- ① Turn on the power to enter the first function measurement (without thermocouple), this function includes ambient temperature humidity, dew point temperature, infrared temperature, as shown on the right.



- ② Press and hold the trigger switch to start measurement, release the trigger to stop measurement.
- ③ press the  key (< 1 second) to enter the next measurement function.

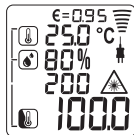
The 1st measurement function (with thermocouple):

- ① Turn on the power on into the first function measurement (with thermocouple), then the thermocouple symbol and thermocouple temperature display area will flash 3 times to indicate



that the thermocouple probe has been inserted. This function includes ambient temperature humidity, thermocouple temperature, infrared temperature, as shown in the figure on the right.

- ② Press and hold the trigger switch to start measurement, release the trigger to stop measurement, as shown on the right.



- ③ Press the  key (< 1 second) to enter the next measurement function.

The 2nd measurement function: upper and lower limit alarm measurement

- ① After power on, press the  key (< 1 second) to switch to the upper and lower limit alarm measurement, this measurement function only measures infrared temperature
- ② Press and hold the trigger switch to start measurement, release the trigger to stop measurement.
- ③ When the infrared temperature is higher than the upper limit alarm value, the indicator lights up red alarm and beeping alarm, displaying the following figure 2; when the infrared temperature is lower than the lower limit alarm value, the indicator lights up red alarm and beeping alarm, displaying the following figure 3; otherwise, it lights up green, displaying the following figure 1.
- ④ Press the  key (< 1 second) to enter the next measurement function.

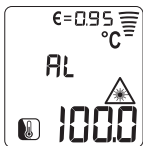


Figure 1



Figure 2



Figure 3

The 3rd measurement function: difference alarm measurement between infrared temperature and ambient temperature

- ① After startup, press the  key (< 1 second) to switch to difference alarm measurement between infrared temperature and ambient temperature, this measurement function includes ambient temperature and infrared temperature measurement.
- ② Press the trigger switch to start the measurement, and release the trigger to stop the measurement.
- ③ When the infrared temperature is higher than the ambient temperature and the temperature difference exceeds the alarm value, the alarm indicator lights red and buzzes alarm, showing as figure A below; When the infrared temperature is

lower than the ambient temperature and the temperature difference exceeds the alarm value, the alarm indicator lights up red and buzzes alarm, as shown in Figure B below. Otherwise, the alarm indicator is green.

- ④ Press the  key (< 1 second) to enter the next measurement function.

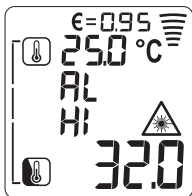


Figure a

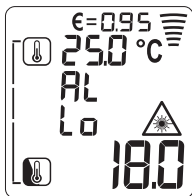


Figure b

The 4th measurement function: difference alarm measurement between infrared temperature and dew point temperature

- ① After startup, press the  key (< 1 second) to switch to difference alarm measurement between infrared temperature and dew point temperature, this measurement function

includes dew point temperature and infrared temperature measurement.

- ② Press the trigger switch to start the measurement, and release the trigger to stop the measurement.
- ③ When the surface temperature of the measured object is higher than the dew point temperature and the temperature difference exceeds the alarm value, the alarm indicator lights up red, buzzes alarm, and "HI" sign appears, as shown in Figure a; When the surface temperature of the measured object is lower than the dew point temperature and the temperature difference exceeds the alarm value, the alarm indicator lights up red and buzzes to alarm, with "Lo" logo appearing, as shown in Figure b. Otherwise, the alarm indicator is green.
- ④ Press the  key (< 1 second) to enter the next measurement function.

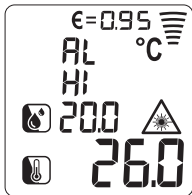


Figure a

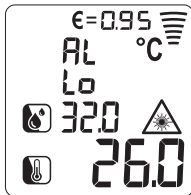


Figure b

The 5th measurement function: difference alarm measurement between temperature and thermocouple temperature

- ① After startup, press the  key (< 1 second) to switch to difference alarm measurement between infrared temperature and thermocouple temperature , this measurement function includes thermocouple temperature and infrared temperature measurement.
- ② Press the trigger switch to start the measurement, release the trigger to stop the measurement.
- ③ When the surface temperature of the measured object is higher than the thermocouple temperature and the

temperature difference exceeds the alarm value, the alarm indicator light is red, buzzer alarm, showing as shown in figure A below; When the surface temperature of the measured object is lower than the dew point temperature and the temperature difference exceeds the alarm value, the alarm indicator lights up red and buzzes alarm, as shown below b; Otherwise, the alarm indicator is green.

- ④ Press the  key (< 1 second) to enter the next measurement function

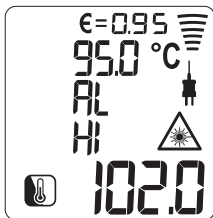


Figure a

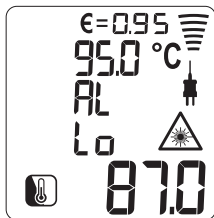
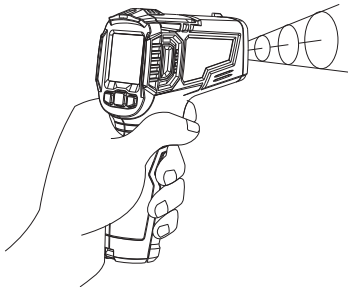


Figure b

Operation notice

Aiming the thermometer at the object under test and pulling the trigger, laser indicator can be used to help the thermometer

aiming and continuous temperature measurement. When the trigger is released, the measurement results are maintained.



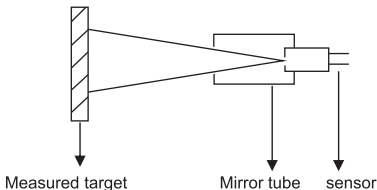
Note:

- Attention should be paid to distance and spot diameter ratio and field of view (see target distance ratio).
- Laser is used only for aim and is independent of temperature measurement.
- When the ambient temperature changes abruptly, the thermometer should be placed in the environment for 30 minutes in order to make the thermometer reach a stable state.
- After 30 seconds without any operation, the thermometer will be turned off automatically. If you need to start a thermometer,

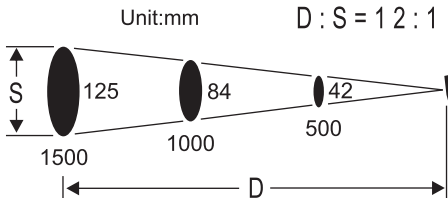
pull the trigger

Target distance ratio (D:S ratio)

The thermometer has a certain angle of view and field of view, as shown in the following figure.



Make sure the object under test is full of the field of view of the thermometer, that is, let the thermometer "see" only the object under test and "not see" other objects. The larger the object is, the farther the distance can be measured; the smaller the object, the closer the distance must be. The ratio of the measured distance to the measured target size is D:S ratio of 12: 1, as shown in the following figure:



Infrared radiation rate of object

The radiant rate represents the ability of an object to radiate infrared radiation. The greater the radiation rate, the stronger the radiation ability of the object surface. The emissivity of most organic or metal oxide surfaces is between 0.85~0.98. The emissivity of the thermometer is 0.95. The emissivity of the instrument should be consistent with the emissivity of the measured object when measuring. Attention should be paid to the effect of radiation on measurement results.

Reference table of Infrared radiation

Measured surface	radiation
------------------	-----------

Aluminum	Oxidized	0.2~0.4
	A3003 alloy (oxidized)	0.3
	A3003 alloy (coarse)	0.1~0.3
Brass	Polishing	0.3
	Oxidized	0.5
Copper	Oxidized	0.4~0.8
	Electrical terminal board	0.6
Hastelloy		0.3~0.8
Ferro-nickel	Oxidized	0.7~0.95
	Abrasive blasting	0.3~0.6
	Electropolishing	0.15
Iron	Oxidized	0.5~0.9
	Rust	0.5~0.7
Iron (casting)	Oxidized	0.6~0.95
	Unoxidized	0.2
	Fusion cast	0.2~0.3
Iron (casting) passivation		0.9
Lead	Coarse	0.4
	Oxidized	0.2~0.6
Molybdenum oxidation		0.2~0.6
Nickel oxidation		0.2~0.5
Platinum black		0.9

Steel	Cold rolling	0.7~0.9
	Grinding steel plate	0.4~0.6
	Polished steel plate	0.1
Zinc	Oxidized	0.1
Asbestos		0.95
Asphalt		0.95
Basalt		0.7
Carbon (unoxidized)		0.8~0.9
Graphite		0.7~0.8
Silicon carbide		0.9
Ceramics		0.95
Clay		0.95
Concrete		0.95
Cloth		0.95
Glass plate		0.85
Gravel		0.95
Plaster		0.8~0.95
Ice		0.98
Limestone		0.98
Paper		0.95
Plastics		0.95
Soil		0.9~0.98

Water	0.93
Timber	0.9~0.95

Technical Specifications

Display	Color LCD display
D:S	12: 1
Emittance	0.10~1.00
Response spectrum	8~14um
Laser	<1mW /630-670nm Level 2
Response time	<0.5S
Auto power off	30 seconds
Work temperature	0°C ~40°C
Storage temperature	-10°C ~60°C
Power supply	1 x 9V 6F22 battery
Non-contact temperature	Range: -50°C~800°C (-58°F~1472°F) Accuracy: -50°C~0°C (-58°F~32°F): ±3°C 0°C~800°C (32°F~1472°F): ±2.0% or ±2°C
ambient temperature	Range: -10°C ~ 60°C(14°F~140°F) Accuracy: 0°C ~ 40°C(32°F ~113°F) ±1.0°C/2°F Others: ±1.5°C/3°F
Dew point temperature	Range: -10 ~50°C (14~122°F) Accuracy: ±1.5°C/3°F

Ambient humidity	Range: 0% ~100%RH Accuracy: 20%~ 80%: $\pm 4.0\%$ RH Others: $\pm 5.0\%$ RH
K-type thermocouple	Range: $-50^{\circ}\text{C} \sim 500^{\circ}\text{C}$ ($-58^{\circ}\text{F} \sim 932^{\circ}\text{F}$) Accuracy: $\pm 2^{\circ}\text{C}$

Maintain

Replace the battery



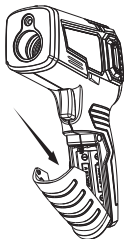
Batteries contain dangerous chemicals that may cause burns or explosions. If you are exposed to chemicals, wash or seek medical advice with water. To prevent injury and ensure safety work and maintenance.:

- Do not disassemble the battery.
- If battery leakage occurs, please repair it and use it first.
- If the meter is not used for a long time, please remove the battery to prevent the battery from leaking and damage the instrument.
- Please make sure that the battery is correct in order to prevent

the battery leakage.

- Do not connect the battery terminals together. Do not disconnect or squeeze the battery.
- Do not store batteries in containers that may cause short circuit terminals.
- Do not place the battery near the heat source or the fire source. Do not shine under the sun.

When the battery power is insufficient, the meter displays the "☐" symbol and the battery must be replaced at this time. Open the battery cover with your hands, replace the new battery with the same specifications, and then close the battery cover tightly. As shown.



Clean lens tube

Use clean air to remove dust particles from the lens barrel. Carefully wipe the surface with a cotton swab dipped in water.

Surface Clean

Wet the sponge or soft cloth with soap and water. Do not use abrasives or solvents.

 CAUTION

To avoid damaging the thermometer, do not immerse it in water. Do not use corrosive cleaners, otherwise they will damage the shell.

EN19651DV10

