

User Manual


Thank you for purchasing our KAPRO 398 Thermoscan™. This tool used for non-contact measurement of solid or liquid objects surface temperature.

NOTE:
Please carefully read this user manual before you use this product for first time.
Keep this user manual for future reference.
Always operate the device according to the instructions of this manual.

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FEATURES

- Switchable dual laser targeting
- Backlit LCD
- Measurement range: -50°C to 650°C / -58°F to 1202°F
- Accuracy: ± 2.5°C (± 4.5°F) at -2°C to 94°C / 28°F to 200°F
- Resolution 0.1°
- 12:1 field of view
- EMS function – emissivity adjustable from 0.1 to 1.0
- MAX / MIN / DIF / AVG – function to display maximal, minimal, Difference or average value
- HAL / LAL - function to set MIN / MAX warning
- LOG – memory function
- Temperature measurement in °C or °F
- Automatic Power-Off in 7 seconds without operation.
- Operating voltage: 9V (one 9V battery).
- Low battery indication
- Operating temperature: 0 - 40°C
- Operating Humidity < 85%RH

Get to know the instrument and set it up for measurement: KAPRO 398 Thermoscan™ measures the amount of infrared radiation emitted by the object and displays the temperature reading based on preset emissivity value – see the emissivity values table of common materials in this manual.

The emissivity of the object depends on the material it is made of and on its surface finish. Glossy, highly reflective surface or transparency of the object may distort the measurement result, as well as contamination of the surface – rust, frost, dirt, oil etc. - and the space between the object and the thermometer – as dust, steam, smog etc.

For most accurate result, keep the object clean; if possible, cover glossy or transparent object with matt adhesive tape or black paint.

The emissivity value of different objects ranges from 0.1 to 1, as the range of emissivity adjustment of this thermometer. Refer to below table of emissivity values to set up the device. The emissivity of most organic materials and painted surfaces is around 0.95, if the emissivity of the object is not known, set the emissivity on $\epsilon = 0.95$.

Emissivity values of common materials:

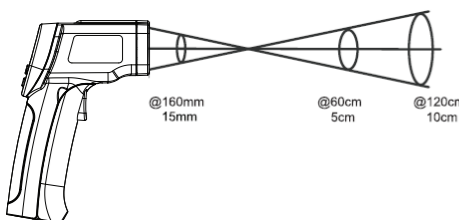
Material under test	Emissivity	Material under test	Emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Skin (human)	0.98
Cement	0.96	Leather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Soil	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.92 to 0.96	Lacquer (matt)	0.97
Ice	0.96 to 0.98	Rubber (black)	0.94
Snow	0.83	Plastic	0.85 to 0.95
Glass	0.90 to 0.95	Timber	0.90
Ceramic	0.90 to 0.94	Paper	0.70 to 0.94
Marble	0.94	Chromium Oxides	0.81
Plaster	0.80 to 0.90	Copper Oxides	0.78
Mortar	0.89 to 0.91	Iron Oxides	0.78 to 0.82
Brick	0.93 to 0.96	Textiles	0.90

The thermometer can compensate the deviation caused by the environment temperature; in case of large deviation the process of self-adjustment may last for up to 30 minutes.

Distance coefficient ratio of this device is 12:1, meaning the field of view diameter is 12 times less than the distance to the measured object. For example, if the measured surface is 72 cm far from the instrument, the portion of the surface that participates in the measurement is 6 cm in diameter.

To achieve the accurate result, the measured object must be larger than the field of view, otherwise the other sources of the infrared radiation will interfere with the measurement and distort the result.

This device marks its field of view by switchable dual laser pointer, as on below picture:


SAFETY INSTRUCTIONS
WARNING

This product is emitting radiation that is classified As class II according to EN 60825 -1

The laser radiation can cause serious eye injury

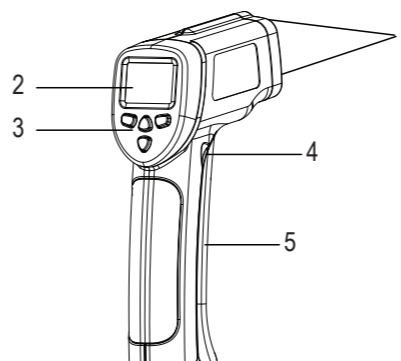
- Do not stare into the laser beam
- Do not position the laser beam so that it unintentionally blinds you or others.
- Do not operate the laser level near children or let children operate the laser level.
- Do not look into a laser beam using magnifying optical devices such as binoculars or a telescope, as this will increase the level of eye injury.

WARNING: This product contains lead in solder and certain Electrical parts contain chemicals which are known to the State of California to cause cancer, birth defects or other Reproductive harm.
(California Health & Safety Code Section 25249.6- Proposition 65)

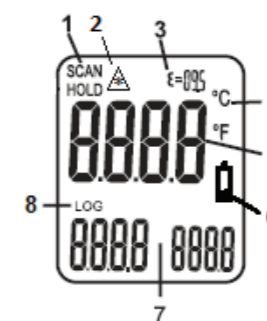
- Do not remove or deface warning labels.
- Do not disassemble the product; laser radiation can cause serious eye injury.
- Do not drop the unit.
- Do not use solvents to clean the unit.
- Do not use in temperatures below 0°C or above 50°C (32°F to 122°F)
- Do not operate the laser in explosive atmospheres such as flammable liquids, gases or dust. Laser sparks may cause ignition.
- To prevent batteries leaking and corrosion damage to the tool. Remove the batteries from the battery compartment, if you are not planning to use the device for a long period of time.

OVERVIEW

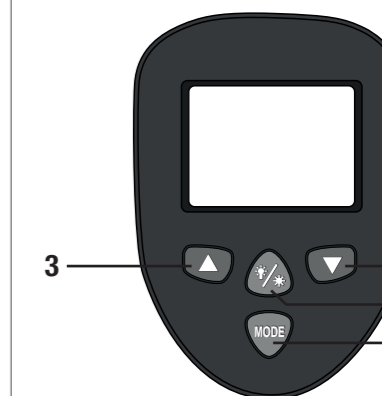
1. Dual laser targeting
2. Backlit LCD
3. Keypad
4. Trigger
5. Battery cover


LCD screen:

1. SCAN / HOLD indication
2. Laser targeting indication
3. Emissivity value
4. Measurement units °C or °F
5. Measured temperature
6. Low battery indicator
7. Function's zone
8. Memory function indicator


KEYPAD

1. MODE - function selector key
2. LASER / BACKLIT key
3. UP and DOWN arrows


OPERATING INSTRUCTIONS

Temperature Measurement:

1. Point the device toward the measurement's object and pull the trigger.
2. Measured temperature value will appear on the LCD followed by the measurement unit - °C or °F, you may scan the surface by moving the laser pointers without releasing the trigger, SCAN indicator will appear on the LCD during the measurement session.
3. After releasing the trigger, the measurement session ends, last measurement will remain on the LCD, HOLD indicator will appear instead of SCAN. After 7 seconds without operation the device will automatically turn off.
If measured temperature beyond the working range of the device, "----" reading will appear on LCD.

Backlit and laser targeting set up:

1. Pull and release the trigger.
2. While HOLD indicator is on, repeatedly push the LASER / BACKLIT key to choose the required configuration.
The LASER / BACKLIT key operating by cycle:
Backlit off, laser off => backlite on, laser off => Backlit off, laser on => backlite on, laser on => Backlit off, laser off. If configuration with laser targeting on is chosen, the laser targeting indicator will appear on LCD. Chosen configuration will remain active until next change.

Measurement unit set up:

1. Pull and release the trigger.

2. While HOLD indicator is on, push and hold the MODE key for 2 seconds to change the measurement unit between °C and °F.
Functions operation:

1. Pull and release the trigger. Function indicator appears on the LCD at the bottom.
2. Push the MODE key repeatedly to choose the required function by cycle: EMS => MAX => MIN => DIF => AVG => HAL => LAL => LOG => EMS...

Operate each function according to below manual:

EMS – Emissivity set up

While EMS indicator appears on LCD, you may change the emissivity value between 0.1 and 1.0 with 0.01 steps by pushing arrow keys. The emissivity value appears on the LCD at the top. MAX -

While MAX indicator appears on LCD, the value displayed on the right of it representing the highest temperature measured during the current measuring session.

MIN -

While MIN indicator appears on LCD, the value displayed on the right of it representing the lowest temperature measured during the current measuring session.

DIF -

While DIF indicator appears on LCD, the value displayed on the right of it representing the modulo of the largest difference between the temperature measured at the start of the current measuring session and subsequent measured temperatures.

AVD -

While AVD indicator appears on LCD, the value displayed on the right of it representing the average value of all temperatures measured during the current measuring session.

HAL – High Alarm Point

LAL – Low Alarm Point

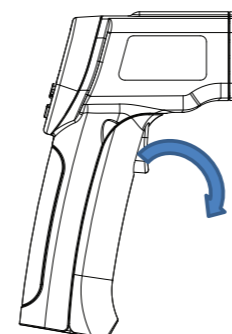
While HAL / LAL indicator appears on LCD, the value displayed on the right of it representing the preset alarm point temperature – if during the measurement session the measured temperature will rise above the high alarm point or drop below the low alarm point, audible alarm signal (beeping) will appear and continue until the measured temperature will return to the interval between HAL and LAL, if by mistake the LAL temperature will be set above the HAL value, the alarm signal will appear all the time. Each alarm point may be set by pushing the arrow keys.

LOG – memory function

While LOG indicator appears, on the right of it appears the number of memory cell – between 01 and 20. Each memory cell administrated independently, you may move between cells by pushing the arrow keys, push on LASER / BACKLIT key will replace the stored value with the current measured temperature, next push on LASER / BACKLIT key will clean the cell.

BATTERY REPLACEMENT

The device utilizes one standard 9V battery for power supply. To replace the battery, open the battery compartment lid placed on the handle near the trigger and connect the new battery to the terminal. When pushing the battery to its place in the handle, make sure that the terminal wire is not stuck between the handle and the battery – this will ensure the proper closure of the battery compartment lid.


SPECIFICATIONS

Range	-50 to 650°C	
	-58 to 1202°F	
Resolution	0,1° < 1000°, 1° > 1000°	
Accuracy	-50°C to -23°C (-58°F to -10°F)	±7°C/14°F (Typical)
	-23°C to -2°C (-10°F to 28°F)	±4°C/8°F
	-2°C to 94°C (28°F to 200°F)	±2.5°C/4.5°F
	94°C to 204°C (200°F to 400°F)	±(1,0%rdg + 1°C/2°F)
	204°C to 426°C (400°F to 800°F)	±(1,5%rdg + 1°C/ 2°F)
	426°C to 1050°C (800°F to 1922°F) ±(3%rdg +1°C/2°F)	
	Note: Accuracy is specified for the following ambient temperature range: 23 to 25°C (73 to 77°F)	
Emissivity	0.10 to 1.00 adjustable	
Field of View	D/S = Approx. 12:1 ratio (D = distance; S = spot or target)	
Laser pointer	Dual, Class 2 laser < 1mW power; Wavelength is 630 to 670nm	
IR Spectral response	8 to 14 µm (wavelength)	
Repeatability	± 0.5% of reading or ± 1°C (1.8°F) whichever is greater	

Response time	150ms
Over range indication	----
Operating Temperature	0°C to 50°C (32°F to 122°F)
Operating Humidity	10% to 90%RH operating, <80%RH storage.
Storage Temperature	-10 to 60°C (14 to 140°F)
Power Supply	9V battery
Automatic Power Off	7 seconds, with LOCK to disable
Weight	150g
Dimensions	180 x 107 x 40mm

WARRANTY

This product is covered by a two-year limited warranty against defects in materials and workmanship. The warranty does not cover products that are used improperly, altered or repaired without Kapro Tool's approval. In the event of a problem with the laser level, please return the product to the place of purchase with proof of purchase.

Model #398

CE CONFORMITY CERTIFICATE

This product meets the standards of the Electromagnetic Compatibility (EMC) established by the European Directive 2014/30/EU and the Low Voltage Directive (LVD) 2014/35/EU

EC DECLARATION OF CONFORMITY

We declare under our responsibility that the product 398 is in accordance with the requirements of the Community Directives and Regulations:

2014/30/EU
 2011/65/EU
 EN60825-1: 2014
 EN61326-1: 2013