

EN

ORIGINAL INSTRUCTIONS
PYROMETER



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Notes regarding the instructions

Symbols



Warning of electrical voltage

This symbol indicates dangers to the life and health of persons due to electrical voltage.



Warning of laser radiation

This symbol indicates dangers to the health of persons due to laser radiation.



Warning

This signal word indicates a hazard with an average risk level which, if not avoided, can result in serious injury or death.



Caution

This signal word indicates a hazard with a low risk level which, if not avoided, can result in minor or moderate injury.

Note

This signal word indicates important information (e.g. material damage), but does not indicate hazards.



Info

Information marked with this symbol helps you to carry out your tasks quickly and safely.



Follow the manual

Information marked with this symbol indicates that the instructions must be observed.

Safety

Read this manual carefully before starting or using the device. Always store the manual in the immediate vicinity of the device or its site of use.



Warning

Read all safety warnings and all instructions.

Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference.

- Do not use the device in potentially explosive rooms or areas and do not install it there.
- Do not use the device in aggressive atmosphere.
- Do not immerse the device in water. Do not allow liquids to penetrate into the device.
- The device may only be used in dry surroundings and must not be used in the rain or at a relative humidity exceeding the operating conditions.
- Protect the device from permanent direct sunlight.
- Do not expose the device to strong vibrations.
- Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.
- Do not open the device.
- Avoid looking directly into the laser beam.
- Never point the laser beam at people or animals.
- Never charge batteries that cannot be recharged.
- Different types of batteries and new and used batteries must not be used together.
- Insert the batteries into the battery compartment according to the correct polarity.
- Remove discharged batteries from the device. Batteries contain materials hazardous to the environment. Dispose of the batteries according to the national regulations.
- Remove the batteries from the device if you will not be using the device for a longer period of time.

- Never short-circuit the supply terminal in the battery compartment!
- Do not swallow batteries! If a battery is swallowed, it can cause severe internal burns within 2 hours! These burns can lead to death!
- If you think batteries might have been swallowed or otherwise entered the body, seek medical attention immediately!
- Keep new and used batteries and an open battery compartment away from children.
- Observe the storage and operating conditions (see Technical data).

Intended use

This device is exclusively intended for measuring temperature by means of an infrared sensor in the measuring range specified in the technical data. People who use this device must have read and understood the operating manual, especially the Safety chapter.

To use the device for its intended use, only use accessories and spare parts which have been approved by Trotec.

Foreseeable misuse

The device must not be pointed at people. Do not use the device in potentially explosive atmospheres, for measurements in liquids or at live parts. Trotec accepts no liability for damages resulting from improper use. In such a case, any warranty claims will be voided. Any unauthorised modifications, alterations or structural changes to the device are forbidden.

Personnel qualifications

People who use this device must:


- be aware of the dangers that occur when working with laser measuring devices.
- have read and understood the instructions, especially the Safety chapter.

Safety signs and labels on the device

Note

Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.

The following safety signs and labels are attached to the device:

Warning sign	
Meaning	<p>The warning sign is located on the back of the device and indicates that the device is equipped with a class 2 laser.</p> <p>The power is less than 1.0 mW. The frequency range of the laser is 630 to 670 nm.</p> <p>Do not look directly into the laser beam or the opening from which the laser beam emerges!</p>

Residual risks



Warning of electrical voltage

There is a risk of a short-circuit due to liquids penetrating the housing!

Do not immerse the device and the accessories in water. Make sure that no water or other liquids can enter the housing.



Warning of electrical voltage

Work on the electrical components must only be carried out by an authorised specialist company!



Warning of laser radiation

Laser class 2, P max.: < 1 mW, λ: 400-700 nm, EN 60825-1:2014

Do not look directly into the laser beam or the opening from which it emerges.

Never point the laser beam at people, animals or reflective surfaces. Even brief eye contact can lead to eye damage.

Examining the laser output aperture by use of optical instruments (e.g. magnifying glass, magnifiers and the like) entails the risk of eye damage.

When working with a laser of class 2, observe the national regulations on wearing eye protection.



Warning

Risk of suffocation!

Do not leave the packaging lying around. Children may use it as a dangerous toy.



Warning

The device is not a toy and does not belong in the hands of children.



Warning

Dangers can occur at the device when it is used by untrained people in an unprofessional or improper way! Observe the personnel qualifications!



Caution

Keep a sufficient distance from heat sources.

Note

To prevent damages to the device, do not expose it to extreme temperatures, extreme humidity or moisture.

Note

Do not use abrasive cleaners or solvents to clean the device.

Information about the device

Device description

The pyrometer BP17 uses an infrared sensor to measure surface temperatures without contact. An integrated laser pointer serves for the determination of the measuring spot. For temperature measurements sensitivity levels of 1 °C, 3 °C and 5 °C can be preselected – depending on a reference temperature. Exceeding or falling below this preselected threshold is indicated by an acoustic and visual alarm function. The display is automatically illuminated during a measurement. An automatic switch-off saves the battery.

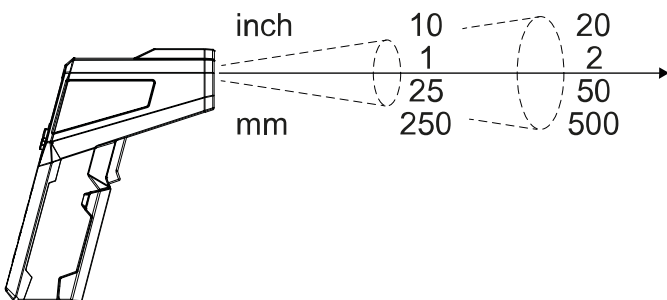
Measurement principle

The device measures the temperature by means of an infrared sensor. Important factors playing a role in the temperature measurement are the measuring spot diameter and the degree of emission.

Measuring spot

Observe the ratio of the distance to the measuring spot diameter. The larger the distance to the object, the larger the measuring spot diameter and hence, the less precise the measured result. The connectable laser pointer indicates the approximate measuring spot centre. Consequently, it is a mere aiming aid and not intended for the actual temperature measurement.

Distance : Spot = 10 : 1



Degree of emission

The degree of emission is used to describe the energy radiation characteristics of a material.

Most organic materials have an emissivity of 0.95. Metals or shiny materials come with a much lower value.

A material's emissivity depends on various factors, e.g. on

- Material composition
- Surface condition
- Temperature

The emissivity can range between 0.1 and 1 (in theory).

The following rule of thumb can be assumed:

- When a material is rather dark and its surface texture matt, it probably has a high emissivity.
- The brighter and smoother the surface of a material, the lower will be its emissivity, presumably.
- The higher the degree of emission of the surface to be measured, the better it is suited for non-contact temperature measurement by use of a pyrometer or thermal imaging camera, since falsifying temperature reflections become negligible.

Emissivity table

The following table supplies reference values for the degree of emission of common materials and merely serves for orientation purposes. The degree of emission is fixed to 0.95 on the measuring device.

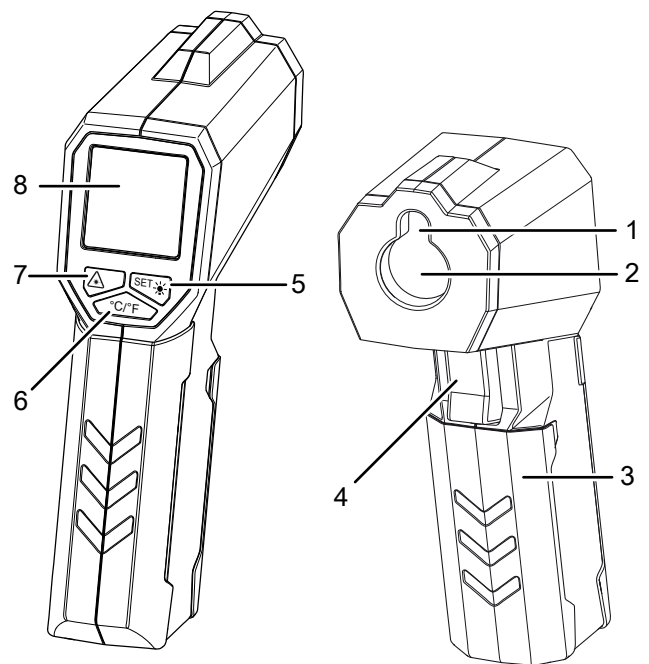
Material	Degree of emission
Aluminium, roughened	0.1 to 0.3
Aluminium, alloy A3003, oxidized	0.3
Aluminium, oxidized	0.2 to 0.4
Asbestos	0.92 to 0.95
Tarmac	0.92 to 0.95
Basalt	0.7
Concrete	0.92 to 0.95
Bitumen	0.98 to 1.00
Lead, oxidized	0.2 to 0.6
Lead, rough	0.4
Roofing felt	0.95
Ice	0.98
Iron (forged), blunt	0.9
Iron, oxidized	0.5 to 0.9
Iron, rusted	0.5 to 0.7
Enamel varnish, black	0.95
Earth	0.92 to 0.96
Paint (not alkaline)	0.90 to 0.95
Paint (non-metal)	0.95

Material	Degree of emission
Gypsum	0.60 to 0.95
Glass, pane	0.85 to 0.95
Rubber	0.92 to 0.95
Cast iron, molten	0.2 to 0.3
Cast iron, not oxidized	0.2
Skin	0.98
Haynes alloy	0.3 to 0.8
Radiator enamel	0.95
Timber (natural)	0.90 to 0.95
Inconel, electro-polished	0.15
Inconel, oxidized	0.70 to 0.95
Inconel, sand-blasted	0.3 to 0.6
Limestone	0.95 to 0.98
Carborundum	0.9
Ceramics	0.88 to 0.95
Gravel	0.95
Carbon, graphite	0.70 to 0.85
Carbon, not oxidized	0.8 to 0.9
Plastic, non-transparent	0.95
Copper, oxidized	0.4 to 0.8
Varnish	0.80 to 0.95
Marble	0.90 to 0.95
Brass, highly polished	0.3
Brass, oxidized	0.5
Molybdenum, oxidized	0.2 to 0.6
Nickel, oxidized	0.2 to 0.5
Paper (any colour)	0.9
Plastic	0.85 to 0.95
Plaster	0.90 to 0.95
Sand	0.9
Snow	0.9
Steel, heavy plate	0.4 to 0.6
Steel, cold-rolled	0.7 to 0.9
Steel, oxidized	0.7 to 0.9
Steel, polished sheet metal	0.1
Steel, stainless	0.1 to 0.8
Cloth	0.95
Wallpaper (non-metal)	0.95
Textiles (non-metal)	0.95
Titanium, oxidized	0.5 to 0.6
Clay	0.90 to 0.95
Water	0.93

Material	Degree of emission
Cement	0.90 to 0.96
Brick (rough)	0.90 to 0.95
Zinc, oxidized	0.1

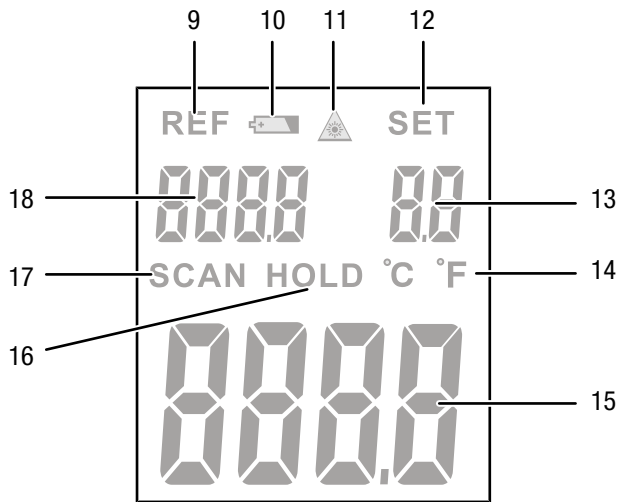
Device depiction

Device depiction



No.	Designation
1	Laser pointer
2	Infrared sensor
3	Battery compartment with cover
4	Measurement button
5	SET/lamp button
6	°C/°F button
7	Laser button
8	Display

Display



No.	Designation
9	Reference indication
10	Battery status
11	Laser indication
12	SET indication
13	Indication of the set threshold value (1 / 3 / 5 °C)
14	°C / °F indication
15	Measurement value indication
16	HOLD indication
17	SCAN indication
18	Reference value indication

Technical data

Parameter	Value
Model	BP17
Weight	188 g
Dimensions (length x width x height)	151 mm x 42 mm x 105 mm
Measuring range	-50 °C to 380 °C (-58 °F to 716 °F)
Resolution	0.1 °C / °F
Target display	Laser class II, 630 to 660 nm < 1 mW
Accuracy	± 2 °C or ± 2.0 % of the measured value (the higher value applies) if T > 0 °C ± 3 °C of the measured value if T ≤ 0 °C
Degree of emission	0.95
Optical resolution	10:1 (D:S)
Smallest measuring spot	∅ 12.7 mm (distance 127 mm)
Spectral sensitivity	8 to 14 µm
Response time	< 0.5 s
Operating temperature	0 °C to 50 °C (32 °F to 122 °F), 10 % to 90 % RH
Storage conditions	-10 °C to 60 °C, < 80 % RH
Power supply	9 V battery
Switch-off	After approx. 15 seconds of non-use

Scope of delivery

- 1 x Pyrometer BP17
- 1 x 9 V battery
- 1 x Device bag
- 1 x Quick guide

Transport and storage

Note

If you store or transport the device improperly, the device may be damaged.

Note the information regarding transport and storage of the device.

Transport

For transporting the device, use the bag included in the scope of delivery in order to protect the device from external influences.

The manufacturer packed the device to the best of his abilities to protect it against transport damage.

Storage

When the device is not being used, observe the following storage conditions:

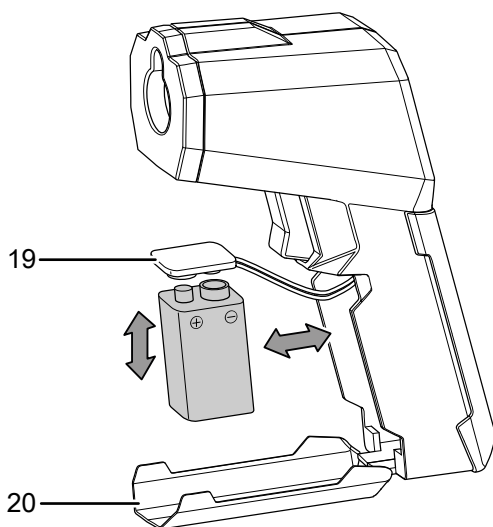
- dry and protected from frost and heat
- protected from dust and direct sunlight
- with a cover to protect it from invasive dust if necessary
- the storage temperature complies with the values specified in the Technical data
- Remove the batteries from the device.
- Preferably use the supplied device bag to store the device.

Operation

Inserting the battery

Note

Make sure that the surface of the device is dry and the device is switched off.



1. Open the battery compartment by folding open the cover (20) with your fingers.
2. Use the battery clip (19) to connect the new battery with correct polarity.
3. Insert the battery in the battery compartment.
4. Close the cover of the battery compartment.

Carrying out a measurement



Info

Please note that moving from a cold area to a warm area can lead to condensation forming on the device's circuit board. This physical and unavoidable effect can falsify the measurement. In this case, the display shows either no measured values or they are incorrect. Wait a few minutes until the device has become adjusted to the changed conditions before carrying out a measurement.

Note

The first object at which you point the device and the temperature of which you measure is then also the reference value for all further measurements. The reference value is displayed on the reference value indication.

- Ensure that the surface to be measured is free of dust, dirt or similar substances.
 - To be able to gain exact measurement results on surfaces which reflect heavily, stick matt masking tape to the surface or apply matt black paint with a very high and known degree of emission.
 - Note the 10:1 ratio of the distance to the measuring spot size. For accurate measurements the measuring object should be at least twice as large as the measuring spot.
1. Point the device at the object to be measured.
 2. Press the measurement button (4).
 - ⇒ The reference value is displayed on the reference value indication (18).
 - ⇒ The *SCAN* indication (17) appears on the display.
 - ⇒ The current measured value is displayed in the measurement value display (15).
 3. Press the measurement button (4) again if you want to "freeze" a measured value.
 - ⇒ The current measured value will be halted.
 - ⇒ The *HOLD* indication (16) appears on the display.

Carrying out a measurement with threshold values

The device permits you to set a threshold value relating to the set reference temperature. Exceeding or falling below the reference temperature by more than this selected threshold is indicated visually and acoustically.

To determine the threshold value relating to the reference temperature use the SET/lamp button (5). The following settings are available:

- --: The threshold is disabled.
- 1 °C: The threshold value is respectively 1 °C (1.8 °F) higher or lower than the reference value.
- 3 °C: The threshold value is respectively 3 °C (5.4 °F) higher or lower than the reference value.
- 5 °C: The threshold value is respectively 5 °C (9 °F) higher or lower than the reference value.

The selected threshold is indicated on the respective display (13).

If the current measured value exceeds the set reference value by the selected threshold, the display (8) will be illuminated in red and an acoustic signal can be heard at frequent intervals.

If the current measured value is within the set range given by the threshold values, the display (8) is illuminated in green.

If the current measured value falls below the set reference value by the selected threshold, the display (8) will be illuminated in blue and an acoustic signal can be heard at long intervals.

Example:

The reference value amounts to 25 °C and the threshold is set to 3 °C.

- The measured temperature is between 22 °C and 28 °C:
The display is illuminated in green.
- The measured temperature amounts to more than 28 °C:
The display is illuminated in red and an acoustic signal can be heard at frequent intervals.
- The measured temperature amounts to less than 22 °C:
The display is illuminated in blue and an acoustic signal can be heard at long intervals.

Switching the laser pointer on or off

Ex works the laser pointer is switched off.



Warning of laser radiation

Please observe that with a switched-on laser the laser pointer will go on as soon as you press the Measurement button (4).

Danger due to laser radiation!



Warning of laser radiation

Class 2 laser radiation.

Lasers of class 2 only radiate in the visible range and during continuous wave operation (lasting beam) no more than 1 milliwatt (mW) of output will be emitted. Looking directly into the laser beam for a longer period of time (more than 0.25 seconds) can cause damage to the retina.

Avoid looking directly into the laser beam. Never look into the laser beam using optical aides. Do not suppress the winking reflex when looking into the laser beam unintentionally. Never point the laser beam at people or animals.

1. Press the laser button (7).
 - ⇒ The laser indication (11) appears on the display (8).
 - ⇒ The laser pointer is switched on.
2. Press the laser button (7) again to switch the laser pointer off.
 - ⇒ The laser indication (11) is no longer displayed.
 - ⇒ The laser pointer is switched off.

Switching the display illumination on or off

With activated thresholds the display illumination is always active and cannot be switched off.

With deactivated thresholds the display illumination can be switched on or off as needed by pressing and holding the SET / lamp button (5) for approx. two seconds.

The device memorizes the selected setting when switching off.

Changing the unit °C / °F

1. Press the °C/°F button (6) to change the temperature unit from degrees Celsius to degrees Fahrenheit or vice versa.

Switching the device off

Note

With activated *SCAN* indication (17) the device switches off automatically after approx. 6 minutes.

With activated *HOLD* indication (16) the device switches off automatically after approx. 15 seconds.

1. Press the measurement button (4) for approx. 3 s.
 - ⇒ The device is switched off.

Maintenance and repair

Battery change

A battery change is required when the battery status indication (10) flashes or the device can no longer be switched on (see chapter Inserting the battery).

Cleaning

Clean the device with a soft, damp and lint-free cloth. Make sure that no moisture enters the housing. Do not use any sprays, solvents, alcohol-based cleaning agents or abrasive cleaners, but only clean water to moisten the cloth.

Repair

Do not modify the device or install any spare parts. For repairs or device testing, contact the manufacturer.

Errors and faults

The device has been checked for proper functioning several times during production. If malfunctions occur nonetheless, check the device according to the following list.

The device does not switch on:

- Check the charging status of the battery. Change the battery, if required (see chapter Inserting the battery).
- Make sure that the battery is properly positioned. Check the polarity is correct.

For repairs or device testing, contact the manufacturer.

Disposal

Always dispose of packing materials in an environmentally friendly manner and in accordance with the applicable local disposal regulations.



The icon with the crossed-out waste bin on waste electrical or electronic equipment is taken from Directive 2012/19/EU. It states that this device must not be disposed of with the household waste at the end of its life. You will find collection points for free return of waste electrical and electronic equipment in your vicinity. The addresses can be obtained from your municipality or local administration. You can also find out about other return options that apply for many EU countries on the website <https://hub.trotec.com/?id=45090>. Otherwise, please contact an official recycling centre for electronic and electrical equipment authorised for your country.

The separate collection of waste electrical and electronic equipment aims to enable the re-use, recycling and other forms of recovery of waste equipment as well as to prevent negative effects for the environment and human health caused by the disposal of hazardous substances potentially contained in the equipment.



In the European Union, batteries and accumulators must not be treated as domestic waste, but must be disposed of professionally in accordance with Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators. Please dispose of batteries and accumulators according to the relevant legal requirements.

Only for United Kingdom

According to Waste Electrical and Electronic Equipment Regulations 2013 (SI 2013/3113) (as amended) and the Waste Batteries and Accumulators Regulations 2009 (SI 2009/890) (as amended), devices that are no longer usable must be collected separately and disposed of in an environmentally friendly manner.

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