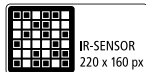# ThermoCamera Connect

MIX-IMAGE

HOT SPOT / COLD SPOT MARKER

HOT SPOT / COLD SPOT MARKER

IR-SENSOR 220 x 160 px

9 FRAMES PER SECOND

REC JPG IMAGE

LI-ION BATTERY

COLOUR TFT

RECHARGE

CONNECT 192.168.230.1

Laserliner

Laserliner

> **!** Completely read through the operating instructions, the „Warranty and Additional Information" booklet as well as the latest information under the internet link at the end of these instructions. Follow the instructions they contain. This document must be kept in a safe place and passed on together with the device.

Function / Application

The ThermoCamera Connect is used to visually display thermal patterns and enables non-contact measurement of surfaces by evaluating the radiation in the infrared wavelength range via the integrated non-chilled microbolometer. The imaging technology of the sensor provides a visual image of the temperatures surrounding the inspected object. The temperature differences can be visualised by colour-coding the individual temperatures in a thermogram with false colour display. Possible applications include locating overloads in electrical components, detecting overheating in mechanical components, pinpointing and analysing heating lines in walls and floors, assessing refrigerant and air conditioning systems and much more.

General safety instructions

– The device must only be used in accordance with its intended purpose and within the scope of the specifications.
– The measuring tools and accessories are not toys. Keep out of reach of children.
– Modifications or changes to the device are not permitted, this will otherwise invalidate the approval and safety specifications.
– Do not expose the device to mechanical stress, extreme temperatures, moisture or significant vibration.
– The device must no longer be used if one or more of its functions fail or the battery charge is weak.
– Use only genuine accessories. Use of inappropriate accessories will invalidate the warranty.
– The charging progress can be viewed by briefly pressing the ON/OFF button.
– The residual charge of batteries with a weak charge is shown in red.
– The battery can also be charged while using the device.
– Disconnect the power pack from the mains when the device is not in use.
– Never use extension cables in conjunction with the battery charger, or similar accessories not approved by the manufacturer, as this may result in a fire risk, the risk of an electric shock or injury to persons.

Safety instructions

Using electromagnetic radiation and RF wireless radiation

– Local operating restrictions – for example, in hospitals, aircraft, petrol stations or in the vicinity of people with pacemakers – may apply. Electronic devices can potentially cause hazards or interference or be subject to hazards or interference.
– The measuring accuracy may be affected when working close to high voltages or high electromagnetic alternating fields.
– The measuring device is equipped with a wireless interface.
– The measuring device complies with electromagnetic compatibility and wireless radiation regulations and limits in accordance with the RED 2014/53/EU.
– Umarex GmbH & Co. KG hereby declares that the ThermoCamera Connect radio equipment complies with the essential requirements and other provisions of the European Radio Equipment Directive 2014/53/EU (RED). The EU Declaration of Conformity can be found in its entirety at the following address: http://laserliner.com/info?an=AGR
– This device complies with the CE limit values for radiation exposure as defined for uncontrolled environments. To avoid wireless radiation, this device should be used at a minimum distance of 20 cm from the body.

ThermoCamera Connect
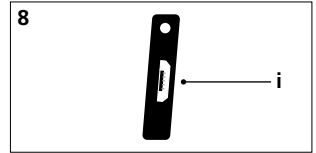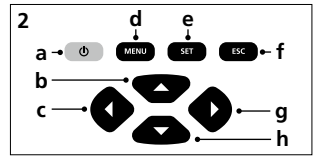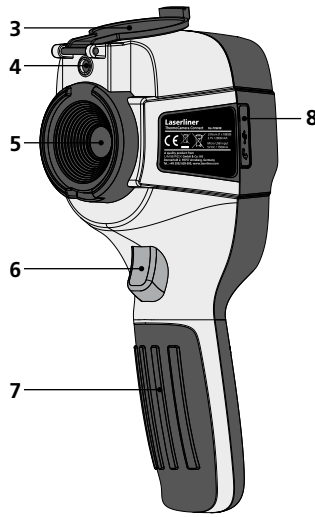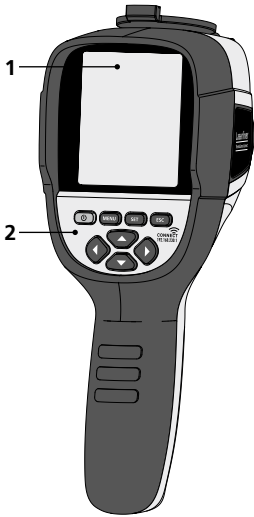
1 3,2" TFT colour display
2 Hot keys
3 Lens cover
4 Camera
5 Infrared camera lens
6 Trigger: Capture
**7** Battery compartment
8 Shaft

a ON/OFF
b Menu navigation
c Menu navigation /
select digital image,
overlay infrared / digital
image and infrared image
d Open main menu /
exit main menu
(cancel) / save image
e Control menu
(confirmation) /
do not save image

f Control menu (cancel)
g Menu navigation /
select digital image,
overlay infrared / digital
image and infrared image
h Menu navigation

i Micro USB interface
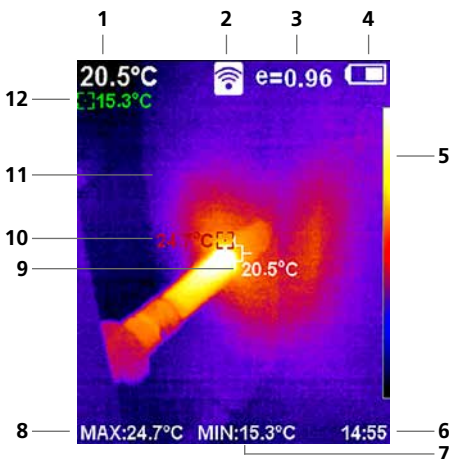
Standard measurement view

1 Temperature at centre of image
2 WLAN active
3 Set emissivity coefficient
4 Battery charge indicator
5 Color palette
6 Time
7 Min. temperature
8 Max. temperature
9 Temperature at centre of image
10 Max. temperature
11 Thermography image
12 Min. temperature

Laserliner
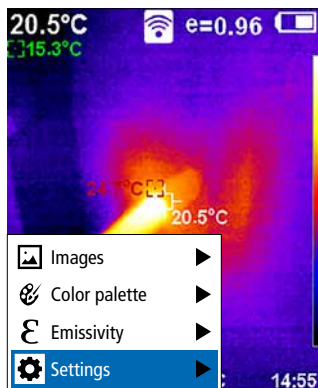
Main menu
13 Open media gallery
14 Change color palette
15 Set emissivity coefficient
16 Settings

13	Images ▶
14	Color palette ▶
15	Emissivity ▶
16	Settings ▶
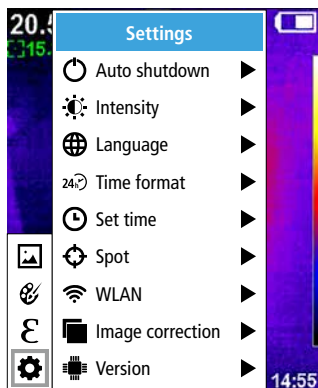
Main menu settings
17 Auto shutdown
18 Display brightness
19 Menu language
20 Time format
21 Time settings
22 Spot (Measuring point)
23 WLAN connection ON/OFF
24 Image correction
25 Software version

Settings	
Auto shutdown ▶	**17**
Intensity ▶	**18**
Language ▶	**19**
Time format ▶	**20**
Set time ▶	**21**
Spot ▶	**22**
WLAN ▶	**23**
Image correction ▶	**24**
Version ▶	**25**

1 ON / OFF

3 sec
ON

3 sec
OFF

ThermoCamera Connect
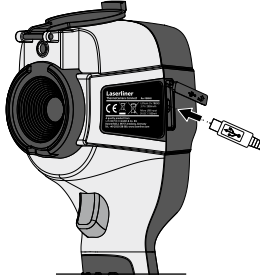
▨2 Charging the li-ion battery

To charge the Li-ion battery pack, plug the supplied USB cable into the charging socket „i" and connect it to the USB 2.0 power supply unit.

Operation while charging is possible.

▨3 Removing / inserting li-ion battery pack

Open battery compartment (7) and remove/ insert the Li-ion battery pack. When inserting battery ensure correct polarity.
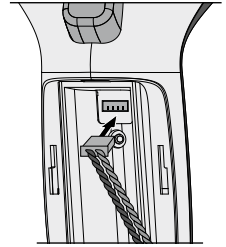
▨4 Main menu

General and measurement-specific settings can be made in the main menu. The menu is controlled with the four buttons (b, c, g, h).

5.0 Settings

Laserliner

5.1 Settings: **Auto shutdown**
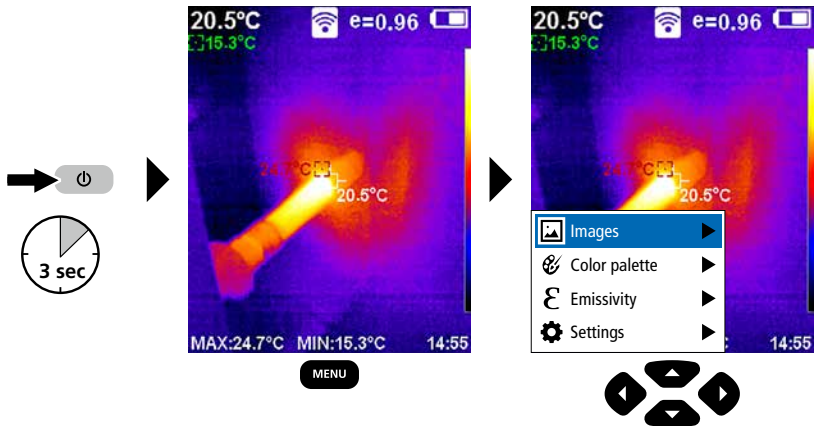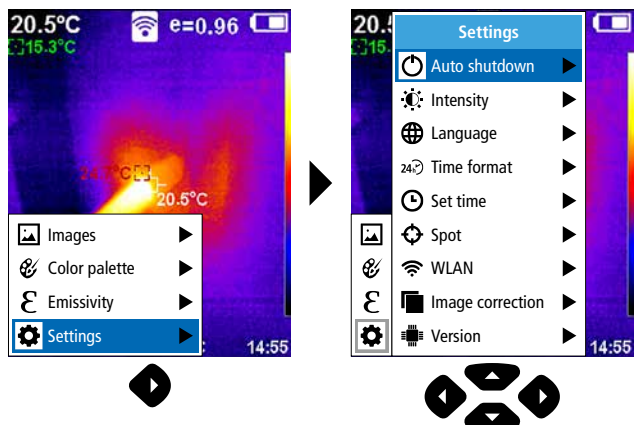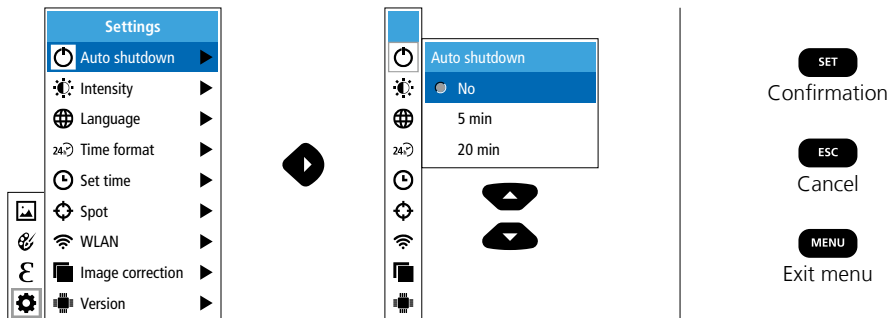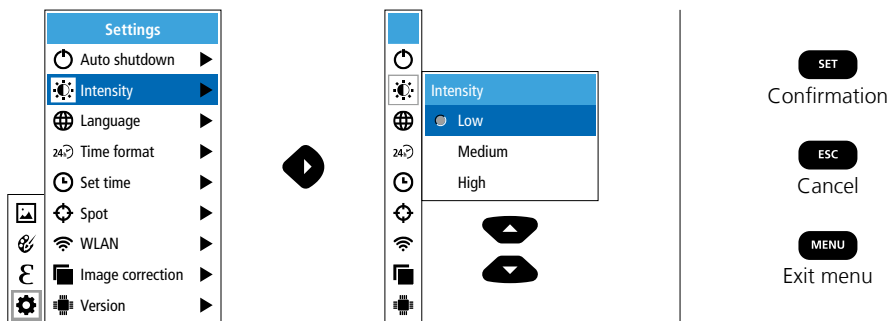
The device switches off automatically after a set period of inactivity.

Settings		
⏻ Auto shutdown	▶	
☼ Intensity	▶	
🌐 Language	▶	
24⏱ Time format	▶	
🕐 Set time	▶	
✛ Spot	▶	
📶 WLAN	▶	
▮ Image correction	▶	
▦ Version	▶	

Auto shutdown	
◉ No	
5 min	
20 min	

SET Confirmation

ESC Cancel

MENU Exit menu
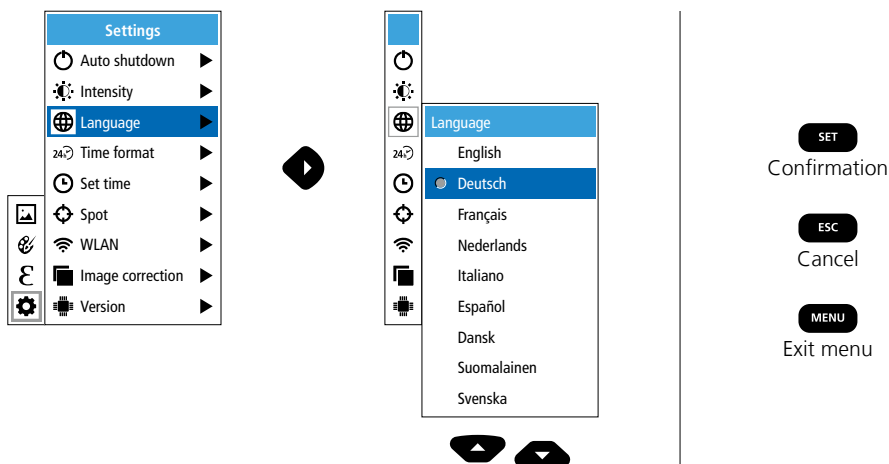
5.2 Settings: **Display brightness**

Settings		
⏻ Auto shutdown	▶	
☼ Intensity	▶	
🌐 Language	▶	
24⏱ Time format	▶	
🕐 Set time	▶	
✛ Spot	▶	
📶 WLAN	▶	
▮ Image correction	▶	
▦ Version	▶	

Intensity	
◉ Low	
Medium	
High	

SET Confirmation

ESC Cancel

MENU Exit menu

5.3 Settings: **To set menu language** EN / DE / FR / NL / IT / ES / DK / FI / SE

Settings		
⏻ Auto shutdown	▶	
☼ Intensity	▶	
🌐 Language	▶	
24⏱ Time format	▶	
🕐 Set time	▶	
✛ Spot	▶	
📶 WLAN	▶	
▮ Image correction	▶	
▦ Version	▶	

Language	
English	
◉ Deutsch	
Français	
Nederlands	
Italiano	
Español	
Dansk	
Suomalainen	
Svenska	

SET Confirmation

ESC Cancel

MENU Exit menu

5.4 Settings: **Time format**

Settings	**Time format**	**SET**
⏻ Auto shutdown ▶	⏻	Confirmation
☀ Intensity ▶	☀	
⊕ Language ▶	⊕	**ESC**
24⟲ Time format ▶	24⟲ **Time format**	Cancel
⏲ Set time ▶	⏲ ● 24 hour	
◈ Spot ▶	◈ AM/PM	**MENU**
🖼 ⟨ WLAN ▶		Exit menu
Ɛ 🖥 Image correction ▶		
⚙ ⊞ Version ▶		

5.5 Settings: **Set time**

Settings	**Set time**	**ESC**
⏻ Auto shutdown ▶	⏻	Confirmation
☀ Intensity ▶	☀	
⊕ Language ▶	⊕	**MENU**
24⟲ Time format ▶	24⟲	Exit menu
⏲ Set time ▶	⏲ **Set time**	
◈ Spot ▶	◈ Year 2018	2018
🖼 ⟨ WLAN ▶	⟨ Month 10	10
Ɛ 🖥 Image correction ▶	🖥 Day 22	22
⚙ ⊞ Version ▶	⊞ Hour 14	14
	Minute 36	36
	Second 25	25

SET
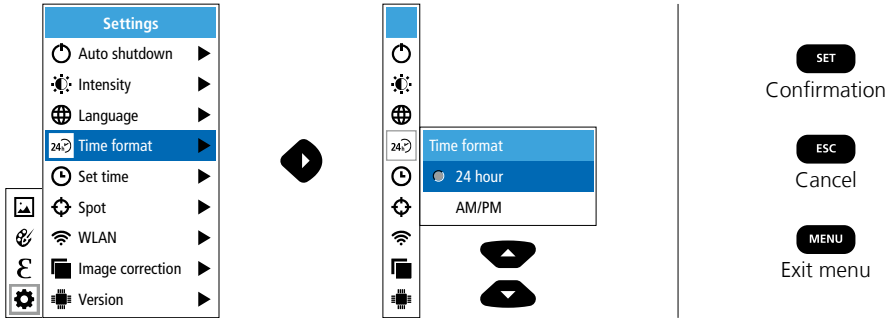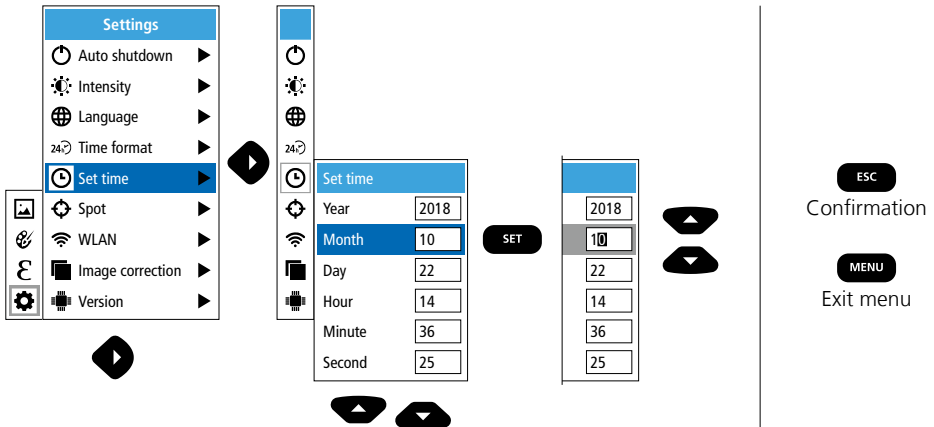
5.6 Settings: **Spot (Measuring point)**

The temperature is shown in the centre of the image as standard. Two spots can be added.
Max: highest temperature, Min: lowest temperature

Settings	**Spot**	**SET**
⏻ Auto shutdown ▶	⏻	Confirmation
☀ Intensity ▶	☀	
⊕ Language ▶	⊕	**ESC**
24⟲ Time format ▶	24⟲	Cancel
⏲ Set time ▶	⏲	
🖼 ◈ Spot ▶	◈ **Spot**	**MENU**
Ɛ ⟨ WLAN ▶	⟨ ● Off	Exit menu
⚙ 🖥 Image correction ▶	🖥 On	
⊞ Version ▶	⊞	
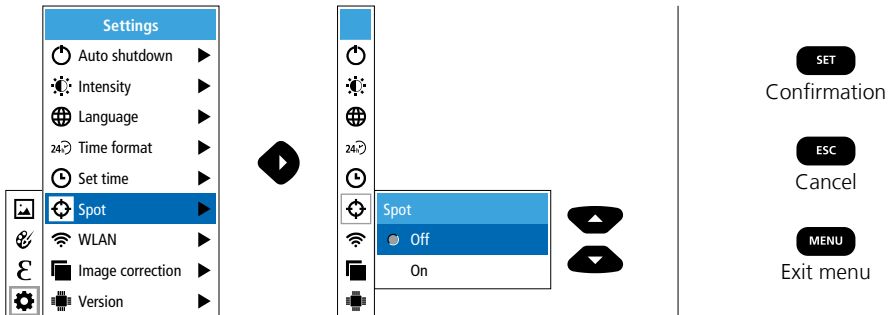
5.7 Settings: **WLAN connection**

To evaluate the data, the ThermoCamera Connect can be connected via WLAN to a terminal device (desktop PC or mobile phone) with WLAN capabilities. For this purpose first select the required WLAN SSID on the device (MAC:MMMMMM). MMMMMM corresponds to the MAC address.
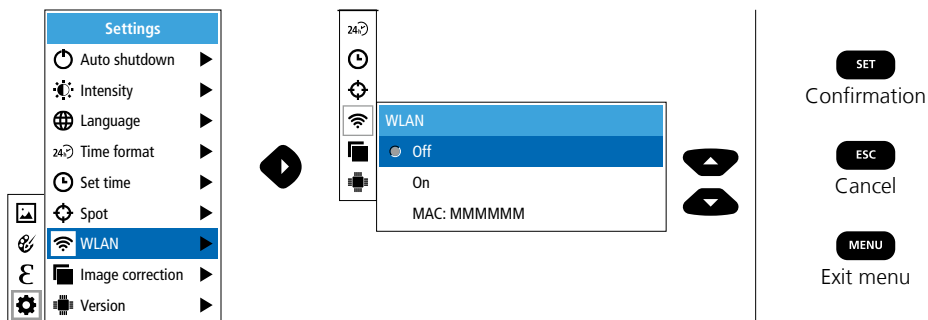
The connection with the corresponding SSID is then set up at the terminal device. With any modern browser the ThermoCamera Connect makes the data available under the IP-address 192.168.230.1 Port 80.

5.8 Settings: **Image correction**

5.9 Settings: **Version**

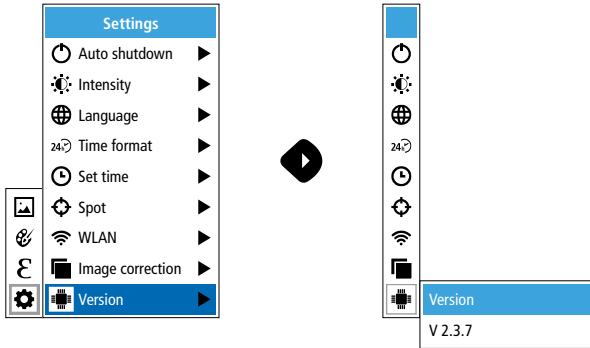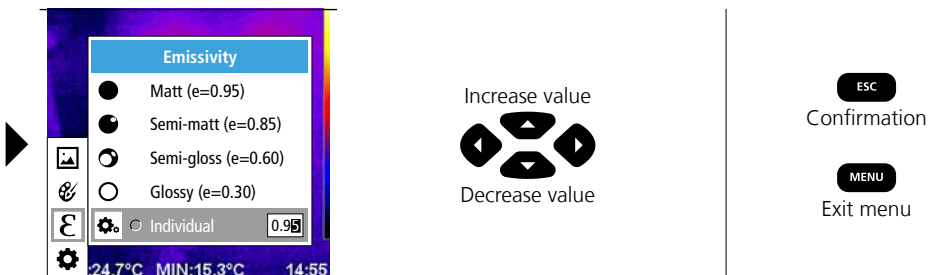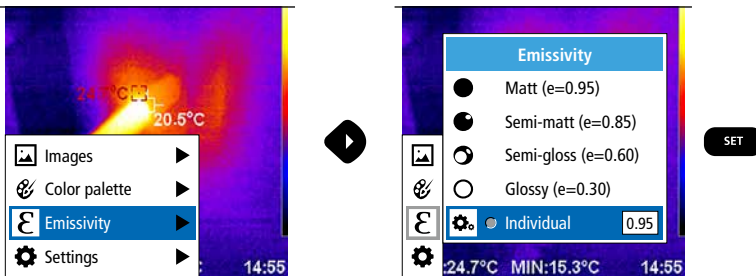| Settings |
|---|
| Auto shutdown ▶ |
| Intensity ▶ |
| Language ▶ |
| Time format ▶ |
| Set time ▶ |
| Spot ▶ |
| WLAN ▶ |
| Image correction ▶ |
| Version ▶ |
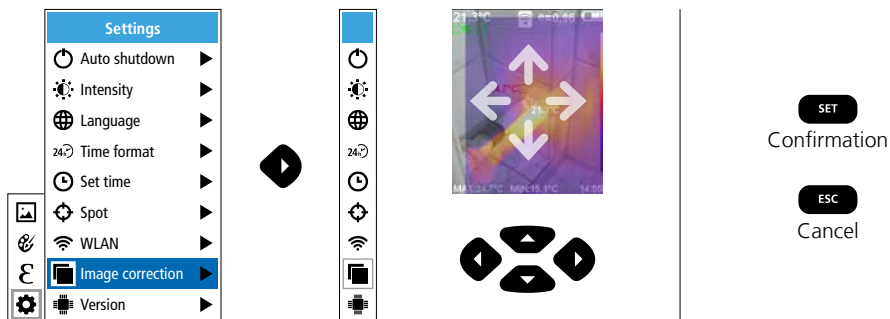
Version
V 2.3.7

6.0 Emissivity

Before each use, check the settings for infrared measurement and adjust them to the respective measuring situation to ensure accurate measurements. Pay particular attention to the general parameters for the emissivity coefficient.

6.1 Emissivity: **Emissivity coefficient**

The level of infrared emissions given off by everything depends on the specific material and surface. This factor is determined by the emissivity coefficient (0.10 ... 1.0). For accurate measurements, it is absolutely essential that the emissivity coefficient is set first. The emissivity coefficient can either be custom set or selected based on the predefined emissivity coefficients from the material list.

Images ▶
Color palette ▶
Emissivity ▶
Settings ▶

Emissivity
Matt (e=0.95)
Semi-matt (e=0.85)
Semi-gloss (e=0.60)
Glossy (e=0.30)
Individual 0.95

24.7°C MIN:15.3°C 14:55

SET

Emissivity
Matt (e=0.95)
Semi-matt (e=0.85)
Semi-gloss (e=0.60)
Glossy (e=0.30)
Individual 0.95

24.7°C MIN:15.3°C 14:55

Increase value

Decrease value

ESC
Confirmation

MENU
Exit menu

Emissivity table (reference values with tolerances)

Metals							
Alloy A3003			**Iron**			**Steel**	
Oxidised	0.20		Oxidised	0.75		Alloy (8% nickel,	
Roughened	0.20		With rust	0.60		18% chromium)	0.35
Aluminium			**Iron, cast**			Galvanised	0.28
Oxidised	0.30		Non-oxidised	0.20		Oxidised	0.80
Polished	0.05		Molten mass	0.25		Heavily oxidised	0.88
Brass			**Iron, forged**			Freshly rolled	0.24
Polished	0.30		Matt	0.90		Rough, flat surface	0.96
Oxidised	0.50		**Lead**			Rusty, red	0.69
Chromium oxide	0.81		Rough	0.40		Sheet, nickel plated	0.11
Copper			**Platinum**			Sheet, rolled	0.56
Oxidised	0.72		Black	0.90		Stainless steel	0.45
Copperoxide	0.78		**Steel**			**Zinc**	
Inconel			Cold rolled	0.80		Oxidised	0.10
Oxidised	0.83		Ground plate	0.50			
Electropolished	0.15		Polished plate	0.10			

| Nonmetals							
Asbestos	0.93		**Gravel**	0.95		**Paper**	
Asphalt	0.95		**Grit**	0.95		All colours	0.96
Basalt	0.70		**Gypsum**	0.88		**Plastic**	
Brick, red	0.93		**Gypsum cardboard**	0.95		Translucent	0.95
Carborundum	0.90		**Heat sink**			PE, P, PVC	0.94
Cement	0.95		Black, anodized	0.98		**Quartz glass**	0.93
Ceramics	0.95		**Human skin**	0.98		**Rubber**	
China			**Ice**			Hard	0.94
Brilliant white	0.73		Clear	0.97		Soft, grey	0.89
With glaze	0.92		With heavy frost	0.98		**Sand**	0.95
Clay	0.95		**Laminate**	0.90		**Screed**	0.93
Coal			**Lime**	0.35		**Snow**	0.80
Non-oxidised	0.85		**Lime malm brick**	0.95		**Soil**	0.94
Concrete, plaster, mortar	0.93		**Limestone**	0.98		**Tar**	0.82
Cotton	0.77		**Marble**			**Tar paper**	0.92
Earthenware, matt	0.93		Black, dull finish	0.94		**Transformer paint**	0.94
Fabric	0.95		Greyish, polished	0.93		**Wallpaper, light-coloured**	0.89
Glass	0.90		**Masonry**	0.93		**Water**	0.93
Glass wool	0.95		**Paint**			**Wood**	
Graphite	0.75		Black, matt	0.97		Untreated	0.88
			Heat-resistant	0.92		Beech, planed	0.94
			White	0.90			

7 Colour ranges IR image

You can choose from several standard colour ranges to represent the measured infrared temperatures. Depending on the colour palette, the measured temperatures are adjusted within the current image section and displayed in the respective colour space. The bargraph for the respective minimum/ maximum temperatures of the entire image serves as a reference for the corresponding temperature/ colour mapping.

ThermoCamera Connect

SET Confirmation	
ESC Cancel	
MENU Exit menu	

Color palette: Spectrum, Iron, Cool, White, Black
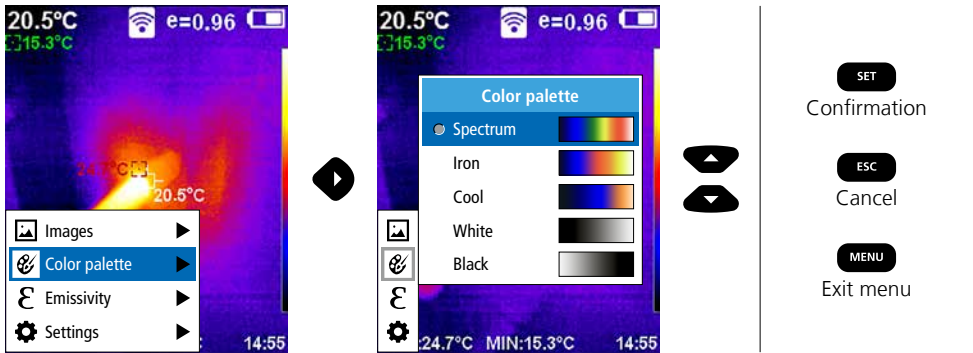
8 Image modes

There are 5 image modes to choose from.
A. IR image (IR)
B. Digital image (Visible)
C. Digital image with IR image overlay (MIX), level 1
D. Digital image with IR image overlay (MIX), level 2
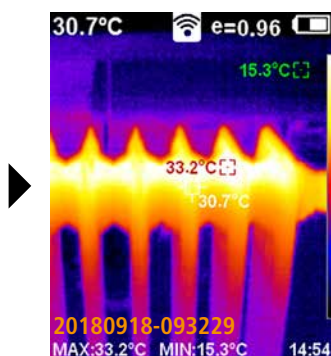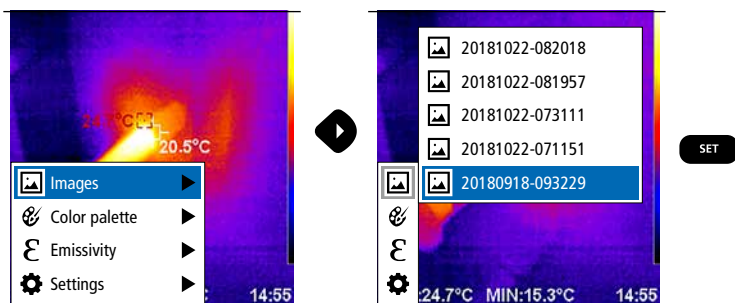E. Digital image with IR image overlay (MIX), level 3
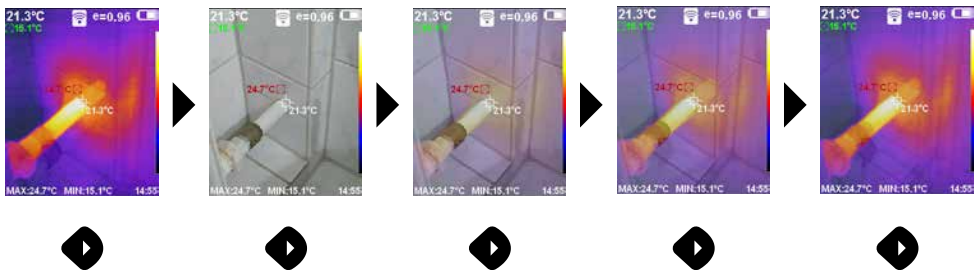
9 Capture image

Using the „Trigger" button (6), users can take images of any measurement situation for the subsequent documentation.

Save image? Yes No

MENU SET

EN 11
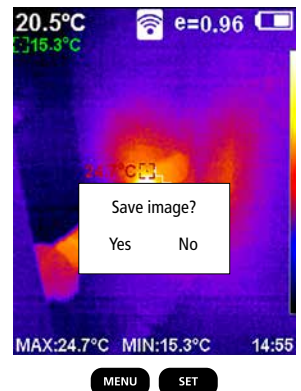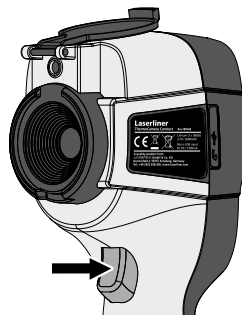
10 Media gallery / to delete recording

All images recorded with the ThermoCamera Connect can be accessed in the media gallery.

| 20181022-082018 |
| 20181022-081957 |
| 20181022-073111 |
| 20181022-071151 |
| 20180918-093229 |

Images ▶
Color palette ▶
Emissivity ▶
Settings ▶

SET

Delete image

Previous image ◀   Next image ▶

MENU
Confirmation / Delete image

SET
Cancel / Confirm / delete image

ESC
Exit menu

! The image will be deleted immediately by pressing the MENU button. There are no safety prompts.

Information on maintenance and care

Clean all components with a damp cloth and do not use cleaning agents, scouring agents and solvents. Remove the battery pack before storing for longer periods. Store the device in a clean and dry place. Do not touch the lens.

Calibration

The meter needs to be calibrated and tested on a regular basis to ensure it produces accurate measurement results. We recommend carrying out calibration once a year.

EU directives and disposal

This device complies with all necessary standards for the free movement of goods within the EU.

This product is an electric device and must be collected separately for disposal according to the European Directive on waste electrical and electronic equipment.

Further safety and supplementary notices at: **http://laserliner.com/info?an=AGR**

CE

ThermoCamera Connect

Technical data		Subject to technical changes without notice. 19W05
IR sensor	Resolution: 220 x 160 pixels, uncooled microbolometer, 9 Hz, 8-14 µm	
IR optics	High-quality IR-lens, 27° x 35° (FOV), fixed focus, working area: 0.5 m … 20 m	
Thermal sensitivity	0.07°C @ 30°C	
Precision	±2°C or ± 2% of measured value	
Measurement range	-20°C … 350°C	
Display	3,2" colour TFT	
Image modes	Infrared image, digital image, MIX image	
Digital camera	Resolution: 640 x 480 pixels	
Format	JPEG format	
Memory function	Integrated SD memory (more than 20.000 images)	
Interface	WLAN	
Ports	Micro USB charging	
Emissivity coefficient	0.01 - 1.0 adjustable	
Protection class	IP54	
Operating conditions	0°C … 45°C, max. humidity 20 … 85% rH, no condensation, max. working altitude 2000 m above sea level	
Storage conditions	-20°C … 60°C, max. humidity 85% rH	
Radio module operating data	WLAN standard	IEEE 802.11 b/g/n
	Frequency band	2.400 - 2.4835 GHz (IEEE 802.11 b/g/n)
	Radio channels	Channel 9
	Transmit power	17 dBm max.
	Transmission rate	IEEE 802.11 b to 11 Mbps IEEE 802.11 g/n to 54 Mbps (at 15 ± 2 dBm)
	Safety	Open
	Local server mode	IP address 192.168.230.1; HTTP; no DHCP
	Port	80
Automatic switch-off	Adjustable: 5 minutes / 20 minutes / no auto power off	
Power supply	Li-Ion pack battery 3.5V - 4.2V / 2000 mAh Micro USB 4.75V - 5.50V	
Charging time	Approx. 3 - 4 h	
Operating time	Approx. 2 - 3 h (depending on use)	
Dimensions (W x H x D)	105 x 223 x 90 mm	
Weight	389 g (incl. battery pack)	