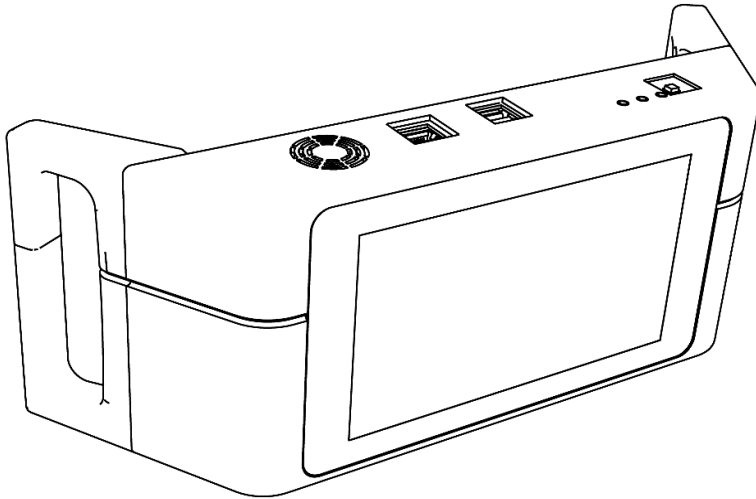


MANUAL FOR INFRARED CAMERA



PARAMETERS

Temperature range

-10 to 50 °C during operation
0 to 40 °C when charging

Maximum air humidity

85%

Dimensions

330 mm x 120 mm x 100 mm

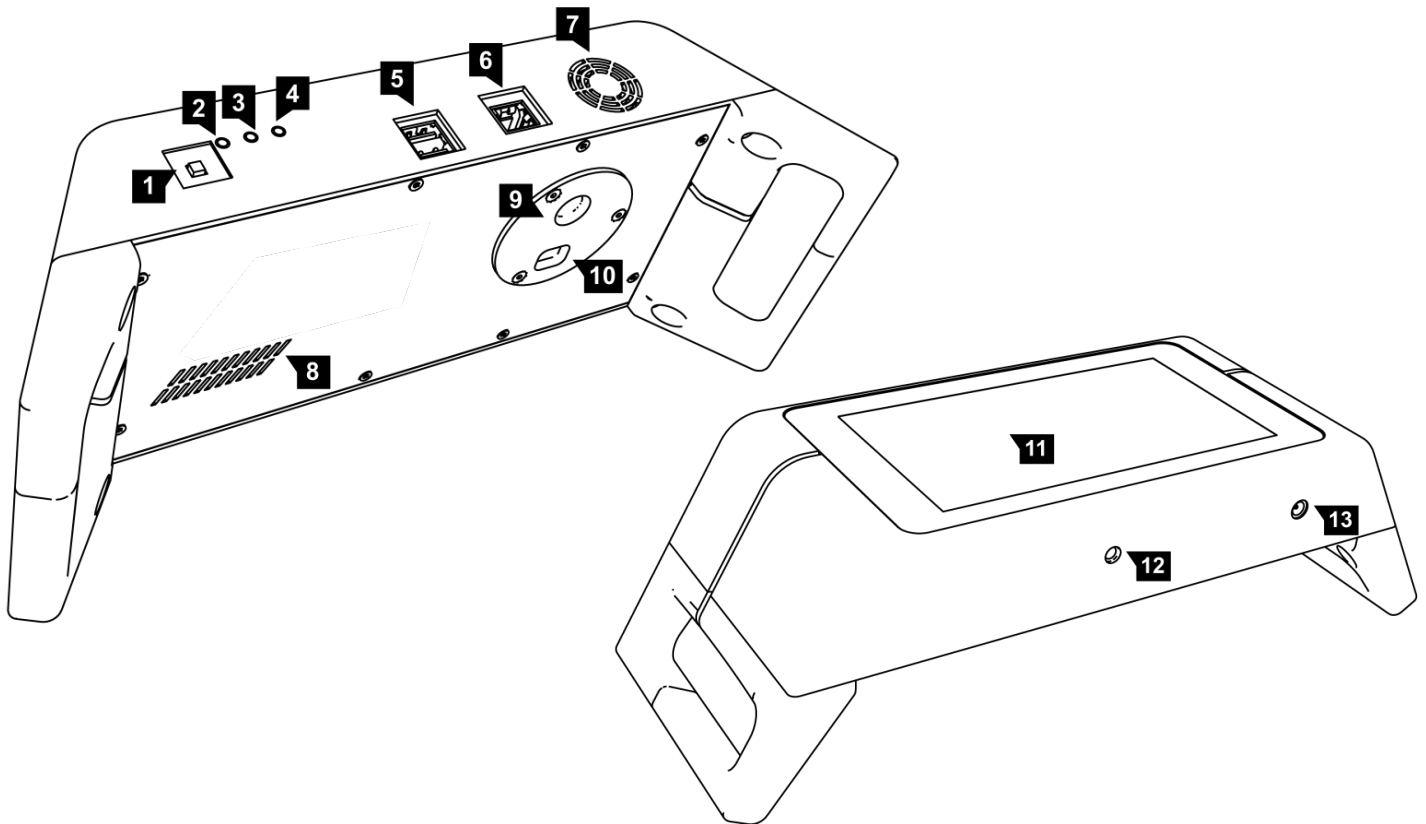
Battery

Lithium-Ion battery (3.65 V, 5500 mAh)

Manufacturer

TIMI CREATION, s.r.o.
Morseova 1126/5
301 00 Plzeň, Czech Republic
www.timic.cz

SUMMARY OF FUNCTIONS AND CONTROL KEYS




- 1** on/off switch
- 2** LED diode - battery charging indicator
- 3** LED diode - voltage indicator
- 4** LED diode - camera operation indicator
- 5** USB ports
- 6** RJ45 connector
- 7** Cooling fan outlet
- 8** Air inlet with filter
- 9** Thermographic camera input
- 10** Camera input (classic camera)
- 11** Display
- 12** Tripod mounting (1/4")
- 13** Adapter connection

HOW DOES THE CAMERA WORK?

The camera can do almost everything. It has intuitive controls that are very easy to use! But first, it is important to turn on the infrared camera by pressing the power button 1 on the top of the device and holding it for about 2 seconds. After that, the screen is activated and individual icons will be displayed.



1. Switching on and off

You can turn the infrared camera off by again pressing for about 2 seconds the button that you used to switch it into operational  mode, or by clicking the icon in the lower-left corner of the display.



2. Battery status and charging



The infrared camera can be charged by using the included adapter. Plug the power supply into an electrical socket and connect it to the device. You can check the battery status in the upper-right corner of the display. The charging process is indicated by the red light **2** and a fully charged battery is denoted by a flashing green light **3**. When the battery is charged, the red light **2** turns off. The battery can last up to 5 hours.



3. Display mode

Using the "Display Mode" function (the display icon is located on the left bar), you can switch between infrared (IR) and visible spectrum (VIS) display mode. You can record an IR or a VIS picture, both of which can be used for later analysis.




4. Temperature analysis




The infrared camera can detect the temperature of a specific point or the minimum, maximum, and average temperature of a defined area. You can use up to three analyses (of a specific point or a defined area) simultaneously.


4.1 Spot measurement

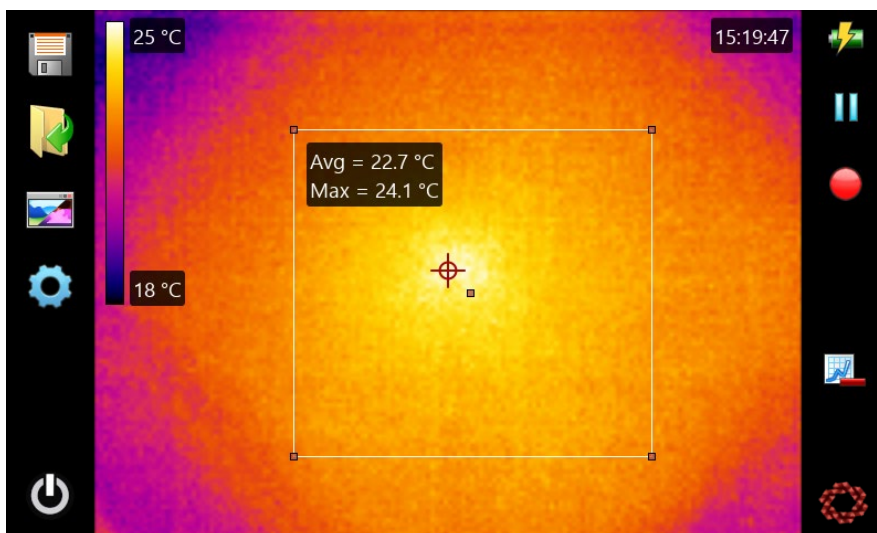
To create a specific point, click on the display.

To remove a specific point click on  the icon and then the point you want to remove.

4.2 Area

To create a defined area, click and drag your finger across the screen. The position and size of an area can be  changed by grabbing a point in the middle, or points  at the corners of the area. This always applies to the last defined area. The maximum, minimum, and average temperature in the area is displayed. The targets display the position of the maximum and minimum  temperature (these can be added and removed in the settings menu).

The defined area can be removed by clicking on the  icon and the area you want to remove.



5. Image pause

You can pause and return to an image by clicking on the second icon on the top right bar. The image can be saved using the instructions presented in point 7.

You can analyse both paused and active images.



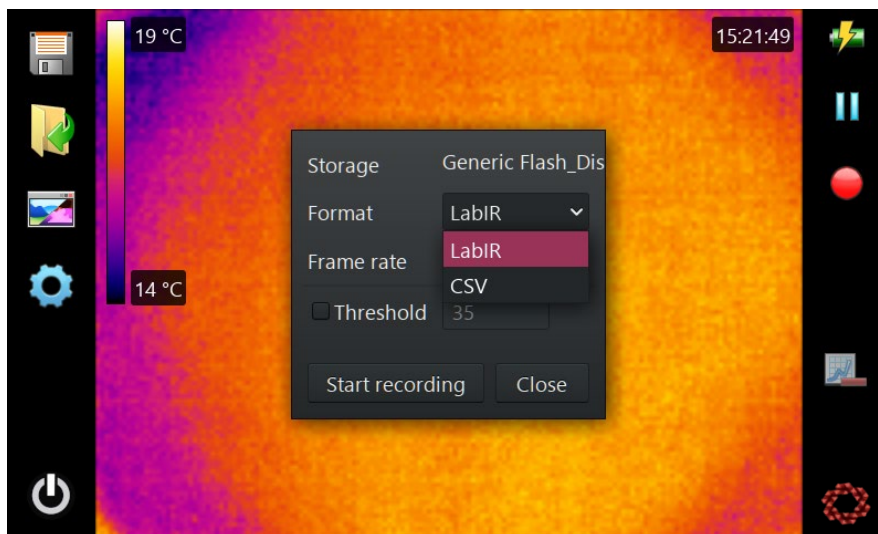
6. Video

The infrared camera can record a video which allows you to monitor temperature changes over time. In order to record a video, a USB drive must be connected to port **5**.

When you press the record icon, a dialog box appears where you can select the **video format** and **frame rate**. Select "LabIR" as the format. The maximum frame rate is 9 frames per second.

RECOMMENDATION: You can set decimal values for the frame rate. If you set the value as 0.1, it means that one image is saved every 10 seconds. This feature is especially useful for recording in slow motion.

It is also possible to set the function **Threshold Recording** by selecting the "Threshold" icon. By selecting this function, the video recording will start only when the temperature set in the analyses (see point 4) is exceeded. When the temperature falls below the set threshold, storage stops after 20 seconds and restarts when the threshold temperature is exceeded again.



7. Image saving


In order to save an image or a video, a USB drive must be connected to port **5**. To save an image, click on the floppy disk icon in the upper-left corner. The image will be saved in three formats:

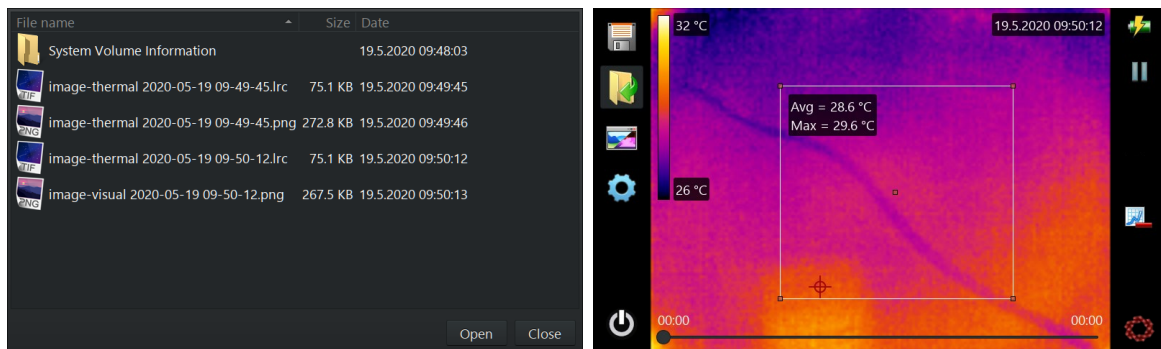
1. PNG infrared image of the display, including analyses,
2. LRC fully radiometric image, which can be analysed later,
3. PNG image taken by a normal camera in visible spectrum (VIS).

You do not have to click the floppy disk icon to save a video. The video is saved automatically (see point 6).



8. Gallery

You can view the saved images and videos in the "Gallery" folder. To escape from the Gallery, click the "Display  Mode" icon.



9. Settings (for advanced users)

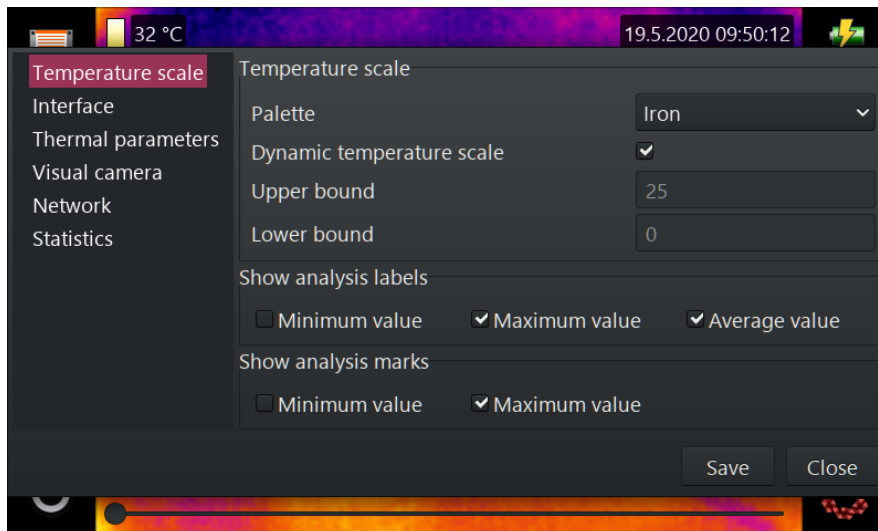
The infrared camera allows you to set all the values needed to evaluate temperature.

9.1 Temperature scale: colour palette and temperature range

This allows you to switch between two colour ranges, iron /jet.

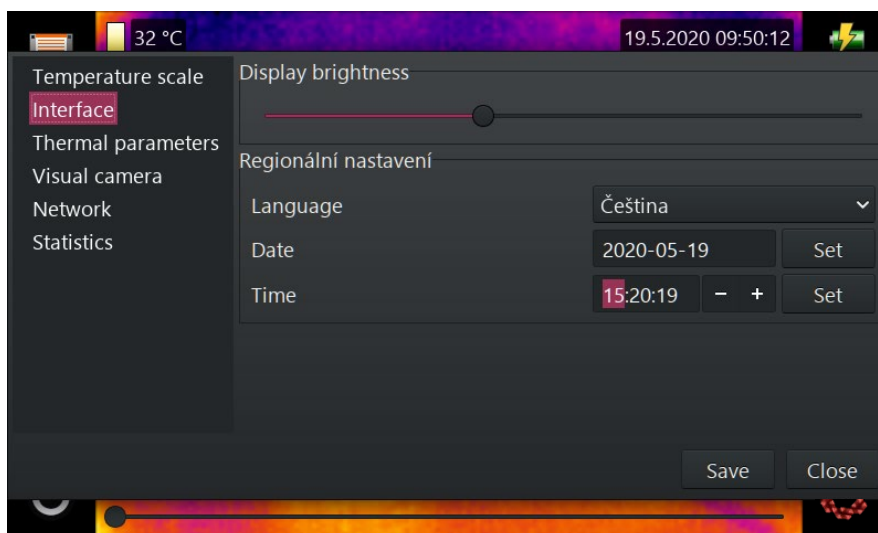
In the dialog box, you can see that the **lower and upper limits of the displayed temperature can also be set**. Limits can be entered numerically in °C or are determined dynamically. The dynamic display sets the limits according to the coldest and warmest points on the image.

You can also set which labels are to be displayed in area analysis and whether the positions of minimum and maximum temperatures will be displayed.



9.2 Interface: display brightness and time

You can adjust the **display brightness**.



9.3 Thermal parameters: measurement parameters

You can set **other parameters for thermal imaging measurements** (e.g. emissivity of the measured object).

Emissivity - emissivity of the monitored object

Background - background temperature (or the surroundings of the monitored object)

Atmosphere - transmissivity and temperature of the atmosphere

Window - window transmissivity (see Calibration mode)

WARNING: Only change these settings if you know what the value means. In the case of incorrectly set values, the measured temperature may not correspond to reality.

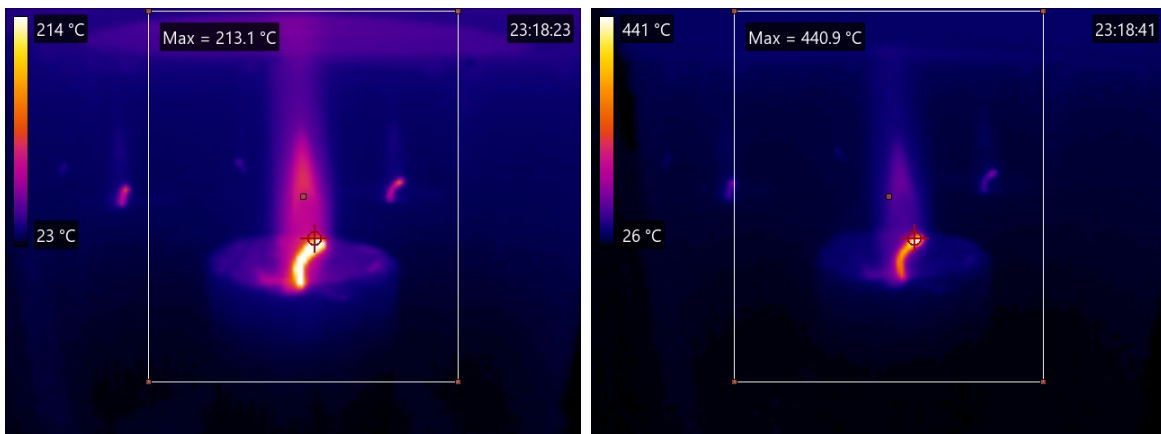
9.4 Calibration: calibration and measuring ranges

Gain mode (range selection)

High gain - measurement in the range: from -10 to - 140 ° C, error +/-5 ° C.

Low gain - measurement in the range. from -10 to - 400 ° C, error + /-10 ° C.

Auto - the mode changes automatically, high-> low if at least 25% of the pixels exceed 115 ° C and low-> high if at least 90% of the pixels fall below 85 ° C.



Calibration mode (selection of the calibration mode)

Lepton default - the value the Lepton was calibrated to during production (window permeability should be 0.83 if the back cover is fitted, 1.0 if not)

FFC compensation - same as "Lepton default", but aims to partially trim the peak after FFC

Post-processing - shifts the measured temperatures according to the set calibration curve (window permeability must be 1.0)

Radiometry only - does not measure temperature, but the intensity of temperature flow

Enable FFC - temporary deactivation of periodic FFC correction (it is not automatically saved and resets to the default state after the camera is switched off)

Correction type (correction of measured temperatures in the image)

Manual offset - all temperatures will be shifted by the specified temperature

Static black body - all temperatures will be shifted to match the specified temperature in the analysis

Dynamic black body - all temperatures will be shifted so that the temperature in the analysis matches the temperature read from the black body. The temperature of the black body can be optional. The only supported black body is Omega BB-701 connected via USB.

When the function "Black Body" is selected, a green 3x3 analysis is added to the image and can be moved to the area corresponding to the black body.

"Run Flat-Field Correction" button - one – off FFC correction

9.5 Network: streaming and software updates

"Enable Network Connection" button - enables network connection and requests an IP address via DHCP. After this address is assigned by the remote server, the address is displayed.

RTSP Streaming - you can enable video streaming via the RTSP protocol through port 5540. Instructions are available at <https://edu.labir.cz/docs/camera/rtsp> .

Using a computer, you can connect to the camera via a video player (e.g. VLC, Media Player Classic, etc.) at `rtsp://<ip address of the camera>:5540/live.sdp`

"Firmware update" button - downloads the latest version of the camera SW from the TIMIC server