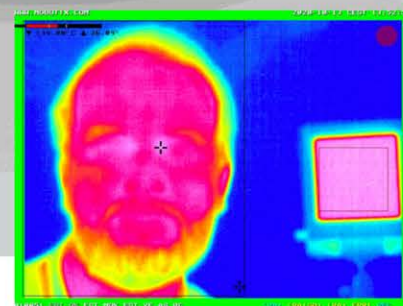
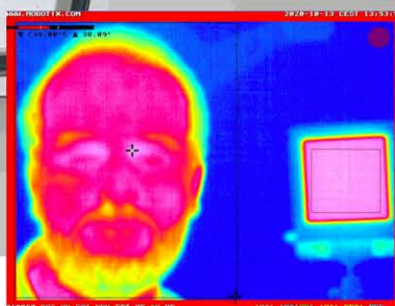
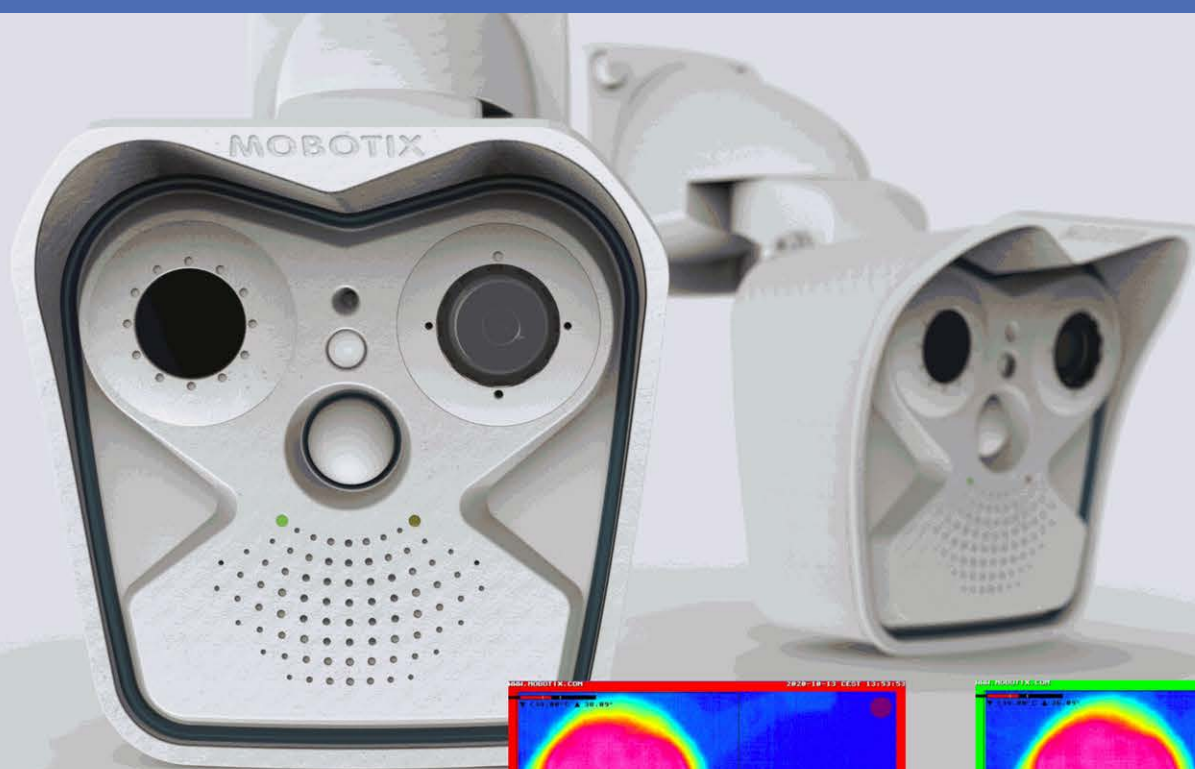


User Guide

MOBOTIX EST Thermal Camera for Adjunctive Screening of Body Temperature

Mx-M16TB-EST

© 2023 MOBOTIX AG



IMPORTANT NOTE

The body temperature measurements from the MOBOTIX EST Thermal Camera should not be solely or primarily relied upon to diagnose or exclude a diagnosis of COVID-19 or any other disease.

Table of Contents

Table of Contents	2
Support	3
Imprint	4
Safety Notices	5
Legal Notes	6
User Instructions	1
Intended Purpose	1
System Components	2
General Procedure Overview	3
Things to Observe When Measuring	4
Things to Avoid When Measuring	5
Preparing the Equipment for Measuring	5
Preparing the Person for Measuring	6
Conducting the Measurement	7
Positioning the Person	7
Measuring the Person’s Temperature	7
Minimum Pixel Requirements	10

Support

If you need technical support, please contact your MOBOTIX dealer. If your dealer cannot help you, he will contact the support channel to get an answer for you as quickly as possible.

If you have internet access, you can open the MOBOTIX help desk to find additional information and software updates. Please visit:

www.mobotix.com > [Support](#) > [Help Desk](#)



Imprint

This document is part of the camera manufactured by MOBOTIX AG (called manufacturer in the following); the document describes how to use and to configure the camera and its components.

Subject to change without notice.

Copyright Information

This document is protected by copyright. Passing on information to others is not permitted without the prior written consent of the manufacturer. Violations will be subject to criminal punishment.

Patent and Copy Protection

All rights reserved. Trademarks or registered trademarks belong to the corresponding owners. Intel Inside and the Intel Inside logo are trademarks of Intel Corporation or its subsidiaries.

Address

MOBOTIX AG
Kaiserstrasse
67722 Langmeil
Phone: +49 6302 9816-103
E-Mail: sales@mobotix.com
Internet: www.mobotix.com

Support

See [Support](#), p. 3.

Safety Notices

- This product must not be used in locations exposed to the dangers of explosion.
- This product must not be used in oxygen-enriched environments.
- Do not use this product in a dusty environment.
- Protect this product from moisture or water entering the housing.
- Make sure that you install this product as outlined in this document. A faulty installation can damage the product!
- Do not replace batteries of the product. Batteries can explode if they are replaced by an incorrect type.
- Only install this system in a separate network without any connections to other networks.
- Electrical systems and equipment may only be installed, modified and maintained by a qualified electrician or under the direction and supervision of a qualified electrician in accordance with the applicable electrical guidelines. Make sure to properly set up all electrical connections.
- If using a Class I adapter, the power cord shall be connected to a socket-outlet with proper ground connection.
- To comply with the requirements of EN 50130-4 regarding the power supply of alarm systems for 24/7 operation, it is highly recommended to use an uninterruptible power supply (UPS) for powering the product.

Legal Notes

Legal aspects of video and sound recording:

You must comply with all data protection regulations for video and sound monitoring when using MOBOTIX AG products. Depending on national laws and the installation location of the MOBOTIX EST Thermal Camera, the recording of video and sound data may be subject to special documentation or it may be prohibited. All users of MOBOTIX products are therefore required to familiarize themselves with all applicable regulations and to comply with these laws. MOBOTIX AG is not liable for any illegal use of its products.

Declaration of Conformity

The products of MOBOTIX AG are certified according to the applicable regulations of the EC and other countries. You can find the declarations of conformity for the products of MOBOTIX AG on www.mobotix.com under Support > Download Center > Certificates & Declarations of Conformity.

RoHS Declaration

The products of MOBOTIX AG are in full compliance with European Unions Restrictions of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive 2011/65/EC) as far as they are subject to these regulations (for the RoHS Declaration of MOBOTIX, please see www.mobotix.com, Support > Download Center > Documentation > Brochures & Guides > Certificates).

Disposal

Electrical and electronic products contain many valuable materials. For this reason, we recommend that you dispose of MOBOTIX products at the end of their service life in accordance with all legal requirements and regulations (or deposit these products at a municipal collection center). MOBOTIX products must not be disposed of in household waste! If the product contains a battery, please dispose of the battery separately (the corresponding product manuals contain specific directions if the product contains a battery).

Disclaimer

MOBOTIX AG does not assume any responsibility for damages, which are the result of improper use or failure to comply to the manuals or the applicable rules and regulations. Our General Terms and Conditions apply. You can download the current version of the General Terms and Conditions from our website at www.mobotix.com by clicking on the COS link at the bottom of every page.

User Instructions

Intended Purpose

The MOBOTIX EST Thermal Camera is intended to be used by health care professionals and others to measure the relative temperature variations of the surface of the body to provide an initial body temperature assessment for triage use. The MOBOTIX EST Thermal Camera can be used in a health care facility or other non-medical locations, including airports, public buildings, etc.

IMPORTANT NOTES:

- The MOBOTIX EST Thermal Camera is not FDA-cleared or approved. It is authorized to be distributed in the U.S. for the duration of the COVID-19 public health emergency in accordance with FDA's [Enforcement Policy for Telethermographic Systems During the Coronavirus Disease 2019 \(COVID-19\) Public Health Emergency \(April 2020\)](#).
- The body temperature measurements from the MOBOTIX EST Thermal Camera should not be solely or primarily relied upon to diagnose or exclude a diagnosis of COVID-19 or any other disease.

User Instructions

Intended Purpose

- Elevated body temperature in the context of use should be confirmed with secondary evaluation methods (e.g., a non-contact infrared thermometer (NCIT) or clinical-grade contact thermometer).
- Public health officials, through their experience with the device in the particular environment of use, should determine the significance of any fever or elevated temperature based on the skin telethermographic temperature measurement.
- The MOBOTIX EST Thermal Camera should be used to measure only one subject's temperature at a time.
- Visible thermal patterns are only intended for locating the points from which to extract the thermal measurement.
- Always use the MOBOTIX EST Thermal Camera in a manner that is consistent with ISO/TR 13154: 2017: *Medical electrical equipment – Deployment, implementation and operational guidelines for identifying febrile humans using a screening thermograph.*

System Components

Black Body Radiator



**MOBOTIX EST Thermal Camera
Mx-M16TB-EST**



- The **black body radiator** is used to generate an area with a specific temperature that will be used by the MOBOTIX EST Thermal Camera.

- The **MOBOTIX EST Thermal Camera** measures the difference between the reference temperature of the black body in the **Offset Correction Reference Area** and the temperature of the hottest spot in the **Measurement Area**.

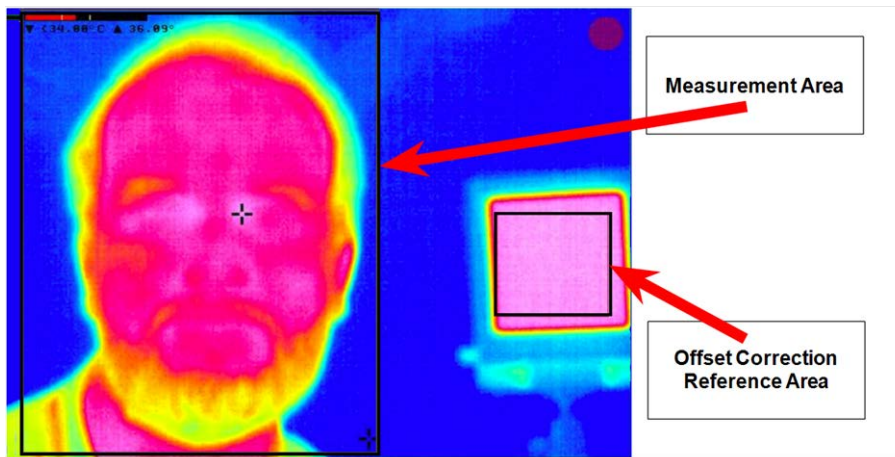
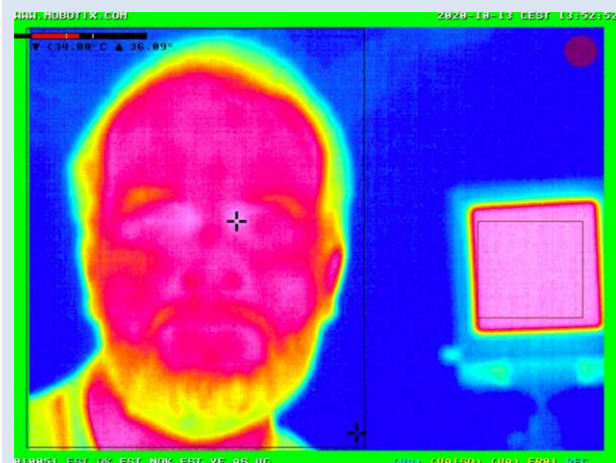


Fig. 1: Live image with *Measurement Area* and *Offset Correction Reference Area* (black body)

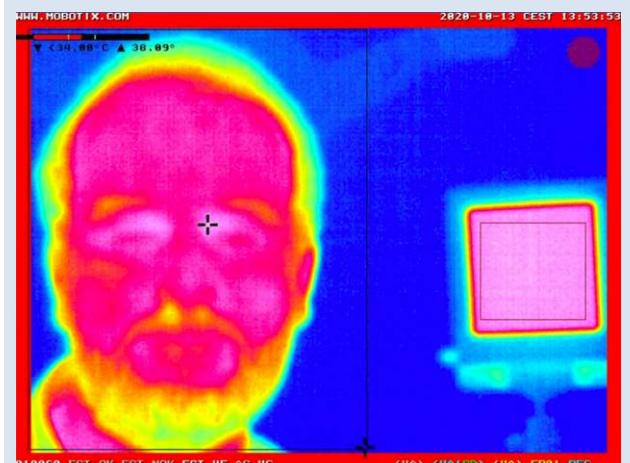
General Procedure Overview

- The operator will observe the monitor that shows the person's face and the black body reference area.
- Depending on the **frame color** of the camera image, the operator can decide on what to do next:

Green Frame: Temperature OK



Red Frame: Temperature not OK



Notes

- The crosshairs in the figure above show the hottest temperature of the image. This spot should be where the **inner cantus** of one eye is located in the image (see enlarged area below).

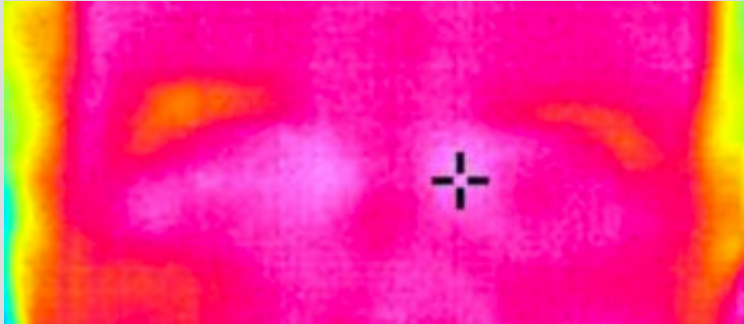


Fig. 2: Crosshairs should mark the *inner cantus* of the eye

- Temperatures are only displayed if they are within the range of **34 °C to 39 °C**. Lower temperatures are shown as $< 34 \text{ °C}$, higher temperatures as $> 39 \text{ °C}$.
- The camera performs an internal self calibration every minute, indicated by a yellow frame. **During this time frame, the camera cannot be used for measurements** (see figure below).

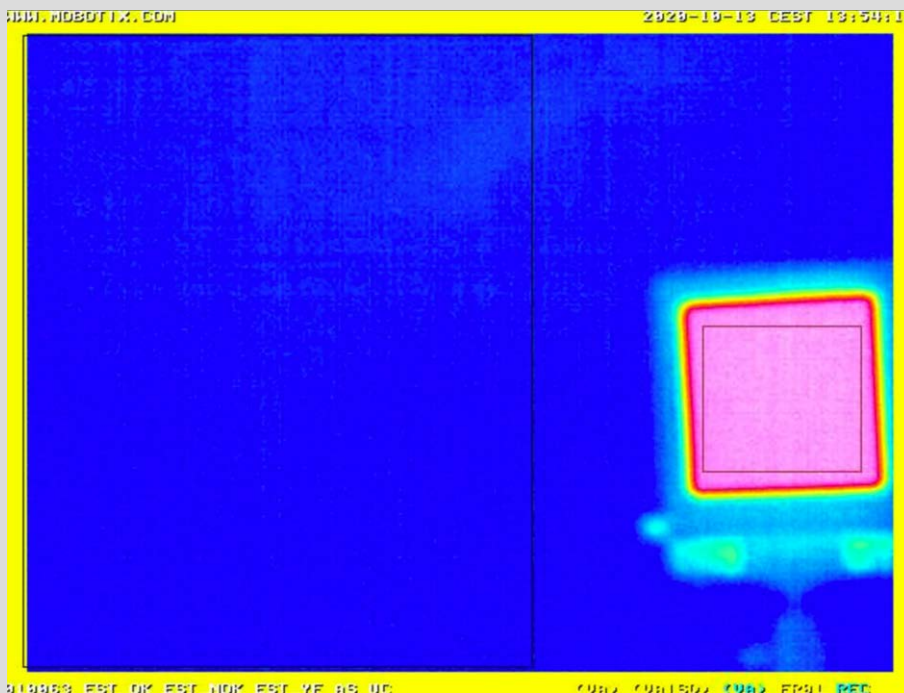


Fig. 3: Camera running internal self-calibration (once a minute)

Things to Observe When Measuring

Make sure that the following conditions are met when operating the MOBOTIX EST Thermal Camera system:

- You have been properly trained on the system to avoid the risk of not detecting persons that be COVID-19-positive (false negatives).
- A person with administrative access to the camera is present once a day before starting measurements to recalibrate the system (see [Preparing the Equipment for Measuring, p. 5](#)).
- The measurement is only finished if a green or red frame indicates the result.
- The camera performs an internal self calibration every minute, indicated by a yellow frame. **During this time frame, the camera cannot be used for measurements.**
- The person's face is properly within the measurement area and covers as many pixels as possible to meet the [Minimum Pixel Requirements, p. 10](#).

Things to Avoid When Measuring

- Avoid reflective backgrounds (for example, glass, mirrors, metallic surfaces) to minimize reflected infrared radiation.
- Avoid moving air in the measurement area as much as possible (no fans, vents, draft, etc.).
- Avoid strong lighting (for example, incandescent, halogen, and quartz tungsten halogen light bulbs).

Preparing the Equipment for Measuring

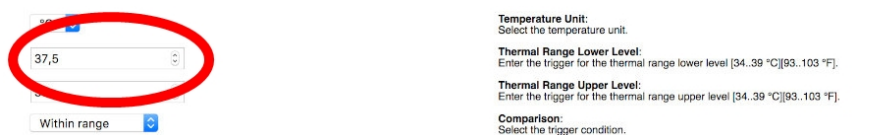
- Room temperature should be 20 to 24 °C/68 to 76 °F and relative humidity 10 to 50 percent.
- Turn on the entire system 30 minutes before use to warm it up.
- Make sure that the black body device is running properly.

- **Calibration** needs to be repeated **daily or after any change of the system setup or environmental conditions** to keep the stated performance level:
 - One to three persons should be measured first by an NICT or clinical thermometer and then by the MOBOTIX EST Thermal Camera.
 - If the temperature measured by the thermal camera differs from the one of the thermometer, adjust the **Temperature Offset** until both show approximately the same value. This step is required, because the body temperature measured by the clinical thermometer is usually 1 to 1.5 °C higher than the temperature measured at the inner cantus and to compensate for different environmental and setup-up factors.



Fig. 4: Adjusting the Temperature Offset parameter

- For testing the alarm condition, put an object with slightly higher temperature (above the **Thermal Range Lower Level** of the EST_NOK profile) into the measurement area.



Preparing the Person for Measuring

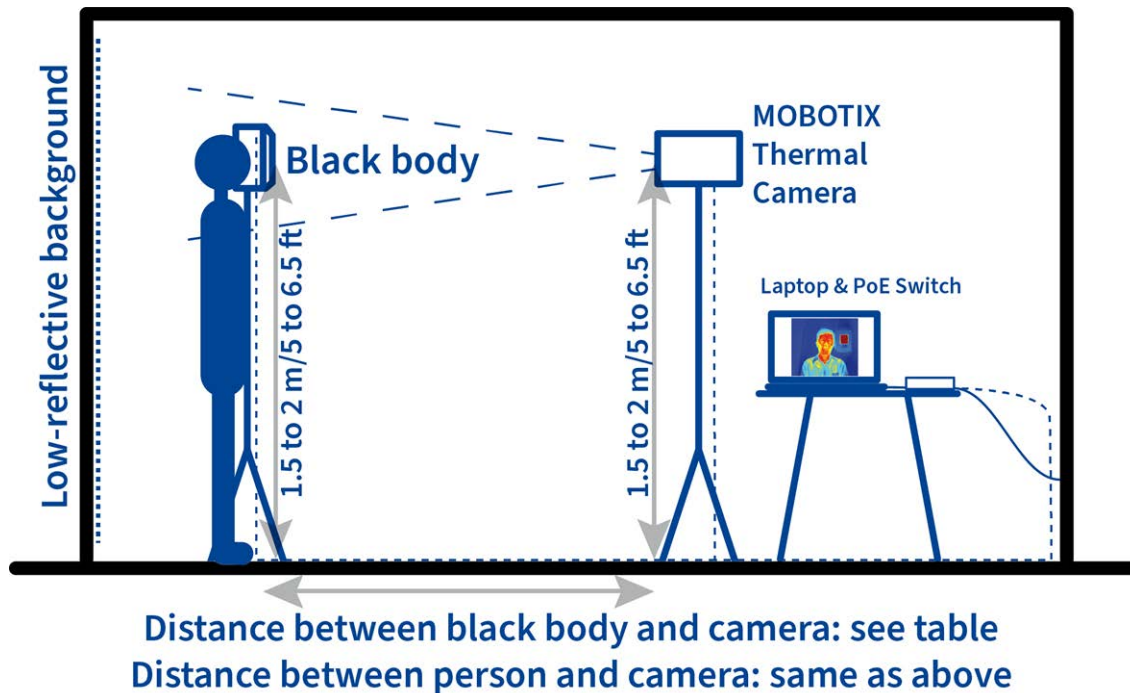
The person handling the system should make sure that the following conditions are met.

- Any face obstructions must be removed before measurement (such as a mask, glasses, hat, headband, or scarf), hair must be pulled away from the face.
- The person's face must be clean and dry.
- The person does not have a higher or lower face temperature from wearing excessive clothing or head covers (for example, headbands, bandanas) or from using facial cleansing products (for example, cosmetic wipes).
- The person has waited at least 15 minutes in the measurement room or 30 minutes after exercising, strenuous physical activity, bathing, or using hot or cold compresses on the face.

Conducting the Measurement

Positioning the Person

Position the person at a fixed distance (1 to 1.5 m/3 to 5 ft) from the thermal imaging system, directly facing the camera:



Measuring the Person's Temperature

- Measure only one person's surface skin temperature at a time.
- Make sure the person has prepared for the measurement as described in [Preparing the Person for Measuring](#), p. 6:
 - Any face obstructions have been removed.
 - The face is clean and dry.
 - No excessive clothing, head covers, or the like.
 - Person has adjusted to room temperature.

User Instructions

Conducting the Measurement

- When measuring, follow these rules:
 - The black body must be fully visible and the reference window must be completely in the **Offset Correction Reference Area** (black body area; see figure below).

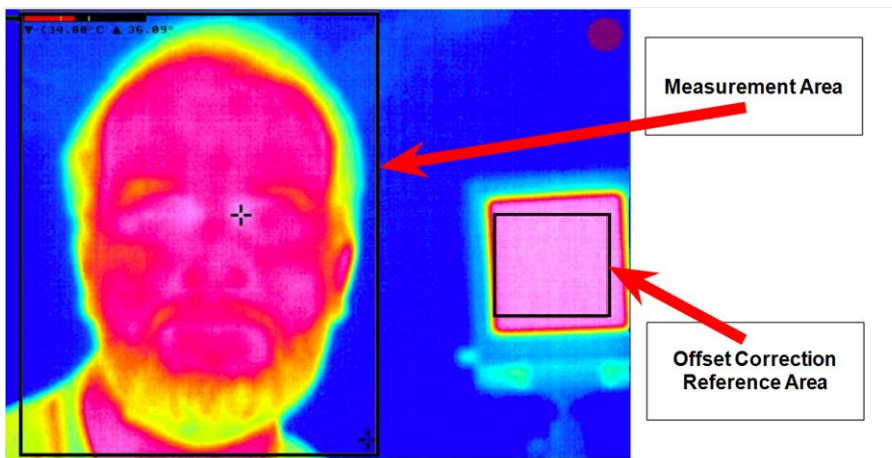
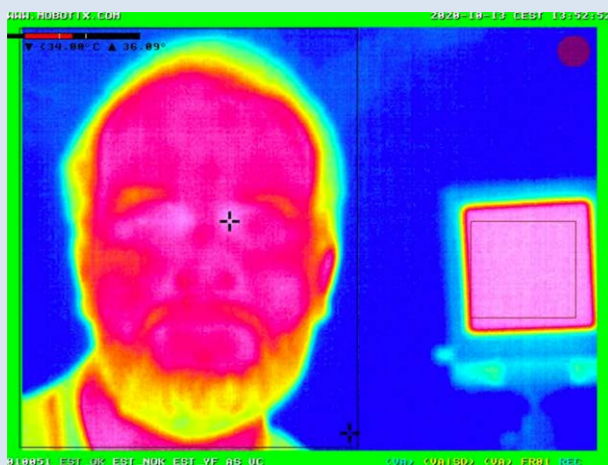


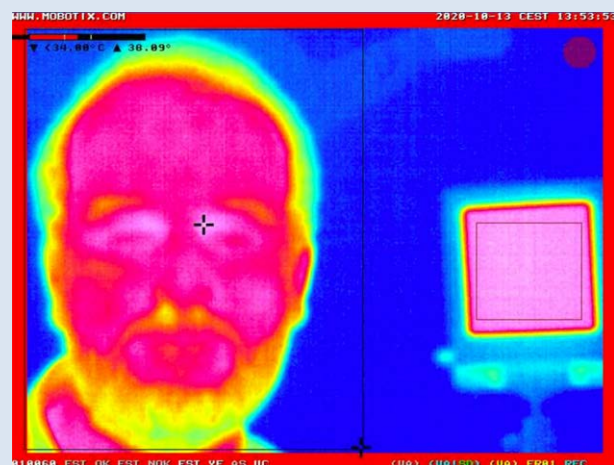
Fig. 5: Live image with Measurement Area and Offset Correction Reference Area (black body)

- The face must cover the full height of the thermal image and the eyes must be completely visible in the **Measurement Area** (see figure above).
- The person must not move while the system is measuring the temperature (up to six seconds). A colored frame around the image (red or green) indicates the end of the measurement.
- Depending on the **frame color** of the camera image, you can decide on what to do next:

Green Frame: Temperature OK



Red Frame: Temperature not OK



Notes

- The crosshairs in the figure above show the hottest temperature of the image. This spot should be where the **inner cantus** of one eye is located in the image (see enlarged area below).

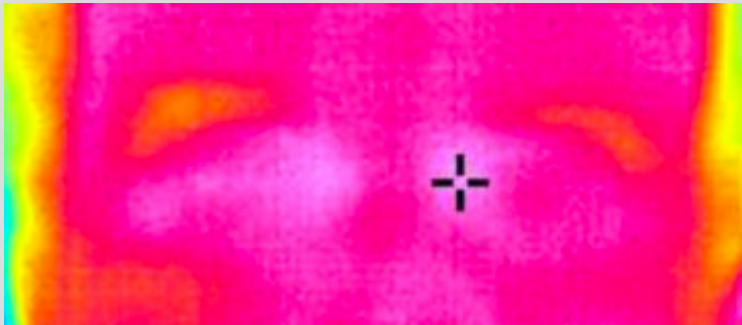


Fig. 6: Crosshairs should mark the *inner cantus* of the eye

- Temperatures are only displayed if they are within the range of **34 °C to 39 °C**. Lower temperatures are shown as < 34 °C, higher temperatures as > 39 °C.
- The camera performs an internal self calibration every minute, indicated by a yellow frame. **During this time frame, the camera cannot be used for measurements** (see figure below).

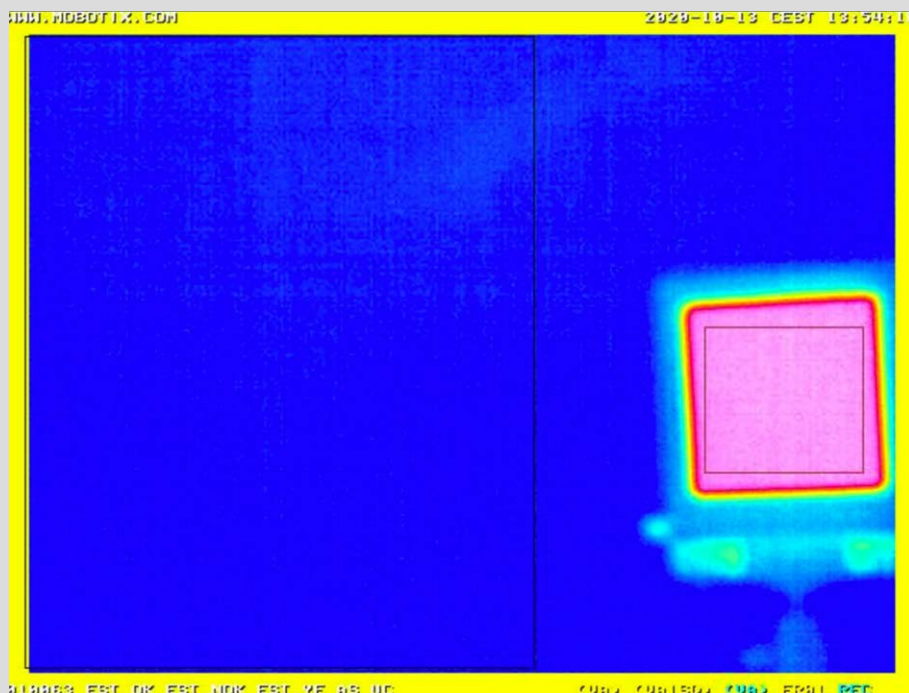


Fig. 7: Camera running internal self-calibration (once a minute)

Attention

If an increased temperature is detected (red frame), you should use a different method to confirm a fever. Public health officials can help you determine if the fever is a sign of infection.

Minimum Pixel Requirements

When setting up and operating the MOBOTIX EST Thermal Camera system, make sure that the minimum pixel requirements specified below are met.

Definitions

- **Workable Target Plane:** This is the entire measurement area in which the person's face should be fully inside.
- **Face Pixels:** Number of pixels within the *Workable Target Plane* that is covered of the person's face.

Item	Minimum Number of Pixels (Horizontally)	Minimum Number of Pixels (Vertically)
Workable Target Plane	320	240
Face Pixels	180	240