## Considerations

#### Follow the IEC and ISO recommendations

**IEC 80601-2-59:2017** Medical electrical equipment — Part 2-59: Particular requirements for the basic safety and essential performance of screening thermographs for human febrile temperature screening.

**ISO/TR 13154:2017** Medical electrical equipment — Deployment, implementation and operational guidelines for identifying febrile humans using a screening thermograph

**ISO 80601-2-56:2017** Medical electrical equipment — Part 2-56: Particular requirements for basic safety and essential performance of clinical thermometers for body temperature measurement

#### FDA Temporal guidelines for the use of Thermographic cameras

The US FDA has declared it will not go after the many companies marketing unapproved fever detection cameras during the coronavirus public health emergency as long as they "do not create an undue risk", even though it does consider these products medical devices, it has announced in new guidance. <sup>(1) (source: IPVM)</sup>

https://www.fda.gov/media/137079/download

#### **MOBOTIX Statement**

- All information provided is intended as a guide.
- This is not a certified medical device.
- Please use as a rapid preliminary screening process to measure elevated temperatures in human.
- Only for indoor applications. Never use outdoors.
- Follow the local government health organization guidance such as FDA, IEC and/or ISO when using this product.

#### **MOBOTIX Thermal Sensors**

Thermal Sensor Type:	Uncooled Microbolometer
Thermal Resolution:	336 x 252
Pixel Pitch:	17 μ m
IR Range:	7.5 to 13.5
Lens Options:	45°, 25°, 17°
Housing Options:	M16 or S16 Series
Power Consumption:	<10W max

## Summary of steps

- 1. Strategic placement of the camera
- 2. What factors are affecting the IR temperatures values from a MOBOTIX Thermal Sensor
- 3. Emissivity
- 4. Atmospheric transmission
- 5. Distance
- 6. Where to measure temperature in humans
- Examples
- 7. Factors that might affect the temperature measurement in humans
- 8. Configuration of the camera: Thermal sensor settings
- 9. Configuration of the camera: Thermal radiometry events
- 10. Configuration of the camera: Periodic event
- 11. Configuration of the camera: Ambient temperature calibration
- 12. Configuration of the camera: Alarm notification

## Strategic placement of the camera

Simply controlling the distance to target is not enough. You must consider other factors that will increase the accuracy of the measurement.

- Don't install the camera near to doors, vents, or anything that can blow hot/cold air to the area surrounding the camera and/or heavily change the relative humidity of the area. Install the camera as further away as possible from such areas.
- Consider (whenever is possible) that a person temperature might be affected by the outdoor environment: Rain, Cold, Hot sunny day, Exercise activity. Measure the temperature as further away as possible from entry points.

# What factors are affecting the IR temperatures values from a MOBOTIX Thermal Sensor



- Emissivity
- Ambient temperature & humidity
- Distance

MOBOTIX's products are made in Germany ensuring that we use the best sources to our components and the highest quality control and manufacturing standards, thus ensuring the highest calibration in our thermal sensors.

## Emissivity

The MOBOTIX's camera can be calibrated to the emissivity factor of the material of interest

Material	Emissivity
Black body matt	1
Human skin	0.98
Paper	0.93
Wood	0.88 - 0.93
Glass smooth	0.92
Concrete	0.85
Cotton cloth	0.77
Polished copper or steel	0.04
Polished silver	0.02

## Atmospheric transmission

Further complications come into play when the atmosphere is not completely transmissive for the thermal radiation. One then has some reduction of the thermal radiation getting from the objects to the camera, but at the same time an additional thermal radiation generated in the atmosphere. Those effects could in principle be compensated in the temperature calculation. <sup>(3)</sup> (source: MOVITHERM)

## Distance

Thermal radiation have a dependence of measurement over the distance. You can only calibrate the camera when the person temperature value measured by the MOBOTIX camera is lower than the the temperature measured by the clinical thermometer. In this figure we see that the performance of the thermal sensor against a baseline fix temperature value would cross-references between 2 to 5 meters in average.

#### Example of an ideal installation environment



## Where to measure temperature in humans with Thermographic cameras

Facial thermography of surface areas other than the region medially adjacent to the inner canthus is unreliable, and may be complicated by perspiration, facial skin flushed from exertion, etc. The current evidence indicates that the region medially adjacent to the inner canthus is the



preferred site for fever screening due to the stability of that measurement site. This is because this region is directly over the internal carotid artery.<sup>(2) (source: IEC)</sup>



#### Example of full face measurement: Inner Canthus

Note: The MOBOTIX Thermographic cameras TR will measure the hottest pixel in the area of measurement

Example of a person wearing goggles, lenses.



Note: A body temperature difference can be present if a person's face if measured in the forehead versus inner canthus (inner eye area), or versus any other spot in the face.





#### Example of a person wearing mask and goggles

Note: Please note that the temperature measure at the forehead area can be lower versus medial canthus area.



#### Example of a person wearing full face obstructions

Note: The MOBOTIX Thermographic cameras TR will measure the hottest pixel in the area of measurement. The carotid artery temperature is reflected in the measurement on the neck area.



Example of a measurement with a vent source (room temperature air) blowing air by the person's face



Note: Please note the cheek area gets colder and the temperature measured at the medial canthus area is ~1°C lower.

Example of a measurement with a vent source (room temperature air) blowing air by the camera lens



Note: Please note how the overall thermal signature is affected by the air being blown by the lens area

# Factors that might affect the temperature measurement in humans

The temperatures measured by a screening thermograph can be influenced when the individual being screened is sweating. Sweating thresholds can vary according to a person's fitness level, environment of residence, length of adaptation and the relative humidity. When humidity is controlled, these effects are minimized.

To produce consistent and reliable results of the temperature screening process, it is imperative that the screening thermograph be situated in a reserved stable indoor environment with a temperature range of 20 °C to 24 °C and relative humidity range from 10 % to 50 %. <sup>(1)</sup> (source: IPVM) These conditions can best be achieved by creating a local, controlled environment. For example a walk-through booth.

Toilets should not be proximal to the screening thermograph area. This is to both inhibit potential cross-infection and to prevent facial washing (alteration of the thermal profile) immediately prior to entering the screening thermograph area.

The individuals to be screened are channelled into single line and caused to stop or pause so that the screening thermograph can capture the region medially adjacent to the inner canthus temperature distribution one individual at a time. Measuring individuals one at a time facilitates the capture of a reliable thermogram and allows the determination of potentially febrile individuals requiring secondary screening.

To minimize disruption in high volume situations, the response time and throughput of the screening thermograph should be capable of operating in near real time for rapid and effective screening. This can necessitate that the screening thermograph be highly automated.<sup>(1)</sup> (source: ISO/ IEC)

<u>The measurement time of a person should be for at least 1 second, 2 seconds will be event</u> <u>better.</u>

There area many more factors such as what the person was doing before entering to the screening area. Here we name a few others,

- Excessive makeup
- Physiological Stress
- High or low blood pressure, fitness.
- Long exposure to hot/cold/humid weather.
- Subject motion (Super fast walking, running). Normal walking pace is OK.

A cold down time is recommended for persons who has been exposed for long periods to hot/ cold/humid weather.

A secondary screening area should be at a tangent to the screening thermograph area, but removed from the general traffic flow. Screening near the entrance of the facility prevents commingling. The secondary screening area is a care area that should equipped with a clinical thermometer and accessories that comply with ISO 80601-2-56 and should be

How to configure the MOBOTIX Camera for Elevated Body Temperature application

staffed by qualified medical personnel.

## Setting up the MOBOTIX Camera

You will need a computer with full administrative rights Windows or Mac, a PoE switch or injector IEEE802.3af/at, network patch cable Cat6a shielded.

More details in the MOBOTIX Camera Manual, <u>https://www.mobotix.com/sites/default/files/2018-07/mx\_ML\_M16\_en\_20180717.pdf</u>

Make sure you have the latest firmware in the camera,

https://www.mobotix.com/en/software-downloads

Download the MOBOTIX Management Center

https://www.mobotix.com/en/software-downloads

MOBOTIX Management Center System Requirements <u>https://www.mobotix.com/sites/default/files/2020-06/MxMC2.3.1\_release-notes\_en.html</u>

## **Camera configuration**

Open up your web the camera in your web browser (Chrome, Safari, Firefox, Edge, etc)





## Configuration of the camera: Thermal sensor settings

Thermal sensor settings is the area where you can calibrate the camera to perform a specific type of thermal measurement. The steps here below are for measuring temperature on persons.

#### Go to: Setup menu / Thermal Sensor Settings

	mx10-22-150-137 Setup Overview	
(i) Not Secure   192.1	68.1.8/control/	
The model of the m	22-150-137 Setup Overview	0 0
Image Control	<u>General Image Settings</u> (camera, image size and quality, sharpness,) <u>Exposure Settings</u> (image enhancement, exposure windows) <u>Color Settings</u> (color profile and saturation) <u>JPEG Settings</u> (MxPEG and JPEG quality) <u>Text &amp; Display Settings</u> (display of text and error messages) <u>vPTZ Settings</u> (vPTZ and zoom settings) <u>Thermal Sensor Settings</u> (color palette, automatic adjustment)	
Event Control	General Event Settings (arming and event LEDs)     Event Overview (trigger reactions based on internal and external sensors)     Action Group Overview (notify users or perform actions on events)     Recording (event, continuous and snap shot recording)	

#### Configure starting parameters as indicated in the picture

• • •	mx10-22-1	150-137 Thermal Ser	isor Settings
(i) Not Secure   192	2.168.1.8/control/ther	mal	
🏫 🔶 MOBOTIX S16 m	1x10-22-150-137 Therma	al Sensor Settings	00
Attribute	Left	Right	Explanation
Color Palette	Rainbow	·]	Color Palette: Select type of color palette. Factory default: <i>Rainbow</i>
			Show Color Palette: Displays the color palette at the bottom of the image. The left side of five bar corresponds to the lowest temperature, the right side to the highest temperature in the image. Factory default: On
Linear Mode			Enable Linear Mode: Enable linear mode in order to use <u>Thermal Radiometry</u> events. Factory default: On
Temperature Compensation			Manual Configuration: Enable the manual configuration of the parameters for temperature compensation. NOte: If disabled, the factory default settings of these parameters (a scene with 100% emissivity in close proximity to the camera) are applied. Factory default: Off
	98		Object Emissivity: Specify the emissivity of the object in percent. Factory default: 100
	99		Atmospheric Transmission: Specify the transmission coefficient of the area between the object and the camera in percent. Factory default: 100
	25		Amblent Temperature: Specify the temperature of the area between the object and the camera in degrees Celsius. Note: This parameter only has an effect if Atmospheric Transmission is set to a value less than 100%. Factory default: 22
Value Range	Small (High Sensitivit	¥) <b>↓</b>	Value Range: Set the value range, i.e., the lowest and the highest temperatures that can be displayed. A small value range noticeably increases th sensitivity (i.e., the smallest temperature difference that can be shown) compared to a large value range. Automatic: The camera automatically switches between high sensitivity and tigh temperature range. Large (Low Sensitivity): Reduces sensitivity and shows a larger temperature range. Small (High Sensitivity): Increases sensitivity and shows a smaller temperature range. Factory default: Automatic
Thermal Range	Disabled ¥		Automatic Adjustment: Enables automatic calculation of the minimum and maximum thermal values used for color mapping. Factory default: Enabled
Note: Disabling the Automa recordings. Appropriate start	atic Adjustment can cause Vide values for Minimum Thermal V	eo Motion and MxActivitySe Value and Maximum Therm Show Windows.	nsor to detect motion that is not visible in the live image and al Value can be found in the Histogram that can be enabled in
	470		Minimum Thermal Value: Thermal value in range (0,1023) that corresponds to the lower boundary of the color palette. Factory default: 45
	500		Maximum Thermal Value: Thermal value in range [0,1023] that corresponds to the upper
Set Factor	y Restore	Close	Less

The most important parameters are:

- Object emissivity: 98
- Atmospheric Transmission: 99
- Ambient Temperature: 25 (Set to current ambient temperature at the room, the MOBOTIX camera requieres this value in Celsius).

Always click SET before leaving exiting any menu to temporarily save and enable your changes

l	Set	Factory	Restore	Close	)			Less

## **Configuration of the camera: Thermal radiometry events**



#### Go to Setup menu / Event Overview

n 🛧 MOBOTIX S16 S16A-R119 Event Overview						
Environment Events		EBT38	Thermal Radiometry	Inactive	Delete	Edit
		EBT43	Thermal Radiometry	Inactive	Delete	

Environment Events: Click on <Edit...>

Events		/alue	Explanation	
			Add new profile	
Set	Factory	Restore	Close	Less

Click <Add new profile>



🏠 🔶 МОВОТІХ	MOBOTIX S16         S16A-R119 Environment Events         Image: Open content of the second							
Events	Value	Explanation						
EBT38		🗌 Inactive 🗆 Delete						
		Event Dead Time: Time to wait [03600 s] before the event can trigger anew.						
Event Sensor Type	Shock Detector Illumination Microphone Temperature Thermal Spotmeter Thermal Radiometry Trigger an event based on the temperature me This event type supports standard variables to be of	Event Sensor Type: Choose the environment sensor. easured in a user-defined area of the thermal sensor. displayed in the live image (see <u>Text &amp; Display Settings</u> ).						

- Assign a name to the profile. Example: EBT38 (Elevated Body Temperature 38 Celsius)
- Event Dead Time : 1 second
- Event Sensor Type: Thermal Radiometry

#### Set measurement area

**Pro-Tip:** Set the image resolution of the camera to VGA mode and maintain Live image and Setup menu side to side in your screen while configuring.



#### Creating the measurement area

On the live image do as follow,

- Initial coordinates: Click [Shit] Key + Click
- Final coordinates: Click

• • • • \$16A-R119 Live x +	000	S16A-R119 Environment Events	
	(i) Not Secure   192.16	58.1.50/control/event_env	
	🏫 🔶 MOBOTIX S16 S16/	A-R119 Environment Events	0 9
🔯 MX 📨 MxC4C 🧧 aDrive 🔯 MX Intranet 📋 MxHelpD 📋 MxToolBox 🏩 Translate 📋 TV-Col 🗦	Attribute	Value	Explanation
MOBOTIX S16 S16A-R119 Live	Shock Detection		Detection Sensitivity: Sensitivity value for Shock Detection events. Lower values trigger more easily. Only increase in case of high false alarm rates.
	Thermal Spotmeter Crosshairs		Show Thermal Spotmeter Crosshairs: Show crosshairs to adjust the camera.
Admin Menu MA-V3.2.6.3 2020-06-13 ED1 16:44:02	Events	Value	Explanation
Arm & Record	EBT38		🖾 Inactive 🗆 Delete
Audio on 1		1	Event Dead Time: Time to wait (03600 s) before the event can trigger anew.
Marticoun Marticouri UC Elwar LEDo Blink Phy Sound	Event Sensor Type	Shock Detector Ulumination Microphone Temporature Thermal Spottmeter Thermal Radiometry	Event Sensor Type Choose the environment sensor.
Fag Chit Strift	Trigger a This event ty	In event based on the temperature measured in a user-define pe supports <u>standard variables</u> to be displayed in the live ima	d area of the thermal sensor. ge (see <u>Text &amp; Display Settings</u> ).
tx Zoom 2		1,213,460,401,367	Edit Measurement Area: For a detailed description of window definitions and additional variables, please refer to the <u>help, papp</u> .
Zoom- End Coordinates			Measurement areas can also be defined by Shift-click+click in the live image and pressing Set Rectangle.
SHIFT + Click		3 🛶	Set Rectangle
		Absolute Temperature 🗸	Measurement Mode: Select measurement mode.
		One Pixel V	Trigger Mode: • One Pixet: Trigger event if at least one pixel of the measurement area exceeds or drops below the Thermal Level. • Percent: Trigger event if the specified Area Percentage in the measurement area exceeds or drops below the Thermal Level.
		Thermal Level 🗸	Alarm Type: Select the alarm type.
		°C 🗸	Temperature Unit: Select the temperature unit.
		38	Thermal Level: Enter the trigger for thermal level [-40550 °C[[-401022 °F].
Her			Thermal Offset Correction: Correction of the offset between measured and actual temperature via a calibration source
© 2001-2000 MORDTH: - https://www.mobolix.com		38	Calibration source temperature: The actual temperature of the used calibration source
	Set Factory	Restore Close	Less

Then Click SET at the bottom right corner of the page.

## Setting up the Thermal Radiometry triggering parameters when not using a Black Body Radiator

Measurement Mode:

Alarm Type: Select the alarm type.

Temperature Unit: Select the temperature unit.

Select measurement mode.

Trigger Mode: • One Pixel: Trigger event if at least one pixel of the measurement area exceeds or drops below the Thermal Level. • Percent. Trigger event if the specified Area Percentage in the measurement area exceeds or drops below the Thermal Level.

Thermal Level: Enter the trigger for thermal level [-40..550 °C][-40..1022 °F].



- · Measurement mode: Absolute Temperature
- Trigger mode: One Pixel
- Alarm type: Thermal Level
- Temperature unit: °C
- Thermal Level: 37.6°C (This value must be in accordance to the local health department guidelines).

Type of reading	0–2 years	3–10 years	11–65 years	Over 65 years
Oral	95.9–99.5°F (35.5–	95.9–99.5°F (35.5–	97.6–99.6°F (36.4–	96.4–98.5°F (35.8–
	37.5°C)	37.5°C)	37.6°C)	36.9°C)
Rectal	97.9–100.4°F	97.9–100.4°F	98.6–100.6°F	97.1–99.2°F (36.2–
	(36.6–38°C)	(36.6–38°C)	(37.0–38.1°C)	37.3°C)
Armpit	94.5–99.1°F (34.7–	96.6–98.0°F (35.9–	95.3–98.4°F (35.2–	96.0–97.4°F (35.6–
	37.3°C)	36.7°C)	36.9°C)	36.3°C)
Ear	97.5–100.4°F	97.0-100.0°F	96.6–99.7°F (35.9–	96.4–99.5°F (35.8–
	(36.4–38°C)	(36.1-37.8°C)	37.6°C)	37.5°C)

Source: https://www.welchallyn.com/

## MOBOTIX

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- Thermal offset correction: Leave blank / uncheck
- **Comparison:** Higher than
- Action type: Every

#### Displaying the values on the image



- Show Measurement area: White
- Show thermal radiometry level meter: Check or Uncheck (as you wish)
- Show thermal radiometry level coordinates: Off
- Show thermal radiometry level crosshair: Red
- Show thermal radiometry profile name: Off

Click [SET] and then [CLOSE] at the bottom left corner of the menu.

### **Configuration of the camera: Periodic event**

The MOBOTIX's camera can calibrate itself against the ambient temperature for this we recommend the use of MOBOTIX's accessories such as ExtIO and GPS-Box. The M16 camera also have a built-in Ambient Temperature Sensor.

We configure a Periodic Event to let the camera know every 5 minutes the ambient temperature changes.



#### Go to Setup Menu / Event Control / Event Overview

	mx10-22-150-137 Setup Overview	
i) Not Secure   192.168	.1.8/control/	
<b>MOBOTIX S16</b> mx10-22-	150-137 Setup Overview	0 0
Image Control	<u>General Image Settings</u> (camera, image size and quality, sharpness,) <u>Exposure Settings</u> (image enhancement, exposure windows) <u>Color Settings</u> (color profile and saturation) <u>JPEG Settings</u> (MxPEG and JPEG quality) <u>Text &amp; Display Settings</u> (display of text and error messages) <u>vPTZ Settings</u> (vPTZ and zoom settings) <u>Thermal Sensor Settings</u> (color palette, automatic adjustment)	
Event Control	General Event Settings (arming and event LEDs) Event Overview (trigger reactions based on internal and external sensors) Action Group Overview (notify users or perform actions on events) Recording (event, continuous and snap shot recording)	

#### Go to Time Events / Click [Edit]

A MOBOTIX S16 S16A-R119 Event Overview							
Environment Events	EBT38	Thermal Radiometry	Inactive	Delete	Edit		
	EBT43	Thermal Radiometry	Inactive	Delete			
Image Analysis Events	No profiles defined.				Edit		
Internal Events	No profiles defined.				Edit		
Message Events	No profiles defined.				Edit		
Meta Events	EBT-Fever	Event Logic	Inactive	Delete	Edit		
Signal Events	UC	UC Soft Button	Inactive	Delete	Edit		
Time Events	PE	Periodic Event	Inactive	Delete	Edit		
Set Restore	Close						

#### Add new profile

Events	Value	Explanation
	Add ne	w profile
Set Factory	Restore Close	Less

Events	Value	Explanation
▼ PE		Inactive Delete
Event Sensor Type	<ul> <li>Periodic Event</li> <li>Random Event</li> <li>Time Task</li> </ul>	Event Sensor Type. Choose the time event type.
	Trigger an actio	periodcally every x seconds.
	Seconds V	Periodic Time Unit: Interval unit.
	600	Periodic Time Interval: Trigger interval [086400] in seconds, msec or Hz.
	[	d new profile
Set Factory	Restore Close	



- Name: PE
- Event sensor type: Periodic Event
- Periodic time unit: Seconds
- Periodic time interval: 300 (5 minutes), 600 (10 minutes) Your choice

Click [SET] and [CLOSE]

#### Creating the IP notifications: Ambient temperature calibration

Go to Admin Menu / Transfer Profiles / IP Notify

**Pro-Tip:** You can use IP Notification Profile # 5 as a example.

n 🛉 🔶 MOBOTIX S16 mx10-22-150-137 IP Notify Profiles 🛛 😨 0			
Profiles & Options	Value	Explanation	
- IP Notify Profile 1 Am	bTempCalib	Delete	
IP Notify Type	Custom Configuration	Predefined Configuration: VMcCC alarm isous produtined network messages to the MsCC alarm list. Acknowledge Required prompts the MsCC user to confirm the message. If the alarm is not acknowledged within the specified acknowledge time, the cavrer singers a transmission error. Select Custom Configuration to see the extended configuration.	
Destination Address	localhost:80	Destination Addresses : Receiver IP address and port. Separate IP address and port using a colon. Enter one address per line.	
	Parallel send to all	Send Order: Send notification to one or more destinations. Sequential and parallel will send a notification to <b>each</b> destination address. Send to next on error will alop after the <b>first</b> successful notification or will ryth a next address if unsuccessful.	
Data Protocol	HTTP/1.0 Request	Transfer Protocol: Transfer notification data using these protocol headers.	
	/control/control	CGI-Path: Absolute CGI path beginning with <sup>14</sup> . This parameter allows using <u>variables</u> .	
	·····	HTTP Authentication: User name and password for HTTP authentication separated by colon. Example: admin:meinsm	
Data Type	Plain text	Notification Data: Select type of IP notification data.	
	<pre>set&amp;section=thermal&amp;uhu_tcomp_atm_temp=\$(SEN.TEX.CELSIUS) \$(SEN.TEX,CELSIUS)</pre>	Message: Message binclude in Plain text notification data. When using HTTP protocol this text is used for QUERY_STINKG in GET request. This parameter allows using <u>variables</u> .	
Send Port		Port Number:	
		Send a message from this camera port (0 for automatic).	
	Add new profile		
Set Fac	tory Restore Close	Less	

- Name: AmbTempCalib
- Destination Address: localhost:80
- Send order: Parallel send to all
- Transfer protocol: HTTP/1.0 Request
- CGI-Path: /control/control
- **HTTP Authentication:** <user-name>:<password> (enter the user name of the camera separated from the password with colon ":")
- Notification Data: Plain text
- Message: set&section=thermal&uhu\_tcomp\_atm\_temp=\$(SEN.TEX.Celsius) \$ (SEN.TEX.Celsius)



#### NOTE

- **\$(SEN.TEX.Celsius)** is the placeholder variable for "Camera Internal Thermometer" and we are using it this as an example only.
- If you are using one of the recommended MOBOTIX accessories **you need to replace** the variable placeholder for the corresponding value.

	1	
<pre>\$(SEN.TEX.CELSIUS), \$(SEN.TEX.FAHRENHEIT)</pre>	Only with ExtIO! Temperature of the ExtIO in degrees Celsius or degrees Fahrenheit	°C °F
<pre>\$(SEN.TGP.CELSIUS), \$(SEN.TGP.FAHRENHEIT)</pre>	Only with MX-GPS-Box! Temperature of the MX-GPS-Box in degrees Celsius or degrees Fahrenheit	°C °F

### **Triggering the Ambient Temperature Calibration to the camera**

Go to Setup Menu / Action Group Overview

	mx10-22-150-137 Setup Overview			
(i) Not Secure   192.1	i) Not Secure   192.168.1.8/control/			
MOBOTIX S16 mx10-2	22-150-137 Setup Overview	0 0		
Image Control	<u>General Image Settings</u> (camera, image size and quality, sharpness,) <u>Exposure Settings</u> (image enhancement, exposure windows) <u>Color Settings</u> (color profile and saturation) <u>JPEG Settings</u> (MxPEG and JPEG quality) <u>Text &amp; Display Settings</u> (display of text and error messages) <u>vPTZ Settings</u> (vPTZ and zoom settings) <u>Thermal Sensor Settings</u> (color palette, automatic adjustment)			
Event Control	General Event Settings (arming and event LEDs)     Event Overview (trigger reactions based on internal and external sensors)     Action Group Overview (notify users or perform actions on events)     Recording (event, continuous and snap shot recording)			

#### Click [Add new group]

n MOBOTIX S16 mx10-22-150-137 Action Group Overview			0 0	
Name	Arming	Events & Actions	Edit	
AmbTempCal	Enabled V (No time table) V	SIG TIM IP	Edit	
EBT-Fever Delete	Enabled V (No time table) V	MET VA I SO I SO	Edit	
Add new group				
Set Restore 0	Close			



n MOBOTIX S16 mx10-22-150-137 Action Group Details 7 0				
General Settings	Value	Explanation		
Action Group	AmbTempCal	Name: The name is purely informational.		
	Enabled V	Arming: Controls this action group: Enabled: activate the group. Off: deactivate the group. SF: group armed by signal input. CS: group armed by custom signal as defined in <u>General Event Settings</u> .		
	(No time table)	Time Table: Time table for this action profile ( <u>Time Tables</u> ).		
Event Selection	(select all) (select none) Environment: EBT38 Environment: EBT43	Event Selection: Select the overlawhich will trigger the actions below. Use [Ctrl]-Click to select more than one event. Events in parentheses need to be <u>activated</u> first.		
Action Details	0	Action Deadtime: Time to wait [03600 s] before a new action can take place.		
	Simultaneously 🗸	Action Chaining: Choose how the status of each subaction influences the execution of all others. Simultaneously all actions are executed aimultaneously. Simultaneously until first success: Simultaneous execution, hut as soon as one action succeeds (i.e. has been completed or the phone is picked up), all others are terminated. Consecutively: All actions are executed in the specified order. Consecutively until first success: Consecutive execution, but as soon as one action succeeds, the following actions are not executed. Consecutively until first failure. Consecutive execution, but as soon as one action succeeds, the clowing actions are not executed.		
Actions	Value	Explanation		
Action 1	IP Notify: AmbTempCalib	Action Type and Profile: Select the Action Profile to be executed.		
Delete	0	Action Timeout or Duration: If this action runs longer than the time specified [03600 s], it is aborted and returns an error; 0 to deactivate. For Image Profile action, this is the duration and no error returns.		
	Add new action			
Note:				
You may need administration privileges to add or modify the action profiles: Signal Out, Visual Alarm, Phone Call, IP Notify, Image Profile, MxMessageSystem, FTP, E-Mail, Play Sound.				
Set Factory Restore Close				

- Name: AmbTempCalib
- Arming: Enabled
- Time Table: No Time Table
- Event Selection: Time: PE
- Action Dead Time: 0
- Action chaining: Simultaneously
- Action 1: IP Notify: AmbTempCalib
- Action timeout or duration: 0



## Fine tuning of the temperature measurement



**Pro-Tip:** You need two persons to complete this task and FDA approve Non-Contact Clinical Thermometer

- 1. Measure the temperature of the person by the Eye' medial canthus, Forehead, between nose and lips area.
- 2. Write down all measurements
- 3. Start placing the person at 10 feet away from the camera
- 4. Look straight to the camera standing still
- 5. Avoid any face obstructions
- 6. The person at the computer must adjust the camera Atmospheric Transmission value
- 7. In order to be able to perform any calibration the temperature value measured by the MOBOTIX cameras must be lower than the temperature measure by the clinical thermometer

#### Example

The subject in the picture measure temperature by the NC Clinical Thermometer is 37°C, but at the 10 feet away the camera measure the person at 35.73°C



#### Go to Setup Menu / Thermal Sensor Settings

Mx10-22-150-137 Thermal Sensor Settings				
O Not Secure   192.1	168.1.8/control/the	rmal		
🏠 🔶 MOBOTIX S16 mx1	10-22-150-137 Therma	al Sensor Settings	00	
Attribute	Left	Right	Explanation	
Color Palette	Rainbow 🗸	•	Color Palette: Select type of color palette. Factory default: <i>Rainbow</i>	
			Show Color Palette: Displays the color palette at the bottom of the image. The left side of the bar corresponds to the lowest temperature, the right side to the highest temperature in the image. Factory default: On	
Linear Mode			Enable Linear Mode: Enable linear mode in order to use <u>Thermal Radiometry</u> events. Factory default: <i>On</i>	
Temperature Compensation			Manual Configuration: Enable the manual configuration of the parameters for temperature compensation. Note: If disabled, the factory default settings of these parameters (a scene with 100% emissivity in close proximity to the camera) are applied. Factory default: <i>Off</i>	
	98		Object Emissivity: Specify the emissivity of the object in percent. Factory default: 100	
	99		Atmospheric Transmission: Specify the transmission coefficient of the area between the object and the camera in percent. Factory default: 100	
	25		Ambient Temperature: Specify the temperature of the area between the object and the camera in degrees Celsius. NOBE: This parameter only has an effect if Atmospheric Transmission is set to a value less than 100%. Factory default: 22	
Value Range	Small (High Sensitivi	ty) 🗸	Value Hange: Set the value range, i.e., the lowest and the highest temperatures that can be displayed. A small value range noticeably increases the sensitivity (i.e., the smallest temperature difference that can be shown) compared to a large value range. Automatic: The camera automatically whitches between high sensitivity and high temperature range. Large (Low Constitivity): Reduces sensitivity and shows a larger temperature range. Small (High Sensitivity): Increases sensitivity and shows a smaller temperature range. Factory default: Automatic	
Thermal Range	Disabled V		Automatic Adjustment: Enables automatic calculation of the minimum and maximum thermal values used for color mapping. Factory default: Enabled	
Note: Disabling the Automatic Adjustment can cause Video Motion and MxActivitySensor to detect motion that is not visible in the live image and recordings. Appropriate start values for Minimum Thermal Value and Maximum Thermal Value can be found in the Histogram that can be enabled in Show Windows.				
	470		Minimum Thermal Value: Thermal value in range (0,1023) that corresponds to the lower boundary of the color palette. Factory default: 45	
	500		Maximum Thermal Value: Thermal value in range (0.1023) that corresponds to the upper	
			merman value in ange (e, rece) mer conception to the appen	

Adjust the Atmospheric transmission down from 99 in decrements of 5 points, 3 points, etc until you match  $\pm 0.3C$  to  $\pm 0.5C$  of the temperature measure by the clinical thermometer

Temperature Compensation		Manual Configuration: Enable the manual configuration of the parameters for temperature compensation. NOTE: If disabled, the factory default settings of these parameters (a scene with 10% emissivity in close proximity to the camera) are applied. Factory default: Off
	98	Object Emissivity: Specify the emissivity of the object in percent. Factory default: 100
	99	Atmospheric Transmission: Specify the transmission coefficient of the area between the object and the camera in percent. Factory default: 100
	25	Ambient Temperature: Specify the temperature of the area between the object and the camrar in degrees Celsius. NOIE: This parameter only has an effect if Atmospheric Transmission is set to a value less than 100%. Factory default: 22

Always click [SET] to enable changes after changing the value. You can also adjust the Object emissivity if needed to 97, or to 99.

# Configuration of the camera: Alarm notification for elevated body temperature alerts

Go to Setup Menu / Action Group Overview

•••	mx10-22-150-137 Setup Overview			
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The model of the m	7 Setup Overview	00		
Image Control <u>General</u> <u>Color S</u> <u>JPEG</u> <u>Text &amp;</u> <u>vPTZ S</u> <u>Therma</u>	al Image Settings (camera, image size and quality, sharpness,) ure Settings (image enhancement, exposure windows) Settings (color profile and saturation) Settings (MxPEG and JPEG quality) Display Settings (display of text and error messages) Settings (vPTZ and zoom settings) al Sensor Settings (color palette, automatic adjustment)			
Event Control Event Control Event C Action Record	al Event Settings (arming and event LEDs) <u>Overview</u> (trigger reactions based on internal and external sensors) <u>Group Overview</u> (notify users or perform actions on events) <u>ding</u> (event, continuous and snap shot recording)			

#### Click [Add new group]

n 🔶 MOBOTIX S16 mx10-22-150-137 Action Group Overview			
Name	Arming	Events & Actions	Edit
AmbTempCal	Enabled V (No time table) V	SIG TIM IP	Edit
EBT-Fever Delete	Enabled V (No time table)	MET VA I SO I SO	Edit
	Add new group		
Set Restore C	Close		

- Name: EBT-Alarm
- Arming: Enabled
- Time Table: No Time Table
- Event Selection: Time: EBT38
- Action Dead Time: 0
- Action chaining: Simultaneously
- Action 1: IP Notify: Visual Alarm: Red Frame
- Action timeout or duration: 0

You can also configure the camera for,

- Signal Output Alarm
- Visual Alarm
- Phone Call: SIP-VoIP Alarm
- IP Notify Alarm
- FTP, Email
- Custom Sound Alarm



🏠 🔶 MOBOTIX S16 S16A-	-R119 Action Group Details	0 0	
General Settings	Value	Explanation	
Action Group	EBT-Fever	Name: The name is purely informational.	
	Enabled V	Arming: Controls this action group: Enabled: activate the group. Off: deactivate the group. Sf: group armed by signal input. CS: group armed by custom signal as defined in <u>General Event</u> <u>Settings</u> .	
	(No time table)	Time Table: Time table for this action profile ( <u>Time Tables</u> ).	
Event Selection	(select all) (select none)  Environment: EBT38 Environment: EBT43	Event Selection: Select the events which will trigger the actions below. Use [Crif-Click to select more than one event. Events in parentheses need to be <u>activated</u> first.	
Action Details	0	Action Deadtime: Time to wait [03600 s] before a new action can take place.	
	Simultaneously	Action Chaining: Choose how the status of each subaction influences the execution of all others. Simulfaneously: All actions are executed simulfaneously. Simulfaneously: All actions are executed simulfaneous execution, but as soon as one action succeeds (i.e. has been completed or the phone is picked up), all others are terminated. Consecutively: All actions are executed in the specified order. Consecutively: All actions are executed in the specified order. Consecutively: All actions are executed in the specified order. Consecutively until first succeess. Consecutive execution, but as soon as one action succeeds, the following actions are not executed. Consecutively until first failure: Consecutive execution, but as soon as one action fails, the following actions are not executed.	
Actions	Value	Explanation	
Action 1	Visual Alarm: Red Frame	Action Type and Profile: Select the Action Profile to be executed.	
Delete	0	Action Timeout or Duration: If this action runs longer than the time specified [03600 s], it is aborted and returns an error; 0 to deactivate. For <i>Image Profile</i> action, this is the duration and no error returns.	
	Add new action		
Note:			
You may need administration privileges to add or modify the action profiles: <u>Signal Out</u> , <u>Visual Alarm</u> , <u>Phone Call</u> , <u>IP Notify, Image Profile</u> , <u>MxMessageSystem</u> , <u>FTP</u> , <u>E-Mail</u> , <u>Play Sound</u> .			
Set Factory	Restore Close		