

Instruction Manual
thermoIMAGER TIM Connect

Software for thermoIMAGER TIM camera

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Content

Content	2
Welcome!	4
Warranty	5
1. Getting Started	6
1.1. Software Installation	6
1.2. Choice of Camera.....	7
1.3. Choice of Language.....	7
1.4. Software Window (Example).....	8
1.5. Menu and Toolbar (Icons).....	12
1.5.1. Menu.....	12
1.5.2. Toolbar (Icons).....	13
2. Software Configuration.....	15
2.1. General Settings.....	15
2.1.1. Color Palettes	15
2.1.2. Temperature Unit.....	17
2.1.3. Temperature Range Scaling of Reference Bar	17
2.1.4. Displayed Frame Rate	18
2.1.5. Change of Title Bar	19
2.1.6. Optimization of Software	20
2.2. Software Layout.....	21
2.2.1. Displayed Windows.....	21
2.2.2. View Bars.....	22
2.2.3. Information within Image	22
2.2.4. Temperatures in Digital Displays.....	23
2.2.5. Layout Management	24
2.2.6. Assign / Remove Layouts.....	25
2.2.7. Further Information	25
2.3. Arranging of Thermal Image	26
2.3.1. Mirroring of Displayed Image	26
2.3.2. Rotation of Displayed Image	26
2.3.3. Zooming in Areas of the Displayed Image	26
2.4. Imager Configuration.....	28
2.4.1. Calibration Files.....	28
2.4.2. Correction of Camera Calibration.....	28
2.4.3. Emissivity, Transmissivity, Ambient Temperature.....	29
2.4.4. Reference Temperature.....	30
2.4.5. Changing the Optics	32
2.4.6. Changing the Temperature Range.....	32
2.5. Imager Interfaces	33
2.5.1. General	33
2.5.2. Process Interface (PIF)	34
2.6. Software Development Kit (SDK)	37
2.6.1. Interprocess Communication (IPC)	37
2.6.2. COM-Port	37
2.7. Start Options	38
2.7.1. Overview of Start Options	38
2.7.2. Start of Multiple Software / Imager Instances	39
3. Data Capturing.....	41
3.1. Open Files.....	41
3.2. Replay of Files	41
3.2.1. Control Panel.....	41
3.2.2. Replay Options	42
3.3. Editing Video Sequences	43
3.4. Saving Files	44
3.4.1. Setting the Recording Frame Rate.....	44
3.4.2. Setting the Recording Modes	45
3.4.3. Temporary Recording File	46
3.4.4. Saving Radiometric Video Sequences or AVI files.....	47
3.4.5. Saving Image Data as Radiometric Snapshot or Text File	49

3.4.6.	Saving Text File of the Temperature / Time Diagram	53
3.4.7.	Location and Filename Templates of Triggered Recordings.....	53
3.4.8.	Display of Snapshots in a Separate Window ..	54
3.4.9.	Saving Images or Screenshots to Clipboard...	54
4.	Data Processing	55
4.1.	Measure Areas	55
4.1.1.	General Settings	55
4.1.2.	Calculated Objects.....	59
4.1.3.	Excluding Hot and Cold Spot Areas	62
4.1.4.	Individual Emissivity Values of Measure Areas	63
4.2.	Temperature Profile	64
4.3.	Temperature Time Diagram	67
4.3.1.	General Settings	67
4.3.2.	Scaling of Diagram Axes	68
4.4.	Histogram	70
4.5.	Extended Measuring Colors.....	73
4.6.	Image Subtraction.....	74
4.7.	Relative Extreme Values.....	75
4.8.	Alarms	76
4.9.	3D display of Thermal Image	78
5.	Visual Camera (only TIM 200/230)	79
5.1.	Enabling the Visual Camera.....	79
5.2.	Monitoring Modus	79
5.3.	Cross-fading Modus.....	80
5.3.1.	General	80
5.3.2.	Transparency of Thermal Image	81
5.3.3.	Moving the Thermal within the Visual Image ..	82
5.3.4.	Cross-fading of Defined Temperatures.....	83
6.	Line Scanner Mode	84
6.1.	General Information	84
6.2.	Basic Settings	85
6.2.1.	Line scanner configuration menu	85
6.2.2.	Choosing the Layout.....	85
6.2.3.	Rotating of the Image	85
6.2.4.	Activating the Line Scanner	86
6.2.5.	Positioning of the Line (Line Scanner Sighting View)	86
6.2.6.	Layout Configuration of the Sighting View Mode	88
6.3.	Data Evaluation of the Scanned Line.....	89
6.3.1.	Line Scanner View.....	89
6.3.2.	Triggered Display of Lines	90
6.3.3.	Snapshot Configuration	93
6.3.4.	Zoom Function of Snapshots	93
7.	Merging	94
7.1.	General Information	94
7.2.	Direct Connection over USB Port	95
7.2.1.	Configuration	95
7.3.	Connection via the Ethernet Network	100
7.4.	Simultaneous Flag Control and Frame Synchronization via PIF.....	101
8.	Further Information	103
8.1.	Activating Software Messages.....	103
8.2.	System Requirements	105
8.3.	About Software.....	105
8.4.	Extended Configuration	106
8.5.	Overview Shortcuts	107

Welcome!

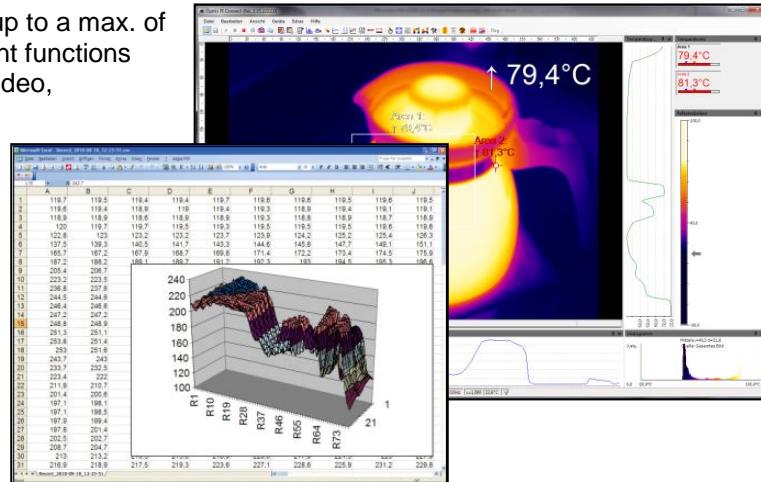
Thank you for choosing the TIM Connect software!

The TIM calculates the surface temperature based on the emitted infrared energy of objects [[► Basics of Infrared Thermometry](#)]. The two-dimensional detector (FPA - Focal Plane Array) or (CMOS -

Complementary metal-oxide-semiconductor) allows a measurement depending on the device max. pixels and will be shown as thermographic image using standardized palettes. The radiometric processing of the picture data enables the user to do a comfortable detailed analysis using the software TIM Connect.

Main features of TIM Connect software:

- Display of the real time thermal image (up to a max. of 1 kHz) with a wide range of measurement functions
- Recording function (video, radiometric video, snapshot)
- Analysis and post processing of infrared images/ videos
- Complete set up of parameters and remote control of the camera



Warranty

All components of the device have been checked and tested for perfect function in the factory. In the unlikely event that errors should occur despite our thorough quality control, this should be reported immediately to MICRO-EPSILON.

The warranty period lasts 12 months following the day of shipment. Defective parts, except wear parts, will be repaired or replaced free of charge within this period if you return the device free of cost to MICRO-EPSILON. This warranty does not apply to damage resulting from abuse of the equipment and devices, from forceful handling or installation of the devices or from repair or modifications performed by third parties.

MICRO-EPSILON is exclusively responsible for repairs.

No other claims, except as warranted, are accepted. The terms of the purchasing contract apply in full. MICROEPSILON will specifically not be responsible for eventual consequential damages. MICRO-EPSILON always strives to supply the customers with the finest and most advanced equipment. Development and refinement is therefore performed continuously and the right to design changes without prior notice is accordingly reserved.

For translations in other languages, the data and statements in the German language operation manual are to be taken as authoritative.



Note

Read the manual carefully before you start the device. The manufacturer reserves the right to change the herein described specifications in case of technical advance of the product.

1. Getting Started

1.1. Software Installation

Please install at first the software TIM Connect from the CD. The CD contains the software application, the specific calibration data of the imager as well as some sample files. These data will be installed automatically.



Note

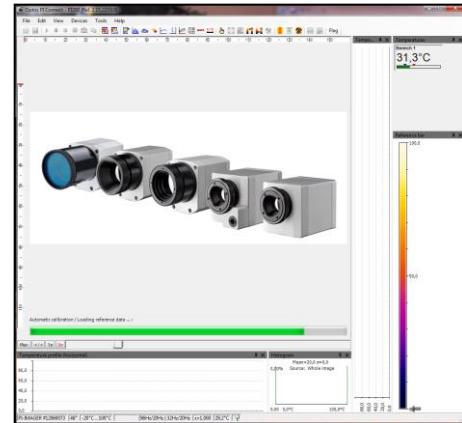
Before installing the new software please uninstall earlier versions of the TIM Connect. If you want to uninstall the software from your system please use the **uninstall icon** in the start menu.

Insert the installation CD into the according drive on your computer. If the autorun option is activated the installation wizard will start automatically. Otherwise please start **setup.exe** from the CD-ROM. Follow the instructions of the wizard until the installation is finished.

The installation wizard will place a launch icon on the desktop and in the start menu.

Now you can connect the infrared imager into an USB port (USB 2.0 or higher) of your PC. After the software has been started, you should see the live image from the camera inside a window on your PC screen.

The sharpness of the image can be adjusted by turning the exterior lens ring at the camera.



thermolIMAGER TIM Connect

1.2. Choice of Camera

In case you are using more than one TIM simultaneously (e.g. via USB hub) please select the required TIM from the list in the **Devices** menu.

1.3. Choice of Language

In the **Tools** and **Language** menu you can choose from a variety of available languages.

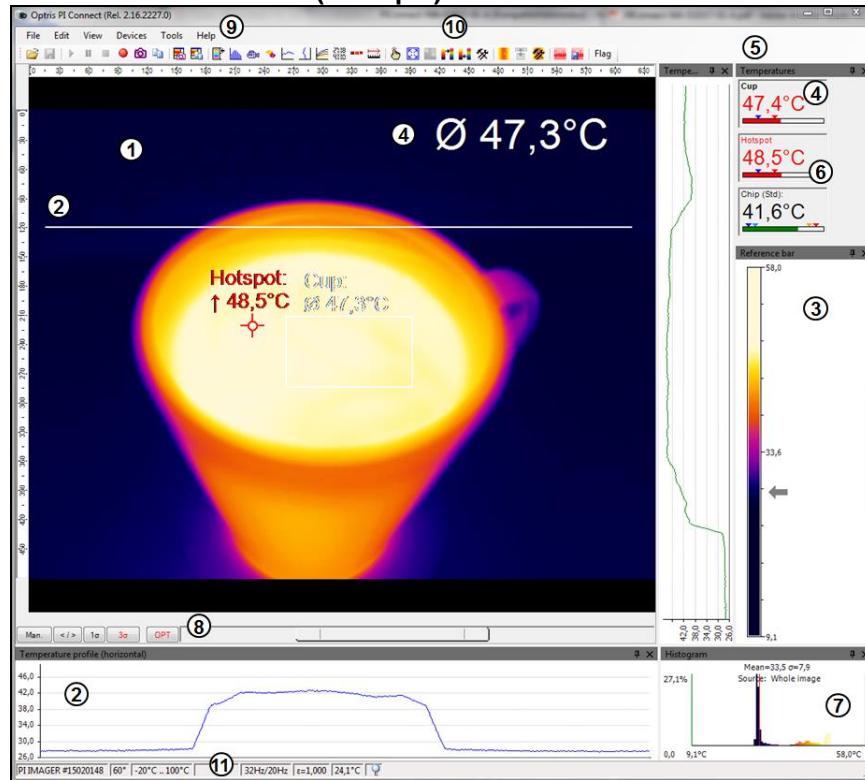
Chinese (People's Republic of China) / 中文(中华人民共和国)
English / English
French (France) / français (France)
German / Deutsch
Italian / italiano
Korean / 한국어
Polish / polski
Russian / русский
Spanish (Spain) / español (España)
Turkish (Turkey) / Türkçe (Türkiye)

Note



In case your language is not provided you will find a translation tool on the software CD delivered with the camera.

1.4. Software Window (Example)

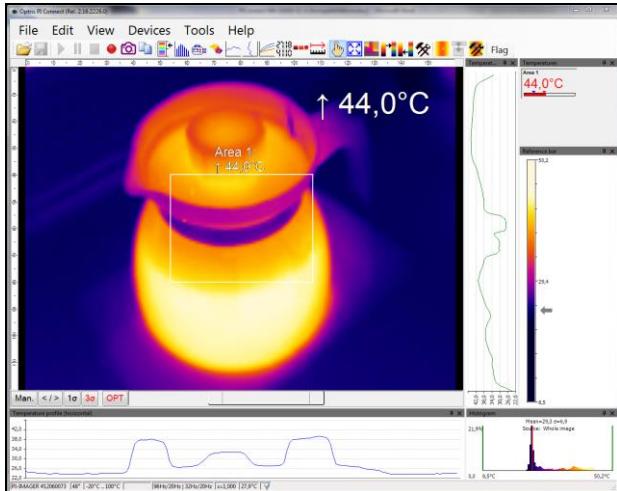


1	IR image from the camera
2	Temperature profile: Shows the temperatures along max. 2 lines at any size and position in the image.
3	Reference bar: Shows the scaling of temperature within the color palette.
4	Temperature of measure area: Analyses the temperature according to the selected shape, e.g. average temperature of the rectangle. The value is shown inside the IR image and the control displays.
5	Control displays: Displays all temperature values in the defined measure areas like Cold Spots, Hot Spots, temperature at cursor, internal temperature and chip temperature.
6	Alarm settings: Bar showing the defined temperature thresholds for low alarm value (blue arrow) and high alarm value (red arrow). The color of numbers within control displays changes to red (when temp. above the high alarm value) and to blue (when temp. below the low alarm value).
7	Histogram: Shows the statistic distribution of single temperature values.
8	Automatic / manual scaling of the palette (displayed temperature range): Man., </> (min, max), 1σ : 1 Sigma, 3σ : 3 Sigma, OPT: Palette optimization
9	Menu and Toolbar (Icons)
10	Icon enabling switching between color palettes

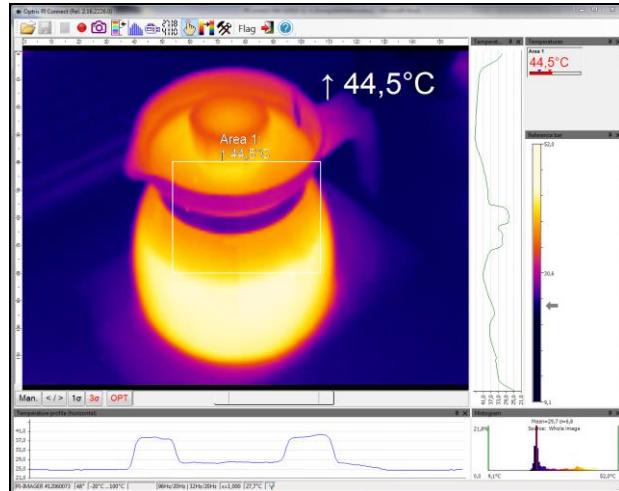
11 Status bar: Serial number, optic, temperature range, cursor position, device framerate/ display framerate, emissivity, ambient temperature, flag status

Under **View** and **User Mode** you can select between two additional display options. In addition to the **Desktop** view, the **Touch** view or the **Tablet** view can also be used here. These additional views are particularly useful when using a touch computer or a tablet. The screen and menu are customized and displayed according to their functions.

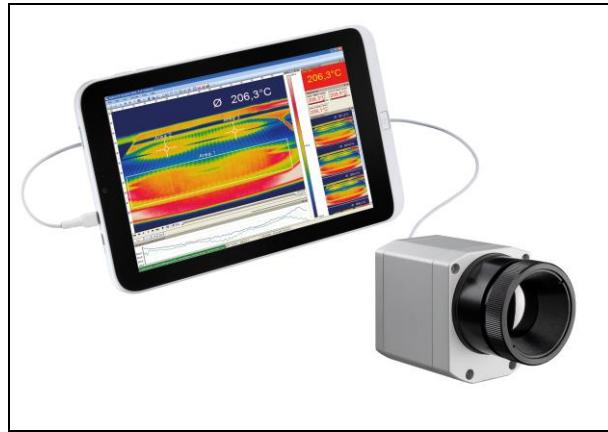
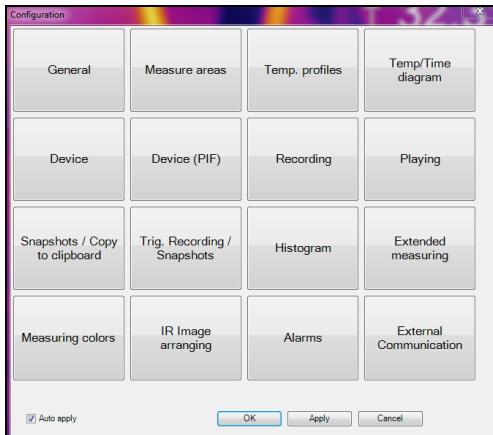
- Desktop
- Touch
- Tablet



User Mode Touch



User Mode Tablet



Configuration window for User Mode Touch and Tablet



Note

The User Mode **Tablet** provides only limited functionality.

1.5. Menu and Toolbar (Icons)

1.5.1. Menu

Using the menu you can adjust all software settings. Each feature will be explained in detail in the following chapters of this manual:

File Edit View Devices Tools Help

File	Open, save and replay of files
Edit	Editing of sequences and layouts
View	Display or fade-out of different software features
Devices	Choice of camera and self-referencing
Tools	Additional settings of camera and software parameters
Help	Information about software

1.5.2. Toolbar (Icons)

The most important features of the software can be activated directly via the toolbar. You can redesign the toolbar according to your preferences (see section [2.2.2](#)). Available toolbar icons are the following:

	Open
	Save
	Play
	Pause
	Stop
	Record
	Save snapshot to file
	Copy snapshot to clipboard
	Save screenshot to file
	Screenshot to clipboard
	Reference bar
	Histogram

	Visible Video
	3D Chart
	Temperature profile (horizontal)
	Temperature profile (vertical)
	Temperature time diagram
	Digital display group
	Snapshot history
	Distance
	Toggle user mode
	Full screen
	IR/Visible Fusion
	Next palette

	Previous palette
	Configuration
	Enable linescanning
	Linescanner view ⇌ Sighting view
	Linescanner configuration
	Image subtraction
	Image subtraction from file
	Refresh Flag
	Acknowledge Alarm
	Close all tools
	Digital display (main measure area)
	Digital display (mouse curser)

	Toggle Minimum, Mean Value, Maximum
	Config merged device

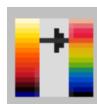


2. Software Configuration

2.1. General Settings

You can activate all here mentioned features in the **Tools**, **Configuration** and **General** menu (except for color palettes).

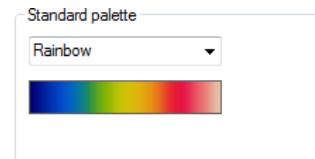
2.1.1. Color Palettes



In the **Tools**, **Configuration**, **Measuring colors** and **Standard palette** menu you can choose from a list of color palettes to achieve ideal displaying of the infrared image and the included temperature information.



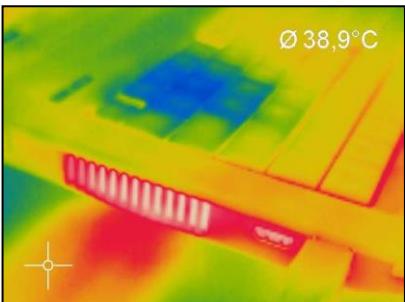
You can also adjust the color palette via the **Icon** on the toolbar or the menu **View** and **Shift palette**.



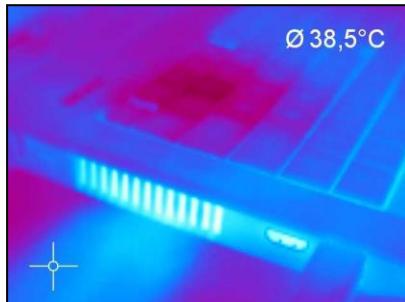
Examples of various color palettes:



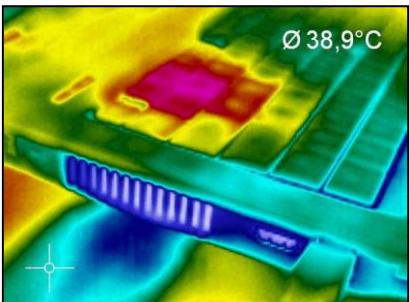
Palette Iron



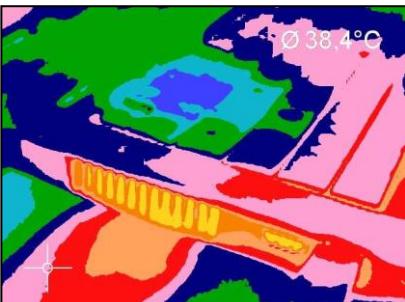
Palette Rainbow



Palette Blue Hi



Palette Rainbow Hi



Palette Rainbow Medical



Palette Gray (Black = Cold)

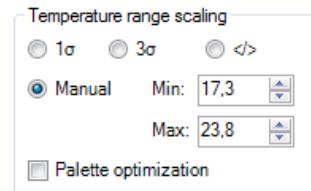
2.1.2. Temperature Unit

When setting the **Temperature unit** you can choose between **Celsius (°C)** and **Fahrenheit (°F)**.



2.1.3. Temperature Range Scaling of Reference Bar

Via the **Temperature range scaling** settings you can allocate colors to temperature values within the reference bar.



These are the following options:

Manual	The lower and the upper border (Min/Max) can be determined individually.
</>	The software continuously defines the upper and the lower border based on the hottest and coldest pixel in the image.
1 σ	The mean value of all pixels in the image will be continuously calculated. Based on the mean value one standard deviation (1 sigma) sets the limits of reference bar.
3 σ	The mean value of all pixels in the image will be continuously calculated. Based on the mean value three standard deviations (3 sigma) set the limits of reference bar.
OPT	With OPT a contrast optimization is achieved. This function allows an optimum contrast between very low and very high temperatures.

2.1.4. Displayed Frame Rate

The option **Reduce displayed frames** defines what frame rate is used to display the image. Typically, the specification is in Hertz (Hz, images per second). The maximum frame rate of the imager depends on the camera model you're using. It is recommended to use the default parameters of 20 Hz.

The camera supplies the software with all images at the whole time. When you using a lower display framerate you have to decide what should happen with the rest of the pictures. Under **Mode** you have several options:

Reduce displayed frames:

Mode:	Ext. Averaging
Display framerate:	20 Hz
Averaging time:	50 % of frame time

Off	The displayed frame rate correlates to the max. frequency of the camera.
Skipping	The remaining images will be skipped by the defined frame rate, which means at 20 Hz that every 20th image will be displayed.
Average	The images will be averaged by the defined frame rate, which means at 20 Hz that 20 images result in one averaged image.
Minimum	E.g. at 20 Hz 20 single images compose one image where only lowest value pixels will be considered.
Maximum	E.g. at 20 Hz 20 single images compose one image where only highest value pixels will be considered.
Ext. Averaging	The images will be averaged by the defined frame rate as well as the averaging time , which means at 20 Hz and 50% of frame time that just 50 % of 20 images (thus 10

images) will compose a new averaged image.

Note



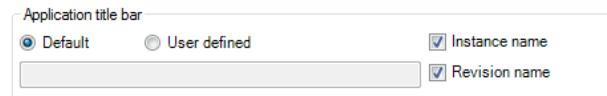
A reduced frame rate means a less loaded computer in terms of data processing. Therefore, please adjust the displayed frame rate according to your application as well as to the performance of your computer.

2.1.5. Change of Title Bar

The **Application title bar** option enables the individual setting for an own title name.

The setting **Default** displays the standard software name „TIM Connect“. Using the setting **User defined**

you can specify an individual name. The option **Instance name** is important if starting several cameras and software on one computer. The option **Revision name** is disabling the display of software version in the title bar.

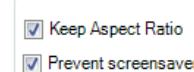
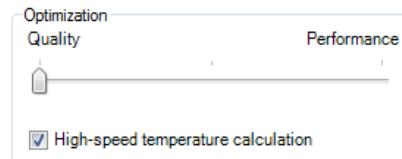


2.1.6. Optimization of Software

The display of the thermal image in the main window of the software can be adjusted according to the performance of the computer. Choosing the option **Quality** and **High-speed temperature calculation** the display will be enlarged to the highest resolution, but requires a higher computing power. Using a slow computer, it is recommended to choose the option **Performance**. If the bar is placed in the middle, you get a compromise between quality and performance.

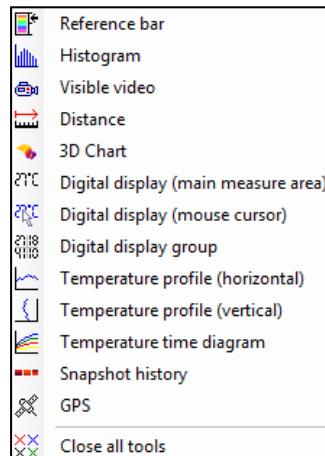
If **Keep Aspect Ratio** is selected the aspect ratio will be maintained.

The option **Prevent screensaver** is suppressing the screensaver functionality of your computer.



2.2. Software Layout

2.2.1. Displayed Windows

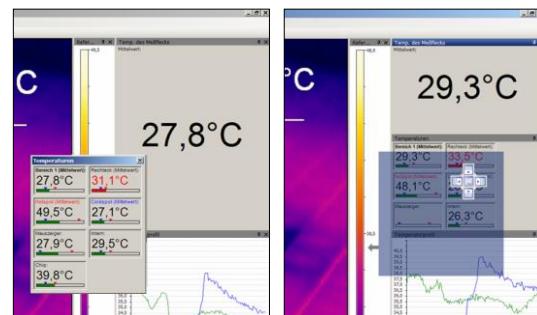


You can individually choose the displayed windows and easily change their positions within the desktop area (drag & drop). To add windows please use the menu item **View** and **Windows**.

On the one hand a window can be positioned separately on the screen. On the other hand a window can be set at a fixed position in the software. The location can be determined using the positioning field (mouse over the arrows „above“, „below“, „right“, „left“).

When a window is dragged into another one (mouse has to be placed within title head) both will be merged. You can switch between them using the tab provided.

Separate window and window with positioning field to place it into the software individually.



2.2.2. View Bars

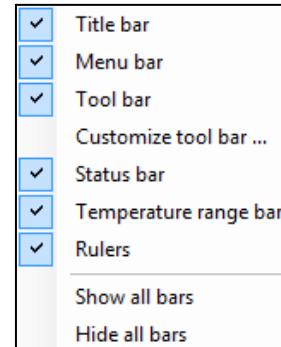
For individual display of software you can show or hide single bars in the software window.

There is the possibility to **Show all bars** or **Hide all bars** by one click.



Note

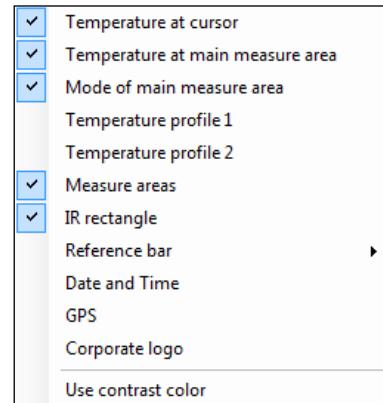
All icons shown on the toolbar can be individually selected via the option **Customize tool bar ...** (Please see also [1.5.2](#)).



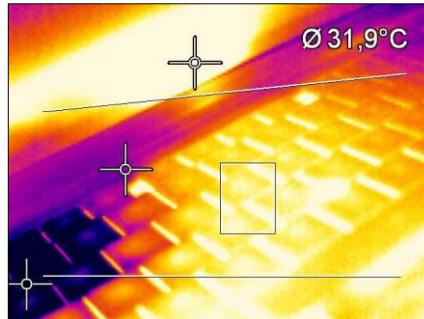
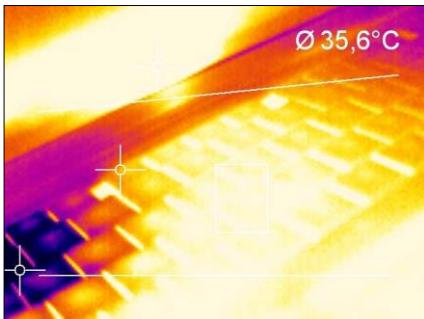
2.2.3. Information within Image

Using the menu **View** and **Image Information** you can decide, which information you would like to see inside the infrared image window.

Via **Reference bar** you can set the position of the temperature scale within the infrared image window.



The menu item **Use contrast color** can be used for highlighting particular information within the IR image.



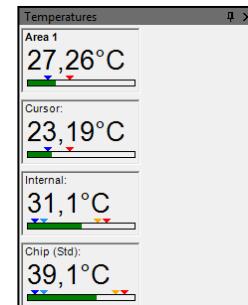
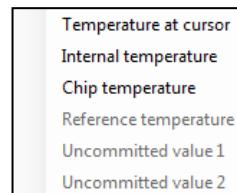
Display of thermal image without
and with contrast colors

2.2.4. Temperatures in Digital Displays

The menu option **View** and **Digital display group**

temperatures allows the user to define which temperature control displays will be shown in the application window **Temperatures** (see section 2.2.1). The shown pre-defined values can also be displayed in the temperature time diagram (see section 4.3).

Furthermore, the alarm configuration can be based on these temperatures (see section 4.8)



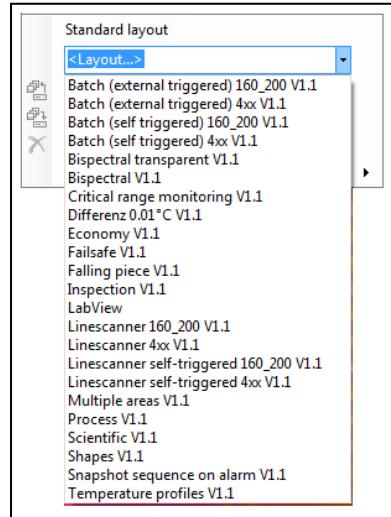
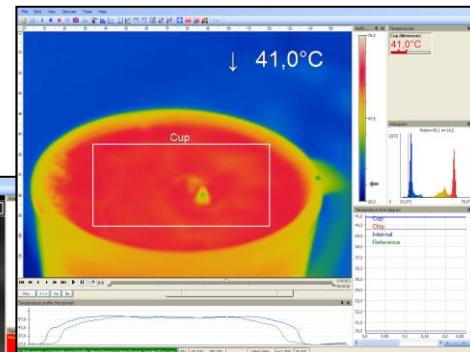
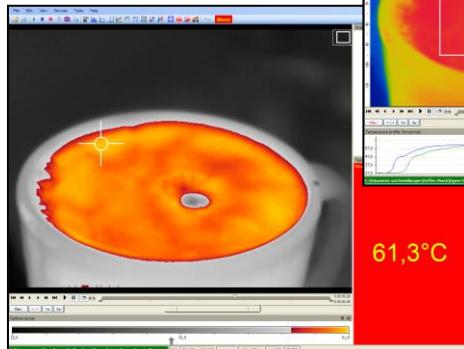
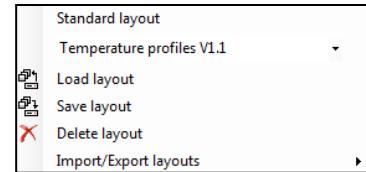
2.2.5. Layout Management

In the menu item **Tools** and **Layout** you can manage pre-designed or your own image layouts. If you want to use an alternative layout you must activate it under **Load layout**. You can save your own layouts with user-defined names.



Note

Before you click **Save layout** you must add new layout name into the field provided.



thermolIMAGER TIM Connect

2.2.6. Assign / Remove Layouts

In the menu item **Edit** and **Assign layout to current file** you can save files with a new layout setting.

Using **Remove layout from current file** it is possible to configure a file in a way that it has no associated layout pattern. When you play it again the layout of the previously played file will be used.

Note



To confirm the changes as explained above you must always save the file. Please use the menu **File** and **Save** or the **Icon** on the toolbar.

2.2.7. Further Information

Independent whether other programs are running on your PC the TIM Connect software can always be kept in the foreground. To activate this feature please use **View** and **Always on top**. All other applications will now run in the background.

The thermal image of the main window can be displayed in a full screen mode. Please use the menu **View** and **Full screen** or the **Icon** on the toolbar to change the display size.

2.3. Arranging of Thermal Image

The thermal image within the main window of the software can be displayed in various ways using the menu **Tools**, **Configuration** and **IR Image arranging**.

2.3.1. Mirroring of Displayed Image

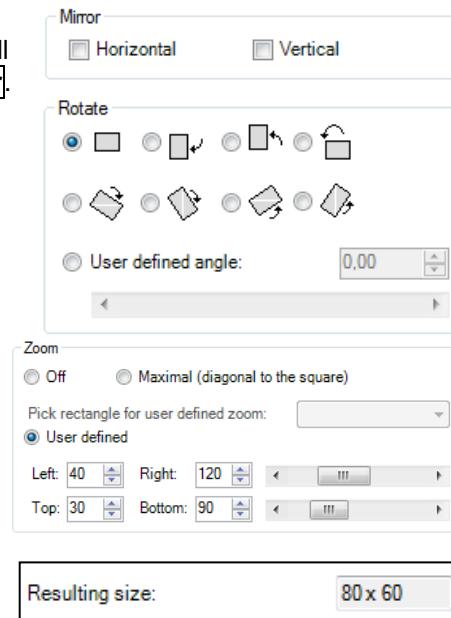
Sometimes, depending on the fitting position of the TIM, it is useful to **Mirror** the camera image horizontally or vertically. Either the image will be adjusted by the menu mentioned above or under **Tools** and **Mirror**.

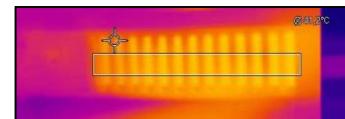
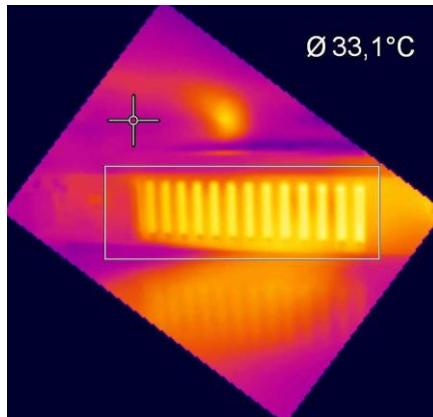
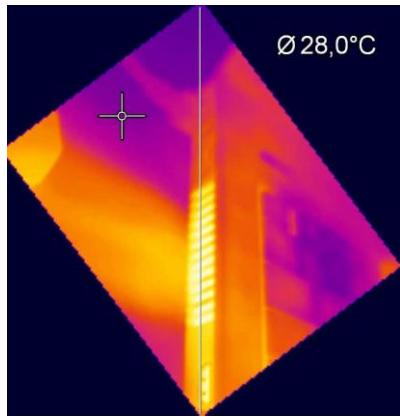
2.3.2. Rotation of Displayed Image

By tagging an icon it is possible to **Rotate** the thermal image into a different position. Alternatively, a manual adjustment can be done by defining a **User defined angle**.

2.3.3. Zooming in Areas of the Displayed Image

Using the **Zoom** option a detail of the image can be enlarged in the main window by the position information. The option can be activated by tagging the **Maximal (diagonal to the square)** filed. Furthermore you can use **Pick rectangle for user defined zoom**. The corresponding measuring area can be selected. When **user defined** is selected, the coordinates **Left**, **Right**, **Top** and **Bottom** can be entered manually. The **Resulting size** of IR image will be shown below.





Rotation and zooming of a defined measure area.

2.4. Imager Configuration

2.4.1. Calibration Files

The menu **Tools**, **Extended** and **Reimport calibration files** enables to boot the calibration data for the currently connected TIM.

2.4.2. Correction of Camera Calibration

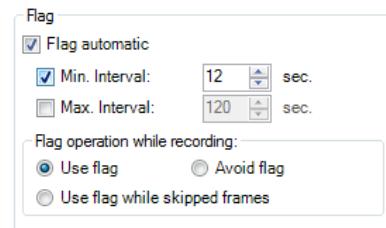
Flag

Due to the thermal drift of bolometers all measuring IR cameras need an offset correction every few minutes. This correction is done by a motor driven motion of a blackened metal piece (so called flag) in the front of the image sensor. In this way each image element is referenced with the same temperature. During those offset calibrations thermal cameras do not measure (time is dependent on model and video mode). In order to minimize this disturbing effect the offset correction can be initiated manually or by an external control pin at a suitable point of time.

In the **Devices** and **Refresh flag** menu or via the **Icon** on the toolbar the Flag (Shutter) can be refreshed manually.

The automatic correction of camera can also be set by defining minimum or maximum intervals via the menu **Tools**, **Configuration** and **Device**.

The options **Flag automatic** and **Min. Interval** control that the flag will not be released before a given time period even though it might be required by the imager. If the **Max. Interval** is defined the flag will always be released after a certain time period even if not required by the imager.



Using the option **Flag operation while recording** and **Use flag** the correction is activated even if the camera is recording. If **Avoid flag** is chosen the camera will not be corrected while recording. The option **Use flag while skipped frames** is suitable at slow data capturing (3 Hz or less) as the correction will take place automatically between two recorded images (correction time app. 250 ms).

Note



The manual or automatic flag functionality is not available if the flag is externally controlled, e.g. via the process interface input (please also see 2.5).

Note



The flag can be also used to protect the detector from potentially dangerous radiation (for example laser radiation).

2.4.3. Emissivity, Transmissivity, Ambient Temperature

Using the menu **Tools**, **Configuration** and **Device** the **Emissivity** and the **Transmissivity (IR-window compensation)** can be set.

The transmissivity is referring to the loss of radiation if an object's surface is measured by looking through a suitable window.

Knowing the **Ambient temperature** is inevitable for a correct temperature measurement. The ambient temperature value is delivered by the camera's internal sensor by default. Alternatively, the value can be set as a fixed value.

Fixed radiometric values	
Emissivity:	<input type="text" value="1,000"/>
Transmissivity: (IR-window compensation)	<input type="text" value="1,000"/>
Ambient temperature:	<input checked="" type="checkbox"/> <input type="text" value="23.0"/>

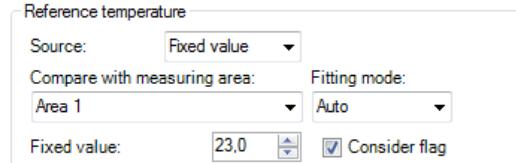
Note



In case that the emissivity and / or the ambient temperature values are controlled through the Process Interface (PIF) the here defined values will be ignored (please also see [2.5](#)). The display of actual values will be shown in the status bar.

2.4.4. Reference Temperature

The detector of the thermal imager has a thermal drift over the time and must be corrected by self referencing. At applications where a high measurement accuracy is needed, the thermal image can be corrected permanently by setting a reference temperature. Using the menu **Tools**, **Configuration**, **Device** and **Reference temperature** several options for manual or automatic correction can be set.



If there is an area within a thermal image having a constant temperature value (e.g. black body) the **Source** can be defined as a **Fixed value**. By the option **Compare with measuring area** the area with constant temperatures can be determined. The known reference value can be set within **Fixed value**. If the temperatures are changing slightly within the defined area due to a thermal drift, the whole image will be corrected by a certain factor.

Alternatively, the correction can be done by an external value (e.g. via connected pyrometer) by choosing the process interface **PIF in** (please also see [2.5](#)).

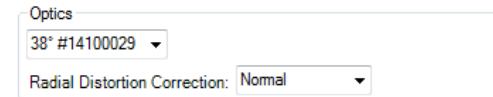
There are several **Fitting modes** to adjust the thermal image:

Auto	The software is choosing the best way of correcting the image (offset or gain).
Offset	This kind of correction is recommended if there are big temperature differences between the reference temperature value and the thermal image.
Gain	This kind of correction is recommended if there are small temperature differences between the reference temperature value and the thermal image.

The option **Consider flag** is decreasing the influence of the camera's correction (high temperature steps) onto the display of the reference temperature. It is recommended to activate this option.

2.4.5. Changing the Optics

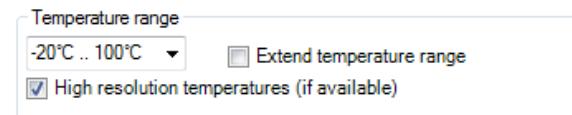
Using the menu **Tools**, **Configuration** and **Device** the **Optics** depending on the camera configuration must be chosen. As a standard the camera can be delivered with different type of lenses. If the camera is ordered with several additional lenses the currently used optics must be chosen in this menu.



With the help of the menu point **Radial Distortion Correction**, the camera image can be corrected in such a way that the image distortion is compensated by the optics (barrel distortion). It can be selected between **Off**, **Normal** and **Wide**.

2.4.6. Changing the Temperature Range

Using the menu **Tools**, **Configuration** and **Device** the most suitable **Temperature range** for the process can be set. The TIM features different temperature ranges depending on the device.

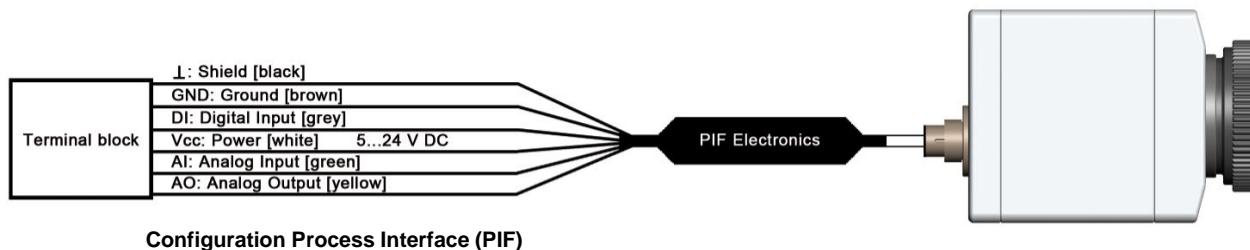


2.5. Imager Interfaces

2.5.1. General

The TIM is equipped with a process interface (cable with integrated electronics and terminal block), which can be programmed via the software as an Analog Input (**AI**) and Digital Input (**DI**) in order to control the camera or as an Analog Output (**AO**) in order to control the process. The signal level is always **0 - 10 V**. The process interface can be activated choosing the following options:

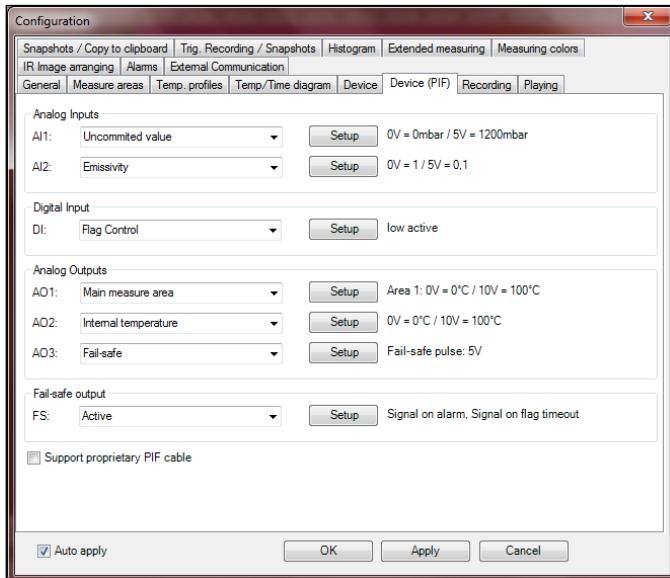
- Analog Input (**AI**): Emissivity, Ambient temperature, Reference temperature, Uncommitted value, Flag Control, Triggered Snapshots, Triggered Recording, Triggered Linescanner
- Analog Output (**AO**): Main measure area, Measure area, Internal temperature, Flag Status, Alarm, Frame sync, Fail-safe, External Communication
- Digital Input (**DI**): Flag Control, Triggered Snapshots, Triggered Recording, Triggered Linescanner



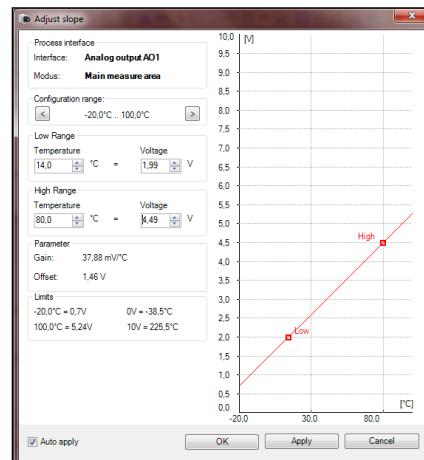
Frame synchronization	In this function, a needle pulse is output for synchronization with fast processes at the beginning of each frame.
-----------------------	--

2.5.2. Process Interface (PIF)

Using **Tools**, **Configuration** and **Device PIF** menu you can configure a PIF which is connected to the camera. The number of in- and outputs can vary depending on the connected PIF (Standard-PIF or Industrial PIF). A not available in- or output will be marked with a red exclamation mark (!).



If you configure an analog value an additional window will show up if you press the **Setup** button. In this window you can scale the in- or output:



On the analog inputs you can select each function only once (exception: Uncommitted value).

On the analog outputs also each function can only be selected once (exception: Measurement area; Alarm).



Note

You can use the analog inputs, outputs and the digital input of the PIF simultaneously.

Snapshots / Copy to clipboard		Trig. Recording / Snapshots		Histogram		Extended measuring		Measuring colors	
General		Measure areas		Temp. profiles		Temp./Time diagram		Device	
IR Image arranging		Alarms		External Communication					
Measure area	Display ranges	Pre-alarms		Alarms		GraphBar	Alarm	Appl.	to PIF
	Min.	Max.	Low	High	Low	High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Area 1	0,0	100,0	<input type="checkbox"/>	24,0	36,0	20,0	33,0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Area 2	0,0	100,0	<input type="checkbox"/>	24,0	36,0	20,0	33,0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Area 3	0,0	100,0	<input type="checkbox"/>	24,0	36,0	20,0	33,0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
[All]	0,0	100,0	<input type="checkbox"/>	24,0	36,0	20,0	33,0	<input checked="" type="checkbox"/>	<input type="checkbox"/>

If you activate the function **Alarm** on an analog output you need to assign also in the **Alarms** tab the desired measurement area to the desired PIF output.

The industrial PIF has a maximum of three analog outputs. To use additional outputs, the ADAM-4024 module from Advantech is recommended, which has four analog outputs per module and can be cascaded with further modules.

For more information on the settings for alarms, see section **4.8 Alarms**.

The process interface has an integrated fail-safe mode. This allows to control conditions like interruption of cables, shut-down of the software etc. and to give out these conditions as an alarm.

Controlled conditions on camera and software	Standard Process interface TM-PIF-TIM	Industrial Process interface TM-PIF500V2C5-TIM
Interruption USB cable to camera	v	v
Interruption data cable camera - PIF	v	v
Interruption power supply PIF	v	v
Shut-down of TIMConnect software	v	v
Crash of TIMConnect software	-	v
Fail-Safe output	0V at analog output (AO)	Open contact (fail-safe relay) / green LED off

The failsafe function can be activated in the tab **Device (PIF)** under **FS**. The industrial PIF has a separate failsafe relay.

Alternatively you can activate this function also on the analog outputs. The checkbox **Stop fail-safe pulse on alarm** must be activated, if the analog output should be used in addition as an alarm output for a temperature alarm. In case of an alarm the alternating fail-safe pulse signal will stop and the set voltage level will be given out as constant value (Industrial PIF only).



2.6. Software Development Kit (SDK)

2.6.1. Interprocess Communication (IPC)

Tools, **Configuration**, **External Communication** and **Interprocess Communication (IPC)** enables you to embed **colors**, **temperatures** or **ADU values** into other applications via Dynamic Link Library (DLL).

2.6.2. COM-Port

You can activate the feature in the **Tools**, **Configuration**, **External Communication** and **Comport** menu.

If selected the data values sent out by the camera can be transmitted via specified **Port**. The **Baud rate** can be changed (from 1200 to 921600) accordingly. The **Bus address** is used to assign an unique address to each participant.

Mode

Off IPC Comport

Interprocess Communication (IPC)

Mode: Temperatures

Internal buffer size: 5

Timeout [sec.] 10

Mode

Off IPC Comport

Comport

Port: Kommunikationsanschluss (COM1)

Baud rate: 9600

Bus address: 1

Note

Two software development kits are offered: **Connect SDK** (provides a very large range of functions, TIM Connect software must run as a background process) and **Direct SDK** (does not require TIM Connect software, the library "libirimager" provides a C++ interface for Linux and Windows). You will find more details on using the SDKs on the CD provided.



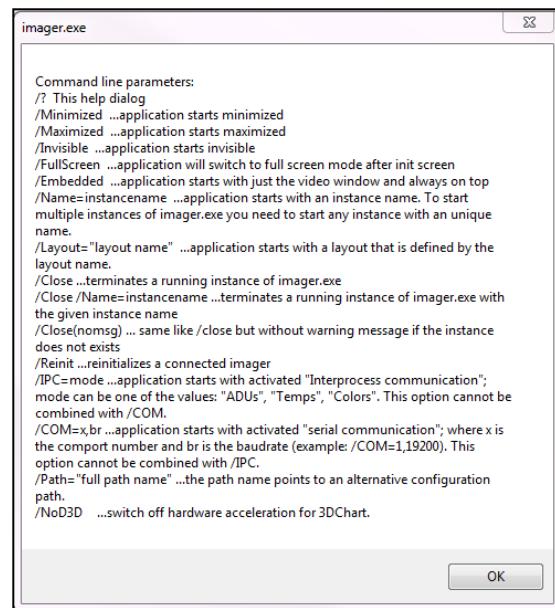
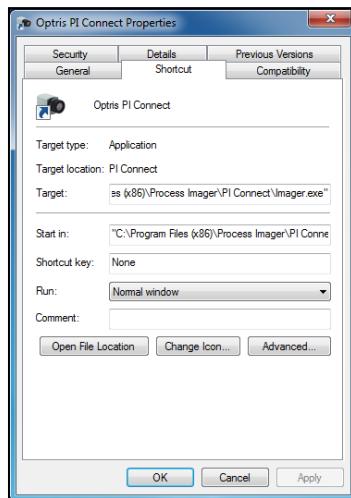
2.7. Start Options

2.7.1. Overview of Start Options

TIM Connect software can be started with additional starting parameters using the command line. Please change the linkage in the software settings via the launch icon on the desktop. Behind the command line please add a space character and the required command parameter, e.g. "C:\Program\...\TIM Connect\imager.exe" ?



Starting the software via the launch icon you will get an overview of possible commands:





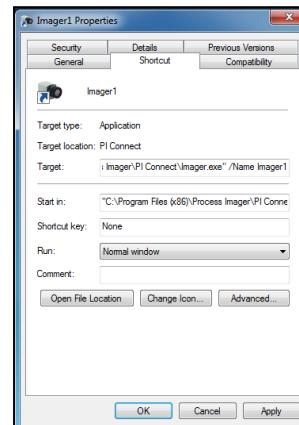
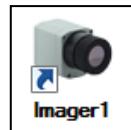
Note

Using the parameter Invisible the software can only be closed via the **Task Manager** and **Processes**.

2.7.2. Start of Multiple Software / Imager Instances

In case you are using more than one TIM simultaneously each imager can be linked to one software instance. In order to setup further software instance please follow the steps below:

- 1.) Duplicate the software icon at the desktop
- 2.) Optional: Change the name of the new software icon at the desktop, e.g. „Imager1“
- 3.) Make a right klick on the new icon, klick on Properties, go to Shortcut and Target and at the end of the line type the new name in:
"C:\Programme\...\TIM Connect\Imager.exe" **/Name=Imager1**
(see **2.7.1**)
- 4.) Optional: Change the title name using the start parameter
(see **2.1.5**)
- 5.) Start the software using the new software icon
- 6.) Link a camera to the new software instance in the TIM Connect software



In order to set up the last step please go to menu **Tools**, **Configuration** and **Device** and select in **Application** start the favored imager for the respective software instance.

Application start:

Connect to device with SN: 14110023

Starting the software via the new desktop icon the linked imager will be displayed automatically. SN is the serial number of the individual camera.



Note

Each imager can only be linked to **one** software instance.



Note

It is recommended to connect at first one camera and to do the steps 1 till 5 and afterwards start with the second camera etc., so that no possible interference is caused.

3. Data Capturing

3.1. Open Files



Via the menu **File** and **Open** or the **Icon** on the toolbar you can open all files which can be processed by the software.



Note

Via the menu **File** and **Reopen** you can easily reopen captured files if the option in **3.4.6** is activated.

3.2. Replay of Files

3.2.1. Control Panel

In order to replay a video sequence you can use different options in the **File** menu or at the control panel. The video control panel contains:



	Start
	Rewind
	Previous image
	Next image
	Forward

	End
	Play
	Pause
	Play in loop
	Play selection only

3.2.2. Replay Options

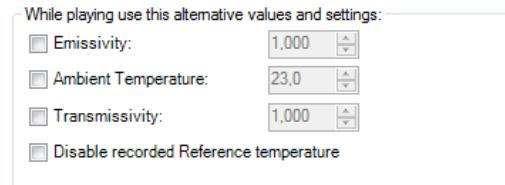
Via the menu **Tools**, **Configuration**, **Playing** and **Playing options** you can modify the **Play rate** of recorded video sequences. This feature ensures that you can replay a video of a fast process in slow motion in order to analyze it in more details. Additionally, you can define to replay a recorded video in a loop (**Infinite loop playing**) or to **Play selection only**. To define a selection the position marks on the time bar needs to be set. All mentioned settings can also be changed via the control panels below the main window.



Note

 The replay settings only refer to the current file shown in the main window. All definitions, however, can be saved in an individual layout assigned to the file.

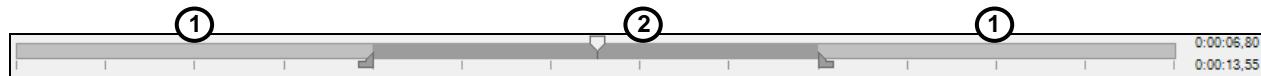
The software allows you to change measurement parameters later on. Via the menu **Tools**, **Configuration**, **Playing** and **While playing use this alternative values and settings** you can adjust the parameters **Emissivity**, **Ambient temperature** and **Transmissivity** to the measurement conditions. Above that, via **Disable recorded Reference temperature** you can deactivate reference value stored in the file.



3.3. Editing Video Sequences

The selected video can be edited by using **Trim to selection** option in the **Edit** menu.

A time bar tool is shown on the bottom of the image. Set the position marks on the time bar to select the beginning and end of the video sequence you want to be edited. The not selected video sequence parts (bright grey) will be deleted by choosing **Trim to selection** option. The selected video sequence (dark grey) will remain.



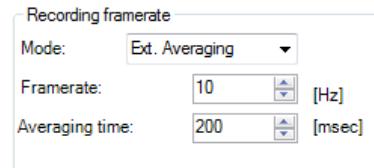
3.4. Saving Files

3.4.1. Setting the Recording Frame Rate

The camera's maximum frame rate depends on the camera model you're using and can be reduced. Using **Tools**, **Configuration**, **Recording** and **Recording framerate** the speed of the data capturing can be set.

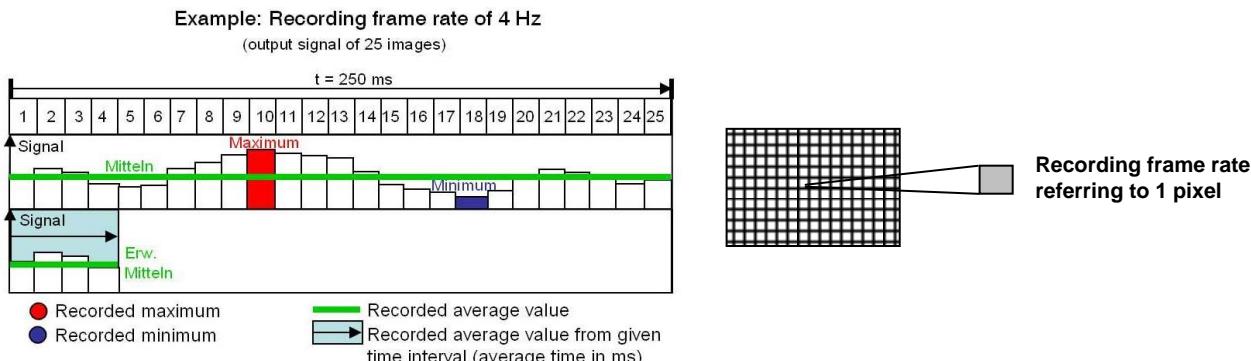
Typically, the specification is in Hertz (Hz, images per second).

The software gets the full frame rate from camera. That is why you need to define what to do with the images which are left if choosing a reduced frame rate. There are several alternatives to set in the **Mode** option:



Off	The recording frame rate correlates to the max. frequency of the camera.
Skipping	The remaining images will be skipped by the defined frame rate, which means that at 10 Hz every 10th image will be recorded.
Average	The images will be averaged by the defined frame rate, which means at 10 Hz that 10 images result in one averaged image.
Minimum	E.g. at 10 Hz 10 single images compose one image where only lowest value pixels will be considered.
Maximum	E.g. at 10 Hz 10 single images compose one image where only highest value pixels will be considered.

Ext. Averaging	<p>The images will be averaged by the defined frame rate as well as the averaging time, which means at 10 Hz and 200 ms that just the first 2 images out of 10 images will compose a new averaged image.</p>
---------------------------	--



3.4.2. Setting the Recording Modes

If desired the **Recording time limit** sets fixed recording time in seconds. After reaching the time limit the software stops the recording.

If activating **Radiometric recording** the temperature value of each pixel as well as information on defined measure areas are recorded. Videos containing these data (RAVI files) allow users to do a detailed post-analysis anytime later. Moreover, new measure areas and alarms can be created in addition to recorded data when doing the analysis.

General recording settings

<input checked="" type="checkbox"/> Recording time limit	100	[sec]
<input checked="" type="checkbox"/> Radiometric recording		
<input checked="" type="checkbox"/> Save after recording is stopped		
<input checked="" type="checkbox"/> Play after recording is stopped		

Note

 If Radiometric Recording is not activated the images will be saved as standard AVI file only containing color information. A later conversion of a RAVI file into an AVI file and vice versa is not possible.

Choosing the option **Save after recording is stopped** the images will be saved without further notice. If the option **Play after recording is stopped** is activated the saved images will be played automatically in the main window.

Note

 The status of recording is displayed at the bottom notice bar. The background color will turn **RED** when recording.

PIIMAGER #14110023 Recording: 00:01:08 388,5MB

3.4.3. Temporary Recording File

Choose the directory for saving your temporarily recorded video file.

Temporary recording file

Estimated file size: 2,1MB/sec; 126,3MB/min; 7,4GB/h

The **Estimated file size** is estimated to indicate the amount of megabits needed or consumed. It can be checked whether the available hard disk is sufficient for the desired recording time.

Note

This temporary file will be overwritten with each new recording.

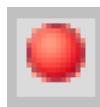
3.4.4. Saving Radiometric Video Sequences or AVI files

Video sequences can both be saved as a radiometric file (RAVI) or as a non-radiometric file (AVI). RAVI files contain all temperature as well as measure area information.

Note



If Radiometric Recording (please see section 3.4.2) is not activated the images will be saved as standard AVI file only containing color information. A later conversion of a RAVI file into an AVI file and vice versa is not possible.



For recording a video sequence you can use either the menu **File** and **Record** or the available **Icon** on the toolbar.



For stopping a video sequence you can use either the menu **File** and **Stop** or the available **Icon** on the toolbar.



If the video sequence includes the expected content you can save it via the menu **File** and **Save** or the **Icon** on the toolbar.

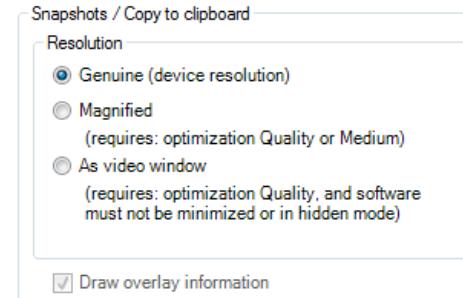
3.4.5. Saving Image Data as Radiometric Snapshot or Text File



Snapshots are single, radiometric images based on a video sequence, this means they contain all temperature as well as measure area information. Thus the images can always be analyzed in detail later on.

Snapshots can be captured via the menu **File** and **Snapshot** or via the **Icon** on the toolbar.

Using the settings in the menu **Tools**, **Configuration** and **Snapshots / Copy to clipboard** you can define how a snapshot is copied into the clipboard or stored on the computer. Either the snapshot will be saved in the **Genuine (device resolution)** corresponding to the camera's resolution, **Magnified** (Magnification for TIM160, TIM2xx to four times the resolution, for TIM4xx to double, and for TIM640 and TIM1M, the original device resolution remains) or using **As video window** (as illustrated video window). The option **Draw overlay information** will display all information, such as measuring area or temperature display and is stored on the image. If the checkmark is not set, only the pure thermal image is stored without values and information.



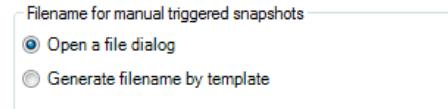
Note



The option **Genuine (device resolution)** needs to be chosen if you want to save and display (snapshot history) the identical snapshot. Otherwise, the camera image taken before the snapshot will be displayed in the history.

If the option **Open a file dialog** is tagged you will always be asked about the location, the file name and the file type before saving a snapshot.

Having chosen the option **Generate filename by template** the snapshots location and name will be generated based on the settings in the menu **Tools**, **Configuration** and **Trig. Recording / Snapshots** (please see section 3.4.6).



In the **Tools**, **Configuration** and **Trig. Recording / Snapshots** menu you define the **File type for triggered snapshots**. The option **Max. triggered snapshots** sets the number of displayed snapshots in the separate window Snapshot history (please see section 2.2.1). If **Ignore last snapshot (if available)** is activated only the latest snapshot will be displayed in the Snapshot history window if a new snapshot is captured.



Show visible image (if available) implies that the visible image if available will be saved too.

Reverse order implies that the sequence of the pictures will be shown in the snapshot history in reverse order.

Create link in “reopen file” list for triggered video sequences and snapshots implies that the snapshots or triggered videos are listed under **File** and **Reopen**.

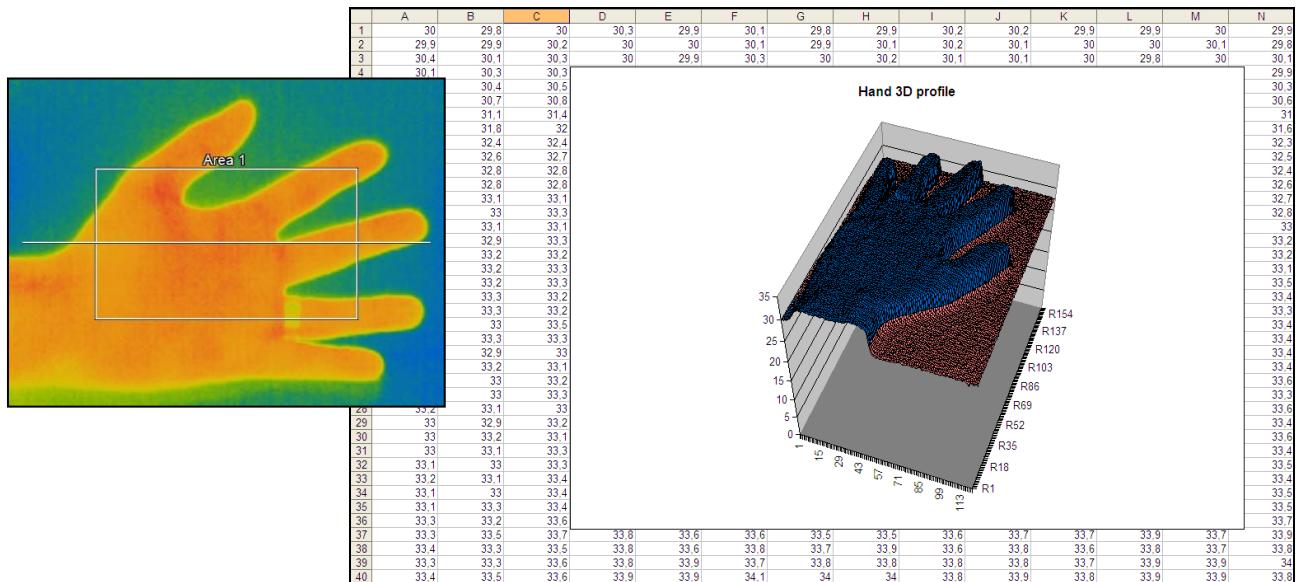
There are the following options to save image data:

TIFF (*.tiff)	Saving of image (snapshot) as radiometric picture in TIFF format.
Text (Image data) (*csv)	Saving of image (snapshot) as Text format to edit information in Excel.
Text (Temp. profile data) (*csv)	Saving of temperature profile data only as Text format to edit information in Excel.

Note



The TIFF files are saved as radiometric files and can be analyzed in detail with the TIM Connect software. Furthermore, they can also be displayed in any standard program like Photoshop showing the color information within the image.



**Analysis of thermal image in Excel via *.csv file
export and display of pixel data in 3D**

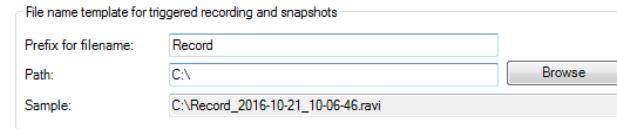
3.4.6. Saving Text File of the Temperature / Time Diagram

Via the menu **File** and **Save Temp/Time diagram data** the data of diagram can be saved in a text file (*.dat) for further analysis.

3.4.7. Location and Filename Templates of Triggered Recordings

In the **Tools**, **Configuration** and **Trig. Recording / Snapshots** menu you can define a **Prefix for filename**. The software is using this prefix if saving a sequence or snapshot.

The **Path** defines the storage location of all files and can be changed here. Once recorded the file is saved under name including prefix, current date and time stamp.



Note

Using the option **Create link in “reopen file“ list for triggered video sequences and snapshots** the files can easily be reopened via the menu **File** and **Reopen**.



The data capturing includes all information like measure areas and temperature displays of the main window if the option **Save layout together with triggered video sequences and snapshots** is tagged.

3.4.8. Display of Snapshots in a Separate Window

In the menu **View**, **Windows** and **Snapshot history** you can activate a window in order to display all triggered snapshots (please also see section 2.2.1). Before you have to choose the option Generate filename by template in the menu **Tools**, **Configuration** and **Trig. Recording / Snapshots** (please see section 3.4.5).

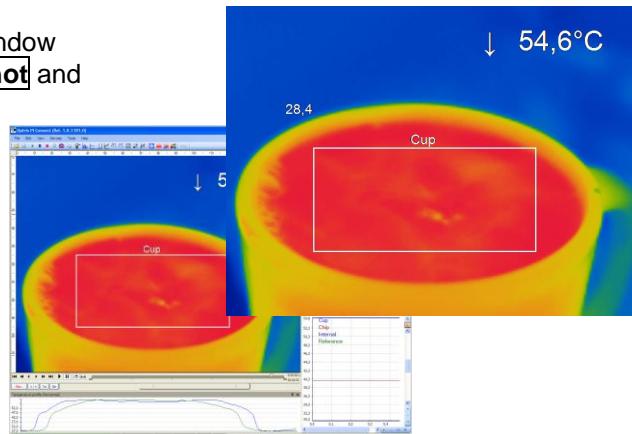
3.4.9. Saving Images or Screenshots to Clipboard

Using the **File**, **Snapshot** and **Copy to clipboard** menu or the **Icon** on the toolbar the image of the main window can be copied to the clipboard in order to paste it into different programs such as MS Word.

Alternatively, you can also copy the whole software window (screenshot) to the clipboard using the **File**, **Screenshot** and **Copy to clipboard** menu.

Note

The whole software window can also be saved using the **File**, **Screenshot** and **Save** menu or the **Icon** on the toolbar.



4. Data Processing

4.1. Measure Areas

4.1.1. General Settings

Measure areas for temperature analysis can be defined, edited and deleted using the menu **Tools**, **Configuration** and **Measure areas**.

Using **Add (Measure Area)** / **Add (Calculated area)** buttons you can create a new Measure area / Calculated area. The **Remove** button deletes an existing Measure area / Calculated area.

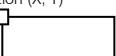
Press **Up** / **Down** to position individual measure areas within the list. 1 measure area from the list can be appointed as the **Main measure area**. The temperature of the main area can be displayed in the main window or converted into an electrical signal to be transmitted via the Process Interface (PIF).

By selecting **Show in image** measure areas can be displayed in the infrared image.

Selecting the option **Show name at location** you can define the position of the name attached to particularly measure area (set the position in the drawing).



Available measure area shapes are:

	User defined rectangle
	Measure point (1x1)
	Measure point (3x3)
	Measure point (5x5)
	Ellipse
	Polygon
	Spline-Kurve

Measure area

Name:

Shape:

Mode:

Bind to temperature profile

Emissivity:

Show in digital display group

Label in image:

Name

Mode

Value

two lines

Position

Location: (Center) X:

Y:

Size: Width: Height:



Any measure area can be renamed individually in the **Name** field. Under the field **Shape** the different measuring shapes can be selected. The table above shows the available shapes. The temperature of the main measuring area can also be displayed in the main window. The value, which is displayed, is defined over the **Minimum**, **Maximum**, **Mean value** or **Distribution [%]** in the field **Mode** or via the icon in the toolbar.

Minimum	Min. value is shown
Maximum	Max. value is shown
Mean value	Mean value is shown
Distribution [%]	Indicates the percentage distribution between two selected temperatures

In the **Position** section the exact **Location** and **Size** of the measure area within the main window can be defined. The moving and minimizing or maximizing of the measuring fields can also be realized directly at the measuring field in the main window. By moving the cursor to the edges of the measuring field, the grippers can be used to adjust the size of thermal image or to move the image completely (hold **Ctrl** synchronously). If desired the area can represent a **Hot spot** (spot or area with highest mean temperature in the image) or a **Cold spot** (spot or area with lowest mean temperature in the image).

Using **Center** you will be moving the measure area into the middle of the main window, using **Standard size** the rectangle will be set in a predefined size. Under **Label in image**, you can select whether the **Name**, **Mode** and / or **Value** is to be displayed in the image. **Two-lines** means that the selected labels are displayed one after the other.

Using **Bind to temperature profile** you can assign each measure area to one of the two temperature profile (**Profile 1 / Profile 2**).

The position of the measure area and the profile can be determined by the option **Location [%]**. The size ratio can be defined by the option **Min. Size**.

Position

Profile 1 Profile 2

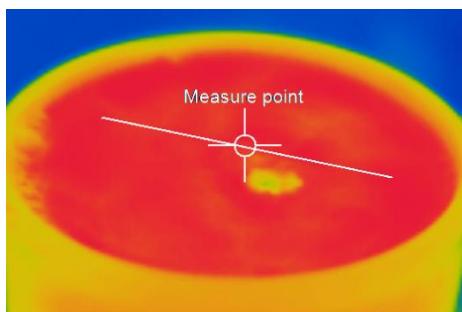
Position at Profile:

Location [%]:

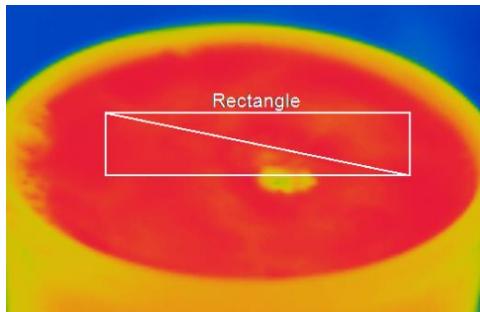
50,0	▲
100,0	▲

Min. Size:

5	▲
---	---



Measure area assigned to a temperature profile (measure point)



Measure area assigned to a temperature profile (rectangle)

4.1.2. Calculated Objects

Calculated objects allow you to select various operations that offer a signal processing. The name for the created object can be changed in the field **Name**. Furthermore, in the field **Show in digital display group**, you can decide whether the object is to be displayed in the digital display group or not. Under **Operation**, you can choose between the following operations:

Off	The operation is off.
Difference	Calculates the difference temperature of two selected measuring areas (Operand 1 and Operand 2).
Absolute difference	The result is a positive number which results from the formation of the difference between two selected measuring areas (Operand 1 and Operand 2).
Average	In this mode an arithmetic algorithm will be performed to smoothen the signal. The Averaging time [sec] is the time constant. This function can be combined with all other post processing functions. If activated (Smart averaging [°C]), a dynamic average adaptation at high signal edges is active.
Peak Hold	This function keeps the respective signal maximum. When the temperature drops, the algorithm keeps the signal level for the set Hold time [sec] . After the hold time the signal will drop down to the second highest value or will descend

Calculation

Name:	Object 1
<input checked="" type="checkbox"/> Show in digital display group	
Operation:	Average
Operand:	Area 1
Averaging time [sec]:	0.0
Smart averaging [°C]:	0.0

Average (Area 1)

	by 1/8 of the difference between the previous peak and the minimum value during the hold time. This value will be held again for the specified time. After this the signal will drop down with slow time constant and will follow the current object temperature. Therefore, if periodic events will be measured (bottles on a conveyor e.g.) this peak hold function avoids a drop down of the signal to the conveyor temperature in-between 2 events.
Valley Hold	With this function the respective signal minimum is held. If the signal ascends the algorithm maintains the previous signal valley for the specified Hold time [sec] . The definition of the algorithm is according to the peak hold algorithm (inverted).
Adv. Peak Hold	This algorithm searches for local maximum values. Peak values which are lower than their predecessors will only be taken over if the temperature has fallen below the Threshold [°C] value beforehand. If Hysteresis [°C] is activated a peak in addition must decrease by the value of the hysteresis before the algorithm takes it as a new peak value.
Adv. Valley Hold	This function behaves inverted to the extended maximum search. This algorithm searches for local minimum values. Minimum values which are higher than their predecessors will only be taken over if the temperature has exceeded the Threshold [°C] value beforehand. If Hysteresis [°C] is activated a minima in addition must increase by the value of the hysteresis before the algorithm takes it as a new minimum value.

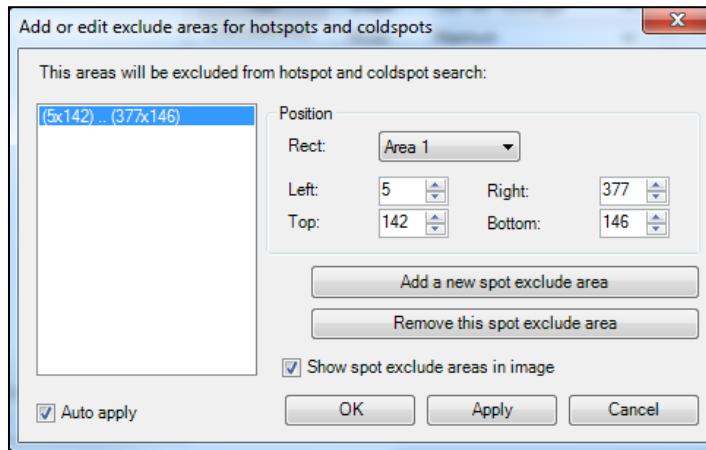


- Area 1 without post processing
- Object 1 with averaging time and smart avagering



- Area 1 without post processing
- Object 1 with averaging time and without smart avagering

4.1.3. Excluding Hot and Cold Spot Areas



Edit excluded areas of hotspots/coldspots ...

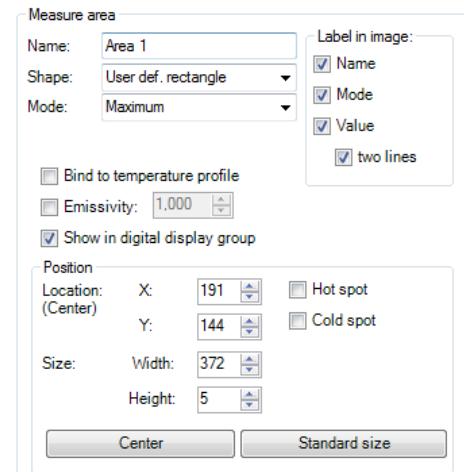
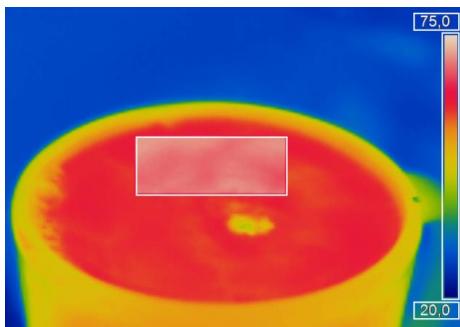
Using the menu **Tools**, **Configuration**, **Measure areas** and **Edit excluded areas of hotspots/coldspots** you can exclude existing or potential hot or cold spots from data analysis. Within the user defined areas of the image the spots will not be taken into consideration. A new area can be edited via the button **Add a new spot exclude area** or deleted via the button **Remove this spot exclude area**. The excluded area can be selected from already existing user defined areas in the drop down list or can be defined using coordinates. If you select the option **Show spot exclude areas in image** the areas will be shown in the main window.

4.1.4. Individual Emissivity Values of Measure Areas

In case of measuring several materials different emissivity values can be set within the image.

Using the menu **Tools**, **Configuration**, **Measure areas** and **Emissivity** the individual emissivity values can be defined.

The display of the changing temperature values within the measure areas will remain linked to the colors of the reference bar.

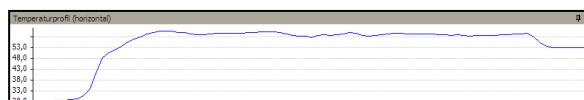
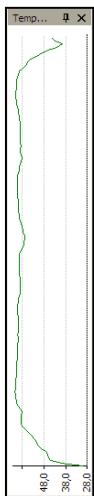


4.2. Temperature Profile

Up to 2 temperature profiles which graphically reproduce the temperature development can be generated. Therefore go to **Tools**, **Configuration** and **Temp. profiles**. The profiles are labeled as **Profile 1** and **Profile 2**.

The position and size of the profiles can be defined via the coordinates **Start (P1)** and **End (P2)**.

Select **Show in image** if you want the profiles to be displayed in the infrared image in the main window. Alternatively, this setting can be made by choosing the menu **View** and **Image information** (please see section **2.2.3**).



The position and size of the profiles can be also defined by dragging the grippers at the end of the lines within the image of the main window.

The temperature profiles can be displayed in additional windows (please see section **2.2.1**). Using the options **Show in horizontal diagram**, **Show in vertical diagram**, **Show alarm values of main measure area**, **Show pre-alarm values of main measure area** and **Use alarm and pre-alarm colors in diagrams** the profiles can be assigned to the horizontal and / or vertical diagram window.

	Profile 1:	Profile 2:
Start (P1) X:	5	191
Start (P1) Y:	144	5
End (P2) X:	377	191
End (P2) Y:	144	283
Show in image:	<input type="checkbox"/>	<input type="checkbox"/>
Show in horizontal diagram:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Show in vertical diagram:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Show alarm values of main measure area		
<input type="checkbox"/> Show pre-alarm values of main measure area (if enabled)		
<input type="checkbox"/> Use alarm and pre-alarm colors in diagrams		

The option **Range** allows you to choose between automatic or manual adjustment of the temperature scaling within the diagram.

There are two possibilities of displaying the profile **Curve** in the profile diagram. Using the option **Assign to image** the profile curve fills only the parts corresponding with the actual length of the profile in the image.

Using the option **Full range** the profile curve fills the whole profile diagram independent from the size of the profile.

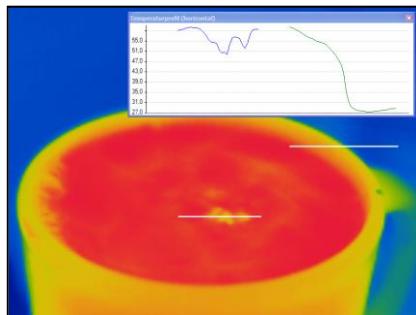
Bind measure areas to profile ...

Range

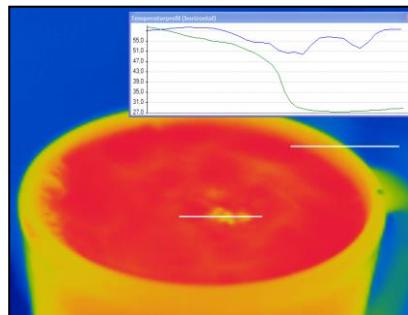
Auto Min: 0,0 Max: 100,0
 Manual

Curve

Assign to image
 Full range



The profile curve assigned to the image (Display in separate window)



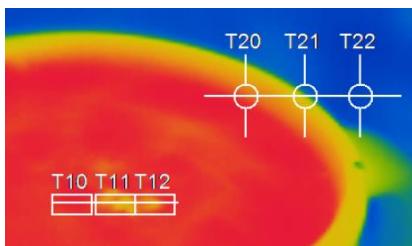
The profile curve assigned to the full range of the diagram (Display in separate window)

Use **Bind measure areas to profile** to assign various measure areas to a temperature profile. If the position of the profile is changed all the measure areas will also be moved. The respective profile can be chosen via the option **Assign measure areas to**.

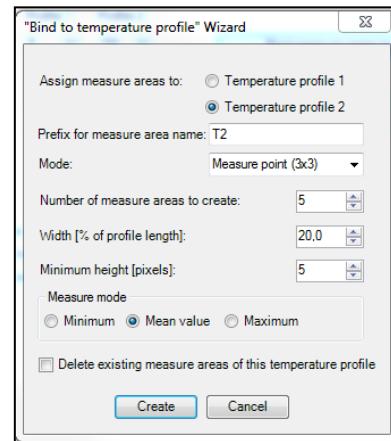
Prefix for measure area name enables the individual labeling of measure areas. The measure area type can be defined under the **Mode** options.

Number of measure areas to create as well as the **Width [% of profile length]** and **Minimum height [pixels]** can also be specified.

Via the **Measure mode** you can determine the way of displaying the minimum, maximum or mean temperature in the digital display window (please see section 2.2.1).



3 rectangles and 3 measure points are assigned to temperature profile 1 and 2.



The option **Delete existing measure areas of this temperature profile** eliminates the defined settings of a profile.

Save the settings by pressing the **Create** button.

4.3. Temperature Time Diagram

4.3.1. General Settings

In the **Tools**, **Configuration** and **Temp/Time Diagram** menu you can display the temperature over time for each configured measure area as well as for predefined values (please also see **2.2.4**).

The **Show** options define if a certain temperature value is displayed or not. If the **graph** is shown you can decide whether to illustrate the **name** or not.

If activating the option **Auto range** the respective graph is influencing the auto ranging of the diagram. If the option is not chosen the scaling is based on the other temperature values.

In the menu **Pen**, the **width** of the graph as well as its **color** can be individually configured.

A further option is to define the time scaling of the diagram at a minimum **[sec.]**. If activating **set initial time to fixed value** the time scale will be the length of the initial time chosen. When choosing **set initial time to length of video** the time scaling is adjusted to the length of the stored video sequence loaded into the software. With **set maximal time to length of video** the scaling of the time axis is fixed to the whole recording length.

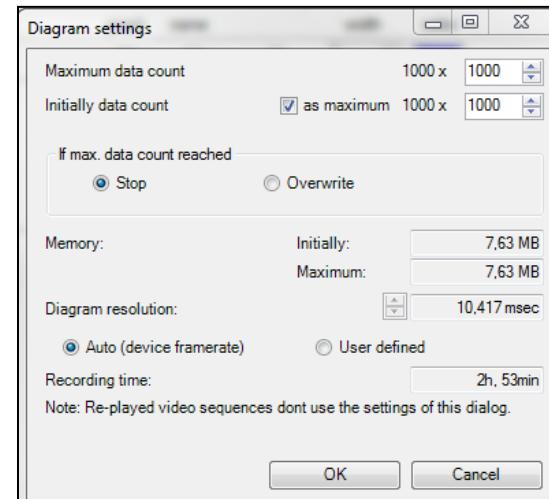
Measure Area	Show		Auto range	Pen	
	graph	name		width	color
Area 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	
Chip	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	
Internal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	
Reference	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	
<input type="checkbox"/> [All]					
Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	 Range
Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	 Range

Initial time:	While playing
10.0 <input type="button" value="▼"/>	<input checked="" type="radio"/> set initial time to fixed value
	<input type="radio"/> set initial time to length of video
	<input type="radio"/> set maximal time to length of video

In the **Diagram measuring settings** you can define the maximum of data (**Maximum data count**) which is displayed in the diagram. 1.000 x 1.000 results in 1.000.000 (one million) data values; the needed **Memory** will be calculated automatically. For demonstration purposes with many measuring fields in the diagram, you can make over the option **Initially data count**, an initial specification of the max. number of data counts (computer memory is reserved). Using the option **Auto (device framerate)**, the **Recording time** is calculated based on the frame rate of the camera (please also see **3.4.1**).

Independent from the frame rate of the camera you can individually set the number of data. If you choose the option **User defined** you can put into the box **Diagram resolution** the rate of displayed data (time interval). Via the arrows the interval can be increased or decreased.

Diagram measuring settings



4.3.2. Scaling of Diagram Axes



Control elements of the time axis

1	Scroll bar to choose time segment.
2	Zoom (increase) into the diagram. The temperature axis will remain.
3	Zoom (decrease) into the diagram. The temperature axis will remain.
4	Whole range: Display of whole time axis, e.g. of a stored video sequence.
5	H: Hold/ C: Continue: Any activation of the H control element will stop the further actualization of the measurement graph. The measurement itself continues in the background. To return to the current measurement graph please press the C control element. During the stopped status any parts of the diagram can be selected. With the zoom in-button + these parts can be stretched (enlarged) and with the zoom out-button – clinched (minimized).

Control elements of the temperature axis

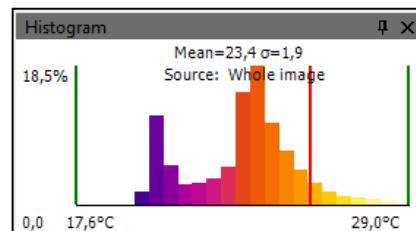
6	Global scaling: The temperature range of the diagram will automatically be adapted to the respective peak values. The range will remain as set during the whole measurement.
7	Local scaling: The temperature range of the diagram will be adapted dynamically to the respective peak values. After the respective peak has left the diagram in the further process of the measurement, the range will be readapted. This option enables an optimum display of the temperature graph.
8	Scroll bar to choose temperature segment.

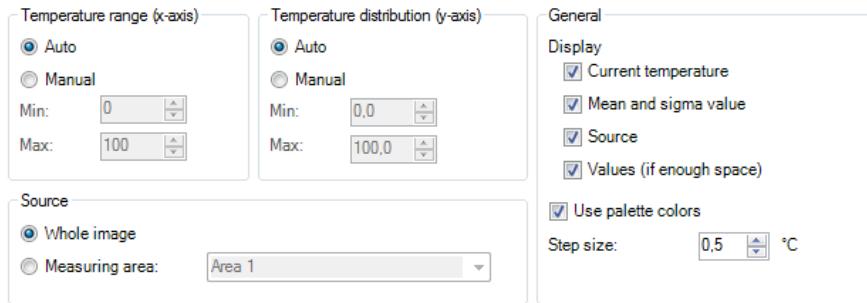
9	Zoom (increase) into the diagram. The time axis will remain.
10	Zoom (decrease) into the diagram. The time axis will remain.
11	Whole range: Display of whole temperature range which is set in the camera.

4.4. Histogram

The Histogram feature shows the distribution of pixel intensity values within a thermal image. The X-axis of the histogram represents the pixel intensity and the Y-axis represents the percent of color count for each pixel intensity value.

In the **Tools**, **Configuration** and **Histogram** menu you can adjust various settings. The given **Temperature range** and **Temperature distribution** can be generated by the software or by the user by defining the minimum/maximum temperature range respectively minimum/maximum temperature distribution.

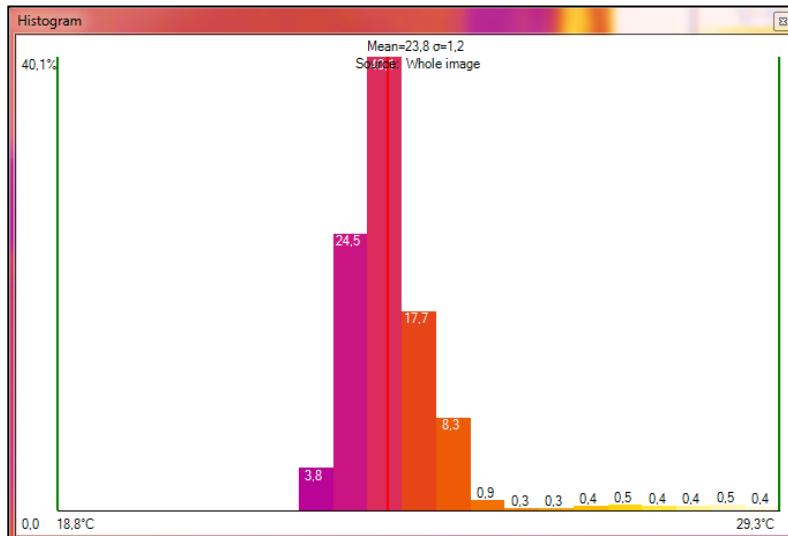




Further options are:

Current temperature	If activated the red line will show the current temperature at the mouse in the graph.
Mean and sigma value	Average temperature and statistical deviation 1σ (1 Sigma) will be displayed.
Source	Shows on what source the histogram is related to.
Values	The current values of the single palette colors are shown, but it needs a certain window size to illustrate them on the graph.
Use palette colors	You can choose between colored or black/white presentation.

Step size	Shows the width of the bar in °C or °F.
------------------	---

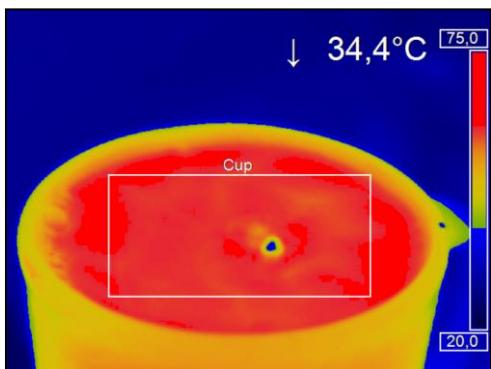


Histogram with the view of current temperature, mean and sigma values, Source, Values, Use palette colors and step size (here: 0,5°C)

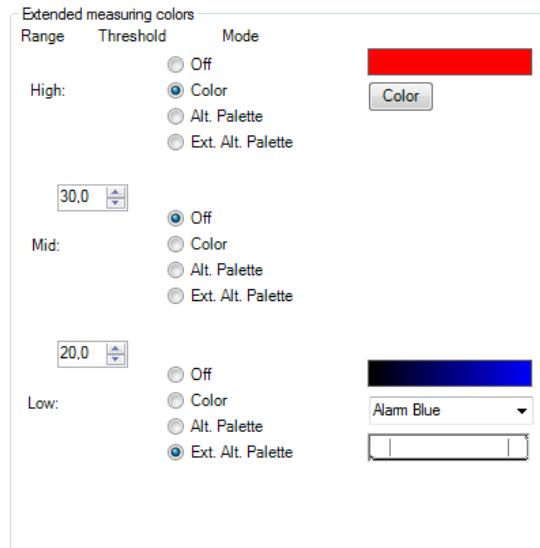
4.5. Extended Measuring Colors

The **Tools**, **Configuration**, **Measuring colors** and **Extended Measuring colors** menus offer you the possibility to change the pixel color within the image if the temperature **Range** reaches predefined low and/or high temperature values. Doing this you can visualize temperature gradients. Furthermore, the display of isotherms (colored display of temperature group) is possible.

Via the **Threshold** definition you can set two temperature values. The individual display of pixel located over (**High**), between (**Mid**) or below (**Low**) the thresholds can be defined by specific isotherm (**Color**) or by an alternative color palette (**Alt. Palette**).



Using Alt. palette the colors correspond to the temperature borders in the reference bar option. You will see the range of the palette which was defined by the thresholds. With **Ext. Alt. Palette** you can individually define the start and end point of the extended alternative color palette within the overall reference bar.



4.6. Image Subtraction



Once you have activated the feature by using **Image subtraction** in the **Devices** menu or via the **Icon** on the toolbar, an image is saved in the background and a temperature difference is calculated and displayed for all the following images.

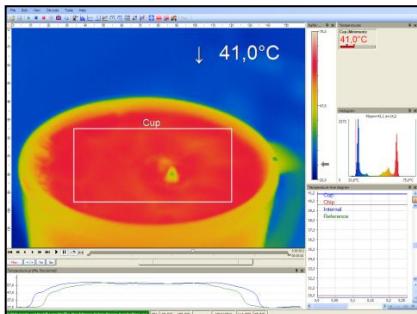
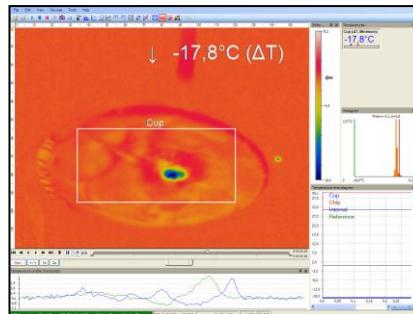


Image subtraction is not activated.
The current averaged temperature of the measure area is displayed in the right top corner.

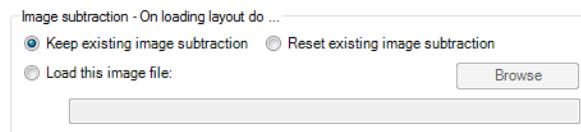


After activating the image subtraction function the current temperature difference compared to the previous image is displayed.



Alternatively, you can load a previously saved radiometric image (.jpg or .tiff) using **Image subtraction from file** in the **Devices** menu or via the **Icon** on the toolbar in order to use it as a template for the image subtraction.

Under Menu **Tools**, **Configuration** and **Extended measuring** you can choose by **Image subtraction –**



On loading layout do between **Keep existing image subtraction**, **Reset existing image subtraction** and **Load this image file**.

4.7. Relative Extreme Values

Within the **Tools**, **Configuration** and **Extended measuring** menu it is possible to exclude pixel within the thermal image from data analysis. Using **Ignore pixels with temperatures** a temperature can be set as lowest (**below**) or highest (**above**) value.



In case of analyzing an image using measure areas (**for measure areas:**) the calculation of e.g. the mean value is not taking values below or above the set limits into account.

For hot/cold spots localization determines that all pixels with the defined values are excluded from search.

For </> temperature ranging means that all pixels with the respective temperature do not influence e.g. the automatic scaling of temperature-time-diagram.

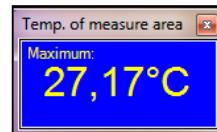
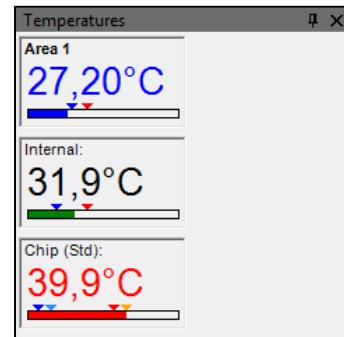
4.8. Alarms

In the **Tools**, **Configuration** and **Alarms** menu you can define an alarm and pre-alarm for each configured measure area as well as for the predefined values (please also see **2.2.4**). Pre-alarms can be useful as an advance warning.

The alarm values can be displayed as figures in the digital display or in a graphical way as a bar. For the latter you need to activate the option **GraphBar**. Regarding the bar you can define via **Display ranges** the **Min.** and **Max.** value (temperature borders). With **Alarms** the **Low** and **High** thresholds can be set which finally defines the displayed color.

If the high alarm value is reached or exceeded the color of bar changes to **red**, for pre-alarm **orange**. If the measured temperature reaches or goes below the lower alarm value the color of bar changes to **blue**, for pre-alarm **light blue**. Temperatures in between the defined thresholds are displayed **green**.

Measure area	Display ranges		Pre-alarms		Alarms		GraphBar	Appl.	Alarm to PIF
	Min.	Max.	Low	High	Low	High			
Area 1	0.0	100.0	24.0	36.0	20.0	40.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cursor	0.0	60.0	10.0	50.0	5.0	55.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chip	0.0	60.0	10.0	40.0	5.0	45.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal	0.0	100.0	24.0	36.0	20.0	40.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reference	0.0	100.0	24.0	36.0	20.0	40.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
[All]:									
Value	0.0	100.0	24.0	36.0	20.0	40.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value	0.0	100.0	24.0	36.0	20.0	40.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Note

The background color of the window for the digital display of the main measuring field also changes when the alarm value is below or exceeded, in **light blue** or **blue** (low alarm) or **orange** or **red** (high alarm).

If a temperature value shall be used as an pre-alarm, you need to tag the **Pre-alarms** option. The alarm can also be put out via the Process Interface (PIF) using the **Alarm to PIF** option.

Note



If activating the **Alarm Appl.**, a red alarm button on the toolbar appears. You can deactivate the visual and acoustic alarm by clicking on the alarm button. The alarm will stay deactivate until the alarm value is reached again.



In the **Alarm configuration** window you can set an **Audible alarm**.

[Alarm configuration](#)

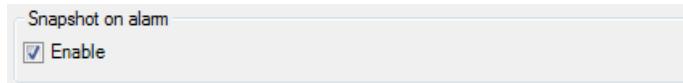
In the **Interval [sec]** input box you can specify the time interval the sound appears. Via the **Path to sound file** you can **Browse** an individual *.wav file

The acoustic alarm signalization can be repeated in defined intervals setting the **Interval [sec]**.

Using the option **Recording on alarm** you can specify a **Delay [sec]**. The recording starts after the delay time is over. In the **Duration [sec]** box the recording time of the video sequence can be set.

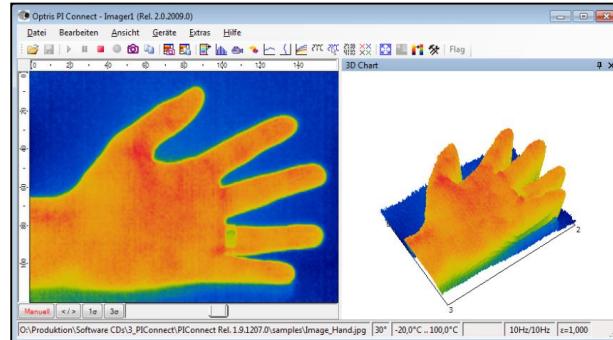
Furthermore, a recording can be stopped via **Abort recording if alarm condition drops out**. If this option is not chosen the recording will be finished based on the time in the duration box.

With the **Snapshot on alarm** option you can set a **Delay [sec]** time before an alarm will trigger the storage of an image.



4.9. 3D display of Thermal Image

Thermal images can be displayed in real time as 3 dimensional images. The 3D Chart is displayed in a separate window. To add the software window please use the menu item **View**, **Windows** and **3D Chart** or the **Icon** on the toolbar



5. Visual Camera (only TIM 200/230)

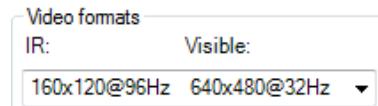
5.1. Enabling the Visual Camera

The TIM200/230 thermal imager features a visual camera. With the help of BI-SPECTRAL technology, the visual image (VIS) can be combined with a thermal image (IR). Both can be finally captured time synchronously. The visual camera can be enabled in the **Tools**, **Configuration** and **General** menu under **Visible camera** via the option **Use (if available)**.



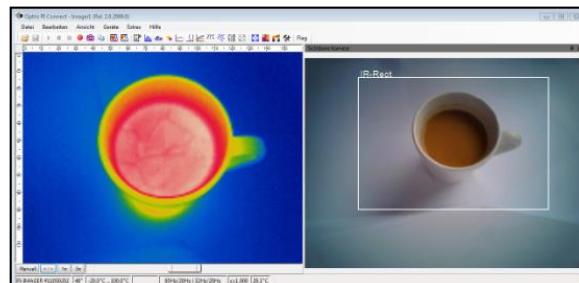
The menu **Tools**, **Configuration** and **Device** displays the **Video formats** depending on the current imager's configuration.

The thermal image (160 x 120 pixels) will be shown with 96 images per second (96 Hz), the visual image (640 x 480 pixels) with 32 Hz. In the second mode, the thermal image is displayed at 160 x 120 pixels with a speed of 128 Hz and the visual image with a resolution of 596 x 447 pixels with 32 Hz.



5.2. Monitoring Modus

The monitoring modus is used to have an easy orientation at the point of measurement. In this modus the visual image is displayed in a separate window.



To add the separate software window please use the menu item **View**, **Windows** and **Visible video** or the **Icon** on the toolbar.

Note

The rectangle within the visual image shows the area covered by the thermal image. In order to cover a big area the wide-angle lens is used, to cover a smaller area the telephoto lens.



In the **View**, **Image Information** and **IR rectangle** menu it is possible to hide the displayed rectangle.

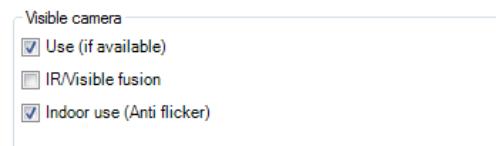
5.3. Cross-fading Modus

5.3.1. General

The cross-fading modus is used in order to highlight critical temperatures at the point of measurement. In this modus the thermal image is faded into the visual image.

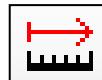


The cross-fading modus can be enabled in the **Tools**, **Configuration** and **General** menu via the option **IR/Visible fusion**. Alternatively, you can use the menu item **View** and **IR/Visible fusion** or the **Icon** on the toolbar.

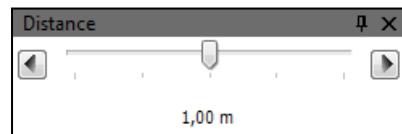


Note

The area covered by the thermal image within the visual image is limited by a rectangle. In order to hide the frame of the rectangle, use the **View**, **Image Information** and **IR rectangle** menu.



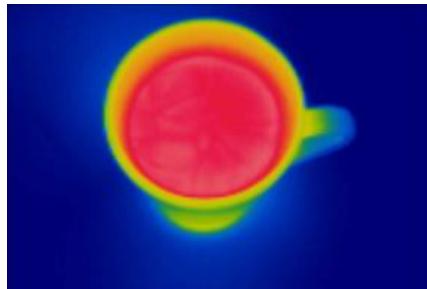
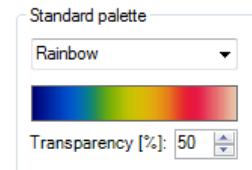
The function **Distance** is used in the cross-fading mode to perform the parallax correction between IR and VIS image.



5.3.2. Transparency of Thermal Image

The thermal image can smoothly be faded into the visual image (0...100 %). To set the transparency value please use the **Tools**, **Configuration**, **Measuring colors** menu and **Standard palette / Transparency [%]**.

0 %	The thermal image is fully faded into the visual image.
50 %	The thermal image is partly (50 %) faded into the visual image. Using this setting the ideal relation of both images can be defined (please see section 5.3.3).
100 %	The thermal image is fully transparent and will not be shown in the visual image.



Cross-fading of thermal image and visual image by 0 % setting



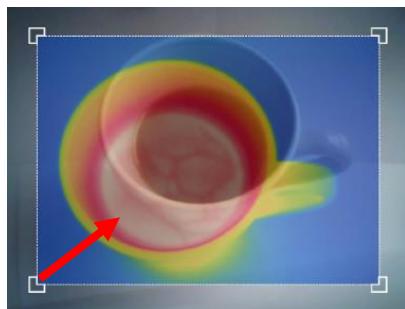
Cross-fading of thermal image and visual image by 50 % setting



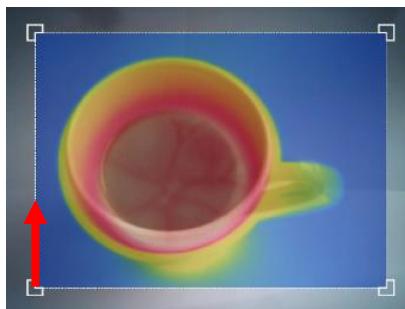
Cross-fading of thermal image and visual image by 100 % setting

5.3.3. Moving the Thermal within the Visual Image

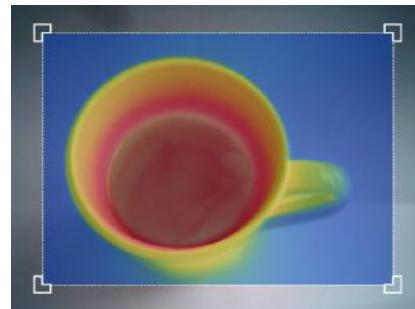
Due to the different optical axis of visual and thermal channel the relation of both images needs to be optimized. If moving the cursor to the edges of the rectangle's frame the grippers can be used to adjust the size of thermal image or to move the image completely (hold **Ctrl** synchronously).



Adjustment of thermal image by dragging to the top right



Adjustment of thermal image by dragging to the top



Ideal adjustment of thermal image to the visual image

Note

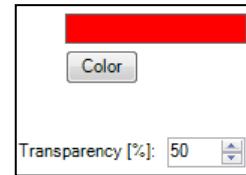


The ideal relation of both images can be set easily by fading the thermal image into the visual image by 50 % (please see section [5.3.2](#)).

5.3.4. Cross-fading of Defined Temperatures

The cross-fading modus can be combined with the **Extended Measuring colors** option (e.g. for isothermal display of temperatures, also see section 4.5). To set the level of fading this option into the visual image use the **Tools**, **Configuration**, **Measuring colors** and **Extended Measuring colors / Transparency [%]** menus:

0 %	The set option is fully faded into the visual image.
50 %	The set option is partly (50%) faded into the visual image.
100 %	The set option is fully transparent and will not be shown in the visual image.



Isothermal cross-fading by 50 % setting



Isothermal cross-fading by 0 % setting

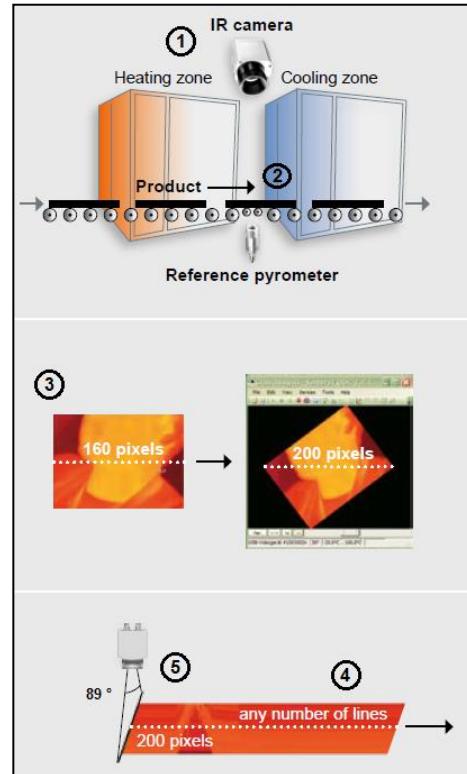
6. Line Scanner Mode

6.1. General Information

The TIM Connect software comes with a line scanner function. The line scanner mode is generally used for continuous processes with moving objects under test, such as measurement of rotary kilns or measurement of great lots at conveyor belts (batch process).

Overview of the advantages:

- ① Simple monitoring of process with limited optical access
- ② Indirect visualization of heat distribution within ovens via camera installation at the oven exit
- ③ Extension of number of pixel through the use of the picture diagonal (e.g. TIM 160)
- ④ Very fast data recording of unlimited lines which-in turn can produce thermal images of any resolution
- ⑤ Huge FOV as a line for detailed process analysis such as at wide conveyor belts (e.g. TIM 160 with an 72° optic)



6.2. Basic Settings

6.2.1. Line scanner configuration menu



All the settings related to the line scanner mode can be done through the **Line scanner configuration** menu. You will find the menu under **Tools**, **Line scanner mode** and **Line scanner settings** or as an **Icon** on the tool bar.

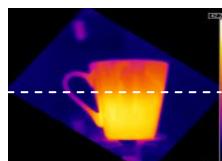
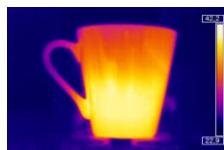
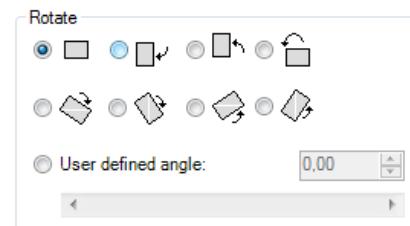
6.2.2. Choosing the Layout

Before you configure the Line scanner mode a suitable layout (e.g. alignment of application windows) should be chosen or created. You will find more details in chapter **2.2**.

6.2.3. Rotating of the Image

For some application is it of advantage to increase the number of pixels per line by changing the view angle. To do so go to **Rotate** menu (see chapter **2.3.2**)

According to the chosen angle the camera has to be mounted under defined angle, too.



6.2.4. Activating the Line Scanner



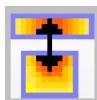
In order to configure the Line scanner it is necessary to activate the Line scanner mode under **Tools**, **Line scanner mode** and **Enable Linescanner** or using the **Icon** on the tool bar.

Note



There are two view options available under Line scanner mode. Line scanner sighting view is showing the position of the line and self-trigger area within the infrared image taken by the camera. Line scanner view delivers the resulting infrared image based on temperature readings for selected lines.

6.2.5. Positioning of the Line (Line Scanner Sighting View)



The pre-defined position of the line can be seen in the Line scanner sighting view. To access the view go to **Tools**, **Line scanner mode** and **Line scanner sighting view** or use the **Icon** provided.



Note

This icon enables to switch between Line scanner sighting view and Line scanner view.

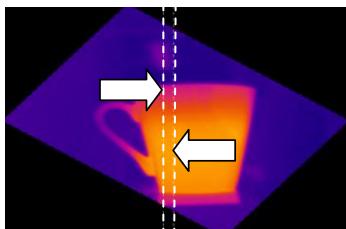
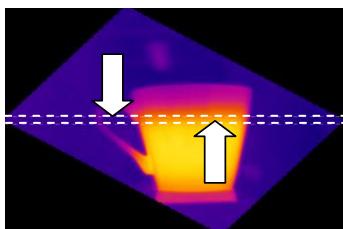
To define the position of the line within the infrared image, go to **Line scanner configuration** application window (see 6.2.1) in the **Source** menu. In the **Lines taken from source** section using **First row** and **Last row** field you can specify how many lines are to be considered during the measurement. Number 1 stands for the first line from the top in the infrared image.

Lines taken from source	
First row:	10
Last row:	10

If more than one line should be taken from the source the **Direction** menu enables to choose the direction in which they will be measured and consequently displayed in **Line scanner sighting view** mode. The option **Scan on user defined line** makes it possible to graphically position the scan line through the mouse. It can

also be entered by the coordinates (X and Y) in the **Start point (P1)** and **End point (P2)** fields. The number of pixels on the scan line and the angle are displayed in the field **linescanner pixels** and **linescanner angle**. The other options you can choose from are **Scan top-down (rows)** where the lines are measured and displayed from the top to the bottom, **Scan bottom-up (rows)** from bottom to top, **Scan left to right (columns)** from left to right and **Scan right to left (columns)** from right to left. In all direction variants the scan line can be moved by mouse.

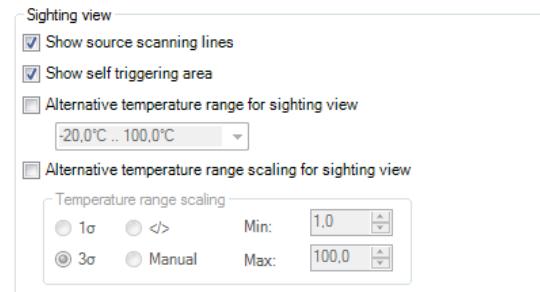
Direction <input checked="" type="radio"/> Scan on user defined line <input type="radio"/> Scan top-down (rows) <input type="radio"/> Scan bottom-up (rows) <input type="radio"/> Scan left to right (columns) <input type="radio"/> Scan right to left (columns)	Points of user defined line X: 0 Y: 0 Start point (P1): 0 End point (P2): 159 linescanner pixels: 200 linescanner angle: 36,8°
---	---



The displayed line scanner sighting views visualize the four possibilities how to capture and finally represent multiple lines in the line scanner view

6.2.6. Layout Configuration of the Sighting View Mode

You can make further modifications to the Sighting view mode using **Tools**, **Line scanner mode** and **Line scanner settings**. If you go to **Sighting view** you can define several modifications. The option **Show source scanning lines** enables you to fade the scanning lines in and out. With **Show self triggering area** the self triggered area can be faded in and out. **Alternative temperature range for sighting view** option enables switching to temperature range different from the one used for the measurement. It is sometimes helpful to configure the line scanner when process is stopped using one temperature range where as different temperature range is defined to examine running process. As a further option **Alternative temperature range scaling for sighting view** you can set up your own temperature range scaling.



6.3. Data Evaluation of the Scanned Line

6.3.1. Line Scanner View



In the line scanner view readings will be displayed as an infrared image. To activate this view mode you can use the icon provided.

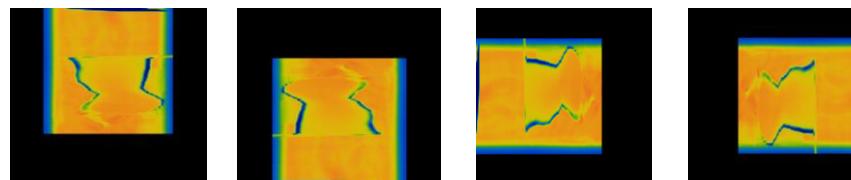


Note

This icon enables to switch between Line scanner sighting view and Line scanner view.

Presentation of the scanned lines can be further defined in **Line scanner configuration** application window (see 6.2.1) under **Presentation**. **Direction** option defines in which direction the scanned lines will be displayed. Scanned lines can be displayed as **Top-down**, **Bottom-up**, **Left to right** or **Right to left**.

Direction
<input checked="" type="radio"/> Top-down
<input type="radio"/> Bottom-up
<input type="radio"/> Left to right
<input type="radio"/> Right to left



Presentation of scanned lines in the Line scanner view:
Top-down,
Bottom-up,
Left to right and
Right to left.

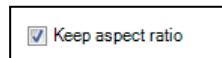
In **Lines** you can enter how many lines will be displayed in the Line scanner view. Number of lines will also define after how many lines the infrared image will be reloaded (Line scan).

History [sec] input field determines the time frame the scanned lines should be displayed. Time frame can be based on the duration of the process cycle

Lines:	<input type="button" value="▲"/> 600 <input type="button" value="▼"/>
History [sec]:	<input type="button" value="▲"/> 10.0 <input type="button" value="▼"/>
<input type="checkbox"/> Auto sync.	
Resulting linerate [Hz]:	60.0

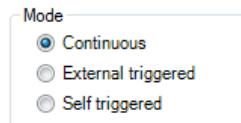
observed. If you tick the **Auto sync** box the value will be provided automatically using an external trigger input (see 6.3.2). In **Resulting linerate (Hz)** field calculated frame rate of each line will appear automatically.

Keep aspect ratio option will adjust width of each line so that all lines will appear within the infrared image.



6.3.2. Triggered Display of Lines

Triggering signal can be used to control how the scanned lines will be arranged within the Line scanner view. In the **General** menu under **Line scanner configuration** (see 6.2.1) there are two options provided.

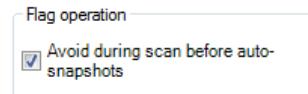


Continuous mode will apply predefined values to display the scanned lines. No triggering signal will be used to control the line scanner presentation.

External triggered option enables using an external triggering signal to control arranging of the scanned lines. Number of lines being reloaded after this signal is defined under **Lines** und **History [sec]** (see 6.3.1).

Further settings can be specified:

In **Flag operation** if you activate **Avoid during scan before auto-snapshots** refreshing of flag will not be executed during the line scan (see also 2.4.2).



If activated **Avoid re-triggering during scan** will not allow to run a new line scan cycle while a previous cycle trigger by recent signal is not finished.

Trigger options

Avoid re-triggering during scan

Using **Avoid temperature analyzing, detecting alarm states and PIF operation during scan**, the three operations mentioned are performed only at the end of the scan. This is very helpful for performance reasons when a very high sampling rate (e.g. 1000 Hz, TIM 1M) is set.

Analyzing operation

Avoid temperature analyzing,
detecting alarm states and PIF
operation during scan

Note

 For external triggering it is necessary to do modifications of the standard configuration on the Process Interface (PIF). You will find more details in the chapter **2.5**.

Using the **Self triggered** option it is possible to use a triggering signal provided by software to control arranging of the scanned lines. Number of lines being reloaded after this signal is defined under **Lines** und **History [sec]** (see **6.3.1**). Further modifications can be carried out:

First of all **Trigger area** within the infrared image needs to be specified. With the mouse you can make a graphic free positioning of the self trigger area in the sighting view. In the **Set Default** button you can choose between **Top, Bottom, Left, Right, Center** and **Full image**.

Trigger area

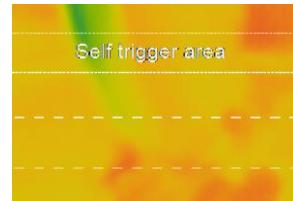
Left:	0	▲ ▼	Right:	159	▲ ▼
Top:	0	▲ ▼	Bottom:	5	▲ ▼

Set Default

Within the trigger area **Trigger thresholds** temperatures can be set to trigger the line scan cycle. **Holdoff time [s]** determines time frame within new signal should be neglected (e. g. if a signal from the heat source in the background is triggered).

Under **Flag operation** and **Avoid during scan** can be set that refreshing of flag will not be executed during the line scan (see also **2.4.2**).

Force after scan will execute the flag once given number of scanned lines is provided.



Trigger thresholds

<input type="checkbox"/> Trigger if below	0,0
<input checked="" type="checkbox"/> Trigger if above	100,0
Holdoff time [s]:	
5,0	

Flag operation

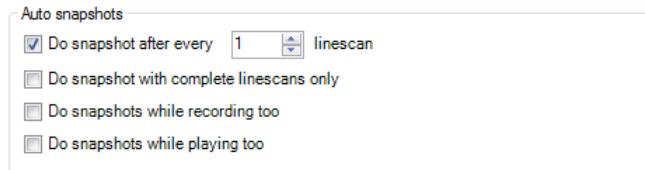
<input checked="" type="checkbox"/> Avoid during scan
<input checked="" type="checkbox"/> Force after scan

6.3.3. Snapshot Configuration

To document the measurement results a complete line scan can be saved as snapshot. You will find the **Auto snapshots** settings options in the **Line scanner configuration** (see 6.2.1).

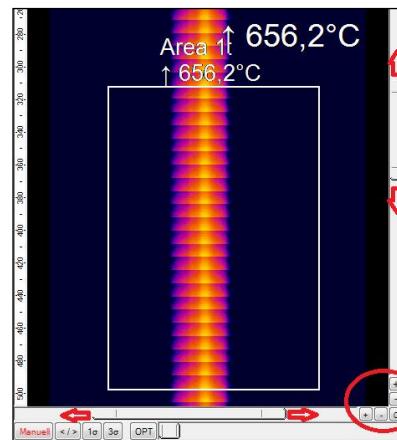
Using Auto snapshots and Do snapshots any...

you can specify after how many line scans a snapshot should be captured and saved. If **Do snapshots with complete linescans only** is activated, the snapshot will be delayed with an externally triggered Line scan until the next scan starts. If the checkmark is not set (default), the snapshot will be taken directly at the end of the line scan. **Do snapshots while recording too** will also take snapshots during a simultaneous line scan recording. **Do snapshots while playing too** will take snapshots from a video recording during playback.



6.3.4. Zoom Function of Snapshots

Large captured snapshots can be enlarged when viewed. To do this, open a saved snapshot (TIFF file), as described in chapter 3.1. Use **[+]** to zoom in and **[-]** to zoom out or use the bars on the side.



7. Merging

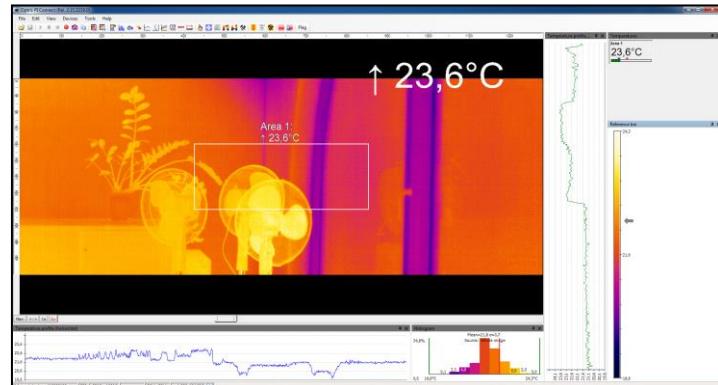
7.1. General Information

A further function in the TIM Connect software is the so-called merging. The merging allows the user to display several cameras in one software instance. This is very useful when whole processes, where several cameras are required, are to be displayed in a single screen.

Generally there are two ways to realize a merging. On the one hand you can connect the cameras directly to your computer via USB Port and on the other hand via the Ethernet network. Using the direct connection, it is really important to have several USB controllers at your PC. You find this information under the windows control panel, device manager and USB controller. One camera should be connected to one USB controller.

Advantages of camera merging

- If pixel size is getting too big, the use of multiple TIMs is possible
- Simultaneous flag control and frame synchronization via PIF
- Measurement areas / hot-, coldspots works over whole area
- Different camera positions allow having various viewing angles for a complete view of a 3D object
- After the merging setup and the restart of the TIM Connect Software, the source instances will open automatically



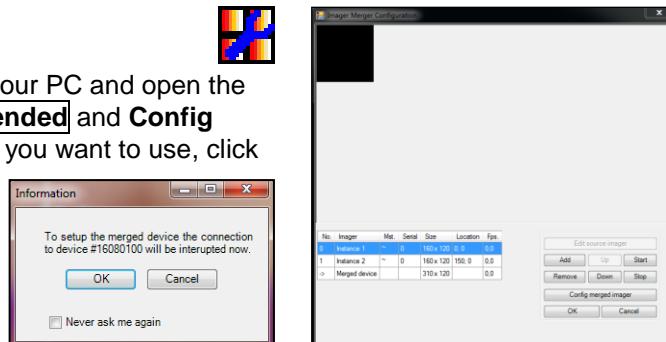
7.2. Direct Connection over USB Port

In this variant, the cameras are connected directly via USB to the PC. It is important to connect the individual cameras to different USB controllers because the maximum bandwidth of the USB interfaces is limited. We do not recommend using more than 3 cameras.

7.2.1. Configuration

At first connect all the cameras you want to use to your PC and open the TIM Connect software. Go to the menu **Tools**, **Extended** and **Config**

merged device. Depending on how many cameras you want to use, click correspondently often the button **Add**. In this example, two cameras are used. Afterwards mark each instance one at another and press the **Start** button. The instances will open in a new window. The main window will contain the merging picture and the two other windows are the different instances of the individual cameras.

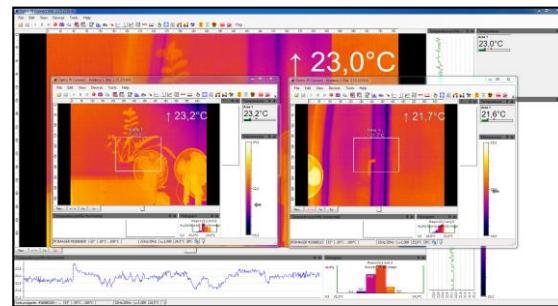


Now you have to assign this Instance to the first camera.

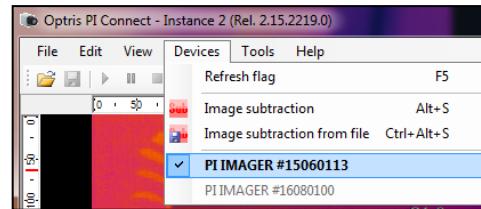
To do that, go on the **Instance 1** window to **Tools**, **Configuration** and **Device**. Under **Application start** set a check on **Connect to device with SN** and press **pick current**. This instance is now assigned to this camera. Repeat the steps for all cameras.

Application start:

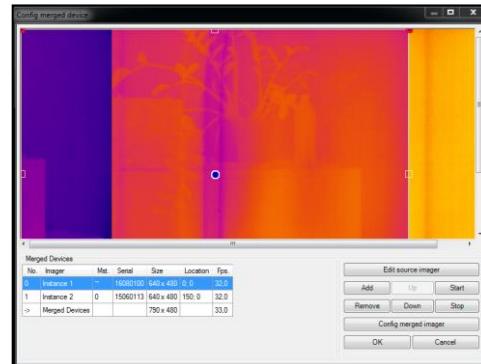
Connect to device with SN: 16080100



You can assign the different cameras to a specified instance by going to the instance window you want to assign and under menu **Devices**, select the camera you want to have.

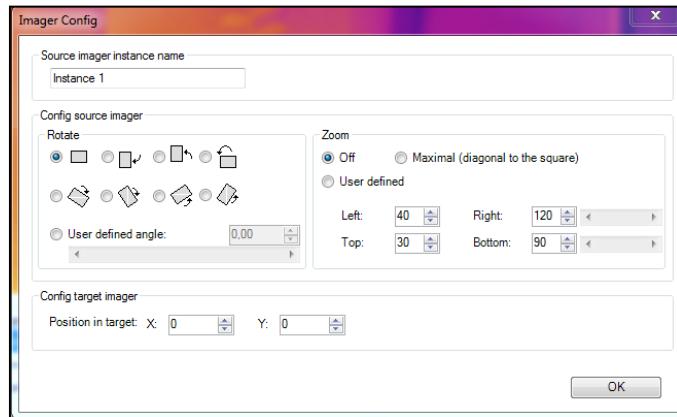


To adjust the pictures go again over the main window to **Config merged device** like described before. Here you can select directly each instance and change the size, the position and the rotation of the imager (starting from TIM Connect Software version 2.15.2222.0).



Another possibility to arrange the images of the different instances is also in the **Config merged device** window. Select the first instance (**Instance 1**) and click on **Edit source imager**.

Here you make several modifications on your imager. You can change the name, the picture of the camera and the position of the picture. Under **Config target imager** you can define the exact position of the target. So here you define where the picture should start. Repeat the same with the second instance (**Instance 2**). You can arrange the picture side by side or on top of each other. The coordinates depends on the camera you're using. For example if you use two cameras with an optical resolution of 640 x 480 and the picture should be side by side you have to use following values for the whole picture:



e.g. TIM 640	Position in target X	Position in target Y
Instance 1	0	0
Instance 2	639	0

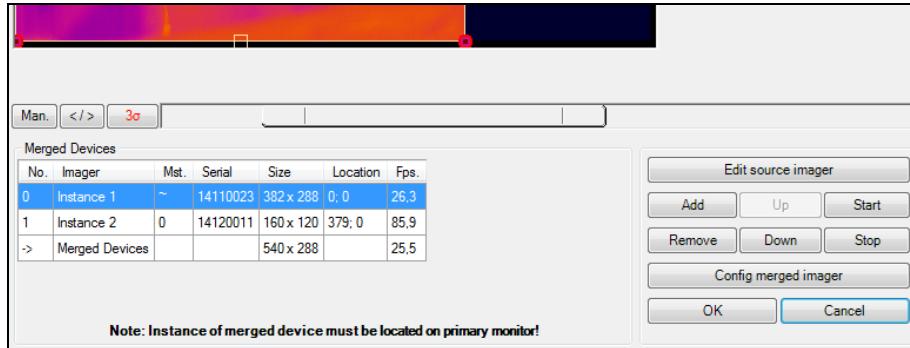
In this example the picture of the camera of Instance 1 is on the left side and the picture of the camera of Instance 2 begins lightly overlapping next to it. It is recommended a light overlapping of the pictures (up to 5 pixels) in order to have a



smooth transition of the two pictures. The windows of the source instances can be minimized. Do not close the windows because then there will be no measuring in the main instance. They have to run in the background or in the hidden mode.

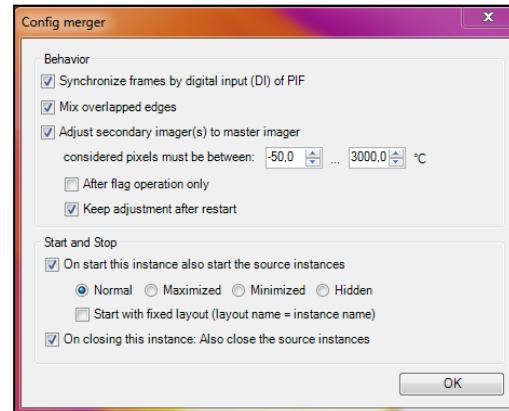
Note

 The instance of the merged device must be located on the primary monitor. If this is not the case, the note in the **Config merged device** Setup dialog box is highlighted in bold.



Under **Config merged imager**, further settings can be made for all instances. With **Synchronize frames by digital input (DI) of PIF**, the frames of the connected cameras are simultaneous synchronized using the PIF. **Mix overlapped edges** makes a smooth transition between the singles images. It will be interpolated. With **Adjust secondary imager(s) to master imager**, an adaptation of the pixels of the individual slave imagers to the master imager within the set temperature range is performed in the overlapping area. Under **After flag operation only**, the pixels are adjusted only after a drawn flag and not continuously.

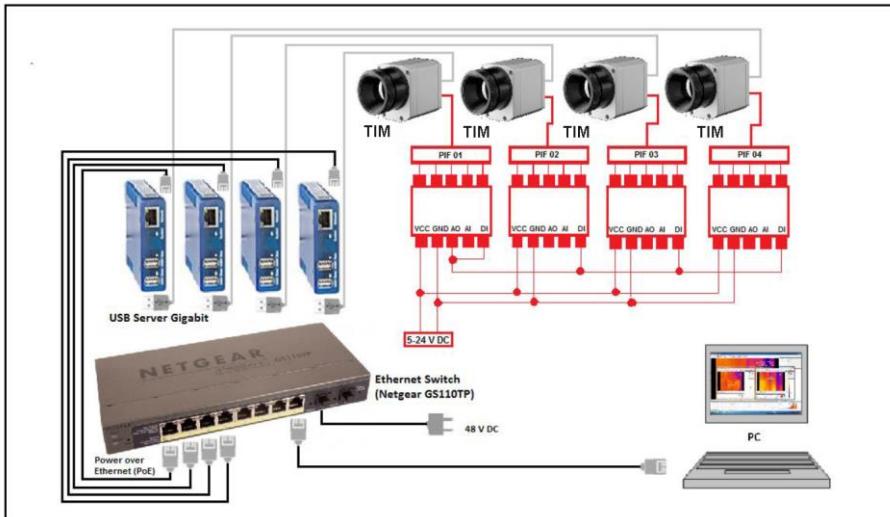
Further, you can make settings for the **Start and Stop** of the software. You can decide how the pictures of the source instances should be started. You can choose between **Normal**, **Maximized**, **Minimized** and **Hidden**. Also it is possible to close the source instances automatically when closing the main instance.



Under menu **View**, **Windows** and **Merged device** a tool window opens with a view of the available instances of the merged device.



7.3. Connection via the Ethernet Network

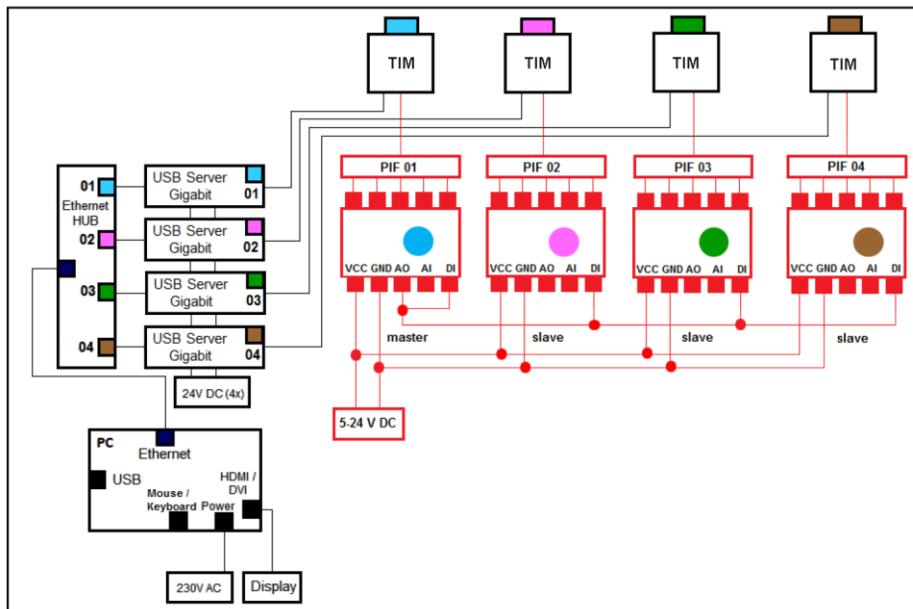


The second possibility is a connection via the Ethernet network. Each camera is connected to one individual USB Server Gigabit and those in turn are connected to the Ethernet switch. The switch than is attached to the PC. For the connection via network you can use more than 3 cameras for the merging.

The configuration of the merging is the same as described in chapter **7.2.1**.

You find a detailed description and procedure for the installation of USB Server Gigabit on the CD in the folder Documentation and Manuals.

7.4. Simultaneous Flag Control and Frame Synchronization via PIF



For simultaneous flag control and frame synchronization, use the PIF connection from the TIM camera. You can choose between the standard PIF and the industrial PIF depending on how many in- and outputs you want to use. In our example, the standard PIF is used. One camera will be chosen as the master and the others are the slaves. Please connect the digital input with the analog output of the master PIF and from the analog output you connect all digital inputs of the slaves together.

After you connected all your PIFs together, you need to set up the settings in the TIM Connect software. Therefore go to menu **Tools**, **Configuration** and **Device (PIF)** in each window of the individual instances.

For the master PIF, go under **Analog Outputs** and **AO1** and select **Flag Status**. The other PIFs are the slaves and there you have to go to **Digital Input**, **DI** and choose **Flag Control**.

Analog Outputs

AO1:	Flag Status	Setup	Flag open: 0V, Flag closed: 5V, Flag moving: 5V
AO2:	Not used	(!)	Setup
AO3:	Not used	(!)	Setup

Digital Input

DI:	Flag Control	Setup	high active
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	Analog Output	Digital Input
Instance 1 (master)	Flag Status	-
Instance 2 (slave)	-	Flag Control
Instance 3 (slave)	-	Flag Control
Instance 4 (slave)	-	Flag Control

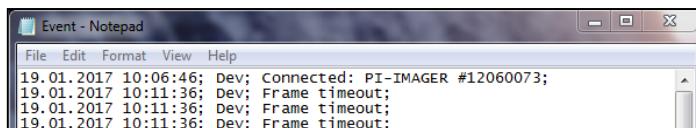
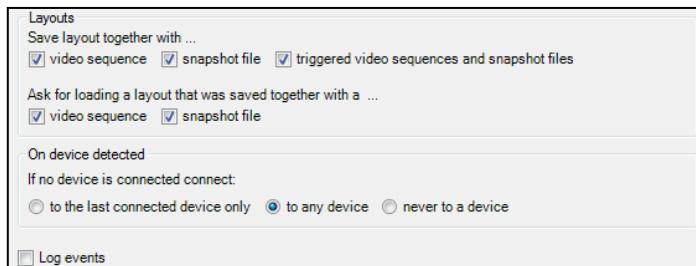
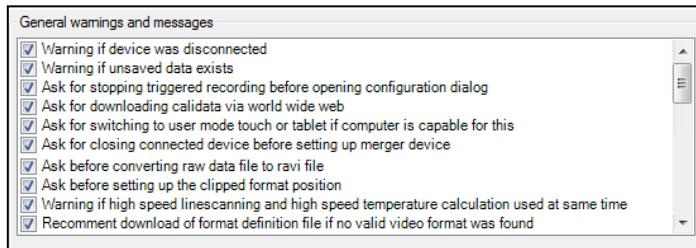
8. Further Information

8.1. Activating Software Messages

At some point a warning message will appear when performing an action that would cause changes to software settings.

To prevent unintended changes you can activate or deactivate these messages by using **Tools**, **Extended** and **Options**.

Further you can choose under **Layouts** how a layout should be saved or loaded together. The layouts are independent of the connected device. Under **On device detected** you can choose what should happen when no device is connected. Also you can activate **Log events**. If it's selected, messages (for example fail-safe events) will be logged. These can be found at: (C:\Users\AppData\Roaming\Imager\Event)



Note

If a message appears you can disable the window by choosing „Never ask me again“. Using the menu **Options** you can activate the appearance of the window again.

Important options are:

Warning if device was disconnected	A window tells the user that a device was disconnected.
Warning if unsaved data exists	If activated a reminder will appear to warn you on unsaved data or setups before shutting down the software.
Ask for stopping triggered recordings...	Opening the configuration dialog you will be asked whether to close a triggered data capturing or not. The message intends to prevent changing trigger settings by accident.

8.2. System Requirements

Minimum system requirements:

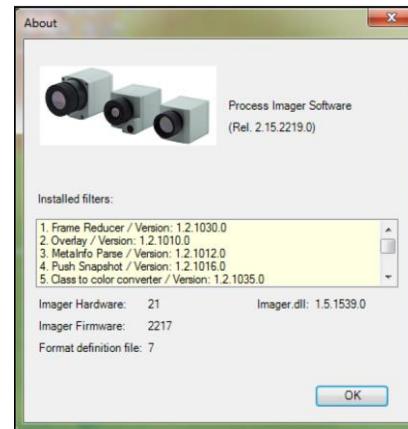
- Windows 7
- USB 2.0-interface
- Hard disc with at least 30 MByte free space
- At least 256 MByte RAM
- CD-ROM-drive

Recommended system requirements:

- Windows 7 or higher
- At least 2 GB hard disk storage for IR videos
- At least 2 GB RAM

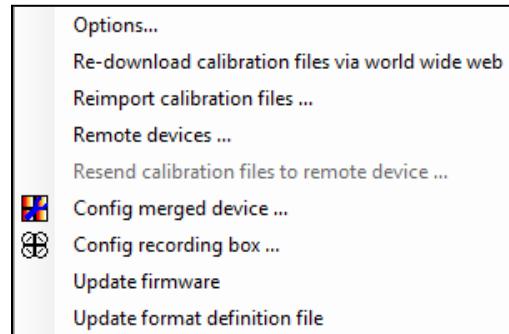
8.3. About Software

In the **Help** and **About** submenu you will find the version name of TIM Connect software you are currently running.



8.4. Extended Configuration

Under **Tools** and **Extended** you can configure different adjustments. Under **Options** you can choose general warnings and messages (see 8.1). Further you can **Re-download calibration files via world wide web** or **Reimport calibration files**. The choice **Remote devices** provides a configuration of the TIM NetBox via the network. You can find a detailed description on the CD (Documentation-Manuals). When you have connected the cameras over the network, you can **Resend calibration files to remote device** if errors appeared. Further you can **Config merged device** (see 7.2.1), **Config recording box** (see CD-Documentation-Manuals), make an **Update firmware** or fulfill an **Update format definition file**. The firmware update should be checked at regular intervals so that you always have the latest version on your device. The format definition file update ensures that the current video formats are supported.



8.5. Overview Shortcuts

F1	Snapshot
Alt+F1	Copy snapshot to clipboard
F2	Record
F3	Stop
Alt+F4	Exit
F5	Refresh flag
F6	Save screenshot
Alt+F6	Copy screenshot to clipboard
F10	Acknowledge alarm
Alt+P	Next palette

Ctrl+Alt+P	Previous palette
Alt+Enter	Full screen
Alt+S	Image subtraction
Alt+H	Horizontal mirror
Alt+V	Vertical mirror
Ctrl+Alt+S	Image subtraction from file
Ctrl+L	Line scanner sighting view
Ctrl+Alt+L	Enable line scanner



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