IC-Report DuoVision

GB *Operating manual – IR-Software* **B - 1**

TROTEC® GmbH & Co. KG • Grebbener Straße 7 • D-52525 Heinsberg
Tel.: +49 (0) 24 52 / 962 - 400 • Fax: +49 (0) 24 52 / 962 - 200
www.trotec.de • E-Mail: info@trotec.de

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1.0 INSTALLATION

1.1 System Requirement

Windows-XP (only 32 Bit-Version):

SP2 above, Memory 512MB above, CPU 700Hz above, Framework 2.0 above, Monitor Resolution 1024x768 above

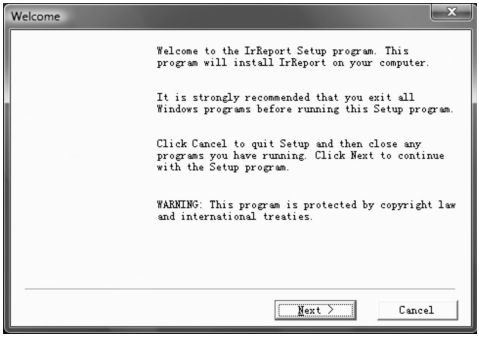
Windows-Vista (only 32 Bit-Version):

SP1 above, Memory 1GB above, CPU 1GHz above, Framework 2.0 above, Monitor Resolution 1024x768 above

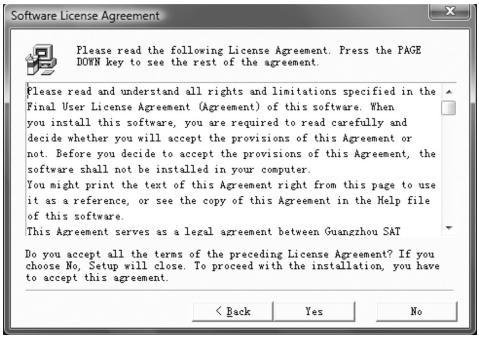
⚠ ***The IC-Report DuoVision does not support USB real time monitoring on Vista currently***

1.2 Install IC-Report DuoVision

- Find the installation program and double click the program file icon.

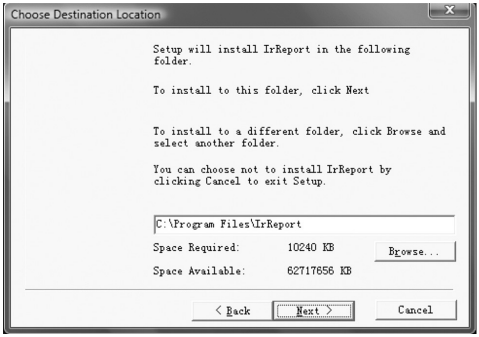


- Click the Next button to continue the installation or Cancel button to terminate the installation.
- On the License Agreement screen, click Yes button to continue the installation or No button to terminate the installation.

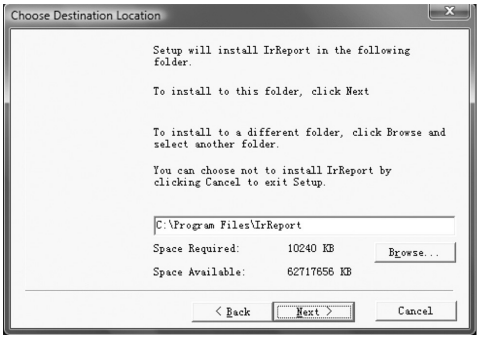


- Choose an installation hard drive and file path by clicking the Browse button or use the default driver and file path (Please ensure there is enough space on the selected drive).

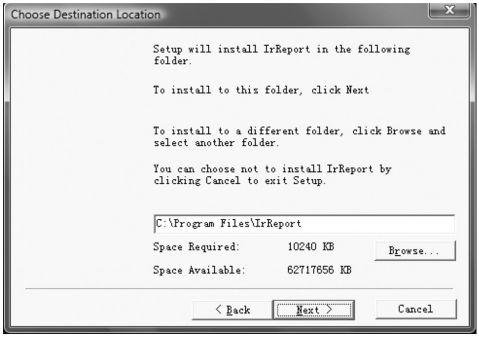
- Then click the Next button.

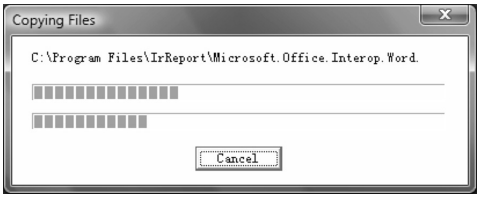


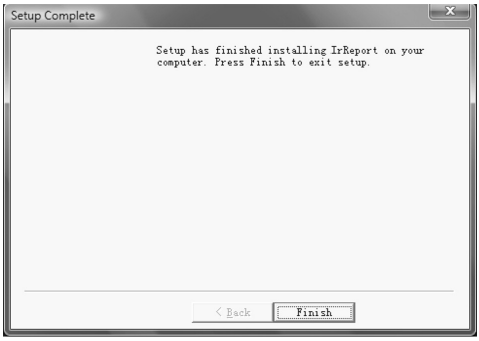
- Confirm the program folder and click Next.



- This will take you to the Start Copying Files dialogue box. Click the Next button.

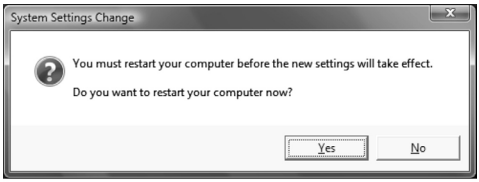






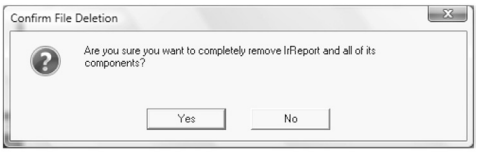
- Click the Finish button. If your computer does not have Microsoft Framework 2.0 (or a later version) installed, the program will prompt you with a message to install Framework 2.0. Click the Ok button and follow the installation instruction on the screens to install Framework 2.0 software.

⚠ ***If you see "Setup cannot continue because this version of the .Net Framework is incompatible with a previously installed one" message during the Framework installation, please go to Control Panel, double click Add or Remove Programs in XP or Programs and Features in Vista to remove previous version of the Framework and uninstall the IC-Report DuoVisionXXX software (See section 1.2, where XXX is version name, such as Std, Pro, USB, NET). Follow the above steps to re-install the application.***

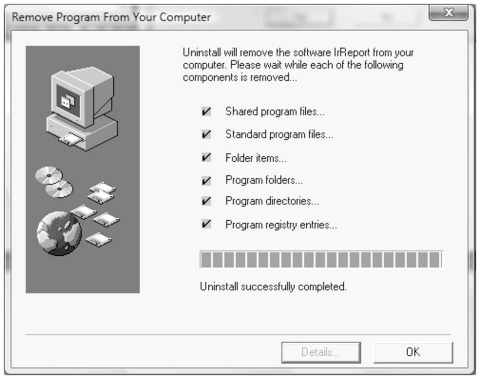


- Click the Yes button to restart your computer after the installation is completed.

1.3 Uninstall IC-Report DuoVision



- Click Start at the bottom left of the Windows's desktop. Under the IC-Report DuoVisionXXX of All Programs click Uninstall IC-Report DuoVisi onXXX and following the instructions to remove the IC-Report DuoVisionXXX software.



2.0 GETTING STARTED

2.1 Launch Application

There are two simple ways you can launch the program. Click Start at the bottom left of the Windows's desktop and under the IC-Report DuoVisionXXX of the All Programs select IC-Report DuoVisionXXX. You can also simply double click the IC-Report DuoVisionXXX icon on your Windows Desktop.

Note: For the professional version, user must plug a dongle associated with the software onto the computer. Otherwise, the program will be terminated.

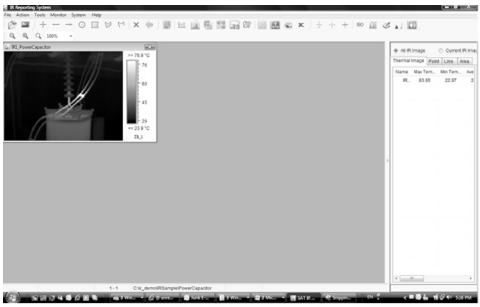
2.2 Terminate Application

User can terminate the application by selecting Exit from the File menu or clicking the top right button.

3.0 INTRODUCTION

3.1 Interfaces

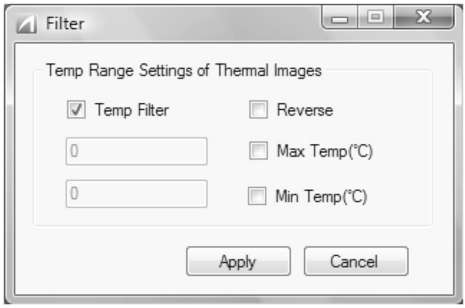
The Figure shows the main interface of the application, which has menus, a toolbar, an IR analysis area, and information areas. Operational functions can be selected using the menus, toolbar, or by right clicking the mouse on the image itself. The IR analysis area is a container for displaying analysis of thermal and/or CCD images. The information areas display analysis data, status, and results.



3.2 Functions

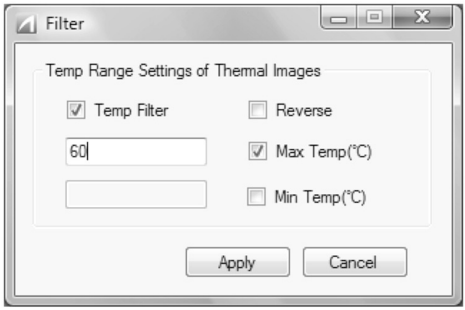
- *Filter*

Set a temperature range as a file open filter, which only opens thermal images in which the maximum temperature value falls into a specified temperature range.

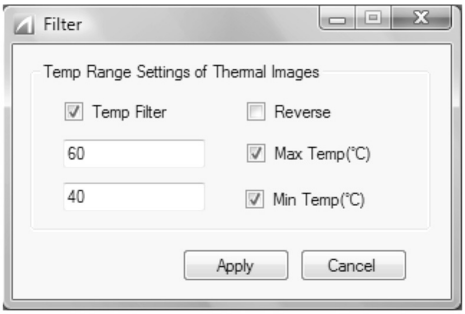


Examples:

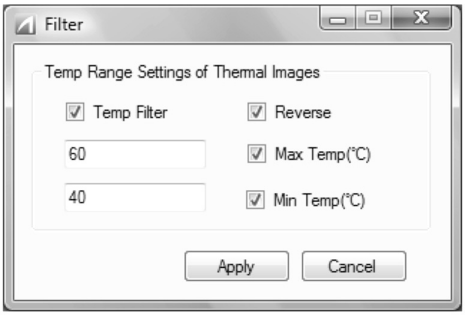
- Open thermal image file(s) in which the maximum temperature is less than or equal to 60 degree Cel sius.



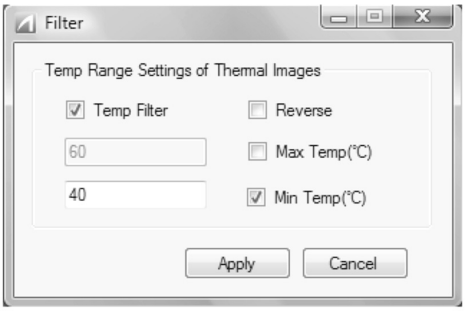
- Open thermal image file(s) in which the maximum temperature is great than or equal to 60 degree Celsius.



-Open thermal image file(s) in which the maximum temperatures is between 40 and 60 degree Celsius.



- Open thermal image file(s) in which the minimum temperature is great than or equal to 40 degree Celsius.

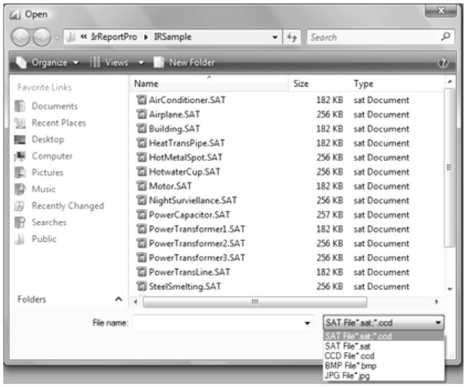


- Open thermal image file(s) in which the maximum temperature is less than or equal to 40 degree Celsius.

- Open IR File

You can open one or multiple thermal images in SAT, JPG with thermal data, and BMP with thermal data format files. You can also open associated digital image in CCD format for fusion work.

Action: menu File => Open IR File or click the Open IR File shortcut.



- Open Image

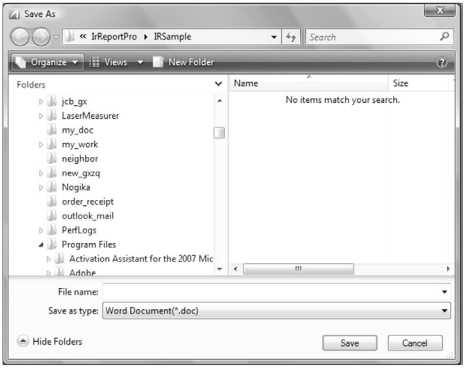
Open one or multiple digital image in JPG or BMP format. The digital image can be used for analysis reporting and image fusion with a thermal image.

Action: menu File => Open Image or click the Open Image shortcut.

- *Save Report*

In Report Mode, save the current analysis results into a Word format file (.doc).

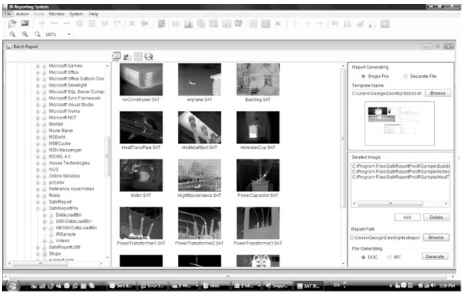
Action: menu File => Save Report => select file name and path => Click Save button.



- *Batch Report*

For Pro, USB, or NET version, user can select a report template and multiple thermal images to generate Word format reports (.doc) or new report templates (.irt). Batch Report uses selected thermal images to replace the thermal image(s) in the report template and recalculate analysis results.

Action: menu File => Batch Report

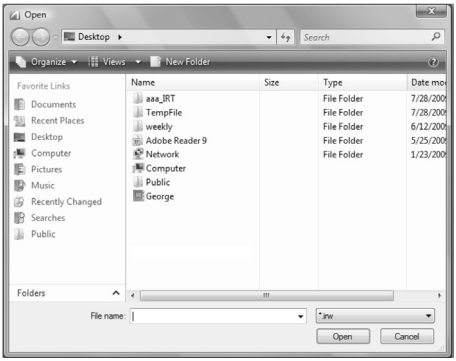


- Select Single File or Separate File for the report generating. Single File will save all reports into a single Word file and Separate File will save the reports into separate files.
- Choose report template methods: 1) search a template (.irt file) from file browse of left side, drag and drop the thumbnail of the template into the Template Name box on the right side, 2) directly type the path and template name into the Template Name box on the right side, 3) click Browse button on the right of Template Name box, select a template.
- Choose thermal image methods: search thermal images (.sat or .jpg with thermal data file) from file browse of left side, 1) drag and drop the selected thumbnails of thermal image files into the Selected Image box on the right side, 2) click Add button. The program uses the selected thermal images in one-by-one order to replace thermal images in the template. When the last thermal image is replaced, a new page or report will be generated. If residue is less than the number of images in the template, the rest thermal images will keep unchanged.
  - Choose path and file name that the report will be saved;
  - Select file type of the generated report;
  - Click Generate button

- *Open IRW File*
- Open an analysis working file (.irw). The IRW includes all analysis objects and results saved from an analysis session, which allow you to continue last analysis session.

⚠ ***IRW File is available for the PRO, USB, or NET version.***

Action: menu File => Open IRW File => select a working template file in Explore => Click Open button.

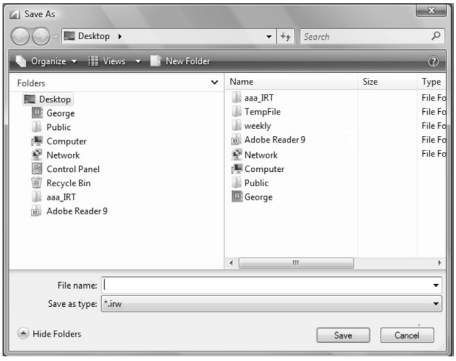


- Save IRW File

- In analysis mode, you can save all analysis contents except Fusion and Image Merging windows/containers into a working file (.irt) and open it later to continue analysis.

⚠ ***IRW File is available for the PRO, USB, or NET version***

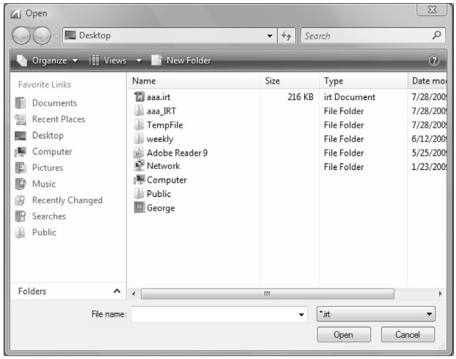
Action: menu File => Save IRW File => specify working template file name => Click Save button



- Open IRT File

- Open a report template file (.irt) into report mode for editing. The IRT is a formatted report template file that can be used to generate batch reports (see 3.2.5 Batch Report).

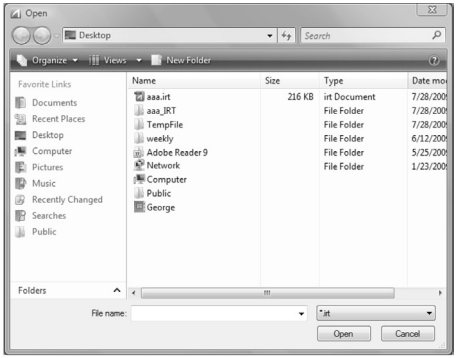
Action: menu File => Open IRT File => select a report template file in Explore => Click Open button.



- 9. Save IRT File

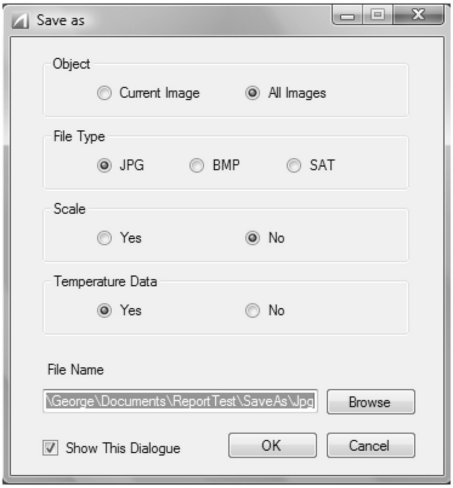
- In report mode, you can save the current formatted contents except Fusion and Image Merging windows/ containers as a reporting template into a file (.irt). The template is used to generate batch report, which uses selected thermal image and analysis data in the template format to form analysis reports (see 3.2.5 Batch Report).

Action: menu File => Save IRT File => specify report template file name => Click Save button.



- 10.Save IR As

- You save an opened thermal image or multiple thermal images into file(s) in a specified format.
  Action: menu File => Save IR As => specify image(s), type, temperature scale, temperature data, path => Click OK.



Choosing the Current Image means to save the current selected thermal image into a file. Choosing the All Images means save all thermal images in Analysis or Report window into files.

You can specify a file type (JPG, BMP, or SAT). For JPG and BMP types, you can specify whether or not includes the temperature scale of the thermal image. For JPG type, you can specify whether or not includes temperature data of the thermal image. If an image is saved in JPG format with temperature data, you can open it as a thermal image and perform analysis as an image in the SAT format.

⚠ ***No Temperature Data option for Standard version.***

Specify file path and name through the Browse and click OK. Click Cancel to abort the operation.

Uncheck Show This Dialogue means this dialogue window will not be shown when you perform Save IR As operation. You can check or uncheck this option box in System => Settings => Save File as well

- Print Preview

Under report mode, preview format of the current report before printing.

Action: menu File => Print Preview or click print preview shortcut .

- Print

Under report mode, send the current report to printer directly.

Action: menu File => Print or click print shortcut .

- 13.Exit

Terminate the application.

Action: menu File => Exit or click top right button .

- Restore Tools

In Analysis Mode, you can restore deleted drawings/ tools in a backward order. That means last deleted and first restored.

Action: menu Action => Restore Tools or click the Restore Tools shortcut .

- Undo

In Report Mode, you can restore deleted drawings and analysis components such as chart, table, and text in a backward order.

Action: menu Action => Undo or click the Undo shortcut .

- *Redo*

  In Report Mode, you can restore last Undo work. For example, after you undo a deleted chart, the redo will delete this chart again.

  Action: menu Action => Redo or click the Redo shortcut .

- *Zoom out*

  Enlarge the current thermal image. You can use mouse to drag edge of a thermal image to change its size.

  Action: menu Action => Zoom out or click the Zoom out shortcut .

- *Zoom in*

  Reduce size of the current thermal image. You can use mouse to drag edge of a thermal image to change its size.

  Action: menu Action => Zoom in or click the Zoom in shortcut .

- *Original Size*

  Restore the current thermal image to original size.

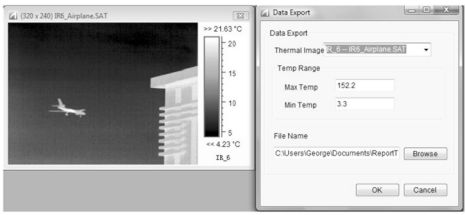
  Action: menu Action => Original Size or click the Original Size shortcut .

- *Data Export*

  Export temperature values of a selected thermal image in a matrix of rows and columns into Txt, CSV, or Microsoft Excel format file. You can specify a temperature range, which export data will be blank if a temperature value is out of the temperature range.

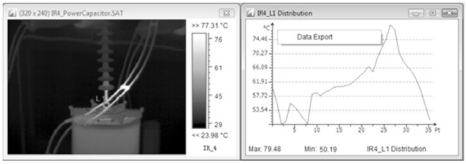
⚠ ***A file in CSV format can be opened by a text edit tool and Microsoft Excel. Exporting data into CSV file is much faster than into Excel file. Therefore, using CSV file for data export is recommended.***

  Action: menu Action => Data Export.



- *Distribution*

  After generate a distribution chart, you can right click on the distribution chart to export the distribution data into a file in CSV format.



- *Trend*

  For the PRO, USB, or NET version, you can export trend data of a record or real time monitor.

  For the record, right click on the record window and select Trend. You can right click on Trend chart and select Start Export Data and click Play to begin data export. And right click on the Trend chart and select Stop Export Data to end of data export. When stop data export, you can specify a file name to store exported data. The export data is saved in the CSV format that can be opened by text edit tool or Microsoft Excel. Data Export generates two files that one is maximum temperature trend and another is minimum temperature trend.

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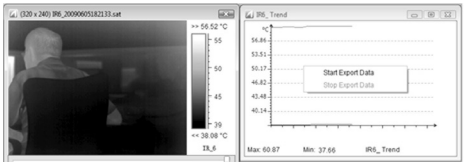
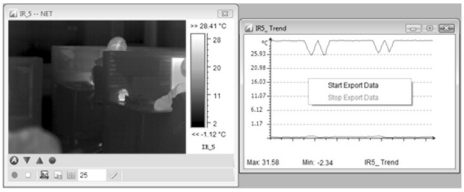


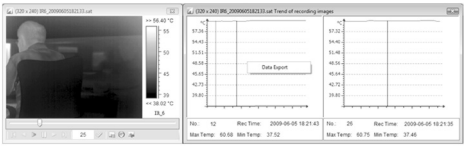
For the real time monitor (USB and NET versions only), right click on the monitor window and select Trend. You can right click on Trend chart and select Start Export Data to begin data export. And right click on the Trend chart and select Stop Export Data to end of data export. When stop data export, you can specify a file name to store exported data. The export data is saved in the CSV format that can be opened by text edit tool or Microsoft Excel. Data Export generates two files that one is maximum temperature trend and another is minimum temperature trend.

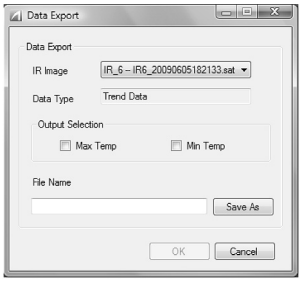


- Partial Trend

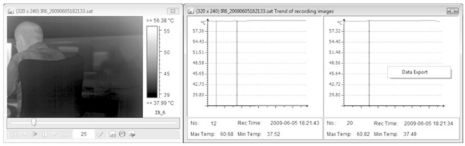
For the PRO, USB, or NET version, you can export whole or partial trend data of a record. Right click on the record window and select Partial Trend.

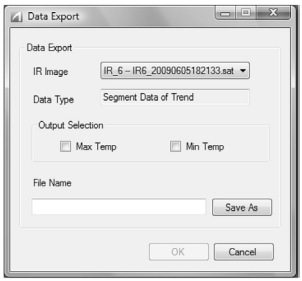
You can export the whole trend data by right click and select Data Export on the left trend chart. You can specify export data, minimum and/or maximum. The export data is saved into a CSV format file that can be opened by text edit tool or Microsoft Excel.





You can export the partial trend data by right click and select Data Export on the right trend chart. You can specify export data, minimum and/or maximum. The export data is saved into a CSV format file that can be opened by text edit tool or Microsoft Excel.





- Snapshot

Take a snapshot of the current thermal image and save it as a new image file in SAT, BMP, or JPG format. You can open the JPG snapshot file using Open IR File as a thermal image or Open Image as a digital image.

Action: menu Action => Snapshot or click the snapshot shortcut => specify type and file name => Save

- *File Processing*

  For the PRO, USB, or NET version, you can edit thermal record file, such as concatenate files or delete selected images.

  Action: menu Action => File Processing or click the File Processing shortcut .

- *Play Audio*

  Listen to voice record in a thermal image file. If the thermal image does not have voice record, the shortcut is disabled.

  Action: menu Action => Play Audio or click the Play Audio shortcut .

- *Fusion*

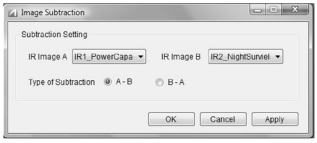
  Blend a thermal image with a BMP, CCD, or JPG image.

  Action: menu Action => Fusion or click the Fusion shortcut => select thermal and CCD image => Ok.

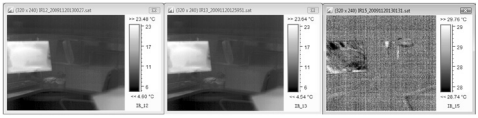
- *Image Subtraction*

  For the PRO, USB, or NET version, calculate temperature value difference at the same point of two thermal images and generate a temperature difference image. Image subtraction can be used to analyze temperature changes of the same view of thermal images that is taken at different time.

  Action: menu Action => Image Subtraction => select thermal images => Ok or Apply.



For example, the right image shows temperature difference of two left thermal image. The image generated by subtraction is a thermal image as well. Therefore, you can do analysis on it.



- *26.Image Merging*

  For the PRO, USB, or NET version, Adjoin specified thermal image and/or area into one thermal image.

  Action: menu Action => Image Merging or click image merging shortcut .

- *Close current IR image*

  Close the current IR image window.

  Action: menu Action => Close current IR image or click top right button of the IR image window.

- *Close All Analysis Windows*

  Close all opened analysis windows.

  Action: menu Action => Close All Analysis Windows or click Close All Analysis Windows shortcut .

- *Tools*

  Plot a point, line, vernier, circle, rectangle, polygon, or poly-line on the current thermal image for more detailed analysis.

  Action: menu Tools => select a draw type or click one of drawing shortcuts .

- *Max Temperature*

  Show the maximum temperature and coordinate of the current thermal image

  Action: click the Max Temperature shortcut .

- *Min Temperature*

  Show the minimum temperature and coordinate of the current thermal image.

  Action: click the Min Temperature shortcut .

- *Cursor*

  Show the temperature and coordinate at the cursor point of the current thermal image.

  Action: click the Cursor shortcut

- *Isothermal Area*

  Paint an image's pixels that denote temperatures falling within a specified temperature range using a selected color.

  Action: menu Tools => Isothermal Area or click Isothermal Area shortcut or right click mouse and select a thermal image => Isothermal Area

- *Delete tool*

  Delete a selected drawing

  Action: menu Tools => Delete tool or click the Delete Drawings shortcut , then click a selected drawing.

- *Clear all tools*

  Clear all drawings on the current thermal image window.

  Action: menu Tools => Clear all tools or right click mouse on a thermal image => Clear all tools.

- *Temperature Range*

  For the USB or NET version, you can select a calibrated temperature range for calculation. When the temperature range change, system will also send a command through RS232 line or Ethernet to change IR camera's temperature measurement range (Please check IR camera's user manual to see if your IR camera has switching temperature range function).

  Action: menu Monitor or right click mouse on a thermal image => Temperature Range => select a range

- *USB Monitor*

  For the USB version, through USB to connect an IR camera, perform real time monitor and analysis of thermal image. The function is available for USB version only. See IR camera manual about USB connection.

  Menü Monitor => USB Monitor or left click USB-Monitor Icon

- *NET Monitor*

  For the NET version, through Ethernet to connect one or multiple Net IR cameras, perform real time monitor and analysis of thermal image.

  Note: the function is available for network version only. See IR camera manual about Ethernet connection.

  Menü Monitor => NET-Monitor or left click the NET-Monitor Icon

- IR Camera Model

  Select an IR Camera Model if you purchase software version that supports multiple types of cameras.

- Dual Vision Player

  For the NET version, the player can play dual vision (CCD and IR) record file.

  Gehen Sie wie folgt vor: Menü Monitor => IR Kamera Modell oder klicken Sie auf das Symbol => öffnen Sie eine DuoVision-Aufnahme.

Open dual vision record file

First

Previous

Play

Next

Last

 Replay

- *Language*

Allow user to select an available language for the application interface.

Action: menu System => Language

- *Temperature Scale*

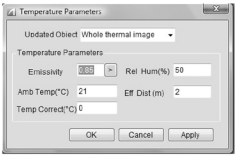
Select the Celsius or Fahrenheit temperature scale.

Action: menu System => Temperature Scale

- *Temperature Settings*

Set parameters of temperature calculation for a thermal image or a selected area.

Action: menu System or right click mouse on a thermal image => Temperature Settings or click Temperature Settings shortcut



- *Palette*

Select a palette to map temperature values of a thermal image. The application provides seven palettes and each one can be reversed.

Action: menu System or right click mouse on a thermal image => Palette or click Palette shortcut

- *Image Adjusting*

Specify a temperature value range of the current image as a color mapping span. If the temperature values of the image fall outside this range, they will be mapped to either upper or lower end of the palette. The image adjustment can highlight or detail certain parts of the thermal image.

⚠ ***When you see, for example, >> 19.2, or << 3, on the palette scale, it means that the temperature values of the image that are greater than >> 19.2, or less than << 3, are mapped with upper end or lower end colors.***

Action: menu System or right click on a thermal image => Image Adjusting or click Image Adjusting shortcut

- *Initial Settings*

Set system initial parameters.

Action: menu System => Initial Settings

- *Emissivity*

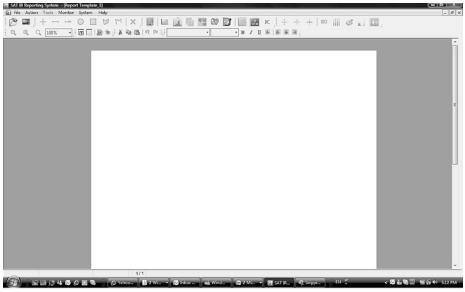
Allow user to manage emission data used for temperature calculation.

Action: menu System => Emissivity

- *Generating Report*

Enter free style reporting mode. You can build or edit a template for batch report.

Action: click Report shortcut



- *Analysis Mode*

Enter Analysis Mode from Report Mode.

Action: click Analysis Mode shortcut

⚠ ***When you click Analysis Mode shortcut, the Report Mode window is minimized. You can go back to the Report Mode by click Maximize button on top right of the Report Mode window.***

- *Area Adjusting*

For the PRO, USB, or NET version, use temperature value range within a selected area as color mapping-

span. If the temperature values of the image fall outside this range, they will be mapped to either upper or lower end color of the palette. The image adjustment can highlight or detail certain parts of the thermal image.

Action: right click mouse on a thermal image => Area Adjusting

- *Three Dimension*

Show the current thermal image in a three dimension view.

Action: right click mouse on a thermal image => Three Dimension

- *Copy to Clipboard*

Copy the current thermal image into system's clipboard so you can paste the image into other application such as Word document.

Action: right click mouse on a thermal image => Copy to Clipboard

- *IR Image Switch*

You can replace the current thermal image with another thermal image.

Action: right click mouse on a thermal image => IR Image Switch.

- *Temperature Label*

Enable or disable temperature value and/or coordinate display at the cursor point, maximum temperature point, minimum temperature point, and/or temperature difference.

Action: right click mouse on a thermal image => Temperature Label

- *Histogram*

Display a statistical graph of a frequency distribution of temperature taken from a selected circle, rectangle, or polygon area of a thermal image.

Action: move mouse cursor onto an area => right click mouse on a thermal image => Histogram

-*Distribution*

Display distribution of temperatures of a selected line or ploy-line of a thermal image.

Action: move mouse cursor onto a line or poly-line => right click mouse on a thermal image => Distribution

- *Partial Trend*

For the PRO, USB, or NET version, you can generate whole trends with its partial trends of maximum and minimum temperature from a thermal record or monitor.

Action: right click mouse on a thermal image => Partial Trend

- *Trend*

For the PRO, USB, or NET version, you can generate trends of maximum and minimum temperature from a sequential thermal images, record, or monitor. You also can generate trends of max and min temperature of a whole images, points, lines, or areas from a thermal record or monitor.

Action: right click mouse on a thermal image => Trend

- *Multiple Trends*

For the PRO, USB, or NET version, you can generate trends of max, min, and/or average temperature using sequential thermal images. You also can generate trends of max, min, and/or average temperature of a whole images, points, lines, or areas from multiple thermal record or monitor windows into one trend chart.

Action: menu Action => Multiple Trends or click shortcut

- Multiple Distributions

For the PRO, USB, or NET version, you can produce temperature distributions of lines or poly-lines from multiple thermal images windows into one distribution chart.

Action: menu Action => Multiple Distributions or click shortcut

- Apply

Clicking Apply button makes settings effective and stays in the same window.

- OK

Clicking Ok button makes settings effective and exits the current window.

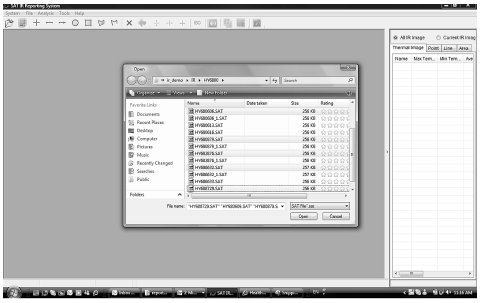
- Cancel

Clicking Cancel button cancels a setting or operation.

4.0 THERMAL ANALYSIS

4.1 Open IR File

By clicking the Open IR File shortcut or Open IR File from the menu, you can explore and open one or multiple thermal image files at once (See Fig. 4.1.1). The application supports SAT (.sat), JPG with thermal data, and BMP with thermal data format files. It can also open CCD format (.ccd) image files.



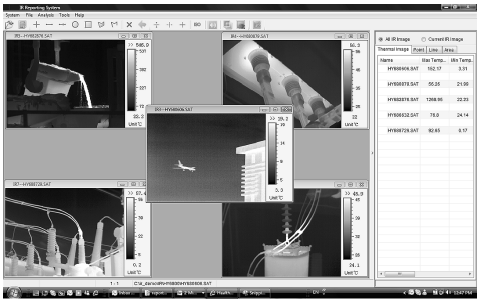


Fig. 4.1.2 shows opened thermal images in the analysis area. The information area on the right side of the analysis area will list temperature information of each thermal image and associated drawings displaying file or drawing name, maximum temperature, minimum temperature, average temperature, emissivity, ambient temperature, relative humidity, effective distance, and temperature correction.

4.2 Open Image

By clicking the Open Image shortcut or Open Image from the menu, you can explore and open one or multiple image files at once. The application supports JPG and BMP image files.

4.3 Close Images

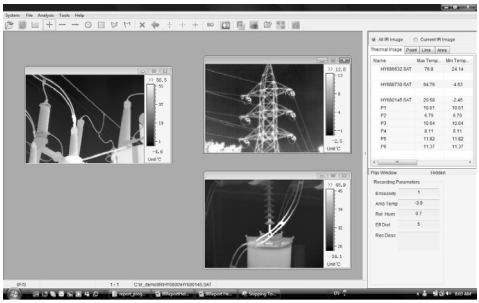
You can click on the top right of a display window to close an image or click the shortcut to close all opened image windows in the analysis area.

4.4 Drawing

You can use drawing tool plot lines or areas to analyze temperature changes at certain parts of a thermal image.

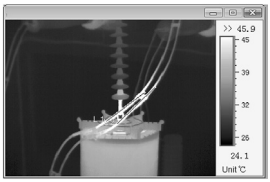
- Point

Click the short- cut to begin plotting point(s) on a thermal image. Click the shortcut again or right click mouse on the thermal image to end the drawing function (See Fig. 4.4.1).



- Line

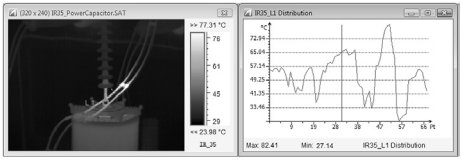
Click the shortcut ⟷ to begin drawing line(s) on a thermal image. To end the drawing function, click the shortcut ⟷ again or right click mouse.



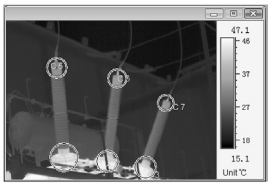
- Vernier

Click the shortcut ⟷ to begin drawing a vernier on a selected line in a thermal image. Click the shortcut ⟷ again or right click mouse to end the drawing function. You can change the vernier location by placing location by placing your cursor at a desired location on the line and clicking, which is useful when you want to view temperature at different point on a line in the distribution chart.

- Circle



Click the shortcut ○ to plot circle(s) on a thermal image. To turn off this feature, click the shortcut again or right click button.



- Rectangle

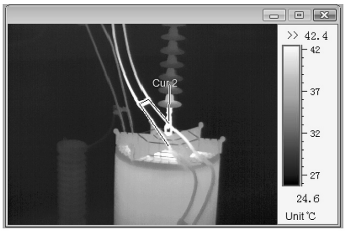
Click the shortcut □ to plot rectangle(s) on a thermal image. Click the shortcut □ again or right click mouse to end the drawing function.

- Polygon

Click the shortcut ⩘ to begin plotting polygon(s) on a thermal image, single clicking to complete the edges of a polygon and finally double clicking to complete the last edge and close the polygon. You can click the ⩘ shortcut again or right click mouse to end the drawing function.

- Poly-line

Click the shortcut ⩘ to plot poly-line(s) on a thermal image, single clicking to complete a line of a poly-line and double clicking to complete the last line of the poly-line. You can click the shortcut ⩘ again or right click mouse to end the drawing function.



- Changes

Place cursor on a drawing (e.g. point, line, circle,rectangle, polygon, or poly-line) to resize it or change its location when no drawing shortcut is selected or clicked. The following shapes of mouse cursor indicate what operation you can perform on a selected drawing.

Move Point – press and hold left button of mouse to move the selected point. Release the button when the point is moved to desired location.

Move Line – press and hold left button of mouse to move the selected line. Release the button when the line is moved to desired location.

Rotate/Resize Line – press and hold left button of mouse to rotate or resize the selected line. Release the button when the change is done.

Move Rectangle – press and hold left button of mouse to move the selected rectangle. Release the button when the rectangle is moved to desired location.

Resize Rectangle – press and hold left button of mouse to change the selected rectangle size in the arrow pointed direction. Release the button when the operation is done.

Move Circle – press and hold left button of mouse to move the selected circle. Release the button when the circle is moved to desired location.

Resize Circle – press and hold left button of mouse to change the selected circle size in the arrow pointed direction. Release the button when the operation is done.

Move Polygon – press and hold left button of mouse to move the selected polygon. Release the button when the polygon is moved to desired location.

Move Vertex of Polygon – press and hold left button of mouse to move the selected vertex of the polygon. Release the button when the vertex is moved to desired location.

Add Vertex to Polygon – press and hold left button at a point of the selected edge where you want to add a new vertex, move cursor to move the new vertex to a desired location. Release the button when the vertex is settled.

Move Poly-line – press and hold left button of mouse to move the selected poly-line. Release the button when the poly-line is moved to desired location.

Move Vertex of Poly-line – press and hold left button of mouse to move the selected vertex of the poly-line. Release the button when the vertex is moved to desired location.

Add Vertex to Poly-line – press and hold left button at a point of the selected edge where you want to add a new vertex, move cursor to move the new vertex to a desired location. Release the button when the vertex is settled.

- Entfernen

Click the shortcut ✕ and use the cursor to select a drawing. When the cursor is changed to a deleting shape (Point, Line, Circle, Rectangle, Polygon, Poly-line), left click your mouse to remove the drawing. Click the shortcut ✕ a second time to end the deleting operation.

OR

Right click mouse on a thermal image and click Clear All Drawings from the popup menu, which allows you to remove all drawings on the image at once.

- 5. Restore Tools

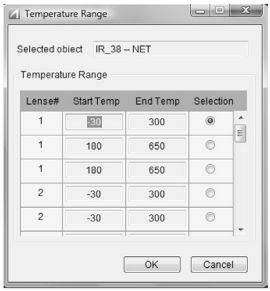
Click the shortcut to restore deleted drawings on the current thermal image window. The drawings will be restored in reverse chronology ("last deleted first restored").

4.5. Temperature

- Range

Calibrated temperature range provided by the manufacturer is one of the parameters for temperature calculation of infrared data. An infrared camera can have multiple calibrated temperature ranges if it is equipped multiple lenses and/or filters. For example, if an infrared camera is equipped with one lens and has two embedded filters, it will have three calibrated temperature ranges where the first range is for the lens only, the second is for the lens with one filter covered, and the third is for the lens with two filters covered. If an infrared camera has no filter, the second and third range for a lens will be assigned with the first one (See example of Fig. 4.5.1). During real time monitoring, you can measure different temperature ranges by selecting a calibrated temperature range.

Right click mouse on a thermal image, click Temperature Range from the popup menu, and choose a calibrated temperature range by clicking the radio button in the temperature range list (See Fig. 4.5.1). Please reference infrared camera user manual about how to select a calibrated temperature range.



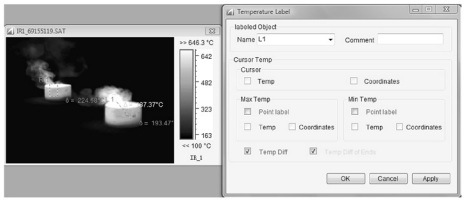
⚠ ***Temperature Range feature is only available for the USB or NET version.***

- Label

First, right click mouse on a thermal image and click Temperature Label from the popup menu. You can set labels with temperature value and coordinates for the maximum temperature point, minimum tem perature point, and cursor point on a thermal image by checking or un-checking option boxes (See Fig. 4.5.2). You can also assign a comment as a part of a label.

Temp Diff shows the difference between maximum and minimum temperatures of a line or an area. Temp Diff of Ends shows the temperature difference between two end points of a line.

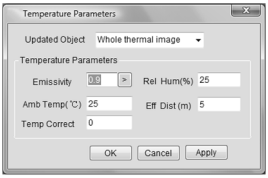
You also can double click on the Point Label, Temp Diff, or Temp Diff of Ends to change label's color.



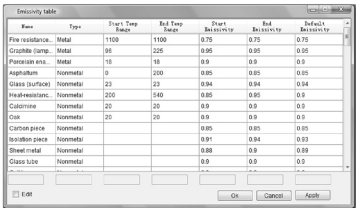
⚠ ***For the STD version, you can only label temperature values for the whole thermal image. For the PRO, USB, or NET version, you can label temperature for the whole thermal image and analysis tools (e.g. point, line, etc.).***

- Settings

Besides the calibrated temperature range, the emissivity of material, ambient temperature, relative humidity, effective distance, and temperature correction are parameters of the temperature calculation. You can set parameters by right clicking on a thermal image and choosing Temperature Settings from the popup menu. You can set parameters of the whole image and any specified drawing (e.g. point, line, circle, rectangle, poly-line, and polygon).



You can enter emission value or click [>] to select a system provided value. Each material in the list has a range of emissivity and default emission value. When you select a row and click Ok or Apply, the default emission value will be used. When you double click an emission value in a column of a row, that value will be used.

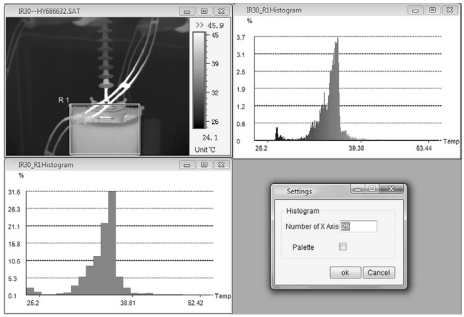


4.6 Chart

- Histogram

The chart can show temperature statistics of a specified thermal area. For generating histogram, move cursor onto a selected circle, rectangle, or polygon; right click mouse and click Histogram from the popup menu. You can right click mouse on a chart window to set number of temperature segments for statistics and color scheme of the histogram (See Fig). You can move the area to view the statistics results.

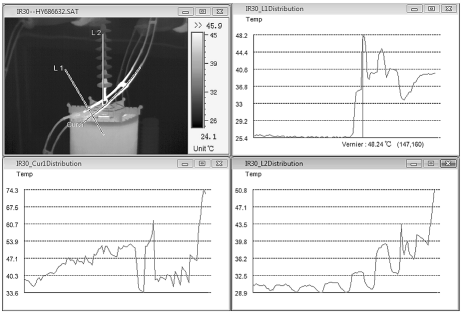
⚠ ***For the PRO, USB, or NET version, you can edit Emissivity table and add emission data.***



- Distribution

The chart shows temperature distribution of a selected line or poly-line. For generating distribution chart, trght click mouse on a selected line or poly-line and choose Distribution Chart from the popup menu. shows temperature distribution charts of line L1 with a vernier, line L2, and poly-line Cur1. If a vernier is on a line like L1, you can move the vernier to see temperature value and coordinate of vernier position.

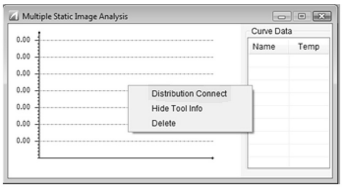
You also can view the distribution changes by moving a line or poly-line.



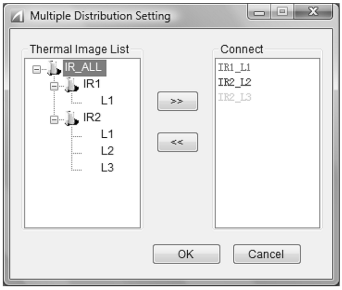
- *Multiple Distributions*

For the PRO, USB, or NET version, you can generate multiple distributions of different lines from the same or different images into a single distribution chart for analysis or comparison.

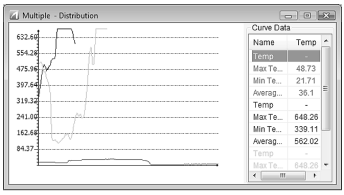
Steps: Menu Action => Multiple Distributions or click shortcut .



Right click on the Multiple Static Image Analysis window , choose Distribution Connect.



Select lines for distribution charts, click OK;

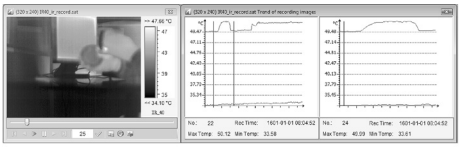


Right click on the Multiple Distributions chart and select Delete to close the chart.

- *6. Partial Trend*

For the PRO, USB, or NET version, you can get partial trends of minimum and maximum temperatures of the current thermal record.

Right click on a thermal record => select Partial Trend.



In Partial Trend chart window, the left chart shows the trend of the record, the right shows a partial trend between two vertical lines in the left chart. You can move two vertical lines in the left chart to select a segment to view partial trend. This feature is very useful for trend analysis of a lengthy record. You can view the whole trend and details in partial trend.

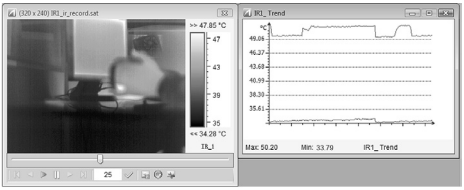
You can move the vertical line in the right chart to view sequential number, maximum temperature, and minimum temperature of a recorded image.

- *Trend*

For the PRO version, you can get trends of minimum and maximum temperatures of a thermal record.

For the USB or NET version, you can get trends of minimum and maximum temperatures of a real time monitor.

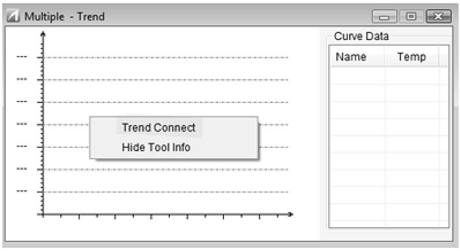
Right click on a thermal record or monitor window => select Trend => if it is record, click Play.



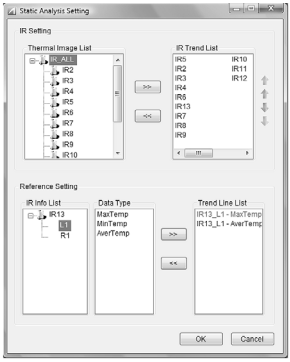
- *Multiple Trends*

For the PRO, USB, or NET version, you can generate multiple maximum, minimum, and/or average temperature trends of different tools (e.g. point, line, circle, rectangle, poly-line, and polygon) and thermal images into a single trend chart for analysis or comparison. For the PRO version, only can sequential thermal images and thermal records be used to produce multiple trend analysis. For the USB or NET version, you can do multiple trend analysis from real time monitors.

Menu Action => Multiple Trend or click shortcut => right click on the Trend window => click Trend Connect.

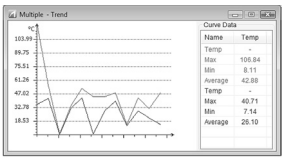


If the current window is a static thermal image, you can generate trends of minimum, average, and/or maximum temperature of the whole image or tools from sequential thermal images. For static image trend, there must be at least two thermal images opened. You can arrange order of the static thermal images and choose a tool of one thermal image as a base to create trends.



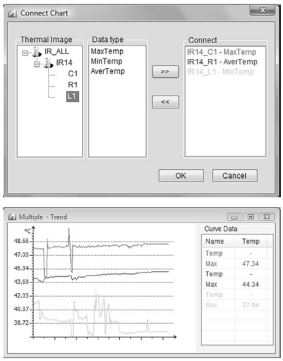
For example, you opened thermal images (IR2 – IR13) and set in an order of IR5, IR2, IR3, IR4, IR6, IR13, IR7, IR8, IR9, IR10, IR11, and IR12. Use line L1 of IR13 as a trend base to generate maximum and average temperature trends. In this case, the trends are produced by the following steps:

1. Get L1 position of the IR13 image;
2. Calculate maximum and average temperature values for each IR images in the order based on the L1 position;
3. Link maximum temperature value of the L1 in order of IR5, IR2, IR3, IR4, IR6, IR13, IR7, IR8, IR9, IR10, IR11, and IR12;
4. Link minimum temperature value of the L1 in order of IR5, IR2, IR3, IR4, IR6, IR13, IR7, IR8, IR9, IR10, IR11, and IR12.



The trend of static image allows you to analyze tem perature changes of the same object from images that have the same view but were taken at different times.

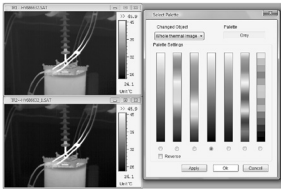
If the selected window is a thermal record or monitor, trends of minimum, average, and maximum temperatures of the whole image or selected tools are produced by choosing thermal images and/or tools with temperature type.



5.0 IMAGE PROCESS

5.1 Palette

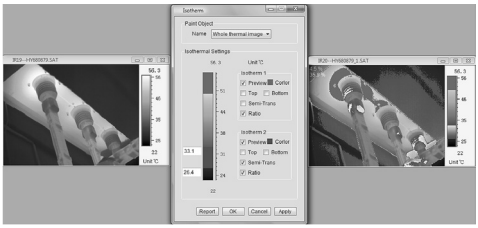
You can change color scheme of whole thermal image by right clicking on a thermal image or drawing area and clicking Palette from the popup menu. (See Fig.) shows, before and after, the changes of color schemes from a Grey palette.



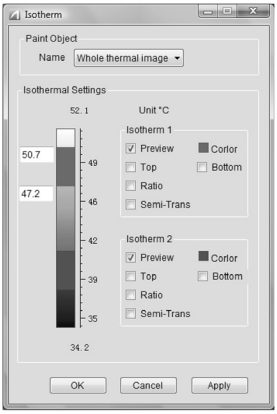
The system provides seven palettes and their reversed settings. You can check the Reverse box to get a complementary palette scheme. For the PRO, USB, or NET version, you can set a palette for individual tool area (e.g. circle, rectangle, and polygon).

5.2 Isothermal Area

You can mark a specified temperature range by setting isotherm. Two isothermal areas can be set per image (See Fig.).



The following isothermal settings are available.



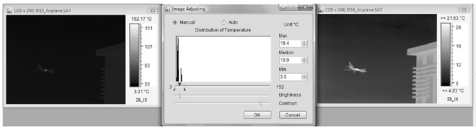
- Paint Object – Select the whole image or a drawing area to perform isothermal analysis (Note: for professional version only).
- Preview – Select an isothermal range 1 or 2.
- Color – Select a color for the isothermal area by double clicking color box.
- Top – Move the isothermal range 1 or 2 up to top of temperature scale.
- Bottom – Move the isothermal range 1 or 2 down to bottom of temperature scale.

- Semi-Trans – Paint the isothermal area 1 or 2 using semi-transparent color scheme.
- Ratio – Display percentage of the isothermal area in the image (See Fig.5.2.1 top left corner of the right thermal image).
- Select – Left click mouse on the isothermal range box to display lower and upper temperature values.
- Move – Move the isothermal range along the temperature scale up and down by clicking and holding the left button of mouse on the isothermal range box.
- Resize – Click and while holding down the left button of mouse on the edge of the isothermal range, move up or down to change the range. You can also change the range by entering temperature values directly into the upper and lower temperature boxes.

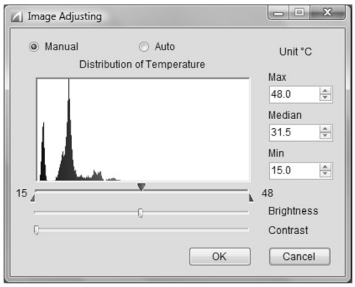
For the PRO, USB, or NET version, you can perform isothermal analysis on individual tool area (e.g. circle, rectangle, and polygon).

5.3 Image Adjustment

You can change the contrast of the thermal image by choosing the temperature range as a mapping range or span onto a palette (See Figure). Right click mouse on a selected thermal image and click Image Adjusting from the popup menu. In the Image Adjusting window, click the Manual radio button, adjusting the blue button on the scroll bar to select the temperature range that you would like to use as the color mapping span.

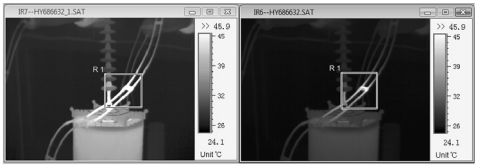


The image adjusting window shows the temperature distribution of a thermal image with a specified palette scheme, in which you can choose a temperature range based on the distribution. The halved blue triangle button can be moved independently. The blue triangle button is used to move the entire span left or right (it moves the range set by both ends of the halved blue triangle buttons). You can also move Brightness or Contrast button to adjust image color mapping.



5.4 Area Adjusting

For the PRO, USB, or NET version, you can change brightness or contrast of a thermal image based on temperature range within a tool area. (See Fig.) is based on a rectangle to map color scheme. The Area adjusting allows you to get a clearer view of a selected area you are most concerned with.



For the area adjusting, right click mouse on a selected drawing area (e.g. circle, rectangle, or polygon) and click Area Adjusting from the popup menu. Right click mouse on a selected drawing area and click Area Adjusting again to remove the area adjusting.

5.5 IR Image Switch

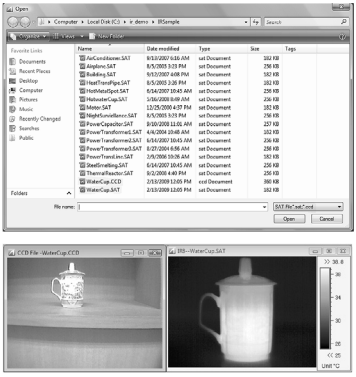
You can replace the current thermal image with another thermal image by right clicking on it and select "IR Image Switch". This feature is useful for analyzing different thermal images with the same set of analysis tools.

5.6 Fusion

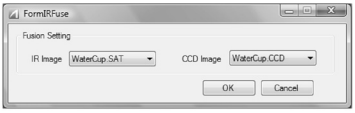
The fusion function allows you to blend a digital image (BMP, CCD, or JPG) with an infrared image, which can assist in identifying objects of infrared images.

Steps of making fusion:

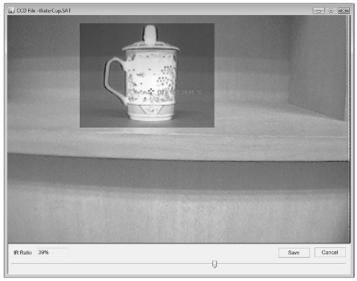
1. Open a thermal image (.sat file) and a digital image (.bmp, .ccd, or jpg file).



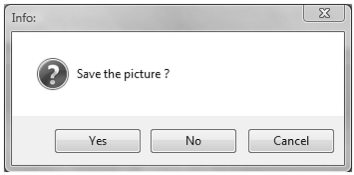
- Click the short- cut ;
- In the fusion setting window, select a thermal image and a digital image.



2. Click the Ok button;
3. Adjust size of the digital image window to make its object matching thermal image's object;
4. Move the thermal image to match the object of the digital image.



5. Adjust the blending ratio by moving the scroll bar button;
6. When fusion is completed, you can save the blended image by clicking Save button.



If click Yes, you can save the blended image as a BMP or JPG format file and the blended image is shown in analysis or report window. Since the JPG file is saved with temperature data, you can analyze it as a thermal image in the PRO, USB, or NET version. If click No, the blended image is shown in analysis or report window.

Click Cancel button to terminate fusing operation.

5.7 Snapshot

You can take a snapshot on the current thermal image and save it as a new image file in SAT, BMP, or JPG format. Since the JPG file is saved with temperature data, you can analyze it as a thermal image.

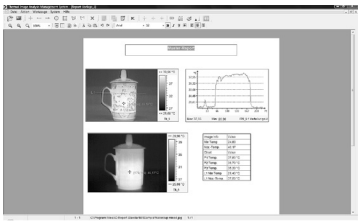
Steps of snapshot:

- Move mouse cursor onto the thermal image and left click mouse to select it as current thermal image;
- Click the shortcut ;
- Choose file type (.bmp, .jpg, or .sat) and file path (See Fig. 5.6);
- Give a file name;
- Click the Save button.

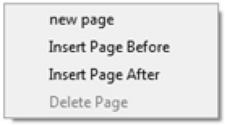
6.0 REPORT

6.1 Generating Report

Clicking the Generating Report shortcut enters report mode. The report mode allows you to build report and/or template in an A4 paper size area. You can add thermal images (.sat or .jpg with temperature data), digital images (.ccd, .jpg, or .bmp), tables with analysis results, text comments, and so on.



For the PRO, USB, or NET version, you can right click and select page operation function to add or delete a page. Note: the Delete Page function cannot delete a page if there is only one page.



You can click the Generating Report shortcut again to open multiple templates.

Click the button on the top right of the display window to close the report mode.

6.2 Report Build

- Image

Add thermal images and/or digital images into the template using Open IR File and Open Image functions.

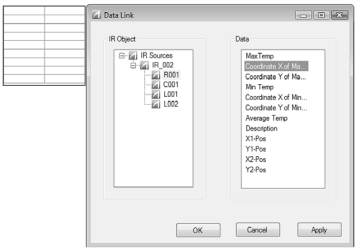
- Text

You can insert text into the template as a title or comment by clicking shortcut . You use the following tools to edit texts.

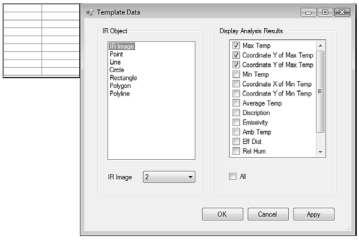
- Table

Click shortcut to insert a table into the template. You can right click on the table to do the following operations:

a. Delete – delete the current table
b. Insert Row Above – insert a row above the current row
c. Insert Row Below – insert a row below the current row
d. Delete Current Row – delete the current row
e. Insert Column to the Left – insert a column to the left of the current column
f. Insert Column to the Right – insert a column to the right of the current column
g. Delete Current Column – delete the current column
h. Add Free Format Data – add selected analysis data into the current cell. After added the data, you can right click to choose showing data value or formula from the popup menu.



i. Add Fixed Format Data – add selected analysis data of a specified IR image into the table. You can choose types of the analysis results.



- IR Image Switch

You can replace a selected thermal image using a new thermal image by right clicking mouse button on a thermal image and select "IR Image Switch" from the popup menu. The new thermal image will use previous analysis tools. This is very helpful for analyzing different images with the same analysis method.

6.3 Save Report

You can save the current template to a Word format file by selecting "Save Report" in File menu.

6.4 Open IRT File

Open a report template file (.irt) into report mode for editing or reporting.

6.5 Save IRT File

In report mode, you can save the current formatted contents except Fusion and Image Merging windows/ containers as a reporting template into a file (.irt). The template can be used to generate batch report.

6.6 Print

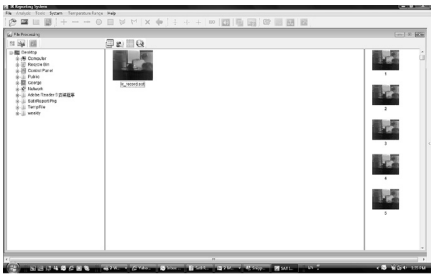
Click Print Preview shortcut to preview and print the current report.

Click Print shortcut to print the current report.

7.0 FILE PROCESSING

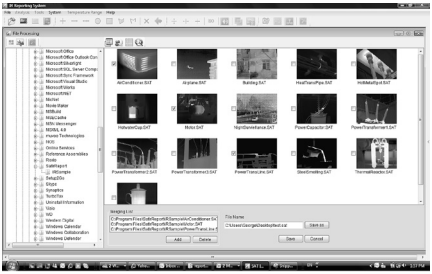
7.1 Preview

By single clicking on a thumbnail of a thermal record file, preview all images of the thermal record. By double clicking a thumbnail of file, open the thermal image or record into analysis mode.



7.2 Merge

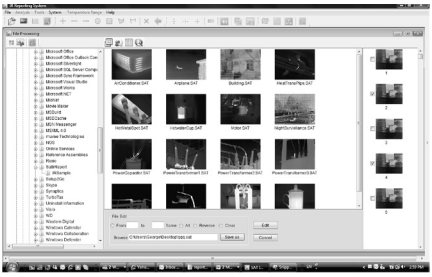
Click Merge shortcut into file merging mode to concatenate thermal record files.



You can select thermal record files in order to concatenate them into one new record file. Note: since the maximum file size of Windows XP is 2GB, the software will automatically split the merging file into several sequential files if the merged file size is greater than 2GB. The software can play the split record files as one file, which it can automatically play the split files in order.

7.3 Edit

Click Edit shortcut into file edit mode.



You remove unwanted images by selecting images and create a new thermal record file.

8.0 MONITORING

Real time monitoring is available for USB and NET version.

8.1 USB Monitor

For the USB version, through USB to connect an IR camera, perform real time monitor and analysis of thermal image. The function is available for USB version only. See IR camera manual about USB connection. Action: menu Monitor => USB Monitor or click the USB Monitor shortcut:

If the application cannot find a corresponding calibrated temperature table file, it will ask if you want to add one. You cannot connect a USB camera without selecting a calibrated temperature table file. Choose camera type and calibrated temperature table file path, click OK:

Connect one end of the USB cable to your PC.

Power up the camera and wait several seconds until the vertical colour bars appear on the LCD.

Connect the other end of your USB cable to the USB port of your infrared camera while the colour bars are still on the display.

As soon as the camera has been identified you will be automatically requested to install the drivers. Proceed as described in the camera's User's Manual. Please refer to your handbook to find more information on your infrared camera.

Proceed as follows once the installation has been successfully performed.

Menu Monitor => USB monitor or click on the symbol

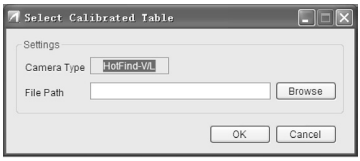
If the application is unable to find a file with a corresponding calibrated temperature table, then you will be asked if wish to add one. This is normally always the case when real-time software is being installed fort he first time. You cannot connect a USB camera without first assigning it to a file with a calibrated temperature table.

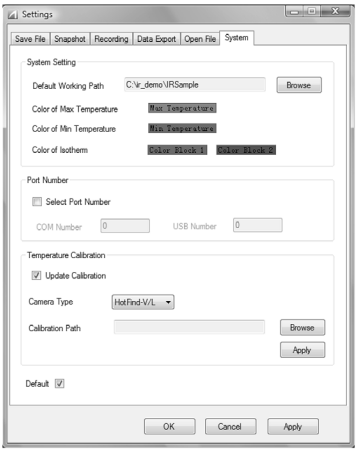
You will find the corresponding calibration curve for your camera on the real-time CD. Operating Manual

– IR Software

Save on to your PC and remember the file path where it was placed. Select the camera type and the file path for the calibrated temperature table and click on OK.

You can update the calibrated temperature table file through System => Initial Settings => System tab





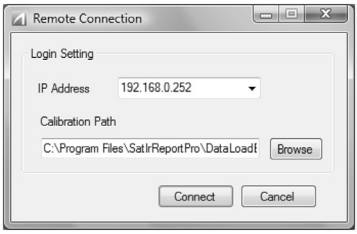
⚠ ***USB real time monitor only support Windows XP operation system. You only can connect one USB camera at one time.***

8.2 NET-Monitor

For the NET version, through Ethernet to connect one or multiple Net IR cameras, perform real time monitor and analysis of thermal image. Note: See IR camera manual about Ethernet connection.

Action: menu Monitor => NET Monitor or click the NET Monitor shortcut

Enter or select IP address of a Net camera and select corresponding calibrated data file, then click Connect.



You can connect multiple Net cameras at the same time. The application supports single and dual vision IR camera.

8.3 Monitoring Screen

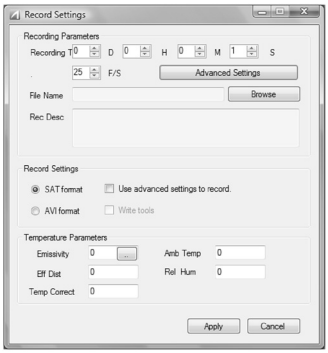
On the monitoring screen, you can control focus and shutter works through RS232 or Ethernet, take snapshot, adjust speed, and record.

- Auto Focus
- Focus in
- Focus out
- Shutter Works
- Record
- Stop
- Snapshot – save current image into a JPG, BMP, or SAT file.
- Settings
- 25 Set play speed

9.0 IR RECORDING

This feature is only available in USB and NET version. Recording steps:

a. Click Settings shortcut to set recording parameters.



You can specify recording time, speed, temperature parameters, and file format (SAT or AVI). For AVI format, you can decide if the analysis tools are recorded. You can specify recording interval and cycle.

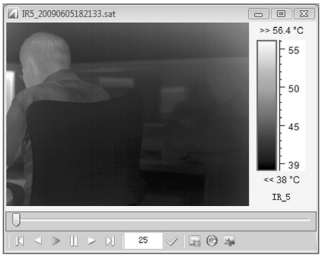
b. Adjust IR camera focus

c. Click Record shortcut to start recording. You can click Stop shortcut to terminate record.

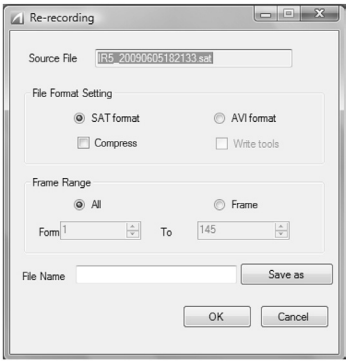
10.0 RECORD PLAY

This feature is only available in the PRO, USB and NET version

Click Open IR File shortcut and select a thermal record file.



- First
- Previous
- Play
- Pause
- Next
- Last
- 25 Set play speed
- Snapshot – save current image into a JPG, BMP, or SAT file
- Repeat
- Re-record – edit and record a new file



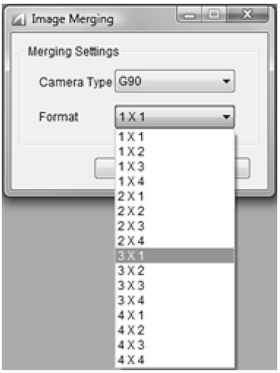
You can specify file format, compression, and segment

11.0 IMAGE MERGING

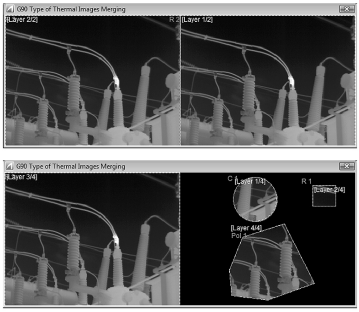
The Image Merging function is available in the PRO, USB, and NET version, which you can merge multiple thermal images or tool areas (e.g. rectangle, circle, and polygon) into a single thermal image. This function is useful for thermal analysis of a large site (i.e. wide view) or equipment (e.g. 360 degree).

Merging steps:

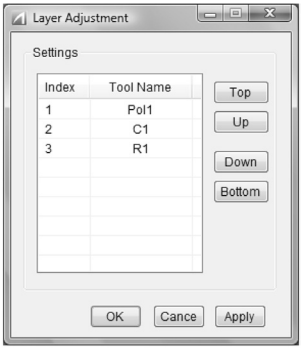
- Open thermal images that you would like to perform image merging.
- In menu Action, select Image Merging or click Image Merging shortcut ;
- Select IR camera type and merging container size;



- On a source thermal image, select the whole image or an area (e.g. rectangle, circle, or polygon), right click mouse button and select Add into Merging File, which copies the selected whole image or area into the merging container. In the container, you can left click mouse button on an area and hold mouse to move around the area.



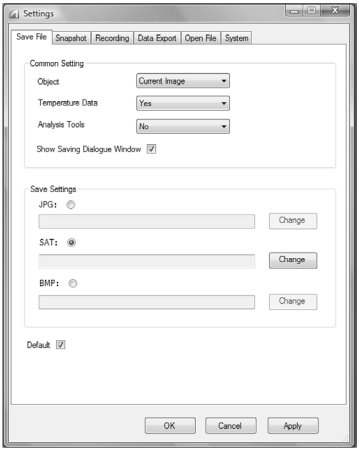
- Right click in the container and select Layer Adjusting. Use Top, Up, Down, or Bottom button to adjust the order of layers of the overlapped image areas.



- To delete an area from the container, click Delete Tools shortcut select an area and left click.
- The merging container cannot be used for thermal analysis. For thermal analysis, you can save the merged image into a SAT or JPG with temperature data format file. Right click on the merging container and select Save Merged Image, which you can choose a SAT, JPG, or BMP format.

12.0 SYSTEM SETTINGS

12.1 Save File



- Default Parameters

Object is used to select saving the current thermal image or all opened thermal images into file(s).

Temperature Data is for saving temperature data into JPG format file if Yes is selected. It always saves thermal data into SAT format file.

Analysis Tools is determined whether or not to save analysis tools or drawings on the thermal image into the JPG and BMP format file. You cannot save analysis tools into the SAT format file.

Show Saving Dialogue Window indicates the system will pop up a saving dialogue window for specifying file name and path if it is checked.

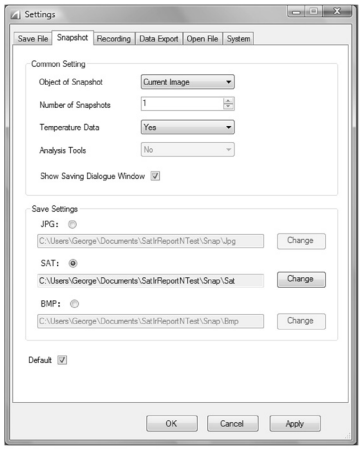
Save Settings is to specify saving path for each file type and default file type.

Default saves the parameters as permanent initial default values if it is checked.

12.2 Snapshot

- Default Parameters:

Object of Snapshot chooses taking snapshot(s) either from the current thermal image or from all opened thermal images.



Number of Snapshot chooses how many snapshots to take on one click. This function is useful for thermal analysis of real time monitor.

Temperature Data determines whether or not save temperature data into JPG format file. It always saves thermal data into SAT format file.

Analysis Tools determines whether or not save analysis tools or drawings on the thermal image into the JPG and BMP format file. You cannot save analysis tools into the SAT format file.

Show Saving Dialogue Window shows a saving dialogue window for specifying file name and path.

Save Settings specifies saving path for each file type and default file type.

Default saves the parameters as permanent initial default values if it is checked

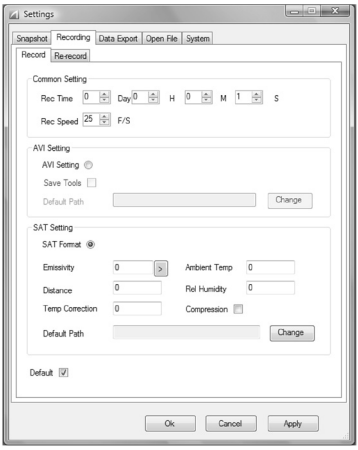
12.3 Record

- Default Parameters:

Rec Time sets default of total recording time.

Rec Speed specifies number of frames per second to record.

AVI Setting sets default of recording format as AVI format and file path. If Save Tools is checked, the analysis tools on the thermal image will be saved into the record.



SAT Setting sets default of recording format as SAT format, default file path, and parameters of temperature calculation.

Default saves the parameters as permanent initial default values if it is checked.

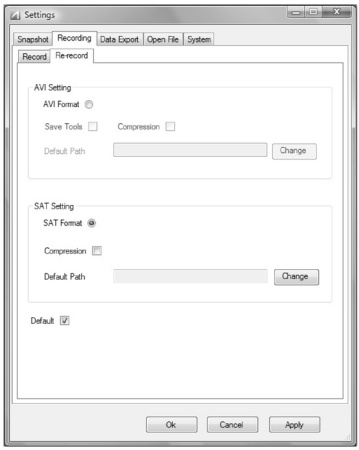
12.4 Re-record

- Default Parameters:

AVI Setting sets default of recording format as AVI format and file path. If Save Tools is checked, save analysis tools into the record. If Compression is checked, recorded file will be compressed.

SAT Setting sets default of recording format as SAT format, default file path, and compression option.

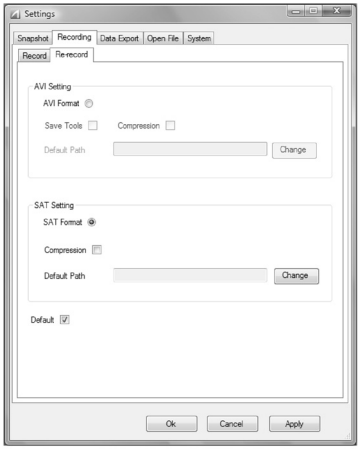
Default saves the parameters as permanent initial default values if it is checked.



12.5 Data Export

- Default Parameters:

Export Setting specifies default of file type and path.



Show Saving Dialogue Window shows a dialogue window for specifying path and file name. Otherwise, export data will be saved into a file that name is generated using system date and time.

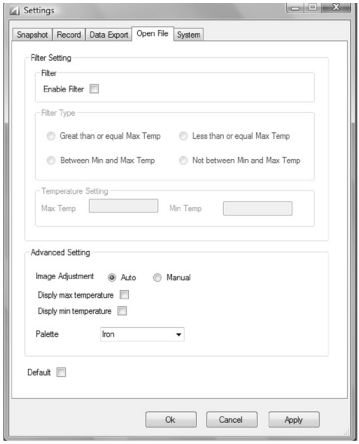
Default saves the parameters as permanent initial default values if it is checked.

12.6 Open File

- Default Parameters:

Enable Filter set default that enables filter feature when open thermal images.

Filter Type specifies a rule to filter opened files.



Temperature Setting specifies a temperature range of the filter.

Advanced Setting specifies a default of image adjustment method, whether display minimum or maximum temperature on the screen, and default palette.

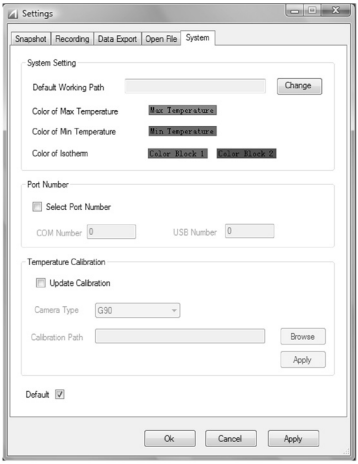
Default saves the parameters as permanent initial default values if it is checked.

12.7 System

- Default Parameters:

System Setting specifies default of working directory and colors.

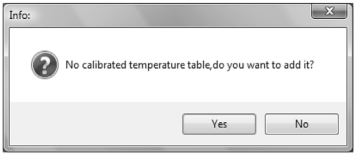
Default saves the parameters as permanent initial default values if it is checked.

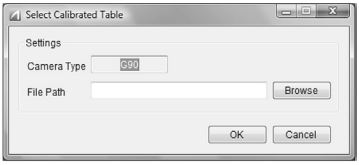


12.8 Temperature Calibration

Each IR camera has its calibrated temperature table. The table is required for temperature calculation. The table file (dataload.bin) is provided on the software CD provided by IR camera manufacturer.

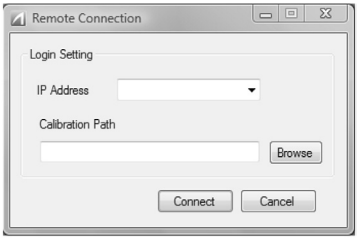
For USB monitor, if the table of the current camera is found, you need to add the table before you can perform monitoring.

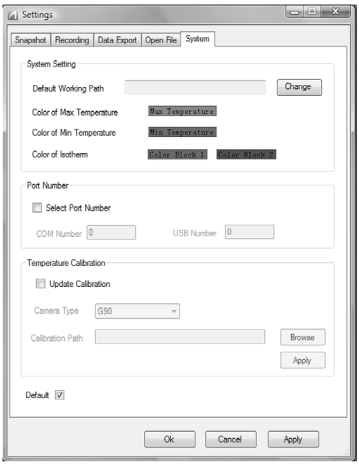




- Default Parameters:

For NET monitor, an IP address is associated with an IR Camera. For each IR camera, you must specify its temperature calibration table file.





- *Default Parameters:*

Update Calibration allows user to update temperature calibration table if it is checked.

Camera Type specifies an IR camera type for updating calibration table.

Calibration Path specifies location of a calibration file.

Apply uses selected calibration table to replace current one.

Default saves the parameters as permanent initial default values if it is checked.

13.0 VERSION COMPARISON

FEATURE	VERSION				
	PRE	**STD**	**PRO**	**USB**	**NET**
Add into Merging File			✓	✓	✓
Area Adjusting			✓	✓	✓
Batch Report (Using IRT template to generate reports)			✓	✓	✓
Copy to Clipboard		✓	✓	✓	✓
Cursor (Temperature)		✓	✓	✓	✓
Data Export (Trend chart)			✓	✓	✓
Data Export (Whole IR Image)		✓	✓	✓	✓
Distribution (Line)		✓	✓	✓	✓
Drawings (Point, Line, Vernier, Circle, Poly-line, Polygon, Rectangle)		✓	✓	✓	✓
Emissivity (Customize)			✓	✓	✓
Emissivity (List)		✓	✓	✓	✓
File Processing (IR record file merging and editing)			✓	✓	✓
Filter (File open)		✓	✓	✓	✓
Fusion (IR image and digital image)		✓	✓	✓	✓
Generating Report (Single page for STD version)		✓	✓	✓	✓
Histogram (Drawing area)		✓	✓	✓	✓
Image Adjustment		✓	✓	✓	✓
Image Merging			✓	✓	✓
Image Subtarction			✓	✓	✓
IR Camera Model			✓	✓	✓
IR Image Switch		✓	✓	✓	✓
Isothermal Area (Drawing area)			✓	✓	✓
Isothermal Area (Whole IR Image)		✓	✓	✓	✓
Language	✓	✓	✓	✓	✓
Max Temperature		✓	✓	✓	✓
Min Temperature		✓	✓	✓	✓

13.0 VERSIONSVERGLEICH

Multiple Distributions			✓	✓	✓
Multiple Trends			✓	✓	✓
NET Monitor					✓
Open Image (JPG, BMP)		✓	✓	✓	✓
Open IR File (CCD, JPG, SAT)	✓	✓	✓	✓	✓
Open IRT File (Open a report template)		✓	✓	✓	✓
Open IRW File (Open a saved analysis working space)			✓	✓	✓
Original Size		✓	✓	✓	✓
Partial Trend (Record)			✓	✓	✓
Palette (Drawing area)			✓	✓	✓
Palette (Whole IR image)	✓	✓	✓	✓	✓
Play (Record)			✓	✓	✓
Play Audio		✓	✓	✓	✓
Record (SAT, AVI)				✓	✓

TROTEC® GmbH & Co. KG • Grebbener Straße 7 • D-52525 Heinsberg
Tel.: +49 (0) 24 52 / 962 - 400 • Fax: +49 (0) 24 52 / 962 - 200
www.trotec.de • E-Mail: info@trotec.de