SKF TKTI 20

Instructions for use

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Original instructions

EC Declaration of conformity

We,
SKF Maintenance Products
Kelvinbaan 16
3439 MT Nieuwegein
The Netherlands

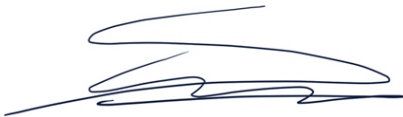herewith declare that the following product:

**SKF Thermal Camera
TKTI 20**

Conforms to the following standards;

- EMC Directive 2004/108/EC as amended
  "Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility" as outlined in harmonized norms:
  EN61000-6-2:2005 Immunity for industrial environments
  EN61000-6-3:2007 Emission standard for residential, commercial and light-industrial environments

- CFR47:2009 Code of Federal regulations:
  Pt 15 subpart B – Radio Frequency Devices – Unintentional Radiators

The laser is classified in accordance to the
21CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated June 24th 2007 and complies with IEC/EN 60825-1 (2001).

Nieuwegein, The Netherlands,
March 2011

Sébastien David
Manager Product Development and Quality

Safety recommendations

635nm
<1mW
<0.2mr

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

THIS PRODUCT COMPLIES
WITH 21CFR 1040.10
AND 1040.11 EXCEPT
FOR DEVIATIONS
PURSUANT TO LASER
NOTICE No.50
DATED JUNE 24th 2007
COMPLIES WITH
IEC/EN 60825-1 (2001)

This product complies with 21CFR 1040.10 and 1040.11
except for deviations pursuant to laser notice No. 50
dated June 24th 2007 complies with IEC/EN 60825-1 (2001).

Warning
• The equipment described in this document uses a Class 2 laser.
  Do not look directly into the laser beam or the laser beam exit aperture,
  irreversible damage to the eye may occur. The laser should not be
  operated when there are personnel in the camera's field of view.

Caution
• Use of controls or adjustments or performance of procedures other than
  those specified in this document may result in hazardous laser radiation
  exposure.
• To help minimize burn hazards, be aware that thermal images of
  highly reflective objects will show lower than actual temperature
  measurements.
• Do not use in a manner not specified in this instruction for use.
• Do not use in explosive atmospheres.
• Always use the lanyard provided to help minimise damage to the
  thermal imager and personal injury accidents.
• Only use genuine SKF spares and accessories. Other spares and
  accessories may damage the thermal camera.
• The thermal camera contains no user serviceable parts. Opening the
  imager casing voids warranty. All service work must be carried out by an
  authorised SKF workshop.

1. Description

The SKF TKTI 20 is a digital camera with advanced thermal imaging capabilities. It is ideal for use as a Predictive Maintenance (PdM) tool. Thermography is a non-invasive technique and is well suited for mechanical and electrical inspections, energy conservation and plant safety activities. The TKTI 20 has a large backlit 3 $^1/_2$" color screen, which gives a clear, sharp image using any of the eight color palettes. Designed for easy operation, multiple temperatures can be measured and the differences between them displayed. Other advanced measurement options are also available. Images can be stored as radiometric data and digital images on the micro SD card (supplied). Powerful PC software supplied with the TKTI 20, allows the images to be further analyzed and to be optimized for ease of interpretation.

2. Getting started

2.1 Contents

Figure 1. Contents of the case

1	SKF Thermal Camera TKTI 20
2	Power supply unit (4-6V) and 4 International adaptors
3	CD - Software and instructions (MP5387)
4	USB cable (camera to PC)
5	Quick Start guide SKF Thermal Camera TKTI 20 (MP5384)
6	Certificate of Calibration and Conformance

Inspect all the items. If any item is damaged or missing, please notify your dealer or local SKF office immediately.

2.2 Charging internal battery

• The TKTI 20's battery can be charged in the camera by connecting the supplied 4-6V power supply unit into the Mini USB port in the hatch of the thermal camera (see figure 2).

• The battery condition indicator appears on the screen when the imager is switched on (see figure 3).

• A green LED will appear while charging and turn red once the charge is complete (see figure 2). A fully charged battery will approximately last 5 hours.
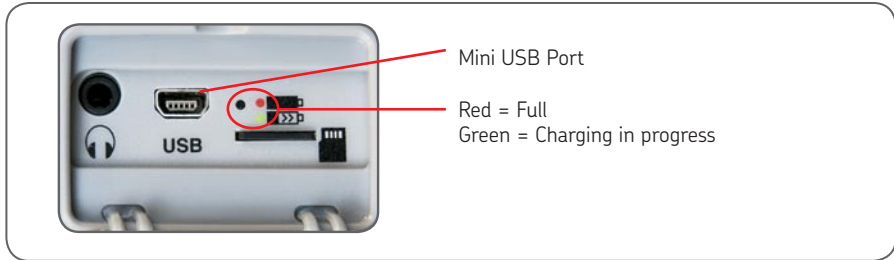

Mini USB Port

Red = Full
Green = Charging in progress

Figure 2. Connection ports

Spot temperature (hot & cold)

Delta temperature

Emissivity

Reflected temperature

Battery condition

Temperature
Span
Level

Status of Direct access buttons
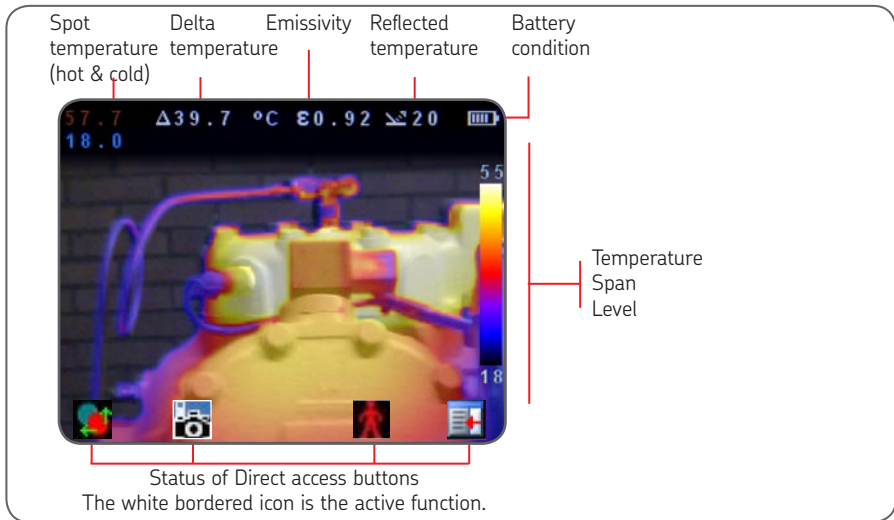The white bordered icon is the active function.

Figure 3. Screen overview

The bottom menu will disappear after 10 seconds, press any button to make it reappear. The green rectangle shows the area where temperature is measurable.

2.3 Replacing the internal battery

The TKTI 20 has a field replaceable battery.

Figure 4: Battery replacement

Open the lock on the battery cover and remove the cover, remove the battery, insert a new one ensuring the contact pads are towards the front of the camera.
Replace and lock the cover.

3. Basic features of the SKF Thermal Camera TKTI 20

3.1 Hardware

The TKTI 20 is designed for use as a handheld thermal camera. Thermal images are stored on a micro SD memory card (supplied size is 2GB). These images can be transferred to a PC using the USB cable provided or via a micro SD card reader connected to the PC. PC software SKF TKTI 20 Thermal Camera Suite is included for viewing and analysis of saved thermal and digital images.
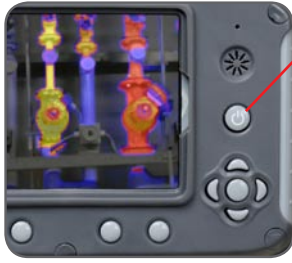

Figure 5. Main camera controls

Figure 6. Front panel

3.2 Switching on the TKTI 20

- The TKTI 20 is switched on and off by pressing and holding down the power button.

- The TKTI 20 takes approximately 20 seconds to be fully operational.

Figure 7. Camera on/off button

3.3 Focusing

- Sharpen the image by rotating the focus ring

Figure 8. Focusing

Focus:
- Is the most important step to obtain a good quality image
- Influences the accuracy of the temperature reading
- Is the only setting that cannot be modified when viewing the images on a PC

It is advised to stay in a 100% thermal image mode for focusing (see chapter 4.2). Some palettes allow you to make a better focus. Make sure you are in automatic span and level.

Rotating the focus ring in a clockwise direction (from user point of view) focuses the images at shorter distances down to a minimum of 30 cm.
Rotating the lens in the opposite direction focuses the imager at longer distances up to infinity.

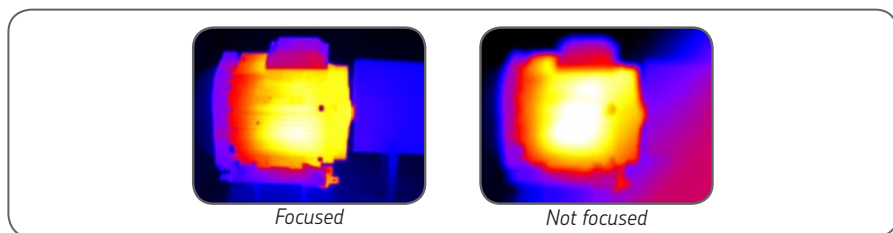Rotate the lens until the image has a sharp definition, with the sharpest contrast at object edges.

Figure 9. Focusing

When focusing, a focus bar appears on the screen showing the focused distance.
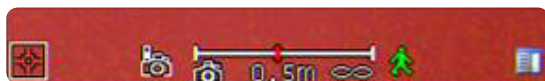REMEMBER TO REMOVE THE LENS CAP

Figure 10. Focus bar

3.4 Using the laser pointer

When the TKTI 20 is switched 'ON', the laser may be activated by pressing and holding down the laser button (see figure 11) on the handle.

Laser pointer button

Figure 11. Laser pointer button

The laser pointer is used to illuminate and identify features in the image.

Note:
The laser centre is aligned to objects at a distance of 3 m.

3.5 Field of view

Figure 12. Field of view

The TKTI 20 has a 20˚ x 15˚ field of view, and a 160 x 120 pixel detector.
The detector resolution can be interpolated to 320 x 240 (see section 4.4.1; Interpolation).
The following table gives an indication of the minimum dimension of an object you can measure the temperature at a given distance.

Distance (m)	0,5	1	5	10	15
Object (cm)	0,3	0,7	3,3	6,6	10

The object size is proportional to the distance. The IFOV is 2,2 mRad.

3.6 Span, Level, Range

The TKTI 20 can operate from -10 °C to +250 °C; this is the range of the camera.
The span is defined by the minimum and maximum temperatures on the scale on the right side of the screen. A wider span will give you less thermal details, whereas a narrower span will give you good thermal details but also increases the noise in the image.
You can adjust its position within the range, this is the level setting.

4. Using the direct access buttons

The Direct access button positions are shown in the below figure. The icon with a white border shows the selected function that can be adjusted (see also figure 5):

Figure 13. Direct access buttons

1	Direct access button 1	4	Direct access button 4
2	Direct access button 2	5	Centre toggle button
3	Direct access button 3	6	4 Navigation buttons

4.1 Direct access button 1

With Direct access button 1 you can access:

a. **Alignment** (if visible on : see Direct access button 2).

As the visible and thermal camera are not co-axial the visible and thermal image often need to be aligned. This is usually required when inspecting objects at different distances. It is possible to align the thermal and visible (digital) images only on "Live" mode. Further adjustments can be done on the saved images with the software.

1. Press Direct access button 2 to locate the camera on/off option and toggle the centre button to turn the camera option on.

2. Press Direct acces button 1 to locate the alignment option.

3. Alignment presets are accessible with centre toggle button. You can also use the navigation buttons for final adjustment.

Align up

Align left   *Fully aligned*   *Align right*

Align down
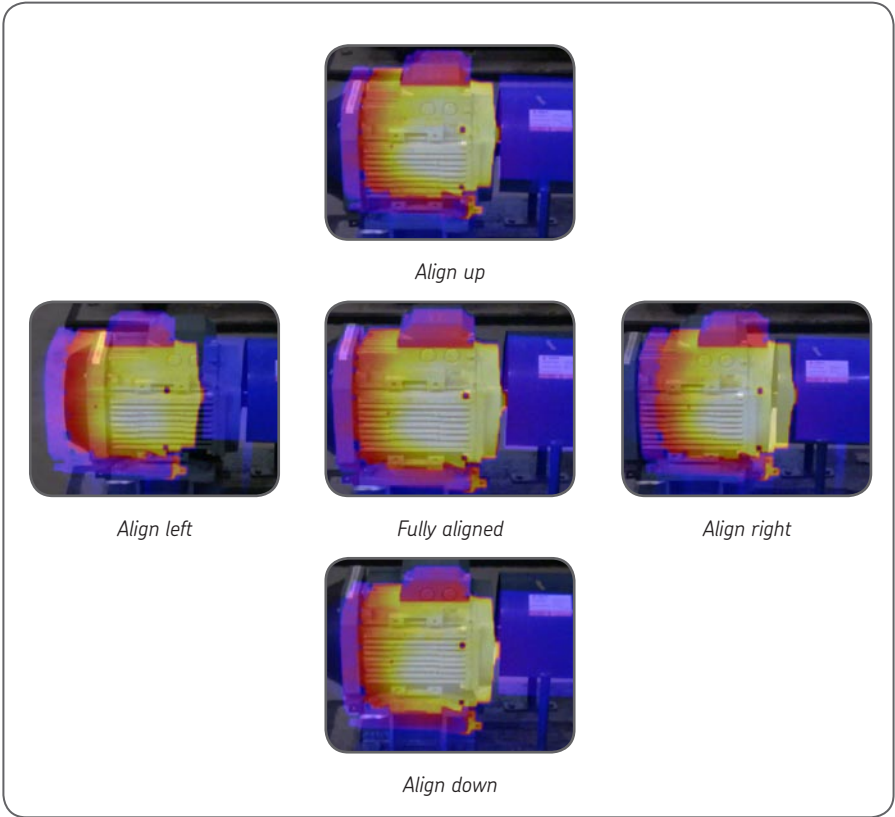
Figure 14. Examples of alignment

Note:
Only the digital image is moving.

b.   Measurement options

To be displayed while navigating with Direct access button 1, these options need to be enabled in the Measurement Option menu.

To access the Measurement Option menu

press Direct access button 4:

and select the correct icon:

Direct access button 1 can display the following icons:

✛ Cursor one Menu> Measurement options> Cursors: 1	✛ Cursor two Menu> Measurement Options> Cursors: 2	✛ Cursor three Menu> Measurement Options> Cursors: 3
✛ Cursor four Menu> Measurement Options> Cursors: 4	▬ Isotherm low temp Menu> Measurement Options> Isotherms: (Low, High&Low)	▬ Isotherm high temp Menu> Measurement Options> Isotherms:(High, High&Low)
↕ Area Menu> Measurement Options> Area: On	⚡ Hot/cold tracking Menu> Measurement Options> Tracking: (High, Low, High&Low)	🔀 Align (If Camera On: 📷 see Direct Access Button 2)
🌡 Low temp range Menu> Measurement Options> Temp. Alarm: (Low, High&Low)	🌡 High temp range Menu> Measurement Options> Temp. Alarm: (High, High&Low)	
🌈 Horizontal profile Menu> Measurement Options> Temp. Profile: Horizontal	🔺 Vertical profile Menu> Measurement Options> Temp. Profile: Vertical	

See for detailed description of the functionality of these options section 4.4.2: Measurement Options.

4.2 Direct access button 2

When a picture is displayed on the screen, this button gives access to 3 different options with 2 settings for each (toggle using centre toggle button):

1. Camera on/off

Enable/disable the display of a digital picture blended with thermal image.
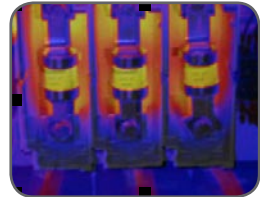
How to set Blending:

1. Press Direct access button 2 to locate the camera on/off option and toggle the centre button to turn the camera option on.

2. Blending between the digital and thermal image by pressing the up/down buttons

3. This will blend the two images on a percentage scale 0%, 25%, 50% 75%, 100% and Picture and Picture (PiP).

4. Blending is also possible in PiP mode. You can adjust the percentage by pressing the left/right button.
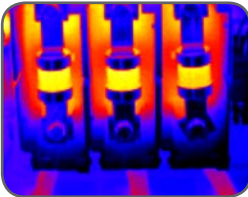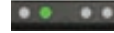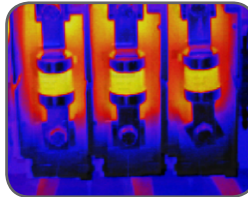
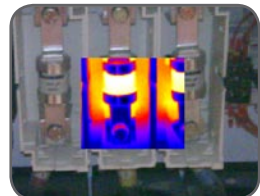*100% thermal*   *25% visible 75% thermal*   *50% visible 50% thermal*

75% visible 25% thermal   *100% visible*   *Picture in Picture*

2. Light on/off

Enable/disable high power LED in the front panel, helpful to take pictures in a dark environment (see figure 6).
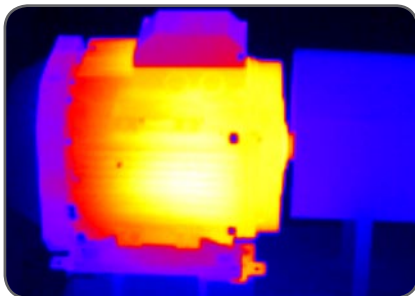
3. Temperature range scale

Auto

Automatically adjusts the image to allow for the highest and lowest temperature in the scene. Useful when starting an imager and switching to different parts of a scene.
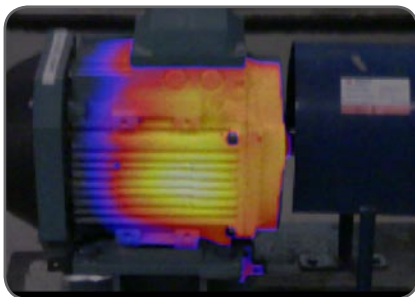

Manual

The user defines the range of temperatures to be displayed. Manual setting is useful when the user wants to examine various pieces of similar equipment. In a fixed temperature range, anomalies or discrepancies can be precisely highlighted.

Set the span using the right and left navigation button and the level using the up and down navigation button.

Persistant Manual

The span and level settings are either selected automatically by the camera or manually by the user. If this mode is selected, the camera stores the level and span settings. On powering up the default mode is always Auto, however selecting the persistent manual mode sets the level and span to the last stored values.

Set the span using the right and left navigation button and the level using the up and down navigation button.

4. Play audio (only in picture viewing mode)
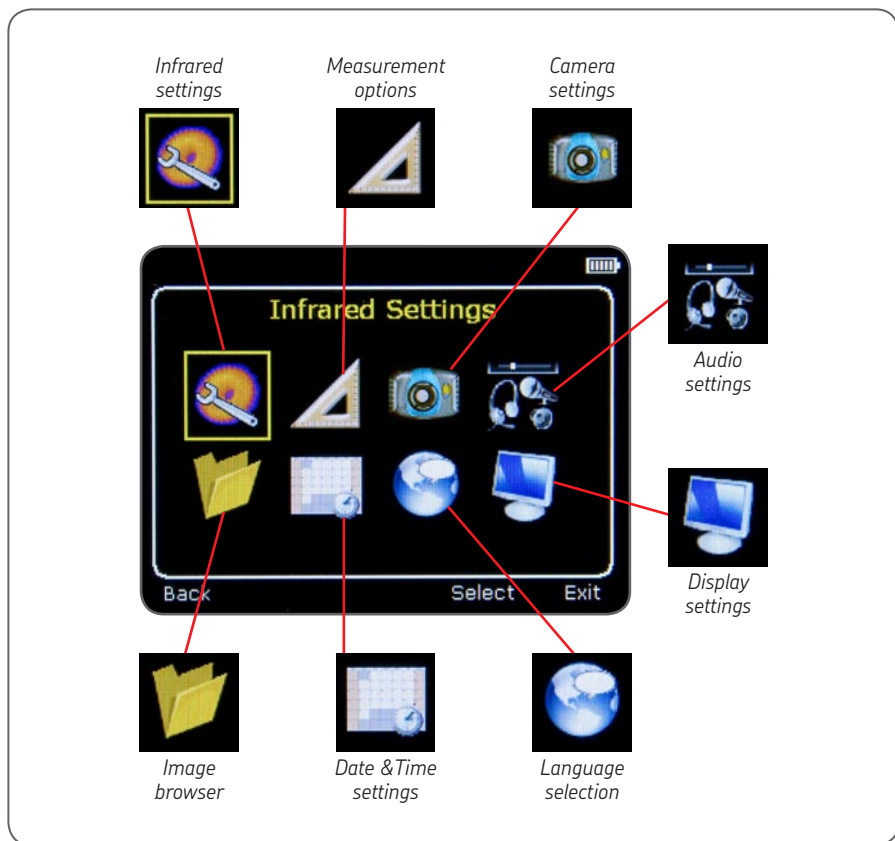Plays previously recorded voice annotation saved with the image.

4.3 Direct access button 3

This button toggles between live image and a frozen image
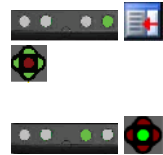
4.4 Direct access button 4

This button selects the camera menus.

Infrared settings

Measurement options

Camera settings

Audio settings

Display settings

Image browser

Date &Time settings

Language selection

Menu selection

1. Press Direct access button 4 to enter the menu selection screen

2. Navigate to the desired option using the navigation buttons.
(The icon with the yellow border show the selected option)

3. Press Direct access button 3 or the centre toggle button to enter
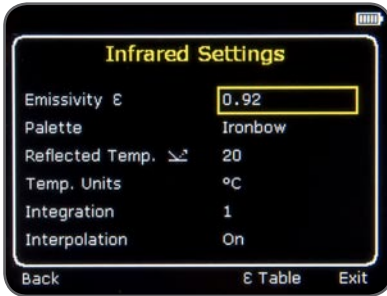the selected option.

Menu items

1. Arrow up and down to the desired item

2. Use the left/right arrows to change the value of this item

3. Select Direct access button 4 to exit or Direct access button 1
to go back to the main menu.

## 4.4.1 Menu Infrared Settings

Emissivity

Different surfaces can radiate different amounts of infrared energy at the same
temperature. This difference in temperature measurement can be corrected by setting the
emissivity value.
The amount of infrared radiation emitted by a surface depends on both its temperature
and its emissivity. Surfaces that are good reflectors (e.g. polished metal) are poor emitters,
and surfaces that are good emitters (e.g. human skin) are poor reflectors. A black body
is defined as an object that absorbs all radiation falling on it and it is a perfect emitter of
radiation.

The emissivity of a surface (usually written ε) is the ratio of the energy radiated by that
surface to the energy radiated by a black body at the same temperature. For accurate
temperature measurements, the emissivity of the surface being measured must be
entered into the camera. This is done by entering a number in the range 0.10 (for
polished chromium) to 1.00 (for a black body). An emissivity lookup table is provided,
which lists the emissivities of a range of common materials.
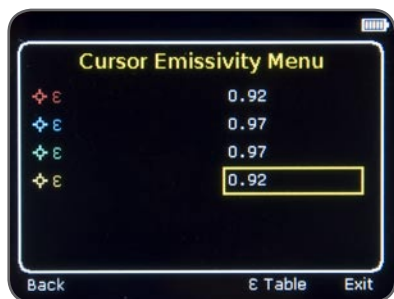
It is not recommended that temperature measurements be attempted when emissivity values lower than 0.70 are required, because large errors are likely due to reflected radiation from surrounding objects.

Set emissivity value between 0.10 and 1.00 for measuring temperature. We recommend a usual value of 0.95. Emissivity can be changed afterward in the saved picture.
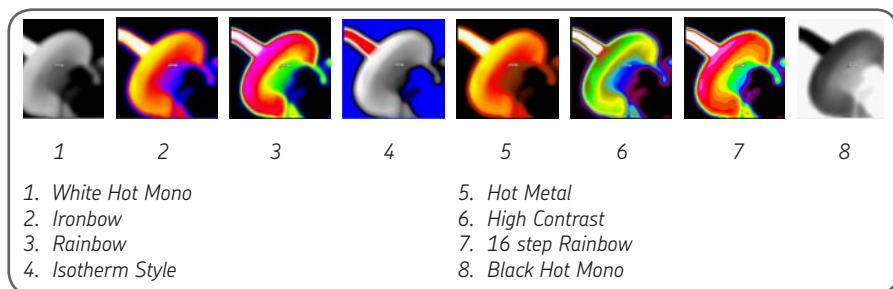
Pressing Direct access button 3 (ε Table) gives a table of emissivity values of common materials from which a selection can be made.
If more than one cursor is selected, it is possible to set a different emissivity for each cursor by pressing Direct access button 3 (Cursor ε), pressing the same button again will give access to the emissivity table.

Palette (8 options)

Different colour palettes are useful in viewing objects and scenes for different requirements. As a simple rule of thumb, palettes with a lot of different colours are more helpful when looking for hot spots or cold spots, whereas palettes with fewer and gradually changing colours are more useful in viewing changes of temperatures in a scene or object. We recommend that you find the palette which suits you best. It is possible to change the palette on the PC software.

1   2   3   4   5   6   7   8

1. White Hot Mono
2. Ironbow
3. Rainbow
4. Isotherm Style

5. Hot Metal
6. High Contrast
7. 16 step Rainbow
8. Black Hot Mono

 Reflected Temperature

This is only applicable if an emissivity of less than 1 is selected.

Some of the infrared energy seen by the camera from a surface with an emissivity of less than 1.00 is energy reflected by the background. If there is a hot object in the background, this can have a significant effect on the temperature measured. By entering a reflected temperature value, the camera can correct for the effect of this reflected background energy.
Usually set to the ambient temperature.

 Temperature units
Choose between ˚C and ˚F.

 Integration. (1 low to 4 high.)
The camera normally operates at a frame rate of 8Hz (i.e. the image is updated 8 times per second). For viewing scenes in which there is very little temperature variation, the image may be improved by integrating over several frames to reduce the noise.

Choose an integration period from 1 (fast) to 9 (slow).
However it is recommended to keep the value at 1 for normal use, higher values can be used when the camera is held steadily or fixed on a tripod.

 Interpolation. (On/Off.)
Interpolation is on by default as it smoothes the image to provide a better visual image. Turning it off gives a more pixelated image. Some users may wish to observe the scene with the actual resolution of the detector.
The processor calculates the temperature of sub-pixels and therefore displays more pixels on the screen. This setting doesn't change anything to the temperature measurement.
Actual resolution is 160 x 120.
By turning interpolation on the resolution is interpolated to 320 x 240.

4.4.2 Menu Measurement Options
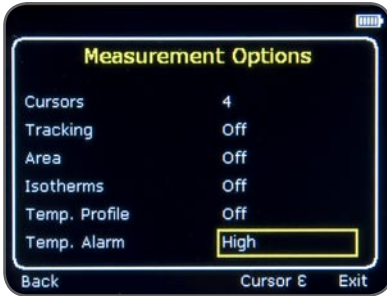
This menu enables the selection of options for temperature measurements. The symbols shown below indicate the icons shown for Direct access button 1 when the various options are selected.
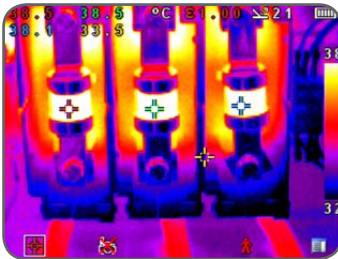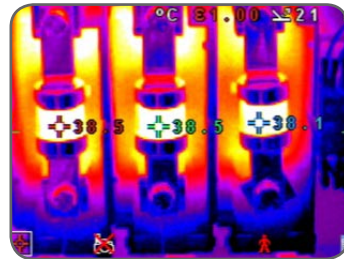
Cursors

Up to four measurement cursors can be selected. When two cursors are chosen, the temperatures of both cursors and the temperature difference between them will be displayed.

When one of the cursors is selected by Direct access button 1, it can be moved around on the display by the navigation buttons.

If two or more cursors are selected then individual emissivity values can be assigned to each cursor. When an emissivity less than 1.00 is selected for a cursor, then that cursor flashes on the screen. The emissivity of cursor 1 is always displayed.

Four tabular cursors   *Three tagged cursors*

![Tracking icon] **Tracking**

![High/Low icon]

Select "High", "Low", or "High & Low" in order to track and measure the following:
- the hottest part of the scene
- the coldest part of the scene
- both the hottest and coldest part of the scene.

Cursors temperature   Cursor temperature difference

Tracking hot in red and cold in blue

![Area icon] **Area**

![Area box icon]

Area analysis is useful when wanting to know the highest and lowest temperature in a part of the scene. It also shows the average temperature. There are three box sizes to choose from.

Maximal temperature   Minimal temperature   Average temperature


Area analysis

◢ Isotherms

Select "High", "Low", or "High & Low" in order to highlight areas of the scene with temperatures within a high (red) or low (blue) temperature band. The temperature bands are adjustable by means of direct access button 1 and the navigation keys.
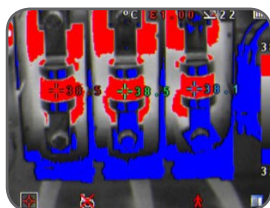Use left/right navigation button to set the span and up and down navigation button to set the level of the isotherm.
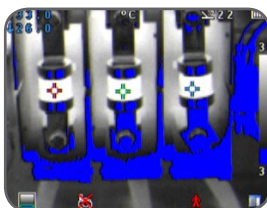

*Red isotherm*   *Blue isotherm*   *Combined isotherms*

◢ Temperature profiles

Select "Horizontal" or "Vertical" to enable a histogram of temperature values along a horizontal or vertical cross section to be displayed on the right hand side or the bottom of the display. The position of the cross section is indicated by small arrows at the left and right or top and bottom of the image and can be adjusted by means of Hotkey 1 and the navigation buttons.
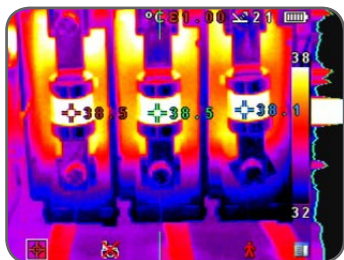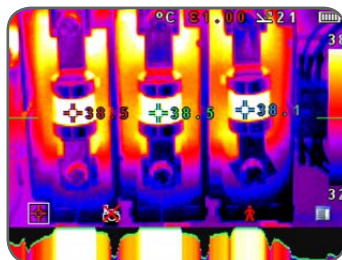
*Vertical profile*   *Horizontal profile*

 Temperature alarms

Select "High", "Low", or "High & Low".
Visual and audio (if enabled in Audio setting menu) alarms will be triggered if either cursor or a point within the designated area is higher or lower than a set temperature. The high and low set temperatures may be adjusted by means of Direct access button 1 and the navigation buttons.

4.4.3 Menu Camera Settings
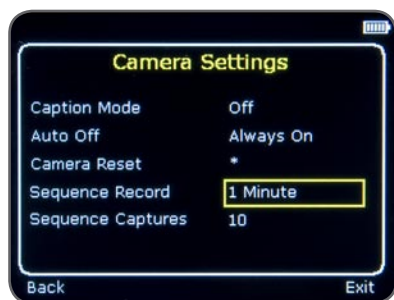
 Caption Mode
Select "On" to enable the addition of a text caption when saving an image.
Options will then be displayed when saving an image, to be selected by means of Hotkey 2 and Hotkey 3.

 Auto Off
Select "5 Mins", "10 Mins", "20 Mins" to allow the camera to switch itself off after a defined period of inactivity in order to save power. Always on means that the Auto off function is disabled.

 Camera Reset
Select Direct access button 3 to restore the factory settings.

 Sequence record
This option allows the user to save images to the micro SD card. When sequence recording is selected, it is possible to save images every 05 seconds, 10 seconds, 20 seconds, 30 seconds, 1 minute, 2 minutes, 5 minutes, 10 minutes, 20 minutes, 30 minutes and 1 hour. The alarm setting works in conjunction with the temperature alarm function. When the temperature in the scene exceeds the user defined high alarm threshold temperature an image is saved. Equally when the temperature in the scene goes below the user defined low alarm threshold temperature an image is saved.

 Sequences Captures

Once sequence record has been selected the user can choose how many images to save from a choice of: 10, 50, 100, 500 or 1000.

4.4.4 Menu Audio Settings
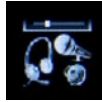
 Imager Sounds

Select "Off" to mute all sounds.

 Voice Annotation

Select "Session" to add a voice message at the start of a set of images (A session ends when the imager is switched off).
Select "Individual" to add a voice message to each saved image.
Select "Combined" to add a common voice message at the start of a set of images and add additional comments for each image.

If session or combined is selected, the voice message is recorded in the audio settings by pressing Direct access button 3. Recording is stopped by pressing Direct access button 3 again.
Direct access button 2 can be used to play back the recorded message. Direct access button 3 can be used to re-record if necessary.
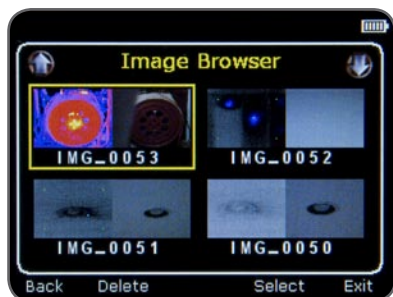
 Voice Playback

Select "Speaker" or "Headset" for the desired method of audible outputs.

 Volume

Select the volume of the audible outputs from 1 to 9.

4.4.5 Menu Image Browser

 The saved images are shown on the screen with the most recently saved image first.

Select the desired image by means of the navigation keys.
To display the selected image press Direct access button 3.
To delete the selected image press Direct access button 2, to confirm deletion press Direct access button 3.

When a stored image is displayed, press Direct access button 3 to return to live imaging.

4.4.6 Menu Date & Time Settings

a)   Use the left/right buttons to navigate in this menu, the item that can be changed is highlighted in red. In the picture above the day (DD) 14 is highlighted.

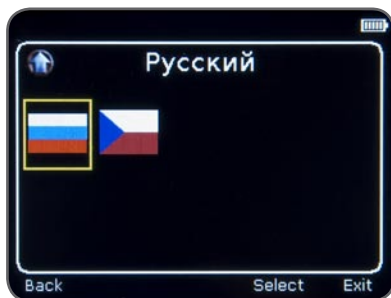The date displayed format can be changed by pressing direct access key number 2

b)   Use the up/down buttons to change the value.

- Minute. (00 to 59.)
- Hour. (00 to 23 in 24 hour format, am or pm in 12 hour format.)
- 12 hour or 24 hour clock.
- Day. (01 to 31.)
- Month. (01 to 12.)
- Year. (2000 to 2099.)
- Format (DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD).
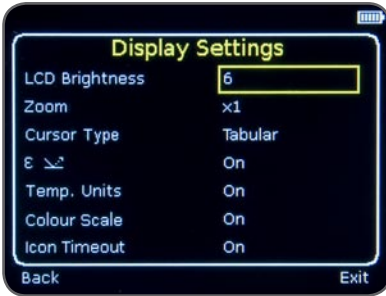
4.4.7 Menu Language Selection

In this menu you can select the language in which you want to use the camera.

The icon with a yellow border shows the selected language.

Press Direct access button 3 to select.

Languages	
French	Korean
German	Japanese
Italian	Turkish
Spanish	Russian
Portuguese	Czech
Chinese	

4.4.8 Menu Display Settings

LCD brightness
Select from 1 (low) to 9 (high) to control the screen brightness. A low setting will contribute to save battery life

Zoom
Allows the user to digitally zoom into the image. Options are X1, X2 and X4 zoom.

Cursor Type
Choose to display a tabular Cursor or a tag next to the cursor.

ε
Choose whether or not to display the reflected temperature. Only applicable when emissivity is selected to be less than 1.

Temp. Units.
Choose whether or not the temperature units (°C or °F) are displayed on the screen.

Colour Scale
Choose whether or not the colour scale is to be displayed.

Icon Timeout
The Icons above the 4 direct access keys can be displayed either continuously or for 10 seconds after the last key is pressed.
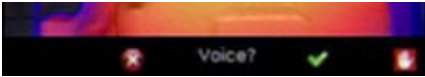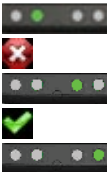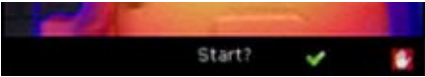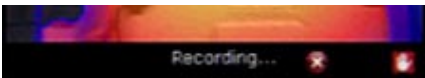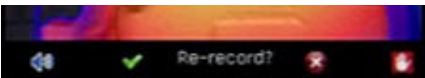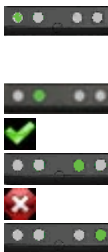
5. Saving and annotating pictures

5.1 Saving a picture

To save a picture press the save button (see figure 6).
After pressing you can add 'voice message' and 'caption' to the picture.
Note: micro SD card should be inserted for saving a picture (see figure 2).
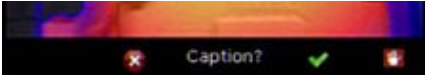
5.2 Adding a voice message

When saving an image with Individual Voice Annotation turned on (see 4.4.4).
There you can save a voice message with each image. The voice recording can be played back when viewing the saved images in the browser (see chapter 4.4.5).

|	
a) You can attach a voice message to this saved image Press Direct access button 2 for no. Press Direct access button 3 for yes . Press Direct access button 4 to cancel and return to 'live'	b) Start voice recording? Press Direct access button 3 for yes. Press Direct access button 4 to cancel and return to 'live'
c) Stop Recording Press Direct access button 3 to stop. Press Direct access button 4 to cancel and return to 'live'	d) Option to Re-record the voice message Press Direct access button 1 for replaying your voice message Press Direct access button 2 for Yes Press Direct access button 3 for No Press Direct access button 4 to cancel and return to 'live'

5.3 Adding a Caption

When saving an image with Caption Mode turned on (see 4.4.3), you can attach a text caption to each image.

a)   You can attach a voice message to this saved image
Press Direct access button 2 for no.
Press Direct access button 3 for yes .
Press Direct access button 4 to cancel and return to 'live'
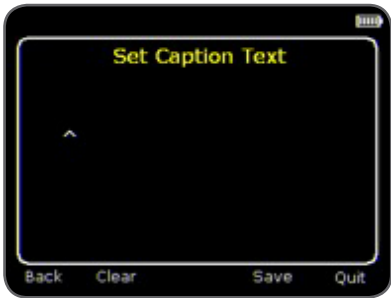
1. Use the up/down arrow buttons to cycle through letters and numbers until the one required appears. The available symbols are:ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789

2. Use the left/right arrow buttons   to move to the next space and repeat the above step until the caption is completed.

3. Press Direct access button 2 to clear the whole message.

4. Press Direct access button 3 to save the image and caption

Note:
Captions cannot be viewed with the saved images in the browser. The captions can be viewed using the PC software (for more detailed information see IFU TKTI 20 Thermal Camera Suite Software (MP5386)).
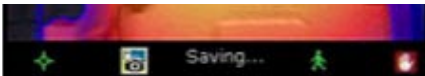
	Image with voice message is being saved.

Both thermal and visible images are now saved with annotations and caption if recorded.

6. Technical specifications

Performance	
Field of view (FOV)	20º x 15º
Spectral Response	8 to 14 µm
Sensitivity	NETD ≤ 80mK (0,08 ºC) @ 23 ºC ambient and 30 °C scene temperature
Detector	160 x 120 pixel array (interpolated to 320 x 240) uncooled microbolometer
Frame rate	8Hz
Focal Range	Manual focus from 0,3 m (12 in) to infinity

Image Storage	
Number	Up to 2500 images on 2GB memory card supplied
Medium	Micro SD Card
Display	3 $^{1/2}$" colour LCD with LED Backlight. 8 colour palettes. Thermal images or visible images or mixed thermal and visible images including picture in picture.
Laser Pointer	A built in Class 2 laser is supplied to highlight the reference pixel

Measurement	
Temperature range	–10 ºC to +250 ºC (+14 ºF to +482 ºF)
Radiometry	Four moveable temperature measurement cursors giving automatic temperature difference measurement and auto locking onto hottest and coldest points
Emissivity Correction	User selectable 0,1 to 1,0 in steps of 0,01 with reflected ambient temperature compensation. The four measurement cursors can have individual emissivity values assigned to them.
Accuracy	The greater of ±2 °C or ±2% of reading in °C for the operating temperature range of –15 °C to +45 °C.

Camera Power Supply	
Battery	Rechargeable Lithium-Ion field replaceable
Operation time	Up to 5 hours continuous operation
AC operation	USB AC power adaptor supplied

Mechanical & Environment	
Housing	Impact Resistant Plastic with over-moulded soft plastic
Dimensions	130 x 95 x 220 mm (5.1 x 3.74 x 8.66 in)
Weight	0.80 kg (1.76 lbs)
Temperature operating & storage Range	-15 °C to 50 °C (5 °F to 122 °F)
Humidity	10% to 90% non condensing / -20 °C to 70 °C (-4 °F to 158 °F)
IP rating	IP 54
Software	SKF TKTI 20 Thermal Camera Suite: Advanced imager analysis and report writing software
Computer Requirements	PC with one of the following operating systems: Windows XP, VISTA, or Windows 7

SKF Maintenance Products