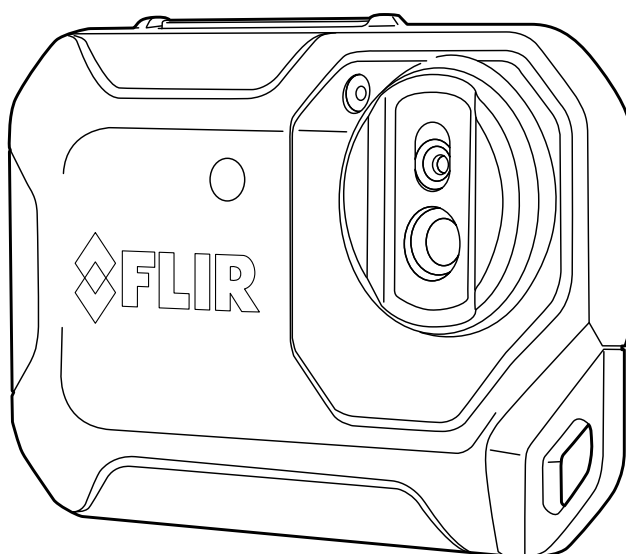![FLIR logo]

User's manual
# FLIR Cx series

Flir C2

5   Quick Start Guide

With suggestions from Cambridge Carbon Fottprint

5.1   Procedure

Follow this procedure:

1. Charge the battery for approximately 1.5 hours, using the FLIR power supply.
2. Push the On/off button ⬭ to turn on the camera.
3. Aim the camera toward your target of interest.
4. Push the Save button to save an image.

(Optional steps)   See Below

5. Download FLIR Tools from http://support.flir.com/tools.
6. Install FLIR Tools on your computer.
7. Start FLIR Tools.
8. Connect the camera to your computer, using the USB cable.
9. Import the images into FLIR Tools.
10. Create a PDF report in FLIR Tools.

Connect Flir C2 to your PC via USB and switch on. When ON,
look for drive letter (eg D;) with Windows Explorer, etc.
Copy images from D:\DCIM\100_FLIR
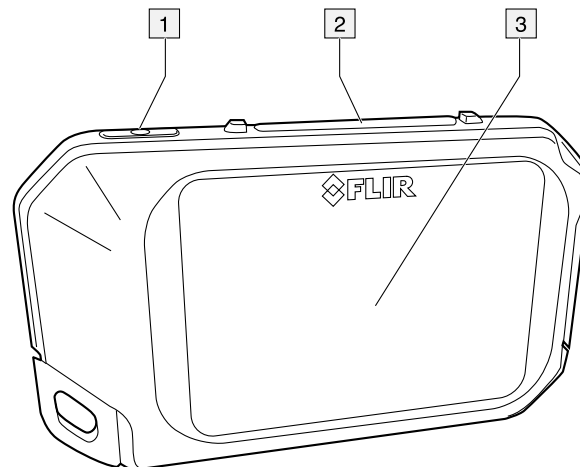Please delete your images from C2, when finished.

6 Description

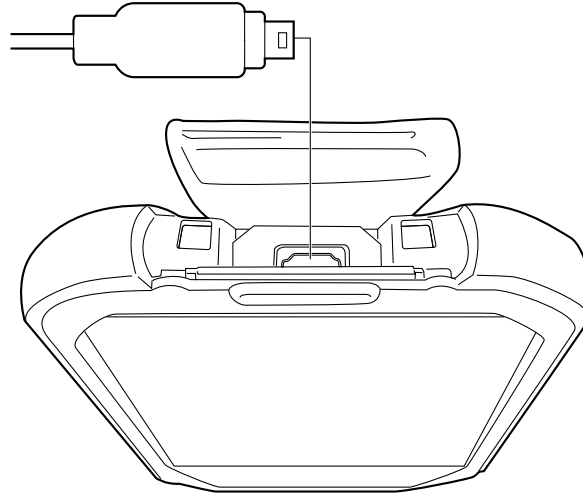## 6.1 View from the front
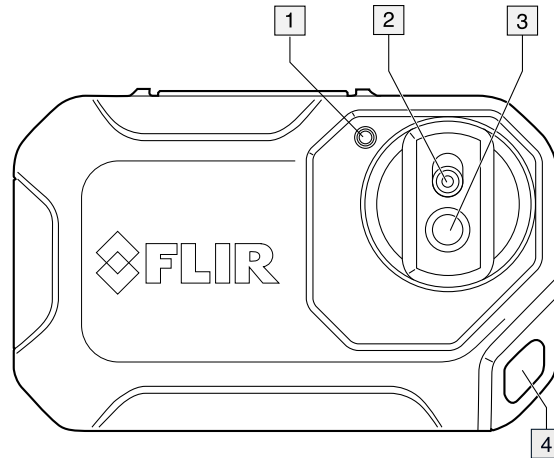
1. Camera lamp.
2. Digital camera lens.
3. Infrared lens.
4. Attachment point.

6.2 View from the rear

1. On/off button.
2. Save button.
3. Camera screen.

6.3   Connector

The purpose of this USB Micro-B connector is the following:

• Charging the battery using the FLIR power supply.
• Moving images from the camera to a computer for further analysis in FLIR Tools.

   Note   Install FLIR Tools on your computer before you move the images.

6.4   Screen elements

1. Main menu toolbar.
2. Submenu toolbar.
3. Result table.
4. Status icons.
5. Temperature scale.
6. Spotmeter.

6.5   Auto-orientation ✓

The camera has an auto-orientation feature, which means that the camera automatically adjusts the measurement information on the display to the vertical or horizontal position of the camera.

Note   The auto-orientation feature is enabled by a setting. Select *Settings > Device set-tings > Auto orientation > On*.

6.6   Navigating the menu system
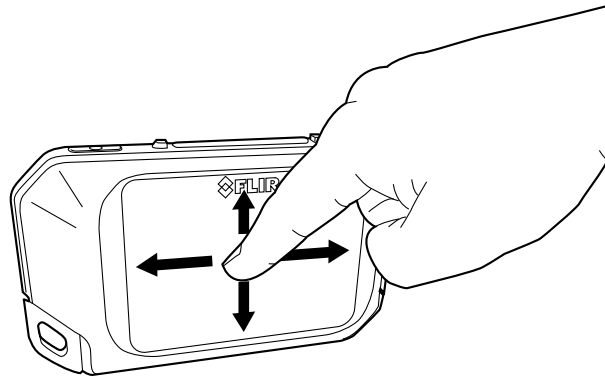
The camera has a touch screen. You can use your index finger or a stylus pen specially designed for capacitive touch usage to navigate the menu system.

Tap the camera screen to bring up the menu system.

7   Operation

7.1   Charging the battery

| ⚠   **WARNING** |
|---|
| Make sure that you install the socket-outlet near the equipment and that it is easy to get access to. |

Follow this procedure:

1. Connect the FLIR power supply to a wall outlet.
2. Connect the power supply cable to the USB connector on the camera.

7.2   Turning on and turning off the camera

- Push the On/off button ⬭ to turn on the camera.
- Push and hold the On/off button ⬭ until the screen goes off (for less than 5 seconds) to put the camera in standby mode. The camera then automatically turns off after 2 hours.
- Push and hold the On/off button ⬭ for more than 5 seconds to turn off the camera.

7.3   Saving an image

7.3.1   General

You can save images to the internal camera memory.

The camera saves both a thermal image and a visual image at the same time.

7.3.2   Image capacity

Approximately 500 images can be saved to the internal camera memory.

7.3.3   Naming convention

The naming convention for images is *FLIRxxxx.jpg*, where *xxxx* is a unique counter.

7.3.4   Procedure

Follow this procedure:

1. To save an image, push the Save button.

7.4   Recalling an image

7.4.1   General

When you save an image, it is stored in the internal camera memory. To display the image again, you can recall it from the internal camera memory.

7.4.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Images* ▷ . This displays an image in the image archive.

3. To view the previous or next image, do one of the following:

   - Swipe left or right.

   - Tap the left arrow 〈 or the right arrow 〉 .

4. To switch between a thermal image and a visual image, swipe up or down.
5. Tap the camera screen. This displays a toolbar.

   - Select *Full screen* ⬚ or *Exit full screen* ⬚ to switch between the full screen and normal views.

   - Select *Thumbnails* ⊞ to display the thumbnail overview. To scroll between the thumbnails, swipe up/down. To display an image, tap its thumbnail.

   - Select *Delete* 🗑 to delete the image.

   - Select *Information* ⓘ to display information about the image.

   - Select *Camera* 📷 to return to live mode.

7.5   Deleting an image

7.5.1   General

You can delete an image from the internal camera memory.

7.5.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Images* ▶ . This displays an image in the image archive.
3. To display the previous or next image, do one of the following:

   - Swipe left or right.

   - Tap the left arrow 〈 or the right arrow 〉 .

4. When the image you want to delete is displayed, tap the camera screen. This displays a toolbar.

5. On the toolbar, select *Delete* 🗑 . This displays a dialog box.
6. In the dialog box, select *Delete*.

7. To return to live mode, tap the camera screen and select *Camera* 📷.

7.6   Deleting all images Please delete your images from C2, when finished.

7.6.1   General

You can delete all images from the internal camera memory.

7.6.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Settings* ⚙ . This displays a dialog box.
3. In the dialog box, select *Device settings*. This displays a dialog box.
4. In the dialog box, select *Reset options*. This displays a dialog box.
5. In the dialog box, select *Delete all saved images*. This displays a dialog box.
6. In the dialog box, select *Delete*.

7. To return to live mode, tap the upper left arrow ‹ repeatedly. You can also push the Save button once.

7.7   Measuring a temperature using a spotmeter

7.7.1   General

You can measure a temperature using a spotmeter. This will display the temperature at the position of the spotmeter on the screen.

7.7.1.1   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Measurement* ✧ . This displays a submenu toolbar.

3. On the submenu toolbar, select *Center spot* ✧ .

   The temperature at the position of the spotmeter will now be displayed in the top left corner of the screen.

7.8   Hiding measurement tools

7.8.1   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Measurement* ✧ . This displays a submenu toolbar.

3. On the submenu toolbar, select *No measurements* ⚡ .

7.9   Changing the color palette

7.9.1   General

You can change the color palette that the camera uses to display different temperatures. A different palette can make it easier to analyze an image.

7.9.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Color* ◧ . This displays a submenu toolbar.

3. On the submenu toolbar, select the type of color palette:

- *Iron*.   ✓
- *Rainbow*.   ✓
- *Rainbow HC*.
- *Gray*.

7.10 Changing the image mode

7.10.1 General

The camera captures both thermal and visual images at the same time. By your choice of image mode, you select which type of image to display on the screen.

The camera supports the following image modes:

- ✓*Thermal MSX* (Multi Spectral Dynamic Imaging): The camera displays an infrared image where the edges of the objects are enhanced with visual image details.

- *Thermal*: The camera displays a fully infrared image.
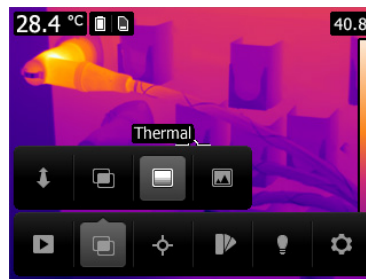
- *Digital camera*: The camera displays only the visual image captured by the digital camera.
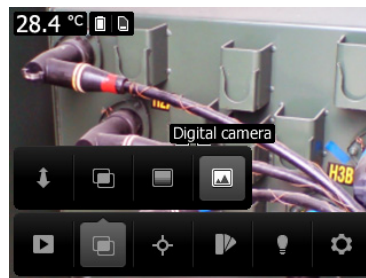
To display a good fusion image (*Thermal MSX* mode), the camera must make adjustments to compensate for the small difference in position between the digital camera lens and the

infrared lens. To adjust the image accurately, the camera requires the alignment distance (i.e., the distance to the object).

7.10.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.
2. Select *Image mode* ▣ . This displays a submenu toolbar.
3. On the submenu toolbar, select one of the following:

✓ • *Thermal MSX* ▣ .

   • *Thermal* ▣ .

   • *Digital camera* ▣ .

4. If you have selected the *Thermal MSX* mode, also set the distance to the object by doing the following:

   • On the submenu toolbar, select *Alignment distance* ↕ . This displays a dialog box.

   • In the dialog box, select the distance to the object.

7.11   Changing the temperature scale mode

7.11.1   General

The camera can operate in two different temperature scale modes:

*   *Auto* mode: In this mode, the camera is continuously auto-adjusted for the best image brightness and contrast. Simple, normally recommended
*   *Lock* mode: In this mode, the camera locks the temperature span and the temperature level. Also called 'Manual' Mode

Good for comaprisons or when temperature extremes in view
7.11.2   When to use *Lock* mode

A typical situation where you would use *Lock* mode is when looking for temperature anomalies in two items with a similar design or construction.

For example, you have two cables, and you suspect that one is overheated. With the camera in *Auto* mode, direct the camera toward the cable that has a normal temperature, and then activate *Lock* mode. When you then direct the camera, in *Lock* mode, toward the suspected overheated cable, that cable will appear in a *lighter* color in the thermal image if its temperature is *higher* than the first cable.

If you instead use *Auto* mode, the color for the two items might appear the same despite their temperature being different.

7.11.3   Procedure

To go between *Auto* mode and *Lock* mode, tap the top or bottom temperature value in the temperature scale.

A gray padlock icon indicates that *Lock* mode is active.

NB: look for a padlock icon, screen-right and touch a scale number to remove it, if you want the simpler Auto mode.

7.12   Setting the emissivity

7.12.1   General   Shiny metals and glass have low emissivities, giving wrong temperatires

To measure temperatures accurately, the camera must be aware of the type of surface you are measuring. You can choose between the following surface properties:

• *Matt*.   It's hard to compansate for low emissivities. Advanced only
• *Semi-matt*.
• *Semi-glossy*.

As an alternative, you can set a custom emissivity value.

For more information about emissivity, see section 15 *Thermographic measurement techniques*, page 59.

7.12.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Settings* ⚙ . This displays a dialog box.
3. In the dialog box, select *Measurement parameters*. This displays a dialog box.
4. In the dialog box, select *Emissivity*. This displays a dialog box.
5. In the dialog box, select one of the following:

    • *Matt*.
    • *Semi-matt*.
    • *Semi-glossy*.
    • *Custom value*. This displays a dialog box where you can set a value.

6. To return to live mode, tap the upper left arrow ‹   repeatedly. You can also push the Save button once.

7.13   Changing the reflected apparent temperature

7.13.1   General   Advanced Only

This parameter is used to compensate for the radiation reflected by the object. If the emissivity is low and the object temperature significantly different from that of the reflected temperature, it will be important to set and compensate for the reflected apparent temperature correctly.

For more information about the reflected apparent temperature, see section 15 *Thermographic measurement techniques*, page 59.

7.13.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Settings* ⚙ . This displays a dialog box.
3. In the dialog box, select *Measurement parameters*. This displays a dialog box.
4. In the dialog box, select *Reflected temperature*. This displays a dialog box where you can set a value.

5. To return to live mode, tap the upper left arrow 〈 repeatedly. You can also push the Save button once.

7.14   Changing the distance

7.14.1   General   Advanced Only

The distance is the distance between the object and the front lens of the camera. This parameter is used to compensate for the following two facts:

• That radiation from the target is absorbed by the atmosphere between the object and the camera.
• That radiation from the atmosphere itself is detected by the camera.

For more information, see section 15 *Thermographic measurement techniques*, page 59.

7.14.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.
2. Select *Settings* ⚙ . This displays a dialog box.
3. In the dialog box, select *Measurement parameters*. This displays a dialog box.
4. In the dialog box, select *Distance*. This displays a dialog box where you can set a value.
5. To return to live mode, tap the upper left arrow 〈 repeatedly. You can also push the Save button once.

7.15   Performing a non-uniformity correction

7.15.1   What is a non-uniformity correction?   Normally occurs automatically

A non-uniformity correction (or NUC) is *an image correction carried out by the camera software to compensate for different sensitivities of detector elements and other optical and geometrical disturbances*[1].

7.15.2   When to perform a non-uniformity correction

The non-uniformity correction process should be carried out whenever the output image becomes spatially noisy. The output can become spatially noisy when the ambient temperature changes (such as from indoors to outdoors operation, and vice versa).

7.15.3   Procedure

To perform a non-uniformity correction, tap and hold the ▶ icon. The text *Calibrating...* appears on the screen.

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1. Definition from the imminent international adoption of DIN 54190-3 (Non-destructive testing – Thermographic testing – Part 3: Terms and definitions).

7.16   Using the camera lamp

7.16.1   General

You can use the camera lamp as a flashlight, or as a flash when taking an image.

7.16.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Lamp* 💡 .
3. Tap one of the following:

    • *Flash* (to use the lamp as a flash when taking an image).
    • *On* (to turn on the lamp and use it as a flashlight).
    • *Off* (to turn off the lamp).

7.17   Configuring Wi-Fi   Not available with C2

Depending on your camera configuration, you can connect the camera to a wireless local area network (WLAN) using Wi-Fi, or let the camera provide Wi-Fi access to another device.

You can connect the camera in two different ways:

• *Most common use*: Setting up a peer-to-peer connection (also called an *ad hoc* or *P2P* connection). This method is primarily used with other devices, e.g., an iPhone or iPad.
• *Less common use*: Connecting the camera to a WLAN.

7.17.1   Setting up a peer-to-peer connection (most common use)

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Settings* ⚙ . This displays a dialog box.

3. Select *Device settings*.
4. Select *Wi-Fi*.
5. Select *Share*.
6. (Optional step.) To display and change the parameters, select *Settings*.

    • To change the channel (the channel that the camera is broadcasting on), select *Channel*.
    • To activate WEP (encryption algorithm), select *WEP*. This will check the *WEP* check box.
    • To change the WEP password, select *Password*.

    Note   These parameters are set for your camera's network. They will be used by the external device to connect that device to the network.

7.17.2   Connecting the camera to a wireless local area network (less common use)

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.

2. Select *Settings* ⚙ . This displays a dialog box.

3. Select *Device settings*.
4. Select *Wi-Fi*.
5. Select *Connect to network*.
6. To display a list of the available networks, select *Networks*.
7. Select one of the available networks.
   Password-protected networks are indicated with a padlock icon, and for these you will
   need to enter a password.

Note   Some networks do not broadcast their existence. To connect to such a network,
select *Add network...* and set all parameters manually according to that network.

7.18   Changing the settings

7.18.1   General   ✓ Suggested Settings

You can change a variety of settings for the camera.

The *Settings* menu includes the following:

- *Measurement parameters*.
- *Save options*.
- *Device settings*.

7.18.1.1   Measurement parameters

- *Emissivity*.   0.95
- *Reflected temperature*.   20°C
- *Distance*.   5m

7.18.1.2   Save options

- ✓*Photo as separate JPEG*: When this menu command is selected, the digital photograph
  from the visual camera is saved at its full field of view as a separate JPEG image. It
  may be necessary to activate this option if you are not using the FLIR Tools software.

7.18.1.3   Device settings

- *Language, time & units*:

  ○ *Language*.
  ○ *Temperature unit*.
  ○ *Distance unit*.
  ○ *Date & time*.
  ○ *Date & time format*.   DD/MM/YY

- *Reset options*:

  ○ *Reset default camera mode*.
  ○ *Reset device settings to factory default*. Try this if PC cpmms via USB fails
  ○ *Delete all saved images*.   Please delete your images from C2, when finished.

- *Auto power off*.   5 min
- *Auto orientation*.   ✓
- *Display intensity*.   Med   Type text here
- *Camera information*: This menu command displays various items of information about
  the camera, such as the model, serial number, and software version.

7.18.2   Procedure

Follow this procedure:

1. Tap the camera screen. This displays the main menu toolbar.
2. Select *Settings* ⚙ . This displays a dialog box.
3. In the dialog box, tap the setting that you want to change.
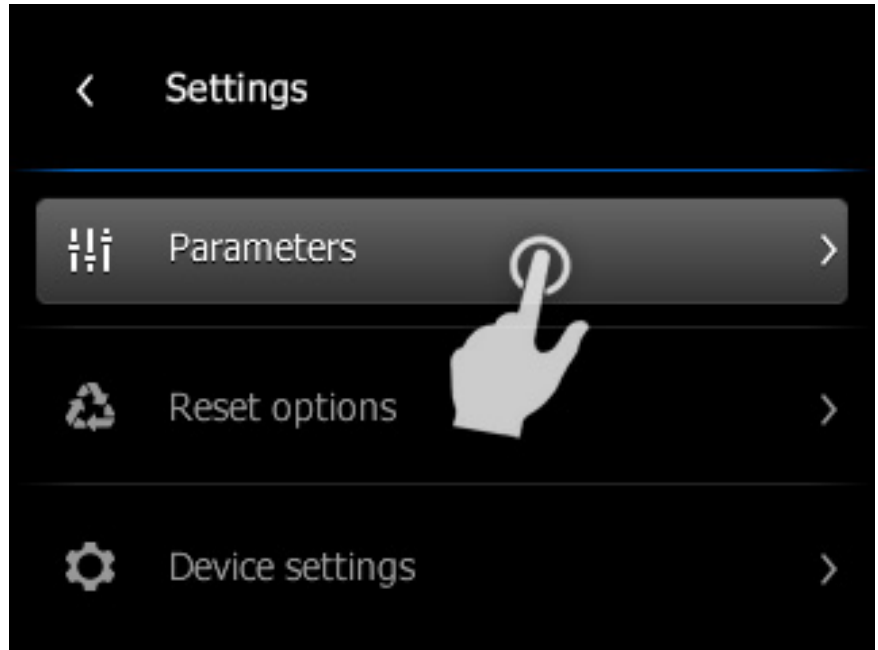
4. To return to live mode, tap the upper left arrow ‹ repeatedly. You can also push the Save button once.

7.19 Updating the camera Please don't try this

7.19.1 General

To take advantage of our latest camera firmware, it is important that you keep your camera updated. You update your camera using FLIR Tools.

7.19.2 Procedure

Follow this procedure:

1. Start FLIR Tools.
2. Start the camera.
3. Connect the camera to the computer using the USB cable.
4. FLIR Tools displays a welcome screen when the camera is identified. On the welcome screen, click *Check for updates*.

   You can also click *Check for updates* on the *Help* menu in FLIR Tools.
5. Follow the on-screen instructions.

Website
http://www.flir.com

Customer support
http://support.flir.com

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