

FLIR One Edge Camera

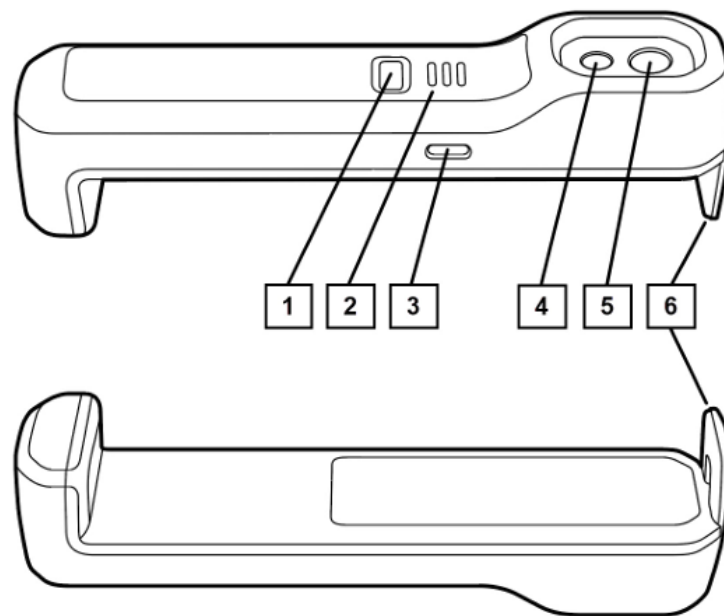


Figure 3.1 View from the front and from the bottom

1. On/Off button
2. Indicator LEDs
3. USB-C charging port
4. Visual camera
5. Thermal camera
6. Extending arm

Prepared by the Center for Collaborative Heat Monitoring

Refer to the [FLIR user manual for more information.](#)



**CENTER FOR
COLLABORATIVE
HEAT MONITORING**

What is a FLIR camera?

FLIR stands for “forward-looking infrared” and is a thermal camera that senses infrared radiation. Unlike traditional cameras, FLIR cameras detect heat, or thermal energy, instead of light. Thus, thermal cameras can produce images in complete darkness or smoke-filled environments. FLIR imaging was originally developed for military and industrial applications but consumer-grade FLIR devices can be highly effective tools to engage community members on a collaborative heat monitoring project.

Getting started

To use the FLIR One Edge, you must connect the camera to a smartphone or smart device using the FLIR One App. FLIR One Edge works with iPhone or Android.

Pair your FLIR One Edge to your device

1. Install the FLIR One App on your smart device.
2. Turn on the FLIR ONE Edge camera by pressing and holding the On/Off button. Release the button immediately as soon as the LEDs start flashing. The flashing LEDs indicate that the camera is booting up. It takes about 20 seconds for the camera to finish booting, then it will start and the LEDs will show a steady light.
3. Place the FLIR ONE Edge camera close to your mobile device.
4. Make sure the camera is turned on.
5. Start the FLIR ONE app on your mobile device.
6. The FLIR ONE app will guide you to set up the app according to your preferences and to connect (pair) the camera with your mobile device.
7. Once your FLIR One Edge is paired with your device, you can begin viewing FLIR images and taking photos.

Using your FLIR One Edge with your device

1. You can attach your FLIR One Edge to your paired device, or you may choose to hold the camera in your hand near the paired device.
 - a. How to attach the FLIR camera to your device: Attach the FLIR ONE Edge camera to the back of your mobile device by pulling out the extending arm until the camera is clamped around the device.
2. When the FLIR ONE Edge camera is connected to the FLIR ONE app, you can see the live view from the camera and take an image or record a video, just as you normally would with your phone camera. The images are saved in the app and in your camera roll.

Adjusting settings

You can modify the following settings in the live view:

- IR Scale: Hide/show scale.
- Adjust scale limits.
- Color: Choose from nine color palettes.
- Measurements: Adjustable measurement spots.
- Automatic tracking of hottest and coldest spot.
- Image mode: Thermal, DC(visual), MSX.
- MSX Distance: Align visual and thermal images in MSX mode, depending on distance to object.
- Temperature range: Choose a suitable object temperature range.

For troubleshooting, and charging the camera, see the online FLIR user manual.

Learn More

How do thermal cameras work?¹

Everything we encounter in our day-to-day lives gives off thermal energy. The hotter something is, the more thermal energy it emits. This emitted thermal energy is called a “heat signature.” When two objects next to one another have even subtly different heat signatures, they show up quite clearly to a thermal sensor regardless of lighting conditions. This allows thermal cameras to produce images in complete darkness or smoke-filled environments.

What can affect an object’s heat signature?²

Two objects can be the same temperature but can appear very different when imaged with a thermal camera. The reason why is something called “**emissivity**.” Emissivity is a measure of how efficiently an object radiates heat, on a scale from 0 to 1.

Surfaces with **high emissivity** will **absorb thermal energy** - human skin, water, fabrics, or flat-finish paints are all good examples of high emissivity objects.

Surfaces with **low emissivity** work like a mirror and **reflect thermal energy** - highly polished metallic surfaces such as copper or aluminum are good examples of very low emissivity objects.

Thermal imaging cameras detect both radiated temperature AND reflected temperature, so high-emissivity surfaces will appear much warmer than low-emissivity surfaces, even if their recorded temperature is the same. For highly reflective, low-emissivity surfaces, what you are seeing with your thermal camera, and therefore measuring, is likely to be affected more by the surfaces of surrounding objects rather than the temperature of the target you are inspecting.

You can adjust for emissivity using your camera’s settings. For example, if you want to take an accurate thermal image of a person’s body temperature you would set the emissivity to 0.98 (equal to the emissivity of human skin) and the reflected temperature to the ambient temperature (around 68°F/20°C if you’re indoors).

For informal and demonstration use of FLIR cameras, it isn’t usually necessary to adjust for emissivity, but it is important to keep in mind. If an object appears much cooler or warmer than surrounding surfaces, it could be because of a wide variation in emissivity rather than a variation in temperature. Encourage participants to compare

¹ <https://www.flir.com/discover/rd-science/how-do-thermal-cameras-work/>

² <https://www.flir.com/discover/professional-tools/how-does-emissivity-affect-thermal-imaging/>

what they are “seeing” with thermal images with actual temperature readings, or their own understanding of how reflected light affects perception of temperature.

Some Ideas to Engage Community Members on Heat

Outdoor thermal imaging demonstration

Ideal for engaging participants who are managing or stewarding long-term sensors, or for backup volunteers on a mobile campaign day.

1. Attach the thermal camera to a paired smart device and demonstrate to a small group how they can walk around and take photos of their surroundings.
2. Encourage participants to explore their surroundings and take photos of different surfaces, people, landscapes, etc. and make hypotheses about what the colors represent. Do the images correspond to their own understanding of which surfaces or landscapes might be hotter or cooler?

Outdoor/Indoor Heat “Photobooth”

Ideal for engaging volunteers on a mobile campaign day or as part of an outdoor event.

1. Attach the thermal camera to a paired smart device. Attach the smart device to a tripod or fixed point (may require an additional attachment).
2. Encourage participants to take photos of themselves or objects in front of the camera.
 - a. Adjust countdown timer on phone to 5 or 10 seconds.
 - b. To create thermal images that accurately capture body temperature, remember to adjust emissivity to 0.98 (equal to human skin)
 - c. Provide objects of different emissivity (metal, fabrics, plastic, wood) for the “photobooth” to allow participants to compare how emissivity affects thermal images.

Heat through the seasons

Ideal for engaging participants who are managing or stewarding long-term sensors, or for backup volunteers on a mobile campaign day.

1. Provide participants with a thermal camera and attached device. Encourage participants to take snapshots near the sensor site and take photos of significant areas around the community.
2. Have participants return to sites periodically and encourage them to see the changes through seasons, at different times of year, or in different weather conditions (cloudy days, just after or before rain, etc.)

3. Examples of good sites for imaging: Parks, schools, areas with water near by and impermeable surfaces, factories/industrial buildings, abandoned lots or spaces, areas with high vs low tree canopy, cemeteries

Efficiency check-ins for indoor heat³

Ideal for pairing with indoor heat monitoring data or demonstrating to community members how they can use thermal imaging in their own homes.

1. Use a thermal camera to take photographs of interior spaces. Thermal images can be used to show if there are problems with insulation that affect heating or cooling loss, heat generated by electrical cords, water damage, and the efficiency of cooking appliances. [Click here](#) for more details and ideas.
2. Keep in mind any privacy considerations or concerns when taking or sharing photos of the interior of private homes or non-public spaces.

³ <https://www.flir.com/discover/home-outdoor/5-ways-you-can-use-your-new-flir-one-edge-pro-around-the-house/>