STANDARD OPERATING PROCEDURE

Measuring eye and ear temperature with the FLIR E8 thermal camera

Purpose: **To accurately measure eye and skin (ear) temperatures using thermal imaging in pigs.**

Before You Start

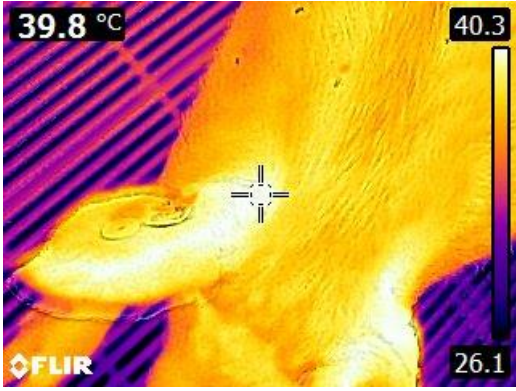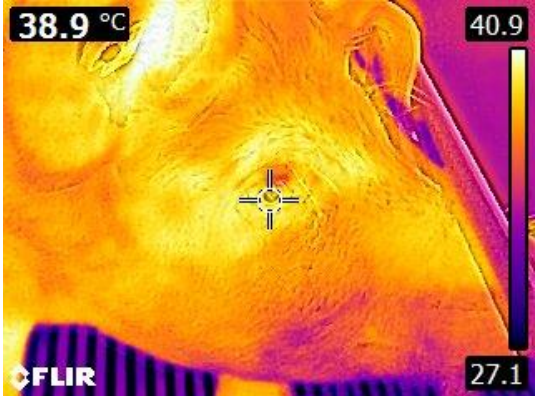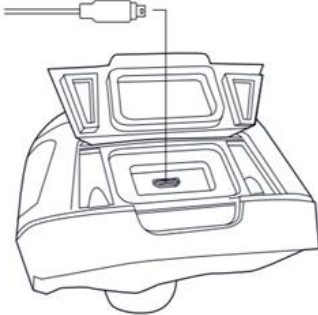| |
|---|
| Before taking photos for a particular sow/litter, it is a good idea to **take a photo of the sows litter card, the piglets' tag, a piece of paper, or a white board** with what sow/piglet that is, the date, and any other relevant information – so this is obvious when the photos are downloaded. Also note down the time that each picture was taken. |
| ALWAYS make sure you keep a **similar distance away** from the part you're measuring every time for each measurement, take a 30 cm ruler with you. The accuracy of the camera temperatures may be different at different distances; hence we want to stay at a similar distance for every reading. |
| Keep the camera **charged** – may lose power quickly when in use. |
| Cameras, iPhone and attachments can get **hot when in use**, take care when picking up cameras if they have been on or charging for a long time. |

Procedure

1	Turn the camera on at the power button (Figure 1) and open the lens cover at the front using the lever.	**Figure 1: Power on button on the E8 Camera**

STANDARD OPERATING PROCEDURE

2	With this camera, you will either need to be measuring with the centre spot, the hot spot, or the cold spot. • To switch modes on the E8 thermal camera (Figure 2), press the middle square button on the back of the camera → Measurement → Hot spot/Cold spot. The camera will then automatically locate the coldest or hottest part of the vulva within the view of the camera.	 **Figure 2: Switching through centre, hot and cold spot measurements on the E8 camera**
3	Make sure the emissivity of the camera is set to 0.985, which has been reported as the emissivity of humans and other mammals' skin (0.98 ± 0.01; Bernard et al., 2013; Hoffmann et al., 2013).	 **Figure 3: Changing the emissivity as a custom value**
4	To measure the thermal temperature at the base of the ear (outside), hold the camera about 30 cm away from the surface of the ear (stay the same distance each time). Take the photo at the base of the ear as shown in Figure 4 using the trigger button on the front of the camera under the lens. Save the image if necessary – or read the centre spot temperature that is recorded in the top left corner of the image (39.8°C in Figure 4). Avoid having any ear tags in the way of the centre spot, if possible.	 **Figure 4: Centre spot photo of the base of the pig's ear**
5	Hold the camera about 30 cm away from the eye and take a photo as per step 5 (see Figure 5). Try to use the same eye (or ear) for each subsequent reading.	

STANDARD OPERATING PROCEDURE

		Figure 5: Centre spot photo of the pig's eye
6	To download images onto the computer: • Connect the USB mini-B connector to the camera (Figure 6) and the USB cable connected to a computer → the camera will appear as a folder → select this folder or the images to be downloaded → Copy → paste in the relevant folder for data extraction later.	 **Figure 6: Connect the USB mini-B connector to the camera**
7	To delete photos from the camera: • select the image first → press the middle square button on the back of the camera → select Delete (Figures 7 and Figure 8) Be aware that the E8 camera can hold approximately 1,008-1,017 photos, after which point it will not save any more images until there is sufficient memory to do so (no warning on the screen).	Follow this procedure: 1. Push the Archive button ▶. 2. Push the navigation pad left/right or up/down to select the image you want to view. 3. Push the center of the navigation pad. This displays the selected image. 4. Push the center of the navigation pad. This displays a toolbar. 5. On the toolbar, select *Delete* 🗑. **Figure 7: Deleting an image** Follow this procedure: 1. Push the center of the navigation pad. This displays a toolbar. 2. On the toolbar, 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*. **Figure 8: Deleting all images**

Before You Finish

Take note of things that you think might have an impact on the reading; e.g. are heaters on, are the piglets wet, does the pig have excessive hair in the area you're trying to measure?
Download all photos at the end of the day to the computer (even more frequently if necessary) and make space on the camera for the next day. Organise the photos for easy identification later on in a folder labelled with the Camera/Day/Time period being recorded.
Remember to turn the camera off and close the lens cover when finished.

END OF STANDARD OPERATING PROCEDURE