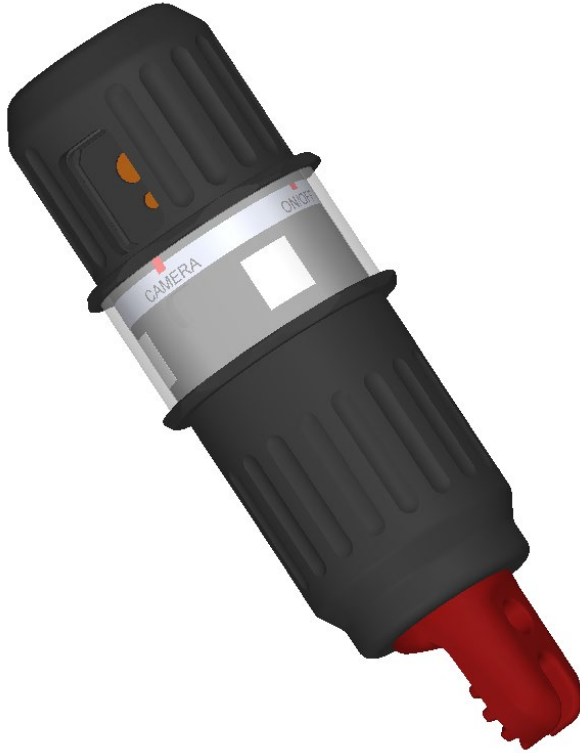


2025.05

A223.2001

INSTRUCTIONS FOR USE

Electro-insulating thermal imaging camera up to 36 kV AC / 54 kV DC



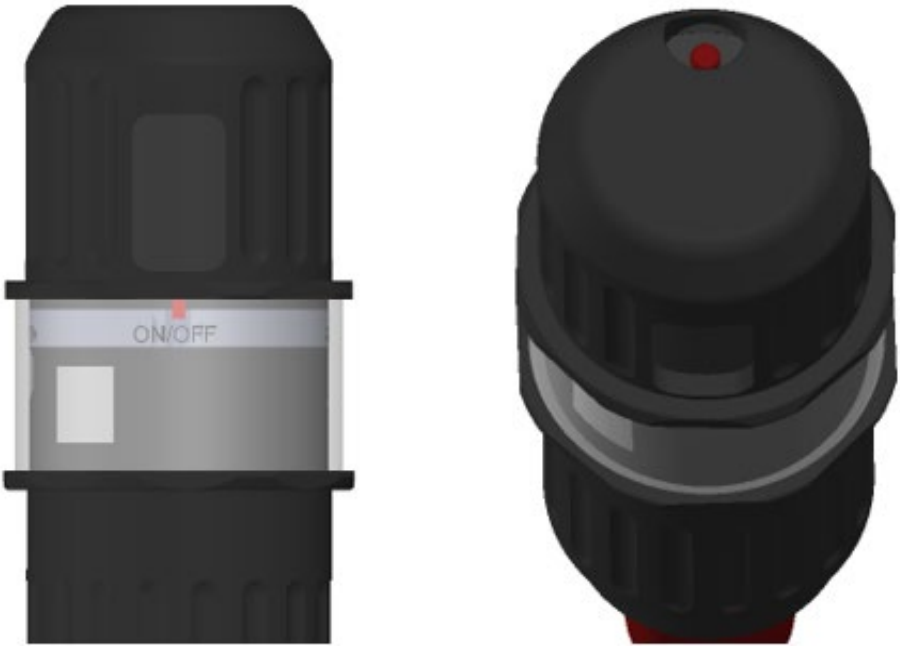
hubix
SAFETY IN POWER

Hubix Sp. z o.o.
Huta Żabiowska | ul. Główna 43,
96-321 Żabia Wola | POLAND
tel.: +48 46 857 84 40 | hubix@hubix.pl,
www.hubix.pl | www.secra.pl

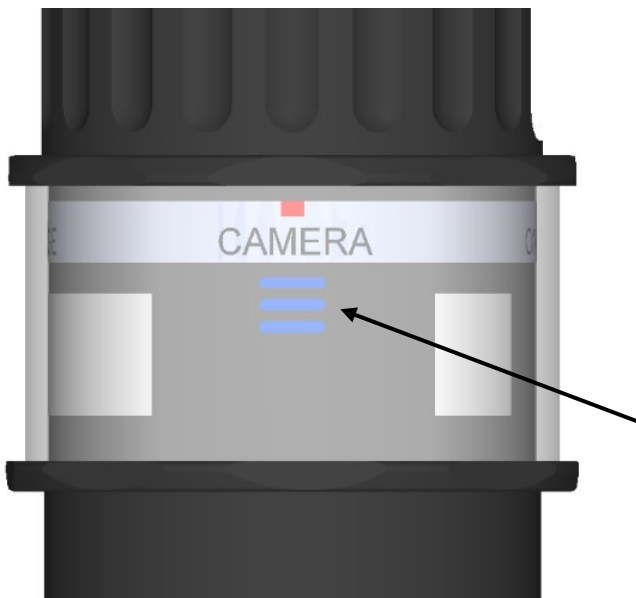
ACTIVATION

If you are using the camera for the first time, you need to pair it with the dedicated **FLIR ONE app** on your smartphone or tablet. To do this, follow the steps below:

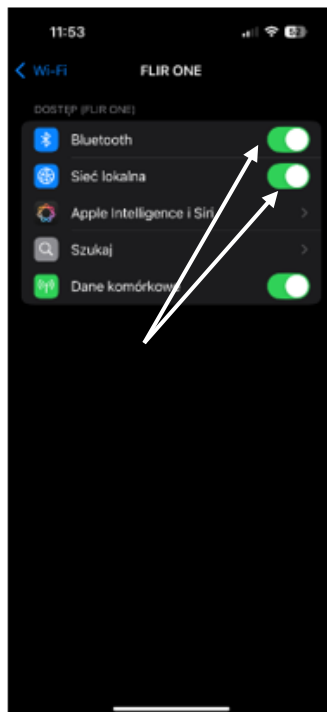
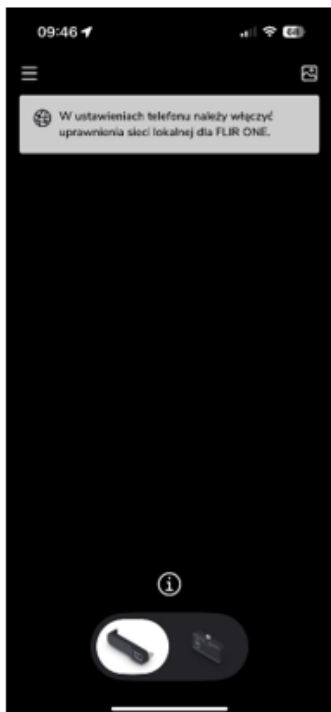
1. Download and install the FLIR ONE app on your smartphone or tablet from the PLAY Store or APP STORE.
2. Turn the rotating head to the "ON/OFF" position. The power button will be revealed at the top of the head.



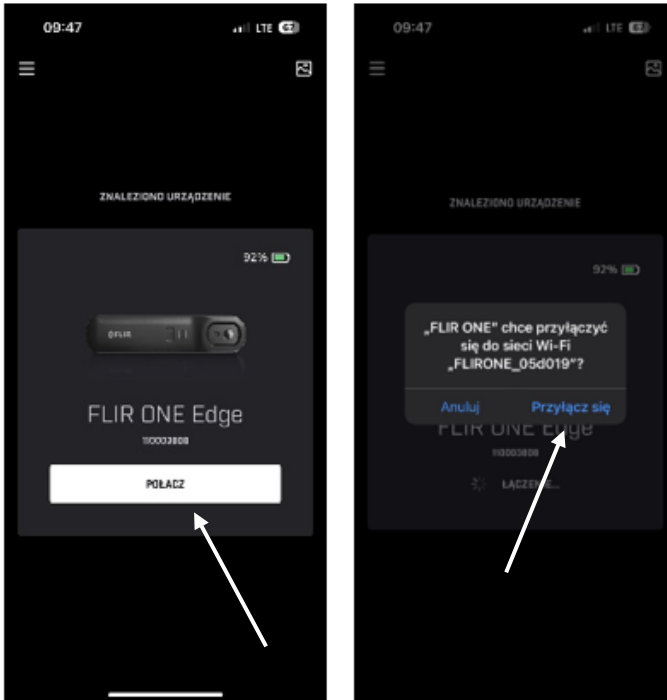
3. Press and hold the "ON/OFF" power button to turn the camera on or off. Flashing LEDs indicate the camera is starting up (this may take a few seconds). A steady light indicates the camera is ready to connect to a mobile device.



4. Launch the FLIR ONE app on your smartphone or tablet. To work properly, the app needs access to your local network and Bluetooth .



5. Activating these options will allow us to connect to the camera. By clicking "Join", the application will ask us to connect to the camera's WiFi network . From that moment on, the connection to the internet will only be possible via mobile data.



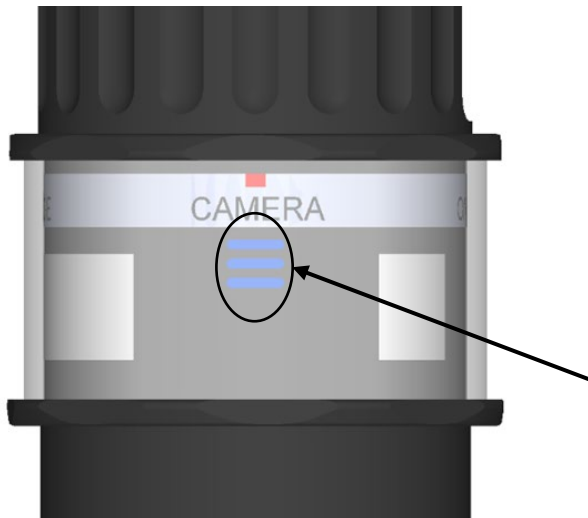
LANDING

To connect the camera to charge, follow the steps below:

1. Turn the housing to the "CHARGE" position. The charging port will be exposed at the top of the head.



2. Flashing diodes indicate that the camera is charging. The charge level is shown by the number of diodes that are lit continuously. (**3/3** – between 100% and 75%; **2/3** – between 75% and 35%; **1/3** – below 35%)
(the camera's charge level is also displayed in the mobile app).



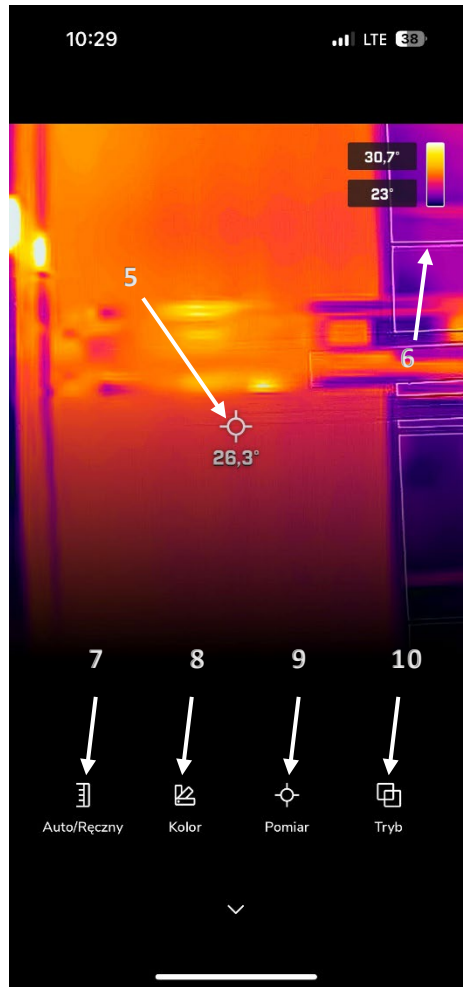
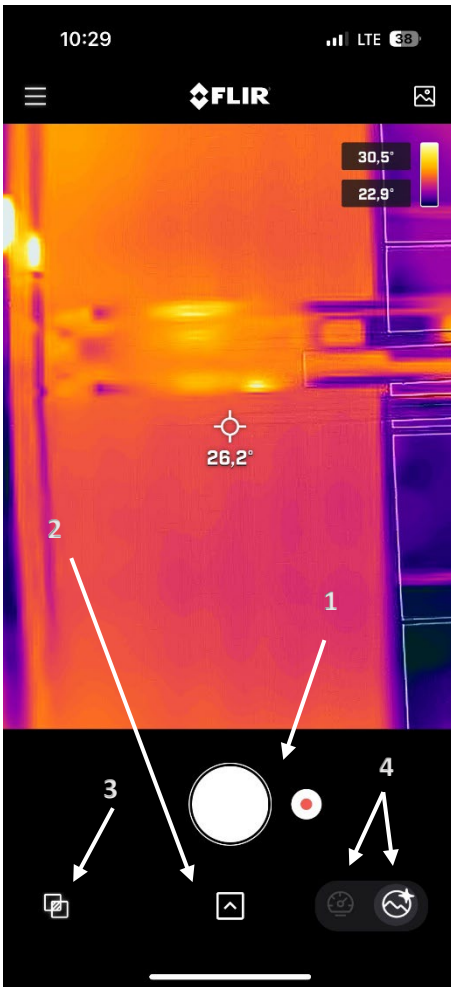
3. After charging the battery, disconnect the USB cable, and then, when you want to continue working, uncover the camera by turning the head to the "CAMERA" position. Otherwise, secure the camera lens, power button and charging port by turning the head to the "SAFE" position.



CONFIGURATION

The mobile application allows you to adjust the camera settings according to your needs.

1. Take a photo or record a video;
2. Open menu;
3. Align camera image;
4. Switch camera mode (performance/quality);
5. Measuring point;
6. Temperature scale;
7. Temperature scale settings;
8. Change color palette;
9. Measuring point settings;
10. Switch image mode (infrared/digital/mixed)



1. DESTINY

Camera attached to an insulating rod designed for thermal inspection of live, up to 36 kV, power station equipment. Allows taking photos and videos. Optionally, the set includes a rotating adapter B228.1101 and a rod extension with a head cover B223.0206, which allows the set to be attached to a rod with a metal head. Both the camera and the elements attached to it do not deteriorate the mechanical or electrical properties of the rod.

2. REQUIREMENTS

The requirements for the rod were developed based on the following standards.

PN-EN 62193:2006 Live working - Telescopic rods and telescopic measuring rods

PN-EN 60832-2:2010 Live working - Insulating sticks and interchangeable tools - Part 2: Interchangeable tools

PN-EN 61481-1:2015-04 Live working – Phase comparators – Part 1: Capacitive type phase comparators for voltages above 1 kV a.c. (*in the part concerning requirements for elements attached to the rod – protection against bridging*).

PN-EN 50110-1:2013-05 Operation of electrical equipment - Part 1: General requirements

Regulation of the Minister of Energy of 28 August 2019 on occupational health and safety at energy equipment

Each camera must have the following markings:

- manufacturer's name or trademark
- production date (year/month)
- serial number
- IEC 60417-5216 symbol (DB:2002-10) – suitable for live work; double triangle
- reference IEC standard number

3. CONDITIONS OF USE OF THERMAL IMAGING CAMERA IN ELECTRIC WORK

The camera may only be used by persons authorised by the person operating the electrical equipment during work under voltage, under the conditions specified in the instructions for work under voltage approved by the person operating the equipment.

The camera is not waterproof and is intended for use in dry conditions.

4. PREPARATION FOR WORK

Before each start of work, the camera should be inspected. Periodic inspection, also consisting of visual inspection, should be carried out once a year.

The inspection includes checking:

- no visible damage to the camera housing,
- correct operation of the camera,
- its correct mounting on the rod extension,
- legibility and completeness of labeling.

camera (mechanical damage to the housing) or one that is malfunctioning must not be used in live work .

ATTENTION!

If any doubts remain after inspection, the camera should be re-tested for bridging resistance or withdrawn from use in live work.

5. STORAGE AND MAINTENANCE

The camera should be stored and transported in a case, separate from other devices, to avoid mechanical damage. The camera contains delicate elements that can be damaged by excessive force. Store the camera in dry rooms, away from heat sources, in a chemically non-aggressive atmosphere. Protect from sunlight.

It is recommended to place a protective cover on the housing cover.

The camera should be cleaned after each use. Only use a dry cloth to clean. Do not use any cleaning agents or solvents.

6. PERIODIC TESTS

Cameras designed to monitor live electrical substation components are subject to periodic inspections. Below are the manufacturer's recommendations for periodic inspection of the technical condition of inspection cameras. Periodic inspections should be carried out according to the instructions in the manual, at least once a year. These recommendations constitute minimum requirements, which, depending on the conditions and intensity of use of the equipment, may be modified by the user.

6.1 Preparing the camera for testing

The inspection camera subject to testing should be cleaned of dirt and dry. It is recommended to wipe the camera with a dry cloth. Cameras intended for testing should be kept for at least 4 hours in the conditions in which the test will be performed.

If the inspection kit includes the B228.1101 swivel adapter or the B223.0206 rod extension with head cover, these items must be inspected together with the camera.

Weather conditions

Tests should be conducted under the following atmospheric conditions:

- ambient temperature from 18 °C to 28 °C
- relative humidity from 45 % to 75%

6.2 Inspection

Before electrical testing, the camera must be inspected. The camera and its components must have a clear marking indicating their

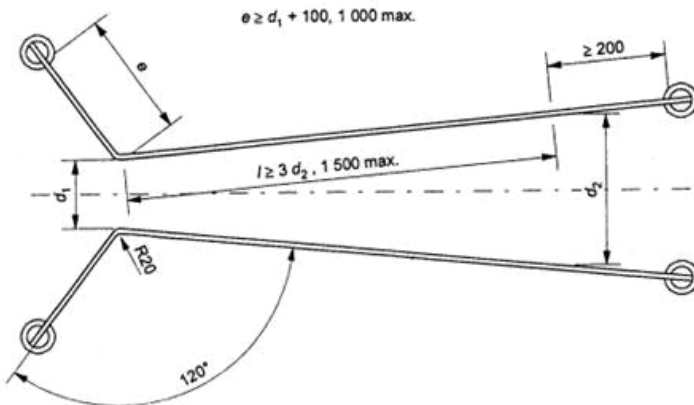
suitability for work under voltage. The camera housing should not have any mechanical damage (cracks, scratches, etc.). The camera's splined mount should also not have any mechanical damage.

6.3 Checking the correct operation

Both the attachment of the cooperating elements (rotary adapter, extension) and the attachment of the camera to the rod or rod extension with the head cover should be correct, without jams or scuffs. The operation of the camera (transferring photos and videos) should be correct.

6.4 Testing the anti-bridging protection

Electrical tests should be carried out in accordance with point 5.3.2 of the standard 61481-1:2015-04. A test voltage of 43.2 kV/50 Hz effective value, which is 1.2 Un (rated camera voltage), should be applied between the electrodes as in the measurement system below. Tests should be carried out with the camera switched on and transmitting an image.

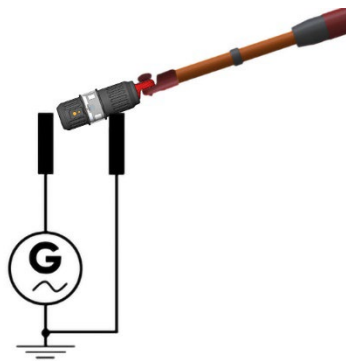


The test voltage should be applied to rails spaced appropriately:

$$d_1 = 180 \text{ mm,}$$

$$d_2 = A_1 + d_1 + 200 \text{ mm}$$

where A_1 – insertion depth (dimension from the beginning of the spline head to the end of the attached element).



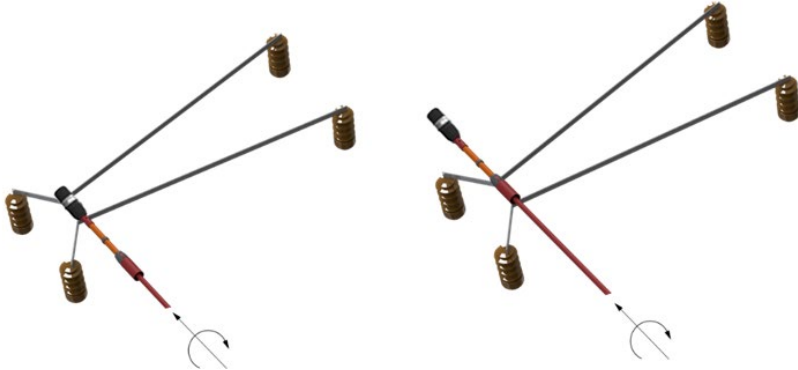
Stage one of the research.

The camera attached to the rod or attached to the rod extension with the head cover should be placed on the grounded rail at the narrowing point where the distance between the electrodes is d_1 , so that the camera tip presses against the voltage rail. Then the tested elements should be rolled along the rails to the final position (in which the end of the rod splined head or the end of the extension head cover is on the grounded rail), while maintaining the contact of the element with both rails.



Stage two of the research.

The camera attached to the rod or attached to the rod extension with the head cover should be placed on the rails at the narrowing point defined by the dimension d_1 so that the top of the camera touches the voltage rail. Then the tested elements should be rotated without rolling and moved towards the voltage rail until the end of the rod splined head or the end of the extension head cover is on the grounded rail. During the test, the contact of the element with both rails should be maintained.



Test results are considered positive when:

- in the two stages of the anti-bridging protection tests, no sparkover or breakdown occurred,
- There was no break in communication during the entire study period receiving device,
- There was no interference with the transmitted image during the entire test period.

7. GUARANTEE

The warranty is provided for a period of 24 months, counted from the date of sale of the product. In the event of finding defects in the product caused by improper workmanship or use of improper materials, the supplier undertakes to repair free of charge during the warranty period, or to replace defective parts, if the validity of the complaint is confirmed.

The warranty becomes null and void in the following cases:

- mechanical damage caused by improper transportation or storage at the recipient's premises
- mechanical damage to the product
- using the product contrary to the instructions for use
- unauthorized replacement of original parts or their repair
- making design changes
- improper installation and operation of the product.

Repairs under warranty extend the warranty period by the time of repair.

In the event of different warranty rules being stipulated in the contracts, the rules resulting from the contracts shall apply.

