OPGAL®
Beyond the Visible

EyeCGas® 2.0

OGI – Optical Gas Imager, Camera

User Manual

Rev 06 | Doc P/N: UM-8G9A0000B

Safety

Read all instructions and warnings before using this product. Your EyeCGas® 2.0 infrared camera is like any other tool. It must be used properly and safely. All users should be trained in the proper and safe use of infrared imaging prior to using the EyeCGas® 2.0 infrared camera. This is especially important for users who may use the product in potentially hazardous or explosive environments. Failure to follow these instructions could result in death or serious injury.

Battery Warnings and Cautions

CAUTIONS

Lithium polymer and Lithium-ion batteries are volatile. Thus:

- Do not expose the battery to temperatures above 60°C (140°F).
- Do not disassemble the battery.
- Use only EyeCGas® 2.0 battery packs manufactured by Opgal (part number 8G9M5000C).
- Use only the supplied battery charger to charge the battery packs.
- Damage to the EyeCGas® 2.0 system caused by batteries manufactured by other companies may void the system warranty.
- Do not charge the battery pack(s) while they are hot.
- Do not charge the battery pack(s) or operate the battery charger in a hazardous environment.

CAUTIONS

- Recycle the battery pack(s) at an approved disposal location.
- Operating the battery pack(s) in high or low temperature environments will reduce operational run time.
- Do not expose the battery pack(s) to fire or extremely high temperatures.
- Do not cause damage to or attempt to short circuit the battery pack(s).
- Fully charge a battery pack if it has not been used in two months.
- Do not leave a battery pack in the charger for extended periods of time.
- Store battery packs at ambient conditions between 10ºC - 27ºC (50ºF – 80ºF) and less than 70 % relative humidity, as in a home or office
- The battery pack must not be replaced when the equipment is located in the hazardous area.

General Warnings

Camera Certification

ATEX HAZARDOUS AREA SAFETY CERTIFICATION FOR ZONE2

- Ex ic nA nC IIC T6 Gc
  Ex ic IIIC T85 °C Dc
  Ex II 3 GD
- IEC 60079-0:2017
- IEC 60079-11:2011
- IEC 60079-15:2017
- IEC 60079-31:2013
- IECEx EMT 19.0006X
- Intrinsic Safety "ic"
- Protection "n"

	CAUTION
⚠	Use devices where the ambient temperature is between -20° and 50° C (-4° to 122° F). Tamb = -20 °C to +50 °C • Connector USB Um = 5V • Connector AUX Um = 2V • Dust and water IP65

ANSI/ISA-12.12.01-2013

- Non-incendive Electrical Equipment for Use in Class I and II, Division 2, and Class III Hazardous (Classified) Locations

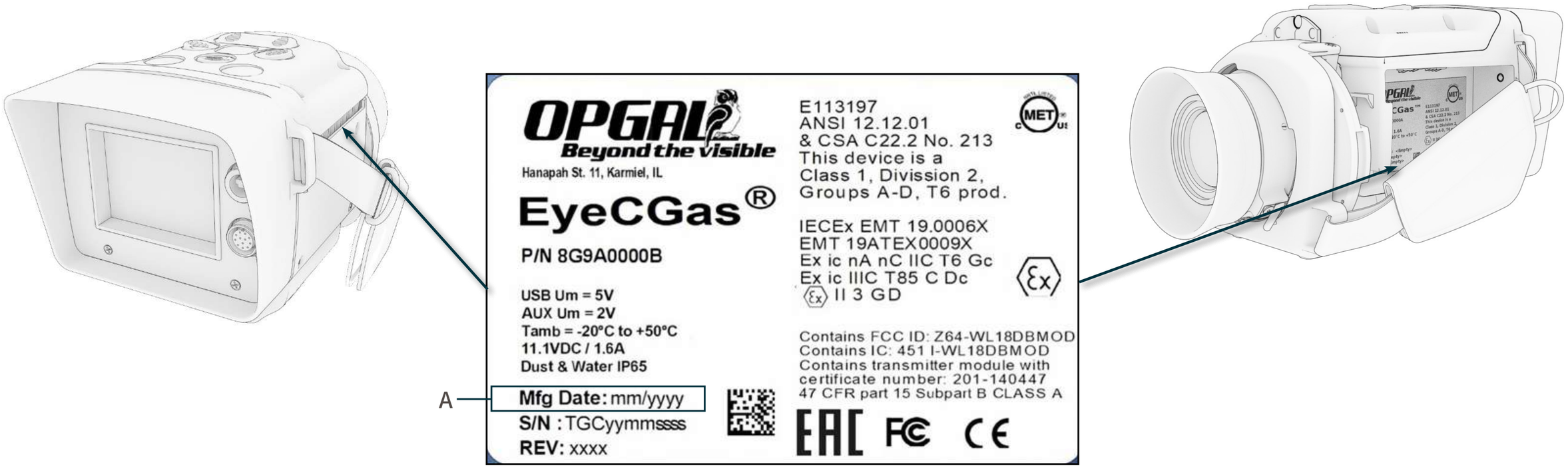
CSA C22.2 NO. 213-M1987, FIRST EDITION

- Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

EyeCGas® 2.0 Nameplate

The EyeCGas® 2.0 nameplate is located on the camera behind the battery.

The nameplate contains the product serial number (A) that may be needed when requesting service.



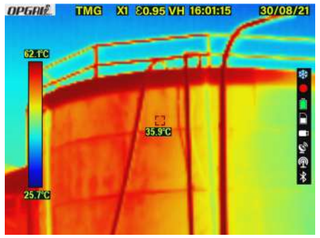
Overview

EyeCGas® 2.0 is a handheld infrared camera engineered specifically for use in gas leak detection. The EyeCGas® 2.0 camera is designed to withstand the rigors of everyday handling in refineries and chemical plants, and also incorporates safeguards for use in hot air environments. EyeCGas® 2.0 uses include: maintenance, video documentation of plant survey inspection, and on-line update of database. Some of the benefits of using infrared technology are increased worker safety, reduced environmental emissions, and substantial financial savings as a result of leak detection and remediation.

This chapter provides an overview of the EyeCGas® 2.0 system and includes:

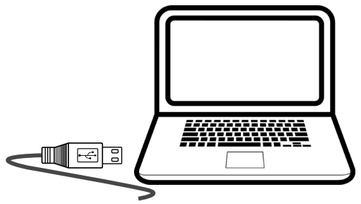
System Layout

HD camera



Thermogrpahy

Infrared camera



USB connectivity

Chateau, Guideware, CNTRL And more....

LDAR S/W connectivity

BT audio headset connectivity

RMLD and other laser connections

GPS localization coordinates on screen

Video streaming and image on phone display

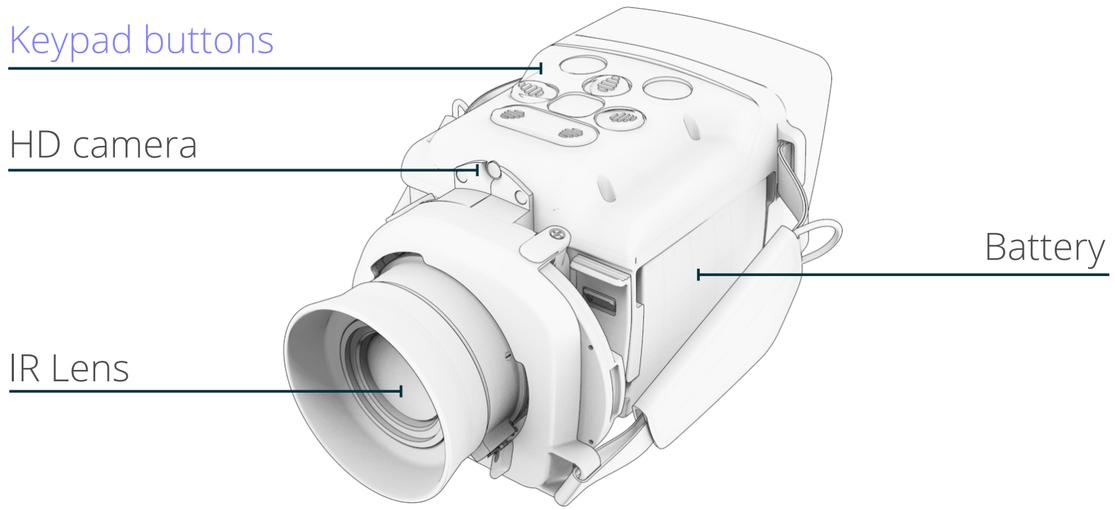
Bluetooth connectivity

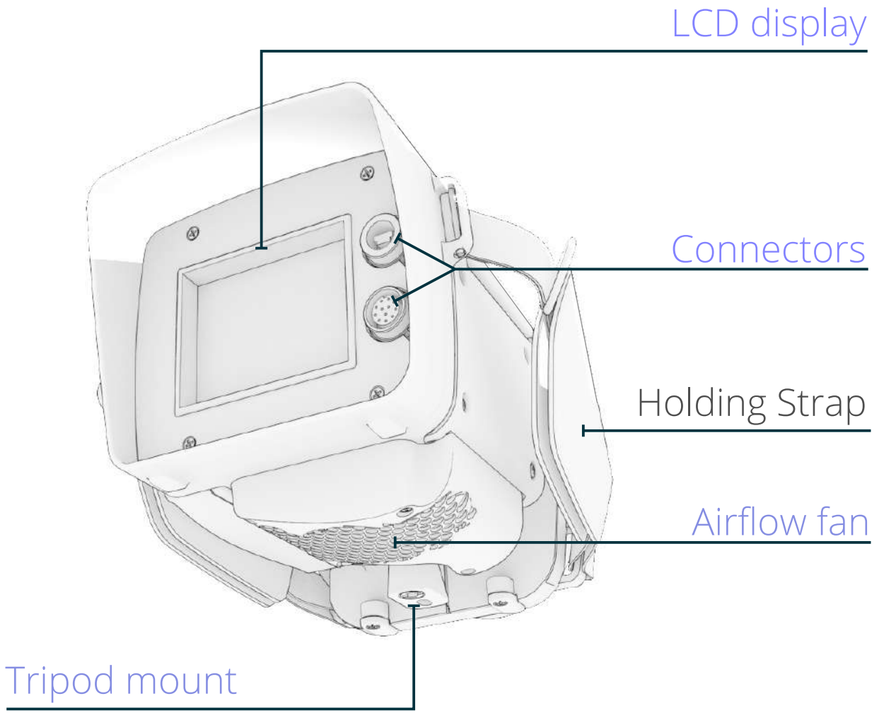
Wi-Fi connectivity (camera as hotspot)

Camera Overview

EyeCGas® 2.0 is a handheld infrared camera capable of autonomous imaging and recording operations for the detection of gas leaks. It is designed to withstand the rigors of everyday handling in refineries and chemical plants.

The EyeCGas® 2.0 camera consists of the following major components:





NOTE

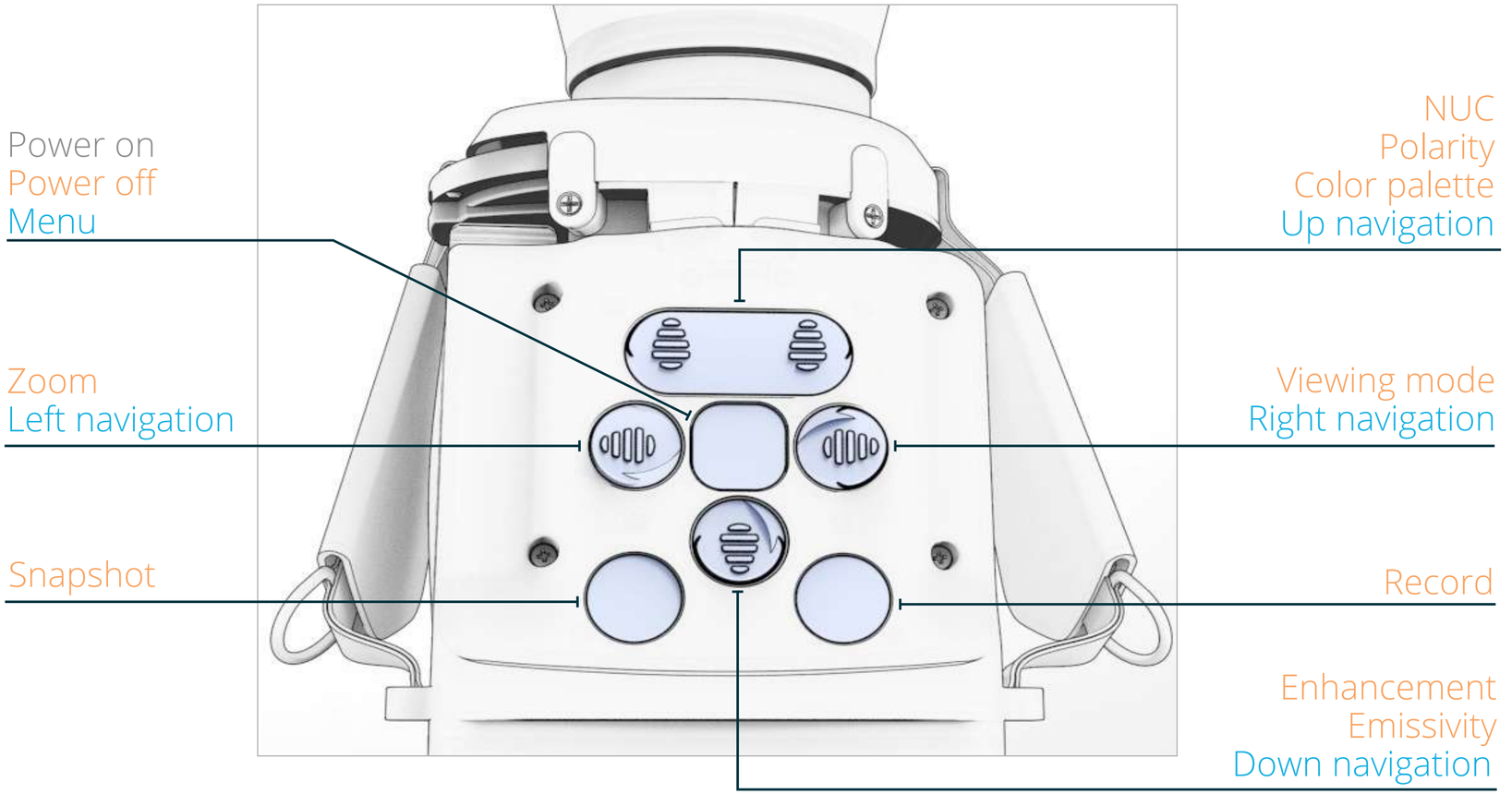
The camera can operate in four different viewing modes: visible, normal, enhanced, and thermography.

KEYPAD BUTTONS OVERVIEW

A set of buttons is used to both control operation of the EyeCGas® 2.0 camera and to navigate through the camera's on-screen menu.

Keypad functionality depends on the state of EyeCGas® 2.0:

- Camera is powered off (see Powering On Camera).
- Camera is in operation mode (see Keypad Buttons Used During Camera Operation).
- Camera is in configuration mode (see Keypad Buttons Used During Menu Configuration).



NOTE

The top button can be pressed on the right or left side. The functionality, however, is the same.

LCD DISPLAY

The LCD screen (A) displays color video when filming in visible mode, and high-resolution grayscale video when filming in the normal, enhanced, and thermography viewing modes.

NOTE
To magnify the LCD screen image by 300%, and for easier viewing in brightly lit areas, attach the glare shield (see Attaching the Glare Shield).

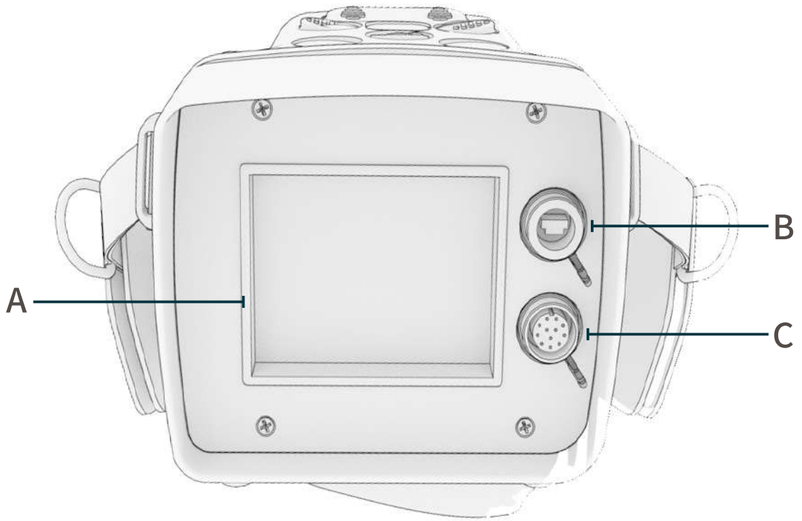
CONNECTORS

The USB connector (B) allows for connectivity to a computer or tablet (see Connecting via USB). The accessories connector (C) allows for connectivity to an audio headset.

CAUTION
When connectors are not in use, they must be covered by their protective cap at all times.

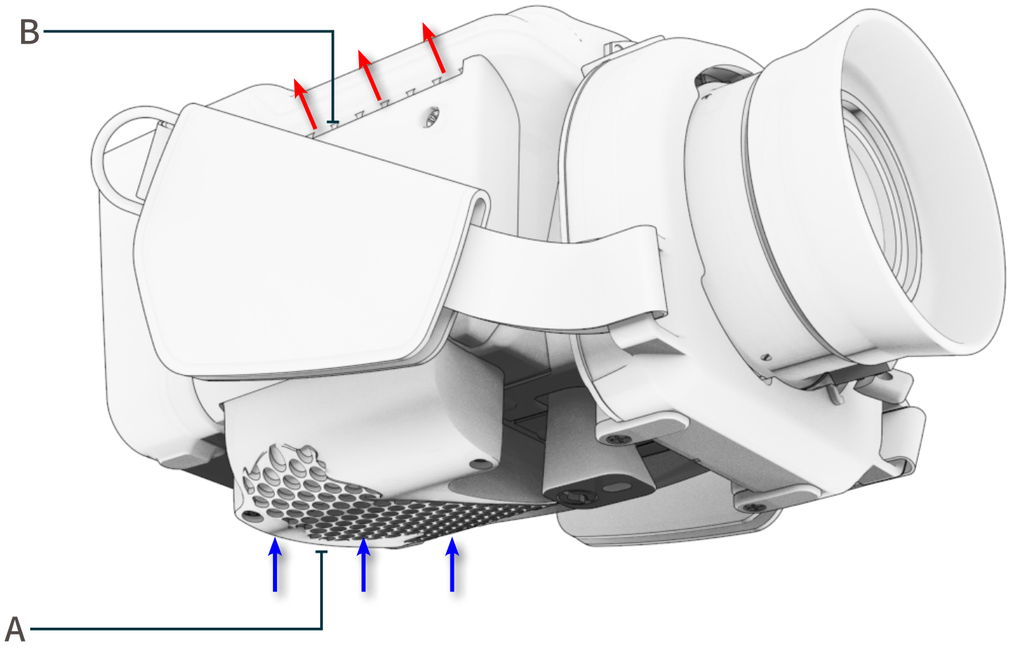
WARNING - EXPLOSION HAZARD
The accessories and USB ports must not be used and the screw-on caps must remain firmly attached when the equipment is located in the hazardous area.

USB connector (B) Um = 5V AUX connector (C) Um = 2V



AIRFLOW FAN

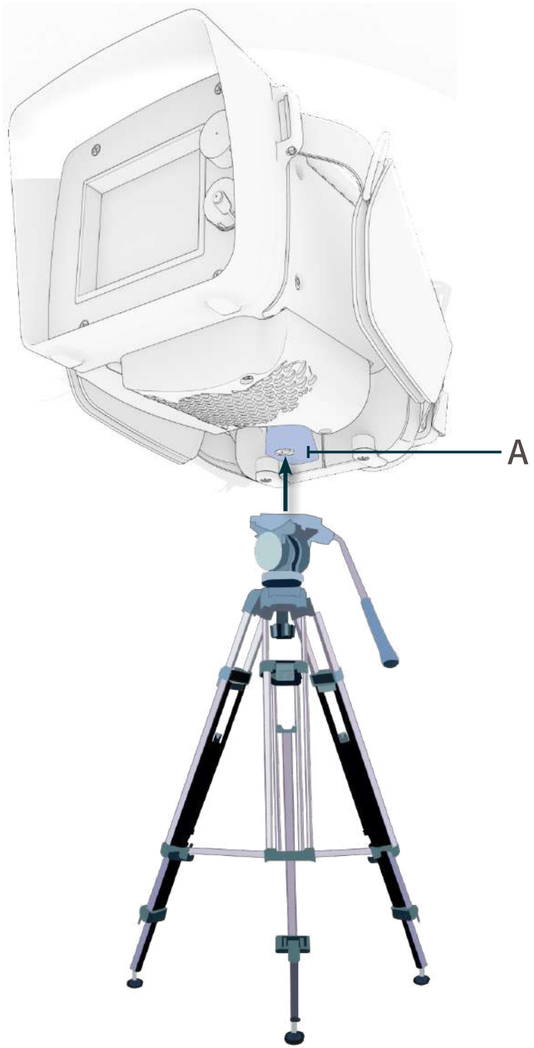
An external fan is used to indirectly cool the electronic components inside EyeCGas® 2.0. The airflow fan takes in air from the bottom of the camera (A) and expels it from the side (B).



	CAUTION
	Verify proper operation of the fan. Ensure the vents are clean and that airflow is not blocked.

TRIPOD MOUNT

The tripod mount (A) allows the camera to connect to a tripod.



	CAUTION
	▪ Ensure the camera is securely fastened to the tripod and the tripod legs are stable. ▪ Use a safety approved tripod.

Opening the Box

After receiving the EyeCGas® 2.0 delivery, open the box and verify that the package contains all the parts mentioned in List of Standard Components and any optional accessories ordered separately (see List of Optional Components).

LIST OF STANDARD COMPONENTS

EyeCGas® 2.0 comes standard with all items listed in the table below.

ITEM IMAGE	NAME	PART NUMBER	QTY	MORE INFORMATION
	Carrying Case	PM-8G9A0000B	1	Stores the camera, battery packs (up to 2), battery pack charger, glare shield, shoulder strap, USB cable, USB memory stick with user manual, and lens cleaning kit.
	EyeCGas® 2.0 Camera	8G9A0000B	1	Handheld infrared camera. See Camera Overview.

ITEM IMAGE	NAME	PART NUMBER	QTY	MORE INFORMATION
	Glare Shield	8G9A0020C	1	Prevents screen glare which impedes direct viewing of the LCD display. Also magnifies the LCD screen 300%. See Attaching the Glare Shield.
	Battery Pack	8G9M5000C	2	One battery pack powers the EyeCGas® 2.0 camera continuously for 4.5+ hours. See Attaching the Battery.
	Single Battery Charger	8G9M6000C	1	Enables charging of a single battery pack. See Charging the Battery.
	Shoulder Strap	8G9A0029B	1	Provides hands-free transport of the camera.

ITEM IMAGE	NAME	PART NUMBER	QTY	MORE INFORMATION
	USB 2.0 Cable	1002056ALF	1	Connects EyeCGas® 2.0 camera to a computer or tablet. See Connecting via USB.
	Lens Cleaning Kit	1000932A	1	Enables cleaning of the camera lens. See Cleaning the Lens.
	EyeCGas® 2.0 User Manual	UM-8G9A0000B	1	
	EyeCGas® 2.0 Quick Start Guide	QG-8G9A0000B	1	

LIST OF OPTIONAL COMPONENTS

	NAME	PART NUMBER	QTY	MORE INFORMATION
	AC Power Supply	8G9K0500A	1	Enables powering of the camera through a wall or car power outlet.
	Triple Battery Charger	8G9M6000B	1	Enables charging of up to three battery packs.
	75mm f/1.2 Manual Athermal Lens Assembly	8G9T7500A	1	Allows for gas detection at longer distances.

	NAME	PART NUMBER	QTY	MORE INFORMATION
	Gas Filter VOC (3.37-3.57) Kit - Heavy Hydrocarbons	8G9K0120A	1	Allows for replacement of the EyeCGas® 2.0 optical filter. See Replacing the Optical Filter.
	Gas CO Filter Kit	8G9K0130A	1	
	Gas CO2 Filter Kit	8G9K0140A	1	
	EyeCSite 2.0	8G9K0900A	1	EyeCSite 2.0 QOGI colorizes and quantifies gas leaks for the Portable EyeCGas 2.0 cameras. EyeCSite 2.0 can quantify VOCs, in simple and user-friendly interface, while seamlessly creating a report at the end of each inspection.

Operation

This chapter provides information on how to operate the EyeCGas® 2.0 camera and includes:

Preparation for Use

This section provides information on preparing the camera for use and includes:

- Charging the Battery
- Attaching the Battery
- Adjusting the Side Straps

CHARGING THE BATTERY

To charge a battery:

1. Plug the battery charger into a power outlet.
2. Remove the adhesive tape from battery contacts.
3. Insert the battery into the charger until it latches.

LEDs on the battery charger indicates the following:

- Red - charging
- Green - fully charged
- Flashing red - error (e.g., incorrect placement on the charger or an improperly functioning battery)

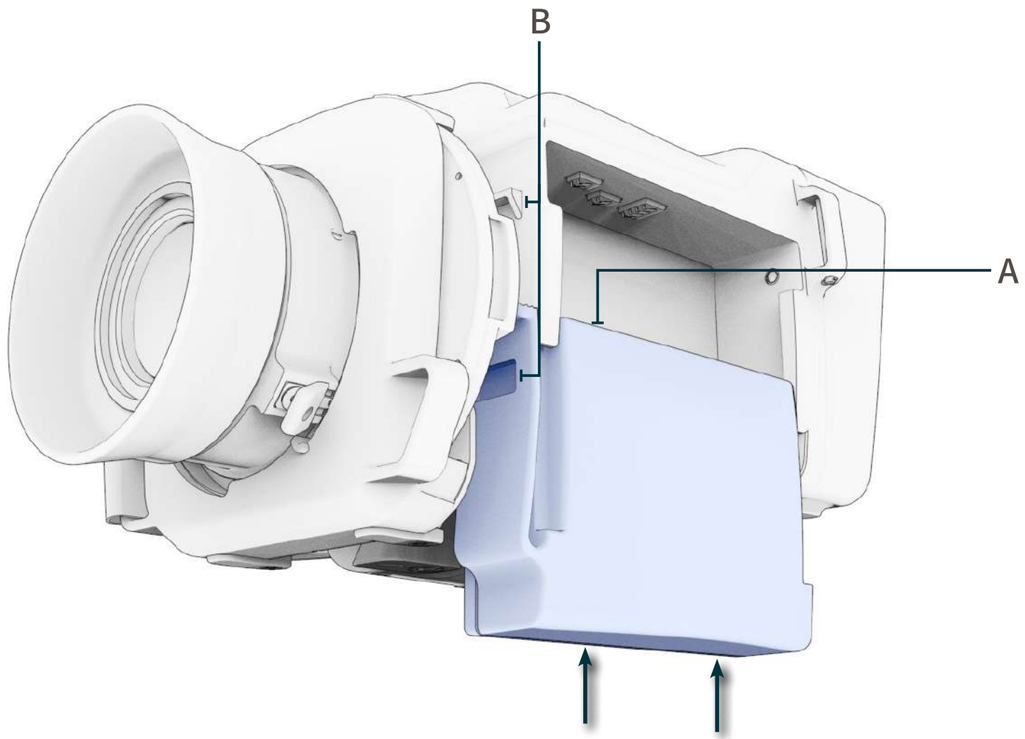
NOTES

- Verify correct orientation when inserting the battery into the charger.
- Fully charge a battery prior to use.
- A fully depleted battery takes about 7 hours to charge.
- For battery warnings and cautions, see Battery Warnings and Cautions.
- In order to allow a longer battery life, stop charging when the green LED is on.

ATTACHING THE BATTERY

To attach a battery to the camera:

1. Ensure the battery contacts (A) are facing up.
2. Slide the battery up along the camera until it snaps in place (B).



NOTES

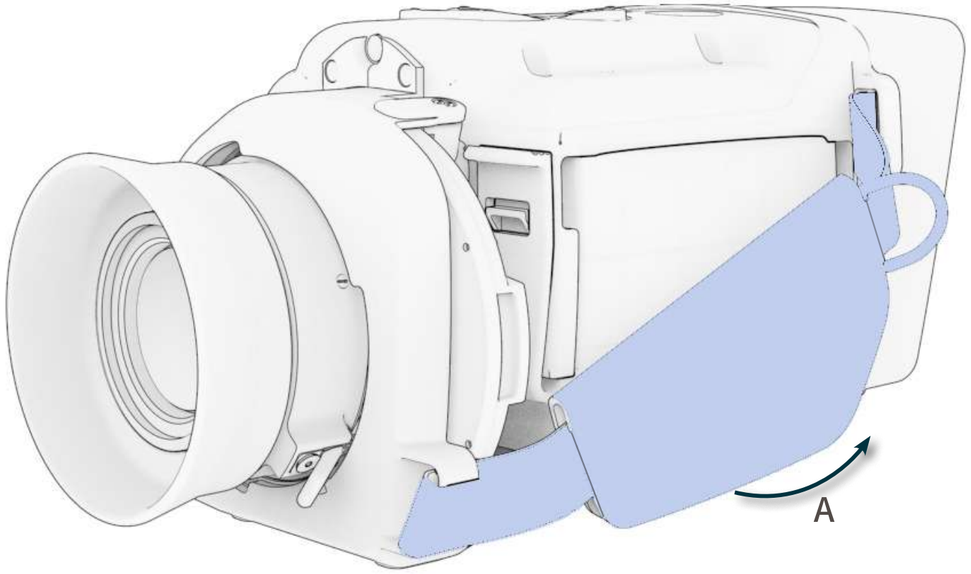
- The battery status indicator on the LCD display indicates battery charge level (see Camera Status Indicators).
- For information on replacing the battery, see Replacing the Battery.

ADJUSTING THE SIDE STRAPS

The straps on both sides of the camera allows the camera to be held comfortably and securely, and also allow for comfortable operation of the keypad buttons.

To adjust the side straps:

1. Lift up the flap (A).
2. Adjust the strap length.
3. Push the flap back down.



Camera Startup

This section provides information on the camera startup sequence and includes:

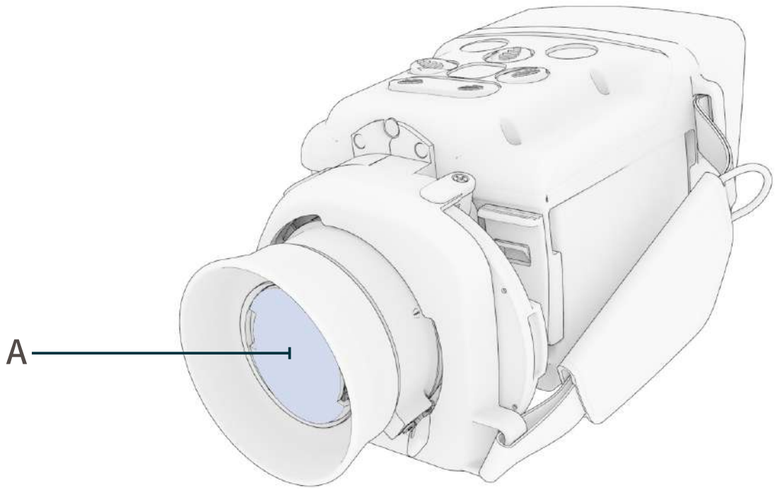
- Powering On Camera
- Power-Up Sequence
- Removing Lens Cover
- Screen Overlay

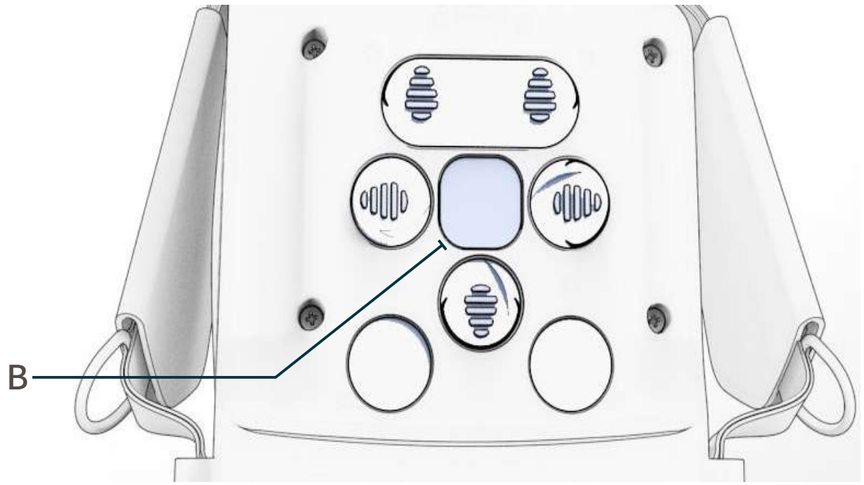
POWERING ON CAMERA

Before powering on the camera, ensure the battery is properly inserted and fully charged (see Attaching the Battery).

To power on the camera:

1. Ensure the lens cover is mounted on the lens (A).
2. Press the **power button** (B) for one second. The camera powers on and the power-up sequence begins.
3. Use a fully charged battery.
4. Charge batteries on the supplied charger only.
5. Keep the batteries charged always.
6. Don't leave Batteries on a non-working camera.





NOTES

- The lens cover must be mounted on the lens while the camera is performing the power-up sequence.
- The camera maintains the settings from when it was last powered off.
- For information on powering off the camera, see Powering Off Camera.

POWER-UP SEQUENCE

The camera goes through the following power-up sequence:

1. A black screen, followed by the Opgal logo, are displayed for approximately ten seconds.
2. The cooler starts.
3. The camera starts in visible mode.
4. The **cooler** icon (A) blinks for 10-12 minutes, indicating the camera is in cool down state.
5. The camera performs an automatic NUC when cool down is complete (see Performing Non-Uniformity Correction (NUC)).
6. Once cool down is complete, all viewing modes become available and cooler icon (A) disappears.

NOTES

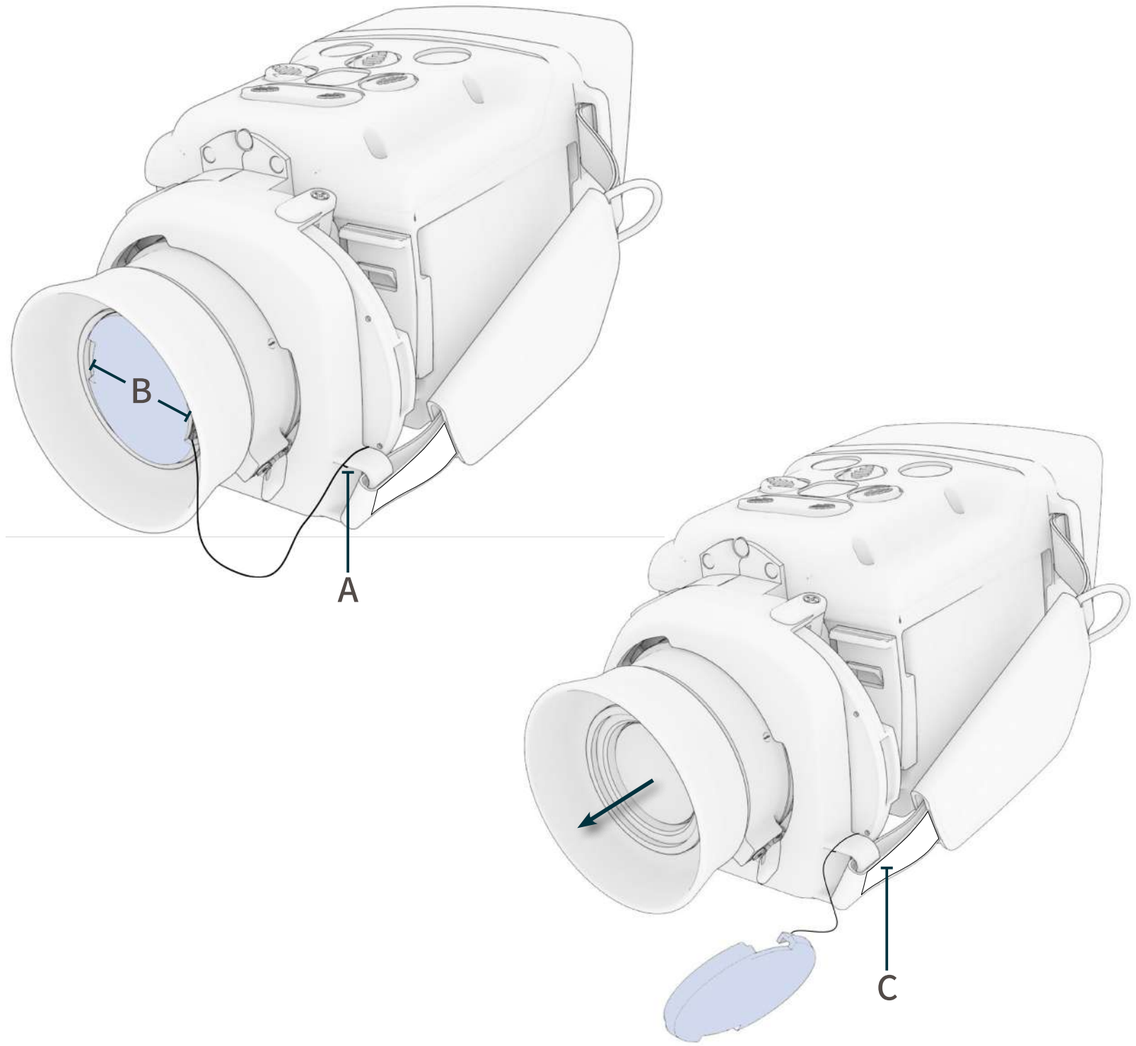
- The cool down process allows the infrared detector to reach operating cryogenic temperature. Once this temperature is achieved, the cooler icon disappears, indicating cool down is complete.
- During the cool down process the camera menu is available (see Camera Settings).

REMOVING LENS COVER

Remove the lens cover once the power-up sequence has completed.

To remove the lens cover:

1. Verify the lens cover is tied to the side of the camera (A).
2. Push in both latches on either side of the cover (B).
3. Remove the lens cover.
4. Attach the lens cover over the Velcro strap (C).

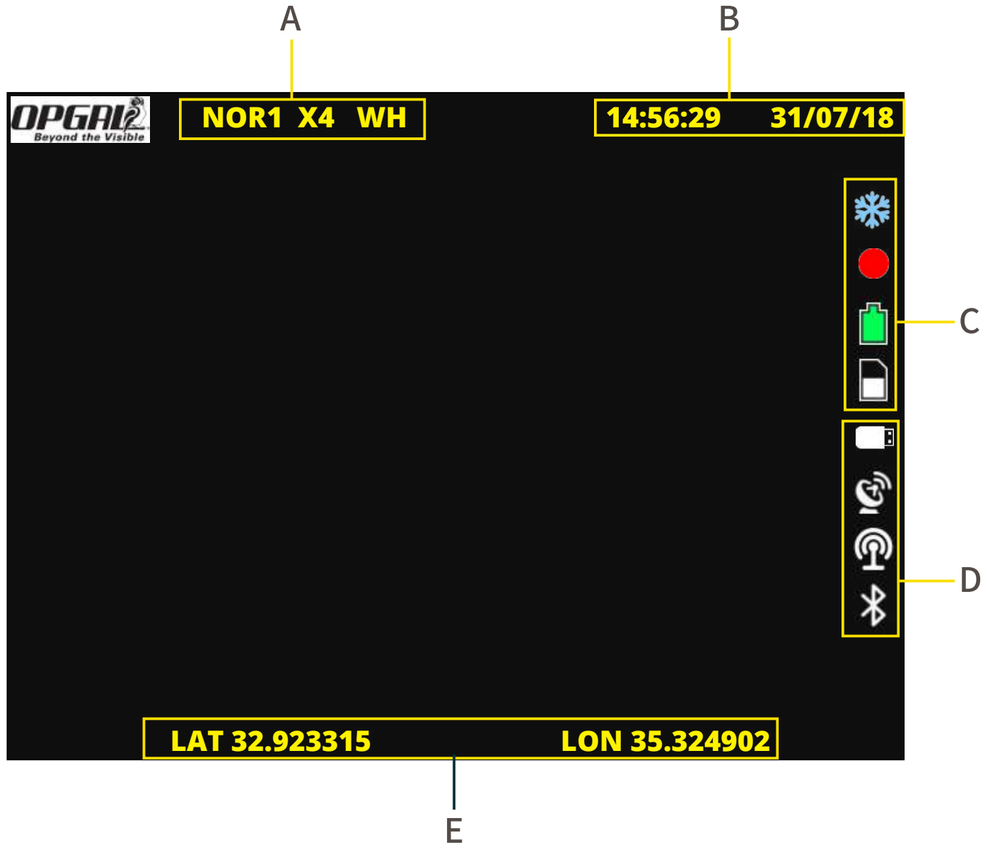


	CAUTION
	To prevent the lens from being scratched, always mount the lens cover over the lens when the camera is not in use.

SCREEN OVERLAY

After the camera has powered up, the following indicators are displayed on the screen:

- **Viewing Status Indicators (A) –** includes indicators for viewing mode, zoom value, and image polarity.
- **Date and time (B) –** date is displayed in MM/DD/YY or DD/MM/YY format; time is displayed in 12-hour or 24-hour format (see Setting Date and Time).
- **Camera Status Indicators (C) –** includes icons for cooler, recording, snapshot, battery status, and memory status.
- **Connection Status Indicators (D) –** includes icons for USB, GPS, Wi-Fi, and Bluetooth connection status.
- **Longitude and latitude coordinates (E) –** acquired from the GPS receiver (see Connecting to GPS).



Viewing Status Indicators

The viewing status indicators include the following:

- **Viewing Mode (A) –** options include:
  - **VIS –** visible
  - **NOR –** normal
  - **ENH –** enhanced
  - **TMG –** thermography

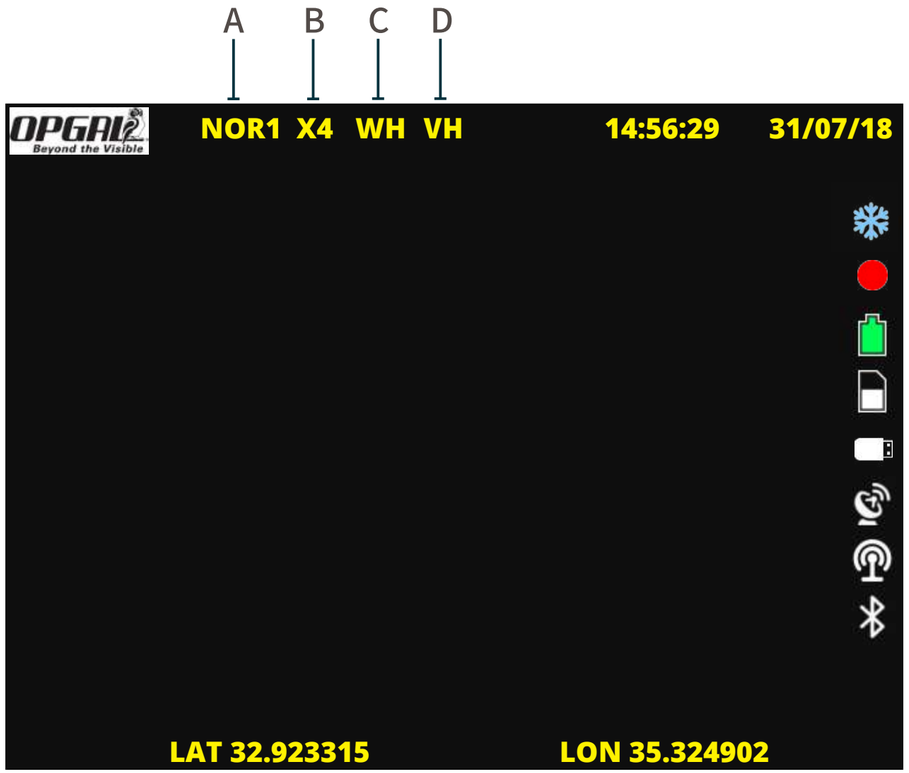
  See Viewing Modes.

- **Zoom value (B) –** indicates digital zoom value. Options include: 1x, 2x, 4x, 8x, or 16x (see Zooming).

- **Image polarity (C) –** options include:
  - **WH –** white hot
  - **BH –** black hot

  See Selecting Polarity.

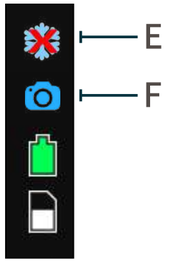
- **Very Hot (D) –** when very hot is active VH appears on screen.



Camera Status Indicators

The camera status indicators include the following icons:

- **Cooler (A) –** indicates cooler is active. Icon blinks during cool down state, and appears with a red cross (E) when cooler is deactivated (see Activating/Deactivating Cooler).
- **Recording (B) –** indicates recording is active (see Recording Video).
- **Battery (C) –** indicates amount of battery capacity remaining.
- **Memory (D) –** indicates amount of internal memory used.
- **Snapshot (F) –** indicates a snapshot has been taken (see Taking a Snapshot).



NOTE
When a snapshot is taken, the snapshot icon briefly appears over the recording icon if recording is in progress.

Connection Status Indicators

The connection status indicators include the following icons:

- **USB (A) –** indicates EyeCGas® 2.0 is connected to a computer or tablet via a USB cable with the Net Adapter option enabled (see Connecting via USB).
- **GPS (B) –** indicates that GPS is turned on (see Connecting to GPS).
- **Wi-Fi (C) –** indicates EyeCGas® 2.0 is functioning as a mobile hotspot (see Connecting via Wi-Fi).
- **Bluetooth (D) –** indicates EyeCGas® 2.0 is connected to a device via Bluetooth (see Connecting via Bluetooth).

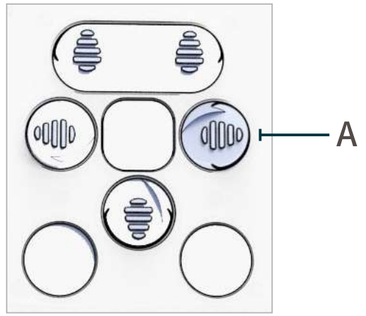
NOTE
Blinking icons indicate there is no connection. Steady icons indicate there is a connection.

Viewing Modes

EyeCGas® 2.0 operates in the following viewing modes:

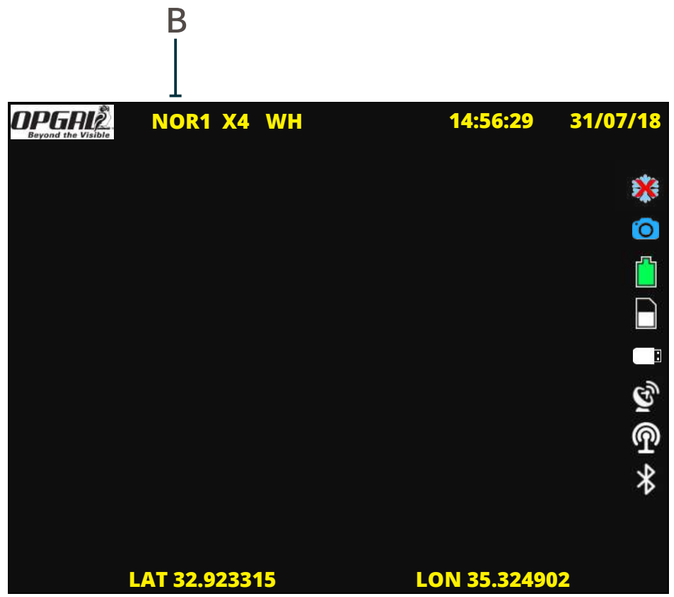
- Visible Mode
- Normal Mode
- Enhanced Mode
- Thermography Mode

Keypad



SWITCHING BETWEEN VIEWING MODES

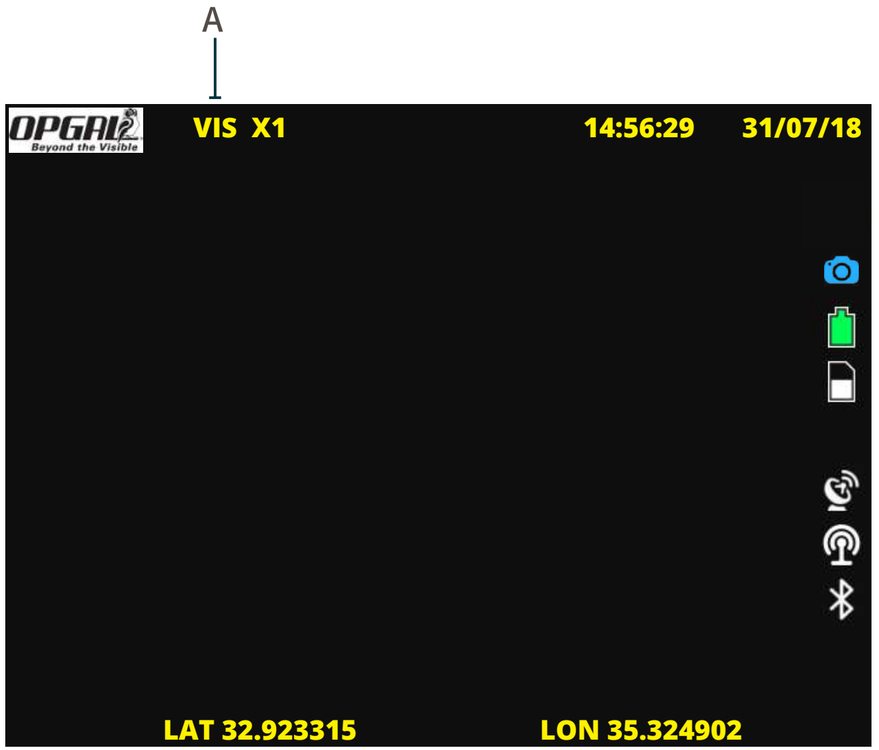
To switch between viewing modes, press the **mode button** (A). The viewing mode indicator on the LCD display (B) indicates the currently selected mode.



VISIBLE MODE

In visible mode, EyeCGas® 2.0 displays video using the HD video camera. Visible mode is used for situational awareness and component identification. The following indicators are specific to this mode:

- **VIS (A) –** indicates visible mode is active.



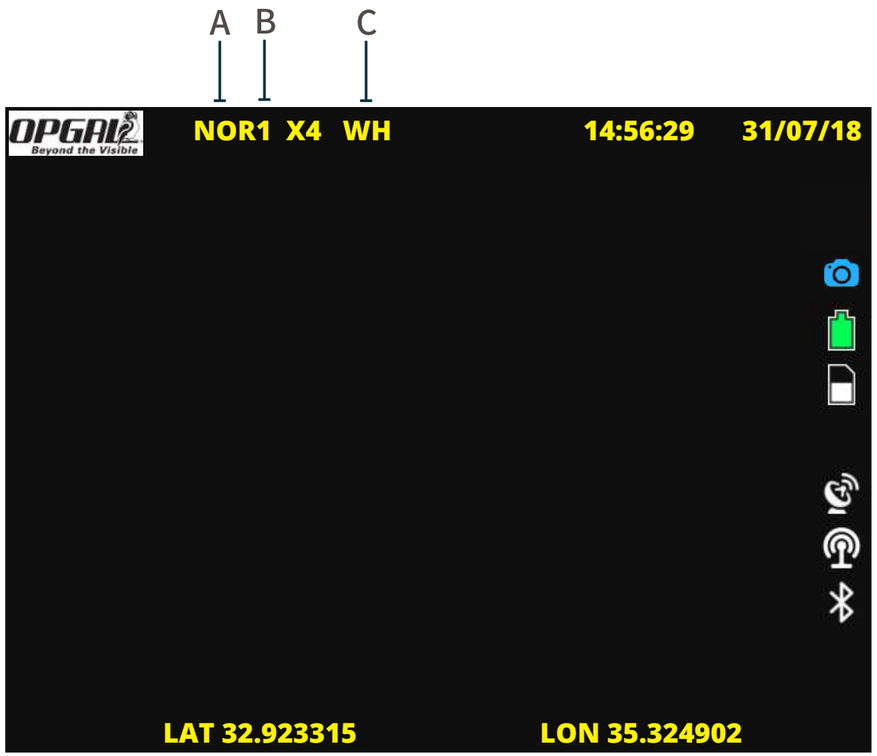
NOTE
Operations available in visible mode are: ▪ Recording Video ▪ Taking a Snapshot ▪ Zooming

NORMAL MODE

In normal mode, EyeCGas® 2.0 produces a very smooth thermal image. Normal mode is used to detect medium to large sized gas leaks in environments with high temperature differences between the gas and the background. This mode is used for general monitoring of components in search of potential gas leaks.

The following indicators are specific to this mode:

- **NOR1 (A) –** indicates normal mode is active.
- **Number (B) –** indicates DRC (Dynamic Range Control) level. DRC level ranges from 1 (high sensitivity) to 3 (low sensitivity) and is changed from the menu.
- **WH or BH (C) –** indicates polarity.



NOTE

Operations available in normal mode are:

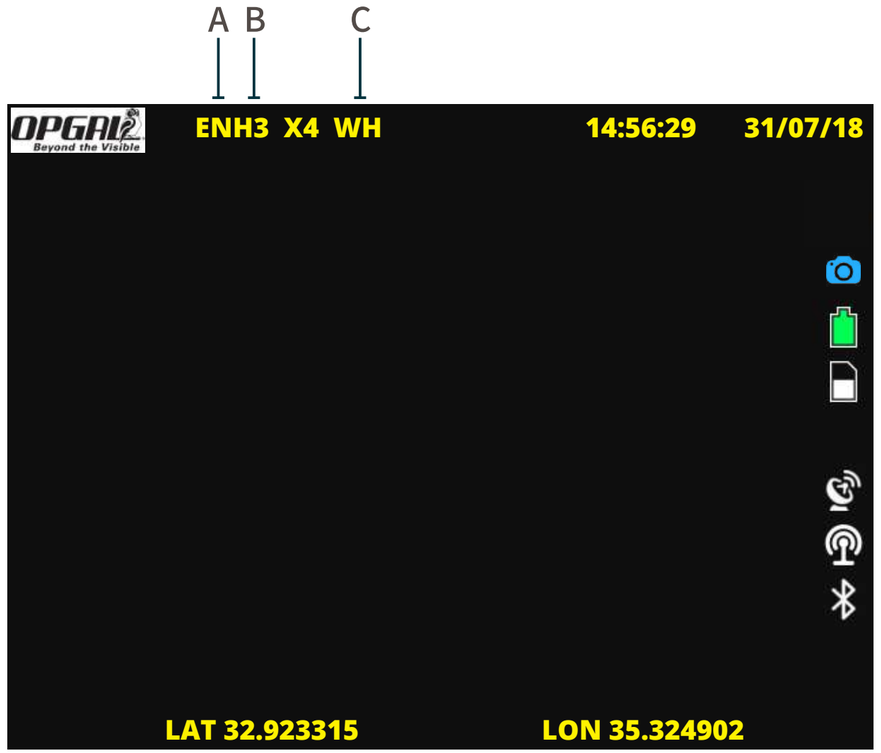
- Recording Video
- Taking a Snapshot
- Zooming
- Performing Non-Uniformity Correction (NUC)
- Selecting Polarity

ENHANCED MODE

In enhanced mode, EyeCGas® 2.0 utilizes proprietary algorithms to enhance gas detection. Enhanced mode is used for detecting low gas flow leakages and when working in an environment with a uniform (low-contrast) background.

The following indicators are specific to this mode:

- **ENH (A) –** indicates enhanced mode is active.
- **Number (B) –** indicates enhancement level.
- **WH or BH (C) –** indicates polarity.



NOTES

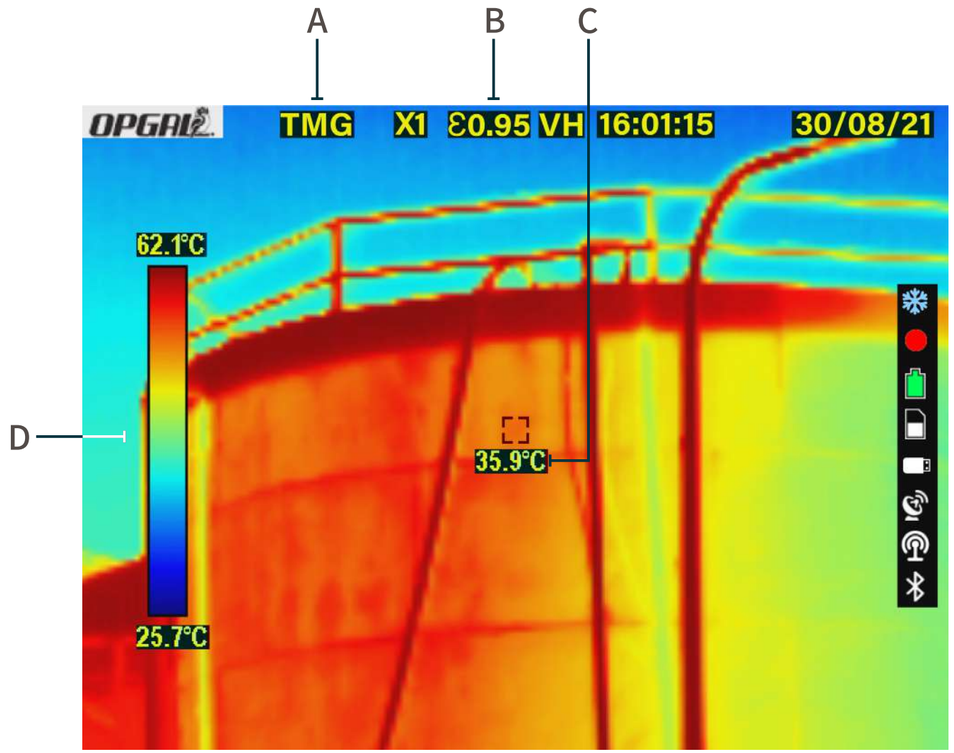
- Enhanced mode is the recommended mode for gas detection.
- Operations available in enhanced mode are:
  - Recording Video
  - Taking a Snapshot
  - Zooming
  - Performing Non-Uniformity Correction (NUC)
  - Selecting Polarity
  - Choosing Enhancement Level

THERMOGRAPHY MODE

In thermography mode, EyeCGas® 2.0 identifies surface temperature variations of objects and displays these variations as differences in color. Colors are determined based on the color palette selected (see Selecting Color Palette).

The following indicators are specific to this mode:

- **TMG (A) –** indicates thermography mode is active.
- **Number (B) –** indicates emissivity value.
- **Temperature (C) –** indicates average temperature within the bounded area.
- **Vertical bar (D) –** indicates temperature range and color palette.



NOTE

Camera operations available in thermography mode are:

- Recording Video
- Taking a Snapshot
- Zooming
- Performing Non-Uniformity Correction (NUC)
- Selecting PolarityColor Palettes
- Choosing Emissivity Value

Frequently Used Operations

This section reviews frequently used camera operations and includes:

- Keypad Buttons Used During Camera Operation
- Recording Video
- Taking a Snapshot
- Zooming
- Performing Non-Uniformity Correction (NUC)
- Selecting Polarity
- Selecting Color Palette
- Choosing DRC Level
- Choosing Enhancement Level
- Choosing Emissivity Value

NOTE

See also:

- Switching Between Viewing Modes
- Powering Off Camera

KEYPAD BUTTONS USED DURING CAMERA OPERATION

The following buttons are used in all viewing modes:

- Power Off
- NUC
- Viewing Mode
- Record
- Snapshot
- Zoom
- Menu

The following button is used in normal and enhanced viewing mode:

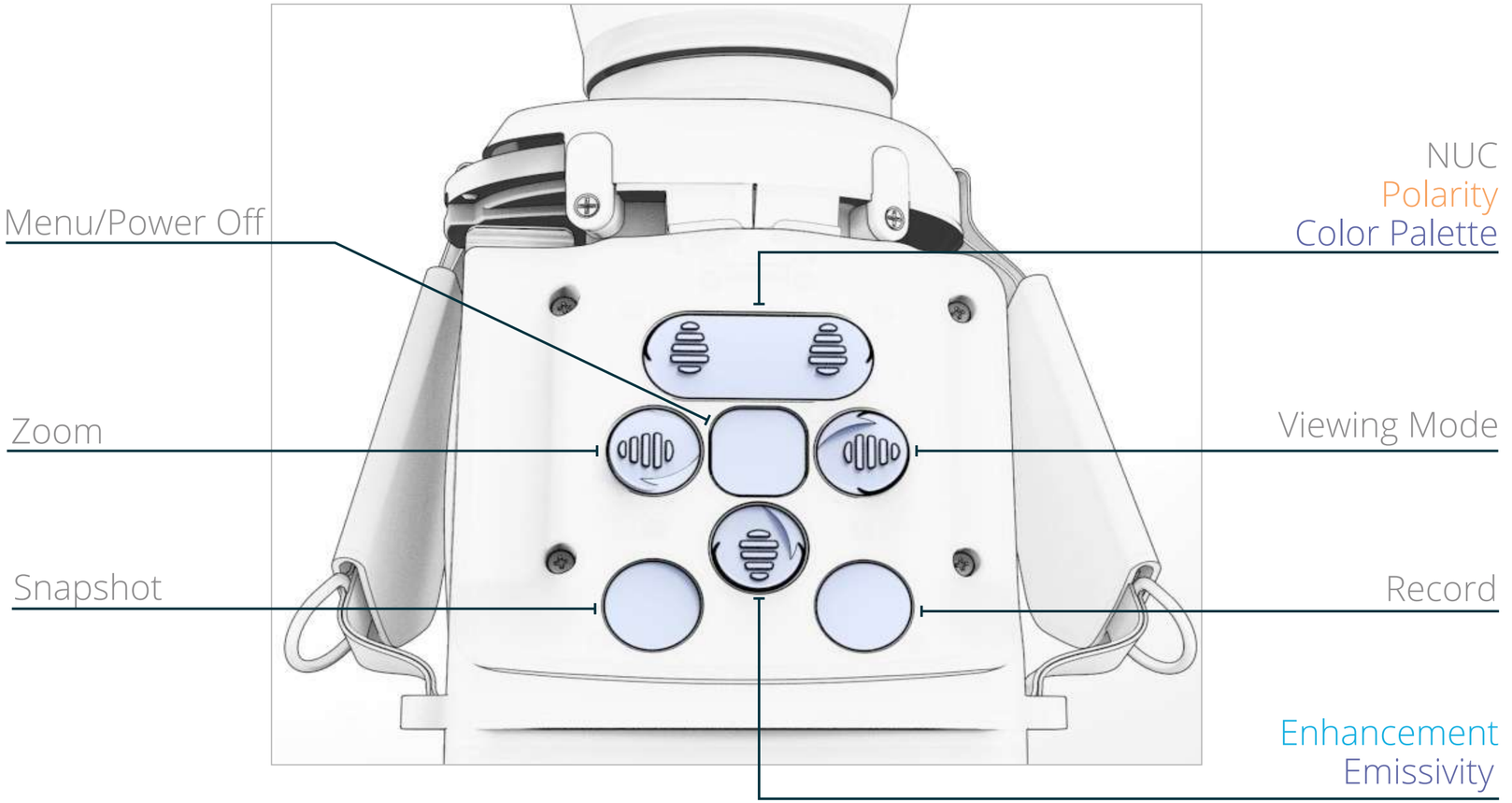
- Polarity

The following button is used in enhanced viewing mode only:

- Enhancement

The following buttons are used in thermography viewing mode only:

- Color Palette
- Emissivity



RECORDING VIDEO

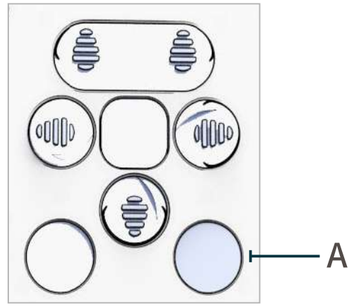
To record video:

1. Set the camera to the required viewing mode (see Switching Between Viewing Modes).
2. Press the **record button** (A).

   A red indicator (B) starts blinking.
3. To stop the recording, press the **record button** (A).

   The red icon disappears and the video is saved in the camera's internal memory.

Keypad



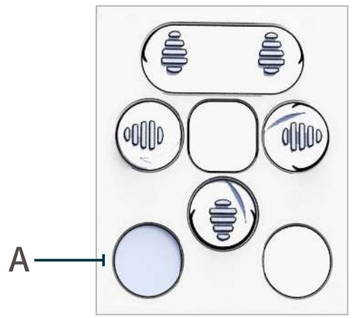
NOTES

- Viewing modes can be switched while recording is in progress (see Switching Between Viewing Modes).
- Recording audio is possible using wired/wireless audio headset (see Attaching the Wired Headset).
- Video files can be viewed and managed on the camera's LCD screen using the menu system (see File Management).

TAKING A SNAPSHOT

To take a snapshot of the image shown on the screen, press the **snapshot button** (A). A blue icon (B) briefly appears on the screen, and the image is saved in the camera's internal memory.

Keypad

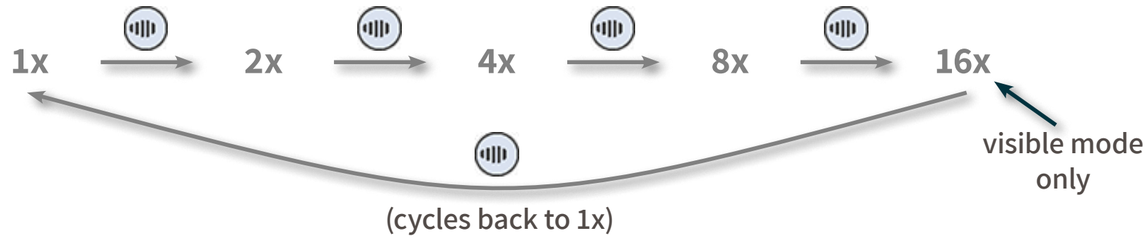


NOTE

Image files can be viewed and managed on the camera's LCD screen using the menu system (see File Management).

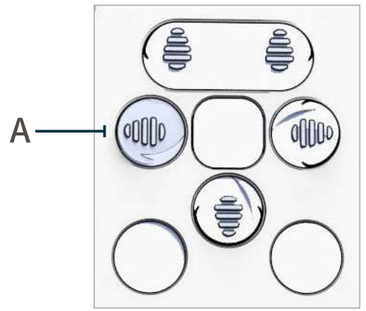
ZOOMING

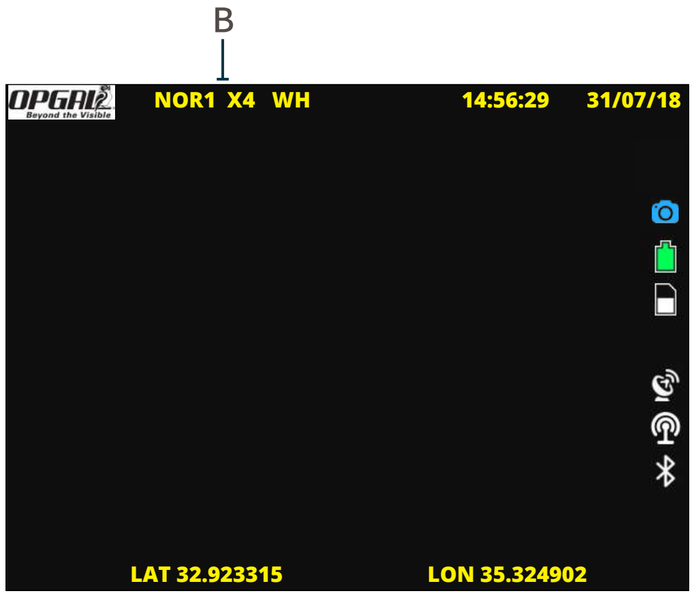
To activate digital zoom, press the **zoom button** (A). Each button press advances the digital zoom as follows:



The current zoom level is indicated on the display (B).

Keypad





NOTES
▪ Digital zoom advances to 16x zoom (for visible mode only). ▪ FIT zoom Used to adjust the visible camera FOV to IR FOV (for visible mode only)

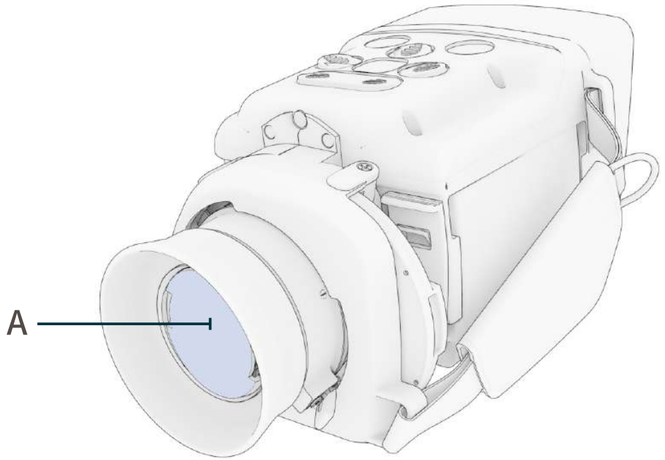
PERFORMING NON-UNIFORMITY CORRECTION (NUC)

The NUC process corrects for image noise or artifacts caused by external or internal temperature changes.

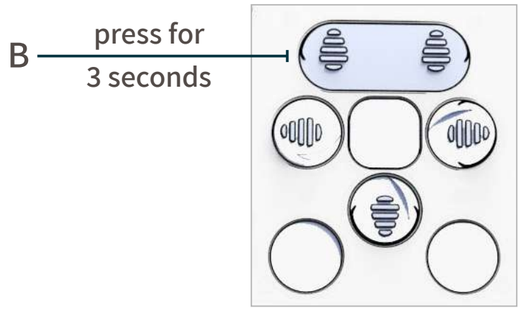
To perform the NUC process:

1. Mount the lens cover (A) on the camera lens.
2. Press the **NUC button** (B) for 3 seconds.

   The image on the screen freezes for a few seconds, indicating NUC is in progress.



Keypad



NOTES

- Only perform NUC when there is image degradation.
- The NUC process does not resolve poor image quality caused by lens condensation or dirt on the lens.

SELECTING POLARITY

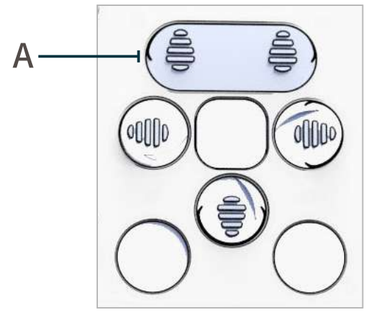
Polarity determines whether hot objects are displayed as white or black.

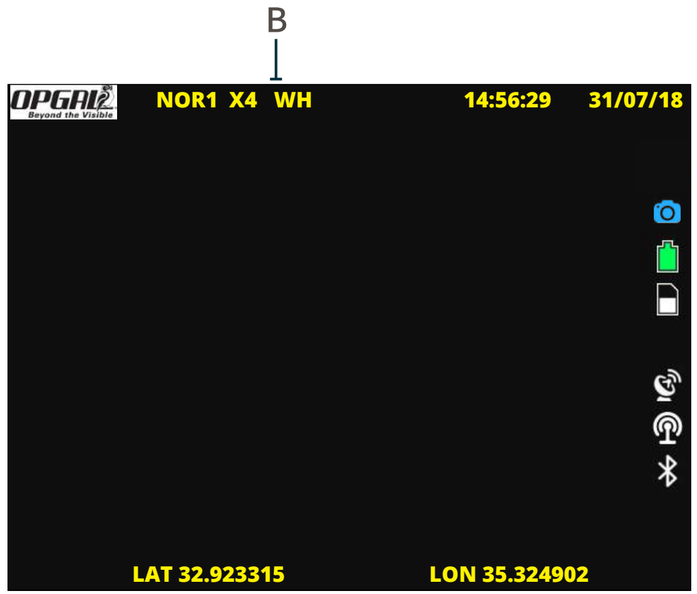
To select polarity:

1. Select normal or enhanced viewing mode (see Switching Between Viewing Modes).
2. Press the **polarity button** (A) to switch between the following two modes:
   - **White Hot (WH) mode –** The hottest parts of the infrared image are displayed in white, while the coolest parts are displayed in black.
   - **Black Hot (BH) mode –** The hottest parts of the infrared image are displayed in black, while the coolest parts are displayed in white.

The current polarity mode is indicated on the display (B).

Keypad





NOTES

- Polarity selection functions in normal viewing mode and enhanced viewing mode only.

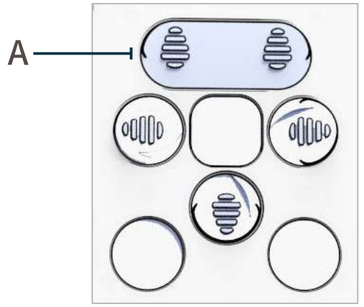
SELECTING COLOR PALETTE

A color palette is a predefined range of colors which correspond to variations in surface temperature of objects. A palette should be chosen which best shows thermal differences in the scene.

To select a color palette:

1. Select thermography viewing mode (see Switching Between Viewing Modes).
2. Press the **color palette button** (A).

Keypad

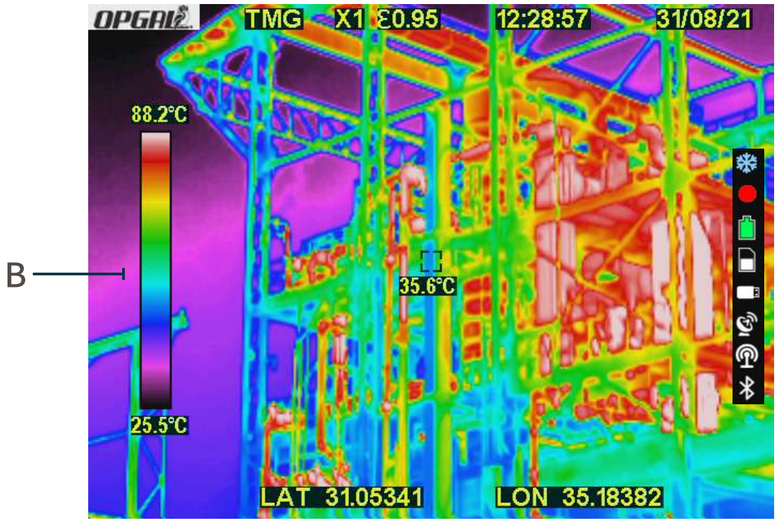


Each button press changes the color palette as follows:

B&W → Hot Red → Green Middle → Blue Cold → Rainbow → Rainbow High Cont. → Iron → Vivid

(Cycles back to B&W)

The vertical bar (B) indicates current color palette and temperature range.



NOTES

- Color palette selection functions in thermography viewing mode only.
- The color palette can also be set using the menu system (see Defining Thermography Mode Settings).

CHOOSING DRC LEVEL

Three different image processing algorithms that can suit a wide variety of scenarios and users preferences.

The levels are setting the sensitivity through the Dynamic range as:

- Level 1 allows more Dynamic range allowing more sensitivity in low contrast scenarios.
- Level 2 closes the Dynamic range for higher contrast scenes
- Level 3 has even less Dynamic range for extreme contrast scenes

On changing normal DRC levels see Setting Normal DRC

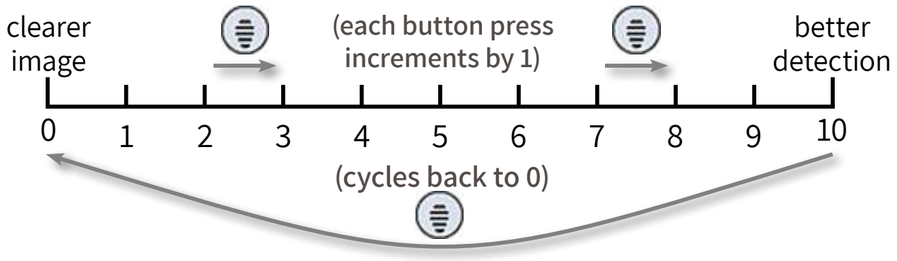
CHOOSING ENHANCEMENT LEVEL

A low enhancement level allows the infrared sensor to be more sensitive to gas. However, low enhancement levels also generate grainier images. An optimum level should thus be chosen between gas detection and clear image generation.

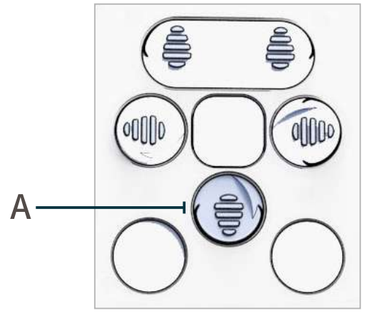
To choose enhancement level:

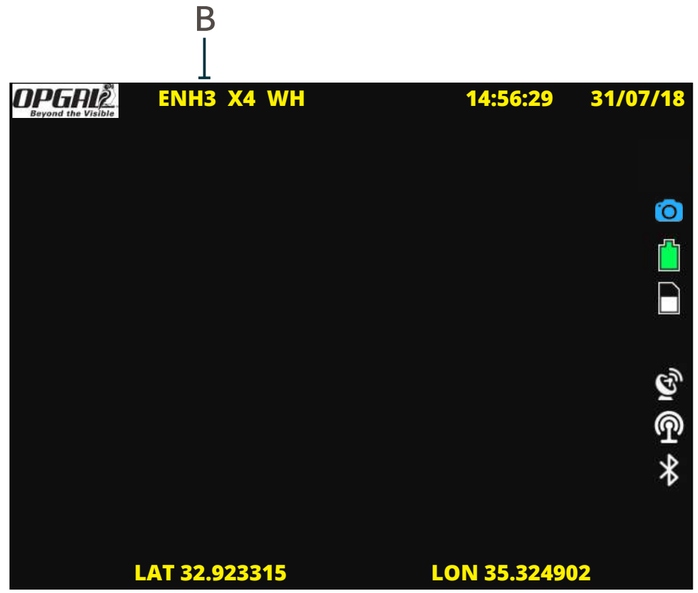
1. Select enhanced viewing mode (see Switching Between Viewing Modes).
2. Press the **enhancement button** (A).

   Each button press changes enhancement level by 1, advancing from 0 to 10 in a cyclic manner. The current level is indicated on the display (B).



Keypad





NOTES

- Enhancement level selection functions in enhanced viewing mode only..

CHOOSING EMISSIVITY VALUE

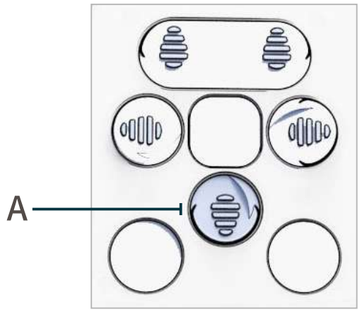
Emissivity value is chosen according to the physical characteristic of the material being reviewed.

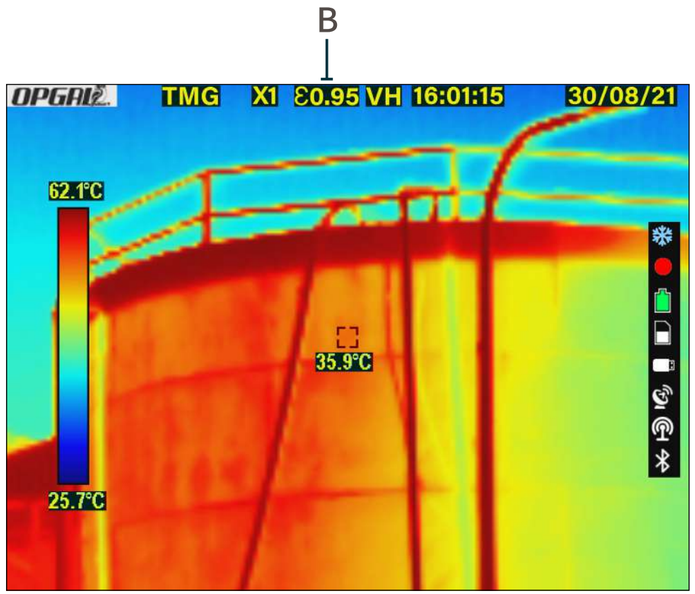
To choose emissivity value:

1. Select thermography viewing mode (see Switching Between Viewing Modes).
2. Consult the emissivity table and choose the relevant value.
3. Press the **emissivity button** (A) to select the desired value.

   Each button press changes emissivity value by .05, advancing from .1 to 1 in a cyclic manner. The current value is indicated on the display (B).

Keypad





Emissivity Values of Common Materials

Material	Emissivity
Aluminium foil	0.03
Aluminium, anodized	0.9[12]
Asphalt	0.88
Brick	0.90
Concrete, rough	0.91
Copper, polished	0.04
Copper, oxidized	0.87
Glass, smooth (uncoated)	0.95
Ice	0.97
Limestone	0.92
Marble (polished)	0.89 to 0.92
Paint (including white)	0.9
Paper, roofing or white	0.88 to 0.86
Plaster, rough	0.89
Silver, polished	0.02
Silver, oxidized	0.04
Snow	0.8 to 0.9
Water, pure	0.96

NOTES

- Emissivity value selection functions in thermography viewing mode only.
- Emissivity value can also be set using the menu system (see Defining Thermography Mode Settings).

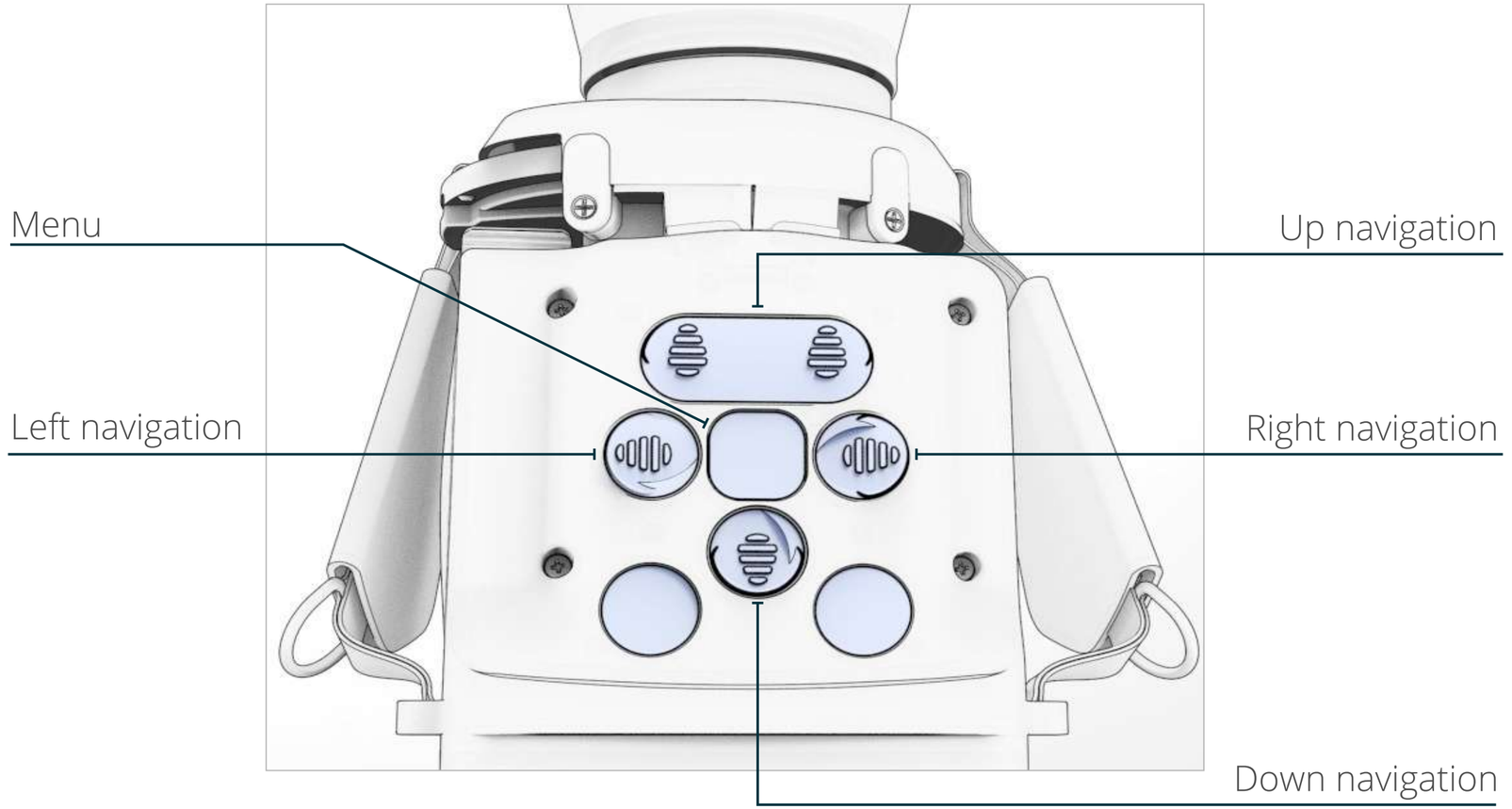
Camera Settings

This section reviews the various camera settings configured using the on-screen menu system and includes:

KEYPAD BUTTONS USED DURING MENU CONFIGURATION

The following buttons are used to access and navigate the menu system:

- Menu
- Left navigation
- Up navigation
- Right navigation
- Down navigation



MENU NAVIGATION

EyeCGas® 2.0's menu system consists of four menu tabs. Under each tab is a list of options which contain either sub-menus or information.

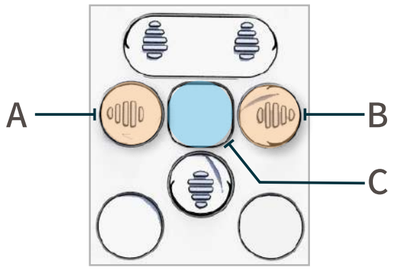
The general process for navigating the menu system is as follows:

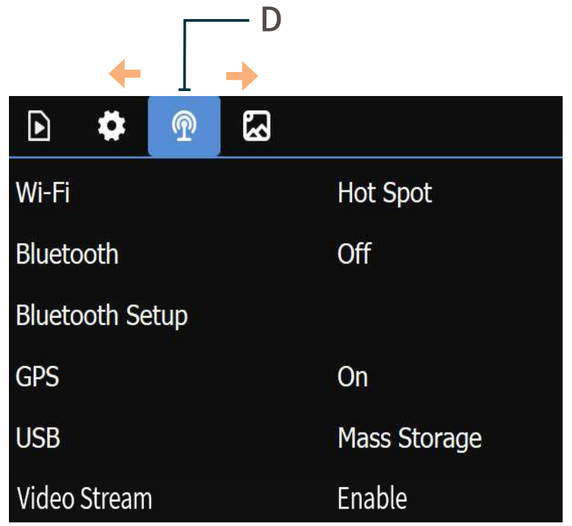
Displaying the Menu

Press the **menu button** (C). The menu appears with the leftmost tab highlighted.

Navigating Between Tabs

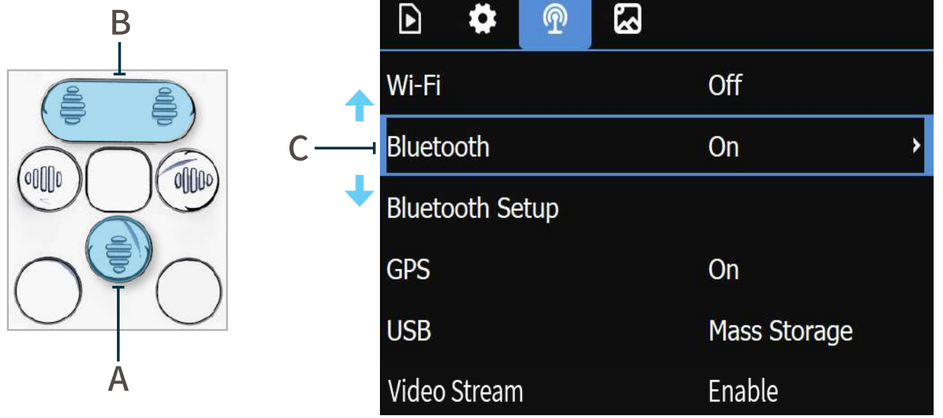
Press the right (B) or left (A) navigation button to navigate to the relevant menu tab. The selected tab is highlighted (D).





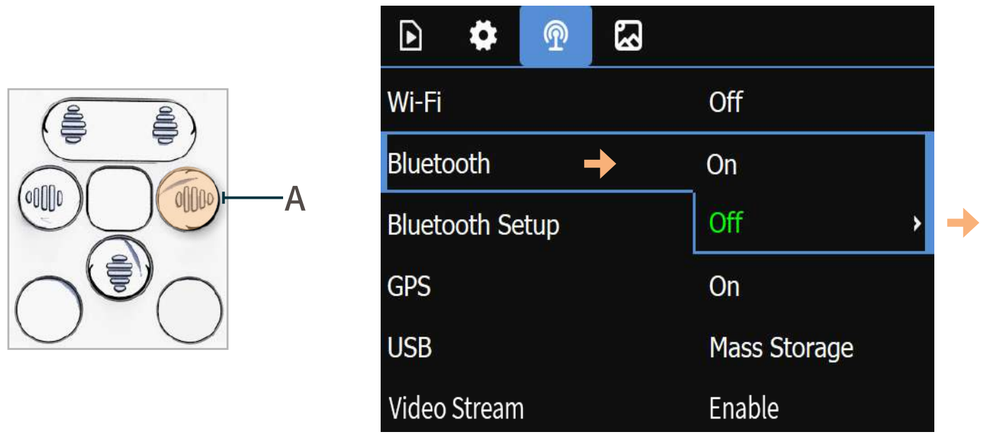
Scrolling Vertically Between Menu Options

Press the down (A) or up (B) navigation button to scroll between menu options.



Selecting a Menu Option

Press the right (A) navigation button to select a menu option.



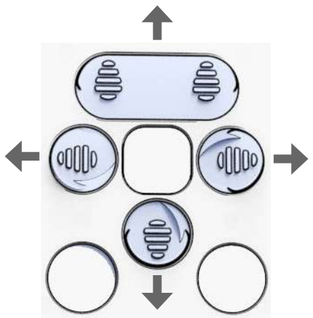
MENU OVERVIEW

Use the right and left navigation buttons to navigate between menu tabs.

File Manager

- XX.ts
- YY.jpeg
- Play
- Delete All
- Delete
  - Yes
  - No

Use the right navigation button to make a selection.



Settings

- Brightness
- Key Mapping
- Set Time
- Cooler
- Language
- System Info
- About

Use the up and down navigation buttons to scroll through menus.

Connectivity

- Wi-Fi
- Bluetooth
- Bluetooth Setup
- GPS
- USB
- Video Streaming

Imaging Modes

- Active Modes
- Normal
- Very Hot
- Thermography

FILE MANAGEMENT

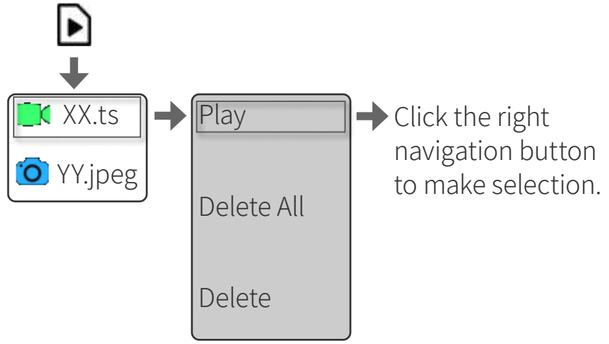
The file manager tab allows for viewing and deleting videos and images saved in the camera's internal memory.

This section includes:

- Playing Videos
- Viewing Images
- Deleting All Videos and Images
- Deleting a Single Video or Image
- Transferring Files using Mass Storage
- Transferring Files using FTP

Playing Videos

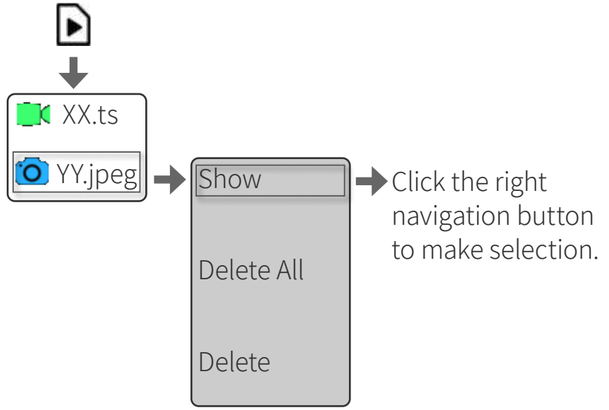
1. Display the menu. The file manager tab is already selected.
2. Scroll to and select the relevant video file.
3. Select **Play**.



NOTE
Video files are saved in **.ts** format, a video streaming file format used for storing video on DVDs. This file format is also able to store audio and data information. TS stands for Transport Stream.

Viewing Images

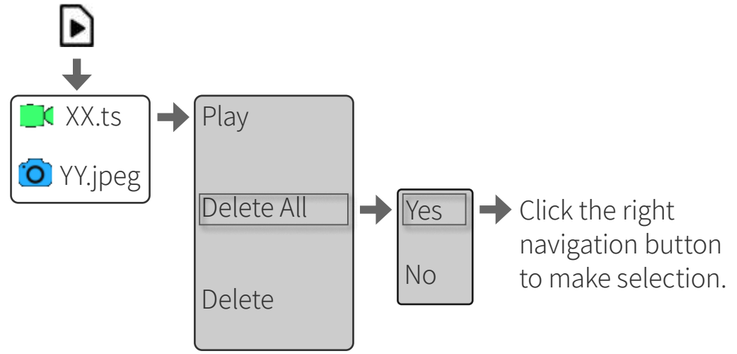
1. Display the menu. The file manager tab is already selected.
2. Scroll to and select the relevant image file.
3. Select **Show**.



NOTE
Image files are saved in **.jpeg** format.

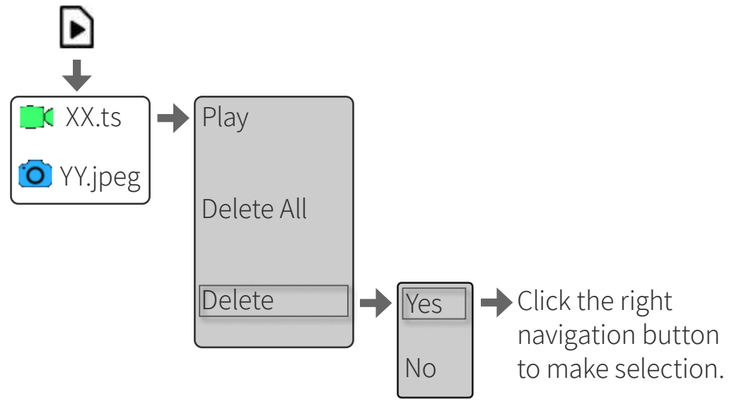
Deleting All Videos and Images

1. Display the menu. The file manager tab is already selected.
2. Scroll to and select any video or image file.
3. Scroll to and select **Delete All**.
4. Select **Yes** to confirm deletion.



Deleting a Single Video or Image

1. Display the menu. The file manager tab is already selected.
2. Scroll to and select the relevant video or image file.
3. Scroll to and select **Delete**.
4. Select **Yes** to confirm deletion.



Transferring Files using Mass Storage

To transfer files from the camera to a computer using the USB mass storage option:

1. Select the mass storage option under USB settings (see Connecting via USB).
2. Connect the USB cable between the camera and a computer.
3. Move the files as needed.

Transferring Files using SFTP

FTP file transfer can done either through a USB cable or through Wi-Fi.
To transfer files from the camera to a computer or mobile device using FTP:

1. Select net adapter option under USB setting (see Connecting via USB) or connect using Wi-Fi (see Connecting via Wi-Fi).
2. Open an FTP client application on the computer or mobile device, as WinSCP or others.
3. Enter the relevant information in the FTP application (Username and password).
4. Move the files as needed.

NOTE

- Username : ogi
- password: ogi

SETTINGS

The settings tab enables setting camera preferences and viewing system information.

This section includes:

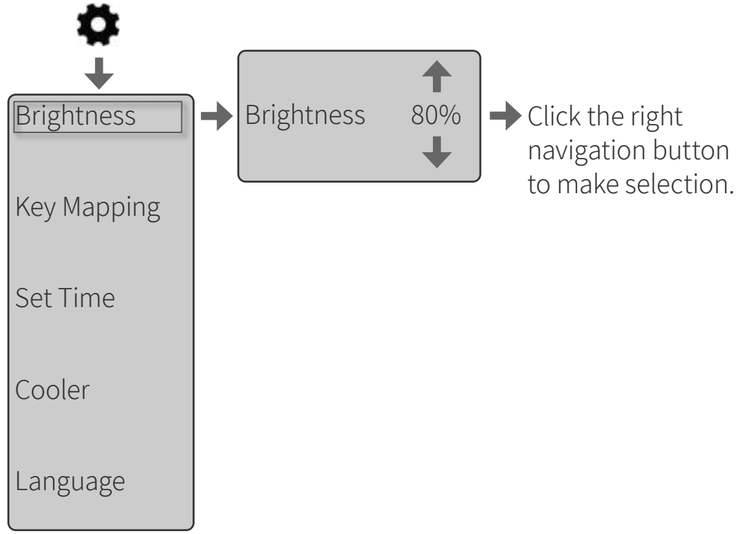
- Adjusting LCD Brightness
- Displaying Keypad Map
- Setting Date and Time
- Activating/Deactivating Cooler
- Selecting Language
- Viewing System Information
- Viewing About Information

Adjusting LCD Brightness

LCD display brightness levels are set from 10% to 100% by increments of 10.

To adjust the LCD brightness:

1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **Brightness**.
4. Choose the desired brightness level using the up and down navigation buttons.
5. Select the brightness level.



NOTES

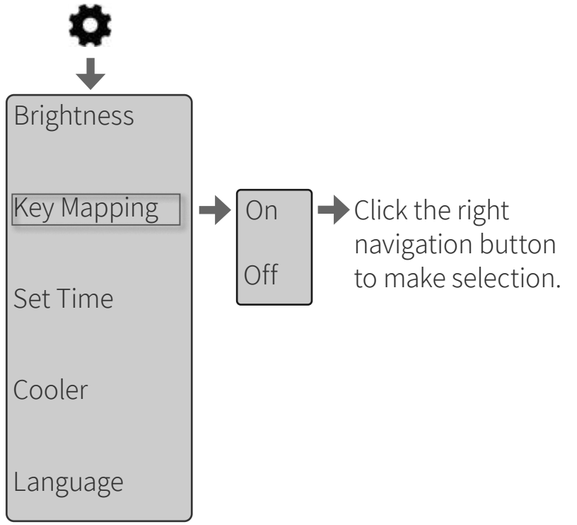
- Low brightness level is suitable for operating EyeCGas® 2.0 at night.
- Use a low brightness level to save battery life.

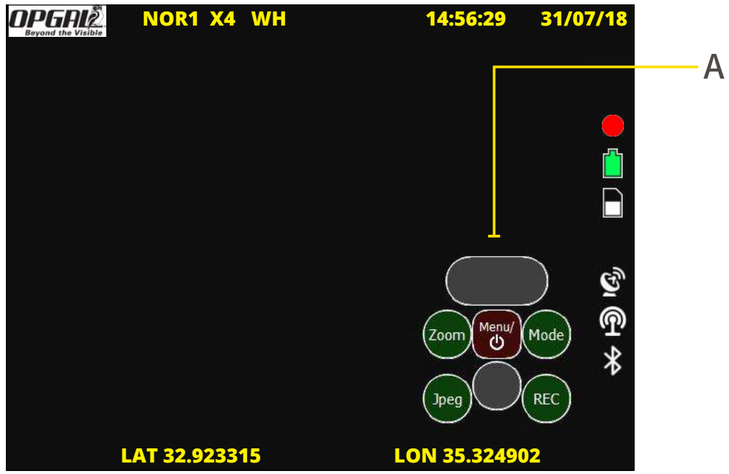
Displaying Keypad Map

The keypad map (A) assists in recognizing keypad button functionality, which changes depending on the current operating state of EyeCGas® 2.0 (see Keypad Buttons Overview). The keypad map is an on-screen diagram that includes a descriptor of the each button's functionality.

To display the keypad map on the screen:

1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **Key Mapping**.
4. select **On**.

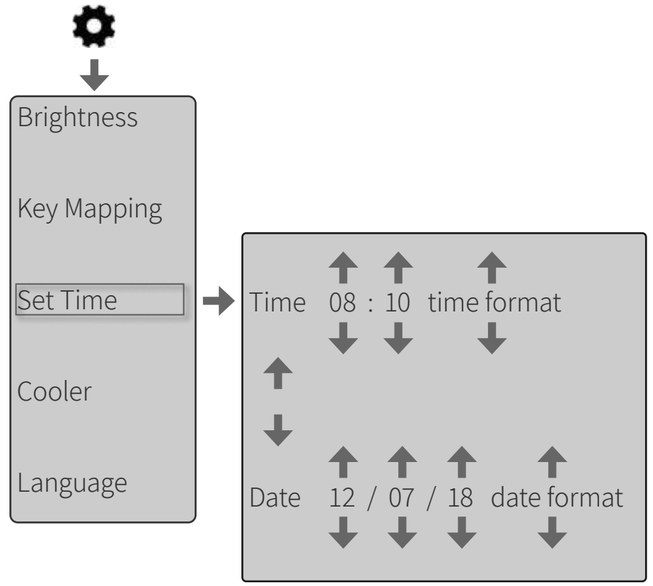




Setting Date and Time

This section explains how to set the EyeCGas® 2.0 internal date and time.
The date and time appear at the top of the LCD display (see Screen Overlay).
To set the date and time:

1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **Set Time**.
4. In the **Time** row, select the hour, minute, and time format options.
5. Choose the desired number and format using the up and down navigation buttons.
6. In the **Date** row, select the day, month, year, and date format options.
7. Choose the desired number and format using the up and down navigation buttons.



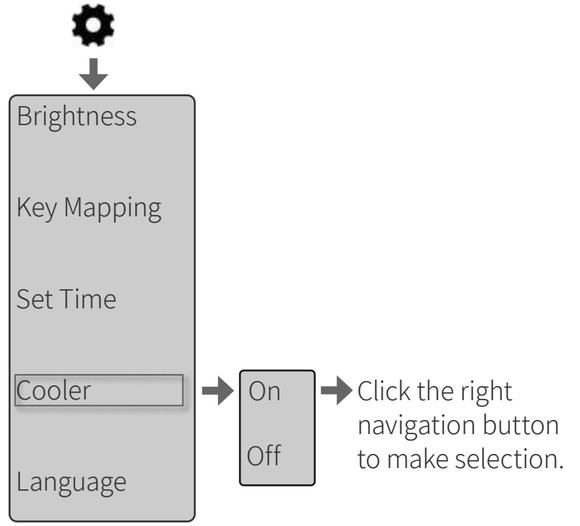
NOTES
▪ Time format is defined as 12-hour or 24-hour. ▪ Date format is defined as DD/MM/YY or MM/DD/YY.

Activating/Deactivating Cooler

EyeCGas® 2.0 uses a cooled IR sensor, and thus the sensor cooler must be activated when using the IR camera. When the cooler is off, the camera switches automatically to visible mode.

To activate or deactivate the cooler:

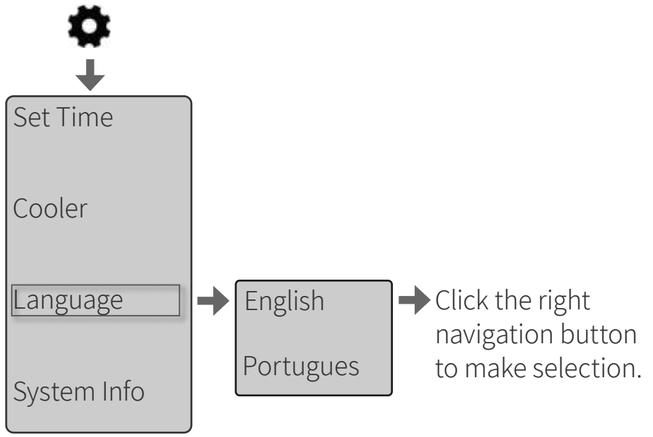
1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **Cooler**.
4. Select **On** or **Off**.



Selecting Language

To select the display language:

1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **Language**.
4. Select the desired language from the fifteen different languages displayed.



Viewing System Information

System information includes software version number, network status, and amount of internal memory left.

To view system information:

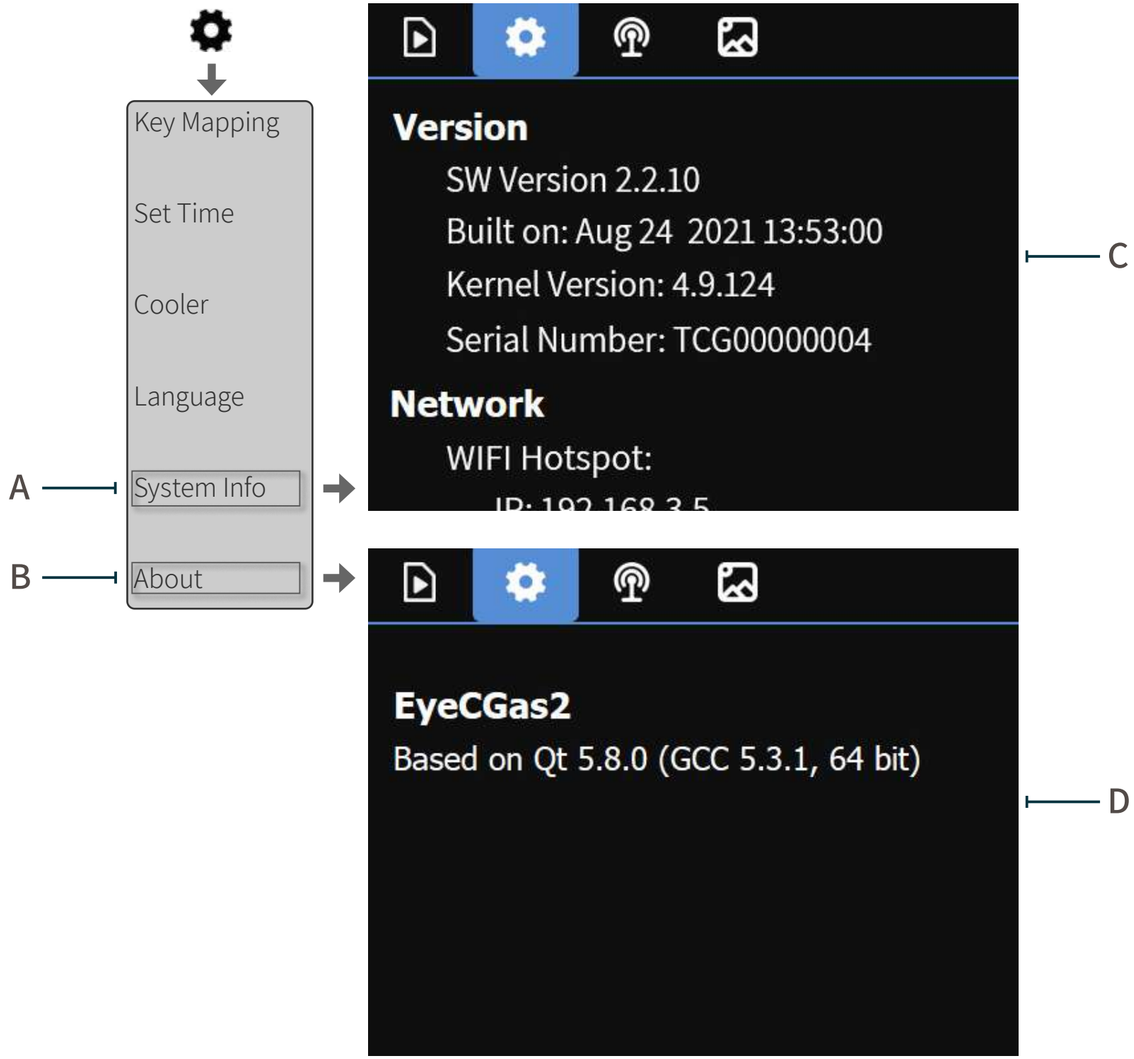
1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **System Info** (A). The system info screen (C) appears. If necessary, scroll down to view all the information.
4. Press the left navigation button to return to the menu.

Viewing About Information

About screen includes copyright information.

To view this information:

1. Display the menu.
2. Navigate to the settings tab.
3. Scroll to and select **About** (B). The about screen (D) appears.
4. Press the left navigation button to return to the menu.



CONNECTIVITY

The connectivity tab enables connecting EyeCGas® 2.0 to peripheral devices using Wi-Fi, Bluetooth, GPS, and USB.

This section includes:

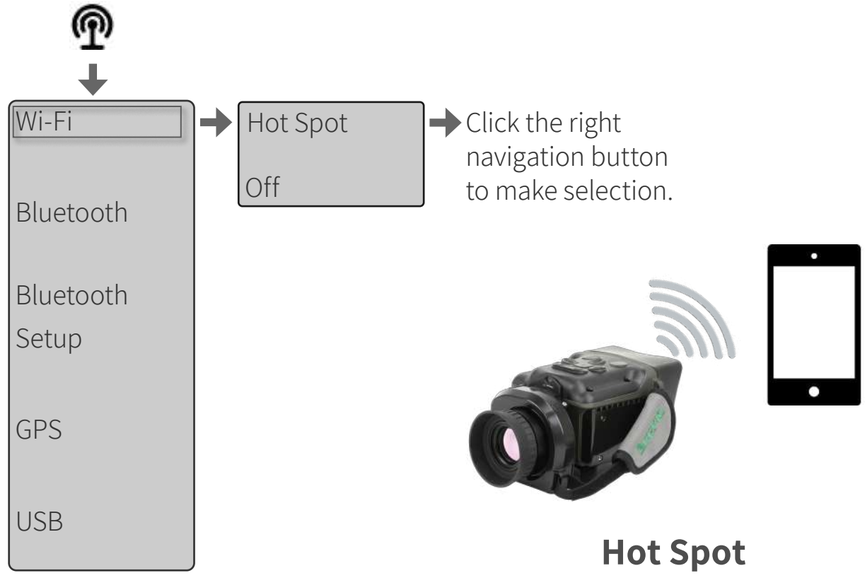
- Connecting via Wi-Fi
- Connecting via USB as LAN
- Connecting to GPS
- Connecting via USB
- Enabling Video Streaming
- Connecting via Bluetooth

Connecting via Wi-Fi

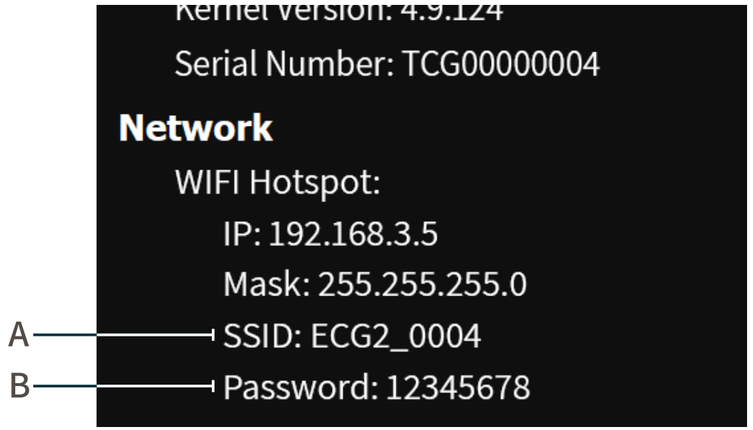
This section reviews the tasks associated with connecting a peripheral device to EyeCGas® 2.0 using Wi-Fi communication.

To enable Wi-Fi connection:

1. Display the menu.
2. Navigate to the connectivity tab.
3. Scroll to and select **Wi-Fi**.
4. Select one of the following options:
   - **Hot Spot –** the camera serves as a Wi-Fi hot spot, enabling a mobile device to connect to it.
   - **Off –** turns Wi-Fi off.
5. Locate the SSID (A) and password (B) in the system information screen. Use these parameters to connect the peripheral device to the camera's Wi-Fi hotspot.



Hot Spot



NOTES

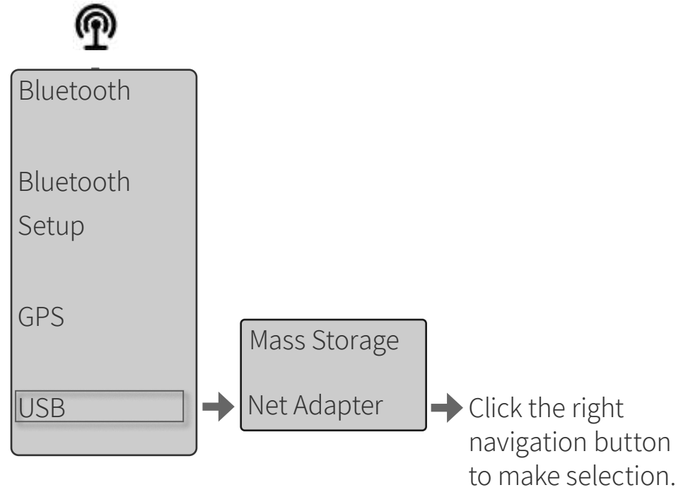
- Consult with your network administrator regarding specific communication settings.
- Set the computer firewall to allow communication with EyeCGas® 2.0.

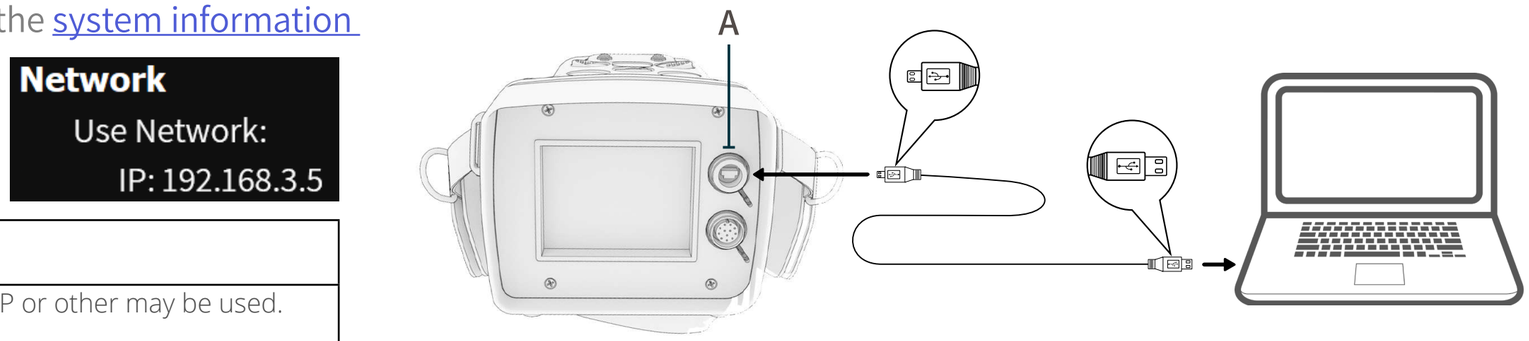
Connecting via USB as LAN

USB connectivity allows for networking communication and file transfer.

To connect to a computer or tablet via USB:

1. Display connectivity menu.
2. Scroll to and Select **USB**.
3. Select **Net Adapter** – enables network communication between EyeCGas® 2.0 and a computer or tablet using the USB cable.
4. Connect the USB cable to the USB camera connector (A). At first usage, the Windows operating system should automatically install a new driver called "USB Ethernet/RNDIS Gadget". EyeCGas camera is now connected to your PC via an Ethernet connection.
5. Locate the camera IP address and settings in the system information screen.





NOTES

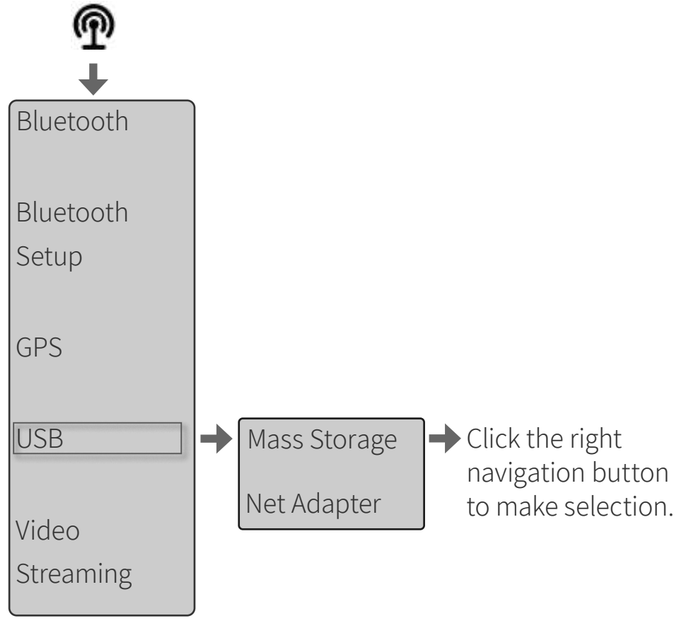
- When connected via Net Adaptor option, SFTP as WinSCP or other may be used.
- Consult with your network administrator regarding specific communication settings.

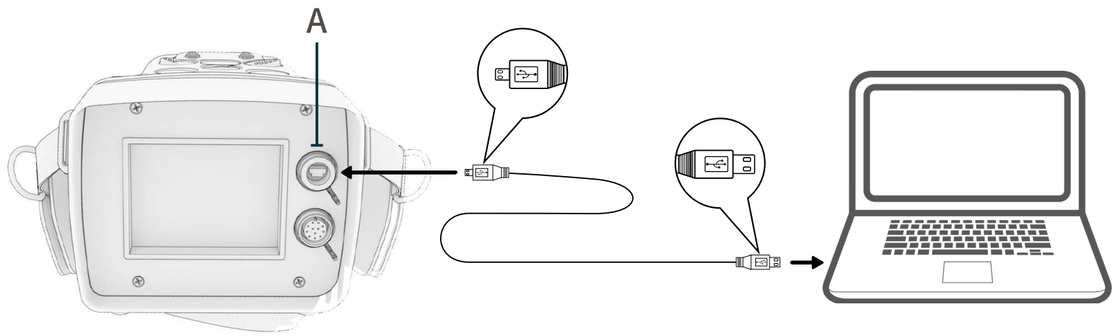
Connecting via USB

USB connectivity allows for networking communication and file transfer.

To connect to a computer or tablet via USB:

1. Display the menu.
2. Navigate to the connectivity tab.
3. Scroll to and select **USB**.
4. Select one of the following options:
   - **Mass Storage –** enables transferring files between the camera and computer/tablet, as well as upgrading the camera software.
   - **Net Adapter –** enables network communication between EyeCGas® 2.0 and a computer or tablet using the USB cable.
5. Remove the cap from the camera's USB connector (A) and connect the USB cable between the camera and a computer or tablet.





NOTES

- The camera keypad is disabled when mass storage option is selected.
- Set the computer firewall to allow communication with EyeCGas® 2.0.
- Consult with your network administrator regarding specific communication settings.

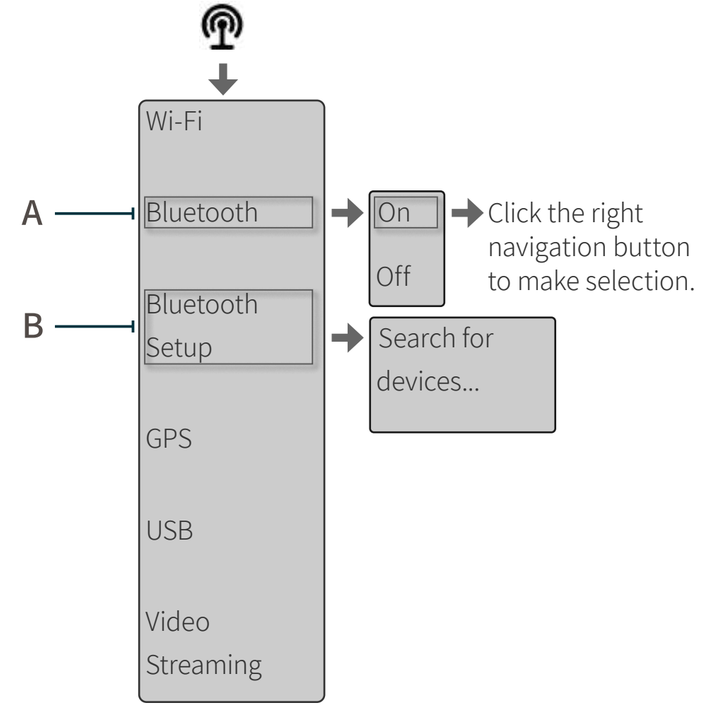
Connecting via Bluetooth

Bluetooth connectivity allows the camera to connect to devices such as BT audio headset, analyzers, and external GPS.

To connect to a Bluetooth device:

1. Display the menu.
2. Navigate to the connectivity tab.
3. Scroll to and select **Bluetooth** (A).
4. Select **On**.
5. Scroll to and select **Bluetooth Setup** (B).

   The camera searches for Bluetooth devices that are in pairing mode, and displays a list of the detected devices on the screen.
6. Select the relevant Bluetooth device from the list, as: RMLD, Headset, LMN, Gas•Trac LZ-30, TVA 2020, PHx42.



NOTE
To enable pairing mode on a Bluetooth device, consult the device's user manual.

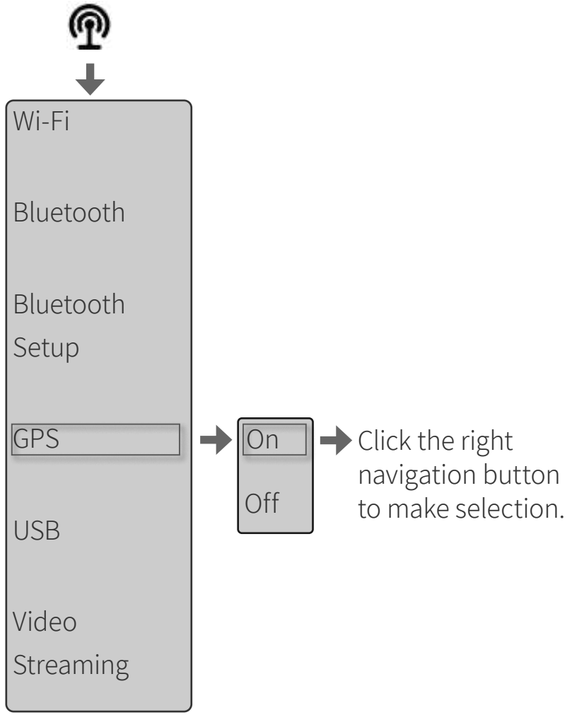
Connecting to GPS

GPS connectivity allows for geo-locating the position where the inspection is being performed outdoor.

To connect to GPS:

1. Display the menu.
2. Navigate to the connectivity tab.
3. Scroll to and select **GPS**.
4. Select **On**.

Once GPS is connected, longitude and latitude coordinates are displayed on the main screen, indicating the camera's location (see Screen Overlay).



NOTE

To engage external Bluetooth GPS device, make sure both the GPS and the Bluetooth menu functions are ON.

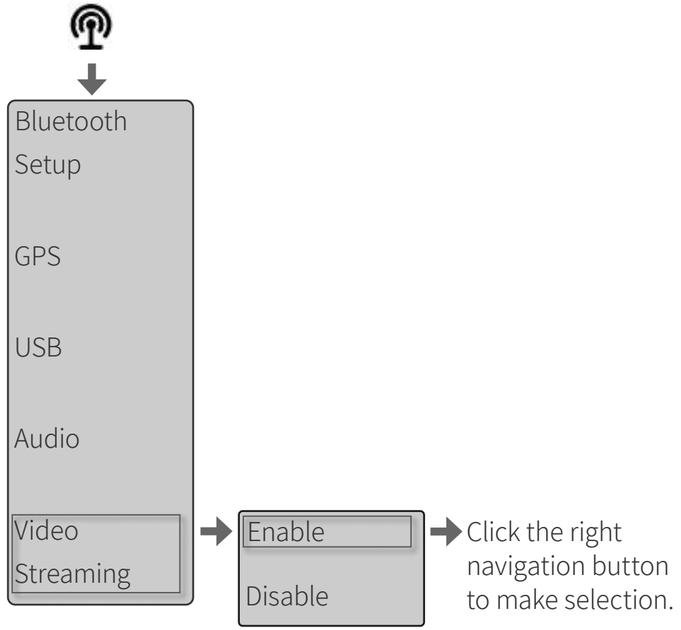
Please aware that GPS signal strength and position accuracy depend on many factors, including satellite geometry, signal blockage transmitted by other devices , atmospheric conditions.

Enabling Video Streaming

EyeCGas® 2.0 can stream live video to peripheral devices connected via Wi-Fi or USB. To receive the video stream, the peripheral device must run a suitable media application (e.g., VLC Media Player or Neptune Player).

To enable video streaming:

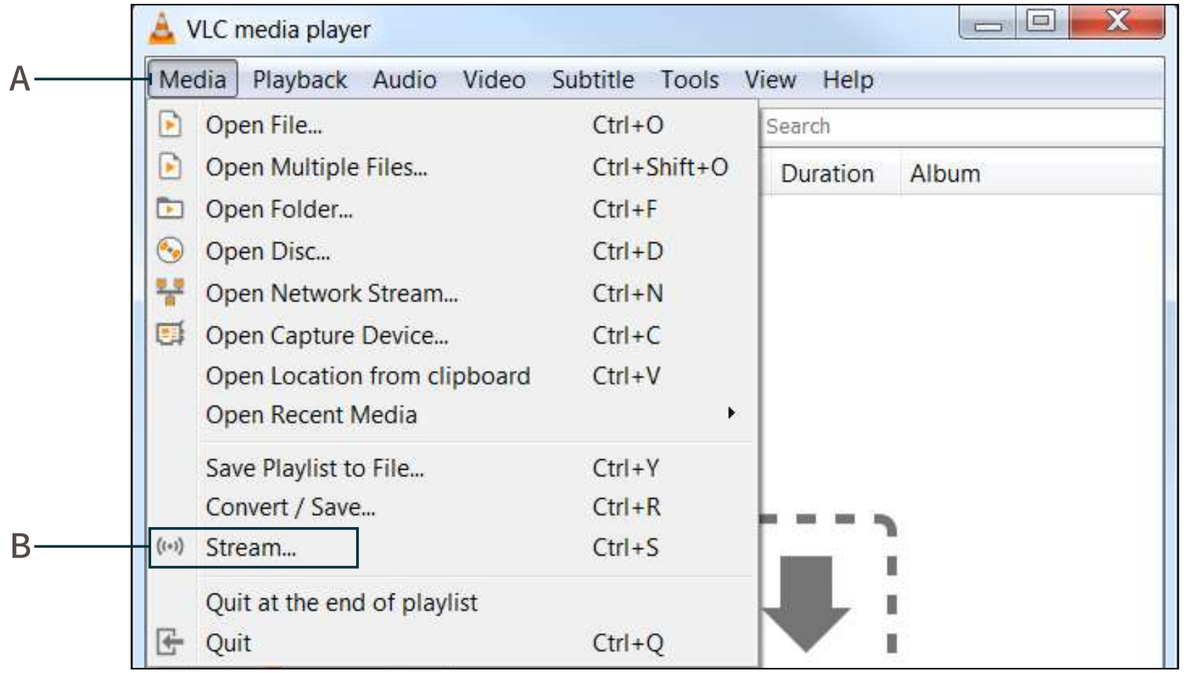
1. Verify that a connection to the peripheral device is established via Wi-Fi (see Connecting via Wi-Fi) or via USB (see Connecting via USB, and choose the Net Adapter option).
2. Display the menu.
3. Navigate to the connectivity tab.
4. Scroll to and select **Video Streaming**.
5. Select **Enable**.



	NOTE
	EyeCGas® 2.0 video streaming is done using RTSP protocol with the camera acting as the server.

In a media application:

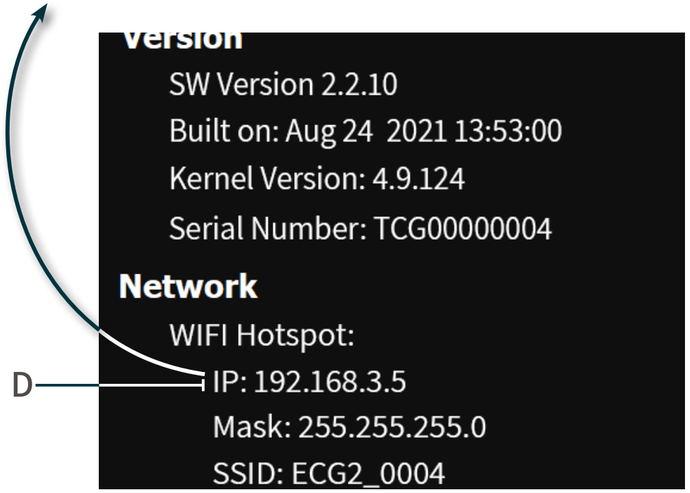
6. Select **Stream** (B) from the Media menu (A).

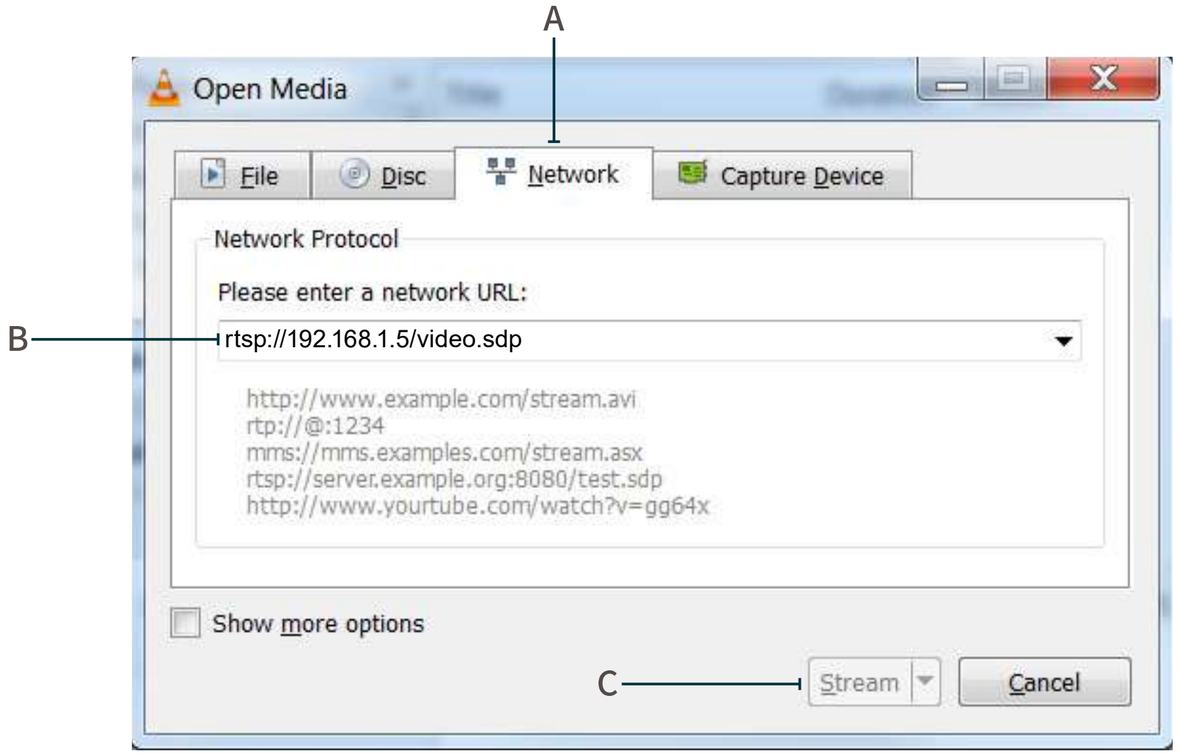


7. Click the **Network** tab (A).
8. Type the URL (B).

   The URL is constructed as follows:

   rtsp://**[IP address (D) found in system info screen]**/video.sdp





9. Click **Stream** (C).

NOTES
▪ The live video stream displays the same viewing mode as that shown on the camera's LCD display. ▪ Latency may occur when streaming in a Wi-Fi congested area.

IMAGING MODES

This section include:

- Defining Active Modes
- Setting Normal DRC
- Setting Very Hot On or Off
- Defining Thermography Mode Settings

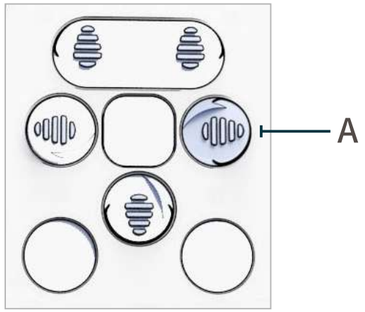
Defining Active Modes

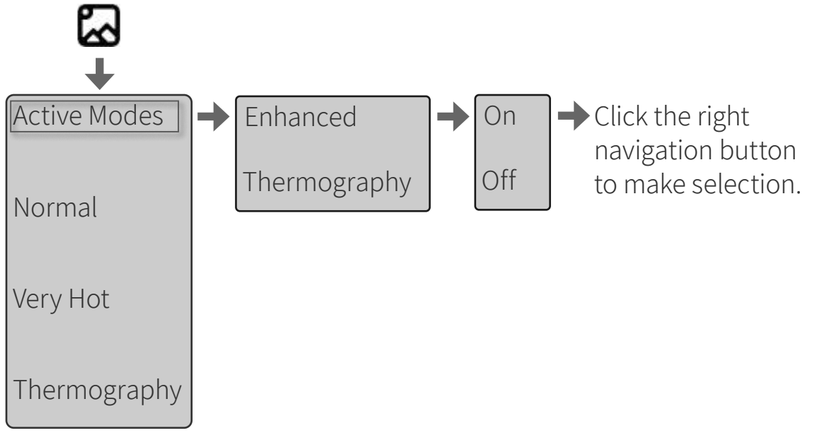
Pressing the mode button (A) on the keypad switches between viewing modes (see Switching Between Viewing Modes).

To select whether enhanced and thermography modes are available when the mode button is pressed:

1. Display the menu.
2. Navigate to the imaging modes tab.
3. Scroll to and select **Active Modes**.
4. In the Active Modes menu:
   - » Select **Enhanced** and select **On** or **Off**.
   - » Select **Thermography** and select **On** or **Off**.

Keypad



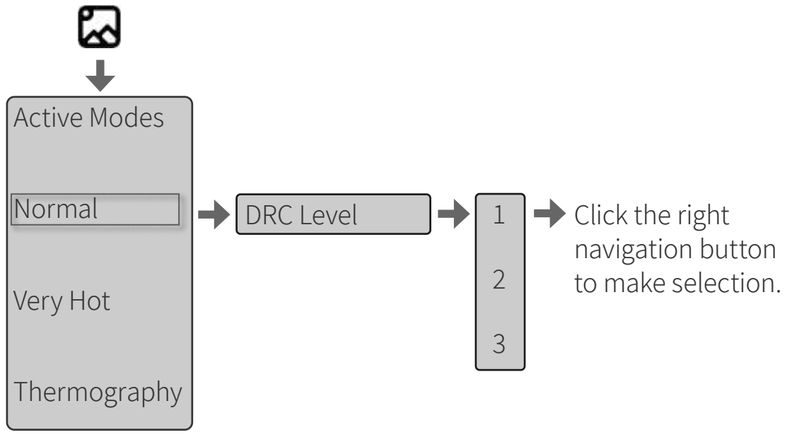


Setting Normal DRC

This section reviews the option to select DRC level when using Normal Mode.

To set normal DRC level:

1. Display the menu.
2. Navigate to the imaging modes tab.
3. Scroll to and select **Normal**.
4. Select **DRC Level**.
5. Choose the desired number of levels using the up and down navigation buttons.
6. Select the DRC level.



NOTES

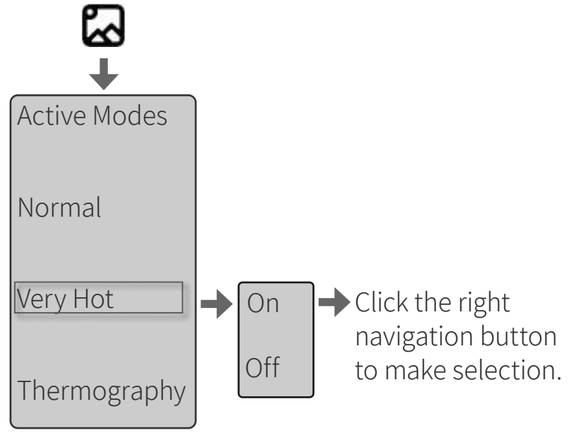
- Normal DRC levels are set from 1 to 3 by increments of 1. The lower the numeber, more sensitivity is achived. The selected value will appear on the screen as NOR1 if 1 was selected.

Setting Very Hot On or Off

This section reviews the option to select Very Hot feature for high temperature scenes On or Off for Normal Mode and Enhanced Mode and thermography mode / for all IR modes.

To set Very Hot:

1. Display the menu.
2. Navigate to the imaging modes tab.
3. Scroll to and select **Very Hot**.
4. Select **On** or **OFF**.
5. On Very Hot (on or Off) selection, follow with **NUC** to activate the VH state.



NOTES

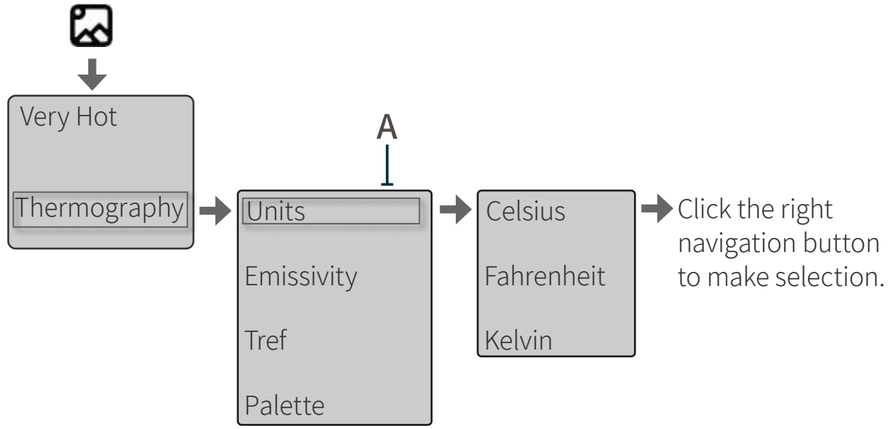
- A VH sign will appear on the display screen when Very Hot is On and after NUC was performed.
- A VH sign will disappear on the display screen when Very Hot is Off and after NUC was performed.

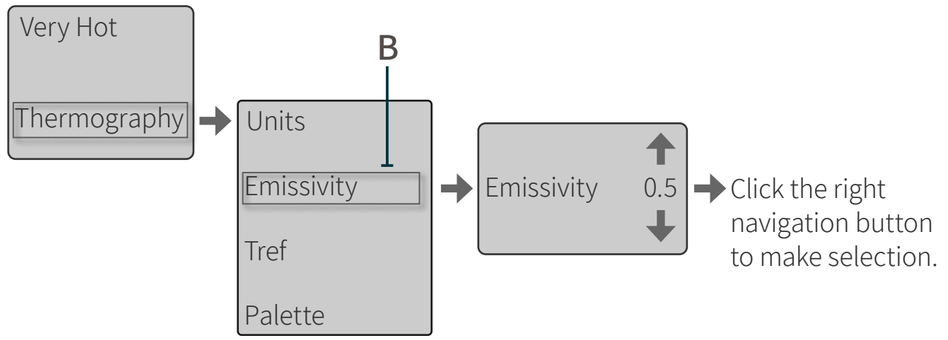
Defining Thermography Mode Settings

This section reviews the option to define the following thermography mode settings when using thermography viewing mode: temperature unit, emissivity value, reflected temperature, and color palette.

To define thermography mode settings:

1. Display the menu.
2. Navigate to the imaging modes tab.
3. Scroll to and select **Thermography**.
4. In the Thermography menu:
   - » Select **Units** (A) and select **Celsius**, **Fahrenheit**, or **Kelvin**.
   - » Select **Emissivity** (B) and choose the desired emissivity value using the up and down navigation buttons.



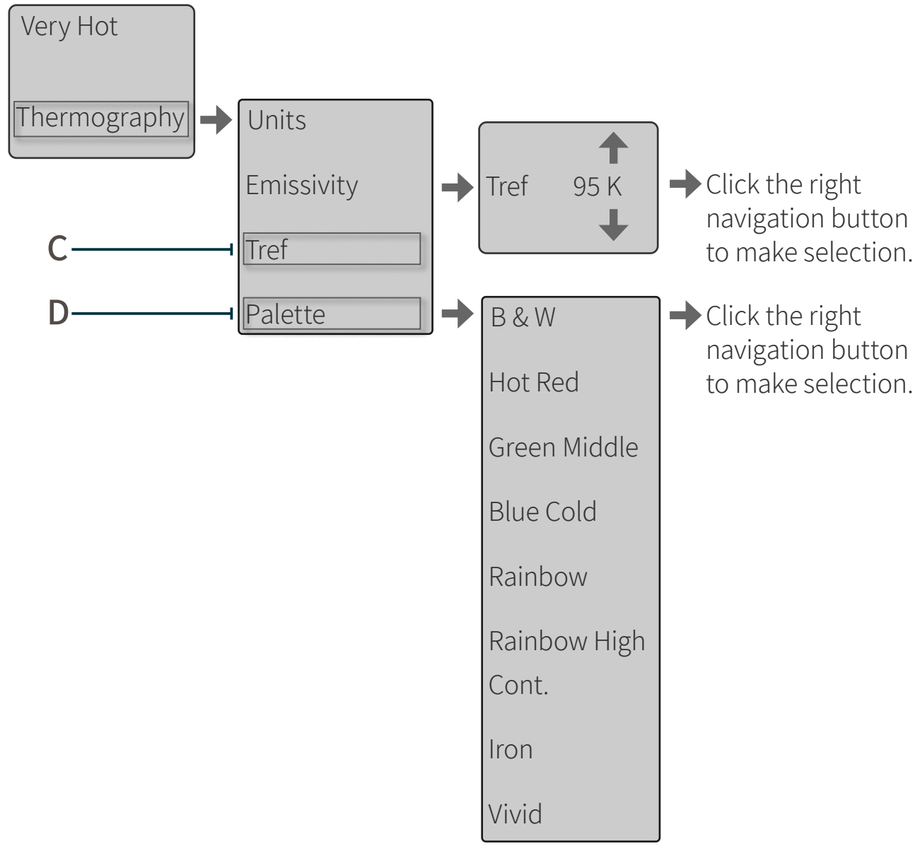


NOTES

- Emissivity values are set from 0.1 to 1 by increments of .05. For more information on emissivity value, see Choosing Emissivity Value.
- Both emissivity value and color palette can also be defined using the keypad buttons (see Choosing Emissivity Value and Selecting Color Palette).

Defining Thermography Mode Settings (cont.)

- Select **Tref** (C) and choose the desired Tref level using the up and down navigation buttons.
- Select **Palette** (D) and select from the following color palette options: **B & W**, **Hot Red, Green Middle, Blue Cold, Rainbow**, **Rainbow High Cont.**, **Iron** and **Vivid**.
- Reflected temperature (Tref) is an estimate of the level of background radiation reflected off the thermography target object, and is expressed as a temperature value. The environmental (ambient, background, air) temperature is often a reasonable estimate of reflected temperature, as long as no sources of a large amount of heat are near the object.



NOTES

- Tref stands for reflected temperature, and it indicates surrounding temperature. Tref levels are set from -20°C to 100°C by increments of 5°.
- For more information on color palette, see Selecting Color Palette.

Attaching Accessories to Camera

The following sections describe how to attach various accessories to the camera:

- Attaching the Glare Shield
- Attaching the Wired Headset

	**WARNING**
	Audio and USB connectors to be used only in non-hazardous areas. Permitted only for connection to passive audio equipment and to USB devices complying with requirements of IEC 60950, IEC 61010 or IEC62368 series ordinary location safety standards. * Glare Shield is not part of ATEX and IECEx certification

ATTACHING THE GLARE SHIELD

The glare shield reduces the effects of reflected light on the LCD display, as well as magnifies the LCD display by 300%.

To attach the glare shield to the back of the camera:

1. Place the glare shield over the camera display.
2. Insert the latches (A) into the strap hooks (B) on the back of the camera.
3. Tighten the glare shield strap.

To release the glare shield, pull up on the strap buckle and loosen the strap.

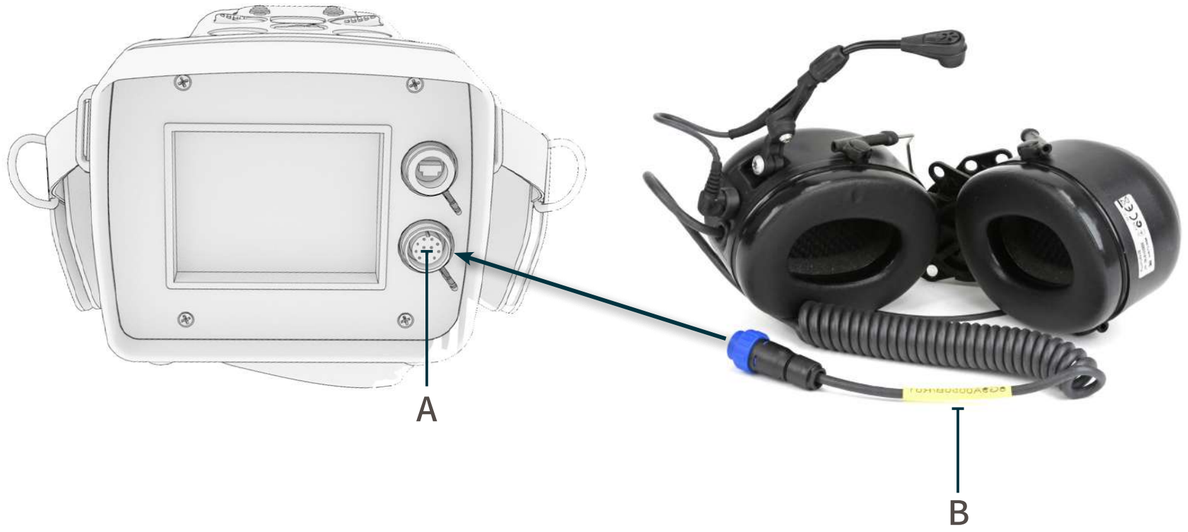
	CAUTION
	Clean the glare shield lens using only a dust pen blower and the LensPen brush (see Cleaning the Lens). Do not use any cloth or other material to clean the glare shield lens, as this can easily scratch the plastic surface.

ATTACHING THE WIRED HEADSET

The headset enables an audio track to be recorded during video recording. During video playback, the headset speakers output the recorded audio.

To attach the headset to the camera:

1. Remove the cap from the camera's accessories connector (A).
2. Plug the headset into the camera to enable audio recording.

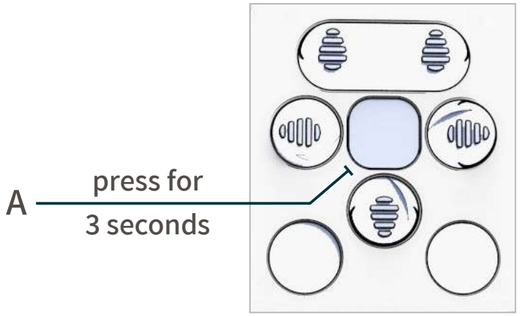


	CAUTION
	Verify that the headset has a yellow label (B) near the connector, meaning it is compatible with EyeCGas® 2.0. Do not use the old headset with the white label.

Powering Off Camera

To power off the camera, press the **power button** (A) for 3 seconds.

Keypad

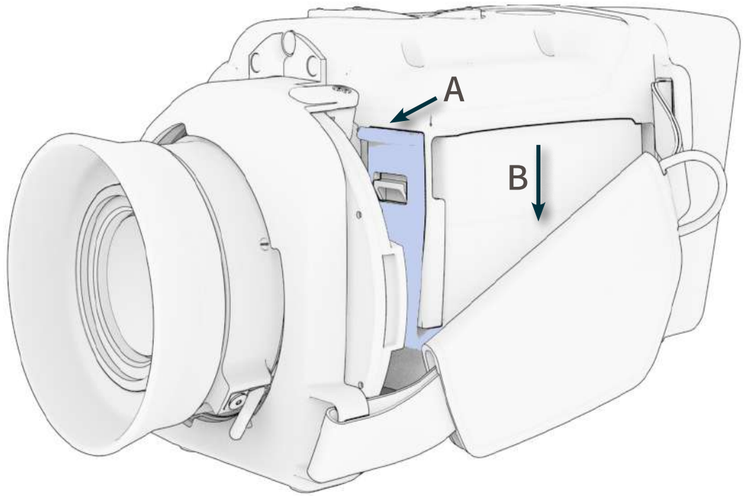


NOTE
The USB cable must be unplugged in order for the camera to power off.

Replacing the Battery

To replace the battery:

1. Power off the camera.
2. Pull the battery latch out slightly (A).
3. Remove the battery from the camera (B).
4. Insert a fully-charged battery (see Attaching the Battery).

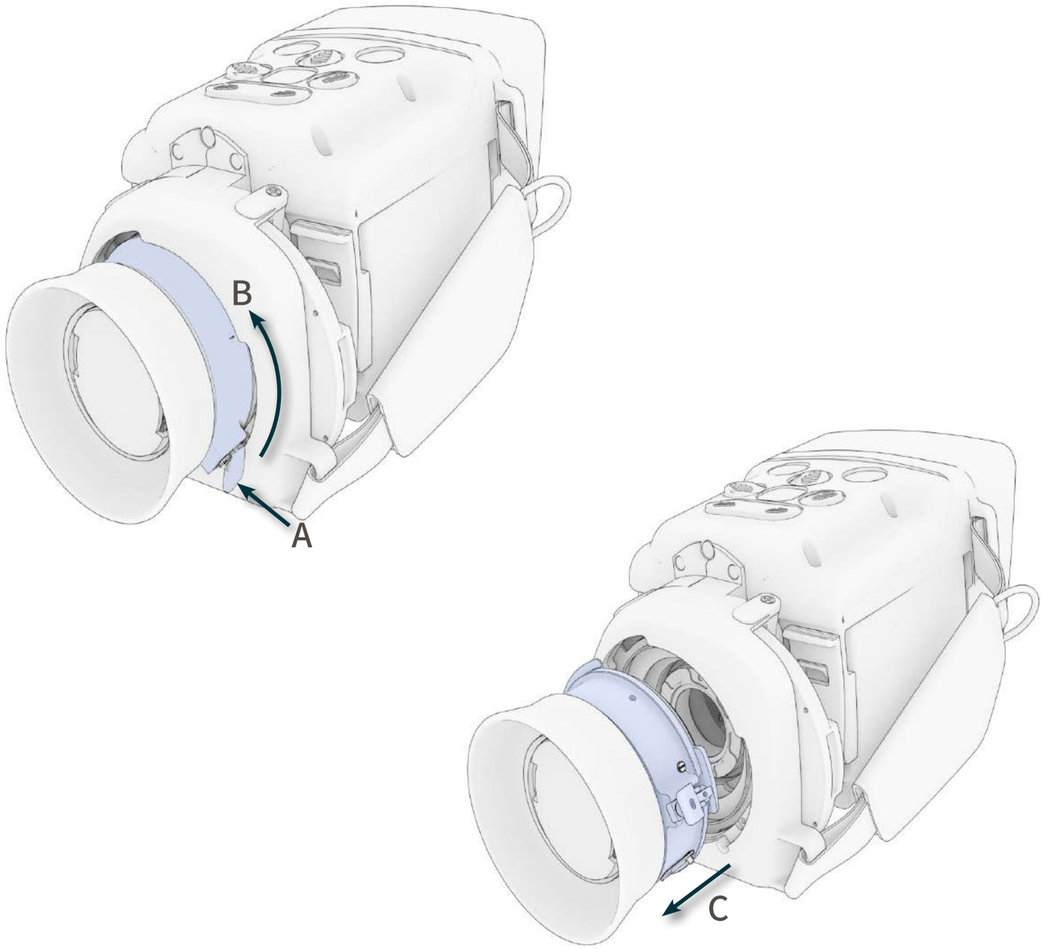


Replacing the Lens

	CAUTION
	Lens replacement should be done in a clean area. Ensure the lens stays free from dust or dirt particles (see Cleaning the Lens), and that dust or dirt particles do not enter the camera when replacing the lens.

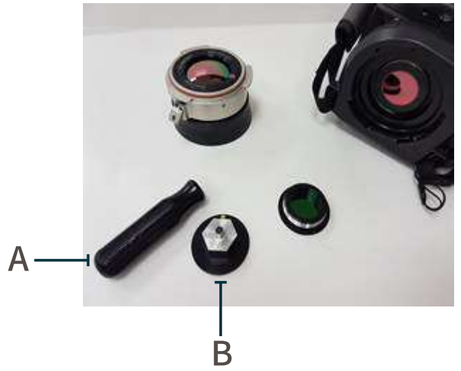
To replace the camera lens:

1. Press the quick release latch (A) towards the camera body.
2. While holding the latch (A), rotate the lens counter-clockwise to its releasing position (B).
3. Remove the lens from the camera (C) and cover both sides of the lens with the protective cap.
4. Connect the replacement lens to the camera and rotate it clockwise until it clicks in place.



Replacing the Optical Filter

CAUTION
▪ Be careful not to touch the optical filter. ▪ Optical filter replacement should be done in a clean area. Ensure the filter stays free from dust or dirt particles, and that dust or dirt particles do not enter the camera when replacing the filter.



To replace the optical filter:

1. Power off the camera.
2. Remove the lens from the camera (see Replacing the Lens).
3. Assemble the filter replacement tool by inserting the handle into the tool head (B) onto the handle (A).
4. Insert the tool into the camera and turn counterclockwise (C) to remove the optical filter which is currently in the camera.
5. Place the removed filter into the optical filter box.
6. Point the camera up and gently insert the new filter into the camera.
7. Using the tool, turn the optical filter clockwise until tight.
8. Reconnect the lens to the camera.

NOTE
After replacing a filter, a NUC calibration is required.

Technical Specifications

Gases detected	400+ compounds such as: Methane, Acetic acid, Benzene, Butadiene, Butene, Butane, Dimethyl-Benzene, Ethane, Ethylene, Ethyl benzene, Ethylene oxide, Hexane, Heptane, Isobutylene, Isopropyl alcohol, Isoprene, Methanol, MEK Methyl Ethyl Ketone, Octane, Pentene, Propane, Propanal, Propanol, Propylene, Propylene oxide, Styrene, Toluene, Xylene
Detector Type	Cooled high sensitivity MCT, 320 x 240 pixels
Spectral Range	Default for VOC 3.2µm to 3.4µm Optional for CO2 filter 4.2µm to 4.3µm Optional for heavier alkanes 3.3µm to 3.5µm and the ability to detect at longer distances avoiding the influence of water vapors in the atmosphere
Optics	18.5° x 13.6° with 30mm lens, F# 1.1, manual focus
Imaging Modes	Normal IR, Enhanced, Thermography, and Visible Spectrum
Thermography	Spot temperature measurement, 8 color palettes
Connectivity	WiFi (2.4 GHz), Bluetooth, and Ethernet over USB
Physical Properties (Size / Weight)	230mm x 110mm x 130mm (9" x 4.3" x 5.1") / 2.3kg (5lbs) w/o battery

Maintenance

To prevent the lens from becoming scratched, always mount the lens cover on the lens when the camera is not being used.

Cleaning the Lens

If the IR lens becomes dirty or smudged, use the LensPen to clean the lens:

1. Remove dirt and dust particles from the lens surface with the LensPen brush.
2. Wipe the lens surface with the LensPen cleaning tip using circular motions.

	**CAUTION**
	Do not wipe or rub the lens with any cloth other than one intended for optics use.

Cleaning the LCD Screen and Camera Body

The LCD protective screen may be cleaned with a dampened optical cloth or tissue.
The camera body may be cleaned with a soft cotton cloth dampened with water. Do not use any solvents.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION	SEE
The power-up sequence does not start after pressing the **Power** button.	Battery is not connected properly.	Disconnect and reconnect the battery. Verify the battery is securely in place.	pg. 80
	Battery is empty.	Switch to a different battery.	pg. 80
IR video doesn't appear after power-up sequence ends.	Lens cover is still mounted on the lens.	Remove the lens cover from the lens.	pg. 26
Ghost video appears with the real video.	NUC on scenery.	Mount the lens cover on the lens and perform the NUC sequence.	pg. 41
Recording process stops without pressing the **Record** button.	Internal memory runs out of storage.	Transfer files from the camera to a computer or tablet, then perform the recording again.	pg. 68
	Battery is depleted. **Note:** The camera ends a recording sequence when less than 3% of battery charge is left.	Switch to a different battery.	pg. 80
The massage “Scan and Fix” appears on the computer after connecting the camera.	Causes vary. **Note:** This is a Windows warning.	Follow the Windows prompts to perform the disk scan.	---

Technical Support

NOTE
Consult the Troubleshooting section of this manual before contacting Opgal regarding a technical support or service matter.

Technical support

For technical support inquiries, follow the inquiry submission instructions on our technical support page at https://www.opgal.com/contact-us. Our team will assess your question or issue and respond back to you within 24 business hours.

Service

If your EyeCGas® 2.0 infrared camera is not performing properly, contact Opgal at +972 4-995-3961. Describe the problem to the Opgal representative as completely as possible. For your convenience, your representative may try to help you diagnose or correct the problem over the phone. Before returning your EyeCGas® 2.0 infrared camera, verify with your representative that the product should be returned to Opgal. Opgal Customer Service will provide you with written permission and a return merchandise authorization (RMA).

If the return is a non-warranty repair, an Opgal Customer Service Representative will provide you with a repair invoice estimate. To authorize repair, you must provide Opgal a purchase order for the amount of the estimate. Once Opgal receives your authorization, we will issue you a return authorization number so that you can return the unit for service. If the cost of repairs exceeds the stated quote by more than 15%, an Opgal representative will re-estimate your repair and will contact you for authorization to complete repairs. After repairs have been completed, the unit will be returned to you and Opgal will invoice you for the actual repair amount.

Prior to returning your product, decontaminate and clean it to remove any hazardous or contaminated materials that may have settled on the product during use. Laws and/or shipping regulations prohibit the shipment of hazardous or contaminated materials. Products suspected of contamination will be professionally decontaminated at the customer's expense.

	CAUTION
	Do not attempt to disassemble the sealed case of the EyeCGas® 2.0 camera. If the unit is not functioning properly, return it to Opgal for evaluation. Disassembling the unit voids all warranties.

Warranty

Opgal warrants to the original purchaser that the EyeCGas® 2.0 and all features/accessories installed in the unit are free of defects in materials and workmanship under intended use and service for a period of one (1) year from date of manufacture. Opgal's obligation under this warranty is limited to repairing or replacing, at its option, articles that are returned within the warranty period and that, after examination, are shown to Gas Leak Solution's satisfaction to be defective, subject to the following limitations:

- Article must be returned to Opgal with shipping charges prepaid.
- Article must not be altered from its original configuration.
- Article must not have been misused, abused, or damaged in transport.
- Maintenance and field replaceable items, if defective, are covered under warranty for a ninety (90) day period. These items include:
  - Batteries
  - Straps
  - Display covers
  - AC/DC adapters
- All other parts and accessories except those installed in the EyeCGas® 2.0

Opgal provides a limited lifetime warranty on the EyeCGas® 2.0 outer shell. This warrants that the outer shell is free of defects in materials and workmanship under intended use and service for the original purchaser. Opgal's obligation under this warranty is limited to repairing or replacing, at Opgal's option, articles that after examination are shown to Opgal' s satisfaction to be defective, subject to the following limitations:

1. Article must not be altered from its original configuration.

2. Article must not have been misused, abused, or damaged in transport.
3. When the outer shell is obsolete and Opgal no longer stocks the part, the limited lifetime warranty will be terminated.

In no event shall Opgal be responsible for damages, loss of use, or other indirect, incidental, consequential or special costs, expenses or damages incurred by the purchaser, notwithstanding that Opgal has been advised of the possibility of such damages.

Any implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to one (1) year from the date of manufacture.

Some states do not allow the exclusion or limitation of incidental or consequential damages or allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Extended Warranty

The extended warranty has all the same terms and conditions as the one-year warranty, except it is for a period totaling two years (standard one-year warranty plus one additional year).

Contact Information

For help with this device, please contact Opgal at:

Website

www.opgal.com

E-mail

info@opgal.com

Phone

Israel: +972 4-995-3903
USA: +1 678-578-4700, ext. 1

Address

Opgal Optronic Industries Ltd.
Industrial Area 5
11 Hanapach Street,
KARMIEL 2165317
Israel

Certifications

This equipment is suitable for use in hazardous locations as certified below:

- UL1604, Electrical Equipment for Use in Class I and II, Division 2, and Class III (Classified) Locations.
- CSA C22.2 No. 213-M1987, Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations.
- ANSI/ISA-12.12.01 - Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III Hazardous (Classified) Locations.
- ATEX for zone 2 rating as:

  Ex ic nA nC IIC T6 Gc
  Ex ic IIIC T85 °C Dc
  Ex II 3 GD
- IECEx EMT 19.0006X
- Intrinsic Safety "ic"
- Protection "n"

This equipment is certified IP65 water jets and dust resistant as stated below:

With Jetting Water (IP65) - CEI / IEC 60529: 1989+A1:1999 Degrees of protection provided by enclosures (IP Code). Paragraph 14.2.5 - Test for second characteristic numeral 5 with the 6.3 mm nozzle.

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