





# **The Blueye Basekit**



## Drone



The drone is safe to submerge in water to a depth of 305 m / 1000 ft.

# Surface Unit 2.0

The Blueye Surface Unit (*S.U.*) is installed inside the tether reel. All S.U. buttons and cable ports are accessible through openings in the front cover on the reel. If you need to separate the S.U. from the reel, use the included tools to unscrew the reel cover.







The surface unit is turned on.



The surface unit is turned on and connected to the drone.



Battery level is low. Push the button with the battery symbol to check the battery level.



Battery is fully charged. Push the button with the battery symbol to check the battery level.

The surface unit can withstand water spray from any direction (IP64) when the USB-C port lid is properly attached. The surface unit CANNOT be submerged in water.



The operator shall maintain a min. distance of 20 cm and max. distance of 30 m to the surface unit.

## Charger





The charger is NOT splash proof. It needs to be kept away from water and dust.



To charge the battery inside the drone with the charger cable, set the charger selector switch to the drone symbol.



To charge the battery outside the drone by connecting it directly to the charger, set the charger selector switch to the battery symbol.



The battery is charging.



The battery is fully charged.

# **Remote controller**

The controller layout will vary based on the type of controller you are using. The mapping will also change depending on what external equipment is connected to the drone. **The diagrams below illustrate the basic control mapping for PXN and Xbox controllers when no equipment is connected.** See the modified diagram for your specific equipment in the Blueye App.





**Some of the buttons have multiple functions:** Press and hold down the *Left alt\** (*LB*) or *Right alt\** (*RB*) to enable the (\*)-actions.

See pagepage 19 to learn how to pair the PXN and Xbox controllers to a mobile device.



### Left stick

Up/down and sideways

### **Right stick**

Forwards/backwards and turning



The left and right sticks control the movements of the drone under water.

#### Slow mode and Boost mode

Press and hold the left or right lower triggers (**LT** or **RT**) to gradually decrease or boost the thrust power. You can also set a fixed thruster power with the static boost function. See the illustration on the next page.

Decreasing the thrust is recommended in situations where higher precision is needed, for example stable video shoots or tricky navigation. Boosting the thrust can be helpful when diving in higher currents or if faster motion is needed. Note that boosting will drain the battery faster.

### Directional pad (D-pad)

Tilting the camera



Use the D-pad buttons to tilt the drone camera upwards and downwards. Tilting the camera will allow you to increase the vertical field of view.



### Left alt\* and Right alt\*

Adjust static boost



Capture still picture



# **Evaluating conditions and safety**

Do your first few dives in line of sight in calm waters to get accustomed to the controls and the behavior of the vehicle.







# **Preparing for launch**

### Batteries



80%

Make sure the batteries on the drone, surface unit, controller and mobile device are at least 80% charged before you go diving.



20%

When the battery in the drone reaches 20% when diving, go back to shore.

### Secure equipment



Make sure to place the tether reel in a steady and secure position to avoid the reel and surface unit getting dragged into the sea.

It's recommended to tie/secure the reel to something stationary, like the boat, dock railing or a tree.

### **Ballast weights**



Seawater and freshwater have different densities, and ballast weights are provided to compensate for the difference.

#### **Configurations for diving WITHOUT external equipment:**

Freshwater:	no ballast weights
Brackish water:	1 ballast weight
Saltwater:	2 ballast weights

### Configurations for diving WITH external equipment:

Check the Blueye Help Center (support.blueye.no) to learn the specific ballast weight configuration needed for your external equipment set-up.



# **External Equipment**

### **Guest ports**

The three guest ports (GP1, GP2, GP3) on the Blueye X3 offer eight different communication protocols and three different power levels to support a variety of external peripherals.

The connector consists of a mechanical housing and a small circuit board connecting with spring-loaded pins on the drone side. The configuration of the circuit board is selected based on which protocols and power levels a particular piece of equipment uses. See page 38 for power and protocol specifications for each of the guest ports.



### **Blind Plugs**

The Blueye X3 comes with three blind plugs installed in the three guest ports. These plugs prevent water from entering the drone when no accessory is connected to the guest port.

The plugs are "smart" so the drone and the app can detect if they are plugged in or not. If a user leaves one guest port open, the app will display a warning before starting a dive. Additional information such as manufacturer, depth rating, and serial number can be found in the Blueye App under "Settings".



To learn how to install and operate your specific external equipment, please check the user guides and video tutorials listed in the Blueye Help Center (support.blueye.no).



Make sure the drone is turned OFF while connecting external equipment to the Guest Port(s).

## Turn on & connect



**Download the Blueye App.** Search for "Blueye" in the App Store or Google Play. To avoid interruptions during the dive, set the mobile device in Airplane mode before diving. Make sure that Wi-Fi and Bluetooth are still on.



Turn on the surface unit by pressing the power-on button. The power button will light up, and the surface unit will initialize. The battery status LEDs will sweep from side to side. Once the initialization is completed, the battery status LEDs will show the current battery charge.



**Turn on the drone** by putting the "ON" side of the magnet against the LED light window until a melody is played and lights start blinking. The magnet is attached to the reel.



## Connect to the Blueye Wi-Fi network, by scanning the OR code on the reel or by opening the Wi-Fi settings on your iOS/Android device to connect manually: SSID: "Blueye\_XXXXXX" Default password: 1234567890



**Connect the controller** to your mobile device using Bluetooth. Follow the steps below.

## 1. Set the controller to pairing mode

<u>Xbox Controller for iOS and Android:</u> Press the Xbox button (a) to turn on the controller. Press and hold the Pair button ((C) for 3 seconds and release.

<u>PXN iOS Controller</u>: Press and hold the power button () until all LEDs start blinking red, then hold the Bluetooth button () for about 5 seconds until LEDs start blinking at a faster rate.

<u>PXN Android Controller</u>: Press and hold the A button O and then the MODE button O at the same time until a blue LED starts blinking at a fast rate.

## 2. Pair with mobile device

Open the Bluetooth settings on your mobile device and select the controller from the list of available devices.

- The Xbox Controller will appear as **Xbox Wireless Controller**.
- The PXN iOS Controller will appear as **Speedy Gaming Controller**.
- The PXN Android Controller will appear as PXN-9613. (May appear as «00:11:22:33:FF:EE» the first time you connect.)



If the controller is not found or you are unable to connect, restart the controller and turn Bluetooth off/on.

# **Calibrating the drone compass**

Do not calibrate the compass where there is a chance of strong magnetic interference, such as magnetite, large steel structures or steel reinforcements underground.

It is recommended to calibrate the compass in the following situations:

- Before the first dive after receiving your drone
- First dive after mounting new external equipment to the drone
- Diving at a new location after traveling with your drone
- When the Blueye app warns you that the compass needs calibration

Compass Calibration

 Tap the "Compass Calibration" button under "Drone Settings" in the app, then follow the on-screen instructions.



 Hold the drone vertically and turn around 360°. Flip the drone upside down and turn back around 360°.



 Hold the drone lying on its side and turn around 360°. Flip the drone so that it is lying on its other side and turn back around 360°.



 Hold the drone with the camera pointing up and turn around 360°. Flip the drone so that the camera is pointing down and turn back around 360°.



 Place the drone securely on a horizontal surface and tap "Finish calibration" in the app. Wait for the drone to finish the calibration process.

# App

## App layout

The app layout will change depending on what external equipment is connected to the drone. The diagrams below illustrate the basic app layout and functions when no equipment is connected.



Depth

Function buttons



Tap the screen to open the touch interface controller.

#### **Function buttons**





# Diving

## Deploying the drone



When possible, lower the drone slowly into the water using the top handle. A boat hook may also be helpful.

When lowering the drone into the water, take notice of any obstacles, or catch points.

/ Not advised



If the "preferred" method is not possible, lower the drone by the tether using a hand-overhand motion.

Note that it's not recommended to lower the drone by the tether as this will shorten the lifetime and effectiveness of your tether cable.



**DO NOT** throw the drone into the water.

### Watch on multiple devices

Download and launch the «Blueye Observer» App and connect the devices to the Blueye network. You can also stream the live drone footage in a Teams meeting. Visit the Blueye Help Center (support.blueye.no) for more info.

# **Ending a dive**

When your battery charge reaches 20% or less, or you are finished with your dive session, bring the drone back to where the pilot is located.



#### Turn OFF auto-depth and heading

Before picking the drone up from the water, make sure that both lock depth and lock heading are turned off. If not, the thrusters will try to compensate for movements also when the drone is out of the water.



#### **Retrieve the drone**

Place your mobile device and controller in a stable and secure position.

Pick up the drone from the water, preferably by the top handle.

#### End dive in app

Press the drone icon in the top left corner and hit the «End Dive» button.

### Transfer media files and generate dive report

You can transfer and share videos, images, and dive data to a mobile device directly after the dive. See «Transferring videos and images» on page 28 and «Transferring and sharing dive logs» on page 29.

#### Power OFF the system

When finished with the dive, turn off the drone, surface unit, and controller.



The drone is turned off by putting the "OFF" side of the magnet against the LED light window on the drone. The magnet is attached to the reel. When the drone is turned off, all indicator lights in the LED light window will be off.



Turn off the surface unit by pressing the power button.

# After each dive in saltwater

### Rinse drone and tether

To avoid unnecessary wear on the drone and tether, rinse with freshwater after each dive.

The drone can either be submerged in freshwater (indoors and outdoors) *or* rinsed with a hose. Running the thrusters submerged in freshwater after each dive will keep them in shape longer.

The tether should also be rinsed when used in saltwater. Unroll the tether from the reel to rinse.

Keep the Blueye Surface Unit away from the water and make sure to properly close the rubber connector lid.





# Transferring videos and images

Transferring video and images from the drone can either be done in the app or on a PC.



### To transfer videos and images to a mobile device

- Turn on the drone and the surface unit, connect the mobile device to the surface unit Wi-Fi.
- 2. Start the Blueye app, and choose "Transfer media files".
- Select the files you want to transfer and press "Transfer". You can find the files in your device's media library.



### To transfer videos and images to a PC

- 1. Go to this address: www.blueye.no/Software/FileTransfer
- Download and install the Blueye File Transfer Desktop App on the computer.
- Turn on the drone and the surface unit and connect the computer to the surface unit Wi-Fi.
- Open the Blueye File Transfer Desktop App and choose which files to download to the computer.
- 5. Turn off the drone when files have been transferred.

# Transferring and sharing dive logs

### Download and view dive logs

After completing your dive, you can synchronize dive logs from your Blueye drone to your mobile device. On the main tab of the app, when still connected to the drone, tap the "Sync log files" button to download and import dive logs.

After dive logs have been synchronized to your mobile device, tap the "Dives" tab icon in the app to view a list of your dives.

### Edit and share dive details

Simply tap one of the dives in the list to view additional details, add additional details, or export the dive log as a PDF, Word or CSV file. Any related media files transferred from your drone to your mobile device will also be available in the dive log view.

### Learn more

Visit the Blueye Help Center (support.blueye.no) for more information and tutorials on generating dive reports, making custom report templates, and downloading captured media.



Blueye Help Center

support.blueye.no

# **Charging the batteries**

Before charging the drone make sure that the drone is turned off. Connect the power supply to the charger and to an electrical socket. Make sure that the charger switch is set to the drone symbol. *See page 6.* 

Place the drone on a robust and stable surface to remove any risk of the drone falling over (preferably laying on the side). Unscrew the charging cap on the drone and connect the charger to the charging port on the drone with the included charging cable.

Open the connector lid on the surface unit and connect an external charger cable to the charging port. Use the other USB output on the external USB charger to charge the controller. (Xbox controllers do not incl. rechargeable batteries as standard.)

After all components are fully charged, disconnect the plugs from the electrical socket.







Do not turn the drone on while charging, it may damage the drone and/or charger. When finished charging remember to put the charging connector cap back on.

# Charging the battery outside of drone



Warning: We recommend charging the battery inside the drone as often as possible, to limit wear of the o-rings on the aluminum lid.







- 1. Open and remove the battery cover.
- **2.** Unscrew the aluminum lid with the pin spanner to open it.
- 3. Pull out the battery.
- Make sure that the switch on the charger is set to the "battery" symbol when charging.
- Remove the blue cover on the charger and connect the battery directly to the back of the charger. Then connect the charger to an electrical outlet.



- Inspect o-ring for damages. Put a small amount of silicone grease on the o-ring before closing the lid.
- Insert the battery. Make sure that the arrow on the battery is pointing upwards.
- Make sure that the battery is pushed all the way in. There are two guiding pins at the bottom of the battery canister that will align the battery with the connector. Fold down the handle.
- 9. Close the aluminum lid with the pin spanner. Make sure to not tighten the lid too much, but there shouldn't either be a large gap between the aluminum lid and the aluminum tube. Be careful to not damage the threads of the lid when closing.
- 10. Close the battery lid by sliding it along the battery tube. The battery lid cannot be pushed all the way in. Tightening the thumb screw will move the lid into place.

# **Maintenance/Service**



### List of serviceable parts:

- Propeller
- Tether\*
- Thrusters\*

\*See separate service manuals and online video tutorials.

#### Video tutorials

You can find video tutorials on how to perform maintenance work on the Blueye drone under *Tutorials* at <u>support.blueye.no</u>



Blueye Service Manual

support.blueye.no

# **Propeller replacement**



If one of the propellers is broken, they can easily be replaced with a spare propeller. Cleaning the propeller should also be done regularly, especially if diving in saltwater.

### Vertical propeller replacement

Remove the grid on top and unscrew the propeller to replace it with a new one.

1. Remove the grid on the top.





**2.** Unscrew the propeller with a hex key.



### Lateral propeller replacement



1. Remove the battery cover.



**2.** Unscrew the 3 screws that hold the side covers with a hex key.



3. Open the side cover.



**4.** Unscrew the 2 screws holding the propeller.



**5.** Pull the propeller out to replace it with a new one.

### Forward/Backwards propeller replacements



**1.** Unscrew the 4 screws holding the thruster grids in place.



**2.** Remove the grid.



**3.** Unscrew the 2 screws holding the propeller.



**4.** Pull the propeller out and replace the propeller with a new one.

# Specifications Blueye X3

# Drone specifications

Ingress protection Dimensions Weight in air Construction

Buoyancy material Maximum rated depth Forward speed at normal use Thrusters Run time at normal use Operating temperature

### Guest Port 1

Power

Protocols

### Guest Port 2

Power

Protocols

### Guest Port 3 Power

Protocols

IPX8 485 x 257 x 354 mm (LxWxH) 8.6 kg (with saltwater ballast) ABS enclosures, Aluminum pressure enclosures, Polycarbonate (PC) windows HCP 30 Polymer Foam 305 m 1.5 m/s (3 knots) 4 x 350 W Approx. 2 hours -5 to +35 °C

5V (2.1A shared), BAT (7A), 20V (2A shared) ETHERNET 10/100Base-T/TX, RS232 (or RS485/RS422), 12C, PWM, UART

5V (2.1A shared), BAT (7A), 20V (2A shared) ETHERNET 10/100Base-T/TX, RS232, 12C, PWM, UART

5V (2.1A shared), BAT (7A), 20V (2A shared) ETHERNET 10/100Base-T/TX, RS232, USB, 12C, PWM, UART

#### Camera

Mechanical tilt Vertical field of view Sensor Max image size Shutter speed Picture max resolution Picture type Video resolution

Video type Video storage bit-rate SD card

### LED lights

Luminous flux Colour temperature Colour rendering index (CRI) Adjustable dimming

### **Smart Battery Pack**

Nominal Voltage Nominal Capacity Nominal Energy Operating temperature Charging temperature -30 to +30 ° 115 ° Exmor R CMOS, 1/2.8 inch 1920 x 1080 pixels 1/30 s – 1/8000 s 2M (1920 x 1080) JPEG FHD: 1920 x 1080 25/30 Fps, HD:1280 x 720 25/30 Fps MP4 2 to 16 MBit/s 256 GB

3300 Lumen 5000 K 90 Yes

14.8 V 6500 mAh 96.2 Wh -5 to +35 °C 5 to 30 °C

#### Sensors

IMU

Depth sensor Depth sensor operating range Temperature sensor

#### Tether

Length Breaking strength Number of cables Size

### Controller

Compatibility

### Surface Unit specifications Surface Unit

Ingress protection Dimensions Operating frequency Max Wi-Fi distance Battery Runtime/Charging time Operating temperature Charging temperature Transmitter power Operating voltage USB C Internal Antennas 3 axis gyro & accelerometer & magnetometer Resolution: 0.2 mbar 0 to 30 bar +/-1 ℃

Up to 300 m 100 kg 1 twisted pair (copper) 26 AWG

iOS and Android

IP64 38 x 149 x 158 mm (LxWxH) 2.4 GHz / 5.8 GHz 30 m 19.48 Wh 6h 0 to +35 °C +10 to +35 °C 125 mW 5 - 8.4 V In: 5 V, 2.1 A - Out: 5 V, 400 mA Dual-band 3.8dBi

## Charger specifications Charger

Dimensions Operating temperature Operating rel. humidity Input Output

### **Power supply**

Input Output Operating temperature Operating rel. humidity Manufacturer Model 56 x 107 x 64 mm (LxWxH) +5 to 30 °C 20% to 80% 19.5 V, 4 A 16.8 V, 2.5 A

100 - 240 V, 3A, 50 - 60 Hz 19.5 V, 11.8 A 0 to 40 °C 20% to 80% FSP GROUP FSP230-A JAN3

# Symbol overview

### Drone

ባ	Standby	0	Charging. Shows where to connect the charging cable.
Charger			
0	Charging symbol		Battery charging symbol
न्द	Drone symbol		Battery fully charged symbol
	Battery symbol		

## Surface unit



Standby



Drone. Lights up when the surface unit is turned on and it is connected to the drone.

Battery checking.



Charging. Shows where to connect the charging cable.

#### Markings

Waste Electrical and Electronic Equipment (WEEE as in directive 2012/19/EU) should not be mixed with general household waste.

CE

CE (Conformité Européenne) indicates compliance with requirements regarding the safety. environmental impact, health, and consumer protection for products sold within the European Economic Area. The full text of the EU declaration of conformity is available at the following internet address: www.blueyerobotics.com.

# FC

Changes or modifications to the equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- ISED This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage ; (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

It is strictly prohibited to replace the antenna by any antenna not approved by Blueye.

### **Recycling information**



This product should not be disposed of in the general household waste. Instead, in order to prevent possible harm to the environment or human health from uncontrolled waste disposal, please dispose of this product separately in accordance with your local laws and regulations. Please check with your Local Authority or retailer for recycling advice.

#### Manufacturer markings

Marking plate for the drone can be found on the outside of the tube containing the battery. See section "Charging the battery outside of drone" for instructions on how to gain access to the battery tube.

# **Battery warnings**

The following warnings apply to both the Blueye Surface Unit and the Blueye Smart Battery.

Important: Blueye Surface Unit battery is only accessible to Blueye service personnel and cannot be accessed by any means by the user or operator. Only the Blueye Smart Battery can be accessed by the user or operator.

- CAUTION: RISK OF EXPLOSION IF (Drone) BATTERY IS REPLACED WITH AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.
- Do not dispose batteries in household waste. Obey local waste disposal regulations.Do not subject the battery to mechanical shock.
- Observe the plus (+) and minus (-) marks on the battery and equipment and ensure correct use.
- Always purchase the battery and charger from Blueye Robotics.
- Keep the battery clean and dry.
- Wipe the battery terminals with a clean dry cloth if they become dirty.
- The battery needs to be charged before use. Always use the correct charger and refer to the Start Guide for proper charging instructions.
- Do not leave the battery in prolonged charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the battery several times to obtain maximum performance.
- Retain the original product literature for future reference.
- Use the battery only for the application for which it was intended.
- When possible, remove the battery from the equipment when not in use.
- Only charge the drone battery with the supplied charger. A charger that is suitable for one type of battery pack may create a risk of fire when used with another battery pack.

- When battery pack is not in use, keep it away from other metal objects, like paper clips, coins, keys, nails, screws or other small metal objects that can make a connection from one terminal to another. A short-circuit of the battery terminals can lead to burns, fire and serious injury.
- Under abusive condition, liquid may be ejected from the battery; avoid contact.
- If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help. Liquid ejected from battery may cause irritation or burns.
- Do not use a battery pack or appliance that is damaged or modified.
  Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion or risk of injury.
- Do not expose a battery pack or appliance to fire or excessive temperature. Exposure to fire or temperature above 130 °C (266 °F) may cause explosion.
- Follow all charging instructions and do not charge the battery pack outside of the temperature range specified in this instruction. Charging improperly or at temperatures outside the specified range may damage the battery and increase the risk of fire.
- Do not open, modify or attempt to repair the battery pack.
- Do not charge the battery pack in a damp or wet environment.
- Do not cover the charger or the battery pack with cloth or anything else. The charger and battery pack heats up during charge and lack of ventilation may result in fire or serious injury.
- Do not use the battery pack for appliances that it is not intended for.
- Keep battery packs and chargers away from children if not thoroughly supervised.
- Failure to comply with these warnings can lead to explosion, fire, leakage and/or serious injury.

FOR MORE TIPS, TUTORIALS AND VIDEOS VISIT **WWW.BLUEYEROBOTICS.COM** 

