IMDEX™

LOGRx™

USER GUIDE

A Leading IMDEX Brand

REFLEX™

About IMDEX

IMDEX is a leading global mining technology company that enables drilling contractors and resource companies to safely find, define and mine orebodies with precision and at speed.

We provide live data to allow for accurate, real-time decisions. By providing not only knowledge of the rocks but a greater understanding of the mine, our customers can mine with confidence and precision.

Our product offering includes an integrated range of drilling optimisation products, cloud-connected rock knowledge sensors and data and analytics to improve the process of identifying and extracting mineral resources for drilling contractors and resource companies globally.

Our unique end-to-end solutions for the mining value chain spans across our four portfolios; Drilling Fluids, Drilling Optimisation Technology, Rock Knowledge Sensors, and Software that ties it all together.

Our technologies and products allow smarter and safer decisions for people, assets and the earth.

For further information visit www.imdexlimited.com

LOGRx™

User Guide Contents

Preface

About IMDEX®

IMDEX® is a company built on inspiration, innovation and a drive for excellence in service.

We provide products for a range of industries including mining, construction, geotechnical engineering and exploration.

Only IMDEX® personnel or an IMDEX® agent is permitted to dismantle, repair or modify any part of a REFLEX™ instrument or solution.

Additional Resources

Visit our website for a complete list of all our products – **www.imdexlimited.com**

See the contacts page for your local IMDEX® office. For the online training, register at **www.imdexacademy.com**

Important Information

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Key and References

This guide may reference one of more of the following:

This symbol indicates information that, if ignored, could possibly result in personal injury or even death due to incorrect handling.

This symbol indicates information that, if ignored, could possibly result in personal injury or physical damage due to incorrect handling.

Notes provide extra information relative to the current topic.

Tips offer examples, reminders or other helpful pointers.

Menu to access Settings and other options on specific app for the supplied tool (top right and hand corner).

PPE Gloves

PPE Safety Boots

PPE Ear Muffs

PPE Hat

PPE Safety Glass

PPE Dust Mask

PPE Hard Hat

PPE Respirator Supplied Air

Product Overview

Easy-to-use core logging solution that provides fast, accurate structural measurements.

The LOGRx solution enables efficient structural data collection using a handheld digital device, while ensuring a dependable audit trail.

The inbuilt data verification capability using stereonet projections ensures orientations are accurate and reliable.

Accuracy and Ease of Use

The LOGRx handheld structural logging device can simply be rolled along the orientation line on diamond core automatically recording depth. Structural measurements can be taken at the press of a button.

Laser alignment with structures is far easier and more intuitive than other methods such as goniometers, and there is no need to remove the core from the core tray to log.

QA/QC and data editing is done at the point of data collection to ensure accuracy. Data then flows digitally, without the risk of alteration or error, from field to office.

Immediate Information

The LOGRx software allows real-time viewing of structural measurements from oriented drillcore on a stereonet and attribution of metadata against the structure for better decision making.

The LOGRx solution includes a seamless workflow into IMDEX's ioGAS™ for stereonet interpretation incorporating assay and other geoscience data.

Specifications

Application

Geologists in mining and exploration environments use the data from the LOGRx for a better understanding of the orientation of ore controlling structures.

Geotechnical engineers use the data from the LOGRx for safe and cost effective mine design.

Operation

The LOGRx solution allows users to gather accurate depth recordings with the flexibility to deal with zones of broken core by simply rolling along the orientation line.

Once the handheld device is aligned with a structure of interest the orientation of the structure can be recorded with a press of a button. Data can be immediately verified via the in-built stereonet plot.

IMDEX's ioGAS™ can then be used for further interpretation with other geoscience data.

Further Information

For more information please go to our website **www.imdexlimited.com** or contact your nearest IMDEX office.

Technical Specifications

Dimensions	190mm x 50mm x 50mm

Laser

Red Line Laser Class 2	Beam width: >90º

Bluetooth

Bluetooth tether between device and computer

Measurement Accuracy

Distance accuracy	Within 1cm per 1m (1% accuracy)
Angular measurements	Less than 4º *

Operating Temperature

Operating temperature	-20ºC to +55ºC

Battery

Rechargeable lithium battery

Software

Software requirements	PC running Windows 7 or later

LOGRx Kit Box

Includes	• Device • Test jig • Charging cable • Charger

** Overall accuracy is heavily user dependent.*

LOGRx™ Conventions

Overview

The LOGRx uses an inertial measurement unit (IMU) to determine the dip and dip direction of a structure. The IMU used contains a reference (or rate) gyro and measurements are taken in relation to a reference plane.

When the LOGRx is aligned with the orientation line the IMU's plane of reference is set to the planned dip and azimuth of the drillhole. As the device is moved and rotated so the laser is aligned with the structure of interest the measurement is taken relative to the reference plane. The alpha and beta angles are back-calculated from the dip and dip direction.

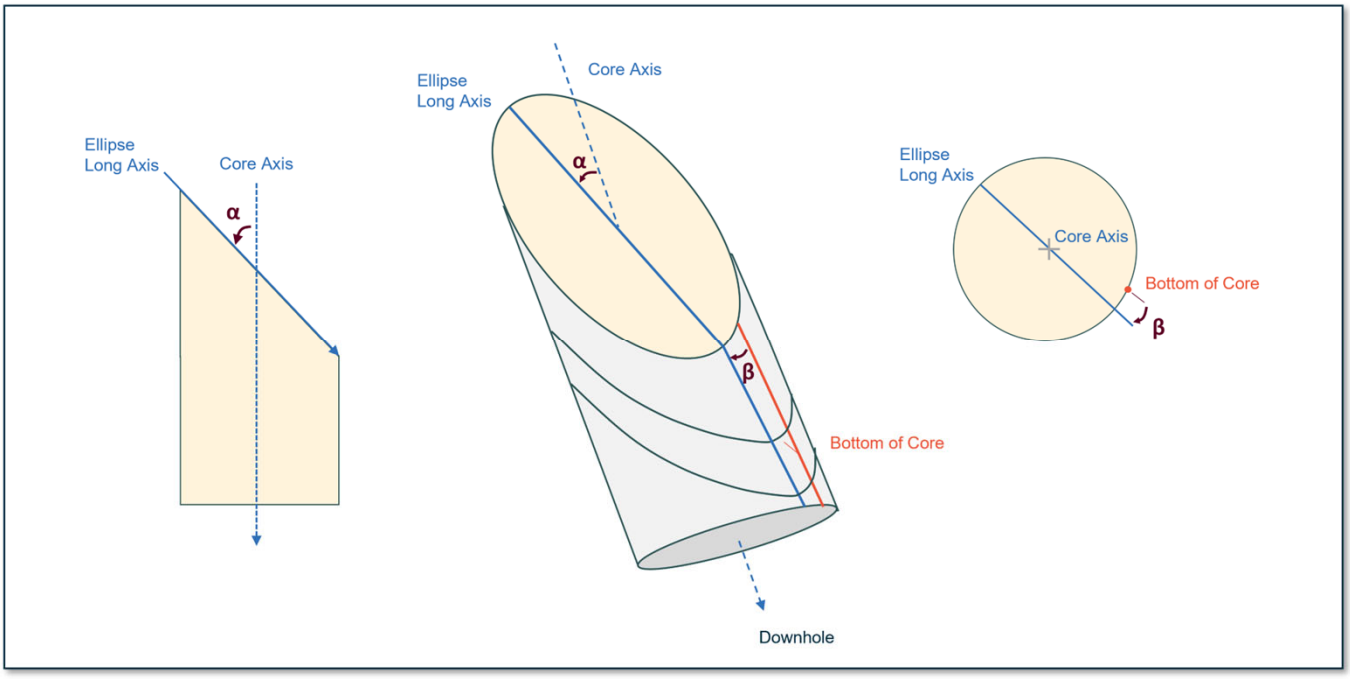
Note that erroneous measurements could occur if the core is moved after aligning the device with the orientation line.

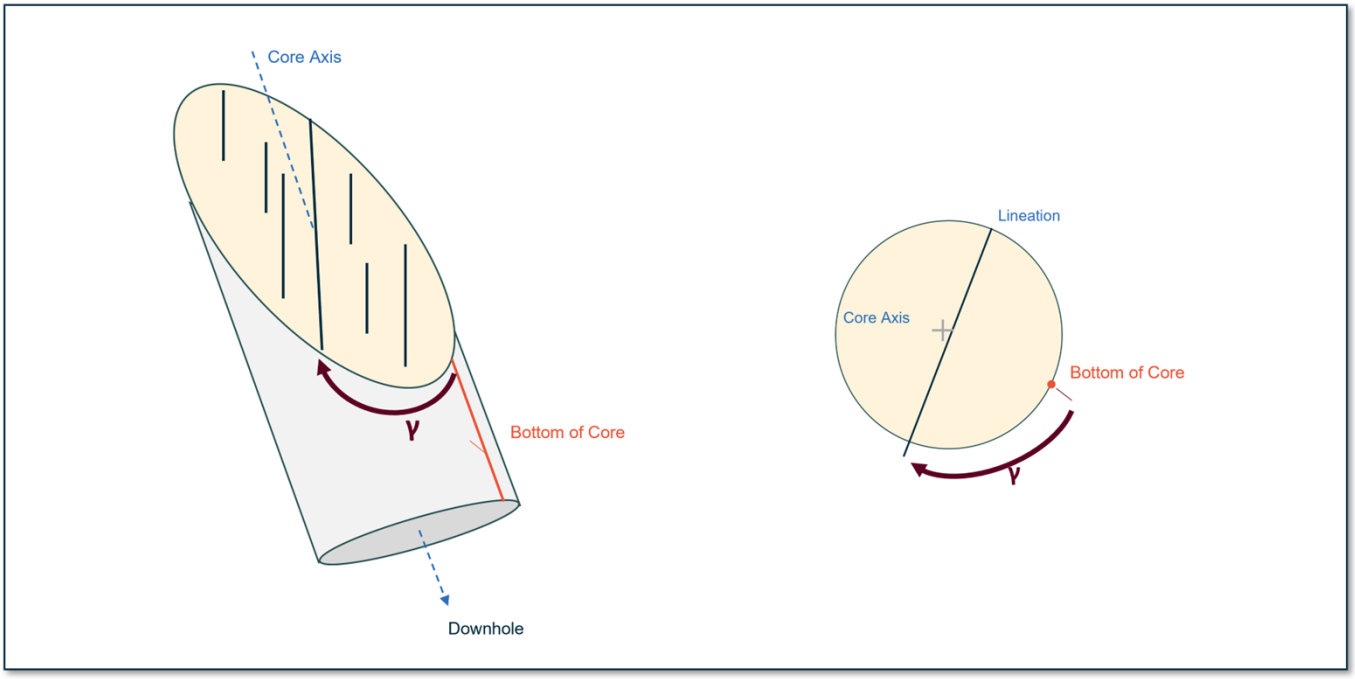
In this instance, it is necessary to re-align the device as the reference plane has moved. Also, because the gyroscopes used in IMUs drift over time it is important to align the device at regular intervals regardless of whether the core has moved.

Definitions

- **Hole Dip:** Measured from the horizontal plane with negative values downwards, for example -90º is a vertical hole.
- **Hole Azimuth:** 0º – 360º from True North.
- **Alpha Angle (*α*):** The acute angle between the long core axis and the long axis of the ellipse plane (0º – 90º).
- **Beta Angle (β):** The angle between the orientation reference line on the core and the bottom of the ellipse looking down hole, measured in a clockwise sense (0º-360º).
- **Dip Direction:** Direction of the dip of the plane relative to true north (0º-360º).
- **Gamma Angle (γ):** There are several different conventions for measuring lineation. LOGRx measures the gamma angle clockwise from the orientation line to the first intercept of the lineation with the core surface (0º-180º) when looking downhole, labelled 1 in the figure below. The lineation does not need to pass through the core axis.

LOGRx™ Conventions





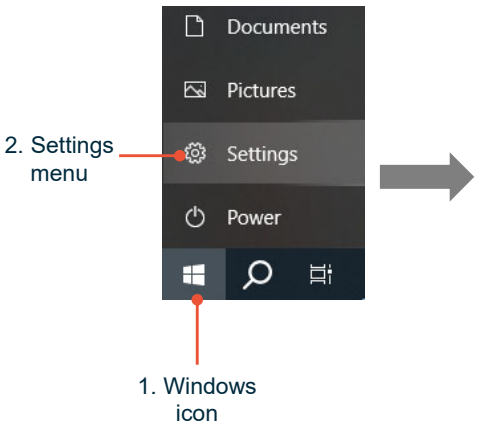
When the feature type is a lineation, the **plunge** and **plunge direction** of the lineation is recorded in the dip and **dip direction** fields, respectively. When plotted on a stereonet the lineation point/s should fall on the great circle of the plane if correctly measured.

Product Setup

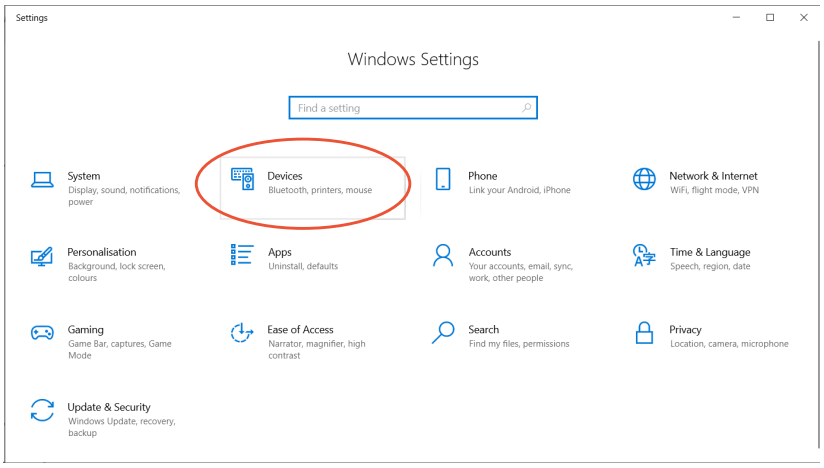
Turn on Bluetooth on your Windows PC

1 **Click on the Window icon located at the bottom left corner of your screen to open the Start Menu.**

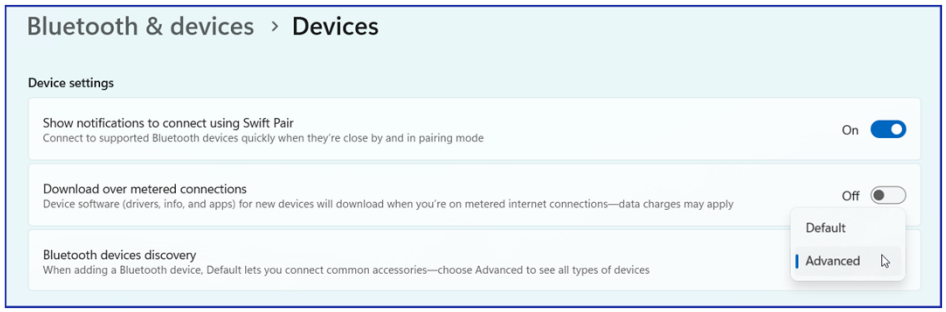
2 **Select the "Settings" gear icon to open the Settings menu.**



3 **In the Settings menu, select "Devices".**



4 **On the left side bar, choose "Bluetooth & devices".**



Toggle the switch to turn on Bluetooth if it's not already enabled.

On Windows 11 it is necessary to set the **Bluetooth devices Discovery** setting to **Advanced.**

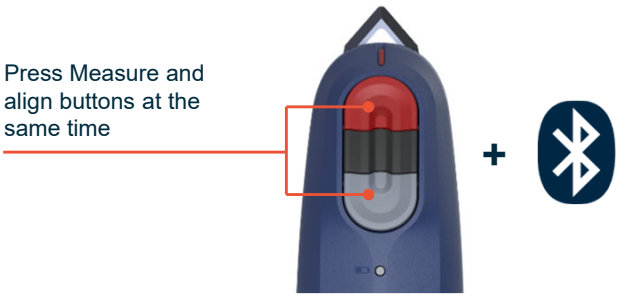
Prepare LOGRx for pairing

5 Charge Battery.

Plug in the supplied micro-USB cable.

Orange light on: Battery charging
Orange light turns off: Battery fully charged

6 Enable pairing mode on LOGRx.



Turn on the device and enter the pairing mode by pressing the Measure (red) and Align (grey) buttons at the same time for approximately 5 seconds until the blue and green lights illuminate; and the red-light flashes.

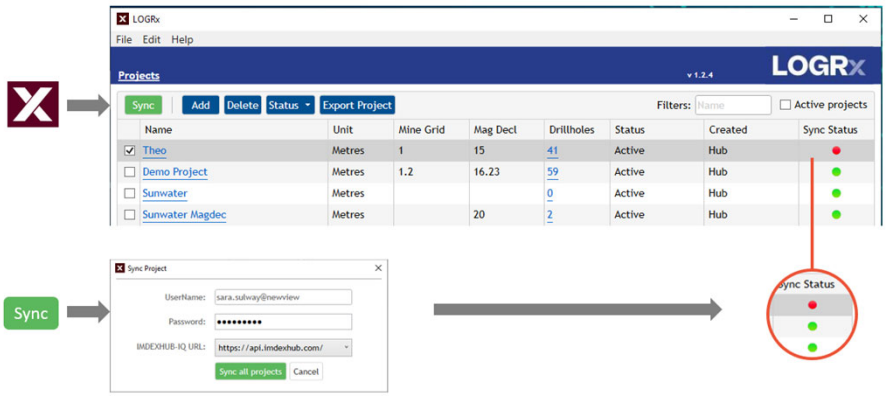
Pair LOGRx with Windows

Once Bluetooth is enabled on your PC and LOGRx is in pairing mode, Windows will automatically search for nearby Bluetooth devices and **IMDEX LOGRx** will appear in the list of Bluetooth devices.

7 Select IMDEX LOGRx from the list to complete the pairing process.

Once paired, the LOGRx device should appear under “Other devices” in the Bluetooth settings menu

8 Launch LOGRx app.



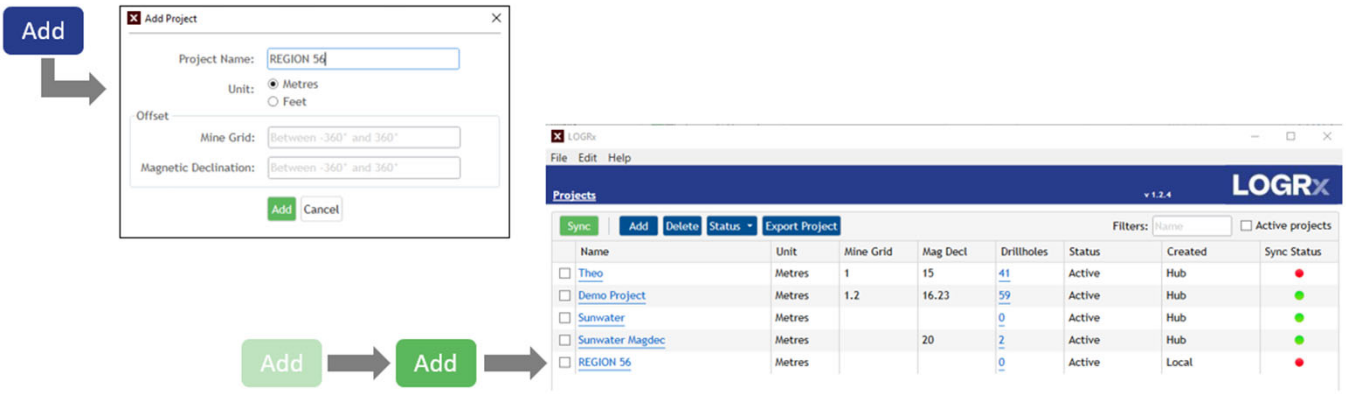
Sync with HUB

Double-click the desktop icon to launch the **LOGRx** app. The **Projects** screen displays. Press the **Sync** button to transfer data between **IMDEXHUB-IQ™** and the **LOGRx** software.

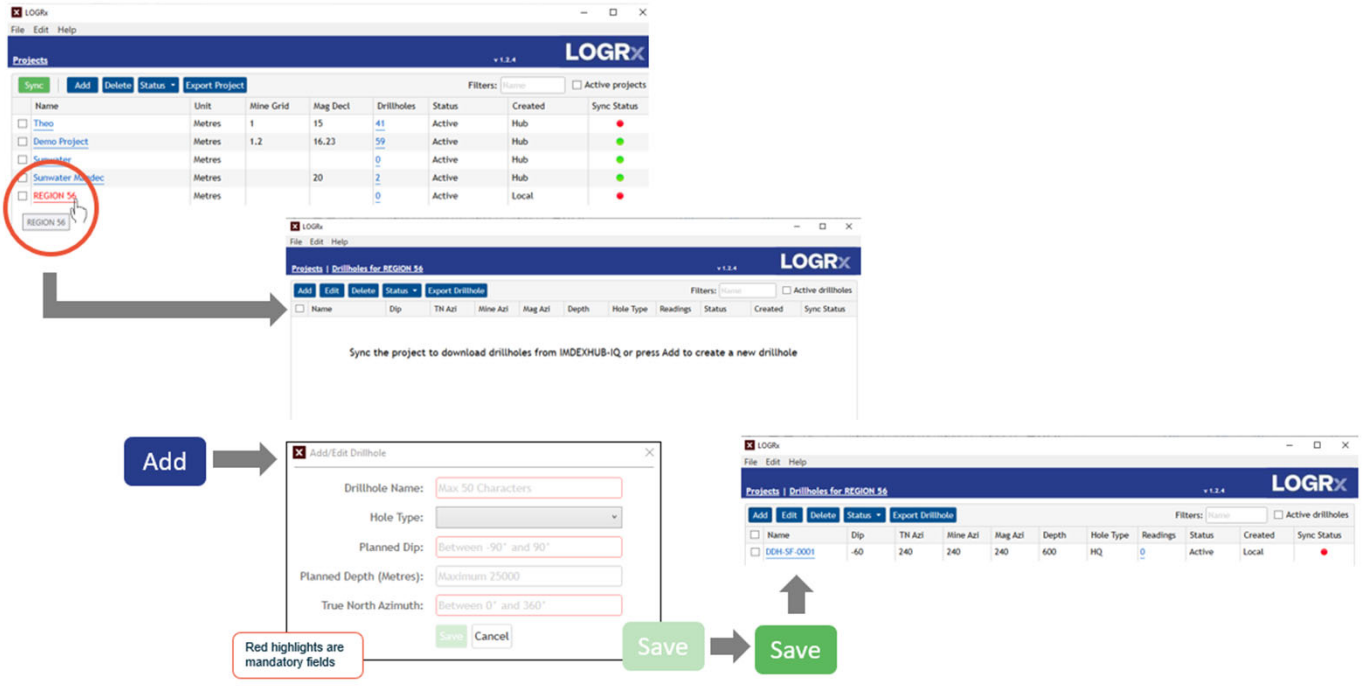
Product Setup

Add Project and Drillhole into App

9 Add Project.



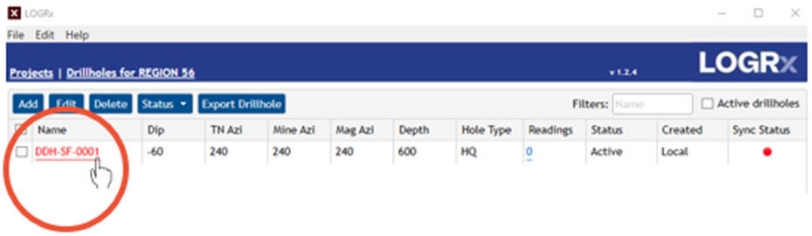
10 Add Drillhole.

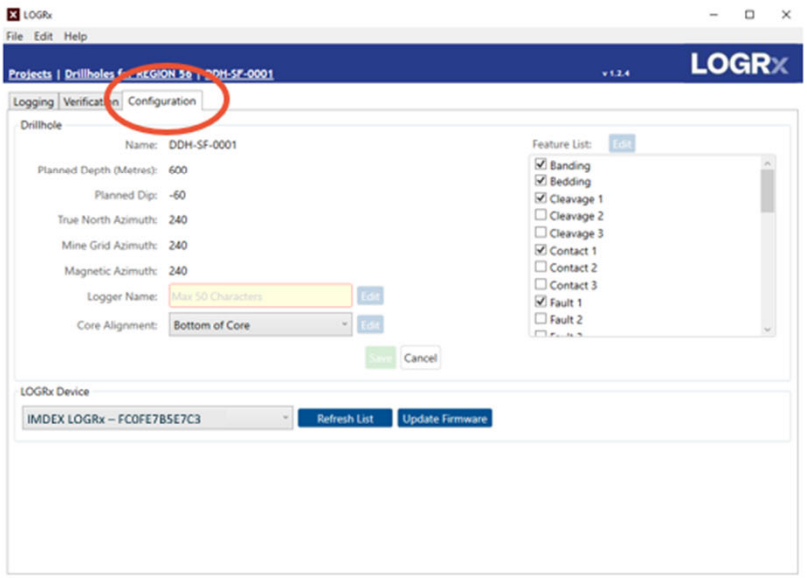


Product Setup

Add Project and Drillhole into App

11 Configure Drillhole.

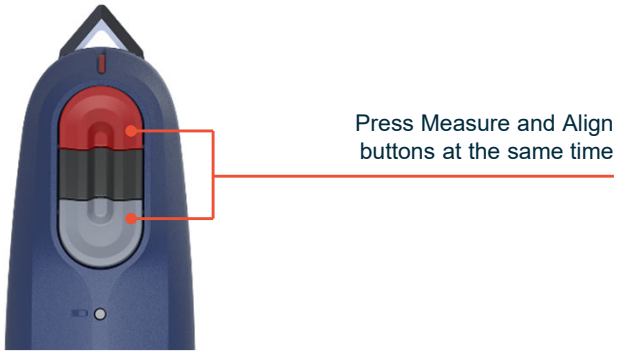




Initialise

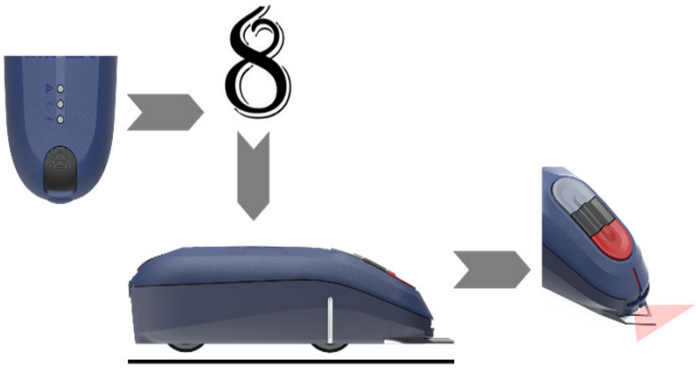
1 Turn on LOGRx.

Press and hold **Measure** (red) and **Align** (grey) buttons until the **green** and **blue** lights turn on and the **red** light starts to flash.



2 Stabilise Gyroscopes.

While the **red** light is flashing, wave the device in a **figure-eight pattern 5 times**, then sit it on a flat surface until the red light extinguishes and the laser illuminates.



This step is essential to ensure the accuracy of measurements.

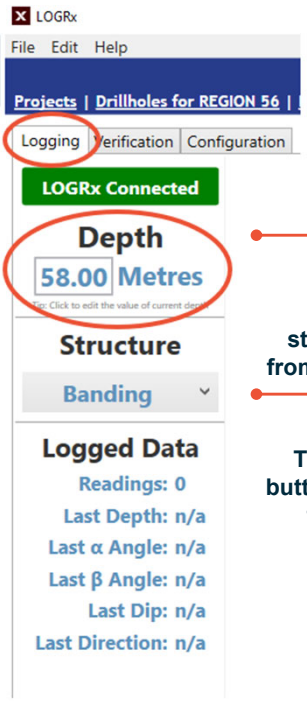
A flashing green light indicates that battery charge is less than 20%. If the battery charge is <5% the device will not turn on and shows a red LED. Charge the device for at least an hour.

Logging

Measuring Planar Features

1 Enter starting depth.

Enter the starting depth on the Logging tab.

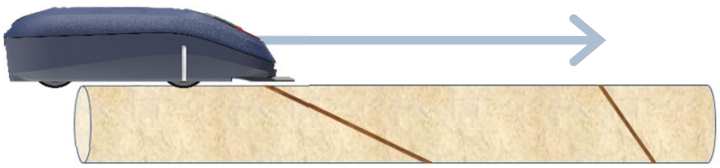


Enter the start depth

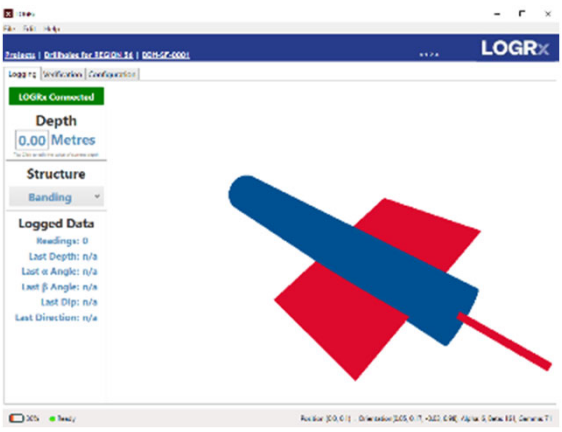
Select the structural feature from the dropdown

The black rocker button can be used to move up and down the list

2 Move device downhole.



Roll the LOGRx device down the core along the orientation line (check that the depth increases in the software interface).

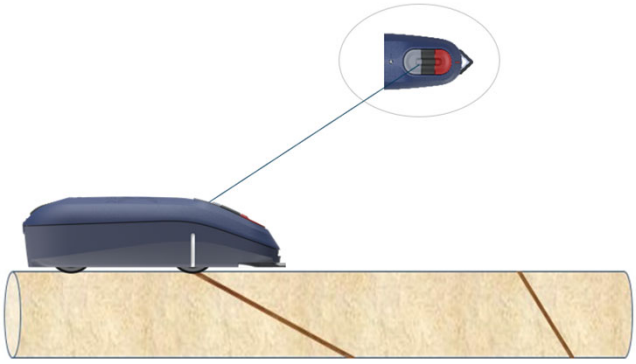


Logging

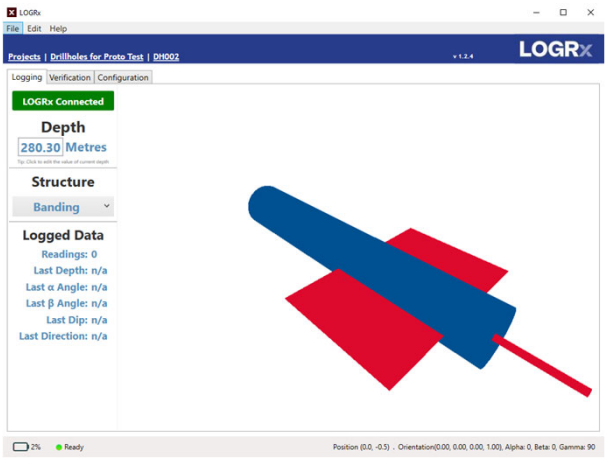
Measuring Planar Features

3 Align with the first structure.

Stop rolling the device when the front wheel alignment marker is in-line with the first structure to measure. Ensure the device is aligned with the orientation line and press the grey **Align** button.

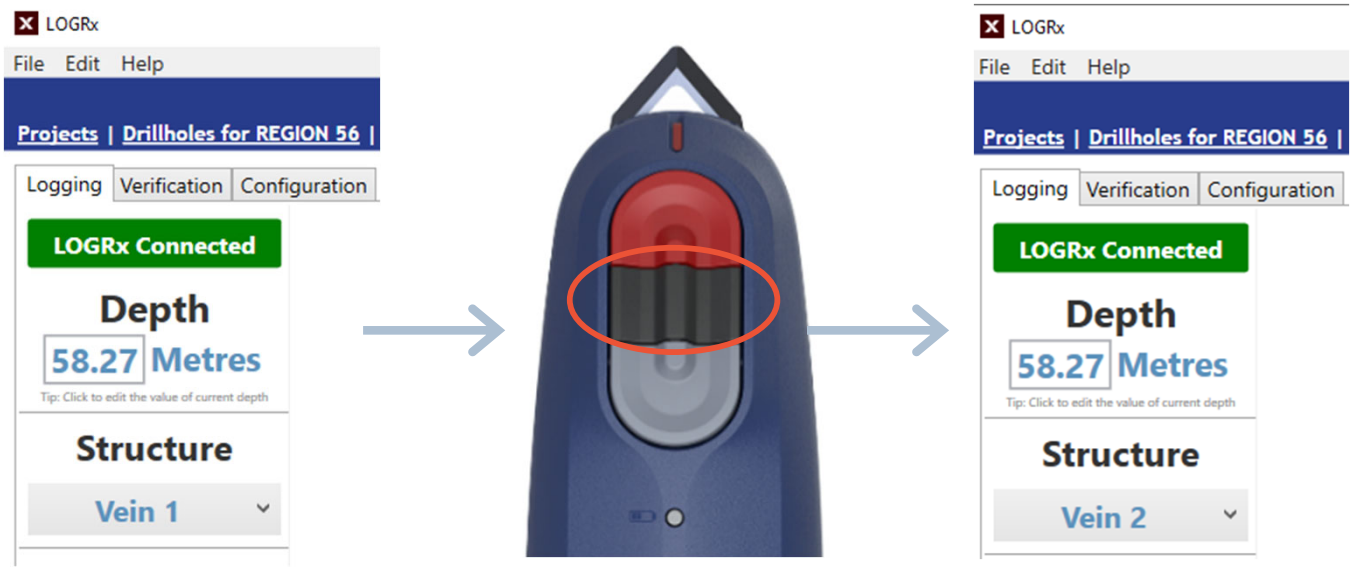


The depth can also be entered manually directly into the App.



4 Structure type.

Change the structure type setting on the device by clicking on the **black rocker** button. Click to the left of the centre bar to move down the list and on the right of the bar to move up.

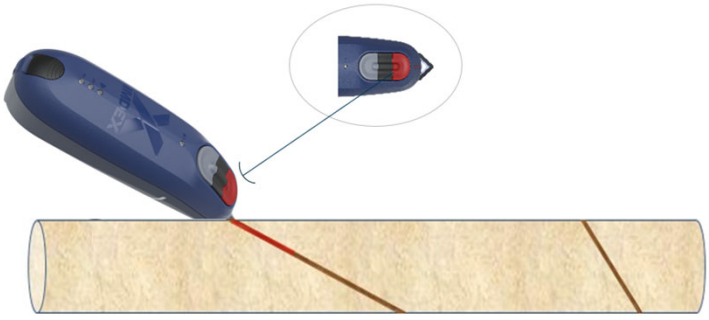


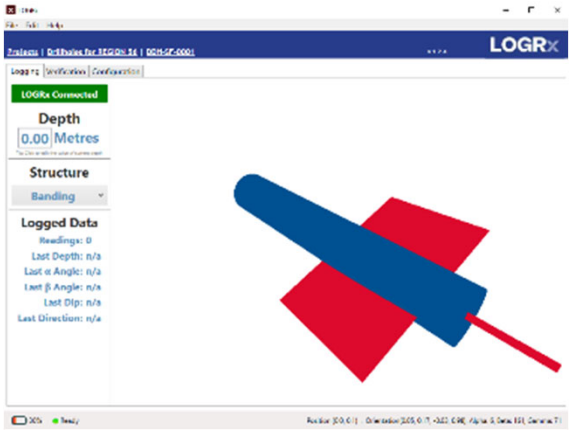
Logging

Measuring Planar Features

5 Measure first structure.

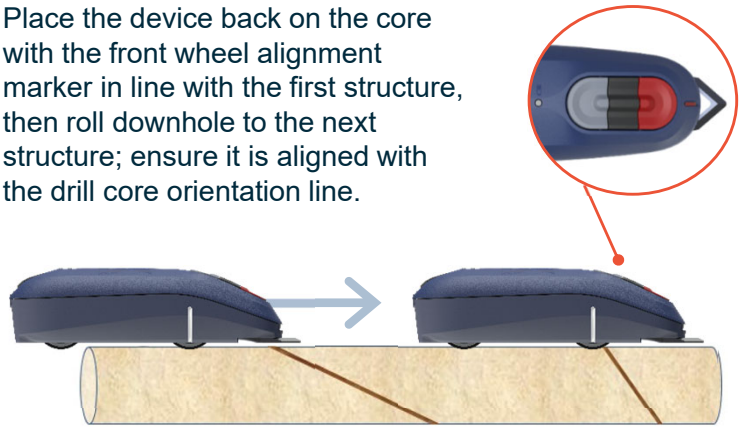
Lift the LOGRx device to align the laser with the structure, click the button closest to the beak on top of the device to record the measurement.

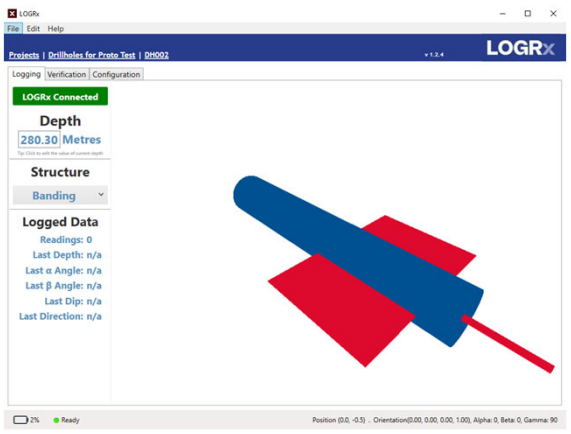




6 Move to second structure.

Place the device back on the core with the front wheel alignment marker in line with the first structure, then roll downhole to the next structure; ensure it is aligned with the drill core orientation line.





To take the measurement repeat the **align through to measurement** steps (3,4 and 5)

Press the front button on the top of the device twice (quickly) to set the QA Flag for that reading.

Logging

Measuring Linear Features

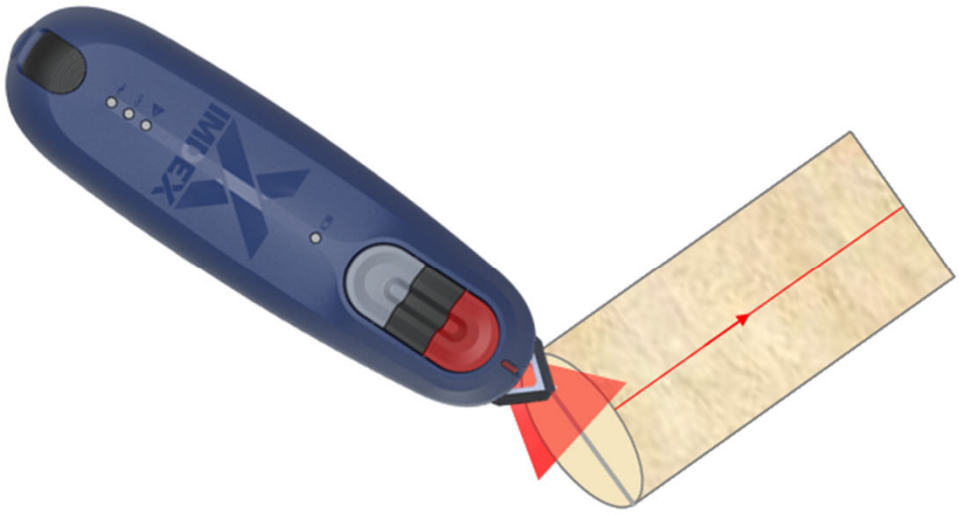
If the structure is a linear feature, first measure the angle of the plane it lies on, then measure the linear structure by aligning the laser with the line on the plane surface.

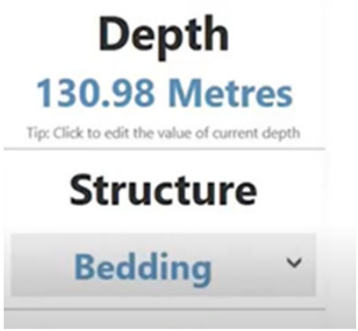
To record a lineation, you must first record the planar feature it lies on.

1 **Align the LOGRx on the orientation line and press the grey alignment button.**

2 **Select the BEDDING feature from the structural features list.**

3 **Measure the angle of the plan the feature lies on.**



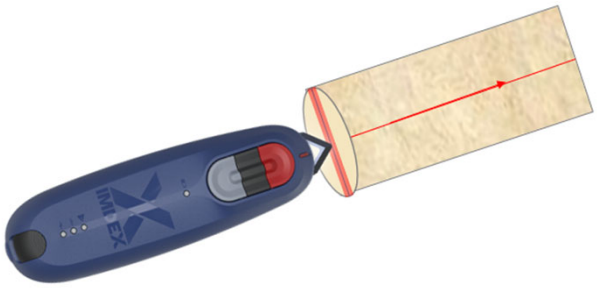


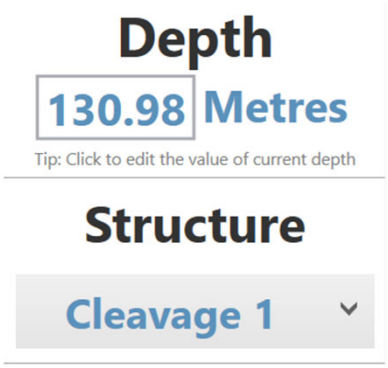
4 **Select the linear feature being measured from the structural features list.**

Logging

Measuring Linear Features

5 **Align the laser with the linear feature ensuring that the LOGRx is perpendicular to the feature and press the red measurement button.**





The **Plunge** and **Plunge Direction** of the linear feature is stored in the **Dip** and **Direction** fields and the **Plane ID** refers to the record number that stores the plane the lineation lies in. The movement direction can also be entered if known.

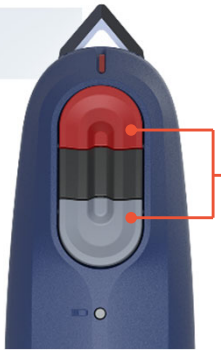
The LOGRx must be held perpendicular to the lineation when taking the measurement.

	No.	Structure	Structural Custom li	Structural Custom li	Depth	Dip	Direction	Alpha	Beta	Gamma	Plane ID	Movement Dirn	QA Flag	Logger Name	Notes	Sync Status
	1	Bedding			131.94	52.2	115.2	41.9	264.7					sss		
	2	Slickenside			131.94	41.2	68.0	41.9	264.7	90.2	1	Unknown		sss		
	3	Bedding			131.96	53.8	112.2	39.1	263.4					sss		
	4	Slickenside			131.96	39.3	59.0	39.1	263.4	83.1	3	Unknown		sss		
	5	Bedding			131.96	49.9	113.8	43.0	261.5					sss		
	6	Slickenside			131.96	39.2	67.4	43.0	261.5	87.6	5	Unknown		sss		
	7	Bedding			130.98	56.3	112.8	37.4	265.9					sss		
	8	Slickenside			130.98	48.7	72.3	37.4	265.9	97.3	7	Unknown		sss		
	9	Bedding			130.98	63.7	186.8	56.2	2.9					sss		
	10	Slickenside			130.98	49.0	242.2	56.2	2.9	34.0	9	Unknown		sss		

6 **Sync to upload to IMDEXHUB-IQ™.**

7 **Turn off device.**

Press and hold Align and Measure buttons for approximately 5 seconds until the green and blue lights extinguish. The LOGRx is now turned off.



Press Measure and Align buttons at the same time

Reset Device

Reset LOGRx

To reset the LOGRx, connect the device to **external power via the USB cable**. Hold the **READ** and **ALIGN** buttons as well as either one of the **ROCKER** buttons simultaneously for approximately **8 seconds** until all LEDs turn off.

The device will reset, and the LEDs should come on again indicating start up sequence.

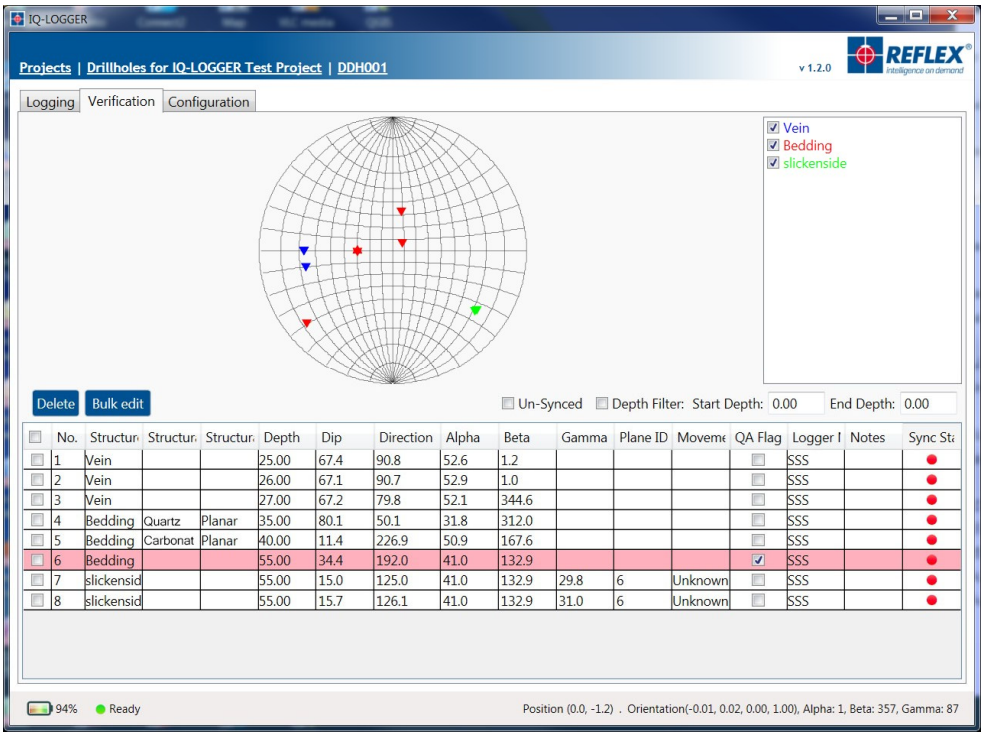
Press Align, Measure and one of the black rocker buttons at the same time

Verification

The **red** star indicates the drillhole position.

The legend describes the feature for each shape and colour. Set the depth filter to display only readings of interest.

The following data can be edited prior to syncing data with **IMDEXHUB-IQ™**:



	No.	Structur	Structur	Structur	Depth	Dip	Direction	Alpha	Beta	Gamma	Plane ID	Moveme	QA Flag	Logger I	Notes	Sync St
	1	Vein			25.00	67.4	90.8	52.6	1.2					SSS		
	2	Vein			26.00	67.1	90.7	52.9	1.0					SSS		
	3	Vein			27.00	67.2	79.8	52.1	344.6					SSS		
	4	Bedding	Quartz	Planar	35.00	80.1	50.1	31.8	312.0					SSS		
	5	Bedding	Carbonat	Planar	40.00	11.4	226.9	50.9	167.6					SSS		
	6	Bedding			55.00	34.4	192.0	41.0	132.9				☑	SSS		
	7	slickensid			55.00	15.0	125.0	41.0	132.9	29.8	6	Unknown		SSS		
	8	slickensid			55.00	15.7	126.1	41.0	132.9	31.0	6	Unknown		SSS		

- Delete a reading: right click on the reading, then select Delete.
- Change the structural feature: click the record in the Structure field and select the new feature from the dropdown list (note that you cannot change linear readings to planar and vice versa).
- If custom lists have been synced from IMDEXHUB-IQ™, select additional meta data attributes in the custom fields labelled List x.
- Edit the Depth: type a new depth into the field labelled Depth.
- Set Movement Direction: On lineation-type readings, click on the record in the Movement Dirn field and select the direction from the dropdown list.
- Set QA flag: Set to on or off for any reading.
- Edit Logger Name: Edit as required.
- Enter Notes: Add notes by typing into the field.

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