Android 4.4 & above compatible

Coming soon

Manual
NEP-5000-LINK

Document history

The Observator range is in continuous development and so specifications may be subject to change without prior notice. When in doubt about the accuracy of this document, contact the Observator Group.

Reference documents

Type of document / tool	Product type and name (incl. url)
Datasheet	NEP-5000-LINK
Manual	NEP-5000-LINK
Analite application notes	Shroud installation Wiper replacement
Videos	NEP-5000-LINK

Revision history

Date	Amendments	Company, position
2016-11-12	Initial document creation	Observator Australia, Document Controller
2017-07-31	Updated external links	Observator Australia, Document Controller
2017-08-21	Updated battery accuracy	Observator Australia, Document Controller
2017-10-24	Edited warranty conditions	Observator Australia, Document Controller
2018-04-09	Introduced document control	Observator Australia, Document Controller
2019-03-09	Added reference documents	Observator Australia, Document Controller
2019-07-04	Quality review	Observator Australia, Operation Manager
2019-08-14	Updated product design & charging operations	Observator Australia, Document Controller
2019-08-26	Compressed images in document	Observator Australia, Document Controller
2020-01-30	Updated document format	Observator Australia, Document Controller
2022-08-02	Modified the export section	Observator Australia, Document Controller
2022-09-30	Document review and updates	Observator Australia, Document Controller
2022-10-09	Update video links	Observator Australia, Document Controller
2024-04-03	Delete QR code	Observator Group, Communication Officer

Procedure sign-off:

Date	Company, position	Status
2018-04-09	Observator Australia, Document Controller	Finished
2019-12-06	Observator Australia, Managing Director	Approved
2020-03-04	Observator Group, Communication Officer	Approved

Distribution list

Date	Company, position

Summary

Thanks for purchasing the new Analite NEP-5000-LINK wireless handheld display and logging solution. It will give you years of service if you install and maintain the turbidity monitoring system according to guidelines as set out in this manual.

What is NEP-5000-LINK?

The NEP-5000-LINK handheld solution is comprised of an Analite NEP-5000 auto-ranging turbidity sensor, a NEP-5000-LINK wireless interface and a NEP-LINK android application for your Bluetooth-enabled Android device.

The Analite NEP-5000 auto-ranging/wiping ISO-7027 90° and/or backscatter 180° turbidity sensors set a new industry standard for accuracy and stability across an unmatchable full-scale range.
The NEP-5000-LINK system can be ordered with a compact NEP-5000 90° for nephelometric field measurements up to 5,000 NTU* or in a 180° version (backscatter optics) for sediment studies up to 30,000 NTU*. The NEP-5000-LINK compact NEP-5000 sensors have all the features of the top of the line Analite NEP-5000 sensors but are purpose built to minimize power demand and cost.

The NEP-5000-LINK interface module provides rechargeable power to the sensor and manages wireless communication to a Bluetooth enabled Android device. The module is lightweight, compact, and clips to a belt for a hands-free experience.

The NEP-5000-LINK Android smartphone application has a large range of features that support data visualization, data logging, and data management. Data can be viewed locally (on device) or exported in excel format via Bluetooth, email or General Packet Radio Services (GPRS) to external data servers. Logged data is time/date stamped and location tagged for mapping.

The NEP-5000-LINK system is a portable product that is ideal for industrial, field and laboratory applications. This is a great reference tool for spot checking in-situ installations. The freedom to port data directly to a phone, tablet or laptop offers the end user, field/lab work efficiencies and an ordered means of managing data. NEP-5000-LINK can be customized and can be upgraded. The NEP-5000-LINK handheld solution offers un-paralleled ease of use, accuracy, and a very competitive price.

> (*) Note: See all sensor ranges and specifications. Please study the sensor datasheet.

Table of contents

1   Applications

Typical use of the NEP-5000-LINK device include applications such as:

1. Monitoring of streams and rivers
2. Monitoring of water storage bodies including stratification studies
3. Intermediate and final effluent treatment monitoring
4. Hydrological run off studies
5. Ground and bore water analysis
6. Drinking water filtration efficiency
7. Industrial process monitoring
8. Sludge and dredge monitoring
9. Sediment load monitoring

The NEP-5000-LINK products are also ideal for water quality, food processing, waste treatment and environmental compliance for dredging operations.

2 Safety

⚠️ Do not connect anything that is potentially electrical to the metal body of the sensor. If you do, it may result in electrical shocks that could harm you or destroy your instruments.

⚠️ Do not attempt to force the wiper mechanism while operating or you may harm yourself due to the higher torque level.

⚠️ Please check with your supplier or material specifications before using the sensor in unknown chemical.

⚠️ Take appropriate precaution when handling or servicing pre-deployed sensors otherwise you may be exposed to radioactive and hazardous solutions.

🚮 After end of life of this product, dispose it according to your local regulations or return it to the manufacturer.

3 Specification

NEP-5000-LINK sensor dimensions	
Length	177mm
Diameter	30mm
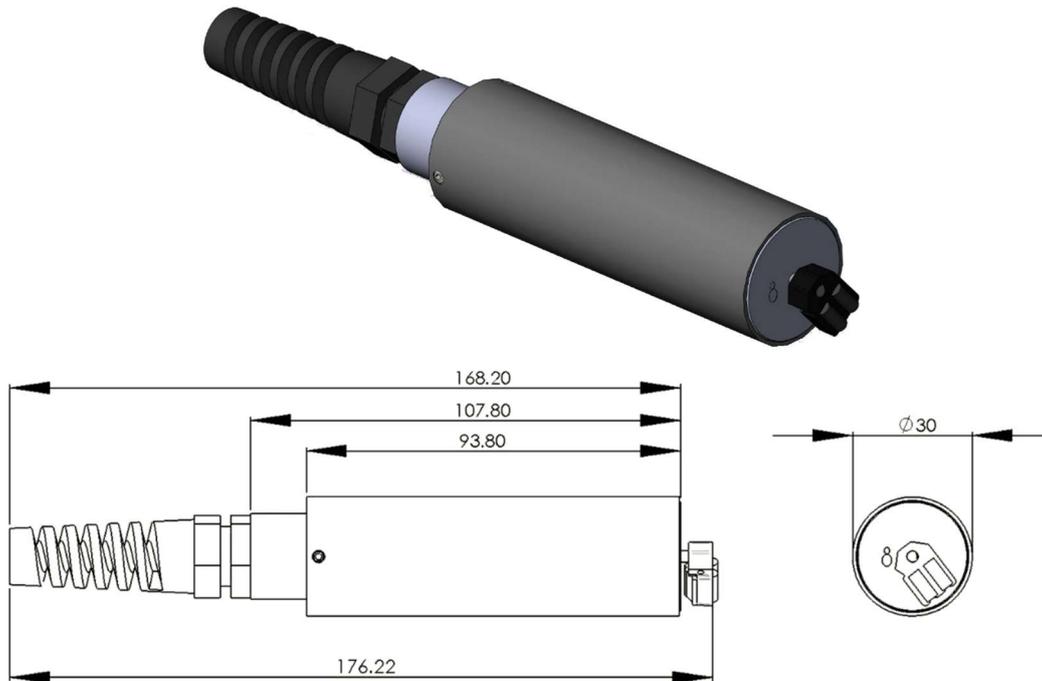
NEP-5000-LINK wireless module dimensions	
Length	141mm
Diameter	50mm
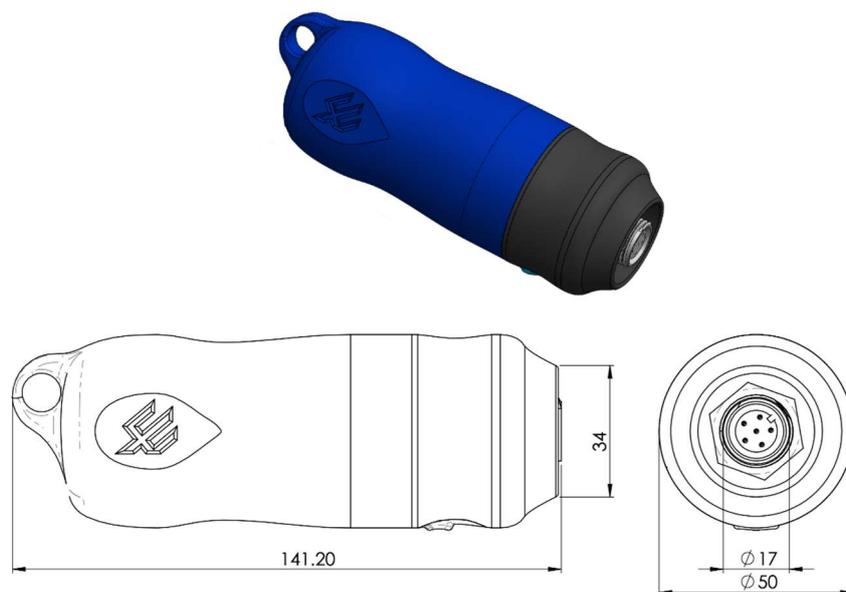
Connectivity	
NEP-5000-LINK interface (Bluetooth module)	Scalable Parallel Processor (SPP) profile
NEP-5000 Transistor–Transistor Logic (TTL) (streaming)	(not polled)

Power supply		
Rechargeable Lithium-ion battery (CAN.NB-10L)	450mAh – 7.4V	(Battery life ~6 hours of operation)
Power supply, charge through 7.4V power pack, powers on when sensor is plugged in		
Auto power off when battery is less than 20% Long press power off		

Android application
Turbidity, range reading & recording
Log files have embedded location, time & date, comments and photos
Logging of comma delimited data sentence
Statistic and smart graph viewer tool
Fast data export
Battery status and charge indicator
Sensor status and wiping indicator

Sensor	
Auto-ranging from sensors 3 ranges	Range 1 --- 0 to 40NTU
	Range 2 --- 0 to 400NTU
	Range 3 --- 0 to 5,000NTU
Accuracy	±1% Full Scale Output (FSO) at 25˚C all ranges (90° version)
Auto wipe	On interval specified by user and power on wipe

Compatibility	
Android application for smartphone	Version 6.0 & above
Windows tablet	Available upon request

Capabilities	
Turbidity	(From sensor)
Temperature	(From sensor)
Location	

4 Pinout & wiring diagram
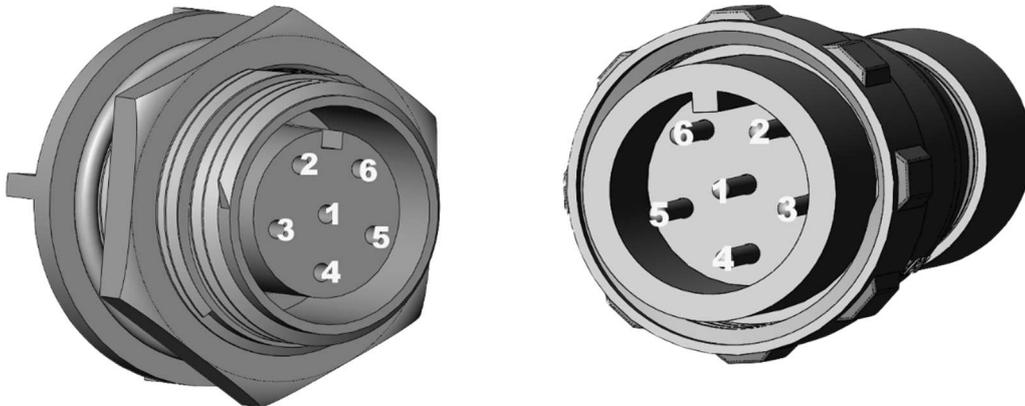
The Pinout configuration of the NEP-5000-LINK is the following:
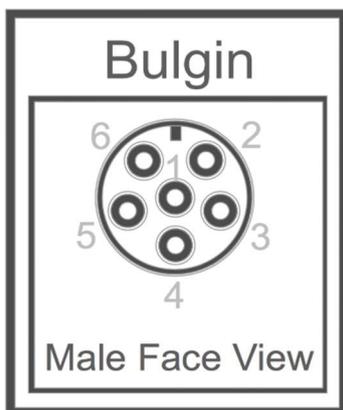
Pin number	Meaning
#1	Ground (GND)
#2	(Spare)
#3	Transistor–Transistor Logic (TTL) Comms
#4	Volt VAR Control (VCC)-sensor
#5	Charge
#6	(Spare)

5   What you will find in the box

When the product is delivered, this is what you will find in the box:

Items found in the box	
90° turbidity sensor **NEP-LINK-TURB**	
NEP-5000-LINK interface module **NEP-LINK-BTM**	
Charging cable **NEP-LINK-CHARGE**	
Standard Li-ion battery **NEP-LINK-BAT**	
NEP-5000-LINK interface module hook **NEP-LINK-HOOK**	

6 Accessories

Observator Instruments offers a wide range of accessories for the NEP-5000-LINK range. These products are available directly from the website.

Accessories	
Spare turbidity sensor (can be a replacement 90° or optional 180° backscatter) **NEP-LINK-TURB**	
Spare charging adapter **NEP-LINK-CHARGE**	
Spare standard Li-ion batteries (up to 5 hours recording) **NEP-LINK-BAT**	
NEP-LINK-CASE	
Calibration module (blue box) for calibrating the sensor **NEP-LINK-CFG**	

Accessories

Wiper replacement kit **NEP-WIPER-KIT**	
Spare NEP-5000-LINK interface module **NEP-LINK-BTM**	
Shroud **NEP-SHRD-D**	
NEP-5000-LINK interface module hook **NEP-LINK-HOOK**	
Calibration solutions **NEP-CAL-GFS**	
Brown bottle for calibration **NEP-CAL-BTL**	

7   Installation

7.1   Install the sensor for the first time

Connect the Li-ion battery to the NEP-5000-LINK interface module (normally installed when provided). If it is not, please follow the instruction described in **chapter 10**. **section 10.1**: "Battery replacement".

To install the Android application on your smartphone, use the following link, download and install the ".apk file" (for smartphone).

1. Remove the protective caps and connect NEP-5000-LINK sensor to the NEP-5000-LINK interface module.
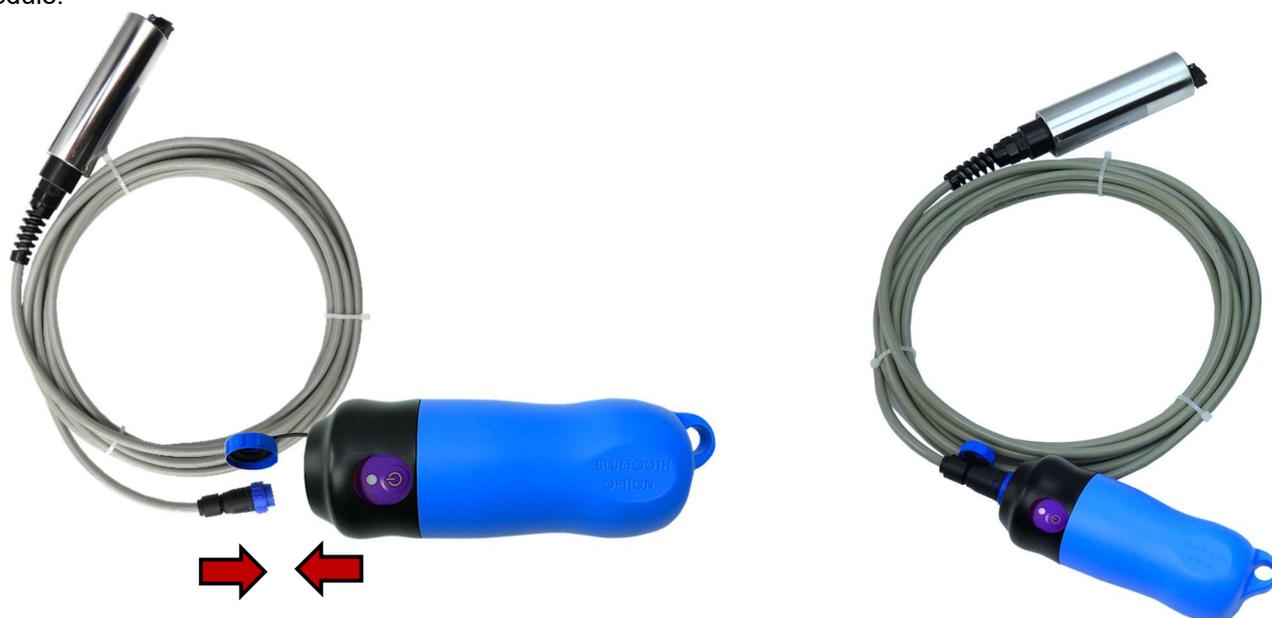
Press on the NEP-5000-LINK interface module button and you will notice the blue Light-Emitting Diode (LED) indicator turning on. If you cannot see the blue indicator light, it means the NEP-5000-LINK interface module is not powered.

Blue LED is on
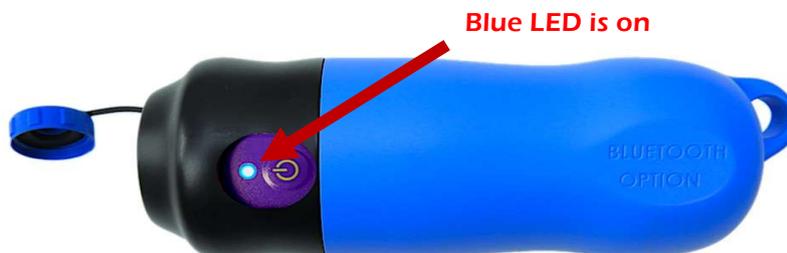
Note: In the event where the indicator is not lighting up, ensure that the NEP-5000-LINK interface module has enough battery (refer to the **section 10.1**: "Battery replacement" of this manual) and ensure that the long term storage switch inside the Bluetooth module is on.

Long-term storage switch

Note: If storing the wireless interface for more than six months, please power off the device.

Light-Emitting Diode (LED) status	Colour	Meaning
Flashing blue	🔵	Bluetooth available for pairing
Flashing green	🟢	Device is paired and connected
Flashing red, blue & green	🔴 🔵 🟢	Battery is charging or charged
No LED	⚪	NEP-5000-LINK interface module off

2. Run the app: go to the **chapter 8**: "Android application interface" of this document.

7.2   Charging the battery

1. Connect the provided charging adapter to the NEP-5000-LINK interface module and apply power.

2. At any time, you can monitor the charging status of the module by pressing on the NEP-5000-LINK interface button. The LED indicator is flashing green, blue and red to indicate that the battery is charging.

3. We highly recommend to use the application to monitor the battery level, please refer to **chapter 8**, **section 8.15**: "Read the Bluetooth battery level".

Note: The best way to verify if the battery is fully charged is to use the Android Application to monitor the battery level. The user should expect that the charge will take up to three hours of charging from fully flat battery.

4. When battery is fully charged, disconnect the charging cable and screw the protective cap back on.

8   Android application interface

8.1   Activate the Global Positioning System (GPS) location & Bluetooth
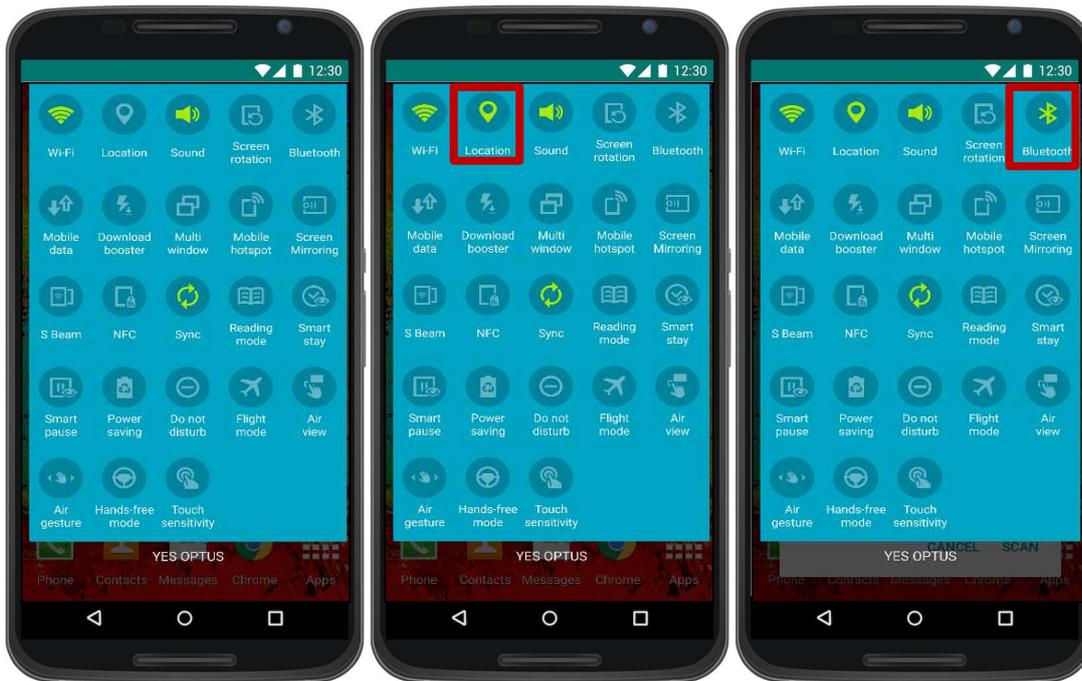
1. Go to your phone options.
2. Activate the GPS location of your phone.
3. Activate Bluetooth.

8.2 Pair the sensor via Bluetooth

Blue indicator is flashing

After having activated the Bluetooth of your phone:

1. Turn on the NEP-5000-LINK interface by pressing on the blue button, make sure that the blue LED indicator turns on.
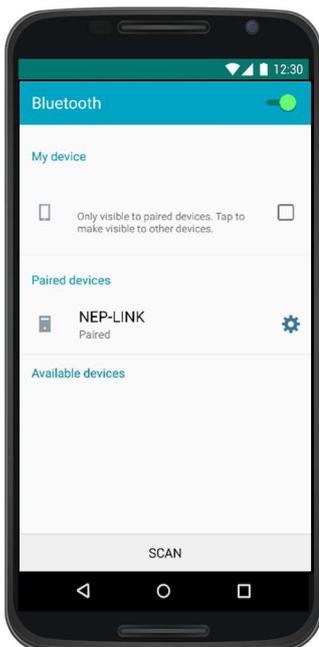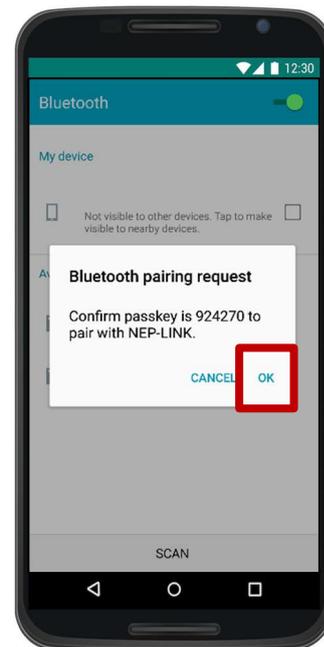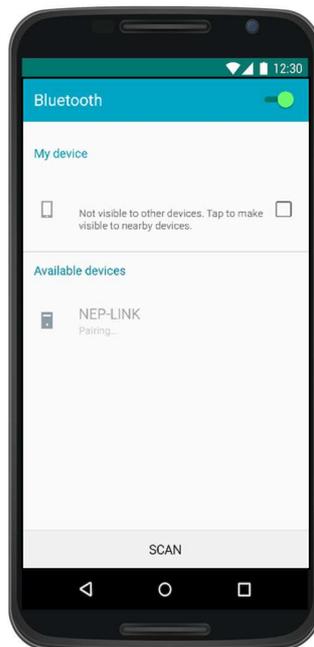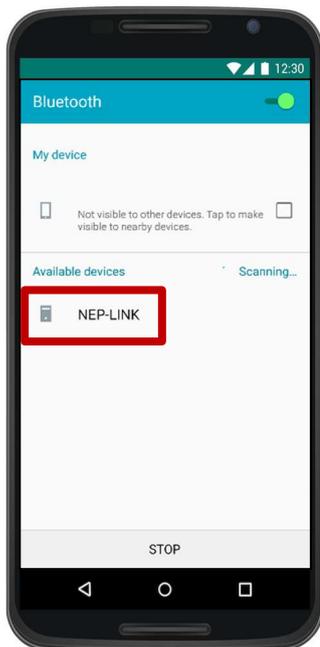
Note: Step 2 to 5 are to be completed only the first time you connect to a new sensor.

2. Go to the Bluetooth settings, scan to find the new device. Select the new sensor to pair and press pair.

3. Wait while pairing the sensor.

4. Allow pairing by pressing "Ok".

5. Sensor is now shown as paired, you can now run NEP-LINK application.

8.3 Launch the app & connect to sensor
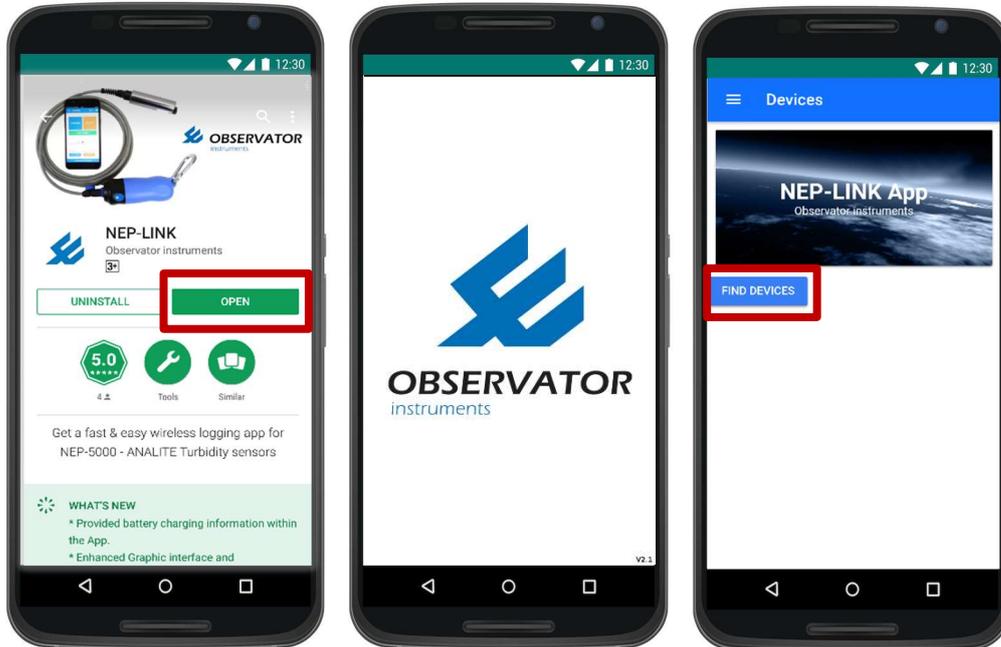
1. Search for "NEP-LINK" application in Google Play store. Download and open the software.

2. Wait for the app to load.

3. Search for device to connect to by pressing on "Find Device". If you cannot see the device, make sure that the NEP-5000-LINK interface module is available and the blue LED is on.

4. Select device from the available list. You will notice the LED indicator turns green when app is successfully connected to the module.

Note: If you want to turn off the module, make sure you disconnect the wireless module from the application.

Green indicator is flashing

8.4   Record data
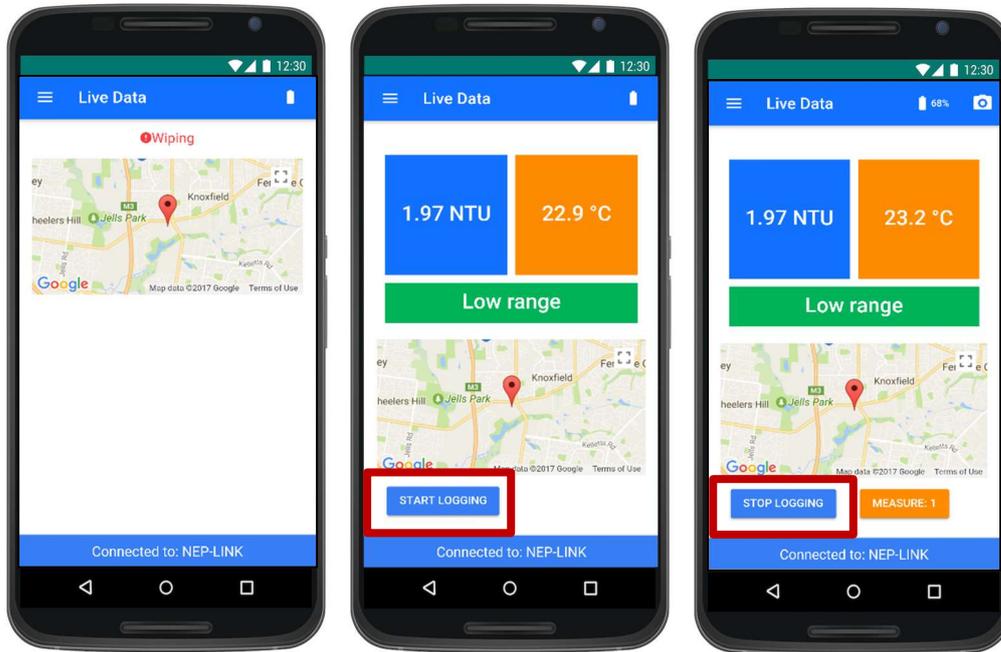
1. When connecting to the sensor for the first time, wait a few seconds in order to load the data.
2. Press on "Start logging to start the record". If a "Wiping" message appears on the screen it means that the sensor is wiping and not taking further measurements.
3. Press "Stop record" when required.
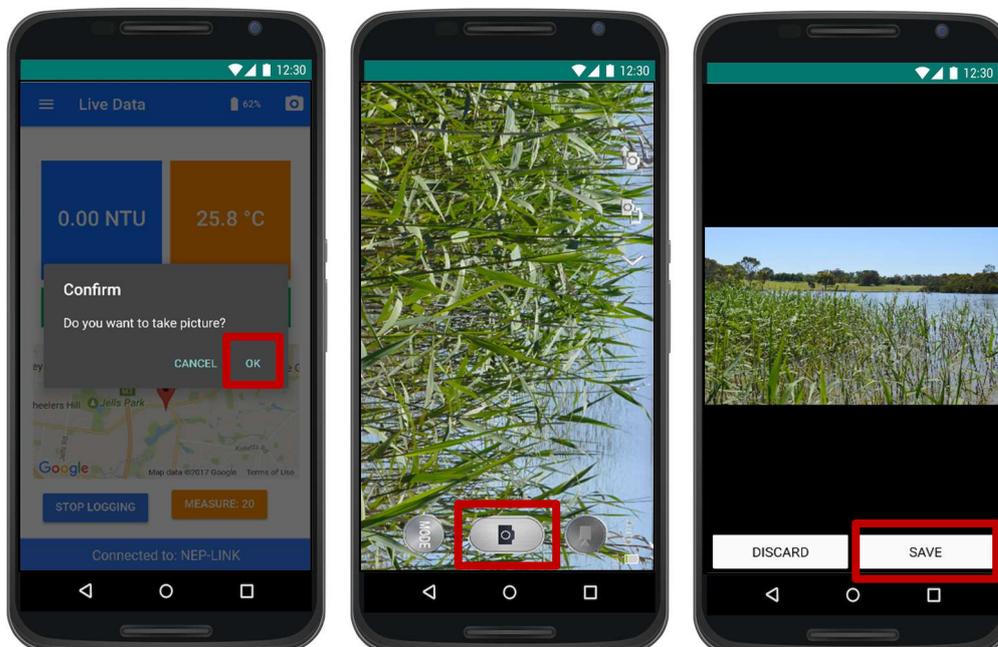
4. If the user did not take a picture, the app will offer the user to record a picture on the database, press "Ok".
5. Take a picture.
6. Press "Save" to save the picture in the database, alternatively press "Discard" to take another picture.

8.5 Export data
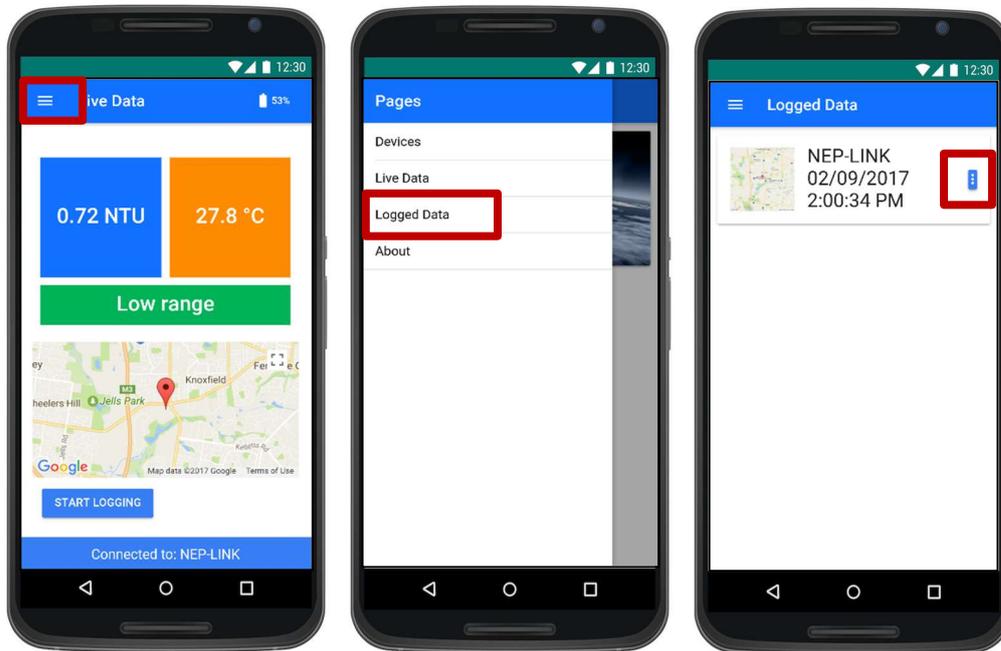
1. Go to the menu page by clicking on the left-hand side icon.
2. Select "Logged Data" menu. It will display the records available from the most recent to the oldest.
3. Click on the icon of the selected record to display options. Select your preferred export option:
   a. Export (via an app).
   b. Save into a local folder.

8.6 Export (via an app)
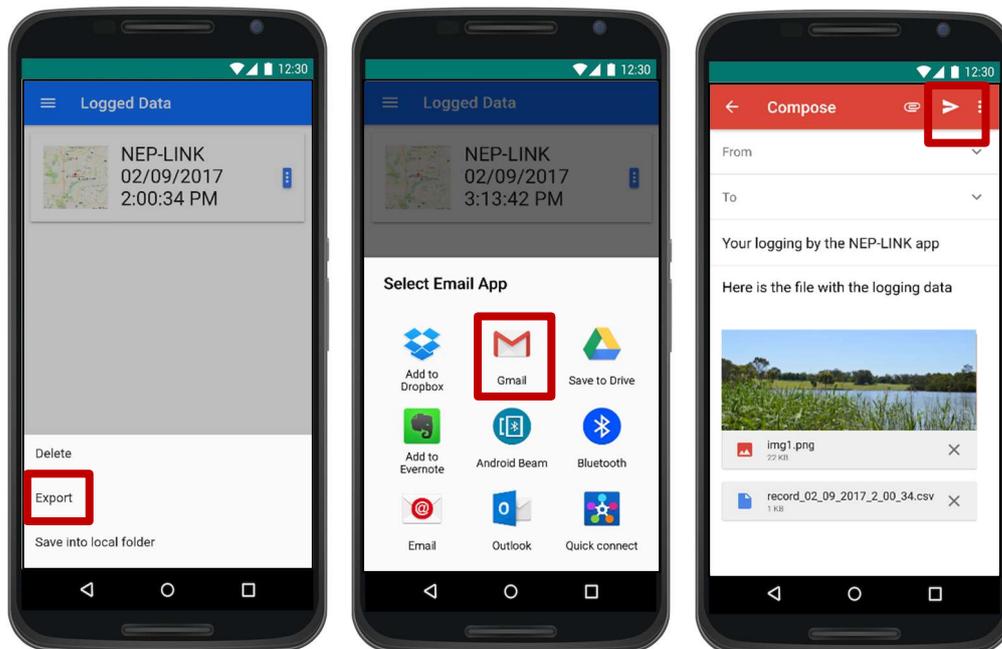
1. Follow steps 1, 2, 3 of the section "Export data". Press on "Export".
2. Select the "email" export method.
3. Compose your email including the recipient and click on the send button to send the log file and the pictures attached.

8.7 Save into a local folder
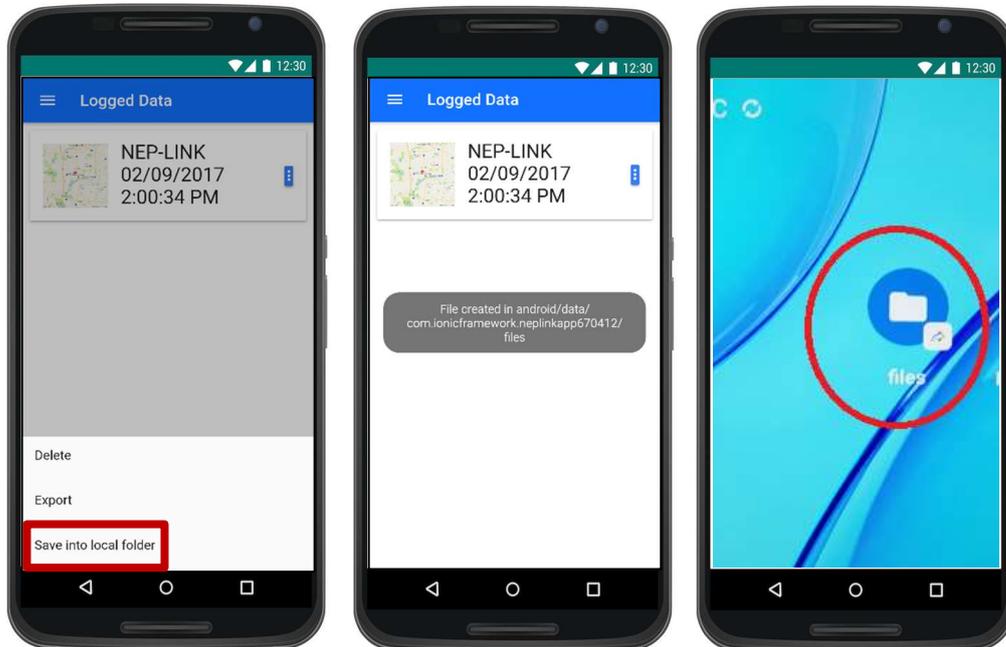
1. Follow steps 1, 2, 3 of the section "Export data". Press on "Save into local folder".
2. The exported record will automatically be saved into your local folder. The phone indicates the location of the ".CSV" files. It will be available in:
   "*Android/data/com.ionicframework.neplinkapp670412/files*" *or a similar folder.*
3. For future convenience, you can create a shortcut of this folder on your android desktop using the "Shortcut Maker" app.
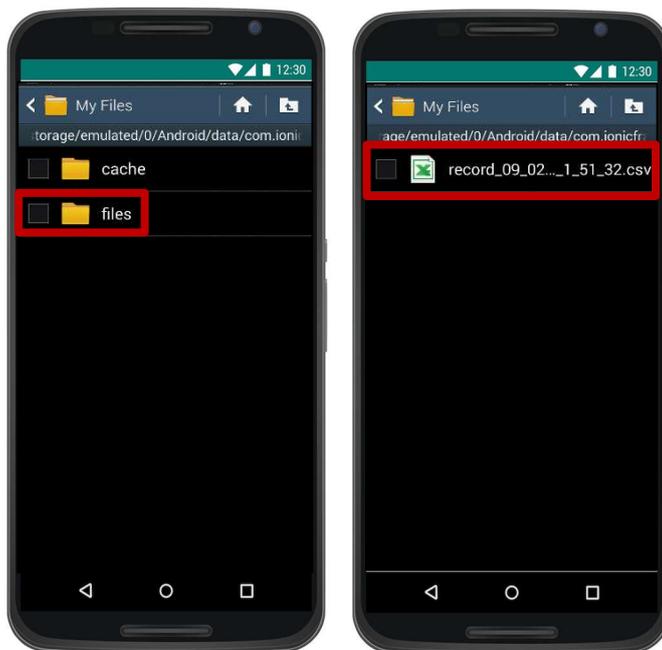
4. To open the file, search on your local folder.

5. Select and open the ".csv" file using Excel or equivalent.
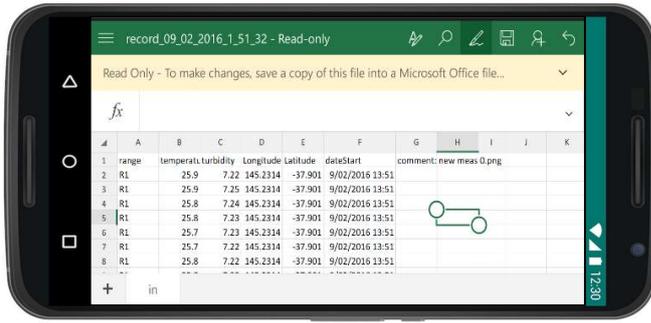
6. Open the ".csv" file to view the logged data.

The file name includes the date and the timestamp of the recording. Comments, picture names are displayed in the header. Range, temperature, turbidity, longitude, latitude data are displayed in columns according to the timestamp.

8.8 View a record
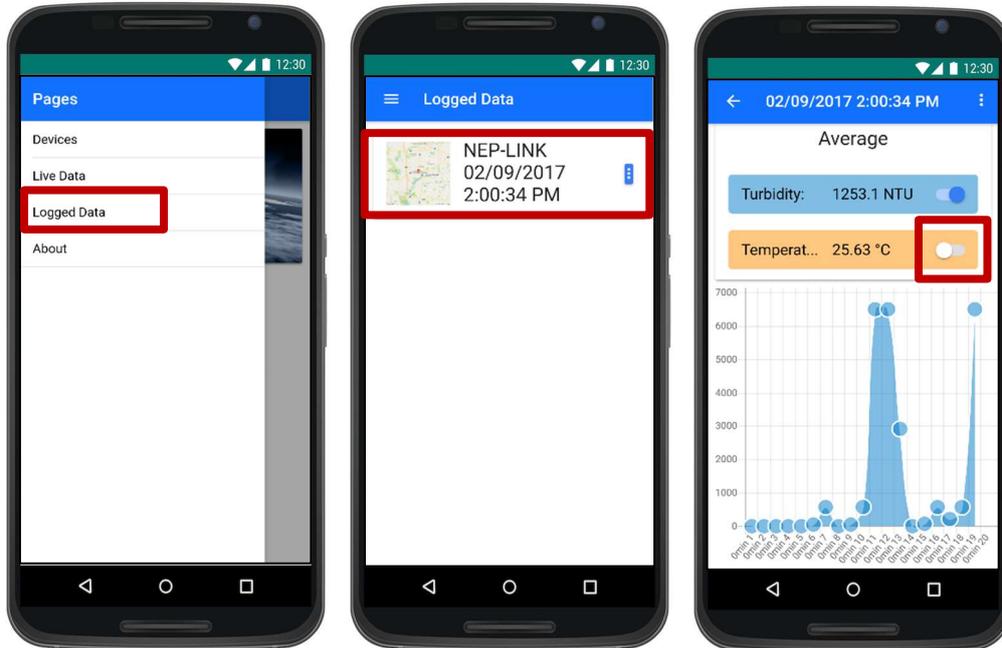
1. In the menu page select "Logged Data" menu.
2. "Logged Data" menu will display the records available from the most recent to the oldest, click on any record to display the logged data.
3. The record displays the average turbidity and temperature information as well as a record of all turbidity measurements. Click on the graph to access individual measurements. Click on temperature if you wish to view the temperature graph.
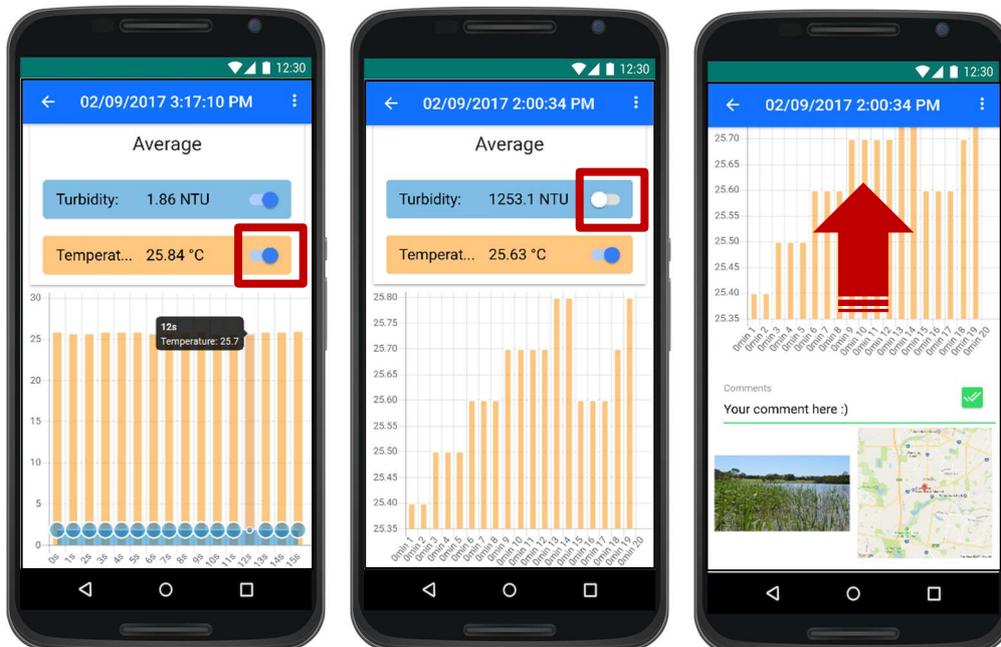
4. Both temperature and turbidity are now displayed on the same graph. Click on turbidity if you want to remove turbidity information.
5. When temperature only is selected, the graph shows the temperature only.
6. Scroll down to see attachments (pictures), GPS map or comments.

8.9   Comment a record
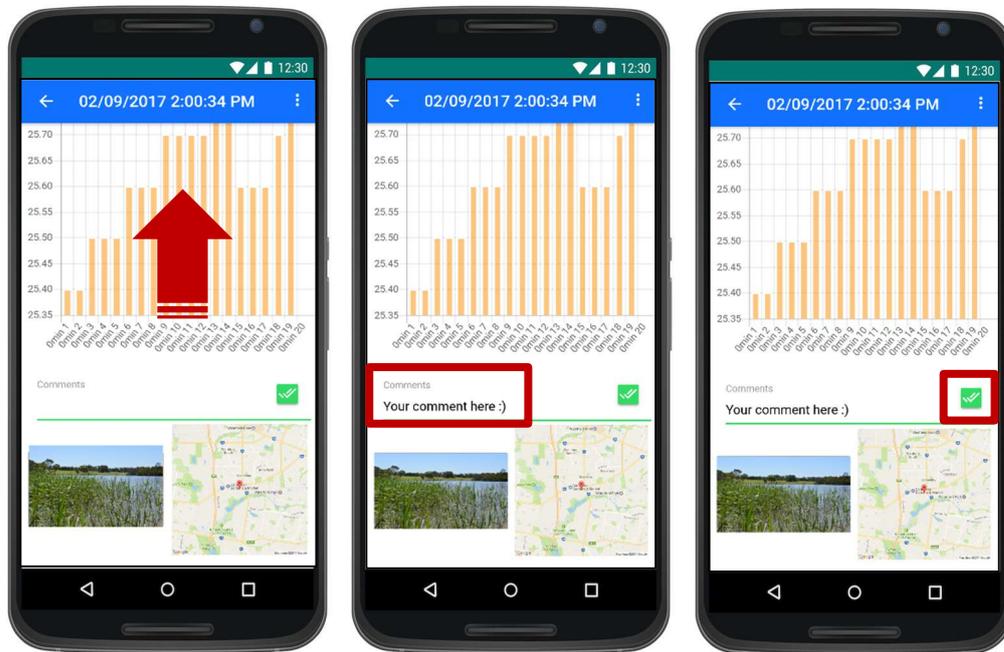
1. Follow steps 1, 2 and 6 of the previous section "View a Record".
2. Type your comments in the "comments box".
3. Press the green icon to save your comment.

8.10 Turn off NEP-5000-LINK interface
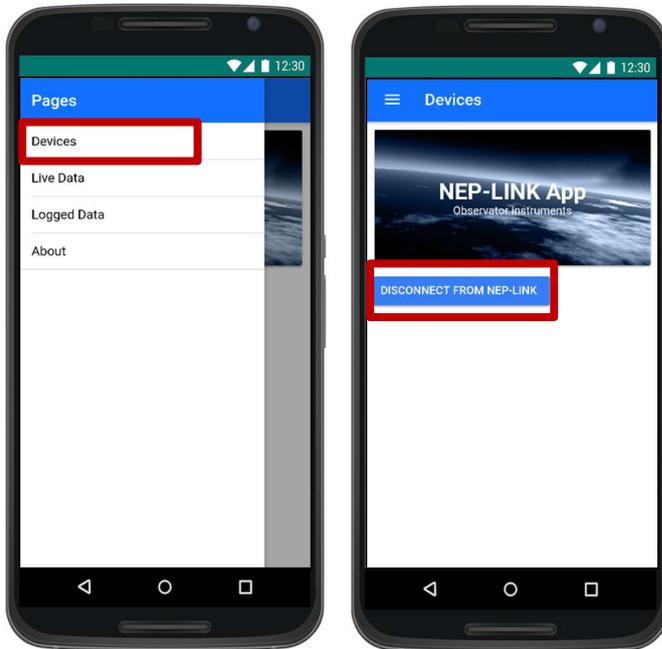
We highly recommend to disconnect the wireless when not taking measurements.

1. In the menu page select "Devices" menu.

2. Click on "Disconnect from NEP-LINK" button to disconnect the sensor. This will immediately turn off the NEP-5000-LINK interface module and turn off the Bluetooth LED indicator.

Note: Unplugging the sensor from the wireless device will not turn off the module.

8.11 Quit the application
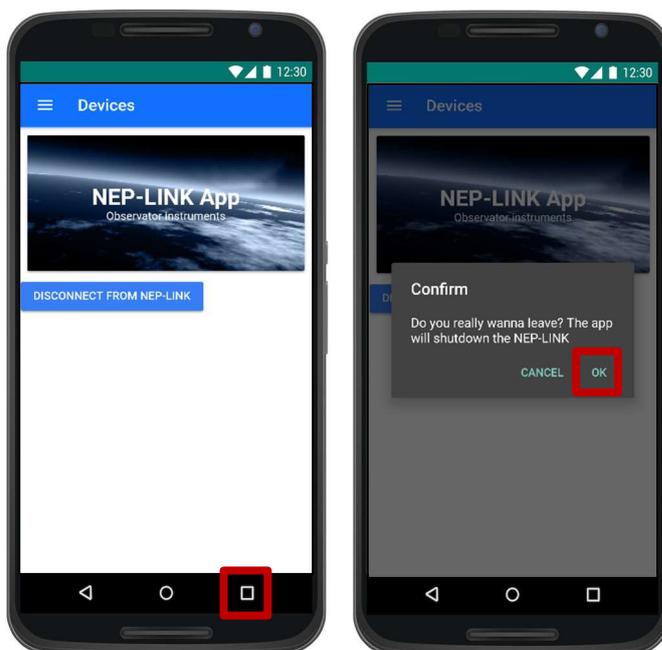
1. You can quit the application at any time by pressing on the return button of your phone.

2. Click on "Ok" to confirm that you are ready to shut down the application. This action will immediately turn off the NEP-5000-LINK interface module.

8.12 Delete a record
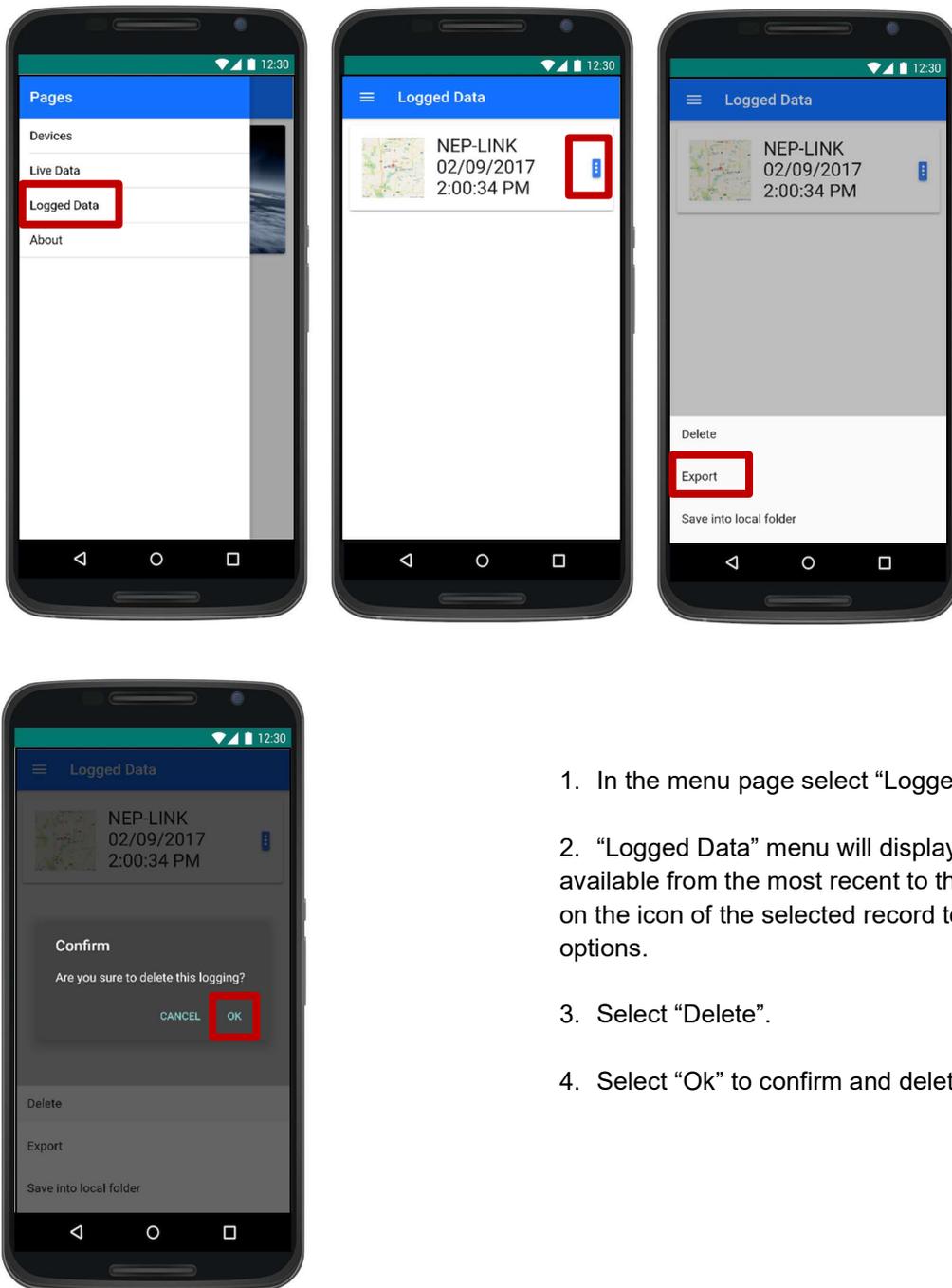
1. In the menu page select "Logged "Data" menu.

2. "Logged Data" menu will display the records available from the most recent to the oldest, click on the icon of the selected record to display options.

3. Select "Delete".

4. Select "Ok" to confirm and delete data.

8.13 Access additional information
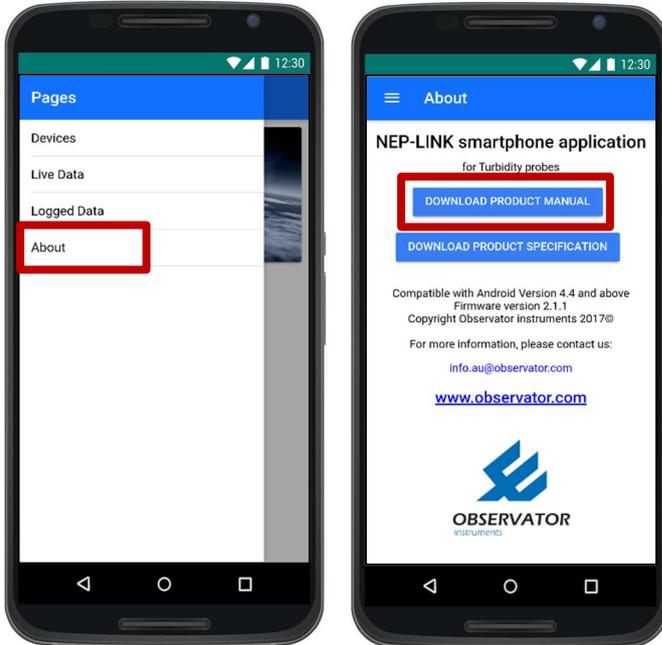
1. On the menu page select "About" menu.

2. Compatibility information and documentation links are available on the "About" page.

8.14 Change sensor name
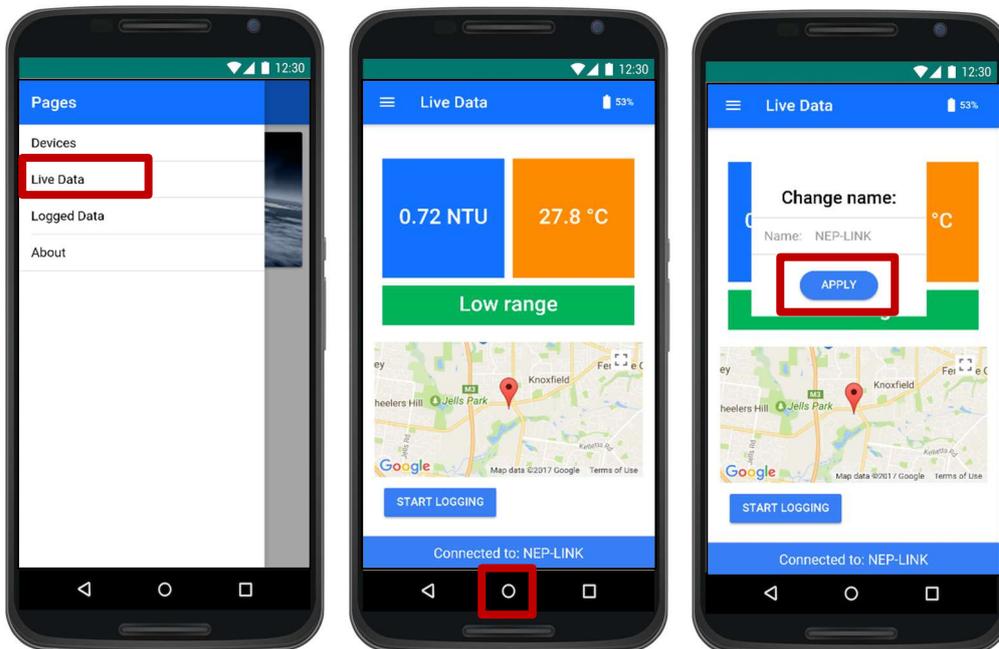
1. On the menu page select "Live data" menu.
2. Click on the sensor name.
3. Type the new sensor name and select "Apply".

Note: When you change the sensor name, you will need to unpair the NEP-5000-LINK interface module and pair your phone under the new device name, for more information, consult the section "Pair the sensor via Bluetooth".

8.15 Read the Bluetooth battery level
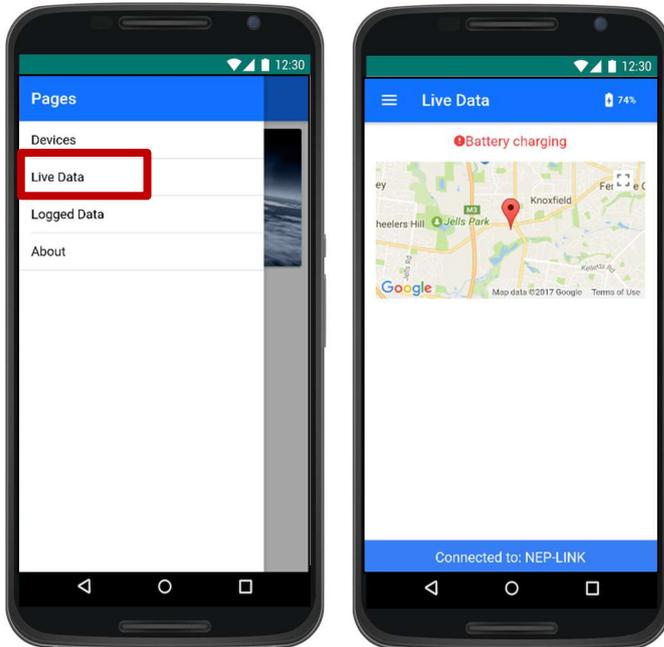
1. In the menu page select "Live data" menu.
2. The battery level is displayed on the top right corner.
3. When Bluetooth interface module is charging, sensor real-time data is no-longer available.

9   Deployment

9.1   Deploy the sensor

1. Start by considering the environment of operation: always operate wearing appropriate safety equipment in safe operating conditions.

2. The sensor is normally installed with the optics pointing downwards (but not vertical) or in a horizontal alignment.

3. In a simple application the sensor is simply immersed into the water to the desired depth, but within the depth rating of the sensor. Please note the depth rating is based on stagnant water.
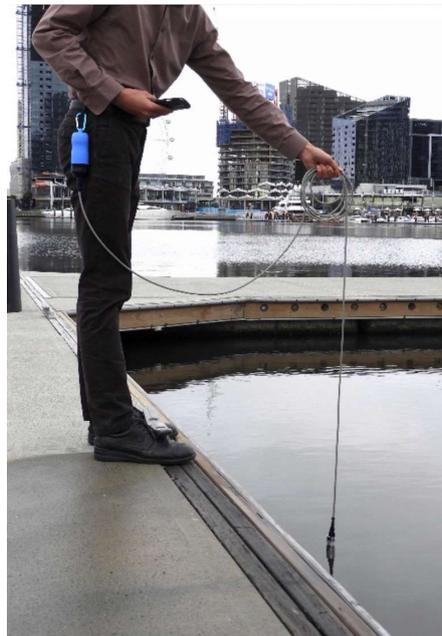
4. Allowances must be made for the effect of flowing water to ensure the stagnant depth rating is not exceeded. If the sensor is to be installed downwards then it is recommended to install it a few degrees away from the vertical to allow bubbles to escape away from the optic face.

5. Sensors with integrated wiping should be installed such that they can be easily retrieved from time to time to replace the wiper arm assembly.

6. It is important that the optic end of the sensor is kept clear of obstruction such as the river bed. The minimum distance between the optic head and any object should be 50mm (2").

7. At any time, you can use the smartphone application to connect to the sensor (refer to section "Android Application interface" of this document). In the case you cannot see live data, disconnect and reconnect the sensor to the NEP-5000-LINK interface module and start the application again.

Note: Be careful, the standard casing of the NEP-5000-LINK as well as the optic face is made of plastic materials and should be protected from accidental scratching or abrasion. The wiper arm assembly should be replaced periodically to avoid abrasive material build-up in the pad that may eventually abrade the optic face. The optic face is partially protected from damage by the protruding castellation in the sensor casing.

If the sensor body is to be installed in a cable gland fitting (for insertion into a pipe, etc.) then care must be taken to ensure the sealing surface pressures offered by the gland fitting are not excessive so as to not cause distortion of the sensor casing and force leakage. The NEP-5000-LINK sensors are thin wall instruments and so glanding pressure must be minimal and spread over the largest possible area. Do not cut or damage the outer sheath of the cable. Water may enter the sensor through holes or cuts in the cable sheath.

Where damage may occur due to river rocks striking or rolling over the sensor body, a protective shroud should be used which can be made of simple Polyvinyl Chloride (PVC) piping or stainless steel, whichever the situation warrants. Such a shroud not only protects the sensor but also assists in maintaining a minimum distance between sensor optics and any local obstructions.

9.2   Take proper measurements

We highly recommend you follow the guidelines below to take proper measurements:
- Make sure the sensor performs a wiping prior to any record.
- When you place the sensor into the liquid, make sure air bubbles are not captured in the optic surface.
- Verify the reading by doing the measurement twice for data redundancy purposes.

9.3   Retrieve the sensor

Carefully pull the sensor out of water, clean the sensor with fresh water, dry and store the sensor in appropriate conditions. After each use, do not disconnect the sensor from the Bluetooth interface module.

10 Maintenance & calibration

10.1 Battery replacement

1. Please unscrew the cover of the Bluetooth interface module.
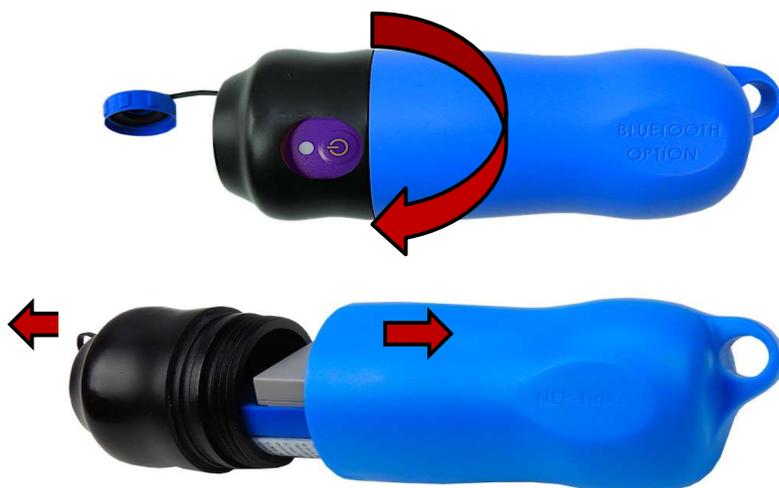
2. Open the Li-ion battery holder and remove the battery.
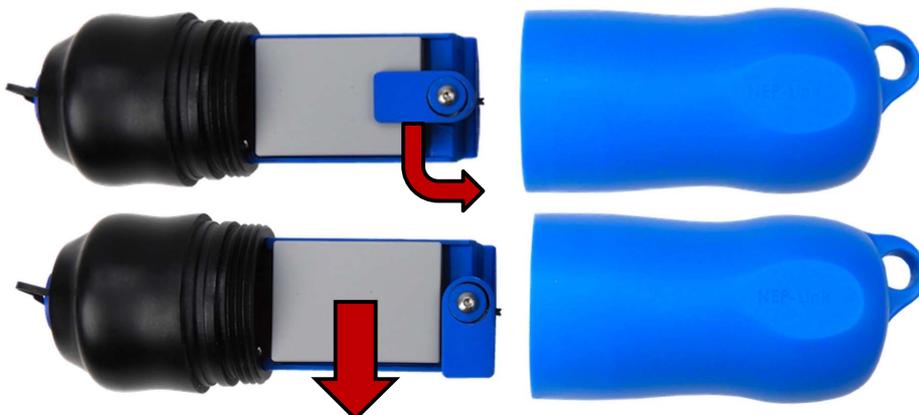
3. Replace the new battery by aligning the pin of the battery to the connector.

4. Close the Li-ion battery holder.
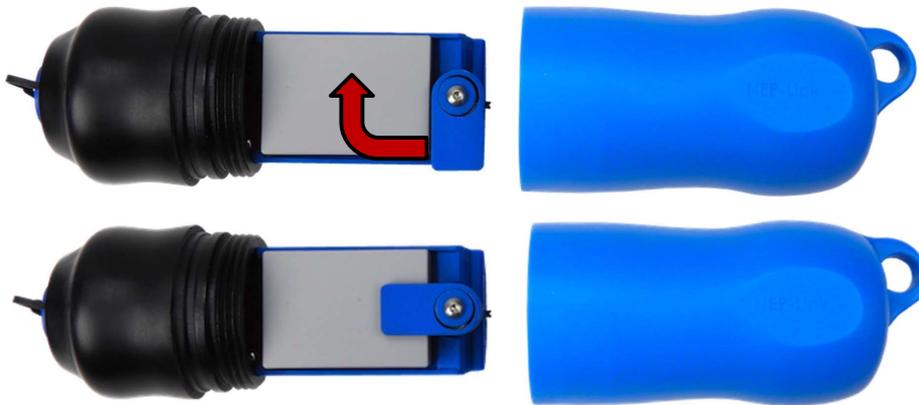
5. Finally, screw the cover of the Bluetooth interface module.
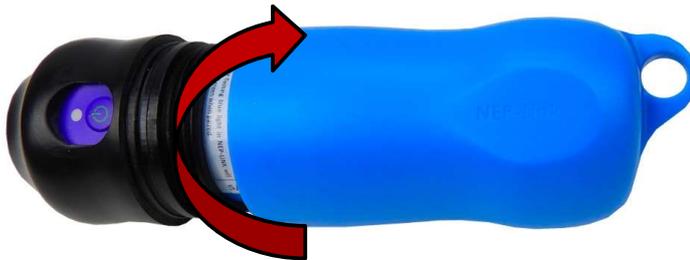
10.2 Cleaning the sensor

After each use, do not disconnect the sensor from the hand-held. It is strongly recommended that the sensor be thoroughly washed in clean water after deployment and prior to storage.
In the field, wash the sensor with fresh water and clean it with a soft cloth.
In the office, we recommend to clean the sensor with isopropyl alcohol (available from grocery stores) and dry the sensor with compressed air.

10.3 Calibration

Calibration should only be performed by experienced users who intend to configure the sensor in a different mode.

Default calibration setup	
Communication	TTL
Protocol	Windows: Digital free-flow only Android: Digital free-flow only
Auto-wipe	Recommended
Auto-range	Recommended

In order to calibrate, you will need complementary modules not included in this kit: The calibration cable and the calibration module can be purchased separately. Alternatively, you can send the module back to Observator Instruments for calibration.
Before calibrating the sensor, please read **chapter 10** of the "NEP-500 manual" available on our website.

10.4 Long-term storage

In order to increase the life-expectancy of NEP-5000-LINK products, we highly recommend you to switch off the long-term storage internal switch on the Bluetooth module.

Switch-off the long-term storage switch
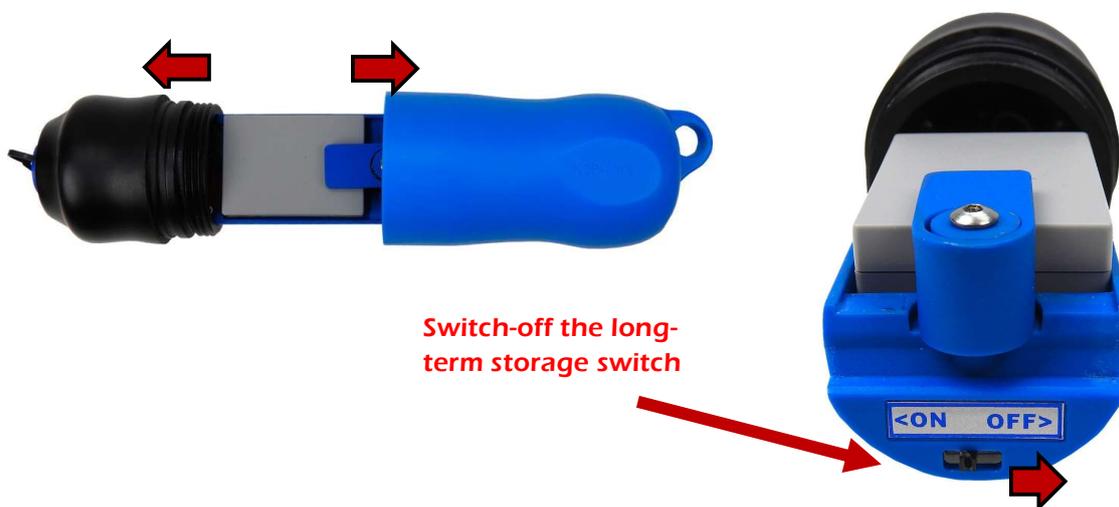
Note: The internal switch should be only used to turn off the unit if the device is in storage more than six months or when transporting by air. Normally it is best to leave it on the "ON position" with the cover closed at all times.

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