Manual

NEP-595

Long-life logging probe

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Author: Observator R&D

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.

NEP-595 Reference documents

Type of document / tool	Product type and name (incl. url)
Datasheet	Datasheet-NEP-595-V20200417.pdf
Manual	This Document

Firmware & manual version

Important Note: Refer to the following manual revisions based on your product serial numbers

Manual version	Serial number	Firmware version
NEP-595 Manual V2020-02-10	All serial numbers	OBS-NEP595-15052020-V1.007

Product Summary

Thanks for purchasing the new Analite NEP-595 long-life logging probe. It will give you years of service if you install and maintain the probe according to guidelines set out in this manual.

The NEP-595 is an all-in-one device that contains a purpose-built configurable SDI-12 logger with an integrated rechargeable and replaceable battery designed for long-term operations.

The system is housed in a fully water-sealed casing that can support up-to fifty meters of water pressure.

The NEP-595 is designed to fit with the NEP-5000 SDI-12 option, providing an optimized logging solution to monitor the turbidity. The NEP-595 has a built–in 6-pin female SubConn connector as a sensor interface. It provides the ability to connect multiple SDI-12 sensors into the same connector and monitor multiple parameters.

When the NEP-595 is integrated with the NEP-5000 sensor, the following features can be obtained:
- SDI-12 configuration.

When using the battery on its own, with the NEP-5000 sensor, the system is capable of logging up to 5 months in 20 minute-intervals or indefinite use when connected with a 20W solar panel. The main advantage of having a built-in rechargeable and replaceable battery is that its low running cost. Hence, users are not required to buy expensive batteries.

Built-in Lithium-ion batteries have a capacity of 144Wh which can be charged via simple DC plug-pack or optional solar input. Thus, providing ideal solution for data-buoys and river monitoring applications.

Possible application for NEP595 & NEP5000: The NEP-595 products are ideal for water quality, food processing, waste treatment, and environmental compliance for dredging operations. They are also an ideal dropping solution for data-buoys and river monitoring applications. Typical use includes applications such as:

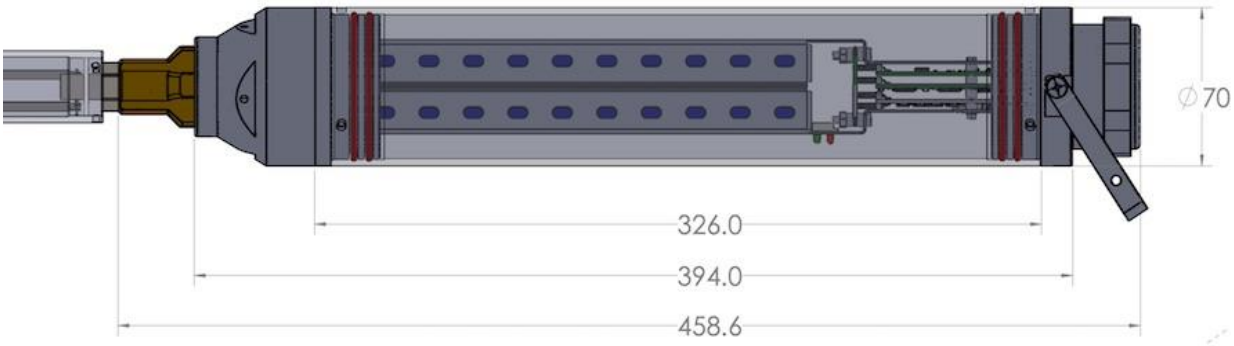
1. Monitoring of streams and rivers
2. Monitoring of water storage bodies, including stratification studies
3. Intermediate and final effluent treatment monitoring
4. Environmental impact studies
5. Hydrological run off studies
6. Ground and bore water analysis
7. Water filtration efficiency
8. Industrial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


Water Quality
Food Processing
Waste Treatment
Environmental Compliance for Dredging Operations

Contents

1 Specifications

Dimensions	
Length	458.6mm
Diameter	70mm



Mechanical	
Weight	1.7kg – including batteries

Specifications	
Operating temperature	1C to to 50°C
Storage temperature	-10°C to 55°C
Construction	Outer tube construction with polycarbonate tube with a structural support built using a stainless-steel chassis. The probe interface assembly and rear electrical interface assembly is built using machine Delrin plastic.
Depth rating	52m (170ft) static water column.
Features	Simple turbidity/temperature reading in auto-range.
	Statistical measurement over a set period of time.
	Ability to have 90-degree NEP-5000 with 180-degree NEP-5000 sensor providing seamless transition between drinking water monitoring to sediment monitoring.
	Adding secondary SDI-12 parameters such as conductivity, PH, Dissolved Oxygen via SDI-12 bus (up to 9 sensors in total).

Power	
Batteries	Built-in Lithium-Ion batteries.
Capacity	96Wh.
Charger	DC plug-pack or solar input.
Communication protocol	SDI-12 & USB

2 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	
NEP-595 logging probe **NEP-595** Turbidity & temperature long-life logging Probe – including 2 SD cards.	
DC charging adapter **NEP-595-charge** Charger adapter for NEP-595, including the adaptor for the purchased country.	
Case **NEP-595-Case** Protective case for NEP-595.	
1m Micro Universal Serial Bus (USB) cable **USB-CBL** Interface cable to connect the probe to the computer.	

Items found in the box	
NEP-5000 Probe **NEP-5000** NEP-CBL - Probe cable in meters.	
Blue box calibration module and USB cable* Module and PC configuration and calibration software. **NEP-CFG** (*) on your first NEP-5000 order only.	
SubConn female pigtail** **NEP-CFG-SF** (**) Only included in the shipment when the NEP-5000 has a male SubConn connector. Wiring is different for SDI-12 and RS422/RS485.	
Universal Serial Bus (USB) key	
Yellow cap	
Wiper replacement kit **NEP-WIPER-KIT** - comprising of 4 silicon wipers and a hex fastening key.	
Shroud **NEP-SHRD-D** - Delrin protective shroud	
Direct/External charging adaptor for battery **NEP-595-ADP**	
Spare battery for NEP-595(Optional) **NEP-595-BAT**	

3 Accessories

for NEP-5000 & NEP-595. The range of products are directly available from the website:

Accessories	
Case **NEP-CASE**	
Wiper replacement kit **NEP-WIPER-KIT** - comprising of 4 silicon wipers and a hex fastening key.	
Shroud **NEP-SHRD-D** - Delrin protective shroud **NEP-SHRD-C** - Copper protective shroud **NEP-SHRD-S** - Stainless steel protective shroud **NEP-SHRD-T** - Titanium protective shroud	
Spare micro USB cable **USB-CBL** Interface cable to connect the probe to the computer.	

Accessories	
Calibration kit for SubConn probes** **NEP-CFG-SF** - comprising of a blue box calibration module, USB cable and a SubConn female pigtail. (**) Only for NEP-5000 with male SubConn connector. Wiring is different for SDI-12 and RS422/RS485.	 

Calibration solutions **NEP-CAL-GSF**	
Brown bottle for calibration **NEP-CAL-BTL**	
SubConn to subConn cable (Custom Extension cable) **NEP-CBL-CON**	
Direct/External charging adaptor for battery **NEP-595-ADP**	
Spare battery for NEP-595 **NEP-595-BAT**	

Note: Additional customised accessories are also available for long-term deployment or multiple sensor configuration such as: Photovoltaic (PV) panel, long-deployment protective cap.

4 Deployment procedure & mechanical installation

4.1 Quick checklist to prepare for easy deployment

- Lower the metal handle if required (refer to **Section 6.4** “Reorient NEP-595 metal handle”).

- Make sure the battery is fully charged /charge the battery.
    - Remove the top cap of the logger (opposite side of the sensor connector).
    - Make sure the power switch is in off position (refer to **Section 6.3** “Switching off the power switch”).
    - Charge NEP-595 battery (refer to **Section 5** “Charging NEP-595 battery”).

- Make sure the SD card memory is cleared and correctly formatted (refer to **Section 6.1** “Manage SD cards”).

- Connect NEP-595 to a NEP-5000 sensor.
    - Make sure the power switch is in off position.
    - Attach NEP595 logger to NEP-5000 sensor (refer to **Section 4.2** “Connect NEP-595 to a NEP-5000 sensor”).

- Switch on the power and observe your first measurement.
    - Switch on the power switch.
    - The logger will now carry on its first measurement.
    - During the measurement, the green LED will turn on, users can also observe the wiping action. The green LED will then turn off when the measurement is finalised (refer to **Section 7.1** “How to make sure NEP-595 is working correctly by monitoring LEDs”).
    - If any error occurs during the measurement, the red LED will turn on (refer to **Section 7.2** “How to check for errors by monitoring LEDs”). Users should not deploy the probe until the error is resolved. Disconnect the sensor, check the problem and reconnect again.
    - Close off the upper cap is and make sure tighten properly (refer to **Section 6.1.3** “Selecting a micro SD card for your NEP-595 device

NEP-595 is designed to carry two micro SD cards and use them in parallel to increase data redundancy. This also provides options by swapping cards to collect data in the field without using a PC.

Although the NEP-595 logging device is designed to work with almost all types of SD cards in the market, the best practice is to use SD cards that are intended for endurance use or have wider operating temperature range (25º C to 85º C). Also, it is important to note that many manufacturers offer data recovery services if you purchase their industrial grade, endurance grade or pro grade micro SD cards. The NEP-595 device supports SD cards up to 128GB of capacity.

Some of recommended SD cards:

- Samsung PRO Endurance

- SanDisk Extreme PRO (64GB micro SD)

- Kingston High-Endurance MicroSD

    - Safely closing of the protective cap”).

The following block diagram represents the connection of the NEP-595 connected to a single sensor:

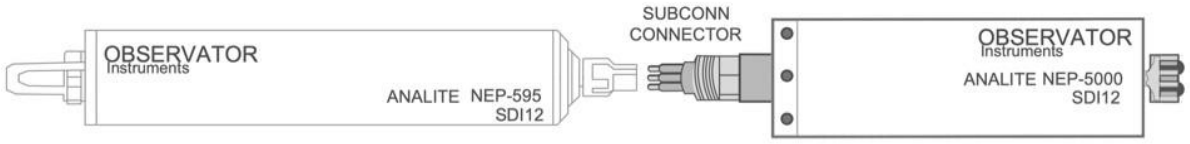


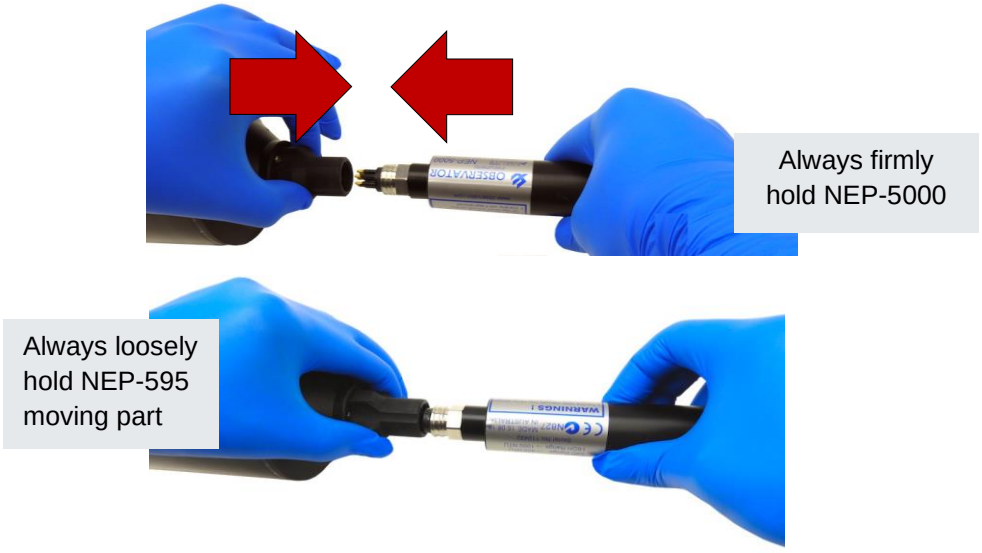
Figure 4.A: Connect NEP-595 to a single NEP-5000

4.2 Connect NEP-595 to a NEP-5000 sensor

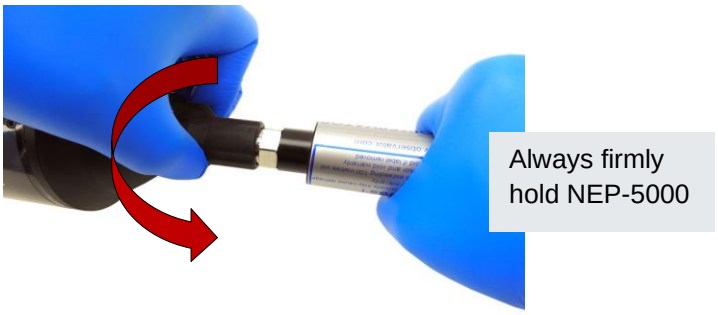
4.2.1 Connect NEP-595 to a single NEP-5000

The following section describes how to connect a single NEP-5000 sensor to the NEP-595 logging probe. Please proceed as follows in order to avoid damaging the NEP-595 connector:

- Turn the power switch off.
- Firmly hold the NEP-5000 probe. Adjust the NEP-5000 male connector to fit the female NEP-595 connector.



- Turn the NEP-595 moving part clockwise to attach the logging probe to the NEP-5000 sensor. Always loosely hold the NEP-595 moving part while firmly holding the NEP-5000 sensor (in order to avoid damaging the NEP-595 connector).



- To verify the connection, Switch the power switch back on. Wait 15 seconds for the sensor to warm up until you hear the probe wiping.

4.2.2 Wiring of NEP-595 to a single NEP-5000 using an extension cable

NEP-595 logger can also be connected to a single NEP-5000 probe using an extension cable. Please contact Observator Instruments for more information about accessories available.

4.2.3 NEP-595 Multiple sensor configurations

Users may apply the following configuration diagram to power multiple NEP-5000 sensors (up to 9 sensors in parallel):

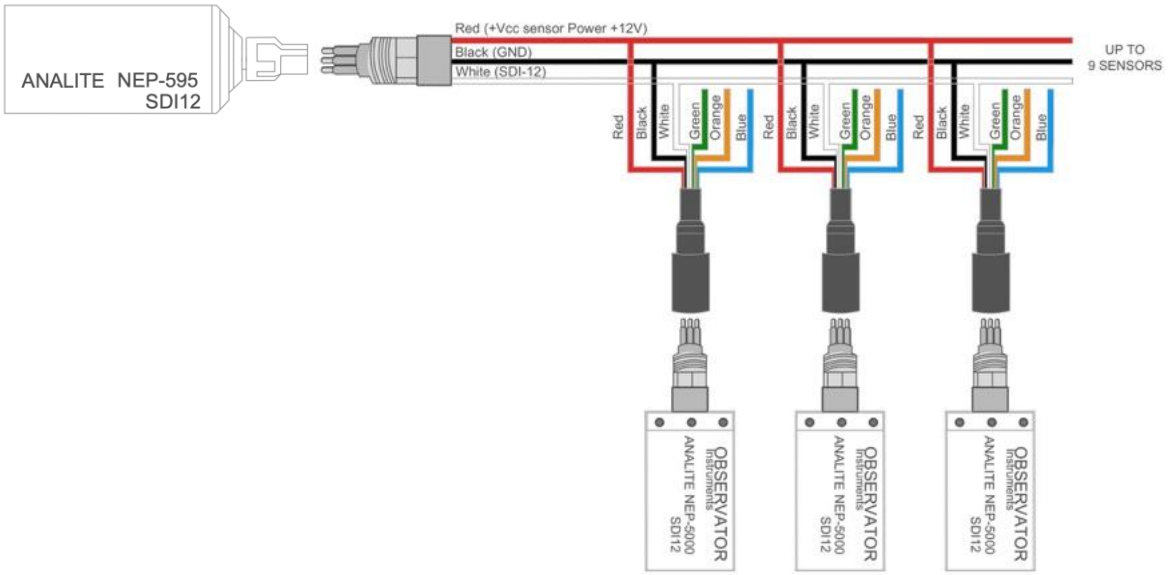


Figure 4.B: Connect NEP-595 to multiple NEP-5000

Note: Please contact your sensor manufacturer to request our special made cables for multiple sensor configuration.

4.2.4 Mounting NEP-595 into a data buoy

The NEP-595 is designed for long term monitoring applications such as data buoy deployments.

Important note: Never apply pressure to the body of the sensor. Always attach the NEP-595 using the metal handle in upper position. Do not use cable clamps. Do not crush the body of the sensor.

Note: A range of data-buoys fitting NEP-595 logging applications are available from the manufacturer. Please contact Observator Instruments for more information.

4.2.5 Power NEP-595 using a solar panel for long-term deployment

Powering the NEP-595 using a PV panel for long-term usage or remote deployment:

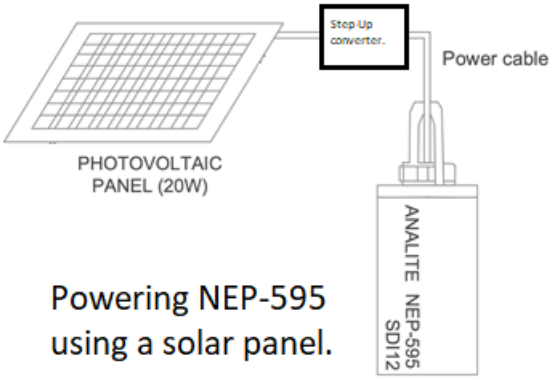


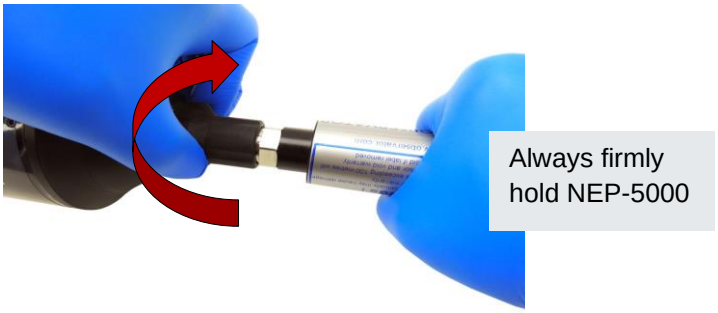
Figure 4.C: Power NEP-595 using a solar panel

Note: Additional customised accessories are available from Observator Instruments for long-term usage such as PV panels and long-deployment protective caps.

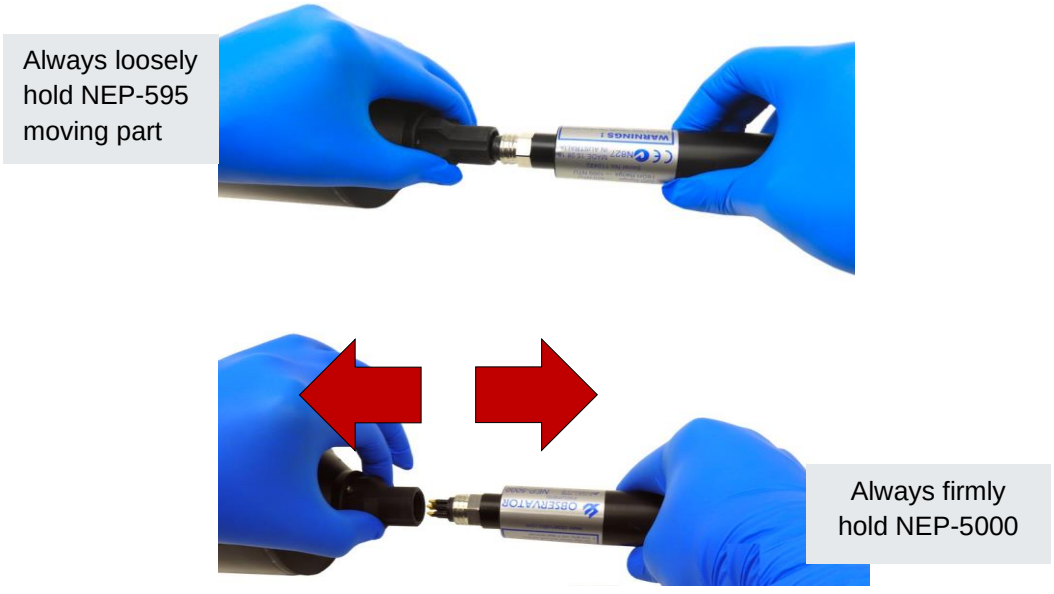
4.3 Disconnect NEP-5000 from the logger

To disconnect NEP-5000 sensor from the NEP-595 logging probe, please proceed as follows in order to avoid damaging the NEP-595 connector:

- Switch off the power switch.
- Turn the NEP-595 moving part anti-clockwise to detach the logging probe to the NEP-5000 sensor. Always loosely hold the NEP-595 moving part while firmly holding the NEP-5000 sensor (in order to avoid damaging the NEP-595 connector).



- Pull out NEP-5000 probe and disengage NEP-595 connector.



5 Charging NEP-595 battery

When shipped, NEP-595 battery will not be fully charged. Before charging the battery make sure that the power switch is off:

a. Undo the protecting top cap off the logging probe (simply turn anti-clockwise).
b. Make sure the power switch is in off position.

Users have the option of charging NEP-595 battery directly via the connector (refer to **Section 5.1** "Charging NEP-595 battery via the connector") or externally using the adaptor cable provided (refer to **Section 5.3** "Charge NEP-595 battery externally").

Once the NEP595 is fully charged, the LED in charger will turn to green from green (refer to **Section 5.4** "How to know if the battery is fully charged") to indicate the battery is fully charged. Do not forget to close the protecting top cap back onto the logging probe when finished.

Note: Make sure to verify the battery is properly charged prior to deploy NEP-595 in the field.

5.1 Charging NEP-595 battery via the connector

1. Connect the charging connector to the logging probe by placing the provided charging adapter into the power pin and apply power.

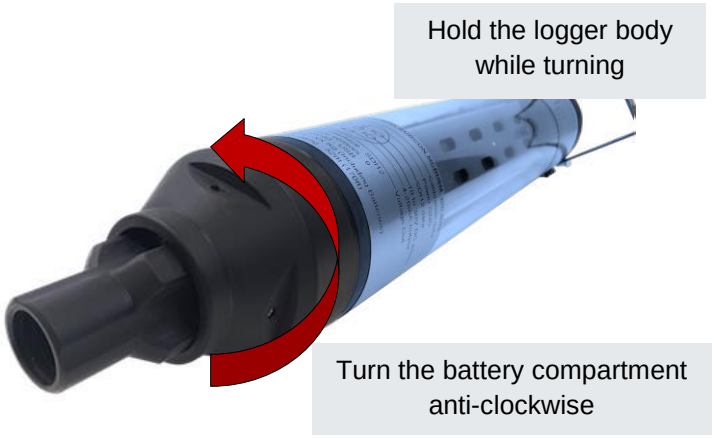
2. When fully charged, remove the charging cable and place the protective cap back onto the probe.

5.2 Replace/Remove NEP-595 battery

The following instructions must be followed to change the battery:

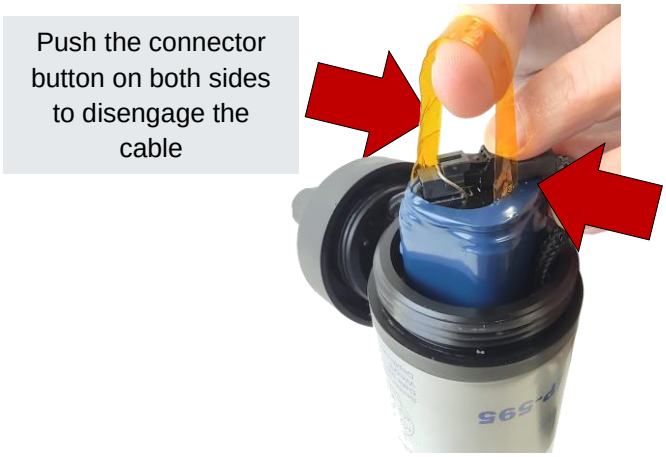
1. Make sure NEP-5000 sensor is disconnected, alternatively, disconnect NEP-5000 sensor from the logger (refer to **Section 4.3** "Disconnect NEP-5000 from the logger").

2. Open the battery compartment (turn anti-clockwise).



3. Pull the yellow strap to lift the battery (just enough to be able to disconnect the connector).

4. Disconnect the cable from the battery connector.



5. Pull the battery out of the battery compartment.

6. If required, charge the battery externally (refer to **Section 5.3** “Charge NEP-595 battery externally”).

7. Replace the fully charged battery back in the same position inside the logger, hold it in position using the yellow strap and plug in the cable to the connector (the connector should be facing the cable).

8. Drop the battery in the battery enclosure using the yellow strap. Tuck the extra cable inside the enclosure.

9. Close off the battery compartment (turn the lid clockwise).Make sure that Orings are not damaged.

5.3 Charge NEP-595 battery externally

Users may charge the battery using the external charging adaptor provided. Please refer to **Section 5.2** "Replace/Remove NEP-595 battery" and follow steps 1-5 to safely remove the battery from the battery compartment.

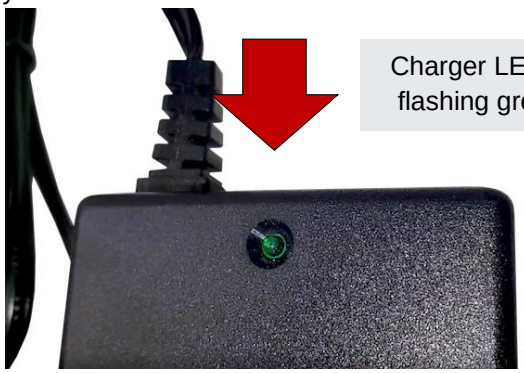
1. Connect the battery to the charger via the external adaptor cable provided.

2. Apply power and charge the battery until fully charged (refer to **Section 5.4** "How to know if the battery is fully charged").

5.4 How to know if the battery is fully charged

Please follow the steps described in **Section 5.1** "Charging NEP-595 battery via the connector" or **Section 5.3** "Charge NEP-595 battery externally" to connect respectively the charger to NEP-595 logger or to the battery directly.

It will take on average eight hours to fully charge from complete flat battery. The charger's LED will automatically turn green after completion of the charge cycle.



6 Maintenance & storage

6.1 Manage SD cards

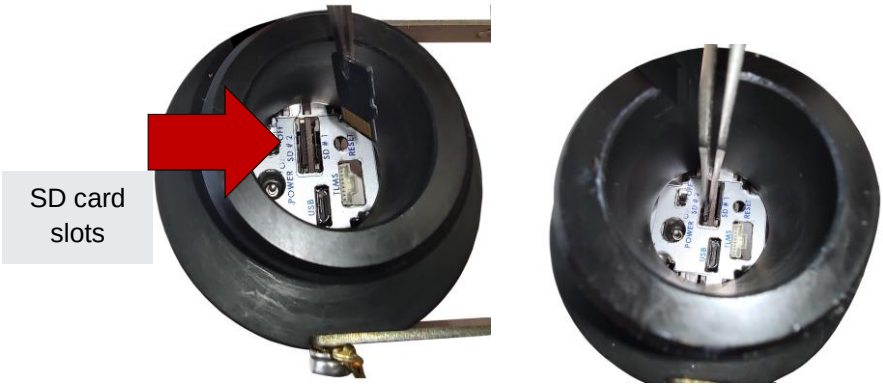
6.1.1 Clearing up SD card memory prior to deployment.

Before a new deployment, proceed as follow to clear the memory on the NEP-595 probe:

1. Undo the protecting top cap off the logging probe.
2. Make sure the power switch is in off position.
3. Insert 2 SD cards in the logger.
4. Connect the logger to the computer as described **Section 8.1** "Connect NEP-595 logger to your Windows PC" (step 3-5 only).
5. Manually empty both SD cards. Delete all files or format the SD card. Use reputable formatting tool such as Windows build in tool or SDORG formatting tool. https://www.sdcard.org/downloads/formatter/

6.1.2 Manually change SD cards

To change the SD cards, undo the protecting top cap off the logging probe and make sure the power switch is in off position. We recommend changing SD cards using a tweezer or similar tool. If you do not access to a tweezer tool you may change SD cards manually, however, this option is not recommended.



Note 1: Care must be taken when placing the SD card into the allocated slot.

Note 2: By default, the NEP-595 is configured to work with 2 SD cards. How ever user may select to use only 1 SD cards by using the configuration software.

6.1.3 Selecting a micro SD card for your NEP-595 device

NEP-595 is designed to carry two micro SD cards and use them in parallel to increase data redundancy. This also provides options by swapping cards to collect data in the field without using a PC.

Although the NEP-595 logging device is designed to work with almost all types of SD cards in the market, the best practice is to use SD cards that are intended for endurance use or have wider operating temperature range (25º C to 85º C). Also, it is important to note that many manufacturers offer data recovery services if you purchase their industrial grade, endurance grade or pro grade micro SD cards. The NEP-595 device supports SD cards up to 128GB of capacity.

Some of recommended SD cards:

- Samsung PRO Endurance

- SanDisk Extreme PRO (64GB micro SD)

- Kingston High-Endurance MicroSD

6.2 Safely closing of the protective cap

Tighten the protective cap so that it does not come off due to vibrations or other mechanical influences. Screw the cap by turning clockwise until the cap is fully screwed on.

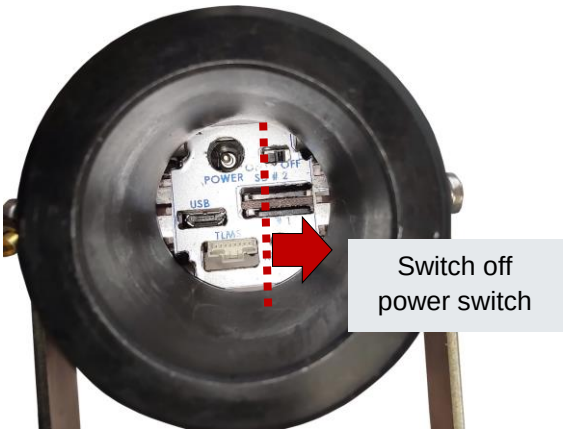
Important: Do not over-tighten the cap as the sealing is ensured by the O-ring (not the level of tightness). By tightening too much, the cap will damage its thread and may result in difficulty in removing the cap.

6.3 Switching off the power switch

Always switch off the NEP-595 after use. Users should also make sure that the switch is off prior to:

1. Connecting/disconnecting the sensor.
2. Inserting or removing a SD card.
3. Connecting the Micro USB cable.

Use the power switch (underneath the cap) to switch off the logging probe to avoid the system running continuously when it's not been used.



6.4 Reorient NEP-595 metal handle

To facilitate mounting, users can manually re-orient NEP-595 metal handle:

1. Remove the mounting screws.

2. Choose the preferred orientation among the 2 positions available:
   a. The upper position is preferred for deployment.
   b. The lower position facilitates access to the protective cap.

3. Place the screws back on.

6.5 Check moisture tabs for water ingress

Please check moisture tabs prior to deployment. If the tab has turned red, it means that moisture has penetrated within the logger electronics and battery. Do not deploy the logger at this condition.

Normal state

Detect water state

Important note: If you detect water inside the body of the NEP595, Please contact Observator Instruments for a evaluation.

6.6 Check the condition of o-rings and replace them

To insure a reliable operation, check the o-rings on a regular basis. Damaged o-rings can be replaced using correct oring kit for NR+EP595 : please refer to "NEP-595 o-ring replacement procedure" application note. You can also send the probe back to Observator Instruments for repairs.

6.7 Clean and wash the probe

In the field, wash the probe with fresh water and clean it with a soft cloth. Best to avoid hash chemicals such as laboratory alcohol.

7 NEP-595 LED status & meaning

7.1 How to make sure NEP-595 is working correctly by monitoring LEDs

User may monitor the activity of the logger by checking the 2 LEDs through the transparent window.

Light-Emitting Diode (LED) status	Colour	Meaning
LED on green		NEP-595 is performing a measurement
LED flashing green (twice per second)		NEP-595 data logger is connecting to the PC via USB cable
LED on red		SDI-12 sensor is not responding, system error, error in logging session
No LED		NEP-595 is sleeping, no logging, no problem has been detected

7.2 How to check for errors by monitoring LEDs

When the red LED is on it means that the logger has detected a problem. Problems encountered can be of three types:

- Errors in logging session.
- System error.
- Sensor does not respond.

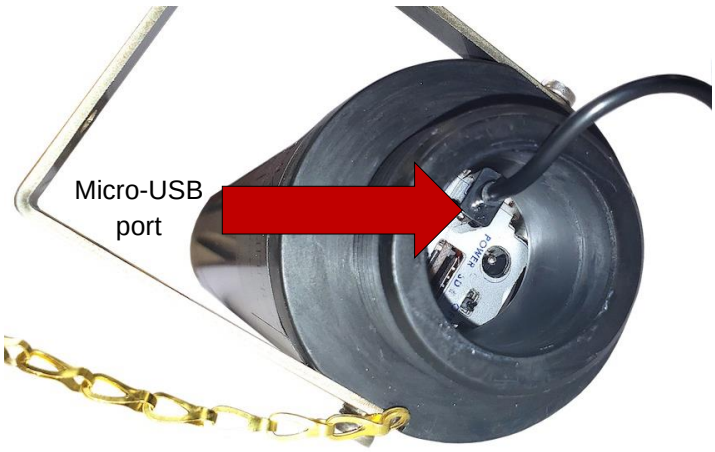
Please make sure your measurement is correct, alternatively reset the probe and **contact support** if the problem persists.

8 Software installation

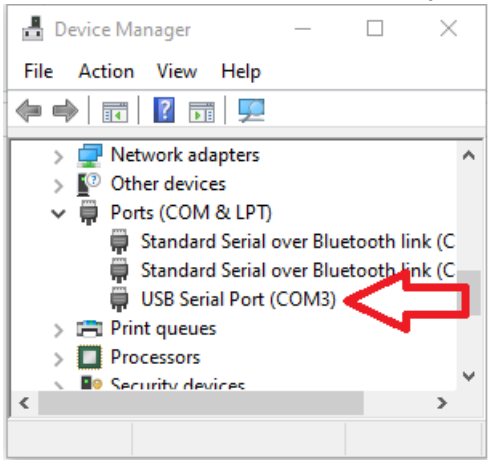
8.1 Connect NEP-595 logger to your Windows PC to download logged data

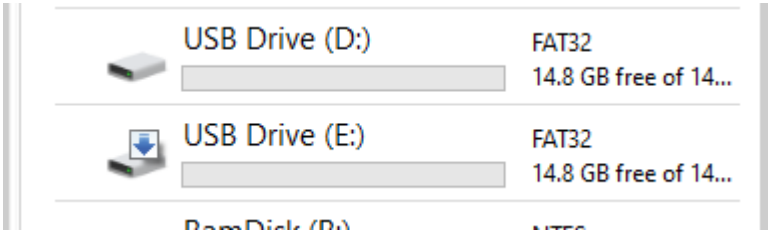
The process is very similar to plugging a USB thumb drive device. Proceed as follow to connect NEP-595 logger to your PC:

1. Undo the protecting top cap off the logging probe (simply turn anti-clockwise).
2. Make sure the power switch is in off position.
3. Plug in the USB cable into the micro-USB port and connect the logger to your computer USB port.



4. Put back the switch to on position.
5. Note the COM port in Device manager & two available Drivers in My Computer in your Windows PC.





Note: When connecting the data logger to the PC via USB cable the logger Green LED will start blinking twice per second until the connection is established.

6. If you are using the logger for the first time, please wait for the software to automatically install the mass storage drivers onto your Windows PC. This may take a few minutes.

7. You can now retrieve the data directly from your logging probe the same way you retrieve data from your USB storage device. Copy ".csv" log files from each SD card folder.

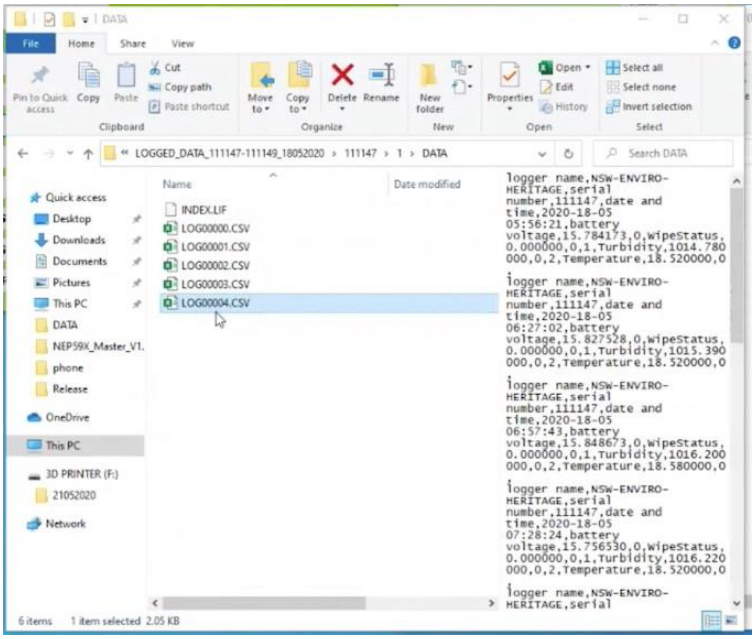


Figure 8.A: Data collected in ".csv" log files

Copy all the data from the SD card onto your computer.

8. When finished, select eject the mass drive from your PC. Turn off the logger switch. Only then, disconnect the micro USB cable from your computer and from the NEP-595 probe and place the protective cap back onto the probe.

Green LED is flashing while the logger is connecting

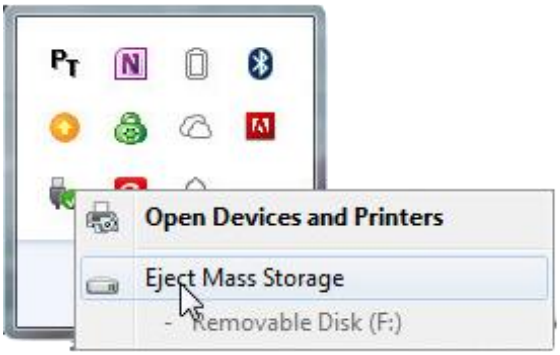


Figure 8.B: Eject NEP-595 probe from your PC

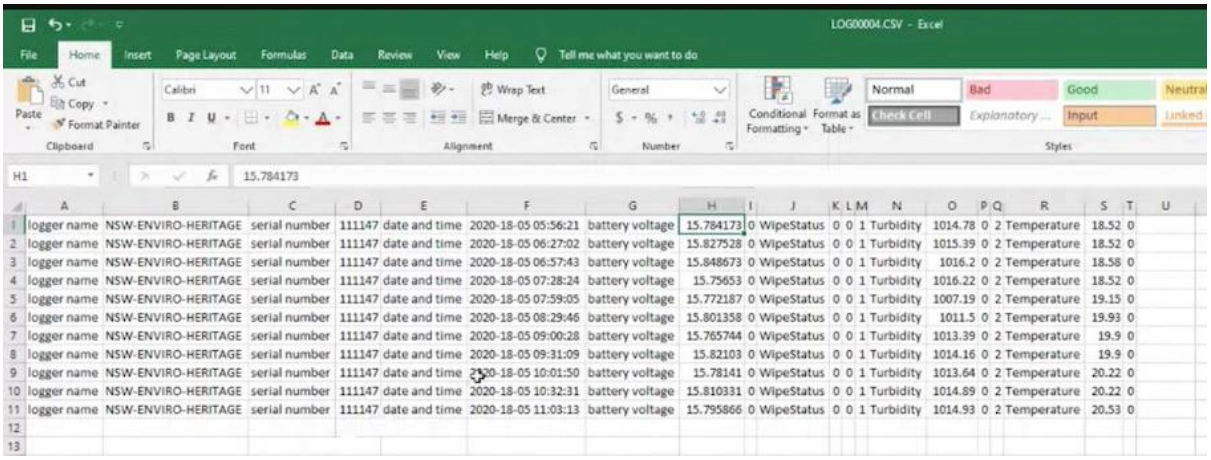
8.2 File format types available in NEP-595

There are 2 formats available with NEP-595:

1. Self-describing ".csv" format.
2. "Eagle.io" format.

8.2.1 Self-describing ".csv" format

Each ".csv" file contains data formatted as follow:



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 05:56:21	battery voltage	15.784173	0	WipeStatus	0	0	1	Turbidity	1014.78	0	2	Temperature	18.52	0	
2	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 06:27:02	battery voltage	15.827528	0	WipeStatus	0	0	1	Turbidity	1015.39	0	2	Temperature	18.52	0	
3	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 06:57:43	battery voltage	15.848673	0	WipeStatus	0	0	1	Turbidity	1016.2	0	2	Temperature	18.58	0	
4	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 07:28:24	battery voltage	15.75653	0	WipeStatus	0	0	1	Turbidity	1016.22	0	2	Temperature	18.52	0	
5	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 07:59:05	battery voltage	15.772187	0	WipeStatus	0	0	1	Turbidity	1007.19	0	2	Temperature	19.15	0	
6	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 08:29:46	battery voltage	15.801358	0	WipeStatus	0	0	1	Turbidity	1011.5	0	2	Temperature	19.93	0	
7	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 09:00:28	battery voltage	15.765744	0	WipeStatus	0	0	1	Turbidity	1013.39	0	2	Temperature	19.9	0	
8	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 09:31:09	battery voltage	15.82103	0	WipeStatus	0	0	1	Turbidity	1014.16	0	2	Temperature	19.9	0	
9	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 10:01:50	battery voltage	15.78141	0	WipeStatus	0	0	1	Turbidity	1013.64	0	2	Temperature	20.22	0	
10	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 10:32:31	battery voltage	15.810331	0	WipeStatus	0	0	1	Turbidity	1014.89	0	2	Temperature	20.22	0	
11	logger name	NSW-ENVIRO-HERITAGE	serial number	111147	date and time	2020-18-05 11:03:13	battery voltage	15.795866	0	WipeStatus	0	0	1	Turbidity	1014.93	0	2	Temperature	20.53	0	
12																					
13																					

Figure 8.C: Data collected within each ".csv" file

When finished downloading data, clear up the SD card memory and set up the SD cards for the next logging section (refer to **Section 6.1.1** "Clearing up SD card memory").

8.3 Procedure for updating firmware

Please check “NEP-595 firmware updating procedure” application note.

9 NEP-595 common popular configurations

9.1 Default configuration for single turbidity measurement with optical wiping

9.1.1 Configuration objectives

The default configuration is pre-loaded onto all NEP-595 logging probes (unless otherwise requested). The configuration turns on the sensor. After the warm up time elapses, it performs an optical wiping followed by a single turbidity measurement, and stores data at each scan (every 5 minutes).
Then the configuration save data into built-in 2 SD cards in ".csv" format within the datalogger:

- The configuration records the wiping status (if jammed or not) of the probe (Wipe_stats) and the turbidity (Turbidity) in NTU within the SD card in "csv" format at each scan (every 5 minutes).
- The configuration records the minimum default NEP-595 Battery Voltage (BattV) into the same ".csv" file.

The configuration uses the SDI-12 command "M1!" to trigger a wipe and the command "M!" to perform a turbidity measurement.

9.1.2 NEP-5000 configuration

Please refer to **Section 4.1** "Quick checklist to prepare for easy deployment" to properly setup and connect the logging probe to the NEP-5000 sensor.

Connect the NEP-5000 probe to your Windows computer using the calibration box "Blue Box". Configure the NEP-5000 ranges using the NEP-5000 software. Apply SDI-12 settings.

> Please refer to the NEP-5000 manual for more information.

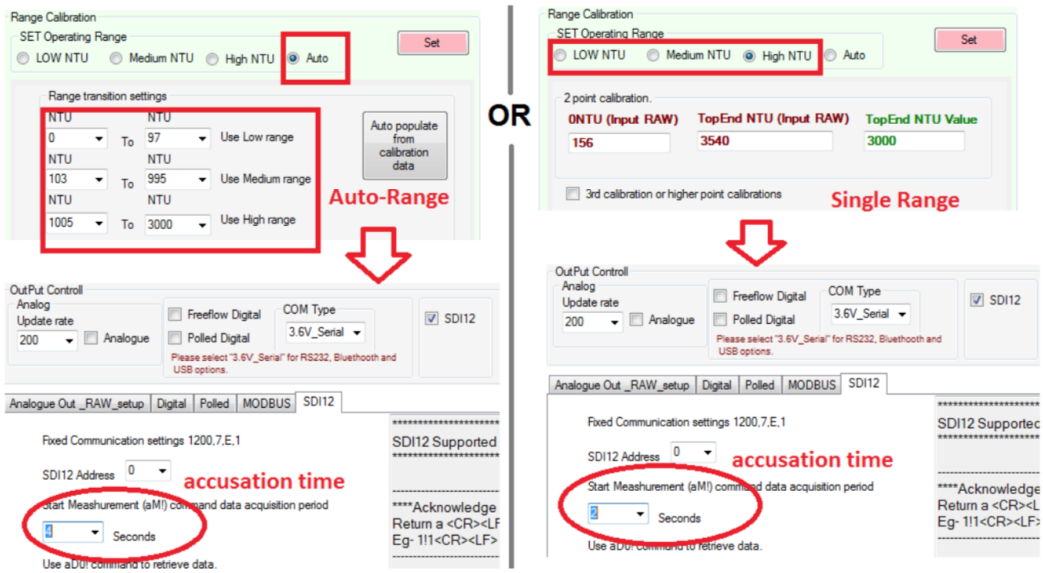


Figure 9.A: To commit above settings to permanent memory please press set followed by save calibration

This provide following SDI-12 settings:

- SDI-12 data accusation time = 10s
- SDI-12 address = 0
- Power on wipe off

9.1.3 Flow chart

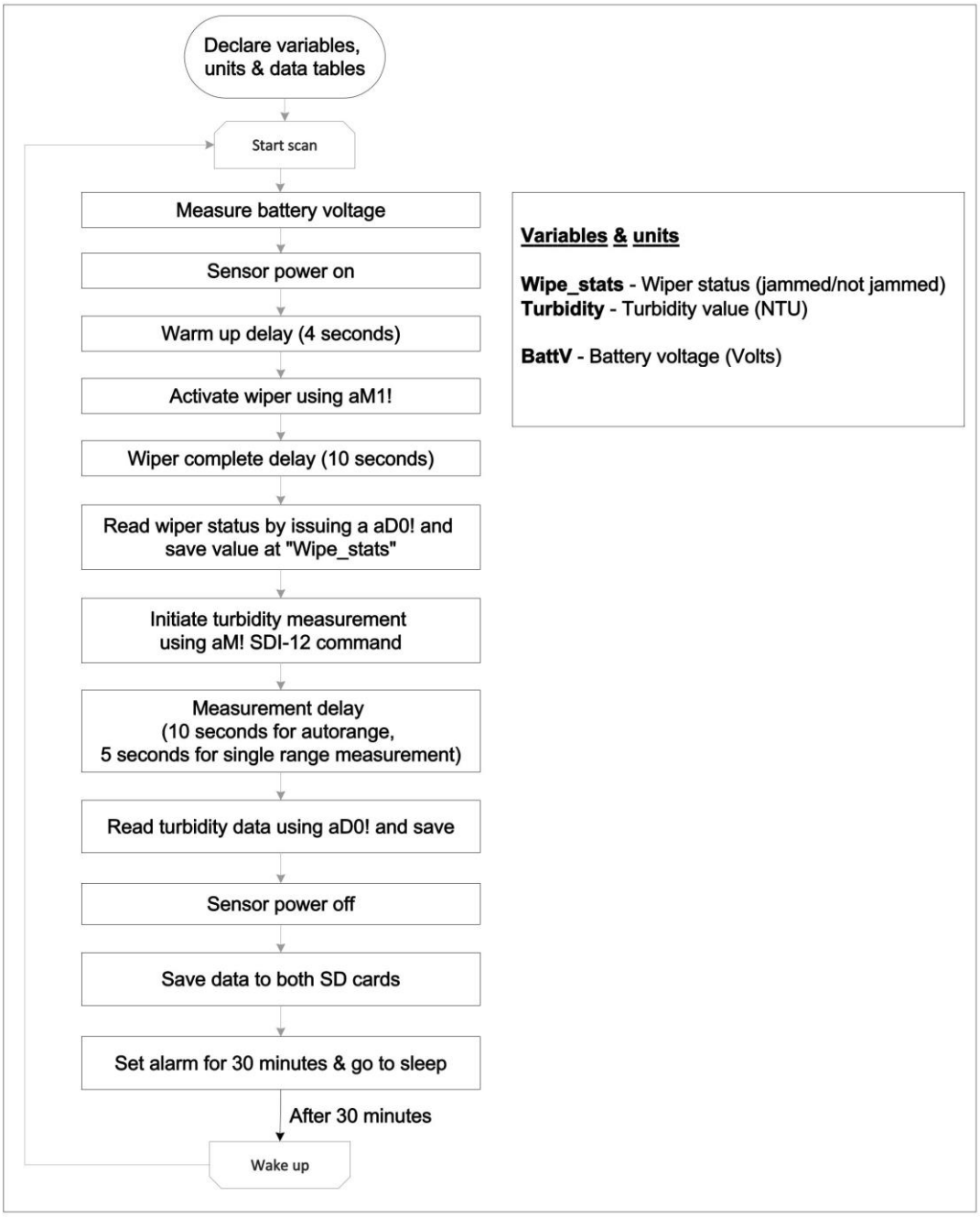


Figure 9.B: Default configuration for single turbidity measurement with optical wiping

9.1.4 Power estimation

The following table represents the power estimation for turbidity in auto-range (ten seconds) with optical wipe.

Logging time (min)	Measurement days
1	5
5	29
10	56
20	108
30	154
40	197
50	236
60	272

Note: All of the above estimations are calculated for ideal temperatures of 25°C. Battery aging and self-discharge are not considered. When deploying for more than three months, the estimation can vary by approximately 30%.

9.1.5 SDI-12 Configuration for NEP-595 logger

This section will be made available to customer upon request.

9.2 Single turbidity measurement & built-in temperature measurement with optical wiping

9.2.1 Configuration objectives

This configuration can be loaded onto all NEP-595 logging probes using the NEP-595 application. The configuration turns on the sensor. After the warm up time elapses, it performs an optical wiping followed by a single turbidity measurement, a temperature measurement, and stores data at each scan (every 30 minutes). Then the configuration save data into built-in 2 SD cards in ".csv" format within the datalogger:

- The configuration records the wiping status (if jammed or not) of the probe (Wipe_stats) and the turbidity (Turbidity) in NTU and the liquid temperature (Liquid_Temp) within the SD card in "csv" format at each scan (every 30 minutes).
- The configuration records the minimum default NEP-595 Battery Voltage (BattV) into the same ".csv" file.

The configuration uses the SDI-12 command "M1!" to trigger a wipe, the command "M!" to perform a turbidity measurement and "D1!" to perform a temperature measurement.

9.2.2 NEP-5000 configuration

Please refer to **Section 4.1** "Quick checklist to prepare for easy deployment" to properly setup and connect the logging probe to the NEP-5000 sensor.

Connect the NEP-5000 probe to your Windows computer using the calibration box "Blue Box". Configure the NEP-5000 ranges using the NEP-5000 software. Apply SDI-12 settings.

Please refer to the NEP-5000 manual for more information.

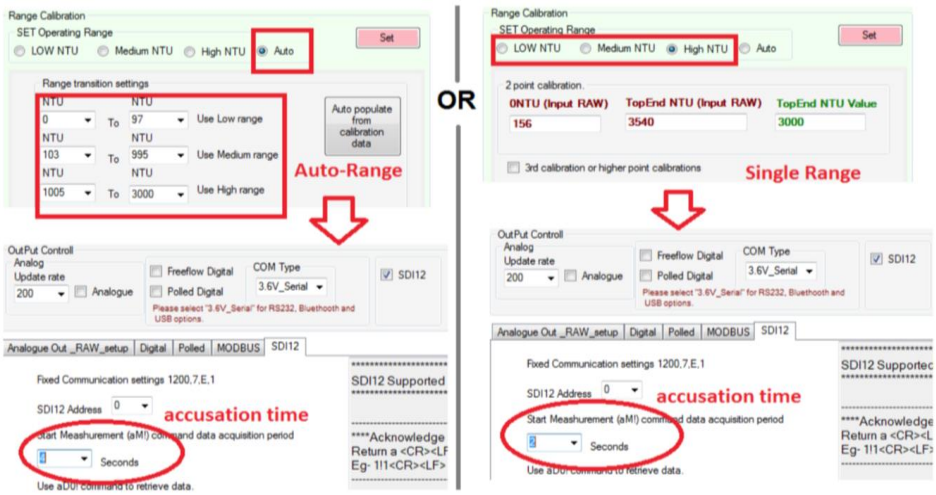


Figure 9.C: To commit above settings to permanent memory please press set followed by save calibration

This provide following SDI-12 settings:

- SDI-12 data accusation time = 10s
- SDI-12 address = 0
- Power on wipe off
- Auto range selected

9.2.3 Flow chart

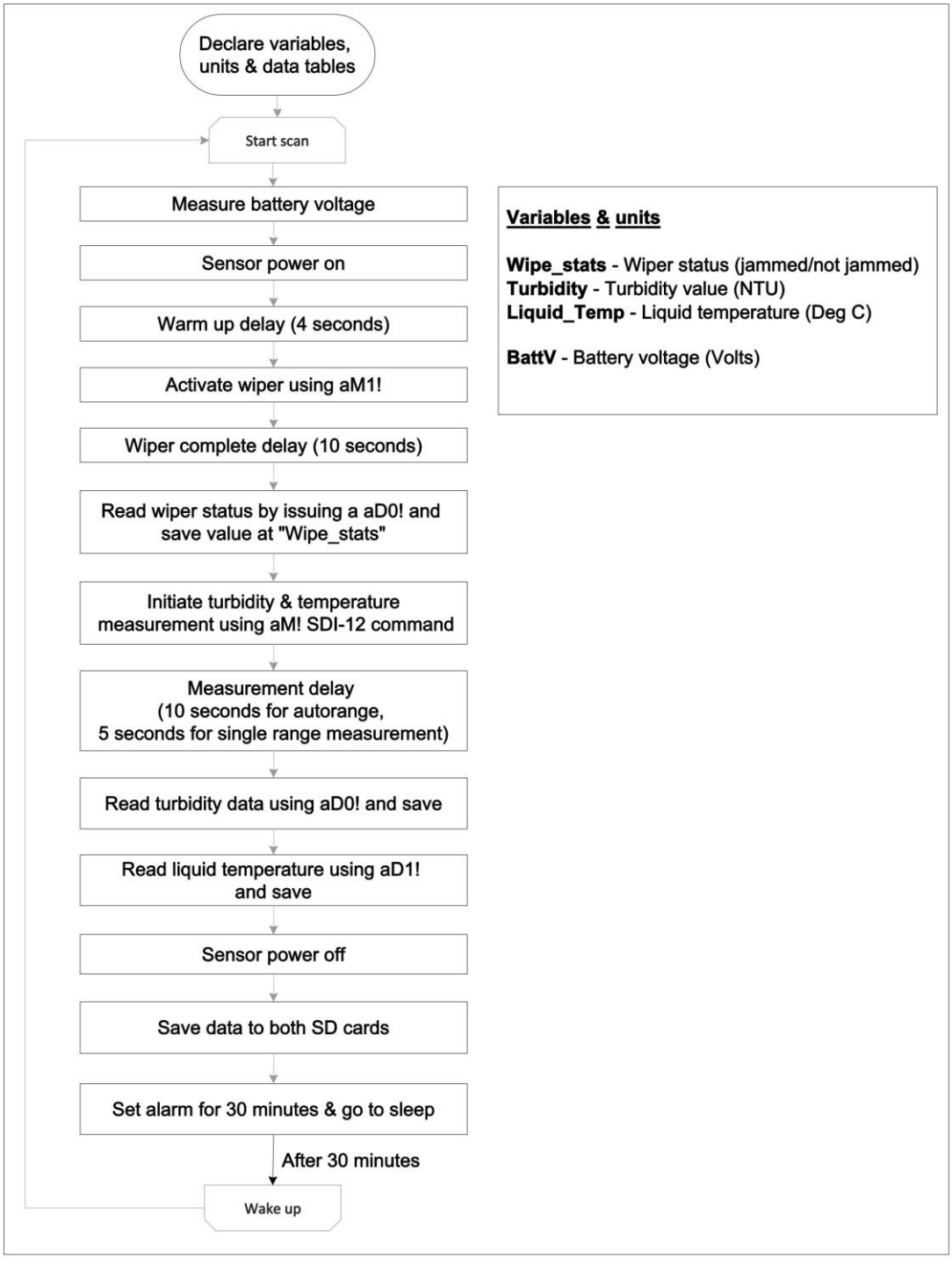


Figure 9.D: Single turbidity measurement & built-in temperature measurement with optical wiping

9.2.4 Power estimation

The following table represents the power estimation for turbidity in auto-range (ten seconds) with optical wipe and temperature measurement.

Logging time (min)	Measurement days
1	6
5	32
10	63
20	120
30	171
40	217
50	259
60	297

Note: All of the above estimations are calculated for ideal temperatures of 25°C. Battery aging and self-discharge are not considered. When deploying for more than ten months, the estimation can vary by approximately 30%.

9.2.5 SDI-12 Configuration for NEP-595 logger

This section will be made available to customer upon request.

9.3 Multiple turbidity measurements in statistical analysis with optical wiping

9.3.1 Configuration objectives

This configuration can be loaded onto all NEP-595 logging probes using the NEP-595 application. The configuration turns on the sensor. After the warm up time elapses, it performs an optical wiping followed by multiple turbidity measurements and stores data at each scan (every five minutes).
Then the configuration save data into built-in 2 SD cards in ".csv" format within the datalogger:

- The configuration records the wiping status (if jammed or not) of the probe (Wipe_stats) and the full statistical measurements (Turbidity, Median, Average, Minimum, Maximum) in NTU within the SD card in "csv" format at each scan (every 5 minutes).
- The configuration the minimum default NEP-595 Battery Voltage (BattV) into the same ".csv" file.

The configuration uses the SDI-12 command "M1!" to trigger a wipe and the command "M6!" to perform the full statistical measurements.

9.3.2 NEP-5000 configuration

Please refer to **Section 4.1** "Quick checklist to prepare for easy deployment" to properly setup and connect the logging probe to the NEP-5000 sensor.

Connect the NEP-5000 probe to your Windows computer using the calibration box "Blue Box". Configure the NEP-5000 ranges using the NEP-5000 software. Apply SDI-12 settings.

Please refer to the NEP-5000 manual for more information.

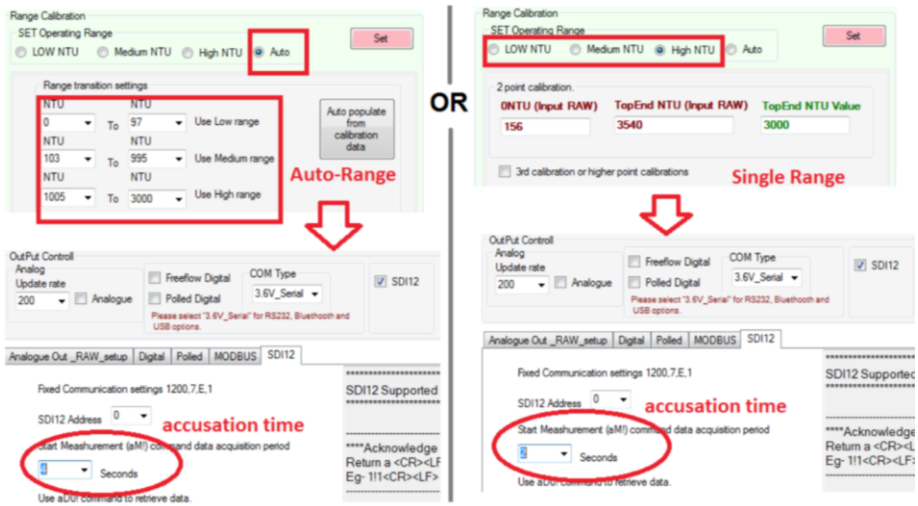


Figure 9.E: To commit above settings to permanent memory please press set followed by save calibration

This provide following SDI-12 settings:

- SDI-12 data accusation time = 10s
- SDI-12 address = 0
- Power on wipe off
- Auto range selected

9.3.3 Flow chart

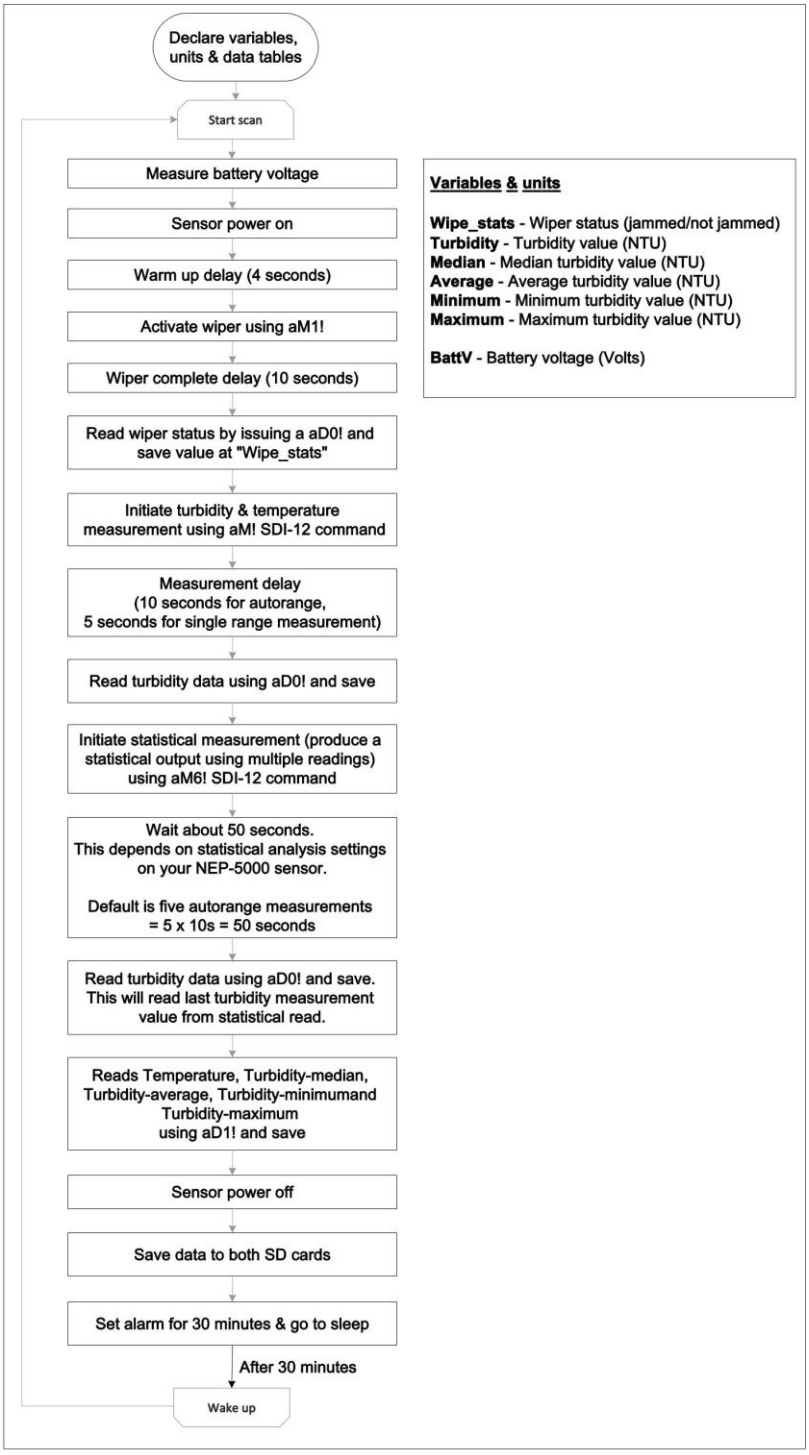


Figure 9.F: Multiple turbidity measurements in statistical analysis with optical wiping

9.3.4 Power estimation

The following table represents the power estimation for turbidity in auto-range (fifty seconds) statistical mode (five samples) with optical wipe and temperature measurement.

Logging time (min)	Measurement days
2	6
5	16
10	31
20	61
30	90
40	117
50	142
60	166

Note: All of the above estimations are calculated for ideal temperatures of 25°C. Battery aging and self-discharge are not considered. When deploying for more than three months, the estimation can vary by approximately 30%.

9.4 Getting started with NEP59x configuring tool.

NEP595 provides a PC software that allows users to fully configure the NEP595 logger.

Some key features are,

- Exporting and importing and logger configurations. This allows users to backup existing logger configuration to a CFG file or apply or setup loggers using a pre-configured CFG file.
- Ability quickly change the logging parameters such as logging interval, Log file configurations, adjust system time and etc.
- Ability to configure SDi12 sequence that retrieve data from sensors.
- Ability live test each SDI12 sequence prior to deployment.

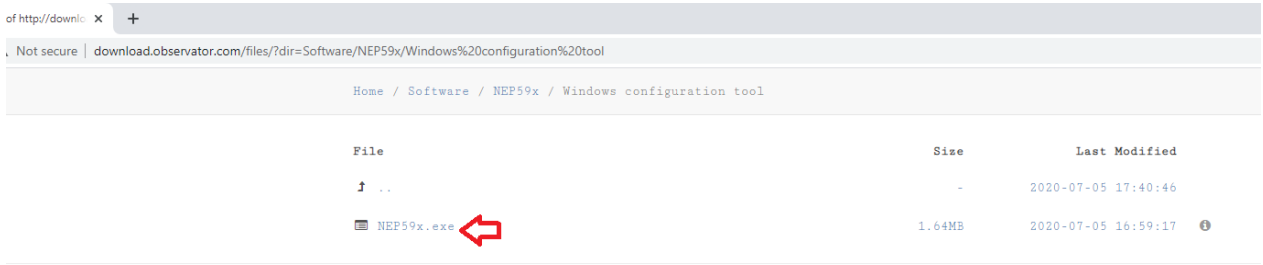
9.4.1 Connecting your NEP59x logger to PC.

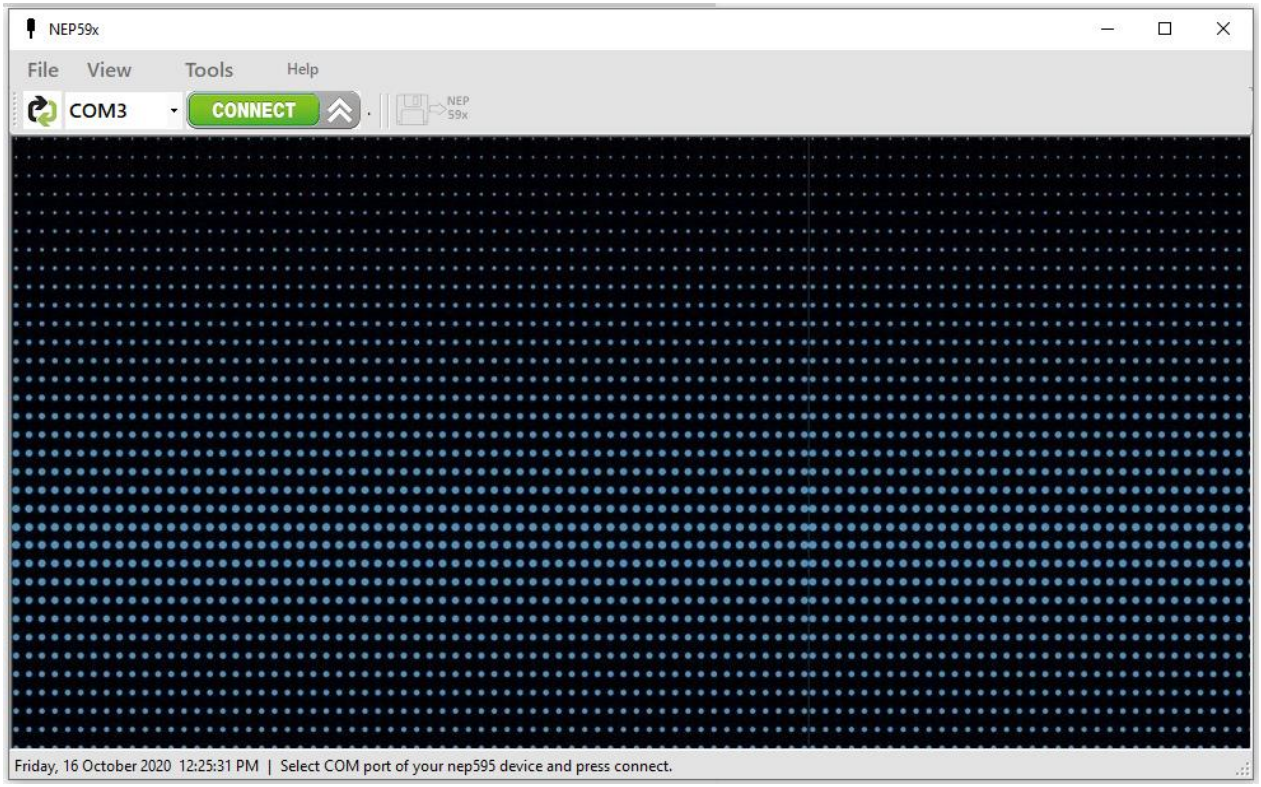
Please refer to section 8.1 of this manual. Step 1 through 5.
NEP59x PC software uses COM port to communicate with logger electronics. Please note down the comport number form the “Device manager” from your PC.

9.4.2 PC configuring tool.

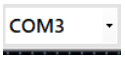
The latest version will be available in
“http://download.observator.com/files/?dir=Software/NEP59x/Windows%20configuration%20tool”

Download the executable file and double click to run.



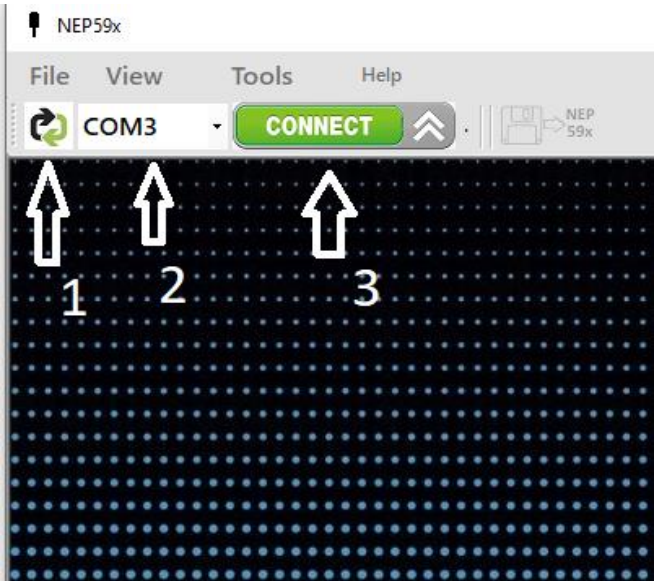


9.4.3 To connecting the PC tool with your logger.

Select the Comport 

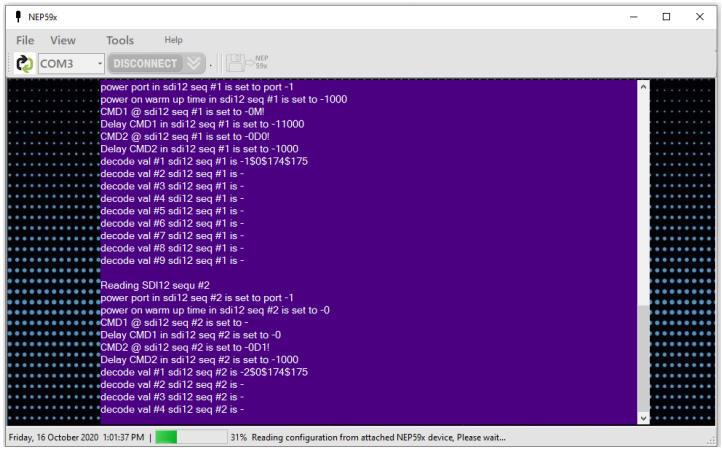
and press connect 

. Press refresh  button if newly install COM port is not displaying in the list.

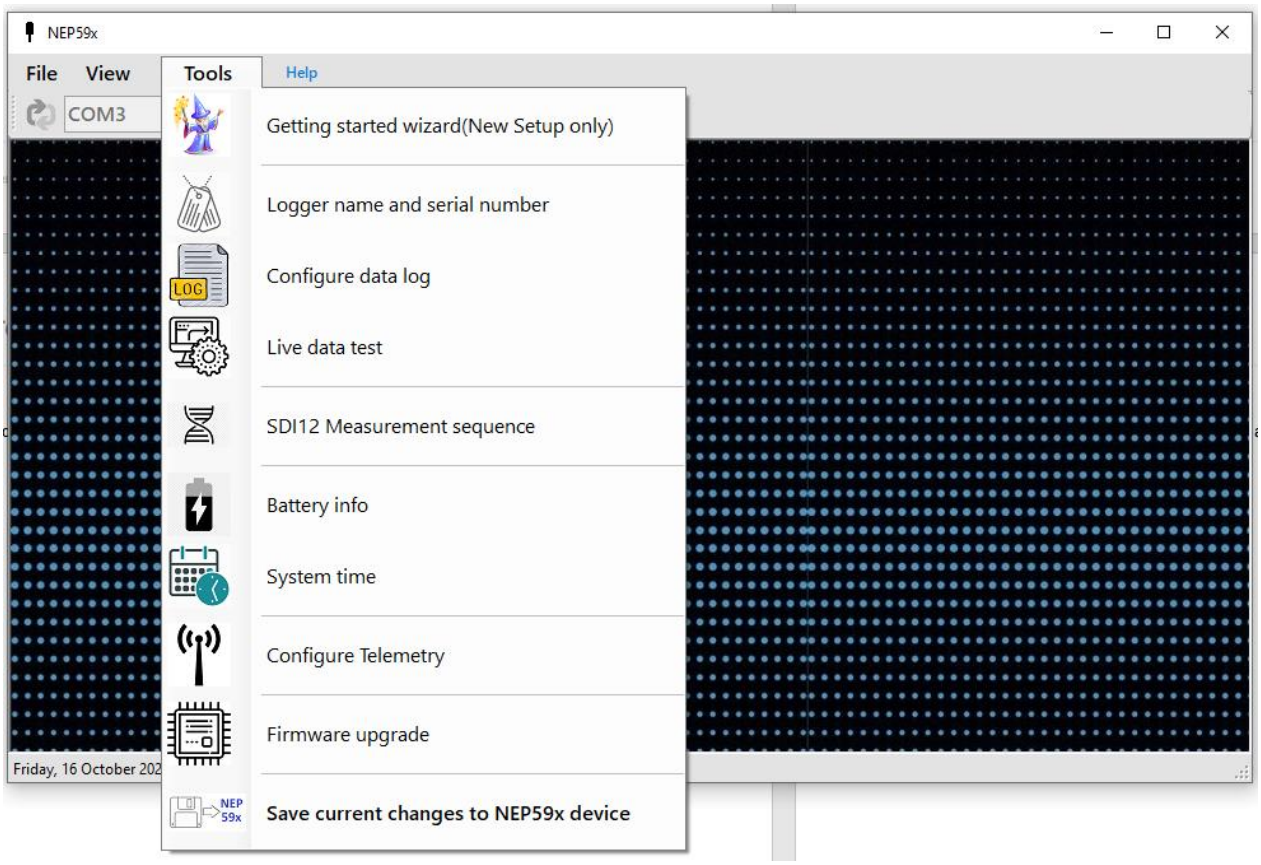


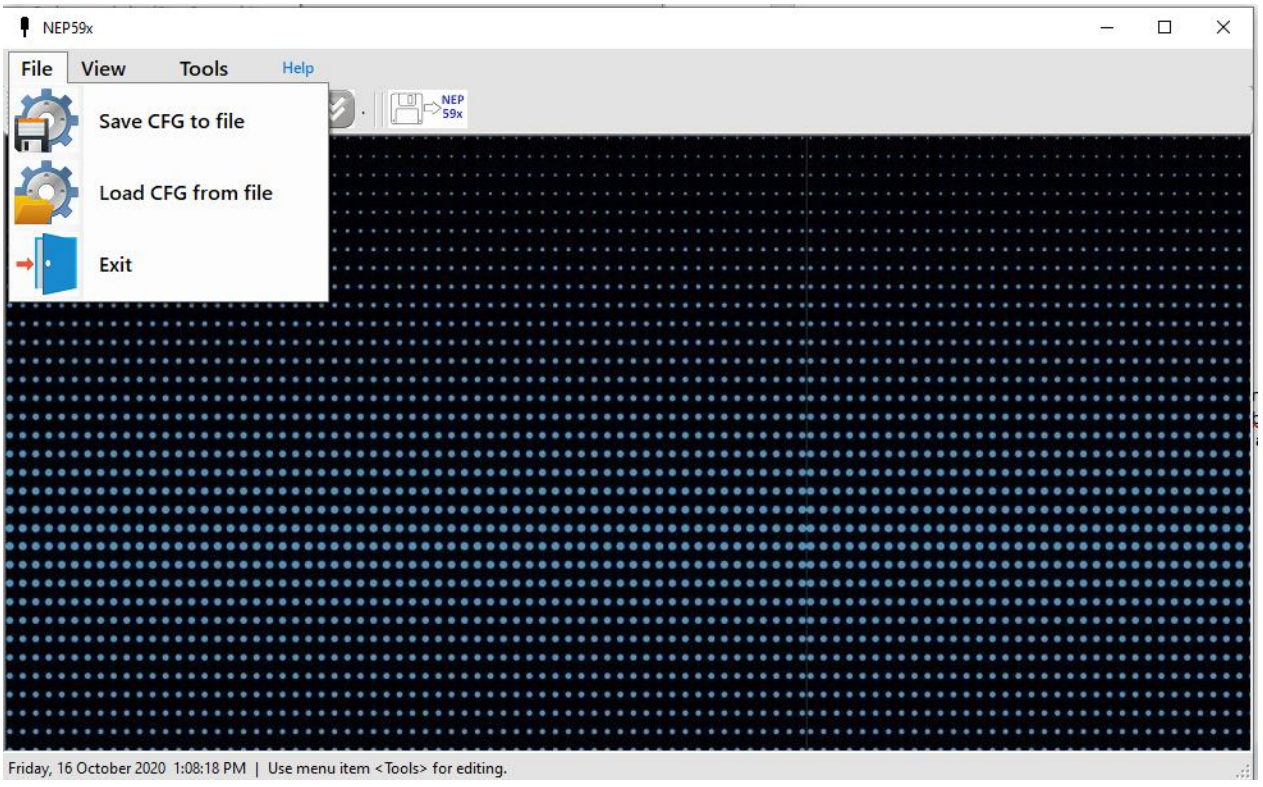
Note that if incorrect port is selected, the software will let user know.

When valid device is recognised by the software after pressing of the connect button, the Software will automatically read all available configuration from the Nep595 device.



Upon completion of retrieving the device configurations the software will enable its configuration controls (Top menu).

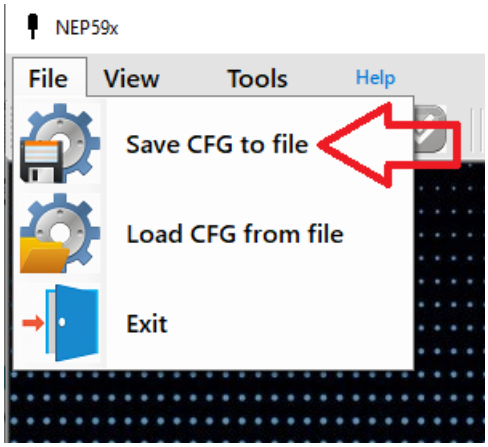


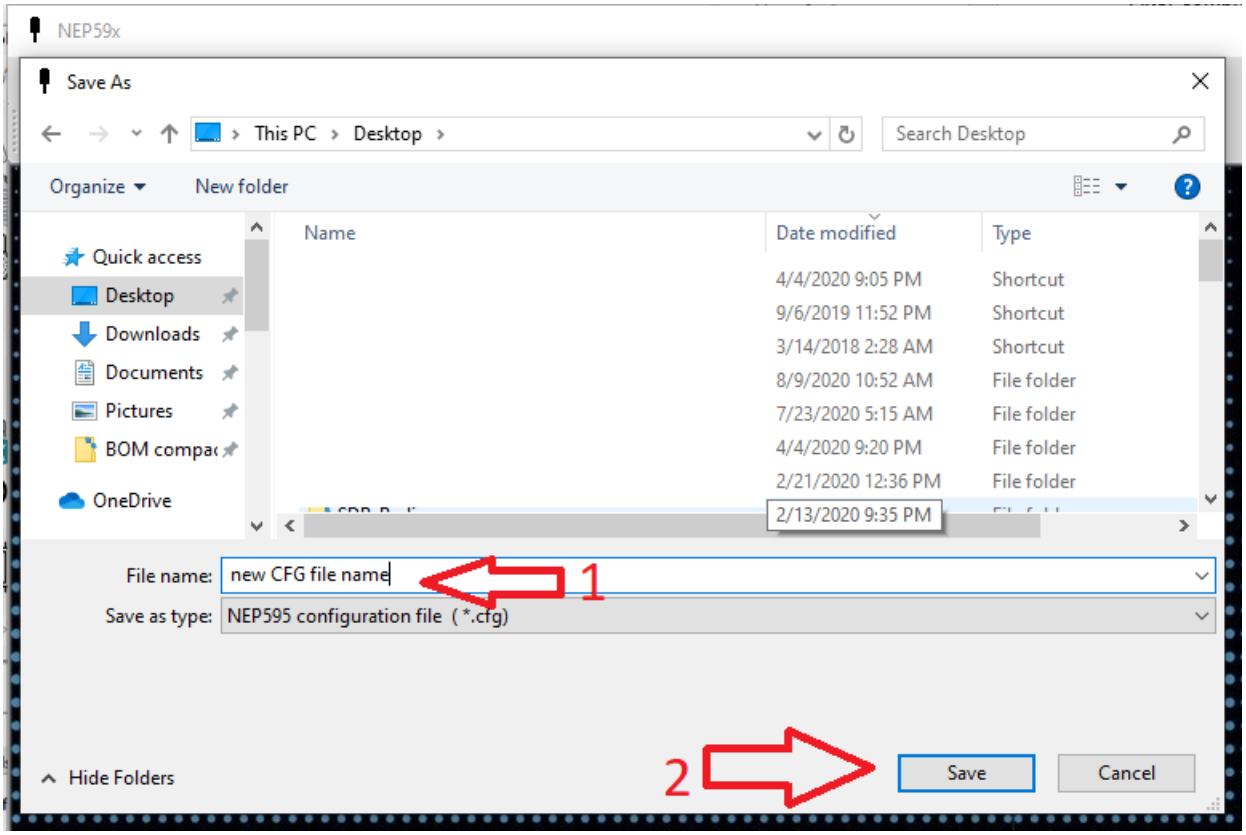


9.4.4 Exporting (Save out to a file) currently loaded logger configuration to a CFG file.

After completion of the connection stage. The PC configuration software will have all of logger configuration in its memory, So the user may export this configuration as backup.

Please click on “File” and then “Save CFG to File”, Then provide your reference file name and press “Save”





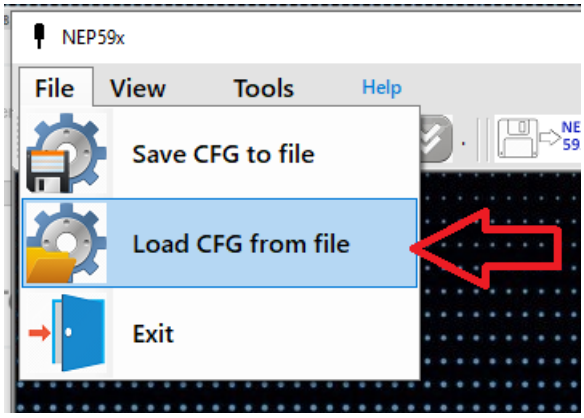
9.4.5 Importing a pre-configured logger configuration to software from a CFG file.

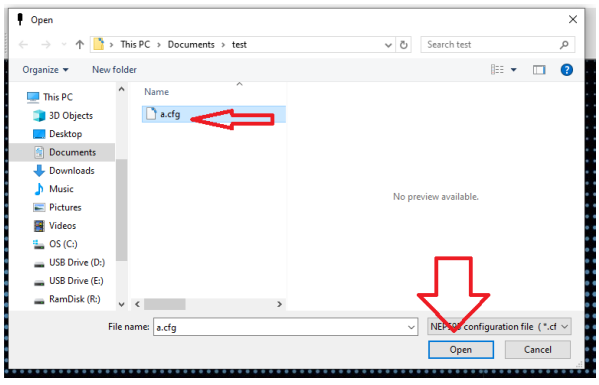
After completion of the connection stage, user may apply preconfigured logger setting from a file.

This procedure is involved in two stages,

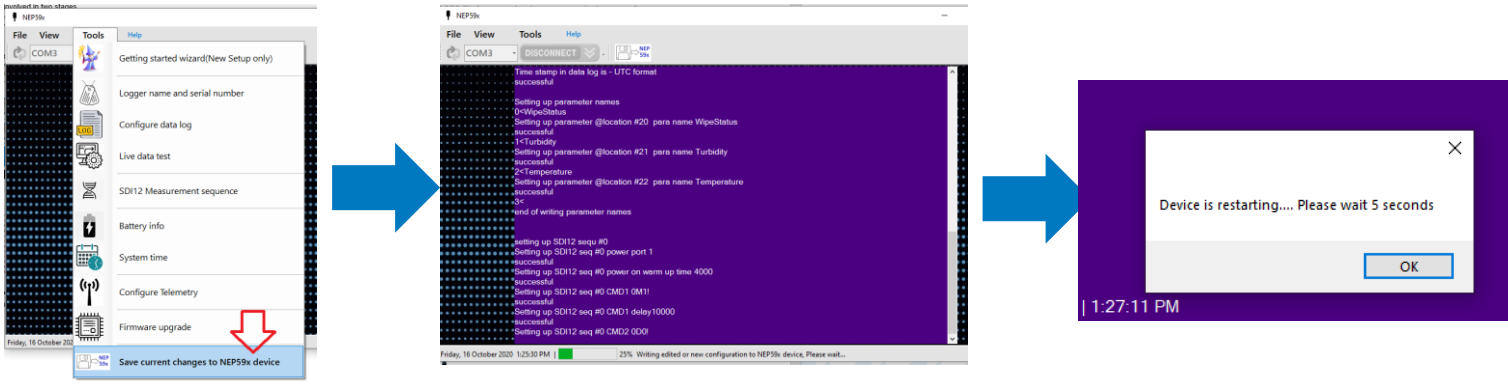
1. Importing of CFG file form your local computer to the Logger software.
2. Save the newly loaded CFG file to the attached NEP59x device.

Importing of CFG file form your local computer to the Logger software.





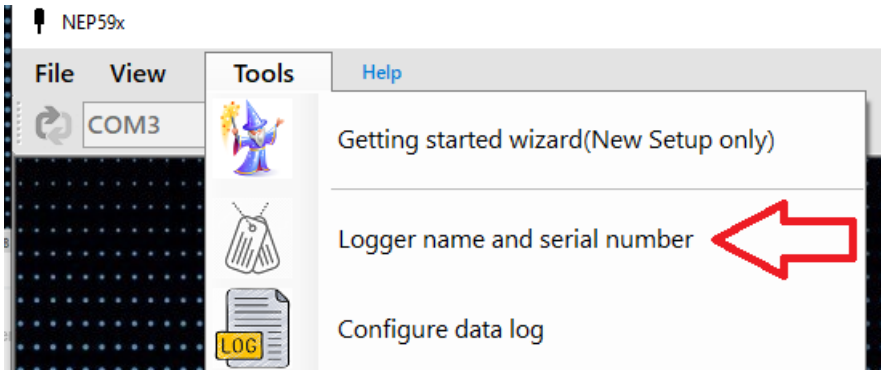
Save the newly loaded CFG file to the attached NEP59x device.



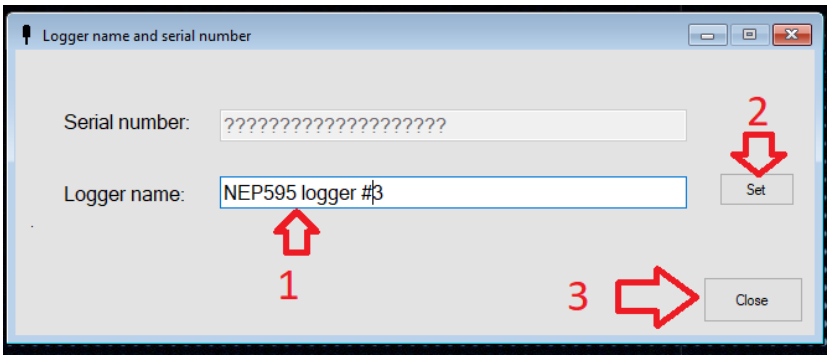
9.4.6 Altering the logger name and reading its serial number.

NEP59x device allows use to provide a unique name to each NEP59x device so that this unique name can appears in user data files. This way user will always know the origin of the data.

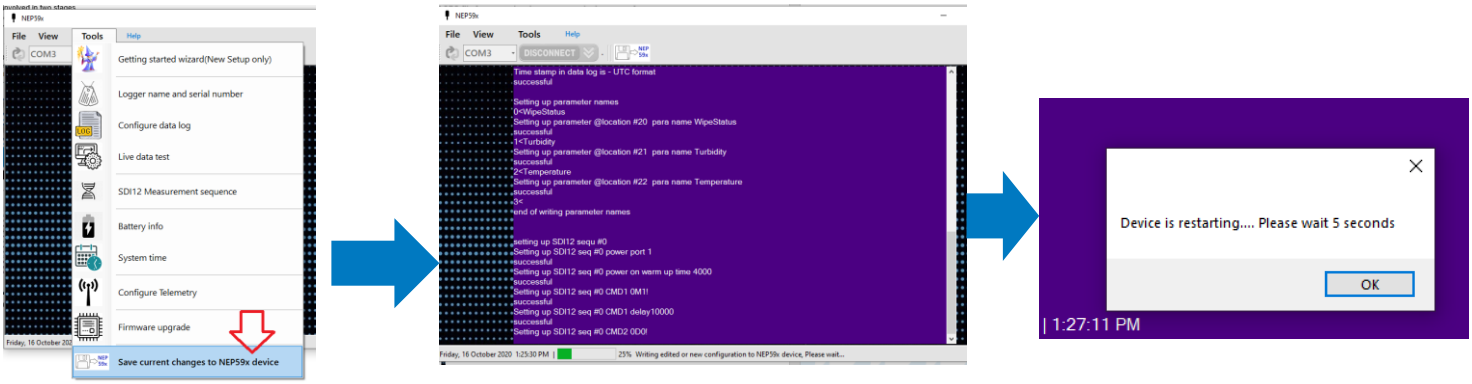
Controls are located at “Tools” > “Logger name and serial number”



Type the desired name and press “Set” and close the window by pressing “Close” buttion.

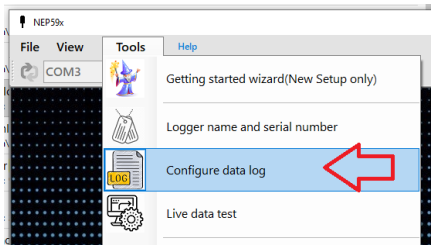


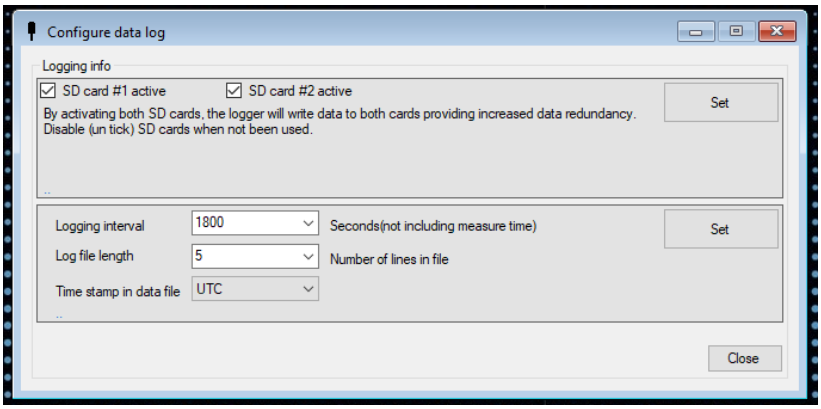
Save the newly configured data to the attached logger. Note that save to device part can be done at a later stage. e.g. Completion of all configurations.



9.4.7 Changing the log file settings in SD cards and enable or disable of number of SD cards in use.

Controls are located at “Tools” > “Configure data log”





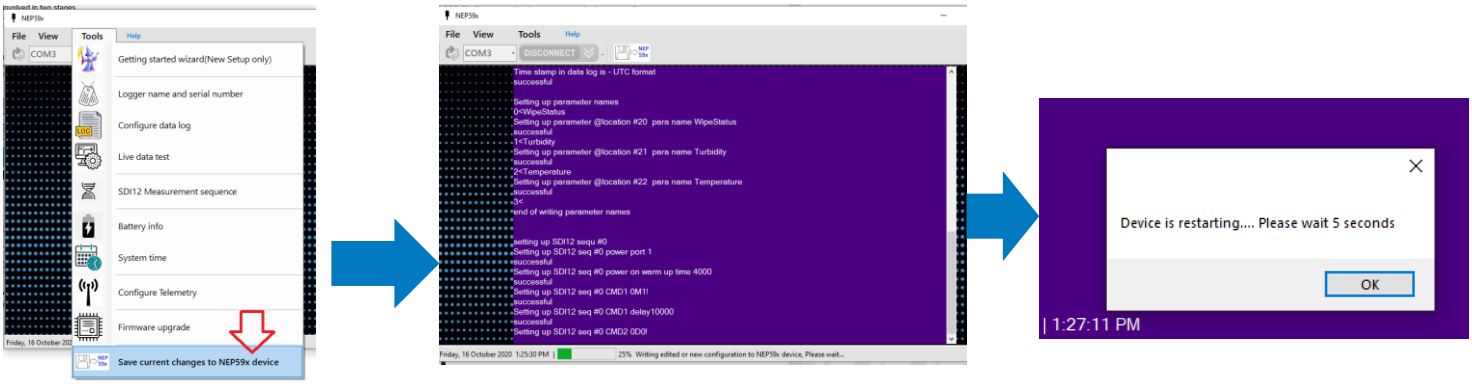
The **“Logging Interval”** – This sets the logging interval of the measurement. The logger will wakeup at this interval and carry out the SDi12 sequence you set in the “SDi12 measurement sequence”

The **“Log file length”** – This control sets the limit of data line in each log file. When this limit is reached, then the logger will create a new file. It is advisable to keep this smaller as possible, more file provide higher data radiancy.

The **“Time Stamp in data file**” – Time stamp format.

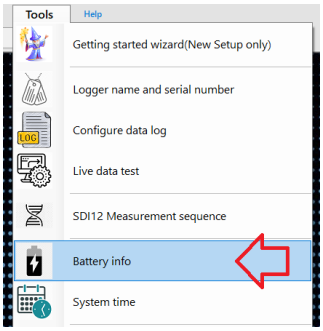
After completion, press “SET” buttons and then close the window by clicking close.

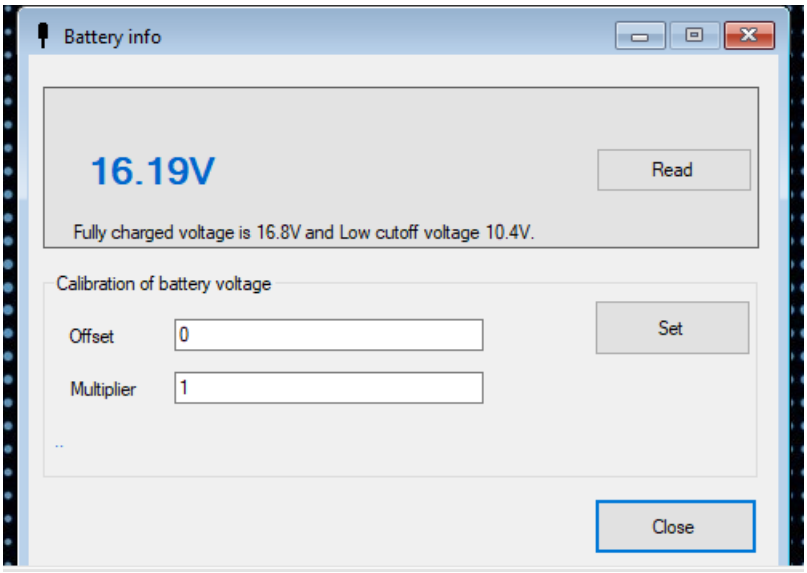
Save the newly configured data to the attached logger. Note that save to device part can be done at a later stage. e.g. Completion of all configurations.



9.4.8 Reading the current battery information.

Controls are located at “Tools” > “Battery info”

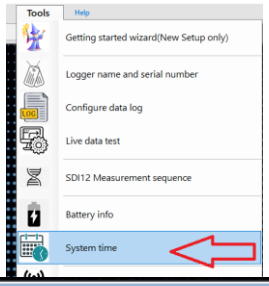


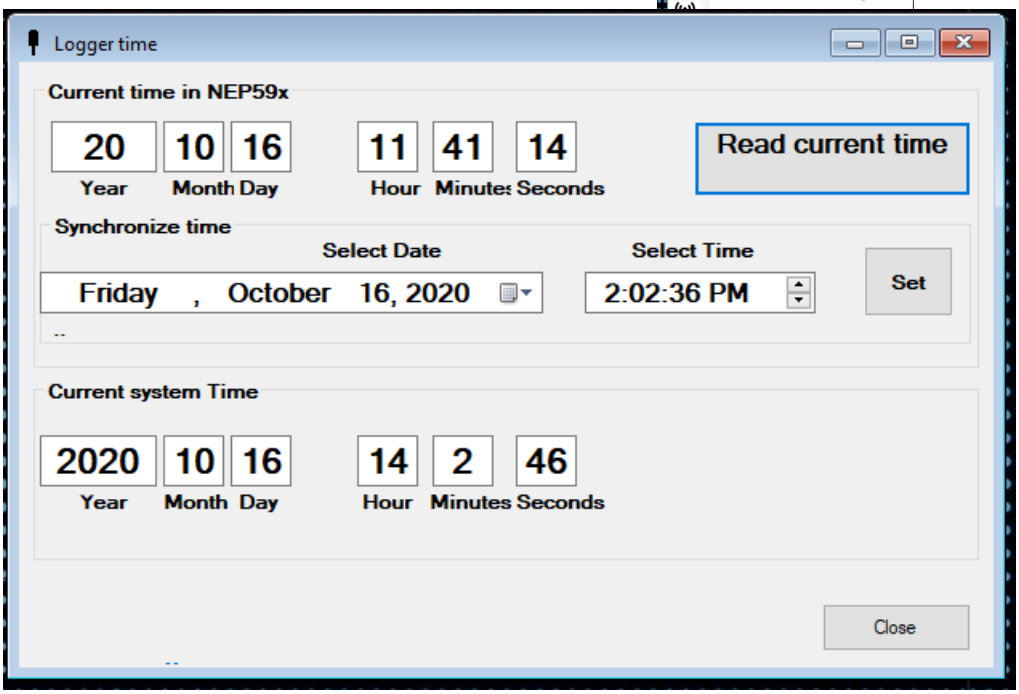


User may apply calibration if required.

9.4.9 Reading or Setting the logger internal clock.

Controls are located at “Tools” > “system time”



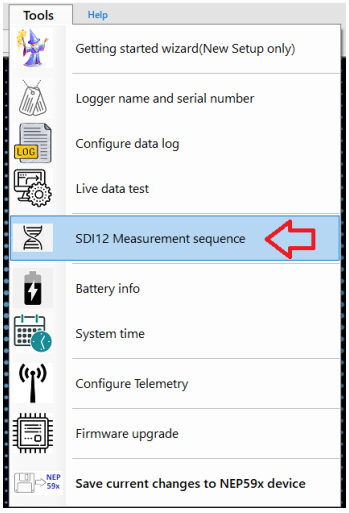


The **“Current time in NEP59x”** – This shows the current time in the logger. Time display here can be update by pressing the “Read current time” Button.

The **“Synchronize time”** – This allows user to set the logger time and date. Please desired date and time and press “SET” button.

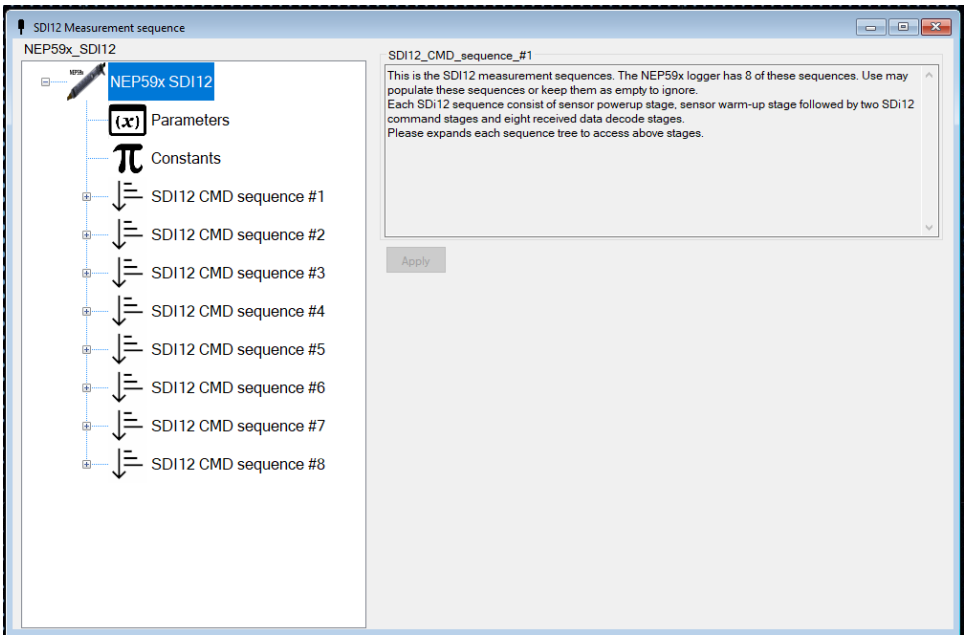
The **“Current system time”** – this shows the current time in your PC.

9.4.10 SDI12 measurement sequence.



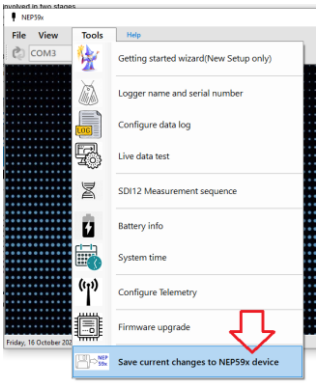
This section allows user to change the SDI12 sequence that controls the sensors and manage parameters.

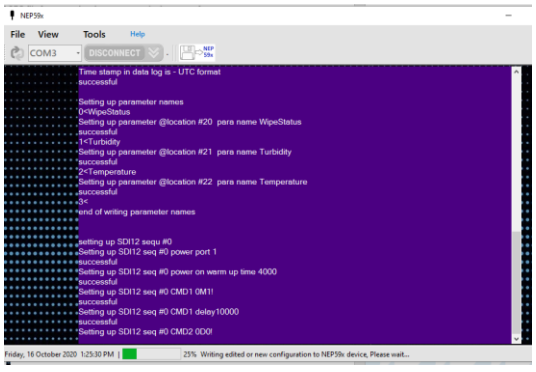
Controls are located at “Tools” > “SDI12 measurement sequence”

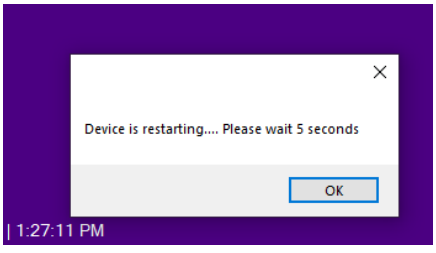


More information regarding how to configure will be explained with our sensor application notes.

After completing alterations in this window, the user must press
Save the newly configured data to the attached logger. Note that save to device part can be done at a later stage. e.g. Completion of all configurations.

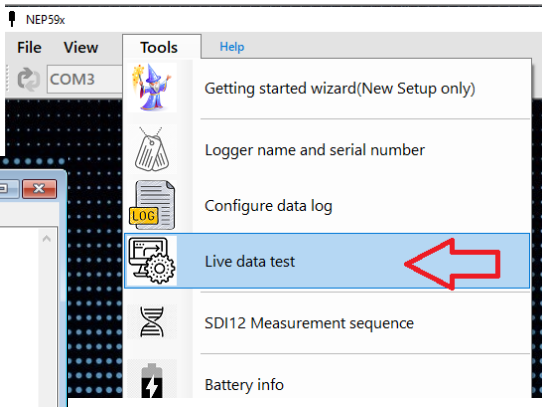


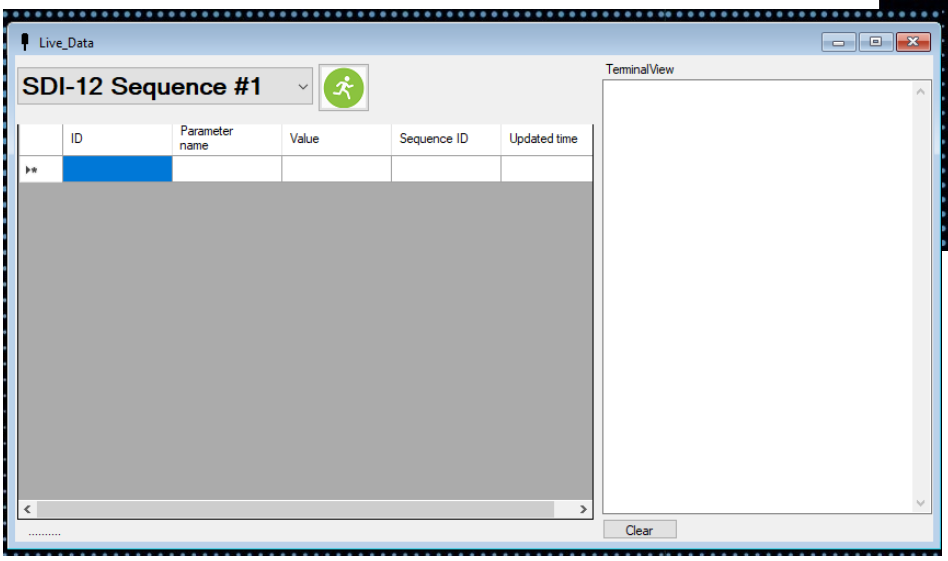


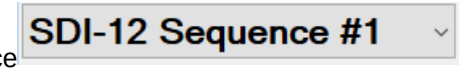


9.4.11 Testing SDI12 setting in Realtime.

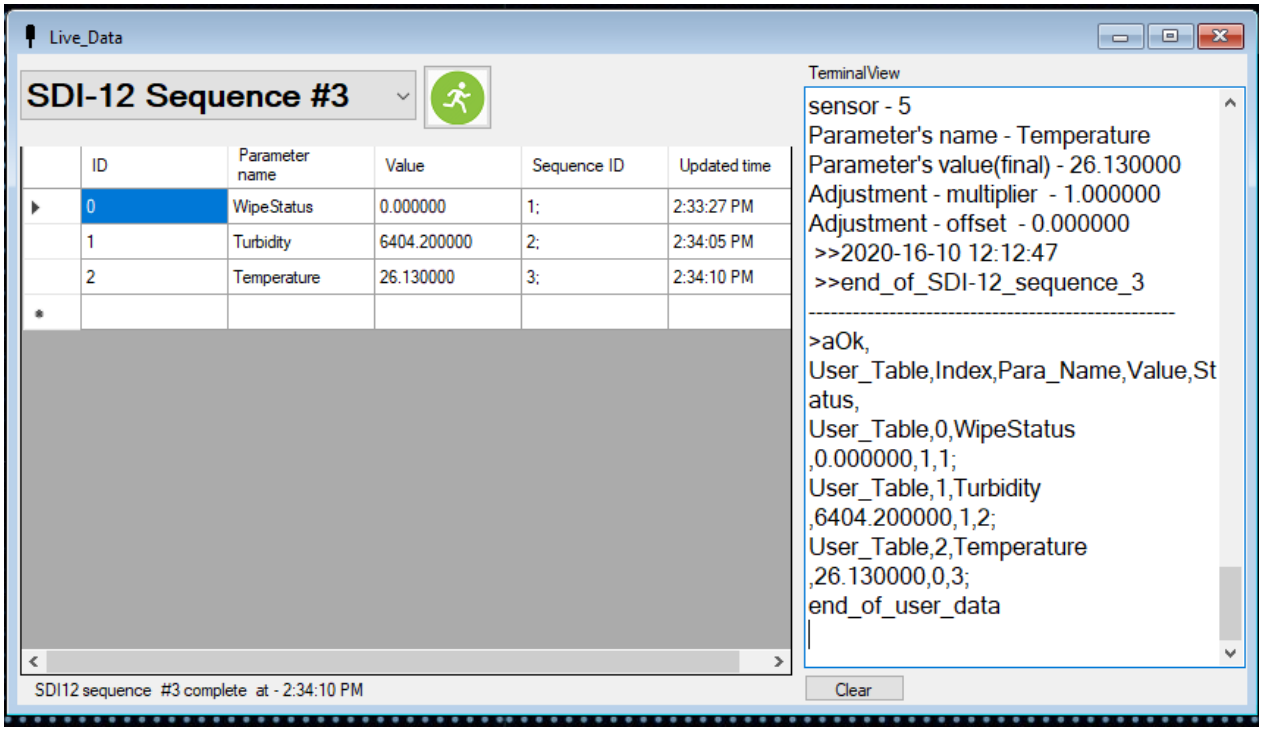
Controls are located at “Tools” > “Live data test”





Simple select the desired SDI12 sequence 

wish to test and press Run  .



Note that the newly red values of each parameters are displayed in the table.

9.4.12 firmware updating procedure.

The tool will be available for this location
http://download.observator.com/files/?dir=Software/NEP59x/Windows%20configuration%20tool"

All available firmware will be available in this location
http://download.observator.com/files/?dir=Software/NEP59x/NEP59x%20-%20Firmware

The following instruction are designed to guide users on how to update NEP-595 software using the Flash Loader Demonstrator application and the new software available from the Analite website.

1. Download the updated NEP-595 software (*.hex) file from the Analite website.

2. Download the "Flash Loader Demonstrator" application software from ST website and install it onto your Windows computer.

3. Turn off NEP-595 power switch.

1. Connect NEP-595 to your PC using the Micro USB cable.

2. Go to your computer device manager and find the correct COM port.

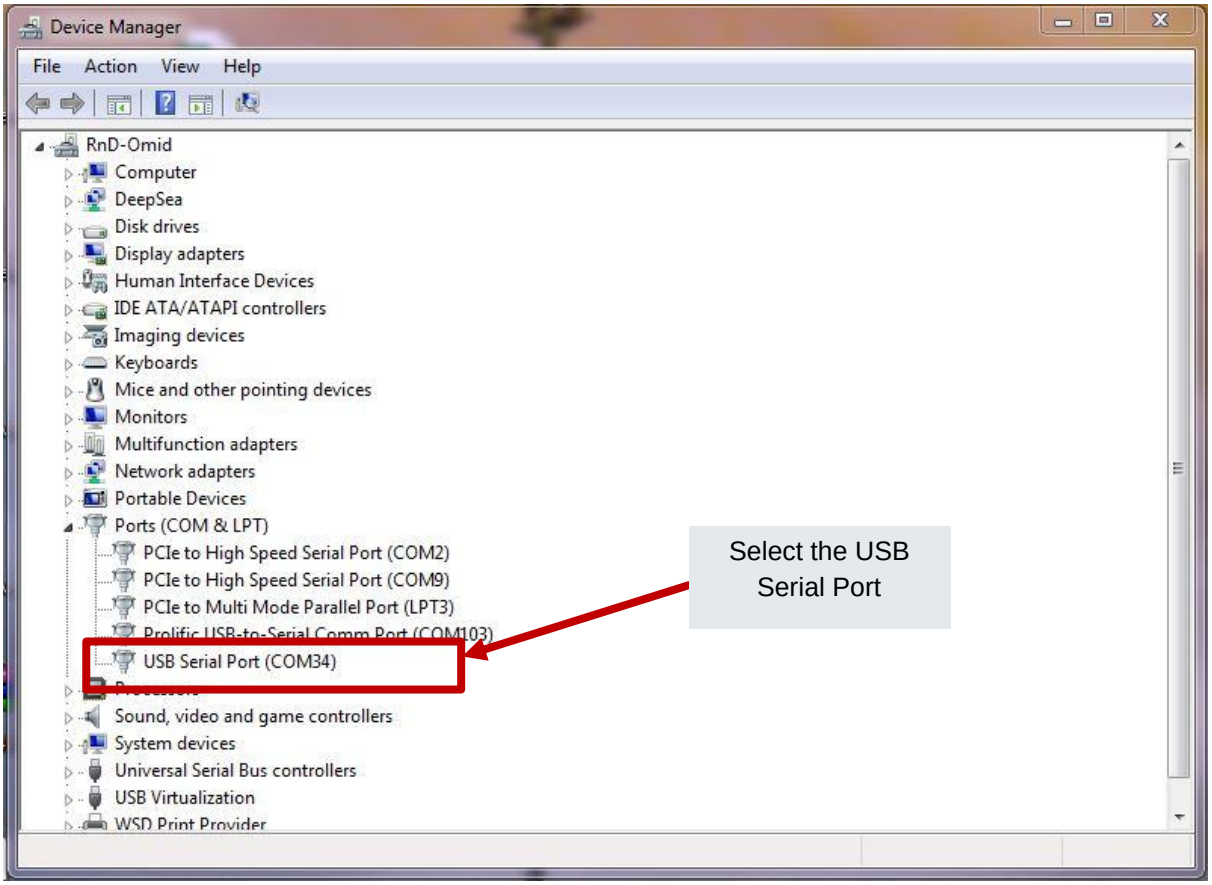


Figure 9.G: Identification of NEP-595 COM port

3. Press and hold the “Boot” button (also named “reset” in older versions) with a screw driver (or equivalent tool). While holding the “boot” button, turn on the power switch at the same time. After turning on, the button can be released (hold at least for 2 seconds).

4. Run Flash Loader Demonstrator application (the software previously installed in step 2).

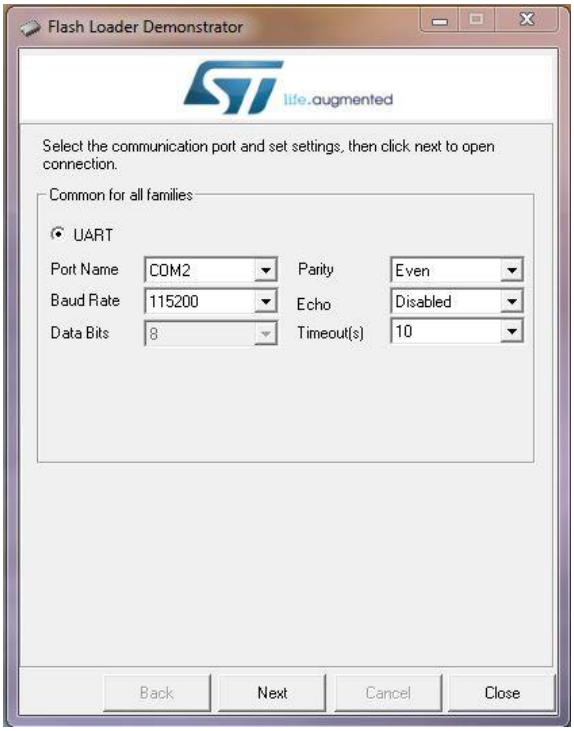


Figure 9.H: Run the Flash Loader Demonstrator

5. Select correct COM port in port name list (according to step 5) and click “Next”.

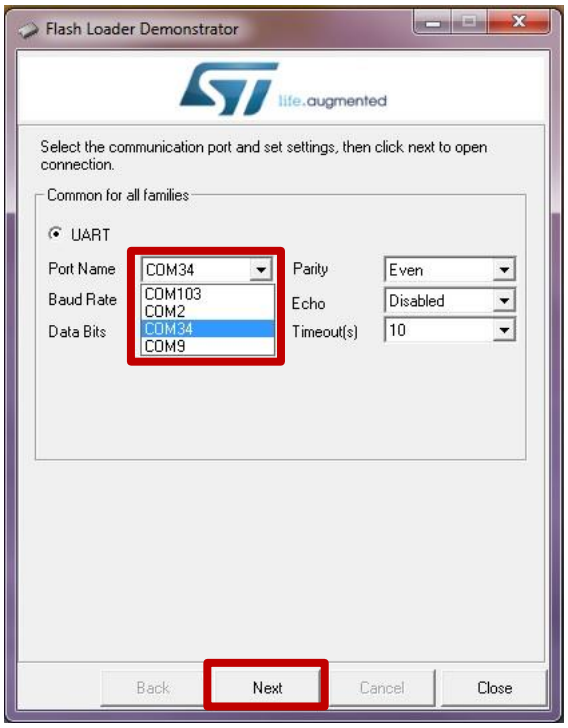


Figure 9.I: Select the correct COM port

6. If the bellow screen appeared it means connection is successful, click “Next”.

Figure 9.J: Connection is successful

7. Wait a few seconds for the application to recognise the device and click “Next”.

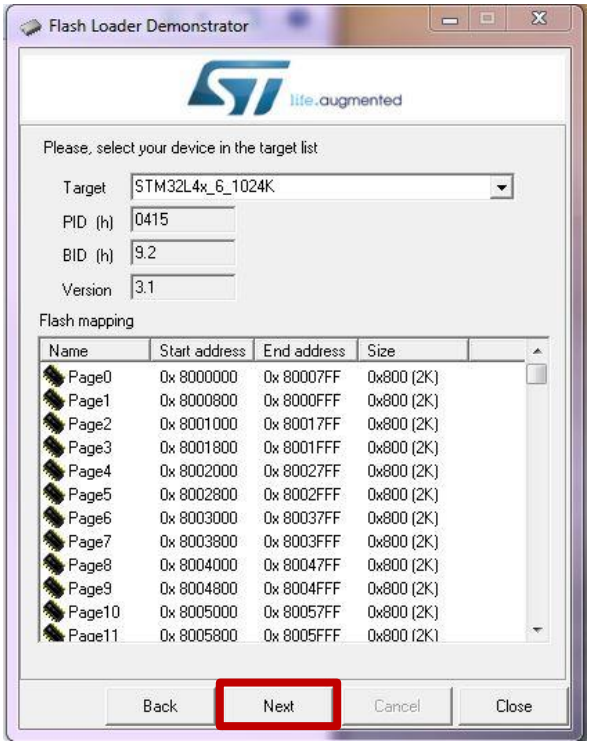


Figure 9.K: Click “Next”

8. Select "Download to device" and click on the “open button” to address the “.hex” file.

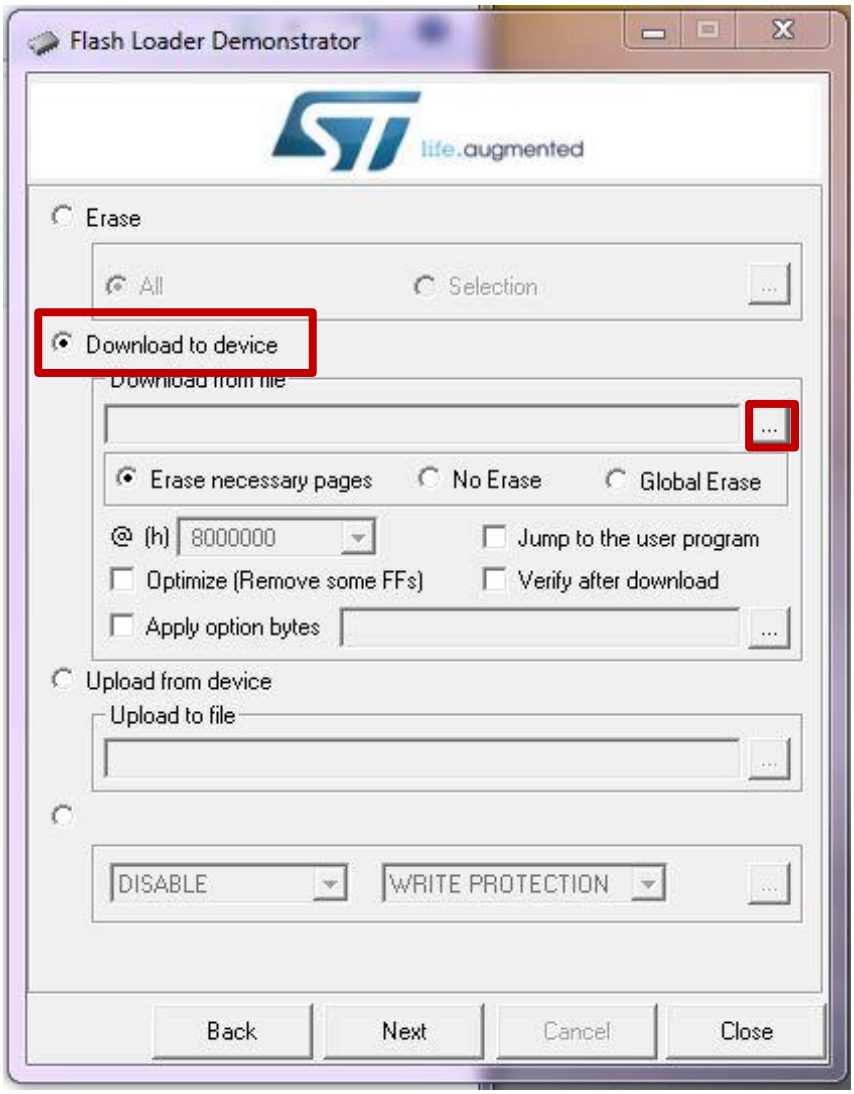


Figure 9.L: Select “Download to device”

9. Change (*.s19) files to (*.hex) file, in file type section.

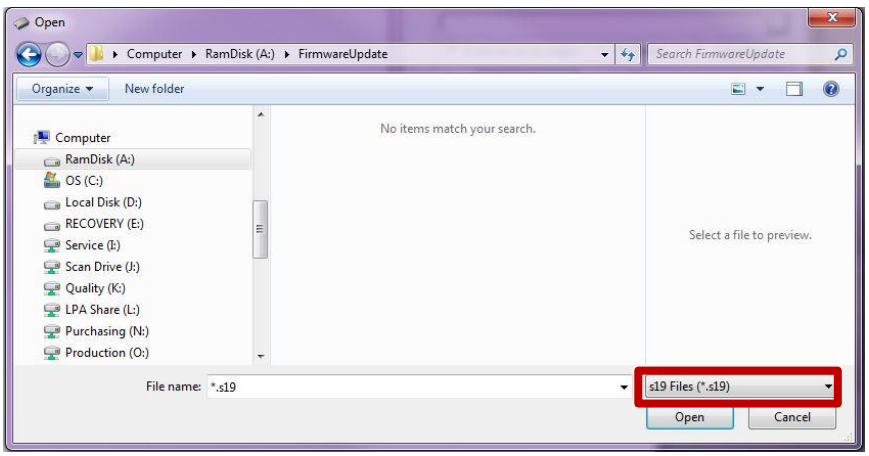


Figure 9.M: Enable (*.hex) visibility

10. You can now select the right file and click open.

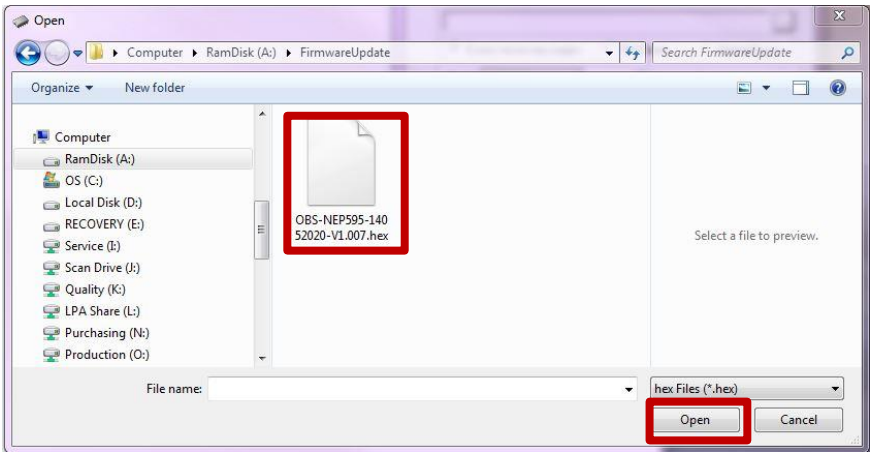


Figure 9.N: Select (*.hex) file

11. Click “Next”.

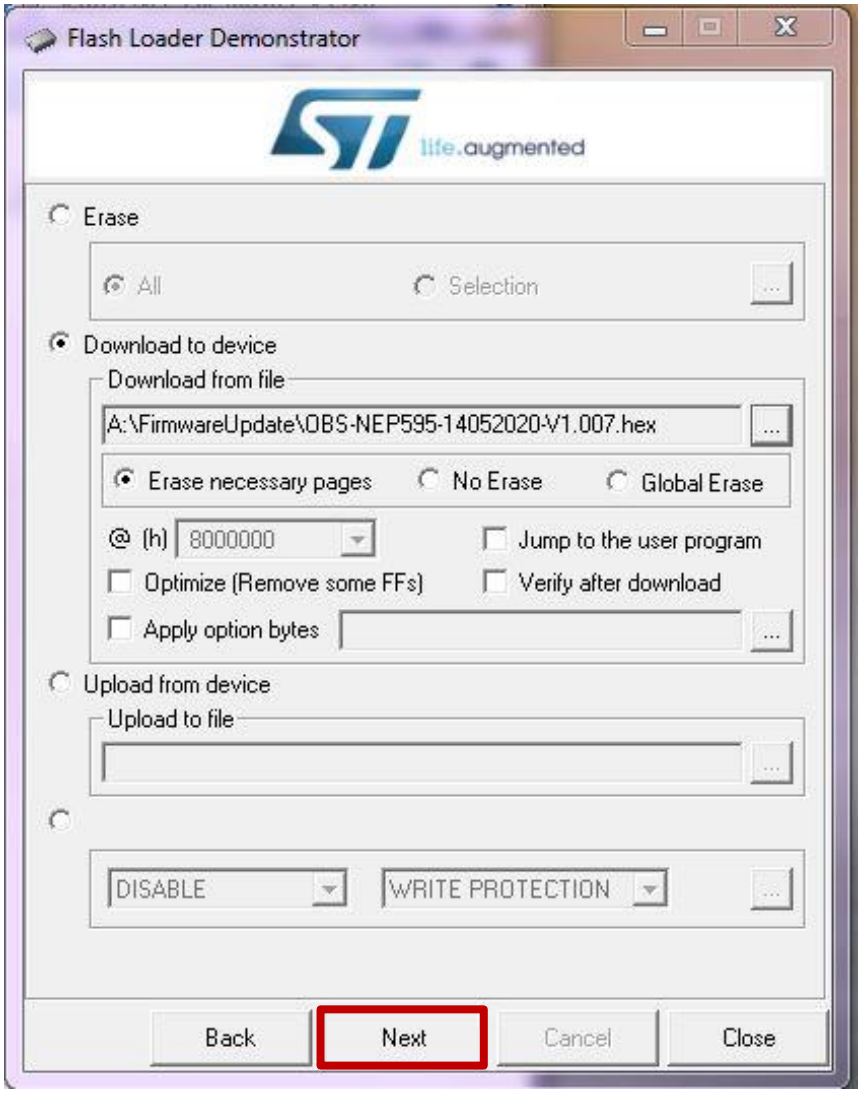


Figure 9.O: Select “Next”

12. Wait a few seconds for the updating process to finish.

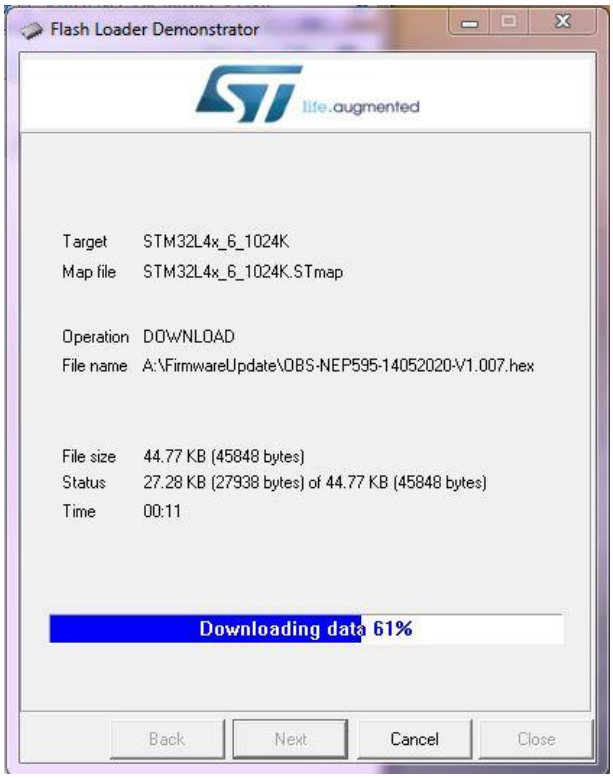


Figure 9.P: Updating in progress

13. When the software is fully updated, the following window will appear.

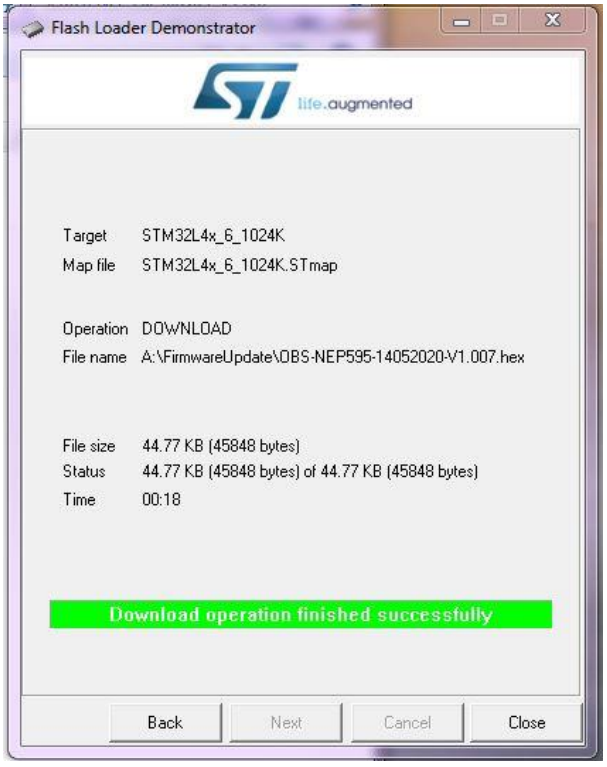


Figure 9.Q: Software has been updated

14. NEP-595 logger is now updated.

15. Click close and turn off the power switch.

16. Disconnect USB cable from computer.

17. Close NEP-595 protective cap.