

# DATA LOGGER GEOLOGGER LINX

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## 1.0 INTRODUCTION

This manual is intended for all users of the **GeoLogger Linx** data loggers and provides a guide for its installation, operation and maintenance.



**It is VITAL that personnel responsible for the installation and use of the GeoLogger Linx READ and UNDERSTAND the manual, prior to working with the equipment.**



### 1.1 General Description

The **GeoLogger Linx™** is a range of low cost, battery-powered data loggers designed for reliable unattended monitoring. Available as single channel, four channel or eight channel suitable for up to 8 vibrating wire sensors and their associated thermistors.

It can be automatically configured using a text file via USB connection or by manual inputs and data can be easily downloaded.

### 1.2 Theory of Operation

Vibrating wire sensors comprise of a tensioned wire held between two restraining ends. As the restraining ends move the tension in the wire changes. The vibrating wire frequency generator within the **GeoLogger Linx™** generates voltage pulses in the magnet/coil at the centre of the gauge and measures the resonant frequency of vibration. These frequencies are then stored within the data logger and can be then be downloaded as a csv file.

### 1.3 Software

The **Geosense® Linx™** software provides the interface to configure and download the data and is provided on the USB supplied with the unit. It is also available as a free download at [www.geosense.co.uk/downloads/software/linxsoftware](http://www.geosense.co.uk/downloads/software/linxsoftware)

As part of continual improvement updates to the software may occur and should be downloaded to ensure the current version is being used.

Details of installation are shown on page 13.

### 1.4 Firmware

As part of continual improvement firmware updates may be required and should be downloaded to ensure the current version is being used.

Details of installation are shown on page 44.

## **1.5 Host system requirements**

### **1.5.1 Hardware**

- Desktop or laptop computer with USB port
- USB cable A to Mini B
- Resource USB containing initial software

### **1.5.2 Windows operating system**

The following Microsoft™ Windows operating systems can be used:-

- Windows 7
- Windows 8
- Windows 10

### **1.5.3 Drivers**

## **1.6 EMC - Electro Magnetic Compatibility**

EMC is the electromagnetic interaction of electrical and electronic equipment with other electrical and electronic equipment. All electronic devices have the potential to emit and be affected by electromagnetic fields. With the reduction in size of electrical components and the ever increasing amount of electrical & electronic devices such as mobile phones, two-way radios, safety control systems, signalling, generators, welding equipment, power cables etc in all environments, especially construction sites, there is a huge potential for devices to interfere with each other.

The **GeoLogger Linx** has been designed and tested for EMC under the relevant CE marking directives to ensure compliance and reliable operation.

## 1.7 Philosophy of operation

### Geocal Files

All Geosense vibrating wire sensors manufactured after 01/03/2016 are sent with geocal files which contain calibration information. These files can be imported into each channel of the Linx logger leaving only the Sensor Name and Site Zero Information to be inputted manually.

For sensors without geocal files these can be created by manually inputting the sensor information and exporting the factors. This can be useful when inputting calibration factors on site is not ideal.

### Disconnected Operation

Unlike other products the Linx has been designed to enable users to run the software when disconnected from the data logger. This feature allows sensor information to be inputted and saved as a .geocal file for quick upload to the logger when on site.

**WARNING:** All changes made in the software for both sensor configuration and logger configuration must be **UPLOADED** to the Logger for them to take effect. Even when the logger is connected changes to configurations are not automatically made.

### Starting and Stopping Logging Mode

The Linx logger can be put in standby by turning the Logging Status to "OFF". The Logger Status is always displayed at the bottom right corner of the software when connected to a logger. This can be useful when logging is not required for long periods.

### Downloading Data

On connecting with the Linx Logger all available sensor configuration information is downloaded to the software. This allows direct download of data in engineering units.

If for any reason sensor information is missing or incorrect it can be altered on the software prior to download to ensure correct data reduction is performed.

*Scenario 1: At time of installation all sensor information is correctly uploaded to data logger.*

To Download: User connects to logger navigating directly to data download where information is downloaded in Engineering Units

*Scenario 2: At time of installation all sensor information is uploaded however with some mistakes (Channel 1 contains the wrong calibration factors)*

To Download: User Connects to logger and navigates to channel 1 sensor config, correct factors are inputted, uploaded and then data is collected.

## 1.7 Philosophy of operation contd...

*Scenario 3: At time of installation no sensor information is uploaded to the logger.*

To Download: User Connects to logger and navigates to **sensor config**, correct factors are inputted, uploaded and then data is collected.

**NOTE:** During download the sensor configuration information on the software is used for converting to engineering units, if required the user can update the sensor information in the software and download without uploading sensor information to the logger in order to validate the sensor information. Once the information is validated it is recommended the correct factors are uploaded to the logger, failure to upload will result in previous sensor information being displayed when next connecting to the logger.

### Append Data

The Append data function performs the same function as data download however gives the ability to append the data onto another file. This is useful when a logger has been wiped of its memory when a new configuration is uploaded.

**NOTE:** Data Append will append all downloaded data to a file and NOT just new data. If logger memory is not wiped after each download, duplication of data will occur.

### Real Time Readings

Real Time Readings are not logged and serve as a tool to ensure sensors are connected and functioning as expected during installation or monitoring. A Key is used to allow easy identification of sensor configuration status:

**RED:** No sensor connected

**ORANGE:** Sensor connected with no calibration information

**GREEN:** Sensor connected with calibration information

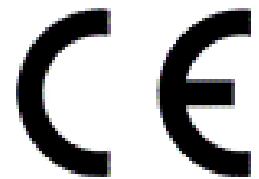
## 2.0 CONFORMITY

### **Geosense Ltd**

Nova House  
Rougham Industrial Estate  
Rougham, Bury St Edmunds  
Suffolk, IP30 9ND  
United Kingdom

Tel: +44 (0)1359 270457, Fax: +44 (0)1359 272860  
[www.geosense.co.uk](http://www.geosense.co.uk)

## **Declaration of Conformity**



We Geosense Ltd at above address declare that the equipment detailed below, complies with the requirements of the following EU Directives:-

- Low Voltage Directive 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC
- Waste electrical and electronic equipment (WEEE) 2012/19/EU
- Restriction on the use of certain Hazardous Substances (RoHS2) 2011/65/EU

### **Equipment description:**

**Make/Brand:**

**Model Numbers:**

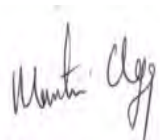
### **Data Logger**

**Geosense**

**GeoLogger Linx 1,4,8**

Compliance has been assessed with reference to the following harmonised standard:  
EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use.  
EMC requirements. General requirements.

*A technical file for this equipment is retained at the above address.*

A handwritten signature in black ink, appearing to read "Martin Clegg".

**Martin Clegg**  
**Director**



### 3.0 MARKINGS



**Geosense® GeoLogger Linx** is labelled with the following information:-

Manufacturers telephone number & website address

Product group: Data logger

Product: GeoLogger Linx

Model: Linx-1C,Linx-4C,Linx-8C

Input supply: 6 Volt DC (battery), 3V USB

Output: 3V USB

Serial number:

CE & WEEE mark

## 4.0 DELIVERY

This section should be read by all users of the **GeoLogger Linx**.

### 4.1 Packaging

**Geosense® GeoLoggers** are packed for transportation to site. Packaging is suitably robust to allow normal handling by transportation companies. Inappropriate handling techniques may cause damage to the packaging and the enclosed equipment. The packaging should be carefully inspected upon delivery and any damage **MUST** be reported to both the transportation company and **Geosense®**.

### 4.2 Handling

**Geosense® GeoLoggers** are precision measuring instruments. They and their associated equipment should always be handled with care during transportation, storage and installation.

Once the shipment has been inspected ( see below ), it is recommended that **Geosense® GeoLoggers** remain in their original packaging for storage or transportation.

Cable should also be handled with care. Do not allow it to be damaged by sharp edges, rocks for example, and do not exert force on the cable as this may damage the internal conductors and could render the installation useless.



**DO NOT DROP AS THIS MAY CAUSE DAMAGE TO INTERNAL COMPONENTS**

### 4.3 Inspection

It is important to check all the equipment in the shipment as soon as possible after taking delivery and well before installation is to be carried out. Check that all the components detailed on the documents are included in the shipment. Check that the equipment has not been physically damaged.

### 4.4 Storage

**Geosense® GeoLoggers** contain electronics and batteries and whilst they are designed for outside use and mounted within a waterproof (IP66) enclosure the internal circuit board can be affected by excessive moisture, dust and temperature. When not in use they should be stored in a cool, dry location.

The units are battery powered and therefore should be disconnected if not in use to avoid discharging.



**DISCONNECT BATTERY WHEN NOT IN USE**

## 5.0 INSTALLATION

This section of the manual is intended for all users of the **GeoLogger Linx** and is intended to provide guidance with respect to their installation.

### 5.1 Location

Prior to installing a **Geosense® GeoLogger Linx** it is essential to establish and confirm details of the installation to be carried out. Some of the main considerations are listed below :-

- **Location** - it should be placed in a suitable location where it cannot be damaged (avoid areas where moving machinery may occur)
- **Mounting**- it can be mounted to any surface using suitable screws in the four mounting holes in the main body.
- **Water ingress** - whilst the enclosure is rated to IP66 care should be taken to ensure that it is not placed in a location where it can be submerged as this will cause damage to the unit. Therefore if placing below ground in a manhole cover or equivalent there must be sufficient drainage to ensure against the unit being submerged.

### 5.2 Batteries



**DO NOT ALLOW UNIT TO BE SUBMERGED AS THIS MAY CAUSE DAMAGE TO INTERNAL COMPONENTS**

The following batteries can be used:-

- 4 x 1.5V C Alkaline cells which are rated for operating temperatures of –18 to +55 degrees Celsius\*.
- 4 x 3.6V C Lithium cells which are rated for operating temperatures of –60 to +85 degrees Celsius\*.

\* Operation at extreme temperatures may lead to reduced capacity and lower voltage readings at the beginning of pulses

The standard battery provided is Alkaline which is suitable for most applications but in extreme cold conditions Lithium may be required for extended use.



**ALKALINE BATTERIES ARE SUPPLIED AS STANDARD**



**LITHIUM BATTERIES ARE CATEGORISED AS “DANGEROUS GOODS”**



**WHEN FITTING BATTERIES ENSURE THE CORRECT POLARITY**

### 5.3 Installing Linx™ software

The **Linx™** software is loaded onto the USB supplied with the unit.

It can also be downloaded from the Geosense website [www.geosense.co.uk/downloads/Linxsoftware](http://www.geosense.co.uk/downloads/Linxsoftware)

#### To install the software:-

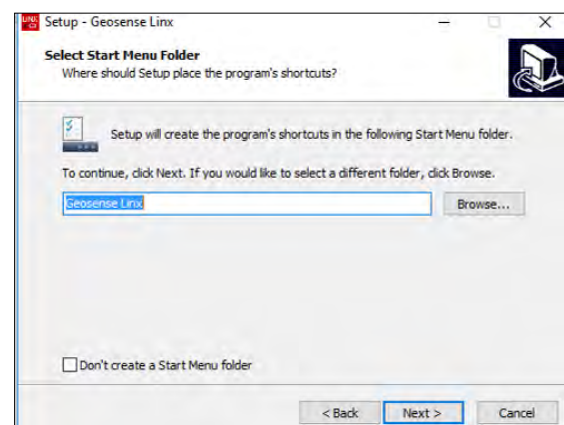
1. Turn on the host device (PC, laptop or Windows tablet)
2. Insert the USB stick into a USB port on the host device
3. Double click on the setup.exe file and follow the instructions to complete the software installation



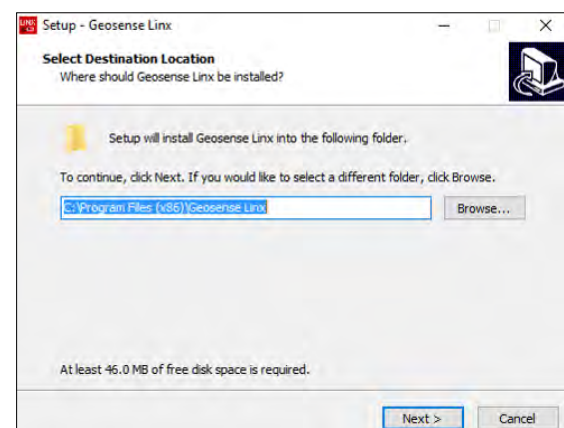
This message may show but please ignore and select **RUN**



The default location for storing the software will be C:\Program Files (x86)\Geosense Linx

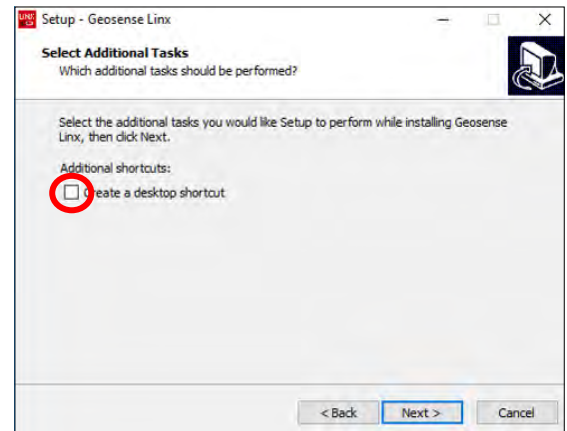


If another location is required use the Browse... and choose the required location

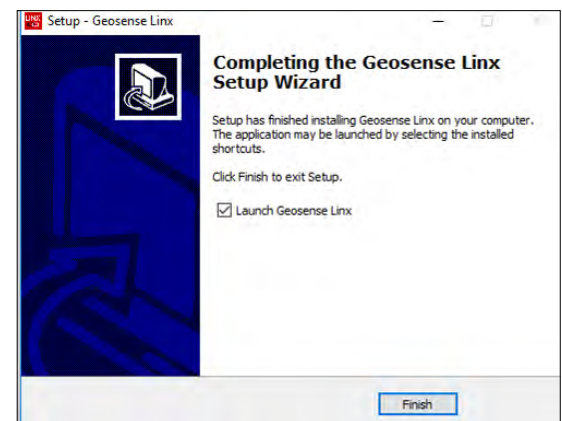


### 5.3 Installing Linx™ software contd...

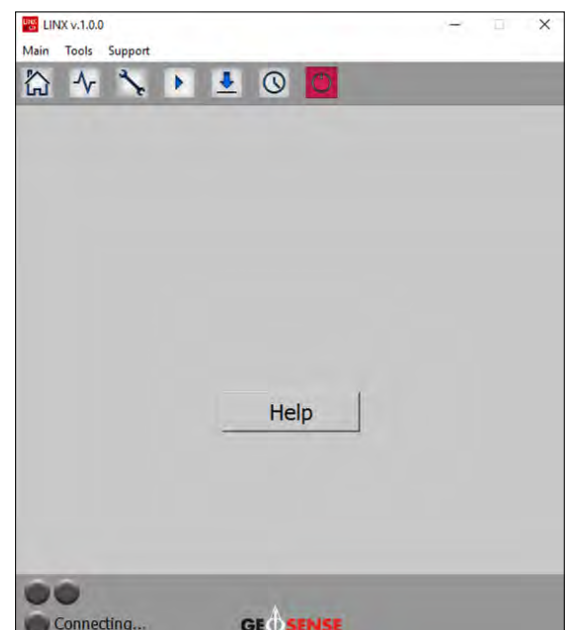
If a desktop shortcut is required tick the box



Once the download time bar has finished click on the Finish button. For software version > V1.0.3 an option to installed the correct drivers will appear. Although this is not always required it is recommended that users follow the instructions to install the drivers.



The home page of the **Linx™** software will then automatically appear and it is ready to use.

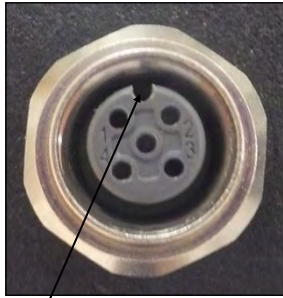


**TO ENSURE THE CORRECT DRIVERS ARE INSTALLED THE LINX SOFTWARE MUST BE DOWNLOADED BEFORE CONNECTING TO A LINX LOGGER**

## 6.) OPERATION

The **GeoLogger Linx™** can be fitted with female quick connectors or cable glands

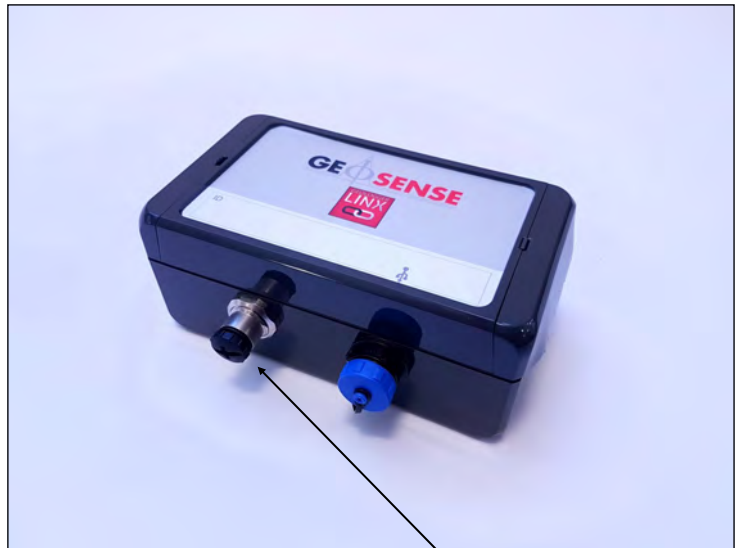
### 6.1 Quick Connectors



THE SLOT ON THE FEMALE CONNECTOR MUST BE ALIGNED WITH THE PEG ON THE MALE CONNECTOR



REMOVE THE PROTECTIVE CAP TO ACCESS THE CONNECTOR



**Geosense** sensors can be ordered with male quick connectors (see below) to allow quick and easy installation in the field



If sensors are not already fitted with the quick connectors they can be supplied with the Linx Logger and be easily be fitted in the field (see next page)

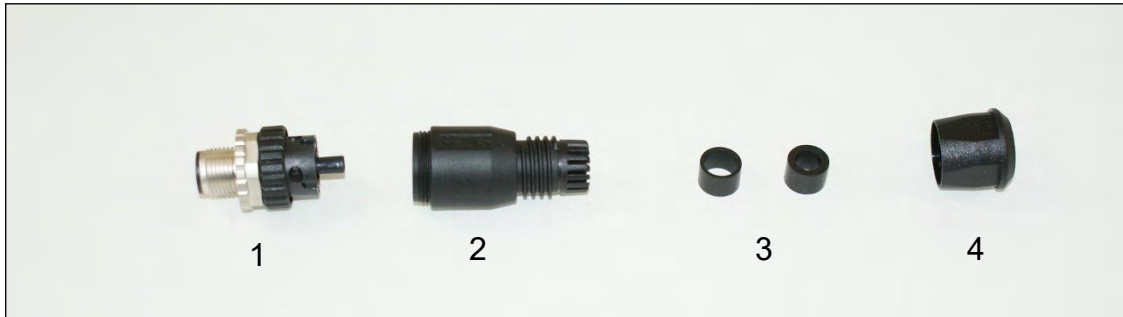




## 6.) OPERATION contd...

### 6.1 Fitting Quick Connectors contd...

Connectors comprise of the following components:-



1 - Coupling

2 - Housing

3 - Grommet(s)

4 - Locking nut

Remove from the packaging and fit connectors as follows:-

#### STEP 1

Unscrew and remove the locking nut

#### STEP 2

Holding the black ribbed collar unscrew the housing



## 6.) OPERATION contd...

### 6.2 Fitting Quick Connectors contd...

#### STEP 3

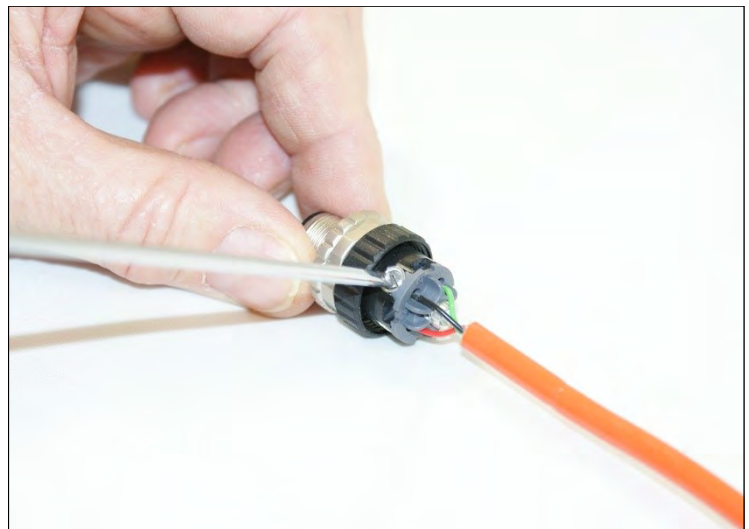
**NOTE:** The connector is supplied with two sizes of grommet 4-6mm & 6-8mm. The appropriate size should be selected to fit the cable diameter.

Feed the cable through the locking nut, grommet and housing

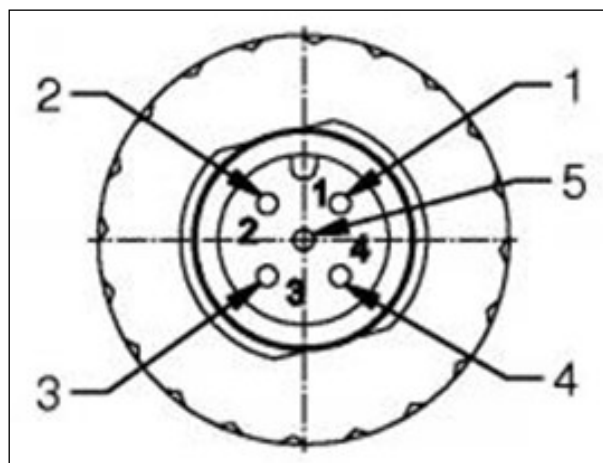


#### STEP 4

Wire the conductors into the coupling as shown below



Connector position 1 vibrating wire  
Connector position 2 vibrating wire  
Connector position 3 thermistor  
Connector position 4 thermistor  
Connector position 5 shield





## 6.) OPERATION contd...

### 6.2 Fitting Quick Connectors contd...

#### STEP 5

Once wiring is complete screw the housing back onto the coupling



#### STEP 6

Fit the grommet into the back of the housing



#### STEP 7

Screw the back nut onto the housing and fully tighten



## 6.) OPERATION contd...

### 6.3 Cable glands

A 2.5mm terminal screwdriver and 20mm open ended spanner will be required.



#### STEP 1

Each cable gland is supplied with a blanking plug which must be removed to allow cabling.



**LEAVE PLUG IN IF  
CHANNEL NOT USED**



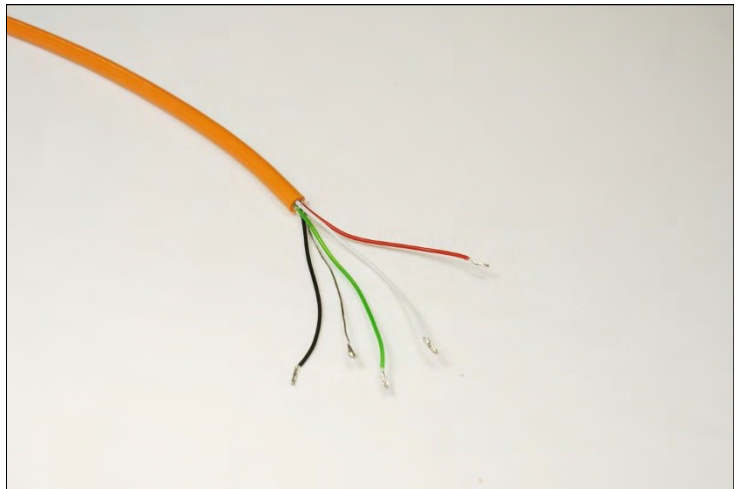
## 6.) OPERATION contd...

### 6.3 Cable glands contd...

#### STEP 2

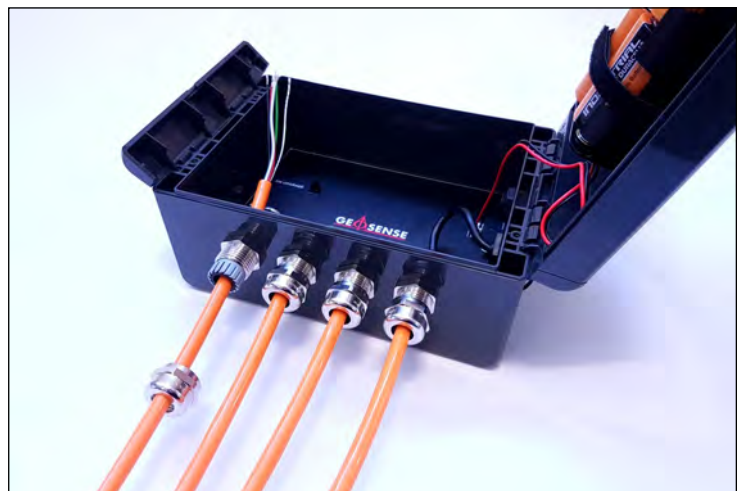
Remove approximately 75mm of the sensor cable outer sheath

Remove approximately 10mm of each individual conductor outer sheath and fix into the individual terminals in the removable male part of the green terminal block



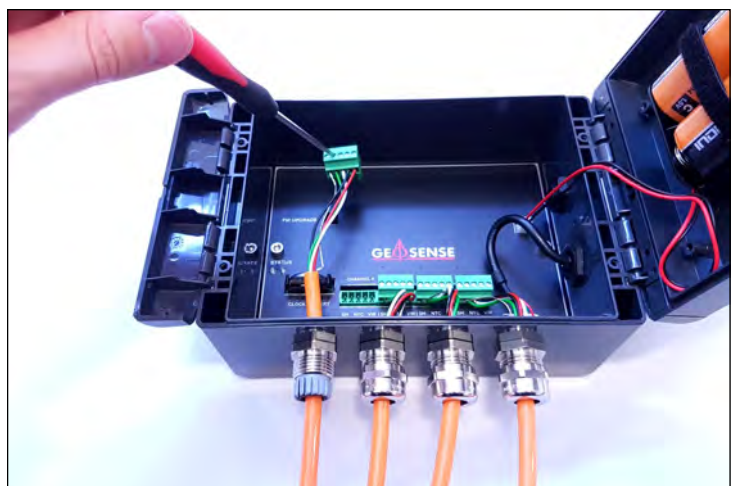
#### STEP 3

Pass the cable through the gland to allow it to be wired into the male half of the removable green terminal block.



**THE MALE PART OF THE TERMINAL BLOCK IS REMOVABLE**

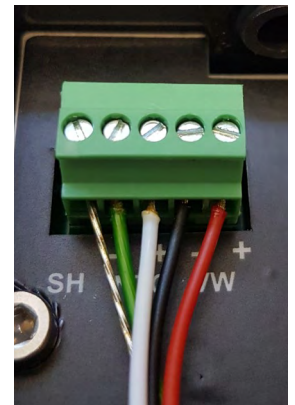
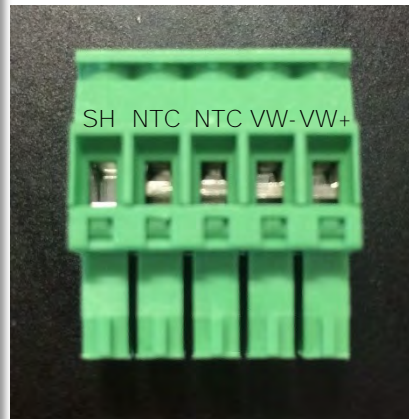
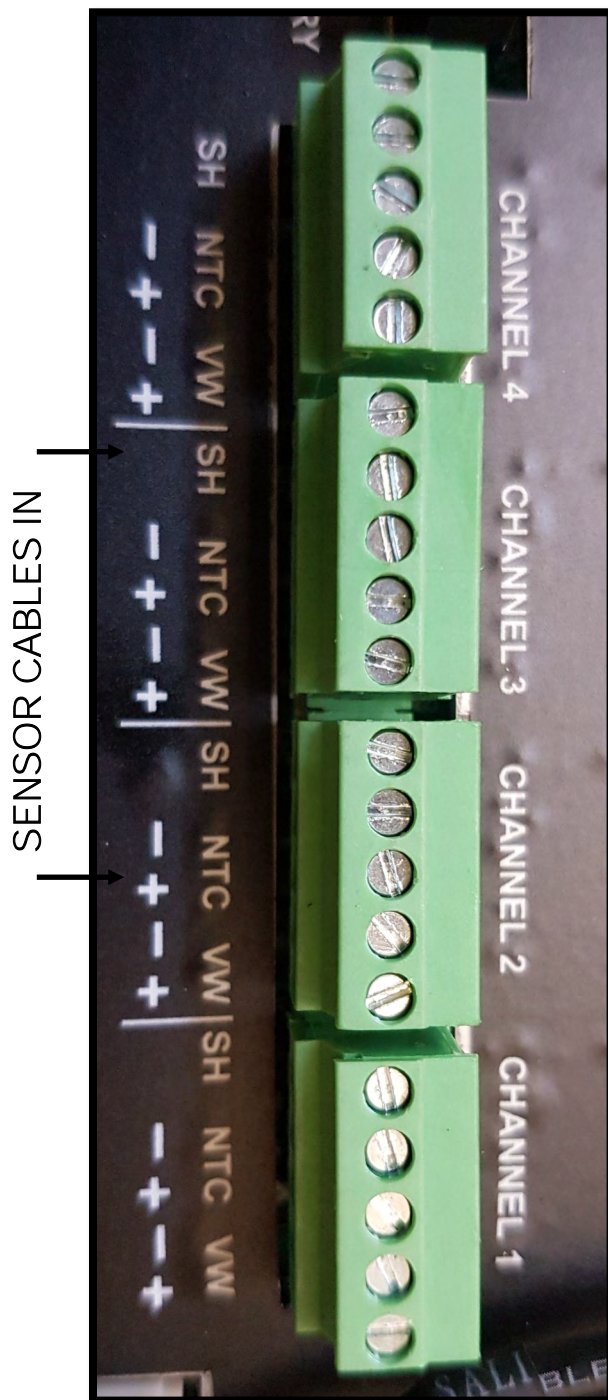
For wiring details see next page



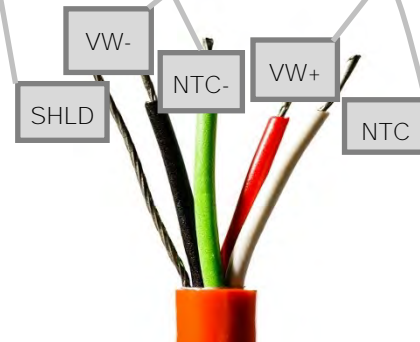


## 6.) OPERATION contd...

### 6.3 Cable glands contd...



| SH            | NTC-<br>(thermistor) | NTC+<br>(thermistor) | VW-   | VW+ |
|---------------|----------------------|----------------------|-------|-----|
| Drain<br>wire | Green                | White                | Black | Red |



#### Note (from left to right)

Single channel loggers have wiring block configuration:

SH; NTC-; NTC+ ; VW-; VW+

Four or eight channel loggers have wiring block configuration:

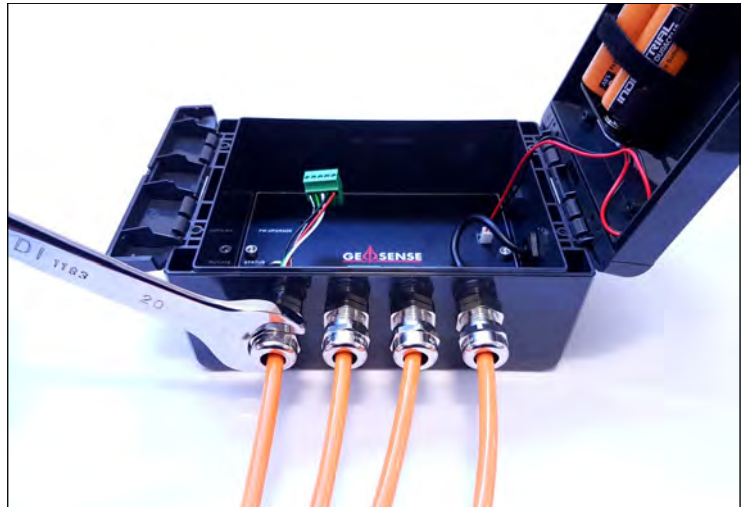
SH; NTC-; NTC+ ; VW-; VW+

## 6.) OPERATION contd...

### 6.3 Cable glands contd...

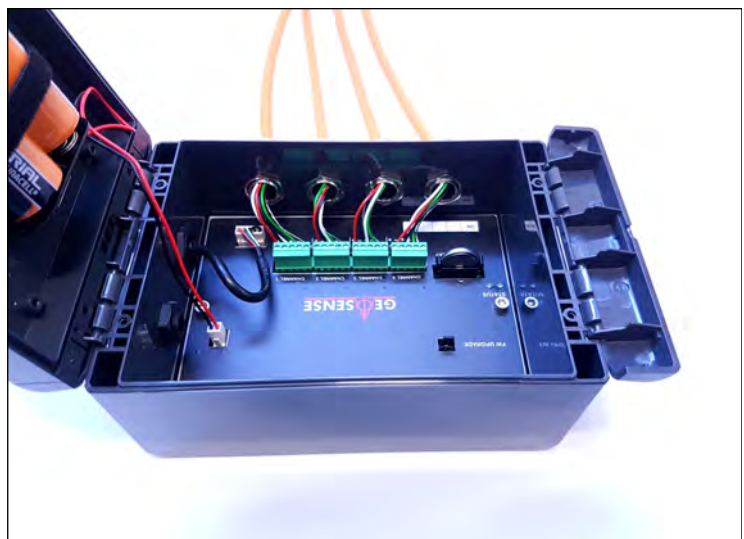
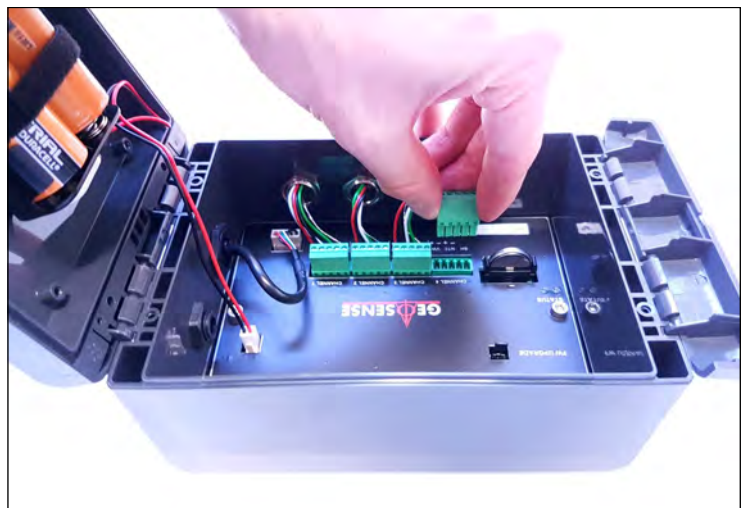
#### STEP 5

Once all channels are wired into the green male terminal block fully tighten the cable gland to prevent the cable from moving



#### STEP 6

Once the cable gland is tight place the male terminal block into the female block attached to the printed circuit board.



## 6.4 Running the software

Connect the USB cable to **both devices** before using the **Linx™** software.

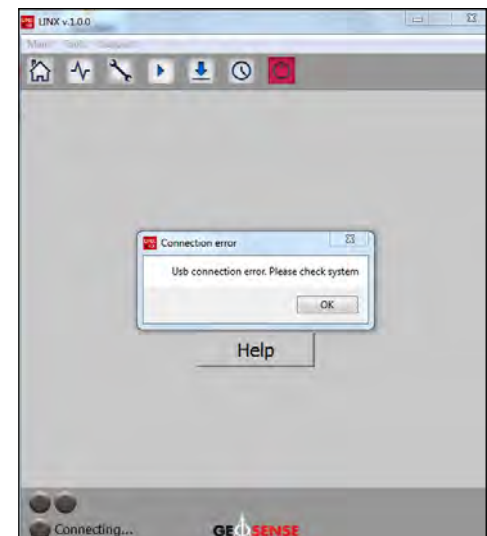
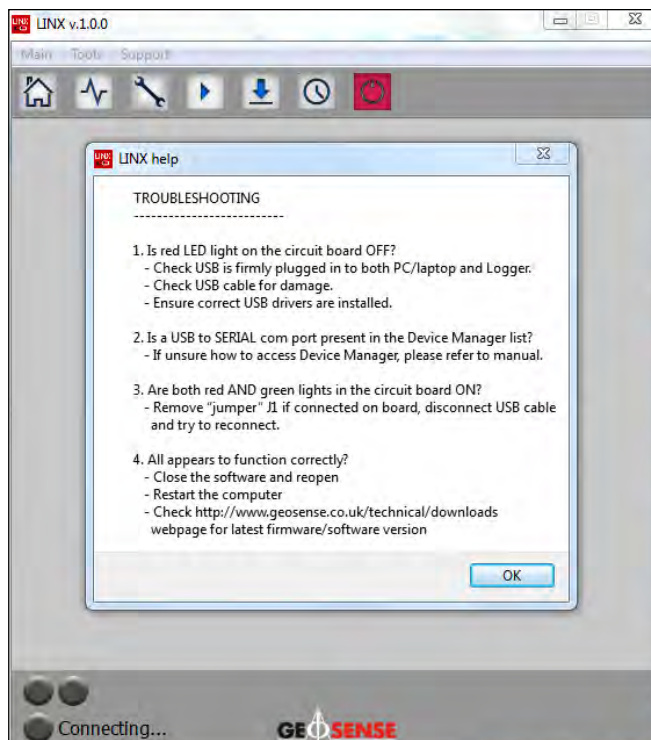
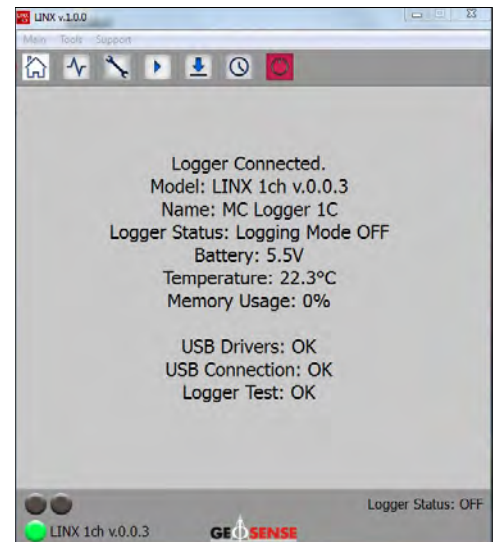
Open the software on the host device and the following screen could be shown:



### CONNECT BOTH DEVICES BEFORE STARTING THE SOFTWARE

A successful connection is confirmed and this message will be shown every time the “Home” icon is pressed

During the connection of the two devices the red lights in the bottom left will flash and once the connection is successful the green light will remain on



This means that the host & data logger are not connected.

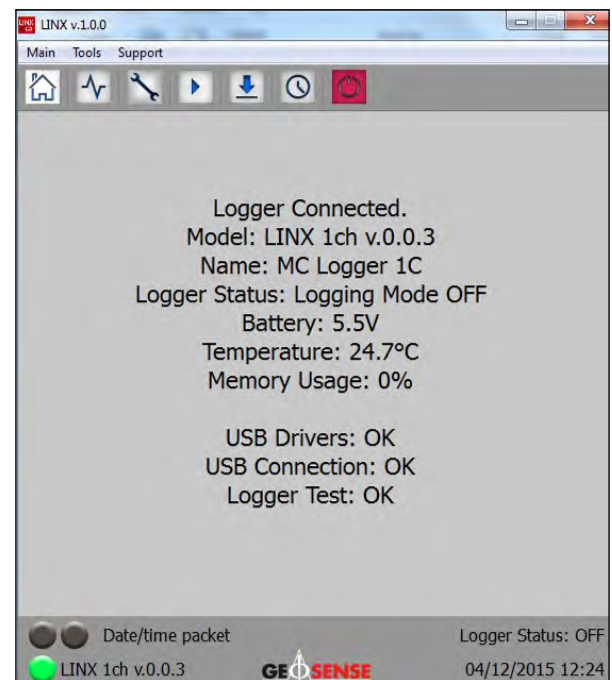
Select the Help tab for problem diagnosis



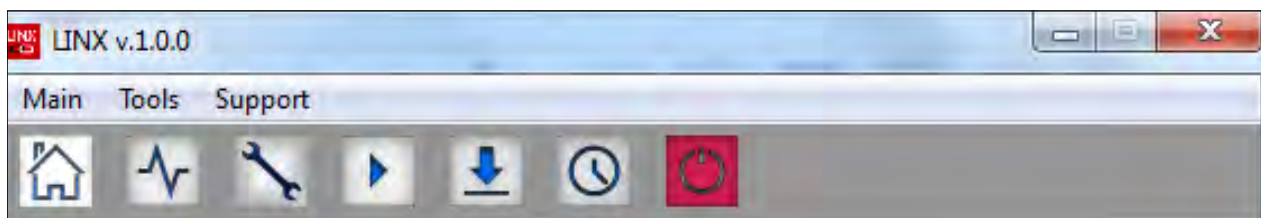
### 6.4.1 Home page

The following information is provided:-

- Logger connection status
- The data logger model & firmware version
- The type of logger
- Logging status
- Battery health
- Temperature of the logger
- Memory usage
- Status of the Drivers
- Status of the USB connection
- Status of the automatic logger operation test



### 6.3.2 Menu icons



1

2

3

4

5

6

7

1. **Home page**

2. **Real time** - allows real time checking of the sensors

3. **Sensor config** - full configuration of the sensors including Engineering units

4. **Logger config** - set logging intervals and dates

5. **Download data** - download & append data in raw or Engineering unit format

6. **Time sync** - synchronise the date & time from the host device to the logger

7. **Exit** - closes the software

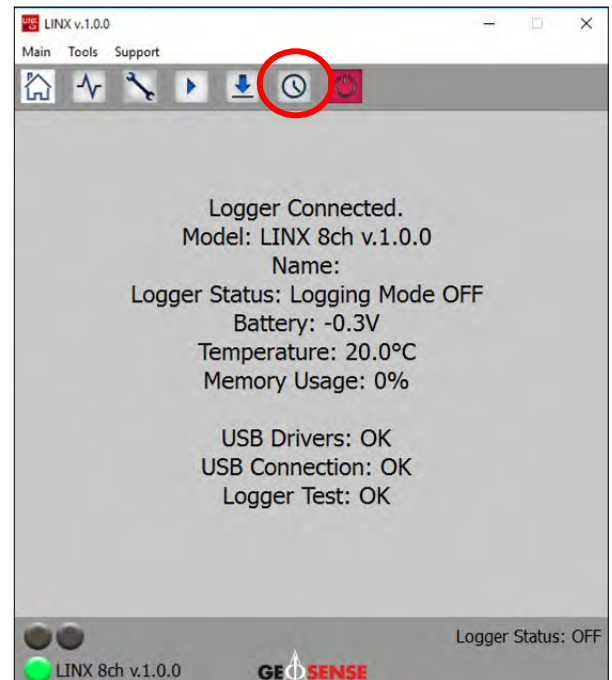
### 6.4.3 Synchronising date & time



#### SYNCHRONISE THE DATE & TIME BEFORE CONFIGURING THE Linx™ LOGGER

Before starting you will need to synchronise the date & time of the **Linx™** logger.

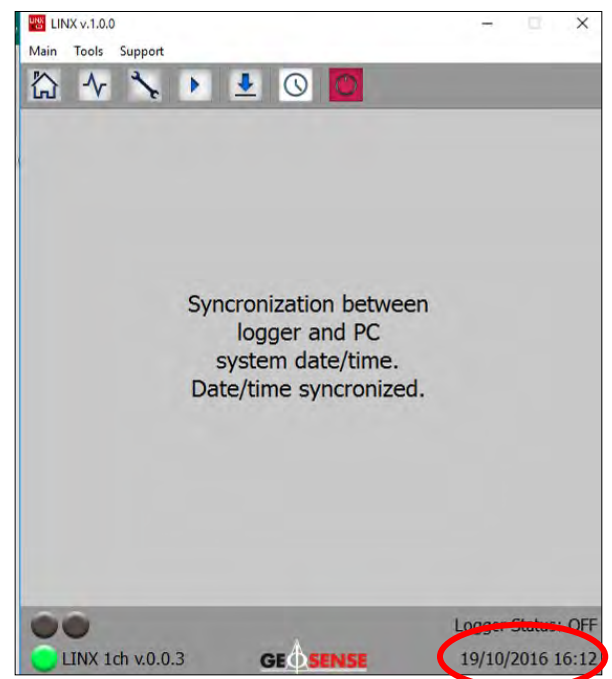
To synchronise click on the clock icon.



Synchronisation is confirmed by the message on the screen

#### **Date/time/synchronized**

The date and time are then displayed in the bottom right of the screen





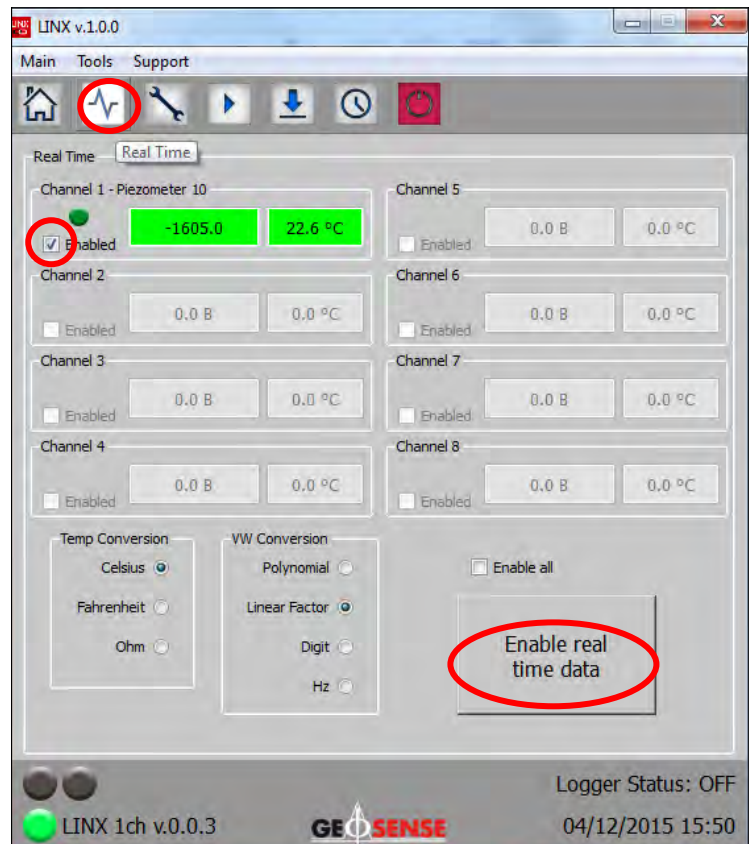
## 6.5 Real time readings

Select the **Real Time** icon

This allows you to see real time readings to confirm that each sensor is working or where real time readings are required.

To start real time readings select

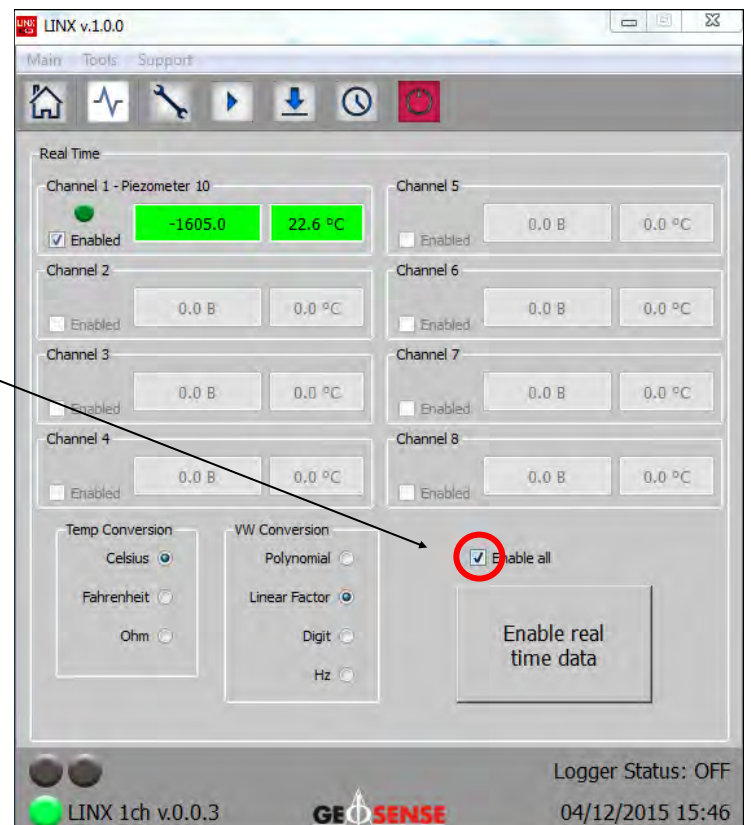
**Enable real time data**



Or you can select the **Enable all**



**NO DATALOGGING OCCURS IN THIS MODE**

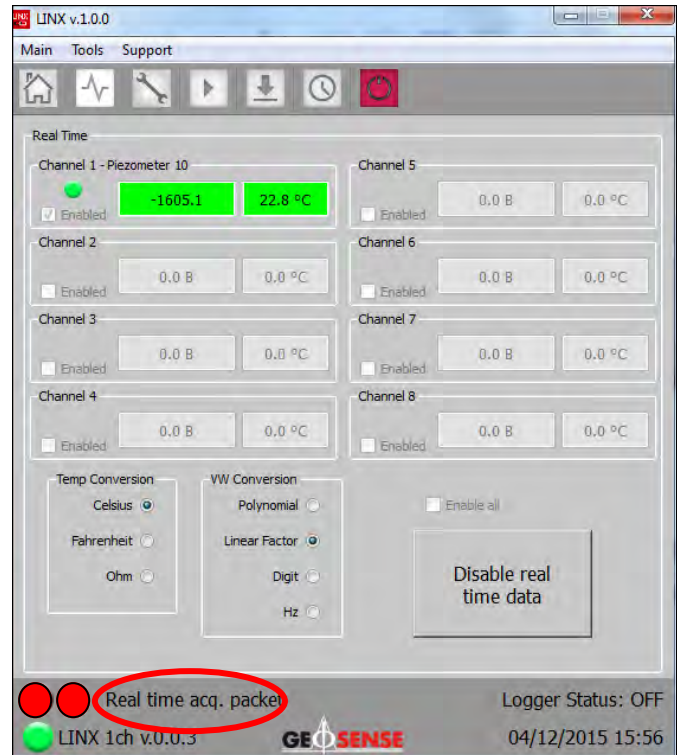


## 6.5 Real time readings contd....

Confirmation that this mode is working can be seen by the message

### Real time acq. Packet

And the two red buttons will flash as each reading is taken



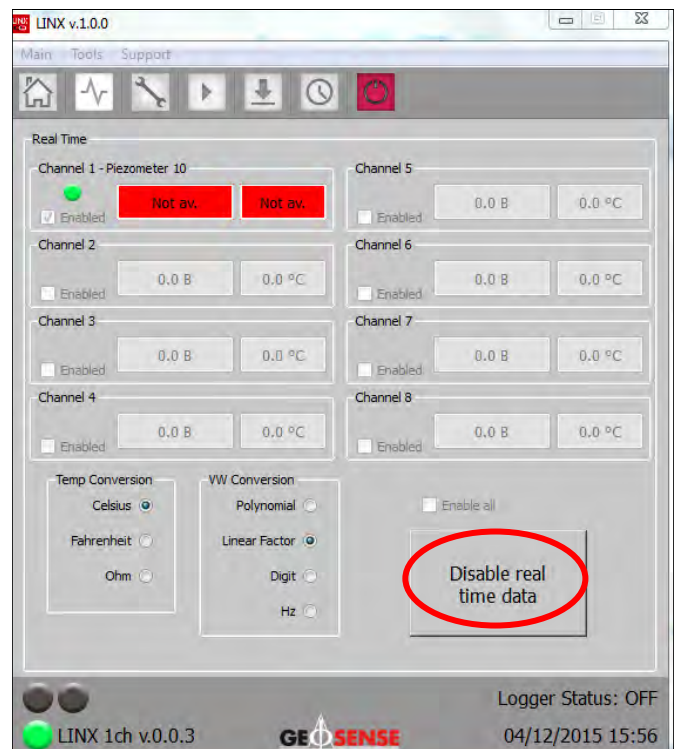
Box highlighted in **red** means no sensor is connected

Box highlighted in **green** means sensor configuration is completed

Box highlighted in **orange** means sensor connected but configuration is not completed

To stop real time select

### Disable real time data



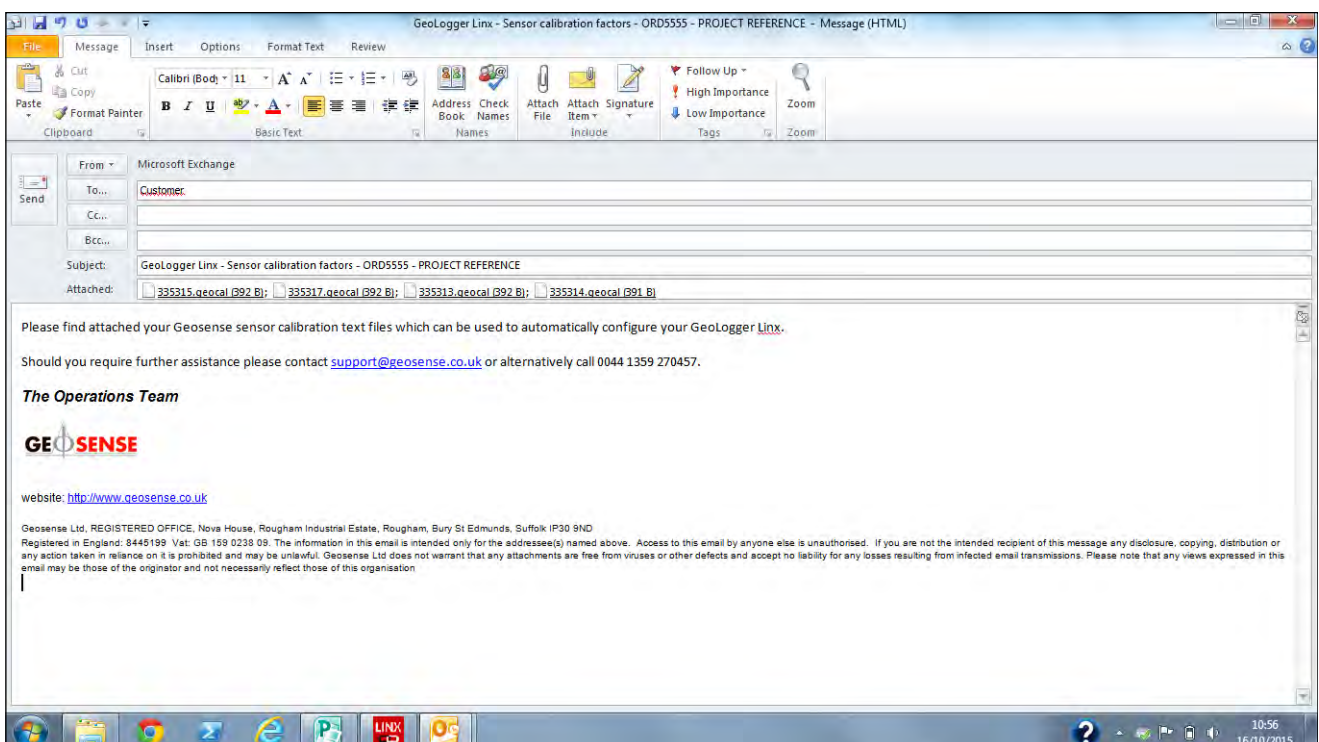
## 6.6 Sensor configuration

### 6.6.1 Cal file input & linear

This mode allows the linear factors from the Geosense calibration sheet to be automatically inputted into the software.

The calibration information is provided using a text file that will have been forwarded by email at the time of supply (see below).

It is recommended to place all these text files into one location for ease of loading.



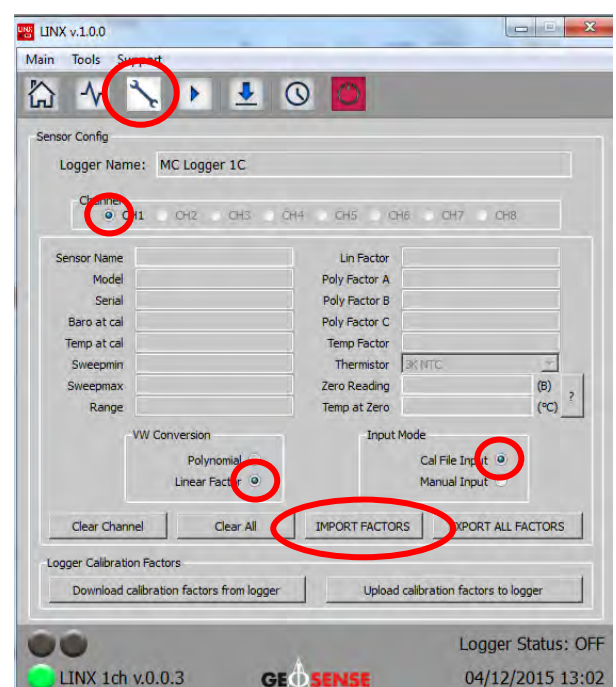
Select **Sensor config** icon

Select the channel to be configured

Select **Linear factor** AND

**Cal file Input**

Select **IMPORT FACTORS**

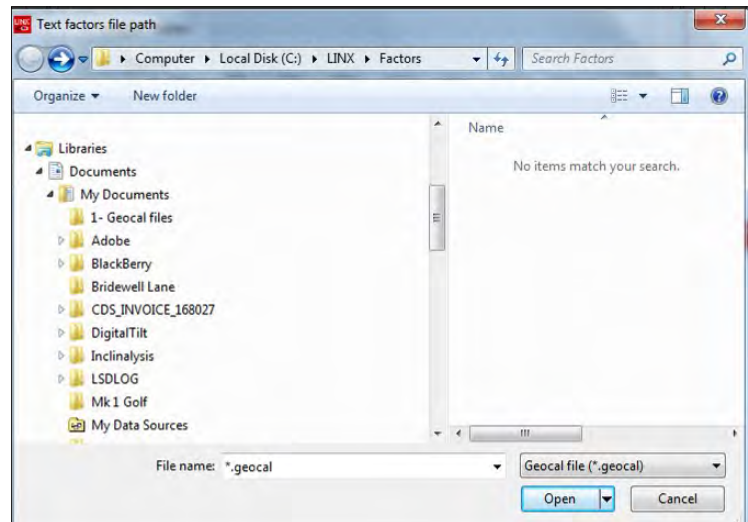




## 6.6.1 Cal file input & linear contd...

Search for the relevant Geosense Calibration file (.geocal) and select **Open**

This will import all the calibration factors



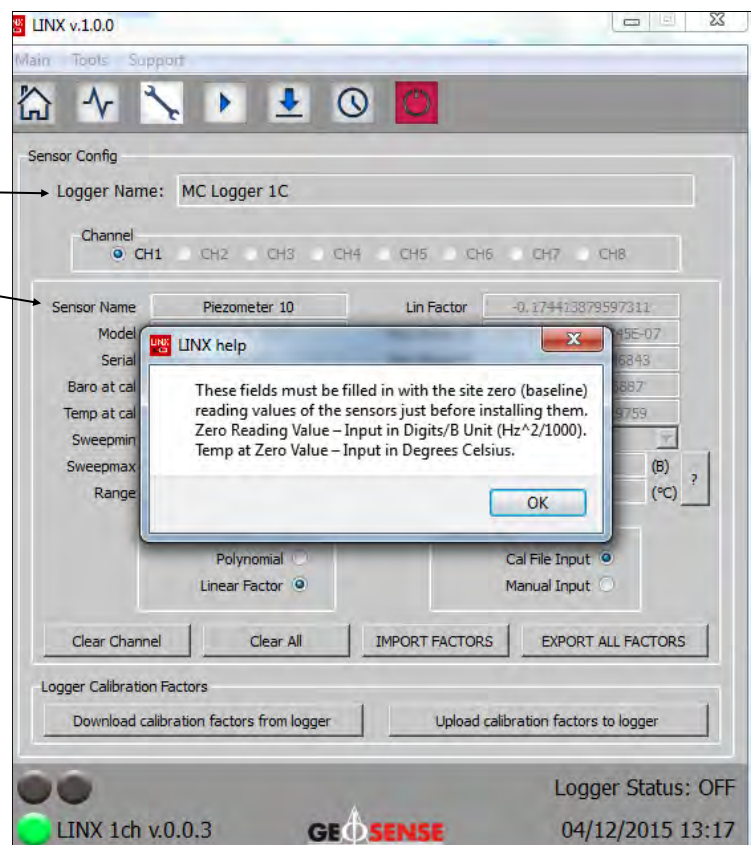
Once the calibration factors have been uploaded fill in the following fields:-

- Logger name
- Sensor name



- Zero reading
- Temperature at zero

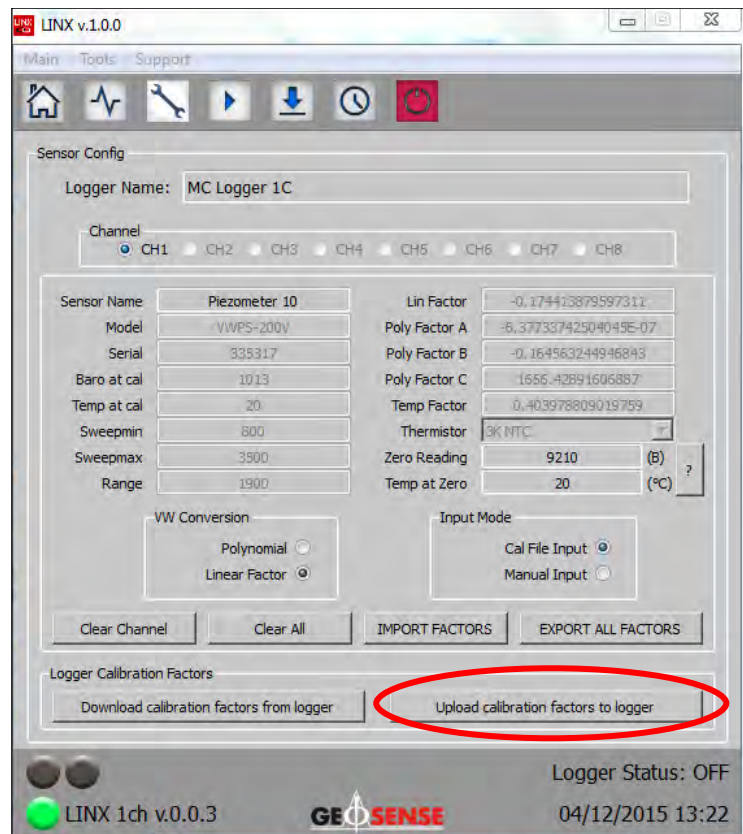
**REPEAT FOR ALL CHANNELS  
AS NECESSARY**



### 6.6.1 Sensor configuration - Cal file input & linear contd...

Once all the information has been entered into all the necessary channels select

#### UPLOAD CALIBRATION FACTORS TO LOGGER

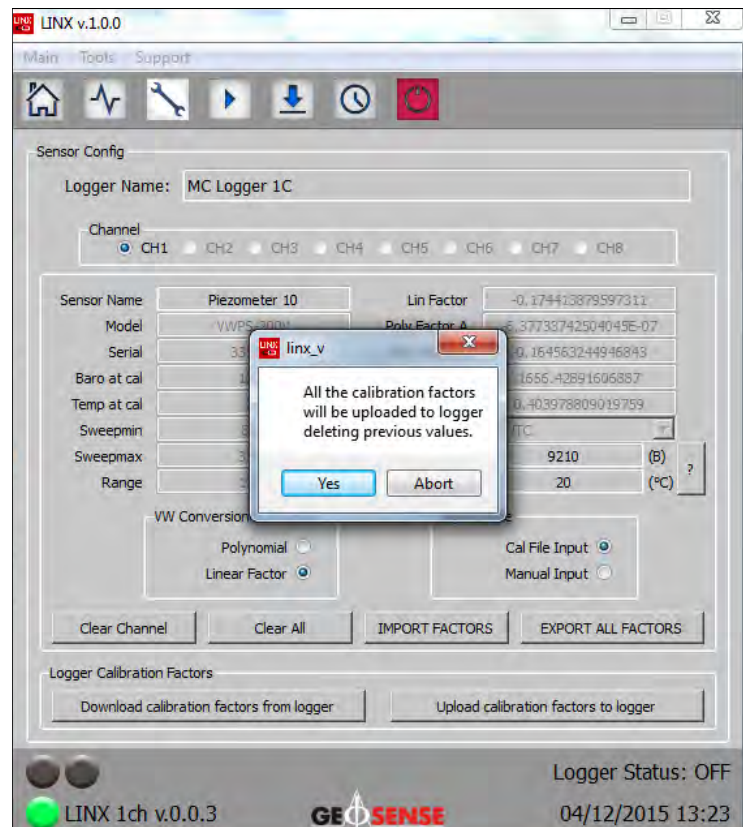



#### DEFAULT IS Linear Factor & Cal file Input

At this stage you have the option to confirm or to cancel

To confirm select **YES**. All the entered data will then be uploaded to the logger

To cancel select **Abort**. This will take you back to the previous screen

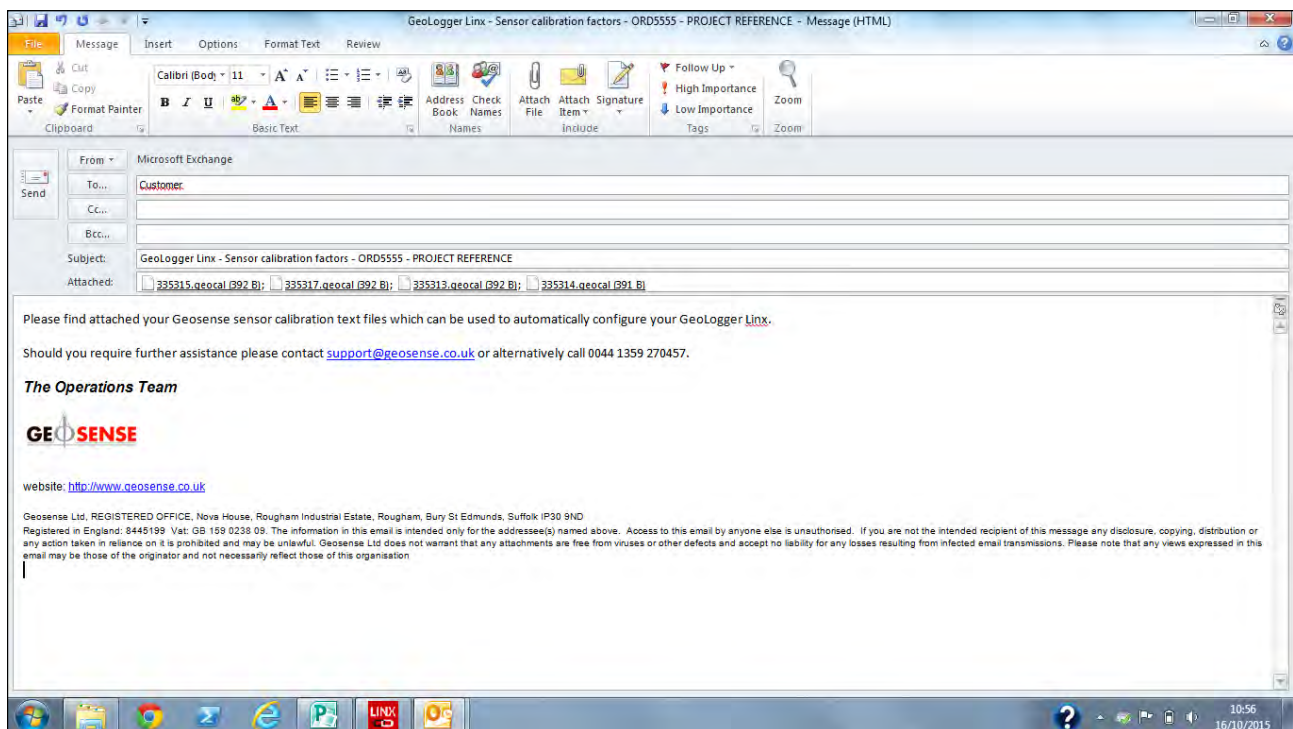


## 6.6.2 Sensor configuration - Cal file input & polynomial

This mode allows the information from the Geosense calibration sheet to be uploaded automatically into the software.

The calibration information is provided using a text file that will have been forwarded by email at the time of supply (see below).

It is recommended to place all these text files into one location for ease of loading.



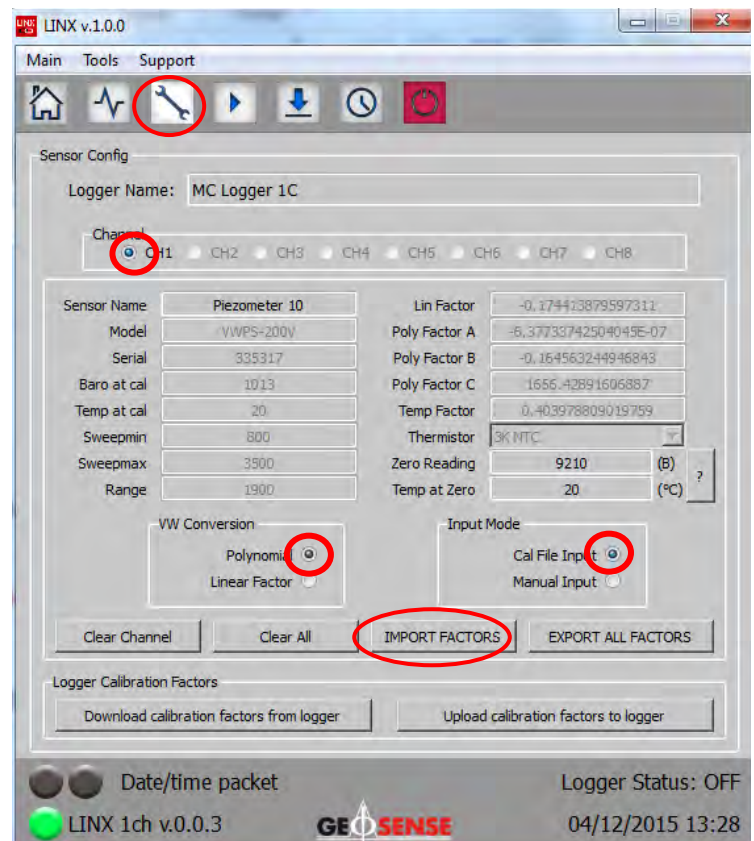
## 6.6.2 Sensor configuration - Cal file input & polynomial contd...

Select **Sensor config** icon

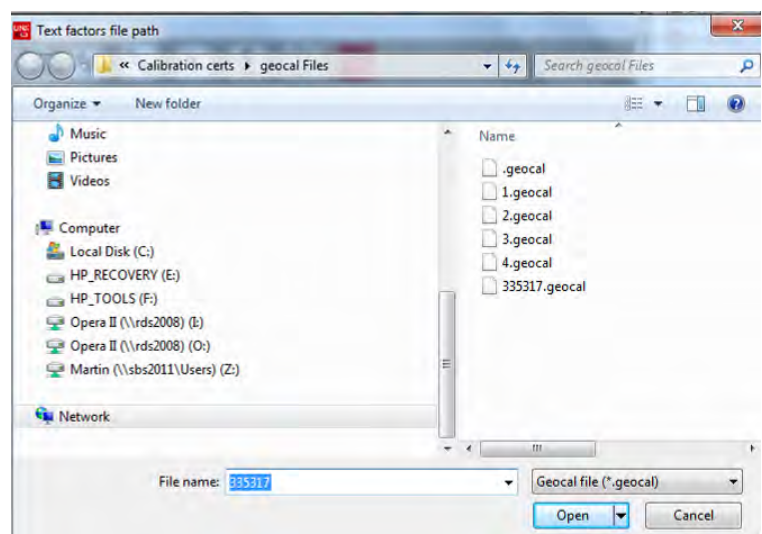
Select the required channel to be configured

Select Polynomial & Cal File Input

Select **IMPORT FACTORS**



Search for the relevant Geosense calibration file (geocal) and select **Open**

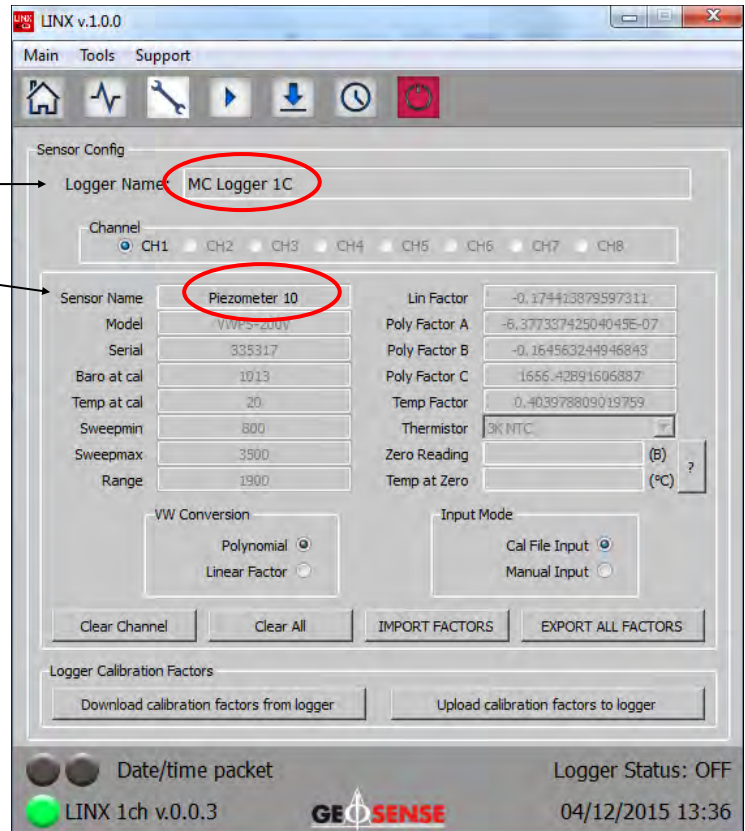




## 6.6.2 Sensor configuration - Cal file input & polynomial contd...

Once the calibration factors have been loaded fill in the following fields:-

- Logger name
- Sensor name



Sensor Config

Logger Name: MC Logger 1C

Channel: CH1

Sensor Name: Piezometer 10

Model: VVPS-200V

Serial: 335317

Baro at cal: 1013

Temp at cal: 20

Sweepmin: 800

Sweepmax: 3500

Range: 1900

Lin Factor: -0.174423879597311

Poly Factor A: -6.37733742504045E-07

Poly Factor B: -0.164563244946843

Poly Factor C: 1656.42891606887

Temp Factor: 0.403978809019759

Thermistor: 3K NTC

Zero Reading: (B) ?

Temp at Zero: (°C) ?

VW Conversion: Polynomial (selected), Linear Factor

Input Mode: Cal File Input (selected), Manual Input

Clear Channel, Clear All, IMPORT FACTORS, EXPORT ALL FACTORS

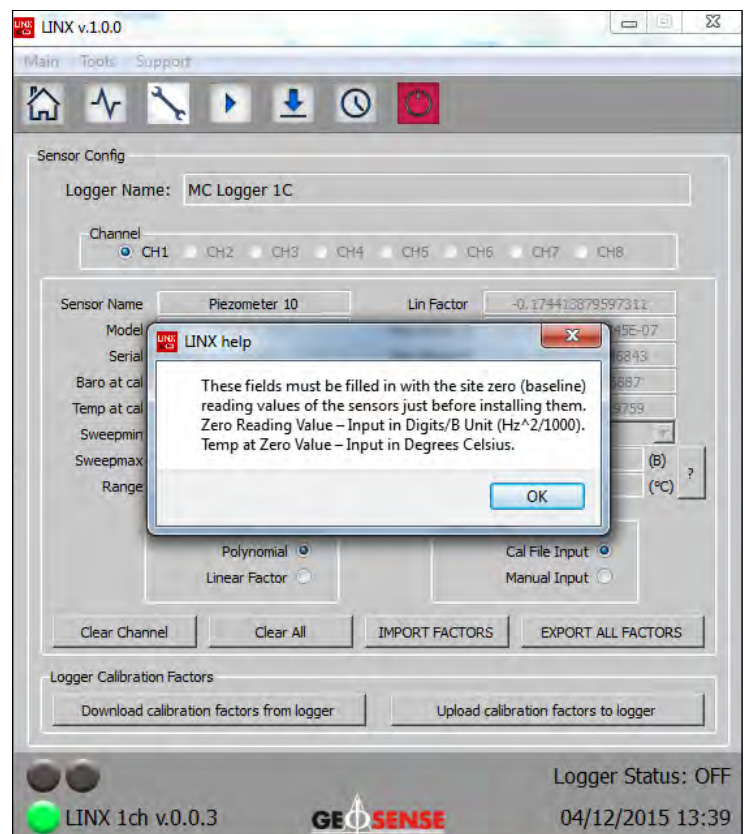
Logger Calibration Factors

Download calibration factors from logger, Upload calibration factors to logger

Date/time packet, LINX 1ch v.0.0.3, GEOSENSE, Logger Status: OFF, 04/12/2015 13:36



- Zero reading
- Temperature at zero



Sensor Config

Logger Name: MC Logger 1C

Channel: CH1

Sensor Name: Piezometer 10

Model: VVPS-200V

Serial: 335317

Baro at cal: 1013

Temp at cal: 20

Sweepmin: 800

Sweepmax: 3500

Range: 1900

Lin Factor: -0.174423879597311

Poly Factor A: -6.37733742504045E-07

Poly Factor B: -0.164563244946843

Poly Factor C: 1656.42891606887

Temp Factor: 0.403978809019759

Thermistor: 3K NTC

Zero Reading: (B) ?

Temp at Zero: (°C) ?

VW Conversion: Polynomial (selected), Linear Factor

Input Mode: Cal File Input (selected), Manual Input

Clear Channel, Clear All, IMPORT FACTORS, EXPORT ALL FACTORS

Logger Calibration Factors

Download calibration factors from logger, Upload calibration factors to logger

Date/time packet, LINX 1ch v.0.0.3, GEOSENSE, Logger Status: OFF, 04/12/2015 13:39

LINX help

These fields must be filled in with the site zero (baseline) reading values of the sensors just before installing them.  
Zero Reading Value – Input in Digits/B Unit (Hz<sup>2</sup>/1000).  
Temp at Zero Value – Input in Degrees Celsius.

OK



## 6.6.2 Sensor configuration - Cal file input & polynomial contd...

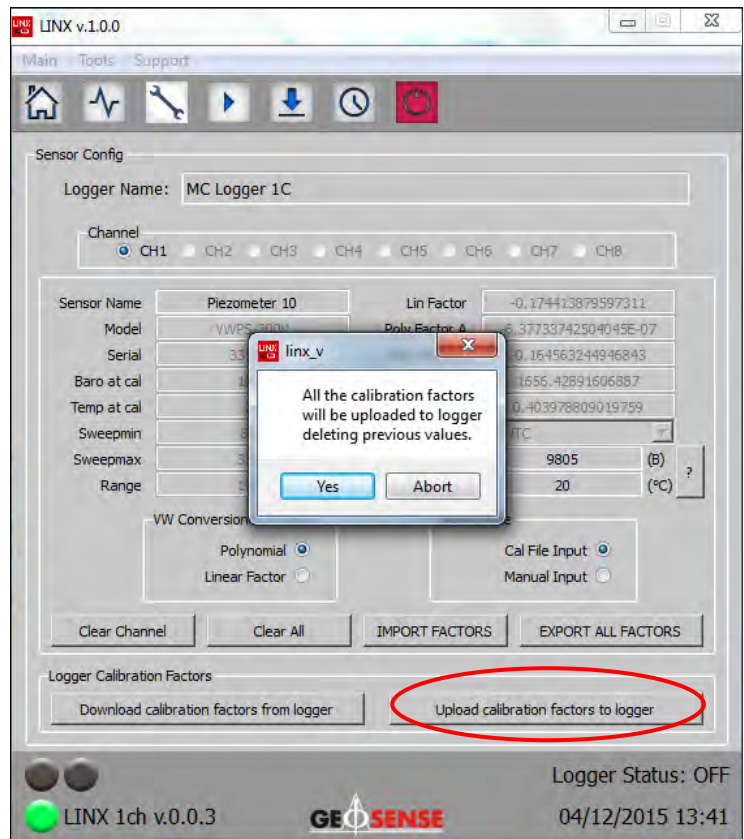
Once all the information has been entered select

### UPLOAD CALIBRATION FACTORS TO LOGGER

### REPEAT FOR ALL THE REQUIRED CHANNELS

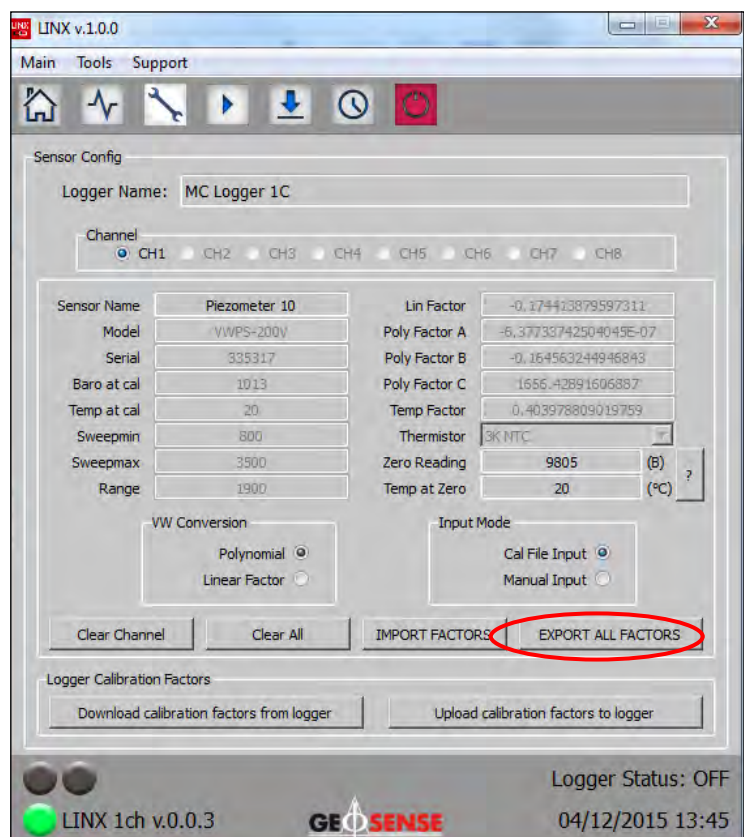
At this stage you have the option to confirm or to cancel

To confirm select **YES**. All the entered data will then be uploaded to the logger



### NOTE 1

All calibration factors can be exported from the software to your computer as a back up if required



## 6.6.2 Sensor configuration - Cal file input & polynomial contd...

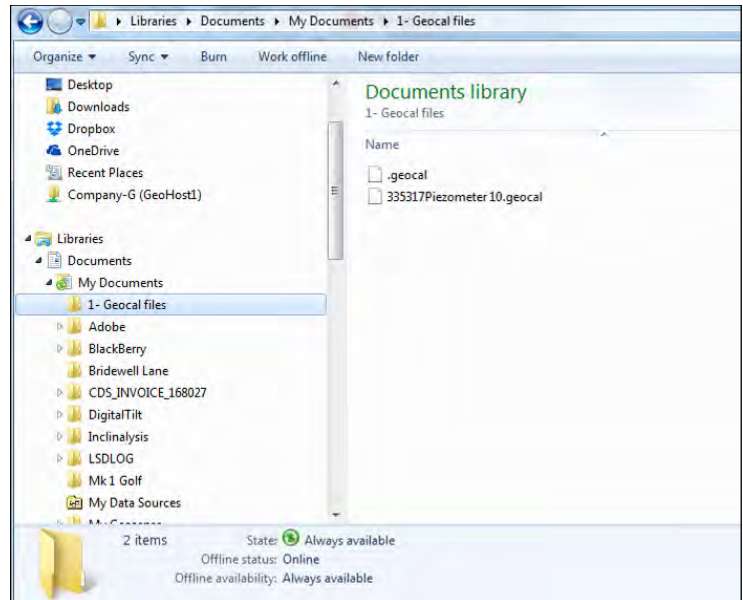
### NOTE 1 contd...

Once **EXPORT ALL FACTORS** has been selected it will open the browser on your computer

Select the required location

Click on **Select Folder**

This will then save the text file with the calibration factors into this location

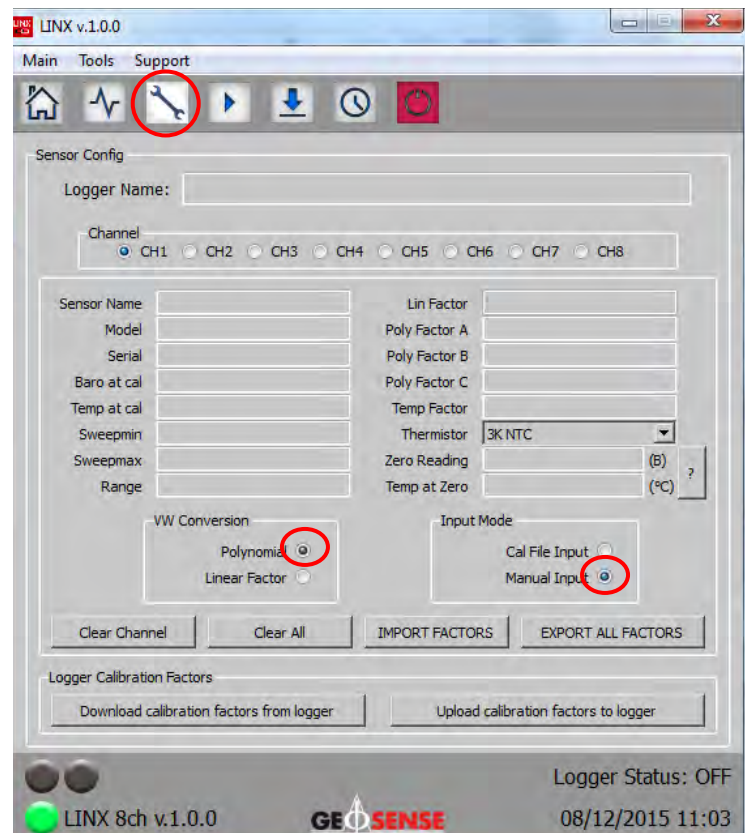


### 6.6.3 Sensor configuration - Manual & polynomial

Select the **Sensor config** icon

Select **Polynomial** in the VW conversion box

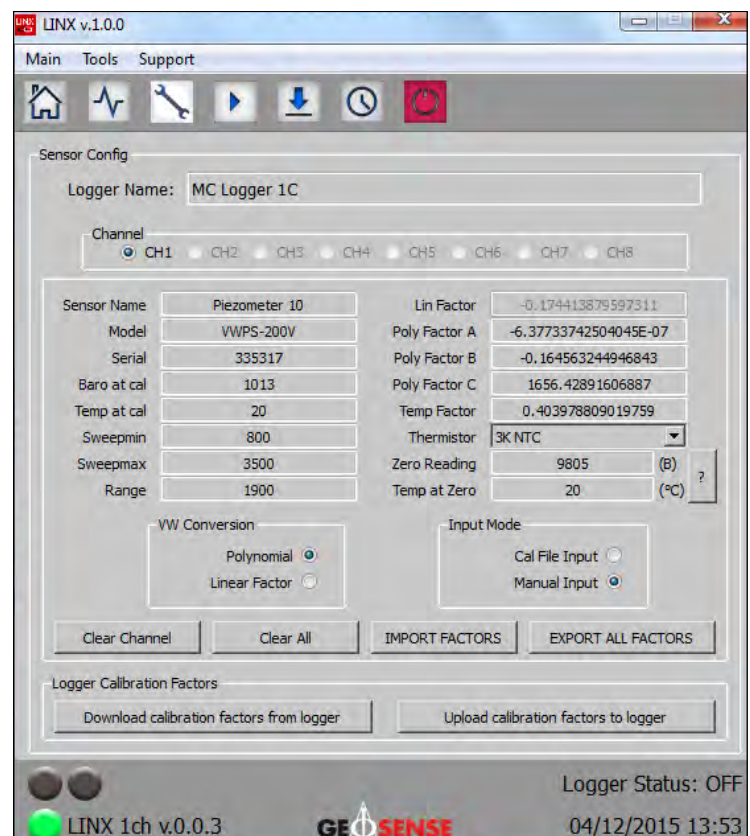
Select **Manual input** in the Input mode box



Fill in all the available fields including all the values from the calibration sheet provided with each sensor.

**NOTE:** The sweep range can be found on the individual sensor data sheet

**REPEAT FOR ALL CHANNELS AS NECESSARY**

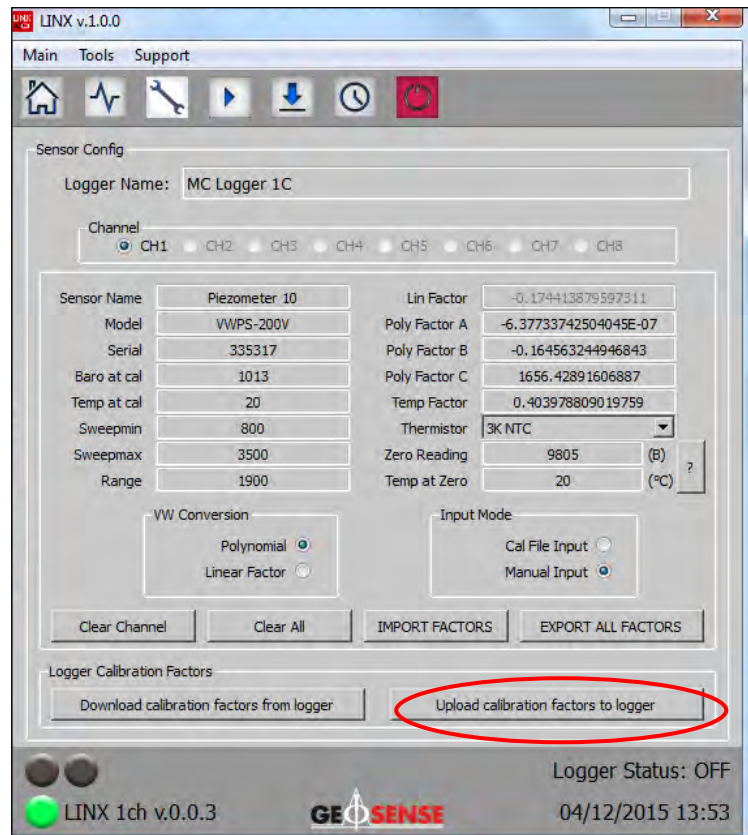




### 6.6.3 Sensor configuration - Manual & polynomial contd...

Once all the data has been inputted select

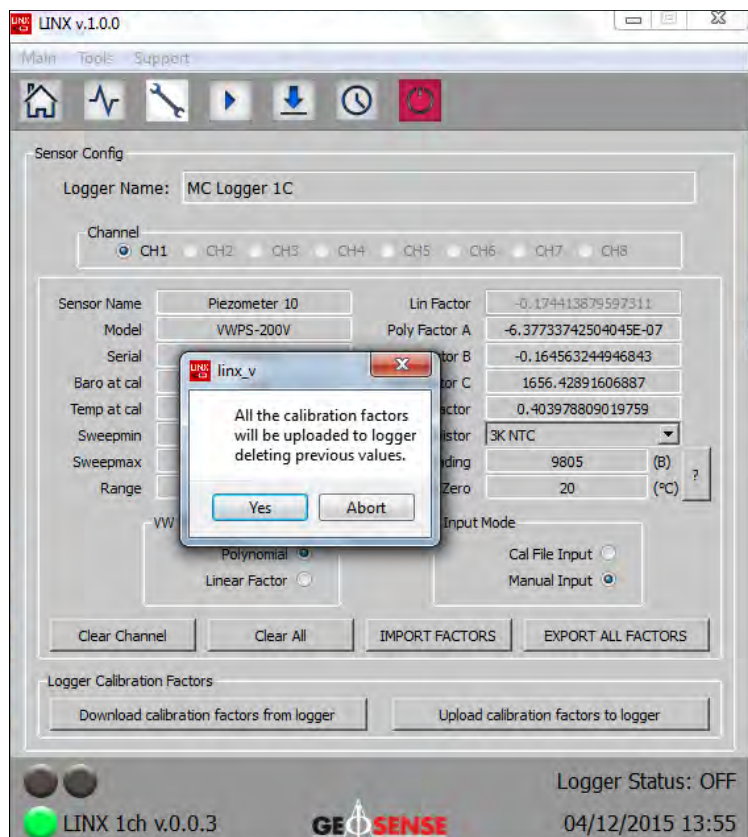
#### UPLOAD CALIBRATION FACTORS TO LOGGER



At this stage you have the option to confirm or to cancel

To confirm select **YES**. All the entered data will then be uploaded to the logger

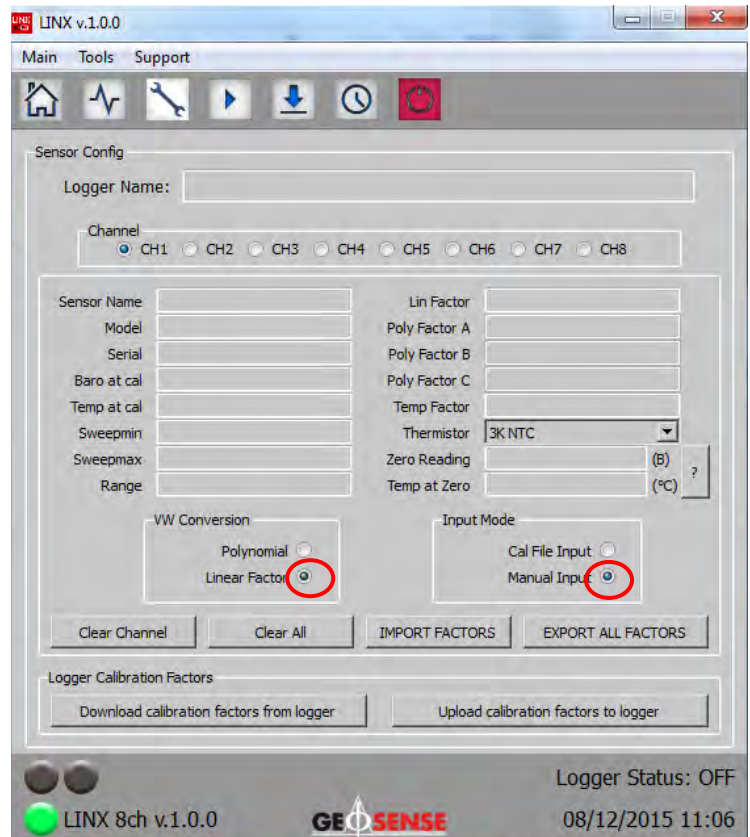
To cancel select **Abort**. This will take you back to the previous screen



## 6.6.4 Sensor configuration - Manual & linear

Select **Linear** in the VW conversion box

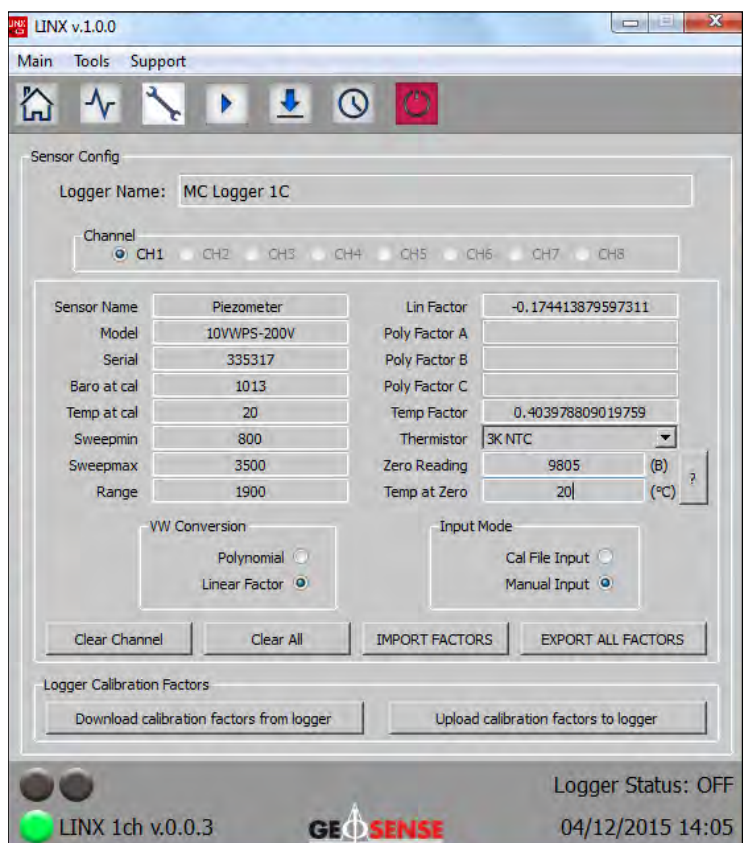
Select **Manual input** in the Input mode box



Fill in all the fields including all the values from the calibration sheet provided with each sensor.

**NOTE:** The sweep range can be found on the individual sensor data sheet

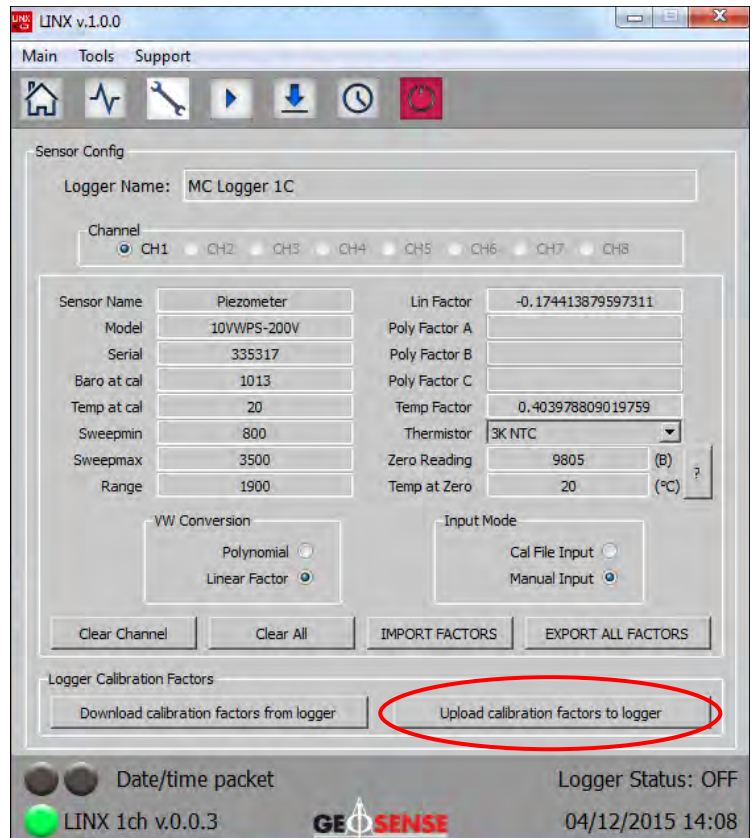
**REPEAT FOR ALL CHANNELS AS NECESSARY**



### 6.6.4 Sensor configuration - Manual & linear contd...

Once all the data has been inputted select

#### UPLOAD CALIBRATION FACTORS TO LOGGER

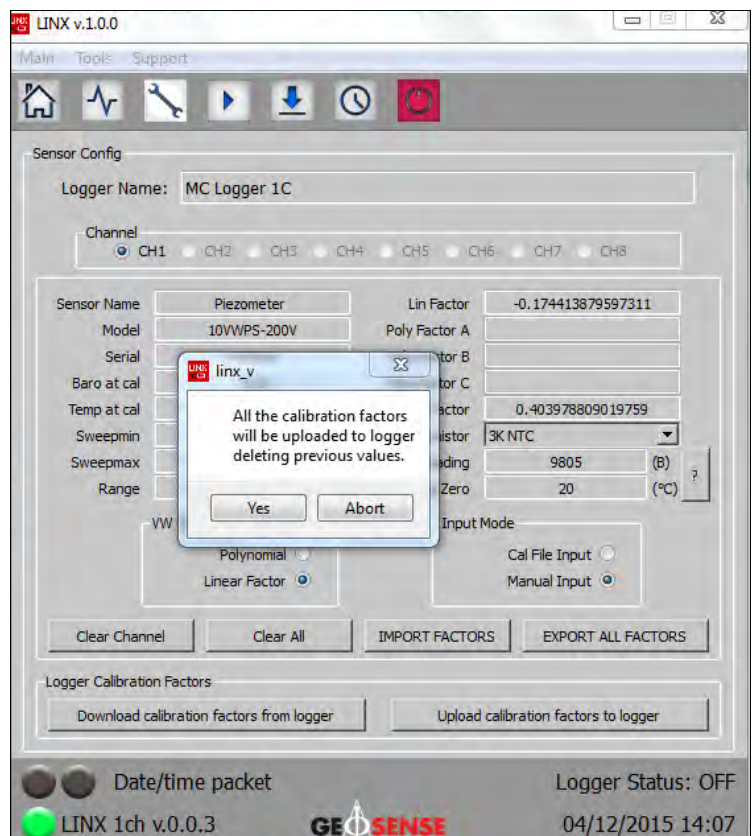


The screenshot shows the 'Sensor Config' window for 'MC Logger 1C'. The 'Channel' is set to CH1. The 'Sensor Name' is 'Piezometer', 'Model' is '10VWPS-200V', 'Serial' is '335317', 'Baro at cal' is '1013', 'Temp at cal' is '20', 'Sweepmin' is '800', 'Sweepmax' is '3500', and 'Range' is '1900'. The 'Lin Factor' is '-0.174413879597311'. The 'Poly Factor A' is empty, 'Poly Factor B' is empty, and 'Poly Factor C' is empty. The 'Temp Factor' is '0.403978809019759'. The 'Thermistor' is '3K NTC'. The 'Zero Reading' is '9805' (B) and 'Temp at Zero' is '20' (°C). The 'VW Conversion' is set to 'Linear Factor'. The 'Input Mode' is 'Manual Input'. The 'Logger Calibration Factors' section has two buttons: 'Download calibration factors from logger' and 'Upload calibration factors to logger', which is circled in red. The status bar shows 'Date/time packet', 'LINX 1ch v.0.0.3', 'GEOSENSE', 'Logger Status: OFF', and '04/12/2015 14:08'.

At this stage you have the option to confirm or to cancel

To confirm select **YES**. All the entered data will then be uploaded to the logger

To cancel select **Abort**. This will take you back to the previous screen



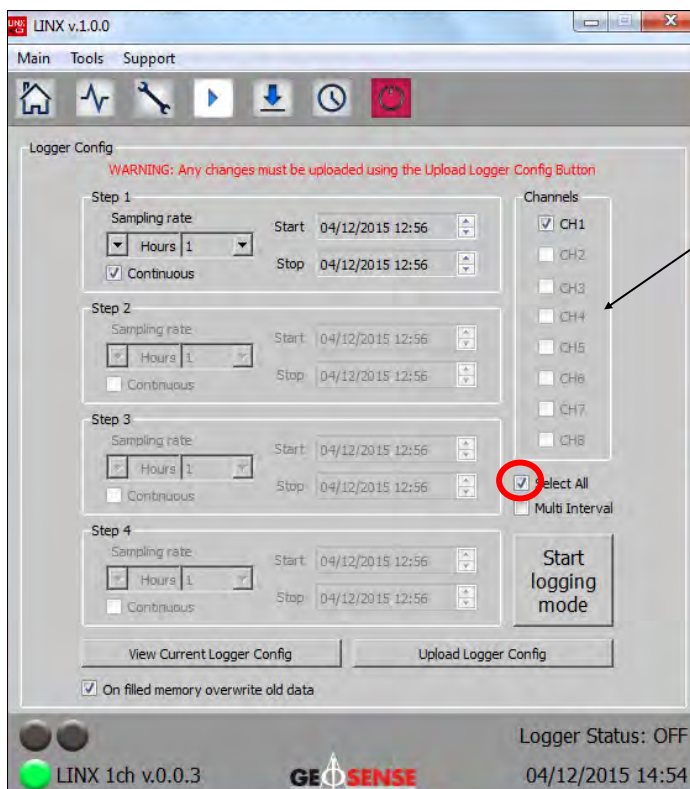
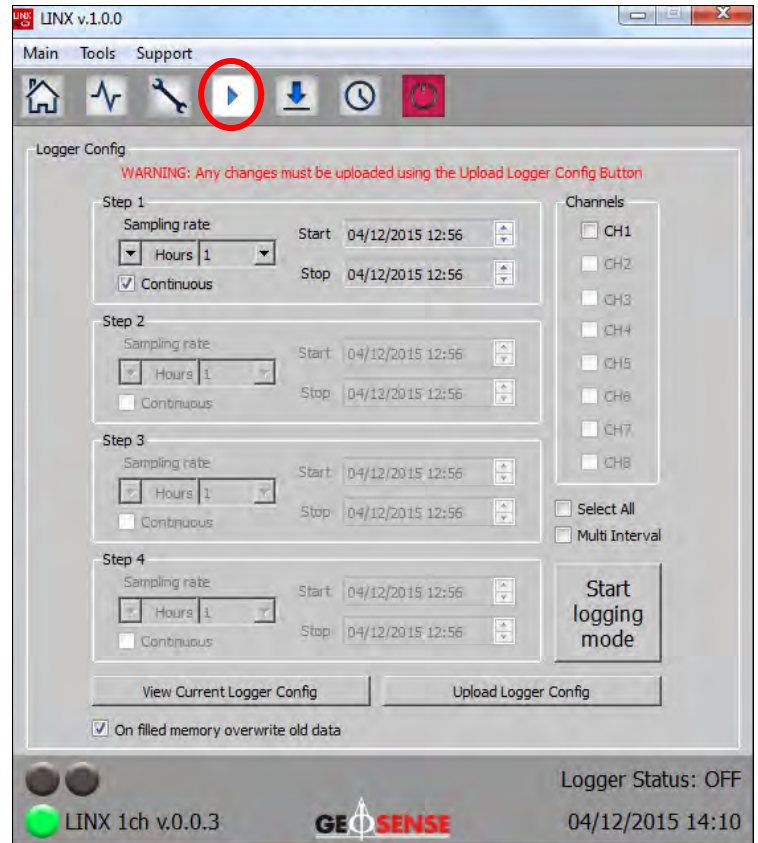
The screenshot shows the same 'Sensor Config' window as above, but with a confirmation dialog box titled 'linx\_v' in the foreground. The dialog box contains the text: 'All the calibration factors will be uploaded to logger deleting previous values.' and has two buttons: 'Yes' and 'Abort'. The status bar shows 'Date/time packet', 'LINX 1ch v.0.0.3', 'GEOSENSE', 'Logger Status: OFF', and '04/12/2015 14:07'.



## 6.7 Logger configuration

This section allows the **logger** to be configured to the project requirements

Select the **Logger config** icon



### Channels

Channels can be selected individually or you can **Select All**

## 6.7 Logger configuration contd...

### Sampling rate

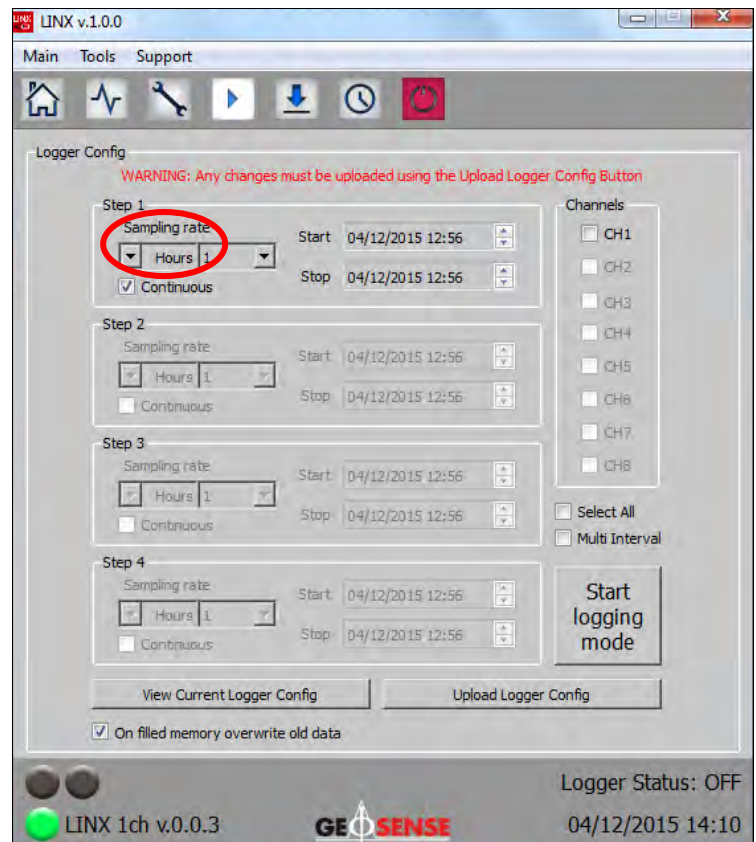
The sampling rate (interval) can be selected in

Seconds

Minutes

Hours

Days



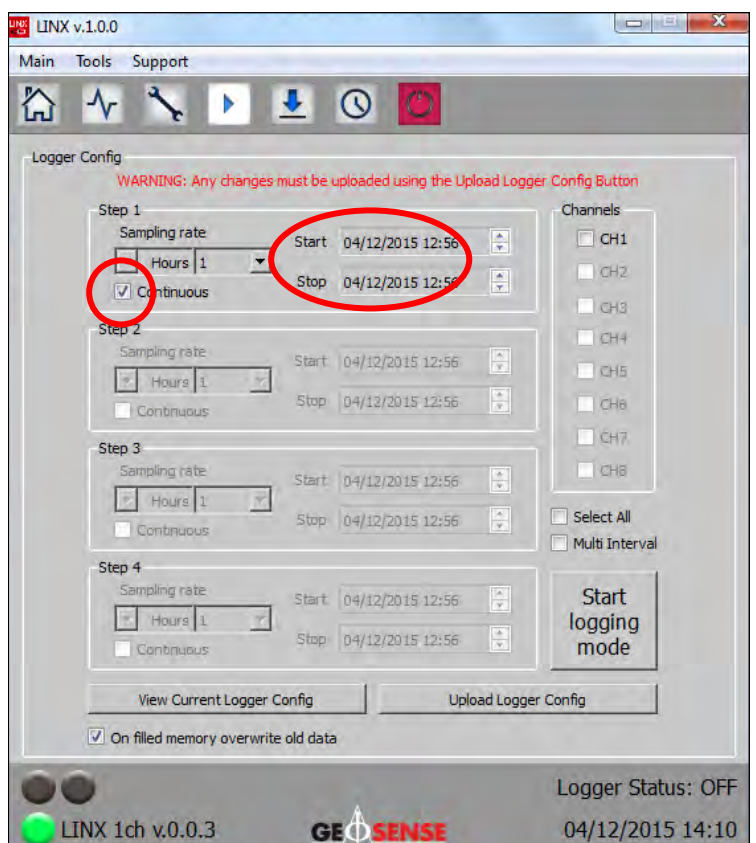
### Date

Can be set from **Start** to **Stop** using the calendar.

It can also be set for **Continuous** (no end date)

### NOTE

To change each **day/month/year hour/minute** place the cursor over each unit and use the up or down arrows to select the required value or use the central wheel to scroll





## 6.7 Logger configuration contd...

### Sampling rate contd...

The sampling rate (interval) can also have four different steps by selecting **Multi Interval**

Individual **Start & Stop** times can be set to suit the project requirements

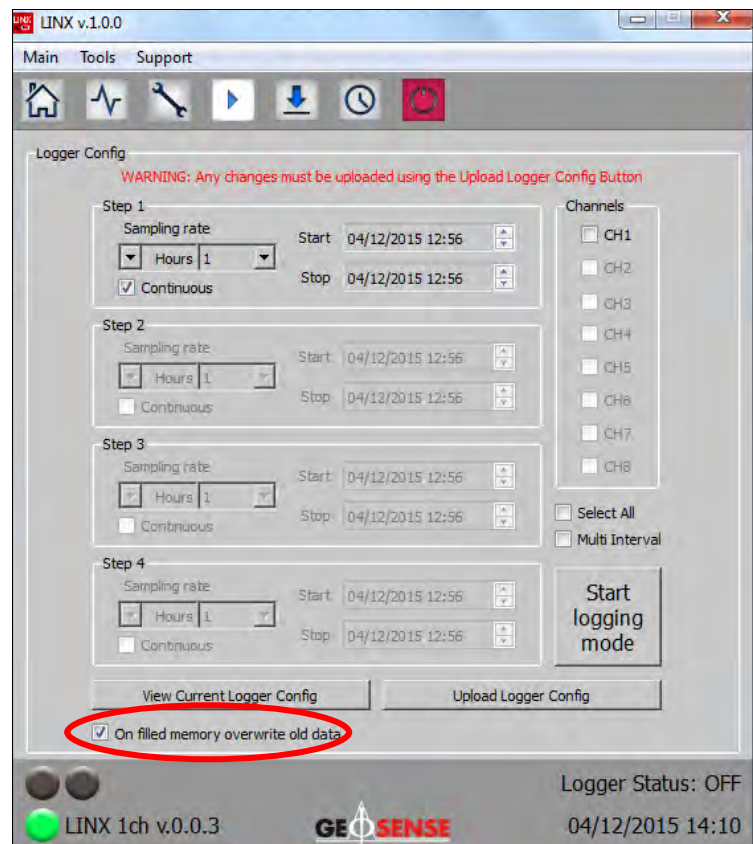
### Data storage

Two types of data storage are available:-



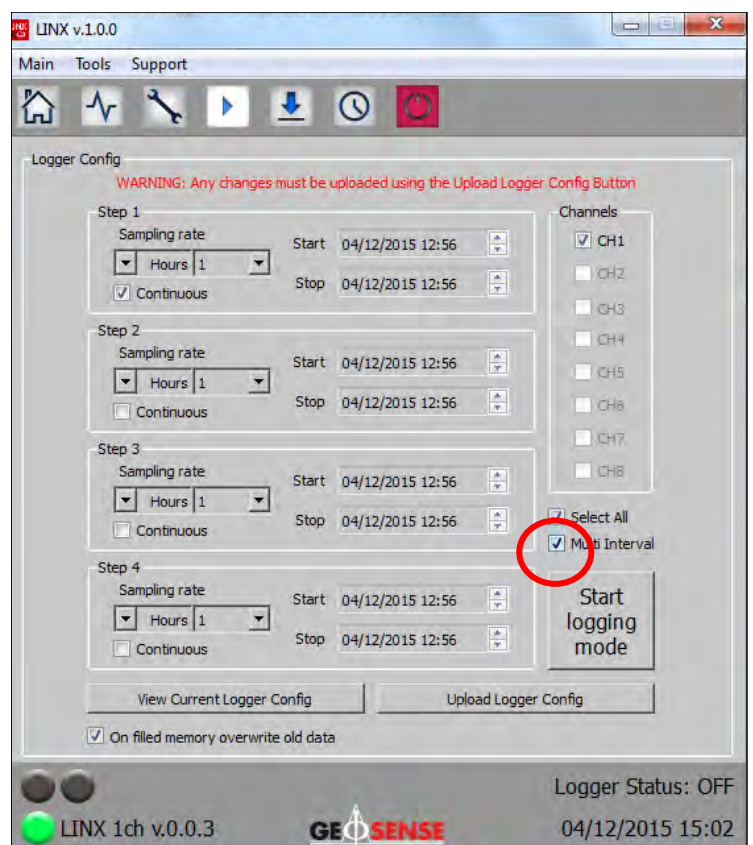
**On filled memory overwrite old data** is the default setting

**Fill and stop** - if this option is required de-select the above option



Multi-interval sampling rates are also available.

Select **Multi Interval** to activate this option



## 6.7 Logger configuration contd...

### Configuration of logger

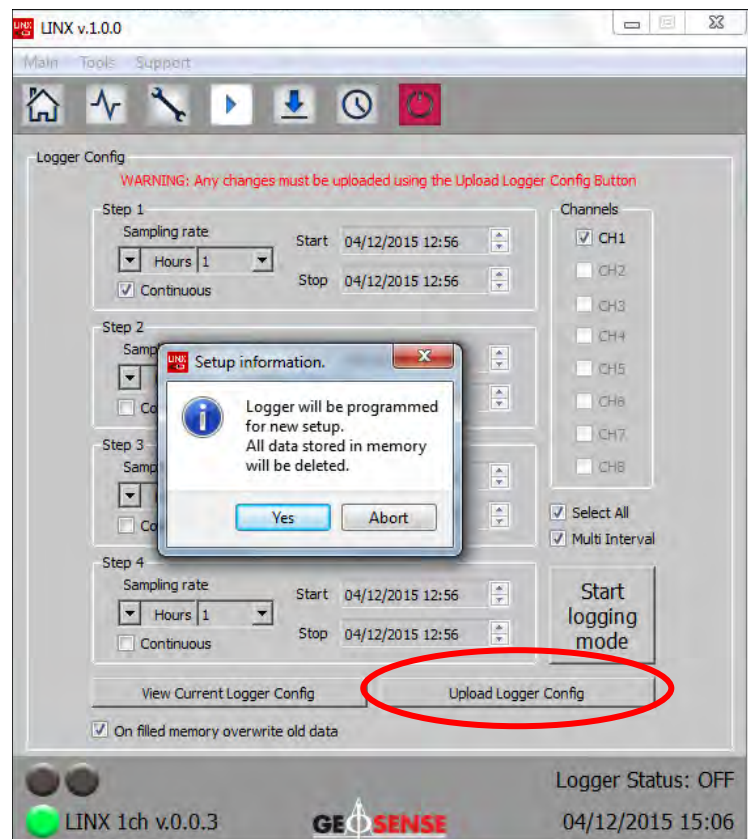
Once all the settings have been selected they need to be uploaded to the data logger

### Select Upload Logger Config

At this stage you have the option to confirm or to cancel

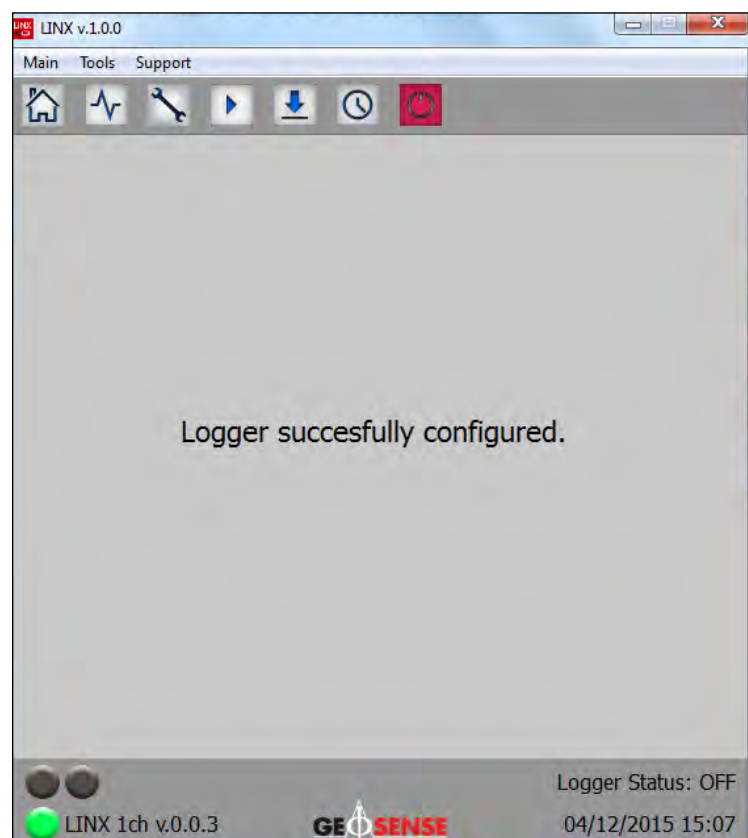
To confirm select **YES**. All the entered data will then be uploaded to the logger

To cancel select **Abort**. This will take you back to the previous screen



### Configuration confirmed

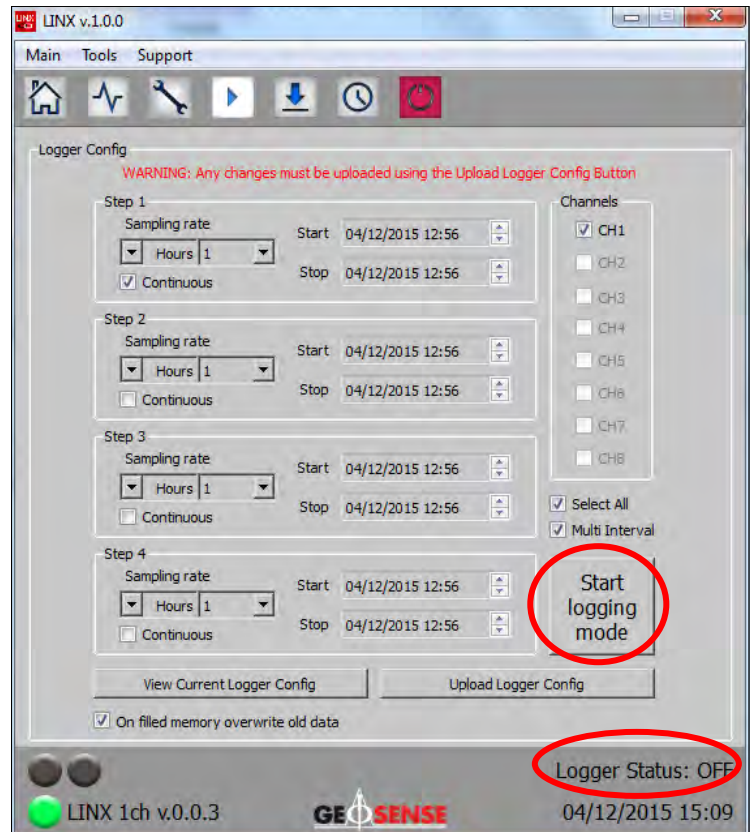
If all fields are filled in correctly then the **Logger successfully configured** message will be displayed



## 6.8 Start & stop logging status

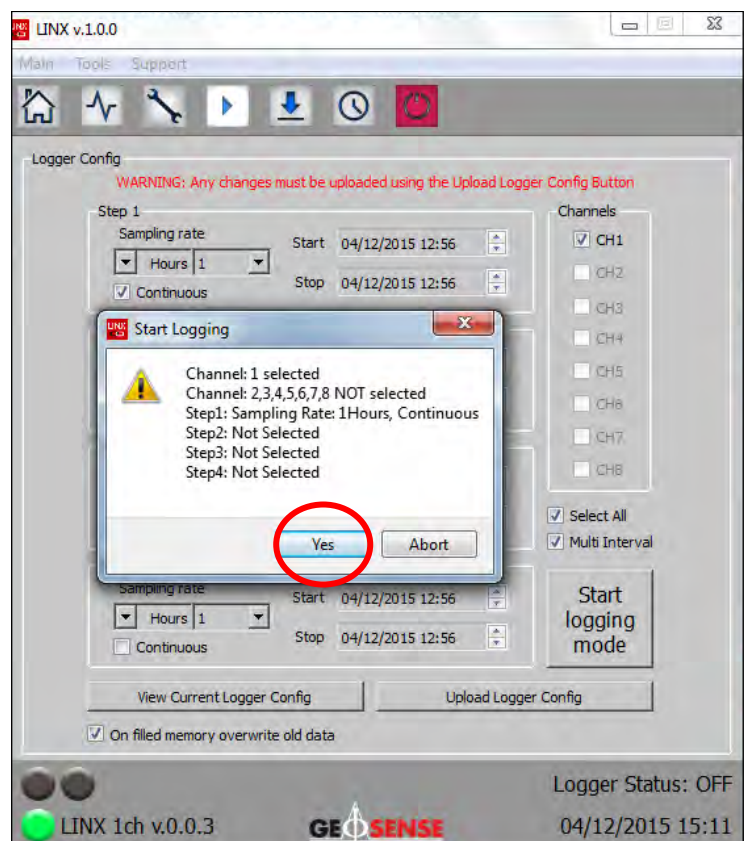
If the Logger Status is **OFF** it is necessary to select

“start logging mode”



Before the logging mode starts confirmation of the logging configuration is displayed

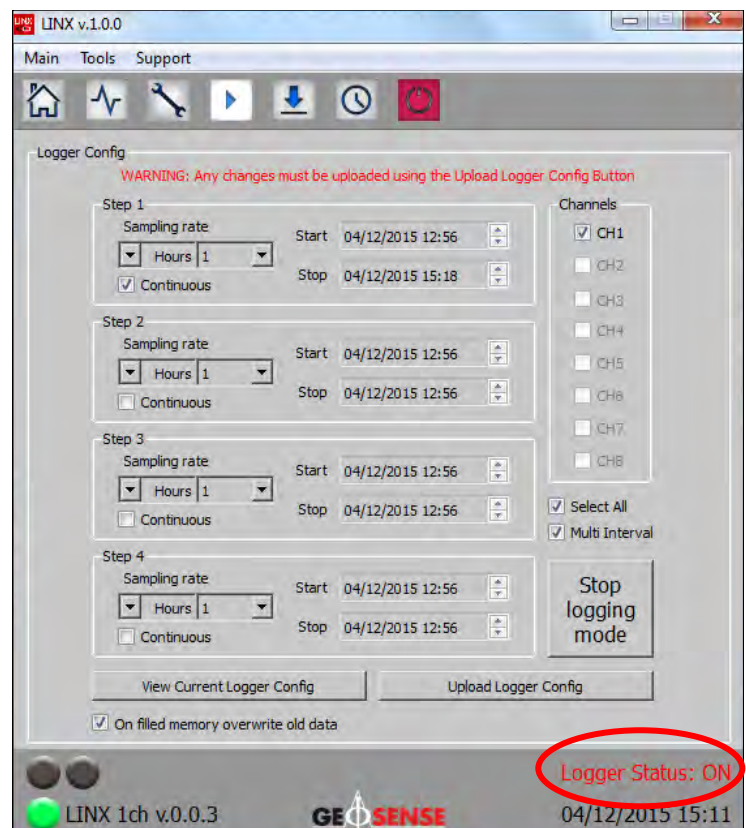
If all is correct select **YES** to set to logging mode





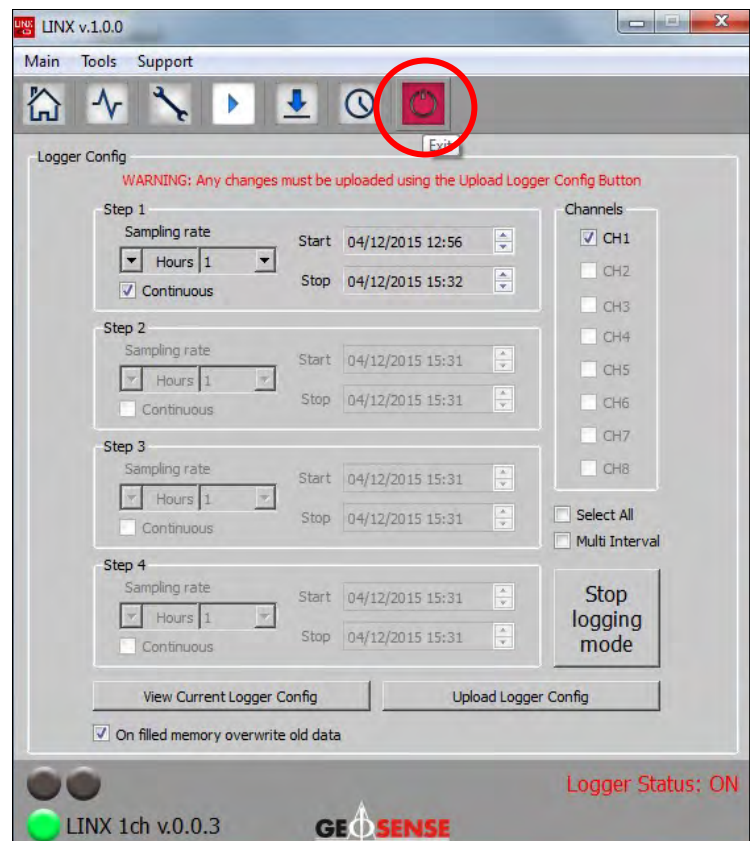
## 6.8 Start & stop logging status contd...

Confirmation that the **Logger Status** is **ON** is confirmed in the bottom right pane



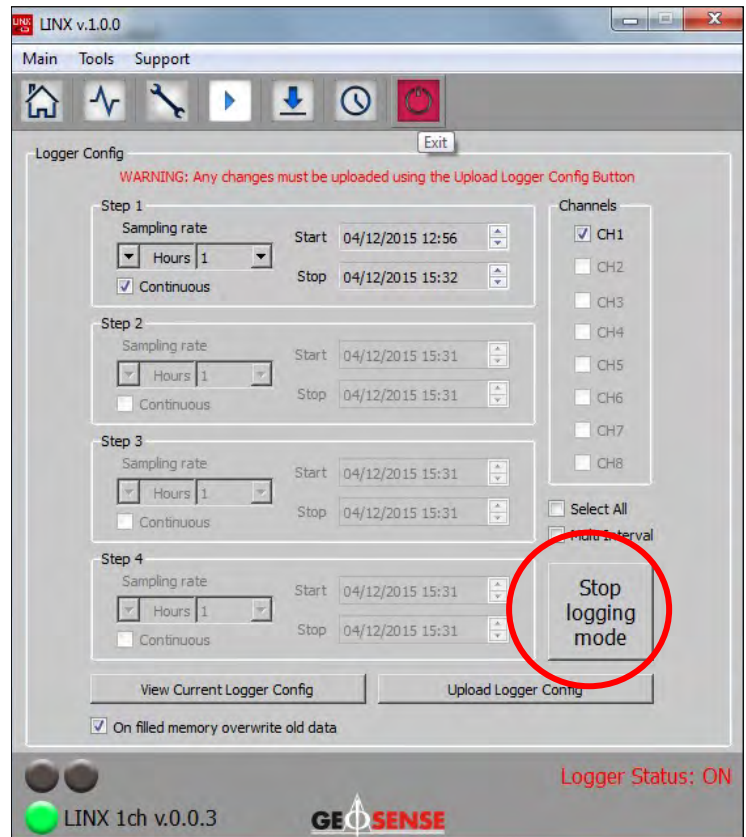
Logging mode can be started with the USB still inserted into the logger. Batteries provided with the logger will need to be placed inside the battery cradle to allow logger to be powered once USB cable is removed

Select **Exit** to close the software



## 6.8 Start & stop logging status contd...

Once data collection is complete and the logger is to be left unused and in order to safeguard battery life and memory it is necessary to select **“stop logging mode”**

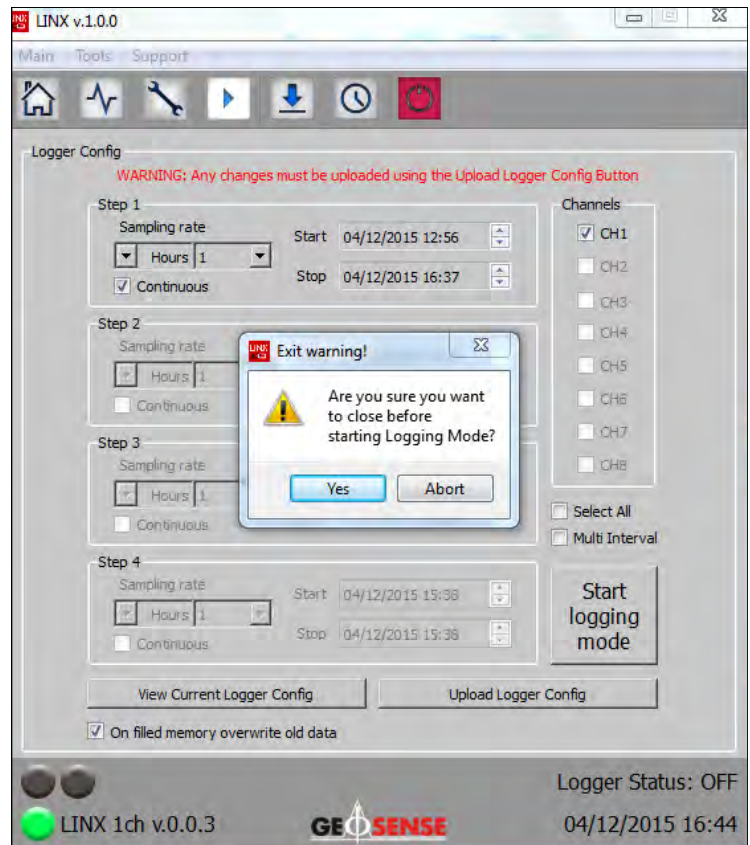




## 6.8 Start & stop logging status contd...



If you forget to set the logger to **Start Logging Mode** on pressing the Exit button you will be prompted to confirm if you want to exit before starting the Logging Mode



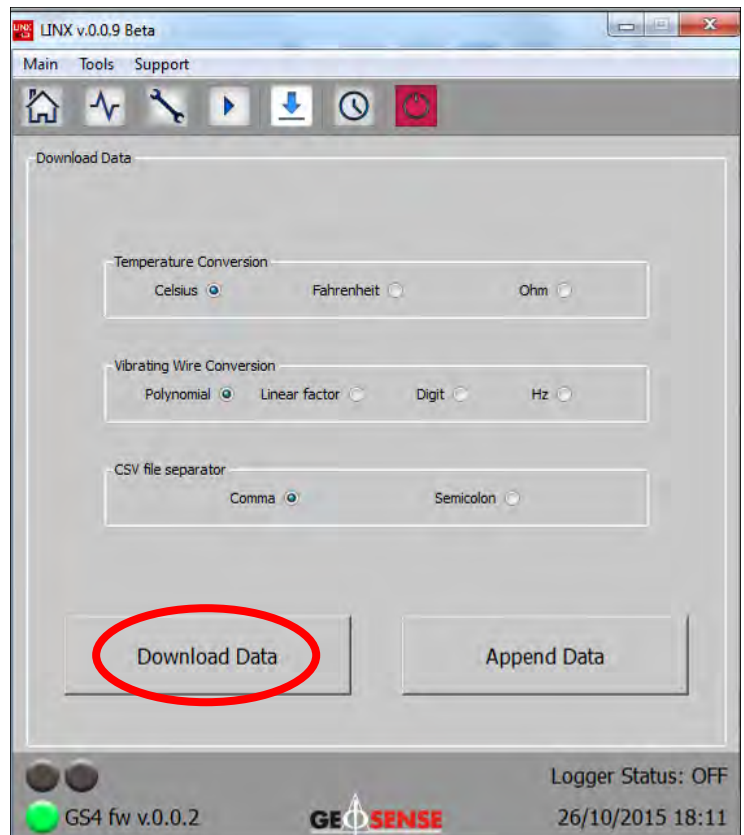
## 6.9 Download & append data

It is not necessary to select the **Stop Logging Mode** in order to download data.

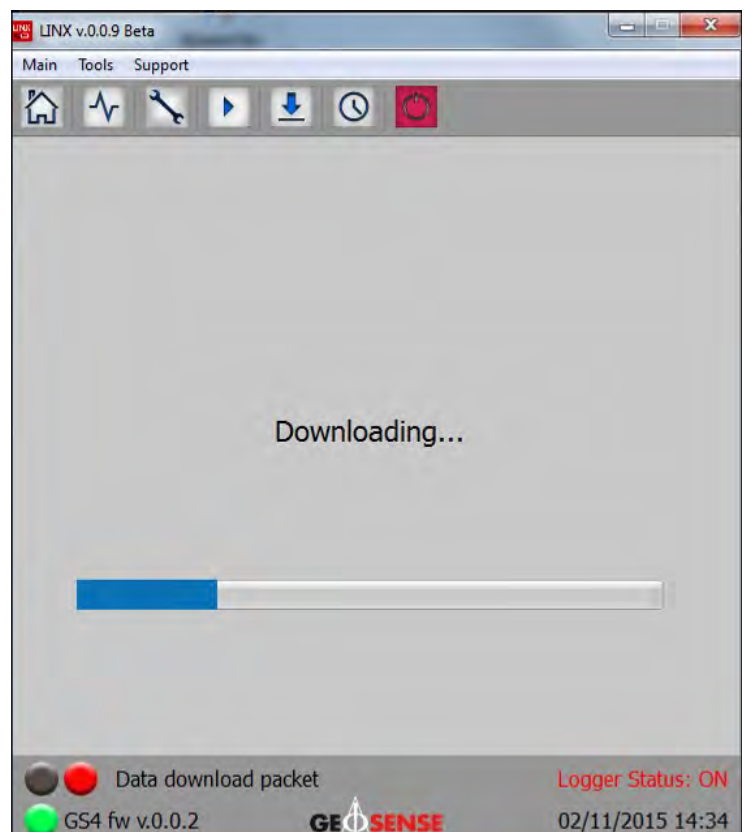
Downloading or appending can therefore be carried out in any mode.

The data can also be downloaded in different units by selecting the relevant ones

Select **Download Data**

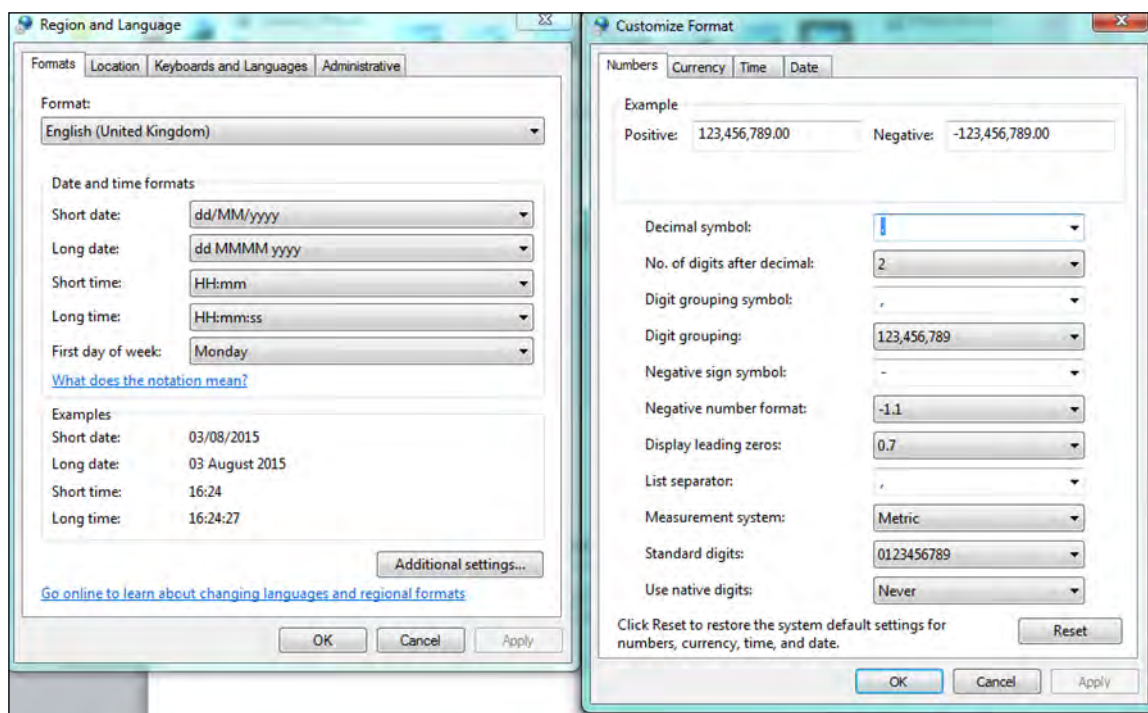
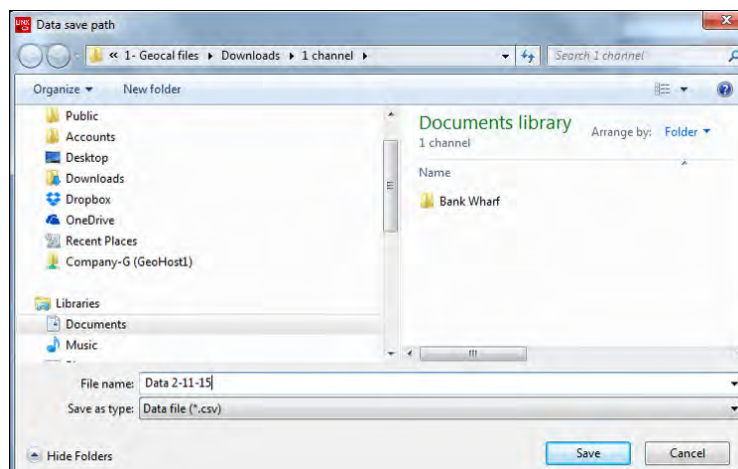


The downloading is confirmed by the horizontal blue bar filling from left to right, the red buttons flashing and the message **Data download packet**



## 6.9 Download & append data contd....

On completion of downloading the browser will open to allow you to select the location to save the data



The software creates CSV files. Both Engineering unit values or raw data units are available in the output CSV file if the VW Sensor conversion factors are set in the "Temperature Conversion" or in the "Vibrating Wire Conversion" group boxes of the "Sensor Config" tab. These factors can be imported from text files, read from the logger or manually filled in. See chapter 3 for more details. If the "Vibrating Wire Conversion" is set differently to "Digit", a "Digit" column will also be present in the CSV file.

The CSV file separator can be set in the dedicated group box. Comma or semicolon separators are available. Check in Control Panel, Regional and language options, for your operating system default settings. If the software and the Operating system settings match, the correct CSV file preview is shown while opening the file with Excel.

## 6.9 Download & append data contd....

|    | A                                     | B     | C    | D         | E         | F         | G         | H         | I         | J         | K         | L          | M       | N       | O       | P       | Q       | R       | S       | T | U | V | W | X | Y | Z | AA | AB |
|----|---------------------------------------|-------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|---------|---------|---------|---------|---------|---------|---------|---|---|---|---|---|---|---|----|----|
| 1  | GS4 fw v0.0.2                         |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 2  | 27/05/2015 11:03                      |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 3  | Vibrating Wire Conversion: Polynomial |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 4  | Temperature Conversion: Celsius       |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 5  |                                       |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 6  | Calibration Factors                   |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 7  | Sensormode                            |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 8  | Model                                 |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 9  | Serial                                |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 10 | Baro                                  |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 11 | TempCal                               |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 12 | UnitFactor                            |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 13 | ConstA                                |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 14 | ConstB                                |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 15 | ConstC                                |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 16 | ConstT                                |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 17 | Sweepmin                              |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 18 | Sweepmax                              |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 19 | Range                                 |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 20 | Thermistor                            |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 21 | ZeroRdg                               |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 22 | ZeroT                                 |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 23 |                                       |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 24 | Date/time                             |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 25 |                                       | Vbatt | Temp | Channel 1 | Channel 2 | Channel 3 | Channel 4 | Channel 5 | Channel 6 | Channel 7 | Channel 8 | CH1 Raw    | CH2 Raw | CH3 Raw | CH4 Raw | CH5 Raw | CH6 Raw | CH7 Raw | CH8 Raw |   |   |   |   |   |   |   |    |    |
| 26 | 27/05/2015 11:02                      | 4.7   | 24.5 | 1500.5    | 18.1 N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | 660.3 N.U. | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    |   |   |   |   |   |   |   |    |    |
| 27 | 27/05/2015 11:02                      | 4.6   | 24.4 | 1500.4    | 18.1 N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | 660.5 N.U. | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    |   |   |   |   |   |   |   |    |    |
| 28 | 27/05/2015 11:02                      | 4.5   | 24.4 | 1500.4    | 18.1 N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | N.U. N.U. | 660.5 N.U. | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    | N.U.    |   |   |   |   |   |   |   |    |    |
| 29 |                                       |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 30 |                                       |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |
| 31 |                                       |       |      |           |           |           |           |           |           |           |           |            |         |         |         |         |         |         |         |   |   |   |   |   |   |   |    |    |

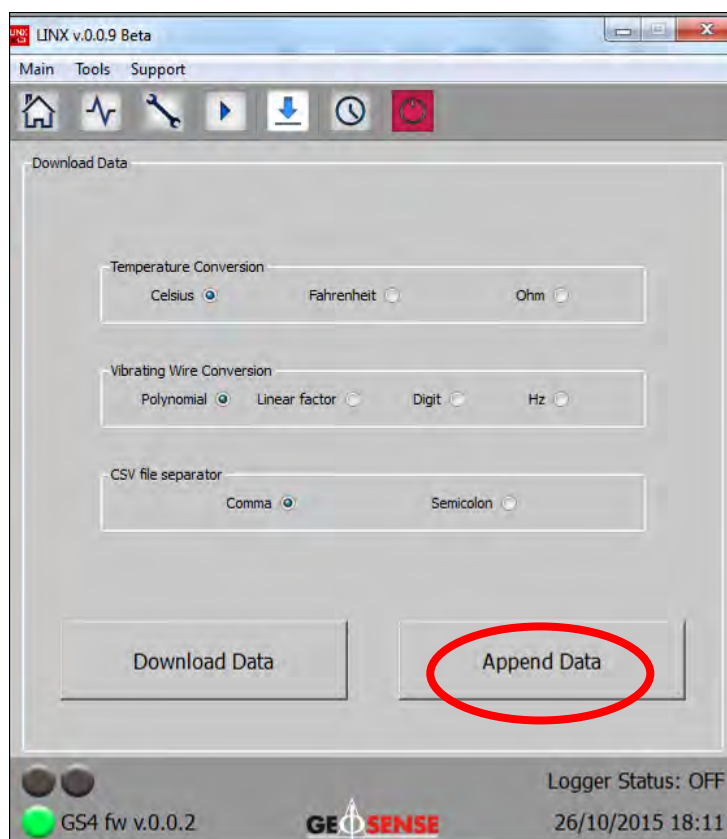
The data is presented as above

There is also a facility to Append all downloaded data to an existing file.

This can be useful if the memory has to be cleared.

### Select **Append Data**

On completion the browser will open to allow you to select the location to append the data as shown previously



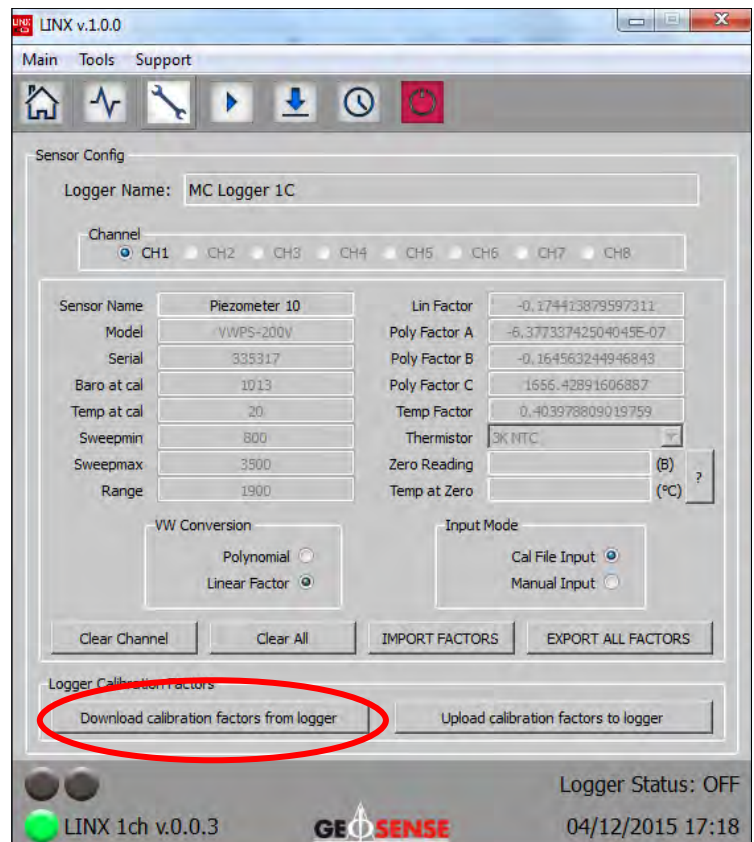
**EXISTING DATA WILL BE APPENDED AT THE END OF EXISTING DATA**  
**MULTIPLE APPENDS WILL RESULT IN DUPLICATE DATA**



### 6.9.1 Download calibration factors from logger

Please note the calibration factors are automatically downloaded from the logger however as a backup feature there is a facility to download all the calibration factors from the logger to the software on your PC.

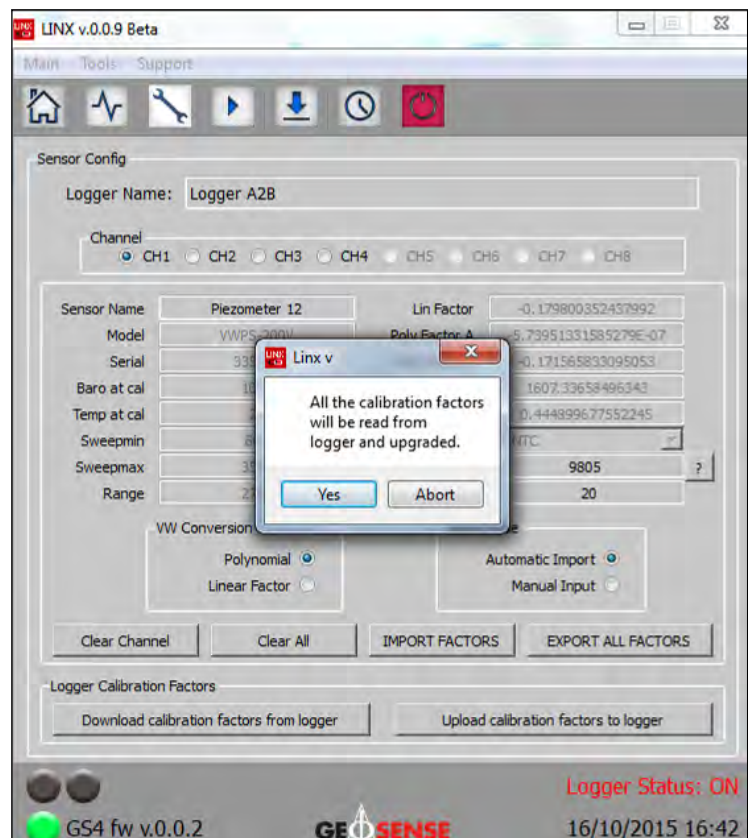
This can be useful where calibration factors are accidentally cleared.



At this stage you have the option to confirm or to cancel

To confirm select **YES**. All the entered data will then be uploaded to the logger

To cancel select **Abort**. This will take you back to the previous screen





## 7.0 MAINTENANCE

**The maintenance for Linx Loggers** is minimal for most applications but the following should be checked periodically:-

| ITEM            | ACTION   |
|-----------------|--|
| Enclosure       | Check for damage, water ingress                |
| Connections     | Check tightness                                |
| Internal cables | Check for loose connections                    |
| Battery         | Check voltage (replace if necessary)           |
| Firmware        | Check for latest version & upload if necessary |

### 7.1 Replacing the batteries

The following batteries can be used:-

- 4 x 1.5V C Alkaline cells which are rated for operating temperatures of -18 degrees to +55 degrees Celsius.
- 4 x 1.5V C Lithium cells which are rated for operating temperatures of -60 to +85 degrees Celsius.

The standard battery fitted is Alkaline which is suitable for most applications but in extreme cold conditions Lithium may be required for extended use.

Loosen the four screws in the lid and remove and replace all the batteries



**DO NOT OVERSTRETCH THE CONNECTING CABLE**



**WHEN FITTING BATTERIES ENSURE THE CORRECT POLARITY**



**DISPOSE OF ALL SPENT BATTERIES RESPONSIBLY**

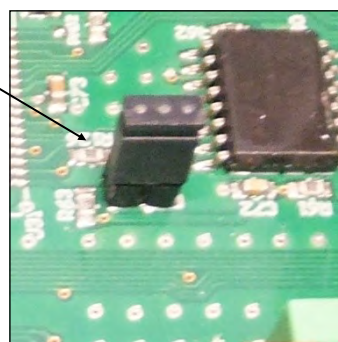
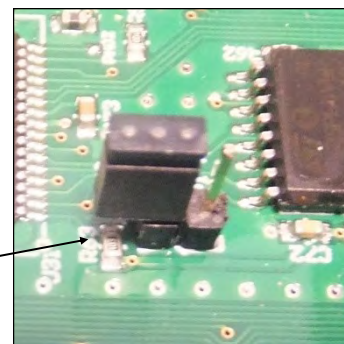
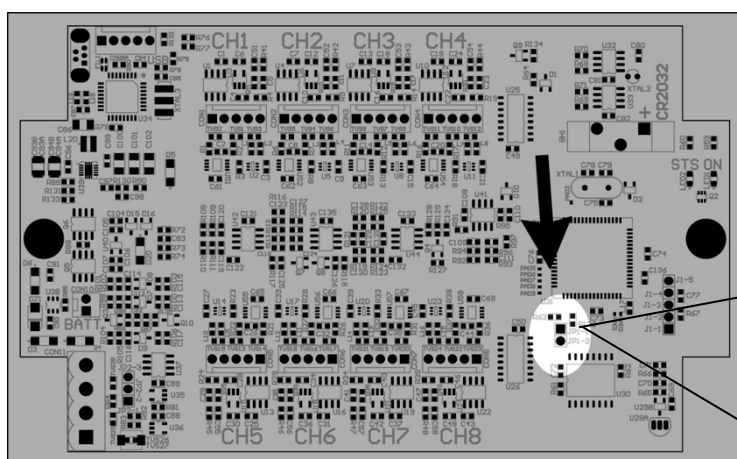
## 7.2 Updating firmware

As part of continual improvement updates to firmware may occur. Updates will be available from the website. We recommend you check periodically to see if you have the latest firmware installed. The version is shown on the **home page**.

In order to install new firmware:-

- Verify that you have installed the logger's drivers correctly
- Disconnect the USB cable if currently connected and/or Set logger status to OFF
- If you are using a laptop, make sure you have enough battery life for at least half an hour otherwise plug in the laptop into mains

A jumper plug is stored on the PCB (see below)



- Remove it from the single peg that it is normally stored on
- Replace it onto the two pegs
- Connect the logger to the PC using the USB cable. Ensure both the red and green LED's are ON
- Open the software



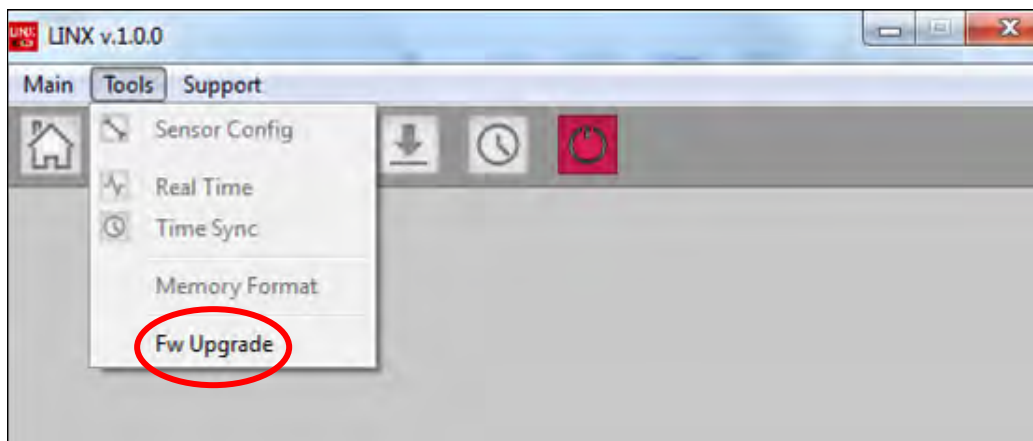
**DO NOT REMOVE THE JUMPER PLUG**

## 7.0 7.2 Updating firmware contd...

- The program will connect to the logger automatically. Once connected, confirmation will be given by the message **GS Bootloader** and the green light will illuminate. It is now safe to remove the jumper plug.



In the “Tools” menu, select “**Fw upgrade**” and then select the .hex file path of the desired upgrade supplied from Geosense.



Wait for the progress bar to finish. During this process the red and green LED's flash alternately, the red very fast and the green much slower.



**DO NOT DISCONNECT THE USB CABLE DURING THE PROCESS AND DO NOT USE THE SOFTWARE OR COMPUTER WHILE THE LIGHTS ARE FLASHING**

## 7.2 Updating firmware contd...

Once the progress bar has reached the end, the program will reconnect to the logger in standard working mode.

Once connected, check the Logger name and the version of updated firmware at the bottom-left hand corner.



## 7.3 Memory format

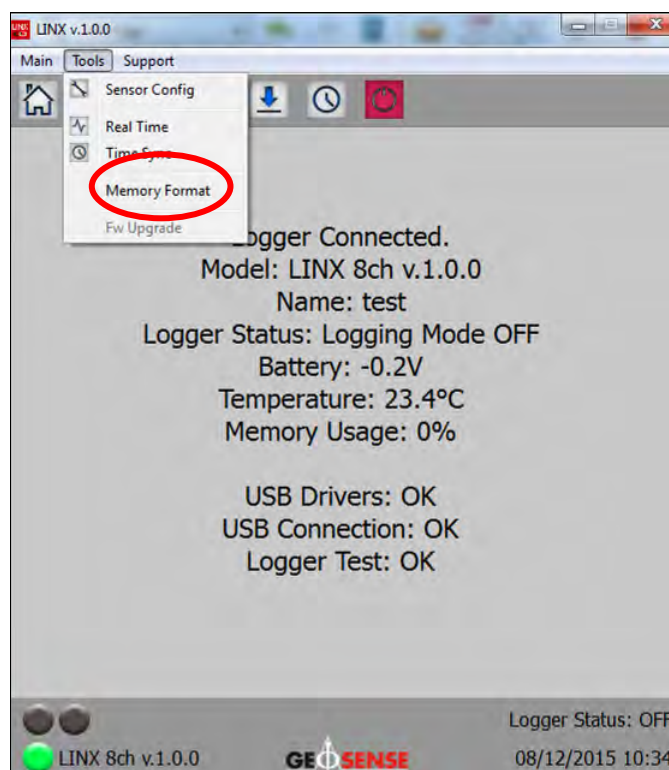
Once the firmware has been updated it is necessary to carry out a **Memory Format**



**IT IS RECOMMENDED TO DOWNLOAD ALL DATA BEFORE UPGRADING THE FIRMWARE AS THIS WILL DELETE ALL OLD AQUISITIONS**

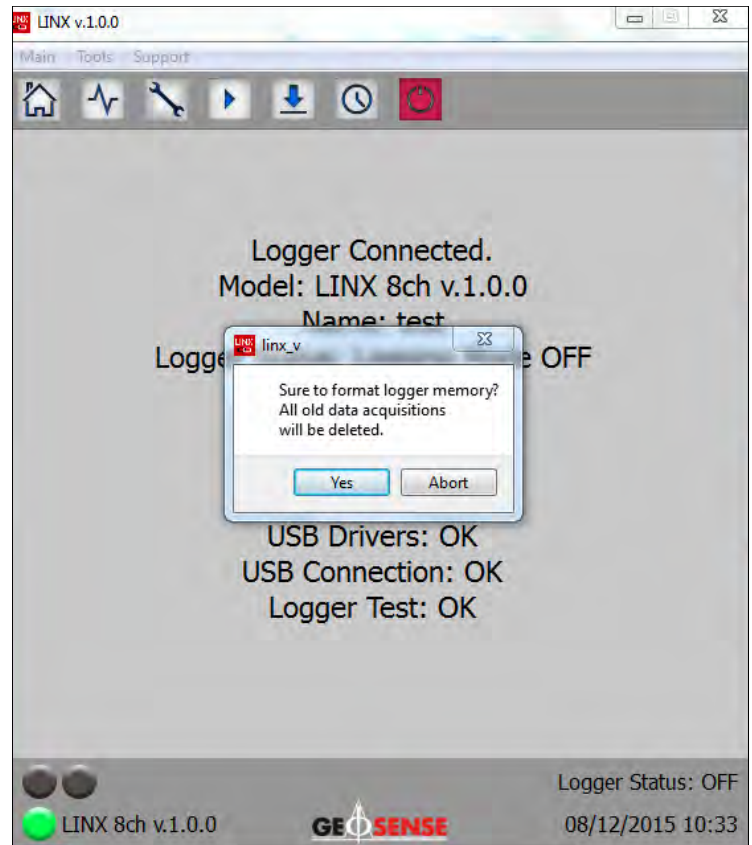
Remove the programming jumper plug from the two pegs and replace back onto one of the pegs.

Select **Memory Format** cycle



### 7.3 Memory format contd...

To upgrade the firmware select **Yes**

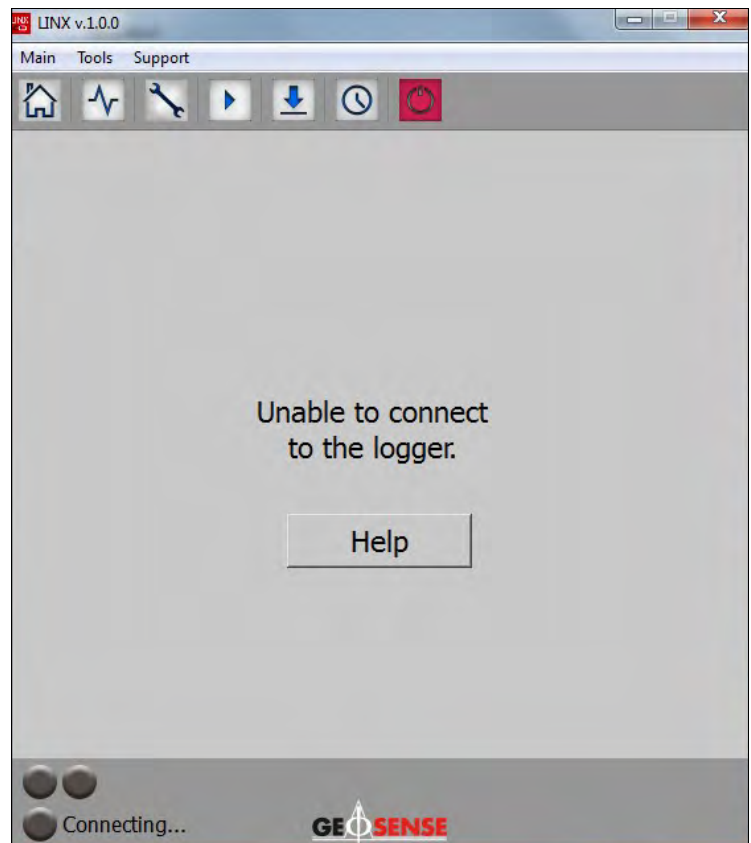




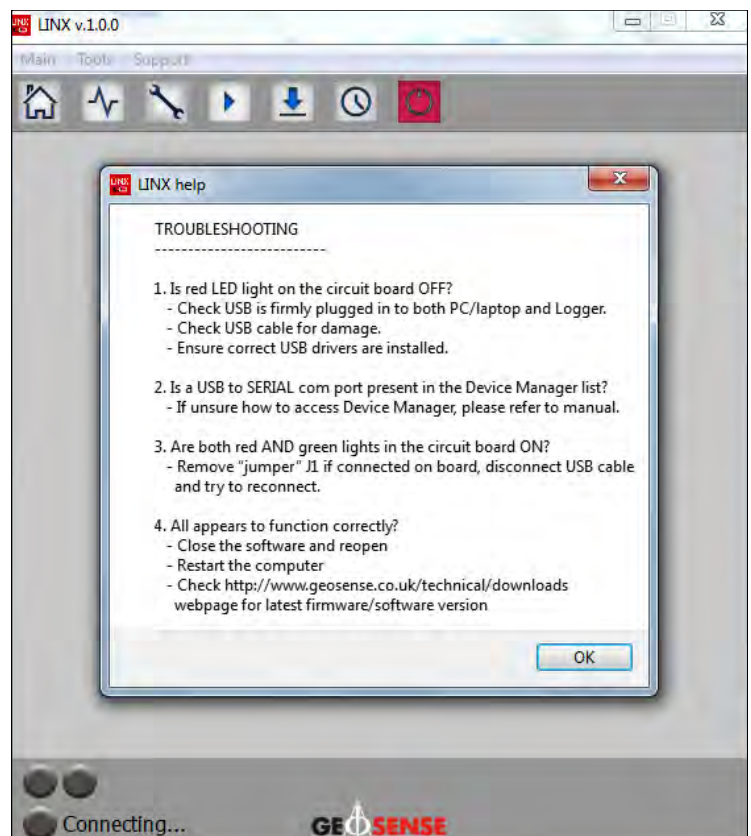
## 8.0 TROUBLESHOOTING

The Linx software contains a large amount of self help and Therefore the user should follow any help found within the software itself.

For any communication problems select the **Help** button which will offer various solutions to the problem.



If problems still arise please contact Geosense for further assistance.



## 9.0 SPECIFICATION

| MODEL                                  | LINX-1C                    | LINX-4C                    | LINX-8C                    |
|--|----------------------------|----------------------------|----------------------------|
| <b>Channels</b>                        | 1VW + 1NTC                 | 4 VW + 4 NTC               | 8VW + 8 NTC                |
| <b>Vibrating wire</b>                  |                            |                            |                            |
| Excitation                             | 0 - 5 V                    | 0 - 5 V                    | 0 - 5 V                    |
| Range                                  | 260 to 4800 Hz             | 260 to 4800 Hz             | 260 to 4800 Hz             |
| Resolution                             | 0.10 Hz                    | 0.10 Hz                    | 0.10 Hz                    |
| Accuracy*                              | 0.01% Full Scale           | 0.01% Full Scale           | 0.01% Full Scale           |
| <b>Thermistor</b>                      |                            |                            |                            |
| Range                                  | 1000 to 64000 Ohm          | 1000 to 64000 Ohm          | 1000 to 64000 Ohm          |
| Resolution                             | <4 ohm                     | <4 ohm                     | <4 ohm                     |
| Accuracy (25 °C)**                     | 0.3 °C                     | 0.3 °C                     | 0.3 °C                     |
| <b>Communication</b>                   |                            |                            |                            |
| Port                                   | Mini B USB                 | Mini B USB                 | Mini B USB                 |
| Software                               | Linx                       | Linx                       | Linx                       |
| Readout                                | Windows XP onwards         | Windows XP onwards         | Windows XP onwards         |
| <b>Data storage</b>                    |                            |                            |                            |
| Memory                                 | 8MB                        | 8MB                        | 8MB                        |
| Readings                               | up to 279,000              | up to 135,000              | up to 83,000               |
| On memory full                         | Overwrite old data or stop | Overwrite old data or stop | Overwrite old data or stop |
| Reading interval***                    | sec/min/hr/day/month/year  | sec/min/hr/day/month/year  | sec/min/hr/day/month/year  |
| Time format                            | Day/month/year; hr/min/sec | Day/month/year; hr/min/sec | Day/month/year; hr/min/sec |
| <b>Power</b>                           |                            |                            |                            |
| Voltage                                | 3-7Vdc                     | 3-7Vdc                     | 3-7Vdc                     |
| Standard battery                       | 4 x AA Alkaline            | 4 x Alkaline C             | 4 x Alkaline C             |
| (Lithium battery available on request) |                            |                            |                            |
| Battery life****                       | >8 years / 8 memory fill   | >5 years / 4 memory fills  | >5 years / 3 memory fills  |
| <b>Enclosure</b>                       |                            |                            |                            |
| Material                               | Cast aluminium             | Cast aluminium             | Cast aluminium             |
| Dimensions (L x W x H)                 | 160 x 100 x 80mm           | 160 x 100 x 80mm           | 160 x 100 x 80mm           |
| Rating                                 | IP66                       | IP66                       | IP66                       |
| Weight (with battery)                  | 1032g                      | 1280g                      | 1368g                      |
| Weight (without battery)               | 932g                       | 998g                       | 1086g                      |

\* Sensor dependent

\*\* Sensor & temperature dependent

\*\*\* Scheduled reading available

\*\*\*\* Depending on temperature and sampling interval



## 10.0 SPARE PARTS

The following components are available:-

| Part number | Description                  |
|-------------|------------------------------|
| Q22-011BP   | Battery - AA Alkaline 4 pack |
| Q22-012BP   | Battery - C Alkaline 4 pack  |
| Q35-507     | USB cable                    |
| Q12-087     | Dust cap                     |



## 11.0 RETURN OF GOODS

### 11.1 Returns procedure

If goods are to be returned for either service/repair or warranty, the customer should contact **Geosense®** for a **Returns Authorisation Number**, request a **Returned Equipment Report Form QF034** and, prior to shipment. Numbers must be clearly marked on the outside of the shipment.

Complete the **Returned Equipment Report Form QF034**, including as much detail as possible, and enclose it with the returned goods and a copy of the form should be faxed or emailed in advance to the factory.

### 11.2 Chargeable Service or Repairs Inspection & estimate

It is the policy of **Geosense®** that an estimate is provided to the customer prior to any repair being carried out. A set charge for inspecting the equipment and providing an estimate is also chargeable.

### 11.3 Warranty Claim (See Limited Warranty Conditions)

This covers defects which arise as a result of a failure in design or manufacturing. It is a condition of the warranty that the **Geosense® GeoLogger Linx** must be installed and used in accordance with the manufacturer's instructions and has not been subject to misuse.

In order to make a warranty claim, contact **Geosense®** and request a **Returned Equipment Report Form QF034**. Tick the warranty claim box and return the form with the goods as above. You will then be contacted and informed whether your warranty claim is valid.

### 11.4 Packaging and Carriage

All used goods shipped to the factory **must** be sealed inside a clean plastic bag and packed in a suitable carton. If the original packaging is not available, **Geosense®** should be contacted for advice. **Geosense®** will not be responsible for damage resulting from inadequate returns packaging or contamination under any circumstances.

### 11.5 Transport & Storage

All goods should be adequately packaged to prevent damage in transit or intermediate storage.





## 12.0 LIMITED WARRANTY

The manufacturer, Geosense Ltd, warrants the **Geosense® GeoLogger Linx** manufactured by it, under normal use and service, to be free from defects in material and workmanship under the following terms and conditions:-

Sufficient site data has been provided to **Geosense®** by the purchaser as regards the nature of the installation to allow **Geosense** confirm its suitability for use and that it shall be installed in accordance with the manufacturer's recommendations.

The equipment is warranted for 1 year from the date of shipment from the manufacturer to the purchaser.

The warranty is limited to replacement of part or parts which, are determined to be defective upon inspection at the factory. Shipment of defective part or parts to the factory shall be at the expense of the Purchaser. Return shipment of repaired/replaced part or parts covered by this warranty shall be at the expense of the Manufacturer.

Unauthorised alteration and/or repair by anyone which, causes failure of the unit or associated components will void this **LIMITED WARRANTY** in its entirety.

**The Purchaser warrants through the purchase of the Geosense® GeoLogger Linx equipment that he is familiar with the equipment and its proper use. In no event shall the manufacturer be liable for any injury, loss or damage, direct or consequential, special, incidental, indirect or punitive, arising out of the use of or inability to use the equipment sold to the Purchaser by the Manufacturer.**

The Purchaser assumes all risks and liability whatsoever in connection with the **Geosense® GeoLogger Linx** equipment from the time of delivery to Purchaser.



**NOTES:**



Nova House . Rougham Industrial Estate . Rougham . Bury St Edmunds . Suffolk . IP30 9ND . England .

**Tel: +44 (0) 1359 270457 . Fax: +44 (0) 1359 272860 . email: [info@geosense.co.uk](mailto:info@geosense.co.uk) . [www.geosense.co.uk](http://www.geosense.co.uk)**