

iLevel-GW

User Manual

Table of Contents

I	Disclaimer	3
II	Safety Instructions	4
III	Specific Safety Instructions	5
Part I	Introduction	6
Part II	Installation	7
2.1	Mechanics	7
2.2	Fitting into Measuring Tube	7
2.3	Fitting the Antenna	7
2.4	Fitting the SIM Card	7
2.5	Assembling and Changing Batteries	8
2.6	Initial Commissioning	8
Part III	Configuration	9
3.1	Functions / Settings	9
3.1.1	Setup	10
3.1.2	Service	10
3.1.3	Main Window	11
3.1.4	Parameters	12
3.1.5	Scale	13
3.1.6	More Buttons	13
3.2	GPRS / GSM Setup	14
3.3	Two Point Calibration	15
3.4	Tare	16
Part IV	Maintenance	17
4.1	HyQuest Solutions GP-Shell - local Software	17
4.2	Loggers	17
Part V	Repair	18
Part VI	Technical Data	19
Part VII	Obligations of the Operator and Disposal	20
7.1	Obligations of the Operator	20
7.2	Dismantling / Disposal	20
Part VIII	Appendices	22
8.1	FAQ - Frequently asked questions	22

I Disclaimer

The information provided in this manual was deemed accurate as of the publication date. However, updates to this information may have occurred.

This manual does not include all of the details of design, production, or variation of the equipment nor does it cover every possible situation which may arise during installation, operation or maintenance. HyQuest Solutions shall not be liable for any incidental, indirect, special or consequential damages whatsoever arising out of or related to this documentation and the information contained in it, even if HyQuest Solutions has been advised of the possibility of such damages.

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II Safety Instructions

- Read the user manual including all operating instructions prior to installing, connecting and powering up the HyQuest Solutions iLevel-GW. The manual provides information on how to operate the product. The manual is intended to be used by qualified personnel, i.e. personnel that have been adequately trained, are sufficiently familiar with installation, mounting, wiring, powering up and operation of the product.
 - Keep the user manual on hand for later reference!
 - If you encounter problems understanding the information in the manual (or part thereof), please consult the manufacturer or its appointed reseller for further support.
 - HyQuest Solutions iLevel-GW is intended to be used in hydrometeorological or environmental monitoring applications.
 - Before starting to work, you have to check the functioning and integrity of the system.
 - Check for visible defects on the iLevel-GW, this may or may not include any or all of the following mounting facilities, connectors and connections, mechanical parts, internal or external communication devices, power supplies or power supply lines, etc.
 - If defects are found that jeopardize the operational safety, work must be stopped. This is true for defects found before starting to work as well as for defects found while working.
 - Do not use the HyQuest Solutions iLevel-GW in areas where there is a danger of explosion.
 - The present user manual specifies environmental/climatic operating conditions as well as mechanical and electrical conditions. Installation, wiring, powering up and operating the HyQuest Solutions iLevel-GW must strictly comply with these specifications.
 - Perform maintenance only when tools or machinery are not in operation.
 - If guards are removed to perform maintenance, replace them immediately after servicing.
 - Never make any electrical or mechanical diagnostics, inspections or repairs under any circumstances. Return the product to the manufacturer's named repair centre. You can find information on how to return items for repair in the relevant section of the HyQuest Solutions website.
-  Disposal instructions: After taking the HyQuest Solutions iLevel-GW out of service, it must be disposed of in compliance with local waste and environmental regulations. The HyQuest Solutions iLevel-GW is never to be disposed in household waste!
-  Inputs and outputs of the device are protected against electric discharges and surges (so-called ESD). Do not touch any part of the electronic components! If you need to touch any part, please discharge yourself, i.e. by touching grounded metal parts.

III Specific Safety Instructions

- The manual provides information on how to operate the sensor system.
- HyQuest iLevel-GW is intended to be used in hydrological surveys, and more specifically to determine groundwater and surface water levels.
- Never use the the HyQuest Solutions iLevel-GW to transport people!
- Special caution is needed for all works and operations in the vicinity of water streams that may result in a risk of drowning. Work places must be equipped by the operator of the site with the required safety and rescue equipment (life vest, buoys, ropes, etc.).

1 Introduction

Thank you for choosing our product. We hope you will enjoy using the device.

HyQuest Solutions manufactures, sells, installs and operates quality instrumentation, data loggers and communication technology. Products are designed with passion for environmental monitoring and with a deep understanding of the quality, accuracy and robustness needed to fulfil the requirements of measurement practitioners in the field.

The present User Manual will help you understand, install and deploy the device. If, however, you feel that a particular information is missing, incomplete or confusing, please do not hesitate to contact us for further support!

iLevel-GW is an IP data logger designed for very low power data acquisition of level and temperature in groundwater and surface waters. The system can be easily expanded into a multi-channel monitoring device by adding optional sensors for water quality monitoring. By default, an iLevel-GW comes with a coupled water level and water temperature sensor accurate to 0.1 % FS. The vented pressure sensors auto-compensate for atmospheric pressure and temperature variations providing a corrected reading at all times.

iLevel-GW loggers are equipped with a 433 MHz near field radio interface for all local communications. The wireless technology allows to connect to an iLevel-GW installed in a borehole or other 2" pole without any need to remove or even touch the device.

At the time of order, users can choose from a series of distinct communication types:

1. 2G/GPRS (General Package Radio Service).
2. 3G/UMTS
3. 4G/LTE Cat M

All of these data communication methods use IP protocols to transmit data directly to the server via cellular network. Using that technology, it becomes possible to set up even large monitoring networks which can still be handled comfortably and require little maintenance. Furthermore, using the cellular networks is a cost-saving way to transfer the data, as it doesn't require any further hardware to be installed in the field.

Network time information is used to sync the internal clock of the data logger, allowing for perfect timing at all times.

2 Installation

This chapter contains the following subsections:

- [Mechanics](#) 
- [Fitting into Measuring Tube](#) 
- [Fitting the Antenna](#) 
- [Fitting the SIM Card](#) 
- [Assembling and Changing Batteries](#) 
- [Initial Commissioning](#) 

2.1 Mechanics

The housing consists of two V4A-steel casing pipes and a plastic fitting inside, in which the battery and the electronic system are located.

The joints and gaskets must not get dirty or damaged!

Prior to assembling the device, joints and gaskets must be checked and lubricated (silicone grease or O ring grease).

Attention: Don't use force!

Replace the desiccant (i.e. Silica gel®) as necessary. The desiccant bag is located at the cover panel of the electronics.

Important: Check the O-ring seal every time the device is reassembled. Any damaged seal must be replaced! Depending on which type of desiccant is used, the humidity should be not higher than 20%. Humidity above 20% might indicate broken seals. At a humidity higher than 50% the electronic is at risk! Advice: most of desiccants can be re-generated by drying at 120 °C...150 °C for 20 minutes.

2.2 Fitting into Measuring Tube

For installation in a 2" tube, the border of the cap of the data logger is placed on the edge of the tube.

To fit the logger into a 3" or 4" tube, an adapter ring is required. Adapter rings of 3" or larger have an opening for light plummet. The antennas are fitted individually: For underfloor installations underfloor antennas are available. Those are clamped between the frame and the lid.

Helical antennas are fitted onto the lid for above-floor measuring points. For fitting the antenna, the lid is pierced with an appropriate drill bit in the centre. Using that hole the antenna can be screwed onto the lid. Inside buildings, a stub antenna can be screwed onto the logger. Once the logger is fitted, a comparative measurement should be performed using a light plummet.

2.3 Fitting the Antenna

Note: The device comes with a standard GSM-plug (FME) for the antenna. Various antennas can be connected using the FME plug. Your cable may be brought out through a small hole or a small notch. It is recommended to mount the antenna on a metallic surface. When connecting the antenna, plug in the plug as far as possible for optimal contact. Please do not unnecessarily tighten the knurled screw. **Note:** In case of low signal strength a slight change of the antenna position can cause a significant improvement in signal strength (just a few cm). If the signal is too low at all, antennas with higher transmitting / receiving power or directional effect can be a good solution. We will be glad to help you finding the optimum antenna for your area!

2.4 Fitting the SIM Card

Important: To open the card holder, press your finger on the drawer slightly and push it in the direction which is marked "Push Open", so that the latch releases the drawer. To lock, simply press your finger on the drawer slightly again and push it in the other direction which is marked "Push Open" until the latch closes.

2.5 Assembling and Changing Batteries

Possible types of batteries are 2 mono-D-cells with 1.5 Volt or 1 lithium DD 35Ah with 3.6V.

Caution: To avoid damage, use appropriate batteries only!

To assemble the battery, remove the steel casing pipe which covers the battery compartment.

For this, twist off the ring nut and pull off the casing pipe.

Attention: Please mind the polarity of the batteries. Inserting the battery incorrectly may blow the fuse (which can only be repaired at the factory) or even damage the electronics.

The electronic comes with a backup capacitor which can compensate a power outage for a short time (i.e. during a battery change), so it doesn't lose data like date and time.

If the outage was too long, the device will reboot, which is indicated by the green LED blinking about 10 times. After that the device is ready to use. The time has to be synchronized again.

2.6 Initial Commissioning

Due to European law, devices will be shipped deenergized only. See [Assembling and Changing Batteries](#) on how to fit the batteries.

3 Configuration

The software HyQuest Solutions GP shell is used for local communication between a PC and the iLevel-GW data logger. For the communication, a 433 MHz radio link is used. Using HyQuest Solutions GP shell, the parameters of the logger can be configured and measured values are shown directly.

Please install the HyQuest Solutions GP shell before you connect the dongle to the PC for the first time! The drivers needed for the installation of the dongle are installed with the HyQuest Solutions GP shell.

Please use the supplied CD or download the latest version of the software from the customer homepage. Double-click the *. Exe file to start the installation. When the installation was successful, click "Exit Installation".

This chapter contains the following subsections:

- [Functions / Settings](#) 
- [GPRS / GSM Setup](#) 
- [Two Point Calibration](#) 
- [Tare](#) 

3.1 Functions / Settings

The start window of the shell is divided into 3 areas:

- Menu with buttons
- Main window with current information
- List of available loggers
- [Setup](#) 
- [Service](#) 
- [Main Window](#) 
- [Parameters](#) 
- [Scale](#) 
- [More Buttons](#) 

3.1.1 Setup

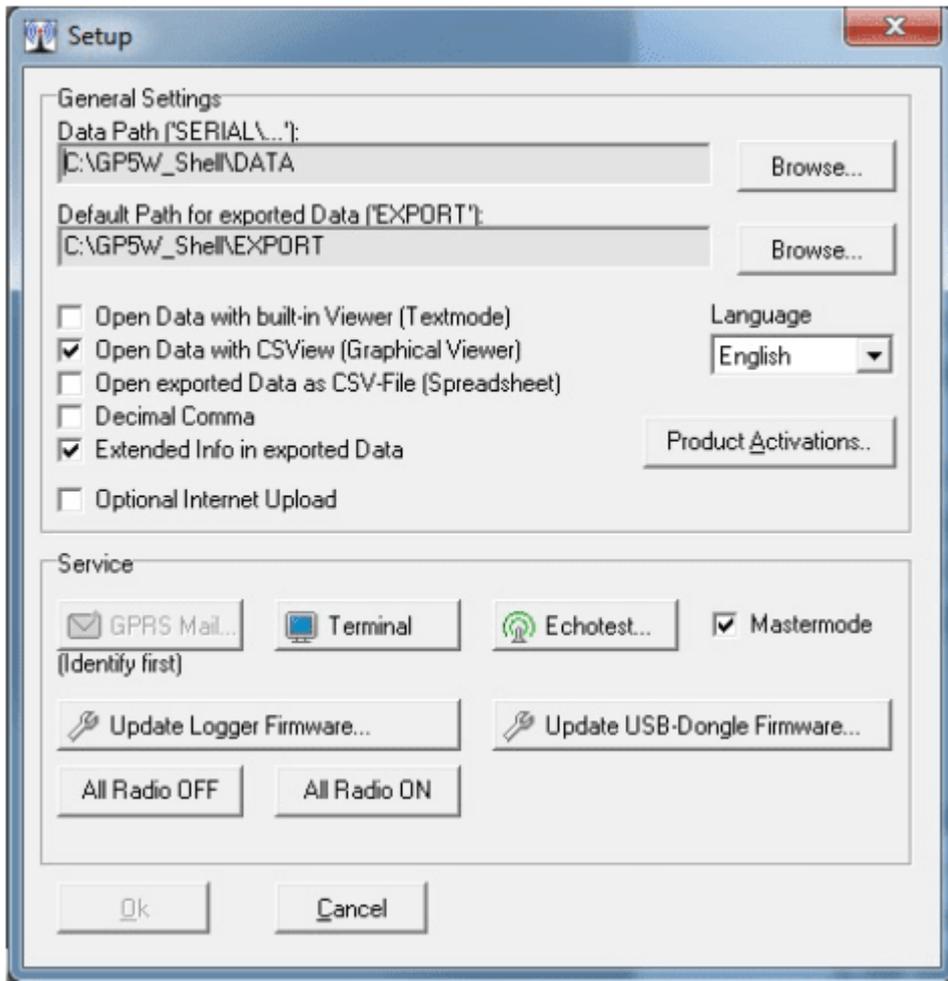


Figure 1 - Setup Dialogue: General Settings

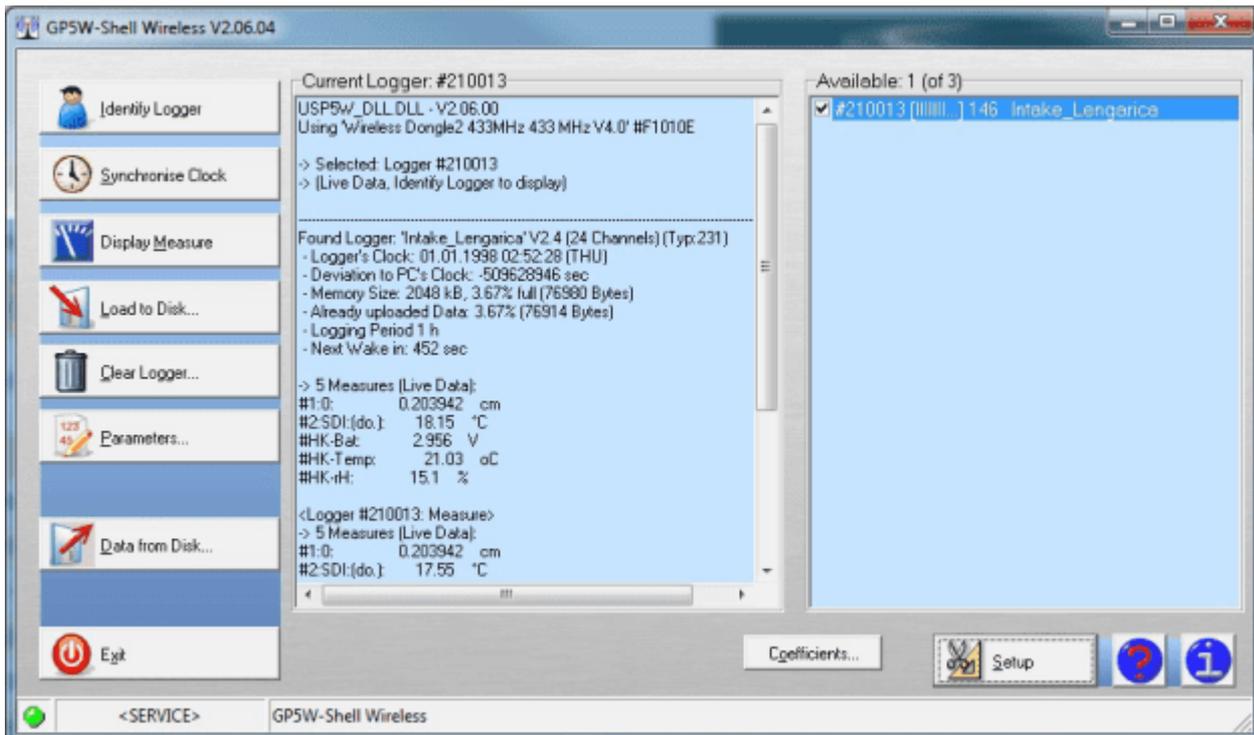
- **Data Path ('SERIAL'):** At this path, one folder for each new logger will be created. Each Folder will be named after the serial number of the logger. Parameters / Settings and all raw data will be saved in each folder.
- **Path for data export ('EXPORT'):** All exported data (i.e. MS Excel) will be stored to the folder entered in that field.
- **Open Data with built-in Viewer (Text mode):** The measured values will be shown as Text files.
- **Open Data with CSVies (Graphical Viewer):** The measured values will be shown as hydrograph and table.
- **Open exported Data as CSV-File (Spreadsheet):** The measured values will be shown as CSV File (Comma separated values).
- **Decimal Comma:** Use comma (,) as decimal separator when exporting data.
- **Extended Info in exported Data:** Check this option, if you want additional Information on actions (i.e. GPRS-transmissions, parameter adjustment) to be added to your export-file.
- **Optional Internet Upload:** Enabling this option, data from third-party loggers can be transmitted to the server.
- **Language:** Language for the user interface can be chosen from a drop-down menu.
- **Product activation:** Additional features can be activated by entering serial numbers. Further information on these features can be found in the feature's separate manuals.

3.1.2 Service

- **GPRS Mail:** By clicking this button, a test mail will be sent to the server in order to check the GPRS connection. The Logger has to be identified by the software before this option becomes available. Once the button is clicked, a terminal window shows all steps of the GPRS-transmission.
- **Terminal:** Opens a terminal window. The terminal mode offers the option of showing text output of the logger. This option can be useful for monitoring data transmissions to the server, as every step of the transmission will be listed. Under normal circumstances, this option will not be needed. As the data is not coming from HyQuest Solutions GP-Shell but directly from the logger, the language settings of GP-Shell will be ignored. The output will always be in English.

- **Echotest:** Clicking this button, the signal strength of the 433 MHz near field radio connection will be tested. Data packages will be sent, until the test is aborted manually by the user.
- **Update Logger Firmware:** Perform an update of the logger's firmware. After a security prompt, new firmware files can be selected and transferred to the logger. Please refer to the chapter "Updates" for further information.
- **Update USB-Dongle Firmware:** Perform an update of the USB-dongles firmware. After a security prompt, new firmware files can be selected and transferred to the USB-dongle. Please refer to the chapter "Updates" for further information.
- **All Radio OFF:** All loggers in range of the dongle will be set to 'flight mode', so they will not send any more data. **Important:** The loggers will also disappear from the list in GP-Shell.
- **All Radio ON:** All loggers in range of the dongle will be set from 'flight mode' back to 'normal mode'.

3.1.3 Main Window



- **Identify Logger:** Establishes a connection to a logger. To connect to a logger, select a logger from the list before clicking "Identify Logger".
- **Synchronize Clock:** Synchronizes logger time with time of the current system.
- **Display Measure:** Show current measurement values (status of logger and measured values of the activated measuring probe). The values measured when clicking this button will not be stored and not be transmitted to the server, but can be used for local calibration of data loggers.
- **Load to Disk:** Download measured values from the data logger to your local computer. You can choose between incremental download (only values that have not been transmitted to the server yet will be downloaded) and full download (all values stored on the logger will be downloaded). The local path for saving the data can be set in the setup menu (see [Setup](#) )
- **Attention:** If the modem of the logger is switched off, any data downloaded to your computer will be marked as sent and will not be transmitted during the next GPRS-transmission. In doing so, the loggers can be operated even without the use of the GPRS-connection.
- **Clear Logger:** By clicking this button, the whole memory of the logger will be cleared. (All measured data will be deleted!)
- **Parameters:** Opens a menu for configuring a logger. The logger must be identified first.
- **Data from Disk:** Open Files that have been downloaded to the local computer previously, i.e. measured values (i.e. *.g2p files).
- **Exit:** Closes the application.

3.1.4 Parameters

The screenshot shows a 'Parameter Form' window with the following sections and fields:

- Global Parameters for: #210436**
 - Period: 1 hr
 - Period Offset: 0 sec
 - Alarm Period: 0 sec
 - Name: fw_v5_Testlogger
 - Clock Adjust (sec): 0.0
 - Live-Mode: Always
 - Record:
 - HK-Counter: 6
 - Log HK: Supply Temperature Humidity
 - Parameter Set: 210436_20140331163708
 - GPRS/GSM Setup... button
- Sensor Power and Bus Settings**
 - Power Up Wait (msec): 1000
 - Sensor Min/Max (sec): 0 / 0
- Channel Parameters**
 - Channel: #1
 - Type: SDI-12 Pressure (STS)
 - Unit: m
 - ID: 0
 - Scale: Offset: -2.002626
 - Multi: -1.000000
 - Tare... button
 - Action: Log Channel
 - Alarm: Low: 0 m
 - High: 0 m
 - Check Alarms:
 - No Measure, use cached Values:
 - Index: 0
 - S.No.: 0
 - Cmd.: 0
 - OK button with a red-green-red vertical bar

Buttons at the bottom: Transfer, Cancel, Write Par..., Read Par...

- **Global Parameters:** The measuring time intervals are set here.
 - **Period:** Enter measuring interval. The minimum for this parameter is 1 minute for GPRS-transmission. If Monitoring on the site, a 2 second interval can be used in combination with the live mode (i.e. pumping tests) If the interval is set as min, sec or hour can be selected from the drop-down menu next to the field. If you set an interval of less than 1 minute, the program will refuse to transfer the parameters to the logger if the transmission intervals are too large to all data measured in the interval to be sent in a single transmission.
 - **Period-Offset:** From a period of 5 minutes or more, the logger automatically selects the first measurement, the next "modular" time, i.e. at a period of 1 h, this would be the next full hour. If for example a period of 12 hours is selected, the measurements would be made, at 0:00 and 12:00. With the "Period Offset" the time of measurement can be postponed. If an offset of 2 hours is selected for example, the measurements would be made at 2:00 am and 2:00 pm.
 - **Alarm period:** Interval of measurements in case of an alarm
 - **Name:** Custom name for each logger (for example, tag number, street name). **IMPORTANT:** The name cannot contain special characters.
 - **Live mode (Real-Time):** The live mode is used for continuous local transmission of data via radio to a receiver. When the real time mode is active, the device sends the currently measured data to the shell software which displays this data in the main window. This allows to monitor the water level in real-time, for example when changing water levels by pumping. The shortest possible measuring period is two seconds.
 - There are 3 modes for the live mode:

- **Intelligent:** Logger detects when a receiver is in range and then sends data automatically in the measuring interval set.
- **Always:** The logger will always send data, not matter whether there is a receiver in range or not. This setting requires continuous power!
- **Off:** The logger does not send any data.
- **HK-Counter:** Set transmission interval of internal self-monitoring values. 1 = with every normal transmission. 10 = with every 10th transmission. In case of alarm the self-monitoring values will be collected at each measurement.
- **Log HK:** Select, which self-monitoring values shall be collected. The following options can be selected: Supply (battery), temperature (Housing temperature) and humidity (Housing inside humidity).
- **Parameter Set:** Shows which set of parameters is currently selected and cannot be changed. The number contains the logger ID, year, month, day, hour, minute, second (e.g. 100012_20090812080050: Logger Nr 100012 _ 12. August 2009 at 08:00:50) The number is set every time parameters are sent to the logger.
- **GPRS / GSM Setup:** Opens the window for transmission and modem settings.
- **Channel Parameters:** Settings of the channel parameters can be changed here. Channel 1 is for the measurement of water level / tapping, channel 2 is for measuring the water temperature.
 - **# 1:** means channel 1 is selected. Switch the channel to be edited by clicking the arrow up / down buttons.
 - **Type:** indicates which value is measured in this channel and cannot be changed manually.
 - **Unit:** Choose the Unit to be measured.
 - **ID:** This parameter is intended to mark the measuring point, for example, in a database. As long as "0" is set, this value has no effect. Values from 1 to 65535 can be entered. The value entered here will be listed in the table headings of the exported data. Whether and how this information will be taken into consideration when importing the data is the responsibility of the importing software.
 - **Action:** Each action can be activated by checking.
 - **Log channel:** Measured data of this channel will be saved when this option is checked.
 - **Check alarms:** Check this option if you want to set special alarm events (e.g. shorter measuring and transmissions intervals).

3.1.5 Scale

- **Offset:** Offset (available if no pressure sensor is used for the water level): This value will be subtracted from the measured value (e.g. if the value should be displayed as height above sea level). **Note:** positive numbers are subtracted from the measured value, negative numbers are added!
- **Multi:** Default setting is 1.000000. If a minus (-) is set before the first digit, the value entered becomes negative. Use this to select whether water column or tapping should be measured. The adjustment value can also be calculated under the tare button. Furthermore, the density of the water can be set here. The value 1.000000 is calibrated for fresh water. Depending on the salinity, the value has to be reduced (i.e.: 3% salt content = 0.997000).
- **Tare:** Opens the tare window (see [Tare](#) .
- **Alarm:** If the thresholds entered here are exceeded or fallen below, the device will switch to alarm mode. High: If the measured value falls below the value entered here, the alarm is activated.
- **Low:** If the value entered here is reached or exceeded, the alarm is activated.
- **Power Up Wait:** warm-up time for the sensor (enter 1000 ms for PTM/N from STS)
- **Sensor min / max.:** Not required if a pressure sensor is used. If slower sensors are used, a period of time can be set for the measuring time. Settings depend on the sensor type.
- **Type:** Drop Down Menu. Choose between SDI (for general SDI sensors i.e. temperature), SDI12-Pressure (for the pressure channel of the iLevel-GW and wireless sensor (to connect more sensors via near field radio)
- **No measure, use cached values:** must be enabled if a sensor sends multiple values (i.e. pressure and temperature)
- **Index:** Numbers of sensor channels (i.e. pressure = 0 as first channel and temperature = 1 as second channel.
- **S.Nr.:** SDI 12 address of the selected sensor (default is 0)
- **Cmd.:** 0 means SDI command m!, which triggers measuring

3.1.6 More Buttons

- **Transfer:** Transfers the new Parameter Set to the logger.
- **Cancel:** Cancel without transferring the new parameter set to the logger.
- **Write Par...:** Save the new parameter set to the local computer without transferring it to the logger.
- **Read Par...:** Read a parameter set that has been saved to the local computer before.

3.2 GPRS / GSM Setup

- **General Settings**
 - **GSM/GPRS Mode:** Switch the modem on or off. By default, the modem is switched on.
 - **GSM PIN:** Enter the PIN of the SIM-card here, if required.
 - **Min. Temp (°C):** Enter the temperature until which the modem should remain active. The default is -10 °C for alkaline manganese batteries and -25 °C for lithium batteries. It is not recommended to enter temperatures lower than the default temperatures. If the temperature falls below the temperature entered here, the logger will keep measuring, but send the data not until the temperature exceeds the limit entered here.
 - **Allow Roaming:** When enabled, the modem is allowed to use foreign networks. When disabled, only the home network will be used. This option becomes important when the device is operated in regions close to the border.
 - **Stay online:** The modem will be operated continuously, so data can be sent every minute. **Attention:** This feature increases the power consumption!
 - **Verbose:** Show detailed information about the internet connection. Useful for finding connection errors.
 - **GSM period:** Set the transmission intervals in which the data is transmitted. The minimum for this setting is five minutes. Use the drop-down menu to switch between seconds, minutes and hours.
 - **GSM Offset:** Sets the time for the data transmission to the server. If, for example, the interval is set to 24 hours and the offset is set to 6 hours, a transfer is performed daily at 6 o'clock. If the interval is set to 12 hours and the offset to 6 hours, a transfer is performed at 6 o'clock and 18 o'clock.
 - **GSM alarm period:** Set the transmission intervals in which the data is transmitted in case of an alarm. The minimum for this setting is five minutes. Use the drop-down menu to switch between seconds, minutes and hours.
- **Network parameter**
 - **GPRS APN:** (Access Point Name) The GSM Access point provided by the GSM network provider.
 - **PPP-User and PPP-Password:** Also provided by the GSM provider. Can be left empty often.
 - **GPRS repeat:** By activating the check box the logger is allowed to repeat transmissions up to 3 times in case a transmission has failed. For different reasons, such as high network load, transmissions can fail from time to time. If this option is enabled, waiting for the repeated transmission and sending again, consumption battery power.

Therefore, it can make sense to disable the option. If disabled, the collected data will be transmitted during the next planned transmission.

- **Internet-Parameter**
 - **Internet Server:** Enter the address or the ip number if the server to which the data should be sent.
 - **Important:** Always enter the address without 'www' at the beginning. For example, enter sensor manager.net instead of www.sensormanager.net.
 - **Script:** Enter the location of the PHP script which receives the information on the server.
 - **E-MAIL Format:** When the data is transmitted to the sever, the server can send the data to an e-mail address. You can choose between plain text e-mails or html formatted e-mails. The data is attached to the e-mail either as a binary file or as a plain text file.
 - **E-MAIL address:** If you want to receive the data via e-mail, enter the e-mail dress to which the data should be sent here.
 - **GRPS Synchro.:** When enabled, the logger will synchronize its clock with the server every time a transmission is performed.
 - **Auto Delete:** When enabled, the logger will delete all logged data when 95% of the memory is used. This will happen only if all data has been transmitted successfully.
 - **GPRS Offset (sec):** Time difference between the logger and the server in seconds. The server's clock is mostly operated in GMT mode (Greenwich without summer time). When using a logger in another time zone (e.g. Berlin, Rome = GMT+1) the value to be added to the time must be entered here. For example, GMT+1 requires a value of 3600 seconds to be entered here.
- **Alarm Receiver**
 - **Alarm:** E-Mail Address #1 - #4: You can enter up to four e-mail addresses to which a mail will be sent in case if an alarm. **Important:** The alarm set here is performed by the logger via a script on the server.
 - **OK:** Confirm the new settings by pressing the OK button and then transfer it by clicking the Transfer button.
 - **Cancel:** Close the current dialog without saving any changes.

3.3 Two Point Calibration

Perform a linear calibration of a sensor. Therefore, 2 points need to be calibrated. The points can be calibrated one after one or both at on time.

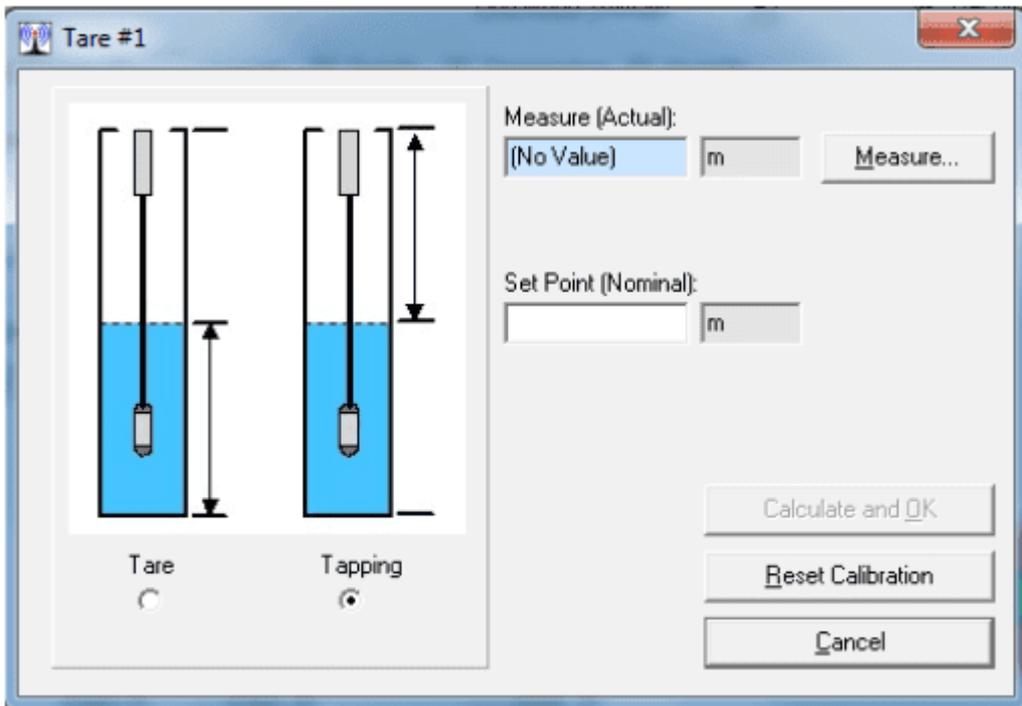
The screenshot shows a dialog box titled "Two Point Calibration #2". It contains the following fields and values:

- Y2 (nominal): 1.0000
- Y1 (nominal): 0.0000
- Scale: Offset: 0
- Multi: 1.000000
- X1 (actual): 0.0000
- X2 (actual): 1.0000

The dialog also features a graph with a red line and three buttons at the bottom: "Calculate and OK", "Reset Koefficients", and "Cancel".

- **Y1, Y2 (nominal):** Enter the measured value of the sensor
- **Y1, Y2 (actual):** Enter a measured value of a reference.
- **Calculate and OK:** Save the settings to the parameter set.
- **Reset Coefficients:** Restore the original parameters of the sensor.

3.4 Tare



Choose, if tare or tapping should be indicated

- **Measure (Actual):** If a current measured value is available, it will be shown here. If not, it will display "No value". In that case, the current value can be measured and displayed by clicking the button "Measure..."
- **Set Point (Nominal):** Enter the required current value. This can be a currently measured tapping or the water level taking the main sea level into account.
- **Calculate and OK:** If all settings are completed, click "Calculate and OK". The software now calculates the values for the data fields "Offset" and "Multi".
- **Reset calibration:** Set the values for Multi and Offset to the default settings (Offset = 0.00, Multi = 1.00)
- **Cancel:** Close the windows without changing any settings.

4 Maintenance

This chapter contains the following subsections:

- [HyQuest Solutions GP-Shell – local Software](#)^[17]
- [Loggers](#)^[17]

4.1 HyQuest Solutions GP-Shell – local Software

The software “HyQuest Solutions GP-Shell” does not require any maintenance by the customer. If an updated version is released.

4.2 Loggers

Our loggers only require very low maintenance. Do not use any sharp tool or any aggressive cleaning agent to clean the hardware. Replace batteries only if necessary. Do not open the battery case during wet weather conditions. Humidity can cause system failure.

5 Repair

HyQuest Solutions precision instruments and data loggers are produced in quality-controlled processes. All HyQuest Solutions production and assembly sites in Australia, New Zealand and Europe are ISO 90001 certified. All equipment is factory tested and/or factory calibrated before it is shipped to the client. This ensures that HyQuest Solutions products perform to their fullest capacity when delivered.

Despite HyQuest Solutions most rigorous quality assurance (QA), malfunction may occur within or outside of the warranty period. In rare cases, a product may not be delivered in accordance with your order.

In such cases HyQuest Solutions' return and repair policy applies. For you as a customer, this means the following:

1. Contact HyQuest Solutions using the Repair Request Form made available online:
https://cdn.hyquestsolutions.eu/fileadmin/Services/Downloads/HS-RepairRequestForm_EU.pdf
In response you will receive a reference number that must be referenced on all further correspondence and on the freight documents accompanying your return shipment.
2. Please provide as much information and/or clear instructions within the return paperwork. This will assist our test engineers with their diagnosis.
3. Please do not ship the goods prior to obtaining the reference number. HyQuest Solutions will not reject any equipment that arrives without reference number; however, it may take us longer to process.

Custom requirements for items sent to HyQuest Solutions for warranty or non-warranty repairs: Check with your national customs/tax authorities for details, processes and paperwork regarding tax exempt return of products. Typically, special custom tariff codes are available (such as HS Code = 9802.00) that verify the item is being returned for repair and has no commercial value. Please note that the customs invoice / dispatch documents should also clearly state: "Goods being returned to manufacturer for repair - No Commercial value". It is mandatory to have any returned goods accompanied by a commercial invoice on headed paper. HyQuest Solutions reserves the right to charge the customer for time spent rectifying incorrect customs documents.

Note: Please ensure that your goods are packed carefully and securely. Damage that occurs during transit is not covered by our warranty and may be chargeable.

6 Technical Data

Technical Specifications Data Logger

Input Channels	24 channels, high-resolution
Communications	<ul style="list-style-type: none"> ▪ Remote: GPRS, 2G or optionally 3G; bi-directional ▪ Local: 433 MHz, license-free ISM radio
Power Supply	<ul style="list-style-type: none"> ▪ Lithium batteries 3.6 V (up to 10 years of operation or up to 20.000 internet transfers and 200.000 data logs per unit) ▪ Optional: External 12 V solar panel power supply
Data Storage	<ul style="list-style-type: none"> ▪ Internal memory for up to 250k measurement entries, non-volatile ▪ Storage cycle: Freely-definable, minimum 2"
Material and Environmental Conditions	<ul style="list-style-type: none"> ▪ Enclosure: stainless steel, ABS ▪ Operating temperature range: <ul style="list-style-type: none"> ▪ Modem -30 °C to +85 °C ▪ Logger -40 °C to +85 °C
Dimensions: Diameter Ø, Length, Mass	48.5 mm Ø, 411.5 mm length, 1,5 kg (without sensor)
Conformity/Compliance	CE

Technical Specifications Sensor

Measuring Range	<ul style="list-style-type: none"> ▪ Temperature: -25 °C to 85 °C with accuracy $\leq \pm 0.3$ °C ▪ Pressure: 0 - 10 mH₂O with max. load 3 bar (further options on demand)
Resolution	Pressure 0.01 % FS; Water Temperature 0.05 °C
Material	<ul style="list-style-type: none"> ▪ Sensor: Stainless steel 316 L / 1.4435 (titanium (GR. 2) optional) ▪ Seals: Viton (EPDM or Kalrez optional) ▪ Cable: PUR (standard), PE (drinking water) or FEP (chemical resistant, Teflon-impregnated)
Dimensions: Diameter Ø, Length, Mass	Typically 24 mm Ø, 157 mm length, 200 g (without cable)
Conformity/Compliance	CE

7 Obligations of the Operator and Disposal

This chapter contains the following subsections:

- [Obligations of the Operator](#) ^[20]
- [Dismantling / Disposal](#) ^[20]

7.1 Obligations of the Operator

European Union

In the Single European Market it is the responsibility of the operator to ensure that the following legal regulations are observed and complied with: national implementation of the framework directive (89/391/EEC) and the associated individual directives, in particular 2009/104/EC, on minimum safety and health requirements for the use of work equipment by employees at work.

Worldwide

Regulations: If and where required, operating licences must be obtained by the operator. In addition, national or regional environmental protection requirements must be complied with, regardless of local legal provisions regarding the following topics:

- Occupational safety
- Product disposal

Connections: Local regulations for electrical installation and connections must be observed.

7.2 Dismantling / Disposal

When disposing of the units and their accessories, the applicable local regulations regarding environment, disposal and occupational safety must be observed.

Before dismantling

- Electrical Devices:
 - Switch off the units.
 - Disconnect electrical appliances from the power supply, regardless of whether the appliances are connected to the mains or to another power source.
- Mechanical devices:
 - Fix all loose components. Prevent the device from moving independently or unintentionally.
 - Loosen mechanical fastenings: Please note that appliances can be heavy and that loosening the fastenings may cause them to become mechanically unstable.

Disposal

Operators of old appliances must recycle them separately from unsorted municipal waste. This applies in particular to electrical waste and old electronic equipment.

Electrical waste and electronic equipment must not be disposed of as household waste!

Instead, these old appliances must be collected separately and disposed of via the local collection and return systems.

Integrated or provided batteries and accumulators must be separated from the appliances and disposed of at the

designated collection point. At the end of its service life, the lithium-ion battery must be disposed of according to legal provisions.

EU WEEE Directive

As players in the environmental market, KISTERS AG and HyQuest Solutions are committed to supporting efforts to avoid and recycle waste. Please consider:

- Avoidance before recycling!
- Recycling before disposal!



This symbol  indicates that the scrapping of the unit must be carried out in accordance with Directive 2012/19/EU. Please observe the local implementation of the directive and any accompanying or supplementary laws and regulations.

8 Appendices

8.1 FAQ – Frequently asked questions

Data Logger

- **If the housing is damaged:** Please contact the customer support and send in the device for maintenance.
- **The cable is damaged:** Please contact the customer support and send in the device for maintenance.
- **The inside humidity increases:**
 - If the humidity inside the device rises, the drying agent is used up. The bags of drying agent (bags of 2g Silica-Gel) should be replaced. The drying agent can be purchased from your local reseller or from a specialist shop.
 - If the humidity inside the device rises rapidly within a very short time, the hermetic sealing might be damaged. This can happen due to material expansion caused by big temperature difference. Please replace O-rings and cable couplings to avoid damage. Please contact the customer support.

HyQuest Solutions GP-Shell – local Software

- **Error message during installation:** No Interface 'Wireless Dongle' found
 - A USB Near Field Radio dongle is required by the software to start. Make sure the USB dongle is connected to your computer properly and start the software again.
- **Access code**
 - All loggers are protected with an access code which consists of four characters.
 - This code is delivered with the loggers and must be entered in GP Shell before a logger can be identified and accessed by the software.

Contact Data

Europe	HyQuest Solutions (KISTERS AG)	 +49 2408 9385 0
		 info@hyquestsolutions.eu
		 www.hyquestsolutions.eu
Australia	HyQuest Solutions Pty Ltd	 +612 9601 2022
		 sales@hyquestsolutions.com.au
		 www.hyquestsolutions.com.au
New Zealand	HyQuest Solutions NZ Ltd	 +64 7 857 0810
		 sales@hyquestsolutions.co.nz
		 www.hyquestsolutions.com.au
Latin America	HyQuest Solutions (KISTERS LATAM)	 +57 350 575 4079
		 sales-latam@hyquestsolutions.com
		 www.hyquestsolutions.es
North America	Hydrological Services America LLC (KISTERS Group)	 +1 561 459 4876
		 sales-hsa@kisters.net
		 www.hyquestsolutionsamerica.com

