HydroMet

User Manual

iLevel-GW

KISTERS
Empowering decisions of tomorrow

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Table of Contents

I	Disclaimer	3
II	Safety Instructions	4
III	Specific Safety Instructions	5
Part I	Scope of Delivery	6
Part II	Introduction	7
Part III	Installation	8
3.1	Mechanics	8
3.2	Fitting into Measuring Tube	8
3.3	Fitting the Antenna	8
3.4	Fitting the SIM Card	8
3.5	Assembling and Changing Batteries	9
3.6	Initial Commissioning	9
Part IV	Configuration	10
4.1	Functions / Settings	10
Part V	Operation	11
Part VI	Maintenance	12
6.1	HyComm - local configuration software	12
6.2	Loggers	12
Part VII	Troubleshooting	14
Part VIII	Repair	15
Part IX	Technical Data	16
Part X	Obligations of the Operator and Disposal	17
10.1	Obligations of the Operator	17
10.2	Dismantling / Disposal	17

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. KISTERS 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 KISTERS has been advised of the possibility of such damages.

Any errors found in any KISTERS product should be reported to KISTERS where every effort will be made to quickly resolve the problem.

This document is public.

II Safety Instructions

- Read the user manual including all operating instructions prior to installing, connecting and powering up the KISTERS 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.
- KISTERS 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 KISTERS 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 KISTERS 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 KISTERS website.
-  Disposal instructions: After taking the KISTERS iLevel-GW out of service, it must be disposed of in compliance with local waste and environmental regulations. The KISTERS 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.
- iLevel-GW is intended to be used in hydrological surveys, and more specifically to determine groundwater and surface water levels.
- 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 Scope of Delivery

iLevel-GW Tube Data Logger (IP data logger)

Optional if ordered with the iLevel-GW:

- Hydrostatic pressure sensor
- Antenna
- Batteries (pre-mounted)
  Note: Lithium batteries are classified as "dangerous goods". The additional overhead will subsequently have an impact on freight costs.

2 Introduction

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

KISTERS 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 (full-scale measurement range). 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 Bluetooth® near field radio interface for all local communications. Current generations of iLevel-GW use 4G/LTE Cat M for remote communication. FTP file transfer is possible.

Older models manufactured prior to 2024 can be equipped with either 2G/GPRS (General Package Radio Service) or 3G/UMTS.

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.

3 Installation

This chapter contains the following subsections:

- Mechanics 8
- Fitting into Measuring Tube 8
- Fitting the Antenna 8
- Fitting the SIM Card 8
- Assembling and Changing Batteries 9
- Initial Commissioning 9

3.1 Mechanics

The housing consists of two V4A-steel casing pipes and a synthetic 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). **Note**: Do no use force!

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

Note: 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.

3.2 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 plummets. 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.

3.3 Fitting the Antenna

The device features a standard FME plug. Ensure the antenna is fully connected and adjust its position slightly for optimal signal. For areas with low signal strength, consider using high-power antennas (while checking applicable regulations) or directional antennas.

Antennas should be installed based on their location: Please consult us for assistance in identifying a suitable antenna for your monitoring site.

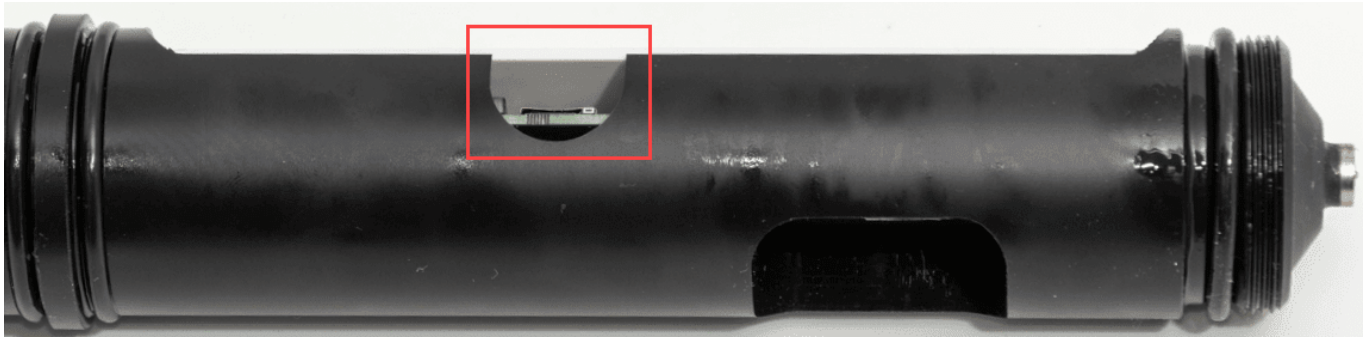
Note: We strongly recommend site visits to assess the quality and stability of network coverage at the installation height of the antenna. If network coverage is unstable or weak, the logger may consume excessive power due to frequent login attempts. A common solution is to position the antenna higher. High-gain antennas can be used but must comply with national/regional regulations, as antenna amplification is often limited; specifications will vary based on frequency range - refer to regulations for 4G/5G LTE Cat M.

3.4 Fitting the SIM Card

iLevel-GW IP Tube Data Loggers are equipped with a push-pull SIM card holder (also known as a friction-fit SIM card holder).

To access the SIM card holder, remove the top half of the metal shell. It is held in place by the removable top cap, which protects the antenna connector and provides an anchor ring for 2" pipe mounting. Unscrew the top cap and slide off the metal

shell. Rotate the open logger until the push-pull SIM card holder sits on top of the synthetic sensor body. You can now push the SIM into place. To remove the SIM, apply light pressure: the SIM can then be pulled out of the holder.



For models distributed before 2024

These legacy models use a SIM card holder with a latching mechanism, i.e., a slider that keeps the SIM in a defined position. These top-loader SIM card holders are located in the same part of the body in a larger cavity that provides direct access to the SIM card holder. 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.

3.5 Assembling and Changing Batteries

The battery compartment is located in the lower half of the sensor. To access it, the lower metal shell must be removed. This shell is secured by a cap that acts as a ring nut. By unscrewing the nut, you can slide the metal shell off the synthetic sensor body.

Possible types of batteries are 2 lithium mono-D-cells with 3.6 V dc. Only high current batteries are suitable - to provide the peak power required for data transmission. Example of a suitable battery: A tried and tested battery is the SAFT LSH 20. Batteries of this type are readily available from most electronics suppliers.

Caution: To avoid damage, use appropriate batteries only.

Note:

- Pay attention to the correct 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 two batteries are connected in parallel to increase capacity and extend battery life. The positive terminals of both batteries are aligned and connected to the same central conductor clamp.

The electronics are equipped with a backup capacitor that can compensate for a brief power outage (e.g. during a battery change), so that data such as the date and time won't be lost. If the power outage is too long, the unit will restart, which is indicated by the green LED flashing about 10 times. The unit is then ready for use. The time must be synchronized again.

3.6 Initial Commissioning

Due to European law, devices will be shipped de-energized only. See Assembling and Changing Batteries 9 on how to fit the batteries.

4 Configuration

The HyComm software is used for local communication between a PC and the iLevel-GW data logger. A Bluetooth® connection is used for communication. With HyComm it is possible to configure the parameters of the logger and display the measured values directly.

HyComm is described in a separate manual that can be downloaded here: HyComm User Manual

The HyComm user manual includes the following topics:

- Downloading Configuration Software
- HyCommunicator
- Connecting to the Device
- Device Overview
- Device Measurement Testing and Visualisation
- Device Integrations
- Device Configuration
- Saving and loading
- Configuration: General
- Configuration: Measurements
- Configuration: Transmission
- Configuration: Time and Date
- Configuration: Firmware Updates

4.1 Functions / Settings

Please refer to the HyComm user manual for details.

5 Operation

Connecting Sensors

The iLevel-GW data loggers are designed for use with SDI-12 sensors that comply with the SDI-12 standard. The sensors are connected internally.

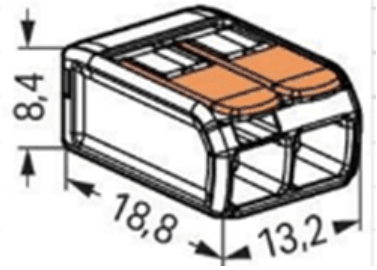
- **Low-Power Operation**: The iLevel-GW operates on two non-rechargeable lithium batteries. Ensure that connected sensors are low-power; those with high power demands may not be compatible.
- **No External Connections**: There are no external connections or terminations.
- **Internal Connections**: To access the connection terminals, open the bottom of the sensor housing. The connection splicing connector terminals feature levers for secure connections.
- **Cable Colour**: Refer to the provided table for cable colour identification.
- **3-Wire Connection**: Use a 3-wire connection for each sensor.
- **Cable Insertion**: Cables must be fed through the cable gland at the bottom of the unit.

Caution: Ensure that cable glands and the sensor housing are properly closed and secured to protect against moisture ingress.

SDI-12 - iLevel-GW

Pin #	Colour		Signal
	White		SDI-12 - 12V, out
	Yellow		SDI-12 - GND
	Green		SDI-12 DATA

Wago Splicing Connectors w/ levers



Starting Measurements

The iLevel-GW data loggers start measuring as soon as the batteries are inserted, powering the device.

- **User Settings**: Measurement parameters depend on user-defined settings (see Configuration 10 for details):
  - Scan rate
  - Log rate
  - Data transmission rate
- **Local Memory**: The iLevel-GW keeps a copy of the data in local memory, functioning as a ring buffer. When the memory is full, new incoming data will overwrite the oldest data.
- **Alarm Supervision**: The iLevel-GW can monitor alarm levels and issue alerts when a threshold is exceeded.

6 Maintenance

This chapter contains the following subsections:

- HyComm - local configuration software 12
- Loggers 12

6.1 HyComm – local configuration software

The software itself does not require any special maintenance. It is recommended that new updates are installed regularly to keep the software up to date.

6.2 Loggers

Our loggers require very little maintenance. Do not use sharp tools or harsh detergents to clean the hardware. Replace batteries only when necessary. Do not open the battery compartment in wet weather. Moisture can cause system failure.

Installation and Replacement of desiccant packs

If the data logger is deployed in humid conditions, replacement of the Silica gel desiccant packs is required. The self-monitoring data provides information about the moisture inside the logger housing. Steadily increasing moisture readings are a trigger for replacing the desiccant packs. If the humidity inside the unit increases, the desiccant will be depleted. It is recommended to replace the bags of desiccant (bags of 2 g Silica gel). The desiccant can be purchased from a local reseller or specialist shop.

Caution: Failure to replace the desiccant packs may result in moisture levels approaching saturation over time, which may result in electronic failure.

Check watertight sealing

In the event of a rapid increase in humidity over a short period of time, the hermetic seal may be compromised. This can be caused by material expansion due to large temperature changes. To prevent damage, it is advisable to replace the O-rings and cable couplings.

Lubrication of seals

To maintain a watertight seal, lubricate the joints each time the data logger body is opened and closed (changing batteries, inserting SIM card, etc.). Seals or O-rings are located at both ends of the synthetic sensor body and again in the centre next to the bar that separates the two parts of the body. The following picture shows the seals (black O-rings) at the lower end of the sensor body and two seals in the middle section.

Regular Inspections

- Check the physical condition of the data logger and its housing for any signs of damage or wear.
- Inspect the antenna and connections to ensure they are secure and free of corrosion.

Battery Maintenance

- Monitor battery levels regularly and replace batteries as needed to ensure uninterrupted operation.
- Follow proper procedures for battery replacement to avoid damage from incorrect polarity.

Data Retrieval

- Schedule routine data downloads to ensure data integrity and prevent loss.

- Backup data in multiple locations to safeguard against potential data loss.

Calibration Checks

- Perform regular calibration of sensors to maintain measurement accuracy.
- Follow manufacturer guidelines for calibration intervals and procedures.

Cleaning

- Keep the exterior of the data logger clean to prevent build-up of dirt and contaminants.
- Avoid using harsh chemicals; a soft cloth and mild detergent are usually sufficient.

Environmental Monitoring

- Assess environmental conditions around the data logger, such as water levels and potential sources of contamination.
- Ensure the installation site remains free of debris or obstructions that could affect performance.

Firmware Updates

- Check for and apply manufacturer-recommended firmware updates to improve functionality and security.
- Use HyComm software.

Site Visit Recommendations

- Conduct periodic site visits to evaluate the operational environment and network coverage.
- Address any issues related to signal strength or environmental changes that could impact data logging.

Documentation

- Maintain a log of all maintenance activities, including inspections, repairs, and calibrations.
- Document any changes to the monitoring site that may affect the data logger's performance.

Note: If you require further assistance, please contact customer support.

7 Troubleshooting

Data Logger

- **If the housing is damaged**: Please contact the customer support and send in the device for maintenance.
- **If the cable is damaged**: Please contact the customer support and send in the device for maintenance.
- **If 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.

8 Repair

KISTERS precision instruments and data loggers are produced in quality-controlled processes. All KISTERS 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 KISTERS products perform to their fullest capacity when delivered.

Despite KISTERS 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 KISTERS' return and repair policy applies. For you as a customer, this means the following:

- Contact KISTERS using the Repair Request Form and the Declaration of Contamination made available online:

Region (Language)	Download Link
Asia-Pacific (English)	Repair Request Form (APAC) Declaration of Contamination (APAC)
Europe, the Middle East and Africa (English)	Repair Request Form (EMEA) Declaration of Contamination (EMEA)
Germany (German)	Repair Request Form (DE) Declaration of Contamination (DE)

  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.
- Please provide as much information and/or clear instructions within the return paperwork. This will assist our test engineers with their diagnosis.
- Please do not ship the goods prior to obtaining the reference number. KISTERS will not reject any equipment that arrives without reference number; however, it may take us longer to process.

Custom requirements for items sent to KISTERS 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. KISTERS 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.

9 Technical Data

Technical Specifications Data Logger

Input Channels	SDI-12, 24 channels, high-resolution

Communications	▪ Remote:
	  ▪ 4G LET-M; bidirectional
	  ▪ FTP file transfer
	▪ Local: Bluetooth®
	Note: Older models used 3G UMTS and 433 MHz, licence-free ISM radio

Power Supply	▪ 2 × SAFT LSH20 lithium batteries 3.6 V, 13,500 mAh non-rechargeable (up to 10 years of operation or up to 20,000 internet transfers and 200,000 data logs per unit)
Data Storage	▪ Internal memory for up to 250k measurement entries, non-volatile ▪ Storage cycle: Freely-definable, minimum 2”

Material and Environmental Conditions	▪ Enclosure: stainless steel, ABS
	▪ Operating temperature range:
	  ▪ 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

10 Obligations of the Operator and Disposal

This chapter contains the following subsections:

- Obligations of the Operator 17
- Dismantling / Disposal 17

10.1 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.

10.2 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 is 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.

Contact Data

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KISTERS
Empowering decisions of tomorrow