

Ovarro LD Ltd User Manual

XiLOG 4G/IOT

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1.1	February 2024	Updated variant product descriptions

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Contents

1	Introduction	6
1.1	Overview	6
1.1.1	Sensor Options	6
1.1.2	Remote Configuration	6
1.1.3	Data Logging	6
1.1.4	Remote Data Viewing	7
1.1.5	Application Programming Interface (API)	7
1.1.6	Power Options	7
1.2	Models & Variants	7
1.2.1	XiLOG4G	7
1.2.2	XiLOGIOT	8
1.3	Features	8
1.4	Applications	9
2	System Components	10
2.1	Software Components	10
2.1.1	XiLOG GO	10
2.1.2	Atrium	11
3	Connectors	12
3.1	Quick Release Connector (Internal Pressure Transducer)	12
3.2	Analogue Input Connector (Pressure Sensors)	13
3.2.1	Millivolt Input	13
3.2.2	Voltage Input	13
3.2.3	Current Input	13
3.3	Digital Input Connector (Flow Sensors)	14
3.4	Antenna Connector	14
4	Installation	15
4.1	Introduction	15
4.2	Installing the SIM Card	15
4.3	Connecting Using Bluetooth Communications	16
4.4	Connecting External Sensors and Cables	16
4.5	Siting the Logger	16
4.6	Configuring/Programming the Logger	17
4.7	Testing Operation	17
5	XiLOG GO	18
5.1	About XiLOG GO	18
5.2	Compatibility	18
5.3	Setting Up Communications	18
5.4	Starting the XiLOG GO Mobile App	18

5.5	Initial Screen	19
5.6	Main Menu	20
5.7	Home Screen	21
5.8	Configure Channels - Site Screen	22
5.9	Configure Channels - Internal Pressure Screen	23
5.10	Configure Channels - Millivolt Screen	24
5.11	Configure Channels - Voltage Screen	25
5.12	Configure Channels - Current Screen	26
5.13	Configure Channels - Digital Screen	27
5.14	Configure Channels - Transmit Screen	28
Atrium		29
6.1	About Atrium	29
6.2	Compatibility	29
6.3	Setting Up Communications	29
6.4	Starting the Atrium Application Main	29
6.5	Screen	30
6.6	Other Atrium Screens and Functions	31
7	Maintenance and Troubleshooting	32
7.1	Care of Your Data Logger	32
7.2	Sensor Fitting and Replacement	32
7.3	Battery Replacement	32
7.4	Troubleshooting	32
8	Options & Upgrade	33
8.1	About Options	33
8.2	Updating the Firmware	33
8.3	Update Certificate	33
Appendix A – XiLOG 4G Technical Specification		34
Appendix B – XiLOG IOT Technical Specification		35
Appendix C – Lithium Battery		36
Appendix D – UKCA DoC		38
Appendix E – EU DoC		39
Index		40

1 Introduction

1.1 Overview

XiLOG is the name of Ovarro's advanced, robust and waterproof (to IP68) range of multi-channel data loggers designed for the water industry. They may be equipped with a wide variety of sensors for clean and wastewater network monitoring.

Configuration and setup of the data logger is performed remotely using Bluetooth and the XiLOG GO app for mobile phone or tablet. The specified status/measurement data is stored by the data logger and communicated wirelessly using either 4G or IOT modem to Primeweb, a cloud-based data collection solution for monitoring water network pressure, flow and leak location pinpointing.

1.1.1 Sensor Options

XiLOG may be fitted with analogue, digital and water pressure connectors to suit a wide range of flexible sensor options for collection of status and measurement data:

- **Flow** – analogue and/or digital input connectors may be fitted to enable flow sensors to measure uni-directional or bi-directional flow. Mechanical, ultrasonic and electromagnetic flow meters are supported.
- **Pressure** – single or dual input pressure connectors may be fitted with internal or external pressure transducers to enable water pressure to be measured at either side of a Pressure Reducing Valves (PRV), which reduces the water pressure coming into the home through the main water line and bringing it down to a safe level before the water reaches plumbing fixtures inside the home.
- **Depth** – analogue and/or digital input connectors may be connected to enable level sensors for open channels, rainfall, reservoirs, weirs, boreholes, pump events, pipelines, etc.

1.1.2 Remote Configuration

Configuration of the logger is achieved remotely and wirelessly using the XiLOG GO app on a smart phone or tablet via Bluetooth communications. This significantly reduces set-up times when installing new equipment and when re-configuring multiple loggers. The XiLOG GO app is available in Android and iOS versions.

1.1.3 Data Logging

The data logger provides a 4GB memory for storage of status/measurement data. Optional Cyclic logging allows data collection to continue indefinitely; the latest reading overwrites the oldest record when the memory is full.

Accurate measurements to +/-0.1% (of full scale) may be taken at intervals of 1 sec to 24 hours to suit a wide range of monitoring scenarios.

The data logger provides reporting of current and historic values, and reporting of real-time alarms direct to mobile or email to permit a quick response to emergency situations such as flooding.

1.1.4 Remote Data Viewing

Underground or external antennae options are available which, when combined with a 4G or IOT modem (with 3G / 2G fall-back), ensures secure and reliable communication of logger and leakage data to Atrium, a cloud-based data analytics platform for monitoring water network pressure, flow and leak location pinpointing.

1.1.5 Application Programming Interface (API)

Using the XiLOG API you can integrate your XiLOG with other systems, such as SCOPE SCADA, and securely send your logged data to your preferred data hosting platform.

1.1.6 Power Options

The XiLOG4G provides battery life of up to 5 years, which will be adequate for many installations.

The units are shipped powered up but with no logging active and the modem turned off.

1.2 Models & Variants

XiLOG is available as two models, which both perform the same basic functions.

1.2.1 XiLOG4G

The XiLOG4G comes with either a factory-fitted 4G SIM Card (with 3G/2G fallback) or users may install their own. It also provides Bluetooth communications, full integration in to Ovarro's Atrium data analytics platform and the ability to integrate in to other systems via API.

This model is designed for applications where there is no requirement for high-speed data connections or very long battery life.

Two variants are available:

- **VXG1.D1PI.20.4G** - 4G LTE CAT1 / 3G / 2G, Dual flow + internal pressure
- **VXG1.D2PA.20.4G** - 4G LTE CAT1 / 3G / 2G, Flow + dual pressure + analogue + 10V, 4-20mA inputs



Xilog4G

1.2.2 XiLOGIOT

The XiLOG IOT comes with NBloT / CATM1 modem (with 2G fallback) and Bluetooth communications, full integration in to Ovarro's Atrium data analytics platform and the ability to integrate in to other systems via API.

This model is specifically designed to meet the needs of commercial and industrial applications, being more robust and suitable for harsh environments with a longer battery life, high speed communications and better data retention and signal penetration.

Two variants are available:

- **VXG1.D1PI.20.IOT** - LTE CATM1/NBIOT/2G, Flow + pressure
- **VXG1.D2PA.20.IOT** - LTE CATM1/NBIOT/2G, Flow + dual pressure + analogue + 10V, 4-20mA inputs



XilogIOT

1.3 Features

The main operational features of the XiLOG data logger are summarised below. For a detailed specification of the XiLOG4G and XiLOGIOT, see *Appendix A and B* at the rear of this User Manual.

Main Features

- Fully submersible to IP68 (to depth of 1 metre)
- Highly tuned underground antenna, or external antenna options
- 4G LTE CAT1 /NB IOT/ 3G / 2G communications options
- Bluetooth local communications
- Robust
- Free licensed programming and data viewing software
- Data compatible with corporate software systems

Logging Features

- 1kHz pulse frequency
- Internal or external pressure transducer
- Auto-calibration (pressure offset)
- Accuracy +/-0.1%
- Current Inputs (Analogue) 0-10mA & 4-20mA
- Voltage Inputs (Analogue) 0-2V, 0-5V, 0-10V
- Logs average data at intervals from 1 second to 24 hours
- Minimum data transmission every 15 minutes
- Flexible wakeup regime allowing regular contact
- Choose preferred units of measurement
- Logs meter index value
- Logs all daily, maximum, minimum and average values
- Optional cyclic logging: allows data collection to continue indefinitely; the latest reading overwrites the oldest record once the memory is full
- Logs from all flow meters e.g. mechanical, ultrasonic and electromagnetic
- Logs bi-directional flow or uni-directional
- Merge combination meters into one data message
- Backward compatibility for sensors
- Choice of threshold alarms
- Logs directly from combination meters

Reporting Features

- Reporting of logged data
- Reporting of current values as required
- Real-time alarms direct to mobile or email
- Data transmission as often as every 15 minutes
- Accepts a variety of analogue inputs

1.4 Applications

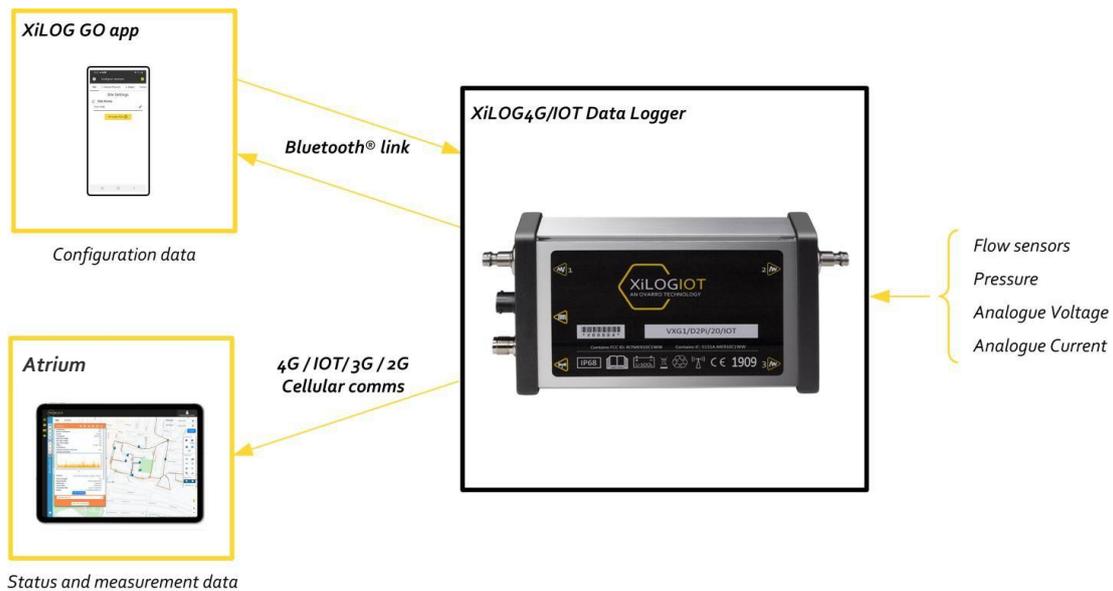
Typical applications for the XiLOG4G/IOT include:

- Network Analysis
- Domestic/commercial consumption
- DMA (zone) monitoring
- Leakage detection
- Flow monitoring
- Pressure management#
- Pipe pressure testing
- Pump monitoring
- Open channel flow
- Overflows
- Reservoir/borehole depths
- Rainfall
- River levels
- Temperature
- Current (mA)
- Voltage (mV and V)

2 System Components

2.1 Software Components

The XiLOG data logging system comprises three main components: the data logger (installed at site), the remote configuration software (XiLOG GO) and the remote data viewing/analysing platform (Atrium).



Software Components

2.1.1 XiLOG GO

The logger is configured using XiLOG GO, an Android/iOS app that runs on a mobile phone or tablet and communicates to the logger using in-built Bluetooth communications. The app provides menus and screens for configuring the logging of sensor inputs, alarm levels and the transmission of status/measurement data and set up of the cellular modem.

The XiLOG GO app enables configuration/indication of:

- Logger identification
- Site name/location
- Battery level
- Firmware updates
- Atrium certificate updates
- Pressure readings (name/units/logging interval/ ambient zero) + alarms (upper/lower/debounce/ deadband)
- Millivolt (name/units/logging interval) + sensor (units/max/mV at max)
- Voltage (name/units/logging interval) +sensor (units/max/voltage range)
- Current (name/units/logging interval) +sensor (units/max/min/mA at max/mA at min)
- Digital (name/units/calibration units/calibration/meter reading units/meter reading) + alarm (upper threshold/lower threshold/debounce/deadband)
- Transmit (enable/commissioning delay/transmit frequency/time) +SIM (APN/user name/password)

See *Section 5 XiLOG GO* for more information about setting up and using this app.

2.1.2 Atrium

Atrium is a cloud-based analytics solution for water network pressure, flow and leak location monitoring. This software allows real-time data collection of status/measurement data using 4G (with 3G/2G fallback) or IOT (with 2G fallback) modem. It displays water network hydraulic data plus leak alarms and correlated leak positions; all on one platform.

The Atrium application enables viewing/set-up of of:

- Logger identification
- Logger configuration data
- Historic sensor measurement/status data
- Table and charts
- Daily summaries
- Maps (logger location)
- User notes
- Alarms
- Email real-time alarm configuration

See *Section 6 Atrium* for more information about setting up and using this application.

3 Connectors

The XiLOG Data Logger has various connector options, cables and sensors that may be ordered. Sensors or cables supplied by Ovarro are factory-fitted with the appropriate connector.



XiLOG Data Logger Connectors

3.1 Quick Release Connector (Internal Pressure Transducer)

A male quick-release connector is fitted to loggers fitted with the internal pressure transducer option. This enables pressure measurements to be logged.

The integral pressure transducer range is 0-20 Bar.

Caution: Damage may occur if the transducer is subjected to pressures of more than 150% of its range. The zero point calibration of the transducer may change if the logger is subjected to shocks, but this offset can be compensated by recalibrating the logger.



Quick-Release Connector

A hose option with male and female connectors is available to connect the logger to a pressure monitoring point.

Caution: Care must be taken to avoid pressure shock when connecting to the transducer, as this can damage or destroy the sensing diaphragm.

Configuration of the connector is detailed in *Section 5.9 Configure Channels - Internal Pressure Screen*.

3.2 Analogue Input Connector (Pressure Sensors)

The 6-pin analogue input connector option provides connection to an external pressure sensor. It is a general input which may be configured for the measurement of millivolts, voltage or current.

Loggers fitted with this option are normally configured at the factory. Ovarro also provide external sensors, which are calibrated prior to installation.

Note: If the logger starts before the sensor is connected, no malfunction will occur but the data up to the time when the sensor was connected will be zero values.



Analogue Connector

3.2.1 Millivolt Input

The millivolt input option is normally fitted and configured at the factory by Ovarro.

The millivolt pressure sensor must be of a bridge type, producing a differential signal in the 15mV range. The sensor is powered from the logger via the connector and is of a piezo-electric type commonly found in liquid pressure measurement.

3.2.2 Voltage Input

The voltage input option is normally fitted and configured at the factory by Ovarro.

The voltage input has an input resistance of 47.5k Ω and a range set by the cable supplied with the unit. Voltage input range is nominally 0 - 2V DC. Voltages outside this range require a specific cable; standard voltage ranges available are 0 - 5V and 0 - 10V. The pressure sensor is powered from the logger via the connector.

Caution: Only the supplied cable should be used, or the calibration will be invalid. The physical input of the logger has a range of 0-2.50V and is overload protected.

Note: The logger produces 2.8V or 12.8V external power (factory configured) to power an external sensor for the voltage input. Power is only applied for short intervals during measurement. Frequent sampling will therefore cause higher drain on the internal battery.

3.2.3 Current Input

The current input option is normally fitted and configured at the factory by Ovarro.

The current input has input resistance of 100 Ω and requires a specific cable supplied with the unit. This is suitable for 0 - 10mA, 0 - 20mA and 4 - 20mA ranges. The pressure sensor is powered from the logger via the connector.

Caution: Exceeding the 20mA by more than 50% will cause damage to the logger.

Note: The external sensor can be powered from the logger, which applies power for short intervals. 20mA is a high drain on the internal battery, so external power should be considered.

3.3 Digital Input Connector (Flow Sensors)

The digital input connector option provides connection to an external flow sensor.

Note: If the logger starts before the sensor is connected, no malfunction will occur but the data up to the time when the sensor was connected will be zero values.



Digital Connector

3.4 Antenna Connector

The antenna connector provides connection to an external antenna for 4G/IOT communications.



Antenna Connector

4 Installation

4.1 Introduction

This section describes the XiLOG data logger installation and connection.



Installation of the XiLOG Data Logger should only be carried out by trained personnel familiar with the product and its function.

4.2 Installing the SIM Card

A SIM card must be installed in the XiLOG4G/IOT data logger to enable communications with the remote data viewing platform, Primeweb. Both XiLOG models can be supplied with a factory fitted SIM or you can install your own.

To install a SIM card:

1. Using a 2.5mm allen screwdriver, remove the four screws from the antenna connector end cap.
2. Carefully take off the end cap and set down next to the logger. Do not disconnect the cables and take care not to put excessive strain onto the internal wiring.
3. Slide the PCB out from the case along the grooves in the case holding it in position.
4. Install the SIM card into the holder.
5. Slide the PCB back into the case.
6. Replace the end cap and screws. Use a torque wrench to tighten the screws to the correct torque setting (0.8Nm).
7. Input SIM details (name, password and transmission parameters) into the **Transmit** screen of the XiLOG GO app, see *Section 5.14 Configure Channels - Transmit Screen*.



SIM Card Installation

4.3 Connecting Using Bluetooth Communications

Bluetooth communications is automatically enabled when the data logger is powered up. There is no configuration to do.

Bluetooth technology uses the 2.4GHz ISM spectrum band (2400 to 2483.5 MHz), which enables a good balance between range and data throughput.

The maximum range for Bluetooth communications is approximately 10m (30ft). Maximum communication range will vary depending on the presence of obstacles, people, walls or electromagnetic environment.

To connect the logger:

1. Start the XiLOG GO app (see *Section 5.4 Starting the XiLOG GO Mobile App* for details).
2. On the initial page, select the **Connect to Device** button.
3. The serial numbers of the data loggers within range will now be displayed.
4. Select the required logger by pressing on the serial number.

4.4 Connecting External Sensors and Cables

Installation of XiLOG is principally a matter of connecting the cables for the inputs:

1. Connecting the cables to the logger may be carried out in the vehicle prior to siting the logger, or may be done at the installation site (in "the pit").
2. Ensure that cable connections are clean and dry when attached.
3. A delay can be configured to allow time to connect cables and install the logger before transmitting data, if required. However, data transmission before connection presents no problems.

4.5 Siting the Logger

Site the logger at required location:

1. Check that the site has been prepared and that the installation of pipework has been completed in readiness for installation of the logger. Ensure that the cables will reach their intended connections.
2. Position the logger close to the required pipe location(s) that minimizes any possible ingress of water. This will usually be at the top-most or highest position possible. The logger is rated IP68 and can withstand periodic flooding but should not be installed in an area of permanent/frequent flooding or underwater.
3. Ensure that cable connections are clean and dry when attached.
4. Ensure the site is covered and left ready for use.

4.6 Configuring/Programming the Logger

Configuration of the data logger is achieved using the XiLOG GO app. For details of all the screens and menu options, see *Section 5 XiLOG GO*.

To configure the data logger:

1. Ensure you are connected to the logger using the XiLOG GO app.
2. Select the **Configure** button at the top of the screen.
3. Using the **Site** screen, enter a **Site Name** (or other identifier) for the location of the data logger in order that it can be identified using Primeweb. Ensure that the data logger is set to the correct time using the **Set Logger Time** button.
4. Configure your internal pressure transducer readings (if this option is fitted) and alarm settings.
5. Configure your external sensor input options (Millivolt/Voltage/Current/Digital) and alarm settings.
6. Configure your data transmissions parameters for communications to Atrium.
7. When you have finished specifying your configuration, commit the configuration to the logger by clicking the tick () the top of any of the **Configure channels** screens.

Your data logger should now be configured for operation.

4.7 Testing Operation

When the data logger is configured, check on Atrium that the new site name is displayed and that the measurement/status data is being transmitted.

For any queries about installation, please contact Ovarro Customer Support for further information.

5 XiLOG GO

5.1 About XiLOG GO

XiLOG GO is an app for configuring the XiLOG4G/IOT data logger remotely. Bluetooth communications is used to ensure reliable and secure communication with your data logger.

5.2 Compatibility

The XiLOG GO app runs on Android and iOS devices. The appearance of screen displays is similar on either platform. However, on a few very small screen devices text maybe truncated.

5.3 Setting Up Communications

The XiLOG GO app is used to configure data transmission from the data logger to Atrium. A SIM card must be installed in the data logger to enable data transmission to Atrium. SIM cards may be fitted at the factory by Ovarro or customers may choose to fit one themselves. See *Section 4.2 Installing the SIM Card* for details of how to install a SIM card.

5.4 Starting the XiLOG GO Mobile App

To start the XiLOG GO app:

1. Ensure the XiLOG GO app is installed on the mobile device to be used for configuring the data logger. The app may be downloaded and installed from the Play Store (Android) or the Apple Store (iOS).
2. Ensure Bluetooth is enabled on the mobile device.
3. Click on the XiLOG GO app icon (shown right) to open it.
4. Select the logger you wish to connect to from the list of serial numbers.
5. The initial screen will be displayed.



XiLOG GO Icon

5.5 Initial Screen

The initial screen is displayed when the XiLOG GO app icon is first pressed.

Menu and XiLOG Logo

At the top of the initial screen a main menu icon (☰) is displayed alongside the XiLOG logo. See *Section 5.6 Main Menu* for details of the main menu.

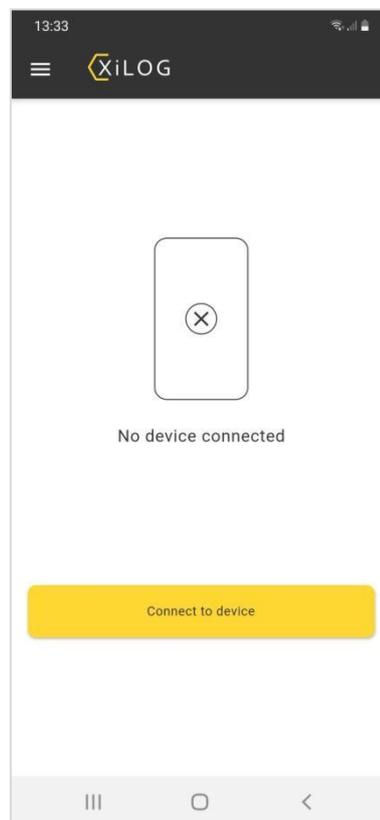
Device

The connected device (logger) is displayed in the center of the screen. Alternatively, **"No device connected"** is displayed if a connection has not yet been established between the mobile device and a data logger.

Connect to Device

Press the **Connect to Device** button to establish Bluetooth communications with a data logger.

When pressed, the serial numbers of the loggers within range are displayed. Click on the relevant serial number to establish communications.



XiLOG GO - Main Menu

5.6 Main Menu

The main menu enables disconnection to a data logger and displays firmware, certificate and version information.

Disconnect from Device

Disconnects the Bluetooth connection between the app and the logger.

Update Firmware

Selecting this will send the firmware file that is part of the app to the logger and restart the logger. The app will need to be re-connected to the logger once the unit has completed the update process. This procedure should only be carried out when directed by Ovarro.

Update Certificate

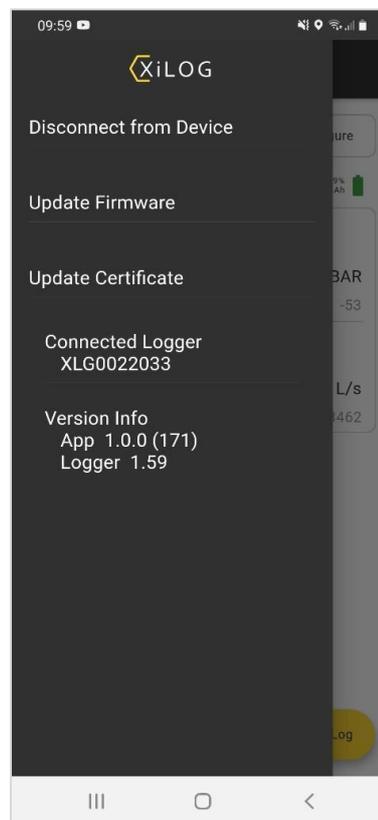
The logger uses secure https communications to Primeweb and this protocol requires a security certificate. These certificates last for many years but will occasionally need to be updated. If this is necessary a new certificate will be downloaded to the android app and you will be notified that the logger needs to be updated.

Connected Logger

Displays the serial number of the data logger the app is connected to.

Version Info

Displays the version numbers of the logger firmware and XiLOG GO app.



XiLOG GO - Main Menu

5.7 Home Screen

The **Home** screen displays the current values (continuously updated) monitored by the logger.

- **Configure** – Pressing this button displays the **Site** screen and the screen configuration menus, detailed in the following pages.
- **Battery Indication** – Displays approximate percentage charge remaining, and a value in mAh (milliamp hours). The starting value depends on the type of logger, some have different battery capacity.
- **Site Name** – The name of the site is set by the user (using the **Site** screen).
- **Internal Pressure, Digital, etc.** – The values/readings shown here for the site will depend on the site configuration (the image shown is for a basic configuration with internal pressure sensor and digital channels).
- **Latitude/Longitude** – Specifies the site location.
- **Disconnect from XiLog** – Pressing this button disconnects the logger from the XiLog GO mobile app.



XiLOG GO - Home Screen

5.8 Configure Channels - Site Screen

The **Site** screen enables you to select a site name and specify the logger time. Click the tick (✔) to commit configuration changes to the logger.

Screen Menus

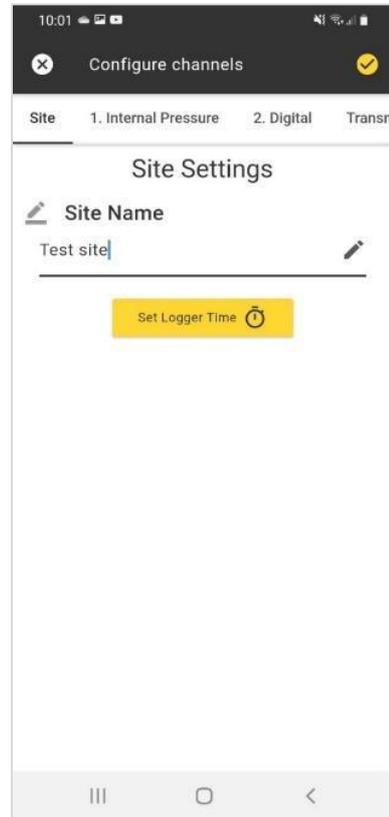
Several screen menu options are available across the top of the screen, depending on the connector options fitted.

Swipe horizontally and press to access these menus:

- Site
- Internal Pressure
- Millivolt
- Voltage
- Current
- Digital
- Transmit

Site Settings

- **Site Name** – Defines the site name for the data logger. When the new name for the site has been entered, press **Done** on the keypad.
- **Set Logger Time** – Specifies the time in order that accurate data is logged at the correct time.



XiLOG GO - Site Screen

5.9 Configure Channels - Internal Pressure Screen

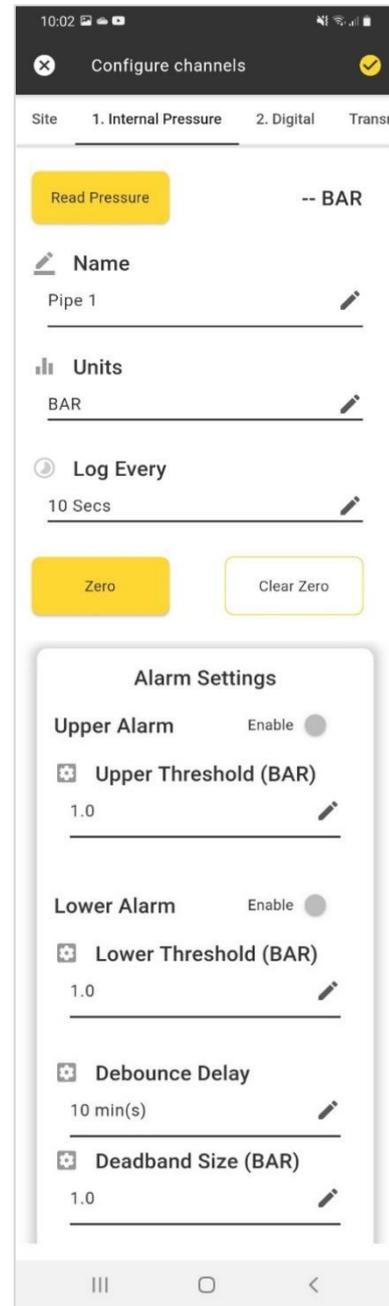
The **Internal Pressure** screen enables configuration of the internal pressure transducer readings and alarm thresholds. Click the tick (✔) to commit configuration changes to the logger.

- **Read Pressure** – If selected, displays the current pressure reading.
- **Name** – Defines name of the channel that will be displayed in Atrium.
- **Units** – Specifies the pressure units to be used (BAR or PSI).
- **Log Every** – Defines the required logging interval for pressure measurement data (1sec to 1 hour).
- **Zero** – If selected, will zero the ambient pressure offset for the sensor.
- **Clear Zero** – If selected, will revert the sensor offset to factory settings.

Alarm Settings

Alarms can be configured for the internal pressure sensor. If an alarm is triggered, the logger will send an alert to Primeweb immediately.

- **Upper Alarm Enable** – If selected, an alarm will be triggered if the pressure value goes above that specified by the **Upper Alarm Threshold**.
- **Upper Threshold (BAR)** – Defines the pressure value above which the alarm will be triggered.
- **Lower Alarm Enable** – If selected, an alarm will be triggered if the pressure value goes below that specified by the **Lower Alarm Threshold**.
- **Lower Threshold (BAR)** – Defines the pressure value below which the alarm will be triggered.
- **Debounce Delay** – Defines a configurable delay to prevent multiple alarms being triggered by a single event. A new alarm will not be triggered until the delay time has run out after the first alarm is triggered.
- **Deadband Size** – Defines the pressure value that must return to before an alarm is cleared.



XiLOG GO - Internal Pressure Screen

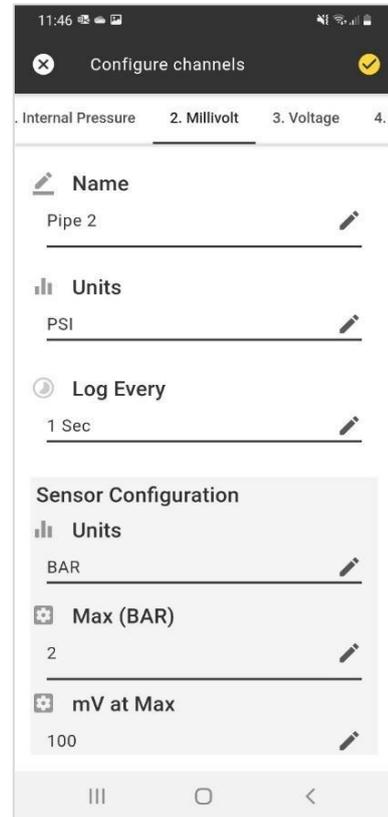
5.10 Configure Channels - Millivolt Screen

The **Millivolt** screen enables configuration of the analogue connector millivolt values corresponding to the external pressure sensor readings. Click the tick (✔) to commit configuration changes to the logger.

- **Name** – Defines name of the channel that will be displayed in Atrium.
- **Units** – Specifies the pressure units to be used (BAR or PSI).
- **Log Every** – Defines the required logging interval for pressure measurement data (1sec to 1 hour).

Sensor Configuration

- **Units** - Specifies the units for pressure (BAR or PSI).
- **Max (Bar)** – Specifies the maximum pressure measured by the sensor.
- **mV at max** – Specifies the voltage (in millivolts) at maximum pressure.



XiLOG GO - Millivolt Screen

5.11 Configure Channels - Voltage Screen

The **Voltage** screen enables configuration of the analogue connector voltage values and corresponding pressure sensor readings. Click the tick (✓) to commit configuration changes to the logger.

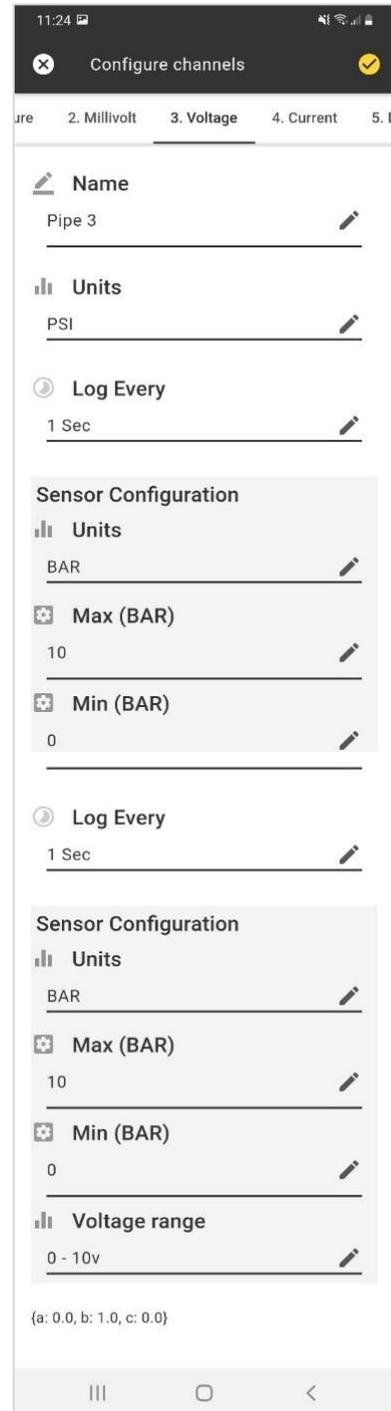
Caution: Only the supplied cable should be used, or the calibration will be invalid. The physical input of the logger has a range of 0-2.50V and is overload protected.

Note: The logger produces 2.8V or 12.8V external power (factory configured) to power an external sensor for the voltage input. Power is only applied for short intervals during measurement. Frequent sampling will therefore cause higher drain on the internal battery.

- **Name** – Defines name of the channel that will be displayed in Atrium.
- **Units** – Specifies the pressure units to be used (BAR or PSI).
- **Log Every** – Defines the required logging interval for pressure measurement data (1sec to 1 hour).

Sensor Configuration

- **Units** – Specifies the units for pressure (BAR or PSI).
- **Max (BAR)** – Specifies the maximum pressure measured by the sensor.
- **Min (BAR)** – Specifies the minimum pressure measured by the sensor.
- **Voltage range** – Specifies the voltage range of the sensor (0-2V, 0-5V, 0-10V). The voltage input has an input resistance of 47.5kΩ and a range set by the cable supplied with the unit.



XiLOG GO - Voltage Screen

5.12 Configure Channels - Current Screen

The **Current** screen enables configuration of the analogue connector current values and corresponding pressure sensor readings. Click the tick (✓) to commit configuration changes to the logger.

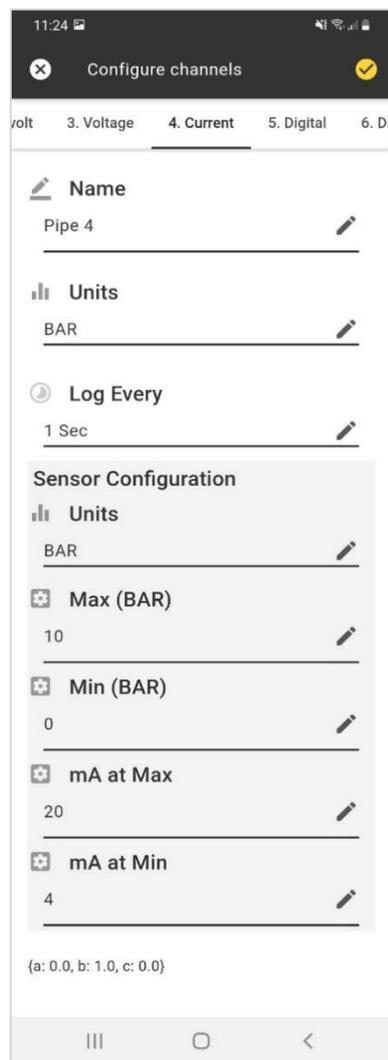
Caution: Exceeding the 20mA range by more than 50% will cause damage to the logger.

Note: The external sensor can be powered from the logger, which applies power for short intervals. 20mA is a high drain on the internal battery, so external power should be considered.

- **Name** – Defines name of the channel that will be displayed in Atrium.
- **Units** – Specifies the pressure units to be used (BAR or PSI).
- **Log Every** – Defines the required logging interval for pressure measurement data (1sec to 1 hour).

Sensor Configuration

- **Units** – Specifies the units for pressure (BAR or PSI).
- **Max (BAR)** – Specifies the maximum pressure measured by the sensor.
- **Min (BAR)** – Specifies the minimum pressure measured by the sensor.
- **mA at Max** – Specifies the current of the sensor in mA at maximum pressure.
- **mA at Min** – Specifies the current of the sensor in mA at minimum pressure.



XiLOG GO - Current Screen

5.13 Configure Channels - Digital Screen

The **Digital** screen enables configuration and calibration of the digital flow channels and configuration of upper and lower alarm thresholds. Click the tick (✓) to commit configuration changes to the logger.

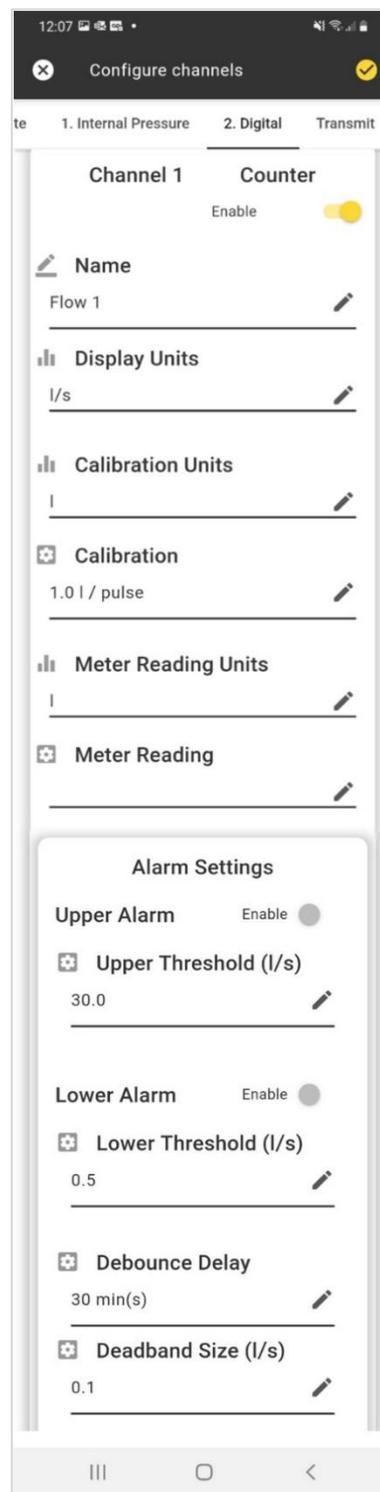
Channel 1 or 2

- **Enable** – If selected, enables the channel to be configured and measured.
- **Name** – Defines name of the channel that will be displayed in Atrium.
- **Display Units** – Defines the units of the flow channel.
- **Calibration Units** – Specifies the units the measured flow channel is calibrated in (e.g. Litres).
- **Calibration** – Defines the volume represented by each pulse from the flow sensor.
- **Meter Reading Units** – Defines the units the measured flow channel meter reading (e.g. Litres), if a flow meter (or totaliser) is required rather than a flow rate.
- **Meter Reading** – Defines the starting figure for the meter reading.

Alarm Settings

Alarms can be configured for the flow channel. If an alarm condition is detected, the logger will send an alert to Primeweb immediately.

- **Upper Alarm Enable** – If selected, an alarm will be triggered if the flow value goes above that specified by the **Upper Alarm Threshold**.
- **Upper Alarm Threshold** – Defines the flow value (litres per second) above which the alarm will be triggered.
- **Lower Alarm Enable** – If selected, an alarm will be triggered if the flow value goes below that specified by the **Lower Alarm Threshold**.
- **Lower Alarm Threshold** – Defines the flow value (litres per second) below which the alarm will be triggered.
- **Debounce Delay** – Specifies the delay to prevent multiple alarms being triggered by a single event. A new alarm will not be triggered until the delay time has run out after the first alarm is triggered.
- **Deadband Size** – Defines the amount the flow value must return to before an alarm will cleared.



XiLOG GO - Digital Screen

5.14 Configure Channels - Transmit Screen

The **Transmit** screen enables configuration of regular, automatic data transmissions to Primeweb using the SIM card installed in the logger. Click the tick (✔) to commit configuration changes to the logger.

Enable Transmit

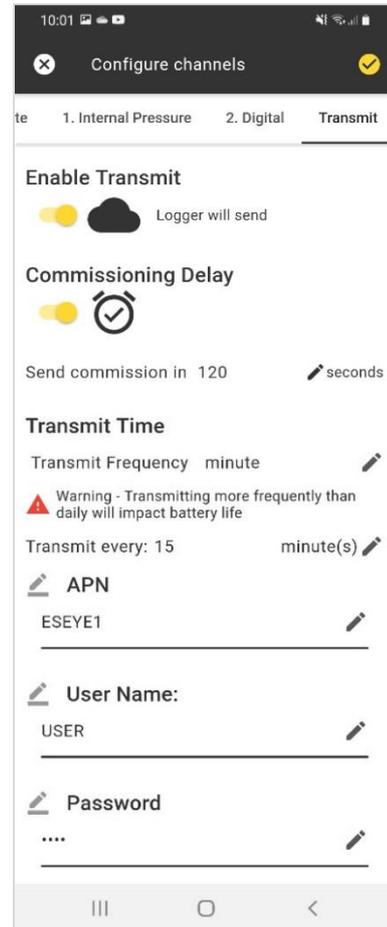
- **Enable switch** – When enabled, the logger will send measurement, status and configuration data to Atrium, as defined by the settings below.

Commissioning Delay

- **Enable switch** – When enabled, the logger will activate a delay in sending data to Atrium, as defined below.
- **Send commission in** – Defines the delay (in seconds) before the logger will send a data to Atrium. The logger will wait for the specified delay before sending data (including the configuration of the logger) to allow time for the unit to be installed in its final position.

Transmit Time

- **Transmit Frequency** – Specifies the transmission interval unit of time in (hour, minute, daily).
Note: Transmitting more frequently than 'daily' will affect the battery life of your logger.
- **Transmit every** – Specifies the time between transmissions from the logger to Atrium.
- **APN** – Defines the Access Point Name (APN) associated with the SIM card fitted in the logger.
- **User Name** – Defines the user name for the SIM card fitted in the logger (dependent on the SIM being fitted and specified as part of the SIM account).
- **Password** – Defines the password for the SIM card fitted in the logger (dependent on the SIM being fitted and specified as part of the SIM account).



XiLOG GO - Transmit Screen

6 Atrium

6.1 About Atrium

Atrium is a cloud-based data collection solution for monitoring water network pressure, flow and leak location pinpointing. This allows data processing and display of water network data, event alarms and correlated leak positions; received from a data logger. The data collected can be accessed anytime, anywhere enabling you to quickly identify problems such as exceptional usage, low pressure or increased leakage.

You can process data in Atrium to generate greater insight than from raw data alone. Atrium offers high security together with customised user access levels.

Data from the logger is uploaded to Atrium at the interval specified in the **Transmit** screen of the XiLOG Go app.

Features

- Identification of leak noise detection, leak positions and logger positions in Google Maps
- Daily updates for reduced leak run time
- Historical data to aid leakage management
- Alarm notifications
- Leak listening for confirmation of leak noise

Benefits

- The data collected is accessible on any device, anytime, via internet access
- Real-time data collection and display of water network hydraulic data
- Ability to monitor water networks on any browser via tablet or smartphone
- High cyber-security
- Customised user access levels

6.2 Compatibility

The Atrium application is displayed on a web browser (Windows, Android or iOS). The appearance of screen displays is similar on either platform. However, on a few very small screen devices text maybe truncated.

6.3 Setting Up Communications

The Atrium application is used to view and analyse data transmitted by XiLOG4G/IOT data loggers. A SIM card must be installed in the data logger to enable data transmission to Atrium. SIM cards may be fitted at the factory by Ovarro or customers may choose to fit one themselves. See *Section 4.2 Installing the SIM Card* for details of how to install a SIM card.

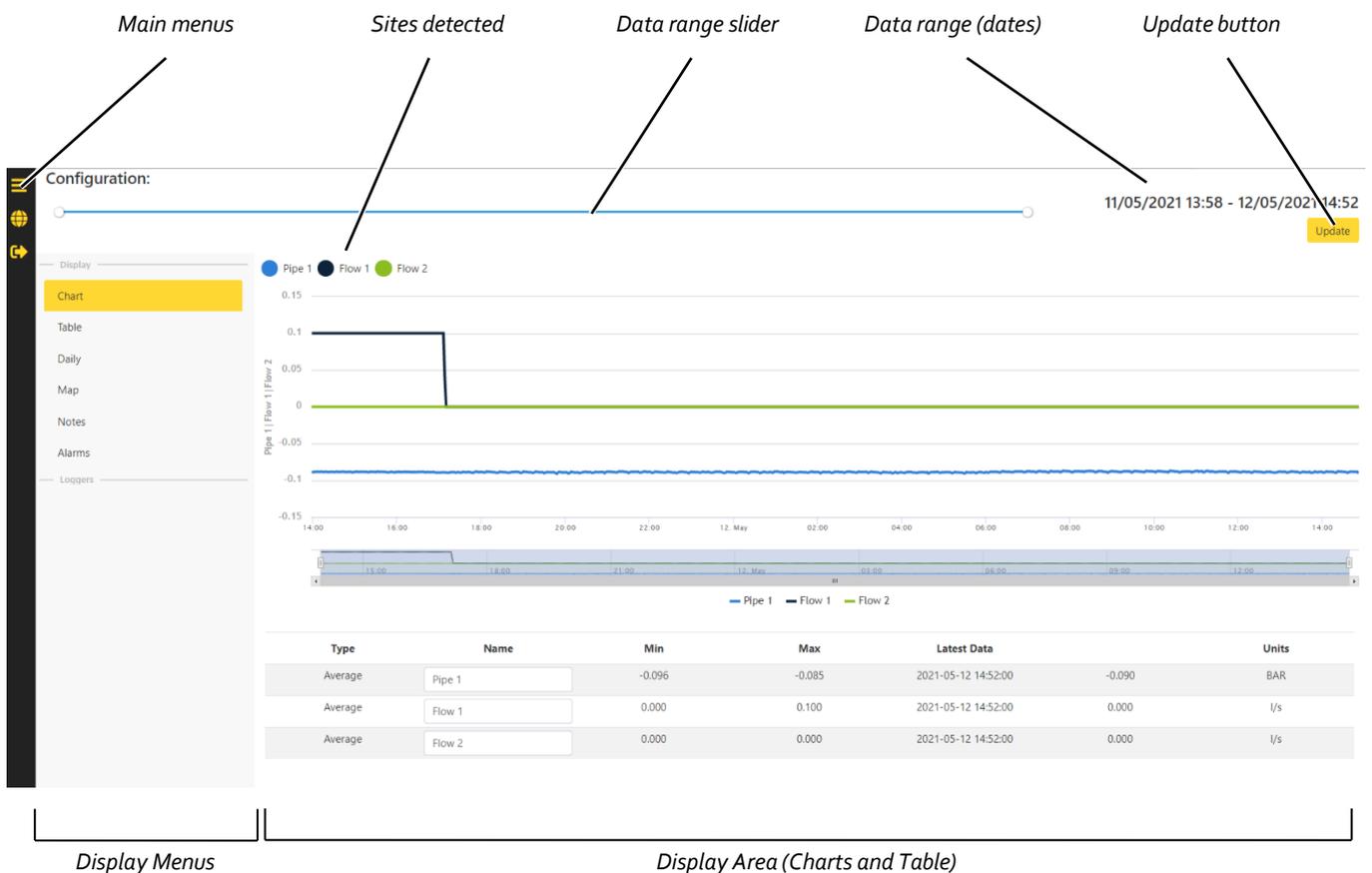
6.4 Starting the Atrium Application

Atrium is a web application and customers are given a link to access it in a web browser. Users will need to be registered to gain access. This will be setup when the customer buys a unit.

To start the Atrium application, follow the link to the web application then enter your username and password to gain access and display the main screen.

6.5 Main Screen

The main menu displays historic data for each logger and allows you to access analytical tools for monitoring of status/measurement data from each site.



Atrium - Main Screen

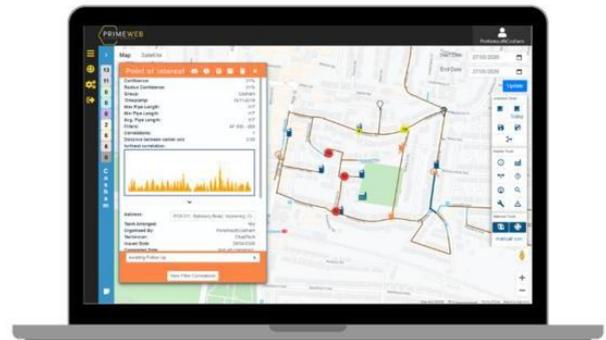
The Atrium main screen provides the following options:

- **Configuration** – Displays the site name specified by the XiLOG GO app. By default the data from the latest configuration is displayed. If older configurations are required, click on the configuration name and select from the drop-down list.
- **Data range slider** – By moving the circles at either end of the timeline, you can define the date range of the data to display on this screen. The corresponding data range dates are displayed on the top right-hand corner of the display area.
- **Chart** – If selected, a chart showing the active values for the date range selected will be displayed. Below the chart is a summary table of the same data
- **Table** – If selected, a table view is displayed of all logged values for the sites.
- **Daily** – If selected, a daily summary (min, max and totaliser for each measurement) for each logger is displayed.
- **Map** – If selected, displays the location of each logger on a map. Various tools are also displayed for monitoring.

- **Notes** – If selected, the display area enables notes to be added for the installation.
- **Alarms** – If selected, the display area of the screen displays any alarms that have been triggered on the logger. It also provides tools for configuration of email alerts triggered by alarms. The email address and the type of alarm (upper or lower) may be specified.

6.6 Other Atrium Screens and Functions

For details of the Atrium application and the menus, screens and tools available, see the *Atrium User Manual*.



Atrium - Maps

7 Maintenance and Troubleshooting

7.1 Care of Your Data Logger

Your data logger is designed to be installed in a dry environment although it provides significant protection against the ingress of dust, dirt and water (IP68). It is fully submersible to a depth of 1m fit enough to withstand dust, dirt and sand, and are resistant to submersion up to a maximum depth of 1m (3ft 3in) underwater for up to thirty minutes.

7.2 Sensor Fitting and Replacement

Sensors and cables may be fitted and replaced in the field by qualified service personnel. Please refer to the relevant manufacturer's manuals for information regarding care and replacement. Sensors and cables may be fitted and replaced while the logger is running.

7.3 Battery Replacement

The lithium battery fitted within this product is not user replaceable and should only be replaced by Ovarro approved qualified service personnel.

7.4 Troubleshooting

Problem	Possible Cause	Solution
Unusual sensor data	<ul style="list-style-type: none"> • Atrium application problem • Wrongly configured/calibrated sensor • Defective sensor, cable or connector • Battery failure 	<ul style="list-style-type: none"> • Check Atrium operation • Check connector configuration using XiLOG GO • Send sensor and cable to Ovarro service department • Check battery voltage and replace, if necessary
Communications/configuration problems	<ul style="list-style-type: none"> • Bluetooth issues/out of range 	<ul style="list-style-type: none"> • Get closer to the data logger location • Check Bluetooth operation
Communications/data viewing problems	<ul style="list-style-type: none"> • Data viewing configuration issue • Atrium application problem • Tablet/laptop operation • 4G/IOT modem issues 	<ul style="list-style-type: none"> • Check Transmit configuration using XiLOG GO • Check Atrium operation • Check tablet/laptop operation • Check SIM card installation and operation
Services unavailable	<ul style="list-style-type: none"> • Firmware not up-to-date • Certificate not up-to-date 	<ul style="list-style-type: none"> • Firmware update required • Certificate update required

In the event of unresolved problems or faults, please contact Ovarro Customer Support.

8 Options & Upgrade

8.1 About Options

The functionality of the data logger depends on the hardware options fitted and the software options enabled. Options may be selected at the time of purchase and will be factory fitted and calibrated by Ovarro. Some options may be fitted after purchase and fitted by the customer.

Contact Ovarro Customer Support for details of the options that may be fitted to your data logger.

8.2 Updating the Firmware

From time-to-time, the firmware of your XiLOG data logger may need to be updated with important functional or security improvements. The logger is updated using the XiLOG GO app, which is used to download the required firmware update file. This procedure should only be carried out when directed by Ovarro.

To update your firmware:

1. On a mobile device, open the XiLOG GO app.
2. Go to the main menu screen, see *Section Error! Reference source not found. Error! Reference source not found.* for full details of this screen.
3. Select the **Firmware Update** menu option. Selecting this will send the firmware file that is part of the app to the logger and restart the logger.
4. The app will need to be reconnected to the logger when the unit has completed the update process (this may take a few minutes). See *Section 4.6 Configuring/Programming the Logger* for details of how to reconnect/rename the logger and check the configuration of the internal transducer and external sensors (if fitted). Also ensure that the transmission settings are configured for transmission of data to Atrium.

Your updated data logger should now be configured for operation.

8.3 Update Certificate

The logger uses secure https communications to Atrium and this protocol requires a security certificate. These certificates last for many years but will occasionally need to be updated. If this is necessary a new certificate will be downloaded to the XiLOG GO app and you will be notified that the logger needs to be updated.

To update your certificate:

1. On a mobile device, open the XiLOG GO app.
2. Go to the main menu screen, see *Section 5.6 Main Menu* for full details of this screen.
3. Select the **Update Certificate** menu option. Selecting this will download the certificate file to the logger.

Your updated data logger should now be configured for operation.

Appendix A – XiLOG 4G Technical Specification







This advanced, robust data logger transfers data reliably and securely over a wide range of communications networks

COMMUNICATIONS

Transmission options	4G (LTE CAT1) / 3G / 2G
Antenna	Internal or external antenna options.
Transmission frequency	Down to every 5 minutes
SIM type	User accessible NANO Sim
Direct connection	Bluetooth

LOGGING

Memory size	4GB
Data types	Average, minimum, maximum, standard deviation
Logging mode	Periodic and event
Sample intervals	1 second – 24 hours

DIGITAL INPUT

No. of digital inputs	2
Max pulse frequency	1000 Hz
Logging modes	Switches to event pulse interval timing at low pulse rates
Meter index	Digital totaliser
Bi-direction/Combination	Option to combine two independent pulse streams into a single logged value

INTERNAL PRESSURE

No. of internal pressure transducers	2
Internal pressure range	0-20 Bar
Accuracy	±0.1% of full range
Connection	Male quick release

ANALOGUE INPUT OPTIONS

No. of 0-20 mA	1
No. of 0-2mV/0-5V/0-10V	1
Accuracy	±0.1% of full range
Resolution	±0.025% (12 bit)

BATTERY

Internal battery	3.6 V
Battery chemistry	Lithium Thionyl Chloride (non rechargeable)
Battery shelf life	5 years @ 20 C nominal temperature

ENVIRONMENTAL

Operating temperature	0 C to 60 C (internal pressure transducers)
Maximum humidity	99% relative humidity
Ingress protection	IP68 (fully submersible to depth of 1m)

PHYSICAL

Dimensions	100 x 160 x 44 mm (external aerial only)
Weight	530g

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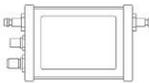
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IXD-662-TN/044 issue 1.0

Appendix B – XiLOG IOT Technical Specification







This advanced, robust data logger transfers data reliably and securely over a wide range of communications networks

COMMUNICATIONS

Transmission options	LTE CATM1 / NB-IOT / 2G
Antenna	Internal or external antenna options.
Transmission frequency	Down to every 5 minutes
SIM type	User accessible NANO Sim
Direct connection	Bluetooth

LOGGING

Memory size	4GB
Data types	Average, minimum, maximum, standard deviation
Logging mode	Periodic and event
Sample intervals	1 second – 24 hours

DIGITAL INPUT

No. of digital inputs	2
Max pulse frequency	1000 Hz
Logging modes	Switches to event pulse interval timing at low pulse rates
Meter index	Digital totaliser
Bi-direction/Combination	Option to combine two independent pulse streams into a single logged value

INTERNAL PRESSURE

No. of internal pressure transducers	2
Internal pressure range	0-20 Bar
Accuracy	±0.1% of full range
Connection	Male quick release

ANALOGUE INPUT OPTIONS

No. of 0-20 mA	1
No. of 0-2mV/0-5V/0-10V	1
Accuracy	±0.1% of full range
Resolution	±0.025% (12 bit)

BATTERY

Internal battery	3.6 V
Battery chemistry	Lithium Thionyl Chloride (non rechargeable)
Battery shelf life	10 to 15 years @ 20 C nominal temperature

ENVIRONMENTAL

Operating temperature	0 C to 60 C (internal pressure transducers)
Maximum humidity	99% relative humidity
Ingress protection	IP68 (fully submersible to depth of 1m)

PHYSICAL

Dimensions	100 x 160 x 44 mm (external aerial only)
Weight	TBC

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IXD-663-TN/044 issue 1.0

Appendix C – Lithium Battery



Important transport safety data for the lithium batteries used in this logger

1. Introduction

Lithium metal batteries are fitted into some Ovarro products as single cell or multi-cell batteries. These batteries are classified as dangerous goods for the purpose of transportation and must be handled in accordance with the regulations governing air, road and sea transportation (see section 3 below). In addition to this transportation requirement, prior to being transported each type of lithium battery (used in the products) must have already successfully been certified to UN test requirements (see *Section 4* below). Ovarro specifies only cells that meet the relevant UN certification.

This is a guide and should not be used as an alternative to the official regulations. The regulations are subject to change and this document is not intended to track those changes.

2. Lithium Content

Product Lithium content:

- XiLOG 4G 3.8g
- XiLOG IOT 3.8g

3. Transportation

3.1 Applicable Regulations

The primary authorities responsible for issuing dangerous goods regulations are:

- **Air** - International Air Transport Association (IATA), Dangerous Goods Regulations (DGR)
- **Road** - European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)
- **Sea** - International Maritime Organisation (IMO), International Maritime Dangerous Goods Code (IMDG)

Dangerous goods are assigned to UN numbers and proper shipping names according to their hazard classification. For Ovarro's products the lithium metal batteries are contained in the equipment and the regulations identified by UN classification UN3091 Lithium metal batteries contained in equipment, Class 9, Packing Group II, Packing Instruction 970

Batteries used in Ovarro products must not be transported separately from the equipment. Separate freighting is covered by another UN classification and not covered in this document.

Lithium batteries transported within the United States are subject to additional limitations as specified in the US national dangerous goods regulations contained in Code of Federal Regulations Title 49 (49 CFR). These limitations are not covered in this document.

3.2 Requirements

The person/company wanting to transport the goods is termed The Shipper and they must choose a Freightling Agent who is familiar with the UN3091 packing instruction. Only qualified personnel are permitted to process the packing and shipping of dangerous goods to ensure the correct packing and labeling are met as follows and as detailed in the applicable regulations.

- Correct packing of product
- Maximum quantity of lithium not exceeded
- Correct labelling of package which should include Class 9 hazard label and markings that identify UN3091 Lithium metal batteries contained in equipment
- Completion of a Shipper's Declaration for Dangerous Goods

3.3 Transportation from Ovarro

Ovarro Limited (UK) holds certification for meeting the above requirement. All new or repaired products leaving Ovarro are packed in accordance with the regulations. If the product(s) is to be transported to a second destination (after leaving Ovarro) it must be declared as Dangerous Goods to the Freightling Agent together with the information required by the above regulations. It is the responsibility of the Shipper to ensure they are working to the current regulations.

3.4 Transportation other than at 3.3 Above

Lithium batteries that have been damaged or have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport. Therefore before equipment is transported it is essential that it is opened and the battery examined. If any sign of battery damage, or ingress of water to the product, is observed then the battery must be removed before transportation. For advice do contact Ovarro Customer Support (contact details below).

4. UN Test Requirements and Design Safety

Ovarro specifies Tadiran SL-700 and SL-2700 cells in sizes AA, C and D and Saft LSH20 cells only in battery packs. Tadiran and Saft cells are safety tested in accordance with International Standard IEC 60086-4. Alternatives may be approved only by Ovarro Limited (UK).

5. Disposal

All batteries and cells must be disposed in accordance with local regulations.

This product is subject to the EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) and should not be disposed of as unsorted municipal waste.



For further information on air-freighting these products or the air-freighting regulations, please contact Ovarro Customer Support.

Appendix D – UKCA DoC

UKCA Declaration of Conformity



We,

Ovarro LD Limited
Ovarro House
Parklands Business Park
Denmead
Hampshire
PO7 6XP
United Kingdom

Declare under our sole responsibility that the product:

Product Name: Xilog4G
Model Numbers: VXG1.XXXX.XX.4G all variants

to which this declaration relates are in conformity with the essential requirements and other relevant requirements of the RED 2015/53/EU and the RoHS 2 Directive (EU) 2015/863.

The UK is no longer a member of the EU/EEA but all relevant standards are still applicable.

Safety	EN 62368-1:2014+A11:2017
Low Voltage Directive	2014/35/EU
RED Directive 2014/53/EU	ETSI EN 301 489-1: V2.2.3 in accordance with the specific requirements of: ETSI EN 301 489-17: V3.2.4 (Modem) ETSI EN 301 489-52: V1.1.2 (Modem) ETSI EN 300 328: V2.2.2 (Bluetooth) ETSI EN 300 330: V2.2.1 (Bluetooth)
EMC	EN 55032:2015
RoHS Directive	(EU) 2015/863

17th August 2021
United Kingdom

Barbara Hathaway – Vice President, Engineering
Authorised signature for and on behalf,
Ovarro LD Limited

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Appendix E – EU DoC

EU Declaration of Conformity

We,

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Ovarro House
Parklands Business Park
Denmead
Hampshire
PO7 6XP
United Kingdom

EU Representative:

Ovarro Limited
Waterloo Office Park
Building M,
Dreve Richelle
161 box 35
B-1410 Waterloo
Belgium

Declare under our sole responsibility that the product:

Product Name: Xilog4G

Model Numbers: VXG1.XXXX.XX.4G all variants

to which this declaration relates are in conformity with the essential requirements and other relevant requirements of the *RED and the RoHS 2 Directive (EU) 2015/863*.

Safety Low Voltage Directive	EN 62368-1:2014+A11:2017 2014/35/EU
RED Directive 2014/53/EU	ETSI EN 301 489-1: V2.2.3 in accordance with the specific requirements of: ETSI EN 301 489-17: V3.2.4 (Modem) ETSI EN 301 489-52: V1.1.2 (Modem) ETSI EN 300 328: V2.2.2 (Bluetooth) ETSI EN 300 330: V2.2.1 (Bluetooth)
EMC RoHS Directive	EN 55032:2015 (EU) 2015/863

17th August 2021
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Barbara Hathaway – Vice President, Engineering
Authorised signature for and on behalf,
Ovarro LD Limited

Index

- alarm location, 31
- antenna, 8, 14
- antennae options, 7
- Atrium 7, 11, 29
- application programming interface, 7
- battery life, 7, 8
- battery replacement, 32
- Bluetooth communications, 7, 8, 10, 16
- certificate updating, 33
- commissioning delay, 28
- configuring the logger, 17, 18
- connect to device, 19
- connecting sensors, 16
- connectors, 12
 - analogue input (pressure), 13
 - antenna, 14
 - current input, 13
 - digital input (flow), 14
 - millivolt input, 13
 - quick release (pressure), 12
 - voltage input, 13
- current inputs, 8, 13
- data collection, 29
- data logger applications, 9
- data logger features, 8
- data logger testing, 17
- data logging, 6
- data logging intervals, 8
- data logging system, 10
- data transmission intervals, 9
- declaration of conformity
 - EU, 39
 - UKCA, 38
- depth sensor, 6
- digital inputs, 14
- disconnect from device, 20
- firmware updating, 33
- flow alarm, 27
- flow sensor, 6
- historic data, 30
- installation, 15
 - SIM card, 15
- IP68, 6, 8, 16, 32
- lithium battery, 36
- maintenance, 32
- memory, 6
- millivolt inputs, 13
- models, 7
- no device connected, 19
- options & upgrade, 33
- PCB, 15
- power options, 7
- pressure alarm, 23
- pressure sensor, 6
 - communications, 29
 - main screen, 30
 - starting, 29
- remote configuration, 6
- remote data viewing, 7
- screen menus, 22
- security certificate, 20, 33
- sensor fitting and replacement, 32
- sensor options, 6
- set logger time, 22
- setting up, 18
- SIM card installation, 15
- site name, 22
- siting the logger, 16
- system components, 10
- technical specification, 34
- testing, 17
- transmit data, 28
- transmit frequency, 28
- troubleshooting, 32
- variants, 7
- version number, 20
- voltage inputs, 8, 13
- XiLOG 4G
 - technical specification, 34
 - variants, 7
- XiLOG GO, 6, 10, 18
 - communications, 18
 - current screen, 26
 - digital screen, 27
 - home screen, 21
 - initial screen, 19
 - internal pressure screen, 23
 - main menu, 20
 - millivolt screen, 24
 - site screen, 22
 - starting, 16, 18
 - transmit screen, 28
 - voltage screen, 25
- XiLOG IOT
 - technical specification, 35
 - variants, 8

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