ADS® XiLog+ System User Manual

ADS LLC
1300 Meridian Street, Suite 3000
Huntsville, AL 35801
Telephone (256) 430-3366 / Fax (256) 430-6633
www.adsenv.com

Table of Contents

C H A P T E R 1

System Overview

The ADS® XiLog+ is a telemetric data logger that communicates through the GSM (Global System for Mobile) cellular radio network using either SMS (Short Messaging Service) or GPRS (General Packet Radio Service).

The XiLog+ is available from the factory with either a quad band antenna or a connector to receive an external antenna. The external antenna version does not support an internal antenna, and the internal version does not support an external antenna. The permanently mounted internal antenna cannot be exchanged or replaced.

ADS XiLog+ data logger

XiLog+ installed in ground

The XiLog+ is available in the following configurations:

XiLog+ Model	1F	1P	2i	2	3i	9
Total number of channels	1	1	2	2	3	9
Number of bi-directional flow channels	1		1	1	1	2
Number of analog channels (transducer: voltage or current input)				1		7 (4 voltage; 3 current)
Number of internal pressure channels		1	1		2	

Current Inputs: 0-10mA and 4-20mA
Voltage Inputs: 0-2V, 0-5V, 0-10V
Analog Channel Accuracy: ± 0.1%

Example of XiLog+ installation

Note: The battery packs in the XiLog+ are designed to last 5 years. However, data logger configuration and usage will impact the estimated battery life. Therefore, ADS does not guarantee that all battery packs will last for 5 years. Refer to *Appendix C: Battery Life* on page 69 for more information.

Caution: The XiLog+ contains Lithium batteries and radio transmitters. These batteries must be removed before shipping the unit by air. Please refer to *Appendix D: Airfreight Restrictions* on page 70 for more information.

Features

- Logs average data at 1-second to 24-hour intervals and flow totals, minimum, and maximum values for 24-hour periods

- Provides cyclic logging for continuous, indefinite data collection. New data begins overwriting the oldest records once the memory is full. Standard memory size of 1GB accommodates data storage for 200 million readings.

- Reports logged data via SMS or GPRS and current data (upon request), real-time alarm, and alarm clear alerts via text message to designated mobile phones. Data collection can occur as often as every 15 minutes.

- Fully submersible to IP68

- Logs data from all flow meters, such as Kent, Meinecke (Socam), Schlumberger, and ABB Kent-Taylor

- Logs bi-directional flow

- Logs directly from combination meters

- Supports internal or external pressure transducer

- Exhibits pressure accuracy of $\pm$0.1% (meeting the WRC code of practice for network analysis)

- Accepts many variations of analog input

- Performs independent logging and SMS reporting

- Supports event logging, including change-of-state monitoring and alarming (for overflow monitoring)

- Offers options for a highly-tuned underground antenna or external antennas

- Provides a flexible wakeup regime, allowing regular contact with the XiLog+

- Generates alarms based on designated thresholds or profiles and sends the alarms via SMS/GPRS to established contacts

- Supports backwards compatibility for sensors

Applications

- Flow monitoring
  - ❏ leakage control (water loss reduction)
  - ❏ demand management
  - ❏ domestic and industrial use
- Hydraulic network modeling
- Pressure monitoring
- PRV (pressure reducing valve) performance monitoring
- Reservoir and bore-hole depth measurement
- River level measurement
- Depth-to-flow conversion
- Rainfall measurement
- Overflow detection

PrimeWorks Software

Use the **PrimeWorks**® software to configure the XiLog+ and manage the data collected from the unit. The management capabilities include reporting and graphing functions.

> **Note:** Do not run other applications on the PC or laptop computer during the **PrimeWorks** software installation process.

Software Requirements

ADS requires the following software for proper operation of the **PrimeWorks** software:

- **Microsoft**® **Windows**® XP or later
- **Microsoft .NET Framework** version 3.5, Service Pack 1

As with any software application, software performance increases with stronger host system specifications.

> **Note:** ADS does not provide technical support concerning issues relating to, or caused by problems with, the operating system installed on the user's PC.

User Access Requirements

The user installing the **PrimeWorks** software must have the appropriate administrative privileges to write to the system's Registry.

SIM Card

To perform wireless communication via GSM, the XiLog+ must be equipped with a SIM card similar to the card used in a cellular phone. SIM cards are available through a local service provider. However, please contact ADS before ordering a SIM card. Technologies and business practices vary among providers; therefore, some provider's services may not be compatible with the XiLog+ system.

In addition, the service provider must know the options to enable on the card and the amount of data transfer that will occur over a particular time period to ensure the card is set up correctly and the plan is administered properly. The selected data connection type (SMS or GPRS) for the logger determines the options that must be enabled on the SIM card.

> **Warning:** Do not disassemble or perform any maintenance or service procedures on the XiLog+ data logger beyond the scope of what is described in this manual, except under the direct supervision of qualified ADS personnel. Conducting unauthorized procedures will invalidate the warranty immediately.

Installing or Removing the SIM Card from the XiLog+

The SIM card must be placed in the SIM holder located inside the XiLog+. Therefore, to install, remove, or replace the SIM card, the holder must first be removed from the logger. This section provides instructions on the following:

- Removing the SIM holder from the logger
- (*applies only to replacement*) Removing the SIM card from the SIM holder
- Inserting the SIM card into the SIM holder
- Installing the SIM holder in the logger

Removing the SIM Holder from the XiLog+

1. Loosen the 4 screws securing the cover plate in position.

Captive Screw

Cover Plate

2. Remove the cover plate.

SIM Holder

Seal
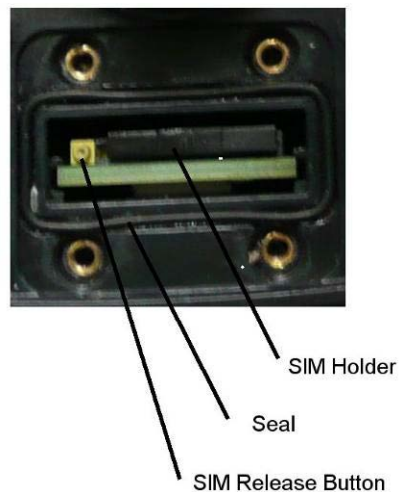
SIM Release Button

3. Push on the SIM release button. *This should cause the SIM holder to protrude slightly from the slot.*

4. Remove the SIM holder from the logger.

Removing the SIM Card from the SIM Holder (applies only to replacement)

1. Without touching the contacts on the SIM card, gently push an object through the hole in the SIM holder.

2. Remove the SIM card.

Inserting a SIM Card into the SIM Holder

Without touching the SIM card contacts, insert the SIM card into the SIM holder, aligning the beveled edge of the card with the keyed corner of the SIM holder and facing the gold contacts on the card outward.
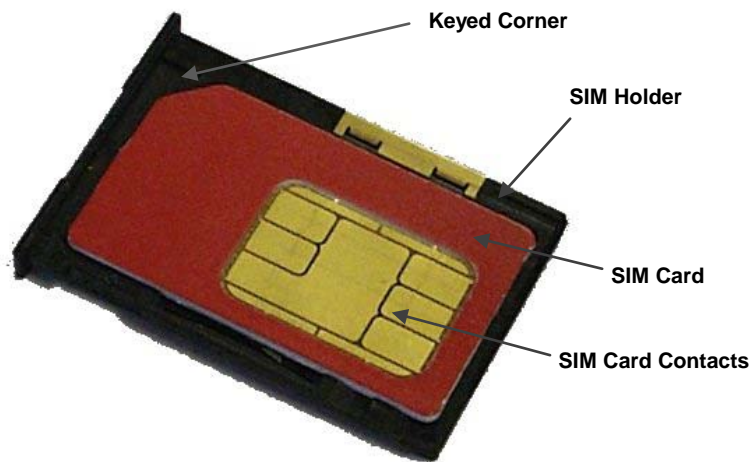
Installing the SIM Holder into the Logger

1. Carefully slide the SIM holder into slot in the logger housing until it clicks into place.

2. Verify that the seal is in the sealing groove and undamaged.

3. Replace the cover plate onto the logger, and secure the plate to the logger with the four screws.

Technical Support

ADS provides comprehensive technical support to assist customers in the configuration and operation of the XiLog+.   Please contact ADS Client Services by email at adssupportcenter@idexcorp.com or by phone at (877) 237-9585 for assistance, when necessary.

ADS No-Hassle Warranty and Return Policy

The following sections detail the hassle-free warranty and return policy for the ADS XiLog+.

New Product Warranty

ADS will repair or replace any XiLog+ equipment (supplied by ADS) that is defective in materials and/or workmanship for up to two (2) years following the date of shipment from ADS. To make a warranty claim, the customer should simply call ADS at (256) 430-3366 or contact ADS Client Services toll-free at (877) 237-9585. The Client Services Representative will assign a *Return Materials Authorization* (RMA) to the customer's claim immediately.

The customer shall return a defective unit or part to ADS for troubleshooting and repair or replacement within 10 days with the RMA.

Replacement or Loaner Equipment

For a defective part, ADS will ship a replacement part immediately once the customer makes an initial claim. However, if ADS does not receive the defective part within 30 days *or* testing concludes that the part experienced excessive wear and tear or abuse for the period of use, ADS will bill the customer for the replacement part.

For a defective unit, at the customer's request, ADS will ship a temporary (loaner) unit to the customer at the time of the initial claim. However, if ADS does not receive the temporary unit from the customer within 15 days of receiving the repaired or replacement unit *or* testing concludes that the unit experienced excessive wear and tear or abuse for the period of use, ADS will bill the customer for the temporary unit.

Shipping

The customer must pay to ship defective equipment to ADS for repair or replacement. However, ADS will incur the costs for shipping the repaired or replacement equipment back to the customer using the same priority shipment procured by the customer upon returning the defective equipment to ADS.

Product Returns

If the customer is not satisfied with the performance of the XiLog+ system, the customer may return the equipment within 30 days for a full refund, provided the condition of the equipment is in the same condition as sold, except for expected or normal wear and tear for the period of use.

C H A P T E R 2

Deploying the XiLog+

Deploying an ADS XiLog+ logger typically involves the involves the following steps:

1. Programming the XiLog+

2. Performing a Signal Strength Test

3. Installing the XiLog+ at the Location

Deploy XiLog+ data loggers in a similar manner to other comparable units. However, consider the following factors concerning GSM capabilities and requirements during deployment:

- Mount the logger in an upright position, not at an angle or on its side.

- When installing the logger underground, mount the logger as close as possible to ground level, preferably within 6 inches of the surface.

Following these guidelines will help ensure the GSM functions most effectively. This chapter provides detailed instructions for each step in the deployment process.

Programming the XiLog+

Configure the XiLog+ using the **PrimeWorks** software. Refer to *Programming the Logger Using PrimeWorks* on page 21 for more information and instructions.

> **Note:** The logger also may be programmed using the **XiLog+ FastTrack** software. Refer to *Appendix A: XiLog+ FastTrack Software on page 62* for brief instructions on programming a logger using this simple application.

Configuring the GPRS Network Settings (*when applicable*)

Loggers communicating over the GSM network via GPRS must be configured with the appropriate network settings *before* undergoing the more comprehensive programming that occurs through **PrimeWorks**. Configure the GPRS settings for a logger(s) using the **GPRS Setup Utility** in the following way:

1. Connect the logger(s) to the computer via USB using the communication cable (ADS part number NXG-881-001) .

2. Select **Start > All Programs >Primayer > GPRS Setup Utility > GPRS Setup Utility.exe** from the **Microsoft® Windows® Start** menu, or click on the **GPRS Setup Utility.exe** icon on the Windows desktop. *The GPRS Setup Utility dialog displays the loggers currently connected to the computer.*
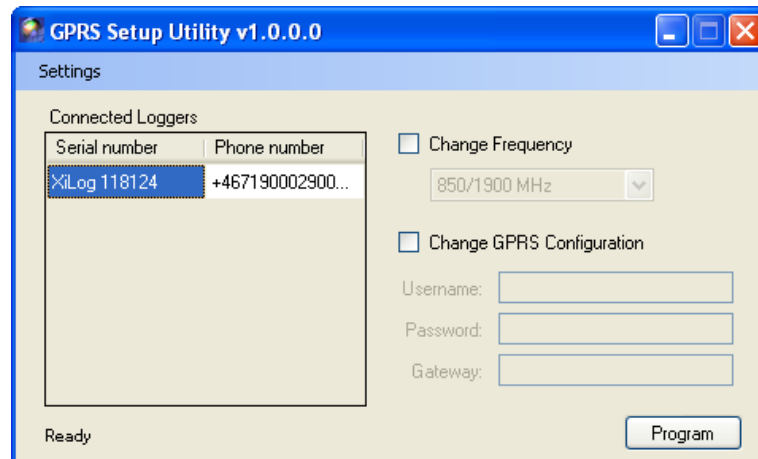
GPRS Setup Utility

3. Select the first logger to configure from the **Connected Loggers** box.

4. Select the **Change Frequency** checkbox, and then choose the appropriate frequency for the network from the corresponding drop-down list.

5. Select the **Change GPRS Configuration** checkbox, and enter the username, password, and gateway (APN) setting for GPRS internet access obtained through the network provider in the corresponding fields.

6. Click on the **Program** button to program the selected logger with the designated frequency and GPRS configuration currently displayed.

7. (*optional*) Select **Settings > Save** from the main menu to save the frequency and GPRS configuration currently displayed to the local or network directory.

8. When applicable, select the next logger to program for GPRS communication from **the Connected Loggers** box, designate the settings in one of the following ways, and click on the **Program** button:

    ❑ Repeat steps 4 through 5 to enter the appropriate frequency and GPRS configuration based on the network provider.

    ❑ Select **Settings > Load** from the main menu to browse to and open a file containing an existing frequency and GPRS configuration that are suitable for the currently selected logger. Once the details display on the dialog, select the corresponding checkboxes to enable the settings.

9. Repeat the step 8 for each additional logger that requires GPRS network programming.

10. Select **Settings > Exit** to close the **GPRS Setup Utility**.

*After configuring the XiLog+ using the **GPRS Setup Utility**, program the logger using **PrimeWorks** or **XiLog+ FastTrack**.*

Performing a Signal Strength Test

GSM network coverage can vary considerably both day-to-day and location-to-location. Therefore, XiLog+ data loggers are equipped with a GSM signal strength test feature for assessing the logger's ability to establish contact with the GSM network from the site during the deployment process.

The test includes deploying the data logger and then measuring the GSM signal strength a designated number of times at established intervals. Once the test is complete, the signal strengths are averaged and the resulting signal strength is displayed. Conducting the test under the default configuration involves taking one measurement every 10 seconds for 5 minutes for a total of 30 measurements. This configuration may be modified as necessary.

> **Note:** ADS strongly recommends performing this step during each logger deployment, even at locations that have been used successfully in the past. GSM coverage can vary even over a short period of time.
>
> **Note:** To perform a signal strength test, a laptop computer with **PrimeWorks** must be available on-site.

Test the signal strength in the following way:

1. Prepare the deployment site.

2. Program the logger to test the signal strength using **PrimeWorks**, and then disconnect the XiLog+ from the computer.

3. Position the logger in the location at which it will be deployed (including closing any doors or replacing any covers).

4. Wait until the test is complete, and recover the logger.

5. Connect the laptop to the logger, and examine the results. The average signal strength should display.

   ❑ **Strong** A signal strength over 25% indicates a strong signal that should enable the Xilog+ to log onto the GSM network regularly.

   ❑ **Adequate** A signal strength from 21 to 25% indicates a borderline signal that may result in an occasional communication failure with the GSM network. Under this condition, repeat the test. If the same result occurs, consider installing the logger in another location, when available. If another site is not available, install the XiLog+ in the existing location, but monitor communications closely.

   ❑ **Inadequate** A signal strength below 21% indicates the signal is insufficient for communications across the GSM network. If this occurs, repeat the test. If the same result occurs, relocate the

XiLog+ to another site. If another site is not available or a new location produces similar results, ADS recommends deploying a XiLog+ equipped with an external antenna.

The signal strength test is now complete.

6. Deploy the XiLog+, if appropriate.

Installing the XiLog+

Installation primarily involves connecting the cables to the inputs on the XiLog+ and mounting the logger. Sensors and cables supplied by ADS come with the appropriate connector from the factory. However, when necessary, ADS can attach an appropriate connector to a sensor supplied by another manufacturer. For information, assistance, or questions regarding installation, please contact ADS Client Services by email adssupportcenter@idexcorp.com or phone at (877) 237-9585.

The connectors on XiLog+ data loggers are waterproof only when the mating connectors or sealing caps are attached. Therefore, to prevent moisture from entering the logger through the connectors, use the sealing caps when the connectors are not in use.

The sensors supplied by ADS are equipped with sealed mating connectors that attach to the connectors on the logger by twisting the rotating shell. These connectors seal correctly only when the mating surfaces are free of dirt and other debris. The sensors operate at low levels of current; consequently, any infiltration of moisture into the electronics will likely result in erroneous or missing data. Scrub contaminated connectors with a brush saturated with distilled ethyl alcohol.

When connecting the sensors to the logger, mate the unused sealing caps together to prevent the accumulation of dirt and moisture in the caps that could eventually be transferred to the connector.

Input Connections

Each connector on the XiLog+ is labeled with a specific symbol indicating the connector type. Following is a description of each connector type with the corresponding symbol:

 Digital Inputs

This connection supports the sensors. The XiLog+ provides the necessary power at this port, so the sensor may be connected either before or after the logger is powered up and begins logging data. If a sensor is not connected upon startup, the logger will record zeros for this input until a sensor is attached.

Internal Pressure Transducer

Loggers equipped with an internal pressure transducer have a male quick-release connector.

The integrated pressure transducer is available in the following ranges: 0-145 PSI (0-10 Bar) or 0-290 PSI (0-20 Bar). Subjecting the transducer to pressures of more than 150% of its range may damage the sensor. Subjecting the transducer to shocks may offset the zero point calibration of the transducer; however, the logger can be calibrated to compensate for this offset.

ADS offers a hose with male and female connectors to connect the logger to the pressure monitoring point. Be careful to avoid introducing pressure shock when connecting the hose to the transducer. Pressure shock can damage or destroy the sensing diaphragm.

Communication/Power Input

This connection supports on-site communication and external power. A computer must be used to configure the XiLog+ before operation. Use a communication link cable to establish a direct USB interface between the data logger and the computer.

This XiLog+ can run on power obtained from an external source. Use only batteries or power cables supplied by ADS.

Analog Inputs

The analog input is a general input that may be used for voltage or current.

The voltage input range is nominally 0 - 2V DC; however, standard voltage ranges available are 0 - 5V and 0 - 10V. Voltages outside the nominal range require a specific cable.

Current input requires a specific cable. The input supports 0 - 10mA, 0 - 20mA, and 4 - 20mA ranges.

A sensor may be connected to the XiLog+ either before or after the logger is powered up and begins logging data. However, if a sensor is not connected upon startup, the logger will record zeros for this input until a sensor is attached.

CHAPTER 3

# Programming the Logger Using PrimeWorks

Use the **PrimeWorks** software to program and readback (or collect) data from the XiLog+. Various other graphing, reporting, and export functions also are available through **PrimeWorks**. A separate **XiLog+ FastTrack** application also is available through ADS for programming the more standard features of the data logger in a more expeditious manner.

Launching the PrimeWorks Software

Prior to launching the **PrimeWorks** software, connect the XiLog+ to the computer using the USB cable. Once connected, select **Start > All Programs > Primayer > PrimeWorks > PrimeWorks** from the Windows start menu *or* double-click on the **PrimeWorks** icon on the Windows desktop to launch the software.

> **Note:** The ordering of these steps is inconsequential. Therefore, the XiLog+ also can be connected to the USB *after* launching the **PrimeWorks** software.

The software automatically detects all loggers connected through the USB and displays a list of these loggers once detection is complete.
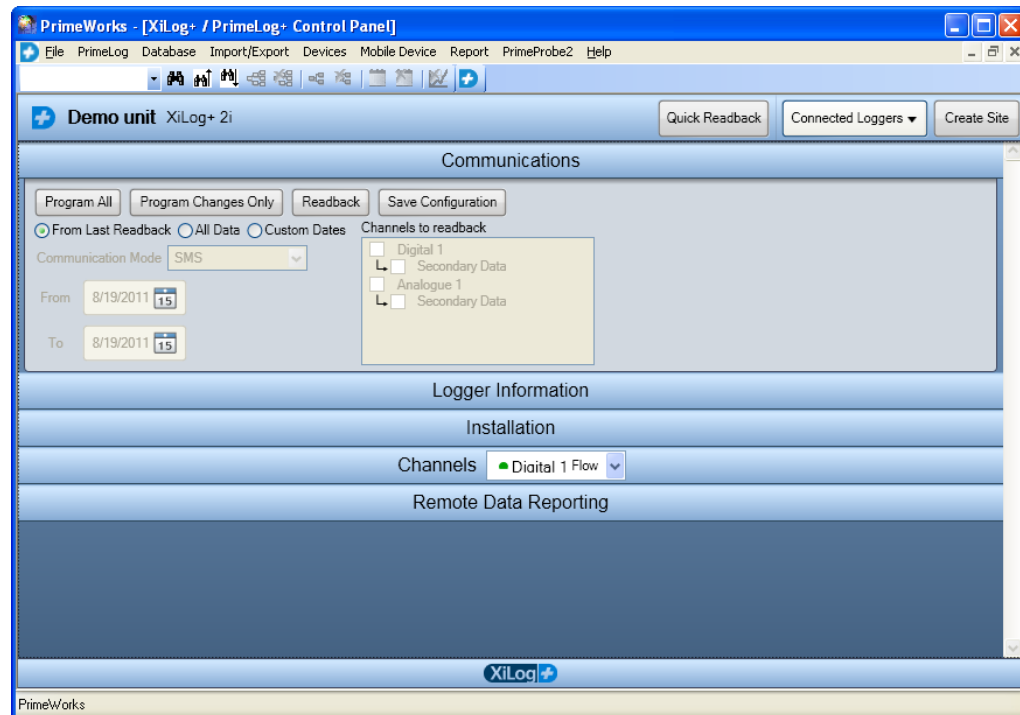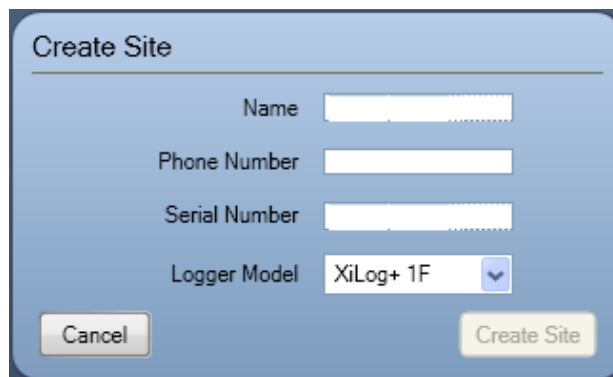

PrimeWorks software

Connected Loggers

Multiple loggers can be connected to the computer simultaneously via USB. For multiple loggers, move among the individual logger configurations by selecting the appropriate logger from the **Connected Loggers** drop-down list. Selecting a logger displays a group of headers representing windows corresponding to the various configuration, communication, and reporting functions of the logger. Access the contents of a window by clicking on the associated header.

The following windows are available, based on the selected logger:

- Communications

- Logger Information

- Installation

- Channels

- Remote Data Reporting

To create a new site, click on the **Create Site** button on the title bar.

Create Site dialog

Enter the name, serial number, and phone number of the new site, and select the type of logger that will be used at the site. Completing these steps and clicking on the **Create Site** button establishes the site in the **PrimeWorks** database and displays the editing options for the new site.

> **Note: PrimeWorks** displays only those headers/windows that are applicable to the selected logger type. For example, an analog channel window will *not* be available for a *flow-only* logger.

Communications
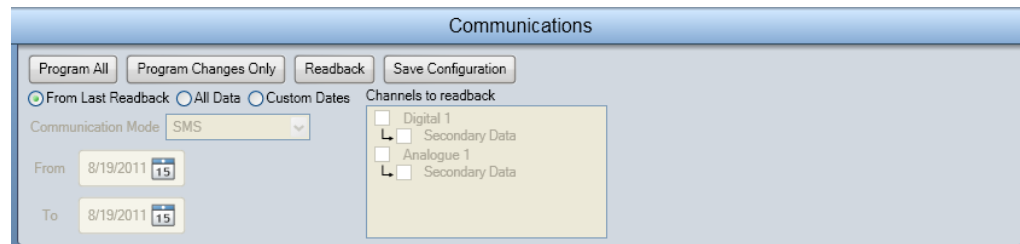
The **Communications** window controls all the communications with the logger. It includes options for collecting data (i.e., readback) from a logger and programming a logger with a new configuration.

Program All

Selecting this button sends the currently selected program settings to the logger and deletes all data from the logger.

Program Changes Only

Selecting this button programs the logger only with the changes made since **PrimeWorks** last read the program settings from the logger, without removing any data from the logger. Therefore, all the data in the logger will remain available for readback.

> **Note:** Selecting **Program Changes Only** *will not* update the time in the logger to the PC clock. However, selecting **Program All** *will* synchronize the time in the logger to the PC clock.

The **Program Changes Only** option is the only option available for making changes to a logger configuration remotely. To accomplish this, make the changes to the configuration as required, select the appropriate transmission media (**SMS** or **FTP**) from the **Communication Mode** drop-down list, and click on the **Program Changes Only** button. **PrimeWorks** will send only the relevant information to the XiLog+.

Readback

Selecting this button initiates data readback (collection) from the logger, based on the selected **Readback** option:

From Last Readback

Choosing this radio button ensures **PrimeWorks** collects only the data recorded by the logger since the last readback was performed.

> **Note:** Clicking on the **Quick Readback** button on the title bar or the **Readback** button corresponding to a logger in the **Connected Loggers** drop-down list accomplishes the same operation as selecting the **From Last Readback** option.

All Data

Choosing this radio button ensures **PrimeWorks** collects all the data available in the logger to the PC. If several months of data are available in the logger, this process may take several minutes.

Custom Dates

Choosing this radio button ensures **PrimeWorks** collects data from the logger for the range indicated in the **From** and **To** fields. Selecting this option enables the **From**/**To** calendar options. Designate the start and end dates of the data for readback from these fields. The dates available for selection are limited to the dates for which data is available in the logger.

Channels to Readback

(*applicable only when collecting data remotely*) Select the checkboxes corresponding to the channels representing the data desired for readback. The list contains only the channels that are available for readback.

After selecting the readback options and clicking on the **Readback** button, **PrimeWorks** initiates the readback process and displays the progress on screen. When performing a readback via USB, **PrimeWorks** calculates and displays the estimated time of completion.

Save Configuration

Selecting this option saves the current configuration for the selected logger to the **PrimeWorks** database.

> **Note:** Selecting the program or readback options automatically saves the configuration.

Logger Information

Logger Information window

Name

This editable field contains the name that will appear in the **PrimeWorks** database for the selected logger. Change or edit the name as necessary.

Site ID

This editable field displays a unique ID that can be programmed into the logger. The logger includes this name with the name of the site when transmitting data via FTP.

Phone Number

This editable field displays the phone number of the logger. Once entered and saved to the logger memory, it is not necessary to enter this number again.

Serial Number

This field displays the serial number of the logger. *It is not an editable field.*

Logger Model

This field displays the logger model. *It is not an editable field.*

Logger Period

This section indicates the date and time period for which the logger records data.

Start Immediately

Selecting this radio button initiates logging immediately once logger programming is complete and continues logging indefinitely.

Custom Dates

Selecting this radio button initiates and sustains logging for the date/time range designated in the **Logging Start** and **End Time** fields.

Logging Start and End Time

These fields represent the date and time period for which the XiLog+ records data. Enter the dates and times in the corresponding fields based on the option selected above. The calendar buttons also may be used to designate the dates.

The **Logging Start Time** fields designate the date and time at which to initiate logging *only when the **Custom Dates** option is in use*.

Once the date and time designated in the **Logging End Time** fields occur, the logger will discontinue logging data until a new logging session is initiated. Leaving the field blank ensures logging continues indefinitely. Under this condition, logging follows a cyclical pattern in which newer data begins to overwrite older data once the memory becomes full.

Additional Notes

This editable field contains information beneficial or applicable to the current site or logger. Enter or edit relevant content as necessary.
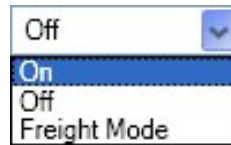
Installation

Installation window

This window includes all the parameters relevant to installing the logger at the site.

Commissioning Mode

This drop-down list contains the options available for communication:

Commissioning Mode menu options

On

Selecting this option places the logger in *commissioning* mode. This mode ensures the logger remains powered up, connected to the GSM network, and available for communication.

> **Note:** Do not maintain a logger in commissioning mode for a long period of time. This will have a detrimental effect on battery life.

> **Note:** Leaving a logger in commissioning mode will generate and send an SMS alarm at 00:00 every day until this mode is discontinued. Discontinue this mode by sending the string #CMOFF to the logger from a cellular phone.

Off

Selecting this option powers up the modem only as designated under the current setup. *This is the standard operating mode.*

Freight Mode

Selecting this mode prevents the modem from powering up so that the logger cannot transmit, even when the logger has been programmed to transmit (e.g., because of an alarm). Select this option when air freighting a logger, even if the SIM card has been removed. ADS ships all loggers transported by air in this mode.

Read Current Values

Selecting this checkbox displays the current values from the attached logger in the **Digital**, **Analog**, **Battery Voltage/External Power Voltage**, and **GSM Signal Strength** fields, as applicable. **PrimeWorks** will request data from the logger every second. Pressure and other analog data update at this interval, but flow values require up to 1 minute to update based on the sample rate programmed into the logger.

Digital/Analog

These fields display the current value and units for each channel. The number of values displayed varies based on the logger features and programming. If the XiLog+ is not logging data on a channel, the corresponding field will not display a reading. A channel that is not logging data may indicate the channel has not been enabled or the *end* date and time designated for logging data has passed.

AutoZero Button

Clicking on this button removes the current offset and forces the analog channel to read zero. This button is available *only* when the XiLog+ is logging pressure, depth, or height on an analog channel.

> **Note:** Use this option only with the transducer open to atmospheric pressure. This new offset will apply only to future data. It will not be applied to previously recorded data.

Battery Voltage

This field displays the current internal battery voltage (nominally 7.2V). If it reads low and the battery requires replacement, **PrimeWorks** will display a warning once the logger is connected to the computer.

External Power Voltage

This field displays the external power voltage measured by the logger. If the logger is attached via USB, **PrimeWorks** will display the USB voltage being supplied to the logger (typically 5 volts). If the voltage is requested remotely, **PrimeWorks** will display the voltage coming from the external power supply.
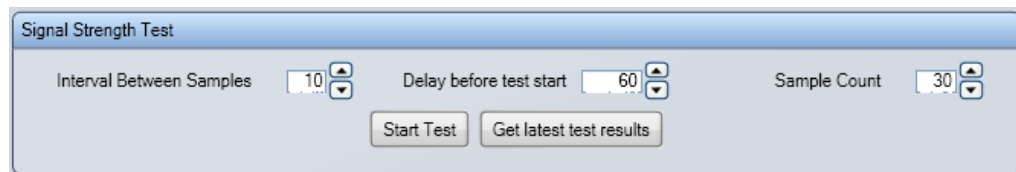
GMS Signal Strength

This field indicates the current GSM signal strength measured by the logger currently (provided the logger is powered up to the GSM network) or the last time it was on-line.

Signal Strength Test

The signal strength test verifies the logger can communicate with the cellular network at the current location (of potential deployment).

Signal Strength sub-window

Interval Between Samples

This field indicates the amount of time in seconds between each test sample. Modify this setting manually or using the up/down arrows.

Delay before test start

This field displays the amount of time in seconds to delay before initiating the test. The delay period begins when **PrimeWorks** sends the command to the logger to initiate the signal strength test. Modify this setting manually or using the up/down arrows.

Sample Count

This field indicates the number of test samples to take during the test. Modify this setting manually or using the up/down arrows.

Start Test

Selecting this button initiates the signal strength test. The logger will begin measuring the signal strength once the delay period has passed. A counter will count down the time until the test is due to begin to allow sufficient time for placing the logger in the appropriate position. This counter also will be used to identify the end of the test.

When the test is complete, recover the logger and read the results.

Get latest test results

Selecting this button displays the results from the last signal strength test recorded by the logger and indicates the quality of the results (*good*, *adequate*, or *inadequate*).

Analog Channel – Internal Pressure

Channels (Analog Pressure) window

This window includes the parameters for setting up the internal pressure transducer channel. A green dot next to the channel name indicates the channel is enabled and recording data.

Enable Channel

Selecting this checkbox enables the channel on the logger. Not all channels on a logger must be enabled when it is in use. Disabled channels do not use power.

Sensor Type

This parameter does not apply to internal pressure sensors.

Sensor Rating

This value indicates the maximum rating of the internal pressure sensor. *It is not an editable value.*

Units

This drop-down list contains the options for the units of measure corresponding to the pressure channel.

Data Type

This drop-down list contains the options for selecting the type of data that will be recorded through the channel.

Custom Offset

This field indicates the offset. Modify this value (when necessary) manually or using the up/down arrows. For example, enter the value representing the offset for adding the ground level to all pressure values.

Logging Interval

This drop-down list contains the options for selecting the measurement interval at which to log data on this channel. Options from 1 second to 24 hours are available. All data logged on a channel represents averaged data (based on the number of samples taken). XiLog+ records the averaged data and daily minimum and maximum values for each channel.

Send Data Reports

Selecting this checkbox ensures the logger sends data reports by SMS or GPRS based on the frequency designated for remote data reporting.

The minimum logging interval for data sent through SMS is 1 minute. Therefore, data sent through SMS based on a shorter interval first must be averaged at a 1-minute interval before being sent.

> **Note:** Selecting a logging interval of less than 15 minutes using SMS requires sending more than one SMS per day for each channel. For example, sending 1-minute SMS data every day requires sending 15 SMS per channel per day.

Secondary Logging

Some XiLog+ models allow a secondary logging interval for logging the same channel input at a second rate. This data can be reported remotely, or logged internally and remotely requested (as required).

Analog Channel – Generic

This window includes the parameters for setting up the generic analog channels present on the XiLog+ 2 and XiLog+ 9 models. Three options are available based on the channel capabilities: current, millivolt, and voltage. If the channel can support all three options, a drop-down menu allows for selection of the one to use.
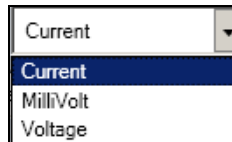
Each option requires a different type of cable to interface to the sensor.

Generic Analog – **Current** (mA) example

Generic Analog – **Voltage** example

Generic Analog – **MilliVolt** example

Enable Channel

Selecting this checkbox enables the channel on the logger. Not all channels on the logger must be enabled when the logger is in use. Disabled channels do not use power.

Sensor Type

This drop-down includes the options for selecting the sensor type (**Current**, **MilliVolt**, or **Voltage**). Selecting the **Voltage** or **Current** also requires selection of the *Electrical Range*. Refer to *Electrical Range* on page 36.

Sensor Rating

(*applicable only to the MilliVolt sensor type*) This drop-down list includes the options for selecting the range of the pressure transducer. The **Physical Range** represents this rating converted to the selected units.

Units

This drop-down list contains the options for selecting the units of measure corresponding to the designated data type. The options available depend on the selected data type.

Data Type

This drop-down list contains the options for selecting the type of data to log (e.g., pressure, depth, flow, or temperature).

PCAL

(*applicable only to the MilliVolt sensor type*) This pressure calibration value represents the number of millivolts at full range. This value is unique for each sensor, and sometimes is referred to as *Full Scale Detection* (FSD).

Custom Offset

(*applicable only when measuring pressure, height, or depth*) This field indicates the offset added to all readings. For example, enter the appropriate value to add to all pressure values to compensate for ground level. To remove an amount from every reading, simply enter the value as negative.

Electrical Range

(*applicable only to voltage or current data types*) These fields represent the electrical range corresponding to the voltage or current, as applicable. Enter or use the up/down arrows to designate a range up to 20mA for *current*. Select 0-2V, 0-5V, and 0-10V for *voltage*.

Physical Range

(*applicable only to the current or voltage sensor type*) These fields represent the range of the sensor input corresponding to the voltage. For example, consider an input of *4-20mA* involving a temperature sensor where 4 mA represents 0 degrees and 20 mA represents 100 degrees. This would require entering the values 0 and 100 in the **Physical Range** fields. Enter the values manually or use the up/down arrows.

Logging Interval

This drop-down list includes the options for setting the measurement interval at which to log data on this channel. Options available range from 1 second to 24 hours. The data logged on this channel represents averaged data (based on the number of samples taken). XiLog+ records the averaged data and daily minimum and maximum values for the channel.

Send Data Reports

Selecting this option ensures the logger sends data reports by SMS or GPRS based on the frequency selected for remote data reporting.

The minimum logging interval for data sent through SMS is 1 minute. Activating SMS reporting for data based on a shorter logging interval requires averaging the data at a 1-minute interval before being sent.

> **Note:** Sending data logged at an interval of less than 15 minutes through SMS requires sending more than one SMS per day for each channel. For example, sending 1-minute SMS data every day requires sending 15 SMS per channel per day.

Secondary Logging Interval

Some XiLog+ models allow a secondary logging interval for logging the same channel input at a second rate. This data can be reported remotely, or logged internally and remotely requested (as required).

Digital Channel

This window includes the parameters for setting up digital channels. The presence of a green dot to the left of the channel name indicates the channel is enabled and recording data.

Enable

Selecting this checkbox enables the channel on the logger. Not all channels on a logger must be enabled when the logger is in use. Disabled channels do not use power.

Sensor Profile/Sensor Type

The **Sensor Profile** drop-down list contains the options for selecting the kind of digital sensor that will be attached to the logger. If the appropriate sensor is not available in the list, select the **Custom** option and then select the corresponding sensor type from the **Sensor Type** list. Each digital channel can receive two pulse inputs.

Sensor Type options

Several options also are included in the **Sensor Types** drop-down list for performing event logging using digital sensors. To implement event logging, select one of the corresponding options from the list.

Pulse Direction

This drop-down list contains the options for specifying how a bidirectional sensor indicates reverse flow.

Logging Interval

This drop-down list includes the options for designating the measurement interval at which to log data on this channel.   The options available range from 5 seconds to 24 hours. The data logged on the channel represents averaged data (based on the number of samples taken). XiLog+ records the averaged data and daily minimum and maximum values for the channel. The digital channel also records daily volume. Transmitting the meter reading from the site to the logger, as below, will ensure remote tracking of the site meter reading is accurate.

Units

This drop-down list contains the options for selecting the units of measure in which to log the data.

Continuous Power

Selecting this checkbox ensures the channel provides uninterrupted power to a pulse (sensor) unit that requires continuous power. Use this option *only* when the required by the sensor type.

Combine Flows

Selecting this checkbox adds together the flow totals from a *combination* meter, which represents two meters (larger and smaller) working in parallel, before the data is transmitted to the logger to provide one flow rate and meter reading. In this scenario, flows *exceeding* a certain rate will flow through the *larger* meter and flows *occurring below* a certain rate will flow through the smaller meter. The outputs from both meters connect to the logger on two different pulse trains of a single channel.

If this option is not selected, the flow rates from the two meters will be logged and transmitted independently. Therefore, transmitting the data via SMS will result in sending double the number of SMS.

Send Data Reports

Selecting this checkbox ensures the logger sends data reports by SMS or GPRS, based on the interval designated for remote data reporting.

The minimum logging interval for data sent through SMS reporting is 1 minute. For data logged at a shorter interval, the logger will average the data at a 1-minute interval before sending the report.

> **Note:** Sending data logged at an interval of less than 15 minutes via SMS requires sending more than one SMS per day for each per channel. For example, sending 1 minute SMS data every day requires sending 15 SMS per channel per day.

Calibration Factor

This field represents the number of liters that correspond to a single pulse from the meter. This value should always reflect the factor set in the meter. Modify this factor manually or using the up/down arrows.

Meter Reading

This field displays the site meter reading entered into the logger. Writing this reading into the logger upon installation will ensure the meter reading in the XiLog+ tracks the actual meter reading. Enter a meter reading up to 10 digits in length, with an accuracy of up to 4 decimal places.

Meter Units

This drop-down list includes the options for selecting the units of measure corresponding to the meter reading. A variety of units are available, based on the size of the meter and accuracy required.
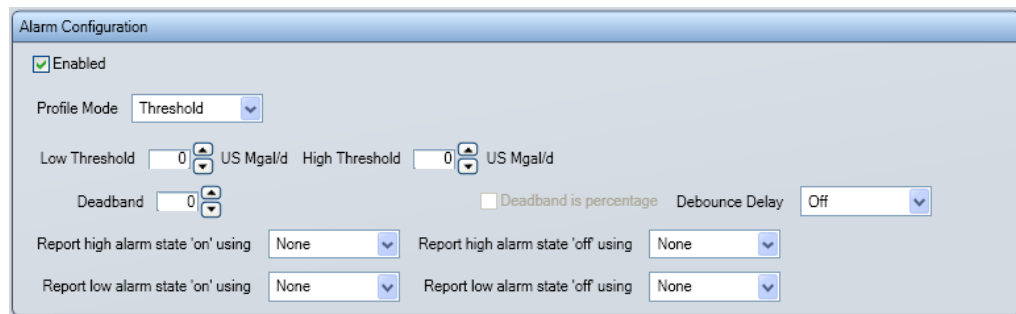
Secondary Logging

Some XiLog+ models allow a secondary logging interval for logging the same channel input at a second rate. This data can be reported remotely, or logged

internally and remotely requested (as required). Select the **Enabled** checkbox to enable the associated fields, and then enter the second interval at which to log the data and designate whether to transmit the data obtained at this interval during data reporting activities.

Alarm Configuration

Alarm Configuration sub-window

Alarms may be setup independently for each channel of the logger. Three types of alarms are available: threshold, profile, and envelope alarms.
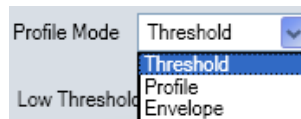
Enabled

Selecting this checkbox activates the alarms for this channel.

Profile Mode

Profile Mode menu options

This drop-down contains the options for selecting the kind of alarm to generate from the XiLog+ under certain threshold conditions for a channel. The following sections provide information on the individual alarm modes and descriptions of the corresponding parameters that must be configured for the alarms. The *Common Alarm Configuration Parameters* section includes the descriptions for those parameters that are applicable to all three alarm modes.

Common Alarm Configuration Parameters

This section describes the parameters that typically are common to all three alarm modes.

Deadband (applicable only to Threshold and Profile alarms)

This field displays the deadband value around the threshold. The logger will generate a *high* alarm when the channel reading *exceeds* the **High Threshold** plus the deadband. The alarm clears when the channel reading falls below the **High Threshold** and the deadband. For example, entering a high threshold of 0.456 mgd and a deadband of 0.023 mgd will trigger a high alarm when the flow exceeds 0.479 mgd and clear when the flow falls below 0.434 mgd. This prevents the system from generating multiple alarms at locations that experience flows that may oscillate around a threshold value.

If this feature is not relevant or required, enter a deadband of **0**.

> **Note:** While the deadband value always represents an amount when establishing a *Threshold* alarm, the deadband can represent either an amount *or* a percentage when using *Profile* alarms. To indicate that the value in the **Deadband** field serves as a percentage, select the **Deadband is percentage** checkbox after entering the value.

Debounce Delay

This drop-down list contains the options for selecting the debounce delay, which represents the amount of time the flow must remain above the designated high threshold (and deadband) or fall below the designated low threshold (and deadband) before the system generates an alarm. Delay options range from 1 to 60 minutes. For example, when selecting a debounce delay of 5 minutes, the flow must remain above the high threshold (plus the deadband) for at least 5 minutes before the system will generate a high alarm.

> **Note:** The debounce delay applies only when initiating alarms. It is not designed for use in determining whether an alarm has been cleared.

Alarm Reporting

Reporting method options

Alarm reporting can occur through SMS or FTP (or both), and each alarm trigger can be setup to occur through a different reporting method. Delivery methods for alarms are independent from the delivery selections for collecting logged data. For example, logged data can be sent via FTP and alarms can be sent via SMS.

Threshold Alarms

Threshold alarms generally involve designating a high and/or low threshold beyond or below which the XiLog+ will generate an alarm. This section includes descriptions for the parameters that are common only to threshold alarms.

Low Threshold

This field represents the threshold below which the logger will trigger a *low* alarm. Enter the threshold manually or use the up/down arrows.
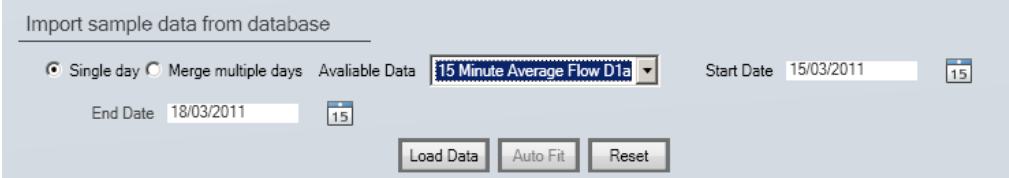
High Threshold

This field represents the threshold above which the logger will trigger a *high* alarm. Enter the threshold manually or use the up/down arrows.

Profile and Envelope Alarms

Profile and **Envelope** alarms are more complex alarms that involve designating a different threshold value for the high and low alarms for every 15-minute increment throughout the day. For example, the high thresholds designated for generating flow alarms may be much lower through the night than during the day.

Selecting either option displays a graph for creating and editing the profile or envelope.

Importing sample data from the database

The simplest way to establish a profile or envelope alarm is to import historical data from the site in the following way:

1. Select the appropriate logging function from the **Available Data** list.

2. Select the radio button corresponding to the option for the number of days for which to import data.

   ❑ **Single day** Choose this option to import data for only one day, and then designate the date for which to import the data using the **Start Date** calendar control.

❑ **Merge multiple days** Choose this option to import data for several days, and then designate the start and end dates representing the date range for which to import the data using the **Start Date** and **End Date** calendar controls.

Note: The calendar controls only allow the selection of dates for which data is available. When multiple days are selected, the system will average the data for each time period for every day in the range. For example, to obtain the profile value for 2:00, the system will average the data recorded at 2:00 for every day in the range.

3. Click on the **Load Data** button to import and display the data on a graph.

Profile Alarms

To edit the profile data, click on the **Auto Fit** button. **PrimeWorks** places a marker on the trace at each 15-minute interval to allow modification of the value, if required.
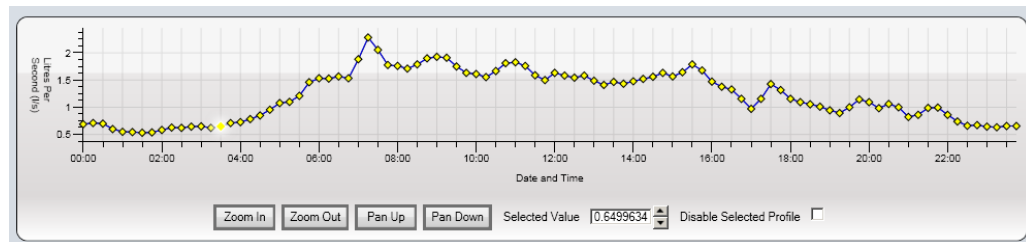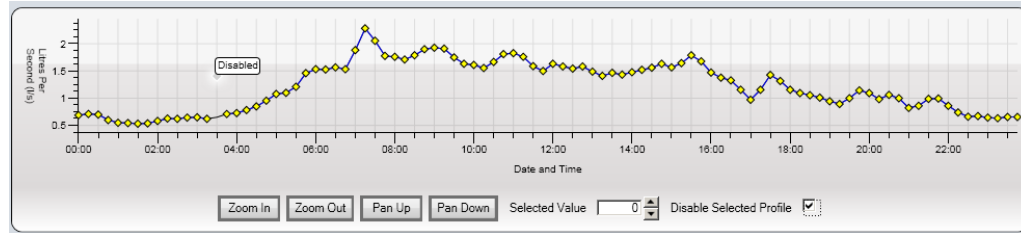

Profile graph

If historical data is not available, click on the **Reset** button to set default values for each profile value so that each one can be set independently.

To change a profile value, simply click on the graph marker and drag it to a new location on the graph. Use the zoom & pan buttons to rescale the Y-axis for the data displayed.

Selecting a profile value highlights the value on the graph and displays the actual value in the **Selected Value** field. For greater accuracy, enter another value in this field.

Disable a value, when necessary, by selecting the value and then clicking on the **Disable Selected Profile** checkbox. When a value is disabled, XiLog+ will not generate alarms during the corresponding 15-minute period.

Disabling a value on the graph

Enable the alarms for this profile period again by deselecting the **Disable Selected Profile** checkbox.

After entering the required profile, select the deadband and debounce delay (when necessary). The deadband around the profile can represent either a single value or a percentage. When it represents a percentage, the value entered for the deadband corresponds to the percentage of the profile value. The system will trigger a high alarm if the channel reading remains above the profile value plus the deadband for the designated debounce delay period.


Selecting the deadband

For example, when applying a flow profile value of 0.114 mgd with a deadband of 0.023 mgd, the logger will generate a high alarm during this period for a reading above 0.137 mgd and a low alarm for a reading below 0.091 mgd. If the deadband were designated as 10% instead, the logger would generate a high alarm above 0.126 mgd and a low alarm below 0.103 mgd.

Envelope Alarms

In addition to the standard Profile alarms, XiLog+ can generate alarms based on a more complex *Envelope* alarm. Envelope alarms allow importing of profile data in the same way as standard profile alarms. However, clicking on the **AutoFit** button displays two rows of markers for editing (as required) on the graph instead of only a single row of markers.
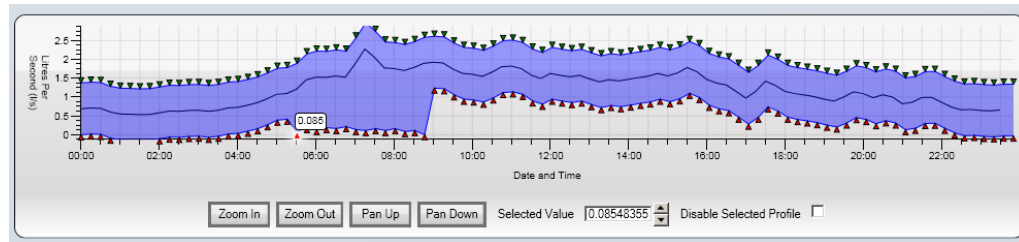
Using the Autofit option for Envelope alarms

This provides the flexibility to change the values used to generate the high and low alarms for each period independently. Select, change, move, and disable specific values using the same methods applied for standard profiles.

Remote Data Reporting

Remote Data Reporting window

This window includes the parameters for setting up remote delivery of data from the XiLog+ to the designated host system(s).

Message Type

This drop-down list contains the options for selecting the delivery method (**SMS** or **FTP** using GPRS technology) through which the XiLog+ will send data.

Selecting **SMS** sends reports to as many as 3 host numbers (when applicable).

Selecting **FTP** transfers data via FTP (File Transfer Protocol) to an FTP Server. This requires entering the details of the server.

Use Automatic GSM Clock Correction

Selecting this checkbox automatically adjusts the clock in the XiLog+ to the time in the GSM network. Using this option for FTP messaging requires identifying the specific server address (URL) at which the time sync script (PHP file) is available and designating the appropriate port. Enter this information in the **Synchronization Script URL** and **Port** fields.

Ignore Daylight Savings

Selecting this checkbox prevents the clock in the XiLog+ from compensating for daylight savings time.

Host and Alarm Numbers

When performing remote data reporting via SMS, the XiLog+ transmits the data to all the host numbers designated in the **Contact Details** section. A host number corresponds to a GSM modem connected to a computer. The **Primayer Data Manager** utility running within **Windows** serves as the conduit through which the data is transferred from the GSM modem to the **PrimeWorks** software for viewing. Up to three host numbers may be entered in **PrimeWorks**, allowing data delivery to up to three different offices or locations.

Up to two additional alarm numbers also may be entered. Any SMS alarms generated by the logger will be sent to these numbers. The logger sends data only to the host number(s); however, it sends alarms to both the host and alarm numbers, when necessary.

> **Note:** To use the Primayer XMS system for remote data delivery over the Internet, select the **Use XMS Host** checkbox and then select the appropriate network from the corresponding drop-down list. Choosing this option does not require entering any additional numbers or contact information. All distribution of data occurs within the XMS system.

FTP Server Address

This field displays the address of the FTP server to which the logger should transmit the data. When using the *Primayer XMS delivery system*, enter www.waterlogger.co.uk. When using another FTP server, enter the address *without an FTP prefix*.

FTP Username

This field displays the username for logging onto the FTP server. Enter the appropriate username for the user.

> **Note:** When using the *Primayer XMS system*, defer to ADS Client Services to obtain the proper login details.

FTP Password

This field represents the password for logging onto the FTP server. Enter the appropriate password for the user.
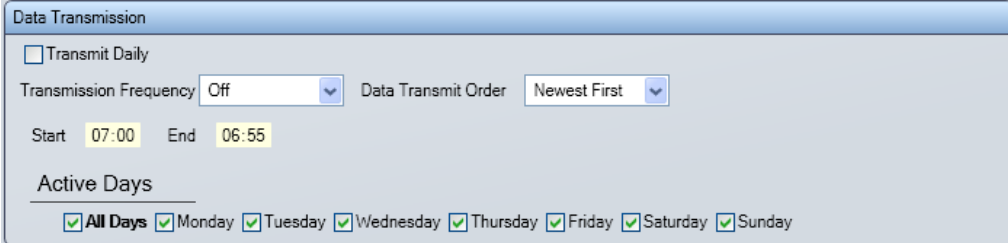
Test Login Details

Clicking on this button verifies the FTP server address, username, and password by attempting to call and log into the server. **PrimeWorks** will provide notification of success or failure. A failure may indicate the wrong server address or login information.

Combine Flow and Pressure

When using a 2i or 3i version of the XiLog+ and sending data via SMS, the flow and pressure data can be included in a single SMS. For this to occur, set up the system to log pressure at a 15-minute interval and flow at a 15-minute interval.

Designating these criteria enables the **Combine Flow and Pressure** checkbox for selection. Selecting this checkbox sends a single SMS (*instead of two*) representing both channels each day.

Data Transmission

Data Transmission sub-window

This window contains the parameters for setting up the process the XiLog+ uses for transmitting logged data.

Daily Data Transmission

Selecting the **Transmit Daily** checkbox programs the logger to send the data once every day at the same time. When using this option, enter the time to perform the daily transmission in the **Start** field.

Data Transmission at Other Intervals

Programming the logger to perform data transmission using a different regime requires selecting or setting several parameters:

1. Select the interval at which to send the data from the **Transmission Frequency** drop-down list.

2. Designate the period of time within which the logger should conduct data transmission in the **Start** and **End** fields. Choosing a frequency of **12** or **24 hours** only requires designating the time at which to perform transmission during the selected day(s) in the **Start** time field.

3. Select the checkboxes corresponding to the days on which to have the logger transmit data (based on the designated frequency and time range) from the options under **Active Days**.

4. Select the order in which to send the data from the **Data Transmit Order** drop-down list. Choosing **Newest First** ensures the logger sends the most current data first.

For example, a logger could be programmed to transmit data every hour between 8 am and 6 pm Monday through Friday.
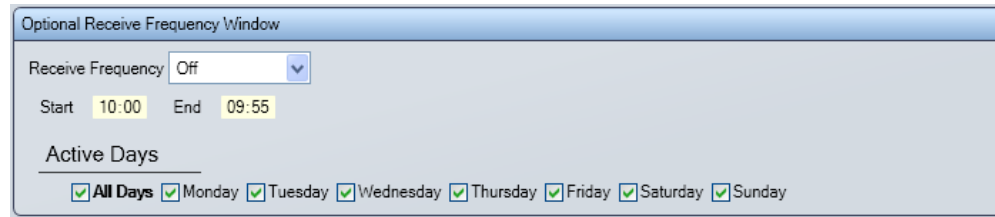
Strategically managing the transmission times can maximize the life of the battery in the logger. To manage the costs associated with SMS transmission, the XiLog+ refrains from sending an SMS until the transmission will be somewhat full, regardless of the selected frequency. Each SMS can contain up to 96 values.

For example, logging data at a 5-minute interval for an 8-hour period will produce enough data to fill an SMS transmission. Therefore, logging at this interval, the XiLog+ would transmit data via SMS approximately every 8 hours, even if the logger is preconfigured to transmit data on an hourly basis. This controls the costs associated with SMS transmission and prevents the duplication of data.

Transmitting data via FTP does not involve these restrictions. At each transmission interval, the XiLog+ will send *all* new data by FTP.

Optional Receive Frequency Window

This window contains the parameters for enabling the modem to receive data. These settings are independent of the settings on the main data transmission window.
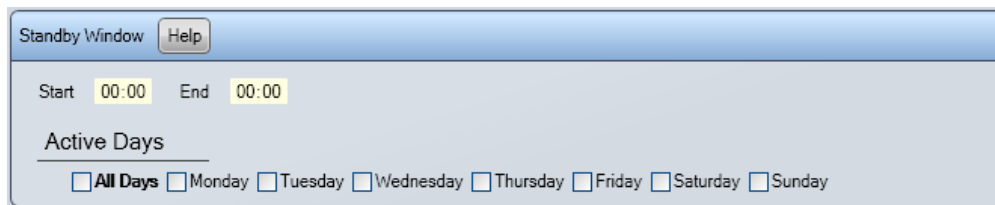
Optional Receive Frequency Window

Standby Window

This window exists for applications where the XiLog+ will provide constant power to the modem so that it is available to accommodate instantaneous requests for data.

Standby Window

C H A P T E R 4

Battery Replacement

1. Carefully unscrew the yellow cover of the XiLog+ counter-clockwise 1/8 of a turn and lift it off the housing.

2. Carefully lift out the antenna and circuit board from the housing.

3. Disconnect or unplug the battery from the board.

4. Remove the screws securing the battery holder to the housing.
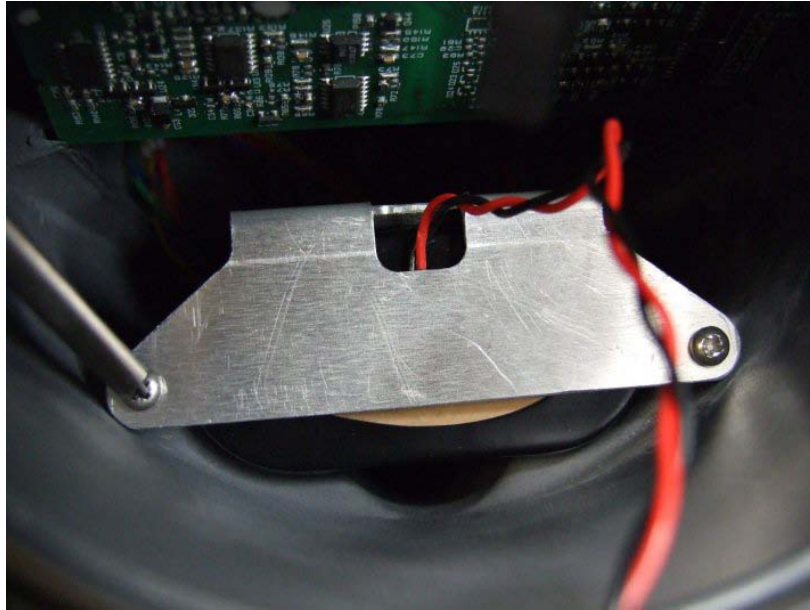
5. Remove the battery holder from the housing.
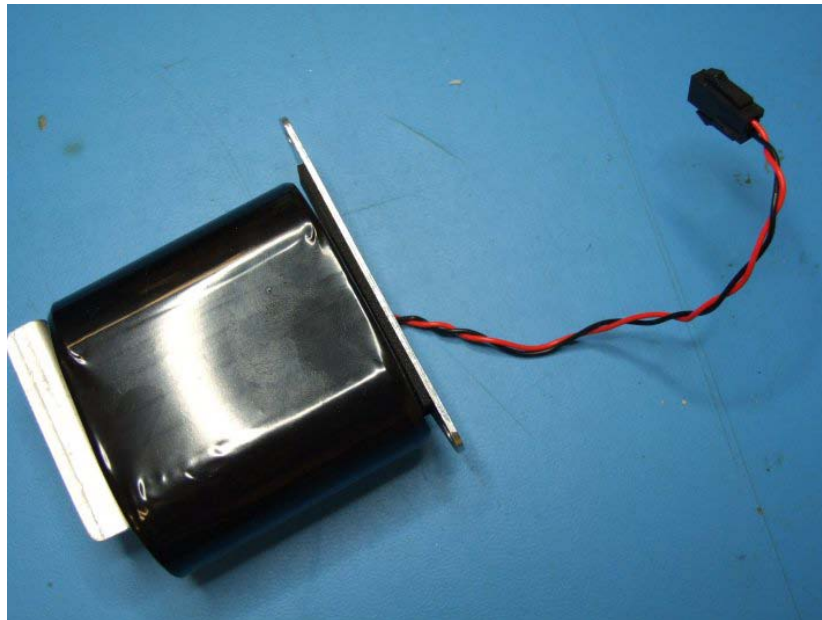
6. Remove the battery from the holder.
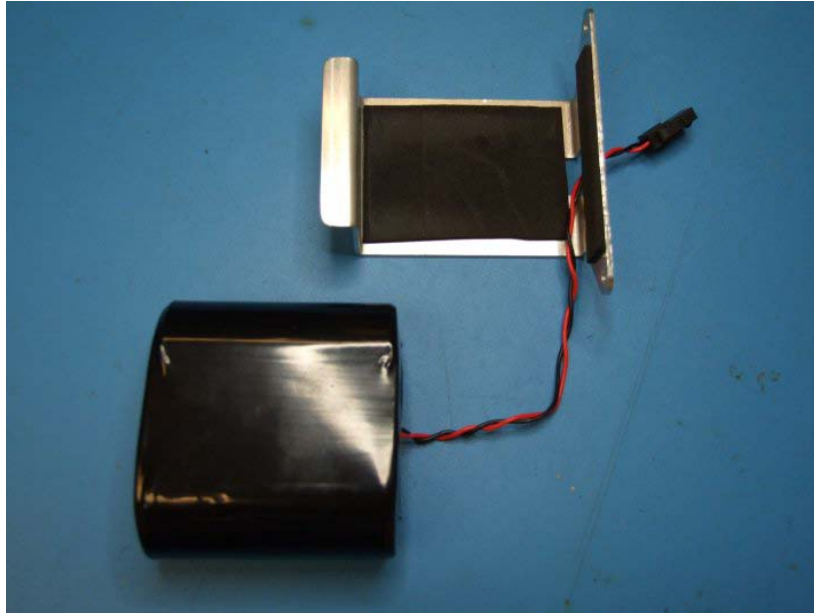
7. Feed the battery cable from the new battery through the hole in the battery holder.

8. Place and properly position the battery into the holder.

9. Insert the battery holder back into the XiLog+, and secure it with the two screws.

10. Connect the battery cable to the circuit board.

11. Slide the circuit board into the rails inside the housing.

12. Place the yellow cover back onto the XiLog+ and into position.

13. Turn the yellow cover clockwise 1/8 of a turn.

CHAPTER 5

9-Channel Connections

Two options are available for wiring the outputs on the XiLog+ 9:

- NXG-302 Expansion Box
- NXG-303 Bare Wire Cable

NXG-302 Expansion Box

ADS offers an expansion box for the wiring. Make connections based on the figures below. Seal any unused connectors on the box with a blank to prevent damage to the connection box.
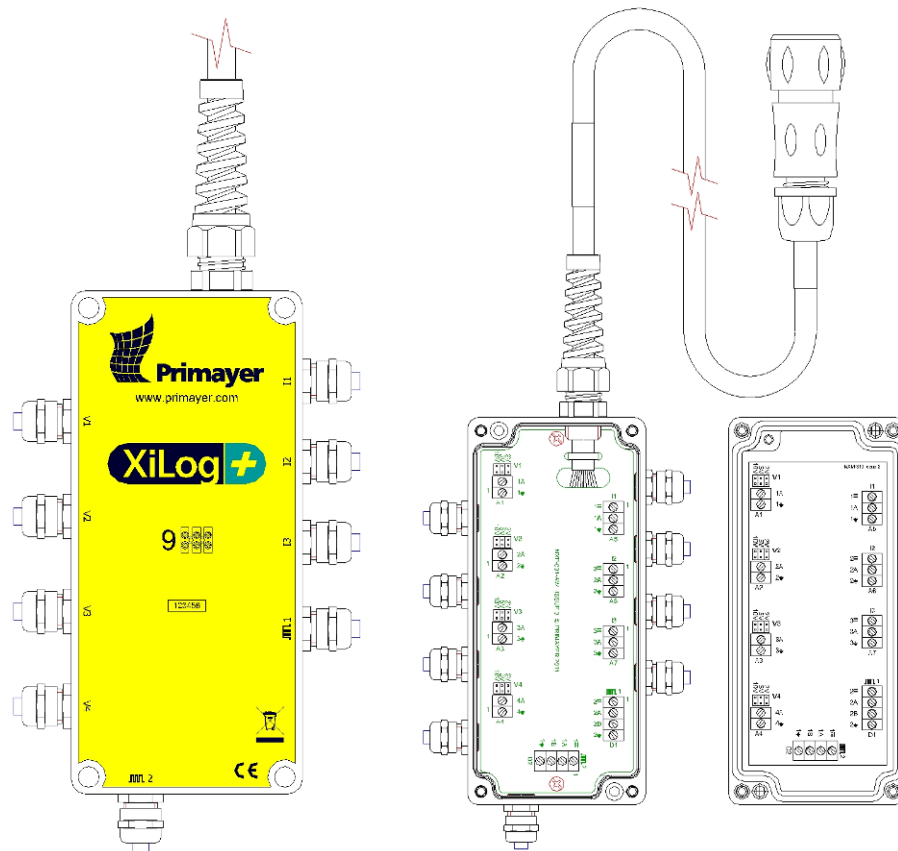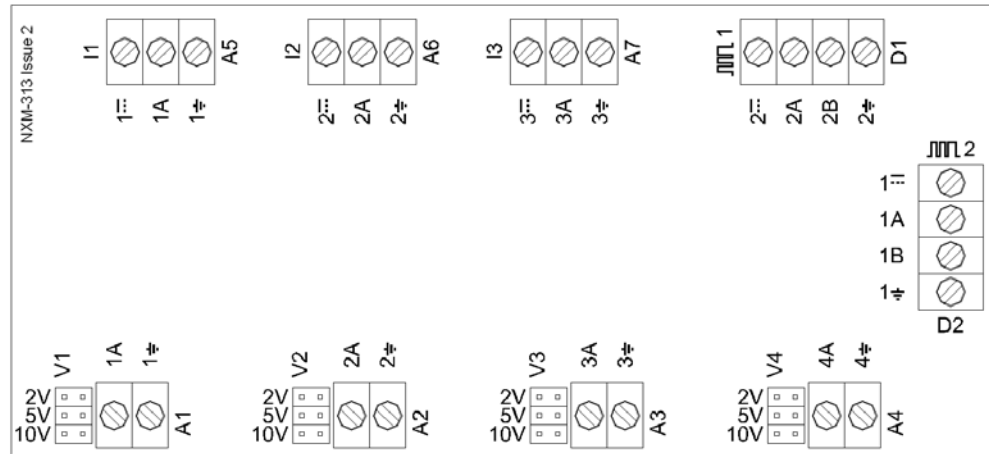
Note: Each voltage input has a 2-, 5-, or 10-volt range, based on the position of the jumper next to the appropriate input. Verify the correct position. Selecting the wrong position could result in damage to the logger.

NXG-303 Bare Wire Cable
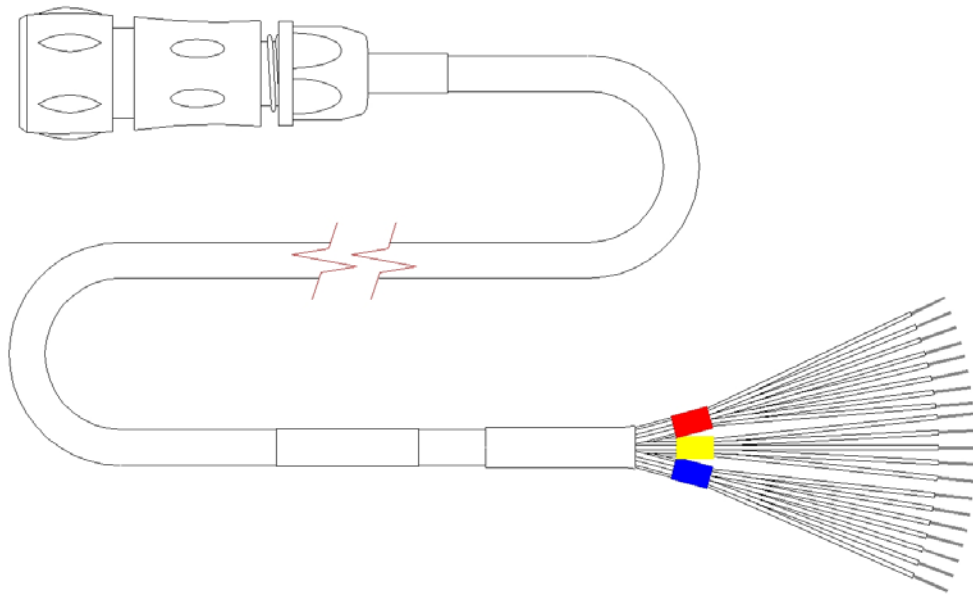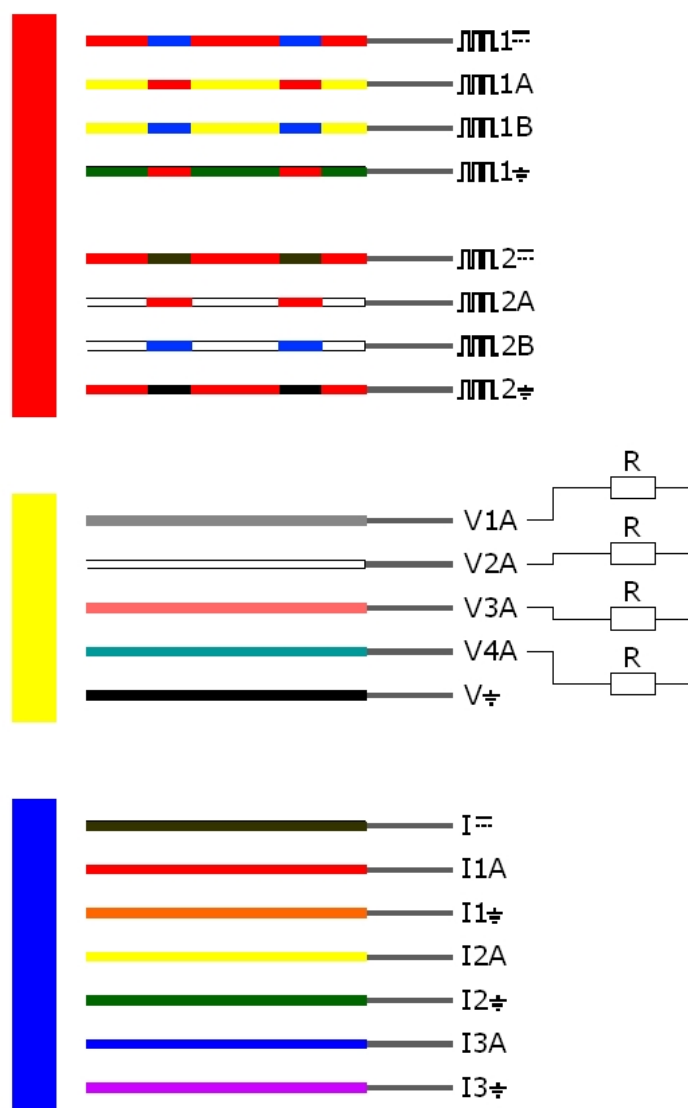
R represents the following:

V= 0-2 volts; R=0Ω
V= 0-5 volts; R=69k8Ω, ±0.1%, 25ppm
V= 0-10 volts; R=187k Ω, ±0.1%, 25ppm

CHAPTER 6

Appendices

This chapter contains important instructional and reference information regarding the **XiLog+ FastTrack** software, meter scaling, battery life, and airfreight restrictions.

Appendix A: XiLog+ FastTrack Software

The **XiLog+ FastTrack** software primarily is designed for expediting the process of programming the logger, viewing the current logger configuration, and testing the signal strength. Although the **PrimeWorks** configuration process is much more comprehensive, **FastTrack** represents an efficient and effective alternative for deploying and/or testing the logger quickly in the field.

> **Note:** The **XiLog+ FastTrack** software does not support XiLog+ models 2 or 9.

To perform any or all of these tasks, first launch the **FastTrack** software (provided it has been previously installed on the computer) by clicking on the icon on the **Windows** desktop or selecting **All Programs > Primayer > XiLog+ FastTrack > XiLog+ FastTrack** from the **Windows Start** menu. Then, connect the XiLog+ to the computer using the yellow communication cable (ADS part number NXG-881-001). The **FastTrack** software will display the current serial number and phone number (when applicable). It also will display other settings based on the last time the software was run.

XiLog+ FastTrack software

Viewing the Current Configuration

To view the current configuration programmed into the logger, click on the **View** button at the bottom of the **XiLog+ FastTrack** application window.

Programming the Logger

1. Edit the name of the logger in the **Site Name** field, when necessary.

2. Edit the phone number (when applicable) in the **Phone Number** field.

3. Designate the parameters under the **Transmission** header in the following way:

   ❑ Enter the time at which the logger should transmit the data to the host system in the **Transmit Time** field. The logger will send the data at this time every day.

   ❑ Select the checkbox corresponding to **Auto GSM Clock Correction** to synchronize the logger clock to the time in the GSM network every 30 days.

   ❑ Select the radio button (**SMS Transmission** or **FTP Transmission**) corresponding to the method of GSM communication that will be in use. For *SMS*, enter the number for the GSM modem connected to the host system to which the data will be sent in the **Host Number** field. For FTP, enter the IP address for the server to which the data will be sent in the **Server Address** field. Enter the user name and the password necessary to access the server in the associated fields.

   Note: When using the *Primayer XMS System* for FTP data delivery, enter www.waterlogger.co.uk for the server address. When using another server, enter the IP address without the initial **ftp://**.

4. Designate the parameters under the **Flow Channel 1** header in the following way:

   ❑ Select the type of sensor connected to Channel 1 from the **Sensor Profile** drop-down list.

   ❑ Enter the amount of flow that must occur to generate a pulse in the **FCAL** field. Select the unit of measure for the value from the associated drop-down list.

   ❑ Enter the unit of measure in which the flow data will be reported from the **Units** drop-down list.

   ❑ Enter the current reading from the meter in the **Meter Readin**g field, and select the appropriate unit of measure from the associated drop-down list.

❑ Select the interval at which the data will be logged and averaged (as necessary) from the **Interval** drop-down list. Sending 5- or 10-minute data will require sending more than one SMS per channel per day. Choosing **Off** will prevent the channel from recording measurements.

5. Designate the parameters under the **Pressure Channel 1** header in the following way:

❑ Select the unit of measure in which to log the data from the **Units** drop-down list.

❑ Select the frequency at which to record the data on this channel from the **Interval** drop-down list.   Choose **Off** to prevent the channel from recording data.

6. Initiate logger programming based on the designated parameters in one of the following ways:

❑ **Program Logger, Delete Data** To delete all old data from the logger during programming, click on the **Start** button.

❑ **Program Logger, Retain Data** To program the logger without deleting the data, click on the down arrow to the right of the **Start** button and select the **Changes Only** option.

XiLog+ FastTrack programs the logger based on the selected method. Pressing start also synchronizes the logger clock to the PC clock.

7. Verify the settings and readings returned. Edit the settings as necessary, and consider the following:

    ❑ The **Flow Channel** header displays the current flow and meter readings. These updates every 10 seconds. If the flow rate does not match the meter reading, edit the **FCAL** value as necessary and click on the red arrow ⬇ to send the new value to the logger. Edit the **Meter Reading** as necessary and click on the corresponding red arrow ⬇ to send the new value to the logger.

    ❑ The **Pressure Channel** header displays the current pressure reading. This reading updates every second. To set the pressure reading to zero (when necessary), click on the **Auto Zero** button.

8. Click on the **Finish** button, and disconnect from the logger.

Testing the Signal Strength

Performing the signal strength test using **XiLog+ FastTrack** requires pre-planning so that adequate time will be available for initiating the test, disconnecting from the logger, and placing the logger at the location of deployment before the formal test begins. The test provides a 30-second window, or delay, following test initiation through **FastTrack** to allow for these activities to occur without disrupting the actual signal test. Run the test in the following way:

1. Make sure the proper SIM card has been installed in the logger.

2. Locate the logger near the proposed site at which it will be deployed.

3. Click on the **Signal Strength** button.

4. Disconnect the logger from the computer.

5. Place the logger in the deployment location, and verify that all enclosures, lids, and doors are in positions (e.g., open or closed) that accurately reflect the deployment conditions.

The signal strength test takes one minute to complete, following the 30-second delay for preparation.

6. Once the test is complete, recover the logger and reconnect it to the computer.

7. Evaluate the results in **XiLog+ FastTrack**. Refer to *Performing a Signal Strength Test* on page 16 for information on properly interpreting the test results.

Appendix B: Meter Scaling Tables

Elster/Kent Helix & Domestic Meters

Meter		PU10/LRP
	(mm)	FCAL
Helix 2000	40-80	10
	100-300	100
Helix 3000	40-80	10
	100	10
	150	100
Master 2000	40-50	1
	80-100	10
		PG100
Helix 4000	80-125	10/1000
	150-300	100/10000
		PSM
PSM-PS15-PS20 (V100)	15/20	0.5
PSM-PS25-PS30 (V100)	25-30	5
PSM-PS40 (V100)	40	5
PSM-LT (V100)	15 & 20	0.5
		MSM
MSM-T (V210)		1
KVM-T (V200)		1
MSM-RS		10

Schlumberger/Actaris/Stream Domestic & Helix Meters

Meter		CYBLE LF		
	(mm)	K=2.5	K=10	K=25
Aquadis (4X4)	15	0.25	1	2.5
Aquadis	15-40	2.5	10	25
P40M (4x4)	15	0.25	1	2.5
P40M	15	2.5	10	25

Meter		CYBLE LF		
	(mm)	K=2.5	K=10	K=25
FlostarM	40-100	25	100	250
Woltex	50-100	25	100	250
	150-300	250	1000	2500
	400-500	2500	10000	25000

Sensus (Socam/Meinecke)

Meter		K510	K505R
	(mm)	FCAL	
510/510PR	15-20	1	0.5
501L		10	
501LM		100	
501JM		1000	
510/510PR	25-30	10	5
501JM		100	
		R01.1	
Cosmosil	50-125	100/1000	
	150-250	1000/10000	
	300-800	10000/100000	
		RD 01	
Cosmos	50-125	100	
WP/WS-Dynamic	40-125	100/1000	
		10/1000	
	150-300	1000/10000	
		100/10000	

Supplementary Notes for Meter Scaling Tables

FCAL = NUMBER OF LITERS PER PULSE

Kent Meters:

* Some earlier 100-mm meters require the following:

FCAL = 100(PU10/LRP) or 10(PU100/HRP). Distinguish these meters by the center pointer dial registration = 1000 liters/rev.

** Applies only to 7-digit counters; the other FCALs apply to the 8-digit counters.

Kent combination meters use a Helix 3000 meter as the main meter and a PSM-T as the secondary meter. Select the appropriate FCAL from the table above for each meter.

The Master 2000 has been discontinued.

Socam meters:

*The 510 pulse unit is factory installed and cannot be removed. The FCAL is determined at the factory, and the table above displays the values available. Check the individual meter before selecting the appropriate FCAL.

Appendix C: Battery Life

Measurement Interval	Transmission	Standard Internal Battery	Double Internal Battery	External Lithium Battery
≥1 minute	Once per day	>5 years	>10 years	
≥1 minute	Once per hour	>1.2 years	>2.5 years	>7 years
≥1 minute	Once every 15 minutes (for 10 hours a day)	>0.7 year	>1.5 years	>5 years
≥1 minute	Once every 15 minutes	0.3 year	0.7 year	2.5 years

Power Supply Options

Following are the *internal* power options available for the XiLog+:

- Standard pack
- Double battery pack

Following are the *external* power options available for the XiLog+ (*all loggers*):

- External battery pack
- Mains
- Solar

Appendix D: Airfreight Restrictions

APP3.1: Essential Safety Precautions before Air Freighting

To prevent radio transmission on aircraft, remove the batteries and the removable external antenna (when applicable) from the equipment before transporting this product by air.

IATA Hazardous Goods Regulation

This product is powered by a battery containing lithium D-cells. IATA (International Air Transport Association) regulation UN/ID number 3091, "*Lithium batteries contained in equipment,*" governs air-freighting of products containing these lithium cells. This regulation clearly states that this equipment is classified as *Hazardous Goods*, *Class 9*. This equipment can be transported by air only if it is packed specifically as defined in instruction UN/ID number 3091. This instruction defines the necessary packing requirements (*Packing Instruction 912*) and labeling requirements (*Miscellaneous*).

Transporting XiLog+ Dataloggers to ADS by Air

To transport this product by air, first remove all batteries. Removing the batteries from the XiLog+ allows the logger to be transported without being declared *hazardous*.

Dispose of any batteries removed according to local waste regulations. ADS will install new batteries in the product at the factory.

To airfreight these products or obtain further information concerning air-freighting regulations, please contact ADS in the following way:

ADS Client Services

(877) 237-9585

adssupportcenter@idexcorp.com