



REMOTE MONITORING SOLUTIONS

Observant Desktop User Guide



Observant Desktop Software User Guide

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Document history

Issue	Date	Suits software version
1	March 2006	1.0
2	October 2006	1.0
3	November 2006	1.0
4	December 2006	1.0.1
5	February 2007	1.0.1
6	June 2007	1.1
7	August 2007	1.1
8	October 2007	1.1
9	January 2008	1.2
10	June 2008	1.3
11	March 2009	1.4

Acknowledgement

Observant would like to thank the many customers who have offered valuable feedback and suggestions for content, both in this Guide and in the Observant Desktop software.

This guide is updated on a regular basis and your feedback is appreciated and included in each edition. Please contact us if you require the latest version or have any questions.

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Before you start

Symbols and notation conventions

The following symbols are used throughout this User Guide:



Notes providing additional or vital information to the topic being discussed.



Helpful hints, suggestions and short cuts.



A **caution** indicates a condition that may lead to equipment damage, malfunction or inaccurate operation.

Product care

While the components of the Observant Water Management System are designed with extreme environmental conditions in mind, there are a number of additional steps that can be taken to ensure the long life of the equipment.



- Always have an antenna or dummy load plugged into a C1 unit's antenna post. Leaving the antenna post open can cause damage to the radio unit and void the C1 unit warranty.
- Always keep the top of a level sensor out of the water. Water level sensors are not designed to be completely immersed in water and are not covered under warranty in this case.



- Observant recommend that the level sensor cable be protected from UV light, birds and insects by containing it within a protective housing such as PVC and/or electrical conduit.
- To ensure the best possible reliability and long life of the system, carefully read the Hardware Installation chapter prior to installation.

Safety information

There are no power sources in the C1 or C2 unit or its associated sensors that can cause harm to people or animals. Inputs to a field unit are protected against reverse polarity and outputs are current limited. Regular inspection of the connecting cables at the base unit and field units is recommended and any damaged cabling should be replaced to ensure reliable operation.

Mains powered equipment such as electric pumps should be installed by a qualified electrical contractor and must be isolated from the field unit or engine controller using a relay.

Terminology

Serial port:

Also referred to as a COM port, the 9-pin socket on the rear of your computer that allows communication with the Observant C1 base unit.

**C1 unit, C2 unit:**

The main component of the Observant Water Management System, the C1 unit is responsible for managing and retrieving data from the measurement and control devices attached to it. The C2 is the new replacement for the C1 and the two are functionally the same, although the C2 has been designed with expansion capabilities for future development. The C1 and C2 units in a system communicate with one another using an inbuilt UHF radio module.

Base unit:

The base unit is the C1 unit directly attached to your computer.

Field unit:

A field unit is a C1 or C2 unit that sends data via the radio to the base unit.

Zone

A zone can be thought of as a location. In most cases, you will only have a single zone covering your property. An additional zone can be added later and this could be used to monitor another property via the Internet.

Introduction

The Observant Water Management System provides remote monitoring and control of sensors and equipment spread across a wide area, using UHF radio communications. Remote equipment is fully self-contained and critical system functions such as battery charge level and radio operation are regularly monitored. The system includes several main components:

- Observant C2 telemetry unit, the core hardware component that gathers data from attached devices and transfers that data to the Observant Desktop software.
- Sensor devices such as the Observant L1 water level sensor
- Control and monitoring devices such as the Observant M1 engine controller
- Observant Desktop software

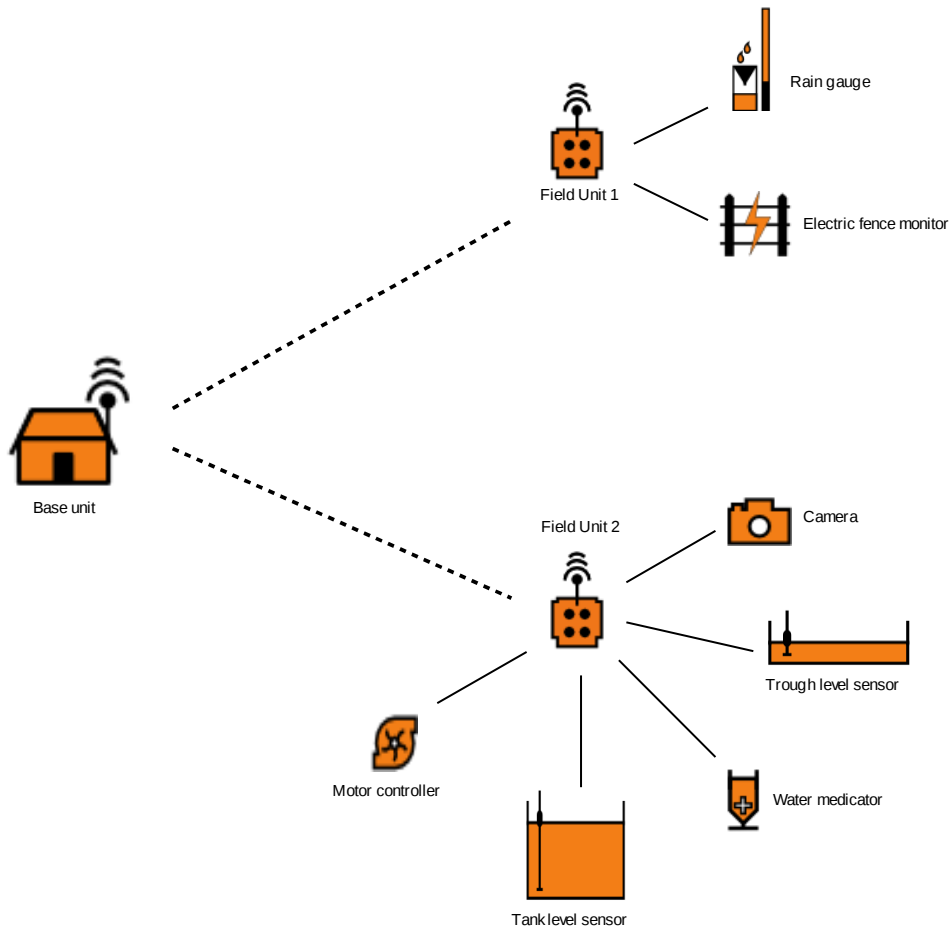
Additionally, a number of third-party sensors and controllers can be added to the system to add further functionality. Examples of these additional components are:

- PFSA Nutridose water medicator
- Axis Digital camera
- Pakton Electric fence monitor

This user guide covers the steps required to install, configure and use the system and includes troubleshooting steps to follow in case of problems.

System overview

The diagram below shows a property where the Observant Water Management System performs a variety of monitoring and control functions.



The base unit is located at the homestead and is connected to a computer running Observant Desktop.

Field Unit 1 is located several kilometres from the homestead and is monitoring rainfall and the voltage on the electric fence.

Field Unit 2 is located 25km from the homestead and is monitoring a number of devices around the water trough. The water level sensor gives a visual indication of the trough water level and the software can display warnings should the level become either too low or too high. The pump controller enables the bore pump to be remotely switched on and off to fill the tank, while the water medicator monitors the water flow and administers the appropriate quantity of nutrient. The water trough is gravity-fed from the tank, and its level monitored by a second level sensor. Pictures are captured by the digital camera showing the cattle as they come to drink each day.

Software installation

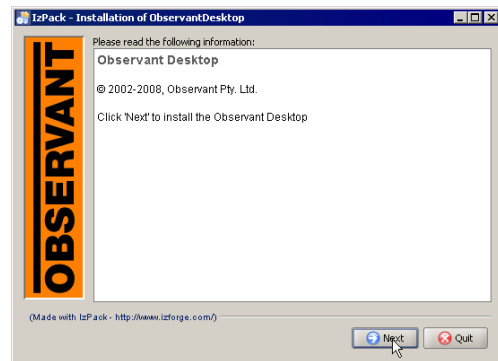
System requirements

- Microsoft Windows 2000, XP or Vista
- RAM: at least 512 MB
- Hard drive: at least 1 GB free
- Available serial COM port. For computers without an inbuilt serial port (as is the case with many notebook computers) a USB to Serial converter is included with each base kit.
- CD Drive

Installation

To install the Observant Desktop software on Windows 2000/XP/Vista:

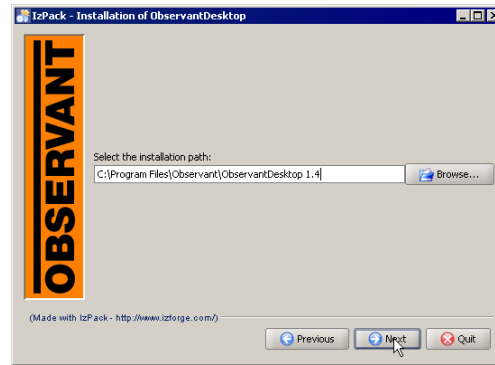
1. Using the cable provided, connect the base unit C1 to the computer's serial COM port and take note of the COM port number used for the connection.
2. Insert the Observant Desktop CD into your CD drive and wait for the installation program to begin.
3. If the installation program does not begin automatically, browse the CD using Windows Explorer and double-click the **Setup.exe** program.
4. The Observant Desktop installation program will begin. Click **Next**:



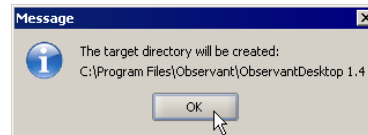
5. Select **I accept the terms of this license agreement**, then click **Next**.



6. Next, you will be asked where the software should be installed. Select a folder to install the software into, or accept the suggested setting. Click **Next**.

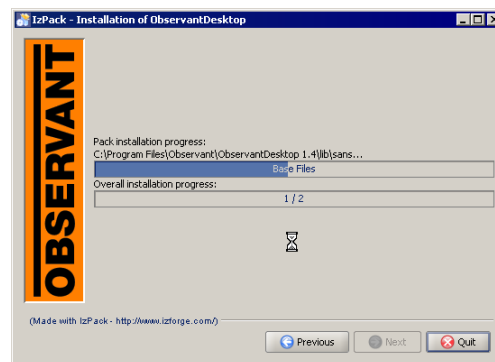


7. The installer will confirm that you want to create the installation directory:

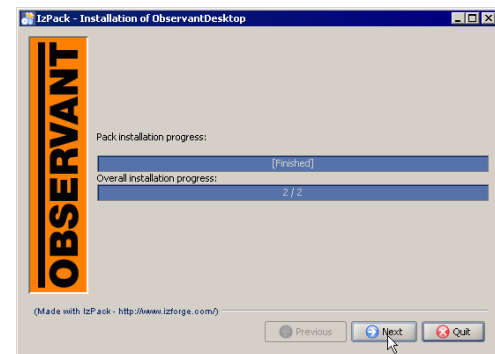


8. Click **OK**.

9. Next, the installer will copy the files to your computer.

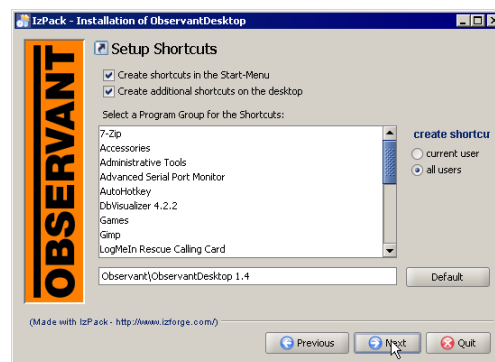


10. Once this process is complete, click **Next**.



11. Click **Next** to create shortcuts to Observant Desktop on the desktop and in the Start menu.

12. Click **Done** to finish the installation.

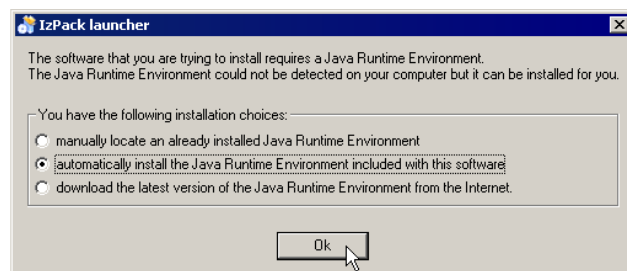


Warning messages during software installation

During installation you may see a number of error or informational messages.

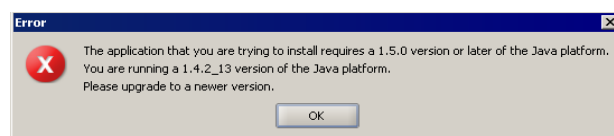
No Java Runtime Environment

Observant Desktop requires the Java Runtime Environment component to be installed on your system. If it is not already installed, you will see this message. Select the option **automatically install the Java Runtime Environment included with this software** and click **OK**.



Outdated Java Runtime Environment

If you have an older version of the Java Runtime Environment component installed on your system, you will see this message. To install the version included on the Observant Desktop installation CD, run the installation program from the **jre** folder on the Observant Desktop installation CD.



Windows firewall warning

If your system is running Windows XP with Service Pack 2, this message may appear during the installation of Observant Desktop.

Click the **Unblock** button to give the Java program permission to run on your computer.



Setup wizard

The first time the Observant Desktop software is run, it will launch a wizard to guide you through the steps to connect to the base C1 unit.

Start Observant Desktop by double clicking on the Observant Desktop shortcut on your desktop:



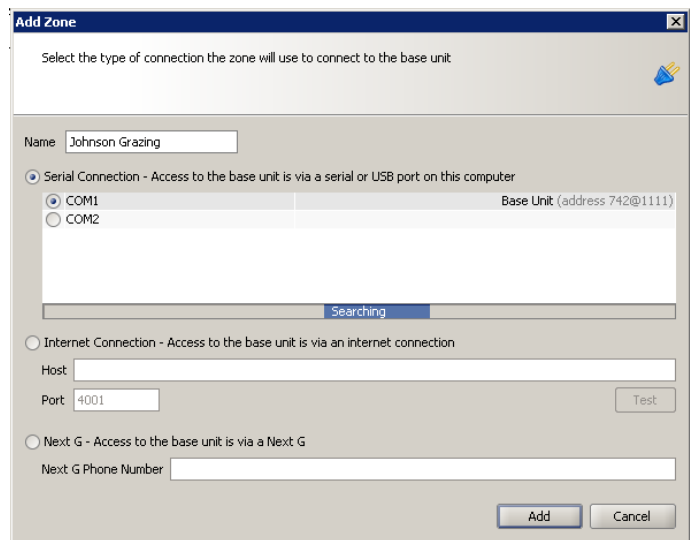
Detecting the base unit



This wizard will search the computer's serial ports to find an attached base unit. For this step to succeed, the base unit must be powered up and attached to a serial port.

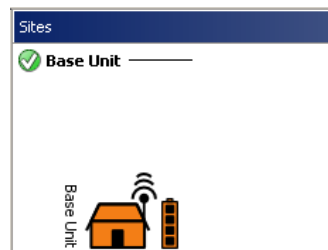
Give your zone a meaningful name, such as the name of your property or company.

The software will scan the computer's serial ports and show the attached base unit. Select the appropriate serial connection (in this example COM1) and click **Add**.



There will be a short delay while the software configures the base unit. During this process, you will see the Port B indicator on the base unit flashing, showing that the software is communicating with the base unit.

Once this process is complete, You will see the site view, containing your base unit:



You can test the connection to your base unit at any time by selecting **Zone, Find Base Unit**.

Connecting to a base unit via the Internet

Observant Desktop allows connection to a base unit at another location via the Internet. The requirements for this are:

- the computer running Observant Desktop must have Internet access
- the base unit must be in a location with Internet access, but does not necessarily need a computer at the location
- an Ethernet-to-serial adaptor is required at the base unit. Observant recommend the following device:

Manufacturer: Moxa
Model: NPort 5110
Description: RS-232 Serial Device Server



Depending on your specific circumstances, additional network configuration might be necessary to allow Internet access to the Moxa adaptor. Please contact Observant support to discuss your requirements prior to installing the base unit in this configuration.

Configuring the base unit

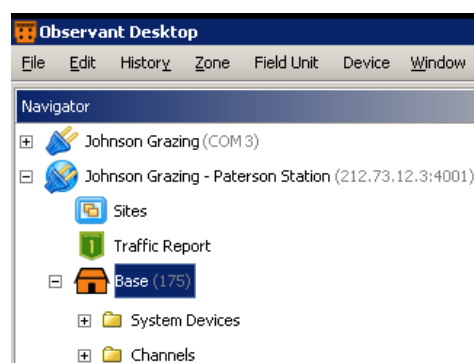
1. Install the base unit as described in the Hardware Installation Guide, but do not connect the base unit to a computer.
2. Using the supplied serial cable, connect Port B of the base unit to the Moxa adaptor.
3. Connect the Moxa adaptor to an available network connection.

Configuring Observant Desktop

To add the base unit, a new zone must be created. To create the new zone:

1. Enter advanced mode and from the menu, select **File, New, Zone**.
2. Select **Internet Connection** and fill in the IP address of the Moxa adaptor.
3. Click **Add** to add this zone.

The newly added zone and its base unit will now appear in the Navigator panel:



Connecting to a base unit via a Next G connection

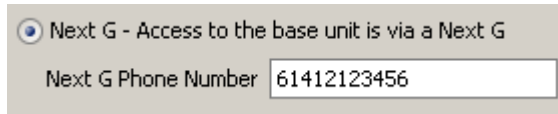
Observant Desktop also allows connection to a base unit at another location via the a Next G wireless connection. The requirements for this are:

- the computer running Observant Desktop must have Internet access
- the base unit must be in a location with Next G coverage
- one Observant field unit must have a Next G modem installed. This unit then becomes the base unit, and communication with all other field units occurs via UHF radio.

Configuring Observant Desktop

To add the field unit, a new zone must be created. To create the new zone:

- Enter advanced mode and from the menu, select **File, New, Zone**.
- Select **Next G** and fill in the phone number of the Next G modem. This is the phone number associated with the modem's SIM card. The number must have the 61 country code prefix, so for a phone number of 0412 123 456, enter:



Next G - Access to the base unit is via a Next G

Next G Phone Number

- Click Add to add this zone.

The newly added zone and its base unit will now appear in the Navigator panel.



A Next G connection can take up to 15 minutes to initially connect.

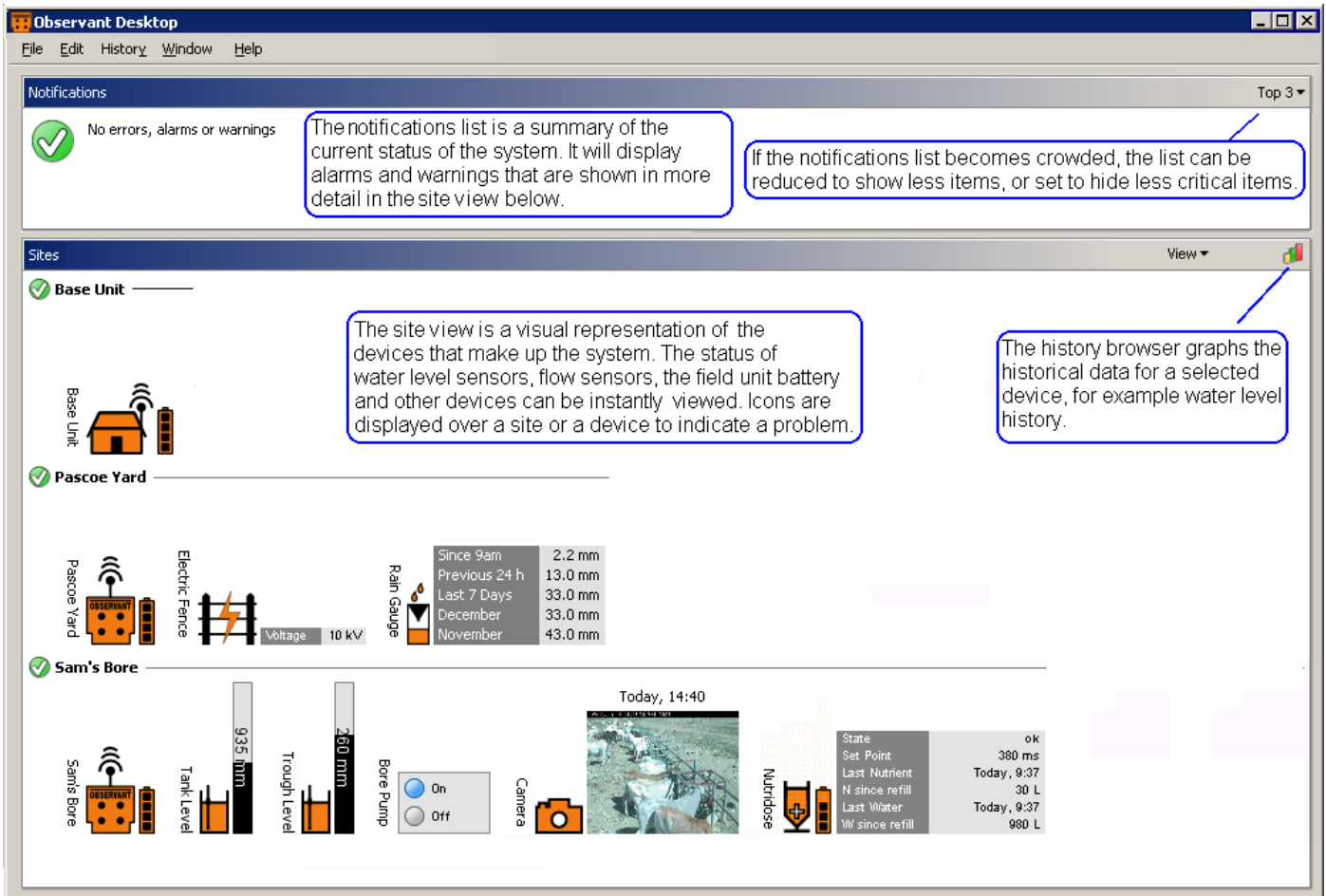
Using Observant Desktop

To start Observant Desktop, double click on the Observant Desktop shortcut on your desktop:



The opening screen

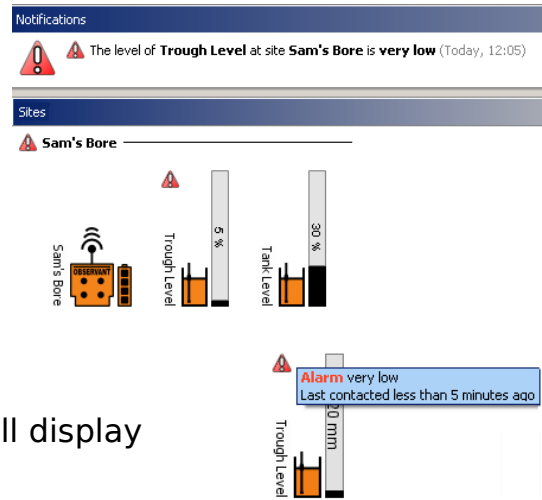
The opening screen presents a snapshot showing the status of the system:



The bar to the right of the base unit (homestead icon) and each field unit icon indicates the current battery level. Each site is then summarised showing the field unit and its attached devices. The example above is the same system outlined in the system overview on Page 7. The bars to the right of the tank level and trough level icons indicate the current water level.

The notifications list will display any current alarms or warnings for the system. If none exist, this is indicated by the green tick icon.

Here, a warning is indicating that the trough level is very low. This could indicate an inlet blockage or a leak from the trough that needs urgent investigation.



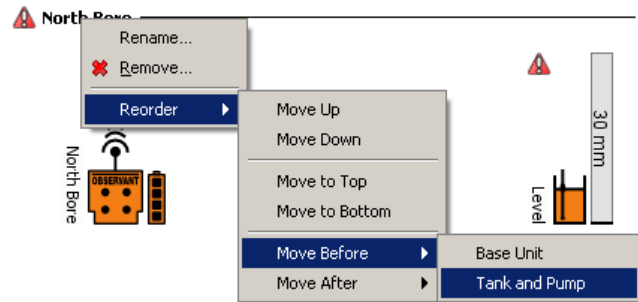
Investigating an Alarm or Warning

Hovering the mouse pointer over the device will display more detail:

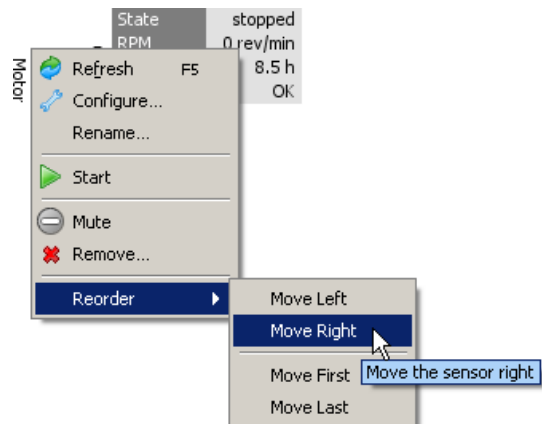
Rearranging the site view

The sites and devices in the site view can all be rearranged as required. For example, it might be more convenient to lay out the sites in the same order a bore run is done, and to have level sensors shown before other devices.

To move a site up or down in the list, right-click the site name (in this example *North Bore*) and select the required option from the **Reorder** menu:





To change the order of devices at each site, right-click on the device and select the required option from the **Reorder** menu:



The notifications list

Notifications are split into three groups:

 **Errors** are events that indicate the system is not operating as expected. For example, an error is generated when the serial cable is disconnected from the base unit or a level sensor is not reporting data due to a damaged cable.

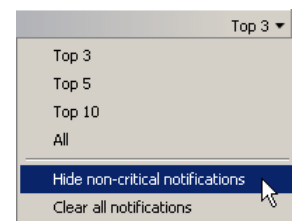
 **Alarms** are high-priority notifications of events such as very low water in a tank or low battery in a field unit.

 **Warnings** are non-critical notifications of events such as low water level.

Managing the notifications list

On a large system, the notifications list can become quite long. The list at the upper right-hand side of the screen provides several ways of managing long lists:

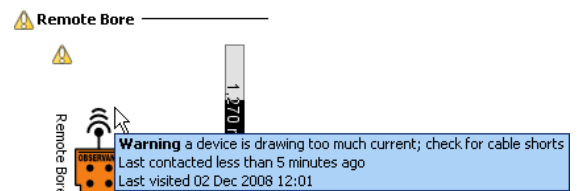
- **Top 3, Top 5, Top 10:** Only show the selected number of notifications. The highest priority notifications will be displayed first, beginning with errors, then alarms and warnings.
- **All:** Show all notifications.
- **Hide/show non-critical notifications:** Hide or show all lower priority items (warnings).
- **Clear all notifications:** Empty the notifications list. New notifications will be added to the list as they arrive from field units.



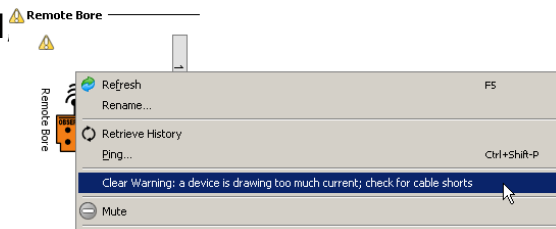
To reset an alarm or warning

Some alarms come from the field unit itself and may indicate a problem such as a cabling short-circuit or other issue that may have been rectified since the alarm occurred. These alarms can be reset by right-clicking on the field unit and selecting the alarm from the list.

Here, damaged wiring has caused a short-circuit and this field unit has raised an appropriate warning:



Now that the damaged cabling has been replaced, the warning can be reset. Right-click on the field unit to clear the warning:



Keyboard shortcuts

Many functions in Observant Desktop can be accessed via keyboard shortcuts. The available commands are:

Function	Windows	Mac OS
Add Device	CTRL-D	CMD-D
Add Field Unit	CTRL-SHIFT-C	CMD-SHIFT-C
Add Zone	CTRL-SHIFT-Z	CMD-SHIFT-Z
Ping	CTRL-SHIFT-P	CMD-SHIFT-P
Comms Monitor	CTRL-M	CMD-M
Exit	ALT-F4	CMD-Q
Show/hide History	CTRL-H	CMD-SHIFT-H
Show/hide Advanced Mode	CTRL-SHIFT-A	CMD-SHIFT-A
Refresh	F5	CMD-R
Copy	CTRL-C	CMD-C
Paste	CTRL-V	CMD-V

Adding a field unit

Once the base unit is installed, field units can be added to the system.



The field unit should be powered up and its device(s) attached to it prior to performing this step.



Observant Desktop uses a field unit's address to identify and communicate with that field unit. A field unit's address is usually the same as its serial number, which is printed on a label on the base of the unit.

To add a field unit, enter advanced mode and select **Zone, Add Field Unit**. Enter the address of the new field unit and select **Configure after added**.

Click **Add**. The field unit will now be added to the site view.



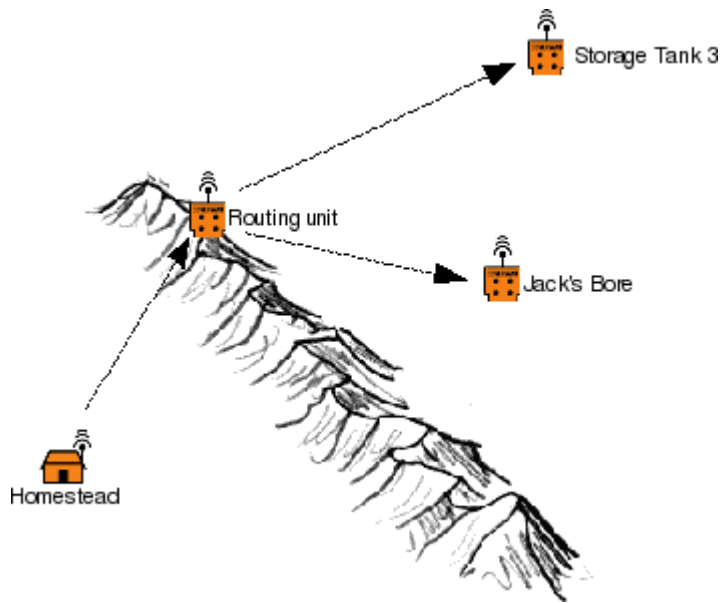
To add a device to an existing field unit, open the **Field Unit** menu and select **Add Device**. For configuration details for each device, refer to **Adding and configuring devices** later in this guide.

Routing

Each field unit has the ability to act as a router, which allows signals to be passed around or over terrain that would otherwise stop radio communications. Routing can also be used to cover longer distances than would be possible using a single radio "hop".

Example:

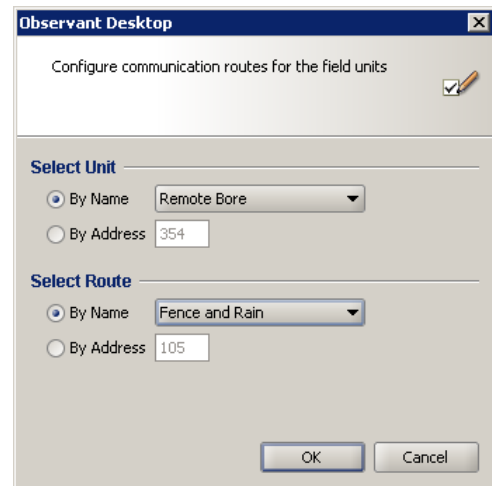
The field units at Jack's Bore and Storage Tank 3 would normally be impossible to contact via radio because of the hilly terrain. Placing an additional field unit at the right location allows the signal to be forwarded, or routed, over the top of the hills.



Using an intermediate field unit to route around terrain.

To configure routing:

1. Enter advanced mode and add the field unit to be contacted, and also the routing field unit if it has not already been added.
2. In the Navigator, highlight the field unit to be contacted, e.g. Jack's Bore, and from the menu select **Field Unit, Add Route**.
3. Select the name of the field unit, or enter its address, under **Select Unit**.
4. Select the routing unit, or enter its address, under **Select Route**.



To route via more than one field unit, enter the addresses separated by commas, starting with the closest to the base. e.g. 101,102 if 101 is the closest to the base unit.

Device icons

Each part of the system is represented by an icon which may also show additional data from the device, for example battery status, water level or water flow.

Base unit

The base unit icon shows the state of the base unit's battery and radio. Often a base unit will not have any devices attached to it, although all devices that can be attached to a field unit can also be attached to the base unit. A common example is a level sensor or flow meter monitoring the homestead water supply.



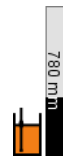
Field unit

Shows the field unit's battery status and its associated devices.



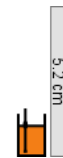
Observant L1 water level sensor

The level sensor icon displays the current water level as a bar graph. It can be set to display a reading of water depth, distance from the top, or percentage full. Alarms can be set to indicate low or high water levels.



Analog level sensor

Displayed in a similar way to the L1 level sensor, the analog level sensor is a pressure-based water level sensor that uses a conversion module (Adam 4017) to interface to a field unit. Unlike the L1 level sensor, analog level sensors do not support high and low level alarms and can not be used to control a motor or pump.



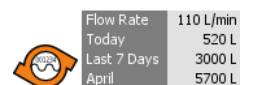
Rain gauge

Displays total rainfall for today, the past 7 days, the current month and the previous month.



Flow meter

Displays total water flow for today, the past 7 days and the current month.



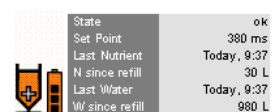
Electric fence monitor

Displays the fence voltage reported by a Pakton fence monitor. An alarm is generated on low voltage or no voltage states.



Nutridose water medicator

Allows full monitoring and control of the Nutridose unit. The icon displays the usage of nutrient and water and any alarms



generated by the Nutridose unit.

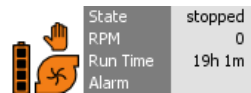
Digital camera

Displays the status of the camera its most recent photo.



M1 engine controller

Displays the current status of the engine (running or stopped), including RPM and total run time and any alarms generated by low oil pressure, high temperature or lack of water flow. In , this icon allows remote starting and stopping of the engine.



Generic port output sensor

Sets a port output on or off. A port output can be used to control a relay which then switches an electric pump or other electrical equipment.



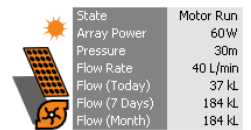
Generic port input sensor

Shows the state of a field unit's input. An input can be used as a counter, a frequency display or a state display as shown here.



Mono solar motor controller

Displays solar power and pump flow statistics for an attached Mono solar pump controller.



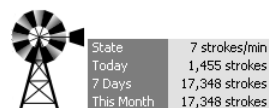
Tru-Test indicator

Shows the state of an attached Tru-Test indicator, and allows export of the Tru-Test weighing records.



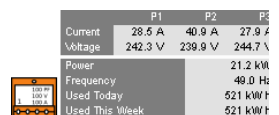
Windmill sensor

Shows the activity of a windmill, including current speed and time since it was last running.



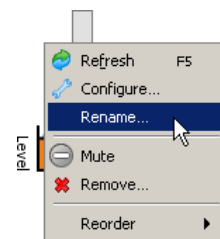
MultiCube power monitor

Shows current and historical data for 3-phase power consumption



Renaming a Device

Devices and sites are assigned a standard reference name that can be customised to give a more appropriate description. To change the name of any device, enter advanced mode, right click on the device icon and select **Rename**. Type in your preferred name and click **OK**.



Refreshing a Device

Information from each unit is refreshed automatically on a regular basis. To manually refresh a device to retrieve the current data, right click on the device and select **Refresh**.

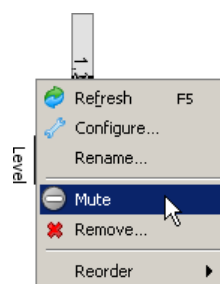


Muting a Device

A device might need to be muted if, for example, it is being replaced or is undergoing maintenance. Muting a device will also mute any errors related to the device.

To mute a device, enter advanced mode, right click on the device icon and select **Mute**.

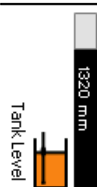
Note that dmuting a device will also stop Observant Desktop from receiving any updates from that device. To unmute a muted device, right click on the device icon and select **Unmute**.



Adding and configuring devices

Observant Desktop provides the *Add Field Unit* wizard to automatically add and configure devices when you add a new field unit to your system. However, sometimes it is necessary to add a new device later, when the field unit is already in service with existing devices.

To add a new device to an existing field unit, select **File, Enter Advanced Mode**. Enter the advanced mode password, *look4water*. Select the appropriate field unit from the list at the left of the screen, and from the menu select **Field Unit, Add Device**. The steps following this will vary depending on the device to be added.

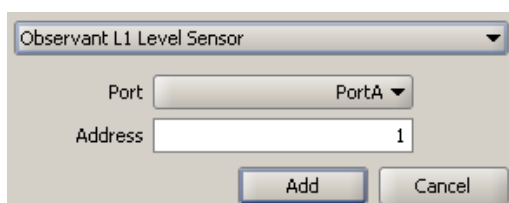


Observant L1 water level sensor

The Observant L1 level sensor is a robust and maintenance free water level sensor designed to suit a range of installations, including dams, overflow pipes and water troughs. The L1 measures water level down to 20 mm resolution with a 400mm, or 2000mm or 2400mm range.

To add a water level sensor:

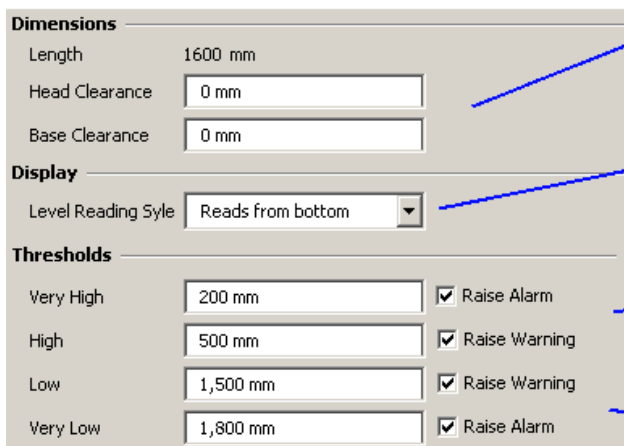
- select **Field Unit, Add Device** from the menu
- select **Observant L1 Level Sensor** from the list.
- set the appropriate configuration options and click **Add**:



- The address depends on the length of level sensor to be attached:
1600, 2000 or 2400mm: Address = 1
400mm: Address = 2
- The address of a level sensor is set at the factory. To attach more than one level sensor of a given type to a single field unit port, it must be configured with a unique address. This process requires the sensor to be returned to Observant. When ordering additional level sensors, a sensor can be set to a specific address on request.

Configuring a level sensor

To change the way the level sensor shows its measurement, and set appropriate levels to show a warning, right click on the level sensor that you wish to change and select **Configure...**



Dimensions		
Length	1600 mm	
Head Clearance	<input type="text" value="0 mm"/>	
Base Clearance	<input type="text" value="0 mm"/>	

Display		
Level Reading Style	<input type="text" value="Reads from bottom"/>	

Thresholds		
Very High	<input type="text" value="200 mm"/>	<input checked="" type="checkbox"/> Raise Alarm
High	<input type="text" value="500 mm"/>	<input checked="" type="checkbox"/> Raise Warning
Low	<input type="text" value="1,500 mm"/>	<input checked="" type="checkbox"/> Raise Warning
Very Low	<input type="text" value="1,800 mm"/>	<input checked="" type="checkbox"/> Raise Alarm

If the water sensor does not begin at the base or extends past the top of the water storage, configure the base clearance or head clearance here.

The level sensor can be configured to read from the bottom, from the top, or to display as percentage full.

Level sensors can generate four types of alarm or warning. These settings define the level at which each warning and alarm is triggered.

Individual alarms and warnings can be disabled so that only relevant warnings or alarms are raised.

Thresholds are set as measurements from the top of the level sensor.

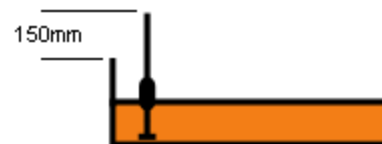
Change the settings accordingly and click **Configure**.

Head and base clearance

Head and base clearance are measurements that allow for water storage that is either deeper or shallower than standard level sensors.

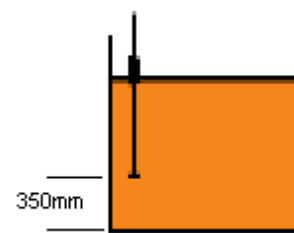
Head clearance:

As this trough is only 250mm deep, it needs to be configured with a 150mm head clearance so that the 400mm sensor will correctly report the percentage full.

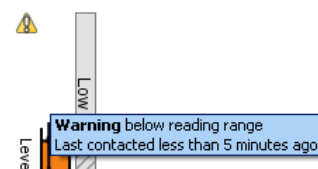


Base clearance:

This tank is deeper than the 1600mm level sensor, but configuring the sensor to have a base clearance of 350mm will allow it to accurately report the water level.



When the water level drops below the bottom of the level sensor and a base clearance is configured, a warning will be shown to indicate that the level can't be accurately read, but is somewhere in the base clearance area:



Automated pump control using the L1 level sensor

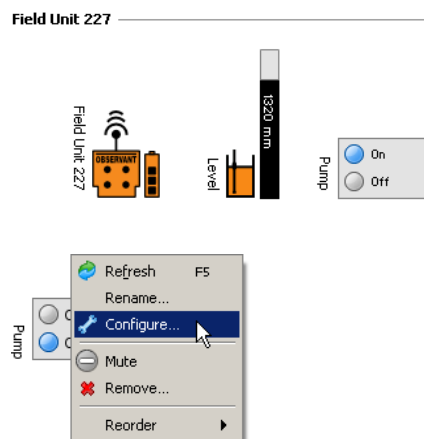
Observant Desktop can be configured to automatically control a pump when the water level drops below a pre-set point, and to continue running the pump until the water level is restored to an acceptable level. Pump automation can be used with any of:

- Observant M1 engine controller
- Pump controlled from a Field Unit port output
- Mono solar motor controllers

Note that due to limitations in older Mono controllers, automation may not be possible using some models. Please check with Observant support if you are planning to use automation with a Mono controller.

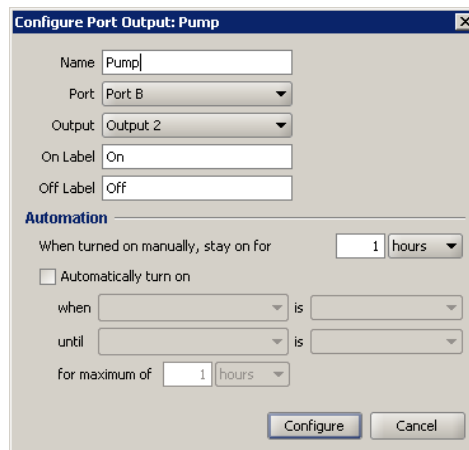
Configuration

In this example, the reading from the level sensor will be used to control an electric pump attached to a port output:

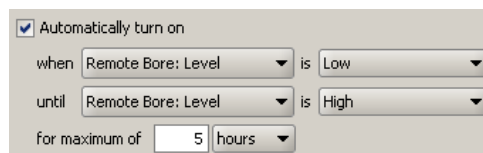


To configure automatic pump control, right-click on the port output icon and select **Configure**.

This opens the configuration window. By default, automatic control is turned off.

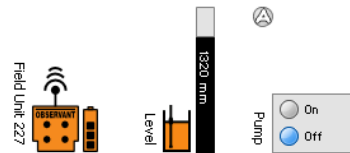


Select the **Automatic Control** option and then select the level sensor that will be used to control the pump.



Click **Configure** to save the settings and return to the site view.

Note that the pump control now has an icon above it to indicate it is under automatic control:



- Observant Desktop must be running for the pump automation to operate.
- The 'very low', 'low', 'high' and 'very high' water levels can be set in the **Configure** window for the level sensor.
- The option *Automatically turn on for a maximum of...* is intended as a failsafe option to limit the time the pump will run. This allows for any event that might stop radio communications, for example low field unit battery, damage to the field unit antenna or the unit entering night mode. Select this time so that it will prevent overfilling of the dam or tank. For example, if the pump normally takes 4 hours to fill the nest from the 'low' water mark, set the maximum pump time to 4 hours.
- As a safeguard, if the level sensor controlling a pump develops a fault, the pump will be immediately stopped. This prevents overfilling in cases where damage to cabling stops a sensor from operating.
- If a level sensor has an error, it can not be selected when configuring automation. The error condition must be resolved before setting up automation.

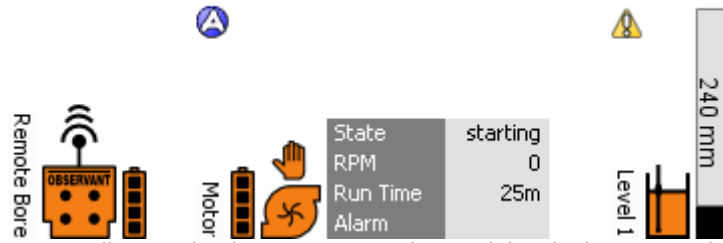
As configured in this example, the system will operate as follows:

1. The pump will switch on when the level sensor shows a 'low' reading.
2. The pump will remain on for 5 hours, unless the level reaches 'high' during that time, in which case it will turn off immediately.
3. After 5 hours, the pump will switch off. If the water level is still reading 'low', the pump will be switched back on and the process continues.

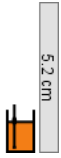
Manual pump operation

The pump can be manually operated while in automatic mode. In this example, clicking “On” will start the pump for 1 hour. The pump can then be left to run for that duration, or can be manually turned off before then. If the level reaches the pre-set “off” level, the pump will automatically switch off.

In a similar way, the M1 engine controller can be configured to automatically start and stop by right-clicking the M1 icon and selecting **Configure**.



M1 engine controller starting in response to a low tank level. The automation icon has changed to blue to show the pump is starting or running under automation.



The analog level sensor requires an Adam 4017 module to allow communication with a field unit. The Adam module must be configured to match the type of sensor used refer to the documentation accompanying the Adam module and level sensor for details, or contact Observant support for assistance if required.

To add an analog water level sensor:

- select **Field Unit, Add Device** from the menu
- select **Adam 4017 Analog Level Sensor** from the list.
- set the appropriate configuration options and click **Add**:

Adam 4017 Analog Level Sensor

Port: PortA

Address: 1

Power Output: Output1

Input Index: Vin0

Add Cancel



- The address needs to be configured in the Adam module; refer to the accompanying documentation.
- The **Power Output** setting refers to the field unit port output that will supply power to the Adam module. This is normally set to output 1, unless that output is already in use.
- The **Input Index** chooses which of the Adam module's 8 inputs is attached to the level sensor.

Configuring the analog level sensor

Before the sensor can be used, it must be configured. Configuration involves entering the calibration settings that allow Observant Desktop to interpret the data from the sensor and display it as a water level. To configure the sensor, right click on the level sensor that you wish to change and select **Configure...**

Configure Analog Level: Analog Level

Current reading is 18.24 mA.

For the range 4 mA to 20 mA:

4 mA represents 0 ft

10 mA represents 50 ft

Show as: cm

Configure Cancel

The specific settings for the sensor will be provided in the documentation accompanying the sensor, or printed on the sensor itself.

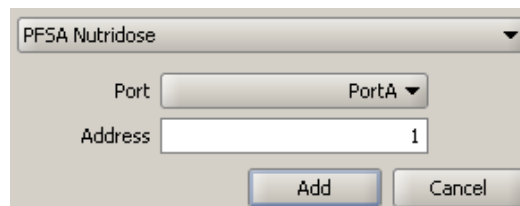
The Nutridose water medicator icon supplies information about:

- Water pumped since last refill
- Nutrient usage since last refill
- Date and time of last nutrient pumped
- Status of the Nutridose unit

When combined with the observation history, this data provides useful historical information on water and nutrient usage over time.

To add a Nutridose unit:

- Select **Field Unit, Add Device** from the menu.
- Select **PFSA Nutridose** from the list, then set the appropriate configuration options and click **Add**:



Setting the tank refill date

When the Nutridose is first installed, or the nutrient tank refilled, Observant Desktop needs to be updated with the refill date to allow it to correctly display the nutrient used since last refill. To do this, enter Advanced mode, right-click on the Nutridose icon and select **Set Tank Refill Date**. Select the date from the calendar and click **Set Date**.

Setting the Nutridose unit to manual mode

When a Nutridose unit is in manual mode, it no longer injects nutrient into the water supply. To set the Nutridose unit to manual mode:

- enter Advanced mode
- right-click on the Nutridose icon and select **Set to Manual**.

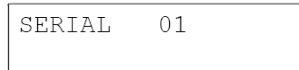


Once the Nutridose unit is set to manual mode, it can not be set to automatic mode through Observant Desktop; a visit to the device will be required.

Setting the serial address of the Nutridose

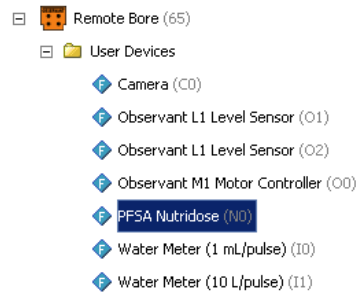
The Nutridose medicator is assigned an address that must match the address set in Observant Desktop. If the addresses do not match, Observant Desktop will show the error **device communications timed out waiting for device response**. To verify that the settings match:

1. On the Nutridose unit, press the  button until the display shows:



SERIAL 01

2. In this example, the serial address is 1.
3. In Observant Desktop, enter Advanced mode.
4. In the Navigator view at the left of the screen, select the field unit then select **User Devices, Nutridose**:



5. From the menu, select **Edit, Refresh** to retrieve the current settings from the field unit.
6. The configured address for the Nutridose device is shown to the right of the screen:



7. The address must match the address seen on the Nutridose screen in step 1. If it does not, change the address to match and click **Save**.



Flow Rate	110 L/min
Today	520 L
Last 7 Days	3000 L
March	5700 L
February	3520 L
3 Months	11,700 L

Water meter

A field unit measures water flow by counting pulses from a water meter. The number of litres represented by each pulse is determined by the manufacturer of the flow meter and will be described in the documentation accompanying the meter. The field unit uses one of its port inputs to count these pulses and Observant Desktop converts this to a measurement of water flow over time.

To add a water meter:

- select **Field Unit, Add Device** from the menu
- select **Water Meter** from the list, with the appropriate litres/pulse setting.
- set the appropriate configuration options and click **Add**:

Water Meter (1 L/pulse)

Port PortA

Input Input1

Add Cancel



The **Port** and **Input** settings must match the physical connections to the field unit.



Observant Desktop supports the following types of water meter:

- 1 litre per pulse
- 10 litres per pulse
- 100 litres per pulse
- 1 millilitre per pulse (used on some nutrient flow meters)

Check the documentation accompanying your water meter to establish its type.

Since 9am	2.2 mm
Previous 24 h	13.0 mm
Last 7 Days	33.0 mm
December	33.0 mm
November	43.0 mm

A field unit measures rainfall using a tipping bucket rain gauge. For each fixed amount of water that flows into the rain gauge, a pulse is generated. The quantity of rain represented by each pulse is determined by the manufacturer of the rain gauge and will be described in the documentation accompanying the gauge. The field unit uses one of its port inputs to count these pulses and Observant Desktop converts this to a measurement of rainfall over time.

To add a rain gauge:

- select **Field Unit, Add Device** from the menu
- from the list of devices, select **Tipping Bucket Rain Gauge** with the appropriate bucket capacity.
- set the appropriate configuration options and click **Add**:



- The **port** and **input** settings must match the physical connections to the field unit.
- In this example, the rain gauge is a Hydrological Services TB4 gauge, which generates one pulse per 0.01 inches.
- Specifications for Hydrological Services rain gauges are available online at www.hydroserv.com.au
- Specifications for Davis rain gauges are available online at www.davisnet.com.au

Rain gauge summary

The site view displays a set of summary data for the rain gauge.
The various totals are calculated as follows:

Since 9am	2.2 mm
Previous 24 h	13.0 mm
Last 7 Days	33.0 mm
December	33.0 mm
November	43.0 mm

Since 9am:	The amount of rainfall since the “last 9am”. For example, at 6am this shows rainfall since 9am the previous day, and at 1pm it shows rainfall since 9am today. The 9am boundary is chosen to align with rainfall figures from the Bureau of Meteorology.
Previous 24 h:	The amount of rainfall in the 24 hour period prior to the above reading
Last 7 Days:	Rainfall in the last 7 days up to now.
December (current month):	Total rainfall for the current calendar month
November (previous month):	Total rainfall for the previous calendar month



State	7 strokes/min
Today	1,455 strokes
7 Days	17,348 strokes
This Month	17,348 strokes

Windmill sensor

A field unit monitors a windmill by counting pulses from a reed switch or similar, mounted on the windmill. The field unit uses one of its port inputs to count these pulses and Observant Desktop presents this as a current reading (strokes per minute) and historical data. If the windmill is stopped, the icon displays the time it stopped.

To add a windmill sensor:

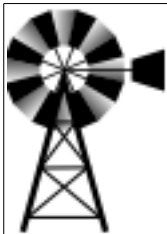
- select **Field Unit, Add Device** from the menu
- select **Windmill** from the list.
- set the appropriate configuration options and click **Add**:

The dialog box for adding a windmill sensor. It has a title bar with a dropdown menu set to 'Windmill'. Below the title bar are two dropdown menus: 'Port' set to 'PortA' and 'Input' set to 'Input1'. At the bottom are two buttons: 'Add' and 'Cancel'.



The **Port** and **Input** settings must match the physical connections to the field unit.

The windmill icon changes according to whether the windmill is running or stopped:



State	7 strokes/min
Today	1,455 strokes
7 Days	17,348 strokes
This Month	17,348 strokes

Windmill: running



State	stopped Today, 11:45
Today	1,455 strokes
7 Days	17,348 strokes
This Month	17,348 strokes

Windmill: stopped



The Axis 225FD camera can be attached to a field unit to provide photos of a site. Earlier Axis camera models are also supported, although their configuration options may vary slightly from those described here.

To add a camera:

- select **Field Unit, Add Device** from the menu
- select **Camera** from the list.
- set the following configuration options and click **Add**:

Camera

Port: PortA

Power Output: Output1

Interval: 2h

Period Start: 08:00:00

Period End: 16:00:00

Resolution: 320x240 (Axis 2100 225...)

Compression: 60.0 %

Color Level: 60.0 %

Rotation: 0

Reserved 1

Features Reserved 2

Reserved 3

Add Cancel



Note

- The **Port** setting must match the physical connections to the field unit.
- The **Address** should always be set as shown. This applies to the Axis 225FD, 2100 and 2120 cameras.
- The **Power Output** setting should be set to Output 1 unless that output is already powering another device, for example a level sensor on the same port.
- Ensure that the selected **Resolution** setting is correct for your camera.

The camera configuration includes a number of options that can be set according to your requirements:

Interval The period of time between photos, in hours or minutes. '2h' represents a photo every two hours, where '30m' would give a photo every half hour. Note that setting this to less than one hour will place increased demands on the field unit

battery each day due to increased radio usage.

**Period Start,
Period End**

Defines the times of day photos will be taken. In the above example, a photo will be taken every two hours between 8am and 4pm.

Resolution

The size of the photo, in pixels. The recommended setting is 320x240 and this can be increased or decreased to give the best combination of quality and picture size. Larger photos will make more use of the radio and hence will place extra demands on the unit's battery. Observant recommend setting the resolution to the minimum setting that gives acceptable photo quality, to obtain the best performance from the field unit battery.

Compression

Sets the compression level for the photo. The recommended level is 60%.


Color Level

Sets the colour level for the photo. The recommended level is 60%.

Features

Not used.

Viewing photos

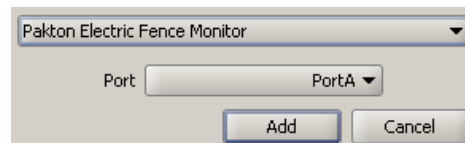
The site view shows the last photo taken. To view past photos, click the history icon  then click on the camera to see thumbnails of recent photos:



The Pakton PTE0703 electric fence monitor measures electric fence voltage and reports this to the field unit. This data is displayed in the site view and can be graphed to give a historic view of the fence voltage. Observant Desktop will raise an alarm in the site view if the fence voltage is low, or drops to zero.

To add a Pakton electric fence monitor:

- select **Field Unit, Add Device** from the menu
- select **Pakton Electric Fence Monitor** from the list, set the appropriate port and click **Add**:



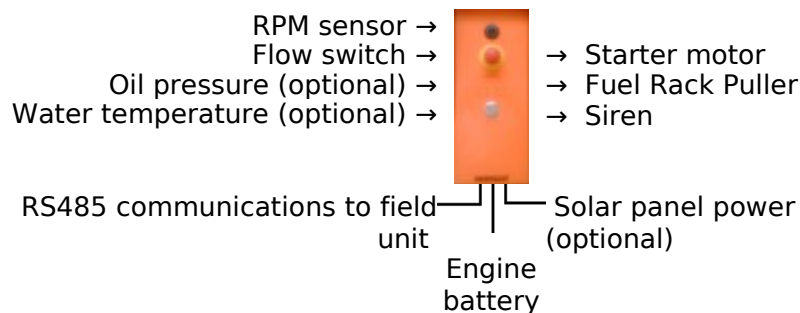
The **Port** setting must match the physical connection to the field unit.

The M1 engine controller provides the ability to remotely control and monitor a diesel or petrol engine, including:

- control of engine starting and stopping
- monitoring of engine and pump vitals via external sensors, including:
 - RPM
 - Oil pressure
 - Water temperature
 - Water flow/pressure
- displaying a warning indicating watchdog automatic shutdown as a result of engine/pump faults

Overview

The diagram below shows a summary of the M1 engine controller inputs and outputs. For full installation and wiring details for the engine controller, please refer to the documentation accompanying the M1.



In the most simple installation, the M1 controller can be used to start and monitor the engine and will stop the engine if the flow switch detects no water flow. In more advanced installations, the oil pressure and temperature sensors can be added to provide full failsafe shutdown capability, and a solar panel can be added to supplement other battery charging methods such as generators.

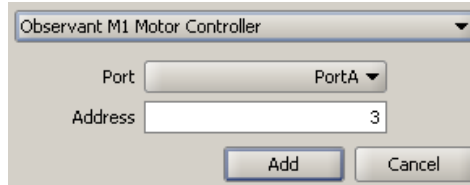
The operational flow is:


1. Siren sounds to alert nearby personnel that the engine is about to start
2. The M1 controls the starter motor and fuel rack puller to start the engine
3. The engine continues running unless an alarm condition is triggered. An alarm can be triggered by:
 - flow switch detecting no flow
 - oil pressure sensor detecting low pressure
 - temperature sensor detecting high temperature.
4. While running, the engine can be:
 - stopped and started from Observant Desktop.
 - manually stopped at the M1 front panel by pressing the emergency stop button

- manually stopped at the M1 front panel by pressing the start/stop button

To add an engine controller:

- select **Field Unit, Add Device** from the menu
- select **Observant M1 Motor Controller** from the list, set the appropriate configuration options and click **Add**:





Note

- The **Port** setting must match the physical connections to the field unit.
- The address of an engine controller is set to 3 in the factory. Should you need to attach more than one engine controller to a single field unit port, it must be configured with a unique address. This process requires the unit to be returned to Observant. When ordering additional engine controllers, a unit can be set to a specific address on request.


Monitoring the engine



Once installed and configured, the site view will show the M1 and its status. This engine is currently running and has generated no alarms. The battery status is shown to the left of the M1 icon.



This engine has stopped because the flow switch is reporting no flow. This could reflect a blocked inlet, faulty pump or empty water source. When this occurs, an alarm will be displayed in the notifications list:

 Motor Controller **North Bore M1** at site **North Bore** alarm: **no flow** (Saturday, 13:03)

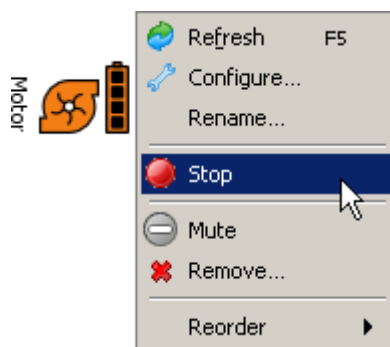
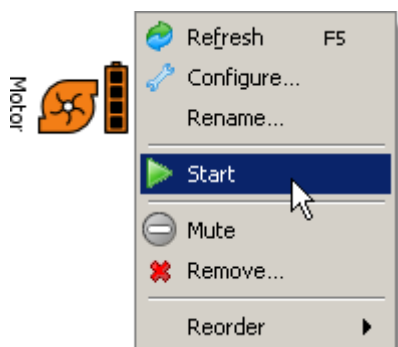


In this case, the engine has stopped without any errors. This indicates that it was stopped either by using Observant Desktop, or using the start/stop button on the M1 unit.

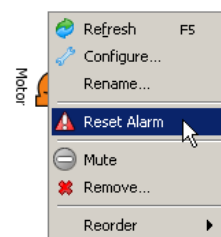
Controlling the engine

In standard mode, Observant Desktop provides the ability to monitor the pump status and view any alarms raised. In advanced mode, the software allows full remote control of the engine. To enable this, enter advanced mode by selecting

File, Enter Advanced Mode from the menu. An engine can be controlled by right-clicking its icon and selecting the appropriate action:



If an engine controller is reporting an alarm such as “no flow”, the alarm must be reset before the engine will be allowed to start. To do this, right-click on the engine controller and select **Reset Alarm**:





The port output sensor is used to control an individual port output on the field unit. Each field unit has two port outputs per port and these are typically used for powering sensors such as level sensors and cameras. Unused port outputs can be used as a general-purpose output to control electrical devices such as electric pumps, motors or lighting. Note that powering devices directly from a field unit port output for an extended period of time may quickly discharge the battery. When powering devices for extended periods (more than one hour per day) or with a current requirement of more than 200mA, Observant recommend using the port output to energise a relay that in turn supplies power to the device from a separate power source.



The port output sensor is not related to the M1 engine controller. Although both can be used to control a motor, the port output sensor does not in any way monitor the device being controlled and only displays the status of the port output (on or off).

To add a port output sensor:

- select **Field Unit, Add Device** from the menu
- select **Generic Port Output Sensor** from the list, set the appropriate configuration options and click **Add**:

Generic Port: Output Sensor

Name: Electric pump

Port: Port B

Output: Output 1

On Label: Pumping

Off Label: Stopped

Add Cancel



Field unit port pinout details can be found in the Observant Hardware Installation Guide.

The port input sensor displays the status of an individual port input on a field unit. Each field unit has two port inputs per port and these are typically used for counting pulses from rain gauges and flow meters. Unused port inputs can be used to monitor the state of any device with a switched output. Examples are:

- monitoring the state of a gate (open or closed)
- monitoring the speed of a windmill or a motor
- counting the pulses from a sensor to display the daily number of vehicles travelling along a road

To add a port input sensor:

- in the Navigator, right-click on the appropriate field unit and select **Add Device**.
- Select **Generic Port Input Sensor** and set the appropriate configuration options, ensuring that the correct port and input are selected. In this example a gate is to be monitored using a switch attached to input 1 of port B:

- Click **Add** to add the port input sensor.

Input Types

A port input can be configured to display one of three types of information about the input:

- | | |
|-------------------------|--|
| Input Counter: | displays the number of pulses counted by the input. |
| Input Frequency: | displays the frequency of pulses counted by the input. |
| Input State: | displays the current state of the input. |



Field unit port pinout details can be found in the Observant Hardware Installation Guide.



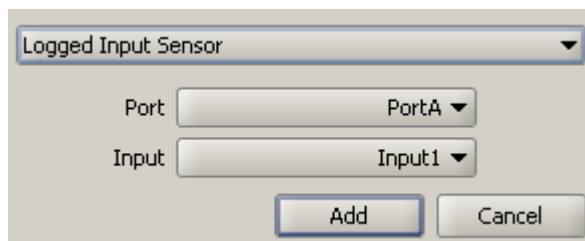
When the input type is set to “Input Frequency”, only input 1 is available for selection because input 1 is more accurate than input 2 when measuring high frequencies.

The logged port input sensor displays the status of an individual port input on a field unit. Each field unit has two port inputs is similar to the generic port input sensor, but with some important features:

- an alarm can be raised when the input has changed state
- information is displayed about the time spent in a given state
- changes in state, and time in each state (open/closed) is logged and can be displayed as historical data.

To add a logged port input sensor:

- in the Navigator, right-click on the appropriate field unit and select **Add Device**.
- Select **Logged Input Sensor** and set the appropriate configuration options, ensuring that the correct port and input are selected. In this example a gate is to be monitored using a switch attached to input 1 of port B:



- Click **Add** to add the port input sensor.



Field unit port pinout details can be found in the Observant Hardware Installation Guide.

To configure the sensor, right-click on the logged input sensor and select **Configure**.

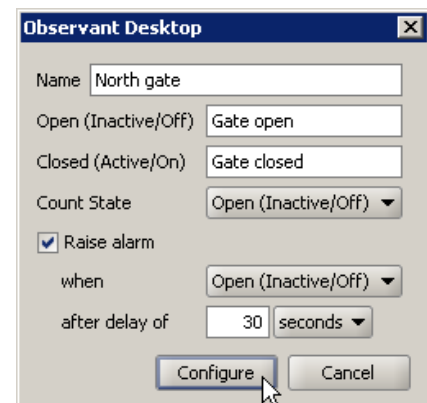
The following configuration options can be set:

Name: set the name that will be displayed in the site view.

Open and Closed states: set the labels that will be displayed when the port input is open (disconnected) or closed (short-circuit)

Count State: Select what state will be summarised in the site view. The site view summary can show total time in the open or closed state.

Raise Alarm: Set the requirements for an alarm to be raised. The alarm can be delayed so that, for example, a gate will only generate an alarm if left open for several minutes.



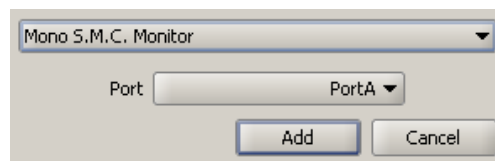
State	Motor Run
Array Power	60W
Pressure	30m
Flow Rate	40 L/min
Flow (Today)	37 kL
Flow (7 Days)	184 kL
Flow (Month)	184 kL

Mono solar motor controller monitor

The Mono solar motor controller (SMC) enables the full remote monitoring of all critical performance characteristics of the solar pump including totalised flow, current flow rate, current RPM, pressure and important operating status and alarm codes.

To add a Mono SMC:

- highlight the field unit that has the Mono SMC attached.
- select **Field Unit, Add Device** from the menu.
- select **Mono S.M.C. Monitor** from the list, set the appropriate port and click **Add**.



- The **Port** setting must match the physical connections to the field unit.
- Some older Mono controllers do not report pressure readings.
- A Mono controller can be operated under automatic control based on the reading from a level sensor (see **L1 level sensor** earlier in this Guide). However, due to limitations in older Mono controllers, automation may not be possible using some models. Please check with Observant support if you are planning to use automation with a Mono controller.

	P1	P2	P3
Current	28.5 A	40.9 A	27.9 A
Voltage	242.3 V	239.9 V	244.7 V
Power	21.2 kW		
Frequency	49.0 Hz		
Used Today	521 kWh		
Used This Week	521 kWh		

The MultiCube power monitor enables full monitoring of power consumption for a three-phase power supply, including frequency, current and voltage.

To add a MultiCube power monitor:

- highlight the field unit that has the MultiCube power monitor attached.
- select **Field Unit, Add Device** from the menu.
- select **Northern Design MultiCube** from the list, set the appropriate port and click **Add**:

Device: Northern Design MultiCube

Configuration:

Port: PortA

Address: 4

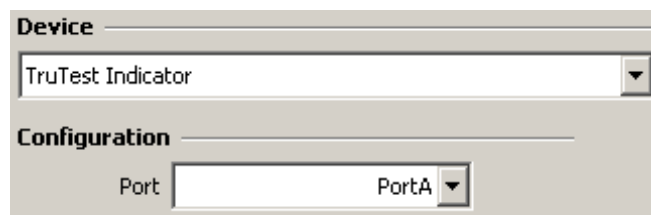


The **Port** setting must match the physical connections to the field unit.

By connecting a Tru-Test electronic livestock weighing indicator to a field unit, data from the Tru-Test can be exported for use in reports or analysed using third-party software such as Microsoft Excel.

To add a Tru-Test indicator:

- highlight the field unit that has the Tru-Test Indicator attached.
- select **Field Unit, Add Device** from the menu.
- select **Tru-Test Indicator** from the list, set the appropriate port and click **Add**.



The **Port** setting must match the physical connections to the field unit.

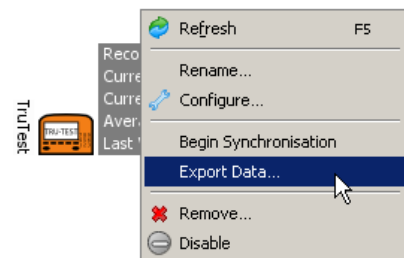
Exporting data from the Tru-Test



Data from the Tru-Test indicator is sent from the field unit once an hour, so weighing records are normally available in the software near the beginning of the hour. For example, weight records from 50 cattle weighed between 3:05pm and 3:40pm will be available for export shortly after 4pm.

To export the stored weighing data from the Tru-Test indicator:

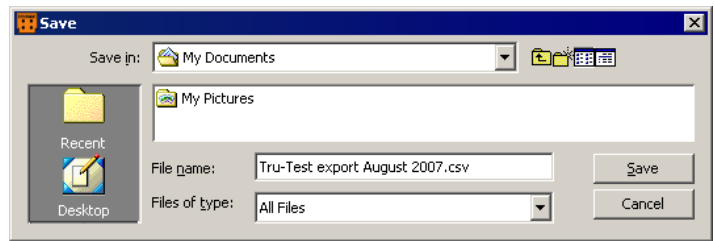
Enter Advanced Mode, right-click on the Tru-Test icon and select **Export Data**.



Select a folder and a name for the file.



Giving the file name a .csv extension will allow Windows to select the correct program to open the file later.



The data can now be opened in any spreadsheet application such as Microsoft Excel or OpenOffice Calc:

	A	B	C	D	E
1	EID	Weight	Date	Time	
2	982 000050337840	0	03/09/07	1735	
3	982 000050832373	520	03/09/07	1735	
4	982 000050337845	442	03/09/07	1735	
5	982 000050832313	471	03/09/07	1736	
6	982 000050324138	392	03/09/07	1736	
7	982 000050832342	472	03/09/07	1736	
8	982 000050337841	445	03/09/07	1737	
9	982 000050832356	505	03/09/07	1737	
10	982 000050337111	309	04/09/07	953	

Site view indicators, warnings and errors

In the site view, field units and sensors that have detected a situation that requires attention will show an error or a warning. This is shown by an icon in the left column of the site and also above the sensor in question. These icons match those shown in the notifications list:



OK

The green tick indicates that all devices attached to this field unit are operating normally, and are not reporting any errors or warnings. A green tick in the notifications list indicates that the whole system is operating correctly, and no devices are reporting a problem.



Errors

Errors are events that indicate the system is not operating as expected. For example, an error is generated when the serial cable is disconnected from the base unit because this prevents operation of the system.



Warnings

This icon indicates a warning that requires investigation. This is typically a warning from a sensor, for example low water level or low battery.



Device communication errors

This indicates the field unit is unable to communicate with the device. This is usually the result of faulty or damaged wiring.



Stale data

A site or sensor may show the stale icon above it. This icon indicates that no recent information has been received from the field unit itself, or from the sensor in question. The usual cause for this will be efforts by the field unit to conserve power (by not using the radio when the battery is low). This can take place at night or when extended periods of cloud cover have prevented full charging of the battery. Poor radio communication can also cause this.



Device muted

If a device has been muted, this icon will appear above it and no data will be collected from that device. A device might typically be muted for troubleshooting purposes, or if it has not yet been put into operation. A device can only be muted or unmuted from Advanced mode. Refer to the **Advanced Mode** chapter for more information regarding muting and unmuting devices.



Night mode

When this icon is displayed above a field unit, that field unit has switched to night mode, which is a low-power mode used to maximise battery life. A field unit normally switches to night mode overnight when the solar panel can not charge the battery. During night mode, the field unit will not be accessible from Observant Desktop. By default, a field unit places itself in night mode between 9pm and 6:30am.



Automation

These icons indicate that the device is under automation control. Grey indicates the motor is stopped, blue indicates running.



Retrieving history

Observant Desktop is currently retrieving history from the field unit.

Viewing historical data


A feature of the Observant Desktop software is the ability to view and manipulate the historical data recorded by the system. For example, the water level in a tank over the previous 12 weeks can be viewed as a graph and can also be exported to a format suitable for inserting into a spreadsheet or report.

Data reliability

If the data displayed for a given device is out of date, it will be highlighted. This could happen if:

- the field unit is uncontactable, possibly due to radio coverage problems
- the software has not been running for some time, so that the most recent historical data has not been retrieved from the field units.

This flow meter is showing current data:



Flow Rate	110 L/min
Today	520 L
Last 7 Days	3000 L
March	5700 L
February	3520 L
3 Months	11,700 L

This flow meter is showing a current flow rate, but its historical data is old because it has not yet been retrieved from the field unit. Hovering the mouse over the flow meter will show more information.




Flow Rate	9 L/min
Today	≈ 0 L
Last 7 Days	≈ 1,567 L
March	≈ 1,567 L
February	no data
3 Months	≈ 1,567 L



Flow Rate	9 L/min
Today	≈ 0 L
Last contacted less than 5 minutes ago	
History retrieved up until 2 hours ago (1 pages remaining)	
February	no data
3 Months	≈ 1,567 L

This indicates that the flow meter was recently contacted, but its historical data is two hours old. To rectify this, either wait for the next automatic data update (every 30 minutes) or right-click on the field unit and select **Retrieve History** to retrieve the most recent history.

Opening the history window

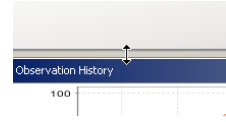
The historical data can be accessed by clicking the history icon at the upper right of the screen. 

Selecting a device from the site view will display the graph for that device. The data displayed will depend on the type of device selected:


- a water level sensor will display historical data of water level over the selected time period.
- an electric fence monitor will display the measured fence voltage.
- the historical data for a field unit will contain details of battery charge state and radio usage. This can be useful for diagnosing radio connectivity or battery charging issues.

Resizing the observation history window

The observation history window can be resized as needed to allow more space for the graphs. To resize the window, hover the mouse over the divider line until the mouse pointer changes to the resize icon, then hold the left mouse button and move the divider up or down:

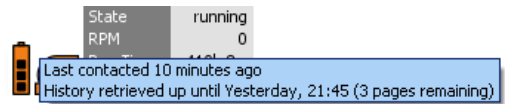


During normal operation, data is retrieved from field units every half-hour, so the observation history window might not show data up to the current time. To retrieve the most recent data for a device, right-click on the relevant field unit and select **Retrieve History**.

While historical data is being transferred, the spinning icon  will be shown.



To find out whether your historical data for a device is up to date, hover the mouse pointer over the device. If the history is not up to date, right-click on the relevant field unit and select **Retrieve History**.

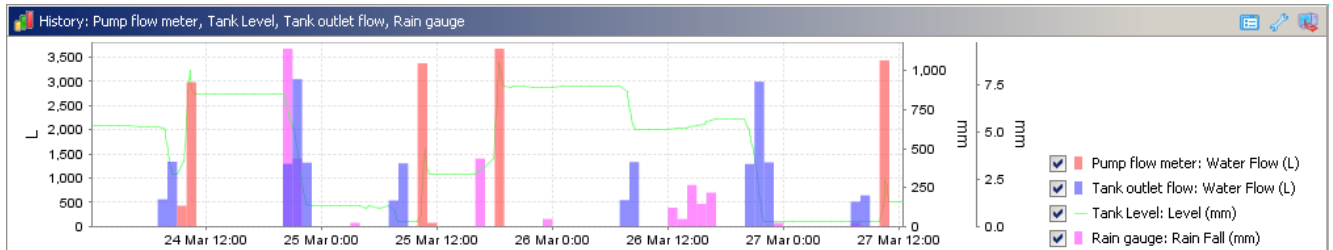


The observation history window can display history for more than one device at a time. Clicking on two or three devices while holding down the Shift key will display the history for all selected devices.

Interpreting the historical data

Example 1: Combined water level and water flow

This site has installed a tank level sensor and flow meters monitoring the tank inlet and outlet. The tank is filled from a pump and also catches rainfall, so a rain gauge is also installed. This combination of sensors allows full monitoring of the health of the tank:



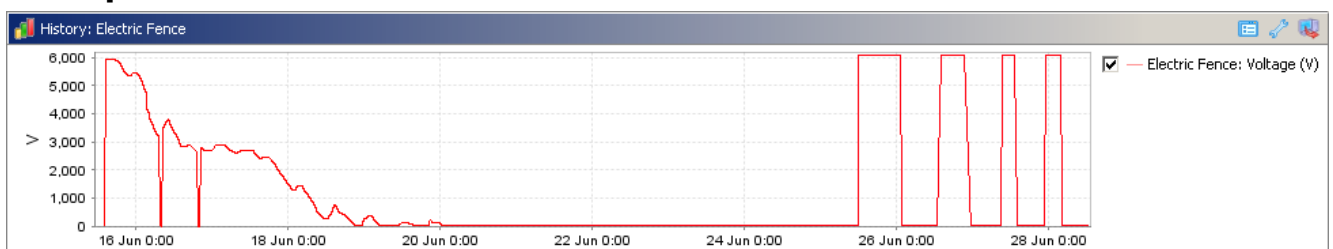
Under normal conditions, the water level (green) will only rise if it rains (pink graph) or if filled from the pump (red graph). It should only drop if there is a matching outlet flow (blue graph).

Some types of fault that can be seen from this combination are:

- leaking tank or outlet: if the water level is dropping but there is no outlet flow, then the tank must be leaking.
- broken poly pipe from pump: if the pump flow meter shows flow but there is no increase in water level, then the poly pipe is likely to be damaged.

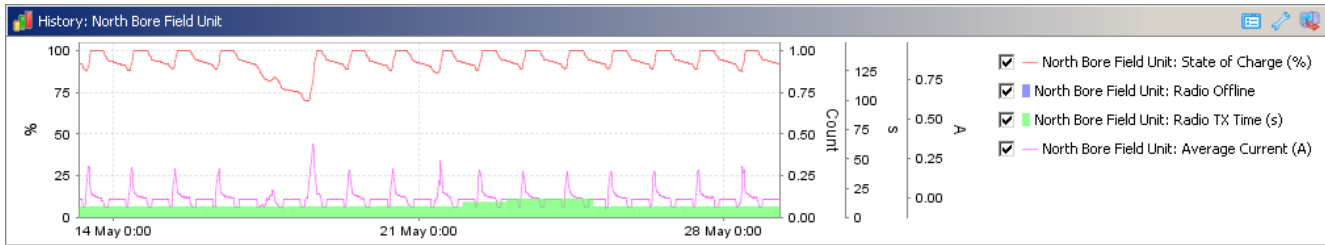
When combined with the Observant M1 engine controller, the water flow can be matched to the pump run time, to give additional data.

Example 2: Electric fence monitor



The history graph for this electric fence monitor shows a gradual drop in the fence voltage (as the energiser's battery discharges), a period when the fence was not live at all, followed by several days where the fence was functioning only intermittently.

Example 3: Field unit battery and radio

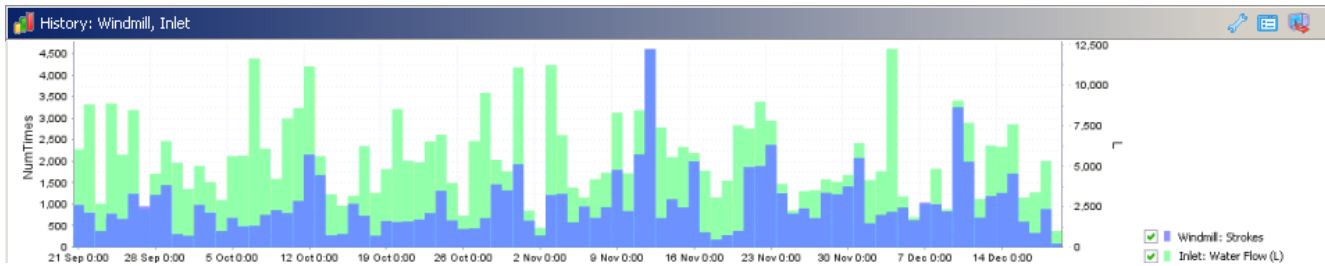


This graph shows a typical pattern of battery discharge-charge over a 14-day period. The battery level shown in the red graph typically decreases slowly overnight while the battery is not charging, followed by a quicker increase in battery level as it charges to full capacity over several hours in the morning. The drop in battery state on 17th May was the result of heavily overcast conditions which prevented the battery fully charging that day.

The green graph shows a uniform pattern of radio use; this is the regular communication that occurs when the field unit updates its status and historical data to the main unit.

The violet graph shows the charge current supplied to the field unit battery from the solar panel and is a useful indication of the amount of charge supplied on a given day. It can be clearly seen that very little charge was supplied from the solar panel on 17th May, resulting in the drop in battery level. On 18th May the overcast conditions cleared and the battery was fully charged.




Example 4: Windmill and flow meter




This site has a flow meter monitoring the water pumped by a windmill. This allows a comparison of flow against windmill rotations and could be used to monitor the pump's health over a period of time; a drop in the volume of water pumped compared to the pump strokes might indicate wear in the pump.

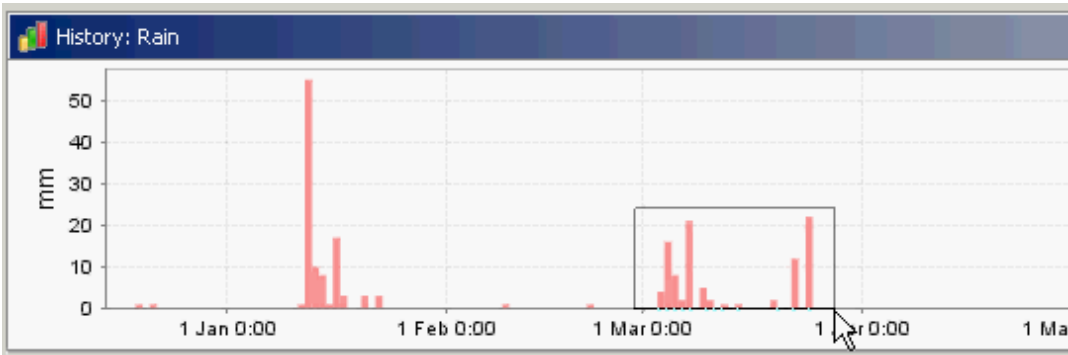
Customising the Historical data view

The observation history toolbar allows the history view to be customised in several ways:

-  Show/hide the legend to allow more space for the graphs.
-  Configure the history: Select the time period for the graphs and configure grouping (hourly or daily totals) for bar graphs.
-  Export the current data to CSV file for import into other programs, such as Microsoft Excel.



For more fine-grained control over the time period, use the mouse to select an area of the graph to zoom. Click to select a corner, hold the mouse button and release it at the far corner. The history will now be displayed for the selected period.



The screenshot shows a bar chart titled 'History: Rain' with a y-axis labeled 'mm' ranging from 0 to 50. The x-axis shows dates from 1 Jan 0:00 to 1 Mar 0:00. A red bar chart shows a significant peak in late January. A black rectangular box highlights a portion of the data in early March, and a mouse cursor is positioned at the bottom right corner of this box, indicating a zoom action.

Showing or hiding selected data

Sometimes a graph will contain more sets of data than can be conveniently viewed at once. In this case, selected data sets can be hidden to make the remaining data more clearly visible. Use the checkboxes in the graph legend to hide selected graphs.

Saving an image of the graph

To save an image of the current data view, right-click anywhere on the graph and select **Save as...** The image will be saved as a PNG file, a standard graphics format that can then be edited or inserted into a document.

Viewing and updating your license information

Your Observant Desktop license allows you to use Observant Desktop, and defines what functions of the software are available to you. The software license can be upgraded by selecting **Edit, Manage License**.

To upgrade your license, copy your license key and paste it into the window and select **Upgrade**. An upgraded license will usually be provided to you by email.

Preferences

The preferences window allows configuration of various options affecting the operation of the software. To access the preferences window, select **Edit, Preferences**. The available settings are:

General:

Auto expand selected node	When in Advanced mode, expand a node in the tree view by clicking on that node, rather than by clicking the “+” on that node.
Auto collapse deselected nodes	When selecting a node, the previously selected node is automatically collapsed, or hidden.
Show 'Debug' menu in advanced mode	Adds a Debug menu with several options for use when diagnosing system problems.

Hub:

Startup:

Start Zones
Start Remote Server
Start HTTP Server
Start UI



WARNING: These options control aspects of how the software starts, and the core operation of the software. These settings should not be changed unless on the advice of Observant support staff.
Incorrect setting of these options can render the software unusable.

Logging:

Log Port Messages	Include the serial port data transfer in the system logs. By default, the logs are stored in the data\logs directory under the program installation directory. Note that enabling this option is only recommended as a temporary measure during troubleshooting, as it generates a large number of messages in the log file.
Time Update	Sets the number of seconds between time synchronisation attempts. The default is 7,200,000 ms (2 hours).
Base Unit Ping	Sets the number of seconds between checks that the base unit is connected. The software “pings” the base unit on a regular basis to check connectivity and if it receives no response an error is generated.

Firmware Upgrade:

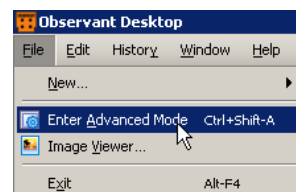


WARNING: These options affect the process of updating the firmware (the internal software) of field units and should only be changed at the request of Observant support staff.

Advanced mode

In standard mode, Observant Desktop gives users the tools to monitor the system and view the data collected from devices. Observant Desktop also provides an Advanced mode which gives access to detailed configuration options for devices and sensors.

To access Advanced mode, select **Enter Advanced Mode** from the **File** menu.



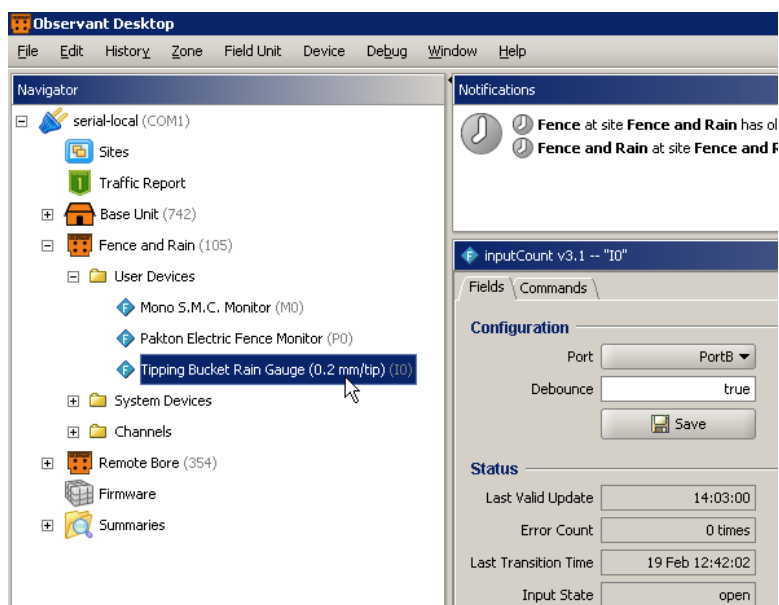
- Advanced mode can also be accessed using the CTRL-SHIFT-A keyboard shortcut.
- To exit Advanced mode, select **File, Exit Advanced Mode**, or use the CTRL-SHIFT-A keyboard shortcut.

To safeguard against accidental changes, Advanced mode is protected with a password. The default password for a new installation is **look4water**. Enter the password and click **OK**.

The Navigator panel

The Navigator panel provides an easy method for navigating and configuring the devices in the system. The panel shows all devices in the system as a “tree” view, starting with the base units and field unit. Each field unit then shows its devices and configuration as further “branches” of the tree.

In this example, the tree is opened to show the advanced configuration information for a rain gauge:



The Edit menu

The Edit menu provides access to your preferences, software license and password settings. The available options are:

Refresh	Retrieve the most current information from the selected field unit, base unit, or sensor.
Copy	Copy information about the selected device to the clipboard.
Remove	Remove the selected device.
Manage License	Opens the license manager, where you can upgrade or view information about your Observant Desktop license.
Change Advanced Mode Password	Allows you to change your password. Note that if you lose the password, it can not be retrieved and the software must be reinstalled to reset it.
Preferences	Opens the Preferences window.

The History menu

The History menu provides an alternative way to access the functions on the history toolbar. The available options are:

Show/Hide	Show/hide the legend to allow more space for the graphs.
Configure	Configure the history: Select the time period for the graphs and configure grouping (hourly or daily totals) for bar graphs.
Export	Export the current data to CSV file for import into other programs, such as Microsoft Excel.

The Field Unit menu

The Field Unit menu provides access to many monitoring and configuration options for the hardware installed on your system. Devices can be added, configured and checked to establish their current status. The items in the Field Unit menu are enabled only where their context makes sense - for example, the option **Reboot** is only enabled when a field unit is selected in the Navigation panel at the left of the screen. The available options are:

Add Device	Add a device to the selected field unit.
Add Route	If a field unit is situated too far from the base unit or otherwise experiences poor radio communications, one or more intermediate field units can be used to route the messages between it and the base unit. The Add Route function allows you to specify one or more field units to be used to route to the selected field unit.
Sync Site View	Update the site view to reflect the configuration of the selected field unit.
Retrieve History	Retrieve the next set of historical data from the field unit. Depending on the number of devices being monitored, this is typically 1-2 days of data.

Transmit Test Tone	Send a test tone from the selected field unit that can be used to test radio communications using a standard UHF radio receiver.
Set Time	Set the field unit's time to match the computer's clock.
Reboot	Restart the selected field unit.
Master Reset	Reset the data logs and device configuration from the selected field unit. This clears all configuration settings except the unit's name, address, zone number, serial number, startup count and location.
Power Down	Power down the selected field unit. Note that the unit can not be powered up remotely; the power must be removed and reapplied to start the field unit again.
Notify Battery Install Date	For the selected unit, record the date the battery was last changed.
Ping	Test the connection to the selected field unit by sending a message and waiting for a response. Optionally, the ping test can route messages via an intermediate field unit to test the effect of this on communication quality.
Upgrade Firmware	Upgrade the firmware in the selected field unit. Refer to Appendix D for more details on upgrading firmware.

The Zone menu

The Zone menu provides the following options:

Find Base Unit	Search the computer's serial ports for a connected base unit.
Add Field Unit	Add a field unit to the system. This option is only available when the zone is selected at the top of the Navigator window.
Set Zone Number	Used during initial setup of the system, this option sets the system zone number which must match the zone number programmed into the base and field units. This option is only available when the zone is selected at the top of the Navigator window.
Monitor	Launches a monitoring window that shows all communication to and from the base unit.
Upgrade Firmware	Launches a wizard that will upgrade the firmware in some or all of the field units in the system.

Moving a field unit

When a field unit is moved to a new site, several steps might need to be taken to ensure it operates as expected:

- testing radio coverage and possibly adding a route to reach the new location
- adding or removing devices
- changing the field unit's name to reflect its new location

Radio coverage

Moving a field unit will often affect the quality of radio signal from the base unit. To test radio coverage, move the field unit to the proposed location and ensure that the field unit can still be refreshed in Observant Desktop. It might be necessary to remove an existing route, or to add a new one, to achieve reliable communications.



If you have accurate GPS points for your field units and the proposed new site, Observant can perform a radio coverage test to ensure the new location has adequate radio coverage. We can also recommend a routing strategy using your existing field units, should that be necessary. Contact Observant support to make use of this service.

Adding or removing devices

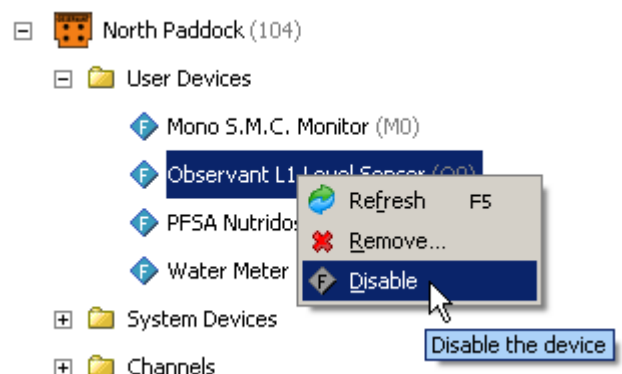
If the new location will have a different set of devices, it will be necessary to add new devices to the field unit or remove existing devices.



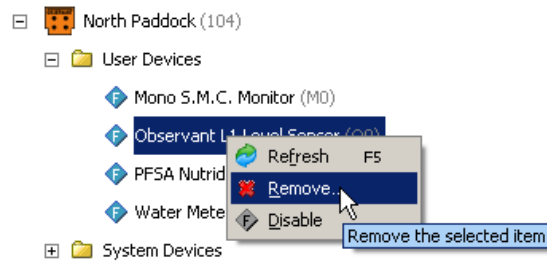
If a device is removed from a field unit, its historical data will no longer be accessible. To keep the historical data for a device that has been removed from a field unit, disable the device rather than removing it.

To disable a device, enter advanced mode. Right-click on the device in the Navigator and select **Disable**.

Disabling a device will also disable any errors related to the device.



To remove a device, enter advanced mode. Right-click on the device in the Navigator and select Remove:

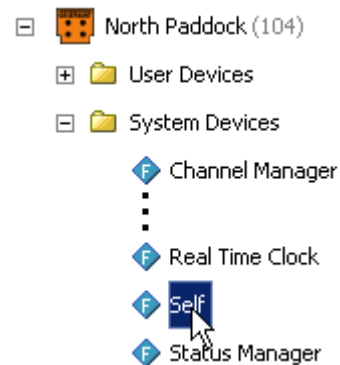


New devices can be added by following the steps in **Working with devices** in this User Guide.

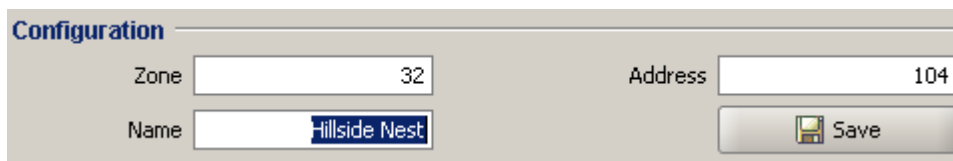
Changing a field unit's name

To change a field unit's name:

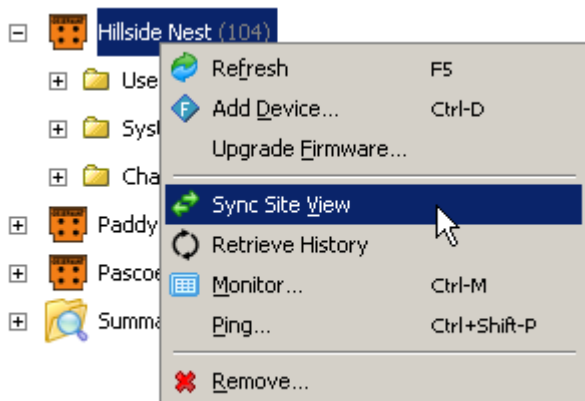
1. Enter advanced mode
2. Select the field unit in the navigator, then select **System Devices, Self**:



3. Set the new name for the field unit and click **Save**:



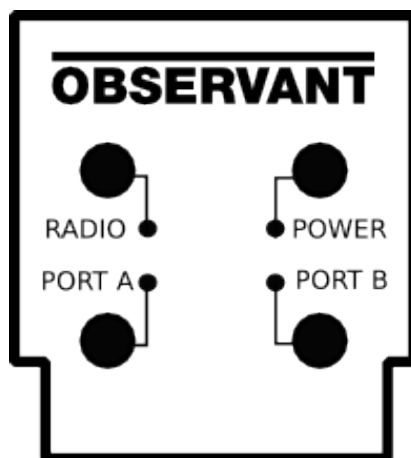
4. To update the site view with the new name, right-click on the field unit and select **Sync site view**:



5. In the site view, the field unit and site will now show the new name:

Appendix A: Interpreting the front panel indicators

Outlined below are the various states of the field unit as shown by the indicators on the front panel. These indicators will communicate to the user a number of different states and conditions that might be affecting the performance of the unit.



Radio indicator

Green:

Single green flash:



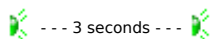
Received data, but ignored because the data is destined for a different field unit

Three green flashes:



Received data OK

Single, short green flash every 3 seconds:



Radio on, waiting for data

Amber:

Flashing amber:



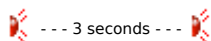
Receiving data

Red:

Solid red:

Transmitting

Single, short red flash every 3 seconds:



Radio off. Possibly caused by very low battery state or the unit being in night mode.

Continuously flashes red:



Internal radio fault

Flashes red, alternating with the Power indicator:

Dire power mode. The battery is at a critically low level and the unit will not transmit via the radio. The field unit will remain in this mode until the battery is sufficiently charged for normal operation.

Port A and Port B only

Flashing amber:	Hidden reed switch activated
Solid green:	Input1 is low
Solid red:	Input2 is high
Slow red flash:	Over-current protection
Green:	Sending data
Amber:	Receiving data
Three red flashes:	Receive data failure
Red:	Receive corrupted or error

Power indicator

The power indicator shows the system heartbeat, charger status and battery status. There are 11 total states:

Completely off:	System switched off
Continuous red flash	Charger fault

The other 9 states are indicated by both a colour and number of flashes as follows:




Green:

Single flash:		Battery OK, Not charging
Double flash:		Battery OK, Charging
Triple flash:		Battery OK, Fast charging

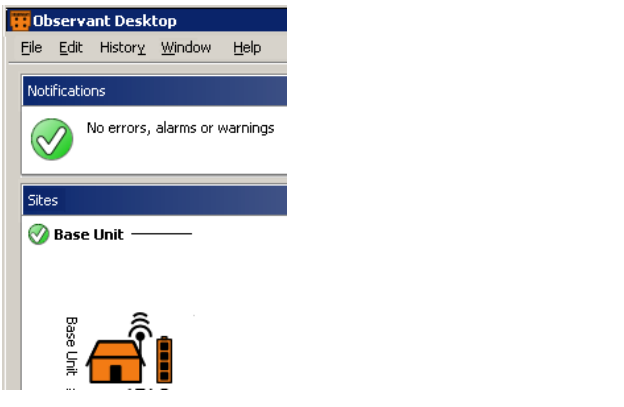
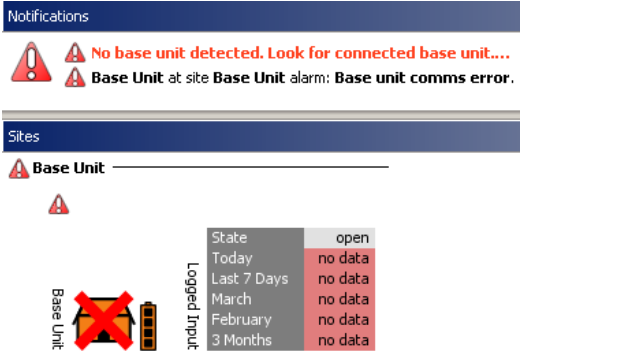
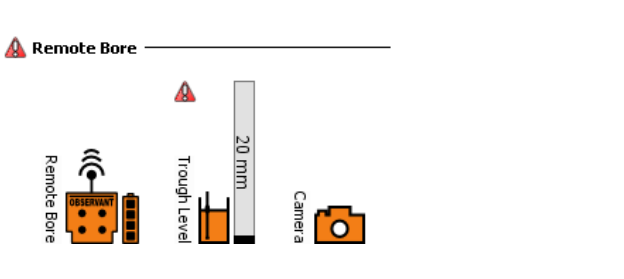
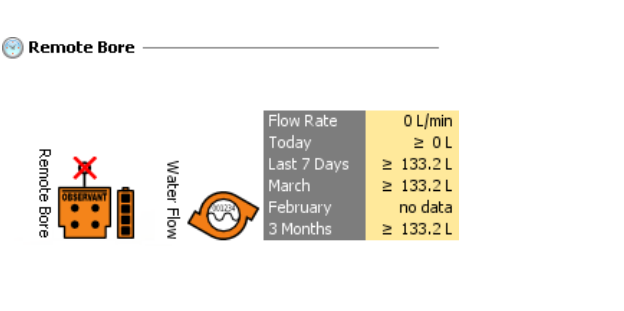
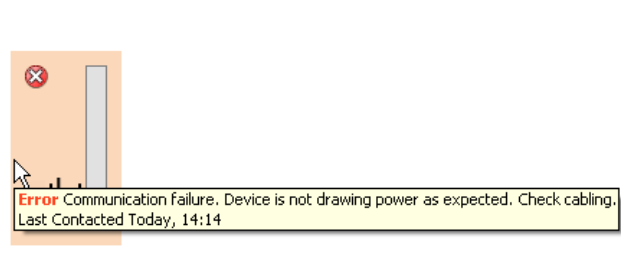
Amber:

Single flash:		Battery low, Not charging
Double flash:		Battery low, Charging
Triple flash:		Battery low, Fast charging

Red:

Single flash:		Battery critical, Not charging
Double flash:		Battery critical, Charging
Triple flash:		Battery critical, Fast charging

Appendix B: Interpreting the Observant Desktop icons

<p>Normal base unit</p> <p>During normal operation the notification window shows the green tick with “No errors, alarms or warnings” message. The notification window will display sensors with conditions that require attention or investigation.</p>													
<p>Base unit communications error</p> <p>If Observant Desktop is unable to communicate with the base unit, it cannot communicate with any field units and is rendered inoperable. If this is detected, the following error is shown. The cause could be that the cable to the base unit has become loose or has been moved, or the serial port has been changed or reconfigured.</p>	 <table border="1" data-bbox="973 784 1141 918"> <thead> <tr> <th>State</th> <th>open</th> </tr> </thead> <tbody> <tr> <td>Today</td> <td>no data</td> </tr> <tr> <td>Last 7 Days</td> <td>no data</td> </tr> <tr> <td>March</td> <td>no data</td> </tr> <tr> <td>February</td> <td>no data</td> </tr> <tr> <td>3 Months</td> <td>no data</td> </tr> </tbody> </table>	State	open	Today	no data	Last 7 Days	no data	March	no data	February	no data	3 Months	no data
State	open												
Today	no data												
Last 7 Days	no data												
March	no data												
February	no data												
3 Months	no data												
<p>Site warning</p> <p>This site is showing a warning. Further inspection shows that the level sensor is reporting a low water warning.</p>													
<p>Stale data</p> <p>The 'clock' icon and the colouring of the summary table indicate that no recent information has been received from the field unit, its level sensor and its flow meter. This can be a result of the field unit conserving power due to low battery, or poor radio communications.</p>	 <table border="1" data-bbox="1029 1332 1220 1467"> <thead> <tr> <th>Flow Rate</th> <th>0 L/min</th> </tr> </thead> <tbody> <tr> <td>Today</td> <td>≈ 0 L</td> </tr> <tr> <td>Last 7 Days</td> <td>≈ 133.2 L</td> </tr> <tr> <td>March</td> <td>≈ 133.2 L</td> </tr> <tr> <td>February</td> <td>no data</td> </tr> <tr> <td>3 Months</td> <td>≈ 133.2 L</td> </tr> </tbody> </table>	Flow Rate	0 L/min	Today	≈ 0 L	Last 7 Days	≈ 133.2 L	March	≈ 133.2 L	February	no data	3 Months	≈ 133.2 L
Flow Rate	0 L/min												
Today	≈ 0 L												
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March	≈ 133.2 L												
February	no data												
3 Months	≈ 133.2 L												
<p>Device not drawing power</p> <p>In this case, the field unit is reporting that its level sensor is not drawing enough power to be operating correctly. An error of this type could be caused by removal or damage to the cable connecting the field unit to the level sensor.</p>													

Appendix C: Troubleshooting

Solutions to common problems

Symptom: Poor or intermittent radio communications, signified by field units showing the stale icon.

Possible Cause	Solution
Base unit antenna mounted close to metallic objects.	Ensure the base unit antenna is mounted well away from metallic structures such as water tanks.
Base unit antenna mounted close to other radio antennae.	Ensure the base unit antenna is mounted a minimum of 3m from any other radio antenna.
Long cable run is causing high signal losses.	Use a low loss coaxial cable if the antenna cable is over 30 metres long. Observant recommend RG213 antenna cable for this purpose.

Symptom: No radio communications with a given field unit, signified by the field unit constantly showing the stale icon. When refreshing the field unit, the error **communications timed out waiting for device response** is displayed.

Possible Cause	Solution
The field unit has entered a low power state due to low battery.	<ul style="list-style-type: none">• Wait for the battery to charge sufficiently, or• “Wake up” the field unit by holding a magnet near the Port B side of the unit for several seconds until the radio indicator turns green.

Symptom: During installation, the installer fails to install the Java Runtime Environment.

Possible Cause	Solution
Some versions of the installer do not include the Java Runtime Environment.	<ul style="list-style-type: none">• From the installer, select download the latest version of the Java Runtime Environment from the Internet. This will open a web page where you can download the software.• Select the Offline Installation option.• Save the installation file somewhere convenient then double-click it to start installation.

	<ul style="list-style-type: none"> ● Follow the prompts to install Java. ● Launch the Observant Desktop installer.
--	--

Symptom: When the software is run for the first time and the wizard attempts to locate a base unit attached to a serial port, Observant Desktop can not access the computer's serial port.

Possible Cause	Solution
Other software is using the serial port.	Uninstall or disable any other software that uses the serial port, such as fax software. The serial port connected to the base unit should not be used for any other purpose, e.g. swapping between the base unit and a modem.
Windows is attempting to load drivers for the base unit. Under some circumstances, Windows may incorrectly identify the base unit as a serial mouse.	Restart the computer with the base unit disconnected. After Windows has started, connect the base unit and attempt to detect the base unit again.
On a notebook computer with a USB to Serial adaptor, the adaptor may not be correctly started when coming out of hibernation.	Restart the computer after it returns from hibernation, or disable hibernation in Windows power management options. To do this in Windows 2000 or XP: <ul style="list-style-type: none"> ● Open Control Panel ● Double-click Power Options ● Select the Hibernate tab and turn off the Enable Hibernation option.

Symptom: A field unit shows the stale icon at the beginning of each day.

Possible Cause	Solution
Overcast conditions in the past 2-3 days have prevented the battery from charging fully. As the battery discharges during the night, the field unit disables the radio to conserve power.	Wait for the battery to charge sufficiently to power the radio.
The solar panel is not correctly orientated to make best use of the available sunlight.	Ensure the solar panel is correctly aligned. Position the field unit so that the solar panel is orientated with its face pointing towards true north (this is approximately 10 degrees east of magnetic north).

Troubleshooting tools: Ping tester

The ping tester tests radio communications by sending a series of messages to a field unit and waiting for a reply. When a reply is received, it is shown as a coloured indication of radio signal quality.

The ping tool is useful for the initial testing of a new system, to verify that radio communications are working as expected. It can also be used as a troubleshooting tool if a field unit is proving difficult to communicate with.

To run the ping tester, enter advanced mode and select **Field Unit, Ping** from the Observant Desktop menu.

Various options can be set here to control how the ping tester behaves.

The field unit to be tested can be selected using its name or its address. Selecting another field unit to route via will send the messages through that field unit first. This enables testing of different routing options to establish the best choice.

Interval: time between messages

Beep: make the field unit beep when it receives a message. This is useful if there is someone at the field unit, as it clearly indicates the ping message has been “heard”.

Count: either ping continuously, or stop after the selected number of pings.

Packet Size: send a small, medium or large message. Sending larger messages takes longer (up to 15 seconds) for a response to arrive, but tests the radio link quality more thoroughly. Often a poor quality radio link will give a reasonable result using small messages, but will fail using larger messages.

Interpreting the results

In this example, the field unit has been experiencing poor radio communications. The site view has been showing “stale” warnings, and refreshing devices often fails with a communications timeout error. The ping tester shows that radio signal quality is poor in both directions.

This was resolved with the help of the traffic report graph, which showed a

Time	Field Unit	Status	Request Signal	Response Signal
11:38:36 AM	Fence and Rain (105)	Timeout		
11:38:41 AM	Fence and Rain (105)	Received	Yellow	Yellow
11:38:46 AM	Fence and Rain (105)	Received	Red	Red
11:38:51 AM	Fence and Rain (105)	Received	Red	Red
11:38:56 AM	Fence and Rain (105)	Timeout		
11:39:01 AM	Fence and Rain (105)	Received	Yellow	Red
11:39:06 AM	Fence and Rain (105)	Received	Red	Yellow
11:39:11 AM	Fence and Rain (105)	Timeout		
11:39:16 AM	Fence and Rain (105)	Received	Red	Red
11:39:21 AM	Fence and Rain (105)	Timeout		

Sent: 10 Received: 6 Loss: 4 (40% loss)

poor radio link from this field unit to the base, and also showed that there was an intermediate field unit with an excellent link to both the base and the “Fence and Rain” field unit.

This was tested using the ping tool to send messages via a routing field unit. The ping tester showed a strong signal for each ping message, indicating an excellent link to the field unit.

Once the link had been tested using the ping tester, the route was added permanently so that all future messages to this field unit would be routed.

The screenshot shows a software interface for configuring and running a ping test. It is divided into several sections:

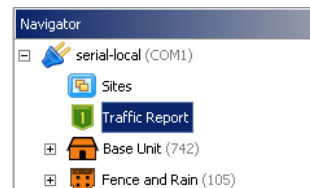
- Destination:** Includes radio buttons for "By Name" (selected) and "By Address". The "By Name" section has a dropdown menu set to "Fence and Rain (105)". The "Route Via" dropdown is set to "Remote Bore (65)".
- Options:** Includes dropdown menus for "Interval" (set to "5 seconds"), "Count" (set to "10"), "Beep" (set to "none"), and "Packet Size" (set to "small").
- Results Table:** A table with five columns: "Time", "Field Unit", "Status", "Request Signal", and "Response Signal". It contains four rows of data, all showing successful pings.

Time	Field Unit	Status	Request Signal	Response Signal
11:36:21 AM	Fence and Rain (105) via 65	Received		
11:36:26 AM	Fence and Rain (105) via 65	Received		
11:36:31 AM	Fence and Rain (105) via 65	Received		
11:36:36 AM	Fence and Rain (105) via 65	Received		

Troubleshooting tools: Traffic Report graph

The traffic report graph shows a graphical view of the link quality between all field units in the system. This information comes from the recent history of all messages heard by each field unit, so can often be a better indication of recent radio performance than the ping tester.

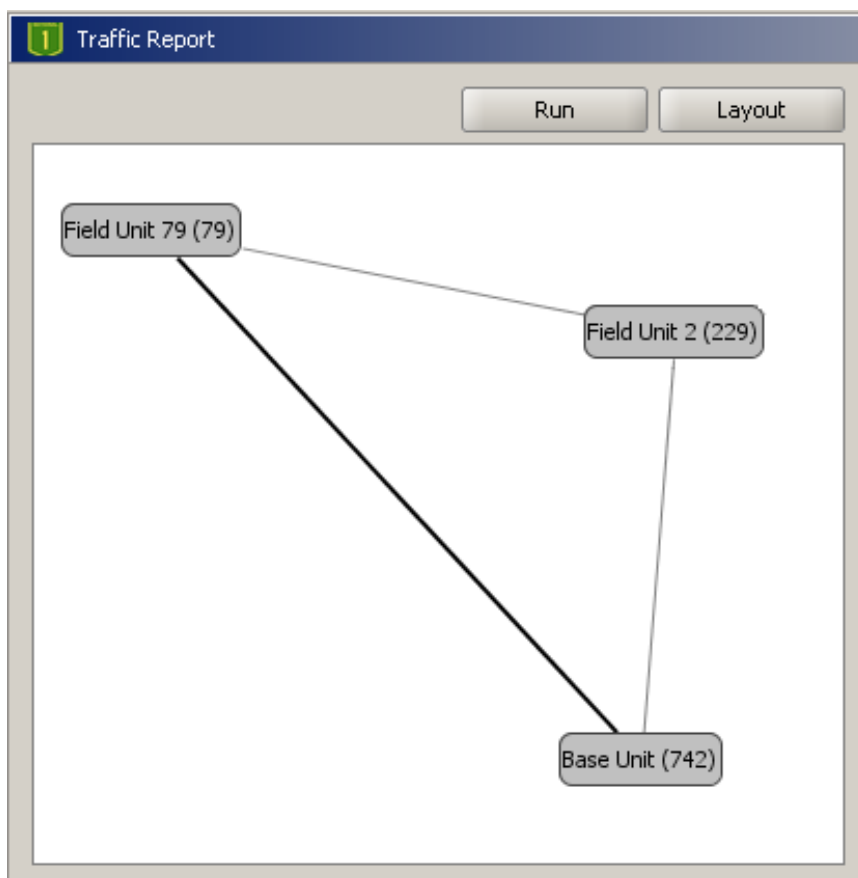
To start the traffic report, enter advanced mode and select Traffic Report from the Navigator:



The link quality between each pair of field units is displayed as one of three types of line:

Solid black:	strong signal
Solid grey:	acceptable signal
Dashed grey:	poor signal.

These lines are the equivalent of the green, orange and red indicators in the ping tester.



Notifications list errors and warnings:

The following list describes some of the common error and warning messages displayed in the Notifications list.

Message	Explanation	Solution
Communications timed out waiting for device response.	A field unit has lost communications with an attached sensor. This could be caused by damage to the cable or a change in the device's configuration.	Check the cable connecting the field unit to its sensor. Check the configuration of the attached sensor. If the device is a Nutridose water medicator, refer to the Nutridose water medicator in the Working with Devices section of this User Guide.
Communication failure. Device is not drawing power as expected.	The field unit monitors its attached devices and senses whether they are using power. If a device is not drawing the expected amount of power, this error is raised.	Check the cable connecting the field unit to its sensor.
Radio offline or Radio power low.	This indicates that the field unit has detected a very low battery and will now wait until the battery is charged to a usable level before fully starting up. This would often be seen after a field unit has been without power for a number of weeks.	Leave the field unit attached to either a power pack or its solar panel. It will return to its normal operation once the battery is sufficiently charged, normally within an hour.
Time sync failed; difference too large	Each field unit unit has an internal clock that is synchronised automatically to ensure consistent timekeeping across the system. This will automatically correct a time difference of up to 15 minutes. If a unit is out of synchronisation by more than 15 minutes then the automatic synchronisation will not operate and the time must be manually synchronised.	To synchronise the time manually: <ul style="list-style-type: none"> ● Enter Advanced mode ● In the Navigator to the left of the screen, click on the field unit to highlight it. ● From the menu, select Field Unit, Set Time.

Base unit charge below 70%.	The power supply for the base unit has been disconnected or switched off for an extended period.	Switch on or connect the base unit power supply.
Configuration space initialised.	The field unit is reporting that its internal configuration data has changed. This is normally the result of a change in settings, or a master reset of the field unit.	This is an expected message after reconfiguring the unit. If the message persists, reset the alarm by right-clicking on the field unit and selecting Reset Alarm: Configuration Space initialised.
Base unit has been over 5 seconds without charge	The power supply for the base unit has been disconnected or switched off.	Switch on or connect the base unit power supply.
Base unit comms error or No base unit detected. Look for detected base unit...	Disconnected serial cable.	<ul style="list-style-type: none"> ● Follow the serial cable from the base unit back to the computer and verify that the cable is not damaged or disconnected. ● If the cable has been moved to a different serial port, click on the alarm message to launch the wizard to search for the base unit. ● On the base unit, check that the Port B indicator is lit green. This indicates that there is a connection to the PC.
	Serial port is in use or otherwise unavailable.	Ensure no other software (e.g. for a mobile phone, PDA or uninterruptible power supply) is running that could be using the computer's serial ports.
A device is drawing too much current	Shorted or otherwise faulty wiring, or faulty sensor.	Check the wiring to the sensor in question. Once the fault has been rectified, the warning can be reset (see To reset an alarm or warning)

<p>Device communication failed with incomplete message</p>	<p>The communication between the sensor and the field unit was interrupted. This can be the result of a configuration problem (e.g. two devices with the same address) or damaged cabling.</p>	<ul style="list-style-type: none"> ● Check the wiring to the sensor in question. ● Check the configuration of all devices on that field unit port.
<p>Level is below reading range</p>	<p>The water level has dropped below the base of the level sensor and the water level can no longer be accurately measured.</p>	<p>This is not necessarily an error, but will be displayed when the water level is below the level sensor's reading range.</p>
<p>Humidity too high</p>	<p>The field unit has an internal humidity sensor that can detect moisture inside the field unit case. The humidity too high warning can be caused by water entering the case, or very humid conditions.</p>	<p>Attempt to reset the warning (see To Reset an Alarm or warning). If the warning will not reset, there could be water in the field unit case and it will be necessary to open the field unit case and inspect it. Please contact Observant support if this situation arises.</p>

Appendix D: Upgrading Firmware

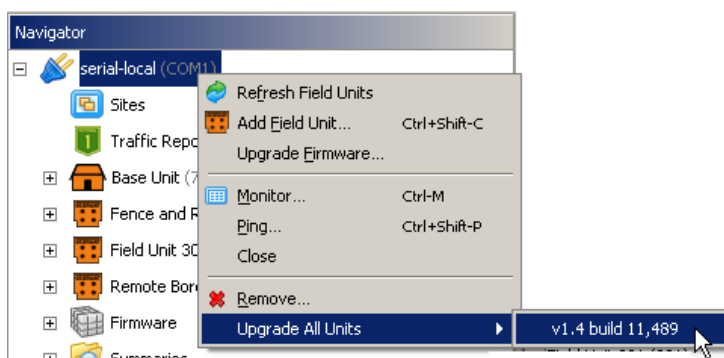
Each field unit contains a program that controls how it operates. Everything the unit does from the time it powers on is controlled by this program, which is known as firmware.



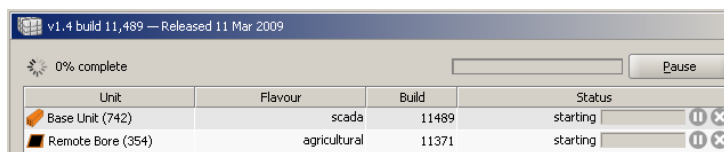
- The process of upgrading firmware requires that all field units are reachable via the radio. Before starting the upgrade process, make sure that you can communicate with all field units. The simplest way to establish this is to open Observant Desktop and check that all field units have the green tick above them.

To upgrade the firmware in all field units at once:

Enter and highlight the zone in the Navigation panel and select **Upgrade All Units**, and select the version of firmware to upgrade to:



To view the progress of the firmware upgrade, select **Firmware** in the Navigator then select the version of firmware as above.



When the upgrade process is complete, the status will indicate that all data has been sent successfully.



To upgrade the firmware for a single field unit, follow the above process but begin by right-clicking the field unit in the Navigation panel and selecting **Upgrade to...**

Contact details

Observant Pty Ltd
Level 1, 106 Victoria St
Fitzroy
Vic 3065

phone: 1300 224 688
fax: 03 9923 6101
email: support@observant.com.au