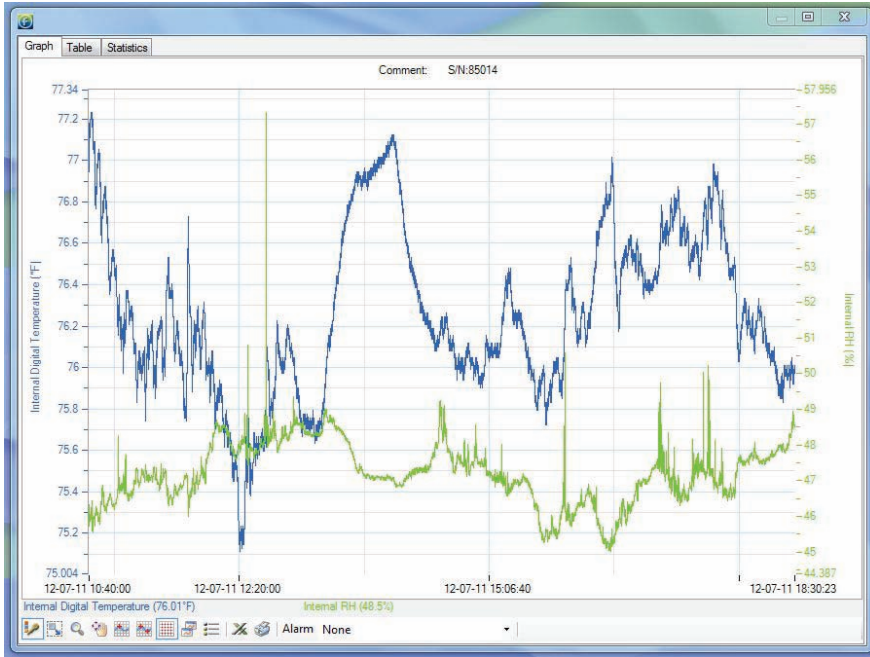




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DataSuite User Guide

Supporting: DataNet, DaqLink, MicroLite, MicroLogPRO II, PicoLite



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DataSuite User Guide

***Supporting DaqLink, DataNet,
MicroLite II and MicroLogPRO
II Data Loggers***

For DataSuite v2.0.0.13

November 2011

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Contacting fourtec technical support:

Email: support@fourtec.com

Web: www.fourtec.com

Telephone:

Worldwide: +972-3-901-4849

USA: 1-888-778-4927 (toll-free within USA only)

To download updated versions of the DataSuite User Guide and DataSuite software/firmware visit:

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Chapter 1: Introduction

DataSuite is the latest software release from fourtec, integrating its existing, legacy software platforms into one unified application providing support for a wide range of fourtec products. You can now monitor and compare data from multiple systems on one, single view.

The DataSuite solution supports simultaneous connection of the following fourtec data acquisition systems:

<ul style="list-style-type: none"> • DataNet 	
<ul style="list-style-type: none"> • DaqLink 	
<ul style="list-style-type: none"> • MicroLite II 	
<ul style="list-style-type: none"> • MicroLogPRO II 	

Each product is supported in the DataSuite modular platform by specific product modules, with each module having a 30 day trial period. DataSuite is installed with all product modules included, but module activation is required per module. Once the trial period ends, the software won't detect the loggers without activation using a unique serial number.

Note: MicroLite software module is free and doesn't require activation.



DataSuite key features include:

- Software GUI based on proven fourtec platforms
- Multiple data view features
- Map view displaying unit location, signal path and strength
- Alarm features with 4 alarm levels sending email and SMS notifications
- Reporting module for creating and generating reports with selected distribution
- Analysis features including dew point analysis, FO Pasteurization, histogram, statistics with export to Excel and CSV formats
- FDA Title 21 CFR Part 11 compliancy (*in future versions*)
- API for DataNet system integration

Seamless Migration from Legacy fourtec Software

Existing fourtec users enjoy a seamless upgrade from DataNet software to the DataSuite software.

All data files and system configurations are migrated. And existing license keys remain valid, so there is no need to purchase additional licenses.

The Uptodata software update mechanism allows for easy download and installation of new DataSuite releases.

Existing MicroLite I users can continue using the current MicroLab Lite software, or install DataSuite for MicroLite (for free) and enjoy the enhanced features of the DataSuite platform.

User Guide Overview

This user guide includes the DataNet, DaqLink, MicroLite, and MicroLogPRO II products.

It is comprised of the following chapters:

- Chapter 1: Introduction
- Chapters 2-4: DataNet
- Chapters 5-7: DaqLink
- Chapters 8-10: MicroLite II
- Chapters 11-13: MicroLogPRO II
- Chapter 14: Using the DataSuite Software
- Chapter 15: Updating DataSuite Software and Firmware
- Appendices A-H

DataSuite CFR Compliancy * Available December 2011

DataSuite includes an additional CFR module which together with the separate DatPass Administrative software achieves compliance with FDA Title 21 CFR Part 11. Among other features, it defines the users that can log into the DataSuite software, their passwords and the digital signatures the users are permitted to sign data within electronic records (files). DatPass also maintains an audit trail to keep track of all activities performed within the system and user privileges can be defined as well. The CFR module includes a 30 day trial period following which the module must be activated using a unique Serial Number.

Chapter 2:

DataNet Overview

This chapter provides a general overview of the DataNet system as well as the concept behind the ZigBee RF protocol.

2.1. DataNet Introduction

The Wireless Intelligent Logging Network

fourtec's next generation data logging system is the DataNet, a 16-bit, mobile data acquisition network based on the innovative and reliable ZigBee technology. This solution provides an intelligent sensor mesh system with 100% data receipt and no data loss.

The DataNet system is comprised of a family of data logging units, as well as a Receiver to manage the intelligent network and Repeaters to extend the transmission range. The data loggers measure a broad range of parameters and include models that feature between one and four inputs for direct measurement and recording of PT-100, thermocouple, 0 to 1 V, 4 to 20 mA, contact, frequency and pulse sensors, as well as internal temperature and relative humidity sensors. These models range from loggers with graphic display, AC or battery power supply, and power amplification, to models with no display and battery power only.

Data is transmitted from the end units to a Receiver connected to a central computer. The system leverages the ZigBee protocol, a 2.4 GHz license-free frequency RF band, to ensure full data integrity. By adding DataNet Repeater units or loggers with power amplification to the network, you can extend the transmission range and form a reliable mesh network of up to 65,000 units.

With its high resolution and fast Analog to Digital converter (ADC), DataNet data loggers meet the majority of data acquisition requirements in most industrial applications. Every DataNet logger unit is embedded with a unique serial number and can be loaded with a descriptive comment for safe identification. An internal clock and calendar keeps track of the time and date of every sample measured.

DataNet loggers can automatically activate external alarm events when data is outside a specified range. Email and SMS notifications can be sent to predefined contacts.

The DataNet system is powered by the powerful DataSuite software. The Windows™ based software is the central management interface of the DataNet network. Data is monitored online and can be displayed in graphs or tables. You can analyze data with various mathematical tools, or export data to a spreadsheet. Detailed reports can also be generated from the system, collating a wealth of relevant system data.

The software also enables you to configure, calibrate or update the firmware of DataNet units wirelessly.

Key DataNet benefits include:

- Reliable transmission ensuring no data loss
- Long-range monitoring
- Ability to constantly expand transmission range by adding additional Repeaters, or turning loggers into Repeaters

- Portable units facilitating easy deployment in various environments
- Remote programming and firmware updates
- 65,000+ possible end units per network
- 16-bit resolution
- Low-power consumption
- Long battery life
- Minimal costs thanks to wireless infrastructure
- Feature-rich software, including multi-network support per PC

2.2. What is ZigBee?

ZigBee is a standards-based protocol built around the IEEE * 802.15.4 wireless protocol, providing the network infrastructure required for wireless, low power network applications.

The mesh network eliminates single points of failure by providing multiple pathways for data to travel.

* IEEE is the *Institute of Electrical and Electronics Engineers*, a non-profit organization dedicated to furthering technology involving electronics and electronic devices.

2.3. The ZigBee Concept

The Coordinator: This device creates and maintains the network. Once the network is up and running, the coordinator behaves as just another device on the network. There is only one Coordinator in a ZigBee network.

The Router: A router relays data packets/messages between devices on the network and increases the distance between these devices.

The End Unit: This device sends and receives information to other devices on the network. It is usually a control or a sensor unit, often battery operated. A ZigBee end unit cannot relay messages.

ZigBee Terminology	DataNet Terminology
Coordinator	Receiver
Router	Repeater
End Unit	Data Logger

ZigBee enables mesh networking which supports a wireless, yet integrated environment with communication between many coordinators, routers and end units in environments where multiple applications are being monitored.

2.3.1. ZigBee Mesh Network Operation

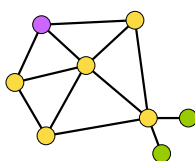


Figure 1: ZigBee network diagram



In a mesh network, all the router units are *aware of their environment* meaning a router *knows* with units are close by. When a router sends a message to a specific unit, it relays the message until it gets to the destination.

Network recovery from a unit failure

In a mesh network, when a router fails, the network automatically finds a different path via a different router for the message relay.

This ensures maximum protection against a network breakdown.

2.3.2. Why is ZigBee Technology Key for Data Logging?

ZigBee technology has proved to be ideal for data acquisition networks which require meter reading, parametric display of data such as temperature or humidity and responsive action when parameters are crossed. This is due to the fully automated, flexible and reliable nature of the protocol. With the Mesh Network system, the ZigBee standard redresses misbalances in any data logging system, responding to weaknesses, inefficiencies, new network structure (with the additional or removal of devices) through self correction.

2.4. The DataNet System

The basic DataNet system will contain at least one of the following units:

- DataNet data logger – Part Number DNL804, DNL808, DNL810, DNL804-BXT, DNL808-BXT, DNL810-BXT, DNL910, DNL920, DNL910-PA, DNL920-PA
- Receiver/Repeater unit – Part Number DNR900
- Mini Repeater – Part Number DNR800
- Mini-USB cable
- Power adapter (one per DataNet unit ordered)
- DataSuite Software CD with unique serial number

2.4.1. The Data Logger

There are seven distinct data logger models compatible with the DataNet system. These are the so-called *end units* of the system. These loggers support up to four external sensors and two internal sensors, temperature and humidity, depending on the specific model. Data is recorded and stored to the logger's internal memory and transmitted over the network to the DataSuite software running on the PC.

The data logger is programmed to consume as little power as possible during operation, in order to conserve the battery life. When not transmitting or recording data the units are in *sleep* mode and they *wake up* when needed.

The battery for the DNL910 and DNL920 is rechargeable and can run up to several months on one charge, depending on the logger configuration.

The DNL910-PA and DNL920-PA loggers include power amplification (PA), enabling longer transmission range compared to the non-PA units, and as a result have high power consumption. The PA units therefore must be connected to AC power at all times otherwise its battery will drain after a few hours.

The battery for the DNL804, DNL808 and DNL810 is not rechargeable and can run up to ten months before being replaced, depending on the logger configuration.

The DNL8XX-BXT models provide extended battery life to the existing Mini DataNet loggers, for up to 3 years with 4 x AA 3.6V batteries connected.

Refer to section 4.9.7 for more information.

Note: Battery life depends on the logger sampling rate, transmission rate, type of sensor, network architecture and number of measured sensors.

The seven DataNet models can be divided into two groups:

- DataNet loggers (with LCD)
- Mini DataNet loggers (without LCD)

DataNet Loggers (with LCD)



Part Number: DNL920 and DNL920-PA

Four external channel RF data logger with two internal sensors, Humidity and Temperature.

** PA model includes Power Amplifier for long-range transmission.*

Transmission Range:

DNL920: 4 dBm

DNL920-PA: 17 dBm

Memory Capacity: ~59,000 samples

Power supply: AC or battery operated

Part Number: DNL910 and DNL920-PA

Four external channel RF data logger with internal Temperature sensor.

** PA model includes Power Amplifier for long-range transmission.*





Transmission Range:

DNL910: 4 dBm

DNL910-PA: 17 dBm

Memory Capacity: ~59,000 samples

Power supply: AC or battery operated

Mini DataNet Loggers (without LCD)					
					
DNL804	DNL804-BXT	DNL808	DNL808-BXT	DNL810	DNL810-BXT
Single channel RF data logger supporting external 4 to 20 mA input		Single channel RF data logger supporting external temperature NTC 10K Ω probe		Dual channel RF data logger with internal Temperature and Humidity sensors.	
DNL8XX-BXT Models					
BXT models include built-in battery pack supporting up to 4 x AA 3.6 batteries, for extended battery life of 3-years (depending on sampling rate). Functionality is identical to regular Mini DataNet loggers. Only external casing and battery supply is different.					
Transmission Range: 4 dBm		Transmission Range: 4 dBm		Transmission Range: 4 dBm	
Memory Capacity: ~59,000 samples		Memory Capacity: ~59,000 samples		Memory Capacity: ~59,000 samples	
Power supply: Battery operated		Power supply: Battery operated		Power supply: Battery operated	

2.4.2. The Receiver/Repeater

Note: The DNR900 can work in one of two modes, Receiver or Repeater. The DNR800 only works as a Repeater.

The Receiver DNR900, acts as a bridge between the DataNet network and the PC. It is connected to the PC via USB cable and is used to create the network to which you add your data loggers. The Receiver is externally powered but also includes a rechargeable battery for back up (in case the external power fails).

More than one Receiver may be detected by the software, enabling the running of multiple DataNet networks from one PC.

Note: Each Receiver can detect up to 8 data loggers and 16 Repeaters. To detect more data loggers, Repeaters are required.

The Repeater is considered the backbone of the network, as it enhances the network range by receiving and transmitting between end unit and Repeater until it reaches the PC. There are two Repeater models, the DNR900 with LCD and the DNR800 Mini Repeater, without LCD. Both are externally powered via the AC



adapter but the DNR900 also includes a rechargeable battery back-up (in case the external power fails).

The Repeaters are the end units' *parent* units, meaning each Repeater has specific end units under their responsibility (their *children*). They route the transmissions to and from the end units to the Receiver (or other Repeaters in the network).

Each Repeater holds the data sent to the end units while the end units are in sleep mode. At a specific interval the end unit wakes up and receives the data from its parent (Repeater).

Note: Each Repeater can detect up to 24 data loggers and 16 Repeaters including the parent unit. If the number of loggers exceeds this capability, additional Repeaters are required.

Receiver/Repeater with LCD



Part Number: DNR900

Repeater Transmission Range: 17 dBm

End Units per Receiver: ~65,000

Mini Repeater (without LCD)



Part Number: DNR800

Repeater Transmission Range: 20 dBm

End Units per Receiver: ~65,000

2.4.3. Hardware Accessories

The DataNet system includes the following accessories:

- Mini-USB cable for connecting PC to DataNet Receiver
- Power adapter to power DataNet Receiver, Repeater and data loggers

2.4.4. DataSuite Software

The user interface for the DataNet system, the DataSuite software CD is provided together with the DataNet hardware and includes the following features:

- Multiple Network management
- Data display, management, storage and data diagnostics
- Alarm settings: Email and SMS notifications, visual and audible alarms
- Reports module
- Wireless sensor definition
- Wireless sensor calibration
- Wireless firmware update (*boot over the air*)
- Data download via USB
- Automatic software update (via fourtec server)

The DataSuite for DataNet module is run together with additional modules such as DaqLink and MicroLogPRO II to allow multiple data view from multiple logger models within one graph view.

The software interface is described in detail in Chapter 14: Using the DataSuite Software.

Chapter 3:

DataNet Implementation Guide

fourtec strongly recommends first time users of the DataNet system read this chapter before drilling down into the many features of the system described later in the user guide. The Implementation Guide will give you a clear understanding of the basic aspects of setting up the system, and getting your network up and running.

Once you are familiar with the technical aspects of setting up the network as outlined in this chapter, please consult section 3.8 for fourtec's recommended approach to initial deployment of the DataNet system.

Example

Below is a diagram depicting a supermarket deployment of a DataNet system, illustrating how the devices may be positioned to provide full coverage within the facility.

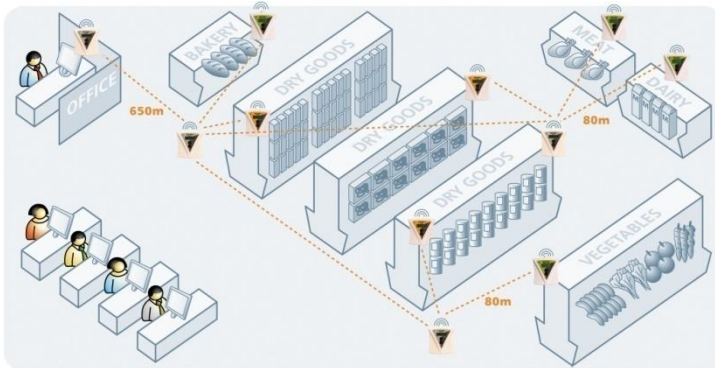


Figure 2: Example of DataNet network application

3.1. DataNet Network Architecture

The DataNet network architecture consists of layers of loggers and Repeaters, forming a mesh network monitored by the Receiver unit connected to the workstation PC.

The basic architecture is as follows:

- Maximum nodes per network: 65,000
- DNR900 Receiver recognizes up to 8 loggers and 16 Repeaters
- DNR900 Repeater and DNR800 Mini Repeater recognizes up to 24 loggers and 16 Repeaters (including parent unit)
- DNL910 and DNL920 (including the PA models) in Short Range Repeater mode (refer to section 3.8.5) recognizes up to 24 loggers and 16 Repeaters

The diagrams below show the architecture of a typical DataNet mesh network. Repeaters and loggers, which are being used as Short Range Repeaters in Figure 4 (see section), can be added to the network in order to extend the range and improve its robustness. Each such device has end units communicating with it, but this route may change as the RF environment changes. This is the ZigBee self correcting mechanism at play.

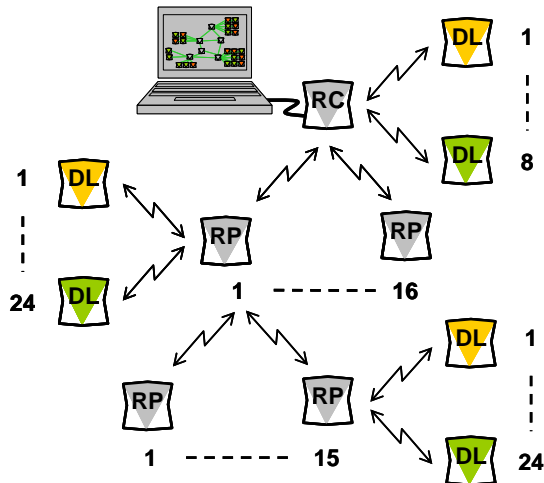


Figure 3: Standard DataNet mesh network architecture

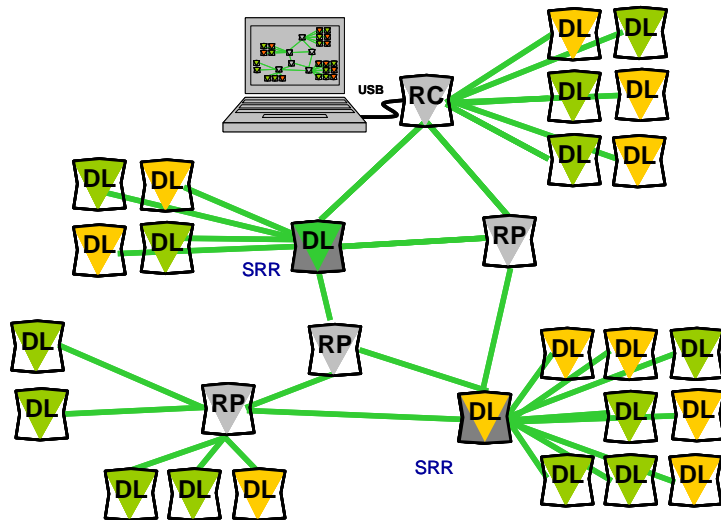


Figure 4: DataNet network with Short Range Repeaters

3.2. Pre-setup Requirements

Prior to commencing with the DataNet implementation you must have the following requirements in place:

PC

- 24/7 availability
- Reliable AC power
- Sufficient hard disk space to store loggers' data
- One free USB port

DataNet devices

- One DNR900 DataNet Receiver
- At least one DataNet logger DNL910, DNL920, DNL910-PA, DNL920-PA, or Mini DataNet logger DNL804, DNL808 or DNL810 (or BXT models)
- At least one DNR900 DataNet Repeater or DNR800 Mini Repeater, depending on your RF environment

Mini-USB cable

The mini-USB cable connects the DNR900 Receiver to the PC (and is supplied with the PC Suite software kit).

3.3. Launching the Software

1. Install the DataSuite software on the PC workstation. Refer to section 14.1: Installing DataSuite Software on page 129 for more details.
2. Once the software and associated components have been installed, launch



DataSuite from your DataSuite desktop shortcut

3. Software activation window will open. Select the DataNet module button. To start the 30-day Trial version, select the **Start trial** option and click **Next**. To activate the software refer to chapter 14.3.
4. The main DataSuite window is launched. The default view is called **Map View**.

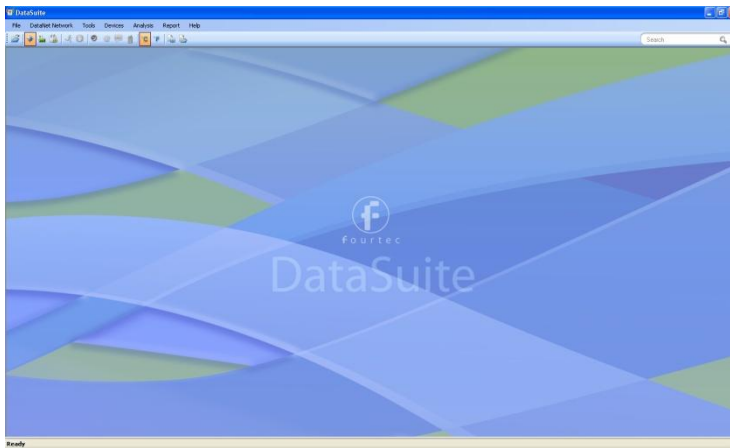



Figure 5: Main DataSuite window

5. Check for DataSuite updates. Go to **Help > Check for Updates** from the DataSuite main menu to check for newer versions of the DataNet module software and firmware released since you purchased your system. For more details on the Update feature go to Chapter 15: Updating DataSuite Software and Firmware.

3.4. Connecting the Receiver

1. Only once the DataSuite software has been installed and activated (either by starting the Trial or activating the module with a serial number), connect the DataNet Receiver/Repeater unit (DNR900) to the fourtec-supplied power adapter.

Note: Only use adapters provided by fourtec. Use of the wrong adapter could damage your DataNet units.

2. Turn on the unit by pressing the **Scroll** button  on the front keypad. The unit will beep when turned on.
3. Verify that the unit is in Receiver mode by seeing the following screen on the LCD:

Receiver ID: 123.456.789

- The ID will be unique to your Receiver network. If the unit is in Repeater mode, switch it to Receiver mode. Go to section 4.15 for more details.
- Connect the mini-USB cable to the computer and to the Receiver's mini-USB

port. The DataNet Receiver icon  will immediately appear in the top left corner of the Map View.

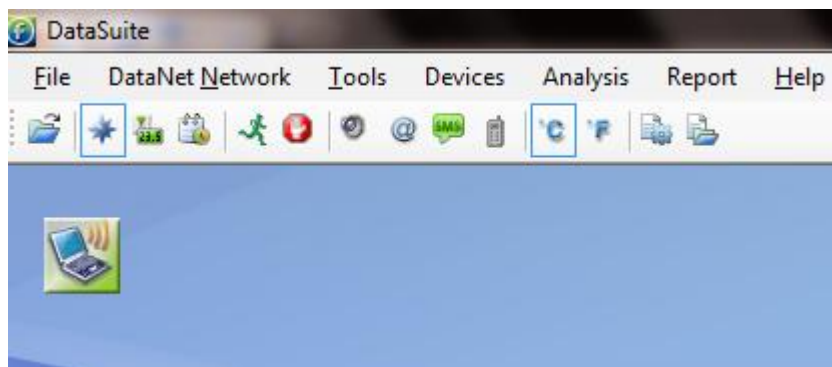



Figure 6: Adding Receiver icon to Map View

- A green icon indicates that the Receiver is online.

Note: If the Receiver is not recognized by the software try connecting the mini-USB cable to another USB port on the PC. Or select Devices > Detect Device in the main menu.

- Should you disconnect the Receiver's USB cable or power adapter (and the battery eventually dies), the Receiver icon will be grayed out: 
- Right-click the Receiver icon and select **Form New Network** from the context menu. The Receiver will then form a new network based on your RF environment rather than use the network formed in the factory. This will ensure optimal network performance. Refer to section 3.8: Optimizing the Network for more details.
- Check the DataNet network ID that was formed by the Receiver by placing the mouse cursor over the Receiver icon. The network ID as well as network name, Receiver firmware version and unit serial number is displayed.

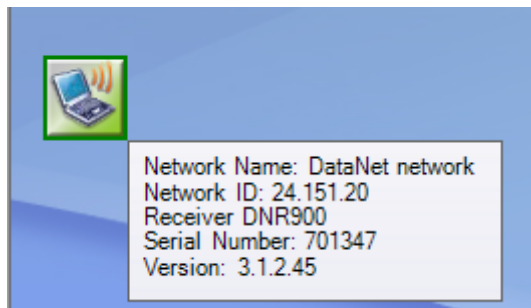


Figure 7: Receiver tooltip

Note: You can move the Receiver icon elsewhere on the screen by going to Tools > Lock Map View and unselecting this option.
--

3.5. Adding the Data Logger to the Network

Once you have connected your Receiver and established a network you are ready to add data loggers and build your system.

3.5.1. Charging DataNet Loggers

This section refers to charging the DNL910 or DNL920 loggers. The Mini DataNet units are battery operated only.

Note: Only use adapters provided by fourtec. Use of the wrong adapter could damage your DataNet units.

Note: DataNet units do not charge when switched off.

If the loggers will run from the battery supply make sure to first charge each of the loggers for 16 hours before use in order maximize the battery life. A fully charged battery can last several months, depending on your logger configuration. Refer to section 4.9.7 or more details on battery life.

If the loggers will run from the AC power supply, when first connected to the AC adapter the logger will always initiate the 16 hour charge cycle.

However, if you reconnect the AC charger within one hour of disconnection from the unit, the logger will not start a new 16 hour charging cycle as long as battery level is at least 90%.


Note: For loggers measuring data with the internal temperature sensor, it is critical to note that during the charge cycle the logger will heat up thereby causing the internal temperature sensor reading to rise up to 10 °C above ambient temperature. Once the charging process is complete, the logger will cool down and the internal temperature sensor readings will return to normal.

For loggers remaining connected to AC power, to prevent the logger from heating up again following the initial charge cycle, the logger will receive a one minute *trickle charge* each day rather than stay continually charged. This is sufficient to ensure the logger doesn't self-discharge and will maintain the logger's full charge status.

Refer to section 4.9.3 for more details on the DataNet loggers' power supply.

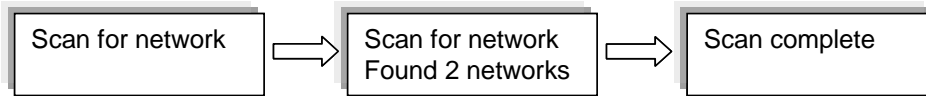
3.5.2. Connecting DNL910 and DNL920 Loggers to the Network

* Includes the PA models


1. Turn on the logger by pressing the **Scroll** button . The unit will beep when turned on. As soon as the unit is turned on, the LCD screen will display the following message:

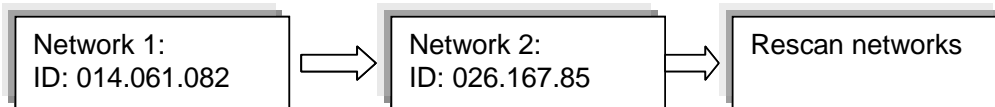
fourtec DataNet
Logger

- The logger will then start scanning for networks. The LCD will indicate how many networks were found in range, and will announce when the scan is complete. Locked networks will not be listed.



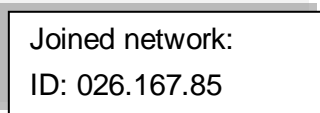
To join the network created by your Receiver (there may be other networks created by your colleagues) scroll through the found networks on the LCD (using the logger

Scroll button) and press the **Enter** button  when you reach the required network. In the example below, the network required is the second network found. You can also rescan the networks by pressing **Enter** on the Rescan networks screen, which is reached by scrolling through all the found networks.



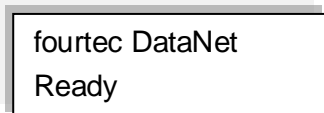
Note: If the logger did not detect a network, the unit will turn off in order to conserve the battery.

- Once you select the network, the logger will automatically join that network and a new message will be displayed on the LCD:

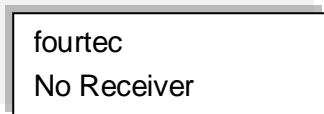







Note: If the message 'Join failed' appears on the LCD, then rescan for the network and try again. If the logger continually fails to join, then form a new network on the Receiver.

- The LCD will then indicate the following status message:



If the Receiver is disconnected for any reason, the following message is displayed:



- When the logger joins the network, the Logger icon  will automatically appear in the Map View.
 - The  symbol indicates the signal strength of the logger in the network.
 - The  symbol indicates that the logger is running from internal battery supply. The  symbol indicates that the logger is running from external power supply.
 - The  symbol indicates that the logger is a new addition to the network and has not yet been configured (setup).

6. Repeat steps 1-3 for every logger in your system.
7. In order to find the physical location of the logger you can right-click on the Logger icon in Map View and select **Call Unit (Beep)**. The logger will then *beep*.

3.5.3. Connecting Mini DataNet Loggers and Mini Repeater to the Network

The Mini DataNet loggers (DNL804, DNL808, DNL810 and BXT units) and Mini Repeater (DNR800) don't have LCD screens therefore the process of joining these units to the network differs than that of the DataNet models with LCD.

Follow the steps below to connect these devices to a specific network.

1. Right-click the Receiver icon and select **Mini DataNet Device Filter** to first define the Mini DataNet devices that are allowed to connect to the network. Enter the SN of each Mini DataNet device in the text window and click **Add**. Click **Remove** to remove a SN of a device you don't wish to join the network.

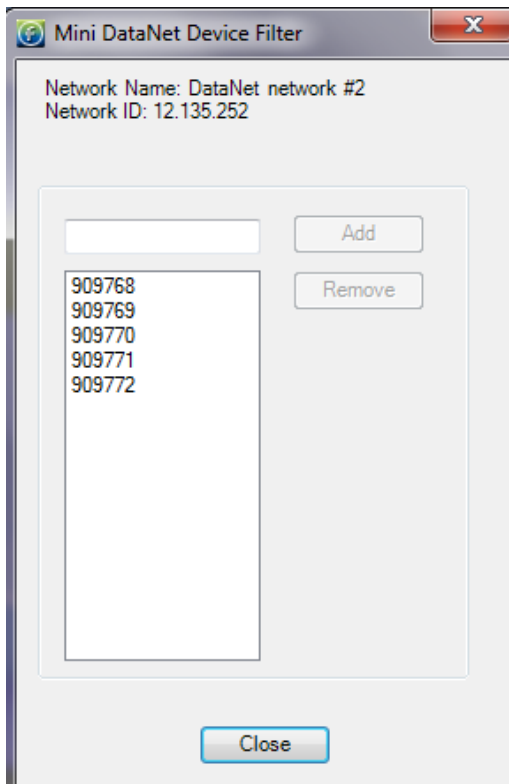


Figure 8: Mini DataNet Device Filter dialog

If a Mini DataNet device tries to join the network but it is not in the list then the software will send the Leave Network command to the device as it tries to connect to the network.

When a device tries to connect to a network and the software is down it will continue to the next available network. If the software is up either the software will accept it or it will send the Leave Network command.

2. Ensure the network is not locked. Go to the **Network** menu and uncheck the **Lock Network** menu item.
3. Take the first Mini DataNet device and from an Off state give the button on the front panel a short press. The green LED will blink once every second until the logger joins the network. The device icon will appear in the Map View.

4. Repeat Steps 1 to 3 for all Mini DataNet devices you wish to join to the network.
5. For more details on joining Mini DataNet units to the network, refer to section 4.13.

3.5.4. Loading Map View Background

Load an image into DataSuite showing a map of your facility in order to place the Receiver and Logger icons in their relative positions. As you add more loggers to the system, this will prove very helpful.

- Double click the Map View background to browse to the image directory and load the image. Remember to unlock the Map View in order to move the icons around.
- Right-click the Map View background and two options will be available: **Load Wallpaper** and **Reset Wallpaper**, which resets to the default fourtec wallpaper.

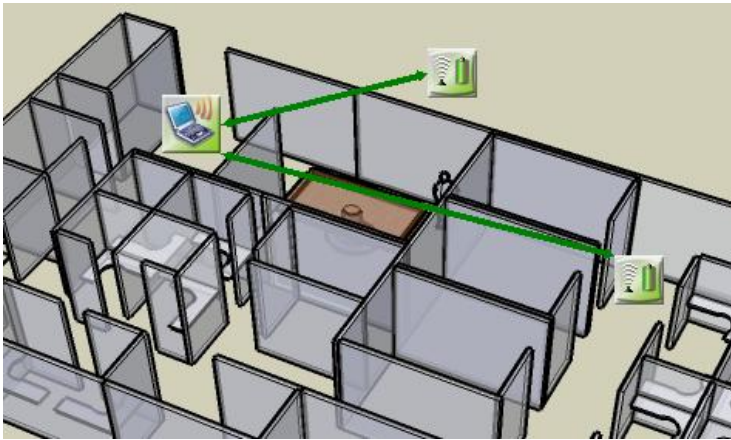


Figure 9: Map View background image example

3.6. Configuring the Logger

Once you connected your DataNet loggers to the network, you must configure them in order to start acquiring data.

1. Right-click on the Logger icon you wish to configure. Select **Setup** from the context menu.
2. The Setup window will be launched.

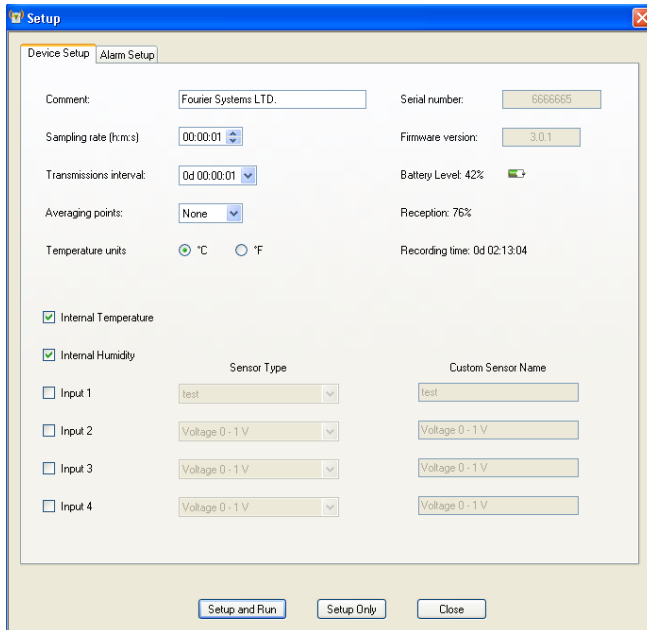


Figure 10: Logger Setup window

This dialog provides non-editable information such as the serial number, battery level, reception level and firmware version of the current unit.

On the **Device Setup** and **Alarm Setup** tabs, the user is able to configure the following parameters:

- Unit's comment
 - Sampling rate
 - Transmission interval
 - Samples averaging
 - Temperature units °C/°F (on the logger LCD. Not applicable for Mini DataNet loggers)
 - Active sensors
 - Custom sensors' names
 - Alarm levels
 - Alarm duration
 - Alarm delay
 - Alarm pre delay
3. Select the sensors you wish to connect to the logger for data acquisition. It doesn't matter which order you select the sensors. You may only have Input 4 selected, for example, and Inputs 1 to 3 left unselected.
 4. Select the sampling rate and transmission interval (rate at which the data is transmitted from the logger to the Receiver).
 5. Unless you have Alarm levels you wish to edit (see the Alarms Setup tab), click either **Setup and Run** (to send the setup and immediately log data), or **Setup Only** (to send the setup but only log data at your command).
 6. If you selected **Setup Only** in step 4, right-click the Logger icon and select **Run** from the context menu to start logging data.
 7. To stop the logger, right-click the Logger icon and select **Stop** from the context menu.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

3.7. Viewing Data

Once you run the logger, you have several ways of viewing the online data that is being acquired.

- Online graph/table/statistics views
- Logger icon tooltip
- Sensor view

3.7.1. Online Data Views

Double clicking the Logger icon or selecting **Display Data** in the Logger icon context menu will open the online graph.

This graph is updated in real-time with the newly recorded data.

You can switch between Graph, Table and Statistics views to view the data in different formats.

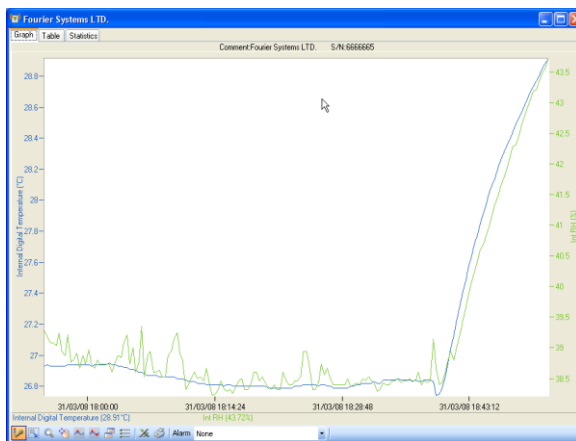
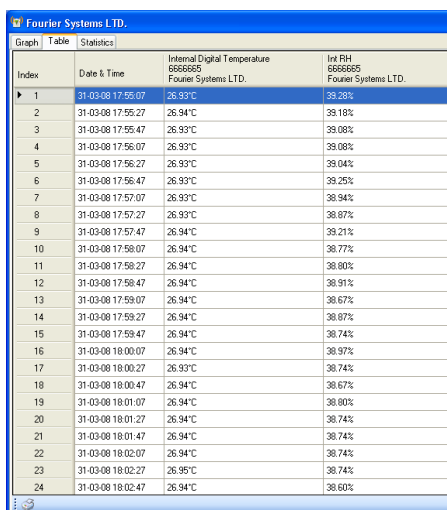
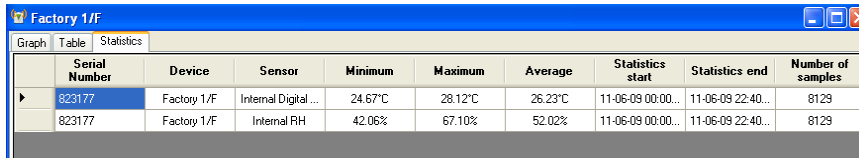


Figure 11: Online data – Graph view



Index	Date & Time	Internal Digital Temperature 8806865 Fourier Systems LTD.	Int RH 8806865 Fourier Systems LTD.
1	31-03-08 17:55:07	26.93°C	38.26%
2	31-03-08 17:55:27	26.94°C	38.18%
3	31-03-08 17:55:47	26.93°C	38.08%
4	31-03-08 17:56:07	26.93°C	38.08%
5	31-03-08 17:56:27	26.93°C	38.04%
6	31-03-08 17:56:47	26.93°C	38.25%
7	31-03-08 17:57:07	26.93°C	38.94%
8	31-03-08 17:57:27	26.93°C	38.87%
9	31-03-08 17:57:47	26.94°C	39.21%
10	31-03-08 17:58:07	26.94°C	38.77%
11	31-03-08 17:58:27	26.94°C	38.80%
12	31-03-08 17:58:47	26.94°C	38.91%
13	31-03-08 17:59:07	26.94°C	38.67%
14	31-03-08 17:59:27	26.94°C	38.87%
15	31-03-08 17:59:47	26.94°C	38.74%
16	31-03-08 18:00:07	26.94°C	38.97%
17	31-03-08 18:00:27	26.93°C	38.74%
18	31-03-08 18:00:47	26.94°C	38.67%
19	31-03-08 18:01:07	26.94°C	38.80%
20	31-03-08 18:01:27	26.94°C	38.74%
21	31-03-08 18:01:47	26.94°C	38.74%
22	31-03-08 18:02:07	26.94°C	38.74%
23	31-03-08 18:02:27	26.95°C	38.74%
24	31-03-08 18:02:47	26.94°C	38.60%

Figure 12: Online data – Table view



Serial Number	Device	Sensor	Minimum	Maximum	Average	Statistics start	Statistics end	Number of samples
823177	Factory 1/F	Internal Digital ...	24.67°C	28.12°C	26.23°C	11-06-09 00:00...	11-06-09 22:40...	8129
823177	Factory 1/F	Internal RH	42.06%	67.10%	52.02%	11-06-09 00:00...	11-06-09 22:40...	8129

Figure 13: Online data – Statistics view

3.7.2. Logger Tooltip

Close the online data window and return to Map View. Scroll over the Logger icon and you will see a tooltip displaying the relevant logger information, including real-time data.

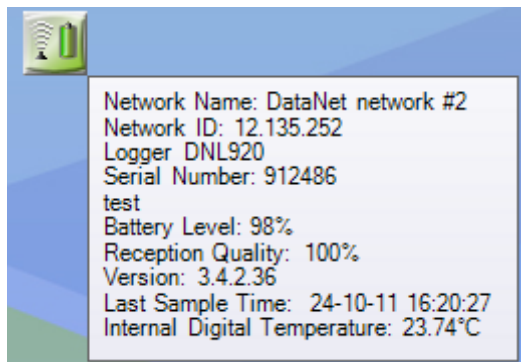



Figure 14: Logger tooltip

This tool-tip is updated with every newly recorded sample.

3.7.3. Sensor View

Click the **Sensor View** icon  in the tool bar to switch to this view. Here, you can monitor the data by viewing data display of each individual sensor, rather than of each logger.

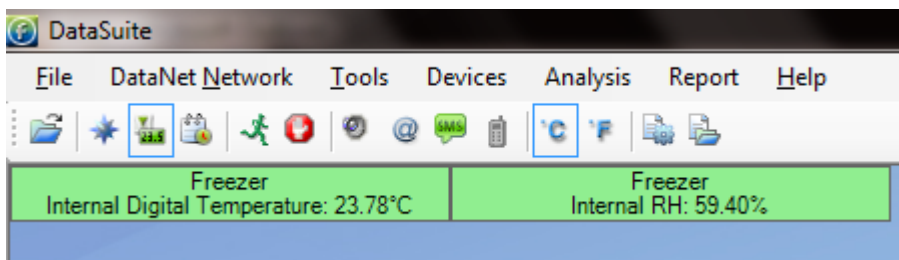


Figure 15: Sensor view

- If the sensor is in alarm, the sensor window will change color from green to red (just as the Logger icon would)
- Double-clicking the individual sensor window will open the data in the online Graph view
- Scrolling over the sensor window with the mouse cursor will display the logger tool tip with relevant logger data (similar to Map View)

Refer to section 14.5.2 for more details on using the Sensor View.

Note: By going to **Tools > Switch Sensor View Mode** you can reduce the size of the sensor window to display only the sensor type and sensor data. Recommended for networks containing many loggers.

3.8. Optimizing the Network

This section outlines a number of features and suggestions for optimizing the DataNet network and getting the best performance out of the end units and parent units.

For example, when you first setup your network, you want to ensure that the loggers are placed in the optimum position in order to receive and transmit data to/from the DataSuite software.

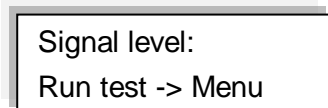
Refer to the DataNet specifications to guide you on the range of the DataNet units. With this knowledge, and based on the layout of your facility, you should have a good idea of the likely positional layout of your units.

3.8.1. Signal Test Utility

Rather than setup the system on a trial and error basis, DataNet has a **Signal Test utility** built in to the logger firmware, which gives you a clear idea of the strength of the signal of each logger to the Receiver, and the quality of the data link between Receiver and logger.

Perform the following test on each logger in your system while deciding where to position the logger:

1. Using the **Scroll** button, scroll through the main menu on the logger until you reach the following display:

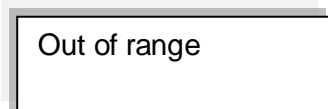


Signal level:
Run test -> Menu

2. Press the **Menu** button to run the test.

The signal level and link quality will be displayed. As you move the logger further away from the Receiver, you will see these two parameters drop from a maximum of 100%.

When the logger is out of range of the Receiver, you will see the following screen:



Out of range

3. To exit the Signal test, press the **Scroll** button.

3.8.2. Overcoming RF Obstacles

A universal issue concerning any wireless system is how to overcome a hostile RF environment. DataNet's ZigBee RF protocol has been designed for these hostile RF environments that routinely exist onsite. ZigBee can overcome competing wireless noise and other problems communicating the data.

Its mesh networking capabilities allows it to re-route signal traffic around temporary

or permanent physical obstacles, radio-frequency interference, Repeater error or other such failures.

The robustness of the system is such that there is no single point of failure, ensuring data recovery from end units on the network.

Tips on overcoming RF barriers

- When first creating the network in the environment where the loggers will be deployed, form a new network on the Receiver. There may be local interference on the 2.4 GHz free bandwidth. The ZigBee protocol, when forming a new network, selects the least noisy channel (out of 16 available channels). Within this channel the units can change RF slots (by hopping) but cannot move to other channels while running. By running on a channel on a network created in another environment e.g. in the office, this channel may become noisy and therefore transmission range may be less than expected.
- When placing units in an indoor or outdoor environment, bear in mind that walls, furniture, metal objects, etc. limit the RF coverage thereby reducing the range of the units.
- Add Repeaters (DNR800 or DNR900) in range of end units and parent unit to enhance RF coverage and improve robustness of network. Have as many alternative transmission routes as possible in order to eliminate single points of failure.
- When placing Repeater ensure it is not on the limit of its range to the end unit or parent unit (Repeater or Receiver), to avoid periods of unavailability due to changing RF conditions.
- Add Short Range Repeaters (DNL910, DNL920 or PA models) to overcome RF interference nearby to the loggers.
- The higher the Receiver is positioned the better reception quality it will obtain.

3.8.3. Showing the Network Path

For All Networks

By going to **DataNet Network > Show All Network Paths** in the DataSuite main menu, the software will show the actual path that the system uses to communicate between Receiver and logger, for all online networks and associated units.

For Specific Networks

Right-click on the Receiver icon and select **Show Network Paths** to see paths for a specific network.

For Specific Units

You can also select **Show Network Path** from the logger context menu to display the individual path from the unit to the parent unit (e.g. Receiver or Repeater).



Figure 16: Showing network paths – Example 1

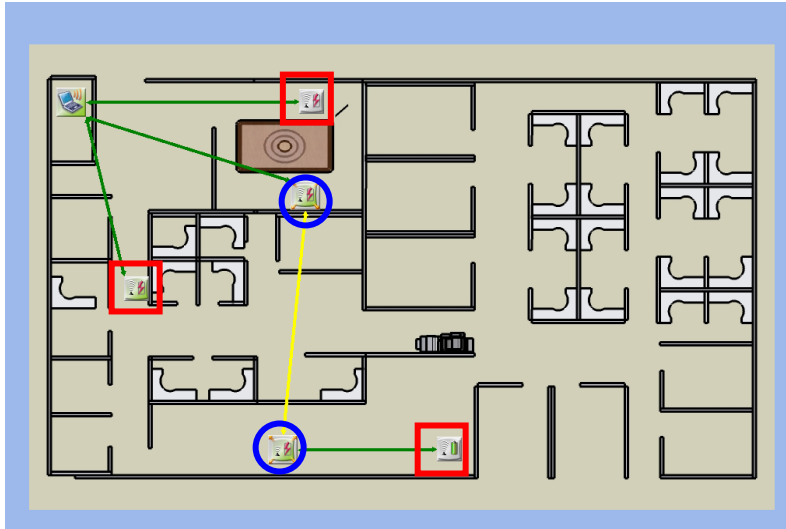


Figure 17: Showing network paths – Example 2

The screenshot above shows a system of three loggers (red squares) and two Repeaters (blue circles) transmitting to the Receiver.

The arrows show the path between the units. Note that they are bi-directional, meaning that the system is a two-way system with units both transmitting and receiving data.

- A green path indicates a strong signal
- A yellow path indicate a medium strength signal
- A red path indicates a weak signal

3.8.4. Adding Repeaters to the Network

Loggers which aren't in range of the Receiver can transmit to the Receiver via a Repeater/Short Range Repeater, which is in range. As DataNet is built using mesh networking technology Repeaters (DNR800 or DNR900) can be added to the system to enhance the network range.

The DNR900 Receiver/Repeater is the same device, just configured differently from the main menu when turned on. Refer to section 4.14.3 to learn how to switch the DNR900 unit type to Repeater.

The DNR800 only functions as a Repeater.

3.8.5. Short Range Repeater

You may also enable a logger (DNL910, DNL920 or the PA models) to operate as a Repeater in addition to its logging capabilities. In this mode the logger is referred to as a Short Range Repeater (SRR).

When in SRR mode the logger maintains the transmission range in accordance with its specifications. Therefore, the DNL910 and DNL920 will transmit at 4 dBm and the DNL910-PA and DNL920-PA, with its built-in power amplification, will transmit at a greater range of 17 dBm.

To switch a logger to SRR mode, simply right-click the logger icon in the DataSuite software **Map View** and select **Enable Short Range Repeater Mode**.

Note: In SRR mode the logger must be connected to AC power at all times as the power consumption is much greater.

3.9. Recommended Approach to Deploying DataNet Units

Now that you have a general understanding of how the DataNet system functions, you may wish to use fourtec's recommended approach for initial deployment of the system. This approach will ensure a smooth and efficient deployment of your DataNet units and you may then tweak this approach based on experience you gain while using the system.

Note: When deploying the system bear in mind that several factors could cause interference with the system, such as electromagnetic pulses, metal shielding in the vicinity of the transmissions, other devices using the same 2.4 GHz band, etc. Be familiar with your environment before deploying the system. Also refer to section 3.8.

1. After you have charged the DataNet units and are ready to deploy them in your facility, collect all units - data logger end units, Receiver and Repeaters (if relevant) – and bring them to your PC workstation.
2. Connect the Receiver to the PC and form a network. Turn on the units and one by one bring them online so you can view their icons in the DataSuite software's Map View.
3. Configure each of the units via the Setup feature. At this stage it is not necessary to configure the type of sensors you will be using, or sample rate, alarm levels, etc. The point of this step is to configure each of the units with a logger or Repeater name that indicates where in your facility they will be deployed. For example, *Room 15 Freezer* or *Floor 2 Bio Lab*. This will make it much easier for you to recognize the units in the Map View once you have deployed them. Once in place, you can reconfigure the units however you like.
4. It is also recommended, if possible, to change the Map View default background to a diagram or map of your facility. You can then move the logger or Repeater icons accordingly so you can have a visual representation of their location in the facility.
5. Take each logger and begin to distribute in your facility in the precise location you would like them to be based. Once in position you can then run the Signal Test on each logger to verify that you have a good signal to the Receiver. If you are out of range and there is no alternative location for the logger, you will most likely have to add at least one Repeater to the network, or replace the existing logger with a PA logger for longer transmission range.
6. Once each of the loggers is in position return to the PC and in Map View, verify that each of the loggers is online. You can also use the **Show Network Paths** feature to see the path of the logger to the Receiver, and the strength of the transmission.
7. If you determine that you need to add Repeater/s to the network in order to bring end units online or enhance the transmission where the signal is weak, then deploy the Repeater/s with the following points in mind:
 - a. There must be an electrical socket accessible at the location of the Repeater as they must be powered externally in order to run for more than a few hours.
 - b. Place the Repeater/s as high from the ground as possible in order to enhance the wireless signal from its antenna.



- c. Expose the Repeater/s to as many end units as possible. For example, if there is a room with several offline end units requiring a Repeater, position the Repeater next to the room so that it is in range of as many of these end units as possible, so you don't have to add more Repeaters.
8. After you have deployed the Repeater/s return to the software and using the Show Network Paths feature verify that all end units are now successfully transmitting to the Receiver, either on their own or via a parent Repeater. You can continue to tweak the position of the units until you are satisfied with the quality of the transmission.
9. Now that the units are in place the last step of initial deployment is to reconfigure each unit to start data acquisition. Configure the sensor setup, sample rate, transmission rate, alarm levels, Email/SMS notifications, etc. as you see fit.

3.9.1. DataNet Site Survey

fourtec has constructed a Site Survey document to aid all DataNet integrators prior, during and after every DataNet system installation.

Please contact the fourtec Help Desk for this document, which includes detailed instructions on surveying various aspects of the DataNet site prior to deployment to ensuring there are no RF problems, for example.

Check lists often prove indispensable when certifying the installation – two such lists are provided below.

Installation Overview Check List

1. Install DataSuite software. Launch in Trial version.
2. Check for software/firmware updates
3. Register software Serial Number (online/offline registration)
4. Connect Receiver to PC USB port and detect Receiver
5. Form New Network
6. Enter SN to Mini DataNet Device Filter
7. Connect DataNet units to network and update firmware (if required)
8. Connect sensors and perform logger Setup
9. Deploy loggers, with optimal RF reception and power supply
10. Review network paths in software
11. Setup alarm levels and notifications
12. Connect modem
13. Setup Report
14. Send fourtec network screenshot

Post-Installation Check List

1. Formed a new network at the start of installation
2. Network is locked
3. DataSuite software and device firmware are up to date
4. PC is connected to the Internet
5. All units are online with green network paths
6. Configured alarm levels for relevant inputs



7. Tested sending of SMS/email notifications
8. GSM Modem is connected with the green online icon
9. At least 2 x DNR900 (one Receiver, one Repeater) to allow Sub Receiver
10. Data files path on PC/network is correct
11. Logger battery readings/AC power supply is stable
12. All online readings are as expected
13. Configured reports to be sent automatically
14. Software SN has been activated
15. Run Application on Windows Startup in Options is selected
16. Sent DataNet screenshot to fourtec support for approval

Chapter 4:

DataNet Hardware Overview

This chapter details the hardware features of the DataNet system components: the data loggers and the Receiver/Repeater.

4.1. Data Logger Front Panel Layout

4.1.1. DNL910 and DNL920

Apart from the color scheme, the DNL910, DNL920 and PA data logger models have the same front panel design.

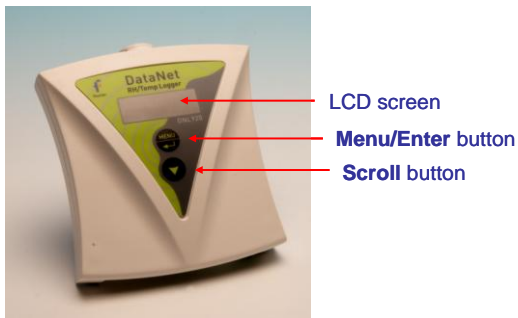


Figure 18: DNL910 data logger front panel

LCD screen

Displays logger status, logger data, Min/Max values and network information.

Menu/Enter button

Use to enter logger menu options and to execute logger commands.

Scroll button

Use to scroll through menu items and to power on unit.

4.1.2. DNL804, DNL808 and DNL810

The Mini DataNet logger models have the same front panel design.

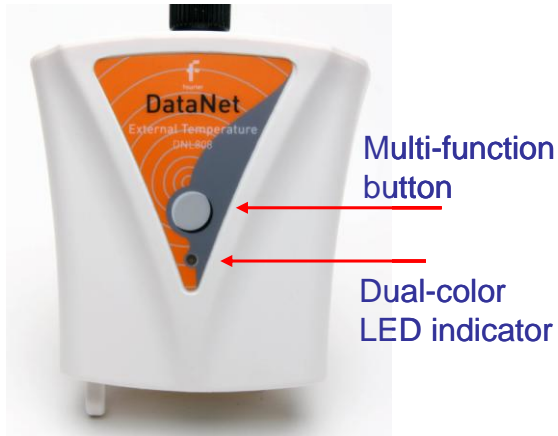


Figure 19: DNL808 data logger front panel

Multi-function button: Use to execute logger commands.

Dual-color LED indicator: Indicates status of logger such as joining network, leaving network, etc.

4.1.3. DNL804, DNL808 and DNL810-BXT – External Battery Pack

The Mini DataNet BXT models have the same front panel design.

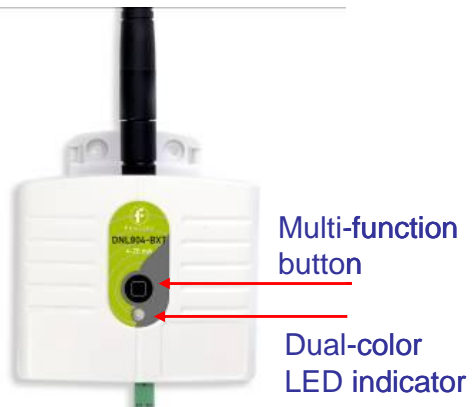


Figure 20: DNL804-BXT data logger front panel

Multi-function button: Use to execute logger commands.

Dual-color LED indicator: Indicates status of logger such as joining network, leaving network, etc.

4.2. Data Logger External Connections

4.2.1. DNL910 and DNL920

External connections of the DNL910, DNL920 and PA models are exactly the same.

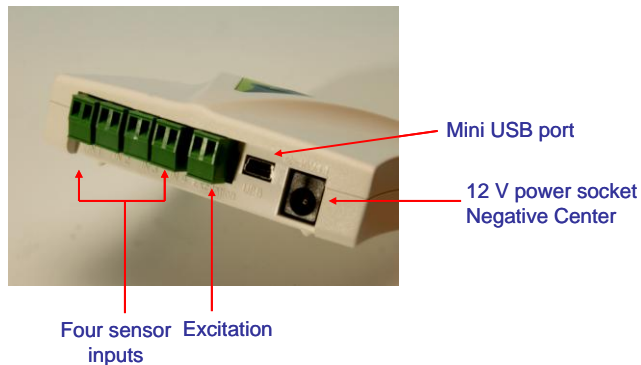


Figure 21: DNL920 data logger external connections

Mini USB Port

To enable data download direct to PC via USB port.

12 V Power Socket

To connect logger to external power supply (negative center).

Sensor Inputs

Pluggable screw terminal blocks marked In-1 to In-4 (from left to right), to connect wide range of sensor types for data acquisition. All four inputs can be used simultaneously. Sensors can be connected in any order.

To connect a sensor to the DataNet data logger, unplug the screw terminal, connect the sensor's wires to the terminals, and then plug the terminal back to the corresponding socket on the input block.

Excitation socket

Output power socket used to power external sensors, power derived directly from the external power supply adaptor.

4.2.2. DNL804 and DNL804-BXT

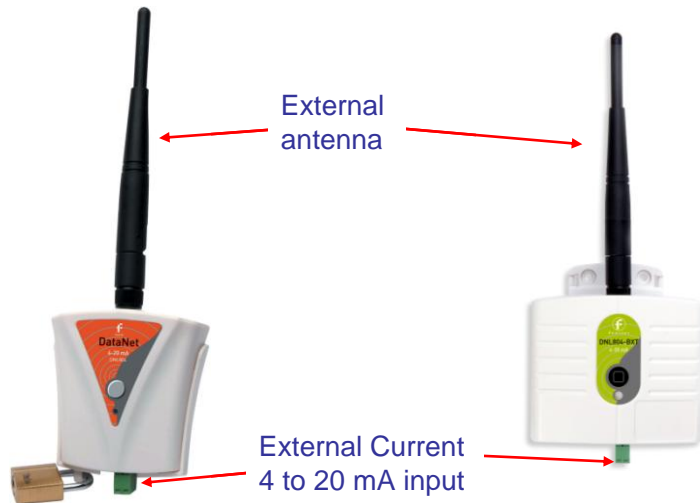


Figure 22: DNL804 and DNL804-BXT data logger external connections

External antenna: For extended transmission distance of the logger.

External 4 to 20 mA input: Standard input for connecting to sensor with 4 to 20 mA output.

4.2.3. DNL808 and DNL808-BXT

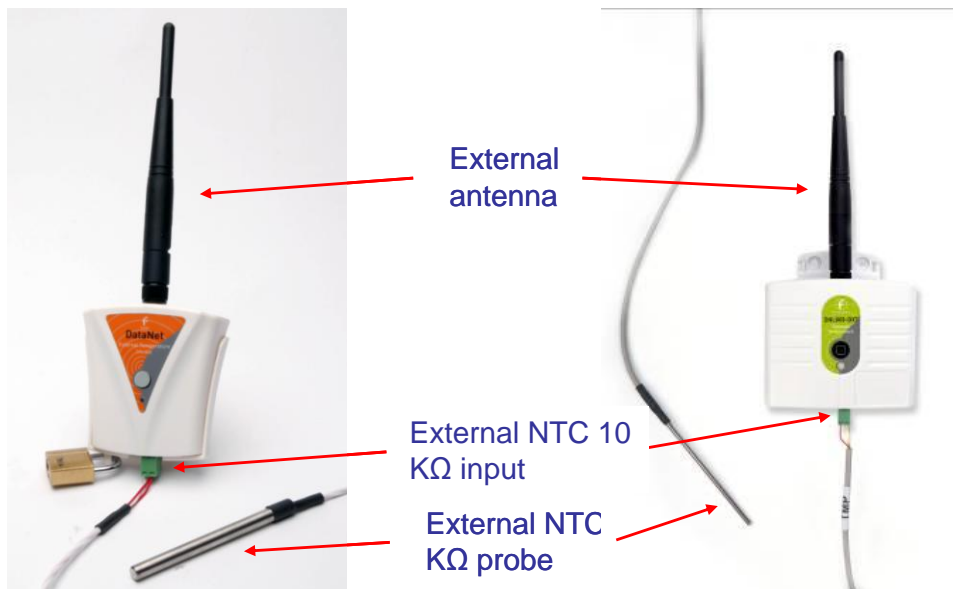


Figure 23: DNL808 and DNL808-BXT data logger external connections

External antenna: For extended transmission distance of the logger.

External NTC 10KΩ input: Standard input for connecting to NTC probe.

External NTC 10KΩ probe: fourtec-supplied NTC probe (part of DNL808 and BXT kit).

4.2.4. DNL810

The DNL810 doesn't have any external connections. It has two internal sensors only, temperature and humidity.

4.3. DNR800 Mini Repeater Front Panel Layout



Figure 24: DNR800 Mini Repeater front panel

Multi-function button: Use to execute logger commands.

Dual-color LED indicator: Indicates status of Repeater such as joining network, leaving network, etc.

4.4. DNR900 Receiver/Repeater Front Panel Layout

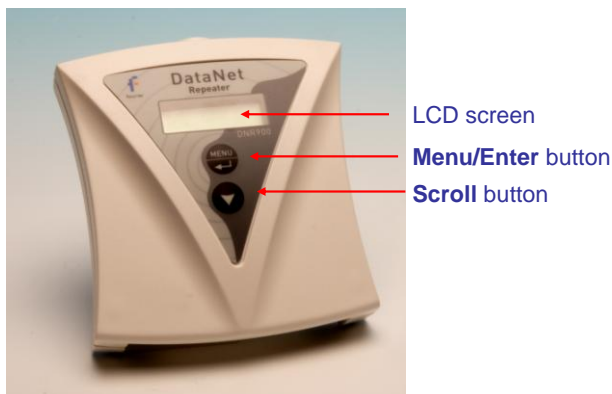


Figure 25: Receiver/Repeater front panel

LCD screen

Displays Receiver/Repeater status and network information.

Menu/Enter button

Use to enter logger menu options and to execute logger commands.

Scroll button

Use to scroll through menu items and to power on unit.

4.5. DNR800 Mini Repeater External Connections



Figure 26: Mini Repeater external connections

12 V Power Socket

To connect unit to external power supply. Plug in an AC/DC 9-12 V adaptor to power the unit. There is no battery supply so when disconnected from the adaptor the unit will shutdown. The adaptor should meet the required specifications. Refer to Appendix A: DataNet Specifications.

4.6. DNR900 Receiver/Repeater External Connections

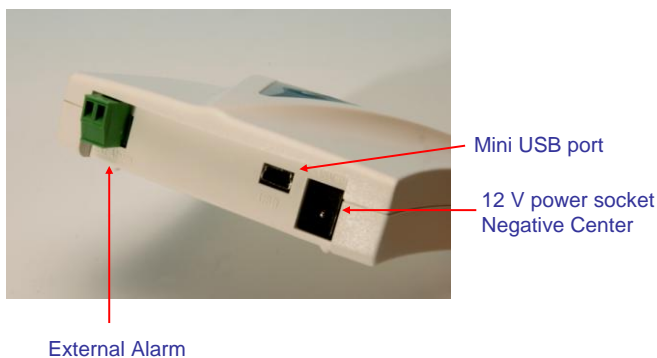


Figure 27: Receiver/Repeater external connections

Mini USB Port

To connect Receiver to PC and be detected by DataSuite software.

Connect the mini USB Type B plug (rectangle plug) of the supplied USB communication cable to the Receiver and the USB Type A plug (flat plug) to the computer.

Refer to section 4.10.

12 V Power Socket

To connect unit to external power supply. Plug in an AC/DC 9-12 V



adaptor to power the unit. To use as a Receiver or Repeater and maintain network integrity, the unit should be powered at all times. Connecting external power to the unit automatically charges the internal back-up battery. The adaptor should meet the required specifications. Refer to Appendix A: DataNet Specifications.

External Alarm

Connect external alarm e.g. siren, audible alarm, to this input. Whenever a logger on the network is in alarm status, the external alarm will be activated. Refer to section 4.7.6 for more details.

4.7. Data Logger Sensor Overview

This section provides an overview of the hardware specifications of the DataNet data loggers.

4.7.1. Internal Sensor Types

The DNL810, DNL910, DNL920, DNL910-PA and DNL920-PA loggers include internal sensors, depending on the logger model.

Sensor	Measurement Range	Accuracy	Logger Model
Digital Humidity	5% to 95%	±3% (in DataSuite software) ±4% (on logger LCD)	DNL920 DNL920-PA DNL810 DNL810-BXT
Digital Temperature	-20 °C to 50 °C	±0.5 °C	DNL920 DNL920-PA
		±0.4 °C	DNL810
Temperature PT100	-20 °C to 50 °C	±0.3 °C	DNL910 DNL910-PA

4.7.2. External Sensor Types

DNL910, DNL920 and PA Models

Each of the four input channels of these data logger models are multi-purpose and can be individually configured to any of the following types and ranges.

Sensor	Measurement Range	Accuracy	Available Inputs
Current	4 to 20 mA	± 0.5 %	In-1 to In-4
Contact	Open (0) / Close (1)	N/A	In-1 to In-4
Frequency	20 Hz to 4 KHz	N/A	In-4 only
Pulse Counter	1 to 65,536 pulses 0 to 4 KHz	N/A	In-4 only
Temperature PT100	-200 to 400 °C	-200 to -60 °C ±0.5 %	In-1 to In-4

Sensor	Measurement Range	Accuracy	Available Inputs
(2-wire)		60 to 400 °C ±0.5 % -60 to 60 °C ±0.3 °C	
Temperature TC-J	-200 °C to 1,000 °C	-200 to -60 °C ±0.5 % 60 to 1,000 °C ±0.5 % -60 to 60 °C ±0.5 °C	In-1 to In-4
Temperature TC-K	-200 °C to 1,000 °C	-200 to -60 °C ±0.5 % 60 to 1,000 °C ±0.5 % -60 to 60 °C ±0.5 °C	In-1 to In-4
Temperature TC-T	-200 °C to 400 °C	-200 to -60 °C ±0.5 % 60 to 400 °C ±0.5 % -60 to 60 °C ±0.5 °C	In-1 to In-4
Voltage	0 to 1 V	± 0.5 %	In-1 to In-4
Voltage	0 to 50 mV	± 0.5 %	In-1 to In-4

DNL804 and DNL804-BXT

Sensor	Measurement Range	Accuracy
Current	4 to 20 mA	0.5 %

DNL808 and DNL808-BXT

Sensor	Measurement Range	Accuracy
Temperature NTC 10 KΩ	-50 to 150 °C	-50 to 60 °C: ±0.3 °C 60 to 150 °C: ±0.5 %

4.7.3. Sensor Connection

Connect the sensor/s to the terminal block/s at the top of data logger:

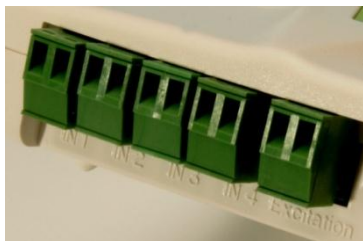


Figure 28: DataNet logger sensor inputs

Sensors do not have to be added successively. You may only configure In-4, or configure In-1 and In-3, for example, when setting up the logger via the software.

4.7.4. External PT-100 and NTC Sensor Connection

The PT-100 (for the DNL910, DNL920 and PA models) and NTC (for DNL808) sensors, as supplied by fourtec comes pre-wired to the data logger's terminal block. The PT-100 positive polarity (red) and ground (white) wires are connected to the + input of the terminal block. The negative polarity (black) wire is connected to the – input on the terminal block.

4.7.5. Programming Limitations for DNL910 and DNL920

The standard sampling rate for all sensors on all inputs is from a maximum of one sample every second to a minimum of one sample every two hours. However, there are certain limitations using a specific combination of sensors, which must be taken into account when programming the DataNet data loggers.

Note: The software integrates all programming limitations automatically when configuring the loggers.

Please refer to the table below for DataNet programming limitations, where:

PT100, Thermocouple J, K or T = A

Internal Digital Temperature (on DNL920) = B

Sensor Combination	Maximum Sampling Rate	Example Setup
3 x A 4 x A A + B	One sample every three seconds	In-1: PT-100 In-2: TC-J In-3: TC-J
(2 x A) + B (3 x A) + B	One sample every four seconds	Internal: Temp In-1: TC-T In-2: PT-100
(4 x A) + B	One sample every five seconds	Internal: Temp In-1: TC-T In-2: TC-J In-3: PT-100 In-4: PT-100

Table 1: Data Logger programming limitations

4.7.6. External Alarm Output

The DataNet system supports connection of an external alarm e.g. siren, audible alarm, to the Receiver external alarm input or to In-1 of the DNL910, DNL920 and PA model data loggers.

When connected to the Receiver, the external alarm will be activated whenever a logger on the network is in alarm status. When connected to the data logger, the external alarm will be activated only when that specific logger is in alarm status.

Once there is no alarm status, the external alarm will be deactivated.

Data Logger External Alarm

In-1 of the DNL910, DNL920 and PA models serves either as a standard sensor input or as an external alarm output. Configure In-1 as **Alarm Normally Open** or **Alarm Normally Closed** in the logger Setup window in the DataSuite software.

Normally Open will result in the alarm being activated during alarm status (the circuit will be closed).

Normally Closed will result in the alarm being activated when logger is not in alarm and therefore deactivated when there is an alarm (the circuit will be opened).

Connect In-1 to your external alarm device.

Use the **Alarm Setup** tab in the Setup dialog to define the logger alarm settings. If these settings are breached then the alarm will be activated.

Receiver External Alarm

By connecting the external alarm to the **Ext Alarm** input on the Receiver, any alarm on the entire network will activate the external alarm.

Use the **Alarm Setup** tab in the Setup dialog to define the logger alarm settings. Whenever the Receiver receives an alarm status from any logger on the network, the external alarm will be activated. No additional configuration in the software is required.

External Alarm Schematic

See the schematic below explaining how to hook up an external alarm to the DataNet unit.

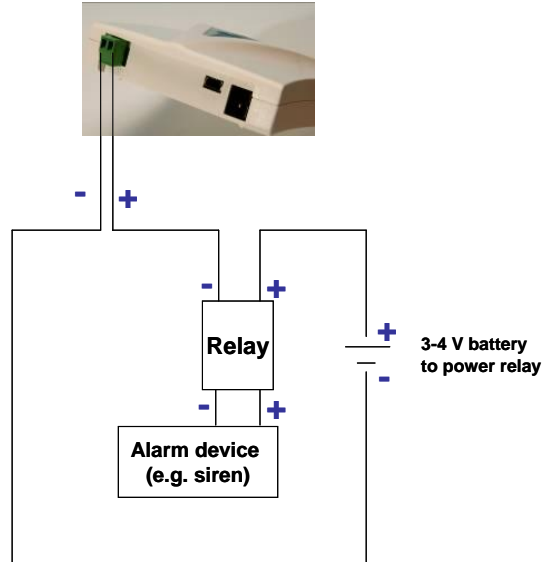


Figure 29: External alarm schematic

- + from DNR900 goes to – of the Relay inputs
- + of Relay input goes to battery that powers the Relay
- Load inputs of the Relay go to the Alarm device e.g. siren, lights, etc.
- - of the battery goes to – of DNR900.

Note: Maximum load of the Relay is 50 mA, 3 V.

Refer to Appendix A: DataNet Specifications for the full external alarm output specification.

4.7.7. Polarity

Current, voltage, thermocouples and user defined sensors have distinct polarity. Be careful to connect them in the right polarity.

4.7.8. Frequency/Pulse Counter

Connect the signal wires to In-4 terminal blocks, and select **Frequency** or **Pulse counter** for **Input 4** from the logger Setup window in the DataSuite software. Inputs 1 to 3 are still available for other sensors.

The Frequency/Pulse counter is optically isolated from the internal circuitry and can simultaneously measure a signal source, together with another input.

4.7.9. User Defined Sensors

DataSuite provides a simple and straightforward tool for defining a limited number of custom sensors. Almost any sensor or transducer with 0 – 1 V or 4 – 20 mA output is accepted by the DataNet logger and its electrical units are automatically scaled to meaningful user-defined engineering units.

The sensor definitions are stored in the logger's memory and are added to the sensors list. The sensor's readings are displayed in the user defined units only in the DataSuite software. Future versions will also support displaying the user defined engineering units on the logger LCD.

Refer to section 14.8.1 for more details.

4.7.10. Sensor Alarms

Via the software, users can define minimum and maximum alarm levels for each input individually. Users can define pre-low and pre-high alarm levels, for an additional level of safety in case the logger is approaching an actual breach of alarm.

The DataNet logger display indicates when the sensor reading is in alarm of any type. The symbols AL-H, AL-L, AL-P-H or AL-P-L are visible next to the corresponding input readings.

Refer to section 14.18 for more details.

4.7.11. Sensor Calibration

The DataNet data logger is shipped fully calibrated. However, further calibration can be applied via the DataSuite software. The calibration parameters are sent to the data loggers wirelessly and stored in the logger's memory.

Users may calibrate individual input as well as all inputs at once. Calibration settings may be saved and then loaded into the logger at a later date if the calibration settings have changed.

Refer to section 14.19.4 for more details.



4.8. Unit Serial Number and Comment

Every DataNet data logger and Receiver/Repeater unit is embedded with a unique serial number.

The data logger only can be loaded with a descriptive comment to identify its task and location. You may add or edit the comment of any logger on the network via the DataSuite software.

Every time data is transferred to the computer it is labeled both with the logger's serial number and comment and is displayed in the graph or data table view.

The unit serial number is also marked on a sticker on the back of the product.

4.9. Power Supply

4.9.1. DNR900 in Receiver Mode

The Receiver unit is powered via the USB port of the PC, when connected via the mini USB cable. In addition, the unit can run for a limited time (up to three hours) from an internal NiMh rechargeable battery. To charge the internal battery, connect the unit to the AC power supply supplied with the DNR900. The internal battery pack is generally used as a back up power supply in the event the external power supply fails.

Note: When in Receiver mode, the unit must be connected to external power at all times. While running on internal power, the unit will run for only several hours before shutting down and therefore shutting down the DataNet network which the Receiver is managing.

4.9.2. DNR800 and DNR900 in Repeater Mode

The DNR800 must be connected to external AC power at all times. This device does not have an internal battery so when the external power supply is disconnected the unit will shutdown.

When in Repeater mode, the DNR900 must be connected to external AC power at all times using the supplied AC charger. Otherwise, when the internal backup batteries drains and shuts down the unit, all the end units dependent on the Repeater to transmit to the Receiver, will not be detected by the software. The user won't be able to monitor data readings from these units until the Repeater comes back online.

When connected to external power supply, the Repeater battery will not be charged when the unit is turned off. This will allow the system to protect the battery from overheating.

4.9.3. DNL910 and DNL920 Data Loggers

The DNL910, DNL920 and PA data loggers run from an internal NiMh rechargeable battery as well as from external AC power supply.

Note: The PA (power amplifier) models must be connected to AC power at all times due to the high power consumption of these units.

Depending on the logger configuration, from a fully charged battery, the non-PA data logger can run for up to several months. Refer to section 4.9.7 for more details on battery life.

Note: Charge the data logger units for 16 hours before using them for the first time.

When connected to external power supply, the data logger battery will not be charged when the unit is turned off. This will allow the system to protect the battery from overheating.

First Time Charging

From a fully drained battery, you must charge the battery for **16 hours** to bring it to a full charge. Once the charge cycle is complete, the logger will run from the external power supply, without draining (or charging) the internal battery. In order to maintain a fully charged battery and ensure the battery doesn't self-discharge, the battery charger will daily charge the unit for a minute to maintain the battery capacity.

Note: Before storing the DataNet units make sure you have unplugged all the sensors and turned the units off via the keypad.

Standard Charging

When a logger is reconnected to the AC charger it will begin the 16-hour charge cycle, no matter what the status of the battery. Once the charging cycle is complete the logger will run from external power supply.

The one exception to this scenario is if the charger is reconnected within an hour of disconnection and the battery level is at least 90%. In this situation the charging process will not restart.

Effect of Charging Battery on Temperature Sensor

For loggers measuring data with the internal temperature sensor, it is critical to note that during the charge cycle the logger will heat up thereby causing the internal temperature sensor reading to rise by up to 10 °C above ambient temperature. Once the charging process is complete, the logger will cool down and the internal temperature sensor readings will return to normal.

For loggers remaining connected to AC power, to prevent the logger from heating up again following the initial charge cycle, the logger will receive a one minute *trickle charge* each day rather than stay continually charged. This is sufficient to ensure the logger doesn't self-discharge and will maintain the logger's full charge status.

4.9.4. Mini DataNet DNL8XX-BXT Data Loggers

The Mini DataNet loggers are powered by non-rechargeable internal 2/3 AA lithium batteries. There is no external power supply for these loggers.

Depending on the logger configuration, the battery can last up to 10 months before they need to be replaced.

Replacing the Mini DataNet Battery

To replace the batteries on the Mini DataNet loggers, follow these instructions:

1. Stop the unit from the DataSuite software.
2. Turn off the unit using the logger button.
3. Remove the two screws located on the top panel of the logger (where the antenna is connected) and with care pull out the internal compartment containing the logger circuit board and battery.
4. Remove and replace the battery, ensuring the correct polarity of the battery.
5. Push the internal compartment back into place.

6. Secure the panel with the two screws.

Note: With the DNL808 also disconnect the external sensor to avoid damaging it.

4.9.5. Mini DataNet DNL8XX Data Loggers

The Mini DataNet Extended Battery Pack includes a modified plastic casing for the three existing Mini DataNet models. This new casing features a battery pack supporting up to 4 x 2/3 AA 3.6 V batteries, for extending the logger's battery life. Functionality of this design is no different than the standard loggers.

With all 4 batteries connected, battery life of up to 3 years, depending on sampling and transmission rates is expected.

There is no external power supply for these loggers.

Note: 2 batteries are supplied with every order of a BXT model.

Replacing the Mini DataNet BXT Battery

To replace the batteries on the Mini DataNet loggers, follow these instructions:

1. Stop the unit from the DataSuite software.
2. Turn off the unit using the logger button.
3. Remove the screw located on the battery case panel at the bottom of the logger and open the panel to expose the battery pack.



4. Remove the battery pack taking care not to pull the wires out of place, and replace the batteries, ensuring the correct polarity of the battery.
5. Push the battery pack back into place.
6. Secure the panel with one screw.

4.9.6. Power Adapter

The DataNet power adapter is used to power the DNR900, DNL910, DNL920 and PA model units. The mains adaptor (AC/DC adaptor) converts mains power (from a wall outlet) to a voltage suitable to the DataNet hardware unit.

- Output: Capacitor filtered 9 to 12 VDC, 300 mA
- Female plug, center negative



Note: Only use fourtec-supplied power adapters to avoid damaging the units with incorrect power supply.

4.9.7. Data Logger Battery Life

Battery life depends on the logger sampling rate, transmission rate, type of sensor, network architecture and number of measured sensors.

- DNL910 and DNL920 can last up to six months on a charged battery.
- DNL8XX can last up to 10 months on a new battery.
- DNL8XX-BXT can last up to 3 years with all four batteries connected.

The table below provides some example scenarios of standard logger configurations and expected battery life.

Logger Model	Sensor Setup	Sample Rate	Transmission Rate	Battery Life
DNL910	<ul style="list-style-type: none"> • Internal Temperature • 4 x Thermocouple 	15 minutes	15 minutes	Five months
DNL910	1 x PT-100	15 minutes	15 minutes	Six months
DNL808	1 x NTC 10 K Ω	15 minutes	15 minutes	10 months
DNL810	<ul style="list-style-type: none"> • Internal Temperature • Internal Humidity 	15 minutes	15 minutes	10 months

Table 2: Data logger battery life scenarios

4.10. USB Communication Cable

A mini USB communication cable is supplied as part of the DataSuite software kit. This cable has the following roles:

- To connect the Receiver to the DataSuite PC workstation, allowing the Receiver to communicate with the DataSuite software and manage the DataNet network.
- To power the Receiver when connected to the PC (the internal battery is not charged).
- To enable data download directly via USB for DNL910, DNL920 and PA model loggers.
- To enable firmware update directly via USB for DNL910, DNL920 and PA model loggers as well as DNR900.
- To enable shutdown directly via USB of DNL910, DNL920 and PA model loggers.

Note: The USB driver is installed as part of the software installation process. Without this driver the PC won't detect the Receiver. To avoid compatibility problems do not connect the Receiver to the PC before installing the USB driver.

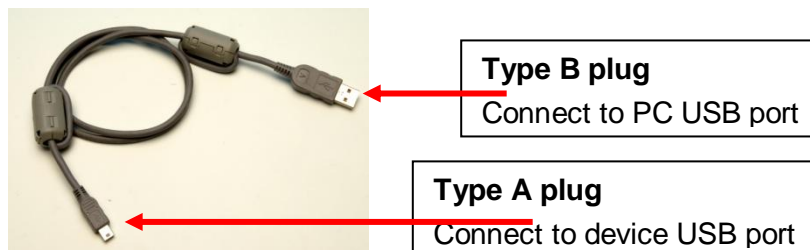


Figure 30: USB communication cable

4.11. DataNet Keypad Overview

Note: Explanations for DNL units also apply to the PA models

4.11.1. DNL910, DNL920 and DNR900 Keypad

The DNL910, DNL920 and DNR900 units each have two buttons on the keypad, used to navigate through the LCD menu options, as well as turn on the units.

Refer to section 4.12 to learn how to operate the data loggers and sections 4.13 and 4.15 to learn how to operate the Receiver and Repeater.



The **Menu** button  has two functionalities:

Navigate to the main menu. When pressed from within a submenu, the display will take you back to the main menu.

Selecting an option from one of the menus. When pressed on one of the main menu items, it will take you to the sub menu options.

The **Scroll** button  has two functionalities:

- When the unit is off, pressing this button will power the unit on.
- Scrolls through the menu options.

4.11.2. DNL8XX and DNL8XX-BXT Keypad

The Mini DataNet units have one button on the keypad. This button is multi-functional and is used to perform various functions such as:

- Turning on/off the unit
- Starting signal test
- Leaving the network
- Locating device icon in software Map View


Refer to section 4.13 to learn how to operate the Mini DataNet and Mini Repeater devices.



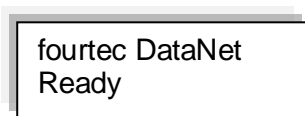
4.12. Operating the DNL910 and DNL920

This section explains how to operate the DNL910, DNL920 and PA model loggers and provides an overview of the menu options on the units' LCD screen.

4.12.1. Turning on the Unit

In order to view the logger menu options, the unit must be powered on by pressing the **Scroll** button  on the keypad. Ensure the logger is charged or connected to the AC adapter.

Once the unit is switched on it will emit a short beep and the screen will read *Search Parent* until the Parent unit e.g. Receiver, is detected. A welcome message is the displayed:



4.12.2. Display Shutdown

When the data logger is running from batteries only, if the screen is inactive for thirty seconds it will turn off. However the logger will continue to operate in the background. Press the **Scroll** button to enable the LCD screen again. The screen will not turn off during firmware upgrade.

When connected to external power supply the logger screen will always stay on.

4.12.3. Joining a Network

When a logger is powered on or reset, it will automatically scan for a network after the welcome message has appeared.

There are four scenarios that can occur while scanning for a network:

Scenario 1: The unit can't find the last network that it was connected to. For example, the logger is a new unit which was never previously joined a network.

Scenario 2: The unit scans and finds the last network it was connected to, and joins that network.

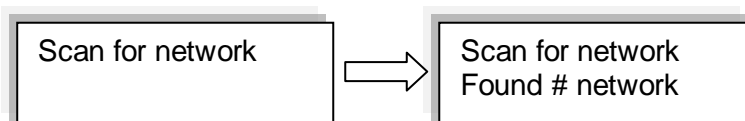
Scenario 3: The unit can't find any networks at all.

Scenario 4: The unit found a network but failed to join.

Read below for more details on each scenario.

Scenario 1

If the unit can't find the last network that it was connected to (for example, it's a new unit), the unit will display all the networks that are in range:

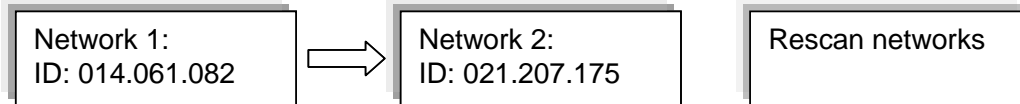


Where # is the number of networks found

Once the scan has been completed the following screen appears:

Scan complete

If more than one network was found, the user will need to select the network ID that he wants to connect to. The user uses the **Scroll** button to scroll through the Network IDs. The relevant network is selected using the **Enter** button.

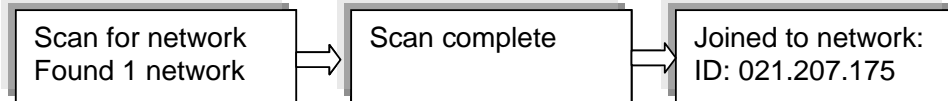


Once the network has been selected the following screen will be displayed.

Joined network:
ID: 021.207.175

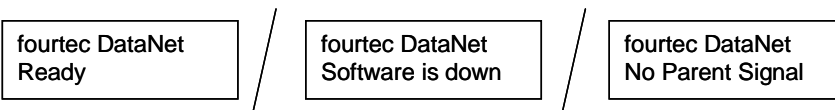
To rescan the networks, simply select the **Rescan Networks** option and the logger will start the scanning process again.

If only one network was found the system will automatically connect to that network without the user needing to select the network manually.



The logger display will return to the welcome message, which consists of the logger name (editable via the software) and the network status:

- **Ready** - If connection to the DataSuite software is established.
- **Software is down** - If established connection to the Receiver but the DataSuite software is down (PC is off, software is not open, etc.)
- **No Parent Signal** – The parent unit, either the Receiver or Repeater, is not detected by the logger therefore the logger is not transmitting its data to the network.



The logger will continue to search for the parent unit (at specific intervals) and the screen will continue to read *Search Parent* until the parent is found.

Scenario 2

When the unit scans for networks and finds the last network that it was connected to it will automatically connect to the last known network.

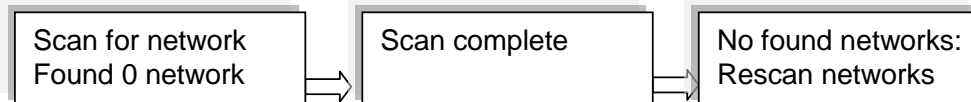
Joined Network:
ID: 021.207.175

As in Scenario 1, the logger display will then return to the welcome message displaying the unit name and status.

Scenario 3

The system can't find any networks at all.

If no networks were found, the unit will display the following screens.



Scenario 4

The unit found a network but failed to join.

The unit will perform up to 99 retries to join the network before scanning for networks again. Press any of the unit buttons to cease the attempts to join the network.

A unit may fail to join a network if it is far from the Receiver, requiring several hops to reach the Receiver, or the network itself is large with many units. The attempt to join a network is made in under a second in real-time and on high traffic network, it may result in failure to join.

Moving the unit closer to the Receiver can help the logger to join successfully. If the logger still can't join, form a new network or contact fourtec technical support.

4.12.4. Main Menu Options

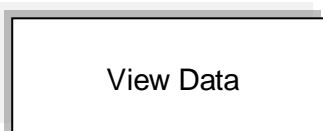
There are three menu categories on the data logger:

- View Data
- Status
- Min/Max Values

Note: If the unit is not in Run mode only the Status menu options will be available.

Press the **Menu** button to reach the main menu display. Scroll through the main menu options (View Data, Status and Min/Max Values) using the **Scroll** button. Once you reach the main menu option you need, press **Enter** to select that option and enter the sub menus.

View Data Menu



Note: View Data is the default page *when the unit is running*.

If there is more than one sensor running, the screen will auto scroll between the sensors showing the sensor name and sensor value. These are real-time displays.

The display will switch back to the View Data screen after five minutes if none of logger buttons have been pressed.

If the sensor breached any of the predefined alarm levels, then the alarm symbol will be displayed alongside the data reading.

For example:

In-TMP	
24°C	AL-Lo

The logger display alarm symbols are:

- **AL-HI** : Alarm High
- **AL-Lo** : Alarm Low
- **AL-P-H** : Pre Alarm High
- **AL-P-L** : Pre Alarm Low

Status Menu

Status

The Status menu contains the following sub menus, all reachable by using the **Scroll** button.

The sub menus are outlined below in the order in which they appear on the logger display.

Name and Status

As explained previously, the unit name (or Comment) is displayed on the first row and the second row indicates the logger status.

If the logger is running, then the following screen is displayed.

fourtec DataNet Logger running

Mark Unit on PC

To indicate the logger icon in the software's Map View, press the **Enter** button when this screen is displayed. The logger's icon located in the Map View will blink a number of times.

Batt Level (battery level)

If the power adapter is not connected the battery percentage will be displayed.

If the power adapter is connected **Battery charging** will be displayed.

Batt Level: 67%

/

Batt Level: Battery charging

Signal Level Test

The Signal Level test allows the user to check the signal strength and quality of the link between the logger and its parent unit. This test is used to determine optimal positioning of the logger during deployment.

Signal level:
Run test -> Menu

By pressing the **Menu** button the unit will show the signal level and link quality in percentage terms.

If there is no connection with a parent unit, an Out of range message will be displayed.

Signal level: 80
Link quality: 95

/

Out of range

- **Signal level:** Indicates the reception level between end unit and parent unit. If the level falls below 20% then the logger should be placed in a better location or a Repeater should be added.
- **Link quality:** Calculation of the data transmitted with no errors from the logger to the parent unit. If the level falls between 85% then the logger should be placed in a better location or a Repeater should be added. The lower the link quality %, the more retries are needed in order for the logger to send all of its data.

Note: The signal level may be low but the link quality can still be 100%.

You will not be able to run the Signal Level test when the logger has lost its connection to the network. If you tried, then the following screens are displayed:

No Parent signal

→

fourtec DataNet
No Parent found

Firmware Version

This menu informs the user of the logger firmware version. This is helpful when you need to upgrade the system firmware, to check the current version. Or when contacting fourtec technical support, with any technical issues.

Firmware version:
2.03.04.**02.30.00**

The firmware version is commonly referred to by the numbers in bold in the screen above. For example, the firmware version which is supported by this user guide is v2.30.

S/N

This menu displays the unit's eight digit SN.

S/N 12345678

Network Data

This menu displays the unique network ID to which the unit is currently connected. This ID will match the network ID displayed in the software in the Receiver icon's tooltip in the Map View.

Network data:
ID: 014.061.082

Device Mode

There are two possible device modes:

- Logger
Device is operating as standard data logger
- Logger – Repeater
Device is operating as a Short Range Repeater. Refer to section 3.8.5 for more details.

Leave Network

If this option is selected, the unit will first leave the network and then reset itself. The scan network procedure described in section 4.12.3 will begin. The only exception to this procedure is that even if the last connected network is found during the scan, the unit will not automatically connect to it.

Leave network

Note: If the logger was in Run mode prior to sending the Leave Network command the software will download all data from the unit first and then force it to leave the network.

Reset Unit

When the unit is reset, upon start up it will automatically scan for networks. The unit will automatically connect to the previously connected network assuming it was found in the network scan.

Following reset the unit will continue to operate according to its last set up instruction. For example, if the logger was in Run mode, then after reset it will continue to run and record data.

Turn Off Unit

Selecting this option will shut the unit down. You can turn the unit on again by pressing the **Scroll** button.

It is recommended to turn off the unit when it is not in use.

Turn off unit

Note: Turning off the logger when in Short Range Repeater mode can have adverse affects on your network, as other units may be dependent on the Repeater for transmitting its data to the Receiver. To prevent the SRR from being a point of failure if shut off, ensure the network is robust enough by having alternative routes for the end units to reach the Receiver.

Min/Max Values Menu

Each sensor's minimum/maximum readings (taken from the current logging session) will be displayed on two rows.

The first row indicates the sensor type, along with the measurement units e.g. V, and the alarm indication if there is an active alarm on this sensor.

The second row indicates the minimum and maximum measured value and the units. H and L represent High and Low values, respectively.

In-TMP °C
26.06H 25.61L

4.12.5. Additional Logger Screens

Unit Beep

When the DataSuite software activates the Call Unit feature, the logger will beep and the following screen will be displayed:

Unit Beep
fourtec DataNet

Refer to section 14.16.5 for more details.

No Parent Signal

When a logger's parent unit, such as a Repeater or Receiver, goes offline then the following screen is immediately displayed on the logger:

No Parent signal

For example, this could happen if the Receiver managing the network has formed a new network, so there is no Receiver managing the previous network. Or if the parent unit is a Repeater, and it goes offline, then the logger will display this message.

Once it has determined that the parent signal is lost, it will try to establish a connection with the network via another Repeater but if it fails then the following screen is displayed:

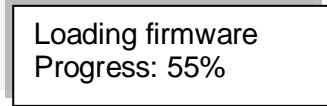
fourtec DataNet
No Parent found

You will have to leave the network and rescan for a new network.

Loading Firmware

When updating the firmware of the data logger via the software's Firmware Update Center, the logger screen will display the update progress. When complete the main logger status screen will be displayed.

Also refer to Chapter 15: Updating DataSuite Software and Firmware.



Note: Logger must be in Stop mode before firmware can be updated.

4.13. Operating the Mini DataNet DNL8XX, DNL8XX-BXT and DNR800

This section explains how to operate the DNL804, DNL808, DNL810, DNL8XX-BXT and DNR800 Mini DataNet units using the multi-functional button on the logger front panel. There is no LCD screen on the Mini DataNet models.

Ensure the device Serial Number has been added to the Mini DataNet Device Filter before continuing. Refer to section 3.5.3.

A useful tip for remembering the LED functionality is that a green LED indicates a logger turning on or joining a network, and a red LED indicates a logger is shutting down or leaving a network.

4.13.1. Turning Mini DataNet Units Off

DNL8XX and DNL8XX-BXT

To conserve battery, the Mini DataNet LED does not provide an indication of on/off status. If you wish to operate the logger it is best to first be sure the unit is turned off before continuing.

1. To turn the unit off:
2. Press and hold the logger button until the LED emits a fixed, red light for at least three seconds.
3. Release the logger button.

DNR800

The DNR800 Mini Repeater is powered by external AC power supply only. There is no battery backup. When disconnected the unit is shutdown immediately and is disconnected from the network.

4.13.2. Turning Mini DataNet Units On and Joining a Network

DNL8XX and DNL8XX-BXT

The action of turning on a unit means that it will also join a network.

When the unit is off:

1. Give the logger button a short press.



2. The logger will search for a network. The LED will blink green at one second intervals until either of the following two scenarios occurs:
 - **The logger automatically finds a network.** The LED will be fixed green for five seconds and the logger icon will display and blink for eight seconds in the software Map View.

The logger will connect to the first network it find which recognizes its Serial Number, as entered in the Device Filter.
 - **The logger doesn't find a network.** After 60 seconds of failed attempts to find a network, the logger will shut down.

Note: The logger won't find a network if its serial network wasn't entered in the Device Filter, the Receiver isn't online or if the network is locked (go to the Network menu to unlock).

3. Once the logger has joined the network you may configure it to start recording data. Refer to section 14.17.

DNR800

The DNR800 functionality for joining a network is the same as for the other Mini DataNet units. The only difference is that to turn on the Mini Repeater, you can also just connect the unit to its external power supply. When turned on it will automatically search for networks.

4.13.3. Rescanning for Networks

If the unit has joined another network i.e. not yours, then you will have to leave that network and rescan for new networks. This requires first shutting off the unit and then leaving the current network.

1. Make sure the unit serial number is entered into the Mini DataNet Device Filter.
2. Turn the unit off by pressing and holding the unit button until the LED emits a fixed, red light for at least three seconds.
3. Release the unit button.
4. To leave the network, press the unit button again for three seconds. The LED will blink red three times to indicate Leave Network command has been received. The unit icon will be removed from the software Map View.
5. To rescan for network, give the unit button a short press. The unit will search for a network and will indicate it has joined a network by emitting a solid green LED for five seconds.

Note: If there are multiple DataNet networks in your environment make sure that the unit SN is listed in the Device Filter of only one of these networks, otherwise you can't control which network it will join first and you will have to rescan the networks several times.

4.13.4. Leave Network

To leave the current network, when the unit is on:

1. Press and hold the unit button until the LED emits a fixed, red light for at least three seconds.
2. Release the unit button.

- To leave the network, press the unit button again for three seconds. The LED will blink red three times to indicate Leave Network command has been received. The unit icon will be removed from the software Map View. The unit is now off.

4.13.5. Running Signal Test

You may run a signal test on the logger or Mini Repeater to check the signal strength to the parent unit.

Right-click the unit icon on the Map View and select the **Signal Test** option. The signal test will be performed on the unit with the following parameters indicating signal quality:

- Good: LED blinks orange at for 0.5 second intervals
- Low: LED blinks orange at one second intervals
- Unit is out of range: LED emits steady orange light

Note: Power consumption of logger battery during signal test increases significantly so do not overuse this feature.

4.13.6. Call Unit from Software


To locate the unit via the software, right-click the unit icon on the Map View and select the **Call Device (LED)** option. The unit LED will alternate between slow green and red blinks and after several blinks it will stop.

4.14. Operating the DNR900 in Receiver Mode

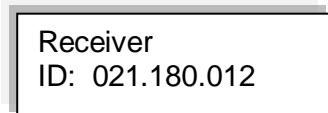
This section explains how to operate the Receiver using the menu options on the units' LCD screen, as how to change the DNR900 unit type from Receiver to Repeater.

4.14.1. Turning on the Unit

In order to view the Receiver menu options, the unit must be turned on by pressing

the **Scroll** button  on the keypad. Ensure the unit is charged or connected to the AC adapter.

Once the unit is turned on it will display a series of status messages, finishing with the welcome screen below:



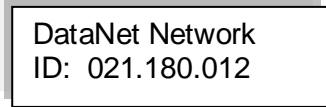
Receiver
ID: 021.180.012

4.14.2. Receiver Menus

When the unit is selected to work as a Receiver (as opposed to working as a Repeater) the following menus are displayed on the unit.

Network Name and ID

When the unit is switched on the following screen is displayed, indicating the default network name and the unique network ID formed by this Receiver. The network name can be changed via the DataSuite software.

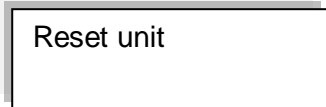


Receiver version

This menu informs the user of the Receiver firmware version. This is helpful when you need to upgrade the system firmware, to check the current version. Or when contacting fourtec technical support, with any technical issues.

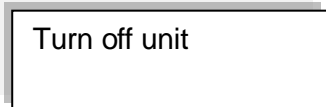
Reset Unit

When the unit is reset, upon start up it will reconnect the network it previously formed and managed.



Turn Off Unit

Selecting this option will shut the unit down. You can turn the unit on again by pressing the **Scroll** button. When the Receiver is shutdown the network will be down as well, as the end units won't be able to transmit to the Receiver.



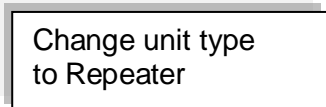
It is recommended to turn off the unit when it is not in use.

4.14.3. Changing Receiver to Repeater

For users of DNR900 firmware 2.45 and higher, use the DataSuite software to change the DNR900 from Receiver mode to Repeater mode. Refer to section 14.16 for more details.

For users of firmware versions lower than 2.45, follow the instructions below.

Scroll through the Receiver menu until you reach the menu **Change Unit Type to Repeater**.



Press the **Enter** button to proceed with changing the unit to Repeater mode. Once you perform this action, any network the unit may have formed while in Receiver mode will be down, and you will need to form a new network with another Receiver unit, and join your existing loggers to that new network.

Note: Once you change the Receiver to a Repeater, you will only be able to download data from loggers on the Receiver's network via direct USB connection or by using the Substitute Receiver feature (see section 4.15.6).



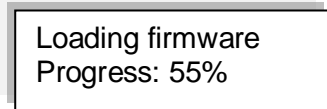
Once the unit is in Repeater mode, you will need to leave the network it is connected to, and scan for a new network. Only once the Repeater joins the network will other units on that network detect it.

Refer to section 4.15 for more details on operating a Repeater and joining a new network.

4.14.4. Additional Receiver Screens

Loading Firmware

When updating the firmware of the Receiver via the software's Firmware Update Center, the Receiver screen will display the update progress. When complete the main Receiver status screen will be displayed.




4.15. Operating the DNR900 in Repeater Mode

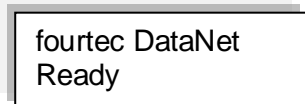
This section explains how to operate the Repeater and provides an overview of the menu options on the units' LCD screen.

Refer to section 4.14.3 to learn how to switch the DNR900 from Receiver to Repeater mode.

4.15.1. Turning on the Unit

In order to view the Repeater menu options, the unit must be turned on by pressing the **Scroll** button  on the keypad. Ensure the unit is connected to the AC adapter.

Once the unit is switched on it will emit a short beep and the screen will display a welcome message:



4.15.2. Display Shutdown

When the Repeater is running from batteries only, if the screen is inactive for thirty seconds it will turn off. However the Repeater will continue to operate in the background. Press the **Scroll** button to enable the LCD screen again. The screen will not turn off during firmware upgrade.

When connected to external power supply the Repeater screen will always stay on.

4.15.3. Joining a Network

When a Repeater is powered on or reset, it will automatically scan for a network after the welcome message has appeared.

There are four scenarios that can occur while scanning for a network:

Scenario 1: The unit can't find the last network that it was connected to. For example, the Repeater is a new unit which was never previously joined a network.

Scenario 2: The unit scans and finds the last network it was connected to, and joins that network.

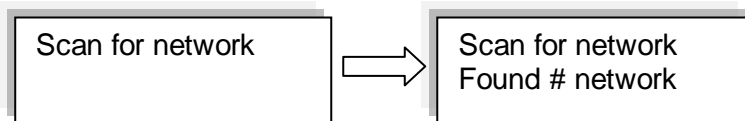
Scenario 3: The unit can't find any networks at all.

Scenario 4: The unit found a network but failed to join.

Read below for more details on each scenario.

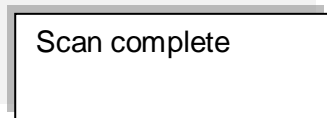
Scenario 1

If the unit can't find the last network that it was connected to (for example, it's a new unit), the unit will display all the networks that are in range:

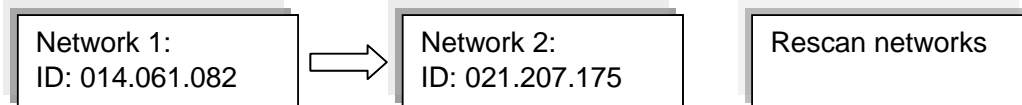


Where # is the number of networks found

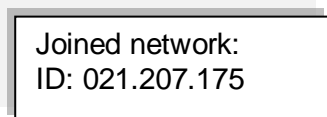
Once the scan has been completed the following screen appears:



If more than one network was found, the user will need to select the network ID that he wants to connect to. The user uses the **Scroll** button to scroll through the Network IDs. The relevant network is selected using the **Enter** button.

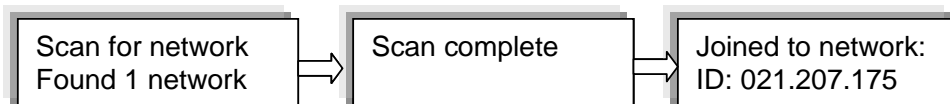


Once the network has been selected the following screen will be displayed.



To rescan the networks, simply select the Rescan Networks option and the logger will start the scanning process again.

If only one network was found the system will automatically connect to that network without the user needing to select the network manually.



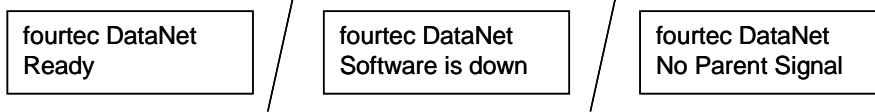
The Repeater display will return to the welcome message, which consists of the Repeater name (editable via the software) and the network status:

Ready - If connection to the DataSuite software is established.



Software is down - If established connection to the Receiver but the DataSuite software is down (PC is off, software is not open, etc.)

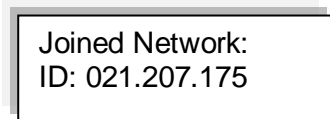
No Parent Signal – The parent unit, either the Receiver or another Repeater, is not detected by the Repeater therefore it is not transmitting its data to the network.



The Repeater will continue to search for the parent unit (at specific intervals) and the screen will continue to read *Search Parent* until the parent is found.

Scenario 2

When the system scans for networks and finds the last network that it was connected to it will automatically connect to the last known network.

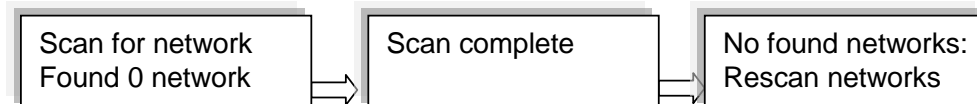


As in Scenario 1, the logger display will then return to the welcome message displaying the unit name and status.

Scenario 3

The system can't find any networks at all.

If no networks were found, the unit will display the following screens.



Scenario 4

The unit found a network but failed to join.

The unit will perform up to 99 retries to join the network before scanning for networks again. Press any of the unit buttons to cease the attempts to join the network.

A unit may fail to join a network if it is far from the Receiver, requiring several hops to reach the Receiver, or the network itself is large with many units. The attempt to join a network is made in under a second in real-time and on high traffic network, it may result in failure to join.

Moving the unit closer to the Receiver can help the logger to join successfully. If the logger still can't join, form a new network or contact fourtec technical support.

4.15.4. Menu Options

Use the **Scroll** button to scroll through the menu options.

Name and Status

The unit name is displayed on the first row and the second row indicates the Repeater status.

fourtec DataNet
Ready

Mark Unit on PC

To indicate the Repeater icon in the software's Map View, press the **Enter** button when this screen is displayed. The Repeater's icon located in the Map View will blink a number of times.

Batt Level (battery level)

- If the power adapter is not connected the battery percentage will be displayed.
- If the power adapter is connected **Battery charging** will be displayed.

Batt Level: 67%

Batt Level:
Battery charging

Signal Level Test

The Signal Level test allows the user to check the signal strength and quality of the link between the Repeater and its parent unit. This test is used to determine optimal positioning of the Repeater during deployment.

Signal level:
Run test -> Menu

By pressing the **Menu** button the unit will show the signal level and link quality in percentage terms.

If there is no connection with a parent unit, an Out of range message will be displayed.

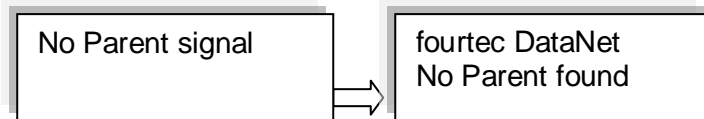
Signal level: 80
Link quality: 95

Out of range

- **Signal level:** Indicates the reception level between end unit and parent unit. If the level falls below 20% then the logger should be placed in a better location or another Repeater should be added.
- **Link quality:** Calculation of the data transmitted with no errors from the Repeater to the parent unit. If the level falls between 85% then the Repeater should be placed in a better location or another Repeater should be added. The lower the link quality %, the more retries are needed in order for the Repeater to send all of its data.

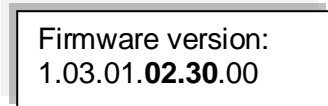
Note: The signal level may be low but the link quality can still be 100%.

You will not be able to run the Signal Level test when the Repeater has lost its connection to the network. If you tried, then the following screens are displayed:



Firmware Version

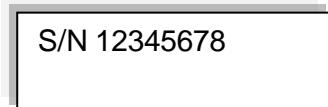
This menu informs the user of the Repeater firmware version. This is helpful when you need to upgrade the system firmware, to check the current version. Or when contacting fourtec technical support, with any technical issues.



The firmware version is commonly referred to by the numbers in bold in the screen above. For example, the firmware version which is supported by this user guide is v2.30.

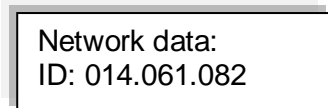
S/N

This menu displays the unit's eight digit SN.



Network Data

This menu displays the unique network ID to which the unit is currently connected. This ID will match the network ID displayed in the software in the Receiver icon's tooltip in the Map View.

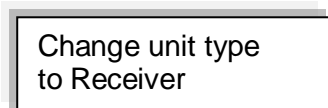


Go to Substitute Receiver Mode

Refer to section 4.15.6 for more details.

Change Unit Type to Receiver

Select this option to change your unit from Repeater to Receiver mode. A new network ID will be formed.

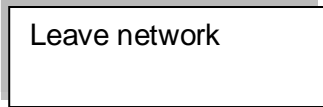


Press the **Enter** button to proceed with changing the unit to Receiver mode.

Leave Network

If this option is selected, the unit will first leave the network and then reset itself. The scan network procedure described in section 4.12.3 will begin. The only exception to

this procedure is that even if the last connected network is found during the scan, the unit will not automatically connect to it.



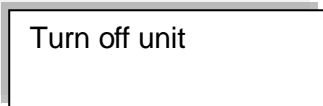
Reset Unit

When the unit is reset, upon start up it will automatically scan for networks. The unit will automatically connect to the previously connected network assuming it was found in the network scan.

Turn Off Unit

Selecting this option will shut the unit down. You can turn the unit on again by pressing the **Scroll** button.

It is recommended to turn off the unit when it is not in use.

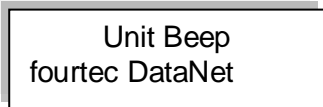


Note: Turning off the Repeater can have adverse affects on your network, as other units may be dependent on the Repeater for transmitting its data to the Receiver. To prevent the Repeater from being a point of failure if shut off, ensure the network is robust enough by having alternative routes for the end units to reach the Receiver.

4.15.5. Additional Repeater Screens

Unit Beep

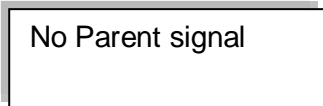
When the DataSuite software activates the Call Unit feature, the Repeater will beep and the following screen will be displayed:



Refer to section 14.16.5 for more details.

No Parent Signal/No Parent Found

When a Repeater's parent unit, such as another Repeater or the Receiver, goes offline then the following screen is immediately displayed on the logger:



For example, this could happen if the Receiver managing the network has formed a new network, so there is no Receiver managing the previous network. Or if the parent unit is a Repeater, and it goes offline, then this Repeater will display the message above.

Once it has determined that the parent signal is lost, it will try to establish a connection with the network via another Repeater but if it fails then the following screen is displayed:

fourtec
No Parent found

You will have to leave the current network and rescan for a new network.

Loading Firmware

When updating the firmware of the Repeater via the software's Firmware Update Center, the Repeater screen will display the update progress. When complete the main Repeater screen will be displayed.

Loading firmware
Progress: 55%

4.15.6. Working in Substitute Receiver Mode

In the event that the network Receiver suffers hardware failure, is damaged or cannot operate for any reason, the DataNet network cannot function as an online monitoring system.

In such an event any network with a functioning Repeater can restore network functionality i.e. transmission of data from logger to software, by using the Repeater to temporarily replace the Receiver.

By doing so, the Repeater will be defined as a *Substitute Receiver*, maintaining the original network ID, and full Receiver functionality except for the ability to add new loggers to the network. Until a new, permanent Receiver is obtained, this feature provides an excellent backup enabling continuous data transfer preventing the time consuming task of moving all devices to a new network.

To enable Substitute Receiver mode:

1. Ensure the original network Receiver is switched off.
2. Connect the Repeater to the PC via mini-USB cable.
3. From the Repeater menu, select **Go to Substitute Receiver mode**.
4. The LCD screen will display *Sub Receiver* and the network ID. To move to standard Repeater mode, select **Change unit type to Repeater** from the menu.

4.16. Data Logger Memory Management

All DataNet data loggers operate using a cyclic memory mechanism. When the logger memory is full, the logger will not stop recording data. It will continue by writing over the first samples recorded to the logger memory.

As DataNet is an online monitoring system, the logger data is regularly transmitted to the Receiver, so any erased samples will already be safely recorded to the DataNet data file folders.

The only scenario where data may be erased is if the Receiver is offline for a period longer than the data logger's Recording Time (as displayed in the Setup dialog). The Recording Time indicates how long the logger can record data for until the memory is full. In this case, the logger memory will fill up and due to the cyclic mechanism, start erasing the first recorded samples. Any samples not transmitted to the computer will be permanently lost. It must be noted that this scenario is highly unlikely.

Chapter 5:

DaqLink Overview

This chapter provides a general overview of the DaqLink system.

5.1. DaqLink Introduction

Light, Portable and Independent Logging

With built-in temperature and humidity sensors, plus four external probe inputs the DaqLink standalone data logger ensures a low cost, reliable and accurate solution. The DaqLink logger is a 16-bit, mobile data acquisition device for continuous indoor or outdoor data monitoring.

The DaqLink system is comprised of two data logger models, measuring a broad range of parameters on four external inputs for direct measurement and recording of PT-100, thermocouple, 0 to 1 V, 4 to 20 mA, contact, frequency and pulse sensors, as well as internal temperature and relative humidity sensors.

With its high resolution and fast Analog to Digital converter (ADC), DaqLink data loggers meet the majority of data acquisition requirements in most industrial applications. Every DaqLink logger unit is embedded with a unique serial number and can be loaded with a descriptive comment for safe identification. An internal clock and calendar keeps track of the time and date of every sample measured.

DaqLink loggers can automatically activate external alarm events when data is outside a specified range. Email and SMS notifications can be sent to predefined contacts.

The DaqLink system is powered by the powerful DataSuite software. The Windows™ based software is the central management interface of the DaqLink network. When connected via USB cable to the PC, DaqLink data can be monitored online and displayed in real-time graphs or tables. Analyze data with various mathematical tools, or export data to a spreadsheet.

The software also enables you to configure, calibrate or update the firmware of DaqLink units via direct USB connection.

Key DaqLink benefits include:

- Real-time logging - Online operation with data results on screen
- Independence - Manual or PC operation with on-site monitoring via two-row LCD display
- Intuitively - Simple keypad and easy-to-navigate menus
- Long life - Low-power consumption and rechargeable battery lasting up to six months
- Flexibility - Four alarm levels with visual LCD, and audible alarms
- Non-stop logging - Continuous data storage to large onboard memory and periodic USB downloads

5.2. The DaqLink System

The basic DaqLink system contains at least one of the following units:

- DaqLink data logger – Part Number DBSA710 or DBSA720

- Mini-USB communication cable
- Power adapter (one per DaqLink unit ordered)
- DataSuite software CD containing user guide

5.2.1. The Data Logger

There are two data logger models compatible with the DaqLink system. These loggers support up to four external sensors and two internal sensors, temperature and humidity, depending on the specific model. Data is recorded and stored to the logger's internal memory and transmitted over the network to the DataSuite software running on the PC.

The data logger is programmed to consume as little power as possible during operation, in order to conserve the battery life. When not transmitting or recording data the units are in *sleep* mode and they *wake up* when needed.

The battery for the DBSA710 and DBSA720 is rechargeable and can run up to several months on one charge, depending on the logger configuration.

Refer to section 4.9.7 for more information.

Note: Battery life depends on the logger sampling rate, transmission rate, type of sensor, and number of measured sensors.

DaqLink Data Loggers



Part Number: DBSA720

Four external channel data logger with two internal sensors, Humidity and Temperature

Memory Capacity: ~59,000 samples

Power supply: AC or battery operated



Part Number: DBSA710

Four external channel data logger with internal Temperature sensor

Memory Capacity: ~59,000 samples

Power supply: AC or battery operated

5.2.2. Hardware Accessories

The DaqLink system includes the following accessories:

- Mini-USB cable for connecting data logger to PC
- Power adapter to power the data logger

Chapter 6:

DaqLink Implementation Guide

fourtec recommends first time users of the DaqLink system read this chapter before drilling down into the many features of the system described later in the user guide. The Implementation Guide will give you a clear understanding of the basic aspects of setting up the system, and getting the data logger up and running.

6.1. Pre-setup Requirements

Prior to commencing with the DaqLink implementation you must have the following requirements in place:

PC

- 24/7 availability, if online data monitoring is required
- Reliable AC power
- Sufficient hard disk space to store loggers' data
- One free USB port

DaqLink devices

At least one DaqLink logger DBSA710 or DBSA720.

Mini-USB cable

The mini-USB cable connects the data logger to the PC for logger configuration and data download (and is supplied with the DataSuite software kit).

6.2. Launching the Software

1. Install the DataSuite software on the PC workstation. Refer to section 14.1: Installing DataSuite Software on page 129 for more details.
2. Once the software and associated components have been installed, launch



DataSuite from your DataSuite desktop shortcut

3. The main DataSuite window is launched. The default view is called **Map View**.

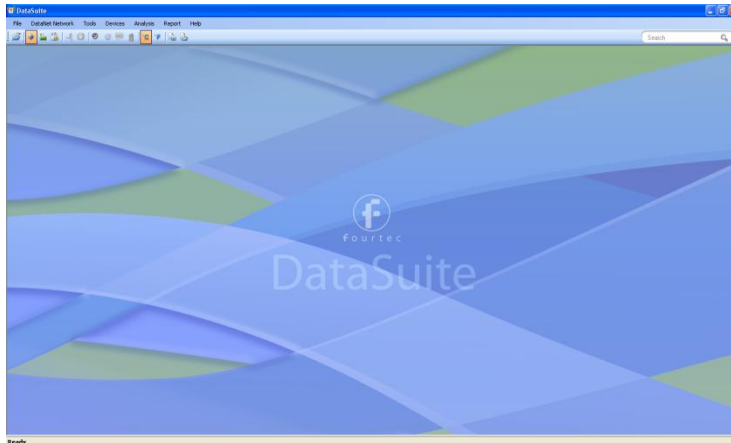


Figure 31: Main DataSuite window


4. Check for DataSuite updates. Go to **Help > Check for Updates** from the DataSuite main menu to check for newer versions of the DaqLink module software and firmware released since you purchased your system. For more details on the Update feature go to Chapter 15: Updating DataSuite Software and Firmware.

6.3. Connecting the Logger

Note: Multiple DaqLink loggers may be detected by the PC at a time.

1. Only once the DataSuite software and USB driver have been installed, connect the DaqLink data logger (DBSA710 or DBSA720) to the fourtec-supplied power adapter.

Note: Only use adapters provided by fourtec. Use of the wrong adapter could damage your DaqLink units.

2. Turn on the unit by pressing the **Scroll** button  on the front keypad. The unit will beep when turned on.
3. Connect the mini-USB cable to the computer and to the data logger's mini-USB port.
4. From the DaqLink main menu, go to **Devices > Detect Device**. The data logger icon will appear in the Map View indicating that the logger is detected.

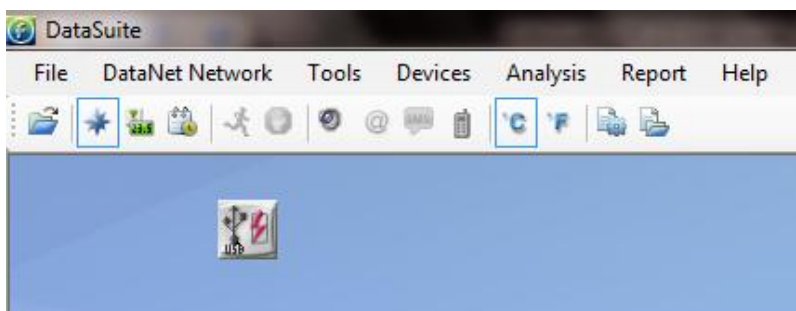



Figure 32: Adding data logger icon to Map View

Note: If the logger is not recognized by the software try connecting the mini-USB cable to another USB port on the PC. Or select **Devices > Detect Device** again in the main menu.

5. Should you disconnect the logger's USB cable or power adapter (and the battery eventually dies), the logger icon will be grayed out: 

Note: You can move the logger icon elsewhere on the screen by going to **Tools > Lock Map View** and unselecting this option.

6.4. Charging DaqLink Loggers

This section refers to charging the DBSA710 or DBSA720 loggers.

Note: Only use adapters provided by fourtec. Use of the wrong adapter could damage your DaqLink units.

If the loggers will run from the battery supply make sure to first charge each of the loggers for 16 hours before use in order to maximize the battery life. A fully charged battery can last several months, depending on your logger configuration.

If the loggers will run from the AC power supply, when first connected to the AC adapter the logger will always initiate the 16 hour charge cycle.

Note: For loggers measuring data with the internal temperature sensor, it is critical to note that during the charge cycle the logger will heat up thereby causing the internal temperature sensor reading to rise up to 10 °C above ambient temperature. Once the charging process is complete, the logger will cool down and the internal temperature sensor readings will return to normal.

For loggers remaining connected to AC power, to prevent the logger from heating up again following the initial charge cycle, the logger will receive a one minute *trickle charge* each day rather than stay continually charged. This is sufficient to ensure the logger doesn't self-discharge and will maintain the logger's full charge status.

Refer to section 4.9.3 for more details on the DaqLink loggers' power supply.

6.5. Loading Map View Background

Load an image into the DataSuite software showing a map of your facility in order to place the Logger icons in their relative positions. As you deploy more standalone loggers, this will prove very helpful.

- Double click the Map View background to browse to the image directory and load the image. Remember to unlock the Map View in order to move the icons around.
- Right-click the Map View background and two options will be available: **Load Wallpaper** and **Reset Wallpaper**, which resets to the default fourtec wallpaper.

6.6. Configuring the Logger

Once the software has detected the DaqLink logger, you must configure the unit in order to start acquiring data.

1. Right-click on the Logger icon. Select **Setup** from the context menu.
2. The Setup window will be launched.

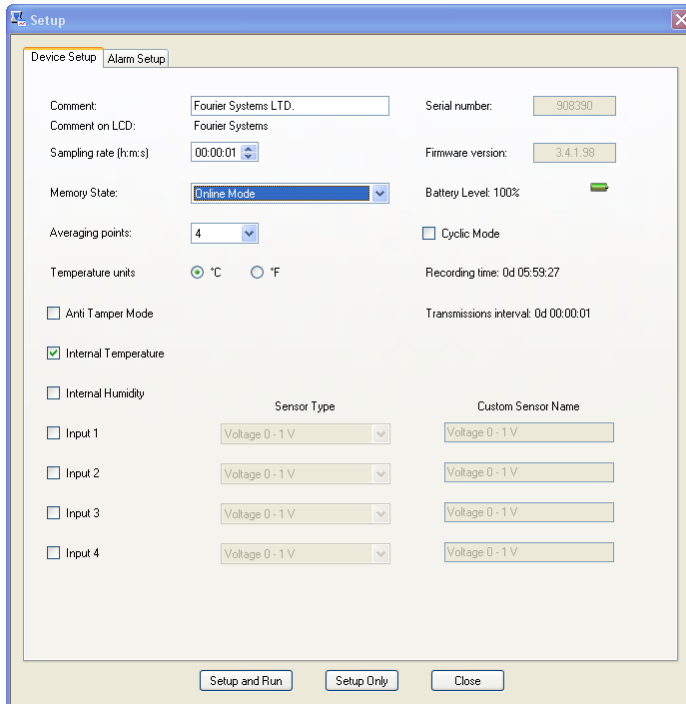



Figure 33: DaqLink Logger Setup window

This dialog provides non-editable information such as the serial number, battery level, and firmware version of the current unit.

On the **Device Setup** and **Alarm Setup** tabs, the user is able to configure the following parameters:

- Unit's comment
 - Sampling rate
 - Memory State
 - Averaging points
 - Temperature units °C/°F (on the logger LCD)
 - Anti-tamper mode
 - Active sensors
 - Custom sensors' names
 - Alarm levels
 - Alarm duration
 - Alarm delay
 - Alarm pre delay
3. Select the Memory State, **Online** or **Optimized Memory Modes**.
 4. Select the sensors you wish to connect to the logger for data acquisition. It doesn't matter which order you select the sensors. You may only have Input 4 selected, for example, and Inputs 1 to 3 left unselected.
 5. Select the sampling rate anywhere from 1 every second to 1 every 18 hours.
 6. Unless you have Alarm levels you wish to edit (see the Alarms Setup tab), click either **Setup and Run** (to send the setup and immediately log data), or **Setup Only** (to send the setup but only log data at your command).
 7. If you selected **Setup Only** in step 5, right-click the Logger icon and select **Run** from the context menu to start logging data or click  in the main tool bar.



8. The Logger icon will appear as follows when in Run mode:
9. To stop the logger, right-click the Logger icon and select **Stop** from the context menu.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

6.7. Viewing Data

Once you run the logger, you have several ways of viewing the online data that is being acquired.

- Online graph/table/statistics views
- Logger icon tooltip
- Sensor view

6.7.1. Online Data Views

Double clicking the Logger icon or selecting **Display Data** in the Logger icon context menu will open the online graph.

This graph is updated in real-time with the newly recorded data.

You can switch between Graph, Table and Statistics views to view the data in different formats.

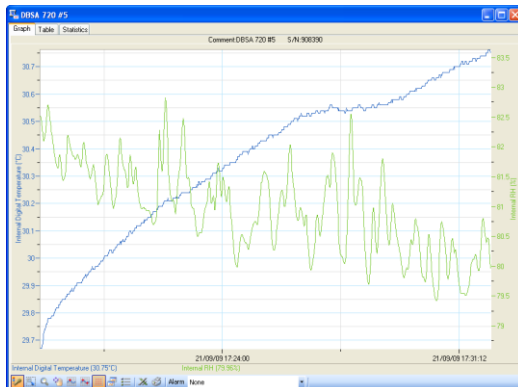
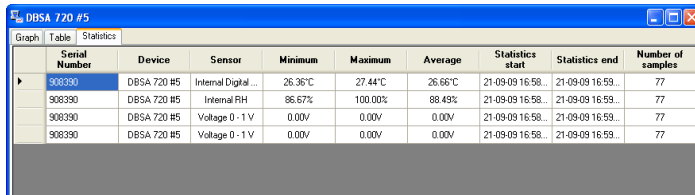


Figure 34: Online data – Graph view

Index	Date and Time	Internal Digital Temperature 486096 DESA 720 #5	Internal RH 486096 DESA 720 #5	Voltage 0 - 1 V 486096 DESA 720 #5	Voltage 0 - 1 V 486096 DESA 720 #5
1	21/09/09 16:50:20	26.36°C	87.22%	0.00V	0.00V
2	21/09/09 16:50:21	26.36°C	87.22%	0.00V	0.00V
3	21/09/09 16:50:22	26.37°C	87.22%	0.00V	0.00V
4	21/09/09 16:50:23	26.36°C	87.22%	0.00V	0.00V
5	21/09/09 16:50:24	26.39°C	87.20%	0.00V	0.00V
6	21/09/09 16:50:25	26.39°C	87.20%	0.00V	0.00V
7	21/09/09 16:50:26	26.40°C	87.20%	0.00V	0.00V
8	21/09/09 16:50:27	26.41°C	87.20%	0.00V	0.00V
9	21/09/09 16:50:28	26.42°C	87.21%	0.00V	0.00V
10	21/09/09 16:50:29	26.43°C	87.21%	0.00V	0.00V
11	21/09/09 16:50:30	26.44°C	87.21%	0.00V	0.00V
12	21/09/09 16:50:31	26.44°C	87.21%	0.00V	0.00V
13	21/09/09 16:50:32	26.45°C	87.21%	0.00V	0.00V
14	21/09/09 16:50:33	26.46°C	87.24%	0.00V	0.00V
15	21/09/09 16:50:34	26.47°C	87.24%	0.00V	0.00V
16	21/09/09 16:50:35	26.49°C	87.27%	0.00V	0.00V
17	21/09/09 16:50:36	26.49°C	87.26%	0.00V	0.00V
18	21/09/09 16:50:37	26.49°C	87.26%	0.00V	0.00V
19	21/09/09 16:50:38	26.50°C	87.32%	0.00V	0.00V
20	21/09/09 16:50:39	26.51°C	87.33%	0.00V	0.00V
21	21/09/09 16:50:40	26.51°C	87.33%	0.00V	0.00V
22	21/09/09 16:50:41	26.52°C	87.30%	0.00V	0.00V
23	21/09/09 16:50:42	26.52°C	87.31%	0.00V	0.00V
24	21/09/09 16:50:43	26.54°C	87.26%	0.00V	0.00V

Figure 35: Online data – Table view



Serial Number	Device	Sensor	Minimum	Maximum	Average	Statistics start	Statistics end	Number of samples
908390	DBSA 720 #5	Internal Digital	26.36°C	27.44°C	26.66°C	21-09-09 16:59...	21-09-09 16:59...	77
908390	DBSA 720 #5	Internal RH	66.67%	100.00%	68.49%	21-09-09 16:59...	21-09-09 16:59...	77
908390	DBSA 720 #5	Voltage 0 - 1 V	0.00V	0.00V	0.00V	21-09-09 16:59...	21-09-09 16:59...	77
908390	DBSA 720 #5	Voltage 0 - 1 V	0.00V	0.00V	0.00V	21-09-09 16:59...	21-09-09 16:59...	77

Figure 36: Online data – Statistics view

6.7.2. Logger Tooltip

Close the online data window and return to Map View. Scroll over the Logger icon and you will see a tooltip displaying the relevant logger information, including real-time data.

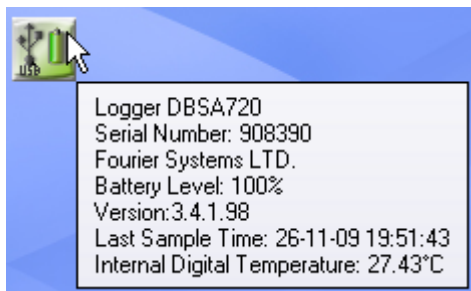



Figure 37: Logger tooltip

This tool-tip is updated with every newly recorded sample.

6.7.3. Sensor View

Click the **Sensor View** icon  in the tool bar to switch to this view. Here, you can monitor the data by viewing data display of each individual sensor, rather than of each logger.

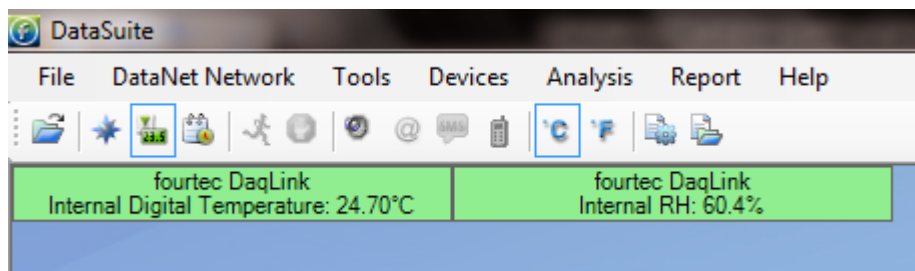


Figure 38: Sensor view

- If the sensor is in alarm, the sensor box will change color from green to red (just as the Logger icon would).
- Double-clicking the individual sensor box will open the data in the online Graph view.

6.8. Downloading Data

If the logger is being used as a standalone device you will have to connect it to the computer via USB cable in order to download the data to the software.

1. Connect logger to PC and go to **Devices > Detect Device** in the main menu.



2. To download data right-click the logger icon and select **Download Data**.
3. View the downloaded data by double-clicking the logger icon.

Chapter 7:

DaqLink Hardware Overview

This chapter details the hardware features of the DaqLink data loggers.

7.1. Data Logger Front Panel Layout

7.1.1. DBSA710 and DBSA720

Apart from the color scheme, the DBSA710 and DBSA720 data logger models have the same front panel design.

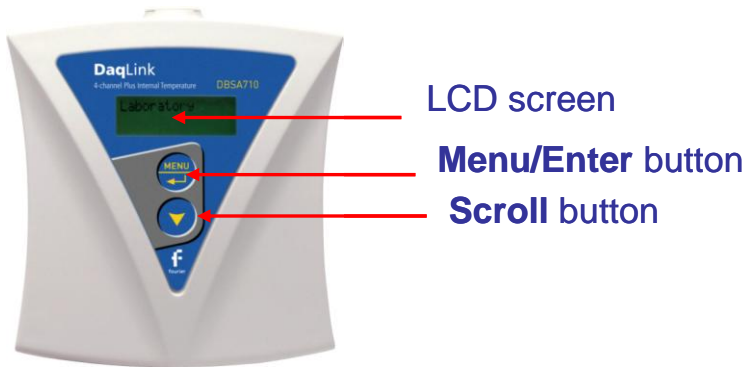


Figure 39: DBSA710 data logger front panel

LCD screen

Displays logger status, logger data, and Min/Max values.

Menu/Enter button

Use to enter logger menu options and to execute logger commands.

Scroll button

Use to scroll through menu items and to power on unit.

7.2. Data Logger External Connections

7.2.1. DBSA710 and DBSA720

External connections of the DBSA710 and DBSA720 are exactly the same.

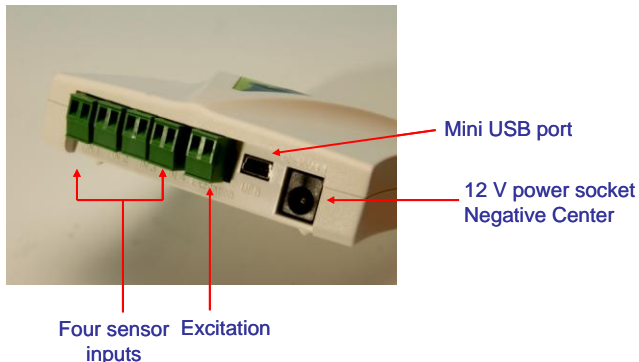


Figure 40: DBSA720 data logger external connections

Mini USB Port

To enable communication between logger and PC, for configuration and data download.

12 V Power Socket

To connect logger to external power supply (negative center).

Sensor Inputs

Pluggable screw terminal blocks marked In-1 to In-4 (from left to right), to connect wide range of sensor types for data acquisition. All four inputs can be used simultaneously. Sensors can be connected in any order.

To connect a sensor to the DaqLink data logger, unplug the screw terminal, connect the sensor's wires to the terminals, and then plug the terminal back to the corresponding socket on the input block.

Excitation socket

Output power socket used to power external sensors, power derived directly from the external power supply adaptor.

7.3. Data Logger Sensor Overview

This section provides an overview of the hardware specifications of the DaqLink data loggers.

7.3.1. Internal Sensor Types

The DBSA710 and DBSA720 loggers include internal sensors, depending on the logger model.

Sensor	Measurement Range	Accuracy	Logger Model
Digital Humidity	5% to 95%	±3% (in DataSuite software) ±4% (on logger LCD)	DBSA720
Digital Temperature	-20 °C to 50 °C	±0.5 °C	DBSA720
Temperature PT100	-20 °C to 50 °C	±0.3 °C	DBSA710

7.3.2. External Sensor Types

DBSA710 and DBSA720

Each of the four input channels of these data logger models are multi-purpose and can be individually configured to any of the following types and ranges.

Sensor	Measurement Range	Accuracy	Available Inputs
Current	4 to 20 mA	± 0.5 %	In-1 to In-4
Contact	Open (0) / Close (1)	N/A	In-1 to In-4
Frequency	20 Hz to 4 KHz	N/A	In-4 only
Pulse Counter	1 to 65,536 pulses 0 to 4 KHz	N/A	In-4 only
Temperature PT100 (2-wire)	-200 to 400 °C	-200 to -60 °C ±0.5 % -60 to 60 °C ±0.3 °C 60 to 400 °C ±0.5 %	In-1 to In-4
Temperature TC-J	-200 °C to 1,000 °C	-200 to -60 °C ±0.5 % -60 to 60 °C ±0.5 °C 60 to 1,000 °C ±0.5 %	In-1 to In-4
Temperature TC-K	-200 °C to 1,000 °C	-200 to -60 °C ±0.5 % -60 to 60 °C ±0.5 °C 60 to 1,000 °C ±0.5 %	In-1 to In-4
Temperature TC-T	-200 °C to 400 °C	-200 to -60 °C ±0.5 % -60 to 60 °C ±0.5 °C 60 to 400 °C ±0.5 %	In-1 to In-4
Voltage	0 to 1 V	± 0.5 %	In-1 to In-4
Voltage	0 to 50 mV	± 0.5 %	In-1 to In-4

7.3.3. Sensor Connection

Connect the sensor/s to the terminal block/s at the top of data logger:

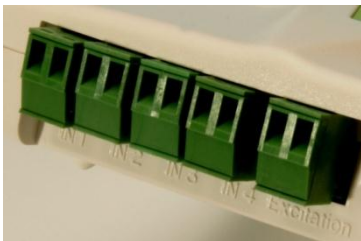


Figure 41: DaqLink logger sensor inputs

Sensors do not have to be added successively. You may only configure In-4, or configure In-1 and In-3, for example, when setting up the logger via the software.

7.3.4. External PT-100 Sensor Connection

The PT-100 sensor, as supplied by fourtec, comes pre-wired to the data logger's terminal block.

The PT-100 positive polarity (red) and ground (white) wires are connected to the + input of the terminal block. The negative polarity (black) wire is connected to the – input on the terminal block.

7.3.5. Programming Limitations for DBSA710 and DBSA720

The standard sampling rate for all sensors on all inputs is from a maximum of one sample every second to a minimum of one sample every 18 hours. However, there are certain limitations using a specific combination of sensors, which must be taken into account when programming the DaqLink data loggers.

Note: The software integrates all programming limitations automatically when configuring the loggers.

Please refer to the table below for DaqLink programming limitations, where:

PT100, Thermocouple J, K or T = A

Internal Digital Temperature (on DBSA720) = B

Sensor Combination	Maximum Sampling Rate	Example Setup
3 x A 4 x A A + B	One sample every three seconds	In-1: PT-100 In-2: TC-J In-3: TC-J
(2 x A) + B (3 x A) + B	One sample every four seconds	Internal: Temp In-1: TC-T In-2: PT-100
(4 x A) + B	One sample every five seconds	Internal: Temp In-1: TC-T In-2: TC-J In-3: PT-100 In-4: PT-100

Table 3: Data Logger programming limitations

7.3.6. External Alarm Output

The DaqLink system supports connection of an external alarm e.g. siren, audible alarm, to In-1 of the DBSA710 and DBSA720 data loggers.

When connected to the logger, the external alarm will be activated only when that logger is in alarm status.

Once there is no alarm status, the external alarm will be deactivated.

Data Logger External Alarm

In-1 of the DBSA710 and DBSA720 serves either as a standard sensor input or as an external alarm output. Ensure the logger is connected to AC power if connected to an external alarm.

Configure In-1 as **Alarm Normally Open** or **Alarm Normally Closed** in the logger Setup window in the DataSuite software.

Normally Open will result in the alarm being activated during alarm status (the circuit will be closed).

Normally Closed will result in the alarm being activated when logger is not in alarm and therefore deactivated when there is an alarm (the circuit will be opened).

Connect In-1 to your external alarm device and connect the logger to AC power.

Use the **Alarm Setup** tab in the Setup dialog to define the logger alarm settings. If these settings are breached then the alarm will be activated.

External Alarm Schematic

See the schematic below explaining how to hook up an external alarm to the DaqLink unit.

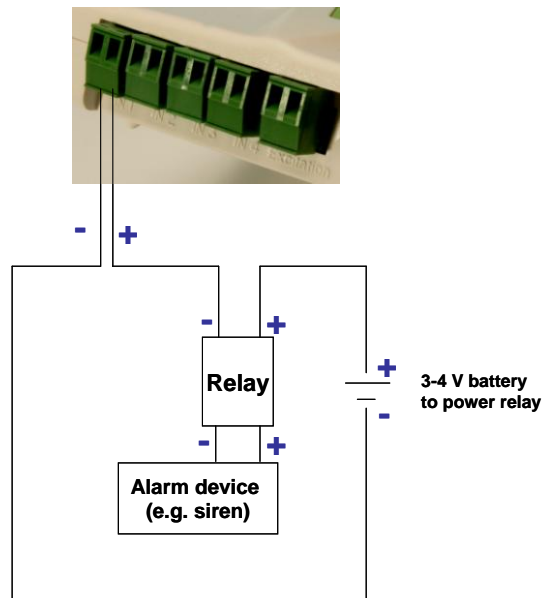


Figure 42: External alarm schematic

- + from DBSA710/720 goes to – of the Relay inputs
- + of Relay input goes to battery that powers the Relay
- Load inputs of the Relay go to the Alarm device e.g. siren, lights, etc.
- - of the battery goes to – of DBSA710/720.

Note: Maximum load of the Relay is 50 mA, 3 V.

Refer to Appendix B: DaqLink Specifications for the full external alarm output specification.

7.3.7. Polarity

Current, voltage, thermocouples and user defined sensors have distinct polarity. Be careful to connect them in the right polarity.



7.3.8. Frequency/Pulse Counter

Connect the signal wires to In-4 terminal blocks, and select **Frequency** or **Pulse counter** for **Input 4** from the logger Setup window in the DataSuite software. Inputs 1 to 3 are still available for other sensors.

The Frequency/Pulse counter is optically isolated from the internal circuitry and can simultaneously measure a signal source, together with another input.

7.3.9. User Defined Sensors

DaqLink provides a simple and straightforward tool for defining a limited number of custom sensors. Almost any sensor or transducer with 0 – 1 V or 4 – 20 mA output is accepted by the DaqLink logger and its electrical units are automatically scaled to meaningful user-defined engineering units.

The sensor definitions are stored in the logger's memory and are added to the sensors list. The sensor's readings are displayed in the user defined units only in the DataSuite software. Future versions will also support displaying the user defined engineering units on the logger LCD.

Refer to section 14.8.1 for more details.

7.3.10. Sensor Alarms

Via the software, users can define minimum and maximum alarm levels for each input individually. Users can define pre-low and pre-high alarm levels, for an additional level of safety in case the logger is approaching an actual breach of alarm.

The DaqLink logger display indicates when the sensor reading is in alarm of any type. The symbols AL-H, AL-L, AL-P-H or AL-P-L are visible next to the corresponding input readings.

Refer to section 14.18 for more details.

7.3.11. Sensor Calibration

The DaqLink data logger is shipped fully calibrated. However, further calibration can be applied via the DataSuite software. The calibration parameters are sent to the data loggers via USB connection and stored in the logger's memory.

Users may calibrate individual inputs as well as all inputs at once. Calibration settings may be saved and then loaded into the logger at a later date if the calibration settings have changed.

Refer to section 14.19.4 for more details.

7.4. Unit Serial Number and Comment

Every DaqLink data logger unit is embedded with a unique serial number.

The data logger only can be loaded with a descriptive comment to identify its task and location. You may add or edit the logger comment via the DataSuite software.

Every time data is transferred to the computer it is labeled both with the logger's serial number and comment and is displayed in the graph or data table view.

The unit serial number is also marked on a sticker on the back of the product.

7.5. Power Supply

7.5.1. DBSA710 and DBSA720 Data Loggers

The DBSA710 and DBSA720 data loggers run from an internal NiMh rechargeable battery as well as from external AC power supply. Depending on the logger configuration, from a fully charged battery, the data logger can run for up to several months. Refer to section 4.9.77.5.3 for more details on battery life.

Note: Charge the data logger units for 16 hours before using them for the first time.

When connected to external power supply, the data logger battery will not be charged when the unit is turned off. This will allow the system to protect the battery from overheating.

First Time Charging

From a fully drained battery, you must charge the battery for **16 hours** to bring it to a full charge. Once the charge cycle is complete, the logger will run from the external power supply, without draining (or charging) the internal battery. In order to maintain a fully charged battery and ensure the battery doesn't self-discharge, the battery charger will daily charge the unit for one minute to maintain the battery capacity.

Note: Before storing the DaqLink units make sure you have unplugged all the sensors and turned the units off via the keypad.

Standard Charging

Whenever a logger is reconnected to the charger it will begin the 16-hour charge cycle, no matter what the status of the battery. Once the charging cycle is complete the logger will run from external power supply.

Effect of Charging Battery on Temperature Sensor

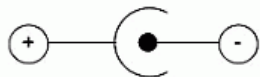
For loggers measuring data with the internal temperature sensor, it is critical to note that during the charge cycle the logger will heat up thereby causing the internal temperature sensor reading to rise by up to 10 °C above ambient temperature. Once the charging process is complete, the logger will cool down and the internal temperature sensor readings will return to normal.

For loggers remaining connected to AC power, to prevent the logger from heating up again following the initial charge cycle, the logger will receive a one minute *trickle charge* each day rather than stay continually charged. This is sufficient to ensure the logger doesn't self-discharge and will maintain the logger's full charge status.

7.5.2. Power Adapter

The DaqLink power adapter is used to power the DBSA710 and DBSA720 units. The mains adaptor (AC/DC adaptor) converts mains power (from a wall outlet) to a voltage suitable to the DaqLink hardware unit.

- Output: Capacitor filtered 9 to 12 VDC, 300 mA
- Female plug, center negative



Note: Only use fourtec-supplied power adapters to avoid damaging the units with incorrect power supply.

7.5.3. Data Logger Battery Life

Battery life depends on the logger sampling rate, type of sensor, and number of measured sensors.

DBSA710 and DBSA720 can last up to six months on a charged battery depending on logger configuration.

7.6. USB Communication Cable

A mini USB communication cable is supplied as part of the DataSuite software kit. This cable connects the DaqLink data logger to the DaqLink PC workstation. When connected to the PC the logger can communicate with the software for configuration and data download purposes, for example.

The USB cable also powers the logger when connected to the PC but it does not charge the internal battery.

Note: The USB driver is installed as part of the software installation process. Without this driver the PC won't detect the logger. To avoid compatibility problems do not connect the logger to the PC before installing the USB driver.

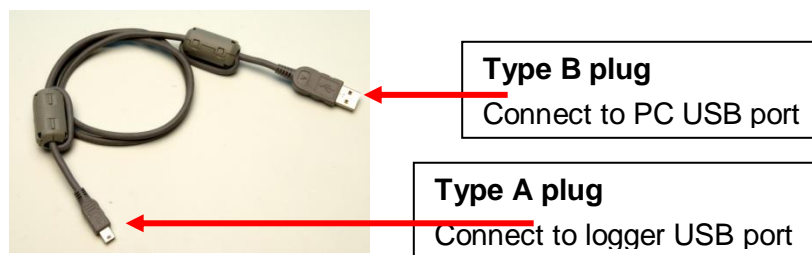


Figure 43: USB communication cable

7.7. DaqLink Keypad Overview

7.7.1. DBSA710 and DBSA720 Keypad

The DBSA710 and DBSA720 units each have two buttons on the keypad, which are used to navigate through the LCD menu options, as well as turn on the units.

Refer to section 4.12 to learn how to operate the data loggers.



The **Menu** button  has two functionalities:

Navigate to the main menu.

When pressed from within a submenu, the display will take you back to the main menu.

Selecting an option from one of the menus. When pressed on one of the main menu items, it will take



you to the sub menu options.

The **Scroll** button  has two functionalities:


When the unit is off, pressing this button will power the unit on.

Scrolls through the menu options.

7.8. Operating the DBSA710 and DBSA720

This section explains how to operate the DBSA710 and DBSA720 loggers and provides an overview of the menu options on the units' LCD screen.

7.8.1. Turning on the Unit

In order to view the logger menu options, the unit must be powered on by pressing the **Scroll** button  on the keypad. Ensure the logger is charged or connected to the AC adapter.

Once the unit is switched on it will emit a short beep and the screen will display a welcome message:



7.8.2. Display Shutdown


If the logger screen is inactive for thirty seconds it will turn off. However the logger will continue to operate in the background. Press the **Scroll** button to enable the LCD screen again. The screen will not turn off during firmware upgrade.

7.8.3. Main Menu Options

There are three menu categories on the data logger:

- View Data
- Status
- Min/Max Values

Note: If the unit is not in Run mode only the Status menu options will be available.

Press the **Menu**  button to reach the main menu display. Scroll through the main menu options (View Data, Status and Min/Max Values) using the **Scroll** button. Once you reach the main menu option you need, press **Enter** to select that option and enter the sub menus.

View Data Menu



View Data

Note: **View Data** is the default page *when the unit is running*.

If there is more than one sensor running, the screen will auto scroll between the sensors showing the sensor name and sensor value. These are real-time displays.

The display will switch back to the View Data screen after five minutes if none of the logger buttons have been pressed.

If the sensor breached any of the predefined alarm levels, then the alarm symbol will be displayed alongside the data reading.

For example:



In-TMP
24°C AL-Lo

The logger display alarm symbols are:

- **AL-HI** : Alarm High
- **AL-Lo** : Alarm Low
- **AL-P-H** : Pre Alarm High
- **AL-P-L** : Pre Alarm Low

Status Menu



Status

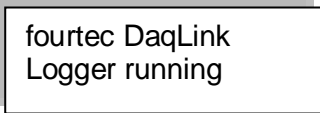
The Status menu contains the following sub menus, all reachable by using the **Scroll** button.

The sub menus are outlined below in the order in which they appear on the logger display.

Name and Status

As explained previously, the unit name (or Comment) is displayed on the first row and the second row indicates the logger status.

If the logger is running, then the following screen is displayed.



fourtec DaqLink
Logger running

Batt Level (battery level)

If the power adapter is not connected the battery percentage will be displayed.

If the power adapter is connected **External power** will be displayed.



Batt Level: 67%

Batt Level:
External power

Logger Version

This menu informs the user of the logger firmware version. This is helpful when you need to upgrade the system firmware, to check the current version. Or when contacting fourtec technical support, with any technical issues.

Logger version:
2.03.00.**01.98**.00

The firmware version is commonly referred to by the numbers in bold in the screen above. For example, the firmware version which is supported by this user guide is v1.98.

S/N

This menu displays the unit's eight digit SN.

S/N 12345678

Memory Mode

There are two possible device modes:

- Stop when full – when the logger memory is full the logger will stop logging.
- Cyclic mode – for continuous logging. The logger will continue to log once the memory is full by writing over the first recorded samples.

The memory mode is toggled in the Setup dialog, using the Cyclic Mode checkbox.

When the logger memory is full, the LCD will display **Memory Full**.

Press Menu to pause logger (when logger is in Run mode)

By pressing the Menu button, the logger will cease to log data until the Menu button is pressed again from the same screen.

When in *Paused* mode, the user can still scroll through the logger menu screens and use other features. The user must scroll back to the Pause Logger menu in order to resume the logger operation.

Reset Unit

When the unit is reset, upon start up it will automatically reconnect to the DataSuite software if a USB connection is established. In addition, if the logger will continue to operate according to its last set up instruction. For example, if the logger was in Run mode, then after reset it will continue to run and record data.



Turn Off Unit / Stop and turn off

Selecting this option will shut the unit down. You can turn the unit on again by pressing the **Scroll** button.

If the logger is in Run mode, selecting this option will first stop the logger, and then turn it off.

It is recommended to turn off the unit when it is not in use.

Min/Max Values Menu

Each sensor's minimum/maximum readings (taken from the current logging session) will be displayed on two rows.

The first row indicates the sensor type, along with the measurement units e.g. V, and the alarm indication if there is an active alarm on this sensor.

The second row indicates the minimum and maximum measured value and the units. H and L represent High and Low values, respectively.

In-TMP °C
26.06H 25.61L

7.8.4. Additional Logger Screens

Loading Firmware

When updating the firmware of the data logger via the software's Firmware Update Center, the logger screen will display the update progress. When complete the main logger status screen will be displayed.

Also refer to Chapter 15: Updating DataSuite Software and Firmware.

Loading firmware
Progress: 55%

Note: Logger must be in Stop mode before firmware can be updated.
--

Chapter 8:

MicroLite Overview

This chapter provides a general overview of the MicroLite I and II data loggers.

8.1. MicroLite Introduction

The MicroLite I and II are compact 16-bit USB data loggers designed for accurate monitoring of various parameters for a wide range of applications. Typical applications include cold chain management, transportation as well as warehousing of food, drugs and hi-tech equipment.

There are two generations of MicroLite data loggers:

- First generation MicroLite I for Temperature monitoring supported by both the DataSuite and MicroLab Lite software (refer to separate MicroLab Lite user guide for using MicroLite I with this software)
- Second generation MicroLite II for Voltage, Current, Temperature and Humidity monitoring supported by the DataSuite software. The MicroLite II models have enhanced functionality compared to the MicroLite I models.

Key MicroLite benefits include:

- High functionality low cost multi-trip logger for an unbroken cold chain
- USB 2.0 interface for fast track communication and firmware updates
- Unique Boomerang feature that automatically creates and emails PDF data report when logger is connected to PC *
- Rapid data download to Graph, Table view and Excel spreadsheet
- Online, real-time data streaming to the DataSuite software *
- Built-in LCD with decimal point readings and LED sampling indicator
- High accuracy sensors with 16-bit resolution
- Up to 32,000 sample memory accommodating long-haul transports
- Reed switch using magnet key to mark time stamps*, activate and stop logging*
- Up to 2-year battery life
- Built-in real-time clock and calendar
- Dust and water proof
- Cradle wall mounting for fixed monitoring

* MicroLite II models only

8.2. The MicroLite Packaging

- MicroLite I – Shipped in a plastic blister containing one MicroLite data logger and one small magnet accessory (located in the placeholder on the MicroLite packaging).
- MicroLite II – Shipped in a carton containing:



- MicroLite II data logger and attached cradle wall mounting
- Nylon bag containing magnet key accessory , screws and screw anchors and zip ties (for external input models)

Each logger packaging includes a quick start guide to help first-time users get set up.

In order to save battery life, the MicroLite's are shipped in Stop mode. This means that before you can start recording, you must first connect the logger to the computer and set it up using the DataSuite software.

8.2.1. The Data Logger

The MicroLite I family includes two internal Temperature sensor models:
LITE5008 and **LITE5016** (8K or 16K sample memory models)

The MicroLite II family includes six models:

- **LITE5008P** and **LITE5032P**: MicroLite II Internal Temperature (8K or 32K sample memory models)
- **LITE5032P-RH**: MicroLite II Internal Temperature/RH
- **LITE5032P-4/20**: MicroLite II External 4-20 mA
- **LITE5032P-V**: MicroLite II External 0-10 V
- **LITE5032P-EXT**: MicroLite II External NTC Temperature

The MicroLite LCD screen continuously displays the most recent samples, and users can also define minimum and maximum alarm levels via the software for a specific shipment, for example. The LCD screen will also show alarm icons if either level is breached.

The accompanying magnet key is used to activate and stop the device, and mark a time stamp.

Note: Stop and Time Stamp functionality is available for MicroLite II only

The data stored by the MicroLite II can be downloaded to any computer with DataSuite installed, for further viewing and analysis, and can also be exported to an Excel spreadsheet.

The data logger is programmed to consume as little power as possible during operation, in order to conserve the battery life. When not recording data the units are placed in *sleep* mode after five minutes. The LCD will shut down. The units *wake up* upon connection to USB. The logger will enter sleep mode after 5 minutes of Stop mode.

The MicroLite battery is easily replaceable and can run up to two years, depending on the logger configuration.

MicroLite Data Loggers



Part Number: LITE5032P-RH

Two internal digital and humidity temperature sensors and USB interface

Memory Capacity: 32,000 samples

Power supply: Battery operated



Part Number: LITE5008, LITE5008P, LITE5016, LITE5032P

One internal NTC temperature sensor and USB interface

Memory Capacity: Four models:
MicroLite I: 8,000 and 16,000 samples
MicroLite II: 8,000 and 32,000 samples

Power supply: Battery operated



Part Number: LITE5032P-4/20

One 4-20 mA current input and USB interface. Logger cap contains universal connector for current sensor. When cap is removed, USB interface is available.

Memory Capacity: 32,000 samples

Power supply: Battery operated



Part Number: LITE5032P-V

One 0-10 V voltage input and USB interface. Logger cap contains universal connector for voltage sensor. When cap is removed, USB interface is available.

Memory Capacity: 32,000 samples

Power supply: Battery operated



Part Number: LITE5032P-EXT

One NTC -50 to 150 C temperature input and USB interface. Logger cap contains universal connector for temperature sensor. When cap is removed, USB interface is available.

Sensor is included.

Memory Capacity: 32,000 samples

Power supply: Battery operated

8.2.2. Hardware Accessories

The only accessory required for the MicroLite system is the magnet key, to stop and activate the logger as well as to mark time stamps.

Chapter 9:

MicroLite Implementation Guide

fourtec recommends first time users of the MicroLite system read this chapter before drilling down into the many features of the system described later in the user guide. The Implementation Guide will give you a clear understanding of the basic aspects of setting up the system, and getting the data logger up and running.

9.1. Pre-setup Requirements

Prior to commencing with the MicroLite implementation you must have the following requirements in place:

PC

- 24/7 availability, if online data monitoring is required
- Reliable AC power
- Sufficient hard disk space to store loggers' data
- One free USB port

MicroLite devices

At least one MicroLite logger.

9.2. Launching the Software

1. Install the DataSuite software on the PC workstation. Refer to section 14.1: Installing DataSuite Software on page 129 for more details.
2. Once the software and associated components have been installed, launch



DataSuite from your DataSuite desktop shortcut

3. The main DataSuite window is launched. The default view is called **Map View**.

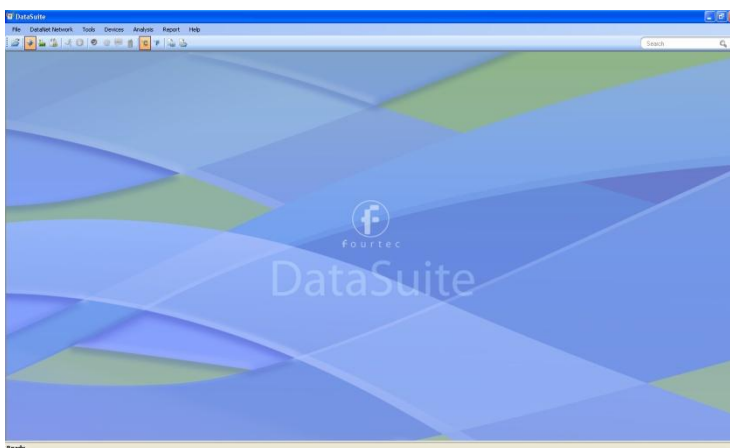


Figure 44: Main DataSuite window

4. Check for DataSuite updates. Go to **Help > Check for Updates** from the DataSuite main menu to check for newer versions of the MicroLite module

software and firmware released since you purchased your system. For more details on the Update feature go to Chapter 15: Updating DataSuite Software and Firmware.

9.3. Connecting the Logger

Note: Multiple MicroLite loggers may be detected by the PC at a time.

1. Only once the DataSuite software has been installed, connect the MicroLite data logger via the USB interface.
2. Assuming this is the first time the logger is used following purchase, it will be in deep sleep mode. When connected to the PC, the logger will automatically turn on.
3. When turned on the LCD will display **Hello** followed by the firmware version and finally, **Stop**.
4. When first detected by the DataSuite software, the logger icon will appear in the Map View. If the logger icon does not appear, from the DataSuite main menu, go to **Devices > Detect Device**.

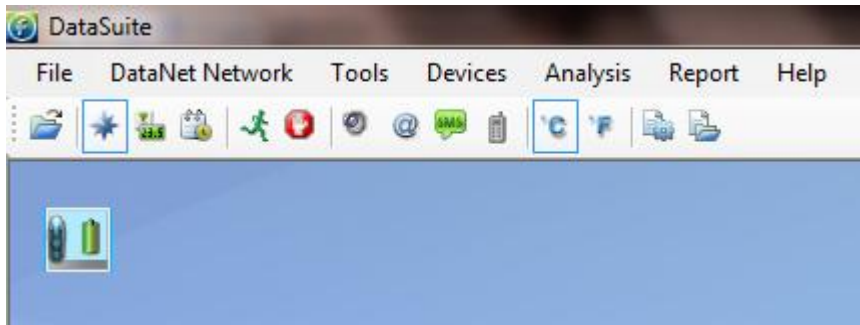


Figure 45: Adding data logger icon to Map View

Note: If the logger is not recognized by the software try connecting the logger to another USB port on the PC. Ensure the unit is turned on and select **Devices > Detect Device** again in the main menu.

5. Should you disconnect the logger's USB cable the logger icon will be grayed out:



Note: You can move the logger icon elsewhere on the screen by going to **Tools > Lock Map View** and unselecting this option.

9.4. Loading Map View Background

Load an image into the DataSuite software showing a map of your facility in order to place the Logger icons in their relative positions. As you deploy more standalone loggers, this will prove very helpful.

- Double click the Map View background to browse to the image directory and load the image. Remember to unlock the Map View in order to move the icons around.
- Right-click the Map View background and two options will be available: **Load Wallpaper** and **Reset Wallpaper**, which resets to the default fourtec wallpaper.

9.5. Configuring the Logger

Once the software has detected the MicroLite logger, you must configure the unit in order to start acquiring data. The configuration parameters of the MicroLite I and II loggers differ. Refer to the relevant section below.

9.5.1. MicroLite I Configuration

1. Right-click on the Logger icon. Select **Setup** from the context menu.
2. The Setup window will be launched.

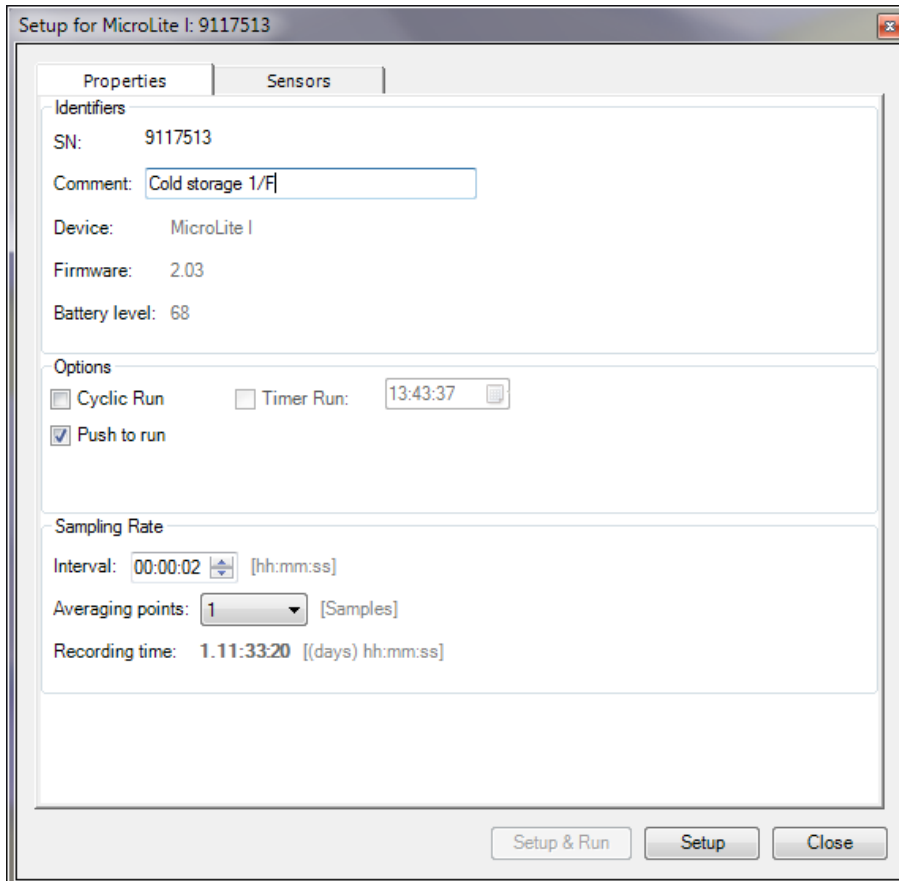



Figure 46: MicroLite I Logger Setup window

This dialog provides non-editable information such as the serial number, battery level, model number and firmware version of the current unit.

On the **Properties** and **Sensors** tabs, the user is able to configure the following parameters:

- Unit's comment
 - Sampling rate
 - Averaging points
 - Alarm levels
 - Alarm delay
3. In the **Properties** tab:
 - a. Select the memory mode: Cyclic or non-Cyclic

- b. Select the activation mode: Push to Run, Timer Run or leave the checkboxes unmarked for immediate activation.
 - c. Select the sampling rate anywhere from 1 every second to 1 every 18 hours. Refer to the Recording Time to ensure the logger won't stop or begin cyclic recording before the end of your specific measurement session.
4. In the **Sensors** tab:
 - a. The Temperature sensor must always be selected.
 - b. If you require alarm levels, select the relevant checkboxes and enter the specific threshold values.
 5. From any of the tabs, click **Setup and Run** to begin logging or **Setup** if you wish to run the logger later.
 6. The Logger icon will appear as follows when in Run mode: 
 7. To stop the logger, right-click the Logger icon and select **Stop** from the context menu.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

9.5.2. MicroLite II Configuration

1. Right-click on the Logger icon. Select **Setup** from the context menu.
2. The Setup window will be launched.

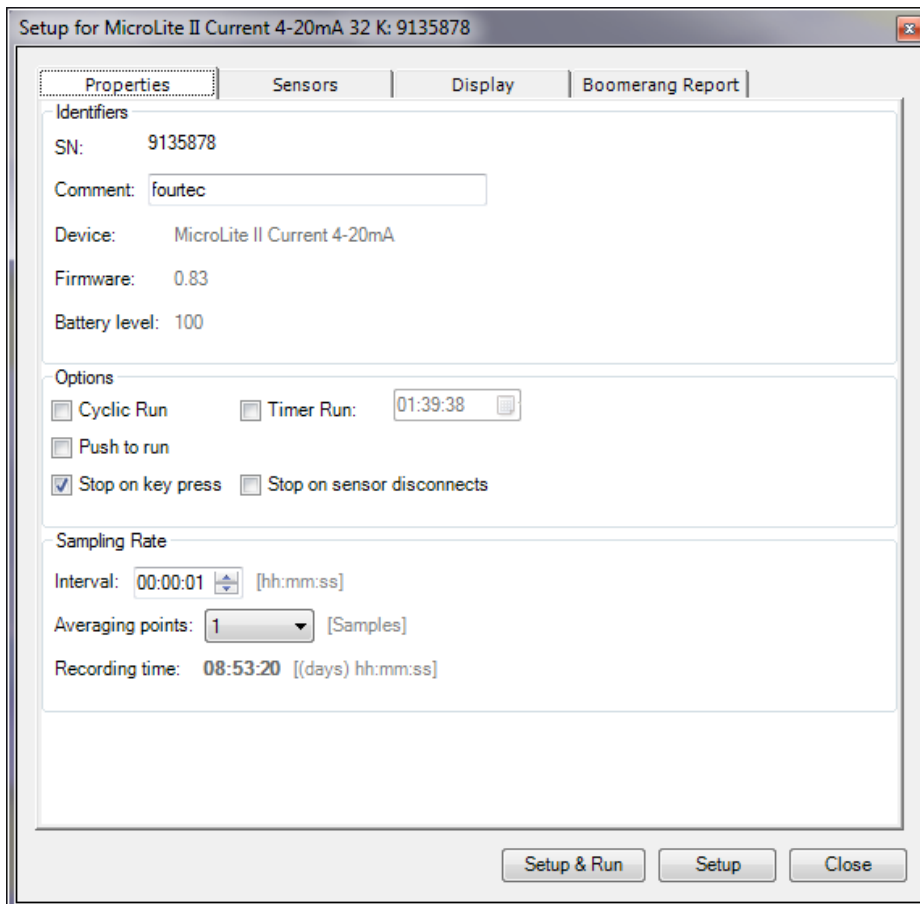



Figure 47: MicroLite II Logger Setup window

This dialog provides non-editable information such as the serial number, battery level, model number and firmware version of the current unit.

On the **Properties** and **Sensors** tabs, the user is able to configure the following parameters:

- Unit's comment
 - Sampling rate
 - Activation and memory modes
 - Averaging points
 - Temperature units °C/°F (on the logger LCD)
 - Active sensors
 - Alarm levels
 - Alarm delay
3. In the **Properties** tab:
 - a. Select the memory mode: Cyclic or non-Cyclic
 - b. Select the activation mode: Push to Run, Timer Run or leave the checkboxes unmarked for immediate activation.
 - c. If you want the ability to stop the logger during operation, select the 'Stop on key press' checkbox.
 - d. For external input models, if you want the logger to stop recording data when the cap is removed, select the 'Stop on sensor disconnect' checkbox.
 - e. Select the sampling rate anywhere from 1 every second to 1 every 18 hours. Refer to the Recording Time to ensure the logger won't stop or begin cyclic recording before the end of your specific measurement session.
 4. In the **Sensors** tab:
 - a. For the Temp/RH model, select the sensors you wish to activate during the current logging session. All other models feature just one sensor, and at least one sensor must always be selected.
 - b. If you require alarm levels, select the relevant checkboxes and enter the specific threshold values.
 5. In the **Display** tab:
 - a. Select the appropriate option for the LCD screen. If you wish to conserve battery life, and do not require a permanent visual data display, select the options to turn on the LCD screen only for alarms or button press.
 6. In the **Boomerang Report** tab:
 - a. Enable the Boomerang feature via this tab. Enter contacts to receive the data report via email when logger is connected to another computer with DataSuite installed. Refer to section 14.25 for more details.
 7. From any of the tabs, click **Setup and Run** to begin logging or **Setup** if you wish to run the logger later.
 8. The Logger icon will appear as follows when in Run mode: 
 9. For the external input logger models, the logger LCD will display *NC* (No Cap) when placed in Run mode. This is because the logger won't actually begin recording data until the logger cap is closed on the logger body (to connect the logger to the USB the cap must first be removed). Therefore, ensure that the cap

is connected to an external sensor before closing it on the logger to avoid erroneous data.

- To stop the logger, right-click the Logger icon and select **Stop** from the context menu. Or use the magnet key if you previously enabled the 'Stop on key press' option.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

9.6. Viewing Data

Once you run the logger, you have several ways of viewing the online data that is being acquired.

- Online graph/table/statistics views
- Logger icon tooltip
- Sensor view

9.6.1. Online Data Views

Note: Only the MicroLite models featuring internal sensors (Temp and Temp/RH) support online data view.

Double clicking the Logger icon or selecting **Display Data** in the Logger icon context menu will open the online graph.

This graph is updated in real-time with the newly recorded data.

You can switch between Graph, Table and Statistics views to view the data in different formats.

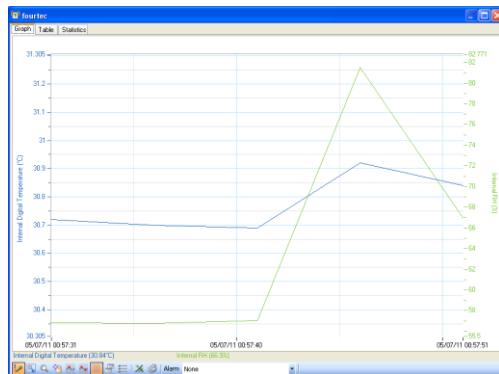
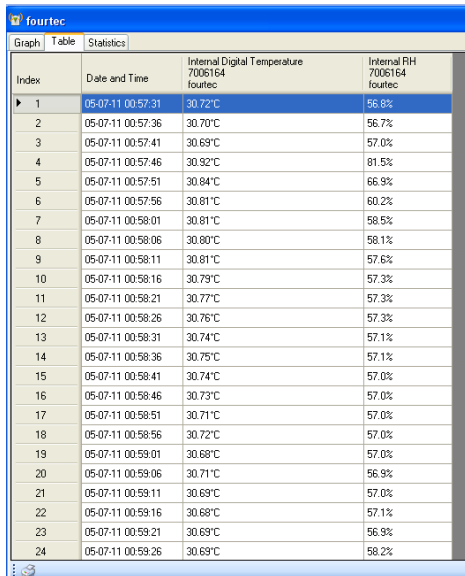
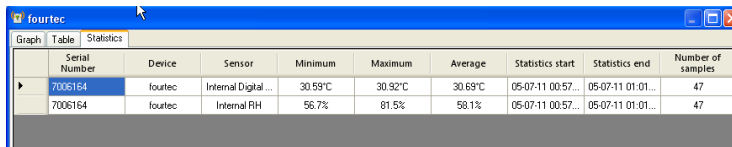


Figure 48: Online data – Graph view



Index	Date and Time	Internal Digital Temperature 7006164 fourtec	Internal RH 7006164 fourtec
1	05-07-11 00:57:31	30.72°C	56.8%
2	05-07-11 00:57:36	30.70°C	56.7%
3	05-07-11 00:57:41	30.69°C	57.0%
4	05-07-11 00:57:46	30.92°C	61.5%
5	05-07-11 00:57:51	30.84°C	66.9%
6	05-07-11 00:57:56	30.81°C	60.2%
7	05-07-11 00:58:01	30.81°C	58.5%
8	05-07-11 00:58:06	30.80°C	58.1%
9	05-07-11 00:58:11	30.81°C	57.6%
10	05-07-11 00:58:16	30.79°C	57.3%
11	05-07-11 00:58:21	30.77°C	57.3%
12	05-07-11 00:58:26	30.76°C	57.3%
13	05-07-11 00:58:31	30.74°C	57.1%
14	05-07-11 00:58:36	30.75°C	57.1%
15	05-07-11 00:58:41	30.74°C	57.0%
16	05-07-11 00:58:46	30.73°C	57.0%
17	05-07-11 00:58:51	30.71°C	57.0%
18	05-07-11 00:58:56	30.72°C	57.0%
19	05-07-11 00:59:01	30.68°C	57.0%
20	05-07-11 00:59:06	30.71°C	56.9%
21	05-07-11 00:59:11	30.69°C	57.0%
22	05-07-11 00:59:16	30.68°C	57.1%
23	05-07-11 00:59:21	30.69°C	56.9%
24	05-07-11 00:59:26	30.69°C	58.2%

Figure 49: Online data – Table view



Serial Number	Device	Sensor	Minimum	Maximum	Average	Statistics start	Statistics end	Number of samples
7006164	fourtec	Internal Digital ...	30.59°C	30.92°C	30.69°C	05-07-11 00:57...	05-07-11 01:01...	47
7006164	fourtec	Internal RH	56.7%	61.5%	58.1%	05-07-11 00:57...	05-07-11 01:01...	47

Figure 50: Online data – Statistics view

9.6.2. Logger Tooltip

Close the online data window and return to Map View. Scroll over the Logger icon and you will see a tooltip displaying the relevant logger information, including real-time data.

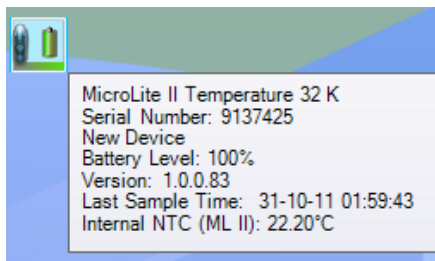


Figure 51: Logger tooltip

This tool-tip is updated with every newly recorded sample.

9.6.3. Sensor View


Click the **Sensor View** icon  in the tool bar to switch to this view. Here, you can monitor the data by viewing data display of each individual sensor, rather than of each logger.



Figure 52: Sensor view

- If the sensor is in alarm, the sensor box will change color from green to red (just as the Logger icon would).
- Double-clicking the individual sensor box will open the data in the online Graph view.

9.7. Downloading Data

If the logger is being used as a standalone device you will have to connect it to the computer via USB in order to download the data to the software.

1. Connect logger to PC and go to **Devices > Detect Device** in the main menu.
2. Data download should begin automatically. To manually download data right-click the logger icon and select **Download Data**.
3. View the downloaded data by double-clicking the logger icon.

Chapter 10: MicroLite Hardware Overview

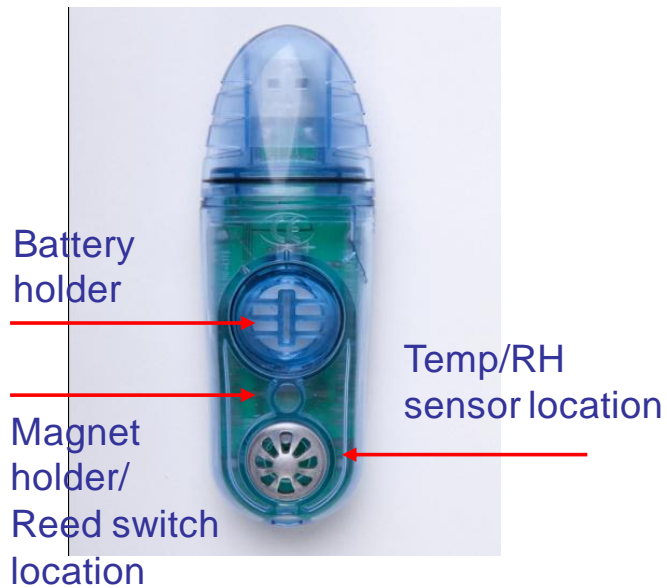
This chapter details the hardware features of the MicroLite data loggers.

10.1. Data Logger Layout

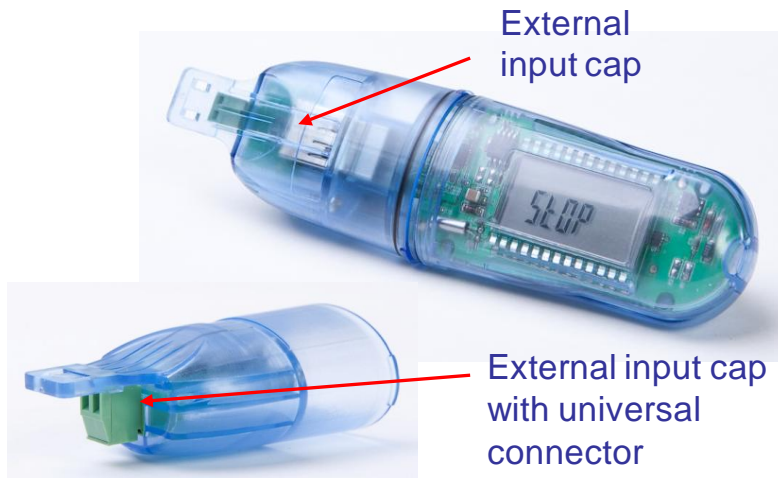
Front LCD View (Temp/RH model)



Rear View (Temp/RH model)



External Cap View



LCD screen

Displays logger status, logger data, alarm level, and engineering units.

LED

Blue LED Indicates activation, logging and alarm status

Magnet Holder

Insert the magnet key here when performing stop, run, time stamp functionality.

Battery Holder

Location of replaceable battery compartment

External Input Cap

Special cap interfacing the external sensor to the logger's USB connector.

10.2. LCD Screen Overview

The MicroLite has a 3-digit (with one decimal place) 7-segment LCD screen, which is able to display the following information:

- The temperature reading currently recorded
- If logger is in Stop, Timer Run or Push to Run modes
- Low or High alarm indication
- Min/Max readings *
- Alarm duration *
- Full logger memory status
- Marking of a Time Stamp**
- External Cap is not connected (external input models only) **
- Low battery warning

* MicroLite I only

** MicroLite II only

10.2.1. LCD Status Messages

- **USB** – Indicates that the logger is connected to the PC via USB
- **Stop** - The logger is currently in Stop mode, not sampling data
- **Run** – Visible immediately before the logger is about to start sampling data, once the Run command was sent.
- **Push** – Indicates the logger is in Push to Run mode, as configured in the logger Setup window.
- **tRUN** - Indicates the logger is in Timer Run mode, as configured in the logger Setup window.
- **F** – Indicates the MicroLite Firmware version e.g. 00.83 *
- **T01, T02, etc.** – Indicates that a time stamp has been taken *
- **FULL** – Indicates that the logger memory has reached full capacity and the logger has stopped
- **NC** – Indicates that no cap is currently connected to the logger and is relevant for the external input models only (Current, Voltage, and Temperature). The logger will only start running when the cap is connected to avoid sampling of data before the external sensor is connected.*
- **Lo Batt** – Indicates the battery level is low and the battery should be replaced

* MicroLite II only

10.2.2. LCD Mode of Operation

For the MicroLite II only, in the **Display** tab in the logger Setup window the user has the option to define several modes of operation for the LCD screen when sampling.

- Always On: The LCD will never turn off
- LCD is off, and will turn on for 30, 60 or 120 seconds upon alarm state or magnet key operation

In addition, when the logger is not sampling (in Stop mode) the LCD will shut down after two minutes of inactivity in order to conserve battery life.

10.3. MicroLite Sensor Overview

This section provides an overview of the sensor specifications of the MicroLite data loggers.

10.3.1. Internal Sensor Types

Sensor	Measurement Range	Accuracy	Logger Model
Digital Humidity	5% to 95%	±2%	LITE5032P-RH
Digital Temperature	-40 °C to 80 °C	±0.3 °C	LITE5032P-RH



Sensor	Measurement Range	Accuracy	Logger Model
Temperature NTC	-40 °C to 80 °C	±0.3 °C	LITE5008 LITE5008P LITE5016 LITE5032P

10.3.2. External Sensor Types

Sensor	Measurement Range	Accuracy	Logger Model
Current	4 to 20 mA	±0.5%	LITE5032P-RH
Voltage	0 to 10 V	±0.5%	LITE5032P-RH
Temperature NTC 10K Probe	-50 to 150 °C	-50 to 60 °C ± 0.3 °C 60 to 150 °C ± 0.5%	LITE5032-EXT

10.3.3. User Defined Sensors

DataSuite software provides a simple and straightforward tool for defining a limited number of custom sensors. Almost any sensor or transducer with 0 to 10 V or 4 to 20 mA output is accepted by the MicroLite II Current and Voltage loggers' universal connectors. Electrical units are automatically scaled to meaningful user-defined engineering units.

The sensor definitions are stored in the logger's memory and are added to the sensors list in the Setup window.

The logger LCD supports the following units for user-defined sensors: mA, V, °C, °F, PSI, BAR, PH, and PPM.

All types of user-defined engineering units are displayed in the DataSuite software.

Refer to section 14.8.1 for more details.

10.3.4. Sensor Calibration

The MicroLite data loggers are shipped fully calibrated. However, further calibration can be applied via the DataSuite software. The calibration parameters are sent to the data loggers via USB connection and stored in the logger's memory. Refer to section 14.19.4 for more details.

10.4. Unit Serial Number and Comment

Every MicroLite data logger unit is embedded with a unique serial number.

The data logger only can be loaded with a descriptive comment to identify its task and location. You may add or edit the logger comment via the DataSuite software.

Every time data is transferred to the computer it is labeled both with the logger's serial number and comment and is displayed in the graph or data table view.

The unit serial number is also marked on a sticker below the unit's USB connector.

10.5. MicroLite Battery

The MicroLite data loggers run from one internal, replaceable CR2032 3V lithium battery. Depending on the logger configuration, from a new battery, the data logger can run for up to 2 years.

The battery maintains the logger's Real-Time Clock (RTC). The logger's time/date settings are synchronized with the PC when you perform a Setup.

Note: When connected to the PC via USB, the logger will draw its power via the USB port and not via the internal battery.

10.5.1. Battery Level

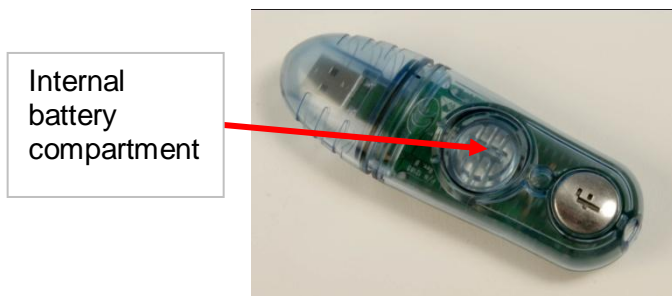
The MicroLite battery level indication is provided in the DataSuite software Setup dialog. Refer to section 14.17.4.

The battery's maximum lifespan is approximately two years. This long battery life is achieved by the MicroLite putting itself to sleep between data recordings. While in sleep mode, the data logger consumes a minimal amount of power. You always have the option of disabling the LCD during logging, only to turn on during alarm state. Refer to section 14.17.4 for more details.

The MicroLite will wake up for a few micro-seconds whenever it has to record a data sample or display new data on the LCD screen.

10.5.2. Replacing the Battery

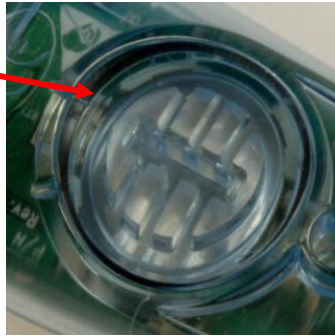
Replacing the battery does not result in any data loss. In addition, the logger's configuration settings are also retained.



As shown in the figure above, the MicroLite internal lithium battery is located under a removable plastic cover.

To replace the battery, simply use the groove in the plastic cover to twist the cover open, and pull out the battery. When twisting the cover back into position, ensure that the small ridge on the battery cover is in line with the similar ridge on the logger case, as indicated in the figure below.

Ensure ridge on cover and on logger case are in line



Note: Be sure to twist the plastic cover properly back into a sealed position, to maintain the MicroLite's dust and waterproof compliancy.

After replacing the battery, the MicroLite LCD will be in Stop mode.

10.6. USB Connection

The MicroLite interfaces with the computer via any of its USB Host ports. No USB driver installation is required in order to be detected by the computer and by the DataSuite software. The software will automatically detect the device upon connection to the PC.

10.7. Logger Cap for External Input Models

The MicroLite II external input models (current, voltage, temperature) feature an industrial screw-to-wire interface located inside the logger cap. This enables connection with the logger's USB connector making the data sampling possible. When the cap is not connected to the logger no sampling is possible. Hence these models do not support online data sampling.

10.1. Using the MicroLite Magnet

The MicroLite includes the magnet key accessory in the logger packaging.

This magnet is used to activate the logger when in Push to Run mode, and for the MicroLite II only, stop the logger, and mark a time stamp.

There is a reed relay on the MicroLite's circuit board which is closed when placing the magnet in the magnet holder, and depending on the duration, will trigger a specific function.

10.2. Operating the MicroLite

This section explains how to operate the MicroLite loggers and provides an overview of the logger functionality. The MicroLite II contains enhanced functionality compared to the MicroLite I.

10.2.1. MicroLite Working Modes

MicroLite is always set in one of five possible working modes. These modes are all activated via the DataSuite software or using the magnet key.

Stop

MicroLite is idle and is not recording. When stopping, the logger it immediately ceases to record data, instead displaying **STOP** on the LCD.

For MicroLite II only, to stop the logger directly from the unit, select the **Turn off on key press** option in the logger Setup window in DataSuite. While the logger is running, place the magnet key in the magnet holder for at least 15 seconds. The logger will then stop sampling. A time stamp will also be recorded for this event and the T indication will display for 2 seconds. The LCD will then display **STOP**.

Run

MicroLite is recording data. It will stop recording automatically when its memory has reached full capacity (8,000, 16,000 or 32,000 samples depending on the model). When full the LCD displays **FULL**.

Cyclic Run

Similar to Run mode, but MicroLite will continuously sample data, recording over old data when the memory reaches its capacity, beginning with the earliest data recording. Cyclic Run mode must be selected from the logger Setup window in DataSuite.

Timer Run

MicroLite can be configured to start recording at a predetermined time. When MicroLite is set for such a run, its status is set to Timer Run. The logger LCD displays **tRUN**.

Push to Run

MicroLite will only begin logging data when the user operates the logger's reed switch with the MicroLite magnet key. The logger LCD displays **PUSH**.

10.2.2. Turning on the Unit

To turn on the unit from *sleep* mode (the LCD and LED are both off) simply connect the logger to the PC's USB port, or place the magnet key in the magnet holder (for MicroLite II only).

10.2.3. Viewing Real-time Data on LCD

When the MicroLite is sampling data the readings from the sensor are displayed on the LCD (alternately, if more than one sensor) followed by the relevant unit e.g. C, F, mA or V.

10.2.4. Viewing Firmware Version

For the MicroLite II only, when the logger is in Stop or Run mode placing the magnet key in the magnet holder for at least 5 seconds will display the device's current firmware version. After two seconds the logger will take a time stamp and then three seconds later **F** will be displayed, with the firmware version shown in the following screen e.g. 00.83.

The firmware version can also be seen in the logger Setup window in DataSuite.

10.2.5. Sensor Alarm Levels

Via the software, users can define minimum and maximum alarm levels for each input individually. The MicroLite logger display indicates when any alarm level is exceeded.

Note: When the MicroLite is in Cyclic mode, the Low or High alarm level displayed represents the lowest or highest readings recorded since the logger starting logging data, irrelevant of how many cycles the logger has recorded.

AL-L – A sensor's reading is *lower* than its low alarm level.

AL-H – A sensor's reading is *higher* than its high alarm level.

The alarm notification remains until the next time you change the logger setup or run a new recording session.

10.2.1. Alarm Duration

The MicroLite I calculates the duration of an existing alarm and displays it on the logger's LCD. The calculation is made in hours and is indicated on the LCD as H.

For example, the shortest possible duration of 0.01H means the logger has been in alarm for between 0 and 36 seconds.

A duration of 1.55H means the logger has been in alarm for 93 minutes (1.55 hours).

If the MicroLite is in a Low and High alarm simultaneously, then it will show the duration for both alarms.

Even if the logger is not currently in alarm state, the duration will still be displayed if an alarm previously occurred.

10.2.2. Marking Time Stamps

For the MicroLite II only, while the logger is running, placing the magnet key in the magnet holder for at least 2 seconds will record a new sample with a time stamp on the logger memory.

Each time stamp can mark a specific event such as the logger has reached its destination, if used during to record temperature during product transportation.

The time stamp is visible both in the DataSuite data graph and table, and the user can enter a comment in the table describing the event.

There is capacity for a maximum of 99 time stamps in the logger memory. When the memory is full, the LCD will display FULL when you attempt to mark another time stamp. To reset the Time Stamp memory, perform a new logger setup.

10.2.3. LED Indications

The MicroLite features a LED primarily to give real-time indication of activation and sampling.

- **Connected to USB** – The LED will permanently indicate blue as long as the unit is connected to the computer via USB and in Stop mode.
- **Normal sampling** – The LED will flash blue with each recorded sample, as long as the logger is in Run mode.



- **Marking a time stamp** – The LED will blink blue when a time stamp is marked, as it is recording a new sample to the logger memory.

Chapter 11:

MicroLogPRO II Overview

This chapter provides a general overview of the MicroLogPRO II data loggers.

11.1. MicroLogPRO II Introduction

Standalone, Portable, Temperature and Humidity Loggers

Replacing the now discontinued MicroLogPRO EC7XX series, the MicroLogPRO II is the latest addition to the established MicroLog line of data loggers. Following in the footsteps of the MicroLog and MicroLogPRO, the MicroLogPRO II offers excellent value with an updated mechanical design, enhanced software and hardware functionality.

These loggers are used to monitor temperature and humidity in a variety of applications, such as perishable goods and controlled environments. Each logger can also be connected to external sensors in order to monitor additional parameters such as voltage and current.

Key MicroLogPRO II benefits include:

- High accuracy Temperature, Humidity and Dew Point measurement
- External sensor input supporting Current, Voltage, Temperature and pH readings
- Large memory with 52K sample capacity
- 4-digit LCD screen and bi-color LED for alarm indication
- Two-button keypad for Start/Stop activation and marking time stamps
- USB communication with PC for setup, data download and updates
- Low power consumption with 2-year battery life
- Supported by feature-rich DataSuite software with online alarm capabilities

11.2. The MicroLogPRO II System

The basic MicroLogPRO II system contains at least one of the following units:

- MicroLogPRO data logger – Part Number EC800 or EC850
- Mini-USB communication cable
- DataSuite software CD containing user guide

11.2.1. The Data Logger

There are two data logger models in the MicroLogPRO II system.

- EC800: Internal NTC Temperature sensor + one external input
- EC850: Internal Digital Temperature and Humidity sensors + one external input

The MicroLogPRO II can be used as a standalone device to monitor temperature and humidity levels. It can also be connected via USB cable to the PC for online, real-time data streaming to the DataSuite software.

MicroLogPRO II continuously displays the most recent samples, along with the maximum and minimum values for a selected time interval. Users can also define minimum and maximum alarm levels via the software for a specific shipment, for example, and the LCD screen will show alarm icons if either level is breached.

The logger two-button keypad is used to activate and stop the device, mark a time stamp, and display min/max values.

The data stored by MicroLogPRO II can be downloaded to any computer with DataSuite installed, for further viewing and analysis, and can also be exported to an Excel spreadsheet.

The data logger is programmed to consume as little power as possible during operation, in order to conserve the battery life. When not recording data the units are placed in *deep sleep* mode and they *wake up* upon key press.

The battery for the EC800 and EC850 is easily replaceable and can run up to two years, depending on the logger configuration.

Note: Battery life depends on the logger sampling rate, type of sensor, and number of measured sensors.

MicroLogPRO II Data Loggers



Part Number: EC800

One internal NTC temperature sensor with external input and USB PC interface

Memory Capacity: 52,000 samples

Power supply: Battery operated



Part Number: EC850

Two internal digital and humidity temperature sensors with external input and USB PC interface

Memory Capacity: 52,000 samples

Power supply: Battery operated

11.2.2. Hardware Accessories

The only accessory required for the MicroLogPRO II system is the mini-USB cable for connecting the device to the PC.

Chapter 12:

MicroLogPRO II Implementation Guide

fourtec recommends first time users of the MicroLogPRO II system read this chapter before drilling down into the many features of the system described later in the user guide. The Implementation Guide will give you a clear understanding of the basic aspects of setting up the system, and getting the data logger up and running.

12.1. Pre-setup Requirements

Prior to commencing with the MicroLogPRO II implementation you must have the following requirements in place:

PC

- 24/7 availability, if online data monitoring is required
- Reliable AC power
- Sufficient hard disk space to store loggers' data
- One free USB port

MicroLogPRO II devices

At least one MicroLogPRO II logger EC800 or EC850.

Mini-USB cable

The mini-USB cable connects the data logger to the PC for logger configuration and data download (and is supplied with the DataSuite software kit).

12.2. Launching the Software

1. Install the DataSuite software on the PC workstation. Refer to section 14.1: Installing DataSuite Software on page 129 for more details.
2. Once the software and associated components have been installed, launch



DataSuite from your DataSuite desktop shortcut

3. The main DataSuite window is launched. The default view is called **Map View**.

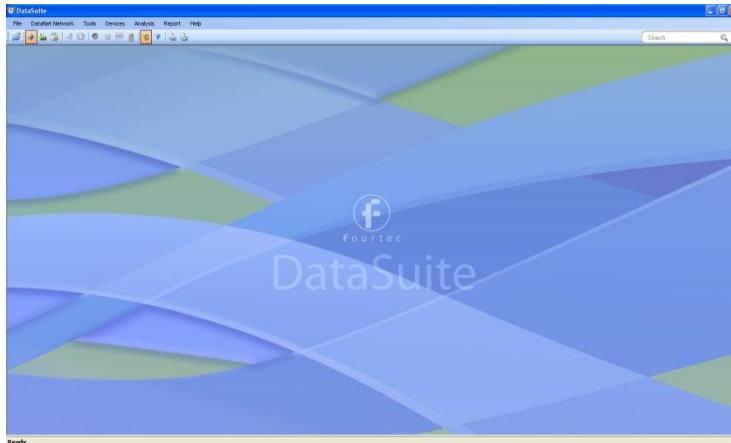


Figure 53: Main DataSuite window

4. Check for DataSuite updates. Go to **Help > Check for Updates** from the DataSuite main menu to check for newer versions of the MicroLogPRO II module software and firmware released since you purchased your system. For more details on the Update feature go to Chapter 15: Updating DataSuite Software and Firmware.

12.3. Connecting the Logger

Note: Multiple MicroLogPRO II loggers may be detected by the PC at a time.

1. Only once the DataSuite software has been installed, connect the MicroLogPRO II data logger to the mini-USB cable. Connect this cable to the computer.
2. Assuming this is the first time the logger is used following purchase, it will be in deep sleep mode. When connected to the PC, the logger will automatically turn on.

To turn on the logger when disconnected from the PC, press the Min/Max Hours



button on the front keypad.

3. When turned on the LCD will display **Hello** followed by the logger model part number, firmware version and finally, **Stop**.
4. When first detected by the DataSuite software, the logger icon will appear in the Map View. If the logger icon does not appear, from the DataSuite main menu, go to **Devices > Detect Device**.



Figure 54: Adding data logger icon to Map View

Note: If the logger is not recognized by the software try connecting the mini-USB cable to another USB port on the PC. Ensure the unit is turned on and select **Devices > Detect Device** again in the main menu.

5. Should you disconnect the logger's USB cable the logger icon will be grayed out:



Note: You can move the logger icon elsewhere on the screen by going to **Tools > Lock Map View** and unselecting this option.

12.4. Loading Map View Background

Load an image into the DataSuite software showing a map of your facility in order to place the Logger icons in their relative positions. As you deploy more standalone loggers, this will prove very helpful.

- Double click the Map View background to browse to the image directory and load the image. Remember to unlock the Map View in order to move the icons around.
- Right-click the Map View background and two options will be available: **Load Wallpaper** and **Reset Wallpaper**, which resets to the default fourtec wallpaper.

12.5. Configuring the Logger

Once the software has detected the MicroLogPRO II logger, you must configure the unit in order to start acquiring data.

1. Right-click on the Logger icon. Select **Setup** from the context menu.
2. The Setup window will be launched.

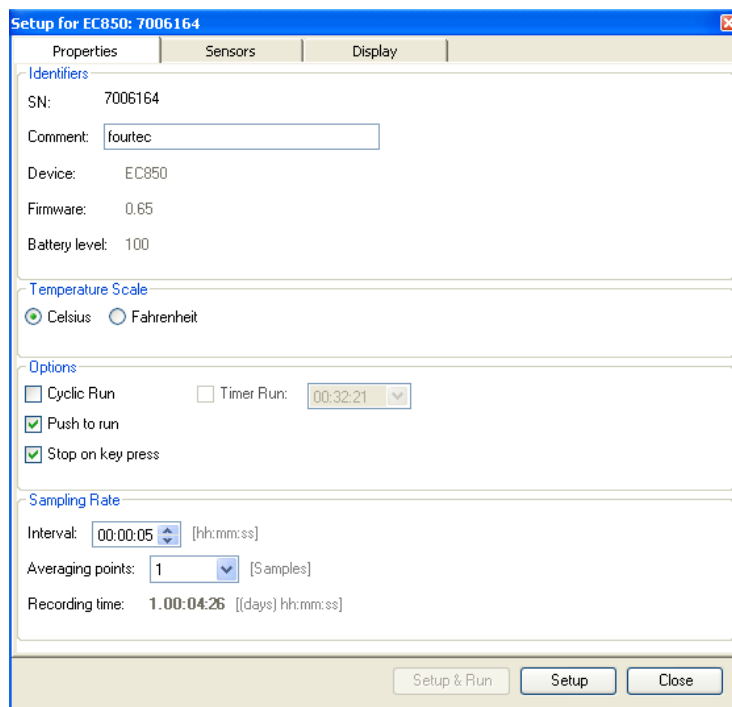



Figure 55: MicroLogPRO II Logger Setup window

This dialog provides non-editable information such as the serial number, battery level, model number and firmware version of the current unit.

On the **Properties** and **Sensors** tabs, the user is able to configure the following parameters:

- Unit's comment
 - Sampling rate
 - Activation and memory modes
 - Averaging points
 - Temperature units °C/°F (on the logger LCD)
 - Active sensors
 - Alarm levels
 - Alarm delay
3. In the **Properties** tab:
 - a. Select the memory mode: Cyclic or non-Cyclic
 - b. Select the activation mode: Push to Run, Timer Run or leave the checkboxes unmarked for immediate activation.
 - c. If you want the ability to stop the logger during operation, select the 'Stop on key press' option.
 - d. Select the sampling rate anywhere from 1 every second to 1 every 18 hours. Refer to the Recording Time to ensure the logger won't stop or begin cyclic recording before the end of your specific measurement session.
 4. In the **Sensors** tab:
 - a. Select the internal and external sensors you wish to activate during the current logging session.
 - b. If you require alarm levels, select the relevant checkboxes and enter the specific threshold values.
 5. In the **Display** tab:
 - a. Select the appropriate option for the LCD screen. If you wish to conserve battery life, and do not require a permanent visual data display, select the options to turn on the LCD screen only for alarms or button press.
 6. From any of the tabs, click **Setup and Run** to begin logging or **Setup** if you wish to run the logger later.
 7. The Logger icon will appear as follows when in Run mode: .
 8. To stop the logger, right-click the Logger icon and select **Stop** from the context menu.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

12.6. Viewing Data

Once you run the logger, you have several ways of viewing the online data that is being acquired.

- Online graph/table/statistics views
- Logger icon tooltip
- Sensor view

12.6.1. Online Data Views

Double clicking the Logger icon or selecting **Display Data** in the Logger icon context menu will open the online graph.

This graph is updated in real-time with the newly recorded data.

You can switch between Graph, Table and Statistics views to view the data in different formats.

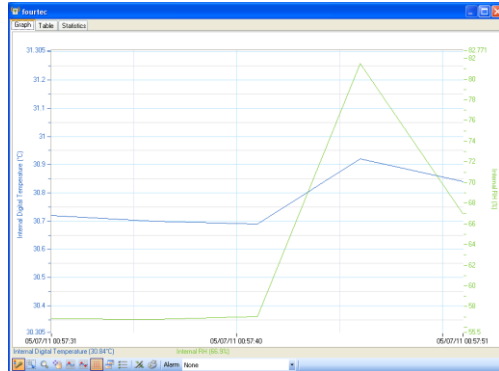
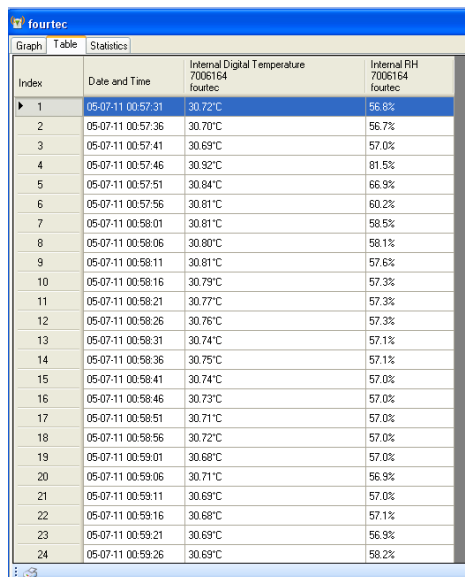
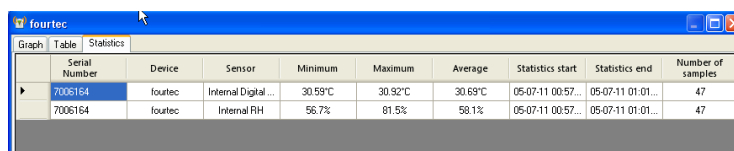


Figure 56: Online data – Graph view



Index	Date and Time	Internal Digital Temperature 7006164 fourtec	Internal RH 7006164 fourtec
1	05-07-11 00:57:31	30.72°C	56.8%
2	05-07-11 00:57:36	30.70°C	56.7%
3	05-07-11 00:57:41	30.69°C	57.0%
4	05-07-11 00:57:46	30.92°C	81.5%
5	05-07-11 00:57:51	30.84°C	66.9%
6	05-07-11 00:57:56	30.81°C	60.2%
7	05-07-11 00:58:01	30.81°C	58.5%
8	05-07-11 00:58:06	30.80°C	58.1%
9	05-07-11 00:58:11	30.81°C	57.6%
10	05-07-11 00:58:16	30.79°C	57.3%
11	05-07-11 00:58:21	30.77°C	57.3%
12	05-07-11 00:58:26	30.76°C	57.3%
13	05-07-11 00:58:31	30.74°C	57.1%
14	05-07-11 00:58:36	30.75°C	57.1%
15	05-07-11 00:58:41	30.74°C	57.0%
16	05-07-11 00:58:46	30.73°C	57.0%
17	05-07-11 00:58:51	30.71°C	57.0%
18	05-07-11 00:58:56	30.72°C	57.0%
19	05-07-11 00:59:01	30.68°C	57.0%
20	05-07-11 00:59:06	30.71°C	56.9%
21	05-07-11 00:59:11	30.69°C	57.0%
22	05-07-11 00:59:16	30.68°C	57.1%
23	05-07-11 00:59:21	30.69°C	56.9%
24	05-07-11 00:59:26	30.69°C	58.2%

Figure 57: Online data – Table view



Serial Number	Device	Sensor	Minimum	Maximum	Average	Statistics start	Statistics end	Number of samples
7006164	fourtec	Internal Digital ...	30.59°C	30.92°C	30.69°C	05-07-11 00:57...	05-07-11 01:01...	47
7006164	fourtec	Internal RH	56.7%	81.5%	58.1%	05-07-11 00:57...	05-07-11 01:01...	47

Figure 58: Online data – Statistics view

12.6.2. Logger Tooltip

Close the online data window and return to Map View. Scroll over the Logger icon and you will see a tooltip displaying the relevant logger information, including real-time data.

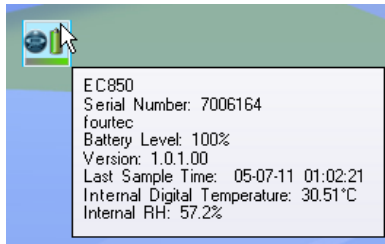



Figure 59: Logger tooltip

This tool-tip is updated with every newly recorded sample.

12.6.3. Sensor View

Click the **Sensor View** icon  in the tool bar to switch to this view. Here, you can monitor the data by viewing data display of each individual sensor, rather than of each logger.

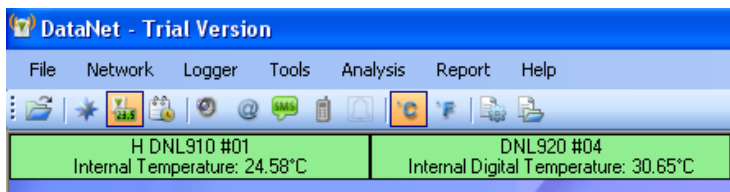


Figure 60: Sensor view

- If the sensor is in alarm, the sensor box will change color from green to red (just as the Logger icon would).
- Double-clicking the individual sensor box will open the data in the online Graph view.

12.7. Downloading Data

If the logger is being used as a standalone device you will have to connect it to the computer via USB cable in order to download the data to the software.

1. Connect logger to PC and go to **Devices > Detect Device** in the main menu.
2. Data download should begin automatically. To manually download data right-click the logger icon and select **Download Data**.

View the downloaded data by double-clicking the logger icon.

Chapter 13:

MicroLogPRO II Hardware Overview

This chapter details the hardware features of the MicroLogPRO II data loggers.

13.1. Data Logger Front Panel Layout



Figure 61: EC850 data logger front panel

LCD screen

Displays logger status, logger data, alarm level, Min/Max values and engineering units.

LED

Green and red LED Indicates activation, logging and alarm status

Min/Max Hours button

Use to view Min/Max values going back 24 hours. Also used to wake up logger from sleep mode.

Min/Max Days button

Use to view Min/Max values going back 30 days. Also used together with Min/Max Hours button to perform other logger functionality.

13.2. Data Logger External Connections

External connections of the EC800 and EC850 are exactly the same.

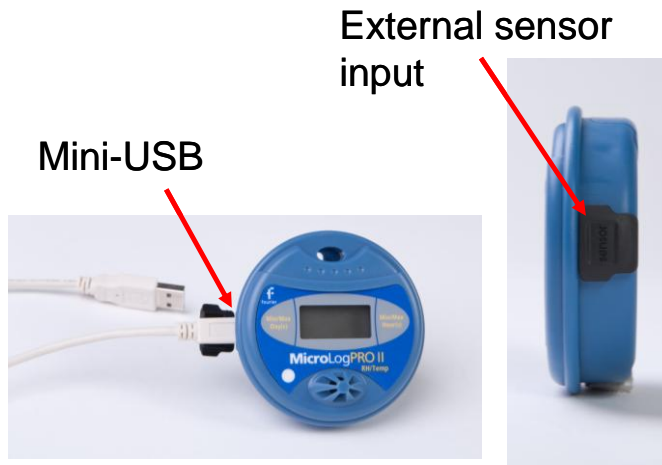


Figure 62: EC800 and EC850 external connections

Mini USB Port

To enable communication between logger and PC, for configuration and data download.

Sensor Inputs

3-pin socket supporting range of MicroLogPRO II external sensor adapters and probes

Note: The MicroLogPRO II ships with a rubber plug that covers each of the external sockets. The plug protects the sockets from moisture and dust. Unless you are using the sockets, leave the plugs in.

13.3. Data Logger Sensor Overview

This section provides an overview of the hardware specifications of the MicroLogPRO II data loggers.

13.3.1. Internal Sensor Types

The EC800 and EC850 loggers include internal sensors, depending on the logger model.

Sensor	Measurement Range	Accuracy	Logger Model
Digital Humidity	5% to 95%	±2%	EC850
Digital Temperature	-40 °C to 80 °C	±0.2 °C	EC850
Temperature NTC	-40 °C to 80 °C	±0.2 °C	EC800

13.3.2. External Sensor Types

The EC800 and EC850 each has one external input, for connection to a range of adapters and probes.

Adapter/Probe	Measurement Range
Current Adapter	4 to 20 mA
Voltage Adapter	0 to 10 V
Temperature NTC 10K Probe	-50 to 110 °C
Temperature PT100 (2-wire) Adapter	-200 to 400 °C
pH Adapter	1 to 14 pH

13.3.3. User Defined Sensors

DataSuite software provides a simple and straightforward tool for defining a limited number of custom sensors. Almost any sensor or transducer with 0 to 10 V or 4 to 20 mA output is accepted by the MicroLogPRO II loggers, using the appropriate adapter. Electrical units are automatically scaled to meaningful user-defined engineering units.

The sensor definitions are stored in the logger's memory and are added to the sensors list in the Setup window.

The logger LCD supports the following units for user-defined sensors: PSI, bAr, PH, mS, and PPM.

All types of user-defined units are displayed in the DataSuite software.

Refer to section 14.8.1 for more details.

13.3.4. Sensor Alarms

Via the software, users can define minimum and maximum alarm levels for each input individually. The MicroLogPRO II logger display indicates when the sensor reading is in alarm of any type. The symbols AL-H and AL-L are used in addition to the LED alarm indicator.

13.3.5. Sensor Calibration

The MicroLogPRO II data logger is shipped fully calibrated. However, further calibration can be applied via the DataSuite software. The calibration parameters are sent to the data loggers via USB connection and stored in the logger's memory.

Refer to section 14.19.4 for more details.

13.4. Unit Serial Number and Comment

Every MicroLogPRO II data logger unit is embedded with a unique serial number.

The data logger only can be loaded with a descriptive comment to identify its task and location. You may add or edit the logger comment via the DataSuite software.

Every time data is transferred to the computer it is labeled both with the logger's serial number and comment and is displayed in the graph or data table view.

The unit serial number is also marked on a sticker on the back of the product.

13.5. Power Supply

The MicroLogPRO II data loggers run from one internal, replaceable 2/3 AA 3.6 V lithium battery. Depending on the logger configuration, from a new battery, the data logger can run for up to 2 years.

Note: When connected to the PC via USB, the logger will draw its power via the USB port and not via the internal battery.

13.5.1. Replacing the Battery

Note: Removing the logger battery will result in logger memory being erased but the setup configuration will be retained.

1. Unfasten the three screws on the back of the MicroLogPRO II.
2. Carefully remove the back cover.
3. Replace the battery, and be sure to insert the new battery into the correct corresponding polarities.
4. Refasten the three screws on the back of the MicroLogPRO II.

13.6. USB Communication Cable

A mini USB communication cable is supplied as part of the DataSuite software kit. This cable connects the MicroLogPRO II data logger to the DaqLink PC workstation. When connected to the PC the logger can communicate with the software for configuration and data download purposes, for example.

The USB cable also powers the logger when connected to the PC but it does not charge the internal battery.

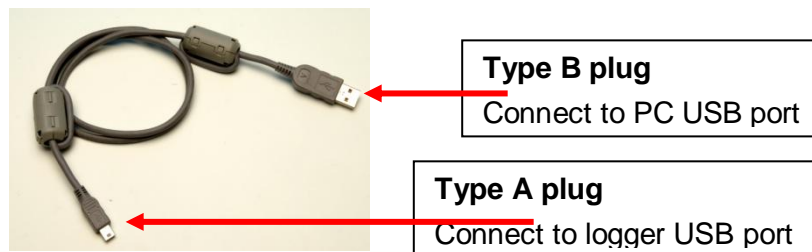


Figure 63: USB communication cable

13.7. Operating the MicroLogPRO II

This section explains how to operate the MicroLogPRO II loggers and provides an overview of the logger functionality.

13.7.1. Turning on the Unit

To turn on the unit from *deep sleep* mode (the LCD and LED are both off) simply press the *Min/Max Hours* button for over one second.

If the unit is in *sleep* mode, whereby the logger is running or in Stop mode but the LCD is off, connecting the unit to the PC via USB or pressing the *Min/Max Hours* button will turn the unit on.

13.7.2. Logger Sleep Mode

The MicroLogPRO II battery's long lifespan is achieved by putting the logger *to sleep* between recordings. After ten minutes without any sampling or PC communication the logger will enter *deep sleep*. To wake up a unit from deep sleep, press the Min/Max Hours button. While in sleep mode, the data logger consumes a minimal amount of power.

MicroLogPRO II *wakes up* every second for a few micro-seconds in order to check if one of the buttons has been pressed or if there is an incoming message from the computer. For this reason, you must press and hold a button for at least two seconds before a status message appears.

13.7.3. Viewing Real-time Data on LCD

When MicroLogPRO II is sampling data the readings from sensors is alternately displayed on the LCD followed by the relevant unit e.g. C or F. The data obtained from external sensors is displayed with a small EXT icon above the reading, following by the unit.

13.7.4. Viewing Firmware Version

From Stop Mode

When the logger is in Stop mode pressing both buttons for two seconds will display the device's current firmware version.

From Run Mode

When the logger is in Stop mode pressing both buttons for five seconds will display the device's current firmware version. After two seconds the logger will take a time stamp and then three seconds later the firmware version will be displayed.

13.7.5. LCD Mode of Operation

In the **Display** tab in the logger Setup window the user has the option to define several modes of operation for the LCD screen when sampling.

- Always On: The LCD will never turn off
- LCD is off, and will turn on for 30, 60 or 120 seconds upon alarm or key press

In addition, when the logger is not sampling (in Stop mode) the LCD will shutdown after five minutes of inactivity in order to conserve battery life.

13.7.6. Logger Operating Modes

MicroLogPRO II features the following modes:

- **Stop** – MicroLogPRO II is idle and is not sampling.
 - To stop the logger when running via the logger keypad itself, select the *Turn off on key press* option in the logger Setup window. When logger is running, pressing both left and right buttons together for over 20 seconds will stop the



logger. A time stamp will also be recorded for this event and the T indication will display for 2 seconds. The LCD will then display STOP.

- **Run** – MicroLogPRO II is sampling data and recording to its internal memory. It will stop recording automatically when its memory has reached full capacity (52,000 samples with one sensor).
- **Cyclic Run** – Similar to Run mode, but the logger will record over the old data when the memory is full, beginning with the earliest data recording. This option is available in the Setup window.
- **Timer Run** – The logger can be configured to start recording at a predetermined time. When the logger is set for such a run, its status is set to Timer Run and is indicated as tRUN on the LCD.
- **Push to Run** – The logger will only begin logging data when the user pushes both of the unit's buttons for at least 3 seconds.
- **Marking a Time Stamp**
 - When the logger is running, pressing both logger buttons for over 2 seconds will record a new sample with a time stamp on the logger memory.
 - Each time stamp can mark a specific event such as the logger has reached its destination, if used during to record temperature during product transportation.
 - The time stamp is visible both in the DataSuite data graph and table, and the user can enter a comment in the table describing the event.
 - There is capacity for a maximum of 99 time stamps in the logger memory. When the memory is full, the LCD will display FULL when both buttons are pressed together for over two seconds. To reset the Time Stamp memory, perform a new logger setup.

13.7.7. LCD Status Messages

- **USB** – Indicates that the logger is connected to the PC via USB cable
- **Stop** - The logger is currently in Stop mode, not sampling data
- **Run** – Visible immediately before the logger is about to start sampling data, once the Run command was sent.
- **Push** – Indicates the logger is in Push to Run mode, as configured in the logger Setup window. Press both logger buttons for over 3 seconds to start running.
- **tRUN** - Indicates the logger is in Timer Run mode, as configured in the logger Setup window. Press both logger buttons for over 10 seconds to start running.
- **T01, T02, etc.** – Indicates that a time stamp has been taken, by pressing both logger buttons for over 2 seconds while running.

13.7.8. Displaying Minimum and Maximum Values

You can display minimum and maximum values on the LCD screen, ranging from the last 1 - 24 hours or from the last 1 - 30 days, by using the MicroLogPRO II left and right buttons.



Viewing Min. and Max Values in the last 1-24 Hours

1. Select a time period by pressing the right button on the logger. The LCD will begin displaying the hour number, ranging from 1 to 24 hours. Once you've reached the desired time period, release the right button.
2. Once you've released the right button, the logger will display the Min and Max values logged by the sensors during the selected time period, including Dew Point.

Viewing Min. and Max Values for the last 1-30 Days

1. Select a time period by pressing the left button on the logger. The LCD will display the day number, ranging from 1 to 30 days. Once you've reached the desired time period, release the left button.
2. Once the left button is released, the logger will display the Min and Max values of the sensors for the selected time period, including Dew Point.

13.7.9. Alarm Levels

The logger displays an alarm notification whenever any alarm level is exceeded.

AL-L – A sensor's reading is *lower* than its low alarm level.

AL-H – A sensor's reading is *higher* than its high alarm level.

The alarm notification remains until the next time you change the logger setup or run a new recording session.

13.7.10. LED Indications

The MicroLogPRO II features a LED primarily to give real-time indication of alarm and activation.

- **Logger alarm** – The LED will flash red at one second intervals until the alarm is cleared.
- **Connected to USB** – The LED will permanently indicate green as long as the unit is connected to the computer via USB and in Stop mode.
- **Normal sampling** – The LED will flash green with each recorded sample, as long as the logger is in Run mode.
- **Turning on the unit** – The LED will blink orange for one second when it is turned on from sleep mode.
- **Marking a time stamp** – The LED will blink green when a time stamp is marked, as it is recording a new sample to the logger memory.

Chapter 14:

Using the DataSuite Software

This chapter provides a detailed description of the DataSuite software features, allowing you to configure and monitor your fourtec data loggers in a unified application. Each DataSuite module utilizes the same core functionality of the DataSuite platform, such as setup, calibration, defining new sensors, managing Email and SMS notifications, configuring reports, firmware updates and so on. In addition, each module includes specific features for the product it supports e.g. ZigBee network communication features for DataNet.



14.1. Installing DataSuite Software

Part of your product package includes a DataSuite software CD. Follow the software installation instructions provided below.

14.1.1. System Requirements

To work with DataSuite your system should be configured according to the following specifications:

Software

- Windows XP SP3, Windows Server 2003 SP2, Windows Vista (32-bit) or Windows 7 (32-bit or 64-bit)
- Minimum screen resolution: 1024 x 768 (800 x 600 not supported)

Hardware

- Pentium 4, 2.0 GHz or better
- 512 MB RAM
- 250 MB available disk space for the DataSuite application

14.1.2. Language Support

DataSuite currently supports English interface only with additional languages to be added in future DataSuite versions.

To toggle the software language, go to **Help > Language**. You must then exit DataSuite for the changes to take effect.

14.1.3. Installation Procedure

Note: If you are planning to use more than one fourtec system e.g. DataNet and MicroLogPRO II, only one DataSuite software installation is required. Each product is managed by a specific product module within the DataSuite modular application.

Please read these instructions before proceeding with the installation process.

1. Insert the DataSuite software CD into your computer's CD drive. The DataSuite Installation Wizard automatically starts running.
2. The Wizard first downloads and installs **Microsoft .NET Framework 2.0**, if not already detected on the computer. The DataSuite software requires this platform in order to run. Follow the installation instructions to install the .NET Framework on your PC. This step can take up to two minutes to complete. Click **Finish** once installation is complete.

Note: If .NET Framework is already installed on your computer this step is skipped.

3. The main DataSuite Installation Wizard now resumes. Follow the installation instructions to install DataSuite on your computer.
4. Following DataSuite software installation is the Silicon Laboratories USB driver installation. The driver is necessary for the computer to detect the DataNet and DaqLink Receiver hardware.

Note: MicroLogPRO II and MicroLite II do not require driver installation.

5. Follow the on-screen instructions to continue the installation process. The default installation location is *C:\SiLabs*.

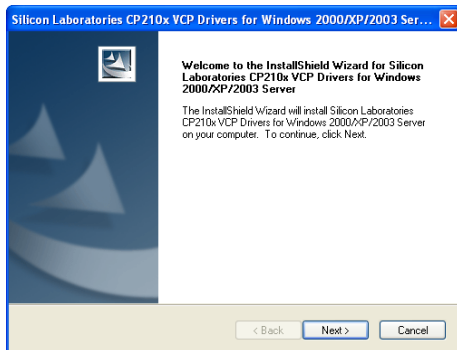


Figure 64: Installing Silicon Labs USB driver – Step 1

6. During the driver installation, the following window will pop up. Make sure to select the checkbox to launch the driver installer, and click **Finish**.

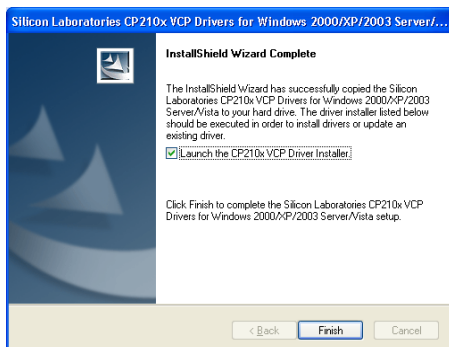


Figure 65: Installing Silicon Labs USB driver – Step 2

7. In the subsequent window, click **Install** to install the driver.

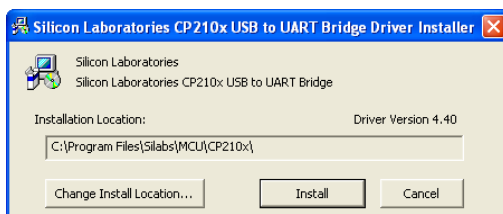


Figure 66: Installing Silicon Labs USB driver – Step 3

The installation of the driver could take up to one minute or more, depending on the system.

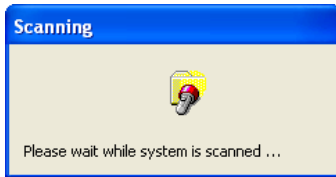


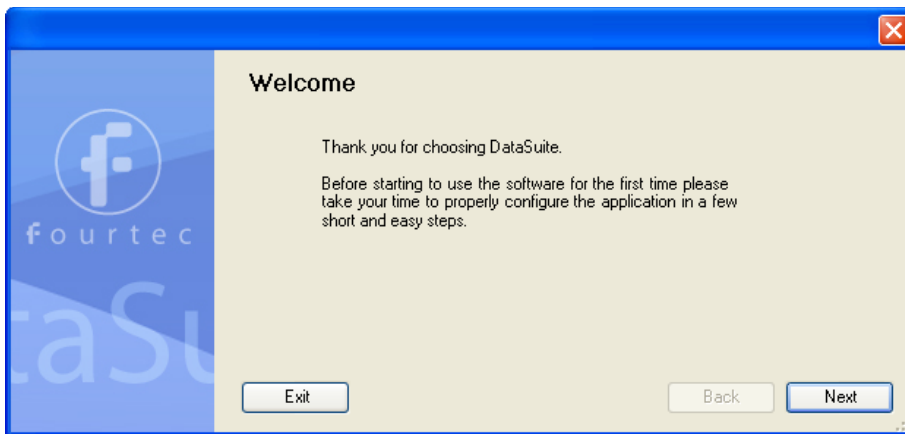
Figure 67: Installing Silicon Labs USB driver – Step 4

8. Once installed click **Finish** to close the USB driver Install Wizard dialog.
9. The DataSuite software and components have now been installed. Double click

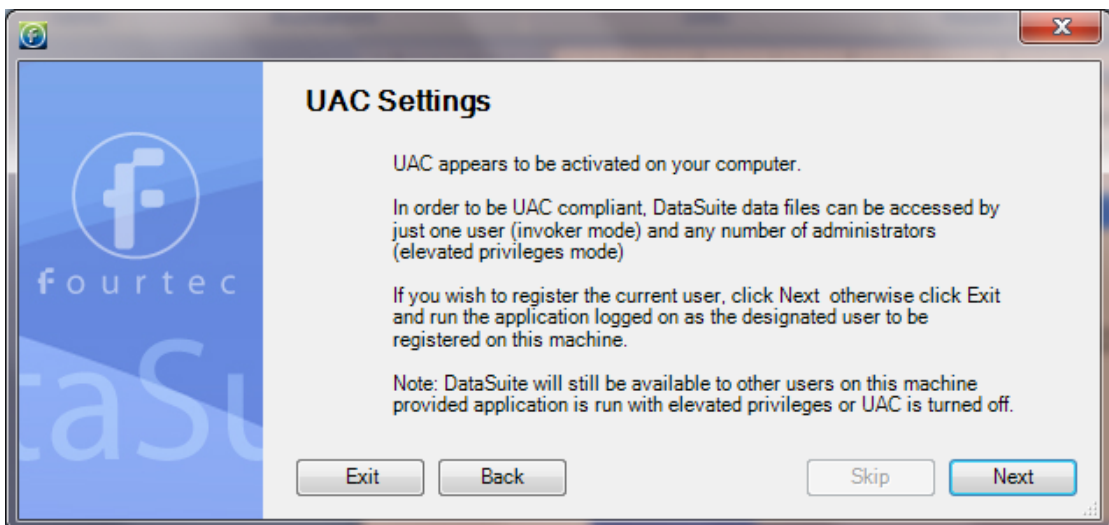


the DataSuite shortcut on your desktop to launch the software.

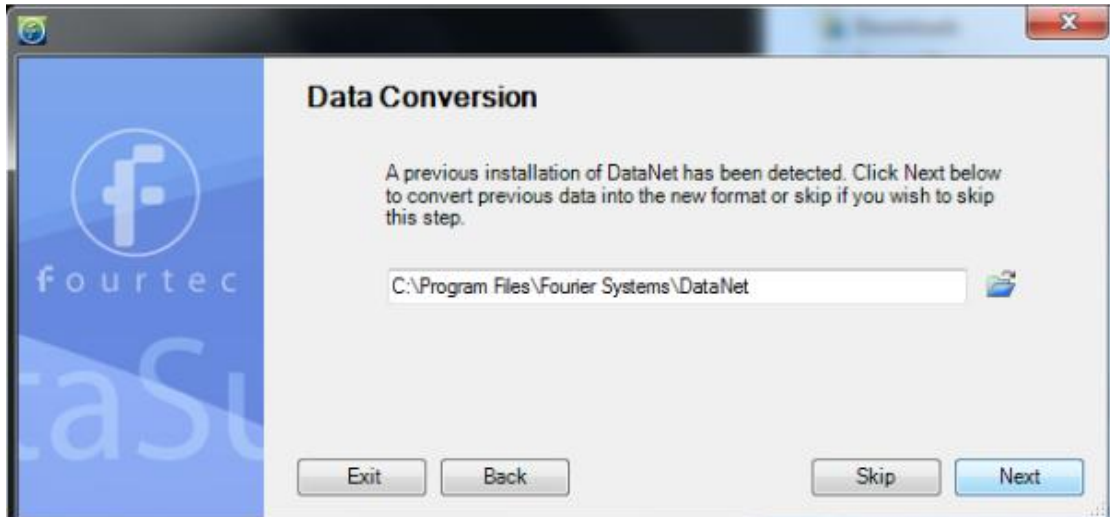
10. The DataSuite Welcome window will open, prompting the user to configure the application before use. This must be done only once when first running the software. Click **Next** to continue.



11. In specific versions of Windows, the user may have User Account Control (UAC) settings activated. If so, the user will be prompted the following instructions. Select the relevant option.



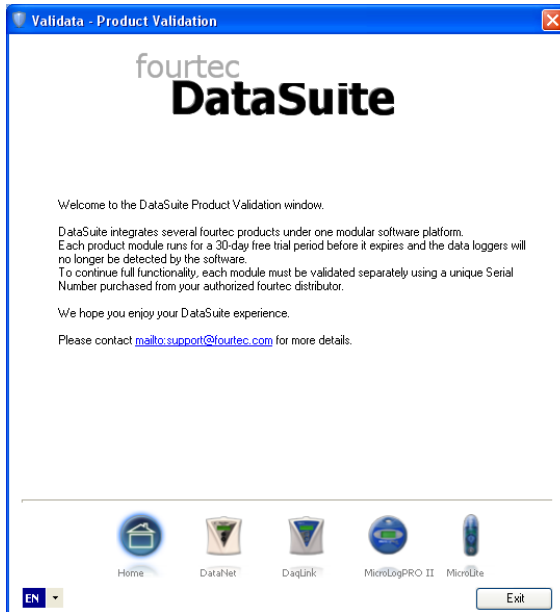
12. If you have an existing, registered, DataNet or DaqLink installation on the same computer, then DataSuite will detect it. You have the option to convert all data files from these previous installations into a format recognized by DataSuite. This will allow you to view all archived data in DataSuite as well as in the legacy software. Click **Next** to convert the data, or **Skip** to skip this step. If you skip, you will not be able to convert the data files later.



13. You are then given the choice to activate the DataSuite software now or to do so later. To activate now click **Next**, to activate later click **Skip**. Even if the software is not activated using the license Serial Number, you still need to commence the Trial period in order to use the hardware.



14. When choosing to activate the software, the DataSuite software registration window will open. Select the relevant module button e.g. DataNet.



15. Select **Start trial** to commence the free 30-day trial and click **Next**. The module registration can be completed at a later stage. For more details refer to section 14.3.
16. Once the Trial period has started, DataSuite will detect the connected loggers. To detect more than one product module at the same time, you must ensure that each module is either in Trial mode or activated using the unique software Serial Number.
17. When completing the necessary tasks in the Validation window, click **Exit**. You will return to the window from step 13. Click **Skip**. You have reached the end of the configuration process. Click **Finish** to launch the application.
18. Once the module is launched, connect the device to a USB port on your computer. It will automatically detect the logger as new hardware and the device will appear as a new icon in the DataSuite Map View.

14.1.4. Working with Multiple User Accounts

Each specific user account that accesses the DataSuite software module can commence trial period for that specific account. However, as soon as a user with Administrator privileges activates the module with a Serial Number, then all user accounts which had previously been in Trial mode, will now be fully activated. All users will have full access to the DataSuite module's settings and data files.

14.1.5. Installation Troubleshooting

When connected to the PC USB port the device was not detected by the software.
Ensure that the USB driver was installed properly.

Go to **Control Panel > Add/Remove Programs** (in WinXP), and check that the driver is installed:



If not, you should run the Silicon Labs setup file to install the USB driver: CP210x_VCP_Win2K_XP_S2K3.exe setup.exe to install the driver.

If the driver is installed, ensure that there is no other device sharing the USB com port with the device.

If you didn't select the **Launch CP210x VCP Driver Installer** checkbox during step 2 of the driver installation wizard (see section 14.1.2), then the driver wasn't installed. Run the wizard again and be sure to select the checkbox.

14.2. DataSuite CFR Login

When launching the DataSuite CFR software (following activation of the CFR module), the user is required to login to the system so that the system Administrator is able to follow user activity in the DatPass Admin software audit trail (per FDA regulations).

1. Prior to running DataSuite CFR for the first time, the Admin must create a new user in the DatPass software. Once this is done, you may launch the DataSuite CFR software.
2. The Login dialog will open. For first time login, click **New User**.



Figure 68: User Login Dialog

3. Select the user via the drop-down menu, and proceed to enter the username and password associated with that user profile.

Note: If the system prompts a **No New Users** message, then request your DataSuite system administrator create a new user in DatPass.

4. Click **OK**.
5. Once logged into the DataSuite CFR software, you will only have access to those features for which the Administrator has granted privileges.
6. To log off from the system, go to **File > Logoff**. The login dialog will remain open in case you wish to login again.

14.3. DataSuite Software Registration

DataSuite requires all modules to be registered within 30 days of installation, using a serial number provided with purchase of the specific DataSuite module:

- DataSuite-DN (DataNet)
- DataSuite-DQL (DaqLink)
- DataSuite-ML (MicroLogPRO II)
- DataSuite-CFR (CFR module)
- DataSuite for MicroLite is free of charge and does not require activation.



When the initial 30 day Trial period is over, the user will not be able to operate the software until a valid serial number is registered.

Note: The software activation feature protects fourtec's intellectual property for both its software and hardware.

Please note that:

- Each serial number is good for unlimited installations on a single computer. You cannot install the software using the same serial number on another computer.
If you have replaced your computer and must reinstall DataSuite using the same serial number, contact fourtec Customer Support for assistance.
- Registration can be performed from the computer with DataSuite installed, or if there is no Internet connection from that computer, then via another computer with Internet connectivity.
- When the trial period for the CFR module ends, DataSuite will revert to the standard non-CFR environment unless activated.

14.3.1. Software Registration Process

Note: The software registration forms are all case sensitive. Incorrect entry will result in invalid registration.

To register any one of the DataSuite modules, follow the instructions below:

1. Locate the DataSuite module serial number (SN). The SN label is found on the DataSuite box as well as on the software CD case.

Note: If you cannot locate your serial number, contact your fourtec distributor or fourtec Customer Support directly.

2. Launch DataSuite. The registration wizard will open.
3. To open the registration wizard from within DataSuite go to **Help > Register**.
4. From the bottom of the wizard Home screen, select one of the module buttons to proceed to the registration screen for that module.



5. Three choices are presented. Select the relevant option and click **Next** to proceed:



- **Activation via the Internet**
Select to proceed with registration on the same computer on which DataSuite is running, ensuring it has a live Internet connection.
 - **Activation via an Internet connection on another computer**
Select if the computer on which DataSuite is running does not currently have Internet connectivity.
 - **Start trial**
Select to commence the 30 day free trial period and continue working in DataSuite.
6. After selecting one of the two available options for continuing with the registration process, and after clicking **Next** in step 4 above, you will be prompted to enter the software SN. Enter the SN and click **Next**.

Note: Each serial number provides a single user license for the specific module. You cannot use a serial number already registered on another computer.

7. The registration process now differs, depending on which option was selected in step 4 above. Read the relevant section below for further registration instructions.

Activation via the Internet

1. After entering the software serial number, a window requesting basic personal information will open. Enter the mandatory fields and click **Next**.



Figure 69: Personal information registration window

2. DataSuite will now establish communication with the fourtec server to complete the registration process. If successful, a confirmation message will appear. In the event of any problem in the registration process, please contact your fourtec distributor or fourtec Customer Support.
3. Click **Close** to return to the DataSuite software.

Activation via Internet Connection on another Computer


1. After entering the software serial number, a window providing additional registration instructions will open.



Figure 70: Activating DataSuite from another computer

2. Follow the steps as outlined in the window.

Note: It is recommended to generate a text file containing both the Application Key

and the Web registration form URL. Press the  icon. Transfer this file to the computer with Internet connection, as the registration process must be continued from there.

3. Record the License Key obtained from the Web registration form. Enter it into the License Key field in Step 1 and click **Unlock**.
4. DataSuite will now establish communication with the fourtec server to complete the registration process. If successful, a confirmation message will appear. In the event of any problem in the registration process, please contact your fourtec distributor or fourtec Customer Support.
5. Click **Close** to return to the DataSuite software.

14.4. System Password

Throughout the software you will be required to enter a password to perform certain functions such as calibration or firmware update.

Note: The default password is 1234.

To change the password:

1. In the **Password** dialog box, click **Change Password** to open the **Change Password** dialog box.
2. Enter the current password in the **Current Password** text box.
3. Enter the new password in the **New Password** text box.
4. Enter the new password a second time in the **Confirm New Password** text box to confirm your new password.
5. Click **OK**.

Note: The password must include at least 4 characters and is case sensitive.

14.5. DataSuite Software Layout

This section provides an overview of the default DataSuite window view as well as a guide to all of the icons available throughout the software.

The most commonly used tools and commands are displayed on two toolbars. Tools that relate to all aspects of the program are located in the main (upper) toolbar. Tools specific to the graphs are located on the graph (lower) toolbar.

Refer to section 14.5.5 for a description of these toolbars.


As the DataSuite platform supports several fourtec products, the interface is common for most of their functionality. There are several areas such as logger configuration, where the interface differs. These differences will be detailed throughout the chapter.

14.5.1. Map View

When DataSuite is first launched and the device detection window closes, the default window that is opened is the Map View (see screenshot below).

This view is used to monitor the status and data of all devices currently detected by the software. This may be via USB connection e.g. for the MicroLogPRO II, or via

wireless connection as with the DataNet system. In the case of the DataNet, the location and network connection of all of the data loggers and Repeaters in the network, in addition to the Receiver, is monitored from the Map View.

You can also switch to Map View at any time by clicking the **Map View** button  in the main toolbar. In addition, the Map View can be printed.

Icons are used to represent each of the fourtec devices, and using the mouse the user can select specific actions to be performed on the unit.

Name tags can also be displayed for each DataNet icon on the Map View.

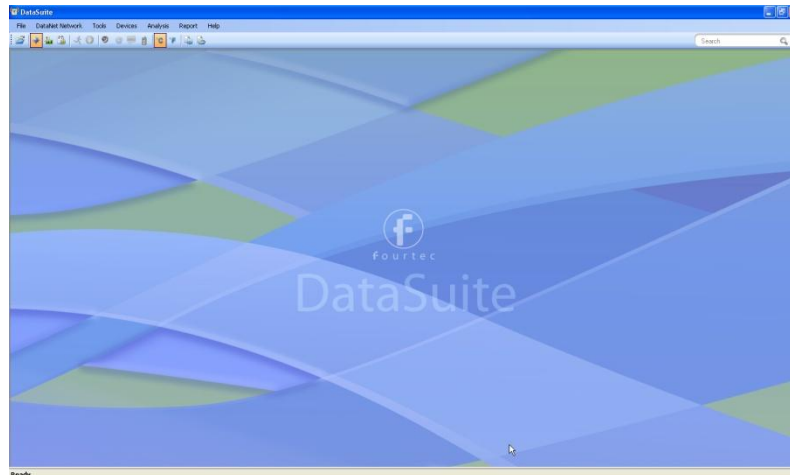



Figure 71: Main window - Map View desktop

Refer to section 14.16 for more details on working in Map View.

14.5.2. Sensor View

Clicking the **Sensor View** button  in the main toolbar switches the main DataSuite window to a display where sensor data is represented in individual windows. All sensors which are currently online will be displayed in this view. If a logger is currently offline then its data will not be visible.

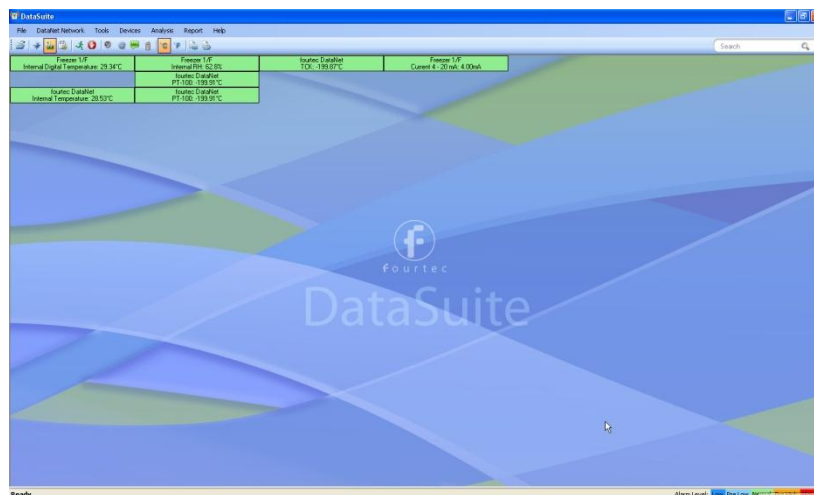
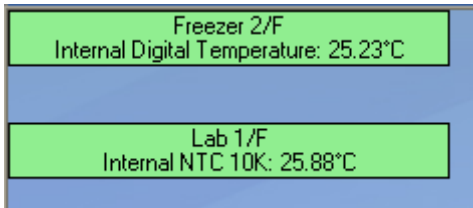


Figure 72: Main window – Sensor View

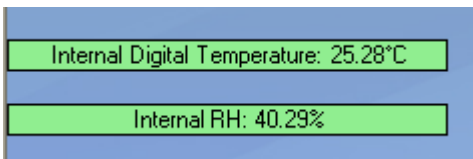
There are two modes for viewing the sensor data, which may be toggled by going to **Tools > Switch Sensor View Mode** in the main menu.

- **Expanded view**



In this view, the logger comment, sensor type and sensor data is displayed.

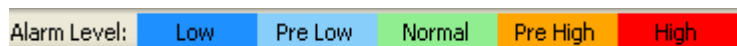
- **Slim view**



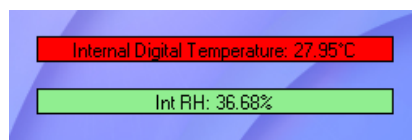
In this view, only the sensor type and sensor data is displayed.

Sensor in Alarm

When the sensor data is in alarm, the color of the sensor window will change according to the alarm type. There is a legend in the lower right corner of the main window:



For example:

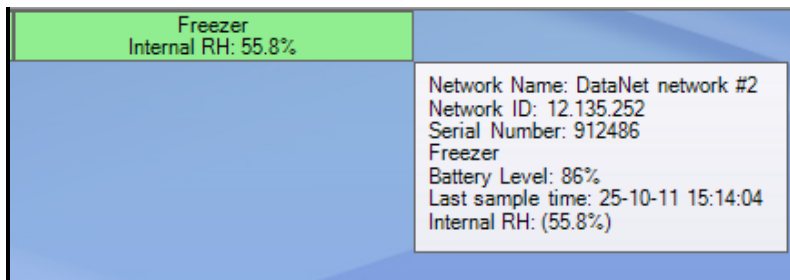


This screenshot indicates that the Internal Digital Temperature reading is in High alarm, while the Internal Relative Humidity reading is at normal levels.

Additional Features


- The sensor windows may be dragged and placed anywhere on the screen.
- Double clicking the sensor window will open the Data Display window, where the real-time sensor data is displayed in graph or table view.
- When the logger is downloading data, a message in the sensor window will be displayed.


- Scrolling over the sensor window with the mouse cursor will bring up a tooltip displaying the following data:
 - Network Name (for DataNet system)
 - Network ID (for DataNet system)
 - Serial number
 - Logger comment
 - Battery level
 - Last sample time
 - Sensor type and reading
 - Downloading data indication (when relevant)



14.5.3. History View

Note: In History View you can view data from multiple fourtec products in the same view. For example, compare data from DataNet loggers side-by-side with MicroLogPRO II and DaqLink loggers.

Clicking the **History View** button  in the main toolbar will switch the main window to view archived, offline data stored in the DataSuite directory on the workstation.

You must first open the archived data file by clicking **Open File**  on the main toolbar. When you open the data file it will be displayed in the History View, otherwise, the History View window will be blank.

Refer to section 14.14: Viewing Archived (Offline) Data on page 163 for more details on opening files in History View.

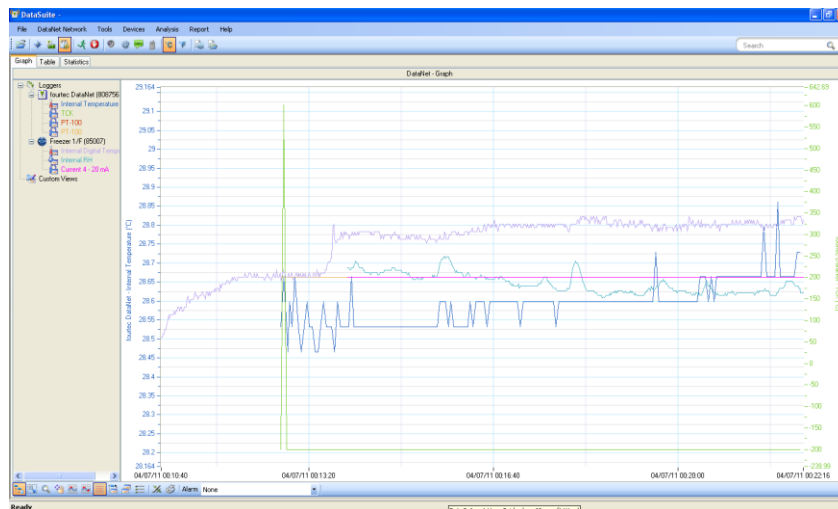


Figure 73: Main window – History View

In History View, the user may view the data in graph or table format by clicking the relevant tabs, as well as view a number of Statistics taken from the data set.

To learn the functionality of the lower graph toolbar, refer to section 14.5.5 below.

Note: Users of Windows 7 using right to left language settings e.g. Hebrew, may have problems viewing the Date/Time in the DataNet graph. This is a known Microsoft ® bug. Until a bug fix is released, change the Regional Settings to English.


14.5.4. Data Map

The History View window also includes the Data Map pane, on the left of the window.

The Data Map displays all data sets opened in History View, saved in the current project file, and includes nodes for each sensor in the data set.

Clicking the sensor label removes the data from the graph. When the label is black, the data is not displayed on the graph. The sensor data plot color is matched to the color of the sensor label in the Data Map.

Each data set is preceded by a **Logger** icon , which can be expanded or collapsed to display the associated sensor data.

Clicking the **Tree** icon  in the lower graph toolbar removes the Data Map pane altogether allowing a full screen graph view.

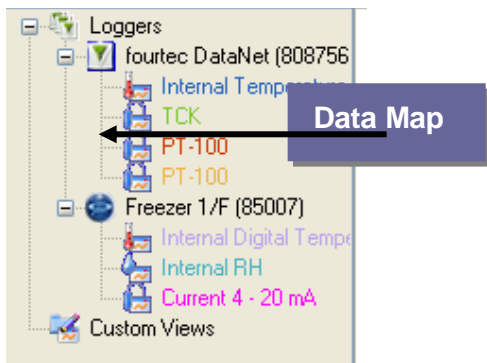


Figure 74: Data Map

14.5.5. DataSuite Toolbar Icons

This section outlines all of the toolbar icons available in the software.

Main (Upper) Toolbar Icons



Figure 75: Main toolbar icons

The main toolbar is always available at the top of the DataNet application, no matter what window view the user is in.

This toolbar cannot be moved or hidden.

-  **Open file** - Opens archived logger data file stored on the PC












-  **Map view** - Switches main window to Map view, where the units connected to the computer are represented
-  **Sensor view** - Switches main window to Sensor view, where data from each running sensor is displayed in a simple view
-  **History view** - Switches main window to History view, where archived logger data can be viewed and analyzed
-  **Alarm mute/unmute** - Mutes or unmutes an audible alarm in the system when a sensor reading has breached the user-defined alarm level
-  **Email Alarm Notifications** - Configuration window for Email alarm notifications
-  **SMS Alarm Notifications** - Configuration window for SMS alarm notifications
-  **GSM Modem** - Indicates if GSM modem is connected (green icon) or disconnected (grey icon)
-  **Temperature unit toggle** - Display all data in Celsius
-  **Temperature unit toggle** - Display all data in Fahrenheit
-  **Reports Profile Manager** – Opens Reports module
-  **Report Browser** – Opens window for browsing saved Reports


Table 4: Main toolbar icon list
















14.5.6. Map View Icons

The following icons representing the various statuses of the devices are viewed in Map View. Using these icons the user is aware of the status of each unit e.g. offline/online, alarm, power, etc.

Alarm status is also indicated: **Green** = Normal ; **Red** = Alarm

DataNet Icons

-  Receiver is online and connected to the PC.

-  Receiver is offline, possibly as USB cable has been disconnected or it was removed from external power supply (and backup battery drained).
-  Logger newly acquired by network and awaiting Setup.
Running from internal battery supply.
-  Logger newly acquired by network and awaiting Setup.
Running from external power supply.
-  Logger which has received its Setup but is in Stop mode.
Running from internal battery supply.
-  Logger which has received its Setup but is in Stop mode.
Running from external power supply.
-  Logger in Run mode and running on internal battery supply.
Green indicates there are no alarms.
-  Logger in Run mode and running on external power supply.
Green indicates there are no alarms.
-  Logger in Run mode with an alarm alert.
Running from internal battery supply.
-  Logger in Run mode with an alarm alert.
Running from external power supply.
-  Logger is offline and is no longer detected on the network. Its power supply may have failed or it's out of range of the Receiver.
-  Logger is processing a command sent from the software.
-  Logger is downloading data.
-  Logger is detected by DataSuite software via direct USB connection. Logger is in Stop mode and running from internal battery supply.
-  Logger is detected by DataSuite software via direct USB connection. Logger is in Stop mode and running from external power supply.
-  Logger is detected by DataSuite software via direct USB connection. Logger is in Run mode and running from internal

battery supply.














-  Logger is detected by DataSuite software via direct USB connection. Logger is in Run mode and running from external power supply.
-  Repeater is online and is running from external power supply.
-  Repeater is offline and is no longer detected on the network. Its power supply may have failed or it's out of range of the Receiver.
-  Repeater is detected by DataSuite software via direct USB connection.

Table 5: Main toolbar icon list







DaqLink Icons

-  Logger which has received its Setup but is in Stop mode.
Running from internal battery supply.
-  Logger which has received its Setup but is in Stop mode.
Running from external power supply.
-  Logger in Run mode and running on battery supply.
Green indicates there are no alarms.
-  Logger in Run mode and running on external power supply.
Green indicates there are no alarms.
-  Logger in Run mode with an alarm alert.
Running from internal battery supply.
-  Logger in Run mode with an alarm alert.
Running from external power supply.
-  Logger is offline and is no longer detected by the computer. Its power supply may have failed or the USB cable was disconnected.
-  Logger is processing a command sent from the software.
-  Logger is downloading data.
-  Receiver is online and connected to the PC.
-  Receiver is offline, possibly as USB cable has been disconnected or it was removed from external power supply (and backup







battery drained).

- 
 Logger newly acquired by network and awaiting Setup.
Running from internal battery supply.

MicroLite II Icons

- 
 Logger which has received its Setup but is in Stop mode.
- 
 Logger in Run mode. Green indicates there are no alarms.
- 
 Logger in Run mode with an alarm alert.
- 
 Logger is offline and is no longer detected by the computer. Its power supply may have failed or the USB cable was disconnected.
- 
 Logger is processing a command sent from the software.
- 
 Logger is downloading data.

MicroLogPRO II Icons

- 
 Logger which has received its Setup but is in Stop mode.
- 
 Logger in Run mode. Green indicates there are no alarms.
- 
 Logger in Run mode with an alarm alert.
- 
 Logger is offline and is no longer detected by the computer. Its power supply may have failed or the USB cable was disconnected.
- 
 Logger is processing a command sent from the software.
- 
 Logger is downloading data.

14.5.7. Graph (Lower) Toolbar Icons

The graph toolbar is located at the bottom of the open graph view, when the user is either in Online Data Display:



Or History View:



The toolbar cannot be moved or hidden.





















-  **Data Map** (in History View only) – Hides or shows the Data Map pane in the History View window.
-  **Plot Legend** (in Display Data View only) – Hides or shows the sensor labels from the bottom of the graph.
-  **Autoscale** - Returns the data to its default scale.
-  **Zoom in** – Zooms in on the graph data.
-  **Pan graph** – Pans the graph along the x or y axis.
-  **Select first cursor** – Adds a cursor to the designated plot on the graph
-  **Select second cursor** – Adds a second cursor to the designated plot on the graph.
-  **Grid** – Adds a grid to the graph background
-  **Show/Hide Time Stamp** – Shows or hides the time stamp markers on the graph
-  **Add Custom View** (in History View only) – adds the open, customized graph view to the Data Map
-  **Copy graph** – Copies the graph to your clipboard, to be copied to a document or spreadsheet, for example.
-  **Graph properties** – Opens the Graph Properties window.
-  **Export to Excel** – Export the open data sets to Excel format.
-  **Print** – Opens the Print dialog. Available for graph, table and statistics views.

Table 6: Lower graph toolbar icon list

14.5.8. Data Map Icons

-  Displayed internal Temperature sensor data set
-  Hidden internal Temperature sensor data set
-  Displayed internal Humidity sensor data set
-  Hidden internal Humidity sensor data set
-  Displayed external sensor data set
-  Hidden internal sensor data set
-  Displayed graph function






-  Hidden graph function
-  Parent node for all logger data sets. Click to expand or collapse all child nodes.
-  Logger data set. Click to expand or collapse the data set containing all measured inputs of the specific logger.
-  Parent node for all custom graph views. Click to expand or collapse all child nodes.
-  Displayed custom graph view. When hidden the icon is grayed out.

Table 7: Data Map icons

14.6. File Menu Items

14.6.1. Open

Select **Open** to access archived data files for each logger in your network.

Shortcuts: You can also click the **Open** icon  or press **Ctrl+O** to open archived files.

14.6.2. Open Project File

Opens project files of offline data, containing data from one or more loggers, as opposed to standard data files containing data from only one logger.

14.6.3. Save Project

Saves multiple data sets and custom graph views into a single Project File. Only available in History View.

14.6.4. Save Project As

Saves an existing Project file under a different name.

14.6.5. Backup System Files

This feature allows the user to backup system data and configuration files for all DataSuite modules to a defined path on the local computer, network or US memory stick.

Backing up these files to a secure location will ensure that in the event of damage to the computer hard disk, for example, you will be able to restore the critical files containing all the device data and configurations of the DataSuite itself. It will also enable you to setup mirror installations using the same devices.

14.6.6. Restore System Files

Once the system files have been backed up, use this feature to restore them to the DataSuite workstation or to another computer.

14.6.7. Print Map View

Prints the current Map View with all unit icons, including their network paths and name tags.

14.6.8. Exit

Exits the DataSuite application.

14.7. DataNet Network Menu Items

This menu is specifically for DataNet users and applies to all DataNet networks currently detected by the software. Additional Network menu items are accessible via the Receiver context menu, by right-clicking the Receiver icon in Map View.

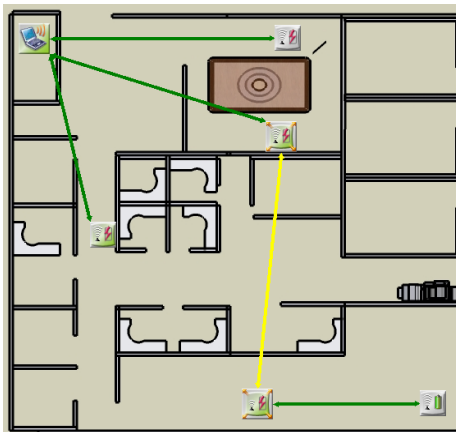
14.7.1. Refresh All Network Connections

Use this feature to send a command to all Receivers to re-establish connection to the end units in its specific network. This is useful when wanting to ensure the network connectivity is performing optimally without any delay or lag due to changes in environmental conditions or location of the end units. Such delays can explain logger icons not displaying the correct information or commands not being sent promptly to the end units.

Note: The software automatically refreshes the network connections every 10 minutes.

14.7.2. Show All Network Paths

While in Map View, enable this option to display the path that the RF signal of all units in the network takes to reach the Receiver. If Repeaters are used in the network it will show the signal routed via the Repeater, en route to the Receiver.



The paths are color-coded so you can also see the transmission strength. A legend appears at the bottom of the window.



- Red = Low (0 to 23% strength)
- Yellow = Medium (23 to 56%)
- Green = High (56 to 100%)

You can also enable this feature for specific loggers by opening the context menu on the Logger icon in Map View and selecting **Show Network Paths**.

14.8. Tools Menu Items

14.8.1. Define Sensor

DataSuite enables the user to define custom sensors. This is a useful tool for when the data logger is communicating with many sensor types from different vendors.

Any additional sensor that you would like to connect to the logger must comply with the following restrictions:

The sensor's output must be either voltage in the range of 0 to 1 V, 0 to 50 mV, current in the range of 4 to 20 mA or Pulse in the range of 0 to 65535 pulses.

1. Click **Tools > Define New Sensor** and the Define New Sensor dialog will open.

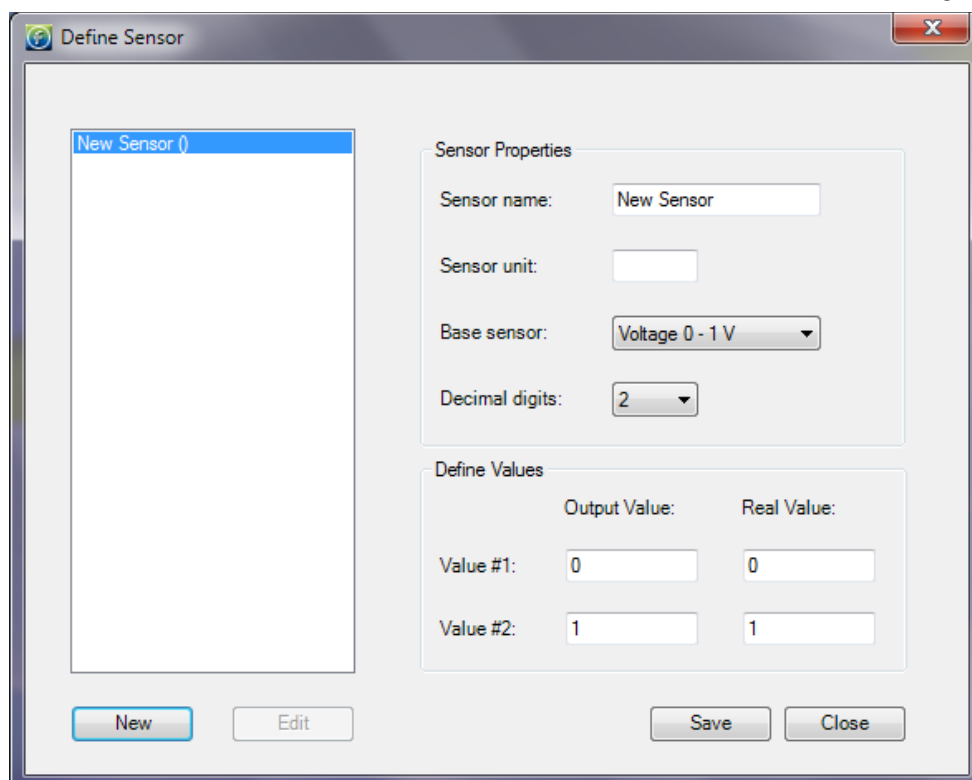


Figure 76: Define New Sensor dialog

2. Click **New** to enable the fields.
3. Select the **Base sensor** from the drop-down menu (depending on whether your sensor's output is 0 to 1 V, 0 to 50 mV, 4 to 20mA, or measuring pulses).



4. If you wish to configure a defined sensor for the EC8XX or MicroLite II models, make sure to select the base sensor corresponding to the specific logger model.
5. Enter the sensor name and sensor unit.
6. Enter two calibration values (two real values and the corresponding output values of the sensor).
7. Click **Save**.
8. To make any changes to the existing sensor definitions, stand on the sensor name and click **Edit**. Otherwise, click **New** to define additional sensors or click **Close** to exit the dialog.

To use the custom defined sensor:

1. Enter the Setup dialog for the data logger you want to configure.
2. Select the Input you wish to use and from the **Sensor Type** drop-down menu, select the custom sensor, which now appears in this list.
3. Proceed with the setup as you would normally do.

14.8.2. Switch Sensor View Mode

While in Sensor View, selecting this option will switch the sensor view between large and small window sizes. By reducing the size of the sensor window you display only the sensor type and sensor data. Enlarging the size of the sensor window will display sensor type, sensor data and logger name.

14.8.3. Lock Map View

While in Map View, with Lock Map View selected the Map View icons are in a fixed position and can't be moved. You must unselect this option in order to freely move the icons anywhere on the screen. This is essential if working with a custom background image.

14.8.4. Options Menu

Refer to section 14.9 for more details.

14.8.5. Manage Contacts

The Manage Contacts dialog is where the user can add, edit and remove all contacts and groups to which DataSuite Reports and Email/SMS notifications are sent.

Refer to section 14.19.1 for more details regarding managing Contacts, and to section 14.19.2 for more details regarding managing Groups.

14.8.6. Email Alarm Notifications

The Email Alarm Notifications dialog is where the user can configure all notifications to be sent via Email to a predefined contact list. Refer to section 14.18 for details.

14.8.7. SMS Alarm Notifications

The SMS Alarm Notifications dialog is where the user can configure all notifications to be sent via SMS to a predefined contact list. Refer to section 14.18 for details.

14.8.8. Firmware Update Center

The Firmware Update Center is where the DataNet firmware updates are managed. Please refer to section 15.2 for more details.

14.9. Tools > Options Menu Items

The Options dialog is divided into four main tabs:

- Preferences
- Device Settings
- Email Settings
- SMS Settings

14.9.1. Preferences Tab

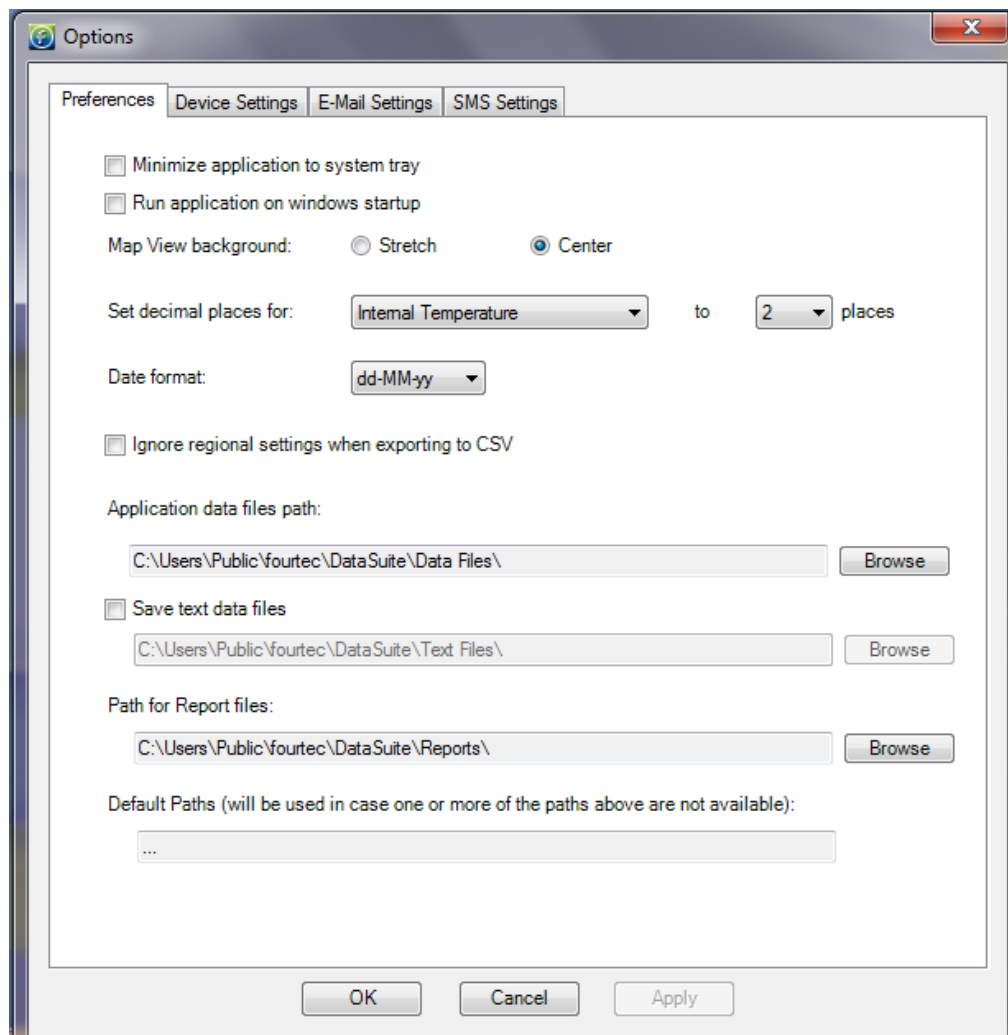





Figure 77: Options > Preferences tab

The Preferences tab includes the following options:

Minimize DataNet to system tray

When this checkbox is selected, the DataSuite icon  will appear in the computer's system tray in the lower right of the screen when the application is minimized. Simply double-click the icon to maximize the application to full screen.

Run Application on Windows Startup

When this option is selected DataSuite will automatically launch upon Windows startup. This feature is useful in the event where the computer unexpectedly resets and when it restarts, DataSuite will launch and online monitoring of the connected devices will be able to continue.

Note: If running Windows Vista, User Account Control (UAC) must be turned off for this feature to work. If UAC is off then DataSuite will not launch on Windows startup.

Map View background

Use this option to toggle between Stretch and Center views for the background image used in Map View.

Set decimal places for...

For each logger sensor, internal or external, you may select between 0 and 6 decimal places to be used when displaying the data in the software.

Date format

Choose between four date formats to be used throughout the software when displaying data e.g. in the Graph display.

Ignore regional settings when exporting to CSV

Selecting this option will ensure that data will be corrected exported to a CSV file and will not use any custom regional settings in the Windows OS which might adversely affect the layout of the data in the CSV file.

Application data files path

The default path for saving all data recorded by the data loggers is:
C:\Documents and Settings\All Users\Application Data\fourtec\DataSuite

Click **Browse** to change this path e.g. to a network path.

Save text data files

Select this checkbox if you would like DataSuite to also save the logger data to a text file. This will allow you to export the data, in csv format, to another application that can display the logger data.



Default path on WinXP: C:\Documents and Settings\All Users\Application Data\fourtec\DataSuite\Text Files.

Default path on Windows 7: C:\Users\Public\fourtec\DataSuite\Text Files

Click **Browse** to change this path e.g. to a network path.

Note: The text file cannot be updated with logger data as long as it is open. Make sure to close the file when you finish inspecting the data, or copy the file to another location and view it from there. Alternatively, open the file in *Read-only* mode.

Path for Report files

The default path where Report files are stored is: C:\Program Files\fourtec\DataSuite\Reports\\Reports.

Click **Browse** to change this path e.g. to a network path.

Default Paths

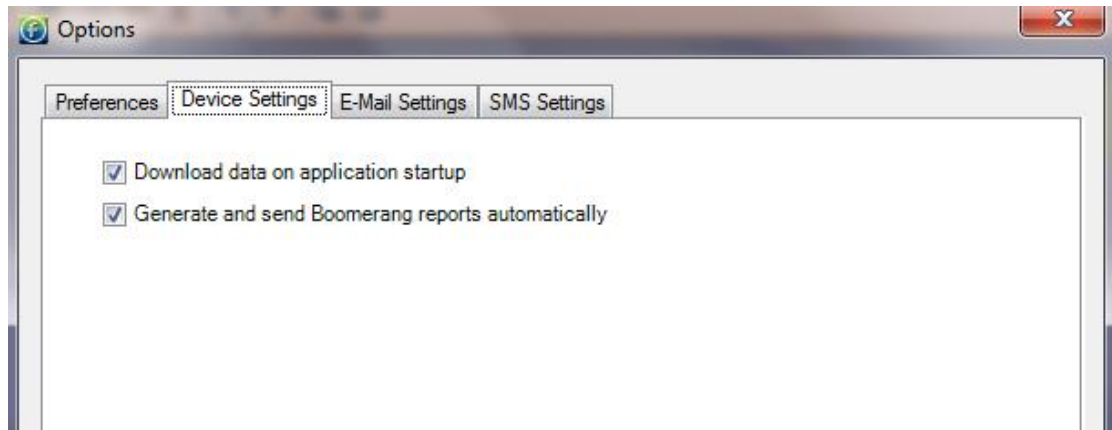
If the user has modified any of the default data file or report paths e.g. to a network path, and should this path become available for any reason, then the DataSuite application will automatically refer to the default path as shown under the Default Paths heading.

This precaution is necessary as otherwise DataSuite cannot download any data from the data loggers if the data file path is not available. Data can therefore be lost.

Default path on WinXP: C:\Documents and Settings\All Users\Application Data\fourtec\DataSuite\Data Files

Default path on Windows 7: C:\Users\Public\fourtec\DataSuite\Data Files

14.9.2. Device Settings Tab



Download data on application startup

Select this checkbox if you want to have automatic download of data when the DataSuite software is launched. If there are many loggers in the system with fast sampling rates, then the download could burden the network. Therefore in some cases disabled this feature is advised.

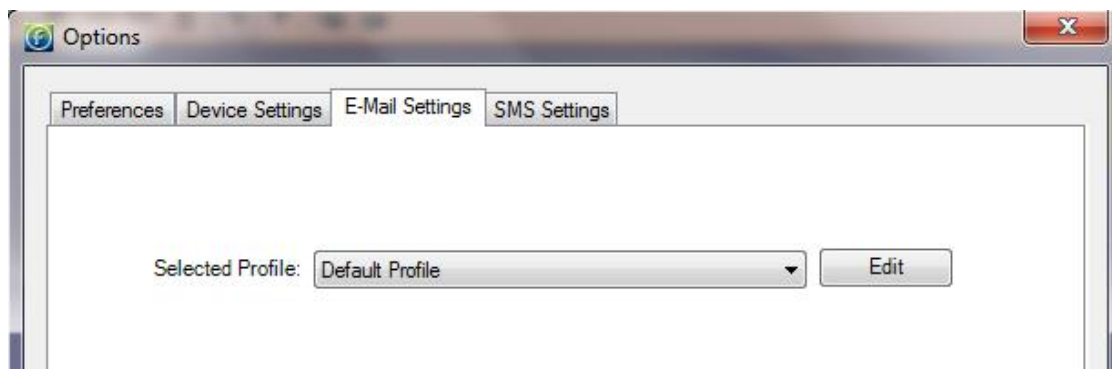
Generate and send Boomerang reports automatically

Select this checkbox to enable the Boomerang feature to run automatically when a Boomerang-enabled logger is connected to the computer. By default, this option is enabled, so that the PDF data report is generated and Emailed as soon as the logger is detected by the DataSuite software.

14.9.3. Email Settings Tab

DataSuite's alarm notification feature enables sending of Emails to notify the user of any alarm in the system.

Clicking the Emails Settings tab will show the following window:



DataSuite includes a Default Profile – this is a fourtec-configured email account, embedded into the software. This means that even if you don't configure any email account, you are still able to send Email alarm notifications and Boomerang data reports using fourtec's own email account.

1. To edit existing Email profiles or add a new one, click Edit.

The following window is opened:

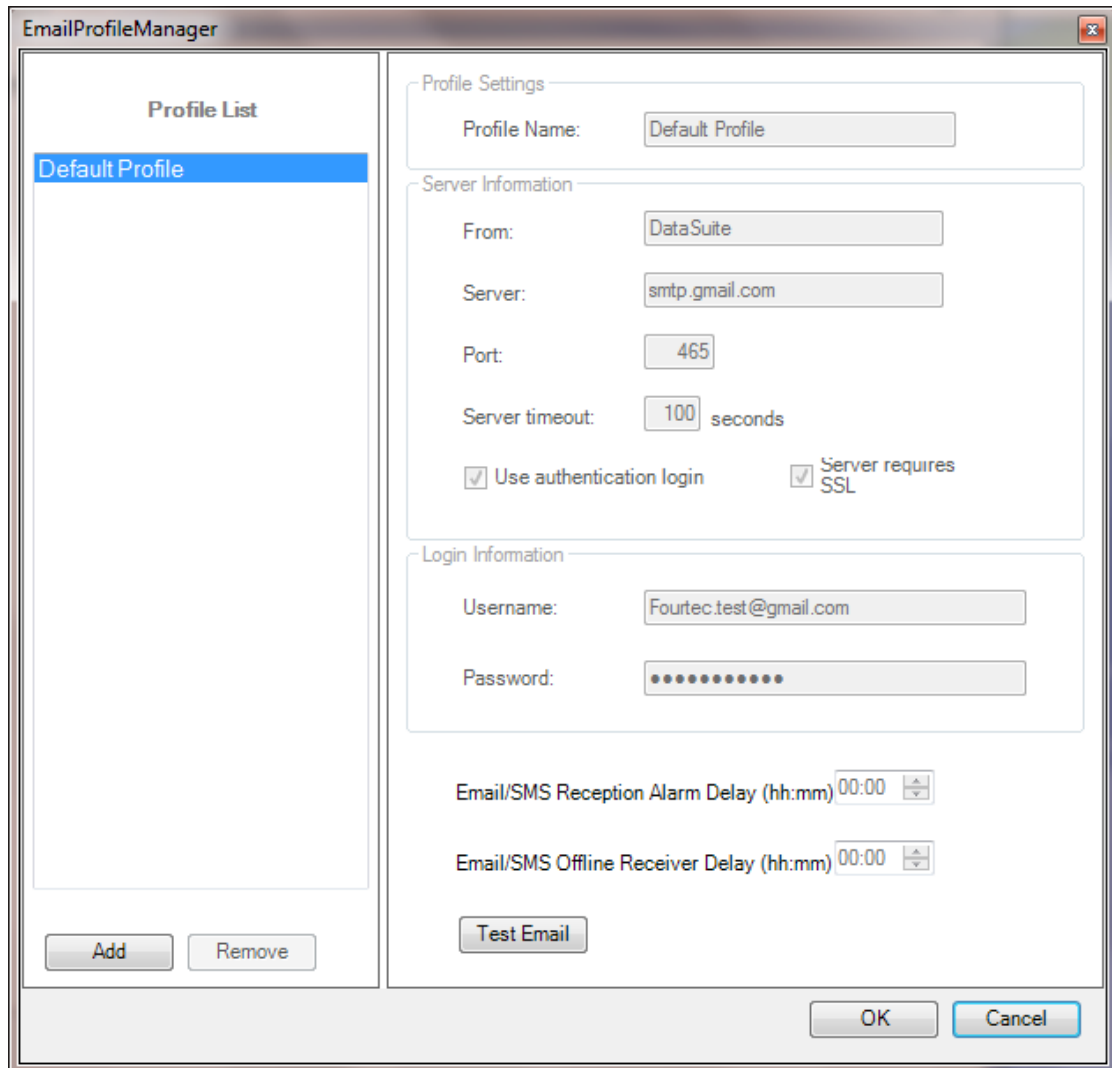


Figure 78: Options > Email Settings tab

You can view the Profile settings here. Note that the Default profile is un-editable.

2. To add a new custom profile, click **Add**. A new entry named New Profile is created. Click on this entry to edit the settings, server information, etc. Make sure to enter the fields correctly e.g. with no extra spaces or typos.
3. When finished, click **OK** to return to the main Email Settings window, displaying the list of profiles.
4. To remove a profile from the Profile List, click **Remove** from the Email Profile Manager window. Note that the default profile cannot be removed.

Note: DataSuite supports SMTP and MIME encoding, and POP3 mail protocols.

Sending a Test Email

To send a test Email to verify the Email configuration is correct:

1. Once the Email profile configuration is complete click **Test Email** to open the Contact Information dialog.
2. Select a contact from the DataSuite contact list or enter an Email address. Click **OK** to send the test Email.

3. The test Email will contain the following content:

Subject: Test message sent from the DataSuite software

Body: This is a test message sent from the DataSuite software. Sent on the dd/mm/yy mm:hh

14.9.4. SMS Settings Tab

DataSuite's alarm notification feature enables sending of SMS's to notify the user of any alarm in the system. First select the **Send SMS notifications** check box. Using the SMS feature requires connection of a GSM modem and SIM card to the DataNet PC, or even just a cellular phone with an active SIM card.

You must select the COM port which the GSM modem/cellular phone is connected to in order for the software to detect it.

Note: When using a cellular phone as a modem, ensure that the PC software suite is disabled before connecting the phone to the PC com port. Otherwise the com port will not be available for the DataSuite software.

Once the configuration is complete, DataSuite will be able to send SMS's to predefined SMS contacts when your loggers have breached certain alarm levels.

Refer to section 14.17.2 for setting Alarm levels on the logger and to section 14.18 for managing the SMS alarm notifications.

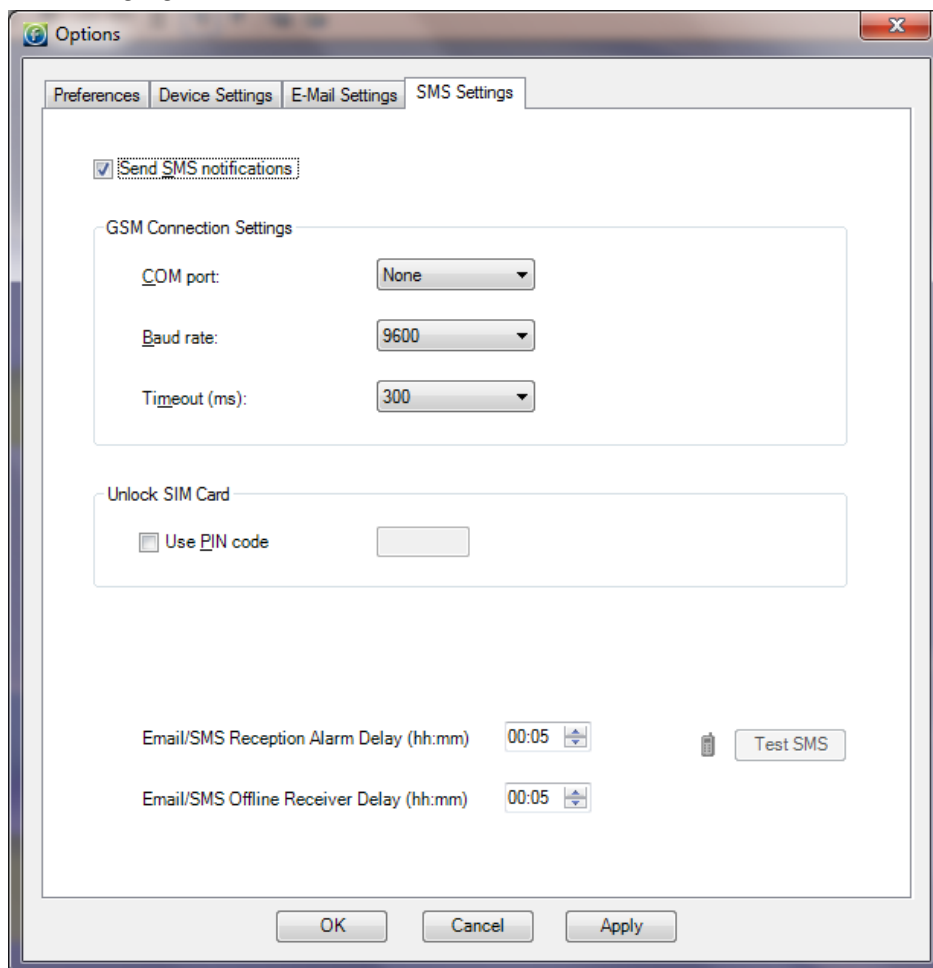



Figure 79: Options > SMS Settings tab

Note: Once the GSM modem is online you will see the green GSM icon  appear in the DataSuite upper toolbar.

Sending a Test SMS

To send a test SMS to verify the SMS configuration is correct:

1. Once the SMS configuration is complete and the GSM modem has been detected by the software, the **Test SMS** button will be enabled.
2. Click **Test SMS** to open the Contact Information dialog.
3. Select a contact from the DataSuite contact list or enter a telephone number. Click **OK** to send the test SMS.
4. The test Email will contain the following content:

Subject: Test message sent from the DataSuite software

Body: This is a test message sent from the DataSuite software. Sent on the dd/mm/yy mm:hh

14.9.5. Email/SMS DataNet Offline Receiver and Reception Alarm Delay

To prevent alarm notifications being sent unnecessarily for unit's which momentarily get disconnected from the network, the user can define an alarm delay for Email and SMS notifications. The RF environment as well as the network behavior are very dynamic and can result in very brief instances of units going offline.

In addition, if the Receiver USB cable is disconnected, or the unit is turned off for any reason (and therefore the USB connection is lost), an alarm will be sounded. By adding a delay you can mitigate any false alarms.

- This feature is found on the Email and SMS Settings tabs in **Tool > Options**.

Email/SMS Reception Alarm Delay (hh:mm)

Email/SMS Offline Receiver Delay (hh:mm)

- The alarm delay can be defined from between one minute to 24 hours, with a resolution of one minute.
- If the DataSuite software is shutdown during a period when alarm delay is being timed i.e. after a unit has gone offline, then the time stamp when the unit went offline will be recorded. When the software is reopened if the period of the alarm delay has already passed then an Email/SMS notification will be sent.

If the alarm delay period has not passed then the SMS/Email message will be initiated only if the time delay is reached.

14.9.6. Analysis Menu Items

The Analysis menu items are enabled when viewing offline data in History View.

The Analysis options available are:

- Functions Parameters

- Dew Point
- FO Pasteurization
- Histogram
- MKT
- Export to Excel
- Export to CSV

MKT (Mean Kinetic Temperature)

Mean Kinetic Temperature or MKT is used for calculating temperature stress of perishable stock goods such as medicines or food, during storage and distribution cycles. The MKT is calculated on a temperature graph opened from an offline DataSuite data file, in History View.

To use the MKT feature:

1. Go to **File > Open** and open the data file containing the relevant temperature measurements.
2. In History View, with the graph tab in view, go to **Analysis > MKT** in the main menu. The MKT dialog is opened.

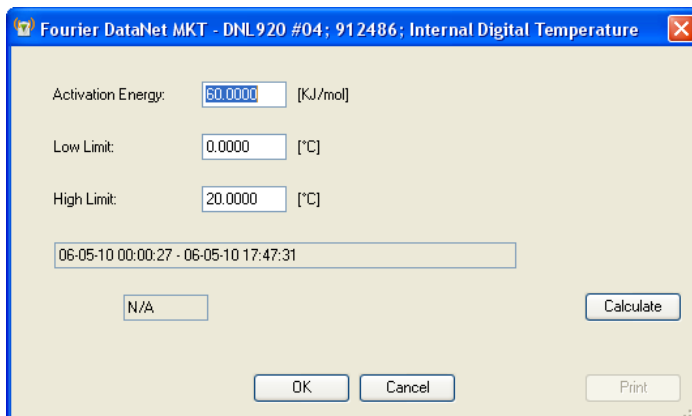



Figure 80: MKT dialog

3. Use the cursors to select the data set, or leave the graph as is to perform the MKT calculation on the entire data set.
4. Enter the relevant Activation Energy, and the Low and High Limits of the data set to be calculated (in °C), into the MKT dialog.
5. Click **Calculate**. A Pass or Fail indication will be displayed and in the event of a Pass, the MKT value will also be displayed.
6. Click **Print** to print the MKT dialog with the results.

Export to Excel

You may export offline data to Excel by selecting this menu item or by clicking the **Export to Excel** icon  in the lower graph toolbar in History View. The data is opened in an Excel worksheet and includes pertinent information such as logger name, SN, sensor names, alarm levels as well as the actual data readings.

Refer to section 14.22 for more information.

Export to CSV

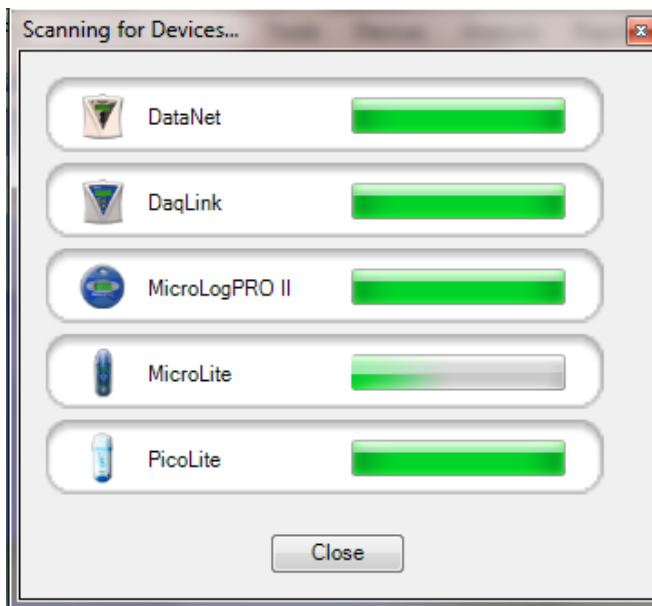
You may export offline data to CSV file format by selecting this menu item. Upon selecting this option, you will be prompted to save the file either in the default DataSuite directory or in directory of your choosing. The data is opened in CSV file format and includes pertinent information such as logger name, SN, sensor names, alarm levels as well as the actual data readings.

Refer to section 14.22 for more information.

14.10. Devices Menu Items

14.10.1. Detect Device

When DataSuite is launched it automatically scans all ports for DataSuite supported devices. Select this menu item to manually detect devices.



All devices are automatically detected by the software when connected to the computer. If you connect a device when it is switched off, and then switch the device on, the software won't detect the unit. You will have to use the Detect Devices feature.

The device may also lose power and go offline while connected to the USB, in which case you will also need to detect it manually.

Connecting the data logger or Repeater to the computer via USB and selecting this menu item supports:

- For DNL910 and DNL920: Direct data download, firmware update and turning off of the unit. Refer to section 14.16.715.2.4 regarding firmware update via USB.
- For DNR900 Repeater: Firmware update. Refer to section 15.2.4.

14.10.2. Stop All

To stop all the online loggers in the Map View simultaneously, go to the **Devices > Stop All** menu item. Prior to stopping the loggers, DataSuite will first download and data not already transmitted to the computer.

This feature is password-enabled.

14.10.3.Run All

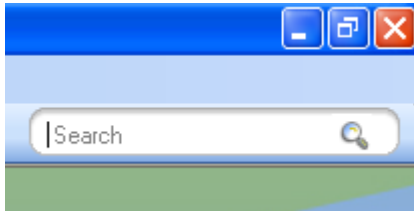
To run all the online loggers in the Map View simultaneously, go to the **Devices > Run All** menu item. Prior to running the loggers, DataSuite will first clear the logger menu. This command will not apply to any devices currently in Timer Run or Push to Run modes.

This feature is password-enabled.

14.11. Search Devices

If you have many device icons situated in the Map View and have trouble locating the specific device to configure, the Search feature can be very helpful.

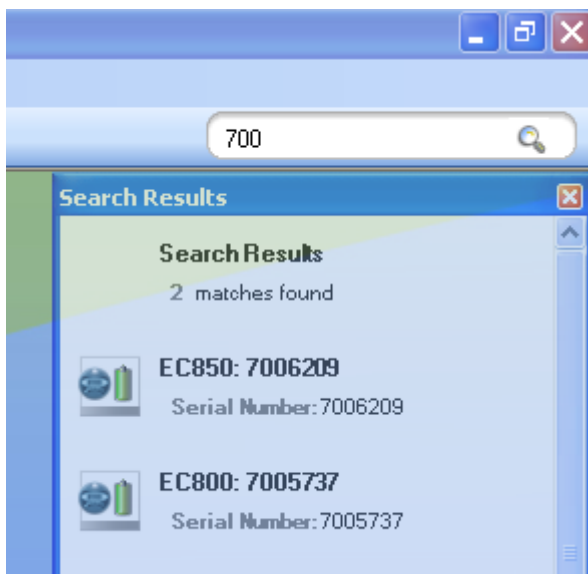
In the top right corner of the main window you will find the Search window:



The search criteria are:

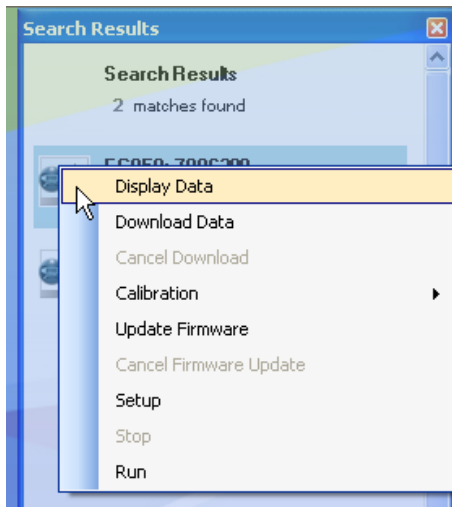
- Device Serial Number e.g. 7002354
- Device Comment e.g. Lab 1/F
- Device Type e.g. DNL910-PA

Enter the relevant search criteria in the text window and all relevant matching devices will appear in the Search Results box.



The Search Results box will filter the results as the search criteria more closely match the devices in the Map View.

Once you have located the relevant device you may configure it directly from the Search Results box by right-clicking on the device icon to open the context menu.



To locate the device on the Map View itself, simply click on the device row in the

Search Results box and the icon will flash three times with a red outline:



14.12. Data Recovery

For DataNet Loggers

The ability to recover data when part of the system goes offline or is shutdown is a key feature of the DataSuite system.

Note: USB-enabled DataNet data loggers support data download via USB if wireless transfer is not possible.

When the data loggers are acquiring data they transmit to the Receiver at the predefined rate, either directly or via one or more Repeaters.

There may be occasions when the data transmission fails and the data is not updated in real-time in the software window. When this happens, the software has several ways of recovering the data so the user will always be able to view all samples recorded by the logger. The online system will never lose data i.e. the data integrity will always been maintained.

If the end unit tries to send data to the Receiver but fails, it will continually try to send the data until it succeeds. In such a case, the software or workstation may be shutdown or its parent unit, the Repeater, may be offline. Or the end unit itself may go offline due to a drained battery. Once the end unit has reconnected with the network, for instance when the software is reopened or the Repeater is back online, it will be able to complete the transmission of all its data and the software will be updated with this data. The data recovery is all completed automatically and the user is not required to perform any specific actions.

Note: In the **Tools > Option** menu, select the checkbox to enable automatic data download when the software is launched. Otherwise you will have to perform manual download from the Logger context menu.



For Standalone Loggers

For DaqLink, MicroLogPRO II and MicroLite loggers, when the units are connected to the computer and detected by the DataSuite software, they will automatically begin downloading data.

If they were already connected and streaming online data, and the DataSuite software or computer was shutdown, the units will continue to collect data. Upon re-detection by DataSuite, data will again be downloaded ensuring full data recovery to the DataSuite database.

14.13. Saving Data

As soon as a logger starts to record data the software creates a data file to which it writes the logger data.

In Windows XP, for example, logger data files are stored in the following default location:

C:\Documents and Settings\All Users\Application Data\fourtec\DataSuite\Data Files

In Windows 7, the data files are stored here:

C:\Users\Public\fourtec\DataSuite

A folder is created for each data logger and is named according to the logger Serial Number. In this folder is stored the data files. A file is created for each day that the logger is recording data. The file name format is the date followed by the file extension e.g. 2007-12-30.dat.

The data is saved automatically by the software. There is no need for the user to save the data manually.

For applications where the data is being streamed online, directly to the software the data file is saved as follows:

- Every 15 minutes
- When the software is closed
- When the user opens an archived data file, the file is updated with all data not saved to that point

You can also save the data in a text file format. Refer to section 14.9.1 for more details.

14.14. Viewing Archived (Offline) Data

The user can view the logger data online or can choose to open archived data of one or more loggers, including loggers of different models. Archived data is all data that was logged by a specific logger and recorded by the software into the DataSuite directory on the PC.

Follow the instructions below to open archived data.

1. Click the **Open** icon to launch the **Open Data Files** dialog.
2. Select the logger from the list of loggers in the dialog. The loggers can be listed in ascending or descending order according to logger serial number or comment by clicking the relevant header.

- Using the calendar define the date and time period for which you wish to view your data and click **OK**.

Note: The DataSuite data file path is displayed at the top of the Open Data Files dialog.

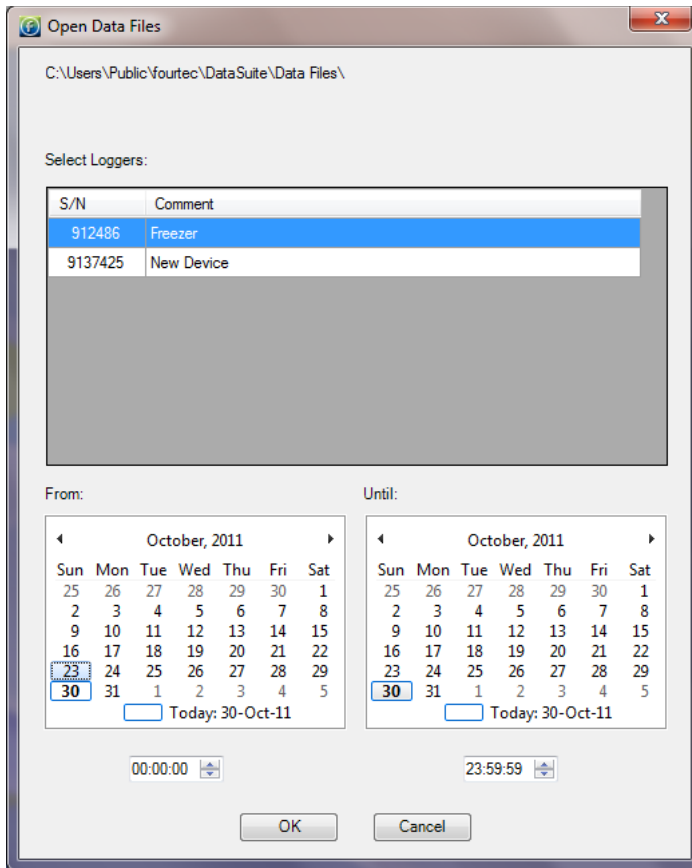


Figure 81: Open Data Files dialog

- In the **Sync Data** dialog, you can select the sampling rate at which you wish to display the data. The default option is the original rate. Click **OK**.

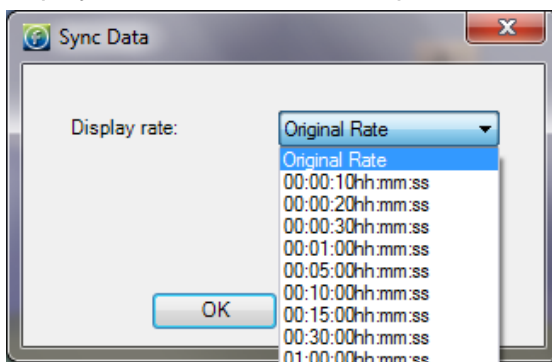


Figure 82: Sync Data dialog

The data is opened in History View. Refer to section 14.5.3 for an explanation of the History View.

You may display data sets from more than one logger and display them all in History View, using the Data Map to navigate through the data. Refer to section 14.5.4 for more details regarding the Data Map.

14.15. Viewing Online Data

You can view the data from any of your loggers in real-time, as the data is being recorded and transmitted to the PC. For DataNet units, the Receiver must be connected and the network up and running. For all other standalone loggers, the units must be connected via USB cable to the DataSuite software to enable online data view.

- While the logger is running double click the Logger icon in the Map View.
- While the logger is running open the logger context menu and select **Display Data**.



Figure 83: Online data window

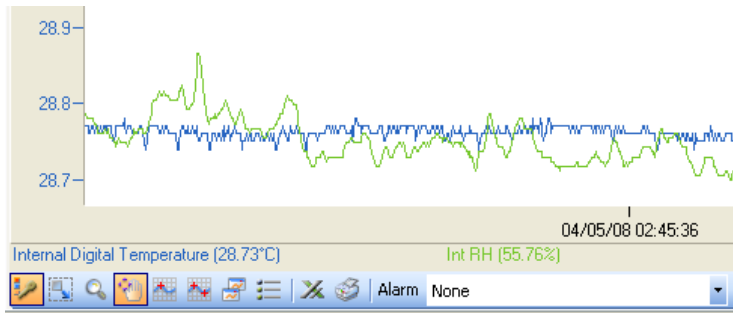
The data displayed in this window is the data that was transmitted by the logger in the current software session. Data transmitted during a previous session of the software being open will not be displayed. For example, when you setup the logger it creates a new online session. This data can be viewed by opening archived data. Refer to section 14.14.

You may view the data in a graph or table by clicking the relevant tabs in the online data window. While in either of these views, the data is constantly being updated in real-time in the respective view according to the transmission rate of the logger.

Note: Users of Windows 7 using right to left language settings e.g. Hebrew, may have problems viewing the Date/Time in the DataNet graph. This is a known Microsoft ® bug. Until a bug fix is released, change the Regional Settings to English.

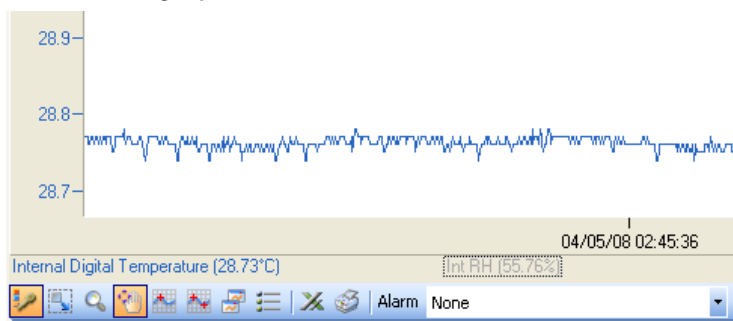
14.15.1. Showing/Hiding the Data Sets


In the online graph display, where you have data from only one logger displayed, you can show or hide the individual sensor data by using the sensor labels at the bottom of the graph.



In the screenshot above you can see two labels, *Internal Digital Temperature* and *Int RH*. At present, each label is active meaning the sensor data corresponding to the label is shown on the graph.

By clicking any of the sensor labels, you can hide the data from the graph. The label will then be grayed out. See the screenshot below:



Note: You can hide all of the sensor labels (not plots) from the graph by clicking the **Plot Legend** icon .

14.16. Working in Map View

The Map View is the main view from which you monitor your connected devices. It is in this view that you can see all the icons representing the units in your system.

Refer to section 14.5.1 for a quick overview of the Map View and section 14.5.5 for a list of all the Map View icons.

14.16.1. Loading Map View Wallpaper

You can load an image file representing a map of your facility in which the network is operating. You can then move the unit icons into their actual positions on the map.

- Double-click on the Map View background to go straight into the **Open** dialog and locate the image file.
- Right-click on the Map View background to open the context menu and select the option to either Load or Reset the wallpaper.

Note: When deploying the system for the first time it is highly recommended to use a map of the facility to make the deployment work efficiently.

14.16.2. Printing the Map View

To print the Map View go to **File > Print Map View**. This will also print the icon name tags and network paths, if enabled.

The Map View maintains its aspect ratio when printed.

14.16.3. Displaying Icon Name Tags

You can display a name tag for each device on the Map View. The name tag consists



of the unit Comment, as defined in the unit Setup:

To toggle this feature, right-click on the Map View background and select **Display All Units' Name**.

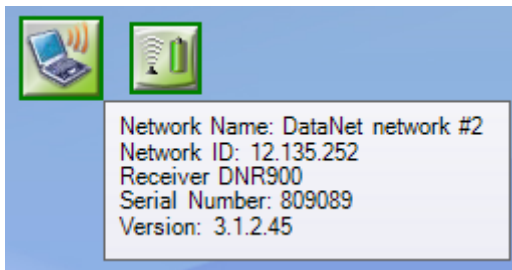
When this feature is enabled, clicking the unit icon will also highlight the name tag in red.

14.16.4. Moving Icons around the Screen

Go to **Tools > Lock Map View** and ensure this menu item is not selected in order to freely move the unit icons around the screen. When you have finished placing the icons into position you may then lock the Map View so as not to mistakenly place an icon out of position.

14.16.5. DataNet Multiple Network Connections

DataSuite supports connection of more than one DataNet Receiver simultaneously. This means that you are able to manage multiple DataNet networks from one DataSuite interface. With a Map View featuring many device icons, to identify which network each device belongs to, each device tooltip includes the network name and unique ID. In addition, when scrolling over the Receiver icon with the mouse, all devices associated to that Receiver's network is highlighted by a green frame.



14.16.6. DataNet Logger Icon Context Menu – Wireless Connection Options

Right clicking the DataNet Logger icon when connected wirelessly to the network will give the following options:

Display Data

Displays the logger's data in Graph view. The graph displays the data in real-time. There is also the option to display the data in Table view or to view the data statistics.

Download Data

Downloads all data in the logger memory to the DataSuite software. When logger is downloading the data, the Logger icon in Map View will appear as follows:



Note: Data download is also available via USB connection. Refer to section 14.16.7.

Cancel Download

When logger is downloading data you may cancel the download per logger by selecting this menu item.

As cancelling the data download results in data not being downloaded to the computer, there is a chance that data may be lost if the download isn't completed at a later stage and the logger's cyclic memory has meanwhile erased these readings.

Note: Cancel Download feature works only if there are no other commands in the queue following the Download process. For example, if the data is downloading and you sent the command *Call Unit* to the logger, and then selected *Cancel Download*, the download will not be cancelled.

Reset Alarm

When the logger is in a state of alarm, this option will reset the alarm state to normal on both the logger and the software. The visual and audible alarms will return to normal. If after reset the logger is still in alarm conditions, then the visible and audible alarms will return.

Call Unit (Beep)

This feature sends a command to the logger to emit intermittent audible *beeps* for up to one minute. This is useful when trying to physically locate a logger in your facility.

Press the **Menu** button on the logger to stop the audible alarm.

Calibration

Refer to section 14.19.4 on page 194 for an overview of the Calibration feature.

Note: A logger can't be calibrated while it is in **Run** mode. The option will be grayed out. You must **Stop** the logger first.

Update Firmware

Refer to section 15.2 on page 218 for an overview of the Update Firmware feature.

Leave Network

Selecting this feature will kick the logger off the network. The logger will reset and will start scanning for a new network to join.

You will be prompted to enter a password when selecting this feature.

Note: The default password is 1234.

Setup

Refer to section 14.17 on page 175 for an overview of how to setup the logger.

Multi-Setup

By using multi-setup you can select more than one logger on the Map View and send the same configuration to all of the loggers. When this option is selected, a dialog will open listing all of the loggers in the multi-setup selection.

Stop

Sends a command to the logger to stop logging data.

Multi-Stop

Sends a command to multiple loggers to stop logging data.

Run

Sends a command to the logger to start logging data. This command will also clear the existing logger memory.

Multi-Run

Sends a command to multiple loggers to start logging data. This command will also clear the existing logger memory.

Show Network Path

Displays the path of the logger RF data transmission to the Receiver. The Transmission Strength legend appears in the bottom right of the screen when this feature is enabled. Refer to section 14.7.2 for more details.

Enable/Disable Short Range Repeater

Changes the unit between Logger mode and Short Range Repeater (SRR) mode, whereby the logger operates as both a logger and Repeater.

Note: In SRR mode the logger must be connected to AC power at all times as the power consumption is much greater.

The logger tooltip and logger LCD menu will both indicate that the unit is in SRR mode.

Remove

This option removes from the Map View any icons of loggers that are not on the network anymore and so are irrelevant.

Turn Off

This option will turn the unit off and is password enabled. As a precaution to avoid any data loss all data not yet transmitted will first be downloaded to the computer prior to turning the unit off.

14.16.7. DataNet Logger Icon Context Menu – USB Connection Options

When connected to the computer via mini-USB cable, the DNL910, DNL920 and PA models supports the following features:

- Data Download – Downloads logger memory directly to the DataSuite data files folder. To view the data refer to section 14.14.
- Firmware Update – Refer to section 15.2.4 for more details.
- Turn Off – Turns off the unit.

To detect the logger using USB:

1. Make sure the data logger is joined to an existing network. When connected to the computer via USB go to **Devices > Detect Device** in the DataSuite main menu.
2. Right-click on the logger USB icon  to open the context menu and select one of the relevant options.

14.16.8. Viewing DataNet Logger Status

When you scroll the mouse cursor over the Logger icon a tooltip will pop up displaying data relevant to the Logger status at the time.

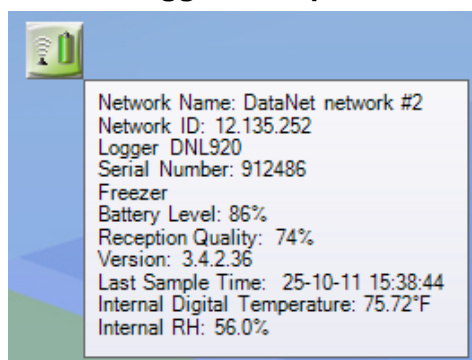
Logger Tooltip

The tooltip will always display the following data, even if offline:

- Network Name
- Network ID
- Logger Type
- Serial Number
- Logger Name/Comment

When the logger is online and running the following tooltip is displayed:

DataNet Logger Tooltip



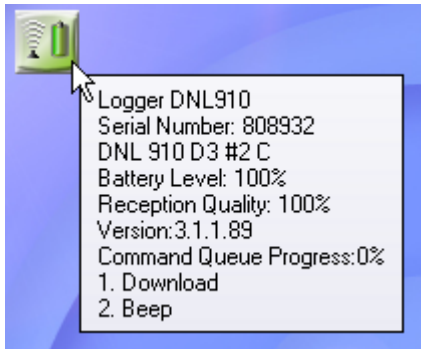
In online mode, the logger also displays:

- Device mode – Logger or Short Range Repeater
- The power status (% Battery left or Connected to AC)
- Reception quality: Strength of RF signal between logger and Receiver
- Version number: Firmware version of the logger
- Last sample time: If logger is running, time stamp of last recorded sample.

- Real-time Sensor values: All sensor values are displayed, including sensor name and alarm status.

DataNet Command Queue Progress

The tooltip is updated with specific commands being performed by the DataNet logger. For example, if the logger is downloading data to the software you can see the progress in the tooltip. In addition, the Logger icon has a blue progress indicator so you can monitor the progress without using the tooltip.

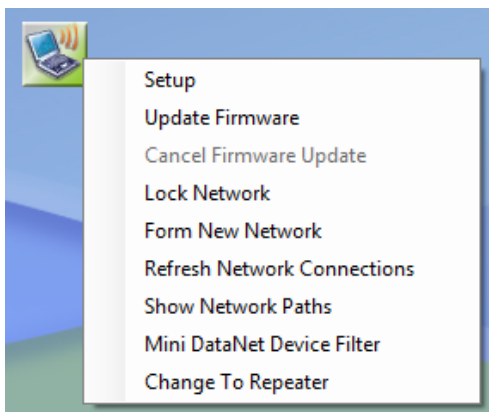


Common commands include Download, Setup, Stop, Run, Beep and more.

14.16.9. DataNet Receiver Icon Context Menu

Right clicking the Receiver icon will give the following options:

- Setup
- Update Firmware
- Lock Network
- Form New Network
- Refresh Network Connections
- Show Network Paths
- Mini DataNet Device Filter
- Change to Repeater



Setup

Receiver Setup lets the user change the name of the network name assigned to that specific Receiver. The network name appears in the tooltip of every device



connected to that network. Click **Setup** to implement the change or **Close** to close the dialog without making any changes.

Update Firmware

Selecting this option will launch the Receiver firmware update process. Refer to section 15.2 for more details.

Lock Network

By locking the network you do not allow any additional units to join the network. During the network scan, the logger will not even detect the network if it is locked.

By unlocking the network you leave it open for any unit to join the network, even if you do not wish them to.

Form New Network

Select this option to form a new network on the Receiver. The Receiver will then form a new network based on your RF environment. This will ensure optimal network performance.

Refer to section 3.8 for more details on optimizing the performance.

Once a new network is formed, any loggers connected to the old network will need to rescan and join the new network. This must be done manually by going to each logger and resetting it via the LCD menu options.

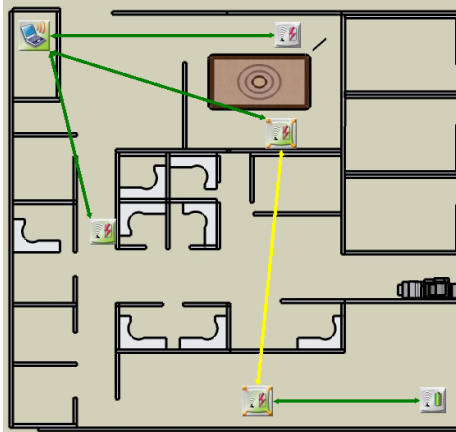
Refresh Network Connections

Use this feature to send a command to the Receiver to re-establish connection to the end units in its specific network. This is useful when wanting to ensure the network connectivity is performing optimally without any delay or lag due to changes in environmental conditions or location of the end units. Such delays can explain logger icons not displaying the correct information or commands not being sent promptly to the end units.

<p>Note: The software automatically refreshes the network connections every 10 minutes.</p>
--

Show Network Paths

While in Map View, enable this option to display the path that the RF signal of all units in the network takes to reach the Receiver. If Repeaters are used in the network it will show the signal routed via the Repeater, en route to the Receiver.



The paths are color-coded so you can also see the transmission strength. A legend appears at the bottom of the window.



- Red = Low (0 to 23% strength)
- Yellow = Medium (23 to 56%)
- Green = High (56 to 100%)

Mini DataNet Device Filter

When working with Mini DataNet units, in order for the device to be allowed onto the DataNet network, the device Serial Number must first be added to the Device Filter. Refer to section 3.5.3 for more details.

Change to Repeater

Use this feature to convert the unit from Receiver to Repeater mode. Do not perform this operation on a Receiver with a dedicated network as the network and all related devices will then go offline.

14.16.10. Viewing DataNet Receiver Status

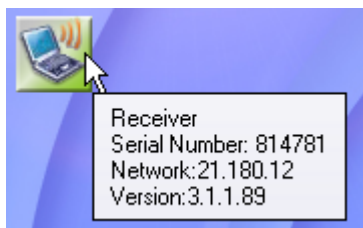
When you scroll the mouse cursor over the Receiver icon a tooltip will pop up displaying data relevant to the Receiver status at the time.

Receiver Tooltip

The tooltip will always display the following data, even if offline:

- Unit type (Receiver)

When the Receiver is online the following tooltip is displayed:





In online mode, the Receiver also displays:

- Serial Number
- Network: The Network ID of the currently formed network
- Version: Firmware version of Receiver

14.16.11. DataNet Repeater Icon Context Menu – Wireless Connection Options

Right clicking the Repeater icon will give the following options:

Setup

Repeater Setup lets the user change the name of the unit. Once the name has been changed, click **Setup** (or Close to close the dialog without making any changes).

Multi-Setup

By using multi-setup you can select more than one Repeater on the Map View and send the same configuration to all of the Repeaters.

Call Unit (Beep)

This feature sends a command to the Repeater to emit intermittent audible *beeps* for up to one minute. This is useful when trying to physically locate a logger in your facility.

Press the **Menu** button on the Repeater to stop the audible alarm.

Leave Network

Selecting this feature will kick the Repeater off the network.

You will be prompted to enter a password when selecting this feature.

Note: The default password is 1234.

Update Firmware

Selecting this option will launch the Repeater firmware update process. Refer to section 15.2 for more details.

Show Network Path

Displays the path of the Repeater RF data transmission to the Receiver. The Transmission Strength legend appears in the bottom right of the screen when this feature is enabled. Refer to section 14.7.2 for more details.

Remove

This option removes from the Map View any Repeater icons that are not on the network anymore and so are irrelevant.

14.16.12. DataNet Repeater Icon Context Menu – USB Connection Options

Update Firmware

Selecting this option will launch the Repeater firmware update process. Refer to section 15.2 for more details.

Turn Off

This option will turn the unit off and is password enabled.

Change to Receiver

This option will change the Repeater to Receiver mode, and form a network. If the Repeater has end units connected to it, performing this option could result in units losing their connection to the network.

Change to Substitute Receiver

In the event that a Receiver is no longer working, any existing Repeater on the Receiver's network can be transformed into a Substitute Receiver, to enable the network to continue working in online mode.

14.16.13. Viewing Repeater Status

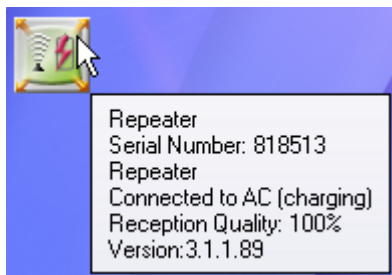
When you scroll the mouse cursor over the Repeater icon a tooltip will pop up displaying data relevant to the Repeater status at the time.

Repeater Tooltip

The tooltip will always display the following data, even if offline:

- Unit type (Router)
- Serial Number
- Repeater Name/Comment

When the Repeater is online the following tooltip is displayed:



In online mode, the Repeater also displays:

- The Power status (% battery left or Connected to AC)
- Reception quality: Strength of RF signal between logger and Receiver
- Version: Firmware version of Repeater

14.16.14. DaqLink Logger Icon Connection Options

Right-clicking the DaqLink logger icon will give the following options:

Display Data

Displays the logger's data in Graph view. The graph displays the data in real-time. There is also the option to display the data in Table view or to view the data statistics.

Download Data

Downloads all data in the logger memory to the DataSuite software. When logger is downloading the data, the Logger icon in Map View will appear as follows:



Cancel Download

When logger is downloading data you may cancel the download per logger by selecting this menu item.

Note: This feature works only if there are no other commands in the queue following the Download process.

Reset Alarm

When the logger is in a state of alarm, this option will reset the alarm state to normal on both the logger and the software. The visual and audible alarms will return to normal. If after reset the logger is still in alarm conditions, then the visible and audible alarms will return.

Calibration

Refer to section 14.19.4 on page 194 for an overview of the Calibration feature.

Note: A logger can't be calibrated while it is in **Run** mode. The option will be grayed out. You must **Stop** the logger first.

Cancel Firmware Update

When a firmware update is in progress, select this option to cancel the update and continue using the previous firmware version.

Setup

Refer to section 14.17 on page 175 for an overview of how to setup the logger.

Stop

Sends a command to the logger to stop logging data.

Run

Sends a command to the logger to start logging data. This command will also clear the existing logger memory.

Turn Off

This option will turn the unit off and is password enabled. As a precaution to avoid any data loss all data not yet transmitted will first be downloaded to the computer prior to turning the unit off.

14.16.15. MicroLite Logger Icon Connection Options

When connected to the computer via USB, the MicroLite models support the following features:

Display Data

Displays the logger's data in Graph view. The graph displays the data in real-time. There is also the option to display the data in Table view or to view the data statistics.

Note: MicroLite II models with external input caps (4-20 mA, 0-10 V and NTC Temperature) do not support online, real-time data view.

Download Data

Downloads all data in the logger memory to the DataSuite software. When logger is downloading the data, the Logger icon in Map View will appear as follows:



Cancel Download

When logger is downloading data you may cancel the download per logger by selecting this menu item.

As cancelling the data download results in data not being downloaded to the computer, there is a chance that data may be lost if the download isn't completed at a later stage and the logger's cyclic memory has meanwhile erased these readings.

Reset Alarm

When the logger is in a state of alarm, this option will reset the alarm state to normal on both the logger and the software. The visual and audible alarms will return to normal. If after reset the logger is still in alarm conditions, then the visible and audible alarms will return.

Calibration

Refer to section 14.19.4 on page 194 for an overview of the Calibration feature.

Note: A logger can't be calibrated while it is in **Run** mode. The option will be grayed out. You must **Stop** the logger first.

Update Firmware

Selecting this feature will commence update of the logger firmware, as long as the firmware file is situated in the main DataSuite directory.

Note: If the logger is currently in Push to Run or Timer Run mode, Update Firmware option will be disabled.

Setup

Refer to section 14.17 on page 175 for an overview of how to setup the logger.

Multi-Setup

By using multi-setup you can select more than one logger on the Map View and send the same configuration to all of the loggers. When this option is selected, a dialog will open listing all of the loggers in the multi-setup selection.

Stop

Sends a command to the logger to stop logging data.

Run

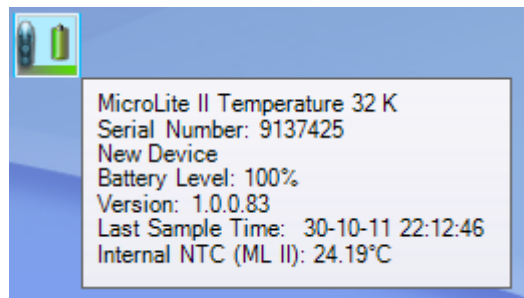
Sends a command to the logger to start logging data. This command will also clear the existing logger memory.

Remove

This option removes from the Map View any icons of loggers that are not on the network anymore and so are irrelevant.

14.16.16. Viewing MicroLite Logger Status

MicroLite Logger Tooltip



In online mode, the logger displays:

- Device model and memory size
- Serial Number
- Device Name
- Power status (% Battery left)
- Logger firmware version number
- Last sample time: If logger is running, time stamp of last recorded sample.
- Real-time Sensor values: All sensor values are displayed, including sensor name and alarm status.

14.16.17. MicroLogPRO II Logger Icon Connection Options

When connected to the computer via mini-USB cable, the MicroLogPRO II models support the following features:

Display Data

Displays the logger's data in Graph view. The graph displays the data in real-time. There is also the option to display the data in Table view or to view the data statistics.

Download Data

Downloads all data in the logger memory to the DataSuite software. When logger is downloading the data, the Logger icon in Map View will appear as follows:



Cancel Download

When logger is downloading data you may cancel the download per logger by selecting this menu item.

As cancelling the data download results in data not being downloaded to the computer, there is a chance that data may be lost if the download isn't completed at a later stage and the logger's cyclic memory has meanwhile erased these readings.

Reset Alarm

When the logger is in a state of alarm, this option will reset the alarm state to normal on both the logger and the software. The visual and audible alarms will return to normal. If after reset the logger is still in alarm conditions, then the visible and audible alarms will return.

Calibration

Refer to section 14.19.4 on page 194 for an overview of the Calibration feature.

Note: A logger can't be calibrated while it is in **Run** mode. The option will be grayed out. You must **Stop** the logger first.

Update Firmware

Selecting this feature will commence update of the logger firmware, as long as the firmware file is situated in the main DataSuite directory.

Note: If the logger is currently in Push to Run or Timer Run mode, Update Firmware option will be disabled.

Setup

Refer to section 14.17 on page 175 for an overview of how to setup the logger.

Multi-Setup

By using multi-setup you can select more than one logger on the Map View and send the same configuration to all of the loggers. When this option is selected, a dialog will open listing all of the loggers in the multi-setup selection.

Stop

Sends a command to the logger to stop logging data.

Run

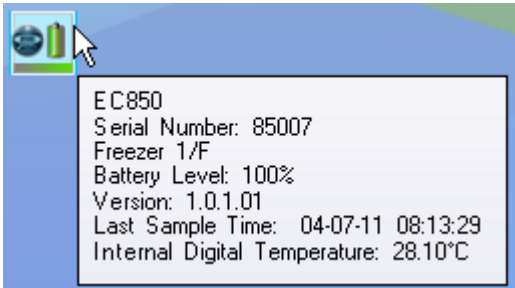
Sends a command to the logger to start logging data. This command will also clear the existing logger memory.

Remove

This option removes from the Map View any icons of loggers that are not on the network anymore and so are irrelevant.

14.16.18. Viewing MicroLogPRO II Logger Status

MicroLogPRO II Logger Tooltip



In online mode, the logger also displays:

- Device model – EC800 or EC850
- The power status (% Battery left)
- Version number: Firmware version of the logger
- Last sample time: If logger is running, time stamp of last recorded sample.
- Real-time Sensor values: All sensor values are displayed, including sensor name and alarm status.

14.17. Configuring the Logger

DataSuite software allows you to configure each logger, via direct USB connection or wirelessly in the case of DataNet.

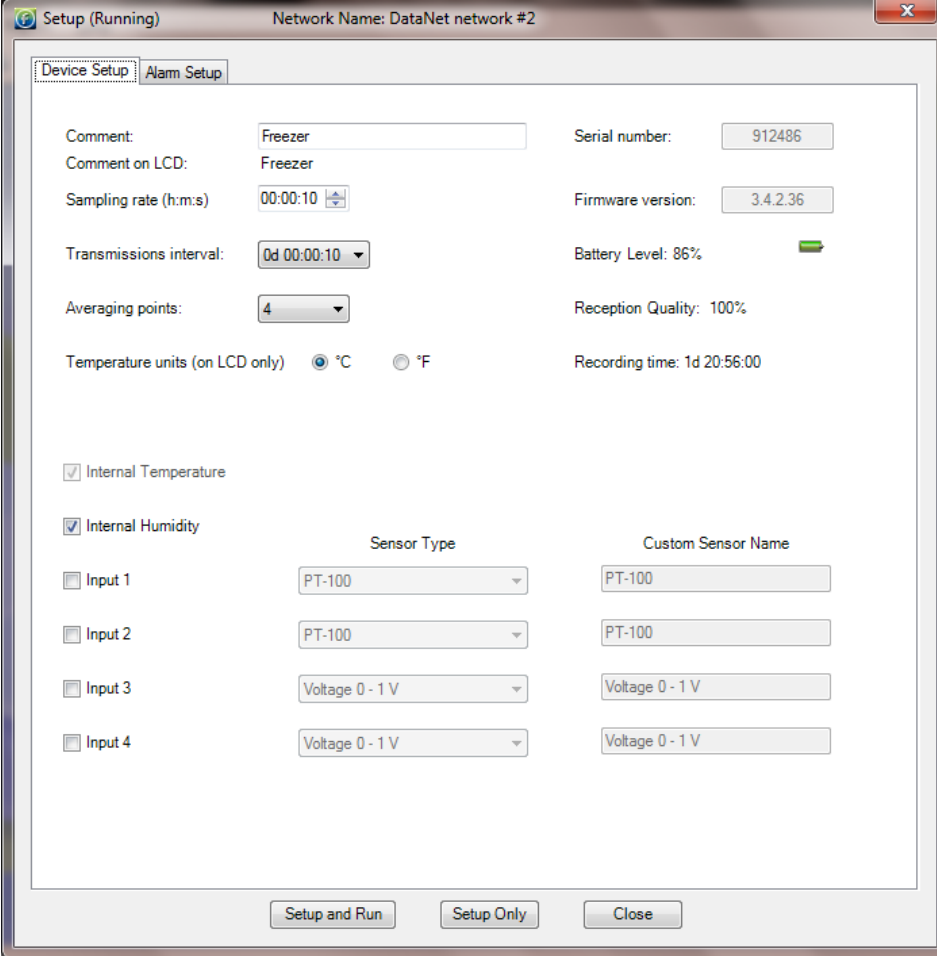
To configure the logger once it's detected by the DataSuite software, right-click the Logger icon in the Map View and select **Setup**.

The DataNet, DaqLink, MicroLite and MicroLogPRO II setup dialogs differ, as each model has different parameters. Each Setup window is described below.

14.17.1. DataNet Setup Window – Device Setup Tab

The DataNet Setup window has two tabs, **Device Setup** and **Alarm Setup**.

The main logger configuration is performed on the Device Setup tab. Any alarm levels you wish to configure is performed on the Alarm Setup tab.



Setup (Running) Network Name: DataNet network #2

Device Setup | Alarm Setup

Comment: Freezer Serial number: 912486

Comment on LCD: Freezer

Sampling rate (h:m:s) 00:00:10 Firmware version: 3.4.2.36

Transmissions interval: 0d 00:00:10 Battery Level: 86%

Averaging points: 4 Reception Quality: 100%

Temperature units (on LCD only) °C °F Recording time: 1d 20:56:00

Internal Temperature

Internal Humidity

	Sensor Type	Custom Sensor Name
<input type="checkbox"/> Input 1	PT-100	PT-100
<input type="checkbox"/> Input 2	PT-100	PT-100
<input type="checkbox"/> Input 3	Voltage 0 - 1 V	Voltage 0 - 1 V
<input type="checkbox"/> Input 4	Voltage 0 - 1 V	Voltage 0 - 1 V

Setup and Run Setup Only Close

Figure 84: DataNet Device Setup tab

Comment

This is the name of the logger. It is advisable to name the logger according to the location in the facility.

Note: The Comment field in the software and on the logger display supports all standard alphanumeric characters except for the following: ', ", ~, &, \

Sampling Rate

Sampling rate is one sample per second to one sample per 18 hours. However, there are programming limitations you must be aware of when configuring the loggers. The sampling rate will vary depending on the number and type of sensors you setup. Refer to section 4.7.5 on page 46.

Transmission Interval

You can define how often the logger will actually transmit to the network. You may wish to have the logger transmit with every sample, if you have slower sampling rates, or less frequently, if you have a fast sampling rate.

The transmission interval must be a multiple of the sampling rate, so for example if the sampling rate is 3 seconds, then the minimum transmission rate must be every 3 seconds, and then every 6 seconds, 9 seconds, and so on.



This parameter was designed to ease the burden on the network if you have many loggers as each logger can transmit at different rates.

Averaging Points

You can choose have online averaging of up to 10 points around the real value in order to smooth the data readings, if they are a little *noisy*. The recommended averaging is 4 samples.

Temperature Units

Toggle between °C and °F. This applies to the readings displayed on the logger LCD as well as in the software.

Active Sensors

Depending on the logger model, you can activate up to two internal sensors and four external sensors. Simply select the inputs you want to use and then select the sensor types from the adjacent drop-down menu. You don't have to select the external sensor input in any order. You may select only Input 4 if you desire.

Note: On the DNL920 you cannot run the humidity sensor without running the temperature sensor in parallel.

This is because when using the DNL920 data logger and selecting the internal humidity sensor in the Device Setup dialog, the internal digital temperature sensor will automatically be selected as well. This sensor provides the temperature compensation necessary for the humidity sensor to reach the 3% accuracy as stated in the sensor specifications. It is not used for recording temperature. The internal digital sensor is used to record temperature on the DNL920.

Custom Sensor Names

You can also give the sensor a custom name, which will appear in the software when viewing the data. This is convenient when using several of the same type of sensors and you wish to differentiate between them in terms of their environment or material it is measuring.

Recording Time

This field displays the length of time the logger memory will be able to record for depending upon the number of sensors used and sampling rate.

Setup and Run

Clicking **Setup and Run** will send the setup to the logger and immediately start logging data.

Setup Only

Clicking **Setup Only** will send the setup to the logger but it will not actually start logging data. You will need to select Run from the Logger context menu or go back into the Setup dialog.

Close

Clicking **Close** will close the Setup dialog without saving any of your configurations.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

14.17.2. DaqLink Setup Window – Device Setup Tab

The DaqLink Setup window has two tabs, **Device Setup** and **Alarm Setup**.

The main logger configuration is performed on the Device Setup tab. Any alarm levels you wish to configure is performed on the Alarm Setup tab.

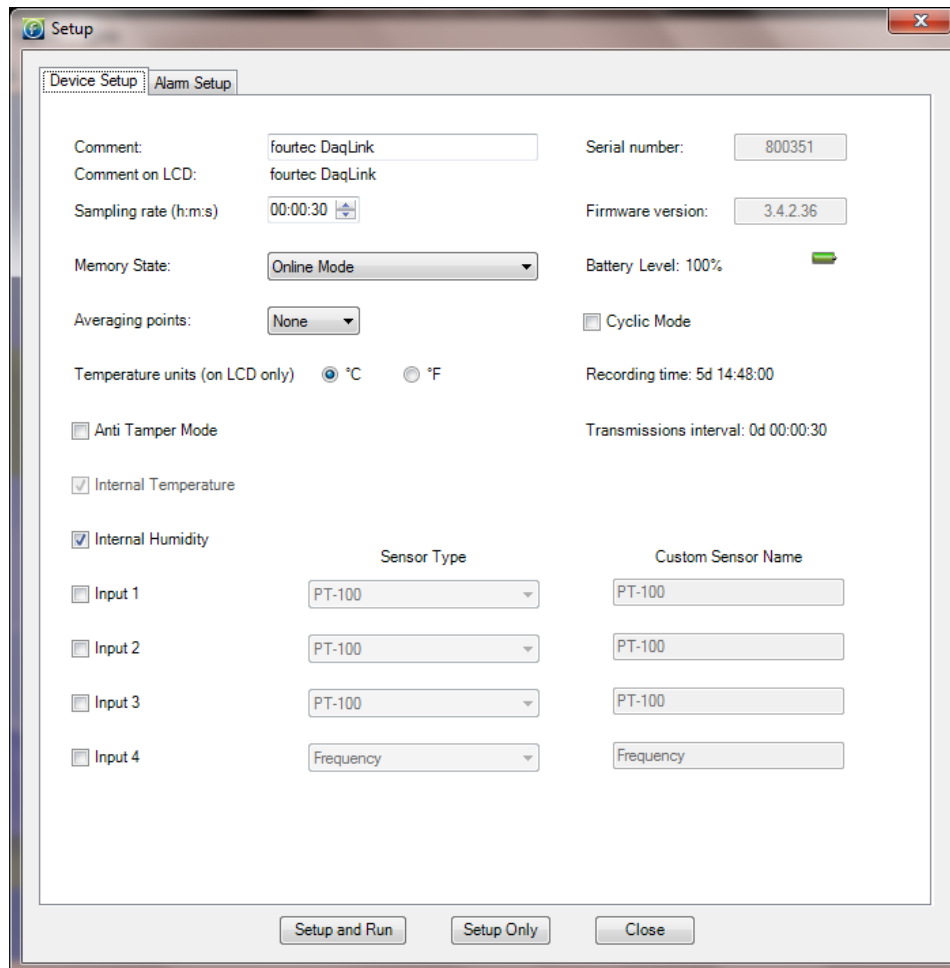


Figure 85: DaqLink Device Setup tab

Comment

This is the name of the logger. It is advisable to name the logger according to the location in the facility.

Note: The Comment field in the software and on the logger display supports all standard alphanumeric characters except for the following: ', ", ~, &, \

Sampling Rate

Sampling rate is one sample per second to one sample per 18 hours. However, there are programming limitations you must be aware of when configuring the loggers. The sampling rate will vary depending on the number and type of sensors you setup. Refer to section 7.3.5 on page 84.

Memory State

From the drop-down menu you have the following options:

- **Online Mode:** For working with logger connected to PC. Data will be transmitted in real-time i.e. at the same time as the sampling rate.
- **Optimized Memory Mode:** For working with the logger as a standalone device, not connected to the PC. In this mode, the memory is more efficiently managed as the data does not need to be transmitted together with the sampling rate. Use the **Transmissions interval** parameter in the Setup window to see the rate at which the data will be displayed on the logger or in the software.

Note: If used when connected to the PC, the data will not be transmitted in real-time.

Cyclic Mode

If this checkbox is not selected, the logger will stop recording data when the memory capacity is filled.

Enabling Cyclic mode will result in the oldest samples in the memory being overwritten by new samples once the memory is full. This allows continuous data logging.

Averaging Points

You can choose have online averaging of up to 10 points around the real value in order to smooth the data readings, if they are a little noisy. The recommended averaging is 4 samples.

Note: If configuring Alarm duration with averaging points selected, the alarm will be counted from the time of the last sampling point used to calculate the average.

Temperature Units

Toggle between °C and °F. This applies to the readings displayed on the logger LCD as well as in the software.

Anti Tamper Mode

To prevent tampering with the DaqLink logger, selecting this option will disable the following features on the logger menu:

- Pause
- Reset
- Stop and turn off unit

Active Sensors

Depending on the logger model, you can activate up to two internal sensors and four external sensors. Simply select the inputs you want to use and then select the sensor types from the adjacent drop-down menu. You don't have to select the external sensor input in any order. You may select only Input 4 if you desire.

Note: On the DBSA720 you cannot run the humidity sensor without running the temperature sensor in parallel.

This is because when using the DBSA720 data logger and selecting the internal humidity sensor in the Device Setup dialog, the internal digital temperature sensor will automatically be selected as well. This sensor provides the temperature compensation necessary for the humidity sensor to reach the 3% accuracy as stated in the sensor specifications. It is not used for recording temperature. The internal digital sensor is used to record temperature on the DBSA720.

Custom Sensor Names

You can also give the sensor a custom name, which will appear in the software when viewing the data. This is convenient when using several of the same type of sensors and you wish to differentiate between them in terms of their environment or material it is measuring.

Recording Time

This field displays the length of time the logger memory will be able to record for depending upon the number of sensors used and sampling rate.

Setup and Run

Clicking **Setup and Run** will send the setup to the logger and immediately start logging data.

Setup Only

Clicking **Setup Only** will send the setup to the logger but it will not actually start logging data. You will need to select **Run** from the Logger context menu or go back into the Setup dialog.

Close

Clicking **Close** will close the Setup dialog without saving any of your configurations.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session

14.17.3.DataNet and DaqLink Alarm Setup Tab

A major feature of the DataNet and DaqLink systems is the ability to configure alarm levels into the loggers so any breach of these levels as recorded on the data logger is monitored by the software, and the user is notified via Email/SMS/audible and visual indicators.

The Alarm Setup tab lets you configure each sensor for the following alarms:

- Low
- Pre-Low
- Pre-High
- High
- Contact Open / Contact Close (when the Contact sensor is selected)

Using the Pre Alarms gives the user ample warning of a possible breach of real alarm levels, so necessary measures can be taken to prevent such a breach.

Simply select the check box for the type of alarm you wish to be notified. You can select all alarms too. Enter the alarm value in the text box.

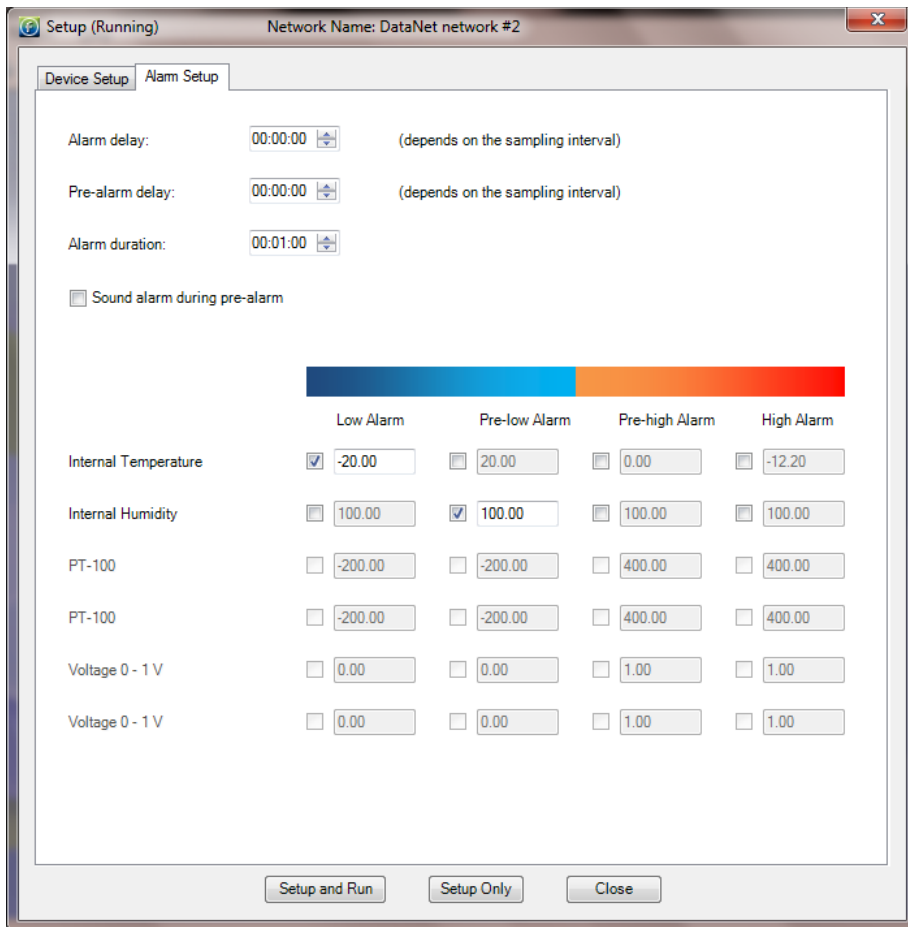


Figure 86: DataNet and DaqLink Alarm Setup tab

Alarm Delay and Pre-alarm Delay

The time until the alarm (or pre-alarm) is activated. You may not want to have the alarm sound immediately after the alarm level is breached as you are only interested in a condition where the alarm level lasted a certain amount of time.

For example, if monitoring change of temperature in a freezer, you would only be interested in a High alarm which lasted more than one minute as anything else could just be caused by the freezer door opening for a few seconds, as opposed to a power failure leading to rise in temperature.

Alarm Duration

The duration of the alarm that is set off by one or more sensors breaching the alarm level.

Sound Alarm during Pre-alarm

You also have the option to sound the alarm in the software during a pre-alarm scenario, not just for a standard alarm.

Once you have configured your alarms, you may return to the **Device Setup** tab or click one of the **Setup** buttons at the bottom of the tab.

14.17.4. MicroLite & MicroLogPRO II Setup Window – Properties, Sensors and Display Setup

The MicroLite and MicroLogPRO II Setup window include the following tabs: **Properties**, **Sensors** and **Display**. They contain the same parameters for both products.

In addition, the MicroLite II has a tab named **Boomerang Report**, for configuration of the Boomerang feature. Refer to section 14.25 on page 212 for more details.

The main logger configuration is performed on the **Properties** tab. The Sensor and Alarm setup is performed on the **Sensors** tab, and LCD options are available on the **Display** tab.

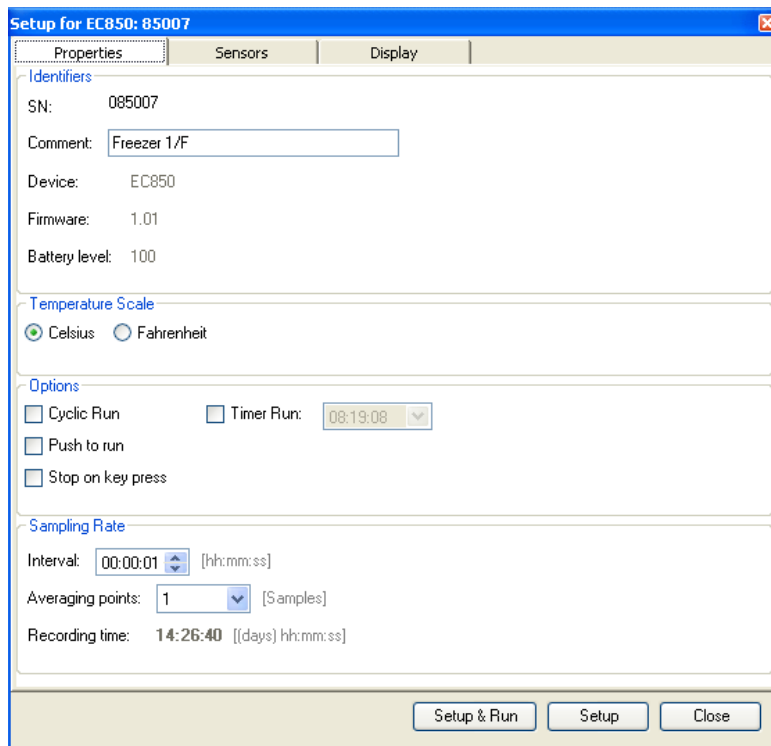


Figure 87: MicroLogPRO II Properties tab

Properties Tab

Comment

This is the name of the logger and supports up to 15 characters. It is advisable to name the logger according to the location in the facility.

Note: The Comment field in the software supports all standard alphanumeric characters except for the following: ', ", ~, &, \

Temperature Scale

Toggle between °C and °F. This applies to the readings displayed on the logger LCD as well as in the software.

Options

- **Cyclic Run** – Select to enable the logger memory to continue running in cyclic mode, whereby the logger will not stop once the memory capacity is reached but will erase the first samples in memory. If this option is left unchecked, the logger will stop when the memory is full.
- **Push to Run** – Select to enable logger activation via the device keypad by pressing both buttons together to start running (MicroLogPRO II) or via the magnet key (MicroLite II).
- **Stop on key press** – Select to enable the user to stop the logger running via the keypad (MicroLogPRO II) or magnet key (MicroLite II) and not just via the software.
- **Stop on sensor disconnect** – *For MicroLite II External input models only.* Select to enable the logger to stop recording data, when the external cap is disconnected from the main body of the logger. This prevents garbage data being recorded when the external sensor is disconnected.
- **Timer Run** – Select the time at which the logger should start running. Until that time the logger will remain in standby mode.

Sampling Rate

Sampling rate is one sample per second to one sample per 18 hours.

Averaging Points

You can choose have online averaging of up to 10 points around the real value in order to smooth the data readings, if they are a little *noisy*. The recommended averaging is 4 samples.

Recording Time

This field displays the length of time the logger memory will be able to record for depending upon the number of sensors used and sampling rate.

Setup and Run

Clicking **Setup and Run** will send the setup to the logger and immediately start logging data.

Setup Only

Clicking **Setup Only** will send the setup to the logger but it will not actually start logging data. You will need to select Run from the Logger context menu or go back into the Setup dialog.

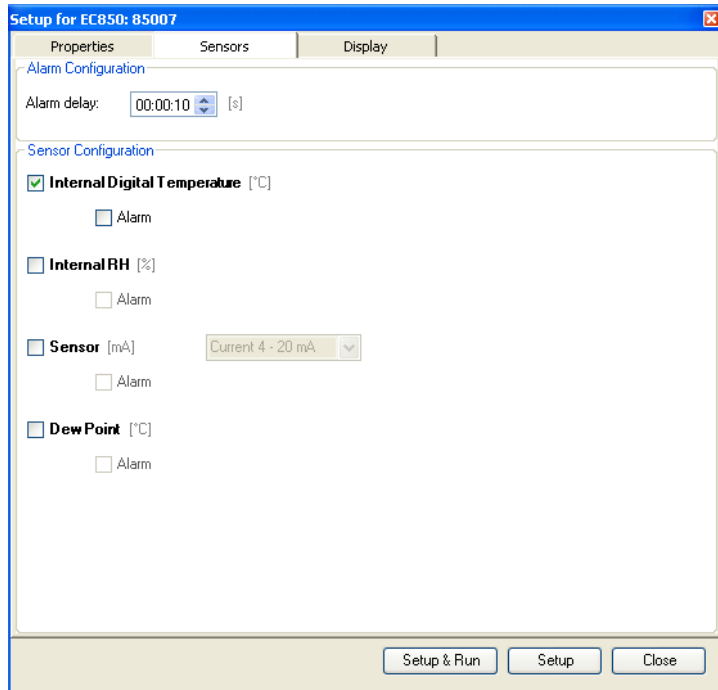
Close

Clicking **Close** will close the Setup dialog without saving any of your configurations.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

Sensors Tab

Use this tab to configure the specific logger inputs which should be run, in addition to relevant alarm levels. A major feature of the DataSuite system is the ability to configure alarm levels into the loggers so any breach of these levels is recorded on the data logger and monitored by the software, if the unit is connected via USB. The user may be notified of these alarms via Email/SMS/audible and visual indicators.



Alarm Delay

The time until the alarm is activated. You may not want to have the alarm sound immediately after the alarm level is breached as you are only interested in a condition where the alarm level lasted a certain amount of time.

For example, if monitoring change of temperature in a freezer, you would only be interested in a High alarm which lasted more than one minute as anything else could just be caused by the freezer door opening for a few seconds, as opposed to a power failure leading to rise in temperature.

Sensor Configuration

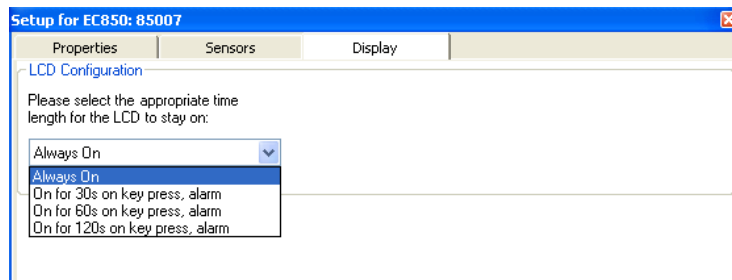
Select the relevant checkbox to configure the logger internal and/or external sensors to be used for measurement.

To enable Dew Point measurement on the EC850 or MicroLite II RH model, you must select both the internal Temperature and Humidity checkboxes.

After selecting one or more of the sensor checkboxes, the Alarm checkbox is enabled. Enter the minimum and maximum alarm levels dependent on your specific thresholds.



Display Tab



The Display tab allows the user to select one of four LCD options:

- Always On – The LCD will always remain on during logging
- On for 30, 60 or 120 seconds on key press and alarm – Selecting one of these options will result in the LCD coming on for the defined period, after the logger keypad is pressed or after an alarm is reached. After the defined number of seconds, the logger LCD will shut off again. Even if the LCD is off, the logger is continually recording data.

14.18. Entering Alarm Reason

In the DataSuite CFR software, and as part of the CFR requirements, any recorded sensor alarm must be assigned an explanation why the alarm occurred.

Whenever an alarm is recorded the Alarm Reason icon will flash in the upper DataSuite toolbar. It will continue to flash until all alarms are assigned a Reason.

When exiting the application a system message will pop up warning that there are alarms without an explanation.

To add an alarm reason:

1. Click the **Alarm Reason** icon to open the Update Alarm Reason dialog.

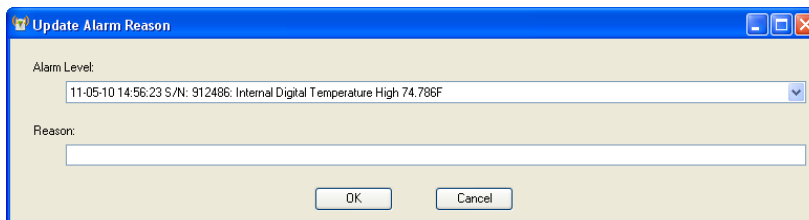



Figure 88: Update Alarm Reason dialog



1. Select the relevant alarm from the drop-down menu and enter the reason in the text box.
2. Click **OK** when finishing entering all alarm reason. The Alarm reason icon will now be disabled: .
3. The alarm reasons will be updated in the DatPass database and will appear in the DatPass Audit Trail.

14.19. Alarm Notifications Setup

Once you have completed the logger alarm setup, you can configure DataSuite to send alarm notifications via Email or SMS.

From the **Tools** menu select one of the following options, depending on the type of notifications required:

- Email Alarm Notification
- SMS Alarm Notification

Or click the Email  or SMS  icons located in the upper toolbar in order to launch the notification dialog.

Note: To enable sending of Email or SMS first define the Email and SMS settings in the **Tools > Options** dialog. Connect a GSM modem to the PC if sending SMS's. Refer to section 14.9 on page 152 for more details.

You may manage your contact list of alarm notification recipients from either the **Manage Contacts** menu item in the Tools menu, or from within the Alarm Notification dialog itself.

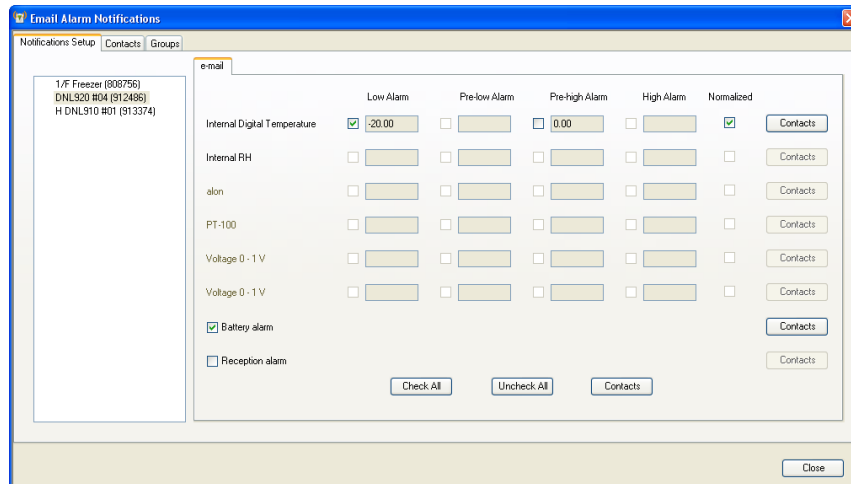


Figure 89: Alarm Notifications Setup dialog

As the Email and SMS Alarm Notifications must be defined separately, they each have separate dialogs. However the interface is identical and the contacts are stored in the same database.

The Email/SMS Notifications dialog is divided into the following tabs:

- Notifications Setup
- Contacts tab
- Groups tab

14.19.1. Contacts Tab

The first step is to create the contacts who shall be receiving the notifications. The ability to manage contacts is possible from both the Email and SMS Notifications dialogs.

1. Click the **Contacts** tab and then click **Add Contact**.

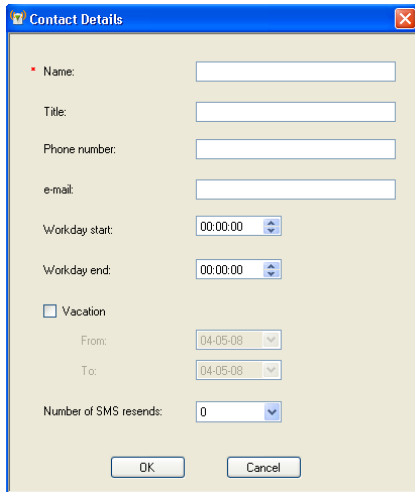


Figure 90: Adding a contact

- In this dialog you must first enter the contact name in the **Name** field. That is the only mandatory field but if you don't enter at least the phone number or Email then they won't receive any alarm notifications.

The other fields in the dialog are as follows:

- **Title:** Corporate position
- **Phone number:** The number the DataSuite software will use to send the SMS notification.
- **Note:** The phone number field supports the following characters: 0-9, #, *, -, (), +
- **Email:** The address the DataSuite software will use to send the Email notification.
- **Workday Start and End:** You can define the hours in which the contact will be eligible to receive the notifications i.e. so they don't receive SMS or Email while in the office, or vice versa.
- **Vacation:** You can define when the contact is on vacation so they won't receive any notifications over this period.
- **Number of SMS resends:** The number of times DataSuite will send follow-up SMS's with the alarm notification. The maximum is nine resends per alarm.
The gap between each resend is five minutes.

Note: In order to stop receiving SMS resends, you can simply send an SMS with 'OK' in the message body to the GSM SIM card's phone number.

- When the contact details have been entered, click **OK**.
- The contact will be added to the **Contacts** tab. You may choose to add another contact, edit an existing contact or remove a contact from the list.

14.19.2. Groups Tab

- Click the **Groups** tab and then click **Add Group**. The **Group Details** dialog will open.

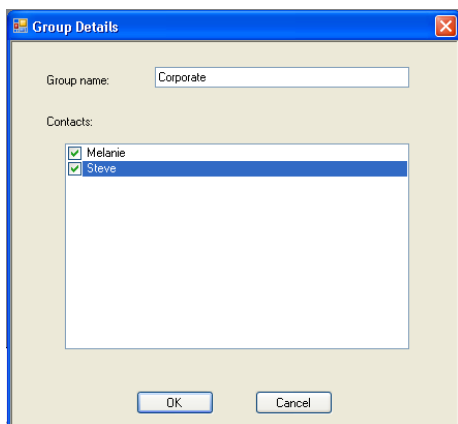


Figure 91: Adding a group

2. Enter a Group name and add your existing contacts to the group by selecting the checkbox next to the Contact name.
3. Click **OK** to create the Group. In the Groups tab you may choose to add a group, edit an existing group or remove a group from the list.

14.19.3. Notifications Setup Tab

1. Once the contacts have been created you may start defining which contacts should receive the alarm notifications.
2. The pane on the left-hand side of the **Notifications Setup** tab displays all the units, loggers or DataNet Repeaters and their serial numbers, which have been configured in your network. You must define the alarm notifications for each unit in turn. Select the first unit you wish to define.
3. The **Email** or **SMS** tab is now active for the unit selected in step 1 above. In this tab, select the type of alarm for which the notification should be sent in the event that the predefined alarm level is breached.
4. Only the sensors which were configured in the logger Setup, with alarms levels, are enabled in this tab. In addition, any online DataNet Repeater will be enabled for sending battery alarm or reception alarm notifications.

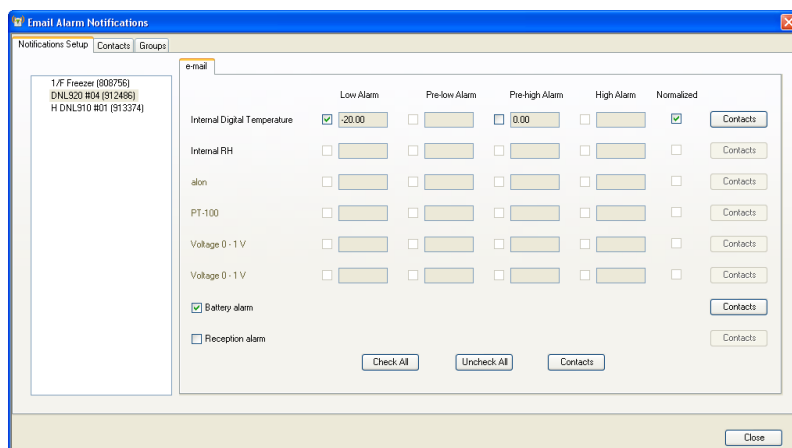


Figure 92: SMS and Email notification setup

5. Select the checkboxes according to the type of sensor alarm for which notifications should be sent.



You may also select the following alarms:

- a. **Battery alarm:** Notification will be sent for low battery alarm when battery level is at or drops below 10%. When the battery level goes above 10% again, when unit is connected to AC power, another email notification is sent stating the battery is charging.
 - b. **Reception alarm:** For DataNet units, an Offline alarm notification will be sent when there is no RF reception from a unit. When the unit is back online, an Online notification is sent.
 - c. **Normalized:** Notification will be sent when the logger return to normal levels having been in alarm.
6. Click the **Contact** button adjacent to each of the sensors which have defined alarms. In the **Select Contact** dialog, select the contact and/or group that will receive the notification.
 7. You can also click **Check All** to select all the sensor alarms for notification.

Note: If the DataNet logger transmission rate is slower than the sampling rate, an alarm notification is still sent even if the logger transmission time hasn't passed. For example, if the sampling rate is every 5 minutes, and the transmission rate is every 10 minutes, if a logger reaches a high alarm after 7 minutes a notification will be sent. The system won't wait until the scheduled transmission time.

14.19.4. Email and SMS Notification Formats

Email Notification Format

When the Email notification is sent the recipient receives the Email in the following format:

Email Header:

DataNet Alarm: Internal Temperature High Alarm, Value Detected: 25.47C)

Email Body:

```
DataNet Alarm
Comment: Factory 1/F
S/N: 808932
08-07-09 13:53:41
Internal Temperature Low Alarm,
Value Detected: 25.47 C
```

The Email header contains the sensor type, last recorded sample, and alarm type.

In addition the Email body contains the logger comment, serial number, time stamp of last sample and value of last sample.

SMS Notification Format

When the SMS notification is sent the recipient receives the SMS in the following format. (The logger comment is displayed in the first row).

```
S/N 515244, Test 810#2, Int. Temperature 15/1/10 17:25 – High Alarm, Value
Detected: 24.24C
```

14.20. Calibration

All fourtec data loggers are shipped fully calibrated either with a calibration certificate or a Declaration of Accuracy certificate. However, DataSuite does provide a simple and efficient process for users wishing to calibrate their data loggers themselves. The process itself can be performed wirelessly (for DataNet units) or with the unit connected via USB cable. As with any data logger calibration a calibrator or other type of calibration instrument is necessary.

The Calibration options are accessible via the Logger context menu in the Map View (right-clicking the Logger icon).

Before performing logger calibration, the logger must be in **Stop** mode. In addition, all of the calibration options are accessible with a password making it difficult for non-authorized users of the system to tamper with the loggers' calibration settings.

Note: The default password is 1234. The password can be changed in the password dialog box.

The Calibration option menu options are:

- **Calibration:** Opens the main Calibration dialog
- **Save Calibration:** Saves the logger's current calibration settings
- **Load Calibration:** Loads a logger's previously saved calibration settings.
- **Reset Calibration:** Resets the logger's calibration settings so that the raw hardware data is obtained, without any software calibration applied to these values.
- **Restore Factory Calibration Default:** Restores the logger's calibration settings to the factory calibration i.e. the calibration settings it received prior to shipment from fourtec.

14.20.1. Introduction to Calibration

Although the data loggers come fully calibrated, the software enables you to calibrate any of the logger sensors, on any input (in the case of the multi-input loggers). The calibration parameters are sent to the data logger and stored in its memory.

DataSuite employs two different calibration methods: **Two-point calibration** and **Offset calibration**.

Each sensor can be calibrated using the Two-point calibration method, and then tweaked using offset calibration, except for the Thermocouples. These sensors require offset calibration only.

DataNet and DaqLink Sensor Inputs

Sensor	Type	Calibration Method
Current	4 – 20 mA	Two-point calibration
Humidity (Internal)	Digital	Two-point calibration

Temperature (Internal)	Digital	Two-point calibration
Temperature (Internal)	PT-100	Two-point calibration and offset
Temperature	PT-100 2-wire	Two-point calibration and offset
Temperature	Thermocouple J	Offset calibration
Temperature	Thermocouple K	Offset calibration
Temperature	Thermocouple T	Offset calibration
Voltage	0 to 1 V	Two-point calibration
Voltage	0 to 50 mV	Two-point calibration

MicroLite Sensor Inputs

Sensor	Type	Calibration Method
Temperature (Internal)	Digital (LITE5032-RH)	Two-point calibration and offset
Temperature (Internal)	NTC (LITE5008, LITE5008P, LITE5016, LITE5032P)	Two-point calibration and offset
Humidity (Internal)	Digital (LITE5032-RH)	Two-point calibration and offset
External Current *	4 – 20 mA (LITE5032P-4/20)	Two-point calibration and offset
Voltage *	0 to 10 V (LITE5032P-V)	Two-point calibration and offset
External Temperature *	NTC 10K (LITE5032P-EXT)	Two-point calibration and offset

* Online calibration is not supported, as external sensor cannot be connected to cap while logger is connected to computer via USB

MicroLogPRO II Sensor Inputs

Sensor	Type	Calibration Method
Temperature (Internal)	Digital (EC850)	Two-point calibration and offset
Temperature (Internal)	NTC (EC800)	Two-point calibration and offset
Humidity (Internal)	Digital (EC850)	Two-point calibration and offset



External Current	4 – 20 mA	Two-point calibration and offset
Voltage	0 to 10 V	Two-point calibration and offset
External Temperature	NTC 10K	Two-point calibration and offset

Calibration Tips

Prior to any two-point calibration it is recommended to restore factory calibration defaults.

Prior to calibrating any of the thermocouple sensor types, calibrate the Voltage 50 mV sensor as this will set the gain (slope) of all thermocouple sensor types.

After calibrating 50 mV, TC-J, TC-K or TC-T sensor types for all inputs you can refine the offset calibration for each input individually.

You may calibrate all thermocouple sensor types at once, or individually.

Prior to calibrating the PT-100 input, you must first perform **Reset Calibration** in the Calibration dialog.

Two-point Calibration

The two-point calibration sets the gain (slope) and offset (intercept) of the sensor's conversion function.

Use the two-point calibration to calibrate all DataNet sensors except for the Thermocouples. In some cases you may need to refine your calibration using the fine offset tuning tool.

Offset Calibration

To calibrate the Thermocouple temperature sensors: TC-J, TC-K and TC-T, first calibrate the 50 mV sensor type. That will set the slope for all Thermocouple temperature sensors. Then proceed to adjust the offset using the Offset calibration technique.

14.20.2. Calibrating the Data Logger

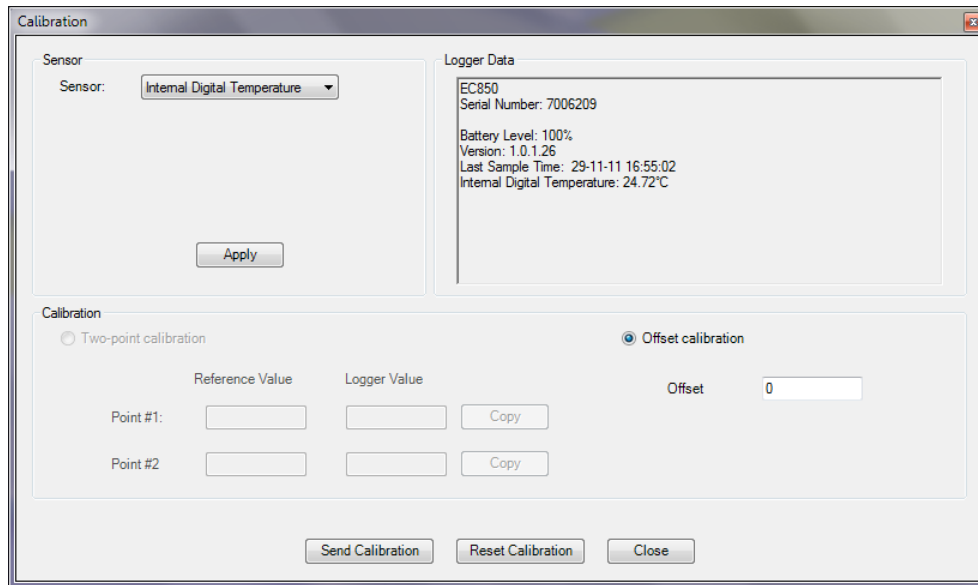


Figure 93: Calibration dialog

1. From the Map View, open the Logger context menu and select **Stop**.
2. Select **Calibration > Calibrate** and enter the password in the **Password** dialog.
3. Select the sensor you wish to calibrate from the **Sensor** drop-down menu.
4. For DataNet/DaqLink loggers, if calibrating an external sensor, select the inputs to calibrate. Select **All** or an individual input, **1 to 4**.
5. Click **Apply** to send the sensor setup to the logger.

Note: The calibration process does not delete the logger's setup prior to calibration. Once Calibration is complete the original logger setup will be restored.

6. If you selected **All** inputs, then by default the logger will be setup to log data on **Input 1** during the calibration process. Otherwise, if you selected a specific input, it will setup the logger to calibrate on that input.

Logger Data Pane

The Logger Data pane displays real-time readings on the logger, at a default sampling rate of one per second. You can also view the logger's general status. Use the Logger Data pane to verify your logger is properly calibrated.

The Calibration dialog will enable either Two-point or Offset calibration, or both, depending on the sensor selected.

Note: The calibrated sensor parameters will be saved both in the logger and in the software memory, so there is no need to calibrate the logger every time you run the software.

14.20.3. Performing a Two-point Calibration

To perform a two-point calibration, you must have two reference points to input against the real logger sensor values.

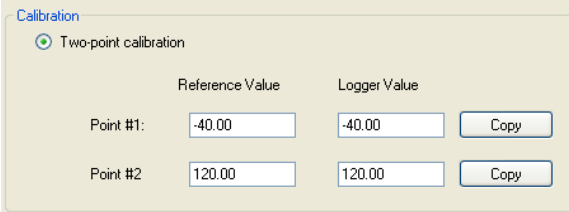


Figure 94: Two-point calibration window

1. In the **Point #1** field, enter the first **Reference Value** and the corresponding **Logger Value**.
2. In the **Point #2** field, enter the second **Reference Value** and the corresponding **Logger Value**.

Note: If you are using a calibrator and the logger is currently displaying the real value to be calibrated, press the **Copy** button to copy the real value to the **Logger Value** text box.

3. Press **Send Calibration** to send these values to the logger memory.
4. Compare the real value in the Logger Data pane to the reference value. If the values are within an acceptable margin of error you may close the Calibration window, or move on to the next sensor or input.
5. If the values are still not accurate enough, you can perform Offset calibration to tweak with values further.

Note: fourtec strongly recommends calibrating using the default Reference values that appear in the two Reference value text boxes for each sensor.

14.20.4. Performing an Offset Calibration

If, after the Two-point calibration procedure, the logger still exhibits some offset value use the Offset calibration tool to correct it.

The offset value is the difference between the value displayed by the logger and the reference value. For example if the calibrator is set to 0 °C and the logger reads 1 °C the offset value is +1, but if the logger reads -1 °C then the offset value is -1.

To perform an Offset calibration, simply select the **Offset calibration** radio button to enable the **Offset** text box. For Thermocouples you will only have the option to perform an Offset calibration.

Enter the offset value in the text box and click **Send Calibration**. Continue to adjust the offset accordingly until satisfied with the readings.

14.20.5. Setting the Offset to a Specific Input

For DataNet and DaqLink loggers, after setting the offset to all inputs simultaneously, you can set the offset of each input separately for even better accuracy.

To set the offset of a specific input:

1. Measure two known reference values making sure to use the input you need to calibrate.
2. Enter the offset value as described in section 14.20.4 above, making sure to select the correct input number instead of **All**.



3. You can repeat the procedure for every input.

14.20.6. Calibrating the Internal Temperature Sensor on the DNL910

The DNL910's internal temperature sensor is a PT-100 sensor. Calibration of this sensor is performed by calibrating the external PT-100 input i.e. two-point calibration followed by offset calibration.

1. In the Calibration dialog, select **PT-100** in the Sensor drop-down menu and select **All** inputs.
2. Press **Setup** to proceed.
3. Connect a calibrator or an actual PT-100 sensor to Input-1. Calibrate the input using the reference values.

Once this calibration procedure is complete both the logger's internal temperature sensor (PT-100) and external PT-100 inputs will be calibrated.

14.20.7. Calibrating the External PT-100 Sensor Input

DataNet and DaqLink PT-100 calibration is a standard 2-point calibration followed by offset calibration. Once the PT-100 sensor has been selected in the **Sensor** drop-down menu, click the **Reset Calibration** button. Then proceed with the 2-point calibration procedure.

Before each calibration this step must be performed otherwise the calibration will not be accurate.

14.20.8. Saving Calibration Settings

At any time you may manually save the logger's calibration settings locally to your PC.

1. Open the logger context menu, select **Calibration > Save Calibration** and enter the password to access this feature.
2. The **Save As** dialog will open. Name the calibration file (with extension .dcf) and save it either in the default Calibration folder in the DataNet directory or in a folder of your choice.

14.20.9. Loading Calibration Settings

You can load a previously saved DataNet .dcf calibration file at any time to restore a logger's restore specific calibration settings.

1. Open the logger context menu, select **Calibration > Load Calibration** and enter the password to access this feature.
2. In the **Open** dialog, browse to the calibration file you need and click **Open**. The logger will be updated with the new calibration settings.

14.21. Analyzing the Data


When in offline (History View) or online data displays, you have a number of features for analyzing the on-screen data. The features for analyzing data while in the graph display are practically the same when in offline or online mode.

14.21.1. Using the Graph Features

The following section explains how to use the numerous graph analysis features, including an overview of the graph toolbar options.



Please first refer to section 14.5.5: DataSuite Toolbar Icons for a full overview of the graph toolbar.

Autoscaling


Click **Autoscale**  on the graph toolbar to view the full data display, thereby restoring the axis range to its default settings.


Zooming

To zoom in to a specific area of the graph:

1. Click **Zoom in**  on the graph toolbar.
2. Drag the cursor diagonally to select the area you want to magnify. Release the mouse button to zoom in to the selected area.
3. Click **Zoom in**  a second time to disable the zoom tool.
4. Click **Autoscale** to restore the default display.

Panning

Use the **Pan** tool  to pan along the x or y axis or after zooming in, to see any part of the graph that is outside the zoomed area.

1. Click **Pan**  on the graph toolbar, then click anywhere on the graph and drag the mouse to view another area.
2. Click the **Pan** icon a second time to disable the **Pan** tool.

The Cursor

You can display up to two cursors on the graph simultaneously.

Use the first cursor to display individual data recording values.

Use two cursors to display the difference between two coordinate values, to display the frequency of periodic data or to select a range of data points.

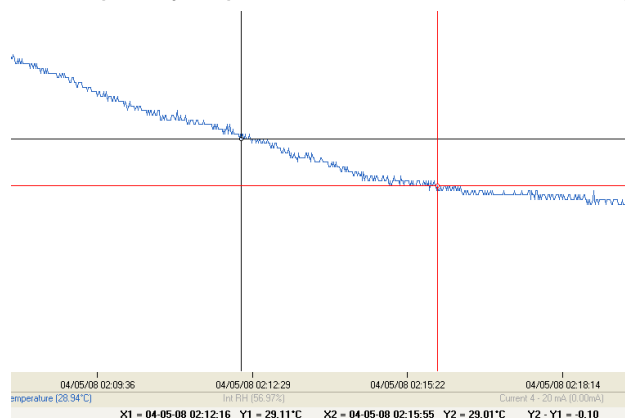



Figure 95: Example of using two cursors


When using two cursors, the Statistics feature will calculate statistics according to the data set between the two cursors.

To display the first cursor:

Click **1st Cursor**  on the graph toolbar. You can drag the cursor with the mouse onto any other point on the plot, or onto a different plot. For finer cursor movements use the forward and backward keys on the keyboard.

The coordinate values of the selected point will appear in the information bar at the bottom of the graph window.


To display the second cursor:

Click **2nd Cursor**  and drag the cursor with the mouse onto any other point on the plot. The information bar will now display the difference between the two coordinate values.

To remove the cursors:

Click the cursor icons a second time.

Grid

Click the **Grid** icon  to add a grid to the background of the graph view. To remove the grid, click the icon again.

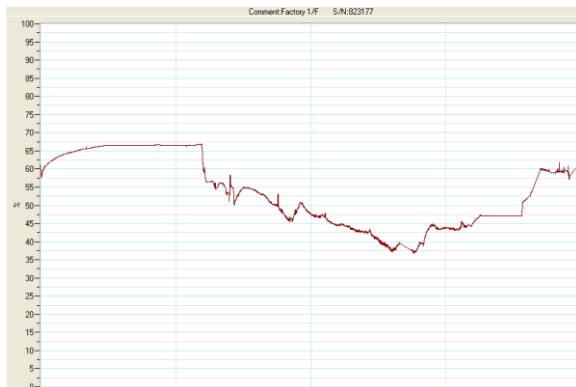



Figure 96: Graph with grid in background

Show/Hide Time Stamps


By default, the Time Stamp icon  is enabled to display in the online or offline graph, any time stamp marked using the MicroLite or MicroLogPRO II data loggers. Refer to section 14.21.2 for more details.

Add Custom View

Whenever the graph in History View is modified, either by using the Zoom tool, changing the scale, panning the graph, etc. you have the option to add this customer graph view to the Data Map, under the Custom Views node. This will enable you to save projects which include the custom graph view for future reference.

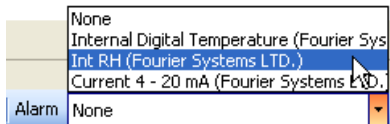
Click the **Add Custom View** icon  to perform this function.

Copying the Graph

Click the **Copy Graph** icon  to copy the graph to the clipboard, and paste it into another application, such as a word processing or spreadsheet application.

Displaying Alarm Levels

Open the Alarm drop-down menu and select the relevant sensor to display its alarm levels.




The Stretch/Compress Axis Tool

Move the cursor onto one of the graph axes. The cursor icon changes to the double arrow symbol (\leftrightarrow), indicating that you can stretch or compress the axis scale. Drag the cursor to the desired location. Repeat the procedure for the other axis if necessary.


To select a data set to display on the Y-axis, click on the data set's name in the Y-axis list. To display more than one curve, click on the data sets you want.

Formatting the Graph

You can change the plot line's color and width. The color of the Y-axis matches the corresponding plot's color and will automatically change with any change made to the color of the corresponding plot.


1. Click **Graph properties**  on the graph toolbar.
2. Click the **Style** tab, and unselect the **Use system line properties** checkbox.
3. Select the axis you want to format in the **Axis** drop-down menu.
4. Select the color and line width.
5. Click **OK**.
6. To restore the default formatting, select the **Use system line properties** checkbox again.

Manual Scaling

1. Click **Graph properties**  on the graph toolbar.
2. Select the **Axis Scaling** tab and with the **Group plots by units** checkbox *unselected*, select the axis to manually scale from the drop-down menu e.g. Date & Time axis.
3. Uncheck the **Autoscale** check box and enter the custom values in the text box i.e. a time range, in the case of the Time & Date axis, or a set of values.
4. Click **OK**.
5. To restore auto scaling select the **Autoscale** checkbox.

Manual Scaling - Grouping Plots by Unit

You may choose to group all of the sensors measuring the same unit, to the same scale. For example, if you have several temperature sensors in your data set, all measuring Celsius, you can apply a common scale when displaying the data from these sensors.

1. Click **Graph properties**  on the graph toolbar.
2. Select the **Axis Scaling** tab and select the **Group plots by units** checkbox.
3. In the **Axis** drop-down menu select the unit by which you wish to group the plots.
4. Uncheck the **Autoscale** check box and enter the custom values in the text box.
5. Click **OK**.
6. To restore auto scaling select the **Autoscale** checkbox.

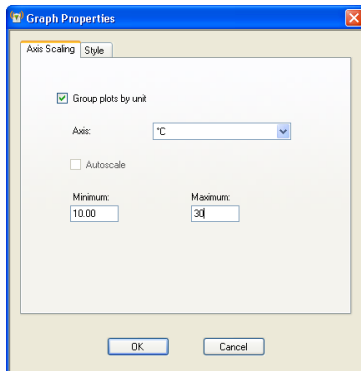

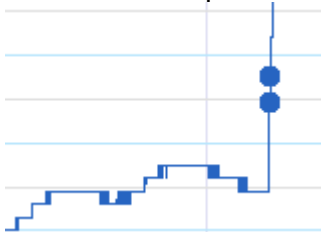


Figure 97: Grouping plots by units

14.21.2. Viewing Time Stamps

MicroLite or MicroLogPRO II users may mark time stamps on the logger memory to indicate specific events, and later view them in DataSuite software.

In the Online and Offline graph views, the lower toolbar features a Time Stamp icon . By default it is enabled to display all time stamps marked in the current data set. Each time stamp is marked as a large dot in the same color as the sensor plot:



Scrolling over the time stamp marker will display the time stamp comment, which by default is the time stamp of the sample itself.

Viewing the time stamp in Table View

Each time stamp is displayed in the data table in addition to the regular samples taken at the defined sampling rate. The time stamp is highlighted in yellow, and a default comment is listed in the Comment column, per device.

To edit the time stamp comment simply click on the relevant cell and enter the desired comment.

Graph	Table	Statistics		
Index	Date and Time	Internal NTC 10K 7005737 Lab 1/F	Comment 7005737 Lab 1/F	
▶ 17580	16-08-11 17:41:06	25.49°C	8/16/2011 5:41:06 PM	
17581	16-08-11 17:41:07	25.49°C		
17582	16-08-11 17:41:08	25.49°C		
17583	16-08-11 17:41:09	25.49°C		
17584	16-08-11 17:41:10	25.52°C		
17585	16-08-11 17:41:11	25.52°C		
17586	16-08-11 17:41:12	25.52°C		
17587	16-08-11 17:41:13	25.55°C	8/16/2011 5:41:13 PM	
17588	16-08-11 17:41:14	25.55°C		

Statistics View

The Statistics View also includes the time stamp when calculating Min, Max, and average.

Export to Excel

Time stamps are also exported to Excel along with the rest of the data set.

Each time stamp is easily indicated by its comment in the Time Stamp Comment column:

21616	16-08-11	17:41:05	25.47		
21617	16-08-11	17:41:06	25.49		8/16/2011 17:41
21618	16-08-11	17:41:07	25.49		
21619	16-08-11	17:41:08	25.49		
21620	16-08-11	17:41:09	25.49		
21621	16-08-11	17:41:10	25.52		
21622	16-08-11	17:41:11	25.52		
21623	16-08-11	17:41:12	25.52		
21624	16-08-11	17:41:13	25.55		8/16/2011 17:41
21625	16-08-11	17:41:14	25.55		


14.21.3. Changing the Graph, Table or Statistics View Header

Each Graph, Table or Statistics tab has a header located above the specific view. The default headers are:

- DataSuite - Graph
- DataSuite - Table
- DataSuite - Statistics

The header will also be included when printing the graph.

To change the header:

1. Click **Graph Properties**  on the graph toolbar.
2. Click the **Style** tab and enter the graph header in the Header field.

14.21.4. Statistical Analysis

DataSuite also provides some basis statistics regarding the open data sets. While in History View or online Data Display view, click the **Statistics** tab.

For each of the sensors in the data set, you will have the following statistics displayed:

- Minimum / Maximum values
- Average value
- Number of samples

You will also see the Logger name and SN, as well as the start and end time of the statistics data range.

While in online mode these statistics are updated in real-time.

If you zoom onto a section of the graph, the statistics are dynamic and will therefore display statistics of the zoomed graph, not of the whole graph.


If using the cursors, the statistics will be calculated according to the data set between the two cursors.

DataNet - Statistics									
	Serial Number	Device	Sensor	Minimum	Maximum	Average	Statistics start	Statistics end	Number of samples
▶	913374	H DNL910 #01	Internal Temperature	20.59°C	36.19°C	25.19°C	04-05-10 00:00:00	09-05-10 12:23:48	11396
	913374	H DNL910 #01	Voltage 0 - 1 V	0.30V	1.00V	0.55V	04-05-10 17:30:15	04-05-10 18:12:05	252
	913374	H DNL910 #01	Current 4 - 20 mA	4.00mA	4.00mA	4.00mA	04-05-10 17:30:15	04-05-10 18:12:05	252

Figure 98: Statistics View

14.22. Exporting Data to Excel or CSV Formats

DataSuite supports exporting data to Excel or CSV file formats (CSV stands for *comma separated values*).

To export to Excel, click **Export to Excel**  in the online or offline lower graph toolbar, or go to **Analysis > Export to Excel** (while viewing data in History View). The data currently displayed on the graph is exported. Data from more than one data logger may be exported simultaneously.


DataSuite will then open a new Excel workbook displaying the data as well as other pertinent information such as logger comment, serial number and the alarm level setup. Data that exceeds any of the alarm levels will be indicated.

	A	B	C	D	E
1	Comment		Freezer 1/F		Freezer 1/F
2	S/N		85007		85007
3	Sensor		Internal Digital Temperature		Internal RH
4	Low		-40		
5	Pre-low				
6	Pre-high				
7	High		80		
8					
9	Date	Time	Internal Digital Temperature	Alarm Type	Internal RH
10	3/7/2011	23:41:49	27.95		
11	3/7/2011	23:41:50	27.97		
12	3/7/2011	23:41:51	28		
13	3/7/2011	23:41:52	28.01		
14	3/7/2011	23:41:53	28.01		
15	3/7/2011	23:41:54	28.04		
16	3/7/2011	23:41:55	28.04		
17	3/7/2011	23:41:56	28.05		
18	3/7/2011	23:41:57	28.05		
19	3/7/2011	23:41:58	28.05		

Figure 99: Example of data exported to Excel

Only offline data opened in History View can be exported to CSV and is available under the Analysis menu.

14.23. Printing the Data

You are able to print data by clicking the **Print** icon  from the lower toolbar in Graph, Table or Statistics tabs of the offline or online data displays. Clicking the Print icon will open the **Print Setup** dialog where you will need to select the printer to print to.

When printing a table, you can select the specific data range you wish to print. You are able to adjust the date and time in order to narrow the data range.

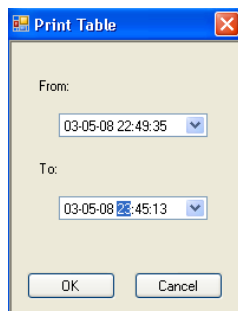


Figure 100: Printing a table

14.24. Reports Module

The Reports module provides an intuitive interface for creating and generating DataSuite reports. Each report contains a wide range of parameters garnered from all units supported by the software. Each report can be sent via e-mail to a selected distribution list, at pre-defined time intervals, in PDF and Excel format.


All reports are saved in the default directory:

C:\Program Files\fourtec\DataSuite\Reports

To change this path go to the Preferences tab in **Tools > Options**.

14.24.1. Creating a Report Profile

The first step when creating a report is to create a new Report Profile. The user can create multiple profiles, each configured with different parameters. To generate a report, at least one profile must be enabled.

1. Go to **Reports > Reports Profile Manager** in the main menu, or click the corresponding icon  in the upper toolbar.
2. Enter the system password. The Reports Profile Manager window will open.
3. Click Create New Profile.

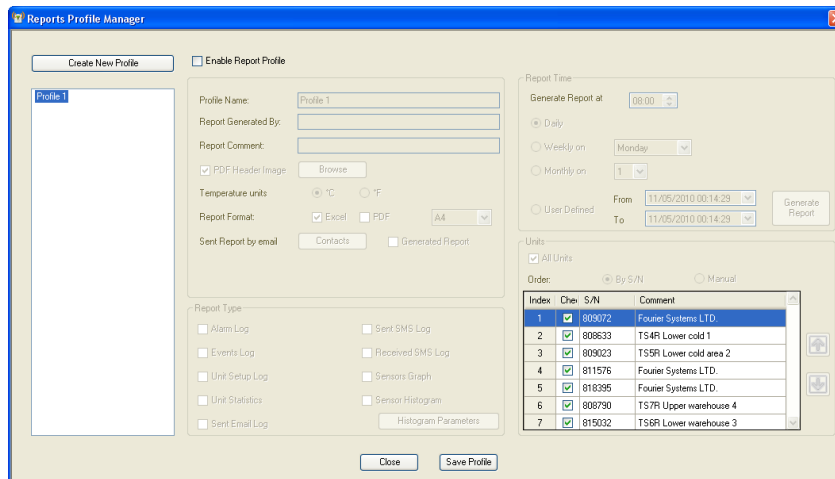


Figure 101: Reports Profile Manager window

4. Select the **Enable Report Profile** checkbox to enable all fields in the window. Each profile that is enabled will have a report generated. If no profiles are enabled, DataNet will not generate any reports.
5. Enter a suitable profile name in the **Profile Name** field.
6. Enter your name in the **Report Generated By** field.
7. Enter a description of the report in the **Report Comment** field.
8. Each report created in PDF format contains a header. To change the report's header, select the **PDF Header Image** checkbox and click **Browse** to locate the relevant image. The default fourtec header is:



Note: The recommended header dimensions are 525 x 50 pixels, 72 dpi. If a header with different dimensions is loaded, then the software will automatically resize the header dimensions.

10. Toggle the temperature unit to appear on the report, if any of the logger's are configured to measure temperature.
11. Next to **Report Format**, select the checkbox next to the required format in which to generate the report. *Excel*, *PDF* or both formats. For PDF format, select the page size, *A4* or *Letter*, from the drop-down menu.
12. Click the **Generated Report** checkbox to send the report via email to a selected distribution list. Click **Contacts** to open your contact list and select the relevant contacts to receive the report via e-mail. If your contact list is empty then the **Select Contacts** window will automatically open when first clicking Generated Report.

Note: To send reports via e-mail, ensure the DataSuite e-mail settings are correctly configured in **Tools > Options > e-mail Settings**.

13. The DataSuite CFR module provides the ability to send reports for Review and Approval by users with specific privileges to review and/or approve reports generated by the software. Select Reviewed Report and/or Approved Report and select the required contacts from the Contacts dialog. Recipients of these reports will be able to enter the DataSuite CFR using their assigned username and in the Reports Browser, declare the report was reviewed or approved.
14. In the **Report Type** pane, select at least one of the report type checkboxes. You will not be able to save the profile unless a report type has been selected.

15. The available types are below. For more details regarding each type, refer to section 14.24.2:
- Alarm Log
 - Events Log
 - Unit Setup Log
 - Unit Statistics
 - Sent Email Log
 - Sent SMS Log
 - Received SMS Log
 - Sensors Graph
 - Sensor Histogram
16. Once a Report Type has been selected, immediately click **Save Profile** to avoid losing your unsaved profile.
17. Use the **Report Time** pane to select the interval when the report will be generated and emailed to the contact list (if desired):
- a. Next to **Generate Report at** select the time when the report should be generated.
- Note:** To allow for data samples recorded in the last minute prior to the defined time, the report will actually be generated 10 minutes after the defined time.
- b. Select the date when the report should be generated. The options are *daily*, *weekly* or *monthly*. Select the specific day for the latter two options.
 - c. The user can also select a report according to a specific time period. Select the **User Defined** option, choose the period and click **Generate** to manually generate the report according to the defined parameters.
18. Use the **Units** pane to select which loggers should be included on the report itself.
- a. Select the **All Units** checkbox to include all network units.
 - b. To include a specific selection of units, unselect the **All Units** checkbox and manually select the checkbox for each unit.
 - c. The order in which the units will appear on the report can be defined according to Serial Number by selecting **By S/N** and clicking the S/N header or manually, by selecting **Manual** and clicking the Up and Down arrows.
 - d. The definition of the report is now complete. Click **Save Profile** and then **Close** to exit the Reports Profiles Manager. A report will be generated at the defined time.

14.24.2. Report Types

Each report contains at least one Report Type, with the data displayed in table format. A description of each Report Type parameter in the Reports Profile Manager is provided below.

Alarm Log

- Parameters include sensor name, setup, alarm parameters, and setup time. In addition, each sensor alarm value is listed according to the relevant setup. If



there are other setups in the report time frame then additional setup tables and alarm tables will be displayed.

- Battery and Reception alarms will be listed after the sensor alarms.
- If no alarms were recorded during the report time frame, a *No Alarm Events* message will be displayed.

Events Log

Logs all events of each logger in the Report, as well as the time of the event. The events are:

- Setup
- Run
- Stop
- Connection to network
- Disconnection from network
- Firmware updated, including indication of previous and updated firmware version
- Leave Network

Unit Setup Log

- Logs all the setups of the logger during the logging period
- If no setups were performed during the report time frame the a *No New Setup* message will be displayed

Unit Statistics

Displays statistics for each sensor in the report. The calculated parameters are:

- Min
- Max
- Average
- Number of samples

Sent Email Log

Logs all emails that were sent during the report time frame.

The details in the Sent Emails Log are:

- Message that was sent
- Date
- Time
- To whom the message was sent (groups will be displayed as groups)

Sent SMS Log

Logs all SMS's that were sent during the report time frame.

The details in the Sent SMS Log are:

- Message that was sent

- Date
- Time
- To whom the message was sent (groups will be displayed as groups)

Received SMS Log

Logs all SMS's that were sent to the DataSuite software during the report time frame.

The details in the Received SMS Log are:

- Message that was received
- Date
- Time
- From whom the message was sent

Sensor Graph

The Sensor Graph log includes the following parameters:


- Unit comment and S/N indicated as the graph header
- Indication of sensor name, sensor type, start time & date and end time & date under each graph
- A small graph of each sensor that is defined in the logger with its alarm levels displayed according to the alarm colors. The graph will be created according to the last logger setup.
- The graph scaling will be set to autoscale
- The graph will include grid lines
- The alarm levels will be marked according to the alarm color and the alarm limit value will be indicated on the Y- axis
- The graph dimensions will be 7.5 cm x 10.5 cm

Sensor Histogram

- Unit comment and S/N indicated as the graph header
- Under each Histogram there will be indication of the sensor name, sensor type, start time & date and end time & date
- A small histogram of each sensor defined in the logger will be displayed
- The histogram will include an indication of the value of each bin on top of the bin
- The graph dimensions will be 7.5 cm x 10.5 cm

14.24.3. Removing a Report Profile

To remove an existing report profile:


1. Go to **Reports > Reports Profile Manager** in the main menu, or click the corresponding icon  in the upper toolbar.
2. In the Profile list on the left side of the window, right-click the Report name to be removed and select **Remove** from the context menu.
3. Enter the system password and when prompted, confirm the action.

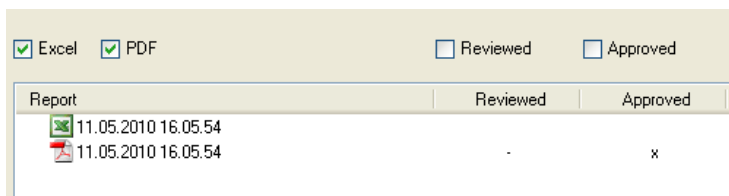
14.24.4. The Report Browser

Use the Report Browser to:

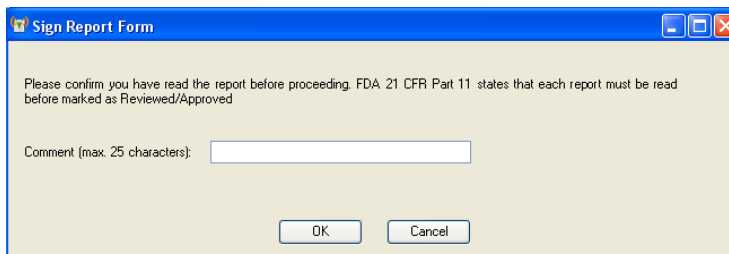
- Open or delete generated reports saved in the Reports folder in the default DataSuite directory.
- For DataSuite CFR module only, assign a Reviewed By or Approved By stamp on each report, based on the user's privilege as defined in DatPass.

Reports are displayed per Profile.

1. Go to **Reports > Report Browser** in the main menu, or click the corresponding icon  in the upper toolbar. The Report Browser window will open.
2. Select one of the profiles in the **Profiles** pane on the left side of the window. All reports generated under that profile will appear in the main Report pane.
3. Use the **Excel**, **PDF**, **Reviewed** and **Approved** checkboxes to filter the reports to be displayed in the Report pane.



4. To open a report click one of the reports in the list and click **Open**.
5. In DataSuite CFR only, to sign the PDF report (Excel reports cannot be signed), select the specific report. The **Review** and **Approve** buttons are enabled.
6. Depending on the user's assigned privileges, click **Review** or **Approve**. The following dialog will pop up. Enter a Comment relating to the read report.



7. Click **OK**. An updated report contained the user's relevant report sign-off, (Reviewed or Approved) will be emailed to the user who generated the report.
8. To delete a report click one of the reports in the list and click **Delete**.
9. Click **Close** to close the Reports Browser window.

14.25. Boomerang Report Overview

Currently supported on the MicroLite II models only, the Boomerang feature is primarily designed for applications where the data logger is used to monitor ambient conditions during goods transportation, and a data report is required in order to verify the integrity of the shipment.

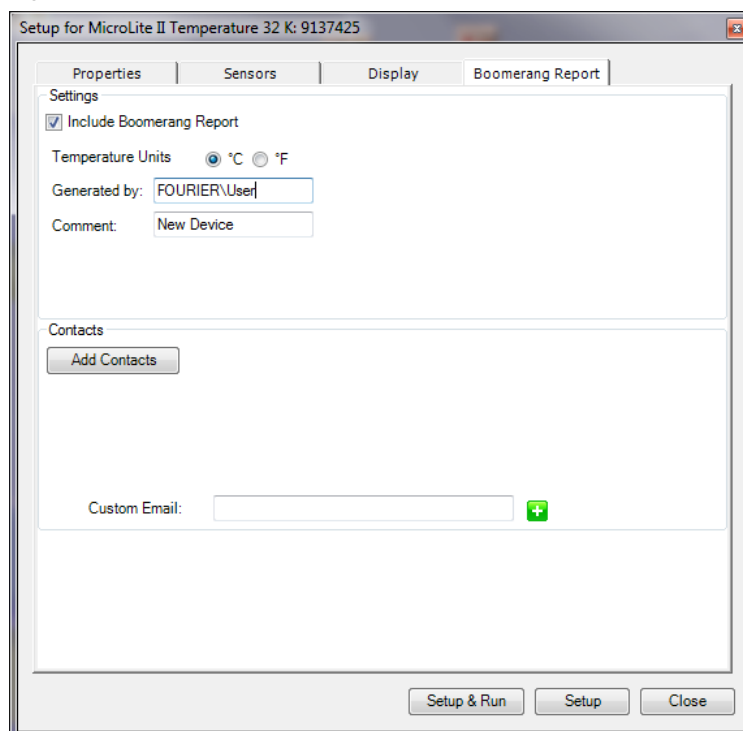
The report can be generated at any stage during the shipment when the logger is connected to a computer with DataSuite installed, and will include all data recorded up to that stage of the shipment. Data is automatically and immediately sent via email

to the relevant parties upon connection. No configuration is required on the destination computer.

In the event of any breach of defined thresholds, relevant action can be taken by onsite personnel in order to ensure the goods reach their markets in optimal conditions.

14.25.1. Boomerang Setup – Point of Origin

When configuring the MicroLite II logger in order to activate the Boomerang, the user must define the email addresses of the contacts to receive the Boomerang report. This information is saved to the logger flash memory and is retained as part of the logger setup, even if the battery is removed. The temperature unit (C or F) in which the data is to be recorded is also defined, as well as the time zone (GMT) that the report should be issued.



To enable Boomerang:

1. Right-click on the MicroLite II logger icon the Map View and select Setup.
2. Perform logger setup using the Properties, Sensors and Display tabs. When complete, click on the **Boomerang Report** tab.
3. Select the **Include Boomerang Report** checkbox. This enables the Boomerang feature on the connected logger, allowing generation of a data report when connected to another computer with DataSuite installed. When this checkbox is unselected, Boomerang is not enabled on the logger.
4. Select the relevant temperature unit, **C** or **F**, for MicroLite II models measuring temperature.
5. Enter the relevant name in the **Generated by** field. This is normally the name of the person responsible for the logger shipment.
6. Enter a relevant comment in the **Comment** field. The comment can be a brief description of the specific shipment, so the report recipient will now which shipment or logger it is referring to.



7. To add the Boomerang report recipients, click the **Add Contacts** button and select from the DataSuite contact list or use the **Custom Email** field to add emails on-the-fly.
8. When complete, use the buttons at the bottom of the window to continue with the logger setup.

14.25.2. Boomerang Setup – Destination Computer

By default, DataSuite (version 1.01.36 and higher) is already enabled to support generation and sending of Boomerang reports whenever a Boomerang-enabled logger is connected to it.

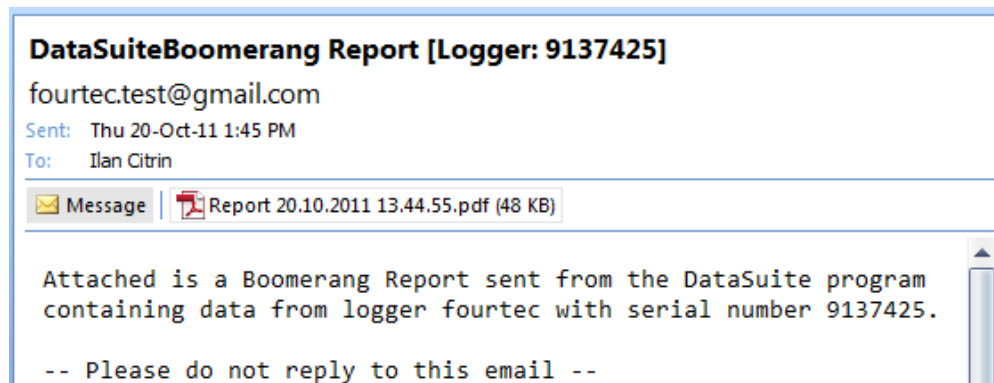
To disable Boomerang on a destination computer (the computer where the logger will be connected during or post-shipment), go to **Tools > Options > Device Settings** and unselect the **Generate and send Boomerang reports automatically** checkbox.

In addition, DataSuite (version 1.01.36 and higher) has a built-in default email account so the user is not required to configure their own email account from where the Boomerang report is sent. Of course, the user may choose to do so if necessary.

14.25.3. Boomerang Email and Report Examples

The Boomerang data report is sent to the defined contacts by the destination computer, as soon as the logger is detected by the software, and as long as an Internet connection is available. The report contains numerous parameters such as data statistics, data graph, and histogram, as well as the time/date the report was issued, and the time range of the report data.

The email includes the report PDF, and indicates the logger Serial Number and the logger name, which in this case is 'fourtec'



The Boomerang report is similar in structure to a standard DataSuite report but only contains data from the specific logger.

Report Cover Page example:



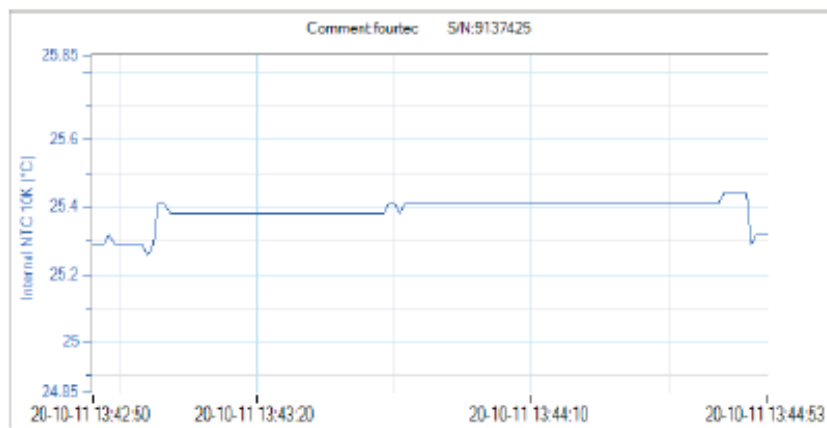
This report was issued by the fourtec DataSuite software
The report was generated by: FOURIER@lancitru
Report comment: fourtec Test
Report profile name: Boomerang Report Profile
Report issue time and date: 20-10-11 13:44:55
Report time range: 20-10-11 13:42:50 - 20-10-11 13:44:53

Report Data Graph example:



Sensor Graph

Internal Input (20-10-11 13:42:50 - 20-10-11 13:44:53)



End of Report

Chapter 15:

Updating DataSuite Software and Firmware

DataSuite supports automatic software and firmware update whenever DataSuite is launched, as long as the computer is connected to the Internet. The update process is managed by fourtec's **Uptodata** client. This client checks for updated software and firmware files located on the fourtec server, and if any have been detected they are downloaded and updated on the user's computer. The user can also have DataSuite automatically update the network units' firmware or can choose to do so manually.

DaqLink, MicroLogPRO II and MicroLite all support easy firmware update via direct USB connection. A major benefit specific to the DataNet system is that units' firmware can also be updated *over the air* as well as via USB (except for Mini DataNet). Without moving one deployed DataNet unit out of position in the network, the user can send a new firmware file wirelessly to all of the data logger end units and Repeaters. The Receiver firmware is updated via the USB cable.

In addition to automatic firmware update, the DataSuite user can also manually update the firmware via the Firmware Update Center or from the Logger/Repeater icon in Map View. Refer to the relevant sections in this chapter for more details.

15.1. Using the Uptodata Client

Use the Uptodata client to perform automatic checks for updated DataSuite software module and firmware versions, including updated versions of this DataNet user guide. Once downloaded, DataSuite software and firmware is automatically updated. However, you also have the option to manually update firmware rather than automatically.

To use the Uptodata client follow the instructions below.

1. Ensure the computer is connected to the Internet and launch DataSuite.
2. Launch the **Uptodata** update client from the DataSuite main menu: **Help > Check for Updates**.
3. You will be prompted to proceed to check for new updates. Click **Next**. The client will then check for updates on the server, including updates to the Uptodata client itself.

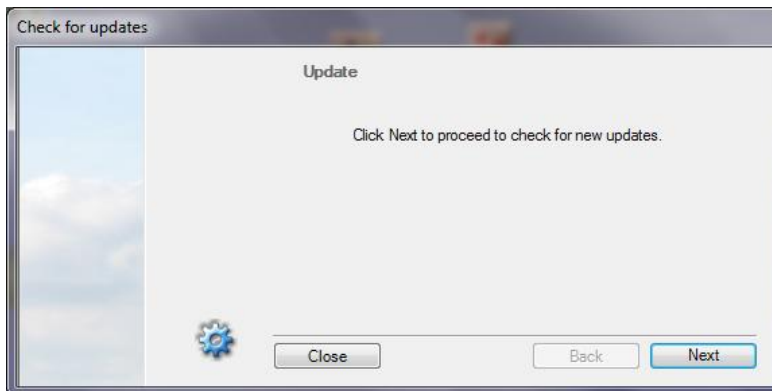
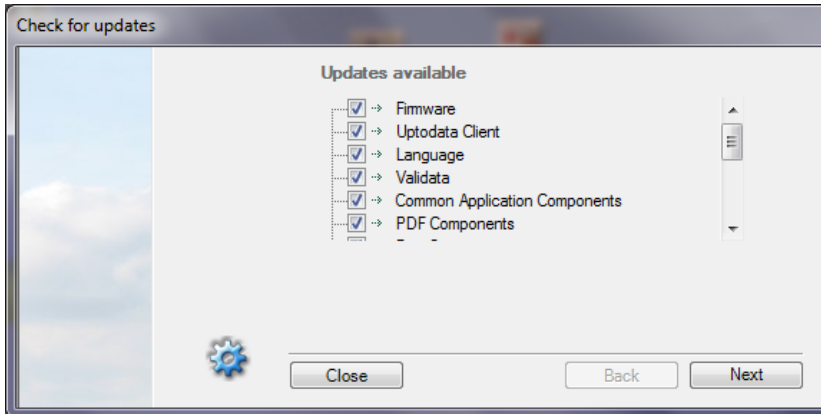
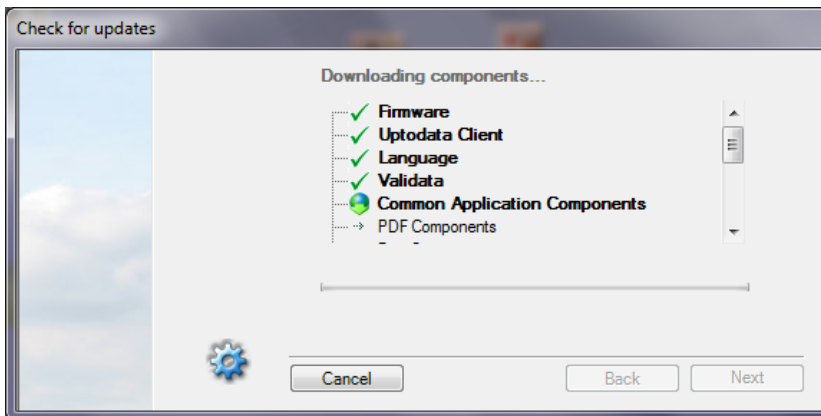



Figure 102: Uptodata dialog

- Once the check is complete, any new updates will be displayed in the Uptodata dialog. Select the checkbox next to the file you wish to update and click **Next**.



- The files will be downloaded to your default application directory. Click **Finish** to close the dialog once the download is complete.



- Click the **Options**  icon in the main Uptodata dialog for further options such as:
 - Checking for updates on startup (select **Further Configurations** menu item to modify frequency of update checking)
 - Automatic firmware update on startup

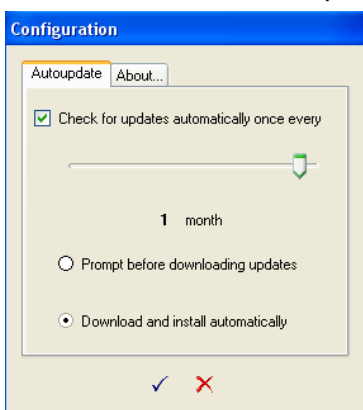


Figure 103: Uptodata configuration dialog

Note: If the update was canceled for any reason and was not completed, none of the previous installation files will be affected.

15.2. Updating Device Firmware

There are several ways to update firmware for your DataSuite supported hardware units.

- Automatically, using the Uptodata client. Refer to section 15.1.
- Manually using the Firmware Update Center. Refer to section 15.2.2.
- Manually, using the context menu on the device icons in Map View.

15.2.1. Downloading the Firmware File

There are two ways to obtain the DataNet firmware file.

1. Using the Uptodata client to download from the fourtec server. Refer to section 15.1.
2. Downloading the latest firmware version directly from the fourtec Download Center at: www.fourtec.com
3. Uptodata downloads the firmware file, named `Firmware.dfw`, to the DataSuite directory on the computer. The default path is: `C:\Program Files\fourtec\DataSuite`.

Note: The firmware file combines firmware for all DataSuite supported hardware units into one file. There is no need to download separate files for each type of unit.

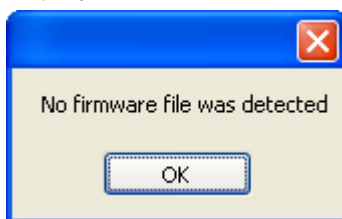
4. If you download the firmware file from the fourtec Download Center make sure to copy the file to the same path listed above.

Once the file is downloaded the next step is to update the units.

15.2.2. Using the Firmware Update Center

To launch the Firmware Update Center:

1. Once the downloaded firmware file is in the DataSuite directory, go to **Tools > Firmware Update Center** from the main menu. Enter the password in the **Password** dialog to access the Update Center.
2. If no firmware file is detected in the DataSuite directory, then an error message is displayed and the Firmware Update Center opens with a blank screen.



3. Copy the firmware file to the directory and reopen the Firmware Update Center.

Note: The default password is 1234.

4. The Firmware Update Center dialog lists all units which were detected by the software and displays pertinent information such as available firmware versions, firmware update status, online/offline status and unit info.

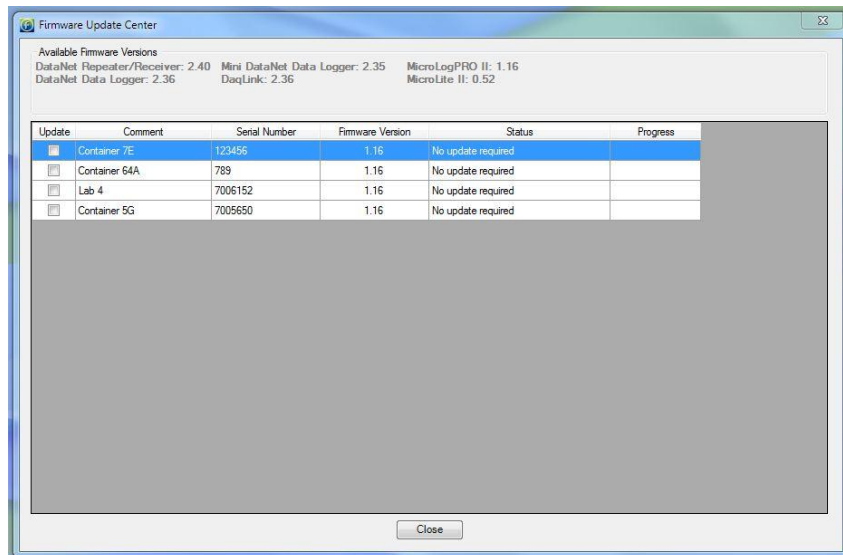


Figure 104: Firmware Update Center dialog

5. If the unit status is **Requires an update**, then select the checkbox in the **Update** column adjacent to the unit you wish to update. You may select as many units as you like to update, but **only two units can be updated at a time**.
6. As soon as you select the **Update** checkbox, the command will be sent to the unit to begin uploading the firmware. The firmware is first uploaded to the unit's memory and then installed. Even if the update is stalled halfway due to the unit shutting down, for example, the unit will not lose its current firmware and so will continue to be operable.
7. When the upload begins the Firmware Update Center status will change to **Uploading firmware file** and the unit display will read **Loading firmware**. The progress will also be displayed on both hardware and software.

Status	Progress
Uploading firmware file	26%
Requires an update	

8. When the upload is complete the unit will reset and the Firmware Update Center will display the status **No update required**. The firmware version will be updated as well.

Note: You can quit the firmware update at any time by unselecting the **Update** checkbox in the Update Center.

9. When the unit resets it will automatically rejoin the network (for DataNet units) or reconnect via USB and will be in **Stop** mode. However the unit configuration will still be saved. For loggers which have completed firmware update, run the logger to start recording data again.

Checking Available Firmware Versions

1. Available firmware versions are displayed at the top of the Firmware Update Center dialog. The information is taken from the firmware file Firmware.dfw stored in the DataSuite directory. The same firmware file is used for all units.

Available Firmware Versions

DataNet Repeater/Receiver: 2.40	Mini DataNet Data Logger: 2.35	MicroLogPRO II: 1.16
DataNet Data Logger: 2.36	DaqLink: 2.36	MicroLite II: 0.52

Unit Status Options

- **Offline** – unit is offline and firmware status can't be determined.
- **No update required** – Unit has latest firmware installed.
- **Uploading firmware file** – Firmware file is being uploaded to the unit. Progress is displayed in percentages.
- **Updating firmware** – Once firmware file is uploaded then the actual firmware update begins, overwriting the existing firmware on the unit.
- **Downloading** – Logger unit is first downloading all data before beginning the firmware update.
- **Waiting to upload firmware** – Unit is in a queue to upload the firmware, as the network can update two units at a time.

Unit Information

Additional information provided in the Firmware Update Center includes:

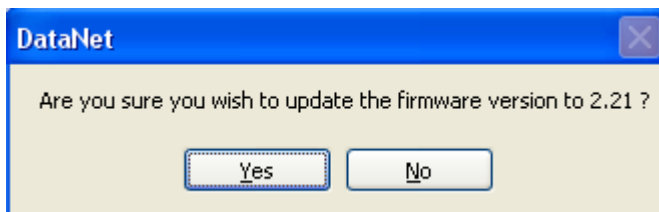
- The unit comment/name
- Serial number
- Current firmware version
- Unit status
- Update progress

15.2.3. Manual Firmware Update via Map View Icon

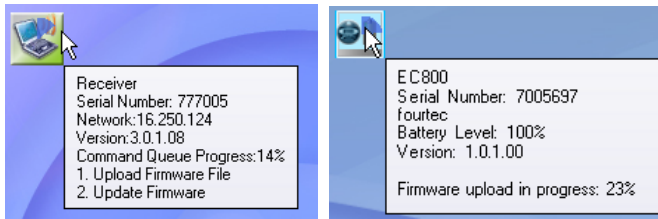
Each DataSuite supported device, including data loggers and DataNet Receivers and Repeaters, have the Update Firmware option in its Map View icon context menu.

DataNet units may have firmware updated wirelessly, or via USB. Refer to section 15.2.4 for an overview of DataNet USB firmware update.

1. To perform a direct update from a specific unit, open the context menu and select **Update Firmware**.
2. Enter the password in the **Password** dialog box.
3. Depending on the product model, a DataSuite system message may prompt you to confirm the update. Click **Yes**.



4. The firmware will begin updating and you can monitor its progress in the unit's tooltip.



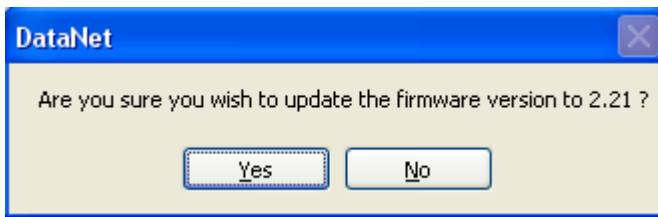
15.2.4. DataNet Firmware Update via USB

All DataNet units with USB port can also be updated via direct USB to PC connection. Follow the instructions below.

DNR900 Receiver

1. Connect the DNR900 to the computer via USB. Go to **Devices > Detect Device** in the DataSuite main menu.

2. Right-click on the Receiver icon  and select **Update Firmware** from the context menu.
3. Enter the password in the **Password** dialog box.
4. A DataSuite system message will prompt you to confirm the update. Click **Yes**.



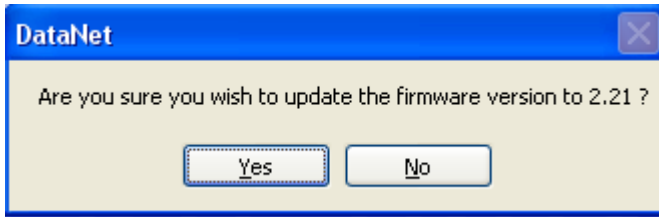
5. The firmware will begin updating and you can monitor its progress in the unit's tooltip.



DNR900 Repeater

1. Make sure the DNR900 is in Repeater mode and joined to an existing network. When connected to the computer via USB go to **Devices > Detect Device** in the DataSuite main menu.

2. Right-click on the Repeater icon  and select **Update Firmware** from the context menu.
3. Enter the password in the **Password** dialog box.
4. A DataSuite system message will prompt you to confirm the update. Click **Yes**.




- The firmware will begin updating and you can monitor its progress in the unit's tooltip.

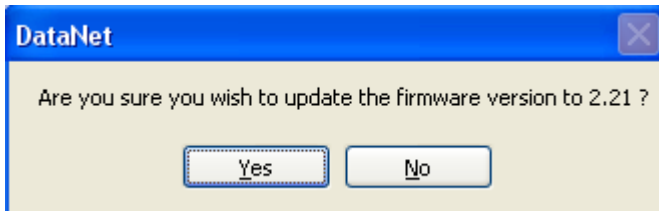


- When complete, disconnect the USB cable and reconnect the Receiver to continue using the DataNet system.

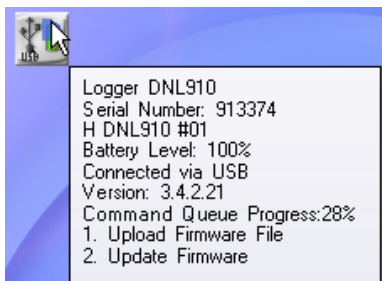
DNL910, DNL920 and PA Data Loggers

- Make sure the data logger is joined to an existing network. When connected to the computer via USB go to **Devices > Detect Device** in the DataSuite main menu.

- Right-click on the logger icon  and select **Update Firmware** from the context menu.
- Enter the password in the **Password** dialog box.
- A DataSuite system message will prompt you to confirm the update. Click **Yes**.



- The firmware will begin updating and you can monitor its progress in the unit's tooltip.



- When complete, disconnect the USB cable and reconnect the Receiver to continue using the DataNet system.



15.2.5. Cancelling Firmware Update

To cancel a firmware update, right-click the unit's icon in the Map View and select the **Cancel Firmware Update** option.

If a data logger was in Run mode prior to the firmware update, when cancelling it the logger will resume operation in Stop mode.

15.2.6. Interrupted Firmware Update

There are several ways an in-progress firmware update may be interrupted:

- Unselecting the checkbox next to the unit name in the Firmware Update Center
- Disconnecting the USB from the Receiver
- Disconnecting the USB from the device during USB firmware update
- Exiting the DataSuite software

In each case, when the unit is back online the firmware update will automatically resume (from the beginning of the update).

If a data logger's firmware update was interrupted, and it was in Run mode prior to the update, the logger will continue to run even after the interruption.

Appendix A:

DataNet Specifications

A.1. DNR900, DNL910, DNL920, PA Unit Outputs

DNL910, DNL920 and PA Models

External Inputs

Four external inputs with selectable sensor type for each input:

- 4 to 20 mA
- 0 to 1 V
- 0 to 50 mV
- PT-100 (2-wire)
- Contact (Open/Closed)
- Thermocouple J, K or T
- Pulse counter (Input 4 only)
- Frequency (Input 4 only)
- User-defined sensors

Internal Inputs

DNL910

- PT-100 Temperature

DNL920

- Digital Temperature
- Digital Relative Humidity

DNL804

External Input

Current 4 to 20 mA

Internal Inputs

None

DNL808

External Input

NTC 10 K Ω

Internal Inputs

None

DNL810

External Input

None

Internal Inputs

Digital Temperature

Digital Humidity

Alarm Output (Output 1)	External Power Excitation (transducers usage)
Open collector Close position resistance: 50 Ω Max. Load: 50 mA, 3 V DC	12 VDC @ 2 A Reset fuse overload protection

A.2. Logger Input Specifications DNL910, DNL920 and PA models

Internal PT-100 Temperature (DNL910)	Internal Digital Temperature (DNL920)	Internal Digital Relative Humidity (DNL920)
Type: PT-100 Range: -20 to 50 °C Resolution: 0.1 °C Accuracy: ±0.3 °C	Type: Digital sensor Range: -20 to 50 °C Resolution: 0.1 °C Accuracy: ±0.5 °C	Range: 5 to 95 % Resolution: 0.5% Accuracy: 3% (software) 4% (Logger LCD)
Temperature Thermocouple J	Temperature Thermocouple K	Temperature Thermocouple T
Range: -200 to 1,000 °C Resolution: 0.1 °C Accuracy: -200 to - 60 °C ±0.5 % 60 to 1,000 °C ±0.5 % -60 to 60 °C ±0.5 °C Cold junction compensation: ±0.3 °C	Range: -200 to 1,000 °C Resolution: 0.1 °C Accuracy: -200 to - 60 °C ±0.5 % 60 to 1,000 °C ±0.5 % -60 to 60 °C ±0.5 °C Cold junction compensation: ±0.3 °C	Range: -200 to 400 °C Resolution: 0.1 °C Accuracy: -200 to - 60 °C ±0.5 % 60 to 400 °C ±0.5 % -60 to 60 °C ±0.5 °C Cold junction compensation: ±0.3 °C
Temperature PT-100 (2-wire)	Pulse Counter (Input 4 only)	Frequency (Input 4 only)
Range: -200 to 400 °C Resolution: 0.1 °C) Accuracy: -200 to - 60 °C ±0.5 % 60 to 400 °C ±0.5 % -60 to 60 °C ±0.3 °C	Range: 1 to 65,536 counts Resolution: 1 count Frequency range: 0 to 4 KHz Input signal: 0 to 3.2 V Input impedance: 470 Ω	Range: 20 Hz to 4 KHz Input signal: 0 to 5 V Input impedance: 470 Ω
4 to 20 mA	0 to 1 V	0 to 50 mV
Range: 4 to 20 mA Resolution: 4.76 µA Accuracy: ±0.5 % Loop impedance: 21 Ω	Range: 0 to 1 V Resolution: 200 µV Accuracy: ±0.5 % Input impedance: 25 MΩ Maximum voltage: 3.2 V	Range: 0 to 50 mV Resolution: 3 µV Accuracy: ±0.5 % Input impedance: 25 MΩ Maximum voltage: 3.2 V
Contact		
Range: Open/Close		

A.3. Mini DataNet Sensor Specifications

Current (DNL804)	NTC 10 K Ω (DNL808)
Range: 4 to 20 mA	Range: -50 to 150 °C
Resolution: 1.16 μ A	Resolution: 0.06 °C
Accuracy: 0.5 %	Accuracy:
Loop impedance: 21 Ω	-50 to 60 °C \pm 0.3 °C 60 to 150 °C \pm 0.5 %
Internal Digital Temperature (DNL810)	Internal Digital Relative Humidity (DNL810)
Temp range: -20 to 50 °C	RH range: 5 to 95 %
Temp resolution: 0.04 °C	RH resolution: 0.5 %
Temp accuracy: \pm 0.4 °C	RH accuracy: \pm 3 %

A.4. General Specifications

DataNet Logger Sampling Features

- Memory capacity: ~59,000 samples
- Sampling rate: Once every second to once every 18 hours
- Sampling resolution: 16-bit
- Channel separation: 80 dB

DataNet RF Network Communication

- Frequency: 2.4 GHz
- Network units: 65,000
- Data rate: 250 Kbps
- Full mesh network architecture supported
- 128-bit network security encryption
- Worldwide license-free
- Transmission strength:
 - DNL8xx and DNL9xx: 4 dbm
 - DNR900, DNL9xx-PA: 17 dbm
 - DNR800: 20 dbm

DNR900, DNL910, DNL920, DNL910-PA and DNL920-PA Hardware Specifications

Display

- 2-row LCD
- 16 character display

Power Supply

- *Battery:*
 - Internal rechargeable 4.8 V, 800 mAh NiMH battery (2 batteries in series)
 - Built-in battery charger
 - Battery Life: Up to six months *

** PA models have battery life of up to three hours*
- *AC Power:*
 - External 12 V DC input @ 300 mA 3.6 VA
 - Center Negative

Operating Temperature Range

- -20 to 50 °C
- Water and dust proof: IP54

DNR900 PC Communication

- USB 2.0 compliance
- Mini USB type B cable

Casing

- Plastic ABS box
- Dimensions: 97 x 93 x 27 mm
- Weight: 200 gr
- Table and wall mounting

DNR800 Hardware Specifications

Power Supply

- External 12 V DC input @ 300 mA 3.6 VA
- Center Negative

Casing

- Dimensions: 68 x 68.6 x 26.5 mm (without the cradle and the external antenna)
- Weight: Device: 61 gr; Cradle: 10 gr; External Antenna: 17.5 gr
- Table and wall mounting

Operating Temperature Range

- -30 to 75 °C
- Water and dust proof: IP54

Mini DataNet Hardware Specifications

DNL804, DNL808 and DNL810

Power Supply

- Internal 2/3 AA lithium battery
- Battery voltage range: 2V - 3.6 V
- Battery life: Up to 10 months depending on sampling rate

Casing

- Dimensions: 68 x 68.6 x 26.5 mm (without the cradle and the external antenna)
- Weight: Logger: 53 gr; Cradle: 10 gr; External Antenna: 17.5 gr
- Table and wall mounting

Operating Temperature Range

- -30 to 75 °C
- Water and dust proof: IP54

Mini DataNet Extended Battery Pack Hardware Specifications

DNL804-BXT, DNL808-BXT, DNL810-BXT

Power Supply

- External battery pack
- 4 x AA 3.6 V lithium battery
- Battery life: Up to 3 years depending on sampling rate

Casing

- Dimensions
 - DNL810-BXT: 10.2 x 8.8 x 5.3 cm (without the external antenna)
 - DNL804-BXT and DNL808-BXT: 9 x 8.8 x 5.3 cm (without the external antenna and strain relief add-on)
- Weight:
 - 137 g not including batteries
 - 218 g including four batteries
 - External Antenna: 17.5 g
- Wall mounting



Operating Temperature Range

- -30 to 75 °C
- Water and dust proof: IP54

Man Machine Interface

Full keyboard operation

Standards Compliance

CE, FCC, FCC Canada

A.5. System Requirements

Software	Hardware
OS Platform: Windows XP SP3, Windows Vista (32-bit) and Windows 7 (32-bit) Browser: Internet Explorer 5.01 or higher Screen Resolution: Minimum 1024 x 768	Processor: Pentium 4, 2.0 GHz or better Memory: 512 MB RAM Storage Memory: 250 MB available disk space for the DataSuite application

Appendix B: DaqLink Specifications

B.1. Data Logger Input Types

DBSA710 and DBSA720

External Inputs

Four external inputs with selectable sensor type for each input:

- 4 to 20 mA
- 0 to 1 V
- 0 to 50 mV
- PT-100 (2-wire)
- Contact (Open/Closed)
- Thermocouple J, K or T
- Pulse counter (Input 4 only)
- Frequency (Input 4 only)
- User-defined sensors

Internal Inputs

DBSA710

- PT-100 Temperature

DBSA720

- Digital Temperature
- Digital Relative Humidity

B.2. DBSA710 and DBSA720 Outputs

Alarm Output (Output 1)	External Power Excitation (transducers usage)
Open collector Close position resistance: 50 Ω Max. Load: 50 mA, 3 V DC	12 VDC @ 2 A Reset fuse overload protection

B.3. Logger Input Specifications DBSA710 and DBSA720

Internal PT-100 Temperature (DBSA710)	Internal Digital Temperature (DBSA720)	Internal Digital Relative Humidity (DBSA720)
Type: PT-100 Range: -20 to 50 °C Resolution: 0.1 °C Accuracy: ± 0.3 °C	Type: Digital sensor Range: -20 to 50 °C Resolution: 0.1 °C Accuracy: ± 0.5 °C	Range: 5 to 95 % Resolution: 0.5% Accuracy: 3% (DataSuite software) 4% (Logger LCD)



Temperature Thermocouple J	Temperature Thermocouple K	Temperature Thermocouple T
Range: -200 to 1,000 °C Resolution: 0.1 °C Accuracy: -200 to - 60 °C ±0.5 % -60 to 60 °C ±0.5 °C 60 to 1,000 °C ±0.5 % Cold junction compensation: ±0.3 °C	Range: -200 to 1,000 °C Resolution: 0.1 °C Accuracy: -200 to - 60 °C ±0.5 % -60 to 60 °C ±0.5 °C 60 to 1,000 °C ±0.5 % Cold junction compensation: ±0.3 °C	Range: -200 to 400 °C Resolution: 0.1 °C Accuracy: -200 to - 60 °C ±0.5 % -60 to 60 °C ±0.5 °C 60 to 400 °C ±0.5 % Cold junction compensation: ±0.3 °C
Temperature PT-100 (2-wire)	Pulse Counter (Input 4 only)	Frequency (Input 4 only)
Range: -200 to 400 °C Resolution: 0.1 °C) Accuracy: -200 to - 60 °C ±0.5 % -60 to 60 °C ±0.3 °C 60 to 400 °C ±0.5 %	Zero crossing detector Range: 1 to 65,536 counts Resolution: 1 count Frequency range: 0 to 4 KHz Input signal: 0 to 5 V Input impedance: 470 Ω	Zero crossing detector Range: 20 Hz to 4 KHz Input signal: 0 to 5 V Input impedance: 470 Ω
4 to 20 mA	0 to 1 V	0 to 50 mV
Range: 4 to 20 mA Resolution: 4.76 µA Accuracy: ±0.5 % Loop impedance: 21 Ω	Range: 0 to 1 V Resolution: 200 µV Accuracy: ±0.5 % Input impedance: 25 MΩ Maximum voltage: 5.2 V	Range: 0 to 50 mV Resolution: 3 µV Accuracy: ±0.5 % Input impedance: 25 MΩ Maximum voltage: 5.2 V

Contact

Range: Open/Close

B.4. General Specifications

DaqLink Logger Sampling Features

- Memory capacity: ~38,000 samples in Online Mode
~59,000 samples in Optimized Memory Mode
- Sampling rate: Once per sec to once every 18 hours
- Sampling resolution: 16-bit
- Channel separation: 80 dB

DBSA710 and DBSA720 Hardware Specifications

Display

- 2-row LCD
- 16 character display



Power Supply

- *Battery:*
 - Internal rechargeable 4.8 V, 800 mAh NiMH battery (2 batteries in series)
 - Built-in battery charger
 - Battery Life: Up to six months depending on logger configuration
- *AC Power:*
 - External 12 V DC input @ 300 mA 3.6 VA
 - Center Negative

Operating Temperature Range

- -20 to 50 °C
- Water and dust proof: IP54

Man Machine Interface

Full keyboard operation

Standards Compliance

CE, FCC, IC Canada

B.5. System Requirements

Software	Hardware
OS Platform: Windows XP SP3, Windows Vista (32-bit) and Windows 7 (32-bit)	Processor: Pentium 4, 2.0 GHz or better
Browser: Internet Explorer 5.01 or higher	Memory: 512 MB RAM
Screen Resolution: Minimum 1024 x 768	Storage Memory: 250 MB available disk space for the DataSuite application

Appendix C:

MicroLite Specifications

C.1. General Specifications

	LITE5008 LITE5016	LITE5008P LITE5032P	LITE5032P-RH	LITE5032P- 4/20	LITE5032P-V	LITE5032P-EXT
Specification	Internal Temp	Internal Temp	Internal Temp/RH	4-20 mA	0-10 V	External NTC
Range	Temp: -40 to 80 °C	Temp: -40 to 80 °C	Temp: -40 to 80 °C RH: 5-95 %	4-20 mA	0-10 V	-50 to 150 °C
Accuracy	Temp: 0.3 °C	Temp: 0.3 °C	Temp: 0.3 °C RH: ± 2%	± 380 pA	±0.5 %	-50 to 60 °C ±0.3 °C 60 to 150 °C ±0.5 %
Resolution	0.1 °C (display) 0.06 °C (software)	0.1 °C (display) 0.06 °C (software)	Temp: 0.1 °C (display) 0.06 °C (software) RH: 0.5%	1.16 uA	200 µV	0.1 °C (display) 0.06 °C (software)
Maximum Load	N/A	N/A	N/A	25 mA, 3 V	12 V	N/A
Dew Point	X	X	√	N/A	N/A	N/A
LCD Display	√	√	√	√	√	√
LED Alarm Indicator	X	√	√	√	√	√
USB 2.0	√	√	√	√	√	√
Sample Memory	8,000 and 16,000	8,000 and 32,000	32,000 (16K per channel)	32,000		
Sampling Rate	Once per second / once every 2 hours	Once per second / once every 18 hours				
Battery Type/ Battery Life	CR2032 3V 1.5 years, depending on sampling rate	CR2032 3V 2 years, depending on sampling rate				
Operating Environment	-40 to 80 C					
Dimensions (with cap)	11 x 3.9 x 2.6 cm		11 x 3.9 x 3 cm	14 x 3.9 x 2.6 cm		
Weight	45.5 g					
Standards Compliance	CE, EN12830, IP68			CE, EN12830, IP54		
Wall Mount	X	Logger cradle accessory provided				



C.2. System Requirements

Software	Hardware
OS Platform: Windows XP SP3, Windows Vista (32-bit) and Windows 7 (32-bit) Browser: Internet Explorer 5.01 or higher Screen Resolution: Minimum 1024 x 768	Processor: Pentium 4, 2.0 GHz or better Memory: 512 MB RAM Storage Memory: 250 MB available disk space for the DataSuite application

Appendix D: MicroLogPRO II Specifications

D.1. General Specifications

	EC800	EC850
Internal sensor range	Temp: -40 to 80 °C	Temp: -40 to 80 °C RH: 5 to 95%
Temperature accuracy	± 0.2 °C	
Humidity accuracy	N/A	± 2%
Temperature Resolution	0.06 °C	0.04 °C
Humidity Resolution	N/A	0.1 %
External Sensor Support	Temperature, 4-20 mA, 0-10 V, pH	
Memory capacity	52,000 samples (over 3 channels)	
Sampling rate	<i>Minimum:</i> Once every second <i>Maximum:</i> Once every 18 hours	
LCD display	Four digit, 7-segment LCD with decimal point	
Dew Point	LCD and Software indication	
LED	Bi-color Alarm	
PC Connection	Mini-USB	
Power supply	2/3 AA 3.6V Lithium battery	
Battery life	~ 2 years depending on sampling rate	
Dimensions	Diameter: 72 mm Thickness: 22.9 mm	
Weight	55 g	
Wall Mount	Cradle accessory	
Standards Compliance	CE, IP65	CE, IP54



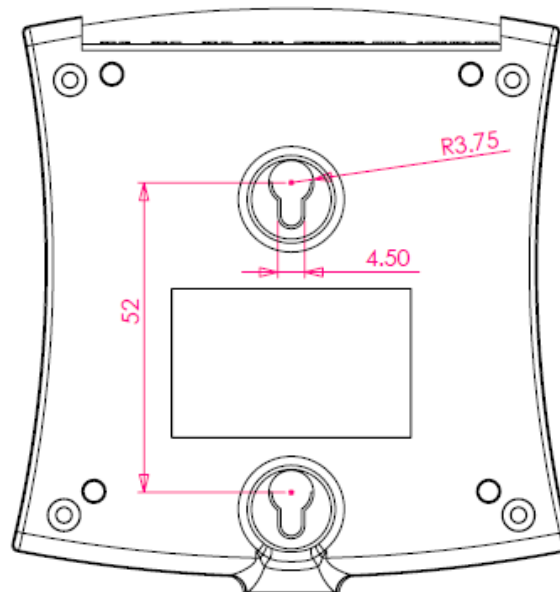
D.2. System Requirements

Software	Hardware
OS Platform: Windows XP SP3, Windows Vista (32-bit) and Windows 7 (32-bit) Browser: Internet Explorer 5.01 or higher Screen Resolution: Minimum 1024 x 768	Processor: Pentium 4, 2.0 GHz or better Memory: 512 MB RAM Storage Memory: 250 MB available disk space for the DataSuite application

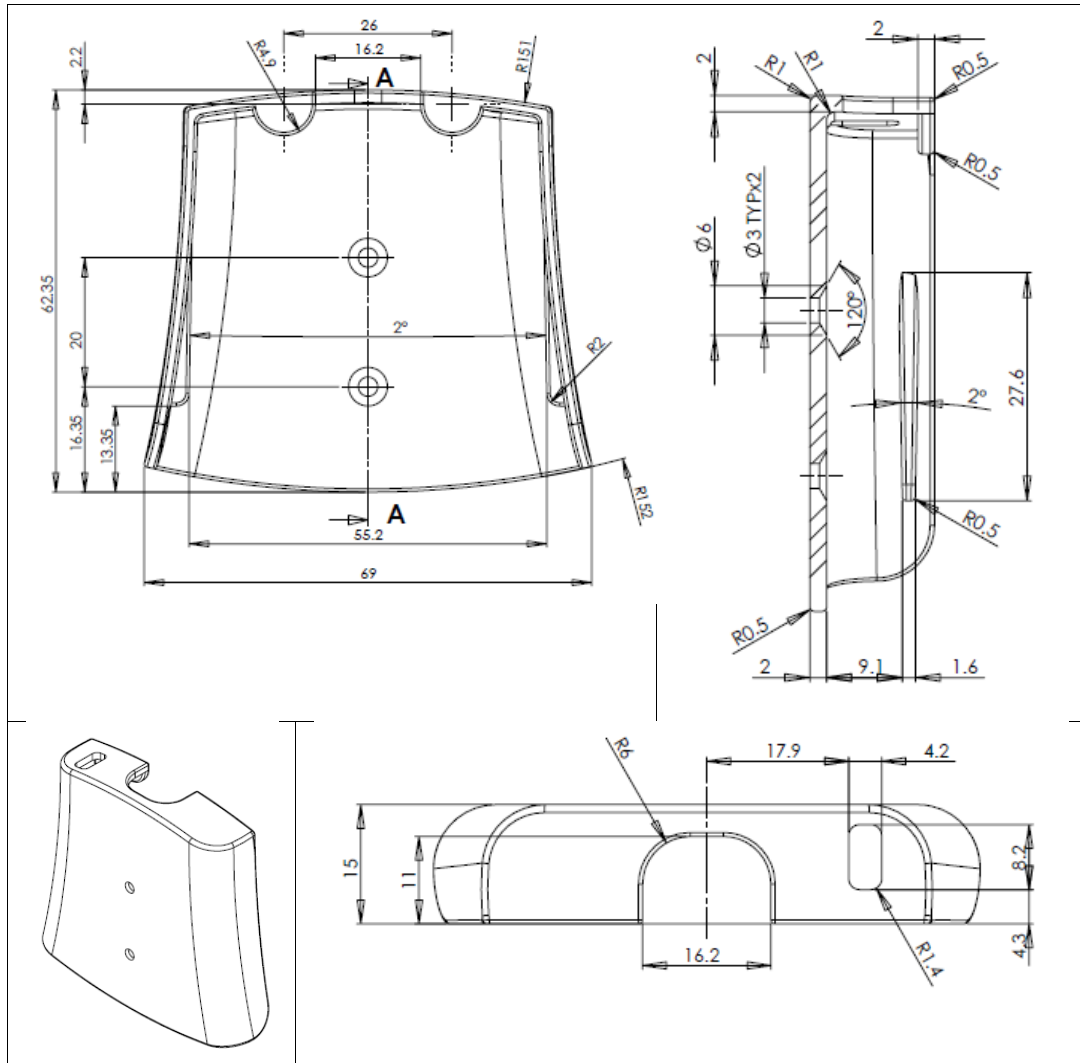
Appendix E: DataNet Mounting Diagrams

This appendix includes mechanical diagrams of the DNL and DNR DataNet models. The diagrams include dimensions to be used as a reference for mounting the units on the wall.

Rear Casing Dimensions for DNL9XX and DNR9XX Wall Mounting



Cradle Dimensions for DNL8XX and DNR800 Wall Mounting



Appendix F: Mini DataNet BXT Assembly Instructions

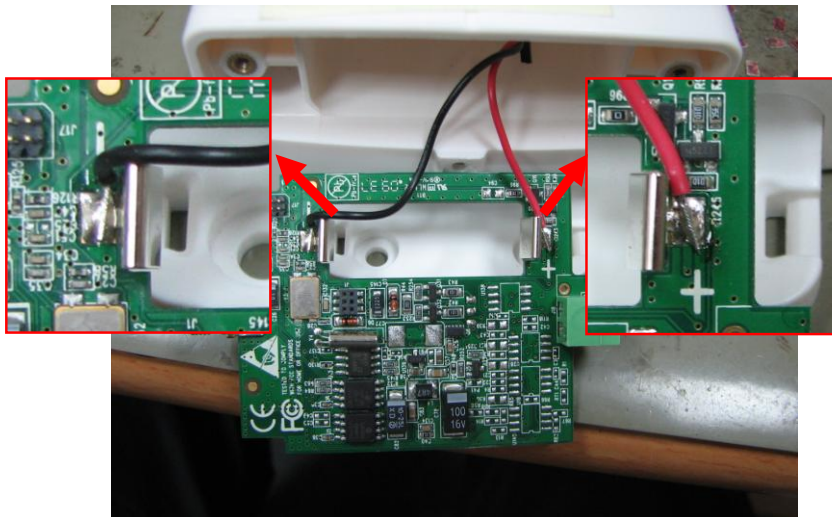
Upgrade Kit Contents

- Main plastic body (with key pad)
- Circuit board compartment cover + 2 screws
- Battery holder compartment cover + 1 screw
- Battery holder with 2 wires + 4 x AA 3.6 V batteries
- Sensor strain relief cover + 2 screws
- 2 screws and dibles for logger wall mounting

To convert standard DNL8XX Mini DataNet units to the new DNL8XX-BXT featuring the extended battery pack plastic casing, follow the instructions below.

Note: Only an authorized fourtec distributor should perform the BXT conversion.

1. Remove the two screws located on the top panel of the standard Mini DataNet logger (where the antenna is connected) and with care pull out the internal compartment containing the logger circuit board and battery.
2. Remove the battery from the circuit board.
3. Take the main BXT plastic body from the BXT packaging and gently pull the red and black wires out from the compartment which will house the Mini DataNet circuit board.
4. Solder the wires to the circuit board: Black wire on the negative (-) battery contact, Red wire on the positive (+) battery contact. See example below:



5. Insert the Mini DataNet circuit board into the main BXT plastic body, so that the logger button will be facing the outside of the plastic casing.



6. Close the compartment housing the circuit board with the plastic panel, using the two screws provided. Re-attach the Mini DataNet antenna to the screw terminal which sticks out from the plastic panel.
7. Remove the black battery holder from the main BXT plastic body and insert the 4 x AA batteries provided.



8. Place the battery holder back into the BXT body and close the battery compartment with the provided plastic cover. Secure the cover to the plastic body using the screw provided.
9. The BXT logger is now ready for use. Please contact support@fourtec.com with any problems.



Appendix G: Safety Information and FCC IDs

The DataNet system complies with relevant safety regulations for data processing devices. Please contact fourtec with any questions regarding DataNet safety issues.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

FCC ID for DataNet System

DNR900:

FCC ID: XGO-DNR9XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL910:

FCC ID: XGO-DNL9XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL920:

FCC ID: XGO-DNL9XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNR800:

FCC ID: XGO-DNR8XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL910-PA

FCC ID: XGO-DNL9XX-PA
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL920-PA

FCC ID: XGO-DNL9XX-PA
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL804:

FCC ID: XGO-DNL8XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL808:

FCC ID: XGO-DNL8XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DNL810:

FCC ID: XGO-DNL8XX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation.

DataNet Battery

The DataNet DNR900, DNL910, DNL920, DNL910-PA and DNL920-PA devices are supplied with internal rechargeable 4.8 V NiMH batteries as well as connection to AC power.

The Mini DataNet DNL804, DNL808 and DNL810 data loggers are supplied with 1 x 2/3 AA lithium battery.

- Do not tamper or drop the battery to avoid leakage of hazardous chemicals contained within.
- Do not puncture, incinerate, disassemble or expose the battery to temperatures above 122 °F (50 °C).
- Keep the battery away from children.
- Dispose of the battery only in accordance with local regulations concerning potentially hazardous waste. Do not throw in the garbage bin.
- Remove the battery when not using the DataNet loggers for a significant period of time e.g. when the DataNet loggers are placed in long-term storage.

DataNet AC Power Adapter

- Only use the AC adapter provided by fourtec.
- Verify that your power outlet is suitable for the voltage of the AC adapter.
- If the AC adapter is connected to an AC outlet, make sure the area around the outlet is accessible and the adapter is not covered while in operation.
- Do not place the AC adapter on heat-sensitive material.
- Do not charge the DataNet while situated in a carrying case or without sufficient airflow surrounding the loggers.
- Do not expose the adapter to direct sunlight or water.
- Do not tamper with the adapter components.







DataNet Operating Environment








- DNR900, DNL910, DNL920, DNL910-PA and DNL920-PA: -20 to 50 °C
- DNR800, DNL804, DNL808, DNL810 and BXT models: -30 to 75 °C











Appendix H: Ordering Information











For the full list of fourtec products, and to place fourtec orders please visit <http://www.fourtec.com> or contact your local fourtec distributor:




Product Suite

Part Number	Product Name	Product Description
DNR900 	DataNet Receiver/Repeater	Two-mode module for creating and managing DataNet ZigBee network, and extending network transmission range
DNR800 	DataNet Mini Repeater	<ul style="list-style-type: none"> Module for extending network transmission range External AC power supply only
DNL910 	DataNet Temp. Data Logger	<ul style="list-style-type: none"> Internal Temperature PT-100 sensor Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact
DNL920 	DataNet Temp/RH Data Logger	<ul style="list-style-type: none"> Internal Digital RH and Temperature sensors Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact
DNL910-PA 	DataNet Temp. Data Logger with Power Amplifier	<ul style="list-style-type: none"> Internal Temperature PT-100 sensor Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact Includes Power Amplifier for long-range transmission
DNL920-PA 	DataNet Temp/RH Data Logger with Power Amplifier	<ul style="list-style-type: none"> Internal Digital RH and Temperature sensors Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact Includes Power Amplifier for long-range transmission

Part Number	Product Name	Product Description
DNL810 	Mini DataNet Temp/RH Logger	<ul style="list-style-type: none"> • Internal Digital Temperature and Humidity sensors • Battery operated
DNL808 	Mini DataNet External Temp. Logger	<ul style="list-style-type: none"> • External NTC 10 KΩ Temperature input with NTC probe • Battery operated
DNL804 	Mini DataNet External Current Data Logger	<ul style="list-style-type: none"> • External 4-20 mA input • Battery operated
DNL810-BXT 	Mini DataNet Temp/RH Logger	<ul style="list-style-type: none"> • Internal Digital Temperature and Humidity sensors • External battery pack supporting 4 x AA 3.6 V battery, 3-year life
DNL808-BXT 	Mini DataNet External Temp. Logger	<ul style="list-style-type: none"> • External NTC 10 KΩ Temperature input with NTC probe • External battery pack supporting 4 x AA 3.6 V battery, 3-year life
DNL804-BXT 	Mini DataNet External Current Data Logger	<ul style="list-style-type: none"> • External 4-20 mA input • External battery pack supporting 4 x AA 3.6 V battery, 3-year life
DBSA710 	DaqLink Data Logger	<ul style="list-style-type: none"> • Internal Temperature PT-100 sensor • Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact

Part Number	Product Name	Product Description
DBSA720 	DaqLink Data Logger	<ul style="list-style-type: none"> • Internal Digital RH and Temperature sensors • Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact
LITE5008 	MicroLite USB Temp Logger	<ul style="list-style-type: none"> • Internal NTC Temp sensor • 8k sample memory
LITE5016 	MicroLite USB Temp Logger	<ul style="list-style-type: none"> • Internal NTC Temp sensor • 16k sample memory
LITE5008P 	MicroLite II USB Temp Logger	<ul style="list-style-type: none"> • Internal NTC Temp sensor • 8k sample memory
LITE5032P 	MicroLite II USB Temp Logger	<ul style="list-style-type: none"> • Internal NTC Temp sensor • 32k sample memory
LITE5032P-RH 	MicroLite II USB Temp/RH Logger	<ul style="list-style-type: none"> • Internal Digital Temp/RH sensor • 32K sample memory
LITE5032P-EXT 	MicroLite II USB External Temp Logger	<ul style="list-style-type: none"> • External NTC Temp input • 32K sample memory
LITE5032P-V 	MicroLite II USB Voltage Logger	<ul style="list-style-type: none"> • External 0-10 V input • 32K sample memory
LITE5032P-4/20 	MicroLite II USB Current Logger	<ul style="list-style-type: none"> • External 4-20 mA input • 32K sample memory
EC800 	MicroLogPRO II Temp Data Logger	<ul style="list-style-type: none"> • Internal NTC Temp sensor • External sensor input
EC850 	MicroLogPRO II Temp Data Logger	<ul style="list-style-type: none"> • Internal Digital RH and Temp sensor • External sensor input

Part Number	Product Name	Product Description
DT139A 	External Current Adapter for MicroLogPRO II	External 4-20 mA input
DT140A-ML2 	External Voltage Adapter for MicroLogPRO II	External 0-10 V input
DT132A 	External Temperature NTC probe for MicroLogPRO II	<ul style="list-style-type: none"> -50 to 110 °C temperature range 2.5 m cable length
DT277A	External PT-100 adapter for MicroLogPRO II	-200 to 400 °C temperature range
DataSuite-SW 	Software CD and Accessories	DataSuite software CD and USB communication cable
13825 	External Alarm Siren + Strobe	Connects to DataNet and DaqLink
12504 	GSM Modem	Quad band GSM modem for sending SMS alarm notifications from DataSuite
DT332 	NTC temperature sensor and cable	NTC 10 kΩ temperature sensor <ul style="list-style-type: none"> Range: -50 to 150 °C 2.5 m cable length
12753 	PT-100 temperature sensor and cable	PT-100 temperature sensor <ul style="list-style-type: none"> Range: -70 to 400 °C 2.5 m cable length
12752 	PT-100 temperature sensor and cable	PT-100 temperature sensor <ul style="list-style-type: none"> Range: -70 to 400 °C 4 m cable length
12751 	PT-100 temperature sensor and cable	PT-100 temperature sensor <ul style="list-style-type: none"> Range: -70 to 400 °C 6 m cable length

Part Number	Product Name	Product Description
13330 	3 m mini-USB communication cable	For connection between device and PC
12928 	Replacement internal battery	<ul style="list-style-type: none"> • Replacement internal battery for Mini DataNet and MicroLogPRO II • 2/3 AA 3.6 V lithium
11199 	Calibration Certificate	Available through advance order
DataSuite-CFR	DataSuite CFR software module	Compliance for FDA Title 21 CFR Part 11