

# IM5990 4000 Series Sensor Units

User Guide

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## Document History

Document Number: IM5990

Issue No.	Issue Date	Changes	By
1	1 June 2018	First Issue	IR
2	7 November 2018	Additions to Section 2.4 Compliance	IR
3	13 November 2019	Addition of Section 3.1 - Connecting Sensor Units to External Probes	IR
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5	3 December 2020	Alarm Corrections; remove obsolete text remote Management tools text; change CR2 to CR3.	CRB
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7	22 February 2021	Minor change to terminology	IR
8	4 March 2021	Addition of reference to UKCA marking on page 5	IR

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## 1 Introduction

This Document details how to configure the **RL4000** and **ML4000** Series Sensor Units (including Durable Units) from Hanwell Solutions Ltd for use in conjunction with the EMS application.

- Durable Units (-DU) function in exactly the same way as other 4000 Series Sensor Units, but have a higher IP Rating.

It also details the additional functions, such as Calibration.

The **4000** Series Sensor Units are, essentially, transmitters with one, two or three data channels. The Units take data received from attached sensors/probes and transmit it to the Hanwell **EMS** System at defined Transmission Intervals, either directly or via an SR2 Controller.

- The sensor(s)/probe(s) themselves can be mounted directly onto the **4000** Series Sensor Unit's case or on a lead connected to the Unit.
- The current Data Values, battery voltage/predicted battery life and (optionally) the Alarm Status are displayed on the Sensor Units' LCD screens.
- The Sensor Units are configured with the EMS software via a USB connection.
- The Sensor Units hold their Calibration Data in their on-board memory and can also be programmed with the High/Low Alarm Values set on the EMS host PC/Server.
- Mark 8 and above 4000 Series Sensor Units can also log data on-board in their internal memory.

### 1.1 Pre-requisites

You will need the following to enable communication between EMS and a 4000 Series Sensor Unit:

- Y055 USB lead.
- **EMS** application installed on a PC/Server.
- **EMS Remote Management Tools**

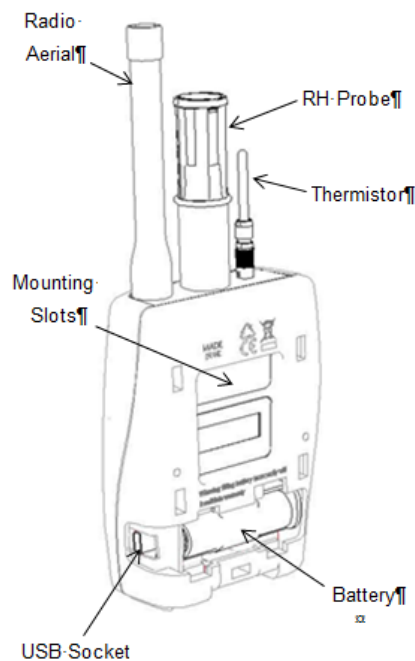
## 2 The 4000 Series Sensor Unit

The illustrations below represent typical 4000 Series Sensor Units fitted with probes.

**Figure 1 – Typical 4000 Sensor Units**



**Durable Unit**



**Figure 2 – Typical 4000 Series Sensor Unit - Schematic**

**Note:** The actual design will vary depending on the probes you have installed.

## 2.1 Sensor Unit Battery

Most variants of the **4000 Series Sensor Units** are powered by a **3.6V AA Lithium** battery.

- The battery life is dependent on the **Transmit Interval** set.
- If a batch of Sensor Units have been set up at the same time, we recommend changing the batteries of all of the batch simultaneously.
- Replacement battery Hanwell Part Number: **88706**.

**Caution: Do Not Fit Standard Alkaline AA Batteries.**

## 2.2 Mounting the Sensor Unit

A wall-mounting bracket is available for the 4000 Series Sensor Units (Code: **Y119**). It comprises a metal strip which is fitted to the wall.

- To mount a 4000 Series Sensor Unit on the bracket, line up the slots on the back of the Unit with the tabs on the bracket and click the Unit into place.
- To remove 4000 Series Sensor Unit from the bracket, gently press the tag at the bottom of the Unit's case towards the wall, using a small screwdriver or similar, and lift the Unit free.

### Durable Units

Wall-mounting brackets are also available for the RL4000-DU Series Sensors

Part Numbers:

**Y549** (ML4109- DU)

**Y550** (All other RL4000-DU Series units).

## 2.3 Radio Testing Dongle

This is an optional plug-in device (Code: **Y058**).

When connected to a 4000 Series Sensor Unit USB socket, it overrides the Unit's configured Transmit Interval and forces the Unit to send a transmission every five seconds.

## 2.4 Compliance

4000 Series Sensor Units have been designed to comply with all relevant RoHS and WEEE EU Directives and carry CE and UKCA marking.

Hereby, Hanwell Solutions Ltd declares that the RE type 12K5 FIDBN is in compliance with RED 2014/53/EU.

The full text of the EU Declaration of Conformity is available at the following internet address:

<https://hanwell.com/download-category/declarations-of-conformity>

## 2.5 Start-up Messages

Mark 8 and above versions of the 4000 Series Sensor Units will show the following sequence on their LCD displays on power up:

- All display segments will flash twice.
- A Serial Number is displayed on two lines.
- A Frequency Code\* is displayed on the top line of the display and a Transmission ID on the lower line.

*\* Earlier versions only show the Transmission ID.*

*The Frequency Code indicates the Synthesised Frequency Setting. It will be 0 for a connected module, otherwise contact Hanwell Solutions for an up-to-date list if there is any doubt.*

*The Frequency is also marked on the instrument labelling.*

The full start up sequence will only occur after the battery has been disconnected for a minute or more or the device is given a Hardware Reset by shorting the pads visible beside the battery.

## 2.6 Cleaning the Sensor Unit

The **4000 Series Sensor Units** are cased in ABS plastic and can be cleaned using a damp, non-abrasive cloth.

**Caution: Do NOT immerse the Sensor Unit in water!**



### 3 Setting up 4000 Series Sensor Units

For information on entering 4000 Series Sensor Units' details into EMS, please refer to the EMS Online User Guide, in particular the section **System Configuration - Sensors**:

<http://www.help.emsprocloud.com/index.html?system-configuration-sensors.html>

- 4000 Series Sensor Units should be added to EMS using the appropriate type as indicated on the Box Insert/Certificate.

#### 3.1 Connecting Sensor Units to an External Probe



**Figure 3**  
**Sensor Unit with Wiring for External Probe.**

Sensor Units supplied with wiring for external probes (see example in Figure 3 above) should be connected to them as follows:

Channel No.	+ve	-ve
1	Green	Black
2	Red	White
3	Yellow	Blue

**Note:** Any unused pairs of wires should be twisted together.

### 3.2 Testing the Sensor Unit

Before putting a 4000 Series Sensor Unit in its intended monitoring location, we recommend testing its operation after entering its details into EMS:

- Connect a **Radio Testing Dongle** (Code: **Y058**), if you have one, to the USB socket of the Sensor Unit to speed the test.
1. Check that a signal is being received on the EMS System from the Sensor Unit.
    - If you are using a **CR3** then you will see the message: **'last signal #'** (where # is the ID Number set) displayed on the **CR3's** LCD.
    - If you are using a **SR2** then you will see both the ID Number and its signal strength on the **SR2's** LCD.
  2. Check that the correct values are displayed on the EMS User Interface on the host PC/Server.
  3. Site the Sensor Unit in its intended monitoring location and confirm that signals are still being reliably received.

### 3.3 Entering a 4000 Series Sensor Unit's Calibration Settings into EMS

In EMS:

1. Select **Edit Mode** from the main **View Data** menu. See Figure 4 below:

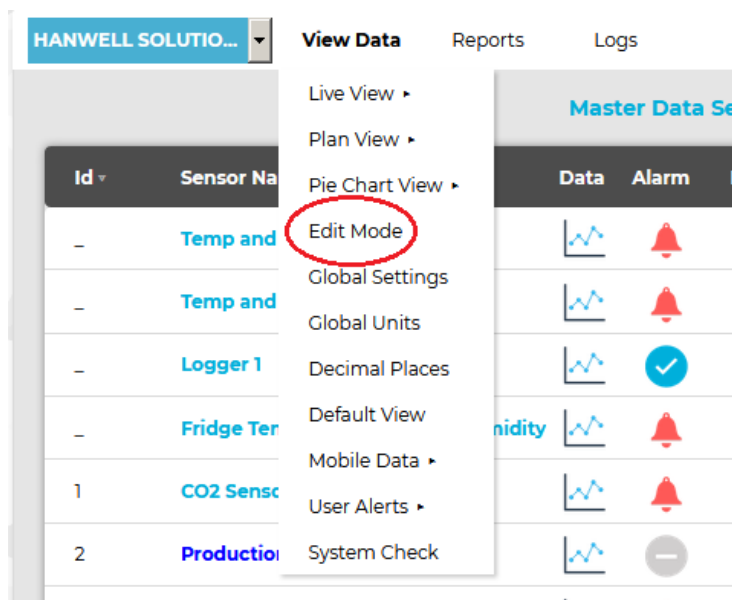


Figure 4

- The **Edit Mode** window is displayed. See Figure 5 below:

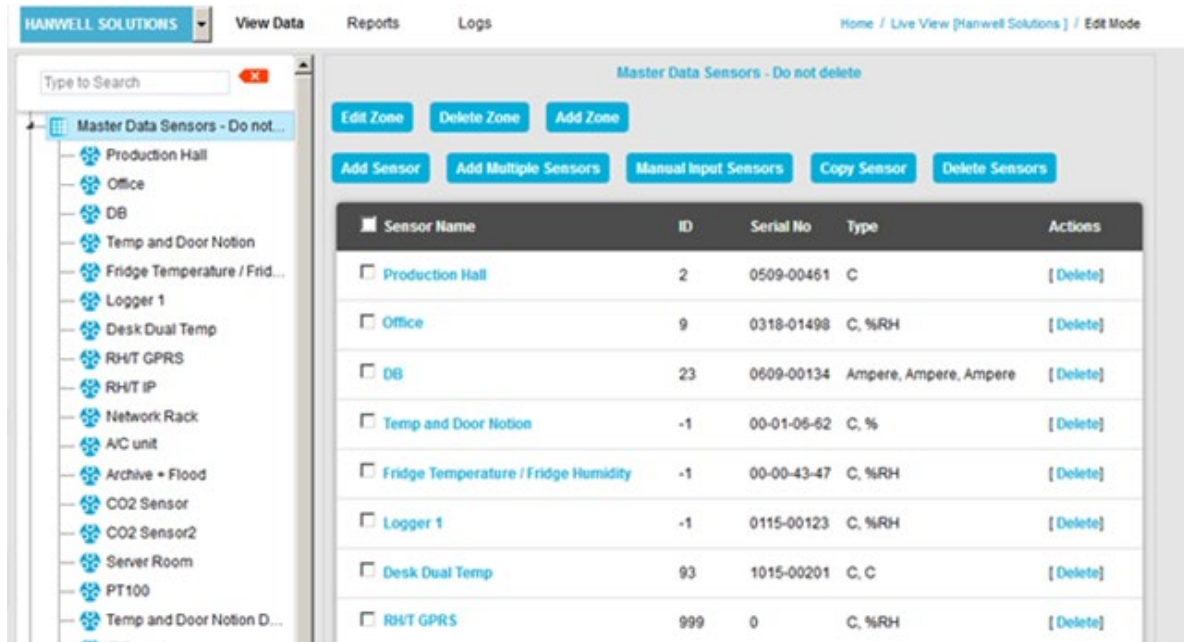


Figure 5

- By default, the **Edit Mode** window for the **Zone** at the top of the left-hand menu is displayed.
- To display another Zone's **Edit Mode** window, click on the entry for the required **Zone** in the left-hand menu. For an example, see Figure 6 below:

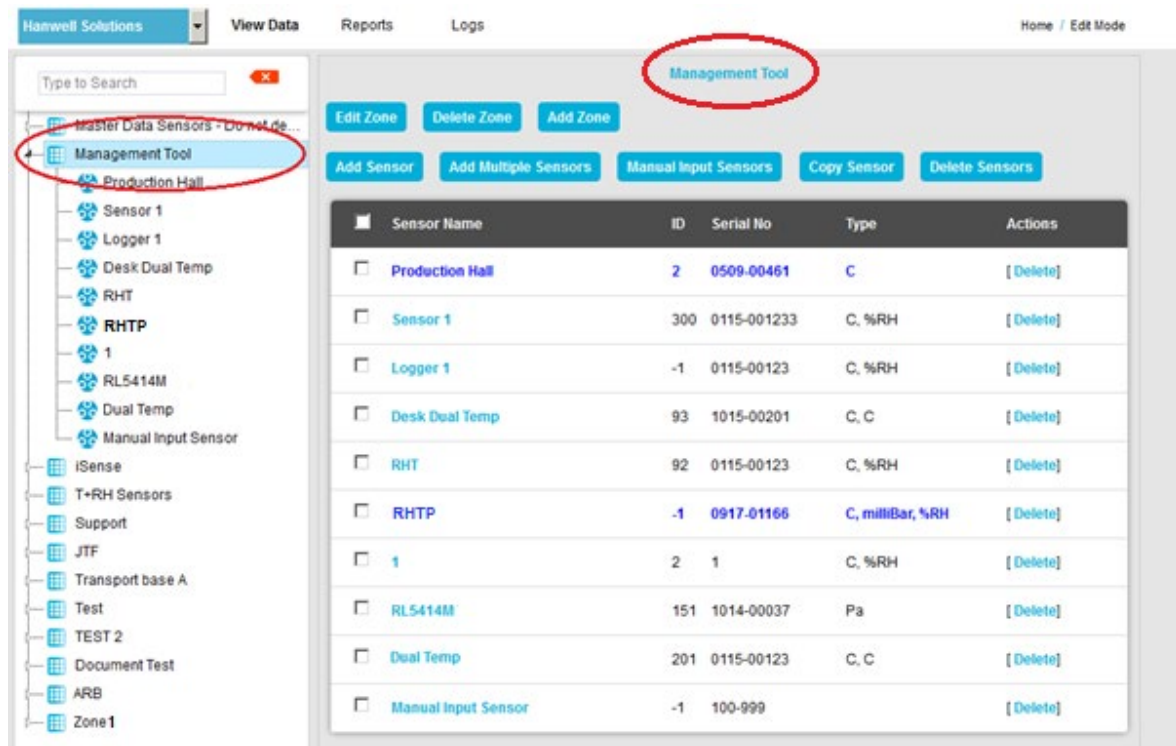
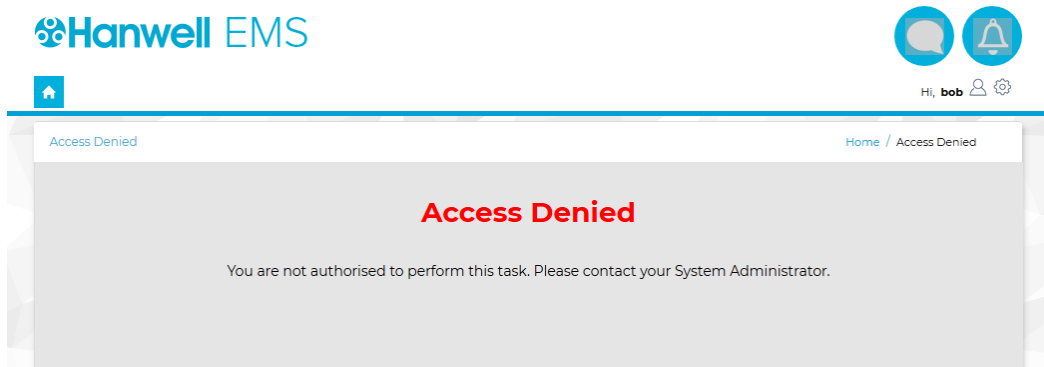


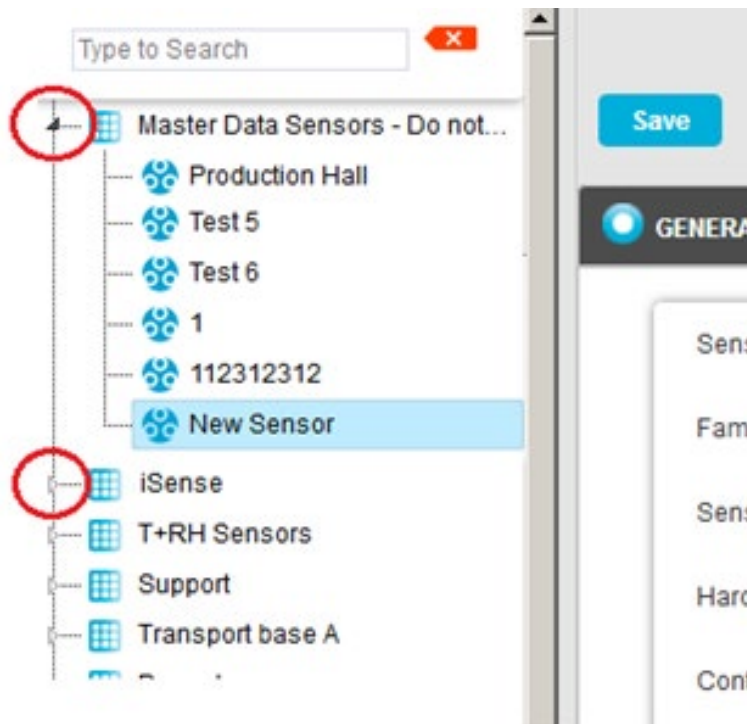
Figure 6

**Note:** **Edit Mode** is only available if you have the correct access **Permissions**. If you do not have the correct access **Permissions** the following message window will be displayed. See Figure 7 below:



**Figure 7**

2. **Either:**
  - i. In the left-hand list of the Zone's **Edit Mode** window, click on the small 'arrow' symbol to display a list of the Sensor Units associated with the Zone. See Figure 8 below:



**Figure 8**

- ii. In the left-hand list, click on the required 4000 Series Sensor Unit's icon:



**Or:**

In the table in the Zone's **Edit Mode** window, click on the required 4000 Series Sensor Unit's name in the **Sensor Name** column. See Figure 9 below:

Master Data Sensors - Do not delete

[Edit Zone](#) [Delete Zone](#) [Add Zone](#)

[Add Sensor](#) [Add Multiple Sensors](#) [Manual Input Sensors](#) [Copy Sensor](#) [Delete Sensors](#)

<input type="checkbox"/> Sensor Name	ID	Serial No	Type	Actions
<input checked="" type="checkbox"/> Production Hall	2	0509-00461	C	[Delete]
<input type="checkbox"/> Office	9	0318-01498	C, %RH	[Delete]
<input type="checkbox"/> DB	23	0609-00134	Ampere, Ampere, Ampere	[Delete]
<input type="checkbox"/> Temp and Door Notion	-1	00-01-06-62	C, %	[Delete]
<input type="checkbox"/> Fridge Temperature / Fridge Humidity	-1	00-00-43-47	C, %RH	[Delete]
<input type="checkbox"/> Logger 1	-1	0115-00123	C, %RH	[Delete]

**Figure 9**

- The **Edit Mode** window for the selected 4000 Series Sensor Unit is displayed. See Figure 10 below:

New Sensor [989789]

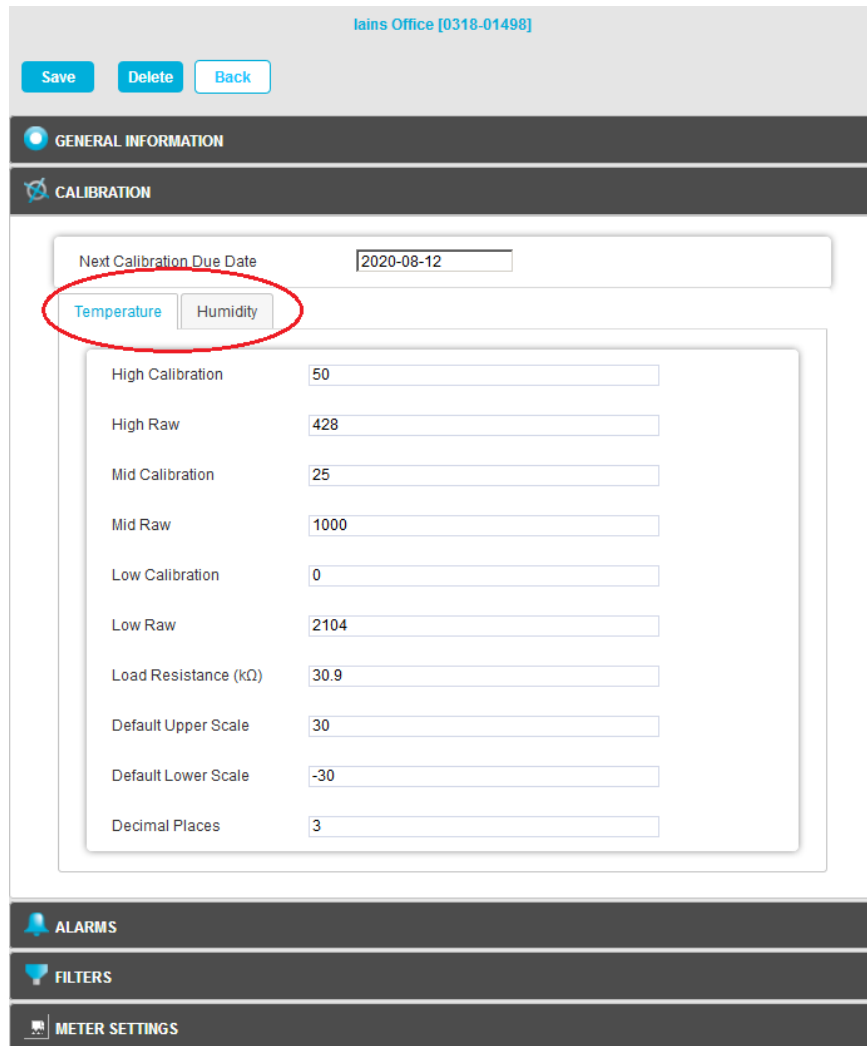
**GENERAL INFORMATION**

Sensor Name:   
 Family Type:   
 Sensor Type:   
 Hardware Serial Number:   
 Control Device Group:   
 Physical ID:   
 Logging Interval(Mins):   
 Units:   
 Sensor Out of Service:  Yes  No  
 Has Digital Input:   
 Location:   
 Second Location:

**Figure 10**

3. Click the on the **Calibration** field to expand the **Calibration** pane for the selected 4000 Series Sensor Unit.
  - The **Calibration** pane will display a separate tab for each channel/probe associated with the selected 4000 Series Sensor Unit.

See Figure 11 below:



ains Office [0318-01498]

Save Delete Back

GENERAL INFORMATION

CALIBRATION

Next Calibration Due Date 2020-08-12

Temperature Humidity

High Calibration	50
High Raw	428
Mid Calibration	25
Mid Raw	1000
Low Calibration	0
Low Raw	2104
Load Resistance (kΩ)	30.9
Default Upper Scale	30
Default Lower Scale	-30
Decimal Places	3

ALARMS

FILTERS

METER SETTINGS

Figure 11

4. Click on each tab representing the sensor(s)/probe(s) to be calibrated and:
  - i. Enter the date that the next Calibration is due into the **Next Calibration Due Date** field, in the format:

**YYYY-MM-DD**

- \* If the Sensor Unit has just been added to the System, you will notice that the default date on the form will be one year from the date that the Sensor Unit was added.
- \* The normal calibration period is one year.
- \* A good rule of thumb would be 12 months for environments that are either contaminated or have consistently high operating humidities. Where the environments are uncontaminated and average humidities are mid-range, then every 24 months would be acceptable.



- ii. Enter or edit any other Calibration parameter values as required.
  - \* Where a particular sensor/probe’s parameters include values for **Offset** and **Gain**, these will be listed on the sensor/probe’s Box Insert.
  - \* For more detailed information on Sensor Unit calibration parameters, please refer to the Online Manual:

<http://www.help.emsprocoud.com/index.html?calibration-general.html>

- 5. When you are happy with the new date select **Save**.
  - Click on the **Back** button to cancel any changes to the **Next Calibration Due Date**.
 If the Update has been successful, you will be returned to Edit Mode window and the following message will be displayed. See example in

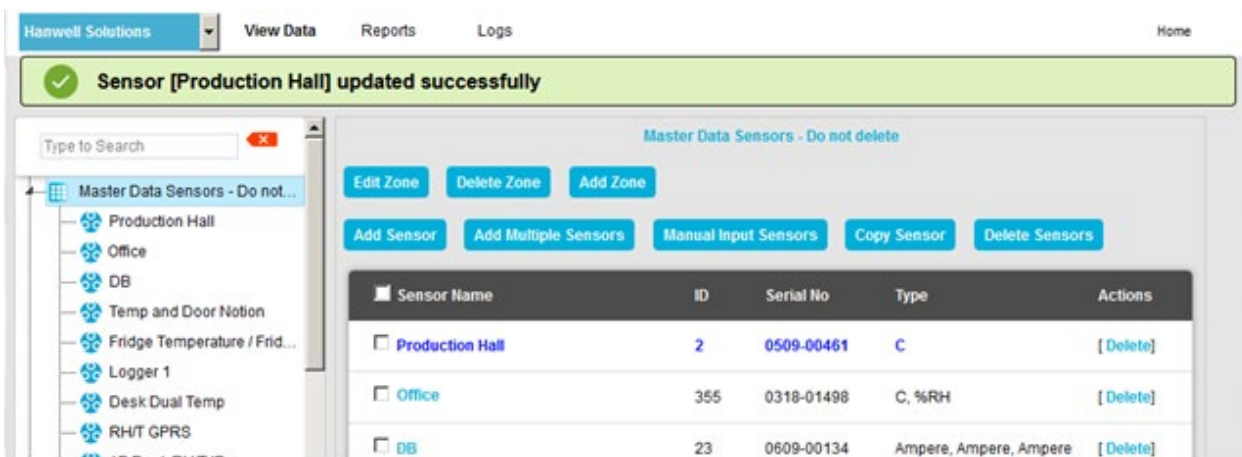


Figure 12 below:

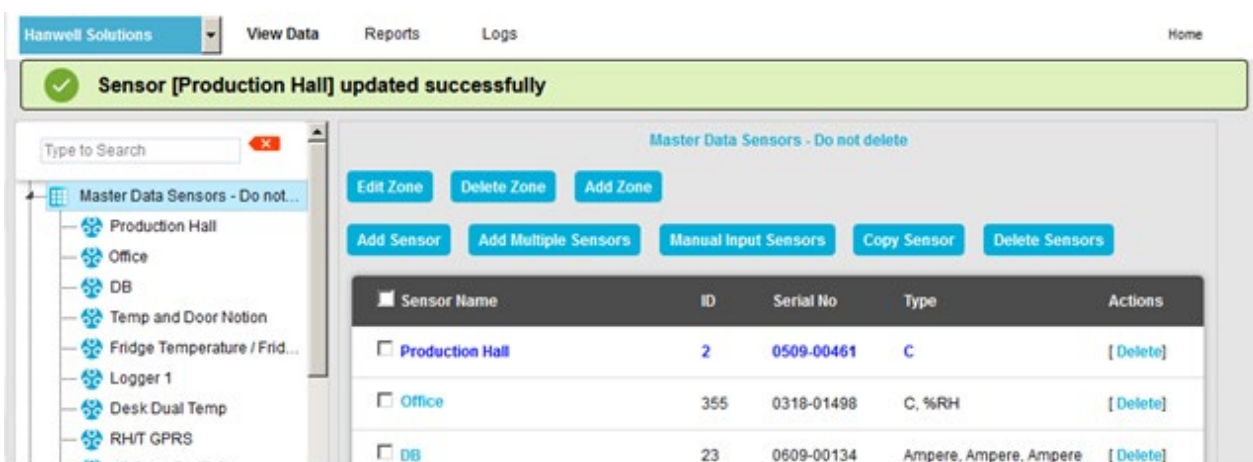


Figure 12

- 6. Repeat Steps 2 -5 for all required 4000 Series Sensor Units.



**Note:** Should you wish to carry out your own calibration of a sensor/probe, please refer to both the EMS Online User Guide:

<http://www.help.emsprocloud.com/index.html?calibration-management-tools.html>

and the following links which are also listed on the Box Insert:

<http://pd.hanwell.com/Cal-linear-sensor.xls>

<http://pd.hanwell.com/Cal-linear-sensor.zip>

### 3.3.1 Setting Alarms

To set Alarm Parameters and Levels, refer to the following section in the EMS Online User Guide:

<http://www.help.emsprocloud.com/index.html?levels.html>

### 3.4 Synchronising Sensor Units

The Synchronise process takes data from a connected USB device and updates its **Serial Number**, and **Calibration** settings in the EMS Database; as well as setting the **Physical Transmit ID** of the device from the EMS Database.

**Note:** If the Physical Transmit ID listed in the Unit does not match the ID of the Sensor that you are trying to synchronise with, then the ID listed in the Unit's memory will change to what is set on the Sensor Unit you are synchronising with.

- Synchronising Sensor Units facilitates efficient communication between the Sensor Units and EMS.
- Even if a Sensor Unit is already running on EMS, it is strongly recommended to carry out Synchronisation to set a faster transmit rate when calibrating.

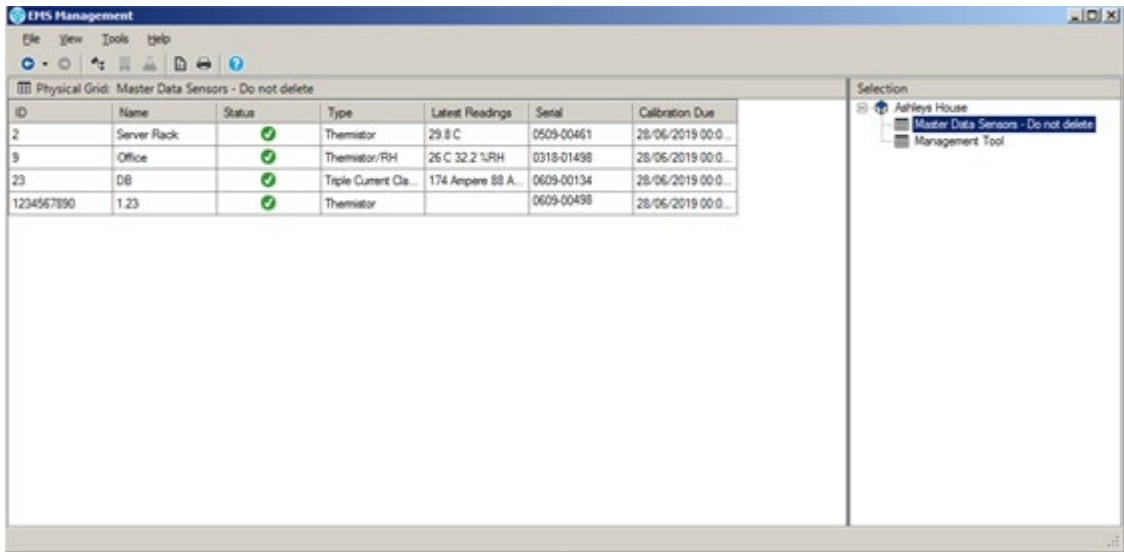
#### To Synchronise a Sensor Unit:

1. Ensure that the Sensor Unit is connected to the PC/Server running EMS via the supplied **Y055** USB lead.
2. Open the **EMS Remote Management Tools** application.
  - **EMS Remote Management Tools** provide:
    - \* A physical link to the database and would be used when it is possible to connect the Sensor Unit directly to the PC with EMS installed via the **Y055** USB lead.
    - \* An HTTP link to data in the EMS database, allowing you to synchronise a Sensor Unit when using EMS installed on a Virtual Machine (VM).

Refer to the **Synchronising Sensors** section of the EMS Online User Guide:

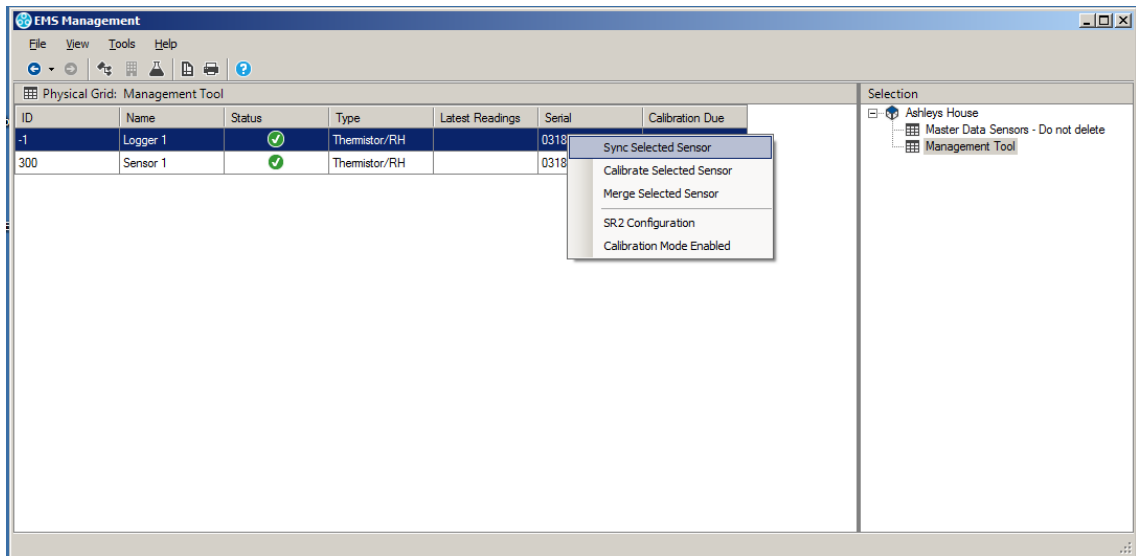
<http://www.help.emsprocloud.com/index.html?calibration-management-tools.html#synchronisingsensors>

3. Select the required Sensor Unit from the EMS Remote Management Tools' **EMS Management** window. See Figure 13 below:



**Figure 13**

- Right click on the selected Sensor Unit's entry and select **Sync Selected Sensor** from the displayed menu. See Figure 14 below:



**Figure 14**

The **EMS Synchronise USB Sensor Vx.x** window is displayed. See Figure 15 below:

Name	<b>Logger 1</b>	
ID Number	<b>-1</b>	
Transmit interval	30	Seconds
Sensor shows alarms	<input checked="" type="checkbox"/>	
Alarm flash rate	None	
Calibration mode	<input type="checkbox"/>	
Tx in Calibrate mode	<input type="checkbox"/>	
Enable logging	<input checked="" type="checkbox"/>	
Serial No.	<b>1014-00037</b>	<input type="button" value="Synchronise"/> <input type="button" value="Close"/>

**Figure 15**

**Note:** The Sensor Unit selected must match the physical device or the program will not complete.

5. Select the required Transmit (TX) interval from the **Transmit interval** drop-down list (60 seconds is recommended for Calibration).
  - The **EMS Synchronise USB Sensor Vx.x** window completes loading and all of the window's fields are populated.
6. Click the **Synchronise** button and follow the instructions given until it reports that the Synchronisation is complete.
  - The Sensor Unit's display should now show the same value as displayed in EMS.
7. Close the window to finish Synchronisation and update the EMS database.
8. Repeat Steps 1 - 8 for all Sensor Units to be added.

Refer to the following section in the Online EMS User Guide for information on **Viewing Sensor Data**:

<http://www.help.emsprocloud.com/index.html?viewing-data2.html>

### 3.4.1 Alarms on Sensor LCD Display

Sensors with LCD displays can be configured to show an alarm bell symbol on the display when the High High or Low Low alarm threshold is exceeded, using the process described here.

Before following the process, make sure the required High High and Low Low alarm levels have been configured in EMS; to set Alarm Parameters and Levels, refer to the following section in the EMS Online User Guide: <http://www.help.emsprocloud.com/index.html?levels.html>

1. Synchronise the sensor as described above.
2. Right click on the selected Sensor Unit's entry and select **Calibrate Selected Sensor** from the displayed menu. See Figure 16 below:

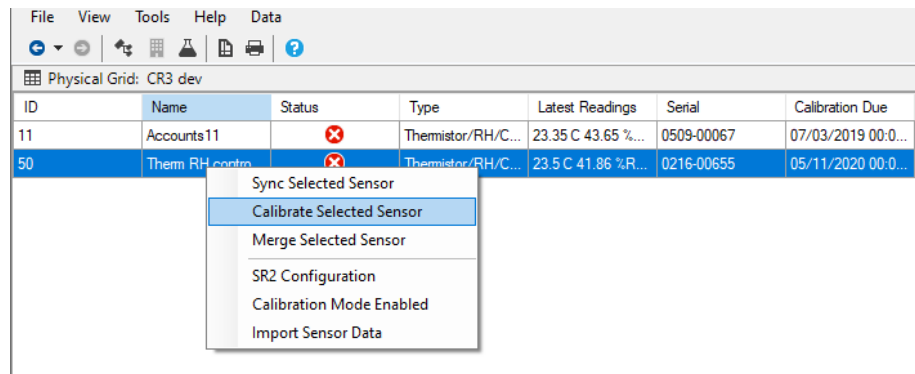


Figure 16

3. The **EMS USB Sensor Calibration Vx.x** window is displayed and its fields are populated. See **Error! Reference source not found.** below:



Figure 17

**Note:** The Sensor's Serial Number and Type must match or the program will not complete.

4. Click on the **Send Calibration** button and follow the instructions given until it reports that the calibration is complete.
5. Synchronise the sensor again making sure Show Alarms and required Flash rate is selected, as described above.
6. Repeat Steps 1 - 5 for all Sensor Units.

**Note:** This is the current process for EMS versions W900 1.1.0 / W906w 2.1.0 and earlier. It is planned that later versions of EMS will have a new synchronisation function, which will write the High High and Low Low alarm values into the sensor when it is synchronised, removing the need to send the calibration and re-synchronise the sensor; and just requiring the selection of Show Alarms & required Flash Rate when Synchronising the sensor.

### 3.5 Merging Collected Data

The **EMS Remote Management Tools** can be used to merge data saved in a Mark 8 or above Sensor Unit, via its on-board Data Logging function, with data received by EMS.

Merging enables any missing data points in the EMS Database, as a result of power or transmission failure or any other break in the data transmitted from the Sensor Unit to EMS, to be uploaded to the EMS Database from the Sensor Unit’s memory.

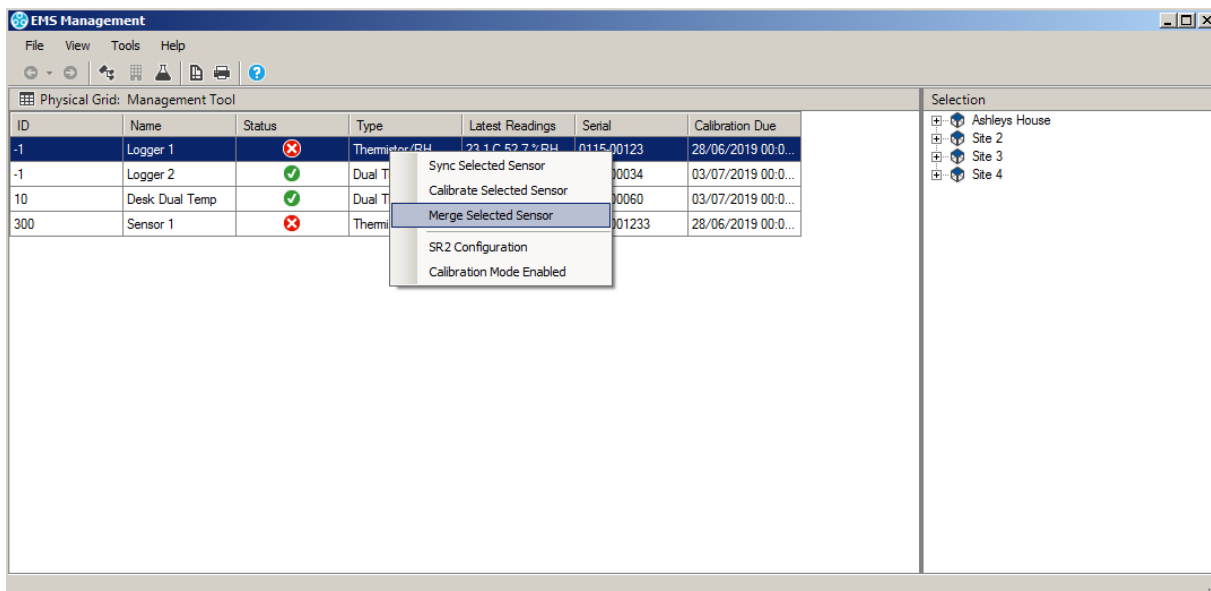
#### To Merge Collected Data:

1. In **EMS Remote Management Tools**, right click on the Sensor Unit which is to have its collected data merged with the EMS database

For additional information on the EMS Remote Management Tools, refer to the following sections in the EMS Online User Guide:

<http://www.help.emsprocloud.com/index.html?EMS-Remote-Management-Tool.html>

2. From the displayed drop-down menu, select **Merge Selected Sensor**. See Figure 18 below:



**Figure 18**

- The **Hanwell 4000 series logger download** window is displayed. See Figure 19 below:

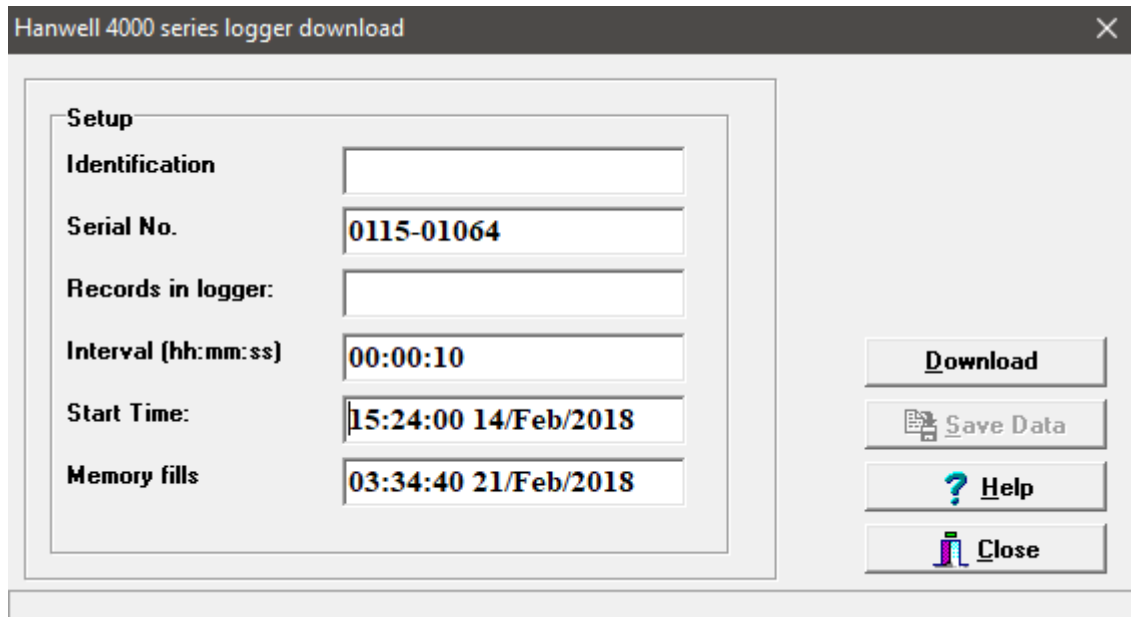


Figure 19

3. Click on the **Download** button.
  - The **Save Data** button becomes active and '**Download complete**' is displayed in the bottom left-hand corner of the window when the Download is complete. See Figure 20 below:

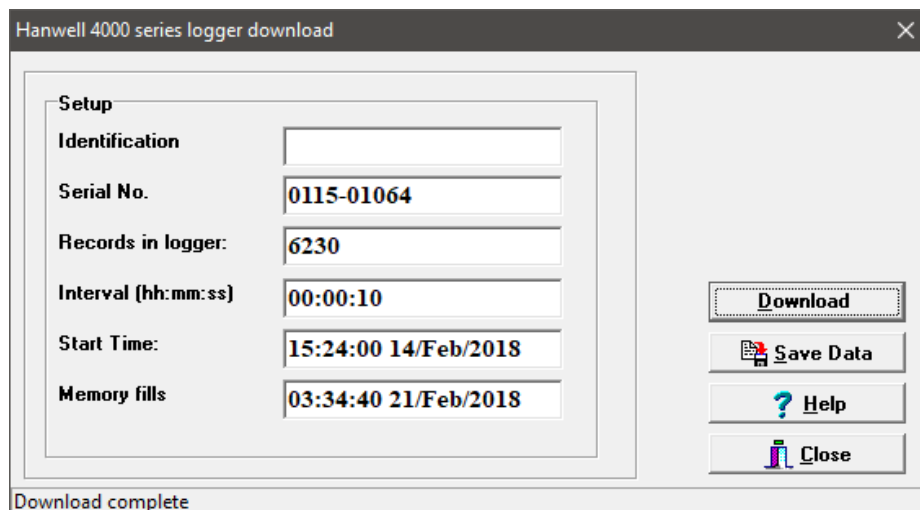
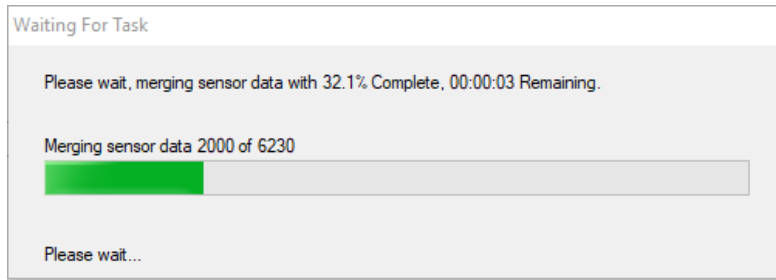


Figure 20

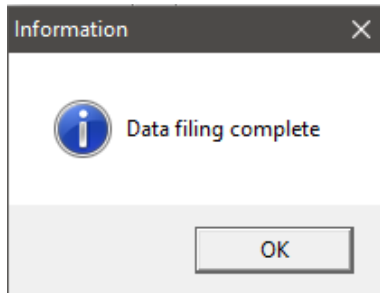
4. Click on the **Save Data** button.
5. The **Waiting for Task** window is displayed, with a bar illustrating the progress of the Merge operation. See Figure 21 below:



**Figure 21**

- When the **Waiting for Task** window disappears with no error messages displayed, the data from the Sensor Unit's memory has been successfully merged with the E Database.

The **Merge Collected Data** process is now complete and the **Data filing complete** Information window is displayed. See Figure 22 below:



**Figure 22**



## 4 Contact Hanwell Solutions

### **UK Customers:**

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### **EU & Overseas Customers:**

Please contact your local Hanwell Distributor.

A list of distributors is available at: <https://hanwell.com/distributors/>

