

# Hanwell Instruments Ltd

## Instruction Manual

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## Document History

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1	26/Jan/07	First release.	LH
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## 1. Introduction

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This document details how to use the **ML4000** range of Hanwell Radio sensors.

The **ML4000** is a new range of Hanwell radio sensors, designed for use with either the **Radiolog for Museums**, **OCEAN** or **EMS** systems. Each sensor has one or two input channels (for example, Temperature and Relative Humidity) which can be mounted in the **ML4000** case or as a probe on a lead. The sensor has an LCD which indicates the current readings of both channels and the life of the battery. The transmitter is powered by a single 3.6V AA Lithium battery, which can be fitted by the user.

The Transmission type, ID number and transmission speed of the sensor is set using the **ML4000 Configuration Utility** and a USB lead. The device can be configured to transmit as either an 8-bit (compatible with older systems) or a 12bit (later systems) radio sensor.

In general you should choose 8-bit if you have the **EMS** software and 12-bit otherwise (see section 4 for details).

**If in any doubt, please contact Hanwell for advice.**

### 1.1. Further Help

There is an interactive online Help file supplied with the software. This is accessed by clicking on **Help** in the software. This manual is based on the electronic Help file.

### 1.2. Contact Hanwell Instruments

#### **UK customers**

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Hanwell Instruments Ltd	t: 0870 443 1786
12 Mead Business Centre	f: 0870 443 1787
Mead Lane	e: <a href="mailto:info@hanwell.com">info@hanwell.com</a>
Hertford	w: <a href="http://www.hanwell.com">http://www.hanwell.com</a>
SG13 7BJ	

For Technical Support email [support@hanwell.com](mailto:support@hanwell.com)

#### **EU & Overseas customers**

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Please contact your local Hanwell distributor.

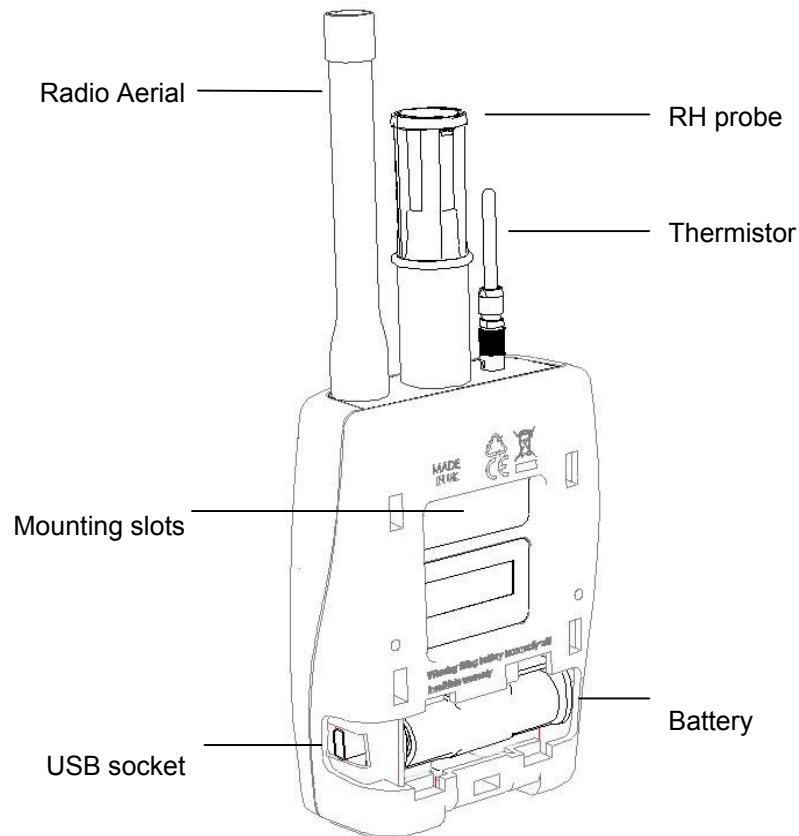
A list of distributors is available at <http://www.hanwell.com>

## 2. The ML4000 Sensor

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### 2.1. Schematic

Below is a schematic of a ML4000 fitted with RH and Thermistor probes. The actual design will vary depending on the probes you have.



### 2.2. Battery

The **ML4000 Series Sensor** is powered by a 3.6V AA **Lithium** battery. Replacement batteries can be supplied by Hanwell or any major supplier.

**DO NOT FIT STANDARD ALKALINE AA BATTERIES**

### 2.3. Front Panel Design

The **ML4000 Series Sensor** is supplied with the LCD screen visible and an optional plain front panel. To hide the LCD gently prise off the windowed front panel and replace it with the plain one.

### 2.4. Mounting the Sensor

A wall-mounting bracket is available for the **ML4000 Series Sensor**, (code Y119). This is a metal strip which is fitted to the wall. Line up the slots on the **ML4000 Series Sensor** with the tabs on the bracket and click the Sensor into place.

To remove the unit, press the tag at the bottom gently towards the wall using a small screwdriver or similar and lift the Sensor free.

## 2.5. Radio Testing Dongle

This is an optional plug-in device, code Y058. When connected to the **ML4000 Series Sensor**'s USB socket, it overrides the Sensor's configured Transmit Interval and forces the Sensor to send a transmission every five seconds. See section 4.3.

**NB If the USB and the battery are both connected then device will also be in fast transmit mode.**

## 2.6. Compliance

The ML4000 range has been designed to comply with the RoHS and WEEE EU directives, and carries the CE mark.

### 3. The ML4000 Configuration Utility

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This is a small software program which is used to configure the **ML4000 Series Sensor** with its ID number and transmission speed. It also sets the Data Encoding (see section 4.4).

#### 3.1. Installing the Configuration Utility

The **ML4000 Configuration Utility** is supplied on later versions of **W119 Radiolog for Museums** CD and on the **W252** CD.

If you do not have either CD then you can download the tool for free from:

<http://support.hanwell.com/radio/sensors>

You should install this program before continuing.

#### 3.2. Running the Configuration Utility

To run the program:

1. Click on the Windows **Start** button and select **Programs**.
2. Select **Hanwell USB Tools**.
3. Select **ML4000 Configuration Utility**.

To close the program click on the Windows Close button (the X in the top right of the window).

#### 3.3. Communications Lead

A **Y055** USB cable (or a generic USB A/USB mini B lead) is used to connect the ML4000 Sensor to the PC. The Sensor should be automatically detected when it is connected.

## 4. Adding an ML4000 to a System

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This section details how to configure and test an **ML4000 Series Sensor** for **EMS**, **Radiolog for Museums** and **OCEAN** (prior to version 8.3).

### 4.1. Configuring an ML4000 for Radiolog for Museums or OCEAN

1. Run **Radiolog for Museums / OCEAN** and switch to **Unprotected Mode**.
2. Switch to **Edit Mode** and add the Sensor to the layout.
  - If adding as an 8-bit sensor then select 8-Bit T/RH.
  - If adding as a 12-Bit sensor be sure to select the right **Sensor Type** (normally Thermistor/RH). This is indicated on the CC4191 sheet supplied with the Sensor.

If adding a Sensor with a Thermistor, check that the **Load Resistor** value 30k9 is selected on the *Calibration* section of the *Sensor Properties* dialog box and then click on **Set Default Calibration** to load the default values.

If customised calibration data has been supplied, enter it in the *Calibration* section of the *Sensor Properties* box.

If you are adding the ML4000 Sensor to **Radiolog for Museums** version 7.6. or earlier (or OCEAN earlier than version 8.3), see section 4.4 for details of the default calibration data which needs to be entered.

If multiple Sensors are being added, repeat this step for each one.

3. **Save** the layout and exit **Edit Mode**.
4. Remove the battery from the sensor.
5. Run **ML4000 Configuration Utility** (see section 3.2).
6. Connect the **ML4000 Series Sensor** to the PC via the Y055 USB lead.
7. Select the **ML4000 Series Sensor** from the list of connected devices.  
The *Configure Device* dialog opens.
8. Set the **ID Number**.  
This is the unique identifying number the sensor will send with its data. This is used by the system to recognise and file the data.
9. Set the **Transmission Speed**.  
This is how often a signal is sent from the sensor to the system. Faster Transmit Intervals may reduce battery life. A typical Transmit Interval is 300 seconds (5 minutes).
10. Click on **Set ML4000 Device to 12bit Mode** or **8bit Mode** as required and click on **OK** to confirm.  
When the configuration is complete, the message *Sensor Successfully Reconfigured* appears.
11. Click on **OK**.
12. Disconnect the **ML4000 Series Sensor** from the PC and connect the battery. The display should confirm the selected ID.
13. If multiple **ML4000 Series Sensors** are being added, repeat steps 6-12 for each Sensor.



## 4.2. Configuring an ML4000 for EMS

1. Switch to **Edit Mode** and add the Sensor to the layout.  
If multiple Sensors are being added, repeat this step for each one.
2. **Save** the layout and exit **Edit Mode**.
3. Remove the battery from the sensor.
4. Run **ML4000 Configuration Utility** (see section 3.2).
5. Connect the **ML4000 Series Sensor** to the PC via the Y055 USB lead.
6. Select the **ML4000 Series Sensor** from the list of connected devices. The *Configure Device* dialog opens.
7. Set the **ID Number**.  
This is the unique identifying number the sensor will send with its data. This is used by the **EMS** system to recognise and file the data.
8. Set the **Transmission Speed**.  
This is how often a signal is sent from the sensor to the system. Faster Transmit Intervals may reduce battery life. A typical Transmit Interval is 300 seconds (5 minutes).
9. Click on **Set ML4000 Device to 8bit Mode** and click on **OK** to confirm.  
When the configuration is complete, the message *Sensor Successfully Reconfigured* appears.
10. Click on **OK**.
11. Disconnect the **ML4000 Series Sensor** from the PC and connect the battery.  
The display should confirm the selected ID.
12. If multiple **ML4000 Series Sensors** are being added, repeat steps 5-12 for each Sensor.

## 4.3. Testing the Sensors

Before putting the **ML4000 Series Sensor** in its intended monitoring location, we recommend testing its operation. When the battery and USB are connected the device will transmit every few seconds. Alternatively, use the Radio Testing Dongle (see section 2.5).

1. Check that a signal is being received on the system.
  - If you are using a **CR-1** then you will see "last signal #" (where # is the ID number set) on the **CR-1's** LCD.
  - If you are using a **SR-2** then you will see both the ID number and its signal strength on the **SR-2's** LCD.
2. Check that you also have correct values on the **PC**.
3. Site the Sensor in its intended monitoring location and confirm that signals are still being reliably received.

## 4.4. Backwards Compatibility

**ML4000 Series Sensors** can be configured so that they are compatible with older Hanwell systems.

### 4.4.1. Data Encoding

The data sent is encoded. This can be in two formats: **8bit** or **12bit**. All **Radiolog** systems can normally accept 12bit data encoded signals, so this is the default setting for the **ML4000 Series Sensors**.

If you have the old **EMS** system, or your infrastructure only supports 8bit, you must set the data encoding to **8bit** by clicking on **Set ML4000 Device to 8bit Mode**.

If you are unsure what your system supports, contact Hanwell Instruments.

### 4.4.2. Calibration Data

If adding a **ML4000 Series Sensor** with Thermistors and RH probes to an **EMS** system then simply accept the default calibration.

If adding a **ML4000 Series Sensor** with Thermistors and RH probes to **Radiolog for Museums** version 7.6 or earlier (or **OCEAN** prior to version 8.3), you will have to change the default calibration data as follows:

1. Select **Load Resistor** value 30k9.
2. Click on **Set Default Calibration** to set the defaults.
3. Edit the Temperature calibration as follows:

High Temperature	50	High Raw	428
Ambient Temperature	25	Ambient Raw	1000
Low Temperature	0	Low Raw	2104

4. Edit the RH calibration as follows

High Humidity	76	High Raw	2541
Ambient Humidity	54	Ambient Raw	1806
Low Humidity	11	Low Raw	368

## 5. Maintenance

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This section details standard maintenance recommendations.

### 5.1. Changing the Battery

The **ML4000 Series Sensor** has a battery life indicator on its LCD screen. It also transmits a low battery warning signal to the **PC** when the voltage is low (only one bar visible on the LCD).

The battery life is dependent on the **Transmit Interval** set.

If a batch of Sensors have been set up at the same time then we recommend changing the batteries of all of the batch simultaneously.

### 5.2. Checking Calibration

The **ML4000 Series Sensor** should be periodically recalibrated to ensure its readings remain accurate. We recommend recalibration is undertaken every 12-18 months.

Recalibration can be performed in Hanwell's calibration laboratory or on-site. Alternatively, you can recalibrate the Sensor yourself, following the normal recalibration procedure. The device should always be calibrated in 12bit mode and then, if required, switched back to 8-bit mode.

### 5.3. Cleaning the Sensor

The **ML4000 Series Sensor** is cased in ABS plastic and can be cleaned using a damp non-abrasive cloth.

Do NOT immerse the Sensor in water!