

# IM5984 RL4512 Dual Channel CO<sub>2</sub> and Temperature Sensor Unit

**User Guide** 

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### **1** Introduction

This Document details how to configure the **RL4512 CO<sub>2</sub> and Temperature Sensor Unit** from Ellab Monitoring Solutions Ltd for use in conjunction with the EMS application.

The RL4512 Unit is a Dual Channel Transmitter with channels for  $CO_2$  and Temperature data inputs from their respective sensors/probes.

The RL4512 Unit also has an on-board Data Logging facility. This facility can provide a data backup capability in the event of a transmission or power failure or other interruption to the flow of data from the Unit to EMS.

• Data is transmitted/uploaded to EMS from the Unit at defined Transmission Intervals, either directly or via an SR2 Controller.

The current  $CO_2$  and Temperature values, battery voltage and, optionally, the Alarm Status are also displayed on the Unit's LCD screen.

#### 1.1 Pre-requisites

You will need the following to enable communication between EMS and the RL4512 Unit:

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

If the RL4512 Unit can be physically connected to the PC/Server with EMS installed or if EMS is installed on a Virtual Machine (VM) or a Remote Server.

• Upgrade Disk

Installations running EMS Version 1.7.0 or lower must run this disk and follow the instructions in the **ReadMe.txt** file before adding the Sensor Unit to EMS.



### 2 The RL4512 Sensor Unit



Figure 1 RL4512 Unit fitted with CO<sub>2</sub> and Temperature/Thermistor probes

#### 2.1 Sensor Unit Battery

#### WARNING!

The RL4512 Series Sensor is powered by a 12V mains power supply which MUST remain connected during normal operation.

When the Unit is not in use, the Battery Link, located on the Unit's PCB, MUST be moved to the position shown in Figure 2 below to disconnect the battery and prevent it discharging.





#### Disconnected



#### Connected Figure 2 - Battery Jumper Link

The Unit's internal battery is ONLY provided as a reserve backup power supply to prevent the RL4512 from losing logged data during the following operations, which may require the Unit to be disconnected from the mains supply:

- Initial setup of the Unit.
- Downloading logged data following a transmission or power failure.
- Any change of the Unit's configuration.



**Note:** The internal battery is soldered in and is not replaceable by the customer. If the battery becomes discharged, the Logging functionality will no longer work and the Unit will have to be sent back to Ellab Monitoring Solutions for battery replacement.

#### 2.2 Mounting the Sensor

A wall-mounting bracket is available for the RL4512 Unit (Code: **Y119**). It comprises a metal strip which is fitted to the wall.

- To mount the RL4512 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 the RL4512 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.

#### 2.3 Radio Testing Dongle

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

When connected to the RL4512's USB socket, it overrides the Unit's configured Transmit Interval and forces the Unit to send a transmission every five seconds.

#### 2.4 Compliance

The RL4512 Unit has been designed to comply with the RoHS and WEEE EU Directives and carries the CE mark.



### **3** Setting up the RL4512 Unit with EMS

For information on the addition of the RL4512's details to 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

- The RL4512 Unit should be added as a **CO2/Thermistor** sensor.
- **Note:** Default Temperature Calibration values are already configured/entered into the Unit and will not need changing.
- 3.1 Entering a Sensor/Probe's Calibration Settings into EMS <u>versions 1.0.9 and</u> later.
- **Note:** For details on entering **Calibration Settings** into EMS <u>prior to Version 1.0.9</u>, please refer to **Appendix A**.
- 1. Select **Edit Mode** from the main **View Data** menu. See Figure 3 below:



#### Figure 3

• The **Edit Mode** window is displayed. See Figure 4 overleaf:

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to Search		laster Data Ser	nsors - Do not de	lete	
Master Data Sensors - Do not	Edit Zone Delete Zone Add Zone				
Contice	Add Sensor Add Multiple Sensors	Manual Input	Sensors Co	ppy Sensor Delete Senso	rs
See DB Coor Notion	Sensor Name	ID	Serial No	Туре	Actions
Se Fridge Temperature / Frid	Production Hall	2	0509-00461	с	[Delete]
S Logger 1 S Desk Dual Temp	Office	9	0318-01498	C, %RH	[Delete]
RH/T GPRS	DB	23	0609-00134	Ampere, Ampere, Ampere	[Delete]
Network Rack	Temp and Door Notion	-1	00-01-06-62	C, %	[Delete]
Archive + Flood	Fridge Temperature / Fridge Humidit	y -1	00-00-43-47	C, %RH	[Delete]
CO2 Sensor	Logger 1	-1	0115-00123	C, %RH	[Delete]
Server Room	Desk Dual Temp	93	1015-00201	C, C	[Delete]
Temp and Door Notion D	RH/T GPRS	999	0	C, %RH	[Delete]

#### Figure 4

- 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 5 below:

well Solutions View Data	Reports	Logs	-	-		Home / Edit Mode
e to Search			Man	agement Tool		
Haster Data Sensors - Do not de.	Edit Zon	e Delete Zone Add Zo	ne			
Management Tool		eor Add Hulfiele Seesore	Unevaller	ut Samearra	ore Sansar Dalata	Consore
Production Hall	Accesses.	Not matche sensors			opy Sensor	Junior a
— 🎡 Sensor 1		Sensor Name	D	Serial No	Type	Actions
— 🍄 Logger 1			1990			
— 😚 Desk Dual Temp		Production Hall	2	0509-00461	с	[Delete]
- 🍄 RHT	1.00					
– 🎡 RHTP		Sensor 1	300	0115-001233	C, %RH	[Delete]
- 🎡 1		and a second		0445 00400	C NOL	( Deletel
- 🍄 RL5414M		cogger i	-1	0115-00125	C, SHOT	[ Deserve]
— 🔂 Dual Temp		Desk Dual Temp	93	1015-00201	C, C	[Delete]
— 🎡 Manual Input Sensor						
ISense		RHT	92	0115-00123	C, %RH	[Delete]
T+RH Sensors			100			
Support	- L	RHTP	-1	0917-01166	C, milliBar, %RH	[Delete]
JTF	<b>D</b>	1	2	1	C. %RH	[ Delete]
Transport base A						
Test		RL5414M	151	1014-00037	Pa	[Delete]
TEST 2						
Document Test		Dual Temp	201	0115-00123	C, C	[Delete]
ARB		Manual Input Sensor	4	100.000		[ Deletel
Zone1		manual input sensor	-1	100.000		[ connect]

Figure 5



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 6 below:

<b>發Hanwell</b> EMS	н, ров 🖉 😳
Access Denied	Home / Access Denied
Access Denied	

#### Figure 6

#### 2. Either:

 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 7 below:



#### Figure 7

ii. In the left-hand list, click on the required R4512 Series Sensor Unit's icon:

## 8

#### Or:

In the table in the Zone's **Edit Mode** window, click on the required R4512 Series Sensor Unit's name in the Sensor Name column. See Figure 8 overleaf:

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Ma	ster Data Ser	isors - Do not de	lete	
it Zone Delete Zone Add Zone Id Sensor Add Multiple Sensors	Manual Input	Sensors Co	py Sensor Delete Senso	ITS
Sensor Name	ID	Serial No	Туре	Actions
Production Hall	2	0509-00461	с	[Delete]
□ Office	9	0318-01498	C, %RH	[Delete]
DB Incomers	23	0609-00134	Ampere, Ampere, Ampere	[Delete]
Temp and Door Notion	-1	00-01-06-62	C, %	[Delete]
Fridge Temperature / Fridge Humidity	-1	00-00-43-47	C, %RH	[Delete]
Logger 1	-1	0115-00123	C, %RH	[Delete]

#### Figure 8

• The **Edit Mode** window for the selected R4512 Series Sensor Unit is displayed. See Figure 9 below:

	CO2 Sensor2 [98]		
Save Delete Back			
GENERAL INFORMATION			
Sensor Name	CO2 Sensor2		
Family Type	ML/RL2000	Ŧ	
Sensor Type	CO2/Thermistor	Y	
Hardware Serial Number	98		
Control Device Group:	SR2 457800	•	
Physical ID	5		
Internal Logging Interval(Mins)	15		
Units	CO2(ppm), C		
Sensor Out of Service	C Yes 💿 No		
Has Digital Input:			
Location			
Second Location			
X CALIBRATION			
🔔 ALARMS			
Tilters			





- 3. Click the on the **Calibration** field to expand the **Calibration** pane for the selected R4512 Series Sensor Unit.
  - The **Calibration** pane will display separate tabs for the Sensor Unit's Temperature and CO<sub>2</sub> channels.

See Figure 10 below:

	CO2 Sensor2 [98]
Save Delete Back	
General Information	
🚿 CALIBRATION	
Next Calibration Due Date	2019-07-06
Temperature CO2	
Title	C02
Units	CO2(ppm)
Hardware Serial Number	
Offset	0
Gain	1
Decimal Places	2
Default Lower Scale	0
Default Upper Scale	4000
🐥 ALARMS	
<b>FILTERS</b>	

#### Figure 10

- 4. Click on the **CO**<sub>2</sub> tab 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 CO<sub>2</sub> Calibration parameter values as required.
  - \* The **Offset** and **Gain** values for the supplied Vaisala CO<sub>2</sub> sensor/probe are listed in the **CH 1** column of the table at the top of the Box Insert.
  - \* For more detailed information on Sensor Unit calibration parameters, please refer to the Online Manual:

http://www.help.emsprocloud.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 the Zone's **Edit Mode** window and the following message will be displayed. See example in Figure 11 below:

Sensor [CO2 Sensor2] up	dated successfully				
e to Search 📉 🍝	Mas	ter Data S	iensors - Do not de	lete	
Master Data Sensors - Do not	Edit Zone Delete Zone Add Zone				
- 🍄 Production Hall	Add Sensor Add Multiple Sensors M	lanual Inp	ut Sensors Co	py Sensor Delete Sensor	•
- 🍄 DB	Sensor Name	ID	Serial No	Туре	Actions
- 🍄 Temp and Door Notion					
- 🈚 Fridge Temperature / Frid	Production Hall	6	0509-00461	C	[Delete]
- 😚 Logger 1 - 😚 Desk Dual Temp	C Office	355	0318-01498	C, %RH	[Delete]
STATION CORS	08	23	0609-00134	Ampere, Ampere, Ampere	[Delete]
-	Temp and Door Notion	-1	00-01-06-62	C, %	[Delete]
- 😚 Network Rack					
- 🍄 Network Rack - 🍄 A/C unit - 🍄 Archive + Flood	Fridge Temperature / Fridge Humidity	-1	00-00-43-47	C, %RH	[Delete]

#### Figure 11

- 6. Repeat Steps 2 -5 for all required R4512 Series Sensor Units.
- **Note:** Should you wish to carry out your own calibration of the CO<sub>2</sub> 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

7. Repeat Steps 2 -7 for all required RL4512 Units.



#### 3.1.1 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

#### 3.2 Synchronising Sensors/Unit

The Synchronise process:

Sets the **Physical Transmit ID** of the device.

• 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 you are synchronising with.

#### And

Takes the following Sensor Calibration settings for the selected RL4512 Unit and loads the Calibration and Alarm settings from the EMS Database into the Unit:

- The CO<sub>2</sub> setting calculated from the **Offset** and **Gain** values entered as outlined in Section 3.1 above.
  - The default Temperature values.

#### To Synchronise a Sensor:

- Ensure that the RL4512 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 an HTTP link to data in the EMS database, allowing you to synchronise an RL4512 Unit when using EMS installed on a Virtual Machine (VM) and also provide a physical link to the database when it is possible to connect the RL4512 Unit directly to the PC with EMS installed via the YO55 USB lead.

Refer to the following sections in the EMS Online User Guide:

http://www.help.emsprocloud.com/index.html?EMS-remote-management-tool.html

- 3. Select the CO<sub>2</sub> Sensor from the EMS Management Tool's/EMS Remote Management Tools' **EMS Management** window.
- 4. Right click on the selected Sensor and select **Sync Selected Sensor** from the displayed menu.
  - The **EMS Synchronise USB Sensor Vx.x** window is displayed. See Figure 12 overleaf:

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Name L ID Number - "	.ogger 1 1
Transmit interval Sensor shows alarms Alarm flash rate Calibration mode Tix in Calibrate mode Enable logging	30 Seconds V None V V V
Serial No. 101	4-00037 Synchronise Close

#### Figure 12

**Note:** The sensor 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'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 7 for all RL4512 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



### **3.3 Merging Collected Data**

The **EMS Remote Management Tools** can be used to merge data saved in the RL4512 Unit, via its on-board Data Logging function, with data received by EMS.

This will enable 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 Unit to EMS, to be uploaded to the EMS Database from the Unit's memory.

#### To Merge Collected Data:

1. In **EMS Remote Management Tools**, right click on the Sensor (CO<sub>2</sub> or Temperature) 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 13 below:

🛞 EMS Managem	ient								
File View To	ools Help								
0-0 4		0							
Physical Grid:	Management Tool	l.							Selection
ID	Name	Status	Туре	Latest Readings	Serial		Calibration Due		Ashleys House
-1	Logger 1	8	Themistor/RH	23.1 C 52.7 % RH	0115.0	0123	28/06/2019 00:0		B Ste 3
-1	Logger 2	0	Dual T Call	Selected Sensor		0034	03/07/2019 00:0		⊞- 💎 Ste 4
10	Desk Dual Temp	Ø	Dual T Callo	rate Selected Sensor		0060	03/07/2019 00:0		
300	Sensor 1	8	Themi	je selected sensor		01233	28/06/2019 00:0	]	
			SR2	Configuration					
			Calib	ration Mode Enabled					



• The Hanwell 4000 series logger download window is displayed. See Figure 14 below:

### IM5984 RL4512 CO<sub>2</sub> and Temperature Sensor Unit



Instruction Manual

Setup		
dentification		
Serial No.	0115-01064	
Records in logger:		
nterval (hh:mm:ss)	00:00:10	<u>D</u> ownload
Start Time:	15:24:00 14/Feb/2018	🖺 Save Data
demory fills	03-34-40 21/Eeb/2018	2 UI-

Figure 14

- 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 15 below:

Setup		
Identification		
Serial No.	0115-01064	
Records in logger:	6230	
Interval (hh:mm:ss)	00:00:10	Ownload
Start Time:	15:24:00 14/Feb/2018	📴 <u>S</u> ave Data
Memory fills	03:34:40 21/Feb/2018	7 <u>H</u> elp

Figure 15

- 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 16 overleaf:



Instruction Manual

Waiting For Task
Please wait, merging sensor data with 32.1% Complete, 00:00:03 Remaining.
Merging sensor data 2000 of 6230
Please wait

#### Figure 16

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

The Merge Collected Data process is now complete and the **Data filing complete** Information window is displayed. See Figure 17 below:



Figure 17



### **Appendix A**

### Entering a Sensor/Probe's Calibration Settings into EMS versions prior to 1.0.9

- **Note:** For details on entering **Calibration Settings** into EMS <u>Version 1.0.9 and later</u>, please refer to Section 3.1.
- In the left-hand menu of the Editing and Configuration (View Data > Edit Mode) window, navigate to the icon representing the RL4512 Unit, as outlined in the Accessing Sensor Properties section of the EMS Online User Guide:

http://www.help.emsprocloud.com/index.html?accessing-sensor-properties.html

- 2. Click on the + sign next to the RL4512's icon to access the **Properties** icon.
- 3. Click on the + sign next to the **Properties** icon in the left-hand menu to display the **Calibration** icon.
- 4. Click on the + sign next to the **Calibration** icon to expand the Calibration property entries. See Figure 18 below:



Figure 18



Update

Set Default

 Click on the CO2 icon (see Figure 18 above) to display the CO2 window for the selected RL4512 Sensor/Transmitter. See Figure 19 below:

C02				
Hardware Serial Number:	*Not Set			
Offset:	0			
Gain:	1			
Title:	CO2			
Units:	CO2(ppm)			
Upper Scale:	4000			
Lower Scale:	0			
Decimal Places:	1			

**Global Setting** 

#### Figure 19

- In the displayed CO2 window, enter the Offset and Gain values for the supplied Vaisala CO<sub>2</sub> sensor/probe into their respective fields.
  - These values are listed in the **CH 1** column of the table at the top of the Box Insert.
  - Note: Should you wish to carry out your own calibration of the Vaisala CO<sub>2</sub> sensor/probe, please refer to both the EMS Online User Guide: <u>http://www.help.emsprocloud.com/index.html?calibration-management-tools.html</u> 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

- 7. Select **Update** to confirm the details and load the **Offset** and **Gain** values into EMS.
  - If the Update has been successful, the following message will be displayed. See Figure 20 below:

Record updated successfully.

#### Figure 20

8. Repeat Steps 1 -7 for all required RL4512 Units.



### **Contact Information**

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

Please contact your local Ellab Office/Distributor.

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



### **Document History**

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1	31 October 2018	First Issue	IR
2	19 December 2019	<ul> <li>Amendments to take account of introduction of EMS Version 1.0.9</li> <li>Rebranding to include Ellab</li> </ul>	IR
3	2 <sup>nd</sup> November 2021	<ul> <li>Further amendments to Contact Details to reflect change to Ellab Monitoring Solutions.</li> <li>Document History moved to end of document.</li> </ul>	IR

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