Read these instructions carefully before using this product.
Keep these instructions in a safe place for future reference.

EMS-01 Water Leak Detection System Instruction Manual

Document Information

Copyright

Publication

Publisher: Aqualeak Ltd. Publication date: 15 February 2021. Version number: 1.1

All possible care has been taken in the preparation of this manual, but Aqualeak, its agents and distributors accept no liability for any inaccuracies that may be found. This manual reflects the state of the product at the publication date below, but further enhancements while in service may mean that the manual does not precisely reflect your system. Aqualeak reserves the right to make changes without notice both to this manual and the products which it describes.

Purpose

This document provides installation and operating instructions for the Environmental Monitoring System (EMS-01) Water Leak Detection System.

Symbols and Notices Used

Important information has been highlighted throughout this document using the following symbols:

Warning

See relevant section

Take note of this information

Important Safety Information has been highlighted throughout the Safety Information section using the following warning notices:

DANGER	WARNING	CAUTION	DAMAGE
Death / serious injury (irreversible)	Death / serious injury (irreversible)	Minor injury (reversible)	Damage to property
Immediate risk	**Potential risk**	**Potential risk**	**Potential risk**

Contact Details

Address	Telephone	Email	Website
Aqualeak Detection Ltd. 11 Forest Gate Pewsham Chippenham Wiltshire, SN15 3RS United Kingdom	+44 (0)1249 715698	sales@aqualeak.com	www.aqualeak.com

EMS-01 Contents

EMS-01 Tables

EMS-01 Figures

1 Safety Information

For your safety and the safety of others, please ensure that you read the Safety Information below **before** you install or operate this product.

1.1 Intended Use

Only use this product for the intended purpose described in this manual.

1.2 Statutory Obligations

- ✓ Installation and maintenance must comply with all relevant local laws and regulations ('statutory obligations'), particularly concerning electrics, water supplies, and building regulations.
- ✓ Statutory obligations always override manufacturer documentation.
- ✓ It is the responsibility of the customer to conduct a Health & Safety risk assessment prior to installing and operating this product.
- ✗ This product should not be operated by children or persons with reduced physical, sensory or mental capabilities. Where necessary, such Persons should be given supervision by a qualified person responsible for their safety.
- ✗ **DO NOT** position the unit (including its power cable) where it may violate Fire or Health and Safety regulations (e.g. block fire exits or stairwells, etc.).

1.3 Electrical Safety

⚠DANGER

RISK OF 230 VOLT ELECTRIC SHOCK

- ✓ ONLY qualified, competent and approved persons (e.g. 'electrical engineers') may undertake installations, repairs, or relocations of this product.
- ✓ The product must be earthed correctly.
- ✓ For **indoor use** only.
- ✓ Ensure that the building electrical system is compliant with Safety Regulations.

⚠WARNING

RISK OF DEATH OR SERIOUS INJURY

- ✗ **DO NOT** allow children or any other unqualified or unapproved persons to install, repair, clean, relocate, or otherwise interfere or tamper with the product.
- ✗ **DO NOT** immerse the unit or its peripherals in liquid.
- ✗ **DO NOT** install outdoors, near hot works, or where there is a danger of freezing.

1.4 Installation Safety

⚠DAMAGE

RISK OF DAMAGE

- ✓ Install the product on a **hard, solid, and level** surface.
- ✓ Follow the instructions provided in this manual. Where necessary, refer to the Aqualeak website (www.aqualeak.com) for contact and support information.

⚠CAUTION

RISK OF INJURY

- ✓ Be aware of any existing electrical (e.g. wiring), water (e.g. pipes), or other installations in the vicinity (including within or behind the surface used for mounting.
- ✓ Where applicable, this manual should be read in conjunction with manufacturer documentation for any components specified in the installation requirements of this manual.

1.5 Post-Installation Safety

Once installed:

1. Perform a test run to ensure normal operation.
2. Explain all safety precautions to the end user.
3. Provide a copy of this manual to the end user.

- ✓ It is the responsibility of the end user to supply this manual to any other subsequent users.
- ✓ All goods are sold subject to our 'Conditions of Sale'.
- ✓ As Aqualeak Detection Ltd. continuously improves products, they may be modified without notice. In such circumstances, this manual and other relevant documentation should be disregarded. Updated documentation will be produced, supplied with new product ranges, and made available on request.

SAVE THESE INSTRUCTIONS

2 Product Overview

Ensure you have read the **Safety Information** in **section 1** before attempting installation or operation of this unit.

The **Aqualeak Environmental Monitoring System** (EMS) **Water Leak Detection System** series are standalone leak detection systems designed to be integrated into larger Building Management Systems (BMS) and networks.

Designed for continuous operation with minimal human intervention, the EMS series is also compatible with a wide variety of sensing technologies (sold separately) to detect the presence of water and other liquids.

The Aqualeak **EMS-01** is designed to monitor for water leaks in **single-zone critical areas** such as **Tea Points**, **Satellite Equipment Rooms** (SERs), and **Main Equipment Rooms** (MERs).

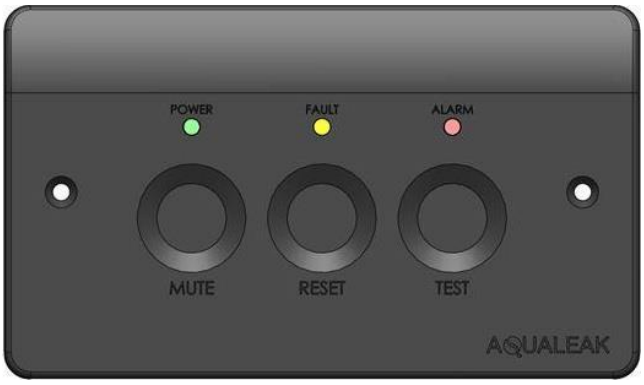

***Figure 1**: Aqualeak EMS-01 Water Leak Detection System*

The unit may also be configured. Sensitivity to moisture and delays to alarms may be adjusted to better tailor the system to intelligently respond to a wide range of environments, situations and user requirements.

Features

- Capacitive touch interface
- User configurable (sensitivity adjustment, alarm delays, output control, overrides, and self-maintenance features)
- Multiple outputs
- Pattress or flush mountable; mains powered
- Audible and visual alarms
- Compatible with a large number of sensor types and ancillary devices
- CE Compliant

Operation

In operation, the EMS-01 continuously monitors the sensing equipment connected to it for both circuit integrity and the presence of water. If a leak is detected, an audible alarm is activated, an LED illuminated, and, if connected, the EMS will report its alarm status to any connected device (BMS/SMS/beacon, valve) via its volt free contacts. Benefits of the EMS-01 include:

- Continuous leak and cable break monitoring
- Minimal human intervention required
- Reduced risks from flooding
- Built-in fault detection

EMS Series Models

In addition to the EMS-01, the Aqualeak EMS series also includes the following models:

- **EMS-05**
  5 input channels
- **EMS-10**
  10 input channels
- **EMS-OS**
  Multiple input channels (scalable and modular for large scale applications, up to 620 zones)

2.1 Technical Specifications

EMS-01	Specification	Notes
Dimensions	146 x 86 x 69 mm	**Millimetres**. Width x Height x Depth
Weight	300 g	**Grams** (0.3 Kilograms)
Supply Voltage	100-240 VAC	**Volts / Alternating Current** 50-60 Hertz
Motherboard Output Relay Voltage	250 VAC	
Motherboard Output Relay Current	8 A	**Amps**. Maximum into resistive load
Relay Minimum Load	10 mA	**Milliamps**. At 5 VDC (Volts / Direct Current)
Leader Cable	Belden 9534	Belden 9534 EIA RS-232 Multicore Cable (4 Core, 24 AWG, 0.2 mm^2). Variable length.
Detection Response Time	1 second	
Alarm (Audible)	85 dB	**Decibels**. Within 0.6 m range
Alarm (Visible)	LED Indicator	Front panel
Operating Temperature	0 to +50˚C	**Degrees Centigrade**. Ambient temperature
Operating Humidity	10 to 95%	Relative humidity (non-condensing) at 45˚C
Operating Altitude	0 to 3,000 m	**Metres**
Storage Temperature	-20 to +70˚C	
Input channels	1	
Maximum Sensor Cable Length	100 m (with maximum 20 probes)	Use recommended yellow Sensor Cable (SCY). Also requires End of Line (EOL) terminator.

Table 1: *EMS-01 Technical Specifications*

2.2 Input-Output Connections

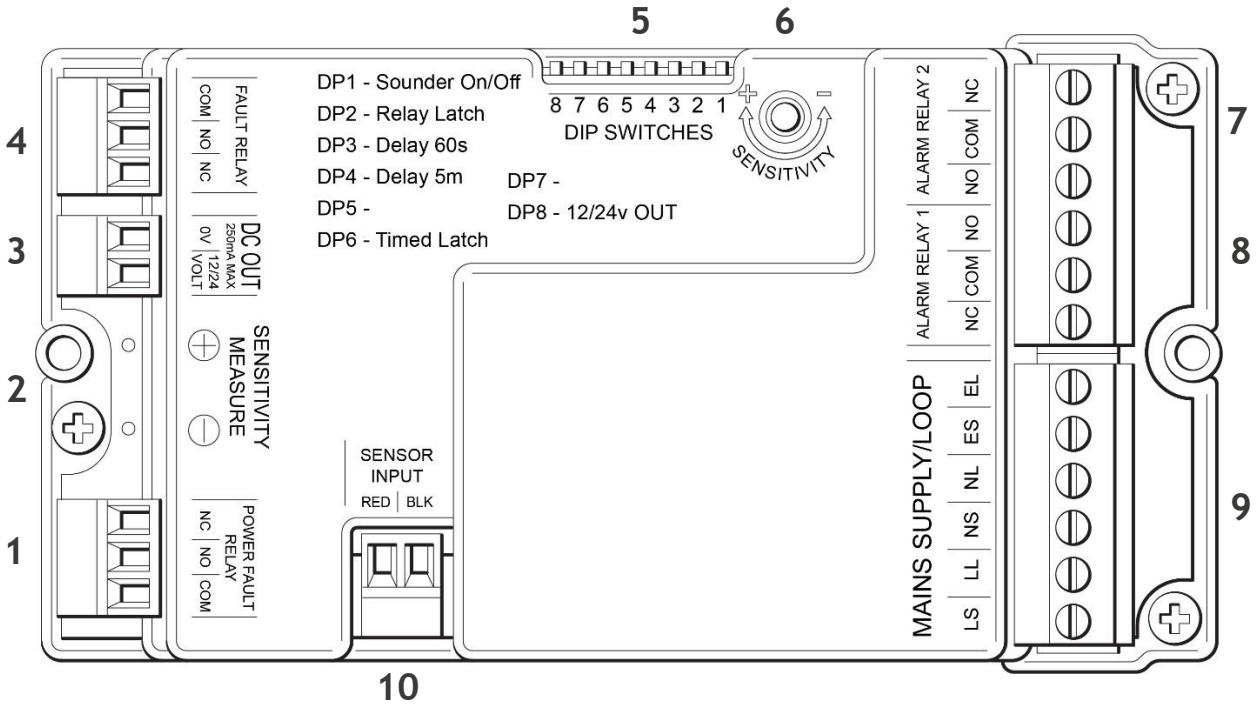

Figure 2: EMS-01 Input-Output Connections

Item	Name	Notes	Relay Abbreviations
1	Power Fault Relay	NC | NO | COM	**NO** = Normally Open **NC** = Normally Closed **COM** = Common
2	Sensitivity Measure	Used with Sensitivity Adjustment	
3	DC Out	12V / 24V Selectable Output Maximum 250mA	
4	Fault Relay	COM | NO | NC	**Mains Abbreviations**
5	DIP Switch Array	8 Switches. Switches 5 and 7 are disabled	**LS** = Live Supply **LL** = Live Loop **NS** = Neutral Supply **NL** = Neutral Loop **ES** = Earth Supply **EL** = Earth Loop
6	Sensitivity Adjustment	Used with Sensitivity Measure	
7	Alarm Relay 2	NO | COM | NC	
8	Alarm Relay 1	NC | COM | NO	
9	Mains Supply / Loop	LS | LL | NS | NL | ES | EL	
10	Sensor Input	Red | Black	

Table 2: EMS-01 Input-Output Connections

2.3 Single Zone Application Examples

Aqualeak water leak detection and prevention systems are based on a modular design. Parts supplied depend upon intended application and particular requirements. Once the individual components have been selected, the system can be built and installed.

2.3.1 Commercial Tea Point

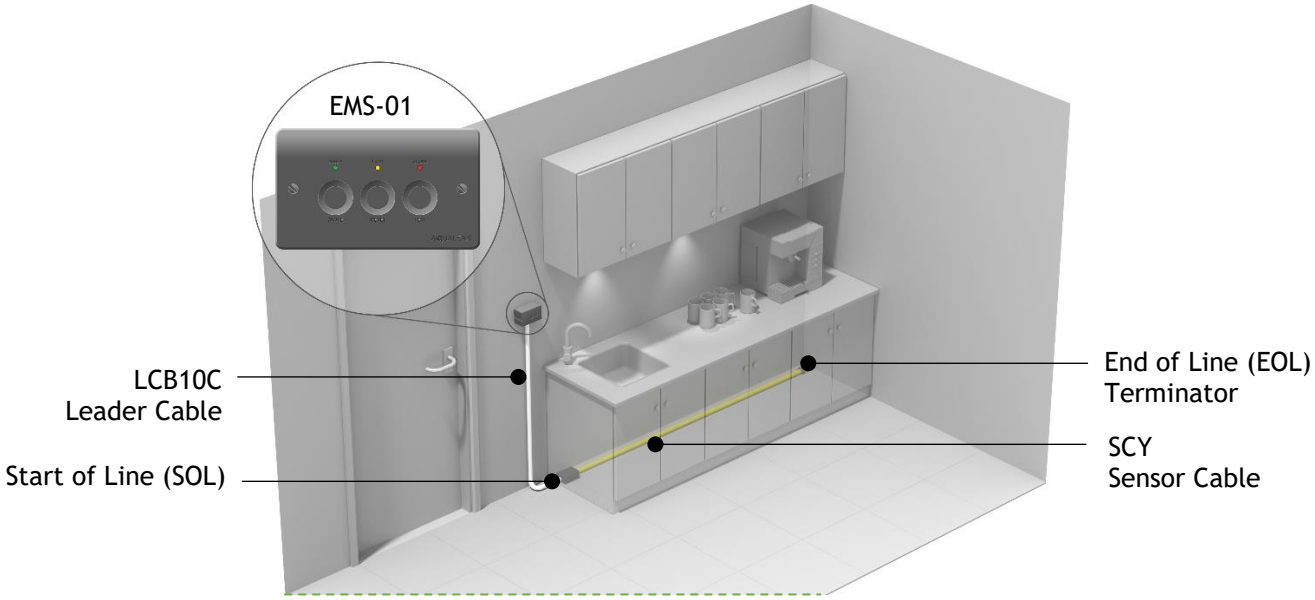

***Figure 3**: EMS-01 Commercial Tea Point Application Example*

2.3.2 Communications Room

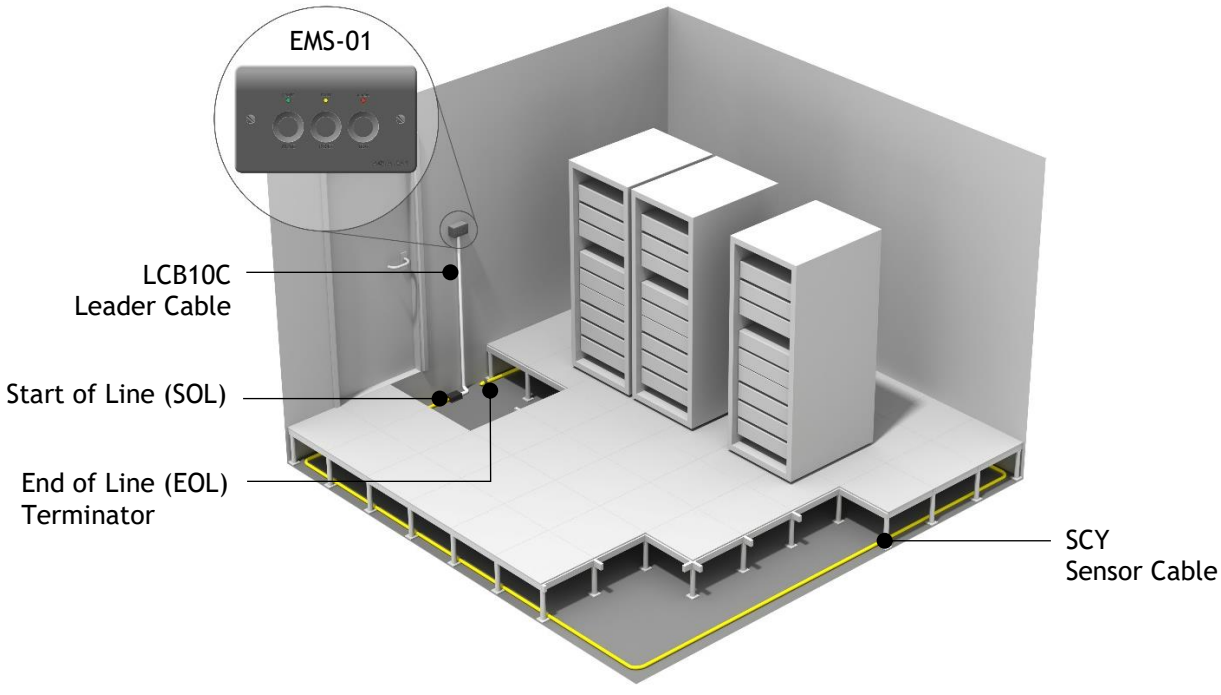

***Figure 4**: EMS-01 Commercial Communications Room Example*

3 Installation

Risk of electric shock and equipment damage! Ensure you have read the **Safety Information** in **section 1** before attempting installation. The EMS-01 can be either surface mounted with the supplied pattress, or flush mounted (back-box not supplied).

3.1 Unit Installation

3.1.1 Mounting

Mount the unit as follows:

1. Ensure the unit has been properly removed from its packaging.
2. Securely mount the supplied **pattress box** or an appropriate **flush mount alternative** in a suitable location, and make the cable entries as required.
3. Bring the **cables** through the pattress box or flush mount alternative to the unit **before** starting to make final connections.
4. Securely house the unit in the pattress box or flush mount alternative.

3.1.2 Power Connections

A competent person must power the EMS-01 via an appropriate mains supply at a nominal **230V 50-60Hz**, from a **spur** with a minimum capacity of **8 Amps**. This supports switching power to external loads through the **8 Amp Double Pole Double Throw (DPDT) relay**.

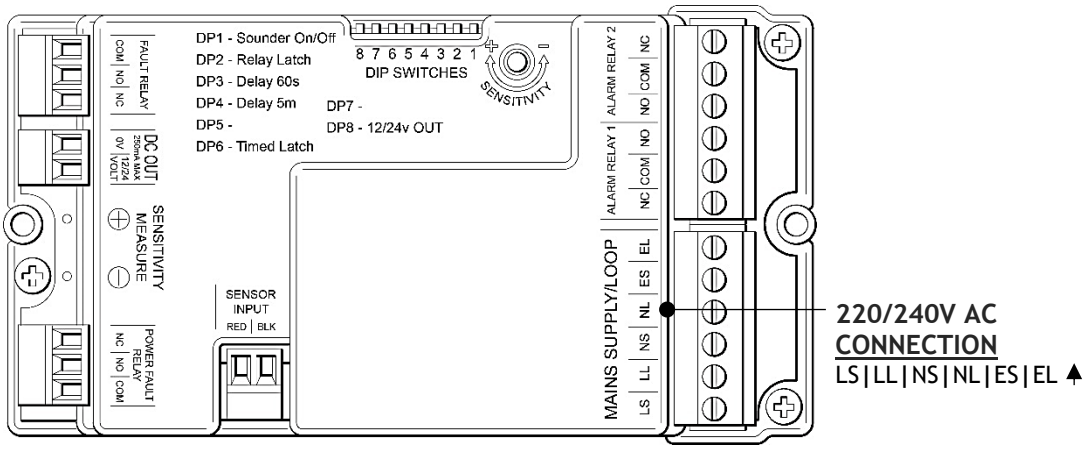

Figure 5: EMS-01 Rear Panel Showing Electrical Power Connections

Connect power to the EMS as follows:

1. Route the **power cable** from the **unswitched fused spur** into the unit mount, using suitable containment/cable protection.
2. Connect the **power cable** (i.e. Live, Neutral and Earth) to the unit.

3.2 Sensors and Relays

Regardless of sensor type or combinations of sensor types, there must always be an **end of line (EOL) terminating resistor** at the end of the sensing circuit to allow for **cable break monitoring** and **alarm reference set point**. The unit relies upon a terminating resistor of value **47k ohms.**

The unit should be **powered OFF** when making connections. Sensors should be installed so that they remain **accessible for maintenance.**

Multiple sensors and sensor types may be connected to the unit. **Sensor cables** (SCY), for example, monitor for water along their full length and can be run in lengths between 1 and 100 metres; Sensor probes (ESD) monitor for water in their exact location only and can be connected in circuits of between 1 and 20 probes.

3.2.1 Sensor / Relay Connections

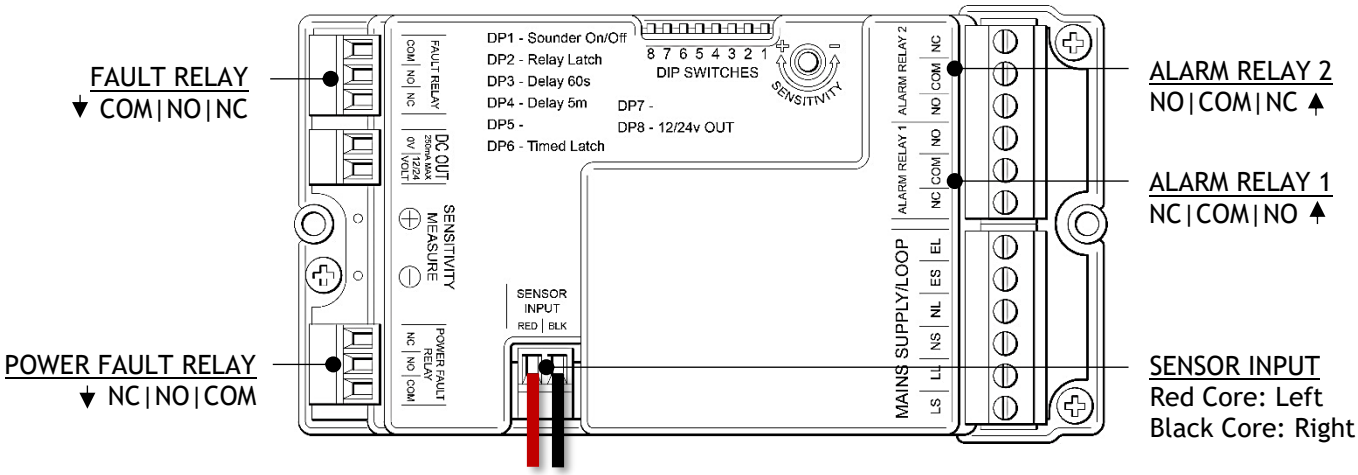

Figure 6: EMS-01 Rear Panel Showing Sensor / Relay Connections

A. Connect Sensor Cable (SCY) using LC10C and End of Line

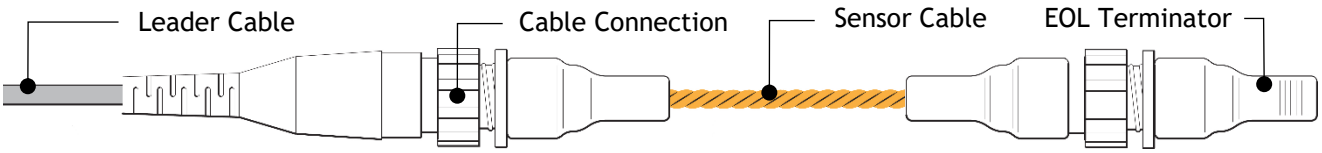

Figure 7: Sensor Cable Connection using Leader Cable (LC10C)

Connect the Sensor Cable using LC10C and End of Line (EOL) as follows:

1. Ensure that the unit is powered OFF. Connect the **leader cable** into the **sensor input terminal** on the unit. Do not connect the green or white cores (**Figure 6**).
2. Plug the opposite end of the **leader cable** into the **sensor cable** (**Figure 7**).
3. Once all sensor cables are connected (to a maximum total length of **100 metres**), plug the **End of Line (EOL) terminator** into the end of the last run of the **sensor cable.**

B. Connect Sensor Cable (SCY) using LC10/LCB100 and Start of Line

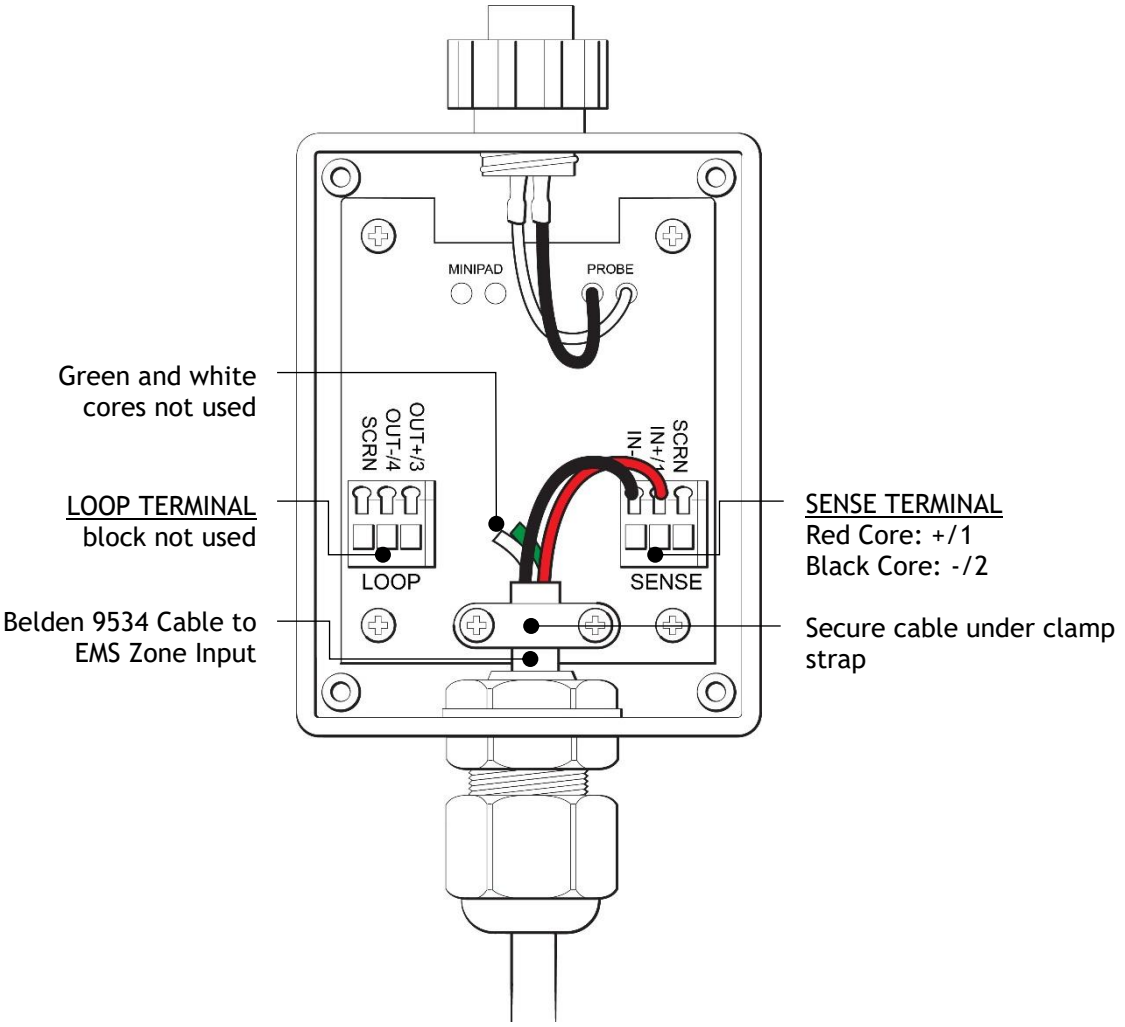

Figure 8: Sensor Cable Connection using LC10/LCB100 and Start of Line (No EOL Switch)

Connect the Sensor Cable using LC10/LCB100 and Start of Line (SOL) as follows:

1. Ensure that the unit is powered OFF. Connect the **leader cable** into the **sensor input terminal** on the unit. Do not connect the green or white cores (**Figure 6**).
2. Cable the opposite end of the **leader cable** in to the **Start of Line** (SOL; **Figure 8**).
3. Plug the **sensor cable** into the connection on the **SOL**.
4. Once all sensor cables are connected, plug the End of Line (EOL) terminator into the end of the last run of the sensor cable.

C. Connect a Single Environmental Sensing Device Sensor Probe

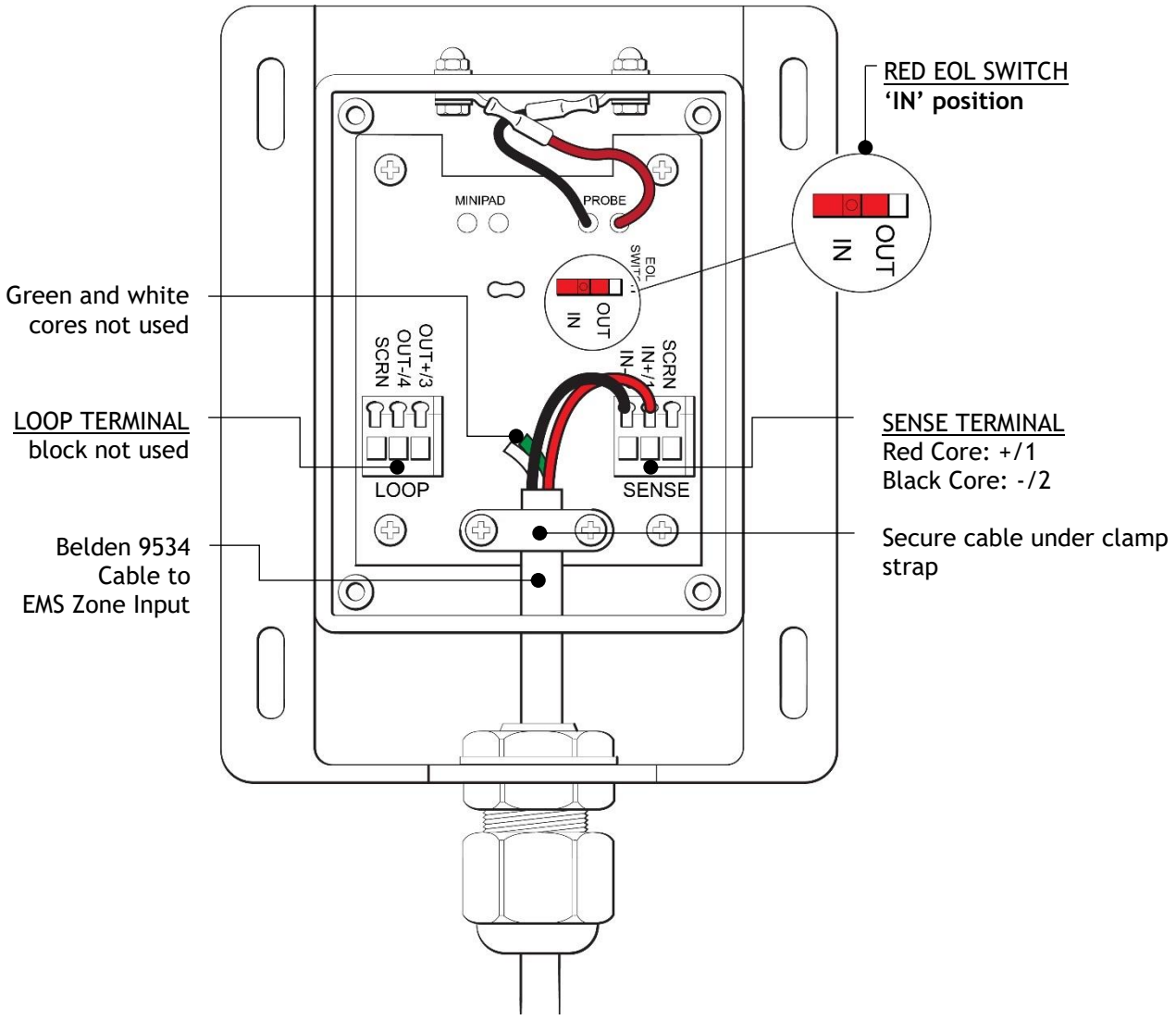

Figure 9: Sensor Cable Connection using Single ESD Sensor Probe

Connect a single ESD Sensor Probe as follows:

1. Ensure that the unit is powered OFF. Connect the **leader cable** into the **sensor input terminal** on the unit. Do not connect the green or white cores (**Figure 6**).
2. Connect the opposite end of the leader cable to the ESD probe, and ensure that the EOL Switch is set to the 'IN' position **(Figure 9)**.

D. Connect Multiple Environmental Sensing Device Sensor Probes as a Single Zone

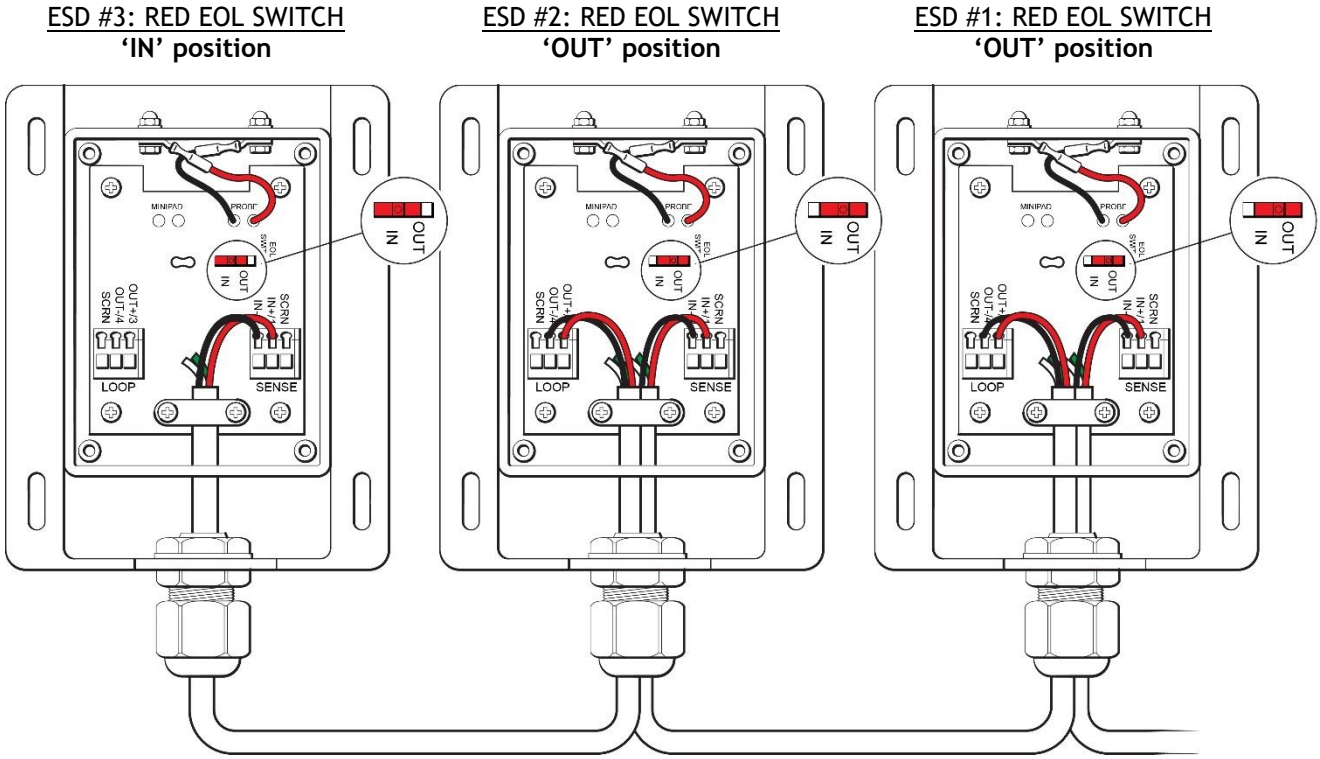

Figure 10: Connecting Multiple ESD Sensor Probes as a Single Zone

Connect multiple ESD sensor probes to a single zone as follows:

1. Ensure that the unit is powered OFF. Connect the **leader cable** into the **sensor input terminal** on the unit. Do not connect the green or white cores (**Figure 6**).
2. Connect the series of ESD probes. Ensure that all EOL switches except the last are set to the 'OUT' position; the last EOL switch should be set to the 'IN' position (**Figure 10**).

3.3 Ancillary Devices

3.3.1 Signalling to an Ancillary Device

The EMS-01 can be connected to provide a signal to a range of ancillary devices such as a Building Management System (BMS) or Short Message Service (SMS) alarm unit.

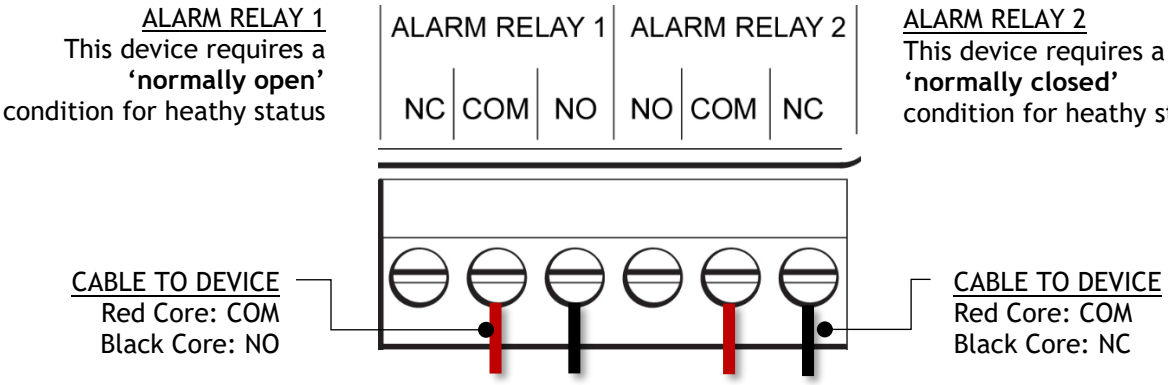

Figure 11:Connection for Signalling to an Ancillary Device

Connect the EMS to an ancillary device as follows:

1. Ensure that the unit is powered OFF. Refer to **Figure 6** to select the correct **relay** for the application.
2. Connect the relevant relay **(Figure 11;** core colours are for illustrative purposes only and may differ during application**)**.

3.3.2 12/24V Output to Power an Ancillary Device

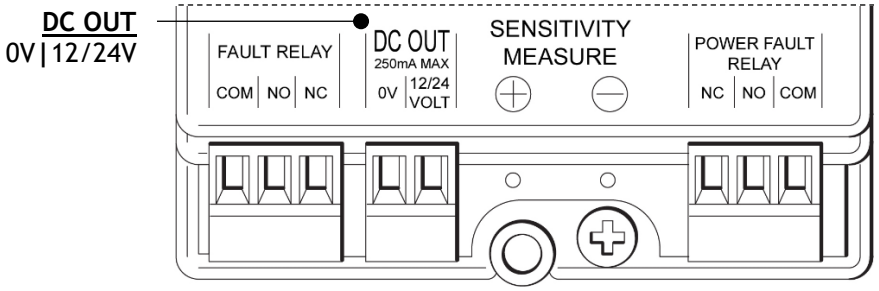

Figure 12: Using the 12/24 Volt Output to Power an Ancillary Device

Use the EMS 12/24 Volt auxiliary output to power an ancillary device as follows:

1. Ensure that the unit is powered OFF. Use **DIP Switch 8** to set the output to the correct voltage for your device (default is OFF/12V; see **section 4.1, Table 3** for DIP Switch assignments and default settings).
2. Connect your device to the 12/24V output, 250mA maximum (**Figures 6 and 12**).

3.3.3 230V Output to an Ancillary Device

The EMS can be used to control powered ancillary devices such as a beacon or solenoid valve.

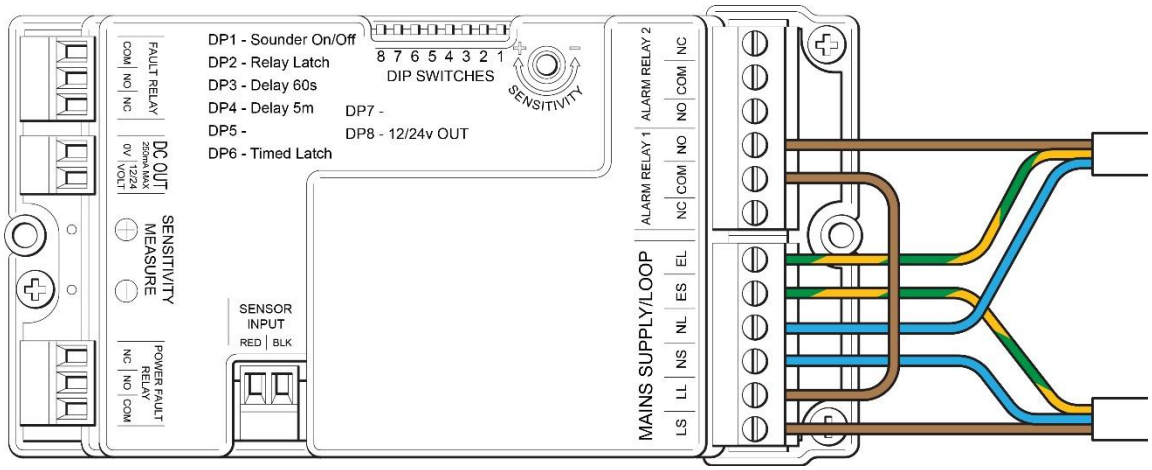

Figure 13: Using the EMS to Power a 230V Ancillary Device (Alarm Relay 1: Normally Open)

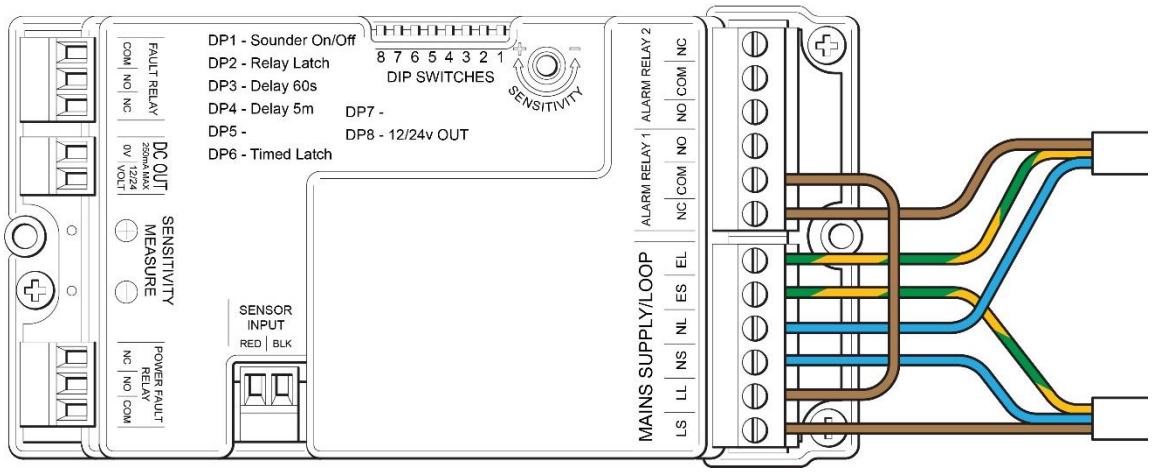

Figure 14: Using the EMS to Power a 230V Ancillary Device (Alarm Relay 1: Normally Closed)

Use the EMS to power a 230V ancillary device as follows:

1. Refer to section 2.2 and/or 3.2.1 **(Figure 6)** to select the correct relay.
2. Wire the device. Wiring is dependent on the labelling of terminals and whether the device is normally open or normally closed (**Figures 13 and 14** show wiring for **normally open** and **normally closed** devices connected to **Alarm Relay 1**).

4 Configuration

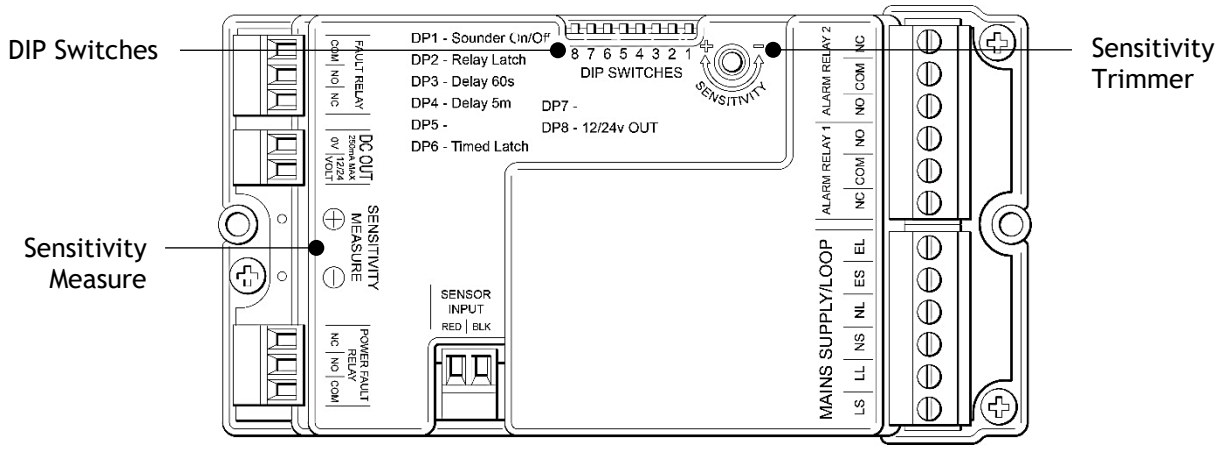

Figure 15: Rear of EMS-01 Showing Sensitivity and DIP Switch Settings

4.1 DIP Switch Settings

DIP Switch setting changes take effect immediately unless the system is in a state of reporting a fault or leak (i.e. **Cable Fault** or **Leak Mode**), or is in **Test** or **Engineering Mode** (see **Section 5**).

The unit should be **powered down** before settings are adjusted and then re-booted.

The unit should be powered OFF before setting the **DIP Switch array** according to the desired configuration:

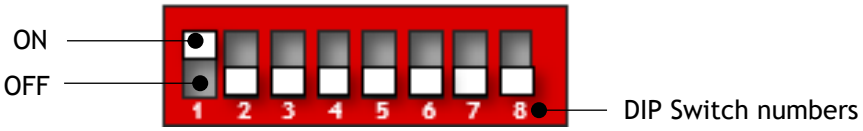

Figure 16: DIP Switch Assignments and Default Settings (bottom of unit)

DIP	Function	Description	Default
1	Unit sounder	Enabled / disabled	**ON**
2	Disable Relay Latch	When enabled, alarm relays are latched in accordance with the real-time alarm condition of the unit; i.e. no user acknowledgement of an alarm is required to unlatch the relay once the unit has returned to a healthy condition.	**OFF**
3	1 Minute Alarm Delay	The unit will delay entering alarm mode for **60 seconds (DIP 3)** or **300 seconds (DIP 4)** after an alarm condition occurs. If the alarm condition is cleared within the delay period (i.e. 1 or 5 minutes), the unit will resume normal operation with no alarm.	
4	5 Minute Alarm Delay		
5	DISABLED		
6	Timed Latch	The unit will latch all outputs for a period of 10s every 28.5 days after last power up. This feature is designed to mitigate against solenoid valve seizure, and also offers a communication health check between the unit and any other connected system.	**OFF**
7	DISABLED		
8	12/24V DC Out Selector	This output provides a constant DC output to power a connected device if required. The output is limited to 250mA maximum.	**OFF (12V)**

Table 3: DIP Switch Assignments and Default Settings

4.2 Sensitivity Adjustment

A small flat-head screwdriver should be used to set potentiometer sensitivity. A **digital multi-meter (DMM)** is also required to measure sensitivity settings during adjustment.

The unit sensitivity trimmer provides a means to control the set point at which alarms occur. This can be adjusted to **prevent false triggering** and manage **temporary rises in humidity**.

There are **5 levels** of sensitivity:

Level	Volts	ADC	Setting	Notes
5	0.7	213	**Maximum**	Sensor resistance up to approximately **30K**.
4	1.4	437	The full-scale dial angle is approximately **220 Degrees** (maximum to minimum); levels are approximately **55 degrees** apart. Adjust **clockwise (CW) to increase sensitivity**, and **counter-clockwise (CCW) to decrease sensitivity**.	
3	2.1	658		
2	2.8	869		
1	3.29	1023	**Minimum**	Sensor resistance at approximately **10K.**

Table 4: EMS-01 Sensitivity Levels

Adjust the sensitivity of EMS sensors as follows:

1. Ensure the unit is **powered on**.
2. Attach a **digital multi-meter (DMM)** to the **Sensitivity Measure terminals** (⊕ ⊖). This is to measure sensitivity as it is being adjusted.
3. Insert a **small flat-head screwdriver** into the **Sensitivity Trimmer** until it contacts the bottom. Some resistance should be felt as the tool is turned to adjust sensitivity.
4. **Table 4** (above) provides sensitivity measurements. Turn the small flat-head screwdriver:
    a. Clockwise (CW) to increase sensitivity, or
    b. Counter-clockwise (CCW) to decrease sensitivity.
5. Once the procedure is complete, remove the digital multi-meter and small flat-head screwdriver from the unit.

5 Operation

Ensure you have read the **Safety Information** in **section 1** before operating this product.

Configuration of **DIP Switch** settings will determine **sounder, alarm delay**, and **relay latch** activation during operating modes (see **section 4.1**).

Once powered on, the EMS-01 Leak Detector maintains a **background timing scheme** while continuously **monitoring sensor and sensitivity levels**. The unit continuously monitors connected **Aqualeak sensors** to gather batches of data samples which are averaged over time to determine if a **cable fault** or **leak** has occurred.

System status is displayed via **indicator LEDs** and **operation** is undertaken via **capacitive touch buttons** located at the front of the unit:

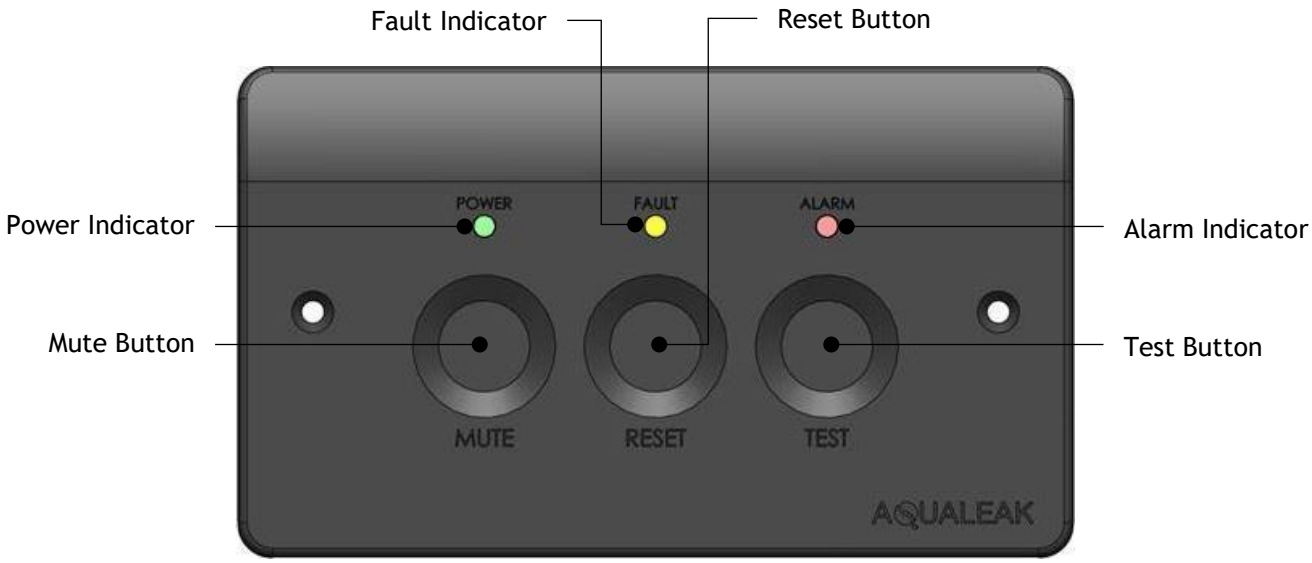

Figure 17: Front Panel of the Aqualeak EMS-01 Water Leak Detection System

EMS-01 Mode	Description
Monitor	Standard operating status.
Fault	Cable break detected.
Alarm	Leak detected.
Test	Test relays and Alarm for 15 seconds.
Engineering	Available only in Fault or Alarm modes. Disables relays.

Table 5: Modes and Capacitive Touch Button Combinations

5.1 Monitor Mode

Standard mode of operation.

Fault and Alarm indicators OFF		
Touch Button(s)	**Hold Time**	**Effect**
Mute	Disabled.	No effect.
Reset		
Test	3 seconds.	Enter **Test mode** (**section 5.5**).

***Table 6**: Monitor Mode Touch Button Inputs and Effects*

5.2 Fault Mode

Occurs automatically if a **cable break** is detected (i.e. the leader cable may be physically severed from the unit or there may be a problem with the connection to the sensing equipment).

Fault indicator FLASHES AMBER. Alarm indicator OFF. Sounder ON Fault indicator SOLID BLUE if Mute button pressed		
Touch Button(s)	**Hold Time**	**Effect**
Mute	Instant.	Disable sounder. The Fault indicator will change to solid blue to indicate there is a muted fault.
Reset	Instant if fault clear.	Clear fault condition. Return to Monitor mode.
Test	Disabled.	No effect.
Mute and Reset	5 seconds.	Enter Engineering mode (**section 5.4**).

***Table 7**: Cable Fault Mode Touch Button Inputs and Effects*

5.3 Alarm Mode

Occurs automatically if the presence of water (i.e. a **leak**) or excess humidity is detected by any connected sensing equipment.

Fault indicator OFF. Alarm indicator FLASHES RED. Sounder ON Alarm indicator SOLID BLUE if Mute button pressed		
Touch Button(s)	**Hold Time**	**Effect**
Mute	Instant.	Disable sounder. This action cannot be undone as the Mute button will also be disabled. The Alarm indicator will change to solid blue to indicate there is a muted alarm.
Reset	Instant if fault clear.	Clear fault condition. Return to Monitor mode.
Test	Disabled.	No effect.
Mute and Reset	5 seconds.	Enter Engineering mode (**section 5.4**).

***Table 8**: Leak Mode Touch Button Inputs and Effects*

5.4 Engineering Override Mode

This mode is accessed in **Fault or Alarm mode** to override the system for a period of **24 hours**. This is to allow water to dry out and to unlatch any latched relays (e.g. which may be holding off water via a solenoid valve).

General maintenance mode to disable relays.

The unit will return to **Monitor Mode** after the 24-hour timer has elapsed. To exit manually during this period, hold the **Mute and Reset** buttons together to return to Monitor Mode. Power, Fault, and Alarm indicators FLASH		
Touch Button(s)	**Hold Time**	**Effect**
Mute	Disabled.	No effect.
Reset		
Test		
Mute and Reset	5 seconds.	End Engineering Mode and return to Monitor Mode.

Table 9: Engineering Mode Touch Button Inputs and Effects

Enter Engineering Mode as follows:

1. The unit must be in Cable Fault Mode (**section 5.2**) or Alarm Mode (**section 5.3**).
2. Hold the **Mute and Reset** buttons together for **5 seconds**. All LED's will flash while entering Engineering Mode.
3. Once in Engineering Mode, the LED's will flash sequentially to show the **24-hour timer** has started.
4. The unit will return to **Monitor Mode** after the 24-hour timer has elapsed. To exit manually during this period, hold the **Mute and Reset** buttons together to return to Monitor Mode.

5.5 Test Mode

Activates all relays and the sounder for a period of **15 seconds** to test the unit and any ancillary devices.

Fault and Alarm indicators FLASH BLUE		
Touch Button(s)	**Hold Time**	**Effect**
Mute	Disabled.	No effect.
Reset		
Test	3 seconds.	End Test mode and return to Monitor mode.

Table 10: Test Mode Touch Button Inputs and Effects

Enter Test Mode as follows:

1. Ensure you are in **monitor mode.** If not already in a standard mode of operation, see cable fault mode (**section 5.2**), leak mode (**section 5.3**), or engineering mode (**section 5.4**).
2. Hold the **Test** button for **3 seconds**. The Fault and Alarm indicators will flash blue in Test Mode.
3. Once in **Test Mode**, the unit will automatically return to **Monitor Mode** after **15 seconds**. To exit manually during this period, hold the **Test** button for **3 seconds**.

5.6 System Testing

For general testing, DIP switches 3 and 4 (Alarm delays) should be disabled. This is to prevent a 1 to 5-minute delay before alarms are raised (see **section 4.1**).

Connect a **dry sensor** to the unit to prevent inadvertently triggering the alarm. For each of the **four tests** listed below it is assumed that the unit is powered on and in **Monitor Mode** (i.e. in a standard mode of operation; see **section 5.1**).

5.6.1 Test System Modes

Test 1 (Test Mode) is performed as follows:

1. Hold the **Test** button to Enter **Test Mode**. The Fault and Alarm indicators will flash blue.
2. Confirm all output relays have latched correctly (i.e. changed state) with use of a digital multi-meter.
3. Hold the **Test** button to manually exit Test Mode and return to **Monitor Mode**, or leave for **15 seconds** to automatically return to Monitor Mode.
4. Confirm all output relays have unlatched correctly with use of a digital multi-meter.

Test 2 (Fault Mode) is performed as follows:

1. Disconnect sensor(s) from the unit. The unit will enter **Cable Fault Mode** (**section 5.2**). The Fault indicator will flash amber and the sounder will activate if enabled.
2. Mute the panel alarm if applicable (i.e. if **DIP Switch 1 is ON**; see **section 4.1**). The Fault indicator will change to solid blue.
3. Confirm fault output relay has latched correctly with use of a digital multi-meter.
4. Reconnect sensor(s) to the unit.
5. If **DIP Switch 2 is ON** this will clear the fault (see **section 4.1**). Otherwise, press the **Reset** button to exit Cable Fault Mode back to **Monitor Mode**.

Test 3 (Alarm Mode) is performed as follows:

1. Wet sensor(s) connected to the unit. The unit will enter **Alarm Mode** (**section 5.3**). The Alarm indicator will flash red and the sounder will activate if enabled.
2. Mute the panel alarm if applicable (i.e. if **DIP Switch 1** is set; see **section 4.1**). The Alarm indicator will change to solid blue.
3. Confirm alarm output relay has latched correctly with use of a digital multi-meter.
4. Dry the sensor(s).
5. If **DIP Switch 2 is ON** this will clear the alarm (see **section 4.1**); otherwise, press the **Reset** button to exit Alarm Mode back to **Monitor Mode**.
6. Confirm alarm output relay has unlatched correctly with use of a digital multi-meter.

Test 4 (Engineering Mode) is performed as follows:

1. Trigger **Cable Fault Mode** (Test 2) or **Alarm Mode** (Test 3).
2. Hold the **Mute and Reset** buttons together for **5 seconds** to enter **Engineering Override Mode** (**section 5.4**). All LED's will flash while entering Engineering Mode.
3. Once in Engineering Mode, the LED's will flash sequentially to show the **24-hour timer** has started.
4. Confirm all output relays have latched correctly with use of a digital multi-meter.
5. The unit will return to **Monitor Mode** after the 24-hour timer has elapsed. To exit manually during this time, hold the **Mute and Reset** buttons together to return to Monitor Mode.
6. Confirm all output relays have unlatched correctly with use of a digital multi-meter.

5.6.2 Test a Cable Fault (leader and sensor cables)

If a **cable break** is detected and a **sensor cable** is used, it is possible to determine whether there is a problem with the sensor cable or the leader cable.

Determine if there is a fault with the sensor or leader cable as follows:

1. Place a **resistor** across the **sensor terminals** in the panel to see if the fault disappears. If so, the problem is somewhere on the cable run.
2. Remove the **End of Line (EOL) terminating resistor**, separate the leader cable from the sensor cable, and connect the EOL terminating resistor into the leader cable.
3. If the fault clears from the panel, fault is with the sensor cable. Otherwise, fault is with the leader cable.

6 Maintenance

Ensure you have read the **Safety Information** in **section 1** before undertaking maintenance.

6.1 Cleaning

✓ Clean the outside of the unit only. Use a dry, clean cloth.

✗ **DO NOT** use abrasive agents or solvents to clean the equipment.

6.2 Troubleshooting

The table below lists the most common problems and their solutions. If a problem cannot be solved then please call support on **+44 (0)1249 715698** or visit our website at www.aqualeak.com.

Problem	Possible Cause	Possible Solution
System does not power on.	**Power cable** is incorrectly connected.	Check the power cable. Review **section 3.1.2.**
	Unswitched fused spur is faulty or inactive.	Check fuses and power on the unswitched fuse spur. Review **section 3.1.2.**
Sensor data is intermittent or inactive.	Sensors not connected properly.	Check Leader Cable and connections. Review **section 3.2.1.**
Leak detected but no leak present.	Sensor cable is touching something conductive.	
	Sensor cable is over 100 metres in length.	
	Sensor cable has debris on it.	Clean sensor cable.
Cable Fault detected.	End of Line switch not engaged in ESD probe or EOL plug not installed in end of sensor cable.	Connect resistor version of sensor at end of run. Review **section 3.2.**
	Break in cable.	Check cable. Review **section 3.2.**
	Unsound connection(s) in cable.	Check cable connections. Review **sections 3.2 and 5.6.2.**
	Faulty sensor or leader cable.	Check cables. Review **section 5.6.2.**

Table 11: *EMS-01 Troubleshooting*

7 Warranty

The Aqualeak Environmental Monitoring System (EMS-01) Water Leak Detector has a **1-year back-to-base warranty** as standard, and a **5-year warranty where installed and annually maintained by Aqualeak**.

The warranty is applicable from the original purchase date and includes repair or replacement if the product is defective. The following exclusions apply:

- ✕ If the system is purchased second hand. Only new products are covered.
- ✕ Persons not named as the original purchasers on the order information.
- ✕ Physical damage to the unit due to abuse, accident, neglect, or misuse. This includes:
  - Damage caused by water or other liquids.
  - Damage caused by connection to incompatible power sources.
  - Damage caused by connection to incompatible devices not manufactured by Aqualeak.
  - Damage caused by improper installation (i.e. not following the instructions provided).
  - Normal wear and tear.
  - Unauthorised attempts to repair, modify, or disassemble the item by unqualified persons.

For further information on our warranty and returns procedure, contact us on **+44 (0)1249 715698** or visit our website at www.aqualeak.com.

AQUALEAK

Only for EC countries:

Do not dispose of Master Unit and Outstations into household waste!

According the European Guideline 2002/96/EC for Waste Electrical and Electronic Equipment and its implementation into national right, measuring tools that are no longer usable must be collected separately and disposed of in an environmentally correct manner.