

'Aqualarm'

WATER LEAK DETECTION SYSTEM



*Installation, Set-up and Operating
Instructions*

**'LeakSense'
LS-2i.**

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Section A

Installation

1. Control Panel

- i. The **LeakSense 2i** Control Panel should be sited in a position where the 'Alarm Horn' can be heard and at a height where the LCD Screen can be seen. **SEE PAGE 20 BEFORE INSTALLING.**
- ii. A 220/240 volt 50 Hz single phase power supply via a non-switched fused spur should be made available adjacent to the Control Panel prior to the start of the installation and should be connected to the Control Panel by a competent qualified person. **DO NOT CONNECT POWER TO THE CONTROL PANEL OR THE BATTERIES YET . (SEE PAGE 15 FOR CONNECTIONS.)**

2. Leader / Jumper cables

NOTE: Only J.A.M. Ltd. Leader & Jumper Cables must be used.

- i. The Leader cable (LS-LC) should be installed first. The bare end of the Leader cable, consisting of 2 cores, should be installed **ready to connect** into the Control Panel via the knockout provided and with a suitable cable gland to the terminals marked 'CD-X'.
- ii. The cores can be connected to either terminal as there is no polarity. **DO NOT CONNECT TO THE CONTROL PANEL YET.**
- iii. The connectorized end of the Leader cable (female) is to be connected to the first piece of Detecting cable (CD-x).
- iv. Detecting cables (CD-x) & Jumper cables (LS-JC) are connectorized at both ends (one end female the other end male, the female end should always be at the furthest end of the piece of cable you have just installed). The Jumper cable (LS-JC) is to be used where it is required to connect Detecting cables (CD-x) installed in different areas.
- v. **Ensure all cables are installed Securely.**

3. Detecting cable

- i. Detecting cable (CD-x) should be installed using the following methods:-
 - a. Clip to the underside of pipe-work using nylon type cable ties at 300 mm centres..
 - b. Clip to the floor slab or other flat surface using 'aqualarm' floor clips (CL-1) hot melt glued or screwed to the surface at 500 mm centres. (Do not rely on sticky back pads only)

Section A cont

- ii. **IMPORTANT NOTES;-**
 - a. Do not use metal ties or straps as they can damage the Detecting cable.
 - b. Do not over tighten the cable ties.
 - c. Detecting cable should never be installed between pipe-work and its insulation. It must be installed on the outside of any insulation finish.
 - d. 'aqualarm' WARNING LABELS (WL-1) should be fitted at 5m intervals along the entire length of all cables installed. Where cables go through walls etc. the WL-1 should be fitted either side of the wall.

Section B

1. Testing Installed Cables

- i. When all your Leader / Detecting / Jumper cables have been installed, the total length should be Tested as follows :-
- ii Ensure that all the cables are connected together BUT DO NOT CONNECT the Leader cable to the Control Panel AT THIS STAGE.
- iii. Connect the End of line resistive plug (EOL-2) to the end of the last length of cable installed.
- iv. Carry out the following 'TEST' using a Multimeter to ensure the integrity of the installed cables.
- v. Set Multimeter to read a resistance above 100 ohms. Connect the Multimeter leads to the bare cores of the Leader Cable. The following should be noted:-

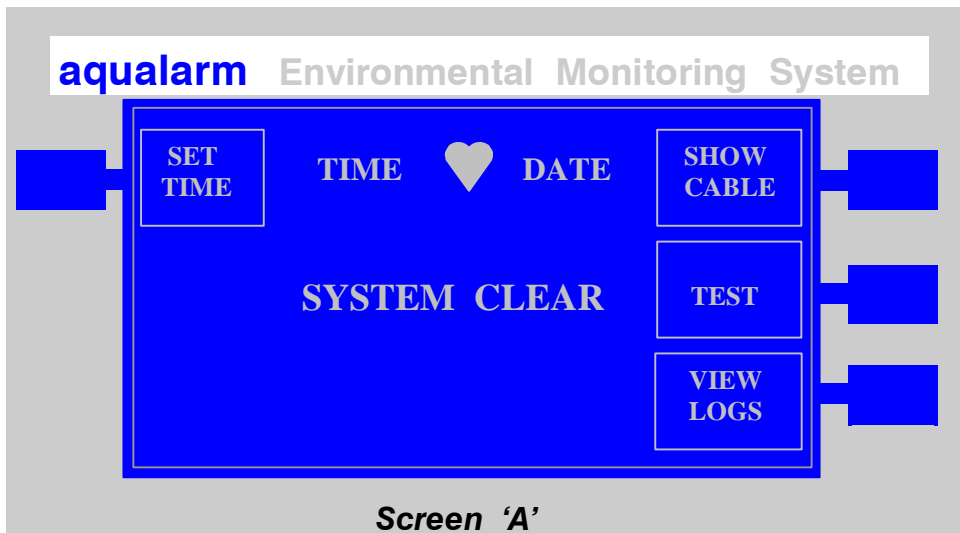
<u>CONDITION</u>	<u>POSSIBLE FAULT</u>
No resistance Circuit)	a. EOL-2 not fitted at end (Open
	b. Cable disconnected along the installed length.
Resistance reading below 45 ohms	a. Cable is damaged (Short Circuit)
	b. Cable is wet (Rectify)
Resistance reading above 50 ohms.	a. All cables are correct. System is ready to connect to Control Panel.

Section C

Control Panel.

1. Start-Up Procedure.

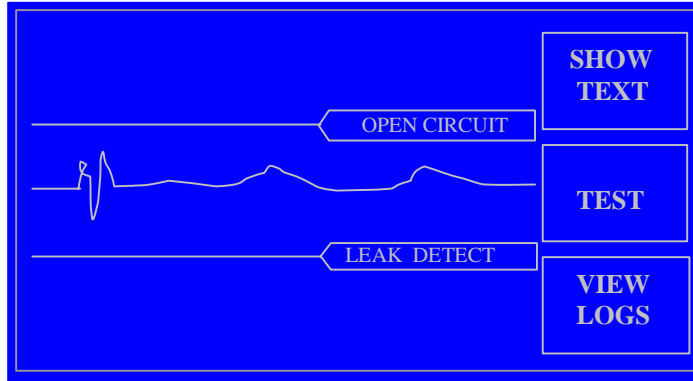
- i. On completion of the Installation of all Leader / Detecting & Jumper cables, the following procedure should be used to Start-Up the system :-
- ii. Ensure that all the cables are connected together and that the End of Line resistive plug (EOL-2) has been connected at the end of the last length of cable installed & that they have been tested as described in **Section 'B'**.
- iii. Connect the Leader cable (LS-LC) to the Control Panel Terminals marked '**CD-x**' via a suitable cable entry gland.
- iv. **Cause a competent qualified person to connect the Battery Back-Up leads to the correct terminals of the sealed Lead Acid Batteries and the Control Panel to the Mains Power supply as described in Section 'A'.**
(See also page 15, Control Panel Terminals.)
- v. **Close & Lock the Control Panel door & Switch on the Mains Power supply.**
- vi. The Control Panel will Automatically recognise the characteristics & length of the cables connected to the system.
- vii. The LCD screen will now DISPLAY the following:-



- viii. The **Heart** will pulse to show that the Power Supply is connected.

Section C cont

- ix. **Press** the button corresponding to the **'SHOW CABLE'** key.
- x. The LCD screen will **DISPLAY** the following:-



- xi. The cable Characteristics of your system should look similar to that displayed.
- xii. **Press** the button corresponding to the **'SHOW TEXT'** key, the screen will revert back to Screen 'A'.

2. Set-Up Time & Date.

- i. **Press** the button corresponding to the **'SET TIME'** key.
- ii. The LCD screen will **DISPLAY** the following:-



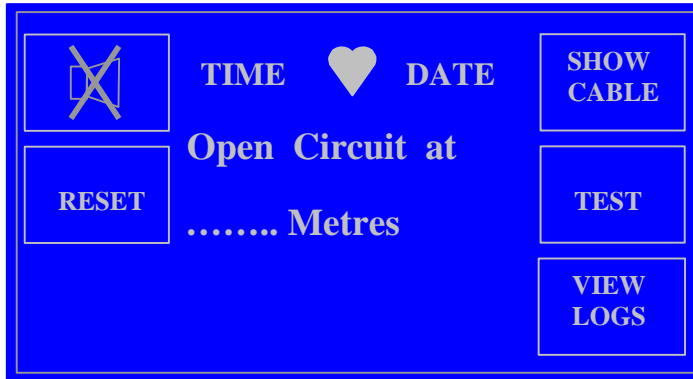
- iii. The Hours will be highlighted. Using the buttons corresponding to the + / - keys, set the hours.
- iv. Continue using the buttons corresponding to the **ARROW** keys, to highlight the Minutes, then the date. Use the + / - keys to set the Minutes then the Date. When this has been done,
- v. **Press** the button corresponding to the **'SAVE'** key. This will save the set time & date and the screen will revert back to Screen 'A'.
The system is now ready for Mapping. (see Sect. C.3.)

Section C cont

3. Mapping Procedure

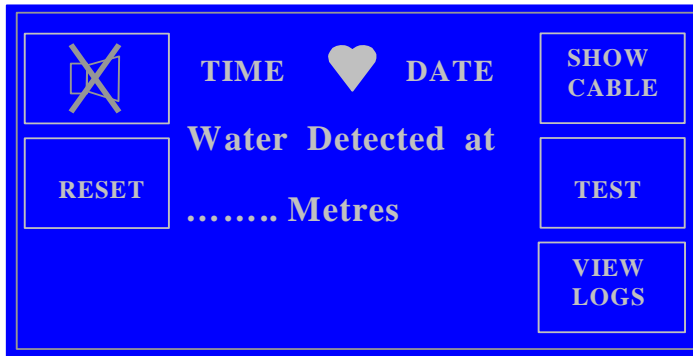
(SEE PAGES 18 & 19 for MAPPING RESULTS SHEET)

- i. Using the Mapping Tool provided, carry out the following:-
- ii. Starting at the first joint between the leader cable LS/LC & the first piece of detecting cable (CD-x), open the joint. The 'Alarm Horn' will sound and the LCD screen will DISPLAY the following:-



Note this Reading on your Mapping Results Sheet.

- iii. Connect the Mapping Tool lead into the Leader cable and the Detecting cable into the other end of the Mapping Tool. **Press** the button corresponding to the 'Reset' key, the LCD screen will now revert to Screen 'A'.
- iv. **Press** & hold down the **Button** on the top of the Mapping Tool until the 'Alarm Horn' sounds. The LCD screen will now display the following:-



Note this Reading on your Mapping Results Sheet..

- v. Disconnect the Mapping Tool & re-instate the joint. **Press** the button corresponding to the 'Reset' key, the LCD screen will now revert to Screen 'A'. – **Go to the next joint.**

Section C..... cont

- vi. Disconnect this joint & **CONTINUE MAPPING EACH JOINT AS DESCRIBED IN the Paragraphs above UNTIL ALL JOINTS HAVE BEEN MAPPED & RECORDED (including the EOL joint).** The figures recorded will form the basis for preparing the 'System Map'.
- viii. **THE SYSTEM IS NOW READY FOR USE.**

Section D.

Control Panel Outputs.

1. Relays.

The Control Panel has the following dedicated relay outputs each with a set of 'Clean Contacts' for remote signalling:-

<u>OUTPUT</u>	<u>TERMINALS MARKED</u>
Water Detected Alarm	'Alarm' - N.C. / C / N.O.
Open Circuit Alarm	'Network Fail' - N.C. / C / N.O.
Mains Failure Alarm	'Mains Fail' - N.C. / C / N.O.
Battery Failure Alarm	'Batt Fail' - N.C. / C / N.O.
Service Alarm	'Service' - N.C. / C / N.O.

N.C = Normally Closed. – C = Common. – N.O= Normally Open

All the above outputs are via a 'Clean Set' of Contacts with a Maximum rating of 200 mA at 24 volts.

<u>OUTPUT</u>	<u>TERMINALS MARKED</u>
Remote Sounder	'Sounder' - V+ / V-
Remote Beacon	'Beacon' - V+ / V-

For connection to J.A.M. Sounder & Beacon only.

Beacon output can also be used for J.A.M. Repeater Panel.

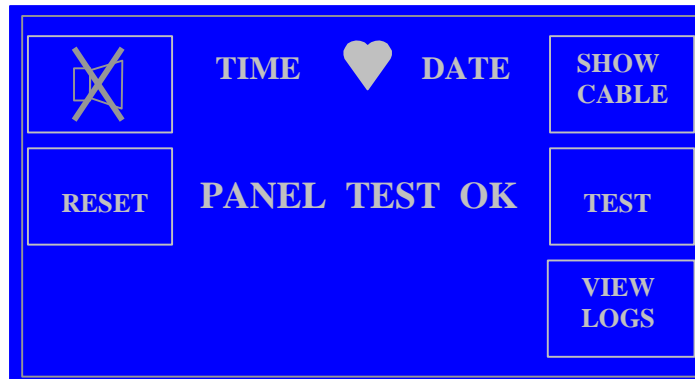
2. RS 232	RS 232	-	RX / TX / 0 v
RS 232 Settings.			
Baud	=		9600
Data Bits	=		8
Parity	=		None
Stop Bit	=		1
Flow Control	=		None
3. RS 485	RS 485	-	A / B / E

Section E.

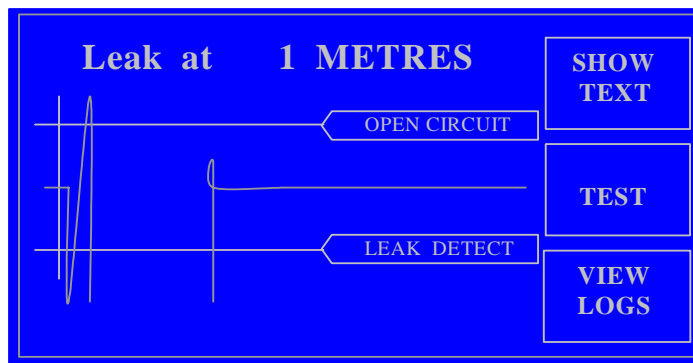
Control Panel Functions.

1. TEST / MUTE / RESET.

- i. **'TEST'** is used to Test the operation of the Control Panel only. Press the button corresponding to the **'TEST'** key, the alarm Horn will sound & the LCD screen will DISPLAY the following:-



- ii. Press the button corresponding to the **'MUTE'** key, the alarm horn will cease to sound. This should be used on all occasions to **'MUTE'** the sounder.
- iii. Press the button corresponding to the **'RESET'** key. This should always be used to **'RESET'** the System following the clearance of an alarm condition or Panel **'TEST'**. The LCD screen will now revert to Screen 'A'.
- iv. In **'TEST'** mode if you Press the key corresponding to the **'SHOW CABLE'** sign, the LCD screen will now DISPLAY the following:-

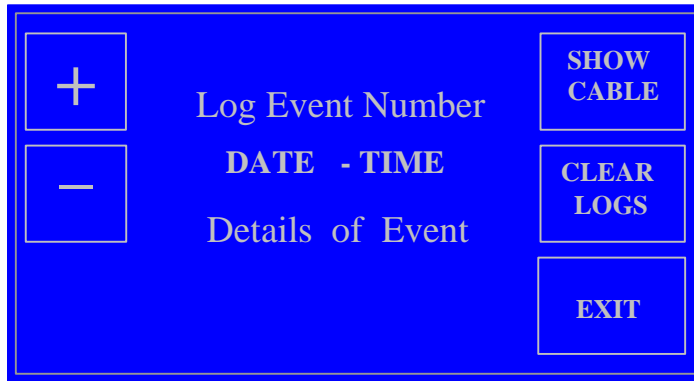


- v. Press the button corresponding to the **'SHOW TEXT'** key, then Press the button corresponding to the **'RESET'** key. The LCD screen will now revert to Screen 'A'.

Section E cont

2. View 100 Event Record Log.

- i. Press the button corresponding to the 'VIEW LOGS' key. The LCD screen will now DISPLAY the following:-



- ii. Scroll through the Events using the buttons corresponding to the + / - keys. The cable characteristics of the alarm event can also be seen by pressing the button corresponding to the 'SHOW CABLE' key.
- iii. Press the button corresponding to the 'EXIT' key to return to Screen 'A'
- iv. To remove all LOGS, Press the button corresponding to the 'CLEAR LOGS' key. Then Press the button corresponding to the 'EXIT' Sign to return to Screen 'A'

3. What to do if an Alarm sounds.

a. Water Detected.

- i. On detecting the presence of water the 'Water Detected' alarm is activated. The LCD Screen will change to the following:-

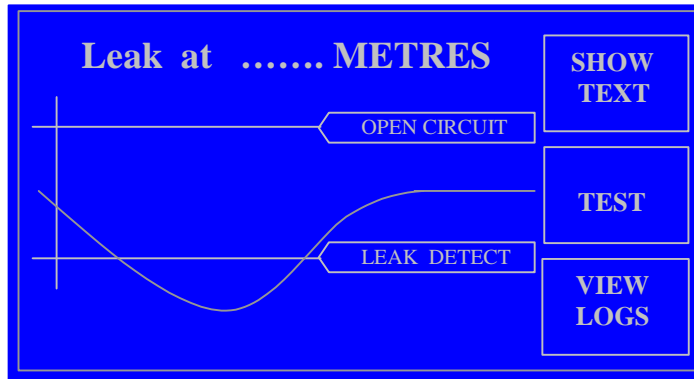


- and the 'Alarm Horn' will sound.
- ii. Press the button corresponding to the 'MUTE' key, take NOTE of the LOCATION READING displayed.

Section E cont

3. What to do if an Alarm sounds. cont

- iii. Check this reading against the 'System Map' to locate the water contact.
- iv. **Attend to the reason giving rise to the Alarm.**
- v. If you **press** the button corresponding to the 'Show Cable' key, The LCD Screen will change to the following & you will be able to view the cable characteristics of the alarm:-



- vi. **Press** the button corresponding to 'Show Text' to return to the previous screen.
- vii. After attending to the reason for the alarm, reset the system by **pressing** the 'RESET' button. The LCD Screen will revert to Screen 'A' and the system will return to Normal Operation.
- viii. Should the system re-alarm within 30 seconds & display the same or similar Location Reading, this will indicate that the Detecting cable has not dried or that the water is still present.
- ix. If a vastly different Location Reading is displayed this will indicate that a further water contact has been made.
- x. Carry out the above procedures again until the LCD Screen reverts to Screen 'A'.

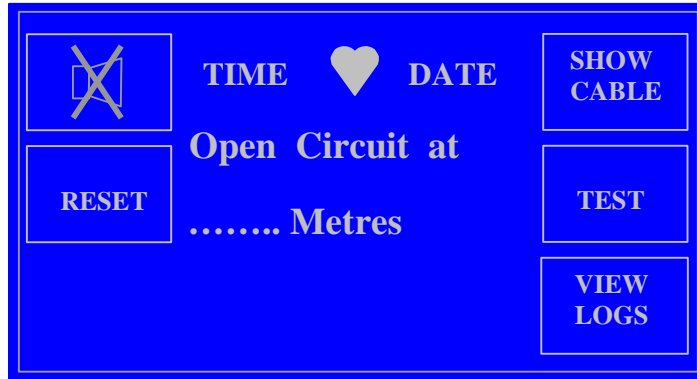
NOTE – Following a Water Leak, the Detecting Cable should be dried using a Clean Dry cloth. If the Detecting Cable is left to dry of its own accord, ensure that an adequate air flow is available to dry it. This could take up to 24 hours (depending on the air flow available, temperature & extent of the water leak). Contamination of Detecting Cable may occur after a water leak (especially if it is allowed to dry of its own accord) if the floor area

Section E cont

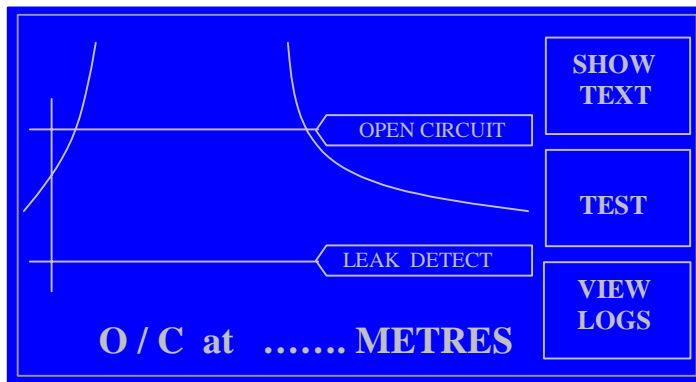
where it is installed is dirty or dusty. This may cause the cable to short circuit because of a 'Trace Path' of congealed dust particles or dirt. This will stop the system from being 'RESET'

b. Open Circuit.

- i. Should damage occur or a joint between Leader, Detecting or Jumper cables become parted, an 'Open Circuit' alarm is activated.
- ii. The LCD Screen will change to the following:-



- iii. The 'Alarm Horn' will sound.
- iv. **Press** the button corresponding to the 'MUTE' key, **take NOTE of the LOCATION READING displayed**, check this against the 'System Map' to locate the 'Open Circuit'.
- v. **Attend to the reason giving rise to the Alarm.**
- vi. If you **press** the button corresponding to the 'Show Cable' key, the LCD Screen will change to the following & you will be able to view the cable characteristics of the alarm:-



Section E cont

- vi. **Press** the button corresponding to the **'Show Text'** key to return to the previous screen.
- vii. After attending to the reason for the alarm, **press** the button corresponding to the **'RESET'** key. The LCD Screen will revert to Screen 'A' and the system will return to Normal Operation.
- viii. Should the system re-alarm within 30 seconds & display the same or similar Location Reading, this will indicate that the **'Open Circuit'** is still present.
- ix. If a vastly different Location Reading is displayed this will indicate that a further **'Open Circuit'** has been found.
- x. Carry out the above procedures again until the LCD Screen reverts to Screen 'A'.

NOTE – The most common cause of an 'Open Circuit' alarm is caused by Engineers who are working in the area of the alarm. They may have caused damage to the detecting cable or opened a joint whilst carrying out other duties or works. Always be aware of any works being carried out in the vicinity of your Water Leak detection System

c. **Mains Fail.**

- i. Should the Mains Power fail, the LCD Screen will change to the following:-



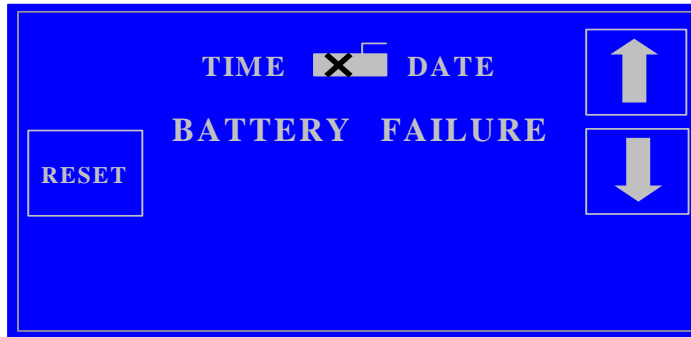
- ii. This will also cause the 'Mains Fail' relay to energise and the system will switch automatically to Battery Back Up. The LCD Screen will display a pulsing plug & show the percentage **Life State** of the **Batteries**. When the **Life State** of the Batteries are **Zero** the Battery Fail relay will de-energise & the System will **Shut Down**.
- iii. On re-instating the Mains Power, **Press** the button corresponding to the **'Reset'** key, the LCD Screen will revert to Screen 'A' & the System will return to Normal operation.

Section E

What to do if an Alarm sounds

4. Battery Fail.

- i. Should the Batteries Fail or become disconnected the LCD Screen will display the following:-



- ii. This will also cause the '**Battery Fail**' relay to energise. The LCD Screen will display a pulsing battery with a **CROSS** through it and a beep will be heard **every 75 secs.** whilst the batteries are in a '**Battery Fail**' state. After a short period of time the LCD screen will change to the General Screen. It will continue to display the '**BATTERY FAIL**' symbol.
- iii. When the cause of the 'Alarm' has been dealt with **PRESS** the button corresponding to the '**RESET**' button. The LCD screen will revert to the General Screen and the system will return to normal operation.

Section F

Maintenance, & Cable Care

1. Maintenance.

- i. Although the system is relatively maintenance free, it is recommended that it should be checked fully at least **ONCE** each year. Should an alarm occur which you cannot clear by the method described in this Manual or you are unsure of the operation of any part of the system, please contact your local 'aqualarm' 'LeakSense' Agent or direct to J.A.M. Limited who will be pleased to give you advice & assistance.
- ii. **J.A.M. Limited & their authorised Agents are able to offer you a comprehensive Maintenance Contract to look after your 'LeakSense' system on a 1, 2, or 4 visit programme each year. For information please contact the Authorised Agent listed on the back of this booklet or directly to J.A.M. Limited**
- iii. Your system is fitted with a 'Mains Fail' Battery Back-Up system in the form of automatic re-chargeable Batteries They should give you a trouble free life of between 3 & 5 years (dependant on use).

Section F

Maintenance, & Cable Care

1. Maintenance. (cont)

- iv. When Maintenance is due the following screen will be displayed:-



- v. The 'Spanner' will pulse and a 'Bleep' sound will be heard.

Telephone the number displayed for Service.

2. Cable Care

The Detecting Cable is one of the most important parts of the system. For the system to work, water must be able to penetrate the Cables. The following list of substances (although not exhaustive) will have a detrimental effect on the cables & will cause un-reliable readings. **Fizzy Soda, (coca-cola etc) Coffee, Tea & Chocolate Drinks, Chemical Cleaning Agents both Wet or Dry, Photocopier, Printer Toners, Mastics & Sealants, Plumbing, Heating & A.C. lubricants, Glycol, Builders Rubble & Dust.**

All the above substances will cause an 'Alarm' state. If allowed to dry without attendance a Trace Path (contamination) may occur & the 'Alarm' state will not be able to be cleared or the system reset. Contamination may also cause un-reliable alarm readings. Contaminated cable should be removed, cleaned & allowed to dry before replacing back into service. If after cleaning the cable the system will not reset, **the cable must be replaced. Damaged cable should always be replaced.**

NOTE – Following a Water Leak, the Detecting Cable should be dried using a Clean Dry cloth. If the Detecting Cable is left to dry of its own accord, ensure that an adequate air flow is available to dry it. This could take up to 24 hours (depending on the air flow available, temperature & extent of the water leak).

Section F

Maintenance, & Cable Care (cont)

2. Cable Care (cont)

Contamination of Detecting Cable may occur after a water leak (especially if it is allowed to dry of its own accord) if the floor area where it is installed is dirty or dusty. This may cause the cable to short circuit because of a 'Trace Path' of congealed dust particles or dirt. This will stop the system from being 'RESET'

Section G

1. Control Panel Terminals

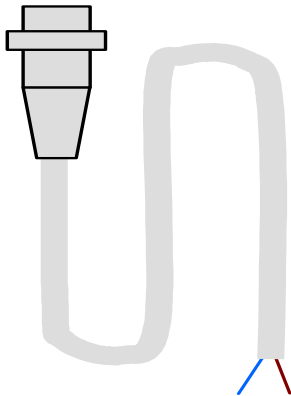
<p>BATTERY No 1 MUST BE CONNECTED TO THE TERMINALS MARKED BAT 1. ENSURE BOTH POSITIVE & NEGATIVE ARE CONNECTED CORRECTLY.</p>		<input type="checkbox"/> N <input type="checkbox"/> L PSU																																
<p>BATTERY No 2 MUST BE CONNECTED TO THE TERMINALS MARKED BAT 2. ENSURE BOTH POSITIVE & NEGATIVE ARE CONNECTED CORRECTLY.</p>		<input type="checkbox"/> L <input type="checkbox"/> N MAINS <input type="checkbox"/> E IN <input type="checkbox"/> E																																
		<input type="checkbox"/> DOOR <input type="checkbox"/> SWITCH																																
<table border="1"> <tr> <td>CDx</td> <td>RS-232 Tx Rx 0v</td> <td>RS-485 A B E</td> <td>Beacon Sounder V+ V- V+ V-</td> <td>Alarm N: C No</td> <td>Network Fail N: C No</td> <td>Mains Fail N: C No</td> <td>Bat Fail N: C No</td> <td>Service N: C No</td> <td>Bat 1 + - + -</td> <td>Bat 2 + -</td> <td>PSU + -</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	CDx	RS-232 Tx Rx 0v	RS-485 A B E	Beacon Sounder V+ V- V+ V-	Alarm N: C No	Network Fail N: C No	Mains Fail N: C No	Bat Fail N: C No	Service N: C No	Bat 1 + - + -	Bat 2 + -	PSU + -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
CDx	RS-232 Tx Rx 0v	RS-485 A B E	Beacon Sounder V+ V- V+ V-	Alarm N: C No	Network Fail N: C No	Mains Fail N: C No	Bat Fail N: C No	Service N: C No	Bat 1 + - + -	Bat 2 + -	PSU + -																							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																							

2. Ancillary Equipment

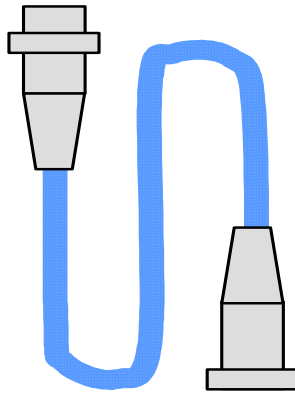
- i. The following 'aqualarm' equipment is available to be connected directly to the 'LeakSense' 2i system:-
- Repeater Panel (RP-1)
 - Beacon & Sounder (B+S-1)
 - Touch Screen system ('aqualarm One Touch')
 - Auto-dialler (SD-1)
 - Automatic Voice Alarm (AVA-1)

Section G cont

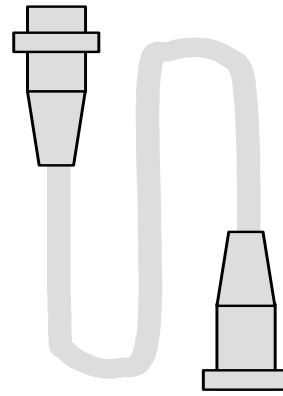
Spares



LS-LC Leader Cable
(Can be cut to Length)



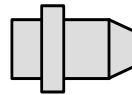
CD-x Detecting Cable
1m, 2m, 5m & 10m



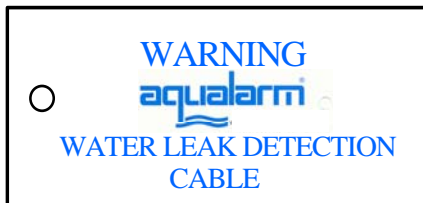
LS-JC Jumper Cable
(Please Specify Length)



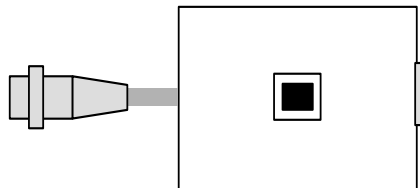
Floor Clip
CL-1/10 Pack of 10
CL-1/100 Pack of 100



EOL-2
End of Line
Resistor



WL-1/10 Pack of 10
WL-1/100 Pack of 100
Warning Labels



LS-MBi
Mapping Box



QMS Quality Management Systems

Registration Certificate

This document certifies that the quality management systems of

J.A.M. LIMITED

have been assessed and approved by QMS Quality Management Systems to the following quality management systems, standards and guidelines:-

BS EN ISO 9001 : 2000

The approved quality management systems apply to the following:-

THE DESIGN, MANUFACTURE, SUPPLY, INSTALLATION AND MAINTENANCE
OF ELECTRONIC ENVIRONMENTAL MONITORING SYSTEMS.

Original Approval: 29 May 1997

Current Certificate: 28 May 2007

Certificate Expiry: 28 May 2017

Certificate Number: GB 1991


On behalf of QMS International plc



This Certificate remains valid while the holder maintains their quality management systems in accordance with the standards and guidelines above, which will be audited by QMS Quality Management Systems
This certificate is the property of QMS International plc and must be returned in the event of cancellation.

A division of
QMS
International plc



QMS Quality Management Systems

Registration Certificate

This document certifies that the environmental management systems of

J.A.M. LIMITED

have been assessed and approved by QMS Quality Management Systems to the following environmental management systems, standards and guidelines:-

BS EN ISO 14001 : 2004

The approved environmental management systems apply to the following:-
**THE DESIGN, MANUFACTURE, SUPPLY, INSTALLATION AND MAINTENANCE
OF ELECTRONIC ENVIRONMENTAL MONITORING SYSTEMS.**

Original Approval: 20 February 2003

Current Certificate: 27 July 2005

Certificate Expiry: 19 February 2013

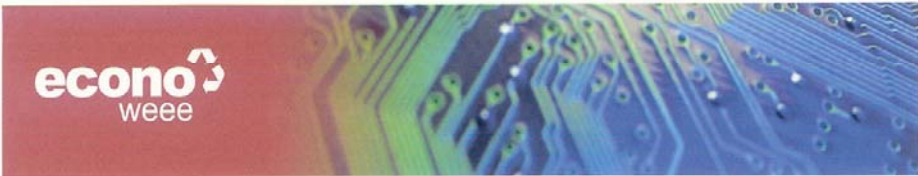
Certificate Number: GB 10787




On behalf of QMS International plc

This Certificate remains valid while the holder maintains environmental management systems in accordance with the standards and guidelines above, which will be audited by QMS Quality Management Systems
This certificate is the property of QMS International plc and must be returned in the event of cancellation.

A division of **QMS**
International plc



**WASTE ELECTRICAL AND ELECTRONIC
EQUIPMENT REGULATIONS 2006**

THIS IS TO CERTIFY THAT

J.A.M. LTD

IS A MEMBER OF THE PRODUCER COMPLIANCE SCHEME

ECONO-WEEE LTD

FOR THE 2008 COMPLIANCE PERIOD

REGISTRATION NUMBER:

WEE/CC0590TQ

A handwritten signature in black ink, appearing to read 'John Kerr', written over a horizontal line.

John Kerr

(Directors)

A handwritten signature in black ink, appearing to read 'David Adams', written over a horizontal line.

David Adams

Econo-Weee Limited is a Compliance Scheme approved by the Environment Agency under the WEEE Regulations (Approval No. WEE/XP3538PP/SCH).

