Abriox

Remote monitoring & control for pipelines

SUNBIRD CUBE

MINI CP MONITOR
Installation Instructions

V1

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1. CONTENTS

1. CONTENTS **Page 2**

2. SAFETY INFORMATION **Page 3**
2.1 General Safety Summary Page 3
2.2 Safety and Electrical Symbols Page 3
2.3 Maximum Input Voltage for Channels 1 and 2 Page 3
2.4 Maximum Input Voltage for Channel 3 Page 3
2.5 Danger of Electric Shock Page 3
2.6 Channel Input Protection Page 3
2.7 Battery Replacement Page 3
2.8 Disclaimer Page 3

3. COMPLIANCE **Page 4**

4. COMPATIBILITY **Page 5**
4.1 Software Compatibility Page 5
4.2 MERLIN Compatibility Page 5

5. INTRODUCTION **Page 6**
5.1 Front View of the SUNBIRD CUBE MINI CP Page 6

6. BEFORE GOING TO SITE **Page 7**
6.1 Check iCPSM4 is Running Page 7
6.2 Check the test post / bond box is suitable prepared Page 7
6.3 Solar Panel Requirements for the Sunbird CUBE MINI CP Page 7
6.4 Equipment Check Page 7

7. ON SITE **Page 8**
7.1 The Install Process Page 8
7.2 House the SUNBIRD CUBE MINI CP Page 8
7.3 Fit GPS and Cellular Antenna Page 8
7.4 Connect the SUNBIRD CUBE MINI CP Page 9
7.4.1 Internal Relay Connections Page 9
7.4.2 Channel 1 Potential Connections Page 9
7.4.3 Channel 2 Potential Connections Page 9
7.4.4 Channel 3 Current Shunt Connections Page 10
7.5 Activate the SUNBIRD CUBE MINI CP Page 10
7.6 Take a Reading with a Multimeter Page 11
7.7 Compare the Readings on iCPSM4 Page 11
7.8 Finish On Site Page 11

8. POST SITE CONFIGURATION **Page 11**

9. INSTALLATION EXAMPLES **Page 12**
9.1 1 Channel Installation (single on potential) Page 12

9.2 2 Channel Installation (Off Potential) with Coupon but no current shunt Page 12

9.3 2 Channel Installation (2 On Potentials) with a Foreign Pipe and 2 Reference Cells Page 13

9.4 2 Channel Installation (2 On Potentials) with a Foreign Pipe and 1 Reference Cell Page 13

9.5 3 Channel Installation with Coupon Page 14
9.6 4 Channel Installation with Native Coupon Page 14

10. DIMENSIONS **Page 15**
10.1 SUNBIRD CUBE MINI CP Dimensions Page 15

11. NOTES **Page 15**

12. APPENDIX A - LED DESCRIPTIONS **Page 16**

13. APPENDIX B - RESET SUNBIRD CUBE MINI CP **Page 17**

14. APPENDIX C - TURN SUNBIRD CUBE MINI CP OFF **Page 17**

2. SAFETY INFORMATION

Please ensure you are familiar with the Electrical Safety Regulations of your company and observe them at all times.

2.1 General Safety Summary

This manual contains information and warnings that must be observed to keep the SUNBIRD CUBE MINI CP Monitor in a safe condition and ensure safe operation. To use the SUNBIRD CUBE MINI CP correctly and safely, read and follow all precautions given. Please ensure you fully understand all instructions throughout this manual that relate to specific measurement functions. In addition, please follow all generally accepted safety practices and procedures required when working with and around electricity.

2.2 Safety and Electrical Symbols

The table below lists safety and electrical symbols that appear on the SUNBIRD CUBE MINI CP and within this document.

Symbol	Description
CAT IV	Installation Category (Overvoltage Category) IV
	Risk of danger. Important information. See Installation Instructions
	Hazardous voltage. Voltage > 30V AC (42.4V peak) or 60V DC might be present

2.3 Maximum Input Voltage for Channels 1 and 2

Channels 1 and 2 of the SUNBIRD CUBE MINI CP have a maximum input voltage of 50V AC (RMS).

2.4 Maximum Input Voltage for Channel 3

Channel 3 of the SUNBIRD CUBE MINI CP provides readings up to 100mV AC and ±100mV DC. The channel itself should not be exposed to voltages greater than ±1V peak. Voltages greater than this will cause the channel input protection to activate which can only protect the SUNBIRD CUBE MINI CP for a limited period of time.

2.5 Danger of Electric Shock

When using the SUNBIRD CUBE MINI CP to monitor voltages greater than 30V AC (42.4V peak), care should be taken as there is a danger of electric shock.

2.6 Channel Input Protection

Channels 1, 2 and 3 have CAT IV surge protection at their rated input voltage ranges.

2.7 Battery Replacement

The battery pack is specific to the product and can be replaced. Please contact Abriox to order replacements.

2.8 Disclaimer

If this equipment is used in a manner not specified by Abriox, the protection provided by the equipment may be impaired. Please ensure you follow all guidance for safe and correct use of your equipment.

3. COMPLIANCE

This product is CE marked which means that Abriox declares that the product or equipment complies with all applicable European Directives. A copy of the Certificate of Conformity can be obtained from Abriox.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.

Do not make any changes or modifications to the equipment unless otherwise specified in the manual. If such changes or modifications should be made, you could be required to stop operation of the equipment.

This product is UKCA marked which means that Abriox declares that the product or equipment complies with all applicable UK Directives. A copy of the Declaration of Conformity can be obtained from Abriox.



This symbol indicates that this product is not to be disposed of with your household waste, according to the WEEE Directive (2002/96/EC) and your national law. This product should be handed over to a designated collection point, e.g., on an authorised one-for-one basis when you buy a new similar product or to an authorised collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, approved WEEE scheme or your household waste disposal service.

4. COMPATIBILITY

4.1 Software compatibility

The SUNBIRD CUBE MINI CP Monitor is only compatible with **iCPSM4**. Earlier versions of the software do not support the features offered by this model.

4.2 MERLIN Compatibility

The SUNBIRD CUBE MINI CP has been designed to make installation easy when replacing previous versions of MERLIN CP Monitors.

Terminal Connections

The **Green Terminal Block** on the SUNBIRD CUBE MINI CP is backwards compatible with all previous versions of MERLIN CP monitors (2G, 3G & 4G versions). Simply unplug the green terminal block from the existing MERLIN monitor and plug the green terminal block into the new SUNBIRD CUBE MINI CP monitor. There is no need to rewire.

GPS Antenna

GPS antennas from previous versions of MERLIN CP monitors (2G, 3G & 4G versions) are fully compatible with SUNBIRD CUBE MINI CP. Simply unplug the GPS antenna from the existing MERLIN monitor and plug the GPS antenna into the new SUNBIRD monitor. There is no need to replace.

Cellular Antenna

Cellular antennas from previous versions of MERLIN CP monitors (2G, 3G & 4G versions) are unlikely to be compatible with SUNBIRD CUBE MINI CP and will require replacing with the correct type to cater for 5G connectivity.

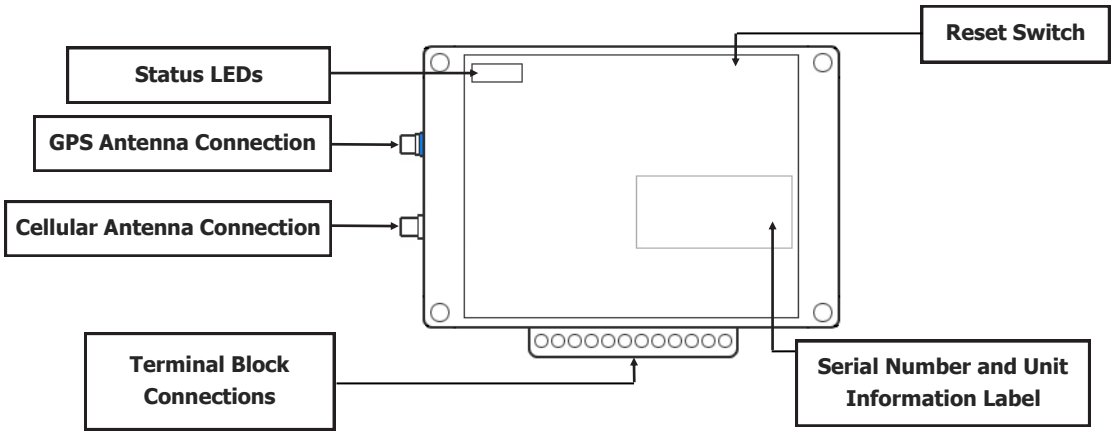
5. INTRODUCTION

The SUNBIRD CUBE MINI CP is a small, compact Remote Monitoring Unit (RMU) housed within the test post that collects Cathodic Protection (CP) data.

SUNBIRD CUBE MINI CP checks the measurements against specified alert criteria and reports immediately if an alarm threshold is exceeded. SUNBIRD CUBE MINI CP can be deployed anywhere on the pipeline network where it is important to record ON/OFF pipe-to-soil potentials, native coupon potentials, bond monitoring or interfering currents. Alternatively, it may simply be that certain measurement points on the pipeline create risks to CP technicians, such as at busy road or rail crossings, or are difficult to access, such as on private land.

All data is automatically transmitted in a management report to the system HQ (using the cellular/mobile network) where it is accessed online using Abriox's iCPSM4 software.

5.1 Front View of the SUNBIRD CUBE MINI CP



6. BEFORE GOING TO SITE

6.1 Check iCPSM4 is Running

Please ensure you have a running iCSPM4 system and you can log in (as detailed on your iCPSM Licence Certificate).

Note

It is vital the iCPSM4 system is running prior to going to site otherwise the installation will fail.

6.2 Check the Test Post / Bond Box is Suitably Prepared

Check the test post / bond box to be monitored has a permanent reference cell and a coupon (if required).

6.3 Solar Panel Requirements for the SUNBIRD CUBE MINI CP

A standard 12V, 5W solar panel is suitable to supply the unit (the unit can accept a supply range of 6V to 30V). The solar panel must be turned towards the terrestrial equator (facing south in the northern hemisphere) so that during the day its orientation allows the panel to catch the greatest amount of solar radiation possible.

6.4 Equipment Check

Item	Description
Current Shunt	An appropriate current shunt for the coupon current (if this is to be monitored). 20A 200mV is recommended for 1cm coupons or 200mA 200mV for 25cm coupons. However, the choice of shunt will depend on the current to be measured and taking some alternative value shunts is always recommended. SUNBIRD CUBE MINI CP has an input range of 0 to 100mV AC and ±100mV DC on its current shunt input.
Magnet	A strong magnet to activate the SUNBIRD CUBE MINI CP on site
Tool Kit	Tool kit for the installation on site
Consumables	Rigid solid core or flexible 0.2mm² to 2.5mm² (AWG 24-12) wire
Documents	Installation instructions (this document), Quick Start Guide
Multimeter	Multimeter to check the voltage and current readings on site
Cell/Mobile Phone/ Internet Enabled Tablet/Laptop	Used for checking the readings in iCPSM4 taken by the SUNBIRD CUBE MINI CP on site.
Accessories	External antennas, lightning arrestors, MERLIN Interrupter or mercury relay, surge filter†

Make sure you have the following equipment prior to going to site.

7. ON SITE

Please ensure you are familiar with the Electrical Safety Regulations of your company and observe them at all times.

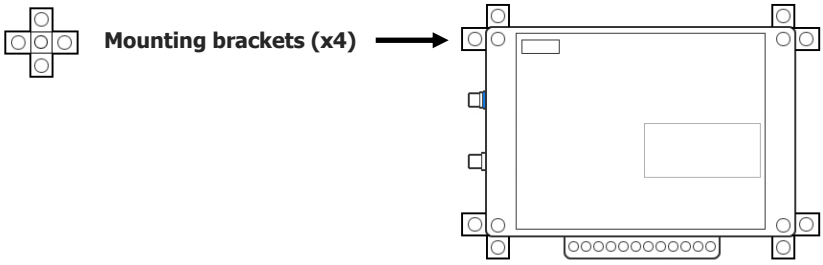
7.1 The Install Process

1. Unscrew and remove the face plate from the test post
2. House the SUNBIRD CUBE MINI CP (see section 7.2)
3. Fit GPS and Cellular antennas (see section 7.4)
4. Connect the SUNBIRD CUBE MINI CP (see section 7.5)
5. Fit any additional accessories (see section 7.6)
6. Activate the SUNBIRD CUBE MINI CP (see section 7.7)
7. Take a reading with a multimeter (see section 7.8)
8. Compare the readings on iCPSM4 (see section 7.9)
9. Finish on site (see section 7.10)
10. Post site configuration (see section 8)

7.2 House the SUNBIRD CUBE MINI CP

The SUNBIRD CUBE MINI CP is designed for installation inside a M28 concrete or plastic post and should ideally be located at the top of the post in order to get the best cellular and GPS reception.

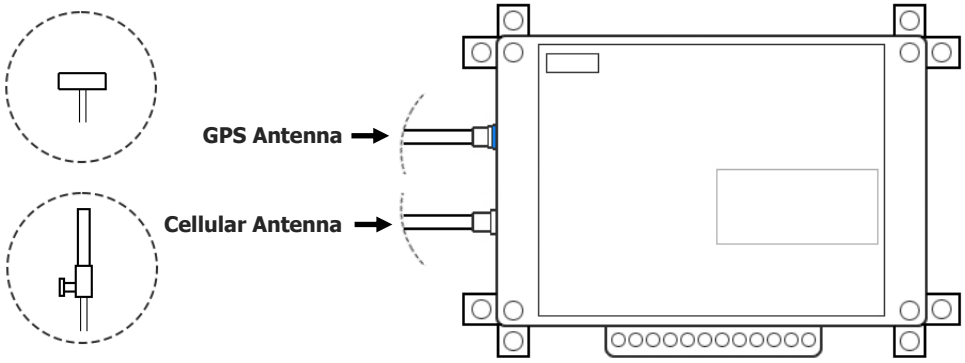
To mount the SUNBIRD CUBE MINI CP to a plastic test post, use the supplied brackets and fix in place using No.6/3.5mm screws.



7.3 Fit GPS and Cellular Antennas

When fitting the external antennas, ensure they are **mounted outside any metal enclosures** and ideally as high up as possible in order to gain the best signal. The external GPS antenna requires a clear view of the sky and needs to be installed in a horizontal position.

Connect both the GPS and Cellular antennas as shown (GPS is colour coded blue).



Note

When installing cellular and GPS antennas, please fit them as far apart as possible.

7.4 Connect the SUNBIRD CUBE MINI CP

The SUNBIRD CUBE MINI CP has up to 12 connections, labelled A to L and are briefly described on the front label of the SUNBIRD CUBE MINI CP.

The connections correspond with the labelled terminal block and are explained in greater detail in the following sections. See section 9 for installation examples.

For wiring we recommend rigid solid core or flexible 0.2mm² to 2.5mm² (AWG 24-12).

Wire up the terminal block as follows (functions are model dependant):

Terminal	Description	Function
A	-	Solar Panel
B	+	
C	NC	No Connection (Not used, leave unconnected)
D	NC	
E	Relay Connection A	Internal Relay
F	Relay Connection B	
G	Channel 1 –ve	Potential Measurement
H	Channel 2 +ve	
I	Channel 2 –ve	Potential Measurement
J	Channel 2 +ve	
K	Channel 3 –ve	Shunt Measurement (in millivolts, for current measurement across shunt)
L	Channel 3 +ve	

Where channels are not used, connect together. Connections are explained in greater detail in the following sections.

7.4.1 Internal Relay Connections

These are the connections to the internal relay contacts of the SUNBIRD CUBE MINI CP. The relay contacts are rated at a maximum 1A at 30V DC. The contacts are normally closed but open 100ms before an OFF Potential measurement is taken. After a measurement is taken (another 100ms), the contacts are closed. These connections are intended to be used so that an instant OFF measurement can be taken at the coupon.

Note
If a coupon is not being used, these connections can be left unconnected.

7.4.2 Channel 1 Potential Connections

Connect the –ve to the reference cell. Connect the +ve to the pipe.

Note
If channel 1 is not required, link both wires together.

7.4.3 Channel 2 Potential Connections

Connect the –ve to the reference cell. Connect the +ve to the pipe.

On a 2 channel installation, channel 2 is intended to be connected to the coupon (and reference cell) via the SUNBIRD CUBE MINI CP's internal relay. This allows an instant OFF measurement to be taken at the coupon.

Alternatively channel 2 can be used to monitor:

- A foreign pipe
- The other side of an isolation joint

- A sleeve
- Another metal structure

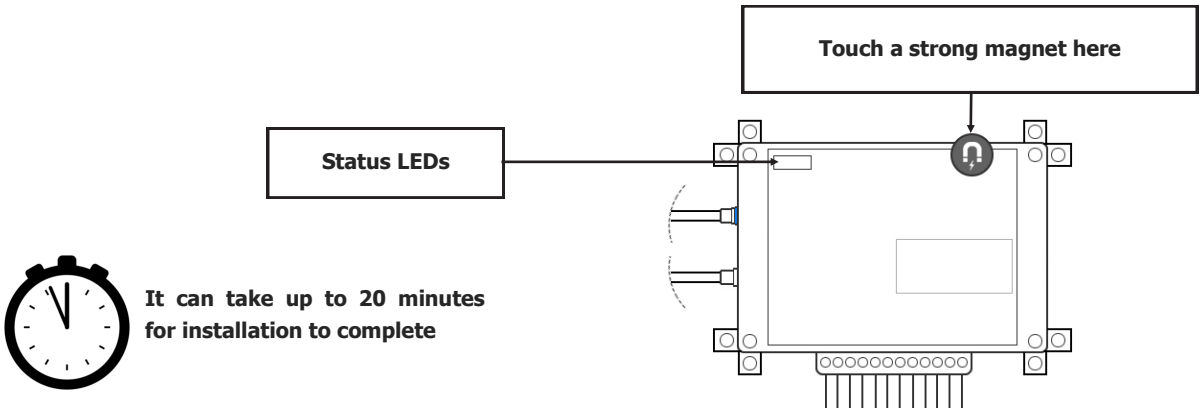
7.4.4 Channel 3 Current Shunt Connections

The SUNBIRD CUBE MINI CP current shunt input channel can read 0 to ±100mV. The shunt can be used to measure the bond current, anode current or coupon current.

Note
If channel 3 is not required, link both wires together.

7.5 Activate the SUNBIRD CUBE MINI CP

Activate the SUNBIRD CUBE MINI CP by touching a strong magnet on top of the Reset switch where indicated on the label, all 3 LEDs (Green, Amber and Red) will illuminate whilst the magnet is held in place.



During Installation

LED Colour	Sequence	Description
	All LEDs Illuminated	Magnet is present on Reset Switch
	Amber/Green Alternating	Connecting to the network and installing

During Normal Operation

	1 flash every 2 seconds	Everything is OK

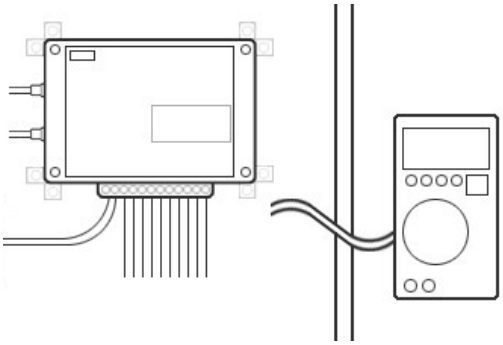
Once the LEDs have illuminated, remove the magnet to start the installation process.

The Status LEDs on the SUNBIRD CUBE MINI CP will flash to indicate the installation status. The LEDs will flash between Amber and Green to show communications/installation is taking place. Once the unit is flashing green (1 green flash every 2 seconds), communications have been established and installation has been completed.

Note
The Status LED can indicate various statuses, please refer to Appendix A for further information on the LED Status.

7.6 Take a Reading with a Multimeter

Take a reading of the input levels to the SUNBIRD CUBE MINI CP, we recommend taking the measurements at the terminal screws on the SUNBIRD itself. If the shunt input is over-range then the reading will clip at maximum i.e. 150.00mV. Change the shunt if necessary. The values can be compared against the iCPSM4 readings as described in section 7.8.



7.7 Compare the Readings on iCPSM4

To check the measurements taken by the SUNBIRD CUBE MINI CP, open iCPSM4 via a browser on your phone/tablet/laptop etc.

Once you are logged in, click on "New Installations" from the menu on the left and locate your unit by matching the serial number on the front of the unit. Check the reading values match those given by the multimeter.

If any other readings are inconsistent with the multimeter check the wiring and the condition of the reference cell.

7.8 Finish On Site

The SUNBIRD CUBE MINI CP is now installed and you can secure the test post.

8. POST SITE CONFIGURATION

Once installed you will need to assign the SUNBIRD CUBE MINI CP to a Pipeline and Location, you will also need to configure the following: **Shunt Values** and **Alarm Thresholds** (specify the high and low values that trigger an alarm).

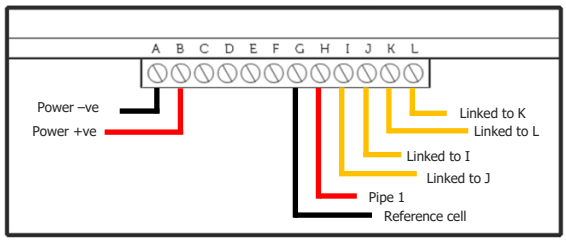
Go to **www.icpsm.com** in your chosen browser and log in with your Abriox issued Username and Password.

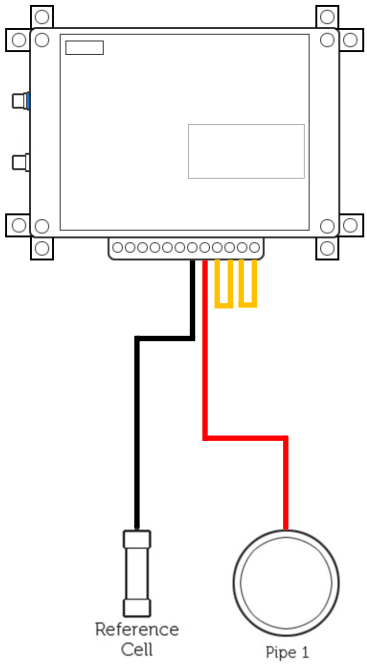
Further configuration and operational features can be carried out directly via the software.

9. INSTALLATION EXAMPLES

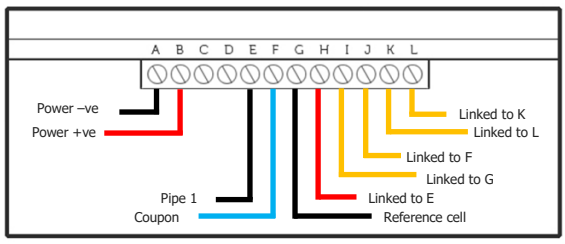
The following examples are shown only as a guide.

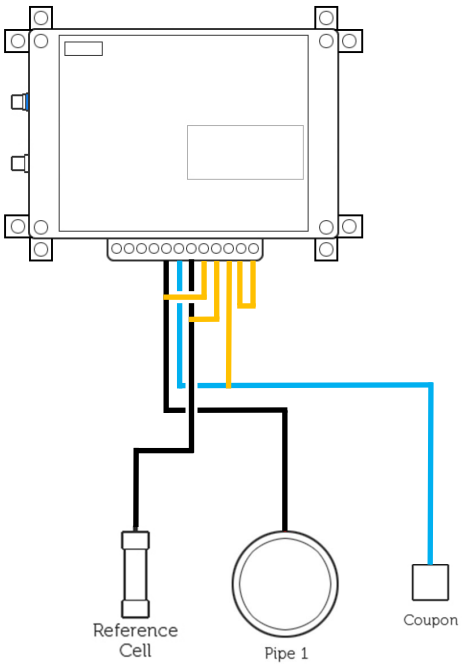
9.1 1 Channel Installation (Single ON Potential)



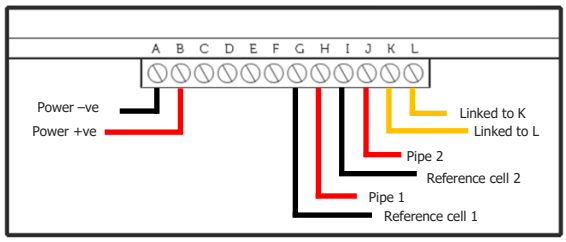


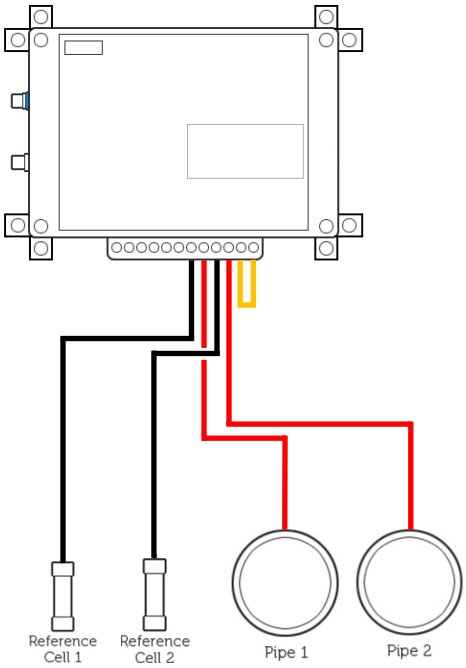
9.2 2 Channel Installation (OFF Potential) - with Coupon but no Current Shunt



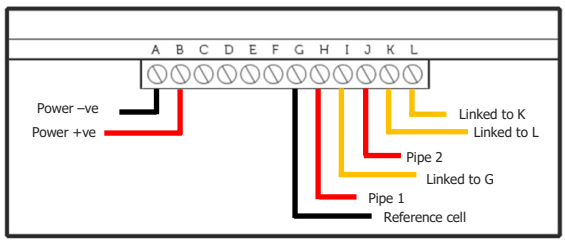


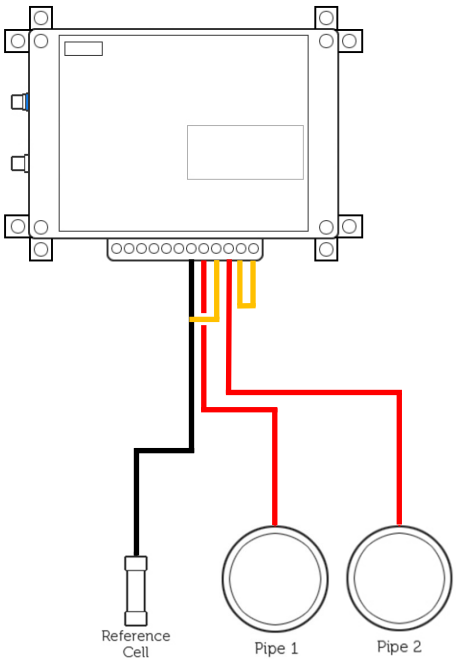
9.3 2 Channel Installation (2 ON Potentials) - with a Foreign Pipe and 2 Reference Cells



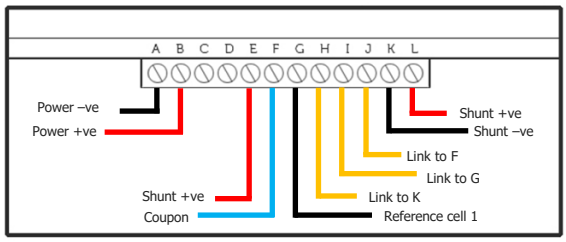


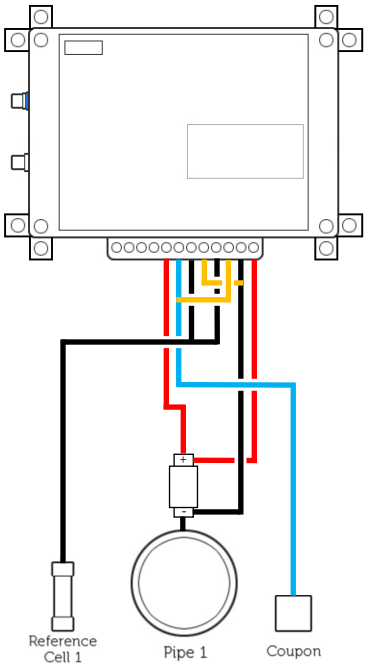
9.4 2 Channel Installation (2 ON Potentials) - with a Foreign Pipe and 1 Reference Cell



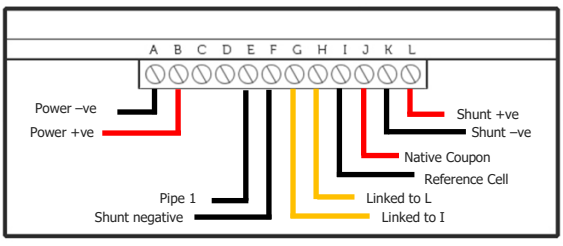


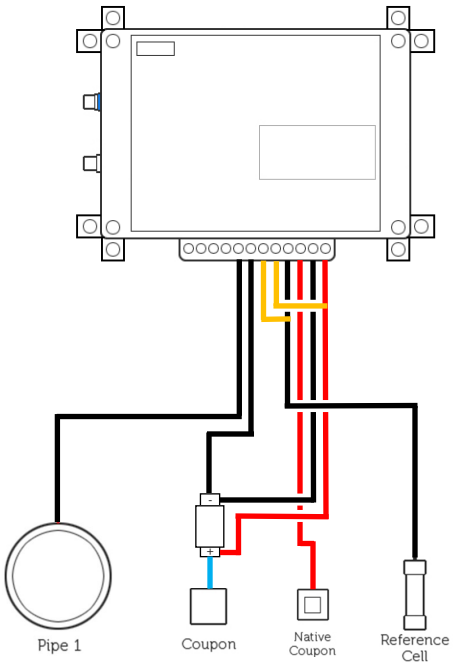
9.5 3 Channel Installation with Coupon





9.6 4 Channel Installation with Native Coupon

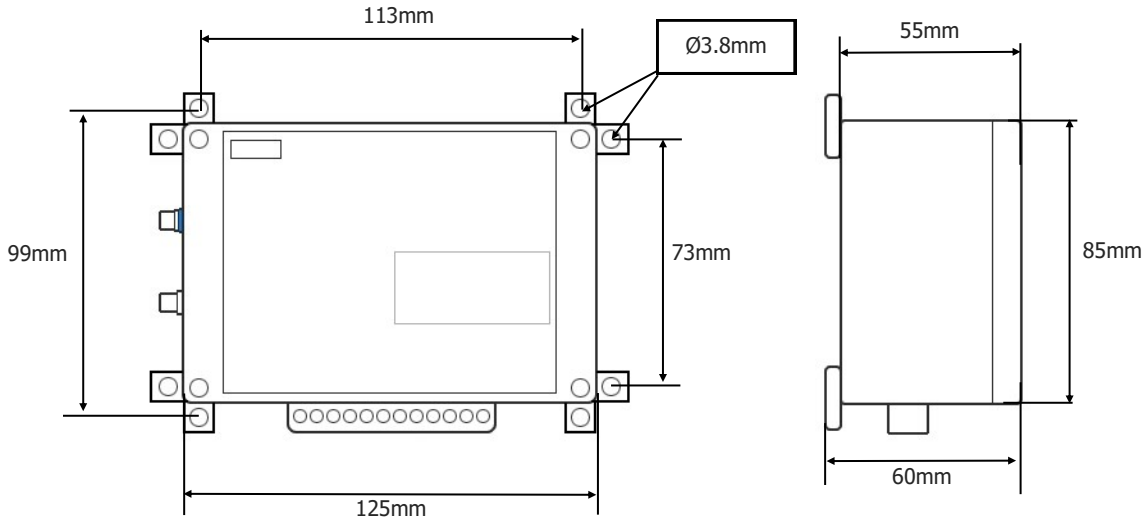




10. DIMENSIONS

10.1 SUNBIRD CUBE MINI CP Dimensions

Use No.6/3.5mm screws for mounting using supplied brackets.



11. NOTES

Use this space to write your own notes, tips and cheats to aid future installations (extra space for creating notes is available on page 24).

12. APPENDIX A - LED DESCRIPTIONS

The Status LEDs on the SUNBIRD CUBE MINI CP describe the current status and can indicate any problems.



Red LED



Amber LED



Green LED

During Installation

LED Colour	Sequence	Description
	All LEDs Illuminated	Magnet is present on Reset Switch
	Amber/Green Alternating	Connecting to the network and installing

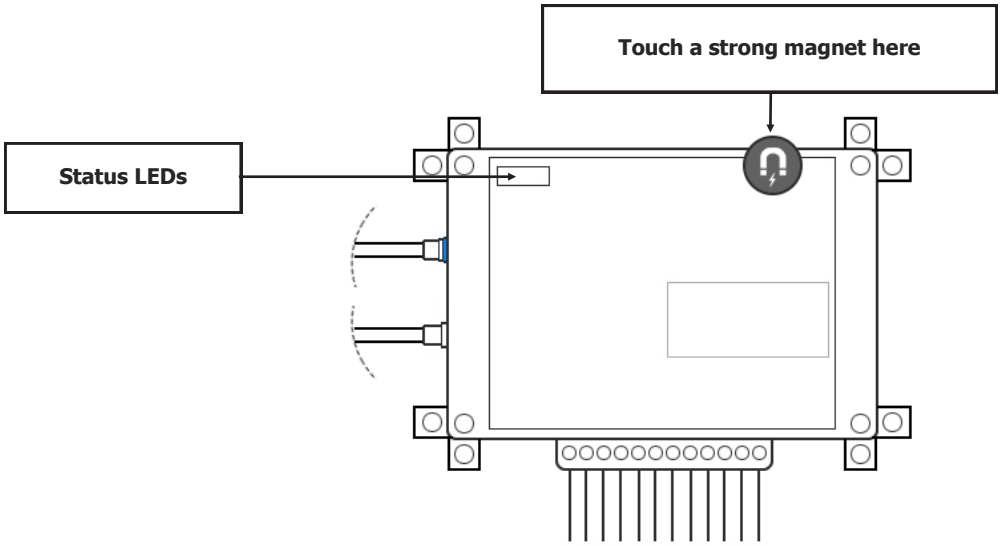
During Normal Operation

	1 flash every 2 seconds	Everything is OK
	2 flashes every 2 seconds	Temporary loss of cellular communications
	3 flashes every 2 seconds	Temporary loss of GPS communications
	1 flash every 2 seconds	Low battery or battery not connected
	2 flashes every 2 seconds	Low battery and temporary loss of cellular communications
	3 flashes every 2 seconds	Low battery and temporary loss of GPS communications
	4 flashes every 2 seconds	No SIM/SIM error
	5 flashes every 2 seconds	Installation failure (continuous AMBER LED flashing)
	1 flash every 2 seconds	Invalid configuration (serial number, apn, server, etc.). Contact Abriox
	2 flashes every 2 seconds	Other fault (e.g. no modem comms, no GPS comms). Contact Abriox

13. APPENDIX B - RESET THE SUNBIRD CUBE MINI CP

To reset the SUNBIRD CUBE MINI CP, touch a strong magnet on top of the Reset switch where indicated on the label, all 3 LEDs (Green, Amber and Red) will illuminate whilst the magnet is held in place.

Once the LEDs have illuminated, remove the magnet to start the installation process.



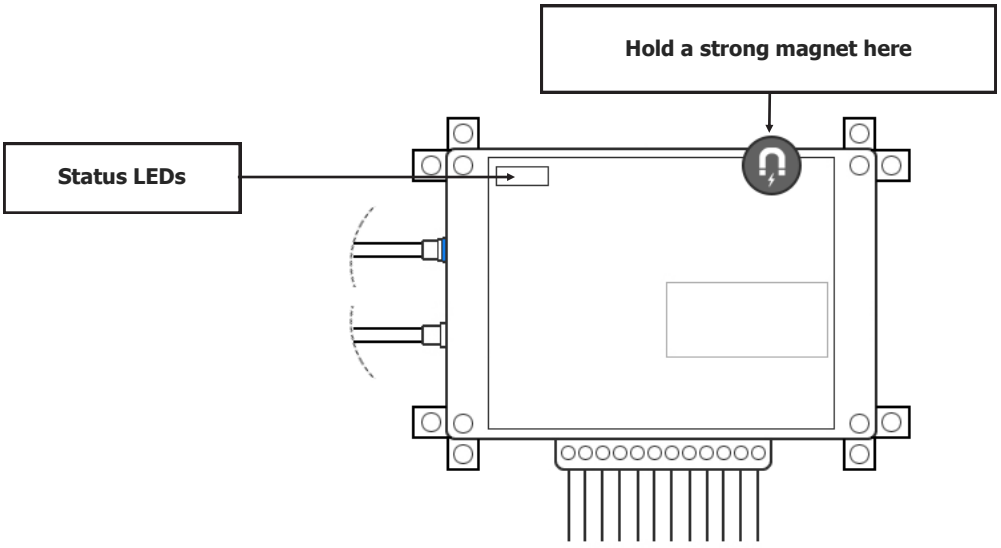
The Status LEDs on the SUNBIRD CUBE MINI CP will flash to indicate the installation status. The LEDs will flash between Amber and Green to show communications/installation is taking place (see Appendix C for further information on LED status).

Once the unit is flashing green (1 green flash every 2 seconds), communications have been established and installation has been completed.

14. APPENDIX C - TURN THE SUNBIRD CUBE MINI CP OFF

To turn the SUNBIRD CUBE MINI CP off completely, hold a strong magnet on top of the Reset switch where indicated on the label, all 3 LEDs (Green, Amber and Red) will illuminate whilst the magnet is held in place.

After 3 seconds the LEDs extinguish GREEN first, then AMBER then RED last and the unit fully switches off. The magnet can then be removed.



Abriox

Remote monitoring & control for pipelines

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