

MERLIN XT

Transformer Rectifier Monitor
Installation Instructions

V15

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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 MERLIN XT Transformer Rectifier Monitor (hereafter referred to as MERLIN XT) in a safe condition and ensure safe operation. To use the MERLIN XT 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 practises 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 MERLIN XT and within this document.

Symbol	Description
CAT III	Installation Category (Overvoltage Category) III
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
	Double insulated
	Earth ground

2.3 Maximum Input Voltage for ON/OFF Potential Channel

The ON/OFF Potential channel of the MERLIN XT is intended to measure ±4V. It can handle a maximum input voltage of 70V AC (RMS) and 70V DC without damage.

2.4 Maximum Input Voltage for TR Volts Channel

The TR Volts channel of the MERLIN XT has a maximum input voltage of 150V AC and 150V DC. The MERLIN XT has protection against high voltage transients built in, but there is a limit to the amount of energy it can dissipate.

An external high energy voltage clamp rated up to 150V AC or 200V DC maximum is recommended to ensure the rectifier is protected and the MERLIN XT internal protection is not overloaded. This is especially important in areas prone to lightning strikes.

2.5 Maximum Input Voltage for TR Shunt Channel

The TR Shunt channel of the MERLIN XT provides readings up to 100mV AC and ±100mV DC. The channel itself should not be exposed to voltages greater than ±4V peak. Voltages greater than this will cause the channel input protection to activate which can only protect the MERLIN XT for a limited period of time.

2.6 Danger of Electric Shock

When using the MERLIN XT on rectifiers with an output greater than 30V AC (42.4V peak) or 60V DC, care should be taken as there is a danger of electric shock.

2.7 Channel Input Protection

Channels 1 and 3 have CAT IV surge protection at their rated input voltage ranges. Channel 2 has CAT III surge protection at its rated input voltage range.

2.8 Battery Replacement

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

2.9 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 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. SOFTWARE COMPATIBILITY

MERLIN XT Excel and **Dual Current** models require **CPSM V3.09** or **newer**. Earlier versions of the software are not compatible and do not support the features offered by these models.

MERLIN XT 6 models require i**CPSM V4.00** or **newer**. Earlier versions of the software are not compatible and do not support the features offered by these models.

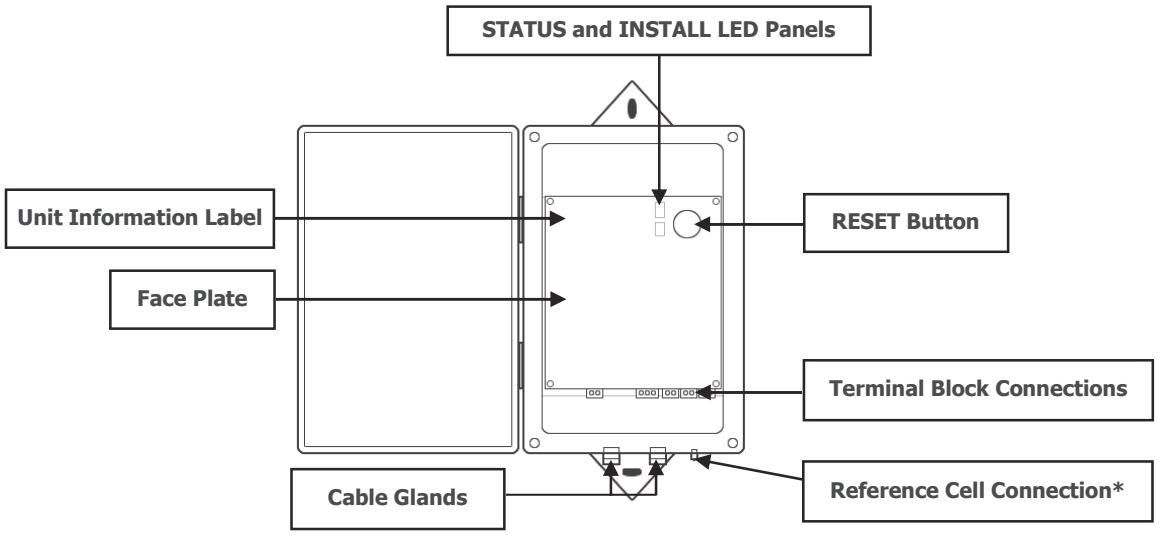
5. INTRODUCTION

MERLIN XT is a compact, durable field unit that monitors the operation of a rectifier or solar station. It carries out the functional checks of the output (voltage and current measurements) that are required in order to comply with regulatory guidelines.

All data is automatically transmitted in a management report to the system HQ (using the Iridium satellite network) where it is accessed online using Abriox's iCPSM software, or at a PC using CPSM software.

MERLIN XT will report immediately if an output alarm threshold is exceeded and will also check that the rectifier remains powered by its external electrical supply. If the power fails, an alarm is transmitted and the MERLIN XT's internal batteries take over monitoring.

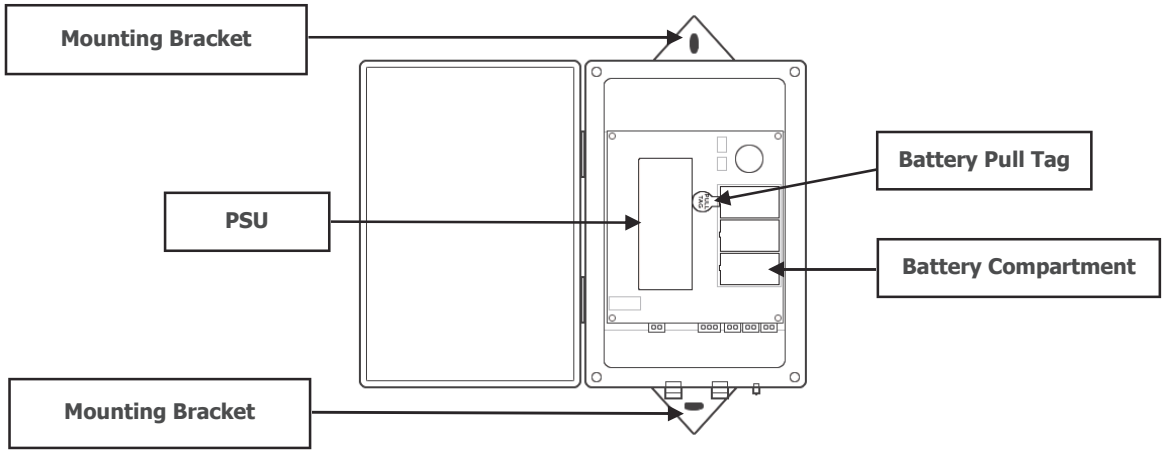
5.1 View of the MERLIN XT



Note

*Reference cell connection is not offered on **Dual Current** models. Contact Abriox for further information on the available options.

5.2 View of the MERLIN XT (Face Plate Removed)



Note

The **Battery Pull Tag** is fitted during manufacturing and shipping and should remain in place until the unit is installed on site.

6. BEFORE GOING TO SITE

6.1 Check the HQ(s)

iCPSM users, please ensure you have received your Licence Certificate which details your Username and Password.

For standalone **CPSM** users, the CPSM software must be installed and running in order to receive messages from the MERLIN XT.

6.2 Power Requirements for the Power Supply Unit

The **Power Supply Unit** (PSU) that comes with the MERLIN XT should be powered from the AC supply to the rectifier (this enables the MERLIN XT to report an AC outage). Make sure beforehand that there is suitable power available so that you can plug or wire the PSU in easily on site.

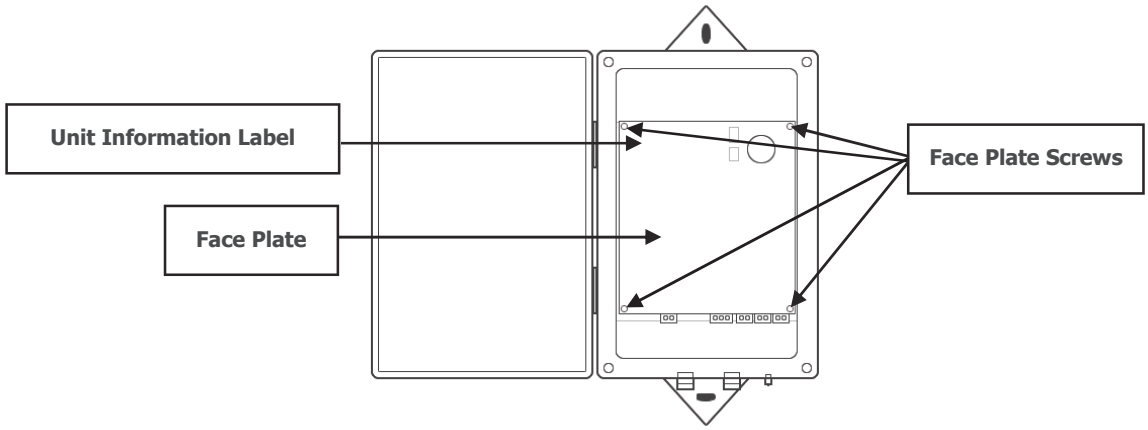
The AC supply input is 100-240V AC, 50/60Hz (0.56A). Abriox recommend that a 3A fused switch or circuit-breaker is used, in close proximity, easily reached and marked as the disconnecting device for the MERLIN XT.

The MERLIN XT can also be powered via an external DC supply. See section 7.3.2 for further information.

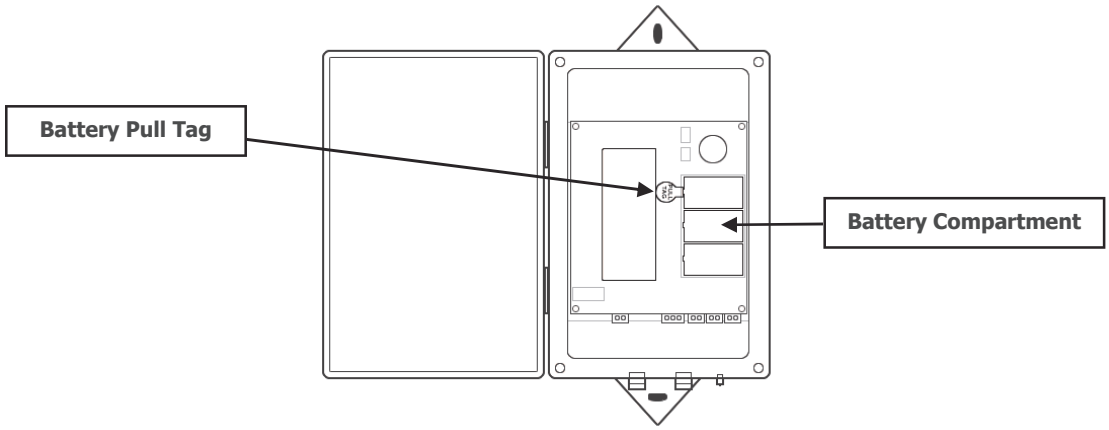
6.3 Check the MERLIN XT

Make a note of the IMEI number and Serial Number printed on the **Unit Information** label located on the face plate, this is required post installation to configure the MERLIN XT in the iCPSM/CPSM software.

Check that MERLIN XT has batteries fitted prior to installation on site. Remove the face plate by unscrewing the 4 screws as indicated below.



Check the batteries are installed but leave the yellow **Battery Pull Tag** in place until ready for installation on site.



Note

The **Battery Pull Tag** is fitted during manufacturing and shipping and should remain in place until the unit is installed on site.

6.4 Equipment Check

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

Item	Description
Current Shunt	An appropriate* current shunt for the output of the rectifier. 20A 200mV or 50A 50mV is recommended.
Tool Kit	Tool kit for the installation on site
Consumables	Rigid solid core or flexible 0.2mm² to 2.5mm² (AWG 24-12) wire Ring terminations Suitable two core AC supply cable for powering the MERLIN XT PSU
Documents	Installation Instructions (this document), Quick Start Guide (optional)
Multimeter	Multimeter to check the voltage and current readings on site (recommended)
Accessories	Lightning arrestors, MERLIN Interrupter, SSR or mercury relay, surge filter† (where applicable)

Note

*The shunt needs to be able to handle the full output of the rectifier (and lightning strikes) whilst also bearing in mind the MERLIN XT has an input range of 0 to ±100mV on its TR Shunt channel.

†The surge filter is only applicable for MERLIN XT Excel with MERLIN Interrupter or SSR installation's where the Pipeline Locate feature is required.

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

This install process is offered as a guide only.

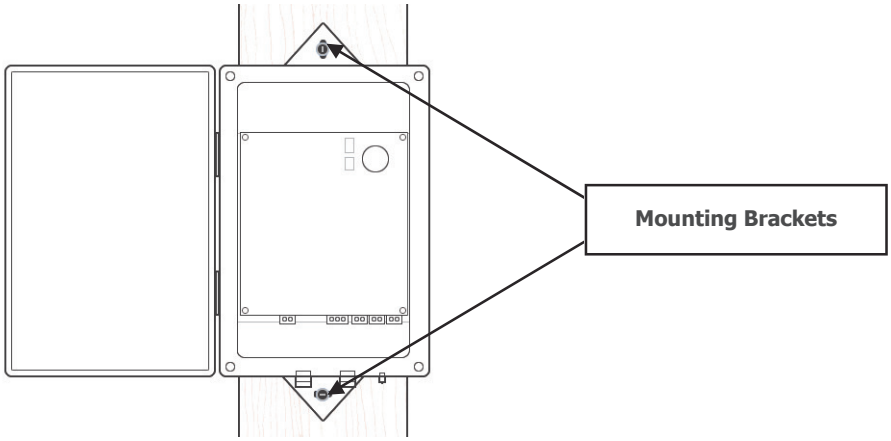
1. **Open the rectifier cabinet and ensure that the AC supply to the rectifier is isolated**
2. **Mount the MERLIN XT (see section 7.2)**
3. **Connecting the MERLIN XT (see sections 7.3 and 7.4)**
4. **Fit any accessories (see section 7.5)**
5. **Apply power (see section 7.6)**
6. **Activate/reset the MERLIN XT (see section 7.7)**
7. **Installation Mode (see section 7.8)**
8. **Normal Mode (see section 7.9)**
9. **Record the input levels (see section 7.10)**
10. **Finish on site (see section 7.11)**

7.2 Mount the MERLIN XT

See section 10 for the MERLIN XT dimensions.

Locate a suitable position for the MERLIN XT and any accessories to be installed (such as lightning arrestors, MERLIN Interrupter/SSR/mercury relay and/or surge filters).

The MERLIN XT is supplied with brackets that allow it to be mounted to a panel, wall or post.



The MERLIN XT requires a clear view of the sky and requires being mounted outside any metal enclosures. Ideally the unit should be mounted as high up as possible in order to gain optimum communications.

IMPORTANT

Mounting position is critical - Section 13 (Appendix B) shows recommended mounting methods for best communications.

Foliage and buildings can affect the satellite signal so be sure to mount/install the unit far from any obstructions, see Section 14 (Appendix C) for further details.

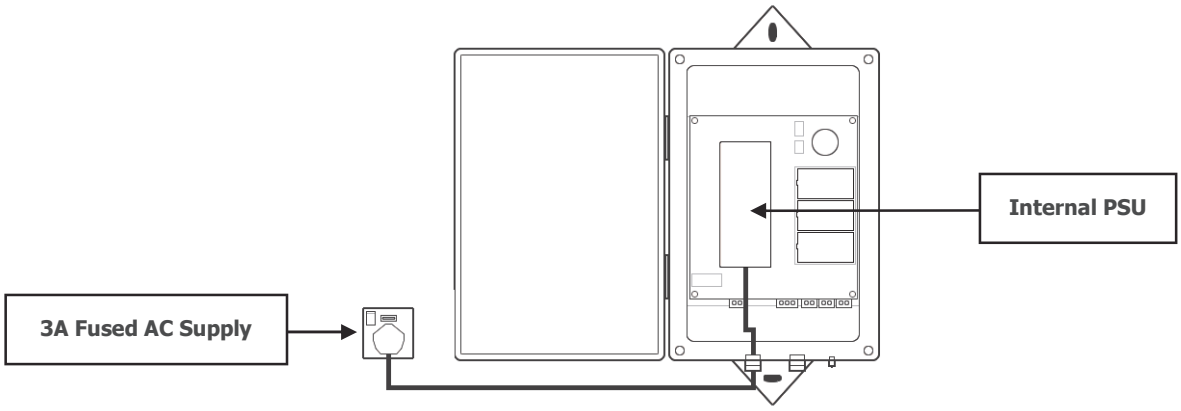
7.3 Power the MERLIN XT

The MERLIN XT can be powered using the internal PSU or via an external 12V DC supply. Ideally, the MERLIN XT should be powered from the AC supply to the rectifier (this enables the MERLIN XT to report an AC outage).

7.3.1 Using the Internal PSU

The AC supply input is 100-240V AC, 50/60Hz (0.56A). Connect the negative wire from the AC supply to Terminal N (AC Negative) and the positive wire to Terminal L (AC Live) on the internal PSU.

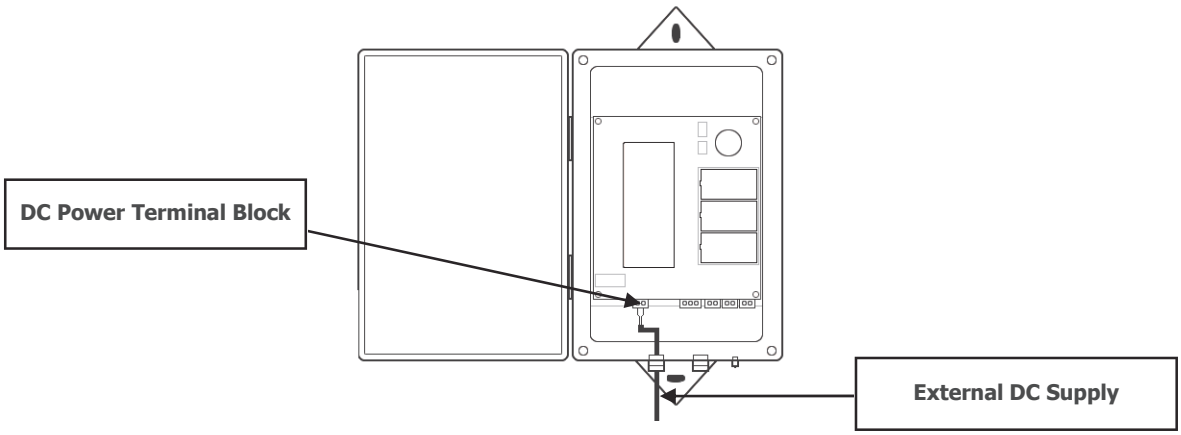
Abriox recommend that a 3A fused switch or circuit-breaker is used, in close proximity, easily reached and marked as the disconnecting device for the MERLIN XT.



7.3.2 Using an External DC Supply

The nominal DC supply input is 12V DC (11 to 15V DC).

Connect the negative wire from the external DC supply to - (DC Negative) and the positive wire to + (DC Positive) on the DC Power Terminal Block as shown below.



Alternatively an 18 to 32V DC voltage supply can be utilised in conjunction with a DC-DC convertor. This allows solar panels and other similar equipment to power the MERLIN XT. Please contact Abriox for further information on the available accessories.

Note
Do not connect the internal PSU to the AC supply if powering the MERLIN XT from a DC supply.

7.4 MERLIN XT Channel Connections

The MERLIN XT has 9 connections that are briefly described on the unit face plate. The connections correspond with the labelled terminal block and are explained in greater detail in the following sections. For wiring we recommend rigid solid core or flexible 0.2mm² to 2.5mm² (AWG 24-12). See section 9 for installation examples.

7.4.1 Relay Control

If a MERLIN Interrupter or mercury relay are not being installed these connections should all be left unconnected. See section 7.5.1 for further information.

7.4.2 ON/OFF Potential (Model Dependant)

Connect the **negative terminal (–ve)** to the **reference cell**, connect **positive terminal (+ve)** to the **pipe**, ideally via a test wire connected directly to the pipe (this will allow IR free ON potential reads). If this is not available connect to the pipe side of the MERLIN Interrupter or mercury relay.

- **- Terminal = ON/OFF Potential –ve**
- **+ Terminal = ON/OFF Potential +ve**

The connection must be made on the pipe side of the relay to allow OFF potential reads to be taken. If there is no reference cell, or pipe potentials are not required, link terminals -ve to +ve.

Note

The pipe will be connected to the –ve output of the rectifier. MERLIN XT's ON/OFF Potential +ve is connected to the pipe (and therefore the -ve output of the rectifier). This means MERLIN XT will read conventionally i.e. a negative ON potential.

7.4.3 TR Volts Connections

Connect to the **positive** and **negative rectifier output terminals**.

- **- Terminal = TR Volts –ve**
- **+ Terminal = TR Volts +ve**

7.4.4 TR Shunt 1 / 2* (Model Dependant)

If no shunt is present one will need to be installed. The shunt can be installed on either output of the rectifier. The correct shunt needs to be selected to handle the maximum output of the rectifier and lightning surges, whilst providing the best resolution for the current reading. We recommend a shunt with a rating at least double that of the rectifier e.g. 20A 200mV on a 10A rectifier, and by default a 50A 50mV shunt if the rectifier output is greater than 10A.

The TR Shunt channel can read 0 to ±100mV. If there is no current shunt then link -ve to +ve.

- **- Terminal = TR Shunt –ve**
- **+ Terminal = TR Shunt +ve**

If a MERLIN Interrupter is being installed this has an internal shunt:

- **- Terminal (–ve) can be connected to MERLIN Interrupter Terminal K**
- **+ Terminal (+ve) can be connected to MERLIN Interrupter Terminal L**

Otherwise if the rectifier has an accessible shunt then connect to this.

Note

*The TR Shunt 2 channel is only available on MERLIN XT Super and Excel **Dual Current** models.

7.5 Fit Any Accessories

The following sections provide a brief overview for installing any accessories.

7.5.1 MERLIN Interrupter, Mercury Relay or SSR

As detailed in sections 7.4.1 and 7.4.4, if a **MERLIN Interrupter** is being installed please refer to the MERLIN Interrupter Installation Instructions, however:

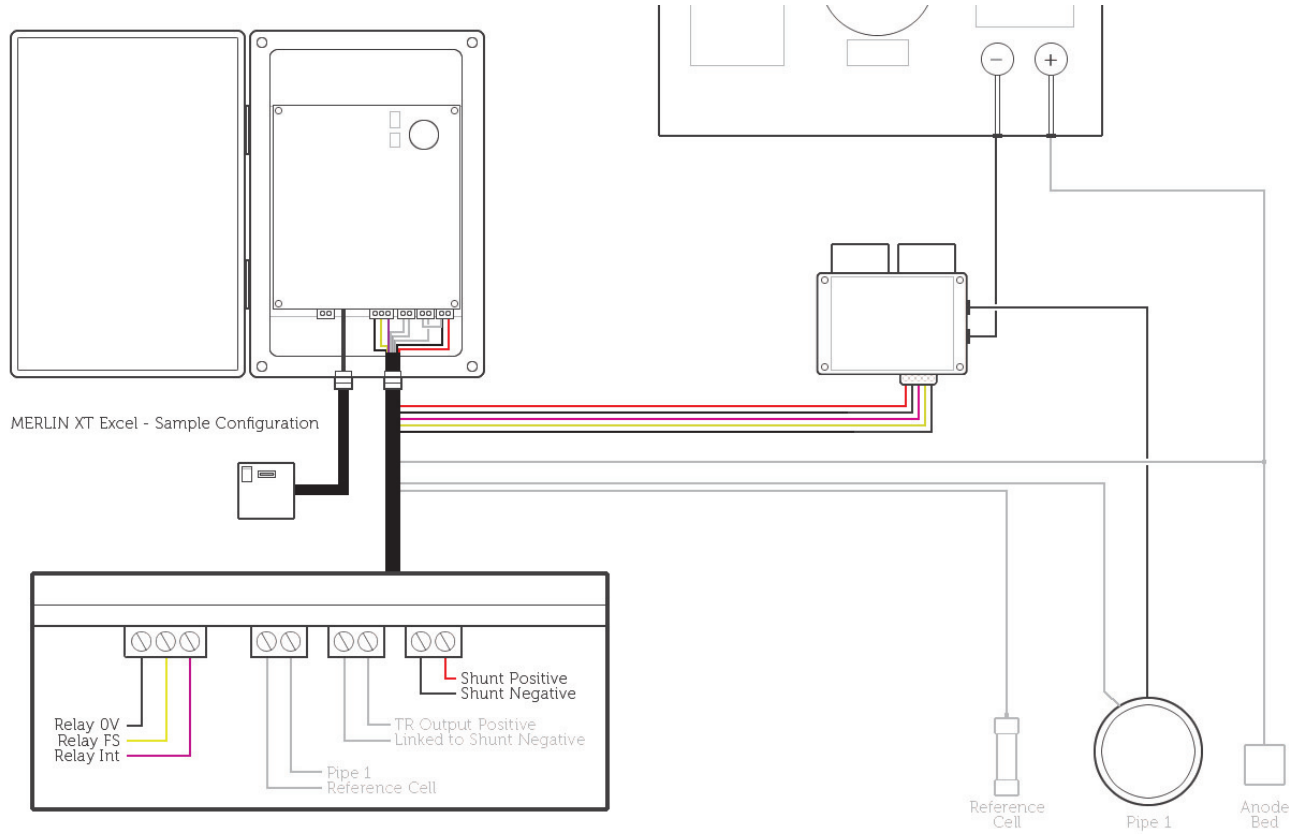
Relay Control Terminals

- **0V Terminal should be connected to MERLIN Interrupter Terminal C**
- **FS Terminal should be connected to MERLIN Interrupter Terminal D**
- **INT Terminal should be connected to MERLIN Interrupter Terminal E**

TR Shunt Terminals

- **- Terminal (TR Shunt -ve) should be connected to MERLIN Interrupter Terminal K**
- **+ Terminal (TR Shunt +ve) should be connected to MERLIN Interrupter Terminal L**

If a **mercury relay** is used, connect the drive connections for the mercury relay to **0V** and **INT**.



Note

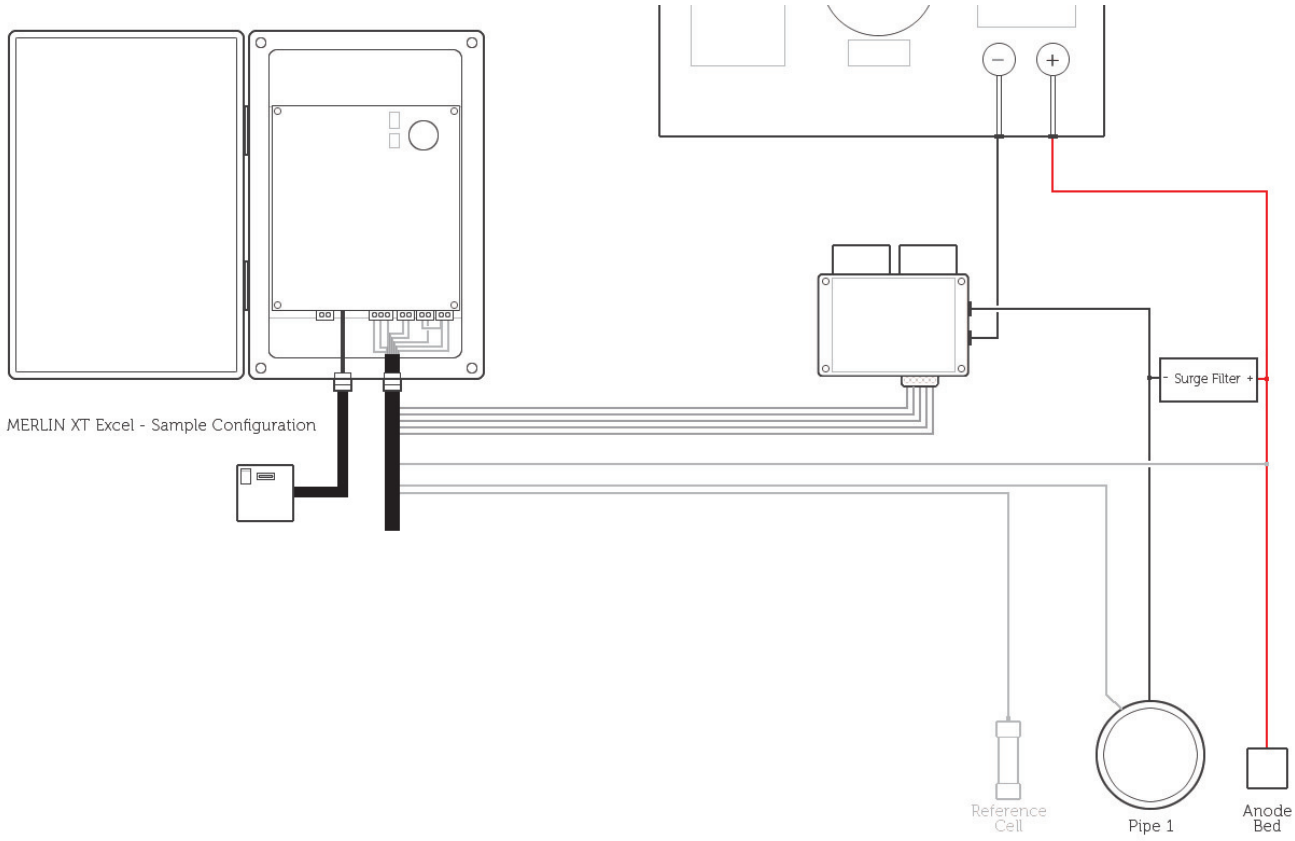
The MERLIN Interrupter has a rating of IP40 (NEMA 1) and needs to be housed within a suitable weatherproof enclosure. Please refer to the MERLIN Interrupter Installation Instructions for further information.

See section 9 for installation examples.

7.5.2 Surge Filter

The **surge filter** is only applicable for **MERLIN XT Excel** and **MERLIN Interrupter** installation's where the **Pipeline Locate** feature is required.

The **surge filter** is fitted between the **rectifier's positive** and **negative output**.



Note

The **surge filter** needs to be housed within a suitable weatherproof enclosure.

See section 9 for installation examples.

7.5.3 Lightning Surge Arrestors

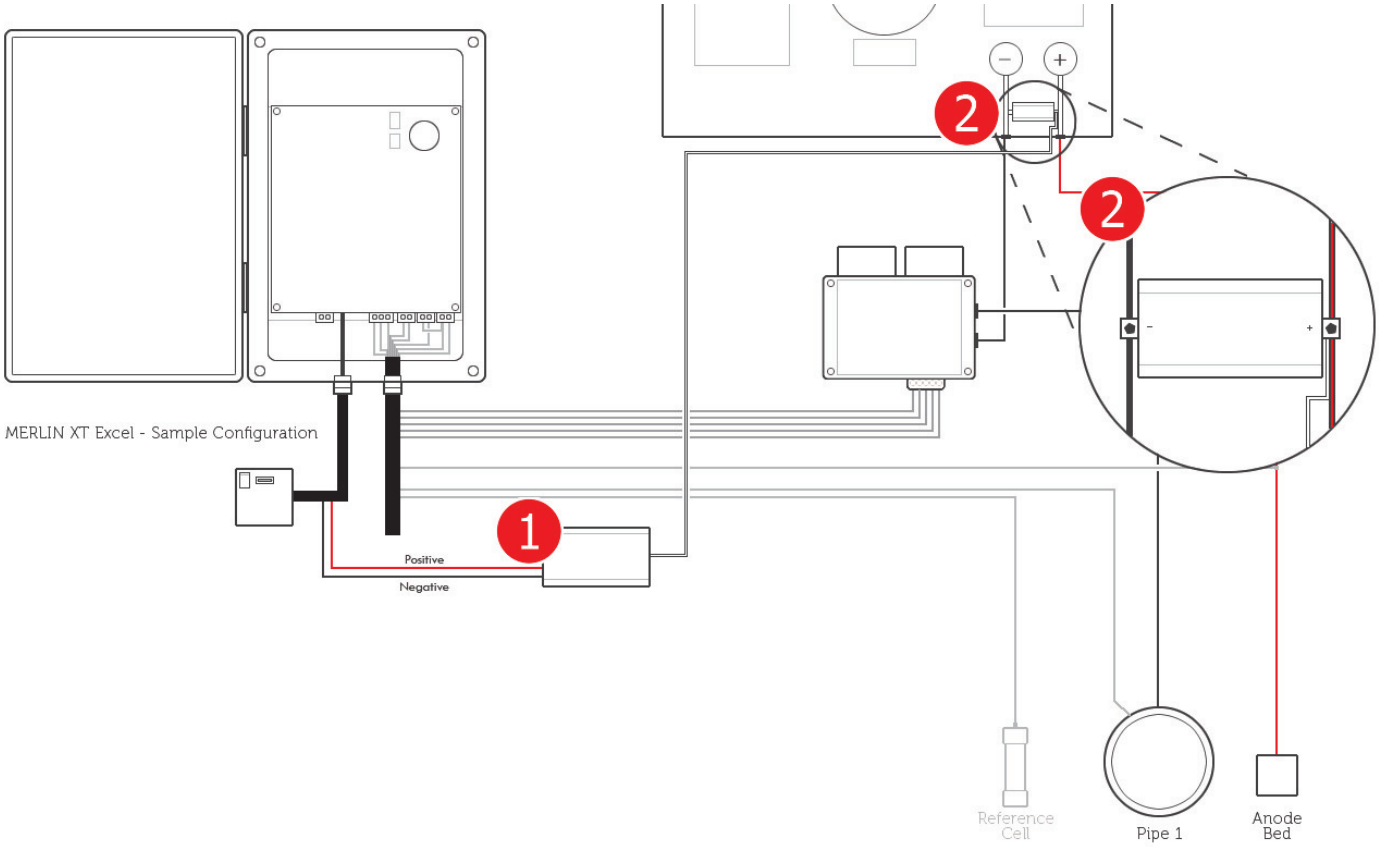
For areas at risk of lightning strikes/surges, we strongly recommend **lightning surge arrestors** are fitted. No surge arrestor can deal with a direct strike but this arrangement should provide a high level of protection.

Abriox recommend the following lightning surge arrestors:

	Model	Type	Position
1	ASZH240C201	240V Single Phase 3 Wire Service	AC Supply
2	LPC11895-2120	0-180V DC	Rectifier Output

For rectifiers that will not accept the LPC11895-2120:

	Model	Type	Position
2	Epcos B60K130	Screw Terminals, 0-130V	Rectifier Output



Ensure that the AC used to power the MERLIN XT and rectifier is isolated before installing the lightning surge arrestors.

The ASZH240C201 surge arrestor is installed across the MERLIN XT's PSU AC input and the rectifier's positive output/ground bed connection:

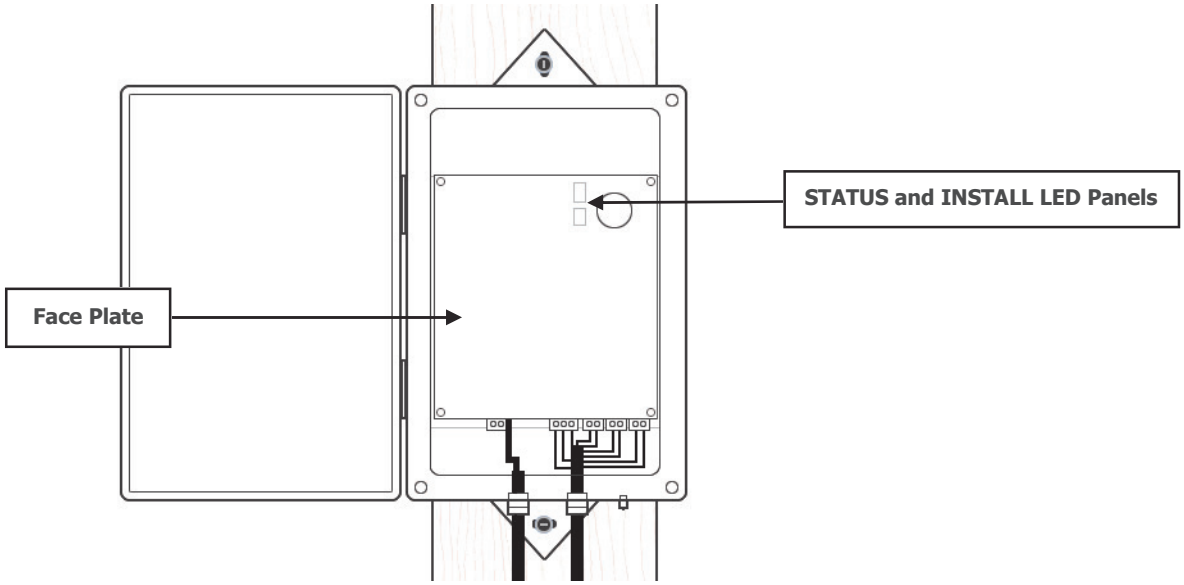
- The white ground wire of the arrestor is connected to the rectifier's positive output/ground bed connection (not electrical ground)
- The black AC line wires are connected to the AC supplying the MERLIN XT PSU

Note
It is vital to keep the connections as short as possible.

7.6 Apply Power

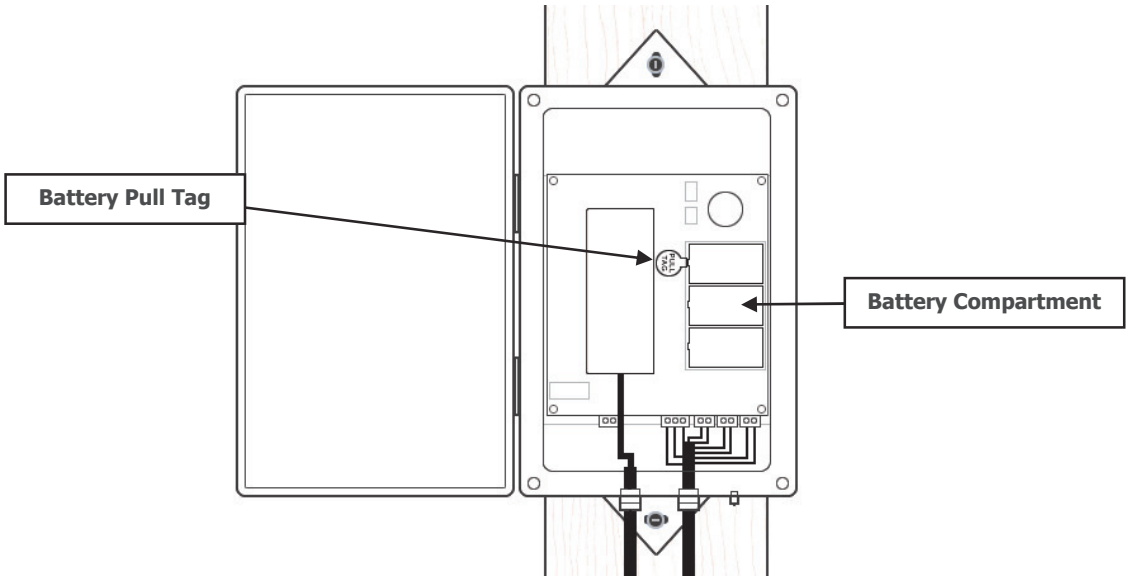
Remove the **Face Plate** and double check all power and terminal connections have been made prior to turning the external supply on.

If you are using an external AC supply to power the MERLIN XT, after switching the AC supply on the **green (Active) LED** on the **STATUS** panel will give a long double flash to show the unit is waking up.



The LEDs will now extinguish for up to 60 seconds whilst the MERLIN XT boots up.

Next, the **red (Error/Low Battery) LED** on the **STATUS** panel will double flash every few seconds to indicate a low battery until you remove the **Battery Pull Tag** from the battery compartment.



Once the **Battery Pull Tag** has been removed, the **red (Error/Low Battery) LED** will go off and the **green (Active) LED** will flash. This indicates the backup batteries are in good condition.

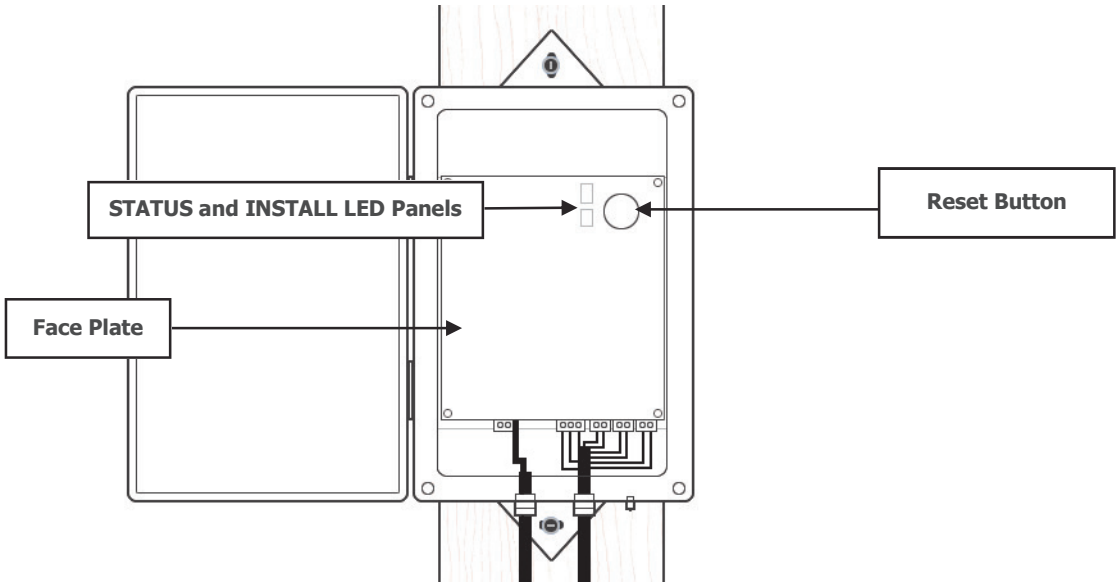
Replace the **Face Plate** and screw firmly in place.

Note

If the **Battery Pull Tag** has been removed prior to the AC supply being turned on you cannot readily determine if the MERLIN XT is running on AC or battery power and therefore cannot be confident the AC supply is correctly wired.

7.7 Reset the MERLIN XT

With the **Face Plate** screwed firmly back in place, press the **RESET** button. This will put the unit into **Installation Mode**.

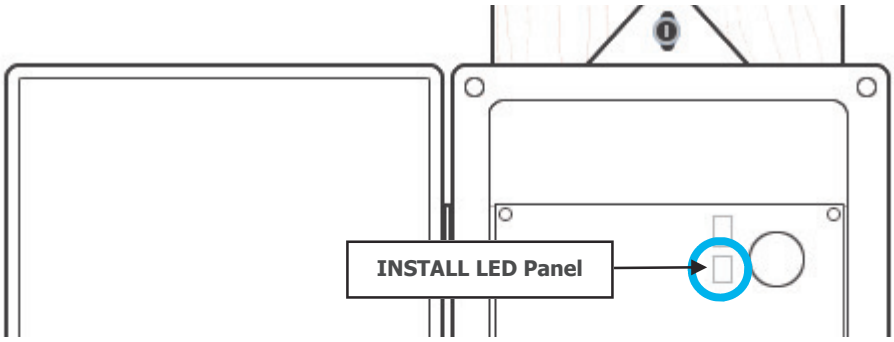


For the first 20 minutes after power up (or after the **RESET** button is pressed) the MERLIN XT runs in **Installation Mode** (see section 7.8) before returning to **Normal Mode** (see section 7.9).

7.8 Installation Mode

During **Installation Mode** (20 minutes after a reset) the MERLIN XT's self-test cycles through checking the communications and each input, any warnings are flashed out in sequence via the INSTALL LEDs in the **INSTALL** panel.

There are two pairs of **INSTALL LEDs** to aid installation; **Comms** and **Inputs**. See sections 7.8.1 and 7.8.2 for further information.



Note

During this period, it is normal to hear the relays operate every few seconds as the unit takes its readings.

7.8.1 Comms LEDs

The MERLIN XT uses two different satellite networks at all times. It uses Iridium satellites for data communications and GPS satellites for timing and position. The **COMMS LEDs** give a visual indication on the status of communications during installation mode.

Initially (after powering the unit or after a reset) the COMMS LED will give a single red flash, pause, then give a double red flash. This cycle will repeat until both Iridium and GPS communications are established. The red LED flashes will stop as each network establishes communications. Once the **COMMS LED** is lit **solid green**, both Iridium and GPS communications have been successful.

LED Colour	Flash	Description
Red	Double Flash	GPS satellite communications not acquired
Red	Single Flash	Iridium satellite communications not acquired
Green	Solid	All communications OK

Note

If the **green COMMS LED** has not been lit within approximately 15 minutes you will need to reposition the MERLIN XT so that it has a better view of the sky.

7.8.2 Inputs LEDs

The **INPUTS LEDs** give a visual indication on the status of the monitored channel inputs. If some channels are not used, be prepared to see a warning.

LED Colour	Flash	Description
Amber	1 Flash	No AC power
Amber	2 Flashes	Rectifier Volts out of range (see Installation Warnings, section 7.8.3)
Amber	3 Flashes	Rectifier Current out of range (see Installation Warnings, section 7.8.3)
Amber	4 Flashes	ON Potential out of range (see Installation Warnings, section 7.8.3) or on Dual Current models, 2nd Current out of range
Amber	5 Flashes	OFF Potential out of range (see Installation Warnings, section 7.8.3)
Green	Solid	All inputs OK

Note

After 20 minutes the MERLIN XT returns to **Normal Mode** and will report in daily for the following 7 days. Any warnings or error LEDs will extinguish after the 20 minute installation mode has expired. It is therefore important that any warnings or errors are rectified during Installation Mode.

7.8.3 Installation Warnings

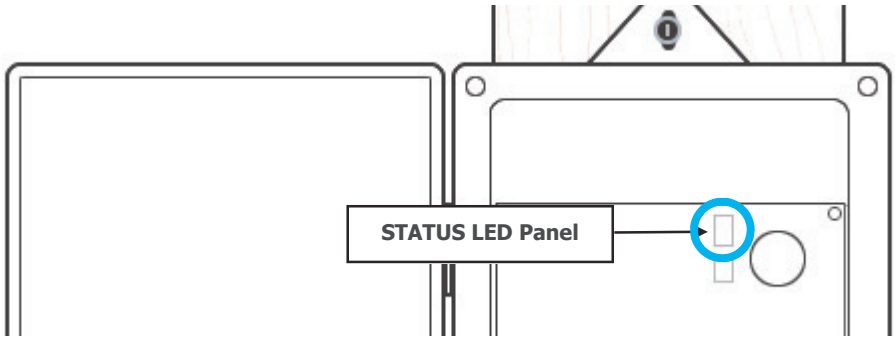
Installation Warnings are given when the channel input thresholds fall out of scope as shown below.

	Low Threshold	High Threshold
TR Volts	**+1V**	**+150V**
TR Current	**+0.2mV**	**+80mV**
ON Potential	**-3000mV**	**-950mV**
OFF Potential	**-3000mV**	**-850mV**
The ON potential value must be at least 100mV more negative than the OFF potential value.		
Anything outside of these typical thresholds will cause the Amber LED to flash for that channel during installation.		

7.9 Normal Mode

During **Normal Mode** the **STATUS LEDs** give a visual indication on the status of the unit.

There are three STATUS LEDs; **Error/Low Battery**, **Active** and **Interrupt/Locate***.



Note

*The **Locate LED** feature is only offered on **MERLIN XT Excel** models.

7.9.1 Error/Low Battery LED

LED Colour	Flash	Every	Description
Red	Single	2 Seconds	Unit awake and active (battery low)
Red	Double	2 Seconds	Unit awake but has no satellite communications* (battery low)
Red	Single	10 Seconds	Unit snoozing between measurements (battery low)

Note

*Satellite communications may come and go, dependent on satellite visibility.

7.9.2 Active LED

LED Colour	Flash	Every	Description
Green	Single	2 Seconds	Unit awake and active
Green	Double	2 Seconds	Unit awake but has no satellite communications*
Green	Single	10 Seconds	Unit snoozing between measurements

Note

*Satellite communications may come and go, dependent on satellite visibility.

7.9.3 Interrupt/Locate LED

LED Colour	Flash	Every	Description
Blue	Single	X Seconds	The Blue LED is lit during the OFF period of Interrupt activity and during Pipeline Locate*

Note

*The **Pipeline Locate** feature is only offered on **MERLIN XT Excel** models.

7.10 Record the Input Levels

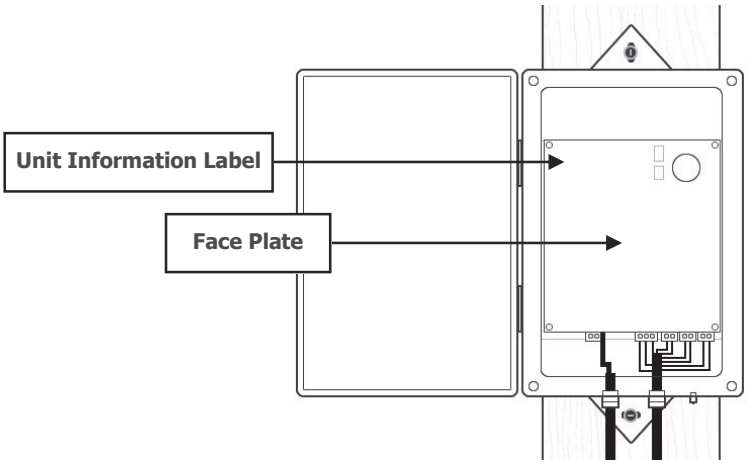
Take a reading and make a note of the input levels to the MERLIN XT, we recommend taking the measurements at the terminal screws on the MERLIN XT itself. The values can then be compared against the readings displayed in iCPSM/CPSM.

If the shunt input is over-range then the reading will clip at maximum i.e. 150.00mV. Change the shunt if necessary. If any other readings are inconsistent with the multimeter check the wiring and the condition of the reference cell (where applicable).

7.11 Finish On Site

Before leaving site, make a note of the **Serial Number (S/N)** and **IMEI number** of the unit as you will need this information for configuring the unit in iCPSM/CPSM.

The Serial Number and IMEI number can be found on the MERLIN XT Face Plate.



8. POST SITE CONFIGURATION

Once the physical installation has been completed, it's time to configure the MERLIN XT in your chosen software (iCPSM or CPSM).

You will need to configure the following:

Unit Allocation
You will need to allocate a Pipe and Location name for each MERLIN XT unit installed.

Shunt Values
Check and configure the shunt values.

Alarm Thresholds
Allows you to specify the high and low values that trigger an alarm. Alarms can be sent via email or text message to selected people/ companies.

Measurement Time
Allows you to specify the time and day of when the MERLIN XT takes its measurements.

Further configuration options and system features are available via your chosen software.

8.1 iCPSM Users

For users who use the web-based **iCPSM** - simply go to **www.icpsm.com** with a suppted browser and log in with your **Username** and **Password** as detailed in your **Licence Certificate**.

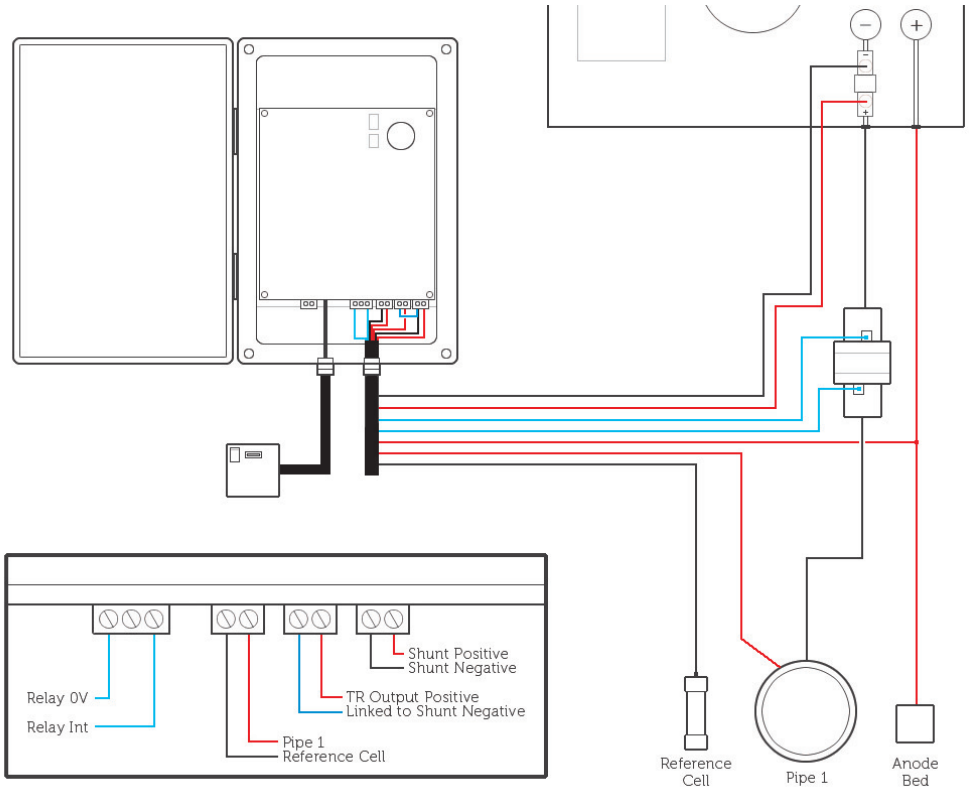
8.2 CPSM Users

Launch **CPSM** by double clicking the icon from the task bar.

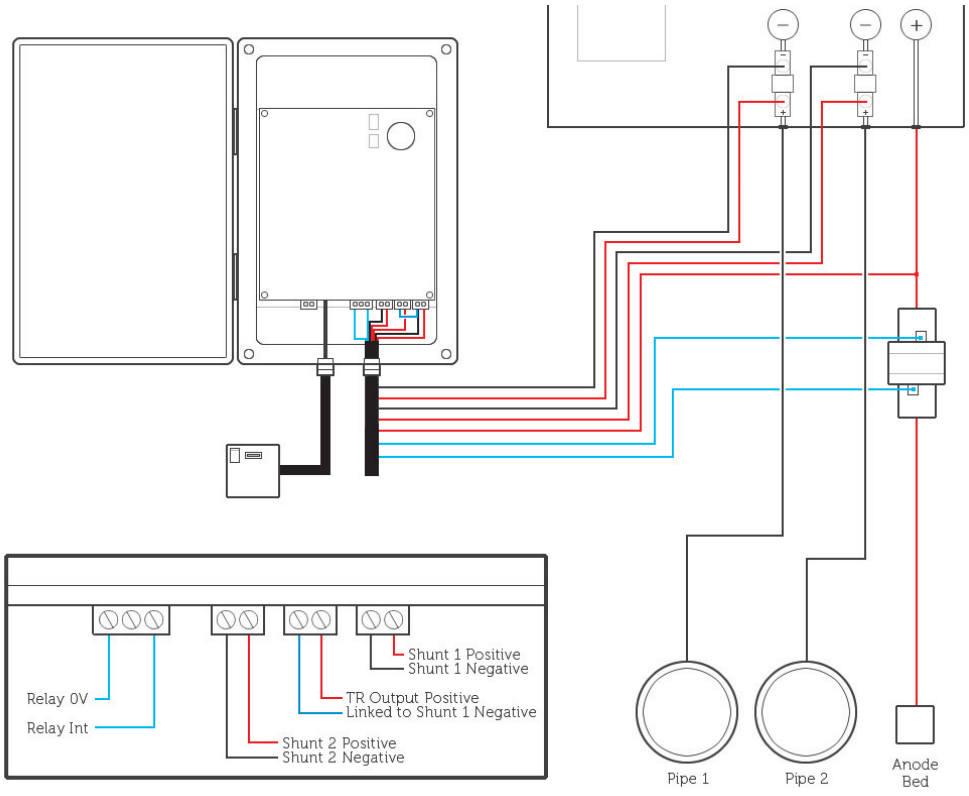
9. INSTALLATION EXAMPLES

The following examples are shown only as a guide.

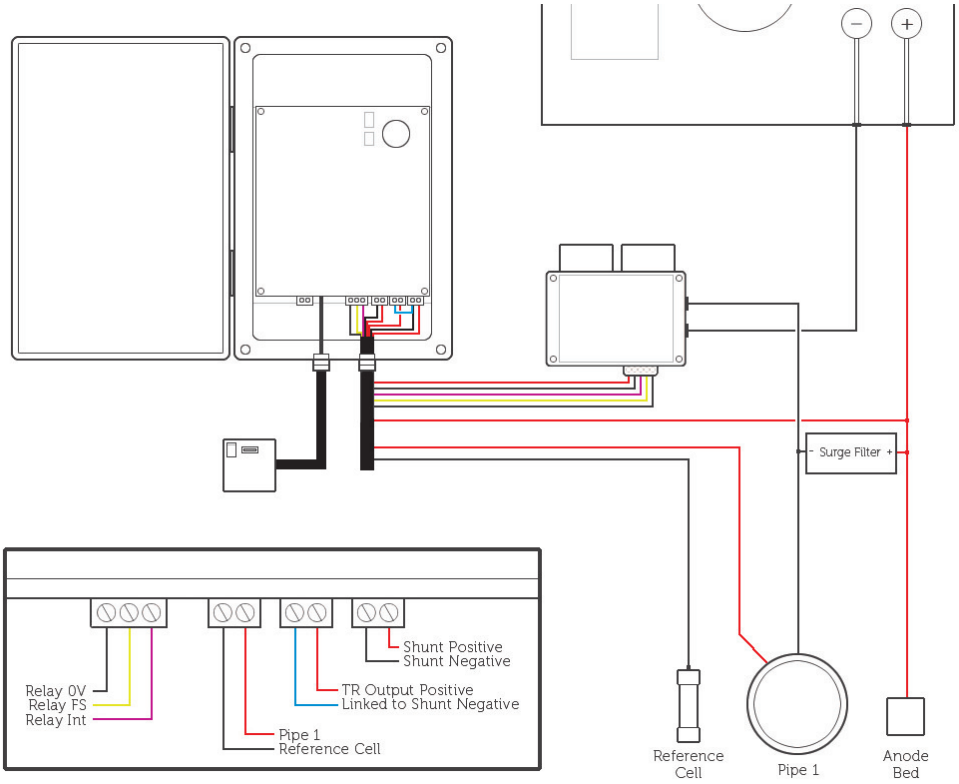
9.1 MERLIN XT Super with Mercury Relay



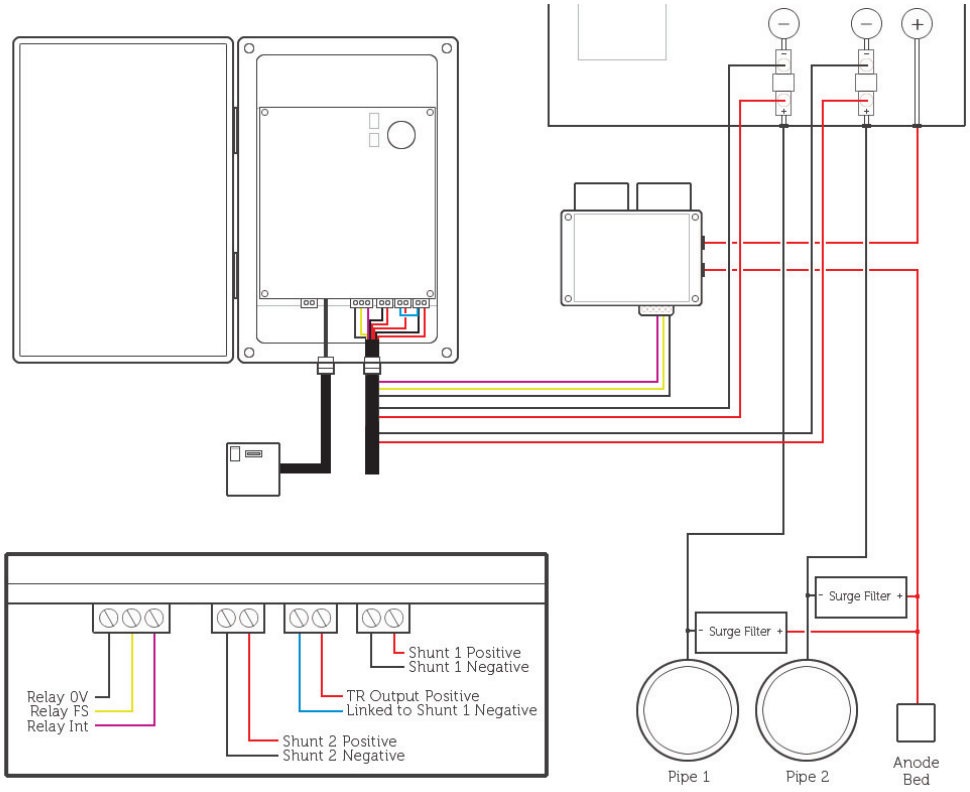
9.2 MERLIN XT Super Dual Current with Mercury Relay



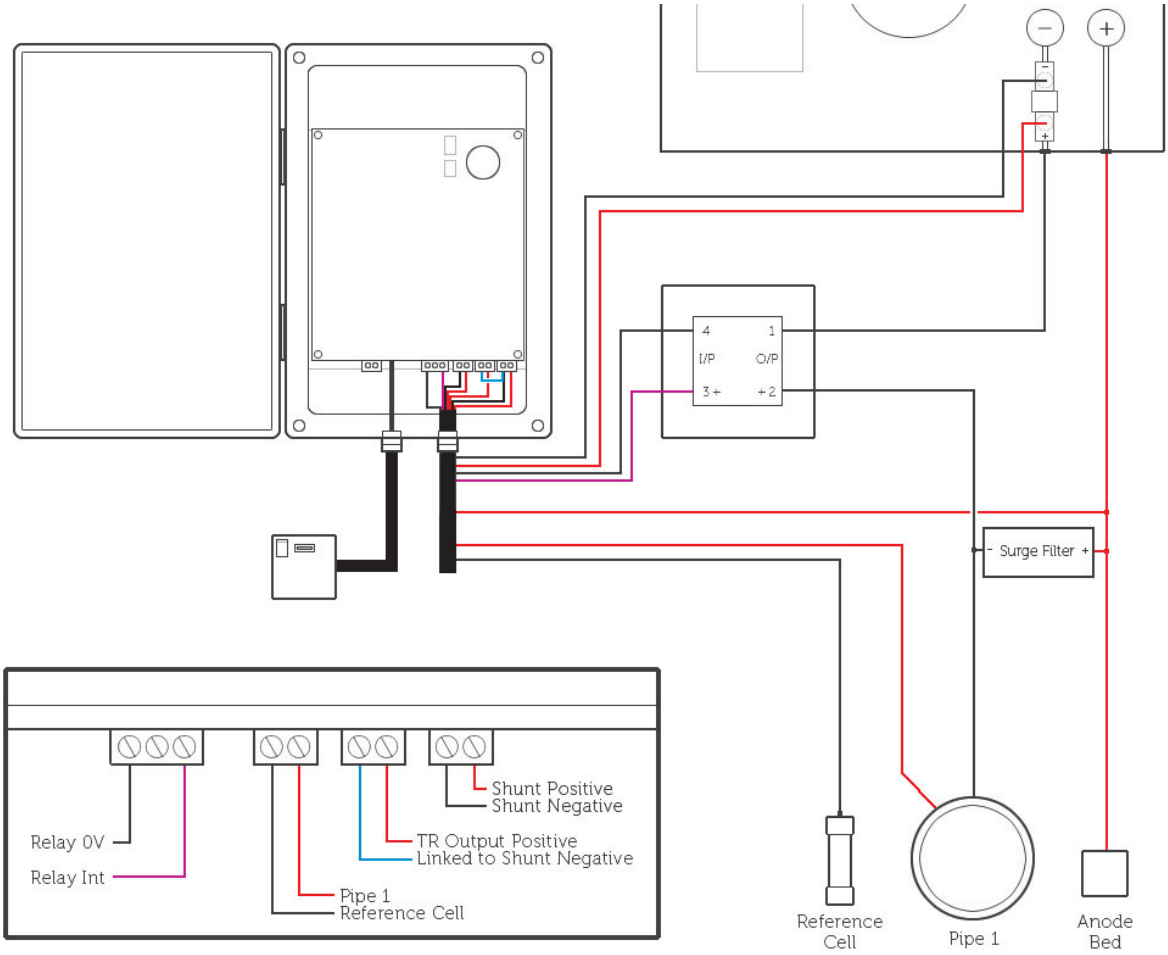
9.3 MERLIN XT Excel with MERLIN Interrupter



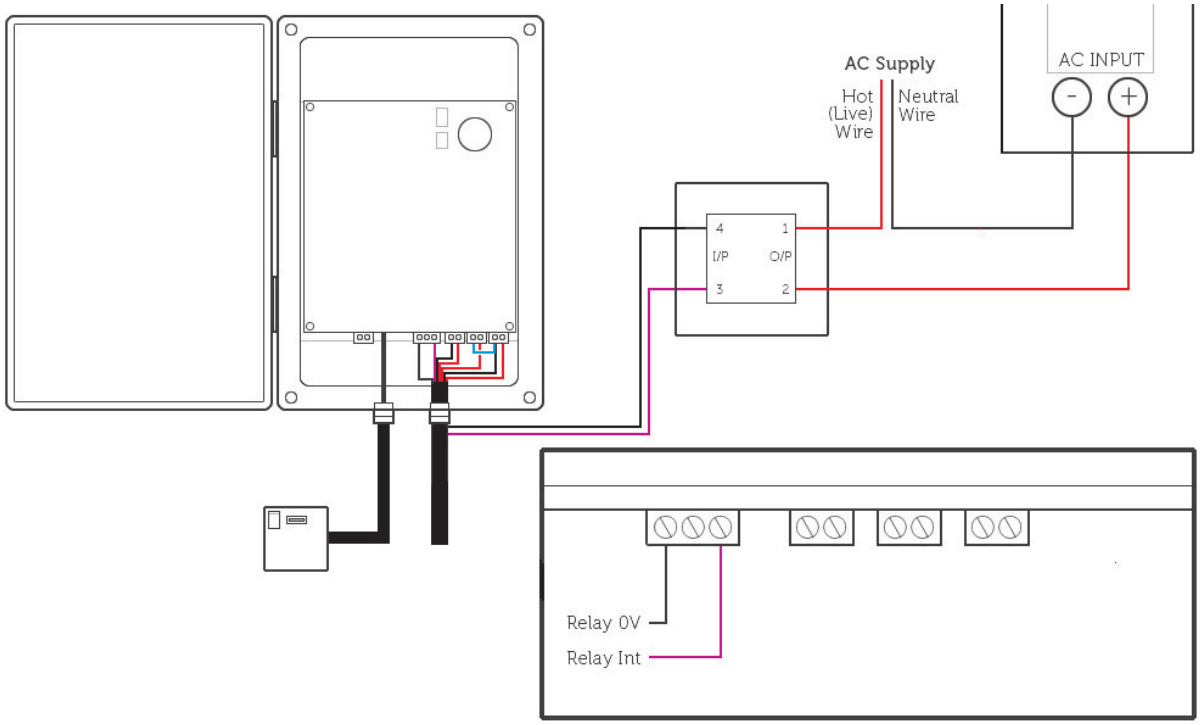
9.4 MERLIN XT Excel Dual Current with MERLIN Interrupter



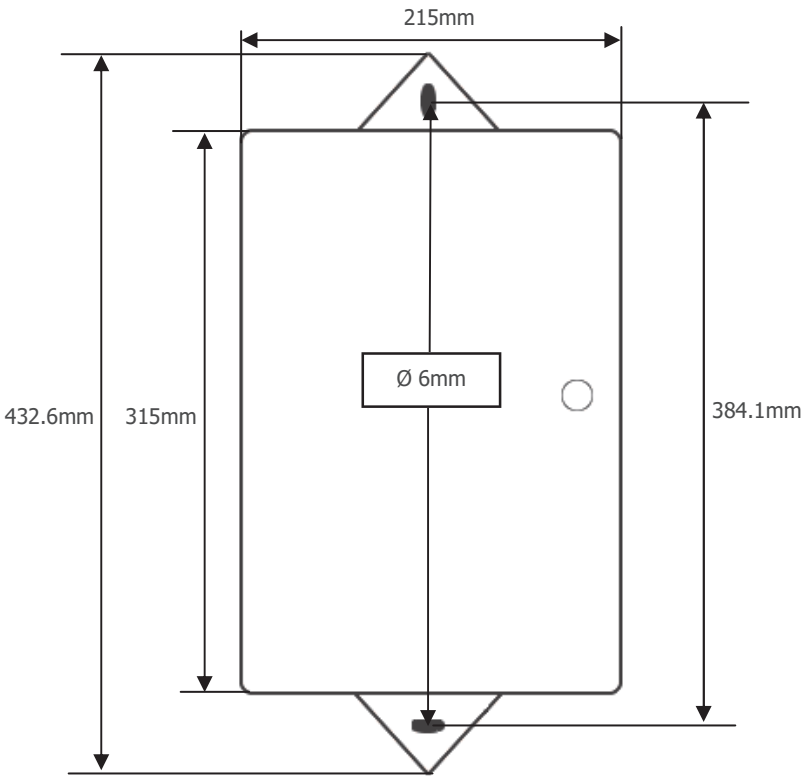
9.5 MERLIN XT 6 Excel with DC SSR (Compatible with MERLIN XT 6 Models Onward)

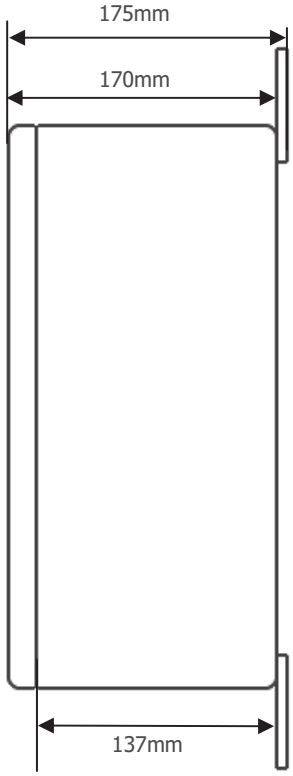


9.6 MERLIN XT 6 Excel with AC SSR (Compatible with MERLIN XT 6 Models Onward)



10. DIMENSIONS





11. NOTES

Use this space to write your own notes and tips to aid future installations.

12. APPENDIX A - NAMING CONVENTIONS

When naming and installing MERLIN XT units in iCPSM/CPSM, it is important to give them a unique location reference. The term 'location reference' is the combination of the 'Pipe' and 'Location' (PIPE: and LOC:) names given to a MERLIN.

All location references must be unique i.e. you can not have multiple MERLINs with the same Pipe and Location names.

Example 1 - Correct Method

MERLIN A **PIPE:WEST**
LOC:RECTIFIER A

MERLIN B **PIPE:WEST**
LOC:RECTIFIER B

In example 1 above, both MERLINs have been installed on the same Pipeline (**PIPE:WEST**) but have been given unique Location names (**LOC:RECTIFIER A** and **LOC:RECTIFIER B**). This is the correct method of naming.

Example 2 - Incorrect Method

MERLIN A **PIPE:EAST**
LOC:RECTIFIER A

MERLIN B **PIPE:EAST**
LOC:RECTIFIER A

In example 2 above, both MERLINs have been installed on the same Pipeline (**PIPE:EAST**) but have been given the same Location names (**LOC:RECTIFIER A**), this will cause data confusion and the system will fail.

The only way you can ever use the same Location name is if the MERLINs reside on separate pipes or are assigned a different Pipeline name, see example 3 below.

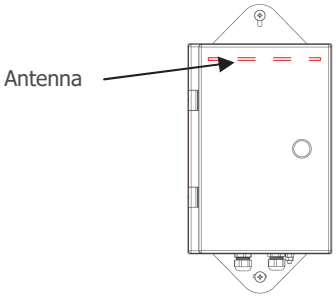
Example 3

MERLIN A **PIPE:NORTH**
LOC:RECTIFIER D

MERLIN B **PIPE:SOUTH**
LOC:RECTIFIER D

In example 3 above, the MERLINs have been installed on different pipelines (**PIPE:NORTH** and **PIPE:SOUTH**) but have been given the same Location names (**LOC:RECTIFIER D**). Even though the units have the same Location name (**LOC:RECTIFIER D**), as they reside on separate pipes the 'location references' are unique.

13. APPENDIX B - MOUNTING POSITION



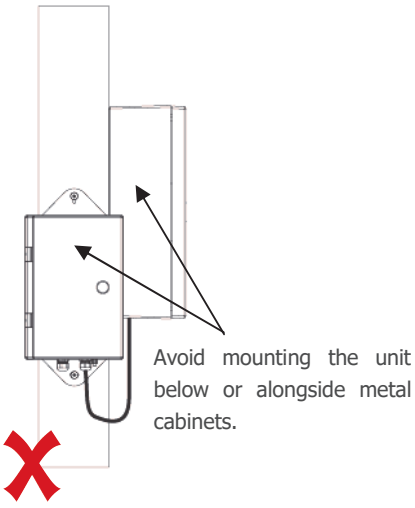
Note : The Merlin XT internal antennas are placed close to the top face of the unit.

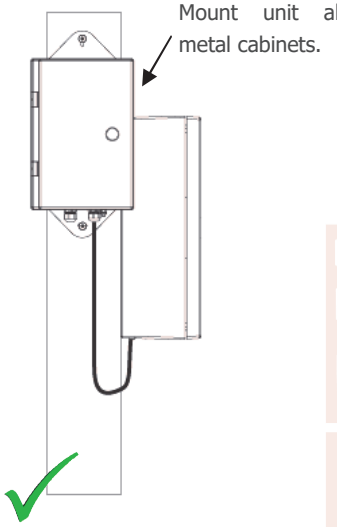
For optimum performance the unit must be located so that the antenna has an unobstructed view of the open sky. Obstacles such as metal mounting frames, metal panels, solar panels and metal enclosures which obscure or block the view of the sky and/or horizon will cause both GPS and Iridium performance to deteriorate.

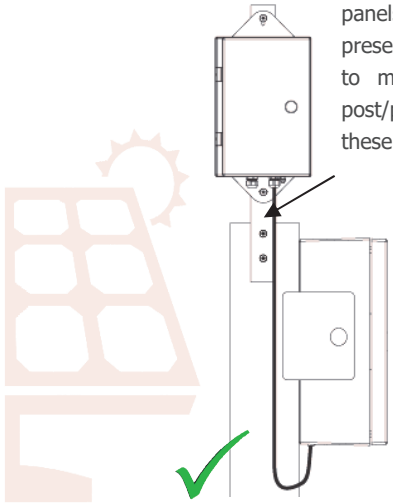
When positioning the unit, for optimum performance, the following conditions must be followed:

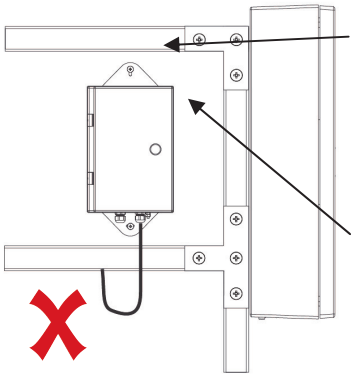
- Top of the unit requires clear line of sight to sky and horizon
- Do not mount to a side of a building, if this is the only available location the antenna must be extended past the highest point (Recommend post/pole mounting)
- Position the unit to minimise obstacles obscuring its line of sight with the sky or horizon (Recommend post/pole mounting)
  - Metallic obstacles/structures close to the antennas may degrade communications performance
  - Obscuring the view of the sky or horizon may degrade communications performance

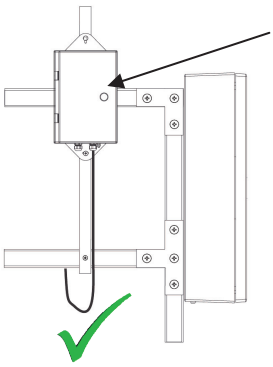
The diagrams below show examples of mounting the unit, for optimum performance these guidelines must be followed.



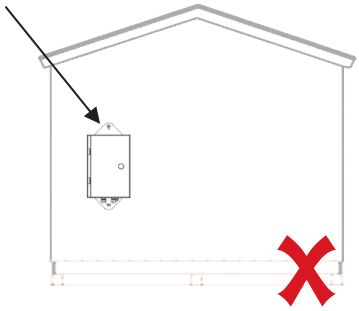




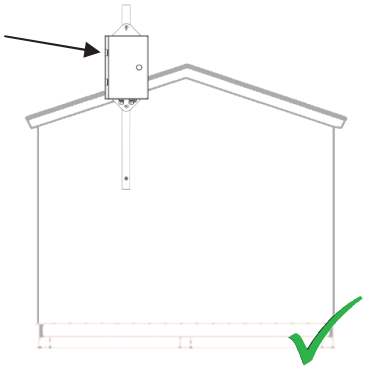




Do not mount the unit on side of a building.



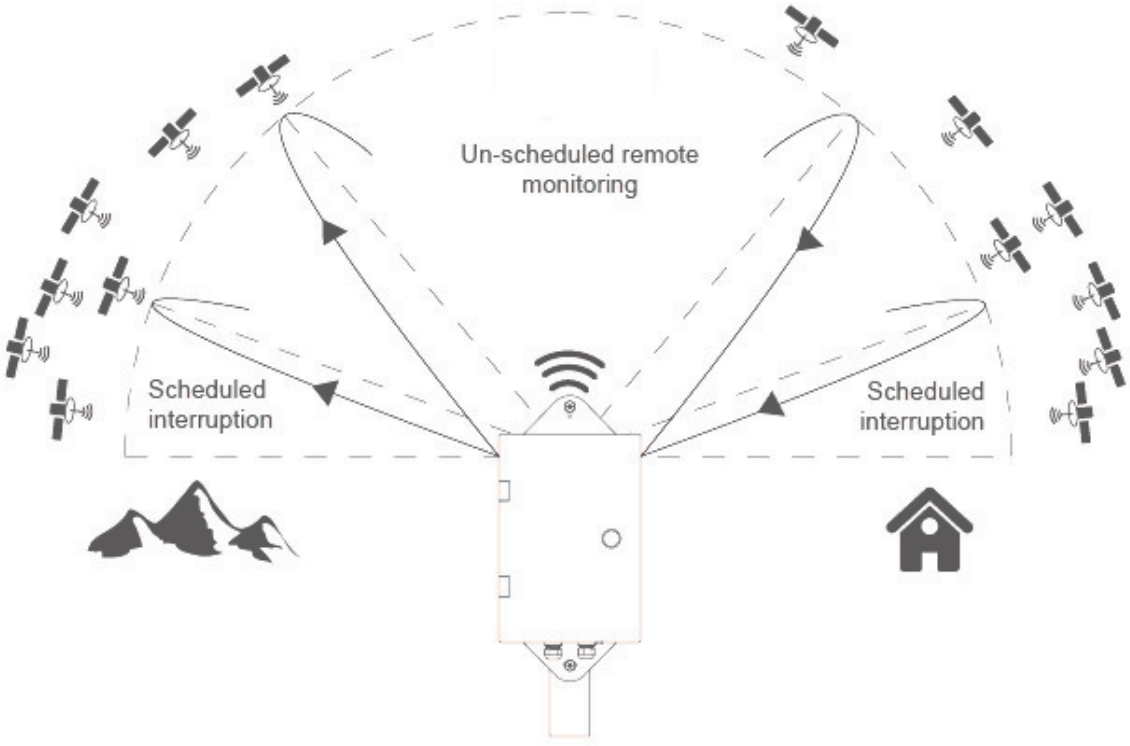
It is recommended to mount the unit on a post/pole to extend past the highest point of the building.



14. APPENDIX C - TOPOGRAPHY OF SURROUNDING AREA

The effect of the topography, on the signal performance, must be appreciated; features such as mountains, trees & buildings may degrade signal performance.

The Unit uses Low Earth Orbit (LEO) satellite technology, satellites are not geostationary, they are constantly orbiting the Earth, from pole-to-pole. At least one satellite must have line of sight to the unit at all times to guarantee coverage. As illustrated below the satellites very often appear low to the horizon. For optimum performance the unit must be mounted in a location which gives maximum line of sight visibility.



IMPORTANT

For optimum performance in time-critical application, such as scheduled interruption, the unit must be mounted in a location which gives maximum line of sight visibility of satellites locations.

Less critical applications such as un-scheduled remote monitoring can tolerate slightly sub-optimal positioning.

Natural barriers are in some cases unavoidable, these may degrade the signal quality and not allow the unit to perform to its optimum. The more barriers that are present the more degradation will occur. Signal degrading will cause a delay in the communications to and from the unit.



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