



ProH2O Professional

Water Leak Detector and Locator

Installation and Operating Instructions

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IMPORTANT GUIDELINES

Please read this instruction leaflet thoroughly before commencing installation.

 The ProH2O Professional must be powered from a standalone UL/cUL listed power supply (18 – 28V d.c. minimum 200mA)











 All Fire Alarm Control Panels connected to the ProH2O Module must have a UL listing.

 The ProH2O Professional is UL/cUL listed for use in Commercial applications only.

-  Ensure the detection cable is laid in areas where water will naturally collect such as at the bottom of slopes, in dips and underneath pipes.
-  For the cable to alarm it must come in contact with a sufficient amount of water.
-  Ensure the installation area is clean and free from dust and debris.
-  Ensure adequate distance is left (at least 6ft/1.8m) from any HVAC downdraft which may contain moisture and condensate on the detection cable.
-  Ensure any power supply used can supply the required amount of current in all conditions (e.g. when the relays are activated and the LCD back-light is on).
-  Ensure the end-of-line plug is firmly attached at the end of the zone before using the system.
-  Ensure the detection cable is thoroughly dried out after an alarm condition before resetting the system.
-  Ensure a minimum of 30m (100ft) and a maximum of 305m (1000ft) of ProH2O Water Leak Detection Cable is used on the zone.
-  A self-adhesive or screw-type U-clip should be used to secure the detection cable to the required surface without lifting it or creating an air gap underneath it.
-  Ensure the product is installed, commissioned and maintained by persons according to good engineering practices and authorities having jurisdiction.

IMPORTANT GUIDELINES

Please read this instruction leaflet thoroughly before commencing installation.

-  Avoid laying the detection cable in areas where heavy traffic may result in the cable being crushed.
-  Store the detection cable and module in a cool, dry area. Storage areas should not exceed 50°C and 75% RH.
-  Do not exceed the maximum rated input voltage of the ProH2O Professional module (28V DC).
-  Do not cut and re-terminate the ProH2O Calibrated Leader cable supplied with the ProH2O Professional module.
-  Do not cut and re-terminate the ProH2O sensor cable.
-  Do not paint the detection cable
-  Do not stretch the detection cable tight. Some slack should be left in the cable runs.
-  Do not bend the detection cable at right angles. The minimum bend radius is 1" or 25mm.
-  Do not allow any conductive surface to come into contact with the black cores of the detection cable.
-  Do not connect the ProH2O Professional module alarm or fault outputs such that it may trigger a fire alarm signal on the fire alarm control panel.

General Description

The ProH2O Professional module is a water leak detection system for use in conjunction with ProH2O Water Leak Detection cable. It incorporates integrated alarm location which will automatically determine the distance along the length of cable to the water leak. The module is designed for simple and straightforward installation and operation.

Features

- ProH2O Professional Water Leak Detection module with built in alarm point distance location
- For use with ProH2O Water Leak Detection Cable
- Available zone lengths 30m to 305m (100ft to 1000ft)
- Integrated automatic detection of water leak from 0m to 305m (0ft to 1000ft)
- Supplied with 10m of ProH2O Calibrated leader cable for accurate distance locating
- Integrated fault detection in the event of a cable break or malfunction
- Installation settings saved in the event of power loss
- Simple installation and operation
- Backlit 16x2 character White-on-Blue LCD display
- Volt-free Form C relay outputs for Alarm and Fault
- Visual display indicators of current condition
- Industry standard process control analogue outputs (4-20mA and 0-10Vdc) as standard
- Integrated sounder for audible warning in fault and alarm conditions



Specifications

ProH2O Professional Control Unit	
Dimensions	W255mm x H180mm x D63mm (W10" x H7" x D2½")
Rating	IP65/IK08 Polycarbonate with removable cover
Finish	Light grey with blue graphic overlay
Display	2 line, 16 character white-on-blue LCD display showing alarm point in meters and feet, installation options and scrolling message in normal operation
Relays	Latching/non-latching selectable at installation
Power Requirements	Class 2 Inherently Power Limited Product
Approvals	
UL File No	E316340
Applicable Standards	
UL 2017 (<i>Standard for Safety For General-Purpose Signaling Devices and Systems</i>)	
CSA Standard C22.2 No 205-M1983, <i>Signaling Equipment</i>	

Package Contents	Qty
ProH2O Professional Controller	1
10m (33ft) ProH2O Calibrated Leader Cable	1
ProH2O Distance Locating End-of-line plug	1

ProH2O Professional Enclosure with metric knock-outs.				
	M32	M25	M20	M16
Long side	2	3	2	3
Short side	2	-	2	-

Specifications

Sensor Cable Specifications	
Minimum leak detection cable length	30m (100ft)
Maximum zone length	305m (1000ft)
<i>Construction</i>	
2 water sensitive cores	Black
2 data cores	Red & Blue

Power Requirements	
Operating Voltage	18 – 28 V DC
<i>Current Consumption (at all operating voltages)</i>	
Normal Operation (LCD Backlight off)	< 80mA
Normal Operation (LCD Backlight on)	<100mA
Both Relays Activated (LCD Backlight on)	< 150mA
Power Supply transient protection	1500W for 1ms

Environmental	
Operating Temperature Range	0 – 50 °C (32° - 120°F)
Accuracy (% of alarm point distance)	
15 – 25°C	< ±5% or 2m (whichever is greater)
0 – 50 °C	< ± 7.5% or 3m (whichever is greater)

Terminal blocks	
Spacing	0.375"
Rating	25A at 300V DC
Wire size	22AWG – 12AWG (0.644mm dia – 2.05mm dia)
Insulation Resistance	5000 Mohm minimum
UL File No	E48521

Relay Outputs	
ALARM and FAULT contacts	Normally Open (NO), Common (C), Normally Closed (NC)
Rating	8A @ 30V DC (UL/CSA certified)
Latching / non-latching	Selectable at installation
UL File No	E41643

Typical System Configuration

The ProH2O Professional module may be used as a standalone system or integrated with an addressable/conventional fire alarm or building management system. In each case the ProH2O Professional module will continuously monitor from 30m (100ft) to 305m (1000ft) of ProH2O Water Leak Detection Cable for a water leak or fault condition (such as a break in the detection cable).

Standalone Configuration

The ProH2O Professional module may be configured as a standalone system. The fixed 10m/33ft length of ProH2O Calibrated Leader cable, supplied with the kit, must be used to connect the leak detection cable to the Professional module. Do not cut or extend the leader cable. Figure 1 shows a typical connection diagram.

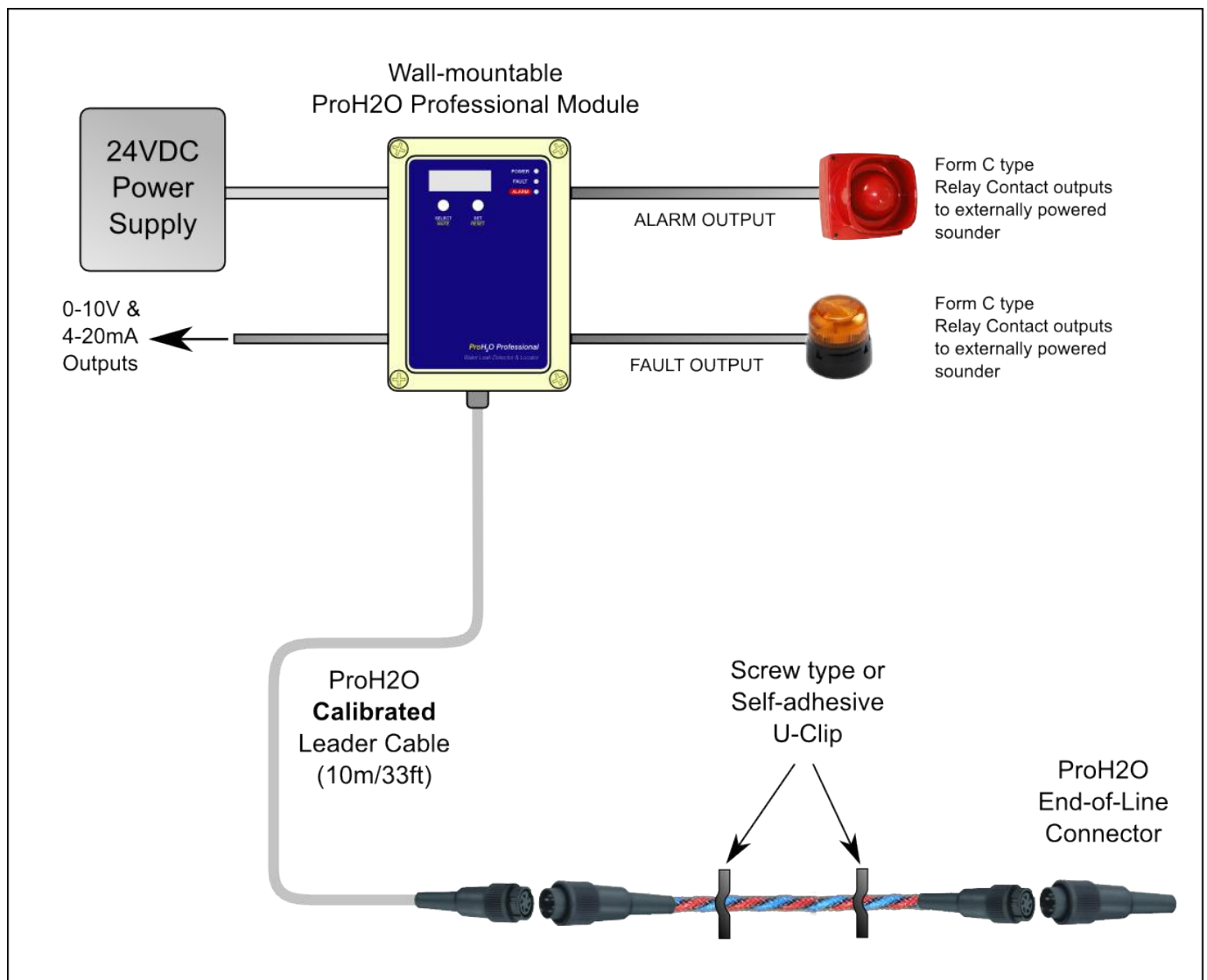


Figure 1: Standalone typical system configuration

Typical System Configuration

Integrated System Configuration

The ProH2O Professional module may be connected to any compatible fire alarm system or building management system using the relay contact outputs or process control outputs in the ProH2O Professional module. The fixed 10m/33ft length of ProH2O Calibrated Leader cable must be used to connect the leak detection cable to the ProH2O Professional module. Do not cut or extend the leader cable. Figure 2 shows a typical connection diagram.

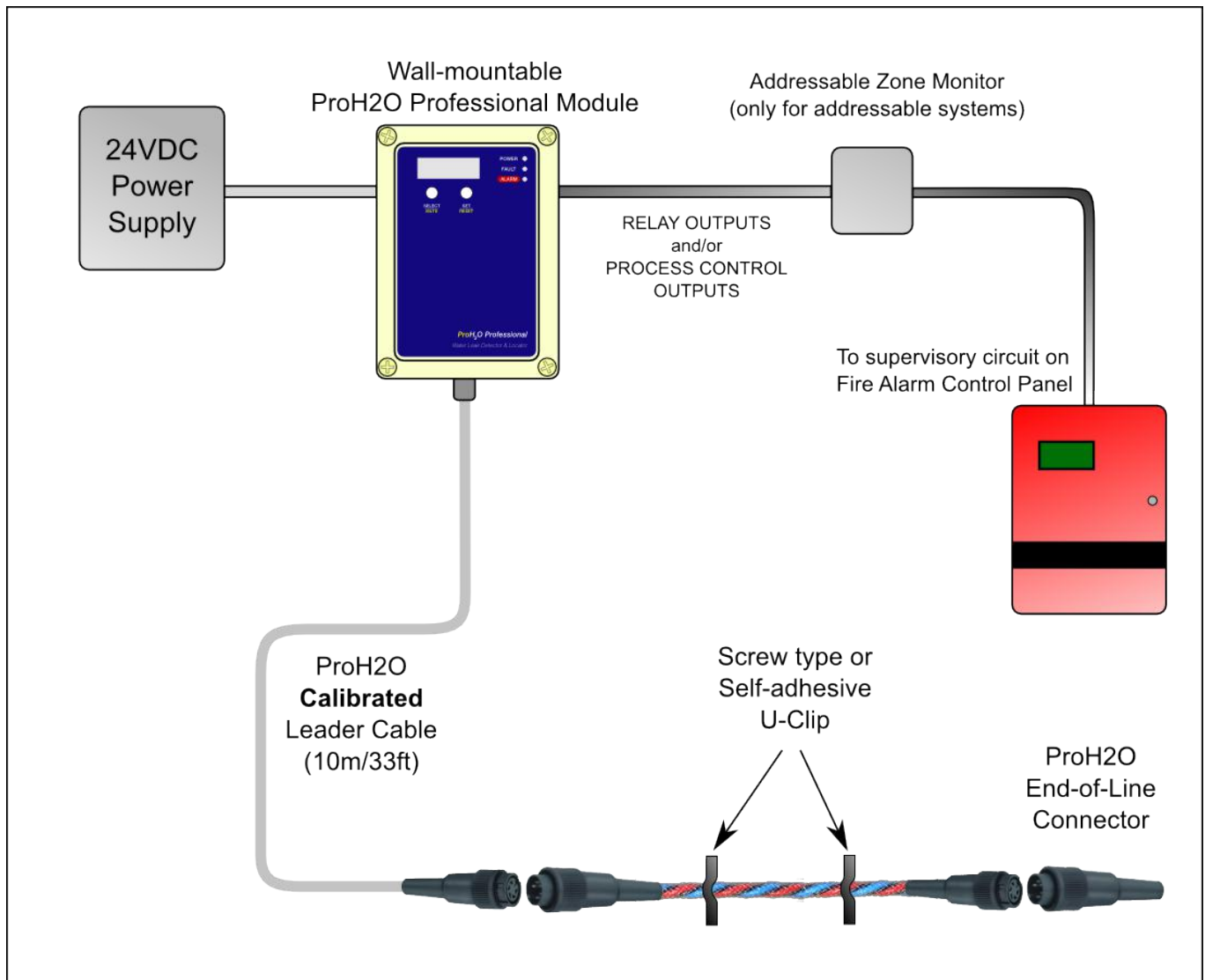


Figure 2: Integrated System Configuration

System Installation Procedure

ProH2O Water Leak Detection Cable is ideally suited to detecting water over large, concealed areas such as false floors or directly attached to pipework enabling coverage in ceiling void areas. In all cases, ProH2O Calibrated Leader cable must be used to connect from the ProH2O Professional module to the first length of ProH2O Water Leak Detection cable on ProH2O Non-sensing cable. The ProH2O Calibrated Leader cable ensures accurate distance location along the zone of leak detection cable where the starting point (0m / 0ft) is at the connecting point between the ProH2O Calibrated Leader Cable and the ProH2O Water Leak Detection Cable or ProH2O Non-sensing cable.

Verifying the system

Before laying the detection cable it is advisable to connect up each of the required lengths separately, attaching an end-of-line plug to one end and connect the other end to the ProH2O Calibrated Leader cable.

Power up the module and check that the reported calculated "Cable Length" is as expected (within tolerance). Go through the setup procedure and verify that no false alarm occurs once the ProH2O Professional module is displaying "Normal Operation".

Removing the end-of-line plug should put the ProH2O Professional module into a fault alarm condition and display "FAULT CONDITION" and "ERROR CODE: 100" on the display. Re-attaching the end-of-line plug should allow the the fault condition to be cleared.

Laying the cable

The fixed 10m (33ft) of ProH2O Calibrated Leader cable provided must be used to connect from the ProH2O Professional module to the first length of leak detection cable. The leader cable allows the system to give accurate distance locating along the entire length of leak detection cable and allows for flexibility with regards to physically locating the ProH2O Professional module.

It is recommended to draw a plan of how you intend to lay the detection cable. This will help determine how much cable is required and the ideal location where water may naturally go to. Avoid installing the detection cable in areas of heavy traffic such as doorways.

The automatic alarm point location of the ProH2O Professional module allows the detection cable to be mapped out to form individual "sub-zones". For example, the first section of the cable may form one zone while the remainder of the detection cable may form a second zone. When installing on a flat floor, it is advisable to lay the detection cable so there is no more than 2m between runs (see Figure 3 for an example).

Do not install the detection cable directly beneath downdraft HVAC units. The downdraft often contains moisture and may create false alarms. A minimum gap of 6ft (1.8m) is advisable around HVAC units.

ProH2O Water Leak Detection cable comes in terminated lengths and can be connected together to increase the coverage area. Do not cut and re-terminate the detection cable. A minimum of 30m (100ft) up to a maximum 305m (1000ft) may be used in a single zone. At the end of a zone an end-of-line plug must be firmly attached to the last connector on the detection cable.

System Installation Procedure (cont.)

If the detection cable is intended to be laid on the floor, ensure the floor is free of dust and moisture. Care should be taken to not damage the cable with sharp tools or other objects. Do not place heavy objects on the detection cable.

The detection cable should be installed so that as much of the cable is in contact with the required surface (either floor or piping) as possible. Either self-adhesive or screw-type U-clip should be used to secure the detection cable to the floor. When attaching the detection cable to piping, the cable should be secured using tie wraps or equivalent but care must be taken not to apply excessive pressure to the cable. ProH2O Water Leak Detection cable should be secured in place at approximately 1m (3ft) intervals. Where the detection cable is installed around HVAC or similar units it is advisable to secure the cable more frequently - approximately every 0.5m (1.6ft).

Typical Floor Layout

In the below example, if a water leak occurred between 0ft and 96ft it would be in Zone 1. A water leak occurring between 102ft and 300ft would be in Zone 2. The length of detection cable can be divided into any number of "sub-zones", each of arbitrary length. However, consideration must be made regarding the accuracy and precision of the ProH2O Professional module. No "sub-zone" should be less than 6ft. An ideal minimum length of the "sub-zone" is 5% of the zone length.

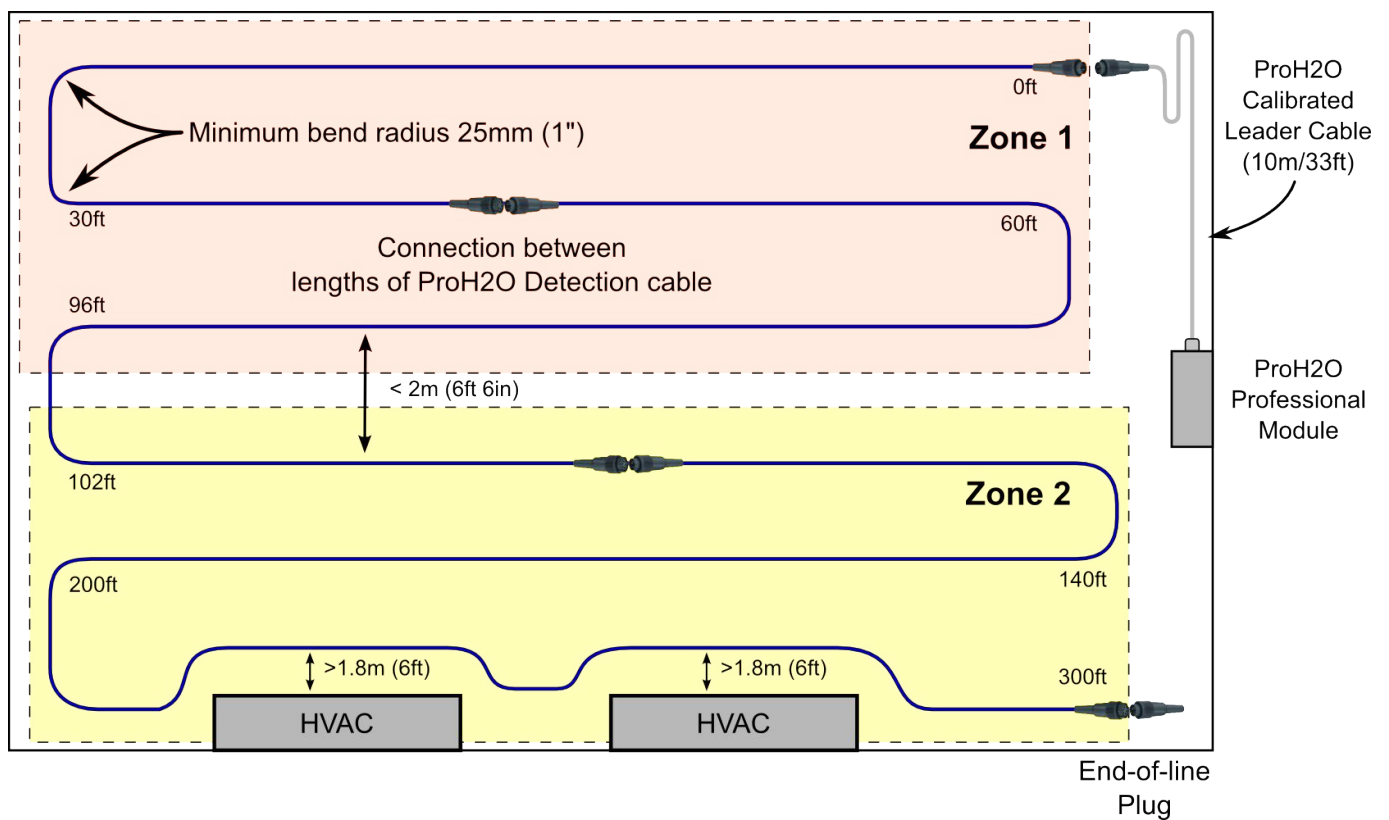


Figure 3: Typical Floor Layout of ProH2O Water Leak Detection Cable

ProH2O Professional Module - Wiring Diagram

Connect the supplied 10m (33ft) length of ProH2O Calibrated Leader cable as show in the illustration below.

Do not cut and re-terminate the length of ProH2O Calibrated Leader cable.

A special crimp tool and crimp terminals (6.35mm disconnect type) are required to make the connections to the P and N terminals on the line filter. Use only copper conductors.

It may also be beneficial to connect a local earth connection to the PE terminal of the Line Filter. This can further improve the reduction in EMI from external electrical noise sources.

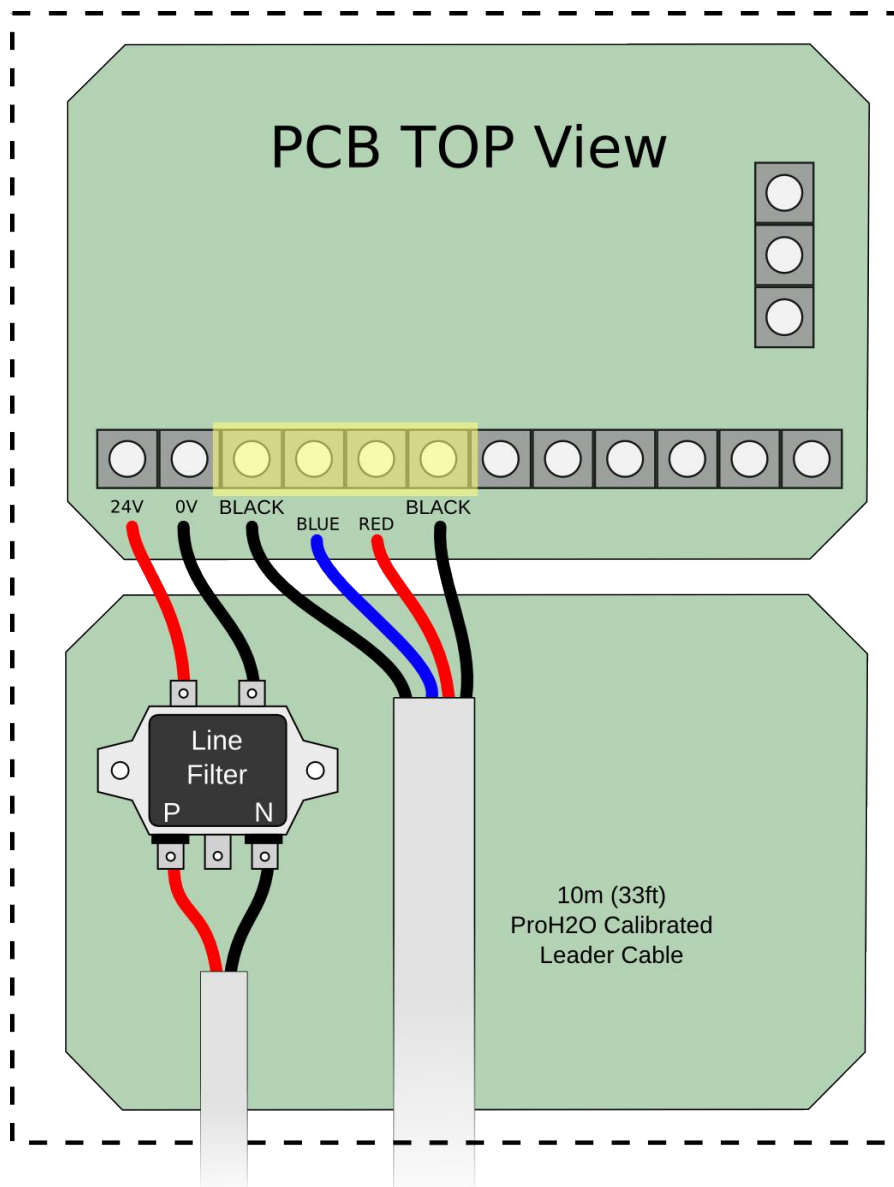


Figure 4: Wiring the Line Filter and ProH2O Calibrated Leader Cable

ProH2O Professional Module - Mounting Instructions

The ProH2O Professional module is intended to be wall-mounted (or equivalent), securely, using four screws in each corner of the base of the enclosure. The hole centres dimensions are shown in figure 5.

Screw Specification for wall mounting	
Minimum screw length	20mm
Maximum thread diameter	4.5mm
Maximum head diameter	8mm

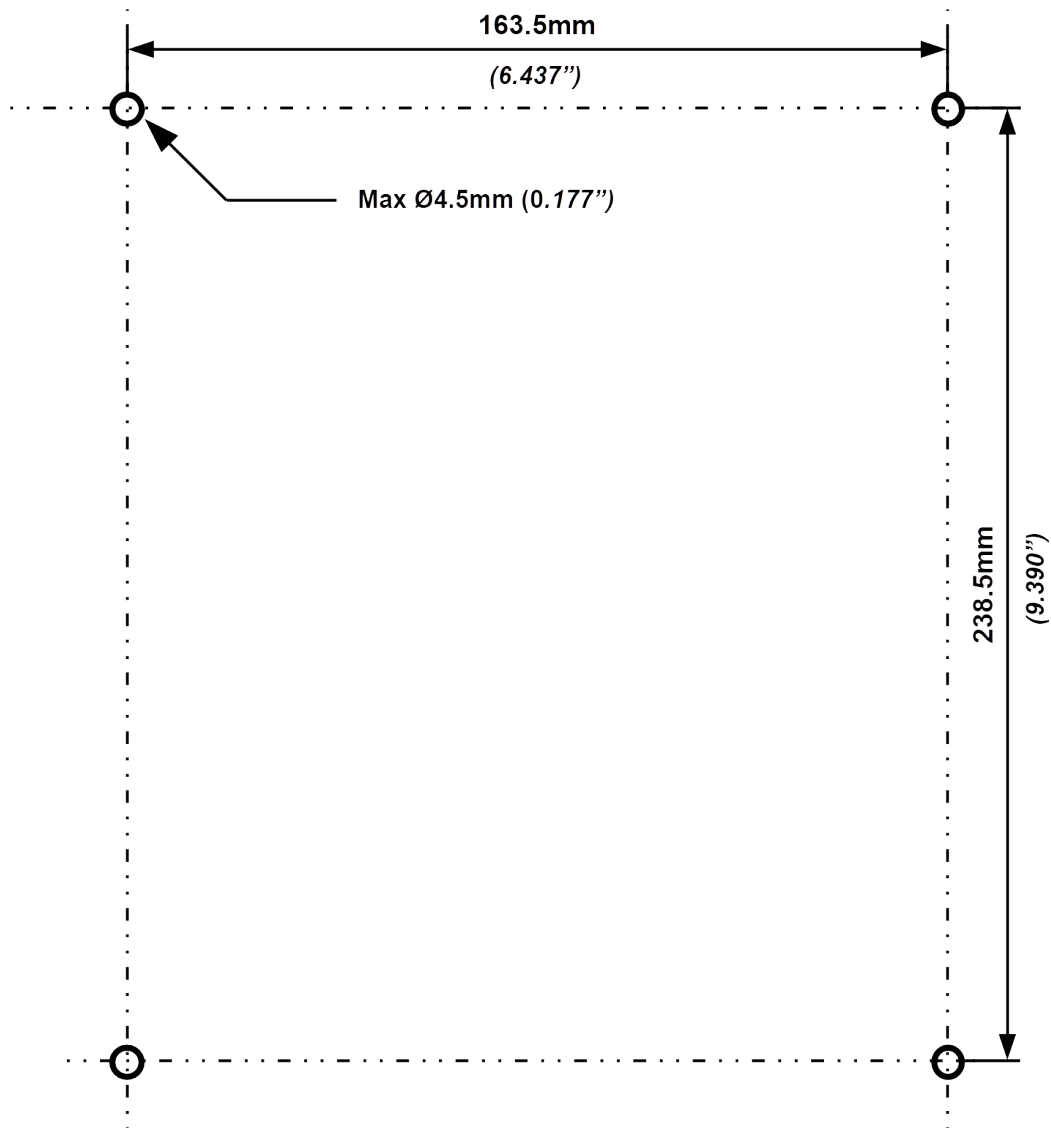


Figure 5: Wall mounting dimensions for the ProH2O Professional Module

ProH2O Professional Module - PCB Connections

The ProH2O Professional module has two rows of terminal blocks for connecting the power supply, ProH2O Calibrate Leader cable, fault output, alarm output and analogue outputs. See Figure 6 for the PCB connections diagram.

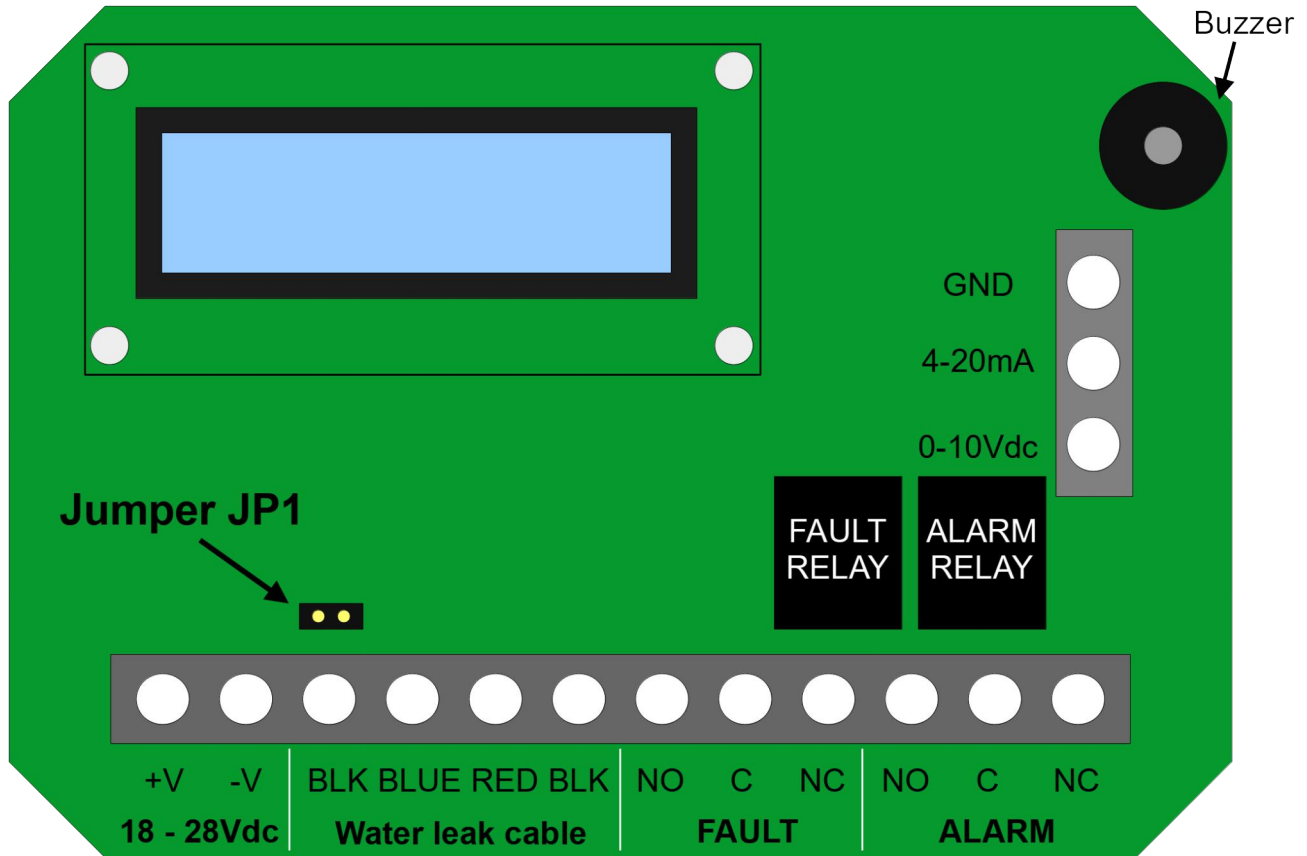


Figure 6: PCB Terminal connections for the ProH2O Professional module

The bottom row of connectors are for connecting power, the detection cable and the two relay outputs. The terminals are clearly labelled on the PCB. The analogue outputs (4-20mA and 0-10Vdc) are located on the right of the PCB. The analogue outputs share a common ground terminal. **The analogue outputs are not isolated from the rest of the PCB and may require isolating if being transmitted over long distances.**

During installation **jumper JP1**, located above the left most BLK terminal, should be shorted with the supplied jumper to allow the controller to automatically detect the length of water leak cable it is attached to. In normal operation this link must be left open.

ProH2O Professional Module - Analogue Outputs

The ProH2O Professional has 0 - 10Vdc and 4 - 20mA analogue outputs as standard which can be used to interface with industry standard monitoring or process control equipment. The table and graph below details how the alarm and fault status may be calculated from the analogue output value.

Please Note: the analogue outputs are referenced to the ground of the ProH2O Professional PCB and may require isolating if being transmitted over long distances.

Analogue Outputs		0 - 10Vdc	4 - 20mA
Type			
Condition			
Any Fault		0V	4mA
"Analogue Ouptuts Distance Loc: Off"	Normal Operation	0.5V	4.8mA
	Alarm	10V	20mA
"Analogue Outputs Distance Loc: On"	Normal Operation	0.5V	4.8mV
	Alarm	Propotional to the distance along the cable where leak has been detected (see graph below) $\text{Distance to leak (0-10V)} = (C_L \times (V_O - 1)) \div 9$ $\text{Distance to leak (4-20mA)} = (C_L \times (5 \times I_O - 28)) \div 72$ where C_L is the zone length I_O is the 4-20mA value & V_O is the 0-10Vdc value	

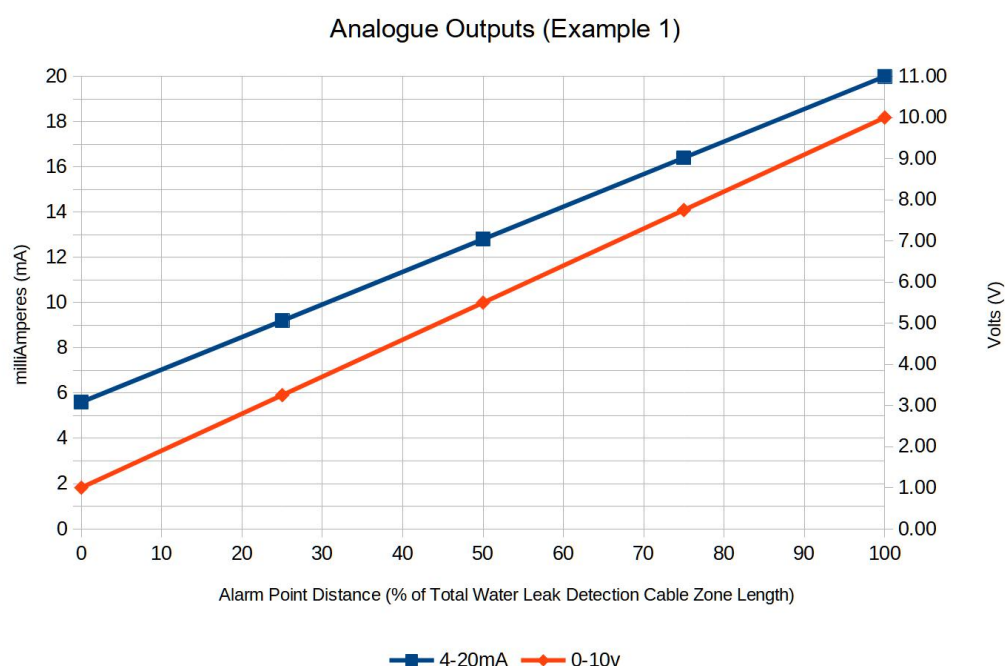


Figure 7: Graph of analogue output value vs alarm point distance

Commissioning

The following screens will be shown on the built in LCD display of the ProH2O Professional module after power up, normal operation and in a fault or alarm condition.

This should be the first screen visible after powering up the ProH2O Professional Module.



PROH2O
PROFESSIONAL

The screen will show the current software version of the ProH2O Professional module for approximately 3 seconds.



PROH2O S/W VER:
092020001

The screen will show "Commissioning Installation" if this is the first time the module has been powered up or it has been reset. Press SET to continue. If the module has already been commissioned then the screen will show "Installed" for approximately 3 seconds before continuing automatically.



COMMISSIONING
INSTALLATION

If the system is being commissioned for the first time or after a reset, the screen will show "Cable Length Calculating...", before displaying the calculated zone length of ProH2O Water Leak Detection Cable and ProH2O Non-sensing Cable. Ensure jumper JP1 is shorted out on the PCB (see page 14) before this stage.



CABLE LENGTH
CALCULATING...

If the cable length cannot be calculated for some reason the screen will show "Error Calculate Check JP1 Link". Check the Jumper JP1 is shorted out and press SET to retry the cable length calculation. Otherwise check the water leak detection cable connections and end-of-line plug is installed firmly.



ERROR CALCULATE
CHECK JP1 LINK

If the cable length has been calculated, the screen will display the length in metres and feet as per the example. Press SELECT to re-calculate the length or SET to continue.



CABLE LENGTH:
250M / 820FT

Commissioning (cont.)

After successfully calculating the cable length the screen will show "Please remove JP1 link". This is a prompt to remove the short from Jumper JP1 (see page 14). Once this is done, press SET to continue.



PLEASE REMOVE
JP1 LINK

Choose whether the alarm relay should be latching or non-latching. Press SELECT to alternate between 'YES' and 'NO'. Press SET to continue.



ALARM RELAY
LATCHING: YES

Choose whether the fault relay should be latching or non-latching. Press SELECT to alternate between 'YES' and 'NO'. Press SET to continue.



FAULT RELAY
LATCHING: YES

Choose whether the built-in sounder should be activated in a FAULT or ALARM condition. Press SELECT to alternate between 'YES' and 'MUTED'. Press SET to continue.



SOUNDER ACTIVE
YES

Select whether the 0-10Vdc and 4-20mA outputs should be set in proportion to the distance along the cable where water has been detected or not. See page 15 for more details.



ANALOG OUTPUTS
DISTANCE LOC: YES

Normal Operation

In normal operation the screen will cycle "ProH2O Professional - " on the top line and "Normal Operation" on the bottom line. Press either SET or SELECT to switch the LCD backlight on briefly.



PROH2O PROFESSI...
NORMAL OPERATION

LED Illustrations

POWER 

FAULT 

ALARM 

Alarm Condition

If sufficient water comes into contact with the water leak detection cable, the controller will automatically calculate how far along the cable the water which has come into contact with the detection cable is located and trigger an alarm condition.



ALARM POINT (L)
750M / 492FT

POWER 

FAULT 

ALARM 

The LCD screen will show "ALARM POINT" followed by "(L)" if the alarm relay is set latching or "(NL)" if the alarm relay is set non-latching.

The bottom line of the LCD will show the distance in metres and feet to the calculated point at which water has come into contact with the water leak detection cable. **"0m / 0ft" corresponds to the connection point at the end of the 10m / 33ft calibrated leader cable (whether this is ProH2O Water Leak Detection cable or ProH2O Non-sensing cable).**

Press SET/MUTE to mute the sounder (if active) but keep displaying the alarm condition.

Press SELECT/RESET, if the alarm relay output is set as latching and the alarm condition has been cleared (i.e. the cable is dry).

Note: While the system may be reset shortly after the detection cable has been removed from any water in contact with it, the detection cable should be allowed to dry thoroughly to maintain alarm point location accuracy. A recurring alarm condition at different points along the detection cable, while other parts of the cable are still damp may result in reduced accuracy of distance location.

Fault Condition




If the controller detects a fault the top line will show "FAULT DETECTED" and an error code:

Code	Description
100	Break in the sensor cable circuit
200	Internal micro-controller fault
300	Reserved for future use



FAULT DETECTED
ERROR CODE: 100

LED Illustrations

POWER 
FAULT 
ALARM 

Resetting Installed Parameters

To reset the installed parameters of the ProH2O Professional Module, hold the SET and SELECT buttons down while powering up the module. (The SET and SELECT buttons must be held down before the module power is switched on). The module parameters will be reset and the unit can be re-commissioned.

Frequently Asked Questions

1. What is the best way to secure the leak detection cable?

The leak detection cable should be firmly attached using self-adhesive U-clips or similar. These can be screwed through to ensure the clip does not become loose. When using the detection cable on the floor, ensuring the cable does not have any air gaps under it will give the quickest response to a leak. Any gaps between the surface and the cable decrease the response time and increase the required amount of water needed to trigger an alarm. If the detection cable is to be run alongside a pipe, tie wraps or equivalent should be used to secure the cable at 8in (20cm) intervals to prevent sagging. Once again, any gaps between the piping and cable will decrease the response time and increase the required amount of water needed to trigger an alarm.

2. How can I check the integrity of the cable?

The ProH2O Professional module continuously monitors the detection cable for faults along the length of cable. To test the cable will detect a leak either dip the cable into a tray containing a reasonable amount of water (see point 4 below) or take a piece of conductive wire and touch it between two black cores on adjacent sides of either a red or blue core at some point along the cable. To verify a piece of cable without powering up the system, disconnect the length of cable from the ProH2O Professional module and use a multimeter to test for resistance between the two outer most pins on the connector at one end of the detection cable with the end-of-line plug attached at the other end. In normal conditions the resistance should be approximately 1.8Mohms. Placing a section of the cable into a tray of water should reduce the resistance between the outer most pins to approximately 1Mohms or less. In normal operation, removal of the end-of-line plug should put the controller into fault. Simulating an alarm condition at the beginning and end of the zone using either of the methods mentioned previously, verifies the integrity of the cable along its whole length. The detection cable must be completely dry for a fault condition to be detected.

3. Can ProH2O Water Leak Detection cable be laid directly on metal surfaces?

Yes. The ProH2O Water Leak Detection cable is constructed to minimise false alarms, including the use of a non-conductive polymer braid, by preventing the sensitive parts of the cable from touching conductive materials even when the cable is laid directly onto a conductive surface. (Care should be taken to prevent protruding conductive parts from going through the braid).

4. What size leak is needed to trigger the ProH2O Professional?

ProH2O Professional periodically sends pulses down the sensor cable to detect the presence of water. The pulse energy is absorbed as it travels down the sensor cable. The result is a larger section of the cable needs to be in contact with water at the far end of the sensor cable compared to the end nearest the ProH2O Professional controller. At the nearest end water needs to be in contact with approximately 60mm (2.5in) of sensor cable whereas at 305m (1000ft) approximately (200mm) 8in of cable needs to be in contact with water (in all cases, submerged to at least half the depth of the cable - 3mm/0.118" deep).

Frequently Asked Questions

5. Can leader cable be used with the ProH2O Professional?

A fixed length (10m/33ft) of ProH2O Calibrated Leader cable is supplied with the ProH2O Professional kit. This ensures accurate distance location and aids in locating the controller some distance from the beginning of the zone. Do not cut or extend this leader cable or this will impair the operation of the ProH2O Professional module. Any excess leader cable should be coiled up in a secure location. ProH2O Non-sensing cable may be connected to the ProH2O Calibrated Leader cable to extend the length before the start of the ProH2O water Leak Detection cable. The 0m / 0ft starting point is always at the connection at the end of the ProH2O Calibrated Leader cable, whether this is onto ProH2O Water Leak Detection cable or ProH2O Non-sensing cable. Any ProH2O Non-sensing cable used counts towards the maximum zone length of 305m (1000ft).

6. What should I do if there are areas in a zone which do not require leak detection?

For sections of the zone which do not require leak detection, ProH2O Non-sensing cable is available in 10m (33ft) lengths. The non-sensing cable is a rugged waterproof cable coated in 105°C rated PVC and is pre-terminated for easy connection to ProH2O Water Leak Detection cable. Multiple lengths may be connected together as required. Any ProH2O Non-sensing cable used counts towards the maximum zone length of 305m (1000ft).

7. Can the ProH2O Professional be used to switch off the flow of water?

Yes. Many fire alarm control panels and building management systems provide outputs which can be programmed to activate when a certain input is triggered - such as the detection of a water leak. These outputs are often used to activate/deactivate door retaining magnets, roller shutter doors or similar things but they are ideally suited to activating electric solenoid valves controlling the flow of water. In the majority of cases the alarm volt-free relay contacts on the ProH2O Professional module will be used to trigger an alarm condition on the fire alarm control panel or building management system by switching in a low resistance. The control panel can then be programmed to activate a particular output operating an electric solenoid valve switching off the flow of water. Alternatively, it is possible to use the outputs of the ProH2O Professional module directly to switch a solenoid valve on or off.

8. Can the ProH2O Professional communicate with serial protocols (RS232/RS485) or addressable systems?

The ProH2O Professional module cannot communicate directly with serial protocols, however, industry standard modules are available which can expand the functionality. For example, the Advantech ADAM-4052 module can link up-to 4 ProH2O Professional modules (2 channels per ProH2O Professional) to an RS-485 or RS-232 network. In a similar manner, many manufacturers of addressable systems supply addressable zone monitors allowing conventional sensors such as the ProH2O Professional module to be connected.