WD Water Detection Cable

and Controller

Product Guide

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WDM-KM SYSTEM INSTALLATION - IMPORTANT GUIDELINES

Please read this instruction leaflet thoroughly before commencing installation.

The WDM-KM control module should be wall mounted with 98.3mm x 36.5mm fixing centres and 4mm dia. screws of minimum 15mm length.

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 (see sensitivity).

It is important at all times to keep the detection cable clean and free from dust, debris and other contaminants that may soil the cable, especially during installation.

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 the WDM-KM end-of-line plug is firmly attached at the end of the zone of water leak detection cable before commissioning the system.

Ensure the detection cable is thoroughly dried out after an alarm condition before resetting the system.

Ensure a minimum of 3.75m (12.5ft) and a maximum of 500m (1640ft) of detection cable is used with a single WDM-KM.

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.

The WDM-KM and Signaline WD water detection cable should be inspected at regular intervals to check correct functioning and if necessary cleaned. The inspection interval should be no greater than 12 months.

Where the Signaline WD water detection cable has been installed following recommendation by an insurance company, the installation must be carried out precisely in accordance with the insurers specification.

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WDM-KM SYSTEM INSTALLATION - IMPORTANT GUIDELINES

Do not connect the WDM-KM alarm or fault outputs such that it may initiate a fire alarm signal on the fire alarm control panel.

Store the detection cable and module in a cool, dry area. Storage areas should not exceed 50°C and 75% RH.

Do not cut and re-terminate the detection cable. The connections have been factory fitted and are unserviceable.

Do not paint the detection cable

Do not put the detection cable under excessive tension. Maintain some slack in the detection cable when laying it out on surfaces.

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 exceed the maximum rated input voltage of the WDM-KM. (30Vdc)

Avoid laying the detection cable in areas where heavy traffic may result in the cable being crushed.

Do not reverse the polarity on the opto-isolated fault output.

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WDM-KM SYSTEM SPECIFICATIONS

Dimensions

- Width 110.79mm (4.36")
- Height 57.88mm (2.28")
- Depth 39mm (1.54")
- Wall Mount Fixing Centers 98.30mm (3.87") x 36.50mm (1.44")

Electrical

- Operating Voltage
   12 - 30 Vdc
- Operating Current
   <5mA (Normal Operation)
   <25mA (Alarm Relay Activated)

Alarm output - Non-latching
   NC - NO (Form C) Volt Free Contacts
   1A, 30Vdc (resistive load)
   0.3A, 110Vdc (resistive load)

Fault output
   Normal closed opto-isolated output
   (opening on power loss or open circuit of detection cable)
   <50mA, 35Vdc (resistive load)
   Max power dissipation: 150mW

Physical

- Operating Temperature 0°C - 50°C (32°F - 120°F)
- Maximum Zone Length 500m (1640ft)
- Minimum Zone Length 3.75m (12.5ft)

Sensitivity

A minimum amount of water must be in contact with a continuous length along the detection cable to trigger an alarm. For example a pool of water 5mm (0.2") deep x 50mm (2") wide x 200mm (8") long. Any size leak must submerge the cable to a depth sufficient enough to come in contact with both black cores for an alarm to be triggered.

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TYPICAL SYSTEM CONFIGURATION

The WDM-KM may be connected to any compatible fire alarm system, addressable module or building management system. The WDM-KM uses a low-power circuit to monitor the detection cable and requires power supply. Do not power the WDM-KM from the fire alarm control panel directly. Figure 1 shows a typical connection diagram. Signaline non-sensing cable may be used between the WDM-KM and the detection cable.
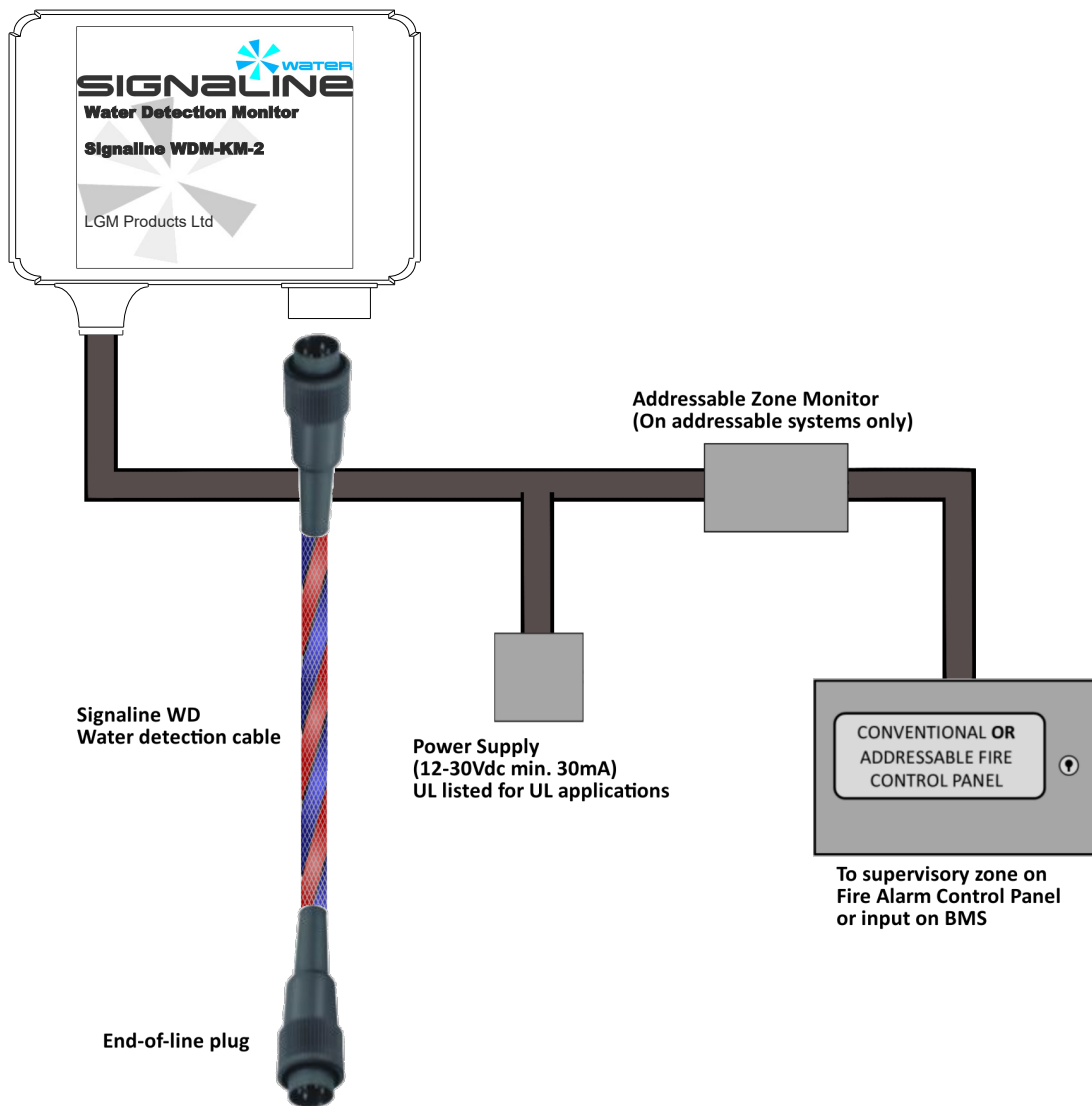

Figure 1: Typical Signaline WD configuration

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TYPICAL WIRING CONFIGURATION

Figure 2 shows the WDM-KM wiring diagram looking at the unit from the above. The Signaline WD Water Leak Detection Cable Zone should be attached to the panel mounted socket on the left hand side. The Signaline WD water detection cable plug pushes into the socket and then the outer barrel twists to lock in place. Between 3.75m (12.5ft) and 500m (1640ft) of Signaline WD cable can be connected to a single WDM-KM.

The field wiring for power and connection to external systems is located on the right hand side of the PCB via a removable 7-pin header. To aid in wiring the unit, pull the plug from the header on the board and wire the field wiring connections as required. Then push the plug securely back into the header on the PCB.

Note: the fault output is polarity sensitive and must be wired the correct way round to avoid damage and function as expected. The NC terminal corresponds to the +ve connection and the C terminal corresponds to the -ve connection.
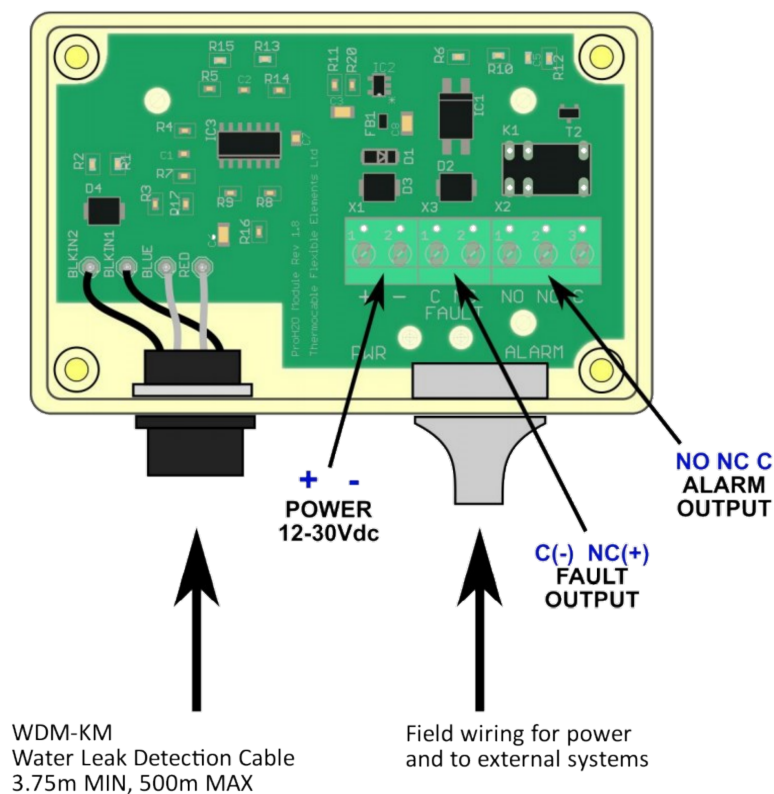

Figure 2: WDM-KM Wiring Diagram

INSTALLATION PROCEDURE

Signaline WD 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.

Commissioning the WDM-KM

The WDM-KM is an interface module which continuously monitors a single zone of Signaline WD water detection cable for an alarm or fault condition. It uses a low-power circuit and requires a power supply.

The sensitivity of the module is set during manufacture to provide a reasonable sensitivity which will prevent false alarms and provide an optimum level of protection.

A Form C (NO-C-NC) volt-free relay contact alarm output and a normally closed opto-isolated fault output are provided for connection to external monitoring equipment, such as a conventional or addressable fire alarm control panel. Figure 2 shows the wiring diagram for connecting to the alarm and fault outputs and supplying power to the WDM-KM. For reference, the fault output opens on an open circuit in the detection cable or on power loss to the WDM-KM, the alarm output changes state when water comes into contact with the Signaline WD water detection cable.

Figure 3 shows an example wiring configuration when connecting the WDM-KM to a fire alarm control panel.
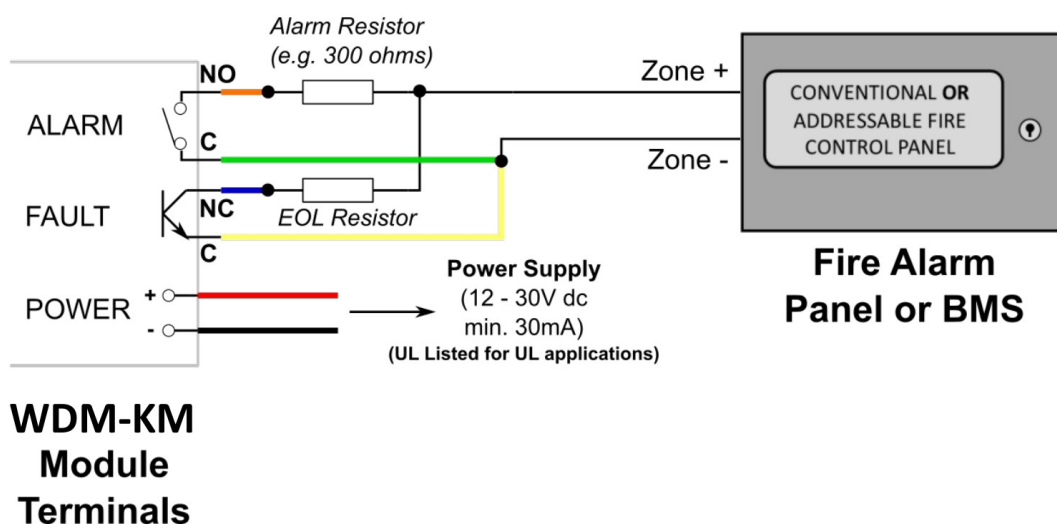
Figure 3: Signaline WD Wiring Diagram

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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 directly to the WDM-KM. The WDM-KM should be connected to an addressable zone monitor or supervisory zone on a conventional fire alarm panel.

Power up the WDM-KM and verfiy that the system does not go into an alarm or fault condition. Removing the end-of-line plug should put the system into a fault condition. Reattaching the end-of-line plug should allow the fault condition to be cleared.

To test for an alarm two methods can be used:
   a) Dip the cable into a reasonable amount of water until the system alarms.
   b) Take a piece of wire and touch it between two black cores on adjacent sides of either a red or blue core at some point on the detection cable.

Removal of the alarm condition, either by drying out the cable or removing the jumper wire between the two black cores, should allow the system to be reset. This should be repeated for each length of detection cable to ensure that they are all functioning correctly

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LAYING THE CABLE

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 WDM-KM continuously monitors a single zone of Signaline WD water detection cable. Signaline Water lead-in cable may be used if the area requiring monitoring is some distance from the module. Signaline Water lead-in cable comes pre-terminated and in a fixed 33ft length (approx 10m) for simple connection to the leak detection cable and interface module. Terminated Signaline Water lead-in cable may also be used in areas where no leak detection is required and can be connected between lengths of leak detection cable.

Signaline WD water detection cable is only available in terminated lengths and can be connected together to increase the coverage area. Do not cut and re-terminate the detection cable. Up to 500m (1640ft) may be used in a single zone. A minimum of 12.5ft (approx 3.75m) of leak detection cable must 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.

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.

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.

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LAYING THE CABLE—CONT.

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. Signaline Plastic P Clip should be used to secure the detection cable to the floor. Signaline WD water detection cable should be secured in place at approximately 4ft (1.22m) intervals. Where the detection cable is installed around HVAC or similar units it is advisable to secure the cable more frequently - approximately every 1.6ft (0.5m). When attaching the detection cable to piping, the cable should be secured to the underneath of the pipe using tie-wraps or equivalent but care must be taken not to apply excessive pressure to the cable. It is important to maintain contact between the cable and pipe hence the maximum spacing between tie-wraps should be no more than 150mm (6"). Lagging the pipe further aids detection of leaks.

TYPICAL FLOOR LAYOUT

In the below example, two zones are laid out consisting of one 100ft (approx 30m) length of detection cable (Zone 1) and two 100ft (approx 30m) detection cables joined together to form a 200ft (approx 60m) zone (Zone 2). Zone 1 is directly connected to a WDM-KM which is connected directly to a conventional fire alarm control panel or addressable zone monitor. Zone 2 is connected to a WDM-KM via a length of Signaline Water lead-in cable. Again, the module for zone 2 is connected directly a conventional fire alarm control panel or addressable zone monitor.
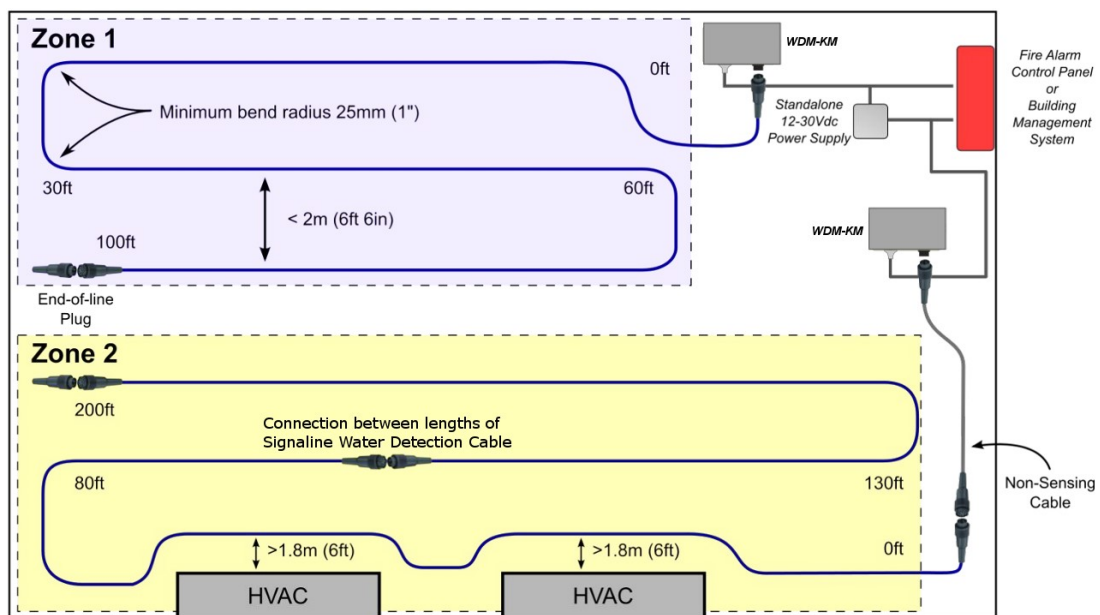
Figure 4: Typical floor layout for Signaline WD Water Detection Cable

FREQUENTLY ASKED QUESTIONS

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

The leak detection cable should be firmly attached using Signaline plastic P-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 decreases the response time and increases 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 intervals no greater than 150mm (6") to prevent sagging. Lagging the pipe aids detection. 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 WDM-KM continuously monitors the detection cable for faults along the length of cable. To test if 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 (less than 22AWG) 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 WDM-KM 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. In normal operation, removal of the end-of-line plug should put the module 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 Signaline WD water detection cable be laid directly on metal surfaces?

Yes. The Signaline WD water 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 though the cable may be laid directly onto a conductive surface. (Care should be taken to prevent protruding conductive parts from going through the braid).

FREQUENTLY ASKED QUESTIONS

4.   What size leak is needed to trigger the WDM-KM?

The WDM-KM and Signaline Water Leak Detection Cable has the ability to detect very small amounts of water or even a saturated environment, however this would increase the frequency of alarms for situations which pose no serious problem. The sensitivity of the   module is set during manufacture to provide an optimum level of protection against significant leaks which are a threat to mission critical or other sensitive equipment. As a guideline a minimum of approximately 100ml of standing water on a surface, at least 4mm (0.15") deep and 150mm (6") long, in contact with at least 150mm (6") of detection cable is necessary to trigger an alarm. It is important to note that when using the leak detection cable underneath a pipe a continuous flow of water at approximately 5l/min will need to be pass over a minimum of 125mm (5") of cable to trigger an alarm.

5.   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, Signaline Water lead-in 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 Signaline WD water detection cable. Multiple lengths may be connected together as required.

6.   Can the WDM-KM 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 WDM-KM will be used to trigger an alarm condition on the fire alarm control panel or building management system by switching in a low resistance (see page 3 - figure 3). The control panel can then be programmed to activate a particular output operating an electric solenoid valve switching off the flow of water.

FREQUENTLY ASKED QUESTIONS

7.   Is it possible to locate where along the detection cable the leak has occurred?

The WDM-KM does not give an indication of where along the detection cable the leak has occurred. It may be sufficient to zone the area requiring protection using multiple WDM-KMs linked to individual zones on the fire alarm control panel or building management system.

8.   Can leader cable be used if the WDM-KM is located some distance from the area requiring protection?

Yes, Signaline Water lead-in cable may be used as leader cable so the module may be located away from the area requiring protection if necessary. Multiple lengths of non-sensing cable may be connected together.

9.   Can the WDM-KM communicate with serial protocols (RS232/RS485) or addressable systems?

The WDM-KM cannot communicate directly with serial protocols, however, industry standard modules are available which can expand the functionality of the WDM-KM. Many manufacturers of addressable systems supply addressable zone monitors allowing conventional sensors such as the WDM-KM to be connected.

FREQUENTLY ASKED QUESTIONS

10.   What can be connected to the fault output?

The opto-isolated fault output is intended to be connected in series with end-of-line devices such as a resistor or capacitor. The values of these components should be chosen to match the required values for the fire alarm control panel or building management system in order to signal a healthy status in normal operation. The fault output can only conduct current in one direction and the polarity across it must not be reversed. To correctly drive a relay from the fault output a high sensitivity relay should be used (e.g. Finder 38.51.7.024.0050 (24Vdc) or Finder 38.51.7.012.0050 (12Vdc)). Caution should be taken when driving a relay which is going to be in the ON position for long periods of time as this may degrade the contacts.

11.   How often should the Signaline WDM-KM system be checked?

The WDM-KM and Signaline Water Leak Detection Cable should be regularly inspected to ensure correct operation. The inspection interval should be no more than 12 months apart. This should include visual examination of the module and cable. The detection cable should be clean and free of dust or other contaminants for maximum effectiveness. To verify the system is functioning correctly follow the steps in question 2.

For product support, contact us at technical@lgmproducts.com

Or call 01252 725257 to speak to our sales team

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