




# ALARMLINE II

## Alarmline II Analogue Linear Heat Sensor Cable Technical Manual

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<b>Version</b>	<p>This document applies to the following Alarmline II Analogue model numbers:</p> <p>AA AAN AAP AASS AASSN AACULP AACUSP</p>
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# Important information

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Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

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**WARNING:** Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

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**Caution:** Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

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**Note:** Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

**Note:** Kidde Products Ltd has taken every care to ensure that Alarmline II Digital Linear Heat Detection systems are as simple to install as possible but in case of difficulty, please contact our Help Line to ensure trouble free installation and operation. Kidde Products Ltd takes no responsibility for damage or injury occasioned as a result of failing to install or operate the equipment in accordance with these instructions.

# Chapter 1

## Introduction to product

### **Summary**

This chapter gives an introduction to the product and product range.

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# Introduction

Alarmline II Analogue Linear Heat detection systems are a flexible durable and cost-effective form of fire detection, suitable for protecting a wide range of commercial and industrial applications.

They provide flexibility in installation enabling them to be used for general area protection or proximity detection close to a specific point of risk. A wide range of alarm and pre-alarm temperatures, protective coatings and installation fixings ensure system design and installation is specific to the risk. Alarmline II analogue sensor cables are especially suited for confined areas and harsh environmental conditions, which prohibit the use of other forms of detection.

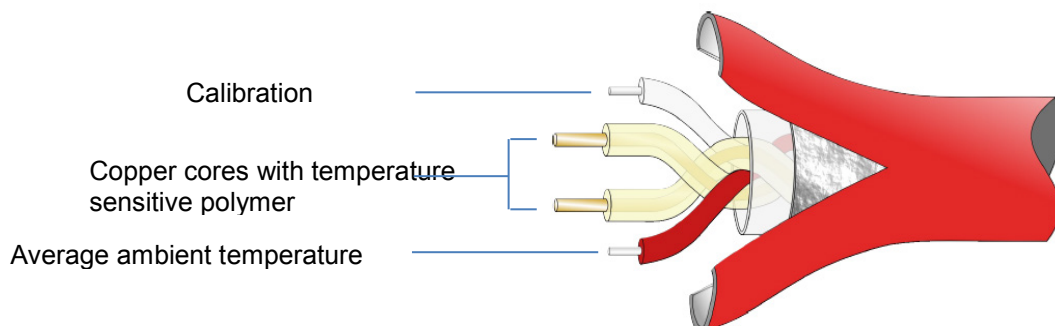
Alarmline II Analogue control unit provides monitoring of the sensor cable and allows full integration with any fire alarm control system.

This manual provides technical information, installation guidelines and design recommendations for some typical applications. This manual does not cover all possible applications, therefore for any design and installation advice you require please contact Kidde Products Ltd technical support on the first page (Contact information).

# Operation

Alarmline II analogue sensor cables consist of four cores. The two cores with the clear outer coating consist of a copper conductor coated in a temperature sensitive polymer whose resistance changes as a function of temperature. The core with the white outer sheath provides the calibration resistance and the core with the red outer sheath monitors the average ambient temperature. A foil shield and protective outer coat is extruded over the twisted cores.

Figure 1: Cable construction



The Alarmline II Analogue control unit monitors the resistance of the specially doped polymers within the sensor cable which change as a function of temperature. An abnormal change in the resistance along the detection cable

triggers either pre-alarm or alarm conditions on the control unit. The pre-alarm and alarm temperatures are programmed on the control unit through internal controls or via a laptop installed with the programming software.

The control unit provides volt free contacts for pre-alarm and alarm signalling as well as an opto-isolated photo transistor fault output, these enable simple interfacing to any fire alarm control system.

## Product range

The Alarmline II analogue sensor cable consists of one cable type with different protective outer sheaths:

**Table 1: Alarmline II product range**

Part number	Description	Comments
AA	Analogue sensor cable – Red	PVC outer sheath
AAN	Analogue sensor cable – Nylon	Nylon outer sheath
AAP	Analogue sensor cable – Polypropylene	Polypropylene outer sheath
AASS	Analogue sensor cable – Stainless steel/PVC	Stainless steel braid over PVC
AASSN	Analogue sensor cable – Stainless steel/Nylon	Stainless steel braid over Nylon

**The Alarmline II Analogue control unit is provided in two versions:**

AACUSP	Analogue control unit – Self programmable	Internal programming controls
AACULP	Analogue control unit – PC programmable	Requires programming software

## Approvals

### UL approval

The Alarmline II Analogue Linear Heat Detection system is fully UL521 approved. The approved spacing for the sensor cable is as follows:

**Table 2: UL approval**

Alarmline II Analogue LHD action temperature	Approved UL spacing
54°C (129.2°F) 64°C (147.2°F), 71°C (159.8°F), 72°C (161.6°F)	10m (35ft)
79°C (174.2°F), 86°C (186.8°F), 93°C (199.4°F), 100°C (212°F)	10m (35ft)

# Technical Specifications

Table 3: Sensor cable

Sensor cable specification		
Outer jacket	High temperature red PVC	
Sensor cable diameter	4.57mm ± 0.075mm (0.180" ± 0.003")	
RFI Shielding	Twisted and Foil shielding to reduce inductance and RF Susceptibility	
	Function	Colour
Sensor cable cores	Calibration resistance	White
	Sensor core	Red
	Conductor and specially doped polymer core	Clear
Maximum sensor cable length	500m (1640ft)	
Minimum sensor cable length	30.5m (100ft)	
Operating temperature range	-40°C - 125°C (-40°F – 257°F)	
Continuous ambient temperature range	-40°C - 90°C (-40°F – 194°F)	

The following chart provides a chemical resistance comparison for the available outer sheath materials on the Alarmline II analogue sensor cable.

Table 4: Outer sheath material

Chemical	Outer sheath material		
	PVC	Nylon	Polypropylene
Ammonia, liquid	*****	***	*****
Butane	*****	*****	*
Copper Nitrate	*****	*	*****
Fuel Oils	*****	*****	***
Gasoline	**	*****	**
Hydrofluoric Acid	*	*	*****
Kerosene	*****	*****	*
Diesel Fuel	*****	*****	****
Acetic acid	**	*	*****

Table 5: Control unit specification

Dimensions (w x h x d)	182 x 180 x 90mm (7.2" x 7.1" x 3.5")
Enclosure material	Polycarbonate with removable cover



<b>Enclosure rating</b>	IP66 (IK08)	
<b>Enclosure finish</b>	Light grey	
<b>Supply voltage</b>	20-28 VDC	
<b>Current consumption normal &amp; Fault</b>	<70mA	
<b>Current Consumption, Prealarm OR Alarm</b>	<80mA	
<b>Current Consumption, Alarm (&amp; Prealarm)</b>	<100mA	
<b>Current Consumption, Fault</b>	<70mA	
<b>Operating temperature</b>	0°C – 50°C (32°F – 122°F)	
<b>Visual indicators</b>	<b>Function</b>	<b>Colour</b>
	Alarm	Red
	Pre-Alarm	Red
	Fault	Amber
	Power	Green
<b>Relay outputs</b>	ALARM, PREALARM (all Form C) 2A@30VDC load rating – resistive 0.25A@250VAC load rating – resistive	
<b>Fault output</b>	Opto-isolated Phototransistor Output Max 50V @ 20mA	
<b>Remote reset</b>	Isolated input for resetting module remotely (20-28VDC pulse for at least 5s)	
<b>Alarm/Pre-Alarm Temperature Range</b>	54°C – 100°C (129°F – 212°F)	

**Note:** 54°C alarm or pre-alarm setting is for use in controlled ambient areas only. Specifically when the overall sensor cable length is less than 75m (246ft) ensure the humidity and temperature **DO NOT** exceed 75% and 30°C respectively



# Chapter 2

## Design and Installation overview

### **Summary**

This chapter covers the information and guidelines required for installation.

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## Design and installation

The design and installation of an Alarmline II Analogue Linear Heat Detection system is unique to every site and application, therefore it is recommended that this work is only undertaken by trained and competent persons following the guidelines in this manual. Further application specific information is provided in section “Application guidelines” on page 38.

### Design guidelines

There are two main types of protection that can be provided by the Alarmline II analogue sensor cable:

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<b>Proximity detection</b>	This is where the sensor cable is installed very close to the point of risk, generally the sensor cable will be installed around the equipment to be protected. There is no specific design criterion for these applications but there are guidelines to be considered.
<b>Area coverage</b>	This is where cable is distributed throughout the risk area allowing protection of the general area as opposed to specific points. Alarmline II analogue sensor cable offers an alternative to point type heat detectors in this type of application

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#### Guidelines for proximity detection

1. Selection of the appropriate sensor cable type is critical to ensure correct performance of the system. The cable selection will be based on the mechanical and environmental properties required.
2. The sensor cable should be installed close enough to the point of risk to give an acceptable response, but not in a position where it can be damaged or foul any moving parts. The location of the sensor cable should not restrict access to any parts of the equipment which require maintenance.
3. The thermal path to the sensor cable should not be obstructed and a minimum distance of 25mm (1”) should be left between the sensor cable and any surface it is being mounted to.
4. It may be necessary in outdoor applications to shield the sensor cable from direct sunlight to control the ambient temperature around the cable and prevent the risk of false alarms.
5. For installation within a hazardous area suitable Ex ‘e’ junction box with barrier glands are required.
6. Fixing of the cable will be determined by the application and the location at which the cable is to be installed. The cable shall be supported at a sufficient number of points to prevent sagging. The environmental conditions and practicality of clips to be used needs to be taken into consideration. The

Kidde Airsense range of standard fixing clips are show in section “Fixing clips” on page 15.

### Guidelines for Area coverage

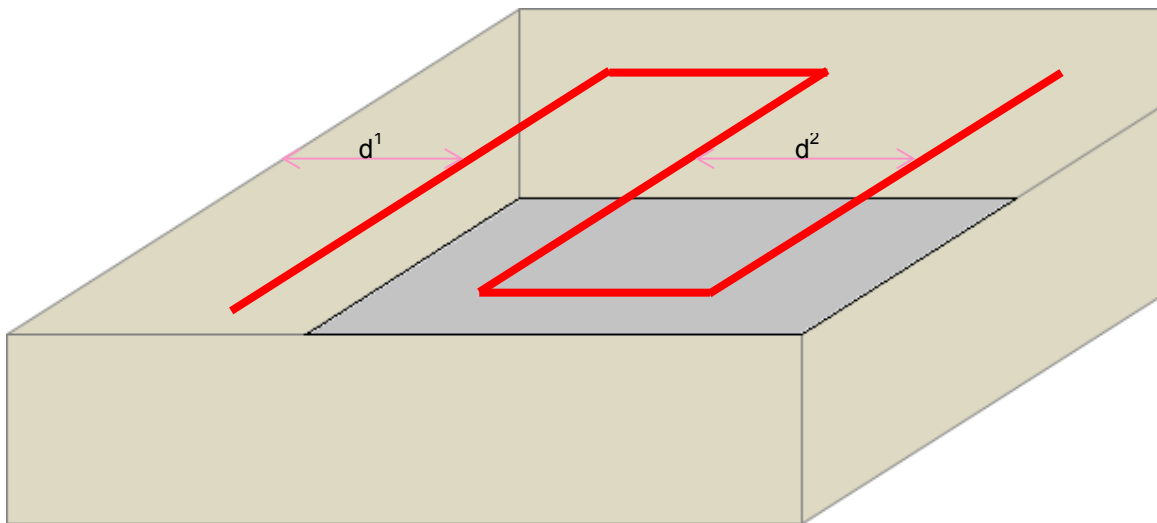
In applications where the sensor cable is installed for general area coverage i.e. as an alternative to point type heat detectors the positioning of the sensor cable will generally follow the relevant local standards or approvals. The sensor cable will generally be installed at ceiling height and laid out in such a way that sufficient coverage is provided, see Fig 2.

Maximum spacing between cable runs will in general follow the same limits as normal point type heat detectors and local standards for these should be followed. The following recognised standards determine the maximum spacing as follows:

BS5839: Maximum spacing between sensor cable runs 7.5m (25ft)

UL: Maximum spacing between sensor cable runs 10m (35ft)

**Figure 2: Distributed sensor cable providing general area coverage**



$d^1$  – Spacing of sensor cable from the wall  
 $d^2$  – Spacing between sensor cable runs

**Note:**  $d^1 = (d^2/2)$ , e.g.  $d^1 = 5\text{m}$  (17.5ft),  $d^2 = 10\text{m}$  (35ft)

Other design recommendations for general area coverage systems are as follows:

1. Selection of the appropriate sensor cable type is critical to ensure correct performance of the system. The cable selection will be based on the mechanical and environmental properties required.

2. The recommended total area coverage for a single Alarmline II Analogue detection zone shall be no more than 2000m<sup>2</sup> (6561sq feet).
3. The Alarmline II analogue sensor cable shall be installed no closer than 25mm (1") and no further than 150mm (6") from the fixing surface.
4. Fixing of the cable will be determined by the application and the location at which the cable is to be installed. Sensor cable shall be supported at no greater than 1m intervals, with additional supports where there are bends in the cable. The environmental conditions and practicality of clips to be used needs to be taken into consideration. Details of fixing clips provided in the Kidde Airsense range are shown in section 2.7
5. The minimum bend radius when installing the sensor cable is 50mm (2") for ambient conditions of 0°C (32°F) and above. For areas where ambient conditions are likely to be less than 0°C (32°F) the minimum bend radius is 100mm (4").
6. For installation within hazardous areas suitable Ex 'e' junction boxes and barrier glands must be used.

## Installation guidelines

The installation of Alarmline II analogue sensor cable systems is specific to the application and must be installed by trained and competent operators. This section covers installation of the Alarmline II Analogue control unit and sensor cable.

### Alarmline II analogue sensor cable installation guidelines

**Note:** It is highly recommended that a continuity test is carried out on the reeled cable prior to installation to ensure no damage has occurred during transit.

As mentioned a number of times throughout this manual it is not possible to provide definitive installation instructions as each application will be uniquely different. The following provides some of the important requirements when installing the analogue sensor cable.

1. Sensor cable must only be installed in the area to be protected. If the equipment monitoring the sensor cable is not installed within the risk area then a suitable interposing/leader cable can be connected between the sensor cable and the monitoring equipment.
2. Sensor cables can be provided with various outer sheaths to suit the environment such as PVC, Nylon, Polypropylene and Stainless steel braid. It is important to select the correct protective outer sheath to suit the environment.
3. Sensor cables should be terminated in junction boxes that are suitable to the environment.
4. Sensor cable fixing clips should be suitable for the environment and the surface they are being fitted to. There is no requirement for the sensor cable

to be tensioned however on straight runs it is recommended to support the cable at a distance of 1 metre to prevent sagging.

5. When using metal fixing clips it is necessary to protect the cable at the fixing points by using the neoprene sleeve around the sensor cable.
6. The minimum bend radius for the sensor cable is 50mm (2"). This increases to 100mm (4") for areas with an ambient temperature below 0°C (32°F) i.e. cold storage areas.
7. Cable is supplied on drums of 100m (328ft), 500m (1640ft) and 1000m (3280ft), cables can be easily jointed to create the required sensor cable length.
8. Sensor cable must not be painted.
9. Where possible fixing of the sensor cable should be the last stage in the installation to prevent any damage to the cable during other installation works.
10. It is recommended to check the continuity of the cable before installation to ensure it has not been damaged prior to installation being carried out.
11. Alarmline II analogue sensor cable should be pulled from the reel using a reel stand. DO NOT pull the cable of the reel vertically as this will twist and may damage the cable.

## Jointing

One of the advantages of the Alarmline II analogue sensor cable is that damaged sections of cable may be cut out and replaced without having to replace the whole sensor cable. When a cable has been damaged the affected section of the sensor cable may be cut away and a new section of sensor cable jointed into the existing cable. Jointing the cable is done with a junction box and appropriate cable glands to form a reliable, weatherproof connection.

It is important when jointing the sensor cable to ensure it is done correctly to prevent any problems from bad connections etc. The cable can be jointed using junction boxes or it can be soldered. It is important if the joints are to be soldered that they are suitably protected using heat shrink sleeving, this will prevent short circuits between the cores and also prevent any humidity getting into the joints. Kidde Airsense can provide an In-line jointing kit (part number: 1-K82024) which is a selection of heatshrink sleeves which will protect the soldered joint.

### Interposing or leader cable

Alarmline II analogue sensor cable is to be installed only within the area it is protecting. In some applications it is necessary to use an interposing or leader cable to connect the sensor cable to the Alarmline II Analogue control, unit. The recommendations for interposing/leader cables are as follows:

**Note:** These recommendations are based on the maximum sensor cable length of 500m (1640ft).

- Cable type: Fire rated, shielded cable

- CSA: 1.3mm<sup>2</sup> (16AWG)
- Max length: 3500m (11.500ft)

### Alarmline II Analogue control unit installation guidelines

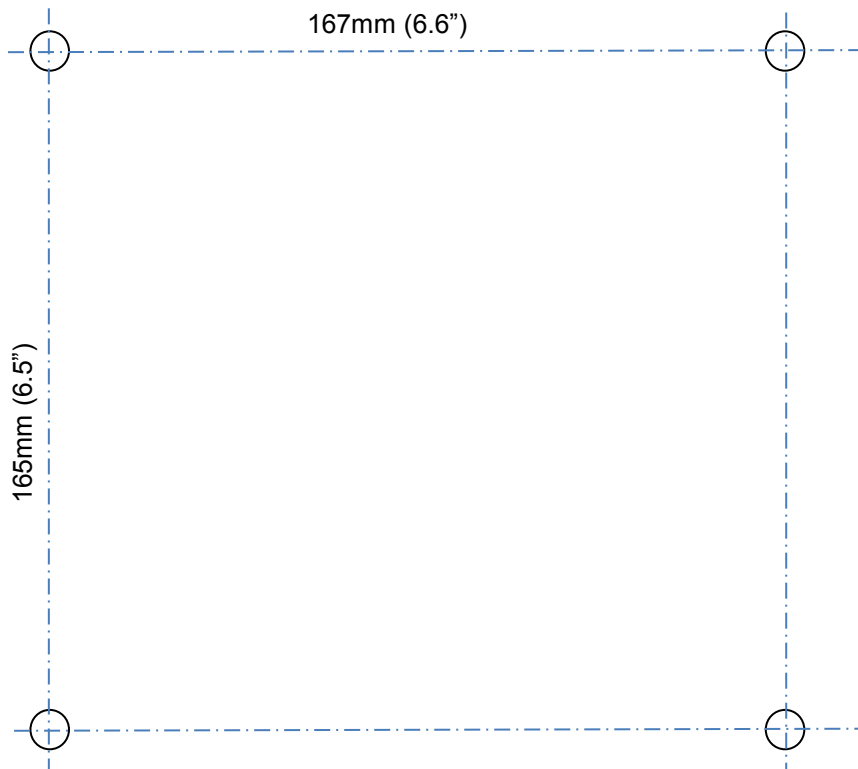
The Alarmline II Analogue control unit is provided in a Polycarbonate IP66 (IK08) enclosure therefore it is important when installing that the integrity of the control unit is maintained. This section provides guidance on the installation of the control unit and its associated end of line unit.

#### Mounting

The Alarmline II Analogue control unit is designed to be wall mounted, four fixing points are available. Fixing details are as follows:

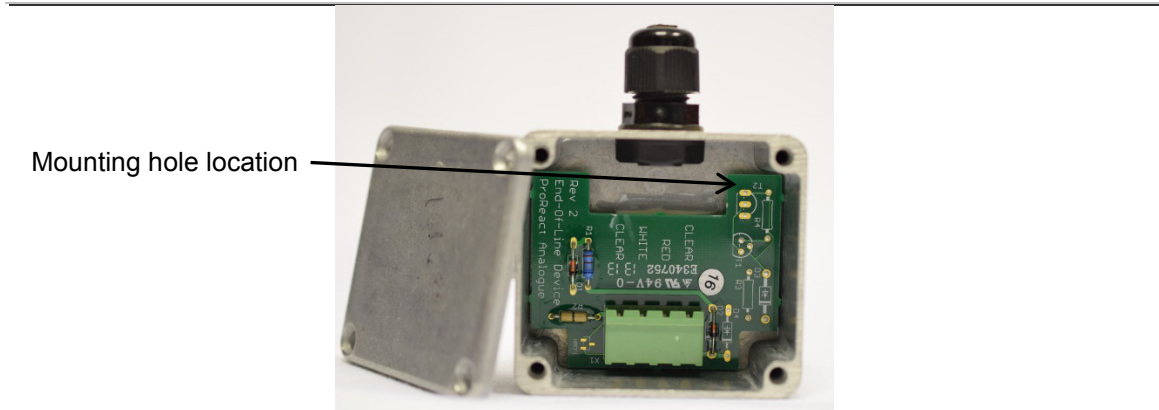
- Minimum screw length: 20mm (0.8")
- Maximum thread diameter: 4.5mm (0.2")
- Maximum head diameter: 7mm (0.3")

Figure 3. Alarmline II Analogue control unit fixing centres



The end-of-line unit for the Alarmline II controller is a small metal enclosure this should be mounted by drilling a hole no larger than 5mm (0.2") through the base of the enclosure, see Figure 4.



**Figure 4: End of line unit**

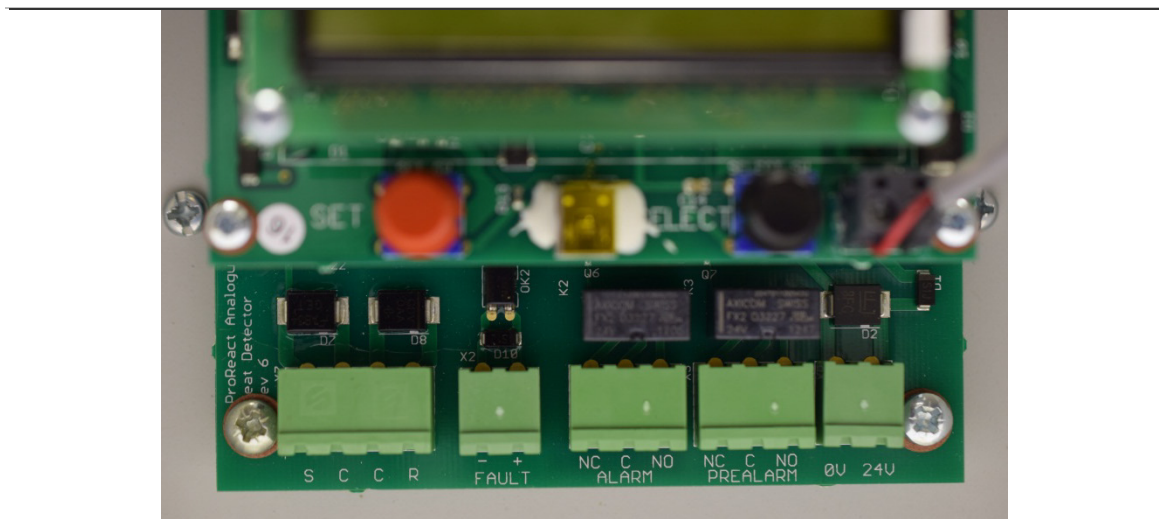
Use a suitable mounting screw of at least 19mm (0.75”) long and a washer to secure the module.

**Notes:**

1. If installing the EOL unit in an external location the IP integrity of the enclosure must be maintained.
2. If installing the sensor cable in a hazardous area the EOL unit must be installed in a safe area. A leader cable can be used between the end of the sensor cable and the EOL unit. The length of the leader cable is limited by the total length of leader cable allowed on the system, see “Mounting” on page 12

**Wiring connections**

Figure 5 shows the internal terminal connections available on the Alarmline II Analogue control unit.

**Figure 5: Control unit terminal connections**

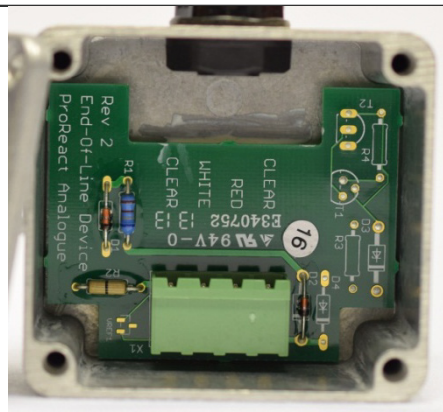
Cabling is terminated into plug-in connectors (not shown in Fig 3) the terminal connections from left to right are detailed below.

## SCCR (Sensor cable connections which are Screen, Clear, Clear, Red)

Screen	This is the connection for the un-insulated screen wire, the screen wire is only terminated at the control unit end of the sensor cable.
Clear	Two terminals which are used to connect the two cores coated in the transparent insulation. It is not important which transparent insulation cable is connected to which terminal marked clear.
Red	Terminal connection for the core coated in the red insulation material.
<b>Fault</b>	Two terminals marked + and – provide connections for the opto-isolated fault output used signal fault status to the main fire alarm system. This is a failsafe fault output and will be active while power is applied to the unit, a power fail will cause the fault output to deactivate.
<b>Alarm</b>	Three terminals marked NC (Normally closed), C (Common), NO (Normally Open) provide volt free changeover outputs used to signal alarm activation to the main fire alarm system.
<b>Pre-Alarm</b>	Three terminals marked NC (Normally closed), C (Common), NO (Normally Open) provide volt free changeover outputs used to signal pre-alarm activation to the main fire alarm system.  In the control units normal state (no pre-alarm) the C and NC terminals are closed circuit and the C and NO terminals are open circuit. When a pre-alarm is activated the terminals change state C and NO become closed circuit and C and NC become open circuit. Most fire alarm systems will connect to the C and NO terminals and will use the change of state from open to closed circuit to indicate a pre-alarm.
<b>0v, 24v</b>	Two terminals for the connection of the external power supply, it is important that the supply is connected to the correct terminals to prevent any potential damage to the PCB.  In the self-programmable version of the control unit the supply terminals are wire linked to the programming PCB and these connections must remain in place.

Figure 6 shows the terminal connections of the EOL monitoring unit.

**Figure 6: End of Line (EOL) unit terminal connections**



Connection of the sensor cable to the EOL unit is slightly different to the Alarmline II control unit end. Four terminals are provided which are for the sensor cable only:

Clear	Two terminals which are used to connect the two cores coated in the transparent insulation. It is not important which transparent insulation cable is connected to which terminal marked clear.
White	Terminal connection for the core coated in the white insulation material. The white core is only terminated at the EOL unit and has no termination at the Alarmline II control unit.
Red	Terminal connection for the core coated in the red insulation material.

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**Caution:** The screen (un-insulated) wire is not terminated at the EOL unit and should be cut off.

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## Hazardous area installation

Alarmline II analogue sensor cable is classified as “simple apparatus” when it comes to Hazardous areas and therefore does not require any certification. The sensor cable can be installed within a hazardous area although the control unit must be installed in a safe area.

All wiring must be carried out in accordance with BS EN 60079-14:2014 clause 9. This essentially means the Analogue Controller and end-of-line unit must be installed in the safe area

Analogue sensing cable can be run from the controller into a zone 0,1 or 2 area and then back to the end-of-line unit with no special considerations are required. It is recommended that a cable with a nylon extrusion on is used to meet the requirements of BS EN 60079-14:2014 clause 9.3.1

All terminations within the hazardous area must be in a suitable Ex ‘e’ junction box using barrier type cable glands which seal around the individual cores of the sensing cable such as the HAWKE ICG 623 cable gland.

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**WARNING:** When installing equipment in Hazardous areas close liaison with the responsible site personnel is essential.

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## Installation accessories

Kidde Airsense provides a standard range of installation accessories which can be used on many different types of application. The range of accessories consists of fixing clips, junction boxes and cable reelers. This section provides details of all installation accessories available within the Kidde Airsense range.

### Fixing clips

Although Kidde Airsense provides an extensive range of fixing clips they may not suit all applications. An assessment should be made to their suitability and an alternative fixing solution may need to be investigated by the installer.

There are no specific requirements for fixing clips other than they should not damage the sensor cable. It is recommended with most fixing clips that a neoprene sleeve is positioned around the sensor cable at the fixing point to

ensure no damage is caused by the clip or the cable tie. When installed it is not necessary for the cable to be taut, recommendations are that the cable should be supported every metre maximum with at least two fixing clips either side of a cable bend.

The minimum bend radius for the sensor cable is 50mm (2"), in freezer/cold store applications this would be extended to 100mm (4").

### T Clip

A common clip for fixing the Analogue sensor cable to flat surfaces such as ceilings, walls etc. The clip is fixed to the surface using a 6mm (0.24") countersunk screw with the sensor cable positioned in the channel of the clip as shown in Fig 6. The sensor cable is held in place using a nylon cable tie (Part no. 1-B6782-121) wrapped around the clip in a figure of eight and tightened. It is important to be careful when fixing as over tightening of the fixing screw may cause the clip to split.

Figure 7 : T clip installation



1. Part no.: 1-B6782-004
2. Material: Plastic
3. Operating temperature: -50°C to +85°C (-58°F to +185°F) material degrades at 120°C (248°F)

### Tie wrap and cradle

The tie wrap and cradle are an alternative method for fixing Alarmline II analogue sensor cable to flat surfaces. A cable tie is supplied with the cradle, although larger cable ties up to 8mm (0.31") wide can be used as alternatives. Neoprene sleeve (Part no. 1-B6782-008) is recommended to protect the cable from being damaged by the cable tie, as shown in Figure 8.

**Figure 8: Tie wrap and cradle installation**

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1. Part no. 1-27400-K245
  2. Technical specification (for cradle and cable tie):
    - a. Material: Polyamide 6.6
    - b. Operating temperature: -40°C to +85°C
    - c. Melting temperature: 260°C (500°F)
- 

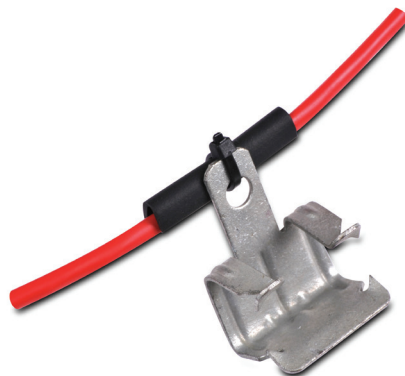
### Edge clip

The edge clip is a quick and easy solution when fixing to a metal structure such as a girder, angle bar etc. It is designed to be knocked onto any metal edge using a hammer; four teeth bite into the metal edge securing it firmly with no requirement for fixing screws. A range of clip sizes are available for various thickness of metal, see part number list. A fixing hole in the clip allows the securing of the sensor cable as shown in Fig 9, although it can also allow the fixing of a distance piece (Part no. 1-B6782-210) to extend the position of the sensor cable.

A neoprene sleeve (Part no. 1-B6782-008) is recommended to protect the cable from being damaged by the cable tie and insulate it from the metal clip.

**Figure 9: Edge clip installation**

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- 
1. Part nos.:
    - 1-B6782-003: Suitable for 2-3mm thickness
    - 1-B6782-024: Suitable for 3-8mm thickness
    - 1-B6782-025: Suitable for 8-14mm thickness
    - 1-B6782-026: Suitable for 14-20mm thickness
    - 1-B6782-195: Suitable for 3-8mm, Stainless Steel version
  2. Technical specification:
    - a. Material: Spring steel
    - b. Max. operating temperature: Approx. 815°C (1499°F)
- 

### Pipe clip

The pipe clip is designed to utilise existing pipework which may run through the protected area. It is designed to fit any size of pipe and should be fitted to the underside of the pipe and be secured in place using cable ties or strapping. The hole in the end of the clip allows for the securing of the cable using a neoprene sleeve and cable tie, or a distance piece can be connected to extend the position of the sensor cable. Without extending the clip the sensor cable will be supported approx. 60mm (2.4”) below the pipe, see fig 10.

**Figure 10: Pipe clip installation**

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- 
1. Part no. 1-B6782-005
  2. Technical specification:
    - a. Material: 304 Stainless Steel
    - b. Max. operating temperature: approx. 815°C (1499°F)
- 

### V clip

The V clip is useful when installing sensor cables within cable tray installations. Where multiple layers of cable tray exist the V clip can be fixed to the underside of a cable tray supporting the sensor cable protecting the lower cable tray as shown in Fig 11 and 12. The clip is designed to fit into the existing slots in the tray itself making it quick and easy to install. The sensor cable is located in the V channel which is approx. 60mm (2.4”) below the tray. The sensor cable is secured using a neoprene sleeve and cable tie.

**Figure 11: V clip installation**

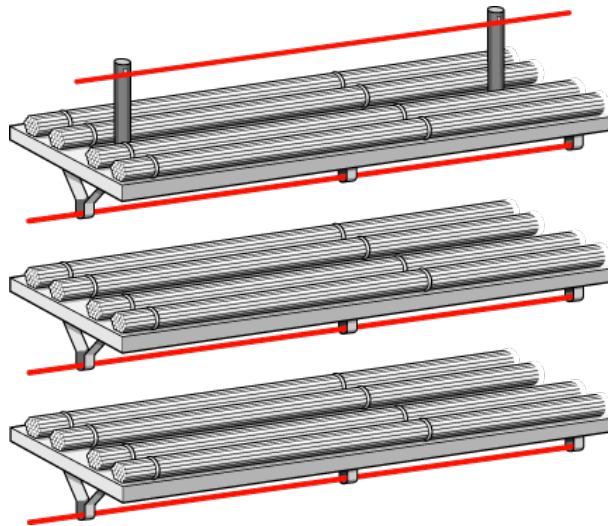
---



- 
1. Part no. 1-B6782-023
  2. Technical specification:
    - a. Material: 304 Stainless Steel
    - b. Max. operating temperature: approx. 815°C (1499°F)
- 

**Figure 12: V clip installation**

---



---

### L bracket c/w strain relief cable gland

The L bracket can be used to support Alarmline II analogue sensor cable either above or below the risk. It is commonly used on cable trays to support the sensor cable over the tray. A 6mm (0.24") fixing hole is provided in the bottom of the L bracket for securing it to its mounting surface. A strain relief cable gland is also provided for securing the sensor cable to the bracket as shown in Figure 13.

**Figure 13: L bracket c/w strain relief cable gland**

---



---

1. Part no. 1-B6782-154

2. Technical specification:

**Bracket:**

- a. Material: 18 swg Stainless Steel
- b. Max operating temperature: approx. 815°C
- c. Dimensions: Height 150mm

**Cable gland**

- a. Material: Nylon 6.6
  - b. Maximum temperature: 105°C (221°F)
- 

### Channel bracket

The channel bracket is an alternative option for securing Alarmline II analogue sensor cable to flat surfaces. Made from stainless steel the bracket has two 6mm (0.24") fixing holes and one 6mm (0.24") hole for securing the sensor cable to it as shown in Figure 14.

If necessary a distance piece can be attached to the bracket to extend the position of the sensor cable.

**Figure 14: Channel bracket**

---



---

1. Part no. 1-B6782-142

2. Technical specification:

- a. Material: 16 swg Stainless Steel
  - b. Max operating temperature: approx. 815°C (1499°F)
  - c. Dimensions: Height 60mm, Width 20mm, Depth 50mm (2.36" x 0.78" x 1.96")
-



## L Bracket

The L bracket is primarily designed to be used with the edge clip as shown in Fig 14. This is a common type of clip arrangement used on floating roof tanks. Edge clips can be connected to the foam dam around the edge of the floating roof tank without any drilling or welding etc. A simple M6 nut and bolt arrangement is used to attach the L bracket to the edge clip enabling the sensor to extend out over the rim seal. The sensor cable is secured to the end of the L bracket using a cable tie and neoprene sleeve through the 6mm (0.24") hole. Note: this solution may not be suitable for all floating roof tanks.

**Figure 15: L bracket and edge clip**



- 
1. Part no. 1-B6782-194
  2. Technical specification:
    - a. Material: 16 swg Stainless Steel
    - b. Max operating temperature: approx. 815°C (1499°F)
    - c. Dimensions: 200mm long
- 

## P Clip

The P clip is a general purpose clip which can be used to install the cable on to any flat edge or surface it can also be used to secure the sensor cable to either the edge clip, L bracket, channel bracket or distance piece. The clip is fitted with a TPE sleeve insulating the cable from the metal clip and protecting it against damage when clamped around the sensor cable. A 6.7mm (0.26") diameter fixing hole is provided, see Figure 16.

**Figure 16: P clip**



- 
1. Part no. 1-27400-K244
  2. Technical specification:
    - a. Material: Clamp Zinc electroplate, cold rolled steel
    - b. Sleeve: TPE
    - c. Max operating temperature: approx. 95°C (203°F)
-

## Distance piece

The distance piece is designed to be used in conjunction with any of the metal clips within the Kidde Airsense range. In some installations the nearest fixing point for the support clip may not be close enough to the point of risk therefore the distance piece can be attached to extend the position of the sensor cable. The distance piece is easily bolted to the clips using the 6mm (0.24") fixing hole, see Fig 17.

Figure 17: Distance piece

---



- 
1. Part no. 1-B6782-120
  2. Technical specification:
    - a. Material: Stainless steel 304
    - b. Max operating temperature: approx. 815°C (1499°F)
    - c. Dimensions: 200mm (7.9") long
- 

## Specialist application accessories

A significant application for Alarmline II analogue sensor cable is floating roof storage tanks. Installation of sensor cables in this particular application provides some significant challenges. The following accessories are specific to this type of application to overcome the installation issues.

### Retractable cable

On floating roof storage tanks where the roof moves up and down over a considerable distance it is necessary to provide a flexible electrical connection which can cope with the increased distance between the tank roof and tank top.

The coiled design of the retractable cable allows it to extend and contract as the floating roof moves up and down, this maintains the electrical contact between the junction boxes located on the tank top and the tank roof. The cable would be used in conjunction with the cable collector, Part number 1-B6782-032. A range of fixed length coils are provided by Kidde and the correct coil length should be selected based upon the height of the storage tank.

**Figure 18: Retractable cable****Technical specification:**

Number of cores : 4  
 Core Colours: 1 Blue 2 Brown 3 Black 4 Yellow  
 Core Size: 0.75 mm 2 (18AWG)  
 Core Insulation: Hytrel  
 Inner Sheath: Polyurethane  
 Outer Sheath: Hytrel  
 Cable OD: 10 mm (0.39")  
 Coil OD Nom: 230 mm (9.1")

**Electrical characteristics**

Core to Ground Capacitance (Ci): 101 pF/m  
 Core to Core capacitance (Cd): 83 pF/m  
 Bus Capacitance (Cbus): 267 pF/m

**Note:** This cable should be overall shielded and the shield connected to the shield wire of the analogue sensor cable.

**Cable collector**

The cable collector is used with the retractable cable on floating roof tank applications. As the tank roof rises and falls the retractable cable will extend and contract accordingly. The cable collector allows the cable to be neatly coiled without getting caught as the tank roof rises. This prevents the retractable cable from becoming snagged when the tank roof moves up and down.

**Figure 19: Cable collector**

---



- 
1. Part no. B6782-002
    - a. Material: 1.5mm BS.304 Stainless steel 304
    - b. Dimensions: Diameter 624 mm (25")  
Height: 505 mm (20")
- 

## Alarmline II Control module configuration

Setting up the control module is critical to ensure correct operation of the Alarmline II Analogue Linear Heat Detection system. This section details the set-up instructions for both the self-programmable and laptop programmable variants of the control unit.

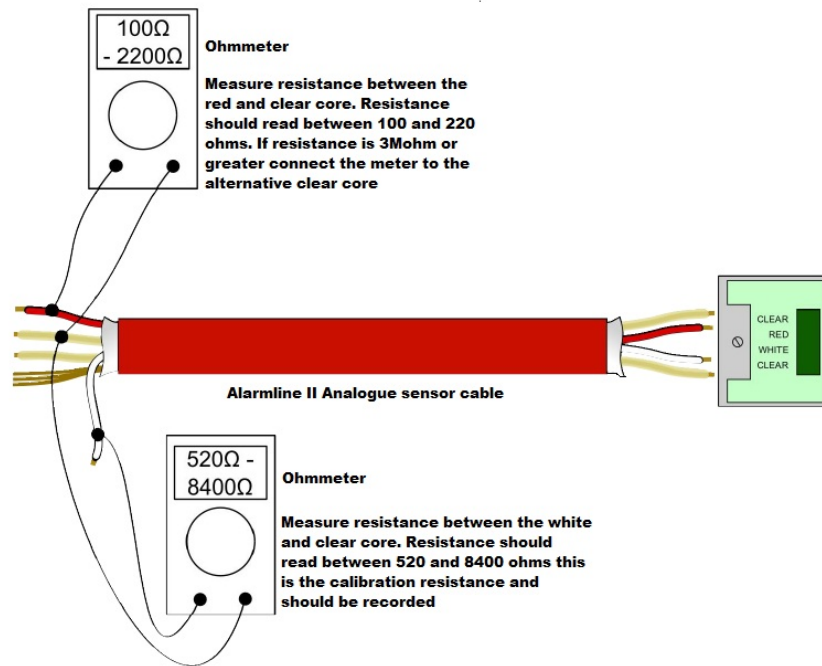
**Note:** The Alarmline II control unit will be in fault condition until configuration and calibration has been completed.

### Measuring the calibration resistance

Before the Alarmline II control unit can be configured it is necessary to measure the calibration resistance of the sensor cable.

To measure the calibration resistance of the sensor cable it must be terminated in the EOL unit, see section "Wiring connections" on page 13, but disconnected from the control unit end. The calibration resistance must be measured between the correct clear core (the clear core which is terminated within the EOL unit) and the red and white cores as shown in Figure 20.

Figure 20: Cable collector



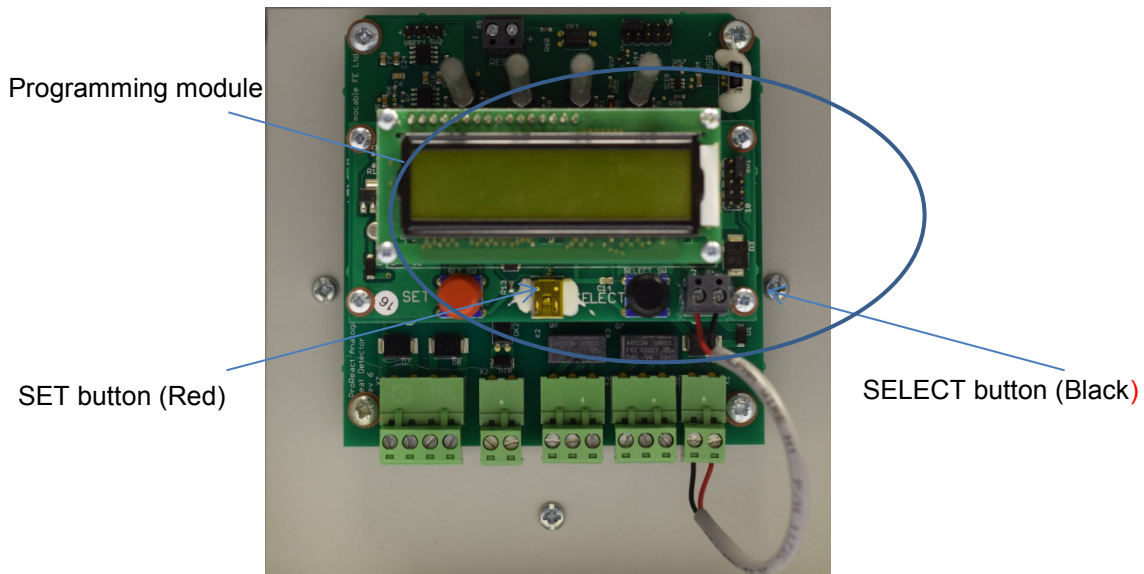
1. At the Alarmline II control unit end of the sensor cable strip back the cores to expose the internal conductors.
2. Connect an ohmmeter to one of the clear cores and the red and white core in turn. If the resistances measured are greater than 3MΩ then switch the ohmmeter to the other clear core. The resistance measured between the correct clear core and the red and white cores should be within the following ranges:
  - Clear to Red: 100 - 2200Ω
  - Clear to White: 520 - 8400Ω

Make a note of the resistance value between the clear and white core as this is the calibration resistance that will be entered into the control unit.

### Configuring the self-programmable control unit

The self-programmable control unit contains a programming module which provides an LCD and internal pushbuttons to enable the user to configure without a laptop, see Figure 21.

**Figure 21: Self-programmable control unit**



- SELECT button: Allows the user to cycle through the available configuration options
- SET button: Allows the user to select the option displayed on the LCD

The self-programmable control unit is also provided with a USB lead which is required to connect the programming module to the main PCB.

The first part of configuring the control unit is to set the calibration resistance of the sensor cable that is attached to the control unit.

1. Connect the sensor cable to the control unit and apply power.
2. The control unit when powered will display “Alarmline II Programmer” and the unit will be in fault i.e. Fault LED on and Fault output active.
3. Press the SET button and the following screen will be displayed:



4. Using the SELECT buttons scroll through the function options until the Commission option is displayed:



Press the SET button to select this option.

5. The screen now prompts you to enter the Calibration resistance as shown:

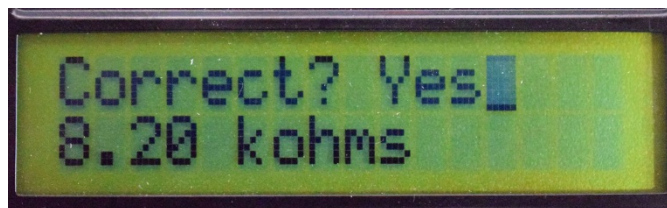


6 Enter the calibration resistance into the control unit using the SELECT button to cycle through the numbers and SET button to select the correct number, each number must be entered separately followed by the SET button. The calibration resistance is entered in kilo-ohms.



7. Once the calibration resistance is entered press SET to confirm.

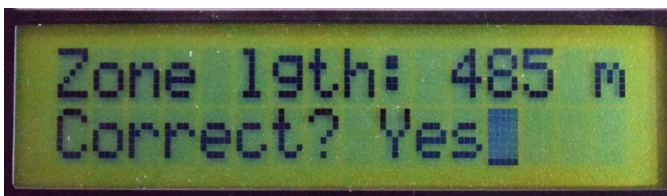
8. The screen will display the following confirmation prompt:



Use the SELECT button to toggle between YES and NO options and press SET to select the correct option.

If the NO option is selected the control unit will request the calibration resistance again.

9. If the calibration resistance is correct select the YES option, the screen will then display the calculated zone length. Zone length is the total length of the sensor cable:



- This must be checked to ensure it matches the installed sensor cable length.
- Toggle between YES and NO options using SELECT button, then press SET to select the relevant option. If the NO option is selected the control unit will request the calibration resistance again.

10. If the zone length is correct press the SET button. The display will request the alarm temperature to be configured, see section “Configuring the self-programmable control unit” on page 25

**Setting the Alarm and Pre-Alarm temperature**

Once the calibration resistance has been set, the display will prompt for the Alarm temperature to be configured.

It is critical the alarm temperature is set correctly for the application, if the alarm temperature is set too low there will be a risk of false alarms and if it is too high the system may not respond quickly enough.

The Alarmline II Analogue Linear Heat Detection System is designed such that when a section, equal to 3% of the total sensor cable length reaches a user-defined temperature an alarm is triggered.

**Example:** A 30m (100ft) length of sensor cable has a configured alarm temperature of 64°C/147°F. The alarm will be triggered when a 0.91m (3ft) section of the sensor cable reaches 64°C/174°F.

- For a greater proportion of sensor cable subjected to an abnormal temperature the activation temperature will be lower.
- For a smaller proportion of sensor cable subjected to an abnormal temperature the activation temperature will be greater.

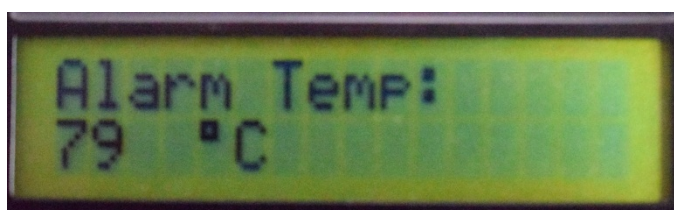
The table below shows the activation temperatures when a 1%, 2%, 3% or 5% length of the sensor cable is subjected to an overheat condition.

**Table 6: Relationship between % of cable subjected to overheat and activation temperature**

5%	3% (UL tested)	2%	1%	
50°C (122°F)	54°C (129°F)	57°C (135°F)	63°C (145°F)	
60°C (140°F)	64°C (147°F)	68°C (154°F)	74°C (165°F)	
67°C (153°F)	71°C (160°F)	75°C (167°F)	83°C (181°F)	Pre-Alarm only
68°C (154°F)	72°C (162°F)	76°C (169°F)	84°C (183°F)	Alarm only
74°C (165°F)	79°C (174°F)	84°C (183°F)	95°C (203°F)	
80°C (176°F)	86°C (187°F)	93°C (199°F)	103°C (217°F)	Alarm only
86°C (187°F)	93°C (199°F)	100°C (212°F)	108°C (226°F)	Pre-Alarm only
93°C (199°F)	100°C (212°F)	106°C (223°F)	113°C (235°F)	

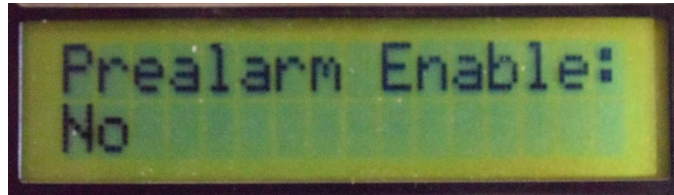
To set the Pre-Alarm and Alarm settings carry out the following steps:

1. The alarm temperature screen is displayed as below:



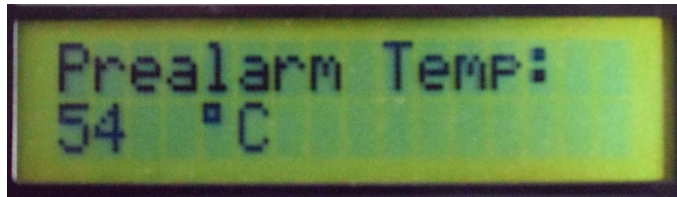


2. Press SELECT to scroll through the alarm temperature options, when the display shows the required alarm temperature press the SET button.
3. The display will show a prompt for the Pre-Alarm option:



Press the SELECT button to scroll between YES and NO options and press SET when the required option is selected.

- If NO is selected then there will be no pre-alarm functionality on the control unit.
  - If YES is selected for any alarm settings where the pre-alarm option is not available pre-alarm options will not be displayed and no pre-alarm functionality will be provided on the unit.
4. To set the pre-alarm temperature press SELECT to scroll through the available pre-alarm temperatures until the desired value is displayed and the press the SET button.



The available pre-alarm settings will depend on the alarm level setting, the table below shows the available pre-alarm settings for the respective alarm setting.

**Table 7: Alarm settings**

Selected alarm temperature(s)	Available Pre-alarm temperature(s)
54°C (129.2°F)	Not available
64°C (147.2°F)	54°C (129.2°F)
72°C (161.6°F)	54°C (129.2°F), 64°C (147.2°F)
79°C (174.2°F)	54°C (129.2°F), 64°C (147.2°F), 71°C (159.8°F)
86°C (186.8°F)	54°C (129.2°F), 64°C (147.2°F), 72°C (159.8°F), 79°C (174.2°F)
100°C (212°F)	54°C (129.2°F), 64°C (147.2°F), 72°C (159.8°F), 79°C (174.2°F), 93°C (199.4°F)

5. Following selection of the Pre-Alarm and Alarm threshold the display shows the message “Connect Alarmline II controller”.

6. Connect the USB lead between the programmer module and the main PCB and press the SET button. This transfers the configured settings from the programming module to the main PCB. Once complete the message “Settings transferred ok” will appear on the display:
- 

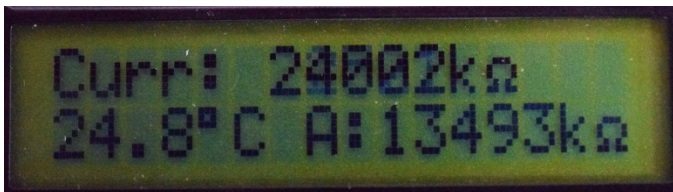


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### Diagnostic information

After configuration the display will automatically show diagnostic information. This is useful for trained service personnel when diagnosing a problem or confirming configuration has been performed correctly.

---



---

The display shows the ambient temperature measured by the cable in the bottom left corner and this should be checked to ensure it closely matches the ambient temperature around the cable  $\pm 2.5^{\circ}\text{C}$  ( $\pm 4.5^{\circ}\text{F}$ ).

If the ambient temperature value is outside the above tolerance check the calibration resistance and if different change the calibration resistance following the steps 6-12 in section “Measuring the calibration resistance” on page 24.

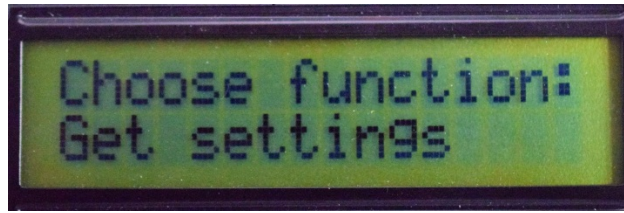
If the calibration is the same as previously measured add or subtract  $0.017\text{k}\Omega$  to the measured value and change the calibration value in the control unit.

To return to the “Choose functions” screen hold down the SET and SELECT buttons together for several seconds.

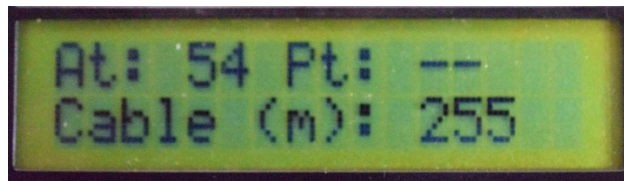
### Get settings

The configuration settings of the control unit can be viewed by carrying out the following steps:

1. To access the “Choose functions” screen hold down the SET and SELECT buttons together for several seconds.
2. Scroll the menu options using the SELECT button until the “Get Settings” option appears on the display:



- 
3. Press the SET button and connect the USB cable between the programming module and the main PCB when prompted.
  4. Press the SET button and the current settings will be displayed as shown below:
- 



- 
- AT = Alarm temperature
  - PT = Pre-alarm temperature (-- indicates a pre-alarm value has not been set)
  - Cable (m): = Sensor cable length

If the SET button is pressed again the unit will revert back to the diagnostic information display.

### Erase settings

The current configuration settings can be erased from the control unit by carrying out the following steps:

1. To access the "Choose functions" screen hold down the SET and SELECT buttons together for several seconds.
2. Scroll through the menu options using the SELECT button until the "Erase Settings" option is shown on the display:



- 
3. Connect the USB cable between the programming module and the main PCB when prompted and press the SET button.
  4. After several seconds the message "Settings Erased ok" will appear. The control unit will go back into fault mode until the unit has been reconfigured.



---

5. Press the SET button again and the following message will appear.

---



---

**Caution:** Erasing the configuration settings on the control unit will put the unit into a fault condition and will not trigger any alarm or pre-alarm. DO NOT LEAVE THE CONTROL UNIT IN THIS STATE. The control unit must be re-configured as soon as possible.

---

### Configuring the laptop programmable control Unit

The laptop programmable control unit provides LED indications only and therefore configuration/commissioning must be carried out using a laptop and the Alarmline II programming software. The following sections detail how to connect and use the software.

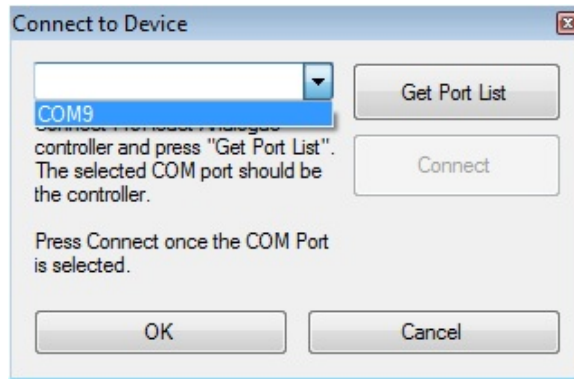
### Commissioning

1. Install and run the programming software on the laptop.
2. On the laptop software click on the green icon at the top left of the screen. Alternatively click on the "File" menu and click on "Connect". The following "Connect to Device" screen will appear:

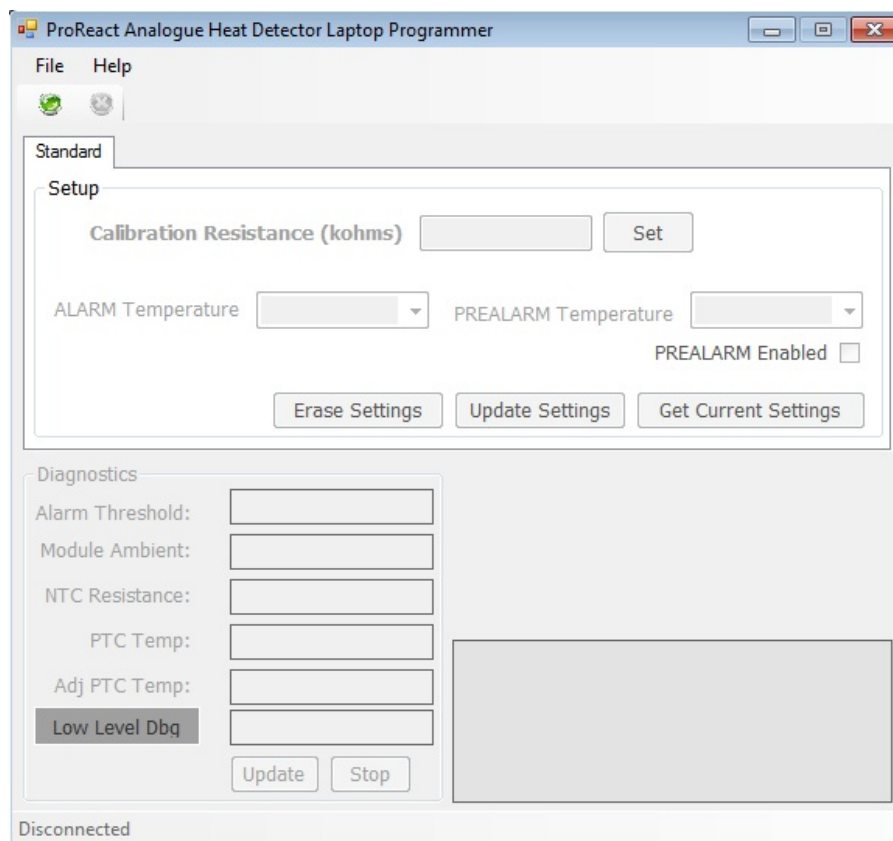


- 
3. Connect the laptop to the Alarmline II control unit using the USB lead provided.
  4. Power on the Alarmline II control unit, the green power LED and the amber fault LED should be illuminated.

- On the software “Connect to Device” screen click on the “Get Port List” button the port number of the Alarmline II control unit should appear in the drop down box.



- Select the port number and click on connect, if connected the “Connect to Device” screen will disappear and the main screen will appear.
- Enter the measured calibration resistance in the allocated box and click the “Set” button. See section “Measuring the calibration resistance” on page 24 for steps on measuring calibration resistance.



- Check the calculated zone length matches the installed sensor cable length.
- Select the required “ALARM Temperature” from the drop down box.

10. If using the pre-alarm temperature enable this by ticking the “PREALARM Enabled” box and select the required “PREALARM Temperature” from the drop down box.
11. Click the “Update settings” button to download the settings in to the Alarmline II control unit.
12. Check the “PTC Temp” field on the software window to ensure it closely matches the ambient temperature around the cable within  $\pm 2.5^{\circ}\text{C}$  ( $\pm 4.5^{\circ}\text{F}$ ). If the “PTC Temp” value is outside of this tolerance disconnect the sensor cable from the control unit and recheck the measured calibration resistance and repeat steps 7-12. If the calibration resistance is the same as previous, add or subtract  $0.017\text{k}\Omega$  to the calibration resistance value and repeat steps 7-12.

### Get current settings

1. To access the current settings from the Alarmline II Control Unit establish communications with the laptop/software.
2. Click on the “Get Current Settings” button and the current settings will be displayed in the software window
3. These settings can be saved for future reference by clicking on the “File” menu option at the top of the window and selecting “Save Configuration” enter the required filename and press “OK”.

### Erase settings

1. To erase the current settings within the Alarmline II control unit establish communications with the laptop/software.
2. Click on the “Erase Settings” button.
3. All previous settings will be cleared and the Alarmline II control unit will show a fault condition showing that it has not been commissioned.

---

**Caution:** Erasing the configuration settings on the control unit will put the unit into a fault condition and will not trigger any alarm or pre-alarms. **DO NOT LEAVE THE CONTROL UNIT IN THIS STATE.** The control unit must be re-configured as soon as possible.

---

# Chapter 3

# Commissioning

## **Summary**

This chapter provides information on commissioning.

## **Content**

Commissioning	36
Passive Checks	36
Functional testing	36

## Commissioning

It is important that the cable is fully tested and inspected prior to handover the following are recommendations to ensure this is carried out correctly.

### Passive Checks

1. Visually inspect the cable to ensure correct installation in accordance with the specification and system design.
2. Check that all clips are securely held in place and that the cable is correctly installed within the clips.
3. Inspect all joints and terminations to ensure that they are correctly installed and appropriate for the application and environment.
4. Check that no faults exist on the unit
5. Check that the control unit has been configured.
6. Ensure the correct pre-alarm and alarm settings are configured on the control unit.

### Functional testing

Alarmline II Analogue Linear Heat Detection system is resettable and provided the sensor cable is not subjected to greater than 125°C (257°F) it is possible to test the cable by applying heat to the sensor cable to confirm the pre-alarm and alarm performance.

#### Functional alarm test

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**Caution:** Testing of the cable will trigger an alarm at the monitoring equipment therefore it may be necessary to isolate the monitoring equipment outputs.

---

1. Using a suitable heat source subject the cable to sufficient heat to trigger the pre-alarm and alarm temperatures.
2. Confirm that the cable indicates the relevant alarm conditions and operates the associated outputs.

**Note:** The type of functional test carried out must be agreed with the client. In hazardous areas use of a heat source may not be possible and therefore if agreed passive checks may be sufficient.



# Chapter 4

## Application guidelines

### Summary

This chapter provides guidance on most of the typical applications.

### Content

Application guidelines	38
Conveyor belts	39
Escalators and moving walkways	41
Cable Trays and Racks	42
Floating roof storage tanks and bund areas	43
Cold storage/Freezer warehouses	45

## Application guidelines

Kidde Alarmline Analogue Linear Heat Detection Systems have been successfully installed in a wide range of applications. Each application is different and a thorough risk assessment must be carried out to determine the best type of system and design. This section of the manual provides guidance on some of the typical applications.

The following is a list of applications where Kidde Alarmline Analogue Linear Heat Detection systems have been used:

- Cable trays and risers
- Boilers
- Conveyors
- Transformers
- Control room and computer suites - floor voids
- Cooling towers
- Alternator pits
- Control cubicle protection
- Ducting and pipework
- Radar
- Missile storage
- Engine bay protection
- Chemical/fuel storage tanks – fixed roof
- Fuel storage tanks - floating roof
- Well heads
- Power units and pumps
- Cold storage warehousing
- Service ducts
- Rolling stock
- Road and rail tunnels
- Dust extraction ducts
- Storage racking
- Grain silos and dryers
- Switchgear
- Cottages - Thatched roof
- Paint spray booths
- Paint storage
- Reactor vessels
- Extraction and ventilation systems
- Wet bench applications
- Food processing/preparation areas
- Car parks
- Passenger walkways
- Distilleries
- Baggage conveyors

- Escalators
- Industrial kitchens - Canopy protection

This list is for guidance only and other applications may exist which have not been included.

## Conveyor belts

Conveyor belts are used on many sites to transport materials/product around the facility which can be anything ranging from coal, chemicals, luggage, minerals, grain etc.

The main causes of fires on conveyor belts are as follows:

- Friction: Misaligned belts/Seized rollers
- Overheat: Drive motors
- Burning material: Combustible material being carried on conveyor

The effect of a fire on a conveyor can be significant as a moving conveyor could assist with the spread of fire over a larger area.

A number of important issues need to be considered when carrying out the risk assessment of the conveyor belt:

**Table 8: Conveyor belt risk assessments**

Assessment	Considerations
Location	If the conveyor belt is located outdoors and is not covered then the detection system must be able to withstand being exposed to the elements without any effect on performance or causing false alarms.
Accessibility	If accessibility is likely to be an issue then a system which requires little or no maintenance once installed is a significant advantage. Accessibility will become more of an issue on covered conveyors.
Key risk areas	Many of the key risk areas may be out of site i.e. roller bearings underneath the belt, drive motor, cabinets etc.
Fuel type	What type of material is being carried on the conveyor is it combustible, is there the potential for a dust explosion. It may be necessary to provide a detection system which is suitable for hazardous areas. The fuel type would also help determine the requirement for any automatic fire-fighting equipment and which type.
Interaction	Should the detection system trigger an alarm what actions are to be taken i.e. Automatic shutdowns, Visual/Audible warnings, activation of automatic firefighting equipment etc.

Alarmline II Analogue Linear Heat Detection systems can provide a very effective detection solution for the protection of conveyor belts. The flexibility of the sensor cable allows it to be installed very close to the point of risk i.e. in close proximity to the belt and the rollers. Once installed the cable should require no maintenance and the system can be reset following an alarm activation provided the sensor cable does not exceed 125°C (257°F). As it is a heat sensor the cable

is unaffected by the potential harsh environmental conditions, optional outer sheaths prevent the cable from being damaged from exposure to the elements or any chemicals which may be present.

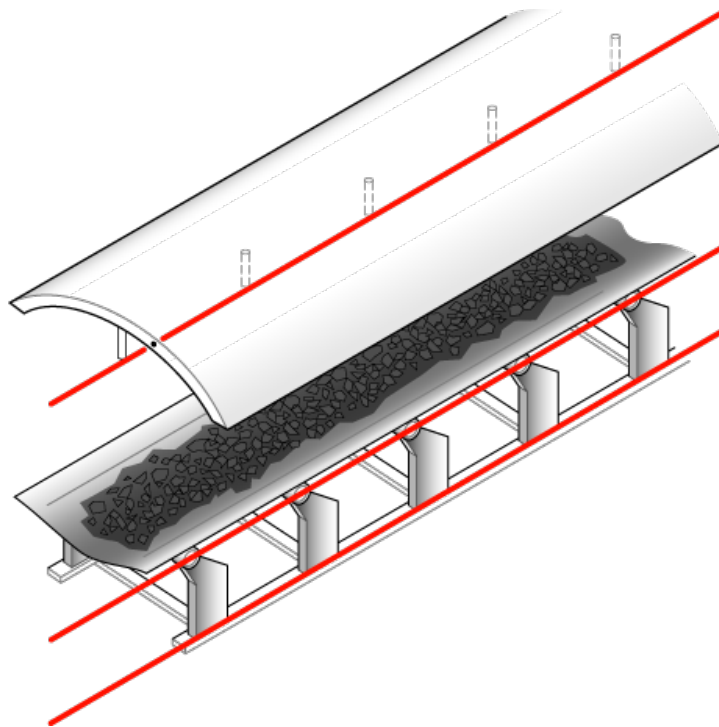
Figure 22 shows the recommended areas for installing Alarmline II analogue sensor cable on a conveyor belt.

Three locations are recommended for the sensor cable to provide complete detection on the conveyor belt:

**Table 9: Recommended locations**

Location	
Roller bearings	Problems with friction from a misaligned belt or a seized bearing will cause an overheat, by placing the sensor cable as close as possible to the roller bearings the earlier a potential incident can be detected. A controlled shutdown can be implemented preventing a potential fire incident. It is recommended that cable is run down both sides of the conveyor.
Above the belt	If the conveyor is covered it is recommended that sensor cable is fixed to the canopy above the conveyor belt to detect for any fires on the belt, enabling a controlled shutdown preventing potential fire spread by the moving escalator.
Underneath	It is a recommendation that sensor cable can also be installed underneath the conveyor to detect any fires that may occur due to trash or combustible fuel that may have fallen from the conveyor belt.

**Figure 22: Alarmline II analogue sensor cable (shown in red) installed on a covered conveyor**



The sensor cable should be installed in such a way as not to interfere with maintenance and to prevent mechanical damage. Fixing clips should be selected based upon fixing location and available fixing surfaces, most commonly edge clips have been used to fit to the metal framework of the conveyor.

## Escalators and moving walkways

Escalators and moving walkways can be found in many buildings such as shopping centres, airports, train stations etc. Underneath the escalator there are many mechanical moving parts which if they become seized or damaged can overheat due to friction. Due to the confined space under the escalator and the harsh operating conditions i.e. dust, oil, grease it is a very difficult environment to install any fire detection equipment.

Like the conveyor belts discussed previously Alarmline II analogue sensor cable is flexible enough to be installed close to the main points of risk and be unaffected by the environment. Once the cable has been installed there is no need to access it for maintenance purposes.

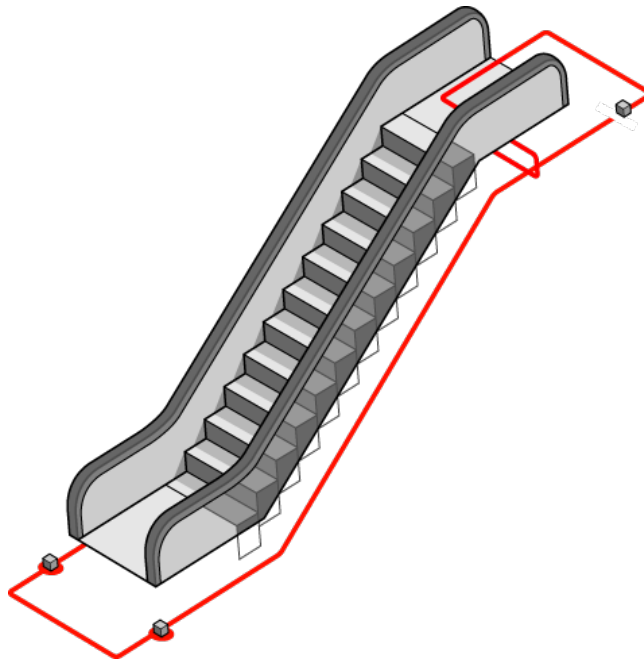
Due to the number of moving parts within the escalator it may be advantageous to use the stainless steel braided version of the cable which provides additional mechanical protection. The recommended clip type for this application is the edge clip making installation easier and quicker.

There are three key areas of an escalator that should be considered when providing detection with Alarmline II Digital sensor cable:

- Bearings
- Trash collector trays
- Drive motor housings

Alarmline Analogue sensor cable can be used to protect all of these areas. Fig 23 shows the principle of protecting an escalator/moving walkway with Alarmline II analogue sensor cable. A continuous run of cable around the bearings and the trash collecting trays at either end provide significant coverage.

**Figure 23: Protecting escalators/moving walkways using Alarmline II analogue sensor cable**



## Cable Trays and Racks

In applications such as Petrochemical plants, Power generation plants etc. miles and miles of cables are used transporting high voltages around the plant. These can be external cable trays exposed to the elements or can be underground cable trays hidden out of sight; either way overheating in a high voltage cable can cause significant damage. Alarmline II Analogue Linear Heat Detection systems are a recognised solution for being able to protect these cables close to the point of risk.

As shown in Figure 23 sensor cable is run above the cable tray to be able to detect an increase in temperature from the cables being protected. Generally one length of sensor cable would be run down the cable tray but this may depend on the width of the cable tray. Where multiple cable trays exist it is recommended that sensor cable is run above each cable tray as shown in Figure 24.

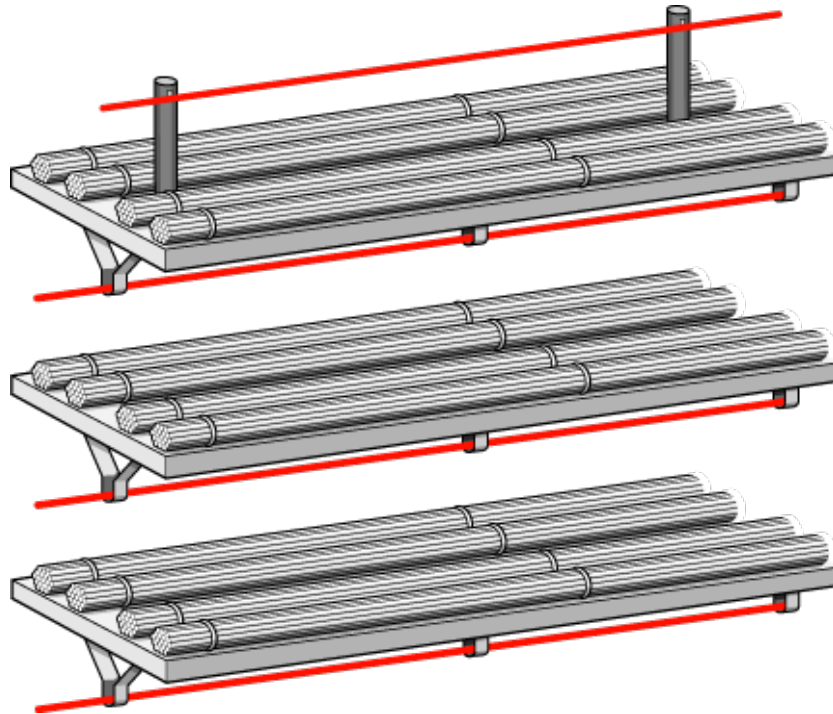
In power generation plants and large industrial installations the general principle of applying Alarmline II Digital sensor cable to cable tray and racks follows the recommendations of the United Kingdom electricity generation companies.

1. A single sensor cable can be used to protect cable trays up to 600mm (24") wide.
2. Cable trays over 600mm (24") wide will require multiple runs of sensor cable to provide adequate coverage i.e. cable tray up to 1200m (3937ft) wide requires two sensor cable runs, cable tray up to 1800mm (71") wide would require three sensor cable runs and so on.

- Sensor cable should be installed between 150mm (5.9") and 250mm (9.8") above the cable tray it is protecting.

The Alarmline II analogue sensor cable is supported at 1m spacing at a height of between 150 (5.9") and 250mm (9.8") above each tray. This provides maximum operating sensitivity without obstructing access to power cables etc. mounted on tray work. It is recommended to install sensor cable on the underside of the bottom tray or rack to further protect against "rubbish" fires.

**Figure 24: Alarmline II analogue sensor cable providing cable tray protection**



'V' clips are specially designed to support cables underneath layers of cable trays, this is a spring steel clip designed to fit the standard holes on a cable tray, see Figure 8: "V clip" on page 18 for further details.

## Floating roof storage tanks and bund areas

Floating roof storage tanks are a high risk application and liaison with experienced site personnel with regards to the design and installation requirements is essential.

Floating roof storage tanks are specifically designed for the safe storage of petroleum products such as crude oil or concentrates the roof is designed to move up and down as the liquid content of the tank changes so there is no vapour space. A rim seal system is provided between the tank shell and the roof which prevents rim evaporation.

Alarmline II analogue sensor cable can be installed to detect an overheat condition or fire around the rim seal and can be used to provide a control signal

to an automatic firefighting system such as a foam system. The Alarmline II Analogue control unit must be installed in a safe area.

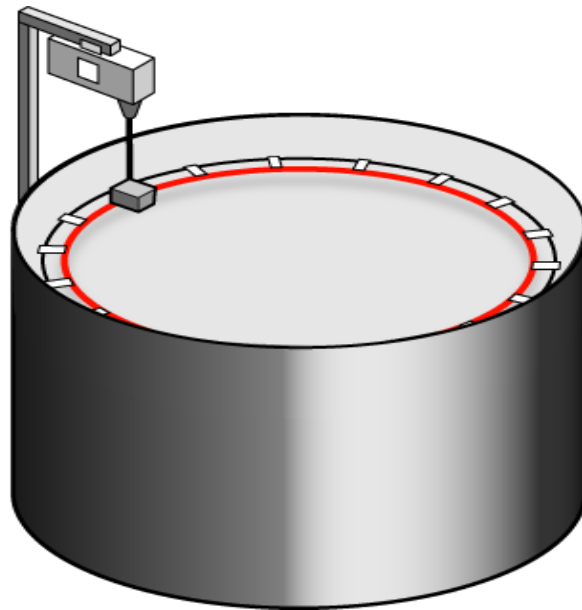
Sensor cable is installed close to the upper edge of the weather seal, using the roof's steel straps or the edge of the foam dam, where provided, as anchor points. Alternatively, support clips may be provided to suit.

Sensor cable (or its interconnection wire) should be installed with consideration of the rise and fall of the floating roof, preferably using an approved retractable cable system, see "Installation accessories" on page 15.

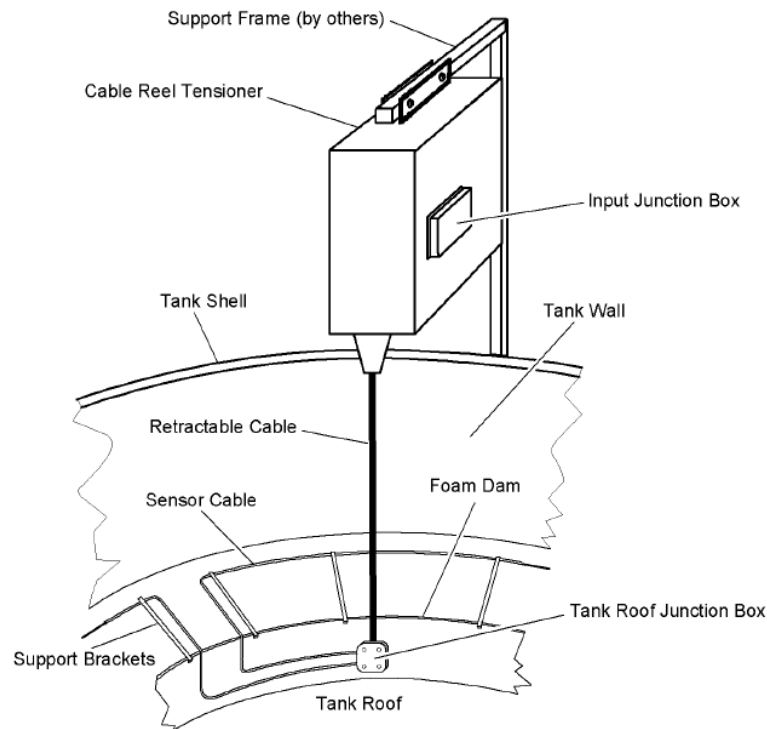
Alarmline II analogue sensor cable is classified as a simple device therefore requires no certification for use in hazardous areas. Unlike previous Alarmline Analogue products Alarmline II Analogue systems do not require safety barriers between the control unit and the hazardous area sensor cable although Ex 'e' junction boxes and barrier glands **MUST** be used. Figure 25 and Figure 26 show the principles of installation.

**Figure 25: Basic configuration of Floating roof tank**

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**Figure 26: Detail of Floating tank roof detection system installation**

## Cold storage/Freezer warehouses

Cold storage areas and Freezer warehouses provide a difficult environment for many types of fire detection due to the sub-zero operating temperatures of such areas. Alarmline II analogue sensor cable can provide an acceptable solution with its minimum operating temperature of  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) allowing it to be installed in the risk area without being effected by the environment, the analogue control unit can be installed in a warm environment.

There are two ways Alarmline II analogue sensor cable can be used to provide fire detection in such an application providing general area coverage or in-rack detection.

General area coverage would follow the requirements detailed in section "Guidelines for Area coverage" on page 9 .

The alternative type of installation for these applications is storage rack detection. As with other applications such as conveyors, escalators etc. a significant advantage of Alarmline II analogue sensor cable is the flexibility to be able to install it close to the point of risk. In storage areas by being able to install the cable within the storage racking itself it is closer to the risk and therefore able to detect an overheat condition or fire condition considerably quicker than general area heat sensors. This system also allows more accurate location of where the condition occurs to provide quicker action. Installation of the Alarmline II analogue sensor cable can be done quickly and easily by using edge clips to fix the sensor cable to the framework of the racking. It is important to ensure the

cable is installed in a position where it is not likely to be damaged by loading and unloading of the storage racks

There a number of precautionary measures that must be considered when installing Alarmline II analogue sensor cable:

1. Installation should not occur in temperatures lower than  $-11^{\circ}\text{C}$  ( $12^{\circ}\text{F}$ ) as this can make the cable less flexible and more prone to damage. It may be necessary to raise the temperature of the area for installation and return to the normal operating temperature once installed.
2. Electronic interfaces and monitoring equipment must be installed outside the low temperature area and therefore interposing/leader cables and IP66/67 junction boxes will be required.
3. The minimum bend radius at low temperatures is increased to 100mm (3.9”).



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