

## Fire Zone Monitoring with Two Level Alarm Set Points



The LDM-519-SEN-N module is designed to monitor a zonal length of Resettable Analogue Linear Heat Detection Cable (LHDC) for both an elevated temperature (Fire) condition, and Fault Status (Open & Short Circuit).

The module offers two adjustable levels of alarm (A1 & A2), one of which may be optionally employed as a "Pre Alarm".

The module provides early warning of hot spots and fire conditions on short sections of the overall LHDC zone length. Maximum LHDC zone length for Resettable Analogue LHDC is 500m.

The modular form of the unit enables it to be provided in a variety of bespoke housings and readily integrated into special control panels.

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### The primary features of the control units are:-

- Linear Heat Detecting Cable fire & fault monitoring.
- Two adjustable levels of Alarm set point / Pre-Alarm operation.
- Wide d.c. supply operation - 20V to 60V
- LED indication of Fire, Fault & Supply status.
- Selectable latching / auto-reset operation.
- Integral Test & Reset push-buttons - Remote Test & Reset signal inputs.
- Volt free contact outputs for Pre-Alarm (A1), Fire(A2), & Fault conditions.
- Maintenance test meter jacks for LHDC and Alarm set points (A1 & A2).
- PCB module readily installed in existing FDS-5 housings.
- Cased unit mounting points identical to FDS-5 enclosures.

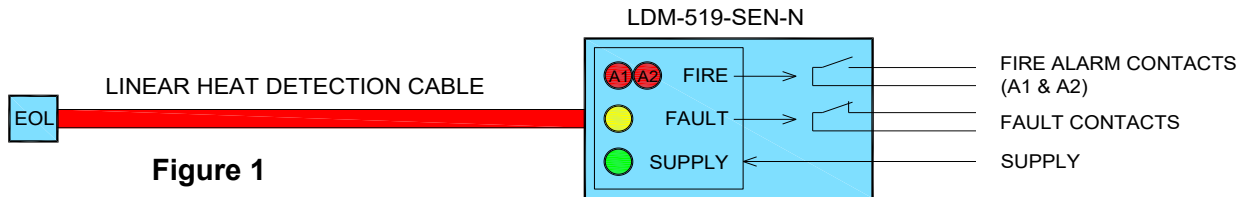
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## Principles

The unit is operated in conjunction with a length of Resettable Analogue Linear Heat Detector Cable (LHDC) and an End of Line (EOL) functional unit. The LHDC is a coaxial cable which may be installed in considerable lengths whilst maintaining the ability for the monitoring unit to provide early warning of 'hot spots' and fire conditions on short sections of the overall zone length. Reference should be made to Resettable Analogue LHDC data sheet D1167 for specification of its performance.

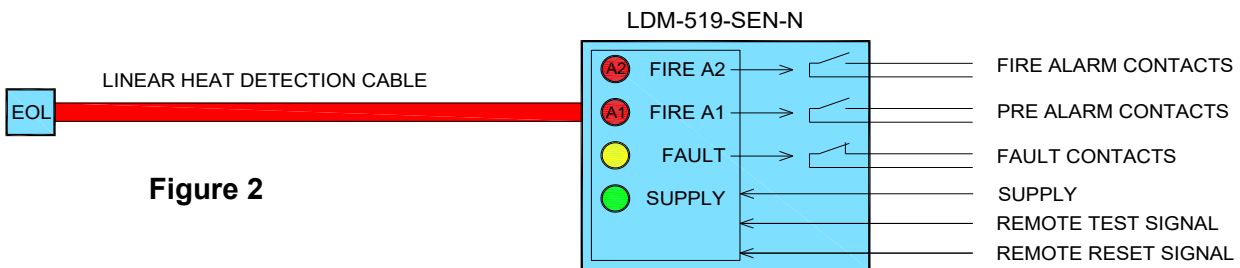
**Figure 1** shows a typical minimum system where a single Alarm level is employed by adjusting the A2 set-point less than that for A1. Thus both A1 & A2 trips occur simultaneously - **At the A1 set point**.



**Figure 1**

In some applications abnormal ambient conditions can arise that must be notified, but for which immediate Alarm operation would not be appropriate. This may be achieved by using A1 Pre-Alarm (e.g. A1 contacts combined with A1-Fire signal)

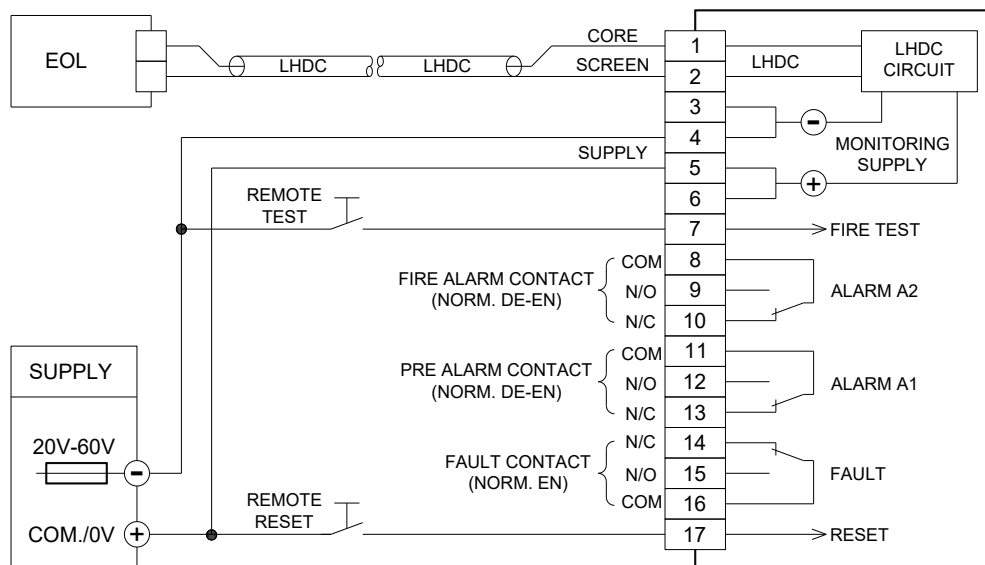
**Figure 2** shows a more comprehensive configuration including Pre Alarm.



**Figure 2**

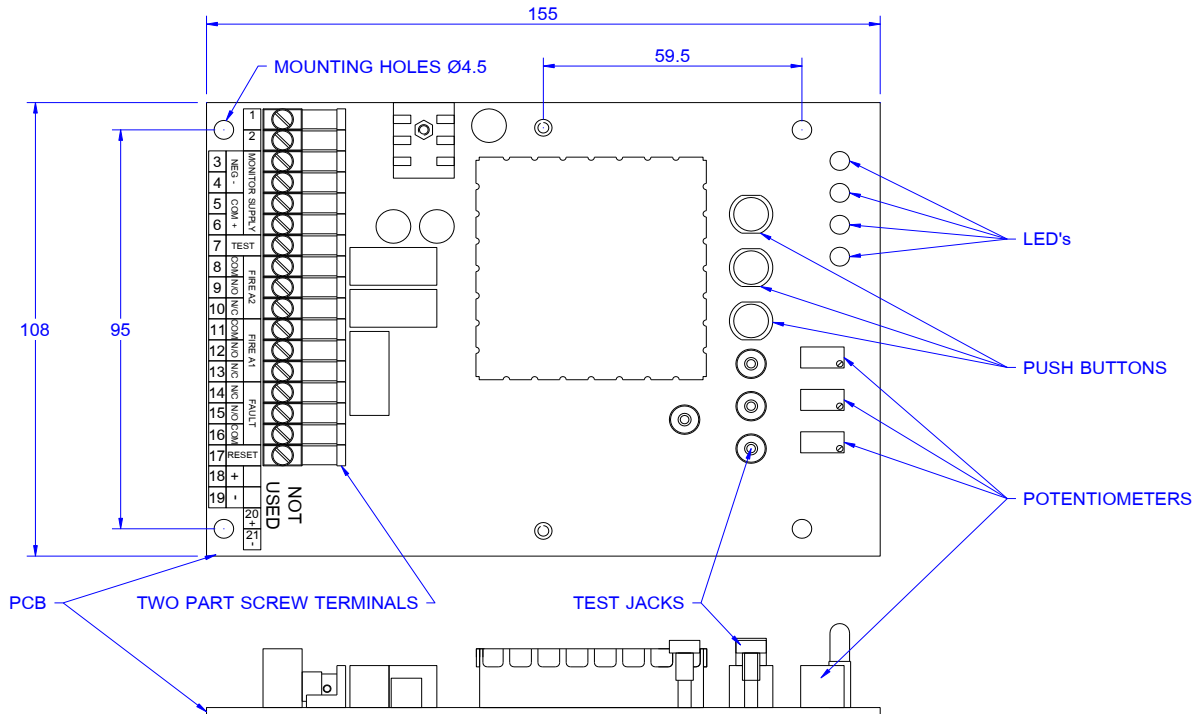
## Connections

**Figure 3 - LDM-519-SEN-N Module terminals showing typical external connections.**



## Module Arrangement

Figure 4 - PCB Module - Shown without Fascia Plate

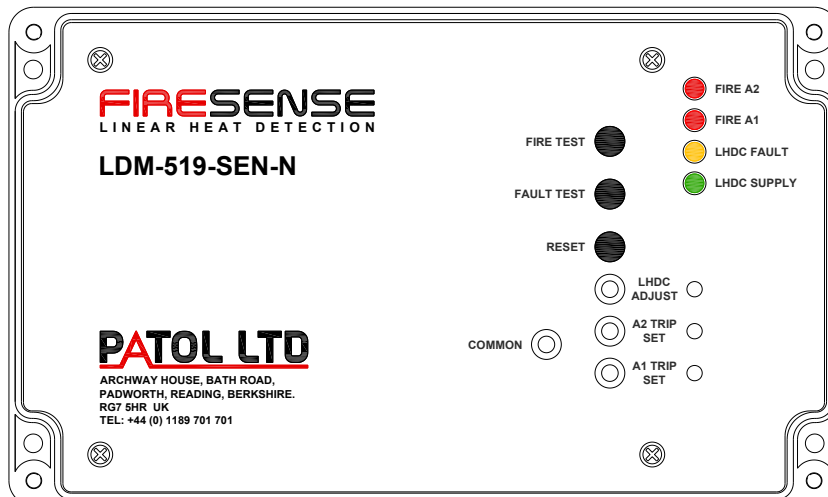


## Cased Units - Enclosures

The design of the LDM-519-SEN-N module is such that it may be fitted to a variety of enclosures. Demands in respect of environmental, aesthetic or project specific requirements are readily accommodated by the ease with which the module may be fitted to virtually any enclosure type or control panel configuration. Patol should be consulted with regard to special housing provisions.

Figure 5 shows a 'standard' polycarbonate cased module with a clear polycarbonate lid.

Figure 5 - Enclosure front with cover removed.



## Operational Specifications

**Supply:** +ve common to LHDC screen  
**Voltage:** -20Vdc to -60Vdc  
**Current:** Quiescent - < 18mA  
 Max (Alarm) - < 60mA

**LHDC Input:** Two levels of Alarm - A1 & A2  
 Fault monitored. - O/C & S/C

**Relay Contacts:** 1A @ 24Vdc / 120Vac

**Remote Fire Test:** Switch to -ve Monitoring Supply

**Remote Reset I/P** Switch to +ve Monitoring Supply

## Indications:

Pre Alarm (A1): 1 off - Red LED  
 Fire Alarm (A2): 1 off - Red LED  
 Fault: 1 off - Yellow LED  
 Supply: 1 off - Green LED

## Controls:

Fire Test P.B.: Simulates LHDC fire condition  
 Fault Test P.B.: Simulates LHDC fault warning  
 Reset P.B.: Resets fire Alarm

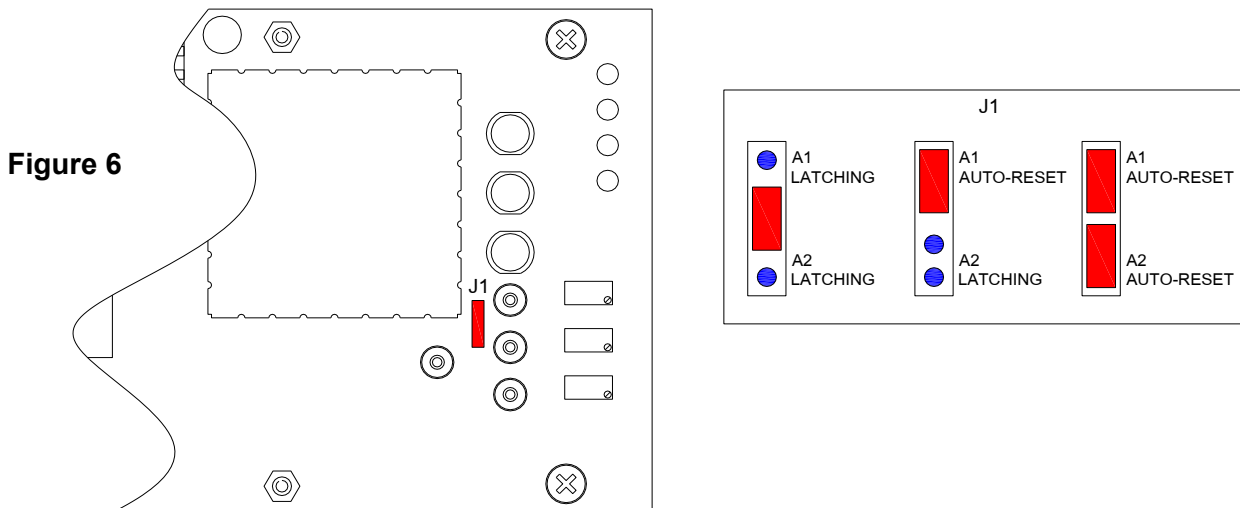
## Adjustments & Test Points:

LHDC Analogue: Potentiometer & 2mm socket  
 A1 Trip Set: Potentiometer & 2mm socket  
 A2 Trip Set: Potentiometer & 2mm socket  
 Meter Common: 2mm meter probe socket

## Module Selector Links.

The LDM-519-SEN-N module is fitted with a jumper link which permits selection of operating parameters. J1 permits the selection of Latching or Auto-Resetting modes for both A1 & A2 Alarms.

Figure 6 shows the Latching / Auto-Reset options as set by J1.



## Installation.

The LHDC should be installed in a manner that complies with the recommendations provided in the “D1224 Guidelines for Routing of Resettable Analogue Linear Heat Detection Cable” application note. This is to ensure that a reliable and easy to maintain installation is achieved.

Patol supply a range of mounting clips and brackets that are suitable for most applications. Please refer to “D1183 Clips and Fixings” for information on each particular mounting clip/bracket. It is of particular importance that LHDC is not fixed to any material that can act as a heat sink as this will impair its sensitivity. Therefore, protective sleeves should be used around the LHDC when it is in contact with metal clips and brackets.

As Resettable Analogue LHDC is a high impedance system, care must be taken at all enclosure cable entry points, to ensure protection against the ingress of dirt or moisture is maintained.

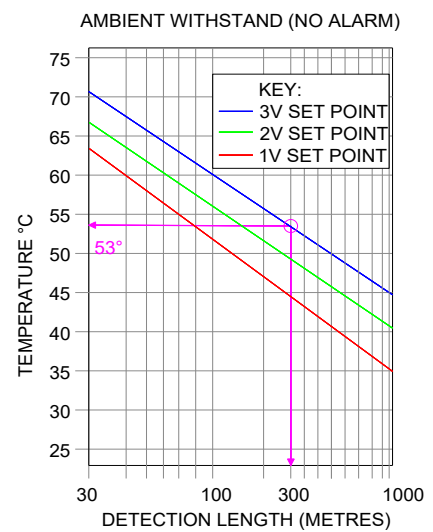
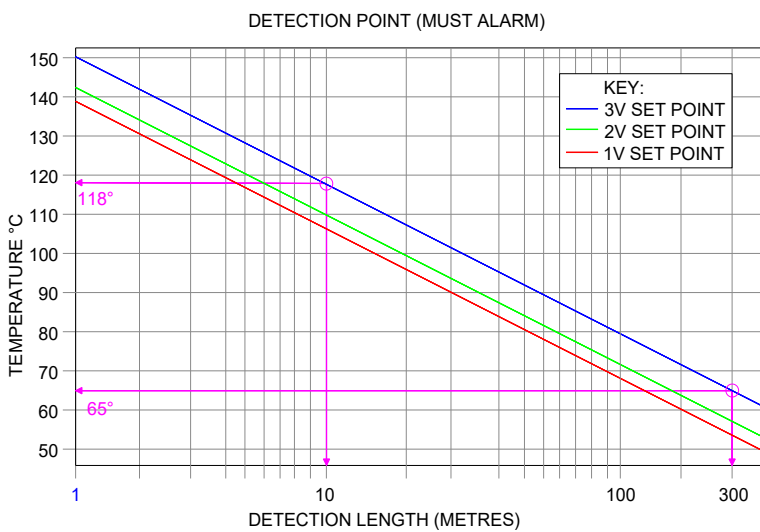
The LHDC Monitor can easily connect to a Fire Alarm panel or process control system using the relay contacts. For further details please contact Patol Ltd.

## Commissioning:

Commissioning of a Patol Resettable Analogue LHDC system is a simple operation that will give many years of reliable operation when performed correctly.

The only tools required are a high impedance Voltmeter and a small screwdriver to adjust the potentiometers on the fascia. For information relating to jumper link settings on LHDC Monitors, please refer to Figure 6 on previous page.

Using the graphs below find the trip level Voltage that suits the required Alarm detection level and also meets the requirements of the LHDC zone length and maximum ambient temperature for the zone.



## **ISOLATE COMMISSIONING ZONE BEFORE MAKING ADJUSTMENTS**

### **Zero Level Adjustment**

1. Disconnect LHDC.
2. Connect the End of Line functional unit directly to the LHDC Monitor so that the LHDC is out of circuit.
3. Connect the Voltmeter probes between the "COM" terminal and the "LHDC ADJUST" terminal.
4. Adjust the "LHDC ADJUST" potentiometer until the Voltmeter reads 0V.
5. Operate the "Fire Test" Push Button and note whether the Voltmeter indicates a positive or negative Voltage swing. Operate the "Reset" Push Button to return to the normal condition.

### **Setting Alarm / Trip Levels**

6. All Alarm/Trip level adjustments must be set to the same polarity as indicated by the "Fire Test" operation in step 4.
  7. Connect the Voltmeter between "COM" terminal and the "A1 TRIP SET" terminal.
  8. Adjust the "A1 TRIP SET" potentiometer to the required trip level determined from the graph on the previous page.
  9. Connect the Voltmeter between the "COM" terminal and the "A2 TRIP SET" terminal.
  10. Adjust the "A2 TRIP SET" potentiometer to the required trip level determined from the graph on the previous page.
- If a single trip level is required A1 should be set to the required trip level. A2 should be set slightly less than A1.  
A1 Alarm and A2 Alarm will occur at the A1 set point.

### **System Start - Up**

11. Re-connect the LHDC to the circuit.
12. After switch on, allow the system to settle for a period of at least 2 hours.
13. Ensure the LHDC Monitor is in a normal state with no Faults or Alarms indicated.
14. If reassurance is desired, measure the Voltage between the "COM" terminal and the "LHDC ADJUST" terminal. The Voltage indicated should be appropriate for the zone length and actual ambient temperature according to the graph in the Resettable Analogue LHDC data sheet.
15. Ensure the LHDC Monitor correctly indicates a Fire Alarm when the "Fire Test" Push Button is operated and that it returns to the normal condition once reset.
16. All Alarm and extinguishing functions may now be enabled.

Care must be taken to avoid undesired Alarms or trigger/release of interconnected extinguishant during commissioning of the LHDC system, which could occur whilst making Alarm level adjustments.