

## Fire Zone Monitoring with Two Level Alarm Set Points



The module is designed to monitor a length of analogue Linear Heat Detecting Cable (LHDC) for elevated temperature states. Two adjustable levels of alarm are provided (A1 & A2), one of which may be optionally employed as a "Pre-Alarm".

The LHDC is also monitored for fault conditions (open & short circuit).

### 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 analogue output, and Alarm set points (A1 & A2).
- PCB module readily installed in existing FDS-5 housings.

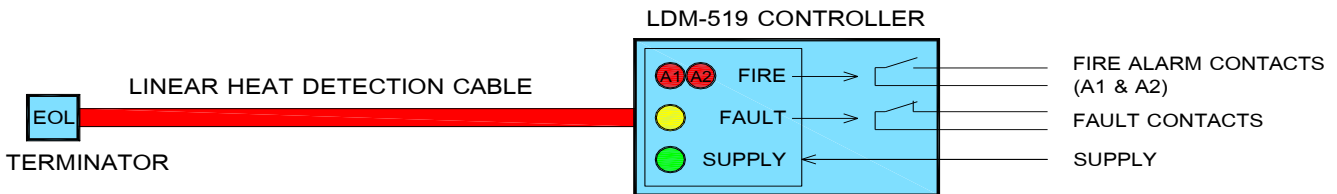
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## Principles

The unit is operated in conjunction with a length of Line Heat Detector Cable (LHDC) and an 'end of line' (EOL) terminator. 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 the data sheet D1167 LHDC for specification of its performance.

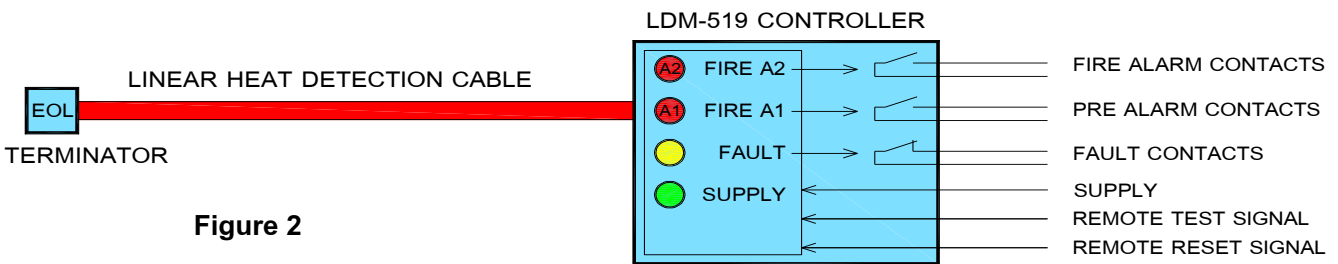
**Figure 1** shows a typical minimum system where a single alarm level is employed by adjusting the A2 set-point less than that for A1. Thus both A1 & A2 trips occur simultaneously - **At the A1 set point**.



**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)

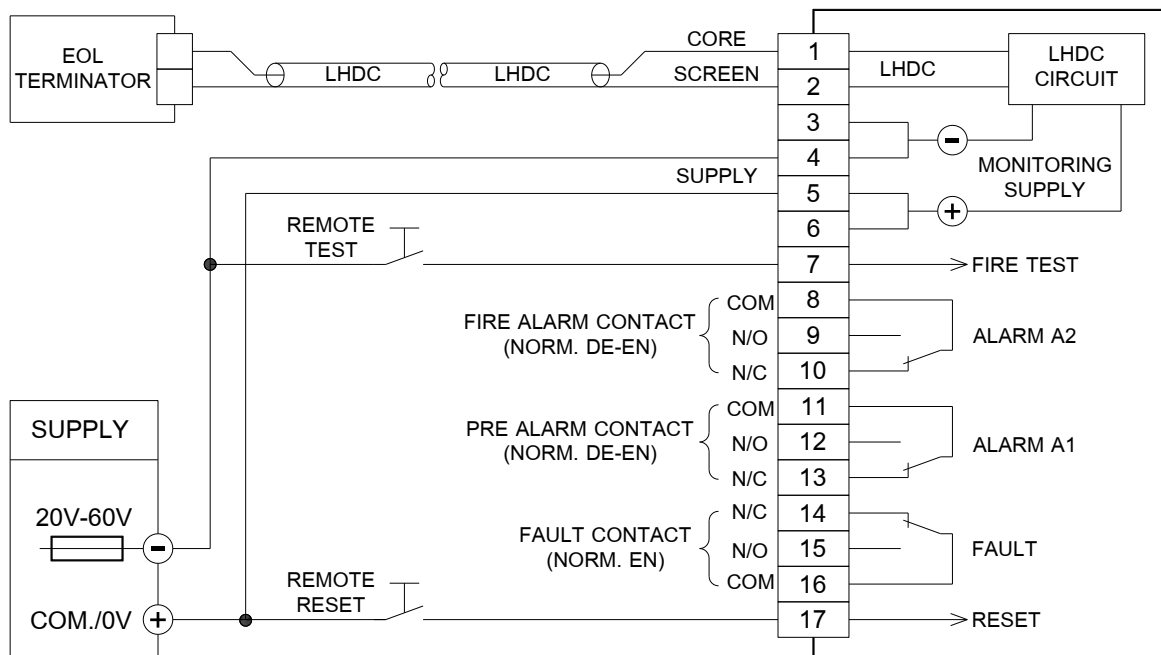
**Figure 2** shows a more comprehensive configuration including Pre Alarm.



**Figure 2**

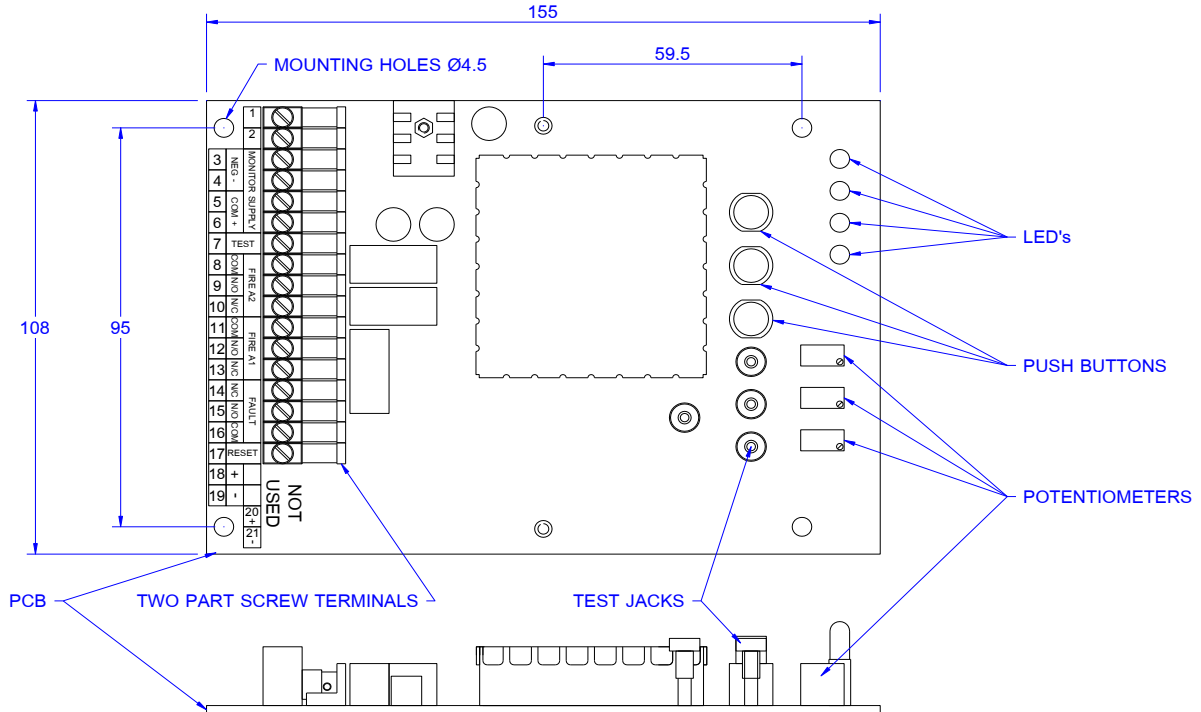
## Connections

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



## Module Arrangement

Figure 4—PCB Module - Shown without Fascia Plate

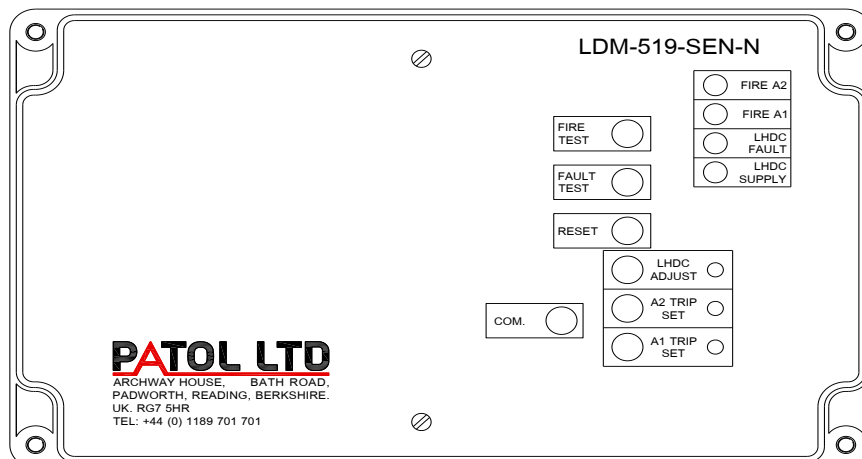


## Cased Units—Enclosures

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:** -20 Vdc to -60 Vdc  
**Current:** Quiescent - < 18 mA  
 Max (Alarm) - < 60 mA

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

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

**Remote Fire Test:** Switch to -ve Monitoring Sup.

**Remote Reset I/P** Switch to +ve Monitoring Sup.

## 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.

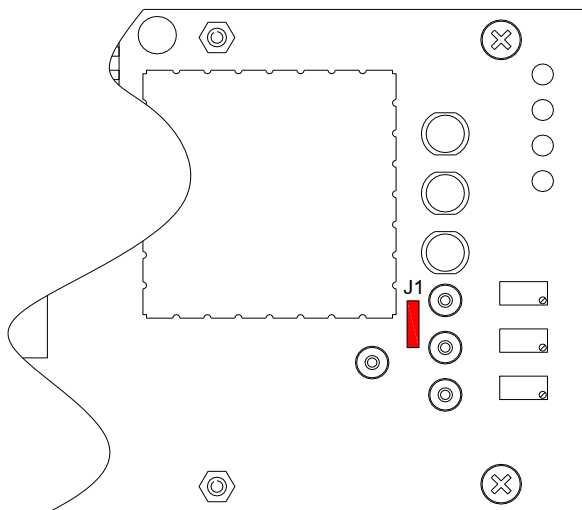
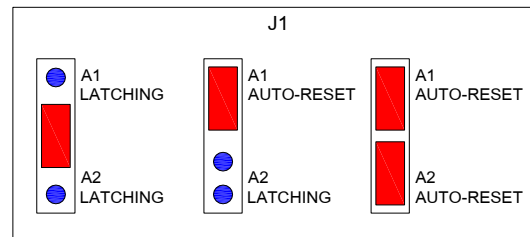


Figure 6



## Installation.

The LHDC should be installed in a manner that complies with the recommendations provided in the "D1224 Guidelines for Routing of 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, neoprene or PTFE sleeves should be used around the LHDC when it is in contact with metal clips and brackets.

As 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.

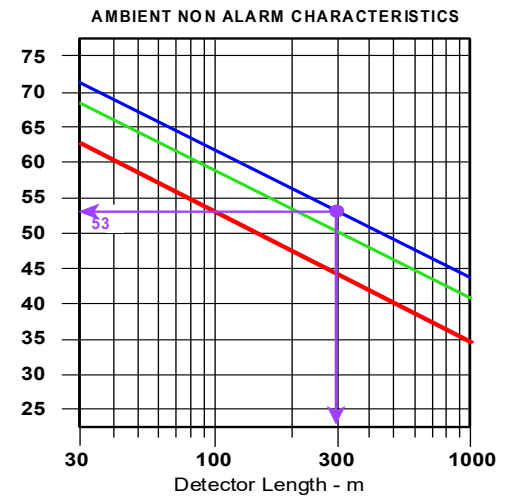
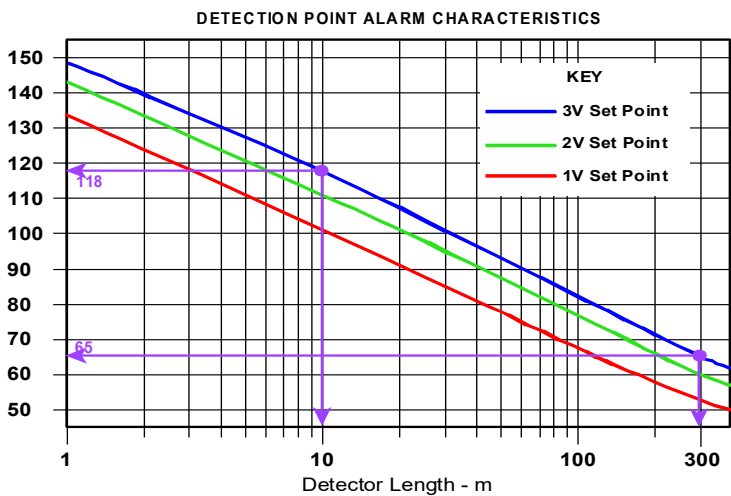
The LHDC Monitor / Controller can easily connect to a fire alarm panel or process control system using the relay contacts. For further details please contact Patol Ltd.

## Commissioning:

Commissioning of a Patol 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 / Controllers, please refer to 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.



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.

## **Zero Level Adjustment**

1. Disconnect LHDC.
2. Connect the End-of-Line Terminator directly to the LHDC Monitor/Controller 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" pushbutton and note whether the voltmeter indicates a positive or negative voltage swing. Operate the "Reset" pushbutton 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.

## **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/Controller 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 Analogue LHDC data sheet.
15. Ensure the LHDC Monitor/Controller correctly indicates a Fire Alarm when the "Fire Test" pushbutton is operated and that it returns to the normal condition once reset.
16. All alarm and extinguishing functions may now be enabled.