

### LDM-519-DIM Digital LHDC Interface



The module is designed to monitor a length of Digital Linear Heat Detecting Cable (LHDC) for both Fire condition and Fault status (open circuit).

Digital LHDC may be employed in lengths up to 5km.

Signalling of fire and fault status by means of volt free contacts.

The units have open collector type solid state outputs for local indicators.

The DIN rail modular form of the unit enables it to both be provided in a variety of discrete housings and readily integrated into multi zone control panels.

The primary features of the control units are:-

- **LHDC Hazardous Area use by means of an Intrinsically Safe Barrier.**
- **Fault monitoring of LHDC for open circuit conditions.**
- **LED indication of Fire, Fault & Supply status.**
- **Integral Test & Reset push-buttons.**
- **Volt free contact outputs for Fire & Fault conditions.**
- **Indicator and control switch connections for local fascia implementation.**
- **DIN Rail mounting.**

## Principles

The unit is operated in conjunction with a length of Digital Linear Heat Detector Cable (LHDC) and an 'End of Line' (EOL) terminator. The LHDC is a twisted pair twin core cable. When the trigger temperature of the LHDC is reached these cores connect and a Fire Alarm is registered. The LDM-519-DIM module monitors the LHDC.

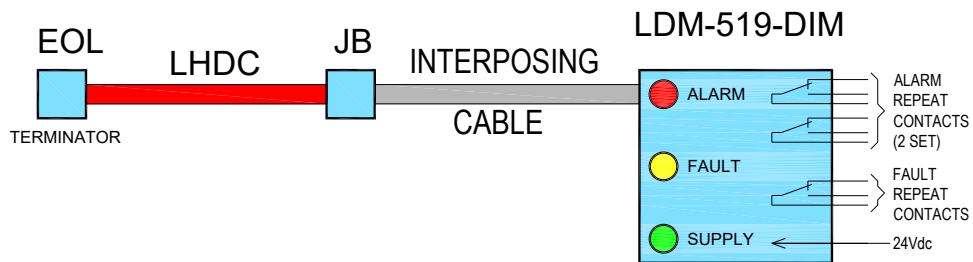
Reference should be made to the (separate) data sheet on the Linear Heat Detectors for specification of their performance.

**Figure 1** shows a typical system where the LHDC is connected via a junction box & interposing cable.

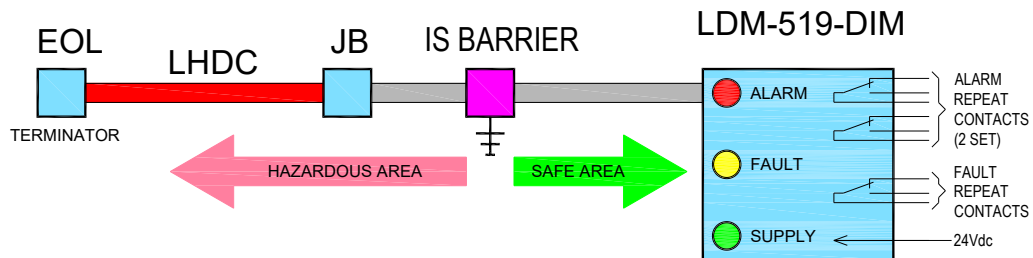
The repeat contacts may be employed to signal an alarm panel and/or initiate control systems.

**Figure 2** shows an arrangement for a 'Hazardous Area' employing an Intrinsically Safe Barrier.

**Figure 1**

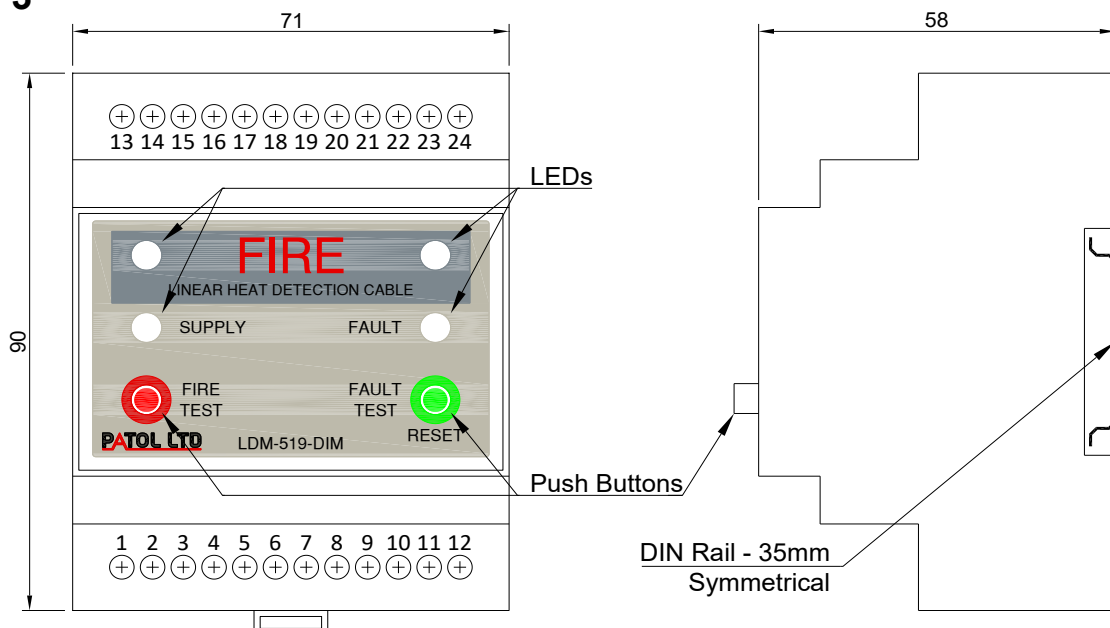


**Figure 2**



## Module Arrange-

**Figure 3**

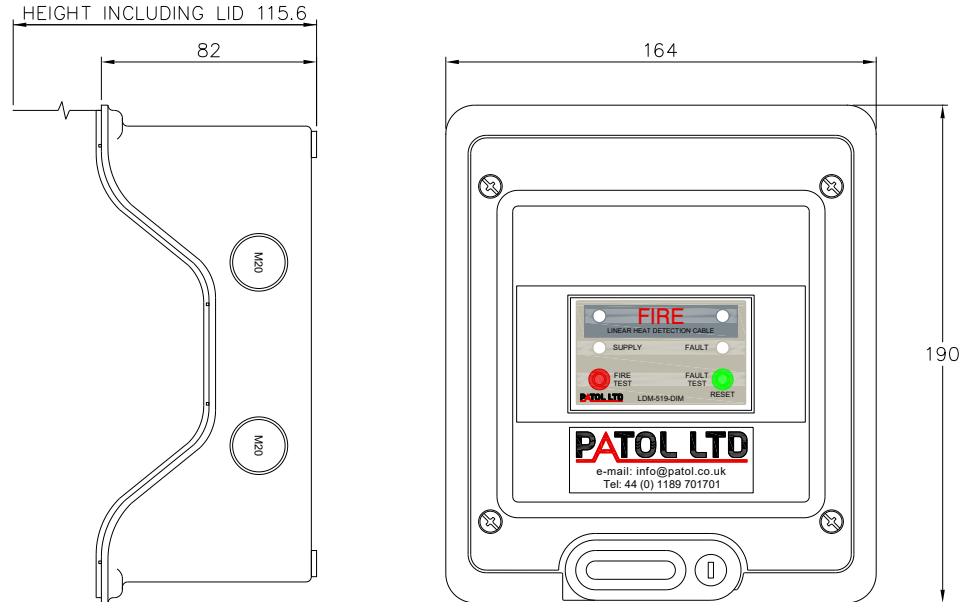


## Enclosures

The unit can be mounted in a variety of enclosures including multi zone alarm panels and 'Explosion Proof' cases.

The example shown is an IP65 Shock Resistant Polystyrene Enclosure with a Key-Lockable Hinged Window.

**Figure 4**



## Operational Specification Connections - Typical

**Supply Voltage:** 21 - 30Vdc

**Supply Current:** <25mA - Normal / Fault  
<56mA - Alarm / Fire

**LHDC Terminator:** 3K3 End Of Line resistor

**Indicators:** Alarm: Red - 2 off  
Fault: Yellow - 1 off  
Supply: Green - 1 off

**Push Buttons:** Alarm Test  
Fault Test / Reset

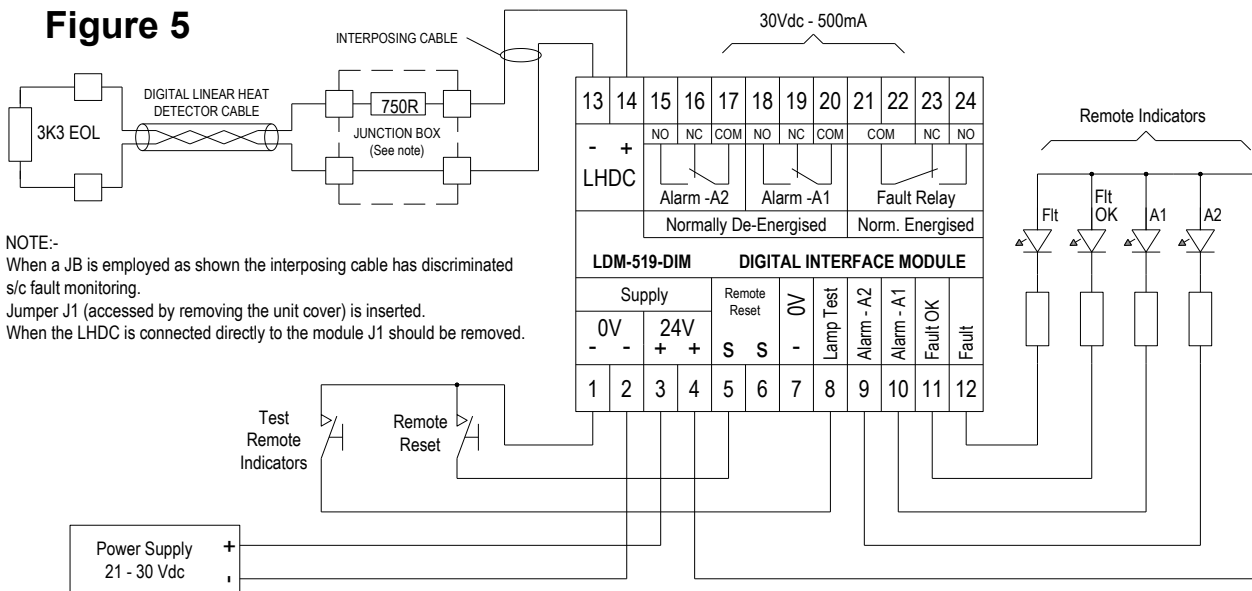
**Relay Contacts:** Alarm - changeover - 2 sets  
Fault - changeover - 1 set

**Lamp Outputs:** Alarm - switch to 0V - 100mA  
Fault - switch to 0V - 100mA

**Remote Inputs:** Reset  
Lamp Test

**Environment:** 0-60°C @ 95% max humidity

**Figure 5**



## Hazardous Areas - IS Barriers

The LHDC may be installed in a Hazardous Area by employing an Intrinsically Safe Barrier which ensures that even under fault conditions the LHDC circuit has insufficient electrical energy to produce a spark initiated explosion. Both Barrier and LDM-519-DIM module must be located in a 'Safe Area' or 'Explosion Proof' enclosure.

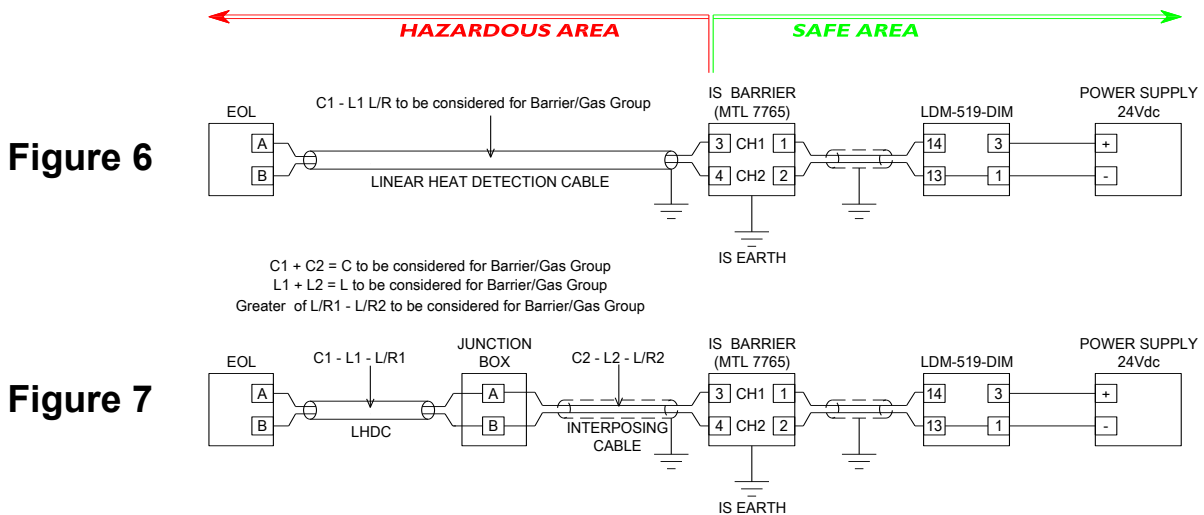
Each Barrier type specifies maximum parameters for cable located in the Hazardous Area. These parameters are:- Capacitance (C), Inductance (L) & Inductance to Resistance Ratio (L/R). The whole of the hazardous area circuit, both LHDC and interposing cable, must comply in all three aspects.

For use with the LDM-519-DIM Patol recommends a Dual Channel Shunt Diode AC Barrier, 15V-150mA-124R per channel. MTL765 or MTL7765 by Measurement Technologies Ltd. is of this type.

The C-L-L/R parameters for the barrier depend on the configuration and 'gas group'. When considered together with the LHDC & interposing cable specification they will determine the compliance of an installation and/or define maximum cable lengths.

### COMBINED CHANNEL CONFIGURATION

Whilst the supply 0V must be maintained within a few volts of earth to avoid barrier leakage currents, by employing both channels of the barrier (Figures 6 & 7) the circuit is isolated from earth at the IS Barrier, thus obviating 'multiple earth points' on Fire Panel signalling systems such as addressable loops.



EXAMPLE: The parameters for the MTL7765 in a combined channel configuration (Figs 6 & 7) for a group IIC gas are:

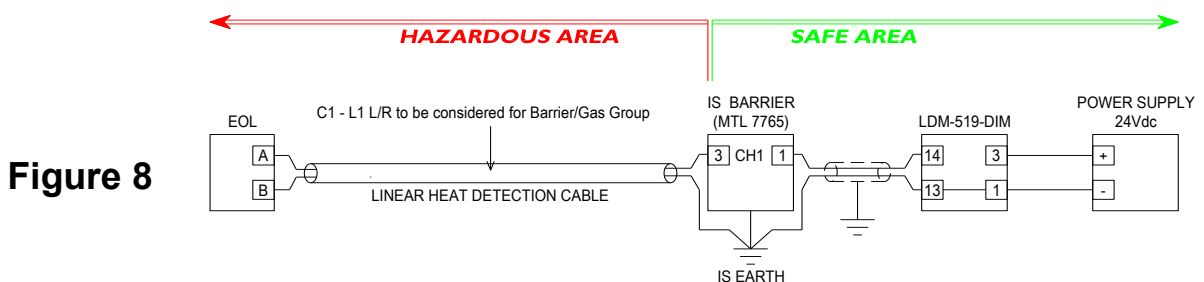
- Maximum Capacitance -  $C=0.58\mu\text{F}$
- Maximum Inductance -  $L=0.32\text{mH}$
- Maximum Inductance to Resistance Ratio -  $L/R=22\mu\text{H}/\Omega$ .

Patol 70°C. Non-Armoured LHDC has  $C=120\text{pF}/\text{m}$  ,  $L=0.95\mu\text{H}/\text{m}$  ,  $L/R=5.5\mu\text{H}/\Omega$ .

With no interposing cable the predominating factor in this case is inductance which limits the LHDC length to 336m ( $0.32 / 0.00095$ ).

### SINGLE CHANNEL CONFIGURATION

Another arrangement is a single channel circuit which permits greater lengths of LHDC to be installed.



The configuration of fig.8 shows one side of the LHDC circuit "returned to earth".

EXAMPLE : The max parameters for the MTL7765 for a group IIC gas are :-

Maximum Capacitance - C=0.58uF

Maximum Inductance - L=1.45mH

Maximum Inductance to Resistance Ratio - L/R=66uH/ohm.

Patol 70°C. Non-Armoured LHDC has C=120pF/m , L=0.95uH/m , L/R=5.5uH/Ω.

With no interposing cable the predominating factor in this case is inductance which limits the LHDC length to 1526m (1.45 / 0.00095).

For further information including the full range of Patol Linear Detector C-L-L/R specifications refer to "D1228 LHDC in Hazardous Areas"

The above information is a guidance note. National / Local Regulations, Standards and Barrier Specifications **MUST** take precedence in any system design and implementation.

## Operation

### NORMAL

#### LHDC & Supply Voltage Normal

- Green 'Supply' LED
- Alarm & Fault LEDs - Off
- Alarm & Fault Indicator outputs - Off (Not Fault / OK output - On)
- A1 & A2 Alarm relays - De-energised
- Fault relay - Energised

### FAULT

#### LHDC open circuit

- Yellow 'Fault' LED - On
- Fault Indicator output - On (Not Fault / OK output - Off)
- Fault relay - De-energised
- The unit will automatically return to Normal on rectification of the Fault condition.

### ALARM

#### LHDC Activated (S/C due to Fire)

- Red 'Alarm' LEDs - On
- Alarm Indicator outputs A1 & A2 - On
- Alarm relays A1 & A2 & - Energised

### ALARM TEST

#### Module Fire Test push-button operated

- LEDs, fire relays and indicator outputs as for Fire above.

### RESET

#### Module Fault Test & Reset push-button operated OR Reset input activated.

- The unit is normalised after a 'Fire Test' push-button operation.
- An LHDC Fault condition is simulated during PB operation
- After a true Fire 'operated' LHDC requires replacement before Reset.

### LAMP TEST

#### Remote Lamp Test input activated

- Alarm & Fault Indicator outputs - On

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