

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 Intrinsically Safe Zener 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 Line 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 Line 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 1

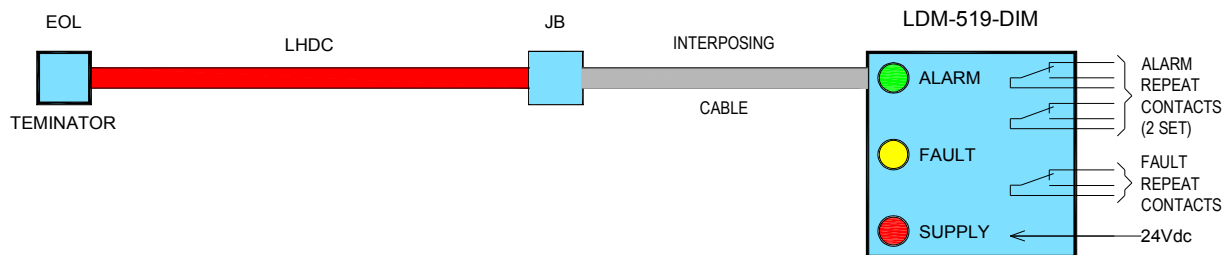
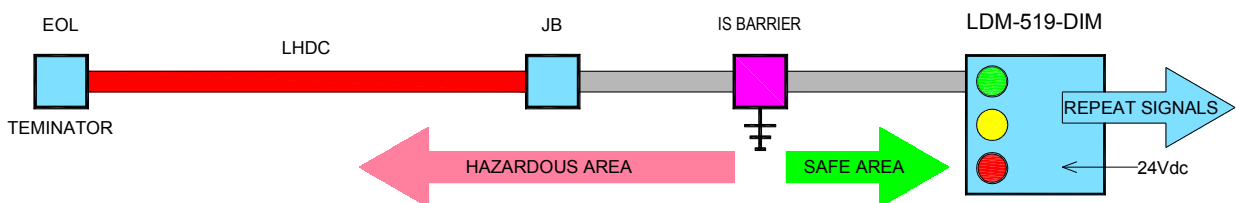


Figure 2 shows an arrangement for a 'Hazardous Area' employing an intrinsically safe zener barrier.

Figure 2



Module Arrangement

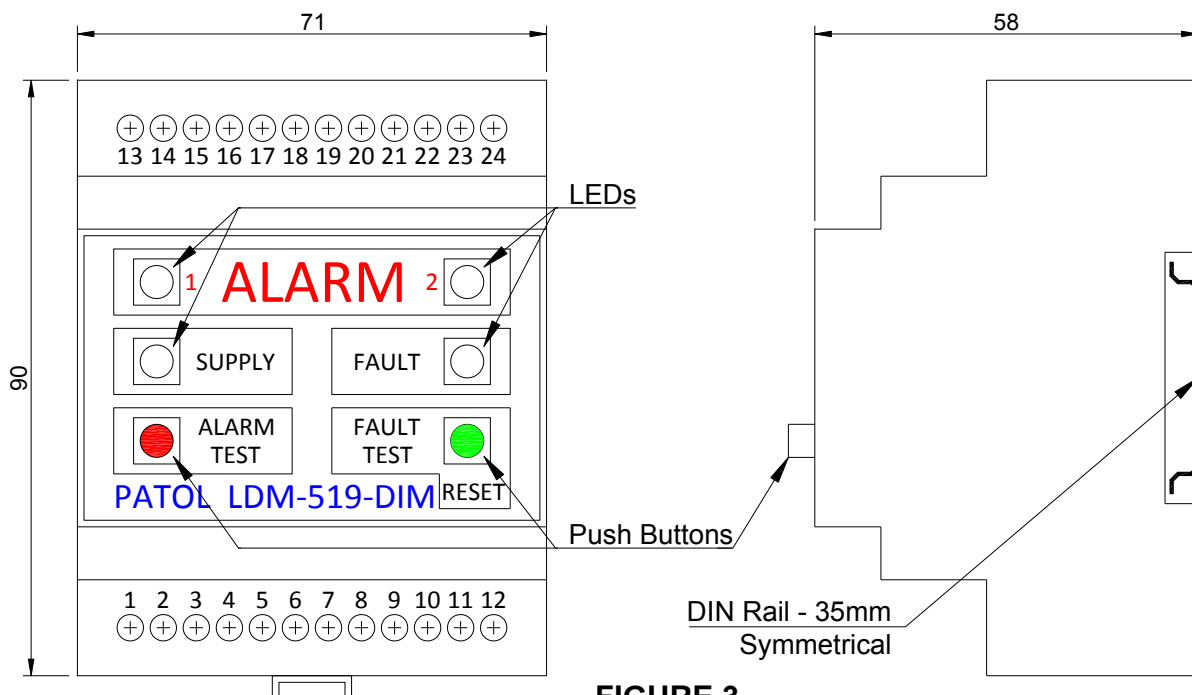
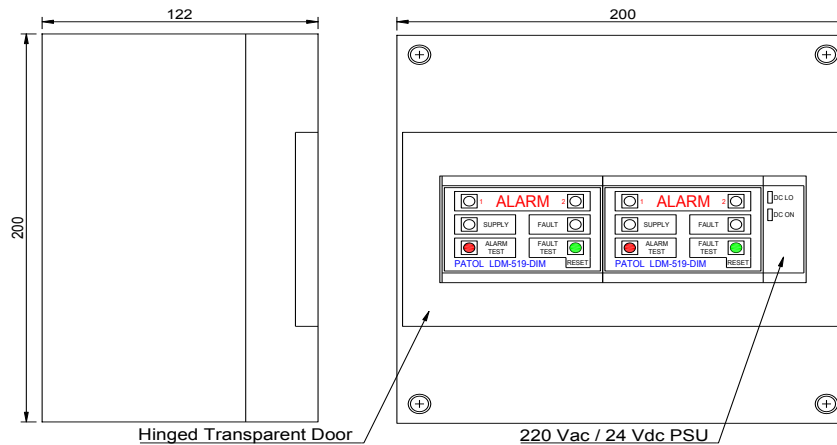


FIGURE 3

Enclosures

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

The example shown combines two zones of detection and incorporates a DIN rail mounting power supply. The case is flame resistant polystyrene, colour RAL 7035. Ingress protection rating is IP65.



Operational Specification

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

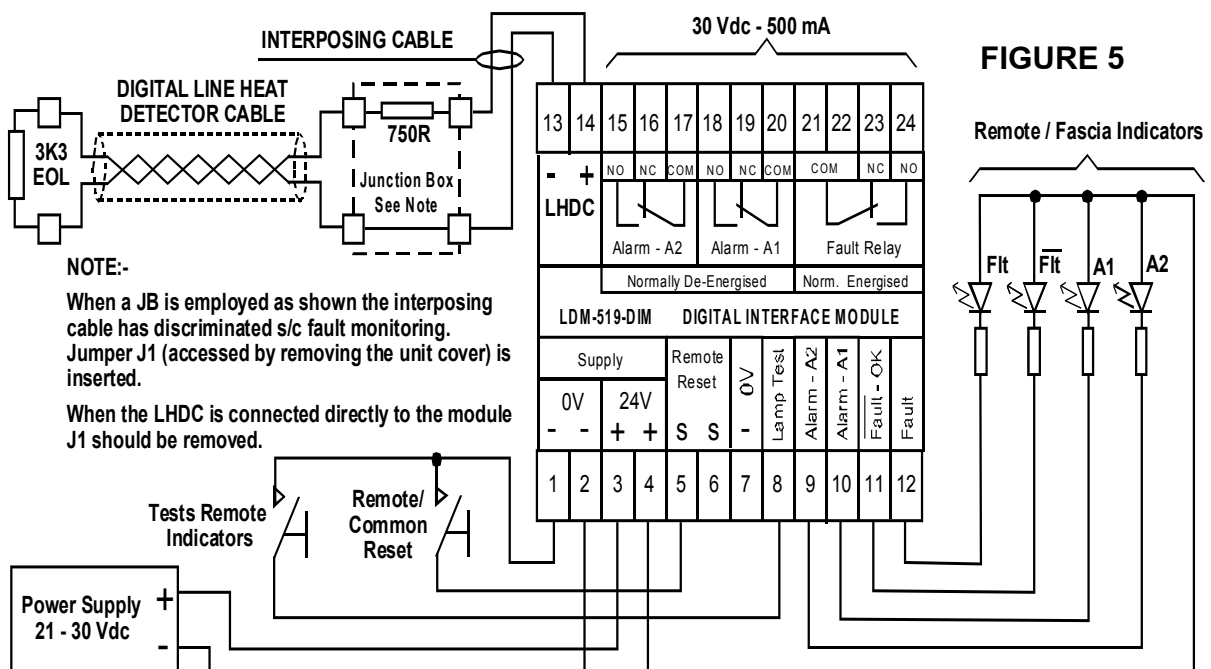
Push Buttons: Alarm Test
Fault Test / Reset

Relay Contacts: Alarm - changeover - 2 sets
(0.5A @ 30Vdc) Fault - changeover - 1 set

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

Remote Inputs: Reset
Lamp Test

Connections - Typical



Hazardous Areas - IS Barriers

The LHDC may be installed in a Hazardous Area by employing an Intrinsically Safe Zener 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 7 & 8) the circuit is isolated from earth at the IS Barrier, thus obviating 'multiple earth points' on Fire Panel signalling systems such as addressable loops.

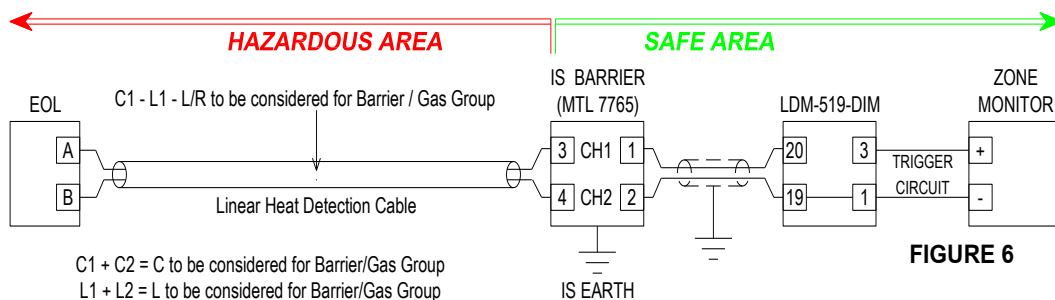


FIGURE 6

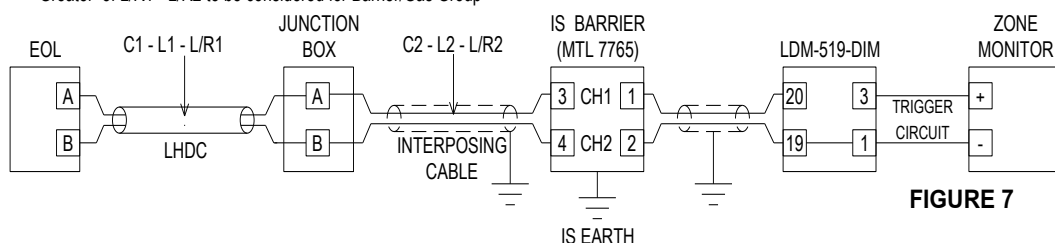


FIGURE 7

EXAMPLE : The parameters for the MTL765 in a combined channel configuration (Figs 6 & 7) for a group IIC gas are:-

Maximum Capacitance - $C=0.58\mu F$

Maximum Inductance - $L=0.32mH$

Maximum Inductance to Resistance Ratio - $L/R=22\mu H/\Omega$.

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

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.

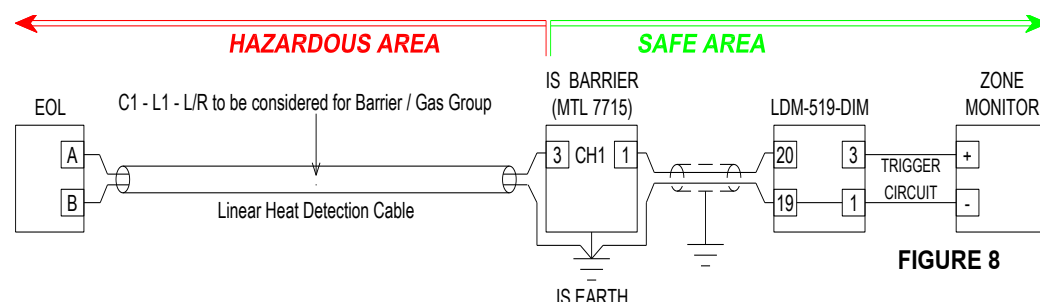


FIGURE 8

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

EXAMPLE : The max parameters for the MTL7715 for a group IIC gas are :-

Maximum Capacitance - $C=0.58\mu\text{F}$

Maximum Inductance - $L=1.45\text{mH}$

Maximum Inductance to Resistance Ratio - $L/R=66\mu\text{H}/\text{ohm}$.

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

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 <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• 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) <ul style="list-style-type: none">• Red ‘Alarm’ LEDs - On• Alarm Indicator outputs A1 & A2 - On• Alarm relays A1 & A2 & - Energised
ALARM TEST	Module Fire Test push-button operated <ul style="list-style-type: none">• LEDs, fire relays and indicator outputs as for Fire above.
RESET	Module Fault Test & Reset push-button operated OR Reset input activated. <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• Alarm & Fault Indicator outputs - On

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