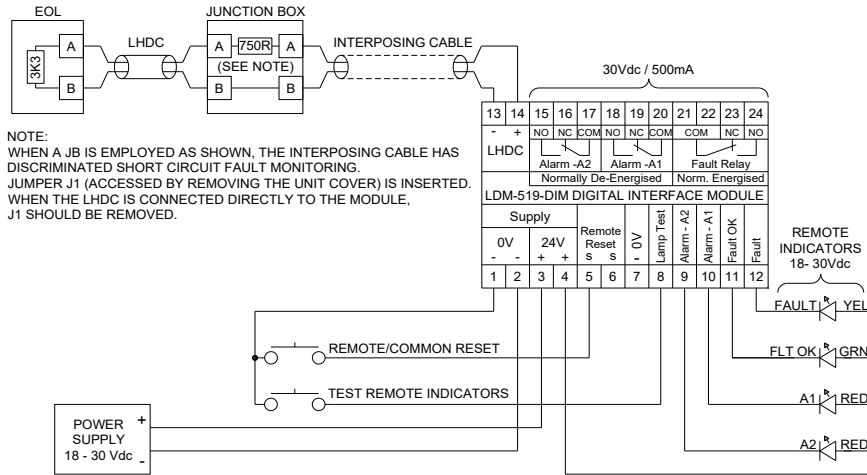


LDM-519-DIM Digital LHDC Interface

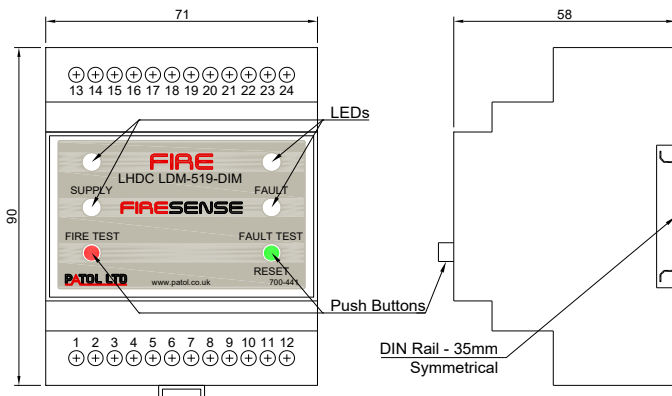
The unit is operated in conjunction with a length of Digital Linear Heat Detector Cable (LHDC) and an 'End of Line' (EOL) terminator. The LHDC is a twisted pair twin core cable. When the trigger temperature of the LHDC is reached these cores connect and a Fire Alarm is registered. The LDM-519-DIM module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

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

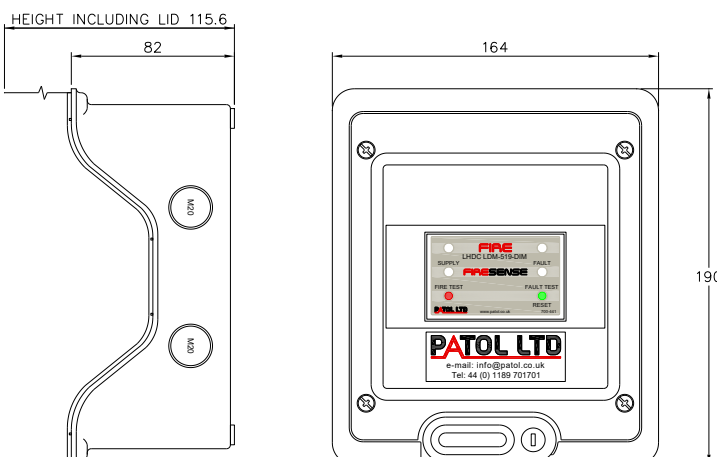
Connections



Module Arrangement



Enclosures



Operational Specification Connections - Typical

- Supply Voltage:** 18 - 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: (0.5A @ 30Vdc)** 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
- Approvals:** SIL 2 certified

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

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

Hazardous Areas - IS Barriers

The LHDC may be installed in a Hazardous Area by employing an Intrinsic Safety Barrier or Isolator 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 the 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.

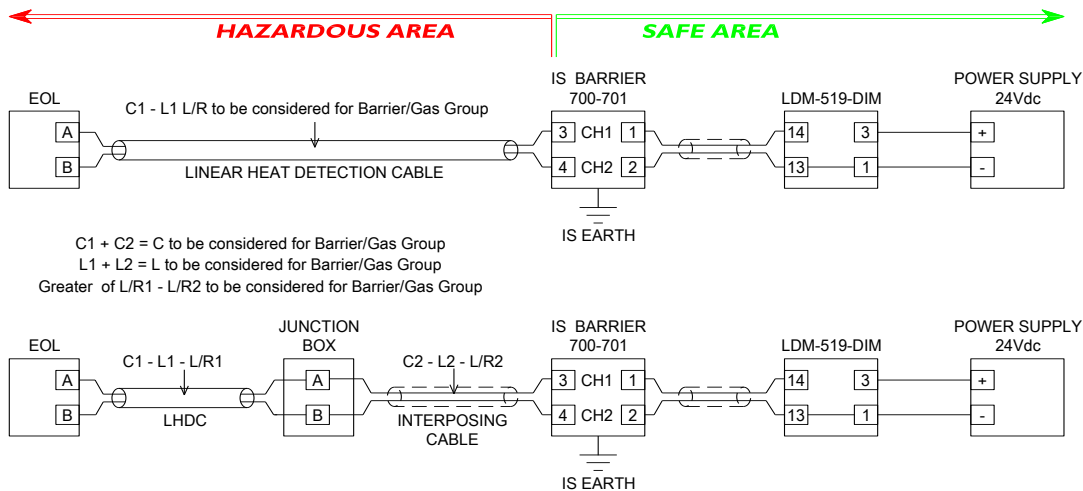
The C-L/R parameters for the barrier depend on the configuration and 'gas group'. When considered together with the LHDC & interposing cable specification they will determine the compliance of an installation and/or define maximum cable lengths.

For use with the LDM-519-DIM Patol recommends a Dual Channel Shunt Diode AC Zener Barrier, 15V-150mA-124R per channel, part number 700-701 and Galvanic Isolators 700-705 / 700-706.

Hazardous Areas - Zener Barriers

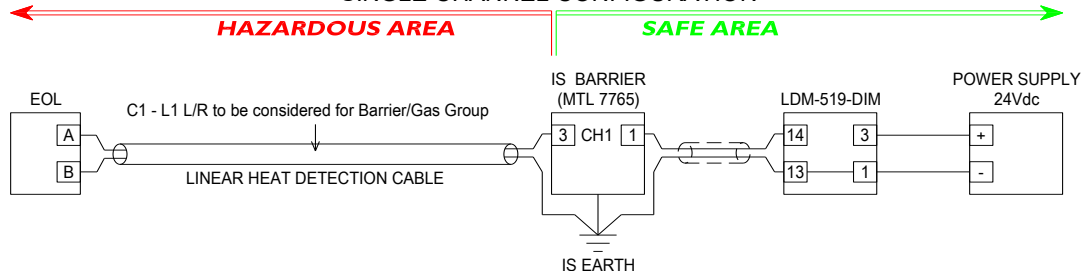
COMBINED CHANNEL CONFIGURATION

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 the circuit is isolated from earth at the IS Barrier, removing the need for multiple earth points on Fire Panel signalling systems, such as addressable loops.



EXAMPLE: The parameters for the 700-701 in a combined channel configuration for a group IIC gas are:-
 Max. Capacitance:- $C=0.58\mu\text{F}$ Max. Inductance:- $L=0.32\text{mH}$ Max. 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



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

EXAMPLE: The max parameters for the 700-701 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:- $L/R = 66\mu\text{H}/\Omega$.

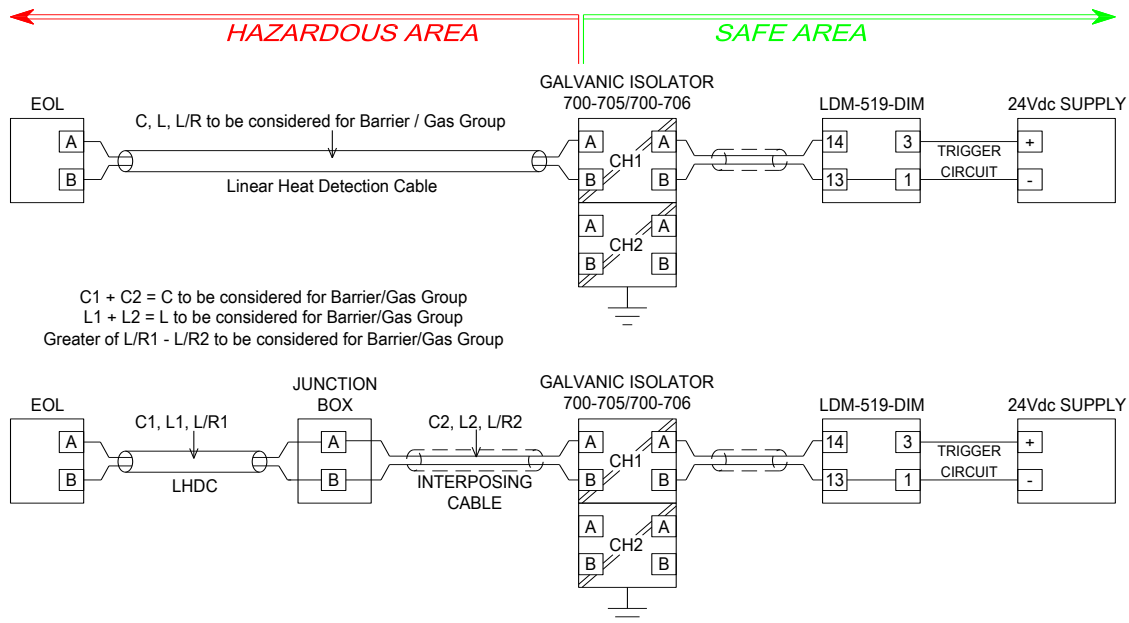
Patol 70°C. Non-Armoured LHDC has:- $C = 120\text{pF}/\text{m}$, $L = 0.95\mu\text{H}/\text{m}$, $L/R = 5.5\mu\text{H}/\Omega$.

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

For further information relating to C, L, L/R specifications for Zener barriers refer to "D1458 LHDC in Hazardous Area Guide"

Hazardous Areas - Galvanic Isolator

Galvanic Isolators do not require an I.S. earth. Shown below are two examples of a Galvanic Isolator arrangement. The calculations for an installation varies between products and/or environments. Galvanic Isolator specifications and site requirements must be observed.



EXAMPLE:

The parameters for the 700-706 in a combined channel configuration for a group IIC gas are:-

Maximum Capacitance:- $C = 0.107\mu\text{F}$ Maximum Inductance:- $L = 4.3\text{mH}$

Maximum Inductance to Resistance Ratio:- $L/R = 60\mu\text{H}/\Omega$.

The parameters for the 700-705 in a combined channel configuration for a group IIC gas are:-

Maximum Capacitance:- $C = 0.083\mu\text{F}$ Maximum Inductance:- $L = 4.2\text{mH}$

Maximum Inductance to Resistance Ratio:- $L/R = 56\mu\text{H}/\Omega$.

Interposing FP400 cable specification used in this example:-

$C2 = 130\text{pF}/\text{m}$, $L2 = 0.322\mu\text{H}/\text{m}$, $L/R = 31\mu\text{H}/\Omega$.

Patol 70°C Non-Armoured LHDC used in this example:-

$C1 = 120\text{pF}/\text{m}$, $L1 = 0.95\mu\text{H}/\text{m}$, $L/R = 5.5\mu\text{H}/\Omega$.

Interposing FP400 Cable length = 150m

Linear Heat Detection Cable length = 450m

Calculations:

Capacitance per total length:- $C = C1 + C2 (120\text{pF} \times 450) + (130\text{pF} \times 150) = 54\text{nF} + 19.5\text{nF} = 0.0735\mu\text{F}$

Inductance for total length:- $L = L1 + L2 (0.95\mu\text{H} \times 450) + (0.322\mu\text{H} \times 150) = 427.5\mu\text{H} + 48\mu\text{H} = 475.8\mu\text{H}$

For further information relating to C, L, L/R specifications for Galvanic Isolators refer to "D1459 LHDC in Hazardous Area Guide" This 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 - On• 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 (Short circuit 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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