

LDM-621-DDLX Digital LHDC Interface with Distance Display



The unit, is designed to monitor a length of Non-Resettable Digital Linear Heat Detection Cable (LHDC) for both Fire condition, and Fault status (open circuit).

The unit has a 4 digit LCD which activates on Fire condition and displays the distance into the zone that the alarm has occurred. Non-Resettable Digital LHDC may be employed in lengths up to 10Km (9999m) with an adjustment to accommodate interposing cables.

The unit is designed such that it may be configured to operate in a 'two wire' mode that emulates the operation of conventional smoke & heat detectors. The unit may therefore be directly interfaced with Fire Control Panels by connection to Fire zone Trigger Circuits or addressable interface modules.

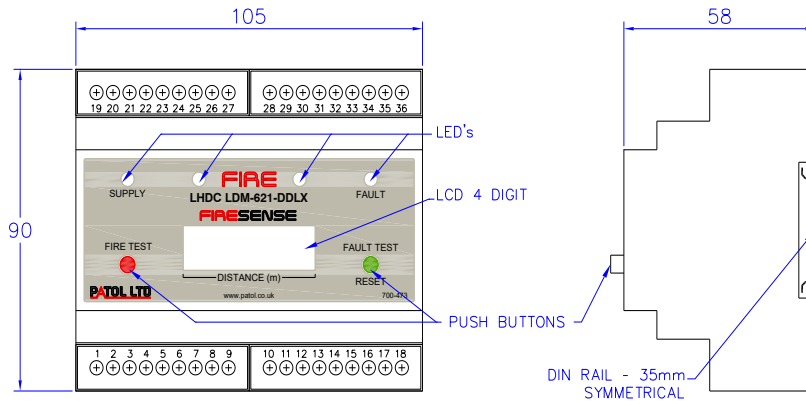
If a separate power supply is employed, signalling of the Fire and Fault status, by means of Volt free relay contacts and a 4 to 20mA output are also available.

The DIN rail modular housing of the unit enables it to be installed in a variety of enclosures and readily integrated into multi zone Control Panels.

The primary features of the control unit are:-

- **Operable from two wire Fire Panel Trigger Circuits. Line Power.**
- **Analogue Addressable Loop Interface - Loop Powered.**
- **Display of Alarm Location - Distance in metres.**
- **4mA to 20mA instrumentation Current Loop Output.**
- **Versions of this unit are available for use with Intrinsic Safety Zener Barriers (LDM-621-DDLX-Z) and Galvanic Isolators (LDM-621-DDLX-G) for connecting to LHDC within Hazardous Areas.**
- **Fault monitoring of LHDC for open circuit conditions.**
- **LED indication of Fire, Fault & Supply status.**
- **Test & Reset Push Buttons.**
- **Volt free contact outputs for Fire & Fault conditions - when connected to a separate power supply.**
- **DIN Rail mounting.**

Module Arrangement

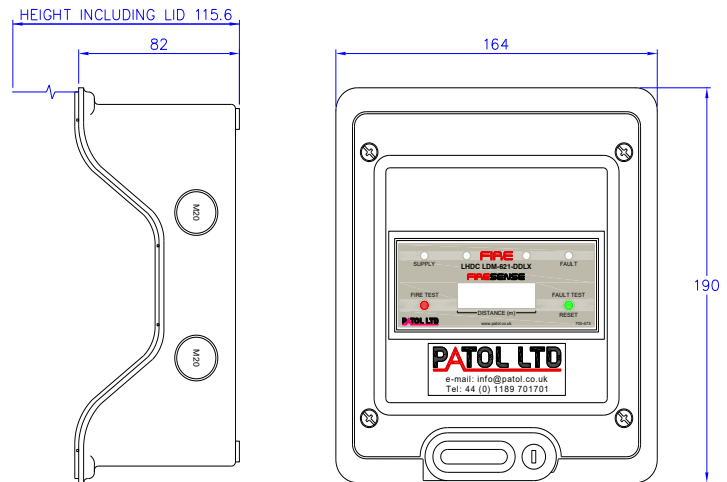


Enclosures

The LHDC Monitor can be mounted in a variety of enclosures.

For the example shown :-

- Rating :- IP 65
- Material :- Shock Resistant Polystyrene
- Cover :- Dark Grey R746A
Key-lockable hinged window
- Base :- Light Grey L750A
- Part No :- 700-801



LDM-621-DDLX Part Number 700-473

Operational Specification

	Two Wire Mode (Line Power)	Relay Mode
Supply Voltage:	14 - 30Vdc	20 - 30Vdc
Current - Normal:	<2mA Plus user defined monitoring (EOL) current	<12mA - (with Fault Relay)
Current - Fire:	<12mA Plus user defined Fire (Trigger) load	<29mA - (with Both Relays) Plus 4-20mA loop current if used
Current - Fault:	<700µA (LDM-621-DDLX-G approx. 1.5mA)	
Display:	4 Digit LCD : 0 to 9999 - Character Height : 8.5mm Unit Accuracy : +/- 1% LHDC Tolerance : +/- 3%	
Relay Contacts:	Fire - changeover - 2 sets Fault - changeover - 2 sets	1A @ 24Vdc / 120Vac
Environment:	0-60°C @ 95% max Humidity	
LHDC Resistance:	Nominal 0.18 Ω /m	

The unit is operated in conjunction with a length of Non-Resettable Digital Linear Heat Detection Cable (LHDC) and an End of Line (EOL) functional unit. The Non-Resettable Digital LHDC is a twisted pair twin core cable. When the trigger temperature of the LHDC is reached the heat reactive polymer causes the cores to connect and a Fire Alarm is registered. The LDM-621-DDLX units automatically determine the distance to the point of operation and displays this by means of the LCD. The current loop output provides an analogue value of the 'distance'. This o/p is 0mA when normal, and scaled 4mA = 0m to 20mA = 10000m on LHDC operation.

Reference should be made to the Linear Heat Detection Cable Sales Information Sheets D1476 and D1177 for the specification of their performance.

There are three principle modes of supply & signalling operation:-

Figure 1 (Relay Mode) shows a typical minimum system where a separate 24Vdc supply is employed.

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

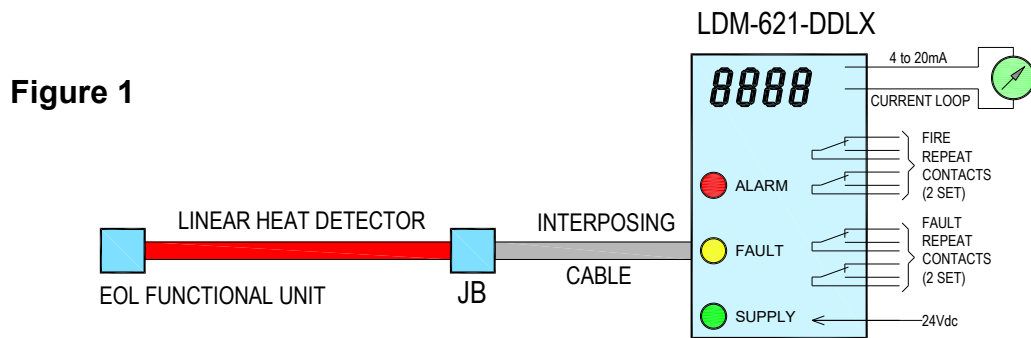


Figure 2 (Line Power Mode) shows a simple configuration with the unit directly connected to the Fire Panel Trigger Circuit.

Note: Values of trigger and EOL resistors may vary on the Fire Panel

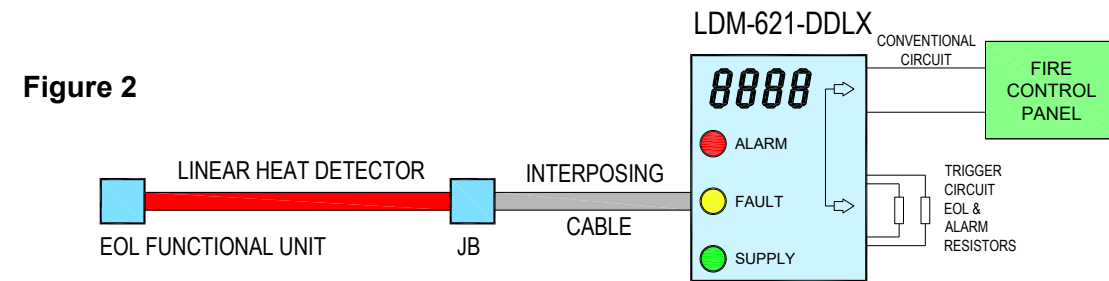
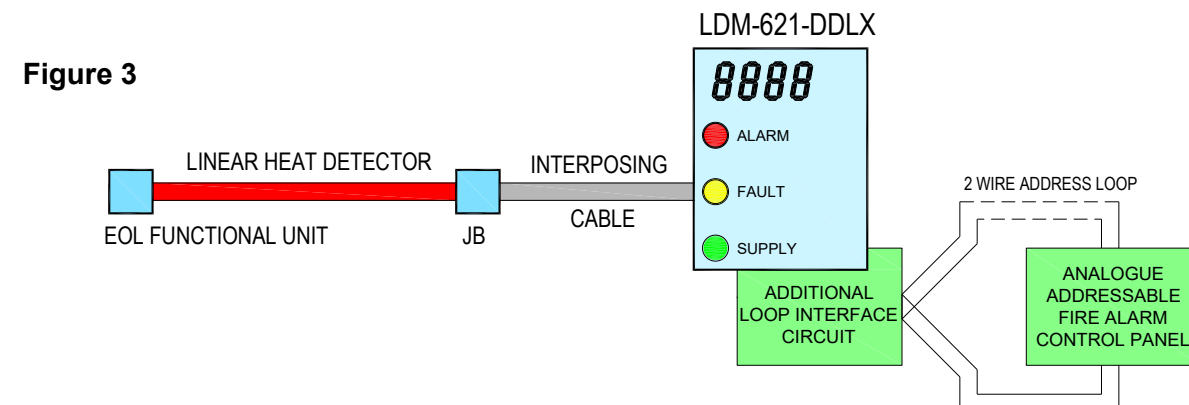


Figure 3 (Line Power Mode) shows the configuration when an ADDRESSABLE LOOP Interface/Zone Monitor Unit (ZMU) module is fitted.

Connection between the LDM-621-DDLX and the Addressable Loop Module is as the Trigger Circuit connection of figure 2.

Note: Values of trigger and EOL resistors may vary depending on the Fire Panel loop Interface / Zone Monitor Unit



Direct Powered Configuration - Relay Mode

In this mode both Fire & Fault relays are enabled by links at 7/8 & 9/10. The Fault relay is energised in normal condition. A 24Vdc power supply is required as the Fault relay coil current requirement is greater than can be obtained from most Trigger Circuits whilst maintaining the required Voltage.

Both Fire & Fault relays have twin contacts enabling both local control and repeat signalling.

The 4 to 20mA current loop output may be employed to signal to PLC's etc.

Figure 4 shows in more detail a typical minimum system where a 24Vdc supply is employed.

The repeat contacts may be employed to signal an Alarm Panel and/or initiate control systems

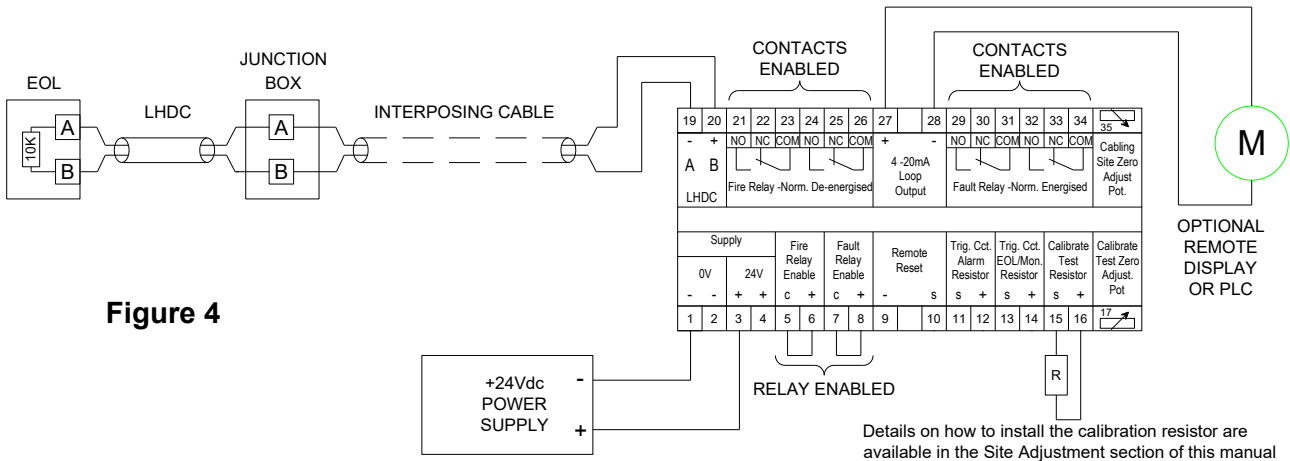


Figure 4

Figure 5 shows in more detail a typical connection to a conventional panel or One Input Zone Monitor similar to Hochiki CHQ-SZM, CHQ-SIM, CHQ-POM; Apollo 55000-812, 55000-845, 55000-833.

Other zone monitor manufacturers may also work .

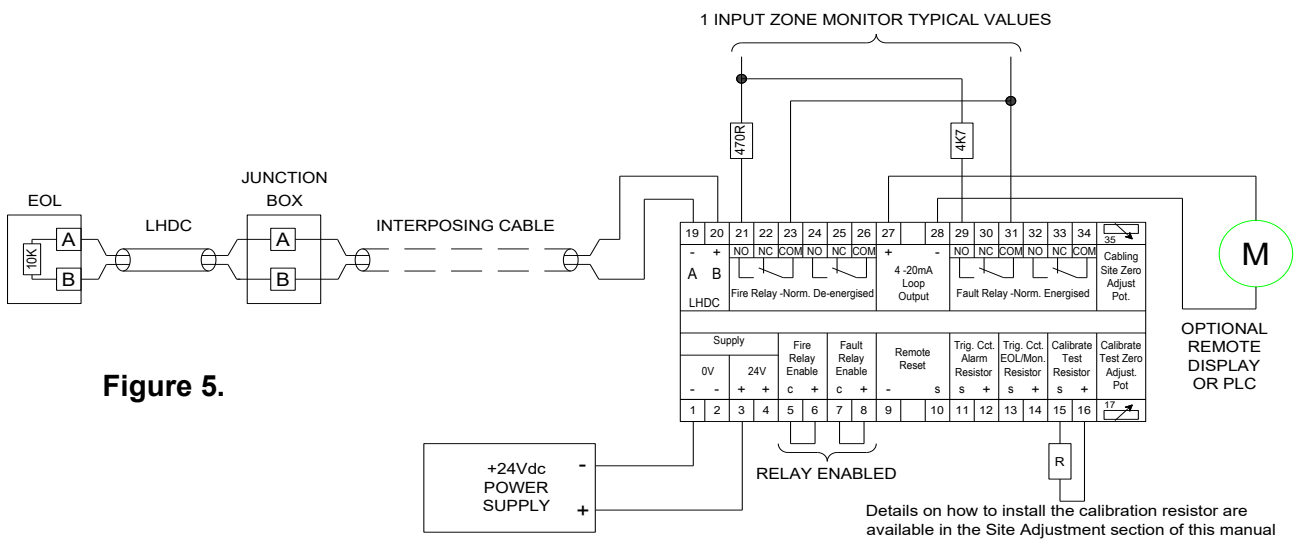


Figure 5.

Figure 6 shows in more detail a typical connection to a Two Input Zone Monitor similar to Hochiki CHQ-DZM, CHQ-DIM, CHQ-POM

Other zone monitor manufacturers may also work .

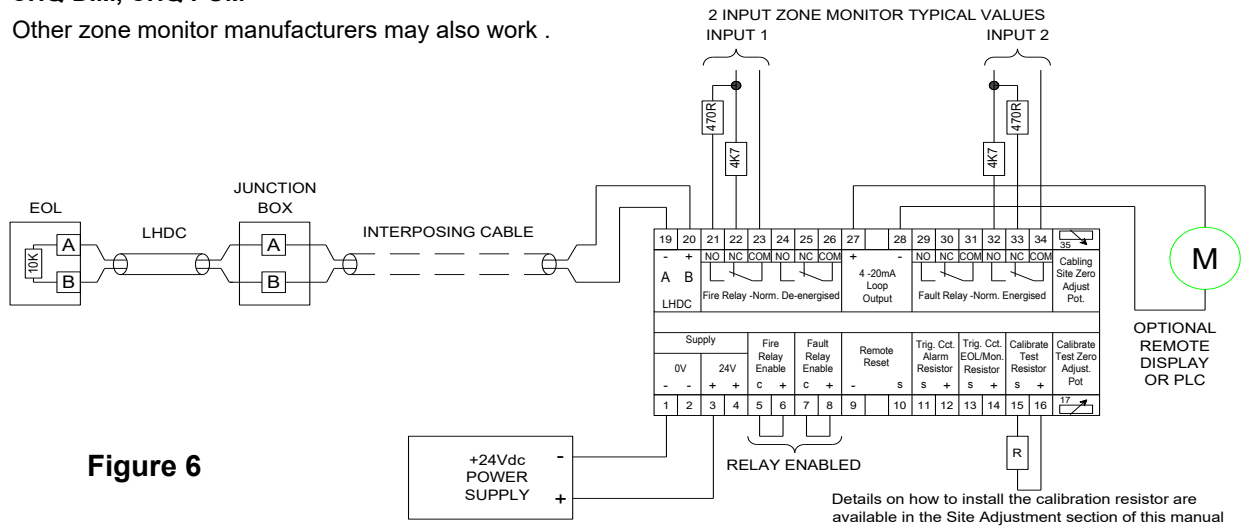


Figure 6

Figure 7 shows in detail a typical Zener Barrier system where the LHDC is located in a Hazardous Area.

Hazardous Area principles used in the installation of Zener Barriers need to be closely adhered to. Those principles will vary depending on the Hazardous Area, equipment, type of installation and site. As in the examples above the repeat contacts may be employed to signal an Alarm Panel and or initiate control systems.

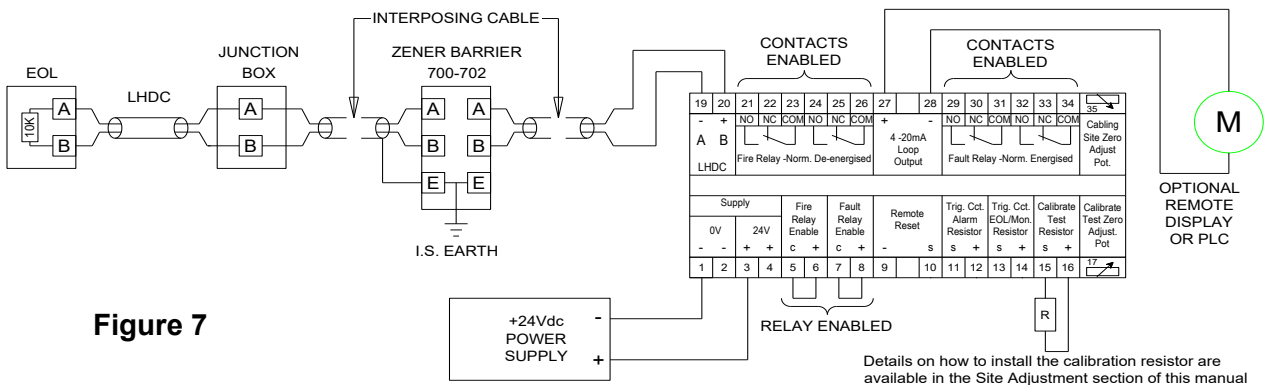


Figure 7

Figure 8 shows in detail a typical Galvanic Isolator system where a length of LHDC is located in a Hazardous Area.

Hazardous Area principles used in the installation of Galvanic Isolators need to be closely adhered to. Those principles will vary depending on the Hazardous Area, equipment, type of installation and site. The main advantage in using a Galvanic Isolator over a Zener Barrier is that a special IS Earth is not required.

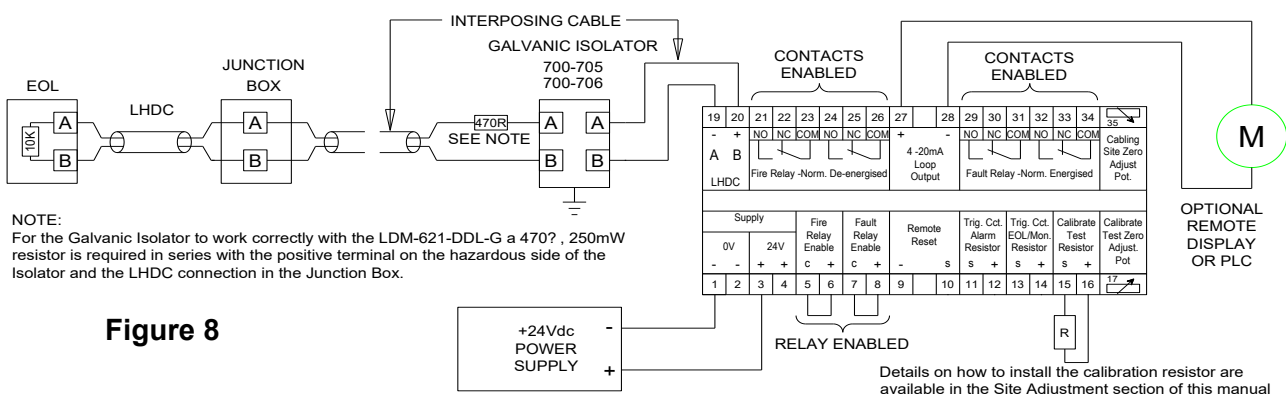


Figure 8

As in the examples above the repeat contacts may be employed to signal an Alarm Panel and or initiate control systems.

Line Powered Configuration - 2 Wire Mode

This 2 wire mode can be used with any of the previous Hazardous Area circuits. In this mode the relays are disabled and the unit's quiescent current is very low. By connection of appropriate value resistors at terminals 11/12 and 13/14, the unit replicates the characteristics of smoke and heat detectors and may be directly connected to, and powered from, most conventional Fire System Trigger Circuits.

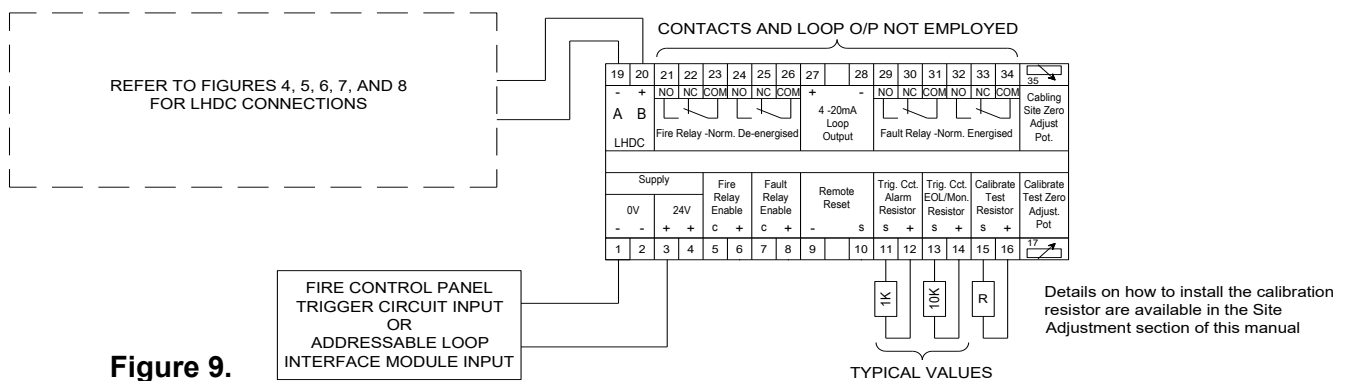
The EOL resistor at terminals 13/14 is connected to the Trigger Circuit when the unit is in normal condition. Should a LHDC open circuit Fault or low Voltage condition occur the resistor is "switched out" and the unit draws less than 700µA from the Trigger Circuit. Systems employing an End of Line Zener diode should operate satisfactorily with the Zener connected at 13/14 instead of a resistor. It may be necessary to use a lower value device than normal as there is a 0.7-1.0V loss through the unit.

The Alarm resistor at terminals 11/12 is connected to the Trigger Circuit on Fire detection. The Alarm resistor value should be compatible with the conventional panel / Zone Monitor Trigger Circuit. The value of resistor may be less than the 1KΩ shown below.

Note: LDM-621-DDLX-G; Fault current is not less than 1.5mA due to the Galvanic Isolator requiring a minimum level of current.

Figure 9 shows a typical connection to a conventional panel or Two Wire Mode Zone Monitor similar to Hochiki CHQ-SZM, CHQ-POM; Apollo 55000-812, 55000-845, 55000-833

Other zone monitor manufacturers may also work.



Operation

It should be noted that in order for the unit to operate at very low supply currents, as is necessary for connection to Fire System Trigger Circuits, the Supply & Fault LEDs illuminate in a 'flashing' mode. The 'flash' cycle is approximately 2s (0.5Hz) with an ON : OFF ratio of approximately 1:5.

The relay & resistor o/p conditions described in the following are appropriate to the configured mode detailed in the previous section.

NORMAL

LHDC OK & Supply Voltage Present

- Green 'Supply' LED - Flashing
- Liquid Crystal Display - Off / Blank
- 4-20mA output - 0 mA
- Fire & Fault LEDs - Off
- Fire relay & Trigger Circuit Alarm resistor o/p (terminals 11/12) - De-energised
- Fault relay & Trigger Circuit EOL resistor o/p (terminals 13/14) - Energised

FAULT

LHDC Open Circuit or Supply Voltage Low

- Yellow 'Fault' LED - Flashing
- Fault relay & Trigger circuit EOL resistor o/p (terminals 13/14) - De-energised
- Supply current - < 700 μ A

The unit will automatically return to Normal on rectification of the Fault condition

FIRE

LHDC Activated

- Red 'Fire' LEDs - On
- LCD - Activated - Displaying distance to 'Alarm Point' in metres.
- 4-20mA output - Current gives distance to 'Alarm Point' - Scaled 4mA=0m 20mA=10km
- Fire relay & Trigger Circuit Alarm resistor o/p (terminals 11/12) - Energised

FIRE TEST

Module Fire Test Push Button operated

- Indications, Fire relay and Alarm resistor output operate as for 'FIRE' above. Please note terminals 15/16 must be linked by wire or a resistor of less than 320 Ω or this function is disabled or may display beyond range (0.0.0.0. (Dots blinking)).
- LCD - Display distance as defined by calibrate resistor (terminals 15/16). Refer to 'Site Adjustments'

Note: The Test Push Button must be depressed until the LC Display stabilises (3s).

- On PB release the unit will remain latched to 'Fire' but the LCD will go beyond range (0.0.0.0. (Dots blinking)).

Note: The output is only valid during Push Button operation. On Push Button release before module reset the 4 to 20mA output will drive over scale - 40mA.

FAULT TEST RESET

Module Fault Test & Reset Push Button operated

- A LHDC Fault condition is simulated during Push Button operation
- The unit is normalised after a 'Fire Test' Push Button operation
- On LHDC activation Reset Push Button operation causes refresh of the LCD indication.
- Reset after a true Fire can only occur after replacement of the 'operated' LHDC

Site Adjustments - Interposing Cable

When a Fire condition is detected the distance in metres from the start of the LHDC zone to the 'Alarm Point' is displayed by the LCD. The mechanism employed is the resistance characteristic of the LHDC.

In some circumstances the LHDC may be connected to the monitoring unit by interposing cables and Hazardous Area Intrinsic Safety Barriers. A re-zero adjustment control (VR2) located at terminal positions 35/36 is provided to negate the resistance of the interposing cable and where used, Barriers. The procedure is as follows:-

- a) With the unit connected to a power source, place a short circuit (s/c) at the start of the LHDC at the Junction Box terminals. This will place the unit into a Fire mode.
- b) The LCD will show a figure which will stabilise after a few seconds. The decimal points between digits will appear if the reading is 'negative'.
- c) The resistance of the Interposing Cable and if used, IS Barriers can be cancelled out by adjusting VR2 until zeros (0000) are shown on the display. If the LHDC is directly connected at the Controller, i.e. no interposing cable or Barrier. Place the temporary s/c at terminals 19/20 and adjust VR2 to zeros (0000) in the display.
- d) When a zero reading is achieved, the short circuit should be removed from the LHDC terminals and the Controller Reset using the FAULT TEST / RESET green Push Button (PB) on the right of the display.
- e) The red FIRE TEST Push Button is a configured option as part of the Maintenance Test programme and is referred to in the Operation Section of this Manual. It is important to understand that its use will place the Controller into Alarm. Ensure the connected Fire Panel / Zone is isolated before operating the Fire Test. To enable this function install a shorting link across terminals 15/16. Keep the button pressed down and adjust the Variable Resistor (VR3) at terminals 17, 18 until zeros (0000) are displayed. On release of the Fire Test Push Button the LCD will display ((0.0.0.0. (Dots blinking))), indicating over range, until the Reset Button is operated. (Note that in this condition the unit may provide more than 40mA current at the 4 to 20mA output terminals 27, 28).
- f) If a different reading in the display is required, for example "1000" metres, replace the Shorting Link with a 160Ω resistor (>250mW).

Note. If Barriers are used, points e) & f) do not apply, please contact Patol for technical advice for this option.

Disclaimer :-

The information contained in this document (D1505) is intended as guidance notes only, and do not take precedence over any applicable on site policies or Hazardous Area regulations. We recommend that you always closely follow the manufacture's own applicable datasheets when installing any Hazardous Area Technology.

Notes.

CAUTION - Unit may be susceptible to ESD, The connections should not be touched when power is on, and the authorised personnel are to ensure they are adequately grounded if touching the connections to prevent ESD.

Contact Details:

Patol Limited
Archway House, Bath Road
Padworth, Reading,
Berkshire.
RG7 5HR
Tel: +44 (0)1189 701 701
Fax: +44 (0)1189 701 700
Email: info@patol.co.uk
Web: www.Patol.co.uk