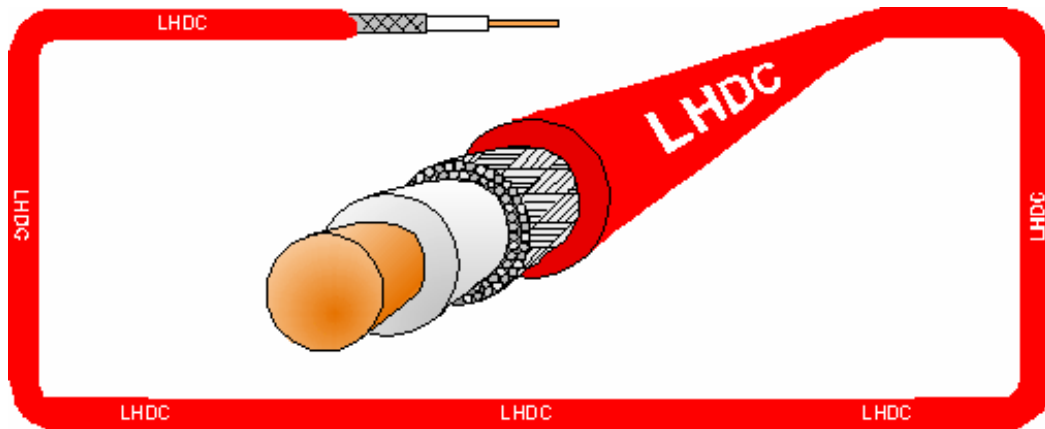


## LINEAR HEAT DETECTING CABLE (L.H.D.C.) Analogue Line Heat Detector & Fire Sensor



The Patol Line Heat Detector is designed to provide early detection of fire conditions and overheating in circumstances where other forms of detection would not be viable, either due to inability to sustain the environmental requirements or through prohibitive costs.

Extensive single zonal lengths of the Line Heat Detector Cable (LHDC) may be installed with the ability to trigger alarms for 'hot spots' occurring on very small sections of the overall cable.

The LHDC may be employed in a wide variety of applications but is particularly suited where there is a harsh environmental condition, a physical or hazardous maintenance access constraint to the protected area, and/or a requirement to cost effectively install detection in close proximity to the risk(s)

The primary features of Patol's Line Heat Detector are:-

- .. **Early detection of hazards at temperatures well below flame point.**
- .. **Rugged construction for use in harsh environments.**
- .. **Ease of installation - wide range of fixings available.**
- .. **Compatible with many existing zone monitors / control equipments.**
- .. **Recoverable & resetable (testable) operation - unlike Digital LHDC.**
- .. **Intrinsically Safe configurable for Hazardous Areas.**
- .. **Compliant with industry standards (e.g. CEGB GDCD-187)**
- .. **Extensive range of proven applications.**

## LINEAR HEAT DETECTING CABLE

Analogue Line Heat Detector & Fire Sensor

### Principles

The Line Heat Detector is a coaxial cable constructed with a copper coated steel central conductor, an inner insulation (dielectric), a tinned copper braid layer, and an overall protective sheath.

The primary mechanism of heat (fire) detection is that the resistance of the dielectric, monitored between the central conductor and braid layer, has a negative temperature coefficient (NTC).

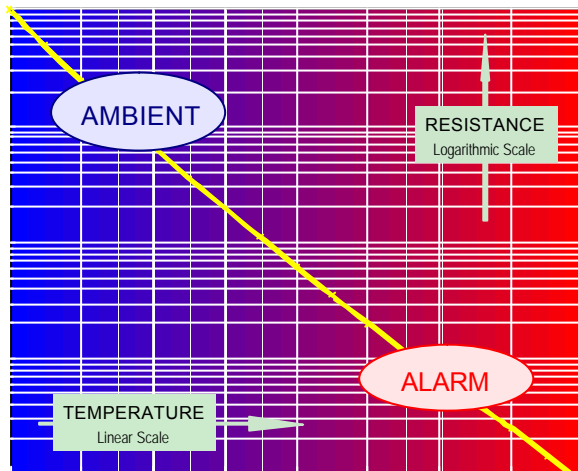


STEEL CONDUCTOR - COPPER CLAD

INNER INSULATION / DIELECTRIC - PVC

BRAID LAYER - TINNED COPPER WIRES

OUTER SHEATH - RED PVC



This NTC characteristic is a logarithmic function, and thus the resistance at normal ambient temperatures is very much greater than at abnormal alarm temperatures.

There are other parameters exhibited by the cable such as capacitive type effects. The cable must be employed in conjunction with the correct type of monitoring unit.

When correctly configured considerable lengths of the detector may be installed whilst maintaining the ability to trigger alarms for 'Hot Spots' on small sections of the detector cable.

Refer to '[Characteristics as a Fire Sensing Cable](#)' .

### Applications

The Line Heat Detector is employed in conjunction with an 'end of line' terminating device (EOL Terminator) and a zone monitoring unit or control panel equipped with an appropriate LHDC interface channel.

The cable may be installed in *Hazardous Areas* by means of *Intrinsically Safe Zener Barriers*. Similarly, when the protected area is remote from the monitoring equipment 'interposing' cables may be employed. (Contact Patol for recommended types).

LHDC is versatile in that it can both provide an alternative to point heat detectors in conventional (space) protection situations, and it may also be readily installed in very close proximity to monitored hazards.

The detector is particularly suited to applications where harsh environmental conditions preclude the use of other forms of detection.

The low maintenance requirement of the detector provides a unique solution to fire detection in areas that have access restrictions due to either physical difficulties or personnel health risk.

- *Cable Tunnels, Ducts & Mezzanines*
- *Escalators & Moving Walkways*
- *Petro-Chem Storage Tank Rim Seals*
- *Paint Shops & Spray Booths*
- *Conveyors - Coal, Wood, Sulphur, etc..*
- *Ceiling Voids & Attic Spaces*
- *Road & Rail Tunnel Carriageways & Sumps*
- *Nuclear Reactor Plant Areas*
- *Refrigerated Stores & Cold Rooms*
- *Electrical Control & Switchgear Cabinets*
- *Warehouse High Rise Pallet Racking*
- *Oil Rigs & Off Shore Platforms*
- *Fume Cupboards & Glove Boxes*
- *Grain Silos & Agricultural Storage*
- *Road / Rail Vehicle Engine Compartments*
- *Steam Pipe Leaks & Trace Heating Faults*
- *Product Lines - Flanges, Valves & Pumps*
- *Computer Room Under Floor Cable Voids*

# LINEAR HEAT DETECTING CABLE

Analogue Line Heat Detector & Fire Sensor

## Characteristics as a Fire Sensing Cable

Patol's Line Heat Detector is of the Analogue type.

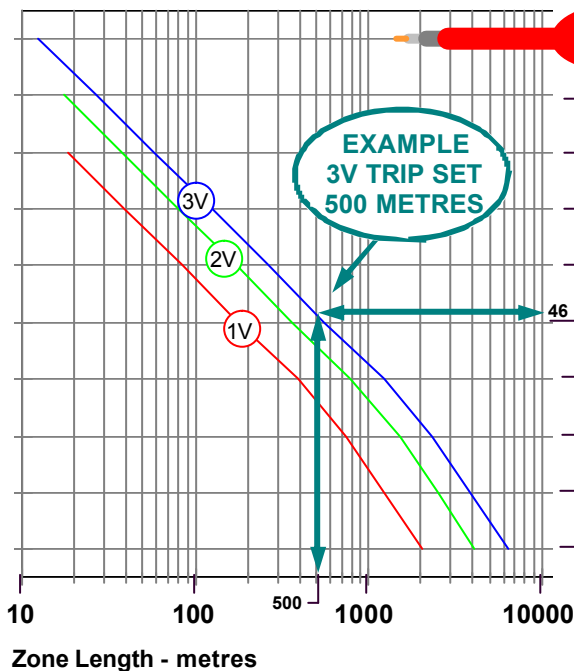
With this form of detector two principle aspects must be considered for any particular application:-

- The total (zone) length of cable being employed and the **normal** ambient temperatures that it may withstand **without** an alarm being raised.
- The point at which an alarm **will** be triggered if a section (or all) of the cable suffers an **abnormal** temperature elevation.

Zone monitors are equipped with sensitivity / trip adjustments. The graphs show three typical settings and accommodate both the worst case *event scenario* and Line Heat Detector manufacturing tolerance.

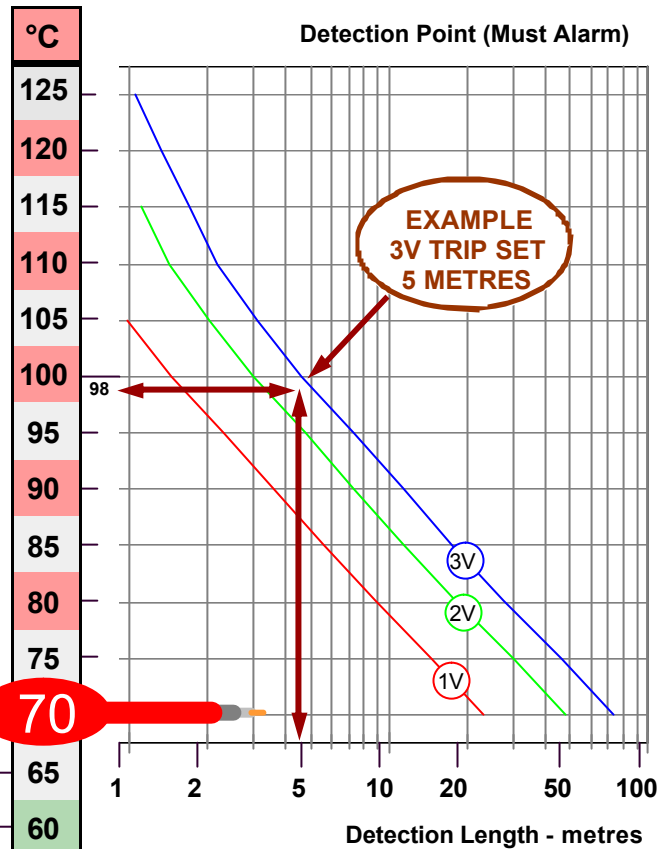
Also refer to the Example shown.

### Ambient Withstand (No Alarm)



### TWO STAGE OPERATION

The data on this page describes the LHDC "Trip" characteristic for one "Set Point". Patol has controllers that have two adjustable "Set Points" thus providing **Two Stage** or **Pre-Alarm** operation. See next Page.



### EXAMPLE

This shows a typical application where 500m of Line Heat Detector Cable is employed in conjunction with a zone monitor adjusted for a 3 Volt set point.

- The lower graph shows that the whole of the zone will withstand ambient temperatures up to 46°C **without** any alarm triggers.
- The upper graph shows that a temperature elevation of a 5m section of the zone **will** produce an alarm trigger at a maximum of 98°C.
- Margin & tolerance are applied to the curves. In practice the withstand will be **greater** than 46°C. In addition the detection graph assumes the rest of the zone cable to be at a very low temperature. At normal ambients the the alarm trigger will be somewhat **less** than 98°C.

## LINEAR HEAT DETECTING CABLE

Analogue Line Heat Detector & Fire Sensor

### *Two Stage Operation - Trip Confirmation - Pre Alarm*

A unique benefit of the Patol Analogue LHDC sensor is that it may be monitored for continuously variable states of abnormal condition. Patol provides Control Units that have two adjustable "Trip Set Point" trigger levels. These Zone Monitors can thus provide the "key" to systems that need confirmation of a Fire condition before Extinguishing or Shut-down actions are automatically initiated. Similarly the feature is invaluable when the LHDC Zone is integrated with Intelligent Address Loop Fire Systems that utilise Pre-Alarm notifications.

### *Basic Specification*

Overall Diameter	2.8 - 3.0 mm	Braid	Tinned Copper Wire
Colour	Red	Inner Dielectric	White
Printed Definition	Patol Linear Fire Detector	Central Conductor	Copper Clad Steel
Outer Sheath Material	PVC	Tensile Strength	200 Newtons

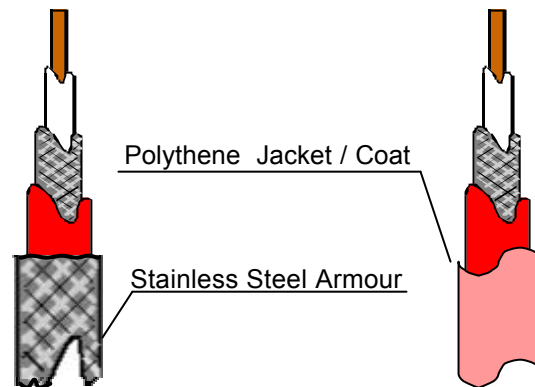
### *LHDC With Additional Protection - Ruggedised*

Patol's primary Line Heat Detector construction is extremely robust and is suitable for virtually all applications including Petro-chemical installations.

However, certain environments and/or Project Specifications may require enhanced protection for the LHDC.

Patol can provide LHDC with an additional Jacket Over Sheath when required.

Such stocked varieties of Patol's sensor include Stainless Steel Braided & Polythene Coated LHDC.



### *System Configuration & Equipment Compatibility*

The Line Heat Detector is compatible with many existing installations and monitoring equipments. Patol will be pleased to give advice on the Line Heat Detector in respect of its suitability as a replacement 'spare' for any particular established system.

LHDC may be installed in **Hazardous Areas** when used with a suitable **Intrinsically Safe Barrier**.

The following diagrams indicate typical system configurations :-

