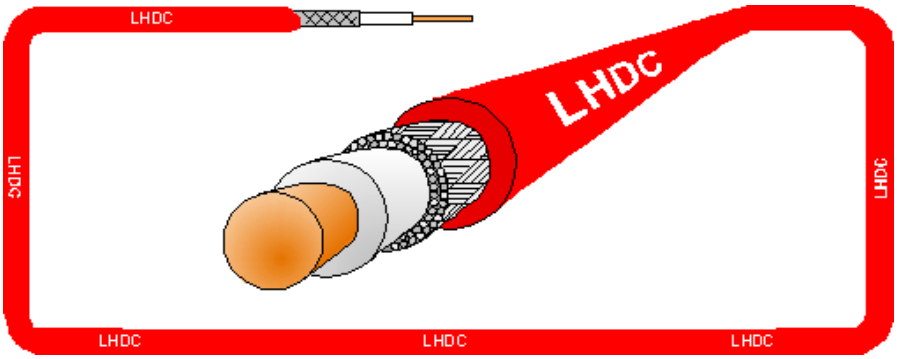
Resettable Analogue Linear Heat Detection



The Patol Resettable Analogue Linear Heat Detection Cable incorporating a Flame Retardant Polyethylene (FRPE) jacket, 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 Resettable Analogue Linear Heat Detection 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 LHDC are:-

- Early detection of hazards at temperatures well below flame point.
- Low Smoke Zero Halogen (LS0H)
- Rugged construction for use in harsh environments.
- Ease of installation - wide range of fixings available.
- Compatible with many existing zone monitors / control equipments.
- Recoverable & resettable (testable) operation - unlike Digital LHDC.
- Intrinsic Safety configurable for Hazardous Areas.
- Compliant with industry standards (e.g. CEGB GDCD-187)
- Extensive range of proven applications.

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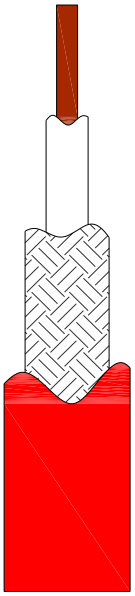
Principles

LHDC 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).

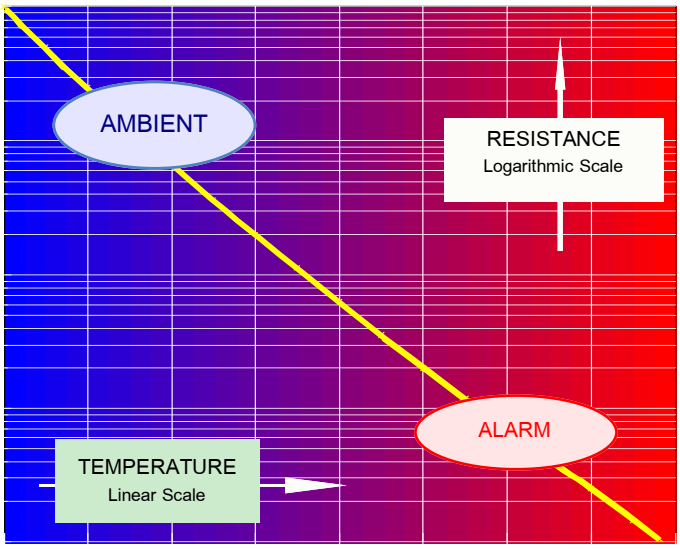


STEEL CONDUCTOR - COPPER COATED

INNER INSULATION / DIELECTRIC - PVC

BRAID LAYER - TINNED COPPER WIRES

OUTER SHEATH - RED FRPE (LOW SMOKE ZERO HALOGEN)



This NTC characteristic is a logarithmic function, and thus the resistance at normal ambient temperatures is 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

LHDC is employed in conjunction with an End Of Line functional unit (EOL Terminator) and a LHDC Interface Module or Control Panel equipped with an appropriate LHDC interface channel.

LHDC may be installed in *Hazardous Areas* by means of *Intrinsic Safety 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 LHDC is particularly suited to applications where harsh environmental conditions preclude the use of other forms of detection.

The low maintenance requirement of the LHDC 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-Chemical Storage Tanks
- 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

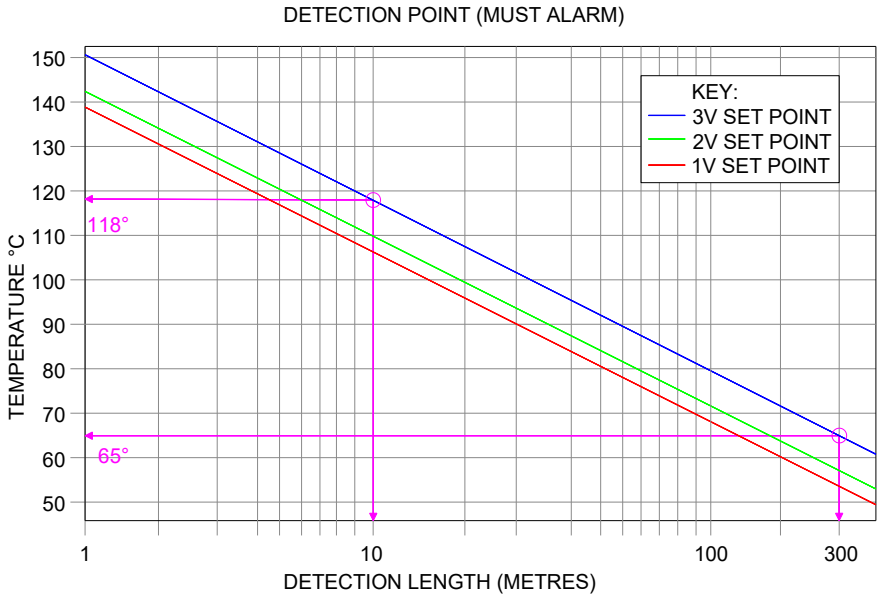
Characteristics as a Fire Sensing Cable

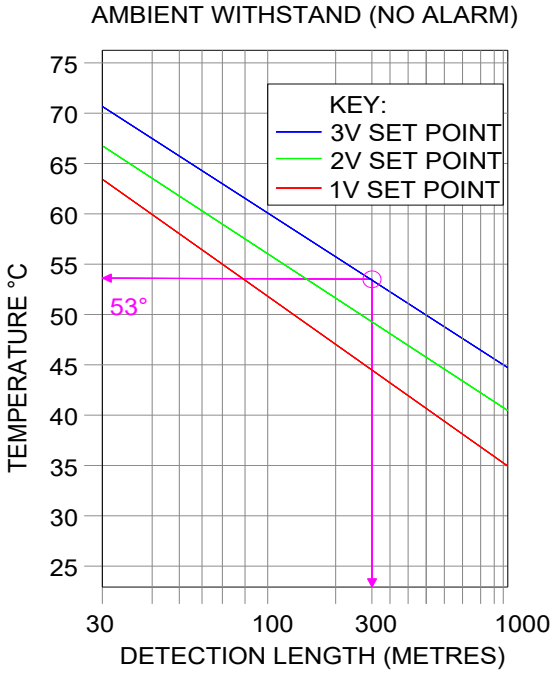
With this form of detector two principle aspects must be considered for any particular application:-

- 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.

LHDC Interface Modules are equipped with sensitivity / trip adjustments. The graphs show three typical settings and accommodate both the worst case *event scenario* and LHDC manufacturing tolerance.

Also refer to the Example shown.





Example

This shows a typical application where 300m of Linear Heat Detection Cable is employed in conjunction with an Interface Module adjusted for a 3V set point.

- The lower graph shows that the whole of the zone will withstand ambient temperatures up to 53°C without any alarm triggers.
- The upper graph shows that a 10m section of the zone will produce an alarm trigger at a approximately 118°C. The 300m zone length will trip at 65°C.
- Margin and tolerance are applied to the curves. In practice the withstand may be greater than 53°C. In addition, the detection graph assumes the rest of the zone cable to be at a very low temperature. At normal ambients the alarm trigger will be less than 118°C.

Two Stage Operation

The data on the previous page describes the LHDC "Trip" characteristic for one "Set Point".

Patol have Interface Modules that have two adjustable "Set Points" thus providing Two Stage or Pre-Alarm operation.

Two Stage Operation - Trip Confirmation - Pre Alarm

A unique benefit of the Patol Resettable Analogue LHDC is that it may be monitored for continuously variable states of abnormal condition. Patol provides Interface Modules that have two adjustable "Trip Set Point" trigger levels. These Modules 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

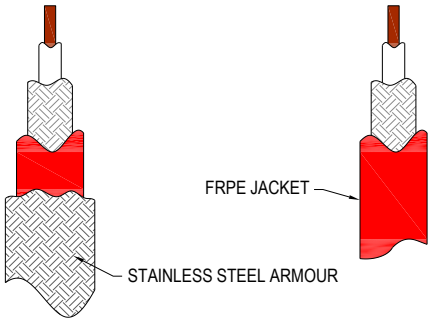
Part Number	700-001LS0H
Overall Diameter	3.3 mm ±10%
Colour	Red
Outer Sheath	Flame Retardant Polyethylene (FRPE)
Braid	Tinned Copper Wire
Inner Dielectric	White
Central Conductor	Copper Coated Steel
Tensile Strength	200 Newtons
Printed Definition	Patol Limited Firesense RLTHD XXXX 700-001LS0H DO NOT PAINT (XXXX = Batch No)

LHDC With Additional Protection - Ruggedised

Patol's primary Low Smoke Zero Halogen LHDC's 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.

Such stocked varieties of Patol's LHDC include Stainless Steel Braided.



System Configuration & Equipment Compatibility

LHDC is compatible with many existing installations and monitoring equipments. Patol will be pleased to give advice on the LHDC in respect of it's suitability as a replacement '***spare***' for any particular established system.

LHDC may be installed in **Hazardous Areas** when used with a suitable Intrinsic Safety Zener Barrier.

The following diagrams indicate typical system configurations :-