Fibresense – Fibre-Optic Linear Temperature Sensing

Fast, accurate and versatile fire detection system
The benefits of fibre-optic technology

Patol fire detection systems provide reliable and intelligent fire detection and asset monitoring on projects throughout the world.

Our fibre optic systems have been delivering added value through highly reliable fire detection since 1996 and lead the way in monitoring temperature and detecting incipient fires within a range of multidiscipline environments with over 1300 devices installed and over one million days of operation.

The fibre-optic technology utilised within Patol Fibresense LTS systems combines the benefits of detection speed, reliability and versatility in one proven solution.

- Fast, accurate and reliable detection utilising Linear Temperature Sensing technology
- Maintenance-free, robust sensor cable ensuring low through-life ownership costs
- Comprehensive functionality with user programmability
- Ease of installation and communication with existing control systems
Fibresense LTS technology

Fibre-optic LTS provides very early temperature rise detection and monitoring, distributed along a length of fibre-optic sensor cable, configurable into multiple detection zones to suit the particular installation. Up to 600 zones of any length can be programmed to provide data in many formats, including fixed/max temperature, average temperature and rate-of-rise. Fibre-optic cable is immune to electro-magnetic interference (EMI) and signal quality is therefore not affected by hostile environments.
Fibresense LTS is a Linear Temperature Sensing system specifically designed to pinpoint fire risks with a high degree of accuracy. It is able to measure temperature profiles at thousands of points simultaneously along its optical fibre sensor cable.

The unique feature of Fibresense LTS is that it provides a continuous temperature profile along the length of the sensing cable and not at discrete sensing points, which must be pre-determined. As a result, Fibresense LTS is able to determine not only the current position, but also the progression of a fire, by measuring the temperature along the sensor cable in real time.

System designers do not therefore have to take into account the precise location of each sensing point, which allows time- and cost-efficient installation compared to traditional sensors.
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Adjustable alarm levels may be set for each zone, providing a programmable platform to suit many fire detection applications and installations. Alarm decisions are communicated directly to the main Fire Alarm Control Panel (FACP) by relay contacts.

Alarm, real-time temperature and distance data may be sent via a Modbus communications path to a third-party system, such as SCADA (Supervisory Control and Data Acquisition), for controlling ventilation or extinguishant systems.

Optical fibre offers several important advantages as a sensing medium. Signals are immune to electromagnetic interference thereby ensuring integrity of electrically noisy areas, for example around power and transformers. As no electric current is used in the sensing fibre and the fibre is a relatively inert and dielectric (non conducting) medium, it is safe technology to use in hazardous environments.

Patol offers two variants of Fibresense LTS control units and two of its fibre-optic sensing cable, plus a choice of mounting hardware. Combined together, these components provide ultimate flexibility to cater for all fire detection applications where Linear Temperature Sensing is the preferred solution.
Fibresense LTS control units and cables

**Fibresense LTS control units**

**Fibresense LTS 200 control unit**
2km loop or two radial circuits of 2km each (total 4km)

**Fibresense LTS 240 control unit**
4km loop or two radial circuits of 4km each (total 8km)

Fibresense LTS system modules are housed in a lockable wall mounted steel enclosure with sealed gland plates to provide IP54 protection. The enclosure also contains a fibre splice housing to protect the splices made between the sensing cable and the supplied pigtails. Alternatively the system can be supplied suitable for mounting in a 19" inch rack.

A relay module contained within the LTS control unit provides 32 volt-free contacts as standard for connection to end user systems. The volt-free contacts are terminated with screw terminal connector blocks within the wall-mount cabinet to simplify installation. Two of these relays are dedicated to Fire Alarm and Sensor Fault.

Embedded software enables the LTS control units to operate independently of an external controller via TCP/IP or RS232 serial connector, eg PC.

There are up to 600 programmable zones, each with individual alarm thresholds. Up to 32 outputs can be connected directly to an end user system via relays. Additional outputs to cover all zones can be achieved via Modbus protocol interface.
Firesense LTS cables are certified fibre-optic cables installed in a similar manner to electrical-based linear heat detection technology. Up to 4km of sensor cable may be installed in the area to be protected. The cable can be connected in a loop, or alternatively as a one or two-channel single-ended system. The fibre-optic cable used is 62.5/125 µm, graded index, communications grade, multimode fibre with acrylate coating.

Fibresense Line
Thermoplastic cable sheath is flame retardant, low smoke and fume, zero halogen and is supplied in lengths of 500m, 1000m, 2000m or 4000m.

Fibresense Tube
Stainless steel cable sheath is particularly suited for hostile environments and is supplied in lengths of 500m, 1000m or 2000m.

When configured in a loop, in the event of a break in the sensor fibre, or significant increase in optical loss, the Fibresense LTS control unit indicates an alarm and the system automatically measures from both ends of the fibre, ensuring continued fire protection over the entire fibre length.

Fibresense LTS Rack Mount Control Unit

PATOL Fibresense Line Cable

PATOL Fibresense Tube Cable
Cable trays and racks

Generally cable trays and racks are located in restricted spaces such as service tunnels and vertical risers, making access difficult and potentially leading to undetected fire spread. Fibresense LTS is ideally suited to this type of application as it can be installed very close to the point of risk giving the earliest possible detection of an overheat condition. Fibresense LTS is unaffected by the environmental conditions which may cause false alarms with other detection types such as dust and humidity.

Conveyors

Conveyor fires are most commonly caused by friction, which if allowed to spread can cause severe damage to the belt, the material being transported and the conveyor housing. Fibresense LTS can be used to provide point of risk detection to give an early warning of an overheat condition. Interfacing with other control equipment can initiate conveyor shut downs and operation of suppression systems to prevent the spread of a fire. Fibresense LTS is particularly suitable as it can be installed where high levels of dirt, dust, wind and moisture exist and still be effective.

Car parks

Combustible materials used in passenger vehicles can result in fires that burn more intensely and generate higher temperatures than ever before with significant opportunity for fire spread. Detection systems in car parks are often subject to the elements and vandalism. Fibresense LTS is ideal for this type of application where wind, dust and moisture are present which can often lead to false alarms with other systems. It is also unaffected by seasonal weather temperature variations and provides a discrete form of detection.

Petrochemical

Petrochemical plants operate 24/7 often at very high temperatures. Fibresense LTS will protect these facilities without affecting production status. Refineries utilise numerous processes involving flammable liquids and toxic chemicals. Every aspect of these processes can be monitored by Fibresense LTS. Its multi-zone temperature sensitive cables are chemical and UV resistant, so are well suited to checking the condition of electrical equipment, cable trays and transformers, as well as toxic materials stored in specialist containers, such as biochemical reactors.
Warehouses

Fires in densely packed racking can be detected with a localised Fibresense LTS system. The cable can be installed within the racking to provide detection very close to the point of risk, providing a discrete detection system which is unaffected by the normal working environment which may comprise dust and dirt. With Fibresense LTS, the warehouse and racking can be split into zones to reduce the search area and to activate the relevant sprinkler/suppression system to restrict the spread of fire.

Tunnels

Tunnels offer limited access/egress points, making it crucial that fires are detected at the earliest opportunity to enable evacuation and fire extinguishing. Vehicle or fuel fires can be detected with Fibresense LTS installed directly over roadways and around sumps and drains designed to contain fuel or oil spills. Fibresense LTS detection zones are calculated according to the length of tunnel, and can be linked to water, gas or foam suppression systems for localised fire fighting or activation of extraction systems.

Escalators and travelators

Fires on escalators and travelators can develop rapidly into a major fire and can spread because of the continued mechanical movement. The public nature of this application means that it is crucial to have the earliest possible detection system to initiate emergency procedures. Fibresense LTS can be installed on both sides of escalators to protect the rollers, and at the top and bottom to detect potential fires in the dust collection trays. Fibresense LTS can also be used to protect the roller trusses and any other moving parts from risk of overheat due to friction.

Power generation

Power generation plants of all technologies employ large equipment including turbines, motors and actuators which can often be difficult to monitor for potential fire risk due to restricted access. Fibresense LTS answers these problems with a cable-based system that can be fitted in restricted spaces and additionally is immune to the vagaries of dirt, dust and moisture which can upset other detection technologies. Cable runs split into zones provide swift alarm response for evacuation procedures and fire suppression systems to be activated.
Fibresense LTS equipment is designed for installation by certified fire engineering companies. Patol adds value to its Fibresense LTS fibre-optic temperature sensing solutions through the provision of comprehensive support, drawing on skills and experience right across the Patol organisation.

By operating an end-to-end solution, from survey and design development to training and customer support, Patol provides critical asset monitoring to meet the individual needs of its clients. As necessary, experienced teams are able to adjust and meet changing application needs throughout a project’s life span. As a result, Patol solutions are manageable, achievable and pleasurable, leading to successful commercial results.

Our project support services include:

- Feasibility studies
- Budget analysis
- Surveys
- Installation support
- Operator training
- Customer support
Feasibility studies provide an analysis of all of a project’s relevant factors, including economic, technical and scheduling considerations, to ascertain overall project viability. The purpose of the budget analysis is to assess whether the allocated funds meet the project’s goals.

Installation surveys are a means of providing a detailed evaluation of an infrastructure’s condition and involve an extensive inspection. Our specialised team will talk through your project at length, covering all the details and possibilities with you. Only then will they provide an in-depth recommendation.

Ultimately, our customers do not buy systems – they buy system productivity. This is why Patol offers operator training for more productive and profitable system ownership, and our customer support covers a range of services to assist clients in making cost effective and correct use of our systems.

Overall, Patol is here to guarantee the success of your project from start to finish.