InnoSys INDUSTRIES INC.

www.innosys-ind.com

ThermoLine™ Optical Fiber Distributed Temperature Sensing System

DTS5000

for Specific Hazard Applications

Power Cable
Pipeline
Power Stations
Road and Rail Tunnels
Mass Transit Railway Systems
Petrochemical and Oil Terminals
Airport Terminals and Hangars
Process Plants, Distilleries, Escalators
Roof Tanks, Warehouses and Cold Stores
Cable and Utility Tunnels
Data Processing Centers
Parking Garages
Conveyer Belts
Offshore

The InnoSys DTS5000 is an innovative solution for special hazard applications utilizing today's most advanced laser and fiber optic based distributed linear heat sensing technologies. This product provides thousands of temperature measurement points along an optical fiber, which enables extensive temperature monitoring coverage that is not achievable through traditional multiple point-sensors.

Why choose ThermoLine?

1. When electrical temperature sensing mechanisms are difficult to use or less effective

There are many industrial places such as extensive city cable tunnels and powerful industrial electrical stations where there is a serious electromagnetic interference. Traditional temperature sensors and sensors which use electrical resistance and thermocouples are greatly affected by this interference and at times, will become unstable leading to malfunctions. ThermoLine TM DTS, an optical fiber based detection device, will not be affected by electromagnetic pulses and therefore, is the best solution for monitoring temperatures in these environments. The suitable locations where ThermoLine is effective are listed below:

- Large City Cable Tunnel, High Voltage Power Cable
- Power Station
- High Power Equipments in factory
- Metro Tunnel and transformer substation

2. When electrical temperature sensing mechanisms are unsafe

In many industrial places, due to combustible and explosive gases, there is always a safety concern when using electrical temperature sensing mechanisms. ThermoLine TM DTS is regarded as safe and dependable and can be applied in these locations.

- Large Oil Tank
- Oil Platform
- Oil & Gas Technical Equipments Area
- LNG Gas Tank

3. When the protected area is lengthy and narrow or when the environment is harsh but fire detection and overheating sensing devices are required.

Applicable places include cable tunnels, traffic tunnels, metro subway tunnels, where the protected area's environment is harsh, lengthy and narrow, and where it will prove difficult for traditional fire detection devices to function at a stable level and for a long period of time as well as pin point the location of the fire or places which has overheated. ThermoLine TM DTS outperforms traditional detectors in all aspects mentioned and is definitely a suitable and effective solution to protect environments listed above.

- Cable Tunnel
- City Tunnel
- Road, Railway Tunnel
- Conveyor and Process Plant

Specifications and Datasheet

DTS5000 SYSTEM Performance and Specification

Performance

Spatial Resolution	Optional 1.0 ~3.0 meters across entire Measurement Range
Sampling Resolution	down to 0.5 meters (0.25 ~3.0 meters optional) across the entire Measurement Range
Temperature Resolution	0.2~1 °C optional
Accuracy	down to +/- 1.0°C
Measurement Range	up to 4km per channel (single-ended or double-ended configuration)
Measurement Temperature Range	-180°C to +700°C
Measurement Time for 4km Range	7s for <1.0°C temperature resolution 30s for <0.5°C temperature resolution

Mechanical

Dimensions(mm)	DTS5000A	483 x 320 x 178
	DTS5000B	500 x 250 x 700
	DTS5100	406 x 355 x 232
	DTS5200	19" rackmount design
Weight(Kg)	24~32	

Electrical

Supply Voltage	DC24V
Power Consumption	48~78W
Supply Current	3~4A

Interface

Relay Outputs

36 Programmable outputs - SPDT 1A @24V dc, extensible

1 Ethernet IP port for user PC and remote monitoring

2 RS232 Ports

Port 1: Direct PC Connection for continuous temperature profile displays

Port 2: Modbus master port or future connection to PLC

Temperature

Control Unit, Operating: 0°C to 40°C

Storage -40°C to 65°C

Humidity 0 to 95% RH (non condensing)

Sensor Cable, Operating: -180~500°C optional

Electromagnetic Compatibility (EMC)

Assessed for Immunity to: EN 50082-1 and EN 50130-4

Assessed for Emissions to: EN 50081-1

Sensor Optic Fiber Cable	Operating Temperature
TL5100 C03	-20°C to 70°C, can be tailored to -40°C ~200°C
TL5100 C04	-20°C to 70°C, can be tailored to -40°C ~200°C
TL5100 C05	-40°C to 90°C, can be tailored to -180°C ~300°C
TL5100 C06	-40°C to 90°C, can be tailored to -180°C ~500°C
TL5100 C07	-40°C to 360°C, can be tailored to -180°C ~500°C

Note: For more information on this product, please refer to the product manuals. In order to comply with the requirements of manufacturer, user must use TL5100 series sensor optical fiber cable

*** All information contained in this data sheet is accurate as of the date of composition, and is subject to change.**

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Overview

We, at InnoSys, commit ourselves to innovative system products, in order to avoid the potential down time and financial losses caused by fire or overheating in complex commercial and industrial environments. The newly developed DTS5000 series system incorporates many unique and special features and benefits not available in competitive products; therefore, it can be integrated into more effective solutions for fire protection systems together with VISFD and other new generation products.

The InnoSys ThermoLine DTS5000 is an innovative solution for special hazard applications utilizing today's most advanced laser and fiber optic based distributed linear heat sensing technologies. This product provide thousands of temperature measurement points along an optical fiber, which enables exceptional temperature monitoring coverage that is not achievable through traditional multiple point-sensors. The DTS5000 provides a flexible programmable platform to suit many different risks and can be easily integrated into the overall fire protection systems.

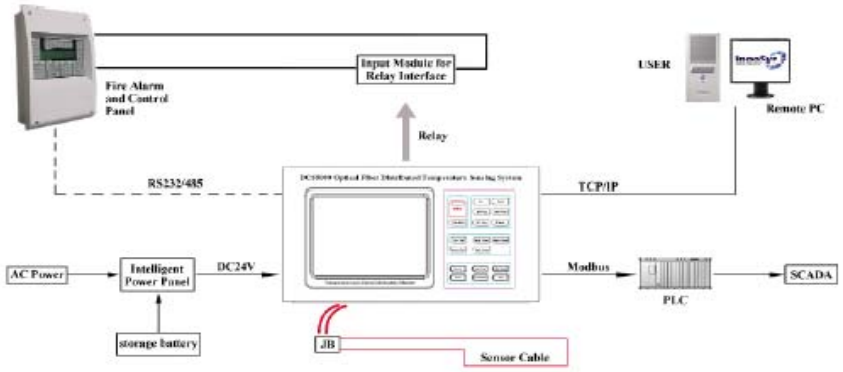
Product Features and Benefits

The DTS5000 Distributed Temperature Sensing System has been developed to meet the most demanding of fire detection applications. The following are the features and benefits of DTS5000:

- Sensor optical fiber cable loop up to 4Km.
- Exact location of fire or hot point along the sensor cable.
- Capable of providing information of fire size and determining the direction of fire spread.
- Immune to electromagnetic disturbances of any kind.
- Intrinsically safe sensor, suitable for hazardous areas.
- Rugged construction of sensor cable resists most environmental influences, such as temperature, pressure and moister, as well pollution and exhaust gas.
- Up to 200 programmable alarm zones and programmable relay outputs.
- Wide range of programmable temperature operating modes and alarm thresholds.
- Automatic detection and full recovery from sensor cable break.

System Architecture

The InnoSys DTS5000 provides several types of output options, which operates concurrently to provide system design flexibility and also compatibility with conventional fire alarm system and other automatic systems. 36 programmable relays (expandable to 200) can be used to map out alarm zones into a fire panel, either directly or via addressable input modules. Also RS232/485 can be used to connect DTS5000 to fire panels. Modbus Protocol definition data is given to enable DTS5000 to be connected via a PLC to a centralized control and monitor information centre, e.g. SCADA. Standard TCP/IP protocol is also available to enable the development of alternative graphics display interfaces for remote PC user. The full 200-zone capability for one loop of the system can be exploited using RS232, MODBUS or TCP/IP port. The following figure shows typical system architecture.



DTS5000 Control Unit

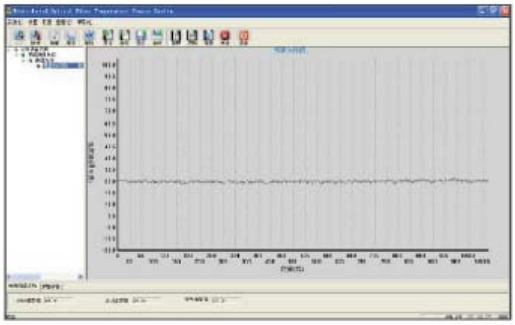
The InnoSys DTS 5000 product line has a variety of options to meet specific and various customer requirements.

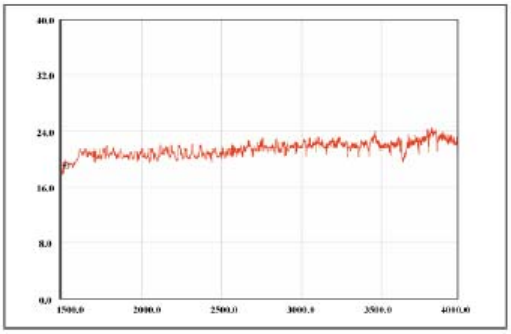
The InnoSys DTS 5000 product series provide real-time dynamic temperature with high accuracy and fine resolution, providing up to 40,000 discrete temperature points along the optical fiber(s).

InnoSys DTS technologies provide an unprecedented signal-to-noise ratio which, together with advanced data processing techniques, provides the fastest measurement speeds in the industry.
We offer two types of control units to meet your fire detection requirements, DTS5000 is designed for normal detection when precise temperature sensing (<1 °C) and high spatial resolution (<2m) are not demanded, whereas DTS5100 is designed for higher requirements.

Software

There are two levels of standard software available, the ThermoLine DTS Commander and Manager Visualization software.





DTS5000 Sensing Software

The on-board computer runs on Microsoft Windows XP to provide a stable, yet flexible operating environment for effective communication and remote control capabilities.

Each DTS 5000 series models are supplied with the standard DTS Commander software. This provides all the necessary functionality for configuration, calibration, communication and autonomous operation. It also provides for a simple temperature trace to be viewed.

It is available in multiple languages (e.g. English, Chinese etc).

The fiber probes can be configured into unlimited "zones". Each zone can be assigned with an unique alarm type, which enables monitoring of discrete physical areas.

DTS5000 Manager Software

The DTS5000 Manager Software is optional in multiple languages which provides temperature data as graphical visualization.

This software requires no additional set-up, as it is automatically configured within the ThermoLine DTS5000 Commander.

In addition to displaying multiple temperature profiles, the summary of temperature and alarm status information for each zone is also shown.

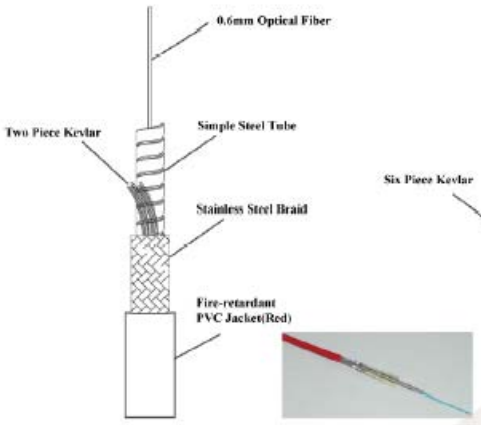
Recorded data can also be "replayed" using the powerful Data Control facility to view historical events at chosen speeds.

TransLine TL5100 Series Sensor Optical Fiber Cable

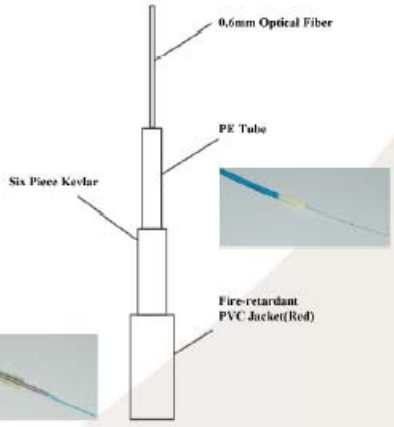
InnoSys offers a wide range of optical fiber cables and accessories that complement the Distributed Temperature Sensing (DTS) systems.

Our DTS systems are designed for standard telecommunication-grade optical fiber, which allows easy integration to any custom and/or specialized designs meeting a wide range of project requirements.

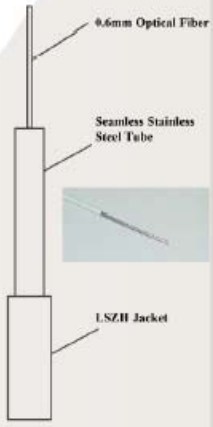
We offer fiber optic probes that operate in temperatures from -185°[-301°F] to +600°C [+1112°F] for applications in above-ground, underground, sub-sea, and in hazardous areas, as well as harsh H2 and radiation environments.
TL5100 Series sensor optical fiber cables mainly consist of five types. Each type has a unique construction and material that has been designed to meet the widest range of installation requirements and environments.



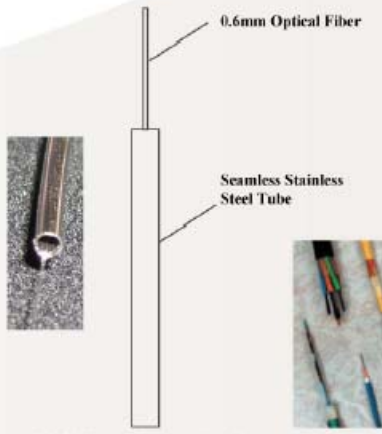
TL5100 C03 Sensor Optical Fiber Cable



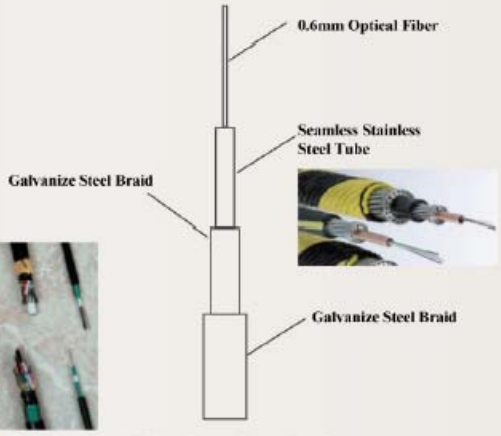
TL5100 C04 Sensor Optical Fiber Cable



TL5100 C05 Sensor Optical Fiber Cable



TL5100 C06Sensor Optical Fiber Cable



TL5100 C07 Sensor Optical Fiber Cable

Sensor Optical Fibre Cable Options