

*Heat detected ...
... with LIST protected*



*Know-how and Safety
Worldwide*

**Examples
from 1.000.000 meters world wide**

GERMANY Erebus Tunnel (Leer), A 44 Düsseldorf Airport, Reichswaldallee (Dortmund), Fariachtunnel (Mannheim) B61n (Bielefeld), Pelling Berg (highwaytunnel), Tunnel Bonn - Bad Godesberg, Grenzunnel Füssen Pfaffenstuntunnel (Regensburg), Tunnel Farchant (Garmisch), Rheinruferunnel (Coblenz), Kappelertunnel (Freiburg), Schöllbergertunnel (Heidelberg), Petusertunnel (Munich), Tunnel Berg Bock (Suhl), Tunnels Hötzbach Ost/West, Hemertunnel (Lübeck), Kappelbergertunnel (Stuttgart)

AUSTRIA Rappener Tunnel, Ehrensteinberg, Schmitteltunnel, Tauertunnel, Tunnels Landeck, Felbertauerntunnel, Pfänderntunnel, Gräbenntunnel, Mona Lisa Tunnel, Tunnel Oswaldsberg, Lobiltunnel, Ofenauerntunnel, Bändermichtunnel

SWITZERLAND Traversée de Neuchâtel, N2 Grancia Melide, Vespertal, J18, Eggflue-Tunnel, Tunnel Sierra, Galleria Bisone, Tunnel Vernier, Tunnel Chanéaz

SPAIN Túnel Marchante, Túnel Amadeu Torner, Túnel Olana C-14, Túnel de Valldivora Túnel de Valldorric, Túnel del Cadi, Airportunnel Madrid, Túneles de Olot T1, Túnel del Bruc Túneles de Olot T2, Túnel de Tiana (B-20), T. Penya del Llamp (C-32), Túnel el Castellot (C-32) Túnel la Granja (C-32), Túnel Pallaresa (B-20), Túnel de Prades, Túnel Aubenc, Túnel PIO XII Madrid M30

CANARIAN ISLANDS Túneles Arguineguin (GC), Túneles Circunvalación III - Las Palmas, Túnel De Las Nieves - La Palma

NETHERLANDS Zeeburgerntunnel, Coentunnel, Vaakertunnel, Margriet Tunnel, Tunnel Leiden, Velsertunnel, Wijvertunnel, Schiphol Tunnel

FRANCE Tunnel Courmier, Tunnel Terregalle, Tunnel Conetans, A86 - Paris

SWEDEN Tunnel Högby, Klaratunnel (Stockholm), Söderledstunnel (Stockholm), Södälasken (Stockholm), Landby Tunnel (Göthenburg), Göbtunnel (Göthenburg), Muskötunnel

GREAT BRITAIN Lancaster Tunnel

IRELAND Dublin Port Tunnel

CROATIA Tunnel Pod Vugles, Tunnel Javorova Kosa, Tunnel Horvatovec, Tunnel Wlbinovec, Tunnel Glasac, Tunnel Ruzman Brdo, Tunnel Dumbockica, Tunnel Mrazivica, Tunnel Sveta Tri Kralja, Tunnel Brezovica



CZECH REPUBLIC Radiole, Brno I, Brno II

MONTENEGRO Tunnel Scina

POLAND Tunnel Kalowice

IRAN Tunnel Resalat

EDYPT Tunnel El Azhar

TURKEY Güllüpe Tunnel, Korutepi Tunnel, Tunnel Adana, P3, Tunnel Adana, P4, Batu Tunnel

GREECE Tunnel Kalamion, Tunnel Egratia Odos S1, Tunnel Egratia Odos S2, Tunnel Egratia Odos S3, Tunnel Egratia Odos S10, Tunnel Polymkos, Tunnel Anthochorou, Tunnel Doctoni

ISRAEL Kfar Zahal Jerusalem, HaArmaut Hyfa, Atzmaotunnel

BRASIL Ecovias TD1-3

KOREA Seogwangs Tunnel, Woomyung Tunnel, Nyeong Ju Tunnel, Sang-Do Tunnel

TAIWAN Nankung Tunnel no 1, Nankung Tunnel no 2, Woni-Juepin no 4, Panshan Tunnel, Woni-Juepin no 1, Woni-Juepin no 3, Meilitunnel, Woni-Juepin no 2



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Linear Fire Detection

Your safety specialists!



LIST in tunnels

*LIST from start to finish
A perfect Team*

*Bi-directional –
simply the best*

Engineering support

References world-wide, well-founded knowledge of national requirements and guidelines. Advisory support for extraordinary tunnel constructions. The LISTEC-team (trained fire protection specialists for tunnels) combines experience and competence.



On-site tests and operators instruction

Extensive functionality tests before opening of a tunnel. Support with official acceptance procedures by safety and fire authorities and end customers. Instruction of operational staff, including the reading and interpretation of messages and alarms.

Fire tests

Performance and assistance of full-scale fire tests in tunnels and test galleries. Recording, analysis and documentation of all registered temperature values. Real-time visualisation of practical fire tests as prove of positive compliance with administrative requirements and norms.



Installation

Supervision of cable installation with optimisation of installation procedures and tools. Execution of quality relevant connection and programming works, in compliance with project specific demands.



Maintenance and fault clearing service

Regular inspection and maintenance in very short time with LISTTerm maintenance software. Remote control and diagnosis via telephone modem in case of failure or disturbance. 24 hour fault clearing service through LISTEC technicians with telephone service line. Fast and easy repair of damaged sensor cable even with harsh environmental conditions.



Factory and platform acceptance tests

Check of all system components according to project specifications in Listec factory. System test performed together with SCADA supplier to guarantee the correct communication. Common analysis and co-ordination of production courses with control of the time management.



Training

Regular courses for installers and operators for basic sensor knowledge and commissioning, inspection and maintenance works in LISTEC's training centre in Isen. Program for different languages and on demand, on-site training with the customers location.



*LIST in
tunnels*

**LIST sensor cable
Bi-directional, simply the best**

Electronic measuring cable with addressable sensors for temperature resolution of 0,1°C. Periodic interrogation of all sensors from both ends of the cable.

Advantages:

- Freely selectable sensor spacing
- Bi-directional bus technology
- Hermetically sealed cable for all environmental conditions
- Temperature range from -40° C up to +85° C (+200°C short time)
- Configuration with cable branches
- Cable jacket acc. IEC 60754-1 and DIN EN 60332-2-2 (FRNC and halogen-free)
- Maintenance-free
- Automatic control of cable function by cyclic interrogation of control unit
- Approved for tunnels with high air velocities

**LIST sensor control unit
Technique with LIST**

Central control unit for continuous interrogation of all sensors within 10 seconds. Evaluation of the registered temperature values with regard to temperature increase, maximum threshold and frost alarm threshold. Display of messages and alarms in clear. Signalisation towards PCs and PLCs via potential-free relay contacts.

Advantages:

- Programmable alarm thresholds
- Loop-Back and RDT-functions (rerouted data transmission) for redundant configurations
- Up to 64 alarm zones programmable, with independent alarm thresholds
- Alarm, pre-alarm, fault and temperature value available per sensor, per zone and per unit

LIST Data Management Unit

Management unit for data visualisation and storage; with TFT touch-screen monitor for the display of system status, messages and temperature values. Long-term memory for temperature and events. Control of redundancy functions.

Advantages:

- Automatic Rerouted Data Transmission-System (RDT)
- RS 232, RS 485 and ethernet interfaces
- Open data protocols
- Display and characters in different languages

