LISTEC® GmbH
Lineare Sensor Technik

TEMPERATURE MONITORING OF CABLE TRAYS AND SUPPLY DUCTS

Isen, September 2025
Early warning with the LIST and d-LIST system

Image generated by AI

This white paper describes the use of sensor cable systems from LISTEC GmbH for the early detection of temperature-related hazards in cable trays and supply ducts. It explains typical causes of fire, outlines technical and organisational solutions, and provides recommendations for installation, operation and integration into existing fire alarm systems.

Table of Contents

1. Introduction & Press Reports 3
2. Fire hazards & triggers 4
3. LISTEC solutions 5
4. Application/Installation/Monitoring 6
5. Certificate excerpt 7

1. Introduction & Press Reports

Cable trays are found in all buildings. Electrical cables, connecting cables, and power supplies share a confined space, which is usually connected across several floors. The risk of fire spreading along the length of the cable tray is therefore particularly high, and under certain circumstances, the entire building can be affected within a short period of time.

Fires in cable trays and supply ducts
Examples from press reports:

August 02, 2025, Barkhausen:
Kabelbrand und Gasaustritt

https://feuerwehr-porta.de/02-08-2025/

2. Fire hazards & triggers

In electrical systems, cable trays and supply ducts, fire hazards often develop gradually and remain undetected for a long time. High energy densities, narrow installation routes and limited heat dissipation mean that even small defects or overloads can lead to critical temperatures.

Typical causes of fire in cable trays

- Thermal overload due to overcurrent, poor contacts or insufficient cross-sections
- Short circuits due to mechanical damage or insulation faults
- Heating due to surrounding heat sources (machines, transformers)
- Accumulation of combustible deposits (dust, grease)
- Chemical reactions or ageing of insulation

Risk factors in supply ducts

- Restricted heat dissipation due to narrow ducts
- Lack of accessibility for inspection
- Mixed operation of power-carrying and signal-carrying cables

Consequences of undetected heating

- Failure of critical infrastructure
- Spread of fire and smoke to other systems
- High economic damage and evacuation risks

3. LISTEC solutions

LISTEC GmbH has been developing, manufacturing and distributing sensor cable systems for early fire detection and temperature monitoring for over 30 years. From our headquarters near Munich, we supply customers worldwide with solutions **'Made in Germany'** that guarantee maximum reliability and precision.

Thanks to their robust, enclosed design, our sensor cables are ideal for use in cable trays and supply ducts. These locations are often subject to difficult environmental conditions such as dust, dirt, moisture and extreme temperature fluctuations. In addition, there are narrow installation routes and high energy density, which require targeted, comprehensive monitoring. In these applications, the early detection of overheating plays a central role. Loose connections, overloaded cables or insufficient heat dissipation can quickly lead to critical temperature rises – especially at cable bundles, transitions or distribution points.

The LISTEC sensor cable has integrated temperature sensors at defined intervals, which enable precise localisation of temperature increases along the entire route or channel. This allows endangered sections to be identified at an early stage and targeted measures to be taken before malfunctions or fires occur. With this technology, LISTEC has been contributing to safety and operational continuity in energy, industrial and infrastructure facilities for decades – reliably, with low maintenance and under a wide range of environmental conditions.

Temperature monitoring of cable trays and supply ducts

For early fire detection and efficiency monitoring, continuous temperature monitoring of the systems is essential. The LIST and d-LIST systems can enable significant improvements in this area.

- Protection of human life
- Comprehensive early fire detection
- Temperature monitoring
- Control of cooling and extinguishing systems
  (see existing VdS protection concept S619004)
- Control of systems and separation from the network

Advantages of the LIST system (SEC 20 + LISTcontroller) and d-LIST system (SEC 15 + d-LISTcontroller / SCU)

- Temperature measurement along cable routes
- Resistant to dust/dirt/gases/vibrations
- Differential and maximum temperature evaluation
- Installation possible in single-branch operation or with multiple branches
- Measurement resolution (always 0.1 °C, internally 0.0625 °C for d-LIST)
- Repeat accuracy (always ± 0.1 K along the entire cable route)
- Detection of overheating along the entire route
- Freely selectable sensor distances, individual identification possible at any time via cable markings
- Systems are generally maintenance-free, resulting in long-term cost savings
- Low commissioning and maintenance costs
- Calibration-free and location-specific resolution in the event of a fire over the entire service life
- Use of individual sensors for object monitoring can be integrated into
  sensor cable installations

4. Application/ Installation /Monitoring

Planning principles

- Risk analysis (hot spot identification)
- Determination of sensor cable routes and sensor spacing (depending on cable density and duct geometry)
- Definition of evaluation logic (alarms, levels, verification times)

Attachment of the sensor cable to cable trays

- The recommended sensor spacing for cable trays is 1 m or 2 m (SEC 15/01, SEC 15/02)

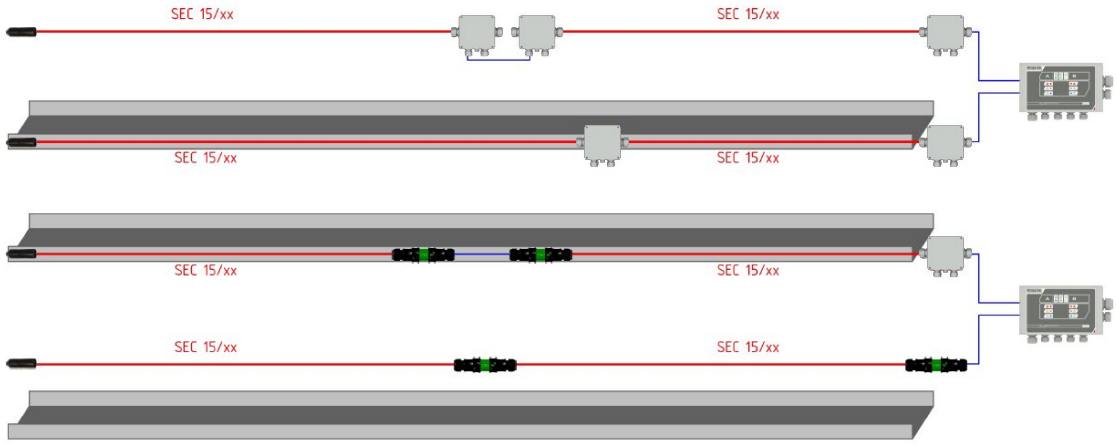
Use of the sensor cable over open cable trays using special fastenings

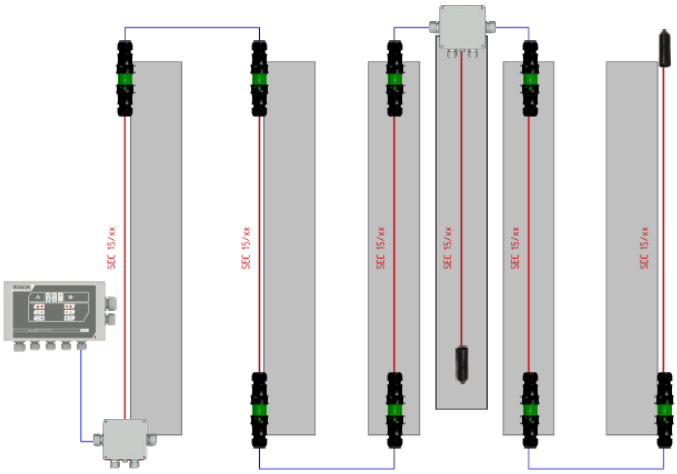
- Recommended sensor spacing: 1 m or 2 m

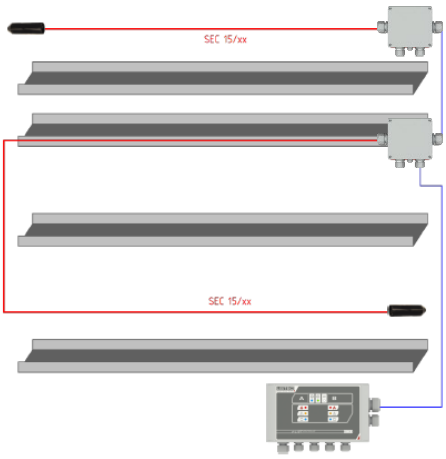
Use of the sensor cable in supply ducts

- For supply ducts, a distance of 5 m may be advantageous (SEC 15/05**)**

Cable routes with CBO 15 and/or SECcon15
(routes shown schematically)







5. Certificate excerpt

The **LIST / SEC 20 system and d-LIST / SEC 15 system** are, among others, VdS-approved systems in accordance with EN 54-22:2015+A1:2020:

Anerkennung
Approval

VdS

von Bauteilen und Systemen
of Components and Systems

Inhaber der Anerkennung / Holder of the Approval
LISTEC GmbH
Am Sandberg 34
DE-84424 Isen

Anerkennungs-Nr. / Approval No.	Anzahl der Seiten / No. of pages	gültig vom (TT.MM.JJJJ) / valid from (dd.mm.yyyy)	gültig bis (TT.MM.JJJJ) / valid until (dd.mm.yyyy)
G 221004	14	26.06.2023	25.06.2027

Gegenstand der Anerkennung / Subject of the Approval
Rücksetzbarer linienförmiger Wärmemelder /
Resettable line-type heat detector
d-LIST

Verwendung / Use
in automatischen Brandmeldeanlagen /
in automatic fire detection and fire alarm systems

Anerkennungsgrundlagen / Basis of the Approval
VdS 2344:2014-07
VdS 2543:2021-03
EN 54-17:2005 + AC:2007
EN 54-22:2015 + A1:2020

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