LISTEC® GmbH
Lineare Sensor Technik

TEMPERATURE MONITORING FOR CONVEYOR BELT SYSTEMS

Isen, September 2025

Early warning with the LIST system and d-LIST system

This white paper describes the specific challenges of fire protection in conveyor belt systems and explains how the LIST and d-LIST linear heat detection systems from LISTEC GmbH enable early and precise localisation of fire incidents. Continuous temperature monitoring along the entire length of the conveyor belt reliably detects potential sources of fire, enabling immediate countermeasures to be taken and effectively protecting people, equipment, and valuable operating assets.

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1. Introduction & Press Reports

Conveyor belt systems are indispensable components of operational infrastructure in numerous industries, from raw material extraction and energy generation to production and logistics. At the same time, they are among the most critical fire risks within industrial facilities.

Fires caused by conveyor belts.
Examples from press reports:

May 15, 2025, Salzgitter-Beddingen
Major fire in Salzgitter:
Fire department extinguishes fire on conveyor belt

https://www.braunschweiger-zeitung.de/niedersachsen/salzgitter/article409024624/feuer-in-salzgitter-foerderband-in-industriegebiet-in-flammen.html

May 15, 2025, Arnsberg
Confirmed fire at industrial plant

https://www.feuerwehr-arnsberg.de/de/presseteam/einsaetze/bestaetigter-brand-in-industriebetrieb-2025-05-17.html

2. Fire hazards & triggers

Fires on conveyor belts not only lead to production downtime and high economic losses but can also cause personal injury or consequential damage in adjacent areas of the plant.

Mechanical causes

- Overheating rollers and bearings
  Lack of lubrication, defective or blocked rollers generate frictional heat
- Insufficient tension or blocked drums lead to friction between the belt and the drive.
- Blockages caused by foreign objects

Electrical causes

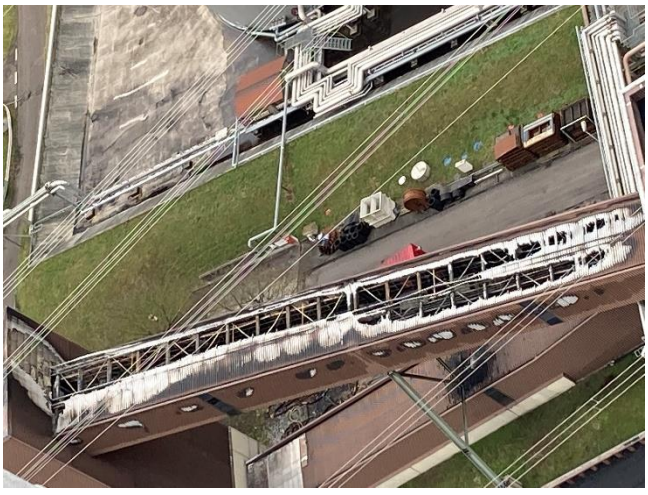
- Overloaded motors or drives
- Cable defects or short circuits

Thermal/process-related causes

- Sparks or embers from upstream processes
- Spontaneous combustion of bulk material

Environmental factors

- Dust explosion hazard
  Fine coal, flour or wood dust forms explosive atmospheres that can be ignited by even small sparks.
- High ambient temperatures
  Temperatures can rise to critical levels in closed or poorly ventilated conveyor tunnels.



Consequences of a belt fire

- **Destruction of the conveyor belt** (high replacement costs, long downtimes)
- **System failure / production stoppage**
- **Spread of fire and smoke** to neighbouring areas of the system
- **Danger to people** from smoke and toxic gases
- **Increased risk of explosion due** to dust deposits

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. Our company headquarters are located near Munich, from where we supply customers worldwide with solutions **made in Germany**.
Thanks to its robust, enclosed design, our sensor cable is ideal for use in harsh environments. For example, in dusty, dirty or damp conditions, or where there are significant temperature fluctuations.
Conveyor belt systems are one of our main areas of focus.
Early detection of overheating is particularly crucial in conveyor belt systems: overheating rollers, belt slippage or material jams can quickly lead to fires.

Our sensor cable has integrated temperature sensors at defined intervals, which enable the precise localisation of temperature increases along the entire length of the belt. This allows critical areas such as deflection stations, drives or transfer areas to be reliably monitored and risks to be detected at an early stage.

Thanks to this technology, LISTEC has been ensuring greater safety and operational continuity in conveyor belt systems for decades – worldwide and under the most adverse conditions.

Temperature monitoring of conveyor belt systems

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

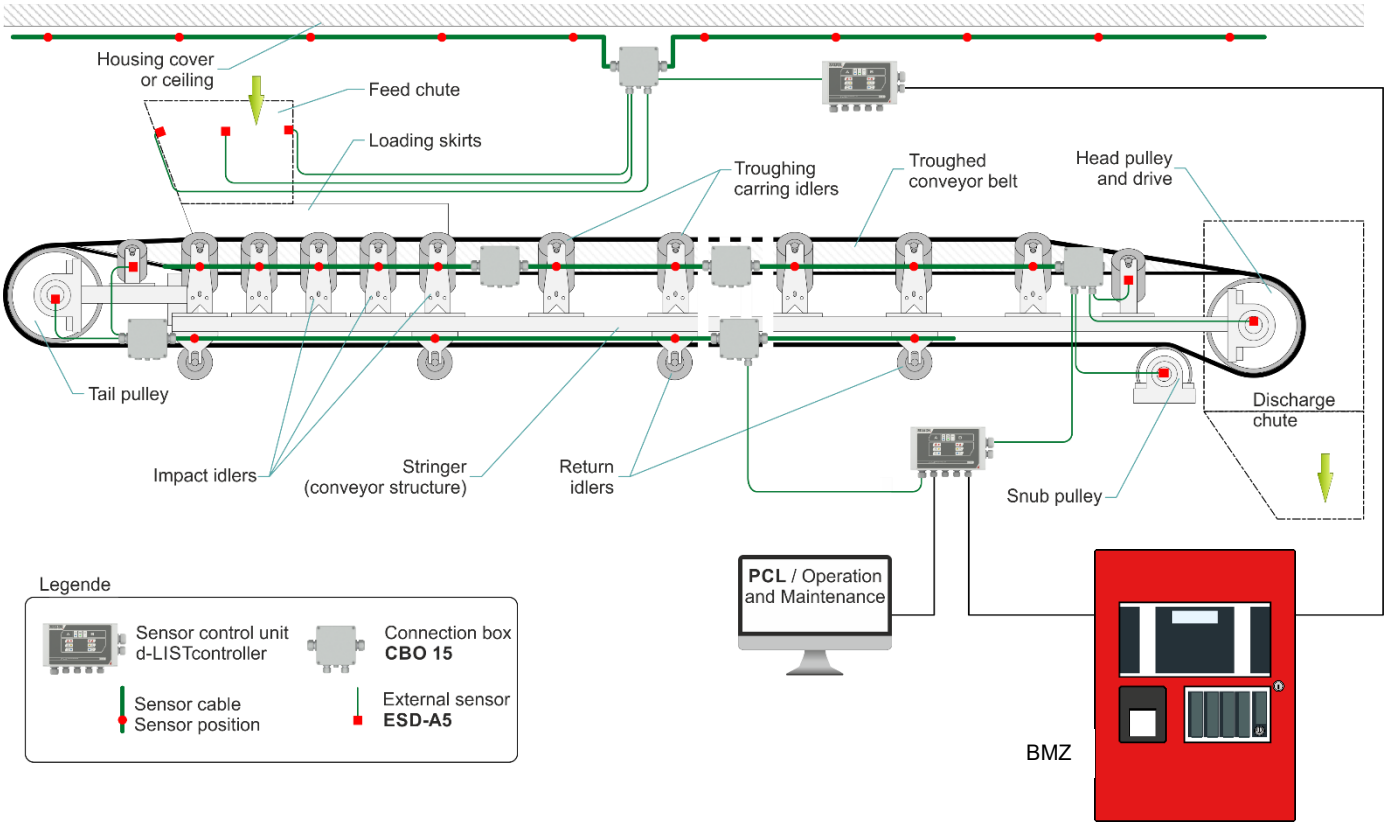
Advantages of the LIST system (SEC 20 + LISTcontroller) and d-LIST system (SEC 15 + d-LISTcontroller / SCU)

Area of application: LIST system - long conveyor lines, large belt conveyors, tunnels
d-LIST system - short to medium belt sections, secondary belts, transfer stations

- 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 length)
- Detection of overheating along the entire belt length
- Freely selectable sensor spacing, 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

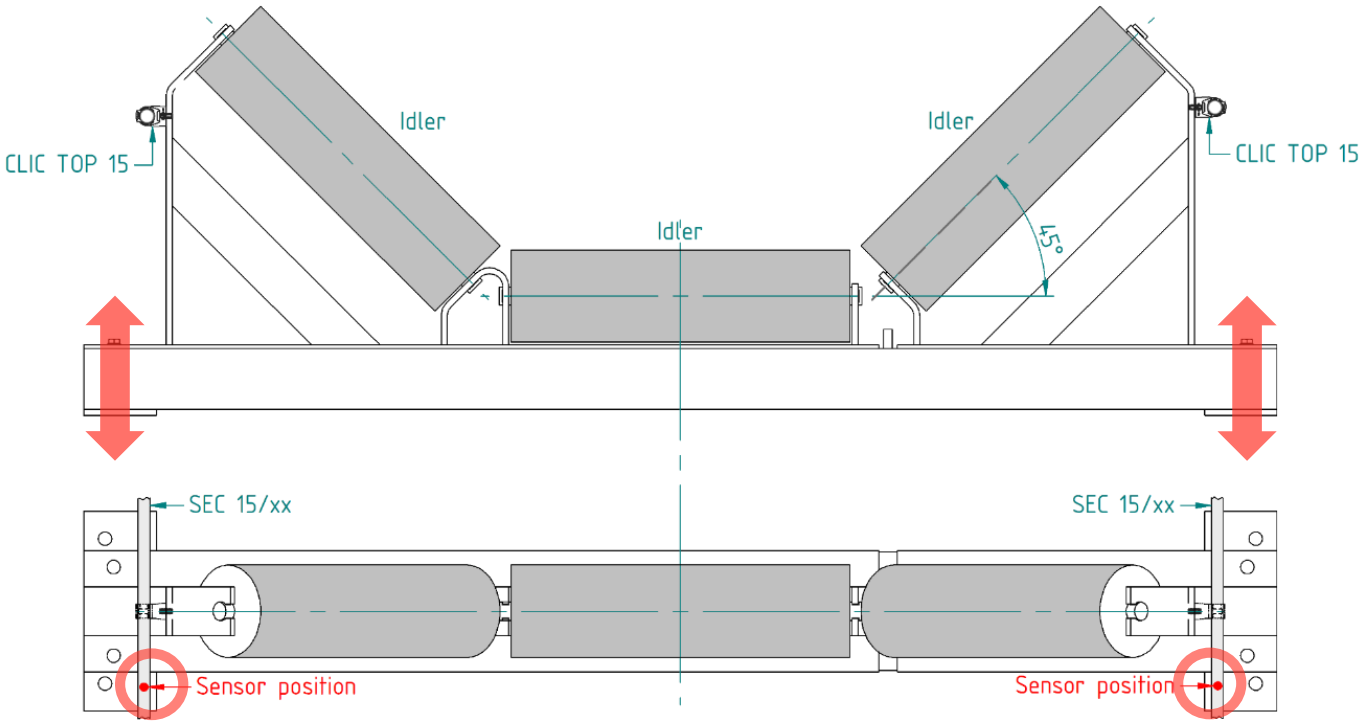
4. Application/ Installation /Monitoring

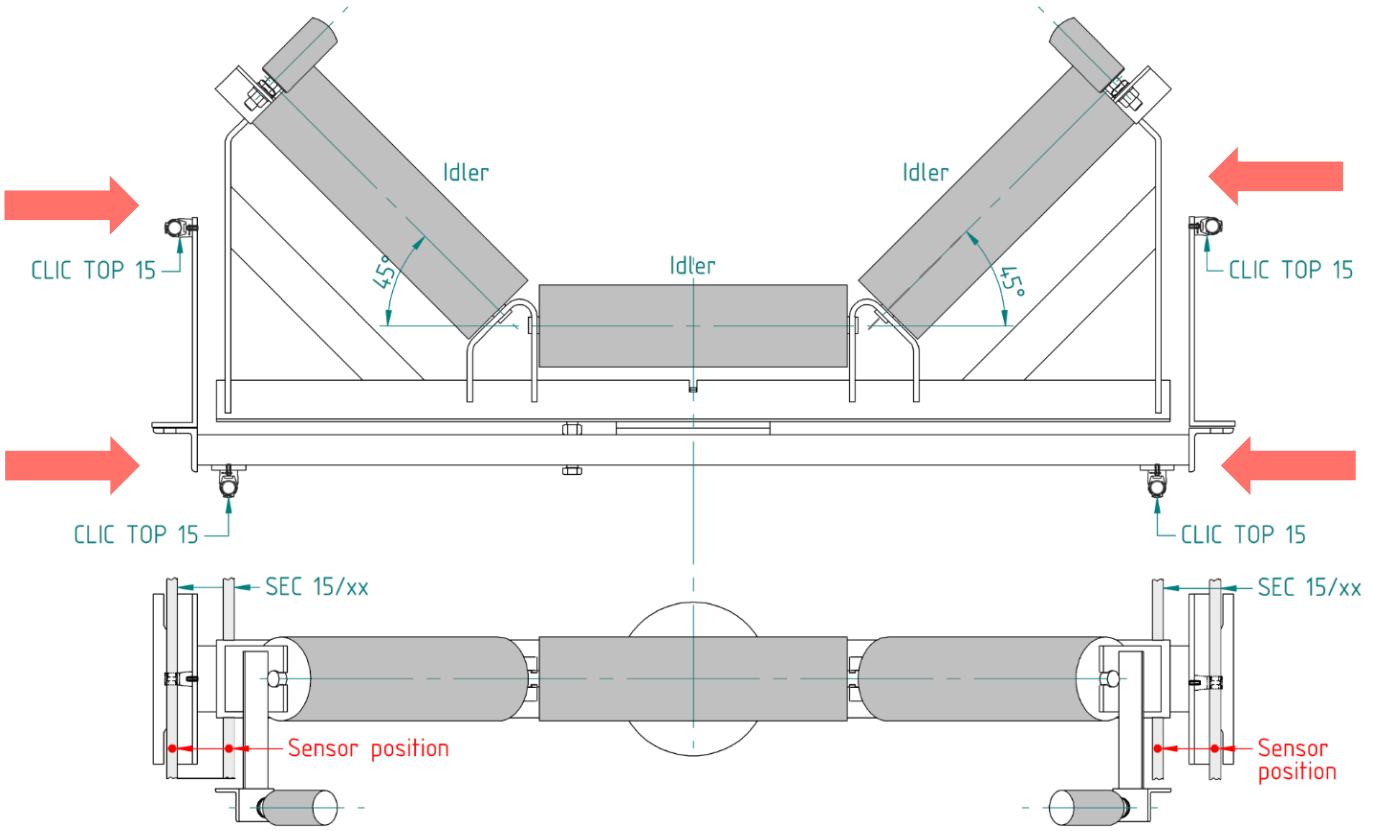
The LIST and d-LIST system provides location-specific temperature values along the entire belt length and will detect both rapid temperature rises and maximum temperatures. It is suitable for harsh, dusty and mechanically demanding environments in the bulk materials and mining industries.



Installation of the sensor cable

With conveyor belt systems, it is essential to clarify what needs to be monitored. In most cases, fire detection is secondary, as the primary concern is hot runners on the support rollers, which need to be detected early on in order to prevent major damage to the conveyor belt.

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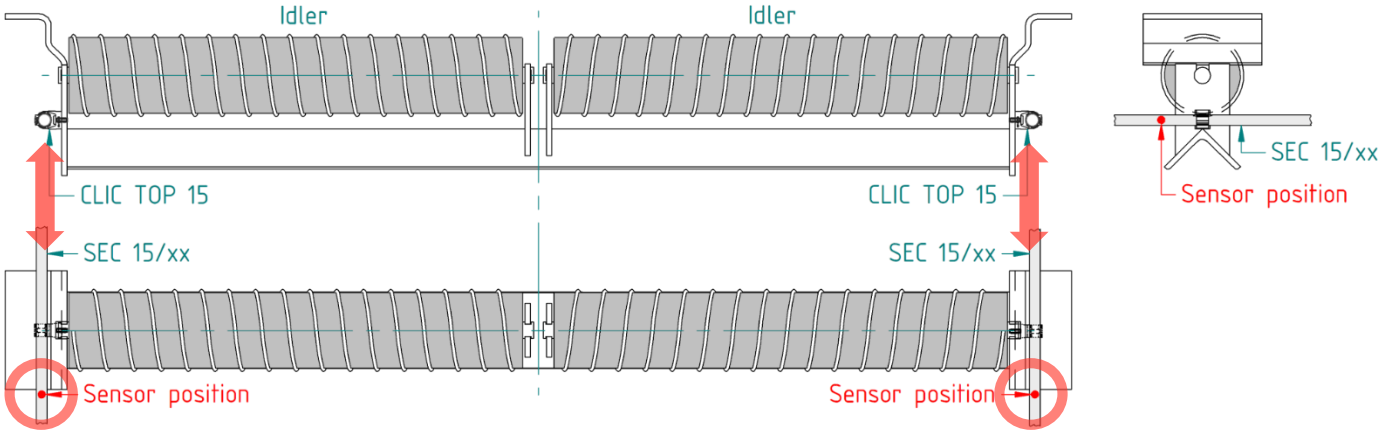
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5. Certificate excpert

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

Anerkennung
Approval

VdS

von Bauteilen und Systemen
of Components and Systems

LISTEC GmbH
Am Sandberg 34
DE-84424 Isen

Approval No.	No. of pages	valid from	valid until
G 221004	14	26.06.2023	25.06.2027

Rücksetzbarer linienförmiger Wärmemelder /
Resettable line-type heat detector
d-LIST

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

VdS 2344:2014-07
VdS 2543:2021-03
EN 54-17:2005 + AC:2007
EN 54-22:2015 + A1:2020

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For more information, scan the following QR code:

LISTEC GmbH
Am Sandberg 34
D-84424 Isen, Germany
Phone: +49 (0) 80 83 53 85-0
Email: sales@listec-gmbh.de