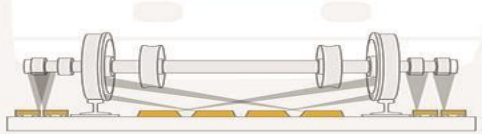
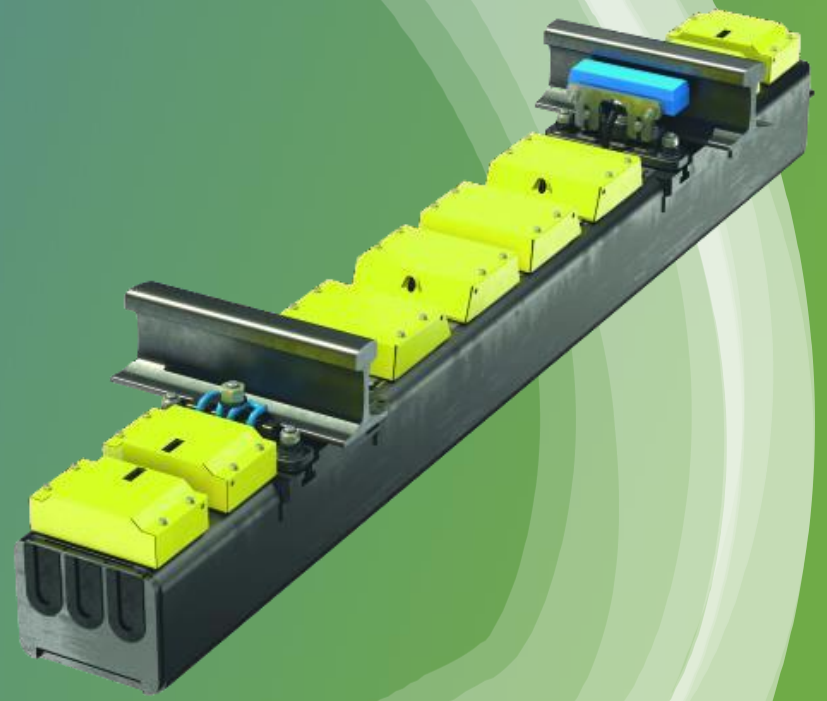
RAILTRO'S HBD/HWD

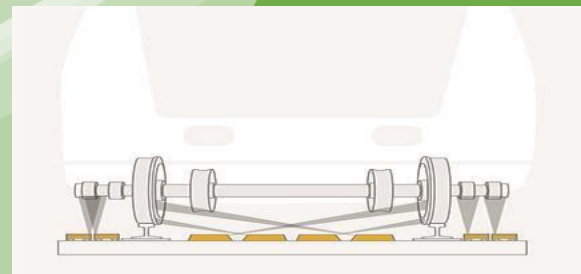
HOT BOX AND HOT WHEEL DETECTION SYSTEM WITH MULTI BEAM TECHNOLOGY



Intelligent Rolling Stock Monitoring

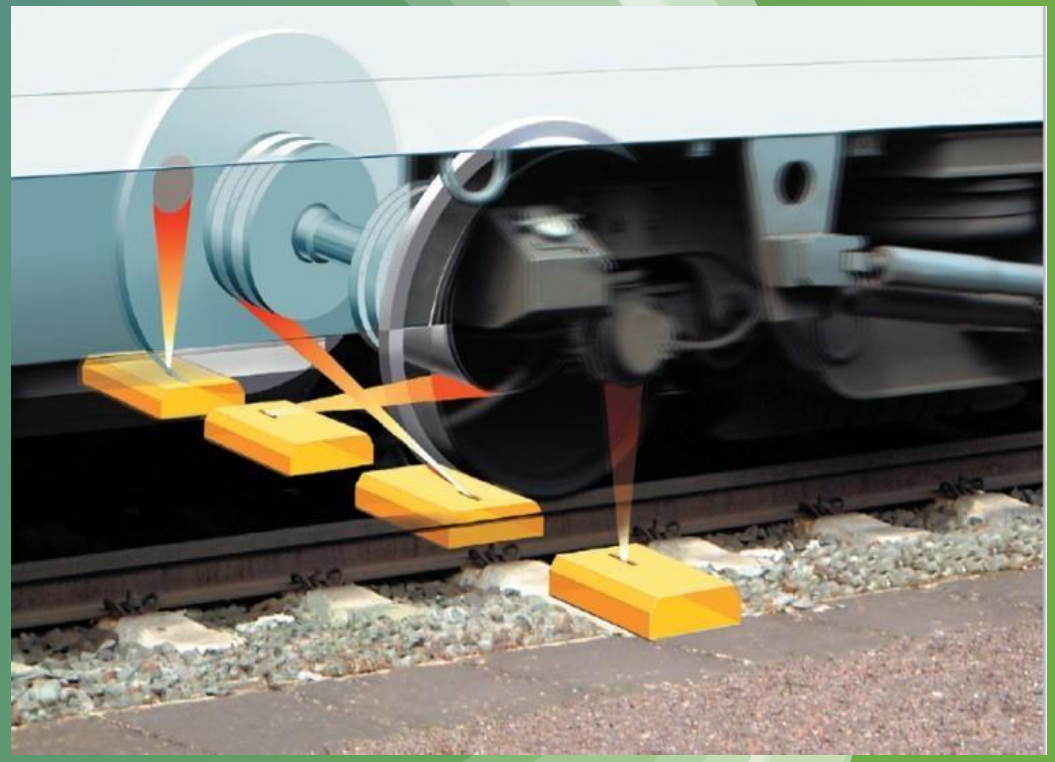
Hot wheels and hot boxes are a major threat for any railway operation. A hot box can lead to fractures of axle journals that might cause a derailment. Remarkable operational hazards are caused by locked brakes, due to overheated loosened wheel rims as well as broken wheel disks. A locked brake can cause fire and is one of the main reasons for the formation of flat spots. Additionally, not functional brakes can lead to very dangerous situations and significant wear and tear. The Hot Box and Hot Wheel Detection functions Railtro's HBD/HWD are solutions to decrease the mentioned faults to guarantee a safe railway operation. Monitor reliably the temperature of axle bearing boxes, wheel rims and brake discs of passing trains up to 300 km/h.

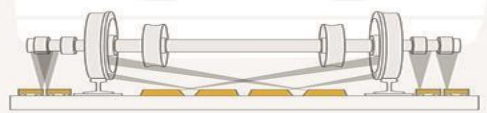




Benefits of HBD/HWD:

- Safety management of railway operations
- Mitigating risks and asset protection
- Improving operational performance by reducing train interruption
- Performance monitoring
- Condition based maintenance
- Modular design for simple and fast mounting without any adjustment
- Up to eight multi-beam scanners per sleeper cover a wide range of wheel set designs
- Low power consumption
- Scanners can be clustered for redundancy
- Self-calibration, self-diagnostic and health monitoring
- No influence on regular track maintenance



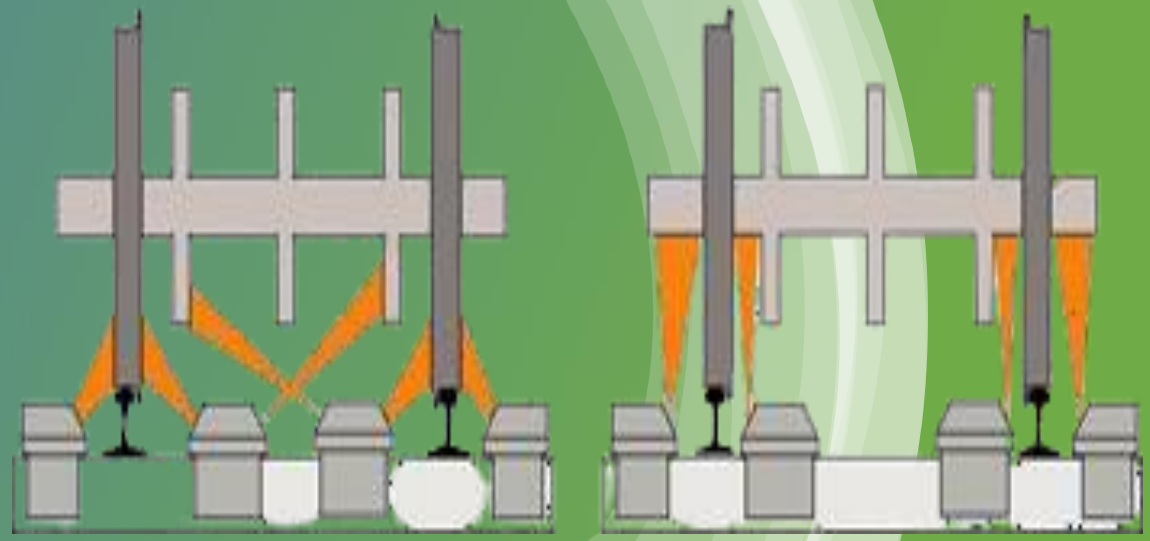


Additional Features

Multiple temperature limits can be set based on vehicle classification (locomotive, cargo or passenger) evaluated by the axles' layout analysis, video detection or external source (traffic database etc.).

Modular design of the infrared sensor allows adaptation to a broad range of axle box types and therefore guarantees reliable identification of all possible hazard conditions.

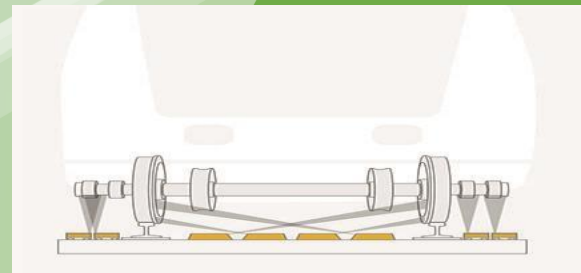
Even higher safety can be achieved by using more sensors in a redundant configuration.



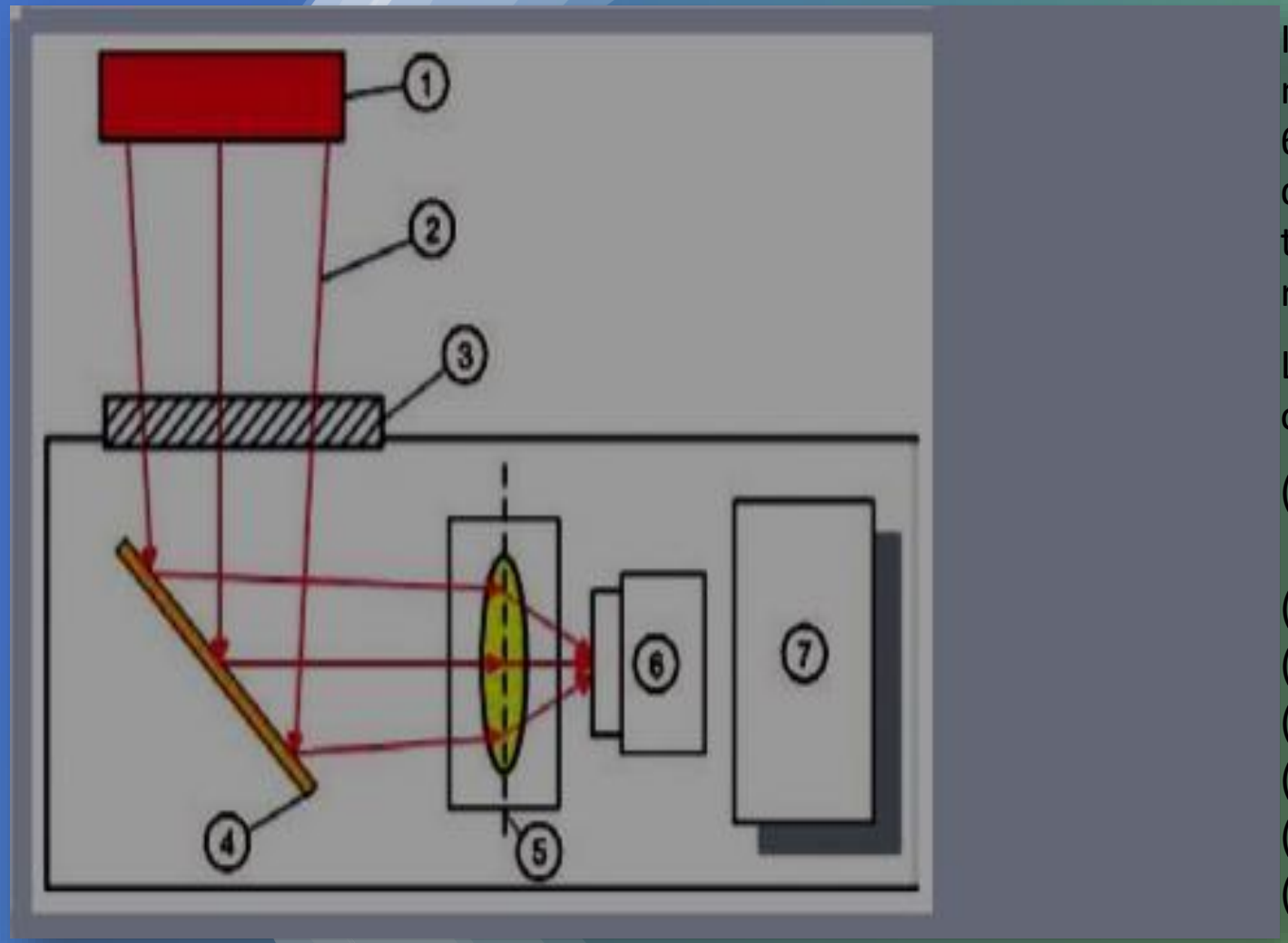
Installation

The measuring system requires a special sleeper placed into the railway and several in-track wheel sensors for measurement initialization and measured data triggering.

Both systems can be combined in a required combination (1 HW+2 HB, 2 HW+2 HB, etc.).



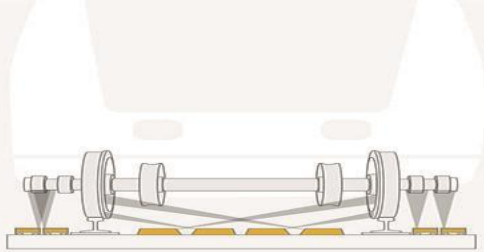
Contactless Temperature Measurement



In order to be able to contactless and very quickly measure temperatures in the range from 0° C to 650° C special infrared detectors are used (quantum detectors), which convert the thermal radiation of the target into electric signals especially in the infra-red range.

Like a photo-camera the measuring systems consist of lenses, mirrors and infrared detectors.

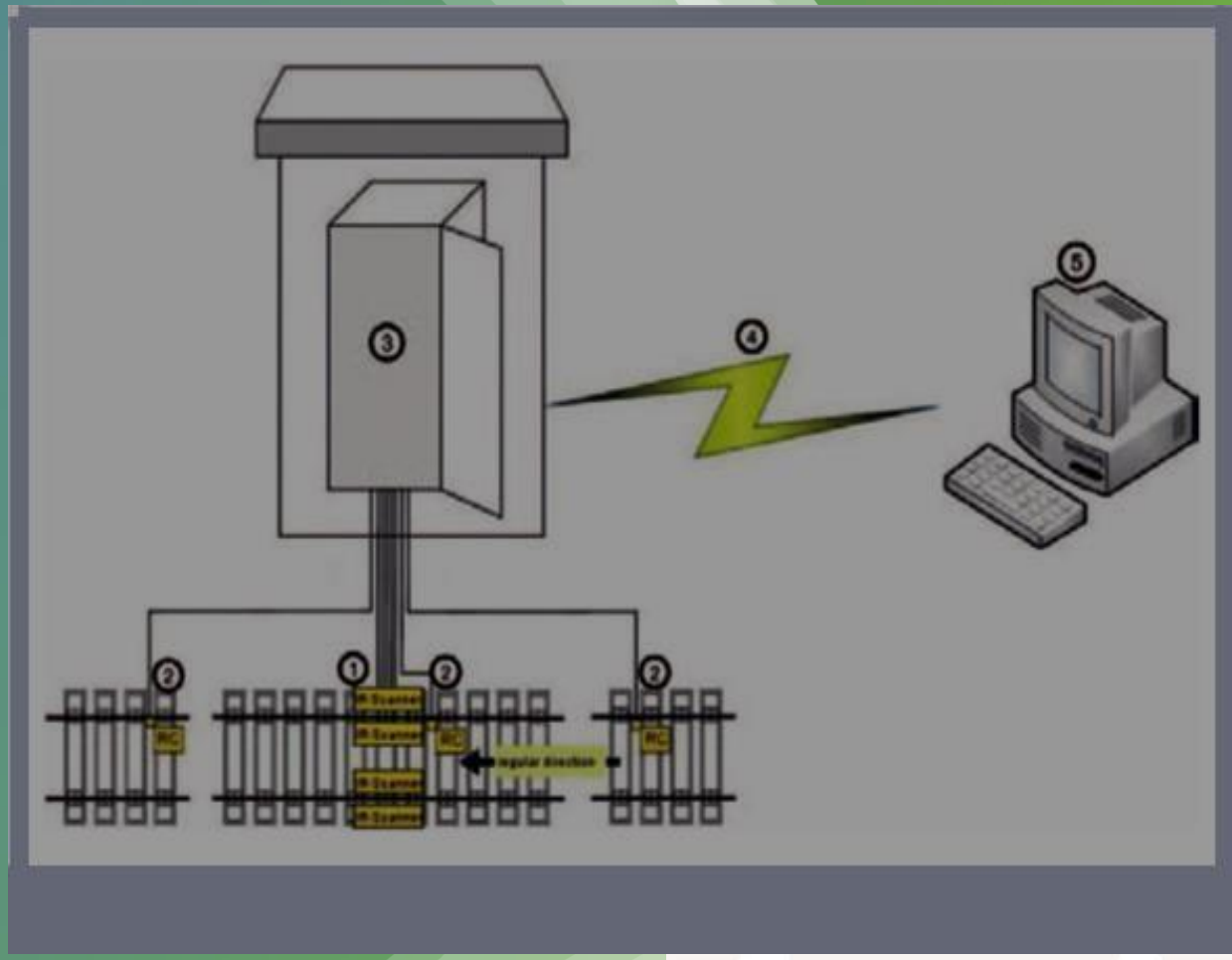
(1) Heat target such as axle bearing, wheel, brake disk
(2) Thermal radiation
(3) Shutter
(4) Deflection mirror
(5) Optical system
(6) Infrared sensor
(7) Electronics



Principle of a HBD/HWD Detection System

The essential structure of a HBD/HWD detector is shown schematically and it consists of the following function blocks:

(1)Infrared measuring systems (pyrometers) in the track (in a sleeper or on the rail)
(2) Rail contact on the track (axle counter)
(3) Evaluation electronics near the track
(4) Data transmission and network
(5) Display unit at the dispatcher's work-place.



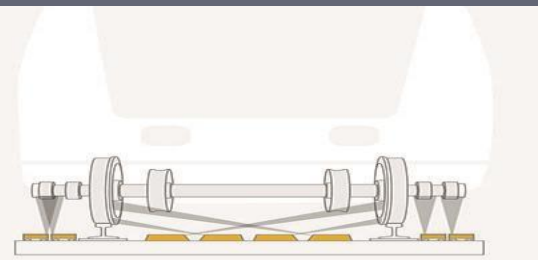
General function:

If a train approaches the measuring system, a rail contact (2) passed over activates the system and it becomes ready for measuring.

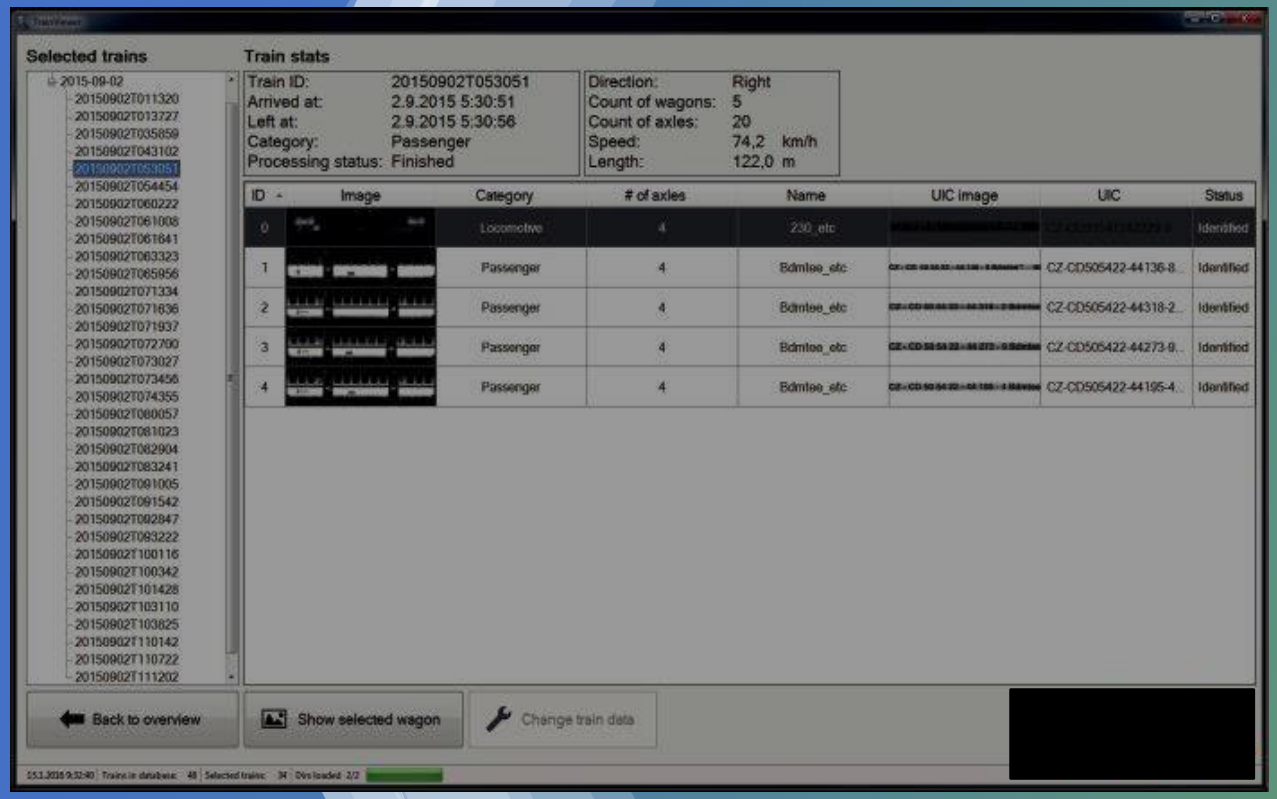
When the wheel passes the infrared measuring system (1) and the axle counters located there, the temperature values of the left - hand and the right-hand axle box cases, the temperatures of the wheel and of the brake disc (depending on the system con-figuration) are recorded and allocated to the axle number in the train consist. In the case of a dangerously high temperature, an alarm is triggered and the dispatcher (5) receives the following information at least:

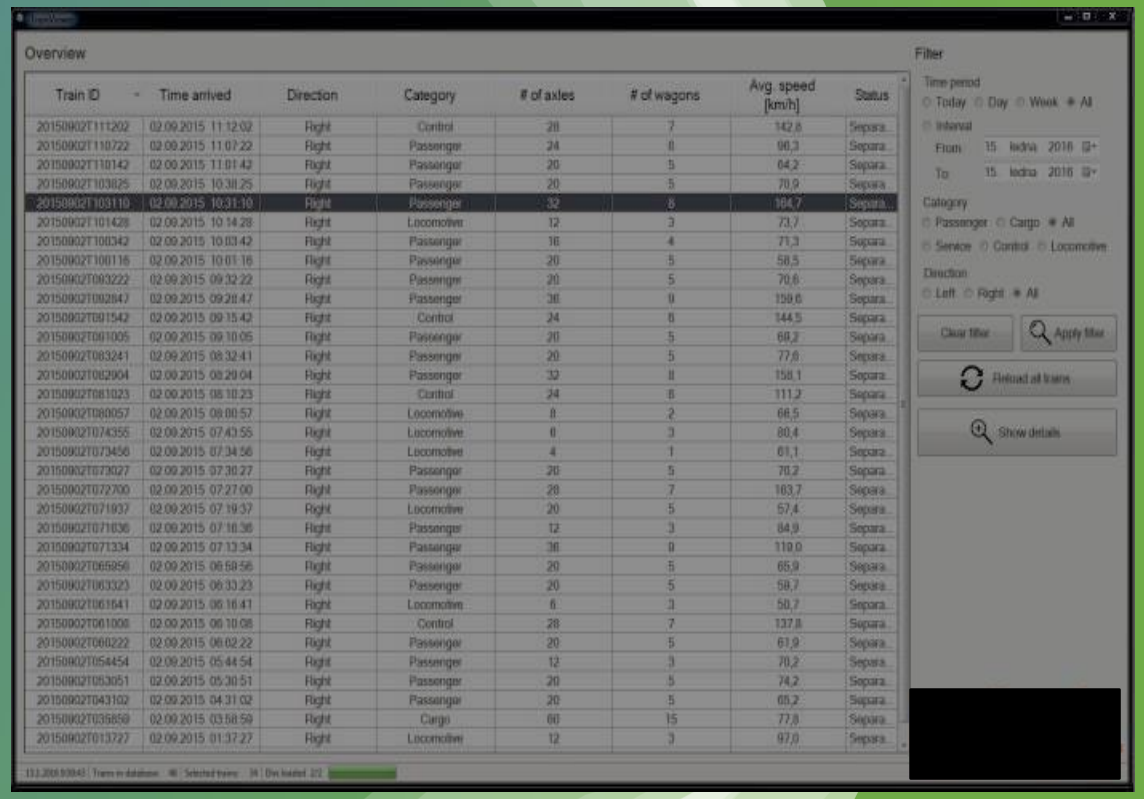
type of alarm (e. g. hot alarm, warm alarm) value of the temperature measured place of the measuring point type of temperature measured (bearing box, wheel, brake disc)
number of the axle on which the alarm was detected side of the train on which the temperature was measured direction of travel of the train

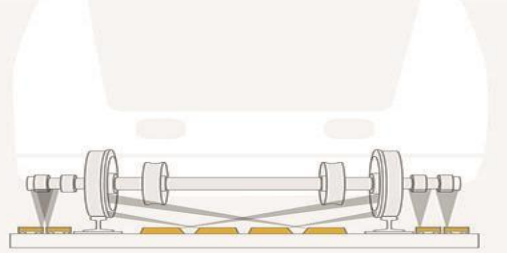
Depending on the type of construction of the system, additional information can be collected and reported. The individual evaluation of temperature values to generate further different customer-specific alarms is possible.



Remote Access Software Panel







Block Diagram

Trackside Equipment- Counters, infrared sensors, Cameras, RFID Reader, DED etc.

Programmable Logic Control (PLC)

MODEM

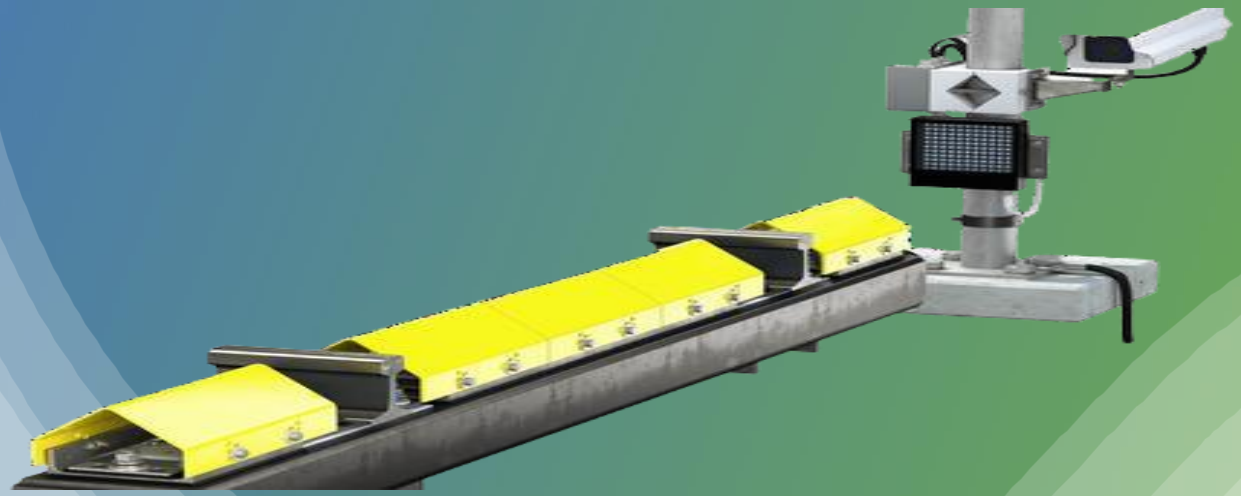
Cloud

SMS/EMAIL Alert

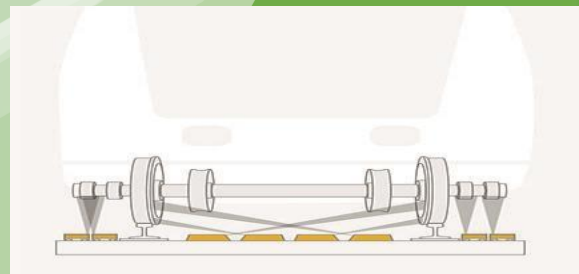
MODEM

PC

CONTROL ROOM



Dragging Equipment Detection using accelerometer with camera



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