



DUCATI energia s.p.a.

RTB

HOT BOX DETECTION SYSTEM

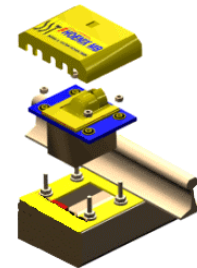
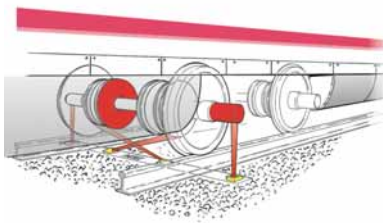
Innovation plus experience for safer travel

The system offered by **Ducati** Energia is capable of identifying all types of axle boxes and braking systems used by the world's railways for speeds up to 500 km/h, and of reliably detecting any emergency situations.

Besides keeping a low purchase price, the modular structure of the system permits fast, low-cost system maintenance.

The heart of the system is a multi-beam (MB) infrared optical assembly which scans the axle box, line by line, with a scan width of up to 120 mm.

The integrated signal processor enables fast, precise processing of the measured values.



Electronic Rail Contacts (Pedals)

As the train passes, the measuring process is made possible by the contacts on the rail, particularly effective and with a high reliability for this purpose.

The contacts activate the system and create a trigger-signal for the evaluation of the data read; subsequently they switch the system back into a standby status.

Scanning modules (Infrared Sensor Scanners)

The infrared sensors are modules inserted into a railway metal hollow sleeper (homologated). They incorporate the microelectronics needed to compute the measured values.

The pre-adjusted supports of the modules allow them to be precisely positioned and completely replaced in just a few minutes, during servicing, without changing the geometry of measurements. Therefore no adjustment is necessary in the event of servicing. Via a protected interface, the processed data are transmitted in real time to the Service & Communication Terminal (SCT), that is to the cabin apparatus of the "Acquisition point" on the line.

Service & Communication Terminal (SCT)

The main component consists in a highly powerful industrial standard PC designed to work in especially difficult ambient conditions.

The terminal is capable of performing all maintenance and test functions on the connected infrared sensors. Measurement data are automatically stored.

The SCT also acts as an interface with higher-level networks (e.g. TCP/IP) and can be integrated into different types of systems.

Central display and control unit (MMI in the Control Station)

From the Control location (Local or Centralised) it is possible to control and monitor the acquisition points along the line. Any alarm detected at the acquisition points are sent in real time to the Control location in order to inform the Movement Manager and, if necessary, interface with the signalling system so to stop the alarmed train. The system can be integrated in the various types of configurations and also as double or single rail controller; an integrated "watchdog" function allows close monitoring of all system sensing points to ensure they are functioning correctly.

The control software is called MMI (**Man-Machine-Interface**) and basically performs, relying on graphs and tables, all control functions as well as storing the transits recorded for all connected sensing points.

Remote Maintenance

The possibility of remote servicing means that system maintenance and test functions can be performed "remotely". The result is a further reduction in operating costs.

Measuring Technique

When no measuring process is taking place, an electromagnetic closing device (shutter) provides guaranteed protection against dirt.

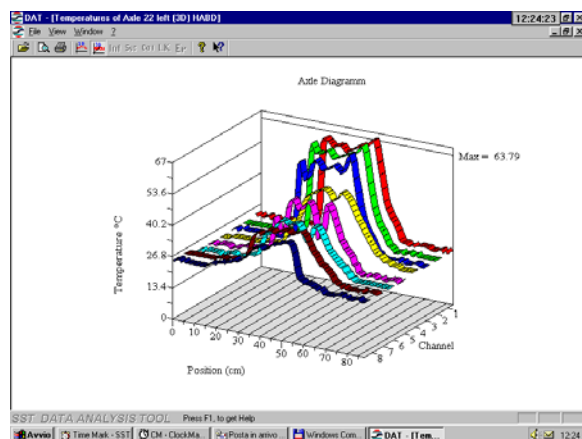
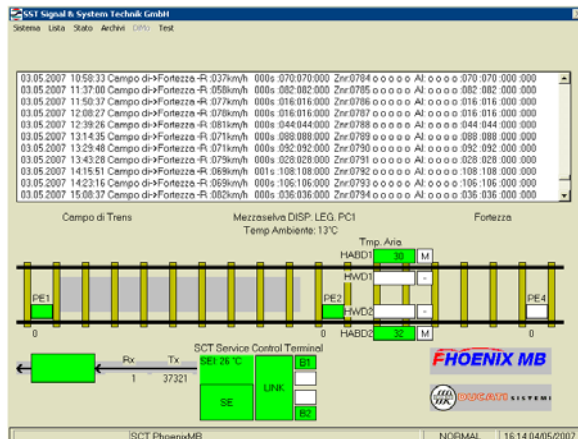
An integrated calibration element assures automatic balancing of the system in the closed status. While measurements are being taken a system of rotating mirrors prevents the entry and deposit of impurities. The integrated digital electronic system analyses the visual information received and performs all scanning module control and adjustment functions.

During this process, the temperature ambient sensors and sensors inside the Scanner module, take into account all of the relevant factors and their variations.

Such features as continual self-diagnosis of all system components and automatic display of warnings when maintenance is required guarantee high reliability and cost-effective operation.

The scanning modules for recording and analysing the entropy diagrams of axle boxes and brakes are easily replaceable units: thanks to the wide sensing cone – up to 8 infrared beams per scanner - field adjustment and pointings are not necessary. What is more, the multiple line-by-line scan with eight measuring points ensures a reliable reading of all types of axle boxes up to 120 mm in width so being able to manage trains for Hi-Speed lines as well as "Lorry Countryroads". This provides extreme flexibility as regards the identification of potential future forms of axle box construction.

The eight independent segments offer a high guarantee against failures.



Performance features and technical data

- Detection of all types of axle boxes
- Possibility of managing "Ultra low floor" cars with a differentiated application of alarm thresholds per individual cars, on a real-time basis
- Continuous measuring of the entire axle box (without blind spots)
- Enhanced safety thanks to the multi-beam scan (with eight independent segments)
- 3D entropy diagram with 450 measuring points at 500 km/h (1,125 points at 200 km/h)
- Possibility of system integration in the 10 typologies of RFI
- Compliance with standard EMV ENV 50121-4 and technical specifications RFI IS402 and IS706
- Flexibility of network integration
- Fast and protected data transmission between scanning modules and SCT unit
- Remote maintenance
- Modular system structure:
 - scanner modules can be replaced in just a few minutes
 - no adjustment necessary after the replacement
- To reinforce the ties, it is not necessary to disassemble the support system
- The mechanical components and box of the scanner module are manufactured completely from stainless steel.

Entropy diagram of the axle boxes

- Train speeds up to 500 km/h
- Entropy diagram of temperature readings from 0 °C to 150 °C
- Temperature resolution +/- 3°C in the range of interest
- Exactness of repetition +/- 2 °C
- Scan width from 50 to 120 mm
- Self-calibration (periodical self-Standardization)

Ambient conditions for the scanner module

- Ambient operating temperature of rail mounted modules: - 25°C to +70°C
- Storage temperature: -40°C to +70°C

Depliant Rev. B2



DUCATI energia

DUCATI energia S.p.A.

Via M. E. Lepido, 182 - 40132 Bologna (BO) - ITALY

Tel. +39.051.6411.511 - Fax 39.051.6411.692

Web: www.ducatienergia.com - E-mail: info@ducatienergia.com