

E+E

—
your partner
in sensor
technology.

**+
Railway
Sensor
Solutions**



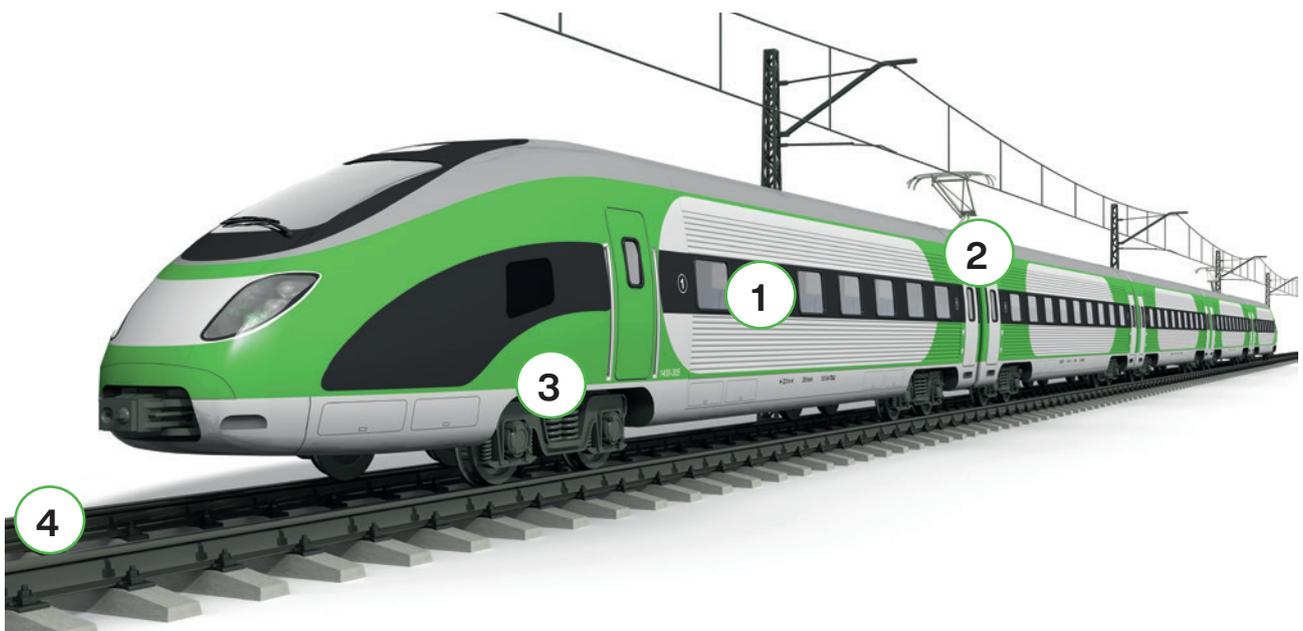
www.epluse.com

+ E+E Elektronik is Your Reliable Partner on the Track

E+E Elektronik is your measurement technology partner in the rail transport sector. Our CO₂, humidity and temperature sensors enable demand-controlled, energy-efficient climate control in the passenger compartment. E+E sensors for monitoring compressed air or determining moisture content in oil increase the operational reliability of pneumatic and hydraulic systems. Our meteorological sensors for outdoor use reliably warn of weather-related safety risks on the track and help to save energy by demand-controlled heating systems.

E+E Elektronik is a member of the Austrian Rail Industry Association.

E+E Sensors in Rail Traffic



1

Climate Control

Air conditioning systems
Climate monitoring

2

Pneumatic Systems

Compressed air system
Brake service
Door controls
Pantographs
Power switches

3

Propulsion Systems

Electric and diesel traction
Hydraulic power transfer
Wheelset gearboxes
Oil-immersed transformers

4

Railway Infrastructure

Weather monitoring
Ice detection systems
Railway switch heaters

+ Climate Control



CO₂, humidity and temperature sensors enable demand-controlled ventilation and air conditioning in the passenger compartment. As well as increasing passenger comfort levels, this also significantly reduces energy consumption by auxiliary climate control systems.

CO₂ is the most important parameter in air handling!

CO ₂ concentration	Flow per passenger*	Flow per 250 passengers
2300 ppm	10 m ³ /h	2500 m ³ /h
2000 ppm	12 m ³ /h	3000 m ³ /h
1000 ppm	30 m ³ /h	7500 m ³ /h

*min. fresh air rates recommended by railway standards

Benefits of demand-controlled air conditioning:

- Comfort for passengers
- Energy savings: reduce power consumption costs by up to 30% with occupancy-dependent fresh air control

Sensor Solutions



EE872

Probe for CO₂, Humidity, Temperature, Pressure

- Long-term stable CO₂ measurement principle
- Temperature and pressure compensation
- Replaceable sensing module
- Analogue output / Modbus RTU / BACnet MS/TP

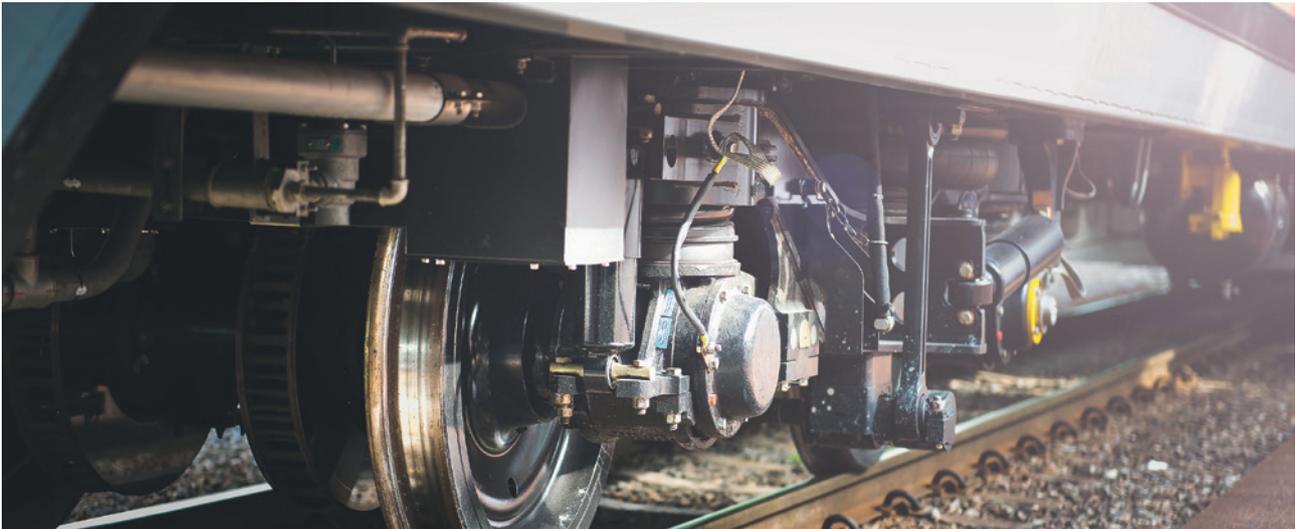


EE8915

CO₂ Sensor for Railway Applications

- Compliance with relevant railway standards
- Temperature and pressure compensation
- Wall and duct mount versions
- Voltage and current outputs

+ Pneumatic Systems



Measuring and monitoring the dew point and air flow of compressed air systems ensure efficient and reliable operation of the various pneumatic systems of rail vehicles. The need for maintenance measures can be detected at an early stage and costly repairs can be avoided.

Dew point and air flow sensors for:

- Compressed air dryer monitoring
- Air brake control system
- Pantograph control system
- Entry and intermediate door control
- Sanding control system

Preventing:

- Failures of the brake system and pneumatic door openers due to condensation or icing in winter
- Corrosion caused by the prolonged presence of moisture in the network and in pneumatic components such as cylinders and valves

Sensor Solutions



EE355 / EE371

Dew Point Sensors

- Measurement range -60...60 °C Td
- High accuracy of ± 2 °C Td
- Compact and robust IP65 enclosure
- Analogue output / Modbus RTU



EE741

Flow Meter for Compressed Air and Gases

- Modular design for DN15 to DN50
- High-accuracy thermal measurement principle
- Analogue, pulse and switching output
- Modbus RTU / M-Bus / IO-Link

+ Propulsion Systems



Monitoring the moisture content of hydraulic, lubricating or insulating oils reduce the risk of damage to hydraulic components, gear boxes, oil-insulated transformers and compressors. Periodic or continuous online measurement of the moisture content increases operational safety and is essential for predictive maintenance.

High risk of free water in oil due to variable environment conditions!

Preventing:

- Transformer insulation failures and short circuits
- Component corrosion and wear
- Valve and fitting blockages due to water and ice particles

Temporary peak load operations

	Situation 1	Situation 2
Oil temperature	90 °C (194 °F)	35 °C (95 °F)
Saturation water content x_s	1000 ppm	550 ppm
Water content x	500 ppm	500 ppm
Margin of saturation	500 ppm	50 ppm

Sensor Solutions



EE360

High-End Moisture in Oil Sensor

- Measuring range: 0...1 aw, -40...180 °C (-40...365 °F)
- Pressure rating up to 20 bar (290 psi)
- TFT colour display with data logging function
- Analogue outputs / Modbus RTU / Modbus TCP



EE364

Moisture in Oil Sensor

- Measurands: water activity (aw), temperature, water content (x) in ppm
- Pressure rating up to 20 bar (290 psi)
- Two 4...20 mA outputs / Modbus RTU

+ Railway Infrastructure



The monitoring of the weather conditions along the railways with specialised humidity / temperature sensors is crucial for traffic control and accident prevention. Due to the demanding operating conditions, the requirements for meteorological sensors and measuring instruments are particularly high. The potential for energy savings on turnout heating systems can be up to 70% by intelligent use of local humidity and temperature measurement.

E+E Elektronik's high-end humidity and temperature sensors enable:

- Detection of icing danger, ice-free tracks
- Controlled rail turnout heating
- Operational safety for railway control devices

Benefits:

- Increased reliability
- Cost reduction through energy savings
- Better environmental footprint by increased energy efficiency

Sensor Solutions



EE260

Heated Humidity and Temperature Probe

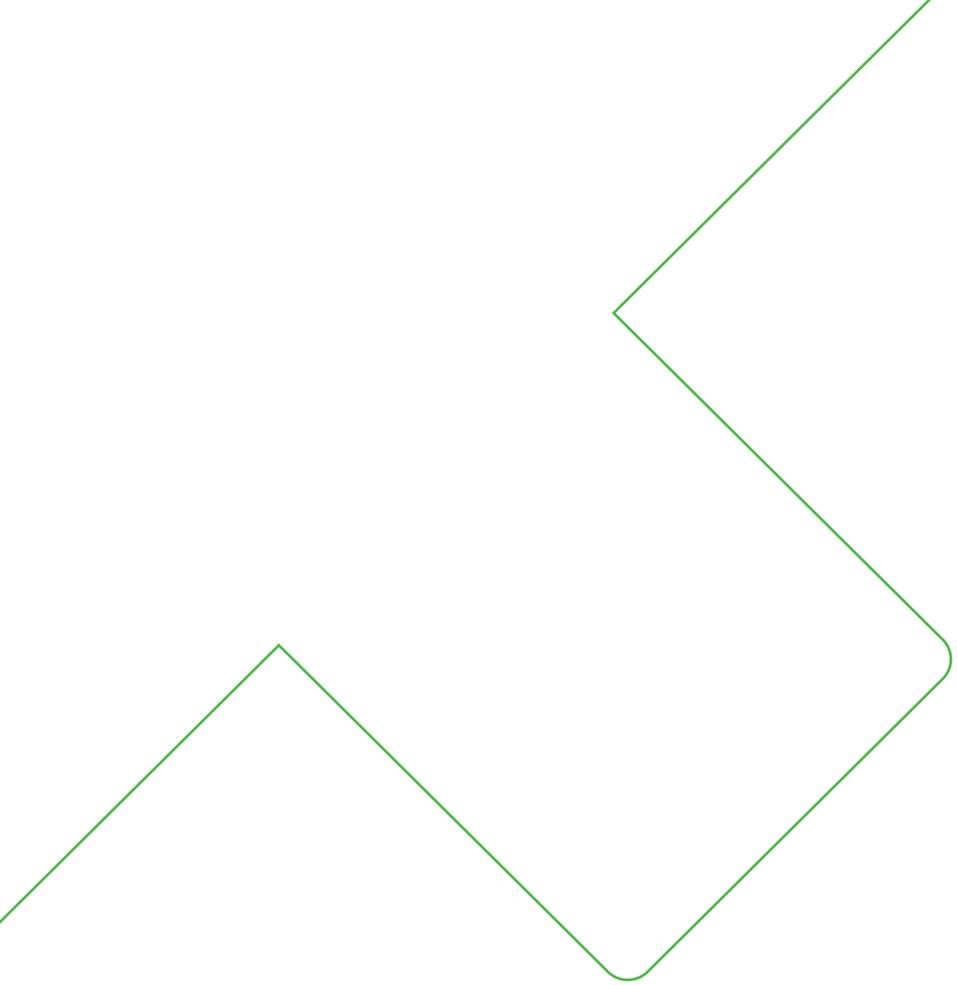
- Innovative probe design with heated RH sensing head and additional T sensing element
- E+E proprietary sensor coating
- Analogue outputs / Modbus RTU



EE33-M

High-End Humidity and Temperature Sensor

- Heated humidity probe and additional T probe
- High accuracy and very short response time
- E+E proprietary sensor coating
- Analogue outputs / RS232 or RS485 interface



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