RAILWAY SYSTEMS

TRAIN DETECTION MONITORING

RAIL CROSSING MONITORING

SWITCH CONDITION MONITORING

SIGNALING POWER MONITORING

TRACK AND RAIL MONITORING

ROADMASTER® SPM

Diagnostic and monitoring technologies for signaling power

voestalpine Signaling
www.voestalpine.com/railway-systems

voestalpine
ONE STEP AHEAD.

DIGITAL PERFORMANCE ON TRACK®

DIAGNOSTIC AND MONITORING TECHNOLOGIES FOR INFRASTRUCTURE

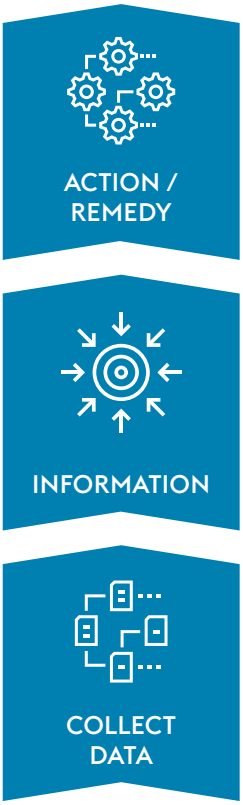
ROADMASTER® – our intelligent diagnostic and monitoring system – records the condition of your infrastructure continuously and comprehensively. Signaling systems represent a central safety relevant element in all railway systems. The performance and reliability is dependent on the quality and availability of the power supply network that feeds them. The module Signaling Power Monitoring (SPM) offers you the opportunity to remotely monitor the power supplies relevant for your rail infrastructure and network such as signaling, rail crossings and switches. The measurement of parameters such as voltage, current, battery condition and insulation resistance provides valuable data to the rail operators. This enables a comprehensive diagnosis of problems that may occur in power supplies, which shortens response times, ensures optimum availability of the signal systems and allows the implementation of proactive condition-based maintenance.

That‘s what we stand for. For Digital Performance on Track®.

SIGNALING POWER MONITORING WITH ROADMASTER® SPM

The SPM concept is based on a modular design, which allows easy expansion to include additional monitoring and integration with existing railway and IT systems on a number of levels. The system consists of sensors to measure physical or electrical parameters, field units including loggers and network equipment to collect, format and transmit the real time data and a back office server to analyze the accumulated data, announce alarms as required and host the web based user interface. The sensors are powered directly by the logger and do not require a separate power source. Usually everything is located inside control cabinets or equipment rooms.

Intelligent analysis of the data collected enables the system to identify deterioration in condition and allow intervention – crucially before a failure occurs. This advance warning provides a vital timeframe in which maintenance work can be scheduled to restore normal operation.



SPM subcategories

» Earth Leakage

» Current & Voltage

» Battery Condition

No matter what rail transport or application area – SPM can be used by all railways.

Why use diagnostic and monitoring systems for signaling power?

» **Reduction in maintenance** work time schedules

» **Reliability-centered maintenance** necessitates the use of diagnostic and monitoring technologies

» **Reduction in power supply** failures which cause significant delays

» **Reduction in fault response times**

» **Valuable data** on the condition of signaling systems for the railway operator

» **Comprehensive diagnosis** of problems in power supplies

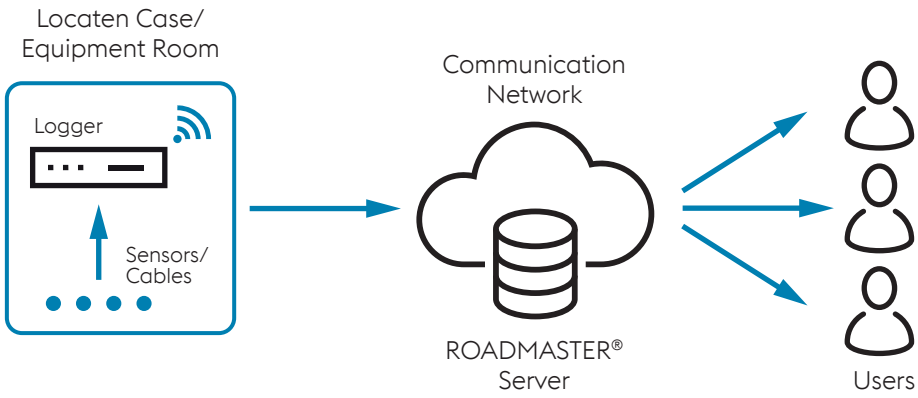
» Ensure **optimal availability** of signaling system

SYSTEM OVERVIEW

Sensors and cables detect quantitative measured variables, for determining the performance and condition of the signaling system power supply. The use of noninvasive technology means the measurements do not cause reactions and therefore are completely risk-free.

Data recording by means of customer-specific hardware (with flexible options), which has been developed specifically for railway applications. The information gained by the sensors is processed and ensures comprehensive data retrieval.

Software modules on a ROADMASTER® server analyze the acquired data to provide the user with information about the asset condition as well as performance statistics using integrated visualization software.



BUSBAR CONDITION MONITORING (BBCM)

BBCM – a subcategory of ROADMASTER® SPM – continuously monitors power supply busbars and is designed to detect earth leakage within the rail environment.

It is intended to be installed in equipment rooms and line side equipment cases and provides real time monitoring of earth leakage and voltage measurement of power supply busbars. The sensor unit is capable of simultaneously monitoring one AC busbar and four DC busbars, uploading the data to an external server via GPRS or Ethernet.

BBCM PRINCIPLE

There are 2 methods for measuring the V1 and V2 voltages and calculating the leakage to earth resistance:

- the **AC Channel Text Method** which applies a small positive and then negative stimulus voltage to the AC channel input, and
- the **DC Channel Text Method** where a temporarily load is applied to the DC channel input.

In both cases the voltage of the busbar is measured separately utilizing different measurement circuitry.

Key Features

- Ease of installation
- Speed of measurement – can be used to detect <1 sec transient earths on assets operation
- Auto compensation per channel for noisy busbars
- Consistent high accuracy across complete voltage and temperature range
- Compatible with voestalpine ROADMASTER® monitoring platform and third party monitoring systems
- Maintenance free for its service life
- Operating temperature -25 °C to + 70 °C

Benefits

- Early stage detection of earth faults
- Continuous monitoring of insulation to earth
- Enhanced operator safety
- Power supply busbar safety management
- Condition based maintenance
- Diagnostics via Ethernet, Bluetooth, WiFi

SIGNALING POWER SUPPLY MONITORING (SPSM)

SPSM – measures the power supply voltage and current coming into the equipment/rack system.

Depending on the application, an external voltage or current transducer is used and fitted into the rack within the equipment room or cabinet. The sensors are used in combination with our logger for the data acquisition whereby one logger can monitor up to eight check sensors. The system takes real time measurements of current or voltage and calculates the power profile.

Benefits

» Measures and trends key parameters such as voltage and current to predict failure

» Captures intermittent faults or fluctuations

BATTERY CONDITION MONITORING (BTCM)

BTCM – as part of ROADMASTER® SPM – dedicates itself to this special topic by continuously monitoring the battery condition.

Railways often use batteries as energy source for their installed assets. The system is based on an intelligent battery monitoring module which is integrated in our proven asset monitoring system ROADMASTER®.

BTCM PRINCIPLE

The sensor module is characterized by thermal/fuse protection, self-configuration and fault tolerant communication bus between modules and our logger. One sensor module, which is powered from the monitored cell itself (<1ma consumption in sleep mode) is used for every 1 to 6 cells to measure:

» battery voltage & -temperature

» battery impedance

» charging current

The generated data is transmitted with a multi-drop bus logger to the ROADMASTER® server. An additional CT (one per battery bank) can be used to measure the charging current.

Benefits

» Identify & replace failing cells before battery performance is affected

» Ability to trend battery performance & condition to predict failure

» Reduced down time risk

» Better maintenance/renewals planning

» Offers opportunity to correlate switch condition alarms or parameters with battery condition to get to the root cause of power related faults.

HARDWARE & SOFTWARE FROM A SINGLE SOURCE

ROADMASTER® SPM provides all components, from hardware to software, as a system and complete solution. This means that you save on interfaces and get everything – from data acquisition to data analysis – from a single source. The system versions can be configured to meet your requirements.

Integration of ROADMASTER®

Our visualization software enables easy and intuitive operation via a multilingual user interface. Seamless monitoring of the operating state is possible on any PC, tablet or common smartphone, regardless of platform, by means of web-based software. As a result, the state of signaling power equipment is continuously available and is comprehensively analyzed and displayed. A clearly displayed overview of the asset conditions saves time and guarantees that you can focus on the essentials.

- Visualization of the asset condition
- Analytics
- Alarms
- KPIs and reporting

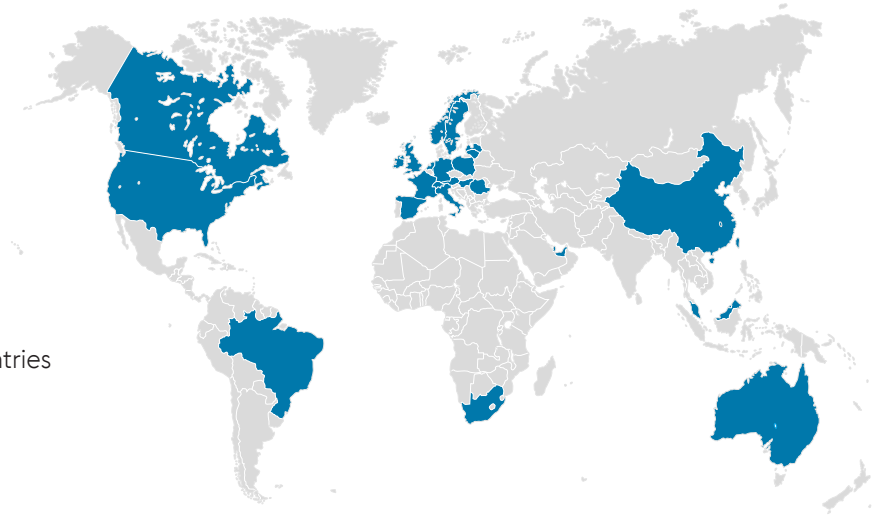
ROADMASTER® SPM can be integrated into external software platforms by system interfaces or visualized by means of our ROADMASTER® diagnostic and monitoring platform (can be expanded with all ROADMASTER® categories).

Interfaces include:

- OPC-UA
- Web services
- Interface development in coordination with the customer is possible

WHY CHOOSE US?

Domain expertise, competency and more than 160 years of experience in the international turnout business guarantee your “digital” Performance on Track®.



- Reference projects in more than 25 countries
- Monitoring of more than 40,000 assets
- Up to 40 % fewer asset failures
- Higher availability of railroad lines

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