



SERVING
SAFETY

Mors Smitt Railway Technology
Products & Services



Core competence



Protection and control of electrical circuits and systems in mission-critical applications serving rail car builders, rail operators, contractors and power utilities worldwide.

Mission statement



To be preferred a supplier by offering safe, reliable and cost-effective solutions with focus on quality and operational excellence exceeding customer expectations.

Vision



World leader in relay technology in railway and power markets. World leader in train borne energy measuring systems.

Global reach



- 5 Manufacturing sites
- 6 Sales & support offices

460 employees
50 engineering
35 sales & support



Product Market Combinations



Railway rolling stock components:

Products: Relays, relay life services, miniature circuit breakers, transducers.

Customers: Rolling stock operators, rail car builders, contractors.



Railway rolling stock systems:

Products: Engineered solutions, energy measurement, power control, services.

Customers: Rolling stock operators, rail car builders, contractors.



Railway signalling & train protection:

Products: Signalling relays, train protection, services.

Customers: Infrastructure operators, rail car builders, contractors.

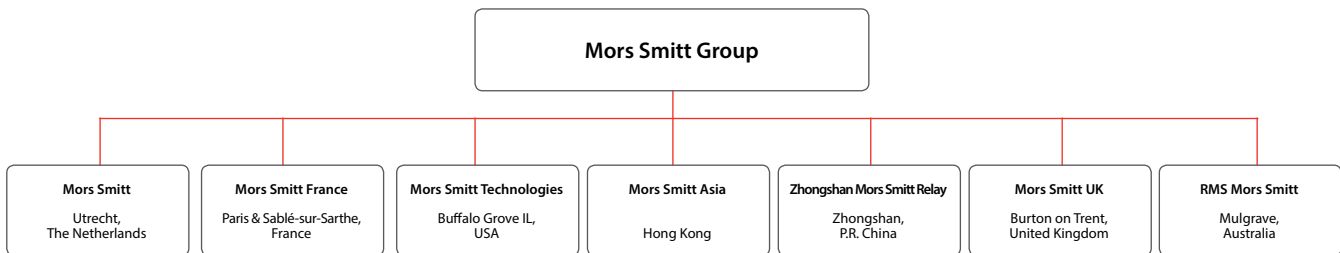


Industrial components:

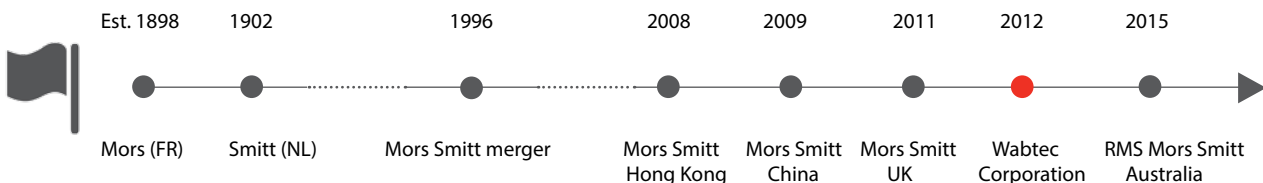
Products: Relays, protection relays, test block systems, engineered solutions, services

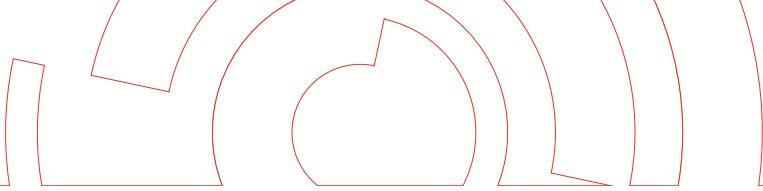
Customers: Power grid & plant operators, system integrators, contractors.

Quality & reliability: no compromises



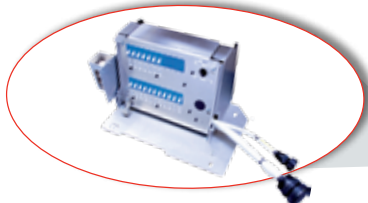
History





Signalling & control relays
 Protection relays
 Measuring sensors

MSAV ultralight AC / DC energy measurement system
 (data handling and train functions)



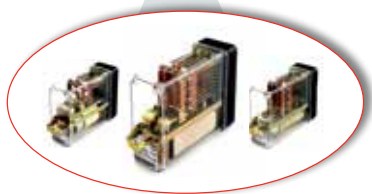
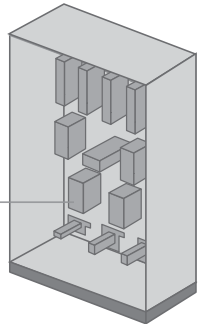
Power distribution (MCB) panels

TPWS & STM train protection & warning system

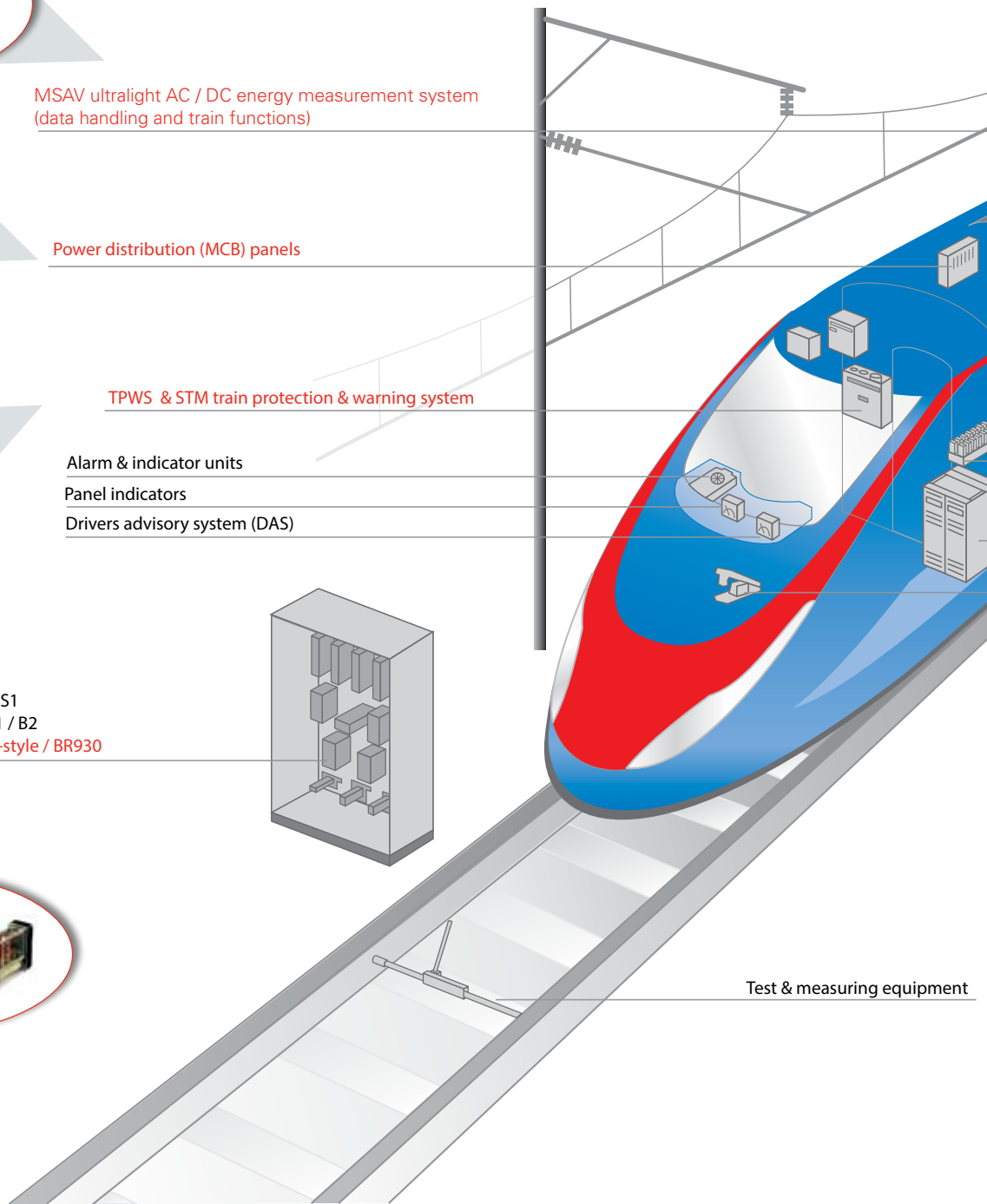


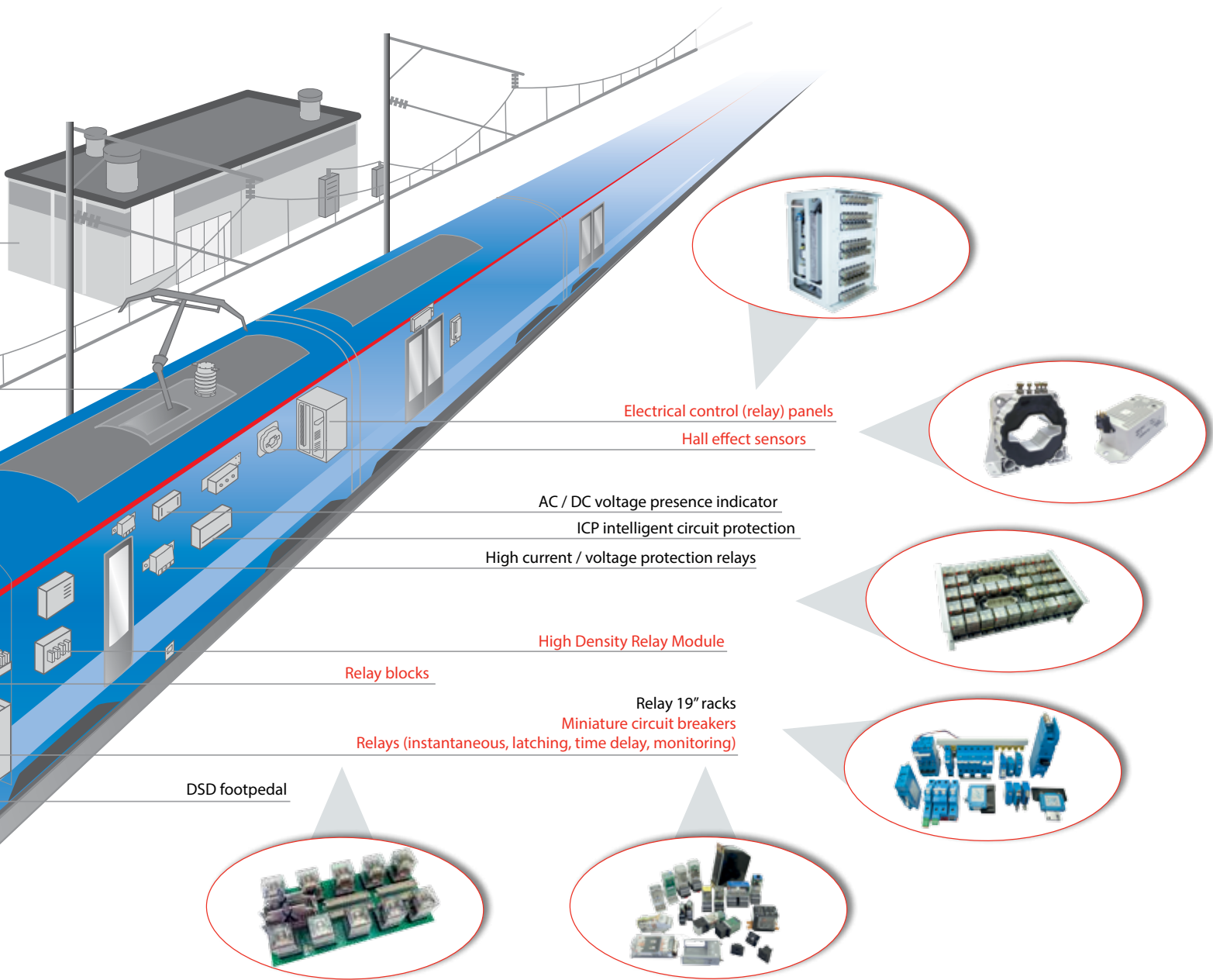
Alarm & indicator units
 Panel indicators
 Drivers advisory system (DAS)

Signalling relays N.S1
 Signalling relays B1 / B2
 Signalling relays Q-style / BR930



Test & measuring equipment





Onboard & trackside railway components and solutions

Relays

World's widest relay range, compliant to the strictest international railway standards

- > 10 million in use in rolling stock applications world wide
- Instantaneous, latching, timing, monitoring, safety critical, 2 - 40 contacts
- Wide range of panel or surface mount sockets/bases
- Proven safety validation in critical applications
- Galvanic separation of control and power circuit(s)
- Insensitive to electromagnetic disturbances (EMI/EMP)
- Proven reliable and low Life-Cycle-Cost (LCC)
- Fail-safe hard-wired relay logic (cyber-attack-proof)
- Fulfilling RAMS (HEC)



Miniature circuit breakers

Mors Smitt offers a wide range of hydraulic-magnetic miniature circuit breakers.

- Current up to 700 A, voltage up to 625 VAC and 160 VDC
- Temperature-independent, selectable trip time/curve
- Options such as mid-trip, auxiliary contacts, different terminals
- Complete range of accessories (such as bus-bars) are available to significantly reduce installation time



Relay life services

Products, tools and services that help our customers optimizing train system performance.

- Training
- Application support
- Train system analyses
- Relay testers
- Relay performance monitoring
- Maintenance consulting

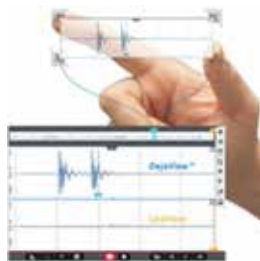
Easy fault-finding & commissioning



*D-dock
Non-intrusive commissioning and
fault-finding tool.*



*D-test switch
Relay circuit testing*

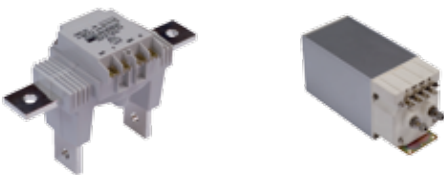


Portable Relay Tester

Protection relays

Voltage and current protection relays

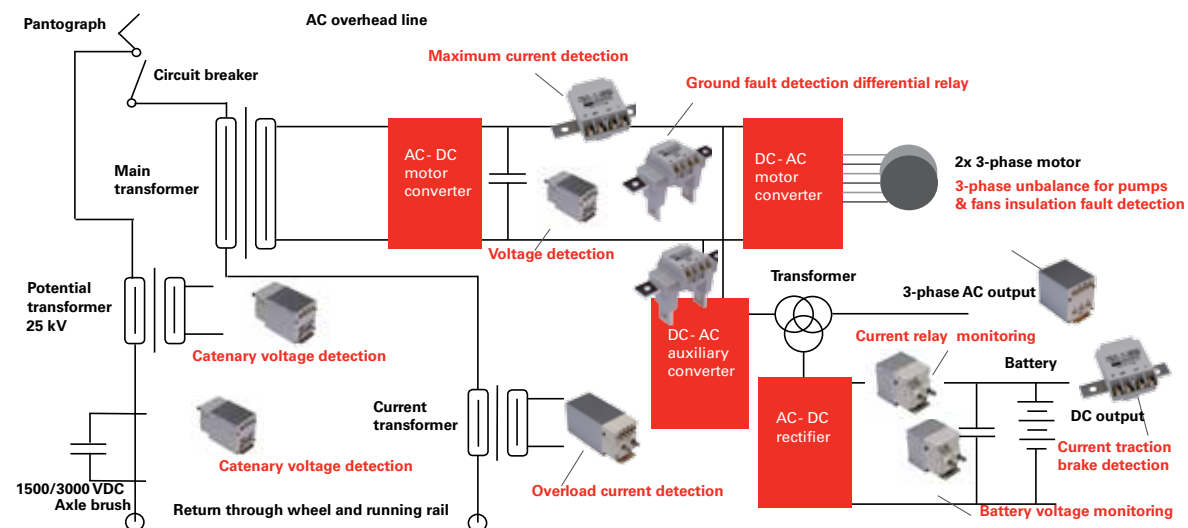
- PRV Voltage measuring relays, 100 - 3000 VAC/DC
- PRA Current measuring relays, 1- 6000 AAC/DC
Ground fault & insulation fault relays



Hall effect sensors

Voltage and current sensors / transducers

- MSV Voltage sensor, 950 – 5000 VAC/DC
- MSA Current sensor, 100 – 2000 AAC/DC



Train energy management solutions

Proven solution for all vital high voltage measurement for train protection & traction control. Energy measurement to obtain highly accurate energy metering data for billing, saving and driver advisory.

- State-of-the-art service-proven solution adopted by both rail car builders and operators
- Highly accurate voltage, current and energy measurement, fully compliant with EN 50463, EN 50155, IEC 61373, EN 45545, etc.
- Single sensor for all functions
- Patented solution for safe galvanic separation between primary and secondary circuits by Fiber optic technology
- AC and DC solutions
- Fully modular and scalable concept
- Compact and easy to install on all train configurations, both new-built and retrofit
- Weight, space and cost saving



Energy Management System - EMS

Mors Smitt's EMS provides highly accurate energy consumption data to train Ethernet backbone as well as data server for billing purposes.

Modular solutions available (configurable electronic remote box) can fulfil train functions (e.g. catenary detection, analog signal for traction inverter) and also offer web-based reporting, plus file transfer from train to infrastructure manager's centralised billing system.

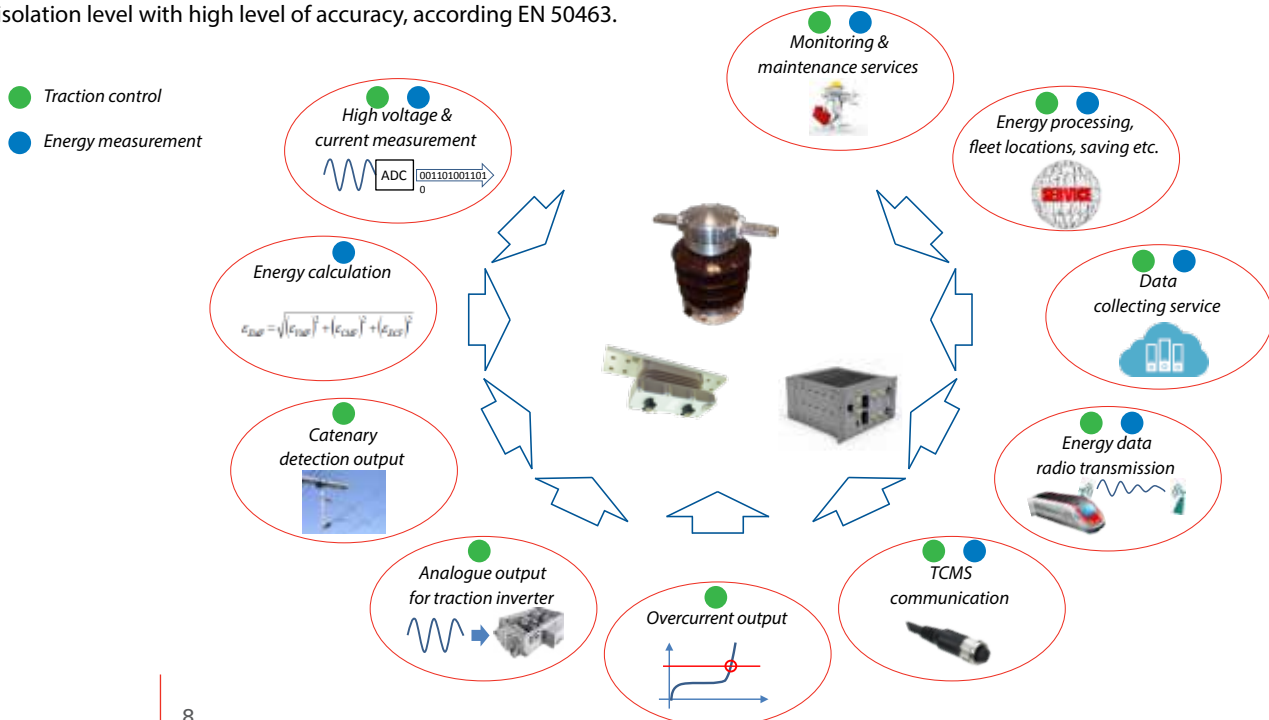
The AC and DC sensor's state-of-the-art design for easy installation and maintenance provides high reliability and isolation level with high level of accuracy, according EN 50463.

Energymiser DAS

Maximise real-time operational performance and efficiency with Energymiser® Driver Advisory System (DAS). This cuts costs by minimising energy consumption while improving on-time running.

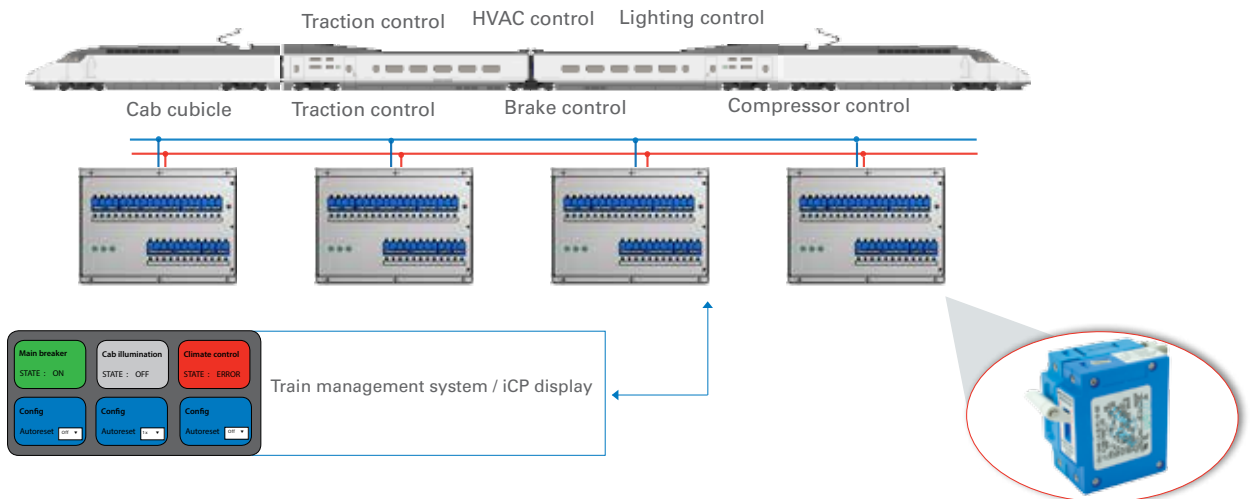
It also helps ensure environmental sustainability and includes web-based reporting that makes it easy to measure, monitor and manage operational performance through time.

Energymiser® is a world-leading solution, being deployed by numerous rail operators.



Intelligent circuit protection (iCP)

iCP controls and monitors all AC and DC circuit breakers remotely



- Decentralised, remote control and status monitoring of circuit breakers
- Dual-bus communication (Ethernet, CAN, others) and diagnostics
- Space, wiring and weight saving
- Designed for ATO, UTO operated trains and difficult-to-access remote circuit breakers

RBR remote operated miniature circuit breaker, 1 - 3 pole

Neutral zone protection

The Automatic Power Control system (APC) opens the main circuit breaker when approaching an overhead line neutral-zone to prevent arcing and sudden deceleration



- Receiver installed on the undercarriage of the train (bogie) traction car
- Control unit (CPU) mounted inside the traction car
- Receiver continuously measures trackside magnetic field strength (to detect trackside sector magnets in accordance with Railway Group Standard GL/RT1210)
- Trackside magnets provide accurate & repeatable location determination
- Solid-state receiver with hall effect technology has no moving parts
- Control unit offers multiple configuration options
- High reliability, long lifetime and easy installation

Engineered solutions

Relay panels, circuit breaker panels, EDB electrical distribution boards, power distribution boards, relay modules / PCB's.

Perfect solutions

New built, retrofit or replacement of obsolete parts, Mors Smitt delivers a perfect, competitive and on-time solution for any onboard challenge of space limitations and / or technical requirements. We understand the need for integrated, specialised and optimised electrical solutions when (spare) parts are no longer available or improvement in e.g. energy efficiency or reduction of weight and space is required. We offer standard-, customised-, and build-to-print solutions.

Optimizing rolling stock LCC & RAMS

Designing, updating and/or improving electrical control systems to the latest standards and state-of-the-art technologies improves the Life-Cycle-Costs (LCC) of rolling stock. Reliability will improve and long term availability of technology is guaranteed by Mors Smitt. We design easily maintainable products and solutions that comply to the latest health and safety standards using the latest eco-friendly materials. Optimised energy consumption contributes to a cleaner environment.

Experience

Our experienced engineers have thorough knowledge of train components & technologies, and we design, develop, test and deliver your solutions to the latest railway standards and directives. All research & development, engineering, manufacturing, assembly and testing will be done in-house in one of our own factories. Localisation of assembly if required. We offer turn-key project management, on-site commissioning and after sales service.

You send us:

- Circuit diagrams
- Space envelope
- Preferred electrical interfacing
or
- Send us your old panel / component for rehabilitation

We offer you

- Quotation within 1 week
- Tested prototype \leq 16 weeks
- Plug & play

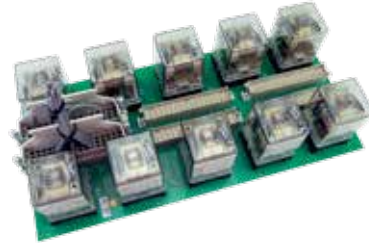


Example projects

Line Replaceable relay Unit.



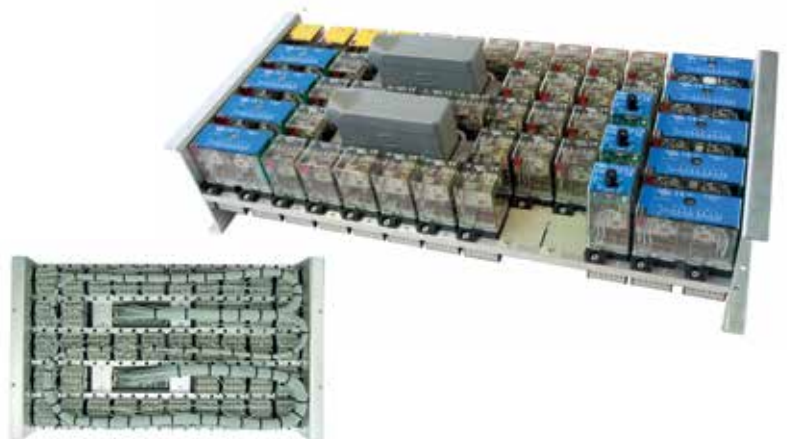
Free configurable relay PCB.



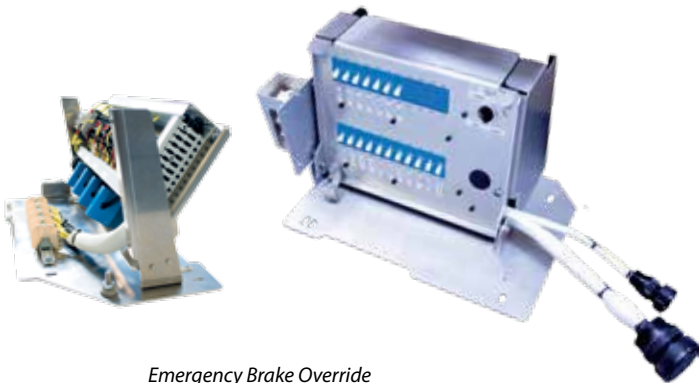
Electrical distribution board for Denver RTD.



High Density Relay Module.



Power distribution panel for SSL trains UK.



Train control / protection under frame panel prototype for ART 300 train.



Emergency Brake Override System for Dutch railways.



19" relay PCB rack for RATP, Paris.



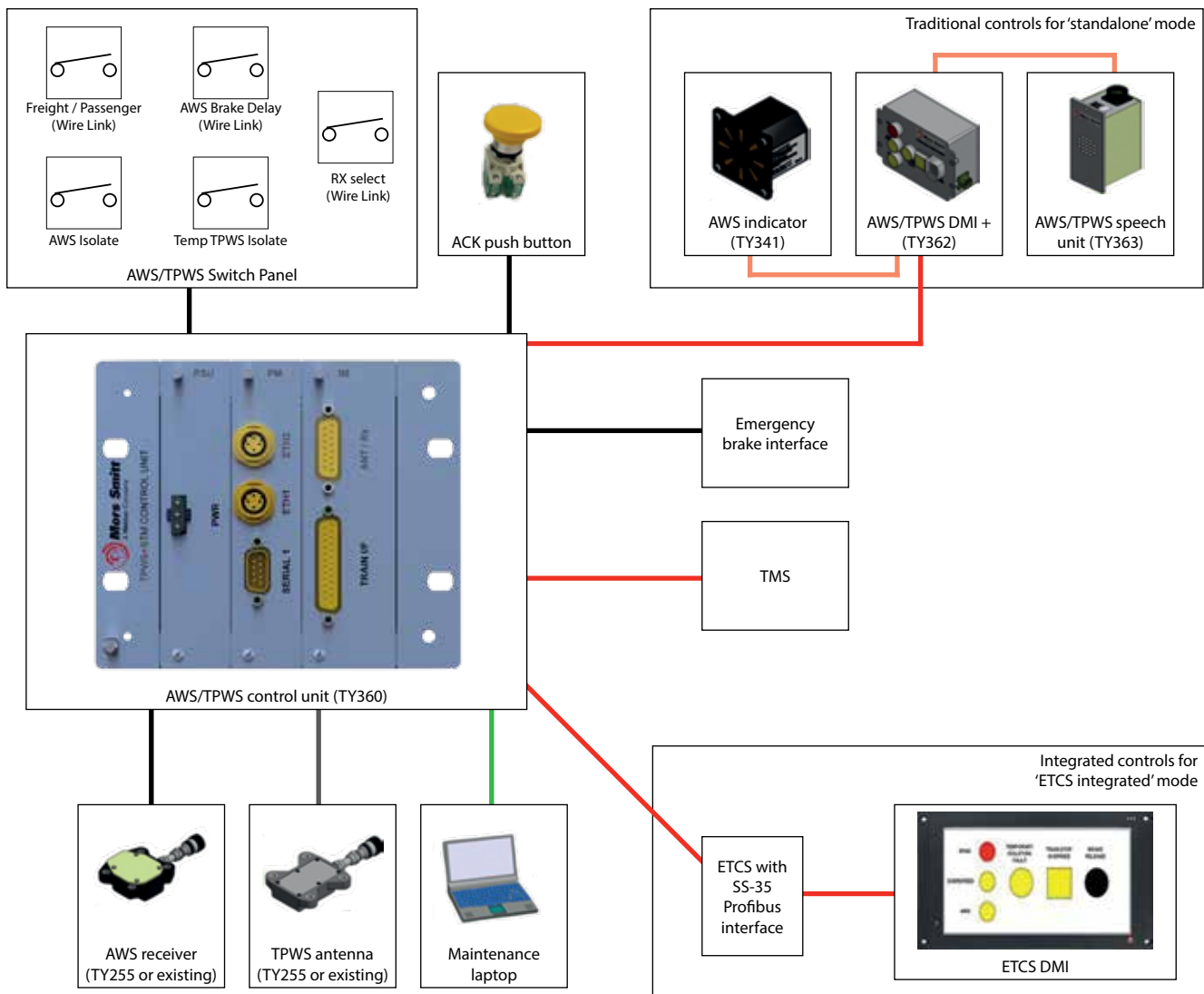
ETCS-Ready Automatic Train Protection

The TPWS+STM product range includes all the equipment required to deploy the UK Automatic Train Protection (ATP) controls for Automatic Warning System (AWS) and Train Protection Warning System (TPWS) as a “Standalone” system fully compliant with GE/RT8075 Issue 2:

- AWS/TPWS control unit
- AWS receiver
- TPWS antenna
- AWS sunflower
- TPWS DMI
- AWS/TPWS speech and sound unit

The AWS/TPWS control unit also includes discrete I/O interfaces and an integrated Specific Transmission Module (STM) fully compliant with UNISIG Subset-35 for operation in “ETCS Integrated” mode via any of three implementations specified by the National Onboard Subsystem Requirements Specification (NOSS):

- As a stand-alone system with rudimentary interfaces to the ETCS for suppression
- Partially or fully integrated into the ETCS DMI
- As a fully-compliant specific transmission module (UK-STM)



Signalling relays

Mors Smitt is an authority when it comes to signalling relays. We offer in-house expertise and manufacturing of various national signalling relay standards used in rail interlocking systems worldwide;

Q-style / BR930 range

- Originally known as Tyer, Field & Grant, STS Rail, now as Mors Smitt UK
- Full Network Rail certification (formerly British Rail)
- Over 150 designs + customers specific requests
- Manufacturing site: Mors Smitt UK



N.S1 range

- Designed & manufactured in accordance with the French Railway & SNCF standards
- Comply to NF F70-021, NF F70-020, NF F70-032, NF F70-031, NF F70-030
- Operations: Automated vision system, operation inspection and end of line testing
- Manufacturing site: Mors Smitt France



GRS type B1 & B2 range

- Repair, retrofit, maintenance, testing and calibration
- All according to original factory specifications (Alstom GRS Rochester-US)
- Manufacturing site: Mors Smitt Netherlands



Mors Smitt can either manufacture new relays or provide a comprehensive refurbishment & repair service for existing units with re-certification.

Repair, retrofitting, maintaining, testing and re-calibration of signalling relays according original factory specifications is part of our activity.

Mors Smitt also has extensive design capabilities enabling other relay versions & types to be developed and manufactured upon request, like special lamp proofing relays.

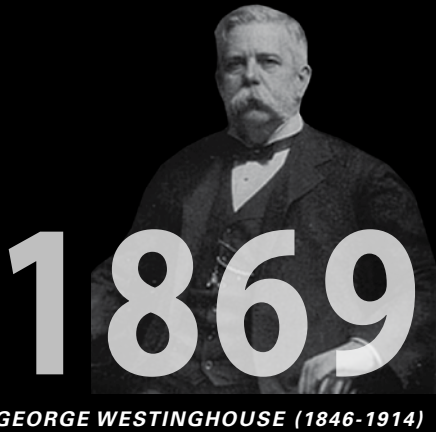


Mors Smitt Group is part of Wabtec Corporation (NYSE: WAB), a global provider of value-added, technology-based products and services for railway, transit, freight and other industrial markets, with facilities located throughout the world. For new-built, upgrade or overhaul/retrofit projects, Wabtec offers specialised products, well-trained staff and services.

**THE WESTINGHOUSE
AIRBRAKE COMPANY**

OUR MILESTONES

- 1869** Invention of air brake
- 1908** Introduction 1st pension fund
- 1913** Introduction 1st paid vacation days
- 1968** Purchased by American Standard
- 1990** Purchase in management buyout
- 1995** Initial public stock offering
- 1999** Changed name to Wabtec
- 2015** Exceeded \$3.3 billion in sales



GEORGE WESTINGHOUSE (1846-1914)

TODAY

Wabtec Corporation is a global provider of value-added, technology-based products and services for railway, transit, freight and other industrial markets. Wabtec is also specialised in aftermarket services.



Trucks & Components



Electronics & Control



Positive Train Control



Current Collecting



Signalling & Wayside



Brake & Friction



Doors & Couplers



Locomotives



Pneumatics



Suspensions



Cooling & HVAC



**Parts, Reconditioning
& Overhaul**



Akapp-Stemmann

Austbreck

Bach-Simpson

Barber Spring

Barber Steel Foundry

Bearward Engineering

Becorit

Brecknell Willis

Brecknell Willis Composites

Brush Traction

Cardwell Westinghouse

CoFren

Dia-Frag

Durox

Fandstan Electric Group

FIP Brakes

Fulmer Company

G&B Specialties

Gerken Group

GT Engineering

Hunslet Engine Company

LH Group

Longwood Elastomers

Microphor

Mors Smitt

MotivePower

MTC

Napier Turbochargers

Perma-Cast

Poli

Pride Bodies

Railroad Controls

Railroad Friction Products

Ricon

SanCast

Schaefer Equipment

Standard Car Truck

Stemmann-Technik

Swiger Coil Systems

Track IQ

TransTech

Triangle Engineered Products

Turbonetics

Unifin

Unitrac

Vapor Bus International

Vapor Europe

Vapor Stone Rail Systems

WABCO Freight Car Products

WABCO Locomotive Products

Wabtec Australia

Wabtec Brazil

Wabtec China

Wabtec Control Systems

Wabtec de Mexico

Wabtec Europe

Wabtec Foundry

Wabtec Global Services

Wabtec Huaxia Technology

Wabtec India Transportation

Wabtec MZT

Wabtec Passenger Transit

Wabtec Poland

Wabtec Rail UK

Wabtec Rail Scotland

Wabtec Railway Electronics

Wabtec Rubber Products

Wabtec Russia

Wabtec Shenyang CNR

Wabtec South Africa

Wabtec Texmaco Rail

Xorail

Young Touchstone

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