LEM

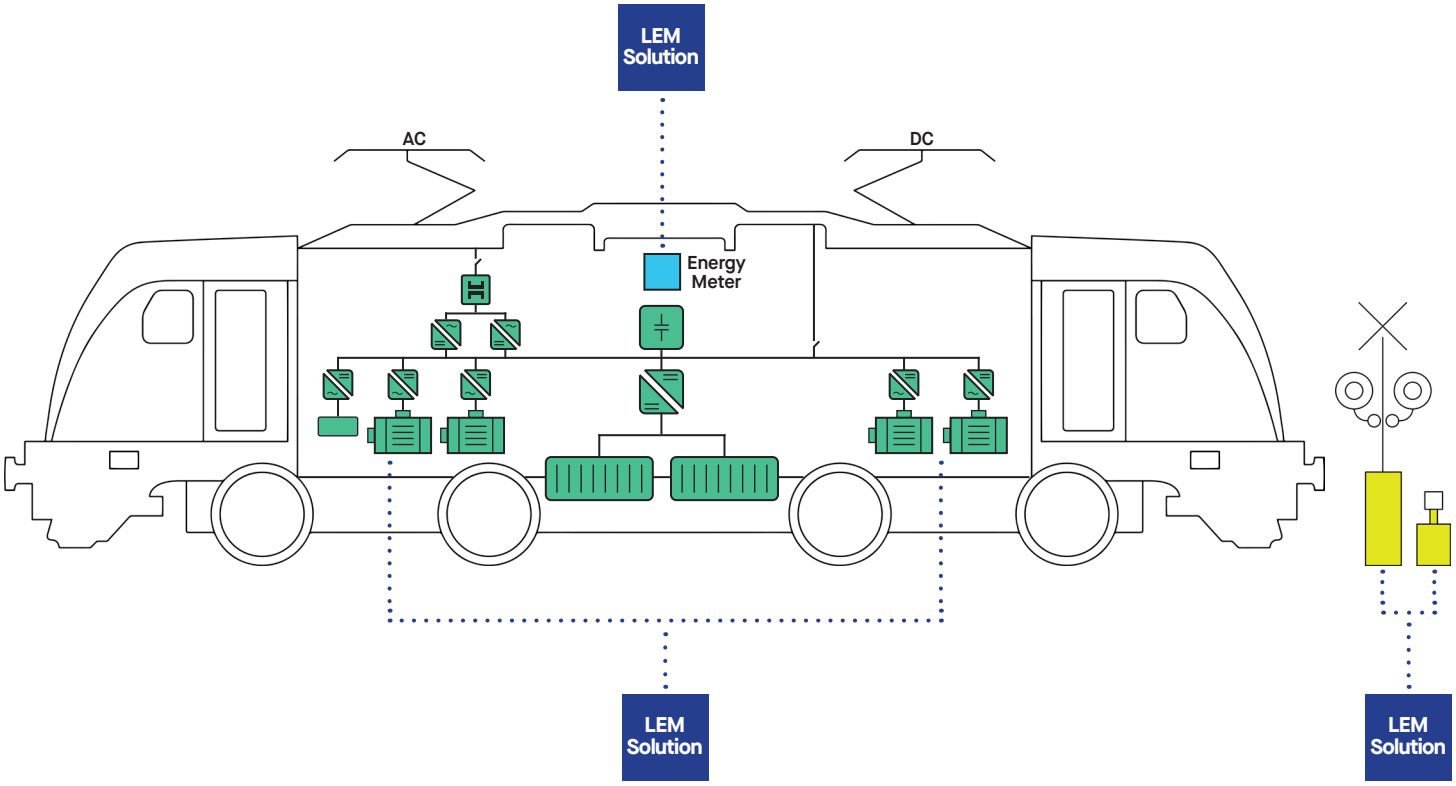
Life Energy Motion

RAILWAY SOLUTIONS

Electrical Measurment Solutions for Railway Applications

Railway Solutions

Modes of public transport such as high-speed trains, city transit systems and freight trains provide an ideal solution to the increased demand for mobility while helping to fight pollution and traffic congestion. LEM's railway solutions offer a diverse set of sensors and energy meters that are utilized across various aspects of railway operations to monitor and control the performance, safety, and efficiency of trains and infrastructure.



On-Board Current & Voltage:

On-board voltage and current sensors are critical components utilized to monitor and provide real-time data on a train's electrical and auxilliary systems. Continuous monitoring of these systems aids in early detection and response time to abnormal conditions, preventing potential electrical failures. This allows for timely maintenance and reduces the likelihood of unexpected breakdowns, ensuring consistent, safe and reliable train operation. Additonally, these sensors help optimize power usage, reducing energy consumption, and improving overall operational efficiency.

On-Board Metering:

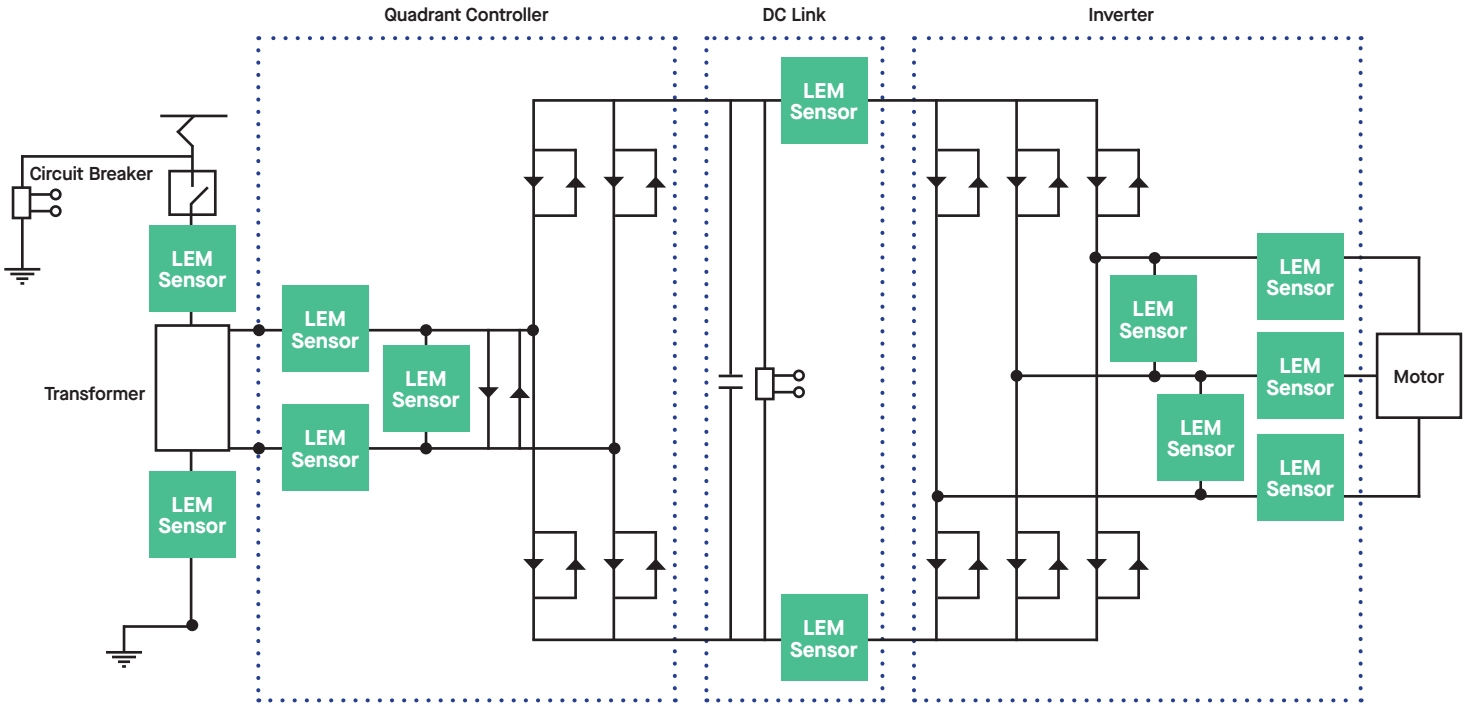
Energy meters measure the electrical energy consumed by the train's traction system and other electrical components. They provide detailed data on energy usage, which is essential for energy management, billing, and optimizing operational efficiency.

Trackside:

Trackside sensors are essential components of modern railway infrastructure, enabling efficient and safe train operations, proactive maintenance, and timely interventions to address issues and prevent disruptions. They form an integral part of signaling systems, train control systems, and asset management systems, contributing to the overall reliability and performance of railway networks.

On-Board Current & Voltage

In railway applications, current and voltage sensors are essential. They regulate torque and motor speed in inverters, stabilize DC bus voltage in rectifiers, and manage braking resistor currents in choppers. LEM offers dedicated on-board current and voltage sensors ensuring safe and efficient operation.



	CD	CV	DHR	DV	DVC	DVL	DVM	EM4TII+
Application	On-Board Current	On-Board Voltage	On-Board Current	On-Board Metering	On-Board Voltage	On-Board Voltage	On-Board Voltage	On-Board Metering
Bandwidth	11kHz	6kHz - 700kHz	20Hz - 6000Hz	12kHz	20kHz - 30kHz	14kHz	8kHz - 12.8kHz	-
Consumption	60mA - 90mA	32mA - 35mA	30mA	25mA	17mA - 20mA	25mA	30mA - 40mA	-
Current Range Max	1A - 3000A	130V - 6000V	600A - 1800A	1200V - 4200V	1000V - 1500V	75V - 3000V	900V - 6000V	-
Supply Voltage	15V - 48V	15V - 24V	20V - 50V	13.5V - 26.4V	5V - 24 V	15V - 24V	12V - 24V	72V, 96 V, 110V
Mounting	Panel	Panel	Panel	Panel	DIN Rail, Panel	Panel	Panel	DIN Rail/ Skrew Mounting
Output	Voltage	Voltage	Voltage	Voltage	Current	Current	Current	RS 232, RS 485
Overall Accuracy	3% - 15%	0.2% - 1%	1%	0.3% - 1.2%	1.7%	0.5%	0.5%	0.5%
Technology	Closed Loop Fluxgate	Closed Loop Fluxgate	Open Loop Hall Effect	Insulation Digital	Isolation Amplifier	Insulation Digital	Insulation Digital	Energy Meter

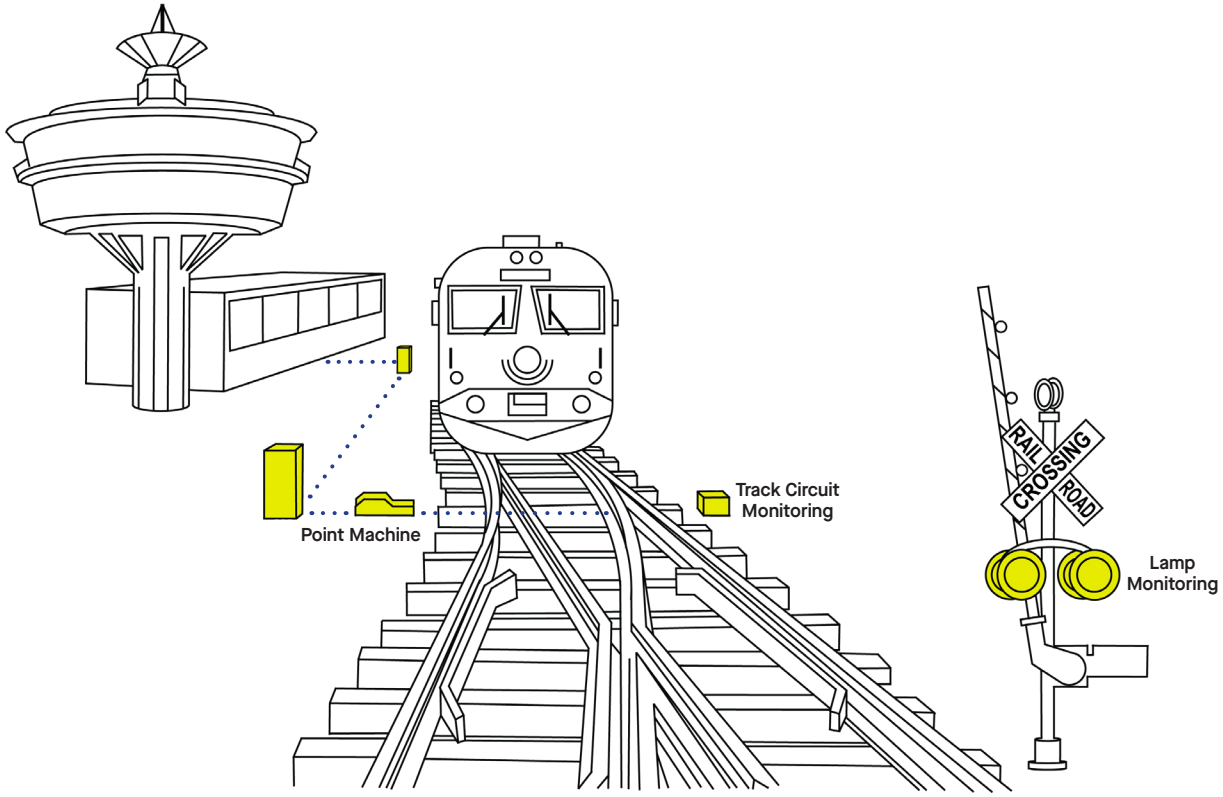
On-Board Metering

Energy metering in railway applications ensures precise monitoring and billing of energy consumption, enabling accurate energy management and cost allocation across different locations and countries. LEM's solutions for on-board energy metering offer highly accurate measurement while ensuring compliance with regulatory requirements.

 HAR	 HTA	 HTC	 HTRS	 IN 1000	 ITC 2000	 ITC 4000	 LAC	 LESR	 LF 210/310/510
On-Board Current	On-Board Current	On-Board Current	Trackside	On-Board Current	On-Board Metering	On-Board Metering	On-Board Current	Trackside	On-Board Current
10kHz	50kHz	10kHz	30kHz	230kHz - 440kHz	27kHz	82kHz	50kHz	300kHz	100kHz - 200kHz
20mA	25mA	20mA	50mA	1500A	70mA	70mA	25mA	20mA	33mA - 49mA
2500A	300A - 1000A	1100A - 3300A	20A	1500A	3000A	6000A	650A - 1000A	20A - 150A	200A 1920A
15V	15V	15V	26V	15V	24V	24V	15V	5V	12V - 24V
Panel	Panel	Panel	Panel	Panel	Panel	Panel	Panel	PCB	Panel
Voltage	Voltage	Voltage	Current	Current	Current	Current	Current	Voltage	Current
0.5%	1%	1%	2% - 5%	0.0018%	0.05%	0.05%	1%	0.7%-0.5%	0.2% - 0.6%
Open Loop Hall Effect	Open Loop Hall Effect	Open Loop Hall Effect	Open Loop Hall Effect	Closed Loop Fluxgate	Closed Loop Fluxgate	Closed Loop Fluxgate	Closed Loop Hall Effect	Closed Loop Hall Effect	Closed Loop Hall Efect

Trackside

In trackside applications, current sensors are essential for monitoring and maintaining equipment, and are found in systems like audio frequency track circuits with continuously welded tracks and lamp monitoring. Both point machines and crossing gates use similar DC or AC motors. LEM's trackside sensors are designed to monitor motor behavior anticipating failures, reducing downtime and optimizing lifecycle costs.



LF 2010

LT 4000

LTC

LV 25

OLCI FL

OLCI FRS

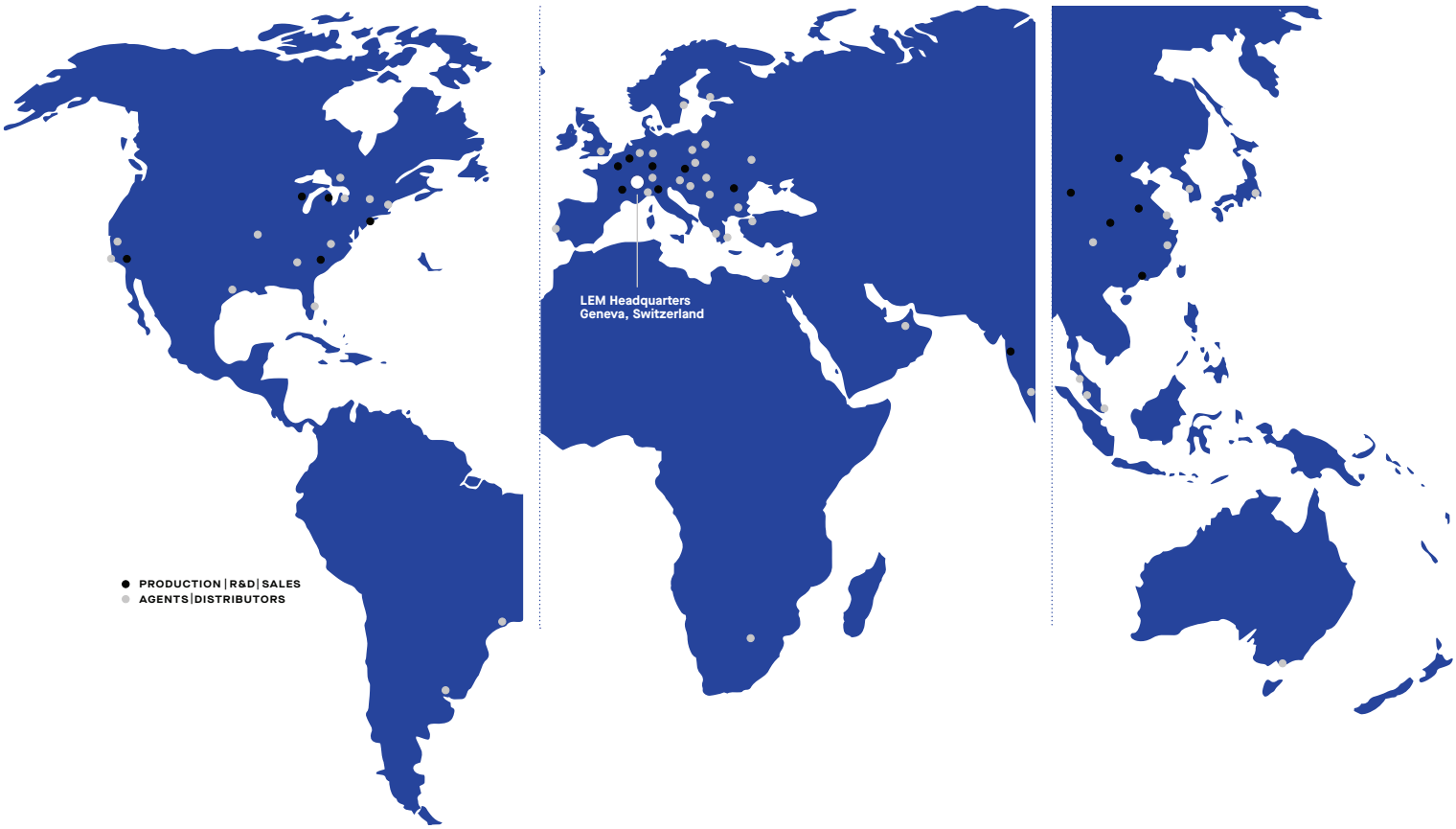
PCM

RA

TEMA4G

On-Board Current	On-Board Current	On-Board Current	On-Board Voltage	Trackside	Trackside	Trackside	On-Board Current	On-Board Metering
200kHz	100kHz	100kHz	-	100kHz	1000kHz	1kHz	20Hz - 3000Hz	16.7Hz, 50Hz, 60Hz, DC
49mA	35mA	32mA - 34mA	10mA	140mA - 280mA	80mA - 140mA	50mA - 65mA	-	-
2700A - 3400A	5000A - 6000A	400A - 3000A	0.014A	42kA	9000A	25A - 30A	1000A - 3000A	-
15V - 24V	24V	15V - 24V	12V - 15V	12V - 24V	12V - 24 V	24V	Self Powered	72V, 96 V, 110V
Panel	Panel	Panel	PCB	On Primary Fasenting	On Primary Fasenting	Panel	Panel	DIN Rail/ Skrew Mounting
Current	Current	Current	Current	Voltage	Voltage	Current	Voltage	2G/4G Ethernet
0.3%	0.3% - 0.5%	0.5% - 0.8%	0.9%	0.5%	0.5%	1% - 2%	3%	0.5%
Closed Loop Hall Effect	Closed Loop Hall Effect	Closed Loop Hall Effect	Closed Loop Hall Effect	Open Loop	Open Loop	Closed Loop Hall Effect	Rogowski	Energy Meter

Global Support Network



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