

Axle Temperature Monitoring System

The Axle Temperature Monitoring System is an advanced diagnostic and control solution designed to acquire and analyze critical rolling stock condition data—specifically temperature and optional vibration—in real time. Engineered for robust performance in harsh railway environments, it processes large volumes of sensor data with ultra-low latency, ultimately maximizing train safety and maintenance efficiency.



Edge Computing-Based Data Processing

Leveraging powerful computing and communication links, it enables the seamless acquisition and precise analysis of vast real-time temperature and optional vibration data generated by distributed sensor nodes with near-zero latency.



Optimized Reliability for Railway Environments

Engineered to ensure stable data acquisition even in environments with high electromagnetic interference (EMI). High ingress protection and wide operating temperature ranges prevent system malfunctions, delivering the specialized durability required for demanding railway operations.



Universal Compatibility Across Rolling Stock

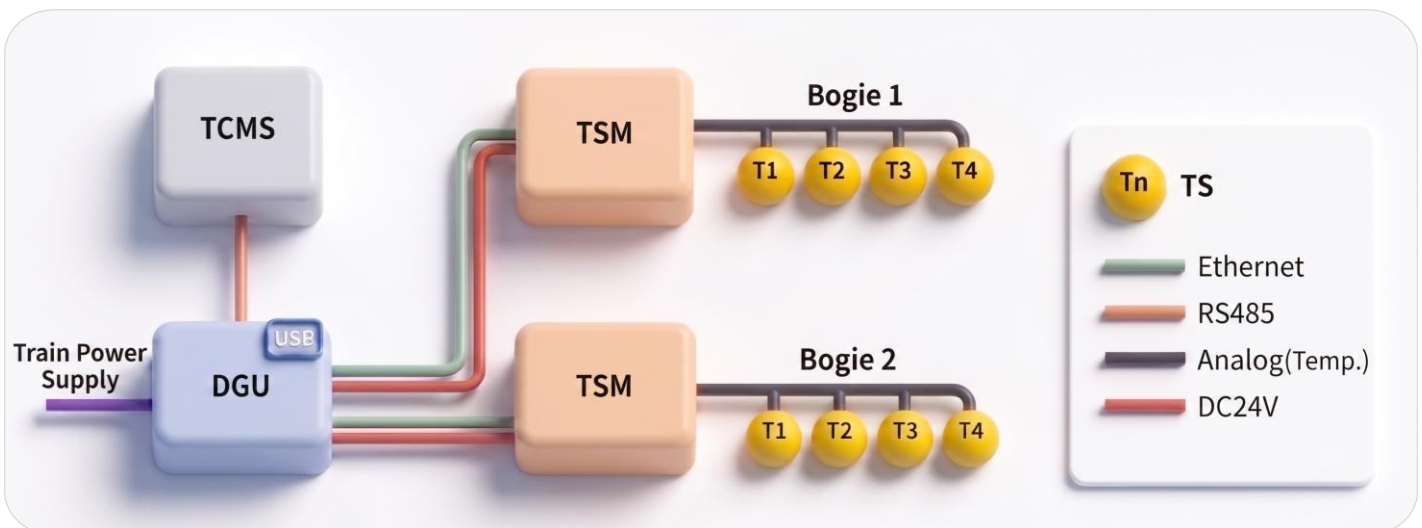
Seamlessly integrates with diverse vehicle architectures, ensuring reliable performance across various platforms—from traditional locomotive-hauled trains to modern Multiple Unit (MU) configurations.



Space-Efficient Modular Design & Scalability

Features a compact, rack-mounted design optimized for constrained onboard environments, maximizing spatial efficiency while streamlining maintenance. It also supports diverse railway communication protocols for flexible field integration.

System Architecture



* DGU : Data Gathering Unit

* TSM : Temperature Sensing Unit

* TS : Temperature Sensor

DGU (Data Gathering Unit)

Processor	32bit ARM Cortex A9 (800MHz) + Cortex M4	
Memory	DDR3L SDRAM 8GB (4GB x 2) eMMC 64GB (Data Storage)	
OS	Embedded Linux	
Interfaces	Ethernet : 2 ports USB 3.0 A-Type : 1 port	RS485 : 2 ports RS232 : 1 port
Operating Temp.	-40°C ~ +70°C (Class TX)	
Input Power	DC 50V~125V	
Output Voltage	DC24V (2 Channels)	
Dimensions	154.5 x 206 x 265.9 (mm)	
Weight	Under 3.5 kg	



TSM (Temperature Sensing Module)

Processor	32bit ARM Cortex M7	
Platform	Rust & Embassy	
Interfaces	Ethernet : 1 port	Temp. Sensor : 8 Channels
Operating Temp.	-40°C ~ +70°C (Class TX)	
Input Power	DC 24V	
Dimensions	260 x 142 x 92 (mm)	
Weight	Under 3 kg	



TS (Temperature Sensor)

Sensor Element	PT1000, 2-Wires
Measurement Range	-40 ~ +120°C
Accuracy Class	Class A
IP Degree	IP67
Mounting Size	M14 Threaded Mounting
Dimensions	Sensor Body : Φ20 x 50 (mm)
Weight	145g (Excluding cable)



Options



Vibration (1-Axis)

- Vibration Sensor : Piezoelectric Ceramic / Accel : ±150g / Freq : 1~10 kHz / Sens : 33.3 mV/g
- Vibration AP Board : 64bit Quad ARM Cortex A53 / 32-bit LPDDR4 / Embedded Linux

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