
WEIGH IN MOTION: MAKING ROAD SAFETY AND INFRASTRUCTURE PROTECTION MEASURABLE





Making vehicle loads visible to improve safety and protect infrastructure

Road infrastructure is under growing pressure. **Traffic volumes are increasing**, vehicles are becoming heavier, and many road assets are ageing while financial resources remain limited. At the same time, road authorities are expected to **improve safety, prevent infrastructure failure, and optimize maintenance budgets**. One critical factor plays a decisive role in all of these challenges: **vehicle weight**.

Weigh In Motion (WIM) makes vehicle loads visible by measuring axle loads and gross vehicle weights directly in traffic continuously, accurately, and without disrupting traffic flow.

THE KEY CHALLENGES FACING ROAD NETWORKS TODAY



Increasing traffic volumes and heavier vehicle loads

Freight traffic continues to grow, with higher axle loads and heavier vehicles placing increasing stress on roads and bridges.



Road safety under pressure

Reducing accidents and fatalities remains a top priority. **Speeding and vehicle overloading** are among the major contributors to severe crashes, significantly increasing stopping distances and accident severity.



Accelerated infrastructure damage

Overloaded vehicles cause **disproportionate damage** to pavements and bridges, leading to:

- Faster pavement deterioration
- Increased bridge fatigue
- Higher risk of structural failure



Ageing infrastructure assets

Many bridges and road structures are **approaching or exceeding their design life**, making them more vulnerable to excessive loads and daily heavy traffic.



Limited maintenance budgets

Funding for maintenance and repairs is often insufficient to keep pace with growing traffic demand and ageing infrastructure forcing authorities to do more with less.

How WIM solutions from Kistler address these challenges

- OIML certified WIM for automatic enforcement
- High speed, non intrusive 24/7 monitoring
- Enhanced road safety through overload and tire condition detection
- Infrastructure protection and lifespan planning
- Integration with Structural Health Monitoring for advanced bridge protection

Kistler: the WIM market leader

Kistler is the global market leader in WIM technology, delivering precise and reliable solutions trusted worldwide. With decades of expertise, we set new standards for real-time, accurate vehicle weight data and drive efficiency and innovation across industries.



Lines of sensors sold worldwide

100.000+



Countries where Kistler's Traffic Solutions are present

50+



Years of innovation with unique quartz technology

30+

Complete and integrated WIM solutions from Kistler

In addition to individual components, Kistler offers complete and fully integrated WIM systems. Covering the entire measuring chain from sensors and electronics to powerful software. Customized solutions from Kistler ensure that each installation precisely meets the requirements of its specific application. This integrated approach ensures reliable performance under demanding traffic and environmental conditions while enabling simple operation and seamless access to measurement data.

Full range of services
 Installation training and certification
 Calibration
 Warranty extension



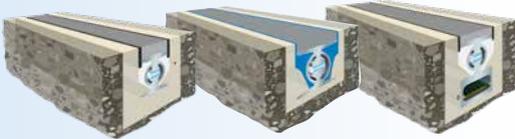
Interfaces for data access
 Access via machine readable interfaces
 Web-based GUI



Data acquisition systems
 WIM Data Logger
 Industrial grade electronics with Kistler Software



High precision sensors
 Lineas Compact
 Lineas
 Lineas Digital



EXCEPTIONAL RELIABILITY



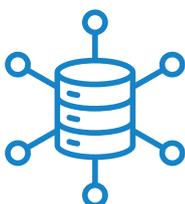
KiTrafic solutions combine unique Lineas quartz WIM sensors with proprietary electronics and software for the most accurate and reliable vehicle detection.

UNMATCHED ACCURACY



Advanced software specifically developed for Lineas WIM sensors ensures the highest accuracy, from low to high speeds, meeting strict OIML accuracy standards.

SEAMLESS INTEGRATION



Open data protocols for seamless transfer of vehicle data ensure effortless integration into higher-level systems.

USER-FRIENDLY SETUP



A modern web-based interface allows for easy commissioning and calibration of all WIM systems and sites.

Tailored WIM systems in the KiTraffic series

Choose from a variety of KiTraffic packages, each designed to meet the specific requirements of different WIM applications ranging from traffic data collection to direct enforcement. KiTraffic WIM systems come with piezoelectric quartz technology in the form of our Lineas sensors and electronics.



	KiTraffic Compact	KiTraffic Basic	KiTraffic Digital
Description	Cost-efficient WIM for diverse applications	Reliable WIM for diverse applications	High-end WIM for direct enforcement
Applications	<ul style="list-style-type: none"> Traffic data collection Pre-selection for weight enforcement Bridge protection 	<ul style="list-style-type: none"> Traffic data collection Pre-selection for weight enforcement Bridge protection 	<ul style="list-style-type: none"> Same as KiTraffic Basic + Direct weight enforcement + Automated tire screening + Free flow tolling with interlane measurements
Delivery scope	Lineas Compact 9196A sensors + WIM DataLogger	Lineas 9195G sensors + WIM DataLogger	Lineas Digital 9181A sensors + industrial grade electronics with Kistler software
Technology	Analogue	Analogue	Digital
Accuracy of GVW confidence interval 95% (2σ)	±5 ... ±7 %	±5 %	±2 %
Certifications	-	OIML R134 F10 certification	OIML R134 F5 certification
Automated tire screening (Flat tire detection)	-	With additional tilted sensors	
Tire type detection	With additional tilted sensors	With additional tilted sensors	
Interlane measurements	-	-	
Connectivity per system (amount of sensors)	Up to 8	Up to 8	Up to 21

Unique quartz technology – the solution of choice for WIM systems

Force measurement mainly relies on two technologies: quartz piezoelectric sensors and strain gauges. In dynamic applications, quartz technology from Kistler delivers clear advantages. In WIM systems, vehicles traveling at highway speeds create extremely short, high-impact loads that must be captured with absolute precision. Kistler quartz sensors respond instantly and remain stable over millions of load cycles, performance that strain gauges cannot match.

Manufactured to highest standards

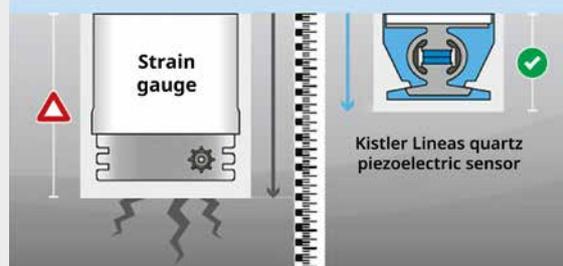
Kistler WIM sensors are **manufactured to the highest quality standards** at our own ISO certified production facilities in Switzerland, combining advanced manufacturing processes with the expertise of skilled specialists.



Shallow road installation depth

Kistler WIM sensors require minimal installation depth, reducing pavement intrusion and preserving the structural integrity of the road.

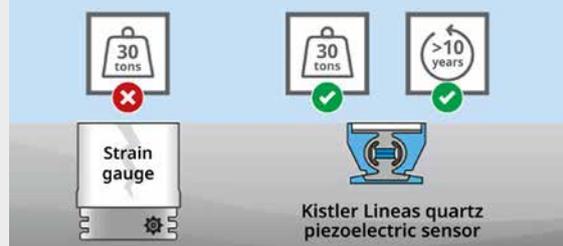
Sensor height is almost halved – for easier installation and less road damage.



High robustness and long-term reliability

Designed for extreme traffic and environmental conditions, Kistler WIM sensors deliver exceptional robustness and long term stability, even under continuous heavy loads.

Quartz PE sensors can withstand loads of 30 tons and their life expectancy is at least 10 years.



Wide measuring range

Kistler WIM sensors offer a **very wide measuring range**, accurately capturing both light vehicles and extremely high axle loads within the same system.

Consistent sensitivity across a wide measuring range for equally accurate measurements of all vehicle types





Quartz at the core

Lineas WIM sensors from Kistler are renowned for their consistently high performance over time under all possible traffic and weather conditions. They have proven their durability in different pavements on all continents: under harsh and extreme winter conditions in northern Europe and North America, in the hot desert environments of the Middle East, and even when exposed to high humidity levels in China and Southeast Asia. Thanks to their wide measuring range, Lineas WIM sensors can measure both light and heavy vehicles with the same high levels of accuracy. The secret of their outstanding performance: Kistler quartz crystal technology combined with advanced sensor design and high-quality manufacturing processes.

Quartz crystals are at the heart of every Lineas sensor. Up to 50 disk-shaped crystals, the same size as a contact lens, are installed in one sensor. The basic structure consists of an extruded aluminum profile. The dimensions and condition of the profile are checked with the utmost precision. Tolerances are extremely tight because the sensor will operate for a long period. Once the quartz crystals are installed, final assembly of the sensor can take place. This includes installing the cables and sealing the sensor to make it airtight and waterproof. As the last step, the aluminum profile is enclosed in a foam casing that dampens lateral forces. In-depth final inspection of the sensor includes a tightness check and various function tests. Uniform sensitivity throughout the sensor's entire length is verified on the calibration system.



High-precision tools check the quality of each sensor before it leaves our factory.

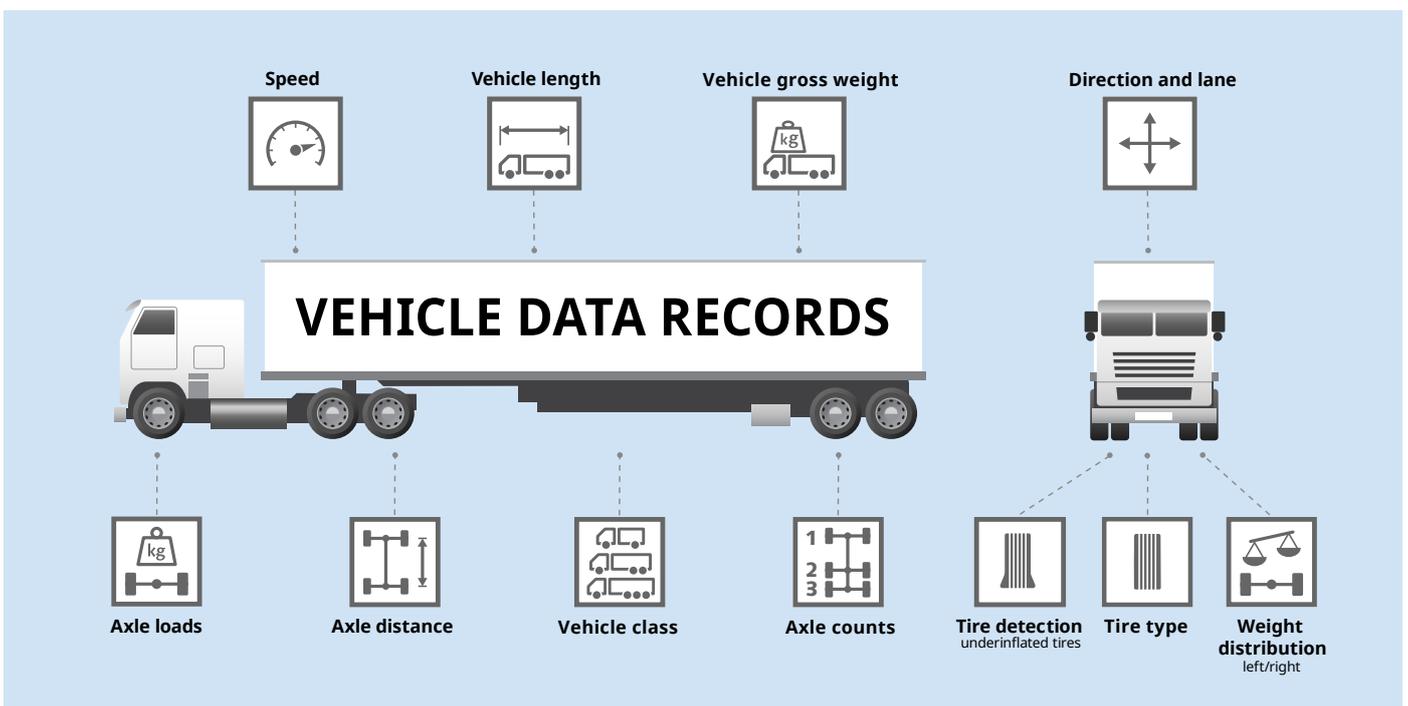
One system – multiple applications

WIM systems from Kistler can measure much more than just weight. They collect critical information from vehicles traveling at widely varying speeds. Thanks to highly accurate measurement data, customers can monitor traffic in real

time and collect vehicle data (such as number of axles, weight per axle or axle distance) as well as information on tire issues. With these capabilities, WIM systems from Kistler cover a diverse spectrum of applications:



- **TRAFFIC DATA COLLECTION**
to enable pavement design, load rate factor or bridge fatigue calculations
- **BRIDGE PROTECTION**
to extend bridge lifetimes and reduce risk
- **DIRECT WEIGHT ENFORCEMENT**
to enable automatic detection and penalization of overloaded vehicles
- **AUTOMATED TIRE SCREENING**
to detect flat tires and tire mismatches
- **PRE-SELECTION FOR WEIGHT ENFORCEMENT**
to enhance efficiency in weight controls
- **INDUSTRIAL TRUCK WEIGHING**
to streamline processes such as invoicing goods or checking axle loads at ports, mines, and concrete plants
- **TOLL COLLECTION**
to count axles, classify and weigh vehicles even in free flow traffic



Worldwide support and effortless installation

With our global sales and service network, we provide tailored support to maximize the performance of every WIM site. This includes expert assistance with site selection, installation, and calibration, as well as comprehensive training and optional warranty extensions to enhance the user experience and extend system lifespan.

Fast, non-invasive installation

Lineas sensors are designed for fast installation, typically completed within a single day, and deliver reliable measurements for many years. They can be installed in all pavement types, including concrete and asphalt, with minimal traffic disruption and limited road closures. Installation is cost-effective, requires no heavy machinery, and causes minimal road impact since only a narrow slot in the pavement is needed.



INSTALLATION IN SIX EASY STEPS

The first step in installing Kistler Lineas quartz sensors is to mark the layout on the road. This helps the installers to cut the slots and break out the pavement. Before the sensors are installed in the road, they must be prepared and checked for correct operation. Two sensors are mounted together in a row, and then the leveling beams are fitted.

The next step is to mix the grouting compound and pour it into the slot. After this, the sensors are inserted into the slot and ground until they are level with the pavement. Finally, the cables are connected to the WIM Data Logger – and then the sensors are ready for calibration.



1. Mark



2. Break open



3. Prepare



4. Fill the slot



5. Insert the sensor



6. Grind



California (US)

Data collection and research

Caltrans upgraded its traffic monitoring by replacing unreliable legacy sensors with a robust WIM solution from Kistler that delivers real-time traffic and vehicle weight data. The result is higher accuracy, lower maintenance, and better insights for smarter infrastructure planning.



Brooklyn Queens Expressway (US)

Weight enforcement

NYCDOT uses WIM and structural health monitoring technology to automatically detect overweight trucks and protect aging bridge infrastructure. By enabling direct weight enforcement and early identification of structural stress, the system helps prevent damage, closures, and potential collapses.



El Carrizo Bridge (Mexico)

Bridge protection

Two Kistler WIM checkpoints were installed on the El Carrizo Bridge to improve safety by accurately measuring axle and vehicle weights, ensuring compliance with weight limits and protecting the bridge.

WIM solutions from Kistler around the globe

Lineas WIM sensors from Kistler operate reliably all over the world under a variety of conditions and in many diverse environments.



Ohio (US)

Data collection and research

Ohio is expanding traffic data collection to secure key federal funding, and tests show Kistler Lineas WIM sensors delivering excellent performance.



Washington Bridge, Rhode Island (US)

Bridge protection

WIM sensors help to monitor traffic loads and protect the structural health of the Washington Bridge. The system measures real time vehicle weights to detect overloads and support proactive bridge maintenance.



Brazilian Highway (Brazil)

Weight enforcement

WIM systems enable multi lane free flow tolling and weight enforcement, reducing congestion and ensuring safer, more compliant heavy vehicle traffic across Brazil's extensive road network.



89 stations across (Hungary)

Weight enforcement

The main benefit is fast, fully automated enforcement of weight limits at highway speeds, improving road safety and control efficiency without stopping traffic.



Akıncılar Highway (Turkey)

Weight enforcement

The General Directorate of Highways of Turkey (KGM) decided to protect Turkey's highway infrastructure and improve safety on national roads thanks to the WIM system from Kistler.



Austrian Federal Railways bridge (Austria)

Bridge protection

Kistler's WIM system helps protect an ÖBB bridge by accurately measuring real traffic loads, identifying overloads, and enabling actions to prevent structural damage and improve maintenance.



A7 Highway (Switzerland)

Weight enforcement

Traffic and Lake Police Thurgau use the WIM system to efficiently carry out commercial vehicle overload inspections.



Erfstadt, A1 Highway (Germany)

Data collection and research

In 2023, 10 Lineas Digital sensors were installed on Germany's A1 highway to deliver comprehensive data for RWTH Aachen's research project "Digital Twin Road".



A6 Highway (Luxembourg)

Weight enforcement

The WIM system strengthens Luxembourg's enforcement network, improving road safety and reducing infrastructure wear by identifying overloaded vehicles.



Cebu-Cordova Link Expressway (Philippines)

Bridge protection

Philippine authorities equipped the CCLEX bridge with full Kistler WIM systems on all lanes to monitor vehicle loads, block overloaded vehicles, and enhance overall bridge safety.

**Would you like to learn
more about our applications?**

Explore now:



www.kistler.com/wim

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