



WEIGH-IN-MOTION

PROTECTING ROADS.
POWERING INTELLIGENT
TRANSPORT.



SYSTEMS FOR DETECTING OVERLOADED VEHICLES

WEIGH-IN-MOTION



SIZE MEASUREMENT SENSOR

LPR SYSTEM

90
3082
ADR
RECOGNITION
SYSTEM

← DIRECT ENFORCEMENT ← STATISTICS

VMS

PRESELECTION
FOR ON-SITE
SOLUTION
OF OFFENCES

COMPATIBLE
WITH VARIOUS
TYPES OF
SENSORS

OVERVIEW
CAMERA

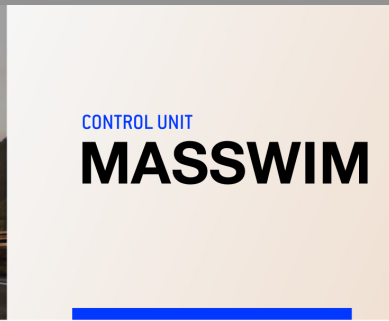
CONTROL UNIT
MASSWIM

- ESAL CALCULATION
- UNDERINFLATED TYRE DETECTION

■ normal ■ overinflated ■ underinflated



PROTECTION OF ROADS,
FAIR TOLL SYSTEMS



LENGTHENING THE LIFESPAN OF ROADS WEIGH-IN-MOTION



LONGER LIFESPANS OF ROADS

Overloaded lorries cause ruts, potholes, damaged edges and costly repairs, easily avoided by diverting them off motorways. **MASSWIM** systems protect roads, extend their lifetimes and cut costs.



IMPROVED DRIVING SAFETY

Modern cars are safer, faster and more technologically advanced than ever before. Our technologies enable fast-running, well-maintained roads and optimal vehicle performance.

Imagine a world with fast-moving traffic on smooth motorways. No restrictions, no gridlock, no diversions. No endless repairs creating hold-ups. Safe roads with fair tolls.



CHARGING FAIR TOLLS

The amount charged to use a road should relate to the distance travelled and load carried by a vehicle. The toll fee ought to reflect that a fully laden lorry wears the surface more than an empty one.



EASIER OPERATION AND PLANNING OF MAINTENANCE

It pays to have accurate data on all aspects of traffic, making it possible to divert oversized vehicles, free up city streets and schedule roadworks and construction.

CONTROL UNIT MASSWIM

MASSWIM is a cutting edge, high-speed and low-speed, weigh-in-motion system that meets the most demanding criteria for traffic detection and dynamic weighing. **MASSWIM** is used to gather traffic statistics and facilitates pre-selection, tolling, and direct enforcement.

It was developed with an emphasis on accuracy, reliability and simplicity. It is suitable for basic, single-lane installations through to extensive, multi-lane environments with heavy traffic.

- Vehicle data (gross vehicle weight, axle load, wheel load, vehicle type/class, vehicle speed, gapped distances, vehicle dimensions)
- Measures the dimensions of vehicles (height, width, length)
- Detects multi-tyre vehicles
- Measures the speed of vehicles
- Road temperature measurement
- Highly accurate vehicle classification
- Detection of underinflated tyres
- Watchdog monitoring system
- Web API for integration of third-party data
- SQL database



Compatible
with third-party
components



Modular
system for
every purpose



Compatible
with various
WIM sensors

- Sensitivity from 0 kg in weight
- Traffic volume accuracy of 98%
- Classification accuracy of 95% (the average depends on the vehicle category)
- Communication options of 4G, 5G, LTE, TCP/IP, Wi-Fi
- 2x SSD disk in RAID 1 for data storage and 1x HDD for storing camera images
- Max. cable length to loop: 300 m; WIM sensor: 100 m
- Designed for operations in extreme climatic conditions (standardized switchboard versions: ARCTIC, TROPIC and DESERT)
- For less road interference, WIM can also be installed in a loopless version

VEHICLE CLASSIFICATION

- Standard EN 8 + 1
- EUR 13, COST 323
- Option for expanded adaptation to specific national standards
- Custom categories to reflect specific customer/end-user needs and requirements



- Weighing sensitivity from 500 to 20 000 kg per axle
- Vehicle length measurement accuracy ± 1 m

- Axle distance measurement accuracy ± 0.05 m
- Speed measurement accuracy ± 3 km/h

HIGH-SPEED MASSWIM

- Minimal recommended speed of 10 km/h for HS WIM

LOW-SPEED MASSWIM

- Speed range 1 - 30 km/h
- Speed and length measurements based on laser scanner technology (loopless solution)

A MODULAR SYSTEM

MASSWIM is designed as a modular system and can be configured to deliver the precision required. The potential exists to combine various units and build stations suitable for particular applications, as described below.



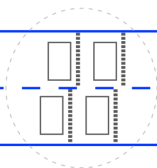
OTHER MASSWIM APPLICATIONS

- Monitoring the movement of lorries and weighing them at logistics centres and similar commercial premises
- Protecting city centres from overloaded vehicles
- Accurate statistical data for licensed users

MASSWIM STATISTICS

Weighing with accuracy of $\pm 20\%$

To measure traffic and to obtain a detailed overview of the traffic flow.



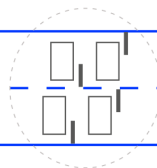
TYPICAL INSTALLATION

- Two induction loops per lane
- Two rows of PIEZO sensors per lane
- Indicative measurement of speed, the number of axes, length of the vehicle, wheelbase and axle load
- Vehicle classification

MASSWIM PRE-SELECTION

Weighing with accuracy of $\pm 7.5\%$

For more accurate traffic measurement, for weighing vehicles and their pre-selection for solving violations.



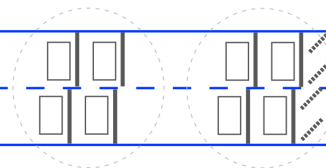
TYPICAL INSTALLATION

- Two induction loops per lane
- One row of QUARTZ or strain gauge sensors per lane
- Measurement of speed, the number of axes, length of the vehicle, wheelbase and axle load
- Vehicle classification

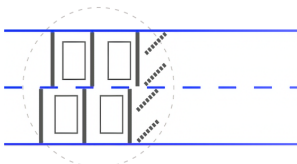
MASSWIM DIRECT ENFORCEMENT

Weighing with accuracy of $\pm 5\%$

For accurate traffic measurement and automatic fines for overloaded vehicles.



Weighing with accuracy of $\pm 3\%$



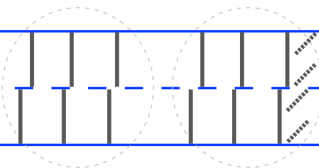
TYPICAL INSTALLATION

- Two induction loops per lane
- Two (or three) rows of QUARTZ or strain gauges
- Measurement of speed, the number of axes, length of the vehicle, wheelbase and axle load
- Optional diagonal sensors for detecting multi-tyres, axle widths, vehicle position relative to lane width
- Enhanced vehicle classification

MASSWIM LOW-SPEED

Weighing with accuracy of $\pm 3\%$

For accurate measurement of vehicles travelling at speed from 1 to 30 km/h. With optional extended functionality of multi-tyre detection.



TYPICAL INSTALLATION

- Three rows of QUARTZ or strain gauges
- Measurement of the number of axes, wheelbase and axle load
- Optional diagonal sensors for detecting multi-tyres, axle widths, vehicle position relative to lane width
- Enhanced vehicle classification



VARIABILITY AND ACCURACY

MASSWIM

MASSWIM is a unique weigh-in-motion system that is independent of the manufacturer and the technology of road weighing sensors. Variability is enhanced by accurate evaluation of temperature-compensated sensor signals, based on installed temperature sensors under the road surface.

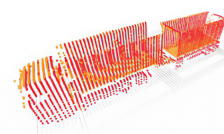
WEB INTERFACE

MASSWIM

Referred to as the Watchdesk, the input module of this online application provides an easily manageable console that displays data on vehicles that have recently passed by, giving a preview of them and indicating any violation. It is possible to view detailed information for each vehicle recorded, such as the number of axes it has and individual wheel load, total weight, dimensions of the vehicle, or tyre inflation level. The system is able to function in various languages, which it automatically sets according to the one running in the browser.



MASSWIM



SOFTWARE

- Real-time visualization of just passed vehicles, including shots from LPR and overview cameras
- Access to a vehicle database, including search and filtering options
- Detailed information of every recorded vehicle (e.g. total weight, wheel load and axle weight, indication of overloading, speed, validity of measurement)
- Traffic statistics (e.g. overloaded vehicles, vehicle classification, country of origin, weight and speed statistics)
- Display of measurement protocol in the case of an offence
- Data export to Microsoft Excel and PDF
- Management of user accounts, database and regional settings
- Web API for data integration
- Calibration, configuration, administrative and maintenance tools

STATISTICS

- Vehicle categories
- Overloaded vehicles
- Weight-related statistics
- Speed statistics
- Time period selection
- Filtering by vehicle category or other parameters



PIEZOELECTRIC sensors



QUARTZ sensors



Strain gauge sensors



Temperature compensation sensors



RoadTrax



Novacos



Kistler



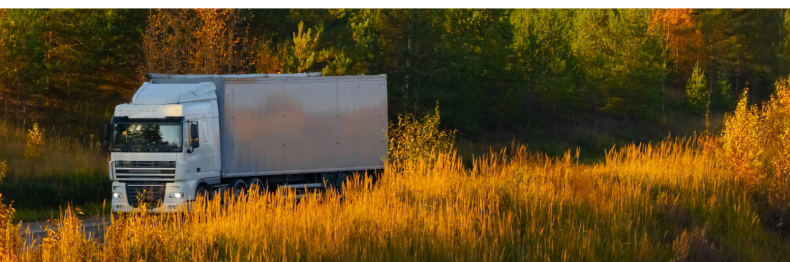
Enviko



Intercomp



Dedicated U-Bed Profile for Intercomp and Enviko Sensor



TYPICAL ACCESSORIES



License Plate Recognition



Vehicle size measurement sensor



Variable Message Signs (VMS)



Overview cameras



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24/7 TECHNICAL SUPPORT

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