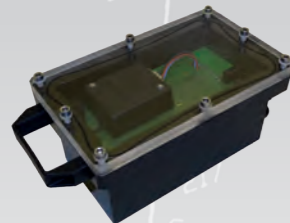




Installation via Martinek special chamber



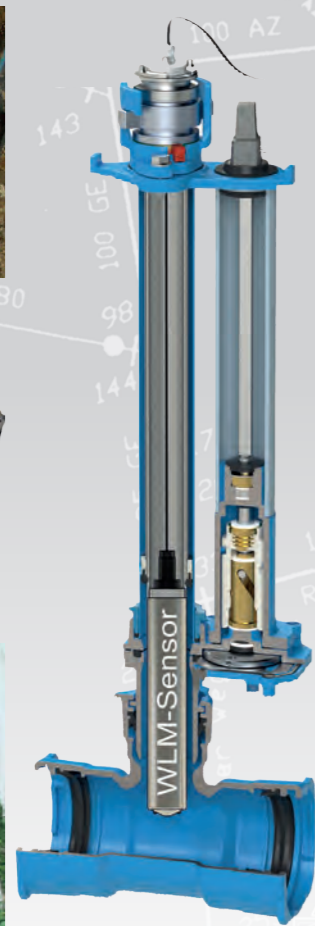
Installation via pipe saddle



Connection box IP68



Installation via underfloor hydrant



# WLM-Sensor

## TECHNICAL SPECIFICATION

### Mechanical Data

Dimension	d = 5/4" length = 340-990 mm
Weight	0,5 kg without cable
Connection cable	up to 40 m (water resistant)
Environmental protection	IP 68
Probe material	stainless steel 1.4401
Probe head	synthetic material PAS-L
Ambient temperature	- 10 °C ..... 40 °C
Storage temperature	- 30 °C ..... 60 °C
Medium temperature	0 °C ..... 60 °C

### Connection data

Power supply	110/220VAC, battery (3 years), solar panel
Pipe material	all pipe materials
Pipe dimension	80-2000 mm

### Flow measuring

Measuring principle	electromagnetic
Flow rate	0,01 m/s to 9,999 m/s (bi-directional)
Resolution	0.001 m/sec
Accuracy	2% FS with turbulent flow
Measuring direction	bi-directional
Medium	minimal conductivity 50 µS

### Pressure measuring

Measuring principle	piezzo-resistive ceramic-technology
Membrane	ceramics
Range	0 .... 16 bar
Burst pressure	up to 30 bar
Accuracy	typ. < 0,25 % FS
Transient recording (water hammer)	up to 100Hz

### Noise measuring

Measuring principle	piezzo electric-polymer sensor
Amplification	5000
Frequency range	8 Hz ..... 3500 Hz
Output	digital

### Water temperature

Range	0 °C..... 60 °C
Measuring position	probe head

### Data logging and output

Interface for probe	RS 232, 4-20 mA
Measuring cycle	1 sec. (from 1 sec. to 1 hour)
Memory cycle	1 min. (from 1 sec. to 1 hour)
Value calculation	actual, min, max, median
Memory size	up to 1 000 000 records (circular buffer)
Data output	4-20 mA, Modbus (RTU/ASCII), OPC UA
Data transmission	Cable, GPRS, Analog, Ethernet, LWL, 4-20mA
Data security	SSL/TLS 1.2

### Agent:

Technical design and data subject to change without notice.

# WLM-SYSTEM

## NETWORK MONITORING AND ACTIVE WATER LOSS MANAGEMENT



**Flow**  
bi-directional



**Pressure**  
Transient recording 100Hz



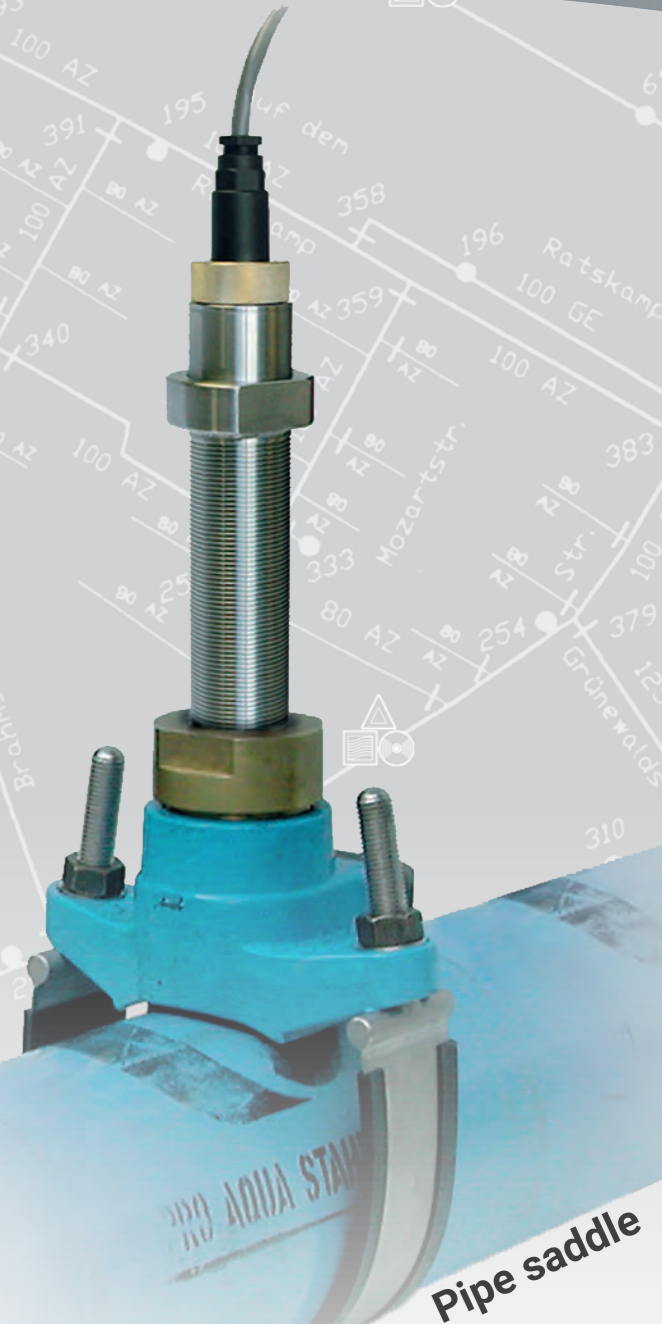
**Noise**  
Flow and leakage noise



**Water temperature**



**AQUALYS & WEB**  
Applied Data Intelligence with AI



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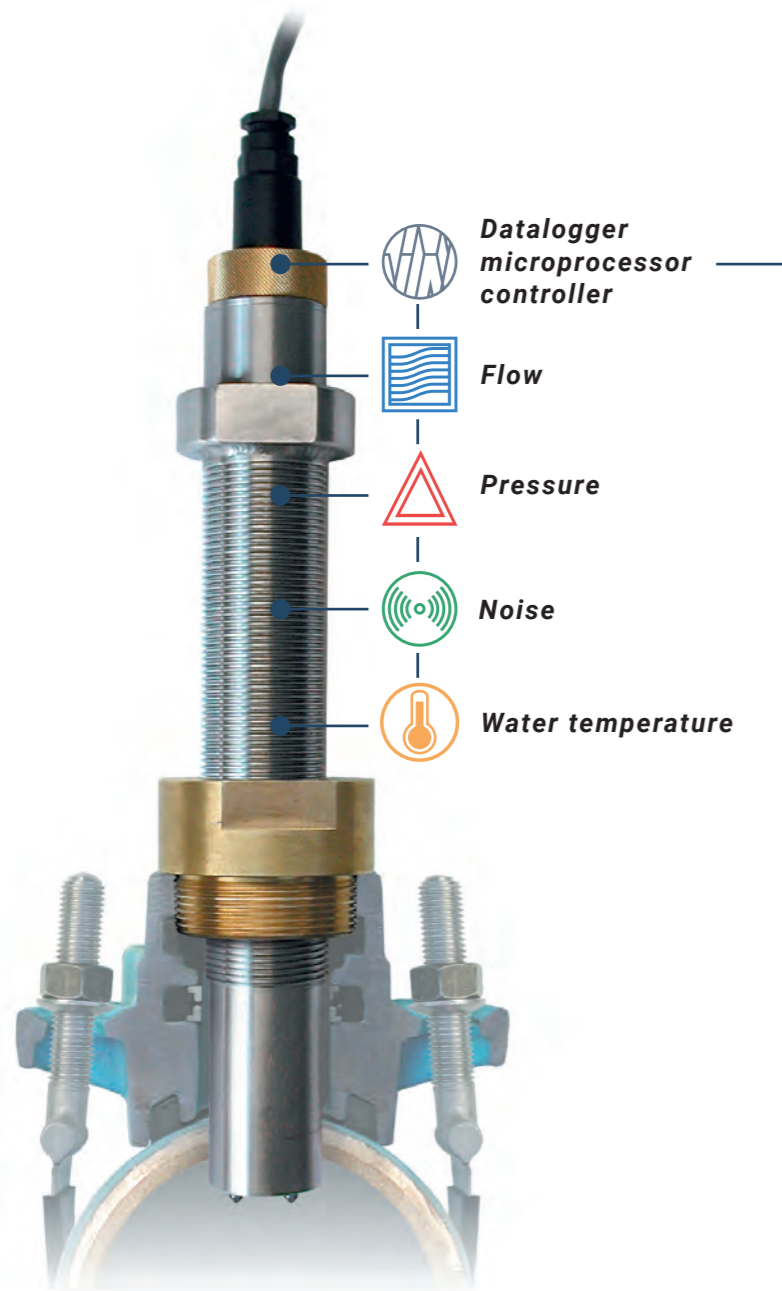
Active leakage control and network monitoring  
Easy water balance module (DMA)  
Inductive flow-metering  
Hot tapping (cost effective installation)  
Transient recording



www.martinek.org

# WLM-Sensor

The WLM-Sensor combines an inductive flow-meter, a piezo noise microphone, piezo pressure sensor and a temperature sensor in one single probe. The WLM-Sensors mounted at the intersection point of the laminar and turbulent flow (mean velocity) to ensure highly accurate flow measurements.



Another important feature of the maintenance free WLM-sensor is the integrated electronic. The electronic package includes all control elements for the sensor and datalogger. A CPU calculates the significant values for each parameter measured and manages the communication to the main server respectively the **AQUALYS**-Software.

# Description WLM-SYSTEM

## APPLICATION

The main objective of the WLM-SYSTEM is network monitoring with automatic leak zone generation (Virtual Zone), which enables sustainable reduction of water loss and active support for strategic leak detection. Additionally, the system allows the development of network diagnostics for strategic planning.

The parameters, FLOW, NOISE, PRESSURE and TEMPERATURE are continuously measured. Typically, the measurement is performed 24h as day. Measurements are obtained, processed, and stored online or for the later transmission (with encryption) to a local server (or online platform). The WLM-SYSTEM automatically analysis the data statistically and figures out significant minimum (flow, noise) and maximum (pressure) values.

Every pattern deviation found between the measured and previously stored values (for example increased flow, flow direction changes, decreased pressure and/or raise of noise) is automatically registered and displayed with an alarm raised by the **AQUALYS**-Software with the help of AI algorithms.

Assuming that all registered leakages are properly repaired a permanent improvement in the water loss situation is achieved as the new automatically set (lower) boundary pattern will immediately enable the system to give alarm if new leaks appear.

Extensive „curve & data“ analysis will be carried out by the system and enables the user to concentrate on spots where problems are expected.

## FUNCTION OF THE SYSTEM

The under full pressure installed WLM-Sensor measures and records permanently data. Significant data will be calculated with the help of AI and displayed (red-green).

## MAIN FEATURES

- **Battery operation**
- Installation to any pipe dimension/ material
- Active leakage survey (ALC)
- Hot tapping under full pressure
- Long term maintenance free
- Helps to keep minimum leakage level (NRW)
- **Pressure transient recorder (100Hz)**
- Diagnosis of network condition
- Immediate burst warning (SMS)
- Easy connection to any SCADA via CSV, SQL or OPC UA
- Super low startup flow (10mm/s)
- Easy self-installation
- Water temperature measurement
- Highly cost effective "Sensor" - chamber installation (no concrete chamber necessary) (WLM-chamber or Hydrant)
- Theft and flooding alarm
- **Water balance module (totalizer)**
- **Online leakage warning**

## POWER SUPPLY

- *Main supply (110/220 VAC)*
- *Battery operation (3 years)*
- *Solar powered*

## TRANSMISSION

- *GPRS (4G NB-IoT)*
- *TLS encrypted (RED conform)*
- *Modbus (RTU/ASCII)*
- *4-20mA (isolated)*
- *Ethernet / LWL*
- *TLS/SSL encrypted*

The location and time of measuring can be chosen between the alternatives mentioned above.

The transmission is dependent on the location, the mode and frequency of queries. (i.e. online, 30 min to 24 h).

# AQUALYS & WEB

The Software for the WLM-SYSTEM manages the data transfer between the local server and the WLM-Sensors, and enables a graphical and numerical display of the measured data. The user-friendly software provides the operator with information about the current leakage situation of the surveyed zone in the network. On an overall water map the user verifies graphically if and where leakage appears. A more detailed screen of the failure (leakage zone) shows the numerical values and a time dependent diagram of FLOW, NOISE, PRESSURE and TEMPERATURE.



## THE MAIN FEATURES OF THE AQUALYS-SOFTWARE

- Easy setup on local servers or online platform (Browser)
- No license fee
- Short and long term reports
- Automatic offset adjusting of min/max levels (AI)
- Compare measuring points just by one click
- Automatic boundary setting (AI)
- SMS-info and burst warning
- Remote setting of WLM-Sensors (i.e. measuring time)
- Automatic export/import (connection to SCADA)
- Live data (online) and historical information
- Totalizer for single meter or DMA
- Import and calculation of 3rd party data (water balance)
- Easy zoning option (DMA) or virtual zoning
- **AQUALYS** Web Platform