



Water



GWF



# Q-Eye PSC Portable

Mobile area velocity flow meter for partially filled or pressurized pipes and open channels

## Your benefits

- Best-in-class Doppler profiling technology: **Excellent long-time measurement stability, no need for costly on-site calibration**
- Velocity profiling with logarithmic interpolation: **No blanking zone at bottom of channel or pipe. Highest accuracy in flow measurement for optimized process control**
- Smallest area velocity sensor worldwide: **No disturbance of the flow profile, velocity measurement starts at 2 cm (< 1") water level**
- Platform-independent web interface for configuration, operation and maintenance: **Easy and fast setup with multi-language graphical user interface. Parametrization with any mobile device, no software needed**
- Integrated Wi-Fi access point, optional mobile connection and FTP Push: **Real-time remote access of your data any-time and anywhere – no need to enter manhole**
- Power supply with two redundant, hot-swappable Li-Ion batteries: **Reliable consistent measurement, no outages, 10 years battery lifetime**

## Application

- Full or partially full pipes 100-2000 mm (4-80") in diameter or open channels with flow depths of 40-2000 mm (1.5-80")
- Ideal for sites with non-uniform or rapidly changing flow behavior. Suitable for applications with low and high water levels
- Temporary survey of flow in slightly to heavily polluted media:
  - Wastewater treatment facilities
  - Wastewater collection systems
  - Stormwater runoff monitoring
  - Irrigation channels

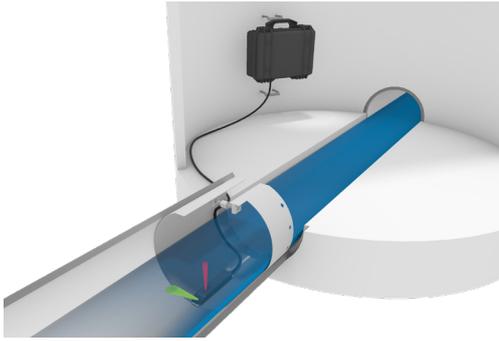
## Features

- Portable lightweight HPX resin housing, IP67
- Two hot-swappable Li-Ion batteries
- Smallest area velocity sensor worldwide, IP68
- Pulse-Doppler Spectral Correlation technology
- Scanning of the entire velocity profile in up to 18 measuring cells
- Measurement of low velocities down to 0.04 m/s
- Bi-directional measurement over the entire flow range
- Typical accuracy:  $\pm 2\%$  of reading for flow
- Integrated Wi-Fi access point
- Graphical user interface in multiple languages
- All units for display and data storage can be customized by the user
- Preselection of typical cross sections or user-definable irregular shapes
- Communication: 4G (LTE) modem with HSPA+ and 2G
- Includes internal storage capacity (16 GB)

## Options

- Area velocity sensor to be mounted on pipe or channel bottom (up-looking) or wall (side-looking)
- Additional external level sensors (pressure, non-contact ultrasonic or radar)
- Well-established sensor mounting systems for diverse applications

# Product description



Temporary installation in manhole

The Q-Eye PSC Portable area velocity flow meter is designed for mobile flow monitoring of slightly to heavily polluted media in full or partially full pipes or open channels.

It uses advanced Pulsed-Doppler technology to directly evaluate velocity profiles, making it the best choice for sites with non-uniform or rapidly changing flow conditions. Additionally, the Q-Eye PSC Portable measures bi-directional flow over the entire measurement range and near zero flow velocities down to 0.04 m/s. This profiling capacity eliminates the need for on-site calibration, thereby significantly reducing the cost of installation.

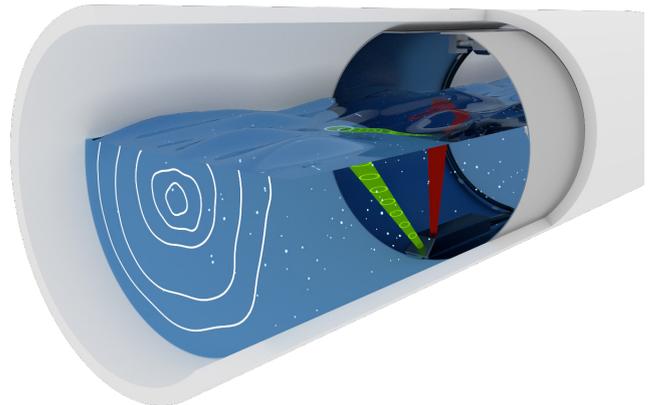
## WebUI (Wi-Fi)

The Q-Eye PSC Portable is equipped with an integrated web server running a WebUI. You can display and manage the WebUI using the standard web browser of your smartphone, tablet PC or notebook. There is no need for any additional software or App. Parameter setting and data visualization has never been so easy.



## Measuring principle

The Q-Eye PSC Portable is a major improvement in mobile open channel flow measurement. In contrast to the older Continuous Wave Doppler method, the Q-Eye PSC Portable transmits acoustic pulses into the flow.



A scheme of the measuring principle

## Data storage and transmission

A 4G/3G/2G cellular modem for automatic data transmission is included. The logged data can be sent to any host computer (FTP server) or to the GWF web-based cloud solution at a user-selectable interval (e.g. 4 times a day, once a day or once a week). Alternatively, wireless LAN connection is available.

Information on level, velocity, flow and signal strength can be taken at regular intervals between 1 minute and 60 minutes. In case of a flood event, the logging can be set automatically to one minute (event mode). The Q-Eye PSC Portable is equipped with internal storage capacity (16 GB) and will store data for up to 18 months.

These sound pulses are echoed back from particles in the medium. By time-gating the returned signals, velocity is measured in multiple cells, enabling a stepwise scanning of the entire velocity profile. Detailed velocity data in relation to the sensor location is used to calculate a highly accurate flow profile.

When compared to the Cross-Correlation method (evaluation of specific patterns in the flow), the Spectral-Correlation technology (PSC) allows for measurements in considerably more cells with a cell size of only a few millimeters. Thus the velocity profile can be measured with a much higher resolution.

By means of the PSC technology, it is possible to measure flow velocity profiles very close to the sensor as well as in greater distances. This makes the Q-Eye PSC Portable suitable for both shallow and high water level applications.

# Component description

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The Q-Eye PSC Portable system is composed of a mobile transmitter in a HPX resin case housing and a submersible area velocity sensor for combined velocity and water level measurement.

## Transmitter

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Mobile transmitter case

The Q-Eye PSC Portable transmitter comes in an IP67 case ready for use in harsh environments, e.g. in sewer networks. The instrument can be read out without opening the case by simply activating Wi-Fi transmission. There is no need to connect any cable for data download or configuration.

All components of the flow meter are powered by 2 redundant Li-Ion batteries. The batteries are hot swappable, meaning they can be changed during operation. A 4G (LTE) modem with HSPA+ and 2G fallback is integrated in the transmitter.

## Sensors

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Low-profile area velocity sensor

The Q-Eye PSC Portable submersible area velocity sensor measures only 15 x 25 x 108 mm, making it the smallest sensor of this type currently available. Its low profile means less interference, which results in more accurate velocity measurements, especially in low-flow situations.

## Additional level sensors

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Down-looking ultrasonic



Submersible pressure

The ultrasonic down-looking sensor provides non-contact level measurements for closed pipes. The sensor deflector plate guarantees minimal dead band and resists condensation. This sensor can be used for redundant level measurements in combination with the PSC area velocity sensor and/or a pressure sensor.

The external pressure sensor is the latest generation of fully submersible high-performance sensors (accuracy +/- 0.1 % FS) for measurement of hydrostatic levels. The slim line stainless steel body incorporates many enhanced features to provide reliable and long-term accurate level measurements. In addition, a full range of related accessories simplifies installation, operation and maintenance.

## Mounting systems

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Mounting plate, spring ring and scissors rings

Standardized accessories including mounting plates, spring and scissors rings are available. Thus, the sensors can be installed within minutes, reducing time in the manhole. The sensor is first attached to a carrier and can then be fixed onto any of the compatible mounting systems. To install the sensors in rectangular, trapezoidal or earthen channels, we recommend the sensor mounting plate. Stainless steel spring rings simplify sensor installation in cylindrical pipes. 8 standard diameters from 100 mm (4") to 600 mm (24") are available.

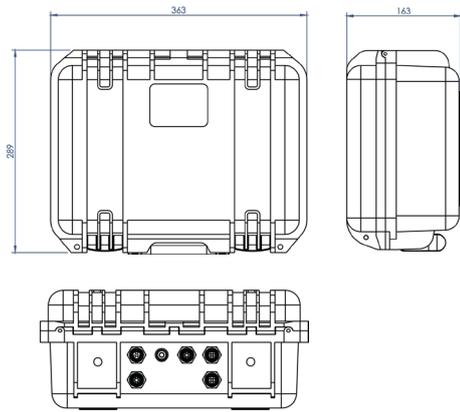
You can install the sensor and fix the cable to a mounting ring before entering the manhole. In this way, the time spent in the sewer is significantly reduced. The rings can be expanded with a screw mechanism against the wall of the sewer. The expanding pressure makes undesired shifting of the ring impossible.

The adjustable scissors ring is installed in large pipes from 500 mm (20") to 1450 mm (57") in diameter. It consists of a base element with a scissors mechanism and one or more pairs of extensions to fit the size of the pipe.

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# Technical data

## Transmitter



## Q-Eye PSC Portable

<b>Display</b>	4 lines, 20 characters
<b>Keyboard</b>	4 keys
<b>Datalogger</b>	16 GB Micro SD card
<b>Communication</b>	Wireless LAN, 4G (LTE) / 3G (HSPA+) / 2G
<b>Inputs</b>	max. 2 x 4-20 mA
<b>Power supply</b>	2 x rechargeable batteries, hot swappable, 24 V DC +/- 10% (option)
<b>Protection class</b>	IP67
<b>Case material</b>	HPX resin
<b>Dimensions</b>	289 x 363 x 163 mm (L x W x H)

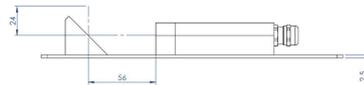
## Sensor



Area velocity sensor



Ultrasonic down-looking level sensor



## Area velocity sensor

## Ultrasonic down-looking level sensor

<b>Sensor</b>	1 x velocity 1 x water level	Water level, down-looking
<b>Frequency</b>	1 MHz	
<b>Range</b>	Velocity $\pm 5.3$ m/s Water level 0.04-1.3 m, expandable with external 4-20 mA level sensor	0-1.2 m
<b>Accuracy</b>	Velocity: $\pm 0.03$ m/s from -1.5 m/s to +1.5 m/s $\pm 1\%$ of reading from -5.2 to -1.5 m/s and +1.5 to +5.2 m/s Level: $\pm 0.5\%$ FS (1.5 m) Flow: typically $\pm 2\%$ , depending on site conditions	0.5 % of FS (1.2 m)
<b>Cable length</b>	10 m incl. (max. 80 m)	
<b>Particle concentration</b>	> 50 ppm	
<b>Material</b>	Epoxy	Stainless steel, PBT
<b>Protection class</b>	IP68 (NEMA 6P)	IP67
<b>Dimensions</b>	108 x 25 x 15 mm (L x W x H)	
<b>Output</b>		4-20 mA

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