

### Advantages

- Contactless measurement
- Improved accuracy in combination with ultrasonic horizontal profile scanner
- Optional surcharge sensor available
- Installation without interrupting processes
- Maintenance-free
- Area correction by sediment detection

**NivuFlow 550**  
**NivuFlow 7550**

**Radar Flow Meter**  
**+ Surcharge Sensor**  
**+ Sediment Detection**  
**+ Automatic Calibration**



# NivuFlow 550 Radar Flow Measurement

The NIVUS radar flow measurement system offers a contactless solution for open channel flow. Our measurement system operates with continuous wave Doppler and provides easy installation and maintenance. The NivuFlow Series is suitable for all kind fluids. Our modular approach offers flexibility for best results in any application.

### Determination of surface velocity

- Low maintenance through contactless radar sensor
- Easy installation and operation
- Ideal for use with all liquids, even aggressive / abrasive media

### Effortless use especially for difficult applications

- Measurement places with high pollutant load and sedimentation
- Measurement places featuring bed load / debris
- Measurement places with installation restrictions in the channel
- Shooting discharge at low flow levels and high velocities

### Extended range of application with optional surcharge sensor

- Uninterrupted and reliable flow measurement during surcharge events
- Sediment detection with ultrasonic level measurement in surcharge conditions



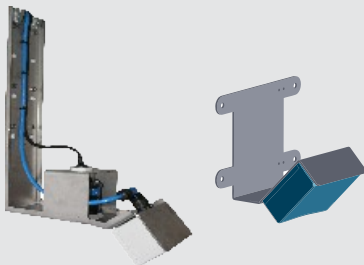
## Modular System

Our Radar flow measurement system is modular. Therefore we can offer the suitable solution for each application.

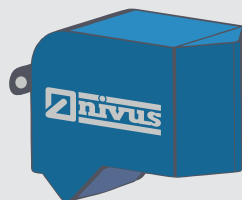
### Your Advantages

- Ideal level measurement on the correct location
- Choose the optimum level measurement method for the application
- Optional ultrasonic measurement for reliable flow measurement in surcharge conditions
- Enhanced accuracy by redundant ultrasonic flow measurement

Radar flow sensor fastening variants



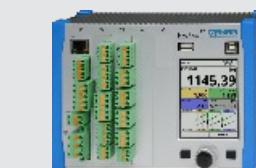
Radar flow compact module



Ultrasonic surcharge sensor



Radar Ultrasonic Hydrostatic



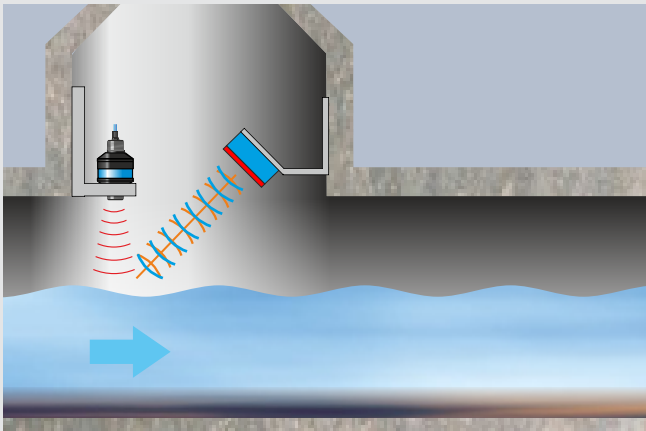
NivuFlow 550 NivuFlow 7550



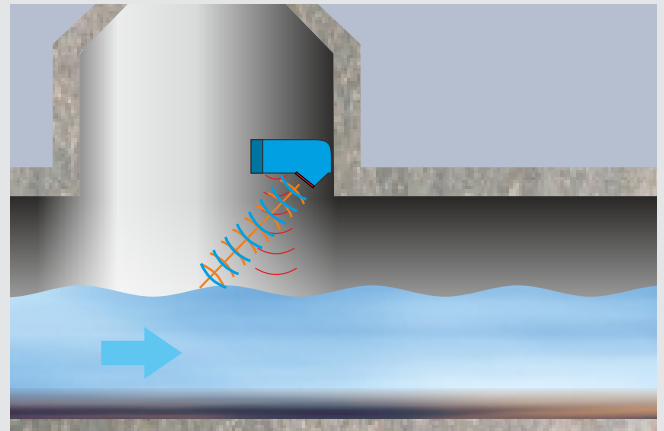
IP 68 field housing

# Installation Examples

## Standard Installations

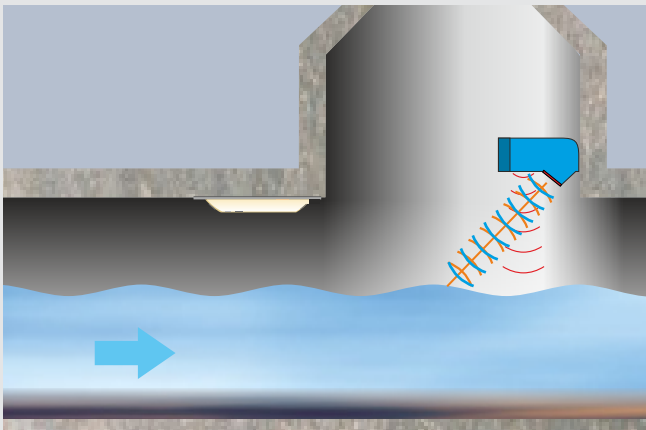


**Modular radar flow measurement** installation with separate ultrasonic level measurement

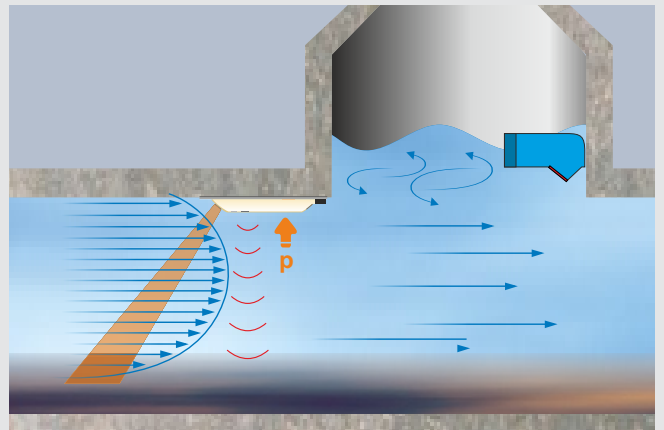


**Compact radar flow measurement** with ultrasonic or radar level measurement in single housing

## Radar Flow Measurement and Surge Flow Measurement



**Normal conditions:** Radar flow measurement with combined ultrasonic or radar level measurement in operation. The surcharge sensor is not active at low level flow.

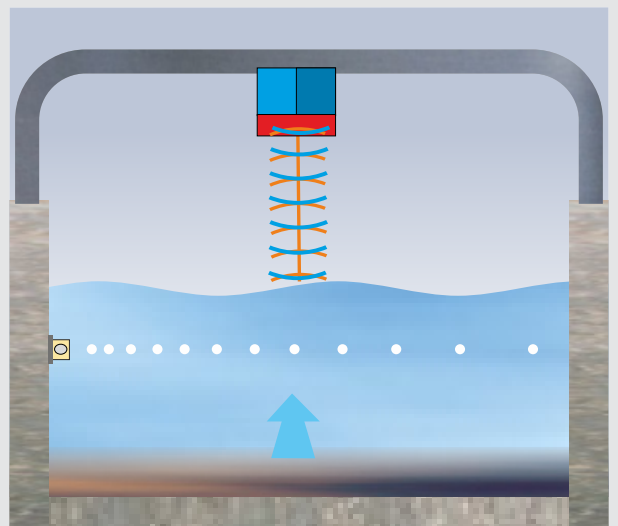


**Surcharge conditions:** Ultrasonic flow measurement detects flow profile with combined hydrostatic level measurement. An additional ultrasonic level measurement detects sediments on ground level.

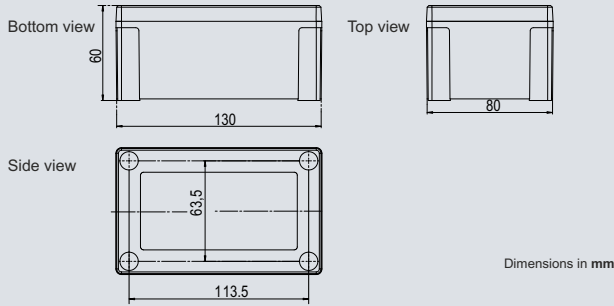
## Hybrid Flow Measurement with Surface Radar and Ultrasonic Profile Scanner

### Your Advantages

- Redundant flow measurement
  - Contactless Radar surface velocity measurement
  - Ultrasonic sideways velocity profile sensor
- Two independent flow measurement technologies increase the accuracy and reliability
- All sensors are above the area of sedimentation,
- No maintenance
- Reliable measurement independently of wave formations, storm conditions as well as in low flow level circumstances



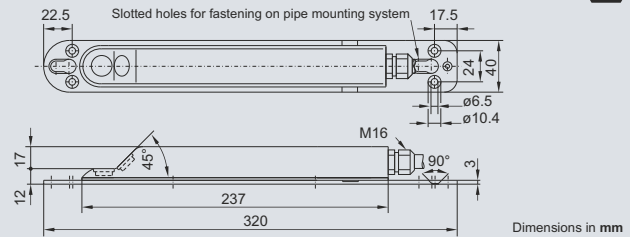
## Radars Sensor, Type OFR



### OFR Radar Sensor

Measurement method	Radars - 24 GHz - ISM band
Measurement range	0.15 m/s - 10 m/s
Temperature range	-30 °C to 70 °C -20 °C to 50 °C in ATEX Zone 1
Measurement distance	0.3 m - 10 m
Protection	IP 68 - completely encapsulated
Enclosure material	high-performance composite
Interface	RS485 for connection to NivuFlow or OCM Pro CF transmitters
Measurement uncertainty	± 0.5 % of measurement value; ± 0,01 m/s
Ex Approval	II 2 G Ex ib IIB T4 Gb; TÜV 16 ATEX 185271X; IECEX 16.0034X

## Ultrasonic Sensor, Type POA



### Surcharge Flow-Level Sensor (optional)

#### Flow Measurement

Measurement method	ultrasonic profile scanner (cross correlation)
Measurement range	- 6 m/s up to + 6 m/s
Protection	IP 68
Measurement uncertainty	0,5% of measurement value (v: 0,05 - 0,5 m/s); 1% of measurement value (v > 0,5 m/s)

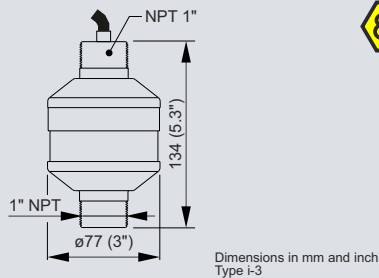
#### Level Measurement

Measurement method	hydrostatic for surcharge detection
Measurement range	0 - 10 m

#### Sediment Detection

Measurement method	ultrasound
Measurement range	0 - 5 m
Ex Approval	II 2 G EEx ib IIB T4 Gb; TÜV 03 ATEX 2262; IECEX TUN 15.0014

## Type NMIxxx...



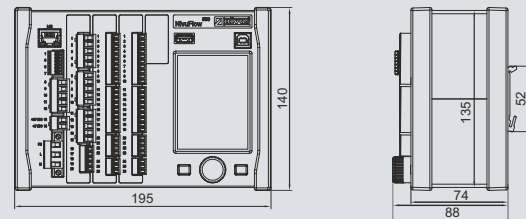
### i-Series Level Sensor

Measurement Method	Ultrasound
Measurement range	up to 15 m
Power supply	10 - 28 V DC
Outputs	HART® – loop powered (2-wire) 4 - 20 mA (3.8 - 22 mA)
Functions	level, distance, empty space, volume and linearisation using 16 breakpoints
Operating temperature	-40 to 80 °C
Configuration	PC software for parameter setting, echo evaluation, linearisation and agitator avoidance
Sensor body material	Valox 357 PBT, optional: PVDF
Protection	IP68
Ex Approval	II 2 GD Ex m IIC T4 or II 1 GD Ex ia IIC T4; TRAC12ATEX0031X
Startup time	4 sec. typical
Measurement uncertainty	0,25 % (Type i-3)
Resolution	2 mm (Type i-3)

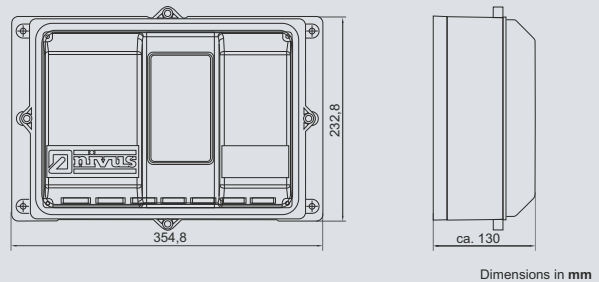
### Type of Transmitter

Radars flow measurement + level measurement (radar, ultrasonic, hydrostatic)	NivuFlow 550
Radars flow measurement and level measurement + surcharge measurement with ultrasonic cross correlation sensor	NivuFlow 7550
Hybrid flow measurement with radar and ultrasonic cross correlation sensors + level measurement (radar, ultrasonic, hydrostatic)	NivuFlow 7550

## Transmitter, Type NivuFlow



## Field Enclosure



### NivuFlow 550 / NivuFlow 7550

Power supply	100 to 240 V AC, +10 % / -15 %, 47 to 63 Hz or 9-36 V DC
Power consumption	typical 14 VA
Enclosure	Aluminium, plastic (transmitter enclosure) Plastic (field enclosure)
Protection	IP 20, IP 68 with optional field enclosure
Operating temperature	-20°C to +70°C
Max. humidity	80%, non-condensing
Display	240 x 320 pixel, 65536 colours
Operation	rotary pushbutton, 2 function keys, menus in English, French and other languages plug with cage clamp terminals
Connection	plug with cage clamp terminals
Inputs	up to 7 x 4 - 20 mA, up to 4 x RS 485
Outputs	up to 4 x 0/4 - 20 mA, up to 5 x relays (SPDT)
Data memory	2.0 GB internal memory, flexibly expandable, readout on faceplate via USB stick
Communication	Modbus, HART®
Measurement uncertainty	flow (Q): ± 5% typical; ± 2% under reference conditions

## Instrumentation For Water Industry

NIVUS GmbH • Im Taele 2 • 75031 Eppingen, Germany • Internet: www.nivus.com  
 Phone: +49 (0)7262 9191-0 • Fax: +49 (0)7262 9191-999 • info@nivus.com

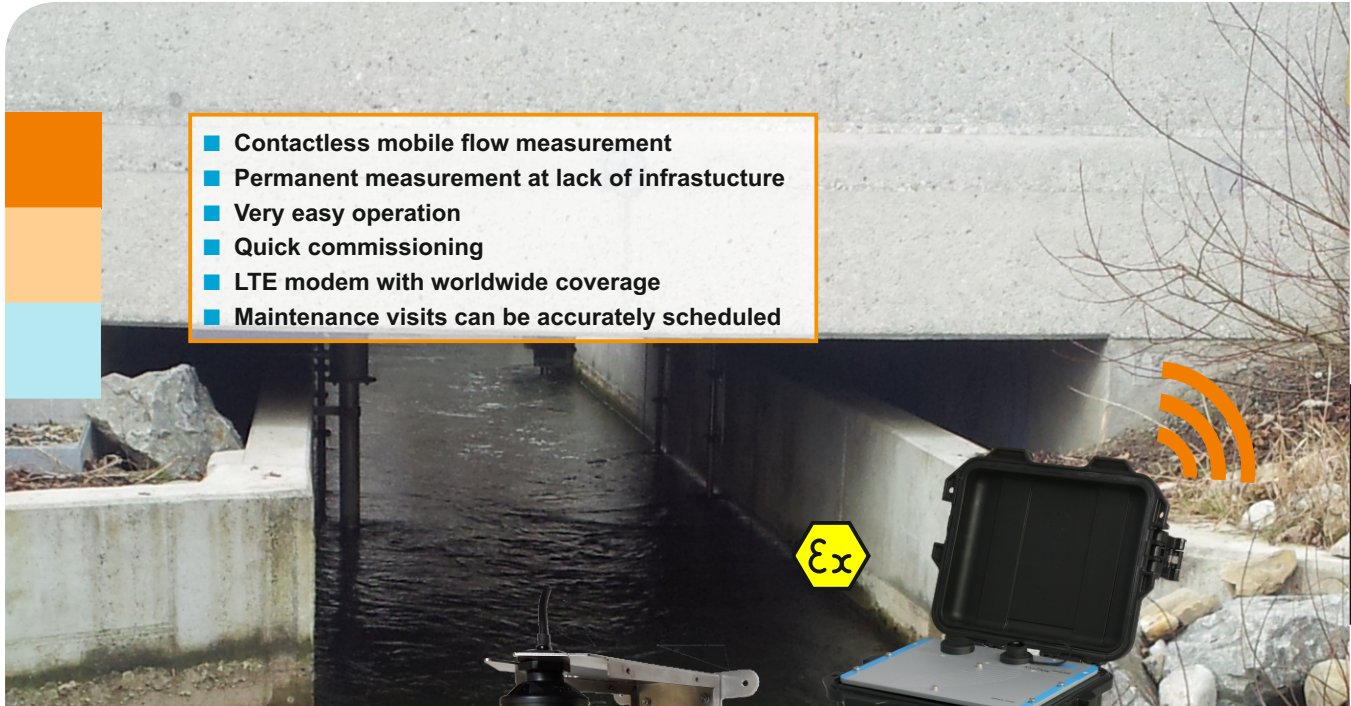


new

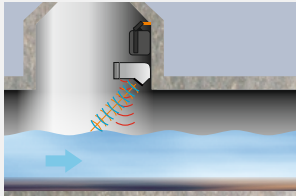
Flow Measurement  
NivuFlow Mobile 550



- Contactless mobile flow measurement
- Permanent measurement at lack of infrastructure
- Very easy operation
- Quick commissioning
- LTE modem with worldwide coverage
- Maintenance visits can be accurately scheduled



NivuFlow Mobile 550



## NivuFlow Mobile 550

For contactless flow metering with Radar-Doppler in part filled pipes and channels. The well thought-out power management and the built-in modem allow long-term measuring with automatic data transmission.

NivuFlow Mobile 550 permits contactless flow metering in a variety of different situations. Hydraulic algorithms determine the exact flow profiles for almost all shapes.

The modern operating concept via web browser in connection with tablet, smartphone etc. is intuitive and enables quick commissioning. Here, a quick start assistant guides through the most relevant parameter settings. While setting parameters, the remaining

operation time is indicated in days. The optional built-in modem provides automatic data transmission via e-mail, FTP or to the NIVUS WebPortal. The energy-efficient system allows for accurate scheduling of maintenance visits and very long operation times.

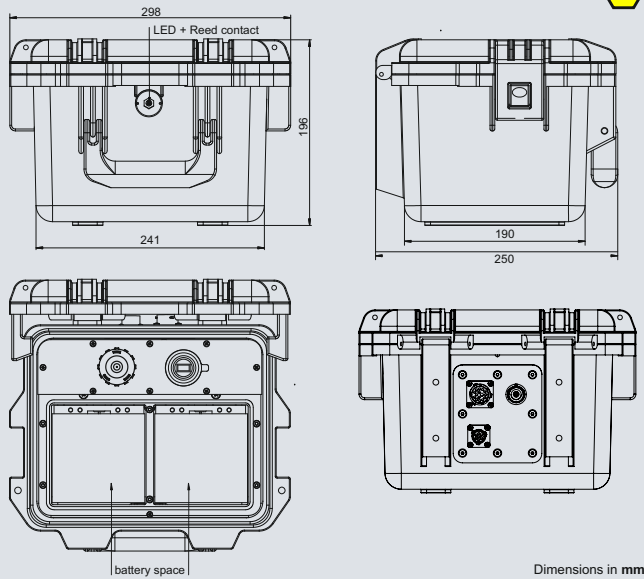
### Typical Applications

- WWTP intakes
- Irrigation channels
- Tributaries



# Specifications

## Transmitter

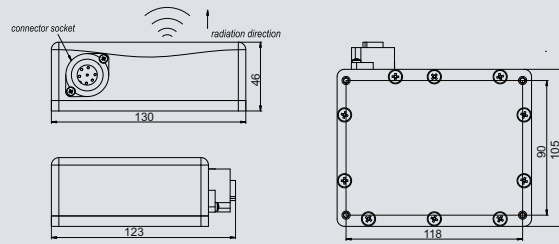


## Transmitter

Measurement principle	Doppler Radar
Power supply	<ul style="list-style-type: none"> <li>• 2 x rechargeable batteries 12V/15 Ah, lead gel</li> <li>• charger 100 - 240 V AC / 50 to 60 Hz / 50 VA</li> </ul>
Enclosure	<ul style="list-style-type: none"> <li>• Material: HPX high-performance synthetic resin</li> <li>• Weight: approx. 4.7 kg (without battery and hoop guards)</li> <li>• Protection: IP68 closed / IP67 open</li> </ul>
Operating temperature	-20°C to +50°C / -15°C to +50°C for Ex-Zone 1
Storage temperature	-20°C to +70°C
Max. humidity	90 %, non-condensing
Display	via mobile device; status LED (RGB)
Ex-Approval	Optional: II 2G Ex eb ib [ib] mb IIB T4 Gb TÜV 17 ATEX 196722 X / IECEx 18.0008X
Operation	Magnetic switch, via WiFi using smartphone, tablet, notebook...
Inputs	<ul style="list-style-type: none"> <li>• 1x socket for OFR-Radarsensor or ConnectorBox for external mains adaptor or power supply as well as: <ul style="list-style-type: none"> <li>• 2x 0/4 - 20 mA (active/passive)</li> <li>• 1x 0/4 -20 mA (passive)</li> <li>• 1x active digital input</li> </ul> </li> <li>• 1x level sensor socket</li> <li>• 1x antenna socket</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• via ConnectorBox <ul style="list-style-type: none"> <li>• 1 x analog output 0 - 10 V</li> <li>• 1 x potential-free digital output as SPDT / bistable</li> </ul> </li> <li>• 1 x USB or readout of values via USB stick</li> </ul>
Storage cycle	5 sec. - 360 min, continuous, cyclic or event-based
Data memory	Internal memory, covering a period of 1.5 years at a measurement interval of 5 minutes
Data transmission	<ul style="list-style-type: none"> <li>• Via plug-in USB stick</li> <li>• Via WLAN</li> <li>• Via GPRS, UMTS, LTE</li> </ul>
Operation time	~1 year on one battery charge* (two batteries)

\*calculated value with storage cycle 60 minutes and daily data transmission. Value may vary according to measurement spot or age of batteries

## Radar Sensor, Type OFR

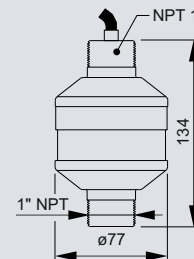


Dimensions in mm

## OFR Radar Sensor

Measurement method	Radar - 24 GHz - ISM band
Measurement range	± 0.15 m/s - 15 m/s
Temperature range	-30 °C to 70 °C -20 °C to 60 °C in ATEX Zone 1
Measurement distance to surface	0.05 m - 10 m
Minimal wave height	~ 3 mm
Protection	IP 68 - completely encapsulated
Enclosure material	Polyoxymethylene (POM)
Interface	RS485 for connection to NivuFlow or NivuFlow Mobile transmitters
Measurement uncertainty	± 0.5 % of raw measurement value; ± 0.01 m/s (rel. to surface velocity)
Ex Approval	II 2 G Ex ib IIB T4 Gb; TÜV 16 ATEX 185271X; IECEx 16.0034X

## Type NMLxxx...



Dimensions in mm  
Type i-3

## i-Series Level Sensor

Measurement method	Ultrasound
Measurement range	0.125 m to 10 m (15 m optional)
Power supply	10 - 28 V DC
Outputs	HART® – loop powered (2-wire) 4 - 20 mA (3.8 - 22 mA)
Functions	level, distance, empty space, volume and linearisation using 16 breakpoints
Operating temperature	-40 to 80 °C
Configuration	PC software for parameter setting, echo evaluation, linearisation and agitator avoidance
Sensor body material	Valox 357 PBT, optional: PVDF
Protection	IP68
Ex Approval	II 2G Ex mb IIC T4 Gb / II 1G Ex ia IIC T4 Ga TRAC12ATEX0031X / TRAC12ATEX0030X
Startup time	4 sec. typical
Measurement uncertainty	0.25 % (Type i-3)
Resolution	2 mm (Type i-3)

The complete technical specifications can be found in the Technical Documentation or on [www.nivus.com](http://www.nivus.com)

# LaserFlow<sup>®</sup>

## Non-Contact Subsurface Velocity Sensor



The LaserFlow<sup>®</sup> velocity sensor remotely measures flow in open channels with non-contact Laser Doppler Velocity technology and non-contact Ultrasonic Level technology. The sensor uses advanced technology to measure velocity with a laser beam at single or multiple points below the surface of the wastewater stream.

*The only non-contact flow measurement device to read below the surface.*

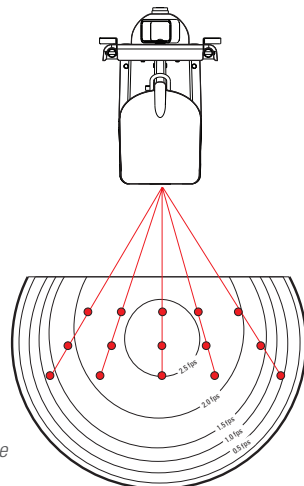
The sensor uses an ultrasonic level sensor to measure the level and determines a sub-surface point to measure velocity. The sensor then focuses its laser beam at this point and measures the frequency shift of the returned light.

The LaserFlow is ideal for a broad range of wastewater monitoring applications. It is compatible with both the Teledyne ISCO Signature<sup>®</sup> Flow Meter and the 2160 LaserFlow Module, depending on the type of installation.

During submerged conditions, flow measurement continues without interruption with optional continuous wave Doppler Ultrasonic Area Velocity technology.

With its specially designed mounting bracket in place, the LaserFlow can be deployed and removed from street level. This avoids the risk and expense of confined space entry. A variety of communication options enable programming and data retrieval from a remote location. Information about data quality can be recorded and transmitted with the flow data.

Additionally, built-in diagnostic tools simplify installation, maintenance, and advanced communication options reduce site visits.



*The LaserFlow device can be programmed to take velocity measurements at single or multiple points below the water's surface.*

## LaserFlow<sup>®</sup>

### Applications:

- Permanent and portable flow measurement for CSO, SSO, I&I, SSEs, CMOM, and other sewer monitoring programs
- Wastewater treatment plant influent, process, and effluent flow measurement
- Industrial process and discharge flow measurement
- Stormwater conveyance and outfall
- Irrigation canals and channels
- Shallow flow measurement in varying pipe sizes

### Standard Features:

- Non-contact velocity and level measurement
- Single or multiple point measurement below the liquid surface
- Rugged, submersible enclosure with IP68 ingress protection
- Zero deadband from measurement point in non-contact level and velocity measurements
- Quality readings without manual profiling
- Bidirectional velocity measurement

## LaserFlow® Sensor

Size (H x W x D):	14.96 x 10.3 x 22.32 in (38.01 x 26.21 x 56.7 cm)
Weight :	8.7 kg (19.2 lbs)
Materials:	Conductive Carbon Filled ABS, SST, Conductive Kynar® <sup>a</sup> , Anodized Aluminum, UV Rated PVC
Cable Lengths:	32.8 or 75.5 ft (10 or 23 m) <sup>b</sup>
Enclosure:	IP68
Certifications:	CE EN61326; FDA CDRH 21CFR1040; IEC 60825-1
Laser Class:	Class 3R
Temperature Range:	Operating: -4 to 140 °F (-20 to 60 °C) Storage: -40 to 140 °F (-40 to 60 °C)
Power Required:	Input voltage: 8 to 26 VDC 12 VDC Nominal
Flow Accuracy:	±4% of reading <sup>c</sup>
Communication Protocol:	TIENet™

## Velocity

Technology:	Non-Contact, Subsurface Laser Doppler Velocity (patented)
Measurement Range:	-15 ft/s to 15 ft/s (-4.6 m/s to 4.6 m/s)
Maximum distance from liquid surface to bottom of sensor:	10 ft (3 m)
Minimum depth:	0.5 in (0.01 m) <sup>c</sup>
Direction:	Selectable Bidirectional Measurement <sup>d</sup>
Accuracy:	±0.5% of reading 0.1 ft/s (±0.03 m/s)
Minimum Velocity:	0.5 ft/s (0.15 m/s)

## Level

Technology:	Non-Contact Ultrasonic
Measurement Range:	0 to 10 ft (0 to 3 m) from measurement point
Accuracy @ 72 °F (22 °C)	0.02 ft (±0.006 m) at <1 ft level change 0.04 ft (±0.012 m) at <1 ft level change
Temperature Coefficient within compensated range:	± 0.0002 x D (m) per degree C ± 0.00011 x D (ft) per degree F (D = Distance from transducer to liquid surface)
Beam Angle:	10° (5° from center line)
Ultrasonic Signal:	50 KHz
Deadband:	Zero deadband from bottom of LaserFlow sensor <sup>e</sup>

## Optional Surcharge Measurement:

## TIENet™ 350 Area Velocity Sensor

Probe Size (H x W x L):	0.75 x 1.3 x 6.0 in (19 x 33 x 152 mm)
Materials:	Sensor: Epoxy, chlorinated CPVC, SST Cable: UV-Rated PVC
Certifications:	CE EN61326
Temperature Range:	32 to 158 °F (0 to 70 °C)

## Velocity

Technology:	Submerged Continuous Wave Doppler
Ultrasonic:	Measurement
Range:	-5 to 20 ft/s (-1.5 to 6.1 m/s)
Velocity Measurement:	Bidirectional
Accuracy:	±0.1 ft/s (±0.03 m/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile
Minimum Depth:	0.08 ft (25 mm)
Frequency:	500 kHz

## Level

Technology:	Submerged Differential Linear Pressure Transducer
Measurement Range:	0.033 to 10 ft (0.01 to 3.05 m)
Accuracy:	± 0.10% of full scale
Maximum Depth:	34 ft (10.5 m)
Stability:	±0.023 ft/yr (±0.007 m/yr)

## Options and Accessories

- Flow measurement during submerged conditions via Ultrasonic Doppler technology
- Redundant flow measurement with simultaneous Continuous Wave Doppler or Ultrasonic Level Sensing
- Permanent and temporary mounting hardware
- Sensor retrieval arm enables installation and removal without confined space entry
- Remote ultrasonic level sensor options for drop manhole and outfall applications

<sup>a</sup> Kynar® is a registered trademark of Arkema, Inc.

<sup>b</sup> Custom cable lengths also available.

<sup>c</sup> Under normal flow conditions.

<sup>d</sup> Turbidity > 20 NTU. Distance < 48 inches.

<sup>e</sup> Deadband for remote TIENet™ 310 ultrasonic level sensor varies, depending on the type of mounting hardware.

## Teledyne ISCO

P.O. Box 82531, Lincoln, Nebraska, 68501 USA  
Toll-free: (800) 228-4373 • Phone: (402) 464-0231 • Fax: (402) 465-3091

teledyneisco.com



Teledyne ISCO is continually improving its products and reserves the right to change product specifications, replacement parts, schematics, and instructions without notice.



# RAVEN-EYE 2®

## New Generation Open Channel Non-Contact Radar Flow Meter



The RAVEN-EYE® is the newest non-contact RADAR area/velocity flow meter for open channel flow measurements from FLOW-TRONIC. The new sensor combines advanced digital Doppler radar velocity sensing technology with most modern and powerful DSP processor technology allowing a patent pending self-learning average velocity calculation. The need for empirical models or time consuming site calibration become obsolete.

Use the RAVEN-EYE® in combination with the RTQ flow logger series for portable monitoring and for permanent monitoring with the IFQ MONITOR™ which display flow rate, velocity, level and much more.

The RAVEN-EYE® provides the user with highly accurate flow measurements under a wide range of flow and site conditions. By measuring the velocity of the fluid above the water surface, the RAVEN-EYE® eliminates accuracy and reliability problems inherent with submerged sensors, including sensor disturbances and sensor fouling.

The RAVEN-EYE® is ideal for monitoring flows from corrosive liquids or with high solids content.

## Technical Specifications

The RAVEN-EYE® is a universal non-contact level/velocity flow sensor that can be connected to the RTQ flow logger series or the IFQ MONITOR™. Optionally it can also be connected to any device using the Modbus ASCII communication protocol.

### Velocity Measurement

Method	Radar
Range	±0,08 to ±15 m/s (bi-directional)
Accuracy	±0,5%, + zero stability
Zero Stability	±0,02 m/s
Resolution	0,001 m/s

### Optional Combined Level Measurement (Ultrasonic)

Method	Ultrasonic pulsed echo
Range	0,00 to 1,75 m (with ULS-02/RAV-0002) 0,00 to 5,75 m (with ULS-06/RAV-0006)
Accuracy	±0,2% of reading (with ULS-06/RAV-0006) ±0,3% of reading (with ULS-02/RAV-0002) Includes non-linearity and hysteresis
Temp. Error	max. 0,04%/K
Resolution	1 mm

### Optional Combined Level Measurement (Radar)

Method	Radar
Range	0,01 to 15 m
Accuracy	±2 mm of reading
Resolution	1 mm

### Optional Separate Level Measurement

Method:	Any 4-20 mA loop powered sensor
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### Flow Measurement

Method	Conversion from surface velocity measurement to average velocity based on patent pending self-learning model using velocity distribution measurements. Conversion of water level and pipe size to fluid area. Multiplication of fluid area by average velocity to obtain the flow rate.
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Conversion Accuracy	±5% of reading Assumes pipe is 0 to 90% full
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### Communication

RS-485 communications port with Modbus ASCII slave communication protocol



[www.flow-tronic.com](http://www.flow-tronic.com)

Chemin des Tilleuls 32 | B-4840 Welkenraedt | BELGIUM

Tél.: +32 (0)87 899 799 | Fax: +32 (0)87 899 790

E-mail: [info@flow-tronic.com](mailto:info@flow-tronic.com)

## Technical Specifications

**Outputs**  
4-20 mA      1 for validated surface velocity (vQP) or validated surface velocity including median filter (vQPMF)

**Internal Temperature Measurement**  
Method      Digital sensor  
Range      -40° to 80° C

**Internal Humidity Measurement**  
Method      Digital sensor  
Range      0 to 100 %

**Internal Pressure Measurement**  
Method      Digital sensor  
Range      0 to 1500 HPa

Auto diagnostic system using internal sensors  
(Humidity, pressure, temperature)

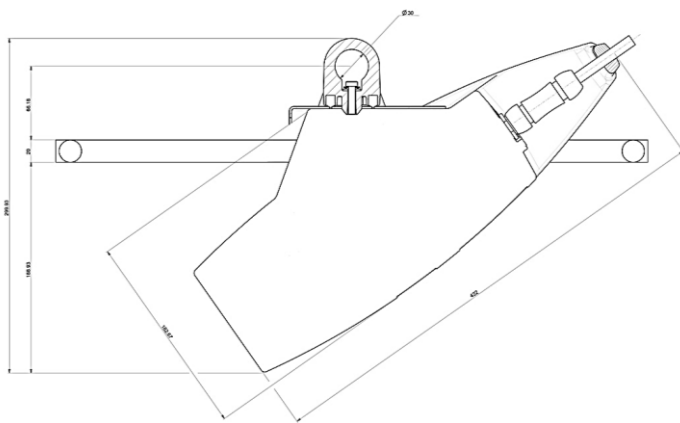
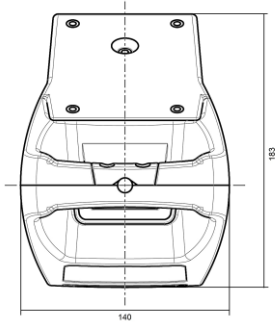
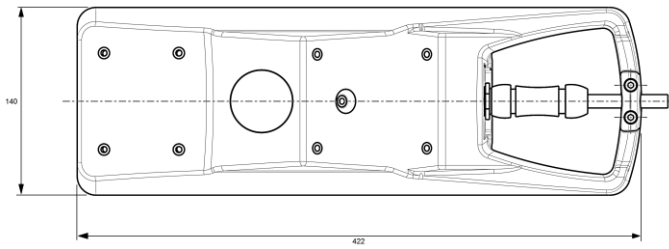
### Material & Dimensions

**Enclosure**      Polyurethane (PU)  
**Dimensions**      422 mm L, 140 mm W, 183 mm H  
Vertical blocking when mounted: 300 mm  
**Weight**      3,65 Kg (without the cable, level sensor and mounting accessories)  
**Protection rate**      IP68

**Environmental Conditions**  
Operating temperature range      -30° to 70° C  
Storage temperature range      -30° to 80° C

**Certifications**  
Sensor      CE

**Sensor Cable**  
**Material**      Polyurethane jacketed  
**Length**      Standard: 10 m  
Optional: 20 m, 30 m or length as needed up to 300 m



*Specifications are subject to change without notice  
Updated: April 2019*



# FLO-DAR® AV Sensor



## Applications

- Wastewater
- Collection Systems
- Industrial Water

**The FLO-DAR® AV Sensor provides an ideal solution for non-contact, maintenance-free portable or permanent sewer flow monitoring.**

The FLO-DAR AV Sensor provides a revolutionary approach to open channel flow monitoring. It combines advanced Digital Doppler Radar velocity sensing technology with ultrasonic pulse echo depth sensing to remotely measure open channel flow. Use with the FL900 Series Flow Loggers (wireless or standard) for portable monitoring. For permanent power application sites the FLO-DAR can be connected to the FL1500 Series Flow Monitor. Intrinsically safe models are available.

## Accurate Flow Measurement

FLO-DAR provides the user with highly accurate flow measurements under a wide range of flows and site conditions. By measuring the velocity of the fluid from above, FLO-DAR eliminates accuracy problems inherent with submerged sensors including sensor disturbances, high solids content and distribution of reflectors.

## Non-Contact Sensor Eliminates Lost Data

No lost data with non-contact, above the flow sensor that is unaffected by fouling due to debris and grease.

## Easy Installation and Maintenance

As the sensor is mounted above the flow, personnel have little or no contact with the flow during installation. Future sensor removal and replacement can be done without the need for confined space entry.

## Independent Accuracy / Long-Term Stability Verification

FLO-DAR sensor accuracy and long-term stability (up to 3 years without need for site calibration) from low flow depths up to surcharge conditions has been independently

verified many times over the years including a formal evaluation by the Alden Research Laboratory, Inc. and recent field evaluations done by municipalities and consulting engineering firms.

## Perfect Solution for Difficult Flow Conditions

Operates in the most difficult conditions including flows with high solids content, high temperature, shallow and caustic flows, large man-made channels, and high velocities up to 20 ft/s.

## Optional Surcharge Velocity Sensor (SVS)

During surcharge events FLO-DAR's optional SVS electromagnetic sensor will continue to provide uninterrupted and accurate flow monitoring through dry and wet weather flows without the need for routine sensor cleaning or maintenance.





## Specifications\*

### FLO-DAR AV Sensor

<b>Enclosure</b>	IP68 Waterproof rating, Polystyrene
<b>Dimensions</b>	160.5 W x 432.2 L x 297 D mm (6.32 x 16.66 x 11.7 in.), with SVS, D = 387 mm (15.2 in.)
<b>Weight</b>	4.8 kg (10.5 lbs.)
<b>Operating Temperature</b>	-10 to 50°C (14 to 122°F)
<b>Storage Temperature</b>	-40 to 60°C (-40 to 140°F)
<b>Power Requirements</b>	Supplied by FL900 Flow Logger, FL1500 Flow Logger
<b>Warranty</b>	1 year

### Interconnecting Cable

Polyurethane, 0.400 (±0.015) in. diameter; IP68 Standard length 9M (30 ft), maximum 305 m (1000 ft)

Cables are available in two styles:

- connectors both ends
- connector from sensor with open leads to desiccant hub, desiccant hub with connector to logger. A potting/sealant kit will be included. This can be used to run the cable through conduit.

If using FLO-DAR cable with FL1500, the cable will have bare leads to the FL1500 (30 to 1000 ft. lengths) and there will be no desiccant hub, as the air tube terminates inside of the FL1500 housing. It is important you attach an external desiccant to the FL1500 (Prod. No. 8321200)

### Set-up/Data Retrieval

FSDATA® Desktop software is used for set-up, data management, and report generation. It is compatible with desktop/laptop computers utilizing Windows operating system.

### Certification

FLO-DAR Sensor Model Numbers: 890004801, 890004901, 890004804, 890005201, 890004807, and 890005204  
Frequency: 24.10GHz to 24.15GHz  
Category: Field Disturbance Sensor  
Output Field Strength: < 2.5 V/m (128dBuV/m) @ 3m, measured per following standards  
Certified to FCC Part 15.245: FCC ID: VIC-FLODAR24  
Certified to Industry Canada Spec. RSS210. V7: IC No.: 6149A-FLODAR24

FLO-DAR Sensor Model Numbers: 890004802, 890004902, 890004805, 890005202, 890004808, and 890005205  
Frequency: 24.16GHz to 24.19GHz  
Category: Short Range Device Output Power (EIRP): < 10mW (10dBm) @ 3m, measured per the following standard  
Certified to ETSI EN 300 440-1 V1.6.1 (2010-08)

Use of this device is subject to the following conditions:

1. There are no user serviceable items inside this device.
2. The user must install this device in accordance with the supplied installation instructions and must not modify the device in any manner whatsoever.
3. Any repair service involving the sensor must only be performed by Hach, facilitated through Hach's Flow Solutions by McCrometer.
4. The user must ensure that no one is within 20 cm of the face of the transmitter when operating.

### Surcharge Depth Measurement

Auto zero function maintains zero error below 0.5 cm (0.2 in.)

<b>Method</b>	Piezo-resistive pressure transducer with stainless steel diaphragm
<b>Range</b>	3.5 m (138 in.), overpressure rating 2.5 x full scale

### Velocity Measurement

<b>Method</b>	Radar
<b>Range</b>	0.23 to 6.10 m/s (0.75 to 20 ft/s)
<b>Accuracy</b>	±0.5%; ±0.03 m/s (±0.1 ft/s)

### Depth Measurement

<b>Method</b>	Ultrasonic
<b>Standard Operating Range from FLO-DAR Housing to Liquid</b>	0 to 152.4 cm (0 to 60 in.)
<b>Accuracy</b>	±1%; ±0.25 cm (±0.1 in.)

### Flow Measurement

<b>Method</b>	Based on Continuity Equation
<b>Accuracy</b>	±5% of reading typical where flow is in a channel with uniform flow conditions and is not surcharged, ±1% full scale max.

*Continued on next page.*

## Specifications\* (continued)

### Surcharge Conditions Depth/Velocity

#### DEPTH (Std with FLO-DAR Sensor)

Surcharge depth supplied by FLO-DAR sensor.

#### VELOCITY (Optional Surcharge Velocity Sensor)

<i>Method</i>	Electromagnetic
<i>Range</i>	±4.8 m/s (±16 ft/s)
<i>Accuracy</i>	±0.15 ft/s or 4% of reading, whichever is greater.
<i>Zero Stability, Typical</i>	> ±0.05 ft/s

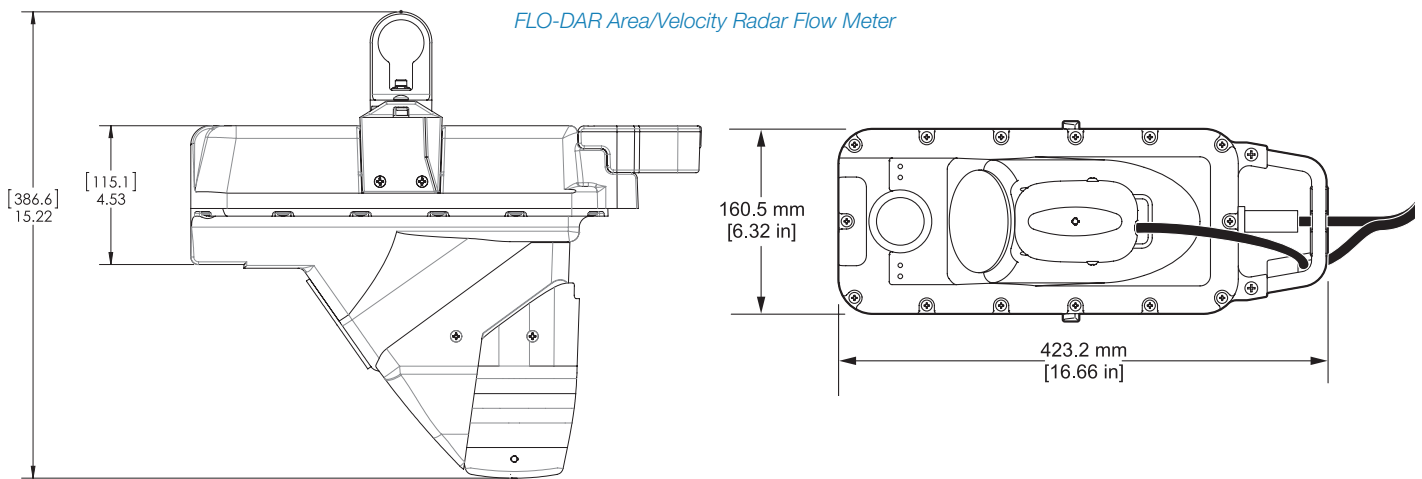
### Certification Intrinsically Safe (Optional)

The optional FLO-DAR with a Surcharge Velocity Sensor (SVS) are certified to Class I, Zone 1 Standards. They conform to ANSI/UL 60079-11 and are certified to CAN/CSA E60079-11 and EN 60079-11 standards.

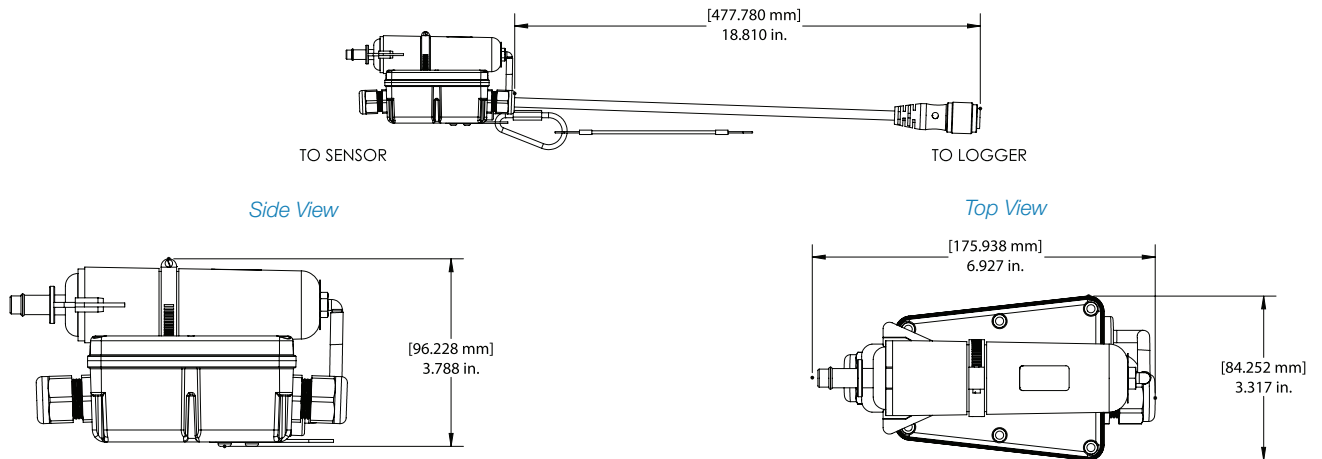
The FLO-DAR sensor meets CE requirements.

*\*Subject to change without notice.*

## Dimensions



The desiccant hub assembly includes a junction box to connect sensor cable to the desiccant and subsequently to the FL900 Logger. The desiccant can easily be replaced without need to purchase a separate desiccant module.



*Desiccant Hub Assemblies for use with portable FL900 Series Loggers.  
(Sensor cable for use with FL1500 will not contain a desiccant hub and will have bare wires on cable end.  
Order Prod. No. 8321200 for desiccant cartridge to attach to FL1500.)*

## Ordering Information

### Configure FLO-DAR Sensor to FL900 (Portable)

FLO-DAR Sensor	Model 4000	-	4	X	X
FLO-DAR Sensor with specified cable length (need to add cable as separate line item)			4		
Non Intrinsically Safe Surcharge Velocity Sensor Option (IMPORTANT NOTE: SVS cable length MUST MATCH FLO-DAR Sensor Cable length)				0 3	
0-60 Inch Range					0

### Configure FLO-DAR Sensor to FL1500 (Permanent)

FLO-DAR Sensor	Model 4000	-	9	X	X
FLO-DAR Sensor with specified cable length (need to add cable as separate line item)			9		
Non Intrinsically Safe Surcharge Velocity Sensor Option (IMPORTANT NOTE: SVS cable length MUST MATCH FLO-DAR Sensor Cable length)				0 3	
0-60 Inch Range					0

### Cables

- FD9000CBL-XXX\*** FL900 Series Logger to FLO-DAR sensor. Cable w/two connectors.
- FDJCTBOXCBL-XXX\*** FL900 Series Logger to FLO-DAR sensor. Cable with connector to sensor, open end to desiccant hub, desiccant hub with connector to sensor. Includes finishing kit for potting/sealing desiccant hub. For use with conduit.
- 6000062XX\*** SVS Sensor with connector for use with FL900 Series Logger.
- 570011800-XXX\*** FL1500 to FLO-DAR sensor cable with one connector and bare leads.
- 6000059XX\*** SVS Sensor with bare leads for use with FL1500.

\*Contact customer service for product numbers.

#### Available Cable Lengths (in feet)

30	125	225	400	700
60	150	250	450	800
75	175	300	500	900
100	200	350	600	1000

### Mounting Hardware

- 800016701** Permanent Sensor Mount-Includes sensor frame & all mounting hardware. Portable Sensor Mounts Available (Sizes 34-107") Contact Sales.

### Accessories & Spares

- 245000501** Sensor Retrieval Pole - Used to place and retrieve sensor from mounting bracket. Pole extends to 7.3 m (21 ft.)
- 510012701** Sensor Retrieval Hook - Used with Sensor Retrieval Pole
- 570011401** Grounding Strap (required with Retrieval Pole and Hook when used with IS units)
- 8755500** Bulk desiccant beads (1.5 pounds)
- 8321200** Desiccant for FL1500

### For additional information on products mentioned in this data sheet, request the following data sheets:

- FL900 Series Flow Logger (DOC053.53.35081)
- FL1500 Series Flow Logger (DOC053.53.30400)



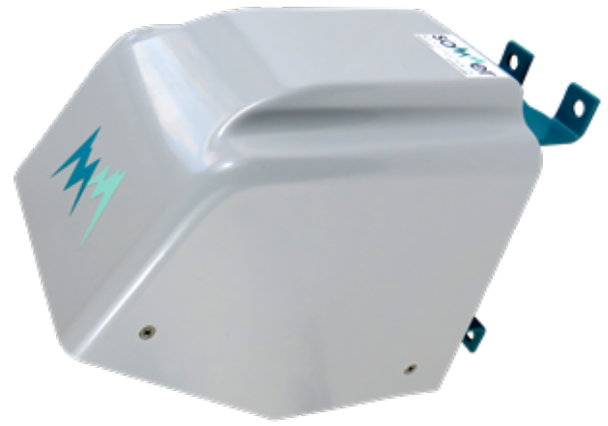
**McCrometer, Inc.**  
3255 West Stetson Avenue  
Hemet, CA 92545 USA

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800-220-2279  
Fax: 951-652-3078

customerservice@mccrometer.com  
www.mccrometer.com

# RQ-30+

## Contact-free Discharge Measurement System



The exact and real time knowledge of water discharge is of central importance in the fields of hydrography, water storage management, irrigation and for the early detection of floods. It is essential in hydraulic engineering and water resource management and is the basis for hydrological modelling and simulation.

The RQ-30+ sensor is a continuous measurement device for the contact-free determination of the water discharge of open rivers and channels. It combines two sensors in one system. The first determines the water level by measuring the transit time of a radar signal. The second simultaneously measures the flow velocity of the water surface by means of the Doppler frequency shift. These two measurements are internally combined and thus provide the water discharge by using an advanced hydraulic model from Sommer Messtechnik to calculate the discharge in real-time inside the RQ-30+.

Due to the contact-free measurement method the RQ-30+ can be installed on extension arms or cable ways without costly structural measures under or inside the water. This also has the advantage that the sensor is located outside the danger area of flood events and that it requires no maintenance over many years.

Harnessing the Power of AI and Machine Learning for Precision Measurements and Unmatched Reliability.

Unlocking new frontiers in data accuracy, the RQ-30+ integrates cutting-edge internal AI and machine learning algorithms, ensuring unparalleled precision even in challenging environmental conditions.

Distinguished by its exceptional robustness, the RQ-30+ stands tall as the instrument of choice, trusted and deployed across thousands of sites spanning over 120 countries worldwide.

Not just a technological marvel, the RQ-30+ is also eco-conscious, boasting low-power consumption and seamlessly operating on solar power, making it a sustainable solution for tomorrow's needs.

Experience the future of measurement technology with the RQ-30+: Where innovation meets reliability, and precision knows no bounds.



### FEATURES

- Contact-free radar method prevents soiling and damage, no sensor maintenance
- Automatic discharge calculation based on hydraulic model with multiple dyn. k-factors.
- Sensor self check with status and error output.
- AI-based machine learning for compensation of environmental influences and early detection of errors.
- 3-point velocity calibration certificate.
- Advanced velocity diagnostics with spectrum display
- Discharge calculation inside the RQ-30+.
- Water level and velocity sensor combined in one weather and vandalism proof housing.
- Sommer Messtechnik ANR: advanced noise reduction system

## Versions

Art	Version
21600	RQ-30+ System for contact-free discharge measurement 0.08...16 m/s, 0...15 m, analog output
22080	RQ-30+ System for contact-free discharge measurement 0.08...16 m/s, 0...30 m, analog output
22081	RG-30+ System for contact-free flow velocity measurement 0.08...16 m/s, analog output

## Scope of delivery

Qty	Art	Item
1	-	RQ-30+ in the required version
1	-	Manual and Q-Commander Software on USB stick

## Accessories

Art	Accessory
15543	Data cable for configuration and testing of RQ-30 / RG-30 / SQ
15833	Data cable for RQ-30 / RG-30 / SQ, 12x0,25 mm <sup>2</sup> , up to 60m
18711	Data cable for RQ-30 / RG-30, LiYCY 12x0,25mm <sup>2</sup> , 10 m
18712	Data cable for RQ-30 / RG-30, LiYCY 12x0,25mm <sup>2</sup> , 20 m
20074	RG / RQ standart mounting set, 2x U-bolt max. Ø60 mm
20572	RQ-30 lightning protection for cable length >50 m
-	Radar velocity verifier

## Specifications

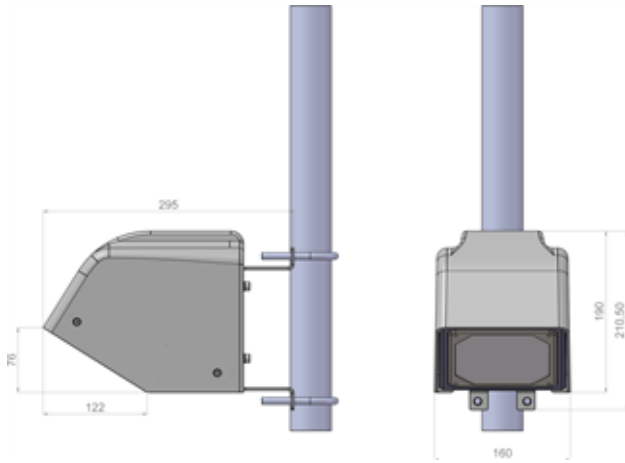
Physical and environmental	
Power supply	9...30 VDC; Reverse voltage protection, overvoltage protection
Power consumption at 12 VDC	Standby approx. 1- Active measurement approx. 140 mA (default 30 sec)
Outputs	RS-485 ASCII or Modbus RTU SDI-12 Analog output 4...20 mA (14 bit, max. load 250 Ω) Digital output (low: 0 V, high: Vsupply, max. 1.5 A)
Operating temperature	-40...85 °C (-40...185 °F)
Storage temperature	-40...85 °C (-40...185 °F)
Relative humidity	0...100 %
Protection rating	IP 67 (IP 68 on request)
Lightning protection	Integrated protection against indirect lightning with a discharge capacity of 0,6 kW Ppp
Housing material	Powder coated aluminum, vandalism-proof, plastic cover Stainless steel (on request)
Mounting bracket	Ø34...48 mm
Size L x W x H	295 x 160 x 210,5 mm (11.61 x 6.30 x 8,29 in)
Weight	5.4 kg (11.90 lb)

Velocity	
Detectable measurement range	0.08...16 m/s practical range (depending on surface water waves) 0.01...20 m/s technical range
Accuracy	± 0.01 m/s (certified by METAS)
Resolution	1 mm/s
Direction recognition	+/-
Measurement duration	5...240 s
Measurement interval	8 s...5 h
Measurement frequency	24 GHz (K-Band)
Radar opening angle	12°
Distance to water surface	0.05...130 m (0.16...426.51 ft)
Noise reduction	Sommer Messtechnik ANR (advanced noise reduction) based on velocity spectrum analysis

Automatic vertical angle compensation	
Vertical inclination	Measured internally
Accuracy	± 1 °
Resolution	± 0.1 °

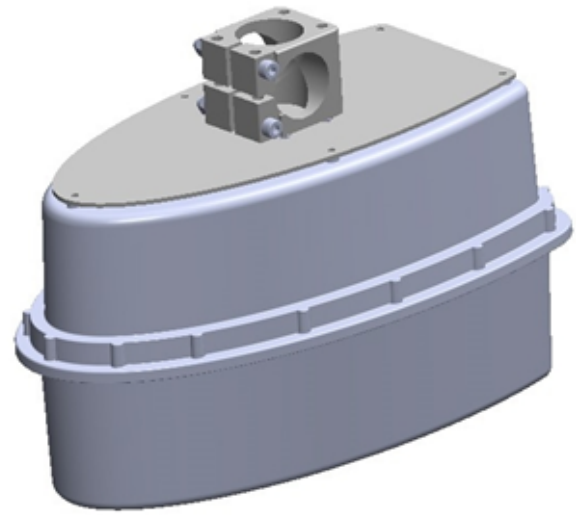
Water level measurement	15 m	30 m
Measurement range	0...15 m 49.2 ft.	0...30 m 98.4 ft.
Measurement frequency	80 GHz	
Resolution	1 mm	
Accuracy	± 2 mm	
Level sensor opening angle	8 °	4 °

Features	
Self check	Internal self check with code output for each measurement
AI Machine learning	Internal Machine learning for velocity and discharge, outputted with each measurement.
Hydraulic model	Dynamically and automatically calculated k-factors for discharge calculation
Data quality	Internal measurement quality value output with each measurement



# SQ-R+

## Contact-free Discharge Measurement System



The exact and real time knowledge of water discharge is of central importance for the operation of waste water treatment facilities, cost allocation in sewage networks and management of communal and industrial water resources.

The SQ-R+ sensor is a continuous measurement device for the contact-free determination of the water discharge of open or closed canals. It combines two sensors in one system. The first determines the water level by measuring the transit time of a radar signal, the second simultaneously measures the flow velocity of the water surface by means of the Doppler frequency shift. Following each measurement, the sensor applies an advanced hydraulic model from Sommer Messtechnik to compute the mean velocity, which in turn is used to calculate the water discharge.

Due to the contact-free measurement method the SQ-R+ can be installed on extension arms or cable ways without costly structural measures under or inside the water or sewage treatment canal. This also has the advantage that the sensor is located outside the danger area of floods and that it requires virtually no maintenance over many years.



### FEATURES

- Contact-free radar method prevents soiling and damage, no sensor maintenance
- Automatic discharge calculation based on hydraulic model with multiple dyn. k-factors.
- Sensor self check with status and error output.
- AI-based machine learning for compensation of environmental influences and early detection of errors.
- 3-point velocity calibration certificate.
- Advanced velocity diagnostics with spectrum display
- Discharge calculation inside the SQ-R+.
- Water level and velocity sensor combined in one weather and vandalism proof housing.
- Sommer Messtechnik ANR: advanced noise reduction system

## Versions

Art	Version
21599	SQ-R non-contact flowmeter for sewage and wastewater flow monitoring, with radar level and velocity sensors

## Scope of delivery

Qty	Art	Item
1	-	SQ-R+ in the required version
1	-	Manual and SQ-Commander Software on USB stick

## Accessories

Art	Accessory
20789	MAIN sensor cable SQ/USH-9, 10 m
20791	MAIN sensor cable SQ/USH-9, 20 m
-	MAIN sensor cable for SQ-R+ up to 60 m available on request
19294	USB to RS485 embedded converter cable, 1.8 m
22524	Universal extension box for cable extension
-	Radar velocity verifier

# Specifications

Physical and environmental	
Power supply	9...30 VDC; Reverse voltage protection, overvoltage protection
Power consumption at 12 VDC	1.5 Ah per day Peak current drain 91 mA Inrush current <200 mA (for a measurement interval of 60 s)
Outputs	RS-485 ASCII or Modbus RTU SDI-12 Analog output 4...20 mA (14 bit, max. load 250 Ω) Digital output (low: 0 V, high: Vsupply, max. 1.5 A)
Operating temperature	-40...85 °C (-40...185 °F)
Storage temperature	-40...85 °C (-40...185 °F)
Relative humidity	0...100 %
Protection rating	IP 68
Lightning protection	Integrated protection against indirect lightning with a discharge capacity of 0,6 kW Ppp
Housing material	Zytel 103HSL NC010, resistant to aggressive substances typically found in sewage channels
Mounting bracket	Mounting cube for Ø30 mm pipe
Size L x W x H	272 x 152.2 x 185.5 mm (10.71 x 5.99 x 7.30 in), including mounting cube
Weight	1.55 kg (3.42 lb)

Velocity	
Detectable measurement range	0.08...16 m/s practical range (depending on surface water waves) 0.01...20 m/s technical range
Accuracy	± 0.01 m/s (certified by METAS)
Resolution	1 mm/s
Direction recognition	+/-
Measurement duration	5...240 s
Measurement interval	8 s...5 h
Measurement frequency	24 GHz (K-Band)
Radar opening angle	12°
Distance to water surface	0.05...130 m (0.16...426.51 ft)
Noise reduction	Sommer Messtechnik ANR (advanced noise reduction) based on velocity spectrum analysis

Automatic vertical angle compensation	
Vertical inclination	Measured internally
Accuracy	± 1 °
Resolution	± 0.1 °

Water level	
Measurement range (distance between level sensor and water surface)	0.05...8 m (0.16...26.25 ft)
Accuracy	≤ 2 mm
W-band (80 GHz technology)	W-band (80 GHz)
Opening angle	8 °

Features	
Self check	Internal self check with code output for each measurement
AI Machine learning	Internal Machine learning for velocity and discharge, outputted with each measurement.
Hydraulic model	Dynamically and automatically calculated k-factors for discharge calculation
Data quality	Internal measurement quality value output with each measurement

# RP-30

## Radar Profiler

Mobile, contact-free measurement of surface velocity profile on rivers specially under flood conditions



## Properties and benefits

- » Portable mobile measurement system
- » For use on cable ways, bridge railings and tripods
- » For flood conditions and high flow velocities
- » No danger from flotsam and debris
- » Calculation of discharge with known water level and cross section profile
- » Easy user interface and handling
- » Wireless data transmission via Radio
- » Measurement range from 0.10 to 15 m/s (depending on flow conditions)

## General

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### Introduction

The RP-30 Radar Profiler, a mobile measurement system, is used to measure the surface velocity profile of rivers and canals. To achieve maximum mobility we offer different mobile mounting devices that will suit any situation. The measurement data are transferred in real time to a laptop by an integrated Radio (2.4GHz) transmitter in the RP-30. The results can be viewed immediately on the computer screen during the measurement.

### Contact-free = reliable

Due to the contact-free measurement the Radar Profiler is not exposed to damage inflicted by flotsam and debris. This results in low maintenance and improved reliability, especially in flood situations.

### Mobile system

The conveniently sized radar sensor is easy to transport and designed for mobile measurements. The Radar Profiler is equipped with a battery that provides power for up to 40 hours of operation. The portable system enables measurements at sites where it is very difficult or impossible to set up alternative systems.



## Applications

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### Cable way

It is easy and fast to mount the Radar Profiler on existing cable ways. Furthermore it is possible to perform a velocity measurement of the complete river profile according to your own requirements. For this purpose it is possible to measure at different and freely selectable horizontal positions across the river.



### Traveler for hand rails

The traveler for rails enables the RP-30 to apply on hand rails. It is possible to perform measurements of the surface velocity at different positions in a short amount of time. The result is a complete velocity profile of the river.

### Tripod Mount

An even more mobile setup can be achieved by using a standard tripod to mount the Radar Profiler. With such a setup it is easy to freely choose a position to perform measurements, as long as the tripod stands on solid ground.



# RP-Commander

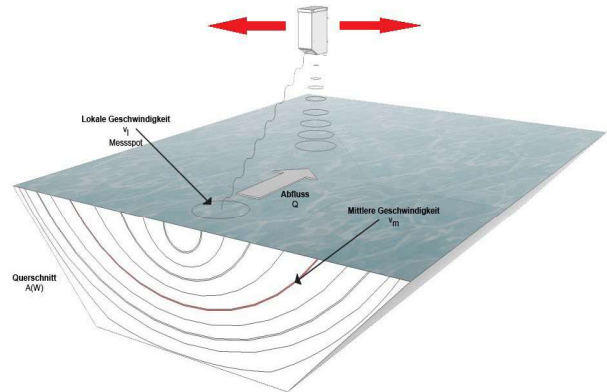
## Profile measurement

The RP-Commander software supports you to measure the surface velocity profile. After the horizontal positions of the single measurements are defined, the RP-30 is moved across the river. At every defined position a velocity measurement is manually started. The measured values are saved, listed in a table and displayed in a velocity profile graph. Additional measurements for the reverse movement of the RP-30 are possible.

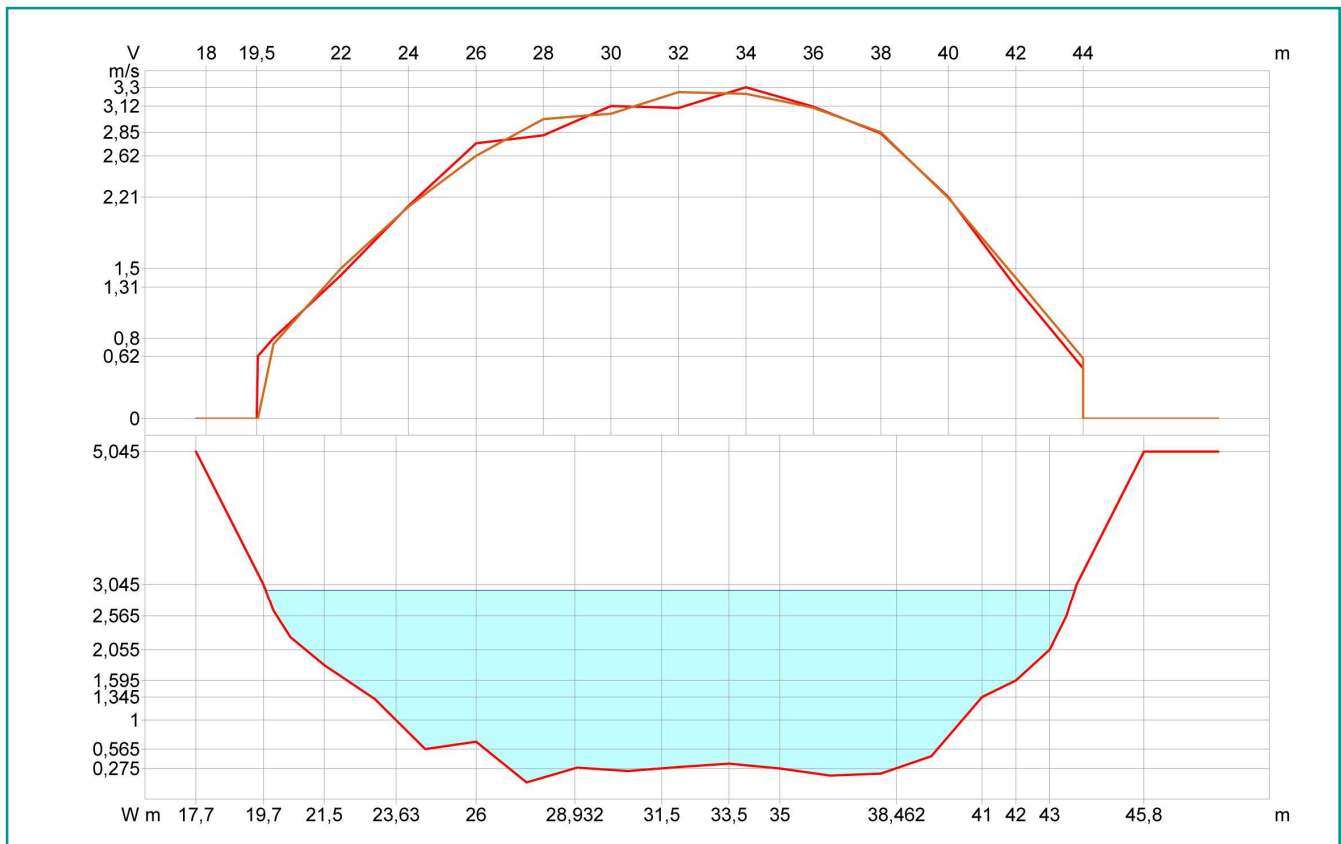


## Calculation of discharge

To calculate the discharge the water level and the cross section profile have to be known and entered in the RP-Commander. For every single measurement the area of the wetted cross section is determined. Additionally the mean velocity of every section is calculated from the measured surface velocity by a hydraulic model. This results in an individual discharge for every section. By adding these up results in the total discharge.



## Diagram: Velocity profile / Cross section



Water level	Area	Discharge measurement 1	Discharge measurement 2
2.96 m	52.3 m <sup>2</sup>	125171 l/s	127328 l/s

## Technical Data

General	
Dimensions	445 x 154 x 226 mm
Weight without traveler	6.60 kg
Weight with traveler	8.00 kg
Protection	IP 67
Battery	12 V / 4,5 Ah
Operation time	up to 40 hours
Power consumption inactive state	10 mA
Power consumption measurement	110 mA
Operation temperature	-35° ... 60° C
Storage temperature	-40° ... 60° C

Velocity measurement	
Detectable measurement range	0.10 ... 15 m/s (depending on flow conditions)
Accuracy	+/- 0.01 m/s; +/- 1 % FS
Resolution	1 mm/s
Measurement duration	5 ... 240 sec.
Measurement frequency	24 GHz (K-Band)
Radar opening angle	12°
Distance to water surface	0.50 ... 130 m
Necessary minimum wave height	3 mm

Internal slope measurement	
Accuracy	+/- 1°
Resolution	+/- 0.1°

Data transfer	
Radio	Radio 2,4GHz (Transfer distance up to 150m)

# HSR-10

Portable and handheld non-contact radar for mobile and spontaneous velocity measurements



The HSR-10 mobile handheld radar sensor is a measurement device for the contact-free determination of the flow velocity of open rivers and channels. The sensor detects the surface flow velocity by the principle of the Doppler frequency shift.

Due to the contact-free measurement method the HSR-10 is ideal for usage at high velocities, turbulent streams and rivers difficult to access. It is ecologically compatible and harmless to the water. Comfortable transmission of measurement values from sensor to receiving unit via WIFI.



## FEATURES

- Contact-free method prevents soiling and damage, no sensor maintenance
- A handy compact radar for safe and fast measurements
- Operational analysis values and a convenient interface
- Sensor self check with status and error output.
- 3-point velocity calibration certificate.
- Sommer Messtechnik ANR: advanced noise reduction system

## Versions

Art	Version
22350	HSR-10 Handheld Surface Radar Bundle

## Scope of delivery

Qty	Art	Item
1	22348	HSR-10 Handheld non-contact radar
1	22427	Charger for Makita batteries
1	22351	HSR-10 Case

## Accessories

Art	Accessory
22432	Battery Makita BL1830 3Ah
22433	Battery Makita BL1820 2Ah

## Specifications

Physical and environmental	
Power supply	9...18V VDC; Reverse voltage protection, overvoltage protection
Battery capacity	2,0 Ah or 3,0 Ah
Charging time	approx. 2 hrs
Outputs	Wi-Fi, 2,4GHz (transmission range up to 50 m)
Operating temperature	-40...60 °C (-40...140 °F)
Storage temperature	-40...85 °C (-40...185 °F)
Relative humidity	0...100 %
Protection rating	IP 65
Size L x W x H (with battery)	263 x 123 x 271 mm (10.35 x 4.84 x 10.66 in)
Weight	1.2 kg (2.71 lb) plus 0.6 kg (1.32 lb) battery
Case size L x W x H	480 x 380 x 190 mm (18.9 x 14.9 x 7.5 in)
Case weight (without battery)	4.74 kg (10.45 lb) plus 0.6 kg (1.32 lb) battery

Velocity	
Detectable measurement range	0.08...16 m/s practical range (depending on surface water waves) 0.01...20 m/s technical range
Accuracy	± 0.01 m/s (certified by METAS)
Resolution	1 mm/s
Direction recognition	+/-
Measurement duration	10 s
Measurement frequency	24 GHz (K-Band)
Distance to water surface	0.5...100 m (1.6...328.0 ft)
Noise reduction	Sommer Messtechnik ANR (advanced noise reduction) based on velocity spectrum analysis

Features	
Data quality	Internal measurement quality value output with each measurement



## Applications

Surface Water Velocity  
Stream Gaging  
Flood warning  
Hydropower  
Storm Water

## Surface Velocity Radar

Non-contact sensor for measuring open channel flow continuously

SDI-12 interface for compatibility with SDI-12 data loggers

Integrated tilt sensor for continuous verification of instrument alignment

Integrated vibration sensor for extended QA / QC

Swivel mount for flexible sensor mounting at vertical and horizontal structures

Velocity and status information available via SDI-12, RS-232, RS-485, and MODBUS protocol

### Reduces number of field visits and total cost of ownership

By mounting safely above the water surface away from floating debris and by having low-maintenance requirements, the sensor can remain operating uninterrupted for longer periods of time to save on unnecessary field visits and long-term costs.

### State-of-art measuring principle technology

Oriented parallel to the main flow direction and tilted against the water surface, the sensor is transmitting and receiving electromagnetic waves. The sensor detects a change in frequency of returning signals if the water surface is rough and in motion (Doppler shift). From this the water surface velocity can be derived.

### A leading indicator to detect shifts in existing discharge rating curves

If you have a rating curve based on flow meter or ADCP measurements and you are measuring continuous surface water velocity, you can use real measurements to verify the extrapolated part of the rating curve.

### Informs when instream velocity measurements may be required

When a shift is detected, depending on the nature and extent of the shift, it can indicate when a field visit is necessary. This ultimately improves data quality by enabling fast response to changes.

# Technical Specifications

	Feature	Value
MEASUREMENT	Measurement Range Velocity	0.08 ... 15 m/s (0.26 ... 49.12 ft/s)
	Resolution	0.1 mm/s (0.0003 ft/s)
	Accuracy	+/- 2% of measured value (0.08 m/s ... 4 m/s) (0.26 ... 13.12 ft/s) +/- 2.5% of measured value (4 m/s ... 12 m/s) (13.12 ... 39.37 ft/s)
	Beam Angle	12° Azimuth
		24° Elevation
	Detection Distance	1 ... 50 m (3.3 ... 164 ft)
	Distance to Water	0.5 ... 25 m (1.64 ... 82 ft)
	Radar Frequency	24 GHz (K-band)
INTERFACES	Serial Interfaces	RS-232, RS-485, SDI-12
	Protocols	SDI-12, MODBUS
ELECTRICAL DATA	Operating Voltage	9 ... 27 VDC
	Power/Current Consumption	Active typ. < 90 mA at 12 VDC
		Standby: < 7.5 mA @ 12 VDC
	Max. current: < 175 mA	
DIMENSIONS & WEIGHT	Dimensions (LxWxH)	134.5 x 114.5 x 80 mm (5.3 x 4.5 x 3.2 in) without mounting bracket
	Weight	Weight without mounting support: 820 g (1.81 lbs.)
		Weight with mounting support: 1530 g (3.37 lbs.)
MATERIAL	Material	Housing: ASA & Aluminium
		Radom: TFM PTFE
		Mounting: 1.4301 (V2A)
GENERAL	Rotation Range of Swivel Mount	Lateral axis: ±90°
		Longitudinal axis: ± 15°
	Cable Length	SDI-12 / RS-232: max. 65 m (9,600 Baud)
RS-485: max. 500 m (9,600 Baud)		
ENVIRONMENTAL CONDITIONS	Operating Temperature	-40° ... +85° C (-40° ... +185° F)
	Housing	IP68

# Hydro-STIV<sub>PORTABLE</sub>

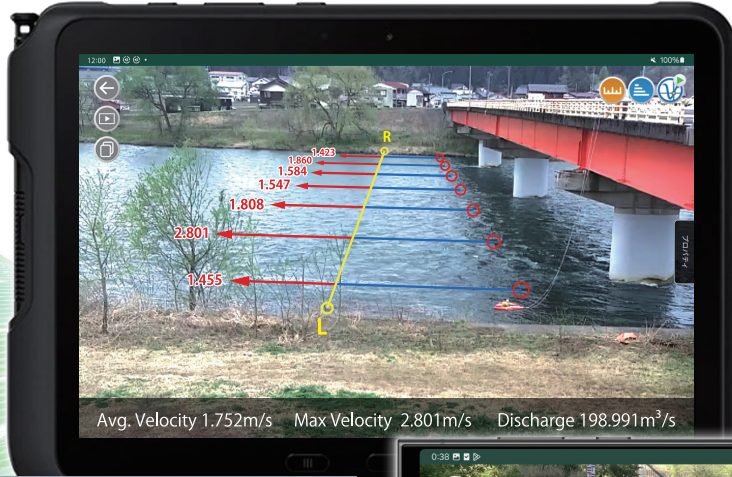
Japanese Patent No. 6910506

NETIS Registered KK-220021-A

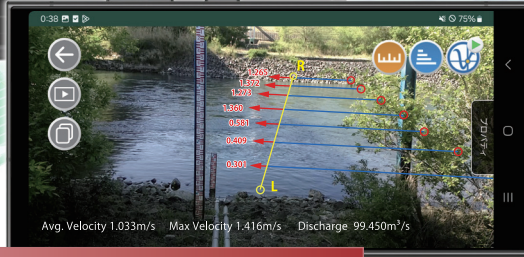
Flow Velocity and Discharge Measurement Device Using Video Images

Using the latest STIV technology  
by Ichiro Fujita  
(Professor Emeritus, Kobe University)

## Flow velocity and discharge measurement using video images



Tablet type ※1



Smartphone type



GCP is **not required**

Speedy measurement

Able to confirm results **on site**

High precision  
(distance up to 150m<sup>※2</sup> wide)

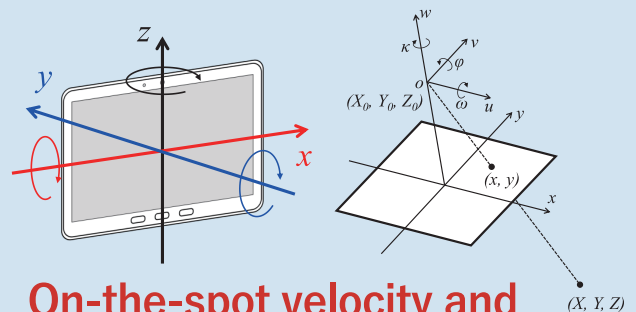
*Installed STIV, a video-based flow velocity and discharge measuring system in mobile device*

*Complete measurement with a single unit!  
Displays flow velocity and discharge instantly on site!!*

*Equipped with drone linkage function*

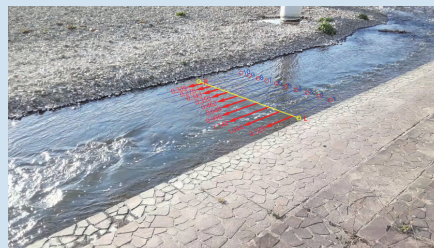
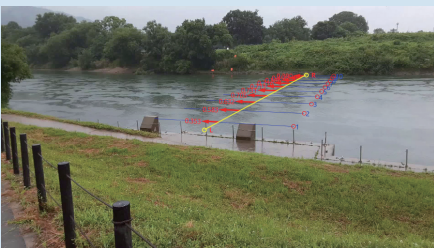
### New Tech

Utilizes acceleration sensors on the device for easy geometric correction in the field **without the need to set up and survey ground control points.**



**From ditch to 150m wide river** ※2

**On-the-spot velocity and discharge measurement**



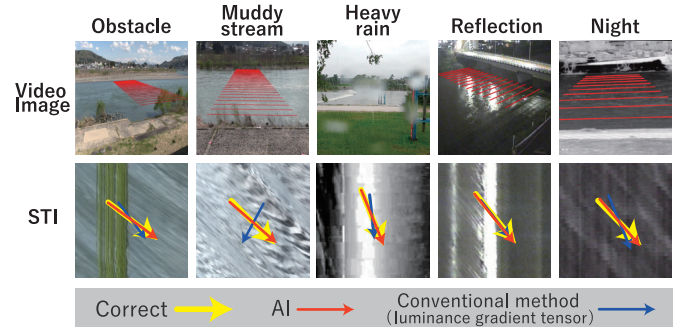
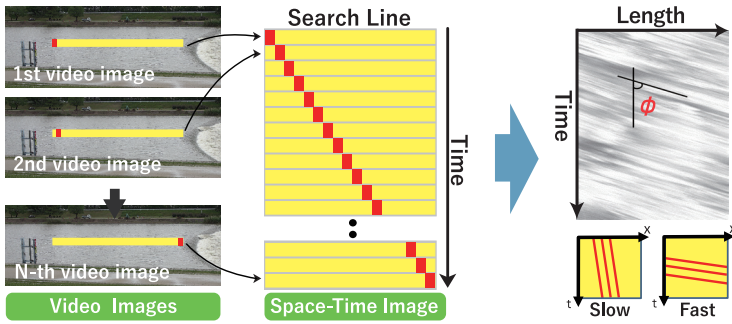
※1 Commercial use tablet with excellent shock resistance, waterproof and dustproof performance compliant with MIL-STD-810H procurement standard of the U.S. Department of Defense

※2 If using a smartphone

The Hydro-STIV Portable is a flow velocity and discharge measurement device that allows to perform the visual velocimetry technique immediately in the field. A single device can perform a number of tasks to measure flow velocity and discharge on the spot because it has all three of the necessary functions for STIV flow velocity measurement: "image capturing," "geometric correction," and "high-precision flow velocity measurement by AI."

## ● High-precision measurement with Hydro-STIV

With the most recent STIV and AI technologies installed, it provides measurement precision comparable to that of our Hydro-STIV Cloud service.



※Ichiro FUJITA, Tastushi SHIBANO, Kojiro TANI: Improvement of STIV for video images captured under deteriorated measurement conditions, JSCE, Ser. B1(Hydraulic Engineering),Vol. 74, No.5,I\_619-I\_624,2018.

## ● New Geometric Correction Methods

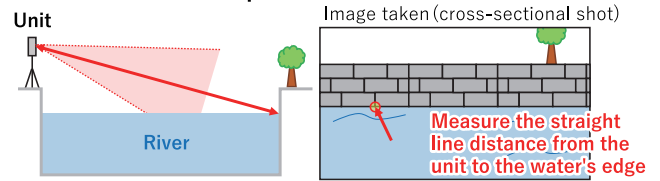
The use of new technologies eliminates the need for a fixed point while doing geometric rectification. To finish the measurement preparation, just one of the following pieces of information is required.

### Distance setting between 2 points

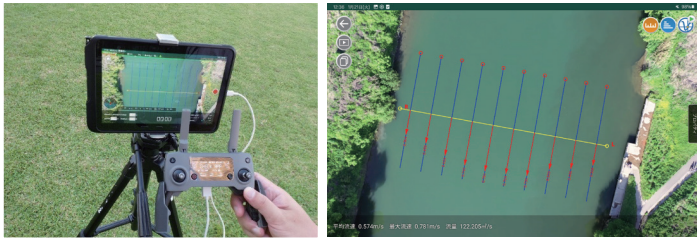
Use the distance between any two points on the water surface.  
(e.g., channel width, between piers, etc.)

### Straight line distance setting

Use the straight line distance from the unit to the water's edge.



## ● Drone linkage function



The Hydro-STIV portable can be linked to a drone to read the drone's video information on the spot to measure flow velocity and discharge. The drone linkage function enables measurements in large rivers and disaster hazardous areas that cannot be taken with the tablet's built-in camera.

※Please check the latest drone operation status on our website.  
[https://hydrosoken.co.jp/data/img/Hydro\\_STIV\\_Portable\\_droneA4\\_en.pdf](https://hydrosoken.co.jp/data/img/Hydro_STIV_Portable_droneA4_en.pdf)

## Device specification

	Tablet type	Smartphone type	Main functions	
Image			<b>Measurement Functions</b> Flow velocity and discharge measurement using STIV Precise automatic velocity measurement by AI Equipped with drone linkage function Geometric correction by acceleration sensor and gyro sensor High-resolution photography using built-in camera(Full HD) Scale setting by linear distance Scale setting by distance between two points Discharge calculation using velocity area method Correction of velocity outliers	<b>Utility Functions</b> Video stabilization Cross section data edit Display of velocity on image Report creation File output for Hydro-STIV Cloud
Device name	Galaxy Tab Active4 Pro	Galaxy S24 Ultra		
Size (H x W x D)	170.2mm×242.9mm×10.2mm	162.3mm×79.0mm×8.6mm		
Mass	832g	233g		
Display	10.1inch WUXGA(1,920×1,200)	6.8 inch Quad HD+(3120×1440)		
Battery	7,600mAh (Video playback up to 30 hours)	5,000mAh (Video playback up to 30 hours)		
S pen	Supported (included)	Supported (included)	<b>Measurement specification</b>	
CPU	Qualcomm SM7325 (quad-core 2.4Ghz + 1.8Ghz)	Snapdragon 8 Gen 3 Mobile Platform for Galaxy (octa-core 3.39GHz + 3.1GHz + 2.9GHz + 2.2GHz)	Principle	Image analysis (STIV method)
Memory/Storage	4GB/64GB	12GB/256GB	Measuring range	0.1 - 20.0 m/s
Camera	13 MP	200 MP	Survey lines	1 - 30 lines
OS	Android	Android	Measurable distance	Tablet ~100m Smartphone ~150m
			Accuracy : Velocity	±2%~±10% *The closer the distance, the higher the accuracy
			Accuracy : Discharge	±1%~±5% *The closer the distance, the higher the accuracy

For product purchases and inquiries, please contact

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