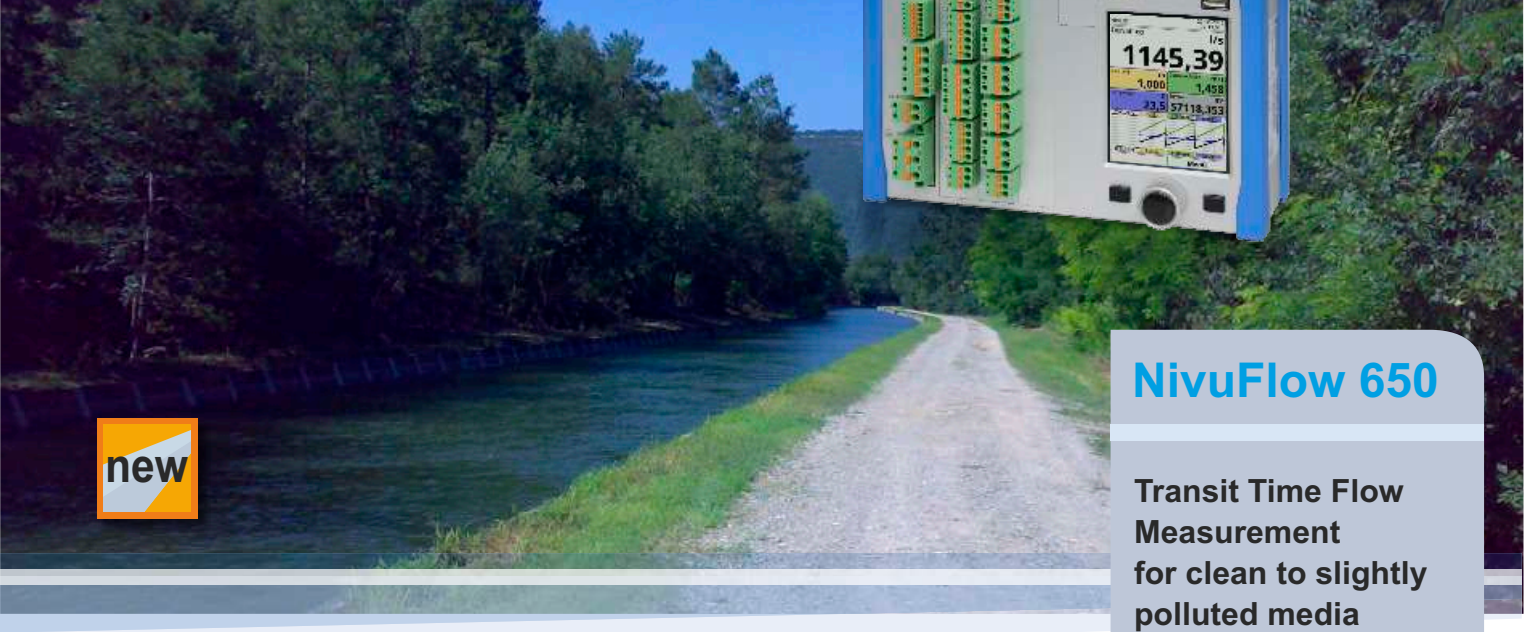


new

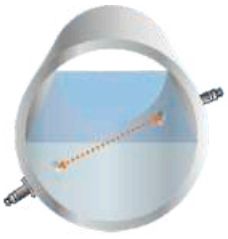
NivuFlow 650

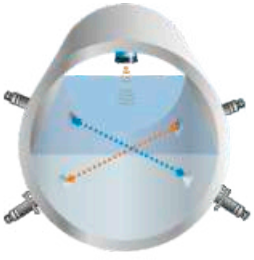
Transit Time Flow Measurement for clean to slightly polluted media

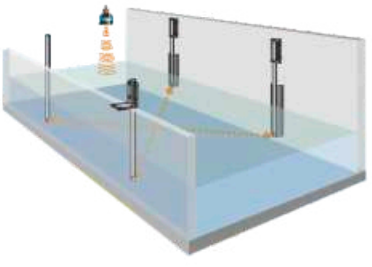
NIVUS - innovation and high accuracy

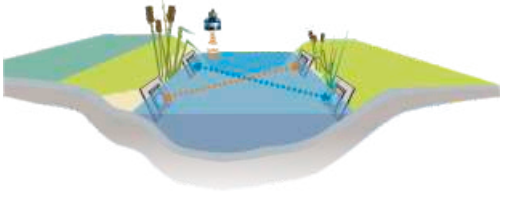
The NivuFlow 650 system was developed particularly for flow measurement in part filled and full pipes, channels and surface water bodies. To meet accuracy requirements it is possible to equip the transmitters with up to 4 measurement paths. Up to 32 measurement paths are possible with optional extention modules. The big variety of transit time flow sensors allows to integrate the systems into almost any given situation. The system is suitable for the detection of flow rates in various liquid media covering a wide range of applications.

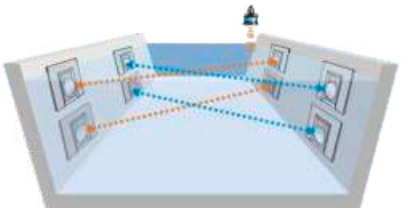
Flow measurement in a channel
The best conditions possible for NivuChannel











Flow measurement systems at the highest technical level

The compact can be easily integrated into switching cabinets saving space thanks to DIN rail mounting.
Moreover, the NivuFlow 650 units are available in a special field enclosure featuring protection for use in rough environmental conditions.
The transmitter‘s large graphic display allows quick and easy commissioning of the flow metering system.

It furthermore provides extended diagnostic options and enables in-depth analyses of running processes on site. The transmitter software was newly developed from scratch. Using future-proof protocols and versatile options for communication and connections opens a wide variety of options to operators when it comes to integrate the instruments into higher systems such as SCADA or process conducting systems.

Your benefits

- Ultrasonic transit time measurement
- Single or multi path measurement
  (up to 32 measurement paths with extention modules)
- quick and easy initial start-up due to intuitive, modern operating concept
- Suitable for each application - we offer the widest range of sensors
- Online connection/data trans-mission and remote maintenance via Internet
- Uncomplicated integration into existing control systems via universal interfaces
- Weatherproof version for outdoor use available

Typical Applications

Measurement in surface water such as rivers, channels, irrigation systems, drainage systems as well as cooling water, process water, hydropower plants, penstock monitoring, turbine efficiency monitoring and many more

Nivu Flow 650 transmitter

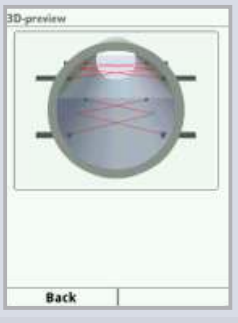
The intuitive one-hand operation and the bright colour display allow quick, easy and cost-efficient commissioning on site. Additional input devices or software are not required.

The flow profile is calculated in real time and is reproducibly and verifiably indicated on the transmitter display. Factors influencing the calculation results such as channel shapes, discharge behaviour and wall roughness are considered during flow calculation.

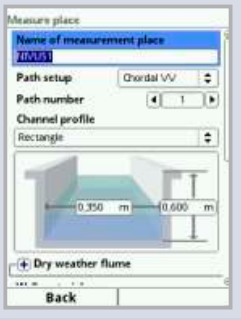
In addition to the compact DIN rail version there is a weatherproof field unit available featuring appropriate connection space for outdoor installation

Screen display menu

Screen display main screen



Screen display 3D-preview



Screen display measure place

Installation suggestion

On site from anywhere

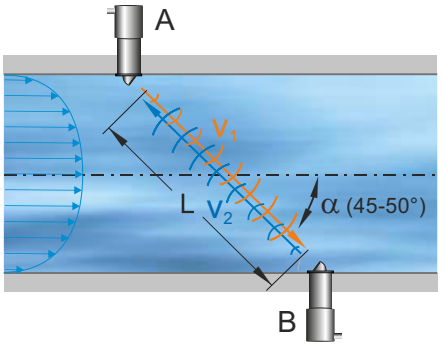
- Integrated data logger for high data security
- Saved data can be recalled at any time
- Online operation and online setting of parameters (remote control)
- Quick and comprehensive remote diagnostics of entire measurement places

How the NivuFlow 650 measures

Ultrasonic flow measurement is an indirect measurement method.
The flow rate is calculated from a velocity measurement and a cross-sectional area related to the water level.
This is where the general equation of continuity comes into effect:

$$Q = A \cdot v_A$$

A = cross-sectional area
v_A = average flow velocity in cross-sectional area

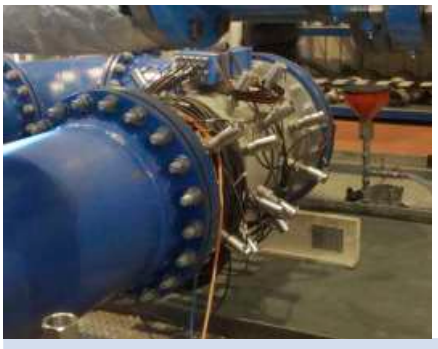


The NivuFlow 650 measurement principle is based on detecting the transit time of ultrasonic signals between two sensors (A and B).
The transit time in flow direction t_1 is shorter than it is against the flow direction t_2. The difference between both transit times is proportional to the average flow velocity along the measurement path v_m.

The measurement system calculates the average cross-sectional area velocity v_A from the path velocity v_m and allows to indicate it directly on the display.

$$v_m = \frac{c^2}{2 \cdot L \cdot \cos\alpha} \cdot \left(\frac{1}{t_1} - \frac{1}{t_2}\right)$$

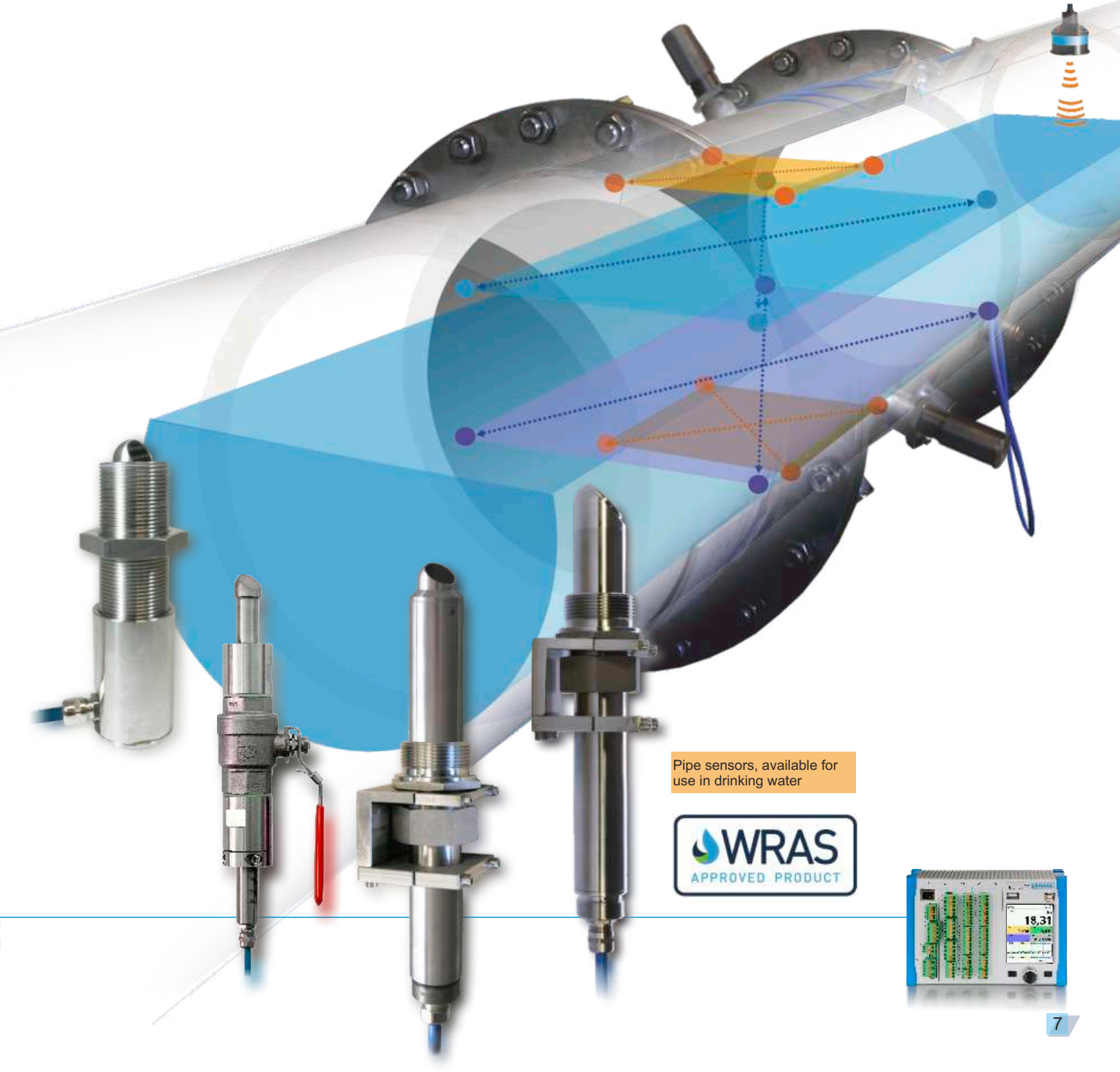
c = velocity of sound
t_1 = time from A to B, t_2 = time from B to A



Measurements in part filled pipes

In case of a fully developed flow velocity profile in pipes in most cases it is sufficient to use a single path measurement (1E1P).
Normally there are distorted flow profiles however which have negative effects on the measurement accuracy.
Such influences can be compensated by using the NivuFlow 650 in combination with up to 32 measurement paths.

The NivuFlow 650 utilises various sensor types depending on applications.
For measurements in part filled and full pipes there are special screw-in pipe sensors available which can be installed very simply.

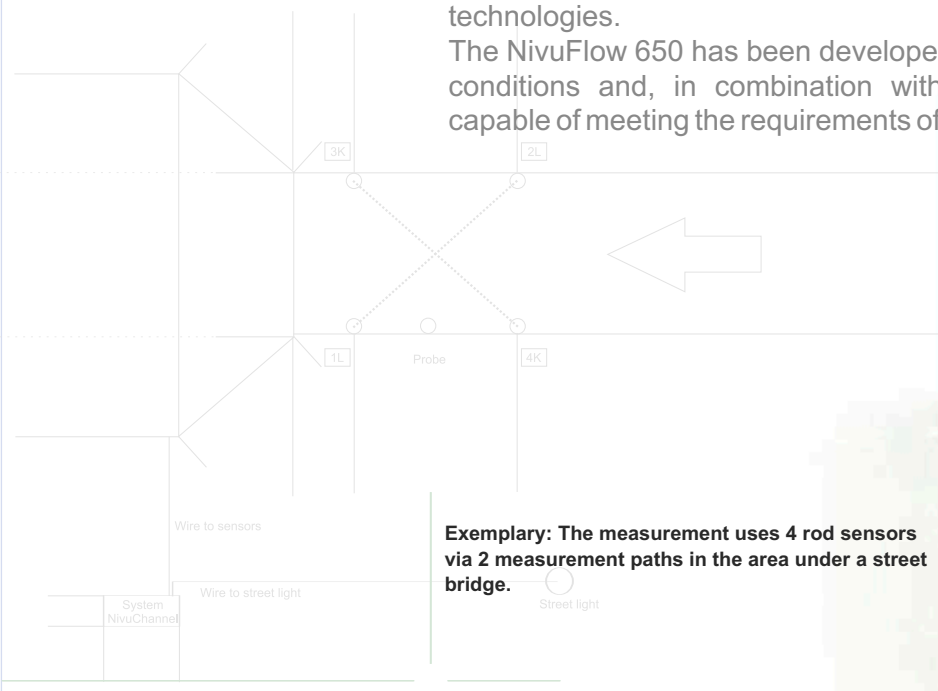


Pipe sensors, available for use in drinking water

WRAS APPROVED PRODUCT

Measurement in open channels

Measuring in open channels and rivers is very demanding regarding the measurement technology used.
From indefinable cross-sectional profiles to movable river beds there are conditions making it very difficult to use standard measurement technologies.
The NivuFlow 650 has been developed particularly for use under such conditions and, in combination with other measurement units, is capable of meeting the requirements of very difficult applications..



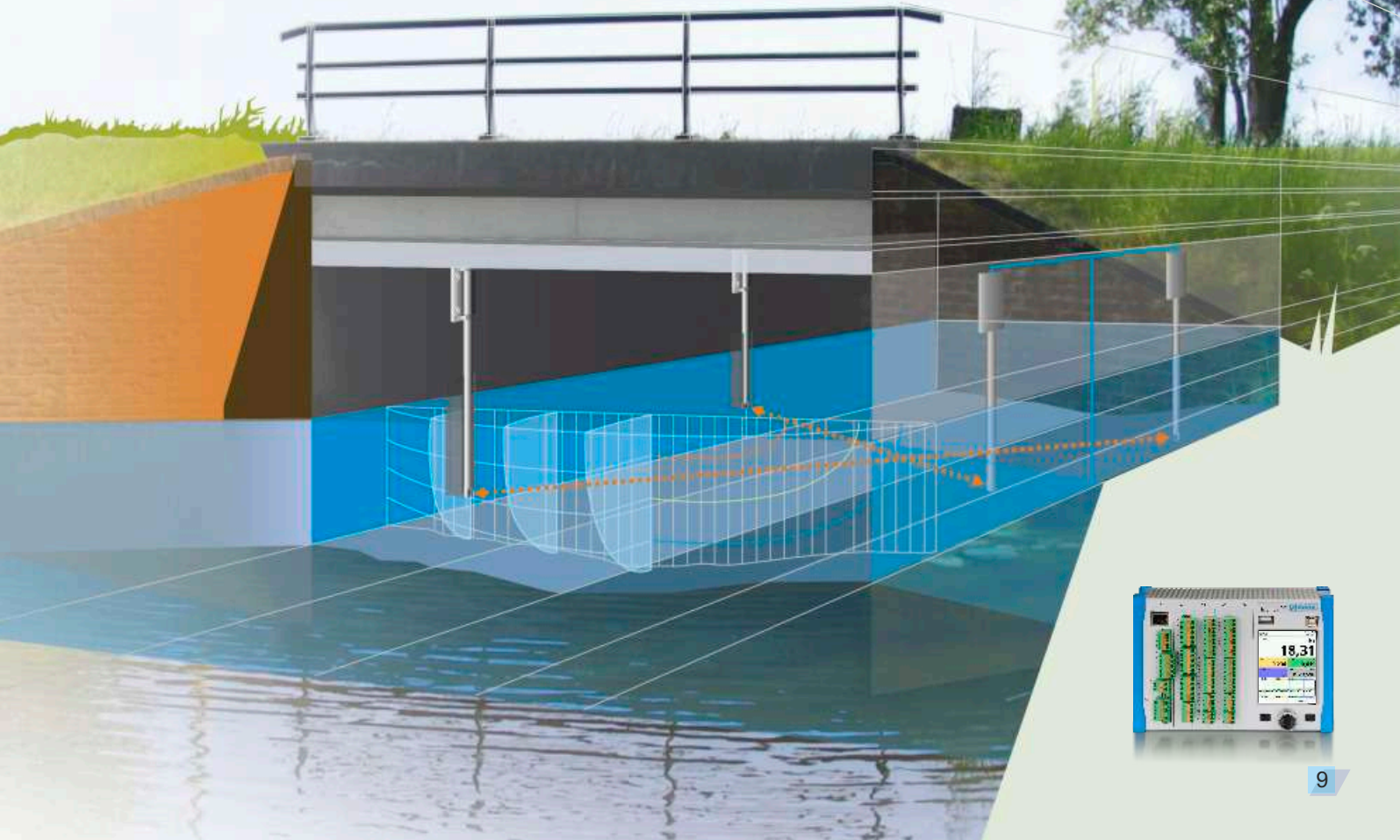
Exemplary: The measurement uses 4 rod sensors via 2 measurement paths in the area under a street bridge.

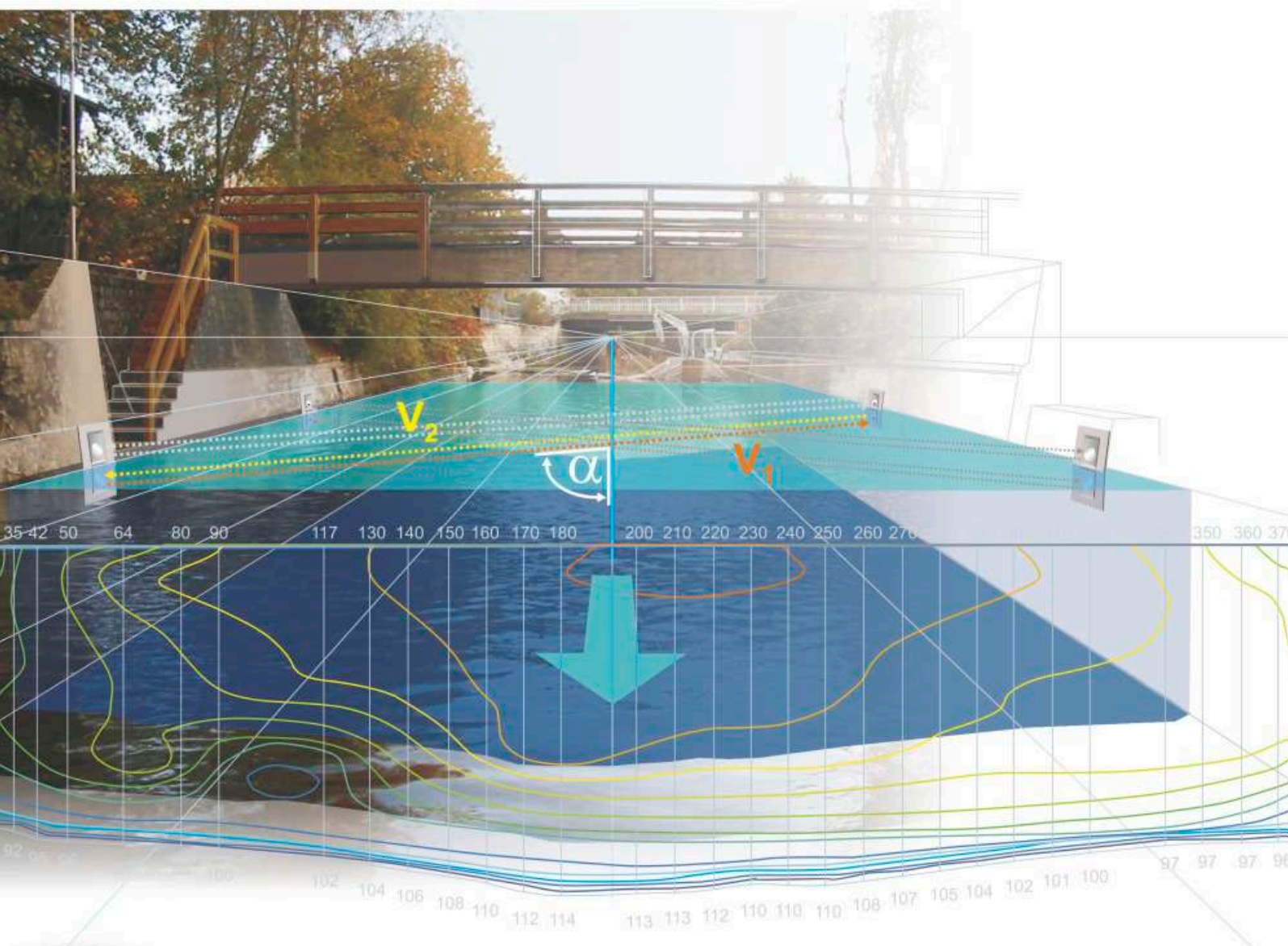
Rod sensors

For use in open channels there are up to 4 measurement paths (32 with extention modules) available as well. Right as in full pipes the number of used measurement paths will enormously increase the measurement accuracy.

Sensors

Particularly for measurements in channels and rivers NIVUS have developed high accurate sensors.
Rod sensors available in various lengths and hemisphere sensors provide the best possible options for almost any application.
Special mounting accessories facilitate installation on site.

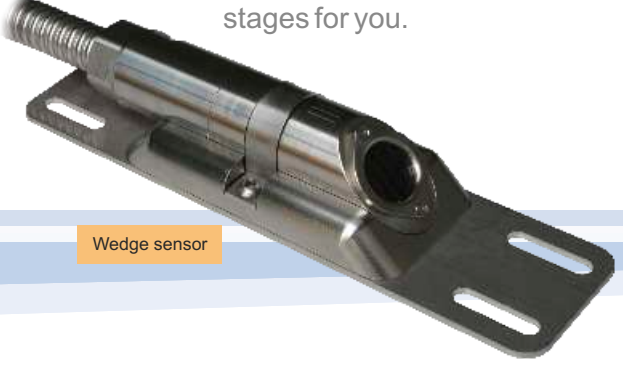




NIVUS - setting exemplary solutions

Numerous reliable measurement places using the NivuFlow 650 indicate its level of sophistication in daily use.
This is accomplished by using both technology as well as planning which is focused on meeting the requirements of the respective applications. Benefit from decades of experience and the know-how our engineers, technicians and expert staff have gained.
If desired, we will implement the complete planning and evaluating stages for you.

Hemisphere sensor



Wedge sensor

Ballhead sensor

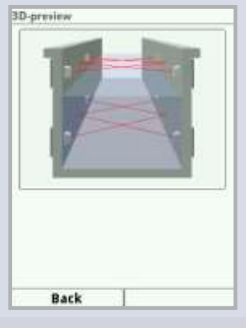
Flow measurement using the hemisphere sensors

Selection and planning of the measurement place as well as channel profile set-up. The channel has a rectangular profile with a natural river bed. Rising and falling water levels had to be taken into account.

There are 8 hemisphere sensors in use which measure crosswise utilising 4 measurement paths in 2 measurement levels.
The upper measurement levels will switch on in case of rising water level.
The sensors have been screwed onto a stainless steel plate (available as accessory), the concrete baseplate has been set up before.

Installation of hemisphere sensors in a part filled channel.

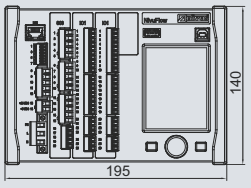
Do you need individual solutions for your measurement problems or you are interested in other application examples and references?
Talk to us.

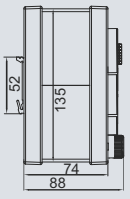


Screen display 3D-preview

Transmitter

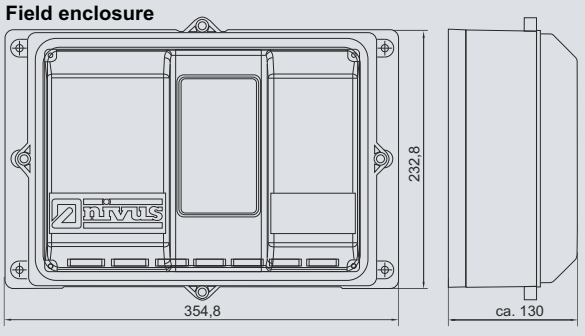
DIN rail enclosure for easy installation in switching cabinet





Dimensions in **mm**

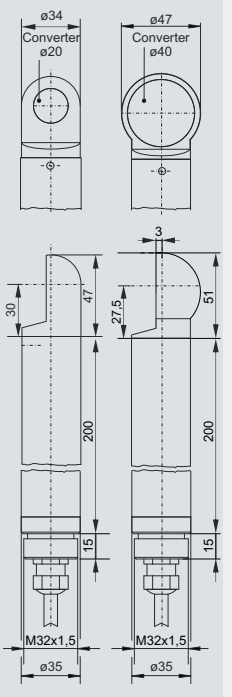
Field enclosure



Transmitter

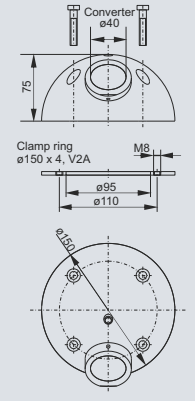
Power supply	100 - 240 V AC, -15 % / +10 %, 47 to 63 Hz or 10 - 35 V DC
Power consumption	1 relay energised, 230 V AC: (rounded) 14 W up to 8 sensors transit time 1 MHz
Enclosure	aluminium, plastic
Weight	approx. 1150 g
Protection	IP 20
Operating temperature	DC: -20°C to +70°C AC: -20°C to +65°C
Storage temperature	-30°C to +80°C
Max. humidity	80%, non-condensing
Display	240 x 320 pixel, 65536 colours
Operation	rotary pushbutton, 2 function keys, menus in English, German, French, Swedish ...
Connection	plug with cage clamp terminals
Inputs	2x (Type T2) 4-20 mA, with 12 Bit resolution for storage of data from external units, load 91 Ohm, 2 x (Type T2) digital input
Outputs	2 x (Type T2) 0/4-20 mA, load 500 Ohm, 12 Bit resolution 1x (Type T2) bistable relay SPDT, load up to 230 V AC/2 A (cos 0.9), minimum switching current 100 mA 1x (Type T2) relay SPDT, load up to 230 V AC/2 A (cos 0.9), min. switching current 100 mA
Data memory	1.0 GB internal memory, readout on faceplate via USB stick
Communication	• Modbus TCP via network (LAN/WAN, Internet) • Modbus RTU via RS485 or RS232 • Ethernet TCP/IP
Measurement uncertainty	• flow (Q): ± 0.5 % depending on measurement and margin conditions • offset velocity < ± 5mm/s
Number of paths	1 up to 4 measurement paths, up to 32 measurement paths with extention modules

Rod sensor
Type V20xx Type V30xx

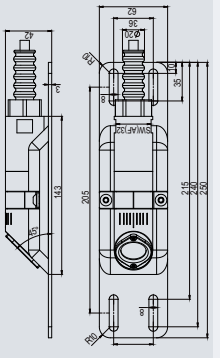


for use with extension pipes
300 mm or 800 mm
other lengths upon request

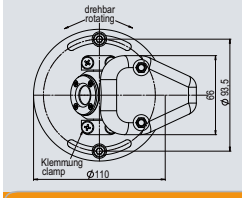
Universal
hemisphere sensor



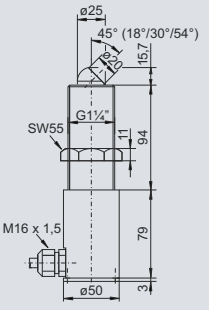
Wedge sensor

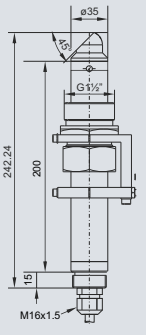


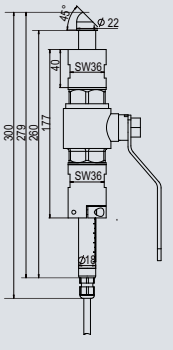
Ballhead sensor



Screw-in sensor/
plug-in sensor







Dimensions in **mm**

Sensors

Measurement principle	**ultrasonic transit time**
Measurement range	flow velocity ±15 m/s
Channel widths	0.5 m to 40 m; other widths upon request
Measurement uncertainty	• flow velocity ($v_{average}$) ±0.1 % of measurement value within path
Number of measurement paths	1 to 4 measurement paths; according to
Measurement frequency	1 MHz; (other frequencies depending on path length)
Protection	IP 68
Operating temperature	-20 °C to +50 °C
Cable length	max. 100 m
Cable type	• uninterrupted pre-configured cable • pre-configured cable with underwater plug and socket
Medium contacting materials	• Screw-in sensor/plug-in sensor and rod sensor: stainless steel 1.4571, CFK (Carbon),Viton® • hemisphere: stainless steel 1.4571, CFK (Carbon), POM, PUR, (plug and socket made of Neoprene)

The specifications above are extracts from the complete documentation. You can find the complete specifications on our data sheets.

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