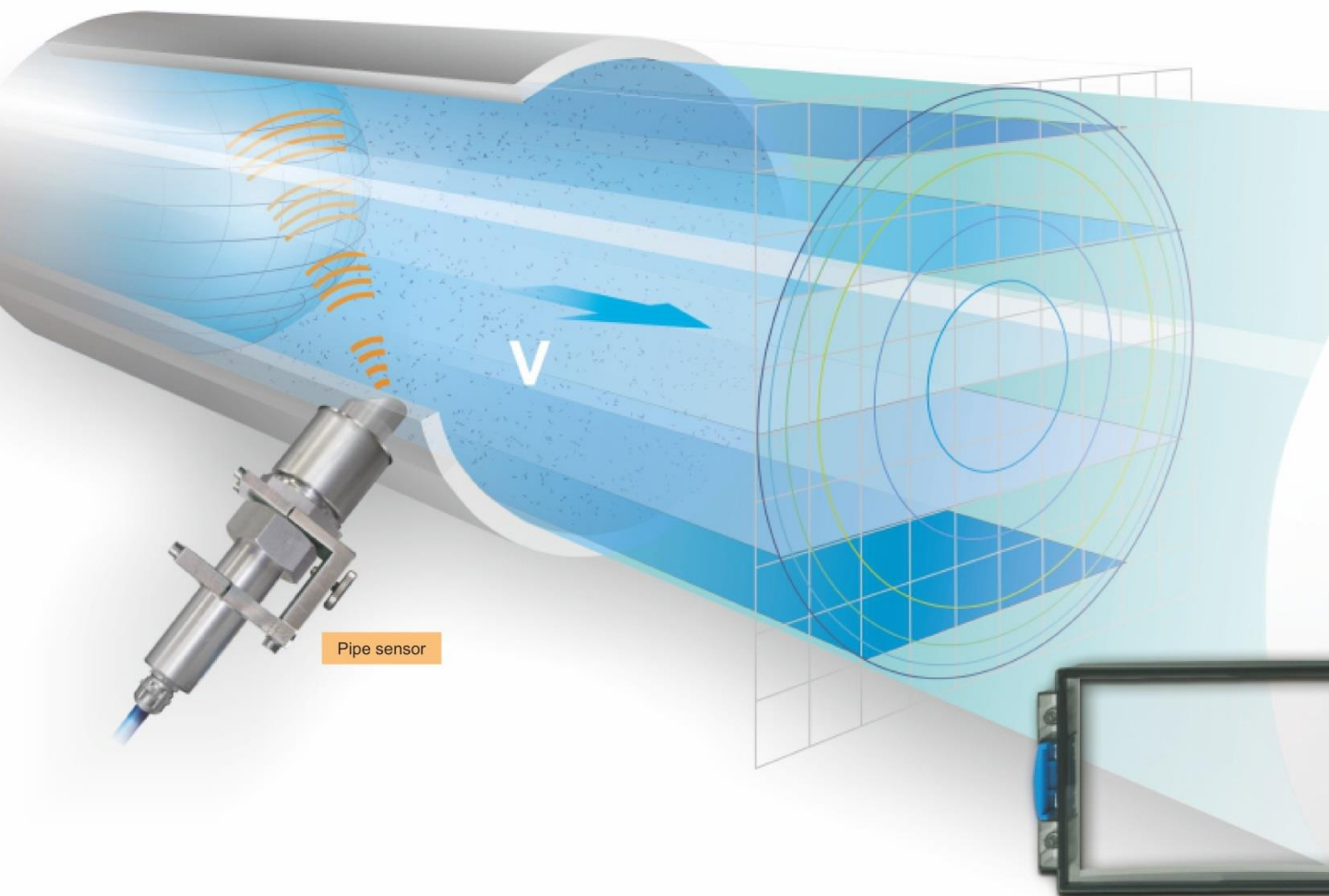


NIVUS NFP



NFP
NIVUS Full Pipe

Flow Measurement
for full Pipes



Pipe sensor

- very high accuracy
- attractive price
- low installation costs
- real flow velocity profile measurement using cross correlation with digital pattern detection
- spatial allocation of single velocities
- absolutely stable zero point and drift-free
- no electrodes, no conductivity required
- suitable for measurements in river water, rain water, process water, dirty water, sludges, cooling water, municipal and industrial waste water etc.
- Ex zone 1 optional

The NFP (NIVUS Full Pipe) has been developed particularly for flow measurement in full pipes with diameters between 100 and 800 mm. Based on the cross correlation method, the system can be used in a range of slightly to heavily polluted media. The NFP combines network measurements including adapted area weighting with a flow profile correction.

The unit has high accuracy and an unrivalled cost/performance ratio. Appropriate NIVUS accessories facilitate installation and keep maintenance expenses low. Therefore the NFP is an ideal substitute for obsolete or defect MIDs and other measurements. It is not necessarily required to remove existing measurement systems.

Simply high accurate

Measurement principle

One of the most modern and most efficient methods used for flow velocity detection is the correlation method (interrelation between two comparable image patterns).

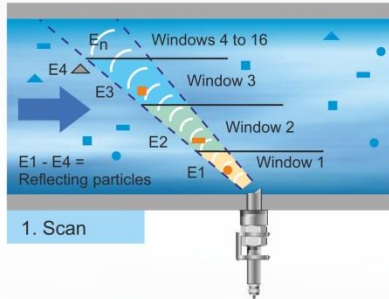
To calculate flow **Q** the NFP utilises the general equation below as a starting point:

$$Q = A \cdot \bar{v}$$

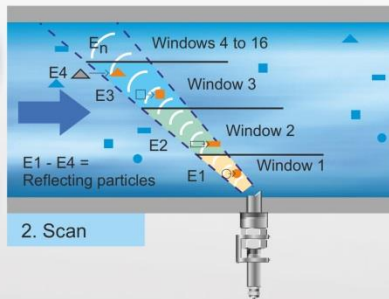
A = wetted cross-sectional area

\bar{v} = average flow velocity

Reflecting particles (debris, minerals or gas bubbles existent in the medium) are scanned using an ultrasonic impulse with a defined angle and the resulting echo is saved as an image or echo pattern.

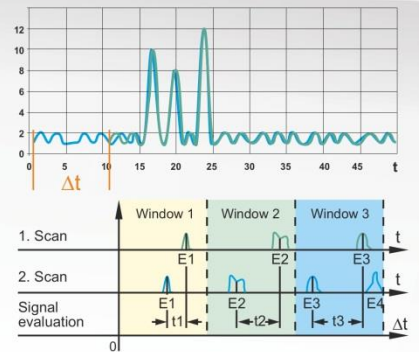


Another scan follows a few milliseconds later. The resulting echo pattern will be stored as well.



It is possible to clearly identify the positions of reflecting particles by correlating both saved signals. The particles can be located in different positions on the images as they move with the medium.

Image pattern overlay



Involving beam angle and impulse repeat rate, it is possible to directly convert the temporal shift of the particles into their velocity and hence into the flow velocity of the medium.

The current flow rate is going to be indicated directly on the display.

Operation

The transmitter operation corresponds to the well-known NIVUS standard. It is very easy to put the system into operation and to recall data since the intuitive user interface and the large graphic display are clearly laid out. Versatile diagnostic options enable the choice of the best possible measurement place and error-free operation of the measurement system.



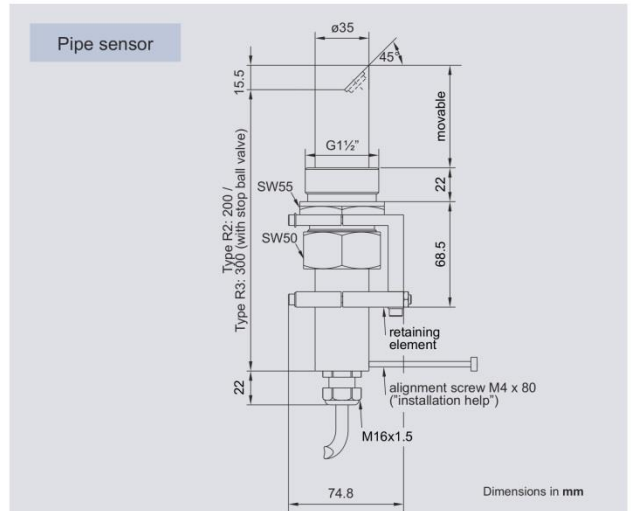
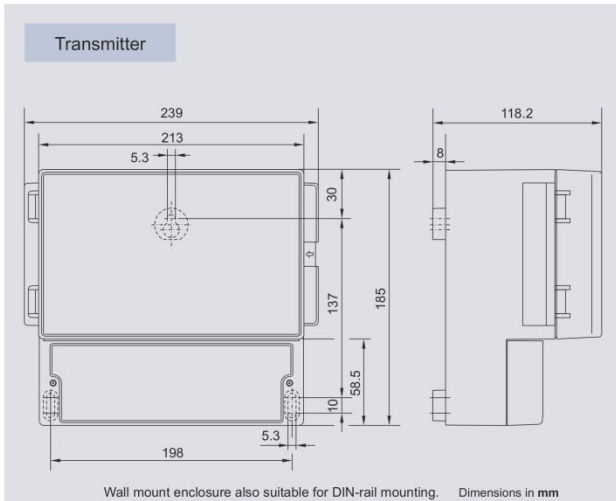
The NFP is outstandingly suitable for use in:

- pump stations for rain water, dirty water and combined waste water
- waste water treatment plants
- pressure pipelines
- drainage lines
- return sludge lines
- recirculation lines
- and many more



We provide suitable accessories such as welding nozzle, stop ball valve for easy sensor installation and maintenance.

Specifications



Transmitter

Power supply	100 to 240 V AC; + 10 % / -15 %, 47 to 63 Hz or 24 V DC \pm 15 %, 5 % residual ripple
Power consumption	max. 18 VA (7 VA typical)
Wall mount enclosure	material: Polycarbonate weight: approx. 1620 g protection: IP 65, if lid is closed and locked
Ex approval (optional)	II(2)G [Ex ib] IIB
Operating temperature	-20 °C to +60 °C
Storage temperature	-30 °C to +70 °C
Max. humidity	90 %, non-condensing
Display	full graphic, back-lit LCD, 128 x 64 pixels
Operation	6 keys, multilingual dialog mode
Inputs	1 digital input, 1 active sensor connectable
Outputs	1 (optional 3) x 0/4-20 mA, load 500 Ohm, 12 bit resolution, deviation less than 0.1 % (after calibration) 2 relays (SPDT)
Parameter transmission	via front-side USB interface

Sensors

Sensor type	pipe sensor/flow velocity sensor
Measurement principle	correlation with digital pattern detection
Measurement range (v)	-1 m/s to +6 m/s
Measurement frequency	1 MHz
Protection	IP 68
Ex approval	II 2 G Ex ib IIB T4
Operating temperature	-20 °C to +50 °C (-20 °C to +40 °C in Ex zone 1)
Storage temperature	-30 °C to +70 °C
Measurement uncertainty	deviation less than 1 %*
Operating pressure	max. 4 bar
Cable length	10, 20, 30, 50, 100m; special length upon request
Materials	Polyurethane, stainless steel 1.4571, PPO GF30, PA, HDPE
Option	chemically resistant sensor made of PEEK, cable with FEP coating
Accessories for pipe sensors	
Tapping saddle	for sensor mounting in pipes with inner diameters from 100 to 800 mm
Stop ball valve	for removal of sensors from pipes without pressure
Welding nozzle	straight construction (90°)
Retractable fitting	for removal of sensors under process conditions

Accessories



Tapping saddles



Stop ball valve



Retractable fitting