ViscoScope® inline viscometer

General description

The ViscoScope® inline viscometer is a maintenance-free measuring instrument for precise, reproducible and reliable real-time measurement of the dynamic viscosity and temperature of liquids.
In continuous processes, the viscosity is permanently monitored. This enables, for example, optimal dosing of solvents in open coating systems, control of the medium temperature to maintain a constant viscosity or determination of the molar mass distribution.
Batch applications are often mixing or reaction processes where the viscosity curve or the achievement of a defined target viscosity is of decisive importance (homogenisation or stopping of a reaction).
Permanent process monitoring enables optimisation of production times and product quality, complete process documentation and minimisation of faulty batches and laboratory samples.

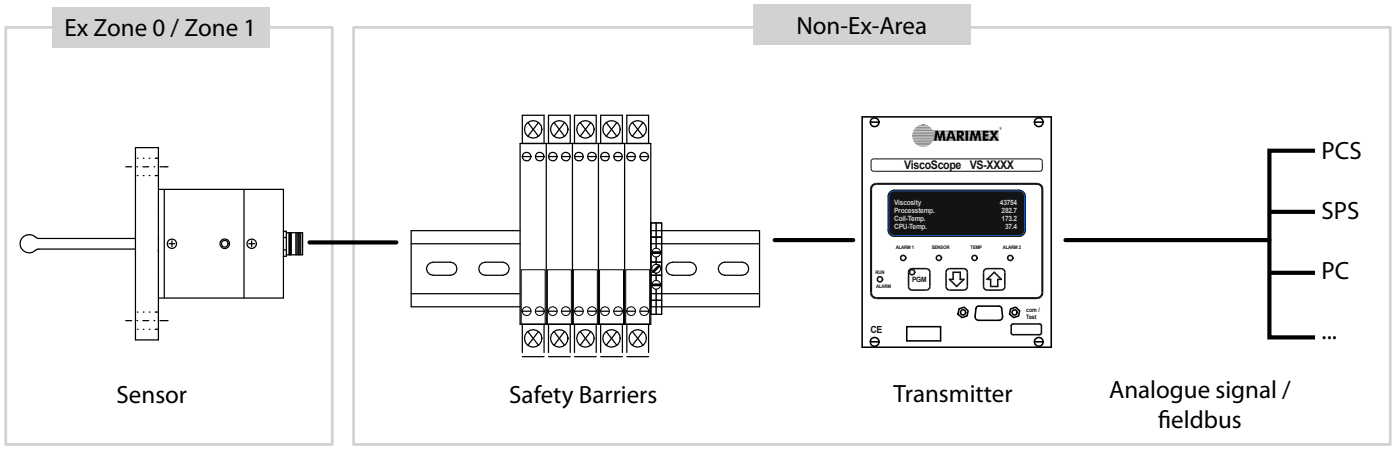
System design and functional principle

The ViscoScope® viscometer consists of a sensor (measuring sensor), a transmitter (measuring transducer), a special cable (transmission cable) and safety barriers (only in Ex applications).
The transmitter excites the sensor's probe to torsion at its resonance frequency with very small amplitude. When the sensor is immersed in a liquid, it „rubs" against the adjacent liquid layer and experiences damping due to viscosity. With a fast PID control, the transmitter compensates for the amplitude loss caused by the damping, i.e. despite changing viscosity, the amplitude is kept constant. This changes the drive voltage, which is the basis of the viscosity value. Due to this technique, the ViscoScope® viscometer measures dynamic viscosity x density in mPa-s x g/cm³ (η x ρ), responds to viscosity changes in less than two seconds and enables detection of the slightest differences, even under harsh process conditions. Factory multi-point calibration with certified Newtonian calibration oils enables reproducible results, regardless of whether the fluid being measured behaves Newtonian or non-Newtonian.
By driving at its resonant frequency with the low amplitude, the probe is not subject to material fatigue. You will look in vain for moving parts, joints or seals in our probe, as all parts in contact with the process are welded. The result: a maintenance-free, extremely durable and reliable process viscometer

Installation

The modular process viscometer can be used in practically all industrial areas, from simple standard installations to extremely individual installation situations. The sensor can be installed in containers, pipelines, flow cells and immersion pipes in any position. Those who do not have the possibility to connect the transmitter to a process control system and use the process viscometer as a stand-alone system can record the data with the ViscoView® software.

Systemaufbau



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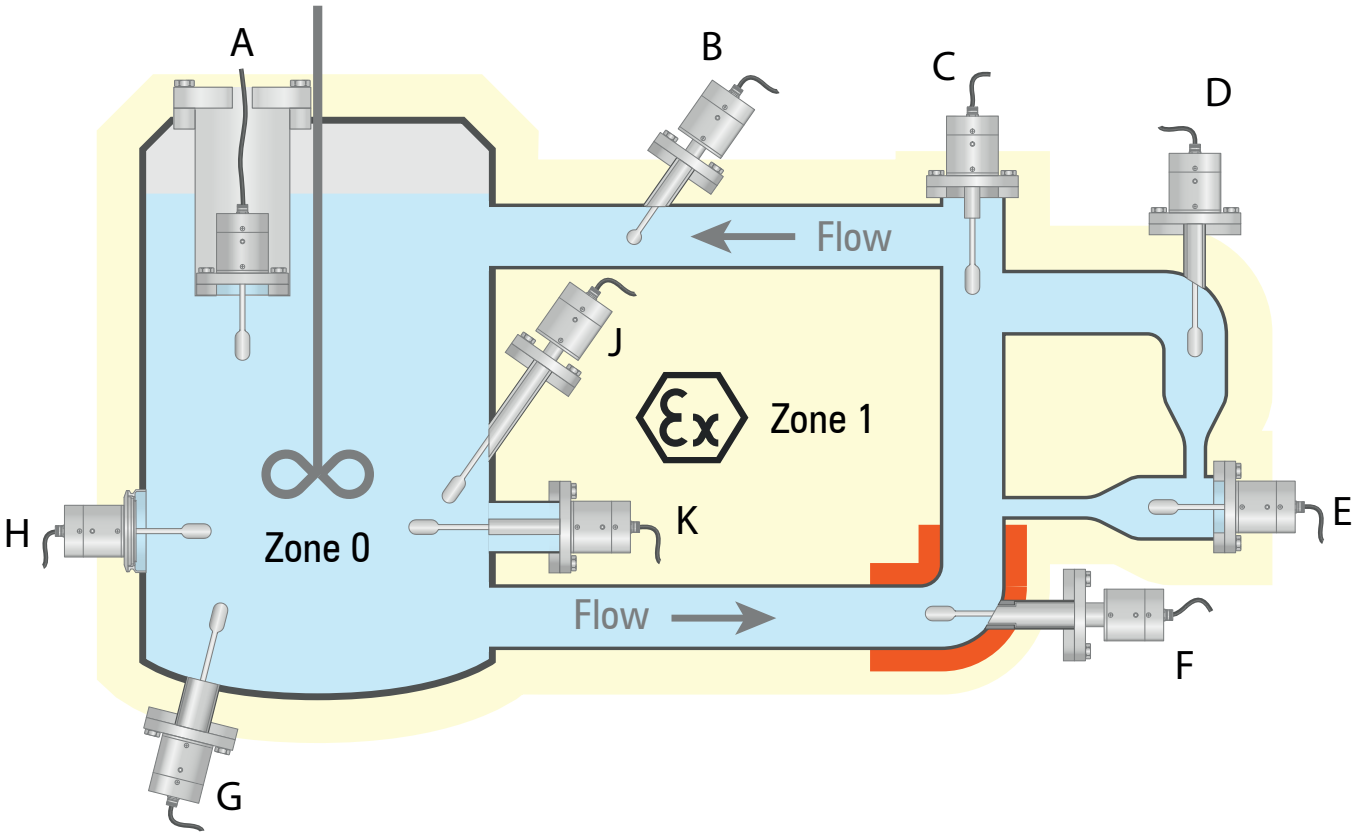
Installation positions ViscoScope® VA-300



Descriptions of the installation positions

Position A
Sensor is attached to the bottom of an immersion tube by means of a flange or thread. The immersion tube is mounted on the vessel cover or the vessel wall.

Position B:
Inclined installation in horizontal or vertical pipelines with half-sided flow. The feasibility of this installation depends on the installation dimensions of the sensor, the nominal diameter of the pipeline, the viscosity level and the flow velocity.

Position C:
For vertical installation, the installation socket should be kept very short or the sensor should be equipped with a non-active extension to bridge a possible air pocket in the pipe socket. This ensures that the active sensor is completely immersed in the medium.

Position D:
The non-active extension bridges and minimises the dead volume in the pipe bend. In addition, the geometry can be adapted to the pipe bend to minimise flow turbulence.

Position E:
Installation in flow cell with pipe expansion/reduction. Enables installation even with very small nominal pipe sizes.

Position F:
Bridging of a heating jacket by means of a non-active extension. The non-active extension can be adapted to the geometry of the installation spigot / pipe bend to minimise dead volume and flow turbulence. A 2-stage non-active extension allows sealing directly at the gradation near the main pipe.

Position G:
When installing in the tank bottom, the installation socket should be kept very short or the sensor should be equipped with a non-active extension to ensure that the active probe protrudes completely from the socket.

Position H:
Installation via e.g. block flange or hygienic flange.

(for more see next page)

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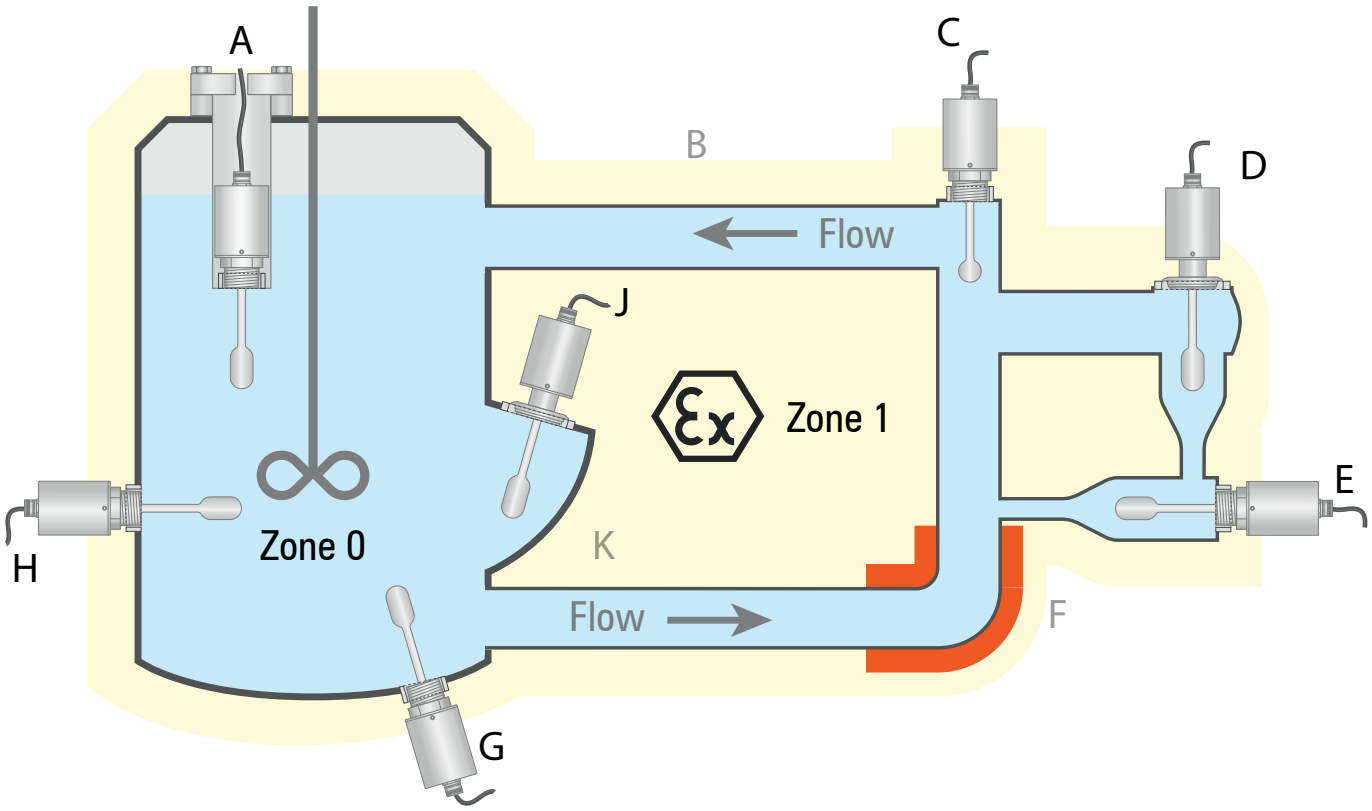
Position J:
The installation in the inclined installation socket, allows a lower immersion depth of the sensor. The non-active extension bridges and minimises the dead volume in the pipe socket.

Position K:
When installing in the horizontal installation spigot, the spigot should be kept very short or the sensor should be equipped with a non-active extension to ensure that the active probe protrudes completely from the spigot.

Installation positions ViscoScope® VA-100



Descriptions of the installation positions

Position A
Sensor is attached to the bottom of an immersion tube by means of a flange or thread. The immersion tube is mounted on the vessel cover or the vessel wall.

Position B:
No installation recommendation.

Position C:
For vertical installation, the installation socket should be kept very short to ensure that the active probe is completely immersed in the medium.

Position D:
Dead space free installation e.g. in Varivent® corner casing.

Position E:
Installation in flow cell with pipe expansion/reduction. Enables installation even with very small nominal pipe sizes.

Position F:
No installation recommendation.

Position G:
When installing in the tank bottom, the installation socket should be kept very short to ensure that the active probe protrudes completely from the socket.

Position H:
Installation via e.g. block flange or hygienic flange.

Position J:
Installation in „wall pocket“.

Position K:
No installation recommendation.

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