

# VACOMASS®

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## Technical Information VACOMASS® flow meter



## VACOMASS® flow meter

The instruments of **VACOMASS® flow meter** series are field transmitters for measuring the flow rate of aeration air in sewage treatment plants. The flow meter can be used for air temperatures up to 130°C (220°C available as an option). The meter uses thermal dispersion technology and directly measures in dry gases, the flow rate at standard conditions according to DIN 1343, unaffected by gas pressure and temperature.

In big pipes and/or if straight inlet and outlet piping is quite short as well as the requirements on accuracy are very high, a patented **VACOMASS® flow conditioner** with low pressure drop can be installed in front of the flow sensor. Alternatively, a multiple sensor **VACOMASS® flow meter multi** can be used.

If the flow meter is installed directly upstream of a control valve and if the closing/ opening valve is influencing the flow signal, the **VACOMASS® flow meter AL 100** can be used. The actual stroke of the control valve can be read in via 4-20 mA and so the flow signal can get corrected simultaneously, because the compensation curve is known due to measurements in the **CAMASS® Calibration Lab**. The corrected flow signal is transferred via 4-20 mA.

The **VACOMASS® hot tapping unit** allows the removing of the sensor during operation for monitoring and maintenance even at higher gas temperatures and pressures, without any loss of air. There are different versions available: a simple ball valve with flexible insertion depth (version OEIN-S) and a more sophisticated unit with fixed insertion depth and mounting position/ orientation of the sensor (version OEIN-F).

All units of the VACOMASS® series are characterized by high-performance digital signal processing. Important practical features of the transmitter electronics are the temperature compensation and the opportunity to select between different measuring modes (constant current or constant temperature principle).

The electronics is located in a compression-proof dual compartment stainless steel enclosure with a separate electrical connection compartment or placed in an aluminium housing. Optionally, a 10-digit LED display with control panel is available for some versions to indicate the actual flow rate or totalized flow as well as for field programming of the flow meter. As well, the electronics and a 10-digit graphic display can be placed in a field housing **VACOMASS® electronic**.

For transmission of the flow signal of all sensor types, an isolated 4-20 mA analog output as well as a field selectable pulse output is available.

Furthermore, the graphic display and a DIN-rail module for the data processing of a multiple sensor-point installation can be integrated into a field housing or can be supplied on Din-rails only for the installation in big control cabinets. Data transmission can be done also with various bus systems.

Each **VACOMASS® flow meter** will be tested prior to shipment and calibrated at our CAMASS® calibration Lab under actual operating conditions (e.g. piping layout, gas composition, pipe diameter, pipe orientation and flow direction, etc). Different calibration levels are available: starting from a standard calibration if straight inlet and outlet pipe run is sufficient long to a calibration with original pipe sections and a control valves placed directly downstream to the flow meter.

## SMART FEATURES

- Thermal flow meter for direct measurement of standard volumetric or gas mass flows in dry gases according to DIN 1343
- Flow rate measurement unaffected by pressure and temperature fluctuations
- Pressure-proof dual compartment stainless steel or aluminium enclosure
- Compact and rugged design for exceptional reliability, maintenance-free, corrosion-proof
- Unmatched accuracy due to digital signal processing and variety of special calibration
- Expandable modular design, easy to install and more or less maintenance-free

## TECHNICAL DATA

Measuring principle	Gas flow measurement based on thermal dispersion technology without additional temperature and pressure compensation
Measured parameter	<ul style="list-style-type: none"> <li>• Gas mass flow [kg/h]</li> <li>• Standard volumetric flow [Nm<sup>3</sup>/h]</li> <li>• Standard flow velocity [Nm/s]</li> </ul>
Signal processing	Microprocessor based, fully digital signal processing
Measuring mode	Constant current or constant temperature principle <u>Note:</u> The measuring mode will be selected by our qualified technicians depending on the application requirements and may not be changed by the operator.
Calibration	Various calibration types <b>VACOMASS® calibration</b> available, depending on installation situation, incl. temperature compensation
Enclosure	<b>VACOMASS® flow meter SS:</b> compression-proof stainless steel housing, Ø 50 mm, dual compartment <b>VACOMASS® flow meter AL and AL DIN</b> respectively: epoxy-coated aluminum enclosure
Protection class	IP65 to IP68
Explosion proof versions	Depends on type of flow meter, ATEX (option only)
Ambient temperature	from -40°C to +80°C
Power supply	18-36 VDC (power supply via standard supply units possible)
Power consumption	Max. 1.1 Watt
Reproducibility	electronics: 0.125% of reading
Measuring accuracy	Standard: +/- 2% of reading + 0.2% of full scale, better accuracies on request, depending on level of calibration and installation situation
Measuring range (1.013 mbar, 0°C)	0.46 – 46 Nm/s (Standard), 0.08 – 400 Nm/s (Option) N... Standard conditions according to DIN 1343
Turn-down-ratio	10:1 to 100 : 1

TECHNICAL DATA

Display and Operation (optional)	<ul style="list-style-type: none"> <li>• 10 digits, alphanumerical LED-display for field indication of actual flow rate and total flow, integrated totalizer, easy programming of the flow meter with a magnetic pin, simple and logical menu for transmitter set-up for <b>VACOMASS® flow meter SS</b> and <b>VACOMASS® flow meter AL</b> and <b>AL 100</b> (not available on type AL DIN)</li> <li>• Monitoring on a remote graphic display, mounted in a field cabinet <b>VACOMASS® electronic</b> (remote-version – electronics in a separate housing) or directly on DIN-rail</li> <li>• Monitoring on a graphic display of the <b>VACOMASS® flexcontrol</b></li> </ul>
Signal inputs & outputs (isolated)	<p><b>VACOMASS® flow meter SS, AL and AL DIN:</b></p> <p>1 x analog output: 4-20 mA, active, load &lt; 400 Ohm, 10 Bit resolution</p> <p>1 x impulse output: field selectable, max. 2 impulse/s</p> <p><b>VACOMASS® flow meter AL 100:</b></p> <p>1 x analog input: 4-20 mA for actual stroke of the control valve</p> <p>2 x analog output: 4-20 mA, active load &lt; 400 Ohm, 10 Bit resolution</p> <p>Option for all types of remote-versions: Modbus, Profibus DP, Profinet, HART</p>
Choice of sensors (option)	<p>Sensor geometry: 2 Pin , stainless-steel-ceramic sensor without welded, soldered or pressed-in parts</p> <p>Process temperature: 130°C (max. 220°C as an option)</p> <p>Operating pressure: max. 10 bar</p> <p>Diameter of sensor rod: 12 mm (standard), 18 mm (option)</p> <p>Type of flow element: Insertion sensor, directly mounted onto a welded sleeve, ½" or ¾" (when using the hot tapping unit, ½" or 1")</p> <p>Material: 1.4571 (316 TI, standard)</p> <p>Hot tapping: unit manually actuated with ball valve for flexible insertion depth <b>VACOMASS® hot tapping unit OEIN-S</b>, as an option unit with fixed insertion depth and secured sensor orientation <b>VACOMASS® hot tapping unit OEIN-F</b>, as an option with protection guard</p> <p>Process connections: Compression fitting or flange (if hot tapping unit OEIN-F shall be used)</p>

## INLET AND OUTLET STRAIGHT PIPE RUNS

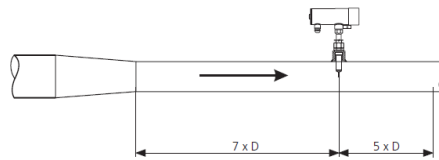
### General information

To achieve high accuracy in flow rate measurement as specified, consideration of sufficient inlet and outlet straight pipe runs according to DIN ISO 5167-1 is crucial during installation of the flow transmitter. Reasonable measuring results can also be achieved with shortened inlet and outlet straight pipe runs according to the specifications below.

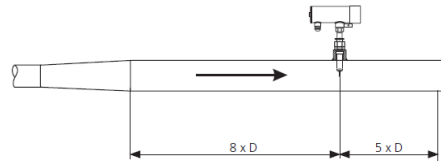
If sufficient inlet and outlet straight pipe runs are not available, it might be possible to achieve the required measurement accuracy if a special calibration can be carried out at our **CAMASS® calibration lab** by simulating the actual operating conditions, the range of flow rates and the pipe run.

Alternatively, with the installation of a **VACOMASS® flow conditioner** or the use of multiple sensors **VACOMASS® flow meter multi** may allow or help to achieve precise measuring results when available straight inlet and outlet pipe run is not sufficient long.

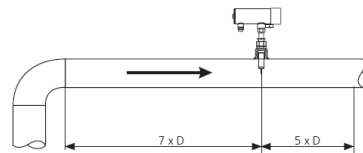
### Reduction pieces



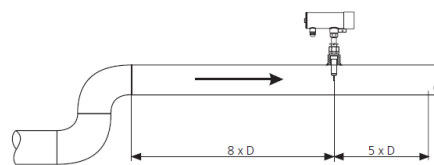
### Extension pieces



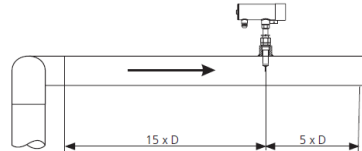
### One 90° elbow



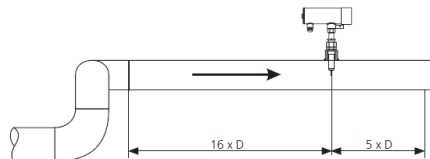
### Two 90° elbows in one plane



### Two 90° elbows in two planes

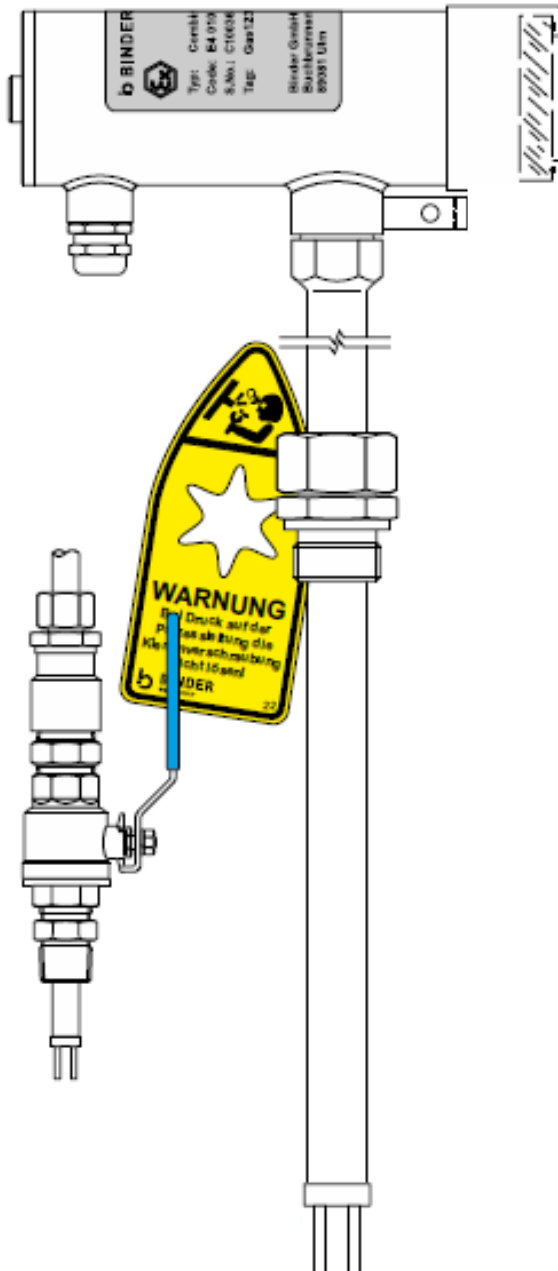


### Three 90° elbows in three planes

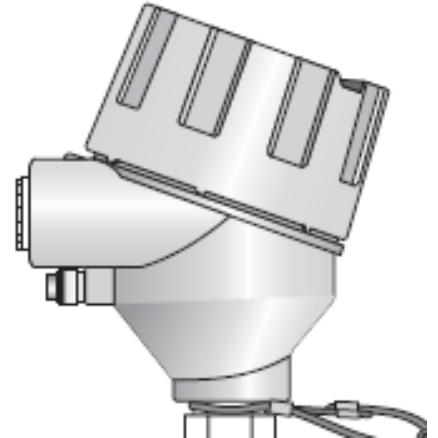


## VARIOUS TYPES OF VACOMASS® flow meter

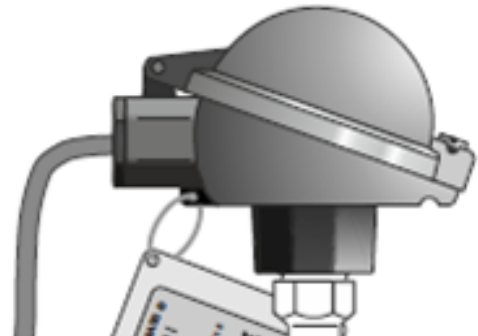
VACOMASS® flow meter SS



VACOMASS® flow meter AL



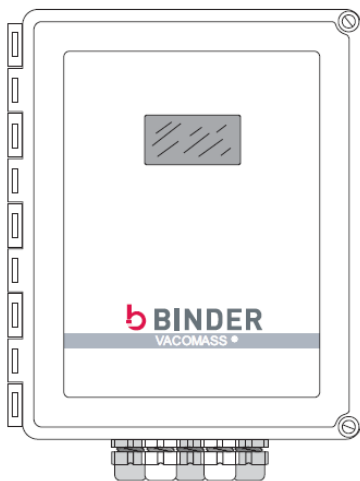
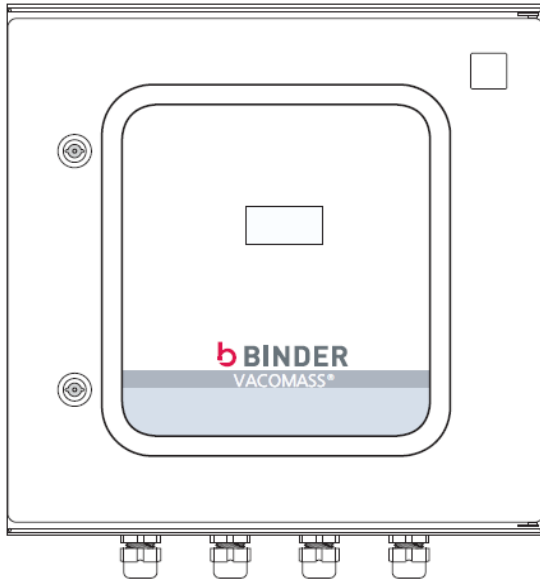
VACOMASS® flow meter AL DIN



Ø 18 mm	Ø 12 mm
200	200
300	300
450	450
600	
750	
1.000	
1.250	

## VACOMASS® electronic & flexcontrol

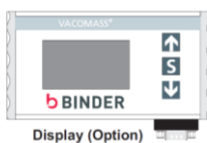
Field housing VACOMASS® electronic  
in various sizes



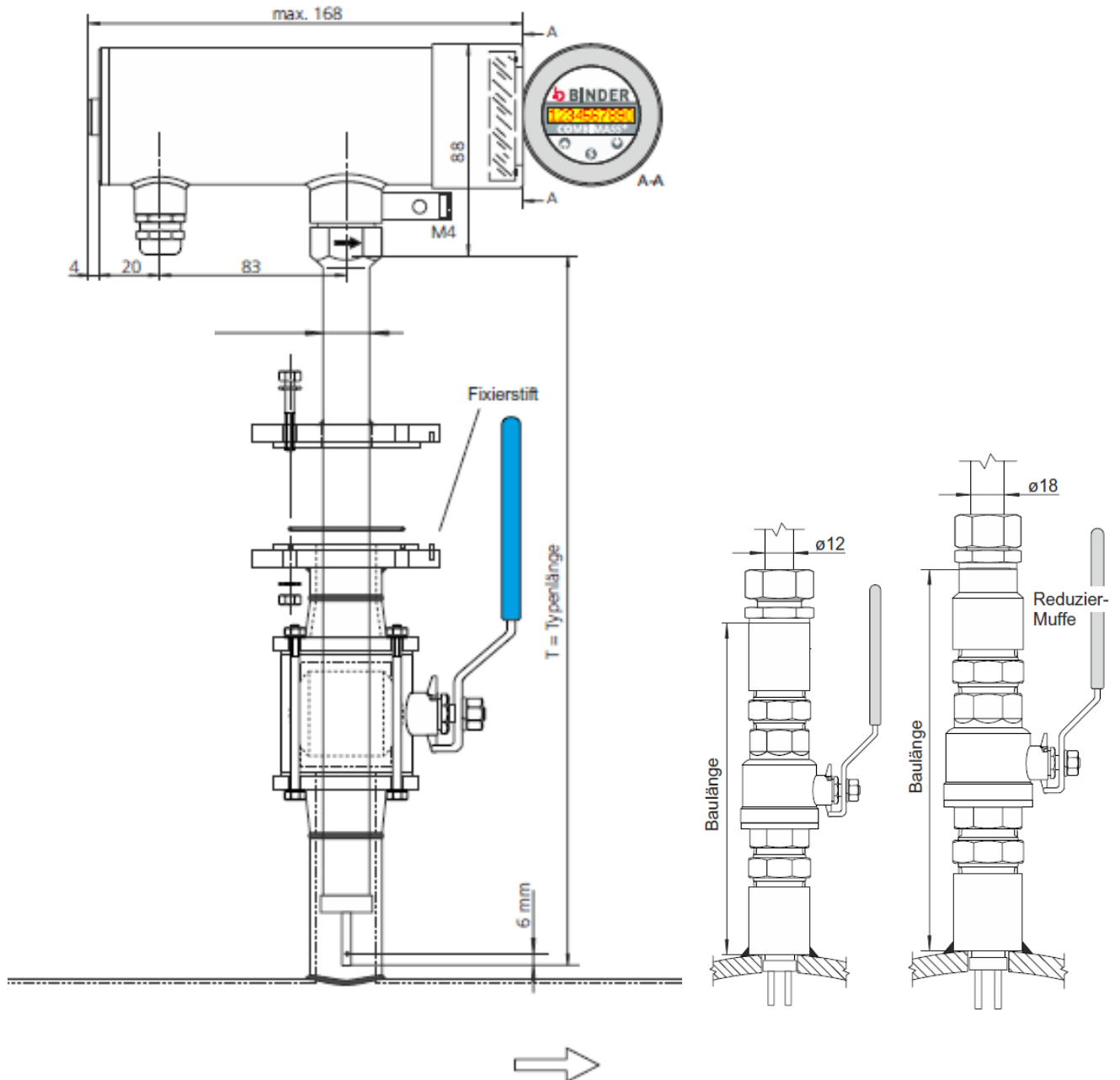
Cabinet VACOMASS® flexcontrol



VACOMASS® graphic display



# VACOMASS® hot tapping unit

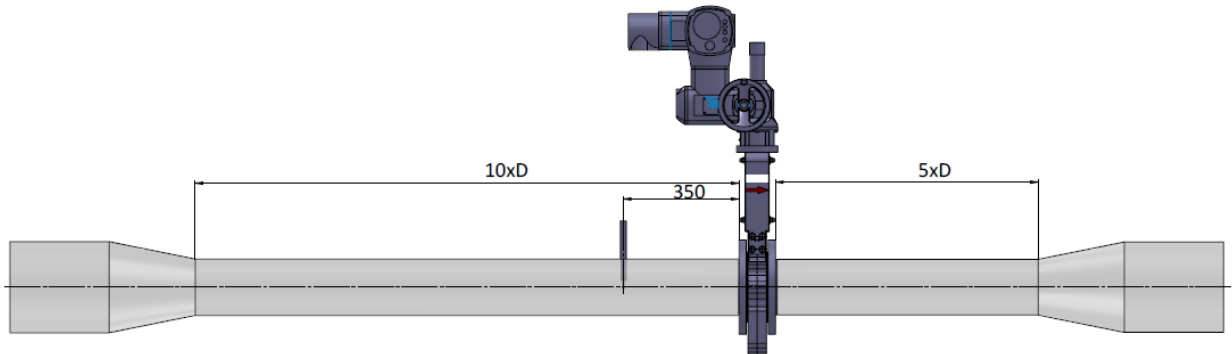


Hot tapping unit with fixed insertion depth for a manipulation-safe assembly and with fixed sensor orientation  
**VACOMASS® hot tapping unit OEIN-F**

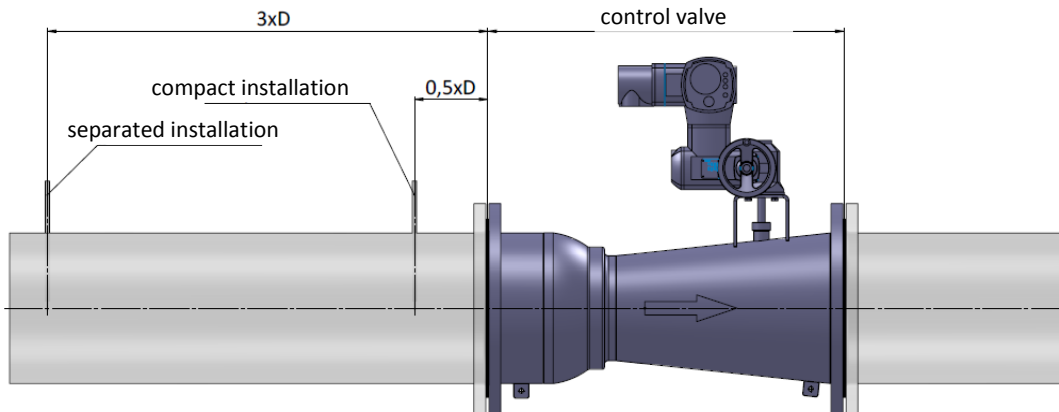
Hot tapping unit with flexible insertion depth  
**VACOMASS® hot tapping unit OEIN-S**



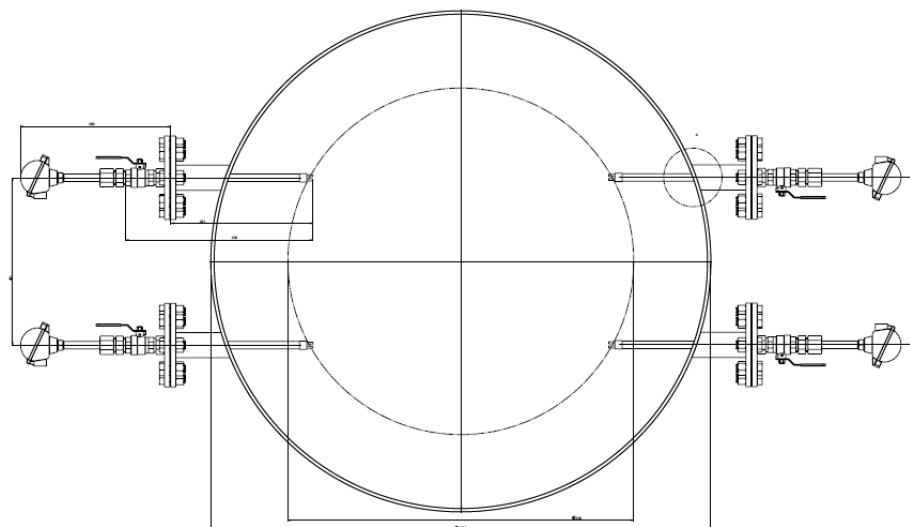
## INSTALLATION EXAMPLES VACOMASS® flow meter



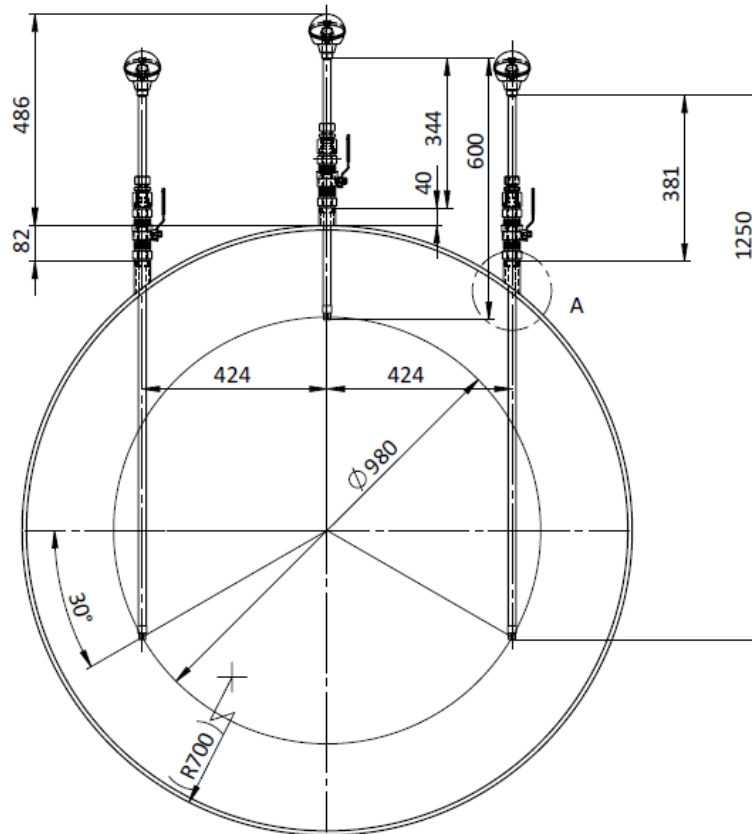
Typical measuring and control pipe section if the flow meter shall be used together with a **VACOMASS® diaphragm control valve** (compact installation directly in front of the control valve with falling flow axis)



Typical measuring and control pipe section for use with a **VACOMASS® jet control valve**



Typical installation with multiple sensor elements in big pipe sizes **VACOMASS® flow meter multi**



Typical installation with multiple sensor elements in big pipe sizes **VACOMASS® flow meter multi**

#### IMPRINT

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