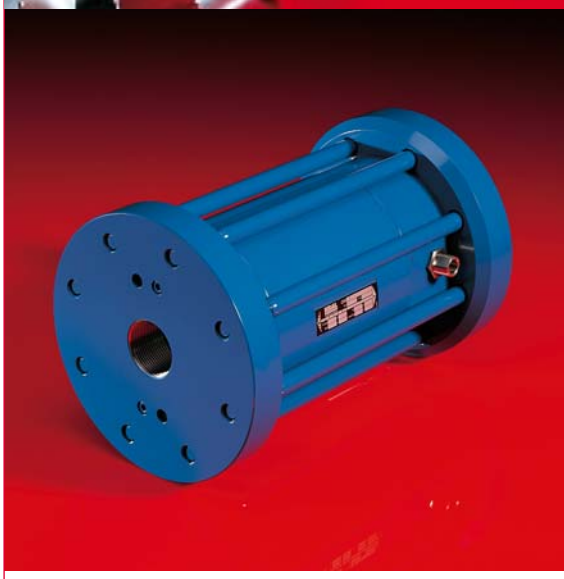
KRAL Volumeter® - OMH Series



OMH
With high pressure to an accurate measuring result

Operating Conditions and Materials

☐ Flow range:	0.1 to 3000 l/min
☐ Max. pressure:	420 bar
☐ Temperature range:	-20 °C to 200 °C
☐ Viscosity range:	1 to 1 x 10^6 mm^2/s
☐ Media:	chemically neutral, lightly lubricious, clean, not abrasive
☐ Casing:	continuous cast GGG
☐ Screws:	nitrated steel
☐ Bearings:	anti-friction bearings
☐ Seal:	Viton

OMH – Uniquely compact at high pressure and high flow

Flow measurement at high pressure

The first thing you're interested in is reliable operating pressure. The KRAL Volumeter® OMH can be used up to 420 bar. This high value is astonishing since it is hardly achieved by other flowmeters.

KRAL Volumeter® of series OMH are designed for high pressures. This is apparent even by looking at the instrument:
☐ robust, stiff casing,
☐ through bolts.

What cannot be expected: the inside hides a fine, high precision measuring movement. Fascinating, not so?

Suitable for pressure and high measuring accuracy

Even with high system pressure the measuring task requires high measuring accuracy.

OMH is a precision measuring instrument. Like the other KRAL Volumeter®, the OMH achieves its accuracy through
☐ the special screw geometry
☐ the accurate manufacture
☐ the calibration of each unit on our in-house test rig.

OMH has a stiff casing. The geometry remains even under high pressure. Consequently there is no impairment of accuracy.

Pressure compatible and high flow rate

Pressure is force per unit area.

High flow rates require large line cross sections and consequently large instruments.

The compact screw measuring movement requires only a small casing with small area. This means small forces.

For this reason the KRAL Volumeter® OMH is an instrument in this pressure category with high flow rates and small dimensions and low weight.

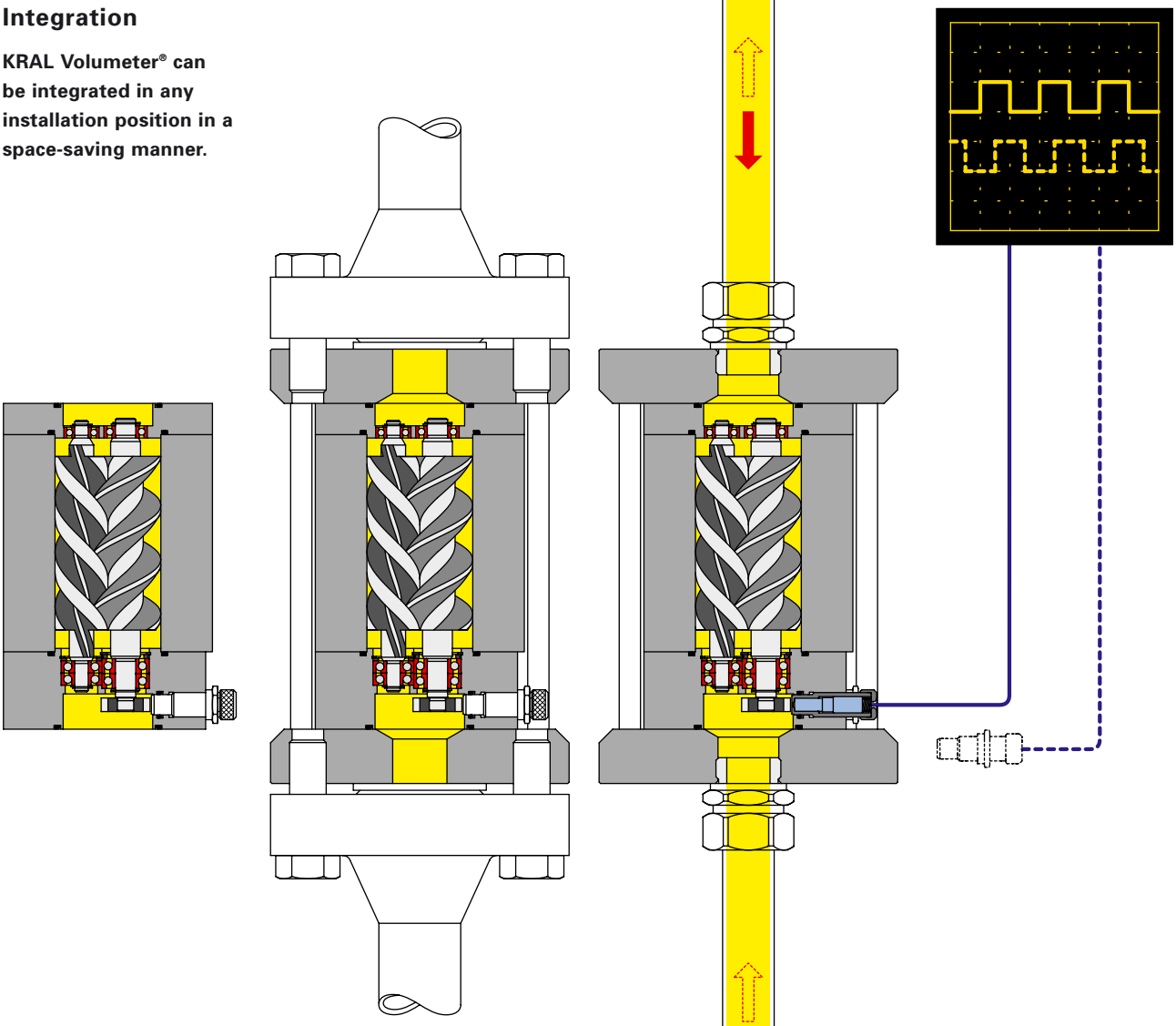
OMH
Space-saving installation

The space for installing the flowmeter is usually limited.

KRAL Volumeter® OMH are extremely sturdy and compact measuring instruments. This is due to the in-line arrangement of the measuring screws. Flow conditioning pipes are not necessary since the measurement is independent of the flow profile. The OMH measures in any installation position. Flow measurement is possible in both directions.

Integration

KRAL Volumeter® can be integrated in any installation position in a space-saving manner.



Mechanical Integration

Various connection plates permit universal installation such as

- ☐ pipe thread,
- ☐ DIN, ANSI and JIS flanges,
- ☐ customer-specific connections.

Electrical Integration

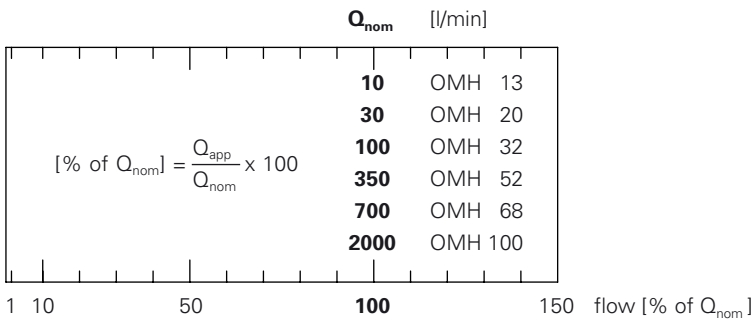
The sensor element is inserted in the dry sleeve.

The output signal is an interference-proof square wave impulse suitable for easy processing.

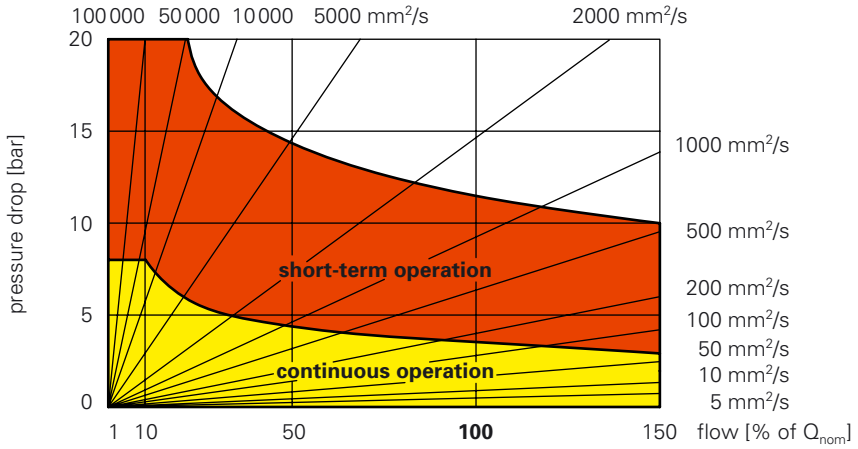
A second sensor can be used as an option for identification of flow direction.

The following questions assist when selecting the ideal unit	All this knowledge simplifies the selection	And this is what you have to do in concrete terms	Hints and Advice
Which size is suitable for the flow range to be measured?	The selection of the correct size ensures a long service life, high measuring accuracy and an excellent cost-utilisation ratio.	From the table, select the **size** whose nominal flow rate Q_{nom} is near that of your application Q_{app}. Then calculate [% of Q_{nom}].	The value [% of Q_{nom}] is required for all the following diagrams.
Does the selected unit have the required service life? **How much is the pressure drop?**		With the viscosity in [mm²/s] and [% of Q_{nom}] you obtain service life and pressure drop from the **load rating diagram.** The selection of a larger unit will increase the service life and reduce the pressure drop.	Yellow range signifies: The device can be used for continuous operation. Red range signifies: Short-term operation. Depending on requirement, this range can be purposely utilised or serve as load reserve.
What is the measuring accuracy of the selected unit?	Precision and ease of operation are prerequisite to high accuracy. The rolling-off action of all moving parts hardly yields any wear. The long-term stability is unmatched. In addition, linearisation is possible. By using the KRAL BEM 4U it is possible to straighten the relevant curve for a defined viscosity.	With the viscosity in [mm²/s] and [% of Q_{nom}] you will obtain the accuracy of the measuring unit from the **linearity diagram.** You get to the linear sector of the curve by selecting the appropriate size.	Yellow range signifies: The device operates within the range of maximum accuracy. Orange range signifies: The device operates within the limits of ± 0.3 % specified by the standards institutions (Local Bureaux of Standards).

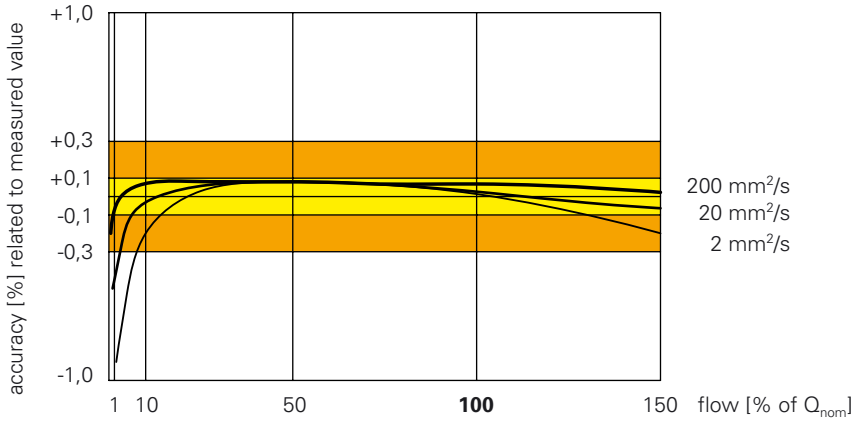
Size



Load Rating



Linearity



Are precision and sturdiness of the KRAL Volumeter® fully utilised?

The combination of load capacity and linearity produces a measuring range of unmatched magnitude.

① Driven by even the smallest impulse from the medium the precise and smooth operating network ensures the safe operation of the device.

② Even with large drive impulses from highly viscous media the sturdy mechanics permit high flow rates.

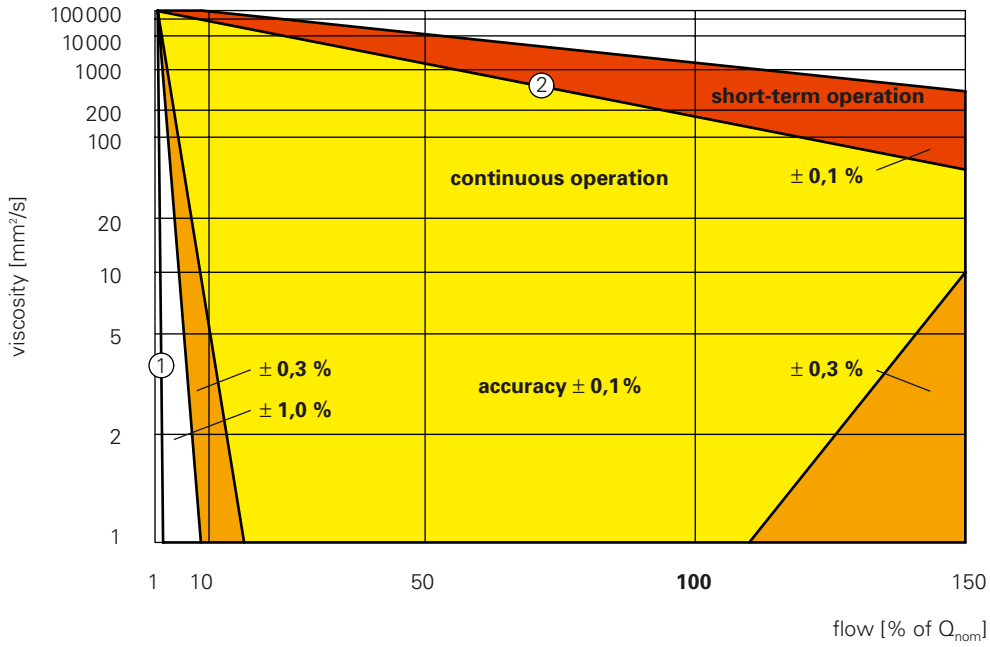
With the viscosity in [mm²/s] and [% of Q_{nom}] a visual impression of the position of the chosen unit is obtained in the **measuring range diagram.** It provides a unique help in selecting the correct unit for the application.

Yellow range signifies: Optimum combination of precision and sturdiness.

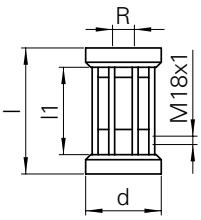
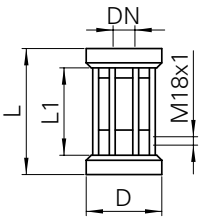
Orange range signifies: The device is suitable for continuous operation and is situated within the limits of ± 0.3 % specified by the standards institutions.

Red range signifies: Short-term operation. The accuracy is situated within the limits of ± 0,1 %.

Measuring Range



Technical data		OMH 13	OMH 20	OMH 32	OMH 52	OMH 68	OMH 100
Flow							
Q_{max}	l/min	15	45	150	525	1050	3000
Q_{nom}	**l/min**	**10**	**30**	**100**	**350**	**700**	**2000**
Q_{min}	l/min	0,1	0,3	1	3,5	7	20
Pressure p_{max}	bar	420	420	420	420	420	250
Temperature $t_{min}...t_{max}$	°C	-20…+200	-20…+200	-20…+200	-20…+200	-20…+200	-20…+200
Viscosity $\nu_{min}...\nu_{max}$	mm²/s	1…1x10⁶	1…1x10⁶	1…1x10⁶	1…1x10⁶	1…1x10⁶	1…1x10⁶
K-Factor K1/K2	Imp/l	1216/2432	640/1120	234/468	71,0/142	39,8/79,6	16,8/33,6
Frequency f1/f2 bei Q_{nom}	Hz	203/405	320/560	390/780	414/828	464/929	560/1120

Dimensions/Weights			OMH 13	OMH 20	OMH 32	OMH 52	OMH 68	OMH 100
	**R**	**inch**	**1/2“**	**3/4“**	**1“**	**1 1/2“**	**2“**	**4“**
	p	bar	420	420	420	420	420	250
	l	mm	150	185	255	320	385	500
	d	mm	100	145	180	220	235	247
	l1	mm	94	115	175	240	295	400
	m	kg	7	13	27	57	76	135
	**DN**	**mm**	**15**	**15**	**25**	**40**	**50**	**100**
	PN	bar	400	400	400	400	400	250
	L	mm	150	185	255	320	385	500
	D	mm	145	145	180	220	235	300
	L1	mm	94	115	175	240	295	400
	m	kg	7	13	27	57	76	155

This is how you select the sensor

Selection criteria are:
☐ K-Factor
☐ temperature
☐ explosion-proof status

The K-Factor describes the number of pulses per litre. Two K-Factors can be taken from the **technical data** table per unit size.

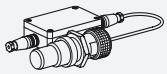
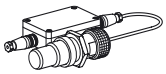
The sensor should be selected depending on the temperature of the medium you wish to measure.

An explosion-proof sensor is available for use in explosive atmospheres.

Our sensors supply square wave PNP signals. The explosion-proof sensor is an exception, it uses a Namur signal.

The Electronics

BEM 4U is specially matched to our KRAL Volumeter® programme. The combination guarantees maximum accuracy and absence of interference.

Sensors	**BEG 34 + BEV 07**	**BEG 35 + BEV 08**
Design M18x1		
System	PNP Hall sensor	PNP magnetic
Material	Arcap	Arcap
K-Factor	K1/K2	K2
Pressure p_{max} bar	420	420
Temperature $t_{min}...t_{max}$ °C	-25…+150	-70…+230

Safe decision-making
OMH has proved itself in many, even extreme, applications

Hydraulic test rigs

Medium: Hydraulic oil
Flow rate: 7-700 l/min
Pressure: 420 bar
Temperature: 20-90 °C
Viscosity: 10-32 mm²/s
Measuring instruments:
Four OMH 68

Piston pumps and piston engines are tested for operation and load on hydraulic dynamometers. The extreme values of the application are simulated during the automatically controlled test runs.

Our OMH 68 are integrated in the high-pressure circuit. While the units have to undergo these sophisticated test runs only once, our KRAL Volumeter® are subject to these conditions every time. An extremely tough loads is emergency stop valve operation which creates extreme pressure pulsations.

Consumption measurement on gas turbines

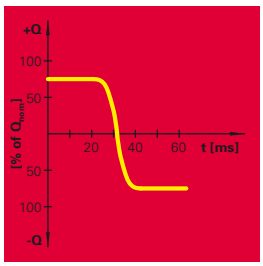
Medium: Diesel oil
Flow rate: 28-1770 l/min
Pressure: 142 bar
Temperature: 15-80 °C
Viscosity: 1.6-6 mm²/s
Measuring instrument:
OMH 100 with ex-sensor

Gas turbines drive power generators in power stations. Here KRAL Volumeter® measure the fuel consumption.

The turbine and consequently the OMH 100 are located in the explosion-proof area. Decisive for this application are

- ☐ large flow at high pressure in minimum of space,
- ☐ accurate and reliable measuring result,
- ☐ high service life,
- ☐ world-wide service.

Determination of hydraulic cylinder position



Medium: Hydraulic oil
Flow rate: 5-340 l/min in both flow directions
Pressure: 350 bar
Temperature: 20-60 °C
Viscosity: 20-140 mm²/s
Measuring instrument:
OMH 52 with 2 sensors

The KRAL Volumeter® in this case registers the flow in the hydraulic cylinder in both directions. Owing to the phase shift of the 2 sensors the connected interpretation electronics recognises the flow direction. Together with the highly accurate flow measurement the exact position of the piston in the cylinder can be indicated and passed on for processing.

The special features in this case are:

- ☐ the rapid reversal of directions of the measuring screws,
- ☐ the large flow range,
- ☐ the high measuring accuracy.

Quality assurance

Every KRAL Volumeter® is calibrated on the in-house test rig. The measured values of this calibration can be traced back to «national normals». The reproducibility of the flow measurement is usually 0.01%.

KRAL

Kräutler GmbH & Co., Bildgasse 40, A-6893 Lustenau, Telephone: +43 / (0) 55 77 / 8 66 44-0, Fax: +43 / (0) 55 77 / 8 84 33,
E-mail: kral@kral.vol.at