KRAL Volumeter® – OME Series.
Economy Flowmeters.

KRAL

OME.
A unique concept for economical precise flow measurement.

Operating conditions and materials.

☐ Flow range:	0,1 to 150 l/min.
☐ Max. pressure:	40 bar.
☐ Temperature range:	-20 °C to 100 °C.
☐ Viscosity range:	1 to 1x10^6 mm²/s.
☐ Liquid:	Chemically neutral, lightly lubricating, clean, non-abrasive.
☐ Accuracy:	±0,1 % of rate.
☐ Casing:	Anodized aluminum.
☐ Screws:	Nitrided steel.
☐ Bearings:	Bearing steel.
☐ Seals:	Viton®.

Favorable price.

In the international marketplace, you are faced with severe price pressure. Savings can start when purchasing individual components.

We recognized that not all our customers needed the wide pressure and temperature capabilities of our original OMG series. That is why we created the patented OME design, to provide an excellent flowmeter value for the large segment of our customers with lower flow, pressure and temperature requirements.

Optimum design.

With the complexity of flow meters it is sometimes difficult to include all the requirements for various applications. The reengineered design of the OME is optimized for efficient production.

☐ Production:
The aluminum housing can be completely machined on one machine without repositioning or retooling.

☐ The components:
Instead of the standard pole wheel, flow pulses are taken from the spindle directly, thus reducing the number of parts in the meter.

By using an aluminum housing, fewer parts, and precision machining, the OME is just what you need… not less, not more.

High measuring accuracy.

Even with reduced operating parameters many applications require high accuracy.

KRAL Volumeter Series OME offers high laboratory measuring accuracy under extreme conditions. The linearity diagram from page 5 and the measuring rate program from page 6 shows the high level of measurement accuracy over a wide range of flowrates.

The measuring chamber is produced to high accuracy. The sensor is positioned outside of the measuring chamber and has no influence on the precisely defined measuring chamber volume.

The advantage of the spindle principle.

Positive-displacement flow measurement with this principle is proven and it's measurement is extremely precise. An exactly defined volume is continuously filled and evacuated. The number of fillings results in the flow. This easily understood principle has important advantages compared with others:

☐ No Flow-conditioning – no straight runs of piping upstream or downstream of the meter is required.

☐ All KRAL Volumeter can measure bi-directionally, simplifying otherwise complex measurement tasks.

☐ Due to the nearly zero starting measurement and the wide measurement range; KRAL Volumeter are ideal for dispensing processes.

The solution.

Economical all-round flowmeter.

The OME is specialising in customers with lower flow, pressure, and temperature requirements, who welcome the favourable price. Installation at any angle and direction.

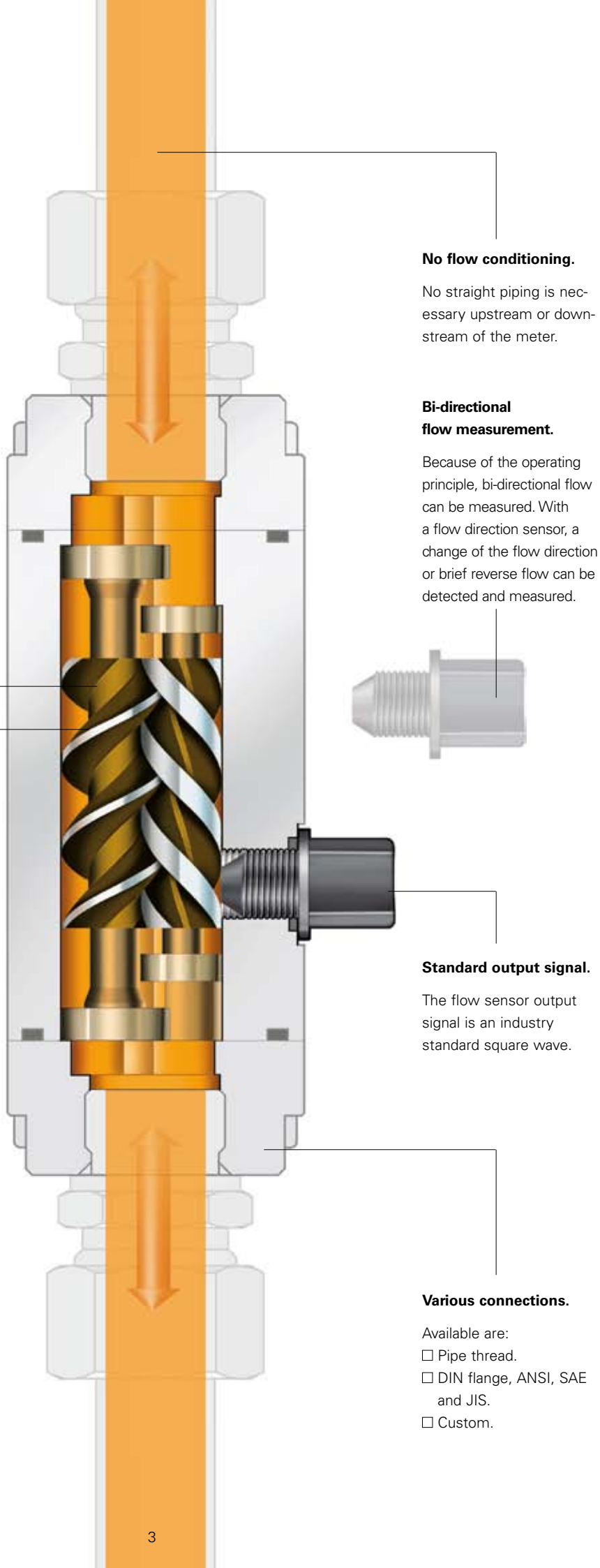
High accuracy.

Because of the precision measurement chamber, extremely accurate measurements are possible.

Precision spindles for wide flow and viscosity ranges.

Compact design.

The axial arrangement of the measurement system allows laminar flow with no change in direction making it a very compact design.



No flow conditioning.

No straight piping is necessary upstream or downstream of the meter.

Bi-directional flow measurement.

Because of the operating principle, bi-directional flow can be measured. With a flow direction sensor, a change of the flow direction or brief reverse flow can be detected and measured.

Standard output signal.

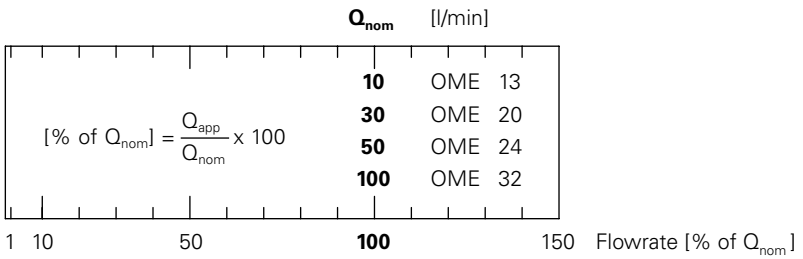
The flow sensor output signal is an industry standard square wave.

Various connections.

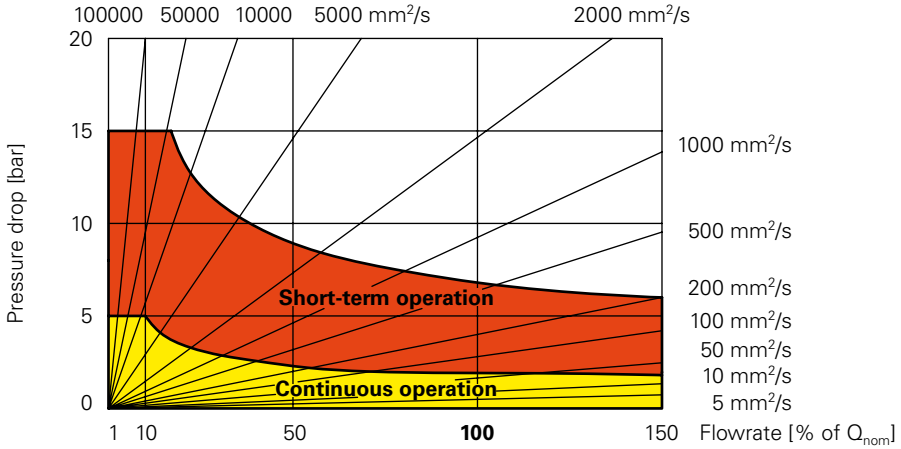
Available are:
- ☐ Pipe thread.
- ☐ DIN flange, ANSI, SAE and JIS.
- ☐ Custom.

The following questions can assist you in selecting an OME meter.	Explanation.	Instructions.	Notes.
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-utilization ratio.	From the **Size** table, select a size, OME 13 - 32, whose nominal flow rate, Q_{nom}, is near that of your application, Q_{app}. Then calculate flowrate in [% of Q_{nom}] using the equation shown at right.	The value of flowrate [% of Q_{nom}] is used in the following diagrams. Draw a line downward from this value to intersect the same value in the other diagrams. Moving the line left or right shows the effects of meter size on load rating and linearity.
Does the selected unit have the required service life? **What is the pressure drop?**	Service life and pressure drop are important factors in selecting a meter size. Verify that your selection will meet your expectations of service life and pressure drop. For increased service life and reduced pressure drop, select a larger size. This will reduce the flowrate [% of Q_{nom}] for a given application. For meters larger than size 32, the OMG Series of Universal flowmeters is available.	In the **Load rating** diagram, find the intersection point of the viscosity [% of Q_{nom}] and flowrate [mm²/s] for your application. To the left of this point, find the pressure drop for the nominal flow of your application. The color range where the point lies signifies either continuous operation (yellow) or short-term operation (red). A point in the white range is not a recommended load rating for an OME.	The range of short-term operation can be purposely used for short times, such as a load reserve or safety factor.
What is the measuring accuracy of the selected unit?	High accuracy is expected from PD meters. The OME delivers excellent accuracy over a wide range of flows. For the highest accuracy, linearization is possible. The KRAL BEM 500 can linearize the meter's performance curve for a defined viscosity. Special calibration may be required.	With the viscosity [% of Q_{nom}] and flowrate [mm²/s] you can obtain the meter accuracy curve from the **Linearity** diagram. Yellow range signifies: The device operates within the range of maximum accuracy of ±0,1 % of rate. Orange range signifies: The meter accuracy is within the limits of ±0,3 % of rate.	The OME begins measuring at an extremely low flowrate, due to very low slippage past the spindles. As viscosity increases, so does the linear region of the accuracy curve.

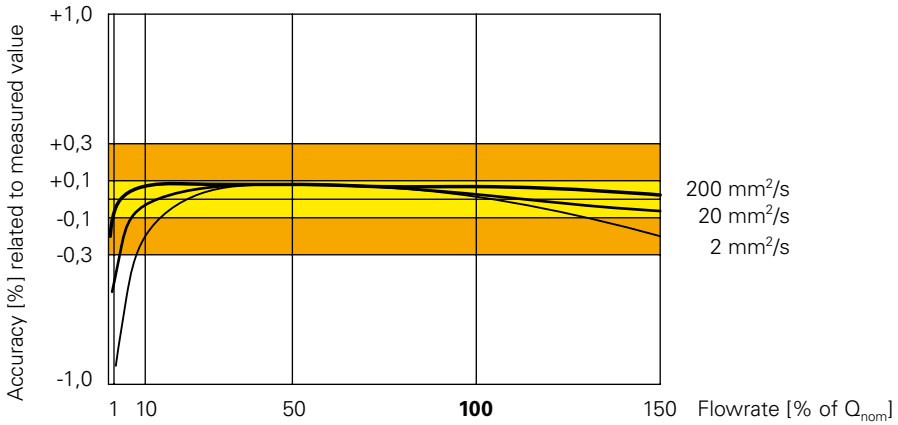
Size.



Load rating.



Linearity.



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

The OME combines service life and accuracy to produce a measuring range of unmatched magnitude. Since normal flow conditions are never static, a wide range of acceptable viscosities and flows is important for precise measurement.

The **Measuring range** diagram provides a visual impression of the wide measurement range available with a KRAL Volumeter.

① This is where accurate operation of the OME starts.

② The OME can be operated continuously up to this line.

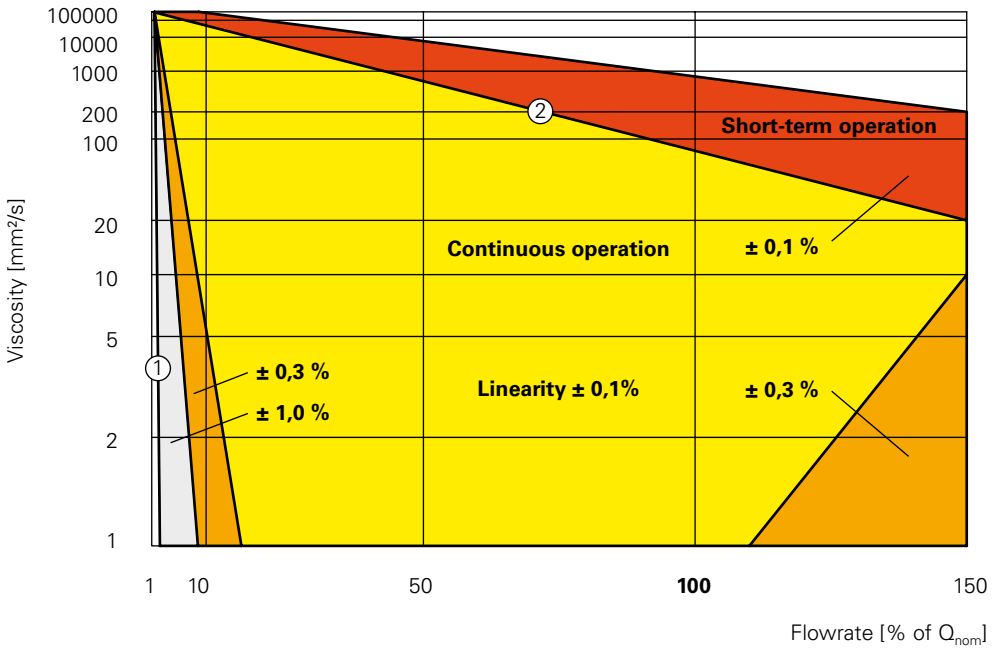
Notice the wide range of conditions where the OME will measure with a linearity of ±0,1 % of rate.

Yellow range signifies: Best combination of accuracy and service life.

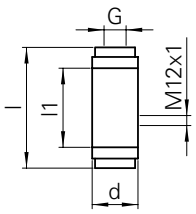
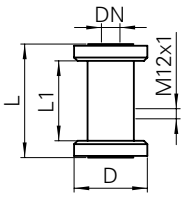
Orange range signifies: The meter is suitable for continuous operation with an accuracy of ±0,3 % of rate.

Red range signifies: Short-term Operation. The linearity will be within ±0,1 % of rate.

Measuring range.



Technical data.		OME 13	OME 20	OME 24	OME 32
Flow					
Q_{max}	l/min	15	45	75	150
Q_{nom}	**l/min**	**10**	**30**	**50**	**100**
Q_{min}	l/min	0,1	0,3	0,5	1
Pressure p_{max}	bar	40	40	40	40
Temperature $t_{min}...t_{max}$	°C	-20 to +100	-20 to +100	-20 to +100	-20 to +100
Viscosity $\nu_{min}...\nu_{max}$	mm²/s	1 to 1x10⁶	1 to 1x10⁶	1 to 1x10⁶	1 to 1x10⁶
K factor K	Imp/l	1214	321	191	78
Frequency f at Q_{nom}	Hz	202	161	159	130

Dimensions / Weights.		OME 13	OME 20	OME 24	OME 32
					
G	**inch**	**1/2“**	**3/4“**	**1“**	**1“**
p	bar	40	40	40	40
l	mm	110	145	165	200
d	mm	45x45	55x55	60x60	70x70
l1	mm	65	95	105	140
m	kg	0,6	1,1	1,8	2,7
					
DN	**mm**	**15**	**20**	**25**	**25**
PN	bar	40	40	40	40
L	mm	105	135	150	185
D	mm	95	105	115	115
L1	mm	65	95	105	140
m	kg	1,1	1,6	2,2	3,1

KRAL Electronics.

Sensor selection.

You have the choice between a PNP sensor for standard applications and an Ex-sensor for use in explosive areas.

Industry standard signals.

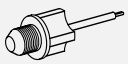
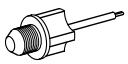
The BEG 40 sensor supplies PNP square wave signal. The BEG 41 Ex-sensor produces a Namur signal. Both of these can be processed by standard industrial interfaces.

KRAL Electronic BEM 300 and BEM 500.

For display of flowrate and consumption, the BEM 500 is an effortless solution. The compact unit is designed by KRAL to support the Volumeter as well as our various applications. BEM 300 is the economy single flowmeter device.

KRAL Industrial PC BEM 900.

For complex applications with up to 16 KRAL Volumeter connected, the preprogrammed BEM 900 is a perfect complement to OME. Beside flow and consumption measurement, this solution offers monitoring and data acquisition and evaluation.

Sensors.		**BEG 40**	**BEG 41**
Size M12x1			 Ex
System		PNP square wave inductive	Namur sine wave inductive
Material		PBTP	PBTP
Pressure p_{max}	bar	40	40
Temperature $t_{min}...t_{max}$	°C	-30 to +100	-30 to +75

Successful application with the KRAL Volumeter® OME.

OME for OEM.

KRAL is a supplier to many original equipment manufacturer (OEM) accounts. These customers look for high flow measurement accuracy and consistent delivery.

With an optimized design, OME flowmeters can be manufactured quickly and delivered on-time in large quantities.

Our customers enjoy the simplicity and lightweight design of the OME. Installation is simple because of the meter's compact and lightweight design. Without the need for upstream or downstream straight piping, OEM customers can place the meters within complicated systems easily.

Gasoline application.

Liquid: gasoline.
Flow: 0,05 to 5 l/min.
Pressure: 40 bar.
Temperature: -20 to 75 °C.
Viscosity: 1,14 mm²/s.
Measuring instrument: OME 13.

An automotive industry supplier needed the best possible solution for testing the flow through automotive fuel pumps during production. The advancements in automotive design required high measurement accuracy of low viscosity fuel over a wide measurement range.

Our Economy flowmeters fulfilled these requirements and are now an integrated part of our customer's production system.

Liquid blending.

Liquid: changing.
Flow: 2 to 50 l/min.
Pressure: 16 bar.
Temperature: -20 to 60 °C.
Viscosity: 0,5 to 10 mm²/s.
Measuring instrument: OME 24.

Blending liquids is a complicated task for a flowmeter. First, a wide flow range needs to be measured accurately. For custody transfer purposes, no loss of accuracy is tolerated. Second, with different liquids and temperatures, the flowmeter must measure accurately over a wide range of viscosities. Third, the measuring chamber must be small to minimize inadvertent mixing of dissimilar products.

Other flow meter designs, which cause large zero-fluctuation readings, can generate measuring errors.

Returnability of the measurement.

Each KRAL Volumeter is tested and calibrated on our in-house test bed. Depending on customer requirements, we perform either a factory calibration or a calibration in compliance to ÖKD (Austrian Calibration Service).

The factory calibration is KRAL Standard. Special standards requirements are also possible. As example, by adding further measurement points. ÖKD calibrated Volumeters are delivered to ISO IEC EN 17025 standards. The measured values are traceable to national standards. The measurement uncertainty of national standard to test unit is specified.

Our certified QA system, in accordance with EN ISO 9001:2000, guarantees the highest quality and delivery reliability.

KRAL

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