



KRAL Flow Measurement.
Flowmeters OME | OMP | OMG | OMH | OMK.

■■■■■■■■ Flow Measurement

Welcome to KRAL.

KRAL AG is a family owned and operated enterprise. Our customers include globally active corporations.

KRAL stands for quality, innovation and speed – anytime and anywhere around the world.

KRAL AG, headquartered in Austria, sets innovative trends in special fields of the pump and flowmeter industry. KRAL solutions make our customers more successful in their competitive environment and guarantee maximum customer benefit. We look not only at the flowmeters but also at the complete system and strategic project in close cooperation with our customers. Resulting in unique, in part customer-specific solutions.

Our customers find KRAL likeable. Friendliness and good cooperation reach the highest values in customer satisfaction surveys. These values are important success factors. They are the result of professional and dedicated work in all fields of the company.

KRAL is a partner of the global players. Such companies require strong and reliable partners. KRAL AG is the foundation of a strong market presence. The family owned enterprise provides the certainty of having a dedicated and cooperative partner for many years in KRAL.

The focus lies on people in our considerations. Success is the result of excellent cooperation between KRAL customers, suppliers, and employees.



At home in the world.
For our customers on all continents.



Find your personal KRAL contact online:
www.kral.at/en/contact

Flow Measurement

KRAL Volumeter® – Precision.

How it works.

■ KRAL Volumeter.

KRAL Volumeter are flowmeters of the highest precision for liquids.

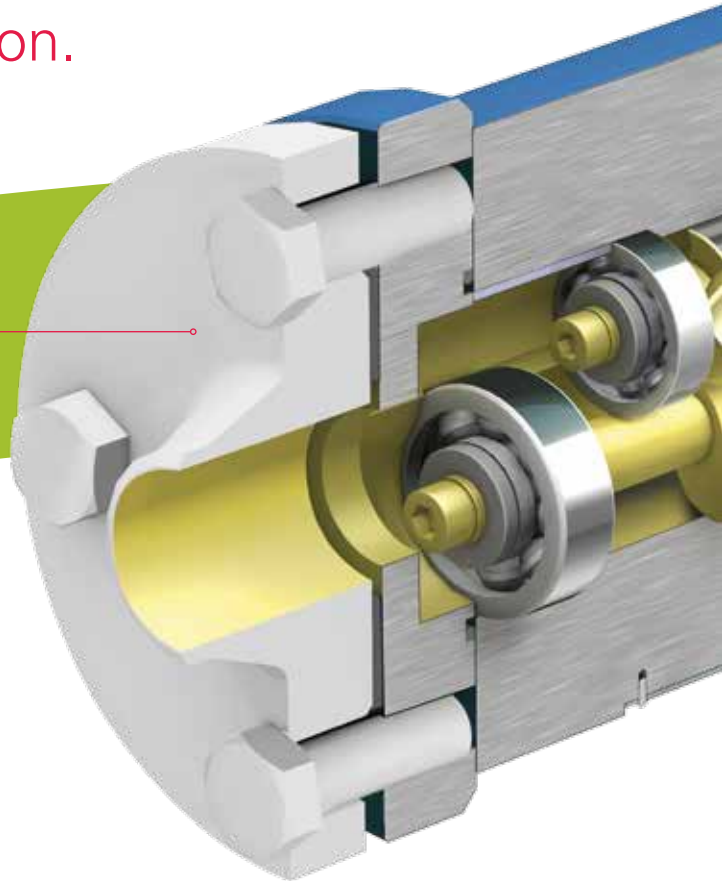
■ KRAL electronic.

KRAL recommends KRAL electronic units for signal detection, evaluation, measured-value display and measured-value forwarding. KRAL electronic units guarantee that the measuring precision is maintained.

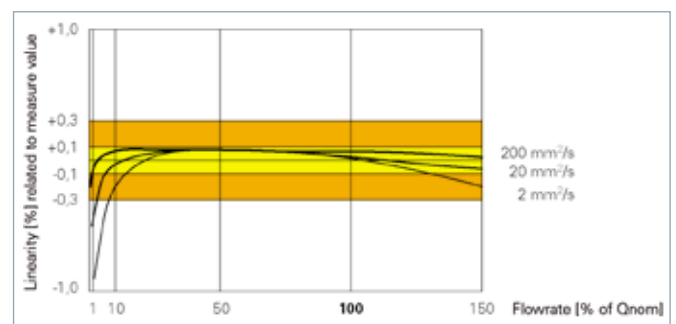
High precision measuring chambers and a wide selection of sizes.

		OMG 13	OMG 20	OMG 32	OMG 52	OMG 88	OMG100	OMG140
Flow rate								
Q_{max}	[l/min]	15	45	150	525	1050	3000	7500
Q_{rated}		10	30	100	350	700	2000	5000
Q_{min}		0.1	0.3	1.0	3.5	7.0	20	50
Pressure max.	[bar]	250	250	250	160	100	40	40
Temperature								
min. – max.	[°C]	-20...+200						
Viscosity								
min. – max.	[mm ² /s]	1 – 1000000						
Measuring chamber volume	[ml/U]	1.64	6.25	25.6	112.7	251.3	833.3	2259.9
Rotation speed								

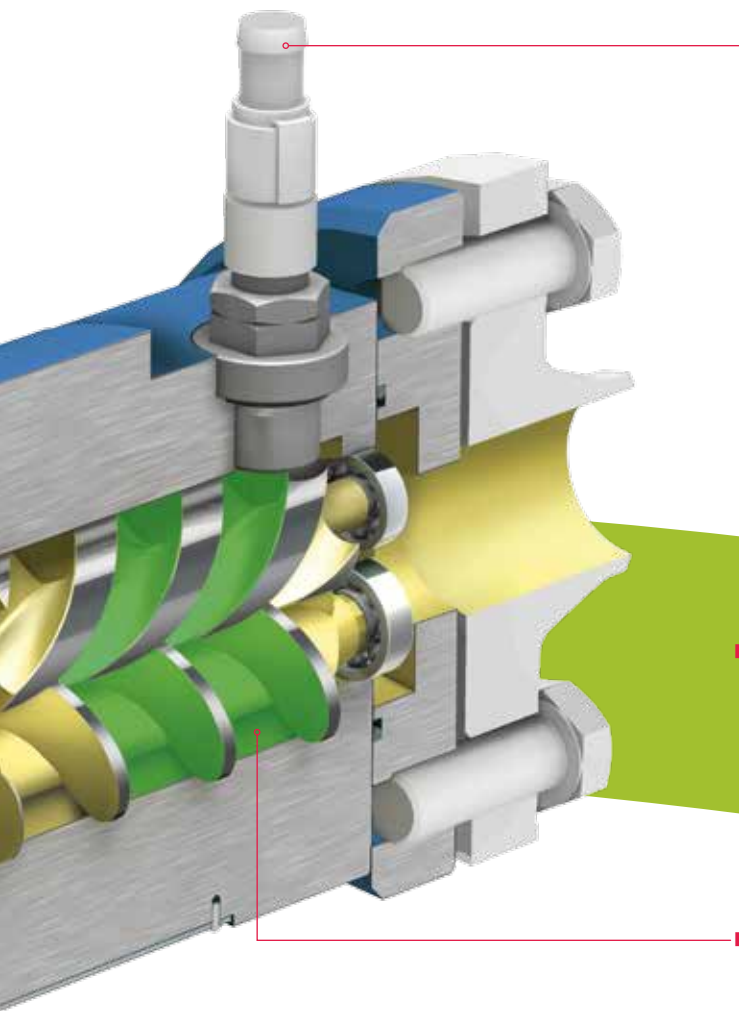
KRAL Volumeters are supplied in various sizes. The sizes ensure that the measuring range can be adapted exactly to the measuring task. The flow rate ranges from 0.1 l/min to 7,500 l/min. The measuring chamber volume described above is specified in the technical catalog. For the OMG series it ranges from 1.64 ml/U up to 2259.9 ml/U.



Highest precision over a wide measurement range.



KRAL Volumeters are very precise measuring instruments with a large measuring range. The linearity diagram shows the characteristics of the precision instrument. Across a measuring range of approx. 1:100 the maximum measuring error amounts to $\pm 0.1\%$.



■ **Sensor.**

The sensor signal is converted into an industry standard signal so that it can be used by all common electronic components.

■ **Measuring chamber.**

Two screw spindles together with the manufactured housing form a highly precise measuring chamber. With each single full rotation of the screws an amount of liquid flows through the measuring instrument that corresponds exactly to the measuring chamber volume.

Calibration.



Each KRAL Volumeter is calibrated on our in-house test bench. Calibration of the KRAL Volumeters can be traced to the „national standards“: KRAL customers can find the calibration factor (K-factor) in the calibration certificate. This K-factor specifies the pulses per liter.

Test stand manufacturers create peak values.

Table 2. Primary data of the meters

	Screw meter
range	300 - 2 300 [l/min]
linearity	± 0.015 %
pulse output	magn. pick up - rectangular pulses
material	carbon steel
nominal bore	4 inch
repeatability from 12 calibration series (1σ-level)	0.001 [p/l] ↔ 0.006 %
nominal k-factor delivered	16.63 [p/l]

The Institute for Calibration and Verification which calibrates the KRAL reference meters, also uses KRAL Volumeters for own measurement tasks. It has determined a linearity of +−0.015% for KRAL Volumeters. This is one magnitude greater than the linearity of +−0.1% specified by KRAL for industrial applications. The impressive values indicate the potential of the KRAL Volumeters when they are used in a test environment, for example in a test bench.

Flow Measurement



OMG



Delivery rate from 0.1 to 7,500 l/min.



Pressure up to 250 bar.



Temperature from -20 to 200 °C.



OMP



Delivery rate from 0.3 to 525 l/min.



Pressure up to 40 bar.



Temperature from -20 to 200 °C.



OME



Delivery rate from 0.1 to 525 l/min.



Pressure up to 40 bar.



Temperature from -20 to 125 °C.



OMH



Delivery rate from 0.1 to 3,000 l/min.



Pressure up to 420 bar.



Temperature from -20 to 200 °C.



OMK



Delivery rate from 0.2 to 150 l/min.



Pressure up to 40 bar.



Temperature from -20 to 100 °C.

6-7

Our universal flowmeter.

8-9

For fuel consumption measurement.

10-11

Compact, with a 3-in-1 sensor.

12-13

For high pressures.

14-15

Chemically resistant.

OMG Series

Universal flowmeters.



Operating conditions and materials.

- Our universal flowmeter for versatile applications.
- Flow range: 0.1 to 7,500 l/min.
- Max. pressure: 250 bar.
- Temperature range: -20 °C to 200 °C.
- Viscosity range: 1 to 1x10⁶ mm²/s.
- Liquids: Chemically neutral, lightly lubricative, clean, non-abrasive.
- Precision: ±0.1% of measured value.
- Screws: Steel, nitrided.
- Bearing: Steel bearing, hybrid ball bearing.
- Seal: Viton® (other sealing materials on request).
- Signal: PNP or NAMUR.

Robust and precise.

Precision and robustness are usually mutually exclusive at flowmeters – OMG provides both! The OMG has a robust housing and is thus protected against external influences such as system vibrations and mechanical stresses, such as often occur in rough industrial environments.

Technical data.		OMG 13	OMG 20	OMG 32	OMG 52	OMG 68	OMG 100	OMG 140
Flow rate								
Q _{max}	l/min	15	45	150	525	1050	3000	7500
Q _{rated}	l/min	10	30	100	350	700	2000	5000
Q _{min}	l/min	0.1	0.3	1	3.5	7	20	50
Pressure								
p _{max}	bar	250	250	250	160	100	40	40
Temperature								
t _{min} to t _{max}	°C	-20 to +200	-20 to +200	-20 to +200	-20 to +200	-20 to +200	-20 to +200	-20 to +200
Viscosity								
v _{min} to v _{max}	mm ² /s	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶
K-factor								
	K1 [P/I]	1,216	640	234	71	39.8	16.8	8.85
	K2 [P/I]	2,432	1,280	468	142	79.6	33.6	17.7
	K3 [P/I]	7,296	2,560	1,014	302	167	57.6	22.1
Frequency								
f1 at Q _{rated}	Hz	203	320	390	414	464	560	738
f2 at Q _{rated}	Hz	405	640	780	828	929	1,120	1,475
f3 at Q _{rated}	Hz	1,216	1,280	1,690	1,760	1,949	1,920	1,842

Application examples.



Marine – Fuel consumption measurement.

Liquid: Heavy fuel oil, marine diesel oil, marine gas oil. Flow rate: 0.2 - 3,000 l/min.
 Pressure: 40 bar. Temperature – HFO: 70 - 160 °C, MDO/MGO: 10 - 60 °C. Viscosity –
 HFO: 10 - 1,300 mm²/s, MDO/MGO: 1.1 - 50 mm²/s. Measuring instrument: OMG 20 - OMG 140.



Mechanical engineering – Determining the position of hydraulic cylinders.

Liquid: Hydraulic oil. Flow rate: 0.2 - 200 l/min.
 Pressure: Pulsating up to 250 bar. Temperature: 40 - 80 °C.
 Viscosity: 60 - 3,000 mm²/s. Measuring instrument: OMG 20 - OMG 52.



Chemicals – Measurement of plastic components.

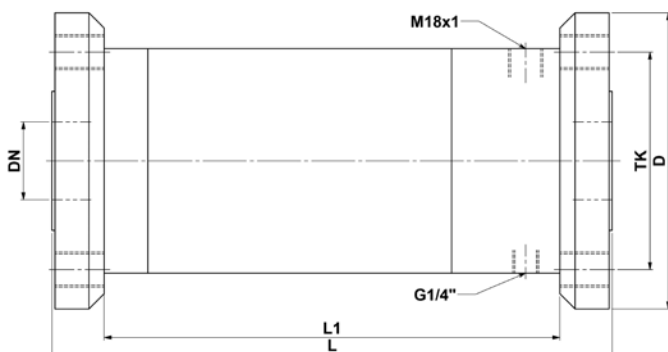
Liquid: Polyol, isocyanate. Flow rate: 35 to 55 l/min. Pressure: 250 bar. Temperature: 10 - 80 °C.
 Viscosity: 20 - 2,000 mm²/s. Measuring instrument: OMG 20 - OMG 52.

Dimensions and connection variants.

OMG – DIN.		13	20	32	52	68	100	140
DN		15	15	25	40	50	100	150
Pressure stage	[bar]	250	250	250	160	100	40	40
L	[mm]	145	195	275	295	355	460	610
D	[mm]	130	130	150	150	195	235	300
L1	[mm]	94	145	215	240	295	400	537
TK	[mm]	90	90	105	125	145	190	250
Weight	[kg]	6,0	8,1	19,0	23,0	37,0	70,0	180,0

Lower pressure stage available.

OMG – ANSI.		13	20	32	52	68	100	140
DN	[inch]	1/2	3/4	1	1 ^{1/2}	2	4	6
Class		1500	1500	1500	900	600	300	300
D		120,6	130,2	149,2	177,6	165,1	254,0	317,5
L	[mm]	155	214	300	320	360	465	673
L1	[mm]	94	145	215	240	295	400	600
TK	[mm]	82,5	88,9	101,6	123,9	127,0	200,1	269,7
Weight	[kg]	4,6	4,1	11	18	29	70	180



Flow Measurement

OMP Series.

The standard for fuel consumption measurement.



Operating conditions and materials.

- Ideal for fuel consumption measurement including booster modules and burner/boiler applications.
- Flow range: 0.3 to 525 l/min.
- Pressure: 40 bar.
- Temperature range: -20 °C to 200 °C.
- Viscosity range: 1 to 1x10⁶ mm²/s.
- Liquids: Chemically neutral, lightly lubricative, clean, non-abrasive.
- Precision: ±0.1% of measured value.
- Screws: Steel, nitrided.
- Bearing: Hybrid ball bearing.
- Seal: Viton® (other sealing materials on request).
- PNP or NAMUR signal.

Clear advantages.

Thanks to the exact measuring chamber, precise measurements across a measuring range of 1:150 are possible. Measurement precision of 0.1% across a wide measuring range. The robust housing protects the precision-manufactured screws. Therefore the OMP unites robustness and precision. The swift measuring screws follow load changes with rapidly varying flow quantities. Smoothing sections are not required either before or after the Volumeter. Pipe bends and tees do not have any influence on the measuring precision. Thanks to the use of high-quality ball bearings the Volumeter operates with low degree of friction and at a low pressure loss. OEM prices available.

Technical data.		OMP 20	OMP 32	OMP 52
Flow rate				
Q _{max}	l/min	45	150	525
Q _{rated}	l/min	30	100	350
Q _{min}	l/min	0.3	1.0	3.5
Pressure				
p _{max}	bar	40	40	40
Temperature				
t _{min} to t _{max}	°C	-20 to +200	-20 to +200	-20 to +200
Viscosity				
v _{min} to v _{max}	mm ² /s	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶
K-factor				
	K [P/l]	321.0	78.0	17.73
Frequency				
	f at Q _{rated} Hz	161	130	104

Application examples.



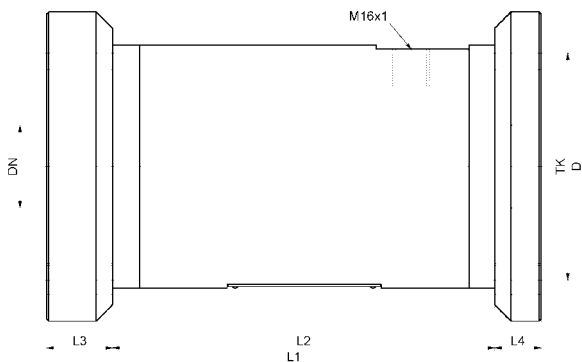
Marine – Fuel consumption measurement.

Liquid: Heavy fuel oil, marine diesel oil, marine gas oil. Flow rate: 0.2 - 3,000 l/min.
 Pressure: 40 bar. Temperature – HFO: 70 - 200 °C, MDO/MGO: 10 - 60 °C.
 Viscosity – HFO: 10 - 1,300 mm²/s, MDO/MGO: 1.1 - 50 mm²/s.
 Measuring instrument: OMP 20 - OMP 52.

Dimensions and connection variants.

OMP – DIN.		20	32	32	52
DN		20	25	32	40
Pressure stage	[bar]	40	40	40	40
D	[mm]	105	115	140	150
TK	[mm]	75	85	100	110
L1	[mm]	125	180	190	240
L2	[mm]	85.0	140.0	140.0	185.5
L3	[mm]	20	20	25	32
L4	[mm]	20.0	20.0	25.0	22.5
Weight	[kg]	5.0	11.2	13.5	19.2

OMP – ANSI.		20	32	52
DN	[inch]	3/4	1	1 ^{1/2}
Class		300	300	300
D	[mm]	117.5	123.8	155.6
TK	[mm]	82.5	88.9	114.3
L1	[mm]	134	195	245
L2	[mm]	85.0	140.0	185.5
L3	[mm]	24.5	27.5	32.0
L4	[mm]	24.5	27.5	27.5
Weight	[kg]	6.0	12.5	19.6



OME Series.

High-precision flowmeter with a 3-in-1 sensor.



Operating conditions and materials.

- The 3-in-1 sensor combines flow rate measurement, flow direction recognition and temperature measurement.
- Flow range: 0.1 to 525 l/min.
- Max. pressure: 40 bar.
- Temperature range: -20 °C to 125 °C.
- Viscosity range: 1 to 1x10⁶ mm²/s.
- Liquids: Chemically neutral, lightly lubricative, clean, non-abrasive.
- Precision: ±0.1% of measured value.
- Screws: Steel, nitrided.
- Bearing: Steel bearing.
- Seal: Viton® (other sealing materials on request).
- Push-pull and Pt100 signal.

Much more than just a flowmeter.

Thanks to the exact measuring chamber, precise measurements across a measuring range of 1:150 are possible. Measurement precision of 0.1% across a wide measuring range. Smoothing sections are not required either before or after the Volumeter. Pipe bends and tees do not have any influence on the measuring precision. Thanks to the use of high-quality ball bearings, the Volumeter operates with low degree of friction and at a low pressure loss. Through their working principle KRAL Volumeters® measure in both flow directions. The new sensor equipment recognizes an inversion of the flow direction. KRAL electronic units take the flow direction into consideration when forming the precise measured value. The output signal is formed by two square wave signals, placed electrically out of phase by 90° in order to recognize the flow direction. The cabling is unique.

OME Compact.		OME 13	OME 20	OME 32	OME 52
Flow rate					
Q _{max}	l/min	15	45	150	525
Q _{rated}	l/min	10	30	100	350
Q _{min}	l/min	0.1	0.3	1.0	3.5
Pressure					
p _{max}	bar	40	40	40	40
Temperature					
t _{min} to t _{max}	°C	-20 to +125	-20 to +125	-20 to +125	-20 to +125
Viscosity					
v _{min} to v _{max}	mm ² /s	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶
K-factor					
	K [P/l]	1214.0	321.0	78.0	17.73
Frequency					
	f at Q _{rated} Hz	202	161	130	104

Application examples.



Marine – Inland waterways fuel consumption measurement.

Liquid: Diesel oil, marine gas oil. Flow rate: 0.2 - 350 l/min.
 Pressure: 40 bar. Temperature: 10 - 60 °C. Viscosity: 1.1 - 50 mm²/s.
 Measuring instrument: OME 20 - OME 52.



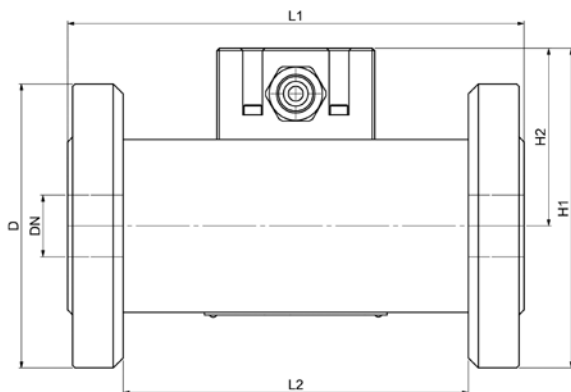
Power Generation – Land based plants fuel consumption measurement.

Liquid: Diesel oil, marine gas oil. Flow rate: 0.2 - 350 l/min.
 Pressure: 40 bar. Temperature: 10 - 60 °C. Viscosity: 1.1 - 50 mm²/s.
 Measuring instrument: OME 20 - OME 52.

Dimensions and connection variants.

OME – DIN.		13	20	32	52
DN		15	20	25	40
Pressure stage	[bar]	40	40	40	40
D	[mm]	95	105	115	150
L1	[mm]	105	135	185	325
L2	[mm]	65	95	140	225
H1	[mm]	107.0	117.0	129.5	167.0
H2	[mm]	59.5	64.5	72.0	92.0
Weight	[kg]	1.2	1.7	3.0	11.8

OME – ANSI.		13	20	32	52
DN	[inch]	1/2	3/4	1	1 ^{1/2}
Class		300	300	300	300
D	[mm]	92.5	117.5	123.8	160.0
L1	[mm]	105	145	195	315
L2	[mm]	65	95	140	225
H1	[mm]	107.1	123.2	133.9	172.0
H2	[mm]	59.5	64.5	72.0	92.0
Weight	[kg]	1.2	2.2	3.6	11.9



Flow Measurement

OMH Series.

Uniquely compact at high pressure and high flow rate.



Operating conditions and materials.

- Our flowmeter for high pressures.
- Flow range: 0.1 to 3000 l/min.
- Max. pressure: 420 bar.
- Temperature range: -20 °C to 200 °C.
- Viscosity range: 1 to 1x10⁶ mm²/s.
- Liquids: Chemically neutral, lightly lubricative, clean, non-abrasive.
- Precision: ±0.1% of measured value.
- Screws: Steel, nitrided.
- Bearing: Steel bearing.
- Seal: Viton® (other sealing materials on request).

High measuring precision at high pressure and high flow rate.

The KRAL Volumeter® OMH can be used at up to 420 bar and is furthermore a precision measuring instrument. The OMH has a stiff housing. The geometry remains even at high pressures. Meaning that the precision is not reduced.

Technical data.		OMH 13	OMH 20	OMH 32	OMH 52	OMH 68	OMH 100
Flow rate							
Q _{max}	l/min	15	45	150	525	1050	3000
Q_{rated}	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} to t _{max}	°C	-20 to +200	-20 to +200	-20 to +200	-20 to +200	-20 to +200	-20 to +200
Viscosity							
v _{min} to v _{max}	mm ² /s	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶
K-factor							
	K2 [P/l]	2,432	1,280	468	142	79,6	33,6
	K3 [P/l]	7,296	2,560	1,014	302	167	57,6
	K4 [P/l]	7,296	2,560	1,014	302	167	87,6
Frequency							
f2 at Q _{rated}	Hz	504	640	780	828	929	1,120
f3 at Q _{rated}	Hz	1,216	1,280	1,690	1,760	1,949	1,920
f4 at Q _{rated}	Hz	1,216	1,280	1,690	1,762	1,948	2,920

Application examples.



Mechanical engineering – Determining the position of hydraulic cylinders.

Liquid: Hydraulic oil. Flow rate: 5 to 340 l/min. Pressure: 350 bar.

Temperature: 20 - 60 °C. Viscosity: 20 - 140 mm²/s.

Measuring instrument: OMH 52 within flow direction recognition.



Oil & gas – Consumption measurement at gas turbines.

Liquid: Diesel oil. Flow rate: 28 - 1,770 l/min.

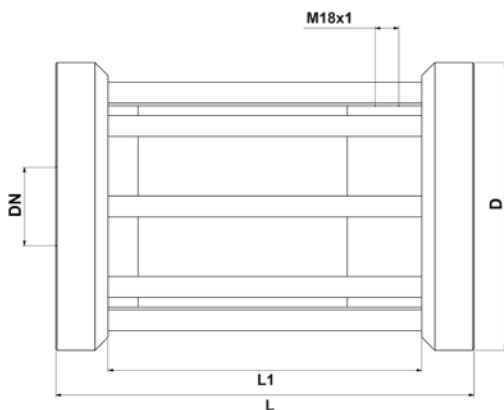
Pressure: 142 bar. Temperature: -15 - 80 °C. Viscosity: 1.6 - 6 mm²/s.

Measuring instrument: OMH 100 with sensor in explosion protection.

Dimensions and connection variants.

OMH – DIN.		13	20	32	52	68	100
DN		15	15	25	40	50	100
Pressure stage	[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
Weight	[kg]	7	13	27	57	76	155

OMH – SAE.		13	20	32	52	68	100
DN	[inch]	1/2	3/4	1	1 ^{1/2}	2	2
Class		6000	6000	6000	6000	6000	6000
D	[mm]	100	145	180	220	235	300
L	[mm]	150	185	255	320	385	510
L1	[mm]	94	115	175	240	295	400
Weight	[kg]	7	12	28	54	80	185



Flow Measurement

OMK Series.

Chemically resistant flowmeters.



Operating conditions and materials.

- Chemically resistant.
- Flow range: 0.2 to 150 l/min.
- Max. pressure: 40 bar.
- Temperature range: -20 °C to 100 °C.
- Viscosity range: 1 to 1x10⁶ mm²/s.
- Housing: CrNi steel.
- Screws: PTFE with 15% graphite.
- Bearing: Sleeve bearing.
- Seal: Viton® or silicone with chemically resistant coating.

Precise flow rate measurement in rough industrial environment.

In particular for the chemical industry and for process engineering the KRAL Volumeter OMK unites the normally mutually exclusive properties of measuring precision and robustness in a single precision measuring instrument. The PTFE spindles have low friction for measurement of non-lubricating liquids and increased chemical resistance for a wide range of compatible liquids.

Technical data.		OMK 13	OMK 20	OMK 32
Flow rate				
Q _{max}	l/min	15	45	150
Q _{rated}	l/min	10	30	100
Q _{min}	l/min	0.2	0.6	2
Pressure				
p _{max}	bar	40	40	40
Temperature				
t _{min} to t _{max}	°C	-20 to +40 or +20 to +100	-20 to +40 or +20 to +100	-20 to +40 or +20 to +100
Viscosity				
v _{min} to v _{max}	mm ² /s	1 to 1x10 ⁶	1 to 1x10 ⁶	1 to 1x10 ⁶
K-factor				
	K [P/l]	1,200	640	230
Frequency				
	f at Q _{rated} Hz	200	320	383

Application examples.



Mechanical engineering – Volumetric examinations of barrels .

Liquid: Water. Flow rate: 0.6 - 45 l/min. Pressure: 6 bar.

Temperature: 10 - 30 °C. Viscosity: 1 mm²/s. Measuring instrument: OMK 32.



Oil & gas – Additives in fuels.

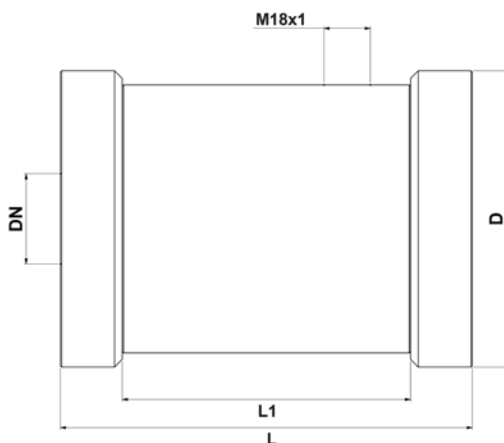
Liquid: Gasoline additive. Flow rate: 0.5 to 16 l/min. Pressure: 2 - 16 bar.

Temperature: -20 - 40 °C. Viscosity: 1 - 40 mm²/s. Measuring instrument: OMK 20.

Dimensions and connection variants.

OMK – DIN.		13	20	32
DN		15	20	25
Pressure stage	[bar]	40	40	40
L	[mm]	110	115	160
D	[mm]	95	105	115
L1	[mm]	69	75	112
Weight	[kg]	3,2	4	10

OMK – ANSI.		13	20	32
DN	[Zoll]	1/2"	3/4"	1"
Class		300	300	300
L	[mm]	110	120	160
D	[mm]	95,2	117,5	123,8
L1	[mm]	69	75	112
Weight	[kg]	3,2	4,8	10,2



■■■■■■■■ We Pump and Measure Liquids

KRAL AG.

Additional Products and Services.



KRAL ■■ Pumps

KRAL AG is a manufacturer of screw pumps of the highest quality and dependability, providing both outstanding suction capabilities and low pulsation.



KRAL || Fluid Handling Solutions

KRAL AG has been manufacturing pumps, pump stations and flowmeters for decades. We have installed our products for a great many customers on-site, and taken those products into operation. As pump specialists, we manufacture the core elements of our pump modules ourselves.



KRAL || Services

Through the expert installation, commissioning and maintenance of your KRAL products, you'll be increasing their lifespans and minimising operational costs while also limiting downtime.

