

**Operating Instructions
for
Screw-Type Volumetric Flow Meter**

Model: OMS



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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

as per PED 2014/68/EU

In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.

Diagram 8, Pipe, Group 1 dangerous fluids

3. Instrument Inspection

All Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

The standard delivery includes:

- Screw-Type Volumetric Flow Meter, model: OMS-...

4. General Information

- It is important that all staff concerned with the unit read the operation and maintenance manual prior to start up of the unit.
- The user is responsible for taking the precautions outlined in this manual
- This screw-volumeter should not be operated outside of the data given on the type plate. Any differences require confirmation from us.
- It is not possible to put all the information you may require in the manual. Should you require any special information, please contact us.
- Depending on the operating conditions, wear, corrosion or age of the unit, its specified attributes may be limited. It is therefore essential that the unit is periodically maintained. The user must replace all parts which would not guarantee a long operating life or trouble-free operation. If the unit operates unusually or if damage is observed, further operation must be discontinued
- Installations which could lead to personal injury and/or material failure should be equipped with an alarm system and/or bypass. This system should be checked periodically.

5. Regulation Use

Any use of the Helical Volume-meter, model: OMK-..., which exceeds the manufacturer's specifications, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

6. Warranty

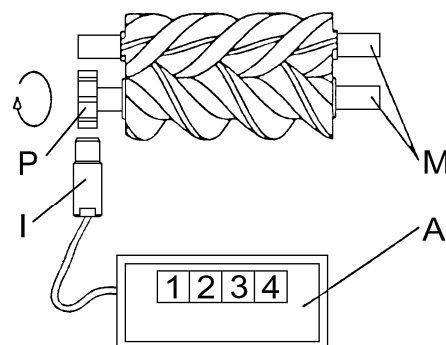
The warranty is according to our terms of delivery. Repairs during the guarantee period must be carried out only by user or any other person authorised by us and in accordance with our agreement and instructions.

7. Operating Principle

The measuring principle of the KOBOLD screw-volumeter is positive displacement.

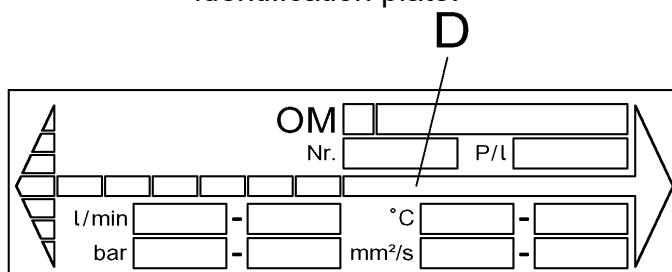
The flow of the fluid to be measured causes the measuring spindles **M** to rotate. With each rotation an exact volume is given. These rotations are being transmitted to the display **A** by the pole wheel **P** and pick up **I**.

There the volume can be shown in any unit of measurement.



8. Mechanical Connection

Mounting position: any
 Flow direction: both directions are possible, preferable flow **D** according the identification plate.



Minimum pressure: The meter back pressure at the outlet fitting should be kept higher than 0,1 bar (1.5 PSIG). In no case may the medium freely run out of the flow meter. If necessary, install a valve at the meter outlet to generate the appropriate back pressure.

Unclean medium: Filtration with max. 0,3 mm (30 Micron) mesh width is required.

Foreign substance: The pipe system must be free from welding slag, cuttings, as they can block and damage the flow meter.

Over pressure valve: A blocked flow meter stops the complete flow of the medium, therefore, depending on the application, a pressure relief valve is required.

Fastening: Must be installed with piping fully supported at the inlet and outlet and properly aligned to prevent stresses on the flow meter pipe thread connection.

Pipe thread connection: The thread length of the pipe should not be longer than the thread length of the flowmeter (Stricture of the flow-diameter, damaging of internal parts).

Storage: Improper storage may cause corrosion and seizing of internal parts.

9. Electrical Connection

The screw-type volumeters are set up, tested and delivered with an integrated dry sleeve.

The purchaser must screw the pulse generator cartridge into the dry shell using the knurled nut and spring.



Caution! The dry shell must not contain any foreign matter. The spring must be able to push the pulse generator cartridge fully into the front side of the dry shell.

The free cable ends are connected to a display unit. When connecting, please comply with the terminal diagram and technical data. Further technical data can be found in the additional operating instructions "Pulse generator of the OM series".



Caution! The sensor system (sensor, measuring transducer and wires) must not be located in the vicinity of powerful electromagnetic field pulses, such as those emanating from overhead power lines, electric motors, frequency converters etc. That could lead to incorrect measurements or even cause serious damage to the sensor system.

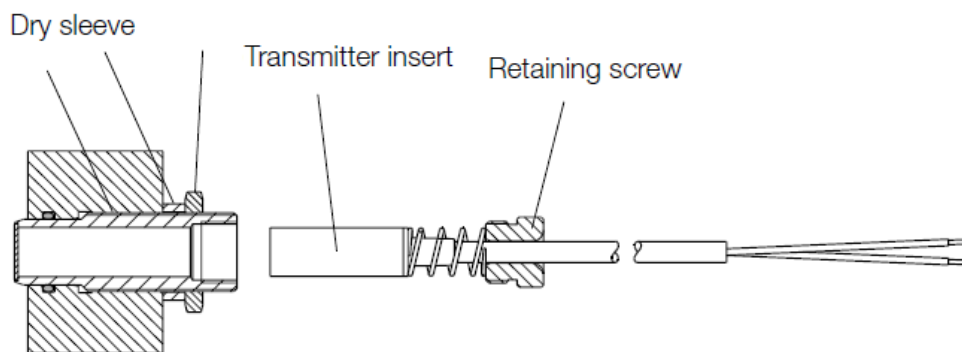
Mounting and dismounting

The sensors consist of a sensor cartridge E that is screwed into the relevant dry shell G using the knurled ring R and spring.

During operation, the sensor insert E can also be changed when the system is under pressure and without fluid leaking out.

The dry shell G was built in, screwed in and tested as a unit with the sensor cartridge E at the KOBOLD factory. The dry shell G must not be moved out of position because that might cause the sensor signal to be lost or the volumeter to be damaged or functionally impaired.

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Caution: If the dry shell G is out of position, this is indicated by the red sealing point. If the sealing point is damaged, then no warranty for the volumeter can be assumed.

10. Disassembly and Assembly

This work is only to be carried out by trained personnel. The manual is only intended as an aid for performing the work.

If the spindle set or the measurement housing is replaced, the volumeter must be recalibrated!

10.1 Servicing

Dangers during servicing

The following safety instructions must be observed strictly:

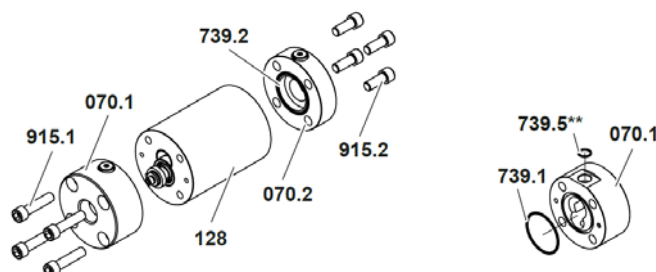
- Have all work only carried out by authorized qualified personnel.
- To ensure the measuring precision, the measuring unit may only be replaced by the manufacturer.
- Before beginning work, let the flowmeter cool down slowly to the ambient temperature. Avoid rapid temperature changes
- Pumped liquids can be hot, poisonous, combustible and caustic.
- Observe the tightening torques, see Appendix, chapter 19.
- Observe the operating instructions and data sheets of the sensors.

10.1.1 Removing seals and bearings OMS-20/OMS-25

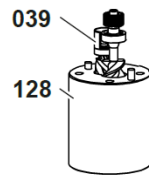
Personal qualification:	<ul style="list-style-type: none"> • Fitter
Personal protective equipment	<ul style="list-style-type: none"> • Work clothing • Protective gloves • Safety boots
Aids:	<ul style="list-style-type: none"> • Extractor

Requirement:

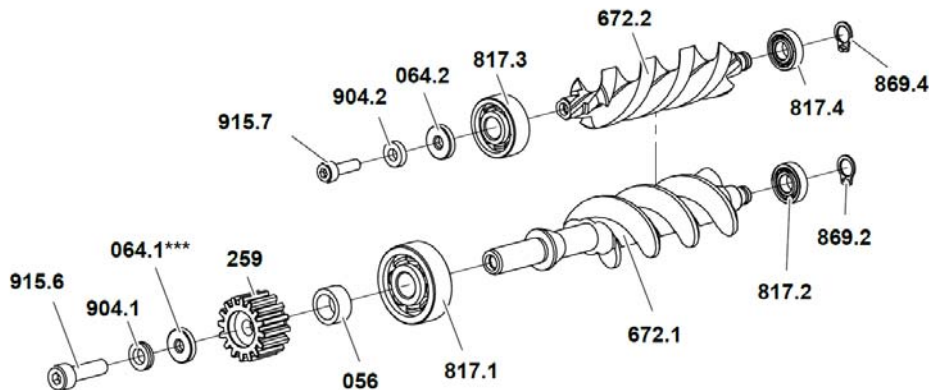
- Flowmeter removed from system
- Completion consisting of socket screws, flanges and seals removed
- Pick up inserts removed



- Remove the socket screws **915.1** and **915.2**, take off the end covers **070.1** and **070.2**
- Remove the O-rings **739.1**, **739.2** and **739.5**** (1 x per pick up hole).



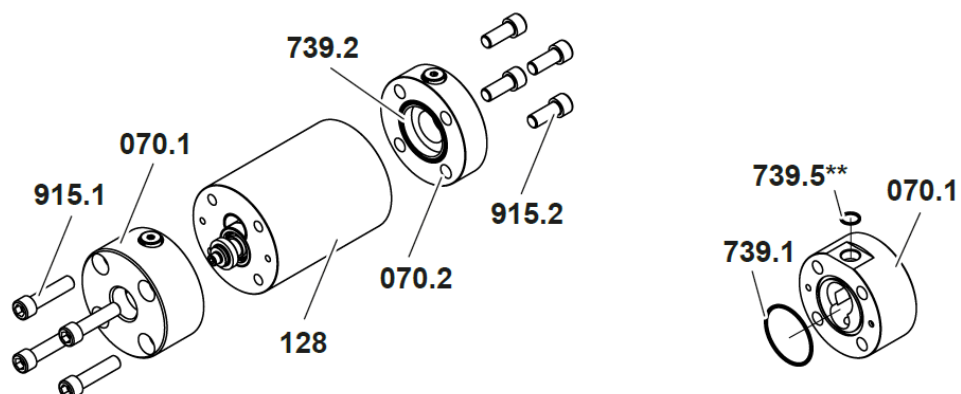
- Pull the distance sleeve **039** together with the screw set out of the measuring housing **128**.



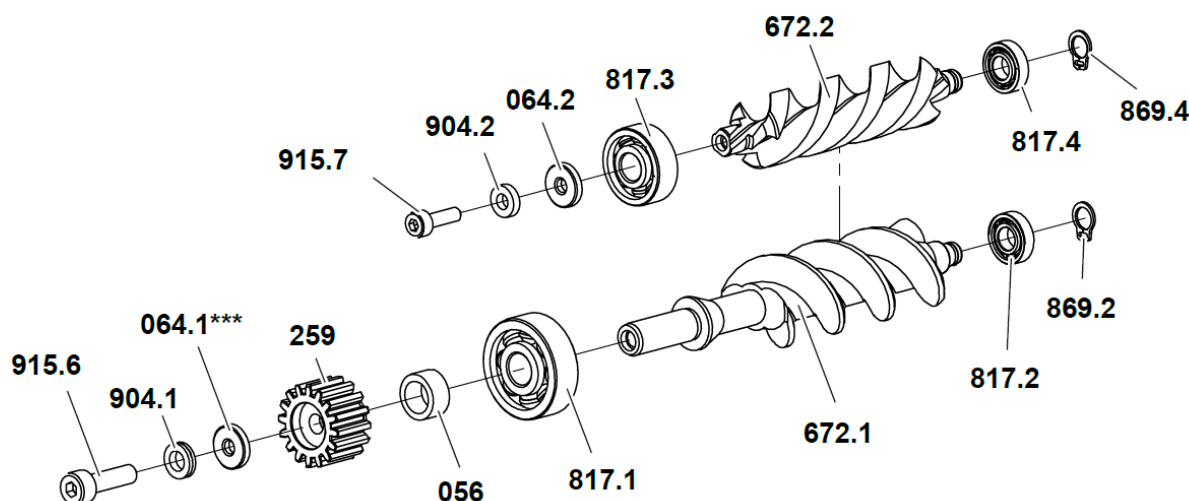
- Remove the circlips **869.2** and **869.4** from the measuring screw large **672.1** and measuring screw small **672.2**.
- Screw out the socket screws **915.6** and **915.7** and remove the wedge lock washers **904.1**, **904.2** and supporting rings **064.1***** (only OMS-032) **064.2**.
- Screw the socket screw **915.6** completely back in, in order to pull the pole wheel **259** and distance ring **056** from the measuring screw large **672.1** by using an extractor. Remove the socket screw **915.6** again.
- Pull the ball bearings **817.1**, **817.2**, **817.3** and **817.4** from the measuring screws by using the ex-tractor.

10.1.2 Installing seals and bearings OMS-20/OMS-25

Personal qualification:	<ul style="list-style-type: none"> • Fitter
Personal protective equipment:	<ul style="list-style-type: none"> • Work clothing • Protective gloves • Safety boots



- Insert the O-rings **739.1** and **739.2** into the end covers **070.1** and **070.2**
- Insert the O-ring **739.5**** into the pick up hole (1 per pick up hole)



- Press on the ball bearings **817.1** and **817.2** only over the inner rings on the measuring screw large **672.1**.
- Press on the ball bearings **817.3** and **817.4** only over the inner rings on the measuring screw small **672.2**
- Slide the distance ring **056** on the measuring screw large **672.1**, press on the pole wheel **259**.
- Pull the wedge lock washers 904.1 and 904.2 and supporting rings 064.1*** (only OMS-032) and 064.2 onto the socket screws 915.6 and 915.7.
- Apply Loctite 242 to the socket screws **915.6** and **915.7**, install on the measuring screw large and measuring screw small with mounted washers and tighten with torque, see Appendix, chapter 19
- Install the circlips **869.2** and **869.4** respectively on the floating bearing end.
- At a BSPP connection: Place the end cover **070.2** on the measuring housing, lay ready the socket screws **915.2**.

-or-

At a flange connection: Place the end cover **070.2** and flange cover **115.2*** with O-ring **739.4*** on the measuring housing, lay ready the socket screws **915.4***.

- Pretension the oiled screws crosswise and tighten with torque.

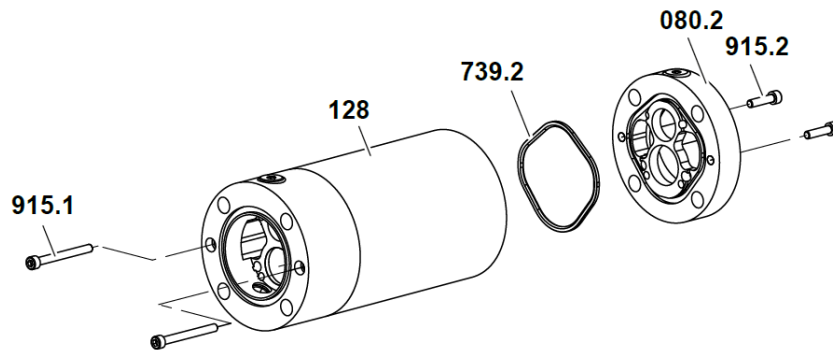
10.1.3 Removing seals and bearings OMS-40

Personal qualification:	<ul style="list-style-type: none"> • Fitter
Personal protective equipment:	<ul style="list-style-type: none"> • Work clothing • Protective gloves • Safety boots
Aids:	<ul style="list-style-type: none"> • Extractor

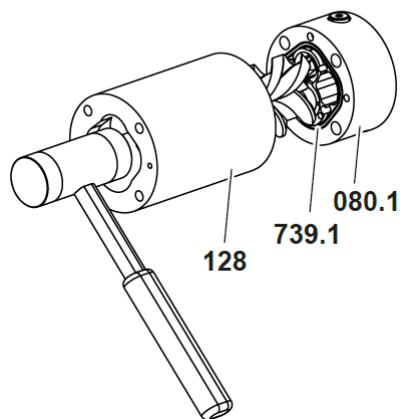
Requirement:

- Flowmeter removed from system
- Completion consisting of socket screws, flanges and seals removed

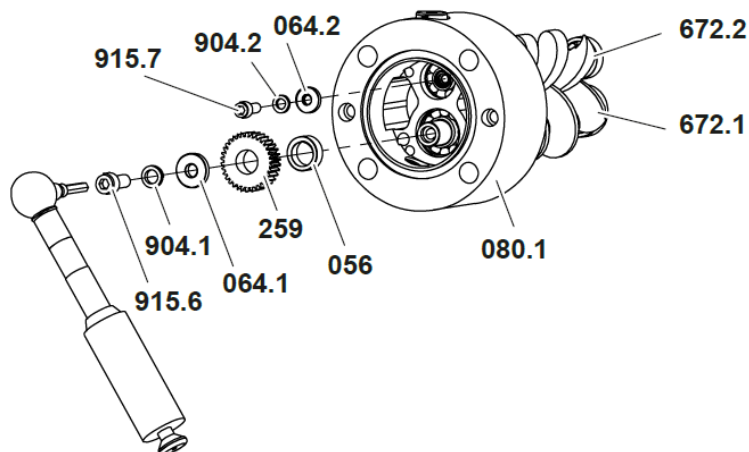
- Pick up inserts removed



- Remove the socket screws **915.1** and **915.2**, take off the bearing cover **080.2**. Remove the O- ring **739.2**

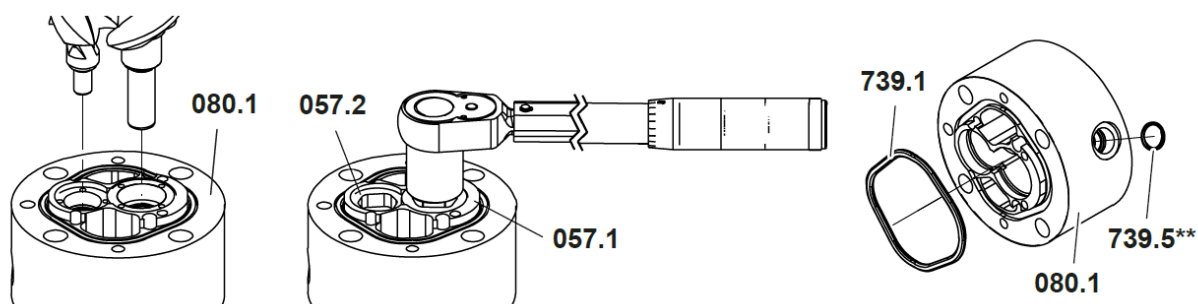


- Drive the screw set together with the bearing cover **080.1** out of the measuring housing **128** using light blows of a plastic hammer and pull out.

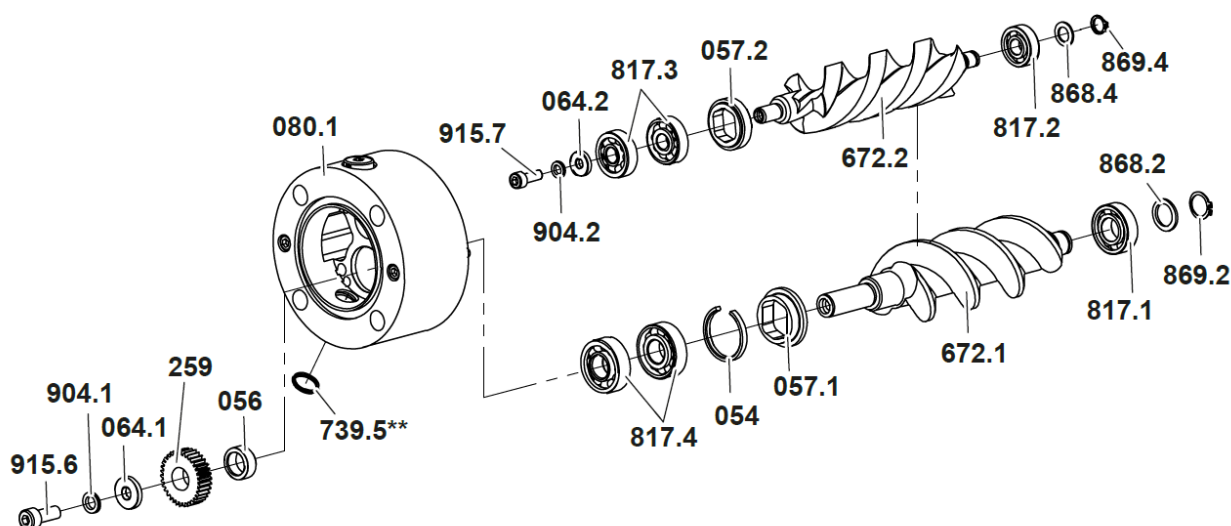


- Screw out the socket screw **915.6** with wedge lock washer **904.1** and supporting ring **064.1** at the measuring screw large **672.1**. Pull off the pole wheel **259** and distance ring **056**.

- Screw out the socket screw **915.7** with wedge lock washer **904.2** and supporting ring **064.2** at the measuring screw small **672.2**.



- Pull out the screw set from the bearing cover **080.1** with extractor.
- Screw the threaded rings **057.1** and **057.2** out of the bearing cover. Widths of the threaded rings, see Appendix, Page 19.
- Remove the O-rings **739.1** and **739.5**** (1 x per pick up hole).



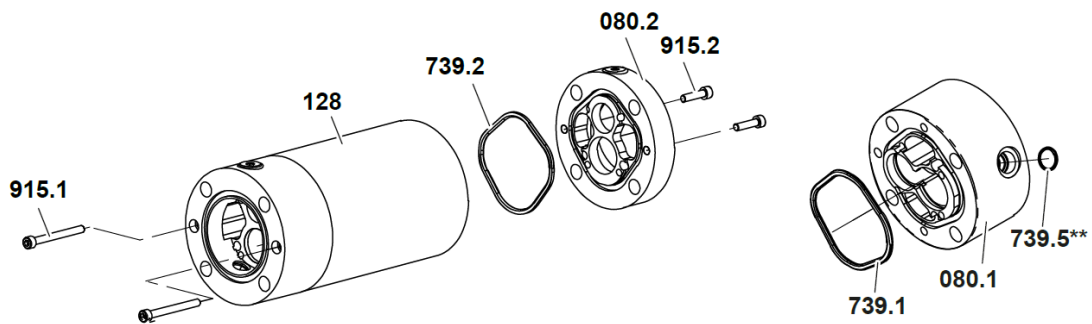
- Take out the distance ring **054** and pull the ball bearings **817.3** and **817.4** out of the bearing cover using an extractor.
- Remove the circlips **869.2** and **869.4** and the support rings **868.2** and **868.4** from the measuring screws.
- Pull the ball bearings **817.1** and **817.2** from the measuring screws by using the extractor.

10.1.4 Installing seals and bearings OMS-40

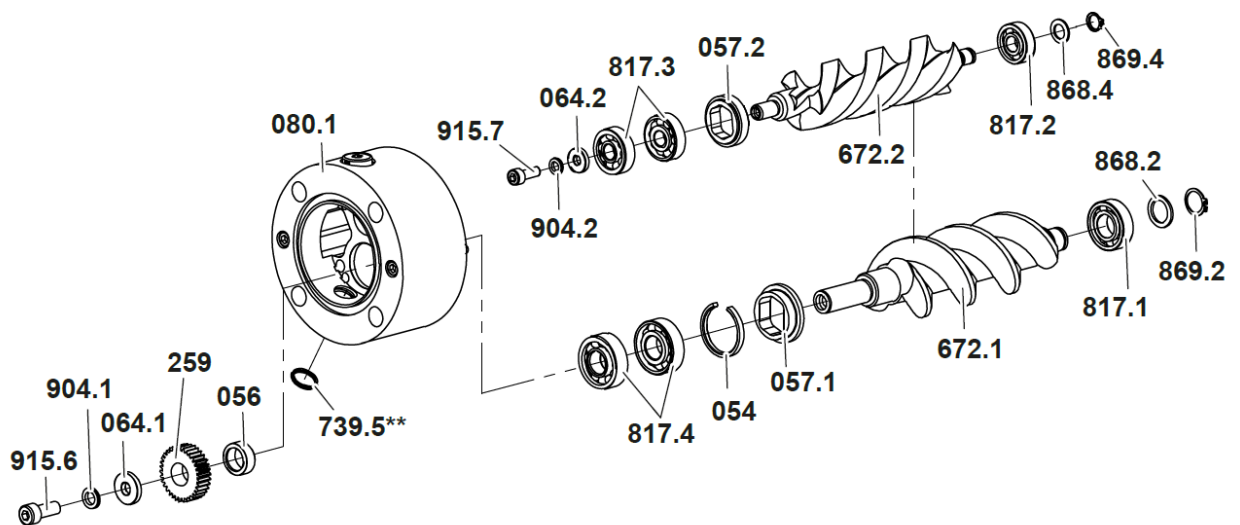
Personal qualification:	<ul style="list-style-type: none"> • Fitter
Personal protective equipment:	<ul style="list-style-type: none"> • Work clothing • Protective gloves • Safety boots

Requirements:

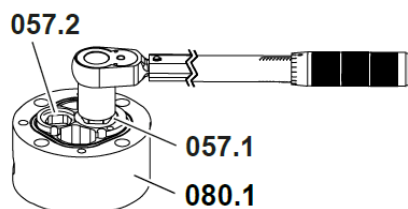
- Replacement parts available



- Insert the O-rings **739.1** and **739.2** into the bearing covers **080.1** and **080.2**.
- Insert the O-ring **739.5**** into the pick up hole (1 x per pick up hole).



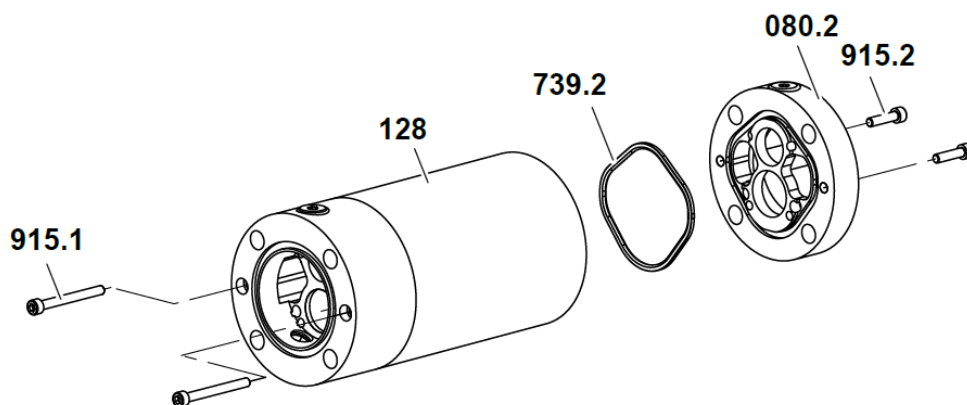
- Press in the ball bearings **817.3** and **817.4** only over the outer rings in the bearing cover **080.1**.
- Press the distance ring **054** onto the ball bearings **817.3**.
- Press the ball bearings **817.1** on only over the inner ring on the measuring screw large **672.1**
- Press the ball bearings **817.2** on only over the inner ring on the measuring



screw small **672.2**.

- First screw in the threaded ring **057.2**, then the threaded ring **057.1** into the bearing cover **080.1** using a torque wrench. For the widths and tightening torques, see Appendix, chapter 19.

- Press the measuring screws into the ball bearings in the bearing cover. Support the respective inner ring in the process
- Pull the wedge lock washers **904.2** and supporting rings **064.2** onto the socket screw **915.7**. Ensure a tight connection of the wedge lock washers.
- Apply Loctite 242 to the socket screws **915.7**, install on the measuring screw small with mounted washers and tighten with torque, see Appendix, chapter 19.
- Slide the distance ring **056** on the measuring screw large **672.1**. Press on the pole wheel **259**.
- Pull the wedge lock washer **904.1** and supporting ring **064.1** onto the socket screw **915.6**. Ensure a tight connection of the wedge lock washers.
- Apply Loctite 242 to the socket screw **915.6**, install on the measuring screw large **672.1** with mounted washers and tighten with torque, see Appendix, chapter 19.
- Install the support rings 868.2 and 868.4 and the circlips 869.2 and 869.4 on the floating bearing end.



- Place the bearing cover **080.2** onto the measuring housing **128** and tighten the socket screws **915.2** with torque.
- Slide the bearing cover **080.1** with bearings and premounted measuring unit, consisting of screw set and pole wheel, into the measuring housing, tighten the socket screws **915.1** with torque, see Appendix, chapter 19.
- Install the flange cover. In the process pre-tighten the oiled screws crosswise and tighten with torque, see Appendix, chapter 19.

11. Start up

Technical data on the identification plate must be considered.
Venting: The system must be free of air (affects the accuracy)

12. Troubleshooting

Problem	Cause	Solution
Too great a loss of pressure	<ul style="list-style-type: none"> • Viscosity of medium and/or flow rate too high 	<ul style="list-style-type: none"> • Increase the temperature (complying with the permissible temperature range) • Reduce the flow rate • Use larger volumeters
Leakage	<ul style="list-style-type: none"> • Sealing not sufficiently pre-stressed • Sealing defective 	<ul style="list-style-type: none"> • Pre-stress the screws • Replace the sealing • Check the chemical stability
Blocked volumeter	<ul style="list-style-type: none"> • Foreign matter • Pulse generator screwed in too far • Supply pressure too low 	<ul style="list-style-type: none"> • Clean the volumeter • Incorporate a filter (see Section 8) • Set the pulse generator • Increase the supply pressure
Measurement errors too great	<ul style="list-style-type: none"> • Entrapped air • Escaped gas • Pulsation too high • Back-pressure too weak • Type of operation <ul style="list-style-type: none"> - Major fluctuations in circulation - Filling quantities too small - Significantly deviating operating data • Significant wear and tear • Errors in the area of the pulse generator / electronic hardware 	<ul style="list-style-type: none"> • Ventilate • Increase system pressure, reduce temperature • Change the feed pump Change made to the system • See minimum pressure (see Section 8) • Change the operating conditions • Upgrade the volumeter • Filter out abrasive substances • See pulse generator manual / electronic hardware manual
No signal	<ul style="list-style-type: none"> • Pulse generator cartridge is defective • Defective connection • Screw volumeter is not running • Incorrect power supply 	<ul style="list-style-type: none"> • Unscrew the pulse generator cartridge and check if the pulse generator cartridge is functioning properly, it must transmit a pulse in the vicinity of a ferromagnetic component (see light-emitting diode) • Check light-emitting diode • Start operating the screw volumeter • Compensate the electronic hardware
No clear signal	<ul style="list-style-type: none"> • Pulse generator cartridge is defective • Poor contacts • Interference sources from outside • Magnet wheel's separation distance not correct 	<ul style="list-style-type: none"> • Replace pulse generator cartridge • Check the connection • Make sure the cable (measuring transducer) is laid correctly • Check the signal with an oscilloscope. Correct the spacing

13. Maintenance

KOBOLD-volumeters are free of maintenance. At high bearing load it is useful to change the rolling bearings after a certain service life.

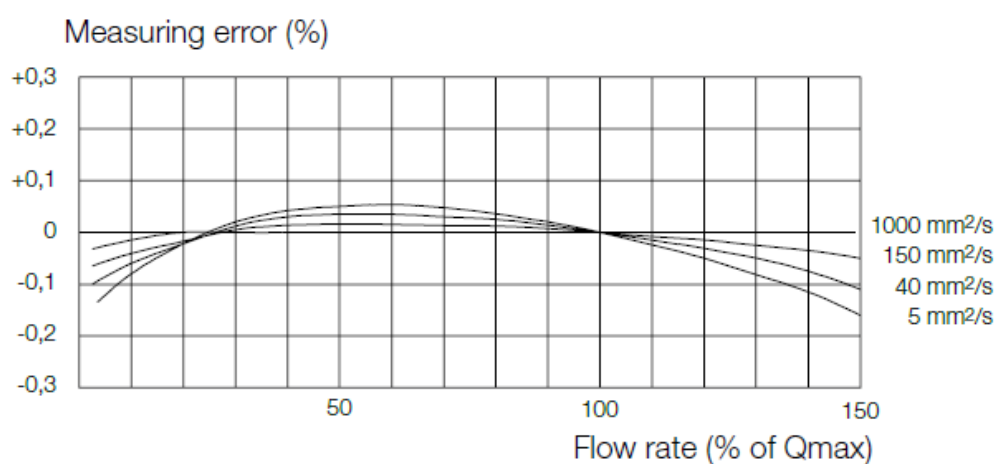
When high accuracy is required, it is further advisable to calibrate the device periodically.

14. Technical Information

Material

Housing:	standard: st. st. (material no. 1.4301) option: st. st. (material no. 1.4435)
Spindles:	st. steel
O-rings:	FKM
Bearings:	stainless steel ball bearings for low viscosities, ceramic sliding bearing for high viscosities
Thread for sensor:	M 18 x 1 with O-ring in the case
Measuring accuracy:	± 0.3 % of span 1:100
Viscosity range:	1-5000 mm ² /s
Flange:	st. st. (material no. 1.4435, sealing face form C, according to DIN 2526)
Pole wheel:	st. steel
Operating temperature:	-20 ... +150°C (Please note limitation due to pulse generator)
Application:	lubricating and non-lubricating liquids

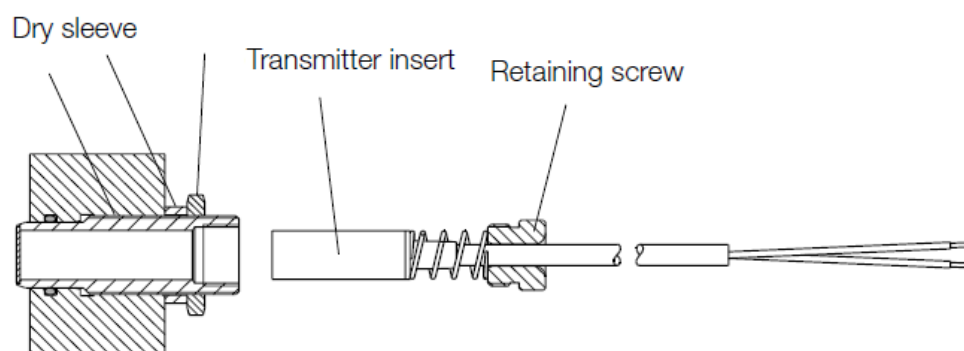
Accuracy Diagram



The measuring error refers to the actual flow rate. The diagram shows the characteristic for the OMS-... screw-type volumetric flow meter.

A test certificate is available because every device delivered is different.

OM.../44



Technical Details Pulse Generator

Model	System	Voltage	t_{\max}	p_{\max} face	Material dry sleeve	Electrical connection	Protection
44	Hall-effect PNP	10...30 V _{DC}	-40...+150°C	420 bar	Arcap	3 m PTFE cable	IP 67

15. Order Details

Example: **OMS-20F20401S4**

Flow rate [l/min]	Code	Process connection	Pmax ¹⁾ [bar]	Pulses/L	Frequency [Hz]	Gasket	Bearing	Pulse generator ²⁾
0,6-30	OMS-20	R20 = G ¾ F2040 = DN20/PN40	185	1200	4,0-200	1 = FKM	S = stainless steel ball bearing K = ceramic sliding bearing	4 = model 44
2-100	OMS-25	R25 = G1 F3240 = DN32/PN40 F251S = DN25/PN160	185	640	6,4-320			
7-350	OMS-40	R40 = G 1½ F4040 = DN40/PN40	120	230	7,7-383			

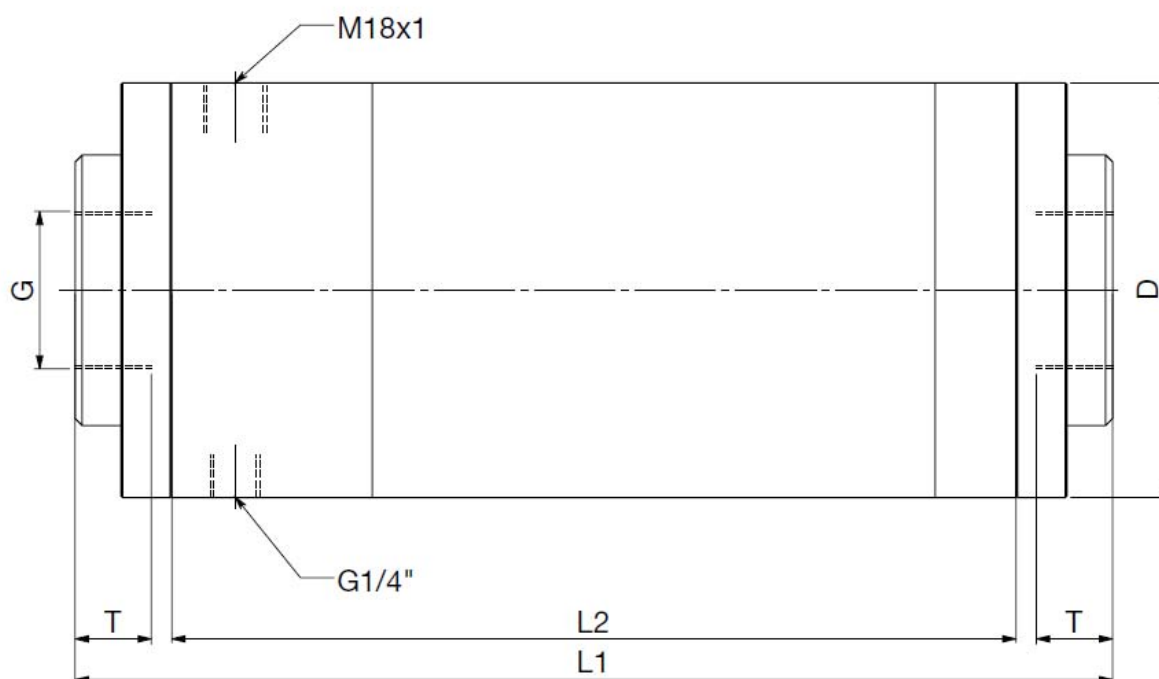
¹⁾ Please note limitations due to pulse generator and flange pressure rating.

²⁾ Specifications see table „Technical Details Pulse Generator “.

16. Dimensions and Weights

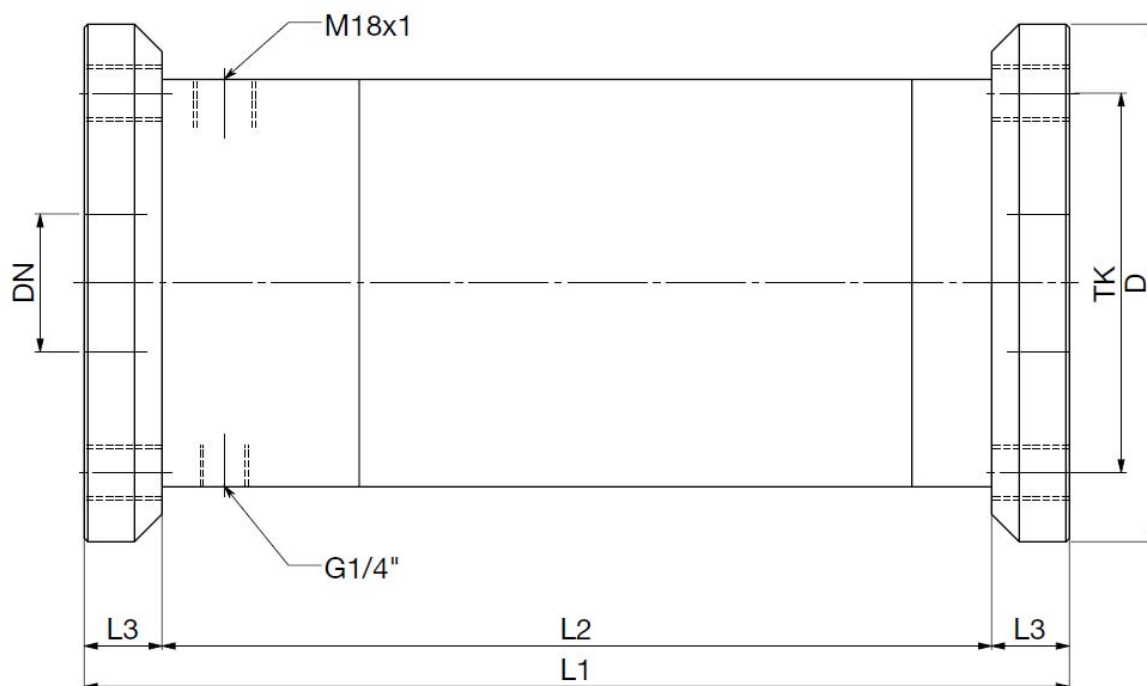
[mm]

OMS Pipe thread version



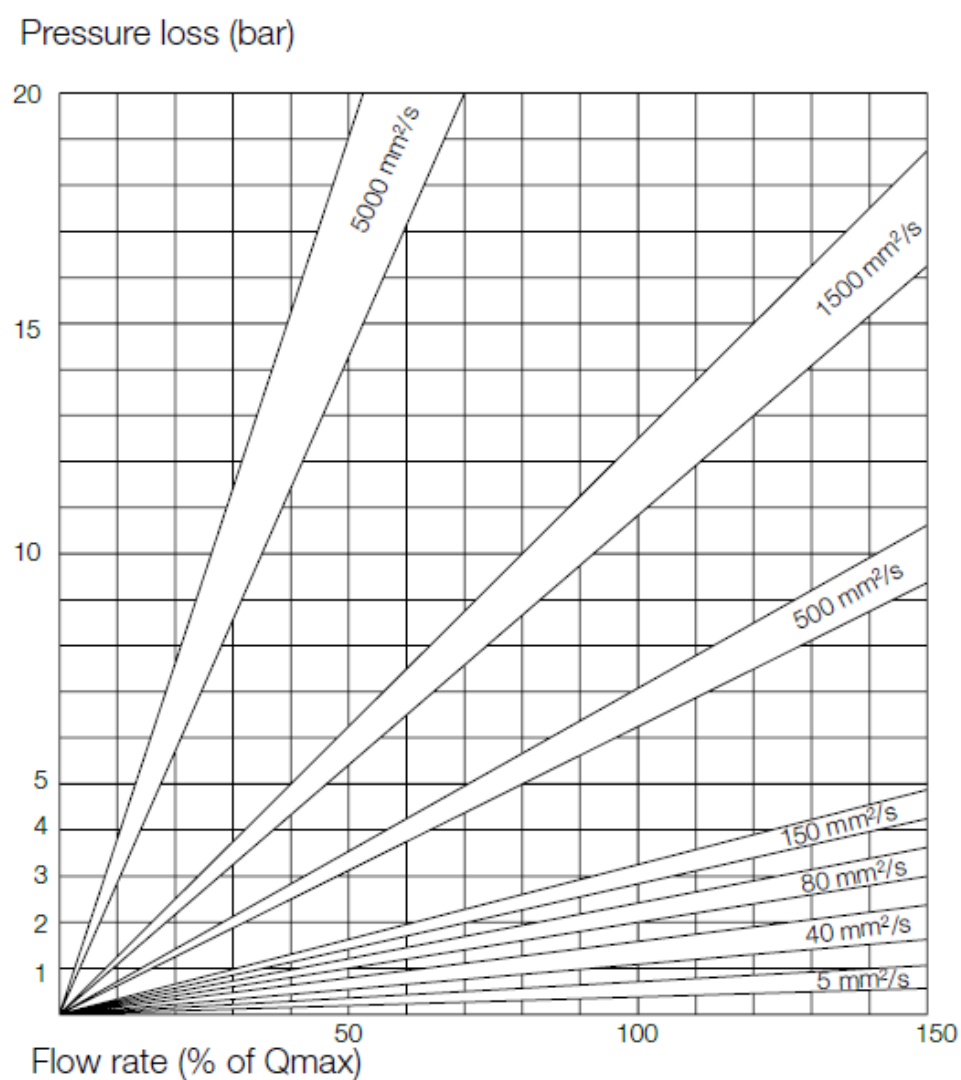
Model	Connection	Pressure rating [bar]	D [mm]	L1 [mm]	L2 [mm]	T [mm]	Weight [kg]
OMS-20R20...	G ³ / ₄	185	74	145	145	16	4,1
OMS-25R25...	G1	185	104	215	215	18	11
OMS-40R40...	G1½	120	118	295	240	27.5	18

OMS Flange version



Model	Connection	Pressure rating [bar]	D [mm]	L1 [mm]	L2 [mm]	L3 [mm]	TK [mm]	Weight [kg]
OMS-20 F2040...	DN20	PN40	105	185	145	20.5	75	6
OMS-25F3240...	DN32	PN40	140	265	215	25	100	16
OMS-25F251S...	DN25	PN160	140	265	215	25	100	16
OMS-40F4040...	DN40	PN40	150	285	240	22.5	110	21

17. Pressure loss diagram



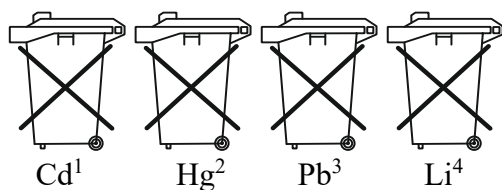
18. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



19. Appendix

19.1 Tightening torque for screws with metric screw threads and head contact surfaces

Tightening torque [Nm]								
Thread	5.6	5.8	10.9	8.8+ Alu*	+ Wedge lock wash- ers 8.8	Rust- proof A4-70	Stainless steel screws A2 and A4 Property class 70	Property class 80
M 3	0.6	1.5	–	1.2	1.5	1.1	–	–
M 4	1.4	2.9	4.1	2.3	3.0	2.0	–	–
M 5	2.7	6.0	8.0	4.8	6.0	3.9	3.5	4.7
M 6	4.7	9.5	14.0	7.6	10.3	6.9	6.0	8.0
M 8	11.3	23.1	34.0	18.4	25.0	17.0	16.0	22.0
M 10	23.0	46.0	68.0	36.8	47.0	33.0	32.0	43.0
M 12	39.0	80.0	117	64.0	84.0	56.0	56.0	75.0
M 14	62.0	127	186	101	133	89.0	–	–
M 16	96.0	194	285	155	204	136	135	180
M 18	133	280	390	224	284	191	–	–
M 20	187	392	558	313	399	267	280	370
M 24	322	675	960	540	687	460	455	605

Tightening torques metric screw thread

* Reduced tightening torque when screwing into aluminium

19.2 Tightening torques for screw plugs with thread measured in inches and elastomer seal

Tightening torque [Nm]	
Thread	Galvanized + stainless steel
G 1/8"	13.0
G 1/4"	30.0
G 3/8"	60.0
G 1/2"	80.0
G 3/4"	120
G 1"	200
G 1 1/4"	400
G 1 1/2"	450

Tightening torques, thread measured in inches

19.3 Tightening torques and widths for threaded rings

Size	Measuring screw	Item No.	Width [mm]	Tightening torque [Nm]
OMS-052	Large	057.1	22	82
	Small	057.2	19	68

Tightening torques and widths for threaded rings

20. EU Declaration of conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Screw-Type Volumetric Flow Meter Model: OMS

to which this declaration relates is in conformity with the standards noted below:

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Also, the following EC guidelines are fulfilled:

2011/65/EU	RoHS (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Additional for the **Sensor OM.../44:**

The product is in conformance with the following norm:

Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

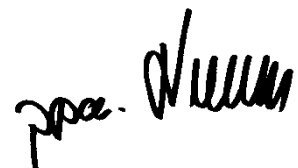
Also, the following EC guideline is fulfilled:

2014/30/EU	EMC Directive
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Hofheim, 22 Nov. 2022



H. Volz
General Manager



M. Wenzel
Proxy Holder