

Operating Instructions for Oval Gear Wheel Meter

Model: OVZ



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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 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.

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

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. Regulation Use

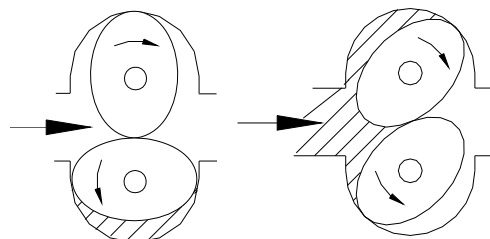
The model OVZ is an oval gear, positive displacement flowmeter which can be used to measure and monitor the flowrate of viscous liquid (min. 10 mm²/s to max. 800 mm²/s); (max. viscosity 1000 mm²/s upon request). Only measure clean, non-abrasive liquids with adequate lubricating properties, and against which the materials used in the sensor case are chemically resistant. Ferrite particles may become deposited on the oval gears as they do contain permanent magnets, - thus causing maloperation, or destruction of the oval wheel. We recommend our model MF-RI... magnetic filter if the liquid contains a high concentration of ferrous solids. In case of uncertainty, please consult your supplier.

Material combinations

Model	OVZ-..1..	OVZ-..2..	OVZ-..3..	OVZ-..4..	OVZ-..5..
Case	POM	POM	Aluminium	Aluminium	Aluminium
Case cover	POM	PMMA	PMMA	PSU	Aluminium
Axle	Stainless steel 1.4301				
Rotating sensing targets	Ceramics (Hall sensor versions) stainless steel (inductive pickup versions)				
Oval gears	POM				
Gaskets	Standard: NBR; option: FPM or EPDM				
max. operating pressure	10 bar	10 bar	16 bar	16 bar	40 bar
max. medium temperature	-10 to +80 °C				
max. ambient temperature	-10 to +60 °C				
Filtration requirements	max. 30 µm				

4. Operating Principle

The OVZ oval wheel meter is a positive-displacement flowmeter. The measuring element comprises two toothed precision oval gearwheels, which are driven by the liquid inlet pressure. As the liquid rotates the gears, a fixed quantity of liquid is transported through the chambers for every turn of the oval-wheel pair. Permanent magnets or stainless steel pins are embedded in the oval gear-wheels. The rotary gear motion is converted to a pulse signal by electrical sensors externally fitted into the casing. The pulse count is a measure of the flow rate. The signals are evaluated by downstream electronics (optional).



5. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition. Should the damage to a device be visible, we recommend a thorough inspection of the delivery packing. In case of damage, please inform your parcel service/forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

- Oval wheel meter model: OVZ
- Operating Instructions

6. Mechanical Connection

Before installation:

- Make sure that the actual flow rate corresponds with the measuring range of the meter.
- Make sure that the approved maximum operating pressure and operating temperature of the meter are not exceeded.
- Remove all transport restraints and ensure that there are no pieces of packaging left in the meter.
- Make sure that there are no welding beads, metal filings, or other pollutants, in the piping. We strongly recommend you to connect a suitable filter in series (filtration $\leq 30 \mu\text{m}$).

Installation:

- The OVZ may be installed in any position; the liquid may flow in both directions.
- Inlet and outlet pipes are not required.
- The connection threads may be sealed with sealing tape etc.
- When installing the meters, make sure that the connection threads are not subjected to large pressure or tensile loads. We recommend that you mechanically secure the inlet and outlet line approximately 50 mm from the connections.
- If possible, you should check that the joint connections are sealed and leak-free after mechanical installation.

7. Electrical Connection

7.1. General



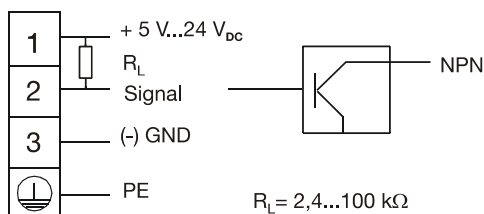
Important! Make sure that the voltages in your plant correspond with the voltages on the nameplate.

- Make sure that the electrical supply lines are dead.
- Meters with connectors: solder the ends of the connection cable according to the wiring diagram in the accompanying portable socket-outlets.
- Meters with cable connections: connect the connection cable with the supply cable.

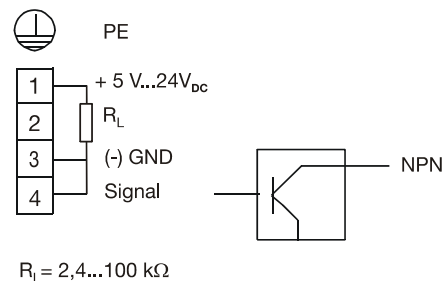


Important! If the connections are incorrectly assigned, the sensor may be seriously damaged.

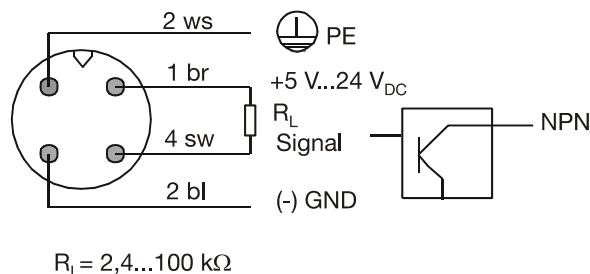
DIN-43650 Plug (OVZ-...I401)



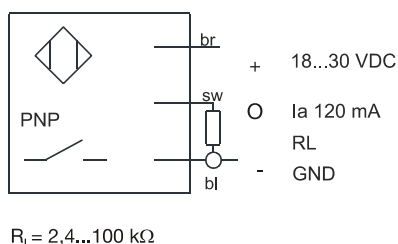
AI-housing / Pg 9 (OVZ-...I302)



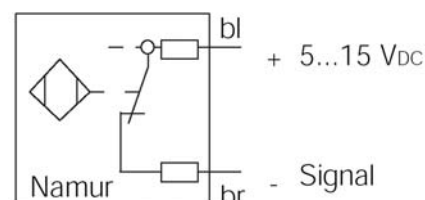
AI-Housing / Round plug (OVZ-...I303)



PNP (OVZ-...I304)

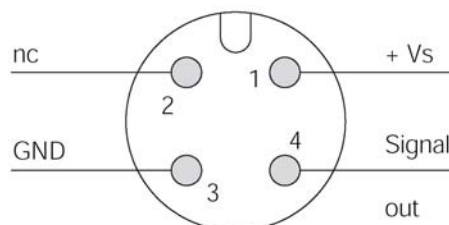


NAMUR (OVZ-...I305)



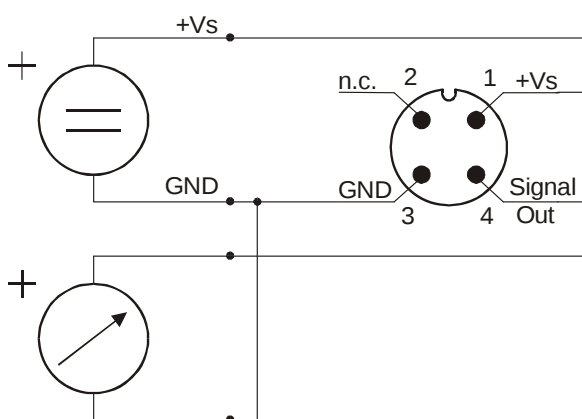
7.2. Evaluation electronics:

Frequency output (OVZ-...F300; ...F3x0)

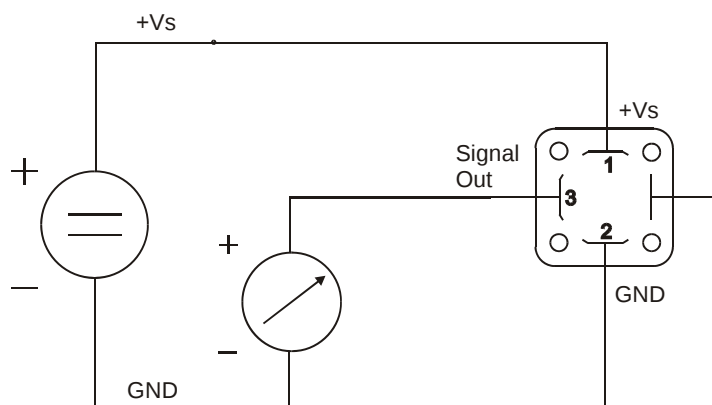


7.3. Evaluation electronics: analogue output (..L..)

3-wire (OVZ-...L303; ...L343)



3-wire, DIN 43650-plug (OVZ-...L443)

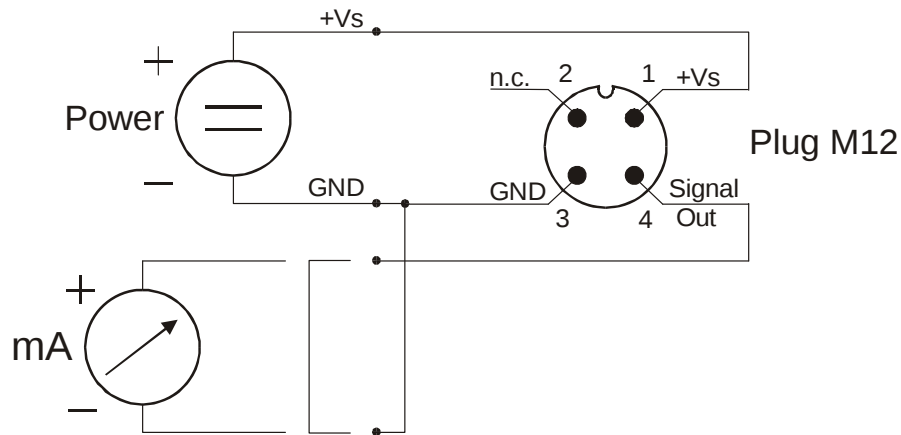


7.4. compact electronics:

(..C30r, ..C30M, ..C34P, ..C34N)

see instruction manual-addition for compact electronics with frequency output.

7.5. Evaluation electronics: Pointer display (..Z300, ..Z340)



- Plug the portable socket-outlet into its mating connector on the meter.

8. Operation – evaluation electronics

8.1. Frequency output

The instruments are pre-adjusted. After electrical connection they are ready for operation.

8.2. Analogue output

The instruments are pre-adjusted. After electrical connection they are ready for operation.

8.3. Compact electronics

The instruments are pre-adjusted. After electrical connection they are ready for operation.

For changing of setting refer
to operating manual for
compact electronic with frequency output

8.4. Pointer display (..Z300, ..Z340)

The instruments are pre-adjusted. After electrical connection they are ready for operation.

9. Mechanical Operation

- To avoid pressure peaks, the flow medium should flow slowly into the meter.



Important! Pressure peaks arising from a sudden influx of liquid, caused by solenoid valves, ball valves etc, may seriously damage the meter (water hammer!). Ensure that the sensor is always filled with medium when in the operating state.



Important! Vent the piping, to prevent large air bubbles in the sensor chamber which may cause measuring errors, erratic flow reading and can possibly seriously damage the bearings.

10. Technical Information

Viscosity range:	10 to 800 mm ² /s (option: 1000 mm ² /s)
Ambient temperature:	-10 °C to +60 °C
Medium temperature:	-10 °C to +80 °C
Max. pressure:	OVZ-..1, OVZ-..2: 10 bar OVZ-..3, OVZ-..4: 16 bar OVZ-..5 : 40 bar
Accuracy:	± 2.5 % f. s.
Filter mesh size:	max. 30 µm
Material:	combination/case/cover OVZ-..1.. / POM /POM OVZ-..2.. / POM /PMMA OVZ-..3.. / aluminium /PMMA OVZ-..4.. / aluminium /PSU OVZ-..5.. / aluminium /aluminium ovals wheels: POM axles: stainless steel 1.4301
O-rings:	NBR; option: FPM, EPDM
Sensor targets:	oxide ceramic magnets or stainless steel
Frequency range:	0.3-9 Hz to 2-57 Hz
Protection:	IP 65 (..I401, I302, -I303, L 443, ...Z 3x0) IP 67 (all others)

Electronics

Frequency output (...I401; ...I302; ...I303)

Power supply:	5-24 V _{DC}
Power consumption:	typically 10 mA
Pulse output:	Hall effect sensor NPN open collector, max. 15 mA
Electr. connection:	connector socket DIN 43650 (...I401) aluminium adapter box with cable connection (...I302) aluminium cover box with circular connector M12x1 (...I303)

Frequency output (...I304)

Power supply:	18-30 V _{DC}
Power consumption:	typically 10 mA
Pulse output:	PNP, asymmetrical, open collector max. 120 mA
Electr. connection:	2 m PVC cable

Frequency output (...I305)

Power supply:	nominal 8.2 V _{DC}
Pulse output:	Namur, asymmetrical, max. approx. 3.5 mA (typ. 0.5 mA)
Electr. connection:	2 m PVC cable

Frequency output (...F300)

Power supply:	12-28 V _{DC}
Power consumption:	10 mA
Pulse output:	PNP, open collector, max. 25 mA
Electr. connection:	connector M12x1

Frequency output with frequency divider (...F3X0)

Power supply:	24 V _{DC}
Power consumption:	15 mA
Pulse output:	PNP, open collector, max. 25 mA
Electr. connection:	connector M12x1
Divisional factor:	acc. to customer specification

Analogue output (...L303; ...L343, ...L443)

Power supply:	24 V _{DC} ± 20 %
Output:	4-20 mA, 0-20 mA, 3-wire
Max. load:	500 ohm
Electr. connection:	connector M12x1 or DIN 43650
Option:	plug-on display AUF-3000 (with DIN connector only)

Compact electronics

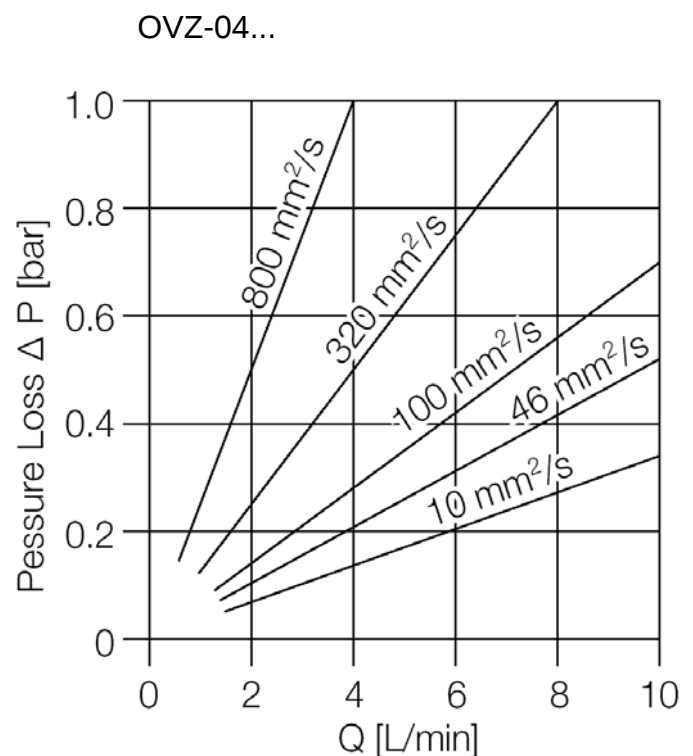
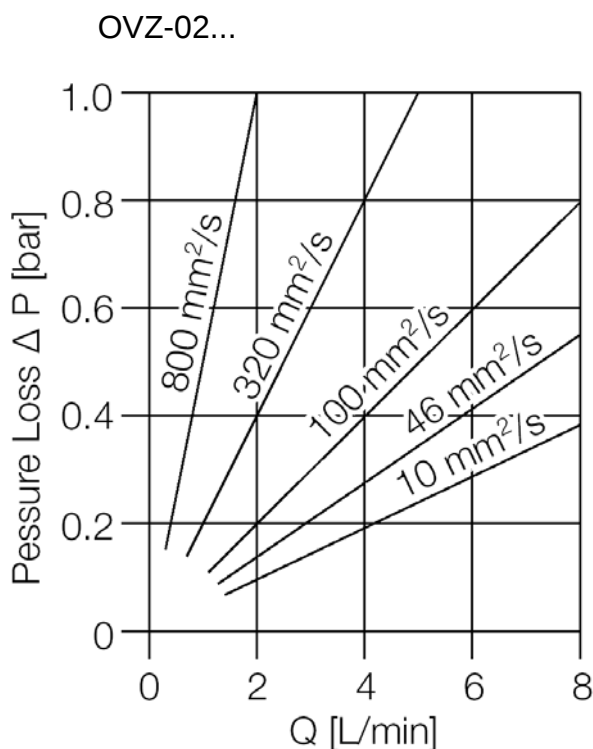
Display:	3-digit LED
Analogue output:	(0) 4...20 mA adjustable, max. 500 W
Switching outputs:	1 (2) semiconductor PNP or NPN, factory setting
Contact operation:	N/C, N/O programmable
Setting:	via 2 keys
Power supply:	24 V _{DC} ± 20 %, 3-wire, approx. 100 mA
Electr. connection:	connector M12x1

Pointer indication with analogue output

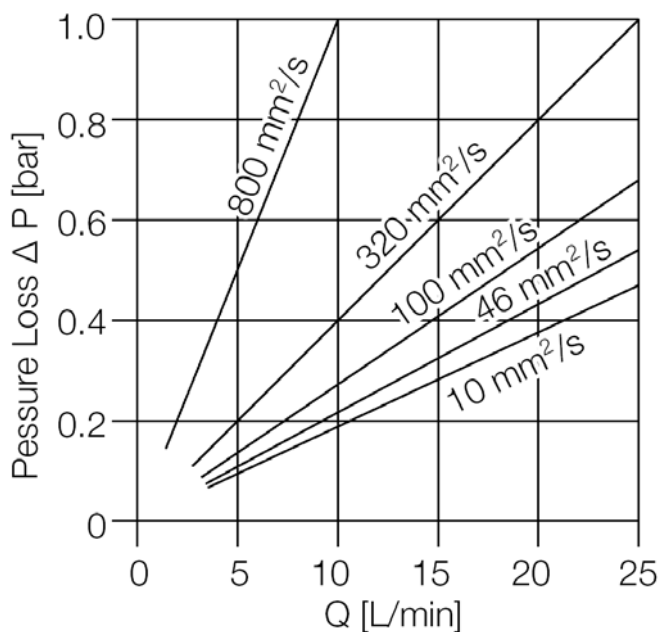
Housing:	aluminium
Indication:	moving coil instrum. 240 ° indication
Power supply:	24 V _{DC} ± 20 %
Output:	0-20 mA or 4-20 mA, 3-wire
Max. load:	250 ohm
Electr. connection:	connector M12x1

11. Pressure loss

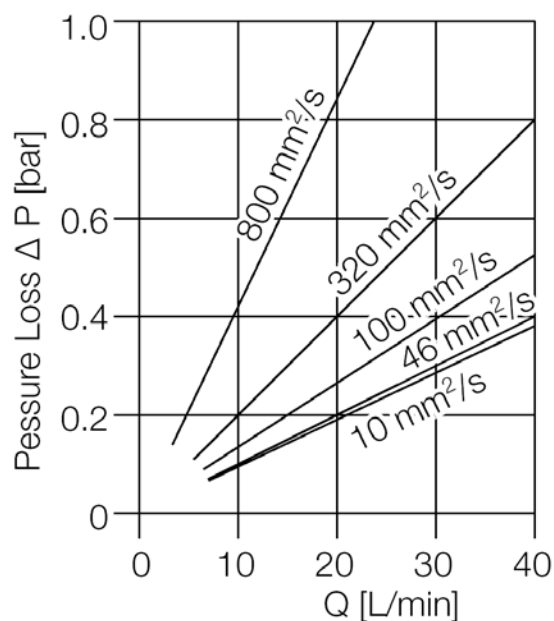
11.1. POM- plastic housing



OVZ-15...

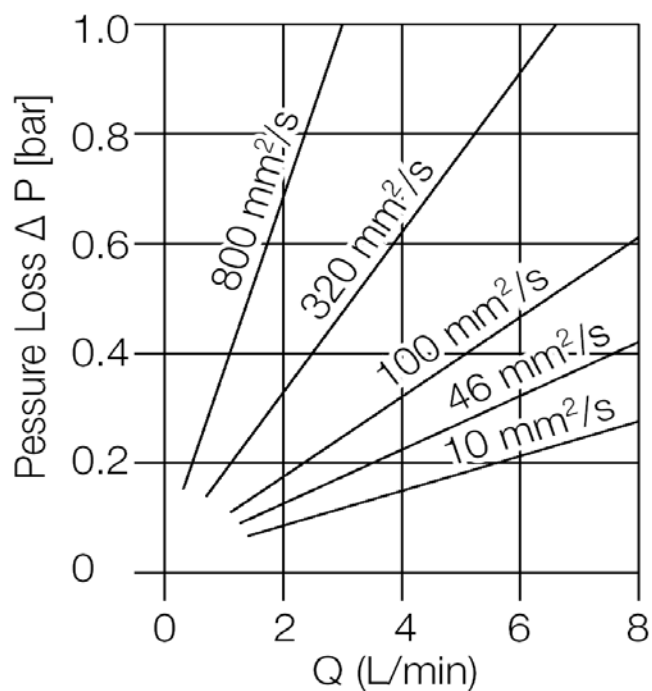


OVZ-30...

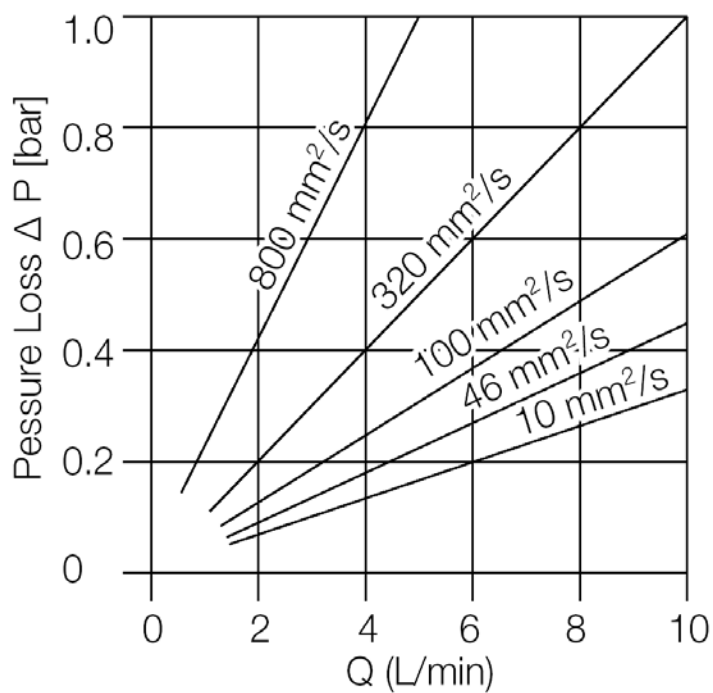


11.2. Aluminium housing

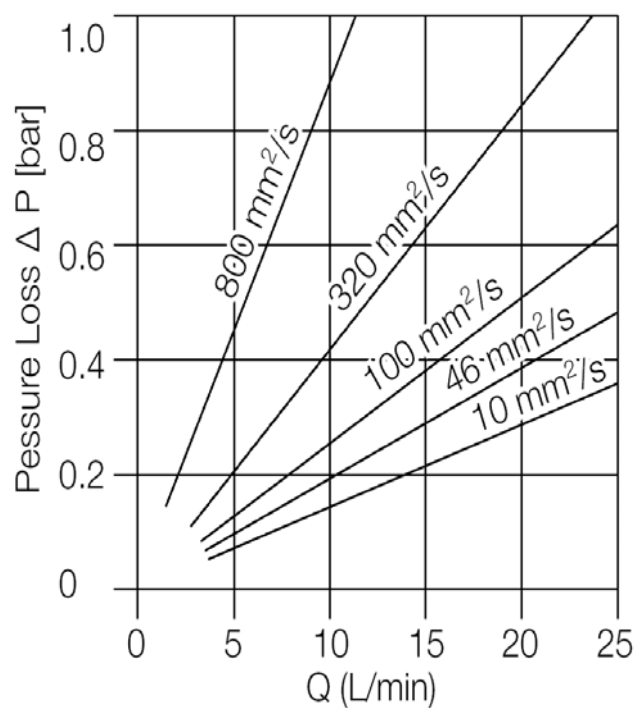
OVZ-02...



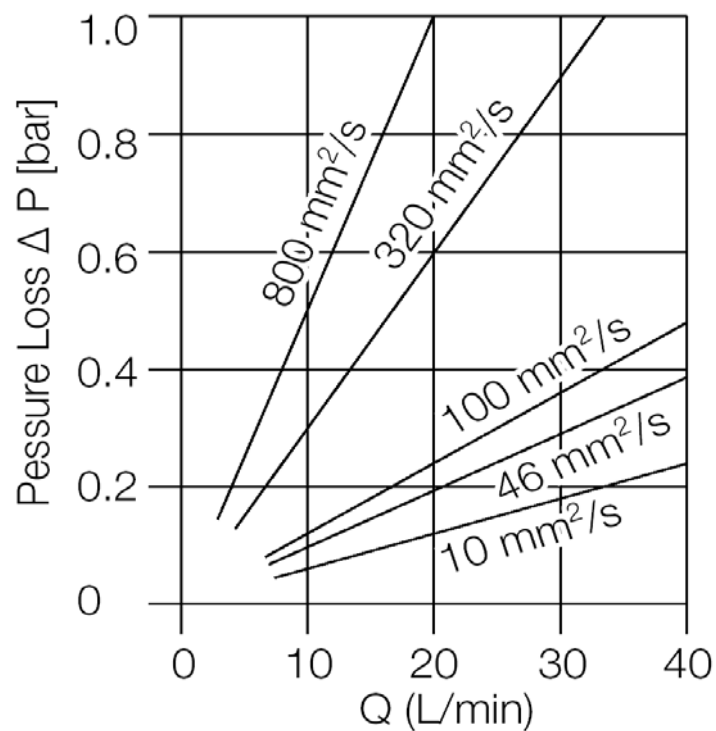
OVZ-04...



OVZ-15...



OVZ-30...



12. Order Codes

12.1. POM plastic housing

(Example: OVZ-02 1 G2 N I401)

Rated measuring range (L/min) ¹⁾ (for different viscosities)				Imp./ Liter ²⁾⁴⁾	Model	Material/ cover	Connection	Gaskets	Electrical transducer
10 mm ² /s	100 mm ² /s	320 mm ² /s	800 mm ² /s						
0.3-8.0	0.3-8.0	0.2-5.0	0.1-2.0	408.5	OVZ-02..	..1..= POM ..2..= PMMA	..G2..= G 1/4 ..N2..= 1/4 NPT	..N..= NBR (standard) ..V..= FPM ..E..= EPDM	Frequency output ..I401= frequency output NPN, DIN connector 43650 ..I302= frequency output NPN, cable connection ..I304= frequency output PNP, 2 m PVC cable ..I305= frequency output Namur, 2 m PVC cable ..F300= frequency output PNP, connector M12x1 ..F3X0= frequency divider adjusted PNP, connector M12x1 Analogue output ..L303= 0-20 mA output, 3-wire, M12x1connector ..L343= 4-20 mA output, 3-wire, M12x1connector ..L443= 4-20 mA output, 3-wire, DIN connector Compact electronic³⁾ ..C30R= LED-display, 2xopen collector, PNP, connector M12x1 ..C30M= LED-display, 2xopen collector, NPN, connector M12x1 ..C34P= LED-display, 4-20 mA, 1x op.coll.,PNP,connector M12x1 ..C34N= LED-display, 4-20 mA, 1xop.coll.,NPN, connector M12x1 Pointer indication, 240°³⁾ ..Z300= 240°-pointer indication, 0-20 mA, connector M12x1 ..Z340= 240°-pointer indication,4-20 mA, connector M12x1
0.4-10.0	0.4-10.0	0.3-8.0	0.15-4.0	224	OVZ-04..		..G2..= G 1/4 ..N2..= 1/4 NPT		
1.0-25.0	1.0-25.0	1.0-25.0	0.4-10.0	52.5	OVZ-15..		..G4..= G 1/2 ..N4..= 1/2 NPT		
1.6-40.0	1.6-40.0	1.6-40.0	0.95-24.0	28	OVZ-30..		..G5..= G 3/4 ..N5..= 3/4 NPT		

¹⁾ Maximum pressure loss at maximum rated flow is 1 bar

²⁾ Hz=Imp./Liter x L/min/60

³⁾ Please specify flow direction in writing

⁴⁾ At the electronic option "frequency output" the actual pulse ratio is stated on the type label

12.2. Aluminium housing

(Example: OVZ-02 3 G2 N I401)

Rated measuring range (L/min) ¹⁾ (for different viscosities)				Imp./ Liter ²⁾⁴⁾	Model	Material/ cover	Connection	Gaskets	Electrical transducer
10 mm ² /s	100 mm ² /s	320 mm ² /s	800 mm ² /s						
0.3-8.0	0.3-8.0	0.25-6.6	0.1-3.0	396	OVZ-02..	..3..= PMMA ..4..= PSU ..5..= Alu	..G2..= G 1/4 ..N2..= 1/4 NPT	..N..= NBR (Standard) ..V..= FPM ..E..= EPDM	Frequency output ..I401= frequency output NPN, DIN connector 43650 ..I302= frequency output NPN, cable connection ..I304= frequency output PNP, 2 m PVC cable ..I305= frequency output Namur, 2 m PVC cable ..F300= frequency output PNP, connector M12x1 ..F3X0= frequency divider adjusted PNP, connector M12x1 Analogue output ..L303= 0-20 mA output, 3-wire, M12x1connector ..L343= 4-20 mA output, 3-wire, M12x1connector ..L443= 4-20 mA output, 3-wire, DIN connector Compact electronic³⁾ ..C30R= LED-display, 2xopen collector, PNP, connector M12x1 ..C30M= LED-display, 2xopen collector, NPN, connector M12x1 ..C34P= LED-display, 4-20 mA, 1x op.coll.,PNP,connector M12x1 ..C34N= LED-display, 4-20 mA, 1xop.coll.,NPN, connector M12x1 Pointer indication, 240°³⁾ ..Z300= 240°-pointer indication, 0-20 mA, connector M12x1 ..Z340= 240°-pointer indication,4-20 mA, connector M12x1
0.4-10.0	0.4-10.0	0.4-10.0	0.25-4.5	203	OVZ-04..		..G2..= G 1/4 ..N2..= 1/4 NPT		
1.0-25.0	1.0-25.0	0.9-23.0	0.5-12.5	46.5	OVZ-15..		..G4..= G 1/2 ..N4..= 1/2 NPT		
1.6-40.0	1.6-40.0	1.3-33.5	0.8-20.0	26	OVZ-30..		..G5..= G 3/4 ..N5..= 3/4 NPT		

¹⁾ Maximum pressure loss at maximum rated flow is 1 bar

²⁾ Hz = Imp./Liter x L/min/60

³⁾ Please specify flow direction in writing

⁴⁾ At the electronic option "frequency output" the actual pulse ratio is stated on the type label

Digital indicators and transducers to this oval wheel flow meter please see end of brochure.

Plug-on display

for Model OVZ... L4 ... (with 4-20 mA output and DIN-connector)

Description	Order number
3-digit LED, plug-connection DIN 43 650 3-wire, power supply with analogue output	AUF-3000

13. Maintenance

The meter requires no maintenance if the measured medium is not contaminated. Should it be necessary to clean the meter, the case cover can be easily removed to gain access to, and clean, the inside of the case (see Sec. 12. Dismantling /Installation).

14. Dismantling / Installation

Dismantling:

- Drain piping.
- Loosen cover screws and remove cover and O-ring.
- Mark the position of the gearwheels relative to one another with a pencil.
- Remove the pair of oval gearwheels and clean parts with care; do not scratch the sealing faces.



Caution: Do not remove the gearwheel position marking!

Installation:

- Install the pair of oval gearwheels; note identifying marking.
- Rotate gearwheels a number of times: they should not disengage.
- Insert O-ring; replace cover and firmly tighten screws crosswise.

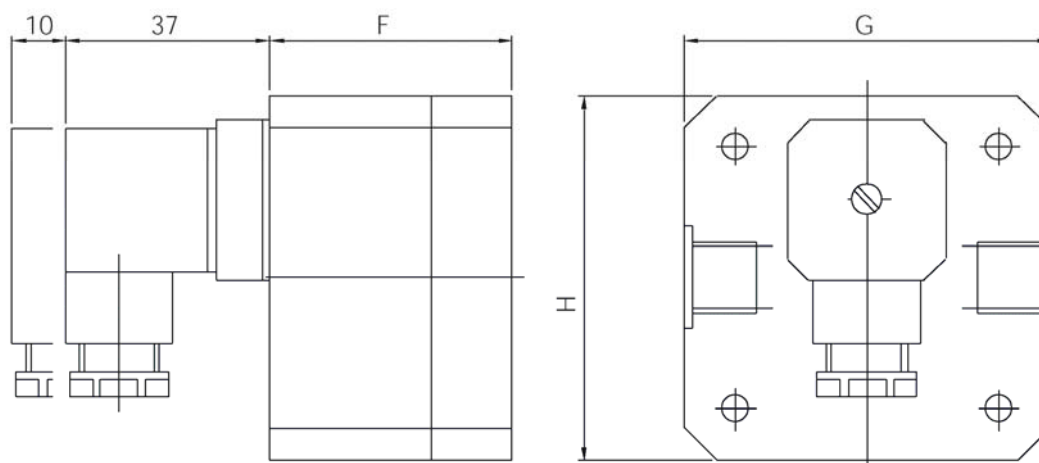
15. Recommended spare parts

- 1.0 Pair of oval gearwheels
- 2.0 NBR, FPM, or EPDM O-ring
- 3.0 POM, PMMA, PSU, or AL cover

Always specify the meter model when ordering spare parts.

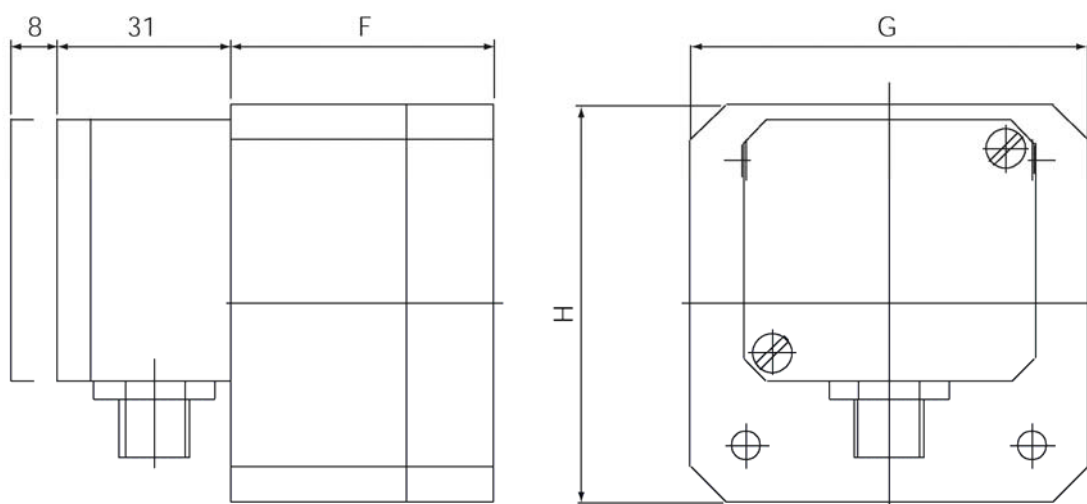
16. Dimensions

OVZ-...I401



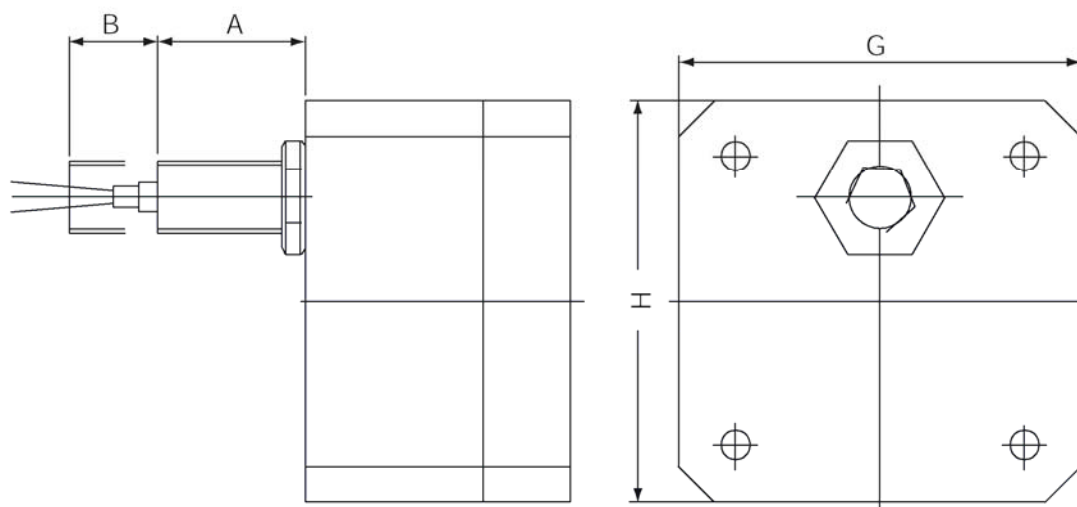
	G [mm]	H [mm]	F [mm]			
			..1..	..2..	..3/ 4..	..5..
OVZ-02...	68	68	45	45	43,5	41
OVZ-04...	68	68	49	49	47	44,5
OVZ-15...	99	99	71	73	71	66
OVZ-30...	119	119	84,5	87,5	86	79,5

OVZ-...I302, OVZ-...I303

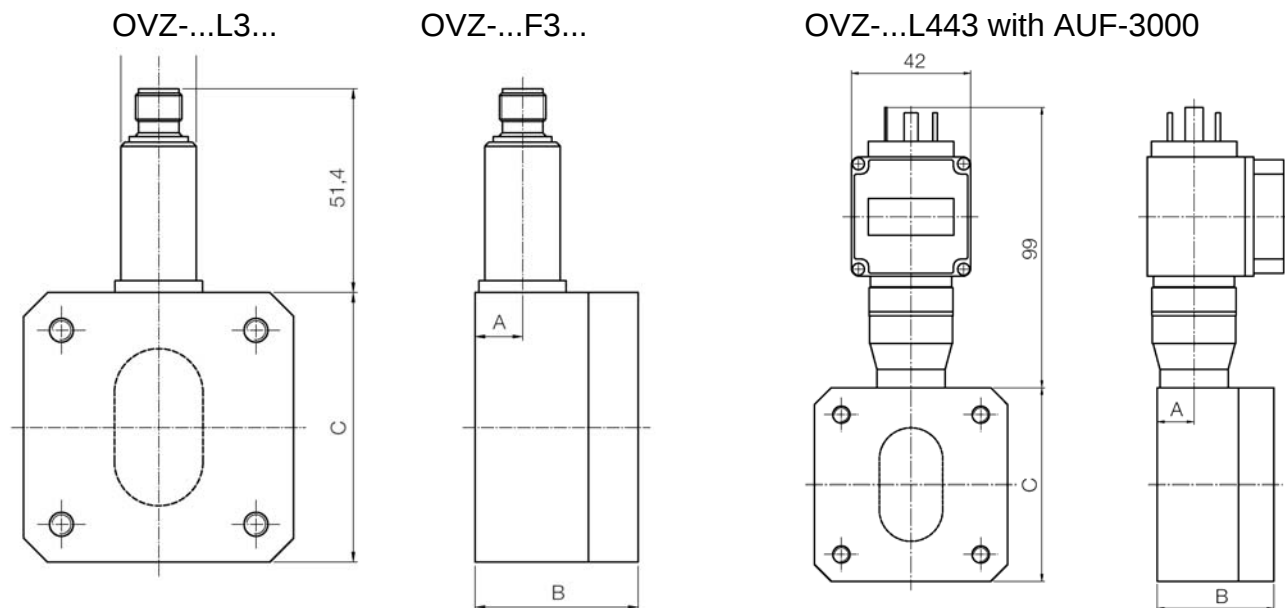


	G [mm]	H [mm]	F [mm]			
			..1..	..2..	..3/ 4..	..5..
OVZ-02...	68	68	45	45	43,5	41
OVZ-04...	68	68	49	49	47	44,5
OVZ-15...	99	99	71	73	71	66
OVZ-30...	119	119	84,5	87,5	86	79,5

OVZ-...I304, OVZ-...I305



	PNP		NAMUR		PNP/ NAMUR	
	A [mm]	B [mm]	A [mm]	B [mm]	G [mm]	H [mm]
OVZ-02..	21,5	13,5	16,5	13,5	68	68
OVZ-04..	21	14	16	14	68	68
OVZ-15..	19	16	14	16	99	99
OVZ-30..	17	18	12	18	119	119



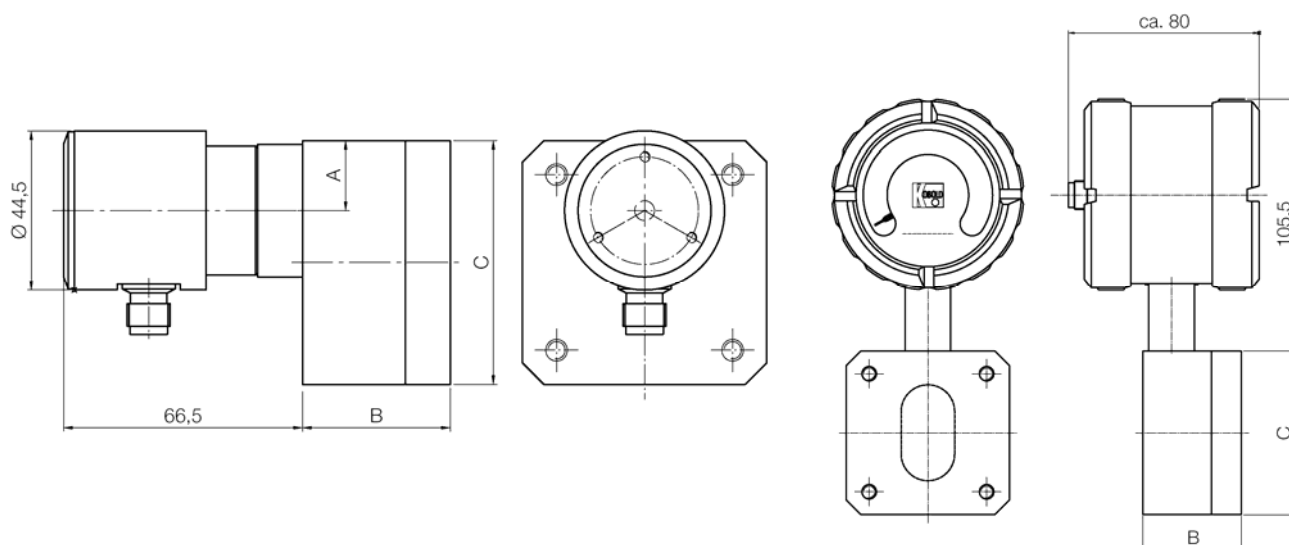
OVZ with frequency or analogue output: overview

Plastic housing (POM)			
Description	Dimension A	Dimension B	Dimension C
OVZ-02 1 = POM	13	45	□ 68
OVZ-02 2 = PMMA	13	45	□ 68
OVZ-04 1 = POM	13.7	49	□ 68
OVZ-04 2 = PMMA	13.7	49	□ 68
OVZ-15 1 = POM	15.65	71	□ 99
OVZ-15 2 = PMMA	15.65	73	□ 99
OVZ-30 1 = POM	17.6	84.5	□ 119
OVZ-30 2 = PMMA	17.6	87.5	□ 119

Aluminium housing (ALU)			
Description	Dimension A	Dimension B	Dimension C
OVZ-02 3 = PMMA	11.5	43.6	□ 68
OVZ-02 4 = PSU	11.5	43.6	□ 68
OVZ-02 5 = ALU	11.5	41.1	□ 68
OVZ-04 3 = PMMA	11.5	47	□ 68
OVZ-04 4 = PSU	11.5	47	□ 68
OVZ-04 5 = ALU	11.5	44.5	□ 68
OVZ-15 3 = PMMA	13.35	71	□ 99
OVZ-15 4 = PSU	13.35	71	□ 99
OVZ-15 5 = ALU	13.35	66	□ 99
OVZ-30 3 = PMMA	15.75	86	□ 119
OVZ-30 4 = POM	15.75	86	□ 119
OVZ-30 5 = PMMA	15.75	79.5	□ 119

OVZ-...C3...

OVZ-...Z3...



OVZ with compact electronics: overview

Plastic housing (POM)			
Description	Dimension A	Dimension B	Dimension C
OVZ-02 1 = POM	19.525	45	□ 68
OVZ-02 2 = PMMA	19.525	45	□ 68
OVZ-04 1 = POM	16.95	49	□ 68
OVZ-04 2 = PMMA	16.95	49	□ 68
OVZ-15 1 = POM	21.125	71	□ 99
OVZ-15 2 = PMMA	21.125	73	□ 99
OVZ-30 1 = POM	23.2	84.5	□ 119
OVZ-30 2 = PMMA	23.2	87.5	□ 119

Aluminium housing (ALU)			
Description	Dimension A	Dimension B	Dimension C
OVZ-02 3 = PMMA	19.525	43.6	□ 68
OVZ-02 4 = PSU	19.525	43.6	□ 68
OVZ-02 5 = ALU	19.525	41.4	□ 68
OVZ-04 3= PMMA	19.525	47	□ 68
OVZ-04 4 = PSU	19.525	47	□ 68
OVZ-04 5 = ALU	19.525	44.5	□ 68
OVZ-15 3= PMMA	21	71	□ 99
OVZ-15 4 = PSU	21	71	□ 99
OVZ-15 5 = ALU	21	66	□ 99
OVZ-30 3= PMMA	23.025	86	□ 119
OVZ-30 4= POM	23.025	86	□ 119
OVZ-30 5= POM	23.025	79.5	□ 119

17. Declaration of Conformance

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

Oval Gear Wheel Meter Model: OVZ-...

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

EN 61000-6-2:2006

Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

Also the following EC guidelines are fulfilled:

2014/30/EU

EMC Directive

2011/65/EU

RoHS (category 9) industrial monitoring and control instruments, compliant, no CE-marking for the transitional period until 2017

Hofheim, 27. April 2016



H. Peters
General Manager



M. Wenzel
Proxy Holder