



**Operating Instructions
for
Oval Gear Flow Meter**

Model: OVZ



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Manufactured and sold by:

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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 someone familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and accident prevention.

When installed into machines, the measuring unit should only be used when the machines fulfill the EWG-machine guidelines.

PED 97/23/EG

In accordance with Article 3 Paragraph (3), "Sound Engineering Practice", of the PED 97/23/EC no CE mark. Diagram 8, Pipe, Group 1 dangerous fluids

3. Regulation Use

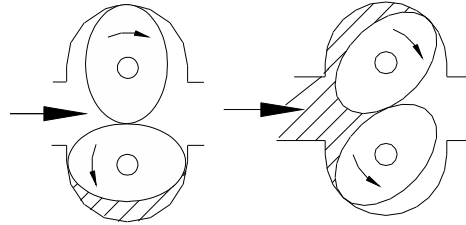
The model OVZ is an oval gear, positive displacement flow meter which can be used to measure and monitor the flow rate of viscous liquid (min. 10 mm²/s to max. 800 mm²/s); (max. viscosity 1000 mm²/s upon request). Only measure clean, non-abrasive liquids with adequate lubricating properties, and against 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 malfunctions, or destruction to the oval gears. We recommend our model MFR series magnetic filters, 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	Aluminum	Aluminum	Aluminum
Case cover	POM	PMMA	PMMA	PSU	Aluminum
Axle	304 Stainless steel				
Rotating sensing targets	Ceramics (Hall sensor versions) stainless steel (inductive pickup versions)				
Oval gears	POM				
O-ring	Standard: NBR; option: FKM or EPDM				
max. operating pressure	145 PSI	145 PSI	232 PSI	232 PSI	580 PSI
max. medium temperature	176 °F				
max. ambient temperature	140 °F				
Filtration requirements	max. 30 µm				

4. Operating Principle

The OVZ oval gear meter is a positive-displacement flow meter. The measuring element comprises of two toothed precision oval gears, 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 gear pair. Permanent magnets or stainless steel pins are embedded in the oval gears. 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 packaging. In case of damage, please inform your parcel service/forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

- Oval gear 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 is 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 that you install 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 straight piping is 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 process connections are sealed and leak- free after mechanical installation.

7. Electrical Connection

7.1. General



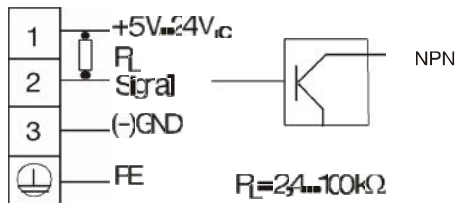
Important! Make sure that the voltage in your plant correspond with the voltage on the nameplate.

- Make sure that the electrical supply lines are disconnected.
- 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.

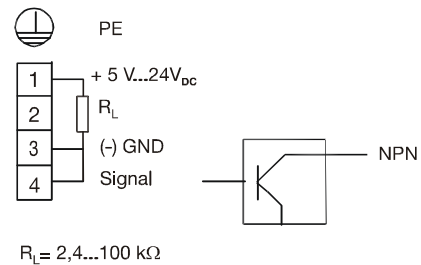


Important! If the connections are incorrectly terminated on the device, the sensor may be seriously damaged.

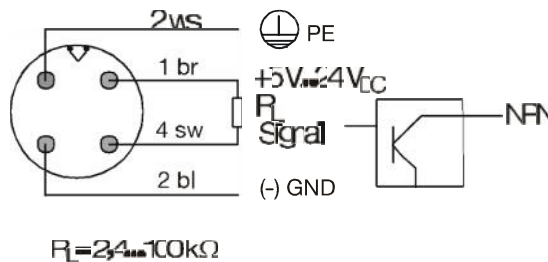
DIN-43650 Plug (OVZ-...I401)



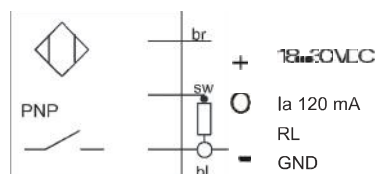
AI-housing / Pg 9(OVZ-...I302)



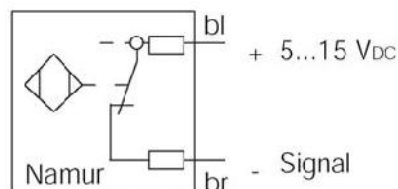
AI-Housing / Round plug (OVZ-...I303)



PNP (OVZ-...I304)

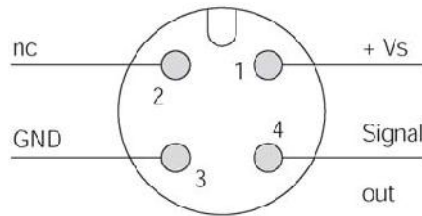


NAMUR (OVZ-...I305)



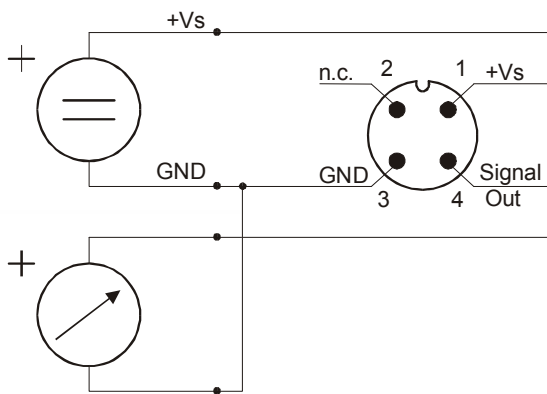
7.2. Frequency Output:

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

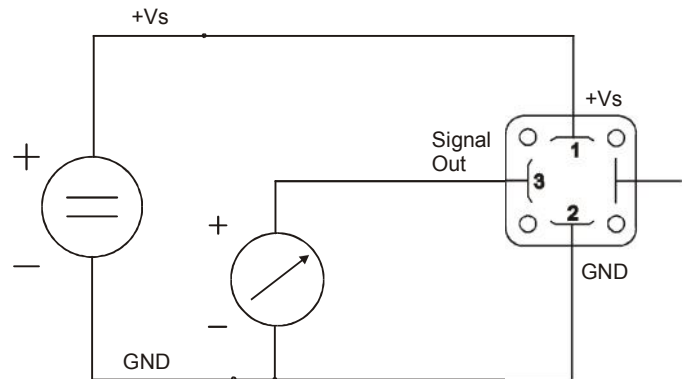


7.3. Analog output (..L..)

3-wire (OVZ-...L343)



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

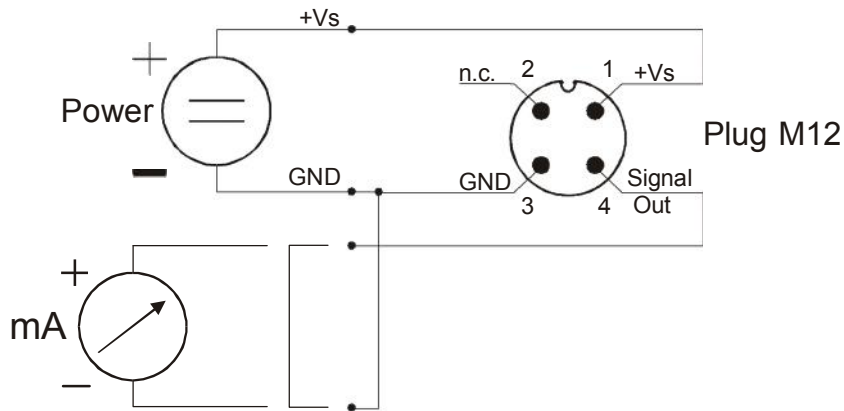


7.4. Compact electronics:

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

see instruction manual supplement for compact electronics with frequency output.

7.5. Pointer display (...Z340)



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

8. Operation – Electronics

8.1. Frequency output

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

8.2. Analog 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 (...Z340)

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

9. Mechanical Operation

- To avoid pressure peaks, the fluid 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 media 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:	14 °F to 140 °F
Medium temperature:	14 °F to 176 °F
Max. pressure:	OVZ-..1, OVZ-..2: 145 PSI OVZ-..3, OVZ-..4: 232 PSI OVZ-..5 : 580 PSI
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.. / aluminum /PMMA OVZ-..4.. / aluminum /PSU OVZ-..5.. / aluminum /aluminum oval gears: POM axles: stainless steel 304
O-rings:	NBR; option: FKM, EPDM
Sensor targets:	oxide ceramic magnets or stainless steel
Frequency range:	0.3-9 Hz to 2-57 Hz

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
Electrical connection:	connector socket DIN 43650 (...I401) aluminum adapter box with cable connection (...I302) aluminum 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
Electrical 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)
Electrical connection:	2 m PVC cable

Frequency output (...F300)

Power supply:	24 V _{DC} ± 20 %
Power consumption:	10 mA
Pulse output:	PNP, open collector, max. 25 mA
Electrical connection:	connector M12x1

Frequency output with frequency divider (...F3X0)

Power supply:	24 V _{DC} ± 20 %
Power consumption:	15 mA
Pulse output:	PNP, open collector, max. 25 mA
Electrical connection:	connector M12x1
Divisional factor:	acc. to customer specification

Analog output (...L343, ...L443)

Power supply:	24 V _{DC} ± 20 %
Output:	4-20 mA, 3-wire
Max. load:	500 ohm
Electrical connection:	connector M12x1 or DIN 43 650
Option:	plug-on display AUF-3000 (with DIN connector only)

Compact electronics

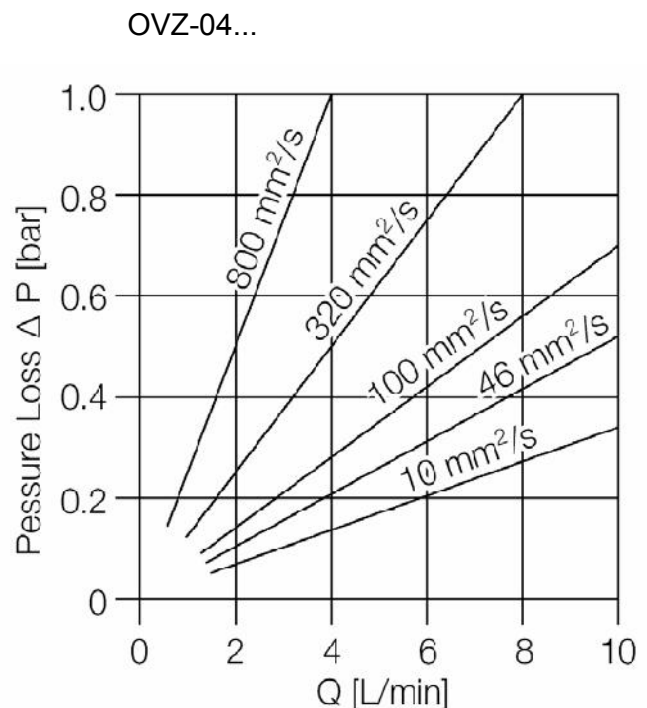
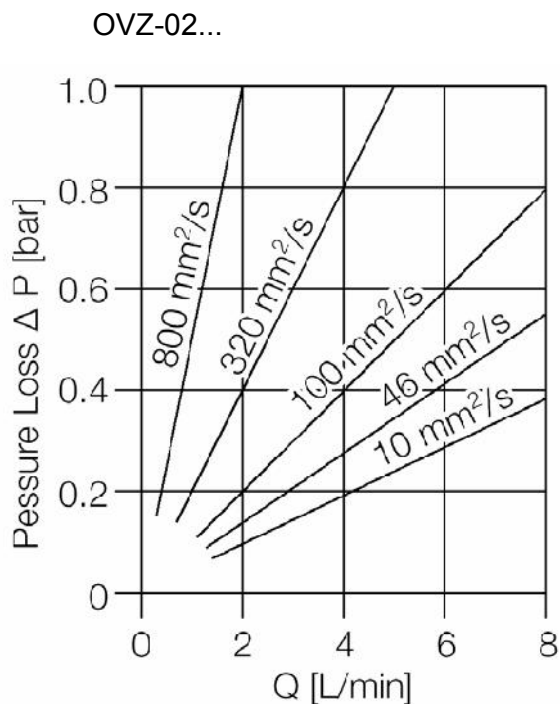
Display:	3-digit LED
Analog output:	4...20 mA adjustable, max. 500 Ω
Switching outputs:	1 (2) semiconductor PNP or NPN, factory setting
Contact operation:	N/C, N/O programmable
Setting:	via 2 keys
Power supply:	24 V _{DC} \pm 20 %, 3-wire
Electrical connection:	connector M12x1

Pointer display with analog output

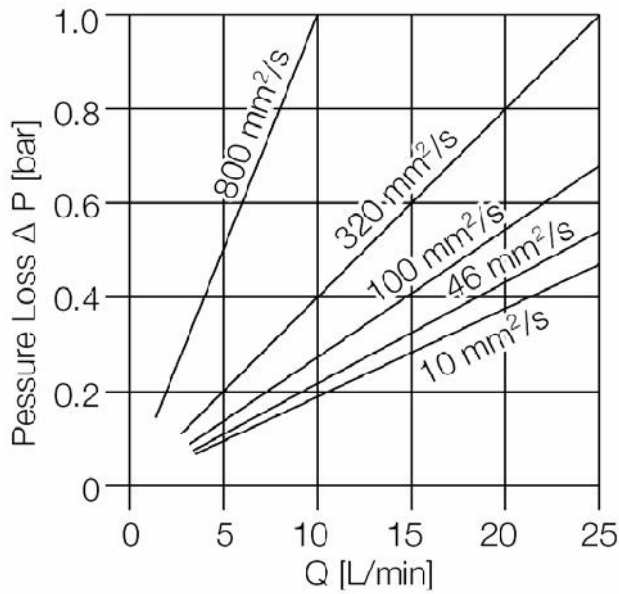
Housing:	aluminum
Indication:	moving coil instrum. 240 ° indication
Power supply:	24 V _{DC} \pm 20 %
Output:	4-20 mA, 3-wire
Max. load:	250 ohm
Electrical connection:	connector M12x1

11. Pressure loss

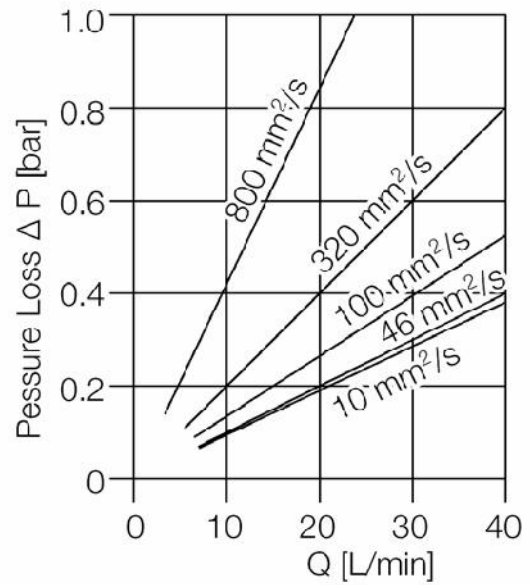
11.1. POM- plastic housing



OVZ-15...

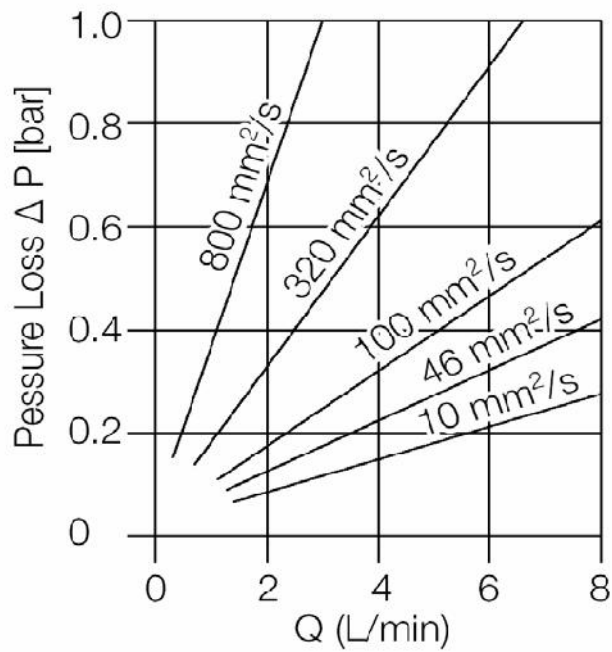


OVZ-30...

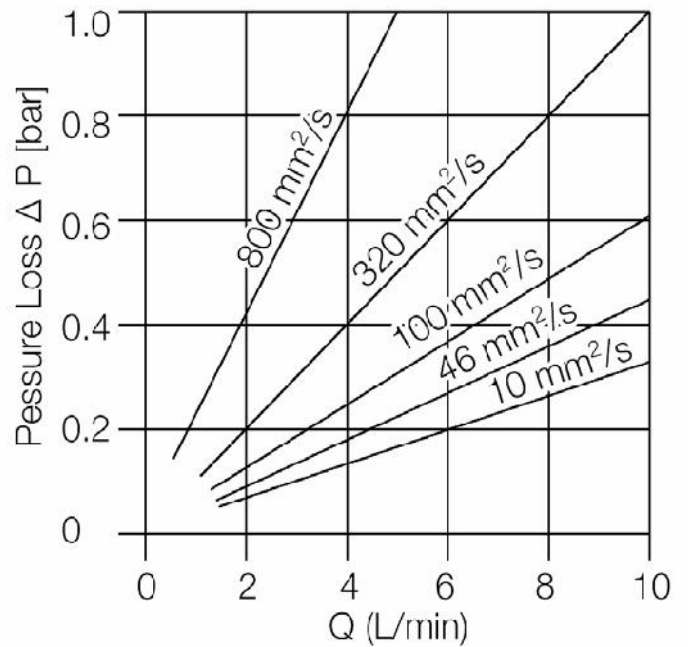


11.2. Aluminum housing

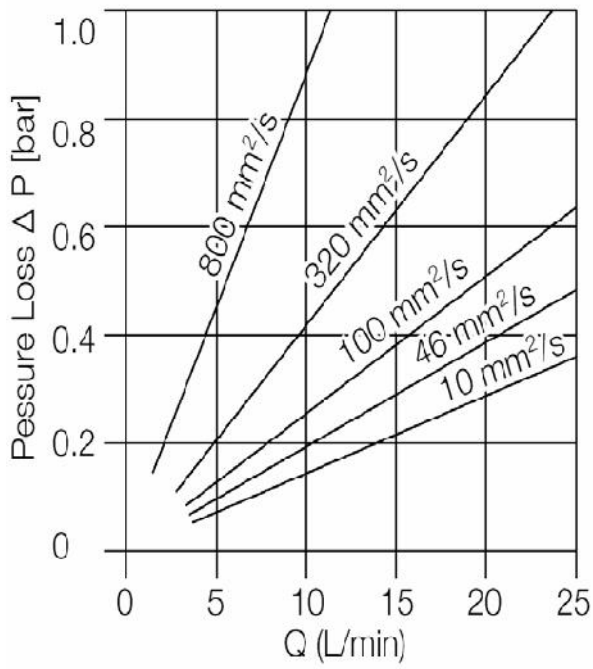
OVZ-02...



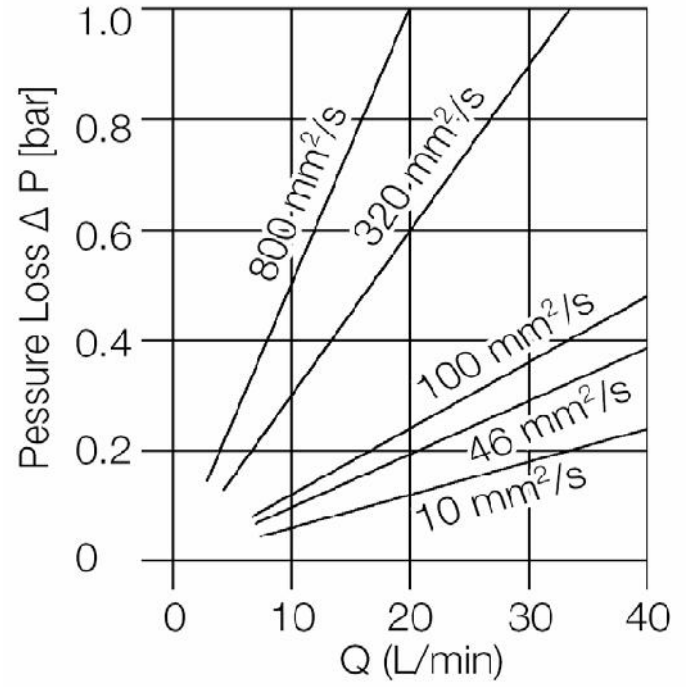
OVZ-04...



OVZ-15...



OVZ-30...



12. Order Codes

12.1. POM plastic housing

(Example: **OVZ-02 1 N2 N I401**)

Rated measuring range (GPM) ¹⁾ (for different viscosities)				Pulses Per Gallon	Model	Material/ cover	Connection	Gaskets	Electrical transducer
10 mm ² /s	100 mm ² /s	320 mm ² /s	800 mm ² /s						
0.8 – 2.1	0.8 – 2.1	0.5 – 1.3	0.3 – 0.53	1546	OVZ-02..	..1..= POM ..2..= PMMA	..G2..= G 1/4 ..N2..= 1/4 NPT	..N..= NBR (standard) ..V..= FKM ..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 Analog output ..L343= 4-20 mA output, 3-wire, M12x1connector ..L443= 4-20 mA output, 3-wire, DIN connector Compact electronic* ..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** ..Z340= 240°-pointer indication,4.20 mA, connector M12x1
0.11 – 2.6	0.11 – 2.6	0.8 – 2.1	0.4 – 1.1	848	OVZ-04..		..G2..= G 1/4 ..N2..= 1/4 NPT		
0.26 – 6.6	0.26 – 6.6	0.26 – 6.6	0.11 – 2.6	199	OVZ-15..		..G4..= G 1/2 ..N4..= 1/2 NPT		
0.42 – 10.6	0.42 – 10.6	0.42 – 10.6	0.25 – 6.34	106	OVZ-30..		..G5..= G 3/4 ..N5..= 3/4 NPT		

¹⁾ Maximum pressure loss at maximum rated flow is 14.5 PSI

²⁾ Hz=Pulse/Gallon x Gallon/Minute/60

* Please specify flow direction in writing

12.2. Aluminum housing

(Example: **OVZ-02 3 N2 N I401**)

Rated measuring range (GPM) ¹⁾ (for different viscosities)				Pulses Per Gallon	Model	Material/ cover	Connection	Gaskets	Electrical transducer
10 mm ² /s	100 mm ² /s	320 mm ² /s	800 mm ² /s						
0.8 – 2.1	0.8 – 2.1	0.07- 1.74	0.03 – 0.79	1499	OVZ-02..	..3..= PMMA ..4..= PSU ..5..= Alu	..G2..= G 1/4 ..N2..= 1/4 NPT	..N..= NBR (Standard) ..V..= FKM ..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 Analog output ..L343= 4-20 mA output, 3-wire, M12x1connector ..L443= 4-20 mA output, 3-wire, DIN connector Compact electronic* ..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** ..Z340= 240°-pointer indication,4-20 mA, connector M12x1
0.11 – 2.6	0.11 – 2.6	0.11 – 2.64	0.07 – 1.19	768	OVZ-04..		..G2..= G 1/4 ..N2..= 1/4 NPT		
0.26 – 6.6	0.26 – 6.6	0.24 – 6.08	0.13 – 3.30	176	OVZ-15..		..G4..= G 1/2 ..N4..= 1/2 NPT		
0.42 – 10.6	0.42 – 10.6	0.34 – 8.85	0.21 – 5.28	98	OVZ-30..		..G5..= G 3/4 ..N5..= 3/4 NPT		

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

²⁾ Hz = Pulse/Gallon x Gallon/Min/60

* Please specify flow direction in writing

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	AUF-3000
3-wire, power supply with analog output	

13. Maintenance

The meter requires no maintenance if the measured media is not contaminated. Should it be necessary to clean the meter, the meter body cover can be easily removed to gain access to, and clean, the inside of the meter body (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 gears relative to one another with a pencil.
- Remove the pair of oval gears and clean parts with care; do not scratch the sealing faces.



Caution: Do not remove the oval gears position marking!

Installation:

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

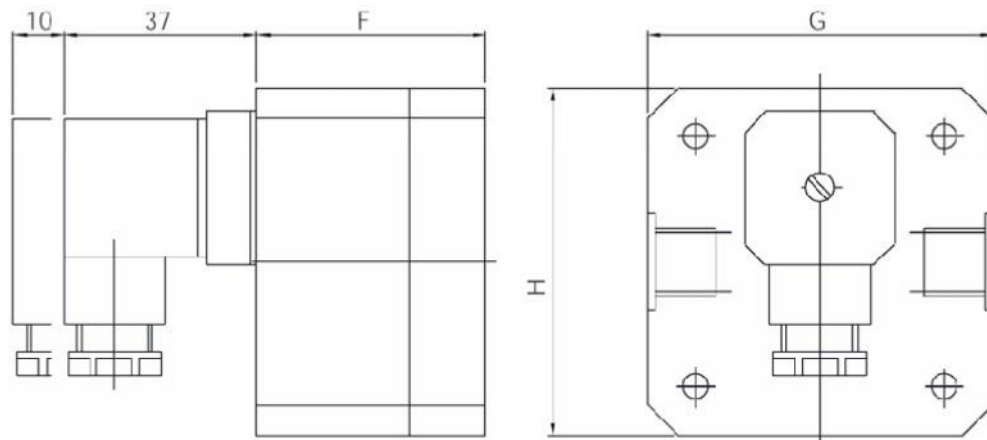
15. Recommended spare parts

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

Always specify the meter model when ordering spare parts.

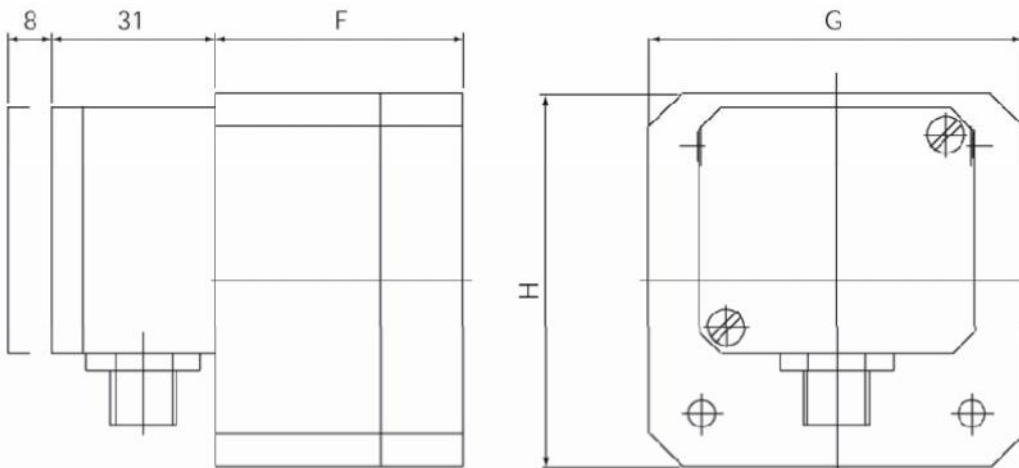
16. Dimensions

OVZ-...I401



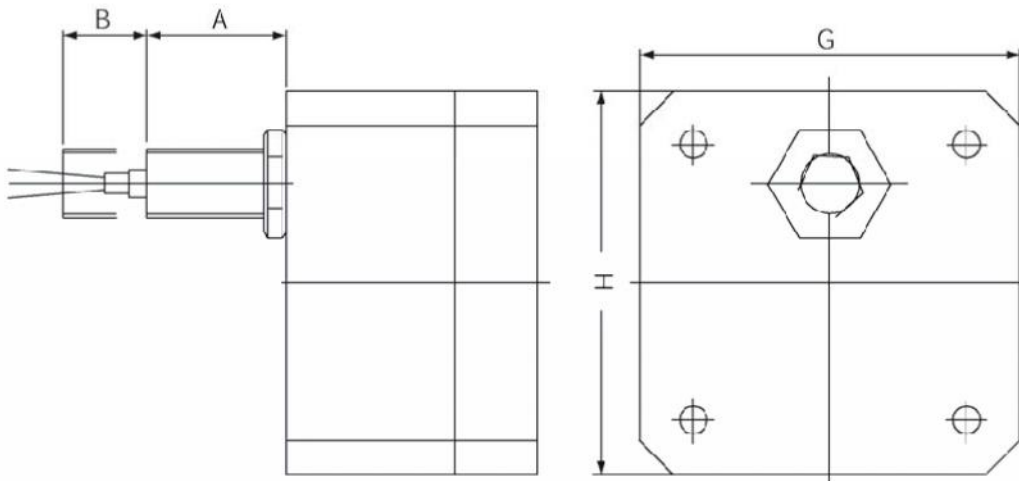
	G [mm]	H [mm]	F [mm]			
			..1..	..2..	..3/ 4..	..5..
OVZ-02...	68	68	45	45	43,5	41
OVZ-04...	68	68	49	49	47	44,5
OVZ-15...	99	99	71	73	71	66
OVZ-30...	119	119	84,5	87,5	86	79,5

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

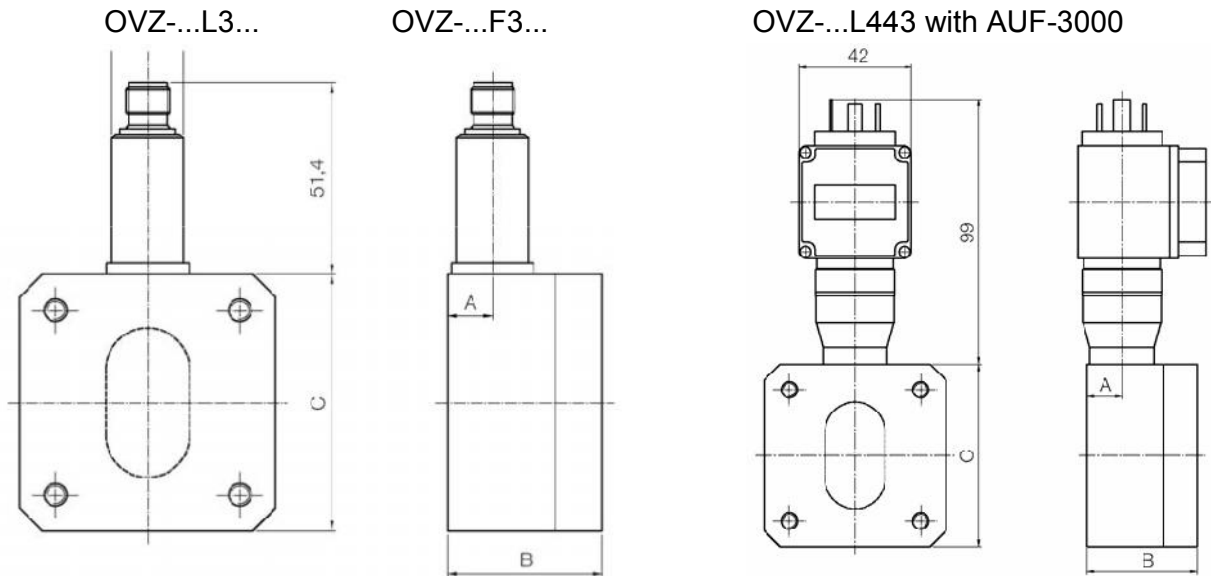


	G [mm]	H [mm]	F [mm]			
			..1..	..2..	..3/ 4..	..5..
OVZ-02...	68	68	45	45	43,5	41
OVZ-04...	68	68	49	49	47	44,5
OVZ-15...	99	99	71	73	71	66
OVZ-30...	119	119	84,5	87,5	86	79,5

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



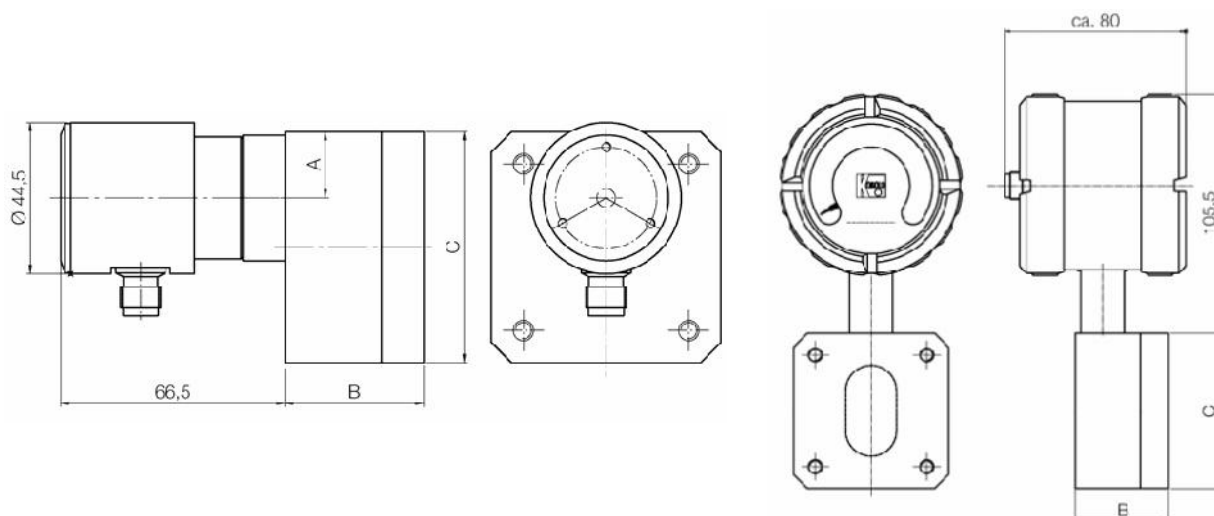
OVZ with frequency or analog output: overview

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

Aluminum 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

Aluminum 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 Flow Meter Model: OVZ-...

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

EN 50082-2

EMC General Immunity Requirements

- a) Immunity against electrostatic discharges
(IEC 0801-2, ESD).
- b) Immunity against fast transients.
(IEC 1000-4, BURST)

Also the following EWG guidelines are fulfilled:

2004/108/EC EMC Directive

Hofheim, 16. Jan. 2007



H. Peters
General Manager



M. Wenzel
Proxy Holder