Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

Oval Wheel Flowmeter

for viscous liquids

KOBOLD

measuring • monitoring • analysing

OVZ

Model: OVZ

Model: OVZ
with compact electronics

Model: OVZ

- Measuring ranges:
  0,1 - 2,0 ... 1.6 - 40 l/min oil
- Measuring accuracy: ± 2.5% f.s.
- p_{max}: 40 bar; t_{max}: 80 °C
- Viscosity range: 10 - 800 mm²/s
- Connection:
  G ¼ ... G ¾, ¼ ... ¾" NPT female
- Material:
  POM, PMMA, PSU, aluminium
- Output: pulses

S4

KOBOLD companies worldwide:
AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHINA, CZECHIA, FRANCE, GERMANY, GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, RUSSIA, SPAIN, SWITZERLAND, THAILAND, TUNISIA, TURKEY, USA, VIETNAM

KOBOLD Messring GmbH
Nordring 22-24
D-65719 Hofheim/Ts.
Head Office:
+49(0)6192 299-0
+49(0)6192 23398
info.de@kobold.com
www.kobold.com

1/05 - 2022

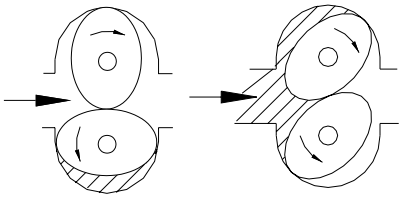
Application

The model OVZ oval wheel flow meters are used to measure, monitor and meter viscous liquids. The flow meters function independent of viscosity in the viscosity range between 10 and 800 mm²/s. A maximum pressure loss of 1 bar has been defined at the factory.

This results in different measuring ranges for different viscosities. The oval gearwheels are manufactured from high quality plastic.

Function

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 and thus roll together. 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 gearwheels. The rotary motion is converted to a pulse signal by electrical sensors externally fitted to the measuring chamber. The pulse count is a measure of the flow rate. The signals are evaluated by downstream electronics (optional).

Technical Details

Viscosity range:	10... 800 mm²/s (option: 1000 mm²/s)
Ambient temperature:	-10° C ... +60 °C
Medium temperature:	-10 °C ... +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
Contactors:	oxide ceramic magnets or stainless steel
Frequency range:	0.3-9 Hz ... 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, asymmetrical, 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} ±20%
  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 Ω
  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, appr. 100 mA
  Electr. connection: connector M12x1
- **Counter electronics (...Exxx)**
  Display: LCD, 2 x 8 digit, illuminated total, part and flow quantities, units selectable
  Quantity meter: 8-digit
  Analogue output: (0)4...20 mA adjustable

No responsibility taken for errors; subject to change without prior notice.
1/05 - 2022

Load:	max. 500 Ω
Switching output:	2 relays, max. 30 $V_{AC/DC}$/2 A/60 VA
Settings:	via 4 buttons
Functions:	reset, MIN/MAX memory, flow monitor, monitoring for part and total quantity, language
Power supply:	24 V_{DC} ±20 %, 3-wire
Power consumption:	approx. 150 mA
Electrical connections:	cable connection or M 12 plug

More technical details see data sheet ZED

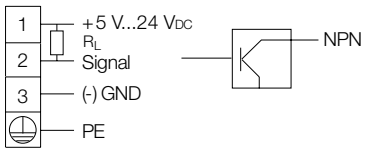
- **Dosing electronics (...Gxxx)**

Display:	LCD, 2 x 8 digit, illuminated dosing-, total-, and flow quantity, units selectable
Quantity meter:	8-digit
Dosage:	5-digit
Analogue output:	(0)4...20 mA adjustable
Load:	max. 500 Ω
Switching output:	2 relays, max. 30 $V_{AC/DC}$/2 A/60 VA
Settings:	via 4 buttons
Functions:	dosing (relay S2), start, stop, reset, fine dosing, correction amount, flow switch, total quantity, language
Power supply:	24 V_{DC} ±20 %, 3-wire
Power consumption:	approx. 150 mA
Electrical connection:	cable connection or M 12 plug

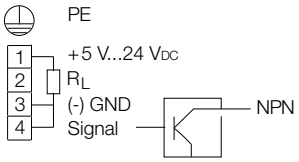
More technical details see data sheet ZED

Electrical Connection

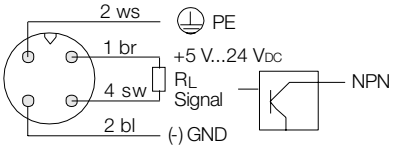
OVZ-...I401



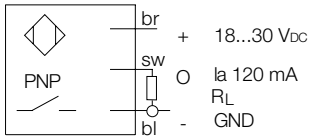
OVZ-...I302



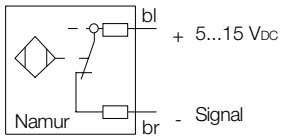
OVZ-...I303



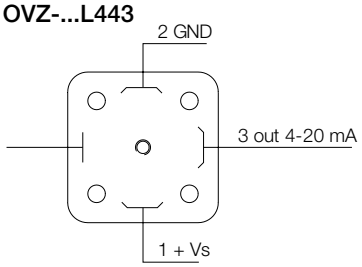
OVZ-...I304



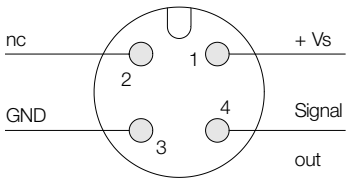
OVZ-...I305



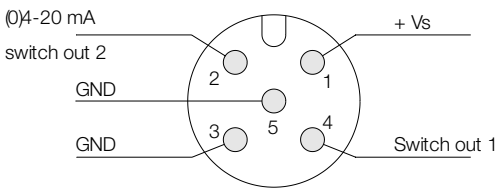
OVZ-...L443



OVZ-..F., OVZ-..L3..



OVZ-..C..



R_L = 2,4 ... 100 kΩ

No responsibility taken for errors;
subject to change without prior notice.

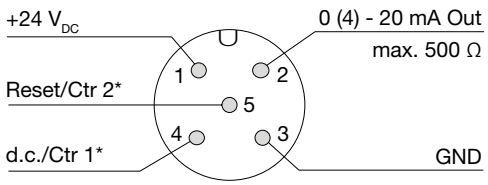
Electrical Connection (cont'd)

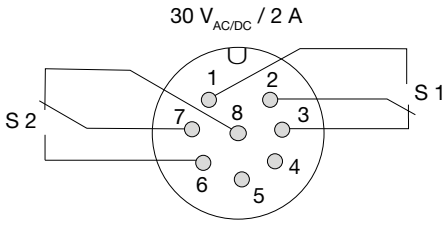
OVZ-...E14R, OVZ-...G14 Cable Connection

Wire number	OVZ-...E14R Counter electronics	OVZ-...G14R Dosing electronics
1	+24 V_{DC}	+24 V_{DC}
2	GND	GND
3	4-20 mA	4-20 mA
4	GND	GND
5	n.c.	Control 1*
6	Reset part quantity	Control 2*
7	Relay S1	Relay S1
8	Relay S1	Relay S1
9	Relay S2	Relay S2
10	Relay S2	Relay S2

Control 1 <-> GND: Start-Dosing
Control 2 <-> GND: Stop-Dosing
Control 1 <-> Control 2: Reset-Dosing

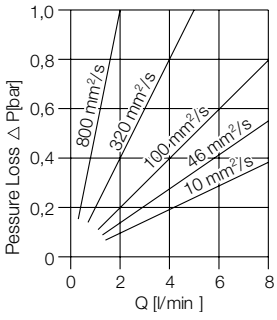
Plug Connection



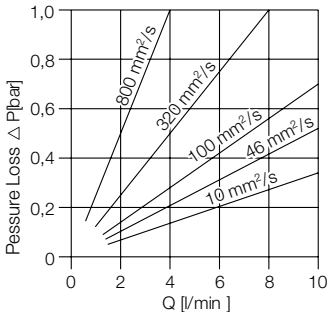


Pressure Losses (POM plastic housing)

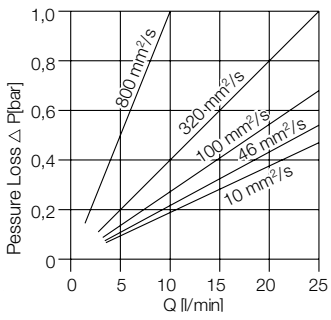
OVZ-02...



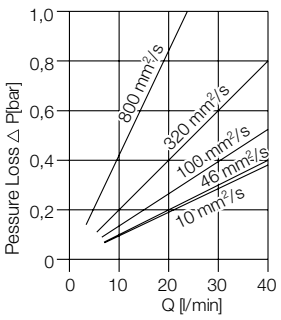
OVZ-04...



OVZ-15...

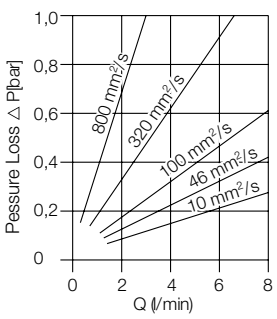


OVZ-30...

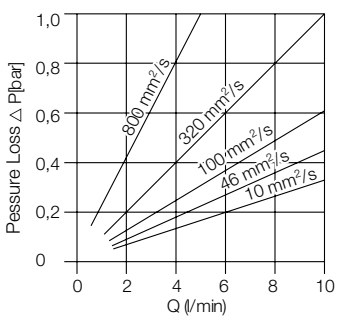


Pressure Losses (aluminium housing)

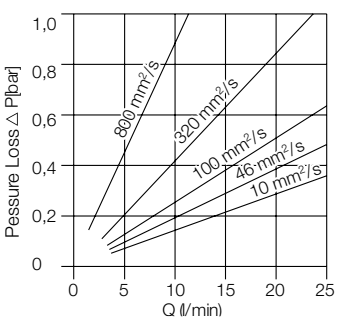
OVZ-02...



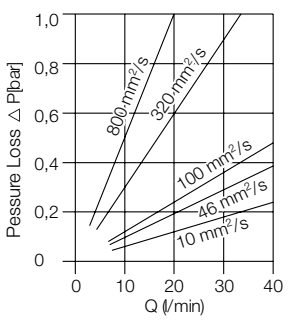
OVZ-04...



OVZ-15...



OVZ-30...



Order Details (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 mm²/s	100 mm²/s	320 mm²/s	800 mm²/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 ¼ **..N2..** = ¼" NPT	**..N..** = NBR (standard) **..V..** = FPM **..E..** = EPDM	**Frequency output** **..I401** = frequency output NPN, connector DIN 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, M12x1 connector **..L343** = 4-20 mA output, 3-wire, M12x1 connector **..L443** = 4-20 mA output, 3-wire, DIN connector **Compact electronic[3]** **..C30R** = LED display, 2 x open collector, PNP, connector M12x1 **..C30M** = LED display, 2 x open collector, NPN, connector M12x1 **..C34P** = LED display, 4-20 mA, 1 x op. coll. PNP, connector M12x1 **..C34N** = LED display, 4-20 mA, 1 x op. coll. NPN, connector M12x1 **Counter electronics** **..E11R** = LCD, 0-10 V, 2 x relay, 24 V_{DC}, 1.5 m cable **..E14R** = LCD, 0(4)-20 mA, 2 x relay, 1.5 m cable **..E31R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} plug connection **..E34R** = LCD, 0(4)-20 mA, 2 x relay, M12 plug **..E91R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} cable connection **..E94R** = LCD, 0(4)-20 mA, 2 x relay, cable >1.5 m[6] **Dosing electronics** **..G11R** = LCD, 0-10 V, 2 x relay, 24 V_{DC}, 1 m cable **..G14R** = LCD, 0(4)-20 mA, 2 x relay, 1.5 m cable **..G31R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} plug connection **..G34R** = LCD, 0(4)-20 mA, 2 x relay, M12 plug **..G91R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} cable connection **..G94R** = LCD, 0(4)-20 mA, 2 x relay, cable >1.5 m[6]
0.4-10.0	0.4-10.0	0.3-8.0	0.15-4.0	224	**OVZ-04..**		**..G2.. =** G ¼ **..N2..** = ¼" NPT		
1.0-25.0	1.0-25.0	1.0-25.0	0.4-10.0	52.5	**OVZ-15..**		**..G4..** = G ½ **..N4..** = ½" NPT		
1.6-40.0	1.6-40.0	1.6-40.0	0.95-24.0	28	**OVZ-30..**[5]		**..G5..** = G ¾ **..N5..** = ¾" 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 [5] Calibration reports only up to 25 l/min [6] Please specify cable length in clear text

No responsibility taken for errors;
subject to change without prior notice.

Order Details (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 mm²/s	100 mm²/s	320 mm²/s	800 mm²/s						
0.3-8.0	0.3-8.0	0.2-5.0	0.1-3.0	396	**OVZ-02..**	**..3..** = PMMA **..4..** = PSU **..5..** = Alu	**..G2..** = G ¼ **..N2..** = ¼" NPT	**..N..** = NBR (standard) **..V..** = FPM **..E..** = EPDM	**Frequency output** **..I401** = frequency output NPN, connector DIN 43650 **..I302** = frequency output NPN, cable connection **..I303** = frequency output NPN, connector M12x1 **..F300** = frequency output PNP, connector M12x1 **..F3X0** = frequency divider adjusted PNP, connector M12x1 **Analogue output** **..L303** = 0-20 mA output, 3-wire, M12x1 connector **..L343** = 4-20 mA output, 3-wire, M12x1 connector **..L443** = 4-20 mA output, 3-wire, DIN-connector **Compact electronic[3]** **..C30R** = LED display, 2 x open collector, PNP, connector M12x1 **..C30M** = LED display, 2 x open collector, NPN, connector M12x1 **..C34P** = LED display, 4-20 mA, 1 x op. coll. PNP, connector M12x1 **..C34N** = LED display, 4-20 mA, 1 x op. coll. NPN, connector M12x1 **Counter electronics** **..E11R** = LCD, 0-10 V, 2 x relay, 24 V_{DC}, 1.5 m cable **..E14R** = LCD, 0(4)-20 mA, 2 x relay, 1.5 m cable **..E31R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} plug connection **..E34R** = LCD, 0(4)-20 mA, 2 x relay, M12 plug **..E91R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} cable connection **..E94R** = LCD, 0(4)-20 mA, 2 x relay, cable >1.5 m[6] **Dosing electronics** **..G11R** = LCD, 0-10 V, 2 x relay, 24 V_{DC},1 m cable **..G14R** = LCD, 0(4)-20 mA, 2 x relay, 1.5 m cable **..G31R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} plug connection **..G34R** = LCD, 0(4)-20 mA, 2 x relay, M12 plug **..G91R** = LCD, 0-10 V, 2 x relay, 24 V_{DC} cable connection **..G94R** = LCD, 0(4)-20 mA, 2 x relay, cable >1.5 m[6]
1.0-25.0	1.0-25.0	0.9-23.0	0.5-12.5	46.5	**OVZ-15..**		**..G4..** = G ½ **..N4..** = ½" NPT		
1.6-40.0	1.6-40.0	1.3-33.5	0.8-20.0	26	**OVZ-30..**[5]		**..G5..** = G ¾ **..N5..** = ¾" 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 [5] Calibration reports only up to 25 l/min [6] Please specify cable length in clear text

Digital indicators and transducers to this oval wheel flow meter please see »accessories«.

Plug-on display

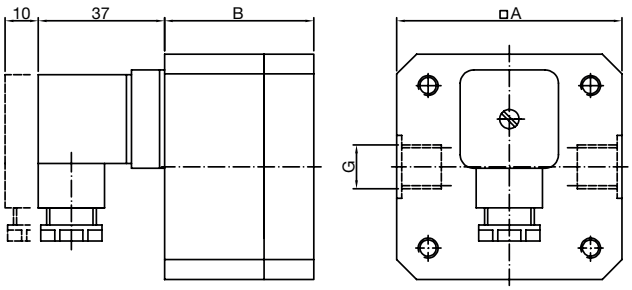
for model OVZ...L4... (with 4-20 mA output and DIN connector)

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

No responsibility taken for errors; subject to change without prior notice.

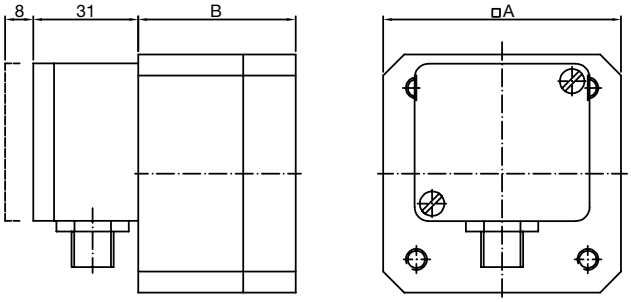
1/05 - 2022

Dimensions OVZ-...I401



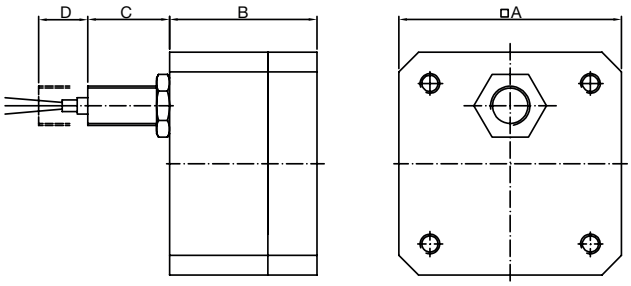
[mm]	□A	B				G	
		..1..	..2..	..3/4..	..5..	G	NPT
OVZ-02..	68	45	45	43.5	41	41	¼"
OVZ-04..	68	49	49	47	44.5	44.5	¼"
OVZ-15..	99	71	73	71	66	66	½"
OVZ-30..	119	84.5	87.5	86	79.5	79.5	¾"

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



[mm]	□A	B				G	
		..1..	..2..	..3/4..	..5..	G	NPT
OVZ-02..	68	45	45	43.5	41	¼"	
OVZ-04..	68	49	49	47	44.5	¼"	
OVZ-15..	99	71	73	71	66	½"	
OVZ-30..	119	84.5	87.5	86	79.5	¾"	

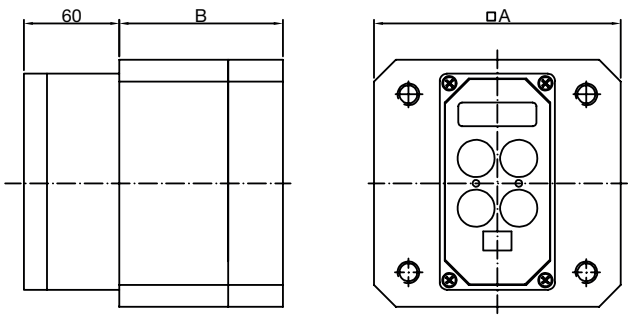
Dimensions OVZ-...I304, OVZ-...I305



[mm]	□A	B				G	
		..1..	..2..	..3/4..	..5..	G	NPT
OVZ-02..	68	45	45	43.5	41	¼"	
OVZ-04..	68	49	49	47	44.5	¼"	
OVZ-15..	99	71	73	71	66	½"	
OVZ-30..	119	84.5	87.5	86	79.5	¾"	

[mm]	PNP		NAMUR	
	C	D	C	D
OVZ-02..	21.5	13.5	16.5	13.5
OVZ-04..	21	14	16	14
OVZ-15..	19	16	14	16
OVZ-30..	17	18	12	18

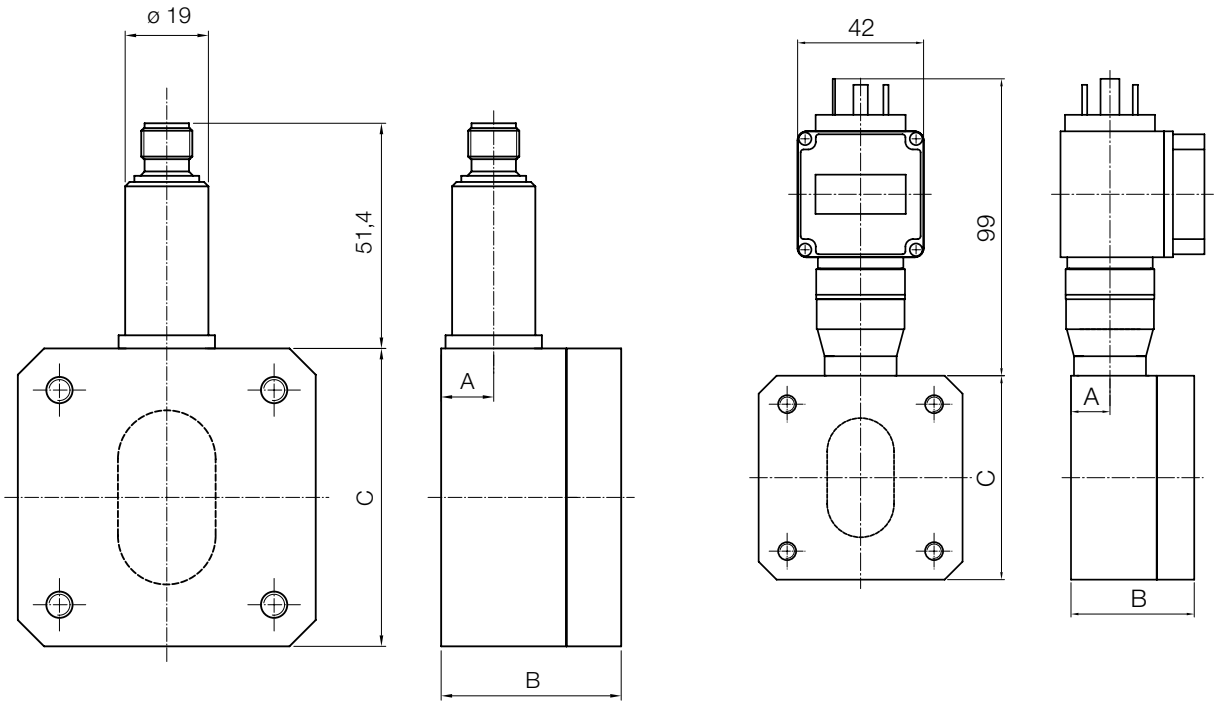
Dimensions OVZ-...ExxR, OVZ-GxxR



[mm]	□A	B				G	
		..1..	..2..	..3/4..	..5..	G	NPT
OVZ-02..	68	45	45	43.5	41	¼"	
OVZ-04..	68	49	49	47	44.5	¼"	
OVZ-15..	99	71	73	71	66	½"	
OVZ-30..	119	84.5	87.5	86	79.5	¾"	

No responsibility taken for errors;
subject to change without prior notice.

Dimensions OVZ-...L3... **OVZ-...F3...** **Dimensions OVZ-...L443 with AUF-3000**



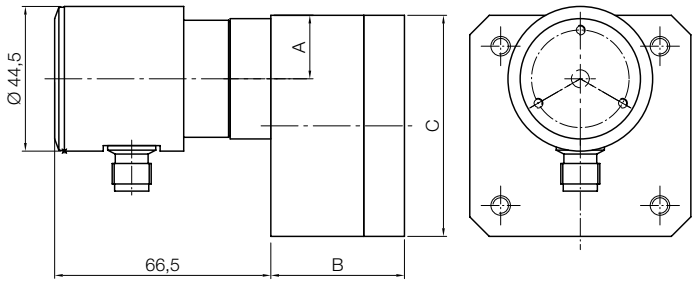
OVZ with frequency or analogue output: overview

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

No responsibility taken for errors;
subject to change without prior notice.
1/05 - 2022

Dimensions OVZ-...C3...



OVZ with compact electronic: 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 = PMMA	23.025	79.5	□ 119

No responsibility taken for errors;
subject to change without prior notice.