BOPP & REUTHER MESSTECHNIK

OVAL WHEEL METER FLOWAL® Plus SERIES OD

1. IDENTIFICATION

Manufacturer Bopp & Reuther Messtechnik
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Product type Direct volumetric meter (positive displacement meter, Single-Case-Version)

Product name Oval Wheel Meter of the family Flowal® Plus, Series OD

2. RANGE OF APPLICATION

The application area for Oval Wheel Meters of the family Flowal® Plus encompasses the simple, reliable and cost-effective measurement of liquid volumes or volumetric flow rates. They have an extremely robust design and combine years of experience with state-of-the-art technologies. The high-resolution Oval Wheel Meter series OD is a compact dosing oval wheel with direct volume measurement. The meter has with TriClamp connections and a high resolution sensor.

This is connected to the control with dosing and measuring function for dosing and measuring Newtonian non-abrasive fluids such as water, oils, greases, etc.

The devices are designed in a compact design and are connected directly to the control system. In the minimum configuration 24VDC supply and pulse output are connected.

3. MEASURING PRINCIPLE AND SYSTEM CONFIGURATION

3.1 Measuring principle

Oval Wheel Meter belong to the group of direct volumetric meters for liquids with movable partition walls (displacement flow meters).
The Oval Wheel Meter consists of a measurement chamber housing with two pivoted oval wheels which are toothed and roll off each other in counter-rotations. Each revolution the oval wheels displaces a discrete volume of liquid (defined by the space between the oval wheel and measurement chamber) through the chamber.
For measurement purposes, the rotation of the oval wheels is transmitted to a mechanical counter and / or a pulse pick-up via a magnet coupling and gear device.

3.2 System configuration

Oval Wheel Meter of the family Flowal® Plus consists of the following main components:

- measuring transducer: measuring chamber with oval wheels
- pulse pick up or multifunctional electronic

3.2.1 Pulse pick-up

Type	Function	Power supply	Output	Connection	Temperature	Protection
Pulse pick-up						
PV13	connection to MID-MDS, MDS-PLC resp. Customer-specific SPS/PLS	18V- 36V DC 100mA	Pulse duration: 500µs 24V DC 20mA High Side Driver	Coninvers RC-09S1N12T004	-10° to 120°	IP67

3.2.2 Measuring chamber

Oval Wheels: stainless steel - max. 3000 mPa•s*

Series OD	Measuring-range	Pulses		
	l/min	Imp/n	Imp/l	Hz_{max}
06	0.2 - 5	12	~2000	166
2	1 - 30	20	~1000	500
5	2 - 50	20	~400	333
10	4 - 100	20	~200	333

Oval Wheels: PEEK - max. 150 mPa•s*

Series OD	Measuring-range	Pulses		
	l/min	Imp/n	Imp/l	Hz_{max}
06	0.2 - 7	12	~2000	233
2	1 - 30	20	~1000	500
5	2 - 60	20	~400	400
10	3 - 120	20	~200	400

*with Newtonian Properties

4. INPUT

4.1 Measured value

Volume

OVAL WHEEL METER FLOWAL®Plus SERIES OD

5. CHARACTERISTIC PARAMETER

5.1 Reference conditions

The calibration of the oval wheel of meters is carried out on test benches with the following reference conditions:

pressure: 2 to 7 bar
temperature: 20°C

5.2 Accuracy

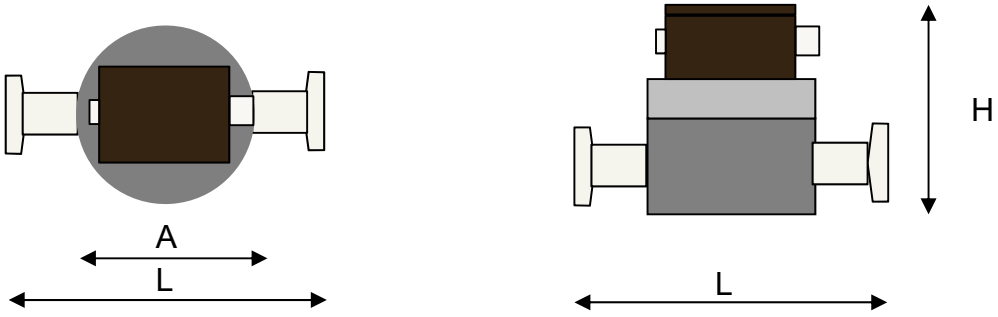
± 0,5 % of measured value

5.3 Repeatability

± 0,1%

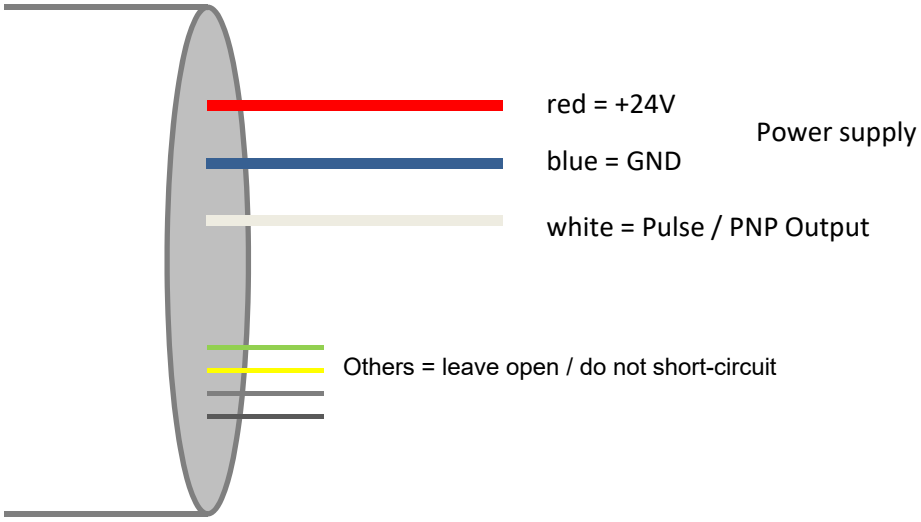
6. CONSTRUCTION DETAILS

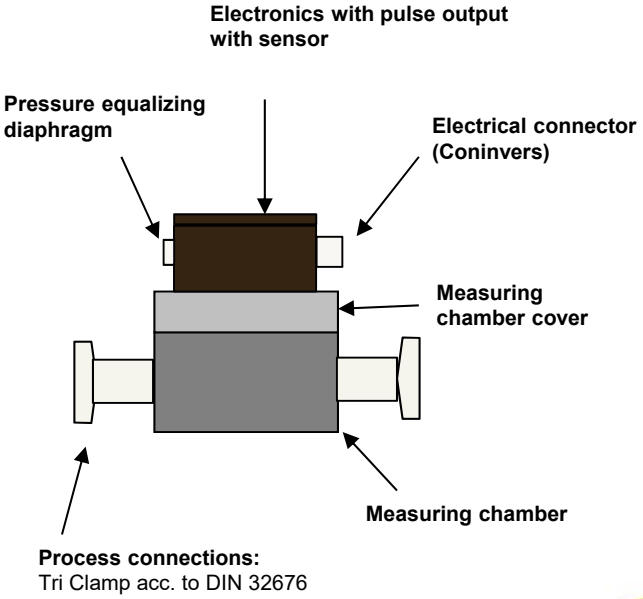
6.1 Design / dimensions / weights: OD



Type OD	DN	**A** (mm)	**H** (mm)	**Tri-Clamp L** (mm)	RG R1/2 **L** (mm)	SS1SS (kg)	SS1PK (kg)
OD06	10	78	98	150	170	2.4	2.4
OD2	15	99	115	150	170	2.9	2.8
OD5	20	112	118	150	170	4.4	4
OD10	25	112	144	150	-----	5.1	4.4

6.2 Electronic connection diagram





6.3 Material

Code	Housing	Oval wheels	Sleeve bearing	Axle	Seals
SS1SS	stainless steel	stainless steel	coal	stainless steel	Viton / EPDM
SS1PK	stainless steel	PEEK	PEEK	stainless steel	Viton / EPDM

7. EINSATZBEDINGUNGEN

7.1 Liquid temperature limit

	Medium temperature	Ambient temperature
SS1SS	-10°C to +120°C	-10°C to +50°C
SS1PK	-10°C to +70°C	-10°C to +50°C

7.2 Liquid pressure limit

PN16

7.3 Viscosity

Oval wheels: **PEEK**

Type OD	VIscosity
06	max.150 mPa•s
2	max.150 mPa•s
5	max.150 mPa•s
10	max.150 mPa•s

Oval wheel: **stainless steel**

Type OD	VIscosity
06	max.1000 mPa•s
2	max.1000 mPa•s
5	max.3000 mPa•s
10	max.3000 mPa•s

7.4 Hydraulic connection

Series	Hydraulic connection	
	Tri-Clamp: PN16	**Whitworth pipe thread**
OD06	DN10 DIN 32676	Internal thread G¼" according to ISO 288
OD2	DN15 DIN 32676	External thread RG½" according to DIN/ISO 2999 / EN 10226
OD5	DN20 DIN 32676	External thread RG¾" according to DIN/ISO 2999 / EN 10226
OD10	DN25 ISO 2582	External thread RG 1" according to DIN/ISO 2999 / EN 10226

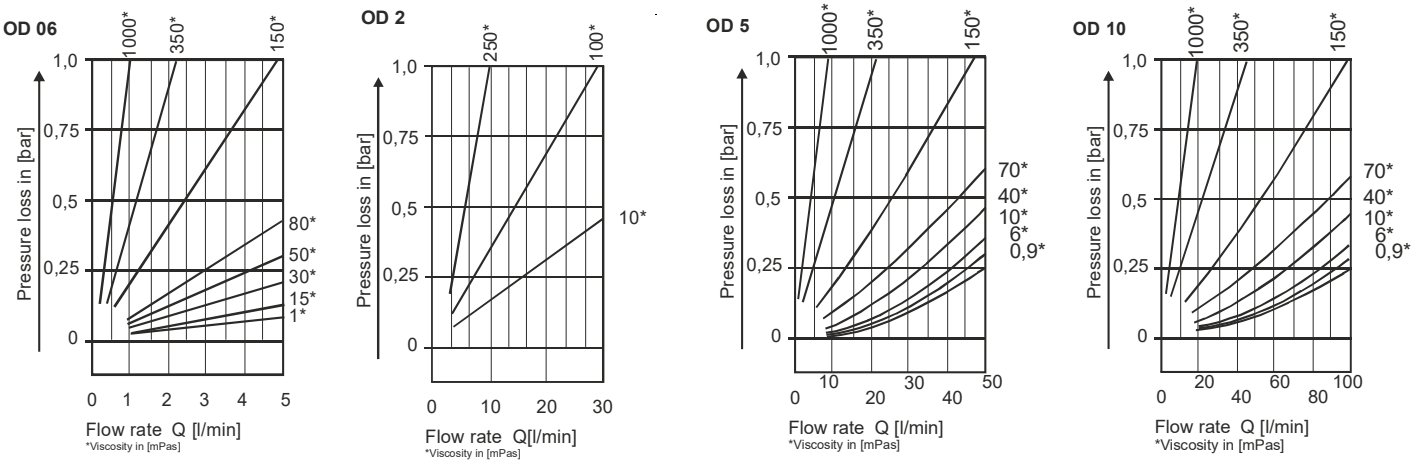
7.5 Measurement range

Material: SS1SS					
	Viscosity range (mPa·s)				
	0.3 – 1.5	1.5 - 150	150 - 350	350 - 1000	1000 - 3000
Type	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)
OD06	0.2 - 5	0.2 - 5	0.1 – 1.8	0.05 – 0.6	-
OD2	1 - 30	1 - 30	0.4 - 11	0.3 – 4	-
OD5	2 - 50	2 - 50	1 - 25	0.6 – 12.5	0.3 – 4.5
OD10	4 - 100	4 - 100	2 - 70	1 - 35	1 - 12

Material: SS1PK		
	Viscosity range (mPa·s)	
	0.3 – 1.5	1.5 - 150
Type	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)
OD06	0.2 - 7	0.2 - 7
OD2	1 - 30	1 - 30
OD5	2 - 60	2 - 60
OD10	3 - 120	3 - 120

*inapplicable

7.6 Pressure loss



8. CERTIFICATES AND APPROVALS

EG-Conformity declaration,
Bopp & Reuther Messtechnik GmbH

Directive 2014/30/EU (EMV-Directive)

Directive 2014/68/EU (Pressure equipment directive)
Liquids of group 1, classification acc. Article 4, paragraph 3 (designed and manufactured according to good engineering practice).

Directive 2011/65/EU (RoHS)

CE-Mark:
The measuring system fulfills the legal requirements of the EC Directives 2014/30/EU and 2014/34/EU including all published revisions or amendments to date. Bopp & Reuther Messtechnik GmbH confirms successful device testing and affixing of the CE Mark.

9. DOCUMENTATION

MANUALS

A-EN-05804-00 Manual Flowal® OD

OVAL WHEEL METER FLOWAL®Plus SERIES OD

1. MODEL CODE

Flowal®Plus, OD	- OVAL WHEEL METERS - 1.1.3 Oval Wheel Meter, Series Flowal®Plus, Type OD	BOPP & REUTHER MESSTECHNIK

Oval wheel meter for direct dosing and measurement of small volumes, Qn = 5 - 100 l/min / 7 - 120 l/min

									Code							Description	Price [€]
Material Design				SS1SS													
Flow rate *		Type		Price [€]													
0,2 – 5 l/min		OD06														DN 10 (⅜"), K-Factor approx. 2.000 ppl [approx. 167 Hz]	
1 – 30 l/min		OD2														DN 15 (½"), K-Factor approx. 1.000 ppl [approx. 500 Hz]	
2 – 50 l/min		OD5														DN 20 (¾"), K-Factor approx. 400 ppl [approx. 333 Hz]	
4 – 100 l/min		OD10														DN 25 (1"), K-Factor approx. 200 ppl [approx. 333 Hz]	
Material Design				SS1PK													
Flow rate *		Type		Price [€]													
0,2 – 7 l/min		OD06														DN 10 (⅜"), K-Factor approx. 2.000 ppl [approx. 167 Hz]	
1 – 30 l/min		OD2														DN 15 (½"), K-Factor approx. 1.000 ppl [approx. 500 Hz]	
2 – 60 l/min		OD5														DN 20 (¾"), K-Factor approx. 400 ppl [approx. 333 Hz]	
3 – 120 l/min		OD10														DN 25 (1"), K-Factor approx. 200 ppl [approx. 333 Hz]	
Material Design									-SS1SS							Housing and oval wheels: Stainless Steel / -10 °C up to 120 °C, PN 16	
									-SS1PK							Housing: Stainless Steel / Wheels : PEEK / -10°C up to 70 °C, PN 16	
Hydraulic Connection										-C10						TriClamp DN 10 acc. to DIN 32676 (for OD06 only)	
										-C15						TriClamp DN 15 acc. to DIN 32676 (for OD2 only)	
										-C20						TriClamp DN 20 acc. to DIN 32676 (for OD5 only)	
										-C25						TriClamp DN 25 acc. to DIN 32676 (for OD10 only)	
										-G15						Female thread G½" acc. to ISO 288 (for OD06 only)	
										-R15						Whitworth Pipe Thread RG ½" acc. to DIN/ISO 2999 / EN 10226 (for OD2 only)	
										-R20						Whitworth Pipe Thread RG ¾" acc. to DIN/ISO 2999 / EN 10226 (for OD5 only)	
										-R25						Whitworth Pipe Thread RG 1" acc. to DIN/ISO 2999 / EN 10226 (for OD10 only)	
											-OO					Viton	
											-O1					EPDM	
Cable Connection												-C				Coninvers connector	
3-point-calibration													-C			with calibration	
TAG-No.																	
Fluid																	
Flow Range																min / norm / max [l/h]	
Oper. Temperature																min / norm / max [°C]	
Oper. Pressure																min / norm / max [barg]	
Oper. Viscosity																min / norm / max [mPas]	
Oper. Density																min / norm / max [kg/m³]	
Beispiel																	
OD2									-SS1SS	-C15	-00	-C	-C				