

OVAL WHEEL METER FLOWAL® Plus

SERIES OD

1. IDENTIFICATION

Manufacturer	Bopp & Reuther Messtechnik Am Neuen Rheinhafen 4 67346 Speyer / Germany Phone: +49 6232 657-0 Fax: +49 6232 657-505
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



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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		
		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		
		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

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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

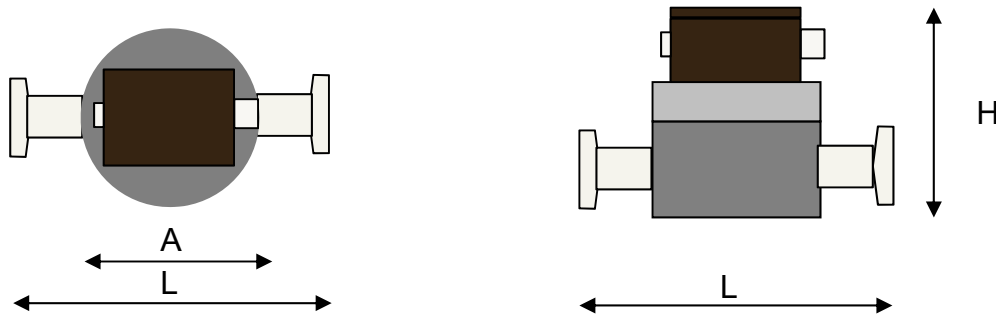
± 0,5 % of measured value

5.3 Repeatability

± 0,1%

6. CONSTRUCTION DETAILS

6.1 Design / dimensions / weights: OD

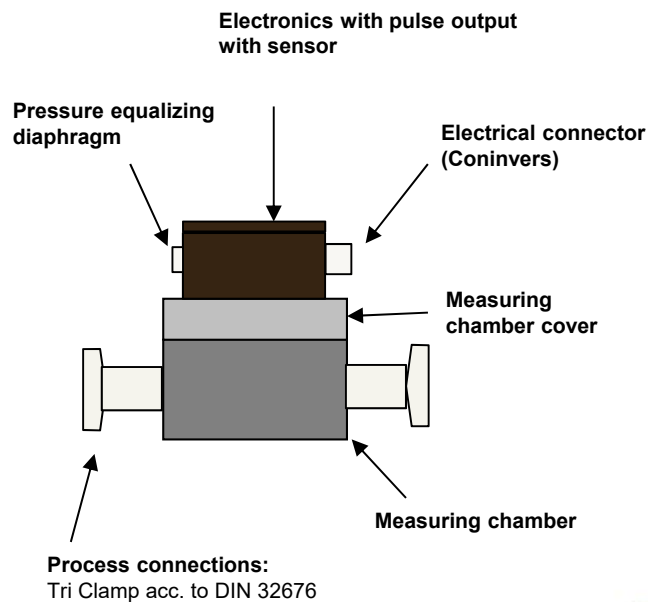
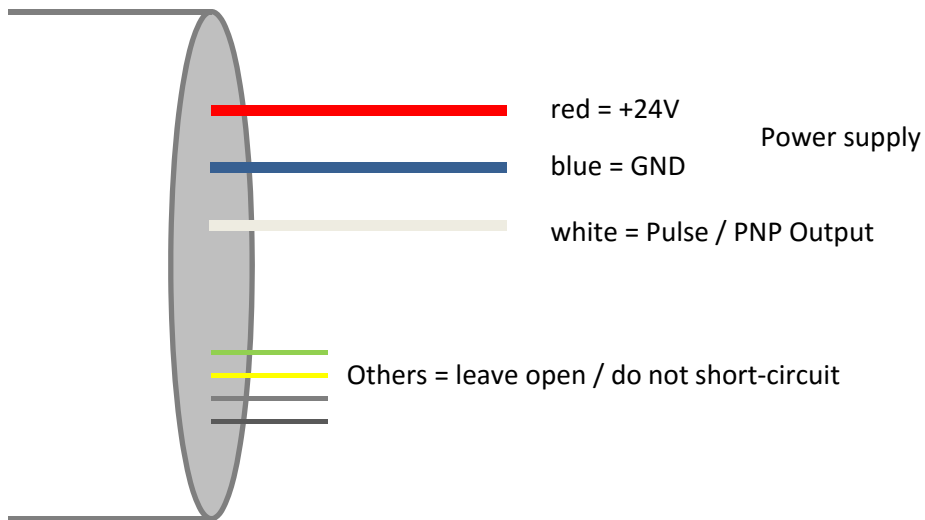


Type OD	DN	A (mm)	H (mm)	Tri-Clamp L (mm)	RG R1/2 L (mm)	SS1SS (kg)
OD06	10	78	98	150	170	2,4
OD2	15	99	115	150	170	2,9
OD5	20	112	118	150	170	4,4
OD10	25	112	144	150	----	5,1

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6.2 Electronic connection diagram



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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

Depending on the material combination (see 7.4)

7.2 Liquid pressure limit

Depending on the material combination (see 7.4)

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

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7.4 Pressure- / Temperature range

Series	Material / Measuring chamber / Oval wheel set	
	SS1SS	SS1PK
OD06	Tri-Clamp: PN16 RG-R1/2: PN16	Tri-Clamp: PN16 RG-R1/2: PN16
OD2		
OD5		
OD10		
Temperature range	-10...120°C Measurement	-10...70°C Measurement

7.5 Measurement range

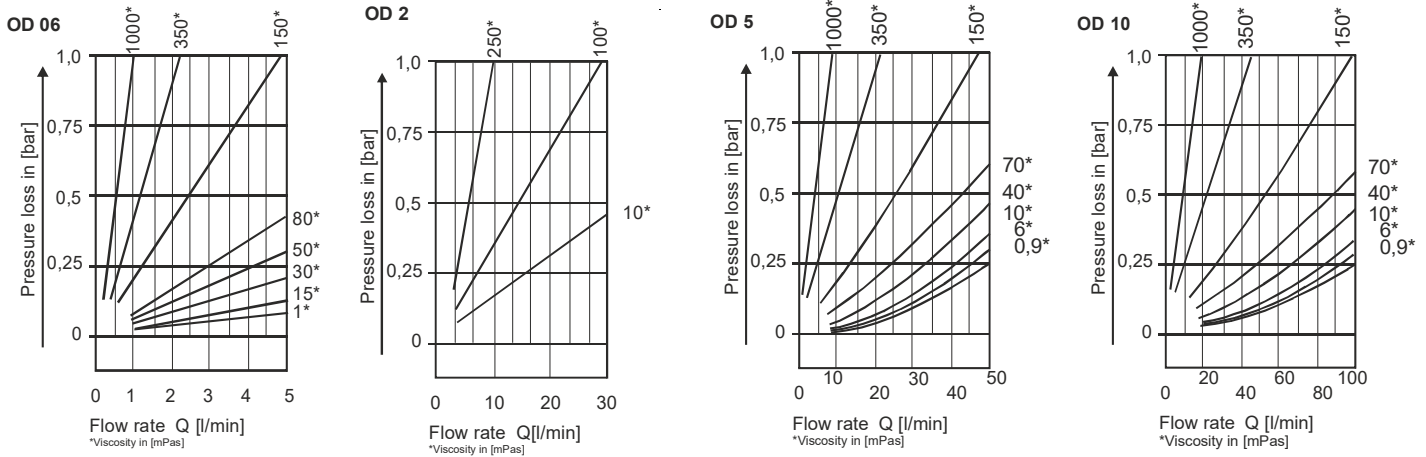
Material: SS1SS					
	Viscosity range (mPa·s)				
	0,3 - 1,5	1,5 - 150	150 - 350	350 - 1000	1000 - 3000
Type	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)	Qmin - Qmax (l/min)
OD06	0,2 - 5	0,2 - 5	0,1 - 1,8	0,05 - 0,6	-
OD2	1 - 30	1 - 30	0,4 - 11	0,3 - 4	-
OD5	2 - 50	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

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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

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1. MODEL CODE

Flowal® Plus, OD		Oval Wheel Meter Flowal® Plus, type OD				BOPP & REUTHER MESSTECHNIK 									
Oval wheel meter for measuring of small volumes															
				Code		Description									
Flow rate *	Type														
0.2 – 5 l/min	OD06	-SS1SS					Housing and oval wheels: Stainless Steel / -10°C up to 120°C								
1 – 30 l/min	OD2	-SS1SS					Housing and oval wheels: Stainless Steel / -10°C up to 120°C								
2 – 60 l/min	OD6	-SS1SS					Housing and oval wheels: Stainless Steel / -10°C up to 120°C								
4 – 100 l/min	OD10	-SS1SS					Housing and oval wheels: Stainless Steel / -10°C up to 120°C								
Flow rate *	Type														
0.2 – 7 l/min	OD06	-SS1PK					Housing: Stainless Steel / Wheels: PEEK / -10°C up to 70°C								
1 – 30 l/min	OD2	-SS1PK					Housing: Stainless Steel / Wheels: PEEK / -10°C up to 70°C								
2 – 60 l/min	OD6	-SS1PK					Housing: Stainless Steel / Wheels: PEEK / -10°C up to 70°C								
3 – 120 l/min	OD10	-SS1PK					Housing: Stainless Steel / Wheels: PEEK / -10°C up to 70°C								
Hydraulic connection							TriClamp acc. DIN 32676								
							Inner thread acc. ISO228 (only with G1/2")								
							Pipe thread acc. To DIN2999								
Size							TriClamp DN10 for OD06 only								
							TriClamp DN16 for OD2 only								
							TriClamp DN20 for OD6 only								
							TriClamp DN25 for OD10 only								
							G 1/2" for OD06 only								
							RG 1/2" for OD2 only								
							RG 3/4" for OD6 only								
							RG 1" for OD10 only								
							Viton								
							EPDM								
Cable Connector							Coninvers connector								
3-point-calibration															
<table border="1"> <tr> <td>Example</td> <td>OD2</td> <td>-SS1SS</td> <td>-CA</td> <td>-16-16</td> <td>-01</td> <td>-C</td> <td>-C</td> </tr> </table>								Example	OD2	-SS1SS	-CA	-16-16	-01	-C	-C
Example	OD2	-SS1SS	-CA	-16-16	-01	-C	-C								
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