



**Oval wheel meter
with pulse pick-up
and mechanical counters**

**OaP-Serie
AG 19/20/45
E/D/M5**

Operation Manual



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I. Transport, Delivery, Storage

Storage and transport:

Protect devices against humidity, dirt, shock and damage.

Inspection of Delivery:

Check shipment for completeness upon receipt. Compare the data marked on the device with the data on the packing slip and the order documents.

Report any transport damage immediately after the delivery. Damages which are reported later, will not be recognized.

II. Warranty

For the scope and period of warranty, please refer to the contractual terms of delivery.

Claims under warranty shall be conditional to expert installation and start-up in compliance with the operating instructions for the device. The required installation, start-up and servicing work may only be performed by qualified and authorized personnel.

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 meters (positive displacement flow meters)

Product name: oval wheel meter series OaP with pulse pick-up AG 19/20/45 or/and mechanical counters E/D/M5

Version no.: A-EN-01221-00E

2. Range of Application

Quantity control of certain industrial liquids is an economic necessity considering the high value of these products. The volume measuring instruments required for these procedures must be adjusted to the particular operating conditions and the characteristics of the liquids to be measured, both with respect to design and the materials used for these instruments.

The field of application of all Oval Wheel Meters of the OI series comprises measuring, dosage, and controlling of liquids. Oval Wheel Meters of the OI series meet all of these requirements. They are used for the measurement of intermediate and final liquid products such as liquified gases, acids, alkaline solutions, fats, alcohol, solvents, dispersions, polymers, polycondensates, paints, colors, adhesives and other media.

Please note the Oval Wheel Meter's capability to measure liquids with very high viscosities with nearly no pressure loss.

The high accuracy provided by the OaP series Oval Wheel Meters ensure a maximum quality of the products being manufactured.

Oval Wheel Meters of the OaP series are manufactured with nominal widths of 25 to 400 mm. Depending on the nominal width they can be used for up to PN 100 with a maximum operating temperature of up to 290 °C.

For all Oval Wheel Meters a wide choice of accessories is available including mechanical, electrical and electronic transmitters. Their signals may be used for remote counting, flow measuring and flow control as well as for data processing systems. In addition, automatic batch control systems (with

appropriate valves) of the most varied constructions and working principles are available to facilitate dosage of media.

3. Working Principle and System Design

3.1 Measuring Principle

Oval Wheel Meters belong to the group of direct volumetric meters for liquids with movable partition walls (displacement flow meters). The Oval Wheel Meter consists of a measuring chamber housing with two pivoted oval wheels, which are toothed and roll off in counter-rotations around each other.

The diagram demonstrates the moving principle of the wheels during the flow measuring process.



Each revolution of the oval wheels displaces four discrete volumes of fluid (defined by the space between oval wheel and measuring chamber) through the counter. For measuring purposes the rotation of the oval wheel is transmitted from the pressure chamber to the outside via an electromagnetic sensor according to the Wiegand principle and processed to be available as standardized electrical signal or counter display.



3.2 System design

The Oval Wheel Meter with Universal Smart Transmitter (UST) consists of the following components:

Transducer:

Measuring of the volumetric flow and the volume of liquids is performed by the Oval Wheel Meter.

Pulse pick-up AG 19 and AG 20:

Pulse pick-up AG 19 resp. AG 20 are employed to control electro-mechanical counters, read-out devices, recorders, regulators, electronic counters, data processing equipment, as well as for remote counters for printing engines using step motors. They are approved for use in oval wheel counters for fiscal metering purposes. However, pulse pick-up model AG 19 may only be used for internal metering purposes (Number of approval AG 19: 411.007; AG 20: 411.005).

Pulse pick-up AG 45:

The pulse pick-up AG 45 is employed to control electro-mechanical counters, read-out devices, recorders, regulators, electronic counters, data processing equipment, as well as for remote counters for printing engines using step motors. They are approved for use in oval wheel counters for fiscal metering purposes (Number of approval AG 45: 5.552/88.08).

Single Pointer Indicator E:

The single pointer indicator E displays the volume flow mechanically. The device is equipped with a six digit roller set (without reset). The single pointer indicator can be combined with the above mentioned pulse pick-up.

Double Pointer Indicator D:

The double pointer indicator D displays the volume flow mechanically. The device is equipped with a six digit roller set (with zeroing lever). The double pointer indicator can be combined with the above mentioned pulse pick-up.

Roller Counter M5 and further models of this type:

The roller counters M5, M5B, M5V and M5BV display the volume flow. They can be equipped with receipt printers and valve control. They can be supplied with the actuation device at the bottom (rotating), upright or diagonal. With the actuation device at the bottom, several roller counters may be mounted above the oval wheel meter. All models are available with an upright or sloping face.

4. Input

4.1 Measured value

Volume and volumetric flow

4.2 Measuring range

Typw	DN	Flowrate Q _{max} l/min	Ranges at viscosity	< 0.3 mPa·s		0.3-1.5 mPa·s		1.5-150 mPa·s		upto 350 mPa s		upto 1000 mPa·s		upto 3000 mPa·s	
				l/min	m³/h	l/min	m³/h	l/min	m³/h	l/min	m³/h	l/min	m³/h	l/min	m³/h
OaP 5	25	50	min	8	0.5	5	0.3	5	0.3	2.5	0.15	1.25	0.075	0.45	0.027
			max	40	2.5	50	3	50	3						
			continuous			33	2	45	2.7	25	1.5	12.5	0.75	4.5	0.72
			batching	16	1.0	45	2.7	50	3						
OaP 10	25	100	min	16	1.0	10	0.6	10	0.6	7	0.42	3.5	0.20	1.2	0.072
			max	80	5.0	100	6	100	6						
			continuous			66	4	90	5.4	70	4.2	35	2.0	12	0.72
			batching	33	2.0	90	5.4	100	6						
OaP 50	50	300	min	50	3.0	30	1.8	30	1.8	18	1.08	9.0	0.54	3	0.18
			max	250	15	300	18	300	18						
			continuous			200	12	270	16.2	180	10.8	90	5.4	30	1.8
			batching	100	6	270	16.2	300	18						
OaP 125	65	700	min	100	6	70	4.2	70	4.2	60	3.6	40	2.4	15	0.9
			max	500	30	700	42	700	42						
			continuous			420	25.2	525	31.5	600	36	400	24	150	9
			batching	200	12	560	33.6	630	37.8						
OaP 250	80	1200	min	200	12	120	7.2	120	7.2	100	6	60	3.6	30	1.8
			max	1000	60	1200	72	1200	72						
			continuous	400	24	720	43.2	1000	60	1000	60	600	36	300	18
			batching	500	30	960	57.6	1200	72						
OaP 600	100	3000	min	400	24	250	15	250	15	200	12	150	9	75	4.5
			max	2000	120	3000	180	3000	180						
			continuous	800	48	1650	100	2500	150	2500	150	1500	90	750	45
			batching	1000	60	3000	180	3000	180						
OaP 1200	150 6"	5000	min	800	48	500	30	500	30	400	24	250	15	120	7.2
			max	4000	240	5000	300	5000	300						
			continuous	1600	96	2500	150	3500	200	4000	240	2500	150	1200	72
			batching	2000	120	4000	240	4000	240						
OaP 2000	200 8"	8000	min	1300	80	800	48	800	48	660	40	400	24	200	12
			max	6500	400	8000	480	8000	480						
			continuous			4000	240	5500	320	6600	400	4000	240	2000	120
			batching	2600	160	5000	300	6600	400						
OaP 3200	300 12"	12000	min	2000	120	1200	72	1200	72	1000	60	600	36	300	18
			max	10000	600	12000	720	12000	720						
			continuous			6000	360	8000	480	10000	600	6000	360	3000	180
			batching	4000	240	8000	480	10000	600						
OaP 4000	400 16"	20000	min	3200	200	2000	120	2000	120	1500	90	1000	60	400	24
			max	16000	1000	20000	1200	20000	1200						
			continuous					13500	800	15000	900	10000	600	4000	240
			batching	6600	400	10000	600	15000	900						

Measuring ranges for cold water: column 0.3-1.5 mPa·s

For continuous operation apply 50%

and for max. flow rate resp. batching

70% of the line 2 (max)

> 150 mPa·s special toothed

Oval wheels are special toothed for cast wheels OaP 10 - 4000

Measuring ranges for hot water: column < 0.3 mPa·s

< 0.3 mPa·s line min. to continuous.

5. Output

5.1 Output Signal

5.1.1 Pulse pick-up AG 19, AG 20 and AG 45

AG 19 and AG 20

Technical Data

number of slots	1/2/10/20/32
max. revolutions per minute	350/min
max. pulse frequency	187 Hz depending on counter type
allowed ambient temperature	-25 to + 90°C
housing protection type	IP 54 (DIN 40 050)
Control head protection type	IP 67 (DIN 40 050)
Ex-protection	 II 2G Ex ia IIC T6
Connection of external devices	in compliance with DIN EN 60947-5-6 (NAMUR) and Ex-approval

oval wheel meter data					pulse pick-up frequency in relation to Qnominal							
					≤10 HZ for: remote metering				> 10 Hz for: regulation, display recording etc.			
serie	DN	Q _{nenn}	nAG	Anzeige Zählwe r k	number of slots in the flag disc							
					1	2	10	10	20	32		
	mm	l min	U min	l/m³	Imp. l	1) s	Imp.1) l	Imp.1) s	Imp.1) l	Imp.1) s	Imp.1) l	Imp.1) s
OaP 2	25	30	3 30 300	10 l	0,1 10		1 10	50 100	100 200	160 320		
OaP 5	25	50	50 250	1 l	1		10	41,7 50	83,3 100	26,7 133	32 160	
			5 50 250	10 l	0,1		1 10	41,7 50	83,3 100	133 160		
OaP 10	25	100	10 100	10 l	0,1		1	16,6 10	33,3 20	53,3 32		
OaP 50	50	300	30 300	10 l	0,1		1	50 10	100 20	160 32		
			3 30 300	100 l	0,01		0,1 1	50 10	100 20	160 32		
OaP 125	65	700	7 350	100 l	0,01		0,1	58,3 5	117 10	187 16		
OaP 250	80	1200	12 120	100 l	0,01		0,1	20 1	40 2	64 3,2		
OaP 600	100	3000	30 300	100 l	0,01		0,1	50 1	100 2	160 3,2		
			3 30 300	1 m³	0,001		0,01 0,1	50 1	100 2	160 3,2		
OaP 1200	150	5000	50 250	100 l	0,01		0,1	41,7 0,5	83,3 1	133 1,6		
			5 50 250	1 m³	0,001		0,01 0,1	41,7 0,5	83,3 1	133 1,6		
OaP 2000	200	8000	8 80	1 m³	0,001		0,01	13,3 0,1	26,7 0,2	42,7 0,32		
			8 80	10 m³			0,01	13,3 0,1	26,7 0,2	42,7 0,32		
OaP 3200	300	12000	12 120	1 m³	0,001		0,01	20 0,1	40 0,2	64 0,32		
			1,2 12 120	10 m³	0,0001		0,001 0,1	20 0,1	40 0,2	64 0,32		
OaP 4000	400	20000	20 200	1 m³	0,001		0,01	33,3 0,1	66,7 0,2	107 0,32		

1) exact value is recorded in the calibration data sheet after the calibration

AG 45 with pre-amplifier PV11

Technical Data

number of control wires	100
max. revolutions per minute	285/min
max. pulse frequency	475 Hz depending on counter type
Housing protection type	IP 65 (EN 60529)
Ex-protection	 II 2G Ex ib IIC T6/5/4
connection of external devices	in compliance with DIN EN 60947-5-6 (NAMUR) and Ex-approval

Temperatures and Ex-protection temperature classes

without temperature extension		
class	T _U	T _{media}
T6	60°C	60°C
minimum	-40°C	-40°C

for all classes

with temperature extension		
class	T _U	T _{media}
T3	70°C	170°C
T4	70°C	135°C
T5	70°C	100°C
T6	60°C	60°C
minimum	-40°C	-60°C
Temperature extensions must protrude in full length from the thermal insulation!		

für alle Klassen

The Wiegand-pre-amplifier PV 11 in connection with pulse pick-up AG 45 is designed to sense the volume pulses in oval wheel counters. Being a category 2G device it may be employed in areas of explosion hazard zone 1.

The Wiegand sensor coils of the above mentioned pulse pick-up types are “simple electrical devices” as defined by EN 60079-11:1997, sections 3.21 and 12.2.1. The explosion protection approval for the Wiegand-pre-amplifier PV 11 is thus applicable for the entire meter using one of these pulse pick-up.

The needle pulses generated in the sensor head due to the Wiegand effect are transformed during the pick-up stage by the secondary multi vibrator in pulses of 500 milliseconds width. Then follows a separation into two independent NAMUR switching-stages with signals of 180° phase shift.

Pulse Pick-up AG 45						
oval wheel meter data			high-frequency output for : regulation, test loops etc.			
type	DN	Q_{max}	nAg	display counter	number of pulses 100	
	mm	$\frac{l}{min}$	$\frac{U}{min}$	l / m^3	Imp. ¹⁾ $\frac{—}{s}$	Imp. ¹⁾ $\frac{—}{l}$
OaP 2	25	30	300	$\frac{1 l}{10 l}$	509	1000
OaP 5 OI 5	25	50	$\frac{250}{250}$	$\frac{1 l}{10 l}$	417	500
OaP 10	25	100	100	10 l	167	100
OaP 50	50	300	$\frac{300}{300}$	$\frac{10 l}{100 l}$	500	100
OaP 125	65	700	350	100 l	583	50
OaP 250	80	1200	120	100 l	200	10
OaP 600	100	2850	$\frac{285}{285}$	$\frac{100 l}{1 m^3}$	475	10
OaP 1200 and 1200.1	150	5000	$\frac{250}{250}$	$\frac{100 l}{1 m^3}$	417	5
OaP 2000	200	8000	$\frac{80}{80}$	$\frac{1 m^3}{10 m^3}$	133	1
OaP 3200	300	12000	$\frac{120}{120}$	$\frac{1 m^3}{10 m^3}$	200	1
OaP 4000	400	20000	$\frac{200}{200}$	$\frac{1 m^3}{10 m^3}$	333	1

1) exact value is recorded in the calibration data sheet after the calibration

5.1.2 Mechanical Counters of the M5 Series

Roller Counter M5

The device is equipped with a five-digit roller set, which counts and displays the units of measurement. A sixth roller is covered. When the measuring process has been completed and the zero re-set lever has been operated, the cover opens and the value after the dash of the fifth roller is shown as a digit. After the measured value has been read out, the zero re-set lever is operated again. The rollers are reset to zero and the sixth digit is covered again. The device is ready for further measurement. An eight-digit totalizer, which cannot be re-set, adds all values displayed on the roller set at the same time.

Roller Counter M5B with Printer

This device is used where a print-out is required in addition to the display of the quantity delivered. After any given quantity has been delivered, the re-set lever is operated. The quantity in the roller counter is now transferred to the printer and printed out on the inserted receipt. Zeroing of the combination device is also done by operating the lever. During the printing sequence, the lever is locked.

Roller Counter M5V with Pre-Setting Device

The attachment of the pre-setting device allows the pre-setting and delivery of a five-digit quantity. It is attached to the meter M5, which is described above. Entering of the quantity is done with push-buttons after operating the zeroing lever (red marking). The setting level always corresponds to one-tenth of the cycle value of the fastest moving roller in the M5 roller counter. The set value remains during the delivery. Switching-off is performed in four stages with the numerical values of 20, 10, 3 and when the set value has been reached. Switching can be done on the right or left side of the housing. The pre-set value is preserved. This is important for the filling of cans or drums. There is a

stop button to interrupt the measuring process. By pulling the start lever again the measurement may be completed.

Roller Counter M5BV with Printer and Pre-Setting Device

The roller counter M5, printer B, and pre-setting device V is a combination device and placed in one housing. Measured quantities are read out on the roller counter M5, the preparation of a printed card for the measured values are printed out in printer B, the desired quantity is pre-set in the quantity pre-setting device V.

IG 2 (Pulse pick-up, 2 Channels)

for roller counters M5, M5B, M5V and M5BV

The above mentioned roller counters can be supplied with an integrated two-channel pulse pick-up. Two slot initiators of the type SJ 3,5-N ( II 2G Ex ia IIC T6) in connection with a lug disc (10 lugs) form the pulse pick-up system with an intrinsically safe control loop according to NAMUR. It is placed in the housing of the counter and driven by the coupling gearwheel. It is equipped with a reverse-run safety mechanism, which ensures that no pulses are delivered when the counter is reversing. For each scale of the fastest counter roller in the M5 roller counter one pulse is triggered per transmitter. Both pulses are delivered delayed in phase so that the second pulse is triggered in the mid of the pulse length of the first pulse.

Optionally a linking switch (KS), designed as a proximity switch according to Namur (Typ NJ 1.5-6.5-N ;  II 2G Ex ia IIC T6)) can be added.

The connecting wire is to be fixed onto the terminal box at the back of the housing.

The electrical connection data for the pulse pick-up and the linking switch are listed on the type plates on the housing.

The value of the pulse is 1/100th of the rotation value of the fastest counter roll.

KS (Linking Switch, Electr.)

for roller counters M5, M5B, M5V and M5BV

KSP (Linking Switch, Pneum.)

for roller counters M5B and M5BV

These additional devices are used as signal output for the operational status of the roller counter. Between the red and green marks (read out, pressure and zero position) an electrical respectively pneumatic signal is provided for the total duration. This signal may be used to stop the delivery (valve) or as an acoustic respectively visual signal. Thus unwanted delivery during the "red-phase" of the counter can be prevented or at least identified.

KS: electrical quick brake switch, Ex-protected (Ex) d3nG5, 250 V ~ 5 A, 250 V-0,4 A. Mounted in the housing onto the right side plate of roller counter M5, operated by the disconnecting coupling. Optional a proximity switch (intrinsically safe) can be provided.

KSP: Pneumatic 3/2 distributing valve; air inlet max. 8 bar; temperature range 10 to + 60°C. air inlet connections at the back of the M5B: air inlet and control air R 1/8"-female thread, mounted into the printer, operated by printing roller.

Type	Roller counter M5					Resettable Printer B		Resettable counter V	
	Resettable counter			Roller counter		Final value	Pressure level	Scale	Amount
	Final value	Starting roller 1 rotation	Starting roller smallest scaling	Final value	Smallest possible value display				
OaP 5 OaP 10 OaP 50	99999 l	10 l	0.1 l	9999999 l	1 l	99999.9 l	0.1 l	1 l	99999 l
OaP 125 OaP 250 OaP 600	999.99 m³	0.1 m³	0.001 m³	999999.99 m³	0.01 m³	999.999 m³	0.001 m³	0.01 m³	999.99 m³
OaP 1200	9999.99 m³	1 m³	0.01 m³	9999999.9 m³	0.1 m³	9999.99 m³	0.01 m³	0.1 m³	999.9 m³
OaP 2000	9999.9 m³	1 m³	0.01 m³	9999999.9 m³	0.1 m³	9999.99 m³	0.01 m³	0.1 m³	999.9 m³
OaP 3200	9999.9 m³	1 m³	0.01 m³	9999999.9 m³	0.1 m³	9999.99 m³	0.01 m³	0.1 m³	999.9 m³
OaP 4000	99999 m³	10 m³	0.1 m³	99999999 m³	1 m³	99999.9 m³	0.1 m³	1 m³	99999 m³

Counter data

5.1.3 Mechanical Single Pointer Indicator E and Double Pointer Indicator D

Both indicators (E and D) are provided with a counter that is not re-settable, so that continuous adding up (adding-up roller counter with 6 digit rollers). The double pointer indicator can optionally be equipped with a re-settable counter.

The counter head is mounted vertically, horizontally or diagonally.

Type	Single Pointer Indicator E				Double Pointer Indicator D			
	Pointer Indicator		Roller Counter		Pointer Indicator		Roller Counter	
	Display	Smallest possible value display	Final value	Smallest possible value display	Dial calibration	Smallest possible value display	Final value	Smallest possible value display
OaP 5	0-1 l 0-10 l	0.01 l 0.1 l	99999 l	1 l 10 l	0-1 l; 0-50 l 0-10 l; 0-500 l	0.01 l 0.1 l	99999.9 l	0.1 l 1 l
OaP 10	0-10 l	0.1 l	999990 l	10 l	0-10 l; 0-500 l	0.1 l	999999 l	1 l
OaP 50	0-10 l 0-100 l	0.1 l 1 l	999990 l 9999990 l	10 l 100 l	0-1 l; 0-500 l 0-100 l; 0-5000 l	0.1 l 1 l	999999 l 9999990 l	1 l 10 l
OaP 125	0-100 l	1 l	9999900 l	100 l	0-100 l; 0-5000 l	1 l	9999900 l	10 l
OaP 250	0-100 l 0-1 m³	1 l 0.01 m³	9999900 l 99999 m³	100 l 1 m³	0-100 l; 0-5000 l 0-1 m³; 0-50 m³	1 l 0.01 m³	9999900 l 99999.9 m³	10 l 0.1 m³
OaP 600	0-1 m³	0.01 m³	99999 m³	1 m³	0-1 m³; 0-50 m³	0.01 m³	99999.9 m³	0.1 m³

Counter data

5.2 Electrical and Thermal Safety Specifications

see attached „EG-Baumusterprüfbescheinigungen“ (EC Type Examination)

6. Characteristic Parameter

6.1 Reference conditions

All oval wheel counters are calibrated at test benches approved for fiscal metering. Pressure: 2 to 7 bar, temperature: 20°C to 30°C

6.2 Measuring accuracy

Lin. $\pm 0.05\%$ to $\pm 0.3\%$ of the measured value (depending on product characteristics and measuring range)

6.3 Repeatability

< 0.02%

6.4 Influence of media temperature

negligible

7. Operating conditions

7.1 Installation conditions

7.1.1 Installation instructions

Warning!

Before mounting and operating the device, carefully read the installation instructions.
Before mounting or disassembling the device, **depressurize** and **cool down the system**.

7.1.1.1 General information

- Bopp & Reuther Oval Wheel Meters are precision flow meters. Inlet and outlet are covered with protective caps against foreign substances. Only remove caps immediately before putting the device into operation.
- Observe the operating data marked on the oval wheel, the order confirmation and the configuration data sheet. If you want to use the device under different operating conditions consult Bopp & Reuther Messtechnik GmbH indicating the factory number.
- Install the Oval Wheel Meter in the pressure pipe behind the pump (approximately 3 m liquid column pressure drop for nominal flow rate).
- Install the Oval Wheel Meter in such a way that it remains filled with liquid also in non-operating condition.
- To avoid measuring inaccuracies due to gas bubbles or contamination preventive measures must be taken (e.g. gas separator or type N strainer).
- Oval Wheel Meters intended for liquid food products must be cleaned thoroughly before putting them into operation (see Maintenance and Cleaning).
-

7.1.1.2 Installation

- Flush and purge the pipe. When doing so, replace the Oval Wheel Meter with a suitable piece of piping.
- Do not remove the caps on the in- and outlet of the Oval Wheel Meter until the device is being installed to prevent ingress of foreign substances.
- The flow direction is indicated by an arrow on the housing of the Oval Wheel Meter.
- The housing cover of the Oval Wheel Meter is to be placed vertically so that the axes of the Oval Wheel are in a horizontal position independent of the position of the pipe.
- The Oval Wheel Meter must be installed free from strain.

The sensor can be used together with the pulse pick-up series AG 19/20 and AG 45 according to the protection type „intrinsically safe“ in the Ex-area.

AG 45 with pre-amplifier PV11:  II 2G Ex ib IIC T6/5/4

AG 19, AG 20 and IG 2:  II 2G Ex ia IIC T6

Linking Switch KS:  II 2G Ex ia IIC T6

EMV protection can only be granted with shielded wires. The shielding must be applied at the metal-PG-connecting bolts.

7.1.2 Start-up Instructions

Important

- **Start-up the Oval Wheel Meter slowly increasing the flow quantity.**
- **For systems measuring viscous fluids which have to be heated the heater of the Oval Wheel Meter, the strainer and the pipe are to be switched on well ahead in time; only then the Oval Wheel Meter is to be started-up while the flow quantity is slowly increased.**

7.2 Environmental Conditions

7.2.1 Ambient Temperature

OaP with AG 19 or/and AG 20: -25 to +90°C
 OaP with AG 45: -40 to +70°C
 OaP with M5 series counter: -20 to +60°C
 OaP with pointer indicator: -20 to +110°C

7.2.2 Storage Temperature

OaP: -25° C to +100° C
 Pulse pick-up: -25° C to +70° C
 Roller counter M5: -20° C to +70° C
 Pointer indicator: -20° C to +110° C

7.2.3 Type of Protection

OaP with AG 19 or/and AG 20: IP54
 OaP with AG 45: IP54
 OaP with roller counter of the M5 series: IP54
 OaP with pointer indicator: IP54
 according to IEC 529 / EN 60529

7.2.4 Electromagnetic Compatibility

Only for devices with pulse pick-up:

DIN EN 61000-6-3, DIN EN 61000-6-2

Electromagnetic compatibility can only be warranted when the electronics housing is closed.

7.3 Process conditions

7.3.1 Operating temperature

Type	Material			Pulse Pick-up		Roller Counter M5	Pointer Indicator E/D	Extension	Special-tolerance	Special-magnet-coupling	Operating Temperature in °C
	A	D	B	AG19 AG20	AG45						
Meter upto PN 40	2	2	2								
OaP 5	•	•	•				•	•		•	0-110
Oap 10	•	•	•				•	•		•	0-290
OaP 50	•	•	•	•							0-90
OaP 125	•	•	•		•						0-60
OaP 250	•	•	•	•				•			0-110
OaP 600	•	•	•		•			•			0-110
OaP 1200	•	•	•	•				•		•	0-290
OaP 2000	•	•	•		•			•		•	0-290
OaP 3200	•	•	•			•					0-60
OaP 4000	•	•	•			•		•			0-290
OaP 125 OaP 250 OaP 600 OaP 1200	•	•	•				•				0-90
	•	•	•				•		•		0-110
	•	•	•				•	•	•	•	0-230
	•	•	•	•							0-90
	•	•	•		•						0-60
	•	•	•	•				•	•		0-110
	•	•	•		•			•			0-90
	•	•	•		•			•	•		0-110
	•	•	•	•				•	•	•	0-230
	•	•	•		•			•	•	•	0-230
	•	•	•			•					0-60
	•	•	•			•			•		0-110
OaP 600 OaP 1200 OaP 2000	•	•	•				•				0-60
	•	•	•	•							0-60
	•	•	•		•						0-60
	•	•	•			•					0-60

Meter for operating temperature from 0 to -140°C for example high pressure version upon request

7.3.2 State of aggregation

Suitable for liquids

7.3.3 Viscosity

0.3 - 3000 mPa·s

7.3.4 Media temperature range

-10 to +170°C

7.3.5 Media pressure range

Depending on the material used (for materials see section 8.3.)

	OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
A2				PN 25 PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100				PN 25
D2	PN40 PN 100	PN40 PN 100	PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100	PN 25 PN40 PN 63 PN 100	PN 25 PN40	PN 25
B2						PN 25 PN40	PN 25 PN40	PN 25 PN40	PN 25 PN40	



Attention!

At temperatures higher than 50°C, the maximum pressure must be reduced according to the nominal pressure according to the tables "Pressure/temperature assignment of the flange standard DIN EN 1092

7.3.6 Flow rate range

Values in l/min

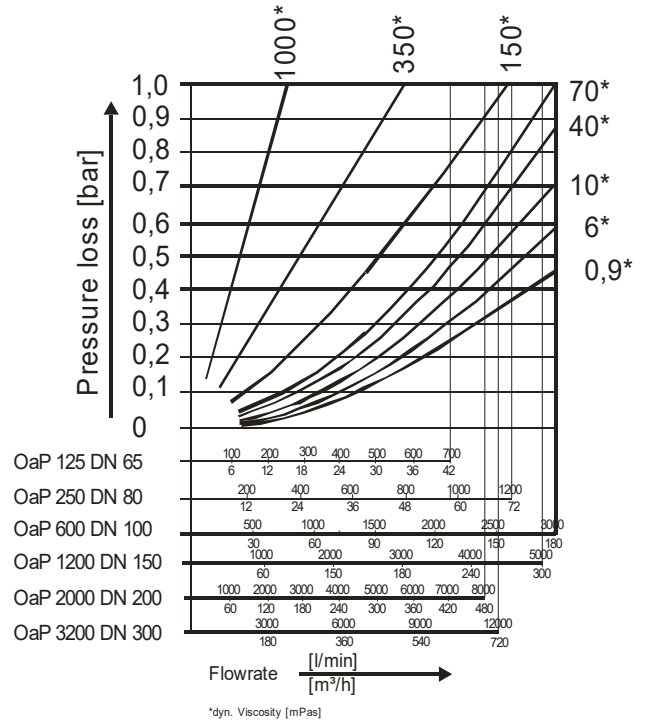
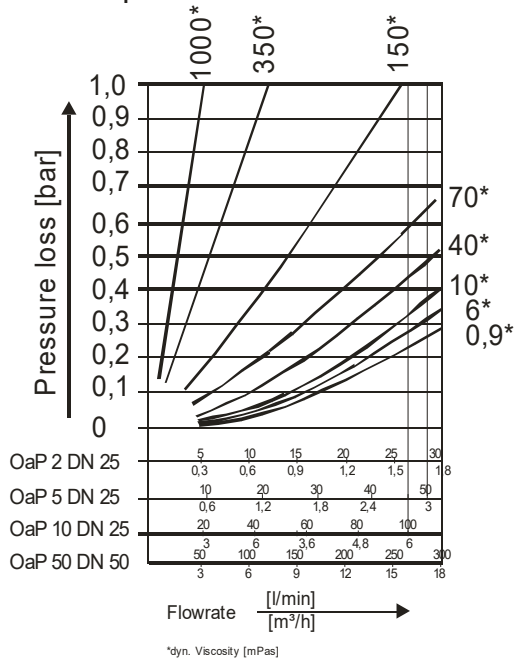
OaP 2	OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
30	50	100	300	700	1200	3000	5000	8000	12000	20000

7.3.7 Pressure loss

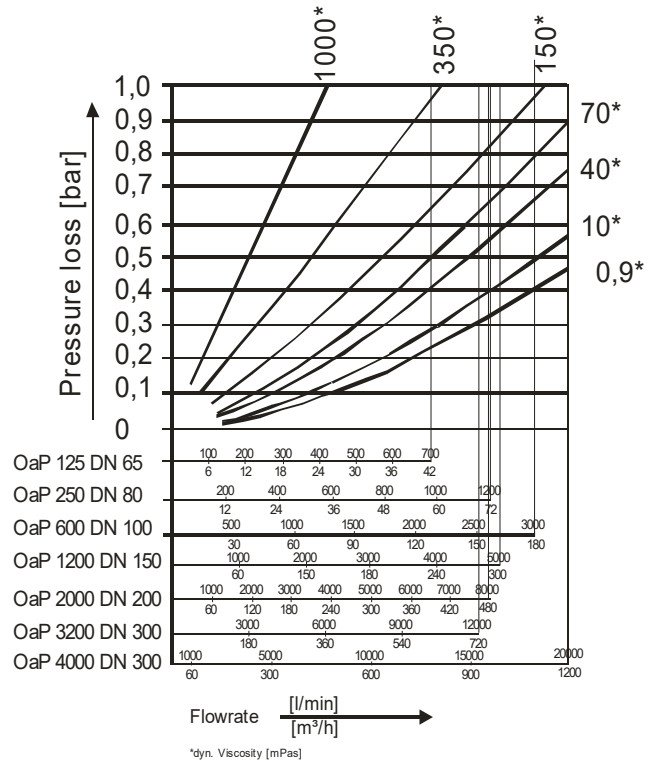
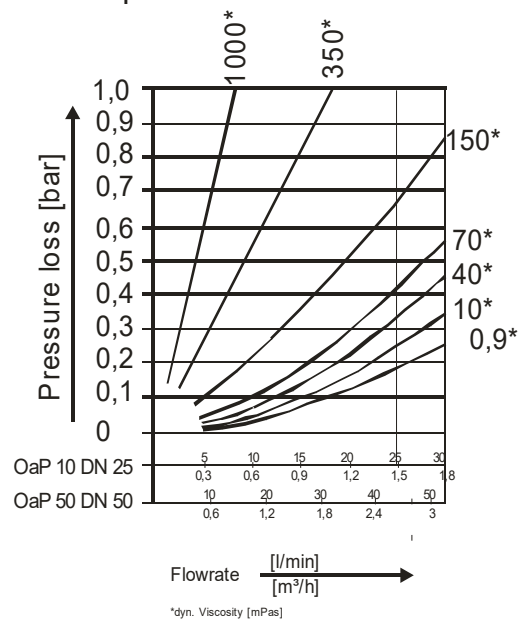
Value in bar for water

OaP 2	OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
< 0.3	< 0.3	< 0.25	< 0.3	< 0.25	< 0.4	< 0.45	< 0.45	< 0.35	< 0.35	< 0.45

Normal tooth profile



Special tooth profile



8. Construction details

8.1 Design/dimensions

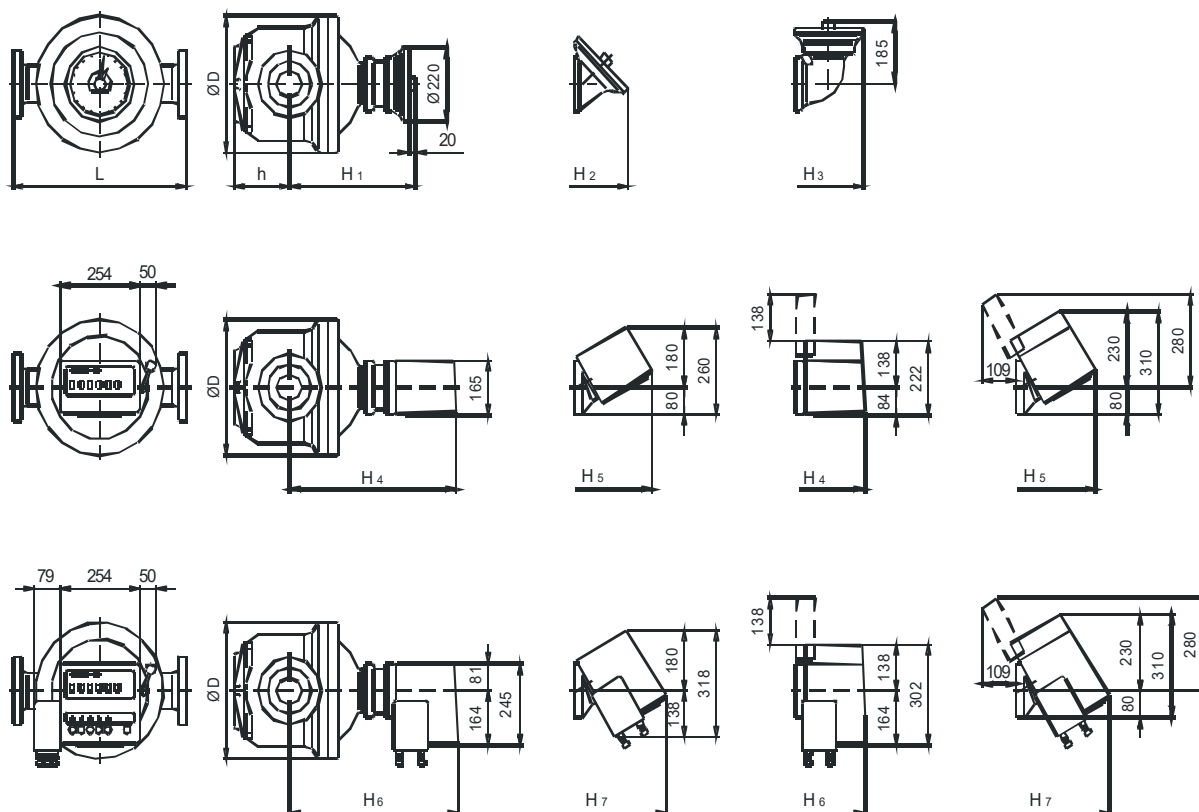
OaP 5 – 4000 with mechanical pointer indicator or roller counter M5 and optional pulse pick-up AG19, AG 20 or AG 45

PN 16,25,40

Type		OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
Dimensions	L	220	220	325	450	550	650	800	900	900	1200
	H1	231	300	327	354	394	441	-	-	-	-
	H2	314	383	410	437	477	524	-	-	-	-
	H3	359	428	455	482	522	569	-	-	-	-
	H4	364	433	460	487	527	574	627	763	971	1061
	H5	394	463	490	517	557	604	657	765	1001	1091
	H6	369	438	465	492	532	579	632	740	976	1066
	H7	439	508	535	562	602	649	702	810	1046	1136
	h	142	82	104	150	176	258	280	400	658	748
	ØD	144	165	260	320	405	480	614	665	665	665

PN 100

Type		OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200
Dimensions	L	250	310	400	500	600	700	900
	H1	369	367	394	421	461	508	-
	H2	452	450	477	505	544	591	-
	H3	497	495	522	549	589	636	-
	H4	502	500	527	554	594	641	964
	H5	532	530	557	584	624	671	724
	H6	507	505	532	559	599	646	699
	H7	577	575	602	629	669	716	769
	h	70	81	121	166	202	278	310
	ØD	150	223	292	345	440	505	665

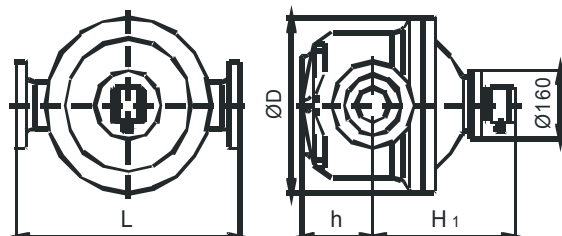


For counters with remote control, pulse pick-up AG 19/20/45 or extension dimensions H1 to H7 are:

- remote control + 42 mm
- pulse pick-up AG 19 + 115 mm
- pulse pick-up AG 20 + 115 mm
- pulse pick-up AG 45 + 115 mm
- extension + 300 mm

**Example: OaP 50 with double indicator D, extension,
pulse pick-up AG 19 and remote control
overall width $H'1+Z = 327+457= 784$ mm**

Dimensions of the Oval Wheel Meters of the OaP series with pulse pick-up (no other accessory)



PN 16, 25, 40

Type		OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
Length	L	220	220	325	450	550	650	800	900	900	1200
Dimensions	H	248	317	344	371	411	458	-	-	-	-
	H	142	82	104	150	176	258	280	400	658	748
	ØD	144	165	260	320	405	480	614	665	665	665

PN 100

Type		OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600
Length	L	220	220	325	450	550	650
Dimensions	H	386	384	411	438	478	525
	h	142	82	104	150	176	258
	ØD	144	165	260	320	405	480

8.2 Weight

PN 16,25,40

Type		OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
Weight	E, D	19	27	61	80	155	260	-	-	-	-
	M5	25	33	67	86	161	266	515	900	1230	1930
	M5B	28	36	70	89	164	269	518	903	1233	1933
	M5V	32	40	74	93	168	273	522	907	1237	1937
	M5BV	35	43	77	96	171	276	525	910	1240	1940
	AGxx	20	28	62	81	156	261	510	895	1225	1925

PN 100

Type		OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200
Weight	E, D	28	53	98	140	260	440	-
	M5	34	59	104	146	266	446	875
	M5B	37	62	107	149	269	449	878
	M5V	41	66	111	153	273	453	882
	M5BV	44	69	114	156	276	456	885
	AGxx	29	54	99	141	261	441	870

8.3 Material

	A2	D2	B2
Measuring chamber	Brass	Cast iron	Brass
Housing	Cast steel	Cast steel	Cast steel
Oval wheels	Bronze	Cast iron	Light alloy
Bearing	Hard carbon	Cast iron	Hard carbon

8.4 Process connection

OaP 2	OaP 5	OaP 10	OaP 50	OaP 125	OaP 250	OaP 600	OaP 1200	OaP 2000	OaP 3200	OaP 4000
25	25	25	50	65	80	100	150 6"	200 8"	300 12"	400 16"

8.5 Electrical Connection

Electrical connections are housed in the terminal box.

AG 19 and AG 20

devices to be connected	acc. to DIN EN 60947-5-6 (NAMUR) and Ex-approval
control line	up to 50 Ohm/wire AG 19: 2-wires, shielded AG 20: 4-wires, twisted in pairs
line connection	M 20x1,5

AG 45 with pre-amplifier PV11

devices to be connected	acc. to DIN EN 60947-5-6 (NAMUR) and Ex-approval
control line	up to 50 Ohm/wire 2-wires, shielded (channel I+II 4-wires), twisted in pairs; shield in blue colour
line connection	M 20x1,5

IG 2

devices to be connected	acc. to DIN EN 60947-5-6 (NAMUR) and Ex-approval
control line	up to 50 Ohm/wire 2-wires, shielded
line connection	M 20x1,5

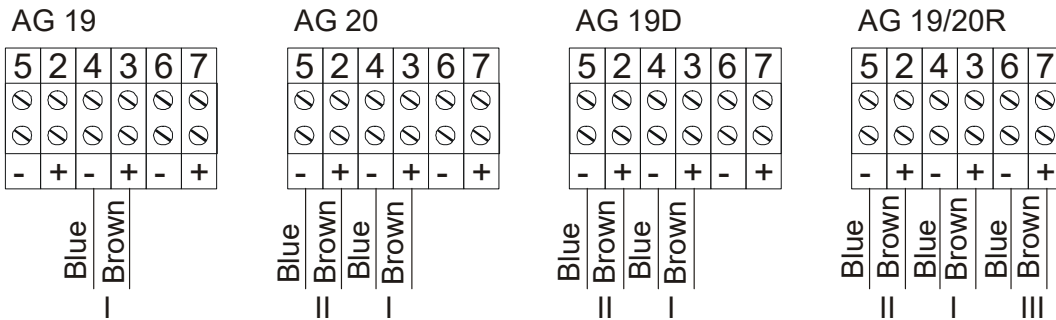
KSN

devices to be connected	acc. to DIN EN 60947-5-6 (NAMUR) and Ex-approval
control line	up to 50 Ohm/wire 2-wires, shielded
line connection	M 20x1,5

Attention

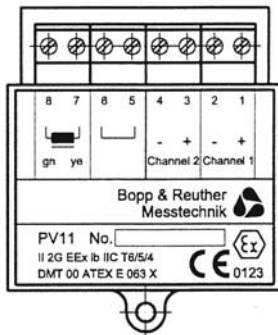
When installed in areas with potentially explosive atmospheres observe the respective country specific regulations (for Germany: EN 60079-14 resp. VDE 0165).

Terminals for AG 19 and AG 20



At AG 19/20R: I: Main Channel, II: Comparison Channel, III: Back Flow

Terminals for AG 45 with Pre-amplifier Pv11



At the Terminals 8 and 7 the Sensor is connected internally.
At 1-channelled operation the terminals 1 and 2 are to be allocated.
The signal from channel 2 is opposite channel 1 inverted.

Bopp & Reuther Messtechnik 2elektr. Impulsgebersysteme-IG2085 1 Imp./Teilstrich, mit Rücklaufsperr Eingebaut: NAMUR-Initiator P+F PTB 99 ATEX 2219 X II 2G EEIa IIC T6 5552 8004 G1 $\frac{BN(2)}{BU(5)}$ $\frac{+}{-}$ G2 $\frac{BN(3)}{BU(4)}$ $\frac{+}{-}$	2 electr. Pulse pick-up systems - IG2085 1 Pulse / scale line with return stop integrated: NAMUR-Initiator P+F BN = Brown BU = Blue
Bopp & Reuther Messtechnik Näherungsschalter n. NAMUR U8V=(Ri≈1KΩ) Signalgeber:KSN $\leq 1\text{mA}$ $\geq 3\text{mA}$ $\frac{BN(7)}{BU(6)}$ $\frac{+}{-}$	Proximity Switch n. NAMUR Transducer : KSN BN = BROWN BU = BLUE

9. Display

Single Pointer Indicator E:

The Single Pointer Indicator E displays the volume mechanically. This series is equipped with an adding-up roller counter with 6 digits roller (no zeroing lever). The Single Pointer Indicator may be combined with the pulse pick-ups described above.

Double Pointer Indicator D:

The Double Pointer Indicator D displays the volume mechanically. This series is equipped with an adding-up roller counter (with zeroing lever). The Double Pointer Indicator may be combined with the pulse pick-ups described above.

Roller Counters of the M5 Series:

The Roller Counters M5, M5B, M5V and M5BV display the volume of the media and may be equipped with a receipt printer and valve control. They can be supplied with the actuation device at the bottom (rotating), upright or diagonal. With the actuation device at the bottom, several roller counters can be mounted above the oval wheel meter. All models are available with an upright or sloping face.

9.1 General

The counters are adjusted to the operation conditions specified in the order form. The pre-set values are listed in the configuration sheet attached.

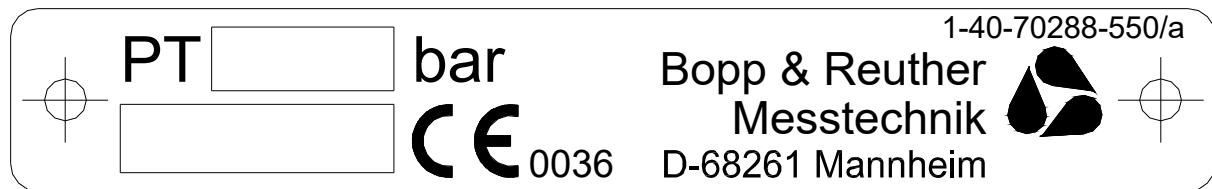
10. Safety Information

1. Oval wheel meters are high-precision and reliable volumetric measuring devices. They should only be used for their intended purpose. Always observe the pressure and temperature limits stated on the type plate (see Appendix), as well as all other technical data and safety information during device installation, start-up and operation.
2. Always observe national and international regulations concerning the operation of devices and systems under pressure.
3. Prior to installation, the operator has to ensure that the pressure bearing parts have not been damaged during transportation.
4. The devices have to be installed, operated and serviced by qualified personnel. The operator has the responsibility to ensure that the personnel have received sufficient and appropriate training. In case of doubt, please contact the manufacturer.
5. Only measure liquids to which the materials of the pressure bearing elements are resistant.
6. Carefully select gaskets or sealing elements according to the operating instruction specifications.
7. The tightening torques for the screw connections at the cover and lower part of the housing, as well as for the flange connections in the pipework are available on request.
8. The sensors (for the pulse pick-up and, if necessary, for the temperature measurement) should only be replaced once it has been ascertained that the meter is depressurised.
9. Type plates with pressure relevant information

Additional type plate at the flange connection with CE0036 mark.

The used abbreviations have the following meaning:

PT: Achieved test pressure and test date



D-67346 Speyer

Appendix

A. Troubleshooting / Error Detection

The Oval Wheel Meter including pulse pick-up and mechanical counters do not require servicing. If a malfunction or incorrect measuring occurs, check the installation conditions mentioned in chapter 7.1.

Warning!

When working on electrical connections, observe local regulations and all safety instructions in the operating instructions.

For Ex-devices all information and regulations from the Ex-documentation are to be observed in addition to the above. In the following possible malfunctions are described as well as necessary steps to eliminate them.

General:

If the reason for the malfunction cannot be identified ask Bopp & Reuther Messtechnik customer service department for help or send the device for repair to Bopp & Reuther Messtechnik (see appendix B2).

B Servicing, Cleaning and Repair / Hazardous Media

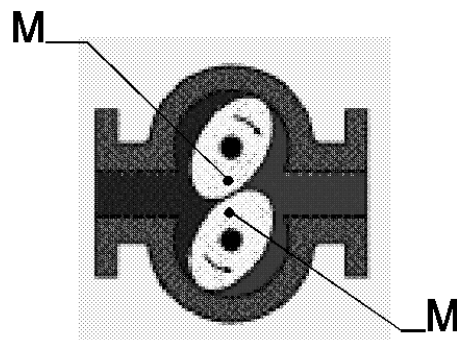
B.1 Servicing, Cleaning

If the Oval Wheel Meter will not be in operation for a longer period of time, it has to be dismantled, thoroughly cleaned and conserved with acid-free oil. Oval Wheel Meters used for liquid food may not be preserved in this way. In- and outlet are to be covered with caps. Make sure to store the Oval Wheel Meter in a dry room.

Cleaning of the Oval Wheel Meters used for liquid food

The oval wheels have to be dismantled if the pipes are flushed with hot water.

- Loosen tommy nut of the casing cover, lift casing cover with pressure screws, pull off oval wheels from axle, handle with great care, do not place on stone floors, use support made of wood or rubber material.
- When mounting, put on the oval wheels toothed in, i.e. in a way that the M marks on the wheel face face each other. Turn the oval wheel manually to make sure they are properly inserted (once). When inserting the gaskets, make sure it fits precisely.



B.2 Repair / Hazardous Media

Before sending the Oval Wheel Meter to Bopp & Reuther, make sure to observe the following:

- Attach a note describing the malfunction, state the application field and the chemical/physical properties of the media (please find the respective form in appendix C1).
- Remove all residues of the media and pay special attention to sealing grooves and slits. This is of extreme importance if the medium is hazardous to health, i.e. caustic, toxic, carcinogenic or radioactive etc.
- Please do not return the device if you are not perfectly sure that all media hazardous to health have been cleaned off.

Costs incurred due to inadequate cleaning of the device and possible costs for disposal and/or personal injuries (causticization etc.) will be billed to the operating company.

Please ask our customer service for help and advice if your Oval Wheel Meter does not work properly:

Bopp & Reuther Messtechnik GmbH Service Am Neuen Rheinhafen 4 67346 Speyer Tel.: +49 6232 657-420 Fax: +49 6232 657 561

C. Certificate of non-objection for contractor

Bopp Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4

67346 Speyer

Germany

BOPP & REUTHER
MESSTECHNIK 

Telefon: +49 (0) 6232 657 420

Fax: +49 (0) 6232 657 561

Mail: service@burmt.de

Web: www.bopp-reuther.de

DECLARATION ON CONTAMINATION OF PRODUCTS AND COMPONENTS

Please complete this form and return in advance by Fax to +49 (0) 6232 / 657 561 in order to receive an equipment return authorisation (ERA) number. No action to repair or examine the product will be done, until a valid declaration of contamination has been received.

ERA number: _____

Contact information

Company name + address

Contact person

Name: _____

Phone: _____

E-Mail: _____

Product information

Type: _____

Id. no.: _____

Serial no.: _____

Reason for return (e.g. calibration, repair). Please describe in detail.

Contamination information

The product was contaminated with:

☐

poisonous


☐

corrosive,
irritant


☐

flammable


☐

hazardous


☐

oxidizing


☐

cancer-causing,
health hazard


☐

explosive


☐

environmental
hazardous


☐

other: _____

The product was cleaned with: _____

Packaging and shipping Instructions

- remove any cables, connectors, separate filters and mounting materials
- double bag each item in suitable protective foil (sealed)
- transport in suitable shipping container (e.g. original B & R shipping container) and include a copy of this declaration form at
- the shipping documents to the outside

By signing this form you are accepting full responsibility for its contents and confirming that any decontamination has taken place in accordance with legal regulations.

Print name: _____

Date: _____

Legally valid signature: _____

D. Certificates

D.1. Explosions protection certificates

D.1.1 PV11: EC type examination certificate DMT 00 ATEX E 063 X

see Homepage: <https://www.bopp-reuther.de/en/download/> EC Type Ex-Approvals Bopp & Reuther Messtechnik

D.1.2 Slot-type initiators SJ (AG 19/20 und IG2): EC-Type-Examination Certificate PTB 99 ATEX 2219 X

see Homepage: <https://www.bopp-reuther.de/en/download/> EC Type Examination Certificate foreign companies

D.1.3 Cylindrical inductive sensors NJ (KSN): EC-Type-Examination Certificate PTB 99 ATEX 2048 X

see Homepage: <https://www.bopp-reuther.de/en/download/> EC Type Examination Certificate foreign companies

D.1.4 Miniature limit switch (KSE): EC-Type-Examination Certificate PTB 02 ATEX 1031 X

see Homepage: <https://www.bopp-reuther.de/en/download/> EC Type Examination Certificate foreign companies

D.2. Pressure Equipment Directive



ZERTIFIKAT
gültig bis: 22.07.2029
CERTIFICATE
valid until: 22.07.2029

EU-Baumusterprüfung (Modul B) - Baumuster - nach Richtlinie 2014/68/EU
EU Type examination (module B) - production type - according to Directive 2014/68/EU

Zertifikat-Nr.: Z-IS-AN1-MAN-19-07-2681356-23083220
Certificate No.:

Name und Anschrift des Herstellers: Bopp & Reuther Messtechnik GmbH
Name and address of manufacturer: Am Neuen Rheinhafen 4
67346 Speyer

Hiermit wird bescheinigt, dass das unten genannte Baumuster die Anforderungen der Richtlinie 2014/68/EU erfüllt.
We herewith certify that the type mentioned below meets the requirements of the Directive 2014/68/EU.

Prüfbericht Nr.: C E 0036
Evaluation report No.: P-IS-AN1-MAN-19-07-2681356-23083220

Geltungsbereich: Ovalradzähler der Typen OI, OUI, OaP, OuaP, OV, OK, OT, OKT, OF, OR, OC, OP, DN 50 - 400, PN 10 - 100
Scope of examination:

Fertigungsstätte: Bopp & Reuther Messtechnik GmbH
Manufacturing plant: Am Neuen Rheinhafen 4
67346 Speyer

Mannheim, 23.07.2019
(Ort, Datum)
(Place, date)

Echtheitsprüfung durch App TÜV SÜD Verify
Verification of Certificate by TÜV SÜD App Verify

Notifizierte Stelle, Kennnummer 0036
Notified Body, No. 0036
TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 München
DEUTSCHLAND

Dokument ID: 2681356Y8193f

TÜV SÜD Industrie Service GmbH
Zertifizierungsstelle für Druckgeräte
Ralf Brinkmann
+49 621 395-367

Seite 1 zum Zertifikat Nr. / Page 1 of the certificate No. Z-IS-AN1-MAN-19-07-2681356-23083220

ZERTIFIKAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ СЕРТИФИКАТ ◆ 認証証書 ◆ CERTIFICATE ◆ ZERTIFIKAT



Industrie Service

ZERTIFIKAT Certificate

**Konformität mit der Bauart (Modul C1)
nach Richtlinie 97/23/EG**
Conformity to Type (Module C1) according to Directive 97/23/EC

Zertifikat-Nr.: Z-IS-DDB-MAN-15-05-100067376-007
Certificate No.:

Gültigkeit / Validity: 10 Jahre / 10 Years

**Name und Anschrift
des Herstellers:**

Name and postal address of manufacturer:

**Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
D-67346 Speyer**

**Der Hersteller ist nach Prüfung der Voraussetzungen berechtigt, die von ihm im
Rahmen des Geltungsbereichs hergestellten Druckgeräte mit unserer Kenn-
nummer gemäß dem abgebildeten CE-Kennzeichen zu kennzeichnen:**

*The manufacturer is - after examination of the prerequisites - authorised to provide his pressure equip-
ment manufactured within the scope of the examination our identification number to the CE-mark as
illustrate:*

CE 0036

Prüfbericht Nr.:
Test report No.:

P-IS-DDB-MAN-15-05-100067376-009

Geltungsbereich:
Scope of examination:

**Durchfluss Messgeräte (Ovalradzähler
OI, OUI, OaP, OuaP, OV, OK, OT, Turbi-
nenradzähler RQ, Wirbeldurchflussmes-
ser VTX2, Kompaktblende Oriflow und
Oriflow PVDF, Filter (Na, NC, N, Nu)**

Fertigungsstätte:
Manufacturing plant:

**Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
D-67346 Speyer**

**Mannheim, 08. Juni 2015
(Ort, Datum)**
(Place, date)

*Bitte beachten Sie die Hinweise auf der zweiten Seite.
Please note the remarks on the second page..*



D.3. EU- Declaration of conformity

BOPP & REUTHER
MESSTECHNIK 

EU - Konformitätserklärung EU - Declaration of conformity UE - Déclaration de conformité

Hiermit erklärt der Hersteller in alleiniger Verantwortung, dass die nachfolgend bezeichnete Baueinheit den Anforderungen der zutreffenden EU-Richtlinien entspricht. Bei nicht mit uns abgestimmten Änderungen verliert diese Erklärung ihre Gültigkeit.

The manufacturer herewith declares under sole responsibility that the unit mentioned below complies with the requirements of the relevant EU directives. This declaration is no longer valid if the unit is modified without our agreement.

Par la présente, le fabricant déclare que les appareils décrits ci-dessous, correspondent aux exigences de la réglementation UE qui les concerne. Toute modification des appareils sans notre accord entraîne la perte de validité de cette déclaration de conformité

Hersteller Manufacture Fabricant	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 D-67346 Speyer
Bezeichnung Description Description	Ovalradzähler Ovalwheel meter Compteur à roues ovales
Typ, Modell Type, model Type, modèle	OI / OUI / OaP / OUaP / OK mit with avec UST, AG, MFE, IG, SE, KSE, KSN, NK

Richtlinie Directive Directive	2014/30/EU /UE Elektromagnetische Verträglichkeit Electromagnetic interference Compatibilité électromagnétique	L 96/79
Normen und normative Dokumente Standards and normative documents Normes et documents normatifs	EN 61000-6-2:2005 EN 61000-6-3:2011	

Richtlinie Directive Directive	2014/34/EU /UE Explosionsschutz Explosion protection Protection contre les explosions	L 96/309
Baumusterprüfbescheinigung Type examination certificate Certificat d'approbation de type	DMT 99 ATEX E 014 X	USTI
	DMT 00 ATEX E 025 X	USTD
	BVS 04 ATEX E 022 X	USTX
	DMT 00 ATEX E 063 X	AG43-45 (PV11)
	PTB 99 ATEX 2219 X	AG19-20, IG (SJ3,5-N)
	TÜV 15 ATEX 131621 X	AG01-08 (01-08)
	BVS 09 ATEX E 031 X	MFE1-3
	BVS 00 ATEX 2048 X	KSN (NJ1,5-6,5-N)
	PTB 02 ATEX 1031 X	KSE, NK (8064/21)
Notifizierte Stelle Notified Body Organisme Notifié	BVS, DMT: DEKRA EXAM	0158
	PTB	0102
	TÜV	0044
Normen und normative Dokumente Standards and normative documents Normes et documents normatifs	EN 60079-0:2012/A11:2013	USTI, USTD, USTX, PV11, SJ3,5-N, 01-08, MFE1-3, NJ1,5-6,5-N, 8064/21
	EN 60079-1:2014	USTD, USTX, 01-08, 8064/21
	EN 60079-11:2012	USTI, USTD, USTX, PV11, SJ3,5-N, MFE1-3, NJ1,5-6,5-N
	EN 60079-26:2015	USTI

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Z-ML-KE ORZ-OI-OAP-elektrisch-V12 2020-03-17

Richtlinie <i>Directive</i> Directive	2014/68/EU /UE Druckgeräte <i>Pressure equipment</i> Équipements sous pression	L 189/164
Konformitätsbewertungsverfahren / Zertifikat <i>Conformity assessment procedure / Certificate</i> Procédures d'évaluation de la conformité / Certificat	Modul B Z-IS-AN1-MAN-19-07-2681356-23083220 Modul C1 Z-IS-DDB-MAN-15-05-100067376-007	
Notifizierte Stelle <i>Notified Body</i> Organisme Notifié	0036 TÜV SÜD Industrie Service GmbH Dudenstraße 28, D-68167 Mannheim	
Normen und normative Dokumente <i>Standards and normative documents</i> Normes et documents normatifs	AD 2000 Regelwerk <i>AD 2000 Code</i> Code AD 2000	
Klassifizierung <i>Classification</i> Classification	Rohrleitungsteil <i>Pipe</i> Tuyauterie	
Fluid Kategorie ; Diagramm <i>Fluid category ; Diagramm</i> Dangerosité du fluide ; Tableau	Gruppe 1 ; Anhang II / 6 <i>Group 1 ; Attachment II / 6</i> Groupe 1 ; Appendice II / 6	
Angewandtes Konformitätsbewertungsverfahren <i>Conformity assesment procedure beeing used</i> Procédure d'évaluation de la conformité appliquée	Kategorie III <i>Category III</i> Catégorie III	

Die Angaben zur Richtlinie 2014/68/EU ist nur gültig für Druckgeräte die unter Artikel 4 Absatz 1 und 2 fallen, alle anderen unterliegen der guten Ingenieurspraxis nach Artikel 4 Absatz 3.

The information on Directive 2014/68 / EU is only valid for pressure equipment that falls under Article 4 Paragraph 1 and 2, all others are subject to good engineering practice according to Article 4 Paragraph 3.

Les informations sur la directive 2014/68 / UE ne sont valables que pour les équipements sous pression relevant de l'article 4, paragraphes 1 et 2, tous les autres sont soumis aux bonnes pratiques d'ingénierie conformément à l'article 4, paragraphe 3.

Richtlinie <i>Directive</i> Directive	2011/65/EU /UE Beschränkung gefährlicher Stoffe <i>Restriction of hazardous substances</i> Limitation de substances dangereuses	L 174/88
Normen und normative Dokumente <i>Standards and normative documents</i> Normes et documents normatifs	EN 50581:2012	

Ort, Datum / Place, Date / Lieu, Date:

Speyer, 2020-03-17


Dr. J. Ph. Herzog
Geschäftsführer / Managing director / Directeur


i. A. B. Bähr
QS Leiter / QA Manager / Responsable qualité

EU - Konformitätserklärung

EU - Declaration of conformity

UE - Déclaration de conformité

Hiermit erklärt der Hersteller in alleiniger Verantwortung, dass die nachfolgend bezeichnete Baueinheit den Anforderungen der zutreffenden EU-Richtlinien entspricht. Bei nicht mit uns abgestimmten Änderungen verliert diese Erklärung ihre Gültigkeit.

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Hersteller Manufacture Fabricant	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 D-67346 Speyer
Bezeichnung Description Description	Ovalradzähler Ovalwheel meter Compteur à roues ovales
Typ, Modell Type, model Type, modèle	OI / OUI / OaP / OUaP / OK mit with avec E, D, M5

Richtlinie Directive Directive	2014/68/EU /UE Druckgeräte Pressure equipment Équipements sous pression	L 189/164
Konformitätsbewertungsverfahren / Zertifikat Conformity assessment procedure / Certificate Procédures d'évaluation de la conformité / Certificat	Modul B Z-IS-AN1-MAN-19-07-2681356-23083220 Modul C1 Z-IS-DDB-MAN-15-05-100067376-007	
Notifizierte Stelle Notified Body Organisme Notifié	0036 TÜV SÜD Industrie Service GmbH Dudenstraße 28, D-68167 Mannheim	
Normen und normative Dokumente Standards and normative documents Normes et documents normatifs	AD 2000 Regelwerk AD 2000 Code Code AD 2000	
Klassifizierung Classification Classification	Rohrleitungsteil Pipe Tuyauterie	
Fluid Kategorie ; Diagramm Fluid category ; Diagramm Dangerosité du fluide ; Tableau	Gruppe 1 ; Anhang II / 6 Group 1 ; Attachment II / 6 Groupe 1 ; Appendice II / 6	
Angewandtes Konformitätsbewertungsverfahren Conformity assesment procedure beeing used Procédure d'évaluation de la conformité appliquée	Kategorie III Category III Catégorie III	

Die Angaben zur Richtlinie 2014/68/EU ist nur gültig für Druckgeräte die unter Artikel 4 Absatz 1 und 2 fallen, alle anderen unterliegen der guten Ingenieurspraxis nach Artikel 4 Absatz 3.

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Z-ML-KE ORZ-OI-OAP-OK-mechanisch-V10 2020-03-17

**BOPP & REUTHER
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Richtlinie <i>Directive</i> Directive	2011/65/EU /UE Beschränkung gefährlicher Stoffe <i>Restriction of hazardous substances</i> Limitation de substances dangereuses	L 174/88
Normen und normative Dokumente <i>Standards and normative documents</i> Normes et documents normatifs	EN 50581:2012	

Ort, Datum / Place, Date / Lieu, Date:

Speyer, 2020-03-17

Dr. J. Ph. Herzog
Geschäftsführer / Managing director / Directeur**i. A. B. Bähr**
QS Leiter / QA Manager / Responsable qualité

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