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**Dosing meter**  
**with quantity presetting**  
**with valve**

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**OK Series**  
**M5uVm4**

## **Operating Manual**

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## Foreword

### I. Transport, Delivery, Storage

Always protect devices against humidity, soiling, impacts and damages

#### Delivery Inspection:

Check the delivery for completeness upon receipt. Compare the device data with the data on the delivery note and in the order records.

Report any in-transit damage immediately. Damage reported at a later date shall not be recognized.

### II. Warranty

Please refer the contractual terms and conditions relating to delivery for the scope and period of warranty.

Warranty claims shall be conditional to correct installation and commissioning in accordance with the operating instructions of the device. The necessary installation, commissioning and maintenance work should only be carried out by qualified and authorized personnel..

### III. General safety instructions

1. Oval Wheel Meters are reliable, high accurate volumetric measuring devices. They should only be used for their intended purpose. Always observe the pressure and temperature limits stated on the type plate, 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 cause of doubt, please contact the manufacturer.
5. The operator must ensure that the materials used (wetted parts) of the device compared with the measured liquid are chemically resistant.
6. The gaskets or sealing elements must be handled with care according to the operating instructions.
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. Symbols used

#### **Warning!**

Failure to observe this warning can lead to injury of persons or a security risk.

#### **Attention!**

Non-compliance can lead to faulty operation or damage to the device.

## 1. Identification

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

Type of product: Direct volumetric meter (positive displacement meter) with dosing facility

Product name: Dosing meter OK with a roller counter M5uVm4 and mechanical shut-off valve  
Version no.: A-EN-01241-00E

## 2. Area of Application

Dosing meters of this type are used for the automatic dosage of all types of chemical liquids, such as solvents, resins, paints and lacquers, alkaline solutions, organic and inorganic acids, depending on the temperature and concentration.

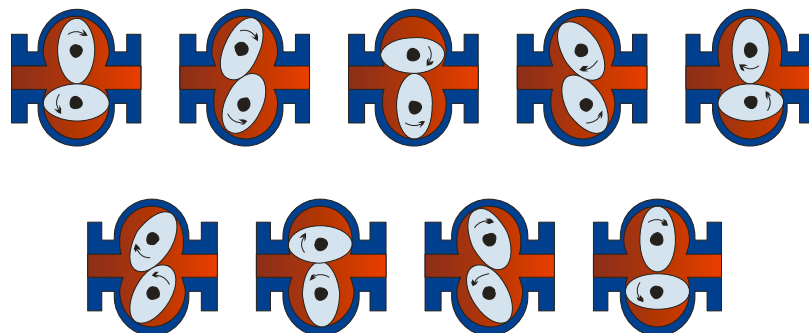
## 3. Principle of Operation and System Design

### 3.1 Measuring principle

Oval Wheel Meter belongs to the group of direct volumetric meters for liquids with movable partition walls (displacement flow meters).

The Oval Wheel Meter consists of measurement chamber housing with two pivoted oval wheels which are toothed and roll off each other in counter-rotations.

The diagram displays oval wheel movement during the measurement process.



Each revolution the oval wheels displace a discrete volume of liquid (defined by the space between the oval wheel and measurement chamber) through the chamber.

The rotation of the oval wheel meter is transferred to a mechanical counter and/or a pulse pick-up via a magnetic coupling and gearing for measurement purposes.

### 3.2 System design

Dosing meters consist of the following components:

#### Sensor:

Measured value recording occurs via OI series oval wheel meters.

#### Quantity setting device keypad M5uVm4:

5-digit integrated quantity setting device keypad with mechanical stop mechanism for 4-step closing of the shut-off valve incl. a 5-digit resettable roller counter (digit height 19 mm) and an 8-digit non-resettable roller sum meter.

Valve:

Mechanical shut-off valve, controlled via a quantity setting device keypad M5uV.

Optional pulse pick-up type IG1 or IG2

With a pulse pick-up the measured flow rate can be transferred to electronic evaluation electronics (e.g. counters, PLC ...) via a pulse output. There are two versions available:

- IG1 single channel
- IG2 dual channel, 90° phase angle  $\pm 10^\circ$ .

Optional zero contact switch NK:

Integrated zero contact NK, which switches at the beginning and end of the measuring process (e.g. pump ...)

Optional coupling switch KS (electric):

This accessory is used as a signal transmitter for the operating status of the roller counters. There is an electrical signal between the "red" and "green" marks (reading, pressure and zero setting) during the entire period.

- KSN: Proximity switch according to NAMUR
- KSE: Micro limit switch

## 4. Input

### 4.1 Measured variable

Volumes

### 4.2 Measuring range

Type	Size	Dyn. viscosity [mPa·s]	0.3 – 1.5 [l/min]	1.5 – 150 [l/min]	150- 300 [l/min]	300 - 1000 (ball bearing) [l/min]
OK5	25	min.	3	3	2.5	2.5
		max.	50	50	25	25
		Cont.operation	33	33	25	25
OK10	25	min.	10	10	7	8
		max.	100	100	70	80
		Cont.operation	66	80	70	80
OK50	50	min.	30	30	18	15
		max.	300	300	180	200
		Cont.operation	200	240	180	200
OK100	50	min.	66	66	48	-----
		max.	500	500	480	-----
		Cont.operation	440	500	480	-----

The values in the table are general nominal ratings. The exact range depends on the measured media, viscosity and type of meter and is listed in the data sheet.

For viscosities of >150mPa·s the meters are equipped with special toothed oval wheels (except OK 5).

## 5. Output

### 5.1 Pulse pick-up, switching contacts

#### Pulse pick-up type IG 2 (2 channels)

Two slotted proximity switches in connection with a flag disc (10 discs) form the pulse pick-up system with intrinsically safe control circuit according to NAMUR. It is installed in the meter housing, driven by the coupling gear and has a return stop which prevents pulses during reverse motion of the meter.



One pulse is released per pick-up for each dash line of the fastest moving digit roller in the M5. Both pulses are released in a shifted phase (90°).

The pulse value is 1/100 of the rotation value of the fastest moving digit roller.

**Coupling switch type KS (electric):**

On request, it is also possible to install a coupling switch KS, designed as a proximity switch according to Namur. The connecting pipe has to be connected to the terminal box on the rear panel of the housing.

This auxiliary component is used as a signal transmitter for the operating status of the roller counters. There is an electrical signal between the "red" and "green" marks (reading, pressure and zero setting) during the entire period.

Coupling switch KSE: Micro limit switch,  II 2G Ex d IIC T6 or  II 2G Ex ia IIC T6, 250 V ~ 7 A, 250 V-0.5 A. Installation in the housing on the right-hand side plate of the M5 roller counter, actuated by the decoupler.

If desired, a proximity switch (KSN, ex intrinsically safe) can also be provided.

**M5 roller counter**

Basic type	Roller counter M5					Resettable printer B		Quantity setting device V	
	Resettable roller counter			Roller sum meter		Final status	Printer resolution	Setting level	max. setting quantity
	Final status	Starting roller 1 rotation	Starting roller smallest division	Final status	Smallest readable quantity				
OK 5	9999.9 ℓ	1 ℓ	0.01 ℓ	9999999.9 ℓ	0,1 ℓ	9999.99 ℓ	0.01 ℓ	0.1 ℓ	9999.9 ℓ
	99999 ℓ	10 ℓ	0.1 L	99999999L	1 ℓ	99999.9 L	0.1 ℓ	1 ℓ	99999 ℓ
OK 10 OK 50	99999 L	10 ℓ	0.1 ℓ	99999999 ℓ	1 ℓ	99999.9 ℓ	0.1 ℓ	1 ℓ	99999 ℓ
OK 100	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

**5.2 Electrical and thermal safety relevant data**

See Appendix EC Type Examination Certificates

**6. Characteristic Parameters****6.1 Reference conditions**

Calibration of the oval wheel meters occurs at test benches whose accuracy is based on national standards.

Pressure: 2 to 7 bar. Temperature: +20°C to +30°C

**6.2 Tolerated deviation**

± 0.3% o.M.

**6.3 Repeatability**

< 0.1%

**6.4 Influence of the ambient temperature**

< 0.005% / °C

**6.5 Influence of the media temperature**

Depends on the viscosity of the measured media.

## 7. Operating Conditions

### 7.1 Installation conditions

#### 7.1.1 Installation instructions

#### Warning!

Before mounting and operating the device, carefully read and observe the installation instructions.

Before mounting or disassembling the device, **depressurize** and **cool down the system**.

### Warning

Please read the operating instructions carefully prior to installation and start-up.

**Depressurize** and allow the system to **cool down** prior to installation or disassembly.





#### 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. Remove caps shortly 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 differing 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 strainer).

#### 7.1.1.2 Installation

- Remove any impurities from the pipework. For this task, install a fitting part instead of the oval wheel meter and flush the pipe.
- Only remove the protective caps at the oval wheel meter input and output ports immediately prior to installation. Prevent any impurities entering the device during installation.
- The arrows on the oval wheel meter housing indicate the direction of flow.
- The oval wheel meter display has to be inclined at an angle of approx. 20° towards the rear to ensure that the oval wheel axles are horizontal, irrespective of the position of the pipework.
- Install the oval wheel meter strain-free into the pipework.

The dosimeter type OK can be installed together with the pulse pick-up (series IG1/IG2) and the switches in areas with an explosive atmosphere according to the following specifications.

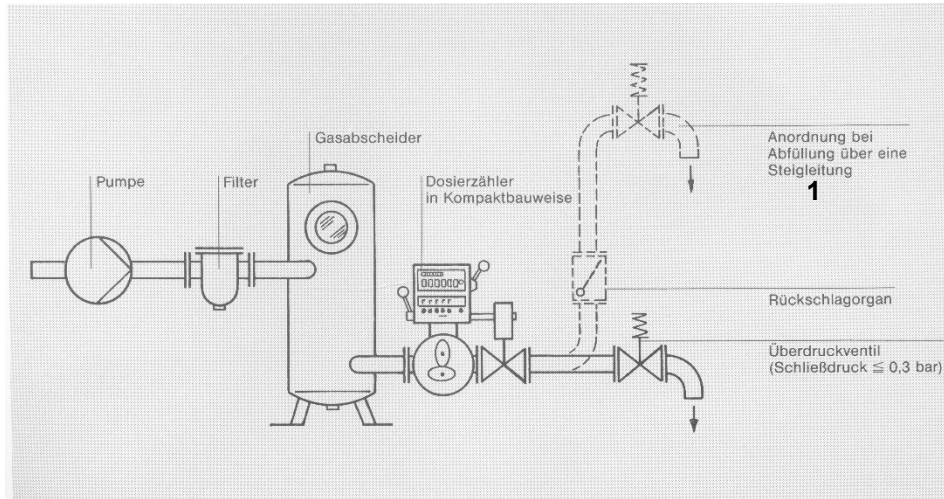
Pulse pick-up type IG1/IG 2:	 II 2G Ex ia IIC T6
Coupling switch type KSE:	 II 2G Ex d IIC T6
Coupling switch type KSN:	 II 2G Ex ia IIC T6
Zero contact type NK	 II 2G Ex d IIC T6

The EMC protection can only be guaranteed with shielded wires. The shielding has to be applied in the metal PG connecting bolts.



### 7.1.1.3 Measuring assembly

Dosimeters are suitable for horizontal installation in pipeworks for flows from left to right or from right to left. The basic direction of flow for the device is specified on the housing of the oval wheel meter. (For modifying the direction of flow please refer to section 6). The metrological installation of a complete facility can be seen in the following assembly example, Figure 2. As shown, each oval wheel meter should be protected against impurities, which can damage the calculation unit, via an upstream strainer.



Pumpe	Pump
Filter	Strainer
Gasabscheider	Gas separator
Dosierzähler in Kompaktbauweise	Compact dosimeter
Anordnung bei Abfüllung über eine Steigleitung	Assembly for filling via a riser
Rückschlagorgan	Check valve
Überdruckventil (Schließdruck $\leq 0,3$ bar)	Overpressure valve (closing pressure $\leq 0.3$ bar)

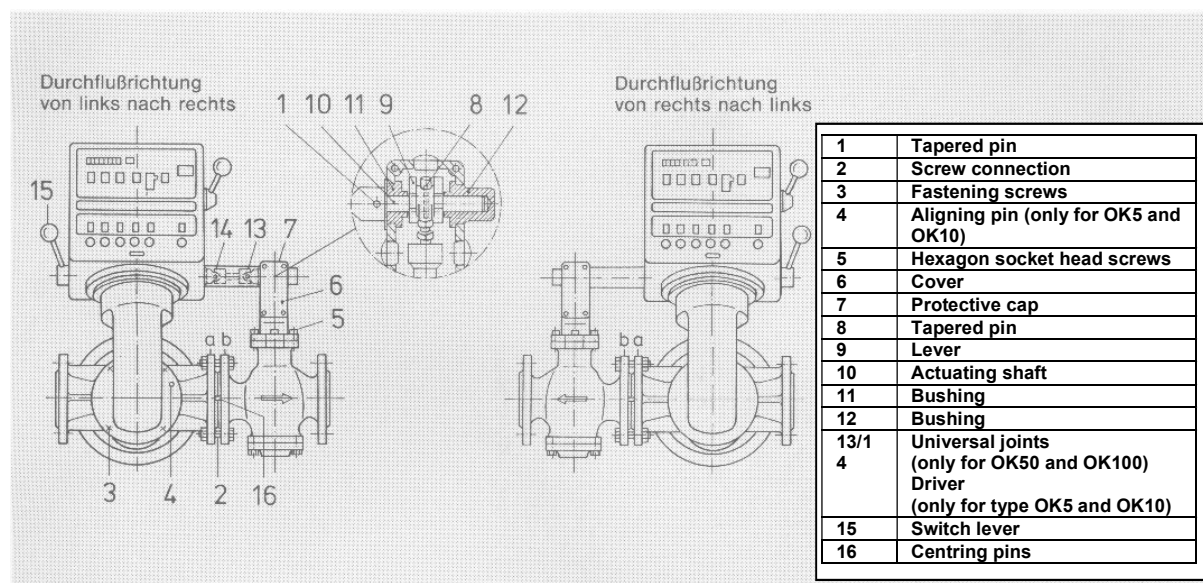
#### Assembly example for a measuring facility with dosimeter

Furthermore, it has to be ensured that the liquid is supplied to the dosimeter free of air or trapped gas, since these are volumetrically recorded the same as the liquid, thus providing incorrect measuring results. If this danger exists, appropriate gas or air separating facilities have to be provided. Strainers and gas separators suitable for each nominal width are available from our production range.

#### Note:

When filling (see figure upper mark 1) via a riser, it has to be positioned in a way that ensures that the pressure behind the mechanical shut-off valve (also after switching off the pump) is not more than 0.3 bar above the pressure in front of the valve. If a greater riser height is required or if for other reasons the pressure difference at the mechanical shut-off valve in the direction of reverse current exceeds 0.3 bar, a check valve has to be installed.

### 7.1.1.3 Changing the direction of flow



Dosimeter, measuring assembly for various directions of flow

Durchflussrichtung von links nach rechts	direction of flow from left to right
Durchflussrichtung von rechts nach links	direction of flow from right to left

Carry out changes as follows:

1. Remove the tapered pin (1)
2. Loosen the screw connection (2) between the valve and meter and remove the valve
3. Remove the fastening screws (3) (with type OK5 and OK10 drive out the aligning pin (4) from the rear), rotate the oval wheel meter by 180° so that the direction of flow arrow on the meter housing is pointing in the desired direction of flow.
4. Reinsert and tighten the fastening screws (3).
5. Remove the hexagon socket head screws (5) and separate the upper part of the valve from the bottom part.
6. Remove the cover (6) from the front of the upper part of the valve, remove the protective cap (7), press the tapered pin (8) out of the lever (9) and extract the actuating shaft (10).  
Caution: Levers with spindle fall out!
7. Exchange the bushings (11 and 12), place the lever (9) with spindle between the bushings (11 and 12) and install the actuating shaft (10) so that the end of the shaft is positioned with the bore hole for the universal joint or driver (13/14) in the large bushing (12).
8. Pin the actuating shaft (10) to the lever (9) and insert the protective cap (7).
9. Place and screw the upper part of the valve onto the lower part so that the cover opening is facing the front.
10. Exchange the universal joints or driver (13 and 14) and engaging lever (15) at the meter head
11. Screw the valve to the output side of the meter. Caution! According to the figure flange a to flange b. Place the universal joint or driver on the shaft end of the valve.
12. By loosening the fastening screws (3) and turning the meter head it is possible to adjust the position of the meter head to the valve.
13. Drill and pin the universal joint or driver (13) to the shaft end of the valve.
14. Drill the hole for the aligning pin (4) and drive in the aligning pin (only for type OK5 and OK10).
15. Reattach the cover (6) to the front of the upper part of the valve.

## 7.1.2 Start-up conditions

### Important

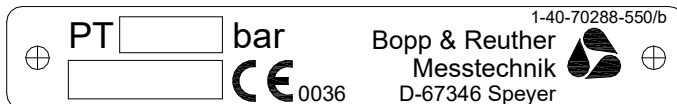
- **Start up the oval wheel meter with a gradually increasing the flow rate.**
- **In measuring systems for viscous liquids which require heating, switch on the heating system of the oval wheel meter, strainer and pipework in sufficient time prior to start-up, subsequently start up the device with a gradually increasing flow rate.**

Type plate with pressure relevant information

Additional type plate at the connection flange with CE0036 mark

The used abbreviations have the following meaning:

PT: Achieved test pressure and test date



## 7.2 Ambient conditions

### 7.2.1 Ambient temperature

-20°C to +60°C

### 7.2.2 Storage temperature

-20° C to +70° C

### 7.2.3 Degree of protection

IP54 in accordance with IEC 529 / EN 60529

### 7.2.4 Electromagnetic compatibility

Only applies for devices with pulse pick-ups:

DIN EN 61000-6-2; DIN EN 61000-6-3

The "electromagnetic compatibility" is only guaranteed when the electronics housing is closed.

## 7.3 Process conditions

### 7.3.1 Liquid temperature

Depending on the version -10°C to +60°C, higher temperatures on request

### 7.3.2 State of aggregation

Suitable for liquids

### 7.3.3 Viscosity

0.3 -1000 mPa·s

### 7.3.4 Liquid temperature limit

60°C (higher temperatures on request)

### 7.3.5 Liquid pressure limit

OK 5	OK 10	OK 50	OK 100
PN10	PN10	PN6	PN6

## Attention!

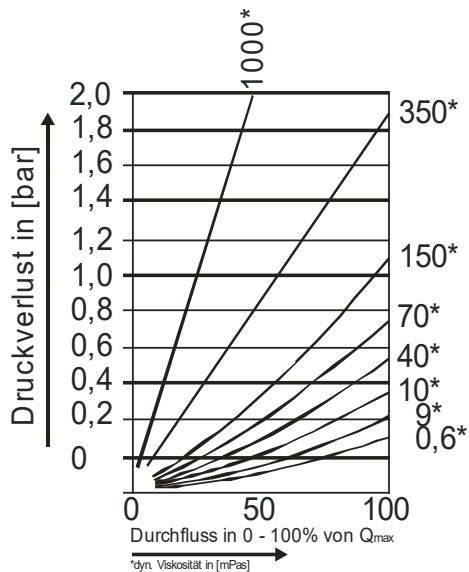
At temperatures higher than 50°C, the maximum pressure must be reduced according to the nominal pressure according to the tables "Pressure/temperature assignment of the flange standard DIN EN 1092

### 7.3.6 Flow rate limit

All details in l/min

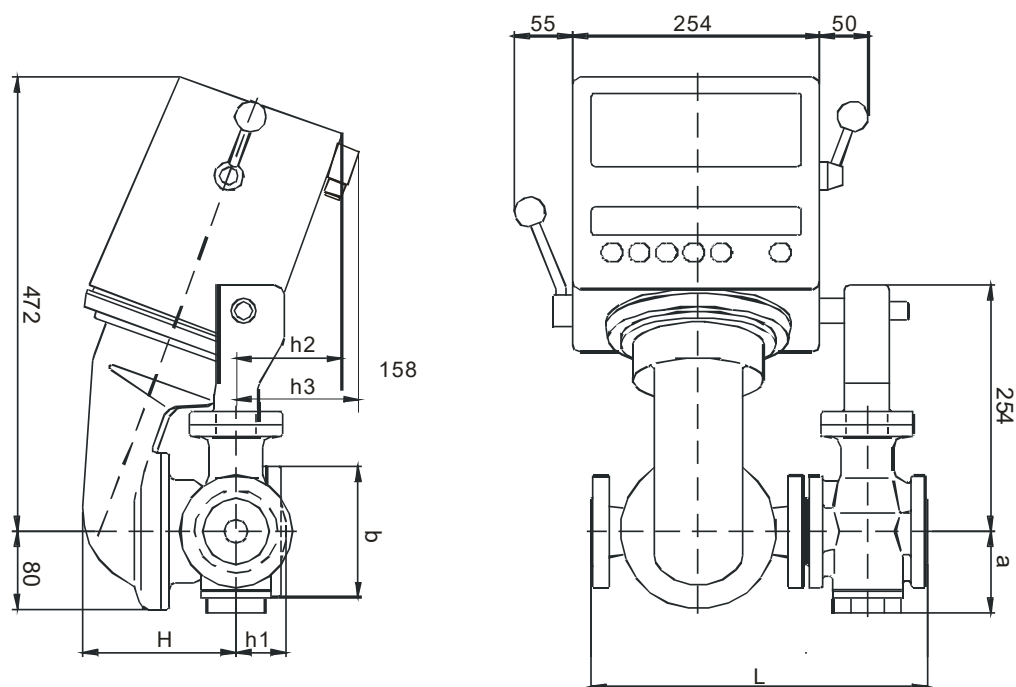
OK 5	OK 10	OK 50	OK 100
50	100	300	500

### 7.3.7 Pressure loss



## 8. Constructive Design

### 8.1 Model/Dimensions



Type	DIN/ANSI	DN	L	H	h1	h2	h3	b	a	Weight
OK 5	DIN ANSI 150	25	345	158	52	110	142	135	84	18
OK 10	DIN ANSI 150	25	345	160	72	108	140	150	84	36
OK 50	DIN	50	500	178	106	90	122	235	97	56
OK 50	ANSI 150 ANSI 300	50	530	178	106	90	122	235	97	upon request
OK 100	DIN ANSI 150	50	570	225	146	43	75	290	97	upon request
OK 100	ANSI 300	50	590	225	146	43	75	290	97	upon request

All dimension details in mm, weight in kg

### 8.2 Weight

See 8.1

### 8.3 Materials

Available materials

	OK 5	OK 10	OK 50	OK 100
Housing	Bronze Cast iron Cast steel CrNiMo	Bronze Cast iron Cast steel CrNiMo	Bronze Cast iron Cast steel CrNiMo	Cast steel CrNiMo
Oval wheels	Cast iron Bronze CrNiMo	Cast iron Bronze CrNiMo	Cast iron Bronze CrNiMo	Cast iron CrNiMo
Bearing	Hard graphite ball bearings	Hard graphite ball bearings	Hard graphite ball bearings	Hard graphite

## Meaning of the material coding

	A 4		G 1		G 2		F 5		F 57	
	Bronze	Hard	Cast iron	Hard	Cast steel	Cast iron	Hard	CrNiMo	Hard	CrNiMo
Housing	•		•		•			•		•
Oval wheels	•		•			•		•		•
Measuring chamber cover	•		•			•		• <sup>1</sup>	•	•
Sliding disc							•		•	
Bearings		•		•			•		•	•

1) CrNiMo measuring chamber cover not required for nominal widths < DN 50

## 8.4 Process connection

Flange DIN, ANSI 150 and ANSI 300

(Others available on request)

## 8.5 Electrical connection

The electrical connections are located inside the terminal box.

Control line	max. up to 50 Ohm/wire 2-wire, shielded
Cable gland	M 20x1.5

### Attention!

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

## 8.5.1 Type plates of the pulse pick-up and signal transmitter

Pulse pick-up IG1:

1 Elec. pulse pick-up system IG 1 pulse/dash line, with return stop Installed: NAMUR initiator P+F PTB 99 ATEX 2219 X II2G EEIaIICT6	
G1	
 1-40-70348-750/a	 Bopp & Reuther Messtechnik GmbH D-67346 Speyer

Pulse pick-up IG2

2 elec. pulse pick-up systems IG 1 pulse/dash line, with return stop Installed: NAMUR initiator P+F PTB 99 ATEX 2219 X II2G EEIaIICT6		<div style="border: 1px solid black; padding: 2px; text-align: center;">5552</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">8004</div>
G1		G2
 1-40-70331-750/a		 Bopp & Reuther Messtechnik GmbH D-67346 Speyer

Electrical zero contact NK:

Bopp & Reuther Messtechnik
Elektr. Kupplungsschalter KSE Kleingrenztaster Typ 8064/21 Fa.Stahl PTB 02 ATEX 1031 X Ex II2G EEExdIICT6 

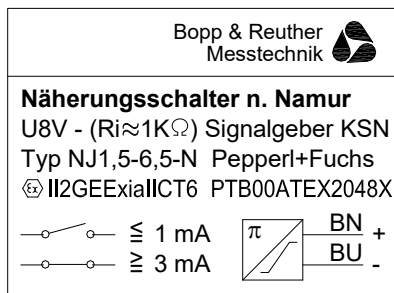
Elektr. Nullkontakt NK	Elec. zero contact NK
Kleingrenztaster	Micro limit switch
Typ 8064/21 Fa. Stahl	Type 8064/21 Stahl
2,5 A	2.5 A
0,5 A	0.5 A

Electrical coupling switch KSE:

Bopp & Reuther Messtechnik
Elektr. Kupplungsschalter KSE Kleingrenztaster Typ 8064/21 Fa.Stahl PTB 02 ATEX 1031 X Ex II2G EEExdIICT6 

Elektrischer Kupplungsschalter KSE	Elec. coupling switch KSE
Kleingrenztaster	Micro limit switch
Typ 8064/21 Fa. Stahl	Type 8064/21 Stahl
2,5 A	2.5 A
0,5 A	0.5 A

Electrical coupling switch KSN (proximity switch according to NAMUR):



Näherungsschalter n. NAMUR	Proximity switch acc. to NAMUR
Signalgeber:KSN	Signal transmitter:KSN

## 9. Display and Operation

### 9.1 Mechanical display

#### Roller counter M5

The device is equipped with a five-digit roller set, which counts and displays the unit of measure. A sixth number roller is hidden by a cover. After the measurement has been completed and the zeroing lever has been actuated, the cover opens and the value after the dash of the fifth number roller is shown at this position as a digit. Once the measured value has been read, the zeroing lever is once again operated. The digit rollers are reset to zero and the sixth digit is recovered. The device is ready for a new measurement. An eight-digit sum meter, which cannot be zeroed, adds all the values displayed on the roller set in a parallel process.

The attachment of the presetting device allows the presetting and delivery of a max. five-digit quantity. It is attached to the roller counter M5 described below. Quantity entering is carried out via the buttons after actuating the zeroing lever (red marking). The setting level always corresponds to one-tenth of the cycle value of the fastest moving digit roller in the roller counter M5. The set value remains during the delivery. Switching off occurs in four stages with the numerical values 20, 10, 3 before reaching the set quantity, as well as the 0 as the end stage.

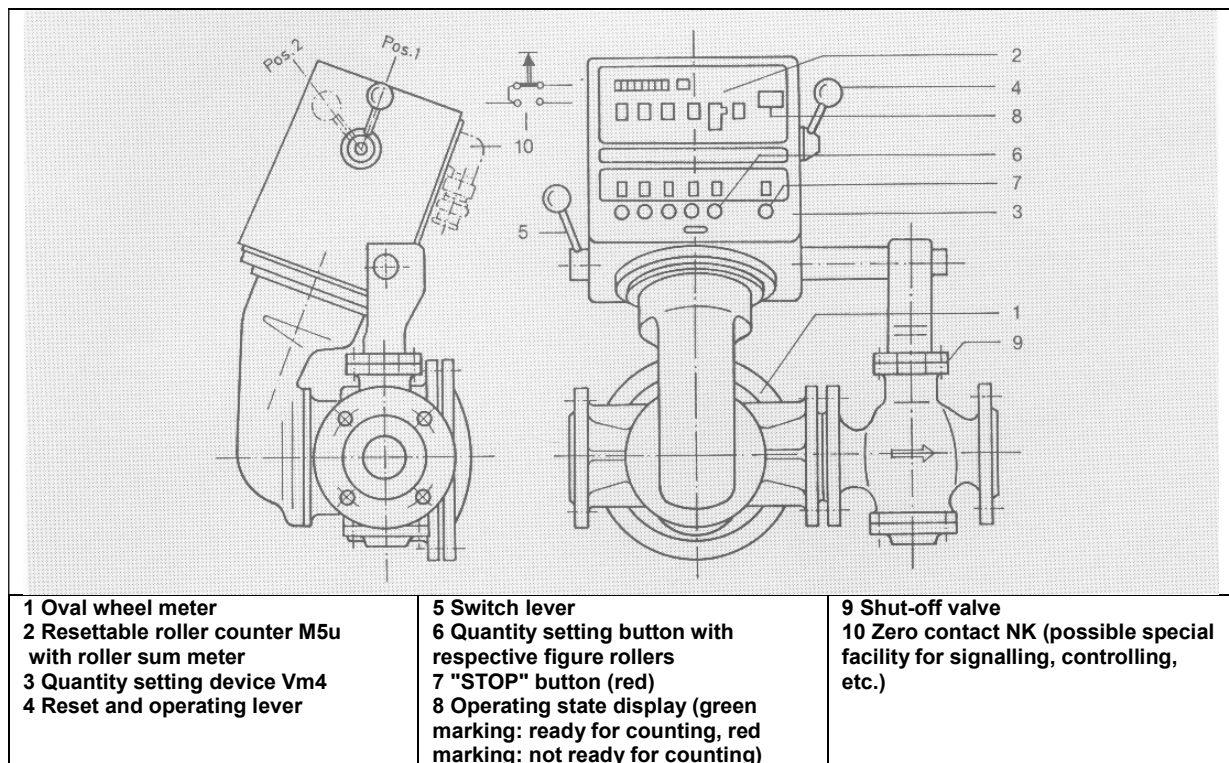
#### Printer

This device is used where a receipt is required in addition to the display of the delivered quantity. After the quantity has been delivered, the zeroing lever is actuated. The sum for the quantity in the roller counter is now transferred to the printer and printed onto the inserted receipt. Zeroing of the combination device is also carried out after actuating the zeroing lever. The zeroing lever is locked during the aforementioned function sequence.



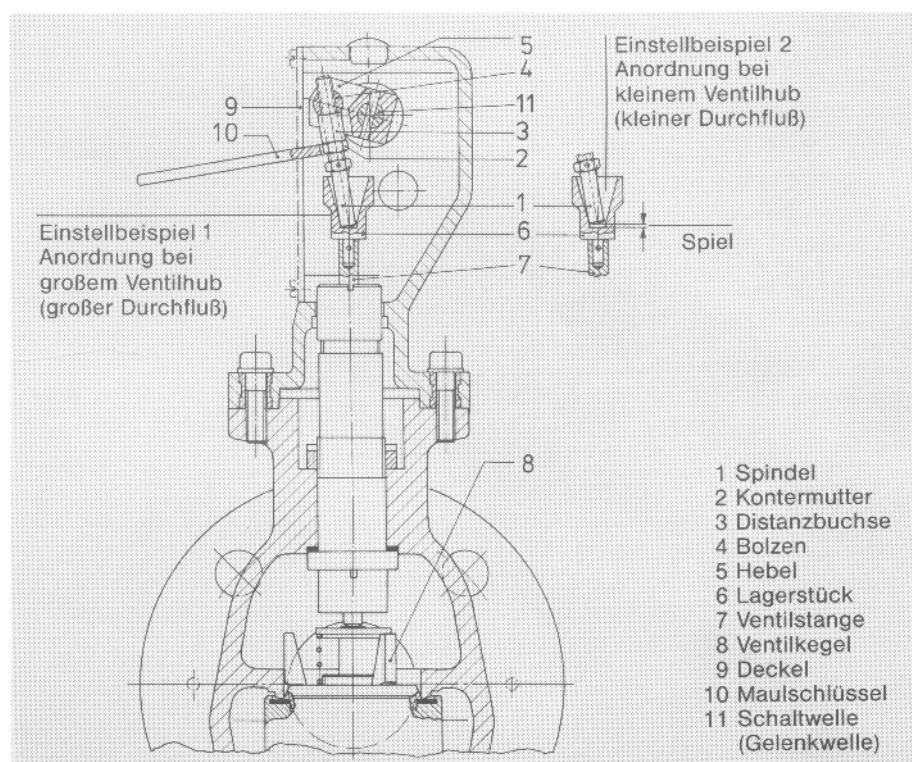
## 9.2 Operation

### 9.2.1 Operation of the roller counter



1. The spring of a spring device is tensioned by turning the operating lever (4) from Pos. 1 to the front to Pos. 2. If the lever is turned back to its original position (Pos. 1) the spring device releases energy and drives a radial cam. A red marking appears in the window (8). The device is not ready for operation.
2. In this setting the desired quantity can be entered via the pushbuttons (6) on the quantity setting device.
3. Further actuation of the operating lever (4), i.e. from Pos. 1 to Pos. 2 and back again to Pos. 1, stores the preset values in the presetting counter and zeroes the five-digit roller counter (2). The marking in the window (8) changes to green. The device is ready for operation.
4. Switch on the device by pulling the switch lever (5) towards the front. It remains in this position for the duration of the measurement and returns to its original position when switching off.
5. After reaching the set quantity, the device switches off automatically. The closing process of the attached shut-off valve occurs in four stages. Please observe the following when zeroing the roller counter (2) and when repeating the set quantity: a) Repetition of the same measuring process. Operation as described in points 1, 3 and 4. b) Setting of another quantity. Operation as described in points 1 and 2.
6. Interruption of the measuring process a) Pressing of the red button (7) "STOP" can prematurely interrupt the measuring process. b) Continuation of the measuring process occurs after actuating the switch lever (5) towards the front as described in point 4. c) Zeroing can be carried out after an interruption. Proceed as described in point 1 and 3.
7. Incorrectly set quantity. If an undesired quantity has been set, set other numerical values as described in point 1, 2 and 3.

## 9.2.2 Setting the valve lift



1	Spindle
2	Counternut
3	Spacer
4	Bolt
5	Lever
6	Bearing unit
7	Valve rod
8	Valve cone
9	Cover
10	Spanner
11	Actuating shaft (universal joint shaft)

Einstellbeispiel 1	Setting example 1
Anordnung bei großem Ventilhub (großer Durchfluss)	Assembly for large valve lift (large flow rate)
Einstellbeispiel 2	Setting example 2
Anordnung bei kleinem Ventilhub (kleiner Durchfluss)	Assembly for small valve lift (small flow rate)
Spiel	Play

### General

The flow rate in the last pre stage shut off is set during the factory test to ensure that 20 to 25 % of the max. flow rate of the oval wheel meter is achieved. However, this throttled flow rate depends to a large degree on the respective operating conditions in the measuring system (e.g. the manometric pressure of the pumps, the viscosity of the liquid and, possibly, strongly varying temperatures). The factory set lift can be modified for altered operating conditions or if adjustments are required for a desired flow rate in the last pre stage shut off. This is achieved by a spindle (1) secured via a counternut (2). Setting examples are based on Figure 3.

### Assembly and functioning of the setting device

When the valve is closed, the play between the spindle (1) and the bearing unit (6) can be increased or decreased after loosening the counternut (2). If, as shown in example 1, there is hardly any play between the spindle (1) and the bearing unit (6), the valve cone (8) is immediately pressed downwards when opening the valve. This means that the valve is comparatively wide open in the last pre stage shut off, i.e. there is a large flow rate. Contrary to this, the play between the spindle (1) and bearing unit (6) can be increased as shown in example 2. In this position a return stroke of the spindle (1) occurs when the valve is opened without the valve rod (7) and the valve cone (8) being pressed downwards. The valve cone is only pressed downwards and the valve opened if the spindle (1) is in the bearing unit (6) in the further switching range. This means that only a small lift is set in the last pre stage shut off, i.e. there is a small flow rate. The play between the two positions according to example 1 and 2 enables you to vary the opening cross section at the valve cone (8) in the last pre stage shut off and thus also the flow rate between certain limits. For the setting according to example 1 please ensure that the closed valve cone (8) does not exert pressure from the spindle (1) onto the bearing unit (6).

**Setting the valve lift**

Carry out the setting as follows:

- 1) Close the valve (press the red stop button)
- 2) Remove the cover (9)
- 3) Loosen the counternut (2)
- 4) Set the play between the spindle (1) and the bearing unit (6)  
(large play – small flow rate, small play – large flow rate in the last pre stage shut off)
- 5) Retighten the counternut (2)
- 6) Replace the cover (9)

## Appendix

### A. Troubleshooting

Oval wheel meters with pulse pick-ups and mechanical counters work maintenance-free.

Please contact our service department with regard to oval wheel meter faults.

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

#### **Warning!**

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

When using devices in explosion-proof areas, always observe the specifications and regulations regarding explosion protection contained in the documentation. Possible faults and their remedies are described below.

#### **General:**

If the fault cannot be detected, please contact the service department of Bopp & Reuther Messtechnik GmbH or return the device for repair work to Bopp & Reuther Messtechnik GmbH (see Appendix B2).

### **B Maintenance, Cleaning, Changing the Indicators**

#### **B.1 Maintenance, Cleaning**

If the oval wheel meter is to be shut down for a longer period, it should be de-installed and cleaned thoroughly. Cover the input and output ports with protective caps. Ensure that the oval wheel meters are stored in a dry room.

If the oval wheels are to be removed, position and mesh the oval wheel meters so that the marking points (M) on the end face are placed above each other during assembly. Check by manually rotating the wheels once. Ensure that the gasket is inserted correctly.

## B.2 Repairs, Hazardous Substances

The following measures have to be carried out before to sending the oval wheel meter to Bopp & Reuther Messtechnik GmbH for repairs:

- Always enclose a note with the device which describes the fault, the application as well as the chemical and physical properties of the measured medium (see Appendix).
- Remove any residual liquid. Carefully check gasket grooves and slots in which residual liquid may be trapped. This is extremely important if the liquid is classed as a risk to health, e.g., corrosive, poisonous, carcinogenic, radioactive, etc.

Costs for disposal or personal injuries (burns, etc.) due to incorrect cleaning shall be borne by the operator.

## C. Forms

### C.1 Certificate of Non-Objection for the Contractor

Bopp Reuther Messtechnik GmbH  
Am Neuen Rheinhafen 4

67346 Speyer

Germany

**BOPP & REUTHER**  
**MESSTECHNIK** 

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Fax: +49 (0) 6232 657 561

Mail: [service@burmt.de](mailto:service@burmt.de)

Web: [www.bopp-reuther.de](http://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:

<input type="checkbox"/> poisonous 	<input type="checkbox"/> corrosive, irritant 	<input type="checkbox"/> flammable 
<input type="checkbox"/> hazardous 	<input type="checkbox"/> oxidizing 	<input type="checkbox"/> cancer-causing, health hazard 
<input type="checkbox"/> explosive 	<input type="checkbox"/> environmental hazardous 	<input type="checkbox"/> 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: \_\_\_\_\_





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..*



**Benannte Stelle, Kennnummer 0036**  
*Notified Body, No. 0036*

**TUV SUD Industrie Service GmbH  
Westendstr. 199  
80686 München  
GERMANY**



### D.3 EU-Declaration of conformity

#### 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

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

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

<b>Richtlinie</b> <i>Directive</i> Directive	2014/34/EU /UE Explosionsschutz <i>Explosion protection</i> Protection contre les explosions L 96/309	
<b>Baumusterprüfbescheinigung</b> <i>Type examination certificate</i> 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)
<b>Notifizierte Stelle</b> <i>Notified Body</i> <i>Organisme Notifié</i>	BVS, DMT: DEKRA EXAM	0158
	PTB	0102
	TÜV	0044
<b>Normen und normative Dokumente</b> <i>Standards and normative documents</i> 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

<b>Richtlinie</b> <i>Directive</i> Directive	2014/68/EU /UE Druckgeräte <i>Pressure equipment</i> Équipements sous pression	L 189/164
<b>Konformitätsbewertungsverfahren / Zertifikat</b> <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	
<b>Notifizierte Stelle</b> <i>Notified Body</i> Organisme Notifié	0036 TÜV SÜD Industrie Service GmbH Dudenstraße 28, D-68167 Mannheim	
<b>Normen und normative Dokumente</b> <i>Standards and normative documents</i> Normes et documents normatifs	AD 2000 Regelwerk AD 2000 Code Code AD 2000	
<b>Klassifizierung</b> <i>Classification</i> Classification	Rohrleitungsteil <i>Pipe</i> Tuyauterie	
<b>Fluid Kategorie ; Diagramm</b> <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	
<b>Angewandtes Konformitätsbewertungsverfahren</b> <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.

<b>Richtlinie</b> <i>Directive</i> Directive	2011/65/EU /UE Beschränkung gefährlicher Stoffe <i>Restriction of hazardous substances</i> Limitation de substances dangereuses	L 174/88
<b>Normen und normative Dokumente</b> <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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Z-ML-KE ORZ-OI-OAP-elektrisch-V12 2020-03-17

## 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

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

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

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



**BOPP & REUTHER**  
**MESSTECHNIK**

<b>Richtlinie</b> <i>Directive</i> Directive	2011/65/EU /UE Beschränkung gefährlicher Stoffe <i>Restriction of hazardous substances</i> Limitation de substances dangereuses	L 174/88
<b>Normen und normative Dokumente</b> <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**  
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Z-ML-KE ORZ-OI-OAP-OK-mechanisch-V10 2020-03-17