

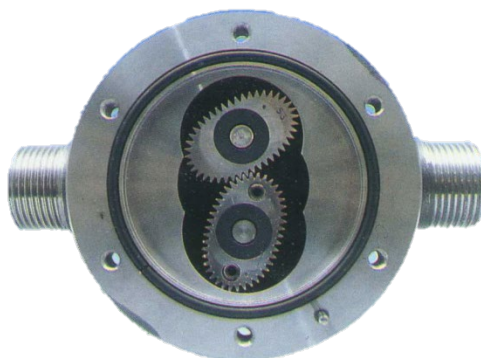
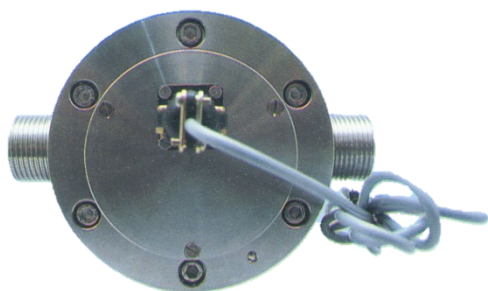


Oval wheel meter

Series

OC with REED

Operating manual



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Foreword

I. Transport, Delivery, Storage

Storage and Transportation:

Equipment shall be protected from moisture, humidity, contamination, shock and damage.

Inspection of delivery:

The shipment is to be checked for completeness upon receipt. The data of the device are to be compared with the data of the delivery bill and the order documents. Any transport damage must be reported immediately after delivery. Damage reported later cannot be accepted.

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-precision volumetric instruments and may only be used in accordance with their intended purpose. The pressure and temperature limits of use indicated on the nameplate as well as the other technical data of the devices and safety instructions must be observed during installation, commissioning and operation of the devices.
2. National and international regulations for the operation of pressurized devices and systems must be observed.
3. Before installation, the operator must ensure that the pressurized parts have not been damaged during transport.
4. Always observe national and international regulations concerning the operation of devices in potentially explosive atmospheres.

5. The equipment must be installed, operated and maintained by qualified personnel. The operator is responsible for ensuring that the personnel are adequately and appropriately qualified. In the case of doubts, the manufacturer must be consulted.
6. The operator must ensure that the materials used (wetted parts) of the device are chemically resistant to the measuring medium.
7. The seals or sealing elements must be handled with care in accordance with the specifications in the operating instructions.
8. The tightening torques for the screw connections between the cover and the lower part of the housing as well as for the flange connections in the pipeline, are available on request.
9. The drain screws and all screw connections of the pressure-bearing parts must not be loosened until it has been ensured that the meter is depressurized.

IV Basic Safety Information

Description of Symbols:

	<p>IMPORTANT NOTES!</p> <p>Please consider these notes carefully to achieve a reliable functional system. The accompanying text contains important information about the product, handling the product or about a section of the document that is of particular importance.</p>
	<p>WARNING! / ATTENTION!</p> <p>Failure to take the prescribed precautions could result in death, severe bodily injury, or substantial material / product damage.</p>

V Intended Use

This OC flowmeter is designed to measure intermediate and final liquid products, such as oil, chemical fluids, demi water, gasoline etc.

Intended User

The intended user is not a general purpose user.



The intended user is not allowed to open, manipulate or dismantle the device.

The device may be maintained, serviced or opened only by dedicated and qualified service personnel.

1. Identification

Manufacturer: Bopp & Reuther Messtechnik
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)

Product name: Oval wheel meter, series OC with REED

Version number: A-EN-01275-00 Rev.A

2. Area of Application

The range of application for all OC series oval wheel meters encompasses the measurement, dosing, and control of volumetric liquids. They are used for measuring intermediate and final liquid products, such as oil, chemical fluids, demi water, gasoline etc.

3. Measuring Principle 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 following sketch displays the movement of oval wheels during the measuring 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.

For measurement purposes, the rotation of the oval wheels is transmitted to a mechanical counter and / or a pulse pick-up via a magnet coupling and gear device.

3.2 System Design

Oval wheel meter series OC can be combined with the following components for its efficient application:

Transducer: Measuring chamber with oval wheels

Pulse pick-up:



The rotation of the oval wheels is sensed by a REED sensor and then converted to equivalent pulses which are in proportion to flow of liquid displaced by the oval wheels inside the measuring chamber.

4. Input

4.1 Measured values

Volume and volumetric flow rate

4.2 Measuring range

Type	DN	Flowrate	Viscosity			
			0.3 mPa·s [l/min]	0.3 - 1.5 mPa·s [l/min]	1.5 - 150 mPa·s [l/min]	150 - 350 mPa·s [l/min]
OC 5	G ¾"	min	8	5	5	2.5
		continuous	16	33	45	25
		max	40	50	50	25
OC 5	R 1"	min	8	5	5	2,5
		continuous	16	33	45	25
		max	40	50	50	25
OC 10	R 1½"	min	16	10	10	7
		continuous	33	70	80	70
		max	80	100	100	70

5. Output

5.1 Output signal

Type	Pulses/l	Freq./Hz
OC 5	200	167
OC 10	100	167

6. Characteristic Parameter

6.1 Reference conditions

In accordance with IEC 770: 20°C, 65% relative humidity, 101.3 kPa
The device is tested with a liquid with a viscosity of 2 mPa·s.

6.2 Measured error (accuracy)

< +/- 0.5 % in the range 10 -100% of the measuring range

7. Operating Conditions

7.1 Installation conditions

7.1.1 Installation instructions



The operating instructions must be read and observed before assembly and commissioning. The system must be **depressurized** and **cooled down** before assembly and disassembly of the device.

7.1.1.1 General information

- Only trained personnel who have been authorized by the system operator are allowed to perform assembly, electrical installations, commissioning, maintenance and operation. You must have read and understood the instructions and follow their instructions strictly.
- Bopp & Reuther Messtechnik 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.
- As indicated on the type plate parameters are maximum values and must not be exceeded. Operating parameters are specified in the contract documents. If you want to use the device under differing operating conditions, consult Bopp & Reuther Messtechnik GmbH indicating the serial number.
- Install the oval wheel meter so that it remains completely filled with liquid even when at a standstill.
- To avoid measuring errors due to gas inclusions or contamination, etc., the user must take appropriate precautions (gas separator, strainer basket filter).
- 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

- Remove any impurities from the pipework. 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 the penetration of foreign substances.
- Any flow direction, if applicable note the 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 wheels are in a horizontal position independent of the position of the pipe.
- The oval wheel meter must be installed free from strain.

EMC protection can only be assured with shielded lines.



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

7.2 Ambient Conditions

7.2.1 Ambient temperature Limit

-10°C to +50°C

7.2.2 Storage temperature

-10°C to +55°C

7.2.3 Climatic category

Class D IEC 654-1

7.2.4 Protection Class

IP 65

according to IEC 529 / EN 60529

7.2.5 Electromagnetic compatibility

According to Guideline EMC 2014/30/EU (EMC-Guideline)

EN 61000-6-2 immunity for industrial environments

EN 61000-6-3 immunity residential area

"Electromagnetic compatibility" is only guaranteed when the electronics housing is closed. When the electronics housing is open, interference can occur due to EMC signal pick-up.

7.3 Process conditions

7.3.1 Fluid temperature

0°C up to 70°C

7.3.2 State of Aggregation

suitable for liquids

7.3.3 Viscosity

OC series with REED:

0.3 – 350 mPa·s

7.3.4 Fluid Pressure Limit

Stainless steel:

16 bar

Aluminium:

10 bar

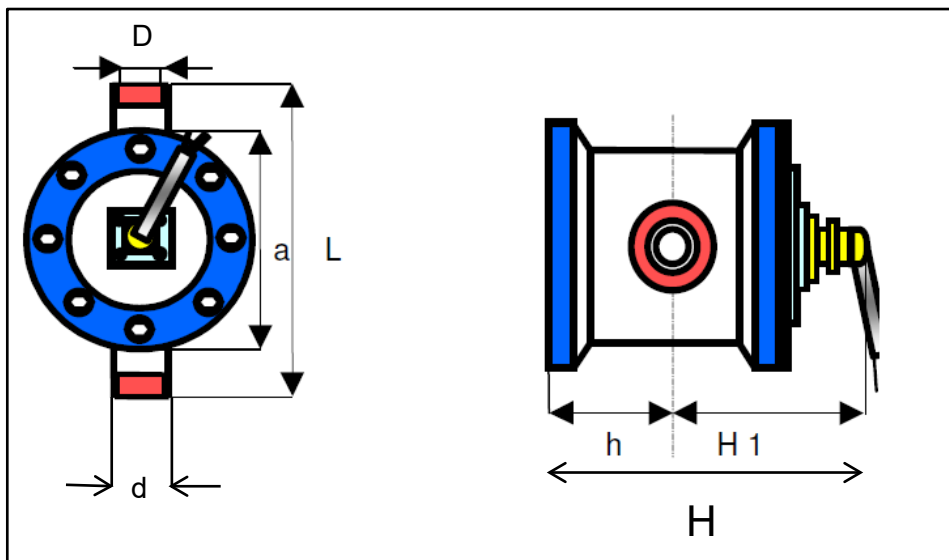
7.3.5 Pressure loss

Specification for Water	Basic Type	
	OC5	OC10
(In bar)	0.25	0.25
Q _{max} [l/min]	50	100

8. Constructive Design

8.1 Type of construction / dimensions

Type	DN	D	L	d (pipe thread)	h	H
OC5	20	20	170	R 1" / G ¾"	50	140
OC10	32	32	210	R 1½"	95	150



8.2. Weight

Basic Type	OC5	OC10
Weight(in kg) approx.	5	7

8.3. Material

AISI 304, wheels AISI 316, bushes in hard carbon, gasket in PTFE

Material Design	OC5 / OC10	OC5
	F5	B3
Housing	Stainless Steel	Aluminium
Oval wheels	Stainless Steel	Aluminium
Bushes	Hard Carbon	
Gasket	PTFE	

8.4. Process connection

Type	Pipe thread
OC5	R 1" / G ¾"
OC10	R 1 ½"

9. Electrical Connection

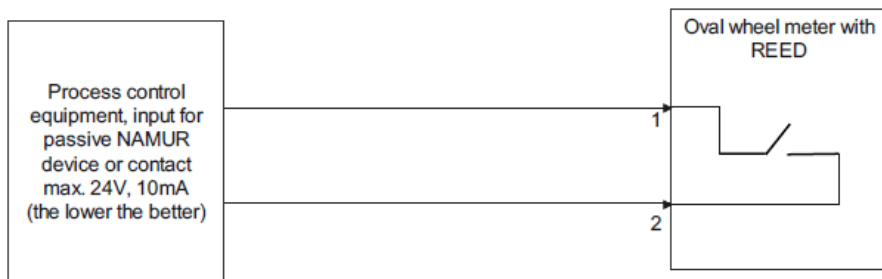
No specific requirements are placed on the cable. All cables that can be soldered well into the connector (shown below) are suitable, e.g. flexible cable $2 \times 0.5 \text{ mm}^2$



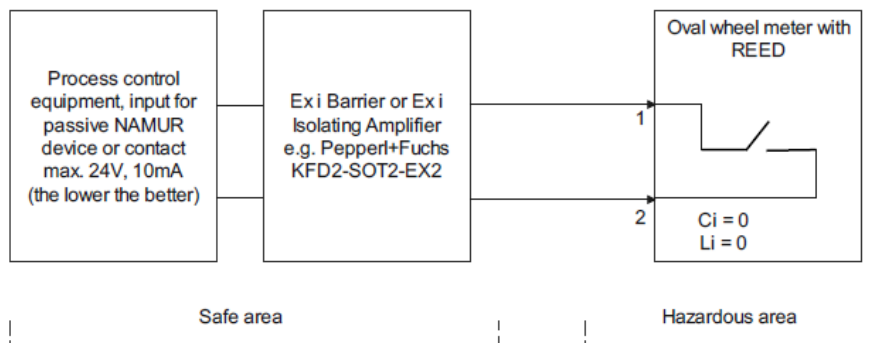



The oval wheel meter can be installed in Zone 2 and Zone 1 hazardous areas if it is connected to an intrinsically safe Ex i circuit.

9.1. Installation in safe areas



9.2. Installation in hazardous areas



	<p>When installing in hazardous areas, the respective national installation regulations must be observed (for European Union: EN IEC 60079-14).</p>
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For cable lengths up to 20m, the Ex i values of the barrier are not relevant. Any intrinsically safe value is acceptable. For longer cables, their inductance and capacitance must match the specified values of the barrier. In the interest of long service life, the reed contact should be operated with a maximum of 24V, 10mA.

Appendix

A. Maintenance and cleaning

If you shut down the oval wheel meter for a longer period of time, it must be de-installed, thoroughly cleaned, and protected with acid-free oil. Oval wheel meters for liquid food must not be protected. Cover the inlet and the outlet with a cap. It must be ensured that the oval wheel meters are stored in a dry room.

B. Repairs and hazardous materials

The following measures must be taken before you send the oval wheel meter for repair to Bopp & Reuther Messtechnik for repair:

- In any case, enclose a note with the device describing the error, the application as well as the chemical-physical properties of the measuring medium (form see appendix C).
- Remove all adhering medium residues. Pay particular attention to sealing grooves and crevices where medium residues can adhere. This is particularly important if the medium is hazardous to health, e.g., corrosive, toxic, carcinogenic, and radioactive, etc.
- We must ask you to refrain from returning the medium if it is not possible for you to completely remove substances hazardous to health with absolute certainty.

Costs incurred for possible disposal or personal injury (burns, etc.) due to inadequate cleaning of the device will be charged to the operator.

In the case of malfunction of the oval wheel meter, please contact our customer service:

Bopp & Reuther Messtechnik GmbH
Service

Am Neuen Rheinhafen 4

67346 Speyer, Germany

Tel.: +49 6232 657-420

Mobile: +49 15115233023

Fax: +49 6232 657 561

Email: service@bopp-reuther.com

C. Declaration on Decontamination

Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67348 Speyer
Germany

**BOPP & REUTHER
MESSTECHNIK** 

ERA number: _____

Telephone: +49 (0) 6232 / 657 420

Fax: +49 (0) 6232 / 657 561

Mail: service@bopp-reuther.com

Web: www.bopp-reuther.com

DECLARATION ON DECONTAMINATION OF METERS AND COMPONENTS

Please complete this form and return in advance by email or by Fax to +49(0)6232 / 657 561 in order to receive an Equipment Return Authorisation (ERA) number (not necessarily required). No action to repair or examine the meter will be done, until a valid declaration of decontamination has been received.

Contact information

Company Name: _____	Contact Person: _____
Company Address: _____	Name: _____
	Phone: _____
	Email: _____


Meter information

Type: _____	Serial no.: _____
Id. no.: _____	

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

Contamination information

The meter 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, harmful 
<input type="checkbox"/> explosive 	<input type="checkbox"/> environmental hazardous 	<input type="checkbox"/> other: _____

The meter was cleaned with: _____

Packaging and shipping instructions

- Remove all cables, connectors, separate filters and mounting materials
- Please pack each item in two suitable sealed protective foil bags
- Transport in suitable shipping package (e.g. original Bopp & Reuther Messtechnik shipping package)
- Include a copy of this declaration form along with the shipping documents on the outside

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

Print name: _____ Date: _____

Legally valid signature: _____

D. Certificates

D.1. Pressure Equipment Directive

ZERTIFIKAT ◆ CERTIFICATE ◆ ЗЕРТИФІКАТ ◆ CERTIFICADO ◆ ЗЕРТИФІКАТ ◆ CERTIFICADO ◆ 認証証書 ◆ CERTIFICATE ◆ ZERTIFIKAT ◆			
	ZERTIFIKAT gültig bis: 22.07.2029 CERTIFICATE valid until: 22.07.2029		
	EU-Baumusterprüfung (Modul B) - Baumuster - nach Richtlinie 2014/68/EU <i>EU Type examination (module B) - production type - according to Directive 2014/68/EU</i>		
	Zertifikat-Nr.: <i>Certificate No.:</i>	Z-IS-AN1-MAN-19-07-2681356-23083220	
	Name und Anschrift des Herstellers: <i>Name and address of manufacturer:</i>	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer	
	Hiermit wird bescheinigt, dass das unten genannte Baumuster die Anforderungen der Richtlinie 2014/68/EU erfüllt. <i>We herewith certify that the type mentioned below meets the requirements of the Directive 2014/68/EU.</i>		
	CE 0036		
	Prüfbericht Nr.: <i>Evaluation report No.:</i>	P-IS-AN1-MAN-19-07-2681356-23083220	
	Geltungsbereich: <i>Scope of examination:</i>	Ovalradzähler der Typen OI, OUI, OaP, Ouap, OV, OK, OT, OKT, OF, OR, OC, OP, DN 50 - 400, PN 10 - 100	
	Fertigungsstätte: <i>Manufacturing plant:</i>	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer	
Mannheim, 23.07.2019 (Ort, Datum) <i>(Place, date)</i> 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 GERMANY	Dokument ID: 2681356Y8193f		
Seite 1 zum Zertifikat Nr. / Page 1 of the certificate No. Z-IS-AN1-MAN-19-07-2681356-23083220			

D.2. 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 sous sa seule responsabilité 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 Manufacturer Fabricant	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer / Germany
Bezeichnung Description Description	Ovalradzähler Ovalwheel meter Compteur à roues ovales
Typ, Modell Type, model Type, modèle	OC mit with avec Reed-Kontakt / MFE

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 IEC 61000-6-2:2019 EN 61000-6-3:2007+A1:2011+AC:2012	

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	BVS 09 ATEX E 031 X	MFE
Notifizierte Stelle Notified Body Organisme Notifié	BVS, DMT: DEKRA EXAM	0158
Normen und normative Dokumente Standards and normative documents Normes et documents normatifs	EN IEC 60079-0:2018 EN 60079-11:2012	Reed-Kontakt, MFE

Bopp & Reuther Messtechnik GmbH, Am Neuen Rheinhafen 4, 67346 Speyer / Germany
Telefon: +49(0)6232 657-0, Telefax: +49(0)6232 657-505, Email: info@bopp-reuther.com, Internet: www.bopp-reuther.com

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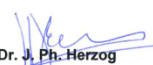
Richtlinie <i>Directive</i> Directive	2014/68/EU /UE Druckgeräte Pressure equipment Équipements sous pression	L 189/164
Konformitätsbewertungsverfahren <i>Conformity assessment procedure</i> Procédures d'évaluation de la conformité	Modul B + Modul C2	
Notifizierte Stelle <i>Notified Body</i> Organisme Notifié	0036 TUV 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 AD 2000 Code Code AD 2000	
Klassifizierung <i>Classification</i> Classification	Rohrleitungsteil Pipe Tuyauterie	
Fluid Kategorie ; Diagramm <i>Fluid category ; Diagramm</i> Dangerosité du fluide ; Tableau	Gruppe 1 ; Anhang II / 6 Group 1 ; Attachment II / 6 Groupe 1 ; Appendice II / 6	
Einstufung Druckgerät <i>Classification équipement sous pression</i> Classification pressure equipment	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.
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 Restriction of hazardous substances Limitation de substances dangereuses	L 174/88
Delegierte Richtlinie <i>Delegated Directive</i> Directive Déléguee	(EU /UE) 2015/863 Änderung Anhang II der Richtlinie 2011/65/EU Amending Annex II to Directive 2011/65/EU Modifiant l'annexe II de la directive 2011/65/UE	L 137/10
Normen und normative Dokumente <i>Standards and normative documents</i> Normes et documents normatifs	EN IEC 63000:2018	

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

Speyer, 2023-01-30


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

i. V. J. Riedl
stv. QM Beauftragter
Deputy QM Officer / Adjoint chargé de la qualité

Notes:

Notes:

Our product portfolio:

Volume flowmeter:

- Oval wheel meter
- Turbine meter
- Electromagnetic flowmeter

Mass flowmeter:

- Vortex meter
- Compact orifice
- Coriolis mass flowmeter

Density and concentration meter (Measuring and testing equipment)

Dosing measurement technology

- Electromagnetic flowmeter
- Coriolis mass flowmeter
- Oval wheel meter
- Dosing control system

Measurement Accessories

- Processing electronics
- Mechanical indicator
- Pulse pick-ups
- Components

Measuring and testing equipment

Conformity assessment according to MID Directive 2014/32/EU

After Sales Service

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BOPP & REUTHER
MESSTECHNIK

