BOPP & REUTHER
MESSTECHNIK

PRODUCT INFORMATION 2024

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OVERVIEW

Precision makes the difference

COMPANY

Founded in Mannheim in 1872, we achieved great fame with the invention of the oval wheel meter principle in 1932, giving industrial flow and quantity measurement of liquids a completely new quality and accuracy, which are still our top priorities today. Through constant further development, we have specialised in the manufacture of flowmeters, density and concentration meters as well as dosing meters.

Until today we have one of the largest ranges of oval wheel meters with more than 1000 variations. Measuring instruments from our company are used worldwide wherever liquid, steam and gaseous media have to be reliably measured, controlled and regulated.

In addition to our extensive and highly specialised product range, we naturally also offer our customers our extensive know-how in all relevant areas of modern measurement technology. Among other things, we support our customers in the implementation of the Measuring Instruments Directive 2014/32/EU. Together with you, we develop individual solutions. Our service team commissions, maintains and repairs measuring devices and systems. In doing so, we ensure your processes and ensure that your measuring instruments or systems always deliver precise measurement results.

OUR VALUES

Measurement and control technology has been our passion for more than 150 years. We are known for the highest measurement accuracy even under the most difficult conditions. Our incentive is to provide our customers with precisely fitting solutions for flow measurements, density measurements, filling of liquids and much more.
Sustainable increases in efficiency and process cost optimisation for our customers are the result of working with us.
The quality and reliability of our products is our top priority.

Contact us, we look forward to hearing from you!

On behalf of the Bopp & Reuther Messtechnik GmbH team

Dr. Jean-Philippe Herzog

VOLUME FLOW MEASUREMENT

OVAL WHEEL METER – Volume measurement

Type	Flow rate	Measuring accuracy	Page
OAP	8 up to 24000 l/min	up to ±0.05 % (of measured value)	8
OP	4.5 up to 5000 l/min	up to ±0.15 % (of measured value)	9-12
OI (slide bearing)	8 up to 1200 l/min	up to ±0.1 % (of measured value)	13
OI (ball bearing)	15 up to 1200 l/min	up to ±0.1 % (of measured value)	14
OI (small)	0.3 up to 10 l/min	up to ±0.1 % (of measured value)	15-16
OR	0.03 up to 660 l/min	up to ±0.25 % (of measured value)	17
OF	0.4 up to 660 l/min	up to ±0.25 % (of measured value)	18
OC	8 up to 100 l/min	up to ±0.5 % (of measured value)	19-20

OVAL WHEEL METER – Dosing measurement

Type	Flow rate	Measuring accuracy	Page
OD	0.2 up to 120 l/min	up to ±0.5 % (of measured value)	45

OVAL WHEEL METER – Filling systems

Type	Flow rate	Measuring accuracy	Page
OK	2.5 up to 500 l/min	up to ±0.5 % (of measured value)	51
OKT	5 up to 3000 l/min	up to ±0.5 % (of measured value)	52
Flowtronic	0.2 up to 100 l/min	up to ±0.5 % (of measured value)	53

VOLUME FLOW MEASUREMENT

TURBINE METER – Volume measurement

Type	Flow rate	Measuring accuracy	Page
RQ	0.6 up to 2400 m³/h	up to ±0.15 % (of measured value)	21-22

ELECTROMAGNETIC – Flow measurement

Type	Flow rate	Measuring accuracy	Page
SPIRAMAG	0.008 up to 28275 m³/h	±0.25 % (of measured value)	23
MID-EMF	0.3 up to 250 l/min	±0.7 % (of measured value) ±0.3 % (of measuring range end value)	24

VORTEX METER –Volume measurement

Type	Flow rate	Measuring accuracy	Page
VTX3	for water 0.36 up to 1840 m³/h	up to ±0.75 % (of measured value)	25-26
	for air 4.34 up to 21028 m³/h	up to ±1.0 % (of measured value)	
	for steam 5.07 up to 357649 kg/h	up to ±1.0 % (of measured value)	

VOLUME FLOW MEASUREMENT

COMPACT ORIFLOW – Flow measurement

Type	Flow rate	Measuring accuracy	Page
ORIFLOW D	for water 0 up to 160 m³/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	27
	for air 4 up to 360 m³/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value	
	for steam 10 barg 0 up to 10000 kg/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	
ORIFLOW O	for water 0 up to 265 m³/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	28
	for air 4 up to 680 m³/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	
	for steam10 barg 0 up to 11000 kg/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	
ORIFLOW U	for water 0 up to 5000 m³/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	29
	for air 4 up to 35000 m³/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	
	for steam10 barg 0 up to 50000 kg/h	up to ±0.8 % uncalibrated (of measured value) up to ±0.5 % calibrated (of measured value)	

OVAL WHEEL METER – TYPE OVERVIEW

Characteristics / Product-Type		OaP	OP	OI	OR / OF / OC	OD	OK / OKT	Flowtronic
Page		8	9-12	13-16	17-20	45	51 - 52	53
Application	Flow measurement	Measurement of liquids - continuous					Measurement of liquids - discontinuous	
	Dosing	-	-	>0.1 l	> 0.01 l	> 0.01 l	-	> 0.1 l
	Filling/Loading	> 0.25 l	> 5 l	> 5 l	> 0.01 l	> 0.01 l	> 5 l	> 0.1 l
Flow rate (l/min)		8 – 24,000	4.5 – 5,000	0.3 – 1,200	0.03 - 660	0.2 - 120	2.5 - 500	0.2 - 100
Accuracy (% of measured value)		up to ±0.2	up to ±0.3	up to ±0.3	up to ±0.5	up to ±0.5	up to ±0.5	up to ±0.5
optional		up to ±0.05	up to ±0.15	up to ±0.1	up to ±0.25	-	-	-
Viscosity range (mPa·s)		0.1 – 10,000	0.3 – 3,000	0.3 –100,000	0.3 – 3,000	0.3 – 3,000	0.3 - 1000	0.3 – 3,000
Ex-Zone		1	1	1	1	-	1	1
Measurement in custody transfer		✔	✔	✔	✔	-	-	-
Process temperature (°C)		-40 up to +290	-10 up to +110	-60 up to +180	-40 up to +130	-10 up to +120	-10 up to +60	-10 up to +70
Process pressure (bar)		up to 100	up to 40	up to 40	up to 68	up to 16	up to 6/10	up to 20
Material: Housing		cast steel, stainless steel	cast steel, stainless steel	cast iron, cast steel, stainless steel	stainless steel, Aluminium, PVDF, PEEK	stainless steel	stainless steel, cast iron, cast steel	stainless steel, Aluminium, brass
Material: Measuring chamber		Aluminium, cast iron	stainless steel, Aluminium					
Material: Oval wheels		Aluminium, cast iron	stainless steel, Aluminium	cast iron, stainless steel	stainless steel, PEEK	stainless steel, PEEK	stainless steel, cast iron	stainless steel, PEEK
Pulse pick-up		1-channel, 2-channel	1-channel, 2-channel	1-channel, 2-channel	1-channel, 2-channel	1-channel	1-channel, 2-channel	1-channel, 2-channel
Supply		24 VDC, NAMUR, none			24 VDC, NAMUR, battery	24 VDC	24 VDC, NAMUR, none	24 VDC, 110-230 VAC
Output signal		NAMUR, 4-20 mA, Open-collec-tor, none	NAMUR, 4-20 mA, Open-collec-tor, none	NAMUR, Open-collec-tor, none	Reed, NAMUR, 4-20 mA, NPN, PNP	Open-collector, PNP	NAMUR, Switching contact	NAMUR, 4-20 mA, Open-collector, none
Digital display		✔	✔	✔	✔	-	✔	✔
Digital display with preselection		✔	✔	✔	✔	-	✔	✔
Digital display with reverse detection		✔	✔	✔	✔	-	-	✔
Communication interface		4-20 mA / HART®, RS232,RS485, netwerk (LAN)				-	RS485	
Protocol / Data		HART®, Modbus (RTU, ASCII, TCP/IP), Profibus, CSV-file				-	Modbus	
Printer		✔	✔	✔	✔	✔	✔	✔
Mechanical display		✔	✔	✔	-	-	✔	-
Mechanical display with preselection		✔	✔	✔	-	-	✔	-
Process connection		Flange acc. to DIN or ANSI			Internal- / ex-ternal thread, Flange	Tri-Clamp	Flange acc. to DIN or ANSI	Internal thread
Strainer		✔	✔	✔	✔	-	✔	✔
Special feature		SIL2	very easy instalation	low up to high viscosity liquids	IECEx	very high resolution	Filling without auxiliary energy	Batchcon-troller, valve
		no inlet and outlet section required						

The listed product characteristics depend on the medium and the ambient conditions.

OVAL WHEEL METER OaP

MAIN CHARACTERISTICS

Product type:	direct volume meter (Double-Case)
Application:	Volume / flow measurement for liquids
Measuring accuracy:	up to ±0.2 % of measured value (optional ±0.05 %)
Ex-approval:	Zone 1
Process temperature:	-40°C up to 290°C
Process pressure:	up to 100 bar
Housing material:	cast steel, stainless steel optional for DN25-DN150
Wetted parts:	Aluminium, cast iron, stainless steel optional for DN25-DN150
Power supply:	NAMUR, 24 VDC
Output / Display:	Mechanical display, pulse output acc. to NAMUR, HART® 4-20 mA, Open-collector
Process connection:	Flange acc. to DIN or ANSI
Special features:	low pressure drop, the only oval wheel meter with SIL 2 worldwide, no inlet and outlet pipe section required, NACE, MR0175, 10–point linearization

MEASURING RANGE

Viscosity in mPa·s				< 0.3	0.3 – 1.5	1.5 - 150	150-350	350-1000	1000- 3000
Type	DN	Q_{max} [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OaP 5	25	60	min	8	5	5	2.5	1.25	0.45
			Continuous	18	36	50	28	14	5
			max	48	60	60	30	15	5.4
OaP 10	25	120	min	16	10	10	7	3,5	1.2
			Continuous	36	73	99	77	39	13.2
			max	96	120	120	84	42	14.4
OaP 50	50	360	min	50	30	30	18	9	3
			Continuous	110	220	297	198	99	33
			max	300	360	360	216	108	36
OaP 125	65	840	min	100	70	70	60	40	15
			Continuous	220	460	578	660	440	165
			max	600	840	840	720	480	180
OaP 250	80	1440	min	200	120	120	100	60	30
			Continuous	440	790	1100	1100	660	330
			max	1200	1440	1440	1200	720	360
OaP 600	100	3600	min	400	250	250	200	150	75
			Continuous	880	1800	2750	2750	1650	830
			max	2400	3600	3600	3000	1800	900
OaP 1200	150 6“	6000	min	800	500	500	400	250	120
			Continuous	1800	2800	3900	4400	2800	1300
			max	4800	6000	6000	4800	3000	1400
OaP 2000	200 8“	9600	min	1300	800	800	660	400	200
			Continuous	2900	4400	6100	7300	4400	2200
			max	7800	9600	9600	7900	4800	2400
OaP 3200	300 12“	14400	min	2000	1200	1200	1000	600	300
			Continuous	4400	6600	8800	11000	6600	3300
			max	12000	14400	14400	12000	7200	3600
OaP 4000	400 16“	24000	min	3200	200	2000	1500	1000	400
			Continuous	7300	11000	15000	17000	11000	4400
			max	19000	24000	24000	18000	12000	4800

Further information and product variants are available on request

OVAL WHEEL METER OP 15-50

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Double-Case)
Application:	for flow and volume measurement of liquids of medium viscosity
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.15 %)
Ex-approval:	Zone 1
Process temperature:	-10°C up to 70°C (AG01), up to 90°C / 110°C (AG19, AG20) up to 170°C with temperature extension
Process pressure:	up to 40 bar
Housing material:	stainless steel, cast steel
Wetted parts:	stainless steel
Power supply:	none (basic model), NAMUR, 24 VDC
Process supply / Display:	NAMUR pulses (AG19 / AG20), Open collector (AG01) / mechanical Display
Process connection:	Flange acc. to DIN or ANSI
Special features:	very simple operation, works without auxiliary energy, no inlet and outlet pipe section required

MEASURING RANGE

Viscosity in mPa·s				< 0.3	0.3 – 1.5	1.5 - 150	150-350	350-1000	1000-3000
Type	DN	Qmax [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OP15	15	30	min	4.5	5	3	1.5	0.075	0.25
			Continuous	9	19.8	19.8	15	7.5	2.5
			max	22.5	27	27	15	7.5	2.5
OP20	20 / 25	50	min	8	5	5	2.5	1.25	0.45
			Continuous	10	33	33	25	12.5	4.5
			max	40	50	50	25	12.5	4.5
OP32	32	100	min	8	10	10	7	3,5	1.2
			Continuous	16	66	66	70	35	12
			max	80	100	100	70	35	12
OP40	40	150	min	12	15	15	9	4.5	1.5
			Continuous	24	99	99	90	45	15
			max	120	150	150	90	45	15
OP50	50	150	min	50	30	30	18	9	3
			Continuous	100	198	198	180	90	30
			max	250	300	300	180	90	30

OPTIONS

Pulse pick-up: AG19, AG20, AG01
Mechanical local display: single pointer totalizer E, double pointer totalizer D, mechanical counter M5, mechanical counter volume pre-setting M5V

Further information and product variants are available on request

OVAL WHEEL METER OP 250 - 1200

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Double-Case)
Application:	for flow and volume measurement of liquids of medium viscosity
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.15 %)
Ex-approval:	Zone 1
Process temperature:	-10°C up to 60°C / 70°C (AG 01) / 90°C / 110°C (AG 19, 20)
Process pressure:	16 bar (up to 40 bar on request)
Housing material:	stainless steel, cast steel
Wetted parts:	stainless steel, Aluminium
Power supply:	none (basic model), NAMUR, 24 VDC
Process supply / Display:	NAMUR pulses / Open collector pulses, mechanical display (single pointer totalizer E / double pointer totalizer D, mechanical totalizer M5 / M5V)
Process connection:	Flange acc. to DIN or ANSI
Special features:	very simple to use, works without auxiliary energy, no inlet and outlet pipe section required

MEASURING RANGE

Viscosity in mPa·s			0.3 ~17	3.5 ~ 120
Type	DN	Flow rate	[l/min]	[l/min]
OP250	80 / 3“	min	167	83
		Continuous	1333	1333
		max	1667	1667
OP470	100 / 4“	min	250	167
		Continuous	2000	2000
		max	2500	2500
OP600	100 / 4“	min	333	25
		Continuous	2667	2667
		max	3333	3333
OP1200	150 / 6“	min	500	250
		Continuous	4000	4000
		max	5000	5000

OPTIONS

Pulse pick-up : AG 19, AG 20, AG 01-08
Mechanical local display: single pointer totalizer E, double pointer totalizer D, mechanical totalizer M5 / M5V

Further information and product variants are available on request

OVAL WHEEL METER OP AG44 / UST

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Double-Case)
Application:	for flow and volume measurement of liquids of medium viscosity
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.15 %)
Ex-approval:	Zone 1
Process temperature:	-10°C up to 110°C
Process pressure:	up to 40 bar on request
Housing material:	stainless steel, cast steel
Wetted parts:	stainless steel
Power supply:	NAMUR or 24 VDC 2-wire technology
Output / Display:	4-20 mA / HART®, NAMRUR pulses / LCD-Display
Process connection:	Flange acc. to DIN or ANSI
Special features:	very easy installation, no inlet and outlet pipe section required, 10-point linearization

MEASURING RANGE

Viscosity in mPa·s				< 0.3	0.3 – 1.5	1.5 - 150	150-350	350-1000	1000-3000
Type	DN	Qmax [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OP15	15	30	min	4.5	5	3	1.5	0.075	0.25
			Continuous	9	19.8	19.8	15	7.5	2.5
			max	22,5	27	27	15	7.5	2.5
OP20	20 / 25	50	min	8	5	5	2.5	1.25	0.45
			Continuous	10	33	33	25	12.5	4.5
			max	40	50	50	25	12.5	4.5
OP32	32	100	min	8	10	10	7	3.5	1.2
			Continuous	16	66	66	70	35	12
			max	80	100	100	70	35	12
OP40	40	150	min	12	15	15	9	4.5	1.5
			Continuous	24	99	99	90	45	15
			max	120	150	150	90	45	15
OP50	50	150	min	50	30	30	18	9	3
			Continuous	100	198	198	180	90	30
			max	250	300	300	180	90	30

OPTIONS

Pulse pick-up: AG44 (blind version)
Electronic local display: UST

Further information and product variants are available on request

OVAL WHEEL METER OP - F016/110/018

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Double-Case)
Application:	for flow and volume measurement of liquids of medium viscosity
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.15 %)
Ex-approval:	Zone 1
Process temperature:	-10°C up to 60°C / 70°C (F016/110/018) / 110 °C (AG50L)
Process pressure:	16 bar (up to 40 bar on request)
Housing material:	stainless steel, cast steel
Wetted parts:	stainless steel, Aluminium
Power supply:	battery, NAMUR, 24 VDC
Output / Display:	4-20 mA / MODBUS, NAMUR pulses / LCD-Display
Process connection:	Flange acc. to DIN or ANSI
Special features:	very easy installation, 8 up to 15 points linearization, no inlet and outlet pipe section required

MEASURING RANGE

Viscosity in mPa·s			0.3 ~17	3.5 ~ 120
Type	DN	Flow rate	[l/min]	[l/min]
OP250	80 / 3“	min	167	83
		Continuous	1333	1333
		max	1667	1667
OP470	100 / 4“	min	250	167
		Continuous	2000	2000
		max	2500	2500
OP600	100 / 4“	min	333	25
		Continuous	2667	2667
		max	3333	3333
OP1200	150 / 6“	min	500	250
		Continuous	4000	4000
		max	5000	5000

OPTIONS

Pulse pick-up: AG 50L, AG 19L, AG 20L
Electronic local display: F016, F110 and F018

Further information and product variants are available on request

OVAL WHEEL METER OI

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	Volume / flow measurement of liquids
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.1 %)
Ex-approval:	Zone 1
Process temperature:	-60°C up to 180°C
Process pressure:	up to 40 bar
Housing material:	stainless steel, cast steel, cast iron
Wetted parts:	stainless steel, cast steel, cast iron
Power supply:	NAMUR, 24 VDC
Process supply / Display:	Mechanical display, pulse output acc. to NAMUR, HART® 4-20 mA
Process connection:	Flange acc. to DIN or ANSI
Special features:	Low pressure loss, no inlet and outlet pipe section required, 10-point linearization

MEASURING RANGE

Slide bearing

Viscosity in mPa·s				< 0.3	0.3 – 1.5	1.5 - 150	up to 350	up to 1000	up to 3000
Type	DN	Qmax [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OI5	25	50	min	8	5	5	2.5	1.25	0.45
			Continuous	16	33	33	25	12.5	4.5
			max	40	50	50	25	12.5	4.5
OI10	25	100	min	16	10	10	7	3,5	1.2
			Continuous	33	66	80	70	35	12
			max	80	100	100	70	35	12
OI50	50	300	min	50	30	30	18	9,5	3
			Continuous	100	200	240	180	90	30
			max	250	300	300	180	90	30
OI100	50	660	min	110	66	66	48	24	10
			Continuous	230	440	530	480	240	100
			max	550	660	660	480	240	100
OI200	80	700	min	110	70	70	50	25	12
			Continuous	230	420	525	500	250	120
			max	560	700	700	500	250	120
OI400	100	1200	min	200	120	120	100	60	30
			Continuous	400	720	1000	1000	600	300
			max	1000	1200	1200	1000	600	300

Viscosities up to 100000 mPa·s are possible with ball bearing guide

Further information and product variants are available on request

OVAL WHEEL METER OI

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	Volume / flow measurement of liquids
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.1 %)
Ex-approval:	Zone 1
Process temperature:	-60°C up to 180°C
Process pressure:	up to 40 bar
Housing material:	stainless steel
Wetted parts:	stainless steel
Power supply:	NAMUR
Output / Display:	mechanical display, pulse output acc. to NAMUR
Process connection:	Flange acc. to DIN or ANSI
Special features:	low pressure loss, no inlet and outlet section required

MEASURING RANGE

Ball bearing

Viscosity in mPa·s				1.5 - 20	up to 350	up to 2000	up to 5000	up to 10000	up to 20000	up to 60000	up to 100000
Type	DN	Q_{max} [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OI5	25	50	min	15	5	2.5	1.2	0.6	0.3	0.1	
			max	50	50	25	12	6	3	1	
OI10	25	100	min	30	10	8	4	2	1	0.3	
			max	100	100	80	40	20	10	3	
OI50	50	300	min	60	30	15	7.5	4	2	1	0.6
			max	300	300	200	150	80	40	12	6
OI200	80	700	min	140	70	30	15	10	4	3	1
			max	700	700	700	350	180	80	25	12
OI400	100	1200	min	240	120	60	35	17	10	4	2
			max	1200	1200	1200	700	350	180	50	25

For Newtonian liquids

Further information and product variants are available on request

OVAL WHEEL METER SMALL-OI UST

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	Volume / flow measurement of liquids
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.1 %)
Ex-approval:	Zone 1
Process temperature:	-60°C up to 180°C
Process pressure:	up to 40 bar
Housing material:	stainless steel, Brass, Aluminium (Electronic housing)
Wetted parts:	stainless steel, Brass
Power supply:	24 VDC (2-wire technology)
Output / Display:	4-20 mA / HART® and pulse output (NAMUR) / LCD-Display
Process connection:	Flange acc. to DIN or ANSI, pipe fitting (8 mm / 12 mm)
Special features:	no inlet and outlet pipe section required, 10-point linearization

MEASURING RANGE

These units are designed with plain bearings to guarantee maximum service life and reliability

Viscosity in mPa·s				0.3–0.8	0.8-2	2-50	50-150	150-350	350-1000
Type	DN	Q_{max} [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OI03	6 / 15	2	min	0.3	0.2	0.2	0.18	0.1	0.03
			Continuous	1	1.3	1.8	1.8	1	0,4
			max	1.6	2	2	1.8	1	0.4
OI06	10 / 15	4,11	min	0.6	0.4	0.4	0.3	0.2	0.08
			Continuous	2.1	2.6	1.8	3.7	2.1	0.8
			max	3.3	4.1	4.1	3.7	2.1	0.8
OI1	15	10	min	1.6	1	1	0.9	0.6	0.2
			Continuous	5	6.6	9	9	6	2
			max	8.3	10	10	9	6	2

Further information and product variants are available on request

OVAL WHEEL METER SMALL-OI

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	Volume / flow measurement of liquids
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.1 %)
Ex-approval:	Zone 1
Process temperature:	-60°C up to 180°C
Process pressure:	up to 40 bar
Housing material:	stainless steel, Brass, Aluminium (Electronic housing)
Wetted parts:	stainless steel, Bronze (Oval wheel meter)
Power supply:	none / NAMUR
Output / Display:	none / pulse output 1- or 2-channel acc. to NAMUR / mechanical indicator Type R7
Process connection:	Pipe fitting, Flange acc. to DIN or ANSI
Special features:	no inlet and outlet pipe section required

MEASURING RANGE

These units are designed with plain bearings to guarantee maximum service life and reliability

Viscosity in mPa·s				0.3–0,8	0.8-2	2-50	50-150	150-350	350-1000
Type	DN	Q_{max} [l/min]	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
OI03	6 / 15	2	min	0.3	0.2	0.2	0.18	0.1	0.03
			Continuous	1	1.3	1.8	1.8	1	0.4
			max	1.6	2	2	1.8	1	0.4
OI06	10 / 15	4,11	min	0.6	0.4	0.4	0.3	0.2	0.08
			Continuous	2.1	2.6	1.8	3.7	2.1	0.8
			max	3.3	4.1	4.1	3.7	2.1	0.8
OI1	15	10	min	1.6	1	1	0.9	0.6	0.2
			Continuous	5	6.6	9	9	6	2
			max	8.3	10	10	9	6	2

Further information and product variants are available on request

OVAL WHEEL METER FLOWAL® PLUS OR

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	for liquids
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.25 %), > 3mPa·s
Ex-approval:	Zone 1
Process temperature:	-40°C up to 130°C
Process pressure:	up to 68 bar
Housing material:	stainless steel, Aluminium, PVDF, Polypropylene, PEEK
Wetted parts:	stainless steel, PEEK
Power supply:	NAMUR, NPN, PNP, battery, 24 VDC
Output / Display:	4-20 mA, pulse output, digital display
Process connection:	Internal thread acc. to ISO 288
Special features:	Low pressure loss, maintenance-free, blind version with 2-channel pulse pick-up can be used in custody transfer metering systems

MEASURING RAGE

Material: Oval wheel meter made of stainless steel

Viscosity range in mPa·s		0.3 – 1.5	1.5 - 150	150 - 350	350 - 1000	1000 - 3000
Type	Process connection	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)
OR015	G ¼	0.03 – 1	0.03 – 1	0.01 – 0.3	-	-
OR06	G ½	0.2 – 5	0.2 – 5	0.1 – 1.8	0.05 – 0.6	-
OR1	G ½	0.4 – 10	0.4 – 10	0.2 – 7.5	0.1 – 2.5	-
OR2	G ¾	1 – 30	1 – 30	0.4 – 11	0.3 – 4	-
OR5	G 1	2 – 50	2 – 50	1 – 25	0.6 – 12.5	0.3 – 4.5
OR10	G 1	4 – 100	4 – 100	2 – 70	1 – 35	1 – 12
OR50	G 2	15 – 300	15 – 300	4 – 180	3 – 90	2 – 30
OR115	G 2	35 - 660	35 - 660	10 - 480	6 - 240	3 - 100

Material: Oval wheel meter made of PEEK

Viscosity range in mPa·s		0.3 – 1.5	1.5 - 150
Type	Process connection	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)
OR015	G ¼	0.03 – 1	0.03 – 1
OR06	G ½	0.2 – 7	0.2 – 7
OR1	G ½	0.4 – 14	0.4 – 14
OR2	G ¾	1 – 30	1 – 30
OR5	G 1	2 – 60	2 – 60
OR10	G 1	4 – 120	4 – 120

Further information and product variants are available on request

OVAL WHEEL METER FLOWAL® PLUS OF

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	for liquids
Measuring accuracy:	up to ±0.3 % of measured value (optional ±0.25 %), > 3 mPa·s
Ex-approval:	Zone 1
Process temperature:	-40°C up to 130°C
Process pressure:	up to 68 bar
Housing material:	stainless steel, Aluminium, PVDF, Polypropylene
Wetted parts:	stainless steel, PEEK
Power supply:	NAMUR, NPN, PNP, battery, 24 VDC
Output / Display:	4-20 mA, pulse output, digital display
Process connection:	Flange acc. to DIN or ANSI
Special features:	Low pressure loss, maintenance-free, blind version with 2-channel pulse pick-up can be used in custody transfer metering systems

MEASURING RANGE

Material: oval wheels made of stainless steel

Viscosity range in mPa·s		0.3 – 1.5	1.5 - 150	150 - 350	350 - 1000	1000 - 3000
Type	Process connection	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)
OF1	DN 15	0.4 – 10	0.4 – 10	0.2 – 7.5	0.1 – 2,5	-
OF2	DN 15	1 – 30	1 – 30	0.4 – 11	0.3 – 4	-
OF10	DN 25	4 – 100	4 – 100	2 – 70	1 – 35	1 – 12
OF50	DN 50	15 – 300	15 – 300	4 – 180	3 – 90	2 – 30
OF115	DN 50	35 - 660	35 - 660	10 - 480	6 - 240	3 - 100

Material: oval wheels made of PEEK

Viscosity range in mPa·s		0.3 – 1.5	1.5 - 150
Type	Process connection	Q_{min} - Q_{max} (l/min)	Q_{min} - Q_{max} (l/min)
OF1	DN 15	0.4 – 14	0.4 – 14
OF2	DN 15	1 – 30	1 – 30
OF10	DN 25	4 – 120	4 – 120

Further information and product variants are available on request

OVAL WHEEL METER OC REEDCONTACT

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	for liquids
Measuring accuracy:	up to ±0.5 % of measured value (optional ±0.25 %)
Ex-approval:	Zone 1 (REED evaluated as simple operating equipment)
Process temperature:	0°C up to 70°C
Process pressure:	up to 16 bar
Housing material:	AISI 304, Aluminium
Wetted parts:	AISI 304, Aluminium
Power supply:	via SPS / PLS, 24 VDC
Output / Display:	Pulse output
Process connection:	male thread (R) / female thread (G)
Special features:	compact version, high resolution

MEASURING RANGE

Viscosity in mPa·s			< 0.3	0.3 – 1.5	1.5 - 150	150 - 350
Type	DN	Flow rate	[l/min]	[l/min]	[l/min]	[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	G 1“	min	16	10	10	7
		Continuous	33	70	80	70
		max	80	100	100	70
OC 10	R 1½“	min	16	10	10	7
		Continuous	33	70	80	70
		max	80	100	100	70

OUTPUT SIGNALS

Pulse output via Reed-contact

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

Further information and product variants are available on request

OVAL WHEEL METER OC WITH MFE

MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	for liquids
Measuring accuracy:	up to ±0.5 % of measured value (optional ±0.25 %)
Ex-approval:	Zone 1
Process temperature:	0°C up to 70°C
Process pressure:	up to 16 bar
Housing material:	AISI 304, Aluminium
Wetted parts:	AISI 304, Aluminium
Power supply:	battery, 24 VDC, 4-20 mA two-wire device
Output / Display:	4-20 mA, pulse output, digital display
Process connection:	male thread (R) / female thread (G)
Special features:	compact version, high resolution

MEASURING RANGE

Viscosity in mPa·s			< 0.3	0.3 – 1.5	1.5 - 150	up to 350
Type	DN	Flow rate	[l/min]	[l/min]	[l/min]	[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	G 1“	min	16	10	10	7
		Continuous	33	70	80	70
		max	80	100	100	70
OC 10	R 1 ½“	min	16	10	10	7
		Continuous	33	70	80	70
		max	80	100	100	70

SUPPLY

MFE-1and MFE-2: Lithium-battery 3.6 V
MFE-3: 24 VDC

OUTPUT SIGNALS

MFE-1 Display
MFE-2 Display, pulses 100 Pulses / Liter
MFE-3 Display, pulses 100 Pulses / Liter, current output 4-20 mA

Type	Pulse/L	Freq./Hz
OC 5	100	83.3
OC 10	100	83.3

Further information and product variants are available on request

IECEx

TURBINE METER RQ UST

MAIN CHARACTERISTICS

Product Type:	indirect volumetric meter
Application:	for liquids up to a viscosity of approx. 30 mPa·s
Measuring accuracy:	up to ± 0.15 % (1:10) of measured value (with inlet and outlet)
Ex-approval:	Zone 1
Process temperature:	-196°C / -40°C up to 120°C / 250°C
Process pressure:	up to 100 bar
Housing material:	stainless steel, cast steel, Hastelloy
Wetted parts:	stainless steel, sapphire or tungsten carbide bearing
Power supply:	24 VDC (2-wire technology)
Process supply / Display:	4-20 mA / HART®, pulse output acc. to NAMUR / LCD-Display
Process connection:	Flange acc. to DIN or ANSI
Special features:	low pressure loss, high resolution design according to NACE MR 0175, 10-point linearization

MEASURING RANGE

Nominal size	m³/h	Pulses			Inlet pipe section mm	Outlet pipe section mm
		Pulses/n	Pulses/l	Hz_{max}		
DN15 / ½"	0.6 - 6	4	~310	517	180 (12xDN)	160
DN25 / 1"	1.8 - 18	4	~105	525	240 (12xDN)	160
DN40 / 1¼"	4.2 - 42	4	~22	257	400	200
DN50 / 2"	7.2 - 72	4	~12.4	248	500	250
DN65 / 2½"	12 - 120	4	~6	200	650	325
DN80 / 3"	18 - 180	12	~15	750	800	400
DN100 / 4"	30 - 300	10	~6	500	1000	500
DN150 / 6"	60 - 600	18	~3.4	567	1500	750
DN200 / 8"	120 - 1200	24	~1.84	613	2000	1000
DN250 / 10"	180 - 1800	40	~1.24	600	2500	1250
DN300 / 12"	240 - 2400	44	~0.78	520	3000	1500

SUPPLY

24 VDC (min. 14 VDC / max. 30 VDC)

OUTPUT SIGNALS

4-20 mA / HART®, connection: 2-wire technology
or current pulses without HART®, connection: 2-wire technology
Separate original or scaled NAMUR pulse output

Further information and product variants are available on request

TURBINE METER RQ PV

MAIN CHARACTERISTICS

Product Type:	indirect volumetric meter
Application:	for quantity measurements of liquids in custody transfer up to a viscosity of approx. 30 mPa·s
Measuring accuracy:	up to ± 0.3 % (1:10) / ± 0.15 % (1:5, with inlet and outlet) of measured value
Ex-approval:	Zone 1
Process temperature:	-60°C up to 120°C / 250°C
Process pressure:	up to 100 bar
Housing material:	stainless steel, cast steel, Hastelloy
Wetted parts:	stainless steel, sapphire or tungsten carbide bearing
Power supply:	NAMUR
Output / Display:	Pulse output acc. to NAMUR, 1- or 2- channel (for connection to a flow computer)
Process connection:	Flange acc. to DIN or ANSI
Special features:	low pressure drop, high resolution Version according to NACE MR 0175, version with up to 3 pulse generators possible

MEASURING RANGE

Nominal size	m³/h	Pulses			Inlet pipe section mm	Outlet pipe section mm
		Pulses/n	Pulses/l	Hz_{max}		
DN15 / ½"	0.6 - 6	4	~310	517	180 (12xDN)	160
DN25 / 1"	1.8 - 18	4	~105	525	240 (12xDN)	160
DN40 / 1¼"	4.2 - 42	4	~22	257	400	200
DN50 / 2"	7.2 - 72	4	~12.4	248	500	250
DN65 / 2½"	12 - 120	4	~6	200	650	325
DN80 / 3"	18 - 180	12	~15	750	800	400
DN100 / 4"	30 - 300	10	~6	500	1000	500
DN150 / 6"	60 - 600	18	~3.4	567	1500	750
DN200 / 8"	120 - 1200	24	~1.84	613	2000	1000
DN250 / 10"	180 - 1800	40	~1.24	600	2500	1250
DN300 / 12"	240 - 2400	44	~0.78	520	3000	1500

SUPPLY

NAMUR

OUTPUT SIGNALS

Volume proportional pulses, connection: 2-wire technology

Further information and product variants are available on request

MID SpiraMAG®

MAIN CHARACTERISTICS

Product type:	Electromagnetic flowmeter
Application:	For flow measurement of liquids with a conductivity of ≥ 5µS/cm
Measuring accuracy:	± 0.25 % of reading ± 0.1 % full scale (for powered devices)
Process temperature:	0°C to + 65°C (compact, rubber liner) 0°C to + 65°C (remote, rubber liner) -20°C to +100°C (compact, PTFE liner) -20°C to +150°C (remote, PTFE liner)
Process pressure:	Up to 40 bar, higher pressures on request
Housing material:	Painted steel / optionally stainless steel
Wetted parts:	Stainless steel, Hastelloy C, Platinum (Electrodes), soft rubber, hard robber or PTFE/PFA (liner)
Power supply:	85-265 VAC (50 / 60 Hz) / 9-36 VDC / battery
Output / Display:	4-20 mA, frequency output / pulse output (active), RS 485 / Display
Process connection:	Flanges acc. to DIN, ANSI, JIS, Tri-Clamp
Special features:	Empty pipe detection, bi-directional measurement any mounting position

MEASURING RANGE

DN	Flow rate (for flow velocity* ~ 0.3 – 10 m/s)*	
	Qmin [m³/h]	Qmax [m³/h]
15	0.2	6
25	0.5	18
32	0.9	29
40	1.5	45
50	2.1	71
65	3.6	119
80	5.4	181
100	8.5	283
125	13	442
150	19	636
200	34	1131
250	53	1767
300	76	2545
350	104	3464
400	136	4524
450	172	5725
500	212	7068
600	305	10178
700	416	13854
800	543	18095
900	687	22902
1000	848	28274

* Recommended flow velocity is 2-3 m/s

OPTIONS

- Remote version with distance to transmitter: standard 10 m optional up to 100 m
- Transducer type with power supply or battery
- Sizes up to DN 2000 on request
- Protection class standard IP67, optional IP68

Further information and product variants are available on request.

Modbus

MID-EMF

MAIN CHARACTERISTICS

Product Type:	Electromagnetic flowmeter
Application:	Flow measurement and filling of conductive liquids
Measuring accuracy:	±0.7 % of measured value ±0.3 % of measuring range end value
Repeatability:	±1 %
Ex-approval:	none
Process temperature:	0 up to +60°C
Process pressure:	max. 10 bar
Housing material:	ABS
Wetted parts:	stainless steel 1.4404 (Electrodes), POM, PVDF (process connections and measuring tube)
Power supply:	24 VDC
Output / Display:	Pulses, 4-20 mA or 0-10 V
Process connection:	Tri-Clamp, thread, others on request
Special features:	Low-cost solution with high resolution up to 50,000 Pulses/l, for conductive liquids from 20 µS/cm

MEASURING RANGE

DN	Q_{max} [l/min]	K-factor pulses/ml	Flow rate				
			v=0.5 m/s	v=1.0 m/s	v=2.5 m/s		v=4.5 m/s
			[ml/s]	[ml/s]	[ml/s]		[ml/s]
3	2	50,000	4.2	8.4	21		32
6	8	25,000	13.9	28	70	…	127
8	14	10,000	21	42	105		226
15	47	5,000	88	176	440		795
20	85	2,500	157	314	785		1,414
25	133	1,200	245	490	1,125		2,209

REFERENCE CONDITIONS

Pressure: approx. 2 bar, temperature: 25°C
Liquid: water without gas inclusions

SUPPLY

12-24 VDC, max. 3,6 W, 4-Pin-plug M 12 x 1

OUTPUT SIGNALS

Pulse output 24 VDC, 4-20 mA, 0-10 V

Further information and product variants are available on request

VORTEX METER VTX 3

MAIN CHARACTERISTICS

Product Type:	indirect volume and mass flow meter
Application:	Flow and volume measurement with integrated temperature and pressure compensation for liquids, gases and steams
Measuring accuracy:	from ±0.75 % of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to +240°C
Process pressure:	up to 100 bar
Housing material:	stainless steel
Wetted parts:	stainless steel
Power supply:	24 VDC
Process supply / Display:	2 x 4-20 mA, HART®, pulses, on-site-Display
Process connection:	Flange or Sandwich version
Special features:	direct calculation of energy quantities

MEASURING RANGE

	Water		Air		Saturated steam (Values for 170°C, 7barg)	
DN	Qmin	Qmax	Qmin	Qmax	Qmin	Qmax
	m³/h		m³/h		kg/h	
15	0.36	5.07	4.34	32.57	9.73	135.7
25	0.81	11.4	9.77	114.00	21.88	474.9
40	2.04	28.58	24.50	326.60	54.86	1361
50	3.53	49.48	42.41	565.50	94.98	2356
80	7.74	108.3	92.90	1239	208.1	5160
100	13.3	186.2	159.60	2128	357.5	8866
150	30.13	421.89	361.60	4822	809.9	20086
200	56.61	792.50	679.30	9057	1521	37730
250	90.49	1267	1086	14478	2432	60316
300	131.40	1840	1577	21028	3532	87601

The values for water and air are operating volumes.

The values for saturated steam depend on pressure and temperature. As an example, the measuring ranges 170°C (7 barg) are given. More ranges can be found in the data sheet or operating instructions.

MEASURING ACCURACY

Volume flow (liquids)	±0.75 % of measured value (Re ≥ 2000)
	±2.0 % of measured value (10000 Re ≥ 2000)
Volume flow (gases and steams)	±1 % of measured value (Re ≥ 2000)
	±2.0 % of measured value (10000 Re ≥ 2000)
Mass flow (gases and steams)	±1 % of measured value (Re ≥ 2000) [1]
	±2.0 % of measured value (10000 Re ≥ 2000)[1]
Mass flow (liquids)	±1.5 % of measured value (Re ≥ 2000)
	±2.5 % of measured value (10000 Re ≥ 2000)
Standard volume (gases)	±1.5 % of measured value (Re ≥ 2000)[1]
	±2.5 % of measured value (10000 Re ≥ 2000)[1]

[1] The maximum measurement deviation refers to the measurement at an operating pressure > 65 % of the measuring range end value of the pressure sensor used.

Further information and product variants are available on request

VORTEX METER VTX 3 WITH P/T

MAIN CHARACTERISTICS

Product Type:	indirect volume and mass flow meter
Application:	Flow and volume measurement with integrated temperature and pressure compensation for liquids, gases and steams
Measuring accuracy:	from ±0.75 % of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to +240°C
Process pressure:	up to 100 bar
Housing material:	stainless steel
Wetted parts:	stainless steel
Power supply:	24 VDC
Process supply / Display:	2 x 4-20 mA, HART®, pulses, On-site display
Process connection:	Flange or Sandwich version
Special features:	direct calculation of energy quantities

MEASURING RANGE

DN	Water		Air		Saturated steam (Values for170°C, 7 barg)	
	Qmin	Qmax	Qmin	Qmax	Qmin	Qmax
	m³/h		m³/h		kg/h	
15	0.36	5.07	4.34	32.57	9.73	135.7
25	0.81	11.4	9.77	114.00	21.88	474.9
40	2.04	28.58	24.50	326.60	54.86	1361
50	3.53	49.48	42.41	565.50	94.98	2356
80	7.74	108.3	92.90	1239	208.1	5160
100	13.3	186.2	159.60	2128	357.5	8866
150	30.13	421.89	361.60	4822	809.9	20086
200	56.61	792.50	679.30	9057	1521	37730
250	90.49	1267	1086	14478	2432	60316
300	131.40	1840	1577	21028	3532	87601

The values for water and air are operating volumes.

The values for saturated steam depend on pressure and temperature. As an example, the measuring ranges 170°C (7 barg) are given. More ranges can be found in the data sheet or operating instructions.

MEASURING ACCURACY

Volume flow (liquids)	±0.75 % of measured value (Re ≥ 2000)
	±2.0 % of measured value (10000 Re ≥ 2000)
Volume flow (gases and steams)	±1 % of measured value (Re ≥ 2000)
	±2.0 % of measured value (10000 Re ≥ 2000)
Mass flow (gases and steams)	±1 % of measured value (Re ≥ 2000) [1]
	±2.0 % of measured value (10000 Re ≥ 2000)[1]
Mass flow (liquids)	±1.5 % of measured value (Re ≥ 2000)
	±2.5 % of measured value (10000 Re ≥ 2000)
Standard volume (gases)	±1.5 % of measured value (Re ≥ 2000)[1]
	±2.5 % of measured value (10000 Re ≥ 2000)[1]

[1] The maximum measurement deviation refers to the measurement at an operating pressure > 65 % of the measuring range end value of the pressure sensor used.

Further information and product variants are available on request

COMPACT ORIFICE ORIFLOW D

MAIN CHARACTERISTICS

Product Type:	Differential pressure flow meter designed for volume or mass measurement based on DIN ISO 5167
Application:	for liquids, gas and steam
Measuring accuracy:	up to ±0.6 % of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to +400°C
Process pressure:	up to 325 bar
Housing material:	Electronics: Aluminium, coated
Wetted parts:	stainless steel, Hastelloy, PVDF
Power supply:	24 VDC (2-wire technology)
Output / Display:	4-20 mA / HART®, pulse output acc. to NAMUR / LCD-Display
Process connection:	Sandwich-version DN 15 – 1000 Flange acc. DIN or ANSI
Special features:	low pressure loss, modular concept

MODEL-OVERVIEW

	Main Features					Options				
	Nominal size available (in DIN or ANSI)	Dimension Standard in mm	Nominal pressure available	Temperature Range	Material available	Valve Block	Steam angle horizontal	Steam angle vertical	Pressure Seals	Special Features
Model D	DN 15 - 150 / 1/2" - 4"	70	max. PN 63 Class 600	-20° - 170°C (-4° - 338°F)	1.4408	x		x		only cast version / with steam angle up to 280°C (536°F)
Model D	DN 200 - 1000 / 5" - 40"	40 - 60	max. PN 63 Class 600	-20° - 170°C (-4° - 338°F)	1.4571, 1.4404	x	x	x		with steam angle up to 280°C (536°F)
Model G	DN 4 - DN 15	150	max. PN 40	-20° - 170°C (-4° - 338°F)	1.4571	x	x	x		
Model I	DN 15 - 150 / 1/2" - 4"	25	PN 40 Class 600	-20°- 170°C (-4° - 338°F)	1.4571	x	x	x		
Model L	DN 6 - 150 / 1/2" - 6"		max. PN 325 Class 2500	-20°- 170°C (-4° - 338°F)	1.4571, 1.4404	x	x	x		with steam angle up to 280°C (536°F) / lens seal or ring joint
Model M	DN 6 - 125		max. PN 325	-20°- 400°C (-4° - 752°F)	1.4571				x	
Model N	DN 15 - 150 / 1/2" - 4"	40 - 60	max. PN 63 Class 600	-20° - 170°C (-4° - 338°F)	1.4571, 1.4404	x	x	x		
Model O	DN 15 - 200 / 1/2" - 6"	60	max. PN 160 Class 1500	-20°- 170°C (-4° - 338°F)	1.4571, 1.4404	x	x	x		with steam angle up to 280°C (536°F)
Model S	DN 150- DN 1000 / 2" - 20"		max. PN 100 Class 900	-20° - 400°C (-4° - 752°F)	1.4571, 1.4404	x				first shut-off single or double welded version
Model T	DN 15 - DN 500	60	max. PN 40	-20° - 170°C (-4° - 338°F)	1.4571, 1.4404					temperature extension
Model U	DN 15 - 500 / 1" - 20"		max. PN 100 Class 900	-20° - 400°C (-4° - 752°F)	1.4571, 1.4404				x	
Model Z	DN 15 - 150 / 1/2" - 4"	25	PN 40 Class 600	-20° - 170°C (-4° - 338°F)	1.4571, 1.4404	x	x	x		
ORIKON	DN 15 -250	65	PN 100	-20° - 350°C (-4° - 662°F)	1.4571, 1.4404					

COMPATIBLE

- Differential pressure transmitters from renowned manufacturers
- Provision possible

Further information and product variants are available on request

COMPACT ORIFICE ORIFLOW MODELL O / PVDF

MAIN CHARACTERISTICS

Product Type:	Differential pressure flow meter designed for volume or mass measurement based on DIN ISO 5167
Application:	for corrosive liquids and gases
Measuring accuracy:	up to ±0.6 % of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to +150°C
Process pressure:	up to 16 bar
Housing material:	Aluminium, coated
Wetted parts:	PVDF
Power supply:	24 VDC (2-wire technology)
Output / Display:	4-20 mA / HART®, LCD-Display
Process connection:	Sandwich-design DN 15 - 150
Special features:	low pressure loss

APPLICATION

The Oriflow model O can be used in the chemical industry for measuring hydrogen chloride gas (HCl) (from dry up to 100 % humidity) or similar highly corrosive liquids.

The primary element is a classic compact orifice made of PVDF, which ensures high corrosion resistance. It is equipped with a differential pressure transmitter from Emerson, model 3051, intrinsically safe, HART®. The diaphragm of the 3051 is made of tantalum, with inert filling.

COMPATIBLE

- Differential pressure transmitters from renowned manufacturers
- Provision possible

Further information and product variants are available on request

COMPACT ORIFICE ORIFLOW MODEL U

MAIN CHARACTERISTICS

Product Type:	Differential pressure flow meter designed for volume or mass measurement based on DIN ISO 5167
Application:	for liquids, gas and steam
Measuring accuracy:	up to ±0.6 % of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to +400°C
Process pressure:	up to 325 bar
Housing material:	Aluminium, coated
Wetted parts:	stainless steel (*)
Power supply:	24 VDC (2-wire technology)
Output / Display:	4-20 mA / HART®, LCD-Display
Process connection:	Flange acc. to DIN or ANSI
Special features:	low pressure loss, modular concept, 3-fold redundancy or extended measuring range

SPECIAL VERSION

(*) for model U the wetted parts (diaphragms) can also be made of Hastelloy, Tantalum or gold-plated

Design also possible with
capillary lines
see picture enclosed

COMPATIBLE

- Differential pressure transmitters from renowned manufacturers
- Provision possible

Further information and product variants are available on request

MASS FLOW MEASUREMENT

CORIOLIS MASS FLOWMETER – Mass flow measurement

ELECTRONIC TRANSDUCER FOR THIS:

CORIOLIS TRANSDUCER FMO

MAIN CHARACTERISTICS

Product Type:	Coriolis transducer FMO
Application:	for direct mass measurement of liquids
Measuring accuracy:	< ±0.2 %
Ex-approval:	Zone 1
IP protection:	IP 65 (Connection box for the transmitter)
Process temperature:	-20°C up to +120°C (-50°C up to +210°C)
Process pressure:	up to 1220 bar
Housing material:	stainless steel
Wetted parts:	stainless steel, Hastelloy, Tantalum
Power supply:	12 – 24 VDC / 100 – 240 VAC
Output / Display:	see corresponding measuring transducers
Process connection:	Internal thread, Flange acc. to DIN or ANSI

MEASURING RANGE

Sensor	Qmin	Qmax	Qnom	Max. pmax	Process connection	
Type	(kg/min)	(kg/min)	(kg/min)	Bar(g)	Thread	Flange
FMO 015	0.002	0.6	0.6	700	1/4“	DN 15, 1/2“
FMO 03	0.038	5.0	5.0	870	1/4“	DN 15, 1/2“
FMO 04	0.05	10	10	870	1/4“	DN 15, 1/2“
FMO 06	0.15	20	20	510	1/2“	DN 25, 1“
FMO 08	0.30	50	50	1185	1/2“	DN 25, 1“
FMO 12	0.75	100	75	960	3/4“	DN 25, 1“
FMO 15	1.00	200	150	815	3/4“	DN 40, 1 ½“
FMO 20	2.25	300	300	700	1“	DN50, 2“
FMO 30	5.0	750	600	700	-	DN80, 3“
FMO 40	12.5	1500	1250	290	-	DN80, 3“
FMO 60	45	3000	2500	430	-	DN100, 4“
FMO 80	130	8000	5000	215	-	DN150, 6“
FMO 100	200	12000	10000	150	-	DN200, 8“
FMO 160	600	30000	23000	50	-	DN300, 12“

COMPATIBLE

Transmitter Type FME

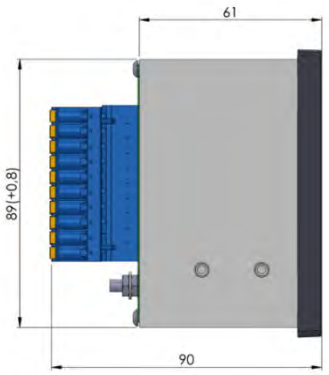
Further information and product variants are available on request

MASS FLOWMETER TRANSDUCER FME 26

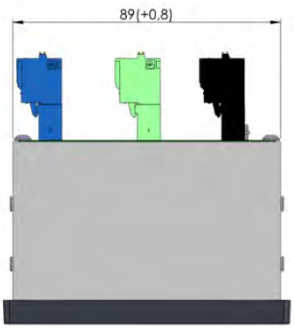
MAIN CHARACTERISTICS

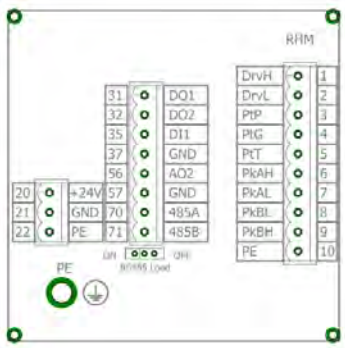
Product Type:	Mass flowmeter transducer FME 26
Application:	for direct mass measurement of liquids
Ex-approval:	Usage in safe area, transducers in zone 1 can be connected
IP protection:	IP20, IP54 (front only)
Ambient temperature:	-20°C up to +60°C
Housing installation:	Panel, DIN-Rail
Housing material	Noryl
Power supply:	10 – 28 VDC or 100 – 240 VAC
Process supply:	1 x 4-20 mA, RS 485 / Modbus, 2 x pulse / frequency / status
Input:	digital input 24 VDC
Display:	LCD with backlight
Weight:	0.55 kg
Special features:	Colour change of the display for indication of warnings or errors

DESIGN / DIMENSIONS



CONNECTION





COMPATIBLE

Coriolis transducer Type FMO

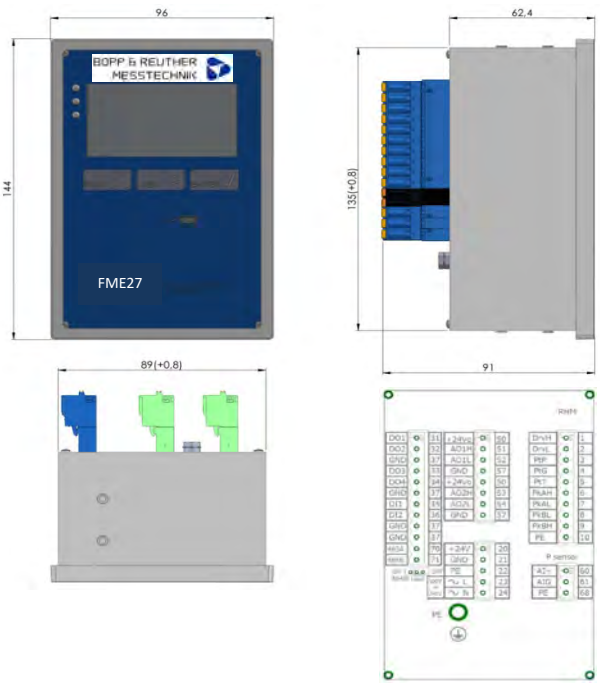
Further information and product variants are available on request

MASS FLOWMETER TRANSDUCER FME 27

MAIN CHARACTERISTICS

Product Type:	Mass flowmeter transducer FME 27
Application:	for direct mass measurement of liquids
Ex-approval:	usage in safe area, transducers in zone 1 can be connected
IP protection:	IP20, IP54 (front only)
Ambient temperature:	-20°C up to +60°C
Housing installation:	Panel, DIN-Rail
Housing material	Noryl
Power supply:	10 – 28 VDC or 100 – 240 VAC
Process supply:	1 – 2 x 4-20 mA, RS 485 / Modbus, 2 x pulse/frequency/status
Input:	1 – 2 x digital input 24 VDC 0 – 1 x 4-20 mA
Display:	LCD with backlight
Weight:	0.55kg
Special features:	Colour change of the display for indication of warnings or errors

DESIGN / DIMENSIONS



CONNECTION

COMPATIBLE

Coriolis transducer Type FMO

Further information and product variants are available on request

DENSITY AND CONCENTRATION MEASUREMENT

Type	Flow rate	Measuring accuracy	Page
DIMF 1.3	0.3 up to 10 l/min	up to ±0.01 % (of measured value	35-36
DIMF 2.0	1.5 up to 50 l/min	up to ±0.02 % (of measured value)	37-40
DIMF 2.1	20 up to 350 l/min	up to ±0.02 % (of measured value)	41
DIMF COMPACT	1 up to 6 l/min	up to ±0.1 % (of measured value)	42

DENSITY MEASUREMENT TECHNOLOGY (measuring and testing equipment / systems)

Type	Flow rate	Measuring accuracy	Page
CDU	0.4 up to 50 l/min	up to ±0.01 % (of measured value)	59
DIME	0.3 up to 50 l/min	up to ±0.01 % (of measured value)	60

DENSITY AND CONCENTRATION METER DIMF 1.3 PV

MAIN CHARACTERISTICS

Product Type:	Density meter based on the oscillating U-tube principle with preamplifier
Application:	Density and concentration measurement of liquids
Measuring accuracy:	up to ± 0.01 % (± 0.1 kg/m³) of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to 100°C
Process pressure:	up to max. 100 bar depending on process connection
Housing material:	stainless steel (1.4571)
Wetted parts:	special alloy of NiFeCr (tuning fork), stainless steel (connections)
Power supply:	NAMUR
Output / Display:	NAMUR (original frequency) and Pt100 for connection to a flow computer e.g. UR06
Process connection:	G ¼ acc. to ISO 228, Flange acc. to DIN or ANSI
Special features:	Instrument version without seals, suitable for custody transfer measurements

MEASUREMENT RANGE

Flow rate	0.3 up to 10 l/min
Density range	400 up to 3000 kg/m³
Calibration range	400 up to 1450 kg/m³
Repeatability	±0.005 % (±0.05 kg/m³)

When installing in the bypass, ensure that there is sufficient flow in the unit so that the liquid sample in the unit is updated quickly enough (recommended approx. 0.3 l/min or approx. 0.01 bar differential pressure).

PROCESS CONNECTION

G ¼ acc. to ISO 228

Flange DN 10 PN 40 (DIN 2545), DN 10 PN 100 (DIN2547)

ANSI 150 (½“), ANSI 300 (½“), ANSI 600 (½“)

OUTPUT SIGNALS

Connection: in 2-wire technology

4-20 mA for operating density, reference density (temperature corrected to reference temperature 15°C or 20°C) or concentration (% mass, % volume, Brix, Bé ….)

HART®- communication

EXAMPLES OF APPLICATION

- direct operating density or reference density measurement of non-corrosive liquids (incl. liquefied gases)
- Concentration measurement of 2-substance mixtures

Further information and product variants are available on request

DENSITY AND CONCENTRATION METER DIMF 1.3 T..

BOPP & REUTHER MESSTECHNIK

MAIN CHARACTERISTICS

Product Type:	Density meter based on the oscillating U-tube principle with T.. Transmitter
Application:	Density and concentration measurement of liquids
Measuring accuracy:	up to ± 0.01 % (± 0.1 kg/m³) of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to 100°C
Process pressure:	up to max. 100 bar depending on process connection
Housing material:	stainless steel (1.4571)
Wetted parts:	Special alloy of NiFeCr (tuning fork), stainless steel (connections)
Power supply:	24 VDC (min. 14 / max. 30 VDC)
Output / Display:	4-20 mA and frequency output according to NAMUR or switching output / LCD graphic display, permanent backlighting, plain text menu navigation
Process connection:	G ¼ acc. to ISO 228, Flange acc.to DIN or ANSI
Special features:	Instrument version without seals, illustration of complex or confidential media via support point table

MEASURING RANGE

Flow rate	0.3 up to 10 l/min
Density range	400 up to 3000 kg/m³
Calibration range	400 up to 1450 kg/m³
Repeatability	±0.005 % (±0.05 kg/m³)

When installing in the bypass, ensure that there is sufficient flow in the unit so that the liquid sample in the unit is updated quickly enough (recommended approx. 0.3 l/min or approx. 0.01 bar differential pressure).

PROCESS CONNECTION

G ¼ acc. to ISO 228

Flange DN10 PN40 (DIN 2545), DN10 PN100 (DIN2547)or Class 150/300 RF ANSI B16.5 (other pressure ratings on request)

OUTPUT SIGNALS

Connection: in 2-wire technology

4-20 mA for operating density, reference density (temperature corrected to reference temperature 15°C or 20°C) or concentration (% mass, % volume, Brix, Bé ….)

EXAMPLES OF APPLICATION

- direct operating density or reference density measurement of non-corrosive liquids (incl. liquefied gases)
- Concentration measurement of 2-substance mixtures

Further information and product variants are available on request

DENSITY AND CONCENTRATION METER DIMF 2.0 PV

BOPP & REUTHER MESSTECHNIK

MAIN CHARACTERISTICS

Product Type:	Density meter based on the oscillating U-tube principle with preamplifier
Application:	Density and concentration measurement of liquids
Measuring accuracy:	up to ± 0.02 % (± 0.2 kg/m³, ± 0.0002 g/cm³) of the measured value up to ± 0.01 % (± 0.1 kg/m³, ± 0.0001 g/cm³) of the measured value (with special calibration)
Ex-approval:	Zone 1
Process temperature:	-40°C up to 150°C (up to 160°C on request)
Process pressure:	up to max. 100 bar depending on process connection (up to 160 bar on request)
Housing material:	stainless steel (1.4571)
Wetted parts:	stainless steel, Hastelloy, Tantalum, Inconel, Monel, others on request
Power supply:	NAMUR
Output / Display:	NAMUR (original frequency) and Pt100 for connection to a flow computer e.g. UR06
Process connection:	Flange acc. to DIN or ANSI
Special features:	Instrument version without seals

MEASUREMENT RANGE

Flow rate	0 up to 50 l/min
Density range	400 up to 3000 kg/m³
Calibration range	400 up to 1450 kg/m³
Repeatability	±0.005 % (±0.05 kg/m³)

When installing in the bypass, ensure that there is sufficient flow in the unit so that the liquid sample in the unit is updated quickly enough (recommended approx. 0.3 l/min or approx. 0.01 bar differential pressure).

PROCESS CONNECTION

Flange DN10 PN40 (DIN 2545), DN10 PN100 (DIN2547)
or Class 150/300 RF ANSI B16.5 other pressure stages on request, as well as various food connections

OUTPUT SIGNALS

Connection: in 2-wire technology

Frequency density dependent, not linearized, the current is modulated onto the supply current, pulse-pause ratio 1:1, approx. 700-1400 Hz acc. to transducer type, linearization and temperature correction in the computer

4-wire technology via screw terminals;
cable enters via cable gland with M 20 x 1.5 or ½“ NPT thread for pipe installation (conduit system)
(PT100 installed in DIMF)

EXAMPLES OF APPLICATION

- direct operating density or reference density measurement of corrosive liquids (incl. liquefied gases)
- Concentration measurement of 2-substance mixtures

Further information and product variants are available on request

DENSITY AND CONCENTRATION METER DIMF 2.0 TVS

BOPP & REUTHER MESSTECHNIK

MAIN FEATURES

Product type:	Density meter based on the oscillating U-tube principle with 2-wire transmitter type TR24 (order code TVS)
Application:	Density and concentration measurement of liquids
Measuring accuracy:	up to ± 0.015 % (± 0.15 kg/m³, ± 0.00015 g/cm³) of the measured value up to ± 0.01 % (± 0.1 kg/m³, ± 0.0001 g/cm³) of the measured value (with special calibration)
Process temperature:	-40°C to 150°C (210°C on request)
Process pressure:	up to 100 bar (up to 160 bar on request)
Housing material:	stainless steel (1.4571), electronics: painted aluminium
wetted parts:	stainless steel, Hastelloy, Tantalum, Inconel, Monel, others on request
Supply:	24 V DC (min. 16 / max. 30 V DC)
Output / display:	4-20 mA and frequency output according to NAMUR or switching output / LCD graphic display, permanent backlighting, plain text menu navigation
Process connection:	compression fittings or flange according to DIN or ANSI (others on request)
Special features:	Instrument version without seals, illustration of complex or confidential media via interpolation point table (in preparation), diagnostic functions (temperature, sensor, medium, supply voltage)

MEASUREMENT RANGE

Flow range	0 to 50 l/min
Density range	400 to 3000 kg/m³
Calibration range	400 to 1450 kg/m³
Reproducibility	±0.003 % (±0.03 kg/m³)

PROCESS CONNECTIONS

- Swagelok® for tube outer diameter 12 mm
- Flange DN 15, DN 25
- ANSI 150 (½", 1"), ANSI 300 (½", 1"), ANSI 600 (½", 1")
- TRI-Clamp DN 15

OUTPUT SIGNALS

Connection: in 2-wire technology

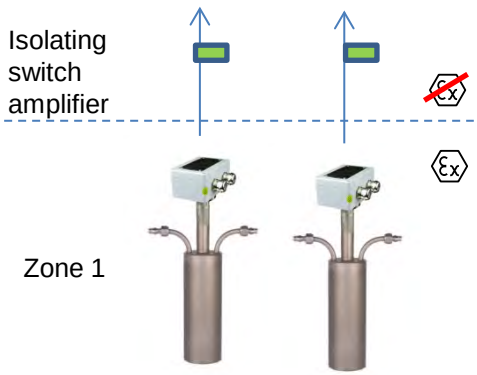
4-20 mA for operating density, reference density (temperature-corrected to reference temperature 15°C or 20°C) or concentration (% mass, % volume, Brix, Bé ....)
Frequency output according to NAMUR (standard) or as switching output (in preparation, e.g. error, limit value)

APPLICATION EXAMPLES

- Direct operating density or reference density measurement of liquids such as acids, alkalis, hydrocarbons, liquefied gases (propane, butane), glycol, sugar solutions, salt solutions, clear juices, oil, suspensions, solvents, alcohol mixtures, etc.
- Concentration measurement of 2-substance mixtures, product detection, quality control, control and monitoring of mixing processes, gas bubble detection, etc.

Further information and product variants are available on request.

DENSITY AND CONCENTRATION METER DIMF 2.0 PVS WITH UNIVERSAL COMPUTER UR06 / ERW 700



MAIN FEATURES

Product type:	Density meter based on the oscillating U-tube principle with a flow computer: 1 or 2 density meters with different media can be combined with a flow computer
Application:	Density and concentration measurement of liquids; in hazardous areas (Zone1) ⟷ universal computer, non-Ex connection via isolating modules
Measuring accuracy:	up to ± 0.02 % (± 0.2 kg/m³, ± 0.0002 g/cm³) of the measured value up to ± 0.01 % (± 0.1 kg/m³, ± 0.0001 g/cm³) of the measured value (with special calibration)
Process temperature:	-40°C to 150°C
Process pressure:	up to 100 bar
Housing material :	DIMF stainless steel (1.4571),
wetted parts:	Stainless steel, Hastelloy, Tantalum, Inconel, Monel (others on request)
Power supply:	NAMUR
Output / display:	NAMUR (original frequency) and PT100 for connection to a flow computer e.g. UR06
Process connection:	Flange acc. to DIN or ANSI
Special features:	Instrument version without seals

MEASUREMENT RANGE

Flow range	0 up to 50 l/min
Density range	400 up to 3000 kg/m³
Calibration range	400 up to 1450 kg/m³
Repeatability	±0.005 % (±0.05 kg/m³)

When installing in the bypass, ensure that there is sufficient flow in the unit so that the liquid sample in the unit is updated quickly enough (recommended approx. 0.3 l/min or approx. 0.01 bar differential pressure).

PROCESS CONNECTION

Flange DN10 PN40 (DIN 2545), DN10 PN100 (DIN2547)
or Class 150/300 RF ANSI B16.5 other pressure stages on request, as well as various food connections

OUTPUT SIGNALS

Connection: in 2-wire technology

Frequency density dependent, not linearized, the current is modulated onto the supply current, pulse-pause ratio 1:1, approx. 700-1400 Hz acc. to transducer type, linearization and temperature correction in the computer

4-wire technology via screw terminals;
cable enters via cable gland with M 20 x 1.5 or ½“ NPT thread for pipe installation (conduit system)
(PT100 installed in DIMF)

EXAMPLES OF APPLICATION

- direct operating density or reference density measurement of corrosive liquids (incl. liquefied gases)
- Concentration measurement of 2-substance mixtures

Further information and product variants are available on request.

DENSITY AND CONCENTRATION METER DIMF 2.0 TWS

BOPP & REUTHER MESSTECHNIK

MAIN CHARACTERISTICS

Product Type:	Density meter based on the oscillating U-tube principle with T.. Transmitter, W.. Wall mounting with 1.5 m cable
Application:	Density- and concentration measurement of liquids
Measuring accuracy:	up to ± 0.02% (± 0.2 kg/m³) of measured value
Ex-approval:	Zone 1
Process temperature:	-40°C up to 150°C (optional up to 210°C)
Process pressure:	up to 100 bar (up to 160 bar on request)
Housing material:	stainless steel (1.4571), electronics: Aluminium painted
Wetted parts:	stainless steel, Hastelloy, Tantalum, Inconel, Monel, others on request
Power supply:	24 VDC (min. 14 / max. 30 VDC)
Output / Display:	4-20 mA and frequency output according to NAMUR or switching output / LCD graphic display, permanent backlighting, plain text menu navigation
Process connection:	compression fittings or flange according to DIN or ANSI (others on request)
Special features:	Instrument version without seals, mapping of complex or confidential media via support point table (in preparation), diagnostic functions (temperature, sensor, medium, supply voltage)

MEASURING RANGE

Flow range	0 up to 50 l/min
Density range	400 up to 3000 kg/m³
Calibration range	400 up to 1450 kg/m³
Repeatability	±0.005 % (±0.05 kg/m³)

PROCESS CONNECTION

- Swagelok® for tube outer diameter 12 mm
- Flange DN 15, DN 25
- ANSI 150 (½", 1"), ANSI 300 (½", 1"), ANSI 600 (½", 1")
- TRI-Clamp DN15

OUTPUT SIGNALS

Connection: in 2-wire technology

4-20 mA for operating density, reference density (temperature-corrected to reference temperature 15°C or 20°C) or concentration (% mass, % volume, Brix, Bé ....)
Frequency output according to NAMUR (standard) or as switching output (in preparation, e.g. error, limit value)

EXAMPLES OF APPLICATION

- Direct operating density or reference density measurement of liquids such as acids, alkalis, hydrocarbons, liquefied gases (propane, butane), glycol, sugar solutions, salt solutions, clear juices, oil, suspensions, solvents, alcohol mixtures, etc.
- Concentration measurement of 2-substance mixtures, product detection, quality control, control and monitoring of mixing processes, gas bubble detection, etc.

Further information and product variants are available on request

DENSITY AND CONCENTRATION METER DIMF 2.1 TVS

BOPP & REUTHER MESSTECHNIK

MAIN FEATURES

Product type:	Density meter based on the oscillating U-tube principle with 2-wire transmitter type TR24 (order code TVS)
Application:	Density and concentration measurement of liquids
Measuring accuracy:	up to ± 0.02 % (± 0.2 kg/m³, ± 0.0002 g/cm³) of the measured value
Process temperature:	-40°C to 150°C
Process pressure:	up to 40 bar
Housing material:	Stainless steel (1.4571), electronics: painted aluminium
wetted parts:	Stainless steel, Hastelloy, others on request
Supply:	24 V DC (min. 16 / max. 30 V DC)
Output / display:	4-20 mA and NAMUR output for frequency or as switching output / LCD graphic display, permanent background lighting, plain text menu navigation
Process connection:	Flange according to DIN or ANSI
Special features:	Instrument version without seals, illustration of complex or confidential media via interpolation point table (in preparation), diagnostic functions (temperature, sensor, medium, supply voltage)

MEASUREMENT RANGE

Flow range	0 tio 350 l/min
Density range	400 to 3000 kg/m³
Calibration range	400 to 1450 kg/m³
Reproducibility	±0.005 % (±0.05 kg/m³)

PROCESS CONNECTIONS

Flange DN25 PN40 according to DIN EN1091, DN50 PN40 according to DIN EN1091Class 150/300 RF ANSI B16.5

OUTPUT SIGNALS

Connection: in 2-wire technology

4-20 mA for operating density, reference density (temperature-corrected to reference temperature 15°C or 20°C) or concentration (% mass, % volume, Brix, Bé ....)
Frequency output according to NAMUR (standard) or as switching output (in preparation, e.g. error, limit value)

APPLICATION EXAMPLES

- Direct operating density or reference density measurement of liquids such as acids, alkalis, hydrocarbons, liquefied gases (propane, butane), glycol, sugar solutions, salt solutions, clear juices, oil, suspensions, solvents, alcohol mixtures, etc.
- Concentration measurement of 2-substance mixtures, product detection, quality control, control and monitoring of mixing processes, gas bubble detection, etc.

Further information and product variants are available on request.

DENSITY AND CONCENTRATION METER DIMF COMPACT

MAIN CHARACTERISTICS

Product Type:	Density meter according to the oscillating U-tube principle
Application:	Density and concentration measurement of liquids
Measuring accuracy:	up to ±0.1 % (±1.0 kg/m³) of measured value
Ex-approval:	none
Process temperature:	0°C up to 70°C
Process pressure:	up to 6 bar
Housing material:	stainless steel (1.4571)
Wetted parts:	stainless steel (1.4571)
Power supply:	24 V DC
Output / Display:	RS 232
Process connection:	G¼“
Special features:	Suitable for tight spaces Length:180 mm; width 60 mm; height 55 mm

MEASURING RANGE

Density range	500 up to 1500 kg/m³
Repeatability	±0.02 % (±0.2 kg/m³)

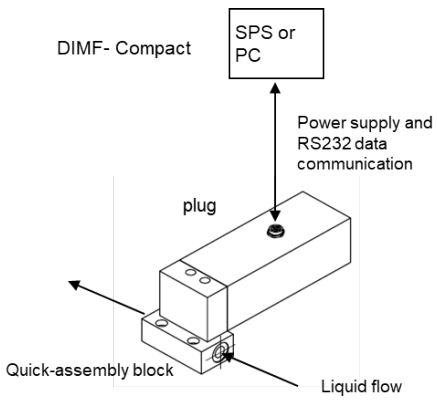
When installing in the By-Pass, make sure that there is sufficient flow in the instrument so that the liquid sample in the instrument updates quickly enough (recommended approx. 1 - 6 l/min).

PROCESS CONNECTION

G¼“

COMMUNICATION

DIMF-COMPACT
with PC or SPS via RS 232



OUTPUT SIGNALS

Output of density and temperature measured values via RS 232 or UART-interface

EXAMPLES OF APPLICATION

- Direct operating density or reference density measurement of non-corrosive liquids such as ethanol, solvents etc.
- Concentration measurement of 2 substance mixtures

Further information and product variants are available on request

DOSING

Magnetic-inductive:

Type	Flow rate	Measuring accuracy	Page
MID-MDS	40 up to 12,560 ml/s	up to ±0.5 % (of measured value)	44
MID-ECO	40 up to 12,560 ml/s	up to ±0.5 % (of measured value)	45
MID-EMF	4.2 up to 4,900 ml/s	up to ±0.7 % (of measured value) ±0.3 % (from measuring range end value)	23

Coriolis mass flowmeter:

Type	Flow rate	Measuring accuracy	Page
FMD	2 up to 40 kg/min	up to ±0.3 % (of measured value) ±0.01 % x Nominal flow rate / instantaneous flow rate	46

Oval Wheel Meter:

Type	Flow rate	Measuring accuracy	Page
OD	0.2 up to 120 l/min	up to ±0.5 % (of measured value)	47

DOSING CONTROLS FOR THIS:

MID-PLC	4-channel	48
MID-MDS-System	1 up to 48 channel	49
TERMINAL	Visualization and configuration of the MID-MDS-Systems	50

MID-MDS WITH UV14-CONVERTER

MAIN CHARACTERISTICS

Product Type:	electromagnetic flowmeter
Application:	fast and precise filling of conductive liquids from 0.1 s
Measuring accuracy:	± 0.5 %
Repeatability:	± 0.1 % - 0.5 % (depending on dosing time)
Ex-approval:	none
Process temperature:	0 up to 90°C (cleaning up to 140 °C)
Process pressure:	up to 16 bar
Housing material:	Aluminium (preamplifier) / Polyurethane (Transducer)
Wetted parts:	Connections: stainless steel 1.4404, electrodes: Hastelloy except DN 10 (DN 10 stainless steel 1.4571), Measuring tube: PTFE
Power supply:	24 V DC and 24 V AC
Output / Display:	Volume pulses via UV14 Converter
Process connection:	Tri-Clamp, sanitary thread acc. to DIN EN 11851, sterile, others on request
Special features:	high resolution up to 60,000 Pulses/l, CIP and SIP capable, for conductive liquids > 1µS/cm

MEASURING RANGE

			Flow rate				
DN	Qmax [l/min]	K-factor pulses/l	v=0.5 m/s	v=1.0 m/s	v=2.5 m/s		v=10 m/s
			[ml/s]	[ml/s]	[ml/s]		[ml/s]
10	48	63.660	40	80	200		800
15	106	28.293	88	176	440	…	1,760
20	188	15.915	157	314	785		3,140
25	294	10.186	245	490	1,225		4,900
32	482	6.216	402	804	2,010		8,040
40	754	3.979	628	1,256	3,140		12,560

REFERENCE CONDITIONS

Pressure: approx. 2 bar, temperature: 25°C,
Liquid: water without gas inclusions

POWER SUPPLY

via converter-module UV14 or MID-MDS-Systems

OUTPUT SIGNALS

Volume pulse output 24 V, 50 KHz via converter module UV14

Further information and product variants are available on request

MID-ECO

MAIN CHARACTERISTICS

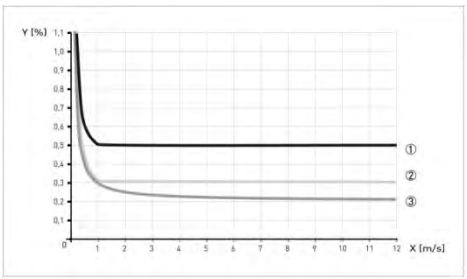
Product Type:	electromagnetic flowmeter
Application:	Precise filling of conductive liquids
Measuring accuracy:	from ±0.2 %
Repeatability:	±0.1 % - 0.3 % (depending on dosing time)
Ex-approval:	none
Process temperature:	0 up to +140°C
Process pressure:	16 bar
Housing material:	stainless steel
Wetted parts:	stainless steel, ceramic, platinum
Power supply:	24 VDC
Output / Display:	Pulses
Process connection:	Tri-Clamp, others on request
Special features:	High resolution up to 20,000 Pulses/l, CIP and SIP capable, for conductive liquids from 5µS/cm

MEASURING RANGE

DN	Q_{max} [l/min]	K-Factor Pulses/l	Flow rate v=0.5 m/s [ml/s]	v=1.0 m/s [ml/s]	v=2.5 m/s [ml/s]	…	v=6.5 m/s [ml/s]
10	31	20,000	40	80	200		510
15	69	10,000	88	176	440		1,148
25	191	5,000	245	490	1,225		3,190
40	490	2,000	628	1,256	3,140		8,168

Nominal size DN 2,5, DN 4, DN 6 on request

MEASURING ACCURACY



DN	v	Accuracy	Curve
2,5 / 4 / 6 / 10	v ≤ 1m/s	± 0,4 % of measured value +1 mm/s	1
	v ≤ 1m/s	± 0,5 % of measured value	
10 / 15	v ≤ 1m/s	± 0,2 % of measured value +1 mm/s	3
25 / 40	v ≤ 1m/s	± 0,2 % of measured value +1 mm/s	2
	v ≤ 1m/s	± 0,3 % of measured value	

POWER SUPPLY

24 VDC ± 25 %, power consumption ≤ 3 W, start-up current ≤ 5 A (< 100 µs) at 24 VDC
Standard: 1x M12, 5-pin plug
with status output: 1x M12, 8-pin plug

Further information and product variants are available on request

DOSING MASS FLOW METER FMD

MAIN CHARACTERISTICS

Product Type:	Coriolis dosing mass flow meter
Application:	Precise and fast filling of conductive and non-conductive liquids
Measuring accuracy:	±0.3 %, ±0.01 % x nominal flow rate / instantaneous flow rate
Repeatability:	0.05 % – 0.5 % (depending on dosing time)
Ex-approval:	none
Process temperature:	0 up to +90°C, for cleaning +140°C
Process pressure:	16 bar
Housing material:	stainless steel
Wetted parts:	stainless steel
Power supply:	24 V DC
Output / Display:	Mass pulses
Process connection:	Tri-Clamp, others on request
Special features:	very high resolution up to 63.66 Pulses/g, fast dosing of small containers in g, CIP and SIP capable

MEASURING RANGE

DN	Type	Flow rate max.	Pulse factor
		[kg/min]	[Pulse/g]
10	FMD06	20	63.660
15	FMD08	40	28.293

INPUT SIGNAL

Requires status input from valve (open / close)

Further information and product variants are available on request

OVAL WHEEL METER FLOWAL® PLUS OD

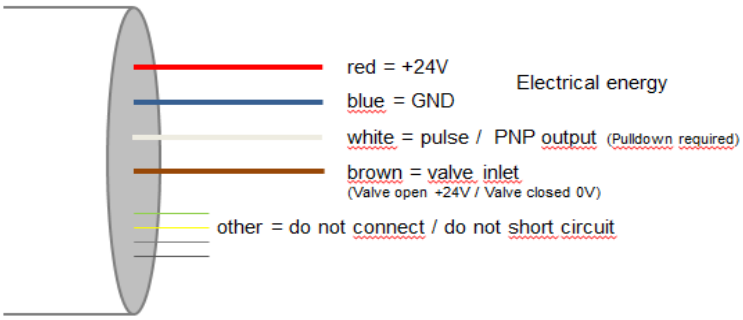
MAIN CHARACTERISTICS

Product Type:	direct volume meter (Single-Case)
Application:	precise filling of liquids
Measuring accuracy:	< 0.5 % of measured value, for liquids >3 mPa·s
Process temperature:	-10°C up to 120°C
Process pressure:	max. 16bar
Housing material:	stainless steel 1.4571 / 316 TI
Wetted parts:	stainless steel, PEEK
Power supply:	24 VDC
Output / Display:	Pulses Open-Collector PNP
Process connection:	Tri-Clamp, others on request
Special features:	Very high resolution up to 2000 Pulses/l

MEASURING RANGE

Type	Connection	Measuring range	Pulse pick-up		
		l/min	Pulses / n	Pulses / l	Hz_{max}
OD 06	Tri Clamp	0.2 - 7	12	~ 2000	~ 233
OD 2	Tri Clamp	1 - 30	20	~ 1000	~ 500
OD 5	Tri Clamp	2 - 60	20	~ 400	~ 400
OD 10	Tri Clamp	4 - 120	20	~ 200	~ 400

ELECTRICAL CONNECTION



OUTPUT SIGNAL

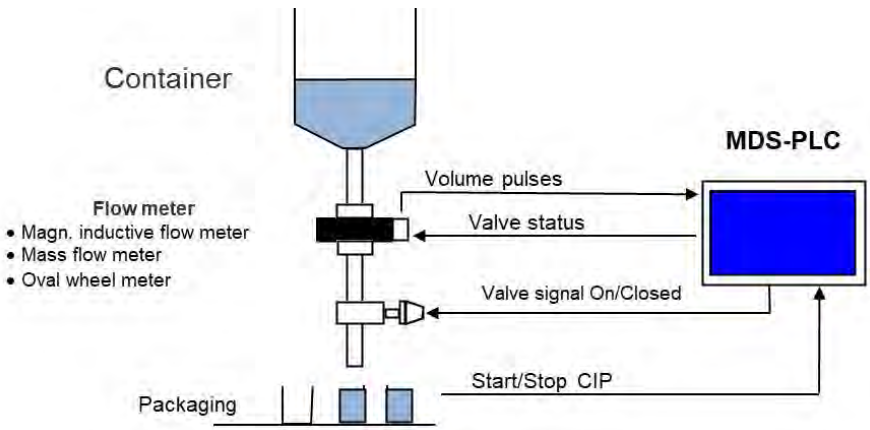
24V-pulses for connection to a SPS or counting device

Further information and product variants are available on request

MDS-PLC

MAIN CHARACTERISTICS

Product Type:	Dosing controller
Application:	Control of up to 4 filling channels
Number of measuring channels:	4
Input signals flow rate:	Pulses, max. 100 kHz
Numbers of Valve control outputs:	4 / 0.2 A
Start inputs:	4
Stop inputs:	4
Tolerance outputs:	4
Status output valve open / closed:	4
CIP-input:	1
Power supply:	24 VDC
Display:	Graphic display, flexibly configurable, panel mounting 170 x 135 x 80
Protection class:	Front: IP 65, Back: IP 20
Special features:	Touchscreen, user-friendly operation, several languages available



EXAMPLE OF APPLICATION

Dosing systems with up to 4 channels

COMPATIBLE

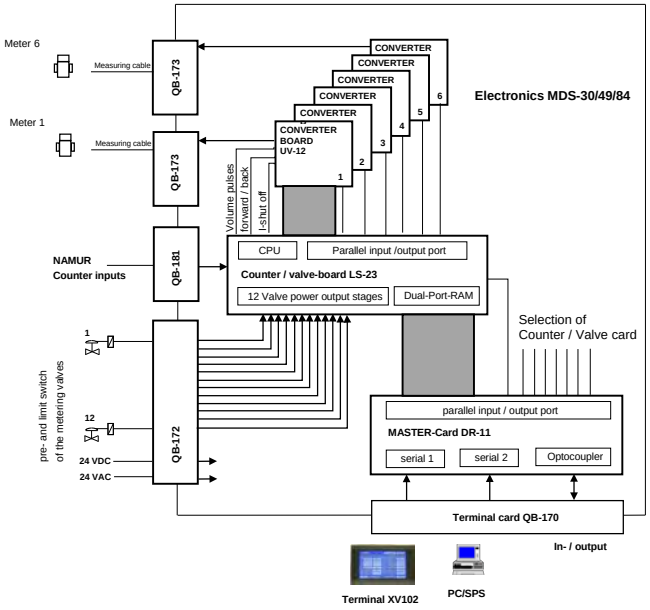
Series MID-MDS, MID-ECO, MID-EMF, OD or FMD
Flowmeters with 24 VDC pulse output

Further information and product variants are available on request

MID-MDS-SYSTEM

MAIN CHARACTERISTICS

Product Type:	Dosing control
Application:	Control of up to 48 filling channels
Number of measuring channels:	1 up to 48
Input signals flow rate:	Measuring voltage from MID
Number of channels:	1 up to 48, 2-stage switch-off
Valve control outputs:	max. 36 VDC / 0.5 A
Start inputs:	external Start, CIP, Error
Tolerance outputs:	1
CIP-input:	1
Power supply:	24 VDC and 24 VAC
Housing types:	Panel-Housing 19“ Cassette
Connection:	SPS per Telegram or an Terminal XV102
Protection class:	Front: IP 65, Back: IP 20
Special features:	for fast and precise fillings



EXAMPLE OF APPLICATION

Filling system with up to 48 channels

COMPATIBLE

Series MID-MDS, MID-ECO, MID-EMF, OD or FMD flowmeters with 24 VDC pulse output

Further information and product variants are available on request

DOSING TERMINAL XV102 FOR MID-MDS

MAIN CHARACTERISTICS

Product Type:	Display and configuration terminal for MID-MDS
Application:	Control of up to 48 filling channels
Number of measuring channels:	max. 48
Interfaces:	RS 232 for connection to the MID-MDS system
Power supply:	19.2 – 30 VDC, 24 VDC
Display:	graphic display, flexibly configurable, panel mounting 197 x 122 mm (±1 mm), 7.0"
Protection class:	Front: IP 65, Back: IP 20
Special features:	ouch screen, user-friendly operation, several languages available

EXAMPLES OF APPLICATION

- for visualising and configuring the MID-MDS system
- for setting the following data:
    - Dosing quantities
    - Overflow quantity correction and max. dosing time
    - Tolerance control of the dosed quantity
    - 1- or 2-stage valve shut-off
    - Manual or automatic start

Further information and product variants are available on request

MEASURING AND TESTING DEVICE / SYSTEMS

FILLING SYSTEMS

Type	Flow rate	Measuring accuracy	Page
OK	2.5 up to 500 l/min	up to ±0.5 % (of measured value)	53
OKT	5 up to 3000 l/min	up to ±0.5 % (of measured value)	54
Flowtronic	0.2 up to 100 l/min	up to ±0.5 % (of measured value)	55

LUBRICATING OIL MEASURING SYSTEMS

Type	Flow rate	Accuracy class	Page
mobile Measuring system	20 up to 300 l/min	±0.5 %	56

LOADING / UNLOADING

Type	Flow rate	Accuracy class	Page
UMS	3.6 m³/h up to 2400 m³/h	up to ±0.3 %	57

DEVICE ACCEPTANCE ACCORDING TO MID

Type	Page
Device acceptance / commissioning according to MID	58

MEASURING AND TESTING EQUIPMENT / SYSTEMS

DENSITY MEASURING SYSTEMS

Type	Flow rate	Measuring accuracy	Page
CDU	0.4 up to 50 l/min	up to ±0.01 % (of measured value)	59
DIME	0.3 up to 50 l/min	up to ±0.01 % (of measured value)	60

PROOFING SYSTEMS

Type	Flow rate	Measuring accuracy	Page
MM1	30 up to 500 l/min	up to ±0.3 % (of measured value)	61
MM2	250 up to 3600 l/min	up to ±0.05 % (of measured value)	62
RAPHAEL	5 up to 3000 kg/h	up to ±0.5 % (of measured value)	63

OVAL WHEEL METER OK

MAIN CHARACTERISTICS

Product Type:	direct volume meter(Single-Case)
Application:	for filling liquids such as oils, lacquers, etc.
Measuring accuracy:	up to ± 0.5 % of measured value
Ex-approval:	Zone 1
Process temperature:	-10°C up to 60°C
Process pressure:	up to 10 bar
Housing material:	stainless steel, cast iron, cast steel (OK100)
Wetted parts:	stainless steel
Power supply:	none (basic model)
Process supply / Display:	Mechanical display with volume preselection (up/down control of volume filling in 4 steps)
Process connection:	Flange acc. to DIN or ANSI
Special features:	very easy to operate, works without auxiliary power, options for limit switching of pumps available

MEASURING RANGE

						with ball bearing
Viscosity in mPa·s			0.3 – 1.5	1.5 - 150	up to 350	up to 1000
Type	DN	Flow rate	[l/min]	[l/min]	[l/min]	[l/min]
OK 5	25	min	3	3	2.5	2.5
		Continuous	33	33	25	25
		max	50	50	25	25
OK 10	25	min	10	10	7	8
		Continuous	66	80	70	80
		max	100	100	70	80
OK 50	50	min	30	30	18	15
		Continuous	200	240	180	200
		max	300	300	180	200
OK 100	50	min	66	66	48	--
		Continuous	440	500	480	--
		max	500	500	480	--

Further information and product variants are available on request

COMPACT DOSING UNIT FLOWTRONIC

MAIN CHARACTERISTICS

Product Type:	Oval Wheel Meter Flowal® OR with electronic preselection meter and metering valve
Application:	for dosing of small volumes of liquid
Measuring accuracy:	up to ± 0.5 % of measured value
Ex-approval:	none
Measuring range:	0.2 up to 120 l/min with 5 solution variants
Process temperature:	-10°C up to 70°C
Process pressure:	up to 20 bar
Housing material:	stainless steel , Aluminium, brass
Wetted parts:	stainless steel, PEEK, brass
Power supply:	110 - 230 VAC
Process supply / Display:	4-20 mA, pulses / LCD-Display
Process connection	Internal pipe thread
Special features:	Very compact, no inlet and outlet pipe section necessary

MEASURING RANGE

DN	Valve Type: S for stainless steel M for brass	Flow Rate Flowtronic (stainless steel-wheels) (l/min)	Flow Rate Flowtronic (PEEK-wheels) (l/min)	Material Combinations OR-Meter (*)	Pulse value OR (Pulses/l)
G ½“	FTS / FTM – OR06	0.2 – 5	0.2 - 7	SS, AL, PK	333
G1/2“	FTS / FTM – OR1	0.4 - 10	0.4 - 14	SS, AL, PK	166
G ¾“	FTS / FTM – OR2	1 - 30	1 - 30	SS, AL, PK	100
G 1“	FTS / FTM – OR5	2 - 50	2 - 60	SS, AL, PK	40
G 1“	FTS / FTM – OR10	4 - 100	3 - 120	SS, AL, PK	20

(*) Abbreviations :
SS = Housing, cover, oval wheels made of stainless steel
AL = Housing and cover made of aluminium, oval wheels made of PEEK
PK = Housing and cover made of stainless steel, oval wheels made of PEEK

A PNP magnetic field sensor serves as pulse detector

DISPLAY

Local electronic display Type F030 or Type F130
with external start, closes single stage

OPTIONS

O-ring OR-meter Viton (FKM) is standard, EPDM optional
Solutions for use in explosion-proof areas see type OKT

Further information and product variants are available on request

COMPACT DOSING DEVICE OKT

MAIN CHARACTERISTICS

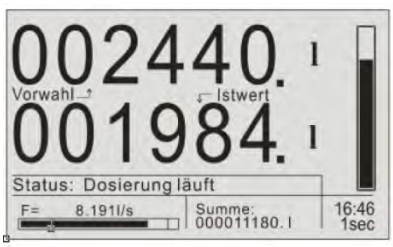
Product Type:	Compact dosing device with electronic preselection counter
Application:	Precise filling of flammable liquids e.g. varnish, alcohol, etc.
Measuring accuracy:	up to ± 0.5 % of measured value
Process temperature:	-10°C up to 60°C
Process pressure:	up to 10 bar
Housing material:	stainless steel
Wetted parts:	stainless steel
Power supply:	230 VAC / electro pneumatic (by pass-valve)
Process supply / Display:	4-20 mA, 3 digital outputs, printer interface LCD-Display, start / stop button
Process connection:	Flange acc. to DIN or ANSI
Special features:	no inlet and outlet section necessary simple operation, 2-stage switch-off

MEASURING RANGE

Type	Ball valve combination	Flow rate in l/min		Length (mm)
		Initial value	Final value	
OKT 5	DN 25 – DN 10	5	50	620
OKT 10	DN 25 – DN 10	10	100	620
OKT 50	DN 50 – DN 10	30	300	745
OKT 100	DN 50 – DN 10	66	660	815
OKT 200	DN 80 – DN 20	70	700	1184
OKT 400	DN 100 – DN 20	120	1200	1319
OKT 400	DN 100 – DN 25	120	1200	1319
OKT 600	DN 100 – DN 25	300	3000	1419

specifications for viscosity from 0.3 up to 150 mPa·s
measurement of high viscosities up to max. 100.000 mPa·s possible

DISPLAY



OPTIONS

MODBUS
- additional analogue process supply
- additional NAMUR inputs
- additional printer interface

Further information and product variants are available on request

MOBILE LUBRICATING OIL MEASURING SYSTEM

BOPP & REUTHER MESSTECHNIK

MAIN CHARACTERISTICS

Product Type:	Mobile filling unit for lubricating oils
Application:	Filling of containers from 5 litres
Delivery rate:	up to 300 l/min (depending on medium)
Measuring accuracy:	±0.3 %
Ex-approval:	none
Process temperature:	-10°C up to +50°C
Process pressure:	6 bar
Wetted parts:	stainless steel
Power supply:	400 VAC
Input:	Tank truck coupling DN 50
Process supply:	Pneumatic dosing valve DN 32
Display:	5.7 inch touch-display
Special features:	Mobile measuring system, individually designed to customer requirements

INDUSTRY

Production of all kinds of lubricants

DESCRIPTION OF THE MEASURING APPLICATION

Mobile full-tube measuring system for filling lubricating oils into containers of 5 litres or more.
The container size is entered at the preselection counter (URS-09) and can be started as often as desired with the start button on the loading arm. The pump speed and the valve are controlled via fixed parameters that are determined during commissioning. Up to five different parameter sets can be stored, which are automatically activated via the preselected container size. This ensures that the ideal flow rate is always used for both small and large containers. The automatic throttling of the flow rate at the end of the filling process guarantees that the desired quantity is reached exactly.

DESIGN OF THE MEASURING SYSTEM

- Tank truck coupling for connection to the storage tanks or tank tapping points
- internally geared displacement pump, speed-controlled
- Filter
- Measuring sensor: Oval wheel meter type e.g. OI50AG20/F5
- Flexible hose loading arm DN32 with shut-off unit
- Electronic control and metering unit Universal computer type URS-09
- Type examination certificate according to MID directive 2014/32/EU

Further information and product variants are available on request

PTB
Physikalisch-Technische Bundesanstalt Braunschweig und Berlin

METERING SYSTEM UMS

MAIN CHARACTERISTICS

Product Type:	Universal Metering System UMS
Performance:	Delivery of a complete solution
Measured variable:	Volume, Mass
Legal basis:	2014/32/EU
Requirements:	acc. to MI-005 / chap VII
Accuracy classes acc. to. OIML R117:	0.3 / 0.5 / 1.0
Measuring system types for:	Long-distance pipeline, loading and unloading, lubricating oils, liquefied gases, highly viscous media, road vehicles, airfield vehicles
Special features:	Placing on the market acc. to module D

RANGE OF SERVICES

We accompany you from the concept up to the turn-key solution:

- Offer / concept
- Clarification, application and implementation in accordance with the necessary approvals
- Design (construction and electrical engineering)
- Implementation and realisation
- Function test
- Training / handover
- Preparation of documentation
- Commissioning
- Calibration
- Final approval

EXAMPLES OF MEASURING SYSTEMS:

- Measuring systems for long-distance pipelines
- Measuring systems for the loading and unloading of ships, tankers and wagons
- Measuring systems for the measurement of lubricating oils, liquid gases, highly viscous media, etc.

OPTIONS

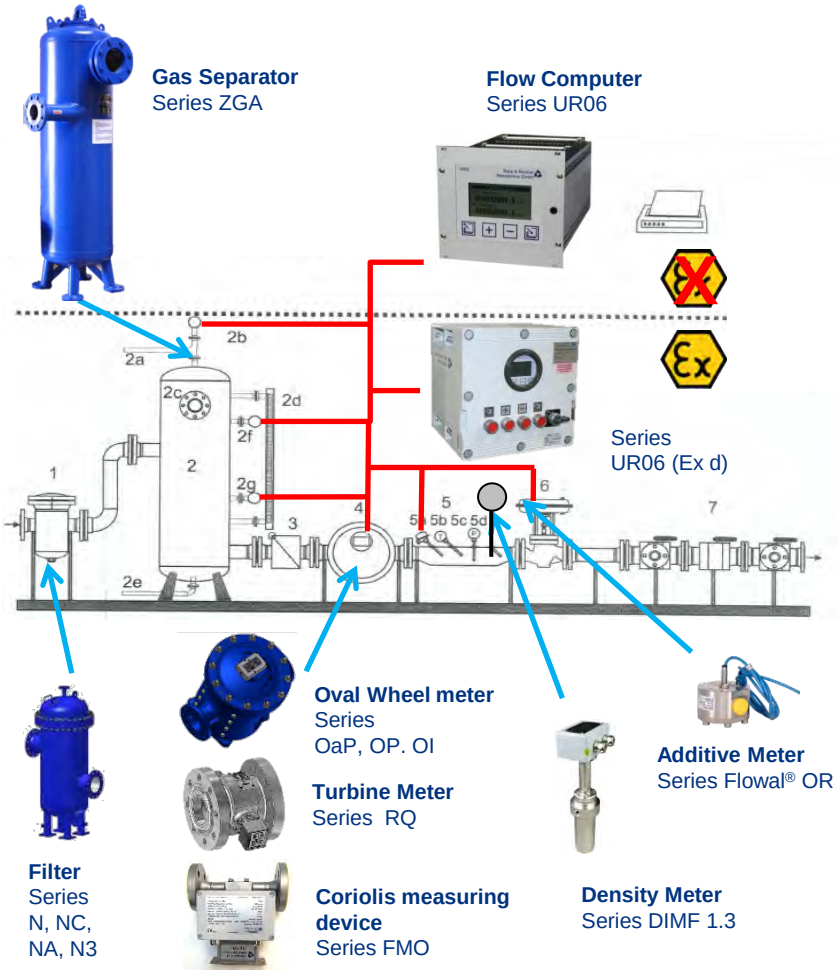
- Evaluation and upgrade of already installed measuring systems
- On-site calibration by recognized specialist companies, e.g. WPD or Mestrole
- Conversion of already proven measuring technology to the latest MID-compliant standard
- Maintenance contracts

Further information and product variants are available on request

PTB OIML NMi LNE MID

CONFORMITY ASSESSMENT ACC. TO MID 2014/32/EU

BOPP & REUTHER MESSTECHNIK



MAIN CHARACTERISTICS

Performance:	Conformity assessment of MID measuring systems
Measured variable:	Volume, Mass
Legal basis:	2014/32/EU
Requirements:	acc. to. MI-005 / chap VII
Accuracy classes acc. to. OIML R117:	0.3 / 0.5 / 1.0
Measuring system types:	Long-distance pipeline, loading and unloading, lubricating oils, liquefied gases, highly viscous media, road vehicles, airfield vehicles
Special features:	Placing on the market acc. to module D

RANGE OF SERVICES

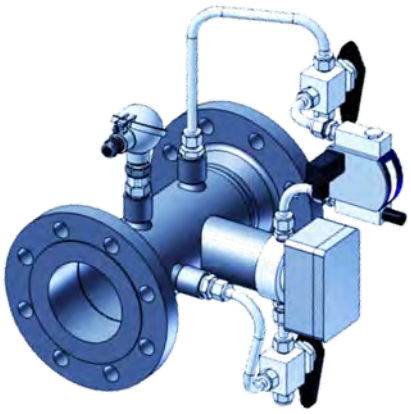
- Preliminary clarification with authorities
- Inventory on site
- Application for type examination certificate to the metrology authorities
- Conformity assessment process according to Annex VII (formerly MI-005) / Module D of the MID
- Coordination with local verification authorities
- Commissioning
- On-site calibration
- Securing of the measuring system
- Issue of the declaration of conformity and measuring system letter

OPTIONS

- Evaluation and upgrade of already installed measuring systems
- On-site calibration by recognized specialist companies such as WPD or Mestrole
- Retrofitting of already proven measuring technology with the latest MID-compliant standard
- Maintenance contracts

Further information and product variants are available on request

COMPACT DENSITY UNIT CDU



MAIN CHARACTERISTICS

Product Type:	**C**ompact **d**ensity measurement **u**nit CDU
Application:	for liquids
Measuring accuracy:	±0.1 kg/m3
Ex-approval:	Zone 1
Process temperature:	-10°C up to 50°C
Process pressure:	50 bar
Housing material:	Aluminium
Wetted parts:	stainless steel or Stahl
Power supply:	24 VDC
Process supply / Display:	Frequency, Pt100, Display for flow (at the variable area flowmeter)
Process connection:	Flange PN 40, ANSI 300
Special features:	multivariable measuring unit in the smallest possible space

MEASURING RANGE

DN	Material 3-way valve	Material combination CDU	Length (mm)
50 / 2“	stainless steel	Steel or stainless steel	515
80 / 3“	stainless steel	Steel or stainless steel	350
100 / 4“	stainless steel	Steel or stainless steel	350

FUNTIONALITY

This compact density measuring unit represents a completely prefabricated solution and is used for continuous recording of the operating density or reference density of non-corrosive liquid media such as liquid gases, petrol, diesel, biofuels, etc. The unit is already designed / configured in the factory to optimally meet the user requirements. It is possible to take samples of the medium at this unit. It can optionally be equipped with a temperature and / or pressure sensor. In connection with a flow computer, such as our UR06, the application-relevant conversions can be carried out.

COMPATIBLE

The following meter types of our product portfolio can be used:

- Oval wheel meters of the following series: OI, OaP, OP, Flowal® OR and OF, OK
- Turbine meter of the RQ series
- Vortex meter VTX3
- Compact Orifices

OPTIONS

- Pt 100
- Pressure sensor

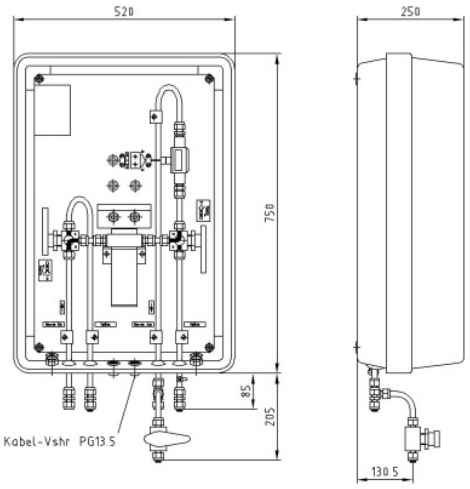
Further information and product variants are available on request

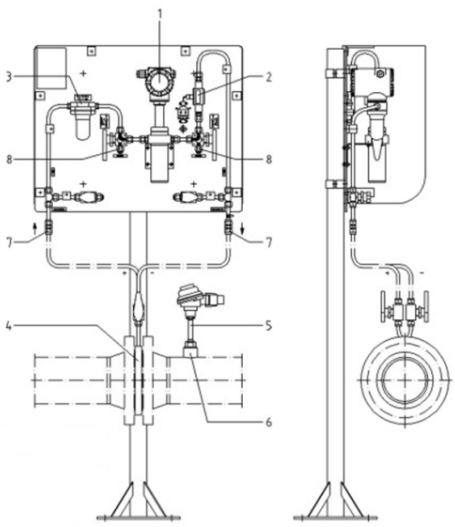
DGRL / ASME

DENSITY MEASURING SYSTEM DIME

MAIN CHARACTERISTICS

Product Type:	Density measuring system DIME
Application:	for liquids
Measuring accuracy:	up to ±0.1 kg/m³ (±0.01 % related to water)
Ex-approval:	Zone 1
Process temperature:	-25°C up to +60°C
Process pressure:	up to 100 bar
Housing material:	stainless steel
Wetted parts:	stainless steel
Power supply:	24 VDC
Process supply / Display:	Frequency, 4-20 mA / HART®, PT100, switch contact / pointer
Process connection:	Swagelok®, Flange acc. to DIN or ANSI
Special features:	easy installation, calibratable version possible





1 Density meter
2 Flow meter
3 Filter
4 Orifice plate
5 Resistance thermometer
6 Welding socket
7 Hydraulic connection
8 3-way-valve

OPTIONS

- Available as custody transfer version
- Available as Ex i or Ex d version
- Bypass can be operated by means of an orifice plate or integrated pump
- Wide range of accessories (heater, flow monitor, flushing connections, etc.)
- Density meter DIMF 1.3 or DIMF 2.0

Further information and product variants are available on request

MOBILE MEASURING STATION MM 1

MAIN CHARACTERISTICS

Performance:	mobile reference standard for checking other flowmeters
Measured variable:	Volume
Legal basis:	2014/32/EU, OIML R117
Requirements:	acc. to MI-005 / chap VII
Accuracy classes acc. to. OIML R117:	0.3 / 0.5 / 1.0
Measuring system types:	Road vehicles, airfield vehicles
Special features:	optionally with DAkkS certificate, measurement works without auxiliary energy

STRUCTURE

- Tanker couplings
- Y-Filter
- Sight glasses
- Manual shut-off valves
- Oval wheel meter made of Aluminium DN 65 / PN10 65 with roller counter
- Grounding rollers and clamps

FUNCTIONALITY

The purpose of this mobile measuring system is to use a very accurate oval wheel meter, which serves as a reference device, to ensure that the tanker drivers check that the delivery of diesel to the end customer's tank farm is correct.
The system is mounted on a hand truck with pneumatic tyres. At the inlet and process supply there are tank truck couplings, as well as a sight glass and a manual shut-off valve. A Y-filter protects the measuring system from contamination. For weight reasons, the meter is a double-case oval wheel meter made of aluminium. At the end customer's request, this is equipped with a mechanical roller counter with an M5B receipt printer. Furthermore, both pages of the mobile measuring system are equipped with grounding rollers and grounding clamps. As weather protection, a 5 mm Aluminium plate was placed on top, which can also serve as a shelf. Hose holders were also fitted on both sides.

OPTIONS

- other meter sizes possible
- Regular inspection of the master meter at the plant in Speyer
- Maintenance contracts

Further information and product variants are available on request

MOBILE MEASURING STATION MM 2

MAIN CHARACTERISTICS

Performance:	mobile reference standard for checking other flowmeters
Measured variable:	Volume, mass
Legal basis:	2014/32/EU
Requirements:	acc. to MI-005 / chap VII
Accuracy classes acc. to OIML R117:	0.3 / 0.5 / 1.0
Measuring system types:	Capillary, loading and unloading
Special features:	optionally with DAkkS certificate

STRUCTURE

Master Meter Set-Up designed and provided by Bopp & Reuther Messtechnik. The OaP 600 is equipped with a double NAMUR pulse process supply at the front. The DIMF 1.3 PV24 is placed in the inlet branch of the pipeline and fixed in a temperature pocket that ensures minimum temperature gradients. The UR06 flow computer (original is in an Ex d box) is fixed on the back page (blue plate). Flexible hoses allow connection to the customer's product line.

FUNCTIONALITY

In a tank storage facility where mass meters are used for loading purposes, the accuracy of the mass meters must be checked regularly. We offer a mobile calibration unit with the highest possible accuracy at an affordable price. This is mounted on a trailer for mobile use at the customer's site. For direct gross volume measurement, the highly accurate double-case oval wheel meter of the OaP series was used, which shows all calibration results better than ± 0.1 % of measured value in a Flow rate of 1:10. The DIMF1.3 density meter, which is also approved for custody transfer applications, was integrated into the set-up to perform an indirect but highly accurate mass measurement. The measurement results of volume, density and temperature are recorded by the UR06 universal computer and converted into kg for comparison with the mass meter. The calculated values can be read out via an interface and compared in the host system with the results of the mass flow meter.

OPTIONS

- Evaluation and upgrade of already installed measuring systems
- On-site calibration by recognised specialist companies, e.g. WPD or Mestrole
- Conversion of already proven measuring technology to the latest MID-compliant standard
- Maintenance contracts

Further information and product variants are available on request

PTB OIML NMi LNE MID

MASTER METER RAPHAEL

MAIN CHARACTERISTICS

Product Type:	Mobile Master Meter Type Raphael
Application:	On-site testing of compressed air measuring devices such as thermal mass flow meters
Measuring accuracy:	±0.5 % at 1:600
Ex-approval:	Zone 2
Process temperature:	+10°C up to +80°C
Process pressure:	16 bar
Housing material:	Frame: Stahl, electronics: aluminium
Wetted parts:	Stainless steel
Power supply:	24 VDC / VAC
Process supply / Display:	Ethernet, PROFIBUS / LCD-Display
Process connection:	Flange acc.to DIN or ANSI
Special features:	can be used as operating equipment for all testing and maintenance services

MEASURING RANGE

maximum mass flow	3000 kg/h
Measuring dynamics	
with one measuring section	10:1
with two measuring sections	80:1
with three measuring sections	600:1

POSSIBLE MEDIA

- Compressed air
- Nitrogen
- CO_2
- Noble gases

POSSIBLE APPLICATIONS

- For the determination of leakages
- Calibration of permanently installed measurements
- Check the air consumption of installations

Further information and product variants are available on request

SERVICE

MAINTENANCE OF MEASURING INSTRUMENTS / MEASURING EQUIPMENT

BOPP & REUTHER MESSTECHNIK

MAIN CHARACTERISTICS

Performance:	On-site instrument maintenance
Measured variable:	Volume, volumetric flow, mass, mass flow, density, concentration, temperature, pressure, differential pressure
Test principle:	Simulation case, suitable test equipment
Availability:	for our Flow, Density, Energy, Metering and METRA Energy Measurement divisions

RANGE OF SERVICES

Use our experienced specialist staff for regular maintenance of your measuring equipment. This will ensure the availability of your measuring device / measuring system.

On-site device maintenance should be carried out in a cycle of no more than 2 years.

Meter maintenance includes the following services:

- Condition check / inventory (e.g. up-to-dateness / integrity of the fuse marks)
- Function and plausibility check of the local display / pulse generator / transmitter / measuring transducer as far as possible on site
- Check of the unit configuration
- Function and plausibility check of the flow or energy computers
- Functional check of the sensors used (measured variables: temperature, pressure, density)
- Documentation of the activities and measures carried out

YOUR ADVANTAGES

- Regular maintenance saves costs and brings process reliability
- Extend your warranty period by concluding a maintenance contract
- necessary spare parts at a preferential price
- Recommendations for plant / energy optimisation
- Support to ensure conformity with the current legal situation

RECOMMENDATION

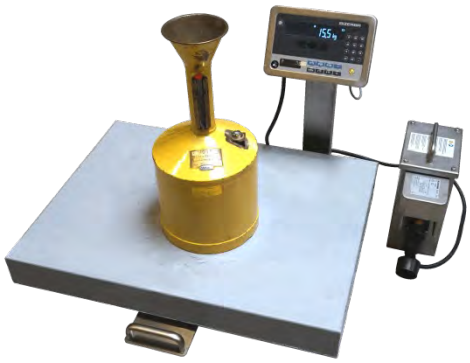
Conclude a maintenance contract with us today.
Inspection / maintenance at the Speyer factory or on site

Further information and product variants are available on request

MID ISO 17025

Bopp & Reuther Messtechnik GmbH - Am Neuen Rheinhafen 4 - 67346 Speyer / Germany
Phone: +49 6232 657-0 Mail: info@bopp-reuther.com www.bopp-reuther.com

MOBILE CALIBRATION WITH SCALE



MAIN CHARACTERISTICS

Performance:	Calibration on site
Measured variable:	Volume, volumetric flow, mass, mass flow rate
Test principle:	200 kg mobile scale
Test accuracy:	±0.3 %, ±0.5 % of measured value
Measurement uncertainty:	±0.08 % of measured value
Flow rate:	up to 700 l/min
Nominal size:	DN 25, 50, 80
Test medium:	Customer-specific medium
Test temperature:	Ambient temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI
Special features:	Use of specialist personnel trained at the head office in Speyer / Germany

POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	0.3 or 5	Test instructions	Standard
custody transfer test	4	0.3 or 5	Calibration regulation	Support of the weights and measures office

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of: Oval wheel meters Series OI5, OI10, OI50, OI100 or OI200

OPTIONS

- Preliminary custody transfer test with calibration piston of the weights and measures office
- Special calibration
- DAkkS (ISO 17025) Testing

Further information and product variants are available on request

PTB **MID ISO 17025**

CALIBRATION / DENSITY TEST BENCH

MAIN CHARACTERISTICS

Performance:	Calibration
Measured variable:	Density (800-1200 kg/m³), Temperature
Test principle:	Comparative measurement
Test accuracy:	±0.01 % of measured value
Measurement uncertainty:	±0.005 % of measured value
Flow rate:	up to 30 l/min
Nominal size:	DN 10 – DN 50
Test medium:	Ethanol, aqueous solutions, hydrocarbons
Test temperature:	+10°C up to +40°C
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Swagelok®
Special features:	Fully automatic

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	1	Test instruction	1 Temperature test point
High-precision testing	5	2	Test instruction	2 Temperature test points
Customer request	acc. to specification	acc. to specification	acc. to specification	

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of:
  Online density transducers according to the oscillating U-tube principle

OPTIONS

- Special calibration of customer samples in the laboratory or on site (incl. temperature dependence)
- with a repeatability up to 0.001 kg/m³
- Tests based on DAkkS approved references (ISO 17025)

Further information and product variants are available on request

ISO 17025

CALIBRATION / DENSITY TEST BENCH 2

MAIN CHARACTERISTICS

Performance:	Calibration
Measured variable:	Density (500 up to 1400 kg/m³), Temperature
Test principle:	gravimetric
Test accuracy:	±0.01 % of measured value
Measurement uncertainty:	±0.005 % of measured value
Flow rate:	up to 30 l/min
Nominal size:	DN 10 – DN 50
Test medium:	Ethanol, aqueous solutions, hydrocarbons
Test temperature:	+10°C up to +40°C
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Swagelok®
Special features:	accredited by the PTB

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	1	Test instruction	1 Temperature test point
Preliminary custody transfer test	4	1	Calibration specification	1 Temperature test point
High-precision testing	5	2	Test instruction	
Module D	4	1	MI-005 (chap. VII)	for measuring systems
Customer request	acc. to specification	acc. to specification	acc. to specification	Customer request

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of:
  Online density transducers according to the oscillating U-tube principle
- Preliminary custody transfer testing of density meter

OPTIONS

- Special calibration of customer samples in the laboratory or on site (incl. temperature dependence) with a repeatability up to 0.001 kg/m³
- Tests based on DAkkS approved references (ISO 17025)
- Tests of liquid gases (propane) on request

Further information and product variants are available on request

MID ISO 17025

CALIBRATIONS /2-WAY PIPE TEST LOOP

MAIN CHARACTERISTICS

Performance:	Calibrations
Measured variable:	Volume, volumetric flow, mass, mass flow rate
Test principle:	bidirectional pipe test loop
Test accuracy:	±0.15 %, 0.3 %, ±0.5 % of measured value
Measurement uncertainty:	±0.06 % of measured value
Flow rate:	12 m³/h up to 1200 m³/h
Nominal size:	DN 50 – DN 400
Test medium:	Oil 2.5 mPa·s
Test temperature:	Room temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Sandwich
Special features:	accredited by the PTB

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	1	Test instruction	1 Temperature test point
Preliminary custody transfer test	4	1	Calibration specification	1 Temperature test point
High-precision testing	5	2	Test instruction	
Module D	4	1	MI-005 (chap. VII)	for measuring systems
Customer request	acc. to specification	acc. to specification	acc. to specification	Customer request

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of:
  differential pressure sensors, differential pressure sensor measuring distances, vortex meters, ultrasonic meters, MID, Coriolis, oval wheel meters, turbine wheel meters
- Preliminary custody transfer testing of oval wheel meters

OPTIONS

- Special calibrations
- DAkkS-testing (ISO 17025)
- KV-value testing of valves
- Testing of liquid gases (propane) on request

Further information and product variants are available on request

PTB **MID ISO 17025**

CALIBRATION / MASTER METER 1

MAIN CHARACTERISTICS

Performance:	Calibrations
Measured variable:	Volume
Test principle:	Oval wheel meter Master Meter
Test accuracy:	±0.3 % up to ±0.5 % of measured value
Measurement uncertainty:	±0.06 % of measured value
Flow rate:	1.8 m³/h up to 72 m³/h
Nominal size:	DN 50 – DN 80
Test medium:	Oil 2.5 mPa·s
Test temperature:	Room temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Sandwich
Special features:	custody transfer testing with calibration piston possible

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	0.3 or 5	Test instruction	Standard
Preliminary custody transfer test	4	0.3 or 5	Calibration specification	
Module D	3	0.3 or 5	MI-005 (chap. VII)	for measuring systems
OIML	6	3 or 5	OIML	
customer request	acc. to specification	acc. to specification	acc. to specification	

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of:
  oval wheel meter
- Preliminary custody transfer testing of oval wheel meters

OPTIONS

- Special Calibration

Further information and product variants are available on request

PTB MID

CALIBRATION / MASTER METER 2

MAIN CHARACTERISTICS

Performance:	Calibrations
Measured variable:	Volume
Test principle:	Oval wheel meter Master Meter
Test accuracy:	±0.3 % up to ±0.5 % of measured value
Measurement uncertainty:	±0.06 % of measured value
Flow rate:	0.18 m³/h up to 6 m³/h
Nominal size:	DN 15 – DN 25
Test medium:	Oil 2.5 mPa·s
Test temperature:	Room temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Sandwich
Special features:	custody transfer testing with calibration piston possible

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	0.3 or 5	Test instruction	Standard
Preliminary custody transfer test	4	0.3 or 5	Calibration specification	
Module D	3	0.3 or 5	MI-005 (chap.. VII)	for measuring systems
OIML	6	3 or 5	OIML	
Customer request	acc. to specification	acc. to specification	acc. to specification	

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of
  Oval wheel meter
- Preliminary custody transfer testing of oval wheel meters

OPTIONS

- Special calibrations
- Calibration against additional master meters DN 15 (up to 10 l/min) and DN 25 (up to 30 l/min) or gravimetric possible

Further information and product variants are available on request

PTB MID

CALIBRATION / MASTER METER 3

MAIN CHARACTERISTICS

Performance:	Calibrations
Measured variable:	Volume
Test principle:	MID Master Meter
Test accuracy:	±0.3 % up to ±0.5 % of measured value
Measurement uncertainty:	±0.06 % of measured value
Flow rate:	0 m³/h up to 600 m³/h
Nominal size:	DN 15 – DN 250
Test medium:	Cold water
Test temperature:	Room temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Sandwich
Special features:	custody transfer testing with calibration piston possible

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro run	Reference document	Notes
Factory test	4	0.3 or 5	Test instruction	Standard
Preliminary custody transfer test	4	0.3 or 5	Calibration specification	
Module D	3	0.3 or 5	MI-005 (chap. VII)	for measuring systems
OIML	6	3 or 5	OIML	
Customer request	acc. to specification	acc. to specification	acc. to specification	

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for the testing of:
  differential pressure sensors, differential pressure sensor measuring distances, vortex meters, ultrasonic meters, MID, Coriolis, oval wheel meters, turbine wheel meters
- Preliminary custody transfer testing of oval wheel meters

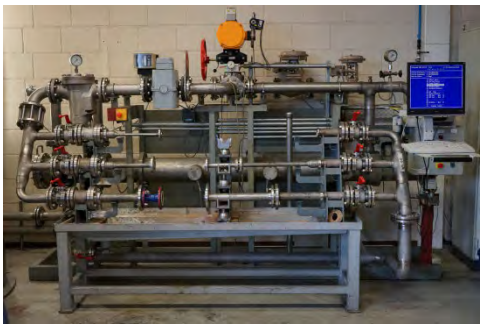
OPTIONS

- Special calibrations, KV value testing of valves
- Tests for liquid gases (propane) on request

Further information and product variants are available on request

PTB MID

CALIBRATION / PISTON PROVER



MAIN CHARACTERISTICS

Performance:	Calibrations
Measured variable:	volume
Test principle:	Piston Prover
Test accuracy:	±0.15 %, ±0.3 % up to ±0.5 % of measured value
Measurement uncertainty:	±0.06 % of measured value
Flow rate:	0.6 m³/h up to 72 m³/h
Nominal size:	DN 15 – DN 50
Test medium:	cold water
Test temperature:	room temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Sandwich
Special features:	fully automatic

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	4	0.3 or 5	Test instruction	Standard
Customer request	acc. to specification	acc. to specification	acc. to specification	

OVERVIEW OF DEVICES TO BE TESTED

- Suitable for testing:
  Oval wheel meters and turbine wheel meters

OPTIONS

- Special calibrations

Further information and product variants are available on request

CALIBRATION / HOT WATER TEST BENCH KRP/2

BOPP & REUTHER MESSTECHNIK

MAIN CHARACTERISTICS

Performance:	Calibrations
Measured variable:	Volume, volumetric flow rate, mass, mass flow rate
Test principle:	MID Master Meter
Test accuracy:	±0.4 % up to ±1.0 % of measured value
Measurement uncertainty:	±0.15 % up to ±0.3 % of measured value
Flow rate:	100 l/h up to 450 m³/h
Nominal size:	DN 15 – DN 250
Test medium:	Hot water
Test temperature:	Room temperature
Test pressure:	up to ca. 10 bar
Process connection:	Flange acc. to DIN or ANSI, Sandwich
Special features:	State-approved testing laboratory KRP/2 for heat meters

OVERVIEW OF POSSIBLE TESTS

Type of test	Number of test points	Number of repro runs	Reference document	Notes
Factory test	3	0.3 or 5	Test instruction	standard
Preliminary custody transfer test	3	0.3 or 5	Calibration specification	
Module D	3	0.3 or 5	MI-004 (chap. VI)	
customer request	acc. to specification	acc. to specification	acc. to specification	

OVERVIEW OF DEVICES TO BE TESTED

- suitable for the testing of:
  differential pressure transducer, vortex meter, ultrasonic meter, electromagnetic flowmeter
- Calibration of sub-units (calculator, hydraulic transmitter)

OPTIONS

- special test for non-calibratable heat meters
- gravimetric test

Further information and product variants are available on request

PTB MID

REPAIRS / SPARE PARTS

MAIN CHARACTERISTICS

Service:	Service, Repairs, Spare parts
Place of performance:	workshop Speyer, on site
Repairs:	Meters of all types (also from other manufacturers)
Spare parts:	Original spare parts from the manufacturer
Special features:	Specialist company according to §19 I WHG, certified according to DIN EN ISO 9001, maintenance contracts meters with a service life of over 40 years can be repaired / calibrated depending on their condition

SERVICE AREA:

- Decontamination room for chemical liquids
- Diagnostic room for checking all measuring instruments
- Test bench
- Specialist workshop for the reworking of mechanical components
- Electronics laboratory for the reworking of electronic components
- Software department for programming and adjustment of software tools
- Calibration laboratory for calibration / recalibration according to DIN ISO17025

RANGE OF SERVICES:

- Pick-up and return transport
- Determination of required protection levels
- Decontamination according to VCI guidelines
- Dismantling and cleaning of delivered flow meters and flowmeters
- Diagnosis and fault identification of mechanical and electronic measuring instruments
- Repair of the measuring instruments by trained specialists using original manufacturer spare parts
- Adjustment / Regulation
- Refurbishment
- Professional disposal of contaminated liquids according to § 19 l WHG (Water Resources Act)
- Calibrations:
  - Factory Test
  - custody transfer test in the presence of an official of the state custody transfer office
  - Testing according to ISO 17025
  - Customer-specific testing

OPTIONEN

- on request, painting according to new condition
- 12-month warranty on repairs on request
- Maintenance contracts

Further information and product variants are available on request

COMMISSIONING

MAIN CHARACTERISTICS

Services:	Commissioning of measuring instruments and measuring systems
Place of performance:	On site
Special features:	Carried out by our qualified personnel

We commission your measuring instruments and / or measuring systems, taking into account all legal requirements.

RANGE OF SERVICES :

- Checking the actual situation
- Checking the parameter configuration, if necessary with optimisation for application-specific or on-site requirements
- Verification of the installation / assembly
- Functional test
- Documentation of the work carried out
- Renewal / replacement of fuse marks within the scope of our repairer qualification in consultation with the calibration authorities
- Commissioning / acceptance MID according to directive 2014/32/EU

OPTIONS

On-site calibration of measuring instruments such as density meters, temperature transmitters etc.
Contact us

Further information and product variants are available on request

MID

ACCESSORIES

ELECTRONIC INDICATOR UNIT

Type	Compatible	Page
Local Display M	Flowal OR, OF, OC	79
Local Display MFE	Flowal OR, OF, OC	80
Universal Smart Transmitter UST	OI, OP, OaP, RQ	81
Local Display F016	OI, OP, OaP, RQ	82
Batch Controller F130	OI, OP, OaP, RQ	83
Preselection electronics F130 / N130	all kind of flowmeters	84
Preselection electronics EMR4	OI, OP, OaP	85
Universal computer UR06	all	86
Universal computer UR06 (cassette)	all	87
Universal computer UR06 Ex d	all	88
Universal computer URS06	all	89
Universal computer URS 09	all	90
Energy flow computer ERW 700	all	91

MECHANICAL DISPLAY

Type	Compatible	Page
Roller counter R7	Small-OI	92
Single pointer totalizer E	OI, OP, OaP	93
Double pointer totalizer D	OI, OP, OaP	94
Mechanical counter M5	OI, OP, OaP	95
Mechanical counter M5V	OI, OP, OaP	96

ACCESSORIES

PULSE PICK-UP

COMPONENTS

LOCAL DISPLAY M

MAIN CHARACTERISTICS

Product Type:	Multifunctional electronics M
Application:	Simple electronic indicator unit for volume meters
Variants:	M1 (battery supply) M2 (battery supply with pulse output) M3 (24 VDC supply, with pulse output, current output)
Ex-approval:	none
Protection class:	IP 65
Ambient temperature:	-20°C up to 70°C
Power supply:	Lithium-battery 3.6 V, 24 VDC with 4-20 mA current output (2-wire technology)
Output / Display:	Pulses, current output, digital display
Special features:	modular concept, as remote mounting available

OPERATING MODES

- Volume measurement: total volume, daily volume, momentary flow
- Daily volume counter: resettable
- Sum measurement
- Differential measurement
- Units of volume: Liter, cubic meter, gram, ton, kilogram
- Time units: h, min, sec.
- Return flow detection
- Memory for density and correction factor for mass conversion, optional Pt1000 (only with M3)

POWER SUPPLY

M1 and M2: Lithium-Battery 3.6 V
M3: 24 VDC with current output 4-20mA (2-wire technology)

OUTPUT SIGNALS

M1: Display
M2: Display, pulses
M3: Display, pulses, current output

Possibilities of data storage and data transmission:
see our UST, F and UR06 electronics

COMPATIBLE

Oval wheel meter series: OR, OF, OC

Further information and product variants are available on request

LOCAL DISPLAY MFE

MAIN CHARACTERISTICS

Product Type:	Multifunctional electronics MFE
Application:	Simple electronic indicator unit for volume meters
Variants:	MFE1 (battery supply) MFE2 (battery supply with pulse output) MFE3 (24 VDC supply, with pulse output, current output)
Ex-approval:	Zone 1
Protection:	IP 65
Ambient temperature:	-20°C up to 70°C
Power supply:	Lithium-Battery 3.6 V, 24 VDC with 4-20 mA current output (2-wire technology)
Output / Display:	pulses, current output, digital display
Special features:	modular concept

OPERATING MODES

- Volume measurement: total volume, daily volume, momentary flow
- Daily volume counter: resettable
- Sum measurement
- Differential measurement
- Units of volume: Litre, cubic meter, gram, ton, kilogram
- Time units: h, min, sec.
- Return flow detection
- Memory for density and correction factor for mass conversion, optional Pt1000 (only with MFE3)

POWER SUPPLY

MFE1 and MFE2: Lithium-Battery 3.6 V
MFE3: 24 VDC with process supply 4-20 mA (2-wire technology)

OUTPUT SIGNALS

MFE1: Display
MFE2: Display, pulses
MFE3: Display, pulses, current output

Possibilities of data storage and data transmission:
see our UST, F and UR06 electronics

COMPATIBLE

Oval wheel meter series: OR, OF, OC

Further information and product variants are available on request

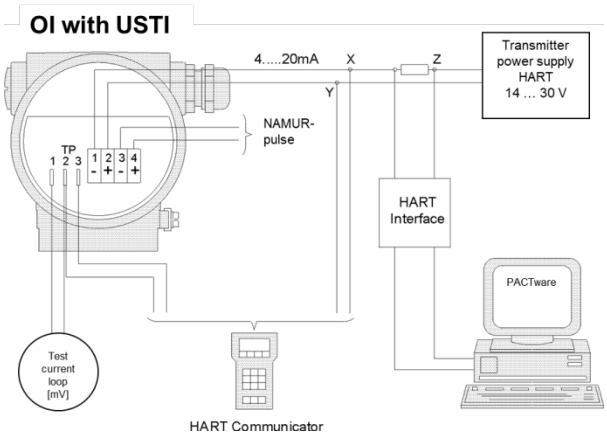
IECEx

UNIVERSAL SMART TRANSMITTER UST

MAIN CHARACTERISTICS

Product Type:	Universal Smart Transmitter
Application:	Evaluation electronics for oval wheel meters and turbine meters
Variants:	UST-D (D = flame proof) UST-X (X = flame proof, no pulse output) UST-I (I = intrinsically safe)
Ex-approval:	Zone 1
Protection class:	IP 65
Ambient temperature:	-20°C up to 70°C
Power supply:	24 VDC (2-wire-technology)
Process supply / Display:	4-20 mA / HART® in 2-wire technology, pulse output (original or scaled) acc. to NAMUR
Special features:	Registration of the last highest measuring frequency for diagnostic purposes, 10-point linearization

CONNECTION



OPERATING MODES

Flow rate: l/s, l/min, l/h, m³/s, m³/min, m³/h, gal/h, gal/min, ft³/min, ft³/h
Volume counter: resettable
Totalizing volume counter: not resettable

POWER SUPPLY

14 - 30 V DC for UST-D, 14 – 28 V DC for UST-X
Cable gland: M20 x 1,5
Terminals: GKDS-Ex

COMPATIBLE

OR, OF, OC:	via Reed-Sensor
OI:	in combination with AG 41, AG 42, AG 43
OaP:	in combination with AG 44
RQ:	in combination with AG 81, AG 82, AG 83

Further information and product variants are available on request

LOCAL-DISPLAY F016

MAIN CHARACTERISTICS

Product Type:	Electronic counter, flow rate display with one measuring channel
Application:	flow measurements, quantity measurement of liquids
Input signals flow rate:	pulses / NAMUR, Reed, NPN, PNP, voltage pulses
Numbers of digital inputs:	1
Numbers of digital outputs:	1 / Relay, Transistor active, Transistor passive
Power supply:	8 – 24 / 30 VDC, 115 – 230 VAC
Housing shapes:	Remote mounting (plastic, aluminium, stainless steel)
Display:	Alpha-numeric, 90 x 40 mm
Ex-approval:	Ex i
Special features:	8-point linearization

EXAMPLES OF APPLICATION

- 1-channel quantity counter with flow rate display and linearization
- different units selectable: ml, l, m³, g, kg, ton, Gal, bbl, lb, scf, Nm³, Nl, P

CONNECTION

- Screw terminals
- various combinations of cable glands possible

Further information and product variants are available on request

IECEx

BATCH CONTROLLER F130

MAIN CHARACTERISTICS

Product Type:	Flow computer for liquids with one measuring channel
Application:	Fillings
Input signals flow rate:	pulses / NAMUR, Reed, NPN, PNP, voltage pulses
Number of digital inputs:	3 / volume, start, stop
Number of digital outputs:	2 / Relay, Transistor active, Transistor passive
Interfaces:	RS232, RS485, TTL
Protocol:	bus-rtu, bus-asc
Power supply:	230 VAC or 24 VDC
Housing shapes:	Remote mounting (plastic, aluminium, stainless steel)
Display:	alpha-numeric, 90 x 40 mm,
Ex-approval:	Ex i
Special features:	easy handling

EXAMPLES OF APPLICATION

- Filling of liquids
- different units selectable: l, m³, kg, Gal, USGal, bbl, lb

CONNECTION

- Screw terminals
- various combinations of cable glands possible

Further information and product variants are available on request

IECEx

OVAL WHEEL METER WITH PRESELECTION ELECTRONICS F130 / N130

BOPP & REUTHER MESSTECHNIK

MAIN FEATURES

Product type:	Oval wheel meter with electronics and monitoring software
Application:	Filing
Input signals Flow rate:	Pulses / NAMUR, Reed, NPN, PNP, voltage pulses
Number of digital inputs:	3 / Volume, start, stop
Number of digital outputs:	2 / Relay, transistor active or transistor passive
Interfaces:	RS232, RS485, TTL
Protocols:	Modbus-RTU, Modbus-ASCII
Power supply:	230 VAC or 24 VDC
Housing moulds:	F130: Wall mounting N413: Switch panel installation
Housing material:	Plastic, aluminium, stainless steel
Display:	Alpha-numeric, 90 x 40 mm,
Ex approval:	Ex i (F130)
Special features:	Simple operation, remote reading, data storage

APPLICATION EXAMPLES

- Filling and emptying tankers
- Filling containers
- Product transfer from tank to tank

FUNCTIONAL DESCRIPTION

- Quantity preselection
- 2-stage switch-off
- Data printout **or** live monitoring with data storage

CONNECTION

- Screw terminals
- Various combinations of cable glands possible

PREREQUISITES

- Windows PC (for monitoring software)
- RS485 serial interface (for monitoring software)

Further information and product variants are available on request.

IECEx

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PRESELECTION ELETRONICS EMR4

MAIN CHARACTERISTICS

Product Type:	Preselection electronics EMR4
Application:	flow and quantity measurement with pre-selection of liquids in custody transfer and hazardous areas
Input signals flow rate:	pulses, 0/4..20 mA
Input signals temperature:	yes
Input signals pressure:	none
Input signals density:	none
Number of digital inputs:	2 (PNP)
Number of current inputs:	none
Number of PT-inputs:	1
Number of digital outputs:	3 (pulse output with selectable voltage) and 3 relay outputs
Number of current outputs:	none
Interfaces:	RS232, RS485, Wi-Fi
Protocol:	serial
Power supply:	230 VAC or 28 VDC
Housing shapes:	meter mounted or remote mounting
Display:	graphic display, flexible configurable, with backlight
Special features:	modular design, user-friendly operation, available in several languages (currently English, French and Spanish), for Ex versions connection box in safe area necessary

EXAMPLES OF APPLICATION

- Tank loading

OPTIONS

- Ex-protection
- Printer (receipt printer)
- Temperature compensation
- multiple products
- Linearization

COMPATIBLE

Oval wheel Meter series: OI, OP and OaP

Further information and product variants are available on request

UNIVERSAL COMPUTER UR06

MAIN CHARACTERISTICS

Product Type:	flow computer for liquids for 2 measuring channels
Application:	flow and quantity measurement of liquids in custody transfer
Input signals flow rate:	pulses, 0/4..20 mA
Input signals temperature:	PT100, PT500, PT1000, 0/4..20 mA
Input signals pressure:	0/4..20 mA
Input signals density:	frequency, 0/4..20 mA
Number of digital inputs:	2 (expandable up to 6), NAMUR, Reed, NPN, PNP, 5 VDC, 24 VDC
Number of current inputs:	2 (expandable up to 4), active, passive
Number of PT-inputs:	2
Number of digital outputs:	3 (expandable up to 7), Optocoupler
Number of current outputs:	2 (expandable up to 6), 0/4..20 mA
Interfaces:	RS232, RS485, Ethernet, PROFIBUS DP
Protocol:	Modbus (ASCII, RTU, TCP/IP) PROFIBUS DP
Power supply:	230 VAC or 24 VDC
Housing shapes:	Remote mounting
Display:	graphic display, flexible configurable
Special features:	Batch-function through higher-level control modular structure, user-friendly operation

EXAMPLES OF APPLICATION

- Continuous measurement with temperature and pressure compensation of 2 meters simultaneously
- Mass counting in combination with a density meter
- Consumption measurement
- Addition of 2 measurement sections
- Batch-function via a higher-level control system, electronic storage of original documents integrated

CONNECTION

- Spring clamp terminals
- Insertion of cables via 9 cable glands

Further information and product variants are available on request

UNIVERSAL COMPUTER UR06-CASSETTE

MAIN CHARACTERISTICS

Product type:	flow computer for liquids for 2 measuring channels
Application:	flow measurements, quantity measurement of liquids in custody transfer
Input signals flow rate:	pulses, 0/4..20 mA
Input signals temperature:	PT100, PT500, PT1000, 0/4..20 mA
Input signals pressure:	0/4..20 mA
Input signals density:	Frequency, 0/4..20 mA
Number of digital inputs:	2 (extendable up to 6), NAMUR, Reed, 5V, 24V
Number of current inputs:	2 (extendable up to 4), active, passive
Number PT-inputs:	2
Number of digital outputs:	3 (extendable up to 7), Optocoupler
Number of current outputs:	2 (extendable up to 6), 0/4..20 mA
Interfaces:	RS232, RS485, Ethernet, PROFIBUS DP
Protocol:	Modbus (ASCII, RTU, TCP/IP) PROFIBUS DP
Power supply:	230 VAC or 24 VDC
Housing shape:	19“ Cassette
Display:	Graphic display, flexibly configurable
Special features:	batch function through higher-level control modular structure, user-friendly operation

EXAMPLE OF APPLICATION

- Continuous measurement with temperature and pressure compensation of 2 meters simultaneously
- Mass counting in combination with a density meter
- Consumption measurement
- Addition of 2 measurement sections
- Batch function via a higher-level control system, electronic storage of original documents integrated

CONNECTION

- Spring clamp terminals
- Insertion of cables via 9 cable glands

Further information and product variants are available on request

UNIVERSAL COMPUTER UR06-Ex d

MAIN CHARACTERISTICS

Product Type:	flow computer for liquids with 2 measuring channels
Application:	flow measurements, quantity measurement of liquids in custody transfer
Input signals flow rate:	pulses, 0/4..20 mA
Input signals temperature:	PT100, PT500, PT1000, 0/4..20 mA
Input signals pressure:	0/4..20 mA
Input signals density:	Frequency, 0/4..20 mA
Number of digital inputs:	2 (extendable up to 6). NAMUR, Reed, NPN, PNP, 5 VDC, 24 VDC
Number of current inputs:	2 (extendable up to 4), active, passive
Number of PT-inputs:	2
Number of digital outputs:	3 (extendable up to 7), Optocoupler
Number of current outputs:	2 (extendable up to 6), 0/4..20mA
Interfaces:	RS232, RS485, Ethernet, PROFIBUS DP
Protocol:	Modbus (ASCII, RTU, TCP/IP) PROFIBUS DP
Power supply:	230 VAC or 24 VDC
Housing shapes:	Remote mounting
Display:	graphic display, flexibly configurable
Ex-protection:	Zone 1
Special features:	batch function through higher-level control, modular structure, user-friendly operation

EXAMPLE OF APPLICATION

- Continuous measurement with temperature and pressure compensation of 2 meters simultaneously
- Mass counting in combination with a density meter
- Consumption measurement
- Addition of 2 measurement sections
- Batch function via a higher-level control system, electronic storage of original documents integrated

CONNECTION

- Spring clamp terminals
- Insertion of cables via 9 cable glands

Further information and product variants are available on request

UNIVERSAL COMPUTER URS06

MAIN CHARACTERISTICS

Product type:	Flow computer for liquids with 2 measuring channels
Application:	Flow measurement, quantity measurement of liquids in custody transfer, 2- channel
Input signals flow rate:	pulses, 0/4..20 mA
Input signals temperature:	PT100, PT500, PT1000, 0/4..20 mA
Input signals pressure:	0/4..20 mA
Input signals density:	Frequency, 0/4..20 mA
Number of digital inputs:	2 (extendable up to 6), NAMUR, Reed, NPN, PNP, 5 VDC, 24 VDC
Number of current inputs:	2 (extendable up to 4), active, passive
Number of PT-inputs:	2
Number of digital outputs:	3 x Relays
Number of current outputs:	2 / 0/4..20 mA
Interface:	Ethernet
Protocol:	MODBUS (TCP/IP)
Power supply:	230 VAC
Housing shapes:	Remote mounting
Display:	3.5 inch Touch-Screen
Special features:	functionality can be adapted to customer requirements

EXAMPLE OF APPLICATION

- Container filling
- Loading

CONNECTION

- Screw terminals
- Insertion of cables via 8 cable glands

Further information and product variants are available on request

PTB
Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

UNIVERSAL COMPUTER URS09

MAIN CHARACTERISTICS

Product type:	Flow computer for liquids
Application:	Flow measurements, quantity measurement of liquids in custody transfer
Number of measuring channel:	2
Input signals flow rate:	pulses, 0/4..20 mA
Input signals temperature:	PT100, PT500, PT1000, 0/4..20 mA
Input signals pressure:	0/4..20 mA
Input signals density:	Frequency, 0/4..20 mA
Number digital inputs:	2 (extendable up to 6), NAMUR, Reed, NPN, PNP, 5 VDC, 24 VDC
Number digital inputs SPS:	8
Number current inputs:	2 (extendable up to 4), active, passive
Number PT-inputs:	2
Number of digital outputs:	3 (extendable up to 7), Optocoupler
Number of digital outputs SPS:	8, 24 VDC 0.5 A
Number of current outputs:	2 (extendable up to 6), 0/4..20 mA
Interfaces:	Ethernet
Protocol:	Modbus TCP/IP
Power supply:	230 VAC or 24 VDC
Housing shapes:	Remote mounting
Display:	5.7 inch Touch-Screen
Ex-approval:	none
Special features:	functionality can be adapted to customer requirements

EXAMPLE OF APPLICATION

- Container filling
- Loading

CONNECTION

- Spring camp terminals
- Insertion of cables via 12 cable glands

Further information and product variants are available on request

PTB
Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

ENERGY FLOW COMPUTER ERW 700

MAIN CHARACTERISTICS

Product type:	Flow and energy computer for liquids, gases and steam
Application:	• Billing meters for district and local heating • System monitoring in power plants • for heat / cold production in the medium and upper performance range • for high requirements on measuring accuracy and measuring stability
Approvals:	• MID approval as heat flow computer • PTB approval as cold heat flow computer
Outputs digital:	up to 7 Digital outputs (Optocoupler)
Outputs analog:	up to 6 Analog outputs 0/4-20 mA
Interfaces:	M-Bus, RS 232, RS 485, Ethernet, Profibus DP
Protocols	Modbus (ASCII, RTU, TCP/IP), Profibus DP
Special features:	• suitable for the material flows gases, liquids, steam and water • can be combined with all common volume / mass transducers (differential pressure, vortex, dynamic pressure, ultrasonic, MID, Coriolis) • extensive modular expandability of inputs and outputs • large illuminated graphical display • parameterization and operation via software and / or manually • suitable for wall mounting, panel mounting, 1/3 19" plug-in panel mounting

OPERATING MODES / APPLICATIONS

Liquids
- Energy, volume (mass) measurement, flow rate, heat output
- Bidirectional measurements such as charge / discharge of heat accumulators,
- Multi-tariff measurements
- Cold measurements for water and water-glycol mixtures, also for separate changing mixing ratios

Steam
- Energy, mass (volume), flow rate, heat output
- Calculation of the heat quantity/flow rate as a function of the process variables steam flow, steam pressure and steam temperature. For superheated steam, the calculation is pressure or temperature compensated. For saturated steam the calculation is either pressure or temperature compensated
- Special functions such as bidirectional measurements / steam / condensate connection or multi-tariff measurements
- 2 channel steam measurements, pressure and temperature compensated

Technical gases / air
- Energy, standard volume (mass), flow rate, heat output
- Calculation of the gas standard volume and gas mass as a function of the process variables gas flow, gas pressure and gas temperature.
- Determination of the heat quantity
- for changing gas mixtures, an input for direct density-concentration measurement is available
- 2-channel gas measurements, pressure and temperature compensated

Further information and product variants are available on request

PTB MID

ROLLER COUNTER R7

MAIN CHARACTERISTICS

Product type:	Mechanical local display type R with single roller counter
Application:	Volume counting of liquids in l or m³
Roll counter unit:	totalizing counter with 7 digit rolls, not resettable
Ex-approval:	suitable for Zone 1
Process temperature:	up to 90°C
Ambient temperature:	0 up to 60°C
Housing material:	Plastic
Position digit sheet:	vertical
Power supply:	none
Display:	mechanical display
Process connection:	mounting with 4 screws
Special features:	works without auxiliary power

UNITS / LANGUAGES

Liter

Languages: German, English, French, others on request

DISPLAY CHARACTERISTICS

- Roller counter: final count 999999.9 liters
- 1 rotation of the last number roller: 1 liter
- smallest division of the last roller: 0.05 liters
- digit height: 5 mm
- diameter: 85 mm

COMPATIBLE

- for mounting on all oval wheel meters of the series small-OI
- can be combined with pulse pick-up type small-AG 19 and small-AG 20

Further information and product variants are available on request

SINGLE POINTER TOTALIZER E

MAIN CHARACTERISTICS

Product type:	Mechanical local display type E with single-pointer totalizer
Application:	Volume counting of liquids in l or m³
Roll counter unit:	totalizing counter with 6 digit rolls, not resettable
Ex-approval:	suitable for Zone 1
Process temperature:	-40°C up to 290°C (using a distance)
Ambient temperature:	-20°C up to 110°C
Housing material:	Aluminium
Position digit sheet:	vertical or desk shape 45° (option W)
Power supply:	none
Display:	mechanical display
Process connection:	mounting with 4 screws
Special features:	works without auxiliary power

UNITS / LANGUAGES

Liter, cubic meter

Languages: German, English, French, others on request

DISPLAY CHARACTERISTICS

0 – 10 Liter

0 – 100 Liter

0 – 1 m³

Roller counter: maximum value 99999.9

Digit height: 5 mm

Digits sheet diameter: 180 mm

COMPATIBLE

- for mounting on all oval wheel meters of the series OI, OP, OaP
- can be combined with pulse pick-up type AG 19 and AG 20

Further information and product variants are available on request

DOUBLE POINTER TOTALIZER D

MAIN CHARACTERISTICS

Product type:	Mechanical local display Type D with double pointer totalizer, pointer can be reset via zero setting device
Application:	Volume counting of liquids in l or m³
Roll counter unit:	totalizing counter with 6 digit rolls, not resettable
Ex-approval:	suitable for Zone 1
Process temperature:	-40°C up to 290°C (using a distance)
Ambient temperature:	-20°C up to 110°C
Housing material:	Aluminium
Position digit sheet:	vertical or desk shape 45° (option W)
Power supply:	none
Display:	mechanical display
Process connection:	mounting with 4 screws
Special features:	works without auxiliary power

UNITS / LANGUAGES

Liter, cubic meter
Languages: German, English, French, others on request

DISPLAY CHARACTERISTICS

0 – 10 Liter
0 – 100 Liter
0 – 1 m³
Roller counter: maximum value 99999,9
Digit height: 5mm
Digits sheet diameter 180 mm

COMPATIBLE

- for mounting on all oval wheel meters of the series OI, OP, OaP
- can be combined with pulse pick-up type AG 19 and AG 20

Further information and product variants are available on request

MECHANICAL COUNTER M5

MAIN CHARACTERISTICS

Product type:	mechanical local display type M5
Application:	quantity counting of liquids in l or m³
Ex-approval:	suitable for Zone 1
Process temperature:	-40°C up to 290°C
Ambient temperature:	-20°C up to 60°C
Housing material:	Aluminium
Roller counter:	5-digit, resettable 8-digit, not resettable
Power supply:	works without auxiliary energy
Display:	mechanical display
Connection:	mounting via 4 screws
Special features:	robust construction, suitable for outdoor use / IP54

FUNCTIONALITY

- 5-digit display of the counted quantity / volume
- at the end of the delivery, a sixth graduation roll can be read off additionally as a digit
- an 8-digit non-resettable total counter (top left of the display) adds up all the individual quantity displays in parallel

OVERVIEW OF AVAILABLE OPTIONS

- clockwise and anticlockwise rotation (convertible)
- installation of a backstop possible
- 1- or 2-channel pulse pick up (NAMUR) type IG1 and IG2

COMPATIBLE

- for mounting on all oval wheel meters of the series (from OI5), OP and OaP
- can be combined with pulse pick-up type AG 19, AG 20 and AG 01-08

Further information and product variants are available on request

MECHANICAL COUNTER M5V

MAIN CHARACTERISTICS

Product type:	Mechanical local display type M5V resettable and presetting mechanism
Application:	volume counting of liquids in l or m³
Ex-approval:	suitable for Zone 1
Process temperature:	-40°C up to 290°C (with accessories 300 mm extension)
Ambient temperature:	-20°C up to 60°C
Housing material:	Aluminium
Roller counter:	5 digit rolls, 1 resettable graduated roll
Totalizer:	8 digit rolls
Power supply:	mechanical movement works without auxiliary energy, switching outputs: 250V~5A, 250V~0,4A
Display:	mechanical display
Connection:	mounting via 4 screws
Special features:	robust construction, precise measurements, additional devices possible

FUNCTIONALITY

- 5-digit display of quantities
- at the end of the delivery, a sixth graduation roll is faded out
- the desired quantity is entered via push-buttons
- during dispensing, the set value remains
- stop button to interrupt the measuring process
- an 8-digit non-zeroable total counter adds up all the displays of the number roller set in parallel.

OVERVIEW OF AVAILABLE OPTIONS

- clockwise and anticlockwise rotation (convertible) and installation of a backstop possible

Installations / attachments:

- 1- or 2-channel pulse pick-up (NAMUR) Type IG1 and IG2
- Various shut-off devices depending on the type of shut-off (pneumatic / electric) Type SE2 (electric) SP2, SP22 (pneumatic up to 1.4 bar) and SP4 up to 10 bar
- Ex-protected zero contact switch (NK) e.g. for switching a pump on and off or for signaling purposes

COMPATIBLE

- for mounting on all oval wheel meters of the series OI (from OI5), OP and OaP
- can be combined with pulse pick-up type AG 19 and AG 20 and AG 01-08

Further information and product variants are available on request

PULSE PICK-UP AG 01-08

MAIN CHARACTERISTICS

Product type:	incremental pulse pick-up (optical shaft encoder) Add-on AG 01-08
Application:	for connection to higher-level control systems
Ex-approval:	Zone 1, Ex d-version
Ambient temperature:	-30°C up to 70°C (medium up to 90°C without temperature extension, from 90°C up to 110°C with temperature extension)
Housing material:	stainless steel, Aluminium
Protection class:	IP 67
Power supply:	24 VDC
Output:	Open collector pulse output, 2 channel
Special features:	Very high resolution

OVERVIEW PULSE VALUE

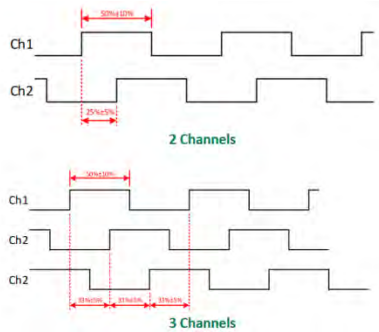
Type OI	Pulses/Liter	fmax (Hz)	Type OP	Pulses/Liter	fmax (Hz)	Type OaP	Pulses/Liter	fmax (Hz)
			OP 15	3450	1725			
OI 5	n. a.	n. a.	**OP 20**	1932	1610	**OaP 5**	1333.33	1111.11
OI 10	666.67	1111.11	**OP 32**	519	865	**OaP 10**	666.67	1111.11
			OP 40	411	1028			
OI 50	116.54	592.69	**OP 50**	240	1198	**OaP 50**	233.37	1166.86
OI 100	62.69	626.94						
OI 200	23.32	272.08				**OaP 125**	117.13	1366.52
OI 400	12.25	245.05	**OP 250**	66.67	1852	**OaP 250**	62.60	1251.96
			OP 470	42.19	1758			
			OP 600	33.33	1852	**OaP 600**	23.33	1166.32
			OP 1200	16.67	1389	**OaP 1200**	11.68	973.29
						OaP 2000	6.26	834.90
						OaP 3200	6.25	1250
						OaP 4000	5.00	1666.67

OUTPUT SIGNALS

NPN, PNP

CLAMP CONNECTION

	Channel 1	Channel 2
green	VCC	VCC
brown	GND	GND
white	Ch1	Ch1
yellow		Ch2
grey		



Square wave: 50 %
Duty cycle: ±10 %
Phase sense: Ch1 - Ch2: 25 % ± 5 %
The direction is counterclockwise when facing the visible part of the coupling.

COMPATIBLE

Can be used with the oval wheel meter series: OI (from OI 10), OP and OaP.

Further information and product variants are available on request

PULSE PICK-UP „Small“ AG 19 / AG 20

MAIN CHARACTERISTICS

Product type:	inductive pulse pick-up add-on AG 19, 20
Application:	for connection to higher-level control systems
Ex-approval:	Zone 1
Ambient temperature:	-25°C up to 90°C
Housing material:	Aluminium
Protection class:	IP54, for clamp box IP 67
Power supply:	NAMUR
Output:	Pulse output acc. to NAMUR, 1-, 2- or 3-channel
Special features:	for AG 19 / 20R: backflow detection, AG 20 suitable for use in custody transfer applications

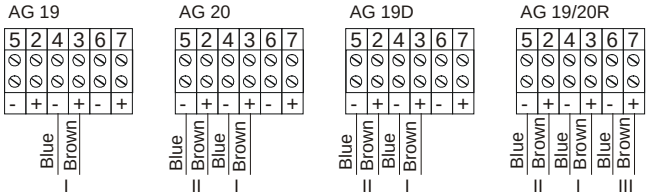
OVERVIEW PULSE VALUE

Type OI	DN Pipe connection	DN Flange connection	Q_{max} (l/h)	Pulses/Liter	f_{max} (Hz)
OI 03	6	15	120	100	3.33
OI 06	10	15	250	100	6.94
OI 1	-	15	600	100	16.67

OUTPUT SIGNALS

NAMUR pulses, 1- or 2-channel

CLAMP CONNECTION



Main Channel, II: Comparison Channel, III: Back Flow

AG 19: Cable 2-core, shielded
AG 20: Cable 4-core, twisted in pairs, shielded

COMPATIBLE

Oval wheel meter series: small-OI

Further information and product variants are available on request

PULSE PICK-UP AG 19 / AG 20

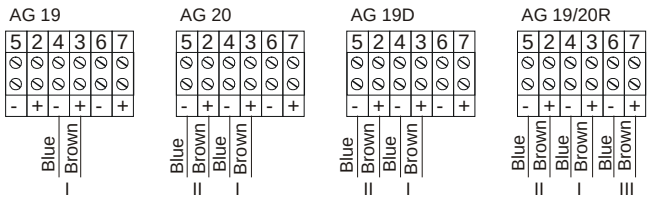
MAIN CHARACTERISTICS

Product type:	inductive pulse pick-up add-on AG 19, AG 20
Application:	for connection to higher-level control systems
Ex-approval:	Zone 1
Ambient temperature:	-25°C up to 90°C
Housing material:	Aluminium
Protection class:	IP54, for clamp box IP 67
Power supply:	NAMUR
Output:	Pulse output acc. to NAMUR, 1-, 2- or 3- channel
Special features:	for AG 19 / 20R: backflow detection, AG 20 suitable for use in custody transfer applications

OVERVIEW PULSE VALUE

		Possibilities based on the number of slots	
		ca. Werte	
OWM-Type	DN	Pulses/Liter	Hz
OI5	25	10/32/213	8.3/26.7/178
OaP5	25	10/100/160/213	8.3/83.3/133.3/178
OI10	25	1/10/80/100/107	1.7/16.7/133.3/166.7/178
OaP10	25	1/10/32/107	1.7/16.7/53.3/178
OP15	15	1/10/100/200/552	0.5/5/50/100/276
OP20	20/25	0.1/1/10/100/309	0.08/0.8/8.3/83.3/257.6
OP32	32	1/10/40/83	1.7/16.7/66.7/138.4
OP40	40	1/10/65.8	2.5/25/164.5
OI50	50	1/10/16/18.6	5/50/80/93
OP50	40	1/10/20/38.3	5/50/100/191.7
OaP50	50	1/10/32/37.3	5/50/160/187
OI100	50	1/3.2/10	11/35.2/111
OaP125	65	0.1/1/10/16/18.7	1.2/11.7/116.7/186.7/219
OI200	80	0.1/1/3.2/3.7	1.2/11.7/37.3/44
OP250	80	0.1/1/3.2/12.8	2.8/27.8/177.9/355
OaP250	80	0.1/1/3.2/10	2/20/64/200
OI400	100	0.1/1/1.6/1.9	2/20/32/39
OP470	100	0.1/1/3.2/6.8	4.2/41.6/133.3/282
OP600	100	0.1/1/3.2/5.3	5/50/160/296
OaP600	100	0.1/1/3.2/3.7	5/50/160/187
OP1200	150, 6“	0.1/1/3.2/2.7	5/50/160/222
OaP1200	150, 6“	0.1/1/1.6/1.9	8.3/83.3/133.3/156
OaP2000	200, 8“	0.01/0.1/0.32/1	1.3/13.3/42.7/133
OaP3200	300, 12“	0.01/0.1/0.32/1	2/20/64/200
OaP4000	400, 16“	0.01/0.1/0.32/1	3.33/33.3/106.7/333

CLAMP CONNECTION



Main Channel, II: Comparison Channel, III: Back Flow

AG 19: cable 2-wire, shielded
AG 20: cable 4-wire, twisted in pairs, screened

OUTPUT SIGNALS

NAMUR pulses, 1- or 2 channel

COMPATIBLE

Oval wheel meter series OI, OP and OaP

Further information and product variants are available on request

PULSE PICK-UP AG 41

MAIN CHARACTERISTICS

Product type:	Wiegand pulse pick-up add-on AG41
Application:	for connection to higher-level control systems
Ex-approval:	Zone 1
Ambient temperature:	-40°C up to 70°C (medium standard up to 170°C with temperature extension)
Housing material:	Aluminium
Protection class:	IP 65
Power supply:	NAMUR
Output:	NAMUR pulse output, 2-channel
Special features:	up to 6667 Pulses/Liter

OVERVIEW PULSE VALUE

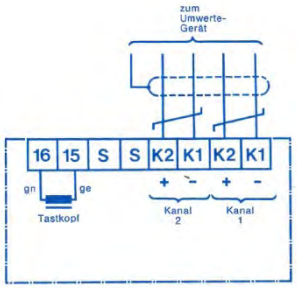
Type OI	DN Pipe connection	DN Flange connection	Q_{max} (l/h)	Pulses/Liter	f_{max} (Hz)
OI 03	6	15	120	6667	222
OI 06	10	15	250	3367	233
OI 1	-	15	600	2000	333

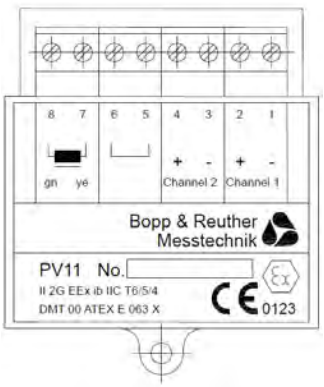
OUTPUT SIGNALS

NAMUR pulses, 1- or 2 channel

CLAMP CONNECTION

Cable: 2-wire, shielded (channel 1+ 2: 4-wire), twisted in pairs,
Cable connection M 20x1.5





The sensor is connected internally to clamps 8 and 7. For 1-channeled operation the clamps 1 and 2 are to be assigned. The signal of channel 2 is inverted channel 1 (180° phase shift).

COMPATIBLE

Oval wheel meter series: small-OI

Further information and product variants are available on request

PULSE PICK-UP AG 42 / AG 43

MAIN CHARACTERISTICS

Product type:	Wiegand pick-up add-on AG 42, AG 43
Application:	for connection to higher-level control systems
Ex-approval:	Zone 1
Ambient temperature:	-40°C up to 70°C (medium standard up to 110°C / up to 170°C with temperature extension)
Housing material:	Aluminium
Protection class:	IP 65
Power supply:	NAMUR
Output:	NAMUR output supply, 2-channel
Special features:	up to 400 Pulses/Liter

OVERVIEW PULSE VALUE

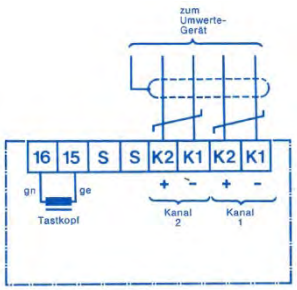
OWM-Type	DN	Output device	Flow rate max.		K Pulses/l	f_N Hz
			m³/h	l/s		
OI 5	25	AG 42	3	0.83	400	333
OI 10	25	AG 42	6	1.66	200	333
OI 50	50	AG 43	18	5	82	410
OI 100	50	AG 43	40	11	35	388
OI 200	80	AG 43	42	12	19	222
OI 400	100	AG 43	72	20	10	200

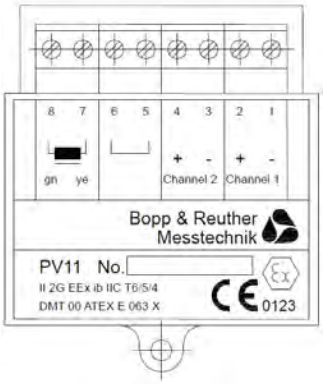
OUTPUT SIGNALS

NAMUR pulses, 1- or 2 channel

CLAMP CONNECTION

Cable: 2-wire, shielded (channel 1+ 2: 4-wire), twisted in pairs,
Cable connection M 20x1.5





The sensor is connected internally to clamps 8 and 7. For 1-channeled operation the clamps 1 and 2 are to be assigned. The signal of channel 2 is inverted channel 1 (180° phase shift).

COMPATIBLE

Oval wheel meter series OI 5, 10 (AG42), series OI 50, 100, 200, 400 (AG 43)

Further information and product variants are available on request

Bopp & Reuther Messtechnik GmbH - Am Neuen Rheinhafen 4 - 67346 Speyer / Germany
Phone: +49 6232 657-0 Mail: info@bopp-reuther.com www.bopp-reuther.com

PULSE PICK-UP AG 44

MAIN CHARACTERISTICS

Product type:	Wiegand pulse pick-up add-on AG44
Application:	for connection to higher-level controls
Ex-approval:	Zone 1
Ambient temperature:	-40°C up to 70°C (medium standard up to 110°C / up to 170°C with temperature extension)
Housing material:	Aluminium
Protection class:	IP 65
Power supply:	NAMUR
Output:	NAMUR pulse output, 2 channel
Special features:	up to 400 Pulses/Liter

OVERVIEW PULSE VALUE

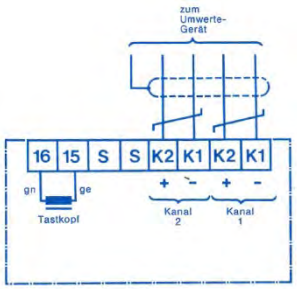
DN	Type OaP	Pulses/Liter	Fmax (Hz)
25	5	400	333
25	10	200	333
50	50	70	350
65	125	35.14	410
80	250	18.78	375
100	600	7	350
150	1200	3.5	292
200	2000	1.88	250
300	3200	1.88	375
400	4000	1.5	500

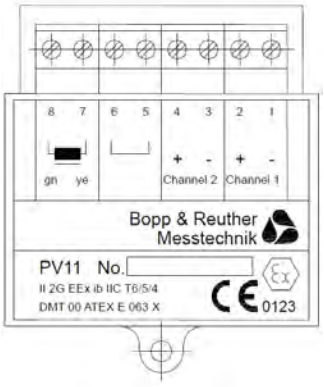
OUTPUT SIGNALS

NAMUR pulses, 1- or 2 channel

CLAMP CONNECTION

Kabel: 2-adrig, abgeschirmt (Kanal 1+ 2: 4-adrig), paarweise verdrillt,
Kabelanschluss M 20x1,5





The sensor is connected internally to clamps 8 and 7.
For 1-channeled operation the clamps 1 and 2 are to be assigned. The signal of channel 2 is inverted channel 1 (180° phase shift).

COMPATIBLE

Oval wheel meter series OaP

Further information and product variants are available on request

PULSE PICK-UP AG 81, AG 82, AG 83

MAIN CHARACTERISTICS

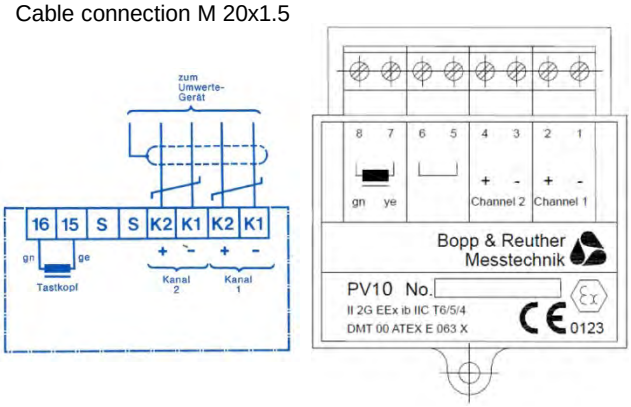
Product type:	inductive pulse pick-up add-on AG 81, AG 82, AG 83
Application:	for connection to higher-level control systems
Ex-approval:	Zone 1
Ambient temperature:	-40°C up to 80°C (Medium) Standard up to 80°C (AG 81) up to 180 °C (AG 82), up to 250°C (AG 83)
Housing material:	Aluminium
Protection class:	IP 65
Power supply:	NAMUR
Output:	NAMUR pulse output, 2-channel
Special features:	up to 1750 Pulses/Liter

OVERVIEW PULSE VALUE

Type RQ	DN	Pulses/Liter	f_{max} (Hz)
10	10	1750	730
15	15	310	517
25	25	105	525
32	32	58	467
40	40	22	257
50	50	12.4	248
65	65	6	200
80	80	15	750
100	100	6	500
150	150	3.4	567
200	200	1.84	613
250	250	1.24	600
300	300	0.78	520

CLAMP CONNECTION

Cable: 2-wire, shielded (channel 1+ 2: 4-wire), twisted in pairs,
Cable connection M 20x1.5



The sensor is connected internally to clamps 8 and 7.

In 1-channeled operation, clamps 1 and 2 are to be assigned. The signal of channel 2 is inverted compared to channel 1 (180° phase shift).

OUTPUT SIGNALS

NAMUR pulses, 1- or 2 channel

COMPATIBLE

Turbine meter of the series RQ1 and RQ2

Further information and product variants are available on request

IN-LINE FILTER L

MAIN CHARACTERISTICS

Product type:	In-line filter series L
Application:	for liquids to protect and increase the service life of equipment and measuring instruments
Process temperature:	-28°C up to +160°C
Process pressure:	up to 40 bar
Housing material:	stainless steel SS 316
Wetted parts:	stainless steel SS 316
Process connection:	Input: Swagelock 6mm Output: suitable for connection to OR015

AVAILABLE SIZES

Nominal size	$Q_{max.}$
mm	l/min
6	1

MASS WIDTH

40 µm

Further information and product variants are available on request

STRAINER Y

MAIN CHARACTERISTICS

Product type:	Strainer series Y
Application:	for liquids to protect and increase the service life of equipment and measuring instruments
Process temperature:	-60°C up to +180°C
Process pressure:	up to 50 bar
Housing material:	CrNiMo 1.4408
Filter material	CrNiMo 1.4401
Wetted parts:	CrNiMo 1.4408 / 1.4401
Seals:	PTFE, Viton
Process connection:	Flange acc. to DIN or ANSI
Special features:	Input: G ½“, G3/4“, G1“ Output: R1/4“, R1/2“, R3/4“, R1“, Swagelok® 12mm

AVAILABLE SIZES

Nominal size		$Q_{max.}$	for devices
mm	inch	m³/h	
15	G1/2“		OR06/01, DIMF1.3 / 2.0
20	G3/4“		OR2
25	G1“		OR5 / 10

MASS WIDTH

100 or 250 µm

Further information and product variants are available on request

STRAINER BASKET FILTER NC

MAIN CHARACTERISTICS

Product type:	Basket strainer series NC
Application:	for liquids to protect and increase the service life of equipment and measuring instruments
Design Code:	AD 2000 / PED
Process temperature:	-10°C up to +100°C
Process pressure:	up to 40 bar
Housing material:	1.0619.01 - 1.0425 / ASTM A 216 – ASTM A 516, 1.4405 - 1.4408 / ASTM A 351
Wetted parts:	Basket strainer in stainless steel
Display:	none, differential pressure display optionally available
Process connection:	Flange acc. to DIN or ANSI
Special features:	Complete self-draining from below, meets TA-Air requirements NACE MR 0175 / ISO 15156

AVAILABLE SIZES

Nominal size		Vessel capacity	$Q_{max.}$
mm	inch	Liter	m³/h
15	1/2	0.5	2.1
25	1	0.6	7.2
50	2	3	21
80	3	8.5	75
100	4	23	200

MASS WIDTH

100/250/500/800 µm

Further information and product variants are available on request

NACE

STRAINER BASKET FILTER W

MAIN CHARACTERISTICS

Product type:	Strainer basket filter series W
Application:	for liquids to protect and increase the service life of equipment
Design Code:	AD 2000 / PED or ASME
Process temperature:	-60°C up to +180°C
Process pressure:	up to 40 bar
Housing material:	stainless steel, cast steel
Wetted parts:	strainer basket in stainless steel
Display:	none, differential pressure display optionally available
Process connection:	Flange acc. to DIN or ANSI
Special features:	complete self-draining from below, meets TA-air requirements NACE MR 0175 / ISO 15156

AVAILABLE SIZES

Nominal size		Vessel capacity	$Q_{max.}$
mm	inch	Liter	m³/h
100	4	50	220
150	6	50	300
150	6	110	420
200	8	110	520

MASS WIDTH

100 µm

Further information and product variants are available on request

NACE

CENTRIFUGAL GAS SEPARATOR ZGA

MAIN CHARACTERISTICS

Product type:	Centrifugal gas separator of the Series ZGA
Application:	for liquids other than water such as LPG, diesel, petrol, bio-ethanol etc. with a viscosity < 20 mPa·s at 20°C
Measuring accuracy:	the additional measuring error is limited to max. 0.5 %, even if the air content is up to 30 %
Ex-protection:	Zone 1 without electronic components
Process temperature:	-40°C up to +100°C
Process pressure:	0 up to 100 bar
Material:	steel, stainless steel
Power supply:	without any auxiliary energy (except for the attached accessories such as level limit switches)
Output / Display:	Sight glass
Process connection:	Flange acc. to DIN or ANSI
Special features:	Ideal for reliably protecting measuring devices such as Coriolis, ultrasonic, oval wheel meters or turbine meters from entrained air in any operating state (for measuring systems in custody transfer).

OVERVIEW AVAILABLE MODELS

DN (mm)	DN (inch)	Vessel (Liter)	Q_{max} (l/min)	Q_{max} (m³/h)
25 / 32	1“ / 1 ¼“	29	100	6
50	2“	54	300	18
65	2 ½“	120	700	42
80 /100	3“ / 4“	180	1200	72
100	4“	300	2000	120
100 / 150	4“ / 6“	470	3000	180
150 / 200 / 250	6“ / 8“/ 10“	1000	5000	300
200 / 250 / 300	8“ / 10“ / 12“	2200	10000	600
300	12“	2700	12000	720
300 / 400	12“ / 16“	5000	20000	1200
300 / 400	12“ / 16“	7000	25000	1500
400	16“	11000	40000	2400

OPTIONS

Fitted accessories such as level limit switch

Further information and product variants are available on request

PED ASME CODAP TA Luft NACE

CERTIFICATE

TYPE EXAMINATION CERTIFICATE

MAIN CHARACTERISTICS

Certificate type:	Type examination certificate (module B) for measuring systems according to chapter VII
Application:	This is the part of a conformity assessment procedure in which a notified body examines the technical design of a measuring instrument / measuring system and verifies / attests that it meets the requirements of this Directive that apply to it.
Special features:	Covers all aspects of a measuring system and applies EU-wide

PTB
Physikalisch-Technische Bundesanstalt
Nationales Metrologieinstitut

KBS
Konformitätsbewertungsstelle

EU-Baumusterprüfbescheinigung
EU Type-examination Certificate

Ausgestellt für: *Issued to:*	METRA Energie-Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer
gemäß: *In accordance with:*	Anhang II Modul B der Richtlinie 2014/32/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Messgeräten auf dem Markt. *Annex II Module B of the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments*
Geräteart: *Type of instrument:*	Rechenwerk *Calculator*
Typbezeichnung: *Type designation:*	ERW 700
Nr. der Bescheinigung: *Certificate No.:*	DE-08-MI004-PTB004, Revision 6
Gültig bis: *Valid until:*	30.01.2028
Anzahl der Seiten: *Number of pages:*	13
Geschäftszeichen: *Reference No.:*	PTB-7.5-4088965
Notifizierte Stelle: *Notified Body:*	0102

Zertifizierung: *Certification:*
Berlin, 30.01.2018
Im Auftrag *On behalf of PTB*
Gerlinde Eichhorn
Siegel *Seal*

Bewertung: *Evaluation:*
Im Auftrag *On behalf of PTB*
Dr. Jürgen Rose

R3-072097

Further information and product variants are available on request.

MODULE D (CHAPTER VII, formerly MI-005)

MAIN CHARACTERISTICS

Certificate type:	Conformity with the type of construction of the requirements according to MID
Application:	The manufacturer has had his QM system assessed and qualified by a notified body. This is monitored by the manufacturer.
Special features:	The manufacturer is authorised to carry out the conformity assessment up to the final acceptance of the measuring system as well as the securing of the measuring system and the preparation of the declaration of conformity according to MID requirements.

PTB
Physikalisch-Technische Bundesanstalt
Nationales Metrologieinstitut

KBS
Konformitätsbewertungsstelle

Zertifikat
Certificate

über die Anerkennung eines Qualitätssicherungssystems
on the approval of a quality system

Ausgestellt für: *Issued to:* Bopp & Reuther Messtechnik GmbH, Am Neuen Rheinhafen 4, 67346 Speyer

gemäß: *In accordance with:* Mess- und Eichverordnung vom 11. Dezember 2014 (MessEV) *Measures and Verification Ordinance dated 11 December 2014 (MessEV)* in Verbindung mit *In connection with*
- Richtlinie **2014/32/EU** vom 26. Februar 2014 (MID)
- *Directive **2014/32/EU** of 26 February 2014 (MID)*

Messgröße lt. MessEV § 1: *Measurand acc. to Measures and Verification Ordinance, section 1:* Volumen *Volume*

Nr. des Zertifikats: *Certificate No.:* DE-M-AQ-PTB034, Revision 1

Gültig bis: *Valid until:* 23.07.2021

Anzahl der Seiten: *Number of pages:* 4

Geschäftszeichen: *Reference No.:* PTB-9.22-4089976

Nr. der Stelle: *Body No.:* 0102

Im Auftrag *On behalf of PTB*
Markus Urner

Braunschweig, 24.07.2018

Siegel *Seal*
PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

R3-027579

Further information and product variants are available on request.

TYPE EXAMINATION CERTIFICATE

MAIN CHARACTERISTICS

Certificate type:	Type examination certificate (module B) for measuring instruments acc. to Chap. VI
Application:	This is the part of a conformity assessment procedure whereby a notified body examines the technical design of a measuring instrument and verifies / attests that it meets the requirements of this Directive that apply to it.
Special features:	valid throughout the EU

PTB
Physikalisch-Technische Bundesanstalt
Nationales Metrologieinstitut

KBS
Konformitätsbewertungsstelle

EU-Baumusterprüfbescheinigung
EU Type-examination Certificate

Ausgestellt für: *Issued to:*	METRA Energie-Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer
gemäß: *In accordance with:*	Anhang II Modul B der Richtlinie 2014/32/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Messgeräten auf dem Markt. *Annex II Module B of the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments*
Geräteart: *Type of instrument:*	Rechenwerk *Calculator*
Typbezeichnung: *Type designation:*	ERW 700
Nr. der Bescheinigung: *Certificate No.:*	DE-08-MI004-PTB004, Revision 6
Gültig bis: *Valid until:*	30.01.2028
Anzahl der Seiten: *Number of pages:*	13
Geschäftszeichen: *Reference No.:*	PTB-7.5-4088965
Notifizierte Stelle: *Notified Body:*	0102

Zertifizierung: *Certification:*
Berlin, 30.01.2018
Im Auftrag *On behalf of PTB*
Gerlinde Eichhorn

Siegel *Seal*

Bewertung: *Evaluation:*
Im Auftrag *On behalf of PTB*
Dr. Jürgen Rose

R3-072097

Further information and product variants are available on request.

MODULE D (CHAPTER VI, formerly MI-004)

MAIN CHARACTERISTICS

Certificate type:	Conformity with the type of construction of the requirements according to MID
Application:	The manufacturer shall have his QM system assessed and qualified by a notified body. The manufacturer shall observe this body.
Special features:	The manufacturer is authorised to carry out the conformity assessment up to the final inspection of the measuring system as well as to secure the measuring system and to draw up the declaration of conformity according to MID requirements.

PTB
Physikalisch-Technische Bundesanstalt
Nationales Metrologieinstitut

KBS
Konformitätsbewertungsstelle

Zertifikat
Certificate

über die Anerkennung eines Qualitätssicherungssystems
on the approval of a quality system

Ausgestellt für: *Issued to:* METRA Energie-Messtechnik GmbH, Am Neuen Rheinhafen 4, 67346 Speyer

gemäß: *In accordance with:* Mess- und Eichverordnung vom 11. Dezember 2014 (MessEV) *Measures and Verification Ordinance dated 11 December 2014 (MessEV)* in Verbindung mit *in connection with*
- Richtlinie **2014/32/EU** vom 26. Februar 2014 (MID) *- Directive **2014/32/EU** of 26 February 2014 (MID)*

Messgröße lt. MessEV § 1: *Measurand acc. to Measures and Verification Ordinance, section 1:* Wärmemenge (Wärme und Kälte in Kreislaufsystemen) *Quantity of heat (heat and cold in circulation systems)*

Nr. des Zertifikats: *Certificate No.:* DE-M-AQ-PTB038, Revision 1

Gültig bis: *Valid until:* 23.07.2021

Anzahl der Seiten: *Number of pages:* 4

Geschäftszeichen: *Reference No.:* PTB-9.22-4089982

Nr. der Stelle: *Body No.:* 0102

Im Auftrag *On behalf of PTB*
Markus Urner

Braunschweig, 24.07.2018

Siegel *Seal*

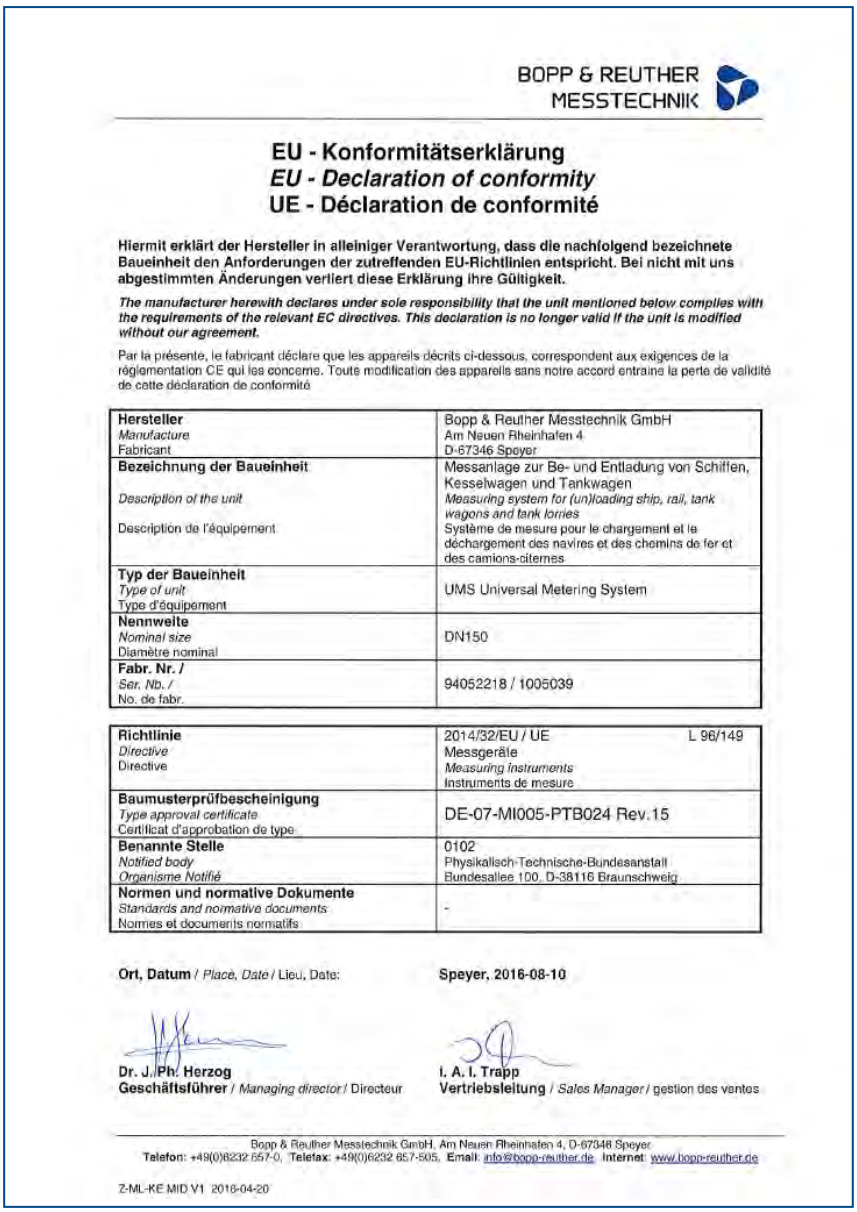
R3-027579

Further information and product variants are available on request.

EU-DECLARATION OF CONFORMITY

MAIN CHARACTERISTICS

Certificate type:	Declaration of conformity
Application:	With this document, the manufacturer confirms that the measuring system fulfils the requirements according to MID
Special features:	The final inspection is carried out by the manufacturer



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 EC 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 CE qui les concerne. Toute modification des appareils sans notre accord entraine la perte de validité de cette déclaration de conformité

Hersteller *Manufacture* Fabricant	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 D-67346 Speyer
Bezeichnung der Baueinheit *Description of the unit* Description de l'équipement	Messanlage zur Be- und Entladung von Schiffen, Kesselwagen und Tankwagen *Measuring system for (un)loading ship, rail, tank wagons and tank lorries* Système de mesure pour le chargement et le déchargement des navires et des chemins de fer et des camions-citernes
Typ der Baueinheit *Type of unit* Type d'équipement	UMS Universal Metering System
Nennweite *Nominal size* Diamètre nominal	DN150
Fabr. Nr. / *Ser. Nb. /* No. de fabr.	94052218 / 1005039

Richtlinie *Directive* Directive	2014/32/EU / UE L 96/149 Messgeräte *Measuring instruments* Instruments de mesure
Baumusterprüfbescheinigung *Type approval certificate* Certificat d'approbation de type	DE-07-MI005-PTB024 Rev.15
Benannte Stelle *Notified body* *Organisme Notifié*	0102 Physikalisch-Technische-Bundesanstalt Bundesallee 100, D-38116 Braunschweig
Normen und normative Dokumente *Standards and normative documents* Normes et documents normatifs	-

Ort, Datum / *Place, Date* / Lieu, Date: **Speyer, 2016-08-10**

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

i. A. I. Trapp
Vertriebsleitung / *Sales Manager* / gestion des ventes

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

Z-ML-KE MID V1 2016-04-20

Further information and product variants are available on request.

EVALUATION CERTIFICATE NMI

MAIN CHARACTERISTICS

Certificate type:	evaluation-certificate
Application:	The exhibitor confirms that the tested instrument fulfils the requirements of OIML and WELMEC Guide 8.8 in terms of modular evaluation of measuring instruments covered by the MID Measuring Instruments Directive.
Available for:	OaP for liquid gas, OaP, UR06, DIMF 1.3 PV
Special features:	serves as a module to obtain a type examination certificate for a measuring system consisting of several components from several manufacturers

NMi

Evaluation Certificate

Number : **TC10828** revision 0
Project number : 16200609
Page : 1 of 1

Issued by: NMi Certin B.V.

In accordance with:
- WELMEC guide 8.8 "General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring Instruments under the MID".
- OIML R117-1 Edition 2007 (E) and R117-2 Edition 2014 (E) "Dynamic measuring systems for liquids other than water".

Producer: Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer
Germany

Part: An **Electronic calculating and indicating device**, intended to be used as a part of a dynamic measuring system for liquids other than water.

Producer's name	: Bopp & Reuther Mestechnik GmbH
Designation	: UR06
Accuracy class	: 0,3 (non-interruptible applications) 0,3 and 0,5 (batch applications)
Environmental classes	: M1 / E2
Ambient temperature range	: -10 °C ... +55 °C, condensing
Power supply voltage	: 230 Vac
Software versions	: see paragraph 1.1.2

Further properties are described in the annexes:
- Description TC10828 revision 0;
- Documentation folder TC10828-1.

Issuing Authority: **NMi Certin B.V.**
18 May 2017

C. Oosterman
Head Certification Board

NMi Certin BV
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INSPECTION
RvA I 172

Further information and product variants are available on request.

OIML TEST REPORT

MAIN CHARACTERISTICS

Certificate Type:	OIML test report
Application:	The exhibitor confirms that the tested device fulfils the requirements of the OIML in terms of a modular evaluation of measuring instruments which fall under the MID Measuring Instruments Directive.
Available for:	OaP, OP, OI, RQ, ZGA, UR06, DIMF 1.3 PV
Special features:	Serves as a building block to obtain a type examination certificate for a measuring system consisting of several components from several manufacturers

PTB Physikalisch-Technische Bundesanstalt Braunschweig und Berlin

Report number: PTB-1.5-4052700, Revision 5 Report page: 1 / 35

OIML

Measuring systems for liquids other than water

Pattern evaluation report of a measuring device

Ensembles de mesurage de liquides autres que l'eau
Rapport d'essai de modèle d'un appareil de mesure

Issued by: Physikalisch-Technische Bundesanstalt
Bundesallee 100
38116 Braunschweig
GERMANY

Test address: Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer
GERMANY

TRAPIL
14 Route d.u Bassin n°5
92230 Gennevilliers
FRANCE

Test specification: OIML R117-1, 2007I4 route du Bassin n

Applicant: Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer
GERMANY

In respect of: A series of oval gear type measuring devices for use as part of a liquid measurement installation

Designation: OAP../ OV

Manufacturer: Manufacturer is the applicant

Physikalisch-Technische Bundesanstalt, Braunschweig, February 28th, 2018

(Signature) (Seal)

Dr. Michael Rinker

Physikalisch-Technische Bundesanstalt
Bundesallee 100
DEUTSCHLAND

Further information and product variants are available on request.

CALIBRATION CERTIFICATE

MAIN CHARACTERISTICS

Certificate type:	Manufacturer's test certificate confirming compliance with OIML / MID 2014/32/EU for a single measuring instrument / part of a measuring system
Application:	Relevant for the delivery of measuring instruments which have to be integrated into a measuring system by third parties according to applicable MID requirements.
Special features:	Simplifies the conformity assessment for the system installer

BOPP & REUTHER
MESSTECHNIK

Prüfzertifikat

Calibration Certificate

Die bei den Messungen verwendeten Normale sind auf die nationalen Normale bei der Physikalisch-Technischen Bundesanstalt rückgeführt. Die grundlegenden Genauigkeitsanforderungen gem. OIML R117 bzw. Europäische Messgeräte-Richtlinie 2014/32 /EU sind erfüllt.
The standards used for the measurements are traceable to the national standards at the Physikalisch-Technischen Bundesanstaltt. The basic accuracy requirements acc. to OIML R117 resp. European Measuring Instrument Directive 2014/32/EU are fulfilled.

Nummer Number	:	**SP-20-043**
Gegenstand Subject	:	**OAP600AG01-08/L2-E-R-S-L-00-99-0-0-2**
Hersteller Manufacturer	:	**Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer**
Gerätenummer Serial number	:	**10080688**
OIML Nummer Report number	:	**OIML PTB-1.5-4052700 Rev 5**
Auftraggeber Customer	:	**C.R.A. Controle et Regulation Automatiques S.A. Dellingstraat 32 2800 Mechelen Belgien**
Bestellnummer Order number	:	**BEK20/825/ / BEL007301**
Ort und Datum der Prüfung Place and date of calibration	:	**Speyer, 27.08.2020**
Kennzeichnung Marking		geprüft i.O.

Prüfzertifikate ohne Unterschrift und Stempel haben keine Gültigkeit. Dieses Zertifikat darf nur unverändert weitergegeben werden.
Calibration certificates without signature and official stamp are not valid. This calibration certificate may only be reproduced in unchanged form.

Ort und Datum
Place and date
Speyer, 21.09.2020

Stempel
official stamp
BOPP & REUTHER MESSTECHNIK
Am Neuen Rheinhafen 4
67346 Speyer / Germany
Phone: +49 6232 657-0
Email: info@bopp-reuther.de

Im Auftrag
on behalf of
Indra Trapp
Beauftragte Person für das gesetzliche Messwesen

Anlage / addendum : Genauigkeitsprüfprotokoll / Calibration protocol

Further information and product variants are available on request.

CALIBRATION CERTIFICATE DAKKS

MAIN CHARACTERISTICS

Certificate type:	Calibration certificate acc. to DIN EN ISO / IEC 17025:2018
Application:	The certificate documents the traceability to national standards for the representation of units in accordance with the international system of units (SI)
Special features:	Traceability to national / international standards

WPD Wartungs- und Prüfungsdienst GmbH
Am Neuen Rheinhafen 4
D-67346 Speyer
Tel. +49 (6232) 91 94 - 60 Fax. +49 (6232) 91 94 - 61
Email: info@wpd-dienst.de
www.wpd-dienst.de

akkreditiert durch die / *accredited by the*
Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / as calibration laboratory in the
Deutscher Kalibrierdienst DKD

115-043
D-K-15108-01-00
2019-06

Kalibrierschein
Calibration certificate

Kalibrierzeichen
Calibration mark

Gegenstand Object	Ovalradzähler
Hersteller Manufacturer	Bopp+Reuther
Typ Type	OI10AG20
Fabrikat/Serien-Nr. Serial number	10072064
Tag/Identnr. Tag/Identnr.	k.A.
Auftraggeber Customer	Bopp+Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 67327 Speyer
Auftragsnummer Order No.	78/19/232

Anzahl der Seiten des Kalibrierscheines 3
Number of pages of the certificate

Datum der Kalibrierung 03.06.2019
Date of calibration

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.
This calibration certificate may not be reproduced other than in full except with the permission of both the German Accreditation Body and the issuing laboratory. Calibration certificates without signature are not valid.

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).
Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Prüfscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).
The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.
The user is obliged to have the object recalibrated at appropriate intervals.

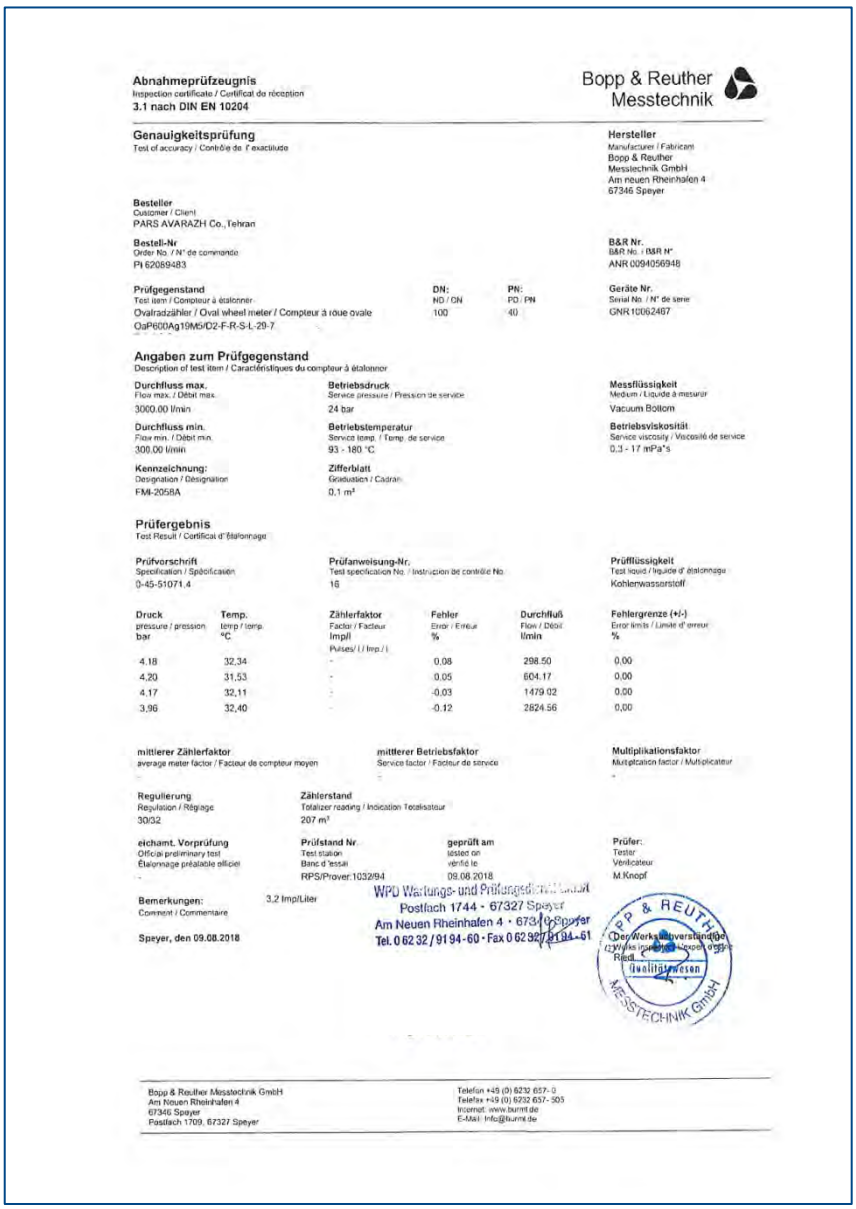
Datum *Date*	Leiter des Kalibrierlaboratoriums *Head of the calibration Laboratory*	Bearbeiter *Person in charge*
04.06.2019	Herr Bähr	Herr Krühner

Further information and product variants are available on request.

INSPECTION CERTIFICATE

MAIN CHARACTERISTICS

Certificate type:	Calibration certificate with inspection
Application:	Confirms the manufacturer's compliance with the accuracy requirements of a measuring instrument on the occasion of an inspection
Special features:	Confirmed / signed by internal QM and third parties



Abnahmeprüfzeugnis
Inspection certificate / Certificat de réception
3.1 nach DIN EN 10204

Bopp & Reuther Messtechnik

Genauigkeitsprüfung
Test of accuracy / Contrôle de l'exactitude

Hersteller
Manufacturer / Fabricant
Bopp & Reuther Messtechnik GmbH
Am neuen Rheinhafen 4
67346 Speyer

Besteller
Customer / Client
PARS AVARAZH Co.,Tehran

Bestell-Nr
Order No. / N° de commande
PI 62089483

B&R Nr.
B&R No. / B&R N°
ANR 0094056948

Prüfgegenstand
Test item / Compteur à étalonner
Ovalradzähler / Oval wheel meter / Compteur à roue ovale
QaP600Ag19M5/D2-F-R-S-L-29-7

DN: ND / DN 100
PN: PD / PN 40

Geräte Nr.
Serial No. / N° de serie
GNR 10062467

Angaben zum Prüfgegenstand
Description of test item / Caractéristiques du compteur à étalonner

Durchfluss max.
Flow max. / Débit max.
3000,00 l/min

Betriebsdruck
Service pressure / Pression de service
24 bar

Messflüssigkeit
Medium / Liquide à mesurer
Vacuum Bottom

Durchfluss min.
Flow min. / Débit min.
300,00 l/min

Betriebstemperatur
Service temp. / Temp. de service
93 - 180 °C

Betriebsviskosität
Service viscosity / Viscosité de service
0,3 - 17 mPa*s

Kennzeichnung:
Designation / Désignation
FMI-2058A

Zifferblatt
Graduation / Cadran
0,1 m³

Prüfergebnis
Test Result / Certificat d'étalonnage

Prüfvorschrift
Specification / Spécification
0-45-51071.4

Prüfanweisung-Nr.
Test specification No. / Instruction de contrôle No.
18

Prüfflüssigkeit
Test liquid / liquide d' étalonnage
Kohlenwasserstoff

Druck pressure / pression bar	Temp. temp / temp. °C	Zählerfaktor Factor / Facteur Impl/l Pulses/l / Imp./l	Fehler Error / Erreur %	Durchfluß Flow / Débit l/min	Fehlergrenze (+/-) Error limits / Limite d' erreur %
4,18	32,34	-	0,08	298,50	0,00
4,20	31,53	-	0,05	604,17	0,00
4,17	32,11	-	-0,03	1479,02	0,00
3,96	32,40	-	-0,12	2824,56	0,00

mittlerer Zählerfaktor
average meter factor / Facteur de compteur moyen
-

mittlerer Betriebsfaktor
Service factor / Facteur de service
-

Multiplikationsfaktor
Multiplication factor / Multiplicateur
-

Regulierung
Regulation / Réglage
30/32

Zählerstand
Totalizer reading / Indication Totalisateur
207 m³

eichamt. Vorprüfung
Official preliminary test
Étalonnage préalable officiel
-

Prüfstand Nr.
Test station
Banc d'essai
RPS/Prover 1032/94

geprüft am
tested on
vérifié le
09.08.2018

Prüfer:
Tester
Vérificateur
M.Knopf

Bemerkungen:
Comment / Commentaire
3,2 Imp/Liter

Speyer, den 09.08.2018

WPD Wartungs- und Prüfgesellschaft mbH
Postfach 1744 · 67327 Speyer
Am Neuen Rheinhafen 4 · 67346 Speyer
Tel. 0 62 32 / 91 94-60 · Fax 0 62 32 / 91 94-61

BOPP & REUTHER MESSTECHNIK GmbH
Der Werksabnahmeverständige
Qualitätswesen

Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer
Postfach 1709, 67327 Speyer

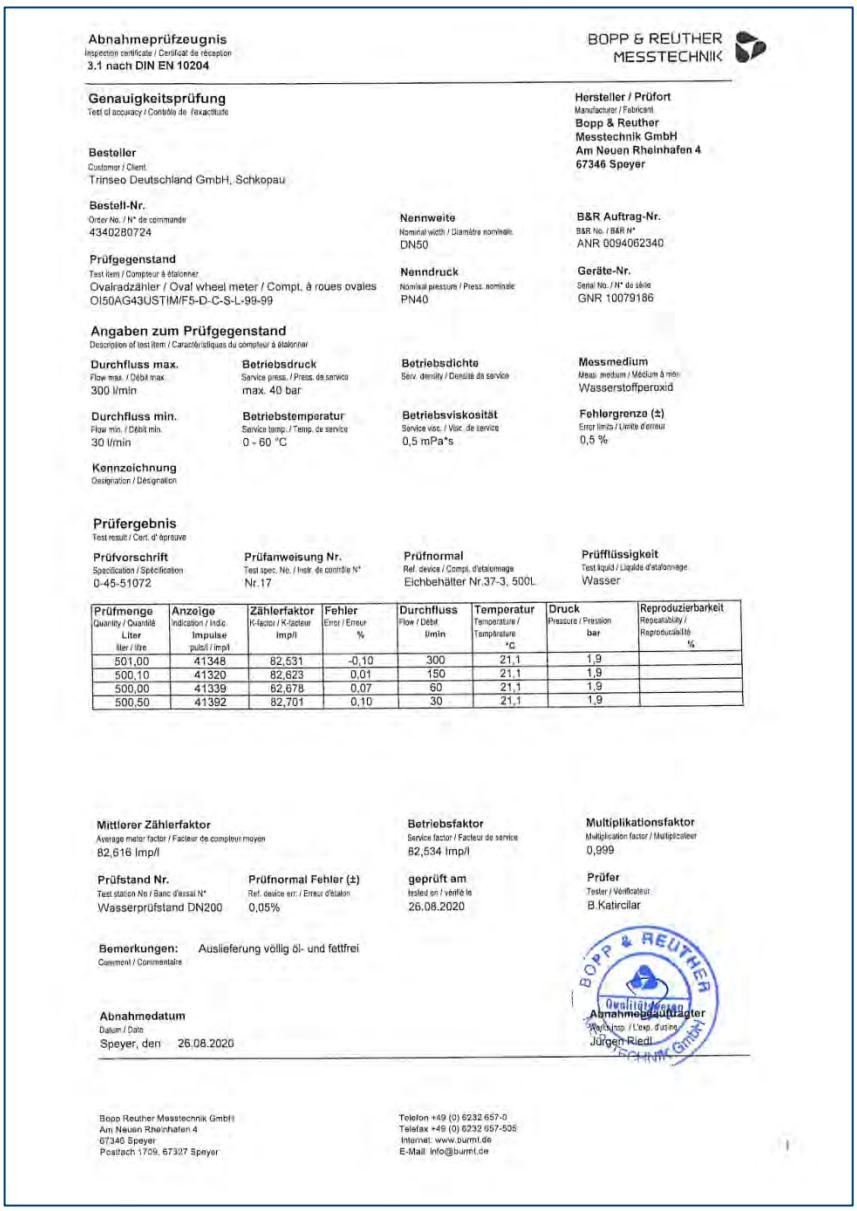
Telefon +49 (0) 6232 657- 0
Telefax +49 (0) 6232 657- 505
Internet: www.burmt.de
E-Mail: info@burmt.de

Further information and product variants are available on request.

INSPECTION CERTIFICATE

MAIN CHARACTERISTICS

Certificate type:	Calibration certificate with inspection
Application:	Confirms the fulfilment of the inspection criteria by the manufacturer
Special features:	Confirmed / signed by the manufacturer QM itself



Abnahmeprüfzeugnis
Inspection certificate / Certificat de réception
3.1 nach DIN EN 10204

BOPP & REUTHER MESSTECHNIK

Genauigkeitsprüfung
Test of accuracy / Contrôle de l'exactitude

Hersteller / Prüfort
Manufacturer / Fabricant
Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer

Besteller
Customer / Client
Trinseo Deutschland GmbH, Schkopau

Bestell-Nr.
Order No. / N° de commande
4340280724

Nennweite
Nominal width / Diamètre nominale
DN50

B&R Auftrag-Nr.
B&R No. / B&R N°
ANR 0094062340

Prüfgegenstand
Test item / Compteur à étalonner
Ovalradzähler / Oval wheel meter / Compt. à roues ovales
OI50AG43USTIM/F5-D-C-S-L-99-99

Nenndruck
Nominal pressure / Press. nominale
PN40

Geräte-Nr.
Serial No. / N° de série
GNR 10079186

Angaben zum Prüfgegenstand
Description of test item / Caractéristiques du compteur à étalonner

Durchfluss max.
Flow max. / Débit max.
300 l/min

Betriebsdruck
Service press. / Press. de service
max. 40 bar

Betriebsdichte
Serv. density / Densité de service

Messmedium
Meas. medium / Médium à mes.
Wasserstoffperoxid

Durchfluss min.
Flow min. / Débit min.
30 l/min

Betriebstemperatur
Service temp. / Temp. de service
0 - 60 °C

Betriebsviskosität
Service visc. / Visc. de service
0,5 mPa*s

Fehlergrenze (±)
Error limits / Limite d'erreur
0,5 %

Kennzeichnung
Designation / Désignation

Prüfergebnis
Test result / Cert. d'épreuve

Prüfvorschrift
Specification / Spécification
0-45-51072

Prüfanweisung Nr.
Test spec. No. / Instr. de contrôle N°
Nr.17

Prüfnormal
Ref. device / Compt. d'étalonnage
Eichbehälter Nr.37-3, 500L

Prüfflüssigkeit
Test liquid / Liquide d'étalonnage
Wasser

Prüfmenge Quantity / Quantité Liter liter / litre	Anzeige Indication / Indic. Impulse pulse / impl	Zählerfaktor K-factor / K-facteur impl/l	Fehler Error / Erreur %	Durchfluss Flow / Débit l/min	Temperatur Temperature / Température °C	Druck Pressure / Pression bar	Reproduzierbarkeit Repeatability / Reproductibilité %
501,00	41348	82,531	-0,10	300	21,1	1,9	
500,10	41320	82,623	0,01	150	21,1	1,9	
500,00	41339	82,678	0,07	60	21,1	1,9	
500,50	41392	82,701	0,10	30	21,1	1,9	

Mittlerer Zählerfaktor
Average meter factor / Facteur de compteur moyen
82,616 Imp/l

Betriebsfaktor
Service factor / Facteur de service
82,534 Imp/l

Multiplikationsfaktor
Multiplication factor / Multiplicateur
0,999

Prüfstand Nr.
Test station No / Banc d'essai N°
Wasserprüfstand DN200

Prüfnormal Fehler (±)
Ref. device err. / Erreur d'étalon
0,05%

geprüft am
tested on / vérifié le
26.08.2020

Prüfer
Tester / Vérificateur
B.Katirciliar

Bemerkungen: Auslieferung völlig öl- und fettfrei
Comment / Commentaire

Abnahmedatum
Datum / Date
Speyer, den 26.08.2020

BOPP & REUTHER Qualität Messen Abnahmebeauftragter
Responsible / L'exp. d'usine
Jürgen Riedl
MESSTECHNIK GmbH

Bopp Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer
Postfach 1709, 67327 Speyer

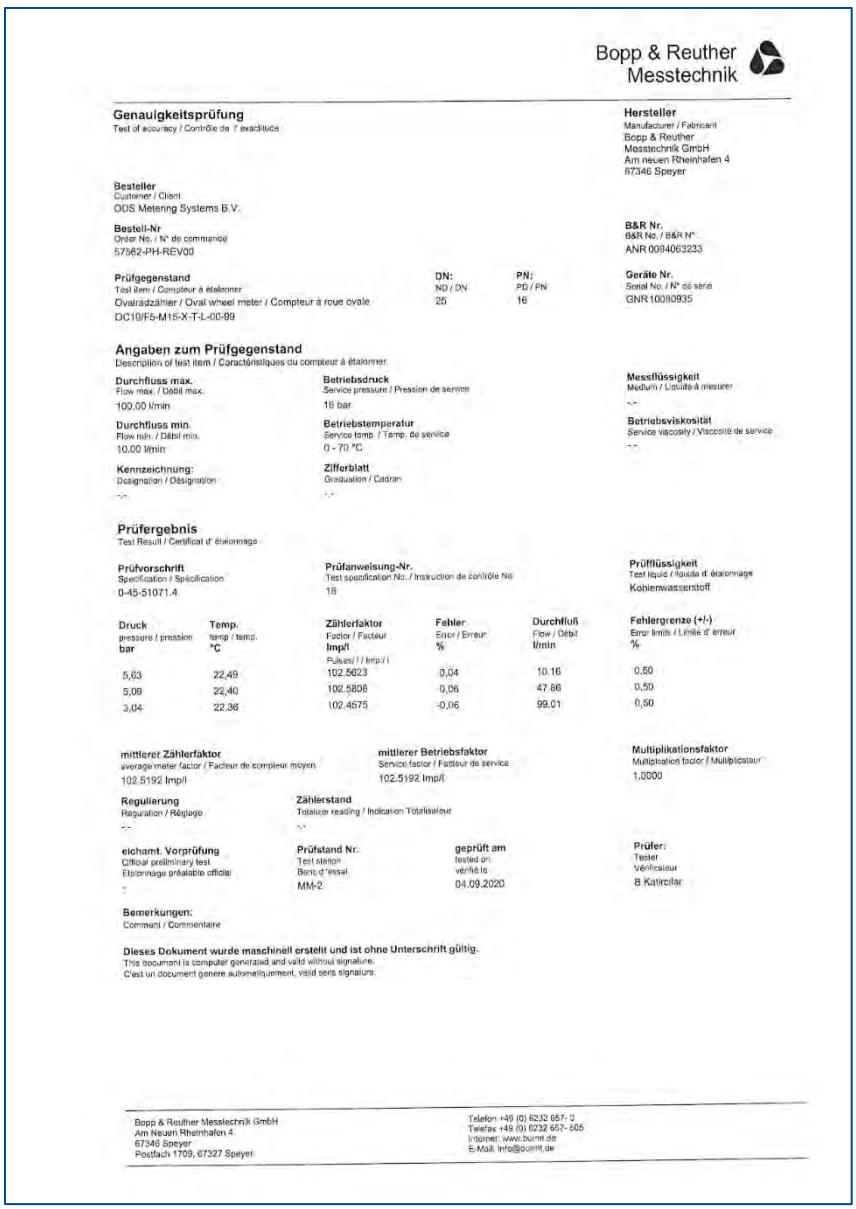
Telefon +49 (0) 6232 657-0
Telefax +49 (0) 6232 657-505
Internet: www.burmt.de
E-Mail: info@burmt.de

Further information and product variants are available on request.

TEST OF ACCURACY

MAIN CHARACTERISTICS

Certificate type:	Calibration certificate
Application:	Confirms and documents the manufacturer's compliance with the accuracy requirements of a measuring instrument.
Special features:	valid without signature



Bopp & Reuther Messtechnik

Genaulgkeitsprüfung
Test of accuracy / Contrôle de l' exactitude

Hersteller
Manufacturer / Fabricant
Bopp & Reuther Messtechnik GmbH
Am neuen Rheinhafen 4
67346 Speyer

Besteller
Customer / Client
ODS Metering Systems B.V.

Bestell-Nr
Order No. / N° de commande
57562-PH-REV00

B&R Nr.
B&R No. / B&R N°
ANR 0094063233

Prüfgegenstand
Test item / Compteur à étalonner
Ovalradzähler / Oval wheel meter / Compteur à roue ovale
DC10/F5-M15-X-T-L-00-99

DN: ND / DN: 25
PN: PD / PN: 16

Geräte Nr.
Serial No. / N° de série
GNR 10080935

Angaben zum Prüfgegenstand
Description of test item / Caractéristiques du compteur à étalonner

Durchfluss max.
Flow max. / Débit max.
100,00 l/min

Durchfluss min.
Flow min. / Débit min.
10,00 l/min

Kennzeichnung:
Designation / Désignation
-.-

Betriebsdruck
Service pressure / Pression de service
18 bar

Betriebstemperatur
Service temp. / Temp. de service
0 - 70 °C

Zifferblatt
Graduation / Cadran
-.-

Messflüssigkeit
Medium / Liquide à mesurer
-.-

Betriebsviskosität
Service viscosity / Viscosité de service
-.-

Prüfergebnis
Test Result / Certificat d' étalonnage

Prüfvorschrift
Specification / Spécification
0-45-51071.4

Prüfanweisung-Nr.
Test specification No. / Instruction de contrôle No
18

Prüfflüssigkeit
Test liquid / liquide d' étalonnage
Kohlenwasserstoff

Druck pressure / pression bar	Temp. temp / temp. °C	Zählerfaktor Factor / Facteur Imp/l Pulses / l / Imp / l	Fehler Error / Erreur %	Durchfluß Flow / Débit l/min	Fehlergrenze (+/-) Error limits / Limite d' erreur %
5,63	22,49	102,5823	0,04	10,16	0,50
5,09	22,40	102,5808	0,06	47,86	0,50
3,04	22,36	102,4575	-0,06	99,01	0,50

mittlerer Zählerfaktor
average meter factor / Facteur de compteur moyen
102,5192 Imp/l

mittlerer Betriebsfaktor
Service factor / Facteur de service
102,5192 Imp/l

Multiplikationsfaktor
Multiplication factor / Multiplicateur
1,0000

Regulierung
Regulation / Réglage
-.-

Zählerstand
Totalizer reading / Indication Totalisateur
-.-

eichamt. Vorprüfung
Official preliminary test
Étalonnage préalable officiel
-

Prüfstand Nr.
Test station
Banc d'essai
MM-2

geprüft am
tested on
vérifié le
04.09.2020

Prüfer:
Tester
Vérificateur
B.Katircilar

Bemerkungen:
Comment / Commentaire

Dieses Dokument wurde maschinell erstellt und ist ohne Unterschrift gültig.
This document is computer generated and valid without signature.
C'est un document genere automatiquement, valid sans signature.

Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer
Postfach 1709, 67327 Speyer

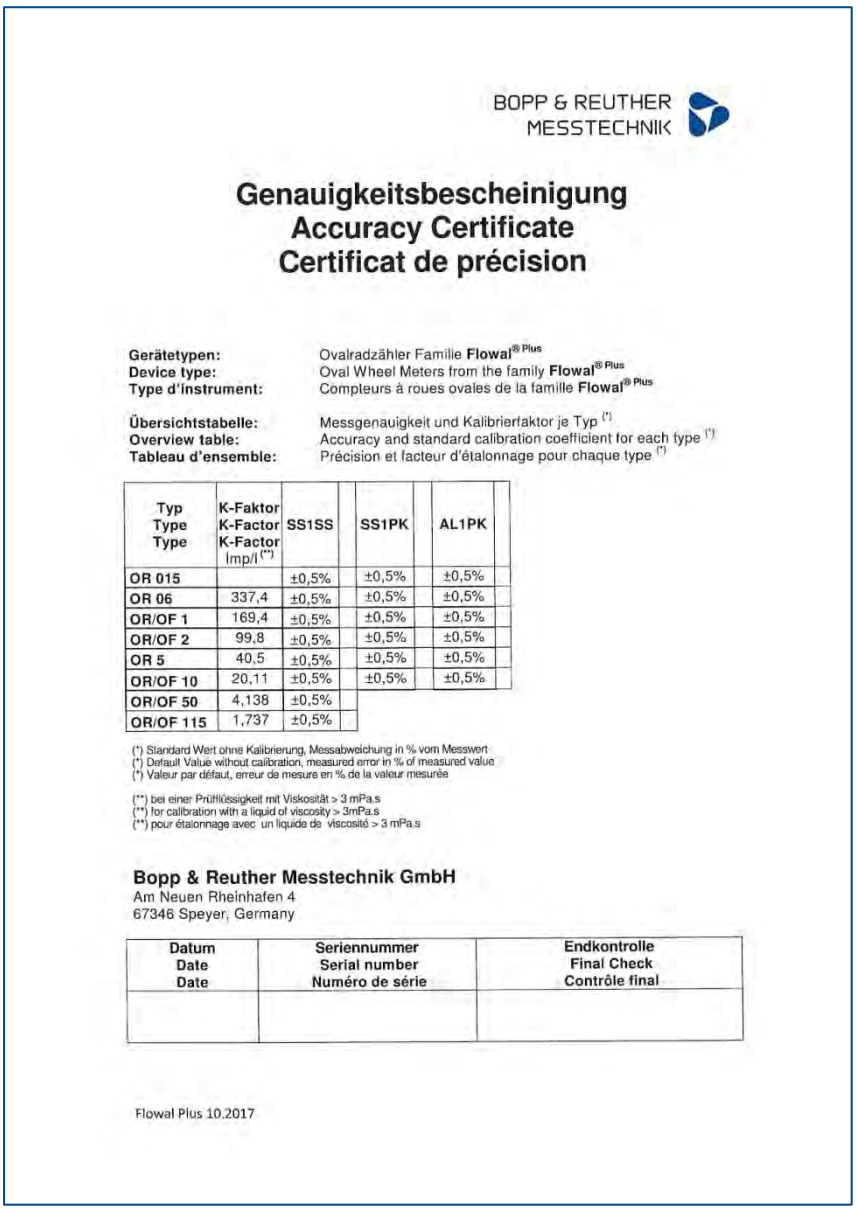
Telefon +49 (0) 6232 657- 0
Telefax +49 (0) 6232 657- 505
Internet: www.burmt.de
E-Mail: Info@burmt.de

Further information and product variants are available on request.

ACCURACY CERTIFICATE

MAIN CHARACTERISTICS

Certificate type:	Accuracy certificate
Application:	For devices that can meet a certain accuracy without explicit testing
Special features:	valid without signature, is enclosed with the instruments free of charget (e.g. Flowal® OR / OF)



BOPP & REUTHER MESSTECHNIK

Genauigkeitsbescheinigung
Accuracy Certificate
Certificat de précision

Gerätetypen: Ovalradzähler Familie **Flowal**® Plus
Device type: Oval Wheel Meters from the family **Flowal**® Plus
Type d'instrument: Compteurs à roues ovales de la famille **Flowal**® Plus

Übersichtstabelle: Messgenauigkeit und Kalibrierfaktor je Typ (*)
Overview table: Accuracy and standard calibration coefficient for each type (*)
Tableau d'ensemble: Précision et facteur d'étalonnage pour chaque type (*)

Typ Type Type	K-Faktor K-Factor K-Factor Imp/l (**)	SS1SS	SS1PK	AL1PK
OR 015		±0,5%	±0,5%	±0,5%
OR 06	337,4	±0,5%	±0,5%	±0,5%
OR/OF 1	169,4	±0,5%	±0,5%	±0,5%
OR/OF 2	99,8	±0,5%	±0,5%	±0,5%
OR 5	40,5	±0,5%	±0,5%	±0,5%
OR/OF 10	20,11	±0,5%	±0,5%	±0,5%
OR/OF 50	4,138	±0,5%		
OR/OF 115	1,737	±0,5%		

(*) Standard Wert ohne Kalibrierung, Messabweichung in % vom Messwert
(*) Default Value without calibration, measured error in % of measured value
(*) Valeur par défaut, erreur de mesure en % de la valeur mesurée

(**) bei einer Prüfflüssigkeit mit Viskosität > 3 mPa.s
(**) for calibration with a liquid of viscosity > 3mPa.s
(**) pour étalonnage avec un liquide de viscosité > 3 mPa.s

Bopp & Reuther Messtechnik GmbH
Am Neuen Rheinhafen 4
67346 Speyer, Germany

Datum Date Date	Seriennummer Serial number Numéro de série	Endkontrolle Final Check Contrôle final

Flowal Plus 10.2017

Further information and product variants are available on request.

MAINTENANCE INDICATOR

MAIN CHARACTERISTICS

Certificate type:	Maintenance indicator
Application:	This can be used if either the security stamp or the verification mark (or both) is damaged during a repair of a measuring instrument in legal metrology.
Special features:	Measuring instruments can be used again immediately by means of a maintenance mark. This does not prematurely terminate the verification period..

Eichdirektion Rheinland-Pfalz

Erteilung einer Befugnis für
Instandsetzer nach § 72 Eichordnung

Die Eichdirektion Rheinland-Pfalz verleiht mit dieser Urkunde der Firma

Bopp & Reuther Messtechnik GmbH
Am neuen Rheinhafen 4

67346 Speyer

die Befugnis, geeichte Messgeräte, die von ihr instandgesetzt wurden, zum Zwecke des Fortbestehens der Gültigkeit der Eichung gemäß §13 Abs. 2 der Eichordnung mit dem Instandsetzerkennzeichen zu versehen und durch ein Plombenzeichen zu verschließen.

Dem Instandsetzer wird gemäß §72 Abs. 2 der Eichordnung folgendes Instandsetzerkennzeichen zugeteilt:

Kennbuchstabe: K
Kenn-Nr.: 517

Die Befugnis des Instandsetzers erstreckt sich antragsgemäß auf folgende Messgerätearten:

Volumenzähler für Mineralöl,
Wirkdruckgaszähler und Dichtemengenumwerter
jeweils mit Zusatzeinrichtungen

Die Befugnis gilt antragsgemäß in allen Bundesländern.

Der Instandsetzer verpflichtet sich, die geltenden Vorschriften, insbesondere die Vorschriften der Eichordnung zu beachten.

Bad Kreuznach, den 15.04.2003

Dipl.-Ing. H. Eisenkopf
Eichdirektor

Eichdirektion 3 Rheinland-Pfalz

Eichdirektion Rheinland-Pfalz, D-55543 Bad Kreuznach, Steinkaut 3, Telefon: 0671/79486-0

Since 19.10.2016, the new maintenance indicator has been in use

Further information and product variants are available on request.

REFERENCE LIST

a small selection of our more than 5000 customers worldwide:

Mineral oil

Shell
BP
Total
Ruhroel
ENI
MiRO
Petronas
Zeller-Gmelin

Machine manufacturer

Messpack
Boatopack
Volpak
Bossar
Bellapack
Hassia Redartron
Ilfamensa

Food

Coca Cola
Weihenstephan
Haribo
Danone
Kraft Foods
Nestle
Unilever

Marine

Hyundai
Samsung
Meyer Werft
Peene Werft
Bloom & Voss

Plant manufacturers

Siemens
Uhde
Bilfinger
Göhler
Zeller-Gmelin

Pharma

Roche
Aventis
Sanofi
Merck
Ciba Geigy

Chemistry

BASF
Bayer
Alessa
Celanese
Clariant
Akzo Nobel

Energy

Evonik
Infraserv
RWE
Kraftanlagen
Bertsch
STEAG
Vattenfall
MVV

Automotive

Daimler
BMW
OPEL
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Ford
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