

Technical Datasheet



ZHM Series

Gear Flow Meters

Application

The gear flowmeters of the series "ZHM" are meters for lubricating and non lubricating liquids as well as filled viscous and abrasive mediums.

Stainless steel materials are exclusively used for this serie. Following gear flow meters are suitable for middle and high pressure ranges. Various design sizes of the flowmeters of the series ZHM allow a wide range of applications in such areas as consumption measuring, monitoring, mixing and dosing. Optimal measurement accuracy as well as good dynamic characteristics are guaranteed thanks to very high-quality bearings made of sintered carbides (hard metal). Short reaction times and exact dosing and flow measuring can be therefore performed in different areas of applications.

Special requirements

Dynamic measurements

The output frequency of gear flow meters is very high resulting in very good resolution and suitability for pulsating flow rates.

Reverse-flow detection and pulse multiplication

Fitting a twin pickup, reverse flow can be detected. Furthermore, pulse rates can be multiplied for faster and more accurate evaluation.

Resistance to high voltage from up to 120 kV

Fibre-optical pickups (type FOP) are available for electrostatical painting systems.

Measurement of fuels

Special ball bearings and adapted riveting thicknesses allow precise fuel and hydraulic liquids consumptions of all sorts.

Flameproof enclosures up to 1000 bar

Enough dimensioned and robust housing constructions allow the application for pressures up to 1000 bar (14000 PSI). Special connection threads (AUTOCLAVE) with pressure relief bore ensure an operating reliability.

Spacial meausing cells out of lake

The compact Cartridge-construction reduces the weight and allows the direct application on spray heads. Due to a special flat seal a patented, optimised rinse and dead space free construction is available.

Ex-protection

Ex-protected EExialICT6/T4 pickups and amplifiers are available for zone 1, zone 0 subject to individual inspection. In addition, intrinsically safe supply units may be provided.

Applications

- Waterborne paints, clear coatings, 2-component paints, highly-filled metal paints and softfeel paints
- Coating wax, glues, PVC, epoxy resin, highly-filled and abrasive fluids
- Polyol- and isocyanate
- Oil, fat (also food and cosmetics)
- Hydraulic oil
- Off-shore-applications, special meters with high-pressure connectors up to 690 bar

Features

- Very high output frequency
- Short response time
- High pressure up to 630 bar
- Reverse flow detection and puls multiplication
- Ex-protected EExialICT4 or T6 for zone 1
- Applicable in electrostatic spraying systems

Principle and Design

Gear Flow Meters are positive displacement meters, similar in design to a gear pump. The measuring medium rotates two gears, which are engaged with minimum play. The medium is forced along through closed measuring chambers between gears and housing. The gears, which run idle, lose no power in the medium stream. The rotational speed is proportional to the flow and is tapped from pickups from the housing wall.

Pickups and Amplifiers

The RPM of the gears is in proportion with the instantaneous flow rate and is precisely detected by integral pickups through the body of the meter without contacting the fluid. Pulses per volume unit will finally serve the evaluation.

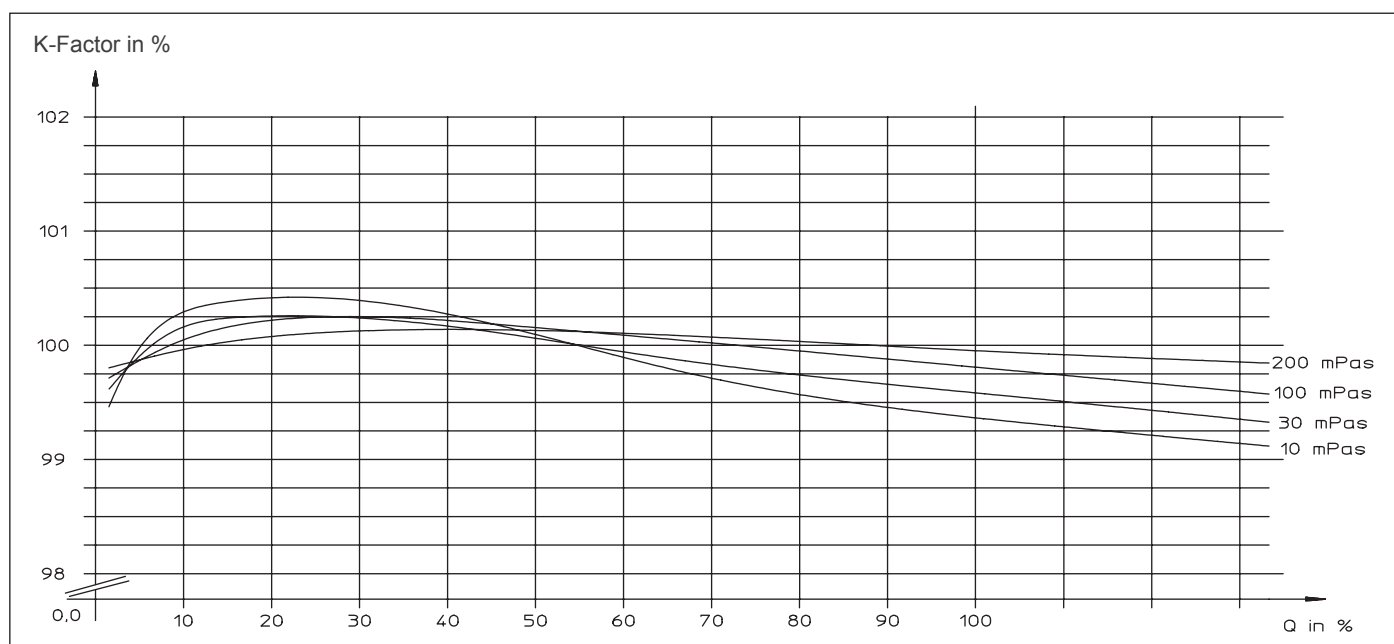
- VTE*/P carrier-frequency amplifier with single pickup
- VTM local display unit with integral frequency- and analogue output
- TD carrier-frequency amplifier with twin pickup
- VTQ quadruple carrier-frequency pickup and amplifier with integral divider
- FOP fibre-optical amplifier for electrostatic environment
- IF*/VIEG inductive pickup and amplifier

Details on pickups are available in separate datasheets.

K-factor and Linearity

The K-Factor (no. of pulses per litre) is almost constant over a wide range. Even with low flow rates measuring results are very precise as leakage is kept down to a minimum by very close production tolerances. A linearity error of $\pm 0.5\%$ of instant value can be easily maintained for a flow ratio of 1:20 and viscosities above 15 mm²/s. Accuracy improves as viscosity increases. The linearity error will decrease to $\pm 0.25\%$ of instant flow for viscosities from 50 to over 10,000 mm²/s.

The individual K-factor and linearity for each ZHM is determined during calibration and documented for the user in calibration records. When calibrating we consider as much as possible operating viscosities and customer's specifications.



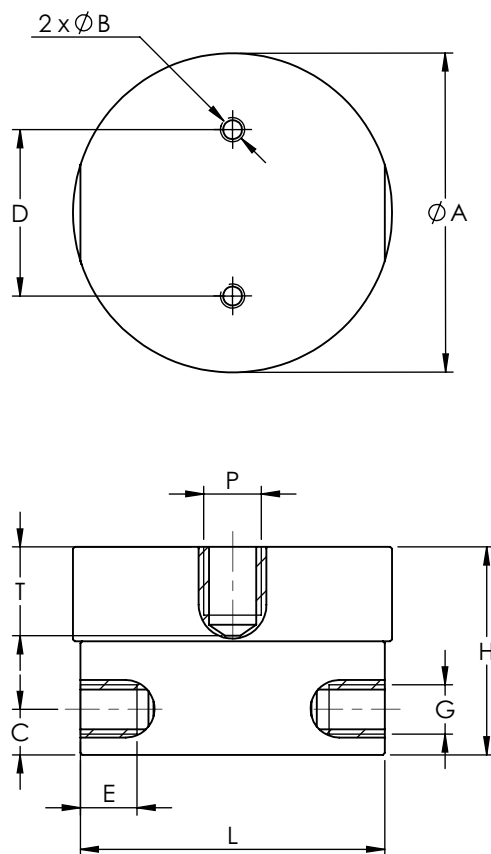
Technical data

Type	Measuring range, l/min			K-Factor, Impulse/l ⁽¹⁾	max. pressure, bar	weight, kg
ZHM 01*	0,005	up to	1	41.000	630	1,3
ZHM 01/1 ¹⁾ *	0,005	up to	2	26.500	630	1,3
ZHM 01/2 ¹⁾ *	0,02	up to	3	14.000	630	1,5
ZHM 02/1 ¹⁾ *	0,05	up to	2	8.200	630	2,2
ZHM 02 ¹⁾ *	0,1	up to	7	4.200	630	2,3
ZHM 03*	0,5	up to	25	1.740	630	2,9
ZHM 04*	0,5	up to	70	475	630	8,5
ZHM 05*	5	up to	150	134	400	23
ZHM 06/1*	5	up to	250	106	400	27
ZHM 06*	20	up to	500	53	400	35
ZHM 07*	50	up to	1.000	24	400	66,5

1) Average values with single pickups. Dual pickups for higher resolution are available.

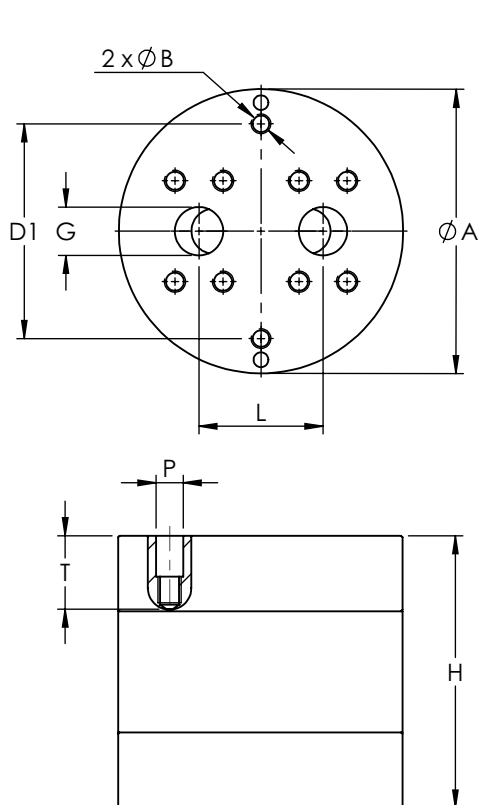
* Detailed type code on request.

Dimensional drawing (mm) - ZHM 01 bis 05

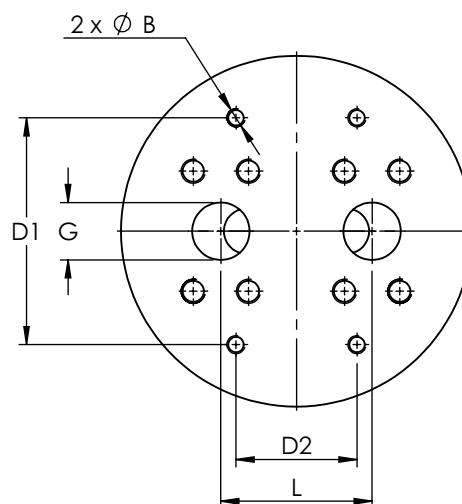


ZHM Type	Ø A	B	C	D	E	F	G	H	L	P ¹⁾	T ²⁾
ZHM 01	76	M6 ↓ 10	10,5	44	14	-	M12x1.5 G1/4"	41	72	E/D/H	19
ZHM 01/1	76	M6 ↓ 10	10,5	44	14	-	M12x1.5 G1/4" 1/4"NPT 3/8" MP 9/16 UNF	41	72	B/D/E/F/Q	18
ZHM 01/2	76	M6 ↓ 10	10,5	44	14	-	G1/4" M12x1.5 1/4"NPT G1/8"	50	72	A/B/D/E/F/Q	18
ZHM 02	85	M6 ↓ 10	12	44	14	-	G1/4" 1/4"NPT M12x1.5 G3/8"	55	80,5	A/D/E/F/H/ S/W	23
ZHM 02/1	85	M6 ↓ 10	12	44	14	-	G1/4" M12x1.5 3/8"AC	55	80,5	A/D/E/F/H/S	23
ZHM 03	85	M6 ↓ 10	12	44	14	-	G1/4" M12x1.5 G3/8" 1/4"NPT	67	80,5	A/D/E/H/M/ S/W	23
ZHM 04	125	M6 ↓ 10	17	60	14	-	1/2"NPT M20x1.5 G1/2" 3/4"-14NPS	96	121	1/D/E/H/S	30
ZHM 05	175	M8 ↓ 15	22,5	100	18	-	M33x2 G1" 1"NPTF	133	170	E/D/H/S	43

Dimensional drawing (mm) - ZHM 06 bis 07



ZHM06-06/1



ZHM07

ZHM Type	Ø A	B	C	D1	D2	E	F	G	H	L	P ¹⁾	T ²⁾
ZHM 06/1	188	M12 ∇ 28	-	142	-	-	-	SAE 1 1/4"	140	82	B/E/DS	48
ZHM 06	188	M12 ∇ 28	-	142	-	-	-	SAE 1 1/4" SAE 1 1/2"	180	82	E/D/S	48
ZHM 07	233	M12 ∇ 25	-	150	80	-	-	SAE 1 1/2" SAE 2"	220	100	E/S/H	63

1) See "Pickup Selection" table (S.3)

2) Please notice: total height is calculated by adding up the height (H) and the height of the pickup (separate data sheet) and subtract the bore hole depth (T)

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