

KRACHT



Volume counter VCL 0,1
for painting technology

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Dimensions	VCL 0,1 P ^A / _B PS 10

Description

The measuring mechanism of the KRACHT Volume counter VCL 0,1 for painting technology consists of a pair of gear wheels driven by fluid flow in accordance with the principle of operation of a gear motor.

The measuring mechanism bearing system comprises radial and axial bearings.

The sensor system is separated from the measuring compartment; there is no contact with the medium.

The motion of the gear wheels is scanned by a magnetoresistive sensor.

The KRACHT VCL 0,1 Volume counter can be supplied with gear wheels and bearings coated with a hard material surface for operation with abrasive media.

An Explosion proof versions for the VCL 0,1 is available.

Application examples

Medium	Version	Series
Lacquer without solid components	Gear wheels and bearings uncoated	A
Lacquer with solid components	Gear wheels and bearings coated	B

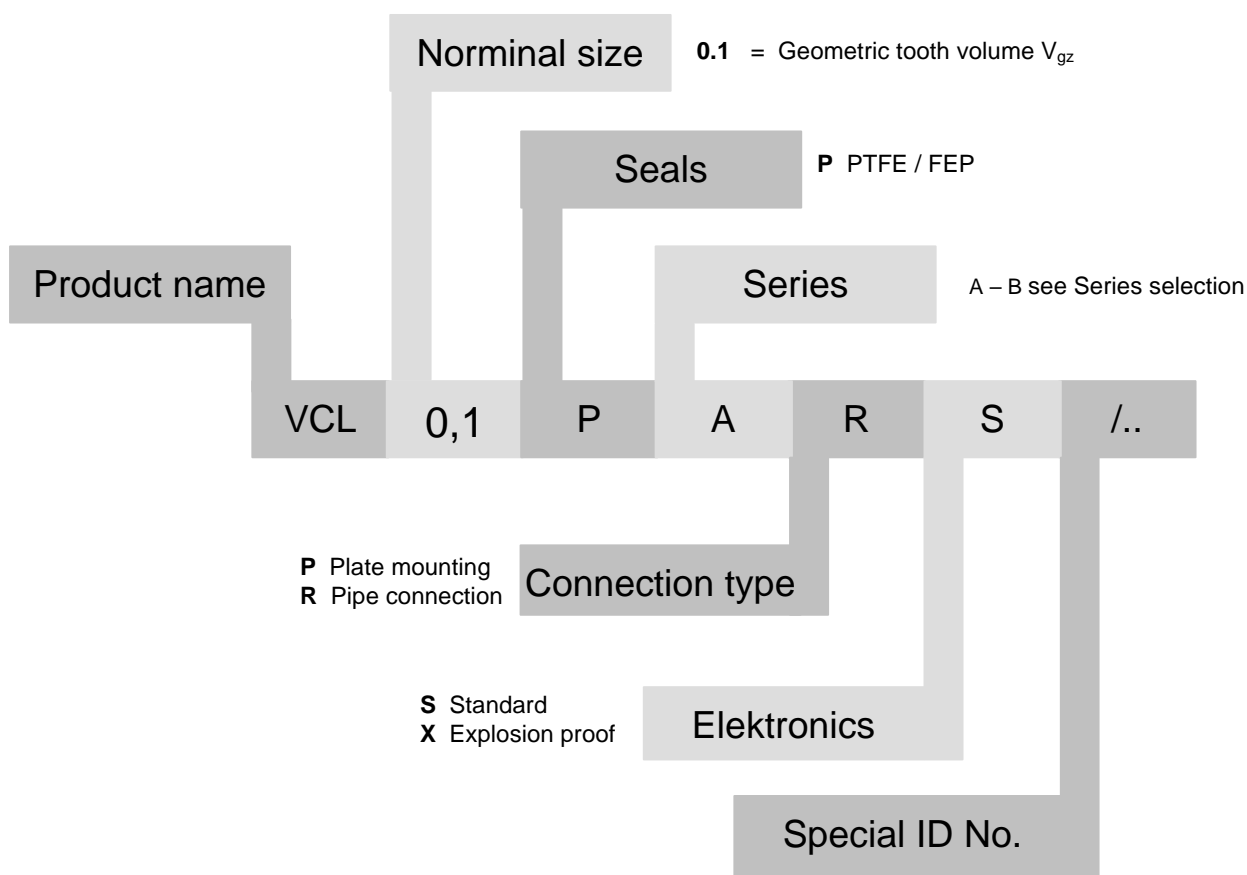
Operating characteristics

Geometric tooth volume	V_{gZ}	=	0.1 cm ³
Operating pressure	p_B	=	70 bar = 1000 psi
Peak pressure	p_{max}	=	85 bar = 1230 psi
Measuring range	Q	=	0.05....2 l/min
			0.01....0.53 gpm
Measuring mechanism starts at	Q_A	=	0.01 l/min ($v = 20 \text{ mm}^2/\text{s}$)
			0.003 gpm ($v = 20 \text{ mm}^2/\text{s}$)
Liquid temperature	δ_{max}	=	80°C = 176°F
Viscosity	v_{min}	=	20 mm ² /s
			v_{max}
Pressure drop	Δp	=	see pressure drop curve
Measuring accuracy	$\pm 2\%$	=	at $Q = 0.05 \dots 0.2 \text{ l/min}$ ($v=100 \text{ mm}^2/\text{s}$)
			at $Q = 0.01 \dots 0.532 \text{ gpm}$ ($v=100 \text{ mm}^2/\text{s}$)
Weight	m	=	1.3 kg = 2.86 lb

Materials

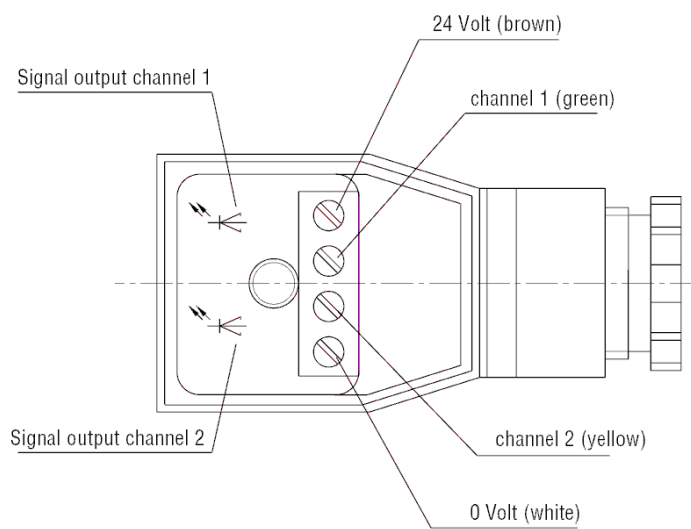
	A	B
Housing	1.4404	1.4404
Cover	1.4404 (hard metal coated)	1.4404 (hard metal coated)
Gear wheels	1.4462	1.4462 (hard material coated)
Bearings	Plain bearing Hard metal	Plain bearing Hard metal (hard material coated)

Type code



Electrical data

Number of measuring channels 2
 Operating voltage $U_B = 12 \dots 30$ V DC polarized
 Pulse amplitude $U_A \geq 0,8 U_B$
 Pulse shape with symm. output signal square wave
 factor/channel 1:1 $\pm 15\%$
 Pulse offset between Two channels $90^\circ \pm 30^\circ$
 Power requirement $P_{bmax} = 0,9$ W
 Output power/channel $P_{amax} = 0,3$ W short-circuit-proof
 Degree of protection std. IP 65 DIN 40050



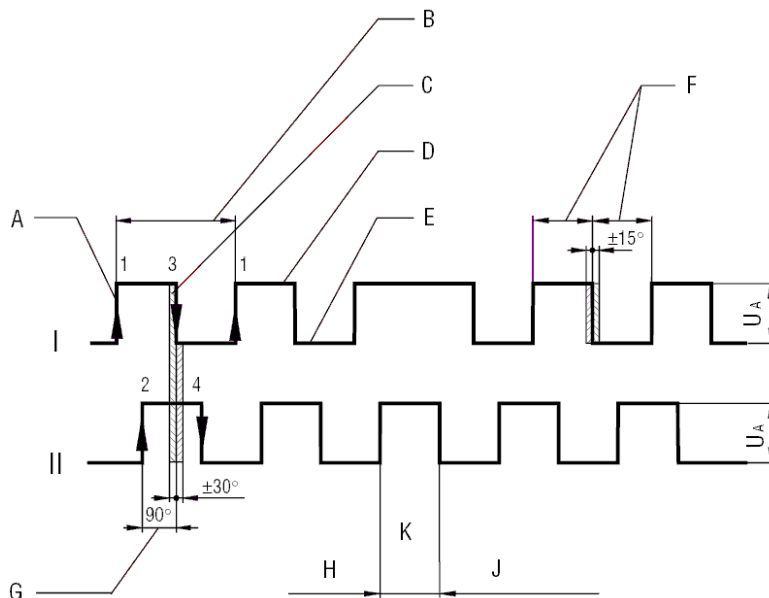
Signal characteristics

Channel I

- A rising edge
- B one pulse (corr. to flow rate of geom. tooth volume V_{gz})
- D ON phase
- E OFF phase
- F pulse duty factor 1:1 $\pm 15\%$

Channel II

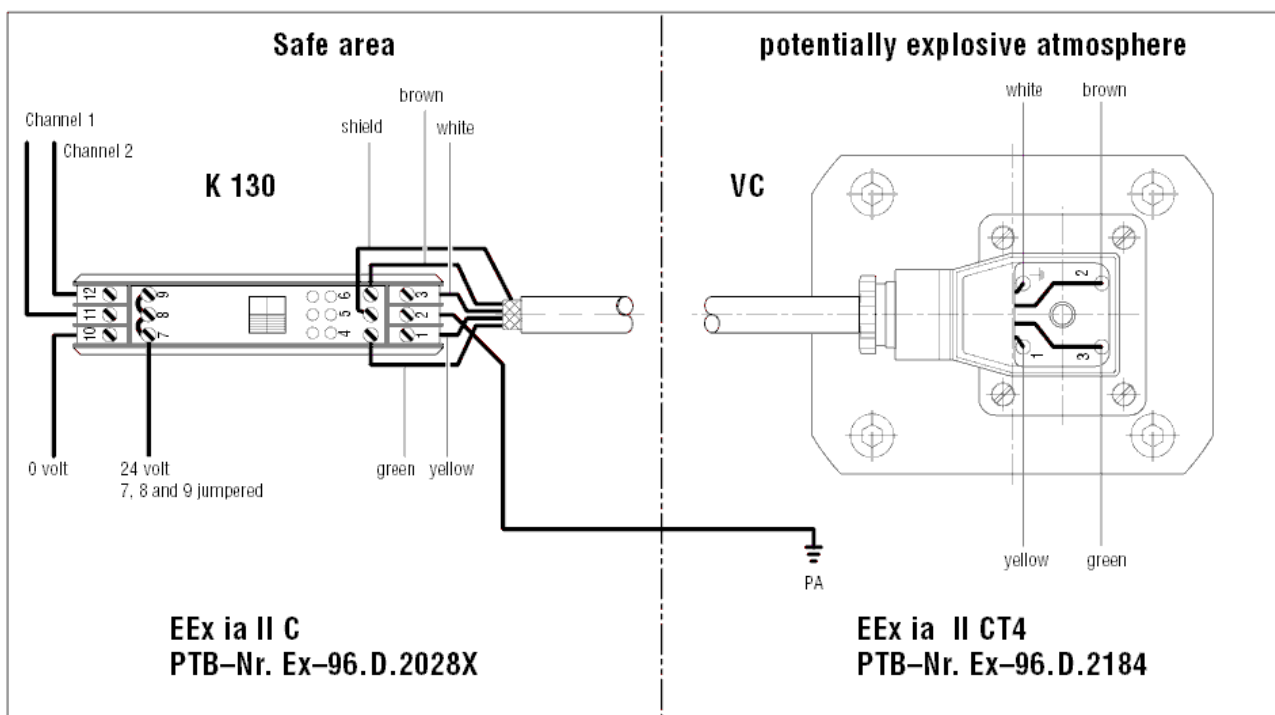
- G Channel offset
- H flow direction 1
- K reversal of flow direction
- J flow direction 2



Explosion proof version

Function

- All volume counters are available in explosion-proof design. A certificate of conformity for this variant has been issued by the PTB (German Federal Institution for Physics and Technology).
- The explosion-proof design consists of the volume counter (intrinsically safe electrical apparatus) and the switching amplifier K 130 (associated electrical apparatus). The type of protection “intrinsic safety” applies to this construction.
- The volume counter is installed in the potentially explosive atmosphere.
- The mounting of the switching amplifier K 130 is carried out in the safe area.
- Volume counter and switching amplifier are electrically connected to each other. The switching amplifier evaluates the sensor signals and converts them to square-wave signals.
- Without switching amplifier, the volume counter must not be operated in the potentially explosive atmosphere.
- Cable lengths of up to 400m are possible between volume counter and switching amplifier. LED’s for monitoring line breaks / short circuits, channel switching state and power supply are located on the switching amplifier



Techn. Data K-130/3-E-10 Explosion proof version

Power supply

Supply voltage cl. 7 (L+), KI10 (L-)	DC 24 Volt \pm 20%
Ripple content white Wss	< 10 %

Inputs (intrinsically safe) Characteristics cl. 1, 3, 4, 6

No-load voltage U_{A0}	approx. DC 9,6 Volt
Short-circuit current I_{AK}	approx. 72 mA
Switching point I_S within the range	10 mA ... 12 mA
Switching hysteresis I_H within the range	around 2 mA
Line-break / short-circuit monitoring	$I \leq 45 \mu A / I < 35 \text{ mA}$

**Data mut. Certificate of conformity
PTB no. EX-96.D.2028 X**

Max. voltage U_O	10 Volt
Max. current I_K	75 mA
Max. power P_{max}	188 mW

Permissible connected loads

Type of protection, category	EEx ia	EEx ib
Explosion-proof type of protection	IIB / IIC	IIB / IIC
Max. external capacity	475 nF	4 μF
Max. external inductance	3 mH	6,7 mH

**Outputs (non-intrinsically safe)
Characteristics cl. 9, 12, 8, 11**

Electronics outputs	electrically isolated via optoelectronic coupler
Short-circuit current	approx. 25 mA
Signal level 1-signal	0,8 x supply voltage with $R_L > 2k \text{ Ohm}$
Signal level 0-signal	inhibited output, residual current < 10 μA

Transmission characteristics

Max. switching frequency

Sensor inputs	approx. 2 kHz
Electronics output	approx. 2 kHz

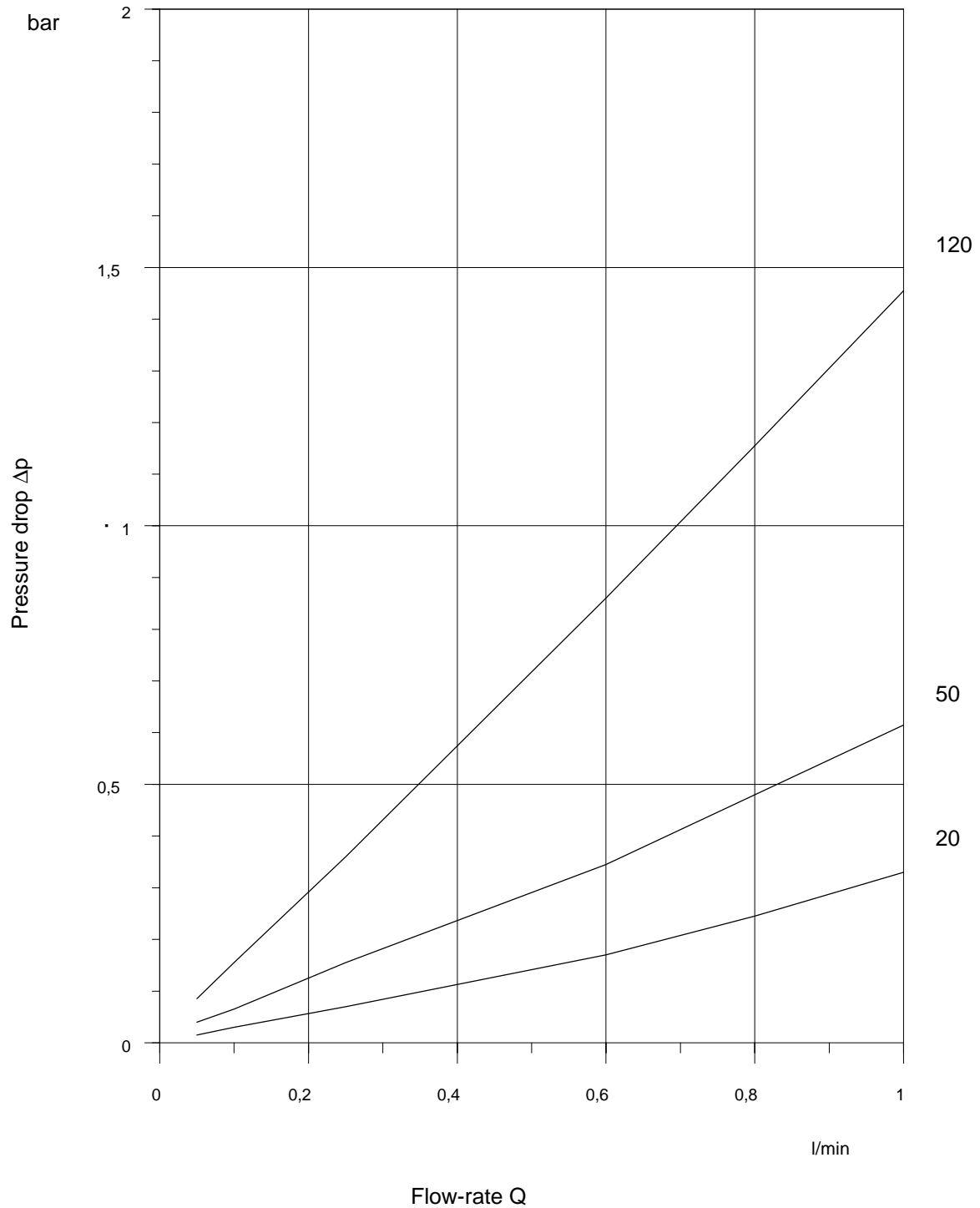
Ambience conditions

Minimum limiting temperature	248 K (-25 °C)
Maximum limiting temperature	333 K (+60 °C)

Mechanics

Design	modular terminal box made of LURANYAL KR 2402 (BASF AG)
Dimensions	107,5 x 92 x 22 mm
Mounting	can be snapped on a 35 mm mounting channel DIN 46277
Connection possibility	terminal screws
Weight	approx. 150 gr.

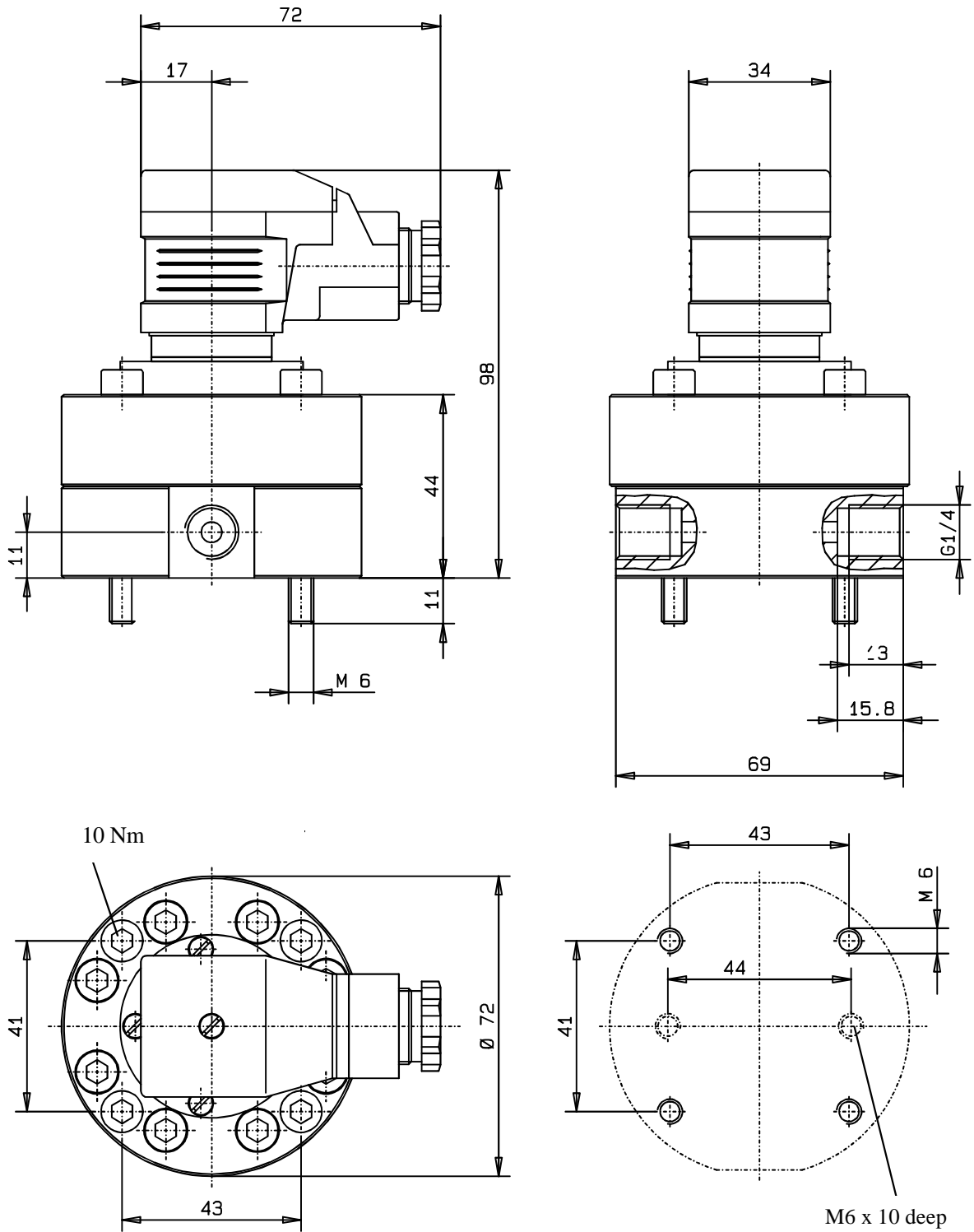
Pressure drop



Parameter: Viscosity (mm²/s)

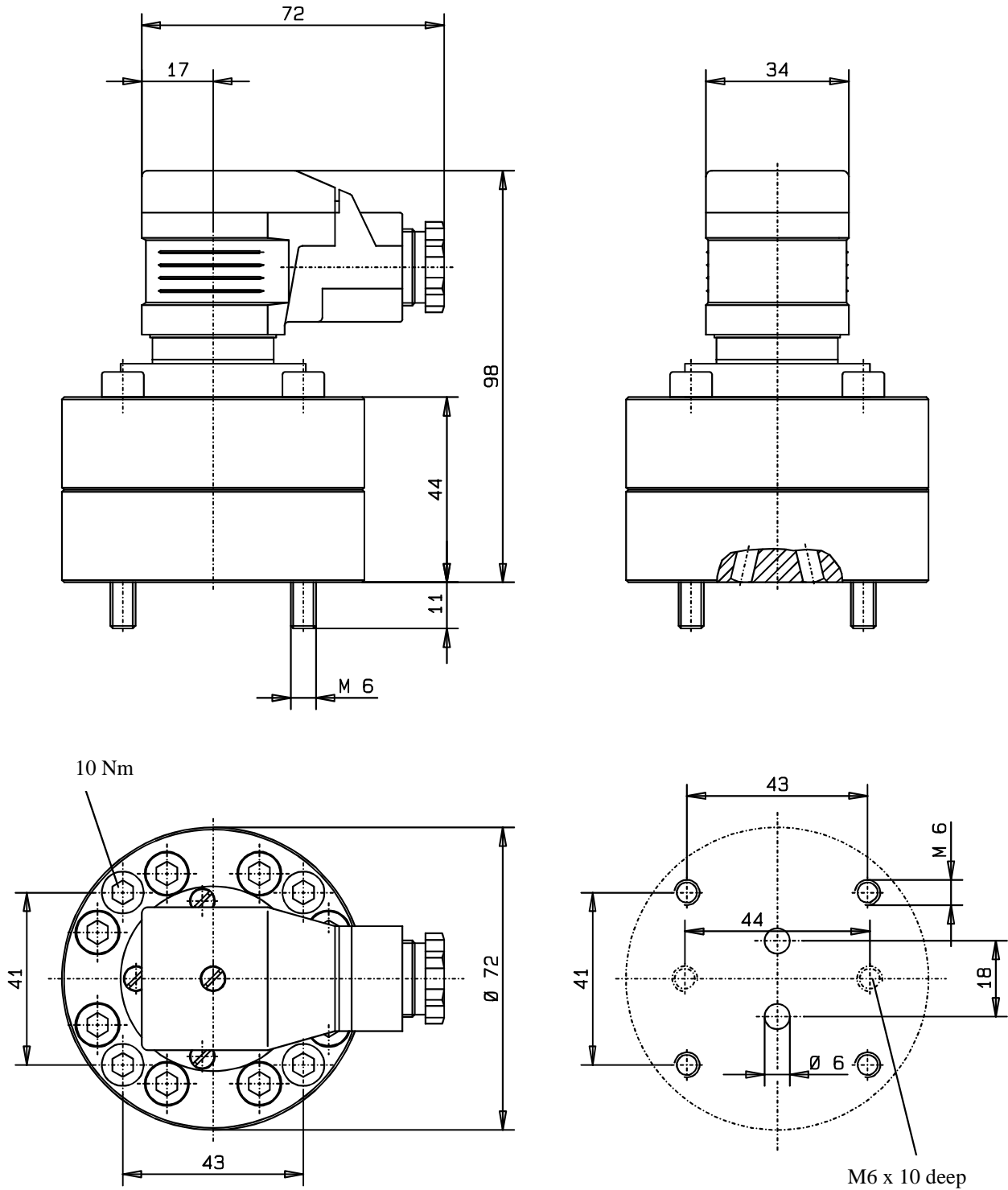
Dimensions

VCL 0,1 P ^A/_B RS



Dimensions

VCL 0,1 P ^A/_B PS



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