

KRACHT®

- | Gear Pumps
- | Flow Measurement
- | Hydraulics
- | Valves

Gear type flow meters **VCA / VCG**



Flow range

0.001 ... 3 750 l/min

Temperature range

-60 ... 210 °C

Maximum pressure

... 480 bar

In addition to our standard products, in close cooperation with our customers we have developed application-specific special solutions for fluidic measurement technology. The associated high-performance electronics process the signals supplied by the flow meter and ensure that processes are precisely monitored, regulated and controlled.

Benefit from our developments!

Get in touch with us. We would be glad to advise you.

Gear type
flow meters

VC
Spheroidal cast
iron / stainless steel



Gear type
flow meters

VCA
Aluminium



Screw type
flow meters

SVC
Spheroidal
cast iron



Turbine
flow meters

TM
Stainless steel



Valve
position indicator

VOLUMEC



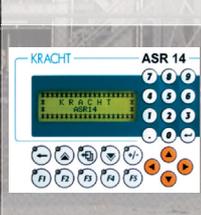
Electronics

ASR 30
Control unit



Electronics

ASR 14
Control unit



Electronics

AS 8
Control unit



Electronics

SD 1
Plug-in display



Exact with us

Applications and media

Pumpable liquids with a certain lubricity can be measured. These fluids include oils, brake fluid, diesel, Skydrol, paints, polyol + isocyanate, adhesives, resins, greases, silicones, paints, propellants, wax and solvents.

Automotive and Marine

- Test benches and plants
- Dosing and filling operating materials such as engine oils, brake fluids, antifreeze, preservatives, etc.
- Fuel consumption measurement
- Valve position indicator

Chemical Industry

- Flow rate and volume measurement in plants and plant systems
- Dosing and filling chemicals with and without abrasive fillers
- Measurement of extremely small amounts and microdosing
- Use in potentially explosive atmospheres

Paint and varnish industry

- Printing presses
- Painting systems
- Coating machines
- Dosing and filling
- Quantity, flow rate and consumption measurements
- Monitoring the mixing ratio

Hydraulics

- Flow and volume measurement
- Indirect, volumetric cylinder stroke measurement
- Cylinder synchronisation controllers
- Measurement, control, regulation of flow rates and volumes
- Test benches for pumps, motors and valves
- Filling and dosing
- Leakage monitoring
- Characteristic curve generation of hydraulic components
- Gear oil filling

Plastics Industry

- Mixing and dosing systems (single and multi-component systems)
- Consumption measurements
- Measurement and control of individual components and mixing ratios
- Flow rate and volume measurements
- Polyurethane (polyol and isocyanate)
- Low and high pressure dosing machines
- Dosing systems for pentane processing
- Block foam plants
- Paint dosages
- Premixing stations
- Hot melt adhesives

KRACHT®

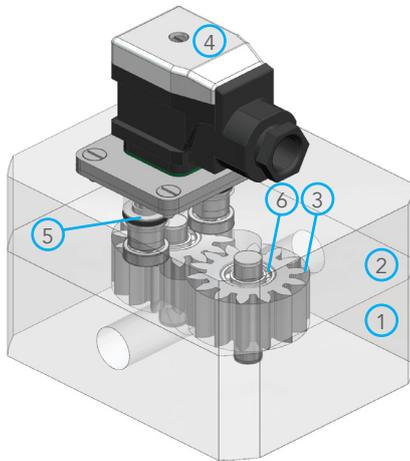
Your fluid solution partner

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Description

I Construction



- 1 Housing
- 2 Cover
- 3 Gear
- 4 Plug
- 5 Sensor
- 6 Bearing

I Function

Consisting of two high-precision gears, the measuring unit is driven by the liquid flow based on the displacement principle. The gears run in an almost contactless manner in the measuring chamber. The bearing consists of ball and plain bearings.

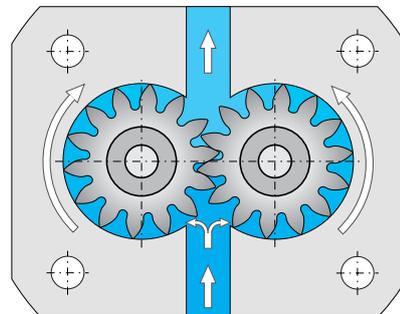
The measuring principle does not cause any pressure or volume flow pulsation. Because there is no need for settling sections on the inlet and outlet side, machines/plants can be designed to be more compact. All moving parts are lubricated by the measuring medium.

The gear movement is scanned in a contactless manner by the lid-mounted sensors. During the rotation of the measuring unit by one tooth pitch, a signal is generated per sensor that corresponds to the so-called geometric tooth volume V_{Gz} .

The plug is equipped with a pre-amplifier that converts the sensor signal into a square-wave signal which serves as output signal. The dual-channel scanning facilitates a higher measuring resolution and detection of the direction of flow.

I Product characteristics

- High-precision measurements with outstanding reproducibility
- Low pressure drop
- Any flow direction
- Wide temperature range
- High working pressure
- Low noise emission
- Highly dynamic measurements
- Explosion-proof versions (ATEX/IECEX)
- EMV-compliant electronics
- RoHS-compliant



Technical data

I General characteristics VCA

Nominal sizes	0.04 · 0.1 · 0.2 · 2 · 5
Type of connection	plate mounting (P) / pipe connection (R)
Mounting position	any
Flow direction	any
Typical measurement accuracy	+ 1.0% from a viscosity of 20 mm ² /s
Maximum permissible pressure loss	16 bar (VCA 0.2 = 10 bar)
Ambient temperature	-10 ... 80°C
Media temperature	-10 ... 80°C
Viscosity	... 4 000 mm ² /s
Sound pressure level	... 60 dB(A)

I Materials VCA

Housing and cover	aluminium
Gears	stainless steel / steel
Bearing	ball bearing, plastic plain bearing, multi-layer plain bearing
Seals	FKM

I General characteristics VCG

Nominal size	2
Type of connection	plate mounting (P)
Mounting position	any
Flow direction	any
Typical measurement accuracy	+ 2.5% from a viscosity of 20 mm ² /s
Maximum permissible pressure loss	16 bar
Ambient temperature	-10 ... 80°C
Media temperature	-15 ... 120°C
Viscosity	... 4 000 mm ² /s
Sound pressure level	... 60 dB(A)

I Materials VCG

Housing and cover	spheroidal cast iron
Gears	steel
Bearing	multi-layer plain bearing
Seals	FKM

I Overview VCA/VCG operating characteristics

Nominal size	geom. tooth volume V _{gz}	Measuring range	Measuring unit starting at	Resolution	Maximum pressure	Weight
	cm ³	l/min	l/min	pulse/l	bar	kg
VCA 0.04	0.040	0.02 ... 4	0.004 (ν = 20 mm ² /s)	25,000.00	240	0.5
VCA 0.1	0.100	0.08 ... 10	0.008 (ν = 20 mm ² /s)	10,000.00	240	0.6
VCA 0.2	0.200	0.25 ... 10	0.04 (ν = 100 mm ² /s)	5,000.00	200	0.6
VCA 2	2.000	1.00 ... 65	0.04 (ν = 100 mm ² /s)	500.00	200	1.9
VCG 2	2.000	1.00 ... 65	0.12 (ν = 100 mm ² /s)	500.00	350	5.0
VCA 5	5.222	1.00 ... 200	0.1 (ν = 20 mm ² /s)	191.50	100	6.0

I Available versions

Nominal size	Bearing			Material			Seal	Type of connection	
	Ball bearing	Plastic plain bearing	Multi-layer plain bearing	Housing spheroidal cast iron / gears steel	Housing aluminium / gears stainless steel	Housing aluminium / gears steel	FKM	Plate mounting	Pipe connection
VCA 0.04	•	–	–	–	•	–	•	–	•
VCA 0.1	•	–	–	–	–	•	•	–	•
VCA 0.2	–	•	–	–	–	•	•	–	•
VCA 2	–	•	•	–	•	•	•	•	•
VCG 2	–	•	•	•	•	•	•	–	•
VCA 5	•	–	–	–	–	•	•	–	•

Type key VCA

Example

VCA	0.2	K	4	F	4	P	2	S	H
1	2	3	4	5	6	7	8	9	10

1 Product	
2 Nominal size	
0.04	
0.1	
0.2	
2	
5	
3 Bearing	
K	ball bearing (only nominal size 0.04)
U	plastic plain bearing (only nominal size 0.2)
M	multi-layer plain bearing
4 Material	
4	housing aluminium / gears stainless steel
5	housing aluminium / gears steel
5 Sealing	
F	FKM
6 Surface	
3	without coating
4	hard-coated
5	anodized (decorative)
7 Connection type	
P	Plate mounting (only nominal sizes 0.2 and 2)
R	Pipe connection
8 Sensors	
1	1 sensor
2	2 sensors
3	without sensors
4	2 sensors, vibration-proof/condensation-proof
9 Electronic versions (pre-amplifier)	
S	Standard
V	without pre-amplifier
10 Electric connection (plug and pre-amplifier housing)	
H	appliance socket (Hirschmann) standard
M	appliance socket (Hirschmann) with M12x1 4-pole connection
V	without

Type key VCG

Example

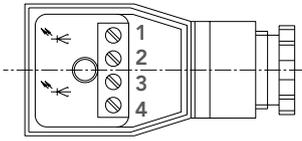
VCG	2	M	1	F	1	P	2	S	H
1	2	3	4	5	6	7	8	9	10

1 Product	
2 Nominal size	
2	
3 Bearing	
M	multi-layer plain bearing
4 Material	
1	housing spheroidal cast iron GJS-400 / gears steel
5 Sealing	
F	FKM
6 Surface	
1	standard coating
3	without coating
7 Connection type	
P	plate mounting
8 Sensors	
1	1 sensor
2	2 sensors
9 Electronic versions (pre-amplifier)	
S	Standard
V	without pre-amplifier
10 Electric connection (plug and pre-amplifier housing)	
H	appliance socket (Hirschmann) standard
M	appliance socket (Hirschmann) with M12x1 4-pole connection
V	without

Electronics

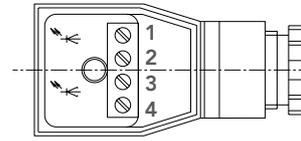
I Electrical connections

Electrical connection VCA – single-channel



1: U _B (brown)
2: Channel 1 (green)
3: not assigned
4: 0 Volt (white)

Electrical connection VCA 0.2/VCG 2 – dual-channel



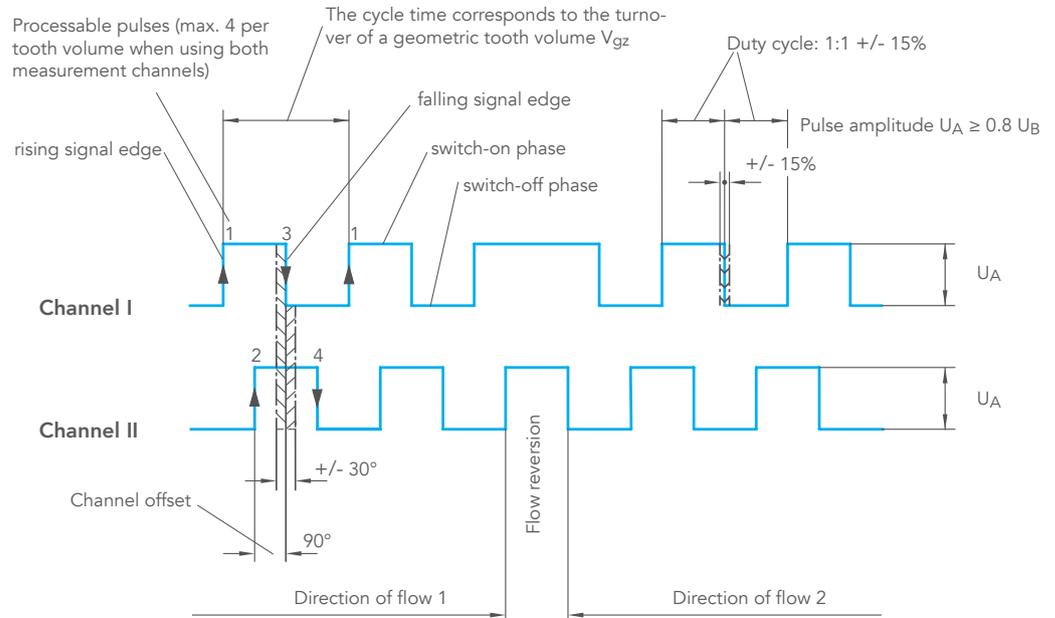
1: U _B (brown)
2: Channel 1 (green)
3: Channel 2 (yellow)
4: 0 Volt (white)

I Electrical characteristics

Number of measuring channels	single-channel: VCA 0.04 · 0.1 · 0.2 · 2 · 5 dual-channel: VCA 0.2 · VCG 2
Working voltage U _B	12 ... 30 V DC reverse polarity protected
Pulse amplitude U _A	≥ 0.8 U _B
Pulse shape with symmetrical output signal	Square duty factor/channel 1:1 +/- 15%
Signal output	PNP / NPN
Pulse offset between the two channels (2 sensors)	90° ± 30°
Power requirement P _{B max}	0.9 W
Output power / channel P _{A max}	0.3 W short circuit-protected
Protection rating	IP 65

I Signal characteristics

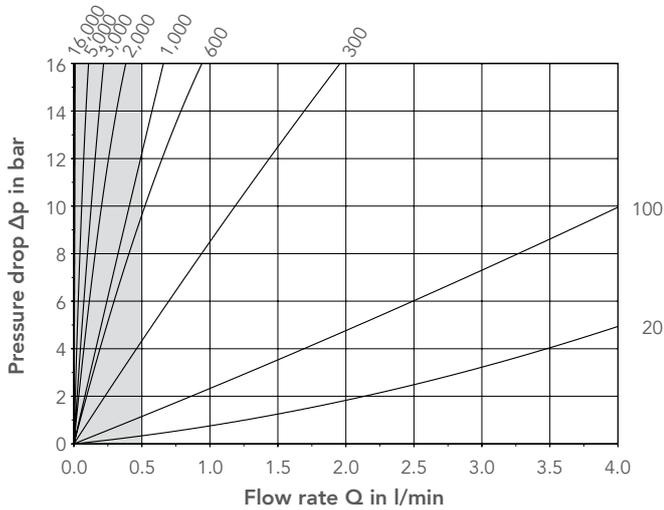
The pre-amplifier-generated square-wave signal enables application-specific resolutions. Standard resolution means that the electronics will process one pulse from a channel/sensor per cycle time (rising signal edge in channel I). In contrast, the 4-fold evaluation uses the maximal pulse rate per cycle time, allowing for a resolution that is four times as high as in the standard evaluation. All characteristics of the signal (rising and falling signal edge of both sensors/channels) are exploited in the evaluation.



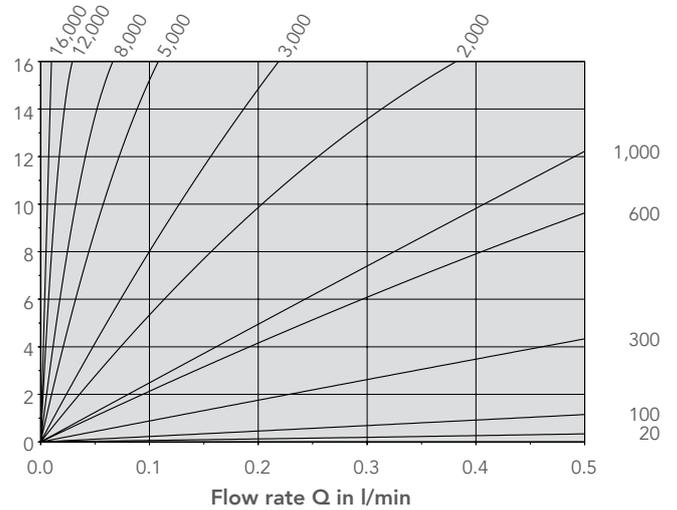
Pressure drop Parameter: Viscosity in mm²/s

I VCA 0.04 ... 0.2

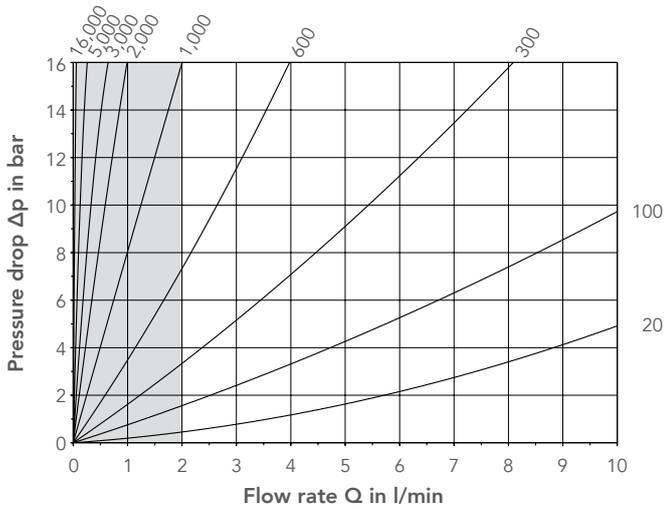
VCA 0.04



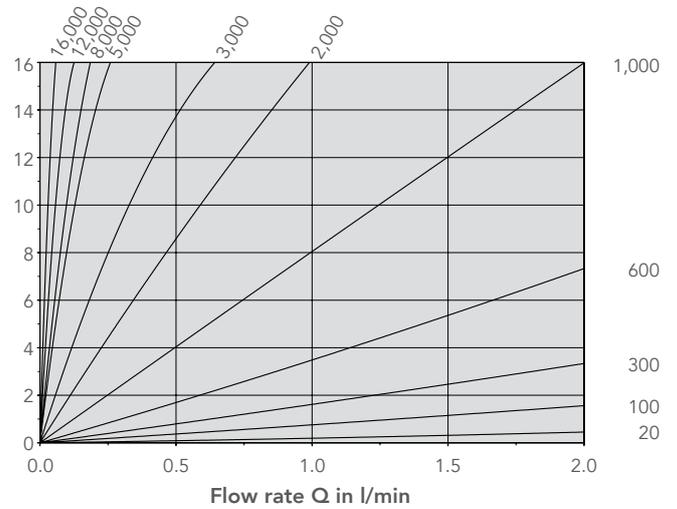
VCA 0.04 (section)



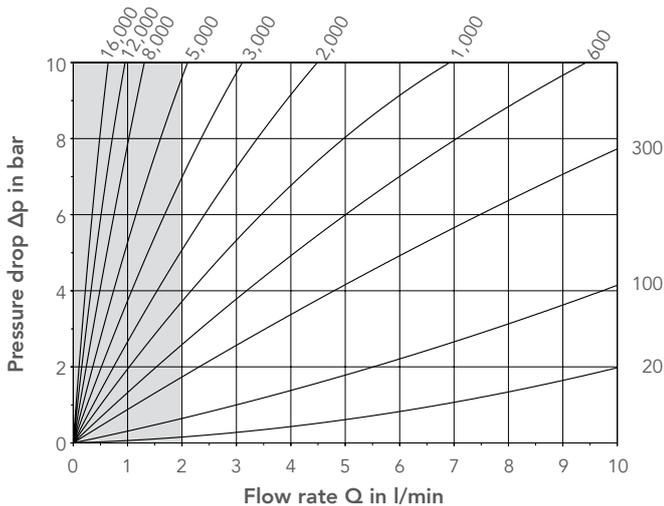
VCA 0.1



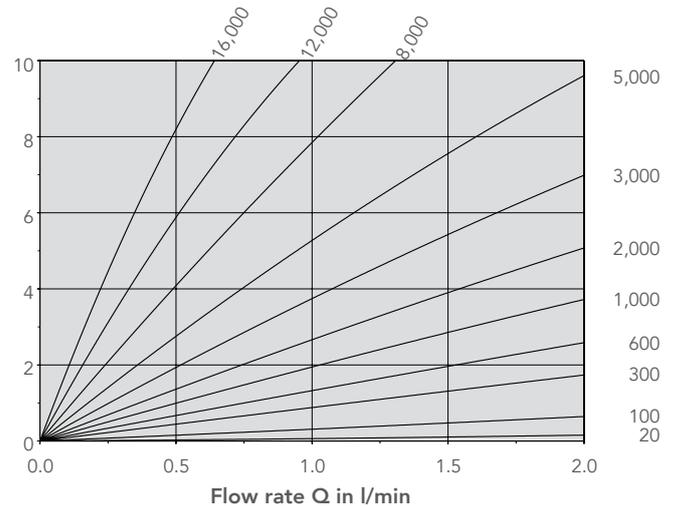
VCA 0.1 (section)



VCA 0.2



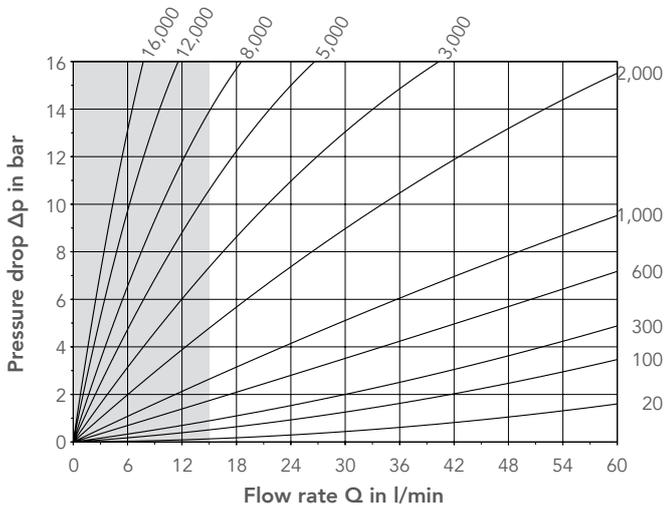
VCA 0.2 (section)



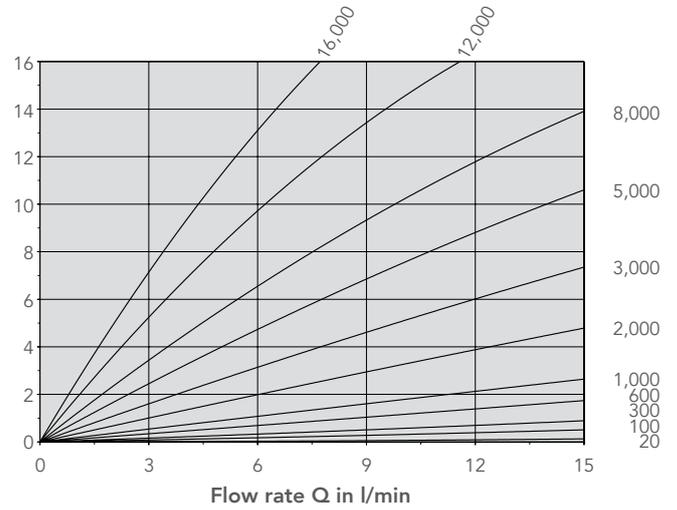
Pressure drop Parameter: Viscosity in mm²/s

I VCA/VCG 2 and VCA 5

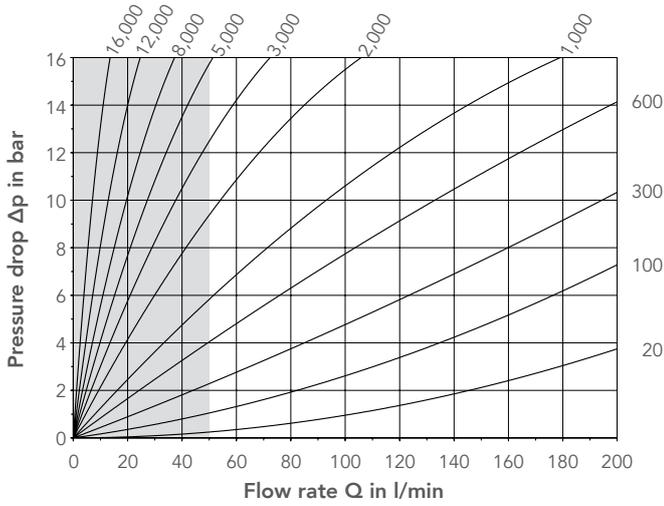
VCA/VCG 2



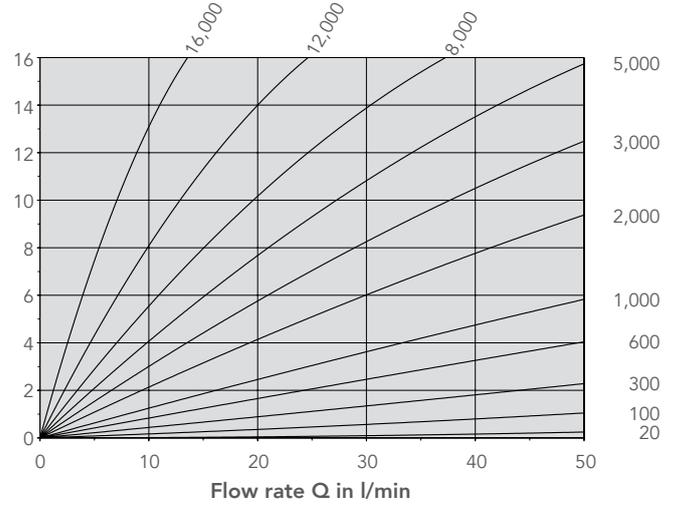
VCA/VCG 2 (section)



VCA 5

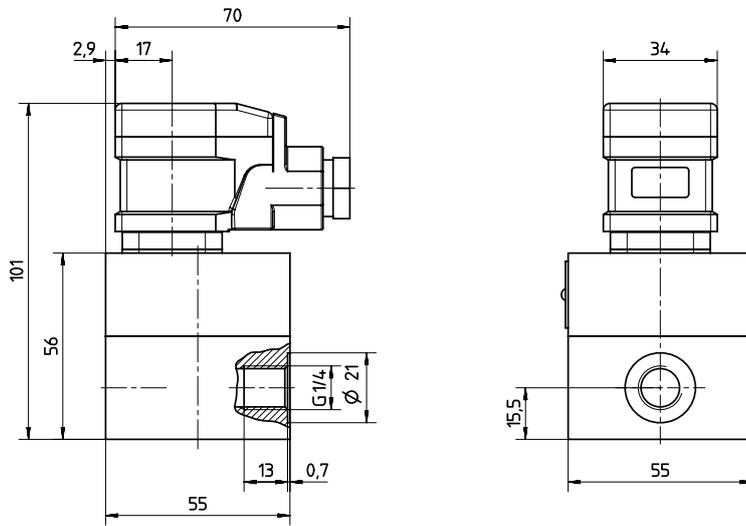


VCA 5 (section)

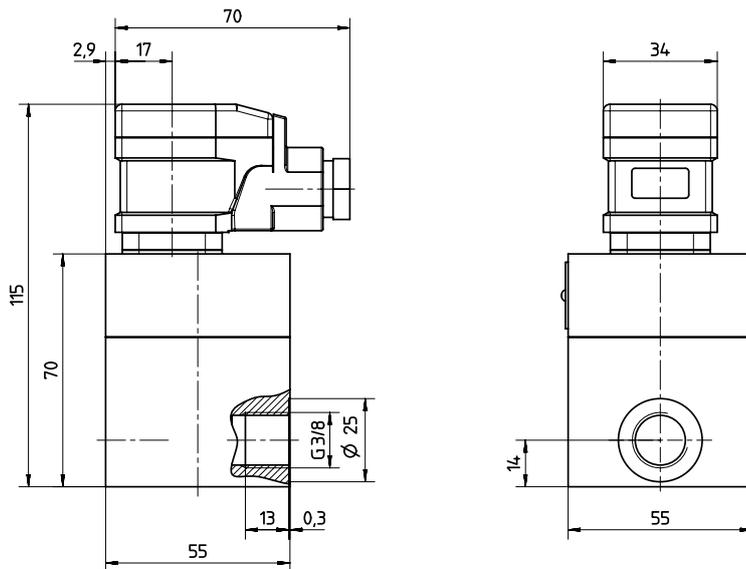


Dimensions

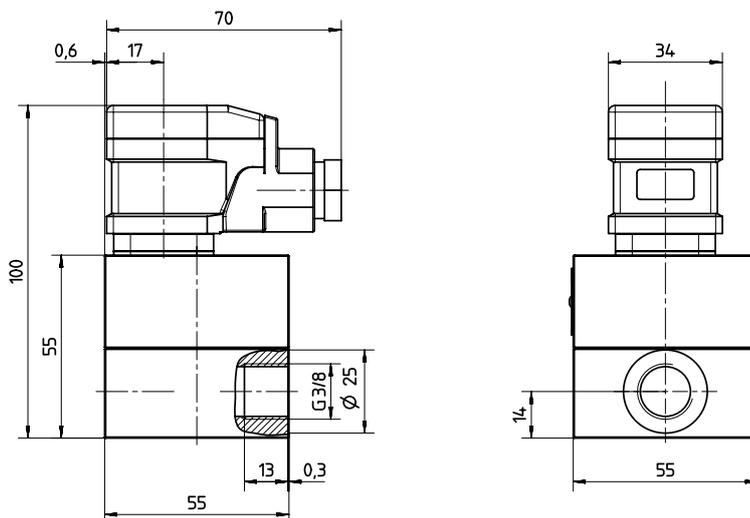
I VCA 0.04



I VCA 0.1

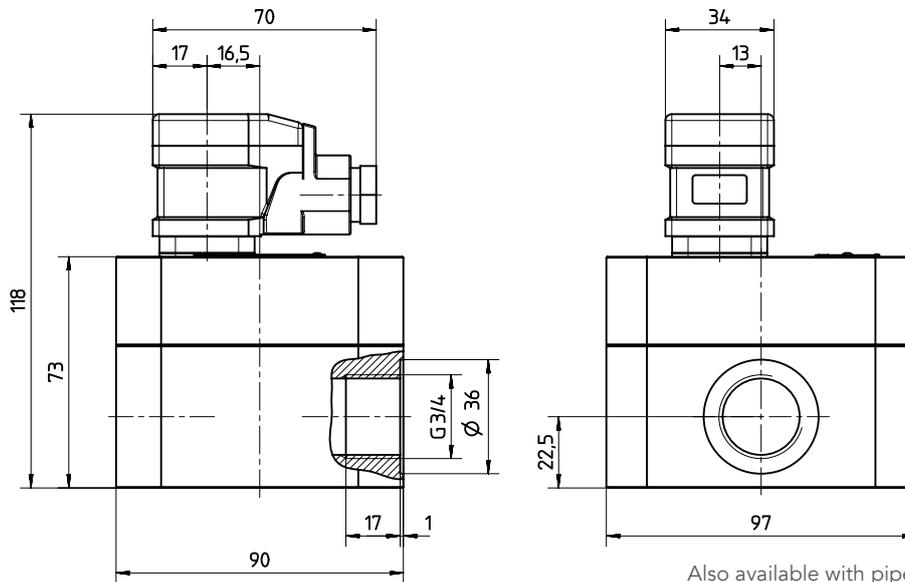


I VCA 0.2



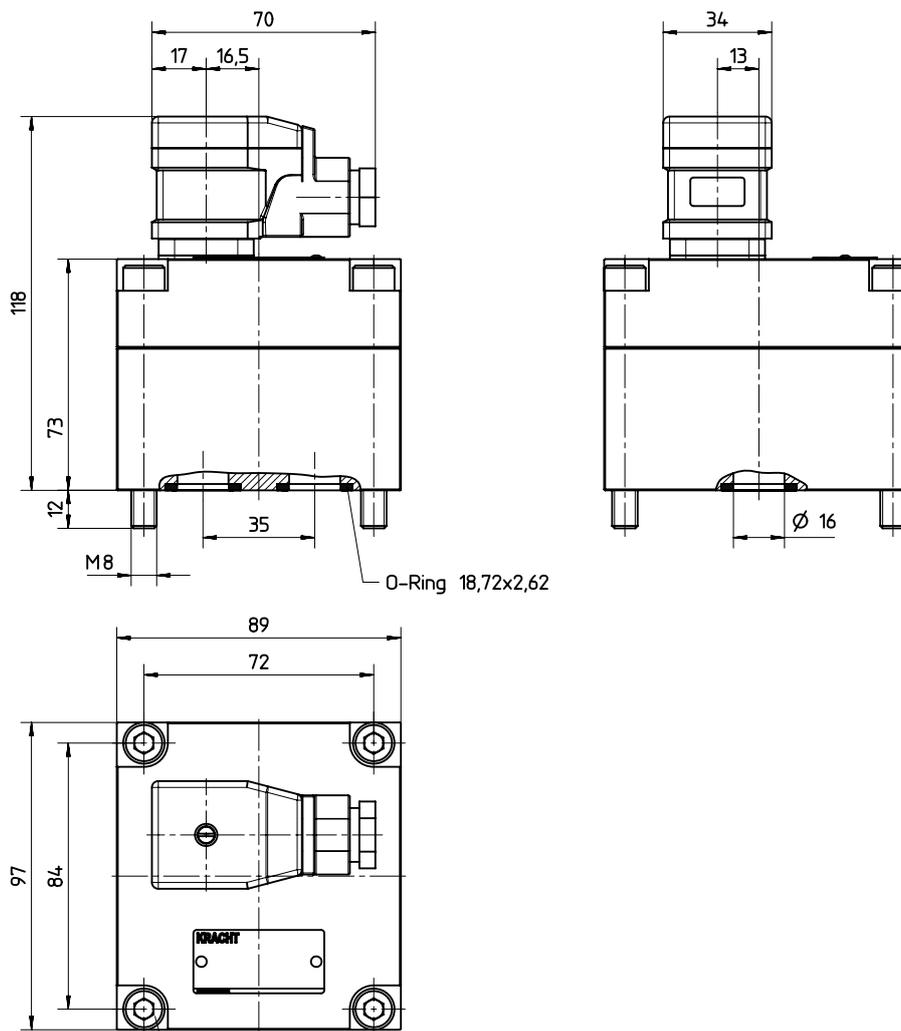
Dimensions

I VCA 2 – pipe connection



Also available with pipe connection dimension G1.

I VCA 2 – plate mounting

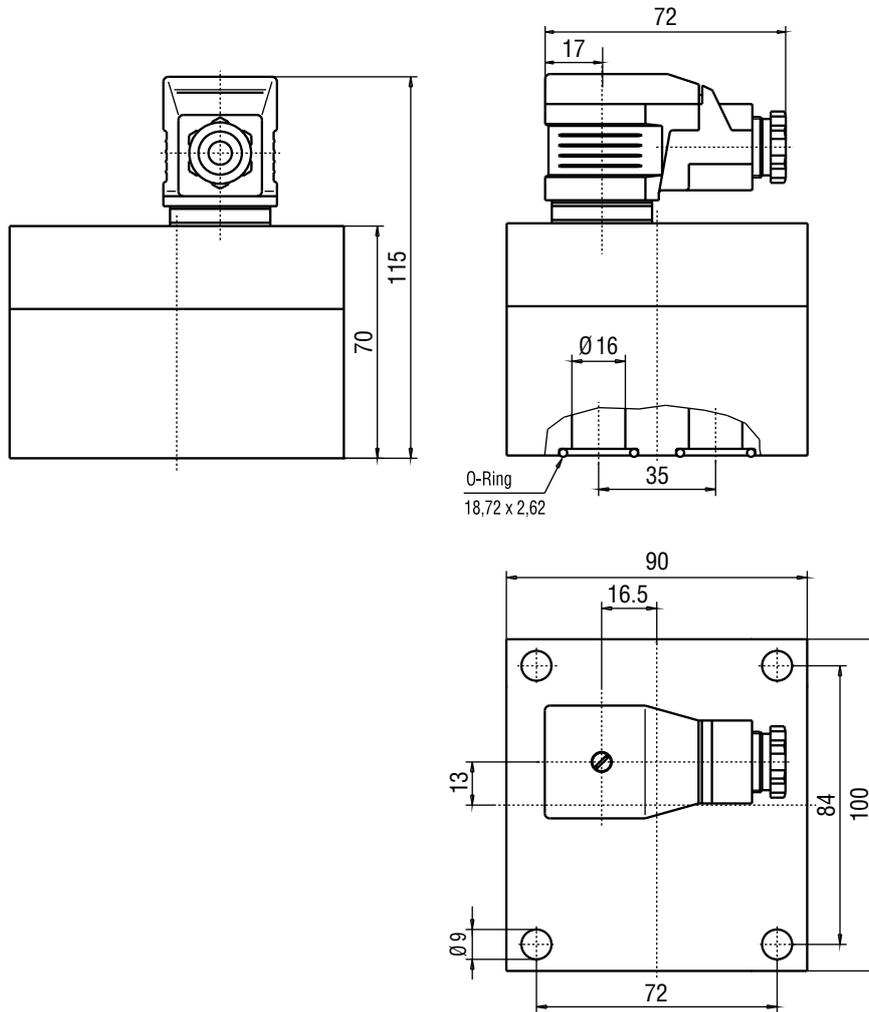


Tightening torque MA=13 Nm

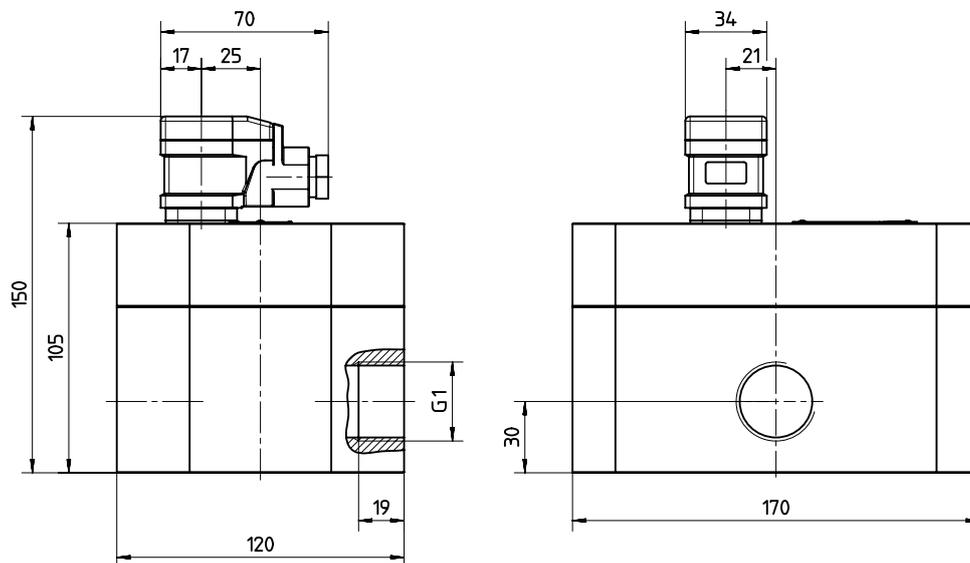
Dimensions in mm

Dimensions

I VCG 2



I VCA 5



Flow measurement overview

Flow meter	Description	Flow range	Medium temperature range	Maximum pressure
VC	Gear type flow meter	0.001 ... 700 l/min	-60 ... 210°C	480 bar
VCA	Gear type flow meter	0.02 ... 200 l/min	-10 ... 80°C	240 bar
SVC	Screw type flow meter	0.01 ... 3 750 l/min	-40 ... 220°C	480 bar
TM	Turbine flow meter	0.92 ... 66 667 l/min	-30 ... 400°C	400 bar
VOLUMEC	The valve position indicator VOLUMEC is a linking unit consisting of a valve block, volume counter, and display unit.	... 7 l/min	-20 ... 80°C	240 bar
VOLUTRONIC®	The valve position indicator VOLUTRONIC® is the electronic variant of the VOLUMEC system. It indicates the direction of flow by generating two incremental signals.	0.16 ... 16 l/min	-30 ... 80°C	200 bar

Electronics	Description	Applications
SD 1	The plug-on display SD 1 is a universal local indicator for all volume counter series (VC, VCA, SVC, TM) with a DIN 43650-A valve plug connection. The display optionally shows the flow or the volume.	Volume measurement flow measurement
AS 8	The AS 8 processes the output signals of the flow meters. The unit filters, transforms and computes the input signals into the physical parameters flow or volume, and displays them.	Measures volume, flow, mixing ratio, flexibility ratio, stroke, sums, and differences Controls flow, mixing ratio and revolutions Dosing
ASR 14	The ASR 14 integrates control, operation and visualisation functions. The programming of the ASR 14 is tailored to customer requirements.	like AS 8 – customisable
ASR 30	The ASR 30 is a control unit which can be operated via touch screen. In addition, the unit can be expanded with manual operating units. This allows the implementation of numerous fluid technology applications. Standardised programs are available for various applications. The programming of the ASR 30 can be optimised to match to the respective application.	like AS 8 – customisable

Notes

I Gear pumps

Low-pressure and high-pressure gear pumps for lubricating oil, hydraulic, process, and test bench applications, fuel and metering systems.



I Flow measurement

Gear, turbine and screw type flow meters and electronics for volume and flow, metering and consumption in the chemical industry; hydraulic, process and test bench technology.



I Hydraulics

Single and multi-stage high-pressure gear pumps, gear motors and valves for construction machinery, municipal vehicles, agricultural vehicles, special-purpose vehicles and truck bodies.



I Valves

Cetop valves for all requirements of stationary and mobile applications. Pressure, switch and check valves with pipe connection for high flow rates. Special valves.



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