→ Sensors

→ Sensors with display

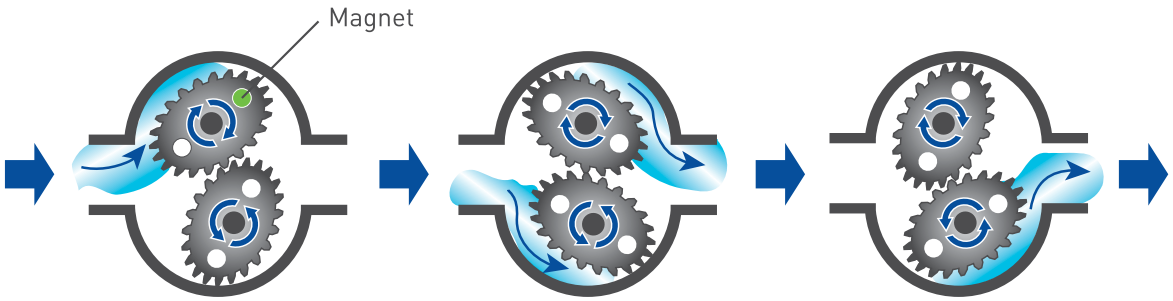
OVAL GEAR FLOW METERS

DS_Oval_gear_flow_meters 01/2016

Oval gear flow meters

Principle of operation

Oval gear meters are displacement-type volume meters that transport defined incremental volumes in individual measuring chambers. The measuring element consists of two high precision toothed oval gears, which are driven by the flow of the medium and mesh with each other. In this way, a defined volume is transported for each rotation of the pair of oval gears. The number of rotations is a measure of the amount of fluid that has passed through the meter. The rotations are detected by a sensor element.



Advantages

- Positive displacement meter for volumetric flow rate or total flow measurement
- Applicable for fluids such as lubrication oils, mineral oils, hydraulic oils, fuels, liquified gases and others
- No inlet or outlet section required
- High-quality construction for long service life and high reliability
- Long-term stability
- High measurement accuracy and repeatability
- Easy installation

Oval gear flow meters

Series VO, Sensor

Threaded Version

Flanged Version

Characteristics

- Sensor with pulse output signal, no local display
- Flow rate or total flow indication by local or remote display
- Individual calibration
- Various versions of local displays are available: battery powered (lifetime approx. 3 years) or externally powered version with analogue and pulse output
- Female threaded or flanged process connection
- O-ring material FKM, EPDM or FEP

Type	V0015	V006	V01	V02	V05	V010	V050	V0115
Measuring range [l/min]								
→ Oval gears st. steel (V0...VA)	0.03...1	0.2...5	0.4...10	1...30	2...50	4...100	15...300	35...660
→ Oval gears PEEK (V0...VP / AP)	0.03...1	0.2...7	0.4...14	1...30	2...60	3...120		
Process connection								
→ Thread	G¼	G½	G½	G¾	G 1	G 1	G 2	G 2
→ Flange (according to DIN EN 1092-1)				DN 15		DN 25	DN 50	DN 50
Nominal puls rate [1/l]	3100	333	166	100	40	20	4	1.7

Type	V0...VA	V0...VP**	V0...AP**
Accuracy*	±0.5 % of reading		
Repeatability*	< 0.05 %		
Pressure rating	PN 40 (PN 25 with FEP O-ring)		
Temperature range			
Standard	-10...70 °C		
High temperature sensor	-10...130 °C		
Materials***			
Housing	Stainless steel	Stainless steel	Aluminium
Oval gears	Stainless steel	PEEK	PEEK
O-ring	FKM (standard) or EPDM (option) or FEP (option)	FKM (standard) or EPDM (option) or FEP (option)	FKM (standard) or EPDM (option) or FEP (option)
Medium			
Allowable Viscosity	0.3...350 mPa s	0.3...50 mPa s	
Max. particle size	25...100 µm		
Electrical data			
Supply voltage			
→ Standard	10...30 VDC	10...30 VDC	10...30 VDC
→ High temperature sensor	18...30 VDC		
Electrical connection (Sensor without display)	M12 x 1 connector		
Signal output			
Standard	NPN, PNP	NPN, PNP	NPN, PNP
High temperature sensor	PNP		
Degree of protection EN 60529	IP67		

* Test conditions:
→ Viscosity >3 mPa s
→ Media temperature 20 °C
** Not availiable for V050 and V0115
*** Other material combinations on request

Series VO, Display

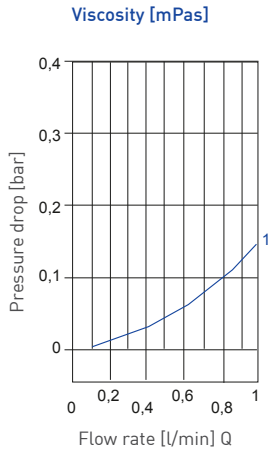
Display 1

General description – displays

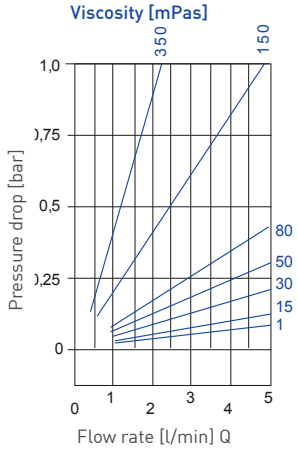
- Choice of three display models
- Actual flow rate indication
- Total flow indication, password protected counter
- Mass indication (temperature-dependent)
- Up to two VO sensors can be connected; configurable for differential measurement (Display 2 and 3)
- Impulse output (Display 2 and 3)
- Optionally available for wall mounting with bracket (for media temperatures up to 70 °C)

Type	Display 1	Display 2	Display 3
Display	8 digit		
Electrical data			
Power supply	Battery	Battery	10...30 VDC
Power consumption			100 mA, 28 V
Signal outputs		Pulse output NPN open collector	Pulse output NPN open collector Analogue output 4...20 mA / 2-wire
Degree of protection EN 60529	IP65		
Electrical connection		Terminal block / cable gland	
Cable length (remote type / wall mounting)		2000 mm	
Temperature range			
Medium temperature	-10...70 °C		
Ambient temperature	-20...70 °C		
Storage temperature	10...55 °C		
Type			
Local (meter mounted)	✓	✓	✓
Remote (wall mounting)		✓	✓

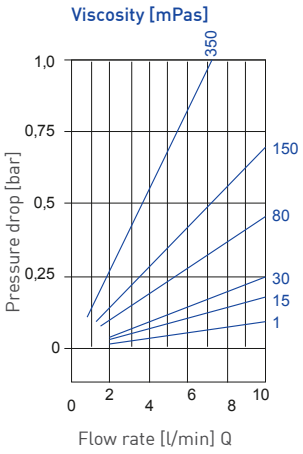
Typical pressure drop V0015



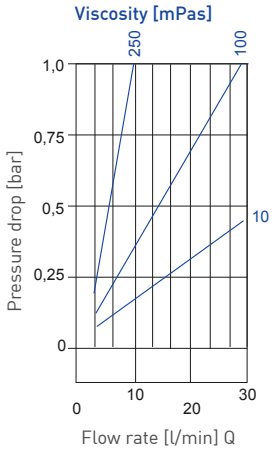
Typical pressure drop V006



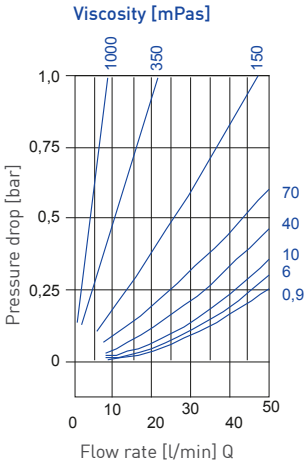
Typical pressure drop V01



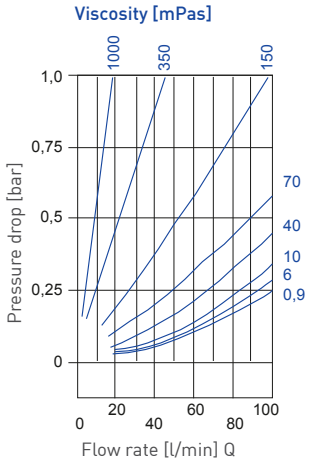
Typical pressure drop V02



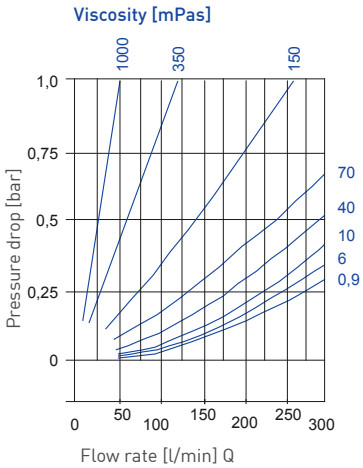
Typical pressure drop V05



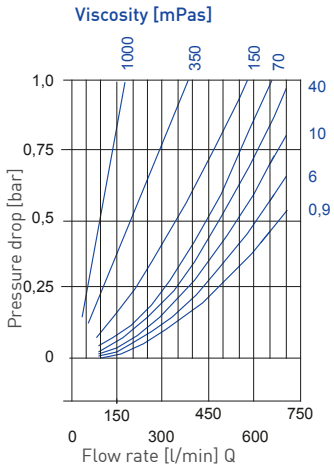
Typical pressure drop V010



Typical pressure drop V050

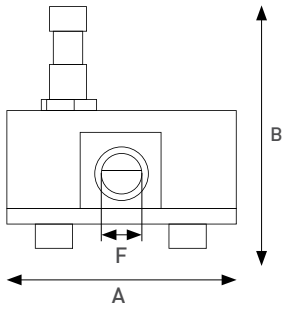


Typical pressure drop V0115

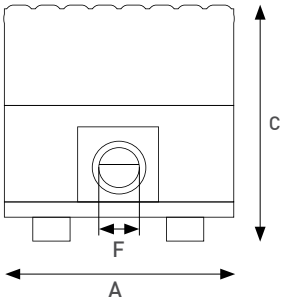


Process connection threaded

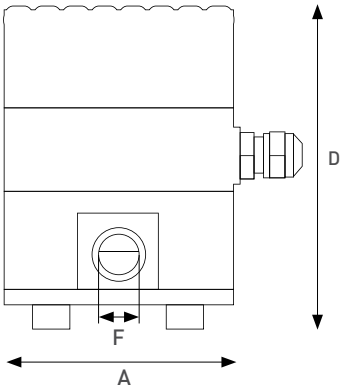
No display



Display 1



Display 2
Display 3

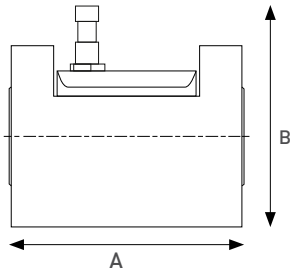


Size	V0015	V006	V01	V02	V05	V010	V050	V0115
A [mm]	78	78	78	99	112	112	220	260
C [mm]	70	75	85	93	98	125	187	245
B_{max}*, D [mm]	96	101	111	120	125	152	213	271
Installation [mm]	73	73	73	90	102	102	184	196
F / Process connection	G¼	G½	G½	G¾	G 1	G 1	G 2	G 2

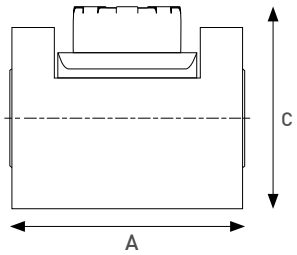
* Depends on sensor

Process connection flanged

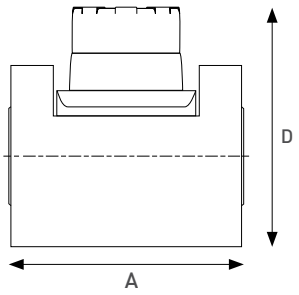
No display

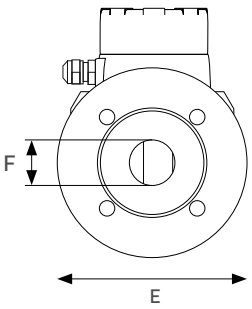


Display 1



Display 2
Display 3



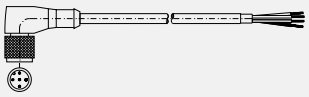


Size	VO 2	VO 10	VO 50	VO 115
A / Installation [mm]	140	170	184	196
C [mm]	108	153	165	243
B_{max}*, D [mm]	135	180	192	270
E [mm]	95	130	220	260
F / Process connection	DN 15	DN 25	DN 50	DN 50

* Depends on sensor

Order code	Example → VO	01	VA	P	N	I1K
Type						
Oval gear meters, series VO	VO					
Size	**Process connection**					
015	G¼ female	01				I1K
06	G½ female	06				I3K
1	G½ female	1A				I3K
2	G¾ female	2A				I4K
5	G 1 female	5A				I5K
10	G 1 female	10				I5K
50	G 2 female	50	[VA]*			I8K
115	G 2 female	11	[VA]*			I8K
2	DN 15 flange according to DIN EN 1092-1	2A				F3K
10	DN 25 flange according to DIN EN 1092-1	10				F5K
50	DN 50 flange according to DIN EN 1092-1	50	[VA]*			F8K
115	DN 50 flange according to DIN EN 1092-1	11	[VA]*			F8K
Materials						
Body	**Oval gears**					
Stainless steel	Stainless steel		VA			
Stainless steel	PEEK		VP			
Aluminium	PEEK		AP			
O-rings						
FKM (standard)				V		
EPDM				E		
FEP				P		
Sensor pulse output without display						
NPN					N	
PNP					P	
PNP (high temperature)					H	
Sensor with display						
Display 1						
Battery powered, local display					D	
Display 2						
Battery powered, local display and pulse output					C	
Battery powered, remote display and pulse output					B	
Display 3						
Local Display, pulse and analogue output (4...20 mA)					T	
Remote display, pulse and analogue output (4...20 mA)					A	

* Preset

Accessories	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type molded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4 pin cable socket M12x1 angle type, unassembled		VT1331	
3.6 V lithium battery for Display 1 and Display 2		VO1036