



VZ-01

Oil Counter for Light to Heavy Fuel Oil



Features

- / Mounting on pressure or suction side
- / Space-saving and flexible mounting
- / Temperature-independent
- / Viscosity-independent

Description:

The VZ-01 series of volume counters are rotary piston meters that function without auxiliary electrical power. A hollow slitted cylinder is situated in a cylindrical housing. Due to the guide slot, the cylinder makes oscillating movements as soon as the measuring chamber is flooded with the medium. The piston movement is transmitted magnetically to a totalizing roller counter which totalizes the volume of flow over a certain period. If necessary, the counter can be equipped with a remote value emitter designed as a reed or inductive contact which will transmit an electrical impulse for each defined volume.

Application:

Rotary piston meters are used wherever flow of oil or liquid fuel needs to be tapped in a simple but highly accurate method without depending on auxiliary electrical power. Some of the typical examples are in its deployment in the bunker piping in ships or as measurement of consumption in the forerun and return in diesel engines. Using the VZ-01 even simple dosing processes can be controlled where even hostile media can be measured by using special type of materials (Teflon or stainless steel pistons, stainless steel chamber). A major advantage of the volume counters is that the outcome of measurement does not depend on temperature and viscosity. This represents a plus point in some applications as against float devices or measuring turbines.



Technical Specifications:

Counter /	roller counter in litres
Process connection /	flange- or thread connection
Flow range /	0.5 up to 30000 l/h
Permissible media /	heating fuel (extra-light, light, medium and heavy), Naphta, Bunker C, gasoil and other lubricating media
Options /	display in US-gallons (1 gallon corresponds to 3.785 litres) outpaired units for differential measurement of fuel consumption approvals as per GL, LR and DNV

Electrical Specifications:

Switching element /	RE, RV = Reed-tubes with protective gas contact IN = inductive slit initiator as per IEC 60947-5-6
Switching voltage /	RE, RV = max. 48 V DC/AC protection class III (SELV) IN = 5 to 15 VDC
Switching current /	RE, RV = max. 50 mA ($R_i = 47 \Omega / 0.5 \text{ W}$) IN = > 3 mA bei 8 VDC / 1 k Ω
Standby current /	RE, RV = open contact IN = < 1 mA at 8 VDC / 1 k Ω
Switching load /	RE, RV = max. 2 W
Switching time /	RE = 40% to 60% (impulse value 1.0 and 0.1 l/Imp.) 30 to 70% (impulse value 0.00125 and 0.00311 l/Imp.) RV = 50% \pm 10% IN = 50% \pm 10%
Ambient temperature /	RE = -10°C to +60°C RV = -10°C to +70°C IN = -10°C to +70°C
Protection class /	RE = IP50 (IEC 60529) RV = IP65 (IEC 60529) IN = IP65 (IEC 60529)
Electrical connection /	RE = on plug connector with cable \varnothing 3.5 mm to \varnothing 5 mm RV = fixed cable 3 m length (2 x 0.14 mm ²) IN = plug for cable (2 x 0.35 mm ²)

Electrical Specifications of display with two selectable pulse- and analogue outputs FA:

Display /	8-character LCD with identification of the parameter, height of numbers 8 mm, flow rate (meter load) using bar indicator
Display values /	total volume, resettable volume, flow rate
Ambient temperature /	-25°C . . +70°C
Power supply /	24 VDC (6 . . 30 VDC)
Data preservation /	by non-volatile memory (EEPROM)
Protection class /	IP66 (IEC 60529)
Output versions /	Version 1: 1 potential free digital output (Rel. 1), adjustable and 1 passive analogue output 4 . . 20 mA Version 2: 2 potential free digital outputs (Rel.1 + Rel. 2) each adjustable
Analogue output /	
Power supply:	6 . . 30 VDC
Load RL:	max. (U-5) V / 0.0215 A [Ω]
Resolution:	16 Bit
Error:	max. \pm 0.2 mA
Update interval:	< 1 s
Digital output /	
Update intervall:	< 1 s
max. Voltage:	48 V DC/AC
max. Current:	50 mA
ON - resistance:	\leq 100 Ω
OFF - resistance:	\geq 10 M Ω
Insulation voltage:	> 100 V DC/AC
max. Output frequency:	200 Hz



Versions:

VZ-01 Oil Counter

max. Temperature: In case of oil counters belonging to the sizes 04M, 04 and 08 the media temperature must not exceed 60°C. And in case of sizes 15 to 50 the maximum media temperature is 130°C. Optionally, a high-temperature version up to 180°C is available.

Process connection: The VZ-01 of sizes 04M, 04 and 08 have only thread connections as per the table „Sizes“ (on the following page). The sizes 15 to 40 offer a choice between thread or flange connections.

Nominal pressure: The nominal pressure for thread connections is PN 16 while for flange connections either PN 25 or PN 40 can be selected.

Impulse emitter: See table „Sizes“ on the following page.

The electronic display FA is a top-mounted unit, that provides two selectable outputs, either as one adjustable pulse- and one additional 4 to 20 mA-analogue output or as two adjustable pulse outputs. The displayed values are total volume, resettable volume and flow rate.

Ordering codes:

Order number

VZ-01. 04. 2. 1. 2. 0

VZ-01 Oil Counter

Size /

04M = 04M (only without impulse emitter)
 04 = 04
 08 = 08
 15 = 15
 20 = 20
 25 = 25
 40 = 40
 50 = 50

maximum Temperature in °C /

1 = 60°C only for Sizes 04M, 04 and 08
 2 = 130°C only for Sizes 15 to 50
 3 = 180°C only for Sizes 15 to 50

Process connection /

1 = thread
 2 = flange

Nominal pressure for flanges /

0 = thread connection PN16
 1 = PN 25
 2 = PN 40 (for 180°C only)

Impulse emitter /

0 = none
 1 = RE (only for Sizes: 04, 08 see table)
 2 = RV (only for Sizes: 15..50 see table)
 3 = IN (only for Sizes: 15..50 see table)
 4 = FA-electronic display with 2 selectable pulse- and analogue outputs



Table of sizes:

Typ:	Einh.	VZ-01.04M	VZ-01.04	VZ-01.08	VZ-01.15	VZ-01.20	VZ-01.25	VZ-01.40	VZ-01.50
Diameter	Zoll	0.125	0.125	0.25	0.5	0.75	1	1.5	2
DN		4	4	8	15	20	25	40	50
Thread size		1/8"-f	1/8"-f	1/4"-f	3/4"-m	1"-m	1 1/4"-m	2"-m	-
PN thread	bar	25	25	25	16	16	16	16	-
PN on the flange	bar	-	-	-	25/40	25/40	25/40	25/40	25/40
max. Temperature	°C	60	60	60	130/180	130/180	130/180	130/180	130/180
max. Flow	l/h	40	80	200	600	1500	3000	9000	30000
Continuous flow	l/h	25	50	135	400	1000	2000	6000	20000
min. Flow	l/h	0.5	1	4	20	40	75	225	750
Start-up at approx.	l/h	0.3	0.4	1.6	4	12	30	90	300
Measuring error limit	± 1% of measured value (max. Deviation: VZO 4 Q _{min} 0.5: 0.5 l/h . . 2 l/h = +1 % / -2 % VZO 4: 1 l/h . . 2 l/h = +1 % / -2 %)								
Repeatability	± 0,2%								
Least readable volume	l	0.001	0.001	0.01	0.01	0.1	0.1	0.1	1
Registering ability	m ³	100	100	1000	1000	10.000	10.000	10.000	100.000
Registering duration	h	4000	2000	7400	2500	10.000	5000	1667	5000
Mesh width for safety filter	mm	0.125	0.125	0.15	0.4	0.4	0.4	0.8	0.8
Mesh width for strainer ¹	mm	0.08	0.08	0.1	0.25	0.4	0.4	0.6	0.6
Measuring chamber volume	ccm	5	5	12.5	12	36	100	330	1200
Housing surface		-	-	-	red, Ral 3013	red, Ral 3013	red, Ral 3013	red, Ral 3013	red, Ral 3013
Weight without joints	kg	0.65	0.65	0.75	-	-	-	-	-
Weight with thread	kg	-	-	-	2.2	2.5	4.2	17.3	-
Weight with flange PN 25	kg	-	-	-	3.8	4.5	7.5	20.3	41
Weight with flange PN 40	kg	-	-	-	4.4	5.5	7.8	20.5	42
Impulse emitter REED									
RE 1	l/Imp	-	-	1	-	-	-	-	-
RE 0.1	l/Imp	-	0.1	-	-	-	-	-	-
RE 0.01	l/Imp	-	-	-	-	-	-	-	-
RE 0.00125	l/Imp	-	0.00125	-	-	-	-	-	-
RE 0.00311	l/Imp	-	-	0.00311	-	-	-	-	-
IN inductive DIN 19234	l/Imp	-	-	-	0.01	0.01	0.1	0.1	1
RV RE	l/Imp	-	-	-	0.1	1	1	1	10
RV RE	l/Imp	-	-	-	1	-	-	10	100
Imp.frq. RE 0,00125 Q _{max}	Hz	-	17.777	-	-	-	-	-	-
Q _{min}	Hz	-	0.222	-	-	-	-	-	-
Imp.frq. RE 0,00311 Q _{max}	Hz	-	-	17.864	-	-	-	-	-
Q _{min}	Hz	-	-	0.357	-	-	-	-	-

¹ Recommended mesh width for optional strainer



Table of Dimensions:

Size	Length	Width (incl. Imp.)	Height	Connections	Height at 130 °C w/o emitter	Height at 130 °C with RV	Height at 130 °C with IN	Height at 180 °C w/o emitter	Height at 180 °C with RV	Height at 180 °C with IN
VZ-01.04M	68	68	79	bottom						
VZ-01.04	68	68 (89)	79	bottom						
VZ-01.08	68	68 (89)	79	bottom						
VZ-01.15	165	105		sideways	106	130	185	147	171	225
VZ-01.20	165	105		sideways	115	139	194	156	180	234
VZ-01.25	190	130		sideways	142	166	221	183	207	261
VZ-01.40	300	210		sideways	235	259	273	235	259	313
VZ-01.50	350	280		sideways	291	315	329	291	315	369

Materials Oil Counter:

Part	Material	PN 4	PN 8	PN 15	PN 20	PN 25	PN 40	PN 50
Housing / Measuring unit	brass	x	x					
Housing with threaded ends	cast brass			x	x	x		
	spheroidal graphite iron GJS 40							x
Housing with flanges	spheroidal graphite iron GJS 40			x	x	x	x	x
Measuring chamber								
- PN 16 / 25	cast brass			x	x	x	x	
	alu-bronze							x
- PN 40	stainless steel			x	x	x	x	x
Seals	NBR butadiene-acrylnitril	x						
	FPM fluorelastomer	o	x	x	x	x	x	x
Rotary piston	aluminium anodized	x	x	x	x	x	x	x
Ancillaries	plastic			x	x	x	x	x
Cover of meter	plastic	x	x					

x = possible configuration o = on request



Pressure drop- / Viscosity-curves:

Kinematic viscosity /

Stokes, Centi-Stokes, mm²/s

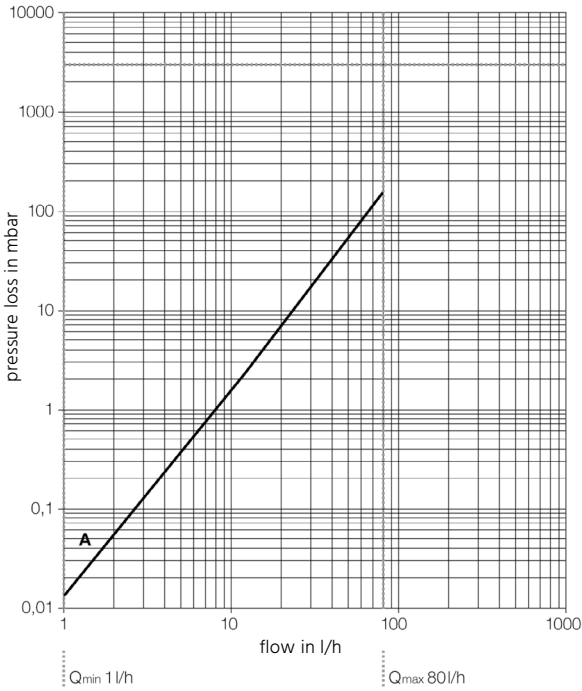
St, cSt, mm²/s

Dynamic viscosity /

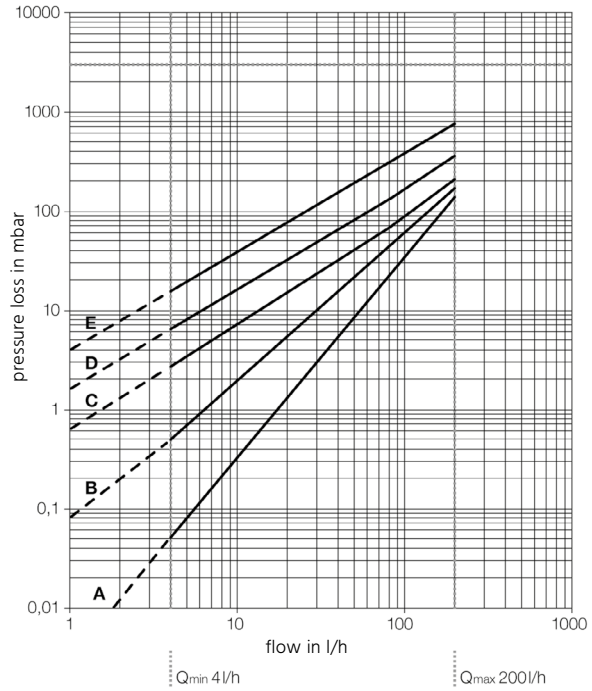
Pascal seconds, milli-pascal seconds
Poise, Centipoise (obsolete)

Pas, mPa.s
P, cP

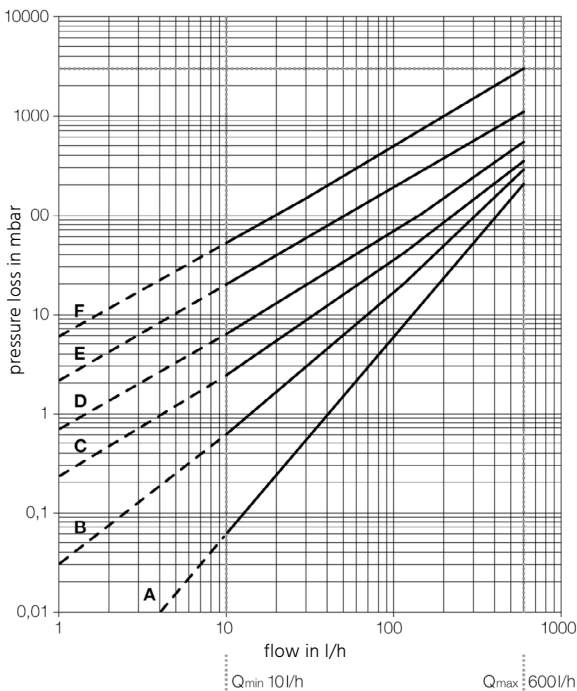
VZ-01.04



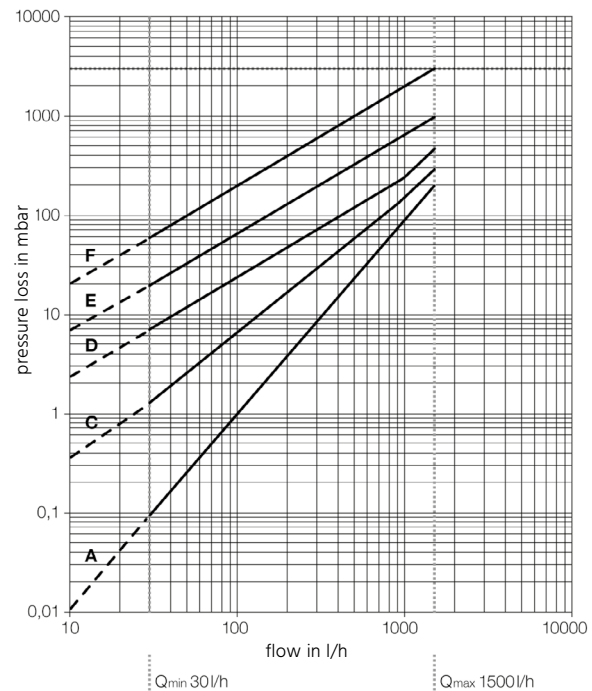
VZ-01.08



VZ-01.15

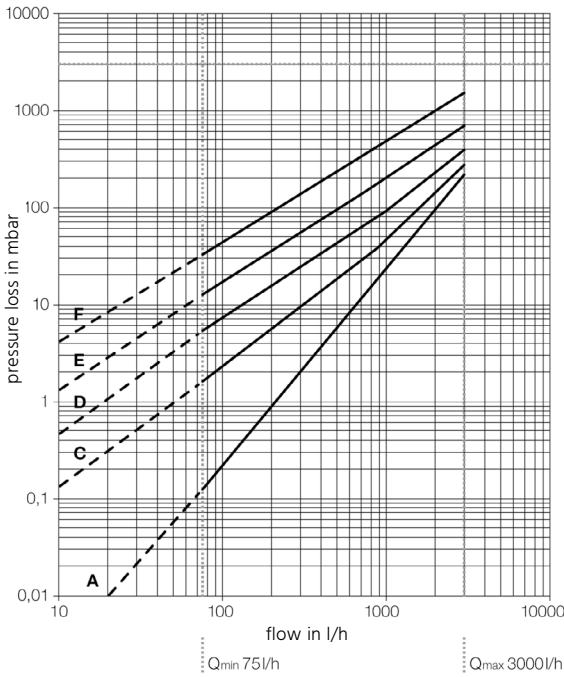


VZ-01.20

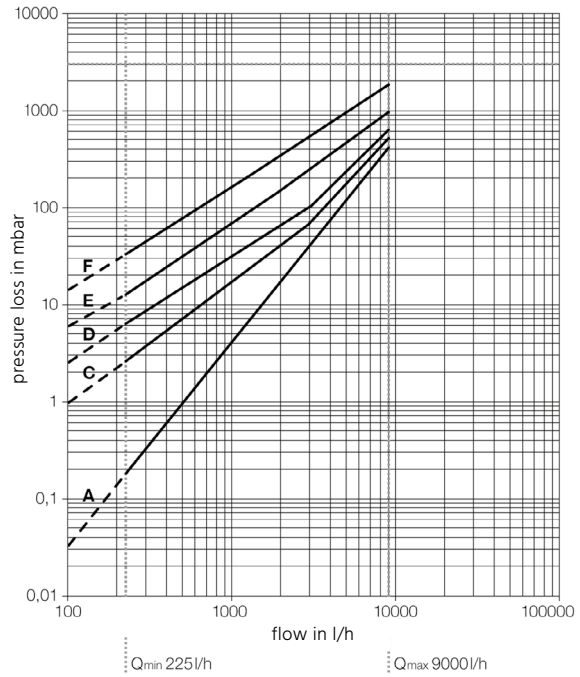




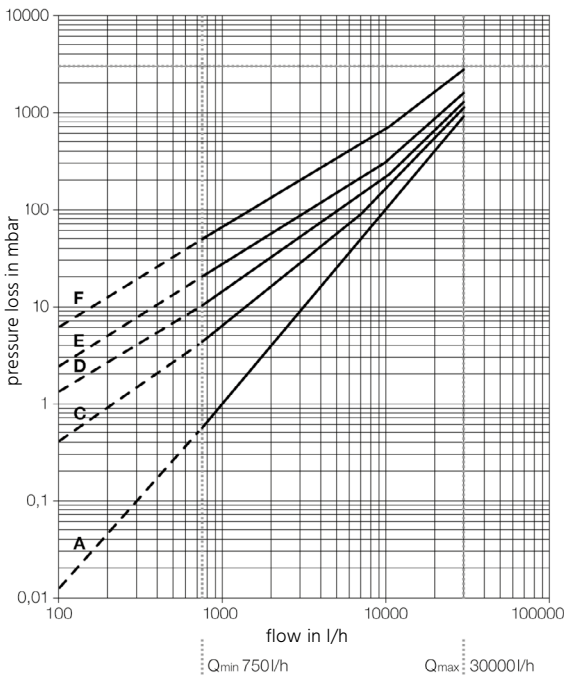
VZ-01.25



VZ-01.40



VZ-01.50



Conversion /

cSt x density = mPa.s

Englergrade °E in mPa.s:

based on comparison table only

Saybold units in mPa.s:

based on comparison table only

Redwood units in mPa.s:

based on comparison table only

Rule of thumb /

1 cSt -> 1 mm²/s -> 1 mPa.s

Viscositylines for VZ-01.04 and VZ-01.08

A = 5 mPa.s B = 50 mPa.s

C = 100 mPa.s D = 200 mPa.s

E = 500 mPa.s

Viscositylines for VZ-01.15 to VZ-01.50

A = 5 mPa.s B = 25 mPa.s

C = 50 mPa.s D = 100 mPa.s

E = 200 mPa.s F = 500 mPa.s

If the pressure drop is above 1 bar, we recommend using the next greater nominal diameter for the counter. Maximum permissible pressure drop = 3 bar.

