Flow - spindle (screw)

Characteristics

System	Volumetric metering system for self-lubricating fluids (oils, ..), excellent viscosity independence.
Evaluation	Display Switching Measuring Counting
Nominal width	DN 25 - 65
Range	1.5..2500 l/min
Pressure resistance	Max. 350 bar
Medium temp.	-25..+150 °C
Materials	Al anodised, steel

Applications

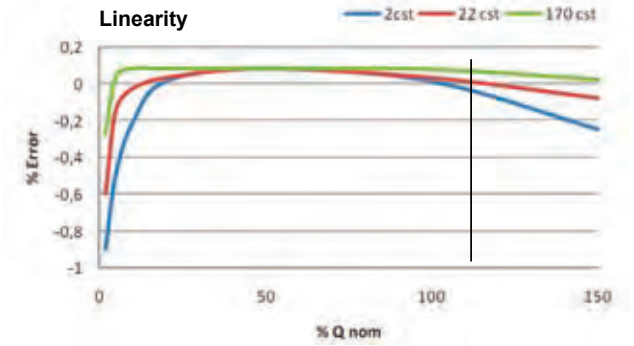
- **Lubrication applications**
- **Filling applications**
- **Hydraulics**
- **Position monitoring (via hydraulics)**
- **Consumption metering**
- **Dry-run protection**

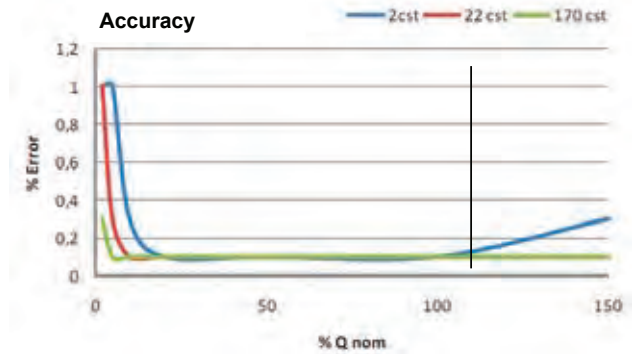
Function and benefits

The fluid fills the defined space between the screws and the wall, and is transported onwards by its own energy of flow. Here, a magnetically pre-tensioned Hall sensor detects a pulse according to the intermediate screw volumes transported. The volume is proportional to the detected frequency.

- Ranges from 1.5..2500 l/min (G 1..G 2 $^{1}/_{2}$)
- Largely independent of viscosity because of volumetric measuring process (fluid, oils, paints, pastes having a self-lubricating character).
- Accuracy better than 1 % (max. 0.25 %) of the measured value (better at higher viscosities)
- Lower ΔP than gear-wheel measurement - Therefore better for larger nominal widths
- Operation independent of location (direction of flow to right or left).
- Intrinsically safe behaviour (operational failure creates error message)
- No magnets in the flow area (detection by external pre-tensioned Hall sensor)
- Operating pressure (up to 350 bar), and temperature range (up to 150 °C)
- Frequency output in a wide range linear (metering range 1:50)
- Analog transducer possible by means of bolt-on electronics or via external converter (then also available with display and switching points)
- LABO, FLEX, OMNI compatible

With oils, for example, different viscosities arise as operating temperatures vary. Here, in addition to the Coriolis principle, the volumetric principle offers the best measurement results. The diagram shows good independence from viscosity. The higherthe viscosity, the smaller the leakage error.

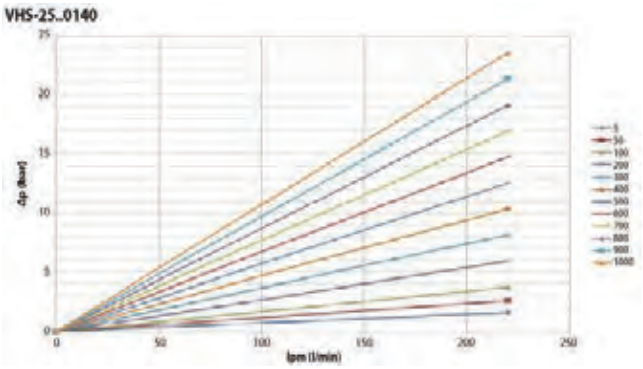


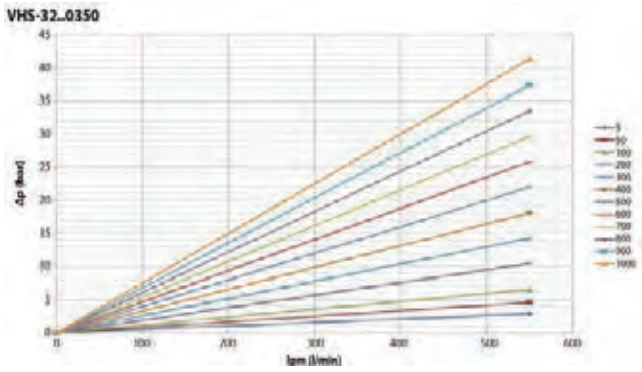


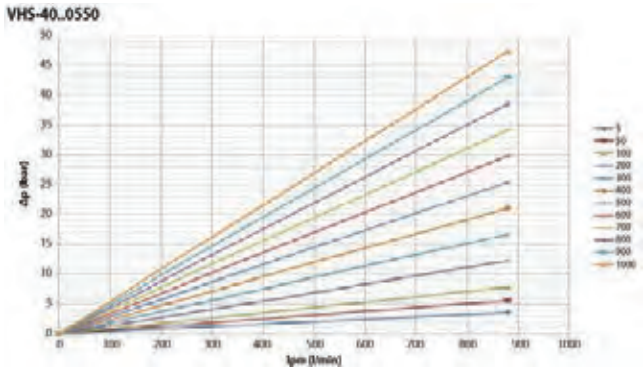
Diagrams

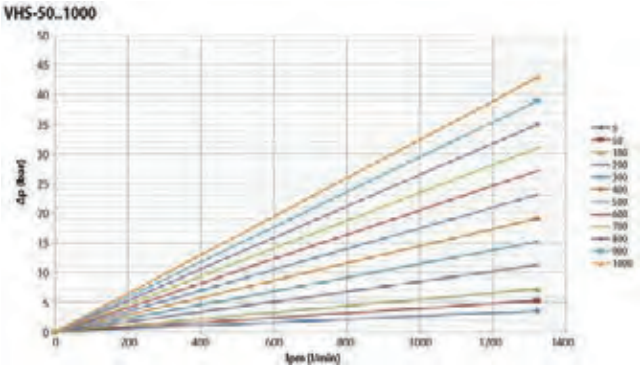
Pressure loss / Viscosity / Flow rate
The pressure loss results from the flow rate and the viscosity of the fluid being measured. Larger viscosities create larger pressure losses.

Higher viscosities than those listed here are easily possible, but require a higher pump capacity.

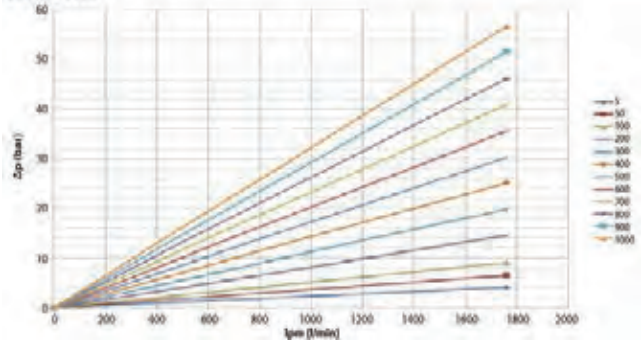




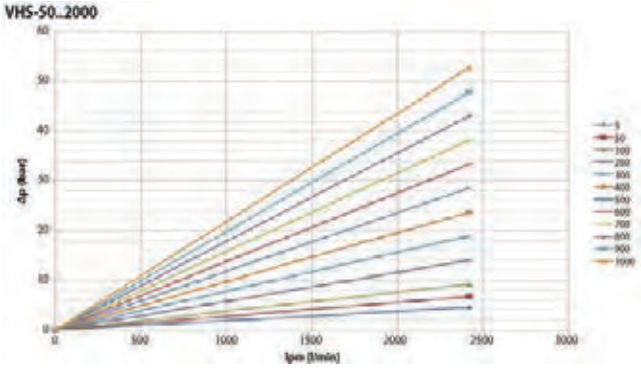




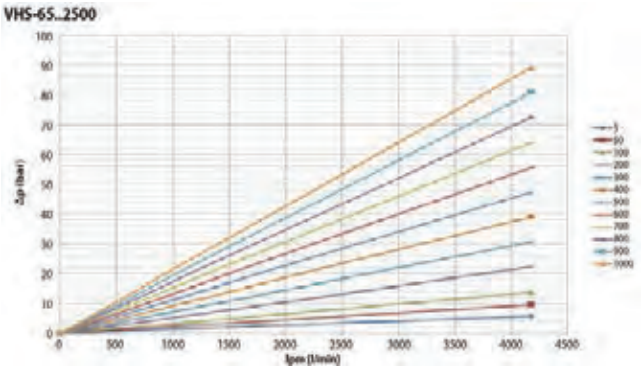
VHS-50..1500



VHS-50..2000



VHS-65..2500

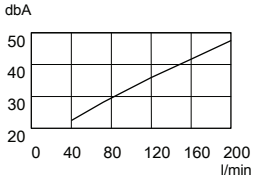


Test viscosities were 2 / 22 / 170 mm²/s

If the flow rate ranges are restricted to 20..80 % FS, the transmitters function to tighter tolerances. If the viscosity is > 170 mm²/s is, the accuracy is also improved.

Noise level and flow rate

One of the main development aims was to build a quiet screw volumeter. The noise level remains permanently < 50 dB (A). The test viscosity was 2 mm²/s. If the viscosity is greater, the noise level is lower.



Sample curve

Combinations

Because the sensors are always installed at the same installation depth and the screw volumeters are very uniform, it is possible to exchange the sensor electronics from one to another at will. That makes it easy to change the electronics if desired.

Comments

Filters of 30 µm mesh size should be used.
If there is a possibility of ferritic abrasion, magnetic filters should be installed in the line upstream of the transmitter.

Installation downstream of a rapidly switching valve should be avoided because of the possible pulses in flow rate. Always install measuring equipment on the pressure side.

On the spot programming options

LABO- VHS..-
I / U / F / C / S

Pulse programming on pin 2:
Apply the supply voltage level for 1 second and save the current value as the full scale value (for analog outputs) or as a switching value (for limit switches).

FLEX-VHS

Programming with magnet clip:
Hold the magnet to the marking for 1 second and save the present value as the full scale value (for analog outputs) or as a switching value (for limit switches).

OMNI-VHS

Programming with magnet ring:
With the aid of the display and of the movable ring, numerous parameters can be conveniently set on the spot.

ECI-1

If required, all parameters can be set at any time on all intelligent sensors, using the ECI-1 device configurator.

Device overview

Device		Range	Pressure resistance in bar	Medium temperature	Supply voltage	Display	Output signal		Page
							Switching	Measuring	
VHS		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30 V DC	For M12x1 Signal LED	-	Pulse / volume, (push-pull or 2-wire)	**6**
LABO-VHS-S		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30 V DC	Signal LED	1 x Push-Pull	-	**10**
LABO-VHS-I		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30 V DC	Signal LED	-	4..20 mA	**16**
LABO-VHS-U		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	15..30 V DC	Signal LED	-	0..10 V	**16**
LABO-VHS-F		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30 V DC	Signal LED	-	Programmable F / F Transducer 0..2 kHz Push-pull	**16**
LABO-VHS-C		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30 V DC	Signal LED	-	1 pulse per defined quantity Push-Pull	**16**
FLEX-VHS		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	18..30 V DC	Signal LED	1 x Push-Pull	0/4..20 mA or 0..10 V or Frequency 0..2 kHz	**21**
OMNI-VHS		1.5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	18..30 V DC	Graphics LCD illuminated transflective and signal LED	2 x Push-Pull	0/4..20 mA or 0..10 V	**26**
Counter-OPTION-C		**Preset Counter with external reset facility, anti-complementary switching outputs and actual value display.**							**32**
Counter-OPTION-C1		**Instantaneous value display with analog output, pulse output and volume totalizer.**							**35**

ECI-1	All LABO, FLEX, and OMNI parameters can be set or modified using the ECI-1 configurator.	**38**
Options	● LABO transmitter – Temperature up to 150 ° ● OMNI – Tropical model	**39**
Accessories	● SAE Flange ● Type ZV / ZE (Filter) ● KB.... (Round plug connector 4/5-pin) ● OMNI-TA (Panel meter) ● OMNI-remote	**40**

Errors and technical modifications reserved.