

Technical Datasheet



SRZ KL Series

Helical Flow Meters
for high-viscosity, not abrasiv media

Description

The SRZ KL helical flow meter series (KL for ball bearing version) are used mainly in highly viscous, not abrasive as well as lubrication media.

Intended for precise volume flow measurement in various media. These include a variety of oils and fuels, greases and lubricants of all kinds, and also coolants and test fluids. The innovative design is particularly well suited for use in test stands. Different viscosities due to temperature fluctuations only have a minor effect on the measurement accuracy.

Furthermore, the helical flow meter sets itself apart with a broad measuring range and low pressure loss. Thanks to the ball bearings, the reproducible detection of the smallest volume flows is possible even at low viscosity.

Only high-grade steels that even withstand corrosive liquids are used in the production of helical flow meters. Combined with the use of stainless steel precision ball bearings, the SRZ KL guarantees optimum measurement accuracy and a long service life even under the toughest application conditions.

Short response times, very dynamic performance and high measurement accuracy ensure accurate regulation and control of flow rates in demanding applications.

For applications in hazardous areas, we offer intrinsically safe sensors and amplifiers with Ex protection in accordance with ATEX, IECEx, CSA and other standards. Additional certifications such as EAC (TR-CU) are available.

Principle and Design

Two cycloidal helical spindles with geometrically lapped profiles that interlock with high precision lie in a cylindrical housing. This creates enclosed measuring chambers between the spindle profiles and the wall of the housing. These transport the medium being measured.

The medium is forcibly guided and flows through the measuring chamber bores in the axial direction, causing the spindles to rotate. This process is pulsation-free with minimum leakage. A contactless frequency measuring element with a high-speed pulse wheel captures the rotational speed of the spindle pair through the housing wall. The rotational speed of the spindles is exactly proportional to the volume flow over a very wide range. Impulses per unit of volume are available for the analysis.

The calibration factor of the Helical Flow Meter describes the exact pulse rate per unit of volume. In order to determine the individual calibration factor of a flow meter, each of our meters is internally calibrated by us prior to delivery. The operating viscosity specified by the customer is taken into account for calibration. A corresponding calibration certificate is included with every flow meter we supply.

Applications

- Hydraulic and gear oils
- Fats and waxes
- Water/glycol mixtures
- Light to heavy fuel oil
- All sorts of fuels
- Thixotropic liquids

Features

- High measuring accuracy up to $\pm 0.1\%$ ¹⁾
- Exceptional repeatability of $\pm 0.05\%$
- Measuring range up to 1:100
- Short response times
- Pressure-resistant up to 400 bar
- Argely independent of viscosity, perfect for 1 to 106 mm²/s
- Low pressure drop compared with other positive displacement meters
- High resolution
- Pulsation-free measurement, non-sensitive to pulsating flows
- Resistant to corrosion by advanced materials and bearings

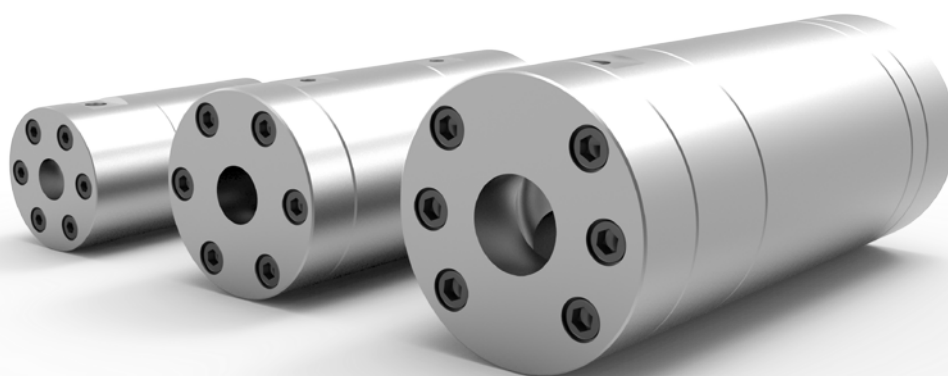
¹⁾ Under laboratory conditions; incl. linearization; viscosity ≥ 30 mm²/s.

Technical Data – Sizes

SRZ Type ²⁾	Measuring Range (l/min)			K-Factor ³⁾ (Impulse/l)	max. Pressure (bar)	Frequency ³⁾ (Hz)			Weight (kg)
SRZ 40	0.4	to	40	3,500	400	20	bis	2,350	6.2
SRZ 100	1	to	100	850	400	14	bis	1,450	15
SRZ 400	4	to	400	214	400	14	bis	1,450	34

Technical Data – General

Measuring Accuracy	Up to $\pm 0.1\%$ ⁴⁾
Repeatability	$\pm 0.05\%$ (under the same conditions)
Linearity	$\pm 0.5\%$ of actual flow (viscosity ≥ 30 mm ² /s) $\pm 0.25\%$ of actual flow (viscosity ≥ 100 mm ² /s)
Materials	Housing: as per DIN 1.4305 (AISI 303), 1.4404 (AISI 316L) Helicals: as per DIN 1.4122, 1.4435 (AISI 316L) Bearing: stainless steel ball bearing Seals: FKM, PTFE, EPDM
Medium Temperature	-4 °F up to +302 °F (-20 °C to +150 °C) (other temperatures on request)
Dimensions	See dimensional drawing (page 4)

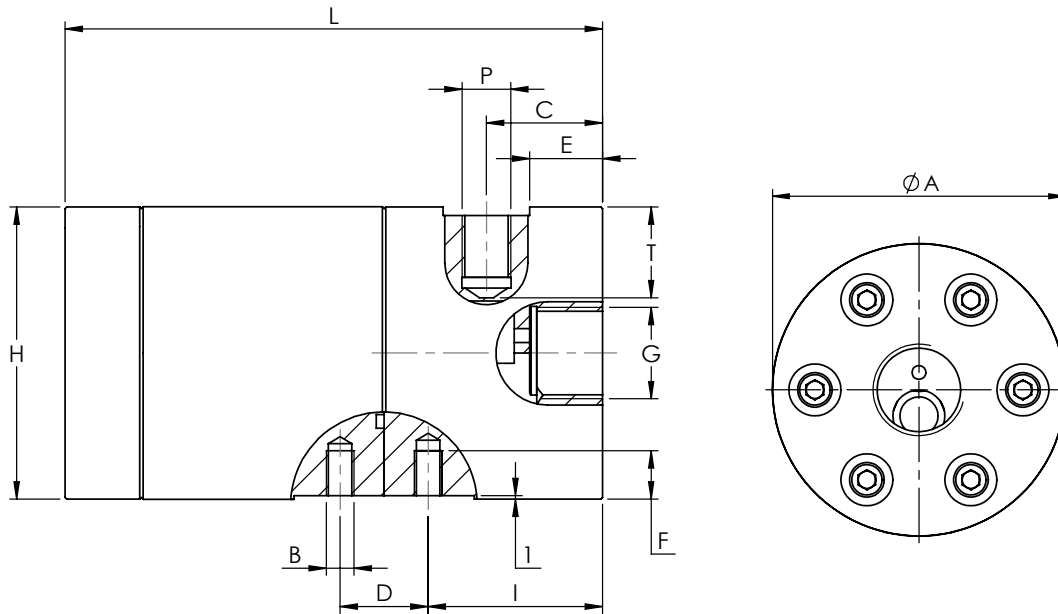


²⁾ Exact type designation on request.

³⁾ Average values for single sensors, dual pickups and higher resolution available.

⁴⁾ Under laboratory conditions; incl. linearization; viscosity ≥ 30 mm²/s.

Dimensional Drawing - SRZ with Single Pickup



SRZ Type	Ø A	B	C	D	E	F	G ⁵⁾	H	I	L	P ⁶⁾	T ⁶⁾
SRZ 40	3.35 in (85 mm)	M8	1.32 in (33.5 mm)	0.98 in (25 mm)	0.75 in (19 mm)	0.51 in (13 mm)	G 3/4" M22x1.5 3/4" NPT	3.19 in (81 mm)	2.00 in (50 mm)	6.10 in (155 mm)	M14x1.5	1.02 in (26 mm)
SRZ 100	4.29 in (109 mm)	M10	2.09 in (53 mm)	1.73 in (44 mm)	0.91 in (23 mm)	0.71 in (18 mm)	G 1" 1" NPT	4.17 in (106 mm)	2.56 in (65 mm)	8.70 in (221 mm)	M14x1.5	1.18 in (30 mm)
SRZ 400	5.28 in (134 mm)	M12	2.36 in (60 mm)	–	1.18 in (30 mm)	–	G 1 1/2"	5.20 in (132 mm)	–	12.52 in (318 mm)	M14x1.5	1.30 in (33 mm)

⁵⁾ Others on request.

⁶⁾ Only applies for single pickup holes of type „E“.

Attention: the total installation height is the result of the height (H) and the height of the electronics (dimensions in separate datasheet).

Calibration

In-house calibration is performed on volumetric calibration rigs or at the wishes of the customer in our DAkkS calibration laboratory.

The KEM calibration lab uses a high-precision load cell system. With an accuracy of 0.05 % for the mass and 0.1 % for the volume of flowing liquids, we occupy a leading position worldwide. The German Accreditation Body (DAkkS) has accredited the laboratory with engineers, processes and measuring equipment in accordance with the international standard DIN EN ISO/IEC 17025:2005.

The KEM calibration certificate not only verifies the accuracy of a flow meter, but also guarantees its traceability to national standards as well as ensuring all requirements according to international quality standards are met.

The calibrations are performed with different hydrocarbons. This ensures the optimum simulation of changing operating conditions in density and viscosity even when temperatures change. This way the primary viscosity for the use of the flow meter can be specifically taken into account when viscosity fluctuations occur in a customised application.

The calibration result is the specified calibration factor (K-factor) in pulses per litre. This K-factor accordingly applies only at a certain flow velocity or a certain flow rate.

The calibration factor varies only very slightly at different volume flow rates. The individual measuring points provide the calibration curve of the flow meter from which the average K-factor is determined. The average calibration factor applies to the entire measuring range.

The linearity error specification (percentage deviation) refers to the average K-factor. To further increase the measurement accuracy in onsite use, the specific K-factors can be used to calculate the flow rate. For this, KEM also supplies optional special electronics.

Calculation of volume flow

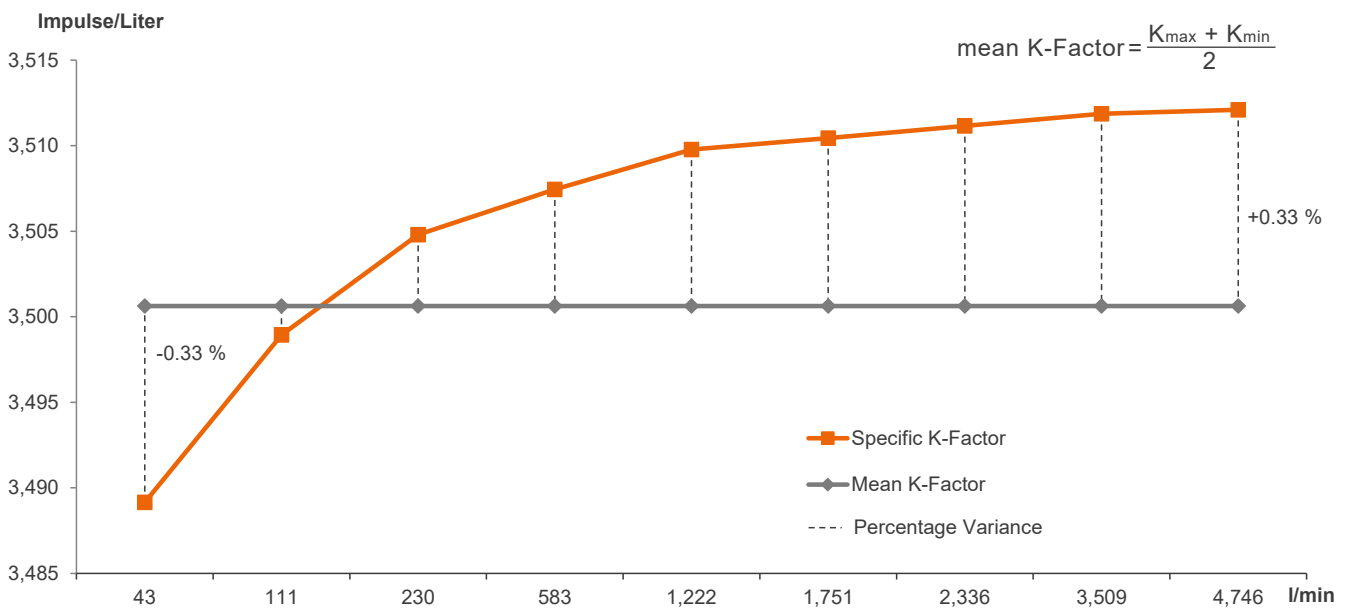
The flow is directly dependent on the measured frequency and the associated calibration factor:

$$Q = \frac{f \cdot 60}{K} \text{ l/min}$$

- Q = Volume Flow
- f = Measuring frequency
- K = Specific K-Factor

Calibration protocol

Example: SRZ 40 KL





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