

Certified according to DIN ISO 9001

Manual



Helical Flow Meter SRZ Series with integrated Pickup

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1 GENERAL INFORMATION

1.1 Features

The SRZ Helical flow meters are positive displacement meters with built-in hall sensors. They provide high resolution and reverse-flow detection.

The SRZ meters are perfect for media with high viscosity (30 mm²/s to 1*10⁶ mm²/s) featuring high accuracy and low pressure drop.

The measurement is pulsation free and insensitive to pulsating flows.

1.2 Safety

1.2.1 General Safety

All statements regarding safety of operation and technical data in this manual will only apply when the unit is operated correctly in accordance with this manual.

The data for Ingress Protection (IP67) will only apply if all electrical connectors are capped properly with the corresponding counterpart with the same or better IP rating. Cable glands must be populated with cables with the specified diameter and closed properly.

During operation all openings of the housing must be closed unless otherwise noted in this manual.

All connections to the load and to the supply must be made with shielded cables unless otherwise noted in this manual. This unit must be grounded.

This unit must be supplied by a safety approved power supply with outputs which comply with Safety Extra Low Voltage (SELV).

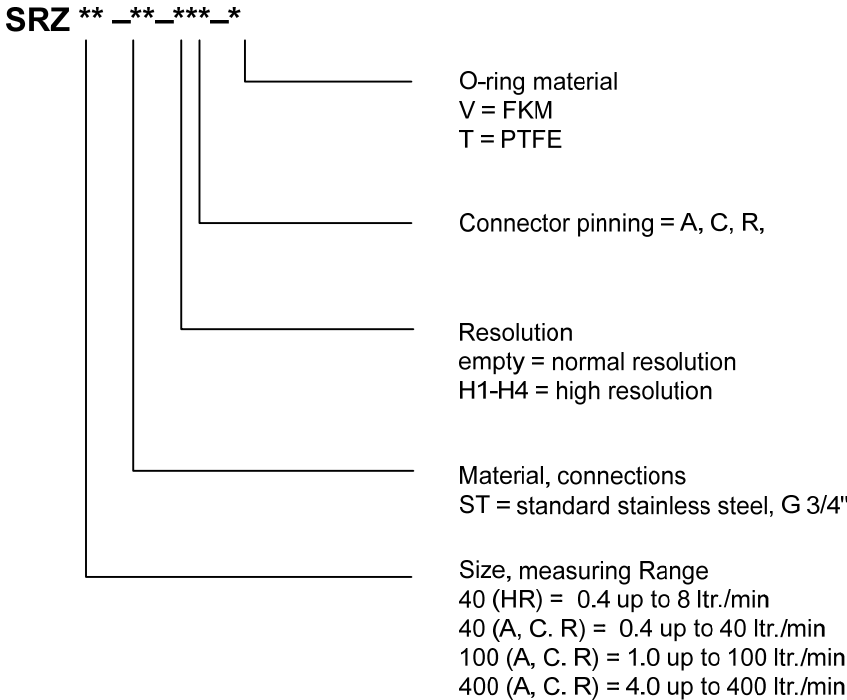
As a protection against fire in the positive supply a fuse with a current rating not higher than the current carrying capacity of the cable used is required.

The user has to adhere to the instructions for installing electrical devices and corresponding instructions.

The devices described in this manual may only be connected and operated by authorized and qualified personnel.

1.3 Ordering Codes and Accessories

1.3.1 Ordering Code



NOTE:

Not every combination is possible.
 For the possible combinations refer to chapter 0 or ask KEM or your nearest dealer.
 For Ex versions contact KEM.

1.3.2 Accessories

Ordering Code	Short description
	Connector M12; 5 pin, male; 713 cable, 5-core, black, 5 m with connector M12
EWS*	Intrinsically safe power supply and separation amplifier

2 GETTING STARTED

2.1 Unpacking

Verify that you have received the following items:

SRZ Helical flow meter
Operational Manual

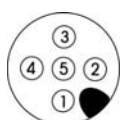
2.2 Operating Elements



1 = electrical Connector
2 = flow input
3 = flow output

2.3 Pin Assignments

Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
SRZ-*A	+ UB	$\frac{1}{2} f_A$	GND	f	$\frac{1}{2} f_B$
SRZ-*C	+ UB	Direction	GND	f	PE
SRZ-*R	+ UB	Direction	GND	f	n. c.
SRZ-*N	+ UB	f_B	GND	f_A	n. c.



+UB = 12 ... 30V DC

For a detailed description of the function of every input and output refer to chapter 3.2.

3 INSTALLATION

NOTE

All installations must be carried out by qualified service personnel.

3.1 Mechanical

Make sure the measuring range of the meter cannot be exceeded by more than 20%.

Purge your pipe system before installing the SRZ. Particles must not enter the SRZ as they could block the screw spindles.

As a precaution the use of the following filters for the measuring medium is recommended:

SRZ 40:	200 micron
SRZ 100	300 micron
SRZ 400	300 micron

3.1.1 Installing the SRZ

Mount the SRZ in a way that the main flow is in direction of the arrow on the SRZ type plate.

NOTE:

The SRZ measures flow in both directions. Ex work only the flow in direction of the arrow is calibrated. Flow in the opposite direction will be measured with reduced accuracy.

Continuous operation in the opposite direction with high flow or pressure might reduce the lifetime of the SRZ.

The SRZ works independent of the mechanical orientation. We recommend however a vertical orientation with upwards going flow for low flow rates and low viscosities.

Connect the SRZ with the corresponding fittings (see chapter 6.4) and use the required sealants.

NOTE:

Never use fibrous sealants such as hemp or PTFE strip for sealing.

3.2 Electrical

Make sure that the flow meter is grounded.

NOTE

The housing of the SRZ* is connected to the shield of the cable. In bigger systems a separate grounding of the meter might be required for avoiding high currents in the cable shield. In that case the shield might be left open or grounded via a capacitance of e. g. 100nF to avoid ground loops.

WARNING:

With the pinning version "C" pin 5 of the electrical connector is connected to PE (protective earth). As the cross section of the internal connection is small compared to any external connections, this pin must not be used as the only PE connection for the unit!

NOTE

Improper grounding and shielding may lead to bad EMC behavior or danger to your health!

Connect the SRZ* via a shielded cable to the control unit. The SRZ is specified for a supply voltage of 15 V or 24 V and will operate at supply voltages from 12 V up to 30 V.

NOTE

Make sure that all cable and wires are connected and fixed properly before applying power to the SRZ*!

3.2.1 Output description

Main Output

The output driver for the main outputs (pin 4 and 2) are asymmetrical push pull output stages with the protective resistors of $R1 = 720 \Omega$ and $R2 = 470 \Omega$ as shown in figure 1.

The high and low output voltages can be calculated as:

$$V_{\text{high}} = V_{\text{supply}} - 720\Omega / I_{\text{load}}$$

$$V_{\text{low}} = 470\Omega / I_{\text{load}}$$

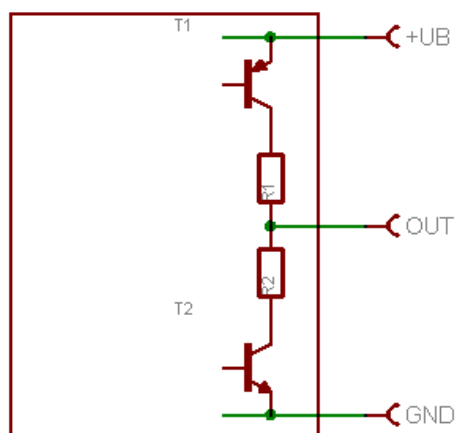


Fig. 1: Main output stage of the SRZ*

NOTE

The main outputs can withstand a short circuit to ground for an infinite period whereas a short circuit to the positive supply for longer than a few seconds might destroy the output stage!

Auxiliary Output

The output driver for the auxiliary outputs (pin 5) is a normal push pull output stage with a protective resistor of 470 Ω .

The high and low output voltages can be calculated as:

$$V_{\text{high}} = V_{\text{supply}} - 470\Omega / I_{\text{load}}$$

$$V_{\text{low}} = 470\Omega / I_{\text{load}}$$

NOTE

The auxiliary output is not short circuit proof. A short circuit to ground or to the positive supply for longer than a few seconds might destroy the output stage!

4 OPERATION

The SRZ* is ready to use and does not require any special settings. After applying the supply voltage the unit immediately provides an output signal proportional to the flow.

4.1 Output signals

Pin 4 provides the main frequency output with the specified resolution.

With the pinning "C" and "R" the output "direction" is low with a flow in direction of the arrow and high with opposite flow.

With the pinning "A" and "N" the frequencies A and B are phase shifted by 90°. With a flow in direction of the arrow A is leading and B is lagging.

4.2 Calculation of flow

The K factor given in the calibration sheet specifies the number of pulses per litre at the main frequency output (pin 4).

The actual flow is calculated as follows:

$$Q = \frac{f \cdot 60}{K}$$

with

Q = flow rate in litres per minute

f = output frequency in Hz

K = K-factor of the SRZ in pulses per litre

5 SERVICE AND MAINTENANCE

5.1 Maintenance

The SRZ* does not require regular maintenance.

For best performance, however, we recommend a recalibration every year if operated 24 hours a day or every 2 years if the unit is running less than 24 hours a day.

When used with aggressive or abrasive media the SRZ* should be checked and recalibrated even more often.

If there is no flow over a longer period, the SRZ* should be emptied and cleaned. This is especially important if curing media like paints are measured.

For recalibration and test, please contact your nearest dealer or directly KEM.

For the addresses see chapter 6.6

5.2 Trouble shooting

In case the SRZ* does not work properly, first check the following items:

No output signal

All cables properly connected?

→ Connect the missing cables

Output frequency too low

All cables properly connected?

→ Reconnect the loose cables

Actual viscosity of the medium too low?

→ Check the viscosity at the actual temperature

Increased leakage due to longer use with abrasive media?

→ Send the SRZ to KEM for recalibration or repair

Output frequency too high or unstable

Most probably EMC problems

Shield and ground properly connected?

→ Connect shield properly. If necessary, try additional means of grounding and shielding

Flow through the SRZ too low

Does the pump provide the necessary pressure for the desired flow?

→ Check and, if necessary, replace the pump

Flow through the SRZ (temporarily) blocked

Solid particles in the medium?

→ Use the specified filter (see chapter 3.1)

SRZ all time blocked?

→ Flush the SRZ backwards

Still blocked?

→ Send the SRZ for repair to KEM

5.3 Service

The SRZ* does not contain any user serviceable parts.

In case of malfunction, please contact your nearest dealer or directly KEM.
For the addresses see chapter 6.5.

6 LISTINGS

6.1 Warranty

KEM warrants material and production for a period of 18 months after installation and start up, max. 24 months from delivery date.

6.2 Declaration of conformity

Category	Standards or description	
EC Declaration of Conformity - EMC	Meets intent of Directive 2004 / 108 / EEC for Electromagnetic Compatibility. Compliance is given to the following specifications as listed in the Official Journal of the European Communities:	
	EN 61326 / 2006	EMC requirements for Class A electrical equipment for measurement, control and laboratory use, including Class A radiated and Conducted Emissions ¹ and Immunity ¹ .
	IEC 61000-4-2 / 2009	Electrostatic Discharge Immunity (Performance criterion B)
	IEC 61000-4-3 / 2008	Radiated RF Electromagnetic Field Immunity (Performance criterion B)
	IEC 61000-4-4 / A1-2009	Electrical Fast Transient / Burst Immunity (Performance criterion B)
	IEC 61000-4-5 / 2007 ²	Power Line Surge Immunity (Performance criterion B)
	IEC 61000-4-6 / 2009	Conducted RF Immunity (Performance criterion B)
	IEC 61000-4-11 / 2005 ²	Voltage Dips and Interruptions Immunity (Performance criterion B)
Australia / New Zealand Declaration of Conformity- EMC	Complies with the Radiocommunications Act and demonstrated per EMC Emission standard ¹	
	AS/NZS 2064	Industrial, Scientific, and Medical Equipment: 1992
FCC EMC Compliance	Emissions comply with the Class A Limits of FCC Code of Federal Regulations 47, Part 15, Subpart B ¹ .	

¹ Compliance demonstrated using high-quality shielded interface cables

² Applies only to units with AC mains supply instead of or additional to the SELV supply

Listings

Category	Standards or description	
EC Declaration of Conformity – Low Voltage	Compliance is given to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 2006/95/EEC	
	EN 61010-1 / 2002	Safety requirements for electrical equipment for measurement control and laboratory use.
U.S. Nationally Recognized Testing Laboratory Listing	UL 61010-1 / 2004	Standard for electrical measuring and test equipment.
Canadian Certification	CAN/CSA C22.2 no. 61010-1-4 / 2008	Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	IEC61010-1 / 2002	Safety requirements for electrical equipment for measurement, control, and laboratory use.
Equipment Type	Test and measuring	
Safety Class	Class 1 (as defined in IEC 61010-1, Annex H) – grounded product	

6.3 Technical Data

6.3.1 General

Type size	Measuring Range ^{1,2} ltr./min	K-Factor ³ pulses/ltr.	Frequency Range ⁴ In HZ
SRZ40-*-A/C/R	0,40 up to 40	7,000	40 up to 4800
SRZ40-*-H1N	0,40 up to 40	33,000	200 up to 22,000
SRZ40-*-H2N/A/C/R	0,40 up to 22	66,000	400 up to 25,000
SRZ40-*-H3N/A/C/R	0,40 up to 11	132,000	800 up to 25,000
SRZ100-*-A/C/R	1,0 up to 100	1700	28 up to 2,900
SRZ100-*-H1N	1,0 up to 100	8,000	120 up to 14,000
SRZ100-*-H2N/A/C/R	1,0 up to 90	16,000	240 up to 25,000
SRZ 400-*-A/C/R	4,0 up to 400	428	14 up to 1,800

Notes:

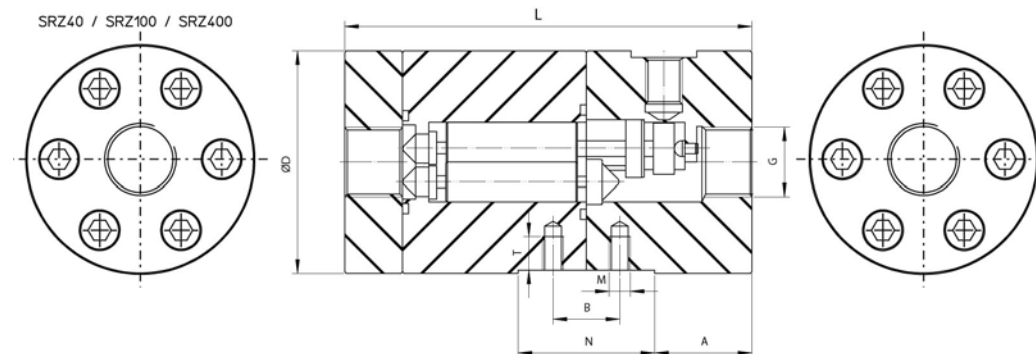
- 1) Reduced lower measuring limit upon request
- 2) With H2 to H4 version upper measuring limit given by maximum output frequency
- 3) Typical values. For exact values refer to the individual calibration sheet
- 4) Typical output frequency for the specified measuring range. Operating range for pickup and output stage is $0.5 \text{ Hz} < f < 25.000 \text{ Hz}$

Measuring media:	fluids free of ferro-magnetic particles (version H1 – H4)
Linearity:	$\pm 0.5\%$ of actual flow at 30 mm ² /s or higher $\pm 0.25\%$ of actual flow at 100 mm ² /s or higher
Repeatability:	$\pm 0.1\%$ at 30 mm ² /s or higher
Operating temperature:	-20 up to +70°C
Materials:	SS 303 or SS316Ti/SS316L
Ingress protection:	IP67

6.3.2 Electrical Data

Nominal supply voltage:	15 VDC and 24 VDC
Supply voltage range:	12 up to 30 VDC
Supply current:	typically < 20 mA at no load
Output type:	Push pull
Max output current:	> 10 mA max. (typically 20 mA)
Output voltage low:	1V @ 1mA 5V @ 10mA
Output voltage high:	22V @ 1mA load and 24 V supply 16V @ 10mA load and 24 V supply
Output short circuit:	to GND: infinite to +UB < 1 s

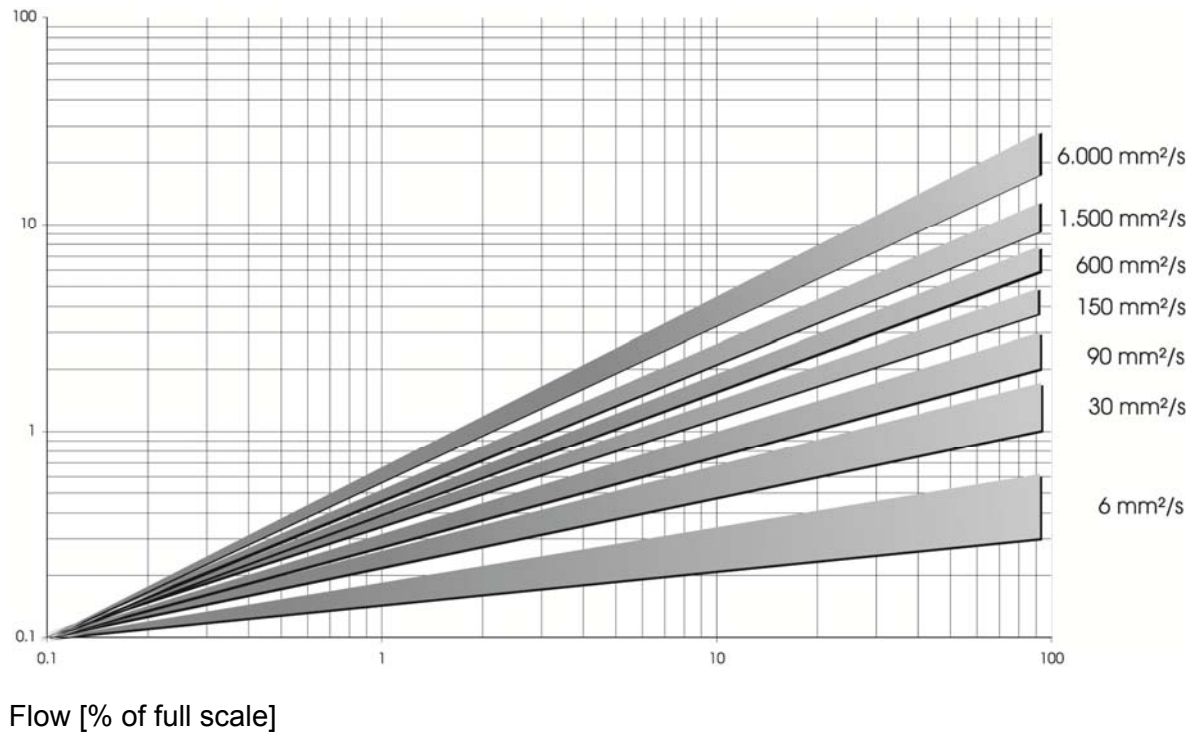
6.3.3 Mechanical Drawings



Type	G	L.	D	PN
SRZ 40 HR	1/3"	155 mm	85 mm	400 bar
SRZ 100	1"	221 mm	110 mm	400 bar
SRZ 400	1 1/2"	318 mm	134 mm	400 bar

6.3.4 Pressure Drop

Pressure Drop in bar
(typical Values)



SRZ 40	0,4	4,0	40 ltr./min.
SRZ 100	1,0	10,0	100 ltr./min.
SRZ 400	4,0	40,0	400 ltr./min.

Fig. 2 Pressure drop as a function of Flow

6.4 WEEE and RoHs

The unit described herein is not subject to the WEEE directive and the corresponding national laws.

At the end of life forward the unit to a specialised recycling company and do not dispose it of f as domestic waste.

The unit described herein fully complies with the RoHS directive.

6.5 Address

Headquarter

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