Kirchner und Tochter
Durchflussmesstechnik seit 1951

Assembly and operating Instructions

Piston type flow meter
SKM

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Version 3.2

Contents

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1 Foreword

These Installation and Operating Instructions are applicable to devices of series SKM. Please follow all instructions and information given for installation, operation, inspection and maintenance. The Instructions form a component part of the device and should be kept in an appropriate place accessible to the personnel in the vicinity of the location. Where various plant components are operated together, the operating instructions pertaining to the other devices should also be observed.

2 Safety

2.1 Symbol and meaning


Safety notice

This symbol is placed against all directions/information relating to occupational health and safety in these Installation and Operating Instructions and draws attention to danger to life and limb. Such notices should be strictly observed.

2.2 General safety directions and exemption from liability

This document contains basic instructions for the installation, operation, inspection and maintenance of the variable area flow meter. Non-observance of these directions can lead to hazardous situations for man and beast and also to damage to property, for which Kirchner und Tochter disclaims all liability.

The operator is required to rule out potentially hazardous situations through voltage and released media energy.

2.3 Intended use

The series SKM piston-type flow meters are designed for position-independent flow measurement of water, oils and liquids. The flow meters are equipped with a spring-loaded piston that is located in a borosilicate glass cylinder. Together with the spring, the piston with orifice plate hole forms the measuring system. The position of the piston changes according to the flow of medium through the SKM. The position is proportional to the volume flowing through the device. The flow rate can be read directly from the upper edge of the piston against a scale on the glass. The SKM can be installed in horizontal and vertical pipes. The limit values pertaining to the device are given in Section 10 and should not be exceeded. Modifications or other alterations to the flow meter may only be carried out by Kirchner und Tochter. Details of the process product and the operating conditions are marked on the measuring glass.

2.4 Special safety instructions concerning glass devices

For safety reasons, we recommend fitting a protective shield in front of the measuring tube when starting up flow meters fitted with glass measuring tubes. The devices should not be operated where there is a risk of pressure surges (water hammer)!

To avoid glass breakage, all fitting work between measuring glass and heads inside the glass should be carried out by twisting and simultaneously pressing after having wetted the gaskets.

2.5 Information for Operator and operating personnel

Authorized installation, operating, inspection and maintenance personnel should be suitably qualified for the jobs assigned to them and should receive appropriate training and instruction. All persons charged with assembly, mounting, operation, inspection and maintenance duties must have read and understood the operating instructions. Gaskets in contact with the fluid product must be replaced after all maintenance and repair work.

2.6 Regulations and guidelines

In addition to the directions given in these Installation and Operating Instructions, observe the regulations, guidelines and standards, such as DIN EN and for specific applications, the codes of practice issued by DVGW (gas and water) and VdS (underwriters) or the equivalent national codes and applicable national accident prevention regulations.

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2.7 Notice as required by the hazardous materials directive

In accordance with the law concerning handling of waste (critical waste) and the hazardous materials directive (general duty to protect), we would point out that all flow meters returned to Kirchner und Tochter for repair are required to be free from any and all hazardous substances (alkaline solutions, acids, solvents etc.).

Make sure that devices are thoroughly rinsed out to neutralize hazardous substances.

3 Transport and storage

Always use the original packing for transport, handling and storage. Protect the device against rough handling, coarse impact, jolts etc.

4 Installation

4.1 Preparatory work prior to installation

Preparation of installation point

- The flow meter can be installed directly behind constrictions. To increase the repeat accuracy we recommend a steadying stretch of 5 DN upstream and 3 DN downstream of the appliance. (DN = pipe diameter)
- If necessary, support the ends of the pipeline to prevent vibration from being transmitted to the flow meter.
- Clean by blowing out or flushing the pipes leading to the device before connecting up.
- Prepare the installation point with the appropriate pipe thread before starting to fit the flow meter. Make sure sealing faces are correctly spaced apart and in true alignment.
- On no account should the piston flow meter be used to pull the ends of the pipeline together (install free of stressen!).

Preparation of the piston flow meter:

- Take the device out of the transport packaging.
- Before installing, remove all protective caps, transport locks and any foreign bodies found.
- Check that the float can move freely in the piston flow meter.
- Have ready appropriate sealing/jointing materials for screw connections. These are not included with the flow meter.
- Check the direction of flow, which should be from the lower to the upper limit of scale. The mounting position of the SKM (vertical, horizontal) is arbitrary.

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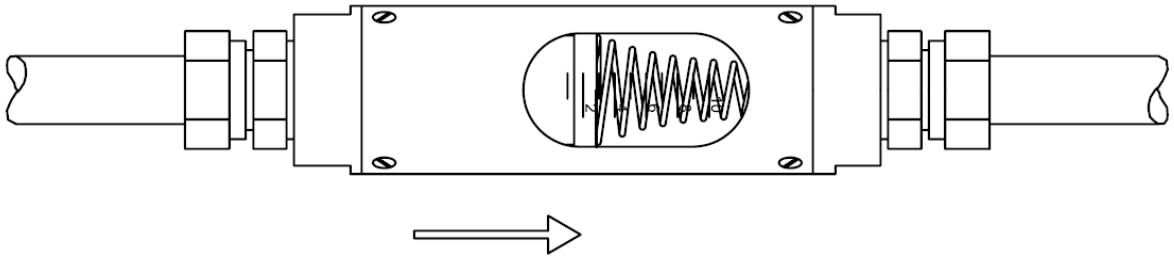
4.2 Installation SKM

The flow meter can be mounted in the installation point after completion of all preparatory work.



Installation: horizontal flow

5 Start-up

The device must be properly installed before it is started up.

1. Check all device connections.
2. To set the flow: pressurize the pipelines by slowly opening the shut-off valves. On liquid service: carefully vent the pipeline.
3. Check the leak-tightness of all components and if necessary, tighten down threaded joints or screw connections.

6 Readings in operation

The flow value is read off from the scale on the glass cone at the top edge of the float.

The measured-value readings are only correct when the operating condition at the measuring point (flowing medium, operating pressure and temperature) corresponds to the values marked on the measuring glass.

7 Limit switch RK

The flow meter can be equipped with limit switches to provide local indication with monitoring function.

The limit switches consist of a limit switch (reed switch) that is switched over by the magnet integrated in the float.

The limit switch is guided in a guide slot in the protective case and can be adjusted over the full measuring range. The reed switches have a bistable characteristic.

Uncontrolled current and voltage peaks can occur in the case of inductive or capacitive loads, e.g. from contactors or solenoid valves. Such peaks will also occur, depending on cable geometry, where cables exceed a certain length.

We therefore recommend using an MSR contact protection relay, which is additionally available. This will increase the contact rating and prevent occurrence of inductive and capacitive peaks, thus ensuring long service life of the contacts.

Electrical data and limit values are specified in section 10.

7.1 Connection of limit switches

Electrical connection of the device must be carried out in conformity with the relevant VDE regulations (or equivalent national standards) and in accordance with the regulations issued by the local power supply utility.

1. Disconnect the plant from supply before connecting the limit switch.
2. Provide a protective circuit for the switches in keeping with their capacity.
3. Connect line-side fuse elements matched to consumption.
4. The connection is made using the supplied 2-core, 1 m long PVC cable. The circuit diagram for the limit switches is shown in the Technical Data (section 10.5).

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7.2 Setting the limit switches

The limit switch is a slot-guided cylinder switch. This is mounted on the back of the flow meter in a slot in the case. The switching point can be changed by sliding the switch along the slot. To do this, detach the M4x6 headless screw on the switch and tighten down after setting the switch position. See drawing in section 10.5.

8 Maintenance

The device is maintenance-free. Should the glass cone become fouled, the device can be removed from the pipeline as follows.

8.1 Cleaning the device

1. Remove the device from the installation point.
2. Unscrew the M6 headless screws Pos. 1.
3. Remove device heads (items 2 and 3) and measuring glass (item 4) from sleeve (item 9). Take care not to damage the now loose measuring piston (item 5).
4. Clean all parts and check for signs of wear. Do not use any aggressive cleaning agents (wire brush, scouring agents, alkaline solutions, acids, etc.). When cleaning the device make sure material is not abraded (avoid using emery paper, scrapers or similar).
5. Fit new O-Rings (item 7,8).
6. Mount the SKM in reverse order. Make sure the spring (item 6) is inserted correctly in the head (item 2).

8.2 Replacement of measuring glass and Piston

To dismantle the device, proceed as described under section 8.1. Remove measuring glass and piston and replace with new ones. After mounting the device in the installation location, take note of the directions for start-up given in section 5.

9 Service

All devices with defects or deficiencies should be sent directly to our repair department. In the service area of the Kirchner und Tochter homepage (www.kt-flow.de) you will find the declaration of decontamination as download and more information about returns.
To avoid risks to our employees and the environment, we can only process devices, for which we get a declaration of decontamination certifying that they are safe due to legal regulations. For questions, please contact our sales department, Tel. +49 2065-96090.

9.1 Disposal

Please help to protect our environment and dispose workpieces in conformity with current regulations resp. continue using them.

10 Technical data

Scale	l/min
Measuring range	1:3
Measuring accuracy	4 % Full scale
Reproducibility	2 % Full scale
Medium temperature[1)]	-20[2)]/0 ... +100 °C,
Ambient temperature	-20[2)]/0 ... +50 °C
Maximum static operational pressure	10 bar

10.1 Materials

Connections	1.4571 or brass nickel plated
Piston	1.4571
Sleeve	1.4301
Glass	borosilicate glass
Splatter protection	perspex
Seals	standard: NBR optionally FKM, EPDM
Connection	female thread acc.to DIN EN ISO 228

other materials on request

10.2 Measuring ranges

measuring range H_2O				Connection G	max. pressure loss [mbar]	Connection G	max. pressure loss [mbar]
1,5	-	4,5	l/min	¼ oder ½	630	¾ oder 1	630
2,5	-	8	l/min	¼ oder ½	695	¾ oder 1	695
5	-	15	l/min	¼ oder ½	800	¾ oder 1	725
10	-	30	l/min	¼ oder ½	1075	¾ oder 1	650
15	-	45	l/min	-	-	¾ oder 1	730
20	-	60	l/min	-	-	¾ oder 1	750
30	-	90	l/min	-	-	¾ oder 1	910

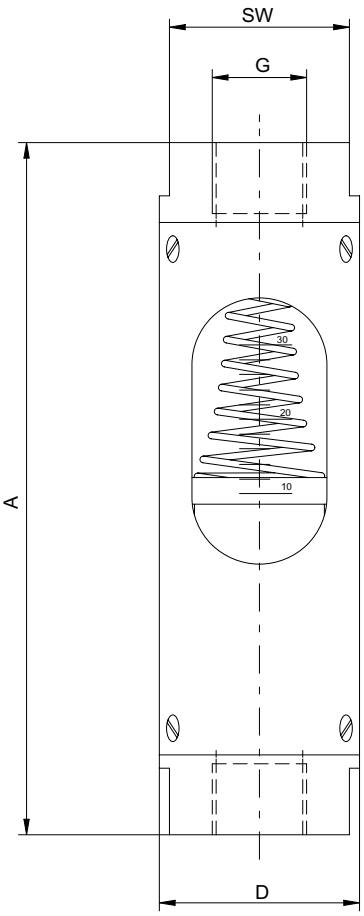
measuring ranges for other substances and operating conditions on request

[1)] at STP: at standard conditions (0 °C and 1013 mbar abs.)

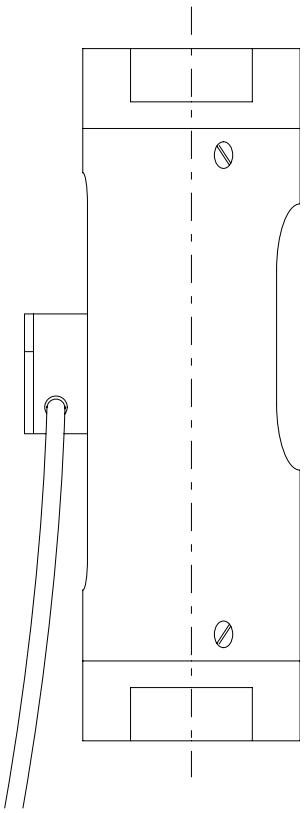
10.3 Dimensions

SKM / SKM-RK1 G	A	SW	D
¼	156	40	48,3
½	156	40	48,3
¾	156	40	48,3
1	156	40	48,3

SKM



SKM-RK1



10.4 Type series

SKM	local Display
SKM-RK1	with limit value switch (NO)

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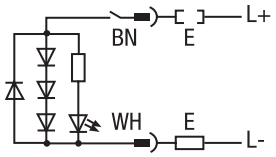
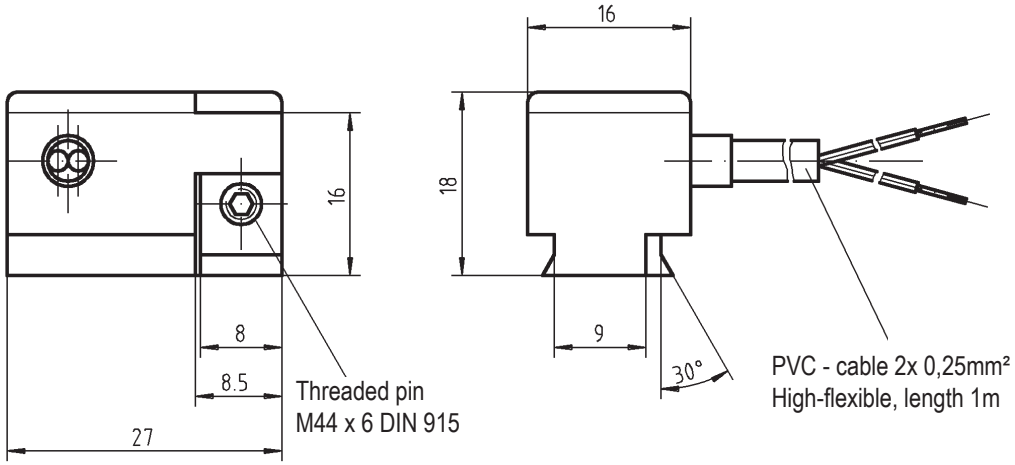
10.5 Technical data of the limit value switches

RK	Design with one limit value switch
Voltage switched	50 V AC/75 V DC
Switching current	max. 0,2 A
Switching capacity	max. 10 W/VA
Dielectric strenght	230 V AC/DC
Switching performance	bistable
Indication of switching condition	LED yellow
Type	Reed switch
Temperature range	-25 ... +75 °C
Degree of protection	IP 67 (IEC 529)
Switching function	NO (normally open)
Connection	



10.6 Low-Voltage Directive

Above 50 V AC/75 V DC, contacts are subject to the EU Low Voltage Directive. The user is required to verify their use accordingly.

Notes

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Notes

The devices from **Kirchner und Tochter** have been tested in compliance with applicable EC/EU CE-regulations of the European Community.

The respective declaration of conformity is available on request. Subject to change without notice. The current valid version of our documents can be found at www.kt-flow.de.

The **Kirchner und Tochter** QM-System is certified in accordance with DIN EN ISO 9001:2015. The quality is systematically adapted to the continuously increasing demands.

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