

**Variable area  
flow meter**



**SKT / SKP / SKPVC**



## **Assembly and operating instructions**

**Variable area flow meter  
SKT / SKP / SKPVC**



**Kirchner und Tochter**



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## 1. General

These assembly and operating instructions apply to variable area flow meter, type SKT, SKP and SKPVC.

All information contained in these operating instructions on assembly, operation, repairs and maintenance has to be observed and adhered to.

The operating instructions form an integral part of the sprinkler measuring orifice; they have to be kept at a suitable location in the vicinity of the place of application and must be accessible for the operators.

In case of interaction of different plant components, the operating instructions of those also have to be observed.

### 1.1. Exclusion of liability

Kirchner und Tochter will not accept any liability for damage or disruptions caused by operating errors, non-observance of this assembly and operating instructions, inexpert execution of assembly and repair work or by the improper use of the variable flow meter.

## 2. Safety

### 2.1. Explanation of pictographs and signs



Pictograph on work safety

This pictograph can be found at all hints on work safety in these assembly and operating instructions pointing out hazards for life and limb of persons.

Further, this pictograph highlights safety hints in these operating instructions that point to regulations, guidelines or operating sequences that must be observed without fail. Non-observance may result in damage to or a destruction of the variable area flow meter and/or other parts of the installation.

### 2.2. Safety information for the owner and the operators

These assembly and operating instructions contain important information to be observed on the assembly, the operation, on repairs and maintenance of the sprinkler measuring orifice. Each person charged with the assembly, the operation, repairs and maintenance must have read and understood these operation instructions.

Non-observance of these assembly and operating instructions, or inexpertly conducted assembly and repair work may result in disruptions of the sprinkler system. As a consequence, man or animal may be at risk or material assets may be damaged.

Hazards by electric energy or released media energy must be prevented.



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### 2.3. Intended use

Series SKT, SKP and SKPVC devices are variable area flow meters for liquids and gases, and are designed for installation in vertical pipe runs. Installation in the pipeline may only be carried out in accordance with these Instructions.

Select the version of the variable area flow meter on the basis of the pipe diameter at the installation location of the device. The limit values for the device are specified in Chapter 10 and must be complied with.

Any modifications or other changes made to the device may be carried out solely by Kirchner und Tochter. Installation in horizontal pipe runs is possible by using appropriately constructed pipe bends.

The direction of flow must always be from bottom to top. Details pertaining to the fluid product and the operating conditions are noted on the measuring glass.



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## 2.4. Safety information for the owner and the operators

The personnel charged with the assembly, the operation, repairs and maintenance must be qualified to fulfill the respective tasks and must have been trained and instructed with regards to the task in question.

## 2.5. Regulations and guidelines

Apart from the information contained in these assembly and operating instructions, the regulations, guidelines and standards such as DIN EN, as well as the DVGW and VdS guidelines in case of branch-oriented applications must be observed; the same is true for the regulations on the prevention of accidents valid in the destination country.

## 2.6. 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 monitors 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, impact, jolts, etc.





## 4. Installation

### 4.1. Preparatory work prior to installation

Preparing the installation location:

1. Check the pipe run at the installation location. VA flow meters are only suitable for vertical installation with the direction of flow being from bottom to top. For all other installation situations appropriate pipe bends need to be fitted in the existing pipeline to ensure vertical flow through the device from below. The region of steady flow should be 4 - 6x DN upstream and downstream of the installation location. Particularly in the case of gaseous media, locate control equipment downstream of the measuring device.
2. If necessary, support the ends of the pipeline to prevent vibration from being transmitted to the flow meter.
3. Clean by blowing out or flushing the pipes leading to the device before connecting up.
4. Prepare the installation point before starting to fit the flow meter. Make sure sealing faces are correctly spaced apart and in true alignment.
5. On no account the VA flow meter should be used to pull the ends of the pipeline together (stress-free installation!). Do not tighten union nuts excessively.

Preparation of the flow meter:

1. Take the device out of the transport packaging.
2. Open the variable flow meter and remove the transportation safety net.
3. Check that the float can move freely in the flow meter.
4. Have ready sealings and sealing material (such as hemp). They do not belong to the scope of delivery.



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## 4.2. Installing

1. Remove the insert and the union nuts from the device.
2. Slide the union nuts over the pipe ends at the installation location.
3. Fit the inserts on to the pipe ends.
4. Slide the device at both ends in the installation location.
5. Screw the union nuts to the measuring cylinder and tighten down so that the device is mounted without stresses in the pipeline.

## 5. Start-up

The flow meter must have been properly installed before it is started up.

1. Test all device connections.
2. To set the flow: pressurize the pipelines by slowly opening the shut-off valves.  
On liquid service: carefully evacuate the pipeline.
3. Check that all components are leak-tight and, if necessary, tighten down threaded joints and 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 cylinder. If operating conditions should differ, the measured value must be corrected with the aid of the general float equation, which you will find in our technical documents.

You can also do the recalculation with the help of our conversion program given on our home page: [www.kt-web.de](http://www.kt-web.de), Section "Physical Basics".





## 7. Limit value contacts

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

The limit value contacts consist of a limit contact (reed switch) that is switched over by the magnet integrated in the float. The limit contact is guided at the measuring cylinder and can be adjusted over the full measuring range. The reed contacts 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 10.1.

### 7.1. Connection of limit value contacts



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 contact.
2. Provide a protective circuit for the contacts in keeping with their capacity.
3. Connect line-side fuse elements matched to consumption.
4. Connect the cable using the supplied right-angle plug. Assigned are terminals 1 and 2. Earth and terminal 3 are not assigned. The circuit diagram for limit contacts is shown in the Technical Data, Section 10.





## **8. Maintenance and cleaning**

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

### **8.1. Dismantling and assembly of the measuring cylinder**

1. Depressurize the pipeline
2. Dismantle the device by first removing the union nuts.
3. Remove the measuring cylinder from the installation location.

Assemble in reverse sequence.

## **9. Service**

All devices with defects or deficiencies should be sent direct to our repair department.

To enable our customer service facility to deal with complaints and repairs as quickly as possible, you are kindly requested to coordinate the return of devices with our sales department, Tel. +49 2065 9 60 90.

### **9.1. Disposal**

For a better environment:

Please help us protect our environment by disposing of the parts used in accordance with the relevant legislation or by recycling same.





## 10. Technical data

Nominal pressure rating	PN 10 at 20 °C
Operating temperatur	Trogamid: 0 to 60 °C Polysulfon: 0 to 100 °C Polyvinyl chloride: 0 to 40 °C
Measuring range	1:10
Accuracy class	4 acc. to VDI/VDE 3513, sheet 2
Special scales	See special table
Connection	gluing sleeve acc. to DIN 8063, optionally thread acc. to DIN 228 T 1 Screw connection with internal thread acc. ISO 7-1
<b>Materials</b>	
Measuring cylinder	SKT Trogamid SKP Polysulfon SKP k Polysulfon SKPVC Polyvinyl chloride
Floats	PVDF red or 1.4571
Float receptacles	PVDF
Fittings and inserts	PVC, optionally PP, PVDF, malleable cast iron Zn, 1.4571
Seals	EPDM, optionally Viton



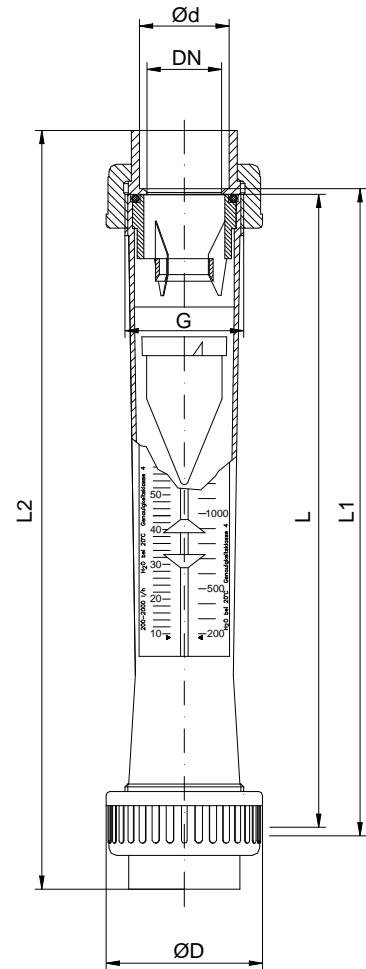


Dimensions SKT/SKP/SKPVC

DN	G	L	L1	L2	Ød	ØD
25	1 1/2	335	341	385	32	60
40	2 1/4	335	341	403	50	83
50	2 3/4	335	341	417	63	103
65	3 1/2	335	341	429	75	122

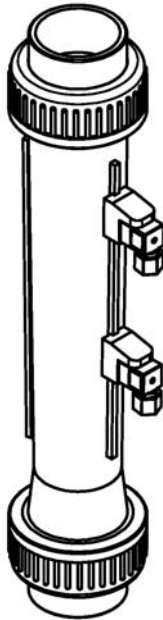
Dimensions SKP-k

DN	G	L	L1	L2	Ød	ØD
25	3/4	165	171	199	16	35
40	1	185	191	223	20	43
50	1 1/2	200	206	250	32	60
65	1	185	191	223	20	43





## 10.1. Limit switches Z 40 und Z 42 for flow meter SKT/SKP/SKPVC



### Application

Limit switches Z 40 and Z42 are designed for the external monitoring of limited flow values on SKT/SKP and SKPVC flow meters. They are slipped on to the guide on the flow meter and can be set to any desired value on the appropriate scale

### Function

A magnet built into the float closes or opens a potted reed contact in the limit switch. The switching function is bistable, which means that the switching status is maintained even when the magnetic float is located a distance away from the contact.

### Switching status:

	Float above switch	Float below switch
Limit switch Z 40 min	open	closed
Limit switch Z42 max	closed	open

### Note:

When retrofitting limit value contacts, be sure to replace the standard float by a magnetic float. The magnetic float is clearly marked with an "M" on the top side.

## 10.2. Directions for assembly

- Slide contact on the dovetail of the flow meter.
- Set the desired value and tighten clamping screw.
- Remove plug connector and wire up.
- Screw on plug connector with seal inserted.



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### 10.3. Technical data Z40 / Z42:

Voltage switched	max. 230V $\tilde{}$
Contact rating	max. 10 W / 12 VA
Current switched	max. 0.5 A
Volume resistance	< 200 m $\Omega$
Insulation resistance	> 10 <sup>11</sup> $\Omega$
Allowable ambient temperature	0 - + 55 °C
Type of protection	Acc. DIN 40050 - IP 65
Make/break hysteresis Z 31	1 - 2 mm float travel

#### **Note!!**

The values for electric strength, contact rating and current switched should not be exceeded on any account, not even for short times, as this could otherwise result in damage to the reed contact.

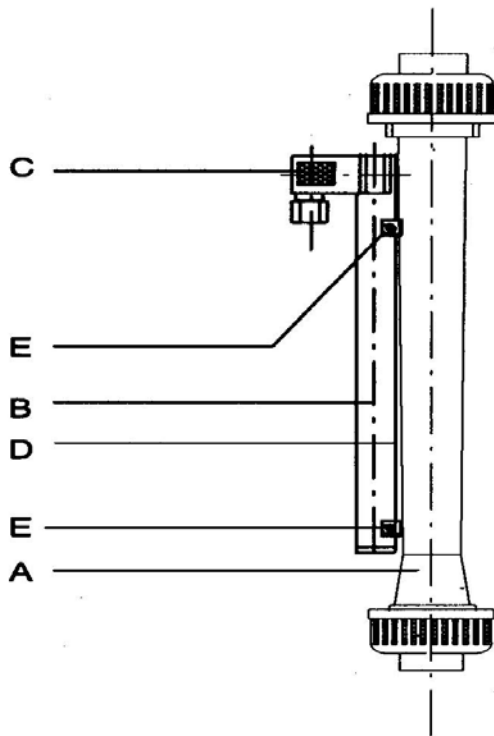
#### **Terminal assignment Z40 / Z 42**

The contacts feature two terminals 1 + 2 and one earthing terminal.  
Voltage is supplied via 1 + 2. Assignment is freely selectable.





#### 10.4. Measuring sensor Z 60 for flow meter SKT/SKP/SKPVC



##### Function elements

- A - Flow meter SKT/SKP/SKPVC with monostable magnetic float
- B - Measuring sensor Z 60
- C - Plug connector
- D - Dovetail guide
- E - Clamping screws for fastening and adjusting the sensor

##### Special features

- Easy to assemble
- Analog output signal 4 - 20 mA
- 24 V DC voltage supply +/- 10%
- Degree of Protection IP 65
- Casing made of PVC-U
- DIN plug connection

##### Function

The Z60 measuring sensor fitted to the SKT/SKP/SKPVC flow meter is a further development of the Z50 sensor. In contrast to the previous model, the Z60 has no reed contacts; instead, it features a special, newly developed electronic device with microprocessor and sensors.

The measuring sensor supplies an analog output signal of 4 – 20 mA that is proportional to the position of the magnetic float. This signal can be further processed in order to control processes, for example by way of a PLC, or to provide exact indications of the flow rate via an external display.

The sensor can also be retrofitted, providing the flowmeter is fitted with a monostable magnetic float (axially magnetized mounting position: south top, north bottom). To obtain best possible reproducibility, programming is always factory-set and adapted to the respective measuring range since the various scales all have a different resolution. Therefore, when ordering, please state the required measuring range.



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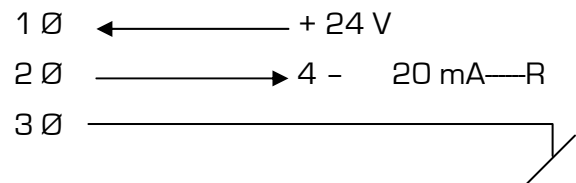


**Directions for assembly**

1. Slide sensor on to the dovetail guide of the flow meter.
2. Adjust marking on sensor to the 50% scale mark on the flow meter.
3. Tighten clamping screws.
4. Remove plug, and wire as specified.

**Electrical Connection**

Pin 1 : Operating voltage 24 V  
 Pin 2 : Output signal 4-20 mA  
 Pin 3 : 0 V



**Technical data**

Operating voltage	24 V ± 10 %
Current consumption	< 50 mA
Load impedance	min. 0 Ohm, max. 500 Ohm
Current output	4-20 mA (3-wire-technique)
Measuring accuracy	< 1%
Degree of protection	IP 65 to DIN 40050
Ambient temperature	0°C - + 50°C
Connection	DIN plug connector DIN 43650

**10.5. Low voltage directive**

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





The equipment from **Kirchner und Tochter** has been tested in compliance with applicable CE-regulations of the European Community.

The respective declaration of conformity is available on request.

Technical data supplied without liability.

The current valid version of our documents can be found under this URL: [www.kt-web.de](http://www.kt-web.de)

The **Kirchner und Tochter** QM-System is certified in accordance with DIN-EN-ISO 9001:2008. The quality is systematically adapted to the continuously increasing demands.



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