



## ***Instruction Manual***

### ***DS52***

#### ***Low Cost Variable Area Flow Switch***



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## **Safety Information**

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### **General Instructions**

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories. Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

### **Proper Usage**

The devices of the DS52 series are used to monitor the continuous flow of liquids or gases. Any other use is considered improper. Unless otherwise stated, the scales of the devices refer to water or air at 1.013 bar abs. and 20 °C.

In particular, applications in which shock loads occur (e.g. clogged operation) should be discussed and checked beforehand with our technical personnel.

The devices of the DS52 series must not be used as the sole means of preventing dangerous conditions on machines and systems.

Machines and systems must be designed in such a way that faulty conditions cannot lead to a dangerous situation for the operating personnel.

### **Dangerous substances**

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

## ***Qualified Personnel***

The DS52 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

## ***Inward Monitoring***

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.

Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

## ***Functional Description***

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The devices of the DS52 series operate according to the principle of the variable area flow meter. A float is moved by the flow of the medium and its integrated magnets generate a magnetic field. The position of the float is determined by the switching contact. The float is returned to its initial position by a spring, so that the device can also be operated in other installation positions (e.g. horizontal).

The devices are calibrated for installation with flow from bottom to top and have their greatest accuracy with vertical installation. Since the weight of the float influences the measurement result, deviations occur in other installation positions.

# ***Installation and Commissioning***

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## ***Process Connection***

### **Attention:**

The following requirements must be met in order to avoid damage to the flow monitor or the system.

- A process connection suitable for the device must be provided by the customer.
- Check connection size and screw-in depth
- Use suitable sealants (liquid sealants damage the flow monitor when they enter)
- Professional sealing

## ***Environmental Conditions***

- The flow monitor must not be used as a load-bearing part in pipe constructions.
- The medium must not carry any solid bodies. Magnetic particles accumulate on the magnetic float and impair its function.
- Check corrosion and antifreeze agents for compatibility before use.

### **Attention:**

The following requirements must be met, otherwise the function of the flow monitor will be impaired or measurement results will be falsified.

- External magnetic fields influence the switching contact. Keep sufficient distance to magnetic fields (e.g. electric motors).
- Pipes, process connections or brackets made of ferromagnetic material influence the magnetic field of the flow monitor. Keep a distance of 100mm to such materials (e.g. steel).
- Changes in cross-section, branches or bends in the pipelines influence the measuring accuracy. In front of the device, a calming section of
- 10 x DN, 5 x DN behind the device. Never reduce the pipe diameter directly in front of the unit!
- In the case of liquid media, take suitable measures to ensure that the device is vented.

# Electrical Connection

## Attention:

Before the electrical connection of the device, it must be ensured that the supply voltage corresponds to the required one and that the supply voltage is switched off.

The switching contacts used in the devices are potential-free and do not require any power supply.

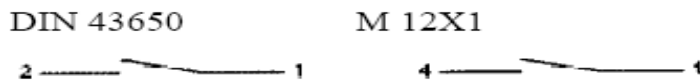
## Attention:

Switching contact and device are matched to each other. After a switching contact has been replaced, it must be readjusted.

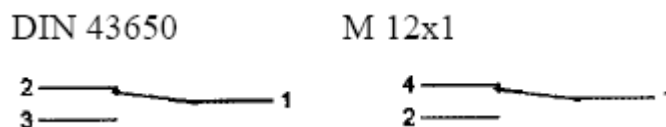
Please ask for the corresponding assembly instructions.

## Condition of the contact with device without flow rate:

### Wiring diagram: N/O

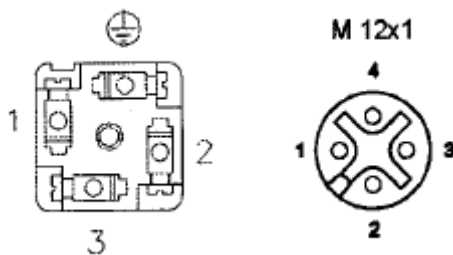


### Wiring diagram: SPDT



## Standard Switching Contact

Connection diagram of the supplied socket (DIN 43650 Form A or C). The earth connection is not used.



## Important note:

Protection class IP65 when using the DIN 43650 plug socket is only guaranteed in conjunction with cable diameters of 6 - 8 mm.

## Switch contact with cable

The wires of the connection cable are numbered according to the above connection diagram.

## ***Special Designs***

On request, switching contacts can be supplied in special designs (plug, pre-assembled cable).

### ***EEx-tested switching contacts***

#### **Attention:**

Special regulations apply to the connection of EEx-tested switching units, which must be strictly observed! Observe the instructions in the separate operating instructions for EEx-tested switching contacts!

### ***Contact Protection Measures***

#### **Attention:**

The following requirements must be met, otherwise the switching contact will be destroyed.

The reed contacts used in the switching contacts are very sensitive to overload due to their design. None of the values such as voltage, current or power may be exceeded even for a short time.

There is a risk of overload due to:

- inductive loads
- capacitive loads
- resistive loads

#### **Inductive Loads:**

This type of load is caused, for example, by:

- contactors, relays
- magnetic valves
- electric motors

## ***Adjustment of the switching point***

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- Loosen the locking screw of the switching contact.
- Move the switching contact until the arrow on the switching contact coincides with the desired switching point.
- Retighten the locking screw of the switch contact.

#### **Important:**

- The set switching point corresponds to the switch-off point of the switching contact with falling flow rate.
- The current state of the switching contact can be determined e.g. with a continuity tester.
- The states of the switching contact refer to the normally open contact (N/O).

## ***Maintenance and Care***

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Due to the small number of moving parts, the devices require very little maintenance. However, regular functional checks and maintenance not only increase the service life and functional reliability of the device, but also that of the entire system.

The maintenance intervals depend on:

- contamination of the medium
- environment conditions (e.g. vibrations)

At least the following points must be checked during maintenance:

- Function of the switching contact
- Tightness of the device
- Mobility of the float

Depending on the application, it is the responsibility of the operator to determine suitable maintenance intervals.

### **Important:**

- The float motion and the switching contact function can be checked by changing the flow rate and monitoring the switching state of the switching contact.
- In most cases, rinsing with a clean medium is sufficient for cleaning. In stubborn cases (e.g. limescale deposits), it can be cleaned with commercially available cleaners, provided these do not attack the materials of the device.

**Attention:** Opening the device voids the warranty claim!

# ***Troubleshooting***

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The switching contact does not switch:

## **The switching contact is always in the idle state**

1. No flow
  - Check whether medium is actually flowing
2. Flow too low or switching contact set too high
  - Set the switching contact to lower flow rate
  - Using a device with a different measuring range
3. Incorrectly reduced (conductor cross-section too small)
  - Reduce according to "Installation and Commissioning"
4. Float jams (dirt)
  - Clean the unit and make the float passable.
5. Switching contact defective
  - Eliminate the cause of the defect (short circuit, overload)
  - Replace the switching contact, see "Electrical connection"

## **The switching contact is permanently switched**

1. Flow too high or switching contact set too low
  - Reduce the flow rate
  - Set the switch contact to a higher flow rate.
2. Float jams (dirt)
  - Clean the unit and make the float passable.
3. Switching contact defective defekt
  - Eliminate the cause of the defect (short circuit, overload)
  - Replace the switching contact, see "Electrical connection"

## **The switching point does not correspond to the actual flow rate**

1. No media-specific scale
  - Request a conversion table or a media specific scale
2. Incorrectly reduced
  - Reduce according to "Installation and Commissioning"
3. Device dirty
  - Clean the unit
4. Device defective
  - Return the instrument for repair / calibration



## Connecting devices equipped with Reed switches

Reed switches are basically designed for small contact ratings. To connect a load with higher power consumption it is indispensable to use a contact protection relay (e.g. our series MSR01)

If you connect directly a load to a Reed contact the following recommendations should be considered. None of the contact rating values printed on the switching unit must not to be exceeded, even momentarily. This is valid for each of the given values individually: voltage, current, power. The Reed contact integrated in the switching unit is very sensible to electrical overload

Danger of overload is given by the following applications:

- inductive load
- capacitive load
- lamp load

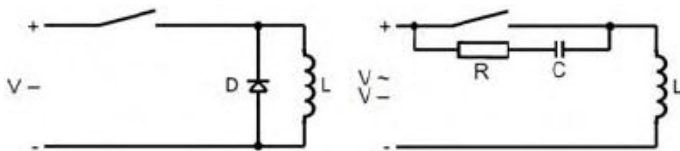
### Inductive Load

Inductive loads consist e.g. of relay, contactors, solenoid valves, motors, electric engines, etc.

**⚠ WARNING:** Voltage spikes at shut down (up to 10 times of nominal voltage)

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Protective measures: (examples)



(Flyback diode, e.g. type 1N4007)

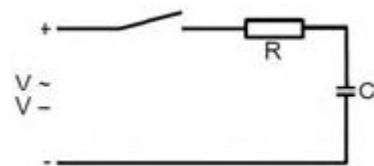
### Capacitive Load

Capacitive loads consist e.g. of long connection cables or capacitive consumers.

**⚠ WARNING:** High current spikes at switching on (this will exceed the nominal current)

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Protective measures: (examples)



Limitation of current by a resistor

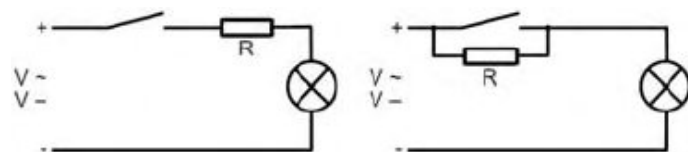
### Lamp Load

Lamp loads consist e.g. by light bulbs, starting motors .

**⚠ WARNING:** High current spikes at switching on, because the glowing spiral has low resistance at low temperature.

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Protective measures: (examples)



Limitation of current by a resistor or preheating of the glowing spiral.

### **Connecting to a PLC**

There is no need for protective measures by connecting the Reed switch to a PLC. The Reed contacts are plated by Tunsten, Gold, and Rhodium located in a protective atmosphere. They can be directly connected to the input terminals of a PLC without problems.

### **RC-Circuits as protective measures (Boucherot cell, Snubber)**

In practice the following values of resistor/capacitor cells give good results. Nevertheless, the values given in the following tables are only recommendations for general purposes. But it cannot be guaranteed that for specific applications more adequate Boucherot cells may exist.

#### **For Reed switches of 10 – 40 VA**

<b>Voltage [V]</b>	<b>Resistance [Ohm]</b>	<b>Capacitance [nF]</b>
230	1500	330
115	470	330
48	220	330
24	100	330

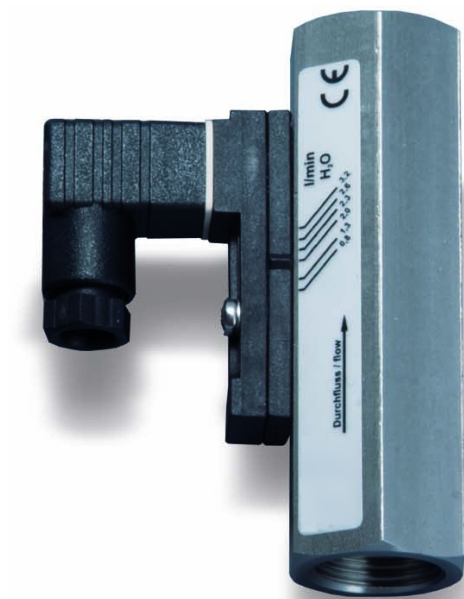
#### **For Reed switches of 40 – 100 VA**

<b>Voltage [V]</b>	<b>Resistance [Ohm]</b>	<b>Capacitance [nF]</b>
230	1000	330
115	470	330
48	100	330
24	47	330

# DS52

## Low Cost Miniature Variable Area Flow Switch

- for low viscosity liquids
- complete stainless steel design
- small switch hysteresis
- high switching accuracy
- universal mounting position
- small mounting dimensions
- measuring ranges: 5...60 ml/min up to 8...30 l/min
- max. pressure: 350 bar  
max. temperature: 100 °C



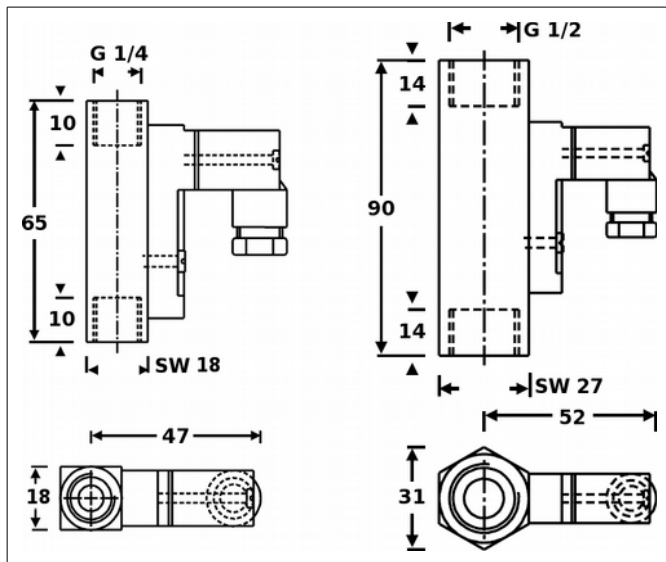
### Description:

The flow switch model DS52 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a spring. The flowing medium moves the float in the flow direction. A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The Reed contact is adjustable over the full switching range of the meter.

### Applications:

The variable area flow switch model DS52 is used for monitoring the flow of low viscosity liquids, e.g. in cooling circuits and laser systems, for pump monitoring, compressors and many other applications.

## Dimensions:



## Electrical Reed Contact:

### DS52.1 (G 1/4 connection)

Function N/O: 200 V / 1 A / 20 VA

### DS52.2 (G 1/2 connection)

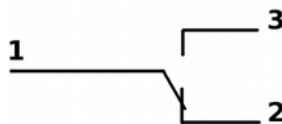
Function N/O: 230 V / 3 A / 60 VA

Function SPDT: 250 V / 1,5 A / 50 VA

### Function N/O



### Function SPDT



## Order Code:

Order number:

DS52. 2. W21. 1

### Low Cost Miniature Variable Area Flow Switch

#### Connection:

1 = G 1/4 female  
2 = G 1/2 female

#### Measuring range:

#### DS52.1 only (G 1/4 connection)

##### N/O contact only:

W101 = 5...60 ml/min  
W102A = 40...130 ml/min  
W106 = 0,1...0,6 l/min  
W11 = 0,2...1,2 l/min  
W12 = 0,4...2 l/min  
W13 = 0,5...3 l/min  
W15 = 1,0...5 l/min

#### DS52.2 only (G 1/2 connection):

W202 = 0,02...0,2 l/min  
W206 = 0,2...0,6 l/min  
W21 = 0,4...1,8 l/min  
W23 = 0,8...3,2 l/min  
W27 = 2...7 l/min  
W213 = 3...13 l/min  
W220 = 4...20 l/min  
W230 = 8...30 l/min

#### Contact:

1 = function N/O  
2 = function SPDT (only with G 1/2)

## Technical Data:

Max. pressure: 350 bar

Pressure drop: DS52.1: 0,02...0,6 bar  
DS52.2: 0,02...0,3 bar

Max. Temperature: 100 °C

Materials: stainless steel 1.4571,  
magnet: Ferrite

Electr. Connection: plug acc. to DIN EN 175301-803

Accuracy: ± 10 % FS