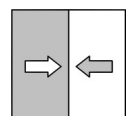


## Data sheet

### DS31

Differential pressure switch



# 1 Product and functional description

## 1.1 Performance characteristics

### Main features

- High repeat accuracy
- Long life span
- High overload protection

### Typical applications

- Filter monitoring
- Water treatment plants
- Heating systems

### Areas of application

- Filter equipment
- Plant engineering
- Machine construction

## 1.2 Product summary

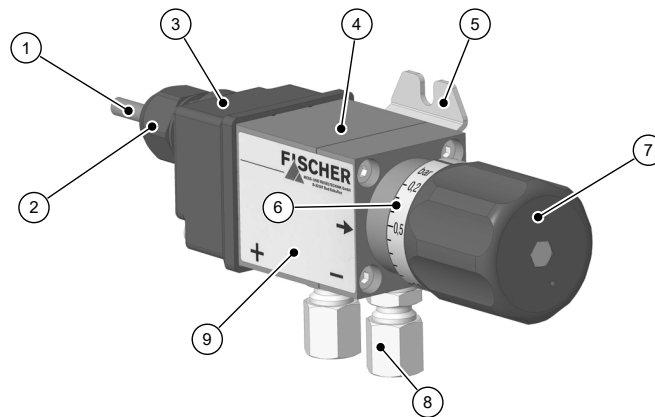


Fig. 1: Product summary

|   |                  |   |                               |
|---|------------------|---|-------------------------------|
| 1 | Connection cable | 2 | Cable screw connection        |
| 3 | Cover hood       | 4 | Pressure chamber              |
| 5 | Mounting foot    | 6 | Scale                         |
| 7 | Setting button   | 8 | Cutting ring screw connection |
| 9 | Type plate       |   |                               |

### 1.2.1 Process connection

As standard, the device has a process connection G $\frac{1}{8}$  inch inner thread. However, the device can also be supplied with cutting ring screw connections for 6 or 8 mm tubes.

The maximum torque for the G $\frac{1}{8}$  inch inner thread is 5 Nm. The cutting ring screw connections may only be mounted with counter brackets (cf. operating instructions/assembly).

### 1.3 Intended use

The DS31 is a differential pressure switch for overpressure, underpressure and differential pressure measurements. The uncomplicated and durable membrane measuring mechanism is suitable for neutral fluid media, e.g. service water, heating water, neutral gases and oils.

### 1.4 Function diagram

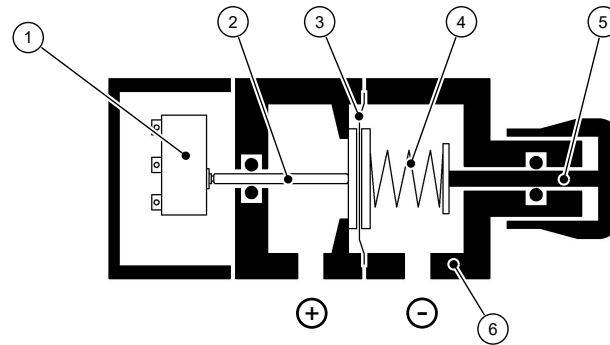


Fig. 2: Function diagram

|   |  |   |                        |
|---|--|---|------------------------|
| 1 | Micro-switch                           | 2 | Switch tappet          |
| 3 | Diaphragm                              | 4 | Measuring range spring |
| 5 | Adjustment spindle with setting button | 6 | Pressure chamber       |

### 1.5 Design and mode of operation

Due to the pressure or differential pressure to be measured, a one-sided force acts on the membrane. This force moves the membrane system against the pre-tensioned measuring range spring. A switch tappet mounted on the membrane actuates a micro switch.

The switch-point can be set with the setting button of the adjustment spindle. One scale and a setting mark attached to the type plate show the respectively set switch-point.

## 2 Technical data

### 2.1 General

| Reference conditions (acc. to IEC 61298-1) |               |                  |
|--|---------------|------------------|
| Temperature                                | +15 to +25 °C |                  |
| Relative humidity                          | 45 ... 75 %   |                  |
| Air pressure                               | 86 to 106 kPa | 860 to 1060 mbar |
| Installation position                      | User-defined  |                  |

### 2.2 Input variables

| Measuring range      | Switching range |                | Nominal pressure | Bursting pressure |
|----------------------|-----------------|----------------|------------------|-------------------|
|                      | 10 ... 100%     | <i>SI unit</i> |                  |                   |
| <b>0 to 400 mbar</b> | 40 to 400 mbar  | 4 to 40 kPa    | PN16             | 64 bar            |
| <b>0 to 0.6 bar</b>  | 0.06 to 0.6 bar | 6 to 60 kPa    |                  |                   |
| <b>0 to 1 bar</b>    | 0.10 to 1.0 bar | 10 to 100 kPa  |                  |                   |
| <b>0 to 1.6 bar</b>  | 0.16 to 1.6 bar | 16 to 160 kPa  |                  |                   |
| <b>0 to 2.5 bar</b>  | 0.25 to 2.5 bar | 25 to 250 kPa  |                  |                   |
| <b>0 to 4 bar</b>    | 0.40 to 4.0 bar | 40 to 400 kPa  |                  |                   |
| <b>0 to 6 bar</b>    | 0.60 to 6.0 bar | 60 to 600 kPa  |                  |                   |

### 2.3 Output parameters

| Micro-switch           | AC                               | DC    |
|------------------------|----------------------------------|-------|
| Max. switching voltage | 250 V                            | 30 V  |
| Max. switching current | 3 A                              | 0.4 A |
| Min. switching current | 0.1A                             | 0.1A  |
| Max. switching output  | 250 VA                           | 10 W  |
| Mech. life span        | 10 <sup>6</sup> switching cycles |       |

### 2.4 Measuring accuracy

|                              |                                     |
|------------------------------|-------------------------------------|
| Switch point switching range | 10 ... 100 % of the measuring range |
| Switch point accuracy        | 3% of the switching range           |
| Hysteresis                   | 5% of the switching range           |

### 2.5 Electrical connection

#### Hard-wired, silicone and halogen-free number cable

|                                 |                      |
|---------------------------------|----------------------|
| Core number                     | 2 + PE               |
| Conductor nominal cross-section | 0.75 mm <sup>2</sup> |
| AWG                             | 19                   |
| Outer diameter                  | 7.1 mm               |

#### Cable screw connection without cables

|                                 |  |
|---------------------------------|--|
| Internal connection terminal    | 2                                      |
| Earthing                        | Connection screw for M4 ring cable lug |
| Conductor nominal cross-section | 1 ... 2.5 mm <sup>2</sup>              |
| Cable screw connection          | M16x1.5                                |
| Terminal range                  | 5.0 ... 10 mm                          |

## 2.6 Operating conditions

|  |   |
|--|---|
| Ambient temperature range  | -10 to +70 °C   |
| Storage temperature range  | -10 to +80 °C   |
| Medium temperature range<br>(for non-freezing media)                           | -10 to +80 °C   |
| Low-Voltage Directive  | EN 61010-1:2010 +A1:2019+A1:2019/<br>AC2019             |
| RoHS   | EN IEC 63000:2018                                       |
| Protection class   | IP 65 acc. to EN 60529                                  |
| <b>Materials of the parts that come into contact with the surroundings</b>     |   |
| Lid, setting button  | POM   |
| Pressure chamber   | CW614N  |
| Cable screw connection   | Polyamide   |
| Connection cable   | PVC halogen-free, flame-retardant                       |
| Mounting foot  | Galvanised steel and passivated                         |
| <b>Materials of the parts that come into contact with the measuring medium</b> |   |
| Pressure chamber   | CW614N  |
| O-rings and membrane   | Stainless steel 1.431 NBR or FKM<br>(acc. to order key) |
| Adjustment spindle, membrane plate   | CW614N  |
| Switch fields  | 1.4310  |
| Other parts  | CW614N, PTFE  |

## 2.7 Construction design

All dimensions in mm unless otherwise stated

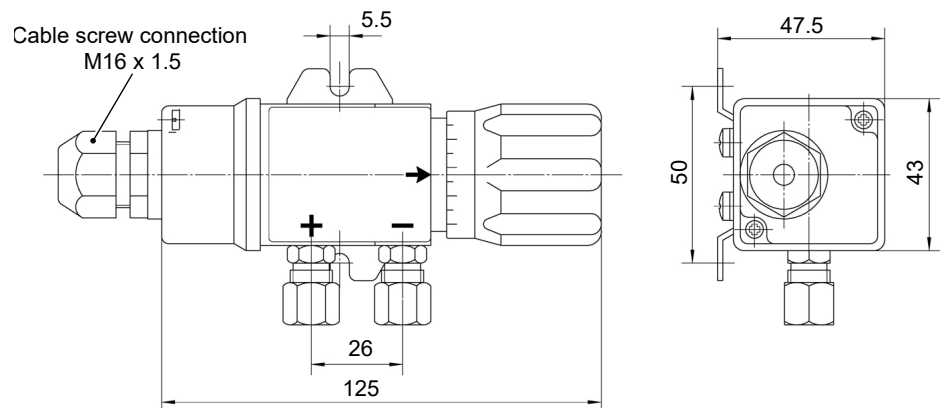


Fig. 3: Dimension drawing

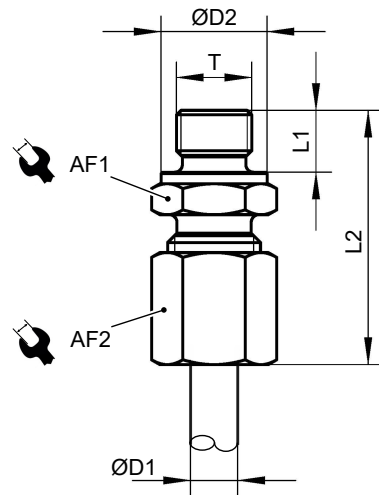


Fig. 4: Cutting ring screw connection

| D               | ØD1  | ØD2   | L1   | L2      | A/F 1 | A/F 2 |
|-----------------|------|-------|------|---------|-------|-------|
| G $\frac{1}{8}$ | 6 mm | 14 mm | 8 mm | 23.5 mm | 14 mm | 14 mm |
| G $\frac{1}{8}$ | 8 mm | 14 mm | 8 mm | 24.5 mm | 14 mm | 17 mm |

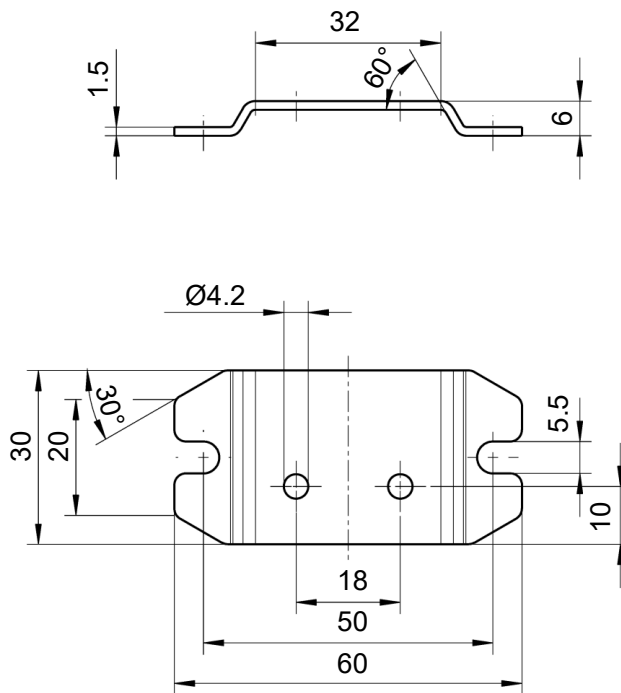
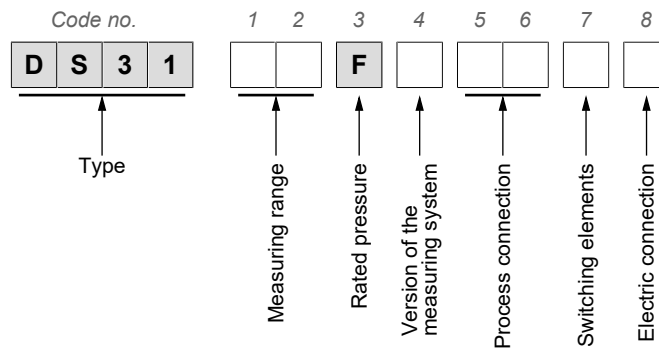


Fig. 5: Mounting foot

### 3 Order codes



| [1.2] | Measuring range | Switching range |
|-------|-----------------|-----------------|
| 83    | 0 to 400 mbar   | 40 to 400 mbar  |
| 01    | 0 to 0.6 bar    | 0.06 to 0.6 bar |
| 02    | 0 to 1 bar      | 0.10 to 1.0 bar |
| 03    | 0 to 1.6 bar    | 0.16 to 1.6 bar |
| 04    | 0 to 2.5 bar    | 0.25 to 2.5 bar |
| 05    | 0 to 4 bar      | 0.40 to 4.0 bar |
| 06    | 0 to 6 bar      | 0.60 to 6.0 bar |

| [3] | Nominal pressure |
|-----|------------------|
| F   | PN16             |

| [4] | Measuring system  |
|-----|---|
| M   | Pressure chamber: brass                      Seals: NBR   |
| N   | Pressure chamber: brass                      Seals: Viton |

| [5.6] | Process connection  |
|-------|---|
| 00    | Inner thread G $\frac{1}{8}$  |
| 20    | Cutting ring connection in brass for 6 mm pipe      Material steel  |
| 21    | Cutting ring connection in brass for 8 mm pipe      Material steel  |
| 28    | Cutting ring connection in brass for 6 mm pipe      Material: brass |
| 29    | Cutting ring connection in brass for 8 mm pipe      Material: brass |

| [7] | Switching Elements  |
|-----|---|
| A   | 1 adjustable micro-switch                      Function: NO contact |
| B   | 1 adjustable micro-switch                      Function: NC contact |

| [8] | Electrical connection                     |
|-----|---|
| 0   | M16 Cable screw connection without cables |
| 1   | 1.0 m long number cable, hard-wired       |
| 2   | 2.5 m long number cable, hard-wired       |
| 5   | 5.0 m long number cable, hard-wired       |

#### 3.1 Information about the document

This document contains all technical data about the device. Great care was taken when compiling the texts and illustrations. nevertheless, errors cannot be ruled out.

Subject to technical amendments.



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