# Special-Sensors
for
# Automation


## Flow Sensors

# Flow Sensors

## Contents



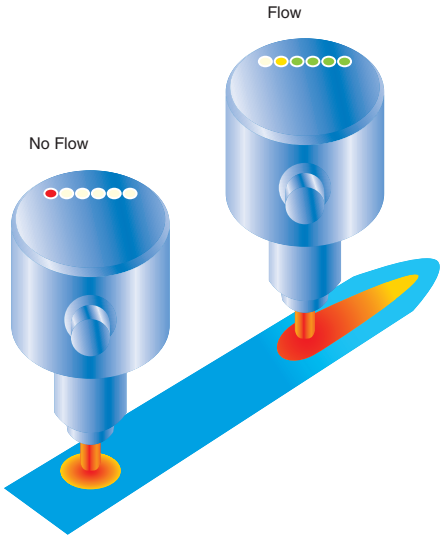
*Technical alterations are reserved to us without prior announcement.*

# Flow Sensors

## Technique and application

## Function

The function of the flow controller is based on the thermodynamic principle. The sensor is heated internally a few degrees °C compared to the medium into which it projects. When the medium flows, the heat generated in the sensor is conducted away by the medium, i. e. the sensor cools down. The temperature within the sensor is measured and compared to the temperature of the medium. The state of flow can be derived for each medium by the temperature difference attained.




*Function of thermodynamic flow controllers*

On the basis of this functional principle EGE manufactures flow monitors for liquid and gaseous media.

The sensitivity of thermodynamic flow monitors depends on the thermal characteristics of a medium. The detection range of a standard sensor for oil, for example, is three times as great than for water and for air is approx. 30 times greater than for water due to the reduced heat conductivity. Unless stated otherwise, the technical sensor data are specified for water.

## Areas of application for flow monitors

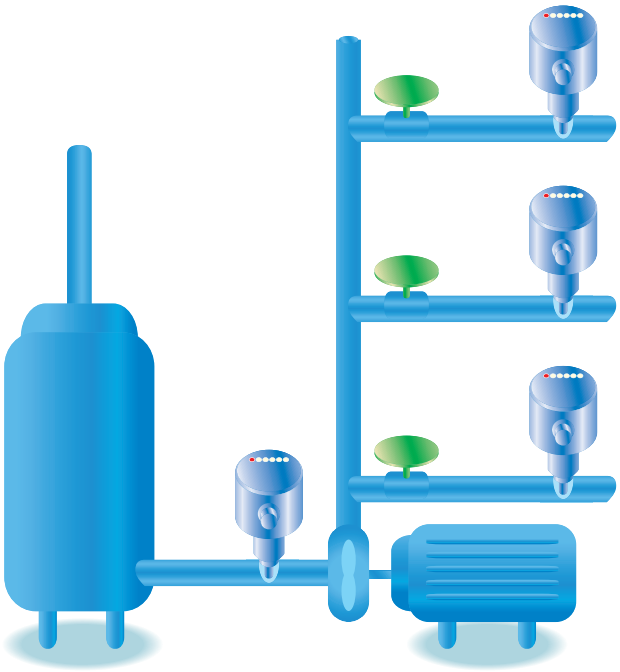
Thermodynamic flow monitors function without any moving parts, therefore they are not subject to failure due to corroded bearings, torn impellers or deflector deformation. This reliability is highly valued in many industries. Today, flow monitors are used both in liquids and in air, and are employed even in explosion hazardous environments.

### Monitoring of cooling

- The cooling water on welding machinery is monitored using compact stainless steel devices. This ensures sufficient cooling even for rapid cycles, otherwise the welding robot will be switched off by the sensor.
- The cooling lubricant flow is monitored continuously in processing centres. The tools are protected and have a greater service life.
- In metal processing, e.g. rolling mills and wire drawing machines, the rolls and coils will be cooled continually. This is monitored by thermodynamic sensors. Due to the rough environmental conditions the sensors are designed for up to 160 °C and settings are made away from the heat with special amplifiers.

### Monitoring of flow medium

- The run-dry protection of pumps is a frequent application, which often uses compact sensors with time delay.
- In dosing technology the aggregate, usually small flow quantities, is measured exactly by means of inline sensors. These sensors are inserted like a pipe into the line.
- Monitoring of filters and sieves can be ensured by medium flow control; if the flow is progressively reduced, the filter must be renewed. Where this is not carried out, the pump is switched off in a second stage should the medium flow drop further. This uses a sensor with two switching points.



*Run-dry protection of a feed pump*

### Monitoring of process flow

- The monitoring of cleaning processes using aggressive media at times is often only possible with special materials, e.g. hastelloy or tantalum.
- Extraction systems for hazardous vapours at laboratory workstations as well as the hall ventilation in the hexane processing industry are monitored using airflow sensors.
- CIP/SIP processes can be monitored and documented with flow monitors.

# Technique and application

## Probes

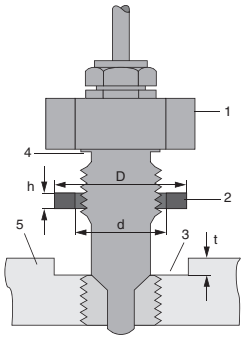
The temperature-sensitive measuring elements are fitted in the tip of the probe. The probe tip and the adjoining thread/mounting part are made in one piece of stainless steel in many probes. This guarantees absolute tightness and high compressive strength. Special materials are used in corrosive, and particularly in oxidizing media, since stainless steel shows only limited resistance to corrosion in this application.
In standard applications, probes can be mounted independently of the direction of flow of the medium. In any case, it is important to make sure that the pin of probe is completely surrounded by the medium to be monitored. Please note that for smaller cross-sections the sensor tip narrows the tube's cross-section. This results in a higher flow rate.
In order to avoid malfunctions caused by unstable flow patterns no fittings that could affect the flow cross-section or the flow direction should be placed directly in front of and behind the sensor. The point of reference for the input/outlet section is approximately 5 to 10 times the tube diameter.

### Assembly

Probes with short thread-pieces of the STK... type are particulary suited for fitting into T-pieces. Sensor length is designed in such a way that the probe tip is completely immersed in the medium without touching the opposite side.
Probes with long thread-pieces of the ST... type are suitable for larger pipe diameters or for use with longer assembly thread-pieces. Probes threads are G-pipe threads to DIN ISO 228 and also comply with the BSP standard. A flat gasket centered by a step on the sensor ensures a good seal. A good seal can also be ensured using Teflon tape. For pressure above 30 bar or very high screw-down torques, a flat gasket may be damaged, especially if it is made of plastic. In this case, a recess must be incorporated into the fitting which will keep the gasket in the right position in the case of high loads. PTFE gaskets must always be used with this technique. For high pressure applications, metal gaskets must be used. The standard material for gaskets is AFM 30/34. Special gaskets made of other materials such as moving iron, copper or PTFE are also available on request.

### Dimensions of the gasket

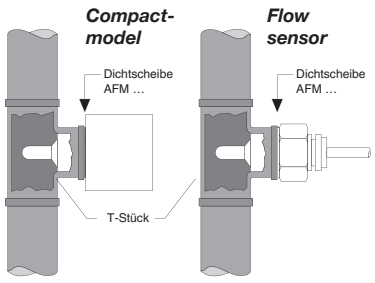
| Thread | d | D | h | t |
|---|---|---|---|---|
| G1/4 | 13.2 | 19.5 | 1.5 | 1 |
| G1/2 | 21 | 27.5 | 2 | 1.5 |
| G3/4 | 26.5 | 32.5 | 2 | 1.5 |



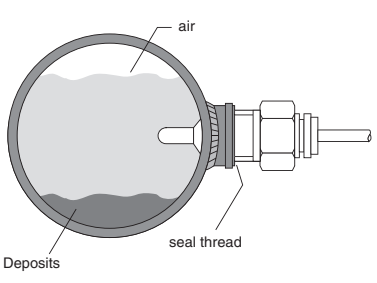

1 = Probe
2 = Gasket
3 = Chamber
4 = Edge
5 = Counterpart

A rising pipe should be used in case of open systems or in the presence of air pockets (1). Deposits and air pockets do not impair sensor function in the case of lateral assembly (2), providing the sensor is completely immersed in the medium. Assembly from below (3) assures flow monitoring function even if there are air pockets in the pipe. However, the monitored medium level must not fall below the upper edge of the measuring tip. Assembly from above is only applicable if there is no air in the pipe.

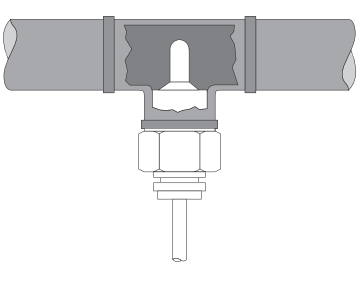
### ① Installation in rising pipe




### ② Lateral installation




### ③ Underside installation



# Technique and application

### NPT threads
NPT threads can be provided as an alternative for all types which have a G1/2 or a G3/4 thread. NPT threads are conical and must be screwed into an equally conical counter-part. Two types of NPT threads must be distinguished. NPT thread according to ANSI B 1.20.1 does not ensure a good seal by itself and requires the use of a sealing medium, e.g. Teflon tape. It is not possible to use flat gaskets with this type of thread.

### Flange types
Standardised pipe connections are required particularly in the chemical, pharmaceutical and foodstuff industries. Sensors for use in these areas are supplied with flange connections per DIN or ASME. Sensor and flange form a corrosion-proof connection using laser or inert gas shielded arc welding.

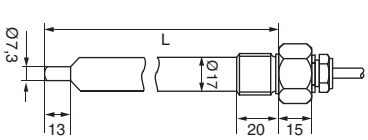
### Food-approved screw connections
For hygienic reasons the food and pharmaceutical industries place special demands on the mechanical and electronic characteristics of sensors.
Probes with food-approved connections, e. g. Triclamp or dairy pipe connections (DIN 11851) comply with the 3-A sanitary standard 28-05. Due to the temperature changes involved, the usual cleaning cycles CIP and SIP place a particular demand on sensor electronics. Therefore, special protective measures are taken. Sensor materials for these applications is mainly the special steel AISI 316 L. Customer-specific connections, e. g. GEA-Varivent or APV flanges are available, as are other special metallic materials.

### Extra long probes
Flow probes are available in screw lengths of 25 mm to 300 mm. The probe length should be selected such that the measuring tip is within an area of stable flow characteristics.

Main applications are:

- detection of small flow velocities in pipes with large cross section
- mounting of the sensor with a standard flange
- use of extra long welding sleeves if the piping is surrounded by a supplementary insulation.

### Long sensor




Immersion depth "L" is determined by the distance between the sealing face and the sensor tip. Standard lengths which can be supplied are: L = 80 and 120 mm; in the Ex-area 80, 110 and 140 mm.

### Inline
Inline sensors are inserted directly into the line of a pipe. This design does not feature any measuring pins protruding into the flow. EGE inline sensors SD of series 500 are suitable for flow volumes from 0.5 ml/min to 6 l/min. These sensors excel through smooth measuring pipes, low pressure loss and fast response to flow changes. A multitude of connection options are available.

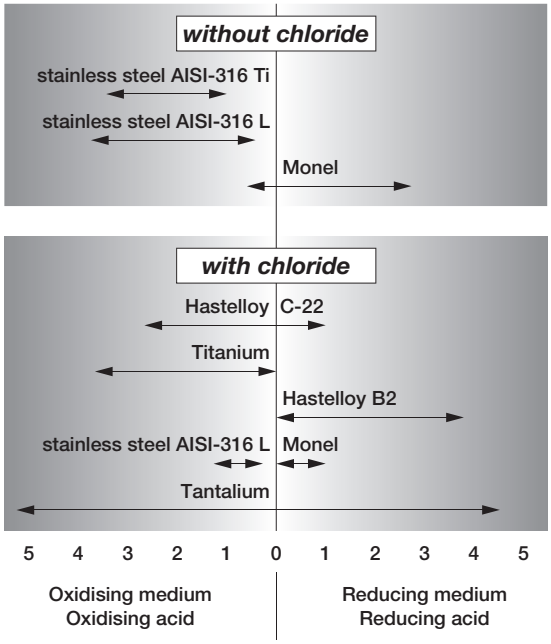
### Chemical stability of probe housings
The chemical stability of the materials used must be verified individually for every application. Basically, no problems occur if the probe and the piping are made of the same material. It is always advantageous if the sensor housing is made of a more noble material than the piping.
The screwed cable gland on the rear side of the ST... sensors is designed in nickelplated brass. Order material PVDF for screwed cable glands in applications that are cleaned with alkaline cleaning agents as is the case, for example, in the food industry.

**Stainless Steel** belongs to the group of chromium-nickel alloys containing further components such as molybdenum or titanium. The proportions of the different alloy components is critical to the resistance to corrosion in the medium. For this reason, there exists a large number of materials identified by numbers to the DIN EN ISO 7153-1:2000 standard. Due to its good corrosive resistance in many areas of application, AISI-316 Ti (VA4) stainless steel is a frequently used material. It may be used in installations used to obtain water, in air conditioning systems, in food processing industries such as dairy products, meat products, beverages, wine production or in kitchen installations. Stainless steels have a restricted stability in chlorinated or poorly oxygenated atmospheres. Special alloys must be used for such applications.

## Special materials

**Hastelloy B-2** (2.4617) belongs to the group of highly corrosion-resistant nickel-molybdenum alloys.
This material has excellent characteristics in reducing media, e.g. in hydrochloric acid of any concentration and for a large range of temperatures. It can also be used in hydrochloric, sulphuric, acetic and phosphoric acid media. Good resistance against corrosion such as pitting, crevice corrosion, chlorine induced stress, corrosion cracking, hair-line corrosion, abrasion and corrosion within the heat influence zone allows for a large range of applications. In the presence of oxidising components such as iron or copper salts, the use of this material is not recommended.

**Hastelloy C-22** (2.4602) belongs to the group of high corrosion-resistance nickel-chromium-molybdenum-tungsten alloys. The material is characterised through high resistance against crevice corrosion, pitting and stress corrosion cracking in oxidising and reducing media. It also displays good behavior in the presence of a large number of corrosive media, including strong oxidants such as iron (III) chloride and copper (II) chloride, hot media, e.g. sulphuric acid, nitric acid, phosphoric acid, chlorine (dry), formic acid and acetic acid. Furthermore, it has satisfactory characteristics in humid chlorine gas, as well as in sodium hypochlorite and chlorine dioxide solutions.




**Titanium** (3.7035) is a light metal with mechanical strength values equivalent to those of high quality steel. The good chemical resistance of this metal is due to the fact that an oxide film is formed on its surface, as is also the case with stainless steels. If this protective layer undergoes mechanical damages in an oxygenated enviroment, it is immediately renewed (titanium will resist even aqua regia). Titanium is not stable in environments containing no oxygen or in reducing enviroments. It is particularly suitable for applications in chloride-containing media. Experience in the chemical industry and in paper bleaching factories has shown that titanium is the only material allowing undisturbed production. The excellent characteristics of titanium also give optimum results in sea water cooling sytems and sea water de-salinising plants.
The material is particularly suited for the application of coating with other metals and metal ceramics. These supplementary coatings noticeably increase its chemical stability and thus the lifetime of sensor housings.

## High temperature

High temperature sensors are manufactured from temperature-resistant components and feature FEP cables.
The functional range of these special probes of series 400 is specified as +10...+120 °C. Temporarily 135 °C is permissible for max. 10 min. High temperature sensors of series 500 can be used for media temperatures of up to 160 °C / 320 °F

## Connection

Flow monitoring probes are available with a M12 plug connector or fixed cable. Special models have a terminal compartment.
The connection cable from the probe to the amplifier may be up to 100 m long. For distances above 30 m a shielded cable is preferred. In all cases the chosen wire strength must be checked against the requirements.

## Chemical resistance of B3-coating

| Medium | $Cl_2$ | HCl | $Br_2$ | HBr | $F_2$ | HF | HA (general) | NaOH | Saltw. (Kestern) | red. media | $HNO_3$ | $H_2SO_4$ (25%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| resistance | +++ | +++ | +++ | +++ | + | + | +++ | ++ | +++ | ++ | ++ | +++ |

HA in generell = Acid. acid in different concentrations
Saltw. Kestern = Saltw.-Kesternich-Test
Resistance = proofed up to 30 °C

**Coating properties**
The coating is hard, resistant to wear and resistant to abrasive substances in media like for examble chalk, mud, sand and fiber.

# Technique and application

## Amplifiers

All amplifiers have a multicolour LED display which visually indicates the flow tendency. If the LED light is red, the preinstalled limit value is not reached and the switching output is not activated. The yellow LED indicates that the limit value was reached and the output is active. In addition to the yellow LED, 4 more green LEDs can light up to indicate how much the limit value is exceeded.

For the installation of the amplifiers, make sure that the devices are not subject to heat build-up. The distance between adjacent devices should not be less than 10 mm.

### Amplifiers SKZ... and SKM...

Terminal rail devices SKZ... and SKM... are prepared for installation on the top hat rail. They evaluate the signals delivered by the measurement probes and provide relays or analog outputs. The settings are made using two potentiometers that are accessible from the front or via buttons for SKM 522. In addition, SKZ amplifiers provide a switch-off delay as well as temperature monitoring.

### EX amplifier SZA...

For EX measurement probes, the SZA... amplifiers with an adjustable turn off delay are offered. It has an own intrinsically safe circuit to which the measurement probes are connected. This safe circuit is galvanically isolated from the mains and isolated from the relay output.
The EX amplifier SZA... must be set up outside of the hazardous area..

## Compact devices

Compact devices integrate amplifier and probe within one housing. This permits setting a limit value directly at the measuring location. The cabling is thus reduced to the less interference-prone mains supply cables and the switching output.

### Screw assembly
### SC 440... / SN 450... / LN 450... / LNZ 450...

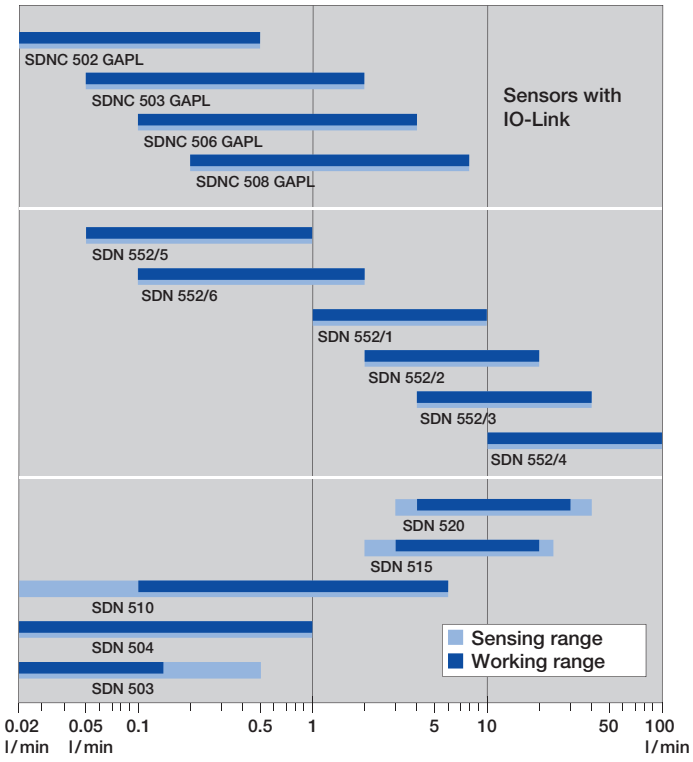
Compact devices of the series mentioned can be easily assembled in screw adapters, bushings and T-pieces. To this end the measuring probes usually have a thread of size G1/4, G1/2 or NPT1/2. Many other options can be implemented as special device.
The devices of series SC 440... are completely manufactured from stainless steel and characterised by robustness and a small footprint. They have been proven in more than 25 years of industrial use. Series SN 450... and SNT 450... have a plastic (PBT) housing and are available in many designs for direct and alternating voltage supply, with relay, PNP or analogue output. The STN 450... variants additionally feature an adjustable temperature monitoring, the variants with ...-VA or ...-VE have an adjustable time delay for the output. The compact devices LN 450... and LNZ 450... are suitable for use in air. They are available in the same variants as SN 450...

### SCS 440... / SNS 450... plug-in assembly

The measuring probes of the above-mentioned device series have been designed for assembly in cutting ring fittings. They are secured in the respective fitting with a union nut attached to the device. The connection is reliably sealed up to 100 bar. Various designs of the screw-in adapter allow the universal use of the flow sensor. The variants of the compact devices match the variants available for screw assembly.

### "Inline" assembly
### SDN 500... / SDN 552... / SDNC 500...

"Inline" assembly is through two opposing process connections at the device directly in a pipe or hose. The measuring tubes of the inline sensors are smooth on the inside and do not feature any pins protruding into the flow. They are characterised by short response times and a large detection range. Due to their compact design they can also be used where installation space is tight. For pulsating flows the inline sensors SDN... -DYN are suitable, which can detect very brief flow rates of the smallest volumes as soon as the flow starts. The SDN 500... are equipped with PNP, relay or analogue outputs.
Sensors of the series SDNC... have a space-saving cubic design and opposing process connections with a G1/4 thread. They have a wide detection range and are sometimes operated with a screw-on pre-adapter or a straight inlet section providing a favourable flow profile for the flow rate detection. This device series has been preconfigured at factory or can be supplied flexibly parametrisable using an IO link. This design also offers a pulse output for simple volume detection.




*Flow ranges for EGE-Inline-Compact models*

# Technique and application • Terminology

### Detection range
The detection range of a probe or compact device indicates the flow velocities of the medium for which the probe can provide an analysable signal. If the medium is not specified, the details for water are applied. Because the different media have different thermal conductivity, the detection range as well as the temperature drift are also dependent of the respective medium.
At the upper and lower limit of the detection range, the temperature drift is higher. The detection range does not limit the maximum flow rate a sensor may be exposed to. Hence, a sensor with the upper detection limit set at 3 m/s can be operated at 10 m/s.

### Operating range
The operating range characterises the section of the detection range for which the flow technology data have been specified. At the outer limits of the detection range these data are reduced. For sensors preconfigured at factory the working range represents the display or output range.

### Nominal flow
For each sensor, data corresponding to its own nominal flow is measured. This is nessesary because response characteristic curves of sensors are non-linear. Consequently the various sensor characteristics depend on the location of the chosen operating point on the curve. As a rule, the nominal flow-point is set in the middle of the portion of the (simple logarithmic representation of the characteristic) curve which appears to be linear. For this operating point, the following values may be defined: switching on and off times, stand by time, hysteresis and temperature response.

### Supply voltage
The supply voltage is the voltage range within EGE Sensors function safely. For direct current supplies it must be ensured that the limits are maintained even including residual ripple.

### Current consumption
The current consumption is the maximum value of the idle current Io which the flow monitor draws without load.

### Switching current
The switching current indicates the maximum continuous current for the switching output of the device. For PNP outputs this value applies to an ambient temperature of 25 °C. At higher temperatures the maximum switching current is reduced. For devices with relays output the value is related to the utility category AC-12 or DC-12 in accordance with EN 60947-5-1.

### Switching voltage
The switching voltage indicates the maximum voltage (including residual ripple) to be switched with the relay output.

### Switching power
The switching power indicates the maximum power to be placed on the output relays.

### Ambient temperature
The ambient temperature indicates the maximum and minimum permissible temperatures for the sensor.

### Temperature of medium
The temperature range for which a sensor is rated. Applies to the medium to be monitored.

### Temperature gradient
The temperature gradient defines the maximum temperature change of a medium per time unit which a sensor can track without malfunction. It is a measure for the quality of a flow sensor. The temperature gradient is determined at nominal data and with symmetrical installation of the measuring probe.

### Start-up time
The start-up time is the period of time required by the flow detector to reach a stable state after the operating voltage has been switched on. Prerequisite is that the medium flows at the rated velocity and that the sensor has adapted to the temperature of the medium before switching the supply voltage on. The start-up time is prolonged in a static medium and reduced if the medium flows faster than the rated value.

### Reaction time
The reaction time combines the switch-on and -off time. Switch-on time elapses from the beginning of the flow until the switching point set at the amplifier is reached. Switch-off time characteristic results for the flow sensors at pump shut-down. If the set switching point is close to maximum flow, the time elapsing between the pump shut-down and the indication of the flow decrease is short. If the switching point is close to the static value, the off-transition time will be long.

### Compressive strength
Pressure resistance relates to the sensor casing. Up to the indicated maximum pressure, the sensor provides a steady signal and the casing suffers no damage. In case the application requires the use of threaded joints, these can have compressive strengths that are significantly lower than the data for the sensor, which must then be observed.

### Protection class
The protection class indicates how well the equipment is protected against ingress of solids and water in accordance with EN 60529. For probes, the stated protection class always refers to the connection area. The area which is in contact with the medium always has IP 68.

### Switch-off delay
The variable time delay which can be set between 0 and 25 seconds becomes active during flow standstill (drop-out delay). If the medium ceases to flow and the amplifier display indicates this state, the relay contact is actuated only after the set delay. During the delay period the yellow LED lights up together with the red LED.

### Cable break monitoring
Cable break monitoring shuts off the flow monitor output if no probe is connected or if the probe cable has been severed. In case of cable severing, "flow failure" signal is displayed. Cable break monitoring is available in the SKZ 400... The SKM 552... monitors each sensor cable for short circuit and cable break.

# Technique and application • Setting instructions

## Switching output

### General

- The output is active when the yellow LED is lit.
- Set the switching point with the potentiometer at the front of the device.
- Keep the flow rate and medium temperature stable during adjustment and wait for the temperature to equalise between the sensor and the medium.
- The flow rate must be within the detection rate of the measuring probe.
- If present, remove the protective screw M3 x 4 from the potentiometer opening for the duration of configuration.

### Monitoring a flow limit for being exceeded

- Specify the flow rate or stop the flow and wait for the standby time.
- Turn the potentiometer screw clockwise until the yellow LED is lit.
- Turn the potentiometer screw counter-clockwise until the red LED is lit. The relay contacts are open.
- Increase the flow rate. Monitor the LED displays and switching output. If the limit value is exceeded, the yellow LED is lit and the relay contacts close. For a reliable monitoring the first green LED should also be lit after the flow commences. If necessary, change the adjustment.

This calibration is only possible if the flow rate of the medium is max. 70% of the limit value of the detection range of the selected measuring probe. If the red LED does not go out, the selected flow rate is too high or the hysteresis of the analysis device too great.

### Monitoring a flow limit for being fallen below or standstill

- Specify the flow rate and wait for the standby time.
- Turn the potentiometer screw counter-clockwise until the red LED is lit.
- Turn the potentiometer screw clockwise until the yellow and 2 green LEDs are lit. The relay contacts are closed.
- Reduce the flow rate and monitor the LED displays and the switching output. If the yellow LED goes out, the relay contacts open.

The switching point for the flow rate is adjusted using one or two potentiometers. For flow rates which are higher than the detection limit of the measuring probe the loss or reduction of the flow rate is reported when the speed falls within the detection range of the measuring probe.

### Limit temperature calibration

The desired value can be set with a potentiometer. The output switches when the set value is exceeded. At the same time the corresponding red LED at the device is also lit.

### Time delay calibration

The desired value can be set with a potentiometer. In the SKM 522 the configuration takes place in the programming mode. The values are shown on a scale. If the red LED already indicates a loss of flow, the output remains switched until the time has expired. Then the yellow LED also goes out.

### Automatic adjustment for SKM 522

Simultaneously pressing the two front buttons will open the programming menu. The automatic adjustment is selected with the FUNCTION button and started with the SELECT button. The adjustment is completed a few seconds later when at least the yellow LED lights up. Flow rate and temperature must be kept constant before and during the adjustment process. The function MAN. ADJUST can subsequently be used to manually modify the switching point.

### LED functions flow

***Red:***
Flow has been interrupted or the flow rate has fallen below the specified value. The "flow" relay has dropped out.

***Yellow:***
The set flow rate has been reached, the "flow" relay pulls in.

***Green:***
The set flow rate has been exceeded. There is extra flow capacity.

### LED temperature function

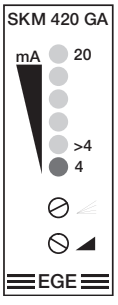
***Red:***
The set temperature value is reached and the "temperature" relay has pulled in.

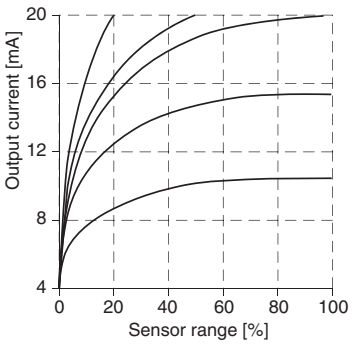
### LED time delay function

***Yellow and Red:***
Flow is below the set value. "Flow" relay remains pulled in until the set switch-off delay runs out.

## Analog output

Flow sensors with analog output supplies a current intensity which depends on the flow speed. The output current range is defined from 4 mA to 20 mA. The dependence between flow speed and output current is non-linear. The detection range is adjusted over two potentiometers: "Range" (◢) and "Adjust" (◢). The lowest value (>4 mA, 1st green LED) is set with the "Adjust" potentiometer at the smallest flow speed to be monitoring and the highest value (20 mA, 5th green LED) is set with the "Range" potentiometer at the highest flow speed to be monitored. The graph shows the characteristic lines obtained with the different settings.



# Technique and application • Inline-Flow monitoring

## Flow monitoring and measuring

The EGE-inline flow controllers with digital display monitor flow rates in the range of 0,05...100 l/min and display the flow rate digitally. They feature front panel buttons used to call functions and modify settings. The application area includes all areas of flow monitoring and measuring, in which a flow display is desired.

### Series SDN 552 / 554 – thermal principle

The SDN 552/554 series is based on the thermodynamic principle, heat is created in a measuring pipe and absorbed by the passing medium. The dissipated heat quantity is a measurement for the flow speed. A microprocessor processes this data, calculates the flow rate quantity and displays the result in liters/minutes in a 3-digit, 7-segment display.

**Page 1.53 - 1.57**

### Series SDV 652 – vortex principle

The flow measurement devices Series SDV 652 are based on the vortex principle. They are well suitable for applications, where a good linearity and larger measurement precision is necessary. They are insensitive to quick temperature changes and the reaction time of the device is below one second.
The vortex principle allows a flow measurement without moving parts: Behind a bluff body in the flow, vortexes are generated which are detected by the device and yield the flow velocity.

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### Series SDI 852 / 853 – magnetic-inductive

The inline flow sensors SDI 852/853 offer a monitoring function as well as precise flow measurements in the range of 0...80 l / min with a measured error smaller than 2%. The flow rate is digitally depicted using a clear 3-digit, 7-segment display. The magnetic-inductive measuring system facilitates that this device i suitable for many different applications in the field of automating processes and workflows. Furthermore, a high degree of measuring accuracy is ensured.
The magnetic-inductive measuring principle requires the electrical conductivity of the medium. Low limit values of 15 µS/cm for water or 10 µS/cm for other fluids still offer a broad function range.
The combination of precise measuring system and small, compact design distinguishes the series SDI from other inline flow sensors. They are easy to install subsequently into existing configurations or offer a space-saving alternative for new constructions.
Cooling and temperature control as well as metering circuits, for example in the field of water treatment, are precisely and accurately monitored. This is accomplished with a set point function as well as an analogue linear current and pulse output.

**Page 1.59 - 1.60**

### Installation

The inline flow sensors are installed "in-line" into a pipe line. The pipe may be connected directly with the compression tube fitting connection or with an adaptor SDA.... Threaded bushings are located in the bottom housing plate and are used to fasten the device to a support plate or other similar base. A mounting plate (optional accessory) may also be attached to the housing. This makes it possible to fasten the unit from the front.

### Signal filter

The parameter for the signal filter allows inputting a value that determines the time interval in which the measuring signal is averaged. Inputs between 0 to 8 seconds are possible. A low value results in a very quick response; a high value results in a very steady display of the measured value. The filter is switched off when the setting is 0. Averaging has the same effect on display and outputs.

### Access code

Protection against unauthorized access to the programming functions provides an access code. Without this number combination, only the currently saved values for the switching points and further parameters can be displayed.

### Reference adjustment

The accuracy of the displayed flow rate quantity can be optimized with the CAL function using an exact reference flow rate meter. Here you have the option to modify the displayed flow rate value and adapt it to the reference value.

### Medium preselection SDN 552 / 554

Besides water, a water-glycol mixture is also often used as a heat carrier in cooling systems. Due to the changed thermal properties of the fluid through the incorporation of glycol, the accuracy of the displayed flow rate value is affected and the limit values are also changed. To correct this effect, the devices of the SDN 552/554 type series have a function for selecting the measurement medium. Glycol fractions up to 30% can be entered. The microprocessor working in the device then calculates the flow rate quantities considering the glycol fraction.

### Applications

These devices are especially suitable for flow rate monitoring in cooling systems due to the greater functionality, as well as easy programming and installation.
These devices are characterized by short response times and robust display values, even if the medium is subject to large temperature fluctuations as to be found in welding technology in the automotive industry.
In the display, the flow rate value, which is continuously updated, is displayed in l/min. The person responsible for the plant or the machine has thus constantly the information on the available cooling performance.
Industrial climate control units are often operated with a water-glycol mixture in the secondary cycle due to the danger of freezing. The glycol fraction can be programmed in the SDN menu in a couple of seconds to ensure a correct value is also displayed in the application.

# Technique and application • Ex

## Use in hazardous areas

The EX measurement probes of the 400 meet the basic requirements of Directive 94/9/EC. Electrical boundary data, permissible temperature ranges as well as installation and connection instructions are specified in the operating instructions of EX equipment.

### Zone classification and categories

The frequency and duration of the occurrence of a hazardous atmosphere determines the zone classification.

#### Zone 0 / Category 1 (Gas)

Zone 0 is an area in which a potentially explosive atmosphere in the form of a mixture of air, combustible gases, vapours or fog continuously, for longer periods or frequently exists.

#### Zone 1 / Category 2 (Gas)

Zone 1 is an area in which a potentially explosive atmosphere as a mixture of air, combustible gases, vapours or fog can occasionally form in normal operation.

#### Zone 2 / Category 3 (Gas)

Zone 2 is an area in which a potentially explosive atmosphere as a mixture of air, combustible gases, vapours or fog can occur in normal operation.

#### Zone 20 / Category 1 (Dust)

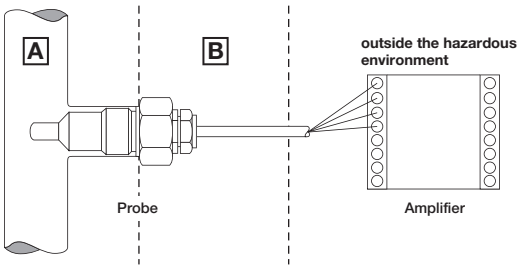
Zone 20 is an area in which a potentially explosive atmosphere in the form of combustible particles suspended in air continuously, for longer periods or frequently exists.

#### Zone 21 / Category 2 (Dust)

Zone 21 is an area in which a potentially explosive atmosphere in the form of combustible particles suspended in air can occasionally form in normal operation.

#### Zone 22 / Category 3 (Dust)

Zone 22 is an area in which a potentially explosive atmosphere in the form of combustible particles suspended in air normally does not exist or only exists for a short period in normal operation.




| Ex marking | A | B |
|---|---|---|
| Ex II 1/2 G... | Zone 0 | Zone 1 |
| Ex II 2 G... | Zone 1 | Zone 1 |
| Ex II 3 G... | Zone 2 | Zone 2 |
| Ex II 1 D... | Zone 20 | Zone 20 |
| Ex II 2 D... | Zone 21 | Zone 21 |
| Ex II 3 D... | Zone 22 | Zone 22 |

A measurement probe may only be used in dust or gas protected hazardous areas, even when there are approvals for both areas. For use in hazardous areas for dusts the maximum surface temperature of the sensor is specified. For the hazardous area for gases the ambient temperatures of the temperature classes are given. On request, EGE delivers sensors with special dimensions and special materials as well as longer connection cables.

# Technique and application • IO-Link

Use IO-Link
Universal · Smart · Easy

IO-Link is an internationally standardised communication technology (IEC 61131-9) for the data exchange with sensors and actuators. IO-Link enables the continuous communication from the control down to the lowest field level to the sensor.

EGE is a member of the IO-Link group of companies organised within the PNO (Profibus user organisation). It develops the technology and supports the members and users in the integration of IO-Link enabled products.

The following description of the IO-Link technology explains the key terms and functions.
Further information is available on the homepage of the IO-Link consortium: www.io-link.com.

## Benefits

### Cost reduction
Parametrisable sensors and actuators with a standardised interface reduce the multitude of device types required and reduce complexity during procurement.

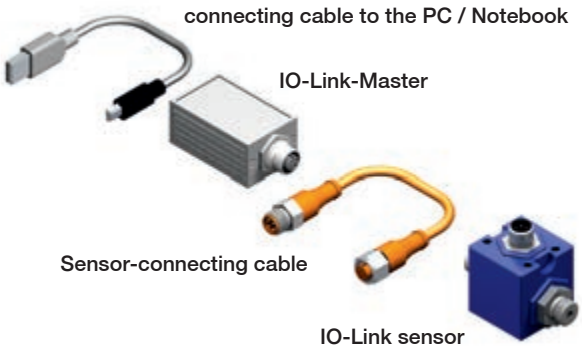
### Innovative machine concepts
Only a continuous communication with each sensor and actuator opens up all functions of intelligent devices. This permits the implementation of innovative machine and plant concepts.

### Short commissioning times
IO-Link communication runs over unshielded cables and uses common industry connectors. The installation location can be optimised and the sensor later parametrised within the system. The complete parameter set can be stored in digital form and transmitted freely to additional devices.

### Productivity
IO-Link devices automatically identify and parametrise themselves when changed (data storage). This simplifies the replacement of faulty components and reduces repair-related downtimes of machines and plant.

### Maintenance
Intelligent IO-Link devices can be uniquely identified in the system, offer functions for self-diagnosis and supply data for the analysis of the system functionality. This permits novel preventative repair and maintenance concepts.

### Parametrisation
IO-Link enabled sensors can comfortably be parametrised with a PC/Notebook, an IO-Link master and the corresponding software and can then be used as conventional sensors with switching and analogue output (SIO mode). Alternative their use is also possible as IO-Link devices which supply the sensor signals as process data to a control.

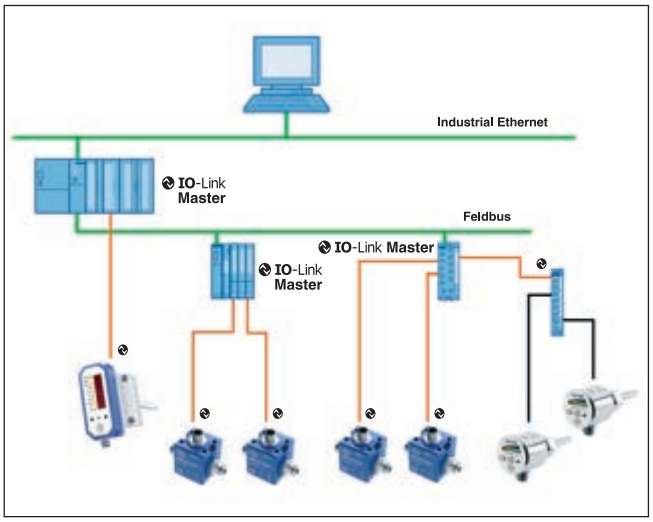



*EGE IO-Link-System*

## System overview

An IO-Link system generally consists of the following components:

- IO-Link master
- IO-Link device (sensor/actuator)
- Unshielded 3 or 4 core cable
- Software for project planning and parametrisation of IO-Link devices




The IO-Link master provides the connection between the IO-Link sensor/actuator and the automation system. As part of a peripheral system the IO-Link master is either coupled directly to the PLC in the control cabinet or installed as remote I/O component with field bus connection in the machine or plant. Such masters have several channels which can each be connected to a device with IO-Link functionality.

# Technique and application • IO-Link

## IO-Link interface

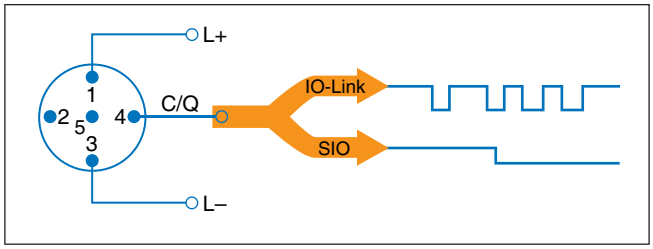
IO-Link is a serial bidirectional point-to-point communication for the signal transmission and energy supply.

### Connection technology in IP 65 / IP 67

For the connection technology in IP 65 / 67 e.g. M12 plug connectors have been defined. Sensors normally feature a 4 pin connector and actuators a 5 pin connector.
IO-Link masters normally feature a 5 pin M12 socket.

The connection assignment has been specified in IEC 60974-5-2 as follows:

- Pin 1 / L+ (BN): 24 V DC (IO-Link specification: 18...30 V DC)
- Pin 3 / L– (BU): 0 V
- Pin 4 / C/Q (BK): Switching (Q) and communication (C) line




### Connection type A

In type A the functional assignment for pin 2 and pin 5 is not defined by the IO-Link specification. The manufacturer can use these freely for additional output and input functions.
EGE uses pin 2 for an additional switching output, a 4...20 mA output or as signal input.

### Connection cable

The connection cable of an IO-Link device to the master should according to the IO-Link specification not exceed a length of 20 m. An unshielded standard cable is sufficient.

## IO-Link communication

### Operating modes

The port (pin 4 / C/Q) of an IO-Link master can be operated in the following operating modes:

- IO-Link: Data transfer between device and master
- DI (digital input): The binary output state of the connected device is processed (the sensor output supplies a switching signal).
- DQ (digital output): At the output the corresponding high or low level is present (an actuator is actuated).
- Deactivated: No use has been assigned to the port.

### Starting the I/O-Link communication

If the operating mode IO-Link is assigned to the port of an IO-Link master, the communication starts. The IO-Link master supplies a wake-up pulse and waits for the response of the IO-Link partner. After successfully establishing a connection, the master determines the data transmission rate of the device and starts the communication.

### Transmission speed

The IO-Link specification V1.1 specifies three data transmission rates:

- COM 1: 4.8 kBd
- COM 2: 38.4 kBd
- COM 3: 230.4 kBd

An IO-Link device only supports one of the defined data transmission rates. An IO-Link master according to specification V1.1 supports all data transmission rates and automatically adjusts to the data transmission rate supported by the device.

### Response time

The response time of an IO-Link system depends on the minimum cycle time of the device and the processing speed of the master. The device description file IODD includes a value for the minimum cycle time.

### Transmission quality

The IO-Link communication utilises the 24 V level of the switching output for the transmission and is therefore highly interference-resistant. If the IO-Link software detects an error in the data transmission, this is repeated. Only after three consecutive failed attempts is the connection terminated. This termination is reported to the higher level control without delay as an error message.

## Data types

Generally, four data types are available:

- Process data: Cyclic data
- Value status: Cyclic data
- Device data: Acyclic data
- Events: Acyclic data

### Process data and value status

Process data and their value status are transmitted cyclically in a data telegram. The process data lengths has been defined with 0 to 32 bytes for each device in its specification by the manufacturer. The value status indicates whether the process data are value or invalid.

### Device data

Device data may be parameters, identification data and diagnostic information. They are exchanged acyclically between the master and the device.

### Events

If a previously defined event occurs in the device, the occurrence is reported to the master. The master then requests further information from the device and forwards the messages to the control. Events may be error messages and warnings. The IO-Link master can also transmit its own error messages and status data to the control.

The transmission of parameters or events is unaffected by the cyclical transmission of the process data.

## Device profiles

Access from application programs to a device is standardised with IO-Link device profiles.

The device profiles define the data structure and content and the basic functionality. Different IO-Link devices are thus provided with a uniform user perspective and an identical program access by the control.

### Smart sensor profile

In the IO-Link specification the "smart sensor profile" has currently been defined. It is particularly suited for measuring sensors, because in addition to the switching points measured values are also transmitted.

## IODD device description file

The manufacturer provides for his IO-Link product an IODD (Input Output Device Description) in the form of XML files and images in digital form. The specified uniform structure of these files ensures the manufacturer-independent universal handling of the data. The IODD contain information about:

- Communication properties
- Device parameters with value ranges and default values
- Identification, process and diagnostic data
- Device data
- Text descriptions
- Device images
- Manufacturer logo

For devices which in addition to IO-Link version 1.0 also support version 1.1 there exist accordingly two different IODD versions.

## IO-Link configuration tool

Software provided by the master manufacturer is required to configure an IO-Link system. This software uses the IODD for the communication and parametrisation of an IO-Link device. If multiple masters are used in control systems, the software has additional tasks:

- Assignment of the devices to the ports of the master
- Address allocation within the address range of the master

# Technique and application • IO-Link

## EGE products with IO-Link

EGE continuously expands its portfolio with sensors which include the IO-Link functionality. These can be integrated directly via the IO-Link interface in a control system and parametrised comfortably via this connection. As with all standard components, customer-specific special designs are also possible within the framework of the IO-Link specification for products with IO-Link interface.

### IO-Link Master

With the IO-Link master the easy parametrisation of IO-Link enabled sensors is possible. The matching configuration software is available as download from www.iq2.development and can be installed on a PC or Notebook. The set includes in addition to the master and power supply also an M12 connection cable to the sensor and a USB cable for connection to the PC.

IO-Link-USB-Master-Set Z01216

## Flow rate measurement and monitoring with SDNC 500 GAPL / GANPL


**for water-based media, linearized:**

| | |
|---|---|
| SDNC 502 GAPL | 0.020...0.500 l/min • P11381 |
| SDNC 503 GAPL | 0.05...2.00 l/min • P11375 |
| SDNC 506 GAPL | 0.10...4.00 l/min • P11377 |
| SDNC 508 GAPL | 0.20...8.00 l/min • P11379 |

**for water / glycol / oil, non linear:**

| | |
|---|---|
| SDNC 503 GANPL | 0.0... ca. 6.0 l/min • P11376 |
| SDNC 506 GANPL | 0.0... ca. 15.0 l/min • P11378 |
| SDNC 508 GANPL | 0.0... ca. 30.0 l/min • P11380 |

SDNC 500 sensors with IO-Link interface are the smart solution for process monitoring. They can record the flow speed and temperature in fluid mediums. To do so, there is a configuration software which configures the sensors via an IO-Link/USB master. The ... GAPL models provide flow data for liquid mediums as a linear output signal. The detection range of sensors suitable for all liquid media can be freely configured. Their output signal is not linear.

### Functions / parameters

- Limit value and range monitoring for flow rate and temperature
- Adjustable delay for the switching signal
- Analog output scalable for flow rate or temperature
- Pulse output for flow rate
- Logical linking of flow rate and temperature monitoring
- Teach commands for determining the limit and range values
- TAG identification programmable
- Available in the SIO mode analog and switching output

The flow rate sensors have a G1/4 process connection and can be easily integrated with hoses or pipe connectors in pipes. A special flow adapter shapes the flow profile and ensures a stable signal for the SDNC 502/503/506 GAPL. In the SDNC 508 GAPL a straight inlet section of 100 mm is sufficient to achieve the specifications. The measuring range of the ...GANPL variants can be adapted to almost all media. A non-linear signal path results. The robust construction makes the sensors not sensitive to moisture and vibrations.

## Compressed air consumption measurement with LDN, LDV und LDS

The compressed air sensors LDN 1009, LDV 1025/1040 and LDS 1000 detect the flow rate, the temperature and the pressure (not LDN 1009) in compressed air networks. They display the current air flow rate of a connected tool or system in an easy-to-read display and respond quickly to any changes in flow speed. At the same time the sensors also act as volume meters and measure the air consumption in the units standard litre and standard cubic metre.


The parametrisation of the sensors is via the IO-Link interface or the buttons on the front panel. Its 6-digit display shows the measurement values which can be sent as process data to an SPS via the IO Link connection. In the IOS mode the user can use the configured analogue and switching outputs.

# Technique and application • IO-Link

### Functions / parameters

- Resettable compressed air consumption meter
- Limit value and range monitoring for all variables
- Adjustable delay of the switching signal
- Scalable analog output for all variables
- Selectable variable for display
- Selectable measuring unit for flow rate and consumption
- 24h average / max and min value readable for all variables
- Configurable outputs (PNP/NPN-NO/NC)
- Adjustable reference values for standard pressure and standard temperature
- TAG ID programmable and readable on device
- Modification counter (changes to the device configuration)
- In the SIO mode analogue and switching output or two switching outputs available

### LDN 1009 GAPL

LDN 1009 GAPL — G1/4 • 15 Nm³/h • P11373

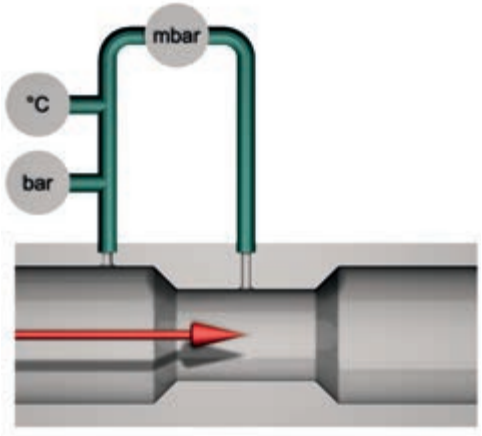
The functional principle of the compressed air sensor is calorimetric. Heat is removed from a sensor element by passing air and results in a temperature reduction. The amount of reduction is determined by the air mass and results in an output signal proportional to the mass flow. No pressure or temperature compensation is required for the medium state. According to factory configuration the flow rate is displayed directly in standard litres or standard cubic metres. The standard conditions for pressure and temperature can be adjusted in the application.

The sensor is inserted inline into the pipe line. The lengths for run-in and run-out distances required result from pipe routes and any existing controls and instruments upstream of the sensor. For the operation of the compressed air meters the air must be free from oil, filtered and dehumidified in accordance with class 1.4.1 as per ISO 8573-1.

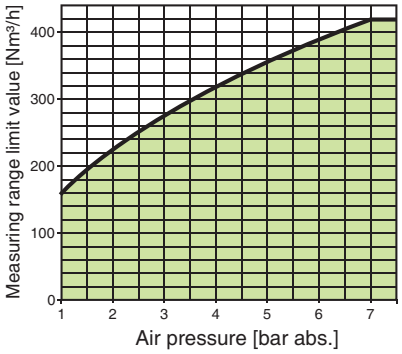
### LDV 1025 / LDV 1040

LDV 1025 GAPL — G1 • 420 Nm³/h • P11382
LDV 1040 GAPL — G1 1/2 • 750 Nm³/h • P11383

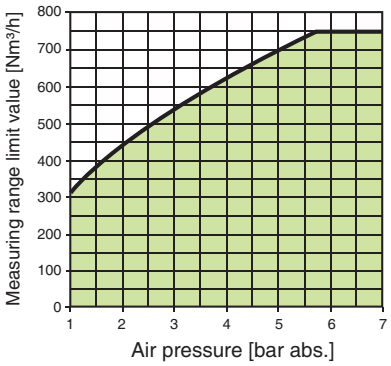
In these sensors the air flow causes in the area of the reduced diameter a vacuum compared to the inlet pressure. This pressure difference is a measure for the flow rate. The influence of the absolute pressure and the air temperature on the flow volume is taken into account by integrated measuring elements. The sensors are installed "inline" in the pipe. No special measures for dehumidification and filtering of the compressed air are required. To achieve the specified deviations, straight inlet and outlet sections without steps must be provided.




Outside the usual pressure ranges the consumption sensors also operate in the low pressure range with a limited functional scope. The optimum ranges of application (green area) for the variants LDV 1025 and LDV 1040 are shown in the diagrams below.




**Working range LDV 1025 GAPL**



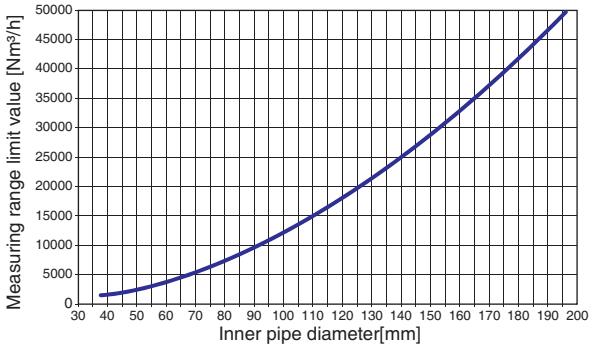

**Working range LDV 1040 GAPL**

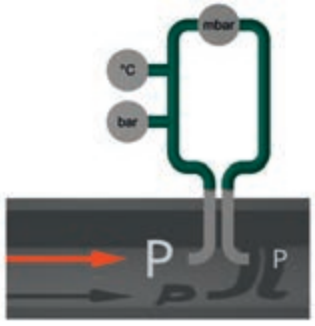
### *LDS 1000*

LDS 1000 GAPL — Usable up to d = 200 mm • P11388

The LDS 1000 is used as immersion sensor in compressed air lines from DN 40. By entering the internal pipe diameter the measuring range limit value for the sensor is determined and the flow rate or air consumption indicated on the display. The measuring range related to the diameter is shown in the diagram below. Via the IO-Link interface the sensor supplies the flow rate data as a percentage value of the measuring range limit value. The limit value can be read as device parameter with the parametrisation software.

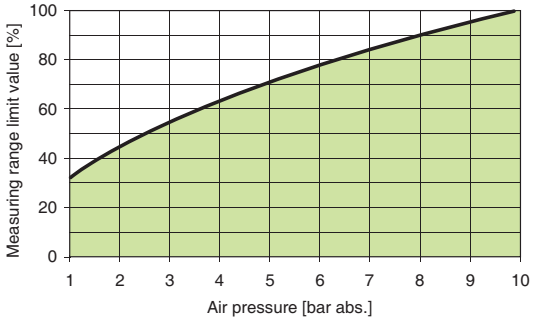
The air flow causes at the measuring point of this sensor which is overflown an overpressure compared to the downstream measuring aperture. This pressure difference is a measure for the flow rate. The influence of the absolute pressure and the air temperature on the flow volume is calculated by integrated measuring elements and taken into account when analysing the pressure difference.




The sensor is installed with a cutting ring fitting in the pipe. The lengths for run-in and run-out distances required result from pipe routes and any existing controls and instruments upstream of the sensor.

Outside the usual pressure ranges the sensor also operates in the low pressure range with a limited application scope. The optimum functional range (green area) is shown in the diagram.




**Working range LDS 1000 GAPL**

# Flow Sensors

## Series 400 • Series 500


# Probes
# Compact models
# Amplifiers

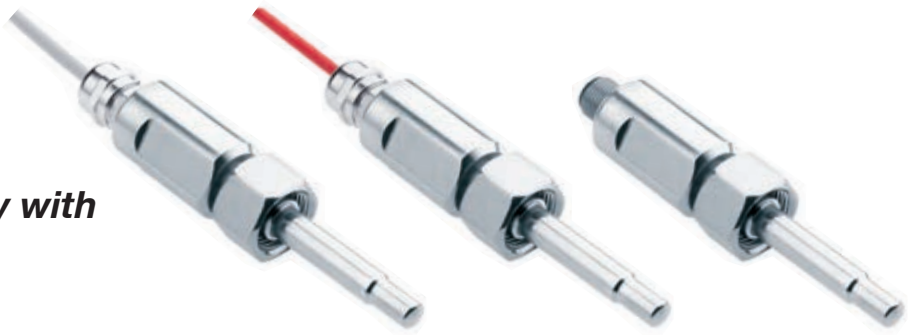
# Flow Sensors

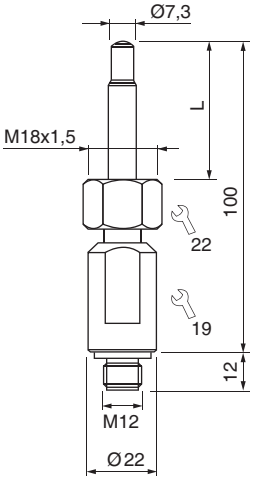
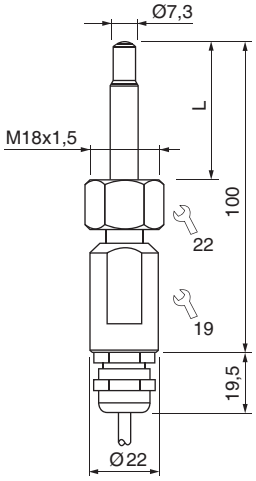
## Probe • Plug-in installation

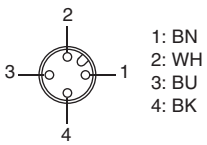
### Series ST 400

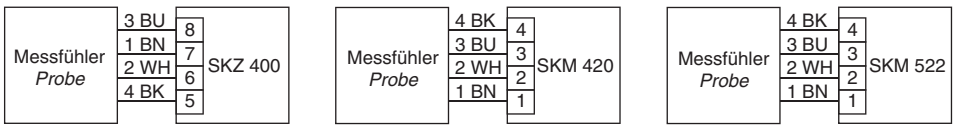
### Connection thread M18x1.5

### Plug-in installation
### Can be used universally with an adapter



| Design | M18x1.5 | M18x1.5 | |
|---|---|---|---|
| Dimensions |  |  | |
| Detection range [cm/s] | | | |
| Water | 1...150 | 1...150 | 1...150 |
| Oil | 3...300 | 3...300 | 3...300 |
| Sensor length L [mm] | 47 | 47 | 47 |
| **ID-No.** | **P11354** | **P11355** | **P11356** |
| Type | ST 418 S-A4 | ST 418 K-A4 | ST 418 KH-A4 |
| Medium temperature [°C] | −20...+80 | | +10...+120 |
| Temperature gradient [K/min] | 250 | | 250 |
| Start-up time typ. [s] | 8 (2...15) | | 8 (2...15) |
| Reaction time typ. [s] | 2 (1...13) | | 2 (1...13) |
| Compressive strength [bar] | 100 | | 100 |
| Sensor material | AISI 316 Ti | | AISI 316 Ti |
| Protection [EN 60529] | IP 67 | IP 68 | IP 68 |
| Connection | M12 connector | 2 m PVC-cable 4x0.25 mm² | 2 m FEP-cable 4x0.25 mm² |




Amplifiers required: SKM..., SKZ..., see page 1.71 - 1.75

| Accessories | connecting cable type SLG, SLW (page 1.99), Screw-in adapter SDA-SCS-... (page 1.103) |
|---|---|

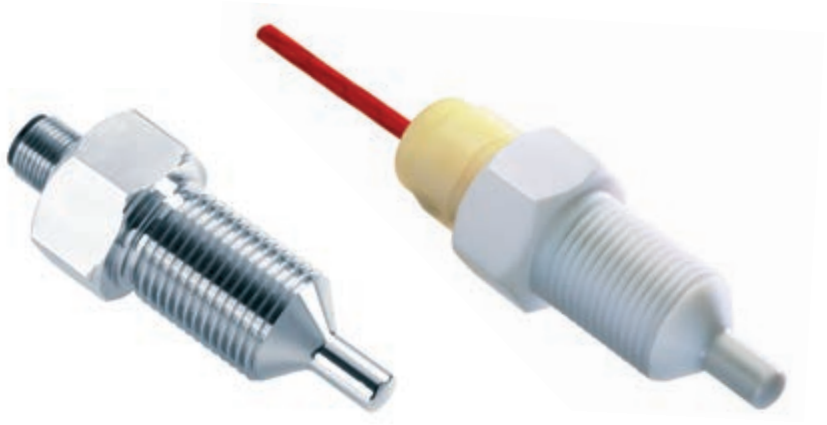
# Flow Sensors

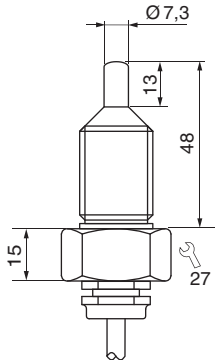
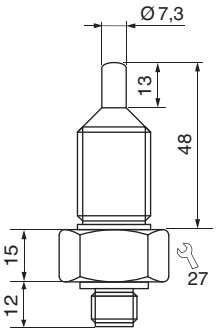
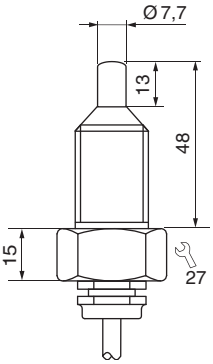
## Probe • Standard thread

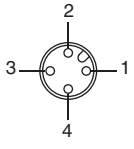
### Series ST 400

### G1/2 thread

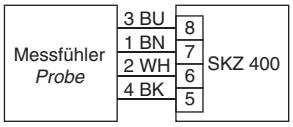
### Stainless steel
### PTFE-Housing

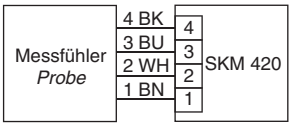


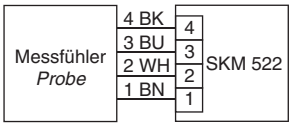
| Design | G1/2 | G1/2 | G1/2 PTFE |
|---|---|---|---|
| Dimensions |   |   |   |
| Detection range [cm/s] | | | |
| Water | 1...150 | 1...150 | 1...70 |
| Oil | 3...300 | 3...300 | 2...100 |
| Sensor length [mm] | 48 | 48 | 48 |
| **ID-No.** | **P10412** | **P10414** | **P10431** |
| Type | ST 421 K-A4 | ST 421 S-A4 | ST 421 K-F |
| Medium temperature [°C] | −20...+80 | | −10...+70 |
| Temperature gradient [K/min] | 250 | | 1 |
| Start-up time typ. [s] | 8 (2...15) | | 60 (40...100) |
| Reaction time typ. [s] | 2 (1...13) | | 30 (10...50) |
| Compressive strength [bar] | 100 | | 5 |
| Sensor material | AISI 316 Ti • different material on request | | PTFE |
| Protection [EN 60529] | IP 68 | IP 67 | IP 68 |
| Connection | 2 m PVC-cable 4x0.25 mm² | M12 connector | 2 m FEP-cable 4x0.25 mm² cable gland PVDF |




1: BN
2: WH
3: BU
4: BK




Amplifiers required: SKM..., SKZ..., see page 1.71 - 1.75

| Accessories | connecting cable type SLG 4-2 (Z00445), SLW 4-2 (Z00446), see page 1.99 |
|---|---|

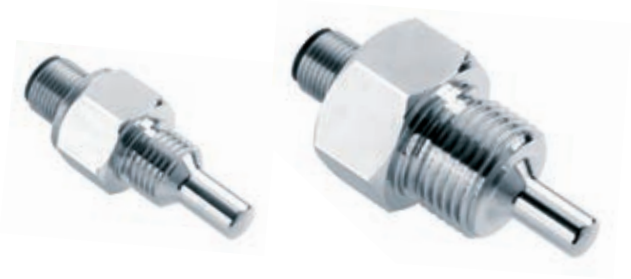
# Flow Sensors

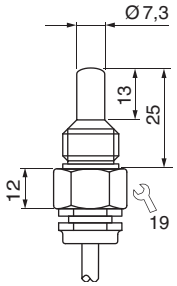
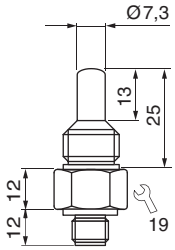
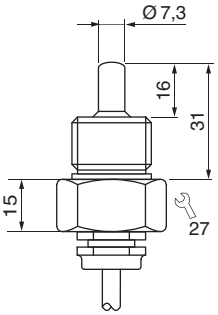
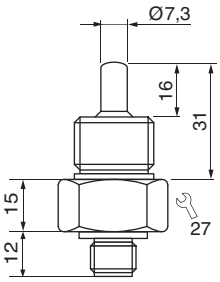
## Probe • Short thread

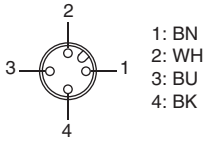
### Series STK 400

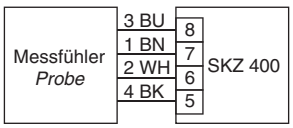
### G1/4 thread
### G1/2 thread

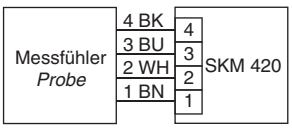
### Stainless steel

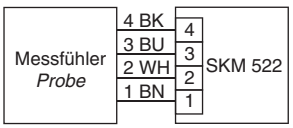


| Design | G1/4 | G1/4 | G1/2 | G1/2 |
|---|---|---|---|---|
| Dimensions |   |   |   |   |
| Detection range [cm/s] | | | | |
| Water | 1...150 | 1...150 | 1...150 | 1...150 |
| Oil | 3...300 | 3...300 | 3...300 | 3...300 |
| Sensor length [mm] | 25 | 25 | 31 | 31 |
| **ID-No.** | **P10402** | **P10404** | **P10408** | **P10410** |
| Type | STK 412 K-A4 | STK 412 S-A4 | STK 421 K-A4 | STK 421 S-A4 |
| Medium temperature [°C] | −20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different material on request | | | |
| Protection [EN 60529] | IP 68 | IP 67 | IP 68 | IP 67 |
| Connection | 2 m PVC-cable 4x0.25 mm² | M12 connector | 2 m PVC-cable 4x0.25 mm² | M12 connector |




Amplifiers required: SKM..., SKZ..., see page 1.71 - 1.75

| Accessories | connecting cable type SLG 4-2 (Z00445), SLW 4-2 (Z00446), see page 1.99 |
|---|---|

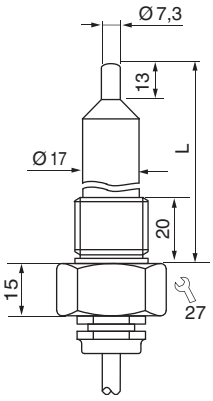
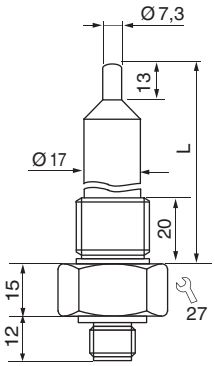
# Flow Sensors

## Probe • Extra long

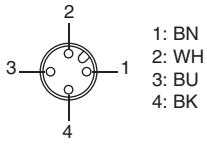
### Series ST 400

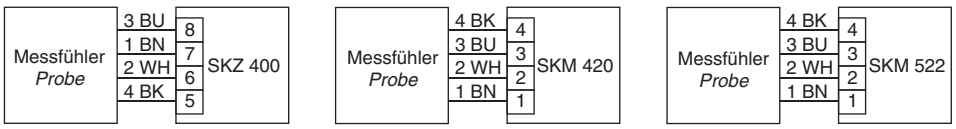
### G1/2 thread

### Stainless steel

| Design | G1/2 | | G1/2 | |
|---|---|---|---|---|
| Dimensions |  | |  | |
| Detection range [cm/s] | | | | |
| Water | 1...150 | | 1...150 | |
| Oil | 3...300 | | 3...300 | |
| Sensor length L [mm] | 80 | 120 | 80 | 120 |
| ID-No. | P10901 | P10902 | P10904 | P10905 |
| Type | ST 421 K-L80 | ST 421 K-L120 | ST 421 S-L80 | ST 421 S-L120 |
| Medium temperature [°C] | −20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Protection [EN 60529] | IP 68 | | IP 67 | |
| Connection | 2 m PVC-cable 4x0.25 mm² | | M12 connector | |

Extra long sensors up to 300 mm on request




Amplifiers required: SKM..., SKZ..., see page 1.71 - 1.75

| Accessories | connecting cable type SLG 4-2 (Z00445), SLW 4-2 (Z00446), see page 1.99 |
|---|---|

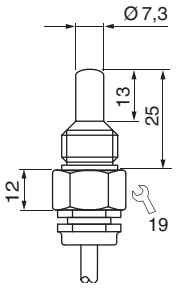
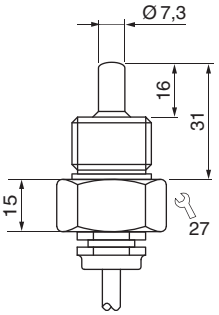
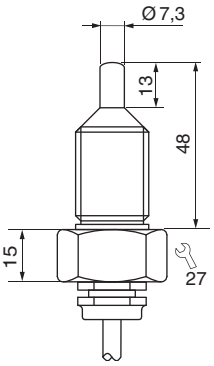
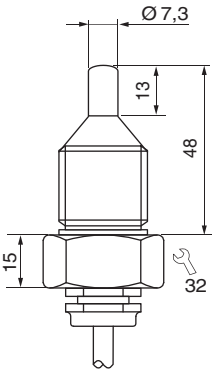
# Flow Sensors

## Probe • High temperature 120 °C

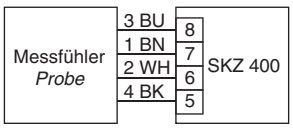
### Series ST 400

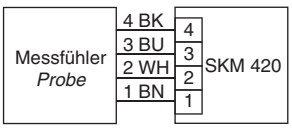
**G1/4 thread**
**G1/2 thread**
**G3/4 thread**

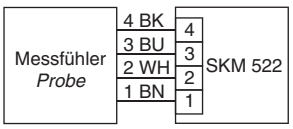
**Stainless steel**
**High temperature sensors 120 °C**

| Design | G1/4 | G1/2 | G1/2 | G3/4 |
|---|---|---|---|---|
| Dimensions |   |   |   |   |
| Detection range [cm/s] | | | | |
| Water | 1...150 | 1...150 | 1...150 | 1...150 |
| Oil | 3...300 | 3...300 | 3...300 | 3...300 |
| Sensor length [mm] | 25 | 31 | 48 | 48 |
| **ID-No.** | **P10435** | **P10436** | **P10437** | **P10438** |
| Type | STK 412 KH-A4 | STK 421 KH-A4 | ST 421 KH-A4 | ST 431 KH-A4 |
| Medium temperature [°C] | +10...+120 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Protection [EN 60529] | IP 68 | | | |
| Connection | 2 m FEP-cable, 4x0.25 mm² | | | |

High temperature sensors my be used for temperature up to 120 °C.
A short-time overload up to 135 °C is allowed; within this time the switching point is not specified. After returning back to temperatures below 120 °C the sensor will work properly again.
Special design on request.



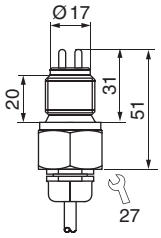
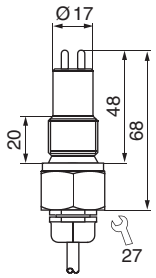
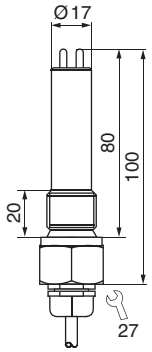

Amplifiers required: SKM..., SKZ..., see page 1.71 - 1.75

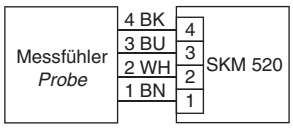
# Probe • High temperature 160 °C

## Series ST 500

## G1/2 thread

## Resistant to hot steam

| Design | G1/2 | | |
|---|---|---|---|
| Dimensions |  |  |  |
| Detection range | | | |
| Fluids [cm/s] | 1...300 | 1...300 | 1...300 |
| Air / gas [m/s] | 1...40 | 1...40 | 1...40 |
| Sensor length [mm] | 31 | 48 | 80 |
| **ID-No.** | **P11259** | **P11260** | **P11261** |
| Type | ST 521 KH | ST 521/1 KH | ST 521/2 KH |
| Medium temperature [°C] | fluids +10...160 – air/gas +10...135 | | |
| Temperature gradient [K/min] | fluids 250 – air/gas 20 | | |
| Start-up time [s] | 5...20 | | |
| Reaction time [s] | 2...20 | | |
| Compressive strength [bar] | 60 | | |
| Protection [EN 60529] | IP 67 | | |
| Sensor material | AISI 316 Ti • different materials on request | | |
| Connection | 2 m FEP-cable 4x0.25 mm² | | |




Amplifier required: SKM 520, see page 1.73

# Flow Sensors

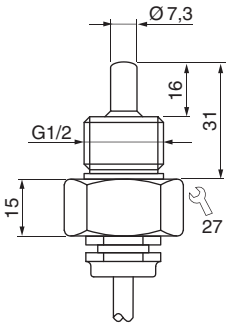
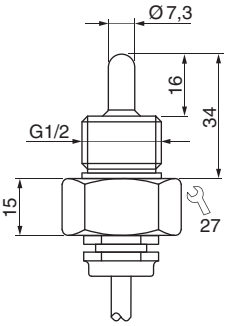
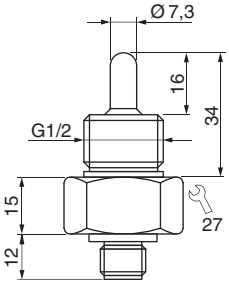
## Probe • Chemical resistant

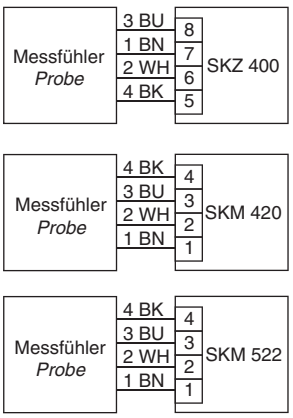
### Series STA 400

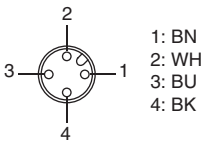
### G1/2 thread

### Hastelloy B-2/C-22

### Metal ceramic coated

| Design | G1/2...HB2/HC22 | | G1/2...K-B3 | G1/2...S-B3 |
|---|---|---|---|---|
| Dimensions |  | |  |  |
| Detection range [cm/s] | | | | |
| Water | 1...150 | 1...150 | 1...150 | 1...150 |
| Oil | 3...300 | 3...300 | 3...300 | 3...300 |
| Sensor length [mm] | 31 | 31 | 34 | 34 |
| **ID-No.** | **P10625** | **P11159** | **P10623** | **P10622** |
| Type | STA 421 K-HB2 | STA 421 K-HC22 | STA 421 K-B3 | STA 421 S-B3 |
| Medium temperature [°C] | –20...+80 (+10...+120 on request) | | | |
| Temperature gradient [K/min] | 250 | | | |
| Reaction time [s] | 1...15 | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | Hastelloy B-2 | Hastelloy C-22 | Titanium / metal ceramic | |
| Protection [EN 60529] | IP 68 | | | IP 67 |
| Connection | 2 m FEP-cable 4x0.25 mm² | | | M12 connector |




These sensors are made of titanium and are coated with a metal-ceramic material layer. Coated sensors display chemical resistance practically comparable to chemical characteristics of PTFE or Hastelloy. Unlike PTFE sensors, coated sensors display the same temperature behaviour as stainless steel sensors, with high temperature gradients.
The high surface hardness of the coating protects the sensor against abrasion, thus considerably increasing its durability. The perfectly smooth surface virtually eliminates deposits.

Amplifiers required: SKM..., SKZ..., see page 1.71 - 1.75

| Accessories | connecting cable type SLG 4-2 (Z00445), SLW 4-2 (Z00446), see page 1.99 |
|---|---|

# Flow Sensors

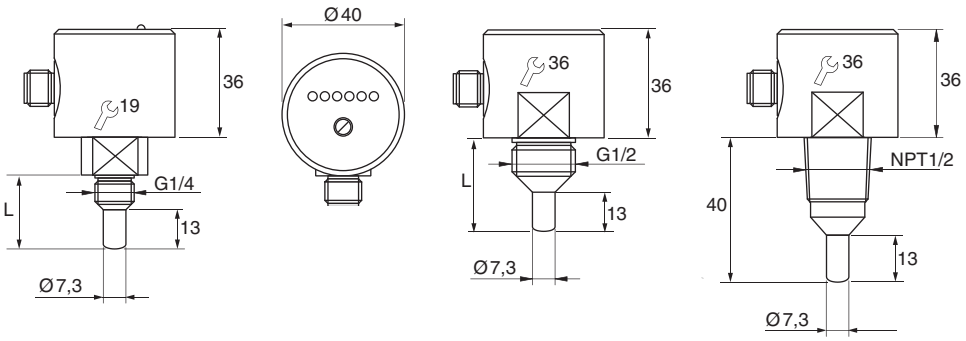
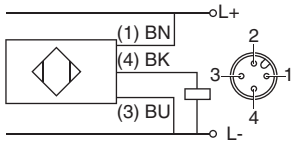
## Compact models DC-PNP • Screw-in mounting

### Series SC 440

### DC 24 V

### Stainless steel

### G1/4 thread
### G1/2 thread
### NPT 1/2 thread


| Design | G1/4 | G1/2 | | | NPT1/2 |
|---|---|---|---|---|---|
| Dimensions |  | | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | | |
| Output | PNP | | | | |
| Sensor length L [mm] | 25 | 31 | 48 | 80 | 120 | 40 |
| Thread | G1/4 | G1/2 | G1/2 | G1/2 | G1/2 | NPT1/2 |
| ID-No. | P11064 * | P10521 * | P10523 * | P10525 * | P10526 * | P11066 * |
| Type | SC440/5-A4-GSP | SC440-A4-GSP | SC440/1-A4-GSP | SC440/2-A4-GSP | SC440/3-A4-GSP | SC440/6-A4-GSP |
| Supply voltage [V] | 24 DC ±20% | | | | | |
| Current consumption [mA] | 70 | | | | | |
| Switching current [mA] | 400 (20 °C) | | | | | |
| Ambient temperature [°C] | –20...+80 | | | | | |
| Medium temperature [°C] | –20...+80 | | | | | |
| Temperature gradient [K/min] | 250 | | | | | |
| Start-up time typ. [s] | 8 (2...15) | | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | | |
| Compressive strength [bar] | 100 | | | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | | | |
| Housing material | AISI 316 Ti / AISI 303 | | | | | |
| Display flow | LED-array | | | | | |
| Protection [EN 60529] | IP 67 | | | | | |
| Connection | M12 connector | | | | | |
| * c UL us LISTED E304328 |  | | | | | |
| Accessories | connecting cable type SLG 3-2, SLG 3-5, SLW 3-2, SLW 3-5, see page 1.99 | | | | | |

# Flow Sensors

## Compact models DC-PNP • Plug-in installation

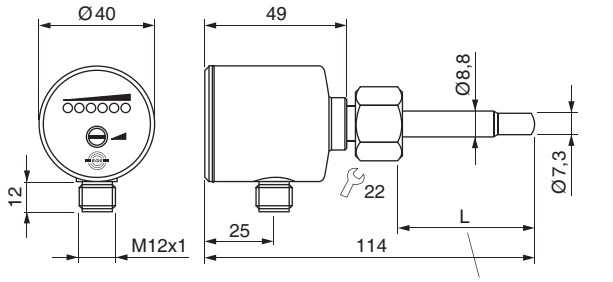
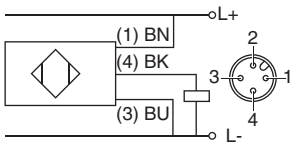
### Series SCS 440

**DC 24 V**

**Robust stainless steel housing**

**Connection thread M18x1.5**

**Can be used universally with an adapter**


| Design | M18x1.5 |
|---|---|
| Dimensions |  |
| Detection range [cm/s] | water 1...150 / oil 3...300 |
| Output | PNP |
| Sensor length L [mm] | 47 |
| Thread fixing nut | M18x1.5 |
| **ID-No.** | **P11352** |
| Type | SCS 440-A4-GSP |
| | |
| Supply voltage [V] | 24 DC ±20% |
| Current consumption [mA] | ≤70 |
| Switching current [mA] | 400 (20 °C) |
| Ambient temperature [°C] | –20...+80 |
| Medium temperature [°C] | –20...+80 |
| Temperature gradient [K/min] | 250 |
| Start-up time typ. [s] | 8 (2...15) |
| Reaction time typ. [s] | 2 (1...13) |
| Compressive strength [bar] | 100 |
| Material | housing: AISI 316 L sensor: AISI 316 Ti |
| O-Ring-Material | FPM |
| Display flow | LED-array |
| Protection [EN 60529] | IP 67 |
| Connection | M12 connector |
| |  |
| Accessories | connecting cable type SLG, SLW (page 1.99), screw-in adapter SDA-SCS-... (page 1.103) |

# Compact models AC/DC • Plug-in installation

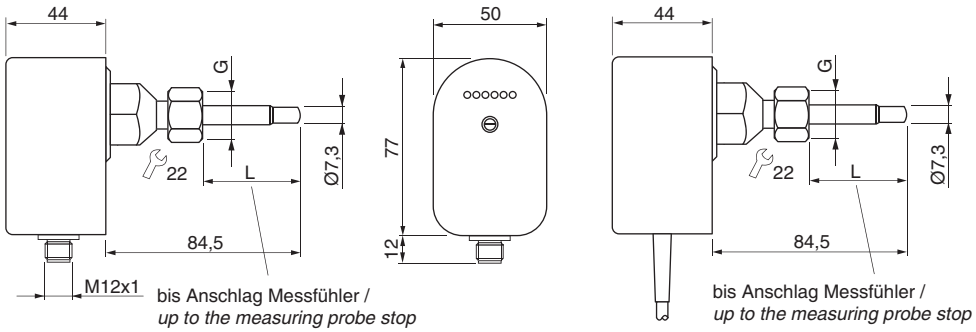
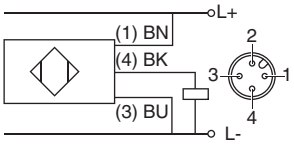
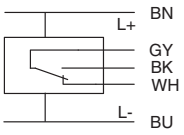
## Series SNS 450

**AC 230 V • AC 115 V • DC 24 V**

**PNP output • Relay output**

**Connection thread M18x1.5**

**Can be used universally with an adapter**

| Design | M18x1.5 | | | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | PNP | Relay | | |
| Sensor length L [mm] | 47 | 47 | 47 | 47 |
| Connection thread G | M18x1.5 | M18x1.5 | M18x1.5 | M18x1.5 |
| ID-No. | P11360 * | P11362 * | P11364 * | P11365 * |
| Type | SNS 450-A4-GSP-S | SNS 450-A4-GR | SNS 450-A4-WR1 | SNS 450-A4-WR2 |
| | | | | |
| Supply voltage [V] | 24 DC ±20% | 24 DC ±20% | 115 AC ±10% | 230 AC ±10% |
| Current consumption [mA] | <100 | <100 | <65 | <35 |
| Switching voltage max. [V] | – | 250 AC / 60 DC | 250 AC / 60 DC | 250 AC / 60 DC |
| Switching current max. [A] | 0.4 (20°C) | 4 AC / 4 DC | 4 AC / 4 DC | 4 AC / 4 DC |
| Switching power max. | – | 1000 VA / 60 W | 1000 VA / 60 W | 1000 VA / 60 W |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti | | | |
| Housing material | PBT | | | |
| Display flow | LED array | | | |
| Protection [EN 60529] | IP 67 | | | |
| Connection | M12 connector | 2 m PVC-cable 5x0.5 mm² | | |
| * c UL us LISTED E304328 |  |  | | |
| Accessories | connecting cable type SLG, SLW (page 1.99), screw-in adapter SDA-SCS-... (page 1.103) | | | |

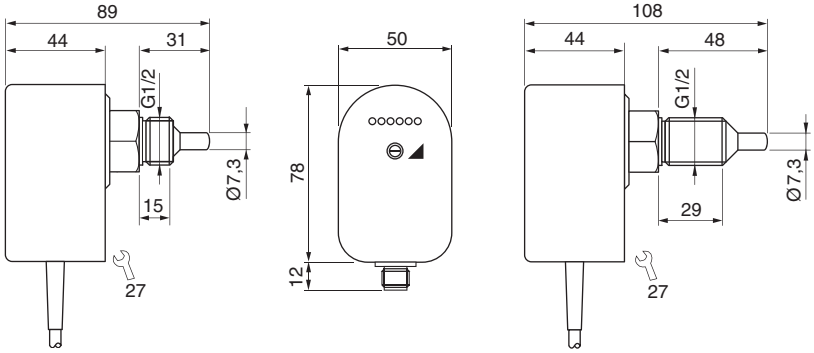
# Flow Sensors

## Compact models DC-PNP • Screw-in mounting

### Series SN 450

### DC 24 V

### G1/2 thread

| Design | G1/2 • L= 31 mm | | G1/2 • L= 48 mm | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | PNP | | | |
| Sensor length L [mm] | 31 | 31 | 48 | 48 |
| Thread | G1/2 | G1/2 | G1/2 | G1/2 |
| **ID-No.** | **P11241 *** | **P11161 *** | **P11228 *** | **P11162 *** |
| Type | SN 450-A4-GSP | SN 450-A4-GSP-S | SN 450/1-A4-GSP | SN 450/1-A4-GSP-S |
| Supply voltage [V] | 24 DC ±20% | | | |
| Current consumption [mA] | 60 | | | |
| Switching current [mA] | 400 (20 °C) | | | |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Housing material | PBT | | | |
| Display flow | LED-array | | | |
| Protection [EN 60529] | IP 67 | | | |
| Connection | 2 m PVC-cable 3x0.5 mm² | M12 connector | 2 m PVC-cable 3x0.5 mm² | M12 connector |

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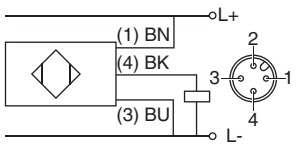



| Accessories | connecting cable type SLG 3-2, SLG 3-5, SLW 3-2, SLW 3-5, see page 1.99 |
|---|---|

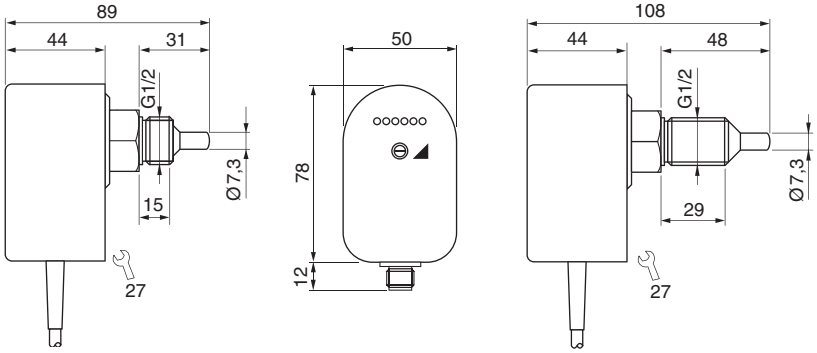
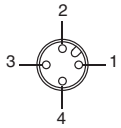
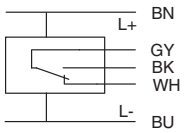
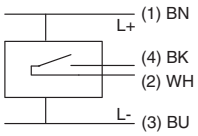
# Flow Sensors

## Compact models DC-Relay • Screw-in mounting

### Series SN 450

### DC 24 V

### G1/2 thread

| Design | G1/2 • L= 31 mm / 48 mm | | G1/2 • L= 31 mm / 48 mm | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | Relay | | Relay | |
| Sensor length L [mm] | 31 | 48 | 31 | 48 |
| Thread | G1/2 | G1/2 | G1/2 | G1/2 |
| **ID-No.** | **P11115** | **P11078** | **P11116** | **P11086** |
| Type | SN 450-A4-GR | SN 450/1-A4-GR | SN 450-A4-GRS | SN 450/1-A4-GRS |
| | | | | |
| Supply voltage [V] | 24 DC ±20% | | | |
| Current consumption [mA] | 80 | | | |
| switching voltage [V] | 250 AC / 60 DC | | 30 AC / 36 DC | |
| Switching current [mA] | 4 A AC / 4 A DC | | 1 A AC / 1 A DC | |
| Switching power max. | 1000 VA / 60 W | | – | |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Housing material | PBT | | | |
| Display flow | LED-array | | | |
| Protection [EN 60529] | IP 67 | | | |
| Connection | 2 m PVC-cable 5x0.5 mm² | | M12 connector | |
|  |  | |  | |
| Accessories | connecting cable type SLG 4-2, SLG 4-5, SLW 4-2, SLW 4-5, see page 1.99 | | | |

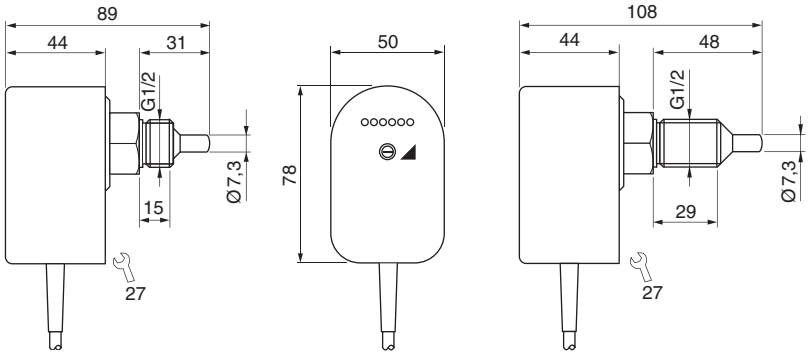
# Flow Sensors

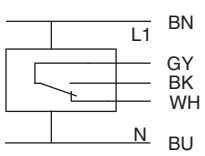
## Compact models AC-Relay • Screw-in mounting

### Series SN 450

### AC 230 V • AC 115 V
### Relay output

### G1/2 thread

| Design | G1/2 • L= 31 mm | | G1/2 • L= 48 mm | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | Relay | | | |
| Sensor length L [mm] | 31 | 31 | 48 | 48 |
| Thread | G1/2 | G1/2 | G1/2 | G1/2 |
| **ID-No.** | **P11113** | **P11114** | **P11074** | **P11076** |
| Type | SN 450-A4-WR1 | SN 450-A4-WR2 | SN 450/1-A4-WR1 | SN 450/1-A4-WR2 |
| Supply voltage [V] | 115 AC ±15% | 230 AC ±15% | 115 AC ±15% | 230 AC ±15% |
| Current consumption [mA] | 60 | 30 | 60 | 30 |
| Switching voltage [V] | 250 AC / 60 DC | | | |
| Switching current [mA] | 4 A AC / 4 A DC | | | |
| Switching power max. | 1000 VA / 60 W | | | |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Housing material | PBT | | | |
| Display flow | LED-array | | | |
| Protection [EN 60529] | IP 67 | | | |
| Connection | 2 m PVC-cable 5x0.5 mm² | | | |

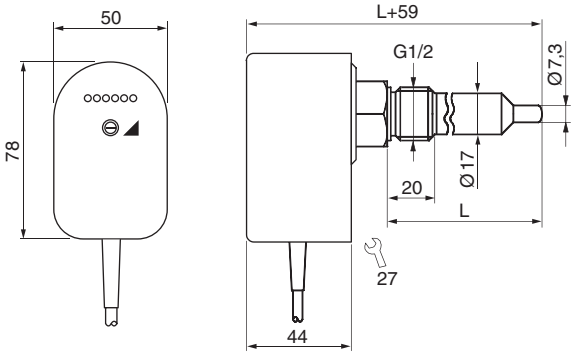
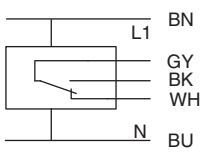
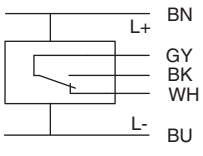


# Flow Sensors

## Compact models AC/DC • Extra long

### Series SN 450

**AC 230 V • AC 115 V**
**DC 24 V**
**Relay output**
**G1/2 thread**

| Design | G1/2 • L= 80 mm | | | G1/2 • L= 120 mm | | |
|---|---|---|---|---|---|---|
| Dimensions |   | | | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | | | |
| Output |  Relay | | | | | |
| Sensor length L [mm] | 80 | 80 | 80 | 120 | 120 | 120 |
| Thread | G1/2 | G1/2 | G1/2 | G1/2 | G1/2 | G1/2 |
| **ID-No.** | **P11079** | **P11080** | **P11081** | **P11082** | **P11083** | **P11084** |
| Type | SN450/2-A4-WR1 | SN450/2-A4-WR2 | SN450/2-A4-GR | SN450/3-A4-WR1 | SN450/3-A4-WR2 | SN450/3-A4-GR |
| | | | | | | |
| Supply voltage [V] | 115 AC ±15% | 230 AC ±15% | 24 DC ±20% | 115 AC ±15% | 230 AC ±15% | 24 DC ±20% |
| Current consumption [mA] | 60 | 30 | 80 | 60 | 30 | 80 |
| Switching voltage [V] | 250 AC / 60 DC | | | | | |
| Switching current [mA] | 4 A AC / 4 A DC | | | | | |
| Switching power max. | 1000 VA / 60 W | | | | | |
| Ambient temperature [°C] | –20...+70 | | | | | |
| Medium temperature [°C] | –20...+80 | | | | | |
| Temperature gradient [K/min] | 250 | | | | | |
| Start-up time typ. [s] | 8 (2...15) | | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | | |
| Compressive strength [bar] | 100 | | | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | | | |
| Housing material | PBT | | | | | |
| Display flow | LED-array | | | | | |
| Protection [EN 60529] | IP 67 | | | | | |
| Connection | 2 m PVC-cable 5x0.5 mm² | | | | | |
| |   | | |   | | |

# Flow Sensors

## Compact models DC-Analog • Plug-in installation

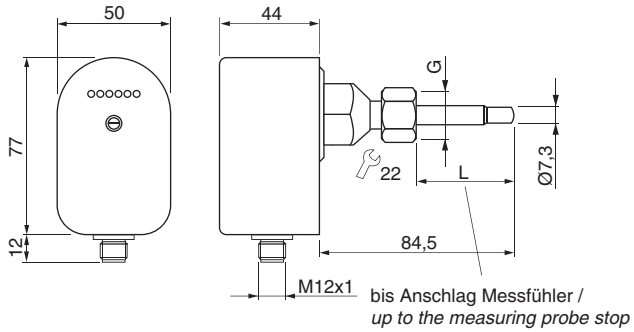
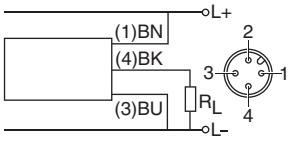
### Series SNS 450

**DC 24 V**

**Analog output 4...20 mA**

**Connection thread M18x1,5**

**Can be used universally with an adapter**

| Design | M18x1.5 | | |
|---|---|---|---|
| Dimensions |  | | |
| Detection range [cm/s] | | | |
| Water | 5...150 | 5...300 | 1...150 |
| Oil | – | – | 3...300 |
| Output | | 4...20 mA | |
| Sensor length L | 47 | 47 | 47 |
| Connection thread G | M18x1.5 | M18x1.5 | M18x1.5 |
| **ID-No.** | **P11357 *** | **P11358 *** | **P11359 *** |
| Type | SNS 450 GA | SNS 450 GA-3M | SNS 450 GAN-S |
| Supply voltage [V] | | 24 DC ±10% | |
| Current consumption [mA] | | < 100 | |
| Current output [mA] | 4...20, linear | 4...20, linear | 4...20, non linear |
| Load $R_L$ [Ω] | | 200...500 | |
| Ambient temperature [°C] | | –20...+70 | |
| Medium temperature [°C] | | –20...+80 | |
| Start-up time typ. [s] | | 8...60 | |
| Reaction time typ. [s] | | 3 | |
| Compressive strength [bar] | | 100 | |
| Sensor material | | AISI 316 Ti | |
| Housing material | | PBT | |
| Display flow | | LED-array | |
| Protection [EN 60529] | | IP 67 | |
| Connection | | M12 connector | |
| * c UL us LISTED E304328 |  | | |
| Accessories | connecting cable type SLG, SLW (page 1.99), screw-in adapter SDA-SCS-... (page 1.103) | | |

# Flow Sensors

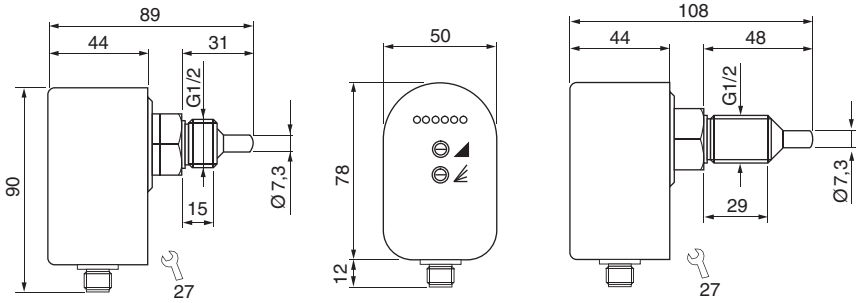
## Compact models DC-Analog • Screw-in mounting

### Series SN 450

### DC 24 V

### Analog output 4...20 mA

### G1/2 thread

| Design | G1/2 • L= 31 mm | | G1/2 • L= 48 mm | | |
|---|---|---|---|---|---|
| Dimensions |  | | | | |
| Detection range [cm/s]<br>Water<br>Oil | 5...150 | 5...300 | 5...150 | 5...300 | 5...150<br>3...300 |
| Output | | | 4...20 mA | | |
| Sensor length L [mm] | 31 | 31 | 48 | 48 | 48 |
| Thread | G1/2 | G1/2 | G1/2 | G1/2 | G1/2 |
| **ID-No.** | **P11121 *** | **P11118 *** | **P11095 *** | **P11122 *** | **P11239 *** |
| Type | SN 450 GA | SN 450 GA-3M | SN 450/1 GA | SN 450/1 GA-3M | SN 450/1 GAN-S |
| Supply voltage [V] | 24 DC ±10% | | | | |
| Current consumption [mA] | < 100 | | | | |
| Current output [mA] | 4...20, linear | | | | 4...20, non linear |
| Load $R_L$ [Ω] | 200...500 | | | | |
| Ambient temperature [°C] | –20...+70 | | | | |
| Medium temperature [°C] | –20...+80 | | | | |
| | | | | | |
| Start-up time typ. [s] | 8...60 | | | | |
| Reaction time typ. [s] | 3 | | | | |
| Compressive strength [bar] | 100 | | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | | |
| Housing material | PBT | | | | |
| Display flow | LED-array | | | | |
| Protection [EN 60529] | IP 65 | | | | |
| Connection | M12 connector | | | | |

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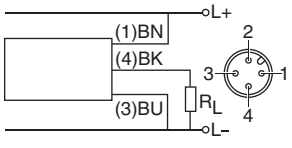



| Accessories | connecting cable type SLG 3-2 (Z01076), see page 1.99 |
|---|---|

# Flow Sensors

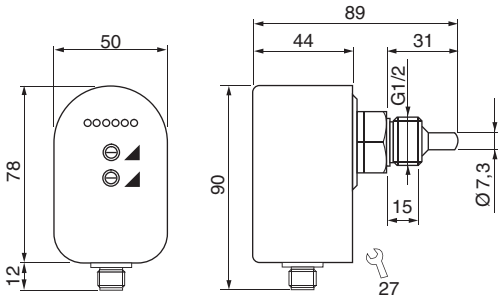
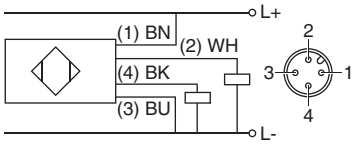
## Compact models DC-2x PNP • Screw-in mounting

### Series SN 450

**DC 24 V**
**PNP output**

**G1/2 thread**

**Two independent switching points**

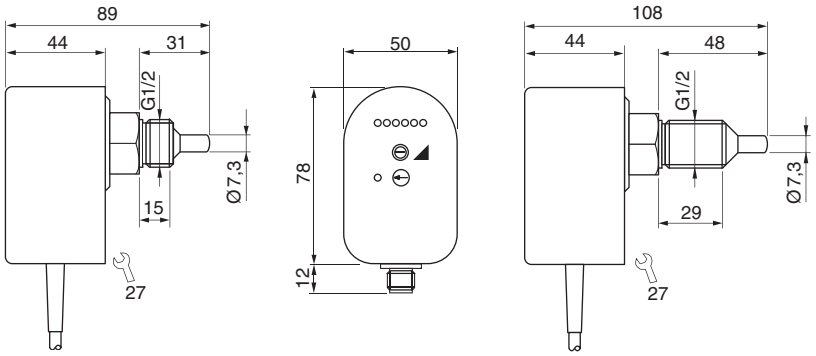
| Design | G1/2 • L= 31 mm |
|---|---|
| Dimensions |  |
| Detection range [cm/s] | water 1...150 / oil 3...300 |
| Output |  2x PNP |
| Sensor length L [mm] | 31 |
| Thread | G1/2 |
| **ID-No.** | **P11264 *** |
| Type | SN 450 GPP |
| Supply voltage [V] | 24 DC ±20% |
| Current consumption [mA] | < 60 |
| Switching current [mA] | 200 (20 °C) each output |
| Ambient temperature [°C] | –20...+60 |
| Medium temperature [°C] | –20...+80 |
| Temperature gradient [K/min] | 250 |
| | |
| Start-up time typ. [s] | 8 (2...15) |
| Reaction time typ. [s] | 2 (1...13) |
| Compressive strength [bar] | 100 |
| Sensor material | AISI 316 Ti • different materials on request |
| Housing material | PBT |
| Display flow | LED-array |
| Protection [EN 60529] | IP 67 |
| Connection | M12 connector |
| * cULus LISTED E304328 |  |
| Accessories | connecting cable type SLG 4-2 (Z00445), see page 1.99 |

# Flow Sensors

## Compact models DC • Temperature control

### Series SNT 450

### DC 24 V
### PNP output
### G1/2 thread

| Design | G1/2 • L= 31 mm | | G1/2 • L= 48 mm | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | 2x PNP | | | |
| Sensor length L [mm] | 31 | 31 | 48 | 48 |
| Temperature [°C] | 0...+80 | 0...+80 | 0...+80 | 0...+80 |
| **ID-No.** | **P11218 *** | **P11219 *** | **P11224 *** | **P11225 *** |
| Type | SNT 450-A4-GSP | SNT 450-A4-GSP-S | SNT 450/1-A4-GSP | SNT 450/1-A4-GSP-S |
| Supply voltage [V] | 24 DC ±20% | | | |
| Current consumption [mA] | < 60 | | | |
| Switching current [mA] | 200 (20 °C) each output | | | |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Housing material | PBT | | | |
| Display flow | LED-array | | | |
| Protection [EN 60529] | IP 65 | | | |
| Connection | 2 m PVC-cable 4x0.5 mm² | M12 connector | 2 m PVC-cable 4x0.5 mm² | M12 connector |

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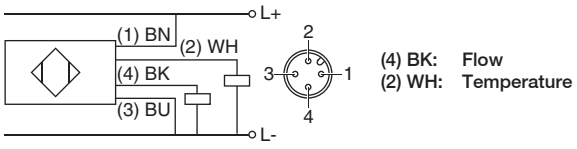


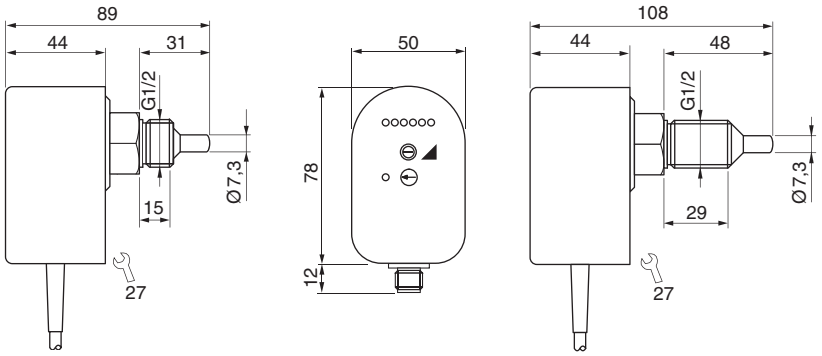
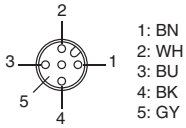
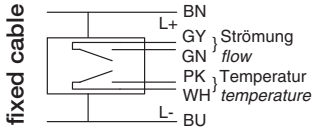
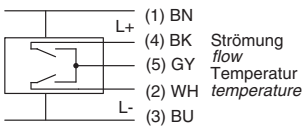

| Accessories | connecting cable type SLG 4-2, SLG 4-5, SLW 4-2, SLW 4-5, see page 1.99 |
|---|---|

# Flow Sensors

## Compact models DC • Temperature control

### Series SNT 450

### DC 24 V
### Relay output
### G1/2 thread

| Design | G1/2 • L= 31 mm | | G1/2 • L= 48 mm | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | Relay | | | |
| Sensor length L [mm] | 31 | 31 | 48 | 48 |
| Temperature [°C] | 0...+80 | 0...+80 | 0...+80 | 0...+80 |
| **ID-No.** | **P11216** | **P11217** | **P11222** | **P11223** |
| Type | SNT 450-A4-GR | SNT 450-A4-GR-S | SNT 450/1-A4-GR | SNT 450/1-A4-GR-S |
| | | | | |
| Supply voltage [V] | 24 DC ±20% | 24 DC ±20% | 24 DC ±20% | 24 DC ±20% |
| Current consumption [mA] | 80 | 80 | 80 | 80 |
| Switching voltage [V] | 250 AC / 60 DC | 30 AC / 36 DC | 250 AC / 60 DC | 30 AC / 36 DC |
| Switching current [mA] | 2A AC / 2A DC | 1A AC / 1A DC | 2A AC / 2A DC | 1A AC / 1A DC |
| Switching power max. | 500 VA / 60 W | – | 500 VA / 60 W | – |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Housing material | PBT | | | |
| Display flow | LED-array | | | |
| Protection [EN 60529] | IP 65 | | | |
| Connection | 2 m PVC-cable 6x0.5 mm² | M12 connector | 2 m PVC-cable 6x0.5 mm² | M12 connecor |
| |  1: BN 2: WH 3: BU 4: BK 5: GY |  fixed cable: BN, GY, GN, PK, WH, BU; L+, L-; Strömung / flow; Temperatur / temperature | |  plug: (1) BN, (4) BK, (5) GY, (2) WH, (3) BU; L+, L-; Strömung / flow; Temperatur / temperature |
| Accessories | connecting cable type SLG 5-2, SLW 5-2, see page 1.99 | | | |

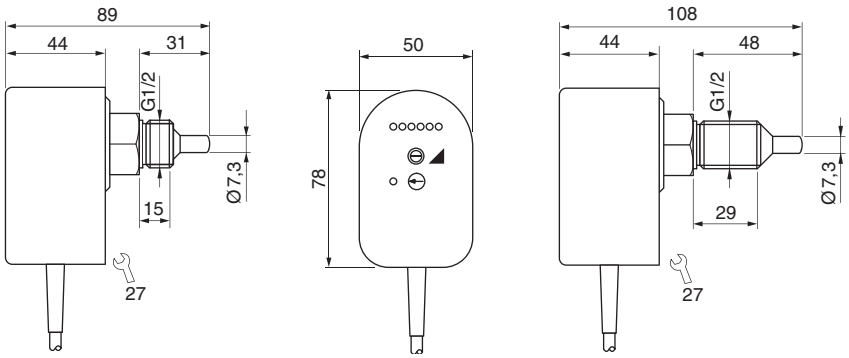
# Flow Sensors

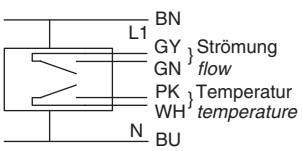
## Compact models AC • Temperature control

### Serie SNT 450

### AC 230 V • 115 V
### Relay output

### G1/2 thread

| Design | G1/2 • L= 31 mm | | G1/2 • L= 48 mm | |
|---|---|---|---|---|
| Dimensions |   | | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | | |
| Output | Relay | | | |
| Sensor length L [mm] | 31 | 31 | 48 | 48 |
| Temperature [°C] | 0...+80 | 0...+80 | 0...+80 | 0...+80 |
| **ID-No.** | **P11214** | **P11215** | **P11220** | **P11221** |
| Type | SNT 450-A4-WR1 | SNT 450-A4-WR2 | SNT 450/1-A4-WR1 | SNT 450/1-A4-WR2 |
| Supply voltage [V] | 115 AC ±15% | 230 AC ±15% | 115 AC ±15% | 230 AC ±15% |
| Current consumption [mA] | 60 | 30 | 60 | 30 |
| Switching voltage [V] | 250 AC / 60 DC | | | |
| Switching current [A] | 2 AC / 2 DC | | | |
| Switching power max. | 500 VA / 60 W | | | |
| Ambient temperature [°C] | –20...+70 | | | |
| Medium temperature [°C] | –20...+80 | | | |
| Temperature gradient [K/min] | 250 | | | |
| Start-up time typ. [s] | 8 (2...15) | | | |
| Reaction time typ. [s] | 2 (1...13) | | | |
| Compressive strength [bar] | 100 | | | |
| Sensor material | AISI 316 Ti • different materials on request | | | |
| Housing material | PBT | | | |
| Display flow | LED-array | | | |
| Protection [EN 60529] | IP 65 | | | |
| Connection | 2 m PVC-cable 6x0.5 mm² | | | |



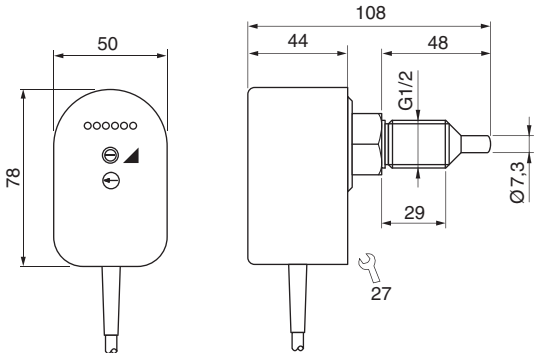
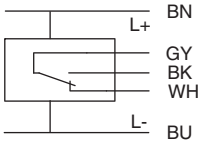
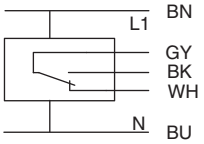
# Flow Sensors

## Compact models AC/DC • Turn on/off delay

### Series SN 450

### AC 230 V • DC 24 V
### Relay output

### G1/2 thread

| Design | Turn on delay | Turn off delay | |
|---|---|---|---|
| Dimensions |   | | |
| Detection range [cm/s] | water 1...150 / oil 3...300 | | |
| Output |  Relay | | |
| **ID-No.** | **P11234** | **P11233** | **P11231** |
| Type | SN 450/1 GR-VE | SN 450/1 GR-VA | SN 450/1 WR2-VA |
| Turn on delay [s] | 0...25 | – | – |
| Turn off delay [s] | - | 0...25 | 0...25 |
| Supply voltage [V] | 24 DC ±20% | 24 DC ±20% | 230 AC ±15% |
| Current consumption [mA] | <80 | <80 | 30 |
| Switching voltage [V] | 250 AC / 60 DC | | |
| Switching current [A] | 2 AC / 2 DC | | |
| Switching power max. | 500 VA / 60 W | | |
| Ambient temperature [°C] | –20...+70 | | |
| Medium temperature [°C] | –20...+80 | | |
| Temperature gradient [K/min] | 250 | | |
| Start-up time typ. [s] | 8 (2...15) | | |
| Reaction time typ. [s] | 2 (1...13) | | |
| Compressive strength [bar] | 100 | | |
| Sensor material | AISI 316 Ti • different materials on request | | |
| Housing material | PBT | | |
| Display flow | LED-array | | |
| Protection [EN 60529] | IP 65 | | |
| Connection | 2 m PVC-cable, 5x0.5 mm² | | |
| |   |   | |

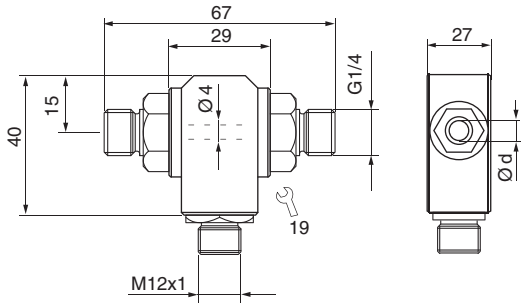
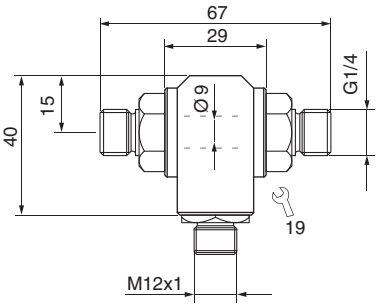
# Flow Sensors

## Inline-Probes

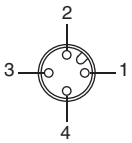
### Series SD 500

### Pipe diameter Ø4 mm / Ø9 mm

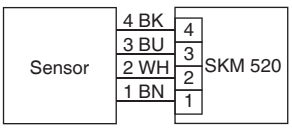
### G1/4 thread


| Design | G1/4 • Ø4 mm | G1/4 • Ø9 mm |
|---|---|---|
| Dimensions |  |  |
| Detection range [l/min] | 0.001...1 | 0.01...6 |
| Working range [l/min] | 0.01...0.8 | 0.2...6 |
| Inner diameter d [mm] | 4 | 9 |
| **ID-No.** | **P11251** | **P11252** |
| Type | SD 504 S | SD 510 S |
| Ambient temperature [°C] | –20...+70 | |
| Medium temperature [°C] | 0...+80 | |
| Temperature gradient [K/min] | 400 | |
| Start-up time [s] | 5 | |
| Reaction time typ. [s] | 0.5...10 | |
| Compressive strength [bar] | 20 | |
| Material | housing: PBT sensor: AISI 316 Ti | |
| Protection [EN 60529] | IP 67 | |
| Connection | M12 connector | |






1: BN
2: WH
3: BU
4: BK




Amplifiers required: SKM 520, page 1.73
(Temperature control with this sensor is not possible)

| Accessories | connecting cable type SLG 4-2 (Z00445), see page 1.99 |
|---|---|

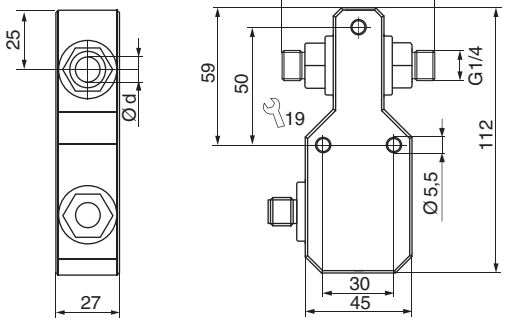
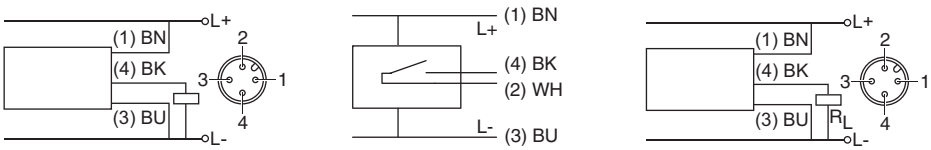
# Flow Sensors

## Inline-Compact • up to 6 l/min

### Series SDN 500

**DC 24 V**
**PNP output**
**Relay output**
**Analog output**

**G1/4 thread • Ø4 mm**
**G1/4 thread • Ø9 mm**


| Design | G1/4 • Ø4 mm | | | G1/4 • Ø9 mm | | |
|---|---|---|---|---|---|---|
| Dimensions |  | | | | | |
| Detection range [l/min] | 0.001...1 | | | 0.01...6 | | |
| Working range [l/min] | 0.015...1 | | | 0.1...6 | | |
| Inner diameter d [mm] | 4 | | | 9 | | |
| Maximum flow [l/h] | 300 | | | 1800 | | |
| Output | PNP | Relay | 4...20 mA | PNP | Relay | 4...20 mA |
| ID-No. | P11247 * | P11271 | P11249 * | P11248 * | P11273 | P11250 * |
| Type | SDN 504 GSP | SDN 504 GR | SDN 504 GA | SDN 510 GSP | SDN 510 GR | SDN 510 GA |
| Supply voltage [V] | 24 DC ±10% | | | | | |
| Current consumption [mA] | <50 | | | | | |
| Switching voltage [V] | – | 30 AC/36 DC | – | – | 30 AC/36 DC | – |
| Switching current [mA] | 200 (20 °C) | 1000 | – | 200 | 1000 | – |
| Load $R_L$ [Ω] | – | – | 200...500 | – | – | 200...500 |
| Ambient temperature [°C] | 0...+60 | | | | | |
| Medium temperature [°C] | 0...+80 | | | | | |
| Temperature gradient [K/min] | 400 (>0.1 l/min) | | | 400 (>0.5 l/min) | | |
| Start-up time typ. [s] | 5...15 | | | | | |
| Reaction time typ. [s] | 0.5...10 | | | | | |
| Compressive strength [bar] | 20 | | | | | |
| Display flow | LED-array | | | | | |
| Material | housing: PBT sensor: AISI 316 Ti | | | | | |
| Protection [EN 60529] | IP 67 | | | | | |
| Connection | M12 connector | | | | | |
| * c UL us LISTED E304328 |  | | | | | |
| Accessories | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 | | | | | |

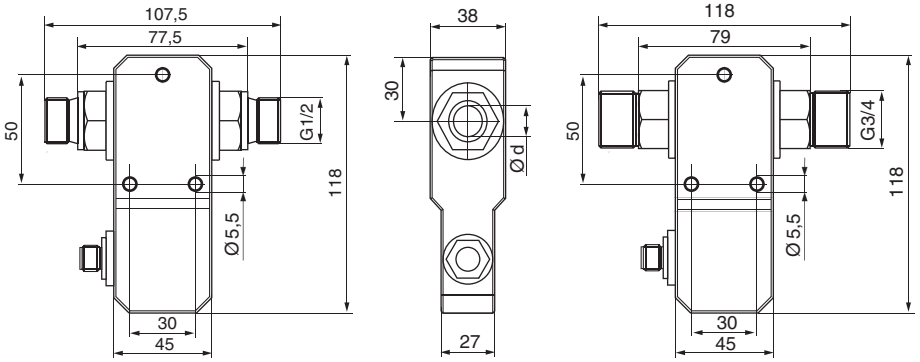
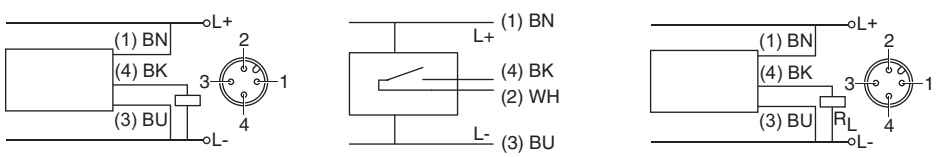
# Flow Sensors

## Inline-Compact • up to 40 l/min

### Series SDN 500

**DC 24 V**
**PNP output**
**Relay output**
**Analog output**

**G1/2 thread • Ø 15 mm**
**G3/4 thread • Ø 19 mm**

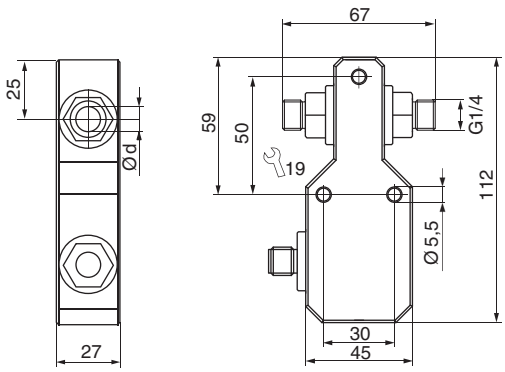
| Design | | G1/2 • Ø 15 mm | | | G3/4 • Ø 19 mm | | |
|---|---|---|---|---|---|---|---|
| Dimensions | |  | | | | | |
| Detection range | [l/min] | 2...25 | | | 3...40 | | |
| Working range | [l/min] | 3...20 | | | 4...30 | | |
| Inner diameter d | [mm] | 15 | | | 19 | | |
| Maximum flow | [l/h] | 4000 | | | 7500 | | |
| Output | | PNP | Relay | 4...20 mA | PNP | Relay | 4...20 mA |
| ID-No. | | P11284 * | P11288 | P11286 * | P11285 * | P11289 | P11287 * |
| Type | | SDN 515 GSP | SDN 515 GR | SDN 515 GA | SDN 520 GSP | SDN 520 GR | SDN 520 GA |
| Supply voltage | [V] | 24 DC ±10% | | | | | |
| Current consumption | [mA] | < 50 | | | | | |
| Switching voltage | [V] | – | 30 AC/36 DC | – | – | 30 AC/36 DC | – |
| Switching current | [mA] | 200 (20 °C) | 1000 | – | 200 (20 °C) | 1000 | – |
| Load $R_L$ | [Ω] | – | – | 200...500 | – | – | 200...500 |
| Ambient temperature | [°C] | 0...+60 | | | | | |
| Medium temperature | [°C] | 0...+80 | | | | | |
| Temperature gradient | [K/min] | 400 (> 7 l/min) | | | 400 (> 10 l/min) | | |
| Start-up time typ. | [s] | 5...15 | | | | | |
| Reaction time typ. | [s] | 0.5...10 | | | | | |
| Compressive strength | [bar] | 20 | | | | | |
| Display flow | | LED-array | | | | | |
| Material | | housing: PBT sensor: AISI 316 Ti / FPM | | | | | |
| Protection | [EN 60529] | IP 67 | | | | | |
| Connection | | M12 connector | | | | | |
| * c UL us LISTED E304328 | |  | | | | | |
| Accessories | | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 | | | | | |

# Flow Sensors

## Inline-Compact • Micro flow

### Series SDN 500

**DC 24 V**
**PNP output • Relais output**
**Analog output**
**G1/4 thread**
**Detection of micro flow pulses**
**Fast reaction time - high sensitivity**

| Design | G1/4 pulse detection | G1/4 | | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [ml/min] | ab 0.02 ml/100 ms | 0.1...500 | | |
| Working range [ml/min] | ab 0.04 ml/100 ms | 1...200 | | |
| Inner diameter d [mm] | 4 | 3.6 | | |
| Maximum flow [l/h] | 300 | 100 | | |
| Output | PNP | PNP | Relay | 4...20 mA, non linear |
| ID-No. | P11372* | P11329* | P11330 | P11331* |
| Type | SDN 503/1 GSP-DYN | SDN 503/1 GSP | SDN 503/1 GR | SDN 503/1 GA |
| Supply voltage [V] | 24 DC ±10% | 24 DC ±10% | 24 DC ±10% | 24 DC ±10% |
| Current consumption [mA] | <50 | <50 | <50 | <50 |
| Switching voltage [V] | – | – | 30 AC/36 DC | – |
| Switching current [mA] | 200 (20 °C) | 200 (20 °C) | 1000 | – |
| Load $R_L$ [Ω] | – | – | – | 200...500 |
| Ambient temperature [°C] | 0...+60 | 0...+60 | | |
| Medium temperature [°C] | –20...+80 | 0...+60 | | |
| Temperature gradient [K/min] | – | 400 (>100 ml/min) | | |
| Start-up time [s] | 5...15 | 5...60 | | |
| Reaction time [s] | <0.1 | 0.5...10 | | |
| Compressive strength [bar] | 20 | 10 | | |
| Display flow | LED-array | | | |
| Material | housing: PBT sensor: AISI 316 Ti | | | |
| Protection [EN 60529] | IP 67 | | | |
| Connection | M12 connector | | | |

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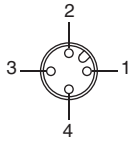
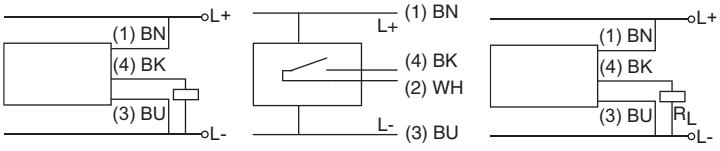
E304328




The SDN 503/1 GSP-DYN detects increasing in flow. The switch-off delay is adjustable between 0.5...10 s




| Accessories | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 |
|---|---|

# Flow Sensors

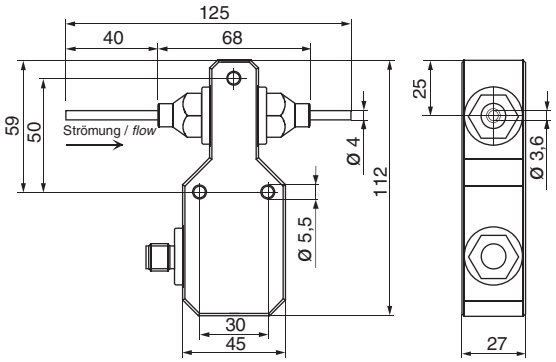
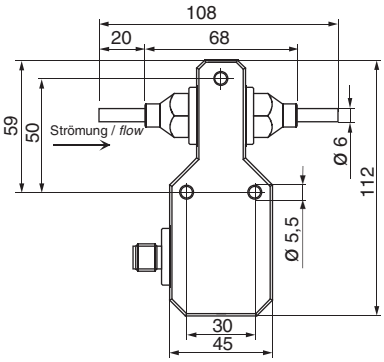
## Inline-Compact • Micro flow

### Series SDN 500

**DC 24 V**
**PNP output • Relais output**
**Analog output**

**Ø4 mm**
**Ø6 mm for tube fittings**

**Fast reaction time - high sensitivity**

| Design | | Tube connection Ø4 mm | | | Tube connection Ø6 mm | | |
|---|---|---|---|---|---|---|---|
| Dimensions | |  | | |  | | |
| Detection range | [ml/min] | 0.1...500 | | | | | |
| Working range | [ml/min] | 1...200 | | | | | |
| Inner diameter d | [mm] | inner diameter 3.6 / outer diameter 4.0 | | | inner diameter 3.6 / outer diameter 6.0 | | |
| Maximum flow | [l/h] | 100 | | | 100 | | |
| Output | | PNP | Relay | 4...20 mA | PNP | Relay | 4...20 mA |
| ID-No. | | P11265* | P11277 | P11266* | P11332* | P11333 | P11334* |
| Type | | SDN 503 GSP | SDN 503 GR | SDN 503 GA | SDN 503/2 GSP | SDN 503/2 GR | SDN 503/2 GA |
| Supply voltage | [V] | 24 DC ±10% | | | | | |
| Current consumption | [mA] | <50 | | | | | |
| Switching voltage | [V] | – | 30 AC/36 DC | – | – | 30 AC/36 DC | – |
| Switching current | [mA] | 200 (20 °C) | 1000 | – | 200 (20 °C) | 1000 | – |
| Load $R_L$ | [Ω] | – | – | 200...500 | – | – | 200...500 |
| Ambient temperature | [°C] | 0...+60 | | | | | |
| Medium temperature | [°C] | 0...+60 | | | | | |
| Temperature gradient | [K/min] | 400 (>100 ml/min) | | | | | |
| Start-up time | [s] | 5...60 | | | | | |
| Reaction time typ. | [s] | 0.5...10 | | | | | |
| Compressive strength | [bar] | 1 | | | 10 | | |
| Display flow | | LED-array | | | | | |
| Material | | housing: PBT sensor: AISI 316 Ti | | | | | |
| Protection | [EN 60529] | IP 67 | | | | | |
| Connection | | M12 connector | | | | | |

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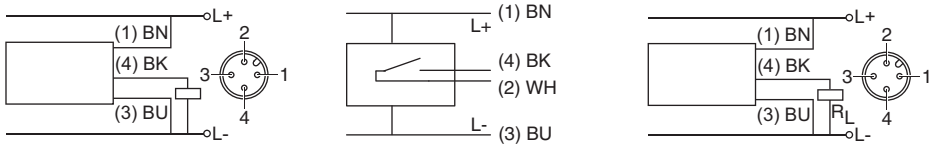
E304328




| Accessories | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 |
|---|---|

# Flow Sensors

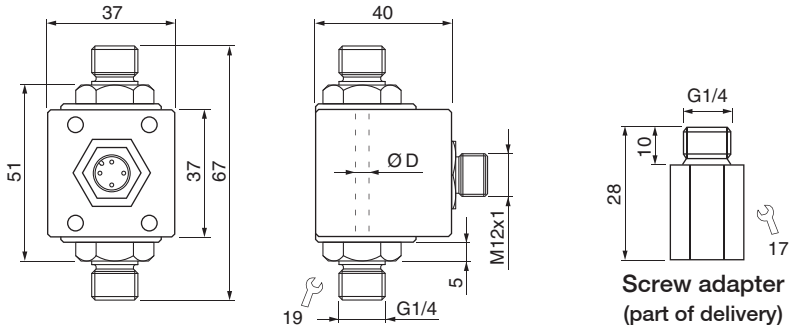
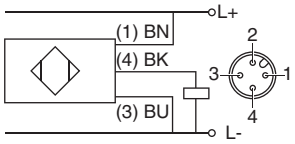
## Inline-Compact

### Series SDNC 503

### DC 24 V

### Flow monitoring

### Can be easily integrated in the tubing
### Immediately ready for use - no adjustment

| Design | | G1/4 • Ø3.6 mm | | |
|---|---|---|---|---|
| Dimensions | |  Screw adapter (part of delivery) | | |
| Switching point | [l/min] | water 0,5 | water 1,0 | water 1,5 |
| Inner diameter D | [mm] | 3.6 | 3.6 | 3.6 |
| Output | | PNP | PNP | PNP |
| ID-No. | | P11338 | P11340 | P11341 |
| Type | | SDNC 503 GSP-05 | SDNC 503 GSP-10 | SDNC 503 GSP-15 |
| Supply voltage | [V] | 24 DC ±10% | | |
| Current consumption | [mA] | ≤70 | | |
| Switching current | [mA] | 200 | | |
| Ambient temperature | [°C] | 0...+60 | | |
| Medium temperature | [°C] | 0...+60 | | |
| Reaction time typ. | [s] | 1 (0.5...10) | | |
| Compressive strength | [bar] | 10 | | |
| Sensor material | | AISI 316 Ti | | |
| Housing material | | PBT-GF30 | | |
| Protection | [EN 60529] | IP 67 | | |
| Connection | | M12 connector | | |
| | |  | | |
| Accessories | | connecting cable type SLW 3-2-LED, page 1.99 | | |

# Flow Sensors

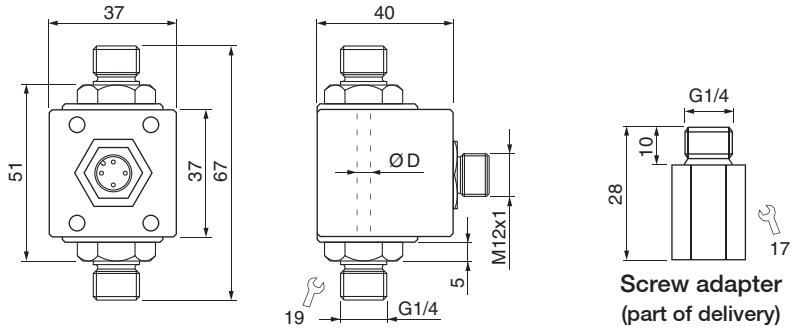
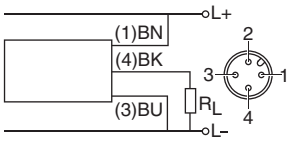
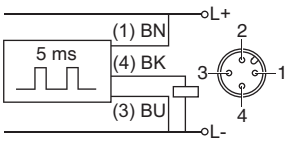
## Inline-Compact

### Series SDNC 503

### DC 24 V

### Flow monitoring of 50 up to 2000 ml/min

### Can be easily integrated in the tubing
### Immediately ready for use - no adjustment

| | | | | | |
|---|---|---|---|---|---|
| **Design** | | **G1/4 • Ø3.6 mm** | | | |
| *Dimensions* | |  Screw adapter (part of delivery) | | | |
| **Detection range** | [l/min] | water 0.05...1.0 | water 0.2...2.0 | water 0.05...1.0 | water 0.2...2.0 |
| **Inner diameter D** | [mm] | 3.6 | 3.6 | 3.6 | 3.6 |
| Output | | 4...20 mA, linear | 4...20 mA, linear | pulse, linear | pulse, linear |
| **ID-No.** | | **P11342** | **P11343** | **P11344** | **P11345** |
| Type | | SDNC 503 GA-10 | SDNC 503 GA-20 | SDNC 503 GP-10 | SDNC 503 GP-20 |
| **Supply voltage** | [V] | 24 DC ±10% | | | |
| Current consumption | [mA] | ≤70 | | | |
| **Load $R_L$** | [Ω] | 200...500 | 200...500 | ≥1000 | ≥1000 |
| Pulse output | [ml/Puls] | – | – | 1 | 1 |
| **Ambient temperature** | [°C] | 0...+60 | | | |
| Medium temperature | [°C] | 0...+60 | | | |
| **Reaction time typ.** | [s] | 1 (0.5...10) | | | |
| Compressive strength | [bar] | 10 | | | |
| **Sensor material** | | AISI 316 TI | | | |
| Housing material | | PBT-GF30 | | | |
| **Protection** | [EN 60529] | IP 67 | | | |
| **Connection** | | M12 connector | | | |
| | |  | |  | |
| **Accessories** | | connecting cable type SLG, SLW, page 1.99 | | | |

# Flow Sensors

## Inline-Compact • with IO-Link

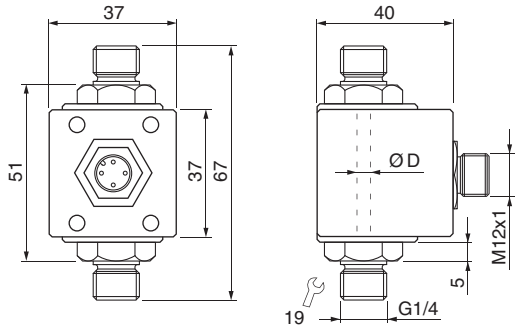
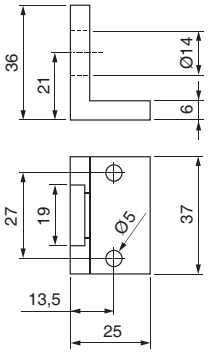
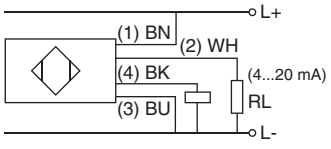
### Series SDNC 500 GANPL

**Monitoring of flow and temperature**

**Configurable via IO-Link**

**Detection range adjustable for all liquid media**


Use IO-Link
Universal · Smart · Easy

| Design | | G1/4 | | |
|---|---|---|---|---|
| Dimensions | |     Mounting bracket | | |
| Detection range | | depending on medium | | |
| Water / Glycol / Oil | [l/min] | 0...2 / 5 / 6 | 0...4 / 10 / 15 | 0...8 / 20 / 30 |
| Inner diameter D | [mm] | 3.5 | 5.5 | 7.5 |
| Output | | / / IO-Link<br>PNP-NO/NC 150 mA (20 °C) / 4...20 mA / IO-Link | | |
| **ID-No.** | | **P11376** | **P11378** | **P11380** |
| Type | | SDNC 503 GANPL | SDNC 506 GANPL | SDNC 508 GANPL |
| Process data | | | | |
| Flow | [Steps] | 0...1023 | | |
| Temperature | [°C x 0.1] | 0...600 | | |
| Supply voltage | [V] | 18...30 DC | | |
| Current consumption | [mA] | ≤ 40 | | |
| Load (4...20 mA) | [Ω] | 200...500 | | |
| Ambient temperature | [°C] | 0...+60 | | |
| Medium temperature | [°C] | 0...+60 | | |
| Reaction time | [s] | 0.5...10 | | |
| Adjustable parameters | | output functions, switching points, range, average value, teach-commandos | | |
| IO-Link-Specifications | | revision 1.1, baud rate COM 2, min. cycle time 3.5 ms, process data 4 Byte | | |
| Compressive strength | [bar] | 10 | | |
| Material | | housing: PBT-GF30 sensor: AISI 316 Ti | | |
| Protection | [EN 60529] | IP 67 | | |
| Connection | | M12 connector | | |
| | |   | | |
| Accessories | | mounting bracket (Z01215), IO-Link/USB master set (Z01216), page 1.98 | | |

# Flow Sensors

## Inline-Compact • with IO-Link

### Series SDNC 500 GAPL

***Monitoring of flow and temperature***

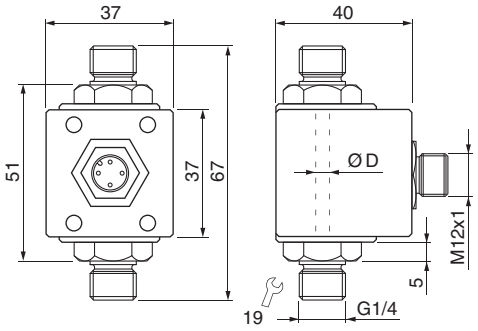
***Configurable via IO-Link***

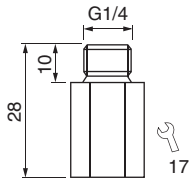
***Linearized for water-based media***


Use IO-Link
Universal · Smart · Easy

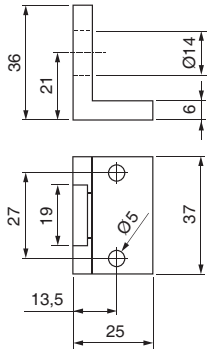
| **Design** | **G1/4** |
|---|---|

*Dimensions*



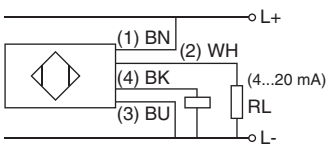

Screw adapter




Mounting bracket

| | | | | | |
|---|---|---|---|---|---|
| **Detection range** | | linearized for water-based media | | | |
| Water | [l/min] | 0.020...0.500 | 0.05...2.00 | 0.10...4.00 | 0.20...8.00 |
| **Inner diameter D** | [mm] | 3.6 | 3.6 | 5.5 | 7.5 |
| Output | | PNP-NO/NC 150 mA (20 °C) / 4...20 mA / pulse output PNP-NO 1 ml/pulse / IO-Link | | | |
| **ID-No.** | | **P11381** | **P11375** | **P11377** | **P11379** |
| Type | | SDNC 502 GAPL | SDNC 503 GAPL | SDNC 506 GAPL | SDNC 508 GAPL |
| **Process data** | | | | | |
| Flow | [l/min x 0.001] | 0...500 | | | |
| | [l/min x 0.01 | | 0...200 | 0...400 | 0...800 |
| Temperature | [°C x 0.1] | 0...600 | 0...600 | 0...600 | 0...600 |
| Supply voltage | [V] | 18...30 DC | | | |
| **Current consumption** | [mA] | ≤40 | | | |
| Load | [Ω] | 200...500 | | | |
| **Ambient temperature** | [°C] | 0...+60 | | | |
| Medium temperature | [°C] | 0...+60 | | | |
| **Reaction time** | [s] | 0.5...10 | | | |
| Adjustable parameters | | output functions, switching points, range, average value, teach-commandos | | | |
| **IO-Link-Specifications** | | revision 1.1, baud rate COM 2, min. cycle time 3.5 ms, process data 4 Byte | | | |
| Compressive strength | [bar] | 10 | | | |
| **Material** | | housing: PBT-GF30 sensor: AISI 316 Ti | | | |
| Protection | [EN 60529] | IP 67 | | | |
| **Connection** | | M12 connector | | | |

Note:
Screw adapter is part of delivery (except P11379)




| **Accessories** | mounting bracket (Z01215), IO-Link/USB master set (Z01216), page 1.98 |
|---|---|

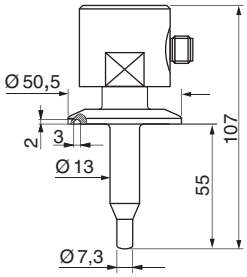
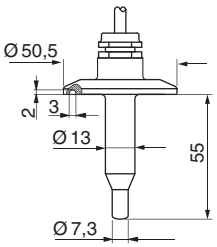
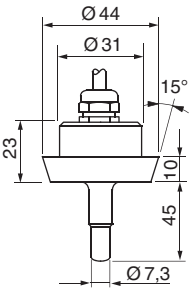
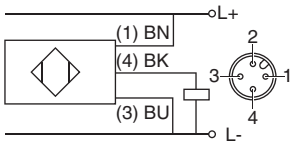
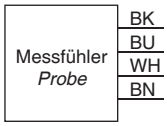
# Flow Sensors

## Special-Probe • Food • Pharma

### Series SCB / STB / STC

### DC 24 V-PNP

### Compact model
### Triclamp Ø50.5
### DIN 11851

| Design | Triclamp compact | Triclamp Ø50.5 | DIN 11851 |
|---|---|---|---|
| Dimensions |  |  |  |
| **Detection range** [cm/s] | | | |
| Water | 1...150 | 1...150 | 1...150 |
| Oil | 3...300 | 3...300 | 3...300 |
| Output | ⌐‾ | | |
| Connecting diameter | Ø 50.5 mm | Ø 50.5 mm | DN 25 |
| **ID-No.** | **P11156** | **P11060** | **P10632** |
| Type | SCB 450 GSP | STB 450 K | STC 425 K |
| Surface roughness [µm] | ≤ 0.8 | ≤ 0.8 | |
| Supply voltage [V] | 24 DC ±20% | – | |
| Current consumption [mA] | <70 | – | |
| Switching current [mA] | 200 (20 °C) | – | |
| Ambient temperature [°C] | –20...+80 | –20...+80 | |
| Medium temperature [°C] | –20...+80 | +20...+120 | |
| Temperature gradient [K/min] | 250 | 250 | |
| Start-up time [s] | 8 (2...15) | 8 (2...15) | |
| Reaction time typ. [s] | 2 (1...13) | 2 (1...13) | |
| Compressive strength [bar] | 100 | 100 | |
| Housing material | AISI 316 L | AISI 316 L / PVDF (cable gland) | |
| Protection [EN 60529] | IP 67 | IP 68 | |
| Connection | M12 connector | 2 m FEP-cable 4x0.25 mm² | |
| For sealing a 3A-compliant seal must be used. |  |  | |
| Accessories | conn. cable SLG, SLW | amplifiers: SKM..., SKZ..., page 1.71 - 1.75 | |

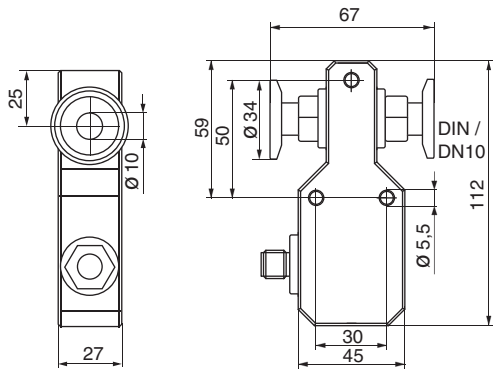
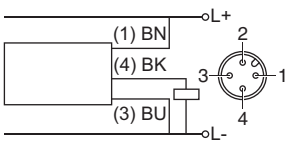
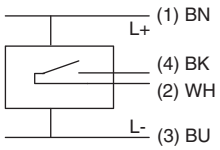
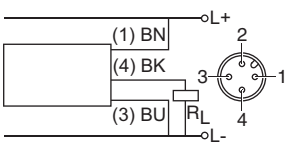
# Flow Sensors

## Inline-Compact • Food • Pharma

### Series SDB 500

**DC 24 V**
**PNP output**
**Relay output**
**Analog output**

**Triclamp connection Ø 34 mm**
**Inner diameter Ø 10 mm**


| Design | Triclamp • Ø 10 mm | | |
|---|---|---|---|
| Dimensions |  | | |
| Detection range [l/min] | 0,01...6 | | |
| Working range [l/min] | 0,1...6 | | |
| Inner diameter [mm] | 10 | | |
| Maximum flow [l/h] | 1800 | | |
| Output | PNP | Relay | 4...20 mA, non linear |
| ID-No. | P11258 * | P11279 | P11280 * |
| Type | SDB 510 GSP | SDB 510 GR | SDB 510 GA |
| Supply voltage [V] | 24 DC ±10% | | |
| Current consumption [mA] | < 50 | | |
| Switching voltage [V] | – | 30 AC/36 DC | – |
| Switching current [mA] | 200 (20 °C) | 1000 | – |
| Load $R_L$ [Ω] | – | – | 200...500 |
| Ambient temperature [°C] | 0...+60 | | |
| Medium temperature [°C] | –20...+80 | –20...+80 | –20...+60 |
| Temperature gradient [K/min] | 400 | | |
| Start-up time typ. [s] | 5...15 | | |
| Reaction time typ. [s] | 0.5...10 | | |
| Compressive strength [bar] | 20 | | |
| Display flow | LED-array | | |
| Material | housing: PBT sensor: AISI 316 L | | |
| Protection [EN 60529] | IP 67 | | |
| Connection | M12 connector | | |
| * c UL us LISTED E304328 |  |  |  |
| For sealing a 3A-compliant seal must be used. | | | |
| Accessories | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 | | |

# Flow Sensors

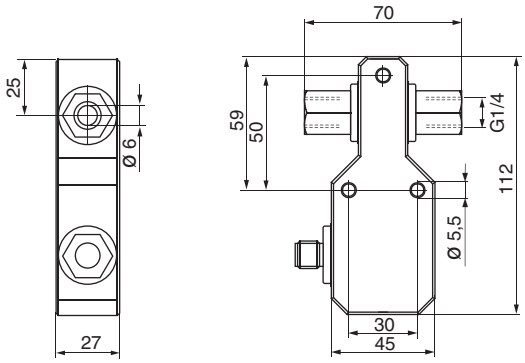
## Inline-Compact • Chemical

### Series SDN 500

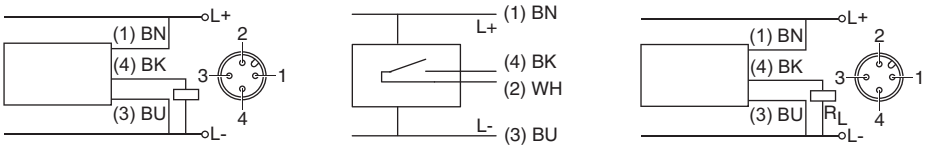
**DC 24 V**
**PNP output**
**Relay output**
**Analog output**

**G1/4 thread • Ø6 mm**

**Ceramic measuring cell • Metal free**


| Design | | G1/4 • Ø6 mm | | |
|---|---|---|---|---|
| Dimensions | |  | | |
| Detection range | [l/min] | 0.005...3 | | |
| Working range | [l/min] | 0.02...3 | | |
| Inner diameter | [mm] | 6 | | |
| Maximum flow | [l/h] | 300 | | |
| Output | | PNP | Relay | 4...20 mA, non linear |
| ID-No. | | P11262* | P11275 | P11263* |
| Type | | SDN 506 GSP-CER | SDN 506 GR-CER | SDN 506 GA-CER |
| Supply voltage | [V] | 24 DC ±10% | | |
| Current consumption | [mA] | – | <50 | – |
| Switching voltage | [V] | – | 30 AC/36 DC | – |
| Switching current | [mA] | 200 | 1000 | – |
| Load $R_L$ | [Ω] | – | – | 200...500 |
| Ambient temperature | [°C] | 0...+60 | | |
| Medium temperature | [°C] | 0...+60 | | |
| Temperature gradient | [K/min] | 400 | | |
| Start-up time | [s] | 5...15 | | |
| Reaction time typ. | [s] | 0.5...10 | | |
| Compressive strength | [bar] | 5 | | |
| Display flow | | LED-array | | |
| Material | | housing: PBT sensor: $AL_2O_3$ / PTFE / FPM (different materials on request) | | |
| Protection | [EN 60529] | IP 67 | | |
| Connection | | M12 connector | | |

* c UL us LISTED
E304328




| Accessories | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 |
|---|---|

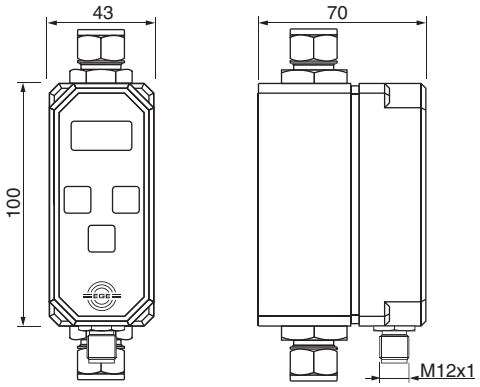
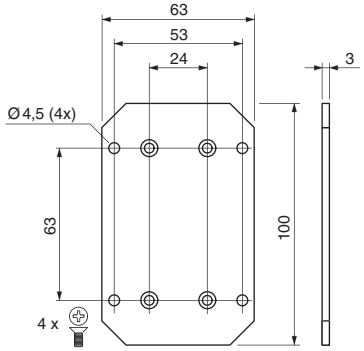
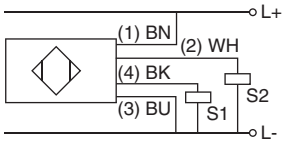
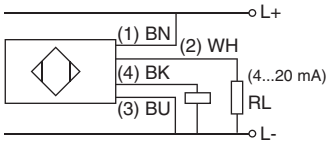
# Inline-Compact • Digital display • up to 40 l/min

## Series SDN 550

**Flow and temperature monitoring of water and water-glycol mixtures**

**Programmable**

**2x PNP output**
**Analog output**

| Design | | SDN 552... GPP | | | SDN 552... GAPP | | |
|---|---|---|---|---|---|---|---|
| Dimensions | |   | | |   Optional: mounting plate (Z01178) | | |
| Medium | | water / glycol (0, 5, ..., 25, 30%) | | | | | |
| Working range | [l/min] | 1...10 | 2...20 | 4...40 | 1...10 | 2...20 | 4...40 |
| Outer diameter pipe | [mm] | 10 | 15 | 18 | 10 | 15 | 18 |
| Pipe connection | | tube fittings for steel tubes accord. to DIN 2391 / ISO 3304 | | | | | |
| | | | | | | | |
| Output 1 | | 2x PNP NC / NO, progr. | | | PNP NC / NO, progr. | + 4...20 mA, linear | |
| Output 2 | | | | | | | |
| ID-No. | | P11293 | P11294 | P11295 | P11296 | P11297 | P11298 |
| Type | | SDN 552/1 GPP | SDN 552/2 GPP | SDN 552/3 GPP | SDN 552/1 GAPP | SDN 552/2 GAPP | SDN 552/3 GAPP |
| Supply voltage | [V] | 24 DC ±10% | | | 24 DC ±10% | | |
| Current consumption | [mA] | <100 | | | <100 | | |
| Switching current | [mA] | 200 (20 °C) | | | 200 (20 °C) | | |
| Load $R_L$ | [Ω] | – | | | 200...500 | | |
| Ambient temperature | [°C] | 0...+60 | | | | | |
| Medium temperature | [°C] | –10...+90 | | | | | |
| | | | | | | | |
| Start-up time | [s] | 6...10 | | | | | |
| Reaction time | [s] | 1...8 | | | | | |
| Programmable functions | | switching point, hysteresis, switching output, time on/off delay, glycol percentage, adjustable to reference, averaging, acess code | | | | | |
| Temperature control | [°C] | –10...90, alternative switching point | | | | | |
| Compressive strength | [bar] | 20 | | | | | |
| Material | | housing: PBT sensor: AISI 316 Ti / FKM | | | | | |
| Protection | [EN 60529] | IP 65 | | | | | |
| Connection | | M12 connector | | | | | |
| | |   | | |   | | |
| Accessories | | mounting plate, connecting cable type SLG, SLW (page 1.99), adapter G1/2, adapter G1/4 (page 1.103) | | | | | |

# Flow Sensors

## Inline-Compact • Digital display • 1 l/min

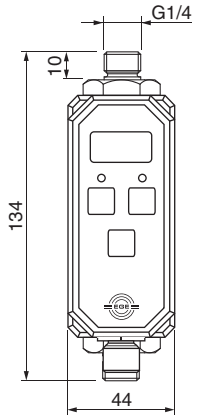
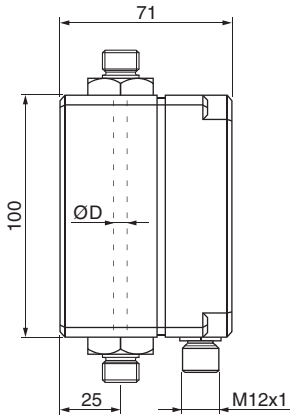
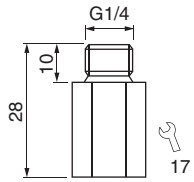
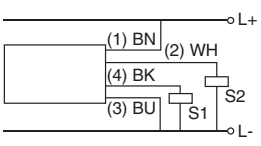
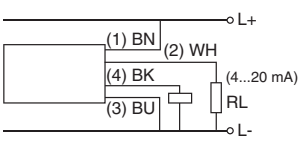
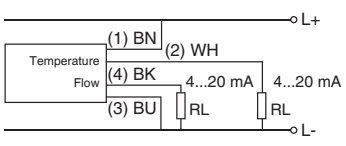
### Series SDN 550

**Flow and temperature monitoring of water**

**Programmable**

**PNP output**
**Analog output**

**G1/4 thread**

| Design | SDN 552/5 GPP | SDN 552/5 GAPP | SDN 552/5 GAA |
|---|---|---|---|
| Dimensions |  |  |  Screw adapter (part of delivery) |
| Medium | water | | |
| Working range [ml/min] | 50...1000 | | |
| Inner diameter D [mm] | 3.6 | | |
| Output 1 | PNP NC / NO, progr. | PNP NC / NO, progr. | 4...20 mA, linear |
| Output 2 | PNP NC / NO, progr. | 4...20 mA, linear | 4...20 mA, linear |
| **ID-No.** | **P11346** | **P11348** | **P11350** |
| Type | SDN 552/5 GPP | SDN 552/5 GAPP | SDN 552/5 GAA |
| Supply voltage [C] | 24 DC ±10% | | |
| Current consumption [mA] | ≤100 | | |
| Switching current [mA] | 200 (20 °C) | 200 (20 °C) | – |
| Load $R_L$ [Ω] | – | 200...500 | 200...500 |
| Ambient temperature [°C] | 0...+60 | | |
| Medium temperature [°C] | 0...+60 | | |
| Start-up time [s] | 6...10 | | |
| Reaction time [s] | 1...8 | | |
| Programmable functions | switching point, hysteresis, NC/NO, time on/off delay, adjustable to reference, analog range, averaging, acess code | | |
| Compressive strength [bar] | 10 | | |
| Material | housing: PBT sensor: AISI 316 Ti / FKM | | |
| Protection [EN 60529] | IP 65 | | |
| Connection | M12 connector | | |
| |  |  |  |
| Accessories | mounting plate (Z01178), connecting plate type SLG, SLW, page 1.99 | | |

# Flow Sensors

## Inline-Compact • Digital display • 2 l/min

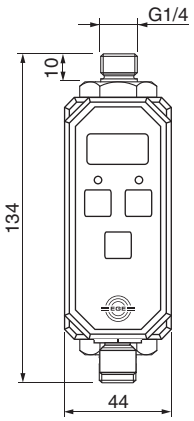
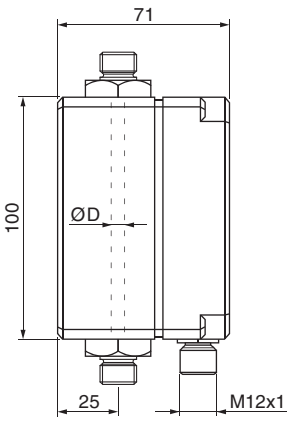
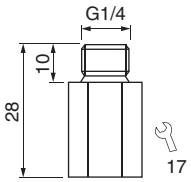
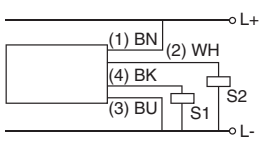
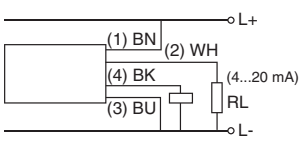
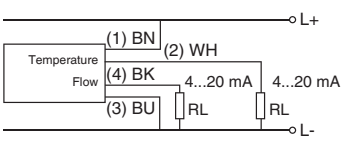
### Series SDN 550

**Flow and temperature monitoring of water**

**Programmable**

**PNP output**
**Analog output**

**G1/4 thread**

| Design | SDN 552/6 GPP | SDN 552/6 GAPP | SDN 552/6 GAA |
|---|---|---|---|
| Dimensions |  |  |  Screw adapter (part of delivery) |
| Medium | water | | |
| Working range [ml/min] | 100...2000 | | |
| Inner diameter D [mm] | 5,6 | | |
| Output 1 | PNP NC / NO, progr. | PNP NC / NO, progr. | 4...20 mA, linear |
| Output 2 | PNP NC / NO, progr. | 4...20 mA, linear | 4...20 mA, linear |
| **ID-No.** | **P11347** | **P11349** | **P11351** |
| Type | SDN 552/6 GPP | SDN 552/6 GAPP | SDN 552/6 GAA |
| Supply voltage [V] | 24 DC ±10% | | |
| Current consumption [mA] | <100 | | |
| Switching current [mA] | 200 (20 °C) | 200 (20 °C) | – |
| Load $R_L$ [Ω] | – | 200...500 | 200...500 |
| Ambient temperature [°C] | 0...+60 | | |
| Medium temperature [°C] | 0...+60 | | |
| Start-up time [s] | 6...10 | | |
| Reaction time [s] | 1...8 | | |
| Programmable functions | switching point, hysteresis, NC/NO, time on/off delay, adjustable to reference, analog range, averaging, acess code | | |
| Compressive strength [bar] | 10 | | |
| Material | housing: PBT sensor: AISI 316 Ti / FKM | | |
| Protection [EN 60529] | IP 65 | | |
| Connection | M12 connector | | |
| |  |  |  |
| Accessories | mounting plate (Z01178), connecting plate type SLG, SLW, page 1.99 | | |

# Flow Sensors

## Inline-Compact • Digital display • 100 l/min

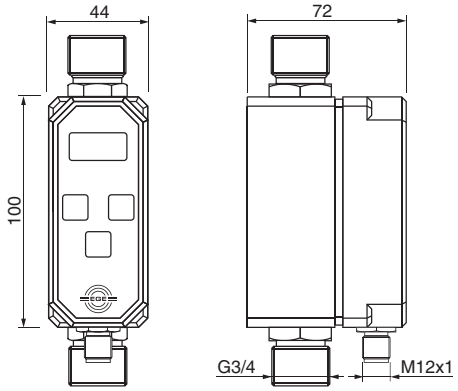
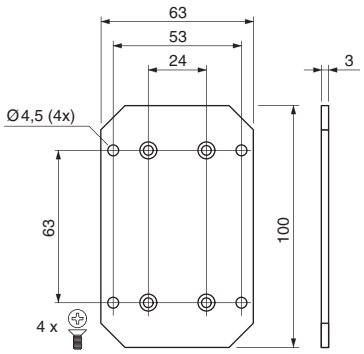
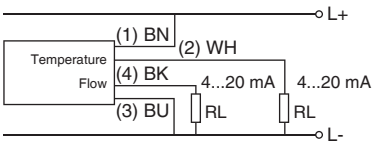
### Series SDN 550

**Flow and temperature monitoring of water**

**Programmable**

**Analog outputs**

**G3/4 thread**

| Design | SDN 552/4 GAA |
|---|---|
| Dimensions |   Optional: mounting plate (Z01178) |
| Medium | water |
| Detection range | flow water: 10...100 l/min temperature: 0...+90 °C |
| Connection | G3/4 |
| Output | flow: 4...20 mA, linear temperature: 4...20 mA, linear |
| **ID-No.** | **P11335** |
| Type | SDN 552/4 GAA |
| Supply voltage [V] | 24 DC ±10% |
| Current consumption [mA] | <100 |
| Load $R_L$ [Ω] | 200...500 |
| Ambient temperature [°C] | 0...+60 |
| Medium temperature [°C] | 0...+60 |
| Start-up time [s] | 6...10 |
| Reaction time [s] | 1...8 |
| Programmable functions | adjustable to reference, averaging, display flow / temperature, acess code |
| | |
| Compressive strength [bar] | 20 |
| Material | housing: PBT sensor: AISI 316 Ti / FKM |
| Protection [EN 60529] | IP 65 |
| Connection | M12 connector |
| |  |
| Accessories | mounting plate (Z01178), connecting cable type SLG, SLW, page 1.99 |

# Flow Sensors

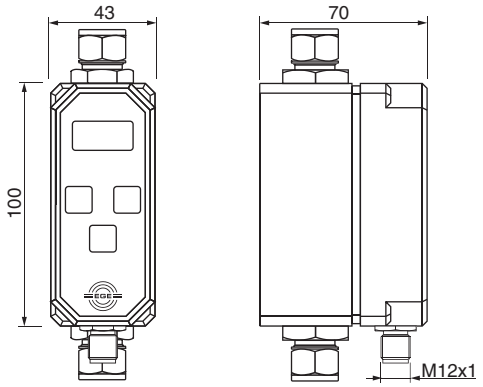
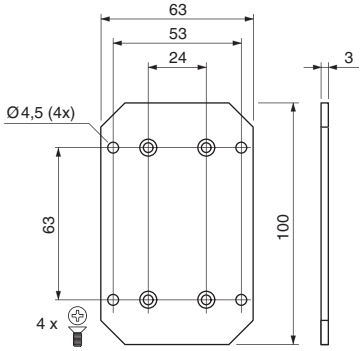
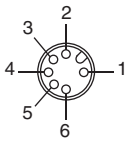
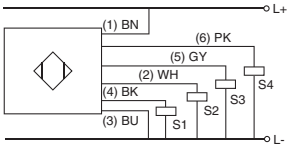
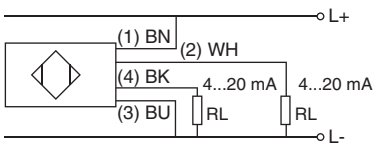
## Inline-Compact • Digital display • up to 40 l/min

### Series SDN 550

**Flow and temperature monitoring of water and water-glycol mixtures**

**Programmable**

**2x PNP output flow**
**2x PNP output temperature**
**2x Analog output**

| Design | | SDN 554... GPP | | | SDN 552... GAA | | |
|---|---|---|---|---|---|---|---|
| Dimensions | |   | | |   Optional: mounting plate (Z01178) | | |
| Medium | | water / glycol (0, 5, ..., 25, 30%) | | | | | |
| Working range | [l/min] | 1...10 | 2...20 | 4...40 | 1...10 | 2...20 | 4...40 |
| Outer diameter pipe | [mm] | 10 | 15 | 18 | 10 | 15 | 18 |
| Pipe connection | | tube fittings for steel tubes accord. to DIN 2391 / ISO 3304 | | | | | |
| | | | | | | | |
| Output flow | | 2x PNP NC / NO, progr. | | | 4...20 mA, linear | | |
| Output temperature | | 2x PNP NC / NO, progr. | | | 4...20 mA, linear | | |
| **ID-No.** | | **P11313** | **P11314** | **P11315** | **P11316** | **P11317** | **P11318** |
| Type | | SDN 554/1 GPP | SDN 554/2 GPP | SDN 554/3 GPP | SDN 552/1 GAA | SDN 552/2 GAA | SDN 552/3 GAA |
| Supply voltage | [V] | 24 DC ±10% | | | 24 DC ±10% | | |
| Current consumption | [mA] | <100 | | | <100 | | |
| Switching current | [mA] | 100 (20 °C) each output | | | – | | |
| Load $R_L$ | [Ω] | – | | | 200...500 | | |
| Ambient temperature | [°C] | 0...+60 | | | | | |
| Medium temperature | [°C] | –10...+90 | | | | | |
| Temperature gradient | [K/min] | 400 | | | | | |
| Start-up time | [s] | 6...10 | | | | | |
| Reaction time | [s] | 1...8 | | | | | |
| Programmable functions | | glycol percentage, adjustable to reference, averaging, access code.<br>only SDN 554: switching point, hysteresis, switching output, time on/off delay | | | | | |
| Temperature control | [°C] | –9.8...90, 2 switching points | | | –10...90, analog, programmable | | |
| Compressive strength | [bar] | 20 | | | | | |
| Material | | housing: PBT sensor: AISI 316 Ti / FKM | | | | | |
| Protection | [EN 60529] | IP 65 | | | | | |
| Connection | | M12 connector | | | | | |
| | |   1: BN 2: WH 3: BU 4: BK 5: GY 6: PK     | | | | | |
| Accessories | | mounting plate, connecting cable type SLG, SLW (page 1.99), adapter G1/2, adapter G1/4 (page 1.103) | | | | | |

# Flow Sensors

## Vortex-Measuring device • Digital display

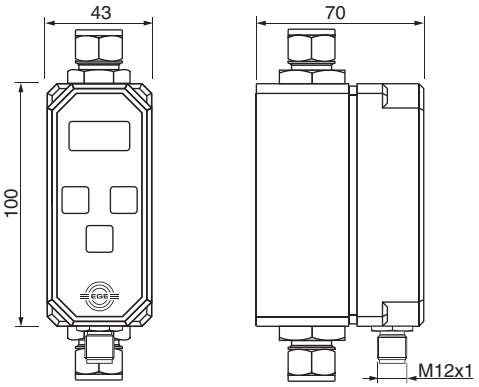
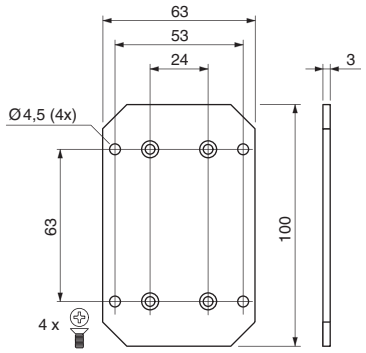
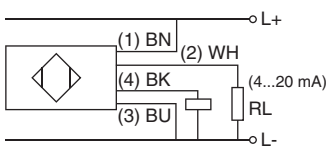
### Series SDV 600

***Flow measuring of water***

***Deviation 2% of terminal value***

***Programmable***

***Analog and PNP output***

| ***Design*** | | ***SDV 652/1 GAPP*** |
|---|---|---|
| *Dimensions* | |   Optional: mounting plate (Z01178) |
| Working range | [l/min] | 2...20 |
| Maximum flow | [l/min] | 25 |
| Precision | | 15...50 °C <2%, 5...60 °C <4% |
| Outer diameter pipe | [mm] | 10 |
| Pipe connection | | tube fittings for steel tubes accord. to DIN 2391 / ISO 3304 |
| Output | | PNP NC / NO, programmable — 4...20 mA, linear |
| **ID-No.** | | **P11319** |
| Type | | SDV 652/1 GAPP |
| Switching current | [mA] | 200 |
| Load $R_L$ | [Ω] | 200...500 |
| Supply voltage | [V] | 24 DC ±10% |
| Current consumption | [mA] | <100 |
| Ambient temperature | [°C] | 0...+60 |
| Medium temperature | [°C] | 5...+60 |
| Start-up time | [s] | 4.5...8 |
| Reaction time | [s] | 0.5...4 |
| Programmable functions | | switching point, hysteresis, switching output, time on/off delay, averaging, acess code |
| Compressive strength | [bar] | 10 |
| Material | | housing: PBT sensor: PVDF, connection AISI 316 Ti |
| Protection | [EN 60529] | IP 65 |
| Connection | | M12 connector |
| Note: Process-connection in PTFE available | |  |
| Accessories | | mounting plate, connecting cable type SLG, SLW (page 1.99), adapter G1/4 (page 1.103) |

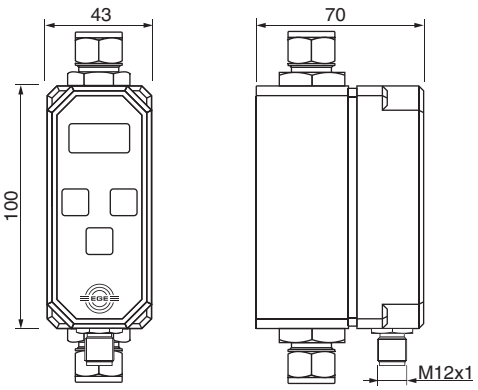
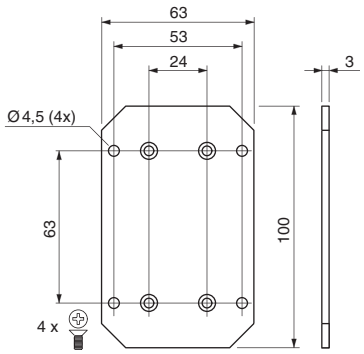
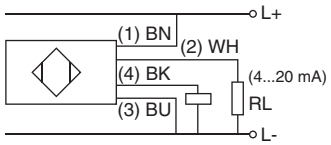
# Magnetic flowmeter • Digital display

## Series SDI 850 - Magnetic flowmeter

### Measurement error <2%

### Programmable

### Analog and PNP output

| Design | SDI... GAPP | |
|---|---|---|
| Dimensions |   |   Optional: mounting plate (Z01178) |
| Working range [l/min] | 0...40 | 0.2...80 |
| Measurement error | 0...5.0 l/min ≤0.1 l/min<br>5...40 l/min ≤2% of measurement value* | 0...10.0 l/min ≤0.2 l/min<br>10.1...80 l/min ≤2% of measurement value* |
| **ID-No.** | **P11320** | **P11321** |
| Type | SDI 852/1 GAPP | SDI 852/2 GAPP |
| Outer diameter pipe [mm] | 10 | 15 |
| Pipe connection | tube fittings for steel tubes accord. to DIN 2391 / ISO 3304 | |
| Output | PNP NC / NO, programmable | 4...20 mA, linear |
| Supply voltage [V] | 24 DC ±10% | |
| Current consumption [mA] | 100 | |
| Switching current [mA] | 200 (20 °C) | |
| Load $R_L$ [Ω] | 200...500 | |
| Ambient temperature [°C] | 0...+60 | |
| Medium temperature [°C] | 5...+60 | |
| Medium conductivity [µS/cm] | ≥10 (water: ≥15) | ≥20 (water: ≥30) |
| Reaction time [s] | 0.5...8 | |
| Programmable functions | switching point, hysteresis, switching output, time on/off delay, analog range, averaging, acess code | |
| Compressive strength [bar] | 10 | |
| Material | housing: PBT sensor: PVDF / AISI 316 Ti | |
| Protection [EN 60529] | IP 65 | |
| Connection | M12 connector | |
| *Note: Reference conditions according to EN 29104 |   | |
| Accessories | mounting plate, connecting cable type SLG, SLW (page 1.99), adapter G1/4 (page 1.103) | |

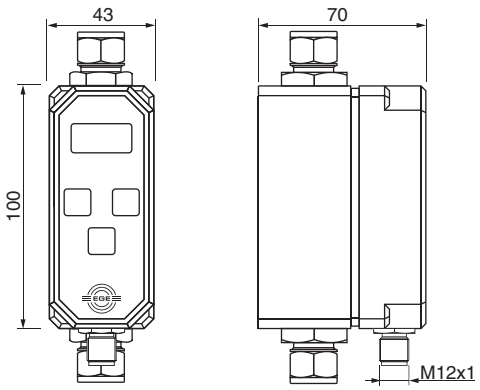
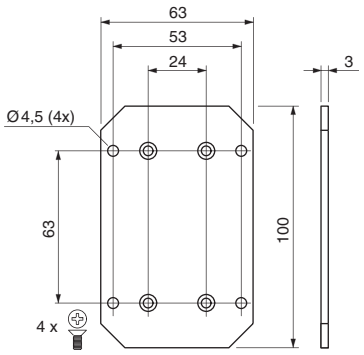
# Magnetic flowmeter • Digital display

## Series SDI 850 - Magnetic flowmeter

### Measurement error <2%

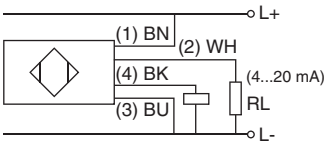
### Programmable

### Analog and PNP output
### Impulse output

| Design | SDI... GAPP | |
|---|---|---|
| Dimensions |   |   Optional: mounting plate (Z01178) |
| Working range [l/min] | 0...40 | 0,2...80 |
| Measurement error | 0...5.0 l/min ≤0.1 l/min<br>5...40 l/min ≤2% of measurement value* | 0...10.0 l/min ≤0.2 l/min<br>10.1...80 l/min ≤2% of measurement value* |
| ID-No. | P11322 | P11323 |
| Type | SDI 853/1 GAPP | SDI 853/2 GAPP |
| Pulse output [1] | • | • |
| Outer diameter pipe [mm] | 10 | 15 |
| Pipe connection | tube fittings for steel tubes accord. to DIN 2391 / ISO 3304 | |
| Output | PNP NC / NO, programmable | 4...20 mA, linear |
| Supply voltage [V] | 24 DC ±10% | |
| Current consumption [mA] | 100 | |
| Switching current [mA] | 200 | |
| Load $R_L$ [Ω] | 200...500 | |
| Ambient temperature [°C] | 0...+60 | |
| Medium temperature [°C] | 5...+60 | |
| Medium conductivity [µS/cm] | ≥10 (water: ≥15) | ≥20 (water: ≥30) |
| Reaction time [s] | 0.5...8 | |
| Programmable functions | switching point, hysteresis, switching output, time on/off delay, analog range, impulse, averaging, acess code | |
| Compressive strength [bar] | 10 | |
| Material | housing: PBT sensor: PVDF / AISI 316 Ti | |
| Protection [EN 60529] | IP 65 | |
| Connection | M12 connector | |

*Note:
Reference conditions according to EN 29104

[1] Impulses can be set to 1, 5, 10 and 50 ml/pulse.




| Accessories | mounting plate, connecting cable type SLG, SLW (page 1.99), adapter G1/4 (page 1.103) |
|---|---|

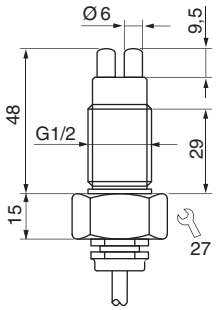
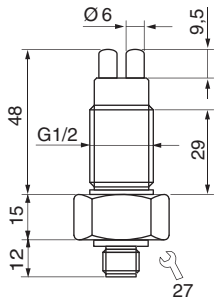
# Air Flow Sensors

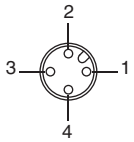
## Probe • Screw-in mounting

### Series LTZ 400

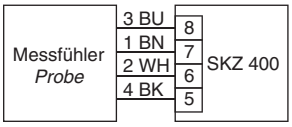
### G1/2 thread

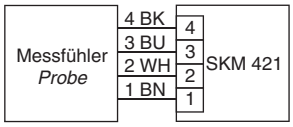
### Stainless steel

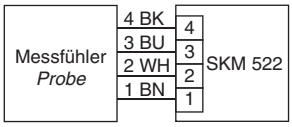
| Design | G1/2 | G1/2 |
|---|---|---|
| Dimensions |  |  |
| Detection range [m/s] | 0.5...30 | 0.5...30 |
| Sensor length [mm] | 48 | 48 |
| ID-No. | P11100 | P11101 |
| Type | LTZ 421 K-A2 | LTZ 421 S-A2 |
| Medium temperature [°C] | –20...+80 | |
| Temperature gradient [K/min] | 20 | |
| Start-up time typ. [s] | 10...90 | |
| Reaction time typ. [s] | 2...30 | |
| Switching-off time [s] | 5...30 | |
| Compressive strength [bar] | 30 | |
| Sensor material | AISI 303 • different materials on request | |
| Protection [EN 60529] | IP 68 | IP 67 |
| Connection | 2 m PVC-cable 4x0.25 mm² | M12 connector |




1: BN
2: WH
3: BU
4: BK




Amplifiers required: SKZ..., SKM..., page 1.71 - 1.75

| Accessories | connecting cable type SLG 4-2, SLG 4-5, SLW 4-2, SLW 4-5, see page 1.99 |
|---|---|

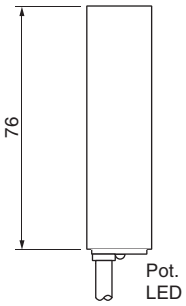
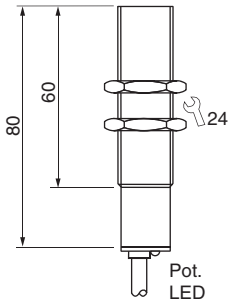
# Air Flow Sensors

## Compact models

### Series LN 500 / LG 500

**DC 24 V**
**PNP output**
**Analog output**

**LED display**
**Detection range 0.5...15 m/s**

| Design | Ø 20 mm | | M18x1 | |
|---|---|---|---|---|
| Dimensions |   | |   | |
| Detection range [m/s] | 0.5...15 | | 0.5...15 | |
| Output | PNP | 4...20 mA | PNP | 4...20 mA |
| **ID-No.** | **P11096 *** | **P11097 *** | **P11237 *** | **P11240 *** |
| Type | LN 520 GSP | LN 520 GA | LG 518 GSP | LG 518 GA |
| Supply voltage [V] | 24 DC ±20% | 24 DC ±20% | 24 DC ±20% | 24 DC ±20% |
| Current consumption [mA] | 70 | 70 | 70 | 70 |
| Switching current [mA] | 200 | – | 200 | – |
| Load $R_L$ [Ω] | – | 200...500 | – | 200...500 |
| Ambient temperature [°C] | –20...+70 | | | |
| Temperature gradient [K/min] | 200 | | | |
| Start-up time [s] | 20...40 | | | |
| Reaction time typ. [s] | 2 | 3 | 2 | 3 |
| Hosuing material | PBT | PBT | PBT / Br-Ni | PBT / Br-Ni |
| Display flow | LED | | | |
| Protection [EN 60529] | IP 67 | | | |
| Connection | 2 m PVC-cable 3x0.5 mm² | | | |

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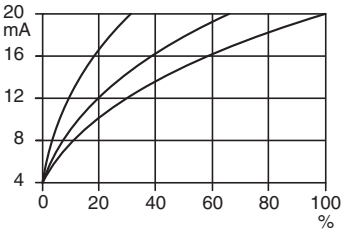
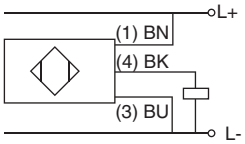
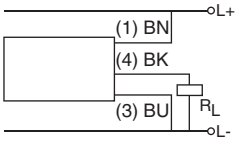


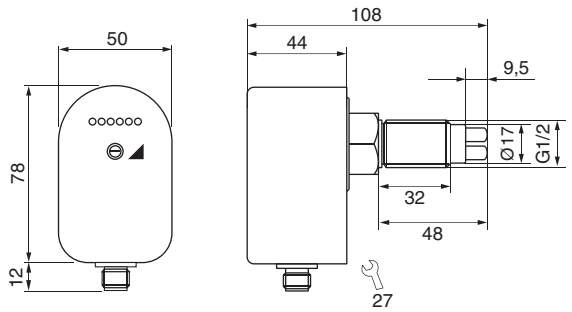

| Accessories | flange Ø 20 mm (Z01106), see page 1.102 |
|---|---|

# Air Flow Sensors

## Compact models • Screw-in mounting

### Series LNZ 450

### DC 24 V
### Analog output
### G1/2 thread

| Design | G1/2 | |
|---|---|---|
| Dimensions |  | |
| Detection range [m/s] | 0.5...30 | |
| Output | 4...20 mA | |
| ID-No. | P11110 * | P11111 * |
| Type | LNZ 450 GA-K | LNZ 450 GA-S |
| Supply voltage [V] | 24 DC ±15 % | |
| Current consumption [mA] | 80 | |
| Current output [mA] | 4...20 | |
| Load $R_L$ [Ω] | 200...500 | |
| Ambient temperature [°C] | –20...+70 | |
| Medium temperature [°C] | –20...+80 | |
| Temperature gradient [K/min] | 20 | |
| Start-up time typ. [s] | 20...90 | |
| Reaction time typ. [s] | 4...30 | |
| Compressive strength [bar] | 30 | |
| Sensor material | AISI 303 | |
| Display flow | LED-array | |
| Protection [EN 60529] | IP 67 | |
| Connection | 2 m PVC-cable 3x0.5 mm² | M12 connector |

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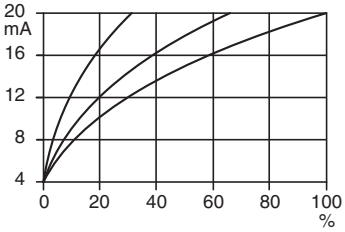
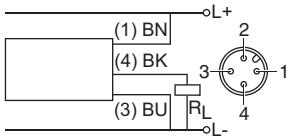


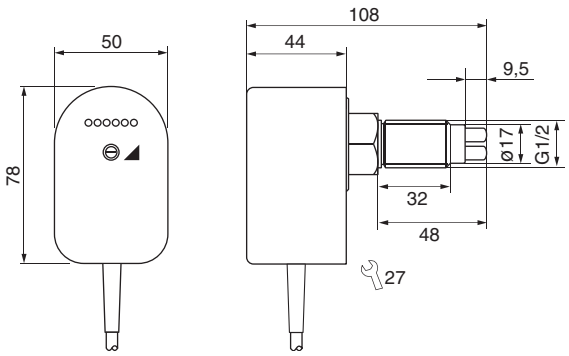
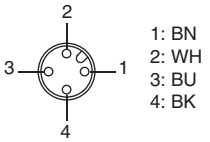
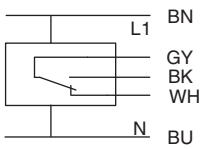
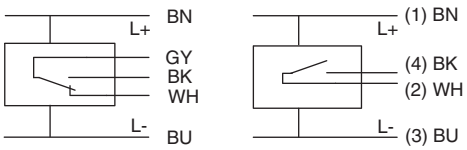

| Accessories | connecting cable type SLG 3-2, SLG 3-5, SLW 3-2, SLW 3-5, see page 1.99 |
|---|---|

# Air Flow Sensors

## Compact models • Screw-in mounting

### Series LNZ 450

**AC 230 V • AC 115 V**
**DC 24 V**
**Relay output**
**G1/2 thread**

| Design | G1/2 | | G1/2 | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [m/s] | 0.5...30 | | 0.5...30 | 0.5...30 |
| Output | Relay | | Relay | Relay |
| ID-No. | P11102 | P11103 | P11104 | P11105 |
| Type | LNZ 450 WR1-K | LNZ 450 WR2-K | LNZ 450 GR-K | LNZ 450 GR-S |
| Supply voltage [V] | 115 AC ±15% | 230 AC ±15% | 24 DC ±20% | |
| Current consumption [mA] | 60 | 30 | 80 | |
| Switching voltage [V] | 250 AC / 60 DC | | 250 AC / 60 DC | 30 AC / 36 DC |
| Switching current [A] | 4 AC / 4 DC | | 4 AC / 4 DC | 1 AC / 1 DC |
| Switching power max. | 1000 VA / 60 W | | 1000 VA / 60 W | – |
| Ambient temperature [°C] | –20...+70 | | –20...+70 | |
| Medium temperature [°C] | –20...+80 | | –20...+80 | |
| Temperature gradient [K/min] | 20 | | 20 | |
| Start-up time typ. [s] | 10...90 | | 10...90 | |
| Reaction time typ. [s] | 2...30 | | 2...30 | |
| Compressive strength [bar] | 30 | | 30 | |
| Sensor material | AISI 303 | | AISI 303 | |
| Hosuing material | PBT | | PBT | |
| Display flow | LED-array | | LED-array | |
| Protection [EN 60529] | IP 67 | | IP 67 | |
| Connection | 2 m PVC-cable 5x0.5 mm² | | 2 m PVC-cable 5x0.5 mm² | M12 connector |
| |  1: BN 2: WH 3: BU 4: BK | |  |  |
| Accessories | connecting cable type SLG 4-2, SLG 4-5, SLW 4-2, SLW 4-5, see page 1.99 | | | |

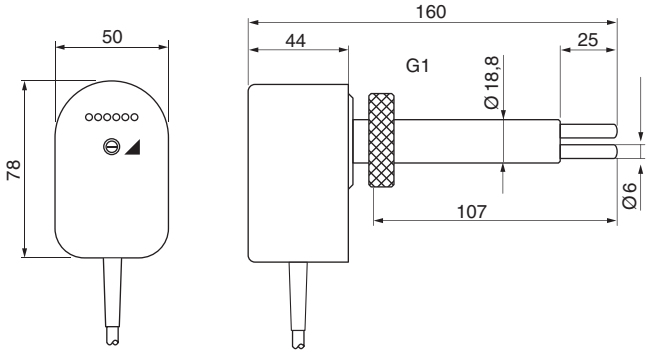
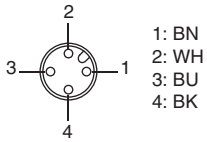
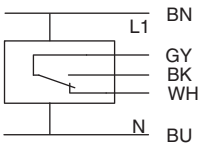
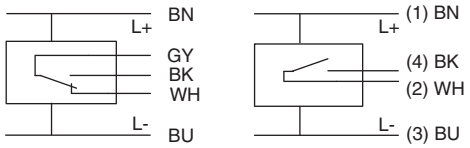
# Air Flow Sensors

## Compact models • Sleeve mounting

### Series LN 450

**AC 230 V • AC 115 V**
**DC 24 V**
**Relay output**

**Suitable for assembly thread pieces**

| Design | G1 | | G1 | |
|---|---|---|---|---|
| Dimensions |  | | | |
| Detection range [m/s] | 0.5...30 | | 0.5...30 | 0.5...30 |
| Output | Relay | | Relay | Relay |
| ID-No. | P11106 | P11107 | P11108 | P11109 |
| Type | LN 450 WR1-K | LN 450 WR2-K | LN 450 GR-K | LN 450 GR-S |
| Supply voltage [V] | 115 AC ±15% | 230 AC ±15% | 24 DC ±20% | |
| Current consumption [mA] | 60 | 30 | 80 | |
| Switching voltage [V] | 250 AC / 60 DC | | 250 AC / 60 DC | 30 AC / 36 DC |
| Switching current [A] | 4 AC / 4 DC | | 4 AC / 4 DC | 1 AC / 1 DC |
| Switching power max. | 1000 VA / 60 W | | 1000 VA / 60 W | 500 VA / 60 W |
| Ambient temperature [°C] | –20...+70 | | –20...+70 | |
| Medium temperature [°C] | –20...+80 | | –20...+80 | |
| Temperature gradient [K/min] | 20 | | 20 | |
| Start-up time typ. [s] | 10...90 | | 10...90 | |
| Reaction time typ. [s] | 2...30 | | 2...30 | |
| Compressive strength [bar] | 3 | | 3 | |
| Sensor material | AISI 303 / Delrin | | AISI 303 / Delrin | |
| Hosuing material | PBT | | PBT | |
| Display flow | LED-array | | LED-array | |
| Protection [EN 60529] | IP 67 | | IP 67 | |
| Connection | 2 m PVC-cable 5x0.5 mm² | | 2 m PVC-cable 5x0.5 mm² | M12 connector |
| |  1: BN 2: WH 3: BU 4: BK | |  |  |
| Accessories | thread sleeve A 50..., see page 1.102 | | | |

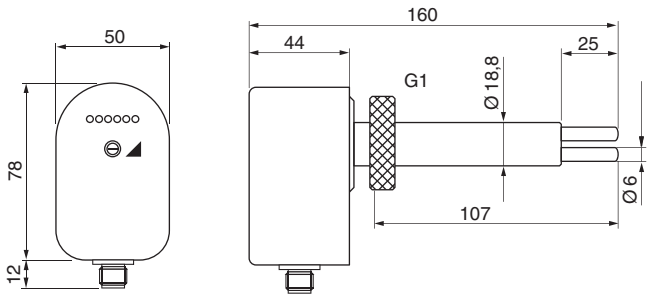
# Air Flow Sensors

## Compact models • Sleeve mounting

### Series LN 450

### DC 24 V
### Analog output

### Suitable for assembly thread pieces

| Design | G1 | |
|---|---|---|
| Dimensions |  | |
| Detection range [m/s] | 0.5...30 | |
| Output | 4...20 mA | |
| ID-No. | P11098 * | P11099 * |
| Type | LN 450 GA-K | LN 450 GA-S |
| Supply voltage [V] | 24 DC ±15% | |
| Current consumption [mA] | 80 | |
| Current output [mA] | 4...20 | |
| Load $R_L$ [Ω] | 200...500 | |
| Ambient temperature [°C] | –20...+70 | |
| Medium temperature [°C] | –20...+80 | |
| Temperature gradient [K/min] | 20 | |
| Start-up time typ. [s] | 20...90 | |
| Reaction time typ. [s] | 4...30 | |
| Compressive strength [bar] | 3 | |
| Sensor material | AISI 303 / Delrin | |
| Display flow | LED-array | |
| Protection [EN 60529] | IP 67 | |
| Connection | 2 m PVC-cable, 3x0.5 mm² | M12 connector |



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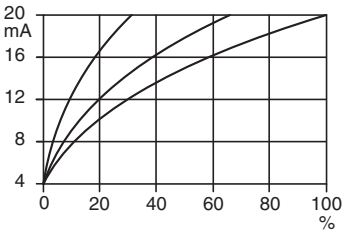
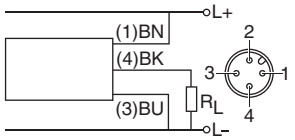



| Accessories | thread sleeve A 50..., see page 1.102 |
|---|---|

# Air Flow Sensors

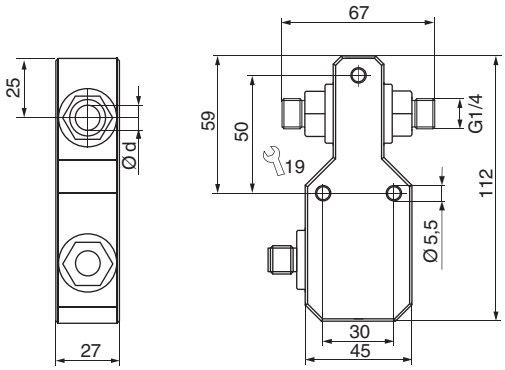
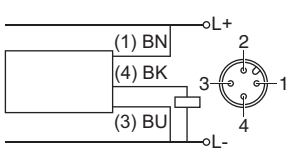
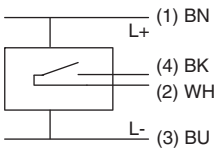
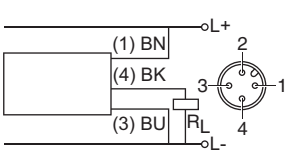
## Inline-Compact

### Series LDN 500

***PNP output***
***Relay output***
***Analog output***

***G1/4 thread • Ø9 mm***

***Compressed-air monitoring***


| ***Design*** | | ***G1/4 • Ø9 mm*** | | |
|---|---|---|---|---|
| *Dimensions* | |  | | |
| Detection range | [m/s] | 0.2...60 | | |
| Working range | [m/s] | 0.5...40 | | |
| Inner diameter d | [mm] | 9 | | |
| Output | | PNP | Relay | 4...20 mA, non linear |
| **ID-No.** | | **P11299 *** | **P11300** | **P11301 *** |
| Type | | LDN 510 GSP | LDN 510 GR | LDN 510 GA |
| Supply voltage | [V] | 24 DC ±10% | 24 DC ±10% | 24 DC ±10% |
| Current consumption | [mA] | <50 | <50 | <50 |
| Switching current | [mA] | 200 (20 °C) | 1000 | – |
| Switching voltage | [V] | – | 30 AC / 36 DC | – |
| Load $R_L$ | [Ω] | – | – | 200...500 |
| Ambient temperature | [°C] | 0...+60 | | |
| Medium temperature | [°C] | –20...+80 | | |
| Temperature gradient | [K/min] | 20 | | |
| Start-up time typ. | [s] | 10...30 | | |
| Reaction time typ. | [s] | 1...20 | | |
| Compressive strength | [bar] | 20 | | |
| Display flow | | LED-array | | |
| Material | | housing: PBT sensor: AISI 316 Ti | | |
| Protection | [EN 60529] | IP 67 | | |
| Connection | | M12 connector | | |
| * c UL us LISTED E304328 | |  |  |  |
| Accessories | | connecting cable type SLG, SLW, SBG, SBW, see page 1.99 | | |

# Air Flow Sensors

## Air flow sensor • with IO-Link

### Series LDN 1000 GAPL

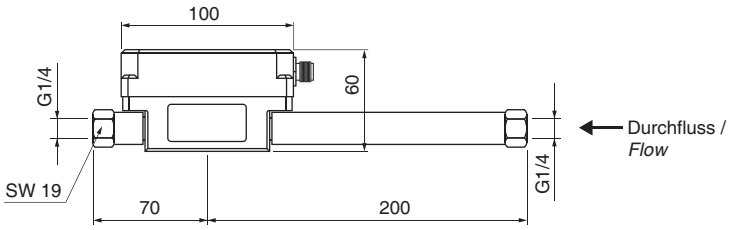
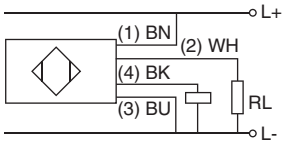
***Mass flow measurement***

***Configurable via IO-Link***

***Compressed air measurement***

***Monitoring of temperature***

Use IO-Link
Universal · Smart · Easy

| ***Design*** | ***G1/4*** |
|---|---|
| *Dimensions* |  |
| **Detection ranges air** | |
| Flow[1] [Nm³/h] [Nl/min] | 0.04...15.00 / 0.5...250.0 |
| **Temperature [°C]** | **0.0...60.0** |
| Output | / / / IO-Link<br>PNP/NPN-NO/NC 200 mA (20 °C) / 4...20 mA / pulse output PNP/NPN-NO / IO-Link |
| **ID-No.** | **P11373** |
| Type | LDN 1009 GAPL |
| **Process data** | |
| Consumption [Nm³ x 0.001] | 0...999999 x 10⁶ |
| Flow [Nm³/h x 0.01] | 0...1500 |
| Temperature [°C x 0.1] | 0...600 |
| Measurement error | flow: ±(4 % of measurement value + 0.5 % of end value) / temperature: ±2 °C |
| **Supply voltage [V]** | **18...30 DC** |
| Current consumption [mA] | ≤70 |
| **Ambient temperature [°C]** | **0...+60** |
| Medium temperature [°C] | 0...+60 |
| **Start-up time / Reaction time [s]** | **4...12 / <0.3** |
| Adjustable parameters | output functions, switching points, units, range, average value, MIN/MAX value |
| **IO-Link-Specifications** | **revision 1.1, baud rate COM 2, min. cycle time 5 ms, process data 8 Byte** |
| Compressive strength [bar] | 16 |
| **Material** | **housing: PBT-GF30 sensor: aluminium, stainless steel, ceramic, PA** |
| Protection [EN 60529] | IP 54 |
| **Connection** | **M12 connector** |
| [1] Reference 1013 mbar / 20 °C |  <br>figure: PNP output<br>2 (WH): 4...20 mA / PNP/NPN output / Input<br>4 (BK): PNP/NPN output / pulse output / IO-Link<br>RL: 200...500 Ohm |
| **Accessories** | **Mounting plate 72x63x3 (Z01217), IO-Link/USB master set (Z01216), page 1.98** |

# Air Flow Sensors

## Air flow sensor • with IO-Link

### Series LDV 1000 GAPL

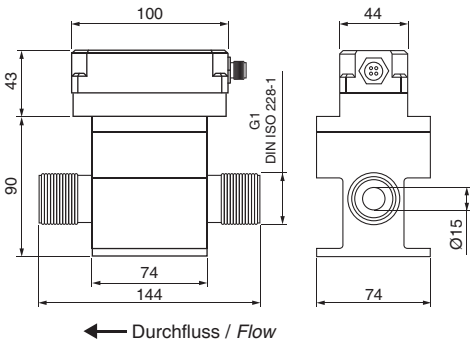
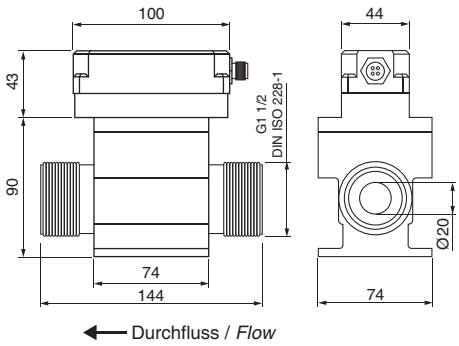
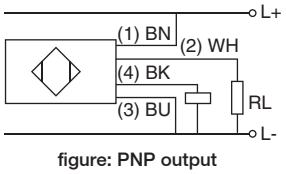
***Venturi priciple***

***Monitoring of pressure and temperature***

***Consumption measurement***

***Configurable via IO-Link***

Use IO-Link
Universal · Smart · Easy

| ***Design*** | ***G1*** | ***G1 1/2*** |
|---|---|---|
| *Dimensions* |  |  |
| **Detection ranges air** | | |
| Flow[1] [Nm³/h] [Nl/min] | 3...420 / 50...7000 (at 7 bar abs) | 5...750 / 80...12500 (at 6 bar abs) |
| Temp. / Pressure [°C] / [bar abs] | 0.0...60.0 / 0.00...14.00 | 0.0...60.0 / 0.00...14.00 |
| Output |  /  /  / IO-Link<br>PNP/NPN-NO/NC 200 mA (20 °C) / 4...20 mA / pulse output PNP/NPN-NO / IO-Link | |
| **ID-No.** | **P11382** | **P11383** |
| Type | LDV 1025 GAPL | LDV 1040 GAPL |
| **Process data** | | |
| Consumption [Nm³ x 0.001] | 0...999999 x $10^6$ | 0...999999 x $10^6$ |
| Flow [Nm³/h x 0.1] | 0...4200 | 0...7500 |
| Pressure [bar x 0.1] | 0...140 | 0...140 |
| Temperature [°C x 0.1] | 0...600 | 0...600 |
| Measurement error | flow: ±(5 % of measurement value + 0,5 % of end value) / temperature: ±2 °C | |
| **Supply voltage [V]** | 18...30 DC | |
| Current consumption [mA] | ≤105 | |
| **Ambient temperature [°C]** | 0...+60 | |
| Medium temperature [°C] | 0...+60 | |
| **Start-up time / Reaction time [s]** | 4...12 / <0.3 | |
| Adjustable parameters | output functions, switching points, units, range, average value, MIN/MAX value | |
| **IO-Link-Specifications** | revision 1.1, baud rate COM 2, min. cycle time 6 ms, process data 10 Byte | |
| Compressive strength [bar] | 11 (burst pressure 16) | |
| **Material** | housing: aluminium, PBT-GF30 sensor: aluminium, stainless steel, ceramic, epoxy | |
| Protection [EN 60529] | IP 54 | |
| **Connection** | M12 connector | |
| [1] Reference 1013 mbar / 20 °C |  figure: PNP output<br>2 (WH): 4...20 mA / PNP/NPN output / Input<br>4 (BK): PNP/NPN output / pulse output / IO-Link<br>RL: 200...500 Ohm | |
| **Accessories** | IO-Link/USB master set (Z01216) | |

# Air flow sensor • with IO-Link

## Series LDS 1000 GAPL

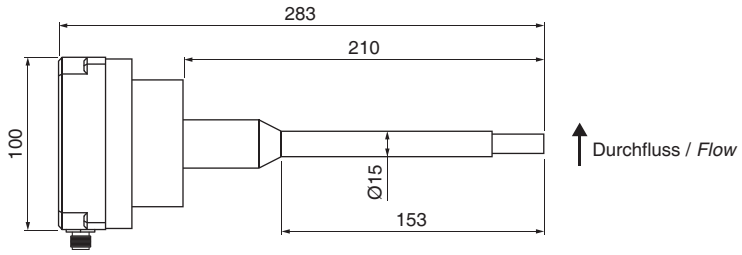
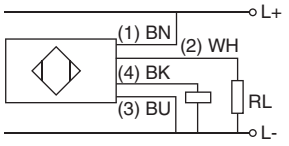
**Dynamic pressure principle**

**Plug-in sensor for big pipes**

**Consumption measurement**

**Configurable via IO-Link**

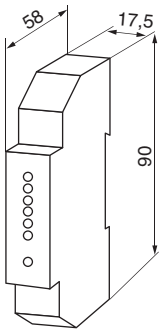
Use IO-Link
Universal · Smart · Easy

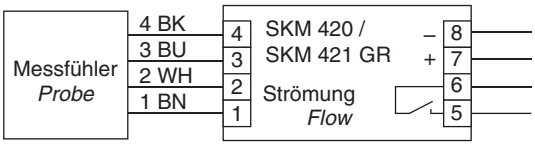
| Design | Ø15 |
|---|---|
| Dimensions |   |
| Detection ranges air | depending on inner pipe diameter d = 38...200 [mm] |
| Flow [Nm³/h] | example d = 38: 14...1400, d = 50: 27...2650, d = 100: 121...12150, d = 200: 515...51500 |
| Temp. / Pressure [°C] / [bar abs] | 0...60 / 0.00...14.00 |
| Output | / / / IO-Link<br>PNP/NPN-NO/NC 200 mA (20 °C) / 4...20 mA / pulse output PNP/NPN-NO / IO-Link |
| **ID-No.** | **P11383** |
| Type | LDS 1000 GAPL |
| Process data | |
| Consumption [Nm³ x 0.001] | 0...999999 x $10^6$ |
| Flow [% x 0.01] | 0...10000 |
| Pressure [bar x 0.1] | 0...140 |
| Temperature [°C x 0.1] | 0...600 |
| Measurement error | flow: ± (8 % of measurement value + 0.5 % of end value) / temperature: ± 2 °C |
| Supply voltage [V] | 18...30 DC |
| Current consumption [mA] | ≤ 105 |
| Ambient temperature [°C] | 0...+60 |
| Medium temperature [°C] | 0...+60 |
| Start-up time / Reaction time [s] | 4...12 / < 0.3 |
| Adjustable parameters | output functions, switching points, units, range, average value, MIN/MAX value |
| IO-Link-Specifications | revision 1.1, baud rate COM 2, min. cycle time 6 ms, process data 10 Byte |
| Compressive strength [bar] | 11 (burst pressure 16) |
| Material | housing: aluminium, PBT-GF30 sensor: aluminium, stainless steel, ceramic, epoxy |
| Protection [EN 60529] | IP 54 |
| Connection | M12 connector |
| [1] Reference 1013 mbar / 20 °C<br><br>Note:<br>Screw-in union G1/2 (zinc-coated steel) is part of delivery |   figure: PNP output<br>2 (WH): 4...20 mA / PNP/NPN output / Input<br>4 (BK): PNP/NPN output / pulse output / IO-Link<br>RL: 200...500 Ohm |
| Accessories | IO-Link/USB master set (Z01216), screw-in union G1/2-Ø15 (Z01290), weld-on union Ø30 (Z01291) |

# Amplifiers DC • Relay output

## Series SKM 420

**DC 24 V**
**Relay output**
**LED display**

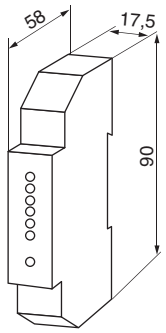
| Design | SKM 420 GR | SKM 421 GR (air flow) |
|---|---|---|
| Dimensions |   | |
| ID-No. | P10530 | P11067 |
| Type | SKM 420 GR | SKM 421 GR (air flow) |
| Output | Relay | Relay |
| Supply voltage [V] | 24 DC ±20% | |
| Output | Relay / NO | |
| Switching voltage max. [V] | 230 AC / 30 DC | |
| Switching current max. [A] | 1 AC / 1 DC | |
| Switching power max. | 125 VA | |
| Load $R_L$ [Ω] | – | |
| Ambient temperature [°C] | –20...+60 | |
| Protection [EN 60529] | terminal: IP 20 / housing: IP 40 | |
| Amplifier for probe | STA..., STB..., STC..., STD..., STK..., ST... (none Ex) | LTZ... |

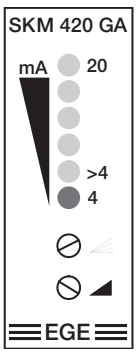


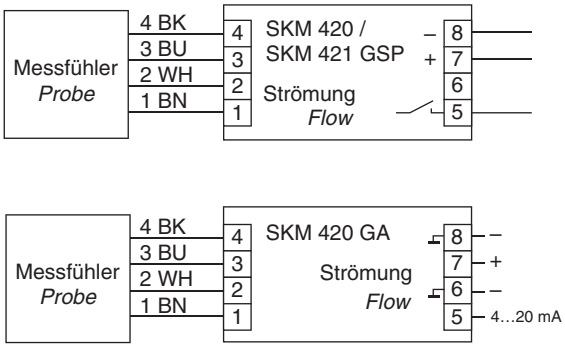
# Amplifiers DC • PNP output

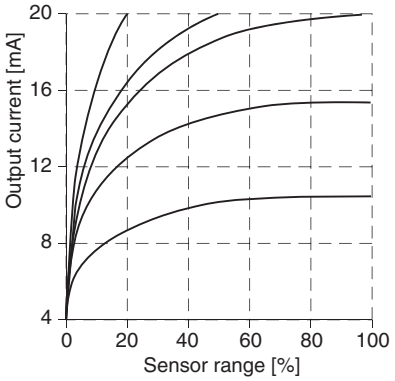
## Series SKM 420

**DC 24 V**
**PNP output**
**Analog output**
**LED display**


| Design | SKM 420 GSP | SKM 421 GSP (air flow) | SKM 420 GA |
|---|---|---|---|
| Dimensions |  | | |
| ID-No. | P11392 | P11393 | P10820 |
| Type | SKM 420 GSP | SKM 421 GSP | SKM 420 GA |
| Output | PNP | PNP | 4...20 mA |
| Supply voltage [V] | 24 DC ±20% | | 24 DC ±10% |
| Switching current max. [mA] | 400 (20 °C) | | – |
| Load $R_L$ [Ω] | – | | 50...500 |
| Ambient temperature [°C] | –20...+60 | | –20...+60 |
| Protection [EN 60529] | terminal: IP 20 / housing: IP 40 | | terminal: IP 20 / housing: IP 40 |
| Amplifier for probe | STA..., STB..., STC..., STD..., STK..., ST... (none Ex) | LTZ... | ST... / LTZ... (none Ex) |



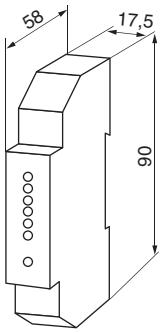



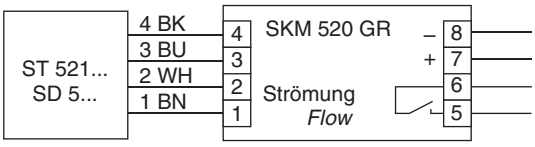



# Amplifiers DC • Relay output

## Series SKM 520

**DC 24 V**
**Relais output**
**LED display**
**ST 521...**
**SD 5...**


| Design | SKM 520 GR |
|---|---|
| Dimensions |   |
| ID-No. | P11391 |
| Type | SKM 520 GR |
| Output |  Relay |
| Supply voltage [V] | 24 DC ±20% |
| Output | Relay / NO |
| Switching voltage max. [V] | 230 AC / 30 DC |
| Switching current max. [A] | 1 AC / 1 DC |
| Switching power max. | 125 VA |
| Load $R_L$ [Ω] | – |
| Ambient temperature [°C] | –20...+60 |
| Protection [EN 60529] | terminal: IP 20 / housing: IP 40 |
| Amplifier for probe | ST 521..., SD 5... |



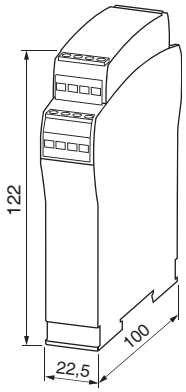
# Amplifiers AC/DC • Automatic adjustment

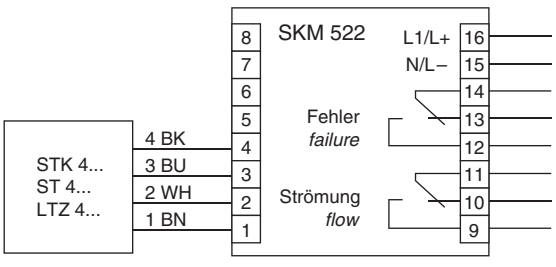
## Series SKM 522

### AC 85 V...AC 260 V
### DC 24 V

### Relay output

### Programming with push-buttons
### Automatic adjustment

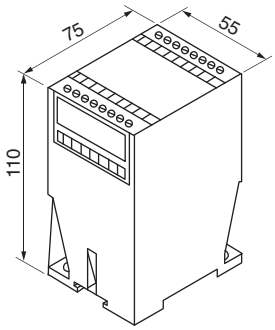
| Design | SKM 522 WR | SKM 522 GR |
|---|---|---|
| Dimensions |   | |
| **ID-No.** | **P11336** | **P11337** |
| Type | SKM 522 WR | SKM 522 GR |
| Output | Relay | Relay |
| Supply voltage [V] | 85 AC...260 AC | 24 DC ±20% |
| Turn off delay [s] | 0...20 programmable | |
| Output | 2x relay / change-over | |
| Switching voltage max. [V] | 250 AC / 60 DC | |
| Switching current max. [A] | 4 AC / 4 DC | |
| Switching power max. | 1000 VA / 60 W | |
| Ambient temperature | –20...+60 | |
| Additional functions | cable break monitoring, turn off delay, supply voltage monitoring | |
| Protection [EN 60529] | terminal: IP 20 / housing: IP 40 | |
| Connection | terminal screws | |
| Amplifier for probe | STA..., STB..., STC..., STD..., STK..., ST... (none Ex), LTZ... | |

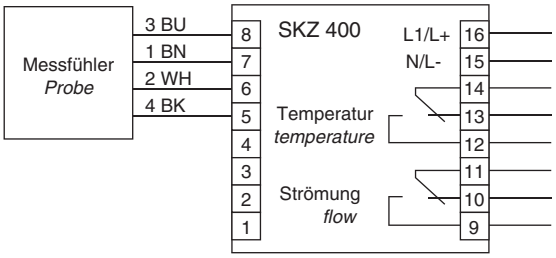


# Amplifiers AC/DC • Potentiometer

## Series SKZ

**AC 230 V • AC 115 V**
**DC 24 V**
**Relay output**
**LED display**
**Temperature control**
**Turn off delay**


| Design | SKZ 400 WR | SKZ 400 WR-115 | SKZ 400 GR |
|---|---|---|---|
| Dimensions |  | | |
| ID-No. | P10501 | P10502 | P10503 |
| Type | SKZ 400 WR | SKZ 400 WR -115 | SKZ 400 GR |
| Output | Relay | Relay | Relay |
| Supply voltage [V] | 230 AC +10/–10% | 115 AC +10/–10% | 24 DC ±20% |
| Temperature [°C] | –20...+100 adjustable | | |
| Turn off delay [s] | 0...25 adjustable | | |
| Output | 2x relay / change-over | | |
| Switching voltage max. [V] | 250 AC / 60 DC | | |
| Switching current max. [A] | 4 AC / 4 DC | | |
| Switching power max. | 1000 VA / 60 W | | |
| Ambient temperature [°C] | –20...+60 | | |
| Protection [EN 60529] | terminal: IP 20 / housing: IP 40 | | |
| Connection | terminal screws | | |



# Probes
# Compact models
# Amplifiers

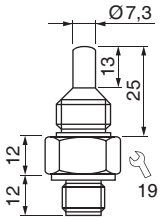
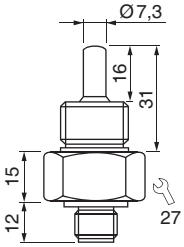
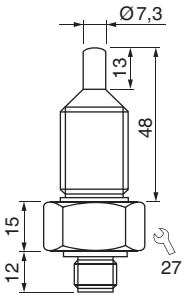
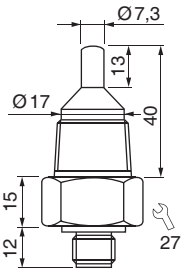
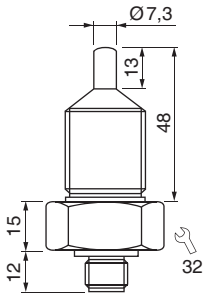
# Flow Sensors

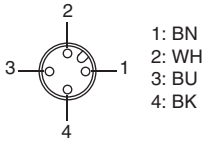
## Ex - Probe • Device category 1G/2G and 1D

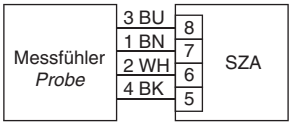
### Series STS

**Ex-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

**Ex-Device category 1D**
**Installation in Zone 20 (dust)**

| Design | G1/4 | G1/2 | G1/2 | NPT1/2 | G3/4 |
|---|---|---|---|---|---|
| Dimensions |  |  |  |  |  |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length [mm] | 25 | 31 | 48 | 40 | 48 |
| Connection | plug | plug | plug | plug | plug |
| **ID-No.** | **P11164** | **P11165** | **P11166** | **P11167** | **P11169** |
| Type | STS 101 S | STS 102 S | STS 103 S | STS 104 S | STS 106 S |
| Ex area of use | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | | | | |
| Certificate No. | TÜV 98 ATEX 1298 X | | | | |
| Ex marking | Gas: Ex II 1/2 G Ex ia IIC T6 Ga/Gb<br>Dust: Ex II 1 D Ex ia IIIC T100 °C Da | | | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: −20 ≤ Ta ≤ +40<br>T5: −20 ≤ Ta ≤ +55<br>T4: −20 ≤ Ta ≤ +60<br>T3: −20 ≤ Ta ≤ +60<br>Dust: −20 ≤ Ta ≤ +60 | | | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. [s] | 8 (2...18) | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | |
| Compressive strength [bar] | 60 | | | | |
| Housing material | AISI 316 Ti • different materials on request | | | | |
| Protection [EN 60529] | IP 67 | | | | |
| Connection | M12 connector | | | | |




(probes with cable length > 2 m are available on request)

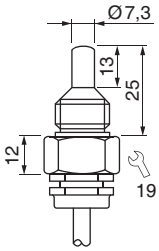
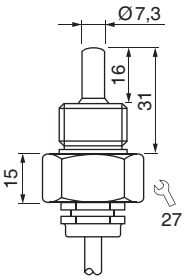
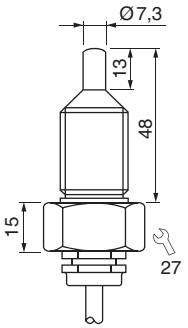
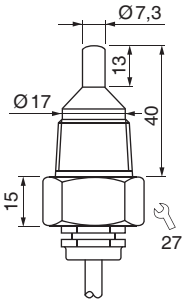
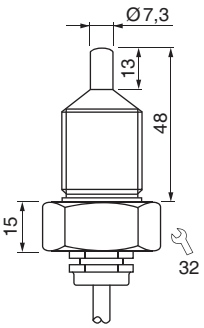
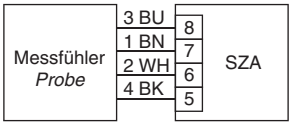
Note: for the connection to amplifier SZA..., page 1.94

# - Probe • Device category 1G/2G and 1D

## Series STS

**-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

**-Device category 1D**
**Installation in Zone 20 (dust)**

| Design | G1/4 | G1/2 | G1/2 | NPT1/2 | G3/4 |
|---|---|---|---|---|---|
| Dimensions |   |   |   |   |   |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length [mm] | 25 | 31 | 48 | 40 | 48 |
| Connection | fixed cable | fixed cable | fixed cable | fixed cable | fixed cable |
| **ID-No.** | **P11140** | **P11141** | **P11142** | **P11143** | **P11168** |
| Type | STS 101 K | STS 102 K | STS 103 K | STS 104 K | STS 106 K |
| Ex area of use | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | | | | |
| Certificate No. | TÜV 98 ATEX 1298 X | | | | |
| Ex marking | Gas: II 1/2 G Ex ia IIC T6 Ga/Gb<br>Dust: II 1 D Ex ia IIIC T100 °C Da | | | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: −20 ≤ Ta ≤ +40<br>T5: −20 ≤ Ta ≤ +55<br>T4: −20 ≤ Ta ≤ +60<br>T3: −20 ≤ Ta ≤ +60<br>Dust: −20 ≤ Ta ≤ +60 | | | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. [s] | 8 (2...18) | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | |
| Compressive strength [bar] | 60 | | | | |
| Housing material | AISI 316 Ti • different materials on request | | | | |
| Protection [EN 60529] | IP 67 | | | | |
| Connection | 2 m PUR-cable 4x0.25 mm² | | | | |
| |   | | | | |
| | (probes with cable length > 2 m are available on request) | | | | |
| Note: | for the connection to amplifier SZA..., page 1.94 | | | | |

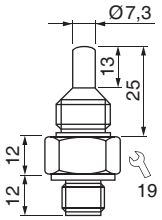
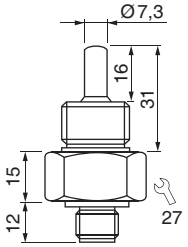
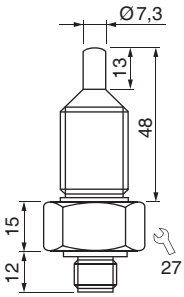
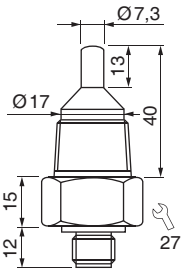
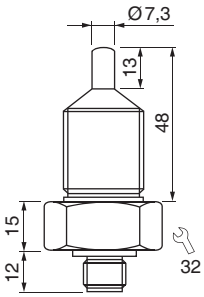
# Flow Sensors

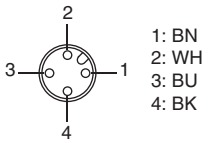
## - Probe • Device category 2G and 2D

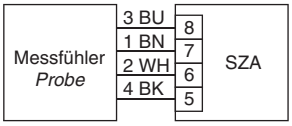
### Series ST

**-Device category 2G**
**Installation in Zone 1 (gas)**

**-Device category 2D**
**Installation in Zone 21 (dust)**

| Design | G1/4 | G1/2 | G1/2 | NPT1/2 | G3/4 |
|---|---|---|---|---|---|
| Dimensions |   |   |   |   |   |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length [mm] | 25 | 31 | 48 | 40 | 48 |
| Connection | plug | plug | plug | plug | plug |
| **ID-No.** | **P11170** | **P11171** | **P11172** | **P11173** | **P11175** |
| Type | ST 101 S | ST 102 S | ST 103 S | ST 104 S | ST 106 S |
| Ex area of use | Gas: Zone 1 / Dust: Zone 21 | | | | |
| Certificate No. | TÜV 97 ATEX 1218 | | | | |
| Ex marking | Gas: II 2 G Ex ib IIC T6 Gb<br>Dust: II 2 D Ex ib IIIC T125 °C Db | | | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: −20 ≤ Ta ≤ +40<br>T5: −20 ≤ Ta ≤ +55<br>T4: −20 ≤ Ta ≤ +85<br>T3: −20 ≤ Ta ≤ +85<br>Dust: −20 ≤ Ta ≤ +85 | | | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. [s] | 8 (2...18) | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | |
| Compressive strength [bar] | 60 | | | | |
| Housing material | AISI 316 Ti • different materials on request | | | | |
| Protection [EN 60529] | IP 67 | | | | |
| Connection | M12 connector | | | | |




(probes with cable length > 2 m are available on request)

Note: for the connection to amplifier SZA..., page 1.94

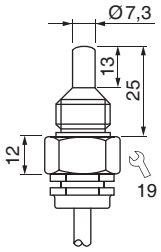
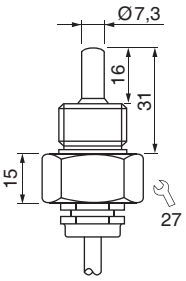
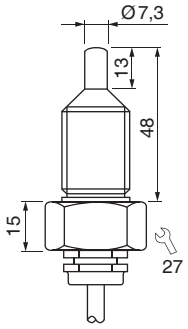
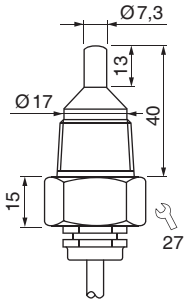
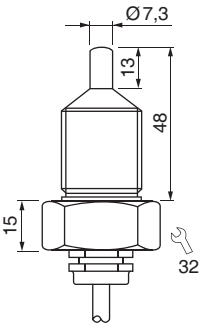
# Flow Sensors

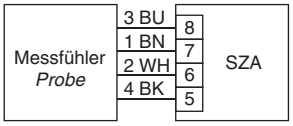
## Ex - Probe • Device category 2G and 2D

### Series ST

**Ex-Device category 2G**
**Installation in Zone 1 (gas)**

**Ex-Device category 2D**
**Installation in Zone 21 (dust)**

| Design | G1/4 | G1/2 | G1/2 | NPT1/2 | G3/4 |
|---|---|---|---|---|---|
| Dimensions |   |   |   |   |   |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length [mm] | 25 | 31 | 48 | 40 | 48 |
| Connection | fixed cable | fixed cable | fixed cable | fixed cable | fixed cable |
| ID-No. | P11144 | P11145 | P11146 | P11147 | P11174 |
| Type | ST 101 K | ST 102 K | ST 103 K | ST 104 K | ST 106 K |
| Ex area of use | Gas: Zone 1 / Dust: Zone 21 | | | | |
| Certificate No. | TÜV 97 ATEX 1218 | | | | |
| Ex marking | Gas: Ex II 2 G Ex ib IIC T6 Gb<br>Dust: Ex II 2 D Ex ib IIIC T125 °C Db | | | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: −20 ≤ Ta ≤ +40<br>T5: −20 ≤ Ta ≤ +55<br>T4: −20 ≤ Ta ≤ +85<br>T3: −20 ≤ Ta ≤ +85<br>Dust: −20 ≤ Ta ≤ +85 | | | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. [s] | 8 (2...18) | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | |
| Compressive strength [bar] | 60 | | | | |
| Housing material | AISI 316 Ti • different materials on request | | | | |
| Protection [EN 60529] | IP 67 | | | | |
| Connection | 2 m PUR-cable 4x0.25 mm² | | | | |




(probes with cable length > 2 m are available on request)

Note: for the connection to amplifier SZA..., page 1.94

# Flow Sensors

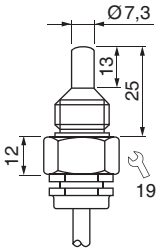
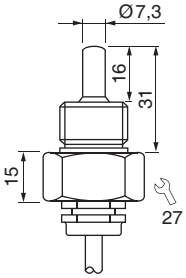
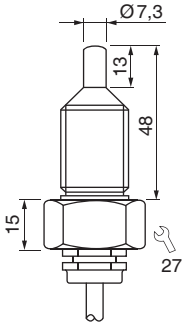
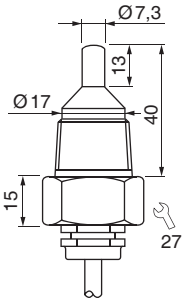
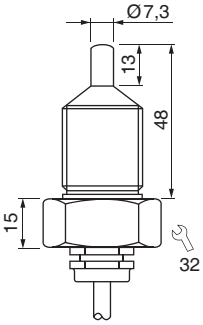
## - Probe • Device category 2G and 2D

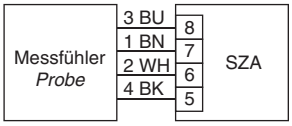
### Series ST

**-Device category 2G**
**Installation in Zone 1 (gas)**

**-Device category 2D**
**Installation in Zone 21 (dust)**

**Extended temperature range**
**up to 120 °C**

| Design | G1/4 | G1/2 | G1/2 | NPT1/2 | G3/4 |
|---|---|---|---|---|---|
| Dimensions |   |   |   |   |   |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length [mm] | 25 | 31 | 48 | 40 | 48 |
| Connection | fixed cable | fixed cable | fixed cable | fixed cable | fixed cable |
| **ID-No.** | **P11176** | **P11178** | **P11180** | **P11182** | **P11184** |
| Type | ST 101 KH | ST 102 KH | ST 103 KH | ST 104 KH | ST 106 KH |
| Ex area of use | Gas: Zone 1 / Dust: Zone 21 | | | | |
| Certificate No. | TÜV 97 ATEX 1218 | | | | |
| Ex marking | Gas: II 2 G Ex ib IIC T6 Gb<br>Dust: II 2 D Ex ib IIIC T125 °C Db | | | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: +10 ≤ Ta ≤ +40<br>T5: +10 ≤ Ta ≤ +55<br>T4: +10 ≤ Ta ≤ +90<br>T3: +10 ≤ Ta ≤ +120<br>Dust: −20 ≤ Ta ≤ +85 | | | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. [s] | 8 (2...18) | | | | |
| Reaction time typ. [s] | 2 (1...13) | | | | |
| Compressive strength [bar] | 60 | | | | |
| Housing material | AISI 316 Ti • different materials on request | | | | |
| Protection [EN 60529] | IP 67 | | | | |
| Connection | 2 m FEP-cable 4x0.25 mm² | | | | |




(probes with cable length > 2 m are available on request)

Note: for the connection to amplifier SZA..., page 1.94

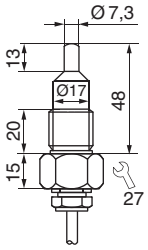
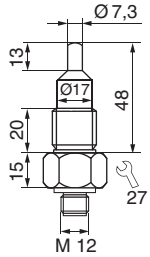
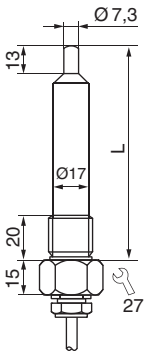
# Flow Sensors

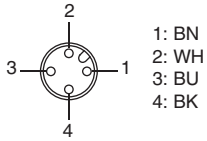
## Ex - Probe • Device category 1G/2G and 1D

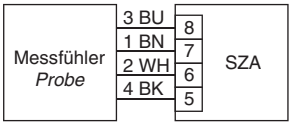
### Series STS

**Ex-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

**Ex-Device category 1D**
**Installation in Zone 20 (dust)**

| Design | | G1/2 | | | | |
|---|---|---|---|---|---|---|
| Dimensions | |  |  |  | | |
| Detection range | [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length L | [mm] | 48 | 48 | 80 | 110 | 140 |
| Connection | | fixed cable | plug | fixed cable | fixed cable | fixed cable |
| **ID-No.** | | **P11186** | **P11187** | **P11188** | **P11189** | **P11190** |
| Type | | STS 110 K | STS 110 S | STS 110 K-L80 | STS 110 K-L110 | STS 110 K-L140 |
| Ex area of use | | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | | | | |
| Certificate No. | | TÜV 98 ATEX 1298 X | | | | |
| Ex marking | | Gas: Ex II 1/2 G Ex ia IIC T6 Ga/Gb | | | | |
| | | Dust: Ex II 1 D Ex ia IIIC T100 °C Da | | | | |
| Ambient temperature and medium temperature | [°C] | Gas: T6: −20 ≤ Ta ≤ +40 | | | | |
| | | T5: −20 ≤ Ta ≤ +55 | | | | |
| | | T4: −20 ≤ Ta ≤ +60 | | | | |
| | | T3: −20 ≤ Ta ≤ +60 | | | | |
| | | Dust: −20 ≤ Ta ≤ +60 | | | | |
| Maximum values | | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. | [s] | 8 (2...18) | | | | |
| Reaction time typ. | [s] | 2 (1...13) | | | | |
| Compressive strength | [bar] | 60 | | | | |
| Housing material | | AISI 316 Ti • different materials on request | | | | |
| Protection | [EN 60529] | cable ...K: IP 67 / plug ...S: IP 67 | | | | |
| Connection | | ...K: 2 m PUR-cable 4x0.25 mm² ...S: M12 connector | | | | |




(probes with cable length > 2 m are available on request)

Note: for the connection to amplifier SZA..., page 1.94

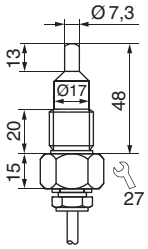
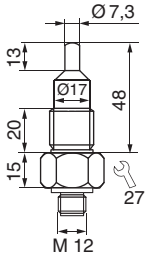
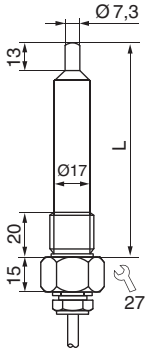
# Flow Sensors

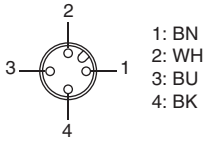
## - Probe • Device category 2G and 2D

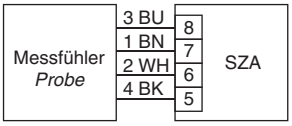
### Series ST

**-Device category 2G**
**Installation in Zone 1 (gas)**

**-Device category 2D**
**Installation in Zone 21 (dust)**

| Design | | G1/2 | | | | |
|---|---|---|---|---|---|---|
| Dimensions | |  |  |  | | |
| Detection range | [cm/s] | water 1...100 / oil 3...200 | | | | |
| Sensor length L | [mm] | 48 | 48 | 80 | 110 | 140 |
| Connection | | fixed cable | plug | fixed cable | fixed cable | fixed cable |
| **ID-No.** | | **P11192** | **P11193** | **P11194** | **P11195** | **P11196** |
| Type | | ST 110 K | ST 110 S | ST 110 K-L80 | ST 110 K-L110 | ST 110 K-L140 |
| Ex area of use | | Gas: Zone 1 / Dust: Zone 21 | | | | |
| Certificate No. | | TÜV 97 ATEX 1218 | | | | |
| Ex marking | | Gas: II 2 G Ex ib IIC T6 Gb | | | | |
| | | Dust: II 2 D Ex ib IIIC T125 °C Db | | | | |
| Ambient temperature and medium temperature | [°C] | Gas: T6: −20 ≤ Ta ≤ +40<br>T5: −20 ≤ Ta ≤ +55<br>T4: −20 ≤ Ta ≤ +85<br>T3: −20 ≤ Ta ≤ +85 | | | | |
| | | Dust: −20 ≤ Ta ≤ +85 | | | | |
| Maximum values | | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | | |
| Start-up time typ. | [s] | 8 (2...18) | | | | |
| Reaction time typ. | [s] | 2 (1...13) | | | | |
| Compressive strength | [bar] | 60 | | | | |
| Housing material | | AISI 316 Ti • different materials on request | | | | |
| Protection | [EN 60529] | cable ...K: IP 67 / plug ...S: IP 67 | | | | |
| Connection | | ...K: 2 m PUR-cable 4x0.25 mm² / ...S: M12 connector | | | | |




(probes with cable length > 2 m are available on request)

| Note: | for the connection to amplifier SZA..., page 1.94 |
|---|---|

# Flow Sensors

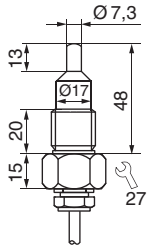
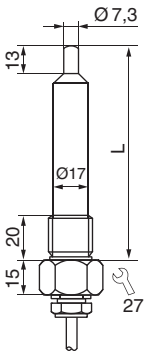
## Ex - Probe • Device category 2G and 2D

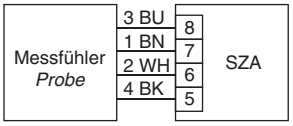
### Series ST

**Ex-Device category 2G**
**Installation in Zone 1 (gas)**

**Ex-Device category 2D**
**Installation in Zone 21 (dust)**

**Extended temperature range**
**up to 120 °C**

| Design | | G1/2 | | | |
|---|---|---|---|---|---|
| Dimensions | |  |  | | |
| Detection range | [cm/s] | water 1...100 / oil 3...200 | | | |
| Sensor length L | [mm] | 48 | 80 | 110 | 140 |
| Connection | | fixed cable | fixed cable | fixed cable | fixed cable |
| ID-No. | | P11198 | P11200 | P11201 | P11202 |
| Type | | ST 110 KH | ST 110 KH-L80 | ST 110 KH-L110 | ST 110 KH-L140 |
| Ex area of use | | Gas: Zone 1 / Dust: Zone 21 | | | |
| Certificate No. | | TÜV 97 ATEX 1218 | | | |
| Ex marking | | Gas: Ex II 2 G Ex ib IIC T6 Gb | | | |
| | | Dust: Ex II 2 D Ex ib IIIC T125 °C Db | | | |
| Ambient temperature and medium temperature | [°C] | Gas: T6: +10 ≤ Ta ≤ +40 | | | |
| | | T5: +10 ≤ Ta ≤ +55 | | | |
| | | T4: +10 ≤ Ta ≤ +90 | | | |
| | | T3: +10 ≤ Ta ≤ +120 | | | |
| | | Dust: −20 ≤ Ta ≤ +85 | | | |
| Maximum values | | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | | |
| Start-up time typ. | [s] | 8 (2...18) | | | |
| Reaction time typ. | [s] | 2 (1...13) | | | |
| Compressive strength | [bar] | 60 | | | |
| Housing material | | AISI 316 Ti • different materials on request | | | |
| Protection | [EN 60529] | IP 67 | | | |
| Connection | | 2 m FEP-cable 4x0.25 mm² | | | |




(probes with cable length > 2 m are available on request)

Note: for the connection to amplifier SZA..., page 1.94

# Flow Sensors

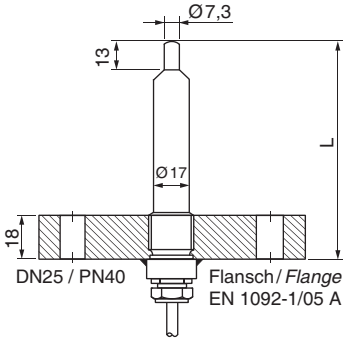
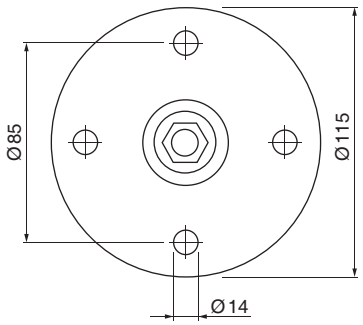
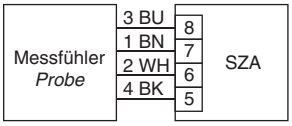
## Ex - Probe • Device category 1G/2G and 1D

### Series STS

**Ex-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

**Ex-Device category 1D**
**Installation in Zone 20 (dust)**

**With welded standard flange**

| Design | DN25 / PN40 (EN 1092-1/05 A) | | |
|---|---|---|---|
| Dimensions |   | | |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | |
| Sensor length L [mm] | 80 | 110 | 140 |
| Connection | fixed cable | fixed cable | fixed cable |
| **ID-No.** | **P11191** | **P11148** | **P11149** |
| Type | STS 111 K-L80 | STS 111 K-L110 | STS 111 K-L140 |
| Ex area of use | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | | |
| Certificate No. | TÜV 98 ATEX 1298 X | | |
| Ex marking | Gas: Ex II 1/2 G Ex ia IIC T6 Ga/Gb | | |
| | Dust: Ex II 1 D Ex ia IIIC T100 °C Da | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: $-20 \le Ta \le +40$ | | |
| | T5: $-20 \le Ta \le +55$ | | |
| | T4: $-20 \le Ta \le +60$ | | |
| | T3: $-20 \le Ta \le +60$ | | |
| | Dust: $-20 \le Ta \le +60$ | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | |
| Start-up time typ. [s] | 8 (2...18) | | |
| Reaction time typ. [s] | 2 (1...13) | | |
| Compressive strength [bar] | probe: 60 / flange: PN40 | | |
| Housing material | AISI 316 Ti • different materials on request | | |
| Protection [EN 60529] | IP 67 | | |
| Connection | 2 m PUR-cable 4x0.25 mm² | | |
| |  | | |
| | (probes with cable length > 2 m and different flanges are available on request) | | |
| Note: | for the connection to amplifier SZA..., page 1.94 | | |

# Flow Sensors

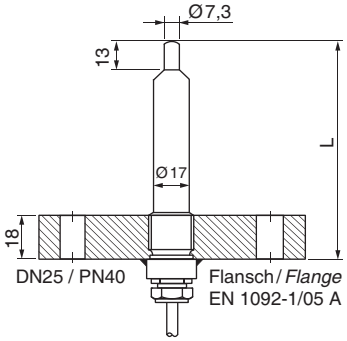
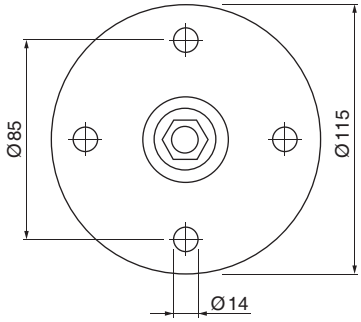
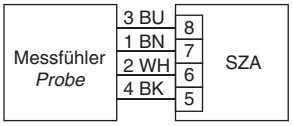
## Ex - Probe • Device category 2G and 2D

### Series ST

**Ex-Device category 2G**
**Installation in Zone 1 (gas)**

**Ex-Device category 2D**
**Installation in Zone 21 (dust)**

**With welded standard flange**

| **Design** | **DN25 / PN40 (EN 1092-1/05 A)** | | |
|---|---|---|---|
| *Dimensions* |   | | |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | |
| Sensor length L [mm] | 80 | 110 | 140 |
| Connection | fixed cable | fixed cable | fixed cable |
| **ID-No.** | **P11197** | **P11150** | **P11151** |
| Type | ST 111 K-L80 | ST 111 K-L110 | ST 111 K-L140 |
| Ex area of use | Gas: Zone 1 / Dust: Zone 21 | | |
| Certificate No. | TÜV 97 ATEX 1218 | | |
| Ex marking | Gas: Ex II 2 G Ex ib IIC T6 Gb | | |
| | Dust: Ex II 2 D Ex ib IIIC T125 °C Db | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: $-20 \le Ta \le +40$ | | |
| | T5: $-20 \le Ta \le +55$ | | |
| | T4: $-20 \le Ta \le +85$ | | |
| | T3: $-20 \le Ta \le +85$ | | |
| | Dust: $-20 \le Ta \le +85$ | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | |
| Start-up time typ. [s] | 8 (2...18) | | |
| Reaction time typ. [s] | 2 (1...13) | | |
| Compressive strength [bar] | 60 | | |
| Housing material | AISI 316 Ti • different materials on request | | |
| Protection [EN 60529] | IP 67 | | |
| Connection | 2 m PUR-cable 4x0.25 mm² | | |
| |  | | |
| | (probes with cable length > 2 m and different flanges are available on request) | | |
| Note: | for the connection to amplifier SZA..., page 1.94 | | |

# Flow Sensors

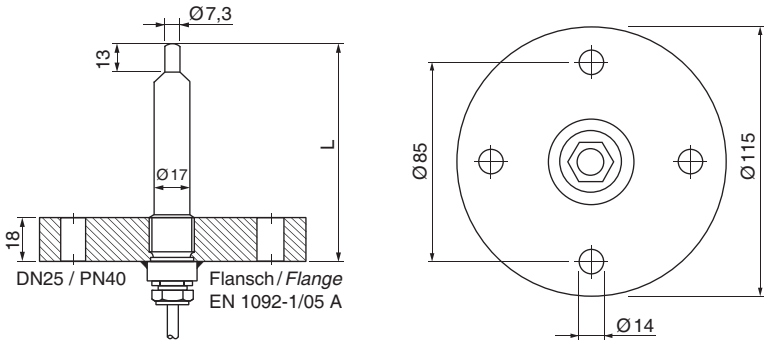
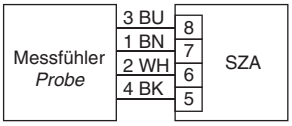
## Ex - Probe • Device category 2G and 2D

### Series ST

**Ex-Device category 2G**
**Installation in Zone 1 (gas)**

**Ex-Device category 2D**
**Installation in Zone 21 (dust)**

**With welded standard flange**
**Extended temperature range**
**up to 120 °C**

| Design | DN25 / PN40 (EN 1092-1/05 A) | | |
|---|---|---|---|
| Dimensions |   | | |
| Detection range [cm/s] | water 1...100 / oil 3...200 | | |
| Sensor length L [mm] | 80 | 110 | 140 |
| Connection | fixed cable | fixed cable | fixed cable |
| **ID-No.** | **P11203** | **P11204** | **P11205** |
| Type | ST 111 KH-L80 | ST 111 KH-L110 | ST 111 KH-L140 |
| Ex area of use | Gas: Zone 1 / Dust: Zone 21 | | |
| Certificate No. | TÜV 97 ATEX 1218 | | |
| Ex marking | Gas: Ex II 2 G Ex ib IIC T6 Gb | | |
| | Dust: Ex II 2 D Ex ib IIIC T125 °C Db | | |
| Ambient temperature and medium temperature [°C] | Gas: T6: +10 ≤ Ta ≤ +40 | | |
| | T5: +10 ≤ Ta ≤ +55 | | |
| | T4: +10 ≤ Ta ≤ +90 | | |
| | T3: +10 ≤ Ta ≤ +120 | | |
| | Dust: −20 ≤ Ta ≤ +85 | | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | | |
| Start-up time typ. [s] | 8 (2...18) | | |
| Reaction time typ. [s] | 2 (1...13) | | |
| Compressive strength [bar] | 60 | | |
| Housing material | AISI 316 Ti • different materials on request | | |
| Protection [EN 60529] | IP 67 | | |
| Connection | 2 m FEP-cable 4x0.25 mm² | | |
| |   | | |
| | (probes with cable length >2 m and different flanges are available on request) | | |
| Note: | for the connection to amplifier SZA..., page 1.94 | | |

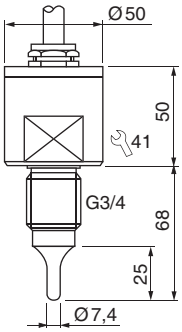
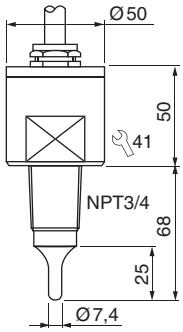
# Ex - Probe • Category 1/2 - 1 • Zone 0/1 - 20

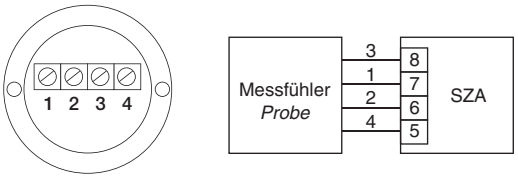
## Series STSEX

### Ex-Device category 1G/2G
### Installation in partition wall
### Zone 0 / Zone 1 (gas)

### Ex-Device category 1D
### Installation in Zone 20 (dust)

### Terminal clamps

| Design | G3/4 | NPT3/4 |
|---|---|---|
| Dimensions |   |   |
| Detection range [cm/s] | water 1...100 / oil 3...200 | water 1...100 / oil 3...200 |
| Sensor length [mm] | 68 | 68 |
| Connection | terminal clamps | terminal clamps |
| **ID-No.** | **P11268** | **P11269** |
| Type | STSEX 01 | STSEX 02 |
| Ex area of use | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | |
| Certificate No. | TÜV 98 ATEX 1298 X | |
| Ex marking | Gas: Ex II 1/2 G Ex ia IIC T6 Ga/Gb | |
| | Dust: Ex II 1 D Ex ia IIIC T100 °C Da | |
| Ambient temperature and medium temperature [°C] | Gas: T6: $-20 \le Ta \le +40$ | |
| | T5: $-20 \le Ta \le +55$ | |
| | T4: $-20 \le Ta \le +60$ | |
| | T3: $-20 \le Ta \le +60$ | |
| | Dust: $-20 \le Ta \le +60$ | |
| Maximum values | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | |
| Start-up time typ. [s] | 8 (2...18) | |
| Reaction time typ. [s] | 2 (1...13) | |
| Terminal clamps [mm] | cable diameter 5.5...8.5 | |
| Housing material | AISI 316 Ti • different materials on request | |
| Protection [EN 60529] | IP 67 | |
| Connection cable | 2 m PVC 4x0.75 mm² (number 1-4) | |




Note: for the connection to amplifier SZA..., page 1.94

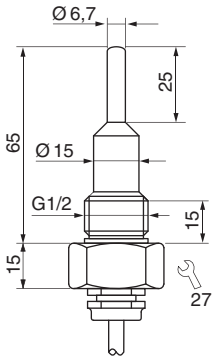
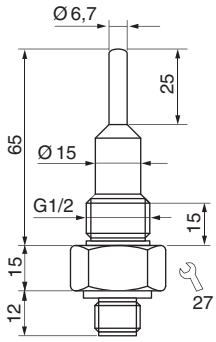
# Air Flow Sensors

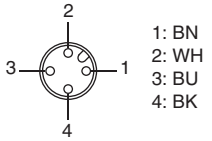
## Ex - Probe • Device category 1G/2G and 1D

### Series STS

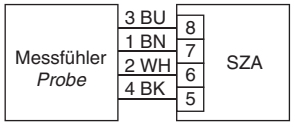
**Ex-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

**Ex-Device category 1D**
**Installation in Zone 20 (dust)**

| Design | | G1/2 | |
|---|---|---|---|
| Dimensions | |   |   |
| Detection range | [m/s] | air 2...25 | air 2...25 |
| Sensor length | [mm] | 65 | 65 |
| Connection | | fixed cable | plug |
| **ID-No.** | | **P11152** | **P11206** |
| Type | | STS 212 K | STS 212 S |
| Ex area of use | | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | |
| Certificate No. | | TÜV 98 ATEX 1298 X | |
| Ex marking | | Gas: Ex II 1/2 G Ex ia IIC T4 Ga/Gb | |
| | | Dust: Ex II 1 D Ex ia IIIC T120 °C Da | |
| Ambient temperature and medium temperature | [°C] | Gas: T4: −20 ≤ Ta ≤ +60 | |
| | | T3: −20 ≤ Ta ≤ +60 | |
| | | Dust: −20 ≤ Ta ≤ +60 | |
| Maximum values | | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | |
| Start-up time typ. | [s] | 10...40 | |
| Reaction time typ. | [s] | 5 (2...30) | |
| Compressive strength | [bar] | 10 | |
| Housing material | | AISI 316 Ti • different materials on request | |
| Protection | [EN 60529] | IP 67 | IP 67 |
| Connection | | 2 m PUR-cable 4x0.25 mm² | M12 connector |




1: BN
2: WH
3: BU
4: BK




(probes with cable length > 2 m are available on request)

| Note: | for the connection to amplifier SZA..., page 1.94 |
|---|---|

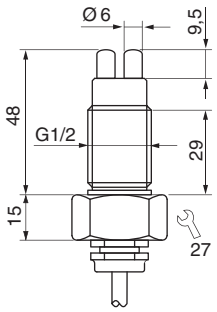
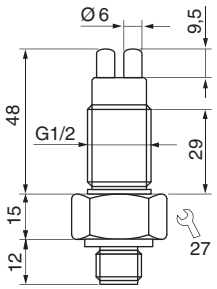
# Air Flow Sensors

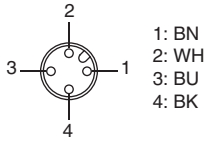
## Ex - Probe • Device category 1G/2G and 1D

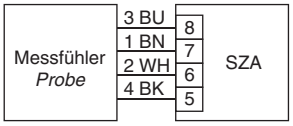
### Series STS

**Ex-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

**Ex-Device category 1D**
**Installation in Zone 20 (dust)**

| Design | | G1/2 | |
|---|---|---|---|
| Dimensions | |   |   |
| Detection range | [m/s] | air 2...25 | air 2...25 |
| Sensor length | [mm] | 48 | 48 |
| Connection | | fixed cable | plug |
| **ID-No.** | | **P11153** | **P11207** |
| Type | | STS 215 K | STS 215 S |
| Ex area of use | | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | |
| Certificate No. | | TÜV 98 ATEX 1298 X | |
| Ex marking | | Gas: Ex II 1/2 G Ex ia IIC T6 Ga/Gb<br>Dust: Ex II 1 D Ex ia IIIC T105 °C Da | |
| Ambient temperature and medium temperature | [°C] | Gas: T6: −20 ≤ Ta ≤ +35<br>T5: −20 ≤ Ta ≤ +50<br>T4: −20 ≤ Ta ≤ +60<br>T3: −20 ≤ Ta ≤ +60<br>Dust: −20 ≤ Ta ≤ +60 | |
| Maximum values | | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | |
| Start-up time typ. | [s] | 5...20 | |
| Reaction time typ. | [s] | 3 (2...30) | |
| Compressive strength | [bar] | 10 | |
| Housing material | | AISI 316 Ti • different materials on request | |
| Protection | [EN 60529] | IP 67 | IP 67 |
| Connection | | 2 m PUR-cable 4x0.25 mm² | M12 connector |




(probes with cable length > 2 m are available on request)

| Note: | for the connection to amplifier SZA..., page 1.94 |
|---|---|

# Air Flow Sensors

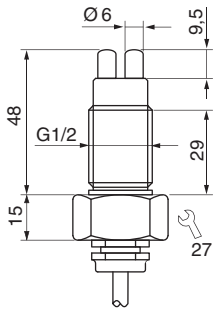
## Ex - Probe • Device category 1G/2G and 1D

### Series STS

**Ex-Device category 1G/2G**
**Installation in partition wall**
**Zone 0 / Zone 1 (gas)**

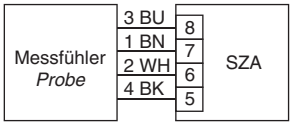
**Ex-Device category 1D**
**Installation in Zone 20 (dust)**

**Extended temperature range**

| Design | G1/2 |
|---|---|
| Dimensions |  |



| | | | |
|---|---|---|---|
| Detection range | [m/s] | air 2...25 | |
| Sensor length | [mm] | 48 | |
| Connection | | fixed cable | |
| **ID-No.** | | **P11212** | |
| Type | | STS 215 KH | |
| Ex area of use | | Gas: Partition wall Zone 0 / Zone 1 / Dust: Zone 20 | Gas: Zone 1 / Dust: Zone 21 |
| Certificate No. | | TÜV 98 ATEX 1298 X | |
| Ex marking | | Gas: Ex II 1/2 G Ex ia IIC T6 Ga/Gb | |
| | | Dust: Ex II 1 D Ex ia IIIC T105 °C Da | |
| Ambient temperature and medium temperature | [°C] | Gas: T6: – 20 ≤ Ta ≤ +35<br>T5: – 20 ≤ Ta ≤ +50<br>T4: – 20 ≤ Ta ≤ +60<br>T3: – 20 ≤ Ta ≤ +60<br>Dust: – 20 ≤ Ta ≤ +60 | Gas: T6: +10 ≤ Ta ≤ +35<br>T5: +10 ≤ Ta ≤ +50<br>T4: +10 ≤ Ta ≤ +85<br>T3: +10 ≤ Ta ≤ +120<br>Dust: –20 ≤ Ta ≤ +85 |
| Maximum values | | Ui = 13.65 V / Ii = 200 mA / Pi = 0.69 W / Ci = 0.27 nF / Li = 1.30 µH | |
| Start-up time typ. | [s] | 5...20 | |
| Reaction time typ. | [s] | 3 (2...30) | |
| Compressive strength | [bar] | 10 | |
| Housing material | | AISI 316 Ti • different materials on request | |
| Protection | [EN 60529] | IP 67 | |
| Connection | | 2 m FEP-cable 4x0.25 mm² | |





(probes with cable length > 2 m are available on request)

| | |
|---|---|
| Note: | for the connection to amplifier SZA..., page 1.94 |

# Air Flow Sensors

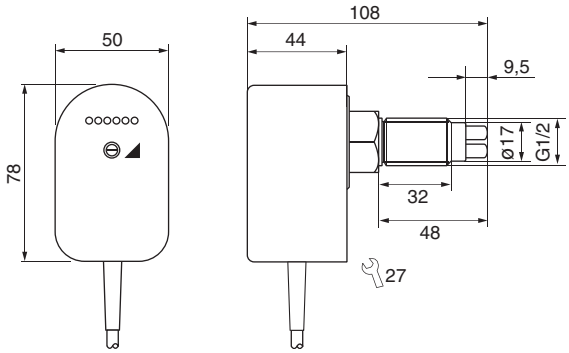
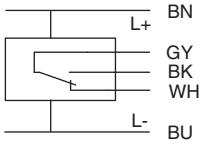
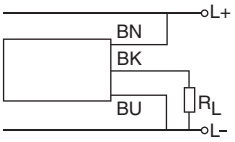
## Ex - Compact models • Device category 3D

### Series LNZ 450 EX22

**Ex-Device category 3D**
**Ex II 3D IP65 T90 °C X**

**DC 24 V**
**Relay output**
**Analog output**

**Detection range 0.5...30 m/s**

| Ausführung | | G1/2 | |
|---|---|---|---|
| Abmessungen | |   | |
| Detection range | [m/s] | air 0,5...30 | air 0,5...30 |
| Output | | Relay | 4...20 mA |
| ID-No. | | P11305 | P11306 * |
| Type | | LNZ 450 GR-EX22 | LNZ 450 GA-EX22 |
| Ex area of use | | Dust: Zone 22 | |
| Ex marking | | Ex II 3D IP65 T90 °C X | |
| Supply voltage | [V] | 24 DC ±20% | 24 DC ±15% |
| Current consumption | [mA] | 80 | 80 |
| Current output | [mA] | 4...20 | |
| Load $R_L$ | [Ω] | – | 200...500 |
| Switching voltage | [V] | 250 AC / 60 DC | – |
| Switching current | [A] | 4 AC / 4 DC | – |
| Switching power max. | | 100 VA / 60 W | – |
| Ambient temperature | [°C] | –10 ≤ Ta ≤ +60 | –10 ≤ Ta ≤ +60 |
| Medium temperature | [°C] | 0...+60 | 0...+60 |
| Start-up time typ. | [s] | 10...90 | 20...90 |
| Reaction time typ. | [s] | 2...30 | 4...30 |
| Compressive strength | [bar] | 30 | |
| Material | | housing: PBT sensor: 1.4305 | |
| Display flow | | LED-array | |
| Protection | [EN 60529] | IP 65 | |
| Connection | | 2 m PVC-cable 5x0.5 mm² | 2 m PVC-cable 3x0.5 mm² |
| * c UL us LISTED E304328 | |   |   |

# Flow Sensors

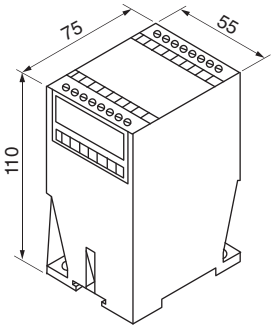
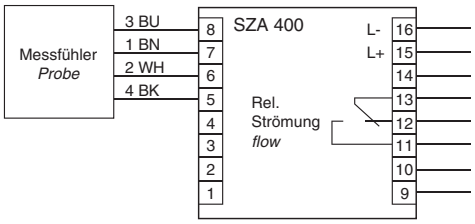
## - Amplifiers AC/DC

### Series SZA

### II (1) GD [Ex ia] IIC

### AC 230 V • AC 115 V
### DC 24 V
### Relay output

### Cable break and short circuit monitoring
### Turn off delay


| Design | SZA 400 Ex... | | |
|---|---|---|---|
| Dimensions |   | | |
| **ID-No.** | **P10706** | **P10707** | **P10708** |
| Type | SZA 400 Ex-230 | SZA 400 Ex-115 | SZA 400 Ex-24 |
| Output | Relay | Relay | Relay |
| Supply voltage [V] | 230 AC ±10% | 115 AC ±10% | 24 DC ±15% |
| Ex marking | II (1) GD [Ex ia] IIC | | |
| Certificate No. | TÜV 96 ATEX 1097 | | |
| Maximum values | Uo = 12.6 V<br>Io = 200 mA<br>Ri = 68.5 Ω<br>Co = 170 nF<br>Lo = 0.5 mH | | |
| Turn off delay [s] | 0...25 | | |
| Output | relay / change-over | | |
| Switching voltage [V] | 250 AC / 60 DC | | |
| Switching current [A] | 4 AC / 0.5 DC | | |
| Switching power | cos φ >0.7 / L/R <200 ms | | |
| Ambient temperature [°C] | −20 ≤ Ta ≤ +60 | | |
| Protection [EN 60529] | terminal: IP 20 / housing: IP 40 | | |
| Connection | terminal screws | | |
| Note:<br>The Ex-amplifier must be mounted outside hazardous areas (gas or dust). |   | | |

# Flow Sensors

## Ex - Junction box • Device category 2G and 2D

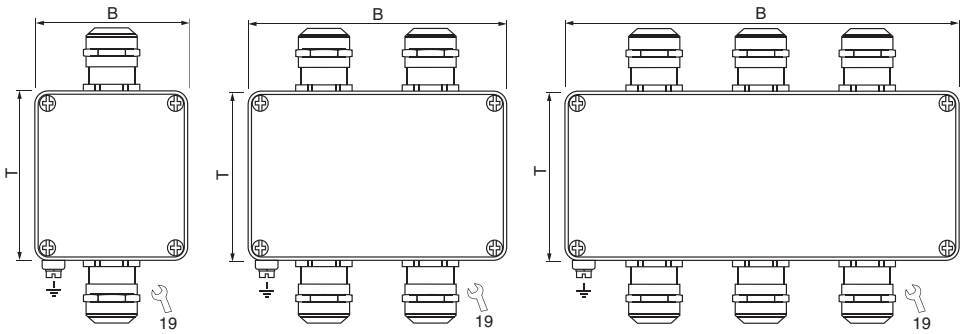
### Series GK...

### For the connection of supply and signal lines in explosion hazardous areas of zone 1 and zone 21

### Clamp fastening


| Design | GK E... |
|---|---|

*Dimensions*




| ID-No. | | Z01222 | Z01232 | Z01246 |
|---|---|---|---|---|
| Type | | GK E 060 K M | GK E 080 K M | GK E 100 K M |
| Number of clamps | | 4 | 2 x 4 | 3 x 4 |
| Dimensions (BxTxH) | [mm] | 58x64x36 | 98x64x36 | 150x64x36 |
| Ignition protection type | | Gas: increased safety | | |
| | | Dust: protection through enclosure | | |
| Ex marking | | Gas: Ex II 2G Ex eb IIC T6 Gb | | |
| | | Dust: Ex II 2D Ex tb IIIC T80 °C Db | | |
| Certificate No. | | TÜV 16 ATEX 152979 X | | |
| Ambient temperature | [°C] | Gas: T3, T4, T5, T6: −20 ≤ Ta ≤ +75 | | |
| | | Dust: −20 ≤ Ta ≤ +75 | | |
| Voltage | [V] | $U_m \leq 275$ | | |
| Current | [A] | $I_m \leq 2$ | | |
| Type of terminal | | terminal with no screws | | |
| Rated cross-section | | „e+t“ single wire: 0.20...2.5 mm² / flexible: 0.20...2.5 mm² | | |
| | | flexible: 0.20...2.5 mm² (with wire end ferrule) | | |
| Clamping range of cable gland | [mm] | 5.0...10.0 | | |
| | | 2.0...6.0 (with reduction insert RDE 16) | | |
| Material | | housing: aluminium powder coated / cable gland: Br-Ni / PA / EPDM | | |
| Protection | [EN 60529] | IP 65 | | |
| Connection | | terminal compartment | | |

Note:

The Ex-junction box type GK E... is designed for the connection of non-intrinsically safe circuits in explosion-hazardous areas of zone 1 and zone 21. Outside of the housing, the lines must be installed permanently; further provisions must be observed if required.

Additional housings, additional terminals and plastic cable glands are available on request.

| Accessories | recuction insert RDE 16 (part of delivery) |
|---|---|

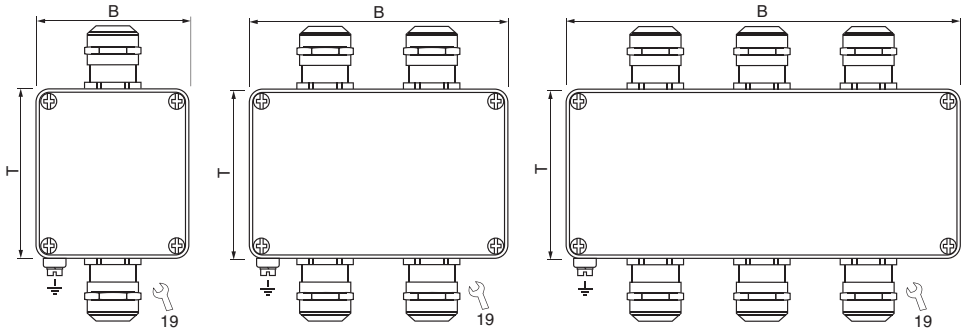
# Flow Sensors

## - Junction box • Device category 2G and 2D

### Series GK...

**For the connection of supply and signal lines in explosion hazardous areas of zone 1 and zone 21**

**Clamp fastening**


| Design | GK I... | | |
|---|---|---|---|
| Dimensions |   | | |
| **ID-No.** | **Z01224** | **Z01234** | **Z01248** |
| Type | GK I 060 K M | GK I 080 K M | GK I 100 K M |
| Number of clamps | 4 | 2 x 4 | 3 x 4 |
| Dimensions (BxTxH) [mm] | 58x64x36 | 98x64x36 | 150x64x36 |
| Ignition protection type | Gas: intrinsic safety<br>Dust: intrinsic safety | | |
| Ex marking | Gas: Ⓔx II 2G Ex ib/ia IIC T6 Gb<br>Dust: Ⓔx II 2D Ex ib/ia IIIC T80 °C Db | | |
| Certificate No. | TÜV 16 ATEX 152979 X | | |
| Ambient temperature [°C] | Gas: T3, T4, T5, T6: −20 ≤ Ta ≤ +75<br>Dust: −20 ≤ Ta ≤ +75 | | |
| Voltage [V] | $U_i$ = 90 | | |
| Current [A] | $I_i$ = 2.0 | | |
| Type of terminal | terminal with no screws | | |
| Rated cross-section | „i“ single wire: 0.08...2.5 mm² / flexible: 0.08...2.5 mm²<br>flexible: 0.08...2.5 mm² (with wire end ferrule) | | |
| Clamping range of cable gland [mm] | 5.0...10.0<br>2.0...6.0 (with reduction insert RDE 16) | | |
| Material | housing: aluminium powder coated / cable gland: Br-Ni / PA / EPDM | | |
| Protection [EN 60529] | IP 65 | | |
| Connection | terminal compartment | | |

Note:

The Ex-junction box type GK I... is designed for the connection of intrinsically safe circuits in explosion-hazardous areas of zone 1 and zone 21. Outside of the housing, the lines must be installed permanently; further provisions must be observed if required.

Additional housings, additional terminals and plastic cable glands are available on request.

| Accessories | recuction insert RDE 16 (part of delivery) |
|---|---|

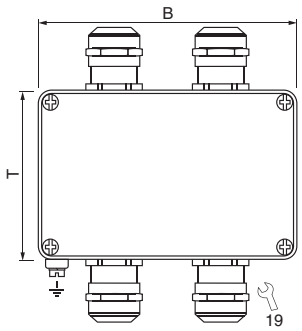
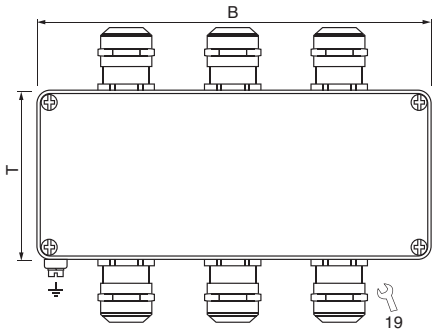
# Flow Sensors

## Ex - Junction box • Device category 2G and 2D

### Series GK...

**For the connection of supply and signal lines in explosion hazardous areas of zone 1 and zone 21**

**Clamp fastening**


| Design | GK EI... | GK EEI... | GK EII... |
|---|---|---|---|
| Dimensions |  |  | |
| ID-No. | Z01236 | Z01250 | Z01252 |
| Type | GK EI 080 K M | GK EEI 100 K M | GK EII 100 K M |
| Number of clamps | 4 / 4 | 4 + 4 / 4 | 4 / 4 + 4 |
| Dimensions (BxTxH) [mm] | 98x64x36 | 150x64x36 | 150x64x36 |
| Ignition protection type | Gas: increased safety / intrinsic safety<br>Dust: protection through enclosure / intrinsic safety | | |
| Ex marking | Gas: Ex II 2G Ex eb ib/ia IIC T6 Gb<br>Dust: Ex II 2D Ex tb ib/ia IIIC T80 °C Db | | |
| Certificate No. | TÜV 16 ATEX 152979 X | | |
| Ambient temperature [°C] | Gas: T3, T4, T5, T6: −20 ≤ Ta ≤ +75<br>Dust: −20 ≤ Ta ≤ +75 | | |
| Voltage [V] | $U_m \leq 275$ / $U_i = 90$ | | |
| Current [A] | $I_m \leq 2$ / $I_i = 2.0$ | | |
| Type of terminal | terminal with no screws | | |
| Rated cross-section | „i“ single wire: 0.08...2.5 mm² / flexible: 0.08...2.5 mm²<br>flexible: 0.08...2.5 mm² (with wire end ferrule)<br>„e+t“ single wire: 0.20...2.5 mm² / flexible: 0.20...2.5 mm²<br>flexible: 0.20...2.5 mm² (with wire end ferrule) | | |
| Clamping range of cable gland [mm] | 5.0...10.0<br>2.0...6.0 (with reduction insert RDE 16) | | |
| Material | housing: aluminium powder coated / cable gland: Br-Ni / PA / EPDM | | |
| Protection [EN 60529] | IP 65 | | |
| Connection | terminal compartment | | |

Note:

The Ex-junction box type GK... is designed for the connection of intrinsically safe and / or non-intrinsically safe circuits in explosion-hazardous areas of zone 1 and zone 21. Outside of the housing, the lines must be installed permanently; further provisions must be observed if required.

Additional housings, additional terminals and plastic cable glands are available on request.

| Zubehör | Reduziereinsatz RDE 16 (im Lieferumfang enthalten) |
|---|---|

# Accessories • IO-Link-Master

## Series IO-Link-Master

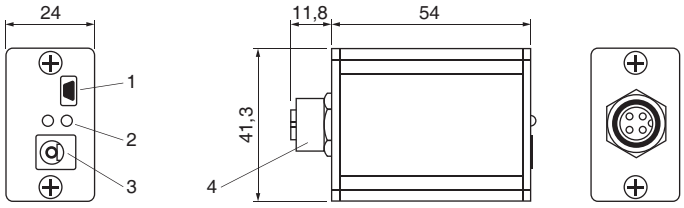
### Parametrization of IO-Link-devices
### Version 1.1 - Universally usable
### Easy configurable software

Use IO-Link
Universal · Smart · Easy

| Design | USB |
|---|---|

**Dimensions**

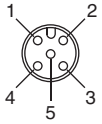
1: mini USB
2: LED operating state / fault display
3: 24 V DC Ø5.5/2.1 mm
4: M12 type A connector

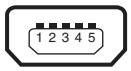



| | | |
|---|---|---|
| Application area | | parametrization of devices with IO-Link-functions and monitoring of process data |
| Communications protocol | | COM 1 (4.8 kBit/s), COM 2 (38.4 kBit/s), COM 3 (230 kBit/s) |
| Related software | | Port and Device Configuration Tool [1] |
| Output | | IO-Link |
| **ID-No.** | | **Z01216** |
| Type | | IO-Link-USB-Master-Set v1.1 |
| Input voltage | [V] | USB: 5 DC / external power supply: 24 DC (EN 60950) |
| Input current | [mA] | USB: < 500 / external power supply: < 600 |
| Output voltage | [V] | USB: 24 DC / external power supply: see input voltage |
| Output current | [mA] | USB: < 65 / external power supply: < 500 |
| | | |
| LED displays | | |
| Green | | continuous: Master ready for operation, flashes: IO-Link-communication active |
| Red | | continuous and green LED off: fault |
| Material | | aluminium, eloxed |
| Protection | [EN 60529] | IP 20 |
| Connection | | M12 connector / type A / socket |

[1] Download of iqPDCT-software from www.iq2-development.de/downloads.

1: +24 V
2: not used
3: GND
4: IO-Link: CH1 (C/Q)
5: not used




1: +5 V
2: D–
3: D+
4: not used
5: GND

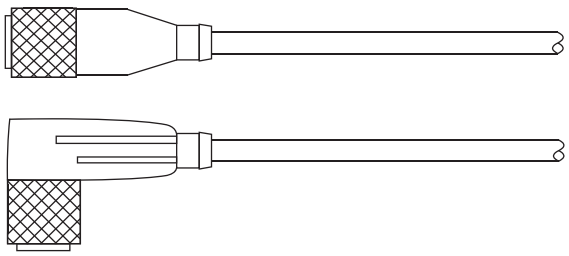
| | |
|---|---|
| Accessories (incl. at delivery) | USB-connecting cable, M12-sensor-connecting cable 2 m, power supply 230 V AC / 24 V DC |

# Flow Sensors

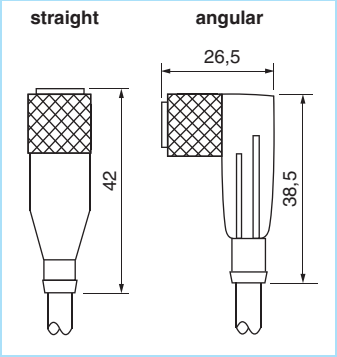
## Accessories • M12 connector

### System SL

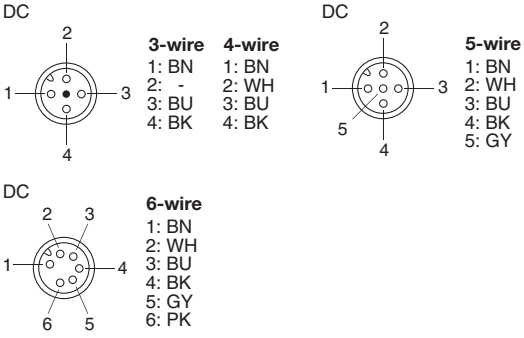
### Finished cable plug housing
### Self locking screw plug
### Protection IP 67



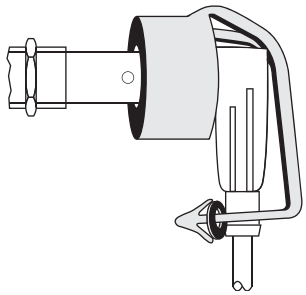
**Cable plug housing**




**Pin-assignment**




**Plug-lock**



**SLG... SLW... DC PL-M12**

| TYPE | ID-NO. | DESIGN |
|---|---|---|
| SLG 3-2 | Z01076 | Cable plug housing straight, 2 m cable 3x0.34 mm² max. 250 V / 4 A |
| SLG 3-5 | Z01077 | Cable plug housing straight, 5 m cable 3x0.34 mm² max. 250 V / 4 A |
| SLW 3-2 | Z01078 | Cable plug housing angular, 2 m cable 3x0.34 mm² max. 250 V / 4 A |
| SLW 3-5 | Z01079 | Cable plug housing angular, 5 m cable 3x0.34 mm² max. 250 V / 4 A |
| SLW 3-2-LED | Z00052 | Cable plug housing angular, 2 m cable 3x0.34 mm² max. 250 V / 4 A PNP with LED |
| SLG 4-2 | Z00445 | Cable plug housing straight, 2 m cable 4x0.25 mm² max. 250 V / 4 A |
| SLG 4-5 | Z00449 | Cable plug housing straight, 5 m cable 4x0.25 mm² max. 250 V / 4 A |
| SLW 4-2 | Z00446 | Cable plug housing angular, 2 m cable 4x0.25 mm² max. 250 V / 4 A |
| SLW 4-5 | Z00450 | Cable plug housing angular, 5 m cable 4x0.25 mm² max. 250 V / 4 A |
| SLW 4-2-LED | Z01157 | Cable plug housing angular, 2 m cable 4x0.25 mm² max. 250 V / 4 A PNP with LED |
| SLG 5-2 | Z01150 | Cable plug housing straight, 2 m cable 5x0.34 mm² max. 60 V / 2 A |
| SLW 5-2 | Z01151 | Cable plug housing angular, 2 m cable 5x0.34 mm² max. 60 V / 2 A |
| SLG 6-2 | Z01197 | Cable plug housing straight, 2 m cable 6x0.25 mm² max. 36 V / 2 A |
| SLW 6-2 | Z01198 | Cable plug housing angular, 2 m cable 6x0.25 mm² max. 36 V / 2 A |
| PL-M12 | Z01182 | Plug-lock for sensors in Ex areas |

### DATA

| | | | |
|---|---|---|---|
| Thread | M12x1 | Contact resistance | ≤ 5 mΩ |
| Material | PVC | Insulation resistance | >$10^9$ |
| Protection | IP 67 | Testing voltage | 2.0 KV eff. / 5 and 6 pol. 1.5 KV eff. |
| Temperature range | –25...+80 °C | | |

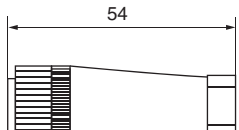
**Note:**
Sensors with NC output are connected to 4 pole cable plug housings. In this case, the break output is connected to the white lead (connection 2).

# Accessories • M12 connector

## System SB

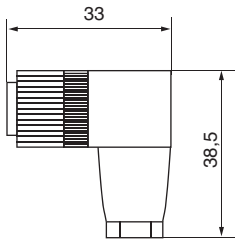
**Cable plug user-assembled**
**Great variety of cables**
**Protection IP 67**

**Cable plug housing straight**

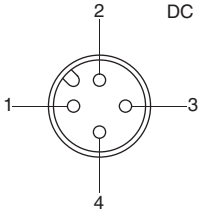



SBG...

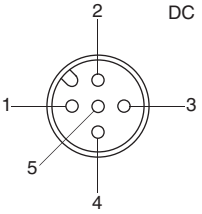
**Cable plug housing angular**




SBW...




SBG.../SBW...




SBG 5.../SBW 5...

| TYPE | ID-NO. | DESIGN | |
|---|---|---|---|
| SBG-DC | Z01060 | DC-Cable plug housing M12x1, straigth 4-pol | user assembled 30 VDC, 3 A |
| SBW-DC | Z00038 | DC-Cable plug housing M12x1, angular 4-pol | user assembled 30 VDC, 3 A |
| SBG 5-DC | Z01146 | DC-Cable plug housing M12x1, straigth 5-pol | user assembled 30 VDC, 1 A |
| SBW 5-DC | Z01147 | DC-Cable plug housing M12x1, angular 5-pol | user assembled 30 VDC, 1 A |

| PREFERRED CABLE | | | |
|---|---|---|---|
| PVC 205 | Z01061 | PVC-cable 2x0.5 mm² | Lead colour coding: BN/BU |
| PVC 205B | Z01062 | PVC-cable 2x0.5 mm², blue cable covering | Lead colour coding: BN/BU |
| PVC 305 | Z01063 | PVC-cable 3x0.5 mm² | Lead colour coding: BN/BU/BK |
| PVC 434 | Z01066 | PVC-cable 4x0.34 mm² | Lead colour coding: BN/BU/BK/WH |
| PVC 405 | Z01067 | PVC-cable 4x0.5 mm² | Lead colour coding: BN/BU/BK/WH |
| PVC 505 | Z01116 | PVC-cable 5x0.5 mm² | Lead colour coding: BN/BU/BK/WH/GY |
| PUR 425S | Z01069 | PUR-cable 4x0.25 mm², shielded | Lead colour coding: BN/BU/BK/WH |
| PUR 425BS | Z01070 | PUR-cable 4x0.25 mm², shielded, blue cable covering | Lead colour coding: BN/BU/BK/WH |
| | Z01074 | Finishing of cable plug housing | |
| | Z01075 | Finishing of cable plug housing and cable extremity | |

***Note***
Different cables on request.

Code: BK = black BN = brown BU = blue GN = green YE = yellow GY = grey PK = pink WH = white

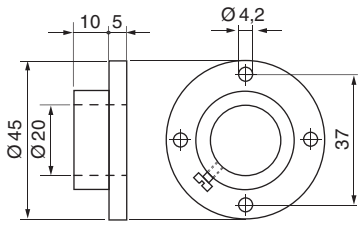
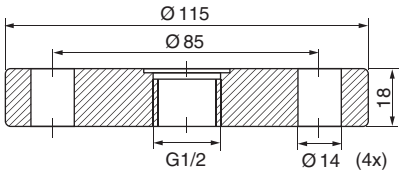
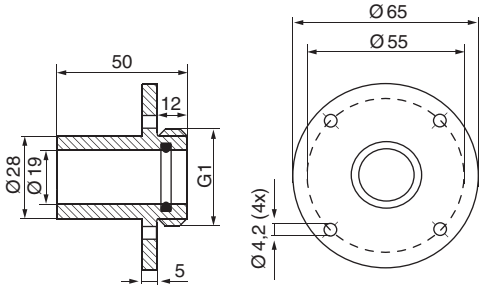
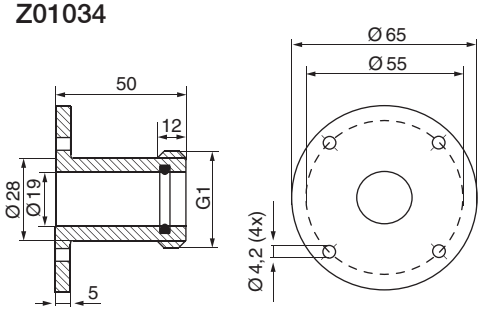
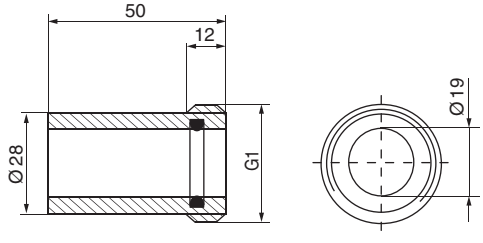
# Accessories • cable

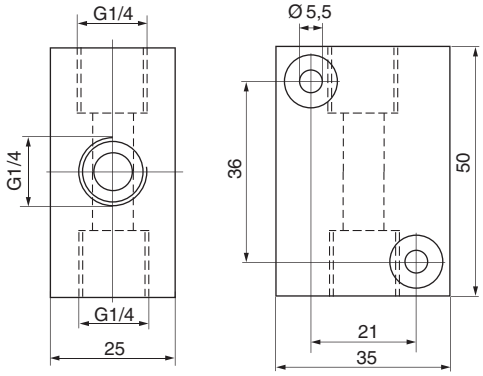
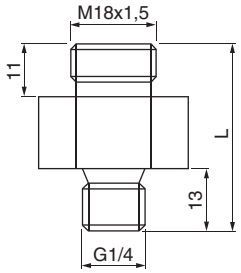
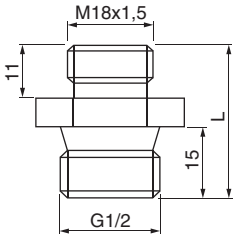
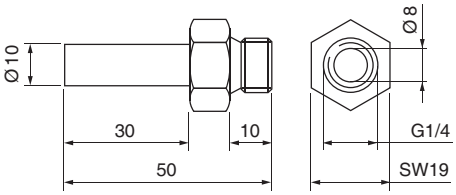
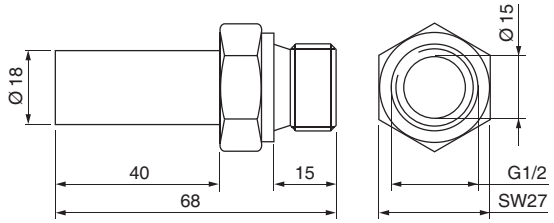
| TYPE | ID-NO. | MATERIAL/SHEAT | $Ø_A$ [mm]* | WIRE SPECIFICATION | | COLOUR |
|---|---|---|---|---|---|---|
| PVC205 | Z01061 | PVC, grey | 5.2 | 2x0.5 | mm² | BU, BN |
| PVC205B | Z01062 | PVC, blue | 4.4 | 2x0.5 | mm² | BU, BN |
| PVC275 | Z01086 | PVC, grey | 6.0 | 2x0.75 | mm² | BU, BN |
| PVC275BS | Z01108 | PVC, blue | 6.3 | 2x0.75 | mm² shielded | numbered cable |
| PVC334 | Z01109 | PVC, grey | 4.5 | 3x0.34 | mm² | BU, BN, BK |
| PVC305E | Z01064 | PVC, grey | 5.2 | 3x0.5 | mm² | BU, BN, GN/YE |
| PVC305 | Z01063 | PVC, grey | 5.2 | 3x0.5 | mm² | BU, BN, BK |
| PVC305B | Z01167 | PVC, blue | 5.2 | 3x0.5 | mm² | BU, BN, BK |
| PVC375 | Z01065 | PVC, grey | 6.0 | 3x0.75 | mm² | numbered cable |
| PVC375E | Z01111 | PVC, grey | 6.0 | 3x0.75 | mm² | BU, BN,GN/YE |
| PVC425 | Z01110 | PVC, grey | 4.3 | 4x0.25 | mm² | BU, BN, BK, WH |
| PVC434 | Z01066 | PVC, grey | 4.5 | 4x0.34 | mm² | BU, BN, BK, WH |
| PVC405 | Z01067 | PVC, grey | 5.5 | 4x0.5 | mm² | BU, BN, BK, WH |
| PVC475E | Z01113 | PVC, grey | 6.5 | 4x0.75 | mm² | BU, BN, BK, GN/YE |
| PVC475BS | Z01114 | PVC, blue | 7.3 | 4x0.75 | mm² shielded | numbered cable |
| PVC505 | Z01116 | PVC, grey | 5.8 | 5x0.5 | mm² | BU, BN, WH, BK, GY |
| PVC705 | Z01117 | PVC, grey | 6.6 | 7x0.5 | mm² | BU, BN, WH, GN/YE, GY, PK |
| PUR334 | Z01156 | PUR, grey | 5.0 | 3x0.34 | mm² | BU, BN, BK |
| PUR375 | Z01068 | PUR, black | 6.0 | 3x0.75 | mm² –40°C | BU, BN, BK |
| PUR425S | Z01069 | PUR, grey | 5.0 | 4x0.25 | mm² shielded | BU, BN, WH, BK |
| PUR425BS | Z01070 | PUR, blue | 5.0 | 4x0.25 | mm² shielded | BU, BN, WH, BK |
| PUR405 | Z01112 | PUR, black | 5.0 | 4x0.5 | mm² | BU, BN, WH, BK |
| PUR405BS | Z01173 | PUR, blue | 6.2 | 4x0.5 | mm² shielded | BU, BN, WH, BK |
| PUR475SE | Z01118 | PUR, grey | 9.0 | 4x0.75 | mm² shielded | numbered cable |
| PUR410E | Z01119 | PUR, orange | 8.0 | 4x1.0 | mm² | BU, BN, BK, GN/YE |
| FEP375S | Z01126 | FEP, red | 5.0 | 3x0.75 | mm² shielded | BU, BN, BK |
| FEP334 | Z01071 | FEP, red | 3.8 | 3x0.34 | mm² | BU, BN, BK |
| FEP425S | Z01073 | FEP, red | 4.1 | 4x0.25 | mm² shielded | BU, BN, BK, WH |
| FEP425 | Z01072 | FEP, red | 3.7 | 4x0.25 | mm² | BU, BN, BK, WH |
| FEP425BS | Z01125 | FEP, blue | 4.1 | 4x0.25 | mm² shielded | BU, BN, BK, WH |
| FEP375 | Z01165 | FEP, red | 4.2 | 3x0.75 | mm² | BU, BN, GN/YE |
| Silikon375E | Z01121 | Silicone, red | 6.0 | 3x0.75 | mm² | BU, BN, GN/YE |
| Silikon475E | Z01122 | Silicone, red | 6.3 | 4x0.75 | mm² | BU, BN, BK, GN/YE |
| Silikon475SE | Z01115 | Silicone, red | 8.8 | 4x0.75 | mm² shielded | BU, BN, BK, GN/YE |
| Silikon305 | Z01143 | Silicone, red | 5.5 | 3x0.5 | mm² | BU, BN, BK |
| PVC705SE | Z01123 | PVC-transparent | 9.2 | 7x0.5 | mm² shielded | numbered cable, GN/YE |

*Tolerance of diameter ±0,4 mm

Code: BK = black BN = brown BU = blue GN = green YE = yellow GY = grey PK = pink WH = white

# Accessories • Product section 1

| TYPE | ID-NO. DIMENSIONS | DESIGN |
|---|---|---|
| Flange - Ø20 | Z01106<br>  | Plastic - flange<br>with drilled hole Ø20 mm<br><br>for sensors type LN 520 |
| Flange DN25/PN40 | Z01001<br>  | Flange AISI 316 Ti (1.4571)<br>EN 1092-1/05 A (DIN 2527)<br>with central thread G1/2<br><br>for sensors type ST... with G1/2 |
| A501 | Z01033<br>  | Thread sleeve of brass, nickel-plated<br>L=50 mm, G1<br><br>for sensors type LN... |
| A502 | Z01034<br>  | Thread sleeve of brass, nickel-plated<br>L=50 mm, G1<br><br>for sensors type LN... |
| A503 | Z01035<br>  | Welding sleeve of FE 360 B (1.0037),<br>L=50 mm, G1<br><br>for sensors type LN... |

| TYPE | ID-NO. | DIMENSIONS | DESIGN |
|---|---|---|---|
| SIA G1/4 - 1/4 - 1/4 | Z01018 |  | Adapter for G1/4-sensors with G1/4-pipe connections<br><br>Material: AISI 316 Ti<br>Sensors: STK 412...<br><br>Massflow down to 10 ml/min<br><br>(additional models on request) |
| SDA-SCS-G1/4 | Z01200<br>L = 39 mm |  | Screw-in adapter G1/4 for flow sensors<br>SCS, SNS, SNTS and ST418<br><br>Material: AISI 316 Ti |
| SDA-SCS-G1/2<br><br>SDA-SCS-G1/2-L37 | Z01201<br>L = 30 mm<br><br>Z01208<br>L = 37 mm |  | Screw-in adapter G1/2 for flow sensors<br>SCS, SNS, SNTS and ST418<br><br>Material: AISI 316 Ti |
| SDA G1/4-Ø10-L050 | Z01175 |  | Adapter G1/4 for flow sensors inline-digital display<br>SDN 5.../1..., SDV 652..., SDI 852/1... |
| SDA G1/2-Ø18-L068 | Z01176 |  | Adapter G1/2 for flow sensors inline-digital display<br>SDN 552/3... |

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