EGP 100: Differential pressure transducer

How energy efficiency is improved

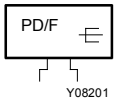
Enables precise measurement of room pressures, duct pressures or air volumes for optimisation of energy consumption in ventilation systems.

Areas of application

Recording extremely low differential pressures and air volumes in air-conditioning, medical and environmental technology as well as in laboratories and clean rooms. Optimised for applications such as filter monitoring, room or duct pressure monitoring, fluid level monitoring, control of frequency converters for fan and air volume control, particularly for air balancing in laboratories.

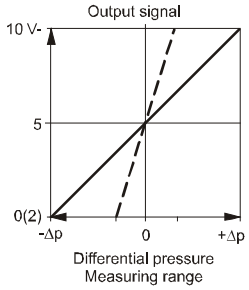
Features

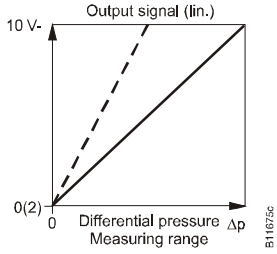
- Precise recording of positive, negative and differential pressures of gases
- Easy to combine with the XAFP100 dynamic-pressure sensor for precise air volume control
- Capacitive-type, static double-membrane pressure sensor
- Any installed position is possible
- Can be used for air that contains dust or that is contaminated with chemicals (no ATEX certification)
- Manufacturer's test certificate ex works
- Optimal adjustment of the measuring range to suit the application
- Adjustable zero point and filter time constant for suppression of pressure surges in the system
- Display showing actual value and signal progression (depending on type)
- Status LED for immediate recognition of operating status (depending on type)
- Fitted to either wall or top-hat rail (EN 60715)
- Cover can be opened without special tools

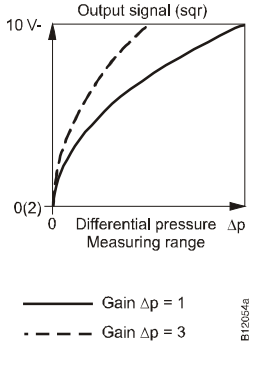


Technical description

- Supply voltage of 24 V~/= (resistant to short circuit and voltage reversal)
- Measuring ranges ±Δp
  - ±75 Pa
  - ±150 Pa
- Measuring ranges Δp
  - 0…150 Pa
  - 0…300 Pa
- Measuring range reducible to 1/3 (depending on type)
- Constant output signal in the range of 0…10 V
- Electrical connection via screw terminals for cables up to 1.5 mm²
- M16 cable gland
- Pressure connection for measuring hoses with internal Ø of 6 mm
- Housing made from PC/ABS







Type	Measurement range (100%)		Display	Adjustable characteristic [1] / LED	Power supply	Weight
	Pa	mbar				kg
EGP 100 F101	±75	±0.75	No	No	24 V~/=	0.17
EGP 100 F102	±75	±0.75	No	Yes	24 V~/=	0.18
EGP 100 F111	±75	±0.75	Yes	No	24 V~/=	0.18
EGP 100 F112	±75	±0.75	Yes	Yes	24 V~/=	0.19
EGP 100 F201	±150	±1.5	No	No	24 V~/=	0.17
EGP 100 F202	±150	±1.5	No	Yes	24 V~/=	0.18
EGP 100 F211	±150	±1.5	Yes	No	24 V~/=	0.18
EGP 100 F212	±150	±1.5	Yes	Yes	24 V~/=	0.19
EGP 100 F301	0…150	0…1.5	No	No	24 V~/=	0.17
EGP 100 F302	0…150	0…1.5	No	Yes	24 V~/=	0.18
EGP 100 F311	0…150	0…1.5	Yes	No	24 V~/=	0.18
EGP 100 F312	0…150	0…1.5	Yes	Yes	24 V~/=	0.19
EGP 100 F401	0…300	0…3.0	No	No	24 V~/=	0.17
EGP 100 F402	0…300	0…3.0	No	Yes	24 V~/=	0.18
EGP 100 F411	0…300	0…3.0	Yes	No	24 V~/=	0.18
EGP 100 F412	0…300	0…3.0	Yes	Yes	24 V~/=	0.19

Power supply	24 V~/= ± 20%
Power consumption, Fxx2	
24 V~	3.0 VA
24 V=	1.3 W
Power consumption, Fxx1	
24 V~	1.4 VA
24 V=	0.4 W
Parts in contact with media	PC/ABS blend, MQ, CuSn6, FR4
Output signal [2]	
F301/F401	0…10 V, load > 10 kΩ
F311/F411	0…10 V, load > 5 kΩ
F302/F402, F312/F412	0(2)…10 V, load > 500 Ω [3]
Filter time constant τ	
Fx01	0.05…2 s
Fx02, Fx11, Fx12	0.15…5.2 s
Influence of position [4]	±1% FS [5] @ 150 Pa, ±75 Pa
	±0.75% FS @ 300 Pa, ±150 Pa
Reproducibility	0.2% FS
Non-linearity	1% FS pressure-linear
Zero point stability	< 0.3% FS
Pneum. connection	6.2 mm [6]
Perm. positive pressure	± 10 kPa
Perm. operating pressure pstat	± 3 kPa [5]
Perm. ambient temperature	0…60 °C
Perm. media temperature	0…70 °C
Perm. ambient humidity	5…95% rh without condensation

Type of protection	IP 65
Protection class	III (EN 60730-1)
Connection diagram, F102/F202	A10670
Connection diagram, F112/F212	A10669
Connection diagram, Fx01	A10665
Connection diagram, F302/F402	A10666
Connection diagram, Fx11	A10667
Connection diagram, F312/F412	A10668
Dimension drawing	M10490
Fitting instructions, F101/F201	MV P100009899
Fitting instructions, F102/F202	MV P100009900
Fitting instructions, F111/F211	MV P100009901
Fitting instructions, F112/F212	MV P100009903
Fitting instructions, F301/F401	MV P100001631
Fitting instructions, F302/F402	MV P100005621
Fitting instructions, F311/F411	MV P100005622
Fitting instructions, F312/F412	MV P100004081
Material and environmental declaration	MD 32.021

Accessories

0520450010	CASE Sensors – USB connection set, incl. software
0010240 300	6 mm connection set, complete
Certificate 001	Manufacturer's test certificate M in accordance with DIN55350-18 (with test values) for each device type
Certificate 999	Testing of another device of the same type (2 items and up) according to DIN 55350-18-M-
XAFP100F001	Dynamic-pressure sensor for recording air volumes in ventilation ducts

1) Manual adjustment of the measurement range with potentiometer *Gain*. Signal progression: linear/square root. Output signal: 0…10 V/ 2…10 V via DIP switch or with CASE Sensors software
2) Analogue output limited to 10.6 V. This allows measured values with an overflow of 6% of the set measurement range to be transmitted.
3) In case of a load < 500 Ω, the device automatically switches to 0…20 mA or 4…20 mA.
Output protected against short circuit and excess voltage up to 24 V~.
4) The sensor is calibrated at the factory for vertical installation. The influence of position must be taken into account if the sensor is to be installed in a position other than vertical.
5) Full span in accordance with the measurement range gap.
6) Maximum measurement line length (di=6.2 mm): Lmax = 15 m for τ < 0.5 s, Lmax = 60 m for τ > 0.5 s
7) The zero point should be recalibrated if the permissible operating pressure is exceeded.

Function

The differential pressure is measured using double membranes. The pressure difference is evaluated using a differential capacitive method of measurement and provided as a linear or square root electrical signal.

Differential pressure recording (linear characteristic)

The differential pressure is converted by the transducer into a linear electrical signal. The output signal on connection 01 is thus proportional to the differential pressure.

Air volume recording (square root characteristic)
The differential pressure generated on an orifice plate or dynamic-pressure sensor (XAFP100) is converted by the transducer into a flow-linear signal. The output signal on connection 01 is thus proportional to the air volume and to the air velocity. The variant with symmetrical measurement ranges supports only the linear characteristic.

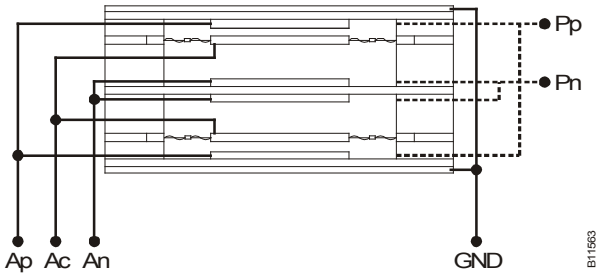
LED indicator
The LED (Run/Fault) indicates the operating statuses as follows:
- Green, continuously lit = power OK and no other faults
- Green, temporarily flashing = the LED flashes for 15 s after a manual setting is made (DIP switch, potentiometer) before lighting up continuously in green.
- Red, continuously lit = sensor measuring range (FS) exceeded by 40%, or a sensor error has occurred. The LED will turn green again after the zero point button is pressed. A zero adjustment is required after the measuring range has been exceeded.
- Red, flashing = low power; once the power is OK (again), the LED flashes for another 10 s, and is then lit continuously in green

An LED inside the housing indicates the various statuses during the zero adjustment process of the differential pressure transducer. These are indicated as follows:
Orange, continuously lit = zero adjustment start
Orange, flashing rapidly = zero adjustment active
Orange, flashing slowly = zero adjustment required

Display
The current measuring range, the unit and the characteristic appear on the 4-digit display. The display can show measured values up to 150% of the set measurement range (linear characteristic) or up to 122% (square root characteristic).

Sensor technology
The sensor element used is a static double-membrane sensor manufactured using PCB technology. Thanks to its symmetrical structure with two measuring cells which are (in principle) independent, the sensor is position-compensated and can therefore be operated in any installed position. The differential pressure is evaluated using the differential capacitive measurement principle. This unique design provides high measuring accuracy for differential pressures of < 1 Pa.
Thanks to its principle (because a static measuring method is used), the sensor can also be used to measure gases which contain dust or are contaminated with chemicals.

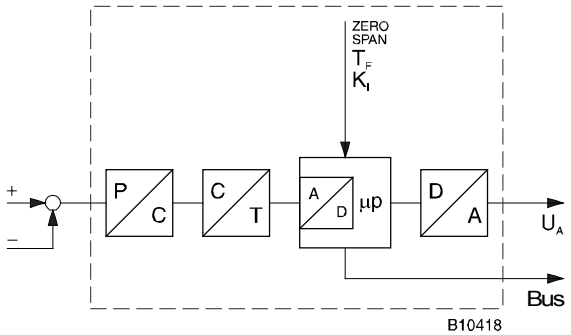
Sensor structure



Key

Pedestrian precinct	Connection for higher pressure
Pn	Connection for lower pressure
Ac	Common pole flange of the differential capacitor
Ap	Positive pole flange
An	Negative pole flange
GND	Earth (ground)

Block diagram of sensor



The filter time constant τ of the transducer can be set to stabilise the sensor output signal in case of widely fluctuating pressure signals (see the technical data and fitting instructions).
The zero point can be reset; zero adjustment needs to be carried out in accordance with the fitting instructions.

Conversion table for pressure

Unit		bar	mbar	Pa	kPa	mWs
1 bar	≡	1	1000	100000	100	10.1971
1 mbar	≡	0.001	1	100	0.1	0.0101971
1 Pa	≡	0.00001	0.01	1	0.001	0.000101971
1 kPa	≡	0.01	10	1000	1	0.101971
1 mWs	≡	0.0980665	98.0665	9806.65	9.80665	1

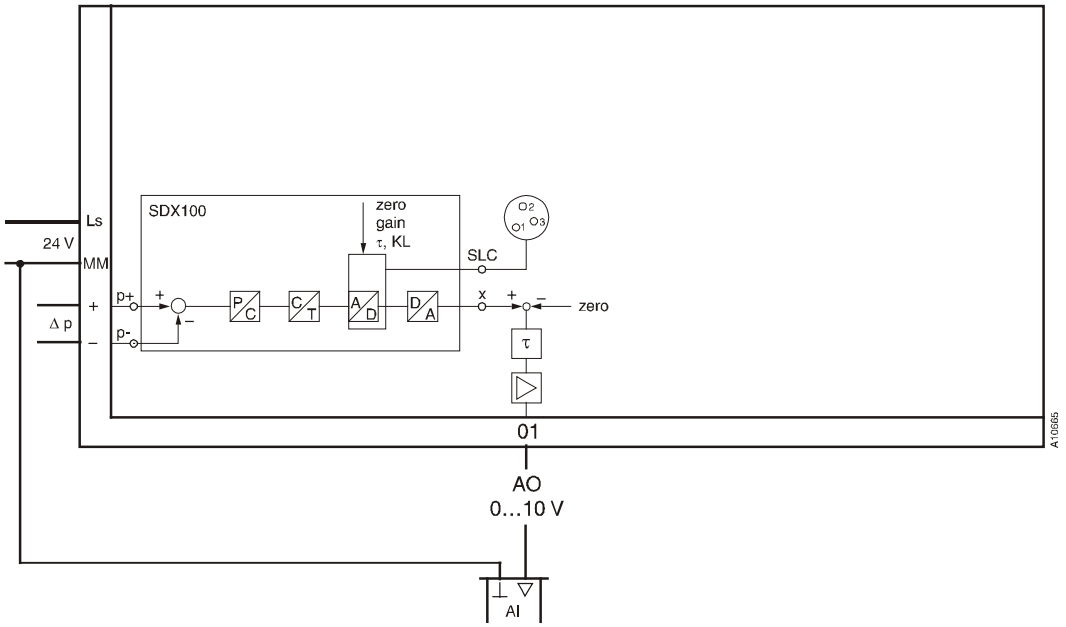
Fitting notes
Any installation position is permitted, as long as the tolerances of the influence of position are taken into account. To increase the measurement accuracy, the zero point can be reset if required.

Wiring
It is essential that a star connection for the power supply is used. To prevent faults in the measuring signal, no inductive loads may be connected to the same transformer as the transducer.
The reference point of the measuring signal (MM) must be taken from the device and connected to the earth terminal of the corresponding analogue input (see connection diagrams).

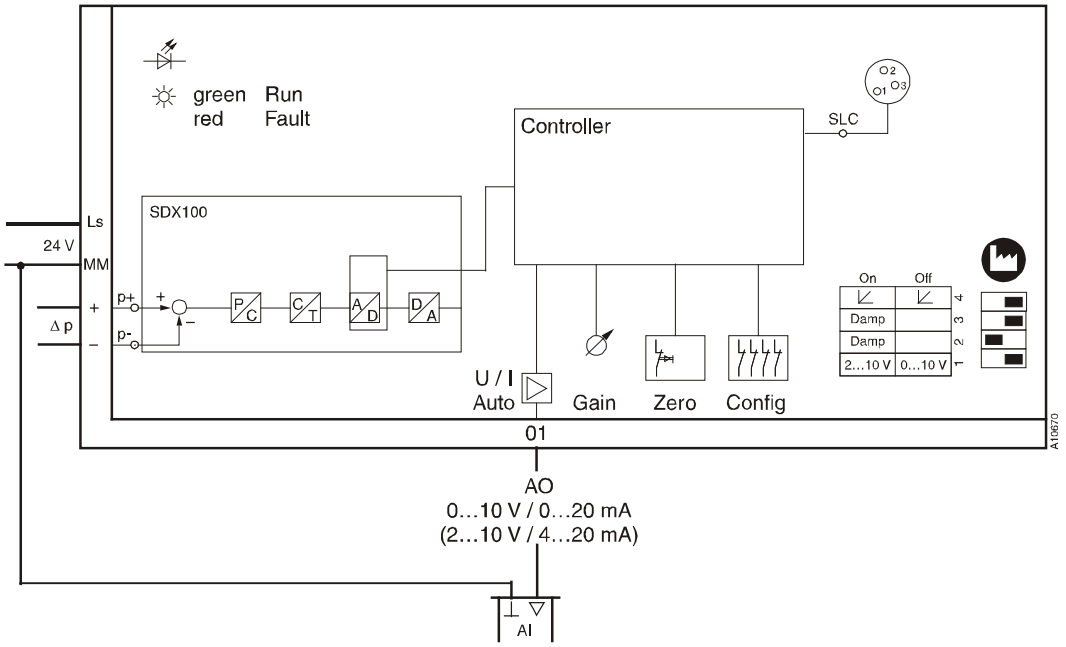
Additional technical data
CE conformity according to EMC Directive 2004/108/EC:
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 61000-6-4

Wiring diagram

F101/F201/F301/F401

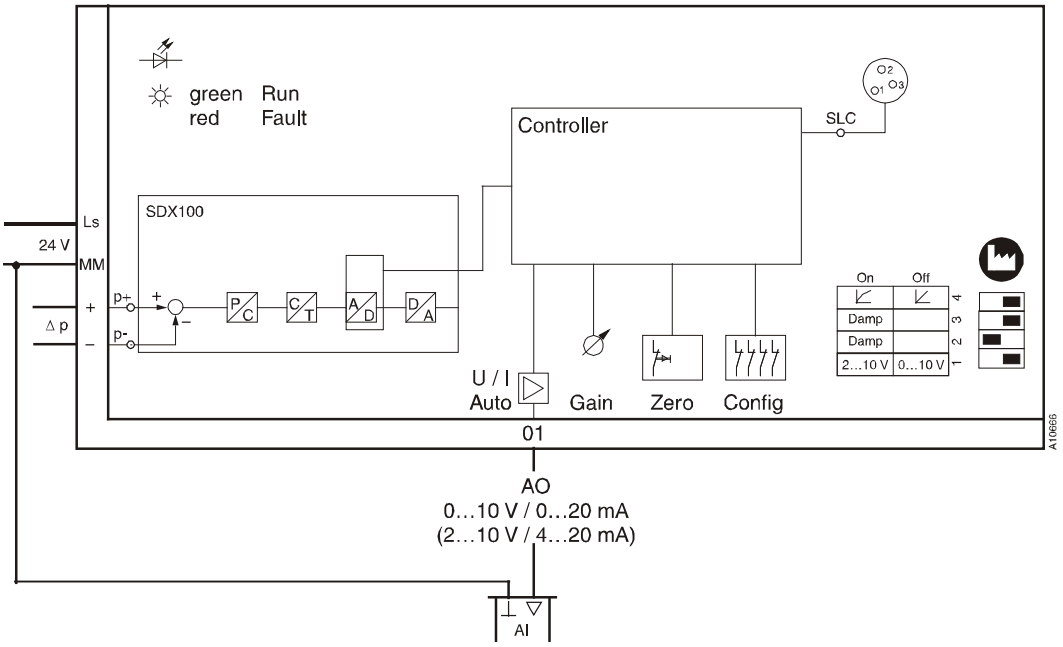


F102/F202

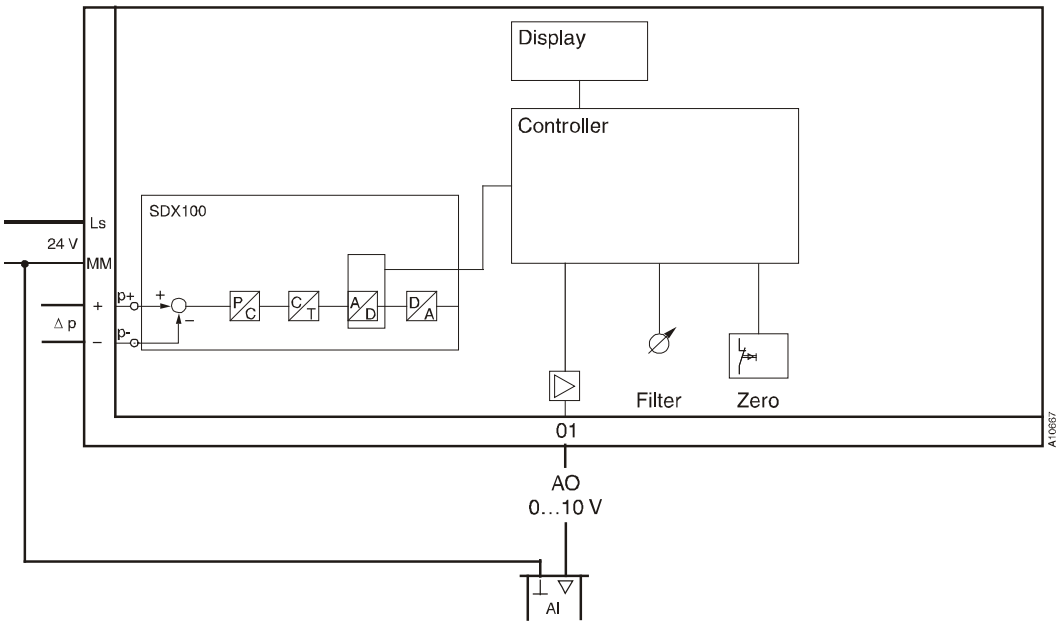


Wiring diagram

F302/F402

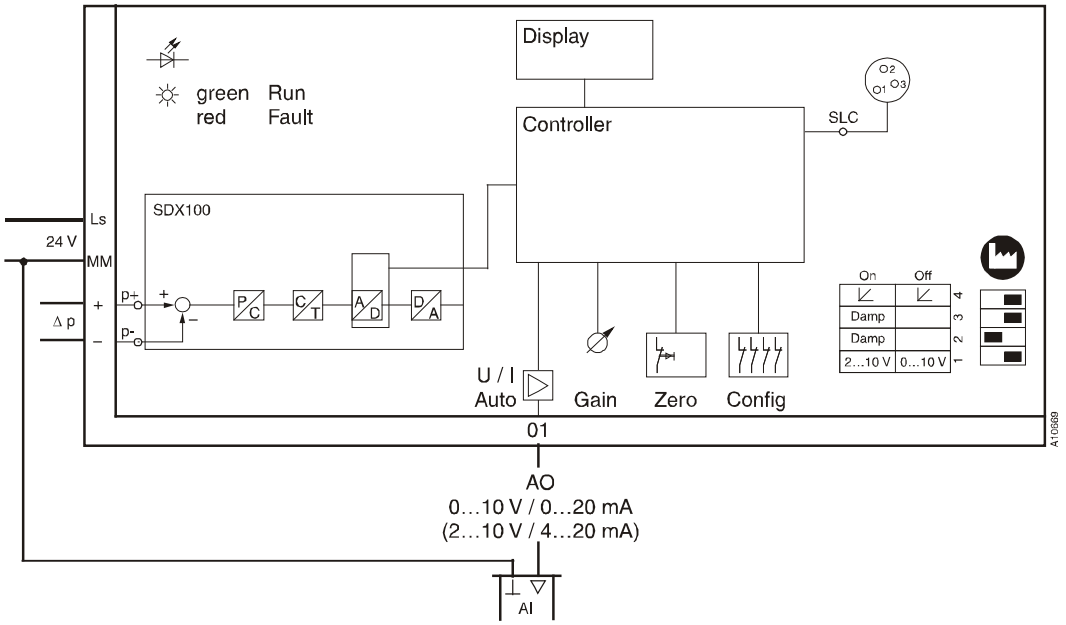


F111/F211/F311/F411

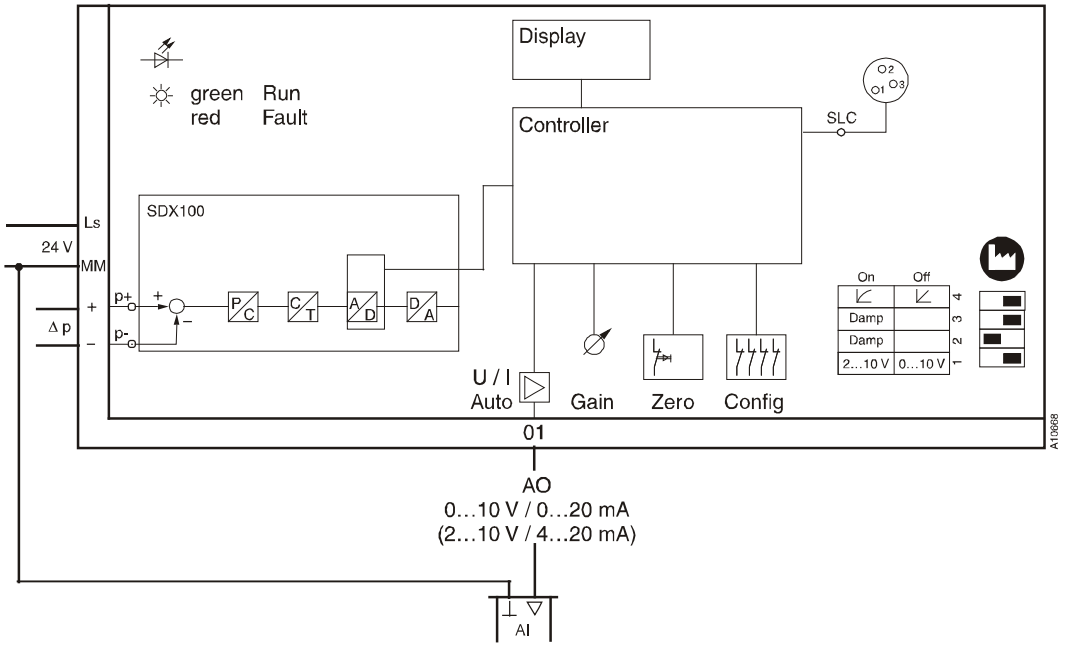


Wiring diagram

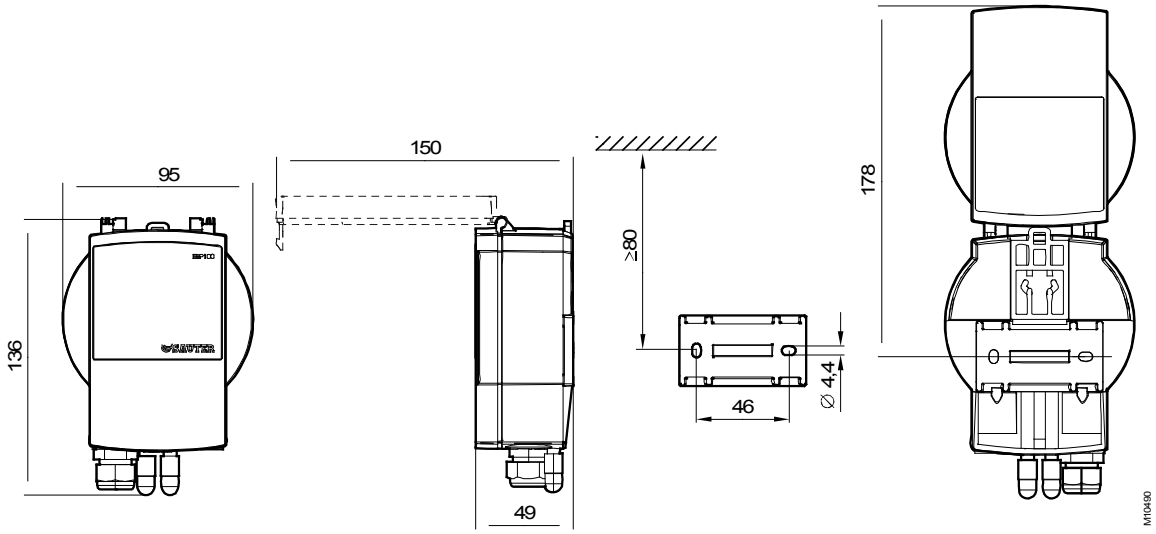
F112/F212



F312/F412

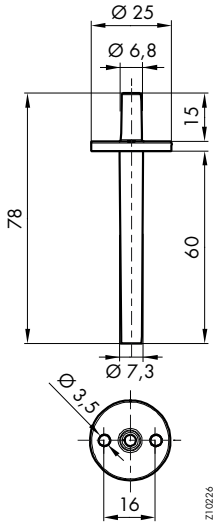


Dimension drawing



Accessories

0010240300



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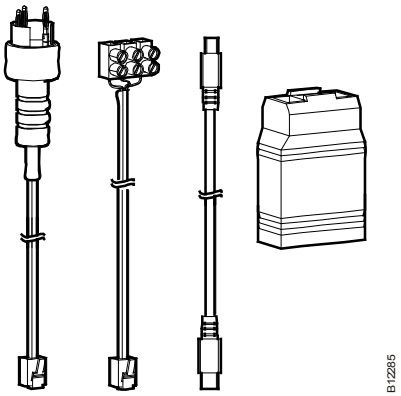

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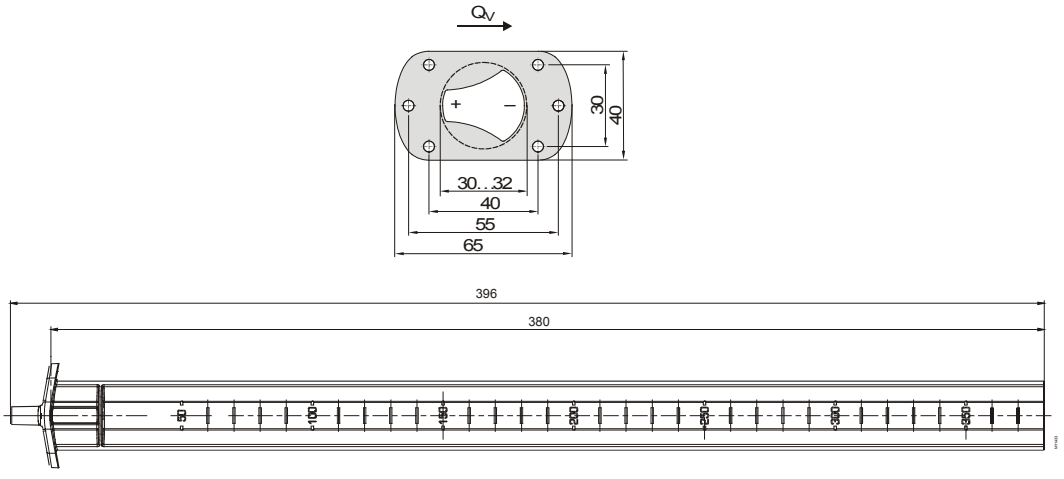
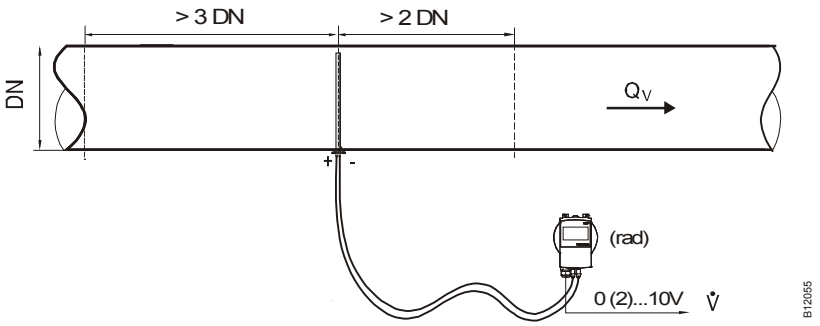
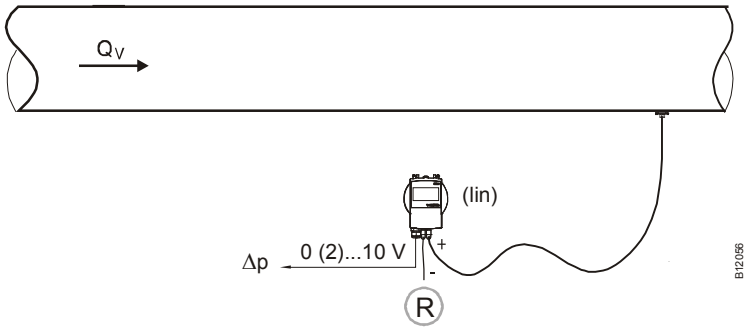


Application examples

Air volume measurement in ventilation ducts



Differential pressure measurement in ventilation ducts



Room pressure measurement