



FLOWSIC100

ULTRASONIC VOLUME FLOW MEASUREMENT FOR
CONTINUOUS EMISSION MONITORING

Gas flow measuring instruments

SICK
Sensor Intelligence.

CONFORMS TO LEGAL REQUIREMENTS FOR EMISSION MONITORING – VOLUME FLOW MEASUREMENT WITH FLOWSIC100

Monitoring gaseous emissions in plants requiring a permit is an important part of environmental protection. Pollutant emissions can be continuously measured and limit values observed through the use of modern and reliable emission measuring technology.

Emission measurement is subject to strict quality criteria. The measuring technology used must comply with the minimum requirements of international standards (e.g. EN 15267 and EPA Performance Specification 6) and prove its suitability by means of an EU type examination. The manufacturers of emission measurement systems are also subject to continuous quality monitoring.

FLAWSIC100 volume flow measuring devices from SICK meet all these requirements: they combine the advantages of modern ultrasonic measurement with outstanding resistance properties and minimum maintenance.



Measurement accuracy and reliability

Measurement takes place continuously across the entire duct diameter and supplies representative measurement results, even with unfavorable flow conditions. The fully automated gain control function of the FLOWSIC100 guarantees signal transmission. Fluctuations in the gas composition, pressure, temperature and humidity have no influence on the measurement result.

A configuration with 2 measuring paths is available for particularly demanding flow conditions at the installation location.

Fully-automated self-monitoring

The device periodically validates its functions using the check cycle integrated in the FLOWSIC100, while the integrated self-diagnosis continuously monitors all important function parameters. In the event of impermissible deviations that could affect the measurement result, warning messages are generated. This allows maintenance work to be planned in good time and component wear to be detected early on. It also allows functional impairment or failure of the device to be prevented.

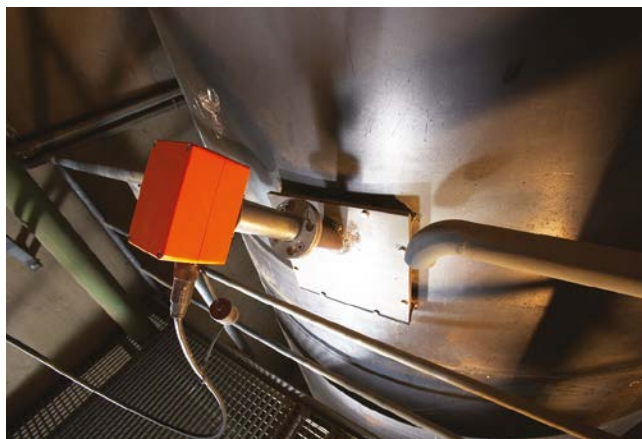
Simple installation

Using weld-in flanges, the sender/receiver units of the volume flow measuring device are simply installed opposite each other in the measuring duct. The probe version FLOWSIC100 PR is used if the measuring duct is accessible only from one side. This version can also be installed very inexpensively.

Low maintenance effort

The FLOWSIC100 does not have any moving parts and is made of highly resistant materials. Maintenance work is therefore essentially limited to performing visual inspections of the components in contact with the gaseous media (e.g. contamination) and checking the general device condition.

As part of the suitability tests for use in emission measurements, the FLOWSIC100 achieved a maintenance interval of 6 months.



PRODUCT OVERVIEW

The FLOWVIC100 is available in multiple versions to meet the needs of numerous different applications. The FLOWVIC100 is designed to easily cope with even large stack diameters, challenging exhaust gas conditions as well as difficult installation and ambient conditions.

Standard versions not purged



FLAWSIC100 H

- High acoustic power – ideal for large stacks with diameters from 3 to 13 m
- Certified for use in plants requiring a permit in accordance with 13th, 17th and 30th BImSchV (German Federal Immission Control Act) and TA Luft (German Technical Instructions on Air Quality Control) as well as in accordance with 27th BImSchV, MCERTS and GOST
- Also suitable for applications with high dust levels



FLAWSIC100 M

- Medium acoustic power – ideal for small stacks with diameters up to 3.5 m
- Certified for use in plants requiring a permit in accordance with 13th, 17th and 30th BImSchV (German Federal Immission Control Act) and TA Luft (German Technical Instructions on Air Quality Control) as well as in accordance with 27th BImSchV, MCERTS and GOST



FLAWSIC100 PR

- Ideal for one-sided installation with stack diameters from 1 m
- Certified for use in plants requiring a permit in accordance with 13th, 17th and 30th BImSchV (German Federal Immission Control Act) and TA Luft (German Technical Instructions on Air Quality Control) as well as in accordance with 27th BImSchV, MCERTS and GOST

I/O concept suitable for modular expansion:

- analog and digital inputs and outputs
- Modbus RS485
- Modbus TCP
- Ethernet
- PROFIBUS DP



LC display with status LED and operating buttons (option)

- Visualization of measured values
- Diagnostic information
- Configuration

The MCU control unit is used to input and output signals and permits simple connection of the FLOWVIC100 to higher-level distributed control systems. Different interfaces are available for this which can be optionally expanded if necessary. The measured volume flow can be calculated to standard conditions. For this purpose, measured values can be read in from external pressure and temperature sensors or fixed values for pressure and temperature parameterized in the MCU.

In the internally cooled device versions FLOWVIC100 M-AC and FLOWVIC100 H-AC, the MCU control unit is equipped with an integrated blower unit and provides the required cooling air for the ultrasonic sensors. In addition, a display unit permits especially convenient operation of the FLOWVIC100.

Outstanding availability and durability

The FLOWSIC100 from SICK is based on more than 30 years experience in ultrasonic transducer technology and offers outstanding performance and durability. The high signal strength and wide beam of SICK ultrasonic transducers guarantee reliable measurement even if the application conditions are particularly challenging, e.g. due to very large stack diameters and/or steam- and dust-laden exhaust gases.

Changing gas compositions and wet gases do not have any influence on the measurement accuracy and excellent availability of the devices. Ultrasonic transducers with different acoustic power ratings and materials are available for such applications.

The ultrasonic transducers are manufactured from highly-resistant titanium in the standard version. For particularly aggressive gas compositions, highly-resistant alloys (e.g. Hastelloy) are used to ensure durability.

Volume flow measuring devices from SICK can be individually adapted to local application conditions. This guarantees optimum performance of the respective measuring system.

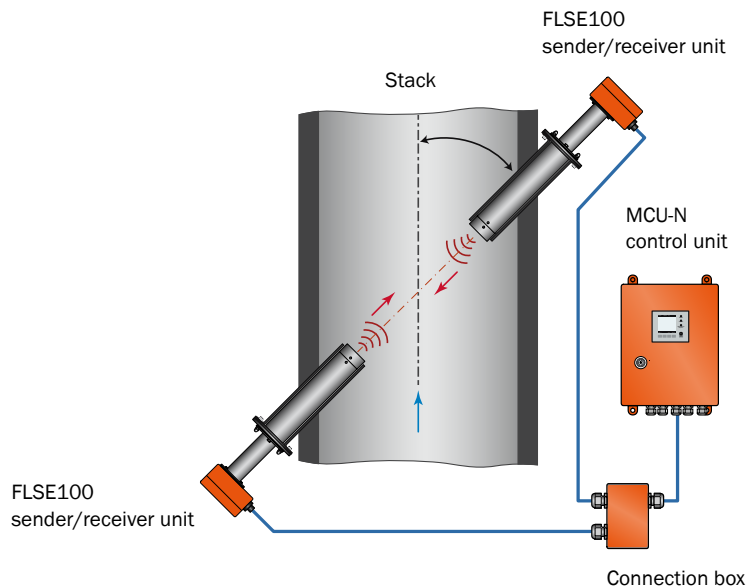
FLAWSIC100 high-performance ultrasonic transducer



LEADING ULTRASONIC TECHNOLOGY FOR DEMANDING EMISSION MEASUREMENTS

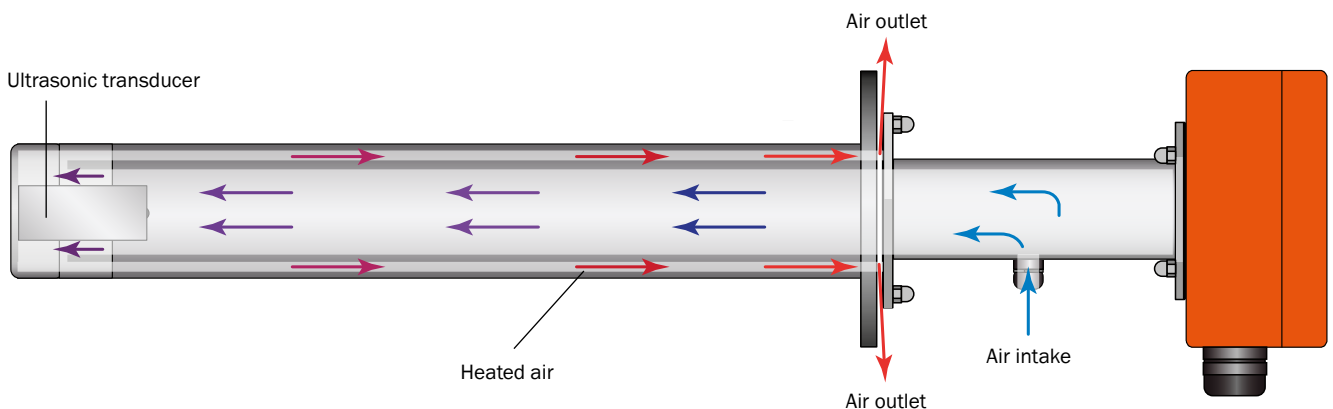
Measurements without purge air – plug and play up to 260 °C

Thanks to the use of ultra-modern ultrasonic transducers, the FLOWSIC100 operates in the temperature range from -40 °C to $+260\text{ °C}$ completely without purge air and thus covers the majority of emission measurements. Installation and operation of the measurement system are particularly cost-efficient. Measurement without purge air prevents temperatures from falling below the dew point at the transducer and reduces the risk of corrosion. This makes it possible to save on maintenance and repair costs. Device replacement is necessary only in rare cases. However, ultrasonic transducers can be replaced individually without pair calibration if should this be necessary.



Devices with innovative integrated cooling for emission measurements in high-temperature applications

The internally cooled device types FLOWSIC100 M-AC and FLOWSIC100 H-AC operate at very high temperatures of up to $+450\text{ °C}$. Specially designed ultrasonic sensors with integrated air cooling are used in the sender and receiver units. A blower unit integrated in the measuring device supplies cooling air. Sensor cooling takes place within the sender and receiver unit. Penetration of cooling air into the measuring medium is excluded.



SOPAS ET CONFIGURATION SOFTWARE

The SOPAS ET software is a standard user interface for numerous SICK devices from the field of emission measurement (e.g. for volume flow measurement, dust measurement, gas analysis). SOPAS ET permits comprehensive support for all technologies implemented in the devices irrespective of whether the devices are already installed or new.

SOPAS ET offers:

- Quick and easy connection setup to the device
- Parameterization, configuration and diagnostics for the FLOWSIC100
- Download and upload of configuration files and parameter sets
- Simple project and device handling
- Communication via various fieldbuses
- Firmware update



SUITABILITY TEST AND APPROVALS

The FLOWSIC100 is a suitability-tested measuring system for continuous emission measurement and complies with the requirements of the standards:

- EN 15267-1, 15267-2, 15267-3
- EN 14181
- EN ISO 16911-2

The device is certified for use in plants requiring a permit in accordance with 13th, 17th and 30th BImSchV (German Federal Immission Control Act), TA Luft (German Technical Instructions on Air Quality Control) and in accordance with 27th BImSchV. The maintenance interval for the FLOWSIC100 is 6 months. The measuring system is also certified in accordance with "MCERTS: Performance Standards for Continuous Emission Monitoring Systems" and meets the requirements of 40 CFR Part 60 and Part 75 and the EPA Performance Specification 6.



VOLUME FLOW MEASURING DEVICES FOR CONTINUOUS EMISSION MONITORING



Product description

The FLOWSIC100 product family was developed for emission monitoring. The “H” versions are suitable for large duct diameters and applications with high dust levels, while the “M” versions are ideal for medium duct diameters. With the probe version “PR”, the two ultrasonic transducers are mounted on one sender/receiver unit (measuring probe) with a fixed measuring distance. The “-AC” device versions feature innovative internal cooling for use at gas temperatures up to 450 °C. The purged “Px”

device versions are used in gases with a high content of sticky or wet dust. Rugged titanium transducers are used in the standard version and are suitable for difficult application conditions. The measuring system consists of 2 sender/receiver units or one measuring probe and the MCU control unit. The MCU is used for signal input and output, calculation with reference conditions (standardization), as well as for user-friendly operation via LC display.

At a glance

- Rugged titanium transducers for long service life
- Corrosion-resistant material for use with aggressive gases (option)
- Integral measurement across the duct diameter for versions H, M, and S
- Probe version PR for cost-saving, single-sided installation on duct
- Automated operational check with zero and reference point test

Your benefits

- Reliable flow measurement in small to very large duct diameters
- Long service life
- No purge air is required for gas temperatures up to 260 °C
- Minimal operational and maintenance costs
- Precise measuring results even under difficult measurement conditions
- Measurements free of pressure loss and without influencing the process
- User-friendly operation via SOPAS ET software
- Extended diagnostics ensure reliable operational monitoring

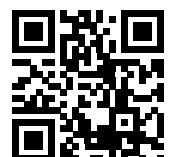


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→ www.sick.com/FLOWSIC100

For more information, simply visit the above link to obtain direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



Fields of application

- Continuous emission measurement in energy generation
- Emission monitoring in waste incineration plants
- Emission measurement in processing industry (cement, iron and steel, glass)
- Emission monitoring in the chemical and petrochemical industry
- Emission monitoring in the paper and textile industry
- Flow measurements and process control, e.g. in heating and ventilation systems

Detailed technical data

The precise device specifications and product performance data may vary and are dependent on the respective application and customer specifications.

FLOWSIC100 system

Measurands	Volume flow in actual conditions, volume flow in standard conditions, gas velocity, speed of sound, gas temperature
Suitability-tested measurands	Gas velocity
Measurement principle	Ultrasonic transit time difference measurement
Measuring ranges	Gas velocity 0 ... ± 40 m/s
Certified measuring ranges	Gas velocity 0 ... 20 m/s / 0 ... 40 m/s
Repeatability	For $v < 2$ m/s: ± 0.02 m/s For $v > 2$ m/s: ± 1%
Measurement accuracy	± 0.1 m/s Depending on application
Diagnostic functions	Automated check cycle for zero and reference point Extended device diagnosis with SOPAS ET software
Ambient temperature	-40 °C ... +60 °C
Storage temperature	-40 °C ... +70 °C
Conformities	2001/80 / EC (13th German Federal Immission Control Act (BImSchV)) 2000/76 / EG (17th German Federal Immission Control Act (BImSchV)) 27th German Federal Immission Control Act (BImSchV) 30th German Federal Immission Control Act (BImSchV) German Technical Instructions on Air Quality Control (TA-Luft) EN 15267 EN 14181 EN 16911-2 MCERTS GOST
Electrical safety	CE

FLOWSIC100 M

Gas temperature	-40 °C ... +260 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	0.15 m ... 3.4 m
Dust load	≤ 1 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45° ... 60°
Electrical connection	Power consumption ≤ 40 W

System components	2 x FLSE100-M sender/receiver unit 1 x MCU-N control unit 1 x connection unit 2 x connection cable 2 x flange with tube Enclosure rating IP65 (electronics housing)
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FLAWSIC100 H

Gas temperature	-40 °C ... +260 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	1.4 m ... 13 m
Dust load	≤ 100 g/m ³ Depending on measuring distance and gas temperature; for dry, non-sticky dust
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 40 W
System components	2 x FLSE100-H sender/receiver unit 1 x MCU-N control unit 1 x connection unit 2 x connection cable 2 x flange with tube Enclosure rating IP65 (electronics housing)

FLAWSIC100 PR

Gas temperature	-40 °C ... +260 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	≥ 0.4 m
Dust load	≤ 1 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45°
Electrical connection	
Power consumption	≤ 40 W
System components	1 x FLSE100-PR sender/receiver unit 1 x MCU-N control unit 1 x connection cable 1 x flange with tube Enclosure rating IP65 (electronics housing)

FLAWSIC100 S

Gas temperature	-40 °C ... +150 °C (-40 ... +260 °C on request)
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	0.15 m ... 1.7 m
Dust load	≤ 1 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 40 W
System components	2 x FLSE100-S sender/receiver unit 1 x MCU-N control unit 2 x connection cable 2 x flange with tube Enclosure rating IP65 (electronics housing)

FLOWSIC100 M-AC

Gas temperature	-40 °C ... +450 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	0.15 m ... 3.4 m
Dust load	≤ 1 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 75 W
System components	2 x FLSE100-MAC sender/receiver unit 1 x MCU-P control unit 1 x connection unit 2 x connection cable 2 x purge air hose 2 x flange with tube Enclosure rating IP65 (electronics housing)

FLOWSIC100 H-AC

Gas temperature	-40 °C ... +450 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	1.4 m ... 11.3 m
Dust load	≤ 100 g/m ³ Depending on measuring distance and gas temperature; for dry, non-sticky dust
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 75 W
System components	2 x FLSE100-HAC sender/receiver unit 1 x MCU-P control unit 1 x connection unit 2 x connection cable 2 x purge air hose 2 x flange with tube Enclosure rating IP65 (electronics housing)

FLOWSIC100 PM

Gas temperature	-40 °C ... +450 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	0.35 m ... 2.5 m
Dust load	≤ 1 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 40 W
System components	2 x FLSE100-PM sender/receiver unit 1 x MCU-N control unit 1 x connection unit 2 x connection cable 2 x flange with tube 2 x purge air hose 1 x purge air unit Enclosure rating IP65 (electronics housing)

FLWSIC100 PH

Gas temperature	-40 °C ... +450 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	0.7 m ... 8.7 m
Dust load	≤ 100 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 40 W
System components	2 x FLSE100-PH sender/receiver unit 1 x MCU-N control unit 1 x connection unit 2 x connection cable 2 x flange with tube 2 x purge air hose 1 x purge air unit Enclosure rating IP65 (electronics housing)

FLWSIC100 PH-S

Gas temperature	-40 °C ... +450 °C
Operating pressure	-100 hPa ... 100 hPa
Nominal pipe size	1.4 m ... 11.3 m
Dust load	≤ 100 g/m ³ Depending on measuring distance and gas temperature
Mounting	Installation angle 45° ... 60°
Electrical connection	
Power consumption	≤ 40 W
System components	2 x FLSE100-PHS sender/receiver unit 1 x MCU-N control unit 1 x connection unit 2 x connection cable 2 x flange with tube 2 x purge air hose 1 x purge air unit Enclosure rating IP65 (electronics housing)

MCU-N control unit

Description	Obligatory control and evaluation unit for volume flow measuring devices without internal cooling
Ambient temperature	-40 °C ... +60 °C
Enclosure rating	IP65
Analog outputs	1 output: 0/2/4 ... 20 mA, 750 Ω Galvanically isolated; up to five outputs with use of additional modules (option)
Analog inputs	2 inputs: 0 ... 20 mA Up to four inputs with use of additional modules (option)
Digital outputs	5 relay outputs (changeover contacts), volt-free: 48 V, 1 A Safety extra-low voltage; for status signals "Operation/Fault", "Limit value", "Warning", "Maintenance" and "Control cycle"
Digital inputs	4 volt-free contacts
Interfaces	USB 1.1 (virtual COM port; service interface) RS-232 (via terminal connection; service interface) RS-485 (for connection of sender/receiver unit(s))

Bus protocol	Ethernet TCP/IP (via optional interface module) Modbus (via optional interface module) Modbus TCP (via optional interface module) PROFIBUS DP (via optional interface module)
Display	LC display (option) Status LEDs: "Power", "Maintenance", and "Fault"
Operation	Via LC display (option) or SOPAS ET software
Dimensions (W x H x D)	210 mm x 340 mm x 120 mm
Weight	≤ 3.7 kg
Electrical connection	
Voltage	90 ... 250 V Version with 24 V DC optionally available
Frequency	47 to 63 Hz
Power consumption	≤ 15 W
Options	Interface module(s) I/O module(s) LC display 19" version

MCU-P control unit

Description	Obligatory control and evaluation unit with integrated cooling air unit, for volume flow measuring devices with internal cooling
Ambient temperature	-40 °C ... +45 °C Intake temperature for purge air
Enclosure rating	IP 54
Analog outputs	1 output: 0/2/4 ... 20 mA, 750 Ω Galvanically isolated; up to five outputs with use of additional modules (option)
Analog inputs	2 inputs: 0 ... 20 mA Not galvanically isolated; additional inputs with use of I/O modules (option)
Digital outputs	5 relay outputs (changeover contacts), volt-free: 48 V, 1 A Safety extra-low voltage; for status signals "Operation/Fault", "Limit value", "Warning", "Maintenance" and "Control cycle"
Digital inputs	4 volt-free contacts
Interfaces	USB 1.1 (virtual COM port; service interface) RS-232 (via terminal connection; service interface) RS-485 (for connection of sender/receiver unit(s))
Bus protocol	Ethernet TCP/IP (via optional interface module) Modbus (via optional interface module) Modbus TCP (via optional interface module) PROFIBUS DP (via optional interface module)
Display	LC display (option) Status LEDs: "Power", "Maintenance", and "Fault"
Operation	Via LC display (option) or SOPAS ET software
Dimensions (W x H x D)	300 mm x 455 mm x 220 mm
Weight	≤ 13.5 kg
Electrical connection	
Voltage	90 ... 250 V Version with 24 V DC optionally available
Frequency	47 to 63 Hz
Power consumption	≤ 70 W

Auxiliary connections	Purge air
Options	Interface module(s) I/O module(s) LC display 19" version

SLV4-2 purge air unit, 2BH1300, 3-ph

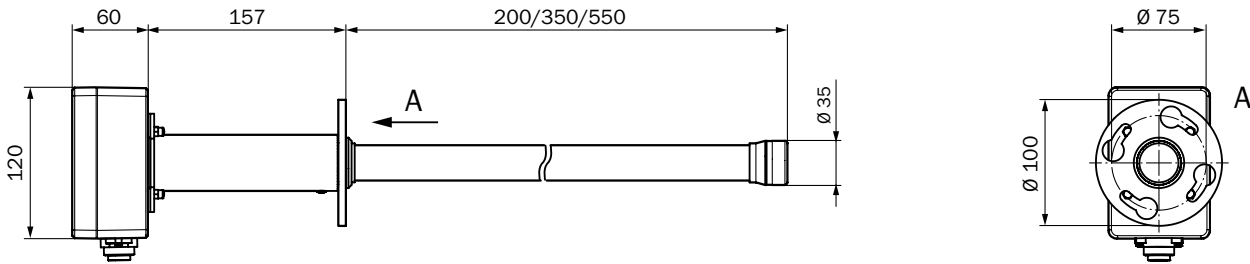
Description	Obligatory purge air unit for purged volume flow measuring devices
Purge air quantity	≥ 48 m³/h
Diagnostic functions	Low-pressure monitor
Ambient temperature	-20 °C ... +40 °C
Enclosure rating	IP 54
Dimensions (W x H x D)	550 mm x 550 mm x 258 mm (see dimensional drawings for details)
Weight	18 kg
Auxiliary connections	Purge air: 40 mm
Integrated components	Two-stage air filter, type Europiclon, dust capacity 200 g

Ordering information

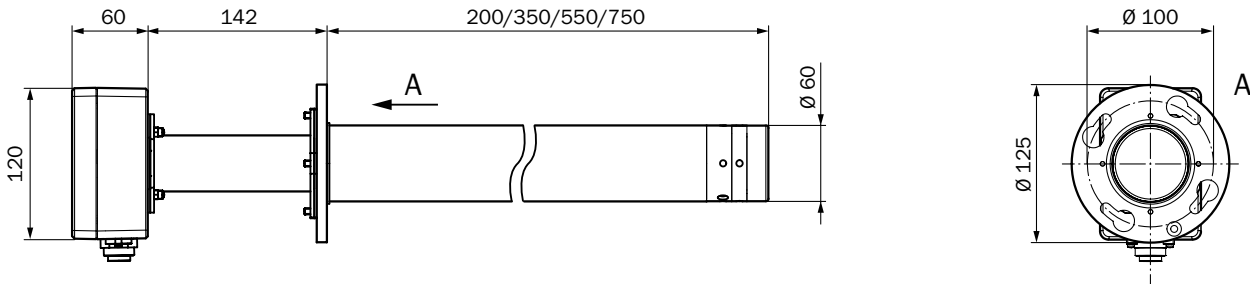
Our regional sales organization will be glad to advise you on which device configuration is best for you.

Dimensional drawings (dimensions in mm)

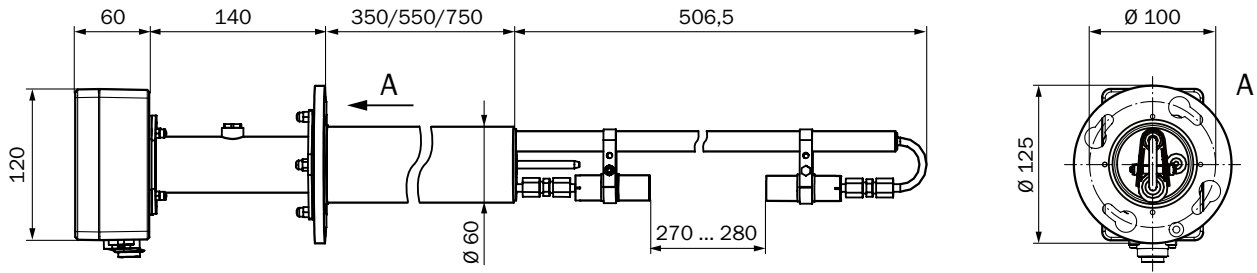
FLSE100-M sender/receiver unit



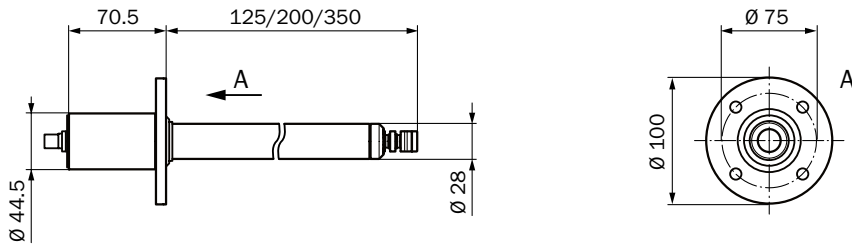
FLSE100-H sender/receiver unit



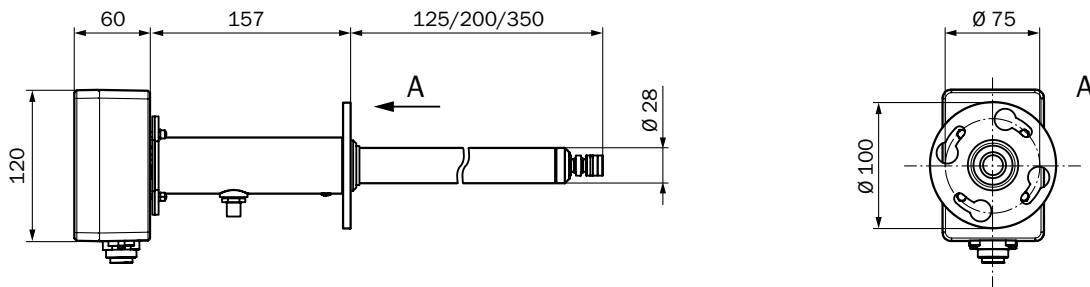
FLSE100-PR sender/receiver unit



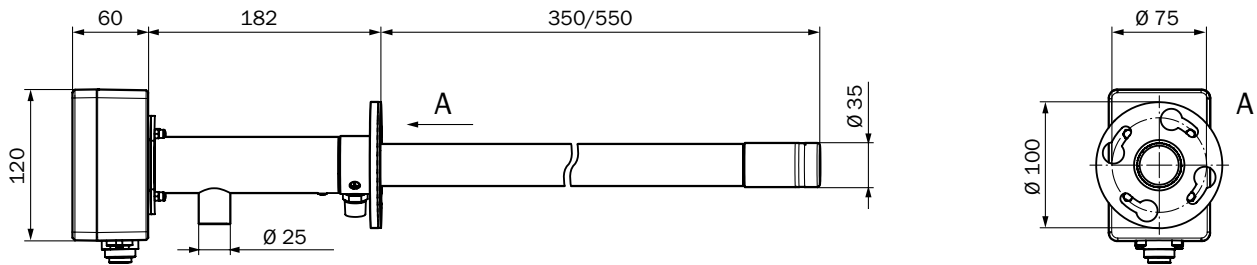
FLSE100-SA sender/receiver unit



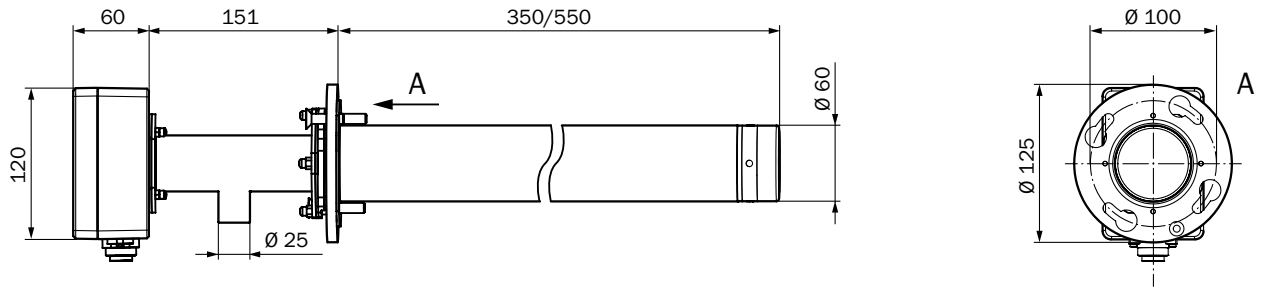
FLSE100-SD sender/receiver unit



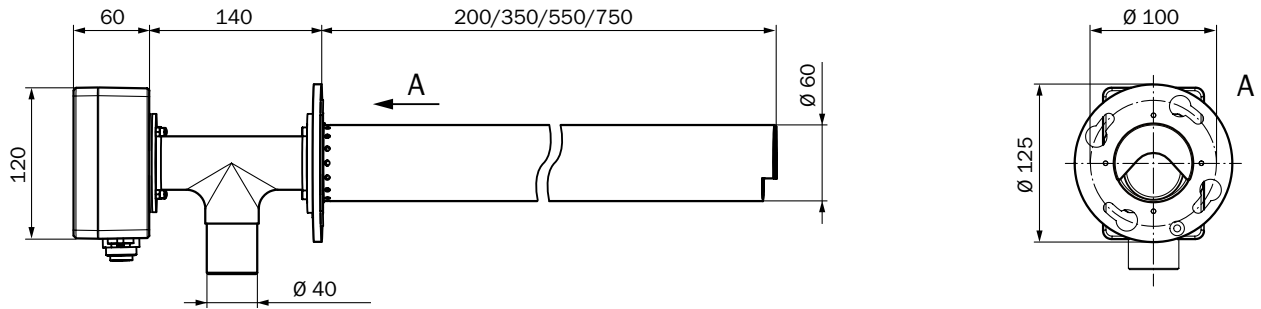
FLSE100-MAC sender/receiver unit



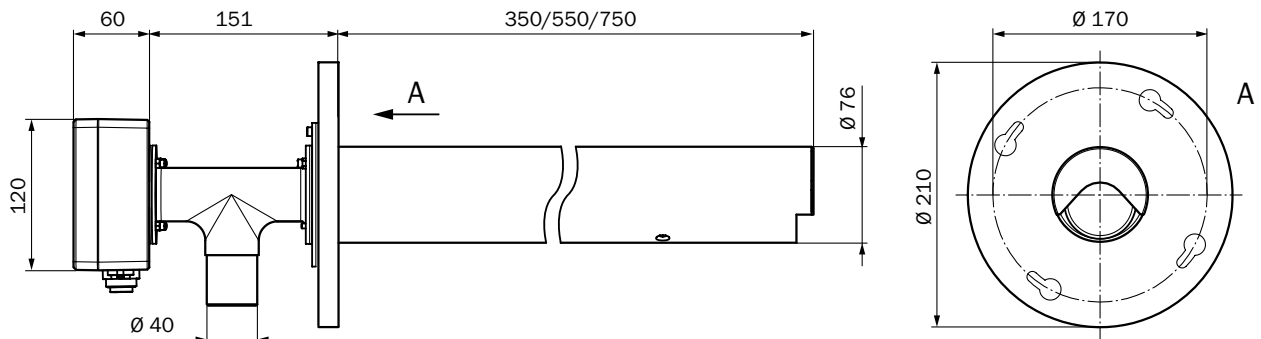
FLSE100-HAC sender/receiver unit



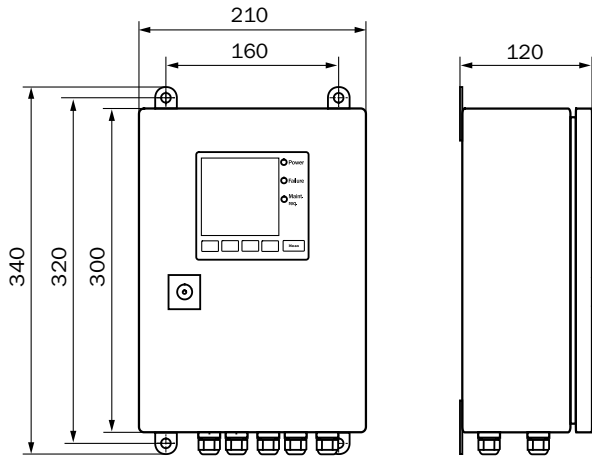
FLSE100-PM and FLSE100-PH sender/receiver units



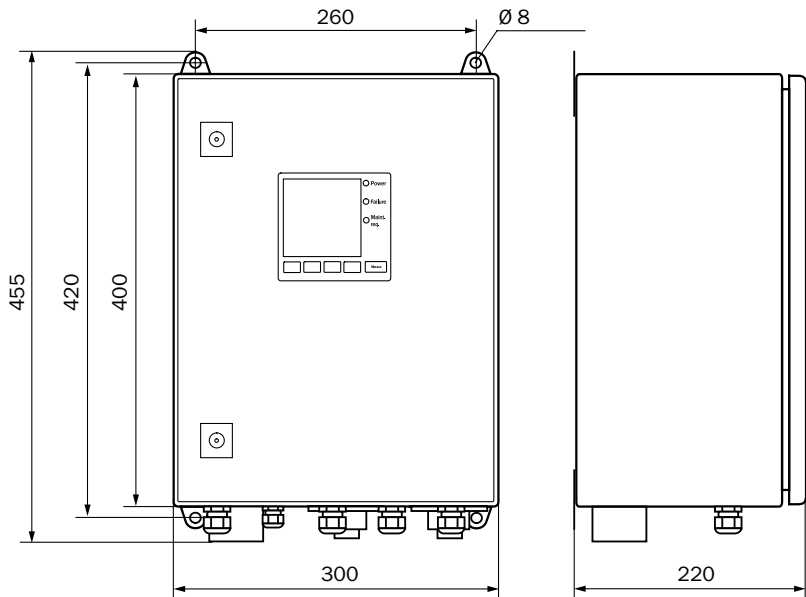
FLSE100-PHS sender/receiver unit



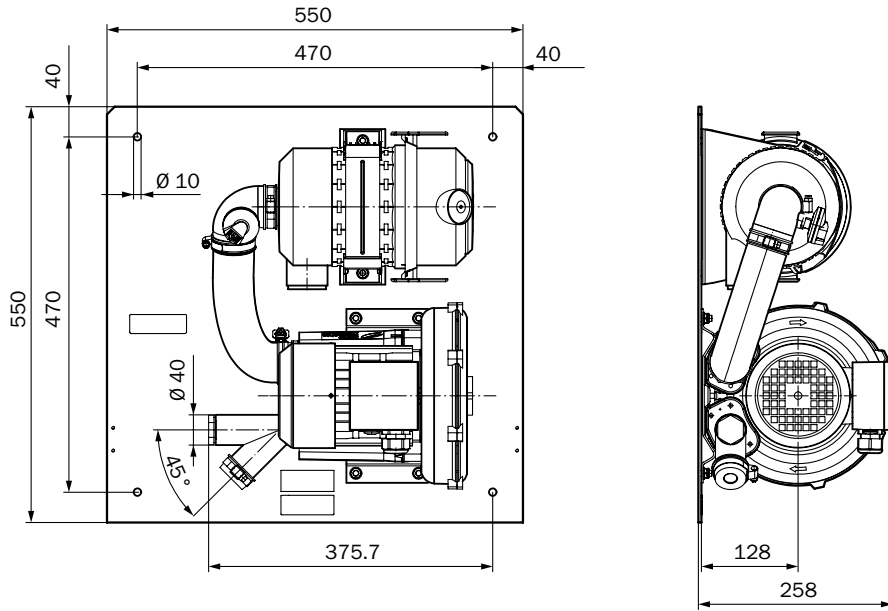
MCU-N control unit; wall housing, compact version (only for non-hazardous areas)



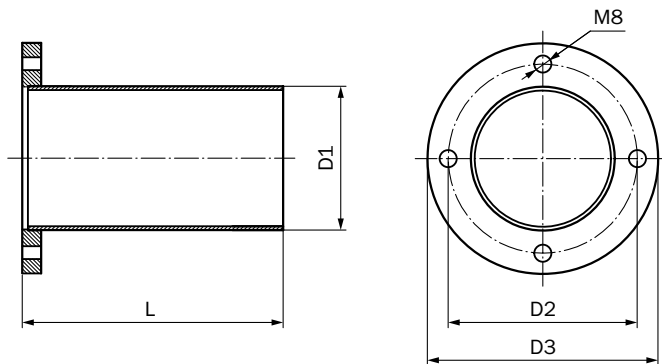
MCU-P control unit; wall housing, compact version (only for non-hazardous areas)



SLV4-2 purge air unit, 2BH1300



Flange plate with tube



D1	D2	D3	L	Type FLSE100
48.3	75	100	113	SA, SD
			188, 338	SA, SD, M
			338, 538	M, MAC
76.1	100	122	188	H, PM, PH
			338	H, HAC, PR, PM, PH
			538	H, HAC, PR, PM, PH
			738	H, PR, PM, PH
114.3	170	210	338, 538, 738	PHS
All dimensions in mm				

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- 
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- 
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 Safe and regularly tested
- 
Upgrade and retrofits
 Simple, safe, and economical
- 
Training and education
 Practical, focused, and professional

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 9,700 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

Comprehensive services round out the offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

That is “Sensor Intelligence.”

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → www.sick.com