Product data sheet

FLOWSIC100

FLOW MEASUREMENT INSTRUMENTS

SICK
Sensor Intelligence.

FLOWSIC100

FLOW MEASUREMENT INSTRUMENTS

Ordering information

Type	Part no.
FLOWSIC100	On request

In accordance with Article 2 (4), this product does not fall within the scope of RoHS directive 2011/65/EU and is also not designed for use in products which fall within the scope of this directive. You can find additional information in the product information.

The exact device specifications and performance data of the product may deviate from the information provided here, and depend on the application in which the product is being used and the relevant customer specifications.

Our regional sales organization will help you to select the optimum device configuration.

Other models and accessories ➜ www.sick.com/FLOWSIC100

Product description

The product family FLOWSIC100 was designed for emission monitoring tasks. The "H" versions are suitable for stacks with large diameters and applications with high dust content. The "M" versions are especially suited for stacks with medium diameter. The ultrasonic transducers of the "PR" probe type are mounted with fixed path length on one sender/receiver unit (measuring probe). The "AC" versions have an innovative internal cooling and are suitable for gas temperatures up to 450 °C. The purged "Px" versions are used for gases with high concentrations of sticky or wet dust.
Rugged titanium transducers are standard and suitable under difficult conditions. The measuring system consists of 2 sender/receiver units or a measuring probe and a MCU control unit. The MCU is used for input and output of signals, for calculation of volume flow to reference conditions (standardization) as well as user-friendly LCD interface.

At a glance

- Rugged titanium converters for long service life
- Corrosion-resistant material for use with aggressive gases (option)
- Integrated measurement via duct diameter for types H, M, and S
- Probe version PR for cost-saving, single-sided installation in duct
- Automated operational check with zero and reference point test

Your benefits

- Reliable flow measurement for ducts with small up to very large diameters
- High durability of the device
- No purge air required for applications with gas temperatures up to 260 °C
- Minimum operating and maintenance costs
- Accurate measuring results under difficult measuring conditions
- Measurement without pressure loss, therefore no influences on the process
- User-friendly operation via SOPAS ET software
- Reliable function monitoring due to enhanced diagnosis

Fields of application

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

Detailed technical data

FLOWSIC100 system

Measured values	Volumetric flow a. c., volumetric flow s. c., gas velocity, speed of sound, gas temperature
Performance-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 %
Accuracy	± 0.1 m/s Depending on application
Diagnostics functions	Automatic check cycle for zero and span point Extended device diagnosis via SOPAS ET software
Ambient temperature	–40 °C ... +60 °C
Storage temperature	–40 °C ... +70 °C
Conformities	2001/80/EC (13. BImSchV) 2000/76/EC (17. BImSchV) 27. BImSchV 30. BImSchV TA-Luft (Prevention of Air Pollution) 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/m³ Depending on measuring path and gas temperature
Enclosure rating	

	IP65 sender/receiver units (electronics housing) IP65 MCU
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

FLOWSIC100 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/m³ Depending on measuring path and gas temperature; for dry, non-sticky dust
Enclosure rating	 IP65 sender/receiver units (electronics housing) IP65 MCU
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

FLOWSIC100 PR

Gas temperature	 –40 °C ... +260 °C
Operating pressure	 –100 hPa ... 100 hPa
Nominal pipe size	 ≥ 0.4 m
Dust load	≤ 1 g/m³ Depending on measuring path and gas temperature
Enclosure rating	 IP65 sender/receiver units (electronics housing) IP65 MCU
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

FLOWSIC100 S

Gas temperature	–40 °C ... +150 °C (-40 °C ... +150 °C on request)
Operating pressure	–100 hPa ... 100 hPa
Nominal pipe size	0.15 m ... 1.7 m
Dust load	≤ 1 g/m³ Depending on measuring path and gas temperature
Enclosure rating	IP65 sender/receiver units (electronics housing) IP65 MCU
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

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/m³ Depending on measuring path and gas temperature
Enclosure rating	IP65 sender/receiver units (electronics housing) IP65 MCU without fan IP54 MCU with fan
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

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/m³ Depending on measuring path and gas temperature; for dry, non-sticky dust
Enclosure rating	IP65 sender/receiver units (electronics housing) IP65 MCU without fan IP54 MCU with fan
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

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/m³ Depending on measuring path and gas temperature
Enclosure rating	IP65 sender/receiver units (electronics housing) IP65 MCU
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

FLOWSIC100 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/m³ Depending on measuring path and gas temperature
Enclosure rating	IP65 sender/receiver units (electronics housing) IP65 MCU
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

FLOWSIC100 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/m³ Depending on measuring path and gas temperature
Enclosure rating	IP65 sender/receiver units (electronics housing) IP65 MCU
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

MCU-N control unit

Description	Compulsory 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

	Electrically isolated, up to five outputs when add-on modules are used (option)
Analog inputs	2 inputs: 0 ... 20 mA Up to four outputs when using additional modules (option)
Digital outputs	5 relay outputs (change-over contacts), potential-free: + 48 V, 1 A Safety extra-low voltage; for status signals "operation/malfunction", "limit value", "warning", "maintenance" and "check cycle"
Digital inputs	4 potential-free contacts
USB	✓
Function	Connection to SOPAS ET software
Serial **Serial**	✓, ✓
Type of fieldbus integration	RS-232
Function	Connection to SOPAS ET software
Ethernet	✓
Type of fieldbus integration	Via optional interface module
Modbus **Modbus** **Modbus**	✓, ✓, ✓
Type of fieldbus integration	ASCII RS-485, via optional interface module
PROFIBUS DP	✓
Type of fieldbus integration	Via optional interface module
Indication	LC display (option) Status LEDs: “Power,” “Failure,” and “Maintenance request”
Operation	Via LC-display (option) or software SOPAS ET
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 available as an option
Frequency	47 ... 63 Hz
Power consumption	≤ 15 W
Options	Interface module(s) I/O module(s) LC display 19″-type

MCU-P control unit

Description	Compulsory control and evaluation unit with integrated cooling air unit, for volume flow measuring devices with internal cooling
Ambient temperature	–40 °C ... +45 °C Intake temperatures for purge air
Enclosure rating	IP54
Analog outputs	1 output: 0/2/4 ... 20 mA, + 750 Ω Electrically isolated, up to five outputs when add-on modules are used (option)
Analog inputs	2 inputs:

	0 ... 20 mA Not electrically isolated; additional inputs if using I/O modules (option)
Digital outputs	5 relay outputs (change-over contacts), potential-free: + 48 V, 1 A Safety extra-low voltage; for status signals "operation/malfunction", "limit value", "warning", "maintenance" and "check cycle"
Digital inputs	4 potential-free contacts
USB	✓
Function	Connection to SOPAS ET software
Serial **Serial**	✓, ✓
Type of fieldbus integration	RS-232
Function	Connection to SOPAS ET software
Ethernet	✓
Type of fieldbus integration	Via optional interface module
Modbus **Modbus** **Modbus**	✓, ✓, ✓
Type of fieldbus integration	ASCII RS-485, via optional interface module
PROFIBUS DP	✓
Type of fieldbus integration	Via optional interface module
Indication	LC display (option) Status LEDs: “Power,” “Failure,” and “Maintenance request”
Operation	Via LC-display (option) or software SOPAS ET
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 available as an option
Frequency	47 ... 63 Hz
Power consumption	≤ 70 W
Auxiliary connections	Purge air
Options	Interface module(s) I/O module(s) LC display 19″-type

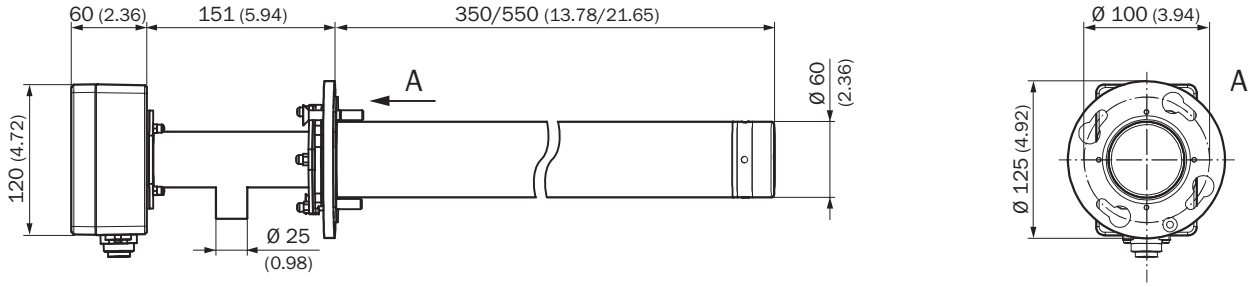
SLV4-2 purge air unit, 2BH1300, 3-ph

Description	Obligatory purge air unit for purged volume flow measuring devices
Purge air quantity	≥ 48 m³/h
Diagnostics functions	Low pressure controller
Ambient temperature	
	–20 °C ... +40 °C
Enclosure rating	
	IP54
Dimensions (W x H x D)	550 mm x 550 mm x 258 mm (for details see dimensional drawings)
Weight	18 kg

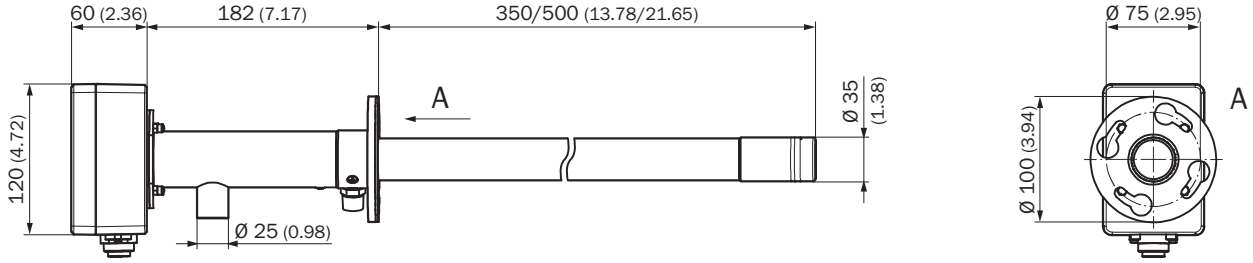
Auxiliary connections	Purge air: 40 mm
Integrated components	2-step air filter, type Europiclon, dust capacity 200 g

Dimensional drawings (Dimensions in mm (inch))

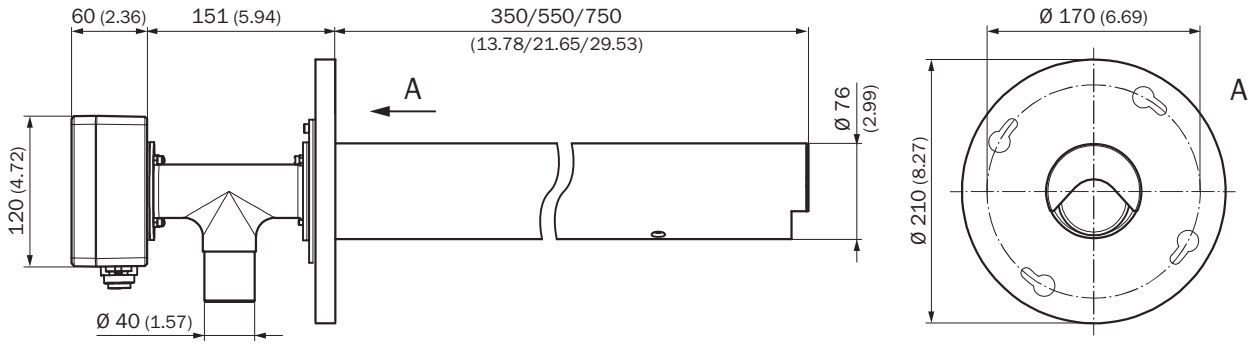
FLSE100-HAC sender/receiver unit



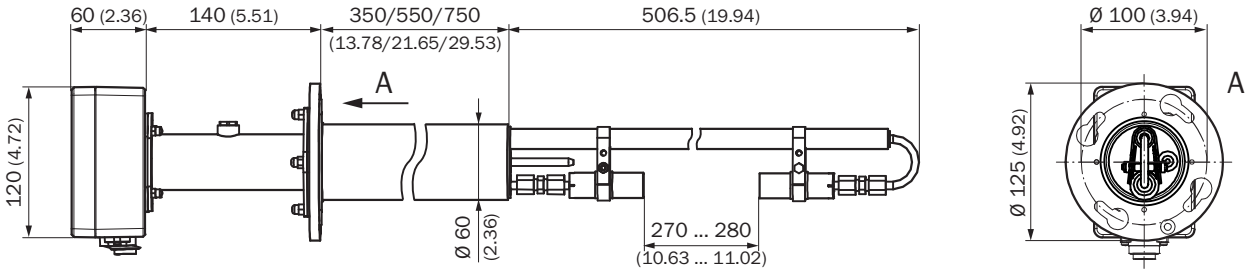
FLSE100-MAC sender/receiver unit



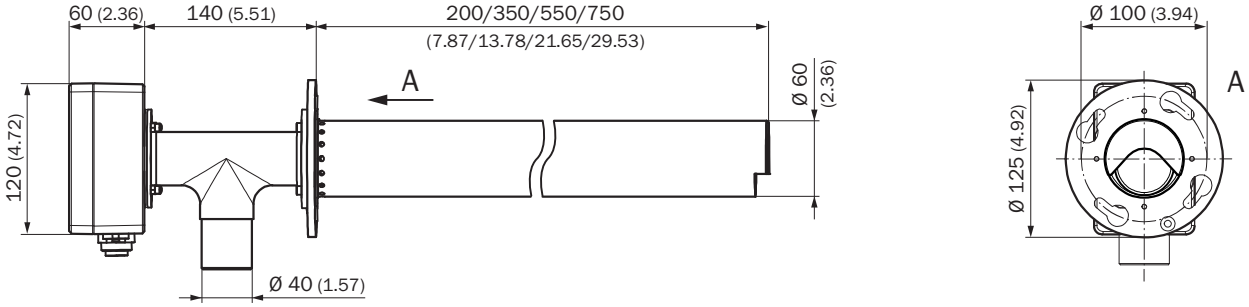
FLSE100-PHS sender/receiver unit



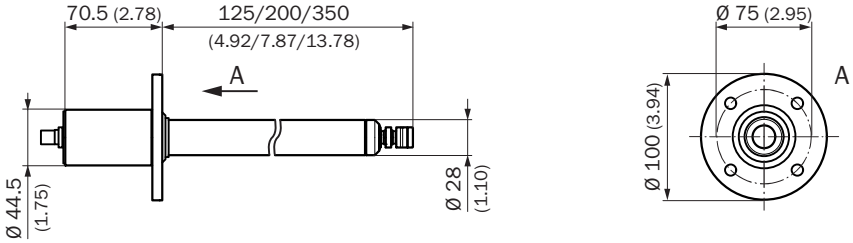
FLSE100-PR sender/receiver unit



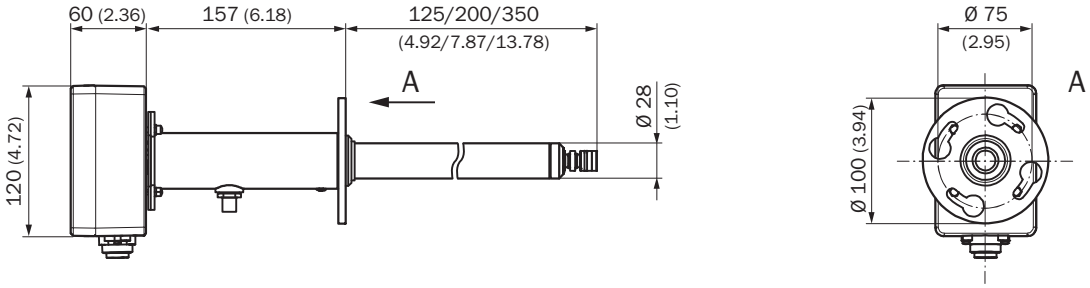
FLSE100-PM and FLSE100-PH sender/receiver unit



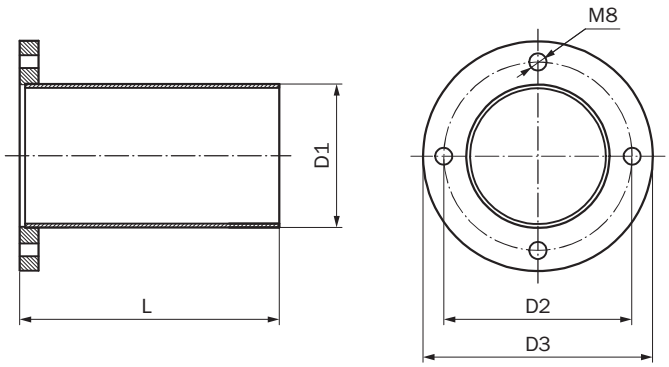
FLSE100-SA sender/receiver unit



FLSE100-SD sender/receiver unit

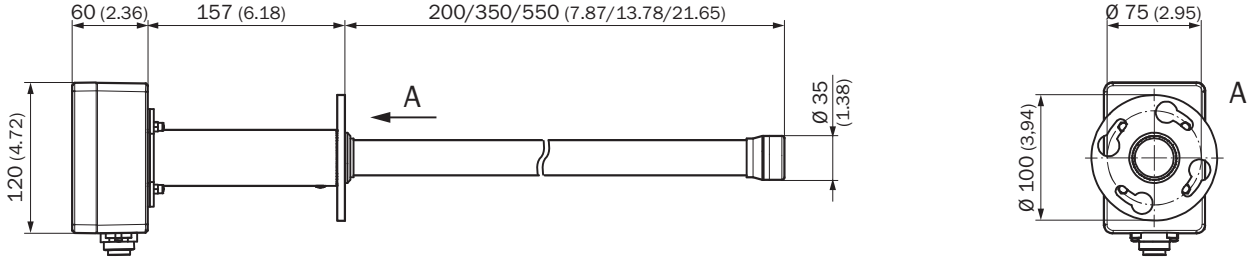


Mounting flange with tube

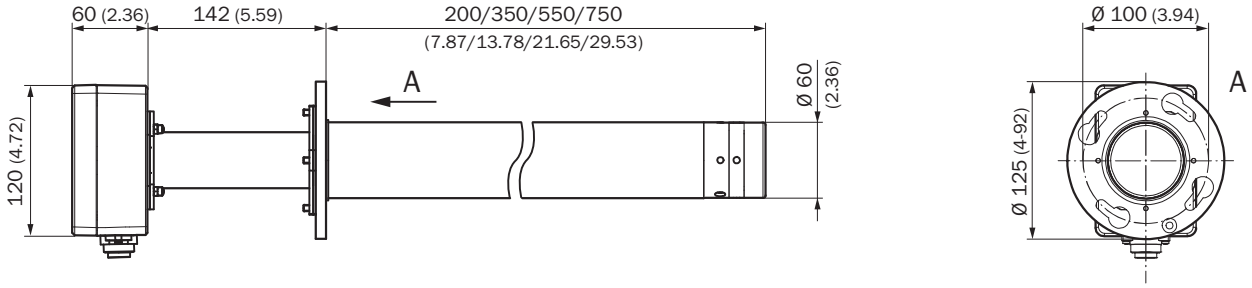


D1	D2	D3	L	Type FLSE100
48.3	75	100	113	SA, SD
			188, 338	SA, SD, M
			338, 538	M, MAC
76.1	100	122	188	H, PM, PH
			338	H, HAC, PR, PM, PH
			538	H, HAC, PR, PM, PH
			738	H, PR, PM, PH
114.3	170	210	338, 538, 738	PHS
All dimensions in mm				

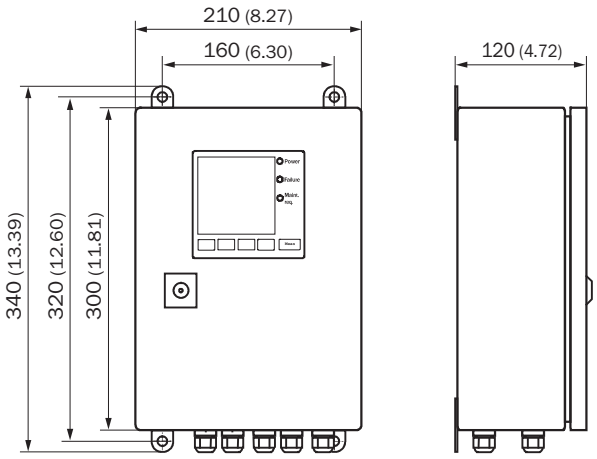
FLSE100-M sender/receiver unit



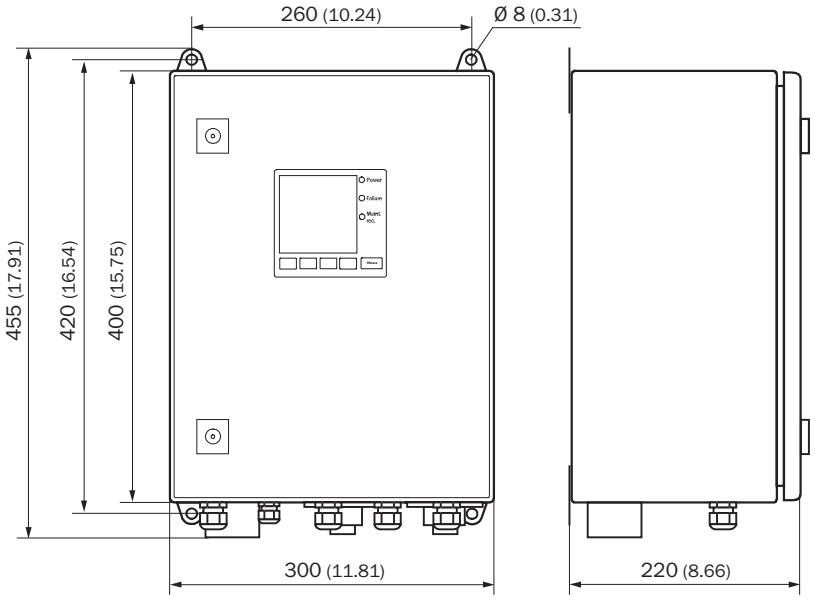
FLSE100-H sender/receiver unit



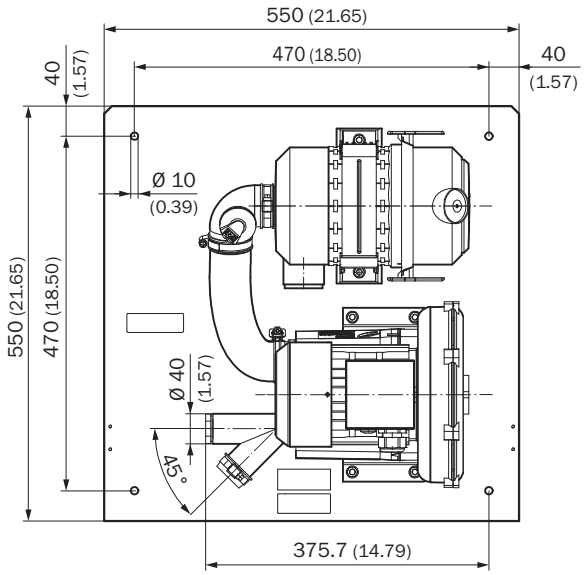
MCU-N control unit; wall-mounting enclosure, compact version (for non-hazardous areas only)

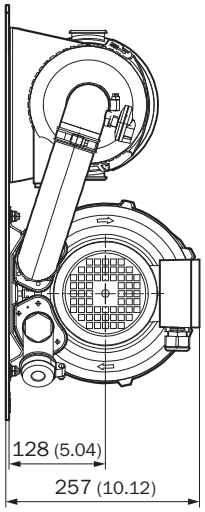


MCU-P control unit; wall-mounting enclosure, compact version (for non-hazardous areas only)



SLV4-2 purge air unit, 2BH1300





Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000038499_02

Certified AMS:	FLOWSIC100 for waste gas velocity
Manufacturer:	SICK Engineering GmbH Bergener Ring 27 01458 Ottendorf-Okrilla Germany
Test Institute:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and found to comply with the standards EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007), EN ISO 16911-2 (2013) and EN 14181 (2014).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 12 pages).
The present certificate replaces certificate 0000038499_01 dated 05 March 2018.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000038499

Publication in the German Federal Gazette (BAnz) of 05 March 2013

This certificate will expire on:
04 March 2028

German Environment Agency
Dessau, 02 March 2023

TÜV Rheinland Energy GmbH
Cologne, 01 March 2023

Dr. Marcel Langner
Head of Section II 4.1

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

10/221 2.08

Test report:	936/21220596/A dated 28 September 2012
Initial certification:	05 March 2013
Expiry date:	04 March 2028
Certificate:	Renewal (of previous certificate 0000038499_01 of 05 March 2018 valid until 04 March 2023)
Publication:	BAnz AT 05.03.2013 B10, chapter II No. 2.2

Approved application
The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC (13th BImSchV:2012), at waste incineration plants according to EC Directive 2000/76/EC (17th BImSchV:2009), Directive 2015/2193/EC (44th BImSchV:2021), the 27th BImSchV:1997, the 30th BImSchV:2009 and TA Luft:2002. The measured ranges have been selected so as to cater for as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a twelve-month field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of -40° to +60°C.

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the flue gas velocity relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the installation at which it will be installed.

Note:
The legal regulations mentioned correspond to the current state of legislation during certification. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

Basis of the certification
This certification is based on:

- Test report 936/21220596/A dated 28 September 2012 of TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 05.03.2013 B10, chapter II No. 2.2, Announcement by UBA dated 12 February 2013:

AMS designation:
FLOWSIC 100 for waste gas velocity

Manufacturer:
SICK Engineering GmbH, Ottendorf-Okrilla

Field of application:
For plants requiring official approval and for plants according to the 27 th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Supplementary range	Unit
Flow velocity	0 – 20	0 – 40	m/s

Software versions:

Sensor (Version 1–3):	21.4.14
Sensor (Version 4–10):	1.4.14
MCU:	1.08.01
SOPAS ET:	02.32

Restrictions:
None

Notes:
1. The following versions were tested as part of the performance test:

1	FLOWSIC100 PR	6	FLOWSIC100 H
2	FLOWSIC100 PR-AC	7	FLOWSIC100 H-AC
3	FLOWSIC100 S	8	FLOWSIC100 PM
4	FLOWSIC100 M	9	FLOWSIC100 PH
5	FLOWSIC100 M-AC	10	FLOWSIC100 PH-S

2. The maintenance interval is six months.
3. Supplementary testing (migration to standard EN 15267) as regards Federal Environment Agency (UBA) notices of 19 February 2009 (BAnz p. 899, chapter II no. 1.1) and of 10 January 2011 (BAnz p. 294, chapter IV notifications 15 and 30).

Test Report:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report no.: 936/21220596/A dated 28 September 2012

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chap. IV correction 3, Announcement by UBA dated 03 July 2013:

3 Correction of Federal Environment Agency (UBA) notice of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2)

The current MCU Firmware version of the Flowsic 100 measuring system for flow velocity manufactured by SICK Engineering GmbH should read as follows:

MCU Firmware: 01.08.00 (instead of 01.08.01)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 28 May 2013

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V notification 13, Announcement by UBA dated 03 July 2013:

13 Notification as regards Federal Environment Agency notices regarding performance tested AMS manufactured by SICK Engineering GmbH and by SICK AG *(excerpt)*

Item no.	AMS designation/ Manufacturer	Notice	Notification	Statement test laboratory
7	FLOWSIC100/ SICK Engineering GmbH	as regards notification 14 of this notice	The current software version of the SOPAS ET platform for AMS control is: SOPAS ET 2.38.	TÜV Rheinland Energie und Umwelt GmbH of 25 March 2013
…	…	…	…	…

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chap. V notification 14, Announcement by UBA dated 03 July 2013:

14 Notification as regards Federal Environment Agency (UBA) notices of 14 February 2008 (BAnz p. 901, chapter II number 1.1) and of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2)

The current software versions of the FLOWSIC 100 measuring the gas flow velocity manufactured by SICK Engineering GmbH are:

MCU Firmware: 01.08.00
Software Sensor:
- Type PR, PR-AC and S: 21.04.16
- Type M, M-AC, H, H-AC, PM, PH, PH-S: 1.04.16

To ensure full functionality of the AMS, the use of the SOPAS ET software platform in one of its notified versions is required.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 26 March 2013

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chap. V notification 3, Announcement by UBA dated 22 July 2015:

3 Notification as regards Federal Environment Agency notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 3 July 2013 (BAnz AT 23.07.2013 B10 chapter IV notification 14)

The current software versions of the Flowsic 100 measuring system for flow velocity manufactured by SICK Engineering GmbH are:

MCU Firmware:	01.12.00
Software Sensor	
Type PR, PR-AC and S:	1.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	21.06.00

To ensure full functionality of the AMS, the use of the SOPAS ET software platform in one of its notified versions is required. The version most recently announced is SOPAS ET 2.38. The Flowsic 100 velocity measuring system also meets the requirements of EN ISO 16911-2 (Issue: June 2013).

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 24 March 2015

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chap. V notification 14, Announcement by UBA dated 14 July 2016:

14 Notification as regards Federal Environment Agency notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 22 July 2015 (BAnz AT 26.08.2015 B4 chapter V notification 3)

The current software versions of the FLOWSIC 100 measuring the gas flow velocity manufactured by SICK Engineering GmbH are:

MCU Firmware:	01.12.02
Software Sensor:	
Type PR, PR-AC and S:	1.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	21.06.00

For the control of the measuring system the SOPAS ET software platform is required in a publically notified version. The most recent publically notified version is:
SOPAS ET 2.38

Statement issued by TÜV Rheinland Energy GmbH dated 25 April 2016

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chap. IV correction 4, Announcement by UBA dated 22 February 2017:

4 Correction of Federal Environment Agency notice of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V notification 3)

In the above-mentioned notice regarding the FLOWSIC 100 measuring system for velocity manufactured by SICK Engineering GmbH, the assignment of the software versions to the instrument types is as follows:

Software Sensor:

Type PR, PR-AC and S:	21.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	1.06.00

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chap. IV correction 5, Announcement by UBA dated 22 February 2017:

5 Correction of Federal Environment Agency notice of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter V notification 14)

In the above-mentioned notice regarding the FLOWSIC 100 measuring system for velocity manufactured by SICK Engineering GmbH, the assignment of the software versions to the instrument types is as follows:

Software Sensor:

Type PR, PR-AC and S:	21.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	1.06.00

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chap. V notification 19, Announcement by UBA dated 28 June 2019:

19 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter IV correction 4)

Instead of the MCU used so far, the Flowsic100 measuring system for velocity manufactured by SICK Engineering GmbH may also be operated with the new MCU100 control unit. The latest software versions of the measuring system are:

Flowsic100 (Type PR, PR-AC, S):	21.08.00
Flowsic100 (Type M, M-AC, H, H-AC, PM, PH, PH-S):	1.08.00
MCU:	01.12.04
MCU100:	r2.3.6

Statement issued by TÜV Rheinland Energy GmbH dated 28 February 2019

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chap. II notification 18, Announcement by UBA dated 27 May 2020:

18 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter V, notification 19)

The latest software versions of the FLOWSIC100 measuring the gas flow velocity manufactured by SICK Engineering GmbH are:

Flowsic100 (Type PR, PR-AC, S):	21.08.00
Flowsic100 (Type M, M-AC, H, H-AC, PM, PH, PH-S:	01.08.00
MCU:	01.12.05.

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020

Publication in the German Federal Gazette: BAnz AT 05.08.2021 B5, chap. IV notification 43, Announcement by UBA dated 29 June 2021:

43 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter II notification 18)

The latest software versions of the FLOWSIC 100 measuring system for waste gas velocity manufactured by SICK Engineering GmbH are:

Software Sensor:

Type PR, PR-AC, S:	21.08.00,
Type M, M-AC, H, H-AC, PM, PH, PH-S:	01.08.00,
MCU:	01.14.00

Statement issued by TÜV Rheinland Energy GmbH dated 16 February 2021

Publication in the German Federal Gazette: BAnz AT 28.07.2022 B4, chap. III notification 23, Announcement by UBA dated 28 June 2022:

23 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 29 June 2021 (BAnz AT 05.08.2021 B5, chapter IV notification 43)

The current software versions of the FLOWSIC 100 measuring device for exhaust gas velocity from SICK Engineering GmbH are:

Software Sensor:

Type PR, PR-AC, S:	21.08.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	01.08.00
MCU:	01.16.00

Statement issued by TÜV Rheinland Energy GmbH dated 12 February 2022

Certified product
This certificate applies to automated measurement systems conforming to the following description:

The FLOWSIC100 measuring system continuously monitors the flow velocity.
The measuring system consists of the following components:

- Sender/Receiver unit FLSE100
  for emitting and detecting ultra sound pulses and for controlling system functions
- flange c/w tube
- MCU control unit:
  control, evaluation and output of data via sensors connected to the RS485 interface
- connecting cable and box
- purge air unit (optional):
  for use of certain E/R units at high gas temperatures and for cleaning the ultrasonic transducer

The FLOWSIC100 uses ultrasonic transit times to measure flow velocity. Emitter / receiver units are installed at both sides of the duct/tube at an inclination angle of 45° to 60° in relation to the gas flow.

The emitter/receiver units are made up of piezoelectric ultrasonic transducers which alternately function as emitter or as receiver. Sound pulses are emitted at an angle of "alpha" in relation to the flow direction. Depending on the angle "alpha" and the gas velocity v, the transit time of the respective sound direction varies as a result of “acceleration and braking effects”. The difference in transit times of the sound pulses increases as a consequence of higher gas velocities and smaller angles in relation the flow direction of the gas.

The gas velocity v is calculated from the difference between both transit times regardless of the speed of sound. Therefore, changes in the speed of sound caused by pressure or temperature fluctuations do not affect the calculated gas velocity with this method of measurement.

Ultrasonic transducers are electromechanical oscillation devices whose essential properties are defined by geometry. A pair of piezoelectric rings is always used as impulse. During the transmission phase they transform electric energy into kinetic energy, or vice versa during the reception phase. Their resonance behaviour is characterised by the frequency-dependent transformer current and the frequency-dependent phase between impulse voltage and transformer current. The transformers are scaled according to the frequency of operation depending on the conditions of the application.

General notes
This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: **qal1.de**.

History of documents
Certification of FLOWSIC100 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic test
Test report 936/21206702/A dated 5 November 2007
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
Publication BAnz. 07 March 2008, No. 38, p. 901, chapter II number 1.1
UBA announcement dated 14 February 2008

Supplementary testing
Test report 936/21206702/B dated 28 February 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
Publication BAnz. 03 September 2008, No. 133, p. 3243, chapter II number 1.1
UBA announcement dated 12 August 2008

Supplementary testing
Test report 936/21206702/E dated 5 October 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
Publication BAnz. 11 March 2009, No. 38, p. 899, chapter II number 1.1
UBA announcement dated 19 February 2009

Notifications
Statement issued by TÜV Immissionsschutz und Energiesysteme GmbH dated 29 October 2009
Publication: BAnz. 12 February 2010, No. 24, p. 552, chapter IV notification 7
UBA announcement dated 25 January 2010
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 5 October 2010
Publication BAnz. 26 January 2011, No. 14, p. 294, chapter IV notification 15
UBA announcement dated 10 January 2011
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 8 November 2010
Publication BAnz. 26 January 2011, No. 14, p. 294, chapter IV notification 30
UBA announcement dated 10 January 2011
(Software changes)

Initial certification according to EN 15267
Certificate No. 0000038499_00: 22 March 2013
Expiry date of the certificate: 04 March 2018
Test report 936/21220596/A dated 28 September 2012
TÜV Rheinland Energie und Umwelt GmbH
Publication BAnz AT 05.03.2013 B10, chapter II number 2.2
UBA announcement dated 12 February 2013

Correction
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 28 May 2013
Publication BAnz AT 23.07.2013 B4, chapter IV notification 3
UBA announcement dated 3 July 2013
(Correction of software version)

Notifications
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 25 March 2013
Publication BAnz AT 23.07.2013 B4, chapter V notification 13
UBA announcement dated 3 July 2013
(Software version SOPAS ET is 2.38.)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 26 March 2013
Publication BAnz AT 23.07.2013 B4, chapter V notification 14
UBA announcement dated 3 July 2013
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 24 March 2015
Publication BAnz AT 26.08.2015 B4, chapter V notification 3
UBA announcement dated 22 July 2015
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 25 April 2016
Publication BAnz AT 01.08.2016 B11, chapter V notification 14
UBA announcement dated 14 July 2016
(Software changes)

Corrections
Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016
Publication BAnz AT 15.03.2017 B6, chapter IV notification 4
UBA announcement dated 22 February 2017
(Correction for notification of 24 March 2015.)

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016
Publication BAnz AT 15.03.2017 B6, chapter IV notification 5
UBA announcement dated 22 February 2017
(Correction for notification 14 of 25 April 2016)

Renewal of certificate
Certificate No. 0000038499_01: 05 March 2018
Expiry date of the certificate: 04 March 2023

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 28 February 2019
Publication BAnz AT 22.07.2019 B8, chapter V notification 19
UBA announcement dated 28 June 2019
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020
Publication BAnz AT 31.07.2020 B10, chapter II notification 18
UBA announcement dated 27 May 2020
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 16 February 2021
Publication BAnz AT 05.08.2021 B5, chapter IV notification 43
UBA announcement dated 29 June 2021
(Software changeSoftwareänderung)

Statement issued by TÜV Rheinland Energy GmbH dated 12 February 2022
Publication BAnz AT 28.07.2022 B4, chapter III notification 23
UBA announcement dated 28 June 2022
(Software changes)

Renewal of certificate
Certificate No. 0000038499_02: 02 March 2023
Expiry date of the certificate: 04 March 2028

Umwelt Bundesamt

Certificate:
0000038499_02 / 02 March 2023

TÜVRheinland®
Precisely Right.

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system					
Manufacturer			SICK Engineering GmbH		
Name of measuring system			FLOWSIC 100		
Serial number of the candidates			06248850 / 06248851 / 07068737 / 07068738		
Measuring principle			Ultrasonic		
Test report			936/21220596/A		
Test laboratory			TÜV Rheinland		
Date of report			2012-09-28		
Measured component			Velocity		
Certification range			0 - 20 m/s		

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.119	m/s	0.014	$(m/s)^2$
Lack of fit	u_{lof}	0.173	m/s	0.030	$(m/s)^2$
Zero drift from field test	$u_{d,z}$	0.092	m/s	0.008	$(m/s)^2$
Span drift from field test	$u_{d,s}$	0.092	m/s	0.008	$(m/s)^2$
Influence of ambient temperature at span	u_t	0.000	m/s	0.000	$(m/s)^2$
Influence of supply voltage	u_v	0.036	m/s	0.001	$(m/s)^2$
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162	m/s	0.026	$(m/s)^2$

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.30	m/s
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.58	m/s

Relative total expanded uncertainty	**U in % of the range 20 m/s**	**2.9**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the range 20 m/s**	**10.0 ****
Requirement of EN 15267-3	U in % of the range 20 m/s	7.5

** EU Directives 2001/80/EG and 2000/76/EG do not define requirements for this component.
A value of 10.0% was used for this.