

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000036945_04

Certified AMS: DUSTHUNTER SP100 for Dust

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)
and EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 9 pages).
The present certificate replaces certificate 0000036945_03 of 07 September 2020.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance


www.tuv.com
ID 0000036945

Publication in the German Federal Gazette
(BAnz.) of 03 May 2021

This certificate will expire on:
02 May 2026

German Federal Environment Agency
Dessau, 02 June 2021

TÜV Rheinland Energy GmbH
Cologne, 01 June 2021



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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.

Test report: 936/21246256/C of 17 September 2020
Initial certification: 20 July 2012
Expiry date: 02 May 2026
Publication: BAnz AT 03.05.2021 B9, chapter I Number 1.3

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), 27th BImSchV, 30th BImSchV and TA Luft. The measured ranges have been selected so as to ensure 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 sixteen-month field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of -40 °C 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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value 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.

Basis of the certification

This certification is based on:

- Test report 936/21246256/C of 17 September 2020 of TÜV Rheinland Energy 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 03.05.2021 B9, chapter I Number 1.3,
Announcement by UBA dated 31 March 2021:

AMS designation:

DUSTHUNTER SP100 for Dust

Manufacturer:

SICK Engineering GmbH, Ottendorf Okrilla

Field of application:

For measurements at plants requiring official approval and
plants according to 27th BImSchV

Measuring ranges during performance testing:

| Component | Certification range | Supplementary measuring ranges | Unit |
|-----------|---------------------|---|-------------------|
| Dust | 0 – 7.5 | 0 – 10 / 0 – 15 / 0 – 50 / 0 – 100 / 0 – 200 / 0 – 500 | mg/m ³ |

Software versions:

Sensor (Standard and Ex): 01.08.00
MCU: 01.12.05

Restriction:

During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient R^2 of the calibration function was not fulfilled.

Notes:

1. The maintenance interval is six months.
2. The dust concentration is determined in wet flue gas under operational conditions.
3. Certification also covers the Ex version of the instrument.
4. A probe of 735 mm length was used for testing. Certification also covers shorter probes.
5. Supplementary testing as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 1.5) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter I number 1.2).

Test report:

TÜV Rheinland Energy GmbH, Cologne
Report No.: 936/21246256/C of 17 September 2020

Certified product

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

The measuring system uses scattered light as its measuring principle (forward scattering). The measured scattered light intensity [SI] is proportional to the dust concentration [c]. However, since the scattered light intensity depends not only on the number and size of the particles but also on their optical properties, the measuring system must be calibrated through gravimetric parallel measurements in order to guarantee an exact measurement of dust concentrations. The determined calibration coefficients can be entered directly into the measuring system according to the following formula:

$$c = cc2 \cdot SI^2 + cc1 \cdot SI + cc0$$

(Default configuration ex-works: $cc2 = 0$, $cc1 = 1$, $cc0 = 0$).

The tested DUSTHUNTER SP100 measuring system comprises the following parts:

- DHSP-T sender/receiver unit
- signal cable for connecting the sender/receiver unit to the control unit (lengths: 5 m, 10 m)
- flange with tube
- MCU control unit
for the control, evaluation and output of data provided by the sender/receiver unit(s) connected via a RS485 interface
 - MCU-P with integrated purge air supply for internal duct pressure of -50 ... +2 mbar
 - MCU-N without integrated purge air supply (external purge air unit required)
- Optional external purge air unit, for internal duct pressure of -50 ... +30 mbar

Communication between sender/receiver unit and MCU

By default, every sender/receiver unit is connected via signal cable to an individual control unit. Nevertheless, more than one sender/receiver unit can be optionally connected to a single MCU-N control unit. In this case, every sender/receiver unit must be supplied with purge air separately.

Sender/Receiver Unit

The sender/receiver unit comprises two main modules:

- electronic unit

It contains the optical and electronic modules for sending and receiving the light beam. It also holds the modules for processing and evaluating signals.

- measuring probe

The measuring probe is available in various designs, materials and nominal lengths, as well as for different gas temperature ranges. The type used defines the device version.

Data transfer to the control unit, as well as voltage supply from it (24V DC) is carried out with a 7 pole cable with plug-type connector. A RS485 interface is available for service purposes. A purge air nozzle provides clean air for cooling the probe and avoiding contamination of the optical surfaces.

The sender/receiver unit is mounted to the duct by a flange with tube.

The measuring probe is available in various designs, nominal lengths, materials and for various gas temperature ranges. The probe defines the instrument version.

Remarks:

- Sender/Receiver units with nominal lengths greater than 735 mm are intended solely for installation at thick-walled or double-walled ducts.
- The distance between the inner duct wall and the measuring opening shall not exceed 450 mm.

Versions

The different versions of the sender/receiver unit are labelled with a type code:

Sender/Receiver unit: DHSP-TXXX
 Maximum permissible gas temperature: ————↑↑↑↑
 - 2: 220 °C
 - 4: 400 °C
 Material: ————|
 Nominal length of measuring probe: ————|

MCU Control Unit

The control unit has the following functions:

- Control of data traffic and processing of data from the unit(s) connected via RS485 interface
- Signal output via analogue output (measured value) and relay outputs (instrument status)
- Signal input via analogue and digital inputs
- Voltage supply to the connected units using a 24 V switching power supply with wide-range input
- Communication with supervisory control systems via optional modules

The control unit can be connected to external devices via a USB port. This way, the setup of plant and instrument parameters can be easily and comfortably carried out via a laptop running the operating software. The parameters are saved efficiently in the MCU in the event of a power outage. By default, the control unit is housed in a sheet steel enclosure.

Standard interfaces

Analogue outputs:

3 outputs 0/2/4–22 mA (galvanically isolated, active) for output of: scattered light intensity, dust concentration (uncalibrated), dust concentration (calibrated), 12 bit resolution

Relay outputs:

5 changeover contacts (120 V, AC, 1A, 30 V DC 2A) for output of status signals:

- Operation/Malfunction • Maintenance • Function check • Service requirement • Limit value

Analogue inputs:

2 inputs 0 ... 20 mA (standard; without galvanic separation) or 0 ... 5/10 V, 10 bit resolution

Digital inputs:

4 inputs for connecting potential-free contacts, e.g. for connecting a maintenance switch or triggering control cycle

Communication:

- USB 1.1 and RS232 (on grips) for measured value enquiry, parameterisation and software update
- RS485 for sensor connection

Versions:

- MCU-N control unit without integrated purge air supply
- MCU-P control unit with integrated purge air supply

This version also contains a purge air blower, an air filter, and purge air nozzles used for connecting the air hose to the sender/receiver unit. The purge air hose is a separate component of the measuring system.

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 DUSTHUNTER SP100 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic approval

Prüfbericht: 936/21208609/B vom 20. Oktober 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
Veröffentlichung: BAnz. 11. März 2009, Nr. 38, S. 899, Kapitel I Nummer 1.2
UBA Bekanntmachung vom 19. Februar 2009

Notifications

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 12
UBA announcement dated 10 January 2011
(New software version)

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. 0000036945: 20 August 2012
Expiry date of the certificate: 19 July 2017
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 20 March 2012
Publication: BAnz AT 20.07.2012 B11, chapter IV notification 18
UBA announcement dated 06 July 2012

Supplementary testing according to EN 15267

Certificate no. 0000036945_01: 22 March 2013
Expiry date of the certificate: 19 July 2017
Test Report: 936/21219384/B dated 27 September 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 05.03.2013 B10, chapter I number 1.5
UBA announcement dated 12 February 2013

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 22 March 2013
Publication: BAnz AT 23.07.2013 B4, chapter V notification 11
UBA announcement dated 03 July 2013
(New software version)

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 03 July 2013
(SOPAS ET software version)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 24 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 11
UBA announcement dated 22 July 2015
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 25 April 2016
Publication: BAnz AT 01.08.2016 B11, chapter V notification 12
UBA announcement dated 14 July 2016
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 13 October 2016
Publication: BAnz AT 15.03.2017 B6, chapter V notification 22
UBA announcement dated 22 February 2017
(New software version)

Renewal of the certificate

Certificate No. 0000036945_02: 18 July 2017
Expiry date of the certificate: 19 July 2022

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 28 September 2017
Publication: BAnz AT 26.03.2018 B8, chapter V notification 44
UBA announcement dated 21 February 2018
(software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 28 February 2019
Publication: BAnz AT 22.07.2019 B8, chapter V notification 16
UBA announcement dated 28 June 2019
(Design and software changes)

Supplementary testing according to EN 15267

Certificate No. 0000036945_03 07 September 2020
Expiry date of the certificate: 30 July 2025
Test report 936/21246256/B of 10 March 2020
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 31.07.2020 B10, chapter I number 1.2
Announcement by UBA dated 27 May 2020

Certificate No. 0000036945_04: 02 June 2021
Expiry date of the certificate: 02 May 2026
Test report 936/21246256/C of 17 September 2020
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 03.05.2021 B9, chapter I Number 1.3
Announcement by UBA dated 31 March 2021

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

Measuring system

| | |
|-----------------------------------|----------------------------|
| Manufacturer | SICK Engineering GmbH |
| AMS designation | DUSTHUNTER SP100 |
| Serial number of units under test | 547 / 428 |
| Measuring principle | Scattering light (forward) |

Test report

| | |
|-----------------|---------------|
| Test laboratory | TÜV Rheinland |
| Date of report | 2020-09-17 |

Measured component

| | | |
|---------------------|------|---------------------------|
| Certification range | Dust | 0 - 7.5 mg/m ³ |
|---------------------|------|---------------------------|

Calculation of the combined standard uncertainty

Tested parameter

| | | | u ² | |
|--|------------------|--------------------------|----------------|-----------------------------------|
| Standard deviation from paired measurements under field conditions * | u _D | 0.070 mg/m ³ | 0.005 | (mg/m ³) ² |
| Lack of fit | u _{inf} | 0.040 mg/m ³ | 0.002 | (mg/m ³) ² |
| Zero drift from field test | u _{d,z} | -0.017 mg/m ³ | 0.000 | (mg/m ³) ² |
| Span drift from field test | u _{d,s} | -0.104 mg/m ³ | 0.011 | (mg/m ³) ² |
| Influence of ambient temperature at span | u _t | 0.121 mg/m ³ | 0.015 | (mg/m ³) ² |
| Influence of supply voltage | u _v | 0.015 mg/m ³ | 0.000 | (mg/m ³) ² |
| Uncertainty of reference material at 70% of certification range | u _{rm} | 0.061 mg/m ³ | 0.004 | (mg/m ³) ² |

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

| | | | |
|---|-----------------------------------|------|-------------------|
| Combined standard uncertainty (u _C) | $u_c = \sqrt{\sum (u_{max,j})^2}$ | 0.19 | mg/m ³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 0.37 | mg/m ³ |

Relative total expanded uncertainty

| | | |
|----------------------------------|---|-------------|
| Requirement of 2010/75/EU | U in % of the ELV 5 mg/m³ | 7.5 |
| Requirement of EN 15267-3 | U in % of the ELV 5 mg/m³ | 30.0 |
| | U in % of the ELV 5 mg/m³ | 22.5 |

CONFIRMATION

of Product Conformity (QAL1)

Approved AMS: DUSTHUNTER SP100 for Dust

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
according to the standards**


**EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007)
and EN 14181 (2014).**

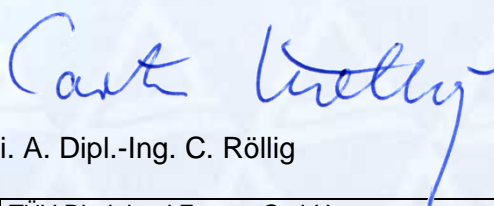
The approval of the measuring equipment subject to the above mentioned conditions
was authorized by the German relevant body.

This confirmation is valid up to the publication of the certificate,
but no longer than 6 months from the date of issue
(this document contains 7 pages).

The confirmation is valid until: 11 August 2021

TÜV Rheinland Energy GmbH
Cologne, 12 February 2021


i. V. Dipl.-Ing. G. Baum


i. A. Dipl.-Ing. C. Röllig

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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.

Confirmation:
12 February 2021



Confirmation:
12 February 2021

Test report: 936/21246256/C of 17 September 2020
First certification: 20 July 2012
Expiry date: 11 August 2021

Tested application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), 27th BImSchV, 30th BImSchV and TA Luft. The measured ranges have been selected so as to ensure 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 sixteen-month field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of -40 °C 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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value 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.

Basis of the confirmation

This certification is based on:

- Test report 936/21246256/C of 17 September 2020 of TÜV Rheinland Energy GmbH
- Notice of suitability as given by the competent body
- The ongoing surveillance of the product and the manufacturing process
- Expert testing and approved by an independent body

Confirmation:
12 February 2021

AMS designation:

DUSTHUNTER SP100 for Dust

Manufacturer:

SICK Engineering GmbH, Ottendorf Okrilla

Field of application:

For measurements at plants requiring official approval and plants according to 27th BImSchV

Measuring ranges during performance testing:

| Component | Certification range | Supplementary measuring ranges | Unit |
|-----------|---------------------|--|-------------------|
| Dust | 0 – 7.5 | 0 – 10/ 0 – 15/ 0 – 50/ 0 – 100/ 0 – 200/ 0 – 500 | mg/m ³ |

Software versions:

Sensor (Standard and Ex): 01.08.00

MCU: 01.12.05

Restriction:

During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient R^2 of the calibration function was not fulfilled.

Notes:

1. The maintenance interval is six months.
2. The dust concentration is determined in wet flue gas under operational conditions.
3. Certification also covers the Ex version of the instrument.
4. A probe of 735 mm length was used for testing. Certification also covers shorter probes.
5. Supplementary testing as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 1.5) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter I, number 1.2).

Test report:

TÜV Rheinland Energy GmbH, Cologne

Report No.: 936/21246256/C of 17 September 2020

Tested product

This confirmation applies to automated measurement systems conforming to the following description:

The measuring system uses scattered light as its measuring principle (forward scattering). The measured scattered light intensity [SI] is proportional to the dust concentration [c]. However, since the scattered light intensity depends not only on the number and size of the particles but also on their optical properties, the measuring system must be calibrated through gravimetric parallel measurements in order to guarantee an exact measurement of dust concentrations. The determined calibration coefficients can be entered directly into the measuring system according to the following formula:

$$c = cc2 \cdot SI^2 + cc1 \cdot SI + cc0$$

(Default configuration ex-works: $cc2 = 0$, $cc1 = 1$, $cc0 = 0$).

The tested DUSTHUNTER SP100 measuring system comprises the following parts:

- DHSP-T sender/receiver unit
- signal cable for connecting the sender/receiver unit to the control unit (lengths: 5 m, 10 m)
- flange with tube
- MCU control unit
for the control, evaluation and output of data provided by the sender/receiver unit(s) connected via a RS485 interface
 - MCU-P with integrated purge air supply for internal duct pressure of -50 ... +2 mbar
 - MCU-N without integrated purge air supply (external purge air unit required)
- Optional external purge air unit, for internal duct pressure of -50 ... +30 mbar

Communication between sender/receiver unit and MCU

By default, every sender/receiver unit is connected via signal cable to an individual control unit. Nevertheless, more than one sender/receiver unit can be optionally connected to a single MCU-N control unit. In this case, every sender/receiver unit must be supplied with purge air separately.

Sender/Receiver Unit

The sender/receiver unit comprises two main modules:

- electronic unit

It contains the optical and electronic modules for sending and receiving the light beam. It also holds the modules for processing and evaluating signals.

- measuring probe

The measuring probe is available in various designs, materials and nominal lengths, as well as for different gas temperature ranges. The type used defines the device version.

Data transfer to the control unit, as well as voltage supply from it (24V DC) is carried out with a 7 pole cable with plug-type connector. A RS485 interface is available for service purposes. A purge air nozzle provides clean air for cooling the probe and avoiding contamination of the optical surfaces.

The sender/receiver unit is mounted to the duct by a flange with tube.

Confirmation:
12 February 2021

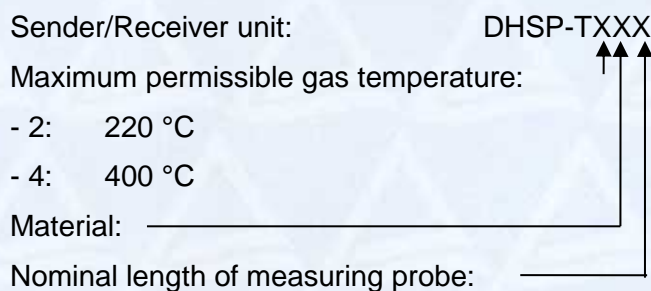
The measuring probe is available in various designs, nominal lengths, materials and for various gas temperature ranges. The probe defines the instrument version.

Remarks:

- Sender/Receiver units with nominal lengths greater than 735 mm are intended solely for installation at thick-walled or double-walled ducts.
- The distance between the inner duct wall and the measuring opening shall not exceed 450 mm.

Versions

The different versions of the sender/receiver unit are labelled with a type code:



MCU Control Unit

The control unit has the following functions:

- Control of data traffic and processing of data from the unit(s) connected via RS485 interface
- Signal output via analogue output (measured value) and relay outputs (instrument status)
- Signal input via analogue and digital inputs
- Voltage supply to the connected units using a 24 V switching power supply with wide-range input
- Communication with supervisory control systems via optional modules

The control unit can be connected to external devices via a USB port. This way, the setup of plant and instrument parameters can be easily and comfortably carried out via a laptop running the operating software. The parameters are saved efficiently in the MCU in the event of a power outage. By default, the control unit is housed in a sheet steel enclosure.

Standard interfaces

Analogue outputs:

3 outputs 0/2/4–22 mA (galvanically isolated, active) for output of: scattered light intensity, dust concentration (uncalibrated), dust concentration (calibrated), 12 bit resolution

Relay outputs:

5 changeover contacts (120 V, AC, 1A, 30 V DC 2A) for output of status signals:

- Operation/Malfunction • Maintenance • Function check • Service requirement • Limit value

Analogue inputs:

2 inputs 0 ... 2 inputs 0 ... 20 mA (standard; without galvanic separation) or 0 ... 5/10 V, 10 bit resolution

Digital inputs:

4 inputs for connecting potential-free contacts, e.g. for connecting a maintenance switch or triggering control cycle

Confirmation:
12 February 2021

Communication:

- USB 1.1 and RS232 (on grips) for measured value enquiry, parameterisation and software update
- RS485 for sensor connection

Versions:

- MCU-N control unit without integrated purge air supply
- MCU-P control unit with integrated purge air supply

This version also contains a purge air blower, an air filter, and purge air nozzles used for connecting the air hose to the sender/receiver unit. The purge air hose is a separate component of the measuring system.