

Dynamic Dilution System





Dynamic Dilution System DDS 560 for variable flow rates and adjustable dilution.

The DDS 562 is an aerosol conditioning system that serves for precise, free-adjustable and defined reduction of the particle number concentrations. Moreover, the dilution system can be passively operated by various aerosol sample flow rates.

Aerosol conditioning by dilution is one basic measure for accurate analyses of aerosols. For example, numerous aerosol-analytical instruments are limited to specific concentration levels. Too high concentrations can cause a false estimate of aerosol characteristics due to the re-entrainment of deposited particles, coincidence effects within optical particle counters or insufficient bipolar neutralisation during differential mobility analyses.

Applications

- calibration of aerosol-analytical instruments
- indoor aerosol analyses
- occupational safety measurements
- fundamental aerosol research

Features

- free adjustable dilution factor over wide range (i.e., one decade)
- compatible with various aerosol-analytical instruments (i.e., variable flow rate)
- automatic readjustment of setting value of dilution
- stand-alone or remote-controlled operation with parameter monitoring

Principle of operation

The DDS 560 principal of operation is based on a splitting of the aerosol sample flow rate into a bypass and a capillary flow rate. All particles within the bypass flow rate are removed by a HEPA filter. The capillary flow is substantially lower than the bypass flow. Both the capillary flow rate and the total flow rate are determined via pressure drop measurement.



Functional principle of the Dynamic Dilution System DDS 560.

The control valve in the bypass flow rate path serves for adjusting the bypass flow rate and therefore the dilution ratio. After the capillary, all flow rates are merged.

DDS 560 | 11 2024

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PARTICLE UNDER CONTROL

Specifications

Details

The nominal operation range of the DDS 560 is shown in the diagram below (other specification are possible on request). Accordingly, the dilution range depends on the aerosol sample flow rate.



Nominal operation range of the Dynamic Dilution System DDS 560.

The adjustment of the required flow rate can be set via both the touch screen on the device and the serial interface.



User interface of the DDS 560: tab for operation with hold (left), tab for operation without hold (right), device data (middle).

During operation, the touch screen shows the set value and the actual value (measured value). The device can be operated with and without dilution control via the hold button.

Accessories

- antistatic hose lines
- spare HEPA filter

References

- Göhler et al. (2024) Performance of intraoperative surgical smoke management technologies for laparoscopic surgery: A comparative in-vivo pig study. J. Aerosol Sci., 177, 106309, doi: 10.1016/j.jaerosci.2023.106309
- Tran et al. (2020) Determining the cutoff diameter and counting efficiency of optical particle counters with an aerodynamic aerosol classifier and an inkjet aerosol generator. Aerosol Sci. Technol., 54, 1335-1344. doi: 10.1080/02786826.2020.1777252
- Kretzschmar et al. (2020) Modulation of silica layer properties by varying the granulometric state of tetraethyl orthosilicate precursor aerosols during combustion chemical vapour deposition (CCVD). Aerosol Sci. Technol., 54, 10, 1124-1134. doi: 10.1080/02786826.2020.1762845

Technical specifications

setting parameter	dilution factor
setting range dilution (depending on flow rate)	5 200 (@ 0,5 L/min) 10 370 (@ 1,0 L/min) 30 190 (@ 3,0 L/min)
setting resolution dilution	stepwise by 1 or 10
set up time	< 10 s
operating flow rate range	0,5 3,0 L/min (others on request)
operating medium	air (others on request)
hose connector	8 mm (outer diameter)
communication interface	RS232 (M9 IP67, 5 pole)
power supply	24 V DC (adaptor)
power consumption	< 25 W
noise emission	not relevant
dimensions (w × h × d)	300 × 200 × 130 mm
weight	2,5 kg

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QMS certified according to DIN EN ISO 9001.



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