KÁLMÁN SYSTEM LTD H-1125 BUDAPEST,TRENCSÉNI U.16.

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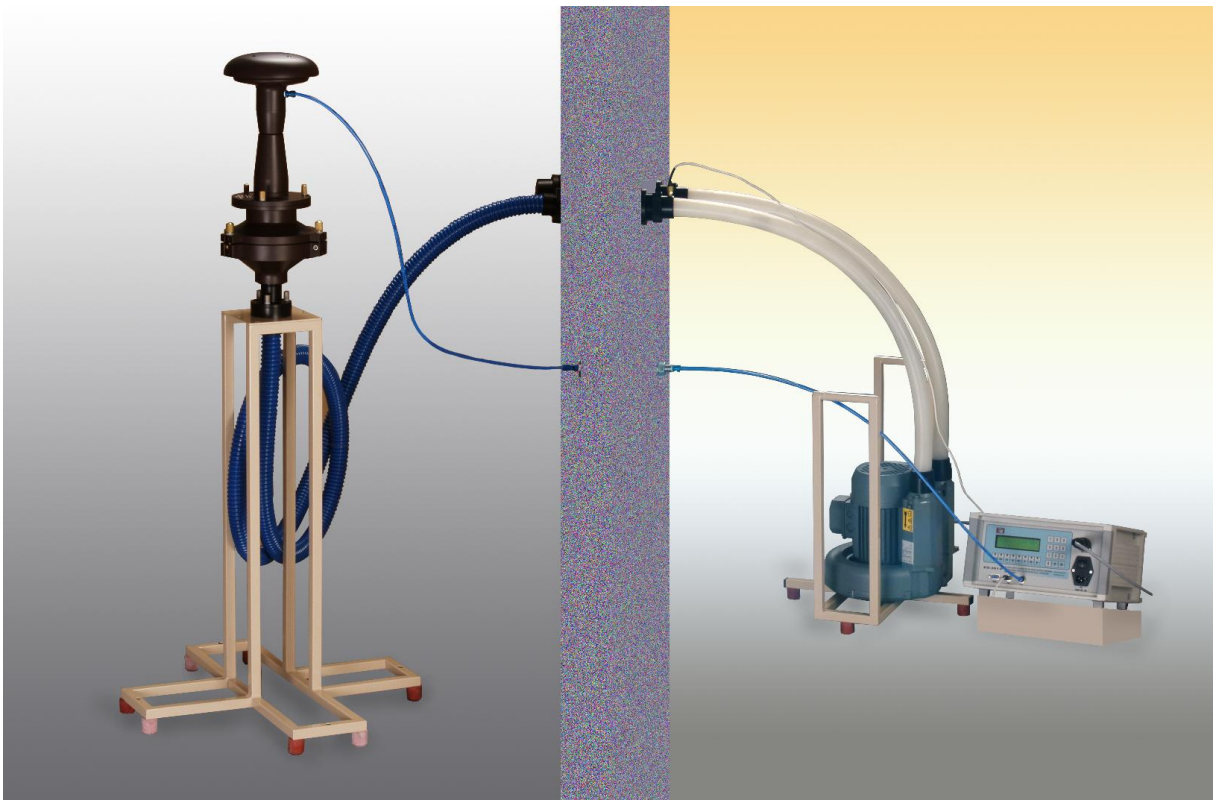
24 HOUR CONTINUOUS OPERATION HIGH VOLUME AEROSOL AND AIRBORNE DUST SAMPLER FOR IMMISSION, WORKPLACE AND ENVIRONMENTAL AIR POLLUTION MONITORING

MODEL KS - 301-FM

STATIONARY / MOBILE VERSION



FEATURES

- Weather resistant, stationary/mobile version.
- No need for base construction, container or special power supply.
- Sampling head and filter housing can be positioned anywhere within 6m radius.
- Volume flow rate meter installed in the sampling head head always measures the amount of the sucked air.
- The PM10/2,5/1 impactor - corresponding to 10 and 2,5 and 1 [µm] particle size "cut-off" - is a teflon-coated, small-size, often used and extensively tested impactor.
- The double stage impactor of the sampler makes it possible to easily change from PM10 impactor, designed for immission measurements, to PM2,5 impactor.
- No moving components in the sampling devive, except the pump engine.
- Energy saving, automatic volume flow rate control.
- All preset and measured data are stored, can be transfered to PC and and can be printed.
- Precision-tested Venturi volume flow rate meter, noise level below 56 [dB].
- In case of power cut measurement data are stored for 120 hours by the control unit.

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1. Purpose

The dust sampler type **KS-301-FM** is applicable for the continuous – 24 hours or longer – fractionated (one or two step) sampling of airborne solid particles, aerosols. Special features:

- Connection to the sampling head and filter housing with 6m long flexible tubing.
- Wall bridging solutions for a wide wall thickness range.
- Lateral channel pump (not requiring base construction), measuring and control unit.

The sampler – with the built-in chamber-system, ring-shaped, gap sampling head double impactor – can filter out in two fractions the aerosol, solid particulate content of appr. 700 [m^3] air daily.

This large amount of air gives a concentrated sample sufficient for the high accuracy analysis of the airborne pollutants. This way – after 24 h sampling and with adequate analytical capabilities – the carcinogenic, heavy metal, radioactive and other potentially harmful, toxic components attached to the aerosols, released into the inhabited areas by the industrial technologies, can be termined. The device is equipped with a PM10 type -10 [µm] cut-off size – pre-separator. In case of special request 2,5 or PM10/2,5/1 [µm] cut-off sizepre-separator is also provided. For the purpose of increasing measurement accuracy a thermometer was built in to the sampling head, and a barometric pressure sensor was attached to the electronic unit. All the measuring data are stored by the controlling electronic unit which can be connected to a PC communication port. The 24-hour measurement data are stored in files and can be displayed or printed. The PC connection and the communication software can be ordered optionally. The measuring method complies with the requirements of the Hungarian Standard EN MSZ 21454/2 and with the recommendations of the corresponding ISO standards. The sampling head and filter housing of the sampler type **KS-301-FM** correspond to the outdoor design, whereas the measuring and control unit and the lateral channel pump correspond to the indoor design specification. **The units paced indoors shall be protected from dripping water and radiating heat.**

2. Technical description

The equipment shown in **Figure. 1.** is a high volume flow rate airborne dust sampler with 24h continuous operating capability, consisting of the following main parts:

- Sampling head with built-in volume flow rate meter.
- Double impactor and filter housing with connection annex.
- Supporting structure.
- Suction tube with annex, wall bridging construction and thermometer probe.
- Lateral channel pump built together with engine, cables, electrical appliances, supporting structure.
- Measuring and control unit with connecting cables for sensors.
- Exhaust construction.

Taken from the external atmosphere through the sampling head /1/ – constructed in accordance with the EPA recommendations, using diverting columns to diminish the influence of wind velocity and direction fluctuation - the air is travelling through the short straight tube, the Venturi volume flow rate meter /2/ and the larger particles deposit on the filter plates of the double impactor /3/. The smaller particles are retained by the planar filter /5/ of Ø150 [mm]. placed in the filter housing /4/. The high purity air is discharged into the external atmosphere through the extension tube /6/, the lateral channel pump /7/ and the exhaust tube /8/.

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Figure 1.

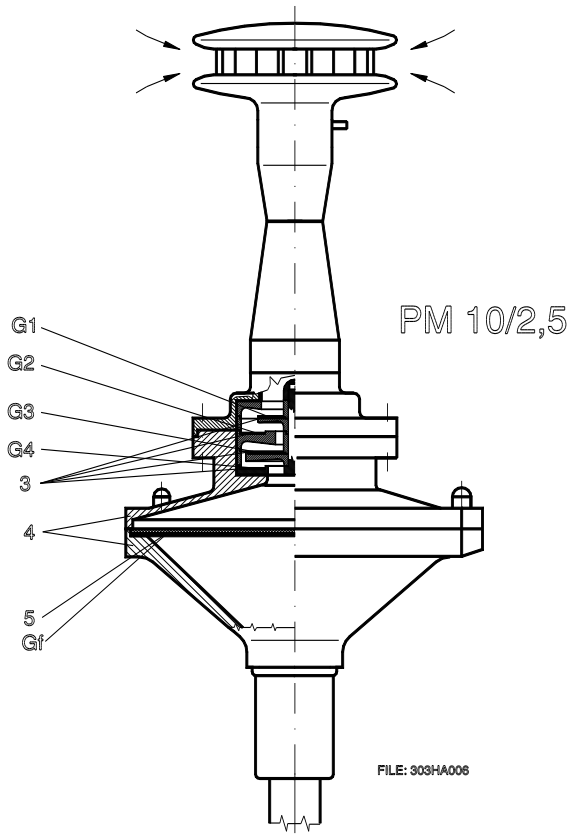

Figure 2.

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On the basis of the electronic signals from the Venturi meter and other temperature and pressure meters – signals that are proportional to the temperature and pressure of the sampled air - the volume flow rate measuring and evaluation unit /9/ determines the amount of the sampled air taken during a unit of time [m³/h], during the whole sampling period [m³] and the duration of the sampling. The slow change in the volume flow rate due to the saturation of the filter is automatically compensated and corrected to the required value by frequency controller.

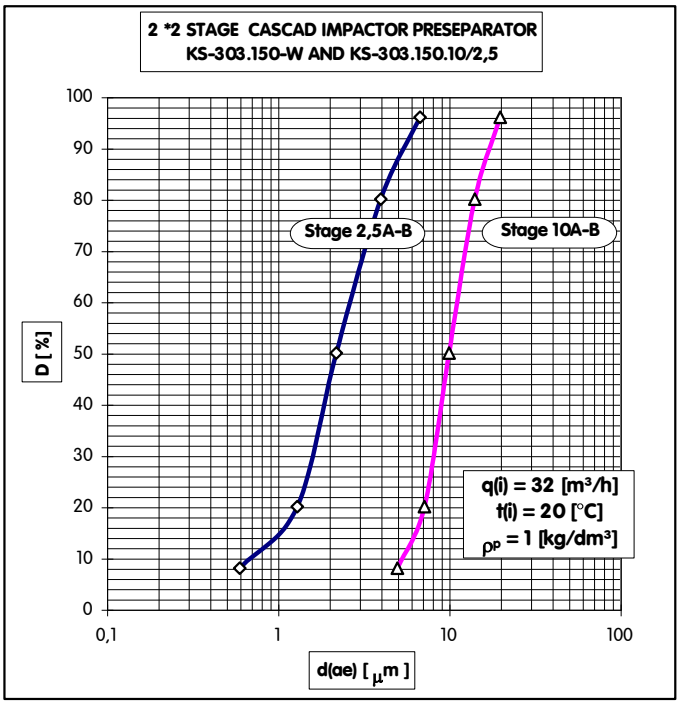

Figure 3.

3. Technical data

Optimum flow rate with impactor	q_N = 30 [m³/h]
Minimum flow rate	q_{min} = 22 [m³/h]
Maximum flow rate with impactor	q_{max} = 40 [m³/h]
Pre-separator impactor	d(ae) = 10 [µm], or d(ae) = 2,5 [µm]
Accuracy of the volume flow rate meter	2 ± [%]
Data storage capacity in case of power shortage	Min. 120 hours
Security	Password for measurement start/stop
Data storage and printing	Softvare
Sampling height	1350 [mm]
Voltage and frequency	230 [V] AC, 50 [Hz]
Power consumption	750 [VA]
Mass of the lateral channel pump with support frame 17 [kg]	
Engine rotation speed regulation	electronic
Controlling of adjusted flow rate	automatic
Space requirement	2x cca. 500 *600 [mm]