

# MODEL KS-407

## PORTABLE, AUTOMATIC, ISOKINETIC AEROSOL / DUST SAMPLER MEASUREMENT CIRCUIT

### IN – STACK VERSION



MADE BY KÁLMÁN SYSTEM LTD. H-1125 Budapest, Trencsényi u. 16.

### SPECIAL FEATURES

- ✓ The material of thimble filter to be inserted into the indoor filter housing: quartz or glass.
- ✓ Small size inner-space probe head, can be inserted through an opening of Ø 72 [mm] in size.
- ✓ Extremely high dust storage capacity.
- ✓ Possibility of controlling the measurement from a distance of 30-50 [m] from the place of sampling
- ✓ Velocity measurement of the main gas flow simultaneously with the sampling.
- ✓ Probe shank integrated with static and total pressure probes.
- ✓ The measurement and the method confirm with the EN ISO 9096 standard and meet many international specifications.
- ✓ Automatic isokinetic measurement control by Windows-based AR-IZO 407 software.

## 1. Purpose

The **KS-400** type samplers are the automatic versions of the KS-100 type portable, emission type, partial gas flow measuring circuits. The **KS-400** family of samplers can be used for the determination of concentration of solid particles in flowing air or gas by means of isokinetic sampling.

The **KS-407** type portable measurement circuit of the partial gas flow emission sampler is suitable - in automatic operation mode - for isokinetic, continuously periodical, total sampling of solid particles in circulating air or gas. The **KS-407** type probe has been designed with the utmost regard to the recommendations of the relevant **EN ISO 9096** and **EN 13284** standards.

The measurement of the partial gas stream is carried out by an annular chamber Venturi meter, which practically does not require maintenance; not like the often failing gasometer (due to the high pressure difference, the damaging of the filter and condensation).

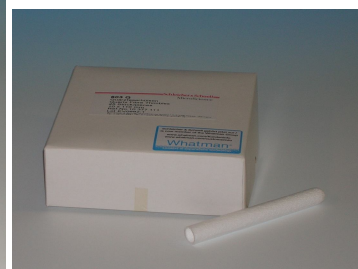
The sampling measurement circuit - **KS-407** - is built with respect to the latest environmental protection regulations and on the basis of user requirements. All details of the isokinetic sampling is controlled, supervised and documented by PC. The control tests were carried out in our own development laboratory and at the Department of Fluid Mechanics of the Budapest University of Technology and Economics and in the Institute of Environmental Management.



**KS-407 probe**



**KS-407 filter holder**



**Thimble filter Ø10x110 [mm]**

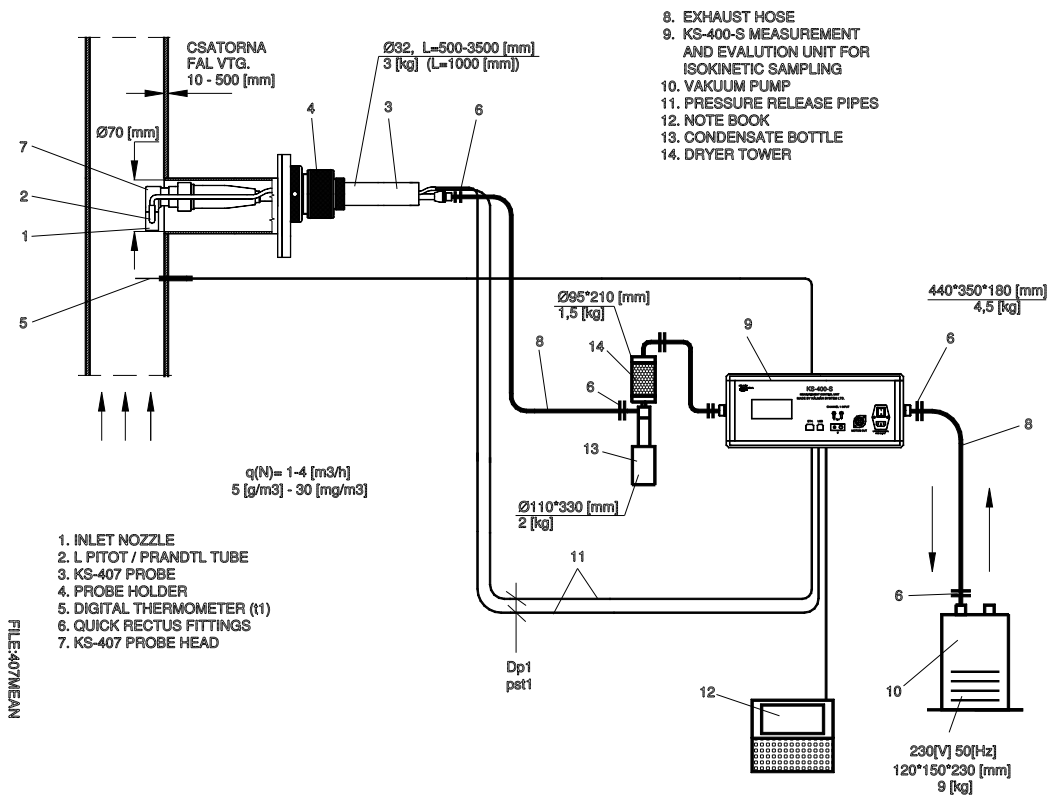
The type **KS-407** measurement circuit is also suitable for the gravimetric determination of concentration of solid particles and dust in flowing gases and air, with simultaneous measurement and continuously periodical supervision of the temporal changes of the flow rate of the main gas flow and of the sampled medium - gas or air.

## 2. Short technical description

Due to the pressure difference generated by the vacuum pump the sampled gas or the partial gas flow enters the sampler through a short suction nozzle, passes through the filter in the probe head, travels through the sampling pipe, the exhaust hose, the moisture separator, the drying tower and the Venturi meter, and through the outlet of the vacuum pump it runs into the outer environment. Practically the total dust, solid content of the sampled gas settles in the filter.

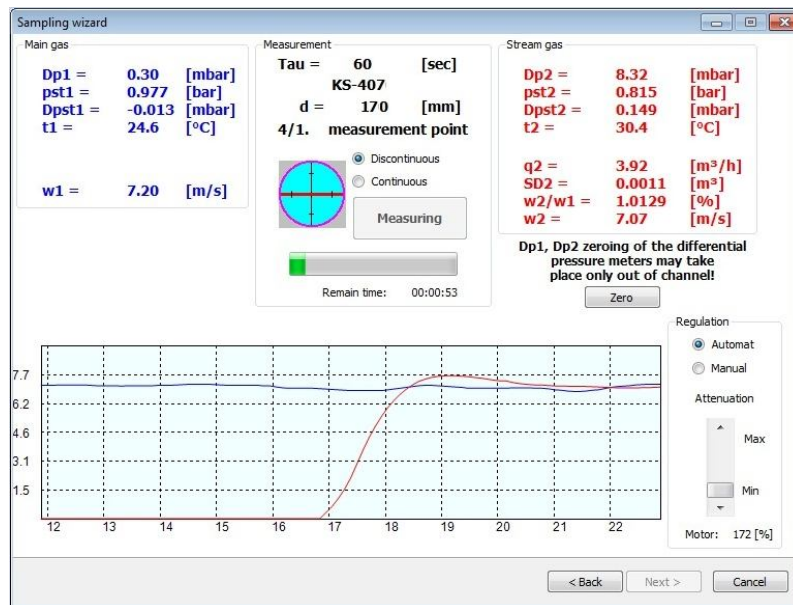
The dynamic pressure **Dp1** in the vicinity of the nozzle (a quantity proportional to the air/gas flow velocity **w1**) is transmitted to the **KS-400-S control unit** by the total and static pressure exhaust probes. The adjustment of the velocity of the air **w1≈w2** in the suction nozzle – as a requirement of isokinetic sampling – is solved automatically by a Danfoss frequency converter which provides a signal proportional to the number of revolutions on the basis of the reference data **Dp1, pst1, fl**.

Within the cladding tube beside the pipe of the partial gas flow there are two pressure exhaust probes – static and dynamic pressure – and (as an option) a thermometer probe cladding tube. Depending on the size of the measuring gap the sampling pipe can be ordered in both bended and straight form.

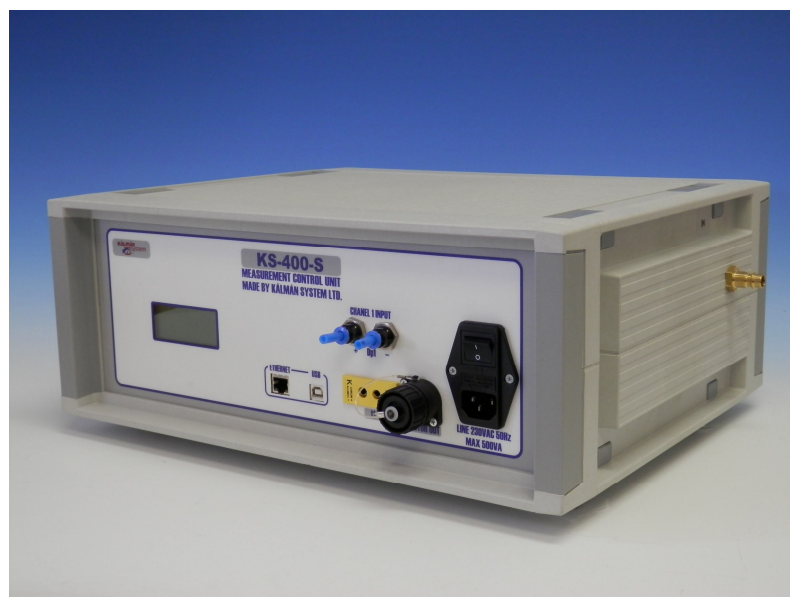


**KS-407 Measuring circuit**

The measurement control software AR-IZO 407 runs on Windows graphic platform with – for the purpose of easy-to-use handling – graphical buttons, pull-down menus and a help system supporting the control of the sampling procedure. The measured data can be saved, earlier measurements can be reloaded, measurement reports can be generated with the program.



**Software for KS-407 (Sampling control)**



**KS-400-S Control Unit**

Calibration of the sampling probe was – according to ISO 9096 ( D ) - carried out in the laboratory of the Fluid Mechanics Department of the Budapest University of Technology and Economics with the help of the vertical, recirculation type, open test section, GÖTTINGEN type wind tunnel which is used exactly for such calibration processes.



### 3. Technical data

- Nominal flow rate thimble filter: 2,7 [m<sup>3</sup>/h]
- Measurement range: 1,0 to 4,5 [m<sup>3</sup>/h]
- Measurement range: 4 to 35 [m/s] standard
- Inlet nozzles: Ø4,5; 5,6; 7,6; 10,7; 14; 17 [mm]
- Thimble filter: Ø 10×110 [mm],
- Power supply KS-400-S 230 V ± 10 %
- Max. humidity 99 [%]
- Heated probe optional **KS-407-H model**
- Temperature of main gas flow t1 = 0-400 [°C]
- Temperature of partial gas flow t2 = 0-100 [°C]