

KS-306.60-W

**MICROPROCESSOR CONTROLLED, CONTINUOUS OPERATION, DUST-
AEROSOL, SOLID PARTICLE SAMPLER WITH
PM_{2,5} PRESEPARATOR
PORTABLE DESIGN
EN 14907 STANDARD
KÁLMÁN SYSTEM SINCE 1976**



FEATURES

- 👍 Tested and calibrated volume flow rate meter.
- 👍 **Wide sampling measurement range.**
- 👍 High-accuracy, long-life volume flow rate meter, practically insensitive to pollution.
- 👍 **Sampling volume flow rate stabilisation, continuous regulation to the set values.**
- 👍 Sampling for Ø 60 or 50 [mm] filter, PM_{2,5} preseparator.
- 👍 **Microprocessor control, PC connection facility for data polling.**
- 👍 Protection against intervention. Data protection and storing, restarting in case of power failures.
- 👍 **Full-range LCD display for checking of the summated volume and volume flow rate.**
- 👍 Portable, lightweight design and easy handling.
- 👍 **Operation from 230 [V] mains .**

1. Purpose

The type **KS-306.60-W** sampler instrument is suitable for continuous, 24-hour or longer-duration, two-stage - PM10+endfilter- , fractionated sampling of airborne solid particles, aerosols to be found in the air. /Fig. 1./.

Together with preseparator and the instrument facilitates filtering out of approx. 70-100 [m³] airborne dust and solid particles from the air, daily.

Depending on the dust concentration - after 24 - 96 hours of sampling - with decomposition to three fractions - having an adequate analytical background - the heavy metals bound to the dust and other toxic materials causing the genetic mutations and, other materials emitted to dwelling areas by the industrial technologies can be detected.

The sampler is provided with PM_{2,5} – 2,5 [µm] cut-off size - pre-separator and back-up filter.

The intake device and the volume flow rate meter form a compact unit. To increase the measuring accuracy a temperature-measuring probe has been built-in.

The control electronics stores all measurement data and it can be interconnected with PC through USB port.

The measurement data can be displayed in file or, using the AR-COM communication software, printed.

The measurement method complies with the specifications of the **EN 14907** standards, too.

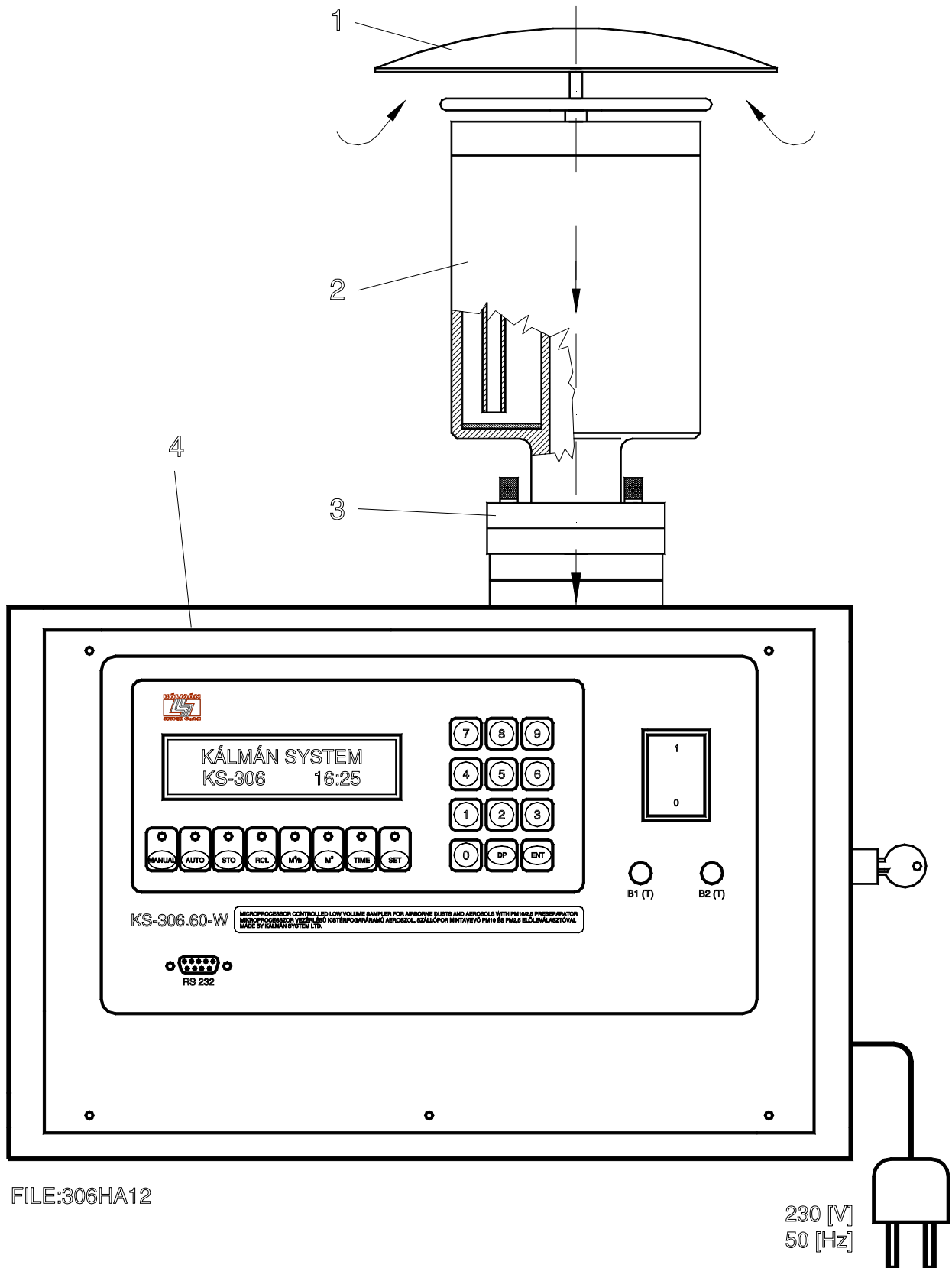
The type KS-306.60-W sampler is a portable instrument.

2. Summarising technical description, volume flow rate measurement

The so-called low volume flow rate sampler shown in **Fig. 1.** consists of the following main sub-units:

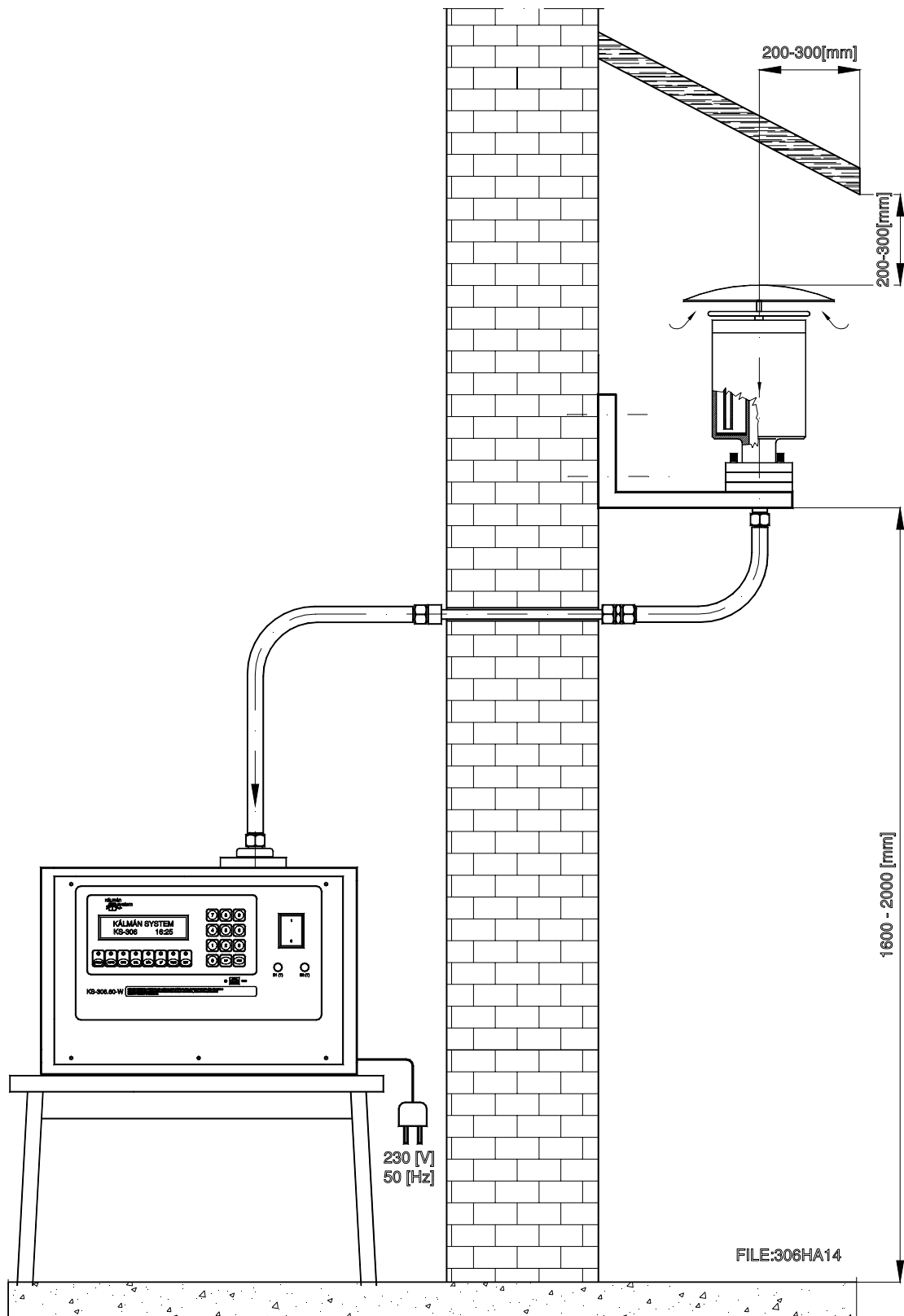
- Suction device.
- Preseparator and filter housing with connection extension.
- Measuring and control unit with thermometer and pressure signal forwarding cables and electric fittings, with covering providing protection against drip water.

From the air flowing from the outer atmosphere through the sampler intake device /1/, **Fig. 1.**, designed according to the EPA recommendations, provided with guide columns reducing the influence of the wind intensity and wind direction variations, and a volume flow rate reducing space, via a short straight tube section , the dust particles of bigger size are separating on the trapping plates of the preseparator PM_{2,5} /2/. The smaller particles are intercepted by a planar filter of 60 [mm] diameter accommodated in the filter housing /3/. The high-purity air is passed through the blow-out opening of the vacuum pump to.



FILE:306HA12

Figure 1.



the outer atmosphere. The evaluation unit /4/ of the volume flow rate meter, processing the electric signal proportional to the temperature of the intake air and the pressure signal of the Venturi meter, measures the quantity of the through-suctioned air [m³/h], the total volume through-suctioned during the sampling, in [m³] and, the duration of the sampling.

Setting of the slow flow rate change originating from clogging of the filter - to the requested value - is effected automatically by the electronic rotational speed controller. Protection of the measuring and control unit against unauthorised intervention and drip water is ensured by a corrosion-proof, lightweight structure.

From the pressure output / Dpv / of the volume flow rate meter, the volume flow rate /q/ can be calculated with use of the following equation:

$$q = kv * \sqrt{Dpv * (t + 273,16)}$$

- q - volume flow rate [m³/h]
- kv - constant admeasured by accuracy test
- Dpv - pressure output of volume flow rate meter [mbar]
- t - temperature of the intake air [°C]

According to meteorological measurement data the density variation on a given area annually is not more than 3 - 4 [%]. Since in the above equation the air density is written under radical sign, the barometric pressure of the outer atmosphere has to be measured only in case of extreme measuring conditions.

3. Technical data

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| <input checked="" type="checkbox"/> Denomination | dust-aerosol solid particle sampler |
| <input checked="" type="checkbox"/> Main functions to be fulfilled | Measurement of particulate matter in ambient air |
| <input checked="" type="checkbox"/> Field of application | 24-hour measurement of PM_{2,5} concentrations in ambient air |
| <input checked="" type="checkbox"/> Main functional requirements | Principle of method: gravimetric |
| Unattended continuous sampling for 1 week | |
| <input checked="" type="checkbox"/> Sampling head | PM_{2,5} |
| <input checked="" type="checkbox"/> Sampler head, impactor material quality | Stainless steel, Al.Mg.Si.h3, |
| <input checked="" type="checkbox"/> Sampling method | Semi-automatic |
| <input checked="" type="checkbox"/> Operating time | Continuous |
| <input checked="" type="checkbox"/> Sampling channel | Automatic or manual |
| <input checked="" type="checkbox"/> Channel change | 1-24 hours, programmable |
| <input checked="" type="checkbox"/> Material quality of the sampler | Corrosion-proof, where necessary |
| <input checked="" type="checkbox"/> Usage of the sampler | Easy access to operating parts |

<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Handling and operation <input checked="" type="checkbox"/> Transportability <input checked="" type="checkbox"/> Protection against illegal intervention <input checked="" type="checkbox"/> Data display <input checked="" type="checkbox"/> Flow rate measuring range <input checked="" type="checkbox"/> Flow rate stability <input checked="" type="checkbox"/> Power supply min. 30 hours from battery supply <input checked="" type="checkbox"/> Display of sampling data, by channel <input checked="" type="checkbox"/> Data storing in case of power failure <input checked="" type="checkbox"/> Data storing and printing <input checked="" type="checkbox"/> Power consumption, max. <input checked="" type="checkbox"/> Mass of sampler <input checked="" type="checkbox"/> Motor speed control <input checked="" type="checkbox"/> Control to the set volume flow rate value <input checked="" type="checkbox"/> Floor area demand <input checked="" type="checkbox"/> Grade of protection <input checked="" type="checkbox"/> Class of shock protection 	<p>Simple and fast with special regard to changing sample in the field</p> <p>Easily portable, by 1- 2 persons</p> <p>Lockable instrument housing, protected against drip water, lock enabled by keyboard-entered password</p> <p>Alphanumeric LCD display for the major parameters</p> <p>$q = 1 - 4 \text{ [m}^3/\text{h]}$</p> <p>$\pm 0,5 \text{ [%]}$</p> <p>230 [V], 50 [Hz] ,</p> <p>$[\text{m}^3/\text{h}] , [\text{m}^3] , [^\circ\text{C}] , [\text{bar}]$</p> <p>Min. 120 hours</p> <p>AR-COM software (option),</p> <p>250 [VA]</p> <p>14 [kg]</p> <p>Electronic</p> <p>Automatic</p> <p>Approx.. 460 x380 [mm]</p> <p>IP20</p> <p>I. MSZ 94</p>
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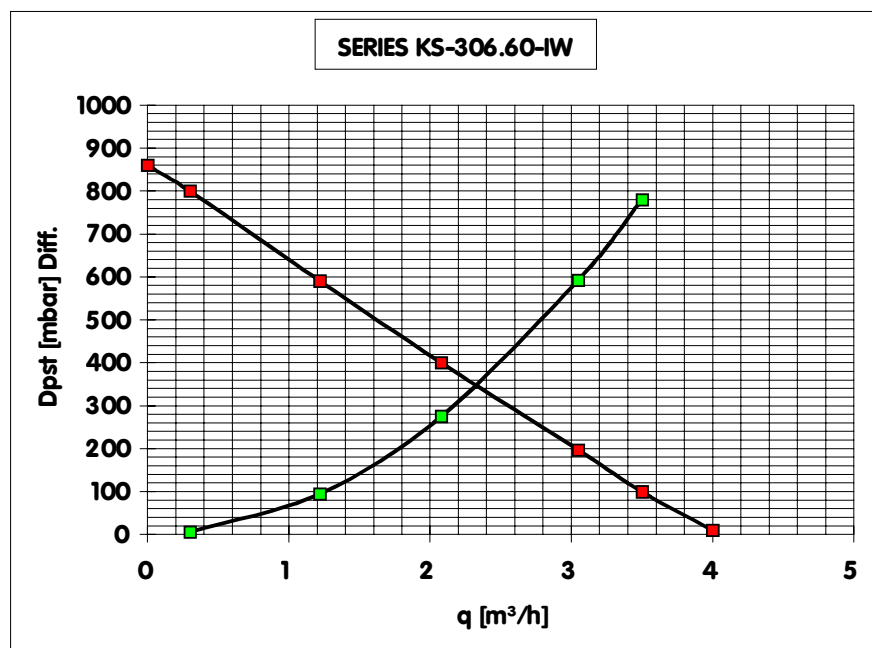


Figure 2.

4. Literature

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