

DIGITEL

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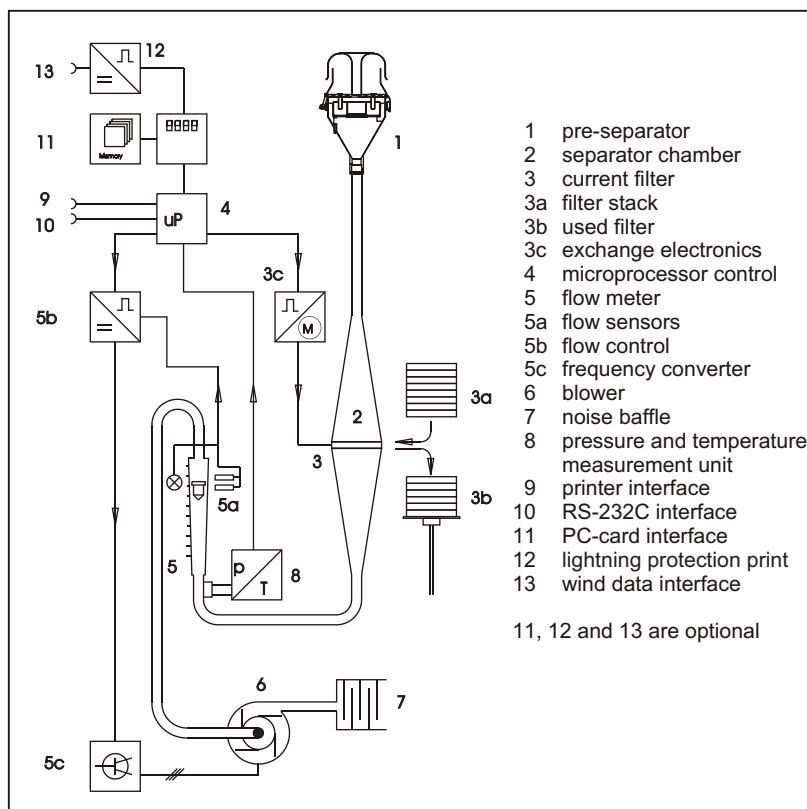
DIGITEL Made in Switzerland

We have been established since 1070 developing and manufacturing high precision samplers for aerosol, gas and rain.

Design and system description - DIGITEL HVS DHA-80

Introduction:

DIGITEL High-Volume Samplers DHA-80 are fully automatic systems to sample dust and aerosol particles for later assessment and analysis (gravimetric and analytical determination). The sampler operation range in standard construction is 100 to 1.000 litres per minute (6 to 60 m³/h). DIGITEL HVS DHA-80 has a magazine of 15 filters clamped in filter holders. They rotate automatically to the flow position at the pre-set time. The devices can be integrated in automatic monitoring systems via various interfaces. The field housing of the DIGITEL HVS DHA-80 is suited for outdoor installation. The device is easy to transport and because of a good sound insulation very quiet. Superior workmanship in sampler mechanics backed by the latest technical and electronic control will guarantee a long life-time and an absolute reliable operation.



Block diagram of DIGITEL Automatic High Volume Sampler DHA-80

Features:

An integrated microprocessor unit controls the filter rotation at the exact pre-set time and collects all relevant data and events. The status "work" and "pause" (filter change) can be programmed with a resolution of one minute. The constant flow of sampled air through the filter is dynamically controlled, so that this value is kept at good reproducibility and at long-term stability which keeps to a minimum of electrical power consumption. The blower unit is maintenance free and ensures a long service life (MTBF > 36.000 hours). All mechanical components of the rotation automatics as well as the units needed for measurement are provided with a highly corrosion-resistant and extremely smooth "Ematal" coating. Due to the large surface filter a low flow velocity takes place. Furthermore, the homogeneously loading of dust and aerosol particles on the filter allows segmenting for different analyses. Different interfaces for data transmission and remote control are available. The systems are operating in important monitoring networks both at home and abroad.

Design and operation:

The air is sampled via a pre-separator (1), using a sampling tube, vertically from the top to the bottom through the filter (3) placed in the separator chamber (2). The top part of the filter separator chamber operates as a diffuser with regular cross section and cares for homogeneous loading of the exposed circular filter. The velocity of the sampled air on the filter, 0.5 m/s at 500 l/min flow rate, is low because of the relatively large filter diameter. The pressure drop across the filter is limited to 130 mbar, so that a rupture of damp or extremely heavy loaded filters is prevented. The DIGITEL HVS DHA-80 changes the filters automatically. After the filter, the transported air quantity is measured by using a flow meter with a floater (5). Its double photo-sensor (5a) optically senses the floater position. In connection with the control electronics (5b, 5c), the capacity of the blower (6) is adapted to the rpm control, so that the air quantity keeps the set-point value. Air pressure and temperature are measured upstream (8) the flow meter and continuously averaged by the controller. A real-time

protocol states sampling volumes yielding from the sampling time and controlled volume flow as core information. The air is released from the instrument with reduced noise through the noise baffle (7). The sampling protocol lists the effective and the standardised volume of each filter exposure, the averaged values of pressure and temperature

Mo 12.01.04	12:05:28
Start of program	
Mo 12.01.04	12:05:28
Work	
Mo 12.01.04	12:05:37
Blower on	
Mo 12.01.04	12:07:37
Motor load : 65 %	
Tu 13.01.04	12:05:28
Pause	
Tu 13.01.04	12:05:28
End of program	
Tu 13.01.04	12:05:30
Blower off	
Collecttime[min]: 1399,96	
paM [mbar]:	929
TaM [°C]:	20,0
cM(20/ 929) :	1,054
cs(15/1013) :	0,949
cA(17/ 962) :	1,007
VM(20/ 929) [m3]:	755,146
Vs(15/1013) [m3]:	680,539
VA(17/ 962) [m3]:	721,591
at 512 l/min	

printer protocol

Design and system description - DIGITEL HVS DHA-80



for that period and the operating as well as the failure status. The DIGITEL HVS DHA-80 has a magazine of 15 filters clamped in filter holders. They are changed automatically to the flow position at the pre-set time. The unit is construed strictly modular, so that all electrical and mechanical function blocks are easily replaceable. The DIGITEL HVS DHA-80 is examined and tested in practice in the monitoring networks of various European countries. These long-term and varied field experiences have led to the efficiency and reliability of the equipment. The DIGITEL HVS DHA-80 is described in the VDI/DIN guideline VDI 2463 page 11. In

connection with a DIGITEL PM10 pre-separator (DPM 10/30/00) the system is approved according to reference method EN12341. In connection with a DIGITEL PM01 (DPM 01/30/00) PM01 measurements can be made. On the illuminated LCD display the current state of the sampling course can be read out any time (e.g. program status, current status, failure indication messages). In case of power failure, all settings are kept stored. Then the time program is internally running in the standard pre-setting. Therefore, programmed filter rotation times are not postponed in case of meantime power interruptions. The DIGITEL HVS DHA-80 supplies a series of

digital interfaces to connect the protocol printer, to activate the remote control and to manage data in- and output using different formats (eg. Bayern-Hessen, AK, TCP/IP, etc.). An analogue interface enables the easy external registration of the sampling course as well as for the remote control. The DIGITEL HVS DHA-80 is equipped with a protection class IP54 field housing. For that reason it is directly suitable for open-air installation under European standard weather conditions.

Design and system description - DIGITEL HVS DHA-80

conditions. The field housing is double-walled so that a considerably improved thermal insulation of the sampler's internal space is ensured. The extraordinary compact type of construction, especially the low depth, allows that even the field equipment can be installed in a container economically.

Accessories:

For total suspended particulates (TSP) sampling, two various designed pre-separators are available: a cylinder probe (EMPA/UBA probe) and a probe called „open circular slot“ according to VDI.

For the PM10 or PM2.5 sampling, pre-separators designed as single-stage impactors are available. They are construed for an operational volume flow of 30 m³/h according to the reference method En12341.

For PM1.0 sampling the pre-separators are designed as double-stage impactors. They are construed for an operation volume flow of 30 m³/h.

The protocol printer and memory card (PCMCIA) provide for the operating recording and error status in real time.

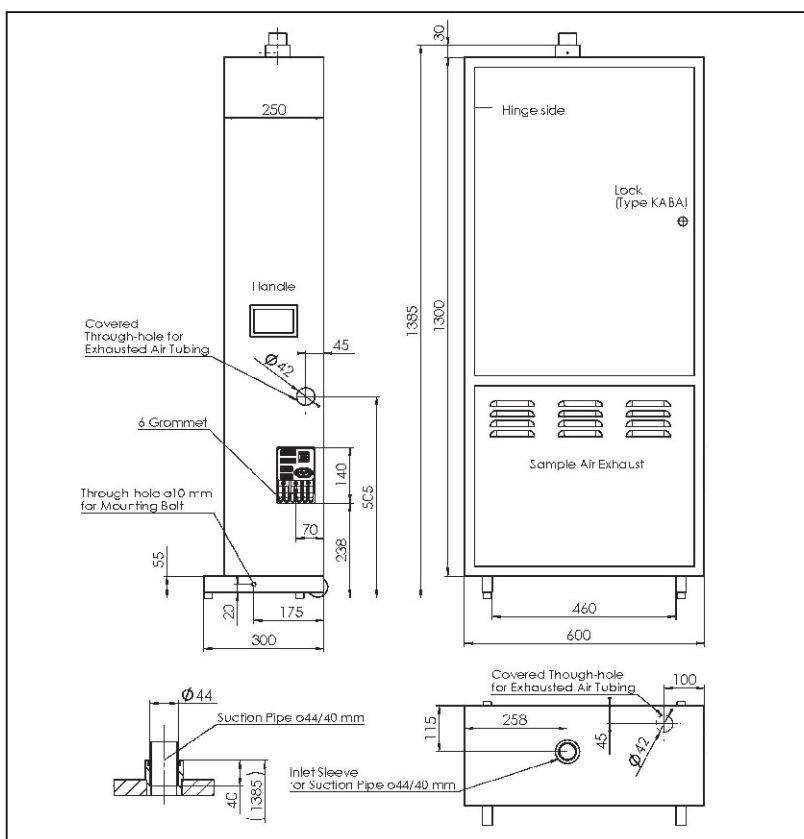
Interfaces RS-232C, RS-485, Ethernet, analogue, radio modem (via RS-232C) enable data logging and activate remote control.

Directional sampling, depending on meteorological data e.g. wind direction and wind speed, also counts to the options.

The PAH hand-changed cartridge holder or PAH cartridge changer offers the possibility for sampling aerosols and volatile substances with PU-foam or granulates in series to the current filter.

In addition to the standard housing the DHA-80 is also available in other housings as the container housing or the 19" housing for rack-mounting

Technical data	DIGITEL DHA-80
Flow rate Time programs Filters Settings reproducible accuracy (according to UMEG report No. 6-08/00) Logged standard and measured volumes accuracy "Volume flow" control accuracy Suction unit, mean life cycle Underpressure at 1.000 l/min. Interfaces Interface protocols power supply Application range	100 - 1.000 l/min (6 - 60 m³/h) Work, Pause (0 to 59.999 minutes each); start time adjustable using date and time 15 round filters of d = 150 mm (flowing area of d = 140 mm); filter material depends on the aim of analysis +/- 0.45% <+/- 2% < 5 % of upper range value (uncalibrated) > 36.000 h max. 130 mbar RS-232C DIGITEL, Bayern-Hessen, AK 230 V +6/-10 %; 50 Hz; max. 1.700 VA 5 to 40°C; 10 to 90 % RH or -20 to 40°C; 10 to 95 % RH with interior heating, maximum operation altitude of 2.000 m above the sea level field housing 1.385 mm x 600 mm x 250 mm 60 kg IP54 automatic filter exchange, changer failure indication identification, manual filter exchange, empty magazine identification, overloading switch-off, blower-load indication, battery-backed data memory 24,5 V; 50 Hz; 160 VA max.
Type Outer dimensions (H x W x D) Weight Protection class Features Pre-separator heater control	
Options Pre-separator Pre-separator heating PAH cartridge holder Memory cards (PCMCIA) internal Log printer Interfaces Interface protocols External meteorological data sensing	TSP, PM10, PM2.5, PM1 regulated, max. 52 W; with built-in over-temperature protection available available available RS-485, Ethernet customer-specific available



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