Enviro Technology Services Ltd
part of CuraTerrae

DIGITEL DHA-80

HIGH VOLUME AEROSOL SAMPLER (HVS)

FEATURES

- For autonomous, continuous sampling
- Automatic filter changer for 15 filters
- Filter diameter 150mm
- Constant and precise flow from 100-1000l/min
- For PM measurements according to EN12341 and EN14907
- TSP, PM10, PM2.5 and PM1 inlets

OPTIONS AND ACCESSORIES

- Cartridges
- Climatisation
- Different housings
- Meteor sensors
- SMS communication
- Calibration units

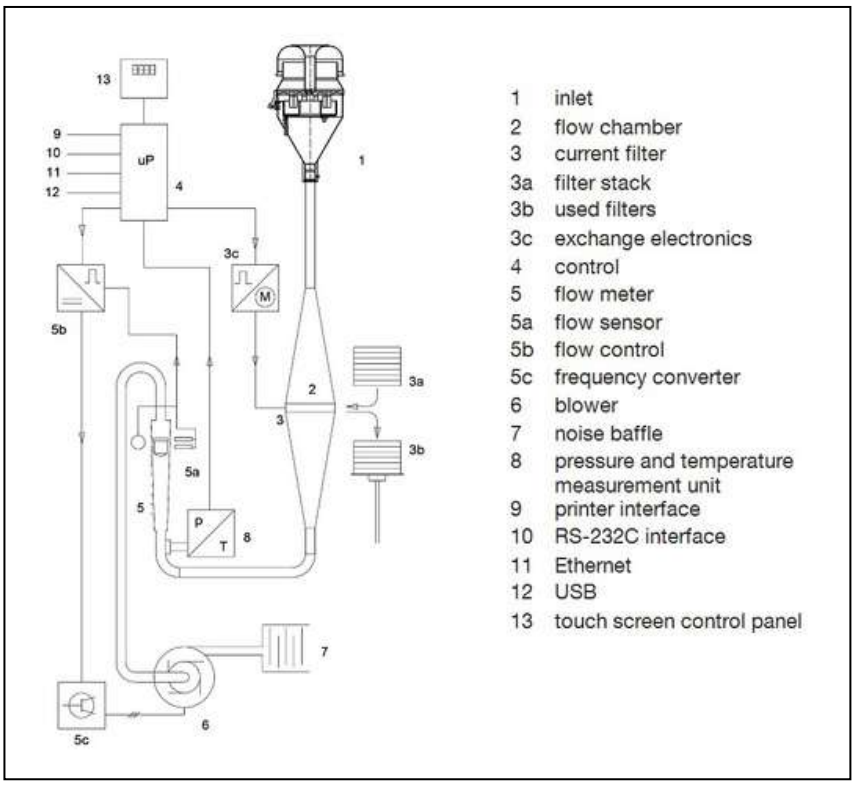
DESIGN AND SYSTEM DESCRIPTION - DIGITEL HVS DHA-80

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 execution is 100 to 1.000 litres per minute (6 to 60 m³/h). The DIGITEL HVS DHA-80 has a magazine of 15 filters stretched in filter holders. They are automatically changed 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. It 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 guarantee a long lifetime and absolutely reliable operation.

Advantages

An integrated microprocessor unit controls the filter changes at the 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 which come into contact with measuring air are coated with a highly corrosion-resistant and extremely smooth “Ematal” surface. A low flow rate is obtained by the large filter surface. Due to the uniform dust distribution on the filter, the filter allows to be segmented for different analyses. The DHA-80 High Volume Sampler has different interfaces for data transmission and remote control. The systems are in operation in important monitoring nets at home and abroad.



Design and Operation

The air is sampled through a PM10/ PM2,5/PM1 inlet (1), using a sampling tube, vertically from the top to the bottom through the filter (3) placed in the flow chamber (2). The upper part of the flow chamber works like a diffuser with regular cross section and ensures uniform loading of the exposed circular filter. Due to the relatively large filter diameter, the face velocity of the sampled air through the filter is only 0,5m/s (at a flow rate of 500l/min). The pressure drop across the filter is limited to 130 mbar, so that a rupture of damp or extremely loaded filters is prevented. The DHA-80 changes the filters automatically. Behind the filter, the transported air quantity is measured by a flow meter with a float (5). Its double photo- sensor (5a) optically captures the float position. With help of the control electronics (5b,c), 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 (8) are measured upstream the flow meter and continuously averaged by the control. A real-time protocol states sampling volumes yielding from the sampling time and controlled volume flow as the 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 standardized averaged values of pressure and temperature for that period and the operating as well as the failure status. The DIGITEL HVS DHA-80 has a magazine of 15 filters stretched in filter holders. They are automatically changed to the flow position at the pre-set time.

DESIGN AND SYSTEM DESCRIPTION - DIGITEL HVS DHA-80

The touch screen allows simple and user friendly programming. The current state of the sampling course (e.g. program status, status periods, failure indication messages) is shown on the display. In case of power failure, all settings are kept stored. The time program is then internally running in the standard presetting. Therefore, programmed filter change times are not postponed in case of meantime power interruptions. The Digitel HVS DHA-80 has a RS-232C interface which is used for data transmission with different protocols (DIGITEL-, Bayern-Hessen-Protocol, AKProtocol, ...) and for the remote control. The internal memory has the ability to store data during several months of daily sampling. Alternatively, the measuring data can be saved on a flash drive which can be attached to a USB interface. The DHA-80 also has an Ethernet interface, which enables connections to any TCP/IP network. This allows data collection via FTP and remote control of the DHA-80 (integrated HTTP-Server). Software-Updates can be performed via USB or Ethernet interface. All mechanical components of the changing automatics and all parts that come into contact with measuring air, including filter holders, have been coated with a highly corrosion-resistant and extremely smooth “Ematal” surface. The DIGITEL HVS DHA-80 is equipped with a protection class IP54 field housing. It is suitable for direct open-air installation under European standard weather conditions. The field housing is double-walled, which leads to a considerably improved interior thermal insulation. The extraordinary compact type of construction, especially the low depth, allows that even the field equipment can be space-savingly installed in a container. The device is in use in important monitoring nets of different European countries. This long term and varied field experiences have lead to the efficiency and reliability of the instruments. The DIGITEL DHA-80 is described in the VDI/DIN guideline VDI 2463 page 11. Together with a DIGITEL PM10 inlet (DPM10/30/00), the system is in accordance with the EN12341 standard. With a DIGITEL PM2,5 inlet (PM2,5/30/00), the DHA- 80 is in compliance with the EN14907 directive.

DESIGN AND SYSTEM DESCRIPTION - DIGITEL HVS DHA-80

Accessories

For total suspended particulates (TSP) sampling, there are two differently designed inlets available: a cylinder probe (EMPA/UBA probe) and a probe of “open circular slot” according to VDI.

For PM10 or PM2,5 sampling, inlets which are designed as single-stage impactors, are available. They are intended for an operational volume flow of 30m³/h and approved according to reference procedure EN12341. For PM1 sampling, we offer inlets as two-stage impactors. They have been constructed for an operational volume flow of 30m³/h.

Options

A protocol printer or a flash drive allow the recording of measuring data in real time.

An air-conditioned instrument allows sampling according to EN14907: the used filters can be stored at a defined and monitored temperature so that losses through evaporation are minimized.

Another option is controlled sampling depending on meteorological data, e.g.: wind direction and wind speed.

When an error occurs during the operation of the device (empty filter stack, blower overload, blocked changing mechanism), alarm text messages can be sent.

Customer-specific special functions can be programmed as well.

The PAH cartridge or the PAH cartridge changer offer the possibility to collect aerosols and slightly liquid substances with the help of PU foam or granulates behind the particulate filter.

Besides the standard housing, various other housings are available, e.g.: a air-conditioned field housing, a container housing or a 19’’-installation housing.

Technical Data	DIGITEL DHA-80
Flow rate	100-1000l/min (6-60m³/h)
Time programs	Work, Pause (0 to 59.999 minutes each), start time adjustable using date and time
Filters	15 round filters of d = 150 mm (flowing area of d = 140 mm), filter material depending on aim of analysis
Reproducible tolerance of settings (according to UMEG report No. 6-08/00)	+/-0.45%
Accuracy of measured flow volume	<+/-2%
Volume flow control accuracy	<5% of MRAV (uncalibrated)
Mean life cycle suction unit	>36.000 h
Negative pressure at 1.000l/min	Max. 130 mbar
Interfaces	RS232C, USB, Ethernet, RS485
Interface protocols	DIGITEL, Bayern-Hessen, AK
Power supply	230 V +6/-10 %; 50 Hz; max. 1.700 VA
Application range	5°to 40°C; 10% to 90% RH or -20° to 40°C; 10% to 95% RH with interior heating, maximum operation altitude of 2.000m above sea level
Model	Field housing
Dimensions (H x W x D)	1.385 mm x 600 mm x 250 mm
Weight	60kg
Protection class	IP54
Features	Automatic filter change, changer failure recognition, manual filter exchange option, empty magazine recognition, overload cut-off, operating hours counter, internal data memory
Inlet heating control	24.5 V; 50Hz; 160 VA max.
Options	
Inlet	TSP, PM10, PM2.5, PM1
Inlet heating	Regulated, max. 52 W, with overtemperature protection
PAH cartridge holder	Available
Protocol printer	Available
Interface protocols	Customer-specific
External meteorological data collection	Available