DPA-14
Low Volume Aerosol Sampler (LVS)

Product Information

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Introduction

DIGITEL Low Volume Samplers DPA14 are fully automatic systems to sample dust and aerosol particles for later assessment and analysis (gravimetric and analytical determination) in accordance with EN12341:2014. The sampler operation range in standard execution is 15 to 50 litres per minute (0.9 to 3m³/h). The DIGITEL LVS DPA14 has a magazine of 30 filters stretched in filter holders. They are automatically changed to the flow position at the preset time. The devices can be integrated in automatic monitoring systems via various interfaces. The field housing of the DIGITEL LVS DPA14 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 preset 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 time for the filter change is kept at a minimum, the automatic filter change is done within 2 seconds and the blower is started again. 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. An optional auto calibration device for the autonomous calibration of the Venturi type orifice flow control is available. The mechanical components which are in contact with measuring air are coated with a highly corrosion-resistant and extremely smooth surface. The DPA14 Low Volume Sampler has different interfaces for data transmission and remote control. The filter magazines can be filled and emptied with one hand, no additional tools are needed. An optional bar code reader allows direct identification of the filters in the sampler.

GOOD TO KNOW

- Autonomous, continuous sampling
- Automatic filter changer for 30 filters
- Constant and precise flow
- Flow range 5 - 50 l / min
- Filter diameter 47 mm
- PM2.5 and PM10 measurements according to EN12341:2014
- TSP, PM10, PM2.5 and PM1 inlets

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Easy Programming

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 stored. The time program is then internally running in the standard presetting and continued once the power is back. 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 and for the remote control. The internal memory has the ability to store data during several months of daily sampling. Alternatively, the measuring data is 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.

State of the art electronics

The Digitel LVS DPA14 has a RS-232C interface which is used for data transmission with different protocols (DIGITEL-, Bayern-Hessen-Protocol, AK-protocol...) and for remote control. The internal memory has the ability to store data during two months of daily sampling. Additionally, the measuring data can be saved on a USB drive.

The USB port can also be used for software updates, which allows a simple in field update of the instrument. The DPA14 also has an Ethernet interface, which enables connections to any TCP/IP network. This allows data collection via FTP and remote control of the DPA14 (integrated HTTP-Server) as well as software updates over Ethernet. An optional text message module sends alert error messages.

Design and Operation

The air is sampled through a TSP/PM10 / PM2,5 / PM1 inlet, using a sampling tube. Around this tube, a protective tube allows a ventilator forced air stream as sheath air to avoid thermal effects on the sampling tube. The air flows vertically from the top to the bottom through the filter placed in the flow chamber. The upper part of the flow chamber works like a diffusor with regular cross section and ensures uniform loading of the exposed circular filter. The pressure drop across the filter is limited, so that a rupture of damp or extremely loaded filters is prevented.

The DPA14 changes the filters automatically. Behind the filter, the transported air quantity is measured by a Venturi type orifice flow meter (optionally by a flow meter with a float and double photo sensor). The blower is speed controlled, so that the air quantity keeps the set-point value with minimal power consumption. Air pressure and temperature are measured upstream of the flow meter and continuously averaged by the electronic control unit. A real-time protocol states sampling volumes yielding from the sampling time and controlled volume flow as the core information. The sampling protocol lists the effective and the standardised averaged values of pressure and temperature, volume and the operating status as well as the failure status.

Design and Operation Flow Chart

Figure 1: Design and Operation Flow Chart DPA-14
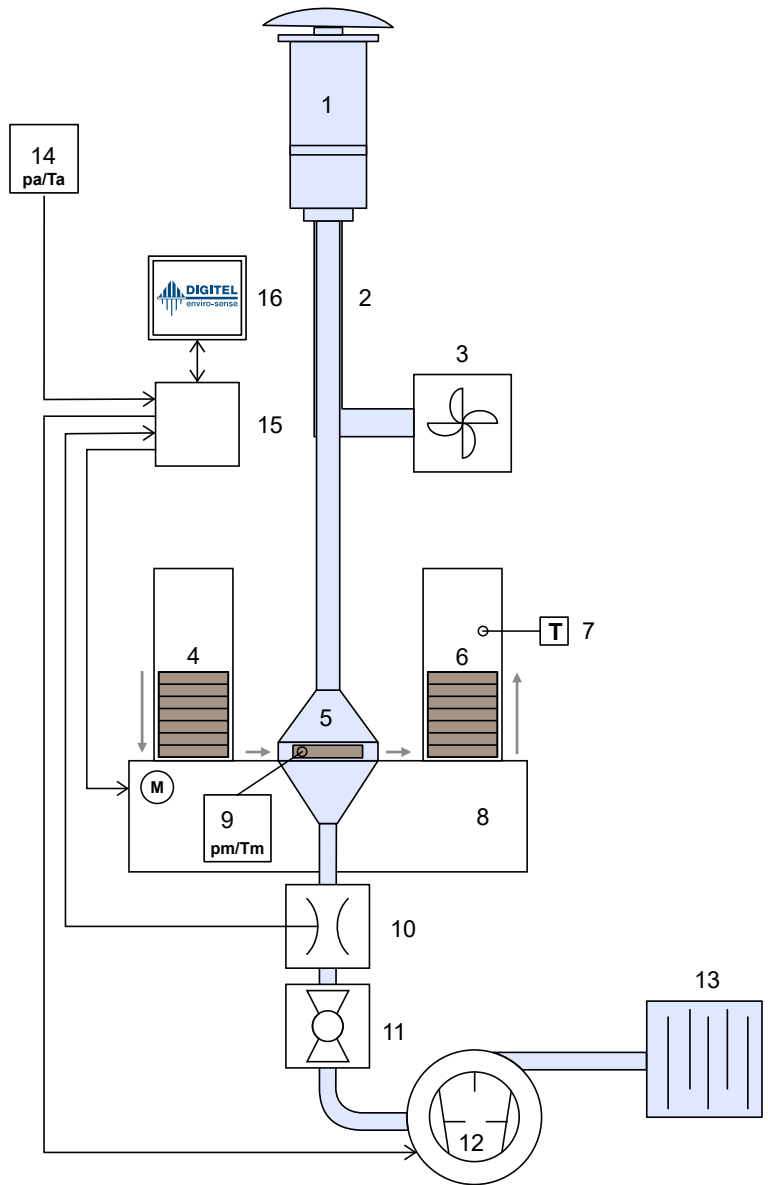
1. Inlet
2. Connecting pipework
3. Ventilation for sheath air
4. Empty filters
5. Current filter
6. Sampled filter
7. T measurement stored filters
8. Changing automatics
9. T/p measurement current filter
10. Flow meter
11. Ball valve
12. Pump
13. Noise baffle
14. Measurement ambient T and p
15. Control unit
16. Touch screen

Gijon Air Quality Station, Spain ©DNOTA

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Superior coating

All parts that come into contact with measuring air, including filter holders, are made of aluminium and coated with a very corrosion- resistant and extremely smooth anodised surface.

Excellent references

Together with a DIGITEL PM10 or PM2.5 inlet, the system is in accordance with the EN12341:2014 Standard (confirmed by TüV). Together with 1m3/h inlets (nozzle type or US EPA type) the system allows collection of samples in accordance with non-European standards.

With the cartridge option the system allows sampling of pesticides or VOCs .

FACTS & FIGURES

- ◆ Light weight but robust and weather proof
- ◆ Low energy consumption
- ◆ Low maintenance cost
- ◆ Easy programming with touchscreen
- ◆ Easy filter handling
- ◆ Software for EN12341 tests
- ◆ Wide range of options and accessories

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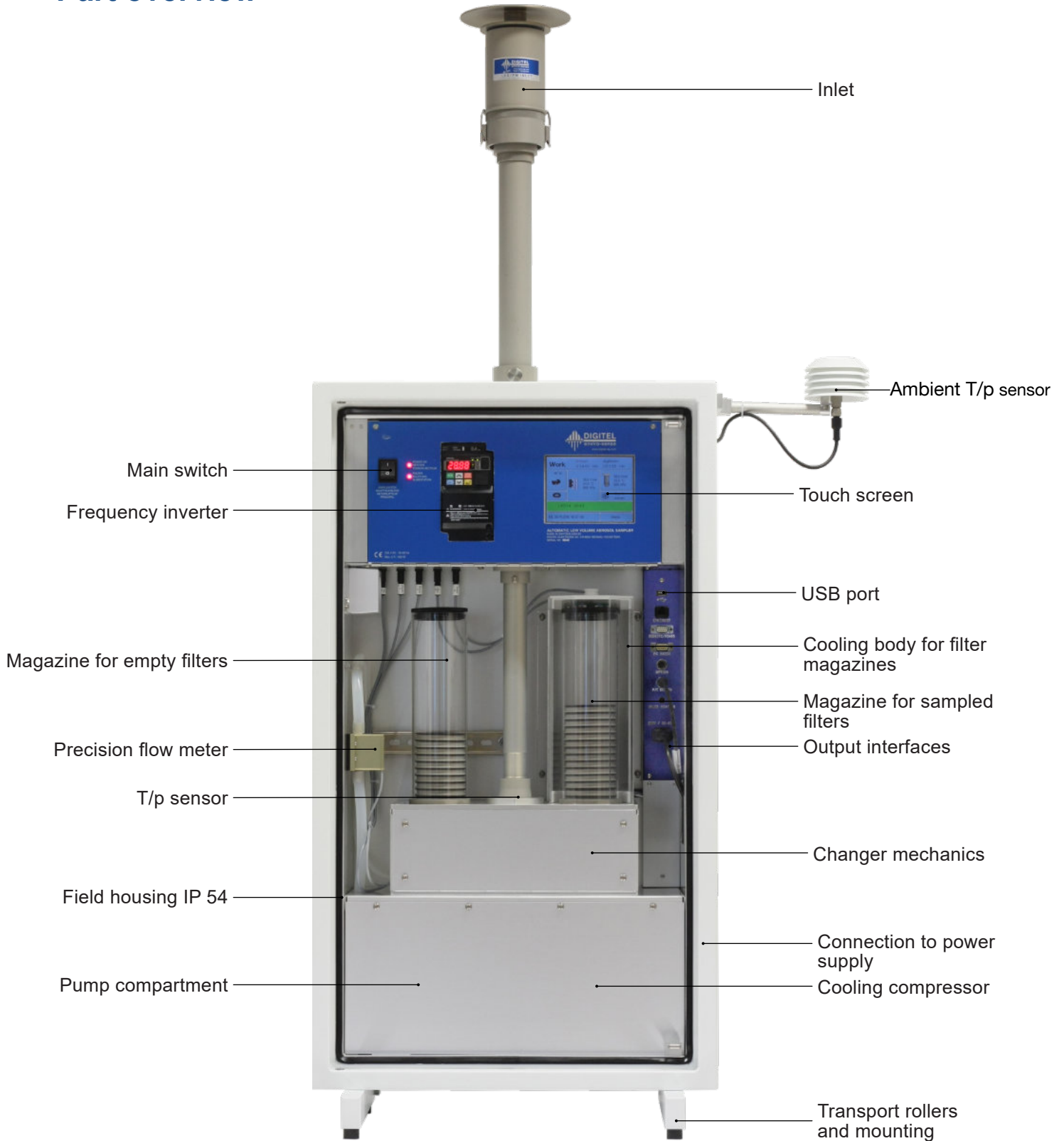enviro-sense

Part overview

Inlet

Ambient T/p sensor

Main switch

Frequency inverter

Touch screen

USB port

Magazine for empty filters

Cooling body for filter magazines

Magazine for sampled filters

Precision flow meter

Output interfaces

T/p sensor

Changer mechanics

Field housing IP 54

Connection to power supply

Pump compartment

Cooling compressor

Transport rollers and mounting

Figure 2: Part overview DPA-14

Technical Data

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Flow rate	15 - 50 l/min
Filter	30 round filters of d = 47 mm (flowing area of d = 40 mm), plus one in sampling position. filter material is depending on aim of analysis
Time programs	Work, pause (0 to 59'999 minutes each), start time adjustable, using date and time
Cooling capacity of compressor	360 W, max. Power consumption 40W
Mean life cycle suction unit	> 16'000 h
Constancy of sample flow	< 2 %
Negative pressure	Max. capacity 800 mbar, limited to -450 h Pa for filter protection
Sensors	Ambient and flow pressure, temperature, humidity
Interfaces / Interface protocols	RS232C, USB, Ethernet, RS485 / DIGITEL, Bayern-Hessen, AK, TCP/IP,HTTP, FTP
Internal memory	16MB
Power supply	230V AC / 50-60 Hz; max. 2A/400 W, mean consumption 90W incl. cooler (50%): 110W
Heating	Inlet heating / indoor heating / reserve heating
Application range	-40° to 50° C; 0 % to 95 % RH (cooling option: max. 40°C for cooling below 23°C)
Material	All components (incl. inlets) in the suction area are made of anodised aluminium, POM filter holders, aluminium filter holders on request
Dimensions & Weight	Field housing, protection class IP54: 526 x 235 x 1000 mm, 40 kg, (with cooling 43 kg) Box housing: 448 x 204 x 922 mm, 32 kg

Table 1: Technical Data DPA-14
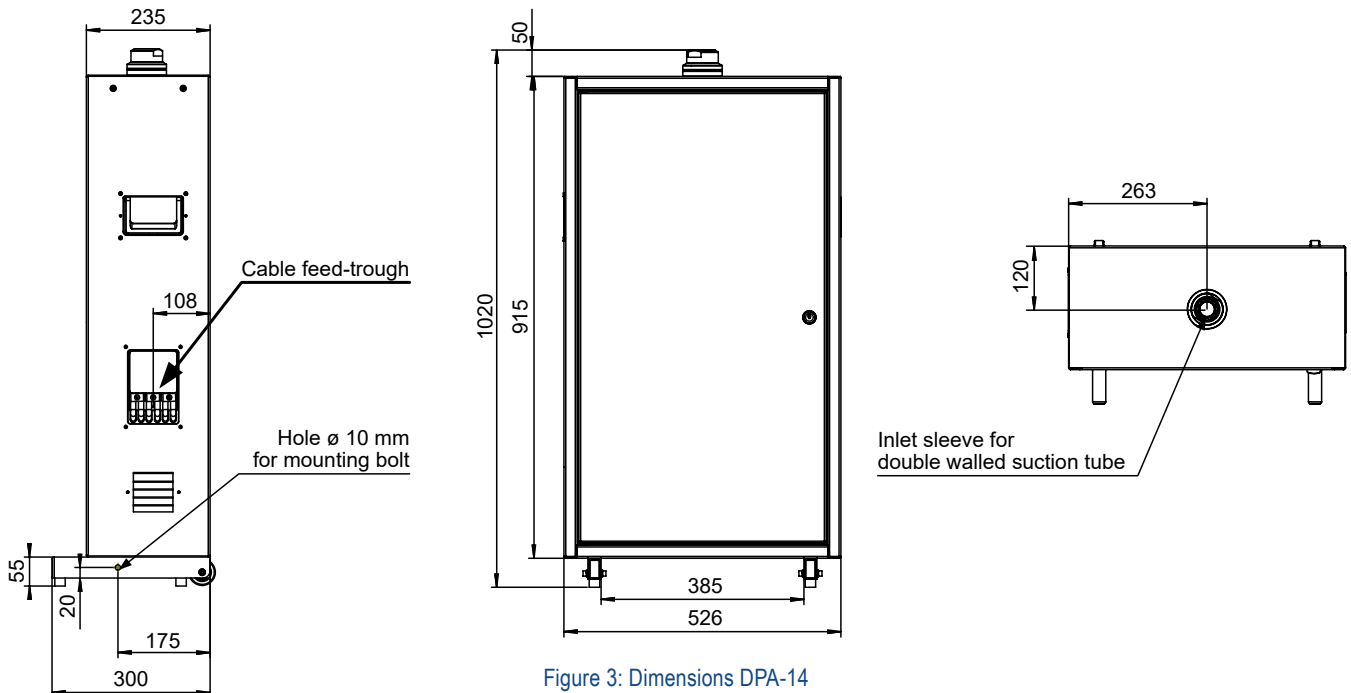
Figure 3: Dimensions DPA-14

Alomar Observatory, Andøya Island, Norway

Features

- Automatic filter change
- Change failure recognition
- Empty magazine recognition
- Overload cut-off
- Internal data memory
- Interchangeable filter magazines
- Auto-calibration of orifice flow meter with rota-meter flow meter
- Valve and software for easy tightness test according to EN:12341:2014
- Venturi type orifice
- Ethernet port for remote control and data query
- Weather-proof housing made of aluminium, protected with an extremely weather and seawater resistant powder coating

Options

- Cartridges for pesticide sampling
- GSM Modem for direct remote access (remote control or filter list upload)
- Rota-meter for auto calibration
- Sampling controlled by external sensors (e.g.: wind sensor or particle counter)
- Text message module for status and messages
- Filter identification: in-built bar code reader assigns filter data to bar code on filter
- Filter identification: filter data stored on filter holder over RF ID
- Printer

Accessories

- TSP inlet
- EN nozzle style PM10, PM2.5, PM1inlets for 1 or 2.3m3/h
- US EPA type inlets
- Adaption for single walled US EPA type inlets
- Inlet heating (regulated, ambient temperature controlled)
- Venturical calibrator for automatic calibration
- Various transport cases
- Delivery of single components on request

Customised Solutions

- Higher /lower flow rates
- PM inlets for customised flow rate
- Integration of other equipment and sensors (Multistage imp actor, Iodine cartridges)
- Customer specific functions (e.g. humidity controlled sampling, wind controlled sampling, PM controlled sampling)
- Customer specific interface protocols

For more information about options and accessories, please follow the links or check our website digitel-ag.com!

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Have a question? We'd love to help!

If you have questions about anything, please contact us and we will be glad to assist you.

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we care

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