DPA-14

Low Volume Aerosol Sampler

Product Information

EN12341: 2014 (TÜV verified),
EN 12341:2023 (Type testing in progress)

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Auchencorth Moss Air Quality Supersite in UK © Enviro Technology Services

Digitel DPA-14

DIGITEL Low Volume Samplers DPA-14 are fully automatic systems to sample dust and aerosol particles for later assessment and analysis (gravimetric and analytical determination) in accordance with EN12341. The sampler operation range in standard execution is 15 to 50 litres per minute (0.9 to 3m³/h). The DIGITEL LVS DPA-14 has a magazine of 30 filters each stretched in filter holders for up to 4 weeks of daily sampling. 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 DPA-14 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 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 the electrical power consumption. The blower is maintenance free. 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 DPA-14 Low Volume Sampler has various 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 barcode reader or RFID allows direct identification of the filters in the sampler.

KEY FEATURES

◆ Autonomous, continuous sampling

◆ Automatic filter changer for 30 filters

◆ Constant and precise flow

◆ Flow range 15 - 50 l/min

◆ Filter diameter 47 mm

◆ TSP, PM10, PM2.5 and PM1 inlets

◆ EN12341: 2014 compliance verified by TüV, EN12341: 2023 type testing in progress

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Easy Programming

The touchscreen allows simple and user-friendly programming. The current state of the sampling courses (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.

State of the Art Electronics

The Digitel LVS DPA-14 has a RS-232C interface which is used for data transmission with various protocols (DIGITEL-, Bayern-Hessen-Protocol, AK-protocol...) and for remote control. The internal memory has the ability to store data during two years of daily sampling. Additionally, the measuring data can be saved on a USB drive.

The USB port can be used for software updates, which allows a simple in field update of the instrument. The DPA-14 also has an Ethernet interface, which enables connections to any TCP/IP network. This allows data collection via FTP and remote control of the DPA-14 (integrated HTTP- server) as well as software updates over Ethernet. An optional router allows direct remote access to the sampler.

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, filtered 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 chambers. 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 DPA-14 changes the filters automatically. Behind the filter, the air quantity is measured by a Venturi type orifice flow meter. The blower is speed controlled, so that the air quantity keeps the setpoint 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 with 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.
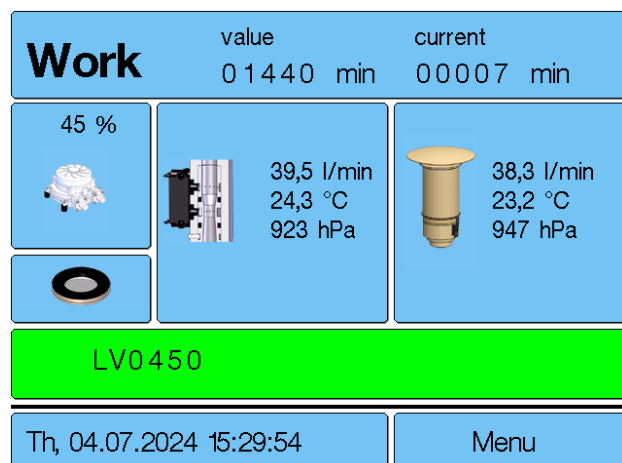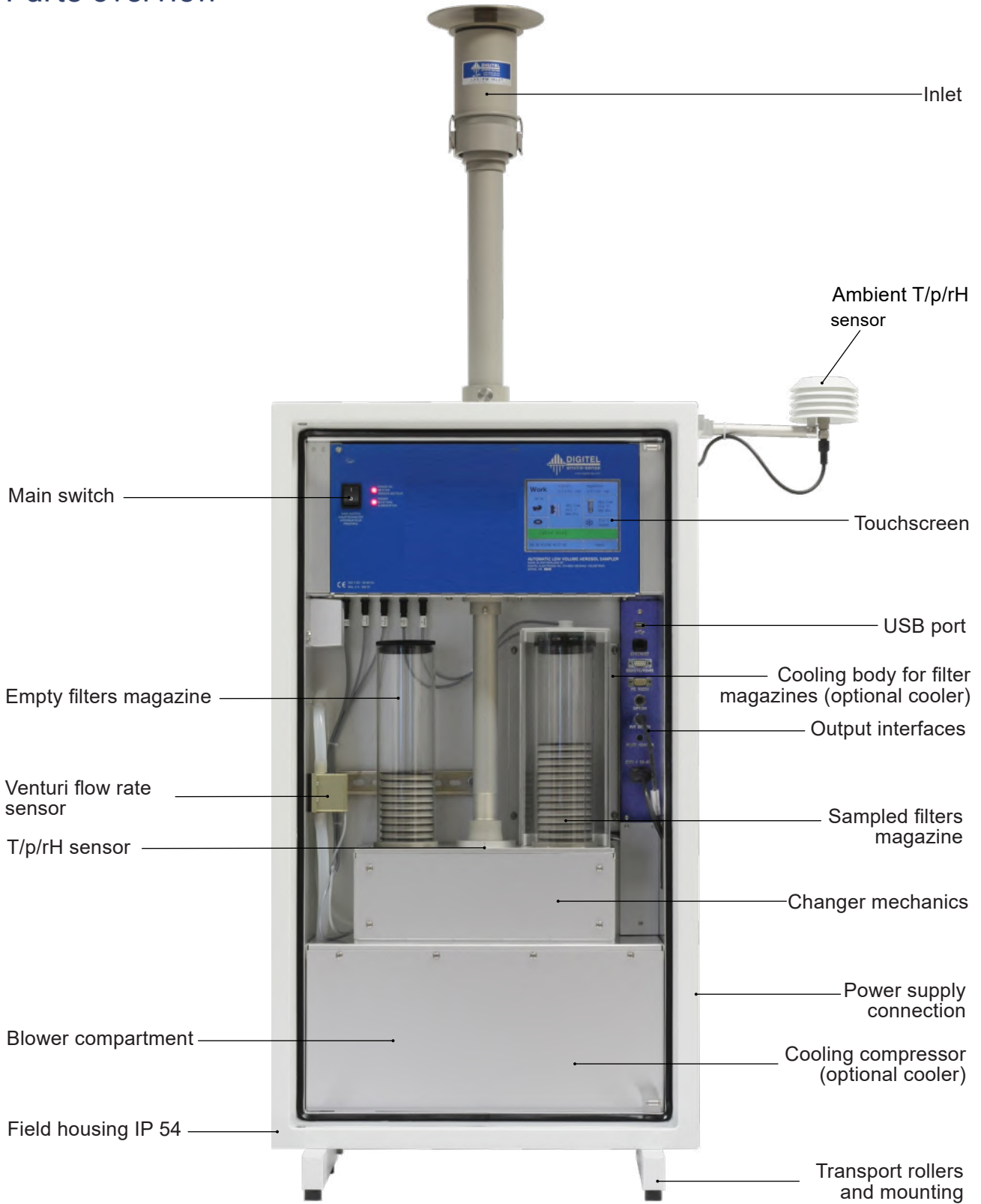
Design and Operation Flow Chart
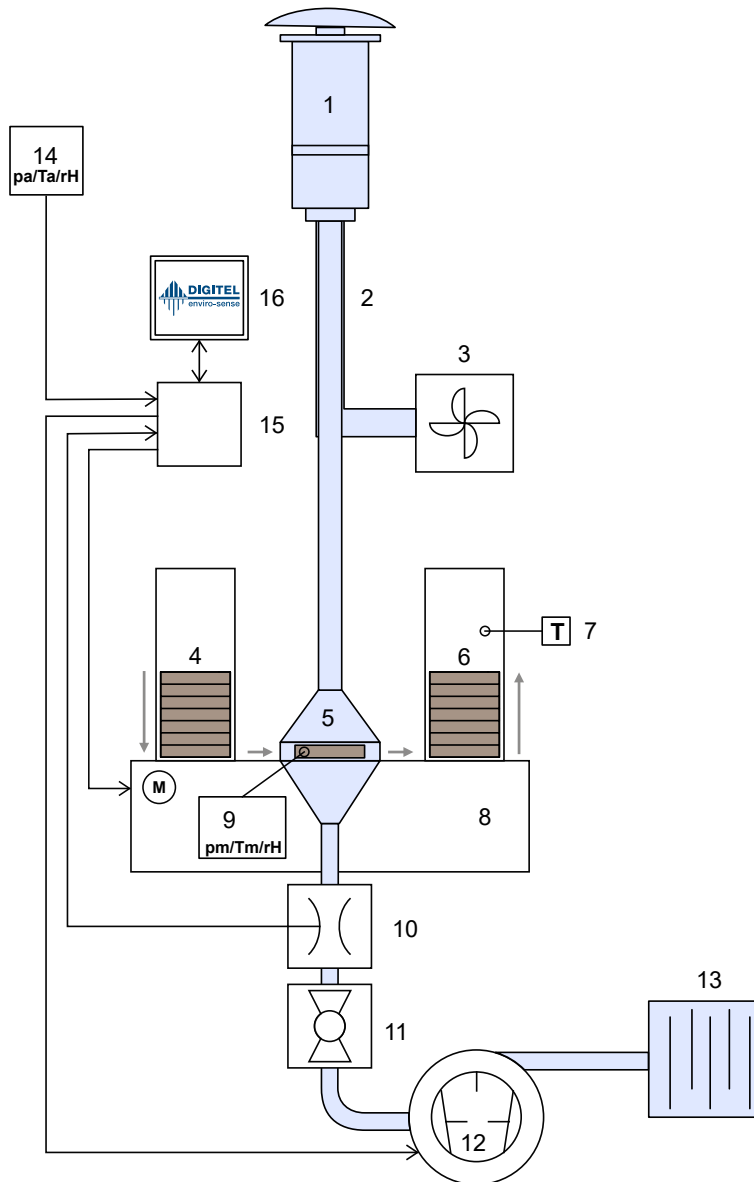
1. Inlet
2. Connecting pipework
3. Ventilation for sheath air
4. Empty filters
5. Current filter
6. Sampled filters
7. T measurement stored filters
8. Changing automatics
9. T/p/rH measurement current filter
10. Flow meter
11. Ball valve
12. Blower
13. Noise baffle
14. Measurement ambient T, p and rH
15. Control unit
16. Touchscreen

Parts overview

Inlet

Ambient T/p/rH sensor

Main switch

Touchscreen

USB port

Empty filters magazine

Cooling body for filter magazines (optional cooler)

Output interfaces

Venturi flow rate sensor

T/p/rH sensor

Sampled filters magazine

Changer mechanics

Power supply connection

Blower compartment

Cooling compressor (optional cooler)

Field housing IP 54

Transport rollers and mounting

Superior coating

All parts that come into contact with measuring air, are made of aluminium and coated with a very corrosion resistant and extremely smooth anodised surface (Ematal).
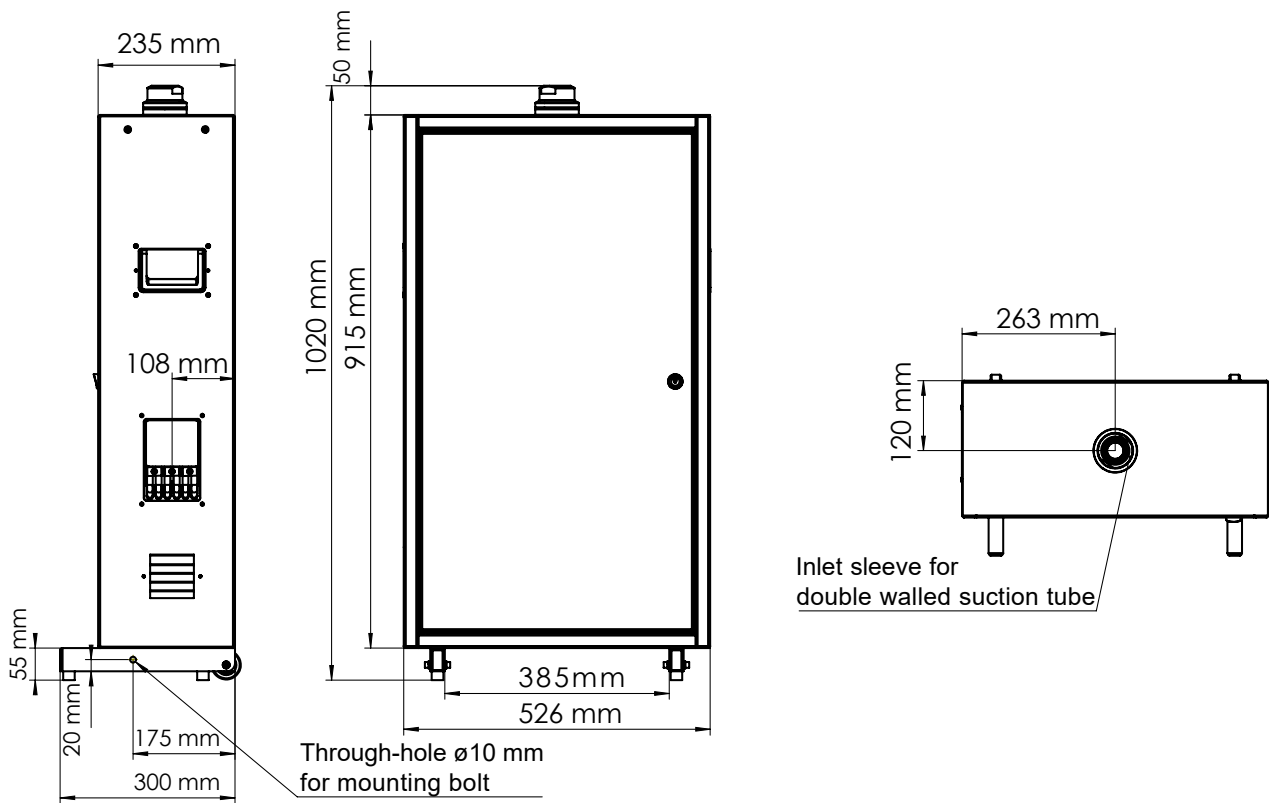
Excellent references

Together with a DIGITEL PM10 or PM2.5 inlet, the system is in accordance with the EN12341 Standard. 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.

GOOD TO KNOW

◆ Light weight but robust and weather proof (field housing)

◆ Low energy consumption, low energy cost

◆ Low maintenance cost

◆ Maintenance free blower

◆ Low noise

◆ Easy programming with touchscreen

◆ Easy filter handling

◆ Software for EN12341 tests

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Field Housing Dimensions

235 mm

50 mm

1020 mm

915 mm

108 mm

55 mm

20 mm

175 mm

300 mm

385mm

526 mm

Through-hole ø10 mm
for mounting bolt

263 mm

120 mm

Inlet sleeve for
double walled suction tube

Specifications

Sampling	• Flow rate: 15 – 50 l/min • Filter: round filters of d = 47 mm, flowing area d = 40 mm • Filter changer capacity: 30 filters in filter magazine plus one in sampling position • Application range: -20° to 50° C; 0 % to 95 % RH, -40° to 50° C with additional heater, 2000 amsl
Time programs	• Work, Pause (0 to 99'999 minutes each) • Start time adjustable, using date and time • Different sampling cycles programmable
Protocol files	• Data of filter, temperature, pressure, humidity, flow, blower load • Calibration history, sensor mean value record file • Settable averaging period 1 min - 24 h
Accuracy	• Constancy of sample flow: <2% with calibration at 20°C, operating at -20°C-+50°C

Operating data	• Power supply: 230V AC/50-60 Hz; max. 2A/180 W
	• Mean consumption 80 W
	  incl. cooler (50%): 100 W
	• Cooling capacity of compressor: 360 W
	  (Option), max. power consumption 40W
	• Mean life cycle suction unit: > 16'000 h
	• Sensors: Ambient and flow pressure, temperature, humidity, filter storage temperature

Interfaces	• RS232C, USB, Ethernet, RS485 • Interface protocols: DIGITEL, Bayern-Hessen, AK, TCP/IP,HTTP, FTP • Internal memory: 16 MB, ring buffer, filter data of two years of daily sampling
Inlets	• TSP, PM10, PM2.5 and PM1, customized inlets on request
Materials	• Coated aluminium, stainless steel, POM, PTFE, NBR • Material of sampling line: EMATAL coated aluminium
Dimensions & Weight	• Field housing (without inlet) 526x 235 x 1020 mm, 33 kg (36 kg with cooling), protection class IP54 • Indoor housing (without inlet) 448 x 204 x 922 mm, 25 kg
Noise level	• <50dB(A) at 1m, <32dB(A) at 8m
Sensor specifications	• Flow sensor accuracy (calibrated): < 1 % • Ambient & internal pressure sensor range / accuracy (calibrated): 300 – 1100 hPa / ± 0.12 hPa • Ambient & internal temperature sensor range / accuracy (calibrated): -40 – +65°C / ± 0.5°C • Ambient & internal humidity sensor range / accuracy: 0 – 60°C; 0 –100 % / ± 3 % rH • Filter storage temperature sensor range / accuracy: -20 – +60°C / ± 0.1°C

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Alomar Observatory, Andøya Island, Norway

Features

- Touchscreen interface
- Automatic filter change
- Change failure recognition
- Empty magazine recognition
- Overload cut-off
- Internal data memory
- Interchangeable filter magazines
- Valve and software for easy tightness test and checks according to EN:12341, automatic calculation of leak rate
- Venturi type orifice, P/T compensated
- Ethernet port for remote control and data query
- Field housing: Weather-proof housing made of aluminium, protected with an extremely weather and seawater resistant powder coating
- Remote control and filter list upload

Options

- Cooled filter storage with defrost/drainage system
- Cartridges for pesticide sampling
- LTE router for direct remote access
- Text message (SMS) module for status and messages
- Sampling controlled by external sensors (e.g.: wind sensor or particle counter)
- Rotameter for auto calibration
- Filter identification via barcode reader or RFID
- Printer
- High pressure drop option for membrane filter/ long term sampling (800 mbar)
- Heating for inlet or filter changer
- External meteorological

data collection (e.g.: wind direction and wind controlled measurement)
- Customer-specific functions

Accessories

- TSP, 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 for filter holders
- Delivery of single components on request

Customized Solutions

- Higher /lower flow rates
- PM inlets for customised flow rate
- Integration of other equipment and sensors (Multistage impactor, Iodine cartridges, Optical particle counter OPC N3, Black Carbon Monitor MicroAeth MA200, Vaisala WTX sensor)
- Customer specific functions (e.g. humidity-controlled sampling, wind controlled sampling, PM controlled sampling)
- Customer specific interface protocols
- Configurations avoiding certain materials (e.g. PFAs)

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

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Building high-precision samplers for dust, gas, and rain since 1970.

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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Where to find us: