Enviro
Technology Services Ltd
part of CuraTerrae

DPA-14 Baby

Compact Low Volume Aerosol Sampler

Product Information

Auchencorth Moss Air Quality Supersite in UK © Enviro Technology Services

Digitel DPA-14 Baby

The DIGITEL compact Low Volume Sampler (LVS) DPA-14 Baby is a fully automatic system to sample dust and aerosol particles for later assessment and analysis (gravimetric and analytical determina- tion) in accordance with EN12341. The sampler's operation range in standard execution is 15 to 50 litres per minute (0.9 to 3m³/h). The DIGITEL compact LVS DPA-14 Baby has a magazine of 18 filters each stretched in filter holders. They are automatically changed to the flow position at the preset time. Due to its small size and light weight, the DPA-14 Baby 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. The mechanical components which are in contact with measuring air are coated with a highly corrosion-resistant and extremely smooth surface. The DPA-14 Baby 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 barcode reader or RFID allows direct identification of the filters in the sampler.

GOOD TO KNOW

- Autonomous, continuous sampling
- Automatic filter changer for 18 filters
- Constant and precise flow
- Flow range 15 - 50 l / min
- Filter diameter 47 mm
- PM2.5 and PM10 measurements according to EN12341
- TSP, PM10, PM2.5 and PM1 inlets

Easy Programming

The touch screen 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 power interruptions.

State of the Art Electronics

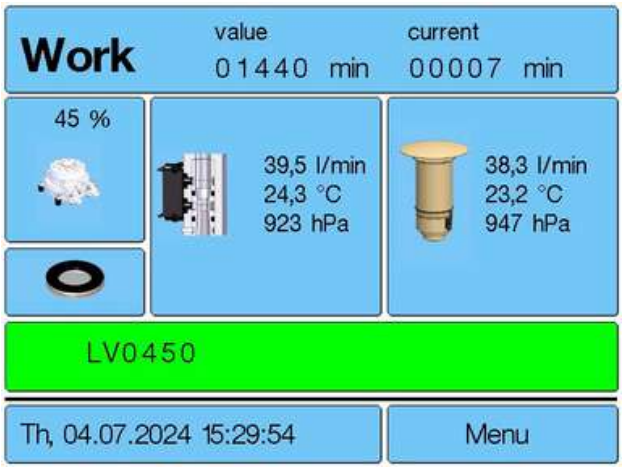
The Digitel compact LVS DPA-14 Baby has a RS-232C interface which is used for data transmission with different protocols (DIGITEL-, Bayern-Hessen- Protocol, AK- protocol...) and for remote control. The internal memory has the ability to store data during two years of daily sampling. Additionally, the 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 Baby 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 Baby (integrated HTTP- server) as well as software updates over Ethernet. An optional router allows direct remote access to the sampler.

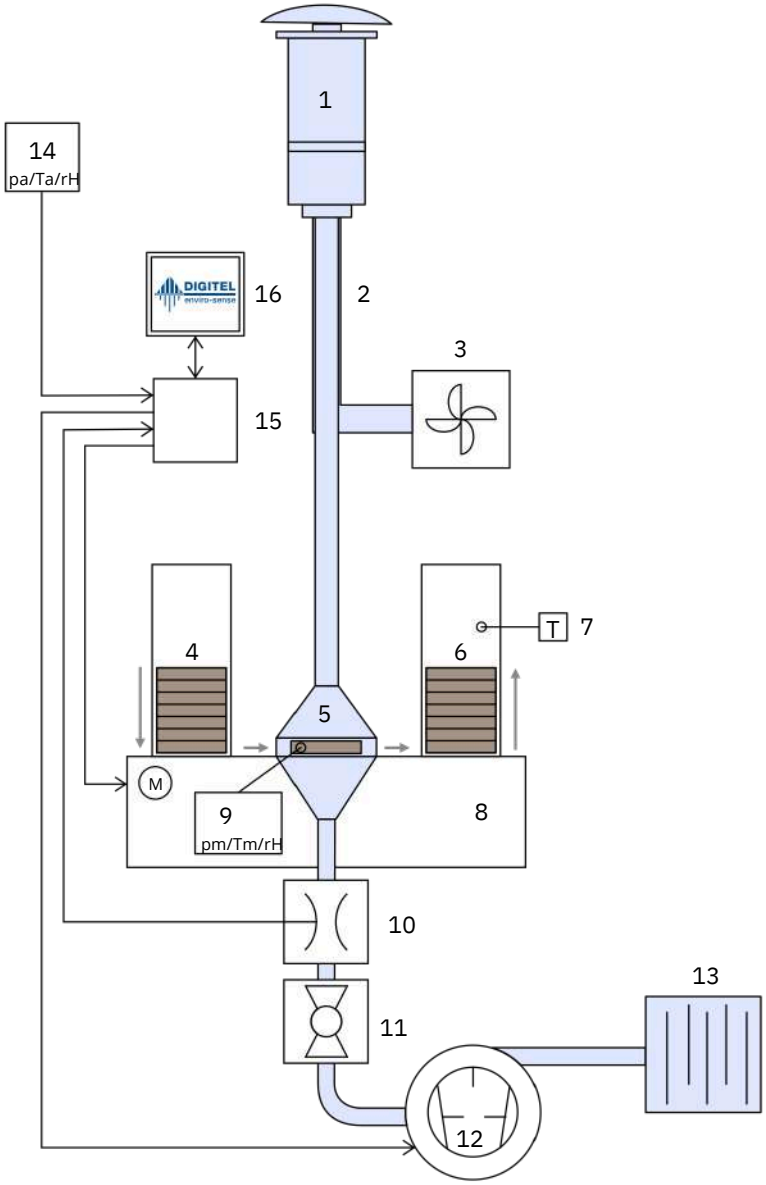
Design and Operation

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 Baby 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 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 average values for pressure, temperature, volume as well as operating status and failure status.

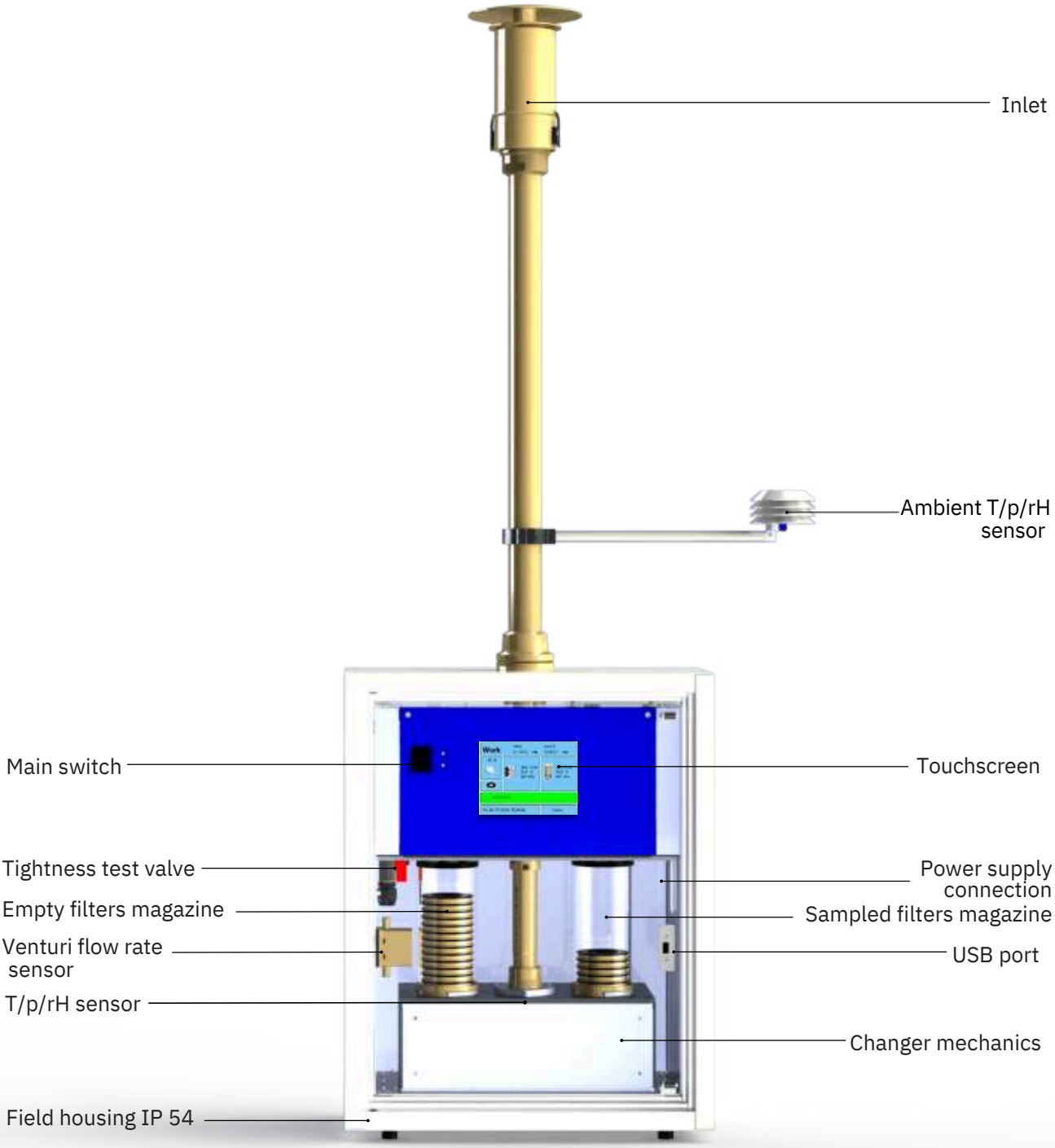


Design and Operation Flow Chart



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

Part overview



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).

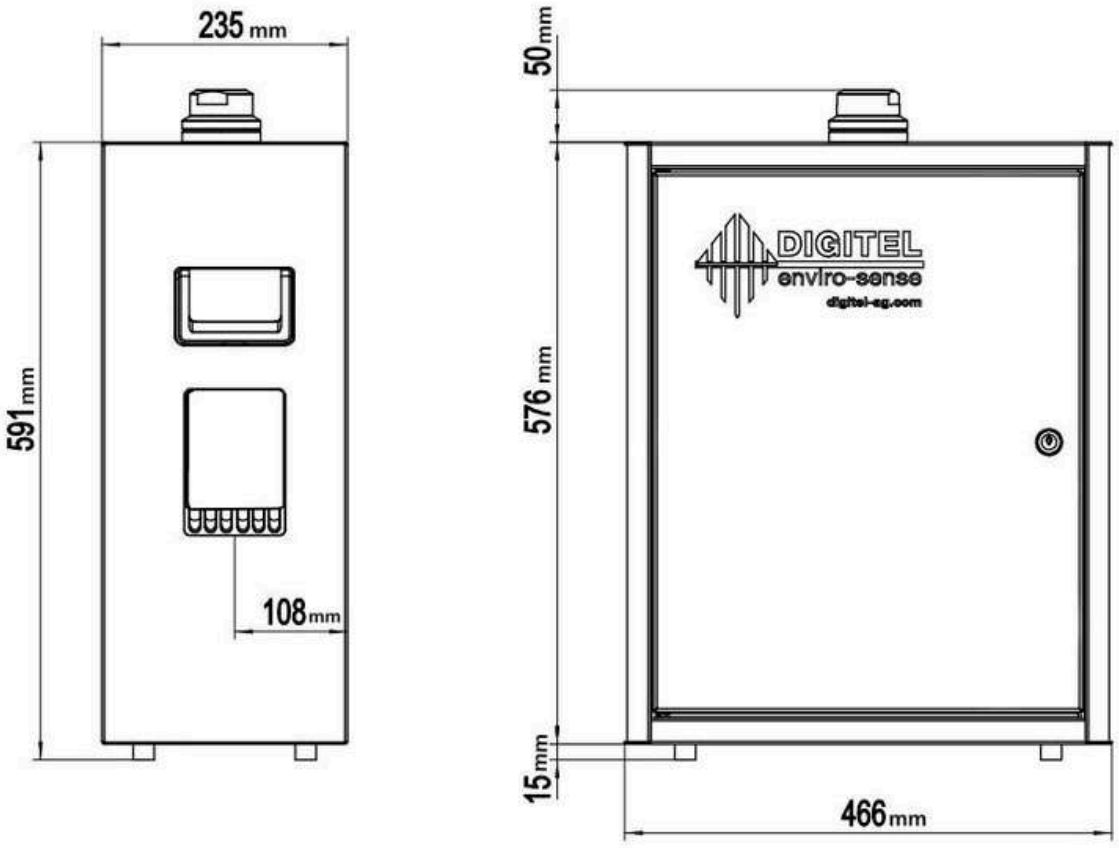
Excellent references

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.

FACTS & FIGURES

- Light weight (21 kg) but robust and weather proof
- 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

Field Housing Dimensions



Technical Data

Flow rate	15 – 50 l/min
Filter	Up to 18 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.
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
Mean life cycle suction unit	> 40'000 h
Constancy of sample flow	< 2 %, with calibration at 20°C, operating at -20°C-50°C, see TüV report
Sensors	Flow sensor, ambient and internal (flow) pressure, temperature, humidity, filter storage temperature
Flow meter type	Venturi type orifice
Interfaces/Interface protocols	RS232C, USB, Ethernet, RS485 / DIGITEL, Bayern-Hessen, AK, TCP/IP, HTTP, FTP
Internal memory	16MB, ring buffer, filter data of two years of daily sampling
Power supply	230 V AC / 50 – 60 Hz; max. 2 A / 180 W mean consumption 80 W
Application range	-20° to 50°C; 0 % to 95 % RH
Material	All components, including inlets in the suction area, are made of anodised aluminium. POM filter holders come as standard, while aluminium filter holders are available upon request. Stainless grids for filter holders can also be provided.
Field housing dimensions & materials	466x235x641mm Protection class IP54 (higher grade on request)
Weight	21 kg
Noise level	<50dB(A) at 1m, <32dB(A) at 8m
Flow sensor accuracy (calibrated)	< 1 %
Ambient/internal pressure sensor range	300 – 1100 hPa
Ambient/internal pressure sensor accuracy (calibrated)	± 0.12 hPa
Ambient/ internal temperature sensor range	-40 – +65°C ±
Ambient/ internal temperature sensor accuracy uncalibrated / calibrated	1°C / ± 0.5°C
Ambient/internal humidity sensor range	0 – 60°C: 0 – 100 %
Ambient/internal humidity sensor accuracy	± 3 % rH
Filter storage temperature sensor range	-20 – +60°C
Filter storage temperature sensor accuracy	± 0.1°C

Alomar Observatory, Andøya Island, Norway

Features

- Touch screen 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
- 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
- Remote control and filter list upload

Options

- LTE router for direct remote access
- Text message module for status and messages
- Filter identification via barcode reader or RFID
- Sampling controlled by external sensors (e.g.: wind sensor or particle counter)

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)
- 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

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