DIGITEL

Technisches Büro für Digitalelektronik
Elektronischer Apparatebau
Messgeräte für Umweltschutz

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

DPA-14 DL

Double Line Low Volume Aerosol Sampler (LVS)

Product Information

DIGITEL
enviro-sense

Auchencorth Moss Air Quality Supersite in UK © Enviro Technology Services

Digitel DPA-14 Double Line

The DIGITEL Low Volume Sampler (LVS) DPA-14 Double Line (DL) is a fully automatic system to sample dust and aerosol particles in accordance with EN12341. It features two completely independent sampling lines with automatic filter changers for parallel sampling of PM10 and PM2.5 inlets. The sampler's operation range in standard execution is 15 to 50 litres per minute (0.9 to 3m³/h). The Digitel LVS DPA-14 DL has two magazines of 30 filters each stretched in filter holders for up to 4 weeks of daily sampling of PM10 and PM2.5 samples. They are automatically changed to the flow position at the preset time. The cabinet housing of the Digitel LVS DPA-14 DL is suited for 19'' rack installation or can be installed on the floor or on a table in a measurement station. An additional noise baffler allows extremely silent operation. 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 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 Digitel LVS DPA-14 DL 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 bar code reader or RFID allows direct identification of the filters in the sampler.

KEY FEATURES

- Autonomous, continuous sampling
- Automatic filter changers for 2 x 30 filters
- Two completely independent sampling lines
- Constant and precise flow
- Flow range 15 - 50 l / min
- Filter diameter 47 mm
- PM2.5 and PM10 measurements according to EN12341
- All components used from EN12341 type tested DPA-14 standard version

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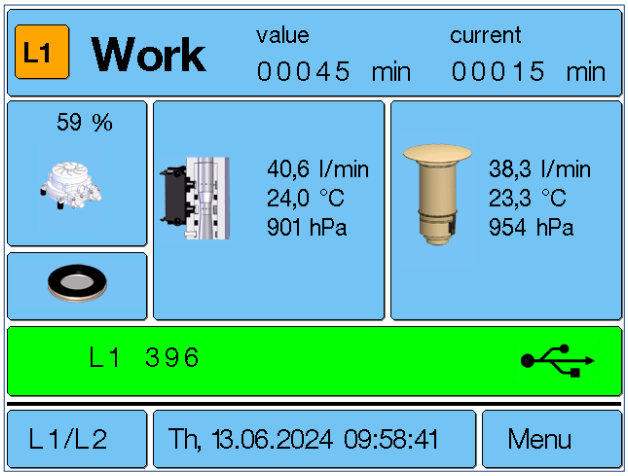
Easy Programming

The touchscreen allows for 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

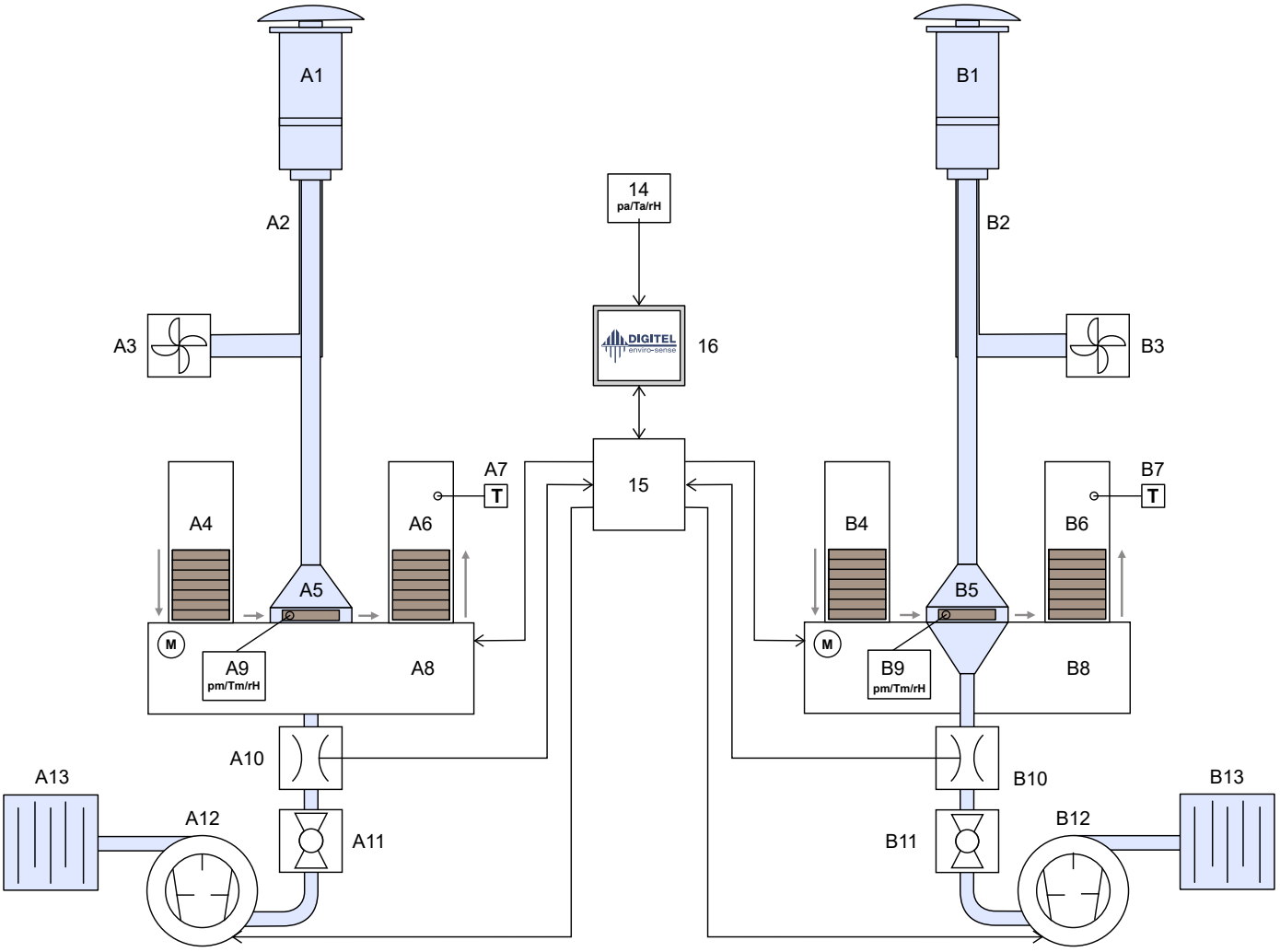
The Digitel LVS DPA-14 DL has a RS-232C interface which is used for data transmission with various protocols (DIGITEL, Bayern-Hessen-Protocol, AK-protocol) and for remote control. The internal memory has the ability to store data during two years of daily sampling. Additionally, the measuring data can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

Design and Operation

The air is sampled through two TSP / PM10 / PM2,5 / PM1 inlets, using sampling tubes. Around these tubes, protective tubes allow a ventilator forced, filtered air stream as sheath air to avoid thermal effects on the sampling tubes. The air flows vertically from the top to the bottom through the filters placed in the flow chambers. The upper parts of the flow chambers work like diffusors with regular cross sections and ensure uniform loading of the exposed circular filters. The LVS DPA-14 DL changes the filters automatically. Both sampling lines can be operated completely independently. Behind the filters, the transported air quantity is measured by Venturi type orifice flow meters. The blowers are 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 meters 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, temperature, volume and the operating status as well as the failure status of each sampling line.

Design and Operation Flow Chart



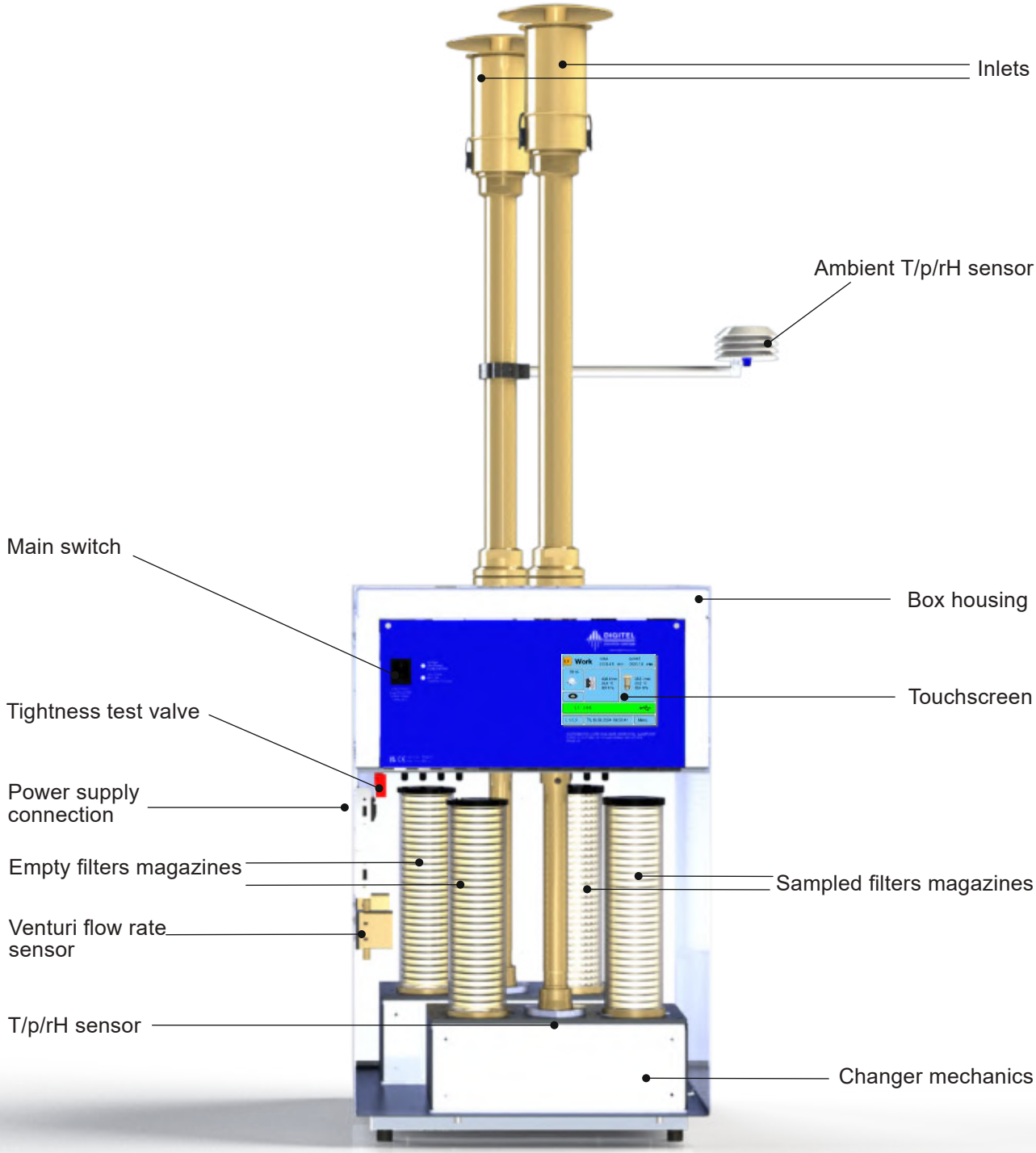
Line A and B

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. Blower
13. Noise baffle

Central control unit

14. Measurement ambient T, p and rH
15. Control unit
16. Touchscreen

Parts overview



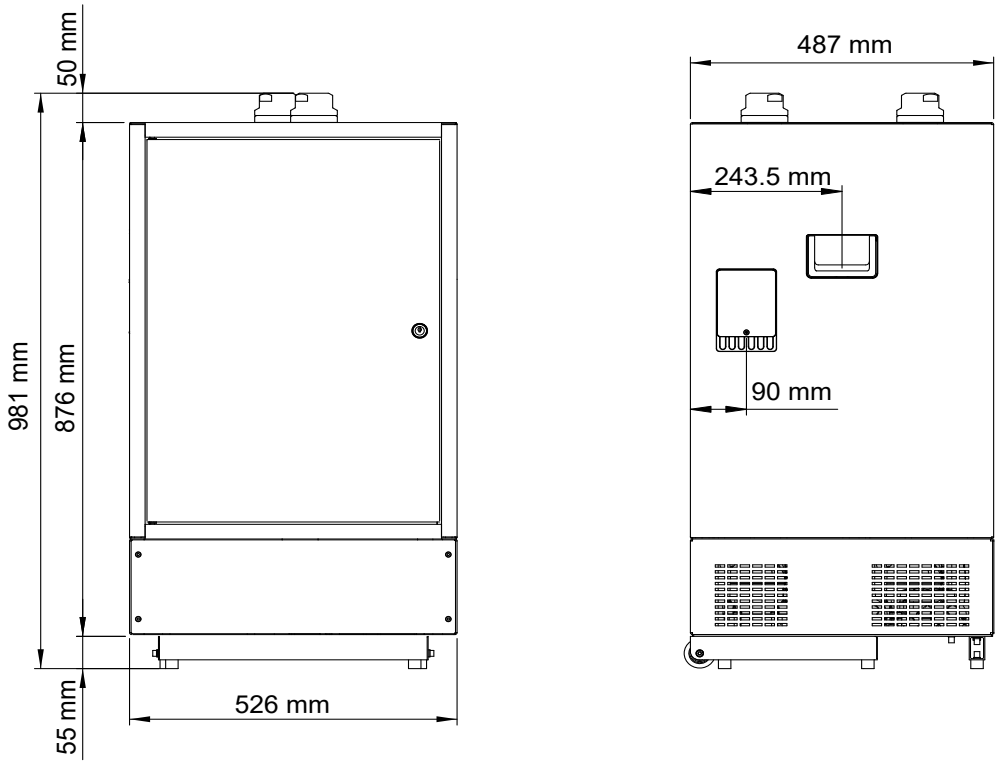
Superior coating

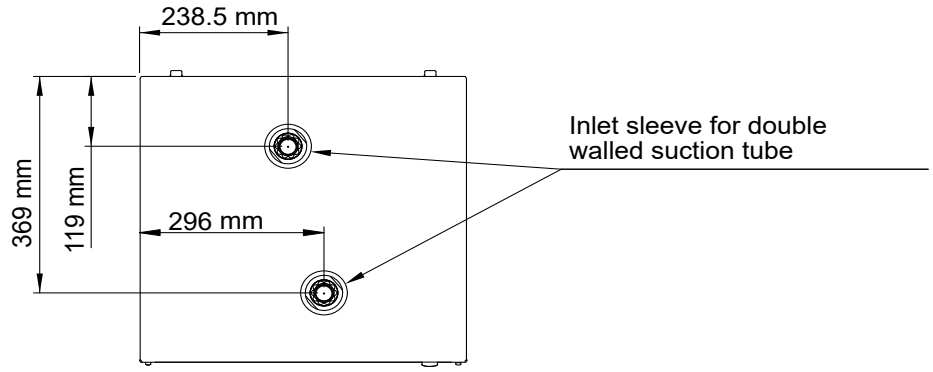
All parts that come into contact with measuring air, are made of aluminium and coated with a very corrosion- resistant and extremely smooth anodised surface (Ematal).

GOOD TO KNOW

- Light weight but robust and weather proof (field housing)
- Low energy consumption, low energy cost
- Low maintenance cost
- Maintenance free blowers
- Easy programming with touchscreen
- Easy filter handling
- Software for EN12341 tests

Field Housing Dimensions





Technical Data

Sampling	• Two independent sampling lines • Flow rate: 15 – 50 l/min • Filter: round filters of d = 47 mm, flowing area d = 40 mm • Filter changer capacity: 2 x 30 filters in filter magazines plus 2 x 1 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. 4A/360 W • Mean consumption: 160 W incl. 2 coolers (50%): 200 W • Cooling capacity of compressors: 360 W each (Option), max. power consumption 40W each • 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 487 x 981 mm, protection class IP54 • 19" indoor housing (without inlet) 448x 455x 986 mm, 36 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

Alomar Observatory, Andøya Island, Norway

Features

- One 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
- Two Venturi type orifices, 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
- 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)
- Heating for inlet or filter changer
- Filter identification via barcode reader or RFID
- External meteorological data collection (e.g.: wind direction and wind controlled measurement)
- Printer
- 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 customized 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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we care

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