

CPM-300 Continuous Particulate Monitor



Purpose

The CPM-300 monitor is designed to continuously measure the alpha and beta particulates concentration in the air. The air can be sampled directly from working environments, ventilation systems or surrounding environments. The monitor displays and archives the measured values and activates the alarm if the pre-set threshold level values are exceeded. It can be used as a part of large monitoring systems with data transfer to the host system.

Description

The following components are attached to the support frame of the CPM-300 monitor:

- **Display Unit** consisting of a PLC panel with an LCD 5.7" touch screen provides the power supply to the system, it displays the values measured by the CPD-13 detector, it archives the measured values and displays the device status. It activates visual and acoustic alarms when the pre-set signal levels are exceeded. Ethernet communication interface is included.
- **CPD-13 Continuous Particulate Detector** ensures the measurement of the activity of alpha and beta active particulates in the air. It provides the setting and control of the measurement process. The measuring area with silicon detectors, the ^{241}Am source for the automatic checks of the detector, the system for the electro-mechanical movement of filter tape, the slot air flow meter and measuring electronics with an MCA (multichannel analyser) and microprocessor, are all placed in a hermetically sealed box. The device is equipped with a differential pressure sensor that monitors the blockage or rupture of the tape by monitoring the pressure drop on the tape. LED indicators are installed on the box to display the status.
- **VP-30 Vacuum Pump** ensures the required air flow in the measuring line; the air is sucked through the CPD-13. The CPD-13 controls the flow rate.

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Main Advantages

- Adjustable mechanical arrangement
- The use of a filter tape allows continuous measurement in a matter of months
- Background compensation in real time
- Adjustable signal levels for alpha and beta channels
- Accessible components for easy maintenance
- Various communication interfaces

Standards and certifications

IEC 60761 Equipment for continuous monitoring of radioactivity in gaseous effluents

Electromagnetic compatibility (EMC)

EN 55022, EN 61000-6-144, EN 61326-1



PLC screen and visual indication

Description

The setup of parameters and mode of measurement is performed by the CPD-13 via RS-485 interface on a PC with installed service software.

The CPD-13 ensures the flow control, controls the filter tape movement, converts the flow values to standard conditions (temperature, pressure), converts the detector signals to the chosen unit of activity (for example Bq/m³) and it monitors the device status.

The measurements and alpha and beta concentration calculations are performed continuously.

The measuring process

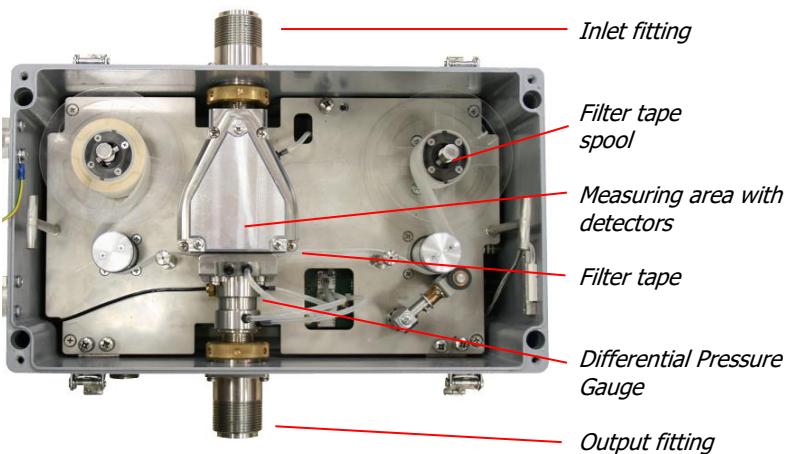
The sample air passes through the inlet fitting into the measuring area of the CPD-13, it passes through the filter tape, slot air flow meter and exits through the outlet fitting into the VP-30 vacuum pump.

The filter tape collects the aerosol particles. The silicon detectors inside the CPD-13 provide continuous measurement – three detectors are to ensure maximum efficiency located close to the filter tape and measure the response to the activity of particulates collected on the tape, the fourth is to ensure the background compensation.

Absolute pressure and air temperature measurement enable the conversion to standard conditions. The device enables continuous or periodical movement of the tape – with the possibility to determine the period.

The detected signals are processed electronically using two MCAs (one for the measurement signal, one for the background compensation), converted to volume activity and transferred to be displayed on the PLC. The pre-set threshold level values are continuously compared to the current calculated values; when the limit is exceeded, the visual and acoustic alarm is activated.

Basic components of the CPD-13:



Specification

Alpha measuring range (²⁴¹ Am, 2h period)	1.5 ~ 1E6 Bq/m ³
Beta measuring range (²⁰⁴ Tl, 2h period)	3.7 ~ 1E6 Bq/m ³
Alpha energy range	2.5 ~ 6.5 MeV
Beta energy range	0.2 ~ 2.5 MeV
Detectors	type Si - PIN
Filter tape	25 m x 50 mm
Aerosol filtration efficiency Ø 0,15 ÷ 0,17 µm	min. 90 % for the rate of 170 cm/s
Nominal air flow (adjustable)	20 l/min
Pressure drop at nominal flow	about 400 Pa
Air circuit connection	M39 x 2
Communication interface	Ethernet
Measurement setup	RS-485
Temperature range	+5 ~ 50 °C
Dimensions	380 x 1750 x 500 mm
Power supply	230 VAC, max. 150 W
Weight (approximately)	55 kg

Models and Accessories

Type	Description
K1385	CPM-300 Continuous Particulate Monitor
Consumables	
K0021	LFS-2-50 Filter Tape
Related products	
K0912	CPD-13 Continuous Particulate Detector
K1380	VP-30 Vacuum Pump
Alternative products	
K1032	CPM-310 Continuous Particulate Monitor



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