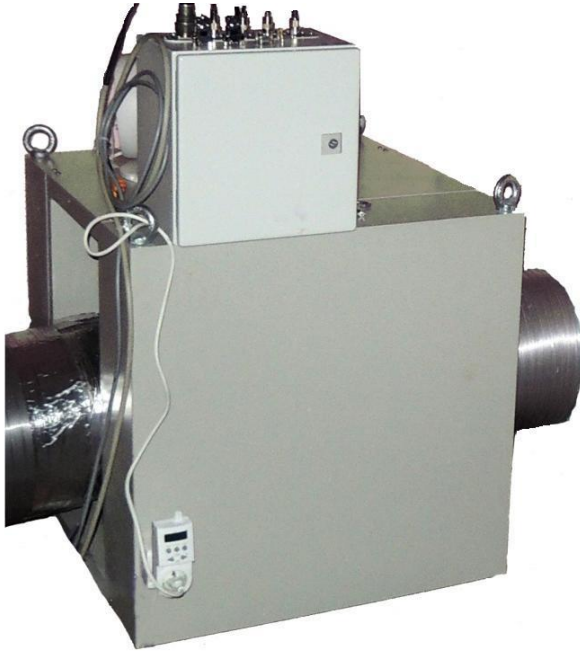


PET-02 PET Air Monitor



The PET-02 monitor is intended for the monitoring of gaseous effluents in facilities that produce and process positron emitting radionuclides.

Typical users include PET centres and cyclotron facilities.

Purpose

The PET-02 monitor is intended for the monitoring of gaseous effluents in facilities that produce and process positron emitting radionuclides. Typical users include PET centres and cyclotron facilities.

The monitor is especially suitable for the detection of ^{18}F and radionuclides of biogenic elements of ^{11}C , ^{13}N , ^{15}O but it is also capable of detecting other positron emitting radionuclides (e.g. $^{82}\text{Sr}/^{82}\text{Rb}$ and $^{68}\text{Ge}/^{68}\text{Ga}$).

The PET-02 monitors may be used as part of most monitoring systems or may serve as autonomous monitors when connected to a local display unit.

Description

The PET-02 monitor is composed of the following main parts:

- A measuring pipe of a circular cross-section with flanges to be used on the connected pipe
- A pair of plastic scintillation gamma detectors in a coincidence arrangement placed tightly to the measuring pipe on opposite sides with each detector being lined with lead shielding on five sides
- Processing unit containing a pair of multichannel analysers (MCA-1000) and electronics of the coincidence counter

Main Advantages

- A device optimized for the detection of typical radionuclides manufactured in cyclotrons for PET centres
- Detectors designed so as to minimize the influence of the background
- Minimization of false coincidences
- Local display and control and/or ability to be part of a larger monitoring system



Connectors of the processing coincidence unit (can be modified)

Description

The PET-02 monitor is placed into a space that is protected from the weather. To ensure the required measurement accuracy, stable temperature of the detectors needs to be maintained (typically 25 °C). Where required, forced or artificial ventilation is used to maintain the ambient temperature.

The physical phenomenon of positron annihilation in a collision with an electron is used to detect positrons where a pair of photons with an energy of 511 keV is emitted which escape in opposite directions. The same phenomenon is used as the basis for diagnostic PET apparatuses.

The processing logic operates in the regime of coincidence summations. It enables the setting of the parameters to count the signals from both detectors which fulfil the condition of time and amplitude coincidence. The advantage is minimization of false coincidences. The resulting count of the impulses is directly proportional to the number of annihilations of positrons that took place in the measured volume.

The counts can be recalculated to volume activity.

Results can be displayed either in the place of measurement (e.g. on a local display unit LZJ-22) or remotely on another display unit. The monitor can also be connected and pass on the results to a host monitoring system where the values obtained may be archived and further processed.



*Installation of PET-02 in air ducts
in a nuclear medicine facility*



Specification

Detector	2 x plastic scintillator
Detector dimensions	355 x 345 x 50 mm (14 x 13½ x 2 in)
Energy range	150 keV ÷ 1,5 MeV
Referential nuclides	¹⁸ F, ⁶⁸ Ge
Shielding thickness (Pb)	50 mm (2 in)
Length of the measuring pipe	600 mm (23½ in)
Diameter of the measuring pipe	300 mm (11¾ in)
Display and Control	local or host system
Weight	approx. 430 kg (950 lb)
Dimensions *	685 x 845 x 685 mm (27 x 33¼ x 27 in)
Ambient temperature	+5 ÷ 50 °C (+41 ÷ 122 °F)
Ambient relative humidity	max. 80%, non condensing
Power supply	230 V AC

* Without input and output flanges

Models and Accessories

Type	Description
K1259	PET Air Monitor PET-02
Related Products	
S0803	Radiation Monitoring system
K0743	LZJ-22 Local Display Unit

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