

BITT Technology

AMS02

Aerosol Monitoring System



Developed by BITT Technology
& Institute of Nuclear Techniques,
Technical University of Budapest

Profile: Measuring of radioactive aerosols, especially artificial nuclides

The AMS 02 has been developed by BITT Technology and the Institute of Nuclear Techniques, Technical University of Budapest and includes the experience of more than 30 years. Among other things, the most important features are the reliable function also under difficult conditions, as well as the possibility of a maintenance-free operating over months.



The aerosol measuring system applies two consecutive static filters, the first one for aerosol particles and a second planar filter for molecular iodine. The presence of non-natural radioactivity on either of the filters is detected by means of alpha-, beta- and/or gamma-counting. If a warning or alarm signal is generated, a third consecutive sampling and measuring unit is connected, as the air leaving the molecular iodine filter enters an appropriate canister filled with a specific absorber in order to separate organic iodine species which would escape the first two sampling devices. Activity of this unit, configured in Marinelli geometry, is measured by gamma counting. The static filter equipment is served by a manipulator from a stock of 500 filters.

MAIN TECHNICAL PARAMETERS

Size: 730 x 920 x 1520 (2100) mm
Weight: approx. 415 kg
Power: 230 V AC / 50 Hz / 950 VA
Environment: Temperature -15°C + 25°C
 Relative humidity 0 - 70 %
Accumulated air: Temperature -30°C + 40°C
 Relative humidity 0 - 99 %
Detectors:
 - 2" x 2" Na(Tl) (2 pieces)
 resolution 8 % (137Cs 662 keV)
 - PIPS 1700 mm²
 resolution 55 keV (α 241Am) < 30 keV (β)
 - Coaxial germanium detector (HP Ge) with electric cooling - No liquid nitrogen required
 resolution 2.0 keV FWHM at 1.33 MeV
 relative efficiency 33% at 1.33 MeV

HIGH PERFORMANCE DSP-BASED GAMMA SPECTROMETER 16k channels for HPGe

- DIGITALLY stable: consistent answers for long counts, changing count-rates and temperatures
- Throughput >100000cts/s
- Automatic optimization for best detector performance (patented), including Auto-Pole Zero
- Zero-Dead-Time (Loss Free Counting) correction
- Low Frequency Rejector (patented digital filter improves resolution for mechanically-cooled systems)

Pump: Nominal flow rate > 6 (normal) m³/h

Filters:

- 60 mm diameter glass fibre filter Schleicher & Schüll type 10 (DIN 24 184)
- 60 mm diameter paper filter with active carbon impregnated (charcoal)
- Ag-activated silica gel filter column

Limit of detection (LD) [Bq/m ³]	duration of air filtering		
	5 min	1 hour	24 hours
Normal Mode			
131I aerosol/NaI(Tl)	5.4	0.8	0.066
131I iodine/NaI(Tl)	6.4	0.53	0.044
137Cs aerosol/NaI(Tl)	4.1	0.67	0.056
α-Activity (²³⁹ Pu) aerosol/PIPS	1.5	0.5	0.042
β-Activity (⁹⁰ Sr) aerosol/PIPS	2.5	0.7	0.052
137Cs aerosol/HPGe	6.7	0.77	0.006
Off-Normal-Mode (organic iodine filter)			
131I iodine/NaI(Tl)	8.7	0.72	0.058



for more information
www.bitt.at
office@bitt.at

BITT Technology
 Wienerstr. 70
 A-2104 Spillern
 Austria

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Container for AMS02 with attachments

The insulated container has no windows and is equipped with a door with a safety-lock and with a door-handle. Furthermore, the roof is prepared for the installation of the meteorological mast. On the frame of the roof a CEE-plug with 32A is installed, used for the power supply (3 x 400 V AC/50 Hz). Inside of the container is an insulating-protection and automatic cut-out, as well as a light with an on/off switch and some sockets (220 V).

The floor is strengthened and enables a loading capacity of 800 kg/qm.

The container stands on a ground work of concrete and is fixed with a corresponding anchoring in the ground work. On the roof is a lightning protection installed.

Technical data:

Outside dimensions: approx. length 3.000 x width 2.450 x height 2.630 mm

Air-conditioning system: split air-conditioner

Central station BITT SCADA

The software package for an early radiation monitoring control center acquires data from measuring stations and provides visualization as well as the control of the stations is possible.

Alarm-Module (Hardware and Software)

Hardware

- GSM modem for SMS alarm (Wavecom modem, incl. external antenna)
- 8 x relays output (max. 230VAC, 2A)
- 8 x analog input (3,3VDC – 20VDC) (currently no software support)
- Status LED's on the front side
- Power supply: 15VDC
- External Power supply for 230VDC included in the delivery
- 19" 1HE rack mount case

Software

- alarm module, capable of sending information (alarm, warning, status, etc.) via emails and SMS (in combination with Alarm Hardware). The module is capable of switching alarm outputs as well (with Alarm Hardware).
- trigger based
- an event causes an trigger to take action
- trigger are user defined
- each trigger has it's own user level
- user rights on stations have majority, thus they cannot access stations where they have no right for
- watchdog trigger, send a notification if no data is received
- vast logging
- acknowledgment of each triggered event



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Austria

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