GALILEO Series

RADIATION PORTAL MONITOR FOR VEHICLES



Large, high-sensitivity plastic scintillators

Configurable layout according to vehicle type

Dynamic background evaluation

- Efficiency per detector (Cs-137): 150 kcps/µSv/h
- False alarm rate: 1:10'000
- Pass-through speed control
- Automatic e-mail with measurement report
- Vehicle plate reader or camera for picture acquisition
- Digital outputs for external devices

The **GALILEO** radiation portal monitor is designed to automatically scan the load of vehicles (trucks or rail wagons on weighting stations) passing through its structure, and to detect any radioactive contamination due to the presence of gamma emitting radionuclide.
The standard **2UV** configuration is composed of 2 large plastic scintillator detectors, an electronic desktop rack and a PC control console.
A **4UV** configuration is also available, employing 4 scintillators, as well as other customisable layouts.
The count rates acquired by the detectors are continuously compared to the pre-set alarm thresholds; if a threshold is exceeded, the system immediately gives a warning to the operator through acoustic and luminous indications.
The detectors are installed in a portal configuration: two mechanical structures are installed one at each side of the passageway. The number of detectors can be adapted to the expected vehicle type or measurement geometry. Each detector is composed of a high-efficiency plastic scintillator facing the passageway, coupled with a PMT and the electronics for HV and signal processing. The detectors are properly shielded to lower the environmental background contribution.
A set of transit sensors detects the vehicle's transit and calculates its speed.

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Information in this publication supersedes all earlier versions
All specifications are subject to change without notice

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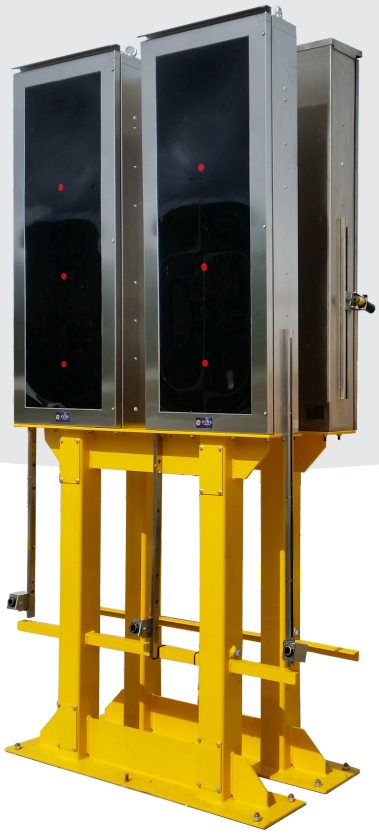
CONFIGURATION

GALILEO radiation portal monitor can be arranged and configured changing the detector number and their installation geometry:



GALILEO 2UV version
2 detectors,
one at each side





GALILEO 4UV version
4 detectors, 2 at each side



Mechanical structure

- Housing the large-surface plastic scintillators and the transit sensors
- Built for outdoor installations, with IP65 protection grade
- Designed to facilitate maintenance operations of the internal elements
- Support columns height defined according to the installation site and the type of vehicles to be monitored (trucks of different dimensions, wagons, etc.)

Electronic desktop rack

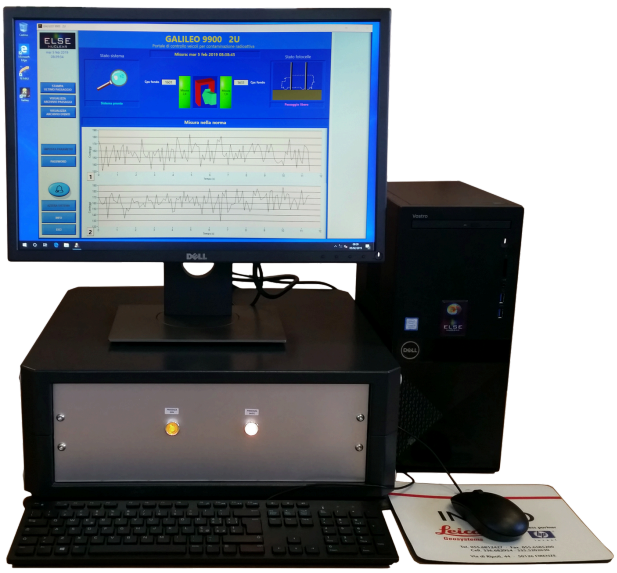
- Housing power supply, acquisition/counting electronics, relays for digital outputs management, and control console connection interface
- Up to 5 programmable 24V digital outputs to command external devices, e.g. barriers, traffic lights, interlocks, alarm indicators

PC control console

- Processing and management software GALILEO
- Providing complete control over the system



Electronics desktop rack



PC control console

Special configurations and examples

According to specific requirements, GALILEO Series portal monitors can be configured with special components to best fit the measurement layout or the site characteristics. Advices and recommendations can also be shared with the end user, operation-wise.



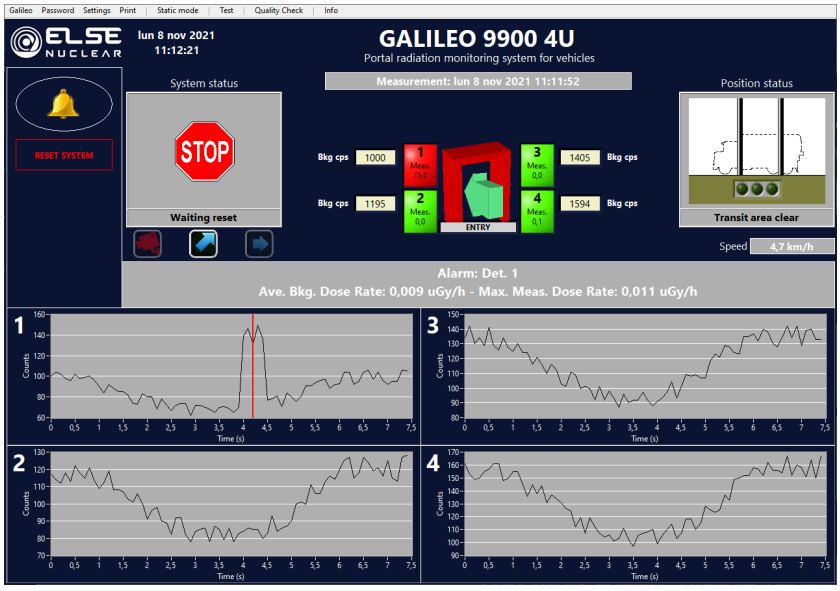
GALILEO 2UV with short columns



GALILEO 4UL for railway weighting stations

GALILEO SOFTWARE

The radiation portal monitor detects and measures the gamma radiation coming from the vehicle passing through and, if the alarm/pre-alarm thresholds are trespassed, optical and acoustic signals are activated. The thresholds are set in sigma units (i.e. number of standard deviations) over the background value.



GALILEO software main panel: count rate VS time, function menu and measurement result

Every 100 ms, the software controls the trend of environmental background: too high or too low values are considered an anomaly (i.e. malfunctioning). Moreover, the program is capable of considering the shielding effects due to the vehicle itself, applying a dynamic algorithm to the detected counts and calculating the background values to be subtracted from the measurement. The algorithm is able to adapt itself to differences in type of load, speed and dimensions of the vehicles; any spurious event is properly filtered, in order to prevent false alarms and to achieve the best sensitivity.

Finally, the software warns the operator if the transit sensors are abnormally engaged.

All measurements results are saved in the internal archive and included in printable reports. The system can automatically convert each report in a pdf file and send it to a defined e-mail address.

TECHNICAL SPECIFICATIONS

Measurement features

- False alarms rate: <1/10'000
- Efficiency referred to Cs-137: 150 kcps/µSv/h (per detector)
- Energy range: 35 keV ÷ 2 MeV
- Maximum transit speed: settable by the user, up to 10 km/h (recommended)

Detection unit

- Detector type: plastic scintillator
- Number of units: from 2 to 4 (custom configuration upon request)
- Volume of each unit: 25 l
- Surface of each unit: 5000 cm^2
- Depth: 5 cm
- Transit sensors: 2 (3 in 4UV version)

Detector lodging

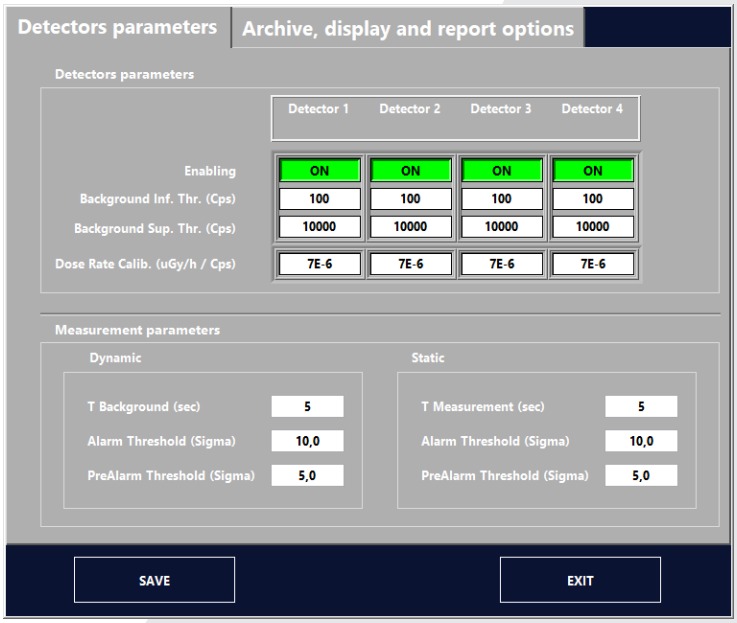
- Maximum dimensions (WxHxD): 734 x 1483 x 222 mm
- Material: stainless steel, with plexiglass windows
- Protection grade: IP65
- PMMA window: 5 mm
- Lead shielding on external sides: 10 mm
- Total weight (each): 171 kg

Support columns

- Weight and dimensions: typically 130 cm or 170 cm, about 37 kg/m

Electronic desktop rack

- Statuses management: 5 relays NO for digital outputs



GALILEO software parameters panel

ACCESSORIES AVAILABLE UPON REQUEST

- Cs-137 point source, activity < 10 kBq, for periodical quality controls
- Source holder for test and quality controls
- Plate detection kit: infrared illuminated camera for plate digital reading and archiving
- Vehicle identification kit: camera and software for vehicle images archiving
- ALU alarm unit for status signalling
- Traffic light: additional status indicator
- Neutron detection sub-system
- Warranty extension from 12 months to 24 months

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