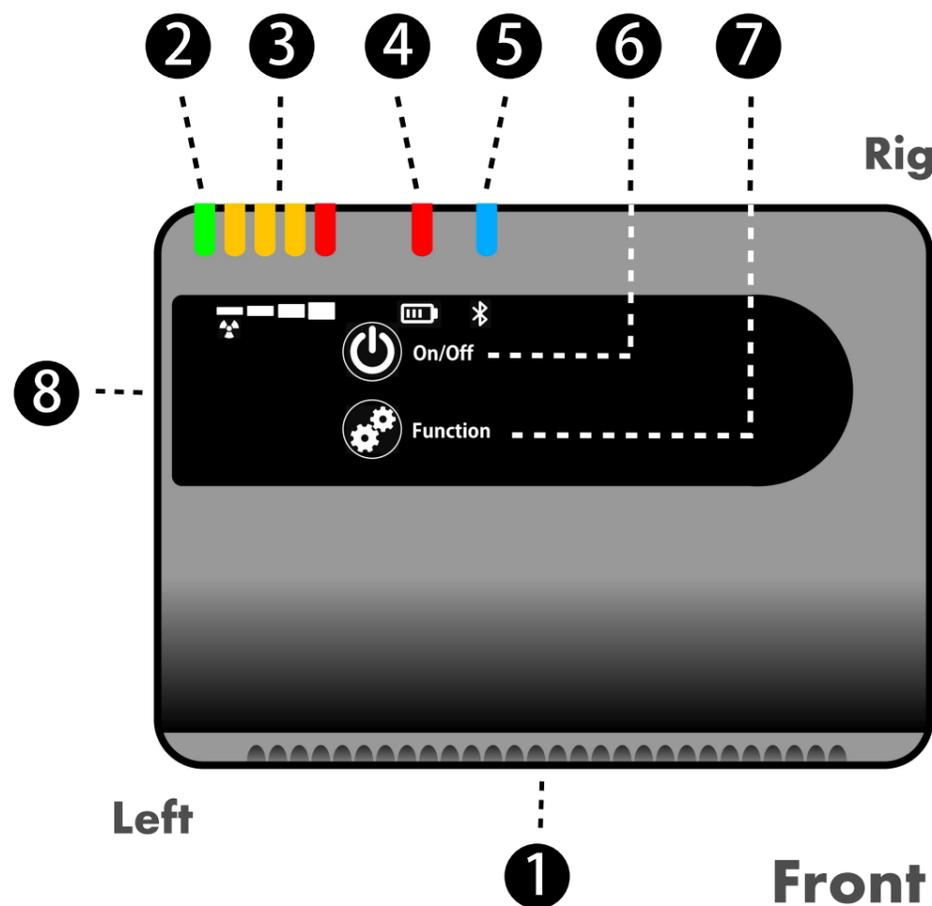
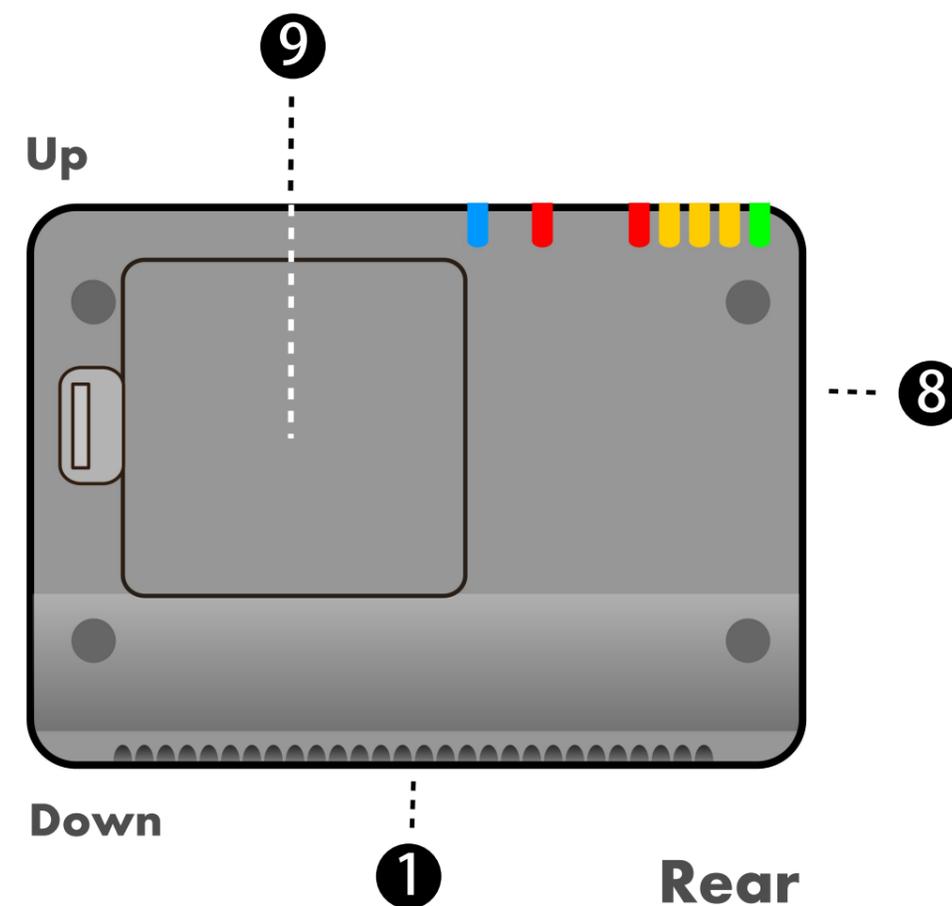


# Learn quickly about your new detector (beta and gamma emissions)



## Legend:

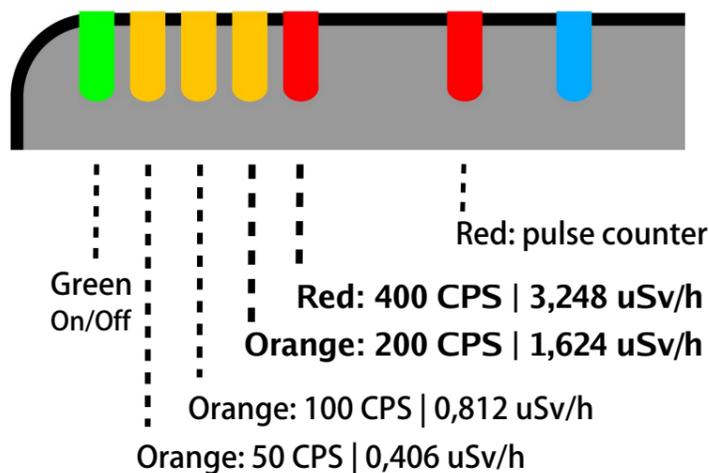
- 1 Radiations sensor (Geiger – Müller tube)
- 2 Green Led: On/Off status
- 3 Orange / Red led: levels of radiation
- 4 Red led: impulse counter / low level battery
- 5 Blue led: Bluetooth status On/Off
- 6 On/Off button
- 7 Function button
- 8 mini USB port for external power supply
- 9 battery compartment (3xAA battery model)



## First steps for using your PRD 100

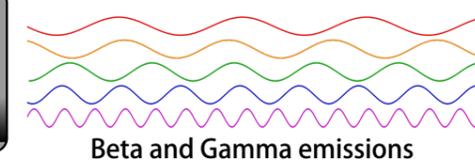
- 1) Insert the batteries in the battery holder (9) and check the right polarity +/- . Close the battery compartment
- 2) Press and release the On/Off button (6) for 1 second to turn on the detector
- 3) Wait for few second the detector startup and the led checking. PRD 100 is ready only when the green led (2) is bright.
- 4) If the blue led (5) is bright, this means you can link also your external Smartphone/Tablet/Notebook (Android compliance) using the Bluetooth mode. Use the official APP to extend the functionality of PRD-100. Download from Google Play Store Albert LIGHT PRD-100 APP or Marie PRO PRD-100 APP: <https://play.google.com/store>
- 5) Start to detect sources of radiation around you approaching the detector in direction of the materials/goods to check. The radiations sensor is placed in the lower part of the device
- 6) If the device will detect some sources of radiation, you'll see the led bar (3) become bright. 3 Orange and 1 Red led will inform you. When a source of radiation is detected also the red led (4), impulse counter, become bright and blinking. Detect the radiation levels around you using the thresholds here after shown.

## How to read radiation levels



## Buttons functionality

| How to              | Button | Mode  |
|---------------------|--------|---|
| Turn ON the device  |        | Press for 1 second and release                |
| Turn OFF the device |        | Press for 2 seconds and release               |
| Turn ON Bluetooth   |        | Press 1 time and release                      |
| Turn OFF Bluetooth  |        | Press 2 times, in rapid sequence, and release |
| Turn OFF the buzzer |        | Press 3 times, in rapid sequence, and release |
| Turn ON the buzzer  |        | Press 4 times, in rapid sequence, and release |



## What is PRD 100

PRD 100 is a portable radiation detector, easy to use, for personal and daily use. The device detects the ionizing radiations inside both Beta and Gamma spectrum for alerting users quickly by a simple led display and a buzzer. In addition to a colored information PRD 100 produces a sound alert in case of dangerous levels of contamination of food, materials, vegetables, clothes, water, wood, tools, ground, .... PRD 100 can operate in stand-alone mode and even on-line functionality. Infact the device is provided by a Bluetooth radio interface. This feature allow to send the data of measurements directly to a SmartPhone (Android) so to show the informations with details on a large display. Day, Time, Levels, GPS Location, can be shown easily on the display and shared the alerts via Internet (i.e. E-mail) or shared like simple posts on the main social networks (i.e. Facebook, Twitter, ...). PRD 100 works with internal batteries (3x1,5 AA batteries) and even with external source of energy (5 Vdc, via mini USB).

## Technical specifications

Radiation detector with Geiger tube (glass tube)  
 Size: 123 x 91 x 35 mm  
 Case: ABS, gray color  
 Led: n. 5 colored led (green=on; orange and red=threshold indicators) + n. 2 colored led (red=impulses detection/batteries status; blue=Bluetooth status)  
 Sensor: Geiger tube model J305 BY, specific to detect radiations inside Beta and Gamma spectrums.  
 Button 1: impulsive button for turn on and off the device  
 Button 2: impulsive button for comuting the status Bluetooth On/Off, Buzzer Off/On  
 Connections: Bluetooth 2.0 radio (range of action in free air, up to 10 m of distance).  
 Internal power supply mode: using n. 3 batteries model AA – 1.5 V, alkaline or rechargeable batteries (batteries not included)  
 External power supply mode: using the micro-USB plug (5 V – max 500 mA); female connector (power supplier not included)  
 Operating Temperature: from - 10° C up to +50° C  
 Weight: 122 g (without batteries); 190 g (with alkaline batteries)  
 Compliance: CE, RoHS

## Why to detect presence of ionizing radiations

The disasters occurred in last recent years at the nuclear power plant in Chernobyl, Fukushima, Three Mile Island and the findings inside and outside the towns of all Europe of several radioactive waste dumps (i.e. slag from steel mills , etc ...) have produced serious contaminations of air, soil, food, vegetables, trees, objects, raw materials such as wood and metals. In many cases the contaminations of these radiations have come up in our homes, gardens, places of work without being detected during official controls. For this reason it is really important for people to have a portable, battery-powered, easy to use, low cost radiation detector, to be used to detect quickly critical conditions for their own health and safety. The device must be able to report and share with others any conditions critical and alerts. In the case of notice of contamination due to the presence of radioactive materials it must be alerted the police and all the health authorities . Early detection is crucial and must be widespread in cases like these. PRD 100 meets these requirements and satisfy the needs of the conscious people.

## Professional sensor for accurate controls:

Radiation Detection:  $\beta$ ,  $\gamma$   
 Recommended Voltage: 380V | Plateau Voltage: 340-440V |  
 Sensitivity  $\gamma$  (60Co): 65cps/( $\mu$ R/s) | Sensitivity  $\gamma$  (equivalent Sievert): 108cpm / ( $\mu$ Sv/h)  
 Max cpm: 30000  
 cps/mR/h: 18  
 cpm/m/h: 1080  
 cpm/ $\mu$ Sv/h: 123.147  
 Conversion Factor: 0.00812"

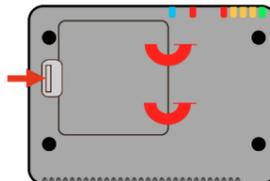
Note  
 Conversion factor: The conversion factor CPS->uSv/h of the sensor (tube) is [ x 0.00812 ]. You have to multiply this value for every single threshold of CPS.Millirem/h: To obtain the value in mrem/h you have to multiply the value of uSv/h for [ x 0,1 ]. Here below you'll find a useful link for more details on this conversion:  
<http://hptech.org/nuclear/convert/sievert.html>

The unit sievert (simbol Sv) is a measurement of the biological effects due to exposure of specific quantity of absorbed radiations. Here below some of the most common units of measure.

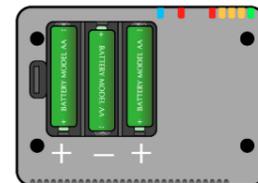
- Sievert (Sv)
  - milliSievert (mSv)
  - microSievert ( $\mu$ Sv)
- There is another unit of measure used to explain the biological effect of radioactivity. This unit is called "rem" .  
 As explained above, it's important even the intensity of the dose (or dose rate), that is the measure of the biological effects due to specifics doses of radiation absorbed per second or per hour.  
 The most common unit of measure used to explain the intensity of the doses are these:
- microSievert per hour ( $\mu$ Sv/h)
  - milliSievert per hour (mSv/h)
- To convert a measure of the dose absorbed every hour into an equivalent dose absorbed every year, you'll have to multiply the value  $\mu$ Sv/h or mSv/h for [ x 8760 ]. Result of 24 hours x 365 days = 8760.  
 The dose of radiation absorbed every year is shown using these units of measure:
- microSievert per year ( $\mu$ Sv/y)
  - milliSievert per year (mSv/y)
- I.e. The ongoing exposure per year to 0,12  $\mu$ Sv/h is equivalent to 1,05 mSv/y. This dose exceed slightly the international limit fixed to 1 mSv/y as suggested by some international organizations as the ICRP, International Commission on Radiological Protection.  
 As suggested by ICRP,
- the minimum levels of radiological emergency are between 1 and 20 mSv/y,
  - the maximum levels of radiological emergencies are between 20 and 50 mSv/y.
- Slight effects due to radiation poisoning appear after exposure to a dose of 0.5 Sv and 1 Sv. More severe effects appear if overpassed the threshold of 1 Sv.

## How to insert or change the batteries

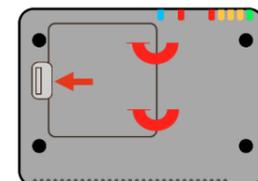
Turn the device on the rear side as shown in figure. Using a small plastic lever or a flat-head screwdriver, lightly press the plastic flap in the point and direction shown by the arrow. Then open the battery compartment.



Introduce, one by one, n. 3 full charged batteries model AA as shown in the figure. Pay attention to respect the right polarity. Introduce only new batteries or full charged batteries.



Replace the plastic cover over the battery compartment and apply a lightly pression to close the plastic flap. Now the device is ready for operation. Turn the device on the front side where are placed the buttons.



## How to power the device with an external source

On the left side of the device is placed a micro USB port (female). Use this port in case you need a long operation of the device. You can use an external power supply or an external battery pack (with USB plug). When you power the device with the external source, the internal batteries are automatically disconnected. The input voltage required is 5 Vdc – 500 mA.



## Turn on/off the Bluetooth communication

The device contains a Bluetooth interface. Press one time the button Function to enable the radio trasmission. This mode will allow you to link your device with an external Smartphone, Tablet or Notebook. Press in sequence two time the button Function to turn off the Bluetooth. A blue led in the upper part of the device will blink while the Bluetooth is on and during the regular transmission. We suggest to turn off the Bluetooth to save the energy of your internal batteries.

Note: Please refer to the userguide of your external device to link your smart terminal with the PRD-100. The standard PIN required during the pairing between two devices is: 1234

Reading the data in detail using the external display (for smartphone/tablet/pc) Please see the additional user guide supplied with the APP for Android and the application for PC.

Sharing the data using the APP (for Android o.s.) Please see the additional user guide supplied with the APP for Android and the application for PC.

## Turn on/off the buzzer

The device contains a Buzzer to inform you about the radiation detection and impulses. While the buzzer is ringing a red light is flashing in the display. You'll be able disable the internal buzzer pressing in sequence three time the button Function. Press in sequence four time the button Function in case you will need to retrieve the sound of the buzzer.

## Warnings and disclaimer

PRD-100, the personal radiation detector, uses a professional sensor to detect the presence of radioactivity. The electronic for analysing and counting uses the latest digital technologies with an advanced microprocessor for supervision. Despite these two characteristics PRD-100 can't be considered a professional measurer. In case you will detect some sources of radioactivity during your activity of monitoring of water, food, air, soil, materials, animals, ... we suggest you to inform immediately the local organizations and emergency infrastructures and all the professional services/staff dedicated to handle any emergencies and health hazards.

## Warranty

All our devices are subjected to strict tests and are covered against manufacturing defects in compliance with the norms in force. The warranty is effective from the date of purchase. We are not held responsible for damage or fault to the device or to any of its components if they are caused by improper use or wrong maintenance of the device.

PRD-100 system is manufactured and distributed by:

ITS srl  
 Via Enrico Mattei, 30  
 25030 Roncadelle (BS)  
 ITALY  
 E-mail info@itsint.com



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 For technical assistance, contact our staff: [info@prd100.com](mailto:info@prd100.com)