

# BARASOL multi sensors BMC2

○ FOR THE CONTINUOUS MEASUREMENT OF THE  
VOLUMIC ACTIVITY OF RADON.

## □ APPLICATIONS

- Measurements of radon in the ground:
  - geophysical studies,
  - earthquake predictions,
  - predictions of volcanic eruptions.
- Measurements of radon flux.
- Measurements of gas velocity in soils.
- Monitoring of the atmosphere in confined environments.

- Instrument designed to be used in difficult environments.
- Passive measurement, no disturbance of the environment.
- Simultaneous measurement of radon and of the main meteorological parameters:
  - temperature and atmospheric pressure,
  - rainfall measurement (as an option).
- Acquisition rate parameters adjustable for 1 mn up to 240 mn.
- 1 year of independent operating time for power supply and memory capacity.
- Power supply from 2 x 1.5 Volt alkaline batteries.
- Sensor parameters set by *RnView2* PC software (see technical data sheet).
- Monitoring of battery voltage and shocks.



Specifications



**Quantities measured :**

- internal: -  $^{222}\text{Rn}$ ,
  - temperature,
  - atmospheric pressure,
  - shocks, battery voltage.
- external with options:
  - two additional  $^{222}\text{Rn}$  channels,
  - a rainfall measurement channel.

**Measurement of radon :**

The radon enters a detection volume through three cellulose filters which trap all the solid daughter products.

The sensor is an implanted silicon detector with a depleted depth of 100  $\mu\text{m}$  and 400  $\text{mm}^2$  of sensitive area. It authorises the counting by spectrometry of atoms of  $^{222}\text{Rn}$  and its daughter products created in the detection volume (window set at between 1.5 MeV and 6 MeV).

The calibration of the sensor enables the volumic activity of the  $^{222}\text{Rn}$  to be calculated.

Radon: 50  $\text{Bq}\cdot\text{m}^{-3}$  per  $\text{imp}\cdot\text{h}^{-1}$  ( typically )  
Range from 0 to 1  $\text{GBq}\cdot\text{m}^{-3}$

**Others parameters :**

Temperature: accuracy  
0.05°C ( relative )  
0.1°C ( absolute )

Atmospheric pressure:  
0.1 hPa ( relative )  
1 hPa ( absolute ) from 500 to  
1500 hPa

Shocks: binary detection,  
the sensor is set for a sensitivity equivalent to that of the radon sensor ( the silicon detector generating spurious pulses in the event of a shock )

Battery voltage: 0.1 V ( resolution )

Rainfall measurement: 0.2 mm of water  
( resolution )

**Measuring cycle:**

adjustable parameters: 1 to 240 minutes

**Memory capacity:**

1 MByte Flash memory (saves the data if there is no power supply).

Storage capacity of more than 1 year for a measuring cycle of 15 mn.

**Power supply:****D type batteries**

- 2 alkaline batteries ( 10 months operating time )

- 1 Lithium battery ( 10 months o.t.)

**2 D type batteries**

- 1 Lithium ( 18 months o.t.)

**Operating temperature:**

-20°C to +70°C with alkaline batteries.

**Casing:**

Casing made of fibreglass and corrosion-resistant stainless steel.

Lining: 5  $\mu\text{m}$  of copper + 3  $\mu\text{m}$  of nickel.

2 Grab handles.

Protection index: IP 68.

**Dimensions:**

Height: 489 mm.

Diameter: 62 mm.

**Weight:** 2 kg. ( with 2 alkaline batteries ).

**Parameter setting and data retrieval:**

RS232 connection ( 19200 Bauds ).

Hyperterminal or,

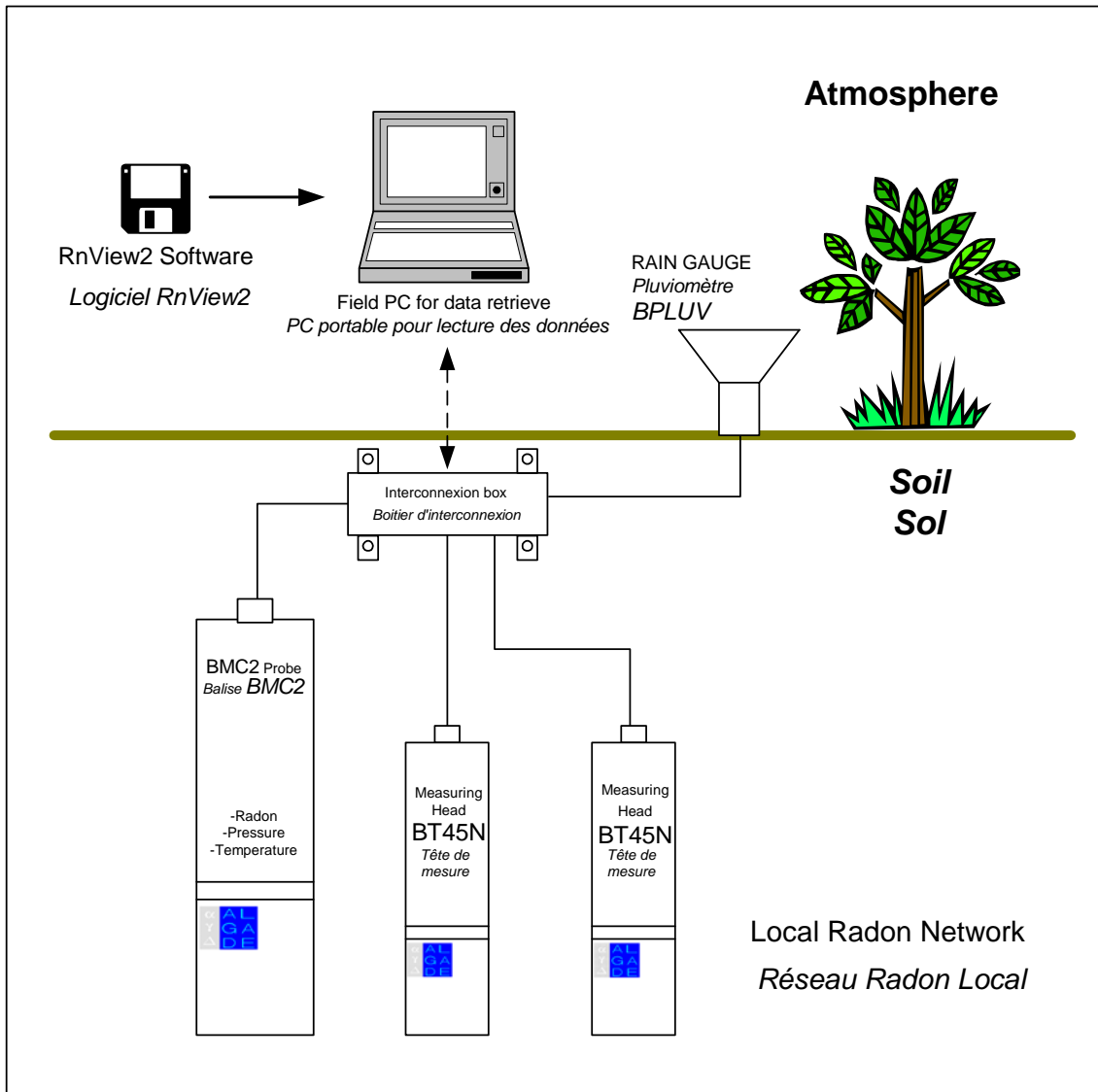
PC software for Windows 2000, NT, XP, Vista, Seven

**The sensor is delivered complete with:**

- a protective cover with shoulder strap for easy carrying on site,
- a certificate indicating the calibration coefficients of the radon.
- a user manual

# GEOPHYSICAL NETWORK BARASOL Multi Sensors

○ TO OPTIMISE YOUR RADON MEASURING SITE



## □ APPLICATIONS

- Measurement of radon in the ground
- Geophysical studies
- Earthquake predictions
- Prediction of volcanic eruptions

Specifications



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<http://www.algade.com>



- ❑ The complete system enables the Barasol MC2 probe to record :
  - 3 radon measuring points on a site with a diameter of about 50m,
  - rainfall,
  - atmospheric pressure,
  - soil temperature.
- ❑ All the data are recorded in the BARASOL MC probe which acts as acquisition centre for all the internal and external sensors.
- ❑ Offset power supply and PC connection make it possible to read back the data contained in the BARASOL MC probe without having to remove it from the environment it is measuring.
- ❑ Permanent connection by modem, radio modem or modem satellite.
- ❑ Operating temperature : -20°C to +50 °C.



### 1 - Barasol Multi Sensors BMC2 :

Specifications of radon probe BARASOL MC2 are described in the dedicated technical data sheet.

### 2 – BT45N Radon mobile head :

The radon mobile head uses the measuring principle of the BARASOL MC probe from which it is derived.

The pulses are transmitted via the interconnection box to the BARASOL MC probe which records them.



**Power supply :**

From external power supply .

**Sensitivity of measurement :**

50 Bq.m<sup>-3</sup> per imp.h<sup>-1</sup> (typical value)

**Length of cable (link to box):**

From 2 up to 25 m.

**Casing :**

Casing made of fibreglass and corrosion-resistant stainless steel.

Grab handle.

Protection index: IP 68.

**Dimensions :**

Height: 350 mm

Diameter: 61 mm

**Weight :** 1.5 kg

**3 - Interconnexion box and offset power supply :**



- 1 connection cable with a BARASOL MC probe,
- 2 inputs for the connection of two offset radon measuring sensors,
- 1 input for the connection of a rain gauge,
- 1 rs232 connector for connection to a PC or to a communication system,
- housing for 6 x 1.5V type D alkaline batteries. ( 2 batteries for BMC2 + 2 batteries per radon measuring head.

**Casing:**

Metal casing with fixing holes.

Protection index: IP 68.

**Dimensions:**

Length: 225 mm

Width: 125 mm

Height: 95 mm

**Weight:** 2.5 kg. (with 6 Alkaline batteries)

**4 – Rain Gauge :**

Tipping bucket rain gauge. The pulse created by the tipping action is transmitted via the interconnection box to the BARASOL MC probe, which then records it.

**Sensitivity of measurement :** 0.20 mm of water per tipping action

**Length of cable ( link to the box ) :** 6 m as standard.



**Casing :** Plastic casing with metal base.  
Holes for fixing it to the ground.

**Dimensions:** Height : 350 mm  
Diameter : 250 mm

**Weight:** 2.1 kg.

**5 - RnView2 User Software :**

**Monitoring:**

- initialisation of the sensors,
- reading the whole of the recordings contained in the probe memory,
- stopping the recording during the transport or temporary storage of the sensor.

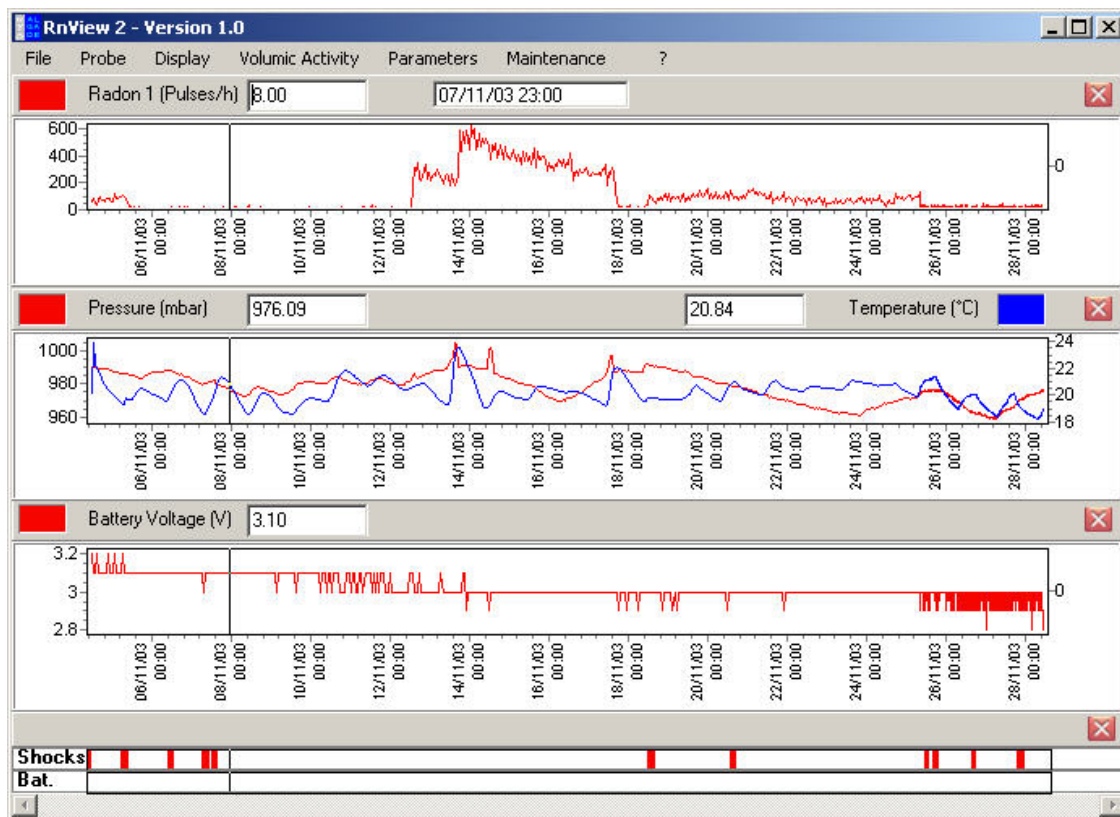
**Visualisation :**

- display of any two curves in each window ( e.g.: radon and temperature ),
- display of three windows ( maximum ),
- display of a window containing binary information ( shocks and battery defect ),
- change of time scale on all windows simultaneously,
- change of ordinate scale for the curve of your choice,
- display of values by cursor,
- smoothing of curves by sliding average (1 to 10 points).

**Conversion :**

- Conversion of data into text file tabulated to be reread in a spread sheet or by external mathematical processing software.

## 5 - RnView2 User Software :



### Printing :

- Printing of the current screen (copy of the screen).

### Delivery package:

- CD Rom,
- The software is delivered with a standard interface cable to PC,
- One documentation file of all the documentation concerning products in the BARASOL MC2 range.

## 6 – To order :

P-542-103	Interconnexion box
P-542-106	RnView2 User Software
P-542-108	Rain Gauge
P-540-109	Lithium D type Battery ( needs P-540-112 )
P-542-110	Radon Mobile Head
P-540-112	Metallic contact for D type Lithium battery
P-542-120	<b>BMC2 Radon probe</b>
P-542-121	Cable BMC2 to PC 2 m length
P-542-122	Lithium 2D type Battery
P-542-123	BT45N to Interconnexion box cable 2 m to 25 m length
P-542-124	BMC2 to Interconnexion box cable 2 m to 10 m length
M-542-104	BMC2 protective cover