Pro
Series

raditeq

Product Manual

RadiGen®

RF Signal Generator

Models:

RGN2400A | RGN2001B | RGN2006B

www.raditeq.com

RadiGen® Product Manual

This product manual pertains to the RadiGen®.

Models: RGN2400A | RGN2001B | RGN2006B
Made by Raditeq.

Read this manual carefully before operating the product and make sure all the safety instructions are strictly followed.

For your convenience, a Quick Start Guide has been added to this product. This Quick Start Guide contains the basic start-up steps and the safety warnings.

For all specifications of this specific product, please refer to the data sheet of the product which can be found at www.raditeq.com

Please keep this manual close at hand when you operate your new Raditeq product(s).

Please contact your local reseller if you have any questions.

Supplier Information

Raditeq B.V.
Vijzelmolenlaan 3
3447 GX, Woerden
The Netherlands

Tel.: +31 (0)348 200 100
Internet: www.raditeq.com
Email: sales@raditeq.com

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WARNINGS & PRECAUTIONS

Read the contents of this product manual carefully and become familiar with the safety markings, the product instructions and the handling of the system. Please refer to the applicable product manual(s) for further information regarding the operation and control of the product(s).

This equipment is designed to be used as a plug-in card for the RadiCentre® series. Do not use this card on its own or in combination with any other mainframe. Using this product with any other mainframe can cause harm and will void warranty.

Only Raditeq qualified maintenance personnel is allowed to perform maintenance and/or repair service on the equipment.

Position the product in such a fashion that power cables are easily accessible or connect the equipment to a mains network that can be easily disconnected from the mains.

This product® contains materials that can be recycled and reused to minimize material waste. At the ‘end-of-life’, specialized companies can dismantle the discarded system to collect the reusable and recyclable materials. If your product is at its ‘end-of-life’, please return it to your local reseller or to Raditeq for recycling.

For cleaning, use a clean, dry cloth (or a damp cloth where needed) and wipe the surface of equipment.

This product contains no hazardous substances as described in the RoHS Directive (2011/65/EU).

Introduction

Product Introduction

The primary test signal of an Electric Magnetic Compatibility (EMC) immunity test system is generated by an RF signal generator. It produces a modulated or un-modulated RF signal at a certain frequency and signal level. The RadiGen® generators are designed for EMC test purposes in order to perform fast and accurate EMC tests without the need for external modulation sources.

RadiCentre® System

The RadiCentre® is a modular EMC/RF test system that serves as the user and computer interface for all the RadiCentre® plug-in cards and modules.

RadiMation® Software

RadiMation ® is the EMC software package from Raditeq used for remote control and automated testing of the RadiCentre® plug-in cards and modules and is sold separately.

RadiField® Electric Field Generator

The patented RadiField® Triple A is no less than a revolution in EMC immunity testing. A complete paradigm shift involves a combination of high-level integration and a field combining technique, making several discrete components like combiner, coupler, power meters and cabling superfluous. This product is sold separately.

The RadiGen® Series

Description and capabilities

The RadiGen® RF signal generator is currently available in the following models:

- RGN2400A
- RGN2001B
- RGN2006B

Offering a broad frequency spectrum, the RadiGen® is the perfect solution for conducted and radiated immunity test applications.

RadiGen® RGN2400A

Signal generator from 9 kHz to 400 MHz Suitable for conducted immunity measurements.

RadiGen® RGN2001B

Signal generator from 4 kHz to 1000 MHz Suitable for conducted immunity measurements.

RadiGen® RGN2006B

The RadiGen® model RGN2006B has one full band RF output ranging from 4 kHz to 6 GHz. This ultra wide frequency range allows testing for most military, aerospace, automotive and commercial immunity tests.

Accuracy

The RadiGen® RF signal generator has a frequency drift of less than 10 ppm/year. For higher frequency accuracy, the RadiGen® can be used in combination with an external frequency reference standard. The LF-signal generator and modulators are fully digital, eliminating any drift in the modulation accuracy.

10 MHz frequency reference output

The RadiGen® has a 10 MHz frequency reference output which is available as a BNC connector. This output can be used to synchronize other T&M devices.

10 MHz frequency reference input

The RadiGen® has a frequency reference BNC input connector for synchronization using an external 10 MHz frequency reference.

Reliability

Defects to the output attenuator and RF switches are eliminated due to the fully solid-state design of the RadiGen®, which results in a better Mean Time Between Failures (MTBF).

Modulation types

AM modulation
The RadiGen® supports AM modulation depths of 0 to 100% and modulation frequencies from 1 Hz to 100 kHz, covering the requirements of all relevant EMC standards.

FM modulation
The RadiGen® supports FM modulation deviations of 1 Hz to 100 kHz and modulation frequencies from 1 Hz to 100 kHz.

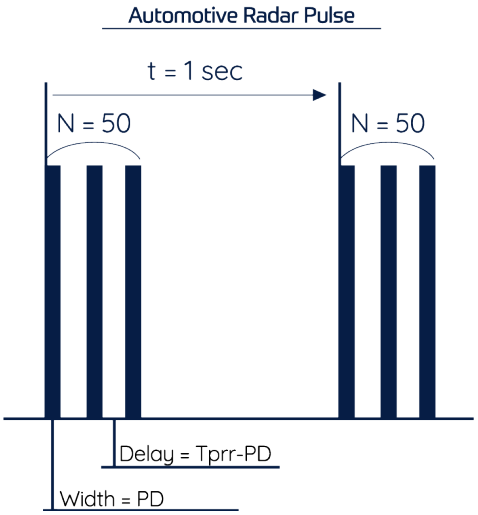
Pulse modulation: 200 ns – 100 s
The RadiGen® supports pulse modulation with ON- and OFF times ranging from 200 ns to 100 s with a resolution of 100 ns.

Pulse modulation settings
The pulse interval (on/off) of the RadiGen® can be set from 200 ns to 100 s This broad range allows for ultimate flexibility in the configuration of pulse modulation.

Gated Pulse
In addition to standard pulse modulation the RadiGen® can also be used to perform Gated Pulse modulation. Gated Pulse testing is necessary to perform automotive radar pulse testing as prescribed in several automotive standards. (E.G. Ford, General Motors and PSA)

Explanation and examples regarding Gated Pulse Modulation

Several automotive manufactures use EMC standards that define specific Radar Pulse tests. These tests consist of a certain amount of pulses with a specific pulse duration and pulse repetition rate.



Explanation of Automotive Radar Pulse testing

Ford RI-114 Radar Pulse test (FMC1278) and PSA B21 7110 are using:

- Pulse Repetition Rate (PRR) = 300 Hz
- Pulse duration (PD) = 3 µs
- No. of pulses per second (N)= 50

GM GMW3097-2019 uses:

- Pulse Repetition Rate (PRR) = 300 Hz
- Pulse duration (PD) = 6 µs
- No. of pulses per second (N)= 50

The RadiGen® plug-in card can generate the requested RF bursts as defined in these automotive standards, using Gated Pulse Modulation. Normal pulse modulation must be used to set the pulse ON/OFF times, using respectively the PULSe:WIDTh and PULSe:DELay command on the RadiCentre® system user interface. For more information go to the command section of this manual.

Limitations

The Pulse ON and OFF times apply to the specific limitations to the number of pulses per period for the Gated Pulse Modulation. The RadiCentre® system user interface makes use of equations to intelligently adapt the buttons, prohibiting invalid settings. When the RadiGen® plug-in card is controlled externally by PC-software, this limitation must be controlled by the PC-software. The limitations are given by the following formula:

$$N_{max} = \frac{Gateperiod - 1ms}{Pulse_{Width} + Pulse_{Delay}} - 1$$

The maximum number of pulses in one burst is limited by the settings of the pulse modulation. For example; using the Ford standard with a repetition rate of 300 Hz, a pulse width of 3 s and period time of 1 second, results in a maximum of 298 pulses.

$$Pulse_{Delay(MAX)} = \frac{(Gateperiod - 1ms) - (N * Pulse_{width})}{N}$$

The formula can also be rewritten to calculate the pulse parameters:

$$Pulse_{width(MAX)} = \frac{(Gateperiod - 1ms) - (N * Pulse_{delay})}{N}$$

Components

The RadiGen® signal generator (plug-in card) is delivered with the following items:

- **RadiGen® plug-in card** - models: RGN2400A, RGN2001B and RGN2006B The RF signal generator plug-in card needs to be inserted into the RadiCentre® system before it can be used. The plug-in card can only be operated with the RadiCentre® modular test system (model CTR1004B or CTR1009B with processor boards PRO2001A or PRO2001B).

NOTE: The RadiGen® cannot be used in combination with the 1-slot RadiCentre® model CTR1001S or with older RadiCentre® systems.

Supporting documentation provided on USB-Stick containing:

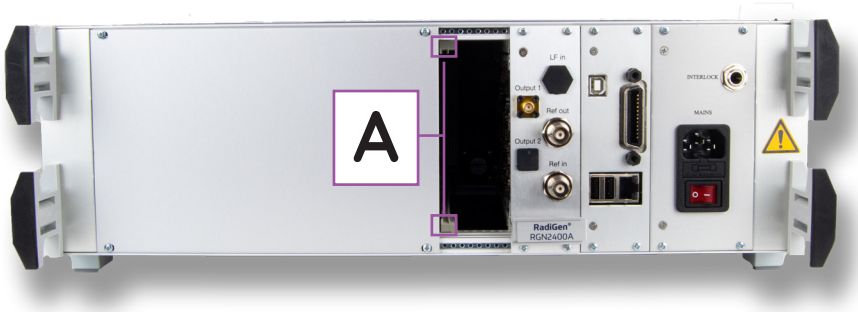
- The Product Manual
- The Quick Start Guide
- Factory verification certificate
- Optional, ISO17025 Calibration certificate.

Hardware installation

Please follow the instructions below on how to install the Raditeq plug-in card into the RadiCentre® correctly. NOTE: before installing and inserting a new plug-in card make sure that the RadiCentre® is turned OFF.

Step 1

Choose an empty slot in the RadiCentre® in which the plug-in card can be installed.
Remove the blind panel from the slot by unscrewing the four (4) screws on the panel (two at the top and two at the bottom).



Step 2

Insert the plug-in card in the rail of the empty slot as shown in the picture A. Position the plug-in card into the slot and slowly push it, using the lower part of the plug-in card. When it reached the end of the rail, gently push and secure the plug-in card into the backplane socket.

Step 3

When the plug-in card is inserted correctly into the backplane socket, fix it by tightening the four screws at the top and the bottom of the plug-in card (shown at B). For connection of the panels into the RadiCentre® a screwdriver type Poze, size PZ1 should be used'

Step 4

After installation of the plug-in card, connect the AC mains power cord on the back of the RadiCentre® and switch the ON/OFF button to the ON position. The RadiCentre® can now be started by tapping the touch screen.

When installed properly, the plug-in card should be recognized and shown automatically on the front screen of the RadiCentre® when turned ON.

Step 6
Connect the RadiCentre® with a PC using any of the available interfaces of the RadiCentre® system;

- USB
- Ethernet
- IEEE-488 (optional)

Be noted that the RadiCentre® can only be controlled by one PC at the same time.

Step 7
Attach the hardware interlock protection plug, which has a safety function! Please make sure that this is plugged into the interlock connector at the backside of the RadiCentre®.

In case the hardware interlock plug is used in series with your interlock system, for example an emergency stop circuitry. please cut the RED shorting wire and connect the open ends to your interlock safety system.

Note: if the interlock system is not connected or in loop, the RadiGen® carrier signal can not be engaged. First connect the interlock plug or close the loop to start the carrier.

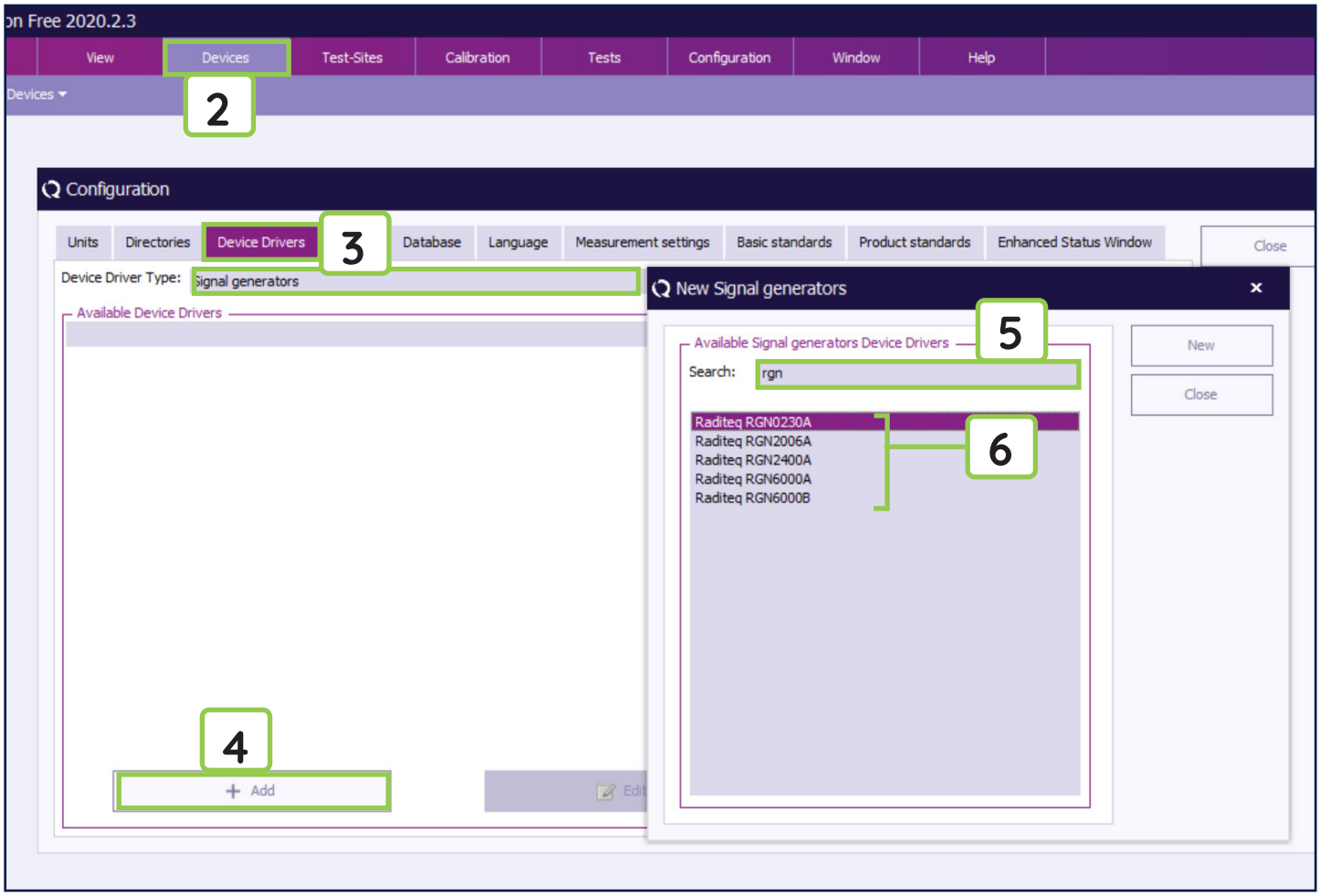
Software Configuration

In order to control the RadiGen® from a computer, either custom made software, third party software or the RadiMation® EMC software package can be used. RadiMation® from Raditeq is sold separately. If the RadiGen® is operated manually, this chapter can be skipped.

The RadiGen® device driver is part of the Signal Generator Device Driver family

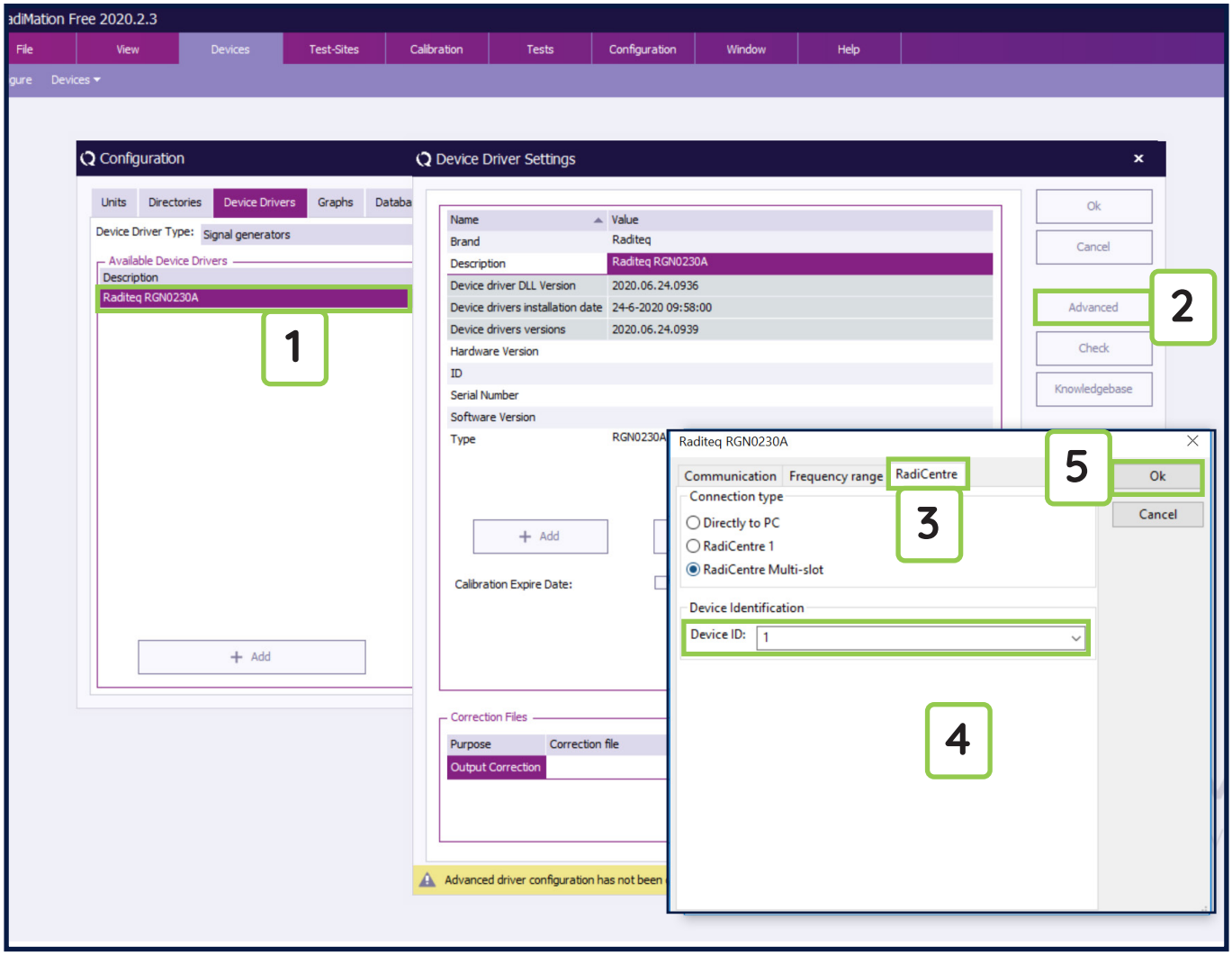
How to configure the RadiGen® in RadiMation®

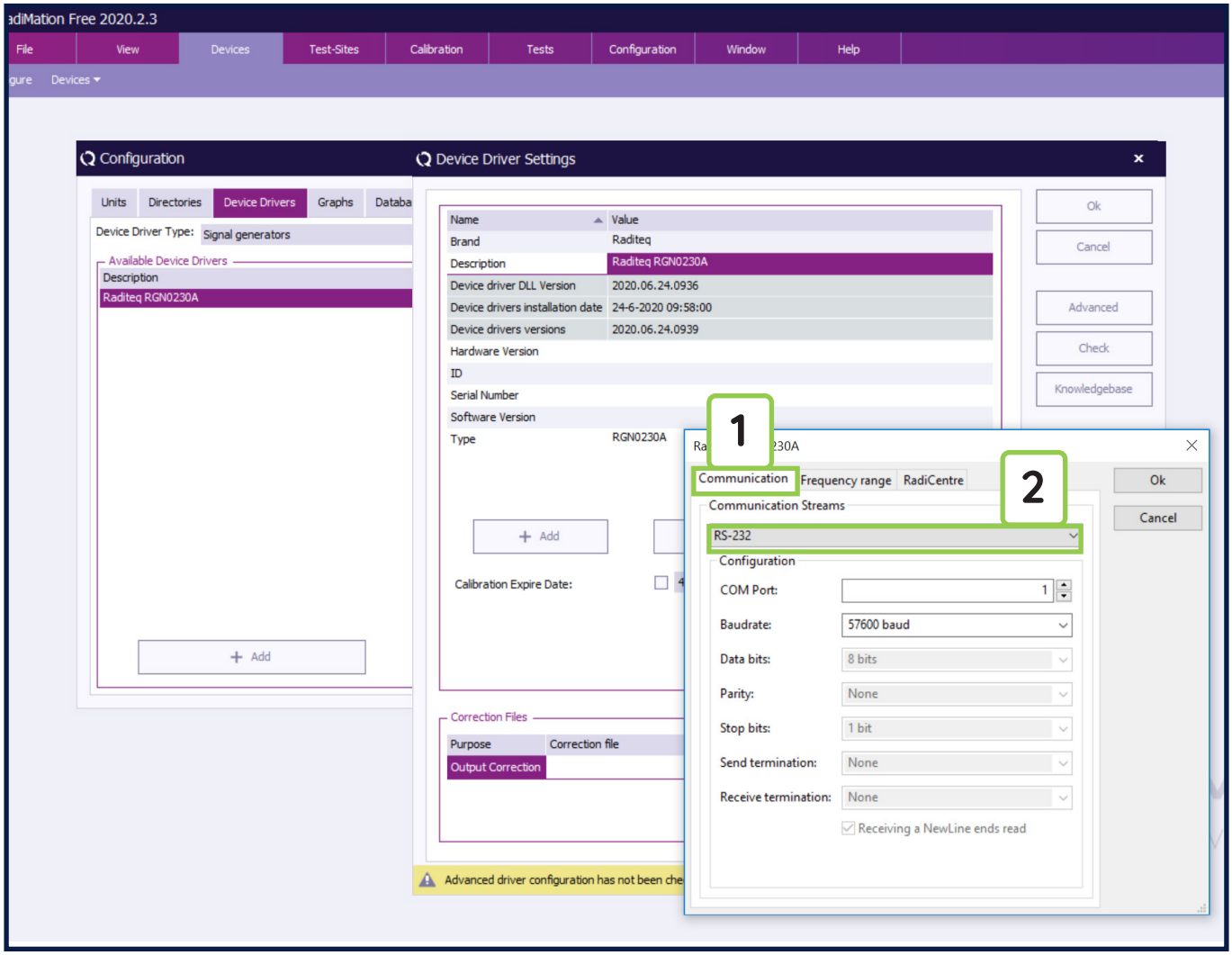
1. Start the latest version of RadiMation®; **Download the latest version here.**
2. Select the button 'Device' at the top menu bar, followed by clicking 'Configure';
3. In the configuration screen select 'Device Drivers' and Select 'Signal Generators' as driver type;
4. Click the 'Add' button to open the selection of available drivers in RadiMation®;
5. Enter 'RGN' in the search bar which will show all available RadiGen® drivers;
6. Select the correct driver, double click it (Optional, rename it) and press 'OK'.



How to connect the RadiGen® to the RadiCentre®

1. Select the recently added RadiGen® driver
2. Select 'Advanced'
3. Click on the tab 'RadiCentre®'
4. Under device identification select the RadiCentre slot number the RadiGen® plug-in card is installed in
5. When the correct slot number is chosen, continue to set the communication of the RadiGen® by clicking the tab 'Communication' (next page)





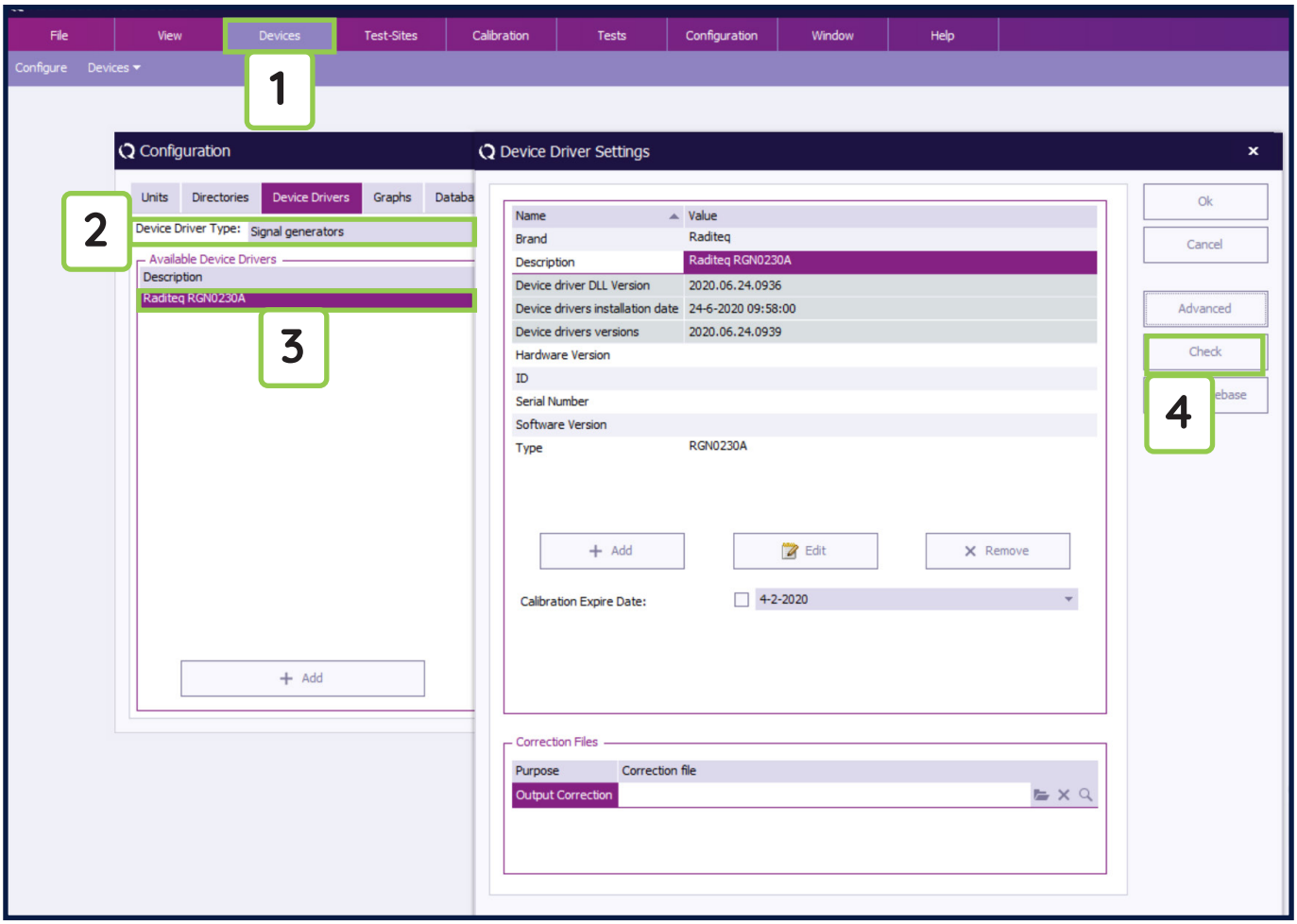
How to setup the communication of the RadiGen® to the RadiCentre®

1. Click on the tab 'Communication'
2. Select the interface to be used, for example:
   a. GPIB
   c. TCPIP
   d. USB
   e. VISA

3. When these steps are performed continue to the next steps for checking the communication of the RadiGen®.

How to check whether the RadiGen® is properly connected to RadiMation®

1. Select 'Devices' in the top menu bar
2. Open 'Device Drivers' and select Device driver Type: 'Signal Generators'
3. Double click the recently configured RadiGen or click 'Edit'.
4. Finally select the 'Check' button on the right side of the opened screen.
5. When correctly configured, RadiMation will notify you that the device is correctly installed.



Important Information:
If you encounter problems with the configuration of any Raditeq Product in RadiMation®, please consult the RadiMation® support team by email: **support@radimation.com**

A free download of RadiMation is available at: **https://www.raditeq.com/downloads**

It is also strongly advised to visit the RadiMation® Wiki to find answers to frequently asked questions (FAQ).

https://wiki.raditeq.com/

Manual or stand-alone use of the RadiGen®

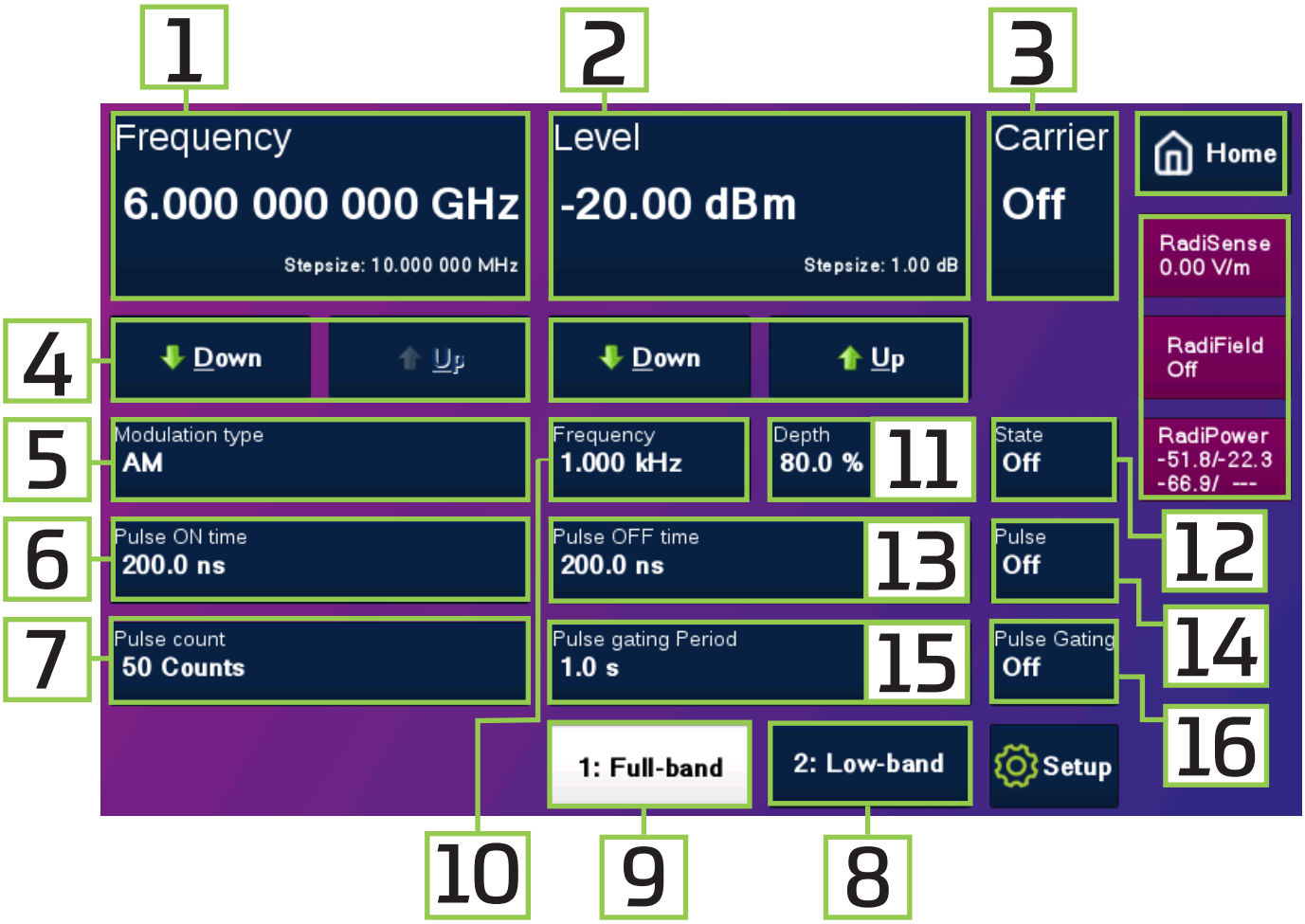
Manual Control

Once the RadiCentre® is switched on at the rear, the RadiGen® can be activated from the 'main' screen of the RadiCentre®, using the touch screen.

Use the RadiGen® 'status' button in the main screen to access the control screen of the RadiGen® (shown on the right). All parameters of the generator can be manually controlled from this screen. The buttons in this screen are divided over separate rows. The top row contains buttons regarding the frequency setting, output power and the 'Carrier' On/Off button

Buttons

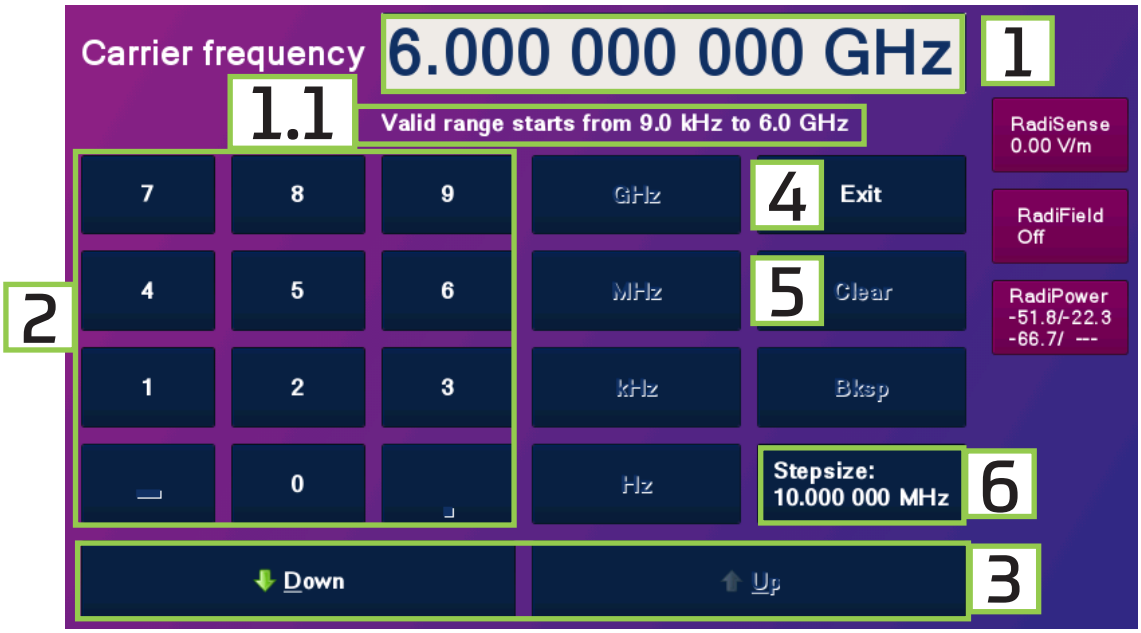
Each button on the RadiCentre® has as specific use and can be followed up by another screen for an additional action. On the next page, all buttons will be explained by following the numbers displayed on the picture below.



No.	Usage
1	**Frequency**: | The Frequency button is used to set the desired carrier frequency of the RadiGen®. When selected it will pop up another screen. The new screen shows a numeric pad and some other options, which will be explained in more details of the numeric pad section.
2	**Level** | The level button defines the carrier output amplitude of the RadiGen® signal generator. This can be set in the same way as the frequency button.
3	**Carrier** | The carrier can be selected (toggled) between: - On – Carrier signal is generated - Off – No carrier signal is generated Toggling of the carrier signal can be achieved by tapping the carrier button.
4	**Down/up** | Positioned under Frequency and Level four buttons are displayed. Two stating Down and two stating Up. The 'Down' and 'Up' buttons can be selected to quickly change the frequency or level without the use of the numeric pad. The step size can be set in the frequency and level menu and is displayed in the right corner of the frequency and level buttons.
5	**Modulation type** | The button Modulation Type can be used to toggle the modulation type from AM to FM or the other way around. Make sure that when one of the types is selected the other signal is turned OFF.
6	**Pulse On time** | The Pulse on time Button is used to define the time for which the pulse is active. The pulse can be turned off by pressing the Pulse Button. (See point 14)
7	**Pulse Count** | The Pulse Count is the amount of pulses generated within the specified time frame.
8	**Low-band** | The LF Output button needs to be selected to use the Low frequency (LF) output. Only one of these settings works at the same time, therefore in this picture only the HF output is in use. (Only applicable for the older models)
9	**Full-band** | The HF Output Button is used to select (as shown in the picture) the Full band / High frequency range is operational. Note that only one of the HF or LF outputs can be active at the same time. (Only applicable for the older models)
10	**(Modulation) Frequency** | This frequency is specifically for the modulation of the generated signal. This can be changed to modify the modulation of the current selected frequency and type of modulation (AM or FM).
11	**Depth** | The Depth button shows the depth of the modulation of the AM signal which can be used to change to depth of the modulation, when AM modulation is selected.
12	**State** | - The State button shows whether the modulation is 'On' or 'Off' and can be used to activate the AM or FM modulation.
13	**Pulse OFF Time** | The Pulse OFF Time shows the time during which the pulse is OFF. This pulse off time can be changed to a longer or shorter duration or be completely turned off by selecting the Pulse button shown at number 14.
14	**Pulse** | The Pulse button can be toggled on or off by tapping the button.
15	**Gating Pulse** | The Pulse Gating button States (and can change) the pulse gating period of the duration in which the pulses are generated.
16	**Pulse Gating** | The Pulse Gating button can be selected to turn the pulse gating On or Off.

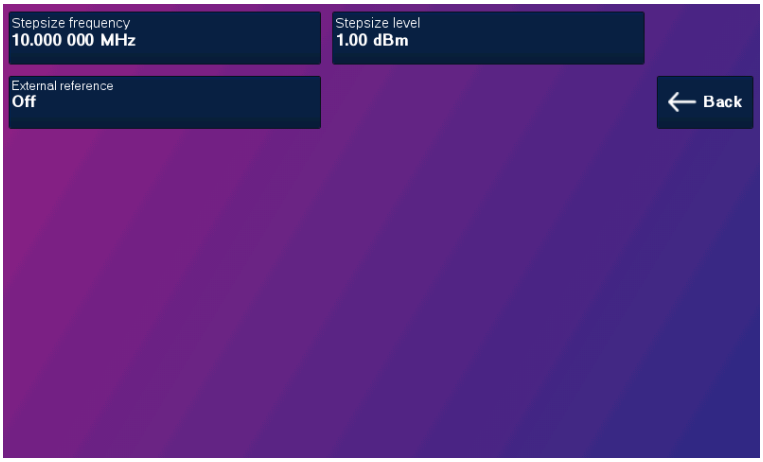
Numeric Pad

By pressing the Frequency or Level button, a numeric pad window will appear which can be seen below. On the numeric pad, new values can be entered for the selected parameter. After selecting the desired unit (for example “dBm”), the control screen will reappear. The numeric pad is used for multiple values and functions in the same way. Be aware that when parameters are changed the valid range may change too.



No.	Usage
1	This button shows the actual level of the chosen parameter. This level and + / - sign can be changed using the numeric pad as shown below at point 2.
1.1	The valid range shows the minimum and maximum values that can be selected.
2	The numeric pad to set the correct value and + /- sign.
3	The down and up button, which changes the step size (see at point 6).
4	Exit the numeric pad.
5	Clears the settings of the actual level (point 1).
6	Indicates the actual step size.

The step size for the parameters for frequency and power on the control screen can be set from this configuration screen. By selecting one of the step buttons, a numeric pad appears where the new value can be entered. By pressing the unit, the value will be entered.



Remote Control

The RadiGen® can be controlled remotely through the interfaces of the RadiCentre®:

1. Ethernet
2. USB
3. GPIB (optional)

The exact communication protocol can be found in the RadiCentre® manual. The specific commands for the RadiGen® are shown in the Programming manual available on the Raditeq website

- https://www.raditeq.com/product/rgn2400a
- https://www.raditeq.com/product/rgn2001b
- https://www.raditeq.com/product/rgn2006b

EU Declaration of Conformity

We

Raditeq B.V.

of

Vijzelmolenlaan 3
NL-3447GX Woerden
The Netherlands

declare under our sole responsibility that the

Product:	**RadiGen®**
models:	**RGN2400A - RGN2001B - RGN2006B**

are in accordance with the European directives:

EMC Directive 2014/30/EU
Low Voltage Directive 2014/35/EU
RoHS Directive: 2015/863/EU

per the provisions of the applicable requirements of the following harmonized standards:

Emission:	EN 61326-1:2013, Class A1 Electrical equipment for measurement, control and laboratory use.
Immunity:	EN 61326-1:2013, Industrial level, performance criteria A Electrical equipment for measurement, control and laboratory use.
Safety:	EN 61010-1:2010, Safety requirements for electrical equipment for measurement, control, and laboratory use

The technical construction files are maintained at the adress specified above.

Date of issue:	Publish date: 20/08/2025
Place of issue:	Woerden, the Netherlands
Authorized by:	P.W.J. Dijkstra
Title of authority:	Director

Warranty

Raditeq B.V. offers a standard warranty term of three (3) years on their products, calculated from the shipping date, under the condition that the product is registered on www.raditeq.com. For registration of the product, the customer should provide the product model, serial number and the responsible reseller (if applicable). If the product is not registered, a limited warranty term of one (1) year will be applicable.

Return Material Authorization (RMA) & Warranty repair

If a defect occurs to our product within the warranty term, a Return Material Authorization (RMA) 'Warranty Repair' request can be issued using the RMA link at www.raditeq.com/support**.** Upon receipt of the request, an RMA number will be provided. Please do not send the product without this RMA number! The defective product should be shipped to our service department at the following address:

Raditeq B.V. – Service Department
Vijzelmolenlaan 3
3447GX WOERDEN
The Netherlands

There will be no charge for repair services (materials or labour) within the (extended) warranty term.
These warranty terms are not applicable to:

- Normal wear and tear
- Fibre optic cables
- Products that have been improperly used
- Products that have been used outside their specified range
- Products that have been improperly installed and/or maintained
- Products that have been modified without approval of Raditeq
- Calibration and/or re-calibration of the product

Repair services on products that are not covered by the Raditeq warranty will be charged to the customer.

Repairs outside warranty

If a defect is not covered under warranty, an RMA fixed-repair can be ordered on the RMA link: www.raditeq.com/support If a re-calibration is needed after repair, this calibration should be ordered separately. The calibration will be performed at the ISO17025 accredited calibration laboratories of DARE!! Calibrations, based on the applicable service code / prices.

Warranty after repair

For repairs outside the original warranty period, a limited warranty of six months is applicable on the performed repair. Shipping conditions are the same as with repairs that are covered within the original warranty period.

Shipping

The customer will need to arrange shipping and cover for the costs (like e.g. transportation costs, duties, taxes) for sending the defect product the service department of Raditeq in The Netherlands. Raditeq will arrange the courier and cover for the costs for the return shipment after repair.

Raditeq B.V. | Vijzelmolenlaan 3 | 3447GX Woerden | The Netherlands

www.raditeq.com | T:+31 348 200 100