# raditeq Product Manual

# RadiField<sup>®</sup> Electric Field Generator



Models: RFS2006A | RFS2006B | RFS2018B www.raditeq.com



# RadiField® product manual

This product manual pertains to the RadiCentre® system. Models: RFS2006A | RFS2006B | RFS2018B **Made by Raditeq.** 

It is strongly advised that this manual is carefully read before operating this product and adhere to any safety instructions it might contain.

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.

Please keep the Quick Start Guide (and this product manual) close at hand.

Please contact Raditeq or your local reseller if you have any questions.

#### **Supplier Information**

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Publish date: 21/12/2020



# **Table of contents**

WARNINGS & PRECAUTIONS	4
Introduction	5
Product Introduction	5
Product Characteristics	6
System safety features	7
RadiField® start-up procedure	7
Components	8
Optional Accessories	8
Antenna mount boom - Product number: RFB1040A.	8
Coaxial N-type cable - Product number: CBL2000N#010.	8
RadiField® Triple A	9
RadiField® PSU2400A & PSU2400B	9
Connections	9
Transport Case	10
Antenna Boom	10
Coaxial cable	10
Installation	11
Hardware Configuration	11
Field Polarisation and Reference Point	12
How to configure the RadiField <sup>®</sup> in RadiMation <sup>®</sup>	13
Software Configuration	13
How to connect the RadiField <sup>®</sup> to the RadiCentre <sup>®</sup>	14
How to check whether the RadiGen® is properly connected to RadiMation®	14
Using the RadiField®	15
Manual Control of the RadiField®	15
Remote Control of the RadiField®	15
RadiField <sup>®</sup> Specifications	16



# 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 product requires a protective earth connection. The mains power source for the equipment must supply an uninterrupted safety ground to the IEC input connector(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.



This product<sup>®</sup> 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.



Please make sure that the airflow through the in- and outlets of this product are not restricted to maintain a constant temperature. The cooling system is designed to operate in the specified operating temperature range.



Please use a suitable coaxial cable to connect the PSU plug-in card with the Triple A: fitted with an N-type connector on both sides, maximum allowed attenuation of 10 dB at 6 GHz and able to handle a DC current of 8 A.



Use two people to mount the RadiField® Triple A to the RTW2000A antenna mast. Take caution while trans locating the mast.



During change of polarisation (rotation) of the RadiField® Triple A with the RTW2000A antenna mast, there is a risk of entrapment. Keep a safe distance to moving parts of the antenna while the polarisation is changed. Prior to and during movement an acoustic signal is audible.



### Introduction

#### **Product Introduction**

In conventional EMC immunity systems, large amplifiers are needed to compensate for cable losses because the amplifiers are normally placed at a substantial distance from the radiating antenna. When generating large amounts of RF power, the power from multiple amplifiers needs to be added using power combiners, resulting in even more power loss. The RadiField® has solved these problems by placing compact amplifiers right behind the antenna array. This eliminates the use of long coaxial cables between the amplifier and antenna. By using an antenna array and combining the electrical fields of the antennas instead of combining RF power, the power losses are reduced even further. The RadiField® is controlled through the RadiCentre®. The RadiField® can be automated and controlled through RadiMation®. RadiMation® is purchased separately



#### RadiCentre® System

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



#### RadiMation® Software

RadiMation<sup>®</sup> is the EMC software package from Raditeq. RadiMation is used for remote control and automated RF and EMC testing. In combination with the RadiCentre<sup>®</sup> the software really shines brightest and enables the user to perform fully automated and effective EMC and RF testing. Plug-in cards and modules are sold separately.



#### RadiSense® Electric field probe

The RadiSense® Electric field probe is currently the most accurate electric field probe available on the market. This probe operated from the RadiCentre® can measure up to 10 GHz.



# The RadiField®

#### **Product Characteristics**

<u>Eliminate Power Loss</u> - Due to the integrated design of the RadiField<sup>®</sup> combining field in stead of power, the RF-power loss is at a minimum, reducing energy consumption and eliminating the need for expensive, high power amplifiers.

<u>Integrated Power Meters</u> - Each amplifier has an integrated coupler with full compliant forward and reflected RadiPower® power meters, eliminating the need for separate external coupler and power meters.

<u>Easy to Use</u> - As only one coaxial cable for the RF signal, the communication signals and DC-power supply of the RadiField® system, is needed, it is easy to set up. Saving time and costs. At the same time the risk of equipment damage due to incorrect equipment connections is minimized.

<u>High Value for Money</u> - The RadiField<sup>®</sup> effectively combines couplers, power meters, antennas and amplifiers resulting in a integrated immunity testing setup. Due to the combination of the different instruments the RadiField<sup>®</sup> comes at a cost effective price in comparison to conventional systems. Furthermore having one device for EMC immunity testing results in a lower maintenance fee making the RadiField<sup>®</sup> cost beneficial in all fields.

<u>RadiCentre® Integrated</u> - The RadiField® works with the RadiCentre® system, which allows for easy touch-screen operation and several control interfaces such as GPIB, Ethernet and USB. This also allows for control by the RadiMation® software which is fully compatible with the RadiField® system.

<u>Fully Compliant</u> - The RadiField<sup>®</sup> system is fully compliant with all international EMC immunity standards. These standards describe aspects such as the frequency, field strength levels and homogeneity.



### System safety features

To ensure the safety of the RadiField<sup>®</sup> system, the RadiField<sup>®</sup> will only be able to power on if all connections are properly made. In addition, the RadiField<sup>®</sup> will shut down immediately if the interlock of the RadiCentre<sup>®</sup> is triggered.

More information on the RadiCentre® interlock is available in the RadiCentre® manual (found at: <u>www.raditeq.com</u>)

#### RadiField® start-up procedure

The start-up procedure consists of three phases that ensure the safe use of the RadiField<sup>®</sup>. If the RadiField<sup>®</sup> is not connected correctly, or if there are any other irregularities, the safety measures of this start-up procedure will be triggered. In each phase the supply power is increased, building up to the DC-power needed for normal use.

#### The probing phase

When the start-up command is given to the RadiField<sup>®</sup>, a safe 'probe signal' is sent through the coaxial cable to the RadiField<sup>®</sup>. Only when the RadiField<sup>®</sup> responds correctly to the probe signal, the start-up procedure is continued. This probe signal is harmless to other equipment and will therefore not cause any harm to humans or defects to other instruments in case of an incorrect connection.

#### Communication phase

After a successful probing phase, the plug-in card will attempt to communicate with the intelligent backplane of the RadiField®. Only when the intelligent backplane responds, the start-up procedure is continued.

#### Completion of start-up procedure

When communication is established, the final DC-power will be applied on the coaxial cable to power the RadiField<sup>®</sup>. The amplifiers in the RadiField<sup>®</sup> can now be switched on and are ready to operate.



#### Components

The RadiField® system is delivered with the following items:

#### RadiField® Triple A (Active Antenna Array)

Model: RFS2006A | RFS2006B | RFS2018B - The field generating active antenna array.

#### RadiField® PSU2400A plug-in card (or PSU2400B)

Power supply plug-in card (for the RadiCentre®) to power the Triple A. Communicates with the Triple A and transfers the RF-signal to the Triple A. The card is plugged into the RadiCentre® and fills two adjacent slots. The PSU2400A is intended for usage with the RadiField models RFS2006A and RFS2006B. The PSU2400B is intended for usage with the RadiField model RFS2018B

#### Supporting documentation in the form of:

• USB stick containing the (digital) Product manual and Quick Start Guide.

**REMARK - A RadiCentre® modular test system is <u>required</u> to operate the RadiField® system which is purchased separately. RadiCentre®, model: CTR1009B (or CTR1004B), serves as an interface for the RadiField® system to the user and computer. This allows for touch-screen operation and remote control through several communication interfaces. <b>RadiField® Triple A** 

The RFS2006A/B or RFS2018B Triple A is the field generating element of the system. This module contains the amplifiers, antenna array and backplane. The amplifiers and backplane are located in the aluminium housing, the antenna array in the black foam cones.

#### Cooling system

The Triple A is air-cooled. Air is drawn in at the back of the Triple A and blown out along the external cooling ribs, through the side air outlets and then out of the openings in the black foam cones. The cooling system keeps the internal amplifiers at a constant operating temperature. Failure to meet the specified environmental temperature range might result in a too high or too low amplifier temperature.

#### <u>Connections</u>

The power, RF input and communication connection of the Triple A run through one coaxial cable. This cable is connected at the back of the Triple A to an N-type connector.

#### <u>Mounting</u>

The Triple A has a standard ¼-20" UNC-1B thread on the bottom. This can be used to mount the Triple A on a tri-pod, antenna tower or boom mount.



In case of a tripod mounting, make sure that the tripod is stable and can handle the weight of the RadiField®!



#### RadiField® PSU2400A & PSU2400B

The PSU2400A & PSU2400B are (two slot) plug-in card for the RadiCentre<sup>®</sup>. The PSU2400A combines power, RF input and communication within the coaxial cable to the Triple A.

#### Connections

The PSU plug-in cards have a separate mains input connection to power the RadiField® Triple A. A SMA connector is used for the RF input and a N-type connector for the connection to the Triple A.



#### **RadiField®** Accessories

#### Transport Waterproof case

A transport case has been designed especially for the RadiField<sup>®</sup>. This transport case can be bought as an option, together with the RadiField<sup>®</sup> system. The case is designed for on-site and facility transports. The RadiField<sup>®</sup> must be stored in the transport case when it is shipped between different locations. Be advised that if you do not buy this specially designed transport case, we recommend that you yourself provide an alternative method of protection for your RadiField<sup>®</sup>.

REMARK – This transport case is designed for short distance transportation. It does not provide sufficient protection for air travel or other long distance shipping. The RadiField® might be damaged if the transport case is handled in a rough manner. Additional or different (protective) packaging is needed in those situations.

#### Antenna mount boom

This custom antenna boom can be mounted on the back of the RadiField® Triple A. The antenna boom can be purchased separately or together with the RadiField® system. The boom is available in the following dimensions:

- diameter 22mm length 300mm
- diameter 40mm lenght 300mm

#### Antenna mast with polariser

The RadiField® can be combined with a RadiTower® which functions as antenna mast and field polariser. The actuator of the polariser connects directly to the RadiField® Triple A. The RadiField® controls and powers the polariser thus no additional cables are required. This polarisation system enables the RadiField® to autocratically rotate between horizontal and vertical positions. The position can be controlled by the RadiCentre® or by the RadiMation® automated software.

#### **Coaxial Cable sets**

#### • CBL2000N#010

10 meter coaxial RF cable assembly with N-type connectors on both sides for RadiField® models RFS2006A or RFS2006B

#### • CBL2018N#010

10 meter coaxial RF cable assembly with N-type connectors on both sides for RadiField® models RFS2018B





#### Installation

#### Hardware Configuration

The hardware configuration is carried out in the following steps:

1. Make sure that all connections to the plug-in card (PSU2400A or PSU2400B) are made:

Connect a suitable N-type coaxial cable from the PSU2400A to the RadiField® Triple A and connect a coaxial cable from a RF signal generator to the RF input of the PSU2400A. Please note that the maximum field strenght is reached at an input power between -10 dBm and 0 dBm, depending on the frequency response and attenuation of the N-type cable used.

- 2. Make sure that the remote interlock connection of the RadiCentre® system is closed.
- 3. Plug the mains cords into the mains inlet of the RadiCentre® system and the mains inlet of the PSU2400A plug-in card.
- 4. Switch the main power switches on both mains inlets to the 'ON' position.

#### The hardware configuration in now complete continue to the manual control on how to use the RadiField®





#### **Manual control**

- 1. Tap the touch-screen on the front panel of the RadiCentre® to activate the RadiCentre®.
- 2. Tap the status button of the RadiField® to initialize the Radifield® followed by acknowledging the command to start the RadiField®.

The system is now ready to be used. The user can control the RadiField® through the touch-screen of the RadiCentre® system



#### RadiField® touch-screen control

Once the RadiCentre<sup>®</sup> is switched on, the RadiField<sup>®</sup> can be activated from the 'main screen' on the RadiCentre<sup>®</sup>.

By pressing the 'status'-button proceeded by the 'Ack'-button, the start-up procedure of the RadiField® will commence. Once this procedure has been completed successfully, the amplifiers in the RadiField® will be powered. When the RadiField® finishes initializing it will be ready to operate. In the RadiField® 'control screen', the parameters of the system can be read. In order to generate an EM-field, the 'operate' button must be selected. To automatically correct for the frequency dependent couplers and power meters the frequency of the signal generator must be entered.



#### Remote Control of the RadiField®

The RadiField<sup>®</sup> can be controlled remotely through the interfaces of the RadiCentre<sup>®</sup>. The exact communication protocol can be found in the RadiCentre<sup>®</sup> manual. The specific commands for the RadiField<sup>®</sup> are shown in chapter 'RadiField<sup>®</sup> Command Set'.



#### **Field Polarisation and Reference Point**

In order to perform radiated immunity measurements, standards require a certain distance from the field generating antenna to the Equipment Under Test (EUT). In most immunity setups, the tip of the transmitting antenna is used to determine the distance to the EUT. Since the actual antenna of the RadiField® is not visible, a small hole in the nose of the RadiField® acts as a reference point to determine this distance.

For most test setups, it is also necessary to know the polarisation of the field generated by the antenna.

Both the field polarisation and reference point on the RadiField® are shown in the picture below.

REMARK – Please make sure that the airflow out of the black foam openings is not restricted to prevent possible overheating of the RadiField<sup>®</sup>. The cooling system is designed to operate in the specified operating temperature range.





## Software Configuration

In order to control the RadiField® 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 RadiField® is operated manually, this chapter can be skipped.

#### The RadiField® is part of the antenna device driver, RF power amplifier, power meter and coupler device driver family

Because the RadiField® series has internal amplifiers, power meters, couplers and antenna's. RadiMation® needs configured for all these elements. Note that separate from the RadiField® additional devices can be configured and used with the same driver family.

#### How to configure the RadiField® in RadiMation®

- 1. Start the latest version of RadiMation®; <u>https://www.raditeq.com/radimation-download/</u>
- 2. Select the button 'Device' at the top menu bar, followed by clicking 'Configure';
- 3. In the configuration screen select 'Device Drivers' and Select 'Antennas' or any of the other drivers as driver type;
- 4. Click the 'Add' button to open the selection of available drivers in RadiMation®;
- 5. Enter 'RadiField' in the search bar which will show all available RadiField® drivers;
- 6. Select the correct driver, double click it (Optional, rename it) and press 'OK'.

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Available Device Drivers	
Available Antennas Device Drivers	New
	Close
Raditeg RadiField RFS1003A Raditeg RadiField RFS10038	
Raditeg RadiField RFS1006A Raditeg RadiField RFS1006B	
Raditeg RadiField RF52003A	
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+ Add 🖉 Edit	
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Repeat this step for all elements of the RadiField®



#### How to check whether the RadiField® is properly connected to RadiMation®

- 1. Select 'Devices' in the top menu bar
- 2. Open 'Device Drivers' and select Device driver Type: 'Antennas'
- 3. Double click the recently configured RadiField® 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.

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# Important information

When you need support with the configuration of your Radi-Product in RadiMation<sup>®</sup>, please consult the RadiMation<sup>®</sup> support team at: <u>Radimation-support@radimation.com</u>.

It is also advised to visit the RadiMation<sup>®</sup> Wiki page and the FAQ section, which can be found at: <u>https://wiki.radimation.com</u> RadiMation<sup>®</sup> software can be downloaded at: <u>https://www.raditeq.com/emc-test-software/radimation-download</u>



#### RadiField® Command Set

#### **General Commands**

Command	Description		
ID_NUMBER?	Returns unique identifier number. Reply (for example): '1.58.95.146.21.0.0.124'		
LOCAL	leturn to local mode, the local display is used to set items. leply: 'OK'		
VERSION_HW?	Returns the hardware version. Reply (for example): '2'		
*IDN?	Returns the ID of the system. Reply (for example): 'Raditeq, RadiField PSU2400A, 1.0.0'		
RESET	<ul> <li>Reset the module. This will:</li> <li>Clear all errors</li> <li>Clear all occurred crowbars</li> <li>Reset the filter to filter 1</li> <li>Reset the frequency to 3 GHz</li> <li>Set the amplifier to standby mode, if this fails an error is replied.</li> </ul>		
CLEAR	All errors are cleared and crowbars are reset. Reply: 'OK'		

The commands: POS, POS? and STOP can only be used if the polariser is connected.

#### **General Commands - 2**

Command	Reply	Description
MAINS?	'1' = ON '2' = OFF	Request the actual status of the RadiField® mains power
MAINS <space><value></value></space>	OK or error	Turn the main power of the RadiField ON or OFF <value> = 'ON' or 'OFF'</value>
STANDBY	OK or error	Switches the RadiField® field generator to STANDBY In this state there will not be generated any RF Field
		OK is replied when the field generator is in 'STANDBY' status
OPERATE	OK or error	Switches the RadiField® field generator to OPERATE
		In this state the applied RF carrier signal will be amplified. OK is replied when the amplifier is in 'OPERATE' status
MODE?	For example: Operate	Returns the actual status of the RadiField® field generator
		Reply is depending on the operational mode
CURRENT?	For example: '1.2'	Measures the RF current in the PSU2400A plug-in card The current response is in Ampere (A)
TEMP?	For example: '23.6'	Measures the temperature The temperature response is in degrees Celcius (°C)
POS <space><value></value></space>	ОК	Controls the position of the internal H/V polariser in the RadiTower® mast to HORIZONTAL or VERTICAL <value> = 'HOR' or 'VER'</value>
POS?	For example: HOR	<ul> <li>Reply the status of the polarizer. <pos> can be:</pos></li> <li>"ERROR <error code="">"</error></li> <li>"HOR" (When stopped and in horizontal position)</li> <li>"VER" (When stopped and in vertical position)</li> <li>"STOP" (When stopped and not in horizontal or vertical position)</li> <li>"MOV" (When moving)</li> </ul>
STOP	ОК	Stop the movement of the polariser
SND <space><soundmode< td=""><td>OK or error when <soundmode> is invalid</soundmode></td><td>Set the sound mode of the RadiField backplane. <soundmode> can be: 0 = All sounds off 1 = Warning sound polarizer movement enabled.</soundmode></td></soundmode<></space>	OK or error when <soundmode> is invalid</soundmode>	Set the sound mode of the RadiField backplane. <soundmode> can be: 0 = All sounds off 1 = Warning sound polarizer movement enabled.</soundmode>
SND?	<soundmode></soundmode>	Question the sound mode of the RadiField backplane. <soundmode> can be: 0 = All sounds off 1 = Warning sound polarizer movement enabled.</soundmode>



#### **General Commands - 3**

Command	Reply	Description
RESET	ОК	Resets the RadiField® E-field generator, which will: • Clear all errors • Clear all occurred crowbars • Reset the frequency to 3 GHz • Set the amplifier to standby mode (if this fails an error is replied)
STATUS?	For example: '0'	Returns the actual status of the RadiField® E-field generator in the form of an error or warning. • '0' = No error/warning • '1' = 3.3 Volt error • '2' = 5 Volt error • '4' = 10 Volt error • '4' = 10 Volt error • '16' = 50 Volt error • '16' = 50 Volt error • '32' = Current driver 3 error • '64' = Current final error • '128' = Temperature error • '256' = Power error • '512' = Driver fet adjustment error • '1024' = Final fet adjustment error • '1024' = Final fet adjustment error • '2048' = Oven too cold warning • '4096' = Oven too hot warning • '4096' = Oven too hot warning • '16384' = Driver vGate min limit error • '16384' = Driver vGate max limit error • '262144' = Final vGate max limit error • '262144' = Final adjustment timed out error • '524288' = Final adjustment timed out error Some numbers represent multiple (of the previously mentioned) errors occurring at ones. For example, reply: • '3' = error 1 and 2 = 3.3V and 5V error • '5' = error 1 and 4 = 3.3V and 10V error
CLEAR	ОК	Clears the internal error and crowbars are reset

#### **RadiField Signal Commands**

Command	Reply	Description
POW <powermeter>?</powermeter>	For example: '-12.34 dBm'	Get the measured power level
		<powermeter> = FWD or RFL power level in dBm</powermeter>
FREQUENCY? MIN	For example: '1000000000'	Get the minimum frequency in Hz
FREQUENCY? MAX	For example: '6000000000'	Get the maximum frequency in Hz
FREQUENCY <space> <value></value></space>	OK or error	Set the frequency of the RadiField® <value> = frequency in Hz, for example: 500000000</value>
FREQUENCY?	For example: '5000000000'	Get the frequency of the RadiField® in Hz

#### **Error Codes**

All RadiField<sup>®</sup> and all other Raditeq product error codes can be found in the RadiCentre<sup>®</sup> modular test system manual. This manual can be found on <u>https://www.raditeq.com/raditeq-downloads</u>

# **RadiField®** Specifications

Model	RFS2006A	RFS2006B	RFS2018B		
Frequency range	0.8 GHz - 6 GHz	0.8 GHz - 6 GHz	6 GHz - 18 GHz		
TME field <sup>1</sup>	3 V/m	10 V/m	N/A		
OME field <sup>2</sup>	16 V/m	54V/m	75 V/m		
Max. input power to reach TME <sup>1</sup> Field	0 dBm	0 dBm	+10 dBm (typcical 0dBm)		
Number of internal power meters	3x fo 3x ref	rward Flected	1x forward 1x reflected		
Power meter type		Integrated RadiPower®			
Directional coupler		Integrated			
Input connector		N-Type			
Harmonic surpression @ 1 dB compression	-	12 dBc (minimum, 2nd harmo - 16 dBc (typical, 2nd harmoni	nic) ic)		
Safety specifications					
Voltage	50 VDC (Se	afe voltage)	55 VDC (Safe voltage)		
Safety circuit		Safe start & shutdown			
Cable (dis)connect	Intrinsically safe				
Connections					
Tri-pod mount		¼-20" UNC thread			
Dimensions	RFS2006A	RFS2006B	RFS2018B		
Length	860 mm	860 mm	715 mm		
Height	250 mm 250 mm		250 mm		
Width	250 mm 250 mm		250 mm		
Weight	10 kg	11 kg	9 kg		
Environment conditions					
Temperature range		10° C – 40° C			
Relative humidity	10% - 90% (non-condensing)				
Sound level produced	< 70 dB(A)				
Maximum installation height	2.000 meters above sea level				
Power consumption	RFS2006A	RFS2006B	RFS2018B		
Max power consumption	300 W	400 W	350 W		
Mains fuse of PSU	4 AT				
Supply voltage	115 VAC / 230 VAC				
Mains	Saf	ety class I, Over voltage categ	gory II		

• All specifications are measured after 10 minutes warm-up time and 0dBm unless specified otherwise.

• Typical specifications indicate that the measured values are met on at least 80% of the points.

• 1) Three Meter Equivalent (TME) Field: 1,5 m x 1,5m Homogeneous field @ 3 m and 2 dB field compression according to IEC 61000-4-3

• 2) One Meter Equivalent



# EU Declaration of Conformity

We

Raditeq B.V.

of

Vijzelmolenlaan 3 NL-3447GX Woerden The Netherlands

declare under our sole responsibility that the

Product:RadiField®models:RFS2006A - RFS2006B - RFS2018B

are in accordance with the European directives:

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

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

Emissi	ion: EN 61326-1:2013, Class A1		
	Electrical equipment for measurement, control and laboratory use.		
Immu	nity: EN 61326-1:2013, Industrial level, performance criteria A		
	Electrical equipment for measurement, control and laboratory use.		
Safety	y: EN 61010-1:2010, Safety requirements for electrical equipment		
	for measurement, control, and laboratory use		
	EN 61010-2-81, Particular requirements for automatic and semi-automatic		
	laboratory equipment for analysis and other purposes		
The technical construction files are maintained at the address specified above.			

Date of issue: Publish date: 21/12/2020

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 <u>www.raditeq.com</u>. 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 <u>www.raditeq.com/support</u>. Upon receipt of the request, an RMA number will be provided. <u>Please do not\_send the product without this RMA number</u>! 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: <u>www.raditeq.com/support</u> 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.



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