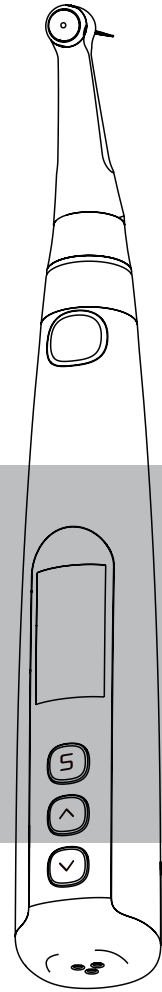


ENDO

MOTOR

INSTRUCTION MANUAL

Please read the instruction manual carefully before using it for the first time

Content

Shanwei Perfect Medical Equipment Co., Ltd
No. 29, Sanhe Road, High-tech Zone, Hongcao Town,
Shanwei City, Guangdong Province

Congratulate!

Thank you for your purchase, be sure to read the entire user manual before use of the product.
Always adhere to all warnings and cautions.

Please place this manual in an appropriate location in case of reading.

Hotline:+86 0660-6128899

E-mail: likee@dental-perfect.com

1 Product instroduction

1.1 Basic Product Information

"BR Rap" is used in Endodontic treatment. It can be used as a endo motor for preparation and enlargement of root canals, or device for measuring canal

1.2 Scope of application

This device should only be used by qualified dentists in hospitals and dental clinics.

1.3 Contraindications

Doctors with pacemakers are disabled.

Patients with pacemakers (or other electrical equipment) who are warned not to use small household appliances (such as electric shavers, hair dryers, etc.) are disabled.

Patients with hemophilia are contraindicated.

Use with caution in patients with heart disease, pregnant women and young children.

warning

Before using this device for the first time, please read the instruction manual carefully.

This device must be used in hospitals, dental clinics, and by a qualified dentist.

The patient can not be an intended operator.

This device should only be used with its accompanying accessories, do not use any other power adapters, contra angles, lithium batteries, etc.

Incorrect replacement of lithium batteries can lead to unacceptable risks, please use the lithium battery provided by the original manufacturer and follow the correct steps in the instructions to replace the lithium battery.

Do not disassemble or repair the device by yourself, any self-disassembly and repair may violate safety regulations and cause injury to the patient. Any self-dismantling and repair will not be warranted by any promise.

Before the motor stops rotating, the contra angle cannot be removed, and the press cap of the contra angle cannot be pressed, otherwise the contra angle may be damaged.

The root canal file needle must not be removed until the motor stops rotating, as this may damage the operator.

Before starting the motor, make sure that the root canal file needle is assembled and locked.

Set the speed of the motor output and torque according to the parameters recommended by the file manufacturer.

Prolonged use of reciprocating mode may cause the motor handle to overheat, and it should be allowed to cool down before use. If the motor handle frequently overheats, please contact your local dealer.

Do not place the device near flammable materials. Do not operate the device in the presence of a flammable anesthetic mixture of air, oxygen or nitrogen oxides.

Portable and mobile RF communication equipment may affect the performance of this device, avoid strong electromagnetic interference when using it, such as near mobile phones, microwave ovens, etc.

Do not place this device near a heat source. The unit must be operated and stored in a reliable environment.

The device should operate in +10°C - +40°C, relative air humidity 30%-75%, atmospheric pressure (70~106) kPa environment.

This device should be sterilized and disinfected after the patient’ s first use and after use to avoid cross-infection.

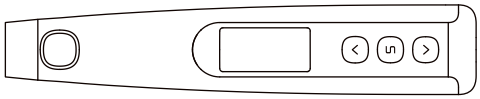
The shank of the device cannot be autoclaved, and the surface can only be wiped with neutral disinfectant or alcohol.

Do not use bent, deformed instruments or those that are non-compliant with ISO. (ISO17971-1: Ø2.334 – 2.350 mm)

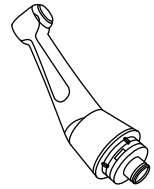
2 Product Introduction

2.1 Components list

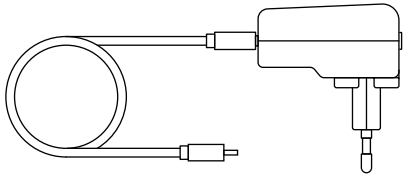
1) Motor handpiece



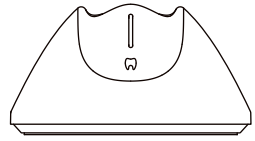
2) 6:1 Contra angle



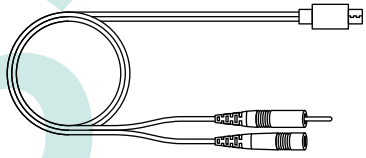
3) Adapter



4) Base

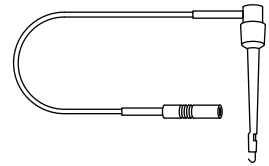


5) Measuring wire

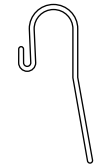


6) Oil injectors

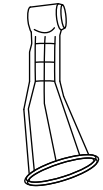
7) File Clip



8) Lip hook



9) contra angle silicone sleeve



2.1.3 Technical data description

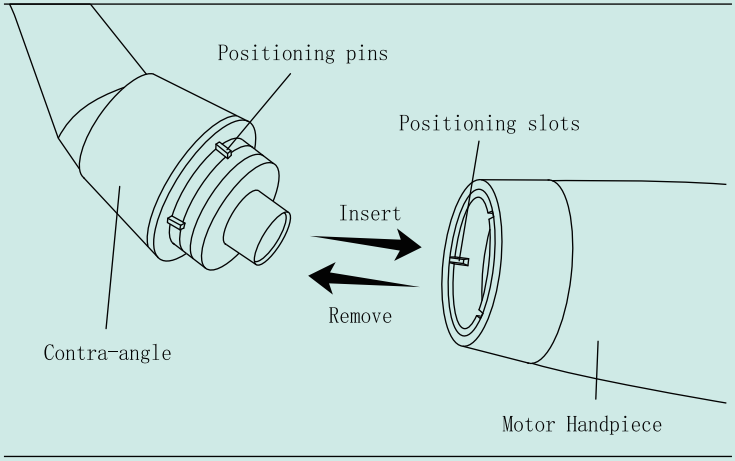
Manufacturer	Shanwei Perfect Medical Equipment Co., Ltd
Model	BR Rap
contra angle	Gear ratio 6:1
Power supply	3.7V/1500mAh lithium battery
Power adapter output	5V DC, 2A
Electrical safety classification	Class II
Application part	Type B application part: contra angle, file clip wire, lip hook, contra angle silicone sleeve Application part contact time: 1~10 minutes
materials	contra angle: copper, stainless steel, aluminum
Speed range	100rpm-1200rpm
Torque range	0.4N · cm-5N · cm
Operating conditions	Operating temperature: +10°C to +40°C Operating humidity: 30% - 75% Atmospheric pressure: 70kPa - 106kPa
Storage conditions	Storage temperature: -10°C to +50°C Storage humidity: 10% - 85% Atmospheric pressure: 70kPa - 106kPa

3 Device installation

3.1 Installation and removal of contra angle

3.1.1 Installation of contra angle

The contra angle can be connected at 3 adjustable head positions. Align the positioning pins of the contra angle with the positioning slots of the contra angle and insert the head until it clicks.



3.1.2 Removal of contra angle

When removing the contra angle, pull it straight out

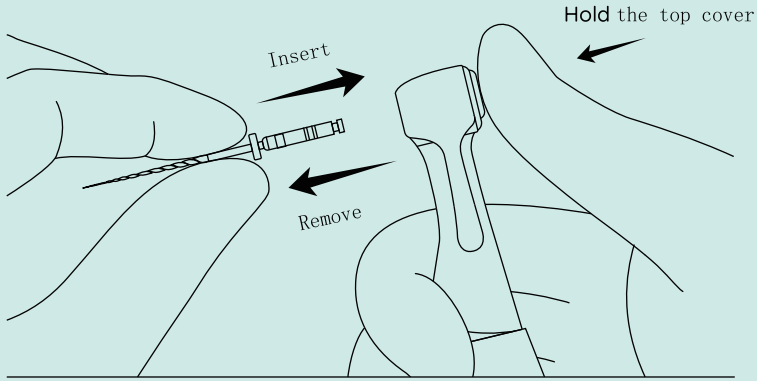
Warning

When install the contra angle, turn off the deviece.
Check that the contra angle is securely assembled to the contra angle.

3.2 Inserting and Removing the File

3.2.1 File insertion
Press the top cover of the contra angle and insert the file until the file tail is loaded into the inner lock slot of the contra angle. Release the contra angle top cover and gently pull the file out to confirm that the file is locked.

3.2.2 File removal
Press the top cover of the contra angle and pull out the file.



Warning

When attaching and detaching the file, turn the power off beforehand.

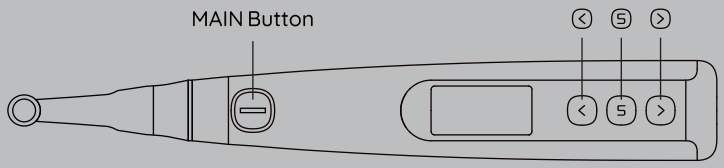
After the file is locked in place, lightly pull out the file to make sure the file is locked.

Always clean the shank of the file to be installed. Allowing dirt to enter the chuck could cause deterioration of chucking force.

Please use a file with an ISO standard file handle。(ISO standards: Φ2.334-2.350mm)

4 Device function and operation

4.1 Button definition and settings



4.2 Power on

Press the main button "⏻" to turn on the motor handpiece.

4.3 Power off

Press the "S" button, then press the main button "⏻" to turn off the motor handpiece.
The device will automatically shut down after 5 minutes without any operation.

4.4 Motor start and stop

Press the main button "⏻"to start the motor, press the main button "⏻" again to stop the motor.

4.5 Terms and Definitions

EMR	Electronic measurement root canal
Speed	File rotation speed
Torque	Torque limit setting
Direction: Fwd	CW, Clockwise rotation
Direction: Rev	CCW, Counterclockwise rotation
Rec	Reciprocating rotation
Apical Action	Root canal length feedback setting, when the depth of the file in the root canal reaches a preset value: STOP: file stop Reserve: file reverse OFF: Disable this function

Auto Start	The file enters the root canal and the motor automatically start ON: Effective this function OFF: Disable this function
Auto Stop	The file exits the root canal and the motor automatically stop ON: Effective this function OFF: Disable this functionOFF: Disable this function
Reference Point	The root canal length preset work value, the preset value range 00-18, Number “00” indicate that the file has reached the root canal apex
ATR	Up to setting torque, the motor will move with reciprocating ATR mode ; when torque reduce to normal value, the motor will clockwise rotate
RP	Reference Point root canal length preset value
AP	Apical foramen

4.5 Main interface

Enter the main interface after the device is turned on

The interface options are preset file program, customer program, and device system setting.

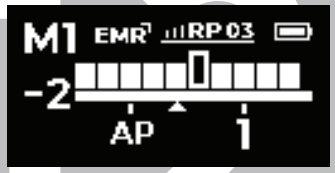
4.6 Mode Introduction

EMR mode		Root canal length measurement mode, which the motor does not work
Fwd(CW mode) Rev(CCW mode)		Speed range 100-1200rpm, Torque range: 0.4-5.0N·cm
REC mode		Reciprocating rotation, Speed range: 100-500rpm, Forward angle: 20-400°, Reverse angle: 20-400°, Torque range: 2.0-5.0 N·cm
ATR mode		Adaptive Torque Reciprocating Speed range: 100-500rpm Forward angle: 120° - 340° Reverse default angle 90° Torque range: 0.4-4.0N·cm

4.7 Icon Definition

4.7.1 Torque display
Start the motor and the OLED screen will show the real-time torque value.

4.7.2 Root canal measurement value displayed



4.8 Parameter Settings

	Root apical feedback mode adjustment, when the file reaches the preset root canal length value, the motor has three feedback methods for selection, "Reserve" "Stop" "OFF"
	The file slows down automatically as it approaches the apical. Activating in “F”(CW) and “R”(CCW) operation mode.
	The file rotation starts automatically when the file is inserted in the canal.
	The file rotation stops automatically when the file is exited from the canal.

4.9 Preset file program

The device has built-in preset file programs of different manufacturers, and the speed and torque are set to the range values recommended by the manufacturer.
Press the button "<", ">" to select file program.

Select file manufacturer: Press the button "<";">" to select a different file manufacturer.

Select the catalog: press the button "S" to select the corresponding file manufacturer, and press the adjustment button "<" or ">" to select different file type programs.

Select the file type: press the button "S" to select the corresponding file type, and press the buttons "<", ">" to select a different file model program.
Press the button "ⓘ" to confirm the selection.

4.10 Device system setting

Auto Power OFF	After 3 seconds, enter the Auto Power OFF adjustment interface. Press the buttons "<" or ">" to select 3-30min. Press the main button "ⓘ" to confirm the selection.
Auto Standby Scr	Press "S" to enter the Auto Standby Scr adjustment interface. Press the button "<" , ">" to select 3-30sec. Then press the main button "ⓘ"
Dominant Hand	Press the "S" button again to enter the dominant hand adjustment interface. Press the adjustment button "<" or ">" to select Right or Left. Then press the main button "ⓘ" to confirm the selection.
Calibration	Press the "S" button again to enter the calibration interface. Press the adjustment button "<" or ">" to select ON or OFF. Press the main button "ⓘ" to confirm. When the setting is ON enter Calibration. In order to ensure the accuracy of calibration, the original contra angle should be equipped during calibration.
Beeper Volume	Press the "S" button again to enter the volume adjustment interface. Press the button "<" , ">" to select Vol.0, Vol.1, Vol.2, Vol.3. Then press the main button "ⓘ" . to confirm the selection.
Restore Defaults	Press the "S" button again to enter the factory reset interface. Press the button "<" or ">" to select ON or OFF. Then press the main button "ⓘ".

4.11 Auto reverse protection function

In M2 and M3 modes, the motor runs in one direction, and when the motor load torque reaches the preset value, the motor will automatically reverse; When the motor load returns to half of the preset torque value again, the motor returns to its original direction of rotation.

Warnings

The auto-roll protection function is only effective in M2, M3 (one-way rotation) mode.

This function does not take effect in REC mode and ATR mode.

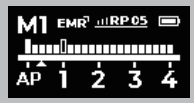
When the device is low power, it is not enough to support the motor to reach the maximum torque value of 5Ncm, that is, the reverse function cannot work normally at this time, please charge it in time.

4.12 Root canal length measurement

4.12.1 Single root canal test function

The EMR of this device is a separate root canal length measurement mode, and plug the USB end of the root measurement cable into the USB port on the back of the device.

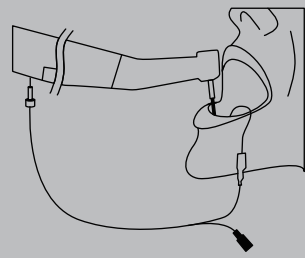
4.12.2 Root canal length value preset.



Preset a root canal length value, doing the root canal length test, the buzzer will "tick" warning when the file needle is close to the set value, as the distance is closer to the preset value, the warning tone frequency is faster.

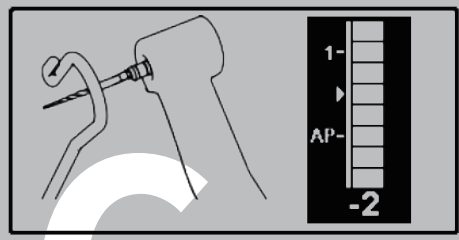
4.13 Simultaneous shaping and measurement function

When using this function, the test wire is connected to the shank, and at the end of the test wire that lip hook can be hung on the patient's lip. The measurement function can be performed when the file needle enters the root bone of the tooth.



Warning

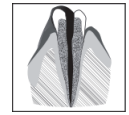
Before using the simultaneous shaping and measurement function, it is necessary to check whether the connection is good, and the verification method is as follows:



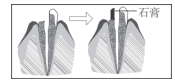
Contact the lip hook with the file needle, and when the root measurement is -2, it indicates a good connection.

Root canal measurements are not suitable for the following situations:

Root canal with large apical foramen
Root canal with a large apical foramen root canal that has an exceptionally large apical foramen due to a lesion or incomplete development cannot be accurately measured. The results may show shorter measurement than the actual length

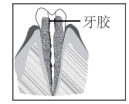


Root canal with blood overflowing from the opening
Blood overflows from the opening of the root canal and contacts the gums, this will result in electrical leakage and an accurate measurement cannot be obtained. Wait for bleeding to stop completely. Clean the inside and opening of the canal through to get rid of all blood, and then make a measurement

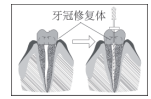


Broken crown
the crown is broken and a section of the gingival tissue intrudes into the cavity surrounding the canal opening, contact between the gingival tissue and the file will result in electrical leakage and an accurate measurement cannot be obtained. In this case, build up the tooth with a suitable material to insulate the gingival tissue.

Fractured tooth
Leakage through a branch canal fractured tooth will cause electrical leakage and an accurate measurement
cannot be obtained.



Re-treatment of a root filled with gutta-percha
The gutta-percha must be completely removed to eliminate its insulating effect. After removing the gutta-percha, pass a small file all the way through the apical foramen and then put a little saline in the canal, but do not let it overflow the canal opening.



Crown or metal prosthesis touching gingival tissue
Accurate measurement cannot be obtained if the file touches a metal prosthesis that is touching gingival tissue. In this case, widen the opening at the top of the crown so that the file will not touch the metal prosthesis before taking a measurement.

Charging should be kept away from heat sources.

4.14 Device charging

This product has a built-in rechargeable lithium battery, plug the power adapter into the USB port at the bottom of the motor handpiece or base, and when it enters the charging status, it displays Charging.

When fully charged, Full Charge is displayed and the battery shows full on the screen.

5 Maintenance

5.1 Replace the battery

Replacement of the battery should use the original lithium battery provided by the manufacturer, please contact the local dealer or manufacturer for replacement.

Replacement steps:

1)Make sure the device is off.

2)Remove the silicone plug of the battery cover with forceps and remove the fixing screw with a screwdriver.

3)Remove the old battery and remove the battery cover.

4)Put the new battery into the battery compartment,turn it on, and ensure it is working properly.

Attach the battery cover, lock it with screws, and plug the silicone plug into the screw hole.

Warning

Do not disassemble parts that are not related to battery replacement.

Do not replace the battery with wet hands, as this may cause the battery to short circuit and damage the device.

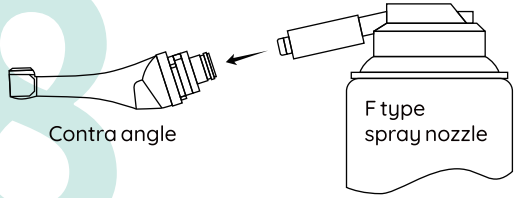
Do not use lithium batteries other than the original, otherwise the device may be damaged.

If the device is not used for a long time, the lithium battery should be removed.

5.2 contra angle lubrication

To extend the life of the contra angle, it should be lubricated each time when the contra angle is used or sterilized.

1)Rotate the oil injector into the nozzle of the oil injector bottle.



2)Insert the oil injector into the tail of the contra angle, and then inject the oil for 2~3 seconds until the lubricating oil flows out of the contra angle.

3)Leave the contra angle and tail upright for more than 30 minutes to drain excess lubricating oil by gravity.

Warning

The motor handpiece cannot be filled with oil.

Note!

When filling oil, hold the Contra-angle tightly to prevent the Contra-angle from leaving the oil injector due to the oil injection pressure.

6 Troubleshooting

Failure status	Possible causes	Processing method
Motor calibration failed	he device is not fully charged Excessive resistance of the contra angle	Charge the device to full capacity, or calibrate it while it is charging. Lubricate the contra angle
The motor handpiece heating	Excessive underload The reciprocating rotation is used for too long While charging	Stop using it until the temperature of the handpiece returns to normal
Battery life becomes shorter when fully charged	The battery capacity becomes smaller	Contact your local dealer or manufacturer to replace the battery
OVERLOAD	Overload	Stop the motor, exit the root canal and activate it
There is continuous beep sounds after starting the motor handpiece.	The continuous beep sound is indicating that the motor handpiece is under Rev mode	Stop the motor handpiece and change the operating mode to Fwd Mode

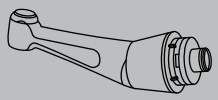
If you do not find the information you need, you can contact the manufacturer through the following Hotline: +86-0660-6128899, E-mail: likee@dental-perfect.com.

7 Cleaning, disinfection and sterilization

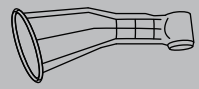
For hygiene and hygiene safety purposes, this appliance must be cleaned, disinfected, and sterilized before the first use and after each use to prevent cross-infection.

Steam sterilization of parts at 135°C is required

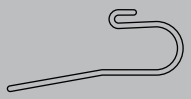
Contra angle



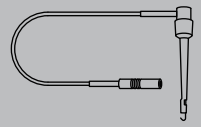
Contra angle silicone sleeve



Lip hook



File clip



⚠ The above components can be sterilized by high-temperature steam

Washing: Use a soft-bristled brush to rinse components thoroughly under running water to remove visible contaminants. Clean all components with a soft cloth moistened with a mild aldehyde-free cleaning solution. Wash the components with tap water and wipe off excess water. Use a tee syringe etc., to blow off residual moisture inside the component.

Disinfection: Wipe the parts five times for 2 minutes each with a gauze soaked in alcohol (alcohol content 70-80vol%)

Oil injection: Before the contra angle is sterilized by high-temperature steam, lubrication with oil is required. The oil injection method refers to section 7.2 of this manual

Packing: Pack the contra angle, lip hook, file clip wire and silicone sleeve in a special bag for high-temperature steam sterilization in accordance with EN 868-5

Sterilization: Autoclaved at 134°C and 0.22Mpa for at least 5 minutes.
Dry for at least 8 min after sterilization

Storage: Keep the sterilized contra angle, lip hook, file clip wire, and silicone sleeve in a special sterilization bag and store them in a dry and clean environment. Check the integrity of the packaging before using it and that the sterilized bag is within the specified expiry date

⚠ **Warning!**

Please follow the relevant regulations for disinfection and sterilization

Please be careful when performing maintenance to avoid cross-infection

Must be autoclaved before the first use and after each use

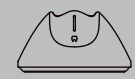
Oil filling of the main unit is prohibited as this may damage the internal components.

The contra angle can be sterilized for a minimum of 250 cycles.
The life expectancy of the contra angle is 1 year, depending on the frequency and duration of clinical use and the degree of difficulty of the patient's oral canal during treatment

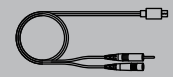
Components to be disinfected

Motor handpiece

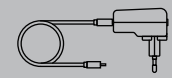
Base



Measurement wire



Adapter



Wipe the surface of the part using gauze soaked in alcohol (70-80 vol% alcohol content)

⚠ **Warning!**

Do not use disinfectants other than alcohol for disinfection

Do not use excessive amounts of alcohol as it may penetrate into the part and damage the internal components

Disinfection is required before the first use and after each use

8 Disposal of products

Do not dispose of the device in the household waste system. Dispose of waste in accordance with local laws and regulations.

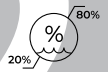
9 Warranty

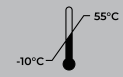
BR-Rap warranty for 12 months from the date of purchase by the user. The company does not provide technical data (such as circuit principles, component lists, etc.) to other organizations.
If you have any questions, please contact your local dealer or manufacturer.

The manufacturer is not responsible for:

1. Use BR-Rap for purposes and purposes that violate the specific provisions in this instruction manual.
2. Use methods that are contrary to those stated in this manual for cleaning, disinfection and sterilization operations.
3. Disassembly and repair by unauthorized personnel.

10 Symbol description

	Power switch
	Dry storage
	Serial number
	Air pressure restrictions for transport and storage
	Manufacturer
	Humidity limits for transport and storage
	Date of manufacture

	Temperature limits for transport and storage
	Class II equipment
	Note, refer to the operating instructions
	Type B application section
	Please refer to the instructions for using
	Warning, if not done properly, may endanger the user or the patient
	Indoor use only
	Do not dispose of the device in the household waste system
	Follow the instruction manual
	DC (power connection)
	High temperature up to 135°C Steam sterilization
	AC power

Guidance and manufacturer' s declaration - electromagnetic emissions

The model BR-Rap is intended for use in the electromagnetic environment specified below. The customer or the user of the model BR-Rap should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The model BR-Rap uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment
RF emissions CISPR 11	Class B	The model BR-Rap is suitable for used in domestic establishment and in establishment directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.
Harmonic emissions lEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions lEC 61000-3-3	Complies	

NOTE: UT means the a.c. mains voltage prior to application of the test level.

Guidance & Declaration electromagnetic immunity

The model BR-Rap is intended for use in the electromagnetic environment specified below. The customer or the user of the model BR-Rap should assure that It is used in such anenvironment

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment guidance
Electrostatic discharge (ESD) lEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2kV for power supply lines ±1 kV for Input/output linesat least 30 %.	±2kV for power supply lines	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Surge lEC 61000-4-5	±0.5 kV, ±1 kV line to line ±0.5 kV, ±1 kV, ±2 kV line to ground	±0.5 kV, ±1 kV line to line	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U T (>95% dip in U T .) for 0.5 cycle <5 % U T (>95% dip in U T) for 1 cycle 70% U T (30% dip in U T) for 25/30 cycles <5% U T (>95 % dip in U T) for 5/6 sec	<5 % U T (>95% dip in U T .) for 0.5 cycle <5 % U T (>95% dip in U T) for 1 cycle 70% U T (30% dip in U T) for 25/30 cycles <5% U T (>95 % dip in U T) for 5/6 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the model BR-Rap requires continued operation during power mains interruptions, it is recommended that the model BR-Rap be powered from an uninterruptible power supply or a battery
Power frequency (50/60 Hz) magnetic field lEC 61000-4-8	3 A/m, 30 A/m	3 A/m, 30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE U T is the a.c. mains voltage prior to application of the test level.

Guidance & Declaration Electromagnetic immunity

The model BR-Rap is intended for use in the electromagnetic environment specified below. The customer or the user of the model BR-Rap should assure that it is used in such an environment

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 6 Vrms in ISM and amateur radio bands 3 V/m, 10 V/m 80 MHz to 2.7 GHz 385MHz-5785MHz Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communication equipment (Refer to table 9 of IEC 60601-1-2:2014)	3 Vrms 150 kHz to 80 MHz 6 Vrms in ISM and amateur radio bands 3 V/m, 10 V/m 80 MHz to 2.7 GHz 385MHz-5785MHz Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communication equipment (Refer to table 9 of IEC 60601-1-2:2014)	Portable and mobile RF communications equipment should be used no closer to any part of the models BR-Rap, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d=[3,5/V 1]×P 1/2 d=1.2×P 1/2 80 MHz to 800 MHz d=2.3×P 1/2 800 MHz to 2.7 GHz where P is the maximum output power rating of the transmitter In watts (W) according to the transmitter manufacturer and d Is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electro-magnetic site survey, a should be less than the compliance level in each frequency range. b Interference may occur In the vicinity of equipment marked with the following symbol:

NOTE 1 At 80 MHz and 800 MHz. the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by
absorption and reflection from structures, objects and people.
Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and
land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted
theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an
electromagnetic site survey should be considered. If the measured field strength in the location in which
the model BR-Rap is used exceeds the applicable RF compliance level above, the model BR-Rap should be observed to verify normal operation. If abnormal performance is observed,
additional measures may be necessary, such as reorienting or relocating the model BR-Rap.
b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3V/m.

Recommended separation distances between portable and mobile RF communications equipment and the model BR-Rap

The model ZR-Ra is intended for use in electromagnetic environment in which radiated RF disturbances is controlled. The customer or the user of the model BR-Rap can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the model BR-Rap is recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitterm		
	150kHz to 80MHz d=1.2×P 1/2	80MHz to 800MHz d=1.2×P 1/2	800MHz to 2,5GHz d=2.3×P 1/2
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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