



Revolution Wireless[™] User Manual-EN

QUICK START GUIDE

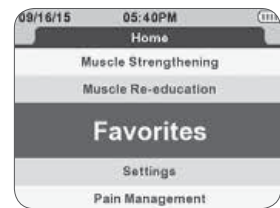
Note

- It is strongly advised to carefully read the contraindications and safety measures described in chapter 1 and 2 in this manual before using your device.
- For detailed information on usage read the entire user manual.

1. Turn the Remote Control on, by pressing the On/Off button.



2. Upon activation the screen displays a list that gives you access to the categories of programs.



3. Select a program category and a program within the category by using the navigation pad (up/down).



4. Confirm your choice with the center button.



5. Stick the electrodes on the patient and connect the modules.



6. Turn on the modules, being careful to respect the order of activation of the modules, the turning-on order corresponds to the channel numbering.

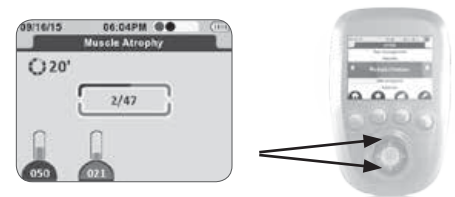


QUICK START GUIDE

7. Validate everything by pressing the button below the START symbol.



8. Start the stimulation by increasing the intensities of the channels.
To pause the device, press the center button.



9. At the end of the program press the center button to return to the main menu or press the On/Off button to turn off the device.



CONTENTS

1. How to use the medical equipment (Intended Use)	5
1.1 Treatment environment	5
1.2 Therapy objectives	5
1.3 Indications	6
1.4 Contraindications	6
1.5 Adverse Effects	7
2. Safety Information	8
3. Description of the Revolution Wireless	18
3.1 Device components and accessories	18
3.2 Explanation of symbols (connections and nameplates)	20
3.3 Description of the device components	22
3.4 Description of key accessories	24
3.5 Description of key Displays shown	25
4. Device Setup	31
4.1 Smart 4CH Docking station - Connecting the unit, performance check	31
4.2 Charging the Remote Control and the Modules	32
4.3 Synchronization between remote and modules	34
5. How to Perform a Treatment, Performance Check	35
5.1 Select a Program	35
5.2 Adjust treatment options	36
5.3 Electrode placement	36
5.4 Patient positioning	38
5.5 Connecting the modules to the electrodes	39
5.6 Starting the treatment	40
5.7 Ending the treatment	42
5.8 Performance Check	42
6. Treatment Options, Functions and Device Settings	43
6.1 Triggering of contraction	43
6.2 Available Programs and Functions	44
6.3 Available Device Settings	48
7. Troubleshooting	61
7.1 Errors shown on display	61
7.2 Behavior of the Module LEDs	64
7.3 Behavior of the Docking Station LEDs	65
7.4 Others	66

CONTENTS

8. Care, Maintenance, Transport, Environmental Statement	69
8.1 Care	69
8.2 Maintenance	70
8.3 Transport	71
8.4 Environmental Statement, Expected Life	72
9. Technical Data, Standards, Guarantee, Patents	73
9.1 Technical Data	73
9.2 Standards	78
9.3 Guarantee	78
9.4 Patents	78
10. EMC Tables	79
10.1 Electromagnetic emissions	79
10.2 Electromagnetic immunity	80
10.3 Recommended separation distances	84
11. Contact	84

1. HOW TO USE THE MEDICAL EQUIPMENT (INTENDED USE)

Note

- This manual is considered as accessory of the therapy unit and therefore it should accompany it at all times.
- The specific instructions provided given here are conditions for the intended use and correct operation of the equipment as well as the safety of the patient and the operator using it.
- Please read the entire manual carefully and section 2 in particular, since information concerning several chapters is only given once, before using your Revolution Wireless device.

1.1 Treatment environment

The Revolution Wireless is a stimulator designed for use by healthcare professionals to provide electrical stimulation treatments in pain management (TENS) as well as for neuromuscular stimulation (NMES).

The Revolution Wireless unit is used in medical and therapeutic treatment environments such as hospitals, clinics, general practices and other health care locations by a skilled clinician.

This device is not intended to be used in a home environment.

1.2 Therapy objectives

The Revolution Wireless is a multifunctional electrotherapy unit for the post-surgical and conservative treatment of muscle atrophy as well as pain management.

The following therapy forms are provided by the unit:

- TENS (transcutaneous electrical nerve stimulation) for pain management
- NMES (neuromuscular electrical stimulation)

1. HOW TO USE THE MEDICAL EQUIPMENT (INTENDED USE)

1.3 Indications

The Chattanooga Revolution Wireless is a clinical electrotherapy device intended for use under the supervision of a Healthcare Professional.

Indications for Use:

As an NMES device, indications are for the following conditions:

- Retarding or preventing disuse atrophy
- Maintaining or increasing range of motion
- Re-educating muscles
- Relaxation of muscle spasms
- Increasing local blood circulation
- Prevention of venous thrombosis of the calf muscles immediately after surgery

As a TENS device, indications are for the following conditions:

- Symptomatic relief and management of chronic, intractable pain
- Post-surgical and post-trauma acute pain

As a pulsed-current device, indications are for the following conditions:

- Relaxation of muscle spasm
- Increasing local blood circulation
- Retardation or prevention of disuse atrophy
- Maintenance or increase of range of motion

1.4 Contraindications

Do NOT use the Revolution Wireless under the following conditions:

- Patients with implanted electronic devices. Do not use the device on patients with a cardiac demand pacemaker, implanted defibrillator or other implanted electronic/electrical device.
- Patients with body worn electro mechanical medical devices, i.e., insulin pump.
- Serious arterial circulation problems in lower limbs.
- Abdominal or inguinal hernia.
- For symptomatic local pain relief unless etiology is established or unless a pain syndrome has been diagnosed.
- Do not use chest stimulation on patients with cardiac arrhythmia.

1. HOW TO USE THE MEDICAL EQUIPMENT (INTENDED USE)

Additional Precautions

- Use caution for patients with suspected or diagnosed heart problems.
- Use caution for patients with suspected or diagnosed epilepsy.
- Use caution in the presence of the following:
 - When there is a tendency to hemorrhage following acute trauma or fracture.
 - Following recent surgical procedures when muscle contraction may disrupt the healing process.
 - Over a menstruating or pregnant uterus.
 - Over areas of the skin that lack normal sensation.

1.5 Adverse Effects

- Skin irritation and burns beneath the electrodes have been reported with the use of powered muscle stimulators.
- Potential adverse effects with TENS are skin irritation and electrode burns.

2. SAFETY INFORMATION

Definitions

The precautionary instructions found in this section and throughout this manual are indicated by specific symbols. Understand these symbols and their definitions before operating this equipment. The definitions of these symbols are as follows



Danger!

Text with a “**DANGER**” indicator will explain possible safety infractions that are imminently hazardous situations that would result in death or serious injury.



Warning!

Text with a “**WARNING**” indicator explains possible safety infractions that will potentially cause serious injury and equipment damage.



Caution!

Text with a “**CAUTION**” indicator explains possible safety infractions that have potential to cause minor or moderate injury or damage to the equipment.



Dangerous Voltage

Text with a “Dangerous Voltage” indicator serves to inform the user of possible hazards resulting in the electrical charge delivered in certain program configurations of waveforms.



Explosion Hazard

Text with an “Explosion Hazard” indicator will explain possible safety infractions if this equipment is used in the presence of flammable anesthetics.



BioHazardous materials

Text with a “Biohazard” indicator serves to inform the user of possible hazards resulting in improper handling of components and accessories that have come in contact with bodily fluids

2. SAFETY INFORMATION



DANGER!



Explosion Hazard — Revolution Wireless is not designed for use in areas where an explosion hazard may occur. An explosion hazard may result from the use of flammable anesthetics, oxygen-rich environments, skin cleansing agents and disinfectants.



Handle, clean, and dispose of components and accessories that have come in contact with bodily fluids according to National, Local, and Facility rules, regulations and procedures.

Stimulus delivered by the waveforms of this device, in certain configurations, will deliver a charge of 25 microcoulombs (μC) or greater per pulse and may be sufficient to cause electrocution. Electrical current of this magnitude must not flow through the thorax because it may cause a cardiac arrhythmia.

Users with an implanted neurostimulation device must not be treated with or be in close proximity to any shortwave diathermy, therapeutic ultrasound diathermy, or laser diathermy anywhere on their body. Energy from diathermy (shortwave, microwave, ultrasound, and laser) can be transferred through the implanted neurostimulation system, can cause tissue damage, or can result in severe injury or death. Injury, damage, or death can occur during diathermy therapy even if the implanted neurostimulation system is turned off.

The solvents of adhesives and flammable solutions used for cleaning and disinfecting should be allowed to evaporate before the unit is used.

DO NOT connect the unit to an electrical supply without first verifying that the power supply is the correct voltage. Incorrect voltage may cause unit damage, malfunction, electrical shock, fire, or personal injury. Your unit was constructed to operate only at the electrical voltage specified on the Voltage Rating and Serial Number plate. Contact your DJO dealer if the unit is not properly rated.

2. SAFETY INFORMATION



Warning!

Patient hazard –

- U.S.A Federal Law restricts these devices to sale by, or on the order of, a physician or licensed practitioner. This device should be used only under the continued supervision of a physician or licensed practitioner.
- Be sure to read all instructions for operation before treating a patient.
- Only authorized individuals are allowed to operate the Revolution Wireless. Individuals are authorized after receiving training in the operation of the unit and reading this operating on manual.
- The long-term effects of chronic electrical stimulation are unknown.
- TENS is not effective for pain of central origin (including headache).
- TENS waveforms have no curative value.
- TENS is a symptomatic treatment, and as such, suppresses the sensation of pain which would otherwise serve as a protective mechanism.
- Before using the therapy unit, the operator must ascertain that it is in correct working order and operating condition. The cables and connectors, in particular, must be checked for signs of damage. Damaged parts must be replaced immediately, before use.
- Stop therapy immediately if you have doubts about the device settings and/or the therapy protocol.
- Patients must be fully conscious while being instructed in the use of the therapy unit and during therapy.
- Do not treat through clothing.
- Stop treatment immediately if patient experiences discomfort or pain.
- The choice of the therapy parameters to program, of the therapy protocols and electrode placement is restricted to the responsible physician or therapist. It is the physician's or therapist's decision whether or not to use the unit on a specific patient.
- The patient must be familiar with the functions of the Revolution Wireless remote control with the modules and the remote control must be within easy reach of the patient, allowing them to stop therapy, if needed. Patients unable to operate the emergency stop function (either by stopping on the remote control or by turning off the modules), e.g. paralytic patients, must never be left unattended during therapy.
- Use of accessories other than those specified in this User Manual may increase electrical emissions, decrease electrical immunity or lead to unsafe conditions.
- The utmost caution is advised under the following conditions. Depending on the judgement of the responsible physician, the unit may only be applied under supervision and with the parameters defined by the responsible physician. Otherwise the exercise may be too strenuous for the patients with:

1. hypertension (> stage 2), ischemic heart disease and cerebrovascular diseases
2. cardiovascular diseases

2. SAFETY INFORMATION

3. Pregnancy. Safety of powered muscle stimulators for use during pregnancy has not been established.
4. under 16 years of age

– Never apply the electrodes as follows:

- Stimulation should not be applied transcerebrally, or on the eyes.
- Stimulation should not be applied over the anterior neck or mouth. Severe spasm of the laryngeal and pharyngeal muscles may occur and the contractions may be strong enough to close the airway or cause difficult in breathing.
- Counter-laterally, i.e. do not use two poles connected to the same channel on opposite sides of the body.
- Stimulation should not be applied over swollen, infected, or inflamed areas or skin eruptions, e.g., phlebitis, thrombophlebitis, varicose veins, etc.
- Stimulation should not be applied transthoracically in that the introduction of electrical current into the heart may cause cardiac arrhythmia.
- Stimulation should not be applied over the carotid sinus nerve particularly in patients with a known sensitivity to the carotid sinus reflex.
- Stimulation should not be applied over, or in proximity to, cancerous lesions.
- If the person is pregnant or menstruating do not place electrodes directly on the uterus area or connect pairs of electrodes on either side of the abdomen to avoid any risk for the mother and/or the baby.
- Keep electrodes separated during treatment. Electrodes in contact with each other could result in improper stimulation or skin burns



Warning!

- Extreme caution should be taken when in use around small children and babies! Sufficient distance to the device and its accessories is mandatory for their safety!
- Never leave the device unattended when it is switched on! Switch the device off and disconnect the electrodes from the modules!
- After use, store the device in a safe place to avoid other people not informed to use the device!
- This device is not a toy but a medical device that misunderstanding use can cause damages!

2. SAFETY INFORMATION



Warning!

Shock hazard — Strictly observe the following warnings. Failure to do so could endanger the lives of the patient, the user and other persons involved.

- **Before use** allow the Revolution Wireless to reach room temperature. If the unit has been transported at temperatures below 0 °C (32°F), leave it to reach at room temperature for about 2 hours, until any condensation has disappeared.
- **Electrosurgical equipment or defibrillators.** Disconnect the electrodes from the device before using electrosurgical equipment, or a defibrillator, to avoid cutaneous burns from the electrodes and destroying the device.
- **Electronic surveillance equipment.** Do not apply stimulation near electronic surveillance equipment (e.g. cardiac monitors, ECG alarms), as there is a risk they may not work properly whilst the electrical stimulation device is being used.
- **Electromagnetic radiation.** Do not use the stimulator in areas in which unprotected devices are used to emit electromagnetic radiation. Portable communications equipment can interfere with the device.
- **Cancer.** Do not apply stimulation if you have progressive cancer or near any cancerous tumour. The increased metabolism, caused by certain modes of stimulation, is likely to encourage cancer cells to spread
- **Muscle shortening.** During the muscular contraction phase it is recommended to hold the extremities of the stimulated limbs to avoid any shortening of the muscle during contraction, which could cause cramps.
- **Contralateral stimulation.** Do not use two terminals connected to the same channel on opposite segments of the body (for example, a positive terminal on the left arm and a negative terminal on the right arm).
- **Loss of sensation.** Proceed with caution if stimulation is applied to areas of the skin whose level of sensation is lower than normal. Do not apply stimulation to a person who cannot express themselves.
- **Battery leakage.** If there is leak from a component, take steps to ensure the liquid does not come into contact with skin or eyes. Should this occur, wash the affected area with water and consult a doctor.
- **Strangulation.** Do not wind cables around the neck. Tangled cables can cause strangulation.
- **Post-surgery.** Proceed with caution after recent surgery.
- **Accessibility of the power adaptor.** The plug socket must be close to the power adaptor and be easily accessible.
- **Internal bleeding.** Proceed with caution if you are prone to internal bleeding; for example, after an injury or a fracture.

2. SAFETY INFORMATION

The Revolution Wireless must only be operated in dry rooms.

- **Do not use** the Revolution Wireless in water or in a humid atmosphere (sauna, Bath, Shower etc.) that would cause electronic failure.
- **Water protection.** The unit is not protected from the ingress of water
- When connecting the unit to other equipment or when creating a medical system, check that the sum of leakage currents will not cause any hazard. Please contact DJO GLOBAL if you have questions regarding this matter.
- No modification of this equipment is allowed.
- Do not open the product and its accessories as there is risk of electrocution
- Before cleaning and service interventions, **turn the remote control and the modules off and disconnect the tablet from the power line** by removing the power cord from the wall outlet.
- **Liquids and foreign material (such as dust, metal etc.) must not be allowed** to enter the remote control, the modules, the charging tablet or the power supply. If such material has entered into the units, it must be immediately checked by a service technician, before it can be reused.
- **Electricity supply.** Never connect the stimulation cables to an external power supply, as there is a risk of electrocution
- Do not apply stimulation near the area of an implant, such as cochlear implants, pacemakers, skeletal anchorage or electric implants. This could cause an electrical shock, burns, electrical interference or death
- Never use the Revolution Wireless or the AC adaptor if it is damaged or open. There is a risk of electric shock.
- Disconnect the AC adaptor immediately if there is abnormal heating or smell, or if smoke comes from the AC adaptor or the device.
- Do not place the docking station in a confined space (carrying case, drawer etc.) when charging the device. There is a risk of electrocution

2. SAFETY INFORMATION



Warning!

Equipment malfunction — these warnings refer to potential equipment malfunctions that could result in patient hazards

- Magnetic and electrical fields are capable of interfering with the proper performance of the unit. For this reason make sure that all external devices operated in the vicinity of the unit comply with the relevant EMC requirements. – Devices that intentionally radiate electromagnetic energy, such as X-ray equipment, MRI devices, –radio systems and cell phones are possible sources of interference, as well as RFID equipment (e.g. electromagnetic security systems).
Keep the unit away from such equipment and verify its performance before use. For additional information, refer to the EMC section of this Manual.
- Do not use the Revolution Wireless within 3 feet of short wave or microwave devices as this could alter the currents generated by the stimulator. If you are in any doubt as to the use of the stimulator in close proximity to another medical device, seek advice from the manufacturer of the latter or from your doctor.
- Exercise caution when using electrotherapy while the patient is connected to monitoring equipment with electrodes attached to the body. Stimulation could disrupt the signals sent to the monitoring equipment.
- Refer **repair** and **maintenance** to authorized persons. Persons are authorized after training by a specialist trained and commissioned by the manufacturer.
- Do not disassemble or modify the Revolution Wireless or its accessories. This may cause damage, malfunction, electrical shock, fire, or personal injury.
- Inspect the **Revolution Wireless** and its accessories for damage and loose connections at least **once a year**. Damaged and worn parts must be immediately replaced with original spare parts by authorized staff.
- Do not use the device if you are connected to a high-frequency surgical instrument as this could cause skin irritation or burns under the electrodes

2. SAFETY INFORMATION



Caution!

Read, understand, and practice the precautionary and operating instructions found in this manual. Know the limitations and hazards associated with using electrical stimulation. Observe any precautionary and operational decals placed on the unit.

Patient hazard — these cautions need to be observed to avoid the risk of electrical shock or other negative effects to the patient.

- The device is designed to comply with electromagnetic safety standards. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. Harmful interference to other devices can be determined by turning this equipment on and off. Try to correct the interference by using one or more of the following:
 - Reorient or relocate the receiving device
 - Increase the separation between the equipment (refer to the EMC section in this manual for recommended separation distances)
 - Connect the equipment to an outlet on a different circuit.
 - Consult your DJO dealer for assistance.
- Do not apply stimulation close to metal. Remove jewelry, piercings, belt buckles or any other metallic product or device in the area of stimulation.
- Be careful if the patient has sensitivity problems or is not able to communicate that he or she feels discomfort, however light.
- Never begin an initial stimulation session on a person who is standing. The first five minutes of stimulation must always be performed on a person who is sitting or lying down. In rare instances, people of a nervous disposition may experience a vasovagal reaction. This is of psychological origin and is connected with a fear of the muscle stimulation as well as surprise at seeing one of their muscles contract without having intentionally contracted it themselves. A vasovagal reaction causes heart to slow down and blood pressure to drop, which produces a feeling weakness and a tendency towards fainting. If this does occur, all that is required is to stop the stimulation and for the person to lie down with the legs raised until the feeling of weakness disappears (5 to 10 minutes)
- Never allow muscular contraction during a stimulation session to result in movement. You should always stimulate isometrically; this means that the extremities of the limb in which a muscle is being stimulated must be firmly fixed, so as to prevent any movement that results from contraction.

2. SAFETY INFORMATION

- Do not disconnect any module that is switched on during the stimulation session. They must be switched off first.
- Do not use the stimulator while driving, operating machinery, or during any activity in which involuntary muscle contractions may put the user at undue risk of injury. Do not apply stimulation during sleep.
- Do not use the stimulator at altitudes of over 9,800 feet.
- Always turn off the stimulator before moving or removing any electrodes during a session, to avoid electrical shock to the patient.
- Do not try to place electrodes on a body part not directly visible without assistance.
- Attach the electrodes in such a way that their entire surface is in contact with the skin.
- For reasons of hygiene, each patient must have their own set of electrodes. Do not use the same electrodes on different patients.
- Contaminated electrodes or gel can lead to infection.
- Use of electrodes with degraded hydrogel can result in burns to the skin.
- **Size of electrodes.** Do not use electrodes with an active area of less than 16 cm² due to the risk of associated burning. Proceed systematically with caution when the density of the current is over 2 mA/cm².
- Do not place the electrodes in water.
- Do not apply solvents of any kind to the electrodes.
- **Skin irritation.** Some patients may experience skin irritation or hypersensitivity due to the electrical stimulation or electrical conductive medium. The irritation can usually be reduced by using an alternate conductive medium, or alternate electrode placement. If redness of the skin is observed under the electrode, do not start another stimulation session on the same area if the redness is still visible.
- **Instructions for electrodes.** See the usage and storage instructions displayed on the bag of electrodes.

2. SAFETY INFORMATION



Caution!

Equipment damage –

- **Do not let the modules get in contact with massage oils or any other products of the same type that could damaged the device or its accessories.**
- Check that the voltage and frequency ratings of your local power line are those indicated on the type plate of the power supply.
- Do not expose the **Revolution Wireless** to direct sunlight, because some of the components may reach unacceptably high temperatures.
- The unit is not protected from the ingress of water droplets from rain if used outside the carrying case
- The presence of children, pets and vermin does not normally affect the proper functioning. However, make sure that these sources do not contaminate the physiotherapy unit and keep them away from it. Also, keep the unit clean and protect it from dust and lint. The safety rules and regulations set forth apply in any case.
- It is recommended to use the transport bag that comes with the unit, for transport of the device, and to use a proper transport box to ship it.
- Always use the AC adaptor (power supply) provided by the manufacturer to recharge the unit.
- Do not store the modules and remote control for a long time with uncharged batteries.
- Only use electrodes supplied by the manufacturer. Other electrodes may have electrical properties that are unsuitable for or may damage the Revolution Wireless.

Note

- For best results and device safety, wash and clean the skin of any oil and dry it before attaching the electrodes.

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.1 Device components and accessories

Model: Revolution Wireless 4CH

Part number: 2544660

Your kit contains (included in delivery):

Quantity	Description
1	remote control
4	stimulation modules
1	smart 4 CH docking station
1	AC adaptor
1	USB cable
2	bags of small electrodes (5x5 cm 1 snap connection)
2	bags of large electrodes (5x10 cm 1 snap connection)
2	bags of large electrodes (5x10 cm 2 snap connections)
1	CHATT REVOLUTION WIRELESS USB STICK ASSEMBLY with User manual and Quick Start Guide
1	quick start guide
1	carrying case
1	lanyard
1	white protection sleeve
1	Set of colored module clips

3. DESCRIPTION OF THE WIRELESS PROFESSIONAL












The following parts can be re-ordered if needed

Quantity	Description	Re-Order part Number
1	remote control	101140
4	stimulation modules	101141
1	smart 4 CH docking station including tablet	101142
		101143
1	AC adaptor	649028
2	bags of small electrodes (5x5 cm 1 snap connection)	42204
2	bags of large electrodes (5x10 cm 1 snap connection)	42203
2	bags of large electrodes (5x10 cm 2 snap connections)	42223
1	carrying case	680050
1	white protection sleeve	5529040
1	Set of colored module clips	5529220

3. DESCRIPTION OF THE REVOLUTION WIRELESS












3.2 Explanation of symbols (connections and nameplates)

3.2.1 Symbols on Remote Control and Modules

	Read the user manual or operating instructions
	Caution! Observe warnings set forth in operation manual!
	The Revolution Wireless is a class II device with internal electric power and type BF applied parts.
	The power switch On/OFF button is a multi-function button.
	The name and address next to this factory symbol is the manufacturer. The date is the manufacturing date.
	The number next to this symbol is the article reference number
	The number next to this symbol is the serial number
	Indicates separate treatment from general waste at end of life.
	Keep dry
	Non-ionizing radiation
	Keep away from direct sunlight

3. DESCRIPTION OF THE REVOLUTION WIRELESS

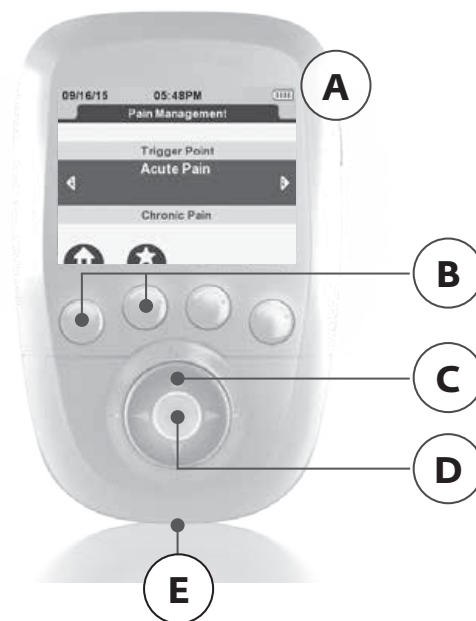
3.2.2 Symbols on Charging Tablet/Docking Station and AC Power Supply

	Alternating current input on AC power supply
	Direct current output from power supply
	Protection class II equipment. The AC Power Supply device has double insulation.
	Type BF applied part
	The name and address next to this factory symbol is the manufacturer. The date is the manufacturing date.
	The number next to this symbol is the article reference number (Artn.)
	Read the user manual or operating instructions
	Caution! Observe warnings set forth in operation manual!
	The number next to this symbol is the serial number
	Do not dispose with unsorted municipal waste
	Keep dry (not on type plates)
	Keep away from direct sunlight

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.3 Description of the device components

3.3.1 Remote Control



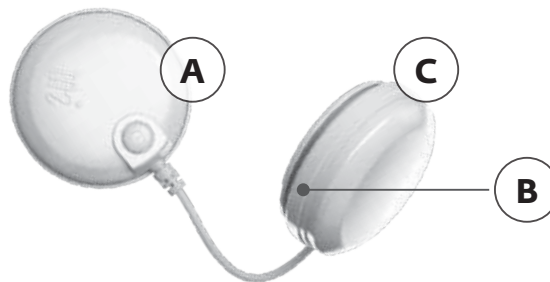
- A. On/Off button (press briefly to switch on, press and hold for more than 2 seconds to switch off, while browsing the lists press briefly to return to the main menu)
- B. 2 multifunction buttons:
 - Functions related to icons are located on the screen (e.g. info, main menu, placement of electrodes, etc.)
 - Selection of stimulation channel to increase or decrease the intensity level of stimulation
- C. Navigation pad to scroll up/down or next/back during programming, or to increase/decrease the intensity level of stimulation
- D. Validation of pause button during stimulation, confirm a selection during program selection or change a setting during programming
- E. Port for the USB cable or the docking station connector

Note

Emergency stop function: By pressing the central button or the On/Off button on one of the modules during stimulation, the device pauses.

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.3.2 Modules



1 module is composed of two pods.

A On/Off button (press briefly to switch on, press for 1 second to switch off, during stimulation press to pause)

- Flashing green LED: ready
- Flashing yellow LED: stimulation on
- Flashing red LED: battery empty
- Flashing red/green LED: no connection to remote control

B Groove to wind up the cable

C Pod containing battery

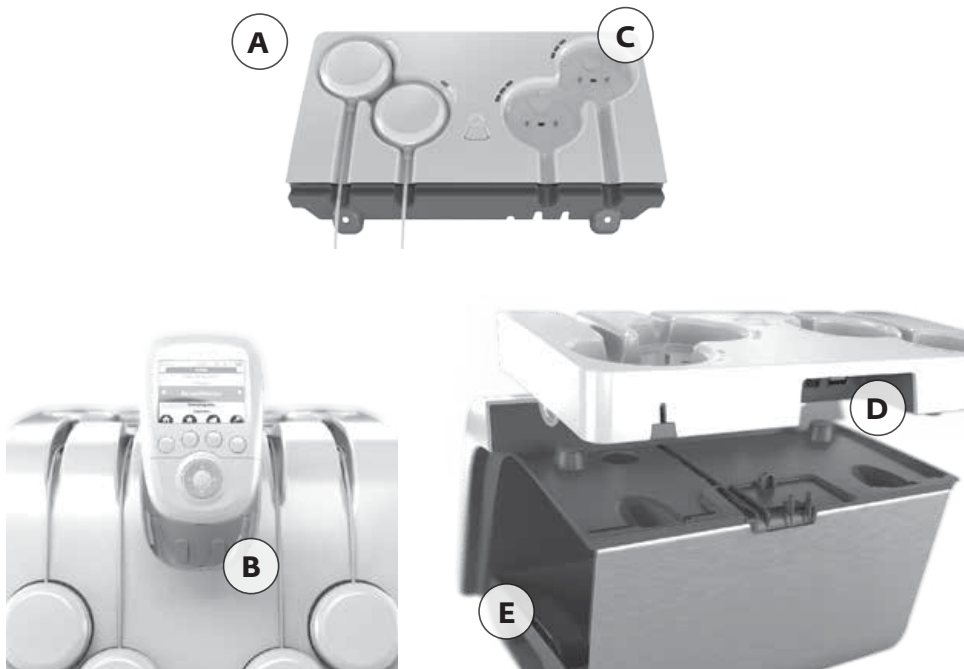
Note

- When the distance among the remote control and the modules is too big, they will lose the connection, stop with the stimulation immediately and the LEDs will flash red and green.
- **Emergency stop function:** By pressing the central button or the On/Off button on one of the modules during stimulation, the device pauses.

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.4 Description of key accessories

3.4.1 Smart 4CH docking station and Removeable tablet



DOCKING STATION

A Removable tablet

B Connector to charge the remote control

C Docking bay to position the modules to be recharged

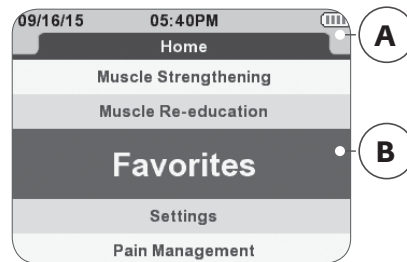
D Port for the AC adapter and for the USB cable connected to the front of the docking station

E Storage bin

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.5 Description of key Displays shown

3.5.1 Display in Program Category selection mode (Home Screen)

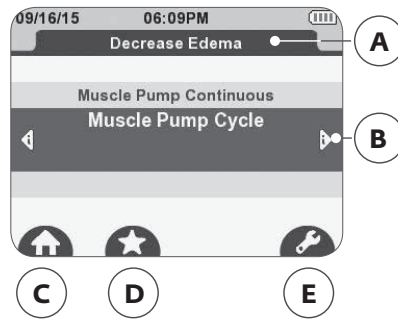


A Header showing date, time and battery status

B Current chosen program category (marked with a blue focus, displayed bigger)

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.5.2 Display in Program selection mode



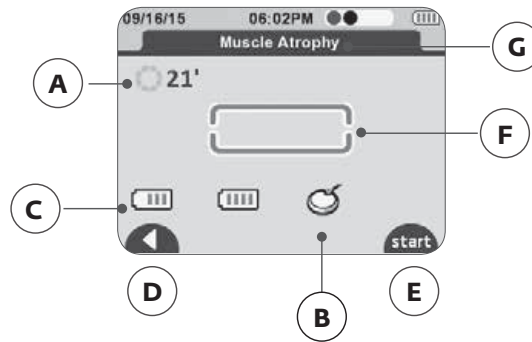
- A Name of the program category
- B Additional program information available
- C Back to main menu
- D Adding program to Favorites list
- E Configuration of program options

Note

- For the visualization of the program information (B), please use the left/right direction of the navigation pad, and scroll within the information by using the up/down direction of the navigation pad.
- To add a program to the Favorite list (D), please press the multifunction button below the icon while program is marked. Press the button again to remove the program from the Favorite list.
- If program options are available icon (E) will be displayed. Please press the button below the icon to enter the program option setting screen.

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.5.3 Display when program is selected, Modules need to be turned on, mode



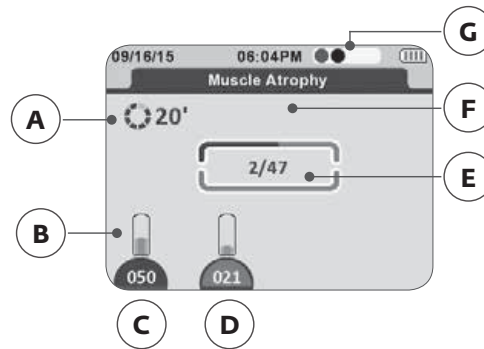
- A. Total program time (minutes)
- B. Module activation indication
- C. Module battery level
- D. Back to previous menu
- E. Start session
- F. Program architecture
- G. Program name

Note

- "B" the device asks you to activate the next module. 1 module needs to be activated at least (1-channel treatment). After activating the number of channels required for the treatment (1 up to 4) press start to start the treatment.

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.5.4 Display during treatment



- A. Total remaining program time (minutes)
- B. Intensity level bar graph for each channel
- C. Intensity level for each channel
- D. Intensity background is:
 - Dark blue = channel is selected
 - Light blue = channel is not selected
- E. Number of contractions remaining / total number of contractions
- F. Indicator of program execution
- G. Number and order of attached channels.
 - Circle = channel recognized by the remote control
 - Circle filled green = channel recognized but module turned off

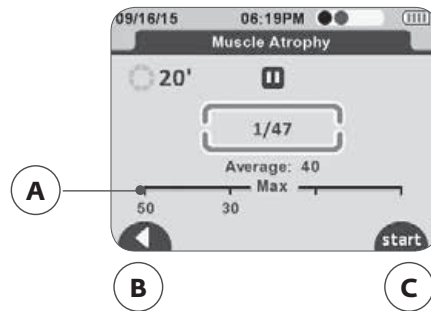
Note

"D" intensity control

- Channels can be selected/de-selected by pressing the corresponding button below.
- To change intensity during treatment, channel needs to be selected (dark blue background).
- While channel is not selected (light blue background) stimulation will be performed with the set intensity.
- This function allows you to change the intensity for each channel itself or more than 1 at the same time (by marking the designated channels).

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.5.5 Display during pause in treatment



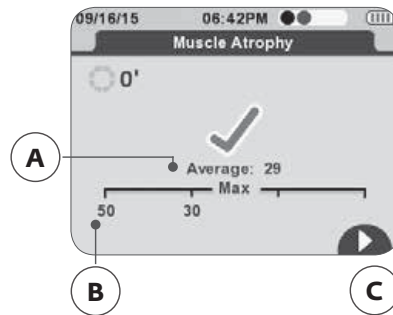
- A. Maximum intensity level achieved by the channel during contraction phases
- B. Back to previous menu
- C. Resume the stimulation session

Note

Emergency stop function: By pressing the central button or the On/Off button on one of the modules during stimulation, the device pauses.

3. DESCRIPTION OF THE REVOLUTION WIRELESS

3.5.6 Display at the end of a treatment



- A. Average intensity level of all the channels used during the contraction phase
- B. Maximum intensity level achieved by each channel during contraction phases and the average level of all channels
- C. Back to main menu (HOME)

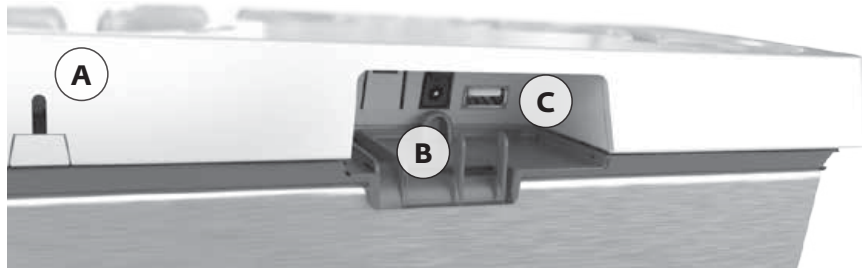
Note

- To turn the unit off, press the On/Off button on the remote control for more than 2 seconds. This will switch off as well all modules.

4. DEVICE SETUP

4.1 Smart 4CH Docking station - Connecting the unit, performance check

Connect the AC adapter supplied with your device to the removable tablet of the docking station (B) and plug it into a power socket. Also connect the docking station's USB cable to the removable tablet (C).



A Rear view of the docking station

B Connector for the AC adapter

C Connector for the USB cable

Note

- It is highly recommended to fully charge the batteries of the remote control and modules before first use to improve their performance and life span.

4. DEVICE SETUP

4.2 Charging the Remote Control and the Modules

Charge the Remote Control by plugging it into the Docking Station. Take care that the USB connector is plugged into the Remote Control.

Note

- The Remote Control can be charged by using the USB connector connected with the tablet allowing to charge modules and remote at same time.



Charge the Modules:

Place the modules into the slots provided for this purpose.

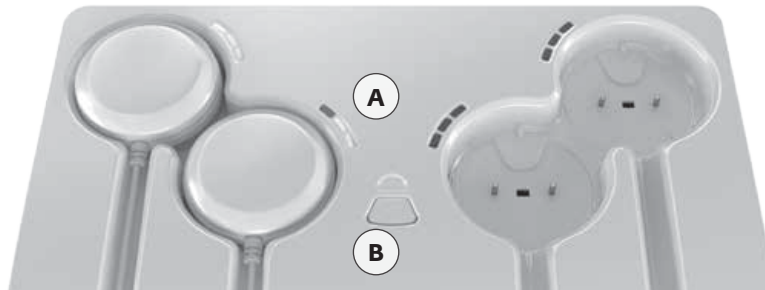
To do this place the pod without the On / Off button in the location indicated with the dotted line.

Do the same for the other modules.

Once the modules are placed for charging, their battery level is shown by the blue LEDs of the docking station.



4. DEVICE SETUP

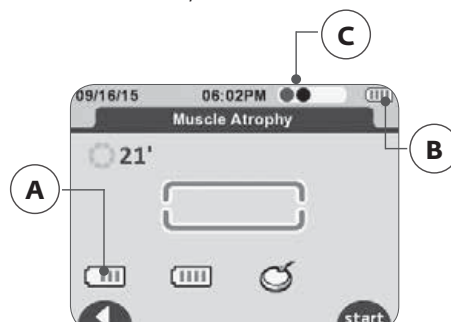


- A** First LED blinking = low battery
 Second LED blinking = battery level average, a session can be performed
 Third LED blinking = good battery level
 All LEDs are lit and not blinking any more = battery completely full
- B** The LED above the button indicates that the tablet is connected to the power supply. It lights:
 Blue = modules can be charged
 Red = right after connecting to the power supply during self test
 The button allows synchronizing modules and remote control, which is usually done automatically by the unit.

Battery level

In the screen "Modules need to be turned on", the module battery level is displayed on the corresponding channel on the remote control, when you turn the module on, just before starting the stimulation session. The battery level of the remote control is always visible in the upper right corner. Small green indicators show how many modules are turned on and recognized by the remote control. The batteries of the remote control and the modules are designed to stand at least 3 days with 5 treatments per day.

Note about battery life: If the device is not used for an extended period, we recommend that you charge the Remote Control and Module batteries to 50% of their capacity every 5 months. You should store the device containing the batteries in a cool and dry environment.

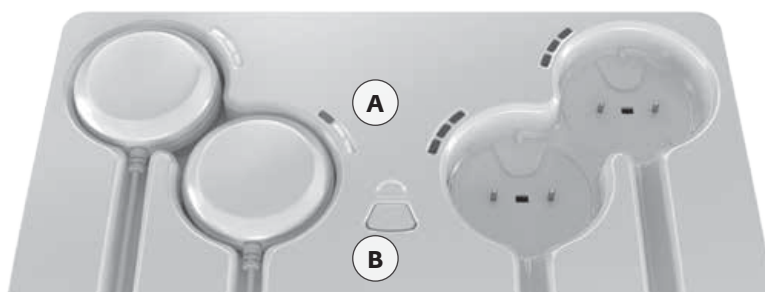


- A** Module battery level
B Remote control battery level
C Number of modules switched on and recognized by the remote control

4. DEVICE SETUP

4.3 Synchronization between remote and modules

Smart 4CH Docking station is able to synchronize any Revolution Wireless module(s) and remote(s) plugged on it. Modules plugged on the station will be automatically synchronized and recognized by the remote plugged as well on the station. The B button allows synchronizing Modules and Remote control which is usually done automatically by the unit.



Warning!

The Revolution Wireless device may be susceptible to Electrostatic Discharge (ESD) at and greater than $\pm 15\text{kV}$. In the event of such a discharge device may experience communication loss between remote and modules. The device will terminate all active outputs, automatically place the device in a safe state.

To recover from this, turn remote and all modules off and turn them on after 5 sec delay using on/off switch on each. Once the device restarts, re-initiate all treatments.

The Revolution Wireless device may be susceptible to Radiated RF energy at and greater than 10V/m . In the event of such exposure, the device may experience communication loss between remote and modules. The device will terminate all active outputs, automatically place the device in a safe state.

To recover from this, turn remote and all modules off and turn them on after 5 sec delay using on/off switch on each. Once the device restarts, re-initiate all treatments.

5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

See also Chapter “Description of the Revolution Wireless”

1. Turn the Remote Control on, by pressing the On/Off button.
2. Upon activation the screen displays a list that gives you access to the categories of Programs.
3. Select a program category by using the navigation pad (up/down)
4. Confirm your choice with the center button.

Note

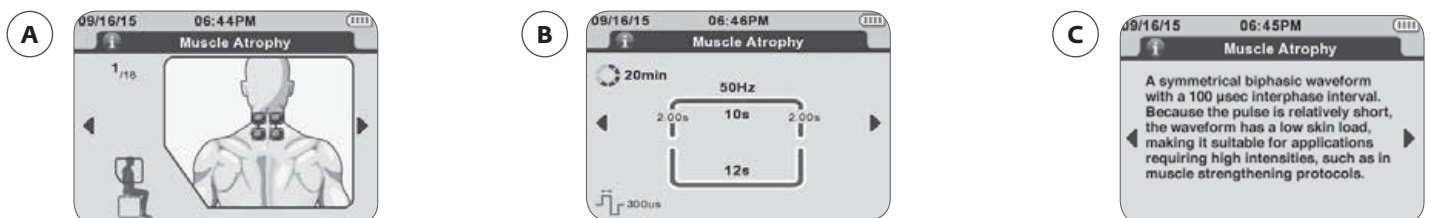
- When you turn on the remote control the first time, the language set up will be displayed first. Choose your preferred language and press the center button to proceed.
- Once you have created your list of favorite Programs, it will be displayed first after switching on the remote control.

5.1 Select a Program

After selecting a Program category the available programs within this category will be displayed. To select a program, use the navigation pad (up/down) and confirm your choice with the center button.

Note

- Additional information about the Programs, such as electrode placement, program parameters and program explanation, is available.
- Use the navigation pad (left/right) to display them and to scroll (up/down) within an explanation for getting more information.
- You can find the program information as well within this manual.



A Placement of electrodes applicable to the Program

B Program parameters



C Program explanation

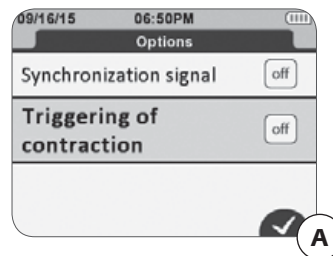
5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

5.2 Adjust treatment options

For most Programs, different options can be enabled or disabled.

For detailed descriptions of the options available see: Chapter "Treatment Options"

1. Press the program options button  to enter the options menu.
2. To mark an item, use the navigation pad (up/down).
3. To change settings of the marked option, use the central button.
4. To store the changed settings press the confirmation button .



A Confirm / store program option settings

5.3 Electrode placement

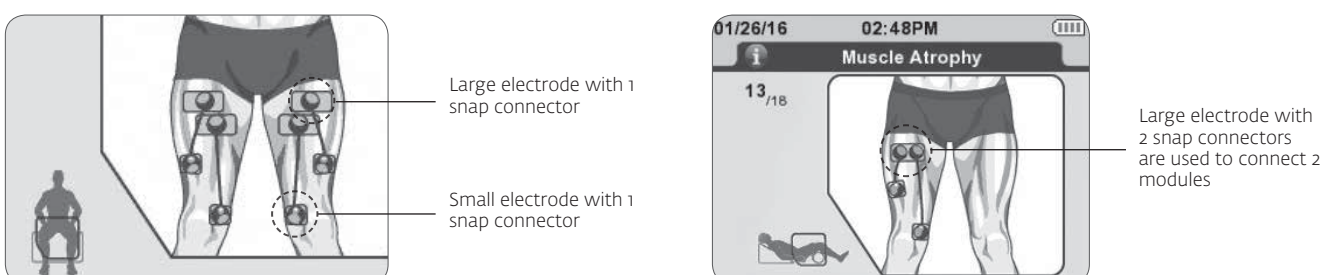
The placement of the electrodes depends on the body area to be treated.

Please find detailed recommendations regarding the electrode placement within your Revolution Wireless remote control.

There are 3 different types of electrodes provided with the Revolution Wireless:

- 5x5 cm small electrodes with 1 snap connection
- 5x10 cm large electrodes with 1 snaps connection
- 5x10 cm large electrodes with 2 snaps connection

Depending on the electrode placement chosen for a desired program, different types and sizes of electrodes may be used. When using two modules, the 2 snap electrode can be utilized in place of two 1 snap electrodes, such that each module is connected to the 2 snap electrode. Refer to the image below illustrating a large electrode with 2 snap connectors used to connect 2 modules.



5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

Note

- Do not connect a module on a single large electrode with a 2 snap connectors as this will give no stimulation to the body.



The choice of electrode size (large or small) and the correct positioning of the electrodes on the muscle group that needs to be stimulated are important considerations in order to achieve effective muscle stimulation.

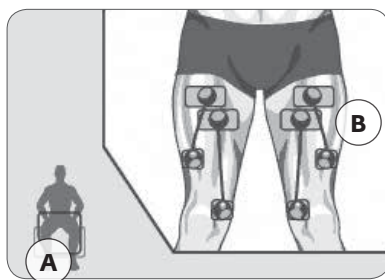
APPLICATION

- **Electrodes do not stick well if any lotion, oil, make-up, dirt, etc., is left on skin.** Wash treatment areas with soap and water. Rinse thoroughly. Dry completely.
- Connect modules securely to the electrodes.
- When removing electrodes from liner or skin, lift one corner gently and pull. **DO NOT** pull by the modules. Doing so may cause damage.
- Adhesion increases when electrodes reach skin temperature. To increase adhesion further, apply a small amount of water and air dry a couple of seconds. If electrodes are extremely dry or to decrease adhesion, use more water and let air dry for a couple of hours.
- Adjust remote control according to the instruction for treatment. **Turn remote control off BEFORE attempting to remove electrodes from skin.**

5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

5.4 Patient positioning

To determine the best electrode placement and patient positioning, please refer to the electrode placement guide on the device remote control (see illustration below for example).



A Patient position

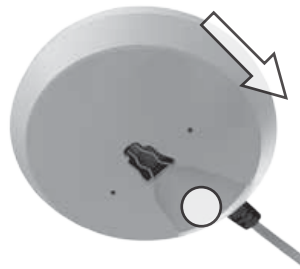
B Electrode placement

The patient position depends on the muscle group that requires stimulation and on the program chosen.

5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

5.5 Connecting the modules to the electrodes

Once the electrodes are stuck to the skin of the patient, fix the pods by sliding them onto the electrode snap until it clicks into place.

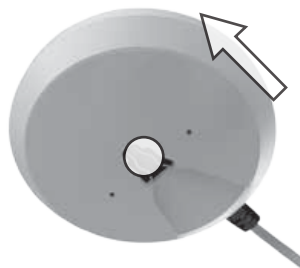


Note

The insertion direction marked by:

- the On/Off button on the main pod
- a small vertical line on the housing of the other pod.

To remove the modules from the electrode simply make the opposite movement.



Caution!

Equipment damage -

Pulling the pods without respecting their pulling direction can damage the attachment system.

A stimulation module consists of two pods. The waveform used in Revolution Wireless is a symmetrical biphasic waveform (VMS). The polarity of the pods will therefore alternate between positive and negative. A separate electrode must be connected to each of the two pods.

5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

5.6 Starting the treatment

Before starting the stimulation, the remote control asks you to turn on the modules, one after the other, by pressing their button On/Off.

For each module detected by the remote control, the device will prompt you to switch on another, up to a maximum of 4 modules.

If you want to use a limited number of modules for your session, press the START button after the number of modules you want has been detected.

After activating the modules, press START to start with the therapy:

- Stimulation always starts at intensity level 0.
- Select a channel to change the intensity by pressing the corresponding button.
- The channel will be marked dark blue.
- Use the navigation pad (up-down) to increase or decrease the stimulation energy intensity on selected channels.
- None selected channels will remain on their set intensity level.

This feature allows you to change the intensity for each channel itself or more than 1 at the same time (by marking the designated channels).

Note

- Be careful to respect the order of activation of the modules, the activation order corresponds to the channel numbering.
- Colored modules process is described in the document to ease identification if need
- Press the central button on the Remote Control or the On/Off button on one of the modules during stimulation, the device pauses.

5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

Stimulation intensity settings

Stimulation intensity depends on the treatment objective and patient tolerance. A habituation period may be required to increase patient tolerance and permit the increase of the intensity to the desired level.

For Pain Management treatments intensity will usually be sensory. Depending on the chosen protocol, the elicited sensation will either be mild-moderate sensory (“tingling”) or strong-noxious (“almost painful”).

For neuromuscular electrostimulation programs intensity will usually be motor. Depending on the chosen protocol, the elicited response will either be mild-moderate motor (mild contraction, smooth or twitch) or strong motor.

5. HOW TO PERFORM A TREATMENT, PERFORMANCE CHECK

5.7 Ending the treatment

When the preset therapy time elapses:

- the device stops the therapy session automatically
- the intensity of all channels drops to 0.

You can stop a treatment as well by:

- activating the pause and returning to program selection
- turning the device completely off, by pressing the On/Off button of the remote control for more than 2 seconds.

To turn the unit off, press the On/Off button on the remote control for more than 2 seconds. This will switch off all modules as well.

Note

At the end of your stimulation session it is recommended to store the remote control and the modules in the docking station to recharge the units.

5.8 Performance Check

If the unit can be operated as described above, the therapy unit has passed the performance check successfully.

The device also runs performance checks regularly during operation.

This is what happens if a problem is identified (at start or during operation):

If there is a risk in usage or a malfunction identified:

- the device will ask you to correct it (see also Chapter “Problems and Solutions”)
- or automatically shut down immediately

In this situation, you may attempt to restart the unit by turning it briefly off and on again. With the unit switched off, check that all plugs are correctly connected.

If the error message persists when the unit is switched on again have the unit inspected by an authorized service technician before using it again.

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.1 Triggering of contraction

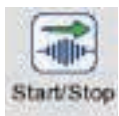


Trigger ON (Manual triggering - Automatic stop):

It is an operating mode in which the contraction from electrostimulation is triggered by the user by pressing any button on any channel (**4 multifunction buttons**) on the remote control.

Contraction will stop automatically at the end of the time set by the program.

The Trigger ON mode is active during muscle work sequences.



Trigger ON (Manual control As Long As you Press):

It is an operating mode in which the contraction from electrostimulation is triggered by the user by pressing any button on any channel (4 multifunction buttons) on the remote control.



Contraction will keep going until the user releases the pressed button.

The Trigger mode is active during muscle work sequences.

Note that during the contraction, even if a channel button is kept, user can still

-Increase / decrease intensities

-Pause the program


6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS


6.2 Available Programs and Functions

6.2.1 The Favorite List

For a fast and easy access to the most frequently used programs, they can be added to the program category "Favorites".

It is possible to add a maximum of 10 programs to the list.

To add a program to the Favorite list, please press the multifunction button below the icon  while program is marked.

The Favorite symbol will be shown below the program while it is marked in the regular program category and the symbol above the corresponding multifunctional button will change to the symbol  for removing the program from the favorite list.

Press the button while the symbol  is shown, to remove the program from the Favorite list.

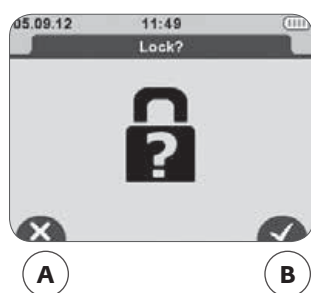
6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.2.2 The Lock Out function

The Lock Out function can be basically activated and deactivated within the menu for the Settings at the Remote Control.

If basically activated:

The Remote Control will ask before each treatment whether the lock out function shall be active for this treatment or not.

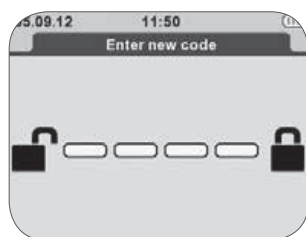


A Deactivation of the Lock function

B Activation of the Lock function

Afterwards you will be asked to enter a code.

To enter the code you just need to press a combination of any four buttons.



If enabled, the function allows you to lock the device in a certain configuration before giving it to the patient.

When the function is active the patient can perform only the basic operations:

- increase or decrease the intensity,
- pause the device
- but he or she cannot exit the program or turn off the device.

To deactivate the Lock Out function during the treatment, pause the device and then hold down the On/Off button on the Remote Control until the display prompts you to insert your key combination to unlock the program.

If you have forgotten the code just put the remote control on the charging station to unlock.

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.2.3 The Synchronization Signal

Synchronization signal:



This function allows you to notify the user by means of a sound signal of the beginning of a muscle contraction.

Before each contraction by electrostimulation the remote control emits beeps.

This function is only available for programs inducing muscular contractions. It can be activated within the program option menu for each corresponding program




6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.2.4 Identify modules

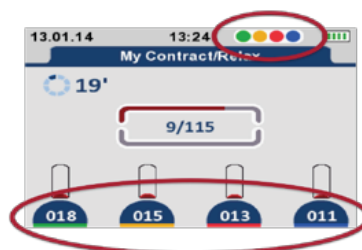
The identify modules function allows you to allocate different colors to the different modules for an easier identification of the channels during usage.

It can be activated and deactivated within the menu for the Settings at the Remote Control. Default setting is: deactivated

To activate the function:

1. Select the function within the Settings menu of the Remote Control and press the center button. You will be asked to turn ON ONE module.
2. Turn on one of the modules you want to match a color to.
3. Use the left and right arrows to select a color for this channel. The following colors are available: none/red/green/blue/yellow
4. Allocate the chosen color to the activated module by pressing the confirmation button . The screen will show a green hook when allocation was successful.
5. Put the reflecting colored clip to this channel and clip it onto the cable of the module (remark: the best positioning is close to the module with the on/off button).
6. Press the next button  to proceed with the process.
7. You will be asked to turn On ONE module again.
8. To allocate colors to more channels, please follow step 2 until 6 for each reflecting module.
9. When you finished the channel identification settings, press the back button  to return to device settings.

When turning on a module and during the treatment, the screen will now show the reflecting color below its intensity setting bar and in the header of the screen, in the order they had been turned on.



To deactivate the function again, please follow the steps 1 through 9 again, and set all modules to color: none.

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.3 Available Device Settings

Back light intensity:

The backlight intensity can be set in 5%-steps from 10% up until 100%.

Default setting: 100%

Buzzer volume:

The buzzer volume can be set in 10%-steps from 0% (= off) to 100%.

Default setting: 100%

Backlight dimmer:

The back light dimmer reduces the backlight after the set seconds of time.

Possible settings are: 15s, 30s, 60s or "off"

Default setting: 60s

Eco mode:

The eco mode can be turned on or off, while activated (on) the

Default setting: off

Lock function:

The lock out function can be activated (on) or deactivated (off).

Default setting: off

Language:

The language set up allows you to change the language setting of the Remote Control.

Default setting: English

Set time:

The set time function allows you to change the time displayed within the header of the screen.

Identify modules:

The identify modules function allows you to allocate different colors to the different modules for an easier identification of the channels during usage.

Default setting: off

Date:

The set time function allows you to change the date displayed within the header of the screen.

System info:

The system info provides information regarding the serial number and the software of the Remote Control.

Pairing of new module:

The pairing of new module function enables you to add a new module to the Remote Control (usually done automatically by the unit). 1 up 4 modules can be operated max with one Remote Control.

Reset to factory setting:

This function activated, resets the Remote Control to the default setting. All options stored on the remote control, incl. Device settings, favorites etc. will be automatically deleted.

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.3.1.1 Configuration/Settings

Within the Configuration/Setting menu, it is possible to change the application configuration by selecting different languages.

The following languages are available:

- English
- Spanish

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

6.3.1.2 Programs and Parameters

Pain Management

PROGRAM NAME	ACUTE PAIN
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	30 minutes
Cycling type	Continuous
Phase duration	200µsec
Frequency	100pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

PROGRAM NAME	CHRONIC PAIN
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	30 minutes
Cycling type	Continuous
Phase duration	300µsec
Frequency	6pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Pain Management

PROGRAM NAME	TRIGGER POINT
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	4 minutes
Cycling type	Continuous
Phase duration	400µsec
Frequency	6pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Decrease Edema

PROGRAM NAME	MUSCLE PUMP CYCLE
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	20 minutes
Cycling type	5-ON/5-OFF
Phase duration	200µsec
Frequency	35pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

PROGRAM NAME	MUSCLE PUMP CONTINUOUS
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	20 minutes
Cycling type	Continuous
Phase duration	200µsec
Frequency	5pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Relax Muscle Spasm/ROM

PROGRAM NAME	DECREASE MUSCLE TONE
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	30 minutes
Cycling type	5-ON/5-OFF
Phase duration	300µsec
Ramp Time	2 sec
Frequency	100pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

PROGRAM NAME	INCREASE ROM
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	20 minutes
Cycling type	4-ON/12-OFF
Phase duration	200µsec
Ramp Time	2 sec
Frequency	35pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Strengthening

PROGRAM NAME	MUSCLE ATROPHY
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval. Because the pulse is relatively short, the waveform has a low skin load, making it suitable for applications requiring high intensities, such as in muscle strengthening protocols.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	20 minutes
Cycling type	10-ON/50-OFF
Phase duration	300µsec
Ramp Time	2 sec
Frequency	50pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Strengthening

PROGRAM NAME	SLOW TWITCH FUNCTION
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval. Because the pulse is relatively short, the waveform has a low skin load, making it suitable for applications requiring high intensities, such as in muscle strengthening protocols.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	20 minutes
Cycling type	4-ON/12-OFF
Phase duration	300µsec
Ramp Time	2 sec
Frequency	35pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Strengthening

PROGRAM NAME	FAST TWITCH FUNCTION
Program Description	A symmetrical biphasic waveform with a 100 µsec interphase interval. Because the pulse is relatively short, the waveform has a low skin load, making it suitable for applications requiring high intensities, such as in muscle strengthening protocols.
Waveform	VMS
PARAMETERS	SETTING
Treatment time	20 minutes
Cycling type	5-ON/5-OFF
Phase duration	200µsec
Ramp Time	2 sec
Frequency	50pps
Channel	Single
CV/CC	CC
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Re-Education

PROGRAM NAME	VMS-FR STATIC 2 CH.
Program Description	<p>The VMS™ FR Static 2 Channels is a physiologically based channel interaction in which one channel stimulates the agonist and the other the antagonist of the muscle group that is being exercised. VMS is a symmetrical biphasic waveform with a 100 µsec interphase interval.</p> <p>VMS FR 2 Channel delivers current for one Agonist/Antagonist muscle group. Channel 1 will fire the Agonist while Channel 2 will fire the Antagonist.</p>
Waveform	VMS-FR
PARAMETERS	SETTING
Treatment time	30 minutes
Burst Duration	4500 msec
Phase Duration	300µsec
Ramp Time	2 sec
Frequency	35pps
ON/OFF Time	4.5 sec / 13.5 sec
Channels	1+2
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Re-Education

PROGRAM NAME	VMS-FR STATIC 4 CH.
Program Description	<p>The VMS™ FR Static 4 Channels is a physiologically based channel interaction in which one channel stimulates the agonist and the other the antagonist of the muscle group that is being exercised. VMS is a symmetrical biphasic waveform with a 100 µsec interphase interval.</p> <p>Channels 1 and 2 will stimulate the first Agonist/Antagonist muscle group while Channels 3 and 4 will stimulate the second Agonist/Antagonist muscle group. Channels 1 and 2 are paired and Channels 3 and 4 are paired.</p>
Waveform	VMS-FR
PARAMETERS	SETTING
Treatment time	30 minutes
Burst Duration	4500 msec
Phase Duration	300µsec
Ramp Time	2 sec
Frequency	35pps
ON/OFF Time	4.5 sec / 13.5 sec
Channels	1+2/3+4
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Re-Education

PROGRAM NAME	VMS-FR DYNAMIC 2 CH.
Program Description	<p>The VMS™ FR Dynamic 2 Channels is a physiologically based channel interaction in which one channel stimulates the agonist and the other the antagonist of the muscle group that is being exercised. VMS is a symmetrical biphasic waveform with a 100 µsec interphase interval.</p> <p>VMS FR 2 Channel delivers current for one Agonist/Antagonist muscle group. Channel 1 will fire the Agonist while Channel 2 will fire the Antagonist.</p>
Waveform	VMS-FR
PARAMETERS	SETTING
Treatment time	20 minutes
Burst Duration	2000 msec
Phase Duration	200µsec
Ramp Time	2 sec
Frequency	80pps
ON/OFF Time	2 sec / 10 sec
Channels	1+2
Intensity range	1 to 120 mA

6. TREATMENT OPTIONS, FUNCTIONS AND DEVICE SETTINGS

Muscle Re-Education

PROGRAM NAME	VMS-FR DYNAMIC 4 CH.
Program Description	<p>The VMS™ FR Dynamic 4 Channels is a physiologically based channel interaction in which one channel stimulates the agonist and the other the antagonist of the muscle group that is being exercised. VMS is a symmetrical biphasic waveform with a 100 µsec interphase interval.</p> <p>Channels 1 and 2 will stimulate the first Agonist/Antagonist muscle group while Channels 3 and 4 will stimulate the second Agonist/Antagonist muscle group. Channels 1 and 2 are paired and Channels 3 and 4 are paired.</p>
Waveform	VMS-FR
PARAMETERS	SETTING
Treatment time	20 minutes
Burst Duration	2000 msec
Phase Duration	200µsec
Ramp Time	2 sec
Frequency	80pps
On/OFF Time	2 sec / 10 sec
Channels	1+2/3+4
Intensity range	1 to 120 mA

7. TROUBLESHOOTING

7.1 Errors shown on display

Poor electrode/module contact



The remote control shows the symbol of an electrode and a disconnected module. Shown on the channel where the problem was detected (in this case channel 1):

Problem	Possible cause	Solution
Electrode failure	Poor electrode connection to the modules	Check that the electrodes are properly connected to the module.
	Poor electrode connection to the skin	Check if the electrodes are outdated, worn and/or the contact is poor: try with new electrodes.

7. TROUBLESHOOTING

Modules out of range



The remote control shows the out of range symbol. Shown on the channel where the problem was detected (in this case channel 1):

Problem	Possible cause	Solution
No connection with modules	Modules are out of range from Remote Control	A. Check that the module and the remote control are less than 6.5 feet away. B. Ensure you are not in an isolated place, without any obstacles that may deflect the signals from the remote control. C. Ensure you are in a place that allows the signal from the remote control to be reflected. D. Check the module is switched on.

7. TROUBLESHOOTING

Battery level



The remote control shows a discharged battery symbol. Shown on the channel where the problem was detected:

Problem	Possible cause	Solution
Module battery low	During the stimulation a module may turn out to be discharged.	Stop the stimulation and recharge the discharged module.

7. TROUBLESHOOTING

7.2 Behavior of the Module LEDs

Problem	Possible cause	Solution
The LED blinks alternately green and red	The module is out of range or is not recognized by the Remote Control.	<ul style="list-style-type: none"> A. Check the remote control is properly turned on. B. Check that the module and the remote control are less than 6.5 feet away. C. Try restarting the module. D. Place the module and the remote control on the same docking station in order to pair them.
The LED is constantly red	Module battery level low	<ul style="list-style-type: none"> A. Check the module is charged. B. Try restarting the module. C. If despite this the LED is still red, contact the customer services that have been stipulated and approved by the manufacturer.

7. TROUBLESHOOTING

7.3 Behavior of the Docking Station LEDs

Problem	Possible cause	Solution
The docking station's central LED lights red	Modules can't be charged due to no connection to tablet or main power.	<p>A. Ensure that the modules are properly placed in their housing.</p> <p>B. Ensure the charging contacts are clean.</p> <p>C. Ensure the correct AC adapter is used.</p> <p>D. Disconnect and reconnect the docking station and check the lighting sequence of the docking station upon activation.</p> <ul style="list-style-type: none"> • Remove all modules. • Remove the remote control. • Disconnect the USB cable. <p>If despite this the LED is still red, contact the customer services that have been stipulated and approved by the manufacturer.</p>

7. TROUBLESHOOTING

7.4 Others

Problem	Possible cause	Solution
The stimulator is not working	Device not answering	<p>If the remote control is ON, but does not respond to pressing the key pad buttons:</p> <ul style="list-style-type: none"> A. Press the ON/OFF button for 2 seconds to turn the device OFF B. Wait 10 seconds. C. Turn Remote Control ON again
	Low charged batteries	<p>Ensure the remote control and the modules are charged. When the batteries are completely discharged, charging for a few minutes may be required before the unit turns on.</p> <ul style="list-style-type: none"> A. Try to restart the remote control and modules. B. Place the module and the remote control on the same docking station in order to pair them. C. If, despite this, the device is still not working, contact the customer services that have been stipulated and approved by the manufacturer.
	Bad connections	<p>If the device is on, the intensity bar graphs and controls are on, and you feel no stimulation, check and verify the connection of the electrodes.</p>
	Lead wire or electrode defective	<p>If the device appears to be functioning, and there is no stimulation, replace the lead wires and/or electrodes.</p>

7. TROUBLESHOOTING

Problem	Possible cause	Solution
Display does not come on	Low batteries	Charge batteries
Weak stimulation with charged batteries	Electrodes dried out, lost their adhesive power and have no adequate connection to th skin.	Replace electrode
	Electrode placement	Make the electrodes at least 2 inches apart
Stimulation stops with charged batteries	Poor electrode contact	Reapply electrodes, secure firmly. Electrodes must be a minimum of 2 inches apart.
	Damaged or worn electrodes or module leadwires	Replace
Stimulation weakens within minutes of starting treatment with charged batteries	This is a normal body adaptive process	Increase the amplitude (intensity) if required.
Stimulation is uncomfortable	Amplitude (intensity) is too high	Decrease amplitude (intensity).
	Electrodes are too close together	Reposition the electrodes. Electrodes must be a minimum of 2 inches apart.
	Damaged or worn electrodes or leadwires of modules	Replace
	Ensure proper program is being used	A. Refer to section 6.3.1.2 Programs and Parameters for a description of the Programs B. Contact clinician if discomfort persists.
Stimulation is ineffective	Improper electrode placement	Reposition electrodes. Electrodes must be a minimum of 2 inches apart.
	Unknown	Contact clinician.
Stimulation only felt on one electrode	Improper electrode placement	A. Reposition electrodes. Electrodes must be a minimum of 2 inches apart. B. Replace electrodes.

7. TROUBLESHOOTING

Problem	Possible cause	Solution
Stimulation on one channel (side) only	Electrodes A. Worn or damaged B. Improper placement Leadwires among modules worn or damaged	A. Replace. B. Reposition electrode. Electrodes must be a minimum of 2 inches apart.
		Replace
Intermittent Output	Intermittent program in use	Some programs will seem intermittent. This is expected. Refer to section 6.3.1.2 Programs and Parameters for a description of the Programs.
Stimulation is not producing the usual sensation	Settings and Electrodes positioning	A. Check that all the settings are correct and ensure the electrodes are positioned properly. B. Change the positioning of the electrodes slightly.
Remote Control is not charging	USB cable of docking station not connected to Tablet	Check connections
	Power cord of Tablet not connected to mains	
Modules are not charging	Power cord of Tablet not connected to mains	Check connections
	Modules not placed the right way	Check module placement in Tablet

8. CARE, MAINTENANCE, TRANSPORT, ENVIRONMENTAL STATEMENT

8.1 Care



Warning!

Shock hazard - Remove the power cord of the Tablet from the wall outlet before cleaning.
Shock hazard, equipment damage -

- Liquids must not enter the device and its components, incl. the Tablet. If liquids have entered into the components, the Revolution Wireless must be immediately checked by a service technician, before it can be reused.
- Never dismantle the remote control, the modules, the docking station or the AC adapter as they contain high-voltage parts with a risk of electric shock.

Remote Control, Modules, and Docking Station:

- All parts of the Revolution Wireless can be disinfected by **wiping down** with a disinfectant. Thus, it complies with the special hygiene standards for medical technical equipment.
- **All components** can be cleaned with common **disinfectants** and **mild household detergents**.
- Only use a **soft cloth** and an alcohol-based, solvent-free cleaning product, to wipe the therapy unit down.
- Allow the device to completely dry before use.

Electrodes:

- Clean electrode surface after each use by holding under dripping water for 5 to 10 seconds while gently rubbing gel surface with fingertips.
- After cleaning, return electrodes to the liner and store in package at room temperature.
- Electrode longevity varies, depending on maintenance, skin condition, frequency of usage, type and site of stimulation. Effective adhesion may be extended by careful cleaning and storing.



Warning!

Patient hazard - patient contamination

- Before using the unit on another patient, clean and disinfect it according to the instructions in this section.



Caution!

Equipment damage -

- The plastic material used is not **resistant** to mineral acids, formic acid, phenols, cresols, oxidants and strong organic or inorganic acids with a pH value below 4.
- Use only clear disinfectants to prevent discoloration of the device.
- Do not expose the therapy unit to strong ultraviolet radiation (sunlight) and fire.
- Do not sterilize the stimulator.
- Do not immerse in liquids.

8. CARE, MAINTENANCE, TRANSPORT, ENVIRONMENTAL STATEMENT

8.2 Maintenance

Your Revolution Wireless does not require calibration or frequently safety testings. Each stimulator is tested prior to distribution. Its characteristics do not vary under normal conditions.

If your stimulator contains parts that seem worn or defective, please stop using it and contact the customer service center that has been stipulated and authorized by the manufacturer regarding an upgrade.

There are no user serviceable parts inside the device. If the device appears to be non-functional, contact DJO Global or your local dealer.



Warning!

Shock hazard, Equipment damage -

Do not attempt to repair the stimulator or any of its accessories. Never dismantle the device because of risk of electric shock. DJO Global declines all responsibilities for any damages or consequences resulting from unauthorized attempts to open, modify, or repair the stimulator. This may only be done by persons or repair services authorized by the manufacturer

8. CARE, MAINTENANCE, TRANSPORT, ENVIRONMENTAL STATEMENT

8.3 Transport

8.3.1 Transport of the 4CH device key components and the Tablet (off site treatment)

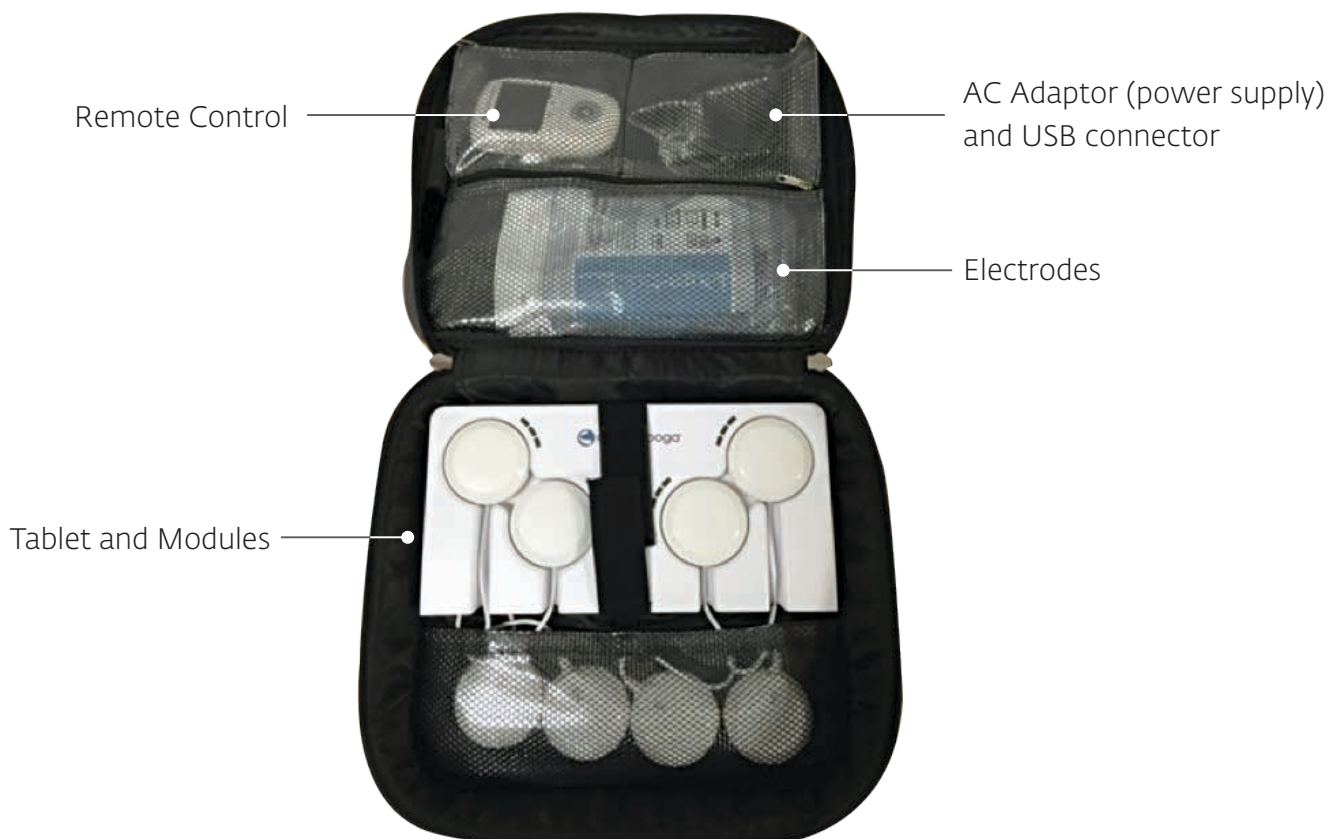


Caution!

Equipment damage -

Only use the original transport bag for carrying the device around.

1. Turn the device and it's accessories off.
2. Disconnect and dismount the device and it's accessories by following the guidelines but keep the Modules in the Tablet.
3. Store the user manual on USB stick in the outer pocket of the transport bag.
4. Place the accessories in the transport bag as shown in picture below



8. CARE, MAINTENANCE, TRANSPORT, ENVIRONMENTAL STATEMENT

8.4 Environmental Statement, Expected Life

The Revolution Wireless device is electronic equipment and may include substances that can damage the environment. It must not be disposed of with unsorted household or municipal waste. It requires separate disposal at a suitable collection point for recycling of electronic equipment. By doing so, you will be contributing to the safeguarding of natural resources and health. Please contact DJO GLOBAL for information about the possible recycling of the product.

When the electrodes no longer stick well to your skin, dispose of them in a receptacle out of reach of children and pets.

9. TECHNICAL DATA, STANDARDS, GUARANTEE, PATENTS

9.1 Technical Data

9.1.1 General information

Model:	Revolution Wireless 4CH
Part number:	2532XXX
MDD:	Class IIa
IP class:	IP20
Applied part:	Type BF
Power supplies:	
Remote Control battery:	Lithium polymer (LiPo) rechargeable 3.7[V] / ≥ 1500 [mAh].
Module batteries:	Lithium polymer (LiPo) rechargeable 3.7[V] / ≥ 450 [mAh].
Tablet AC Adaptor:	Only 5 [V] / 3.5 [A] adapters with the reference number 6490xx can be used to recharge the Revolution Wireless.
Battery life:	Battery life of Remote control and Module batteries: approx. 5 years, cannot be replaced by the user!

9. TECHNICAL DATA, STANDARDS, GUARANTEE, PATENTS

9.1.2 Neuro-Stimulation Parameters

All electrical specifications are given for an impedance of 500-1,000 ohms per channel.

Outputs:	Four independent and individually adjustable channels that are electrically isolated from each other.
Pulse shape:	Constant rectangular current with pulse compensation to eliminate any direct current component to prevent residual polarisation at skin level.
Maximum pulse intensity:	120 mA.
Pulse intensity increments:	Manual adjustment of stimulation intensity from 0 to 120 mA (intensity) in minimum increments of 1 mA.
Pulse width:	30 to 400 μ s.
Maximum electrical charge per pulse:	96 micro coulombs ($2 \times 48 \mu$ C, compensated)
Standard pulse ramp-up time:	3 μ s (20 %-80 % of maximum current)
Pulse frequency:	1 to 100 Hz.

9. TECHNICAL DATA, STANDARDS, GUARANTEE, PATENTS

9.1.3 Radio Frequency Wireless Description

The Revolution Wireless may be affected by other devices even if they are compliant with CISPR EMISSION requirements.

Wireless Protocol Characteristics	
Frequency band	2.4 GHz ISM
Protocol type	Proprietary frequency hopping
Channels	6 channels
Channel width	2 MHz
Frequency modulation	GFSK
Frequency deviation	± 320 kHz
EIRP	Measured max -6.2 dBm (0 dBm configured as maximum output power)
Effective emission power:	4.4 [dBm]
Data rate	2 Mbps
Quality of service requirement	6.5 feet range between remote and stimulation modules
Wireless Security Measures	
Device identification	32 bits, shared only with other Chattanooga Revolution Wireless devices
Data integrity checks	Each data frame protected by a 16 [b] length CRC
Acknowledgement	Each point-to-point communication is acknowledged
Out of range behavior	<ul style="list-style-type: none"> - Stimulation modules stop stimulation automatically when out of range from remote control. - Remote control stops entire network stimulation when it detects one module out of range.

9. TECHNICAL DATA, STANDARDS, GUARANTEE, PATENTS

9.1.3 Radio Frequency Wireless Description

Coexistence with Other Chattanooga Revolution Wireless Devices	
<p>Chattanooga Revolution Wireless wireless protocol is designed to allow coexistence with at least 3 other Chattanooga Revolution Wireless devices.</p> <p>Each Chattanooga Revolution Wireless remote control and module is assigned a unique ID. Before initial use, the remote is paired with the 4 stimulation modules in its network.</p>	
Coexistence with Other Wireless Technologies	
Designed for coexistence with wireless products in the same RF band	<ul style="list-style-type: none"> - Bluetooth (IEEE 802.15.1) - Wi-Fi (IEEE 802.11)
Utilizes established coexistence principles to minimize cross-talk with other wireless devices.	<ul style="list-style-type: none"> - FDMA (Frequency Division Multiple Access) - TDMA (Time Division Multiple Access)
Interference from other devices	<ul style="list-style-type: none"> - If all Chattanooga Revolution Wireless RF channels are saturated by emissions from other devices, the failsafe outcome is that all stimulation modules will stop stimulation. - Interference from other RF wireless and mobile communication devices is possible. Refer to Table 4 for recommended distances between Chattanooga Revolution Wireless and other RF devices
FCC Requirements	
This device complies with Part 15 of the FCC Rules. Operation is subject to the following 2 conditions:	<ul style="list-style-type: none"> - This device may not cause harmful interference - This device must accept any interference received, including the interference that may cause undesired operation.
Remote Control FCC ID	2AD2U-REMHHTFT24
Modules FCC ID	2AD2U-NMESTNSMOD

9. TECHNICAL DATA, STANDARDS, GUARANTEE, PATENTS

9.1.4 Information on electromagnetic compatibility (EMC)

The Revolution Wireless is designed to be used in typical environments that have been approved in accordance with the EMC safety standard IEC 60601-1-2.

This device complies with the CISPR standard, indicating that radio frequency (RF) emissions are not likely to cause interference with electronic equipment installed nearby (radios, computers, telephones, etc.).

The Revolution Wireless is designed to withstand foreseeable disturbances from electrostatic discharge, magnetic fields from the mains power supply or RF transmitters.

Nevertheless, it is not possible to ensure that the stimulator will not be affected by powerful RF (radio frequency) fields from other sources.

For more detailed information concerning electromagnetic emissions and immunity, refer to the EMC tables.

This device is not intended to be used in a home environment.

9.1.5 Environmental conditions

Storage and Transport Conditions

The device must be stored and transported in accordance with the following conditions:

Temperature:	-20° C to 45°C (-4°F to 113 °F)
Maximum relative humidity:	75%
Atmospheric pressure:	700 hPa to 1,060 hPa

Conditions of use

Temperature:	0° C to 40° C (-32°F to 104°F)
Maximum relative humidity:	30% to 75%
Atmospheric pressure:	700 hPa to 1,060 hPa

9. TECHNICAL DATA, STANDARDS, GUARANTEE, PATENTS

9.2 Standards

The Revolution Wireless has been designed, manufactured, and distributed in compliance with current standards for medical devices.

The Revolution Wireless also complies with the IEC 60601-1 standard on general safety requirements for electro-medical devices, the IEC 60601-1-2 standard on electromagnetic compatibility, and the IEC 60601-2-10 standard on particular safety requirements for nerve and muscle stimulators.

9.3 Guarantee

This guarantee is valid only if it is accompanied by proof of purchase.
Your statutory rights are not affected by this guarantee.

Your Revolution Wireless stimulator is guaranteed for a period of 2 years from the date of purchase. The guarantee covers the remote control, the modules, the docking station and the AC adaptor (hardware and labor), but not the batteries or electrodes.

All defects resulting from poor quality material or workmanship are covered.

This guarantee does not cover damage resulting from impact, accidents, misuse, inadequate protection against moisture, immersion in water or repairs made by unauthorized personnel.

9.4 Patents

The Revolution Wireless incorporates several innovations with patents pending or already issued.

10. EMC TABLES

The Revolution Wireless needs special EMC precautions and must be installed and started according to the EMC information supplied in this manual.

All RF wireless transmission systems can affect the Revolution Wireless.

The use of accessories, sensors and cables other than those recommended by the manufacturer may result in stronger emissions or reduce the immunity of the Revolution Wireless.

The Revolution Wireless should not be used beside or stacked on top of any other equipment. If you must use it side by side or on top of another system, you should check that the Revolution Wireless works properly in the chosen configuration.

The product designation of the Revolution Wireless used in the text below includes all product variants.

This device is not intended to be used in a home environment

10.1 Electromagnetic emissions

RECOMMENDATIONS AND DECLARATION BY THE MANUFACTURER CONCERNING ELECTROMAGNETIC EMISSIONS

The device is intended for use in the electromagnetic environment specified below.
The customer or user of the device should ensure that it is used in this environment

Emissions test	Compliance	Electromagnetic environment - Guide
RF emissions CISPR 11	Group 1	The device uses RF energy only for its internal operation. Consequently, its RF emissions are unlikely to interfere with any adjacent electrical device (radios, computers, telephones etc.).
RF emissions CISPR 11	Class B	Device is suitable for use in any establishment, other than a private dwelling or a place connected directly to the low voltage mains supply which powers residential buildings.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / emission oscillations IEC 61000-3-3	Complies	

10. EMC TABLES

10.2 Electromagnetic immunity

RECOMMENDATIONS AND DECLARATION BY THE MANUFACTURER CONCERNING ELECTROMAGNETIC IMMUNITY

Device is designed for use in the electromagnetic environment stipulated below. The buyer or user of the device must ensure it is used in this recommended environment.

Immunity test	Test level IEC 60601	Observance level	Electromagnetic environment - Recommendations
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV at the contact ±8 kV in air	±6 kV at the contact ±8 kV in air	<p>Floors must be wood, concrete or ceramic tile. If floors are covered with synthetic material the relative humidity must be maintained at a minimum of 30%.</p> <p>The Revolution Wireless device may be susceptible to Electrostatic Discharge (ESD) at and greater than ±15kV. In the event of such a discharge device may experience communication loss between remote and modules. The device will terminate all active outputs, automatically place the device in a safe state.</p> <p>To recover from this, turn remote and all modules off and turn them on after 5 sec delay using on/off switch on each. Once the device restarts, re-initiate all treatments.</p>
Fast transient electrical bursts IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	2 kV for power supply lines Not applicable (I/O lines)	The quality of the electrical power supply should be that of a typical commercial or hospital environment.
Surge (1) IEC 61000-4-5	±1 kV differential mode ±2 kV joint mode	±1 kV differential mode Not applicable (line to earth)	The quality of the power supply should be that of a typical commercial or hospital environment.


10. EMC TABLES

<p>Voltage dips, short interruptions and voltage variations on power supply lines IEC 61000-4-11</p>	<p><5 % V_T (dips >95 % de U_T) for 0.5 cycle <40 % V_T (dips >60 % de U_T) for 5 cycles <70 % V_T (dips >30 % de U_T) for 25 cycles <5 % V_T (dips >95 % de U_T) for 5 seconds</p>	<p><5 % V_T (dips >95 % de U_T) for 0.5 cycle <40 % V_T (dips >60 % de U_T) for 5 cycles <70 % V_T (dips >30 % de U_T) for 25 cycles <5 % V_T (dips >95 % de U_T) for 5 seconds</p>	<p>The quality of the power supply should be that of a typical commercial or hospital environment. If the device user requires continuous operation during mains power cuts, it is recommend that the Device is powered by a UPS or a battery.</p>
<p>Magnetic field at grid frequency (50/60 Hz) IEC 61000-4-8</p>	<p>3 A/m</p>		<p>Magnetic fields at the mains frequency should be at a level characteristic of a typical location in a typical commercial or hospital environment.</p>
<p>NOTE :V_T is the AC supply voltage before application of the test level.</p>			

10. EMC TABLES

**RECOMMENDATIONS AND DECLARATION BY THE MANUFACTURER
CONCERNING ELECTROMAGNETIC IMMUNITY**

Device is designed for use in the electromagnetic environment stipulated below. The buyer or user of the device must ensure it is used in this recommended environment.

Immunity test	Test level IEC 60601	Observance level	Electromagnetic environment - recommendations
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms 150 kHz to 80 MHz	<p>Portable and mobile RF communication devices must only be used relative to the device and its wiring at a distance which is not less than the spacing recommended and calculated using the appropriate equation for the transmitter's frequency.</p> <p>Recommended spacing</p>
			$d = 1.2 \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	<p>$d = 1.2 \sqrt{P}$ 80 MHz to 800 MHz $d = 2.3 \sqrt{P}$ 800 MHz to 2.5 GHz</p> <p>The Revolution Wireless device may be susceptible to Radiated RF energy at and greater than 10V/m.</p> <p>In the event of such exposure, the device may experience communication loss between remote and modules. The device will terminate all active outputs, automatically place the device in a safe state. To recover from this, turn remote and all modules off and turn them on after 5 sec delay using on/off switch on each. Once the device restarts, re-initiate all treatments.</p>
			<p>where P is the maximum output power of the transmitter in watts (W) set by the manufacturer's specifications and where d is the recommended spacing in metres (m). The field intensity of RF fixed transmitters, as determined by an electromagnetic survey a must be less than the observance level to be found in each frequency range^b. Interference may occur close to any appliance identified by the following symbol: </p>

10. EMC TABLES

NOTE 1 At 80 MHz and at 800 MHz, the high frequency amplitude is applied

NOTE 2 These guidelines may not be appropriate for some situations. Electromagnetic wave propagation is modified by absorption and reflection due to buildings, objects and persons.

^a The field intensity from fixed transmitters, such as radio telephone base stations (cellular/wireless) and a mobile radio, amateur radios, AM and FM radio transmissions and TV transmissions cannot be predicted with any accuracy. It may therefore be necessary to consider an analysis of the electromagnetic environment of the site to calculate the electromagnetic environment coming from fixed RF transmitters. If the field intensity measured in the environment where the Device is located exceeds the appropriate RF observance level above, the Device should be monitored to ensure it is operating properly. In the event of abnormal operation, new measures may then be imposed, such as realignment or movement of the Device.

^b Above the frequency amplitude from 150 kHz to 80 MHz, the field intensity must be < 3 V/m.

10. EMC TABLES

10.3 Recommended separation distances

RECOMMENDED SPACING BETWEEN A PORTABLE AND MOBILE COMMUNICATION DEVICE AND THE DEVICE

The device is designed for use in an electromagnetic environment in which radiated RF waves are controlled. The buyer or user of the device can contribute to preventing electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication devices (transmitters) and the device according to the table of recommendations below and according to the maximum output power of the telecommunication device.

Maximum transmitter output power W	Spacing according to the frequency of the transmitter m		
	From 150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	From 80 kHz to 800 MHz $d = 1.2 \sqrt{P}$	From 800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
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

In the case of transmitters whose maximum output power is not shown in the table above, the recommended spacing of d in meters (m) can be calculated using the appropriate equation for the transmitter frequency, where P is the maximum output power of the transmitter in watts (W) as set by the transmitter manufacturer

NOTE 1 At 80 MHz and at 800 MHz, the spacing for high frequency amplitude is applied.

NOTE 2 These guidelines may not be appropriate for some situations. Electromagnetic wave propagation is modified by absorption and reflection due to buildings, objects and persons.

11. CONTACT

We would be happy to answer any questions you may have about our products and services. Please contact your local dealer, or your corresponding DJO Global site. DJO Global sites are listed on the backside of the cover.

For technical service from DJO Global, please contact:

chattproductsupport@djoglobal.com

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