Quattro™ 2.5

INSTRUCTION MANUAL

Richmar®

This manual is valid for the

QUATTRO™ 2.5

This user manual is published by Richmar.

United States Federal Law restricts this device to sale by or on the order of a physician or licensed practitioner

Conformity to safety standards
Richmar declares that the device complies with following normative documents:
IEC60601-1, IEC60601-1-2, IEC60601-2- 10, IEC60601-1-4, ISO10993-5, ISO10993-10, ISO10993-1
Complies with MDD 93/42/EEC and Amended by directive 2007/47/EC requirements

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1. GENERAL INFORMATION

1.1 General Description

The microprocessor controlled Quattro™ 2.5 provides Interferential (4-pole interferential), Premodulated (2-pole interferential), medium frequency Russian (S and A), EMS (S and A) and TENS waveforms. You can choose between several different amplitude modulation options. The Interferential and Premodulated waveforms offer frequency modulation as well as a static frequency option. There are four output channels available with the Quattro™ 2.5. Channel 1 and 2 are grouped together and are independent of the grouped channels 3 and 4. This design feature enables the Quattro™ 2.5 to be used on two patients with different waveforms, programs and output intensities simultaneously.

This manual has been written for the users of the Quattro™ 2.5. It contains general information on operation, precautionary practices, and maintenance. In order to maximize its use, efficiency, and the life of the stimulator, please read this manual thoroughly and become familiar with the controls, as well as the accessories before operating the stimulator.

1.2 Indication For Use

The Quattro™ 2.5 may be used for the following conditions:

TENS, Interferential and Premodulated (IFC):

1. Symptomatic relief and chronic intractable pain
2. Post-traumatic acute pain
3. Post-surgical acute pain

For EMS and Russian:

1. Relaxation of muscle spasm.
2. Increase of blood flow circulation.
3. Prevention of disuse atrophy.
4. Muscle re-education.
5. Maintaining or increasing range of motion.
6. Immediate post-surgical stimulation of lower leg muscles to prevent venous thrombosis.

2. SAFETY INFORMATION

Read instruction manual before operating. Be sure to comply with all "Contraindications", Warnings", "Cautions" and "Adverse reactions" in the manual. Failure to follow instructions may cause harm to user or device.

2.1 Contraindications

1. **DO NOT** use this device on patients who have a cardiac pacemaker, implanted defibrillator, or other implanted metallic or electronic device, because this may cause electric shock, burns, electrical interference, or death.
2. **DO NOT** use this device on patients whose pain syndromes are undiagnosed.

Safety Symbols Used in this Manual	
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in serious injury and equipment damage.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or damage to the device or other property.

2.2 Warnings, Cautions and Adverse Reactions

⚠ WARNINGS:

1. United States Federal Law restricts this device to sale to, 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.
2. Make certain the unit is electrically grounded by connecting only to a grounded electrical service receptacle conforming to the applicable national and local electrical codes.
3. Care must be taken when operating this equipment around other equipment. Potential electromagnetic or other interference could occur to this device or to the other equipment. Try to minimize this interference by not using the other equipment in conjunction with it.

4. Before administering any treatment to a patient you should become acquainted with the operating procedures for each mode of treatment available, as well as the indications, contraindications, warnings and precautions. Consult other resources for additional information regarding the application of electro-therapy.
5. To prevent electrical shock, disconnect the unit from the power source before attempting any maintenance procedures.
6. The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer as replacement parts for internal components, may result in increased emissions or decreased immunity of the device.
7. This device is not designed to be use in an MRI environment and should be removed prior to MRI exposure.
8. **DO NOT** apply stimulation over the patient's neck because this could cause severe muscle spasms resulting in closure of the airway, difficulty in breathing, or adverse effects on heart rhythm or blood pressure.
9. **DO NOT** apply stimulation across the patient's chest, because the introduction of electrical current into the chest may cause rhythm disturbances to the patient's heart, which could be lethal.
10. **DO NOT** apply stimulation over open wounds or rashes, or over swollen, red, infected, or inflamed areas or skin eruptions (e.g., phlebitis, thrombophlebitis, varicose veins).
11. **DO NOT** apply stimulation over, or in proximity to, cancerous lesions.
12. **DO NOT** apply stimulation in the presence of electronic monitoring equipment (e.g., cardiac monitors, ECG alarms), which may not operate properly when the electrical stimulation device is in use.
13. **DO NOT** apply stimulation when the patient is in the bath or shower.
14. **DO NOT** apply stimulation while the patient is sleeping.
15. **DO NOT** apply stimulation while the patient is driving, operating machinery, or during any activity in which electrical stimulation can put the patient at risk for injury.
16. Consult with the patient's physician before using this device, because the device may cause lethal rhythm disturbances to the heart insusceptible individuals.
17. Apply stimulation only to normal, intact, clean, dry, healthy skin.
18. This device should not be used for symptomatic local pain relief unless etiology is established or unless a pain syndrome has been diagnosed.

19. Patients with arterial or venous thrombosis or thrombophlebitis are at risk of developing embolisms when electrical stimulation is applied over or adjacent to the vessels containing the thrombus. If a patient has a history of deep vein thrombosis, even many years past, the affected area should not be stimulated.
20. Fresh fractures should not be stimulated in order to avoid unwanted motion.
21. Stimulation should not be applied immediately following trauma or to tissues susceptible to hemorrhage.
22. **DO NOT** apply electrodes directly over the eyes or inside body cavities.
23. **DO NOT** use electrical stimulation in conjunction with high frequency surgical equipment or microwave or shortwave therapy systems.
24. Keep electrodes separated during treatment. Electrodes in contact with each other could result in improper stimulation or skin burns.
25. Since the effects of stimulation of the brain are unknown, stimulation should not be applied across the head, and electrodes should not be placed on opposite sides of the head.

⚠ CAUTIONS:

1. Keep yourself informed of the contraindications.
2. Read, understand, and practice the warnings, cautions and operating instructions. Know the limitations and hazards associated with using any device. Observe the precautionary and operational decals placed on the unit.
3. **DO NOT** operate this unit in an environment where other devices used intentionally radiate electromagnetic energy in an unshielded manner.
4. **DO NOT** use sharp objects such as a pencil point or ballpoint pen to operate the buttons on the control panel.
5. Inspect applicator cables and associated connectors before each use.
6. This device should not be used adjacent to or stacked with other equipment. If adjacent to or stacked equipment use is necessary, this device should be observed to verify that it is operating within the normal configuration in which it is to be used.
7. This device needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the manual.

8. Portable and mobile RF communications equipment can affect this device. **DO NOT** use a mobile phone or other device that emits electromagnetic fields, near the unit. This may result in incorrect operation of the device.
9. This device has been thoroughly tested and inspected to assure proper performance and operation!

ADVERSE REACTIONS:

1. Skin irritation, inflammation, and electrode burns beneath the electrodes are potential adverse reactions.
2 Patients may experience headache and other painful sensations during, or following the application of, electrical stimulation near the eyes and to the head and face.
3 The clinician should stop using this device and should consult with the patient's attending physician should the patient experience any adverse reactions from treatment used with this device.

Note: Always use devices that are legally marketed and sold in the United States under 510K guidelines.

.If the stimulation levels are uncomfortable, reduce the stimulation intensity to a comfortable level and contact your physician if any problems persist.

⚠ **WARNING**

The device complies completely with all parts of 21 CFR 1050. 10 of the performance standard for sonic, infrasonic and ultrasonic radiation-emitting product.

⚠ **CAUTION**

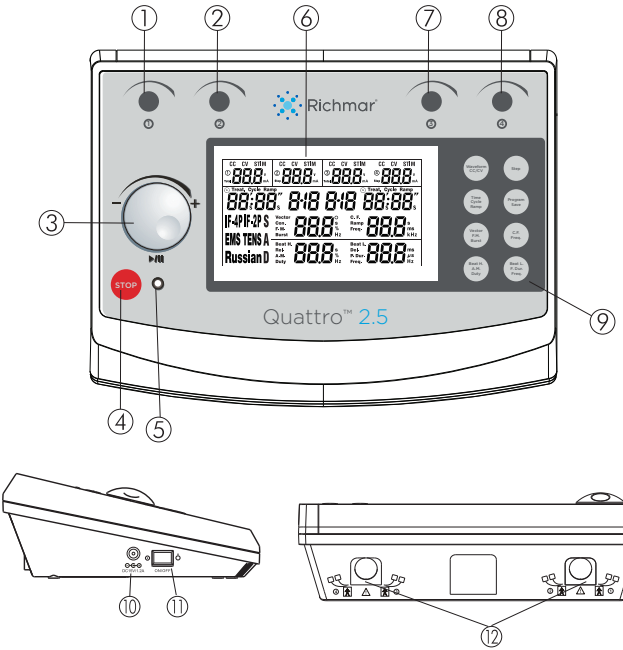
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to ultrasonic energy.

PRECAUTIONS

1. Federal law (USA) restricts this device to sale to or on the order of a physician.
2 The long-term effects of chronic electrical stimulation are unknown.
3 Electrical stimulation devices have no curative value.
4 Electrical stimulation is not a substitute for pain medications and other pain management therapies.
5 Effectiveness is highly dependent upon the patient and the selection of a practitioner qualified in the management of pain.
6 The safety of electrical stimulation during pregnancy has not been established.
7 Some patients may experience skin irritation or hypersensitivity due to the electrical stimulation or electrical conductive medium (gel).
8 Physician recommended precautions should be followed when treating patients with suspected or diagnosed heart disease.
9 Physician recommended precautions should be followed when treating patients with suspected or diagnosed epilepsy.
10 Physician recommended precautions should be followed when treating patients who have a tendency to bleed internally, such as following an injury or fracture.
11 Physician recommended precautions should be followed when treating patients who recently had any surgical procedures; stimulation may disrupt the patient's healing process.
12 Use caution if stimulation is applied over the menstruating or pregnant uterus.
13 Use caution if stimulation is applied over areas of skin that lacks normal sensation.
14 Use of this device on a patient should only be used under the continued supervision of a licensed practitioner.
15 Electrical stimulation is ineffective for pain of central origin.
16 Use extreme caution when treating desensitized areas on patients who may not be able to report discomfort or pain.
17 Patients should not be left unattended during any treatment.
18 Keep this device out of the reach of children.

3. PRESENTATION

3.1 Construction

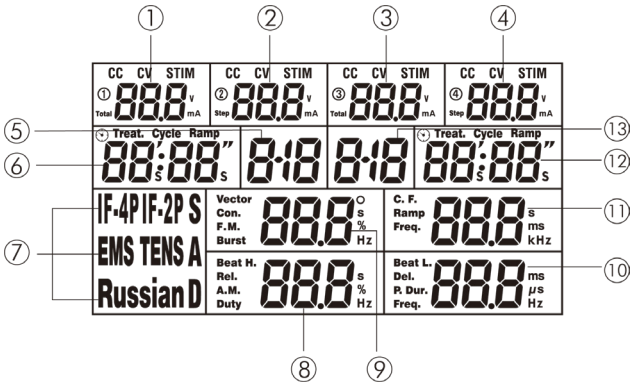


1. Channel 1 Knob
   - Press to enter treatment parameters for Channel 1 and 2.
   - During treatment, press to display treatment parameters for channel 1 and 2
   - Rotate to adjust the output intensity for channel 1
2. Channel 2 Knob:
   - Press to enter treatment parameters for channel 1 and 2.
   - During treatment, press to display treatment parameters for channel 1 and 2
   - Rotate to adjust the output intensity for channel 2
3. Central Controller Dial and Pause button.
4. Stop Treatment Button: Press to stop current channels' treatment.
5. Power Indicator Light

6. LCD display: Shows the current information of the device.
7. Channel 3 Knob:
    - Press to enter treatment parameters for channel 3 and 4.
    - During treatment, press to display treatment parameters for channel 3 and 4
    - Rotate to adjust the output intensity for channel 3
8. Channel 4 Knob:
    - Press to enter treatment parameters for channel 3 and 4.
    - During treatment, press to display treatment parameters for channel 3 and 4
    - Rotate to adjust the output intensity for channel 4.
9. Adapter Receptacle
10. ON/OFF Switch
11. Output Connector: connect with connector of cable.
12. Parameter Adjustment Panel: See below for details:

Button	Remark	
Waveform CC/CV	Waveform CC/CV	Press to toggle between CC/CV. CC = Constant Current Output CV = Constant Voltage Output
Step	Step Professional Mode Only	Switch from default mode to professional mode and to set up treatment steps within professional mode.
Time Cycle Ramp	Time—Treatment Time Cycle—Cycle time (Con/Rel) Ramp—Ramp Time	Press to adjust either the Treatment time, Cycle time or Ramp time.
Program Save	Program Save	Press to choose or save a program 1-10.
Vector F.M. Burst	Vector F.M.—Frequency Modulation Burst—Burst Frequency	Press to adjust, either the Vector, Frequency Modulation (F.M.) or Burst.
C.F. Freq.	C.F.—Carrier Frequency Freq.—Frequency	Press to adjust either the Carrier Frequency or Frequency
Beat H. A.M. Duty	Beat H. Sweep High Beat Frequency A.M.—Amplitude Modulation Duty—Duty Cycle for Russian Waveform	Press to adjust either the Beat High Frequency, A.M. or Duty Cycle.
Beat L. F. Dur. Freq.	Beat L.—Sweep Low Beat Frequency P. Dur—Pulse Duration Freq.—Frequency	Press to adjust either the Beat Low Frequency, P. Dur or Frequency.

3.2 User Interface



1. Displays output intensity of channel 1;
   Displays total treatment steps of channels 1 and 2.
2. Displays output intensity of channel 2;
   Displays treatment steps of channels 1 and 2.
3. Displays output intensity of channel 3;
   Displays total treatment steps of channels 3 and 4.
4. Displays output intensity of channel 4;
   Displays treatment steps of channels 3 and 4.
5. Displays therapeutic programs (including professional mode) of channels 1 and 2.
6. Displays treatment time, cycle time or ramp time of channels 1 and 2.
7. Displays 7 therapeutic waveform: IF-4P (IFC-Interferential, Traditional 4 Poles), IF-2P (Premodulated, Traditional 2 Poles IFC), TENS, EMS S (Synchronous), EMS A (Asynchronous), or Russian S (Synchronous), and Russian A (Asynchronous).
8. Displays parameters of Beat H./A.M./Duty button.
9. Displays parameters of Vector/F.M./Burst button.
10. Displays parameters of Beat L./P.Dur./Freq button.
11. Displays parameters of C.F./Freq button
12. Displays treatment time, cycle time or ramp time of channels 3 and 4.
13. Displays therapeutic programs (including professional mode) of channels 3 and 4.

4. Installation

4.1 Before Use

Remove the equipment and all accessories from shipping carton and box. Visually check if there is any damage or missing parts or accessories. If yes, please report to local dealer or retailer where you purchase this unit. Your equipment contains the following Quattro™ 2.5 – DQ8450 accessories.

No.	Part #	Part	Quantity
1	ER2535B2	Rubber electrodes 2.5"x3.5"	4
2	ER2743B2	Rubber electrodes 2.75"x4.3"	4
3	ES2740Y2	Electrode Sponges 2.75"x4"	4
4	ES3047Y2	Electrode Sponges 3.0"x4.75"	4
5	E1P2020WC2	Self-adhesive Electrodes 2"x2"	8
6	E1P2035WC2	Self-adhesive Electrodes 2"x3.5"	8
7	EW2023BW2	Elastic Wrap 3"x23.5"	2
8	EW3047BW2	Elastic Wrap 3"x47"	2
9	WQ6005PLUG	Lead Wires	4
10	DQ2001MGC	Adapter 100-240V/50-60Hz	1
11	DQ8432CPLUG	Connector of cable	2
12		User Manual	1

4.2 Connection of the Power Adapter

- Connect the power adapter to the device connector
- Connect the power adapter to a wall socket

⚠ **CAUTION**: Prior to connecting this device to the power supply, check that the voltage and frequency stated on the rating label match with the available power supply.

4.3 Switching On

Switch on the device, using ON/OFF switch . The device executes a self-test, checking all important functions and enters standby mode about 6~8 seconds later.

4.4 Switch Off and Disconnecting Power Adapter

- Switch off the device by switching the ON/OFF switch from the [⊙] to the [⏻] position.
- Remove the power adapter from the wall socket.
- Remove the power adapter from the device.

5. OPERATION

5.1 Check Before Treatment

- Ensure there are no contraindications to treatment.
- Inspect the skin treatment area for any abrasions, inflammation, surface veins etc.
- Clean the skin treatment area with soap or alcohol (70%).
- Shaving or clipping excessive hair on the skin treatment area can provide optimal treatment.
- Test the heat sensitivity of the treatment area.

5.1.2 Electrode Placement

- Examine the skin for any wounds and clean the skin.
- When using self-adhesive electrodes, remove the electrode from plastic backing.
- Apply the electrodes to or around the treatment area. Electrode should be placed at least 2" but no more than 6" apart, per channel.
- Ensure that the electrodes are applied securely to the skin.
- Ensure good contact between each electrode and the skin.
- Check the electrode contact regularly during the treatment.
- Examine the skin again after the treatment.
- Choose electrodes to properly fit the anatomy.
- Follow electrode manufacturer's instructions for use.
- To avoid skin irritation due to high current density, **DO NOT** use electrodes smaller in surface area than 25cm^2 self-adhesive electrodes.

⚠ **CAUTION**:

- Keep electrodes separated during treatment. Electrodes in contact with each other could result in improper stimulation or skin burns.
- Output current density is related to electrode size. Improper application may result in patient injury. If any question arises as to the proper electrode size, consult a licensed practitioner prior to the therapy session.
- Powered muscle stimulator should be used only with the leads and electrodes recommended by the manufacturer

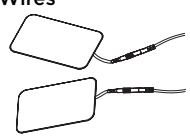
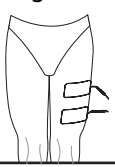
5.1.3 Self-Adhesive Electrodes

This device comes with 8 pieces 2"×2" and 8 pieces 2"×3.5" adhesive electrodes. You can select the appropriate sized electrodes according to the treatment area and output current density.
It is recommended that manufacturer's electrodes be used whenever possible to ensure the highest level of performance and contact with the treatment area and to give the most uniform delivery of the prescribed electro-therapy treatment.

After the electrodes no longer stick to the treatment site completely, dispose of electrodes and start with new electrodes. Replacement electrodes should be re-ordered through or on the advice of your physician to ensure proper quality.

⚠ CAUTION

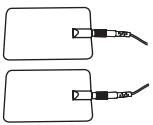
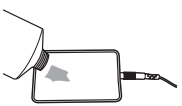
1. Before applying the self-adhesive electrodes, it is recommended to wash and degrease the skin, and then dry it.
2. **DO NOT** turn on the device when the electrodes are not positioned on the body.
3. **NEVER** remove the self-adhesive electrodes from the skin while the device is still turned on.
4. It is recommended that, at minimum, 2"x2" self-adhering based, square electrodes are used at the treatment area.

Connecting Lead Wires 	Insert the lead with the red (+) electrode connector into one adhesive electrode. Insert the lead with the black (-) electrode connector into the other electrode. Make certain the lead wires are seated completely into the electrodes, and there are no bare metal parts of the pins exposed.
Securing Electrodes 	Remove the adhesive electrodes from the protective backing and apply to the treatment area as prescribed. Ensure that the entire electrode surface is in contact with the patient's skin by pressing the electrode firmly into place.

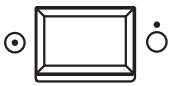
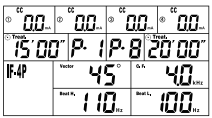
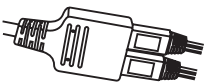
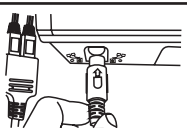
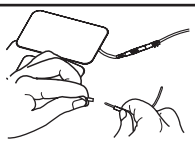
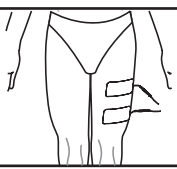
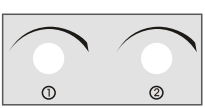
5.1.4 Rubber Electrodes

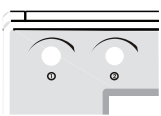
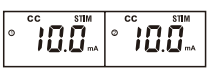
If used for delivery of electro-therapy, there are two conductive mediums for you to select from, the first one is to use electrode sponges as conductive mediums, and the other is to use a conductive medium such as an FDA approved Transmission Gel transmission gel is sold separately. If using sponges, make sure the sponges are damp before putting electrodes into the sponges.

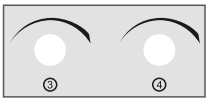
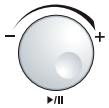
The rubber electrodes should be secured to the treatment area using the nylon wraps that are included with the Quattro™ 2.5 device.

Rubber Electrodes - Connecting Lead Wires 	Insert the lead with the red (+) electrode connector into one adhesive electrode. Insert the lead with the black (-) electrode connector into the other electrode. Make certain the lead wires are seated completely into the electrodes, and there are no bare metal parts of the pins exposed.
Conductive Medium 1 	Insert the rubber electrodes into the electrode sponges that have been moistened with distilled water.
Conductive Medium 2 	Liberally apply transmission gel to electrode prior to placement on the patient. **Note**: purchase the transmission gel with CE mark or that has been cleared by the FDA.
Elastic Straps to secure rubber electrodes in place 	Use Nylon Wrap to secure each rubber electrode into position on the patient.

5.2 Quick Set-Up for Electrical Stimulation

	1. In order to turn on the device, press ON/ OFF switch to [⊙] icon which is located on the left side of the device
	2. When you turn the Quattro™ 2.5 on, the device will perform a self-check for about 6~8 seconds, and then the default parameters will display the last treatment mode.
	3. Connect the electrode wires to the cable; **Note** the color of the wires and the color marks on the cable, they should correspond. ⚠ **CAUTION**: If you want to use 4 channels, connect all electrode lead wires to two cables.
	4. Plug the cable(s) to the device connector(s), the left connector corresponds to output channel 1 and channel 2; the right connector corresponds to output channel 3 and channel 4.
	5. Connect the electrodes to electrode lead wires.
	6. Place the electrodes on the patient.
	7. Press channel 1 or channel 2 knob to enter the desired parameters for Channel 1 or 2.

	8. There are 7 therapeutic waveforms for you to select. Press the **[Waveform]** button to choose the therapeutic waveform. Then rotate the central controller dial ( ) to select one of the following waveforms: IF-4P, IF-2P, EMS S, EMS A, TENS, Russian S and Russian A.
	9. There are 50 programs for all waveforms. For detailed preset programmable parameters for each program refer to Program Parameters Table on page 22. To change parameters refer to each waveforms “Set-up Procedure”. Press the **[Program]** button to choose the therapeutic program. Then rotate the central controller dial ( ) to select the therapeutic programs in the corresponding waveform.
	10. Press the **[Waveform]** button to choose CC for Constant Current.
	11. Adjust the output intensity and start treatment by rotating the output intensity adjustment knobs on the control panel. (0.5mA/step or 0.5V/step). The “STIM” symbol in the LCD indicates there is intensity output. Some waveforms have a pause in the middle of treatment and then will start up again. **DO NOT** increase intensity if “STIM” is not blinking at the top.
	12. For safety purposes, the load detection function was designed so when the output intensity surpasses 10.0mA/10.0V, and there are no electrodes placed on the patient’s skin or the device is not connected to the electrodes, an alarm buzzer will sound and the intensity value will flash and reset to zero. ⚠ **CAUTION**: In TENS or EMS mode when the pulse duration is less than 80μs, the load detection function will activate when the output intensity surpasses 40.0mA/40.0V.

	13. Press the channel button (3 or 4) to enter channel 3 and 4 parameter setting mode if necessary. Then set the parameters following steps 8 through 12 above.
	14. To pause a channel's current, press the corresponding channel knob and then press the Central Dial to pause that channel.
	15. Press the **[STOP]** button to stop treatment of the current channel(s). If you want to stop the other channel(s)treatment, press corresponding channel button first, and then press the **[STOP]** button. ⚠ **CAUTION**: This will only stop the selected flashing channels, not all 4 channels.

5.3 Using Preset Programs

Each therapeutic waveform has 10 programs with default parameters, but you can also set and save the parameters according to the patient's need. The default parameters for each program are referenced below:

IFC-4P & Premodulated IFC-2P

Symptoms	Program	Vector	C.F.	Beat L.	Beat H.	Time	Step 1	Step 2	CC/CV
Acute pain	1	45°	4kHz	80 Hz	150 Hz	15 min			CC
	2	45°	4kHz	130 Hz	150 Hz	15 min			CC
	3	45°	4kHz	80 Hz	120 Hz	15 min			CC
Chronic Pain	4	45°	4kHz	5 Hz	15 Hz	15 min			CC
Acute Edema	5	45°	4kHz	80 Hz	130 Hz	15 min			CC
Pain/ Edema Combo Treatment	6	45°	4kHz	5 Hz	15 Hz	15 min		80-120 Hz	CC
IFC Sensory	7	45°	4kHz	80 Hz	120 Hz	15 min			CC
IFC Motor Sensory	8	45°	4kHz	15 Hz	100 Hz	15 min			CC
IFC Motor	9	45°	4kHz	2 Hz	4 Hz	15 min			CC
Inflammation Retardation	10	45°	4kHz	80 Hz	120 Hz	15 min			CC

TENS

Symptoms	Pro-gram	Freq.	Pulse Dur.	A.M.	F.M Burst	Time	CC/ CV
Acute Pain, lg site	1	150 Hz	250µS	100%	0	20 min	CC
Acute Pain, sm site	2	150 Hz	50µS	100%	0	20 min	CC
Chronic Pain, lg site	3	10 Hz	250µS	100%	0	20 min	CC
Chronic Pain, sm site	4	10 Hz	50µS	100%	0	20 min	CC
TENs Sensory	5	150 Hz	80µS	100%	0	15 min	CC
TENs Motor	6	10 Hz	200µS	100%	0	15 min	CC
Arthritis	7	160 Hz	90µS	60%	0	15 min	CC
Sciatic Nerve Pain	8	150 Hz	325µS	100%	0	15 min	CC
Shoulder Pain	9	90 Hz	375µS	100%	0	15 min	CC
Lower Back Pain	10	150 Hz	100µS	100%	0	15 min	CC

EMS S/A

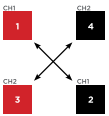
Symptoms	Pro-gram	Freq.	Pulse Dur.	A.M.	F.M.	Con/ Rel	Ramp	Time	CC/ CV
EMS S: Muscle Re-Ed, lg muscle group	1	30 Hz	250 µs	100%	0	4/12	5s	15 min	CC
EMS S: Muscle Re-Ed, sm muscle group	2	30 Hz	50 µs	100%	0	10/10	1s	15 min	CC
EMS S: Muscle Spasm Reduction	3	50 Hz	150 µs	100%	0	10/10	2s	15 min	CC
EMS S: Spasticity Control	4	100 Hz	150 µs	100%	0	10/10	2s	20 min	CC
EMS S: Acute Edema	5	100 Hz	50 µs	100%	0	--	2s	20 min	CC
EMS S: Chronic Edema	6	50 Hz	250 µs	100%	0	10/10	2s	20 min	CC
EMS S: U.E. Biphasic (PENs)	7	150 Hz	70 µs	60%	0	4/12	2s	15 min	CC
EMS S: L.E. Biphasic (PENs)	8	150 Hz	60 µs	60%	0	4/12	5s	20 min	CC
EMS-A: R.O.M, lg muscle group	1	50 Hz	250 µs	100%	0	10/30	5s	15 min	CC
EMS-A: R.O.M, sm muscle group	2	50 Hz	50 µs	100%	0	10/30	1s	15 min	CC

RUSSIAN S/A

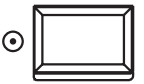
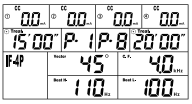
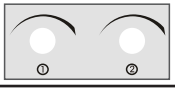
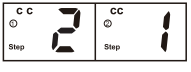
Symptoms	Pro-gram	Freq.	Duty	Con/ Rel	Ramp	Time	CC/ CV
RUSS S: Muscle Re-Ed, lg muscle group	1	30 Hz	50%	4/12	5s	15 min	CC
RUSS S: Muscle Re-Ed, sm muscle group	2	30 Hz	50%	4/12	1s	15 min	CC
RUSS S: Muscle Spasm Reduction	3	50 Hz	50%	10/10	3s	15 min	CC
RUSS S: Spasticity Control	4	100 Hz	50%	10/10	1s	20 min	CC
RUSS S: Atrophy Retardation, lg muscle group	5	50 Hz	50%	10/30	5s	15 min	CC
RUSS S: Atrophy Retardation, sm muscle group	6	50 Hz	50%	10/30	2s	15 min	CC
RUSS S: Muscle Strengthening, lg muscle group	7	100 Hz	50%	4/12	5s	15 min	CC
RUSS S: Muscle Strengthening, sm muscle group	8	50 Hz	50%	4/12	2s	15 min	CC
RUSS S: Increase Circulation	9	100 Hz	50%	10/30	5s	15 min	CC
RUSS A: Increase R.O.M.	1	100 Hz	50%	10/30	5s	15 min	CC

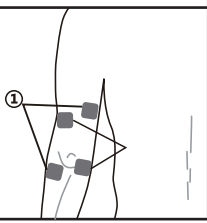
5.4 Each Stimulation Set-Up Procedure

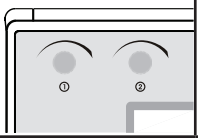
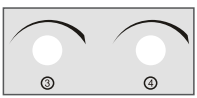
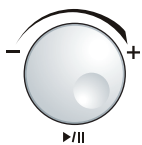
⚠ **WARNING:** When using IF-4P, you must use 2 channels (4 electrodes) and criss cross the channels as shown in the picture to the right. If using IF-2P, only use one channel (two electrodes).



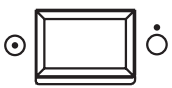
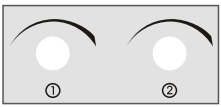
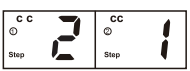
5.4.1 4-Pole Interferential Stimulation Set-up Procedure

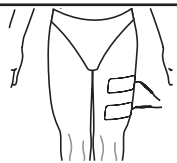
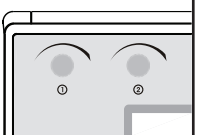
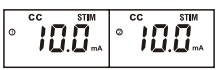
	1. In order to turn on the device, press ON/ OFF switch to [⊙] icon which is located on the side of the device
	2. When you turn the Quattro™ 2.5 on, the device will perform a self-check for about 6-8 seconds, and then the default parameters will display the last treatment mode.
	3. Press channel 1 or 2 button to enter channel 1 and channel 2 parameter setting mode.
Waveform CC/CV	4. Press the **[Waveform]** button to choose the therapeutic waveform, and then rotate the central controller dial ( ) to select "**IF-4P**" waveform.
Program Save	5. Press the **[Program/Save]** button to choose between P1 – P10. Then rotate the central controller dial ( ) to until the desired program number is displayed.
Step 	6. There are two modes in the device: Normal/Default Mode Professional Mode To switch from Normal to Professional, press and hold the **[Step]** button until you hear a "beep". The program will change from P1 to S1 for professional mode. In Professional Mode, each program has 2 treatment steps. Press the **[Step]** button again and the display will show like the figure to the left. The parameters of each step can be set according to the following methods.

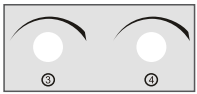
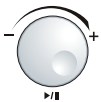
CC	7. Press the **[Waveform]** button to choose CC for constant current.
Vector F.M. Burst Vector 0 %	8. Press the **[Vector]** button, once to choose a manual vector degree. Press the **[Vector]** button a second time to choose the auto vector percentage (%) setting. Then rotate the Central controller knob ( ) to adjust to the desired setting.
Beat H. A.M. Duty	9. Press the **[Beat H.]** button, and then rotate the central controller dial ( ) to set the parameter from (Beat. L) Hz to 150Hz, 1Hz/step.
Beat L. P. Dur. Freq.	10. Press the **[Beat L.]** button, and then rotate the central controller dial ( ) to set the parameter from 1Hz to(Beat. H)Hz, 1Hz/step. (**Note**: Beat L. parameter will not exceed Beat H. setting.
Time Cycle Ramp	11. Press the **[Time]** button, and then rotate the central controller dial ( ) to set the treatment time from 1min to 60min, 1min/step.
Program Save	12. Press and hold the **[Save]** button until you hear a “beep” sound if you want to save all settings. **Note**: The settings will not be saved if you have not followed the steps above.
	13. Place the electrodes on the patient. You will need to use at least one channel, with two electrodes. You can also use two channels with four electrodes as shown in the figure to the left. Place electrodes at least 2” but no more than 6” apart, per channel.

	14. To adjust the output intensity, press the corresponding channel being used for treatment and rotate the knob clockwise until a strong but comfortable stimulation is felt. The “STIM” symbol indicates when the device is giving the patient an active stimulation. When “STIM” is not present on the screen, **DO NOT** increase intensity anymore until it is displayed again, to avoid any sudden spikes.
	15. For safety purposes, the load detection function was designed so when the output intensity surpasses 10.0mA/10.0V, and there are no electrodes placed on the patient’s skin or the device has not been connected to electrodes, an alarm buzzer will sound and the intensity value will flash and reset to zero.
	16. If using Channels 3 & 4, press the knob to enter parameters by following steps 4-15 above.
	17. To pause a channel, press the corresponding channel knob on the top of the device and then press the central controller dial to pause that channel. Each channel must be paused individually.
	18. Press the **[STOP]** button to stop treatment of the current channel(s). If you want to stop the other channel(s) treatment, press corresponding channel button first, and then press the **[STOP]** button. ⚠ **CAUTION**: This will only stop the selected flashing channels, not all 4 channels.

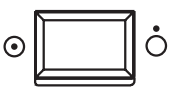
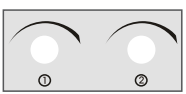
5.4.2 IF 2-P Interferential Stimulation Set Up Procedure

	1. To turn on the device, press the ON/OFF switch to [⊙] icon which is located on the side of the device.
	2. When you turn the Quattro™ 2.5 on, the device will perform a self-check for about 6~8 seconds, and then the default parameters will display the last treatment mode.
	3. Press channel 1 or 2 knob to enter channel 1 and channel 2 parameter setting mode.
	4. Press the **[Waveform]** button to choose the therapeutic waveform. Then rotate the central controller dial (◌) to select "**IF-2P**" waveform.
	5. Press the **[Program/Save]** button to choose between P1-P10. Then rotate the central controller dial (◌) until the desired program number is displayed.
 	6. There are two modes in the device: Normal/Default Mode Professional Mode To switch from Normal to Professional, press and hold the **[Step]** button until you hear a "Beep". The program will change from P1 to S1 for professional mode. In Professional Mode, each program has 2 treatment steps. Press the **[Step]** button again and the display will show like the figure to the left. The parameters of each step can be set according to the following methods.

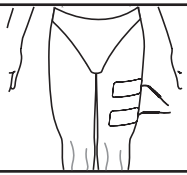
CC	7. Press the **[Waveform]** button to choose CC for Constant Current
Beat H. A.M. Duty	8. Press the **[Beat H.]** button, and then rotate the central controller dial ( ) to set the parameter from (Beat. L) Hz to150Hz, 1Hz/step.
Beat L. P. Dur. Freq.	9. Press the **[Beat L.]** button, and then rotate the central controller dial ( ) to set the parameter from 1Hz to (Beat. H) Hz, 1Hz/step. (**Note**: Beat L parameter will not exceed Beat H. setting)
Time Cycle Ramp	10. Press the **[Time]** button, and then rotate the central controller dial ( ) to set the treatment time from 1min to 60min, 1min/step.
Program Save	11. Press and hold the **[Save]** button until you hear a "beep" sound if you want to save all settings. **Note**: The settings will not be saved if you have not followed the steps above.
	12. Place the electrodes on the patient. You will need to use at least one channel, with two electrodes. You can also use two channels with four electrodes as shown in the figure to the left. Place electrodes at least 2" but no more than 6" apart, per channel.
	13. Adjust the output intensity and start treatment by rotating the output intensity adjustment knobs on the control panel. (0.5mA/step or 0.5V/step.) The "STIM" symbol in the LCD indicates there is intensity output. Some waveforms have a pause in the middle of treatment and then it will start up again. **DO NOT** increase intensity if "STIM" is not blinking at the top.
	14. For safety purposes, the load detection function was designed so when the output intensity surpasses 10.0mA/10.0V, and there are no electrodes placed on the patient's skin or the device has not been connected to electrodes, an alarm buzzer will sound and the intensity value will flash and reset to zero.

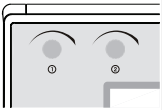
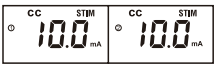
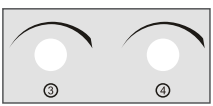
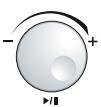
	15. If using Channels 3 & 4, press the knob to enter parameters by following steps 3-13 above.
	16. To pause a channel, press the corresponding channel knob on the top of the device and then press the central controller dial to pause that channel. Each channel must be paused individually.
	17. Press the **[STOP]** button to stop treatment of the current channel(s). If you want to stop the other channel(s) treatment, press corresponding channel button first, and then press the **[STOP]** button. ⚠ **CAUTION**: This will only stop the selected flashing channels, not all 4 channels.

5.4.3 EMS S/A Stimulation Set-up Procedure

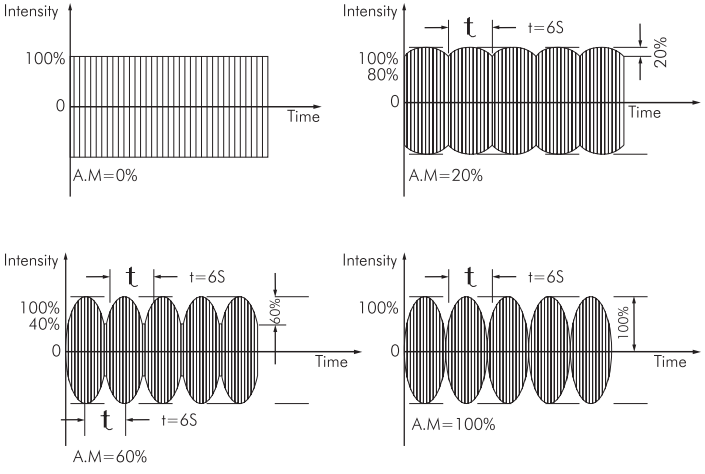
	1. To turn on the device, press the ON/OFF switch to [⊙] icon which is located on the side of the device.
	2. When you turn the Quattro™ 2.5 on, the device will perform a self-check for about 6~8 seconds, and then the default parameters will display the last treatment mode.
	3. Press channel knob to enter channel 1 and channel 2 parameter setting mode.
	4. Press the **[Waveform]** button to choose the therapeutic waveform. Then rotate the central controller dial ( ) to select “EMS S” or “EMS A” waveform.

Program Save	5. Press the **[Program/Save]** button to choose between P1-P10. Then rotate the central controller dial until the desired program number is displayed.
Step 	6. There are two modes in the device: Normal/Default Mode Professional Mode To switch from Normal to Professional, press and hold the **[Step]** button until you hear a "Beep". The program will change from P1 to S1 for professional mode. In Professional Mode, each program has 2 treatment steps. Press the **[Step]** button again and the display will show like the figure to the left. The parameters of each step can be set according to the following methods.
CC	7. Press the **[Waveform]** button to choose CC for constant current.
Vector F.M. Burst	8. Press the **[F.M.]** button, and then rotate the central controller dial ( ) **Note**: to set the F.M. PLUS Freq. (next setting) must be ≤ 250Hz.
C.F. Freq.	9. Press the **[Freq.]** button, and then rotate the central controller dial ( ) **Note**: to set Freq. correctly, note that Freq. (next setting) must be .≤ 250 MINUS F.M. Setting.

Beat H. A.M. Duty	10. Press the **[A.M.]** button, then rotate the central controller dial ( ) to set the parameter from 0% to 100% (“A.M.” means amplitude modulation, the setting value indicates percentage of modulation, e.g.: “0%” means no modulation, the intensity is outputting at the setting value continuously. “100%” means the output intensity is modulated between 0 and the setting value. The “A.M. waveform” patterns are shown on page 34, 20%/step.
Beat L. P. Dur. Freq.	11. Press the **[P.Dur.]** button, and then rotate the central controller dial ( ) to set the pulse duration from 30μs to 400μs, 5μs/step.
Time Cycle Ramp	12. Press the **[Time]** button, and then rotate the central controller dial ( ) to set the treatment time from 1min to 60min, 1min/step.
Cycle S S	13. Press the **[Time]** button again to choose Cycle time, and then rotate the central controller dial ( ) to select the cycle time (Contr./Relax) from “-/-(continuous)”, “4/4”, “4/8”, “7/7”, “5/5”, “4/12”, “10/10”, “10/20”, “10/30” and “10/50”.
Ramp S	14. Press the **[Time]** button again to choose Ramp time parameters, and then rotate the central controller dial ( ) to select the ramp time from 1s, 2s and 5s.
Program Save	15. Press and hold the **[Save]** button until you hear a “beep” sound if you want to save all settings. **Note**: The settings will not be saved if you have not followed the steps above.
	16. Place the electrodes on the patient. You will need to use at least one channel, with two electrodes. You can also use two channels with four electrodes as shown int he figure to the left. Place electrodes at least 2” but no more than 6” apart, per channel.

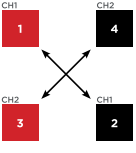
	17. Adjust the output intensity and start treatment by rotating the output intensity adjustable knobs on the control panel. (0.5mA/step or 0.5V/step). The “STIM” symbol in the LCD indicates there is intensity output. Some waveforms have a pause in the middle of treatment and then it will start up again. **DO NOT** increase intensity if “STIM” is not blinking at the top.
	18. For safety purposes, the load detection function was designed so when the output intensity surpasses 10.0mA/10.0V, and there are no electrodes placed on the patient’s skin or the device has not been connected to electrodes, an alarm buzzer will sound and the intensity value will flash and reset to zero. **Note**: If the pulse duration is less than 80μs, the load detection function will activate when output intensity surpasses or equal 40.0mA/40.0V.
	19. Press the channel button to enter channel 3 and 4 parameter setting mode if necessary. Then set the parameters following steps 4 through 18 above.
	20. To pause a channel, press the corresponding channel knob on the top of the device and then press the central controller dial to pause that channel. Each channel must be paused individually.
	21. Press the **[STOP]** button to stop treatment of the current channel(s). If you want to stop the other channel(s) treatment, press corresponding channel button first, and then press the **[STOP]** button. ⚠ **CAUTION**: This will only stop the selected flashing channels, not all 4 channels.

A.M. Waveform:

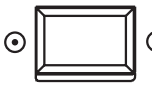
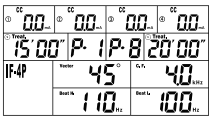
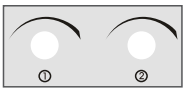
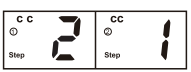


Remark:

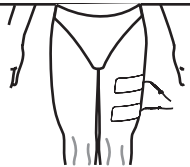
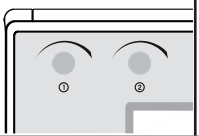
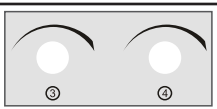
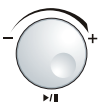
1. EMS S (Synchronous) stimulation: For this treatment, use two channels (either channels 1 & 2 or 3 & 4). Electrodes for each channel will be placed on different muscle groups. During treatment, both channels will stimulate at the same time. Best used for Bi-lateral conditions.
2. EMS A (Asynchronous) stimulation: For this treatment, use two channels (either 1 & 2 or 3 & 4). Electrodes for each channel will be placed on separate muscle groups. During treatment, channels will alternate stimulation. Best used when treating opposing muscle groups.
3. ⚠ **WARNING:** When using IF-4P, you must use 2 channels (4 electrodes) and criss cross the channels as shown in the picture below. If using IF-2P, only use on channel (two electrodes).



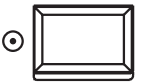
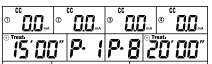
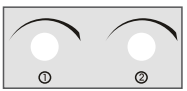
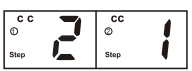
5.4.4 TENS Stimulation Set-Up Procedure

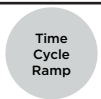
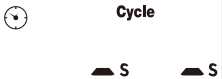
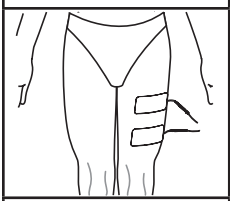
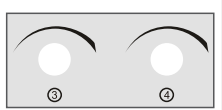
	1. To turn on the device, press the ON/OFF switch to [⊙] icon which is located on the side of the device.
	2. When you turn the Quattro™ 2.5 on, the device will perform a self-check for about 6~8 seconds, and then the default parameters will display the last treatment mode.
	3. Press channel button to enter channel 1 and channel 2 parameter setting mode.
	4. Press the **[Waveform]** button to choose the therapeutic waveform. Then rotate the central controller dial ( ) to select "**TENS**" waveform.
	5. Press the **[Program/Save]** button to choose between P1-P10. Then rotate the central controller dial until the desired program number is displayed.
 	6. There are two modes in the device: Normal/Default Mode Professional Mode To switch from Normal to Professional, press and hold the **[Step]** button until you hear a "Beep". The program will change from P1 to S1 for professional mode. In Professional Mode, each program has 2 treatment steps. Press the **[Step]** button again and the display will show like the figure to the left. The parameters of each step can be set according to the following methods.
CC	7. Press the **[Waveform]** button to choose CC for constant current.

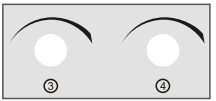
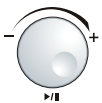
Vector F.M. Burst	8. Press the **[F.M.]** button, and then rotate the central controller dial ( ) to set the F.M. parameter from 0Hz to 249Hz,1Hz/step. But F.M.+Freq.≤250Hz.
Vector 0 %	9. Press the **[F.M.]** button again to switch to Burst, and then rotate the central controller dial ( ) to set the Burst rate from 0Hz to 10Hz, 1Hz/step. But Burst ×8≤Freq.
C.F. Freq.	10. Press the **[Freq.]** button,and then rotate the central controller dial ( ) to set the frequency from 1Hz to 250Hz,1Hz/step. But Freq.≤ 250-F.M.
Beat H. A.M. Duty	11. Press the **[A.M.]** button, then rotate the central controller dial ( ) to set the parameter from 0% to 100% "A.M." means amplitude modulation, the setting value indicates percentage of modulation, e.g.: "0%" means no modulation, the intensity is outputting at the setting value continuously. "100%" means the output intensity is modulated between 0 and the setting value. The "A.M. waveform" patterns are shown on pg. 34, +/-20%.
Beat L. P. Dur. Freq.	12. Press the **[P. Dur.]** button,and then rotate the central controller dial ( ) to set the pulse duration from 30μs to 400μs, 5μs/step.
Time Cycle Ramp	13. Press the **[Time]** button, and then rotate the central controller dial ( ) to set the treatment time from 1min to 60min, 1min/step.
Cycle S S	14. Press the **[Time]** button again to switch to Cycle time, and then rotate the central controller dial ( ) to select the cycle time (Contr./Relax) from "-/-(continuous)", "4/4", "4/8", "7/7", "5/5", "4/12", "10/10", "10/20", "10/30" and "10/50".
Program Save	15. Press and hold the **[Save]** button until you hear a "beep" sound if you want to save all settings. **Note**: The settings will not be saved if you have not followed the step above.

	16. Place the electrodes on the patient. You will need to use at least one channel, with two electrodes. You can also use two channels with four electrodes as shown int he figure to the left. Place electrodes at least 2” but no more than 6” apart, per channel.
	17. Adjust the output intensity and start treatment by rotating the output intensity adjustable knobs on the control panel. (0.5mA/step or 0.5V/ step). The “STIM” symbol in the LCD indicates there is intensity output. Some waveforms have a pause in the middle of treatment and then it will start up again. **DO NOT** increase intensity if “STIM” is not blinking at the top.
	18. For safety purposes, the load detection function was designed so when the output intensity surpasses10.0mA/10.0V, and there are no electrodes placed on the patient’s skin or the device has not been connected to electrodes, an alarm buzzer will sound and the intensity value will flash and reset to zero. **Note**: If the pulse duration is less than 80μs, the load detection function will activate when output intensity surpasses or equal 40.0mA/40.0V.
	19. Press the channel button to enter channel 3 and 4 parameter setting mode if necessary. Then set the parameters following steps 4 through 18 above.
	20. To pause a channel, press the corresponding channel knob on the top of the device and then press the central controller dial to pause that channel. Each channel must be paused individually.
	21. Press the **[STOP]** button to stop treatment of the current channel(s). If you want to stop the other channel(s) treatment, press corresponding channel button first, and then press the **[STOP]** button. ⚠ **CAUTION**: This will only stop the selected flashing channels, not all 4 channels.

5.4.5 Russian S/A Stimulation Set-up Procedure

	1. To turn on the device, press the ON/OFF switch to [⊙] icon which is located on the side of the device.
	2. When you turn the Quattro™ 2.5 on, the device will perform a self-check for about 6~8 seconds, and then the default parameters will display the last treatment mode.
	3. Press channel button to enter channel 1 and channel 2 parameter setting mode.
	4. Press the **[Waveform]** button to choose the therapeutic waveform. Then rotate the central controller dial () to select "**Russian S**" or "**Russian A**" waveform.
	5. Press the **[Program/Save]** button to choose between P1-P10. Then rotate the central controller dial until the desired program number is displayed.
  	6. There are two modes in the device: Normal/Default Mode and Professional Mode To switch from Normal to Professional, press and hold the **[Step]** button until you hear a "Beep". The program will change from P1 to S1 for professional mode. In Professional Mode, each program has 2 treatment steps. Press the **[Step]** button again and the display will show like the figure to the left. The parameters of each step can be set according to the following methods.
	7. Press the **[Waveform]** button to choose CC for constant current.
	8. Press the **[Duty]** button, and then rotate the central controller dial () to set the parameter from 10% to 50%, 10%/step.

	9. Press the **[Freq.]** button and then rotate the central controller dial ( ) to set the frequency from 20Hz to100Hz, 5Hz/step.
	10. Press the **[Time]** button, and then rotate the central controller dial ( ) to set the treatment time from 1min to 60min, 1min/step.
	11. Press the **[Time]** button again to choose Cycle time, and then rotate the central controller dial ( ) to select the cycle time (contr/ relax) from "-/-(continuous)", "5/5", "4/12", "10/10", "10/20", "10/30" and "10/50".
	12. Press the **[Time]** button again to choose Ramp time, and then rotate the central controller dial ( ) to select the ramp time from 1s, 2s and 5s.
	13. Press and hold the **[Save]** button until you hear a "beep" sound if you want to save all settings. **Note**: The settings will not be saved if you have not followed the step above.
	14. Place the electrodes on the patient. You will need to use at least one channel, with two electrodes. You can also use two channels with four electrodes as shown int he figure to the left. Place electrodes at least 2" but no more than 6" apart, per channel.
	15. Adjust the output intensity and start treatment by rotating the output intensity adjustable knobs on the control panel. (0.5mA/step or 0.5V/step). The "STIM" symbol in the LCD indicates there is intensity output. Some waveforms have a pause in the middle of treatment and then it will start up again. **DO NOT** increase intensity if "STIM" is not blinking at the top.

	16. For safety purposes, the load detection function was designed so when the output intensity surpasses10.0mA/10.0V, and there are no electrodes placed on the patient's skin or the device has not been connected to electrodes, an alarm buzzer will sound and the intensity value will flash and reset to zero.
	17. Press the channel button to enter channel 3 and 4 parameter setting mode if necessary. Then set the parameters following steps 4 through 16 above.
	18. To pause a channel, press the corresponding channel knob on the top of the device and then press the central controller dial to pause that channel. Each channel must be paused individually.
	19. Press the **[STOP]** button to stop treatment of the current channel(s). If you want to stop the other channel(s) treatment, press corresponding channel button first, and then press the **[STOP]** button. ⚠ **CAUTION**: This will only stop the selected flashing channels, not all 4 channels.

Remark:

1. There is a "beeping" sound which will appear for approximately 20 seconds to alert the user after the treatment has finished. Press any button to cancel the "beeping" sound.
2. If you want to restore factory parameter settings, turn the device off then press and hold knobs (1) and (2) at the same time, and then turn on the device by pressing the ON/OFF switch, keep pressing the (1) and (2) knobs and the device will continuously beep until all parameters are restored to the factory setting.

6. SPECIFICATIONS

6.1 General Specifications:

Adapter supply voltage	100V~240V, 50Hz~60Hz, 0.6A
Adapter output	15V = 1.2A Max.
Type of protection against electric shock	Class II Equipment
Adapter Dimensions	3.5" (L) x 2.0" (W) x 1.15" (H)
Dimensions	9.8" (L) x 7.3" (W) x 3.25" (H)
Operating Environmental	Temperature: 50°F (10°C) to 104°F (40°C), Relative humidity: 30%-85%
Storage Environmental	Temperature: -4°F (-20°C) to 131°F (55°C), Relative humidity: 30%-85%
Maximum Treatment Time	60 minutes

6.2 Waveform Specifications:

6.2.1 4-Pole Interferential Mode

Waveform Type	Bi-phasic square
Mode Selection	CC (Constant Current) or CV (Constant Voltage)
Vector	Auto: 0%-100% Manual: 0°-90°
Carrier Frequency (C.F.)	4.0kHz
Sweep High Beat Frequency (Beat H.)	(Beat L.) - 150 Hz
Sweep High Beat Frequency (Beat L.)	1 - (Beat H.) Hz
Output Intensity	0-50mA (CC, at 1k ohm load) 0-50V (CV, at 1k ohm load)
Treatment time	1-60 minutes

6.2.2 2-Pole Interferential Mode

Waveform Type	Bi-phasic square
Mode Selection	CC (Constant Current) or CV (Constant Voltage)
Carrier Frequency (C.F.)	4.0kHz
Sweep High Beat Frequency (Beat H.)	(Beat L.) - 150 Hz
Sweep High Beat Frequency (Beat L.)	1 - (Beat H.) Hz
Output Intensity	0-50mA (CC, at 1k ohm load) 0-50V (CV, at 1k ohm load)
Treatment time	1-60 minutes

6.2.3 TENS Mode

Waveform Type	Bi-phasic square
Mode Selection	CC (Constant Current) or CV (Constant Voltage)
Frequency	1 - 250 Hz
Frequency Modulation (F.M.)	0 - 249 Hz
Burst Rate (Burst)	0 - 10 Hz (7 pulse)
Phase Duration (P.Dur.)	30-400 μs
Amplitude Modulation (A.M.)	0%-100%
Output Intensity	0-100mA (CC, at 1k ohm load) 0-100V (CV, at 1k ohm load)
Cycle Time (Cycle)	Continuous, 4/4, 4/8, 7/7, 5/5, 4/12, 10/10, 10/20, 10/30, 10/50
Treatment Time	1-60 minutes

6.2.4 EMS S/S mode

Waveform Type	Bi-phasic square
Mode Selection	CC (Constant Current) or CV (Constant Voltage)
Frequency	1 - 250 Hz
Frequency Modulation (F.M.)	0 - 249 Hz
Step Duration (P.Dur.)	30-400 μs
Amplitude Modulation (A.M.)	0%-100%
Output Intensity	0-100mA (CC, at 1k ohm load) 0-100V (CV, at 1k ohm load)
Treatment time	1-60 minutes
Ramp time	1s, 2s, 5s
Cycle Time (Cycle)	Continuous, 4/4, 4/8, 7/7, 5/5, 4/12, 10/10, 10/20, 10/30, 10/50

6.2.5 Russian Mode

Waveform Type	Bi-phasic square
Mode Selection	CC (Constant Current) or CV (Constant Voltage)
Carrier Frequency	2.5kHz
Burst Frequency	2 - 100 Hz
Output Intensity	0-50mA (CC, at 1k ohm load) 0-50V (CV, at 1k ohm load)
Duty cycle	10%, 20%, 30%, 40%, and 50%
Ramp time	1s, 2s, 5s
Cycle Time (Cycle)	Continuous, 4/4, 4/8, 7/7, 5/5, 4/12, 10/10, 10/20, 10/30, 10/50
Treatment Time	1-60 minutes

⚠ CAUTION:

This device has been thoroughly tested and inspected to assure proper performance and operation!

7. CLEANING AND CARE

7.1 Tips for Skin Care

Follow these suggestions to avoid skin irritation, especially if you have sensitive skin:

1. Clean the treatment area with mild soap and water. Rinse thoroughly and dry area completely before placing electrodes on or around the treatment area.
2. Excess hair may be clipped with scissors; **DO NOT** shave stimulation area.

7.2 Cleaning the Device

1. Unplug the device before you clean the device.
2. Clean the device after use with a soft, slightly moistened cloth. For hard to clean situations, you can also moisten the cloth with mild soapy water.
3. **DO NOT** use any chemical cleaners or abrasive agents for cleaning.

⚠ **CAUTION**: **DO NOT** submerse the device in liquids. Should the unit become accidentally submersed, contact the dealer or Authorized Service center immediately. **DO NOT** attempt to use a system that has been submersed in liquid until inspected and tested by a Service Technician certified by an Authorized Service center. Do not allow liquids to enter the ventilation holes.

7.3 Cleaning the Electrodes

1. Apply the protective backing to the tacky side of the electrode before storing.
2. It may be helpful to improve repeated application by spreading a few drops of cold water over the adhesive on the electrode and turn the surface up to air dry. Over-saturation of the electrode with water will reduce the adhesive properties. If any electrodes are not sticking completely to the skin (no edges lifting) replace with new electrodes, to avoid possible injury.
3. The rubber electrodes should be cleaned with lukewarm water. To disinfect the electrodes or to remove stubborn stains of dirt, use a 70% alcohol solution. The alcohol solution may discolor the electrode; however, this does not affect the operation of the electrodes.

4. Ensure electrode is completely dry before using the treatment. Check with patient to ensure the patient is not allergic to any cleaning solution used to clean the rubber electrodes, prior to administering treatment.
5. The sponge pads should be washed in warm water, using a household cleaner. After washing, they must be rinsed with clear water, thoroughly drained and then dried. Damaged sponge pads should be replaced.
6. Between uses, store the electrodes in the reusable bag and in a cool dry place.

⚠ **CAUTION**:

1. The self-adhesive electrodes are intended for single patient use only.
2. If the electrodes **DO NOT** adhere completely to the patient's skin, it may cause a slight shock.
3. If irritation occurs, discontinue use and consult your clinician.
4. Always use the electrodes with CE mark, or are legally marketed in the United States under an approved 510(K) procedure

7.4 Cleaning the Lead Wires and Cables

1. Periodically wipe the lead wires clean with a cloth dampened in a mild soap solution, and then gently wipe them dry. Use of rubbing alcohol on the lead wires will damage the insulation and dramatically shorten their life. It is the manufacturer's recommendation to replace lead wires every six months

7.5 Maintenance

1. Maintenance and all repairs should only be carried out by an authorized agency. The manufacturer will not be held responsible for the results of maintenance or repairs completed by any unauthorized person(s).
2. Opening of the equipment by unauthorized agencies is not allowed and will terminate any claim to warranty.

8. TROUBLESHOOTING

For optimal use:

1. Please follow the directions on the electrode packaging for the care of electrodes. The life of the electrodes varies, depending on skin conditions, skin preparation, storage and climate. Replace electrodes that no longer stick.
2. **NOTE**: If the following measures fail to alleviate the problem, please call your dealer.

Problem	Possible Cause	Solution
Displays fail to light up	Adapter contact failure.	Ensure adapter is connected. Check the following contacts: • All contacts are in place. • All contacts are not broken. • Ensure that adapter is connected.
Stimulation is weak	Electrodes 1. Dried out or contaminated 2. Placement	1. Replace. 2. Electrodes must be at least 2" and no more than 6" apart, per channel..
	Lead wires old/worn/ damaged.	Replace
Stimulation stops	Poor electrode contact.	Reapply electrodes, secure firmly.
	Damaged or worn electrodes or lead wires.	Replace.
Stimulation is uncomfortable	Intensity is too high.	Decrease intensity.
	Electrodes are too close together.	Reposition the electrodes.
		Electrodes must be at least 2" and no more than 6" apart, per channel..
	Damaged or worn electrodes or lead wires.	Replace.
	Electrode active area size is too small.	Replace electrodes with ones that have an active area no less than 25.0cm².
Stimulation is ineffective	Improper electrode.	Reposition electrode.
	Unknown.	Contact clinician.

“E1” or “E2” displays on LCD	Hardware problem.	Restart the device.
“E3” displays on LCD	Detected the device is over temperature limit.	The device will stop treatment automatically, please wait several minutes before using again.
“E4” displays on LCD	Detected the working current is over the limit.	
“E5” displays on LCD	Memorizer failure is detected.	Restart the device, if the problem still exists, please contact the manufacturer or distributor.

Remark: If there is a failure, a beeping sound will appear until the failure has been corrected or eliminated, or until the button on the panel has been pressed.

9. STORAGE

1. For prolonged pauses in treatment, store the device in a cool dry room and protect it against heat, sunshine and moisture and remove the battery to avoid battery leaking.
2. Store the device in a cool, well-ventilated place.
3. **NEVER** place any heavy objects on the device.

10. DISPOSAL

Used fully discharged batteries must be disposed of in a specially labeled collection container, at a toxic waste collection point or through an electrical retailer. Please dispose of the device in accordance with the laws in your area.

11. ELECTROMAGNETIC COMPATIBILITY (EMC) TABLES

IMPORTANT INFORMATION REGARDING ELECTROMAGNETIC COMPATIBILITY (EMC)

1. The device requires special precautions regarding electromagnetic compatibility (EMC) and needs to be installed and put into service according to the EMC information supplied in this manual.
2. Care must be taken when operating this device adjacent to or stacked with other equipment. Potential electromagnetic or other interference could occur to this device or other equipment. Try to minimize this interference by not using other equipment in conjunction with it.
3. The performance of the device was determined to be essential. This device has been tested and inspected thoroughly to assure proper performance and operation.

<table>
<tr><td colspan="3">Guidance and manufacturer's declaration - electromagnetic emissions</td></tr>
<tr><td colspan="3">The device is intended for use in the electromagnetic environment specified below. The customer or the user assures that it is used in such an environment.</td></tr>
<tr><td>Emissions Test</td><td>Compliance</td><td>Electromagnetic environment - guidance</td></tr>
<tr><td>RF emissions
CISPR 11</td><td>Group 1</td><td>The device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF emissions
CISPR 11</td><td>Class B</td><td rowspan="3">The device is suitable for use in all establishments including domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td></tr>
<tr><td>Harmonic emissions
IEC 61000-3-2</td><td>Class A</td></tr>
<tr><td>Voltage fluctuations/flicker emissions IEC 61000-3-3</td><td>Not applicable</td></tr>
</table>

Guidance and manufacturer's declaration - electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact	±6 kV contact	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
	±8 kV air	±8 kV air	
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply	±2 kV for power supply	Main power quality should be that of a commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is needed that the device be powered from an uninterruptible power supply
Surge IEC 61000-4-5	±1 kV line(s) to line(s)	±1 kV line(s) to line(s)	
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0.5 cycle	<5% UT (>95% dip in UT) for 0.5 cycle	
	40% UT (60% dip in UT) for 5 Cycles	40% UT (60% dip in UT) for 5 Cycles	
	70% UT (30% dip in UT) for 25 Cycles	70% UT (30% dip in UT) for 25 Cycles	
	<5% UT (>95% dip in UT) for 5 sec	<5% UT (>95% dip in UT) for 5 sec	
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristics of a typical location in a typical commercial or hospital environment.
NOTE UT is the a.c. mains voltage prior to application of the test level.			

Immunity test	IEC 60501 test level	Compliance level	Electromagnetic environment guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF Communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d=[\frac{3.5}{V1}]\sqrt{P}$ $d=[\frac{3.5}{E1}]\sqrt{P}$ 80 MHz to 800 MHz $d=[\frac{7}{E1}]\sqrt{P}$ 800 MHz to 2.5 MHz Where P is the maximum output power rating of the transmitter In watts (W) according to the. Transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, a should be less than the compliance level in each frequency range b. 
Radiated RF IEC 61000-4-3	3 V/m80 MHz to 2.5 GHz	3 V/m	

NOTE I. At 80 MHz and 800 MHz. the separation distance for the higher frequency range applies.
NOTE 2. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

1. Field strengths from fixed transmitters, such as base stations for radio (cellular/ cordless) telephones and land mobile radios, amateur radio, AM and FM broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device is used exceeds the applicable RF compliance level above, should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the device.
2. Over the frequency range 150 kHz to 80 MHz, field strength should be less than (Vi) W/m.

Recommended separation distances between portable and mobile RF communications equipment and the device.

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

Rate maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d=[\frac{3.5}{V1}]\sqrt{P}$	80 MHz to 800 MHz $d=[\frac{3.5}{V1}]\sqrt{P}$	800 MHz to 2,5 GHz $d=[\frac{3.5}{V1}]\sqrt{P}$
0.01	0.117	0.117	0.233
0.1	0.369	0.369	0.738
1	1.167	1.167	2.333
10	3.689	3.689	7.379
100	11.667	11.667	23.333

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) accordable to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
Note 2: These guidelines may not apply in all situations. Electromagnetic propogation is affected by absorption and reflection from structures, objects and people.

12. GLOSSARY OF SYMBOLS

SN	Serial number
	Attention: Read the operating instruction before use! Equipment capable of delivering output values in excess of 10mA r.m.s. or 10V r.m.s. averaged over any period of 5s.
	Electrical devices are recyclable material and should not be disposed of with household waste after their useful life! Help us to protect the environment and save resources and take this device to the appropriate collection points. Please contact the organization which is responsible for waste disposal in your area if you have any questions.
	Type BF Applied Part
	Type of protection against electric shock: Class II Equipment
	Refer to instruction manual
IPX7	Only for treatment head: Protected against the effects of temporary immersion water.

13. WARRANTY

Please contact your dealer or the device center in case of a claim under the warranty. If you have to send in the unit, enclose a copy of your receipt and state what the defect is. The following warranty terms apply:

1. Richmar's sole obligation in the case of any breach of its warranties set forth in the manual shall be, at Richmar's option, to replace the Product with a new or factory certified refurbished product without charge to the purchaser or to refund the purchase price of the Product. If the product is unopened/unused it can be returned minus a 25% restock fee. The warranty period for the Quattro 2.5® device is two years from date of purchase and does not include accessories.
2. For defective products, please contact your distributor or Richmar directly at 800-376-7263 to speak with Tech Support. If product cannot be remedied over the phone, a prepaid shipping label will be sent to you with the authorized RMA number (if product is within warranty). Any product sent back without an authorized RMA number will be returned to the sender. Richmar will not be responsible for damage due to improper packaging or shipment. If Richmar determines in its sole reasonable discretion that the Product contains defective workmanship or materials, Richmar will replace the product with a new or factory certified refurbished product at Richmar's expense or refund the purchase price to the original purchaser for the price of the defective product (minus shipping costs). If Richmar determines in its sole reasonable discretion that the Product does not contain defective workmanship, materials, or it is observed that product has been mishandled, abused or device has been opened, Richmar will inform the Purchaser and return the product, freight billed to the purchaser.
3. Repairs under warranty DO NOT extend the warranty period either for the device or for the replacement parts. Replacement lead wire, applicators and power cords have a one year warranty from date of original device purchase.

4. The following is excluded under the warranty:
   a. All damage which has arisen due to improper treatment, e.g. nonobservance of the user instruction.
   b. Any device that has been opened or has a damaged warranty seal, automatically voids the warranty and no refund or warranty replacement will be provided.
   c. Damage which has arisen during transport from the manufacturer to the consumer or during transport to the service center.
   d. Accessories which are subject to normal wear and tear.
5. Liability for direct or indirect consequential losses caused by the unit is excluded even if the damage to the unit is accepted as a warranty claim.
6. Serial number is a sequential and unique identification number that represents date of manufacture.

Manufactured for:

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