







# EDRE-02 (Rev. 0)

# exoRehab User's Manual

### exoRehab - k





## **Important Safety Notice**

Person with limited physical, sensory, or psychological ability must use the device under the supervision of authorized personnel in charge of safety protection. Special care is needed to prevent children from toying with the device.

Content below is to protect the safety of user and prevent property damage. Please read the instructions before use for appropriate application. Important safety notice is distinguished as 'Danger', 'Warning', and 'Caution', the meanings are shown below. The sign is to call the attention about possible danger and inappropriate usage.



Violation of the instruction causes severe injury, even death.



Violation of the instruction leads to severe injury and even death with high possibility



Violation of the instruction may cause minor injury or property damage.



The General Warning sign can only be used in combination with other warning signs.



A.C.: Provides or being provided by alternative current.



D.C.: Provides or being provided by direct current.



BF-Type Equipment : Body Floating.



Non-Reusable: Wet-Electrode pads are disposable.



Class IIA Medical Device: Basic Insulator+Double Insulator



Follow Instruction



Follow legal disposal regulation to minimize the environmental effect of disposed electronic device.



### Prohibition

- Prohibition: Never use with other medical electronic device listed below. (danger of malfunction)
  - Insert-type electronic medical device(Pace maker)
  - Life sustaining electronic medical device(artificial heart)
  - Install-type electronic medical device(electrocardiograph)
- 2 Never use on lower abdomen during pregnancy.
- \* If you are under medical treatment or attending hospital, follow doctor's guide.



# Power Source(for body recharge)

- 1 Rated power for recharge is (100-240)V~, 50/60 Hz. (Never use while recharging)
- 2 Never use damaged power cord or loose consent.
- Fully insert the power plug to prevent bad connection.
- 4 Never put multiple plugs on one consent (major cause of fire by abnormal overheat).
- 5 Do not damage, bend, twist, or pull, the power cord (major cause of fire or electric shock)
- 6 Do not pull the cord with excessive force (damage on the cord causes fire or electric shock)
- 7 Stretch the cable and cord properly before use.
- 8 Keep the power cord clean (damaged or unclean cord causes fire or electric shock).
- 9 Never pull or put the power plug with wet hand(it is a major cause of electric shock).
- 10 Keep the power cord from being trodden.
- 11 It is safe to unplug the power plug when lightning strikes.
- 12 Unplug the power plug when you are not using it.



### 3 Usage

Never disassemble, fix, or remodel the product. It causes electric shock and malfunction. (contact the customer service for repair)

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- 2 If you notice any anomaly, stop using the device immediately and contact the store you purchased the product from or customer service.
- 3 Gradually increase the Functional Electrical Stimulation(FES) intensity from low to high. (sudden change of intensity to high level is dangerous)
- 4 Adjust to appropriate FES intensity that meets your comfort.
- 5 Do not use the product for purpose other than those provided in this manual.
- 6 If abnormal skin reaction occured, stop using the product immediately and consult your doctor.
- 7 Do not pull or twist the cord with excessive force.
- 8 Do not throw or apply excessive force on the device.
- 9 Do not apply the device on or near the eye.
- 10 Do not use with other devices at the same time.
- 11 Do not use in the moist environment such as bathroom.



### Children Care

- 1 Keep the children away from the device while using (otherwise they may contact the electric pad and be startled).
- 2 Do not let the children toy with the device(otherwise children may choke on band and cable parts)
- 3 Biting or scratching the power cable causes electric shock and fire.
- 4 Turn the power OFF while device is not in use (misuse may startle the children).
- 5 Stepping or jumping on the device causes injury to the children and damage the device. Please warn the children not to.

# **CAUTION**

### 5 Caution Before Installation

- 1 Do not drop or apply excessive impact on the product while carrying. (otherwise it causes damage to the product and even fire)
- 2 Avoid direct sun ray(otherwise it causes the change of color).
- Avoid combustibles such as alcohol or thinner and placing it near electric heater or stove(otherwise it causes dis-figuration and fire).
- 4 Check the rated voltage before recharging the product(failed to use the correct voltage causes circuit damage and fire).



### Using the Device

- 1 If you found any issue not noticed on the user manual, contact the store you purchased or customer service before use.
- 2 Please use the device after reading the instructions thoroughly.
- 3 Do NOT make contact or scratch the device with sharp or metal object.
- 4 Adjust the FES intensity to meet the user comfort.
- 5 Do NOT apply excessive force while operating(otherwise it causes damage on the device).
- Do NOT place the device near water or liquid. (accidental inflow of liquid into the device causes malfunction of the device, electric shock, and fire).
- 7 If water or drink went into the device, immediately unplug the power cord and contact the customer service.
- 8 If the fault was detected or the device underwent the blackout, immediately unplug the power cord and contact the customer service.
- 9 Do NOT exceed 30 minutes for one session. Use 2~3 times a day.
- 10 Do NOT use with parts other than provided ones.
- 11 Do NOT leave the device on when it is not in use.

# **CAUTION**

# Storage and Cleaning

- 1 Avoid extremely high or low temperature and store indoor with normal temperature.
- 2 Avoid wet environment.
- 3 Clean the device after use for proper use afterwards.
- 4 Check the device before usage if it was left unused for long period of time.
- 5 Clean the belt with soft and dried towel.
- Do not spray the water directly or clean the device with chemicals such as benzene, thinner, or alcohol.
- 7 Unplug the power plug before cleaning the device.
- 8 Do not keep the device under high temperature and moist environment.
- 9 Keep the device away from children.

# This medical device can be used by general individuals.

- The medical device must be eletrically recharged before use.
- Individual user can safely utilize every function of the medical device.

# Contents

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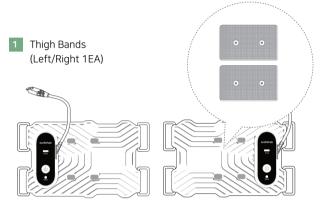


# Product Introduction

Product Set
Parts and Functions

# **Main Products**

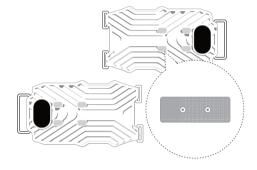
Thigh Band Wet-Electrode Pad (\*installation)



- Wet-Electrode Pad for Electrical Stimulation 5 Sets (3 pads in 1 Set)
- Metal Dry-Electrodes for EMG measurement 5 EA

\*Installation: The attachable/detachable parts that makes direct contact with user's skin

3 Shin Bands (Left/Right 1EA)



4 Shin Band Wet-Electrode Pad(\*installation)



5 Metal dried-electrode for EMG measurement



6 Extension Cables (2EA)

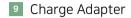


Shin Band Velcro StrapThigh Band Velcro Strap



8 Electrode Cover (Fabric Electrode Cover)

# Product Set







10 User Manual



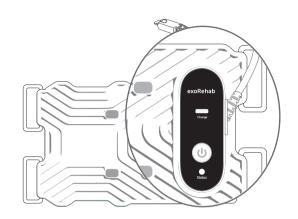


11 Storage Box/Case\*\*

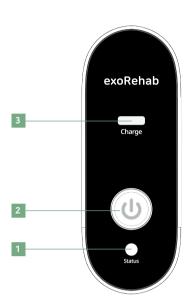
\*\*Storage Box/Case may change without notice.

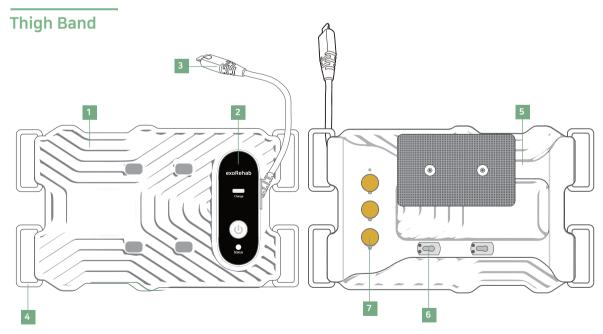
- Illustrations provided are to help understand the device. They may change for improvement without notice
- Do not use with products other than provided or optional items

# Controller



- 1 Operation Status LED(Full-color)
- 2 Power Button ON/OFF
- 3 Recharge status LED

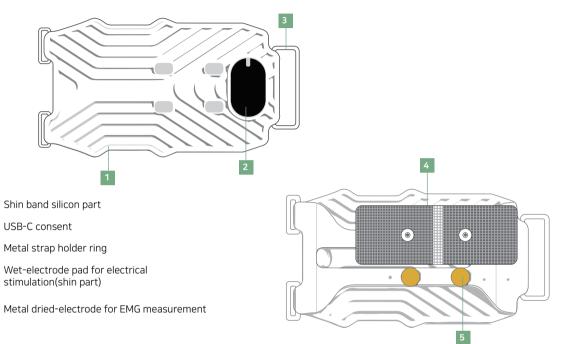




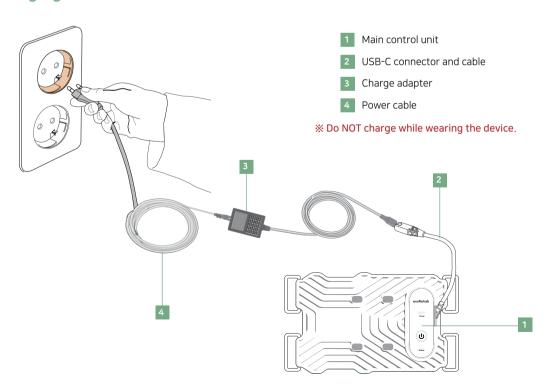
- 1 Thigh band silicon part
- 2 Main control unit
- 3 USB-C connector and cable
- 4 Metal strap holder ring

- Wet-electrode pad for electrical stimulation(thigh part)
- 6 Metal electrode socket
- 7 Metal dried-electrode for EMG measurement

# **Shin Band**



# **Charging Parts**





Installation

How to Wear and Charge

Device Control

exoRehab Electrical Stimulation Control

Installation

- \* Please read the instructions beforehand in order to use the product correctly and safely.
- 1 Install wet-electrode pads on the thigh band.
- Install wet-electrode pads on the shin band.
- 3 Connect the product with the tablet via wireless connection.

Please read the tablet user manual for further instructions for tablet use.



- Minimum Tablet Performance Required:
  - 1 Above or equal to Android OS 5.0/ iOS 12.1
  - 2 Greater or equal to 1280x800 display resolution

- Silicon body part is liable to damage by sharp metal object.
- While putting it on, the silicon belt is liable to rip if excessive force is applied.
- · If used near the high-voltage power cable, the device is liable to malfunction due to effect of electromagnetic wave.
- If the belt(all the metal dry-electrodes) is not pressed enough against the skin, precise detection of the motion and correct rehabilitation process cannot be done nor be achieved.

FS : Frimware Software FS version consist of 3 digits.

FS 1.0.0

Patch Number: UI/Strategic Modification for Bug Modification and User Convenience
Minor Number: Add and Improve Function that do not affect system stability

Major Number: Add and Improve Function that affect systems stability

CS : Control Software CS version consist of 3 digits.

CS 1.0.0

Patch Number: UI/Strategic Modification for Bug Modification and User Convenience

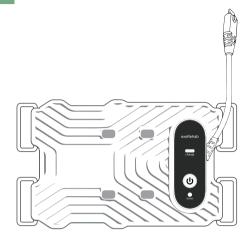
Minor Number: Add and Improve Function that do not affect system stability

...... Major Number: Add and Improve Function that affect systems stability

Please contact the customer service if you have any inquiry related to the product.

### How to Wear

# 1 How to wear Thigh Band



(X) Wet-electrode pads are disposable

- 1 Take the Thigh Band out from the box/case.
- 2 Take the wet-electrode\* pads(for Thigh Band) out from the box/case.

(To use soon after the surgery, use the fabric electrode cover to protect your surgical wound from the direct contact by metal electrode sockets.)



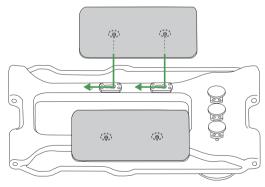


**Electrode Cover** 

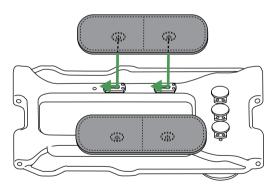
Thigh Band Wet-Electrode Pad

\* When using 1 person, it can be

reused after washing



How to install wet-electrodes on the band

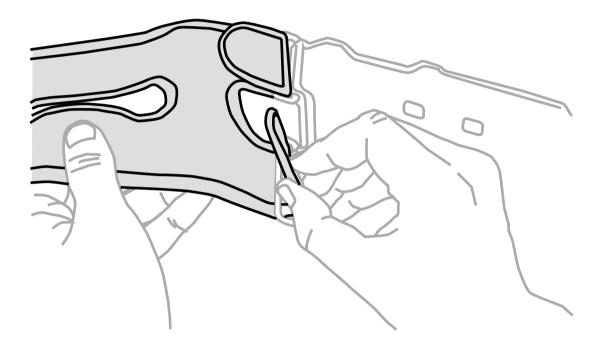


How to install fabric electrode cover

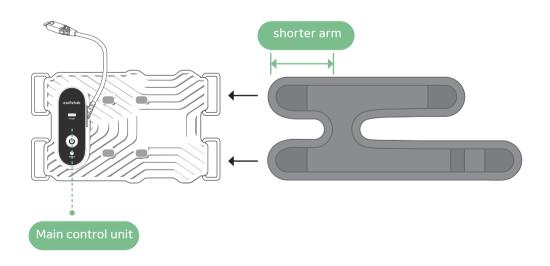
- 3 On a metal electrode socket back of the thigh band, place one of the fabric electrode cover's snap button and slide toward the arrow direction while keep pressing it toward the band.
- 4 Follow the same procedure for the remaining snap button.

<sup>\*</sup> Remove the cover vinyl from the surfaces of the wet-electrode pads.

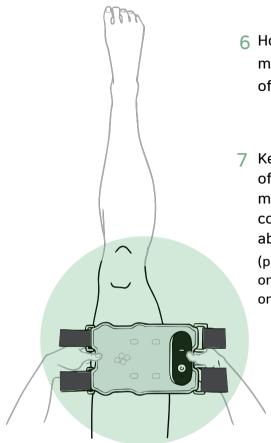




5 Place the Velcro strap to let the rough Velcro hooks face the ceiling and attach the shorter arm of the Velcro strap on the metal rings farther from the main control unit.

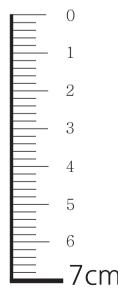


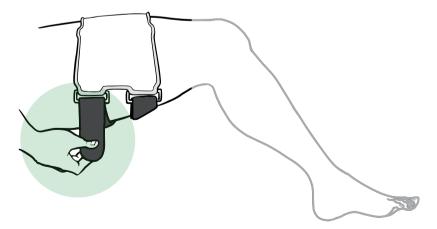




- 6 Hold the band with both hands while the main control unit is biased to the outer side of your affected leg and facing the ceiling.
- 7 Keep your leg straight and align the center of concave part of the thigh band with the middle line of your thigh. Then, place the concave part heading the knee on 7 cm above your knee cap.

(please refer to the ruler on bottom-rightcorner on this page. You may adjust the distance based on your leg)

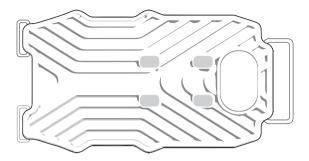




8 Use two Velcro straps of the device to wrap around the thigh with appropriate tension.

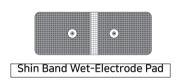
# 2 How to Wear Shin Band

1 Take the Shin Band(same side as the Thigh Band above) out from the box/case.



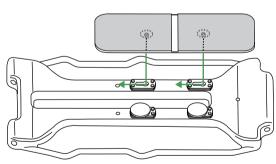
2 Take the two sponge sticks out from the box/case.

(To use soon after the surgery, use the fabric electrode cover to protect your surgical wound from the direct contact by metal electrode sockets.)

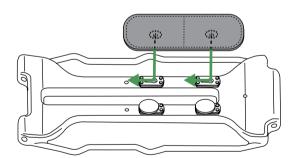




\* When using 1 person, it can be reused after washing



How to install wet-electrodes on the band



How to install fabric electrode cover

On two metal electrode sockets on the back of the shin band, place the snap button of the fabric electrode cover, place both snap buttons of the fabric electrode cover and slide toward the arrow direction while keep pressing it toward the band.

If you are using the wet electrode, remove the vinyl before use.

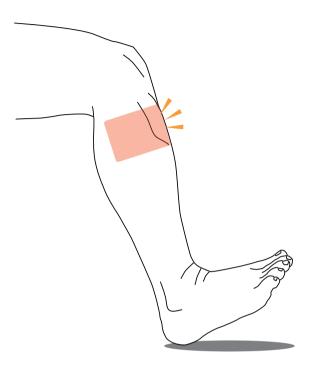


저주파 전기 자극 패드는 일회용입니다!

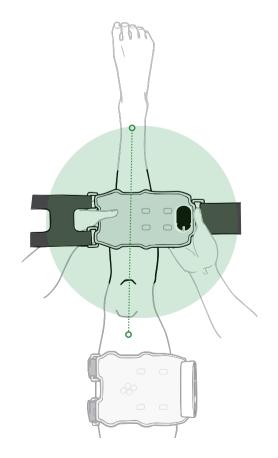
4 Lift your ankle and check the most bulging muscle area of your shin.

(about 5 cm below your knee cap)

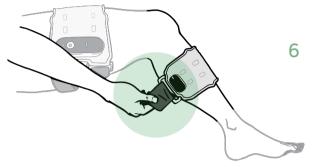
Place the wet electrode or fabric electrode cover on that area.



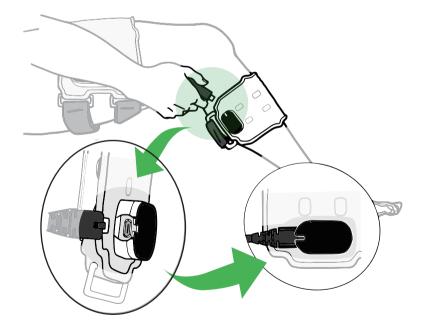
5 Align the center of concave part of the shin band with the center line of your shin bone



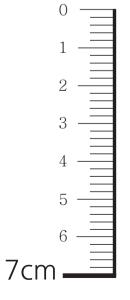




Use Velcro strap of the device to wrap around the shin with appropriate tension.



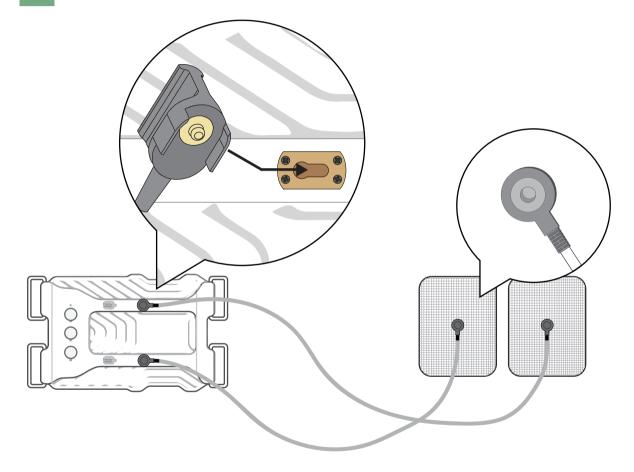
- 7 Hold the USB-C connector of the main control unit of the Thigh Band.
- 8 Plug the USB-C connector to the USB-C consent unit of Shin Band.



# How to use extension cable

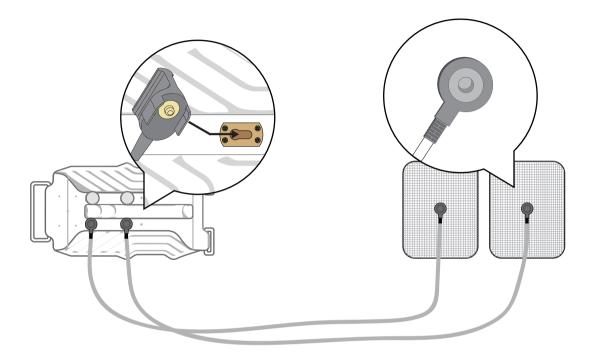
• Extension cable is used for electrical stimulation on body parts other than leg.

# Connecting the extension cable to the Thigh Band



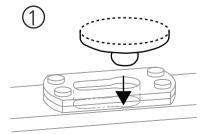
- 1 Plug snap-button-end of the extension cable on any upper row electrode sockets of the Thigh band. (please refer to the dotted circles①)
- Attach the wet-electrode to the other end of the extension cable.
- Plug the other snap-button-end of the extension cable on any lower row electrode sockets. (please refer to the dotted circles②)
- ⚠ Attach the wet-electrode to the other end of the extension cable.
- Attach the extended wet-electrode pads on the desired body part.

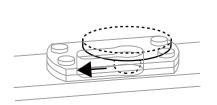
# 2 Connecting the extension cable to the Shin Band

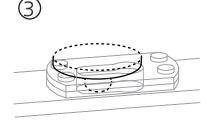


- 1 Plug snap-button-end of the extension cable on any empty electrode sockets of the Shin band (please refer to the dotted circles③)
- ? Attach the wet-electrode to the other end of the extension cable.
- 3 Plug snap-button-end of the extension cable on the remaining electrode socket.
- Attach the wet-electrode to the other end of the extension cable.
- 5 Attach the extended wet-electrode pads on the desired body part.

### \* Thigh/Shin Band and wet-electrode connection(magnified view)





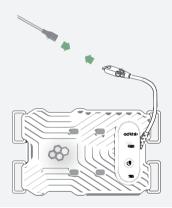


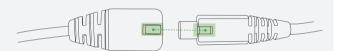
# 3 How to Charge

The battery of the product is reusable by recharging it.

Plug in the power cord to a consent where anyone can easily notice and plug out.

1 Connect the USB-C cable of the Thigh Band to the charge adapter.



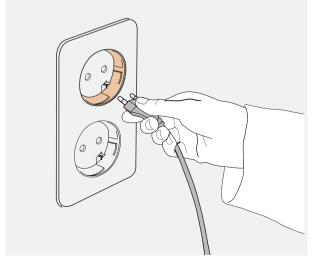


\* When connecting the USB-C cable of exoRehab with the charging adapter, please align the small bump of the USB-C cable with the groove of the charging adapter.

2 Connect the charge adapter and power cable.



3 Plug in the power cable to a consent.



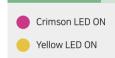
# Informs the battery remainder of the device to the user. Battery remainder 0~25% LED ON Battery remainder 26~50% Battery remainder 51~75% Battery remainder 76~100% Control Switch

- 1 Run/Stop Switch: Executes Run and Stop function of the device.
  - <sup>1</sup> Run: Pressing the switch while Charge LED is off will turn on the Charge LED and run the device.
  - <sup>2</sup> Stop: Pressing the switch while Charge LED is on will turn off the Charge LED and stop the device.



### **Status LED**

Informs the current device status to the user.



Functional error occurred. Please follow the instruction shown in the application.

Electrical stimulation is activating (one of each or both Bands are activating).

LED color while charging: White

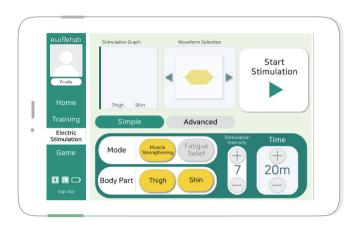
st For more information on battery level notification, please refer to page 25 of User's Manual.



- Always start from the low intensity and gradually increase the intensity to meet the user's comfort.
- Response to electrical stimulation intensity may vary by users, so one should control the device by oneself according to one's body condition.
- Great care is needed during high-intensity electrical stimulation operation.



# 1 Electrical Stimulation



### Simple mode Setting

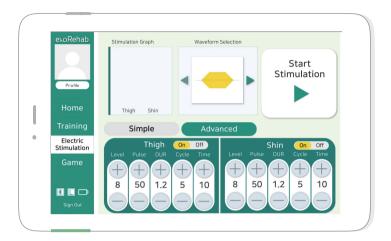
- 1 Select electrical stimulation type in 'Mode Selection'
- <sup>2</sup> Select electrical stimulation target body part(thigh/shin) in 'Part Selection'. (single/both parts selection available)
- 3 Adjust electrical stimulation intensity by pressing Up(+)/Down(-) Button.
- 4 After the settings, press 'Start' button to initiate the electrical stimulation
- \* Right after pressing the 'Start' button, it automatically becomes 'Stop' button.

  Press 'Stop' button to terminate the electrical stimulation.
- \* Graph visualizes real-time electrical stimulation waveform.
- \* Electrical stimulation lasts 20 minutes per one session.
- \* 'Stimulation Intensity' proportionally changes the Level. Correspondence is shown below.

Stimulation Intensity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Level	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30

27





### Advanced Mode Setting

- \* Advanced Type Setting consists of 'Channel' and 5 different setting variables(Level, Pulse, Duration, Cycle, Time) on the control panel for fine adjustment of electrical stimulation.
- 1 Select preset waveform of electrical stimulation by pressing Left(◄)/Right(▶) triangle-shaped arrow on the 'Waveform Selection'.
- 2 Choose body part on the 'Channel'.(single/both parts available)
- 3 Next, adjust Level, Pulse, Duration, Cycle, and Time of each channel by pressing Plus(+)/Minus(-) button for more detailed configuration.

•	Level:	Initial value	1	Range	1~30
•	Pulse(Hz):	Initial value	20	Range	10~70
•	Duration(ms):	Initial value	0.4	Range	0.2 ~ 1.0
•	Cycle:	Initial value	2	Range	2~12
•	Time(min):	Initial value	10	Range	1~30

- 4 After finishing the setting, press 'Start' button to initiate the electrical stimulation.
- \* Right after pressing the 'Start' button, it automatically becomes 'Stop' button.

  Press 'Stop' button to terminate the electrical stimulation.
- \* Graph visualizes real-time electrical stimulation waveform.



# Management and Precautions

Product Care and Storage

Customer Service and Battery Replacement

Product Specification

Warranty

### **Product Care**

- 1 Always turn off the main power switch and unplug the USB-C plug before cleaning the device.
- While cleaning or storing the device, do not apply excessive force or drop the device(it causes malfunction and reduced product durability).
- 3 Wipe the area of the parts with clean and dried towel where skin makes direct contact with.
- 4 Clean the metal EMG electrodes and index electrodes with distilled sterilized alcohol. Do NOT use chemicals such as alcohol, benzene, and thinner on non-metal parts(it causes damage on the device).
- 5 Completely dry the device after cleaning.

# **Product Storage**

- 1 Keep the device on ventilative indoor under appropriate temperature(-25℃~70℃).
- 2 Turn off the main power switch and unplug the USB-C plug after use.
- 3 Place the parts such as pads and belts properly inside the case.
- 4 Do NOT bend or strain the cord and cable.
- 5 Clean and completely dry the device after use.
- 6 Avoid direct sun ray on the device or the place where is kept.
- 7 Prevent children from reaching the device.



# **Before Requesting Customer Service**

If the product is out of order, please check the lists below before the service request.

# **Trouble Diagnosis and Fix**

- 1 Power does not turn on when pushed the power button.
  - Please check the battery remainder
- 2 Electrical Stimulation does not operate.
  - Please check if yellow LED ignites on the main control unit of the thigh band when electrical > stimulation is activated.
  - · Please check if the wet-electrode electrical stimulation pads are correctly connected to the sockets.
  - If yellow LED does NOT ignite, contact the customer service.
  - If yellow LED ignites, but the electrical stimulation does not activate,
    - → Turn off the tablet and the exoRehab thigh band main control unit.
    - → Then, turn on the tablet and exoRehab application.
    - → Log in
    - → Move to Electrical Stimulation Tab of the application and try the electrical stimulation again.
- 3 Thigh band makes vibrating noise.
  - It is a normal operating noise due to low frequency electrical stimulation.
- 4 It stings during the electrical stimulation.
  - Fully attach the wet-electrode electrical stimulation pads to the skin.
  - Check if any contaminant is on the pad and clean it with dried towel.
  - While using wet tissue, check if it is moist enough.
  - Check for the correct connection between USB-C cable and shin band housing consent.



# Malfunctioning

- If detected any other malfunction of the device, immediately stop the operation, turn of the main power, and unplug the USB-C plug. Contact customer service to explain the malfunction and request repair.
- 2 Request the repair service to our customer service.
- 3 EXOSYSTEMS warrants 1-year customer service in effect from the purchase date for the product used under normal operating condition stated on the user manual.

# **Battery Lifecycle**

1 After 1 years of usage, EXOSYSTEMS will replace the used battery with new battery. Battery replacement is onerous. (device cannot be operated with faulty battery. Use after replacement)

\*\* Replacement is executed by manufacturer. Replacement by unskilled personnel would cause harmful outcome(excessive heat, explosion, or fire).



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Warranty covers 1 year from the purchase date, and fault by careless use is covered by paid service regardless of warranty. Confirmation by the place of purchase from is required on the warranty document.

# Specification

Model Name	exoRehab-k
Product Name	Electric Stimulator
Rated Voltage	3.7 Vd.c. Li-Po/ 1200 mAh Input : (100-240) V~, (50/60) Hz, (0.5-0.25) A Output : 5 Vd.c., 3 A, 15 W
	※ Actual battery capacity may differ to the provided product specification.
Operating	While in use Temperature(+5℃~40℃), Humidity(15%~90%)
Temperature	Not in use Temperature(-25°C~70°C), Humidity(15%~90%)
Atmospheric Pres- sure	While in use Not in use 700~1060 hPa
Classification	Internal Power Supply Type, Continuous Operation
Serial Number	
Certified Module Serial Number	
BLE	Frequency: 2402 ~ 2480 MHz, EIRP: 1.69dBm  ** Embedded wireless communicator is not for emergency use due to radiowave crosstalk
Size	Thigh Band: 280mm x 165mm Shin Band: 250mm x 85mm
Weight	2800 g ± 10%
	* Actual weight may differ to the provided product specification.
Manufacture Permis- sion	
Item Approval	
Output	Maximum output voltage: 35Vp-p $\pm$ 20% , Maximum output current(RMS): 27mA $\pm$ 20% Frequency: 10~70Hz $\pm$ 10% , Duration:0.2~1.0ms $\pm$ 10%
Manufacturer	EXOSYSTEMS Inc.
Manufacturing Company	EXOSYSTEMS Inc.

# **Product Warranty**

### Provided product is guaranteed as below.

Model	exoRehab-k							
Manufacture Number								
Warranty Period	Year	Month	Date	~	Year	Month	Date	
Place of								

- Purchase
- 1 EXOSYSTEMS warrants the benefit for the valid claims that accord with the provided policy.
- If any defect was found during 'Warranty Period', submit the product and this warranty document for customer service.
  - · Warranty is NOT valid if the fields above are left unwritten(in case of blank field, contact the place of purchase immediately).
  - This document will NOT be reissued. Please keep it safe.
  - This product is being released after strict quality inspection.
- 3 EXOSYSTEMS warrants any fault during normal use within 1 years. However, intentional fault made by customer(due to repair or remodel by unauthorized technician or user) is not covered.
- Submit the product and warranty to the place of purchase to receive customer service within warranty period.
  - % Only paid service is available after warranty period.
- 5 In case of moving to other region, consult the previous place of purchase.
- 6 For cases listed below, paid service is provided regardless of warranty period remainder.
  - Fault or damage by, but not limited to, abnormal use, carelessness, repair and remodel.
  - Fault or damage while, but not limited to, moving or falling.
  - Fault or damage during the use that was not under normal operation environment.
  - · Fault or damage by associating with other products.
  - Disposable items.
  - Fault or damage by any natural disasters such as fire, earthquake, flood, lightning, pollution or abnormal voltage failure.
  - · Fault or damage by inflow of exterior matter(soft drink, coffee, etc.).
  - Absence of the warranty document.
  - · Absence or unauthorized change of warranty period, user name, and place of purchase on the warranty document.
- 7 Please keep this document for it is required for customer service.
- B This device can be operated in at least one Member State without infringing applicable requirements on the use of radio spectrum.

# **MEMO**

EXOS'	YSTEMS	exoRehab

# **EXOSYSTEMS**

### EXOSYSTEMS Inc.



#907, LH Business Growth Center, 54, Changeop-ro Sujeong-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

EC REP

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