1. **Manufacturer**
   A. **Legal Manufacturer's Name**
   WAVE COMPANY Ltd.

   B. **Legal Manufacturer's Address**
   B-#716 DMC Hi-Tech Industry Center, 330, Seongam-ro, Mapo-gu, Seoul, Korea
   Postcode: 03920

   C. **Storage and Manufacturing**
   B-#716 DMC Hi-Tech Industry Center, 330, Seongam-ro, Mapo-gu, Seoul, Korea
   Postcode: 03920

   D. **Tel number**
   +82-70-4044-7331

   E. **Regulatory representative**
   Mr. Sang Chul Lee

   F. **Certificates of Manufacturer**
   i. Business registration

   G. **Company History**
   2010 Establishment of Odoroso Co., Ltd.
   2017 Company name changed to Wave Company Co., Ltd.
   2015 Started development of adhesive silicone coated sportswear
   2017 Started development of conductive silicone coated sportswear
   2018 Official launch of adhesive silicone coated sportswear (Wavewear)
   2021 Selected as Mass Challenge finalist
   2022 Selected for attracting investment from Stadia VC

2. **Product Name**
   ElecSuit: e-Haptic Suit for EMS Workout & VR Games

3. **Mechanism**
   A low-frequency electrical stimulator sends microcurrents in a specific pattern into the body through electrodes attached to the skin for providing the user with a virtual sense of touch.

4. **Product List**
   i. Elec Suit
   ii. Controller
   - 2ch e-stim Device
   - Cables

   iii. Software

5. **Elec Suit**
   A. **Product Name**
   Elec Suit

B. Material Brand Name

Elecsil A
Elecsil B

C. Model List

No	Brand name	Color	Type	Model Name	Model Code
1	Elec Suit	Black	Top	Standard Sleeveless Top	ES111
2			Bottom	Standard Shorts	ES211
3			Top	PRO Short Sleeve Top	ES112
4			Bottom	PRO Shorts	ES212

D. Picture of the product

Blue indicates the location of the electrode, which is actually black
Front Side(Left), Back Side(Right)

No	Model Image
1	
2	
3	

4	

E. Indication method of Model Code.

ES 2 1 3 L

① ②③④⑤

① : Brand name
1. Elec Suit (ES)

② : Type
1. Top
2. Bottom

③ : Color
1. Black

④ : Model
1. 2021 Standard
2. 2022 PRO

⑤ : Size
XS. XSmall
S. Small
M. Medium
L. Large
XL. Xlarge
XXL. XXlarge

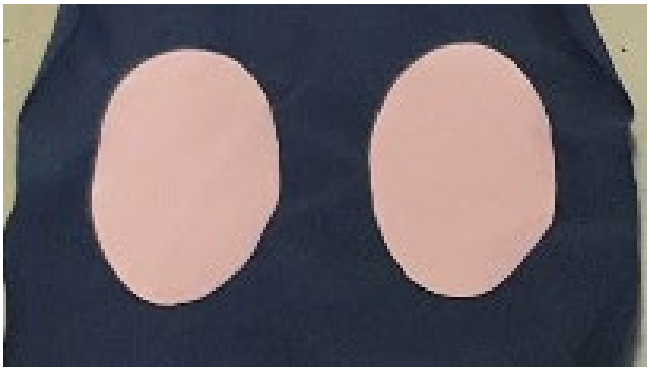
F. Electrode Structure of Elec Suit

i. Fabric

- Spandex Fabric
- Elastic in all directions

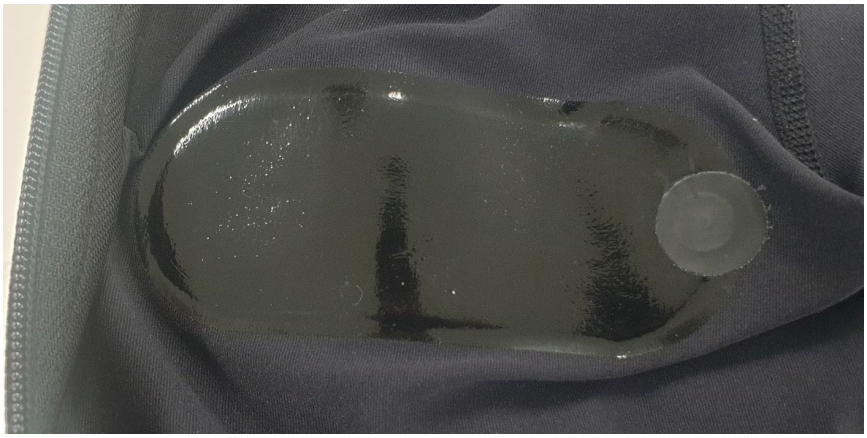
ii. Elecsil A

- Coating Thickness: less than 0.3mm
- Coating on Fabric
- Stretchable and Low Resistance
- Performs the function of reducing resistance for the coated electrode



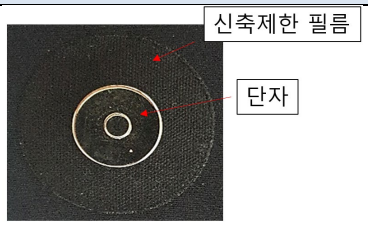
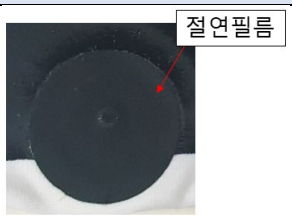
iii. Elecsil B (Black)

- Coating Thickness: less than 0.3mm
- Coating on Elecsil A, contacting on skin
- Stretchable, Adhesiveness and Harmless to human body
- Pass cytotoxicity test(ISO 10993-5), Skin irritation, Skin sensitization(ISO 10993-10)
- Performs the function of electrical conduction between coated electrode and skin



iv. Parts

No.	Part name	Description
1	Magnetic button	Electrically connects the device and conductive silicon by using magnetic force of button.
2	Non stretchable film	It removes elastic to prevent buttons from detaching.
3	Insulating film	An insulating film is attached to the opposite side of the magnetic button that touches the skin for preventing unwanted electric conduction to skin.

Front	Back
	

G. Usage

i. Electrical Stimulation for Haptic

Realization of virtual tactile sensation through electrical stimulation

ii. EMS training

During exercise, electrical stimulation is provided to the muscles to maximize contraction and relaxation, allowing for high-intensity exercise in a short period of time.

H. Performance

i. Elecsil A

7 * 7 cm size coating sample. Initial distance: 5cm
Strain to 10% or 100% and then after waiting 2 sec,
release to 0% and then waiting 2 sec. during repeating this cycle, measuring resistance

- 10% 100 times strain-release (Unit : Ω)

  Initial Resistance 0.028Ω

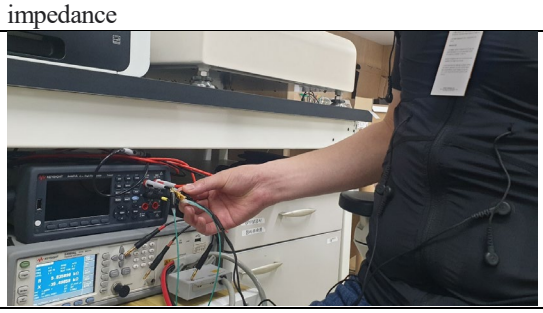
	1 time 100%	1 time 0%	50 times 100%	50 times 0%
Immediately after strain or release	0.105	0.077	0.403	0.239
After waiting 2 sec	0.096	0.098	0.363	0.201

- 100% 50 times strain-release (Unit: Ω)

  Initial Resistance 0.028Ω

	1 time 100%	1 time 0%	50 times 100%	50 times 0%
Immediately after strain or release	8.036	0.807	26.806	0.889
After waiting 2 sec	7.796	0.657	19.843	0.741

ii. Elecsil B

stretch	impedance
	

- Stretchability

  Elecsil B on Elecsil A

  There is no damage even when pulled at 100% strain.

- Measuring Impedance

  Wearing the PRO top and then measureing impedance to a pair of abdominal electrodes

  Impedance, 100Hz (Unit: Ω)

Contact on original skin	Contact on wet skin
5.8k	3.2k

- Washing durability

  No damage for an appearance after 30 times machine wash

Impedance for skin contact (unit: Ω)

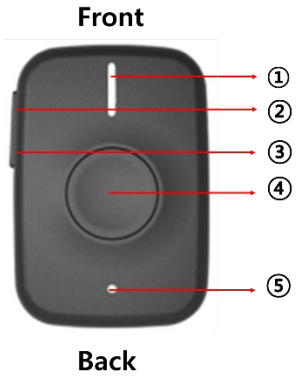
Before wash	After wash
5.28k	5.8k

6. Controller

A. Appearance

i. 2ch e-stim Device

- Description of an appearance

Top	Front	Back
		

No.	Name	Description
①	RGB LED	Displays the status of the device. Color can be controlled during wireless control.
②	+ Button	Above the side button Increases the voltage level in manual mode.
③	− Button	Below the side button Lowers the voltage level in manual mode. Press and hold the + and − buttons together to enter Bluetooth pairing mode.
④	Power Button	Control power on/off by pressing and holding for about 2 seconds. In manual mode, you can change the electrical stimulation channel by quickly pressing and releasing the button when the voltage intensity is one level or higher.
⑤	Battery indicator LED	Lights up in red when the battery is charging. When fully charged, it lights up in green.
⑥	Electrical stimulation AUX Socket	AUX jack (F) type terminal that outputs electrical stimulation Based on the TOP, there is 1 channel on the left and 2 channels on the right.

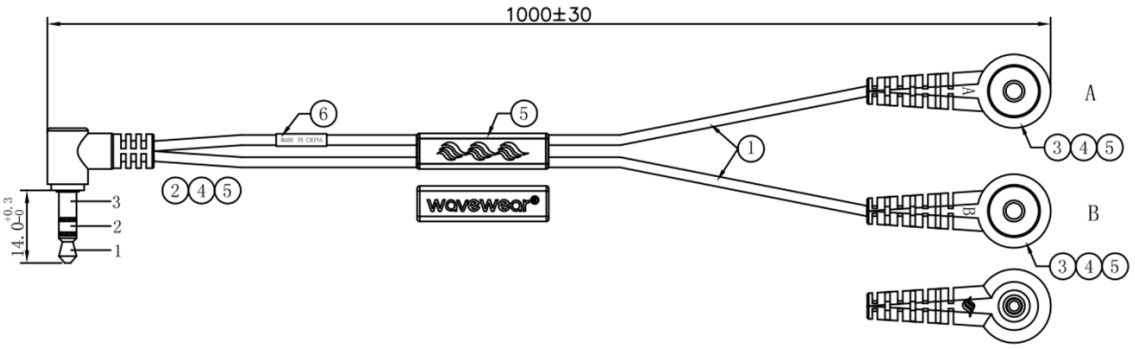
⑦	C type charging terminal	Terminal area for charging

- RGB LED

No.	Color	Description
1	White	The power is turned on and entered manual mode
2	Green flicker once	Press the side button to display voltage level control
3	Purple flicker once	Quickly press and release the power button to display the electrical stimulation channel change
4	Blue flicker once	Bluetooth pairing status
5	Blue green flicker once	Bluetooth connected status

ii. Cables

- Plug the AUX jack into the electrical stimulation AUX terminal
- Connect the magnetic terminal on the other side to the ElecSuit.



B. specification

i. Basic specification

1. Model Name	2ch MV2 (Firmware: WaveEnhanced_v3.0 0516)
2. Rated voltage	3.7Vdc
3. Power	Li-Po Battery, 240mAh
4. Size	about 45 * 65 * 14 mm (D*L*H)
5. Weight	about 26g
6. Case material	Polycarbonate
7. Usable time	Recommended within 15 minutes for one-time use
8. Channels	2 channels (4 pads)
9. Maximum voltage (500Ω)	about 55.5V (Based on manual mode)
10. Bluetooth	BLE, 4 multi-point linkages possible
11. minimum command interval	More than 100ms
12. Mode	1) Manual mode EMS output of power by pressing buttons 2) Bluetooth mode - EMS mode (Repeatedly output of power) - Haptic mode(Cycle 1 output of power)

ii. Manual mode specification

1. Stimulation Level	Lv. 1~15
2. Width of pulse	200 us 2 pulses biphasic wave
3. Number of pulses per pick	1.25kHz interval biphasic wave 3 pairs pulse
4. Frequency	about 30 Hz
5. Cycle Width	3s
6. Cycle interval	1s
7. Control of channel	Channel 1 and 2 can be changed by clicking the power button
8. Wave Slope	Gradually increase voltage intensity (at the beginning of cycle)

- Manual mode stimulation intensity at each stage

Only 1ch 500Ω load (no connected 2ch)

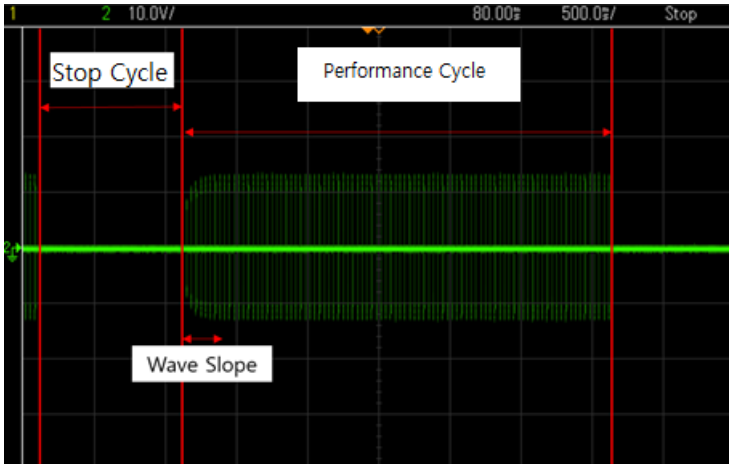
1ch voltage

Lv	Voltage(V)	Lv	Voltage(V)	Lv	Voltage(V)
1	12.5	6	28.1	11	44.6
2	14.9	7	31.4	12	47.4
3	18.1	8	35.0	13	50.3
4	22.1	9	38.2	14	52.7
5	25.3	10	41	15	55.5

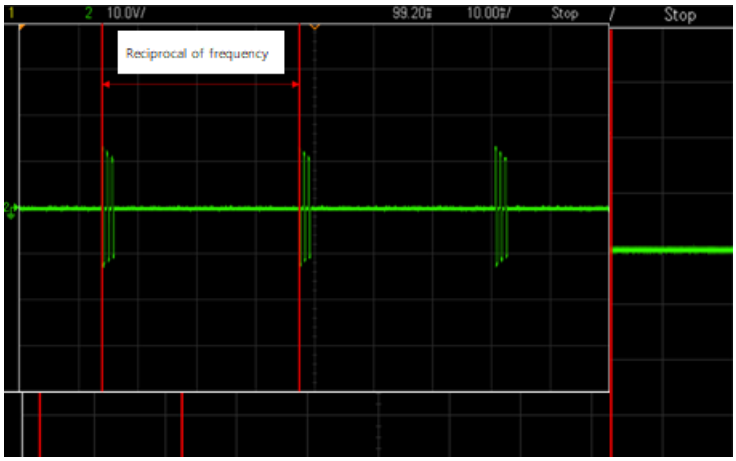
iii. Control elements of Bluetooth mode

1. Width of pulse	100, 200, 400 us
2. Number of pulses per pick	1~5 pairs
3. Frequency	1~500Hz(Width of pulse 100us), 1~250Hz(Width of pulse 200us) 1~125Hz(Width of pulse 400us)
4. Cycle Width	1.0~10.0s, 0.1s unit control Infinite operation possible without stopping cycle
5. Cycle interval	1.0~10.0s, 0.1s unit control (EMS mode)
6. Control of channel	Controllable with 6 patterns Controlled by pair of channels 1 and 2 (2 types) PAD 1,2,3,4 independent stimulation (4 types)
7. Wave Slope	Tilt adjustment at the beginning of cycle
8. stimulation intensity	1~1971
9. RGB	RGB LED in the Device R 0~255, G 0~255, B 0~255

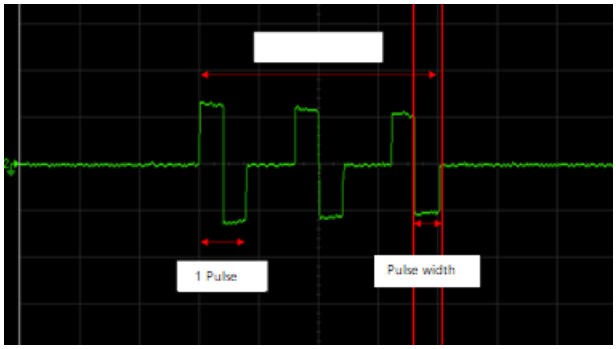
- Control elements picture
  Overall view



Zoom

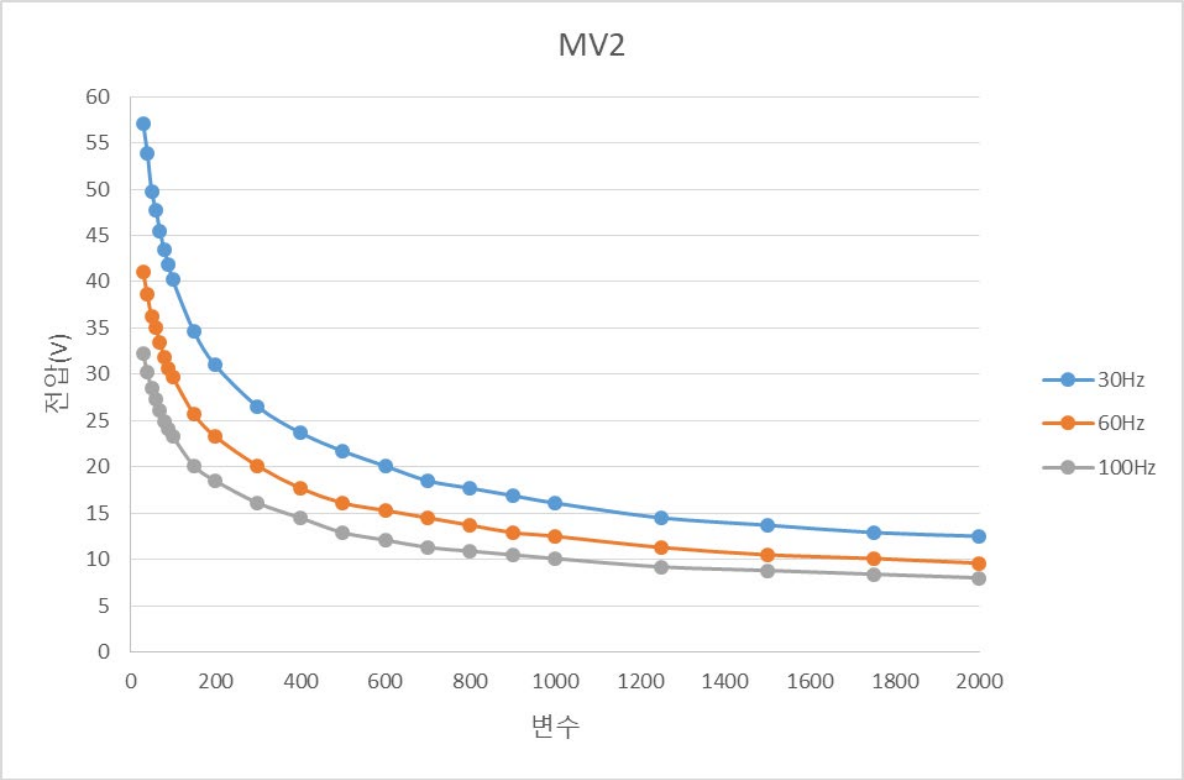


Zoom2



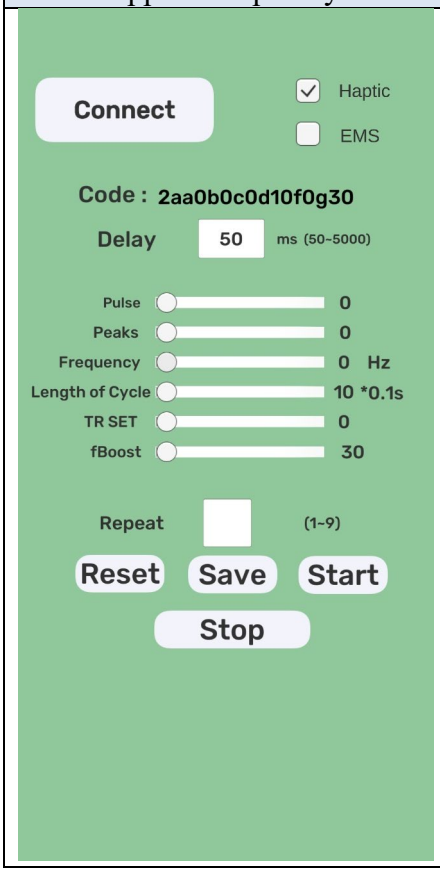
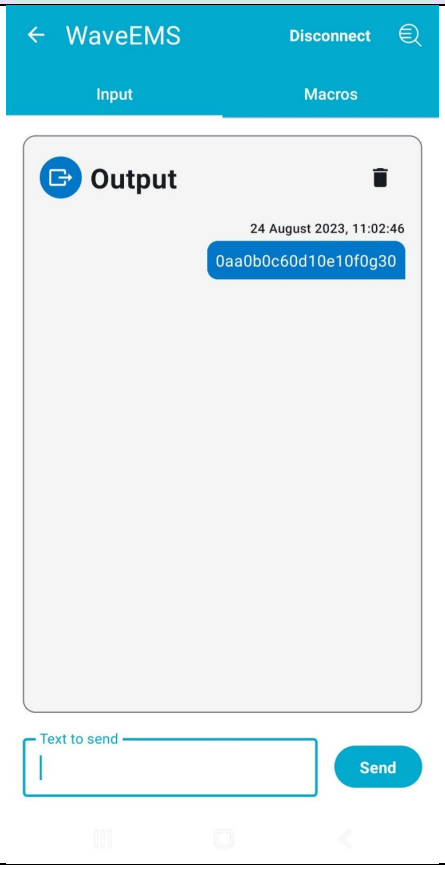
- Bluetooth mode electrical stimulation intensity
  Voltage intensity varies depending on the number of picks, pulse width, and frequency.
  Fix the number of picks to 3 and pulse width to 200us and adjust only the frequency and voltage intensity variables.
  Voltage intensity based on load 500Ω.

	30Hz	60Hz	100Hz
Minimum Voltage(V)	12.5	9.6	8
Maximum Voltage(V)	57.1	41	32.2


MV2
전압(V)
60
55
50
45
40
35
30
25
20
15
10
5
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
변수
30Hz
60Hz
100Hz

7. Software

- Wireless control using command control method

Test app developed by ourselves	nRF Toolbox
	

8. Cautions

FCC Compliance Statement
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Interference Statement
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

FCC Caution
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 5 mm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.